

DOTWise 4.5

**MicroStation, InRoads & ProjectWise for Survey, Design,
Real Estate & Traffic Plans**

12/4/2020
State of Indiana
INDOT CAD Support

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1. Welcome to INDOTWise 4.5

A Message from CAD Support

Welcome to DOTWise 4.5, our fifth major release of a MicroStation and InRoads SS4 workspace, and our first major rewrite of the ProjectWise and MicroStation chapters since the 2.0 version. While much of what's in this document hasn't changed, care has been given to make sure that all documentation and imagery is current, offering clearer and more up to date information. Also, moving to SS4 InRoads means that we're moving forward with OpenRoads technology which lays the future groundwork for upcoming Bentley releases and is covered as it pertains to the INDOT Plans Production process in the latter chapters of this document.

In addition to the latest release of the MicroStation and InRoads workspace, we have migrated our ProjectWise infrastructure from an on-premise system to a system hosted on the cloud by Bentley Systems. In order to facilitate the migration, we have created a new INDOTWise datasource to replace the former DOTWise datasource. To account for this in this document, we have updated the associated documentation and imagery as necessary.

Now fully vested in the InRoads SS4 environment, and the OpenRoads technology it contains, this document is intended to roll up all the enhancements to the CAD Workspace, ProjectWise and InRoads suites into a single document. While this document won't show every new item, we will hit on the major productivity enhancements and procedural changes. Please keep in mind that this document is not a replacement for Fundamentals training on each of these products, and can be supplemented with the use of each products online Help file.

We want to impart to you **why** things are, as much as **how** certain tools work or what buttons to click to perform a particular operation.

The focus of this document is to answer the question, "What has changed in CAD and where can I find all the needed information to take advantage of those changes?" The answer is simple: Right here in this document. Note that the focus is on the how these tools work and a rough guideline on how they should look. As always, Users should consult the current Indiana Design Manual for requirements related to the content and presentation of INDOT plans.

If for any reason you believe that the information provided in this document is not accurate or clearly explained, please do not hesitate to let us know. We will make every effort to make it right.

Thanks,

INDOT CAD Support

2. INDOTWise 4.5

INDOT has internally standardized on the use ProjectWise for all CAD management and file storage needs, and has expanded our system to include a number of other agency disciplines. This chapter will cover how to get access to the system, the folder layout, per project security, and general usage.

2.1 Requesting ProjectWise Access via ITAP (INDOT Technical Application Pathway)

Enrolling for ProjectWise requires going through the INDOT Technical Applications Pathway (more commonly known as ITAP), which is how it will be referred to throughout the rest of the document. The following sections will cover getting into ITAP, enrolling for the INDOT ProjectWise application with the appropriate roles, and how to request additional roles at a later time.

2.1-1 Getting to ITAP

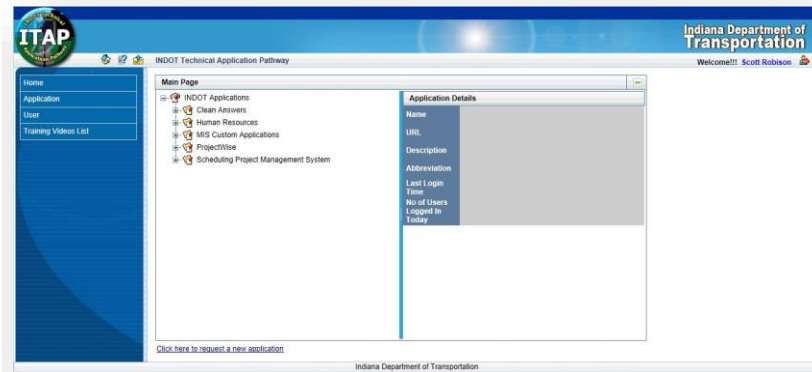
You can access ITAP via the INDOT Intranet at <http://intranet.indot.state.in.us/> or directly at <http://itap.indot.in.gov/>. Going through the intranet, you can find the link for ITAP under the Popular Applications heading shown below. This is located toward the center of the page.



ITAP Link on the Intranet Homepage

2.1-2 ITAP Overview:

- The ITAP Main Page provides a list of a user's approved applications with application details, a link to request access to additional INDOT applications, and a link to request additional roles for some applications. (Click the Help icon at top left of page for additional instructions).
- If you have already used ITAP in the past and enrolled or logged in for access to other applications they will show on your main page when you click the ITAP link. It should look very similar to this screen.



The ITAP Main Page

2.1-3 Request a new ProjectWise Account

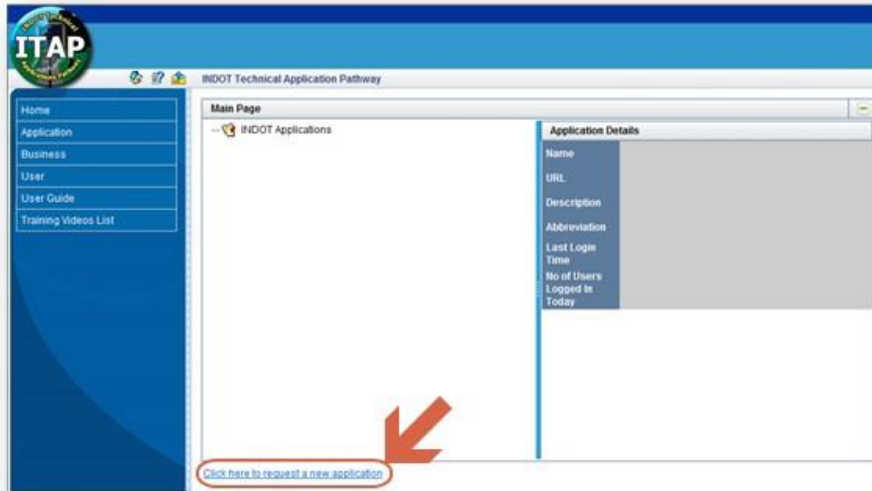
Once in ITAP, the following steps can be used to request an account:

1. A User may request access to a new INDOT application from the ITAP Menu and from the ITAP Home Page itself.
 - 1.1. Option #1 -To request a new application from the ITAP Menu, select Application, and then Request New Application.



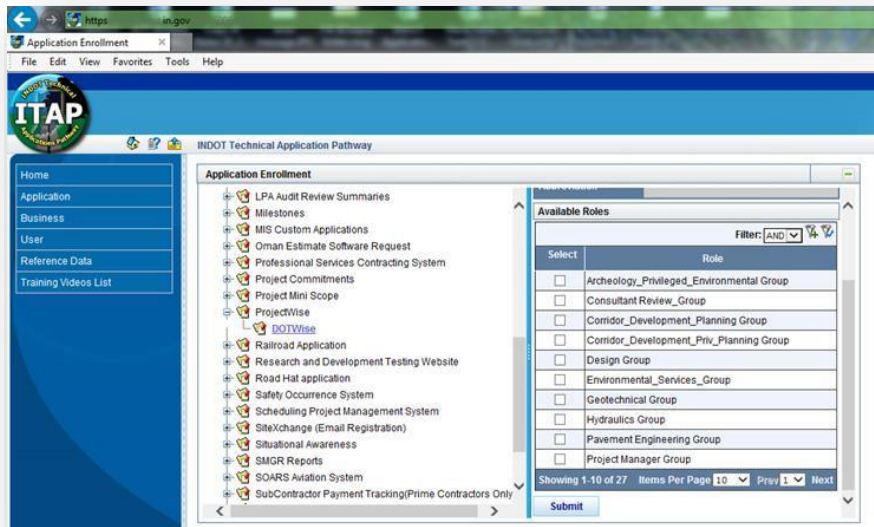
Request New Application

- 1.2. Option #2-To request a new application from the ITAP Home Page, click on the link “Click here to request access to new application”.



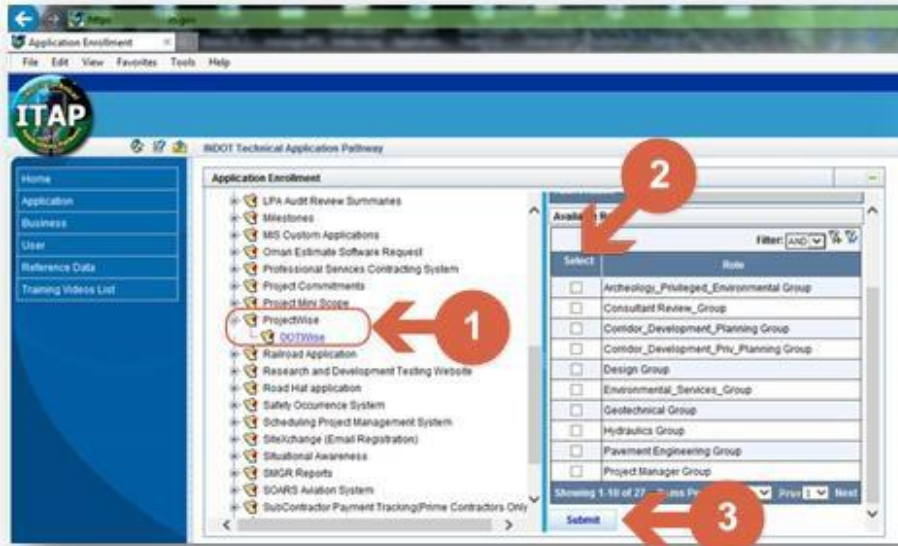
Request New Application

2. Selecting Request New Application from the ITAP Menu or the link “Click here to request access to new application” from the ITAP Home Page will display the Application Enrollment panel.



Application Enrollment

3. In the Application Enrollment panel, select the ProjectWise entry, followed by the DOTWise listing underneath it from the left side of the panel. Application Details and Available Roles (if applicable) will be displayed on the right side of the Application Enrollment panel.



DOTWise Application Enrollment

4. Select the applicable roles for your current position. It is possible to have more than one role, but in many cases your primary work assignment will cover your ProjectWise needs. ***Please also keep in mind that when enrolling in the INDOT ProjectWise system, all INDOT users have read only access to all other files in the system. There is no need to request a role for the sole purpose of reading the files. A role should only be selected for a discipline where you will need to actively edit documents.***
5. To complete the application enrollment, select the Submit button on the bottom of the right hand panel.

6. If the submission was successful, the message below displays. Click on the OK button.



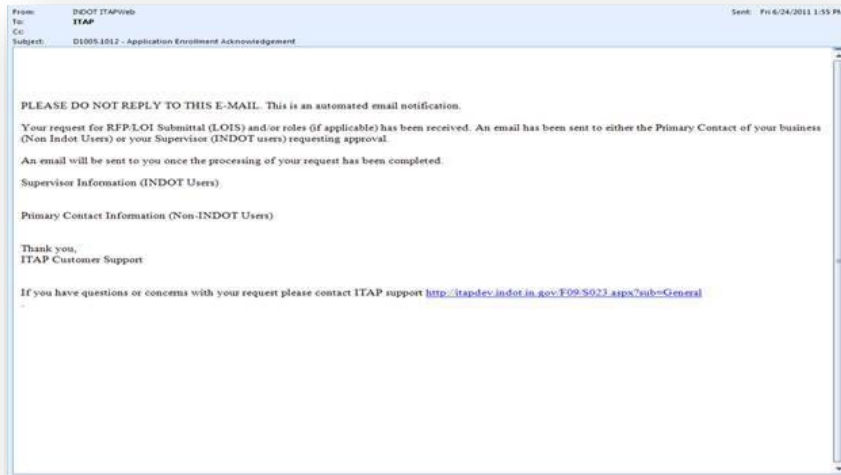
Successful Request

7. If your account already has a pending request for the application, you'll receive the following message. Select OK to continue. This indicates that a request is currently outstanding and awaiting additional input.



Pending Request

Once the request has been completed, you will receive an email with a recap of what has been requested. In addition to this information, it will also contain the name of the business administrator responsible for approving the next step in the process.



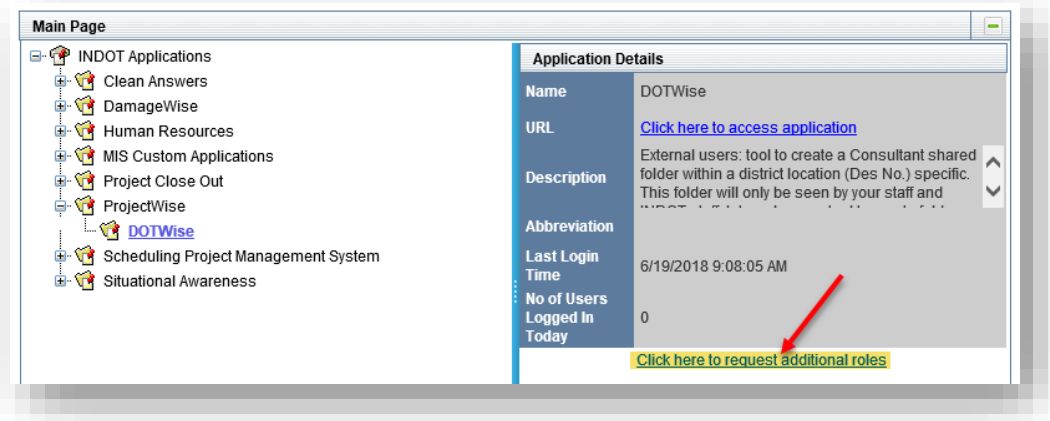
Request Acknowledgement

Note: INDOT CAD Support acts on account requests in the order we receive them, normally in 1 business day. For internal users, your request will first need to be approved by your immediate supervisor. If you do not receive a timely response to your account request, please contact indotcadsupport@indot.in.gov and we can provide the name of the person who received your request. Please keep in mind however, we cannot circumvent the approval process.

Upon approval of the application enrollment, two emails will be received. First will be an automated email from the ITAP system stating that approval has been granted to the application. The second email in most cases will be a confirmation from the INDOT CAD Support staff with relevant information including information on getting the software installed for the INDOT ProjectWise system.

2.1-4 Request Additional Roles

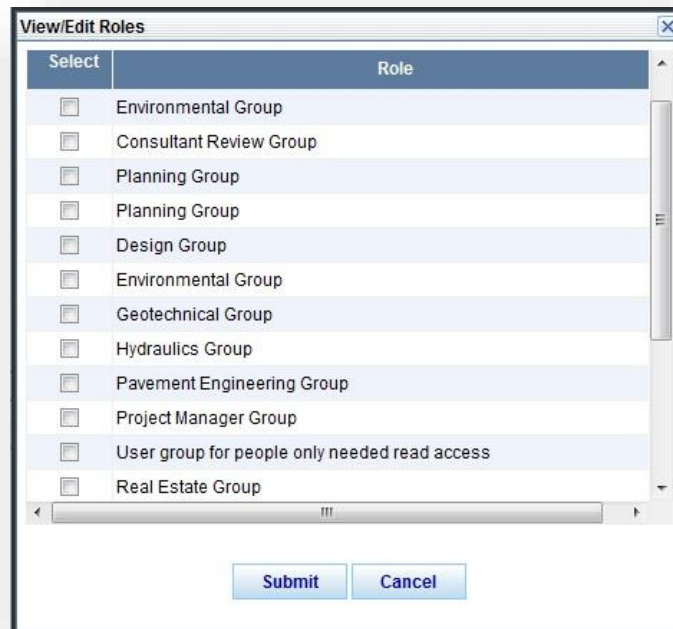
To request an additional role(s) for one of your approved applications, click on the link, “[Click here to request additional roles](#)” in the Application Details panel to display the View/Edit Roles panel. You may be changing groups or need access temporarily to work on a project. This will require the same approval process as when initial enrollment occurs.



Requesting Additional Roles

In the View/Edit Roles panel, to request a Role, click on the Checkbox under Select next to the Role name. A checkmark that is grayed out indicates that that particular role is already assigned.

Click on the Submit button to submit the request or click Cancel to return to the Main Page panel.

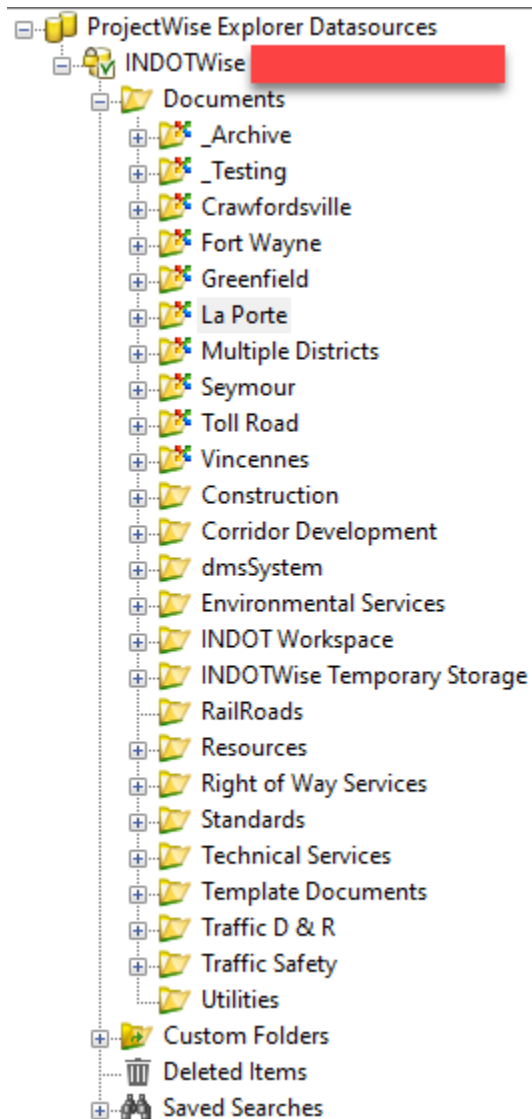


Requesting Additional Roles

2.2 ProjectWise Folder Structure

2.2-1 Overview:

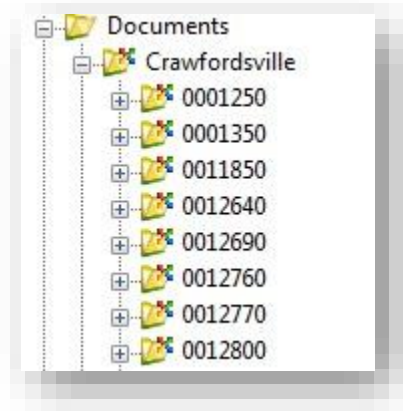
To maintain standardization, avoid duplication, and provide a better workflow, a Location: Designation Number (abbreviation Des. No. will be used throughout remainder of document) based project structure currently best suits INDOT's workflow. As shown in the image below, when the Documents is expanded, there will be a listing of all the District locations, as well as other folders that will be discussed later.



The INDOT ProjectWise Root Folder Structure

2.2-2 Project folders

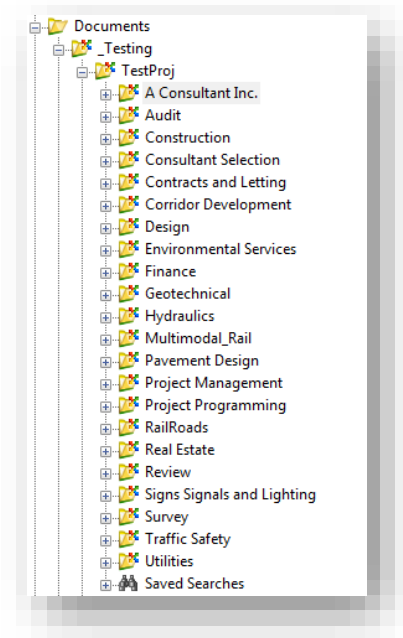
Expanding any district folder will display a list of any Des. No. that has been requested under that location. The route number and/or description will be displayed in the description field.



District w/Des. No.

Each group/discipline will have their folder structure directly under the District\Des. No. These structures are created as needed via the DOTWise Project Creator.

In the following illustration, a Project containing all currently included disciplines is shown. Depending on what stage of the project workflow you're currently in, it's possible that very few of these folders will exist at a given time, and will be added later in the project development process.



Project w/Disciplines

2.2-3 Other folders (Non-District Folders):

Corridor Development – This group’s data is stored in this location prior to being associated to a Des. No. A corridor development folder also exists under a Lead Des. No when the data is associated to a project.

Construction – This location is for the Construction and Construction Management groups to perform non des processes.

Environmental Services – In addition to the Environmental Services group folder under the Location: Des. No., there is also this folder which will contain all Non-Des. No. projects that are exclusive to Environmental Services.

INDOT Workspace – Location of the new Managed Workspace files that used to be located on the X: drive. This also includes the location of InRoads resource files such as the XIN, Drafting Notes, and cell libraries. Unless specifically directed, resources from this folder should not be used.

INDOTWise Temporary Storage – Data in the folder has been imported into ProjectWise, but has not yet been moved to the appropriate project location. This folder is not visible unless your discipline has data within it.

RailRoads – Location of in-process RailRoad files to be shared amongst the group prior to placing in the Des No. project related folder.

Resources – This folder takes the place of the previous Common folder. All groups will have their own folder for documents which pertain to their group’s operation. The CAD Support group has also created a Design Information folder containing informational documents (formerly DSInfo).

Right of Way Services – This folder contains the Right of Way Excess ROW Sales information.

Roadway Services/Traffic – This folder contains Roadway Services/Traffic data that does not apply to a Des. No.

Standards – The Standards group folder is directly under the Documents folder due to their differing workflow.

Technical Services – This folder contains Technical Services/Traffic project data.

Template Documents – Contains INDOT specific document templates and seed files. These are used throughout the document creation process as needed. Specific procedures for using these documents can be found throughout this book.

Traffic Safety – This group’s data is stored in this location prior to being associated to a Des. No. A Corridor Development folder also exists under a Lead Des. No. when the data is associated to a project.

Utilities – Location of in-process Utility files to be shared amongst the group prior to placing in the Des. No. project related folder.

2.2-4 ProjectWise Resources\Documentation Folder

Under the Resources folder covered in the previous section, there is a [Documentation](#) folder. This folder is the location of all CAD Support and other user provided documentation for all users to access. The files in this location range from simple, single process technical notes all the way through the full DOTWise manual, along with links to other valuable content such as the INDOT Sign Catalog.

In addition to this documentation, new for the CAD Fall 2019 release, the Peer group has requested a number of documentation checklists that can be found under the [CAD Process Checklists](#) folder. These checklists can be used during the design/plans production process as a quick overview of the steps, and as a reference back to this document for the specific processes and how to perform them.

2.3 ProjectWise Security Overview

2.3-1 Overview:

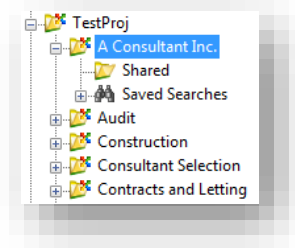
The INDOT ProjectWise Datasource (INDOTWise) adheres to a strict security model—providing inner discipline security, while providing all INDOT users the ability to review other data as necessary. In addition to these security features, there are additional policies that are used administratively in order to provide rapid support and file restorations, should the need arise. These policies are as follows:

1. Projects will be created by the DOTWise Project Creator.
2. Users will not have folder delete privileges; this will aid in CAD Support's and IOT's ability to process restores in a timely fashion.
3. Document delete privileges will be assigned at management discretion.
4. Users will no longer be able to adjust the security settings of template folders/projects created by the DOTWise Project Creator.
5. District and Central Office now share a common security group. Data access and rights are based on need and positional responsibilities.

There is no longer a distinction between Central Office and District users. For example, instead of a Central Office Environmental Services group and a separate group in each district, all Environmental Services users have the same rights across all locations and projects. This is to increase collaboration between locations with a minimal need for security adjustment.

2.3-2 Consultant Access

At this time, DOTWise access has been made available to the INDOT consultant community via ITAP (Section 2.1). Throughout the project lifecycle, it will be quite possible at the root of the Des. No. to see folders named after various consultant firms. A project containing a consultant folder would look like the following:



Des. No. with Consultant Folder

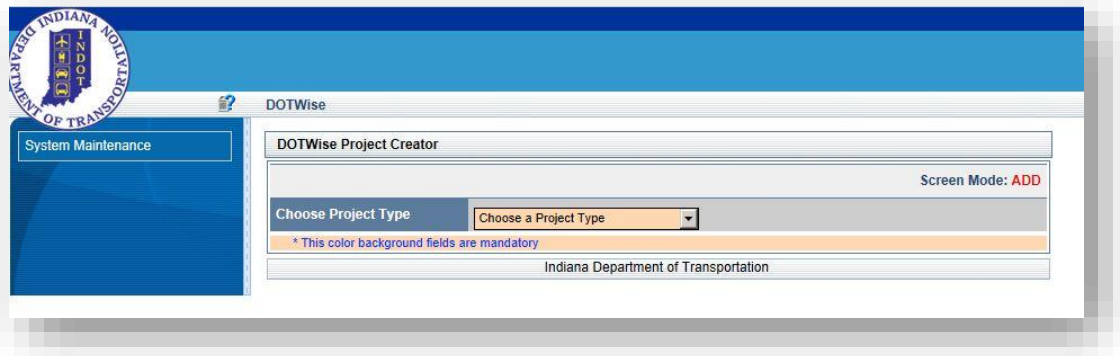
Any instance where a consultant is placing data into our datasource, the following conditions will apply:

1. The folder will be named with the consultants' name.
2. The consultant will only be able to see the data placed in their folder or the Shared sub-folder.
3. All INDOT Users will be able to see all consultant data.
4. The shared folder is provided for all INDOT users to place data they need to share back to the consultant (copies are recommended). Only the intended consultant will see this data.

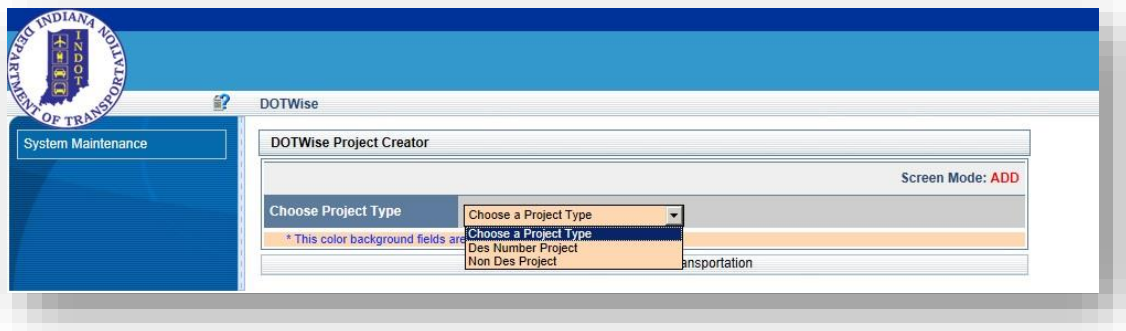
2.4 The DOTWise Project Creator

The DOTWise Project Creator tool allows internal and external users the ability to create ProjectWise projects without modifying the underlying security model. Depending on the roles/groups you have requested and granted access to, you will be taken to one of three interfaces.

The DOTWise Project Creator interface (Choose Project Type) will look as shown below and will only show for anyone that is in the Corridor Development or Traffic Safety group. Any other groups will be taken directly to the Des Number Project interface (i.e. Design or Survey). This allows for you to choose to create a Des No. or Non Des project.

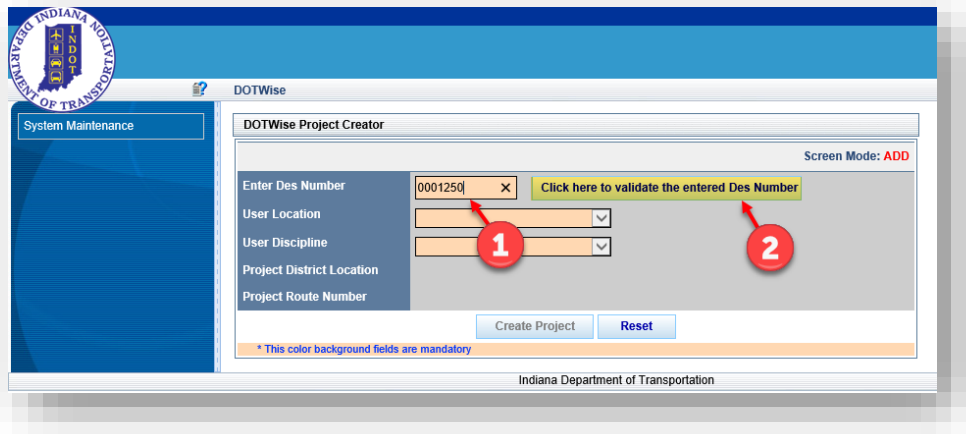


1. By selecting the Project Type from the pull down you will be taken to one of the other two interfaces (Des Number Project or Non Des Project)



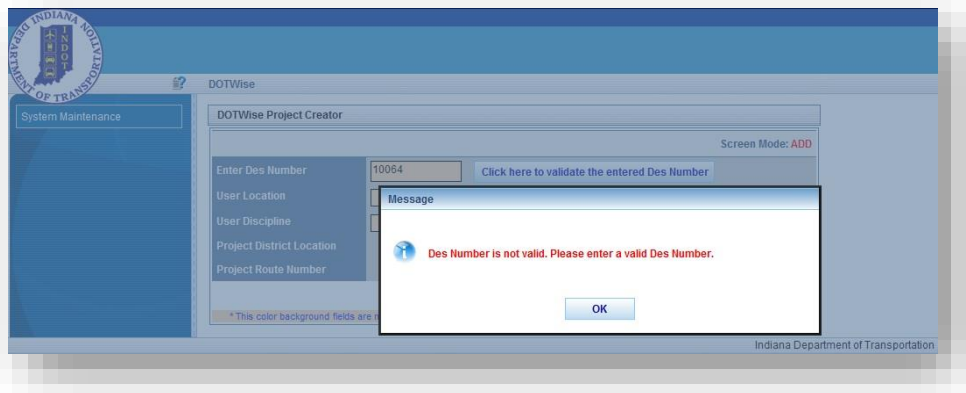
The DOTWise Project Creator interface (Des Number Project) will look as shown in the following step and is for all disciplines other than Traffic Safety and Corridor Development (i.e. Design, Survey, Geotechnical, Hydraulics). The interface for a Non Des Project allows for the creation of projects that do not have a Des No. in SPMS. This functionality is currently only enabled for the Traffic Safety and Corridor Development groups for folder placement in their respective folder locations outside the District/Des. Structure.

- To create a ProjectWise project, enter a Des Number for the project and click the *Click here to validate the entered Des Number* button.

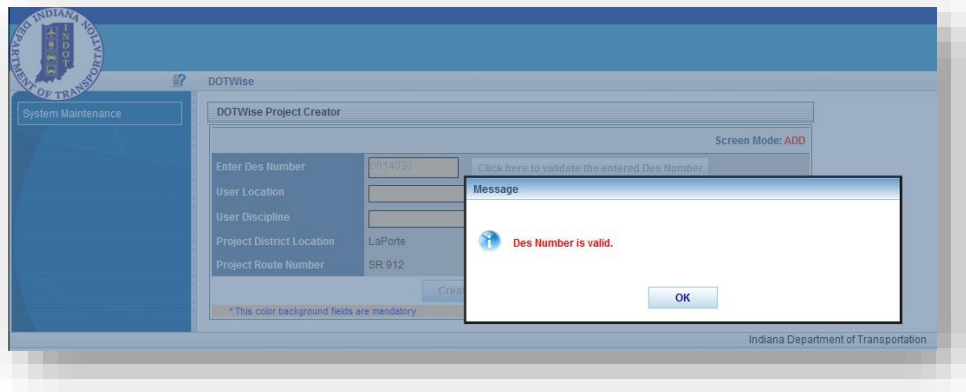


The application will check to see if the Des Number is a valid Des Number or not. If the Des Number entered is not a valid Des Number, a message will be displayed stating that the Des Number entered is not valid.

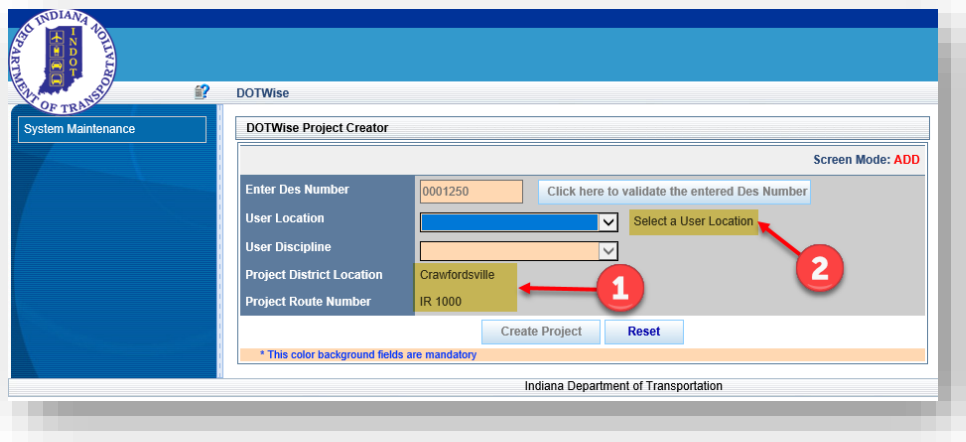
Note: The DOTWise Project Creator is updated with fresh project information nightly. If your project is not showing as valid, it's advised to wait 24 to 48 hours for the system to update. If the folders are required immediately, please submit a ticket to CAD Support requesting their manual creation.



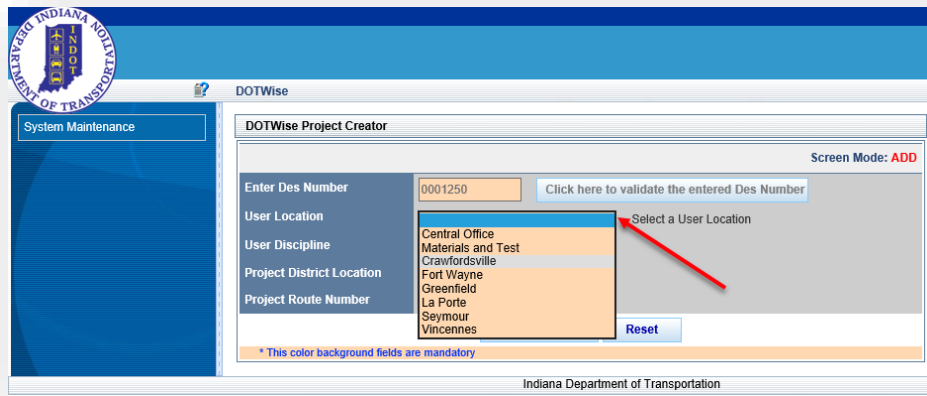
3. Clicking the OK button will allow you to change the Des Number to a valid Des Number. If a valid Des Number is entered, a message will be displayed stating that the Des Number is valid.



4. Click the OK button and you will see that the Project District Location and Project Route Number values are displayed on the form. You will also notice that the User Location dropdown list is enabled.

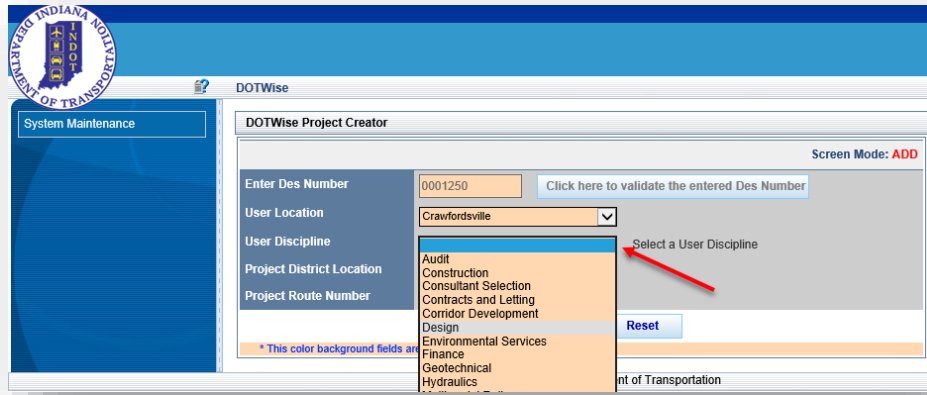


5. Select a User Location from the User Location dropdown list. (Be sure to select the location where you physically reside and not where the project is being built). This will ensure the files are stored locally to where you are working). The Project District location is defined by data from SPMS.



The User Discipline dropdown list will then become enabled.

6. Select the User Discipline in which you are working.



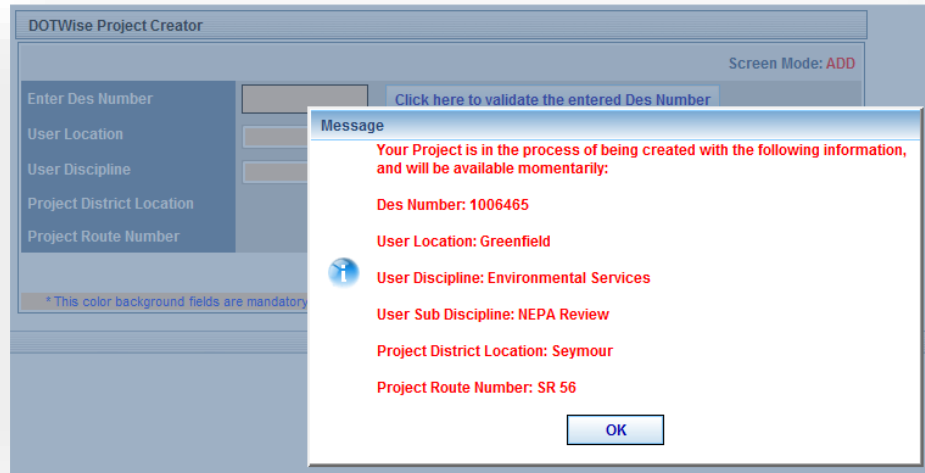
If Environmental Services is selected, a User Sub Discipline dropdown list will become visible. In this case you will need to select a User Sub Discipline. If a User Discipline other than Environmental Services is selected, the User Sub Discipline dropdown list will not be visible and you are ready to create the project.

The screenshot shows the 'DOTWise Project Creator' interface. The 'Enter Des Number' field contains '0001250'. The 'User Location' dropdown is set to 'Crawfordsville'. The 'User Discipline' dropdown is set to 'Environmental Services'. The 'User Sub Discipline' dropdown is open, showing options: 'Cultural Resources', 'Ecology', 'Hazardous Materials', 'NEPA Review', 'Scoping', and 'Waterways Permitting'. The 'Project District Location' is 'Crawfordsville' and the 'Project Route Number' is 'IR 1000'. A 'Reset' button is visible. A note at the bottom states: '* This color background fields are mandatory'. The screen mode is 'ADD'.

7. To create the project, click the Create Project button.

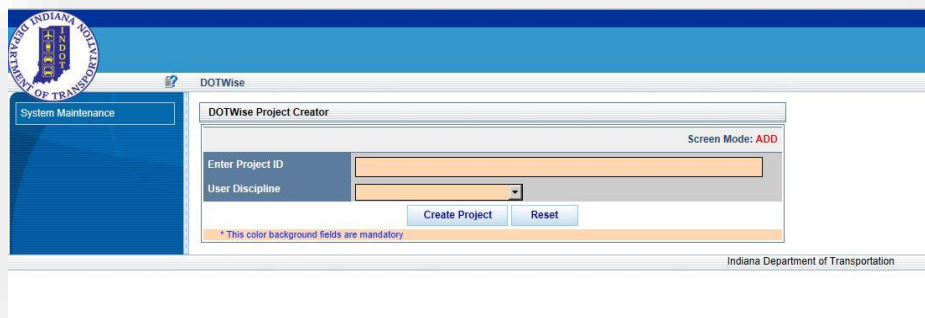
This screenshot is identical to the previous one, but the 'User Sub Discipline' dropdown is now closed and set to 'Cultural Resources'. The 'Project District Location' is now 'Crawfordsville' and the 'Project Route Number' is 'IR 1000'. A red arrow points to the 'Create Project' button. The 'Reset' button is also visible. The note '* This color background fields are mandatory' and the screen mode 'ADD' are still present.

A confirmation message will appear showing that the project is in the process of being created. You will also see the project information. There may be a small delay (1-2 minutes) before the project shows in ProjectWise.

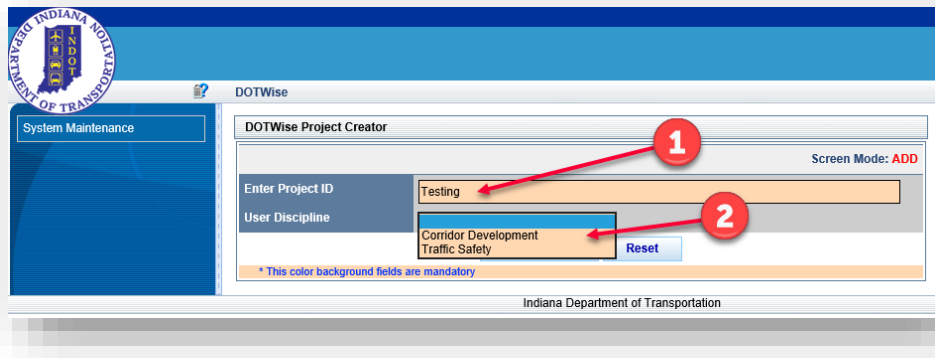


8. Click the OK button to start a new project from the beginning.

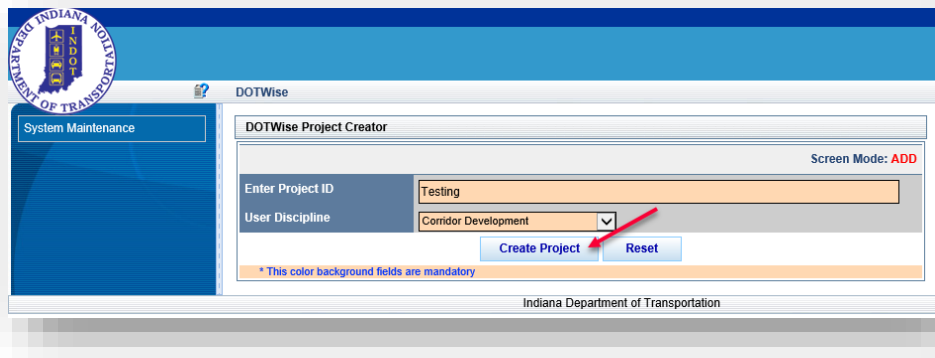
The DOTWise Project Creator interface (Non Des Project) will look as show below and is for anyone that is in the Corridor Development or Traffic Safety group. This interface allows for the creation of projects that do not have a Des No.



- To create a Corridor Development or Traffic Safety ProjectWise project, enter the Project ID in the first field and select the User Discipline from the pull down as shown below.



- Once completed filling in the information, select the Create Project button



- The Reset button will take you back to the Start and allow you to begin the process all over again.

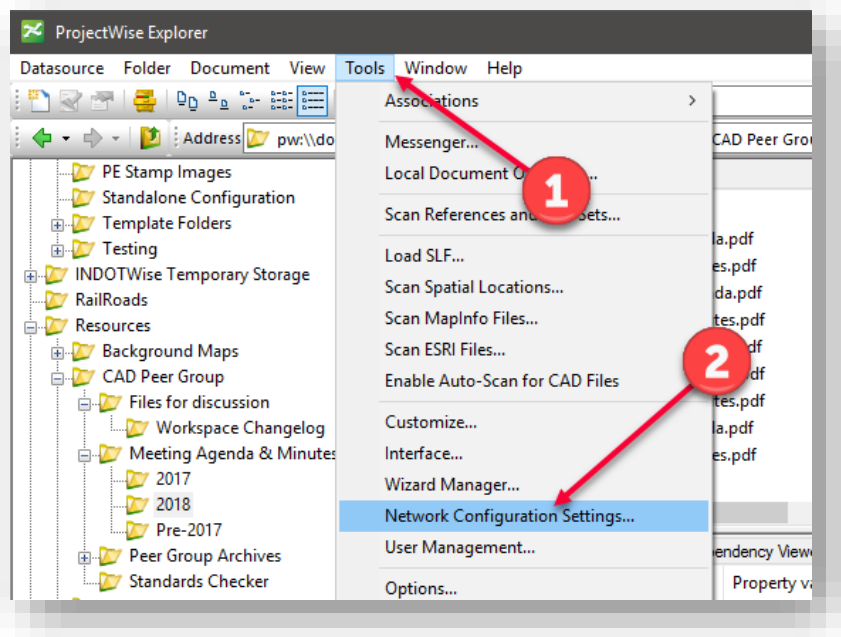
2.5 Auto-Logins for Integrated Applications

ProjectWise has the ability to have integrated applications such as MicroStation or Microsoft Office automatically log in to ProjectWise with your user credentials. In prior versions, when attempting to use one of these applications from the desktop, you would be prompted for your login information prior to being able to communicate with ProjectWise. This new feature removes that step and allows you direct access without being prompted.

2.5-1 Enabling Auto-Login

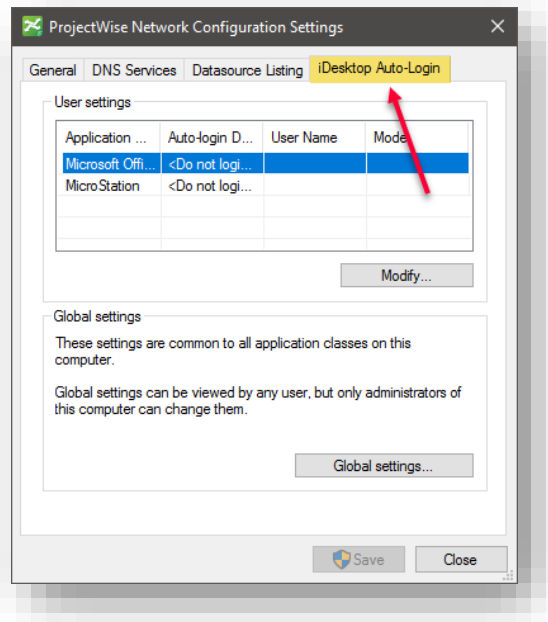
To enable this feature:

1. In ProjectWise Explorer, go to the “**Tools > Network Configuration Settings...**” option. This will present you with the network settings for your ProjectWise Client.



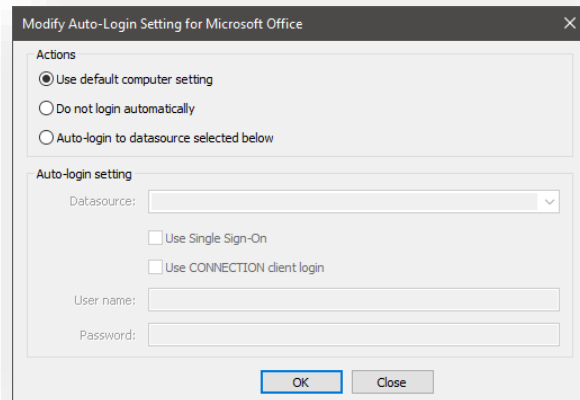
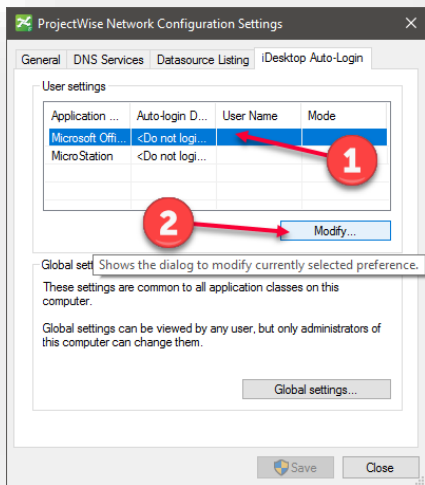
Network Configuration Settings

- On the displayed panel, we're concerned with the 4th tab, *iDesktop Auto-Login*. This panel shows all the integrated applications that ProjectWise has found on your machine.



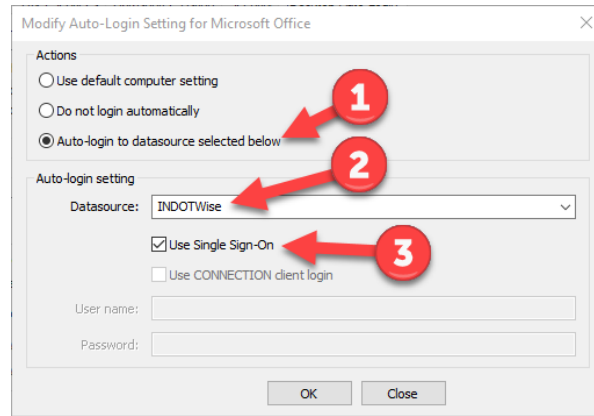
iDesktop Auto-Login

- To enable the automatic login to your Datasource, you will need to adjust the following. First, highlight the application you wish to have auto-login. Then select the Modify button.



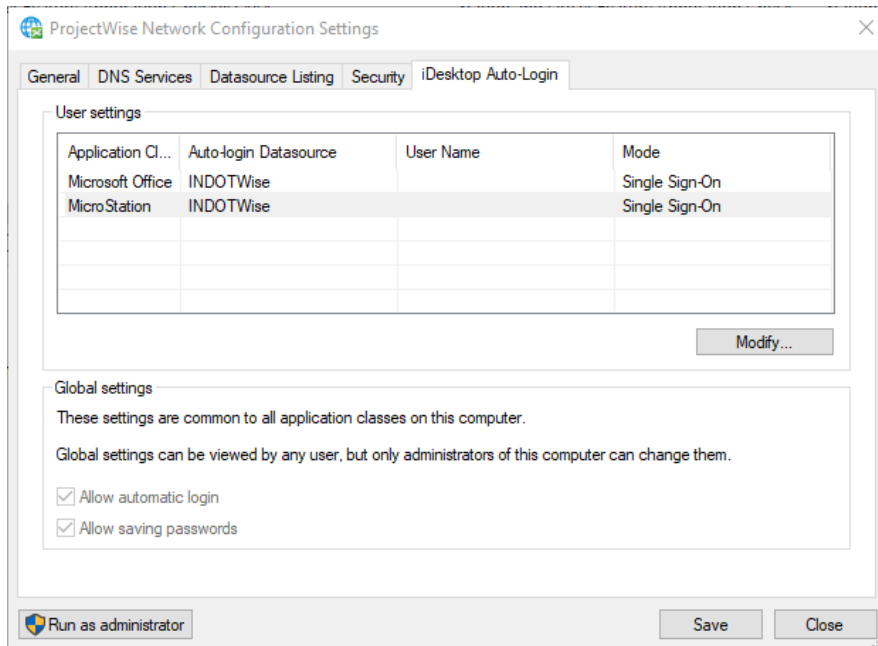
Application Auto-Login Settings

- At this time, you will want to adjust your settings as shown. These settings will cause your client to automatically login your application to the DOTWise datasource with your user credentials.



Enabling Single Sign On

- Finally, select OK and repeat these steps are necessary to configure auto-login for any additional applications. When completed, your dialog will look similar to the following:



Auto-Logins Enabled

- When completed, select Save and close any remaining windows for the Network Configuration settings.

2.6 ProjectWise and Documentation Notes

The remainder of the ProjectWise Explorer materials in this document assume that the end user has taken the *ProjectWise Explorer CONNECT Edition Basics-The ProjectWise Explorer Client Bentley Learn Course*, or has a functional knowledge of the application in previous versions. As not to duplicate documented materials, any specific processes can be reviewed in the listed training material or the online application help under the *Help > Contents* menu item. Any other items can be sent to INDOT CAD Support as a Help Desk Ticket.

Note: With the rollout of the ProjectWise Explorer CONNECT Edition, Bentley has changed how they refer to the ProjectWise Projects. To maintain consistency, INDOT CAD will adopt the updated naming of Work Areas where we previously referred to Projects throughout this document.

2.7 Productivity Enhancements

2.7-1 Utilization of the Data Warehouse (Work Area Properties and Environments)

The Data Warehouse is INDOT's internal data repository with the vast majority of project-related information provided by the many systems within the agency. Several departments within MIS at INDOT (GIS, CAD, and SPMS) have worked as a team to ensure that the information provided within the Data Warehouse is correct and updated in a timely manner. By bringing together all of the data that these systems provide, ProjectWise can use this data in a variety of ways in both the CAD environment (e.g., populate Title Sheets) and also within ProjectWise interface (e.g., Work Area Properties).

As a major enhancement to the available functionality within the INDOT ProjectWise datasource, we're now providing metadata fields for all major disciplines that are part of the project development process. At this time, all Work Areas will have at least a Des. No. and archival field at the Work Area level and the Des. No. field at the document level. These placeholders have been put in place to allow the ability to add metadata to existing documents as the datasource functionality evolves over time.

2.7-2 Features for all Work Areas

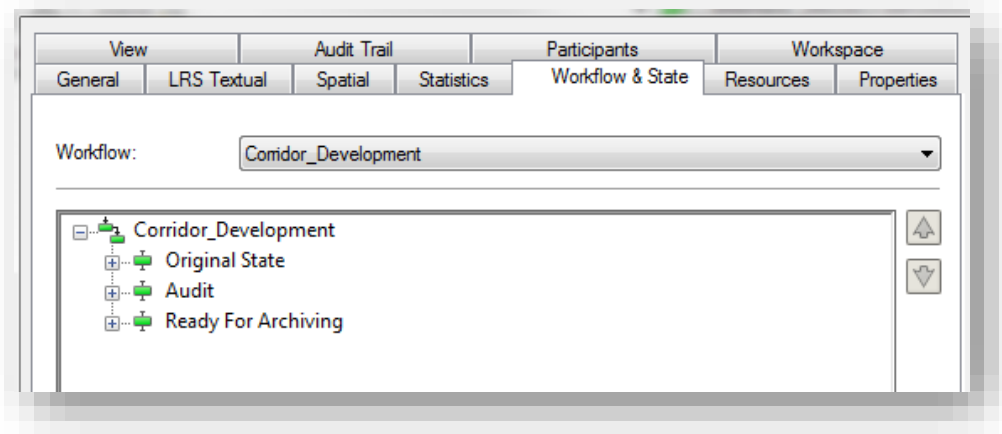
- **Separate Environments:** There are now specific Environments for each area of a project. As described below, this allows us to streamline the data available to each work group.
- **Documents Properties to populate sheet models:** One of the major changes in Version 2.0 of the INDOTWise workspace was the shift from populating sheet models with project properties to using document properties to perform this function. The major factor in this change is the fact that it allows users to utilize searches based on document attributes. This functionality has not changed for this release.
- **Similar Interfaces:** Through the use of environments, we were able to minimize the number of interfaces available while still providing the customization needed between different work groups.

2.7-3 Workflows and States

At this time, ProjectWise is currently enabled to send documents to ERMS directly for the Design discipline, and archive for all disciplines. To facilitate this functionality, all disciplines now have

workflows and states available which can be used as document flags when specific milestones have been met and documents need sent to ERMS.

As this is an evolving process, most workflows only contain an initial, interim and archival state as shown:



Default States for Each Workflow

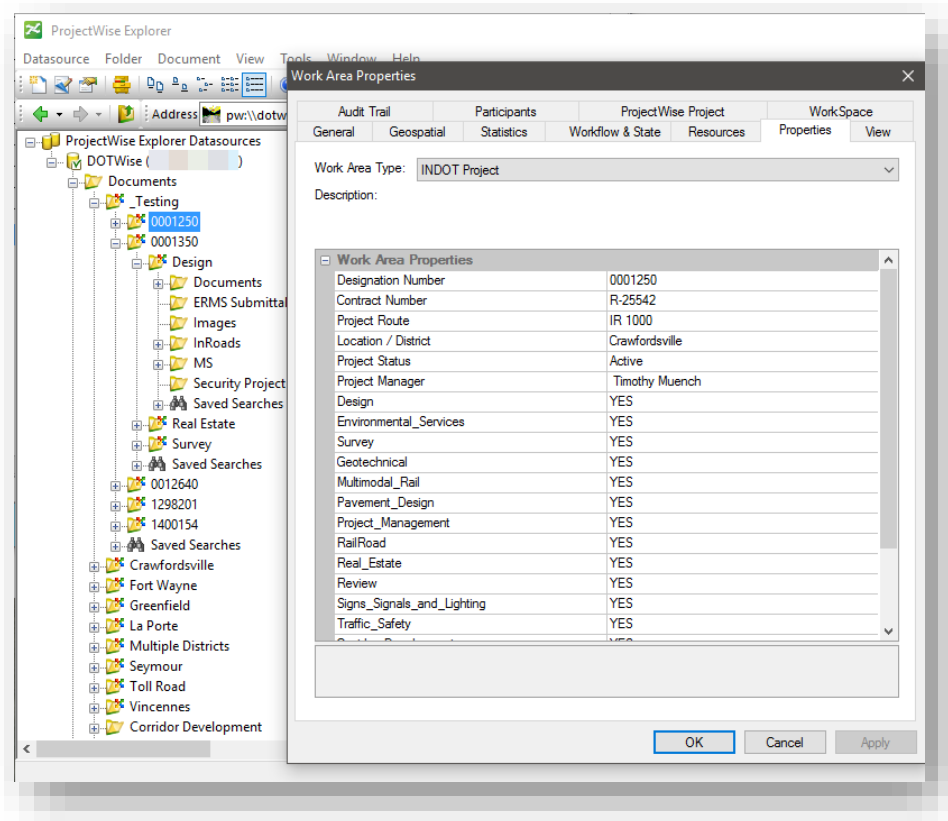
The Design Workflow contains far more steps, as will be discussed later in this chapter.

2.8 Work Area Properties

2.8-1 Overview:

As discussed previously, projects will be created via the DOTWise Project Creator. After the Work Area is created, Work Area properties will be editable by the person(s) responsible for the project. There are a few variables that are populated using the data warehouse in the Work Area properties. Others will need to be populated by the responsible parties.

All items populated using the Data Warehouse are driven by the Designation Number. If the Designation Number changes, all information will change along with it.



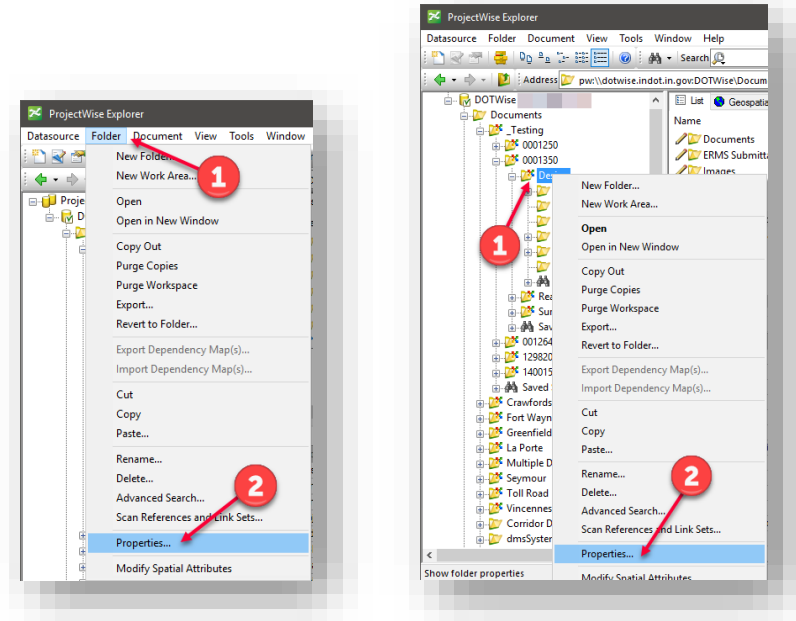
INDOT Work Area Properties

Contract Number, Survey Book, Project Number and Bridge File information is still populated in INDOT border sheets using Project Information. Please make sure that this information is populated in the "Design" Work Area Properties dialog box.

At the time of the writing of this manual, the functionality to populate some of the above described Project Properties does not exist and they will have to be keyed into the Work Area Properties dialog box.

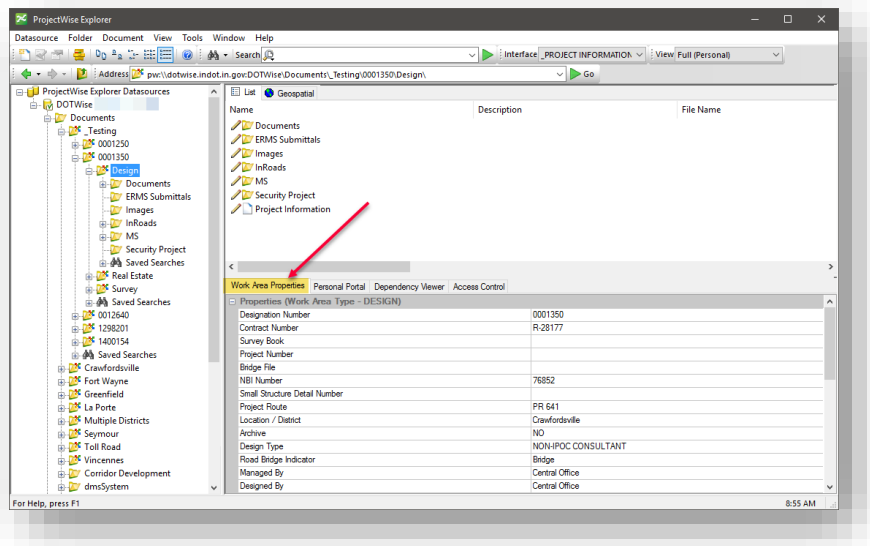
To access the Work Area Properties dialog box, highlight your project by left mouse clicking on your project in the datasource tree in ProjectWise Explorer. Then in the ProjectWise Explorer toolbar, click

on **Folder > Properties**. Alternatively, it can also be accessed by right clicking on the Work Area in the datasource tree and selecting Properties.



Accessing Work Area/Folder Properties

To simply view your current Work Area properties, left click on your project in the datasource tree. Your Work Area Properties will be displayed in the Properties window located in the bottom right portion of the ProjectWise Explorer.

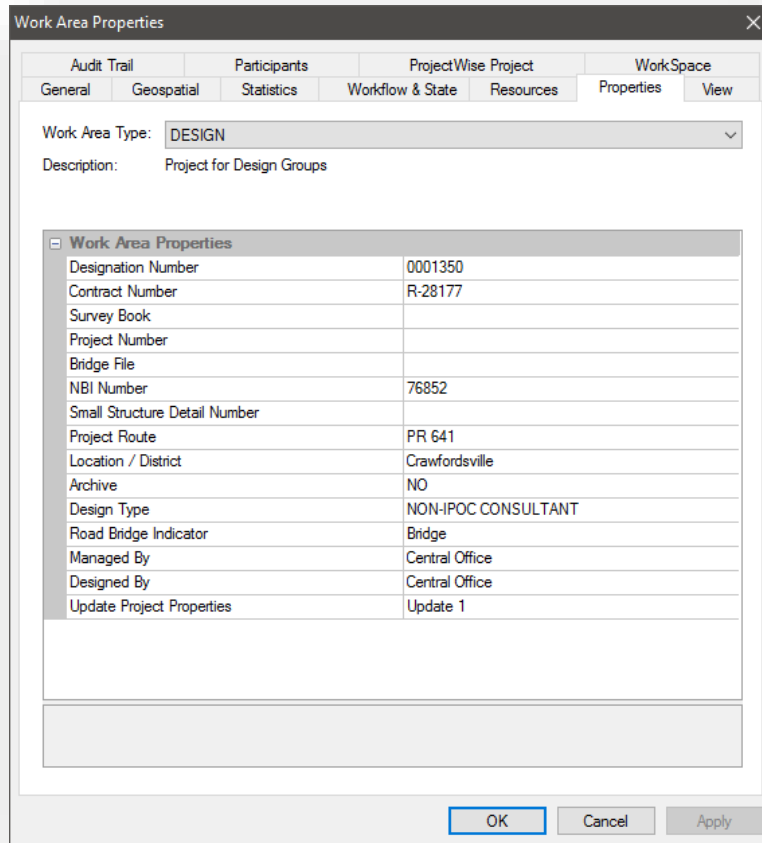


Work Area Properties Tab

For a complete description of the Work Area Properties dialog box, and the various tabs contained within, please see the sections titled “Folder Properties” and “Work Area Properties” in your Bentley Institute, *ProjectWise Explorer CONNECT Edition Basics-The ProjectWise Explorer Client* Bentley Learn Course or under the *Help>Contents* menu in ProjectWise.

2.8-2 Modifying Custom Properties

You can add or edit the custom Work Area properties at any time via the *Properties tab* on the *Work Area Properties* dialog box.



Work Area Properties

Any of the items under this tab (including the Work Area Type) can be edited by either entering text, or in certain cases, by using the pre-populated pull down menu.

2.9 Creating New Documents

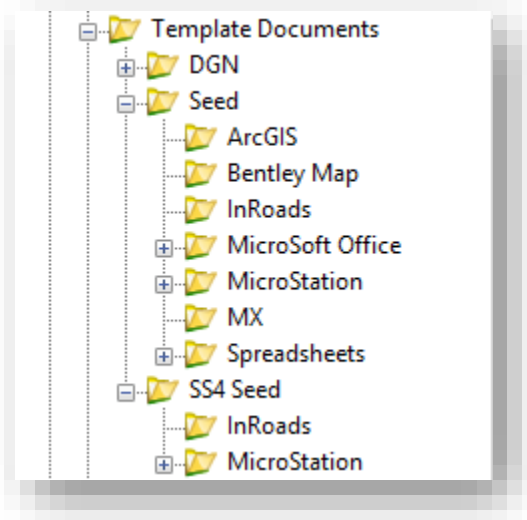
The creation of new documents is covered in the Bentley Institute Course Guide via BLN, titled *ProjectWise Explorer CONNECT Edition Basics-The ProjectWise Explorer Client*. The following section covers the specifics of creating a document using the INDOT provided seed files. For other document creation processes, please refer to the BLN material for specifics or the ProjectWise application help.

2.9-1 Creating Documents from ProjectWise Seed Files

When creating a new document within the INDOT Workspace, the user will need to know a few items:

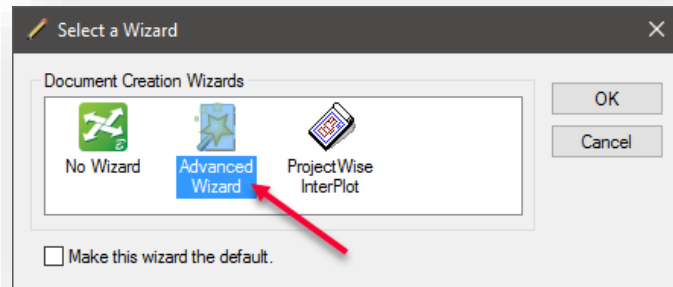
- The location of the Template Documents for SS2 ([Documents\Template Documents\Seed](#)).
- The location of the Template Documents for SS4 ([Documents\Template Documents\SS4 Seed](#)).
- The type of document creation wizard (Advanced or No).
- The location where the file needs to go.

Note: These steps apply for any document created from a pre-existing file in the ProjectWise datasource, including those for MicroStation, Office or otherwise.



Template Documents

With the template documents located, we need to start the document creation process. Within the folder you'd like to create the document in, either Rt. Click in the document panel and select **New -> Document**, or access this from the Document window. If you've previously defined a wizard, you may be shown a blank document panel; for this example, however, the assumption will be made that no default wizard has been set. Upon starting the **New -> Document** command, you will be prompted with the following dialog:

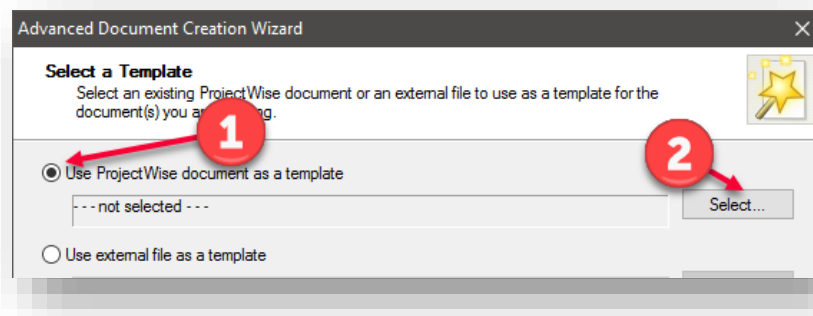


Document Creation Wizards

Select the option for Advanced Wizard as illustrated in the prior screenshot, which will begin the **Advanced Document Creation Wizard** and the accompanying steps.

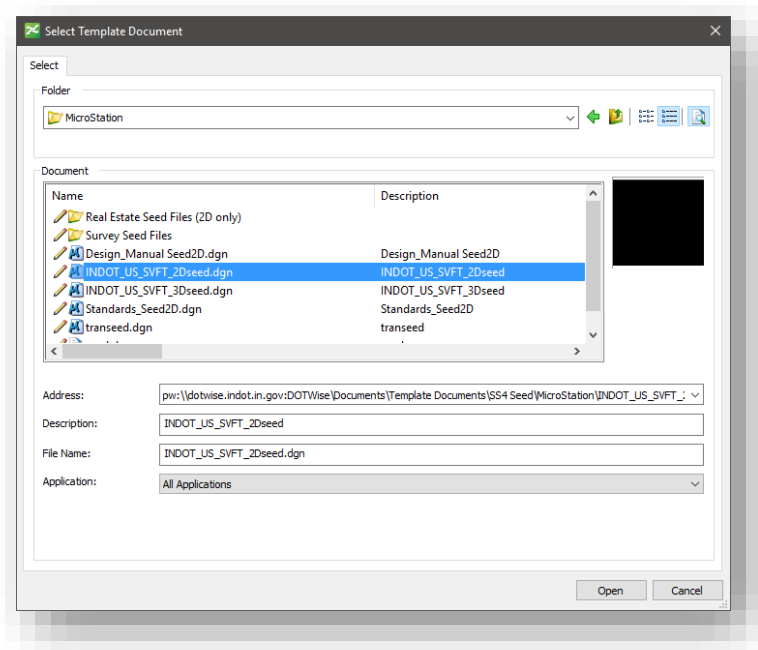
Note: It is highly advised that the user NOT check the “Make this wizard the default” checkbox.

On the Select a Template dialog box, enable the **Use ProjectWise document as a template** radio button, and then click Select.



Advanced Document Creation

Then, in the folder selection area of the following dialog box, navigate to [Documents\Template Documents\SS4 Seed\MicroStation\](#) and select one of the available DGN seed files.



Selecting a Template Document

The following can also be found via the BLN Bentley Institute Course Guide Titled *ProjectWise Explorer CONNECT Edition Basics-The ProjectWise Explorer Client*.

“A ProjectWise template is the same as a Microsoft template, or a seed file in MicroStation. It is a file that is copied to create a new document. You can use a document stored in ProjectWise or a document that resides outside ProjectWise as a template.”

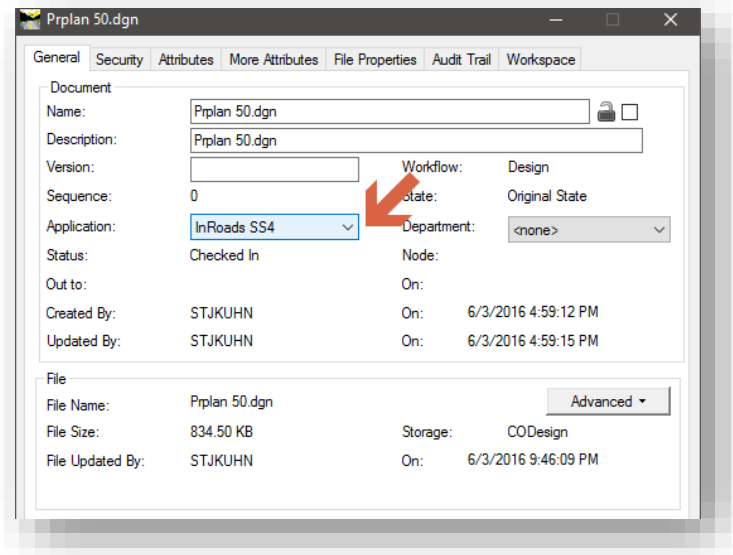
With that being said, there have been [Template Documents](#) created within ProjectWise for most of the integrated applications/programs used at INDOT. These include Microsoft Office, MicroStation, ProjectWise Plot Organizer and the Microsoft Excel spreadsheet tables that are pasted as links into MicroStation.

Note: Be sure to give the proper file extension for the document you are creating.

Example File Extensions	
File Type	Extensions
MicroStation	.dgn
InRoads SS4/PowerInRoads	.dgn
ProjectWise InterPlot	.ips
Adobe PDF	.pdf
Microsoft Word	.doc or .docx
Microsoft Excel	.xls or .xlsx

2.9-2 File Associations with the SS4 Workspace

As you may have noticed in the above section, InRoads SS4 and PowerInRoads both use .dgn as their file extension. This is due to how both products now operate and launch. As such, the file extension alone is no longer sufficient to determine what application will load when started. For this we must look at the application association for these files. The below screen capture was generated from the document properties dialog through the **Document > Properties** menu item or by right clicking and selecting properties.



In the previous screen capture, you'll notice that the Prplan 50.dgn is now associated directly to InRoads SS4. This is very important going forward. If you wish to access a file with InRoads SS4 or PowerInRoads, the application association must be set to the relevant product. This will affect if these applications launch and the workspace information they launch with.

- PowerInRoads must be associated with the application of the same name.
- InRoads/OpenRoads SS4 must be associated with the InRoads SS4 application.

Note: For the period of time that INDOT is running both SS2 and SS4 products, file associations will be very important. For any file you wish to use with the SS4 workspace, please associate these with InRoads SS4; and for those using the SS2 workspace, they should be associated with PowerInRoads SS2. This includes any regular drawings that do not contain civil data. There is no issue with using Power InRoads for drafting processes.

2.9-3 Importing Documents into ProjectWise

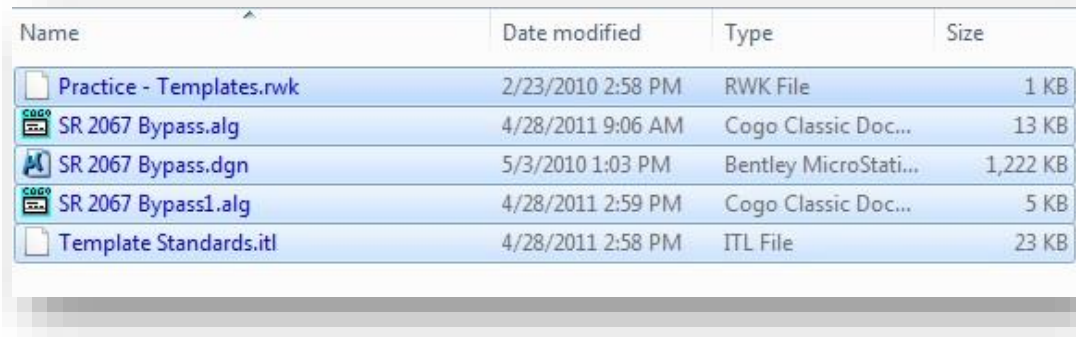
During the course of a project, it is inevitable that you will acquire documents that are not contained within ProjectWise. Importing a Document into your ProjectWise Project can be accomplished a couple of different ways.

You may receive these documents via email, or CD/DVD, or they may reside on a network server.

2.9-3a Drag and Drop

The simplest method for moving a file or files into ProjectWise is to simply use the Microsoft Windows method of dragging the file from its current location and dropping it into the appropriate project folder in your ProjectWise Explorer.

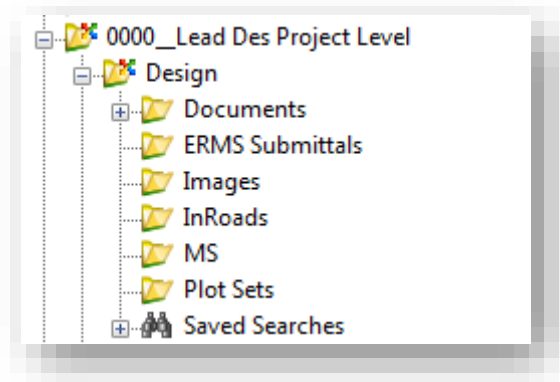
1. Using Windows Explorer, navigate to any document you wish to place into ProjectWise
2. Select the files as shown in the example.



Name	Date modified	Type	Size
Practice - Templates.rwk	2/23/2010 2:58 PM	RWK File	1 KB
SR 2067 Bypass.alg	4/28/2011 9:06 AM	Cogo Classic Doc...	13 KB
SR 2067 Bypass.dgn	5/3/2010 1:03 PM	Bentley MicroStati...	1,222 KB
SR 2067 Bypass1.alg	4/28/2011 2:59 PM	Cogo Classic Doc...	5 KB
Template Standards.itl	4/28/2011 2:58 PM	ITL File	23 KB

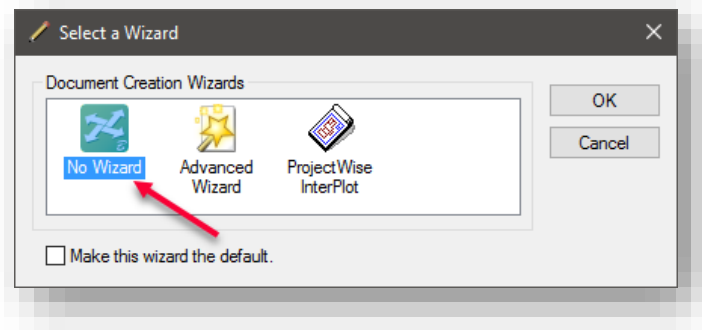
Selecting Files in Windows Explorer

3. Using Microsoft Windows methodology, drag the selected files and drop them into the appropriate folder of your project.



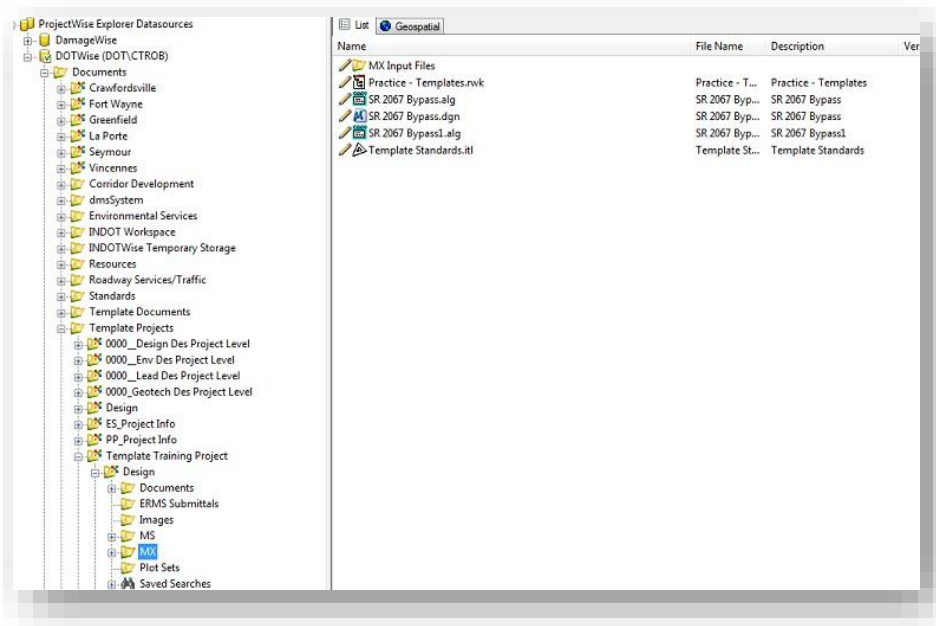
ProjectWise Project

- Since the documents have already been created, you may select No Wizard in the Select a Wizard dialog box. Click OK.



Document Creation Wizard Selection

- After processing, the files should appear in the Documents folder of your Project in ProjectWise Explorer. If they don't appear during the import process, you may need to refresh your view either by using the **View > Refresh** command, or by using the F5 key on the keyboard.



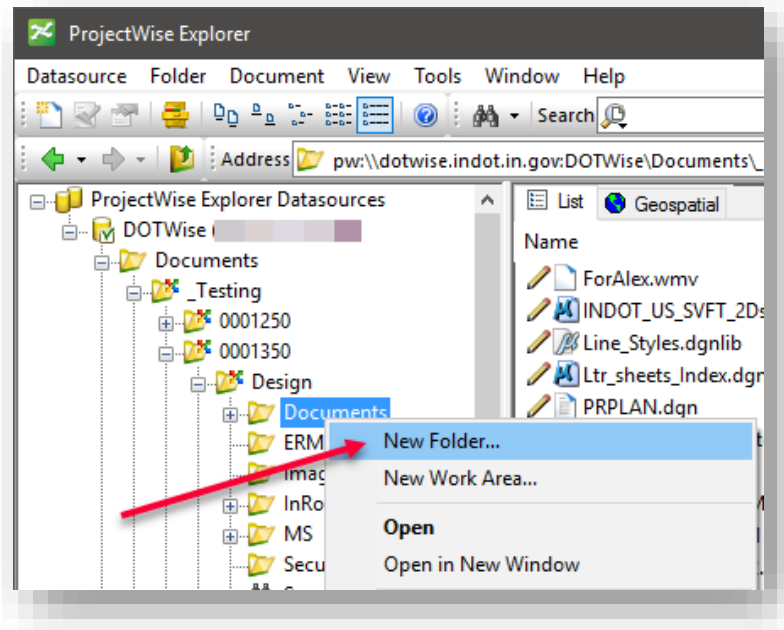
Files Imported into ProjectWise

Note: When dragging and dropping files into ProjectWise, you're only making a copy of these documents in the ProjectWise datasource. If you no longer need the copies you imported, you can delete them at this time from the Windows Explorer.

2.9-4 Creating Folders and Copying/Moving Documents

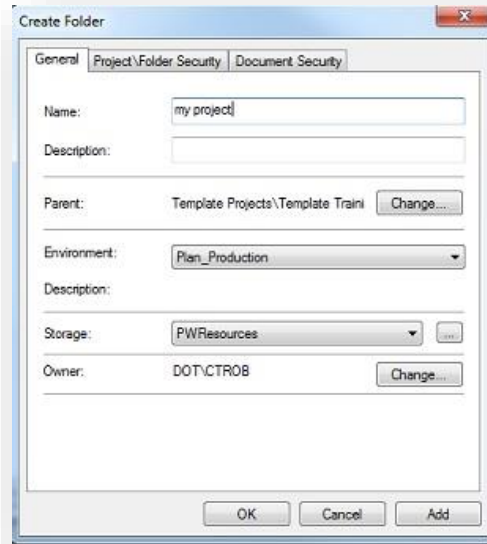
Note: Moving documents in ProjectWise is considered a two part process. The first is copying the document, and the second is the deletion of the original file. In order to move files within the system, you must have the document delete privilege on your account; otherwise, you will only be able to move files.

1. In the datasource tree of ProjectWise Explorer, right click on the Documents folder for your project, and select New Folder.



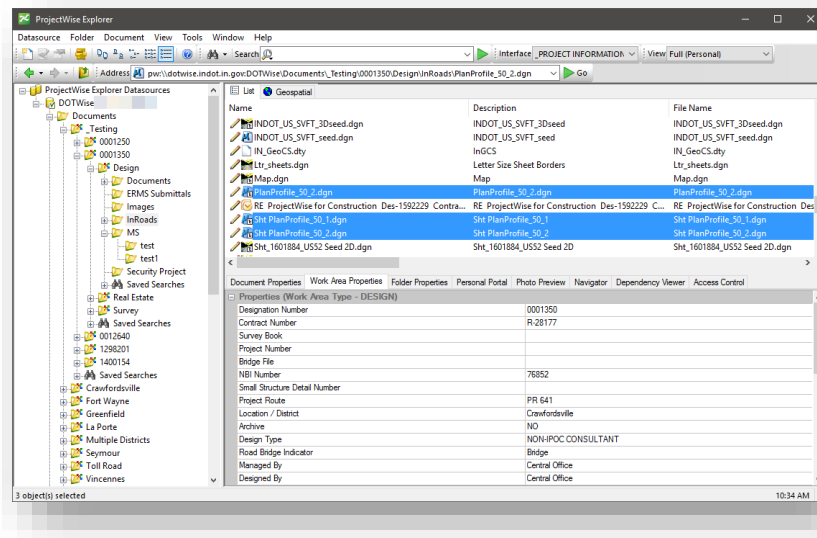
Creating New Folders

- In the Create Folder dialog box, name the folder. You may leave the Description field blank. Once complete, select OK to create the folder and go back to the ProjectWise Explorer or Add to create the folder and be presented with the folder properties.



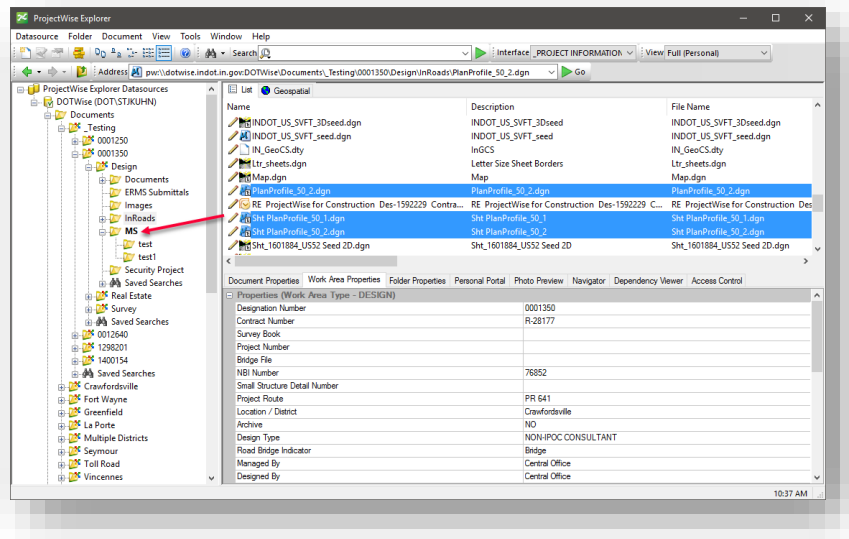
Create Folder Dialog

- To the copy/move your documents, select the documents using typical Windows selection methods (CTRL key + Click to select multiple individual files, or SHIFT key + Click to select a range of files).



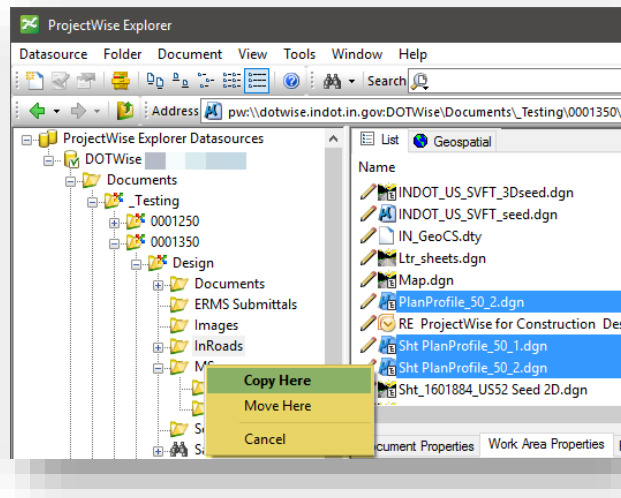
Multiple File Selection

- At this time, right click and hold on one of the selected files. Drag from the Document Panel to the folder location in the Folder Tree where you want to move the files.



Right Click and Drag

- When hovering over the folder to place the files, release the right mouse button. You will be presented with the below menu:



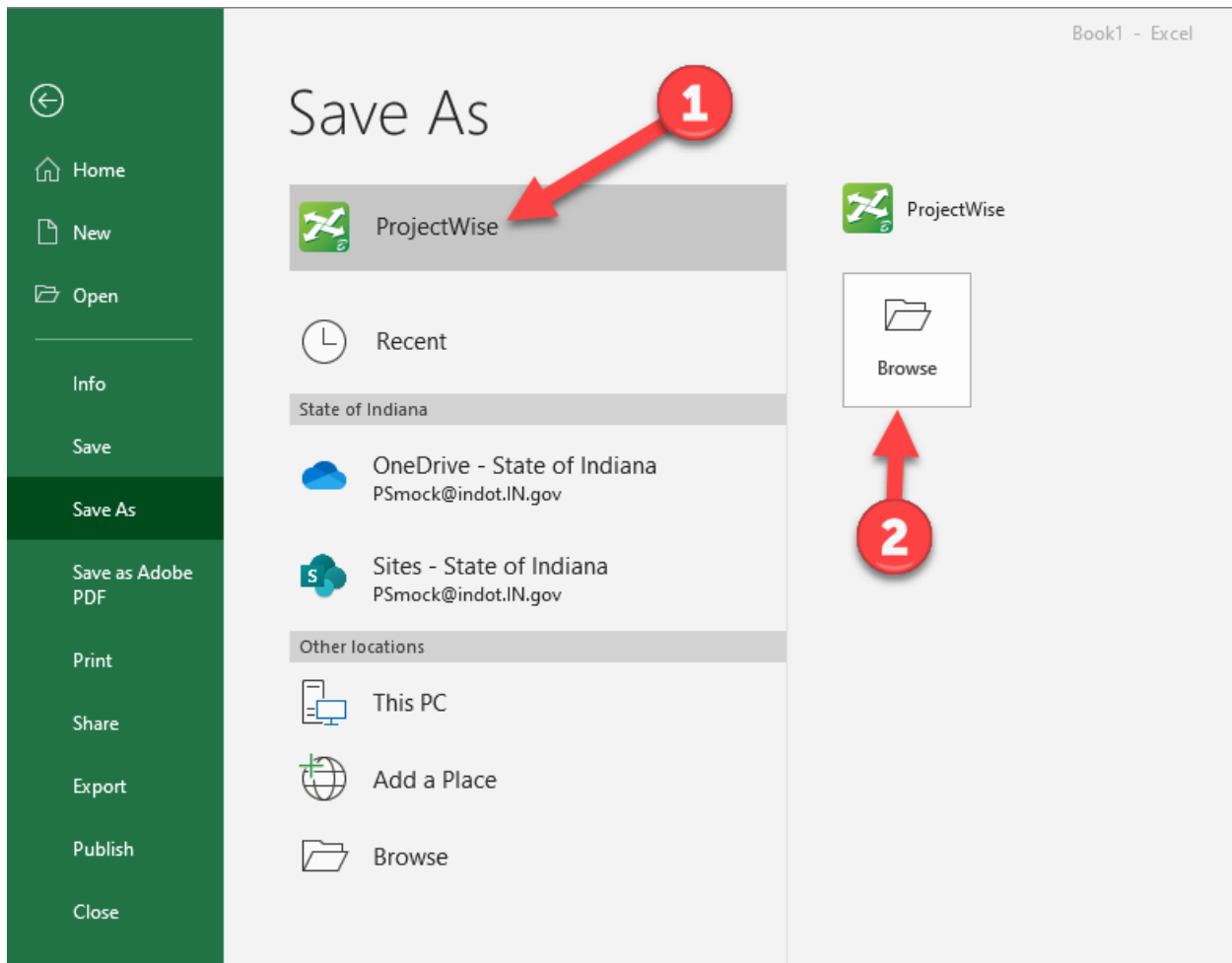
The Copy/Move Menu

6. Select the appropriate movement method for your files. Please keep in mind the note from the beginning of this section regarding moving files and the necessity of having the Document Delete privilege.

2.9-5 Save and/or Save As

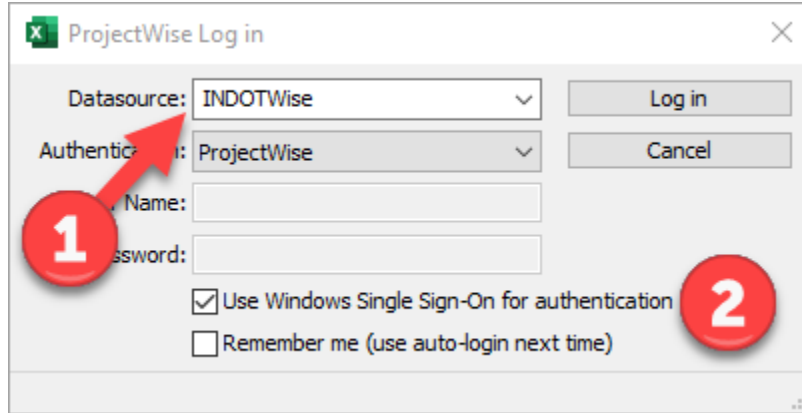
Should you create a document such as a Word or Excel document without first creating it in ProjectWise, you can use the Save and Save As commands to save that document into ProjectWise.

1. Start Microsoft Word or Excel from your **Start > All Programs** menu.
2. Place some text in the document.
3. On the product ribbon, click **File** and select **Save As**. You'll be presented with a series of options similar to the following. Select the **ProjectWise** entry and the **Browse** button.



Office Application Save As

4. You should get the ProjectWise Log in dialog box. If you are connected to the INDOT network (via direct network connection in the office, or VPN) the following steps can be used. In the Datasource dropdown, select the INDOTWise entry. Then select the *Use Windows Single Sign-On for authentication* option.

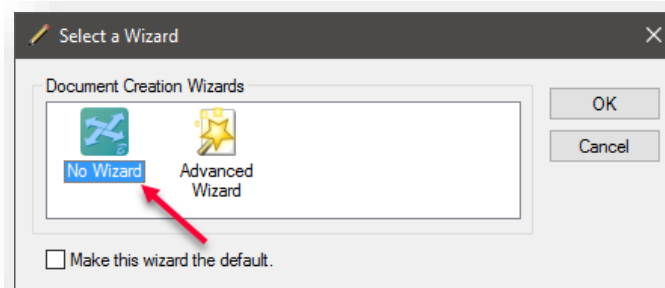


ProjectWise Log in Via Integrated Application

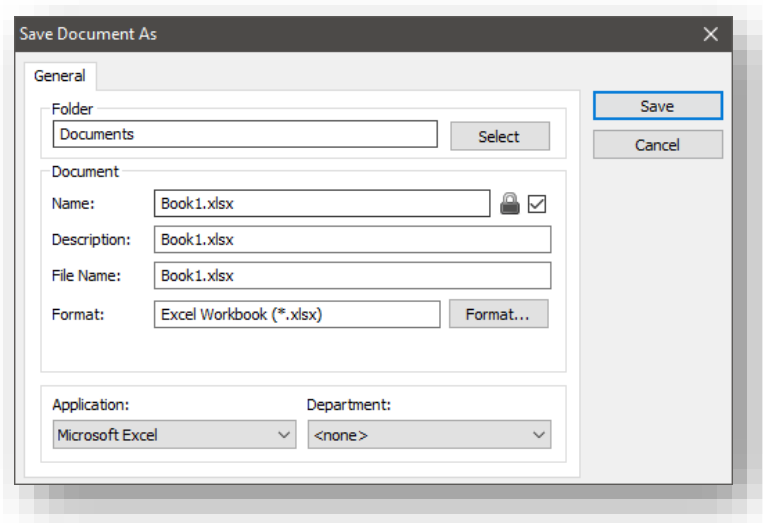
If you're connected externally via laptop without VPN, the following information should be used:

Datasource: INDOTWise (this should be populated in the pull down)
User Name: dot\your *INDOT username*
Password: *your INDOT password*

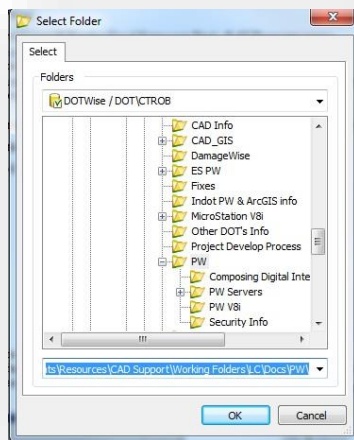
5. In the Select a Wizard dialog box, select No Wizard and click OK.



6. In the following Save Document As dialog, click Select and navigate to the folder in your project where you want to save the document.



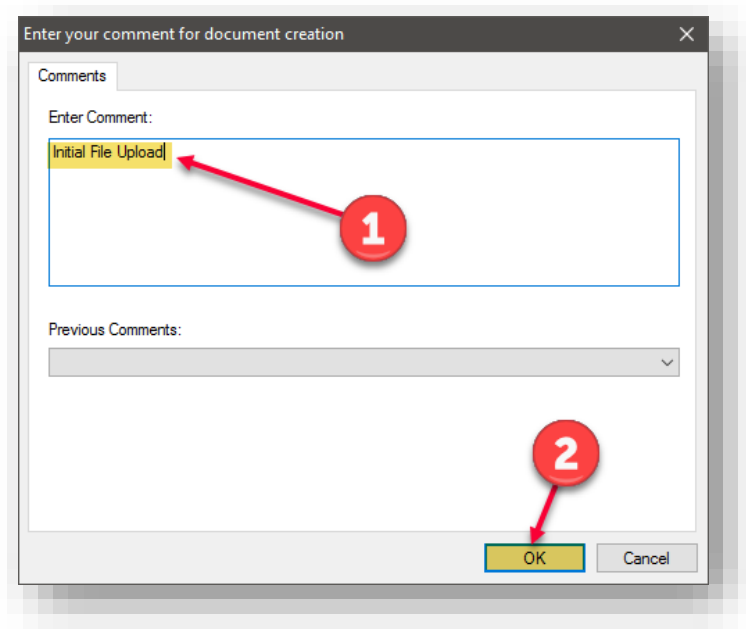
External Application ProjectWise Save As Dialog



Save As Folder Selection

7. Fill in the remainder of the dialog boxes in the Save Documents As dialog box. For ease of navigation, we suggest that you put the extension on the Document name as well as the File Name. The application window should be automatically populated. The Department drop down is optional.

8. Click Save. When prompted, enter any comments relevant to the placement of your file into ProjectWise and select OK to complete the file saving process.



Document Comments

Attention: Upon importing a CAD document (DGN, DWG, etc.) with references into ProjectWise Explorer you will want to run the Reference Scan on the file(s) that you imported. Further information on the Reference Scan tool can be found in the Help>Contents of ProjectWise.

2.10 Interfaces: The Plan Production Environment

The Environments and Interfaces discussed in the following chapters are intended to be in a constant state of improvement. Therefore, if you require an addition or change at any time, please channel those requests through the proper personnel (CAD Peer Group Members) so that we may attend to them in a timely manner.

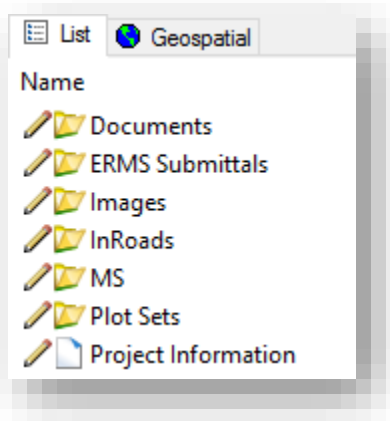
Helpful Hint: By setting your interface before you create a new document, you can complete that interfaces task during the document creation process.

2.10-1 Document Properties

As with the Work Area Properties, there is information in the Document Properties that is populated utilizing the information contained in the Data Warehouse. As mentioned earlier, this information is driven by the Designation Number that is entered in the Work Area Properties.

2.10-2 __PROJECT INFORMATION

Each project within the INDOTWise datasource will contain a non-associated (no extensions, For Information Only) document labeled “*Project Information.*” This document, along with the *__Project Information* interface, can be used to view information that was retrieved using either the SPMS system or by going to the Management Information Portal (MIP).



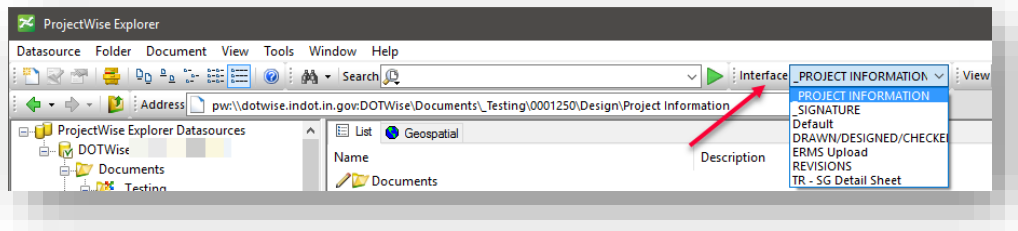
Design Folders w/Project Information Document

In the *Plan_Production* Environment however, the *__Project Information* interface can and should be used for much more than just reporting information that can be accessed in other locations.

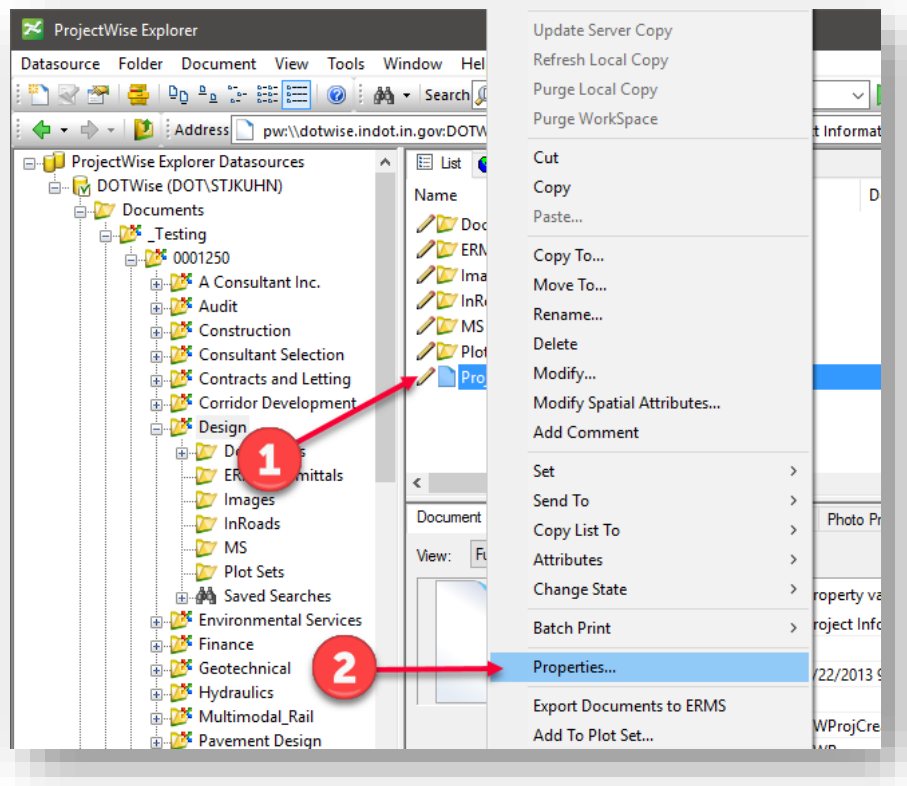
2.10-2a PROJECT INFORMATION Interface, Attributes Tab (Universal Title Sheet)

The Universal Title sheet is intended for use with **ALL** Title sheets. Please keep in mind that while driven from the INDOT Data Warehouse, it is possible and acceptable to have empty fields in your properties. This means that if you do not have information for a certain field in the interface, then it is acceptable to leave that field blank. (Example: Bridge information on a Roadway project)

To access the Universal Title sheet, set your Interface to PROJECT INFORMATION and go to the properties of the applicable file. (Hint: The shift bar is a shortcut to document properties.)



The PROJECT INFORMATION Interface.



Opening Document Properties

On the *Document Properties* dialog, select the *Attributes* tab.

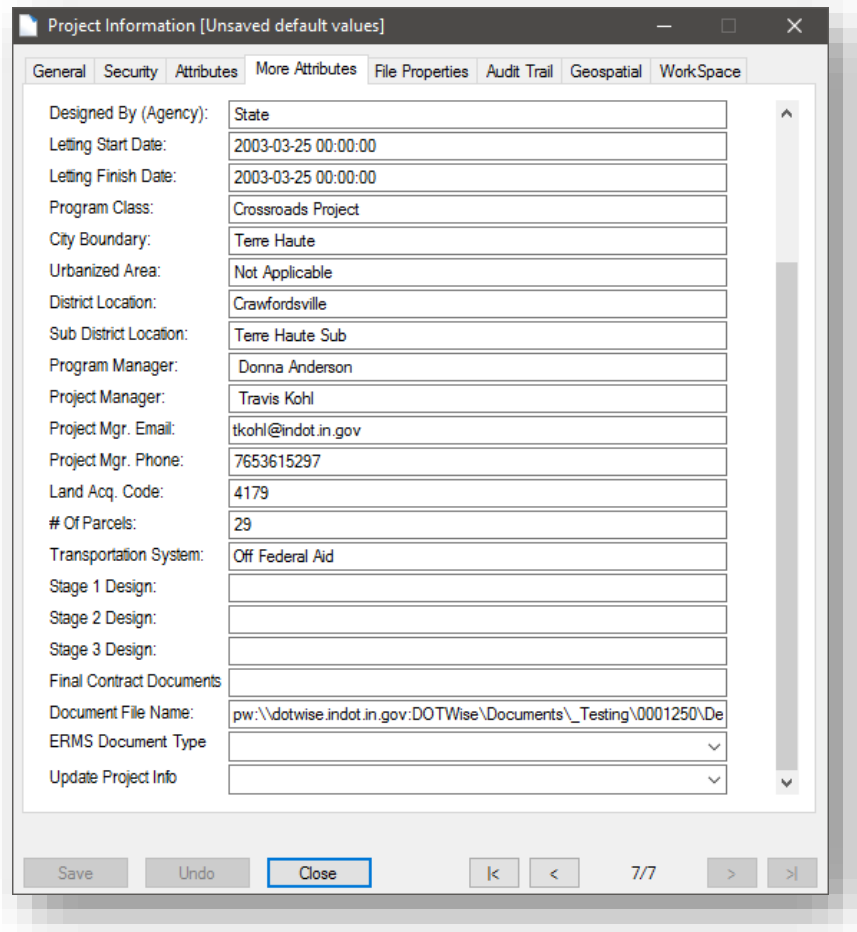
The Universal Title Sheet Interface

This interface has been created with the intention that it should serve every title sheet in use by INDOT Design. This includes 24" x 36" Roadway and Bridge Title sheets, as well as the 8.5" x 11" Title sheets.

Note: In the title bar of the previous screen capture, notice the [Unsaved default values]. This denotes that the document is pulling all its properties directly from the configured system queries. At this time, any changes to Work Area properties would be immediately reflected at the document level. Once any value is modified, this notation will be removed and any document updates will have to occur manually using the document Update field discussed in the next section.

2.10-2b __PROJECT INFORMATION Interface, More Attributes Tab (Project Information)

The **More Attributes** tab provides some of the information that would otherwise be found in the Data Warehouse or SPMS. This is provided for your convenience. However, there are a few fields to take note of:



Field	Value
Designed By (Agency):	State
Letting Start Date:	2003-03-25 00:00:00
Letting Finish Date:	2003-03-25 00:00:00
Program Class:	Crossroads Project
City Boundary:	Terre Haute
Urbanized Area:	Not Applicable
District Location:	Crawfordsville
Sub District Location:	Terre Haute Sub
Program Manager:	Donna Anderson
Project Manager:	Travis Kohl
Project Mgr. Email:	tkohl@indot.in.gov
Project Mgr. Phone:	7653615297
Land Acq. Code:	4179
# Of Parcels:	29
Transportation System:	Off Federal Aid
Stage 1 Design:	
Stage 2 Design:	
Stage 3 Design:	
Final Contract Documents	
Document File Name:	pw:\dotwise.indot.in.gov:DOTWise\Documents_Testing\0001250\De
ERMS Document Type	
Update Project Info	

More Attributes

Document File Name: This is provided as an additional resource for INDOT users to cut and paste the document file name into a problem report.

ERMS Document Type: This field is used for the ProjectWise to ERMS document upload tool and is discussed in section 2.10-6: ERMS Upload.

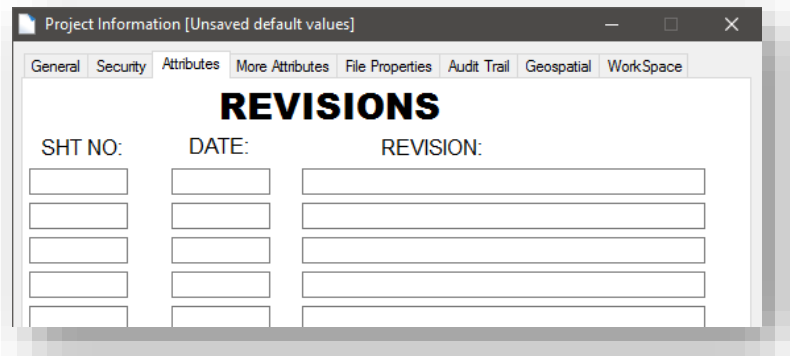
Update Project Info: The More Attributes tab is set up in such a manner that all fields should update automatically. However, there may be a time that the user wishes to make sure he or she has the most current information. In that case, simply select “**UPDATE**” in the editable field (pull down), then select “**Save**” from the dialog box.

2.10-3 __SIGNATURE

Use of the __SIGNATURE interface is discussed in Chapter 4 of this manual

2.10-4 REVISIONS

The REVISIONS interface is tied to the sheet revision blocks, and allows for quick entry into the fields provided without having to use MicroStation to modify this information. It appears as follows:



REVISIONS Interface

2.10-5 DRAWN/DESIGNED/CHECKED BY

Due to the ability to create multiple sheets in one .dgn, the Title Block Integration for this interface has been removed from the INDOT sheet models. However, for those that wish to take advantage of this functionality, we have provided a methodology for using this interface. By default, some of the InRoads sheets do contain this functionality, so please verify whether or not your file has these fields prior to replacing them.

The image shows a software dialog box titled "Project Information [Unsaved default values]". It has a tabbed interface with tabs for "General", "Security", "Attributes", "More Attributes", "File Properties", "Audit Trail", "Geospatial", and "WorkSpace". The "Attributes" tab is selected. The dialog contains several input fields:

- DESIGNED:
- DATE:
- CHECKED:
- DATE:
- DRAWN:
- DATE:
- CHECKED:
- DATE:
- SCALE:
- SHEET TITLE:

At the bottom, there are buttons for "Save", "Undo", and "Close" (highlighted with a blue border). To the right of these buttons are navigation controls: a left arrow, a right arrow, the text "7/7", and another left and right arrow.

2.10-6 ERMS Upload

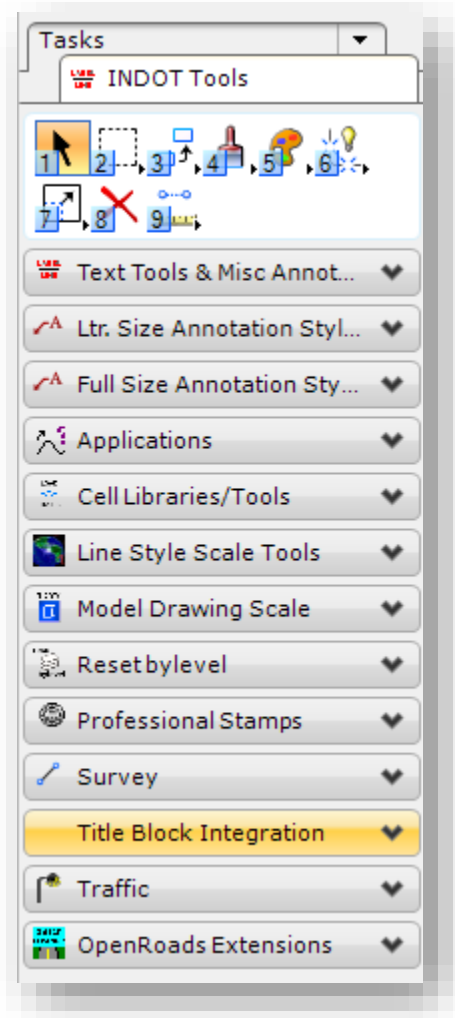
This is a new Interface for use with the ProjectWise to ERMS tools discussed in section 2.23. This is an informational interface used to give the user information on who the last user was to send the document to ERMS, when it was sent, and what state the document was in when sent.

2.11 Title Block Integration

2.11-1 Overview:

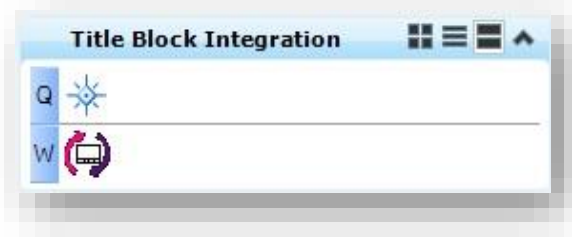
Due to the move from using Project Information to populate our title blocks to using document interfaces, there has been a new task bar developed in MicroStation to allow for use of some of our Title Block Integration cells (tag sets).

The new task bar is titled *Title Block Integration* and can be found under the INDOT Tools workflow:



Task Navigation – Title Block Integration

The Title Block Integration task bar consists of only two tasks:

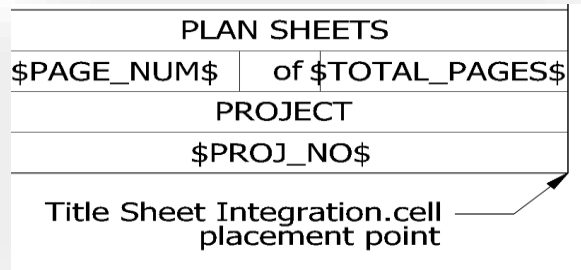


Title Block Integration Tools

- **Attach Cell Library:** This attaches the “*Title Sheet Integration*” cell library, which in turn contains 5 cells for use with the various interfaces available.
- **Update Title Block:** This updates all title block information driven by document interfaces.

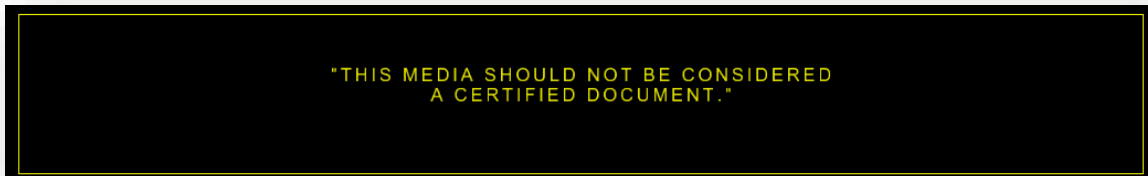
2.11-2 Title Sheet Integration Cell Library

The Title Sheet Integration Cell Library consists of 5 cells. The orientation of these cells is set so that they are placed in the lower right corner of the large “D” size sheets.



elect_sig_box

The `elect_sig_box` cell is intended to be used with electronic signatures. The process of utilizing electronic signatures is discussed in detail in Chapter 4.



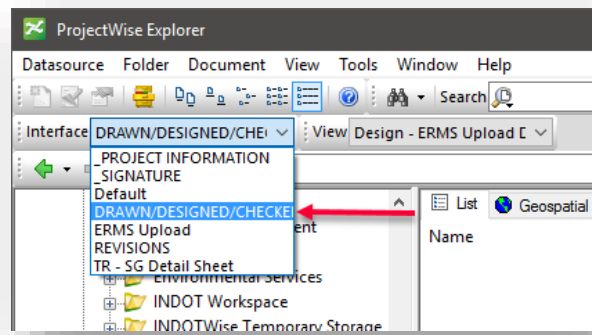
Signature Placeholder

2.11-2a Drawn By/Designed/Checkedby

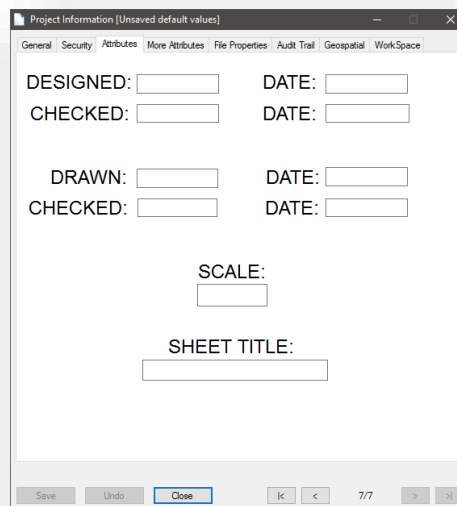
The checkedby cell is intended to be used with the *DRAWN/DESIGNED/CHECKEDBY* interface and the *Plan Production* environment within ProjectWise.



Drawn By/Checked By Cells



Drawn By/Checked By Interface Selection



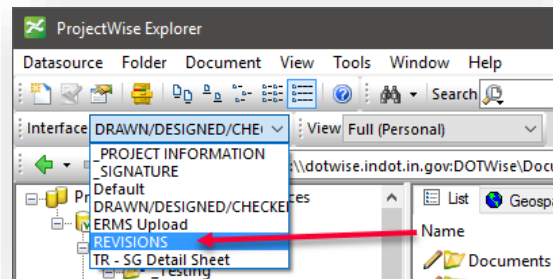
Drawn By/Checked By Interface

2.11-2b revisions

The revisions cell is intended to be used with the **REVISIONS** interface and the **Plan Production** environment within ProjectWise.

\$sht1\$	\$date1\$	\$rev1\$
\$sht2\$	\$date2\$	\$rev2\$
\$sht3\$	\$date3\$	\$rev3\$
\$sht4\$	\$date4\$	\$rev4\$
\$sht5\$	\$date5\$	\$rev5\$
\$sht6\$	\$date6\$	\$rev6\$
\$sht7\$	\$date7\$	\$rev7\$
\$sht8\$	\$date8\$	\$rev8\$
\$sht9\$	\$date9\$	\$rev9\$
\$sht10\$	\$date10\$	\$rev10\$
\$sht11\$	\$date11\$	\$rev11\$
\$sht12\$	\$date12\$	\$rev12\$
\$sht13\$	\$date13\$	\$rev13\$
\$sht14\$	\$date14\$	\$rev14\$
\$sht15\$	\$date15\$	\$rev15\$
\$sht16\$	\$date16\$	\$rev16\$

Revisions Cell



Revisions Interface Selection

A screenshot of the 'Project Information [Unsaved default values]' dialog box. The 'Attributes' tab is selected. The title 'REVISIONS' is prominently displayed in the center. Below the title, there are three columns of input fields labeled 'SHT NO:', 'DATE:', and 'REVISION:'. Each column contains five empty text boxes for data entry.

Revisions Interface

2.11-2c sht_num

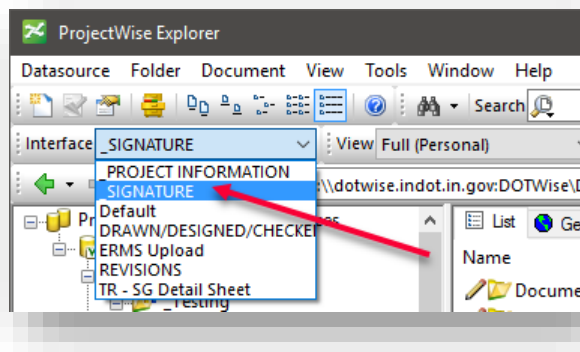
The sht_num cell is intended to be used with the automatic page numbering feature available through ProjectWise InterPlot Organizer.

2.11-2d signature

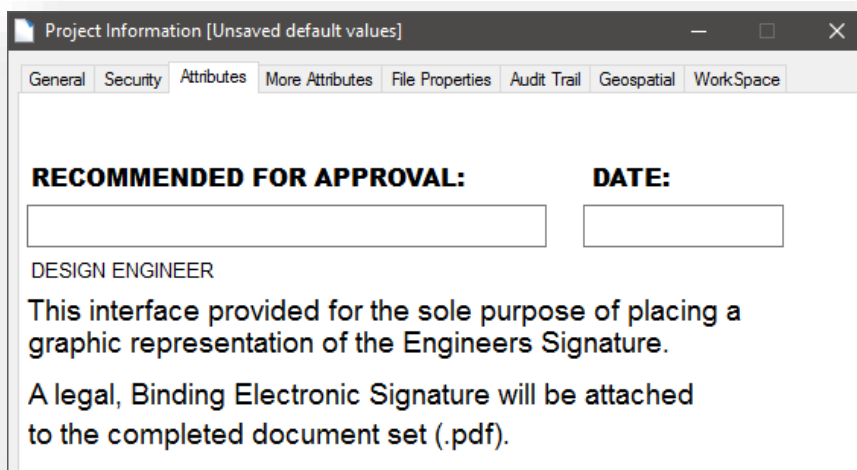
The signature cell is intended to be used with the _SIGNATURE interface and the Plan Production environment within ProjectWise. Further instructions on the use of this feature are in Chapter 4 of this manual.



Signature Cell



Signature Interface Selection



Signature Interface

WARNING: *With the exception of the sheet_num cell, all of the cells contain tag sets with very distinctive names. Placement of the cells in sheet models that already contain these tags—or placing duplicate cells in sheet models—may result in these cells not working. If you have issues of this type, please contact CAD Support via a Help Desk ticket.*

2.12 ProjectWise Interfaces and Special Character Integration

With the DOTWise 3.1 (Fall 2012) release of the CAD Workspace, non-True Type fonts are no longer available for use in the CAD Environment, with the exception of the SignCAD fonts. Users will notice that all fonts will now appear in the font drop-down list within MicroStation preceded with a TT whereas in the past their names may have been preceded by the Bentley B.

Also with this change, a number of special characters are not directly available for use in certain ProjectWise Interfaces, although they may be accessed as Windows special characters. One application in particular is the Universal Title Sheet interface (section 2.9-2a) in ProjectWise as it is used to place the project latitude and longitude on an INDOT title sheet.

In general, in order to place a special character when no Insert Symbol command or shortcut is available, users must hold the ALT key and type a series of digits from the number pad (the primary keyboard number row will not work in combination with the ALT key). In the case of placing the degree symbol in the latitude and longitude values, the key-in sequence is ALT+0176. See the table at the end of this section for a listing of common windows special characters.

Example: For 6 degrees 23 minutes and 23 seconds you would type 6[ALT+0176]23'23" to obtain the result shown below.

SPEC DATE	COUNTY	SURVEY BOOK	DESIGNATION
	Various	123456	0400096
LATITUDE	LONGITUDE	CONTRACT	PROJECT
6°23'23"	8°42'23"	B-29007	123456

MicroStation will then process the degree symbol and place it where called by a tag on one of the template title sheets, as shown below.

PROJECT LOCATION SHOWN BY Various

LATITUDE: 6°23'23" LONGITUDE: 8°42'23"

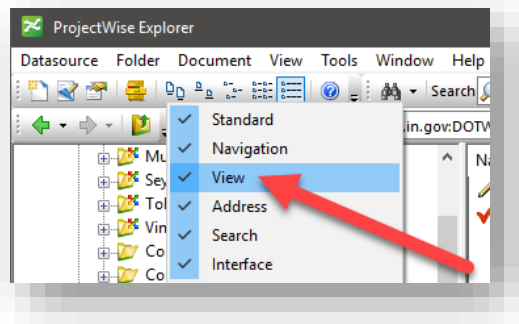
Special Characters

Symbol	Key-In	Description
°	ALT 0176	Degrees
±	ALT 0177	Plus or minus
¼	ALT 0188	Fraction: One Fourth
½	ALT 0189	Fraction: One Half
¾	ALT 0190	Fraction: Three Fourths

2.13 ProjectWise Views

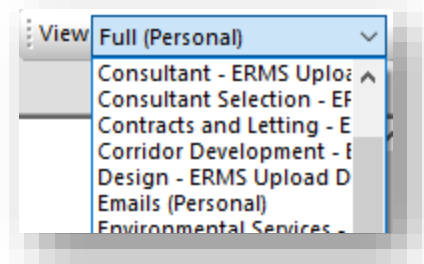
ProjectWise views control the display of documents and columns that you see in the ProjectWise Documents panel, and can also influence what is displayed in the Preview panel when looking at Document Properties. Views can control the display of a number of different items from various document properties such as creation and modification dates, to Environment/Interface specific pieces of data such as specific document attributes.

Views can be accessed by right clicking on the ProjectWise Explorer menu bar and making sure the View entry is checked.



Enabling Views

This will display the View toolbar:



The View Toolbar

When selected, the View toolbar will show the views that have been created for the datasource, or any you may have created. In most instances the view will be set to INDOT Default which covers the display of a number of default columns:

Document Name	Document Updated Time
File Name	Out to
Document Description	Created Time
File Size	Created By
File Update Time	Folder ID
File Updated By	Version
Folder Storage	Storage
Folder GUID	Local File Directory

Having these features enabled in the system default view allows for most of the relevant information to be displayed about the files, and additional information that's useful in troubleshooting. Again, this view has been set for the entire datasource unless one is specified for a particular area.

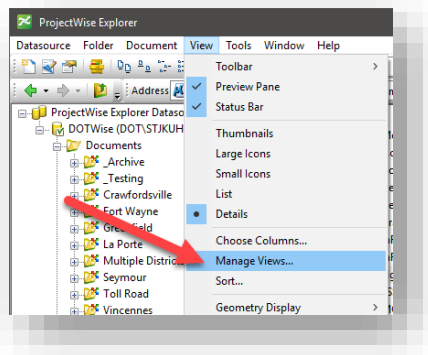
In addition to the INDOT Default View, there is also an ERMS Upload Document Status for each discipline in the system. This view for instance shows the last user to upload a document to ERMS from ProjectWise, the state it was in, and when it was sent.

End users can also create and modify their own view, which is covered in the next section.

2.13-1 Custom Views

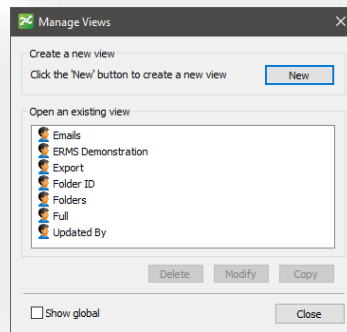
In some instances, it may be desired to have a view tailored to a specific set of data or a personal view with more information than the INDOT Default covers. This section will look at how to create and use these views.

When creating/editing custom views, you can go to View -> Manage Views from the ProjectWise Explorer menu.



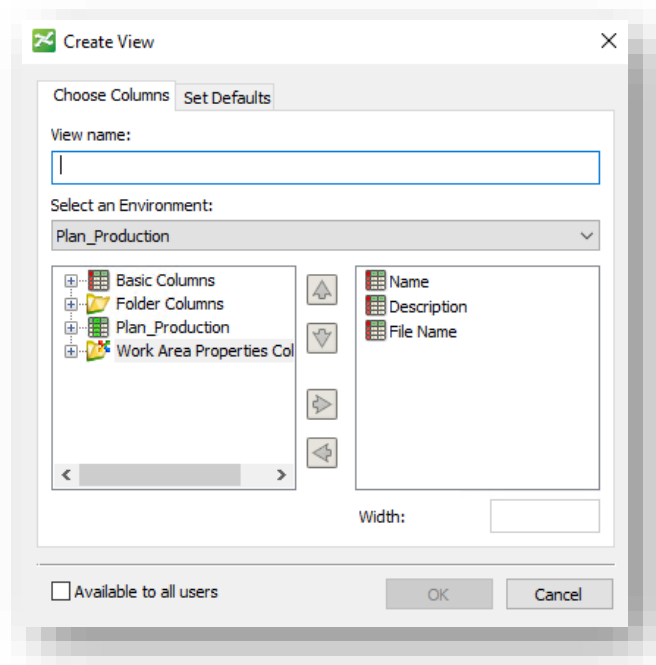
Manage Views

This will take you to the Manage Views dialog. In the example below, you can see that a number of views have been created under this account for various purposes.



Manage Views

A new view can be created by selecting the New button in the upper right corner. On the Create View dialog, you can then begin populating the view with available datasource columns.



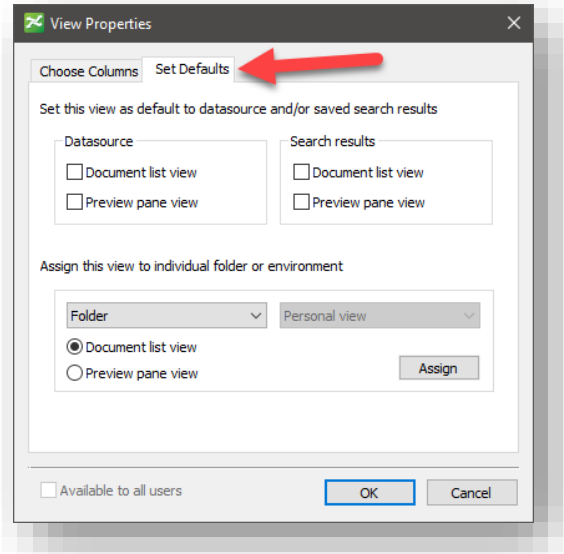
Create View

To create a view, you need to first give it a name in the View name field. After that, it's a matter of adding the relevant columns to your view. The initial view creation will give you Name, Description, and File Name. From that point you can then add a number of different columns with information from the system. On the Create View dialog you can add information from four areas:

- Basic Columns – These are system columns for document information, which includes items such as modification and creation dates, version information, and a number of other items.
- Folder Columns – This can display information about the documents parent folder, including any information about its dates, storage area, etc.
- Environment (Plans_Production in this example) – These are the fields that contain document properties specific to the discipline you're working in. For example in Design, this could include Spec Years, Project Manager, etc. Anything that is part of the Document Attributes or More Attributes will show up under this option.
- Work Area Properties – This allows for adding any of the properties assigned to the parent work area.

With these, you can tailor a view to the specific columns of information you want displayed while working in the system. Should you need to Modify/Delete the view, you can use the commands back on the Manage Views panel.

With custom views, you may wish to override the INDOT Default as the default view for the system to one of the ones you've created. To do so, go into the View Properties (highlight the view, select Modify). On this panel, you'll see two tabs. Select the Set Defaults tab.



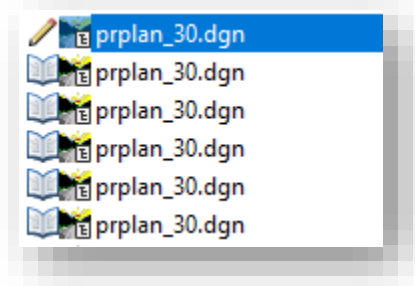
View Properties – Set Defaults

On this panel, you can set the selected view as your default for any folder document view or preview pane using the Datasource section. The same can be done for Search results, or individual folders or Environments.

2.14 Versioning

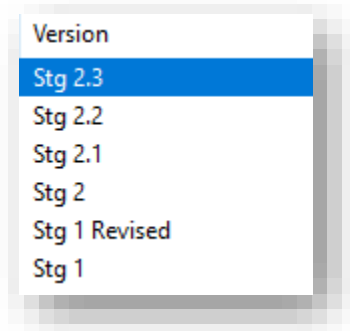
Versioning is not officially supported by INDOT CAD Support but is available for power user use. For more information on versioning and how to use it, please refer to the application help and the Working with Versions section.

To identify documents that have versions, you may see multiple copies of the same file in the same folder. If you have edit access, one of these will show the icon (pencil) denoting it's an editable document, and the rest of the copies will be denoted by the read only document icon (open book). If a user does not have edit access, all copies of the document will be denoted as read only. The copies with the read only icon will be the versions. Depending on the user, they may or may not use a specific versioning scheme.



Document with Versions

At this point, using the INDOT Default view, if you scroll to the right, you will see a column for version which looks like this for the above documents.



Versions naming displayed in the Document Panel

Again, this is not officially supported functionality, but these methods will allow you to identify documents that have versions and if you need clarity from the document provider as to what's the most recent or if they're asking you to view older versions.

2.15 Revised Template Sheet Models

To reduce duplication and ease navigation, we have split up sheets_eng.dgn into two separate files.

[D size sheets.dgn](#): All 24 x 36 (D size) sheet models now reside in this design file.

[Ltr sheets.dgn](#): All 8.5 x 11 (letter size) sheet models now reside in this design file.

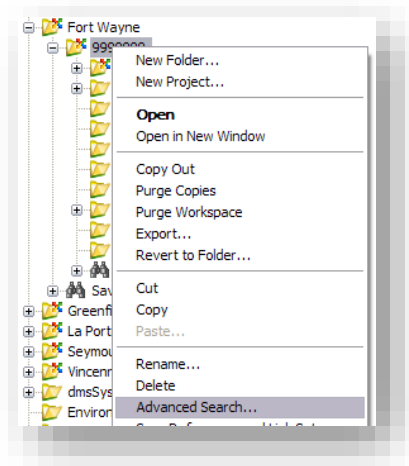
In addition to separating the large format sheet models from the smaller ones, MicroStation's ability to convert units on the fly has allowed for the metric versions of these sheet models to be removed.

2.16 Searching

As with the previous version of ProjectWise, searching plays an important role in interacting with your documents on a day to day basis. Searching via the Search Form or Search Builder has not changed significantly in this version. Supplemental information can be found in the application help file, or on the Bentley Learn Network course referred to earlier in this chapter.

2.16-1 Search Form, Search Builder, and Searching for Document and Work Area Data

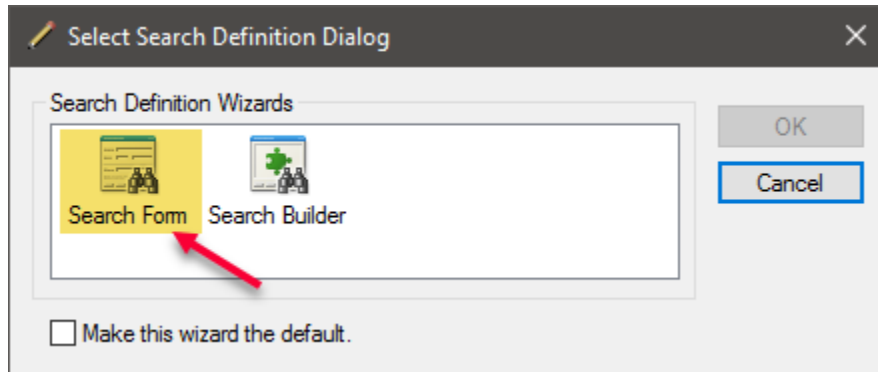
ProjectWise allows for searching on Work Area and Document metadata from the various interfaces we've discussed thus far. In order to search for this data, we will need to use the Search Form with the appropriate Environment and Interface selected.



Starting an Advanced Search

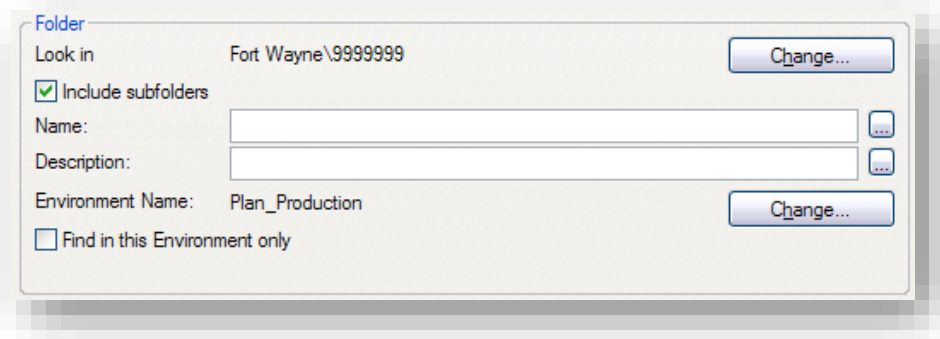
- Select your folder via a right-click and navigate to **Advanced Search**:

- You will then be prompted for the search method you would like to use. For this example, we will be using the **Search Form**. You could also select the **Search Builder** should you prefer to perform your search in a different method. At this time, you may also define one of the methods as your default search style. Should you need to change this setting, you may adjust the options under **Tools > Wizard Manager** and selecting the Search Definition Tab.



Selecting a Search Type with the Search Form

- Once in the Search Form, you will need to define the Environment you're searching in. This is done by adjusting the Environment Name area in the Folder portion of the panel. In the following illustration, we are showing a selection being performed on documents in the **Plan_Production** environment. It is NOT required that you toggle **"Find in this Environment only"** for these searches, however it is recommended. Should an identically named attribute be present in a different environment and have information that is the same as what you've searched on, it will be returned as a valid result.



Folder and Environment Definition

Search by Form - DOTWise

General | Attributes | More Attributes | File Properties | Full Text | Geospatial

Universal Title Sheet

PLAN TYPE

DESCRIPTION:

LOCATION:

AREA ENG. COUNTY. NO.

PLANS PREPARED BY: PHONE NUMBER

PROJECT ROUTE

FROM RP TO RP AT RP

PROJ. NO. CONST	GROSS LENGTH	BRIDGE LENGTH
<input type="text"/>	<input type="text"/>	<input type="text"/>
PROJ. NO. PE	NET LENGTH	RDWY LENGTH
<input type="text"/>	<input type="text"/>	<input type="text"/>
PROJ. NO. RW	MAX. GRADE	TOTAL LENGTH
<input type="text"/>	<input type="text"/>	<input type="text"/>

BRIDGE FILE STRUCTURE NO.

SPEC DATE	COUNTY	SURVEY BOOK	DESIGNATION
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
LATITUDE	LONGITUDE	CONTRACT	PROJECT
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

A.A.D.T. V.P.D.

A.A.D.T. V.P.D.

D.H.V. V.P.H.

DIRECTIONAL DIST. %

TRUCKS % D.H.V.

DESIGN SPEED: M.P.H.

PROJ. DES. CRIT.:

FUNC. CLASS.:

RURAL / URBAN:

TERRAIN:

ACCESS CONTROL:

Look For Add OR Group Clear Saved Search

Show results in new window

Searching Title Sheet Attributes

Search by Form - DOTWise

General | Attributes | More Attributes | File Properties | Full Text | Geospatial

Origin #:

KIN #:

Lead Project?

Associated DES Nos.

Project Status:

Sponsored By:

Designed By (Agency):

Letting Start Date:

Letting Finish Date:

Program Class:

City Boundary:

Urbanized Area:

District Location:

Sub District Location:

Program Manager:

Project Manager:

Project Mgr. Email:

Project Mgr. Phone:

Land Acq. Code:

Of Parcels:

Transportation System:

Stage 1 Design:

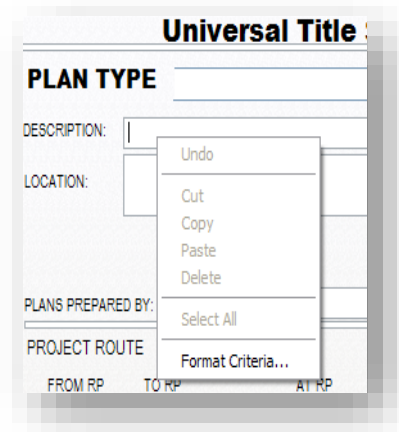
Look For Add OR Group Clear Saved Search

Show results in new window

Searching More Attributes

- Once you've selected the environment you'd like to search with, you will then navigate to the Attributes or More Attributes tab (This is dependent on the environment your document's use. Further information is provided in the first section of this document) at the top of the Search Form. On this panel, you will see the attribute layout for the environment. For this example, we're looking at the INDOT Universal attribute layout for *Plan_Production*.

Note: *Unlike the document attribute panel, the Search Form version of this panel has no locked fields. This is to allow you the ability to search on any field available and retrieve documents that have the information you need.*



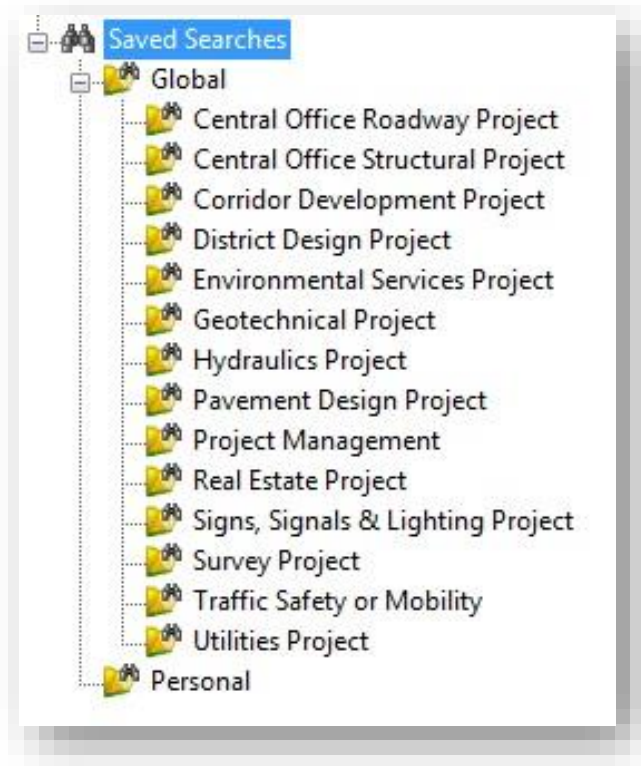
Format Criteria for Searches

At this point, you will then be able to search for documents using any available field on the Attribute Panel. As a reminder, you can use Format Criteria on any field in order to perform more intelligent searches. You can do this by right-clicking any field as shown and selecting *Format Criteria*.

As you complete the setup of your search, you may then execute the search, or proceed to save it and re-use it as necessary. The default behavior for saved searches is to associate them with the project you're currently working in. Should you wish to adjust this, you will need to browse to the ROOT level in the location browser. This will allow you to save your own personal searches that are not associated to a specific project.

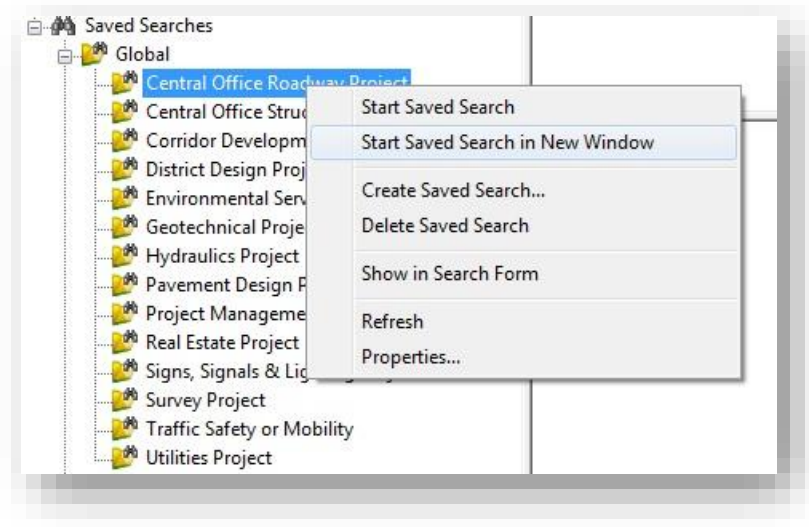
2.16-2 Saved Searches

Within ProjectWise, pre-configured saved searches are now being provided. At the district level, Saved Searches that relate to each Discipline are provided; such as Survey, Design, etc. Under each Des. No., searches are provided for a variety of document types and time last modification times. These are basic searches over the entire project but will allow for a quick access to information within.



District Level Saved Searches

Note: When performing saved searches, we recommend you push the output to a new window. You can do this by right clicking on the saved search and selecting Start Saved Search in a New Window as shown:



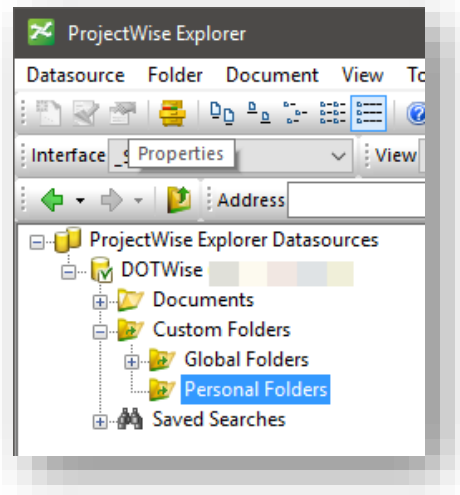
Running a Saved Search to a New Window

This will provide a secondary window with your search results, allowing for the ability to browse both the datasource and your search at the same time.

2.17 Custom Folders

With the current folder structure being used in ProjectWise, all users will see the full list of active projects across the agency. In order to ease browsing through this data to get to the project you need, *Custom Folders* have been enabled for your use.

In your document tree you will see an entry for Custom Folders underneath the Documents folder:



Custom Folders

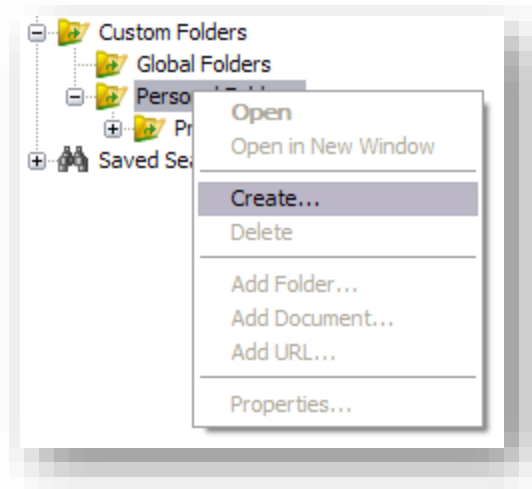
The Custom Folders can be thought of as a “Favorites” for ProjectWise. By using these folders, you can virtually bookmark your project in the datasource allowing for fast access without the need to drill into the datasource to find it. When linking to documents or full Work Areas within the datasource, all data in that location is virtually linked back to the location of files/Work Area in ProjectWise. As this is a live link to the original data, all rights in regards to folder/document creation/deletion apply.

Note: *Be extremely careful when using the Delete command within Custom Folders. While behaving similar to a web browser’s favorites, any document action you perform in the Custom Folders will occur to the document itself, of which deletion is the most destructive. Do not use Delete to remove a file from your Custom Folders as it will completely delete the file should you have permissions. Instead, use the Remove from Folder option if applicable.*

The following steps will walk you through the steps of creating a set of Custom Folders and linking to your data.

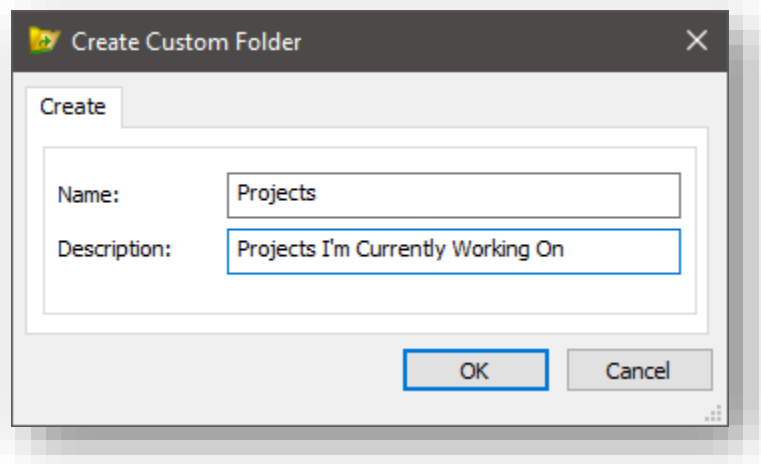
2.17-1 Using Custom Folders

1. In ProjectWise, navigate to the Custom Folders and expand them. Right click on *Personal Folders* and select create:



Creating a Custom Folder

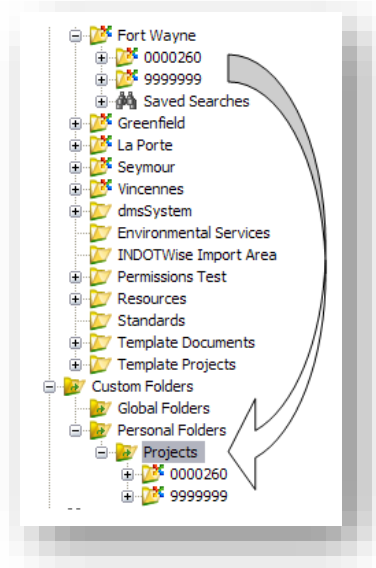
2. When prompted, create your personal folders. Some possible custom folders you may wish to have are for active projects, region projects, or for resource documentation.



Creating a Custom Folder

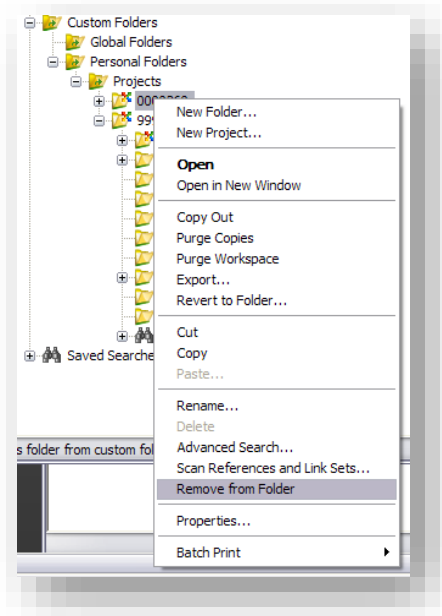
3. Once you've created your folder, it shows up under the Personal Folders in ProjectWise. This folder is one only you can see, so each person will need to setup their Custom Folders however benefits them the most.

- At this point, you're now ready to begin populating your Custom Folder. You do this by dragging and dropping anything you'd like into the Custom Folder of your choosing. This will create a live link to your data.



Dragging a Folder/Document into Custom Folders

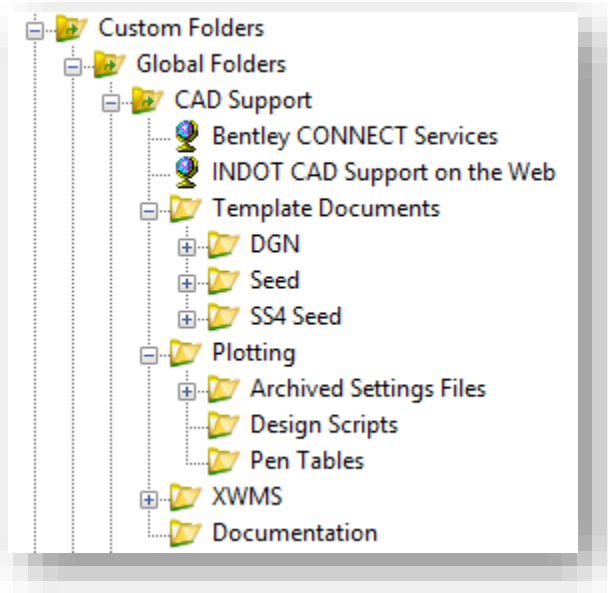
- Should you wish to remove any link from your custom folder, right click on the project/file and select **Remove from Folder**. This will remove the link without modifying your data. Any other method of deletion/removal will delete your data depending on your permission levels.



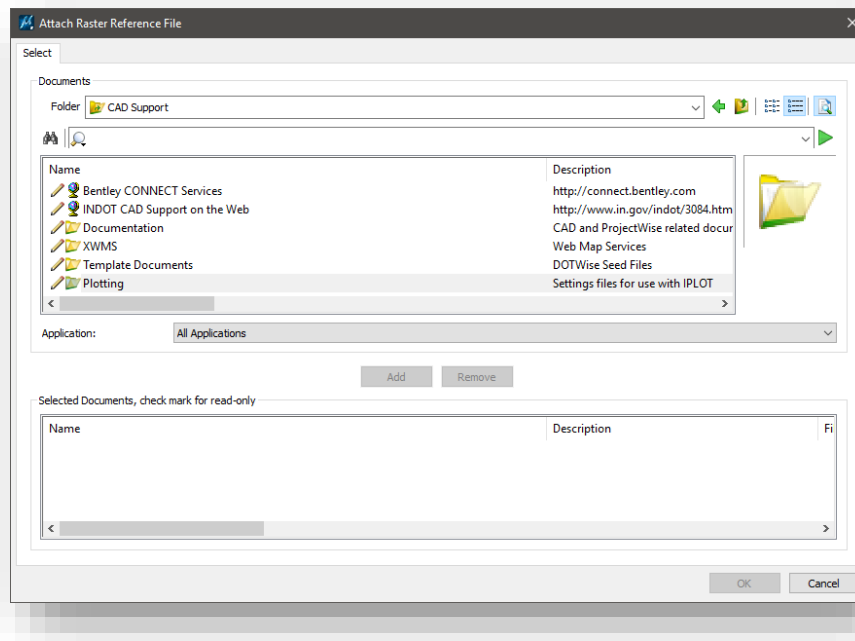
Removing an Item from Custom Folders

2.17-2 Agency Global Folders

With the 2019 Fall release of DOTWise, the INDOT CAD Support group has added an INDOT CAD Support entry under Custom Folders\Global Folders\CAD Support. This folder has been added for end users to quickly locate a number of commonly used resources such as Documentation, Plotting Files, Template Documents, and WMS Imagery without having to navigate throughout the folder tree when trying to reach these resources.



CAD Support Global Folders in ProjectWise Explorer



Global Folders when Browsing in an Integrated Application

2.18 Applications Without ProjectWise Integration

As has been discussed, ProjectWise provides a managed environment for working with your documents and data. It achieves this through a combination of file operations and application integration with applications such as MicroStation, ProjectWise InterPlot, and Microsoft Office applications. The user experience with these applications is almost transparent as the direct application integration allows the user to open/modify/save files directly to and from the ProjectWise datasource.

What happens with applications that are not integrated, though? This section will explain the events that happen and procedures that will need to be taken to work with a small subset of the applications that are used by Production during the Project Lifecycle.

Currently, there are a few non-Bentley applications that are being used at INDOT that do not have native ProjectWise integration (i.e. MathCAD, SignCAD). If you have questions about a particular application you are using and its integration with ProjectWise, contact CAD Support.

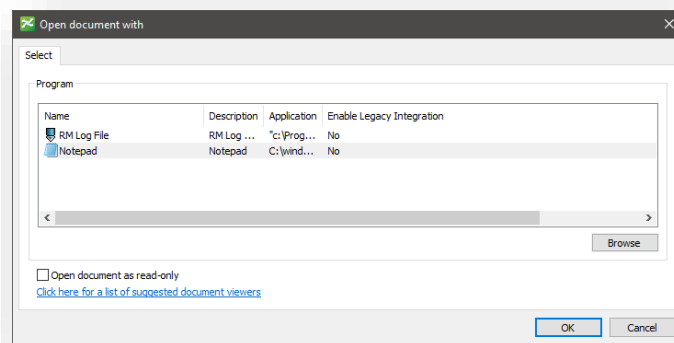
As these programs lack ProjectWise integration, you may have to perform additional steps to retrieve your data and then work with it. In the following sections, we will discuss the options available to work with these types of data.

2.18-1 Working with Non-Integrated Applications

ProjectWise allows two ways for the end user to work with applications that are not integrated with it. The first way is by providing a semi-managed/integrated environment. In this instance, ProjectWise relies on the file extension to guess what application the file should be opened in.

Warning: *The following procedure only works with single files. Applications that rely on more than one file, or a master file and multiple data files will need to be handled in a different manner that is discussed later in this section.*

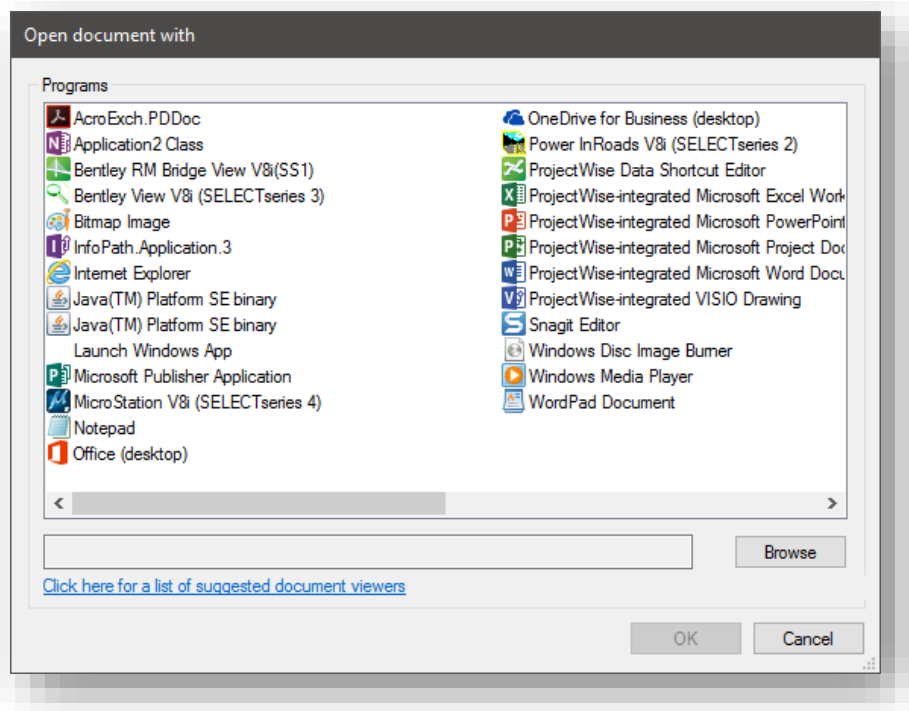
For example, we'll examine the behavior of .log files. Outside of ProjectWise, when a .log file is opened, it will automatically start Notepad, as Windows Explorer knows that this is the application that should be used. In the ProjectWise environment, you will see similar behavior. When a .log file is opened from the ProjectWise environment, you will be prompted with the following:



Open Document With Dialog

Note: It's possible that more than one application is eligible to open files of a specific type. As shown in the previous illustration, in addition to NotePad, RM Log File is also an installed application that can open this type of file. If presented, you will need to determine the appropriate application to proceed.

ProjectWise communicates with Windows Explorer to check what application it should open the file with. In the case of .log files, ProjectWise finds that Windows Explorer wants to open the file with Notepad, so it makes the same assumption. This is not static behavior, however. As shown in the previous illustration, ProjectWise first prompts you via the “Open Document With” window. Additionally, you are also provided a Browse button; you may manually define the application you wish to open the file with. The applications listed in this option are a list of commonly available applications on the computer you're working at.



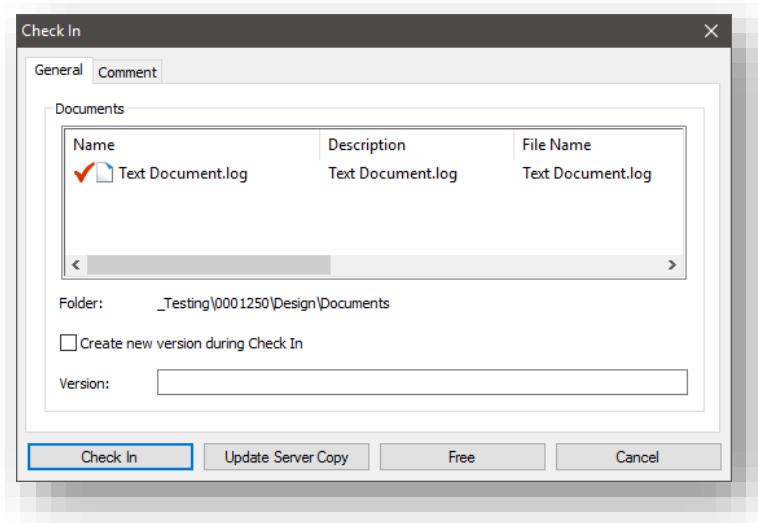
Selecting an Application to Open With

Once satisfied with the application selected to open the file, you may then work with it normally.

While working in the application, you will notice some differences from working in an integrated application. When you perform save/open operations in a non-integrated application, you will not receive the ProjectWise dialog windows, but rather, the standard Windows Explorer ones. This will also be true for any file operation command that would prompt you with similar options such as an import/export, an attachment, or a link.

Note: When performing non-integrated file operations, these applications will typically display the path to the file in your local ProjectWise working directory. You should not attempt to directly access the files at this location, or manually edit or modify them. It is possible to get your data out of sync with the server and to lose data.

As you complete work with the file, you are then ready to check the document back in. ProjectWise remembers the application that opened the file and maintains knowledge of its status as you're working on them. When you've completed work, you will need to save your file, and then exit the application. As the application closes, ProjectWise will see that work on the file has completed and will then prompt you to check the file in.



Document Check In

It should be noted that this will only happen when the application is closed, as ProjectWise only maintains knowledge of the application and not the file operations (Save As, File -> Close, etc.) performed within it.

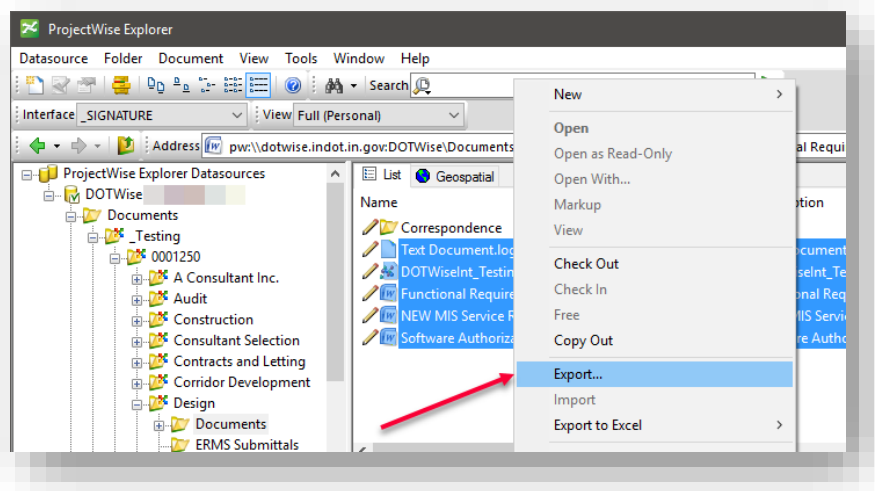
Note: When working with documents that use a single session for all documents of that specific type, it's possible for ProjectWise to not automatically prompt for file check in when one of the files is closed. The system maintains knowledge of the application in whole, and a single file closure will not be enough to trigger the check in. It will display once the entire application is closed. Alternatively, you can use the Local Document Organizer to check those files in.

2.18-2 Working with Documents of an Unknown Type or Multiple Files

As shown in the prior example, ProjectWise is very flexible in maintaining control over applications when working with single files. For applications that rely on multiple files, a master file and additional data files, or a single file that does not have an application association, a different procedure is required.

For files that match the preceding criteria, you will need to use the document export tools within ProjectWise. The document export process is a ProjectWise-managed process that places files in a location of your choosing, while maintaining knowledge of these files for re-import at a later time.

For this example, you can use any small group of files. To start the export process, select the files you wish to export and select the Export option by right clicking on the files, or selecting the option from the Document menu.

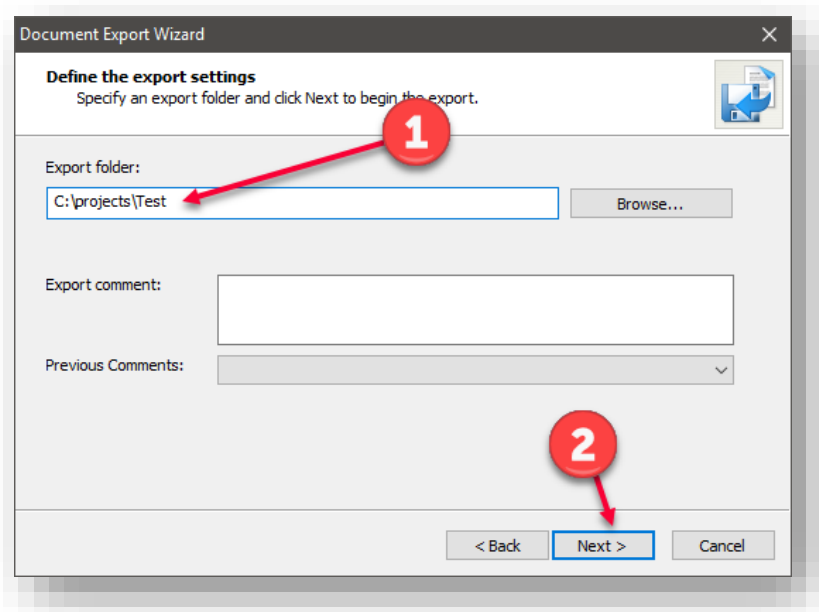


The Document Export Command

This will start the ProjectWise Document Export Wizard; the first panel is information and may be skipped. On the second panel, you are prompted to select the method with which you'd like to retrieve your document. The two options presented are **Export** and **Send to Folder**. To maintain a semi-managed environment, we will be selecting the Export option as it allows ProjectWise to maintain knowledge of the exported file and allows for later re-import. The Send to Folder option should only be used when you want to create an unmanaged copy—which causes ProjectWise to only make a copy of your file locally with no method of re-import.

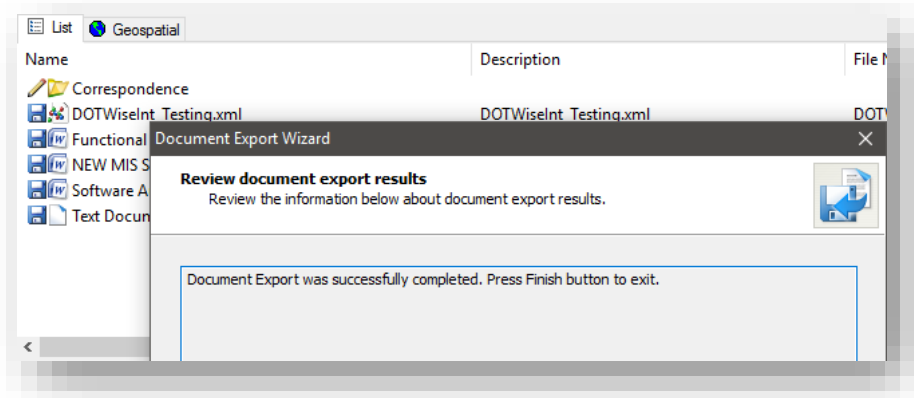
On this panel, you also need to select the folder where you'd like to export the files. When selecting this location, you must make sure that you select a location that is consistent and predictable. If you do not specify locations in this manner, the potential for data loss exists, or the possibility of overwriting data. For the example shown here, the path of C:\Projects\Test has been chosen. During production use, this would translate into the Des. No. and route of the project you are exporting files from. This gives you an easily identifiable container to place your files while working on them.

Once you're satisfied with the export location and any potential comments you'd like to be recorded in the Audit Trail, you may then select the Next button.



Document Export Wizard

The documents will be exported from ProjectWise and their icons will change to denote that they are exported.



Completed Document Export

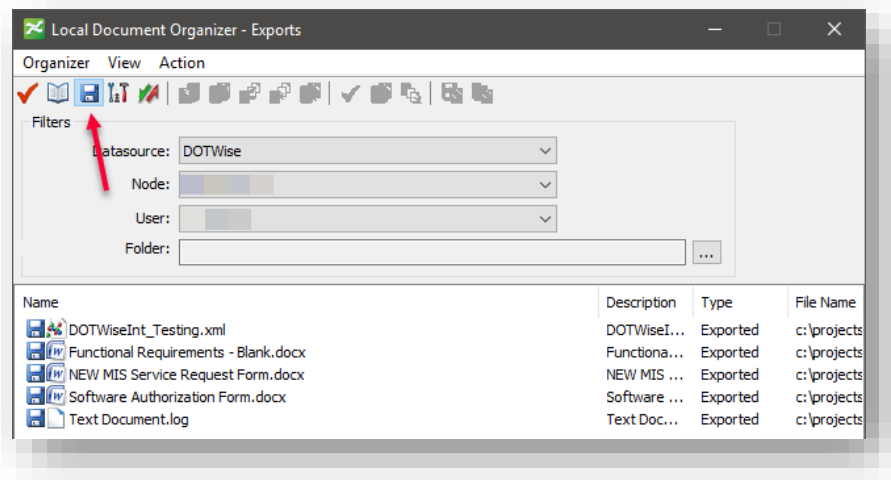
You're now free to work on the files how you normally would outside of ProjectWise. As the files are not being opened within ProjectWise, no automatic prompts for check in will be shown. Also, in the event your files exported are DGNs, it is probable that the appropriate libraries are unavailable.

Upon completion of working with your files, you will then need to re-import the documents back into the datasource. To perform this step, you may either use the Local Document Organizer, or highlight an exported document and select Import from the Document/right-click menu. *To provide the*

utmost data security, and flexibility in data sharing, it is recommended that you re-import your data daily. In the event of PC hardware problems, this will prevent large amounts of data and work loss, along with making the most up-to-date copies of your data available for use by other members of the project.

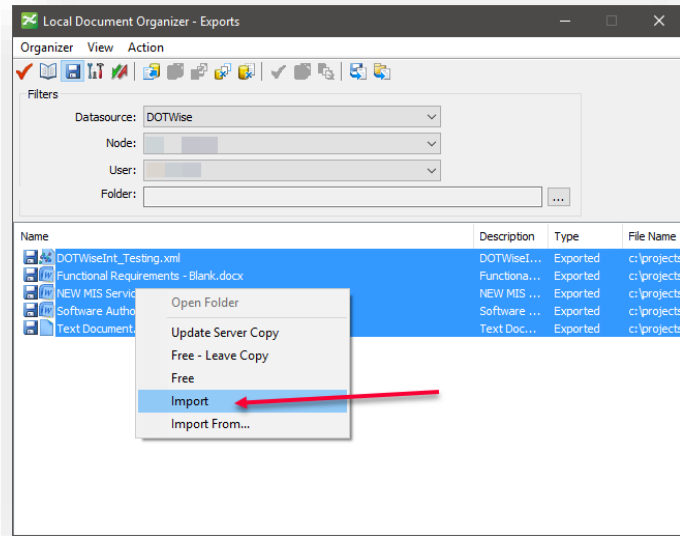
The single document Import process behaves as though you're checking in the file that was exported. You will be prompted to add meaningful comments during the check-in process as you are with other documents.

To re-import your data, you will use the Local Document Organizer that is a component of ProjectWise Explorer. This can be found under the **Tools -> Local Document Organizer**. You will be presented with the following window:



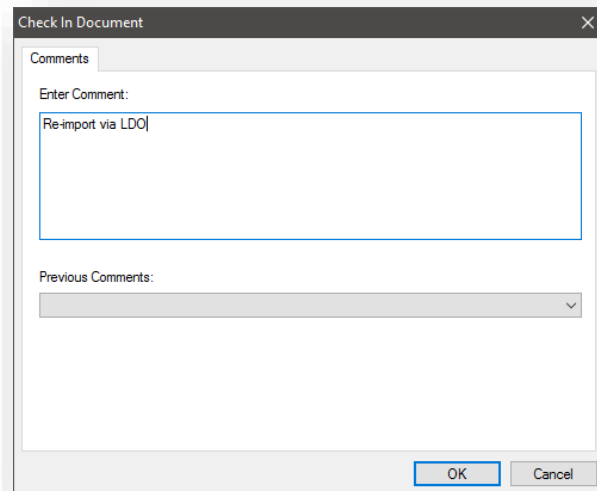
Local Document Organizer

This tool defaults to having only Checked Out documents shown. You will **change the filter to the Exports (floppy disk)** option as shown in the prior image. To ease the re-import process, it is suggested that you sort your exported documents by file name. This will make sure that all documents in that location are together. To re-import the documents, you then need to **select all of the files that you'd like to re-import and right-click on them. Select the import** option as shown.



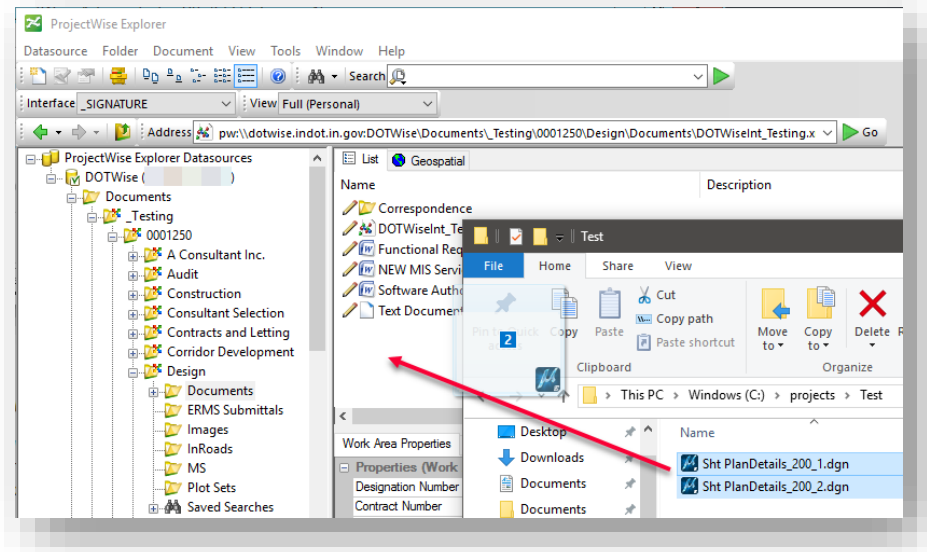
Import Menu Item

Once you've selected the import option, you will be prompted to enter any relevant comments pertaining to this operation. Relevant comments include any operations you may have performed.



Document Check In

This will re-import and remove any documents that you initially exported prior to working with your data. Any new files will remain in the designated location on your PC. To bring these newly created documents into ProjectWise, you will need to open the export location on your PC in Windows Explorer, and select the remaining files (no subfolders) and drag and drop these files into the necessary folder for your project in ProjectWise.



Drag and Drop of New Files

The Document Export Process: Things to remember!

- *Make sure you export your documents to a consistent and predictable location.*
- *Re-import your data daily. It is your responsibility to maintain your most recent data.*
- *Do not move exported files, as ProjectWise only retains information regarding these files when they are in their exported locations. Moving these files presents the potential for data loss.*

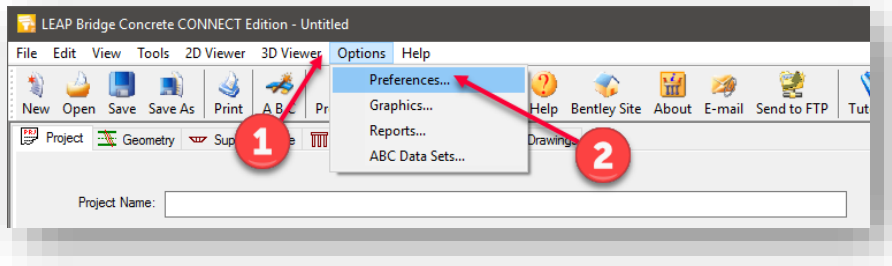
2.19 LEAP Bridge Integration with ProjectWise

Unlike typical Bentley applications, the LEAP Products integrate with ProjectWise in different fashions. This section will cover a very high-level overview of how these products integrate.

2.19-1 LEAP Bridge Concrete

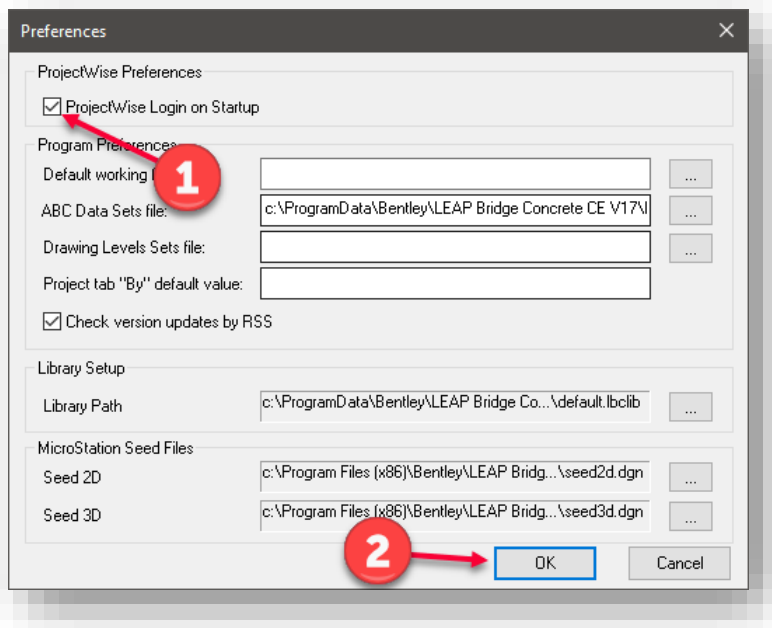
The first step in LEAP Bridge Concrete integration is to enable the ProjectWise login. To do so:

1. Launch LEAP Bridge Concrete.
2. In the application, navigate to the Options > Preferences menu.



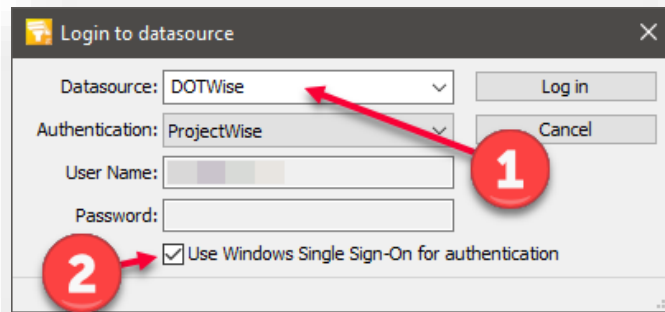
LEAP Bridge Concrete Preferences

3. On the Preferences dialog, enable the checkbox for **ProjectWise Login on Startup**. Select OK when completed.



Enabling ProjectWise Login

4. Close and Relaunch LEAP Bridge Concrete. You will be presented with the ProjectWise login dialog. Select **INDOTWise** for the Datasource and **Use Single Sign On** and select **Log In**. *Note: With the new INDOTWise datasource, there will NOT be an option for DOTWise as shown below—but the process is exactly the same.*



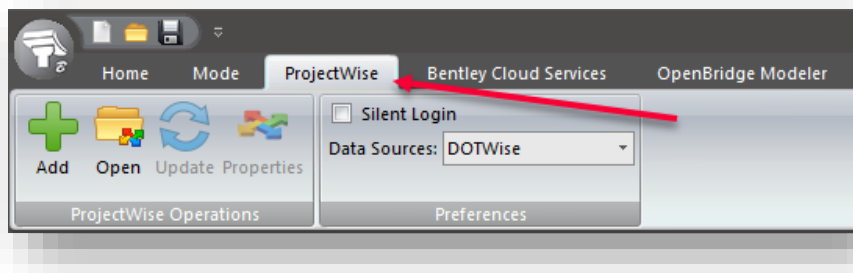
LEAP Bridge Concrete Login

5. Once logged in, the typical LEAP Bridge dialogs will now use ProjectWise file operation dialogs such as Save As, and File Browsers. At this time, you are integrated with ProjectWise and can leverage this integration similar to other applications such as MicroStaton.

2.19-2 LEAP Bridge Steel

LEAP Bridge Steel uses a different interface methodology for ProjectWise integration. The application integration in this application is configured via its Ribbon interface. To begin:

1. Launch LEAP Bridge Steel. Navigate to the ProjectWise ribbon.



ProjectWise Ribbon

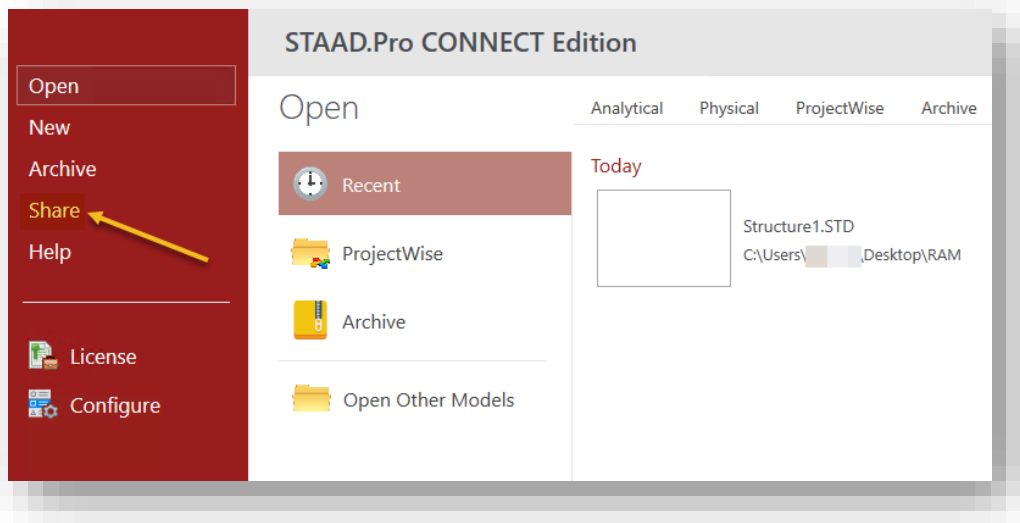
2. For LEAP Bridge Steel, you may directly interact with the system using the tools presented without needing to enable any preference. From the previous screen capture, there are two items of note. The first is the Data Sources: entry. For this one, select **INDOTWise**. The second option is directly above the Data Sources and is a checkbox for Silent Login. By enabling this, your ProjectWise session will immediately login to the system with your credentials, bypassing the login dialog.

3. Once connected, the Open and Add buttons will activate allowing you to perform your typical file operations on LEAP Bridge Steel files, again replacing any file operation commands and browsers with their ProjectWise counterparts.

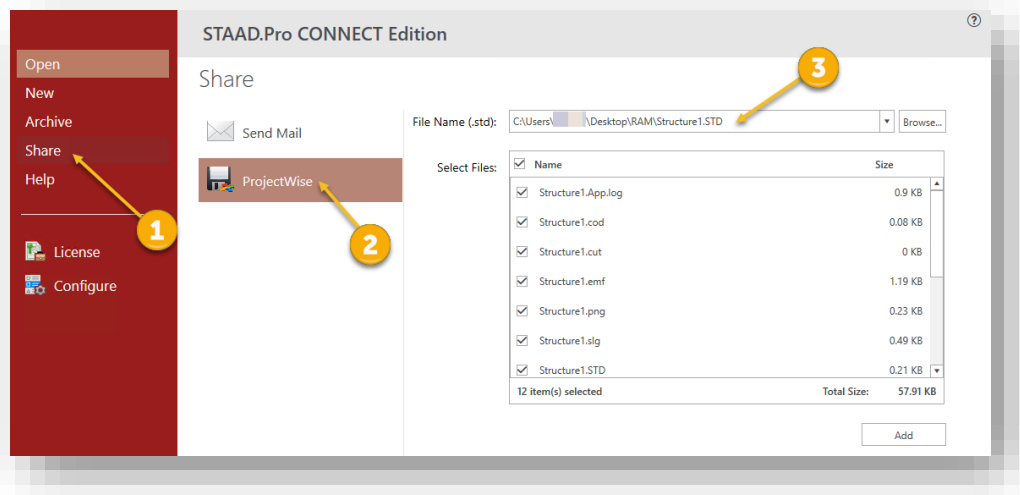
2.19-3 STAAD Pro

STAAD Pro does integrate with ProjectWise. The most important initial note is that a STAAD project file should not be directly placed in the datasource. The following process will cover how to place STAAD data into the system properly, and then open it afterward. These steps assume that you already have a STAAD Pro project that you'll want to place in the system.

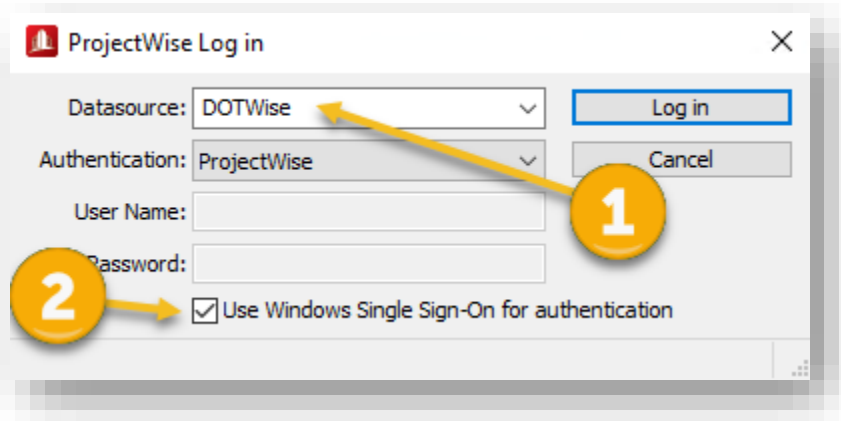
1. Open STAAD Pro, on the home screen, select the Share link.



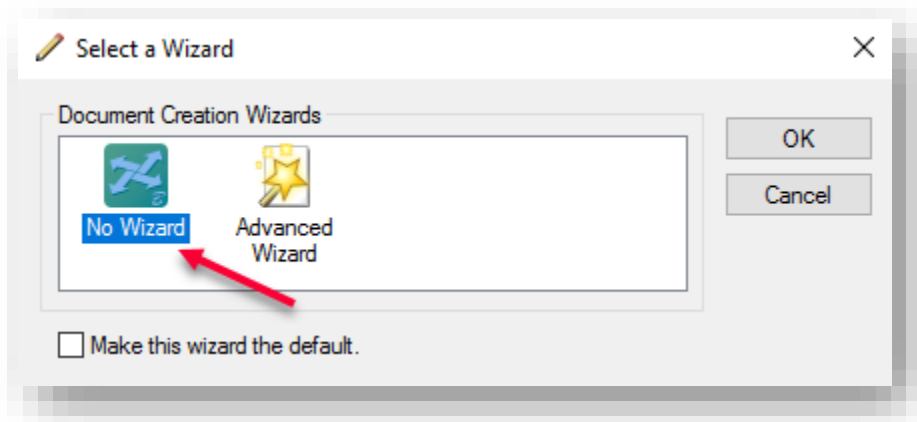
2. On the Share panel, select ProjectWise, and then navigate to the location of your STAAD files. Once you select the .STD file, all associated project files will also be included as shown.



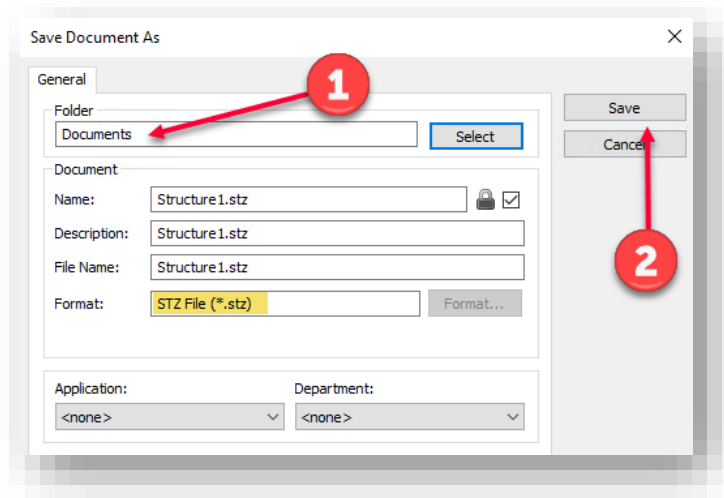
- Once prepared, select the Add button in the lower right of the previous display. You will be prompted with a ProjectWise login. As we've done with previous logins, make sure to select the INDOTWise datasource, and enable the Single Sign On check box. Click on Log In when ready. **Note: With the new INDOTWise datasource, there will NOT be an option for DOTWise as shown below—but the process is exactly the same.**



- At this time, you will be prompted with a Document Creation Wizard choice. For the purposes of this example, we will be using No Wizard.

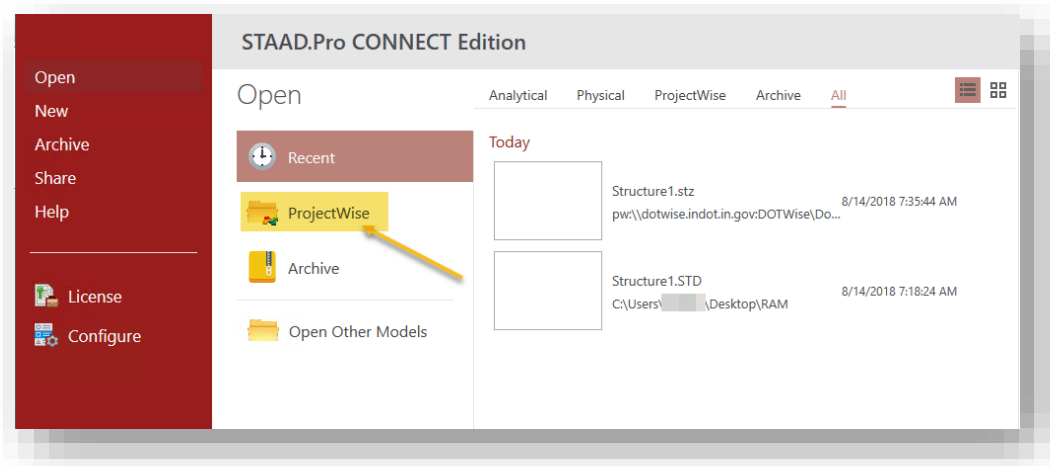


- On the following panel, select the ProjectWise location you'd like to place the file and then select Save.



Note: The highlighted portion of the above screen shot shows the format of the file placed in ProjectWise. STAAD automatically changes and requires that ProjectWise uploaded projects be in the .STZ format instead of the .STD format.

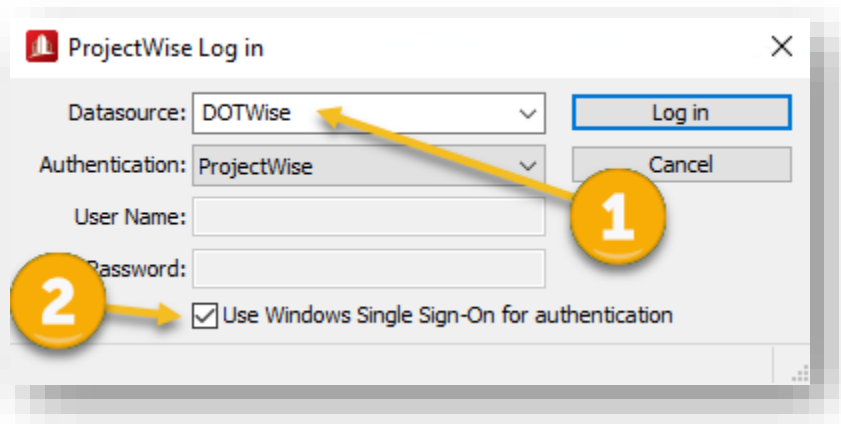
- You will be prompted to enter any upload comments when you select Save. Enter any necessary. Upon closing the STAAD software, you will be prompted to check the project file.
- To then open a STAAD project, open the application, and select ProjectWise on the Open tab that's initially presented.



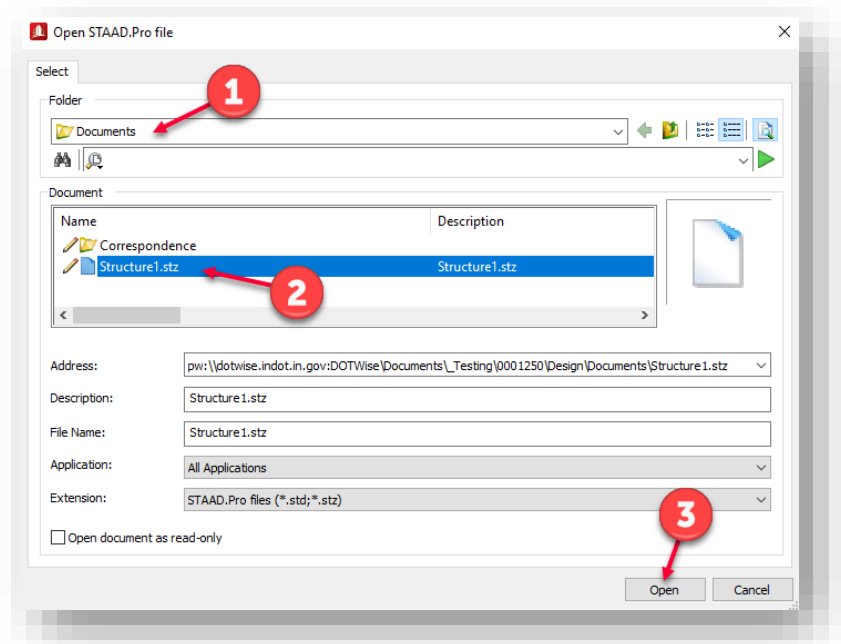
Note: The STAAD project file (.STZ) should not be opened directly from ProjectWise. Please open these files through the STAAD application to ensure that all functionality is present.

- When presented with the ProjectWise login, your Datasource should be remembered from uploading a file. If not, select DOTWise and enable the Single Sign On checkbox. Click Log In

when ready. *Note: With the new INDOTWise datasource, there will NOT be an option for DOTWise as shown below—but the process is exactly the same.*



9. Navigate to the appropriate location in ProjectWise and select your .STZ file. Select Open when ready.

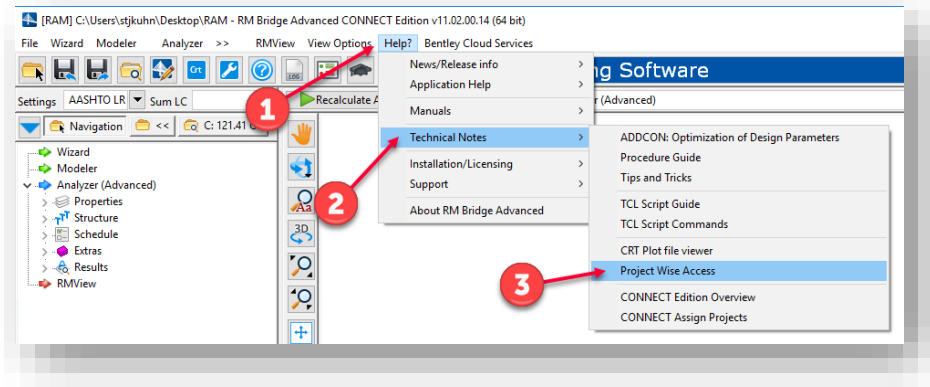


Note: You may be prompted to associate to a project. INDOT is not currently using this functionality, so if this prompt occurs, please cancel it.

10. At this time, you'll be placed into your STAAD project. You can modify your data in the typical fashion, and then when you close your file, you'll be prompted to check the project file back in.

2.19-4 RM Bridge

RM Bridge does not integrate with ProjectWise, however it uses its own version of the ProjectWise tools in order to function within that system. As it uses these non-standard integration methods, it's highly advised that if you'd like to use this functionality, you will need to review the application-provided documentation on this tool. This information can be found under the Help? > Technical Notes > Project Wise Access, and will open a .PDF with the relevant information.



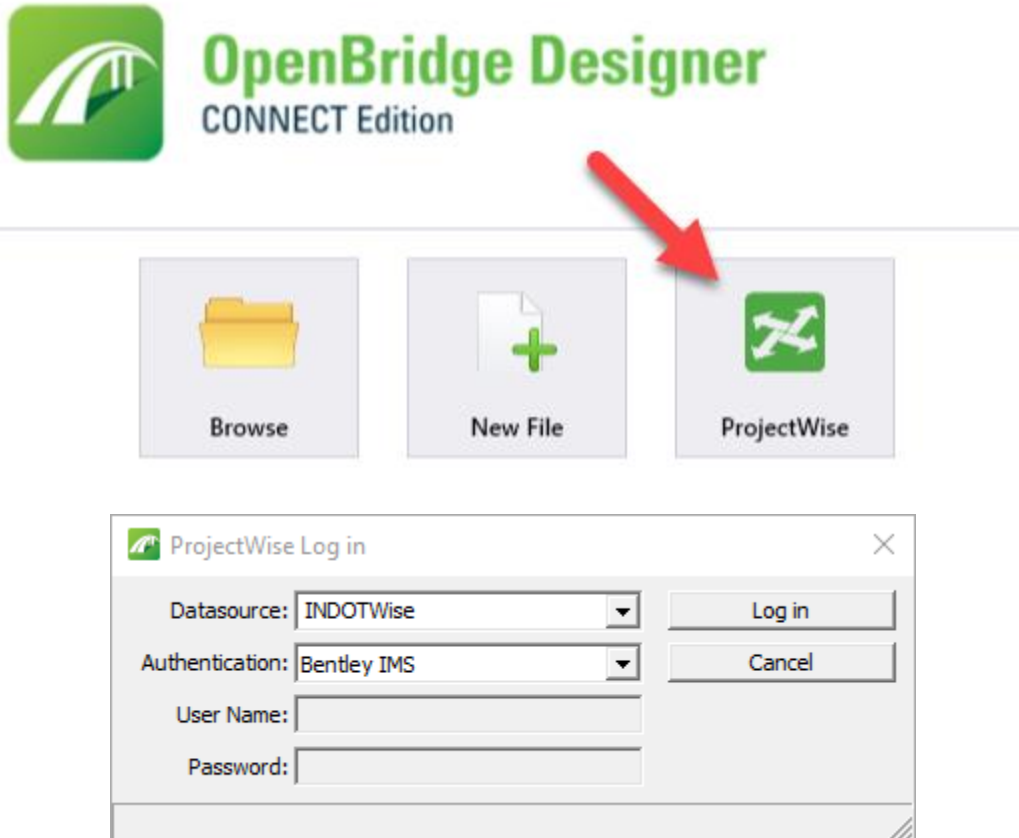
RM Bridge ProjectWise Documentation

2.19-5 LEAP Consys and RAM Elements

LEAP Consys and RAM Elements do not have any ProjectWise integration. If you would like to try and use these products with ProjectWise, please refer to [Section 2.18](#).

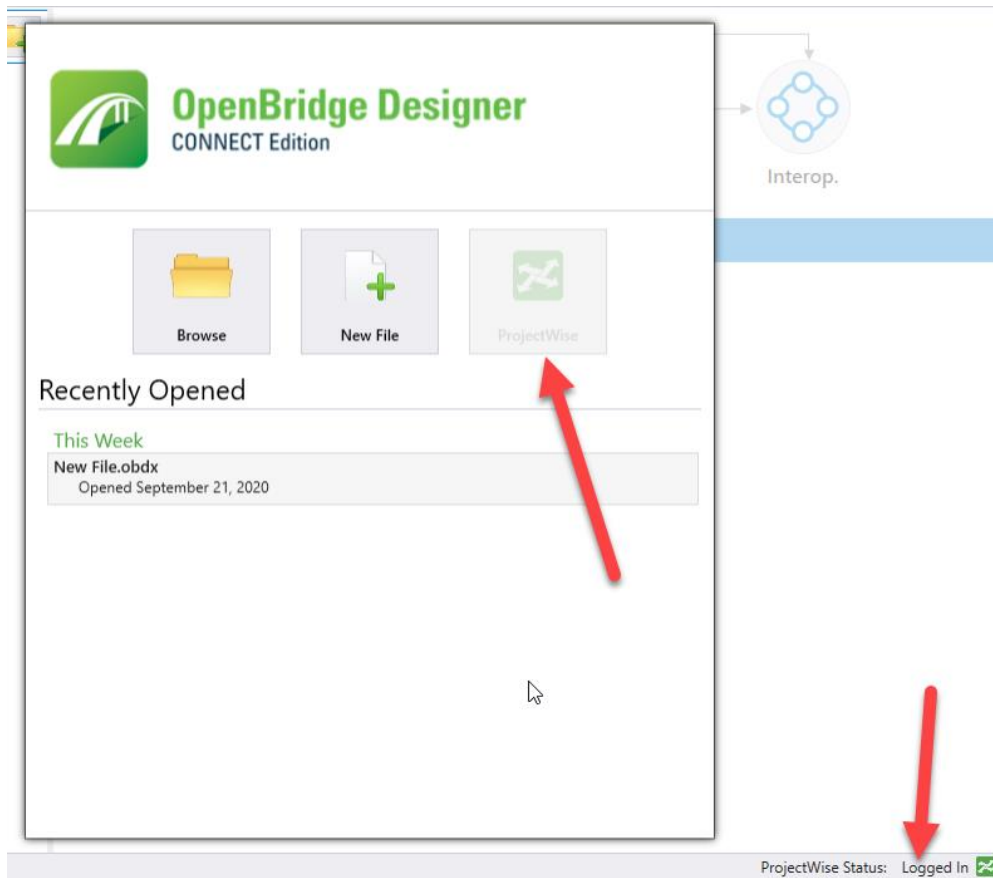
2.20 OpenBridge Designer Integration with ProjectWise

Instead of leaving ProjectWise integration up to each of the individual products, OBD moves the integration up to the top level of the OpenBridge Designer. On the OpenBridge Designer main screen, select the ProjectWise icon, and login appropriately. Be sure to choose INDOTWise as the datasource and Bentley IMS for the authentication method. *NOTE: Be sure you are logged into the CONNECTION Client first, prior to logging in with this method.*

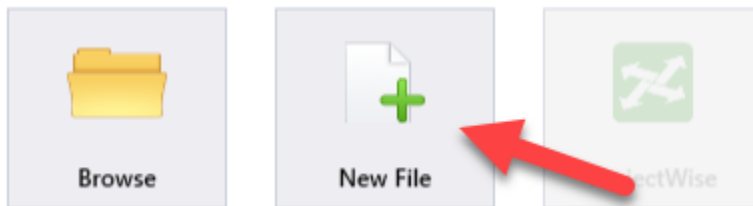


Logging into ProjectWise within OpenBridge Designer

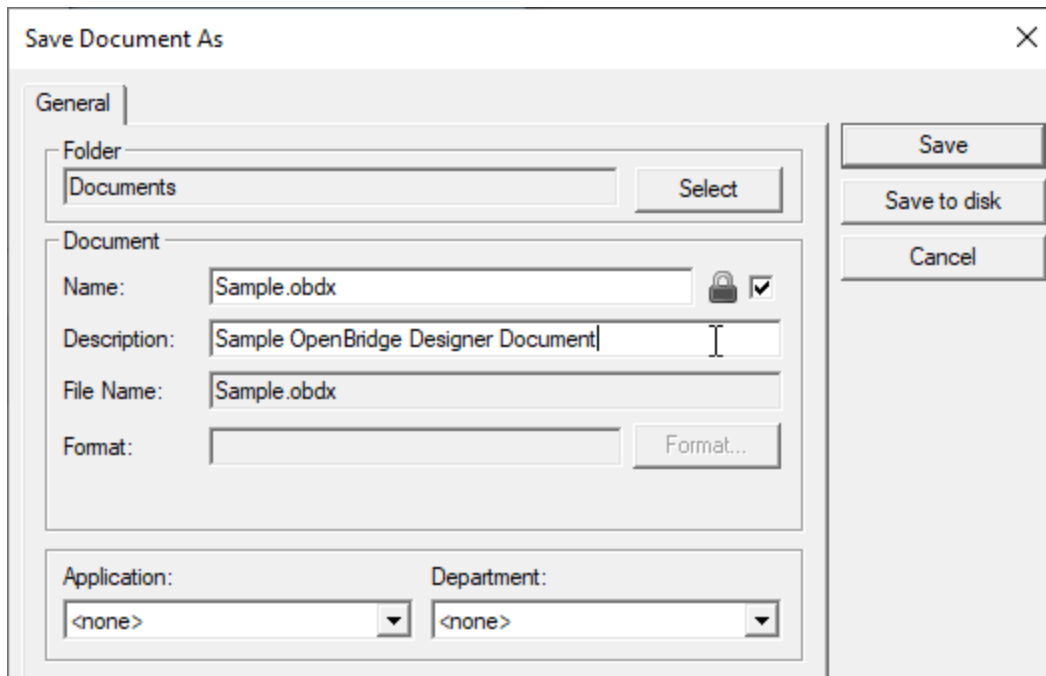
When successfully logged in, the status bar in the lower right will show that ProjectWise is Logged In, and the icon will be grayed out for the duration of your OBD session.



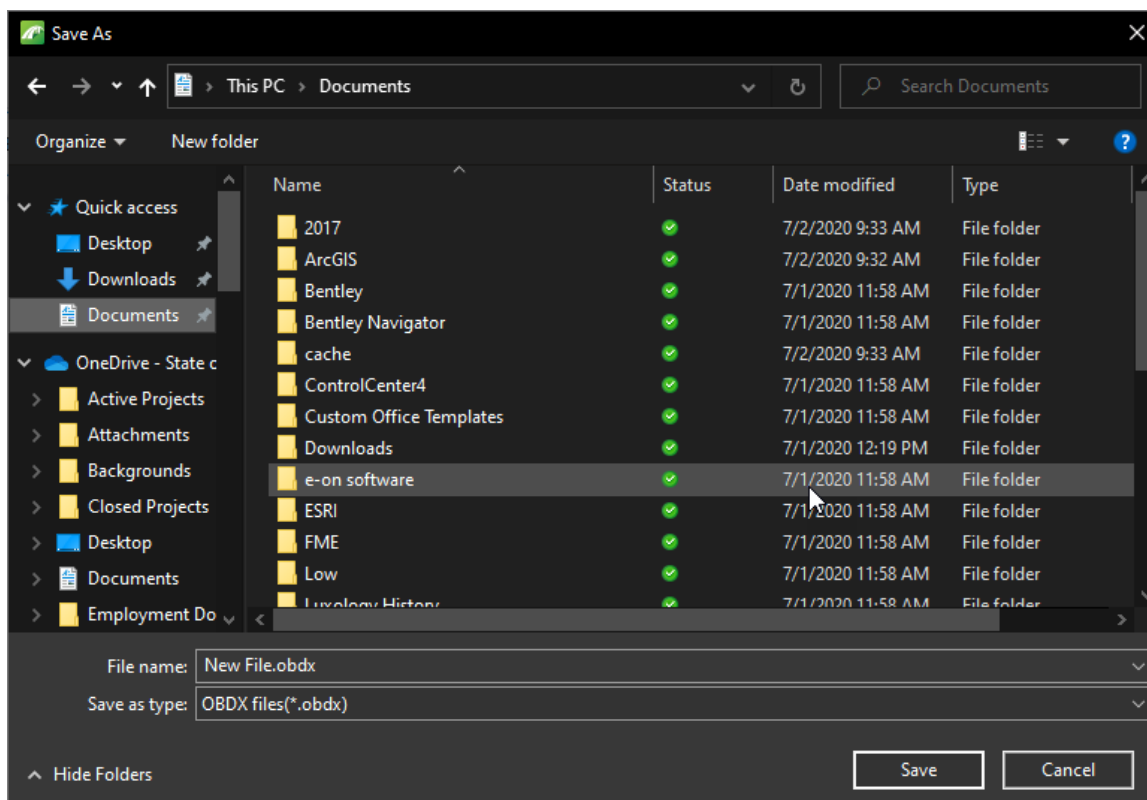
At this point, you can create your file. Select the New File icon.



If you opt to place your files in ProjectWise, fill out the Save Document As window similar to what's shown below:



Please note that you can save the file to your local disk by selecting the Save to disk or Cancel buttons. If you do so, or have not logged into ProjectWise prior to creating the new file, you will be presented with the standard Windows Save As window.



Give your file a name and save it to proceed.

2.21 The ProjectWise Managed Workspace

The Managed Workspace is a feature of ProjectWise that allows MicroStation workspace files to be managed within the ProjectWise environment. Benefits of doing this are that all workspace files are located and administered in a single location. This allows for the rapid deployment of updates and changes; while allowing flexibility in what and how workspace resources are accessed.

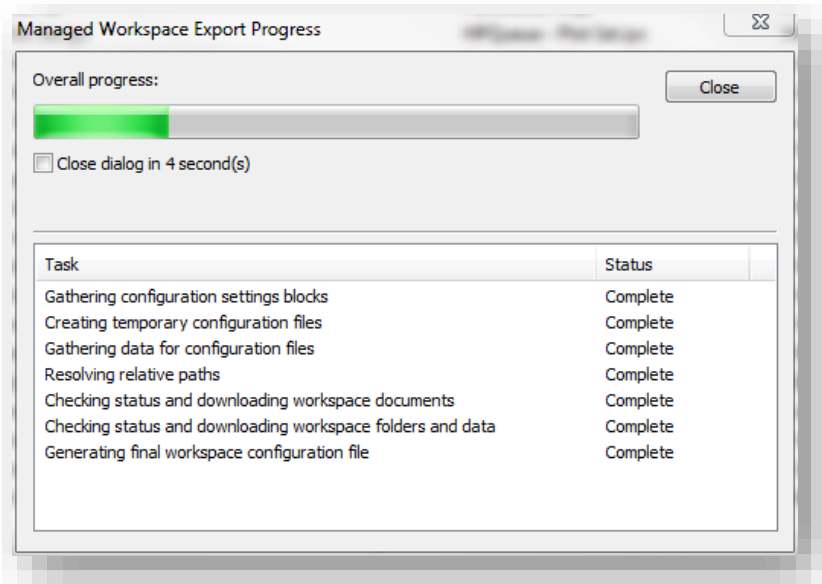
Like the plotting resources (such as pen tables, design scripts and settings files); the managed workspace has taken the place of X:\ drive locations for most CAD resources.

As this is just a location change for the workspace, end user impact should be minimal; and with few exceptions, no changes should be particularly evident.

2.21-1 Managed Workspace Export

The managed workspace attaches itself to any document opened by a MicroStation based application (MicroStation, Bentley View, Power InRoads, etc.) from within ProjectWise. In particular, you can expect the managed workspace to be active when viewing/editing DGNs, DWGs, DXFs or any other file ProjectWise opens with MicroStation.

When opening CAD files from ProjectWise for the first time, you will see the following.



Managed Workspace Export Dialog

This is the Managed Workspace Export Progress dialog, and it shows the status of ProjectWise placing the workspace in your working folders. The first time you open a CAD file after the workspace has been initialized, this dialog will take a short amount of time to download all the relevant files and configure your workstation for the first time.

Subsequent file opens will reduce the amount of time required for the export to complete—as once the files have been downloaded, ProjectWise will only update them if there's been a change at the server. This ensures that you always have the most up-to-date workspace files available.

2.21-2 Working with the Workspace

Day to day use of the workspace has not changed in a visible manner. All tool boxes, macros, and symbology resources have been updated to automatically be available when you access your files. Areas where you may see differences are in the file paths where items such as cells are being attached from, or where you're initially directed to attach other resources.

Cells in particular are loaded, on-demand resources in the workspace. They are not copied out the first time you run the workspace, but are loaded when you access their icon in the toolbox. At this time, you may see a slight hesitation as ProjectWise is downloading the appropriate file to your PC. After this initial install, it will load instantly unless there's been a change to the file that causes it to be re-downloaded.

2.21-3 INDOT Customized Fonts

With the release of MicroStation V8i, Bentley no longer provides a method of maintaining and further customizing font resource files. Due to this limitation, INDOT customized fonts have been discontinued and we've instead moved to using true type fonts only. The benefits of this method are that files will seamlessly translate between CAD packages and this will prevent the various other issues such as text rendering improperly or with the wrong character set.

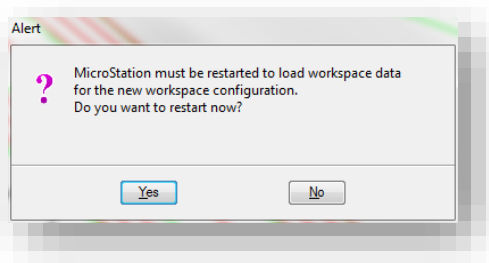
As such, the Office of Standards and Policy has provided CAD tech notes on how the special character cells that have been instituted as their replacement should be used in conjunction with the True Type fonts.

2.21-4 MicroStation and Files with SignCAD Fonts

With the removal of the legacy INDOT font resource file, the managed workspace is now configured to have the SignCAD fonts available on every project as there's no longer a conflict with existing resources.

2.21-5 MicroStation, File -> Open and Workspace Reloads

When opening files from the File -> Open command in MicroStation, you may be prompted with the following dialog:



Managed Workspace Prompt when Switching Files

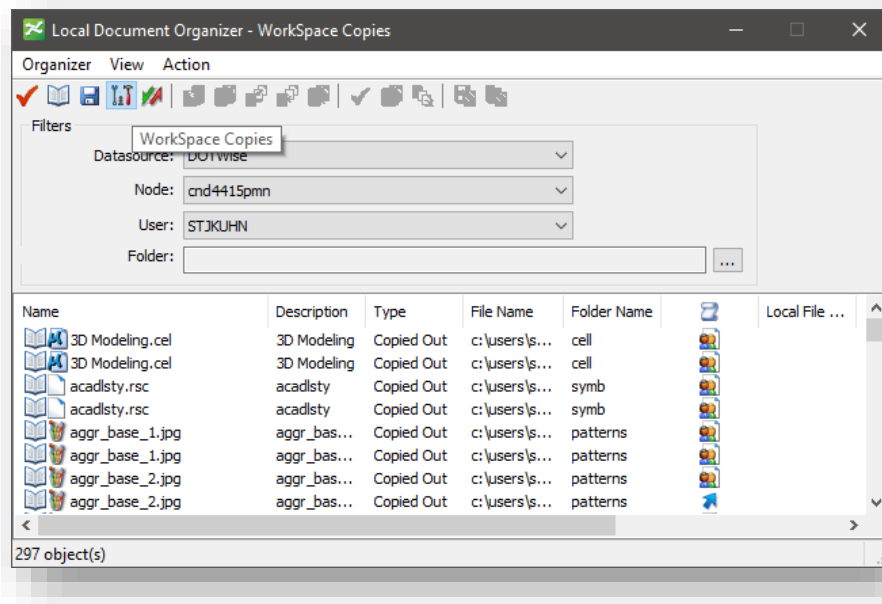
This dialog denotes that there's a difference between the workspace you currently have loaded and the workspace options for the file you're attempting to open (most commonly a file based, reference path will change). In most instances the user can safely select No to proceed to their next file as most files now share the same workspace. One should consider however if they are switching from a MicroStation to an InRoads associated file so the appropriate civil resources are loaded.

2.22 Local Document Organizer

As the managed workspace copies files to your local machine, ProjectWise will allow you to manage these through the Local Document Organizer. It's highly recommended that you not remove the workspace documents from your PC unless directed by CAD Support. ProjectWise will handle the updating and export of documents "as needed" behind the scenes to provide a seamless experience.

If you do purge these files, the first time you open a CAD file, ProjectWise will re-download the workspace, providing a slight delay similar to the first time it's used.

Should CAD Support request you purge your workspace copies, go to the Local Document Organizer (**Tools -> Local Document Organizer...** from the ProjectWise Explorer menu). On the Local Document Organizer toolbar, select the button for Workspace Copies as shown:



Local Document Organizer

This window functions similarly to the Copies option, in that you can only Purge or Refresh these documents. Check out will be unavailable as these are administered by the CAD Support staff. Should they request you purge your workspace copies, select all entries in this window and either right-click and select Purge Copy or perform the same option from the Action menu.

2.23 Document Archival and Audit Process (PW to UCM)

2.23-1 Introduction

With the rollout of DOTWise 3.5, the process of sending documents from ProjectWise to ERMS has been put in place and is now available for use. The following document looks at the requirements for setting up Design documents on the ProjectWise side, sending them to ERMS, and then locating them once they've been uploaded. Also, this material covers the process of preparing your Work Area for archiving for future use.

Please note that the information in this document only applies to Work Areas created after the Spring (March) 2014 release. Work Areas created prior to this date will not have the appropriate metadata frameworks and will not function properly with the processes discussed. If there are any questions, please contact CAD Support via a Helpdesk Ticket with your Des. No.

2.23-2 Sending Documents to ERMS and Preparing for Archiving and Design Workflow

2.23-2a Document Naming

A critical step in the transferring of documents from ProjectWise to ERMS is that they are properly named according to the Project File Naming Conventions sheet (link provided in section 3). In order for them to be placed in the proper workflow in ERMS and in order to locate them using search tools for later recovery, they must be named using these naming conventions.

2.23-2b ProjectWise Enhancements Required for ProjectWise to ERMS Transfers

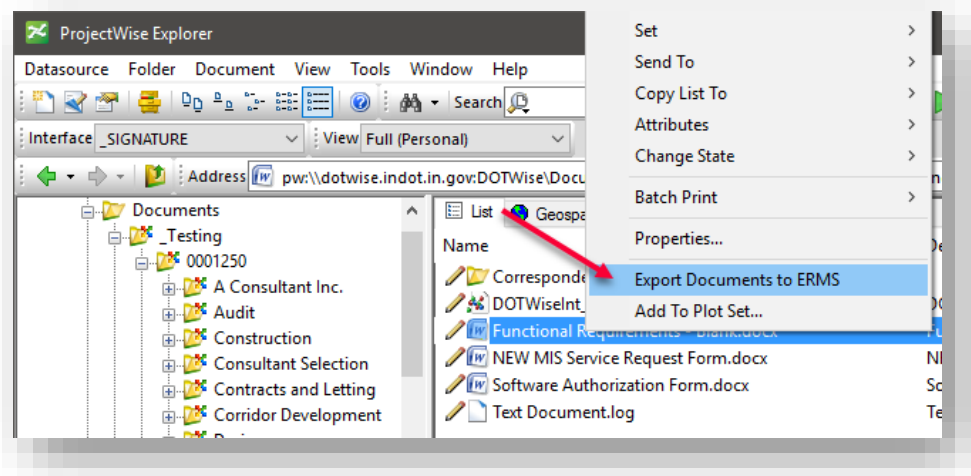
In the DOTWise 3.4 release, the INDOT ProjectWise structure underwent a major overhaul to enable the following functions that are key to the document transfer process:

- All disciplines have a Project Type
- All disciplines have a Workflow & State configuration
- All disciplines have an Environment structure
- All Work Area Types are keyed to the project Designation Number
- All Environments have Properties for:
 - Designation Number
 - ERMS/UCM Document Type
 - The last date the document was sent to ERMS/UCM
 - The last state the document was in when sent to ERMS/UCM
 - The last user to send the document to ERMS/UCM

The next section will discuss how these enhancements are used in conjunction to send a document from ProjectWise to ERMS.

2.23-2c Transferring Documents from ProjectWise to ERMS

As part of the DOTWise 3.5 release, all ProjectWise users within INDOT have been provided a new extension that appears in the ProjectWise Documents menu and right click context menu.

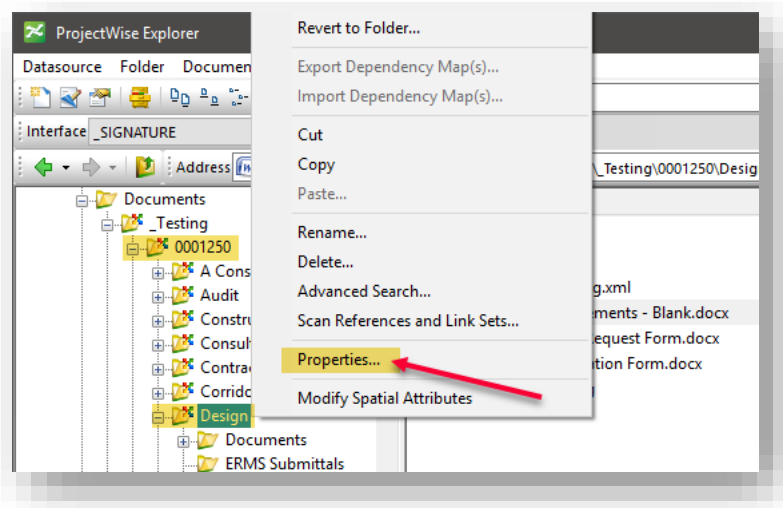


The Export Documents to ERMS Menu

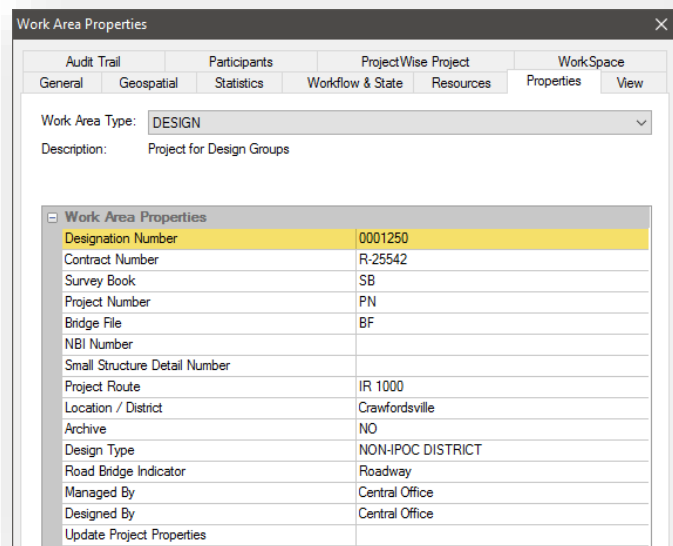
This menu item is toward the bottom of the documents menu, and will only appear on documents. It will not function when selecting document sets, folders, or projects.

The following steps **are required** when sending a document from ProjectWise to ERMS:

1. Locate the document to be sent in ProjectWise (under the Des No -> Discipline folder).
2. Right-click and select Properties command and make sure all applicable Project and Environment data is filled out.
 - a. The Discipline Work Area folder (ex. Design). Ensure as much information as possible is filled out as permissions allow. The Des. No. is required (pre-populated by SPMS) and the other fields should be filled out accordingly. Focus on the last 4 fields; these properties will help determine where in the ERMS Design workflow the document will be placed.

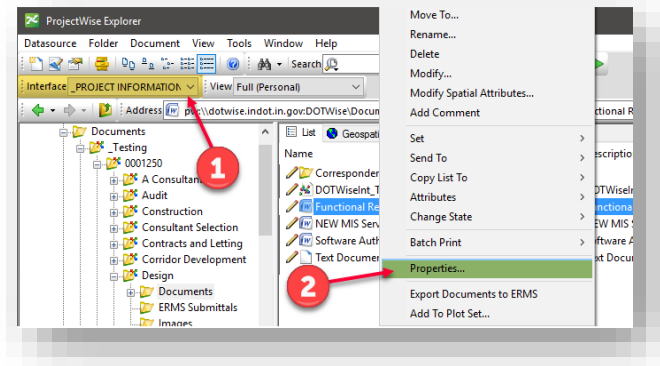


Project Property Checks

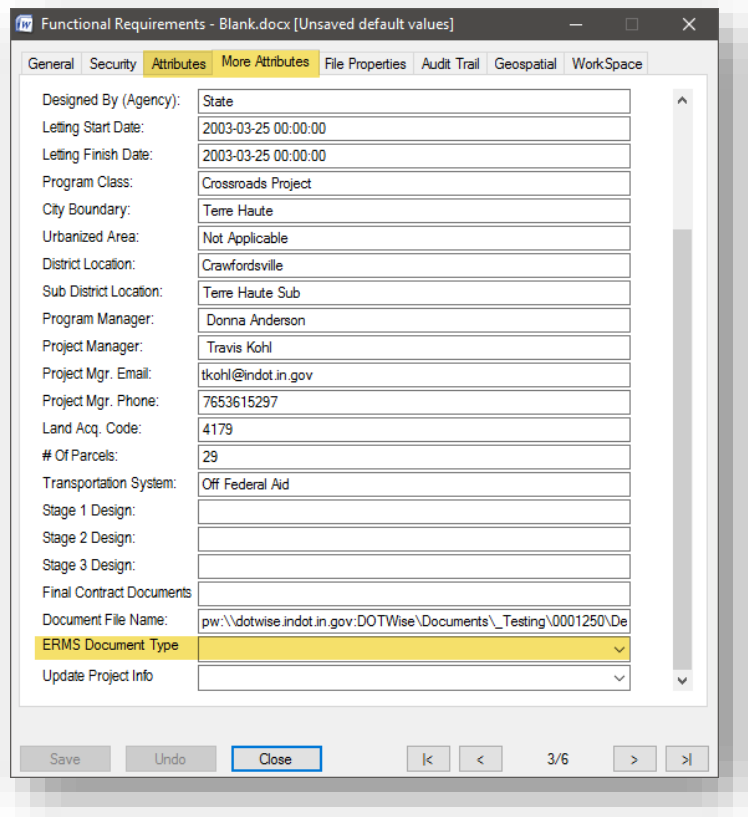


Required – Designation Number

- b. Look at the document properties with the **_PROJECT INFORMATION interface active**. (By right-clicking and selecting the properties command from the selected document). Fill out as many document properties as possible on both the Attributes and More Attributes panels. The **ERMS Document Type is required** and corresponds to the available document types when manually uploading a document to ERMS.

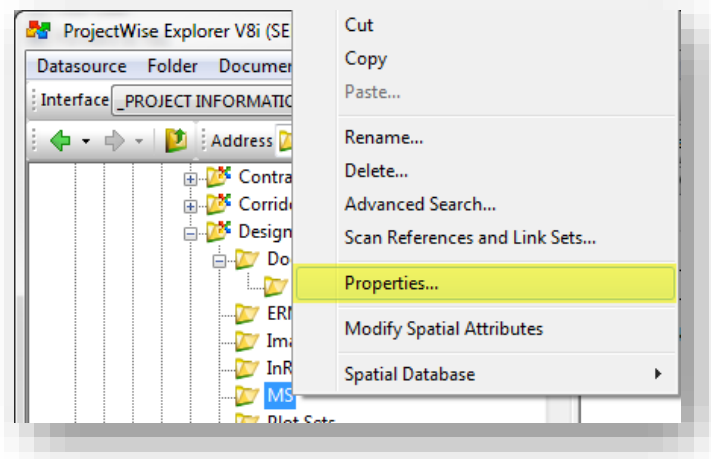


The **_PROJECT INFORMATION** Interface and Document Properties

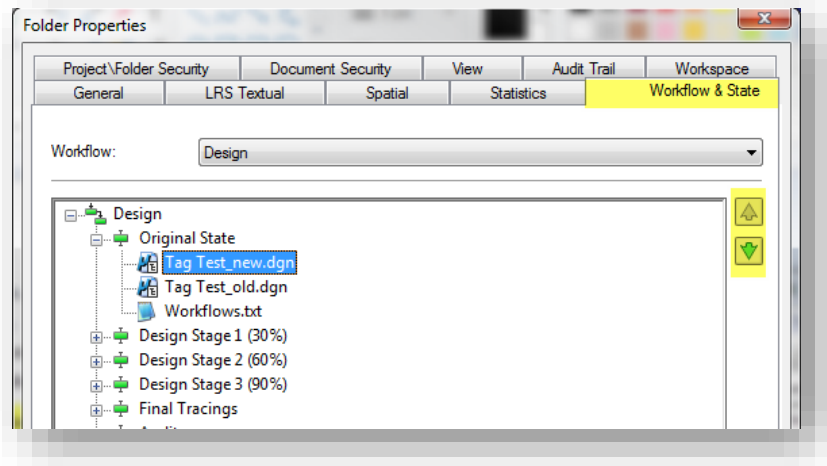


Attributes, More Attributes and ERMS Document Type

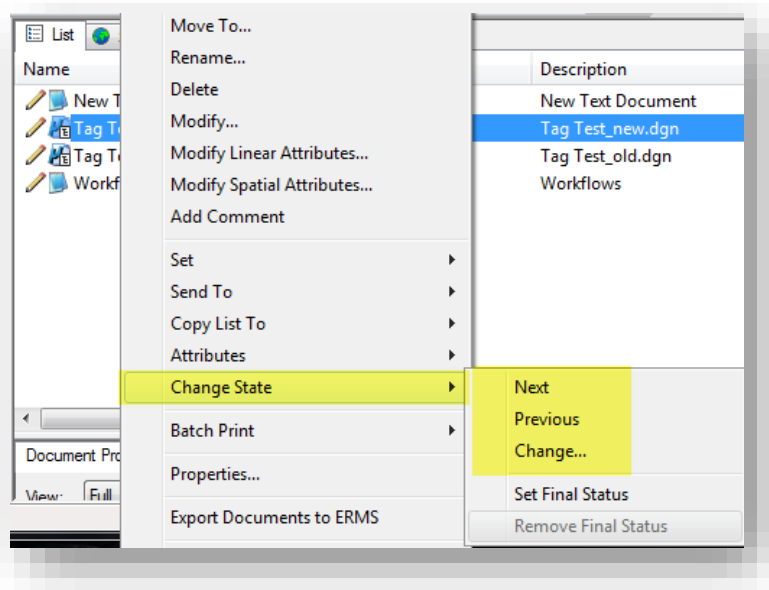
3. Next, set the appropriate document state from the Document's parent folder properties Workflow & State tab. These states also correspond with those required when manually uploading files to ERMS. To change a document state, select it in the Workflow & State tab and use the up/down arrows on the upper right to change the state. This can also be accomplished by right clicking on the document in the ProjectWise Explorer and Selecting the Change State entry and its sub options Next, Previous, or Change.



Folder Properties

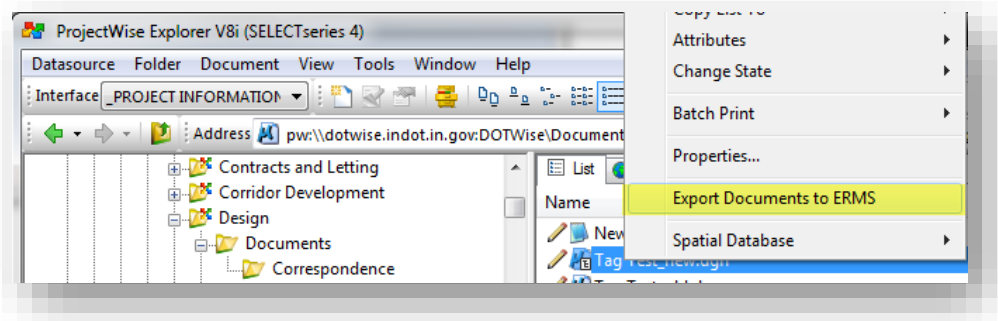


Workflow & State



Workflow & State on a Document

4. With all the appropriate information filled out at the Work Area, Environment and Workflow & State levels, it's now possible to send the document to ERMS. In the Document window, right click on the document(s) that are ready to transfer, and select the *Export Documents to ERMS* option.



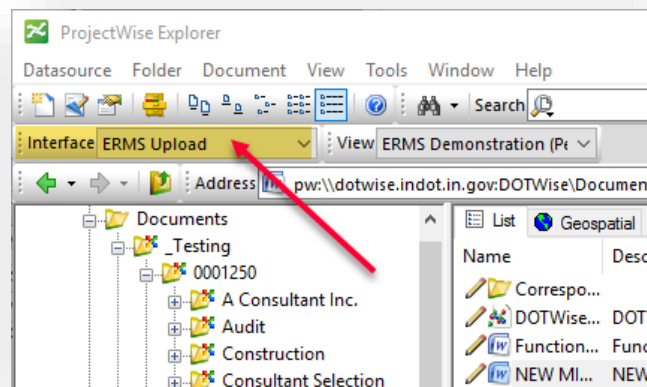
Export Documents to ERMS

5. Selecting the menu will cause a brief pause to occur where the selected documents are queued to be transferred into ERMS. At the conclusion of this process, the selected documents will show that the PWUCM user is the last user listed in the Updated By column. This is due to how the process updates the date, user, and state the document was sent.

Name	Description	File Name	Created By	File Updated By	Updated By
Correspo...					
DOTWise...	DOTWiseInt_Testing.xml	DOTWiseInt_Testing.xml			
Function...	Functional Requirement...	Functional Requirement...			PWUCM
NEW MI...	NEW MIS Service Reque...	NEW MIS Service Reque...			PWUCM
Software...	Software Authorization ...	Software Authorization ...			PWUCM
Text Doc...	Text Document.log	Text Document.log			

The Updated By User (Post Queuing)

6. To inspect the upload information, change the ProjectWise Interface to ERMS Upload, and perform a properties on one of the sent documents. Change the tab to More Attributes. The Last Sent By, On, and State have all now been populated. (**Refresh – F5**)



The ERMS Upload Interface

Field	Value
Document Last Sent By	
Document Last Sent On	8/14/2018
State of Document When Sent	Original State

The ERMS Upload More Attributes

7. At this time, the selected documents have been queued to be sent to ERMS. As this is a scheduled process, the documents may not be immediately available in ERMS, and care should be taken when making further modifications. Due to potential delays in processing, documents should not be edited in ProjectWise until they are verified to be in ERMS in the correct workflow and with their complete metadata.

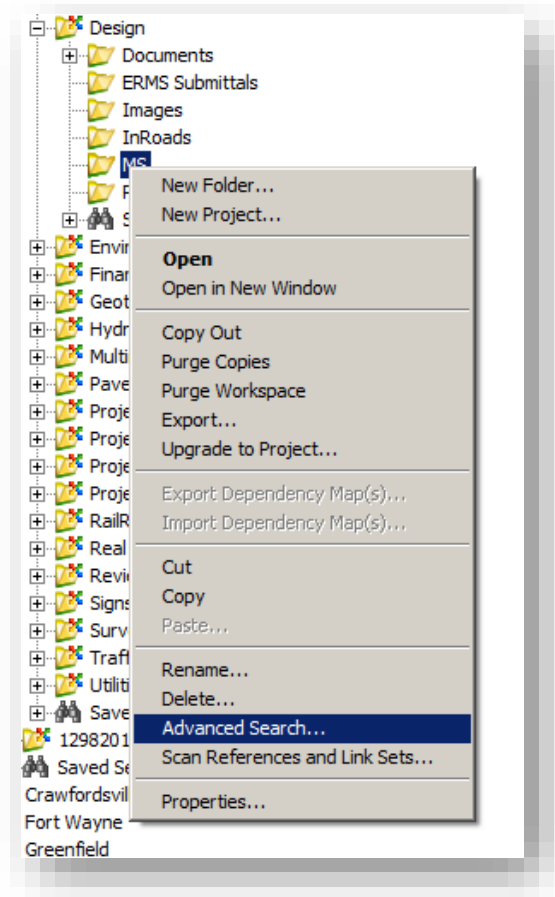
Note: When .DGNs are selected to be moved to ERMS, any associated reference files will also be exported and moved to ERMS.

2.23-3 Other Methods of Preparing and Sending Documents

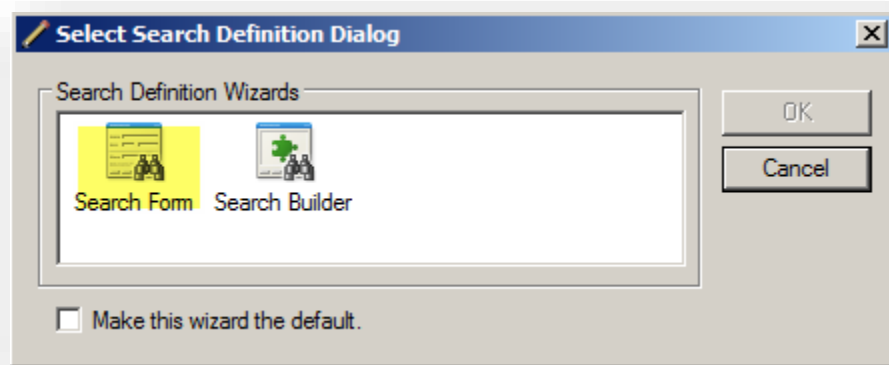
In addition to the single file method demonstrated in the previous section, the ProjectWise to ERMS tool also accommodates the sending of multiple files at once as long as all the appropriate data is applied to the files. The two methods that will be discussed in this section are the usage of Advanced Searches and Document Sets to collect your files.

2.23-3a Collecting Multiple Documents to send to ERMS/UCM using an Advanced Search

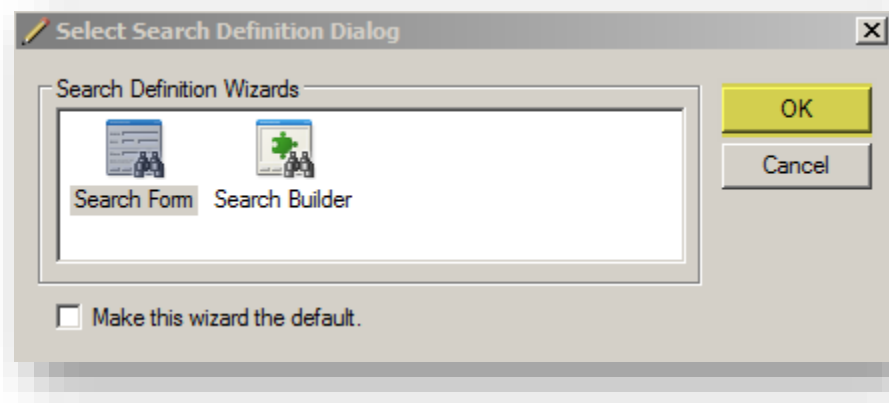
1. Using advanced searches is a good way to locate multiple files to send to ERMS.
2. Right click on the folder that contains the documents you wish search for.
3. The Right click menu will appear (select Advanced Search) as shown below:



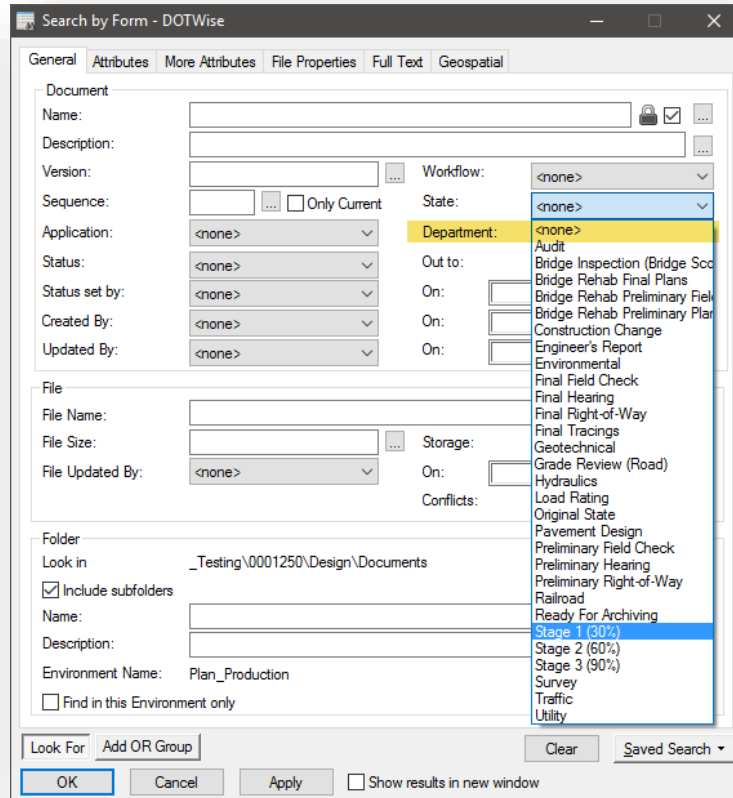
4. The Select Search Definition Dialog box will appear, giving you the option to Search Form or Search Builder. Select the Search Form option as shown below:



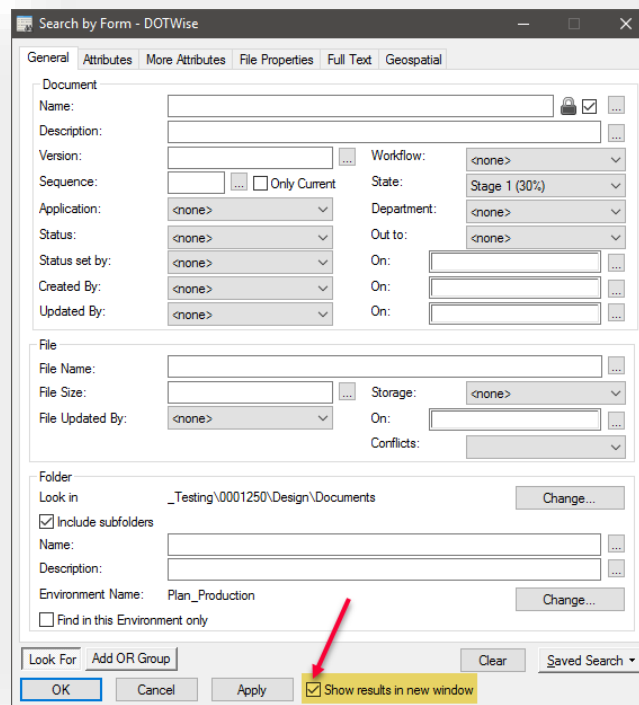
5. Once Select, click the OK button to the right



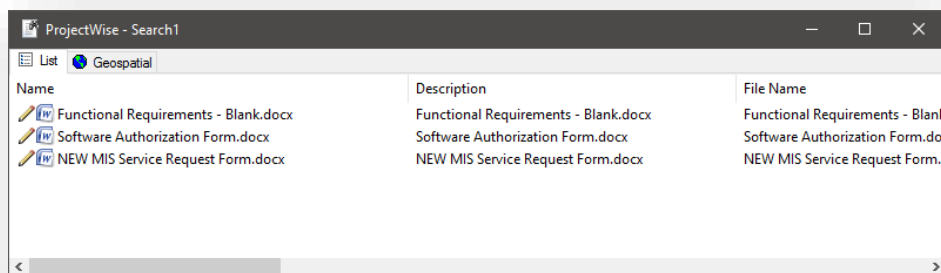
6. Once you have clicked the OK button, the Search by Form dialog will appear on the screen. Next, select the State Pull down. In the State Pull down, select the stage of Audit you are searching for as shown below:



7. Select the OK button of the dialog box. As mentioned earlier, it might be beneficial to place the results in a new window. The following screen capture shows the results that are presented with that option enabled. *Remember this is just one example of a search on Stage 1 documents. Your search can be as advanced as you choose to make it.*



8. The results screen will appear with the results of your search.

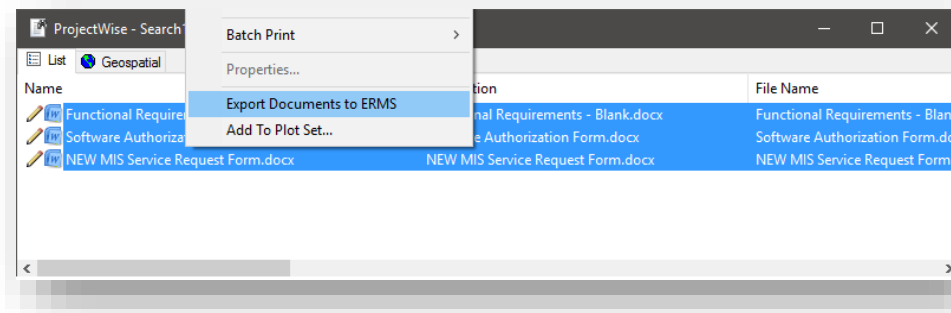


9. Each of the file's properties are now available to you, and be sure to fill in all the required attributes related to them before exporting to ERMS.

10. Select each file and check the More Attributes tab and ensure the ERMS Document Type has been selected (as shown below) – can be arrowed through each file.

The screenshot shows a dialog box titled "Functional Requirements - Blank.docx" with several tabs: General, Security, Attributes, More Attributes, File Properties, Audit Trail, Geospatial, and WorkSpace. The "More Attributes" tab is active, displaying a form with various fields. The "ERMS Document Type" field is highlighted in yellow and set to "Existing Plans". Other fields include "Designed By (Agency): State", "Letting Start Date: 2003-03-25 00:00:00", "Letting Finish Date: 2003-03-25 00:00:00", "Program Class: Crossroads Project", "City Boundary: Terre Haute", "Urbanized Area: Not Applicable", "District Location: Crawfordsville", "Sub District Location: Terre Haute Sub", "Program Manager: Donna Anderson", "Project Manager: Travis Kohl", "Project Mgr. Email: tkohl@indot.in.gov", "Project Mgr. Phone: 7653615297", "Land Acq. Code: 4179", "# Of Parcels: 29", "Transportation System: Off Federal Aid", "Stage 1 Design:", "Stage 2 Design:", "Stage 3 Design:", "Final Contract Documents", "Document File Name: pw:\\dotwise.indot.in.gov\\DOTWise\\Documents_Testing\\0001250\\De", and "Update Project Info". At the bottom, there are buttons for "Save", "Undo", "Close", and navigation arrows, along with a "3/6" indicator.

11. You can then select the files you wish to export to ERMS/UCM.



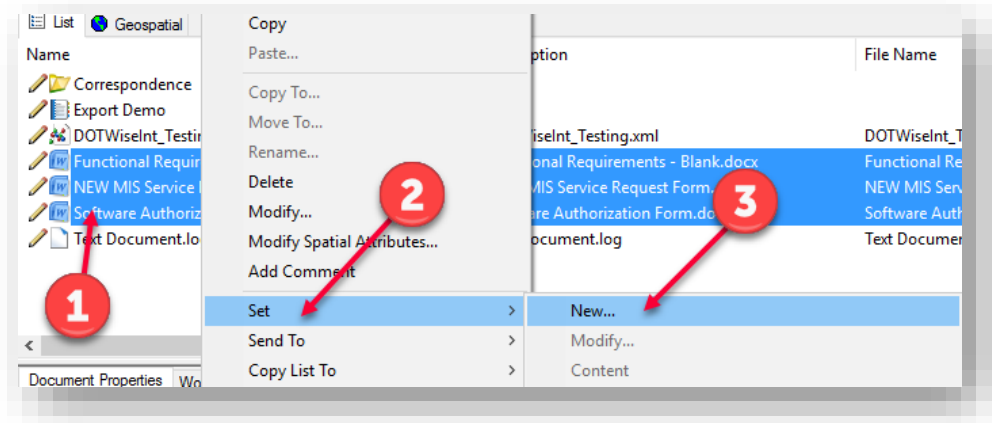
12. You will right click once you have selected the files and will then scroll down to the bottom of the pop-up menu and select Export Documents to ERMS. The screen will flash a brief second as the export is being completed.

Depending on the frequency with which you may need to use these searches, please keep in mind that you can save them and use them repeatedly for your project.

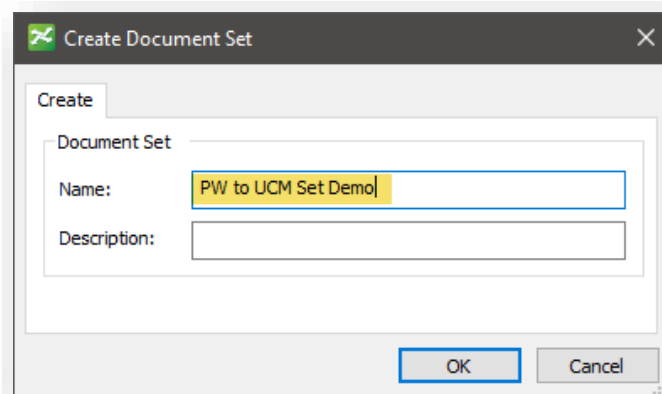
2.23-3b Collecting Multiple Documents to send to ERMS/UCM using a Document Set

A document set is a grouping of documents. A document set can either be a flat set, which is just a collection of documents that are grouped together but with no physical connection to each other, or a logical set, which is any document in ProjectWise that has other documents referenced into it.

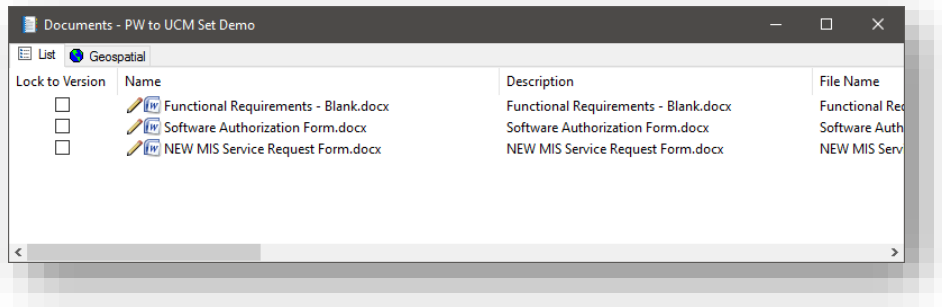
1. To create a Document set in order to send multiple files to ERMS, follow these instructions.
2. Under the Discipline (i.e. Design, Survey) folder and sub-folder containing the files you wish to export, Shift+Click or Ctrl_Click on the files (***Be sure to check attributes for these files and make sure ERMS Document type have been set for all files***) you want in the Document set as shown below:



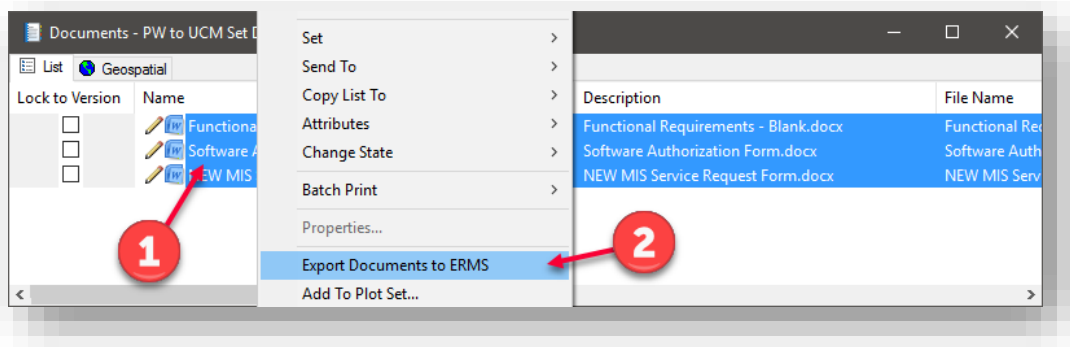
3. A pop-up menu will appear, and you will scroll down and select Set New.
4. You will then give the Document set and appropriate name. Then click the OK button



- Once selected, a box will pop up with the Document Set files in it as shown below:



- Once again ensure the correct document type is set in the More Attributes tab for all the files. You can then close the dialog box.
- With the document set open, select the files you're prepared to send and right click and select the Export Documents to ERMS command. The screen will flicker as the files are being exported.



2.23-4 Archiving Projects from ProjectWise to ERMS/UCM

As with the Audit and Export to ERMS processes shown in the previous sections, we have created tools to allow for the archiving of completed projects from ProjectWise and the transfer of those projects/files to ERMS.

This archiving procedure is a two-step process, and there are two major responsibilities needed for the successful archiving of a project:

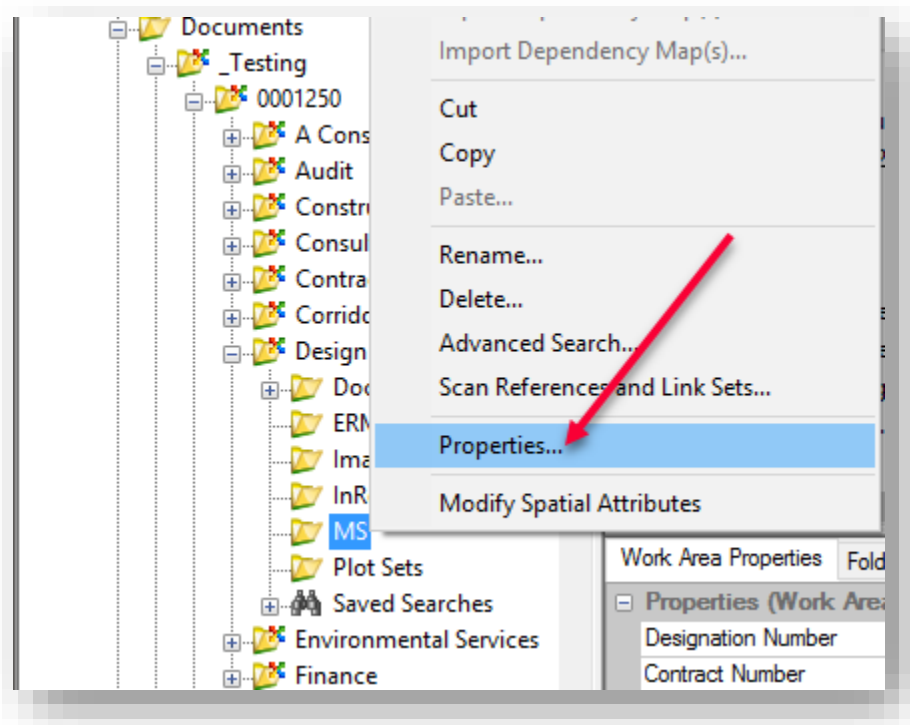
- Each discipline is required to flag their own relevant documents—as they are the subject matter experts. At the conclusion of each discipline's project responsibilities, the relevant parties will need to perform their archival steps.
- The Project Manager will be responsible for ensuring that each discipline has flagged the appropriate documentation prior to initiating the full project archive process.

2.23-4a Per Discipline Setting a project (Ready for Archiving) Workflow and State

The first portion of the project archiving tools are discussed in this section. The following are the steps that members of each discipline are responsible for during their project development process—and can be performed at any relevant time during the project process. Note that these steps do share some common features with the other steps in sending documents from ProjectWise to UCM; particularly the usage of Workflows and States.

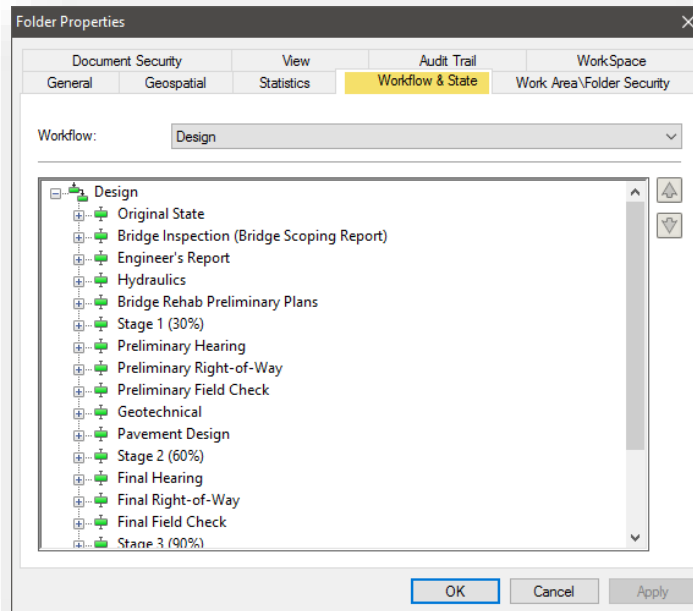
There are two methods within ProjectWise for setting the State of a file to Ready for Archiving. We want all users to understand that there is no need to archive all files within a project. We only want files that are necessary (i.e. no working or draft copies).

1. The first method is started by right clicking the folder containing the files within a discipline (see image below of MS folder under Design)

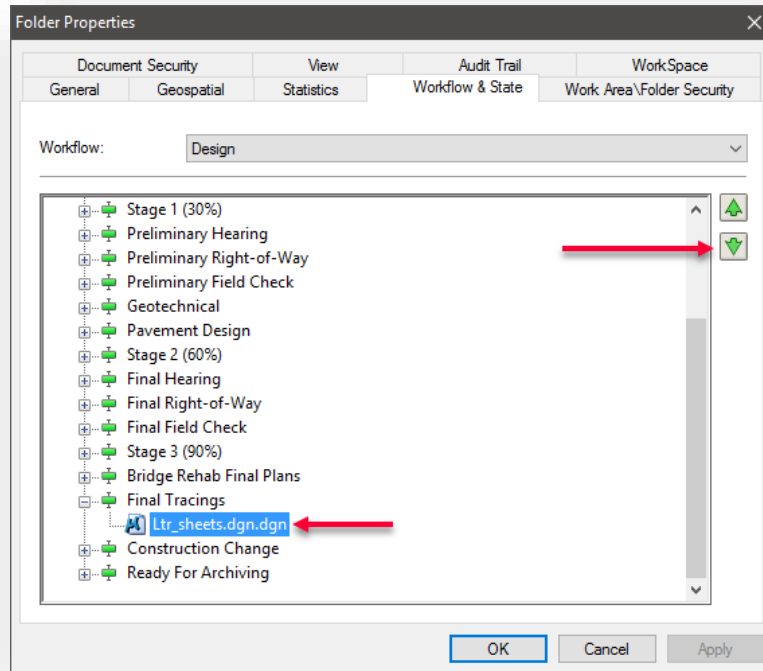


2. Once the Properties dialog is selected it will appear on the screen and you will select the Workflow and State tab

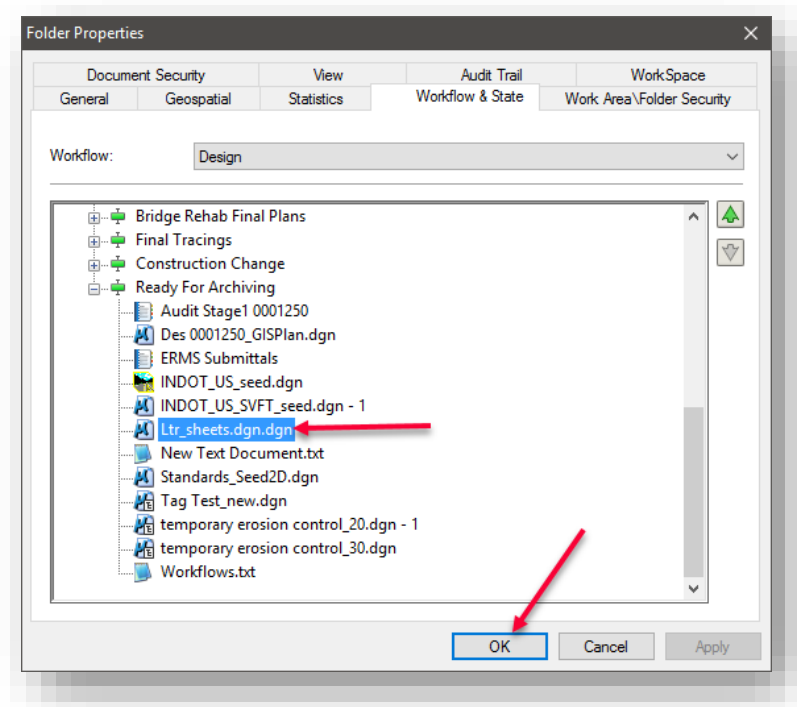
Note: When .DGNs are selected to be moved to ERMS, any associated reference files will also be exported and moved to ERMS.



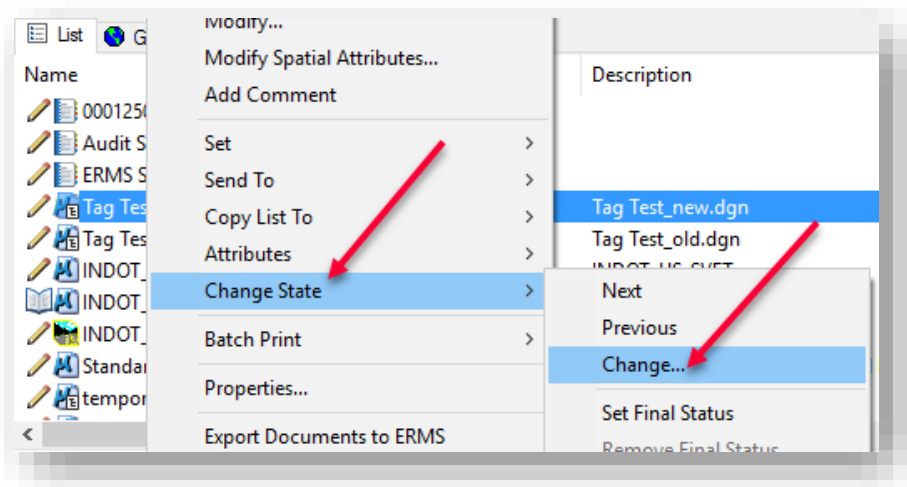
- By opening the various states, you will be able to see what files are currently in what state. You will from this window be able to move a file from its current state to the state of Ready for Archiving. You select the file (it will highlight) and you then select the green arrow to the right and click the arrow until the files moves to the next state. Note that multiple files can be selected in this step through the use of Ctrl+Click or Shift+Click selection methods.



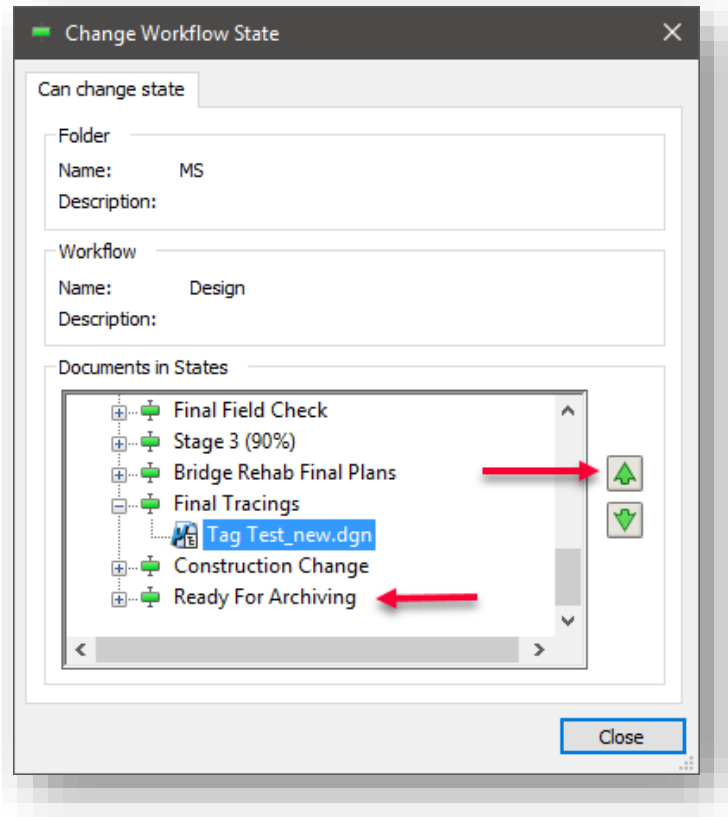
- Once the file/files have been transitioned to the Ready for Archiving State, you will select the OK button at the bottom of the dialog.



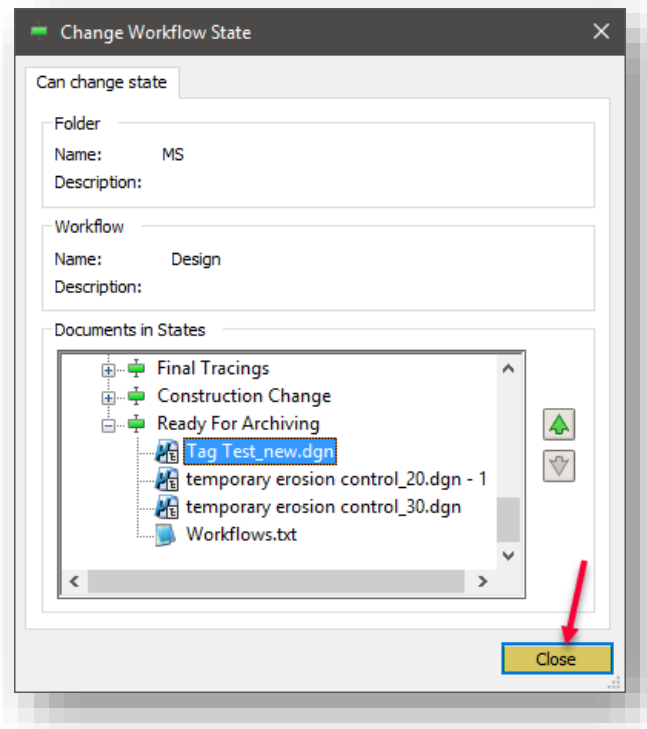
- The second method is to individually select the files from the folder by right clicking and selecting the Change State -> Change command



- This will bring up the Change Workflow State dialog box (it will show the selected file you have chosen in its current state). You can click the green arrow to the right (as many times as needed) to move the file to the Ready for Archiving state.



7. Once moved to the Ready for Archiving State, select the Close button.

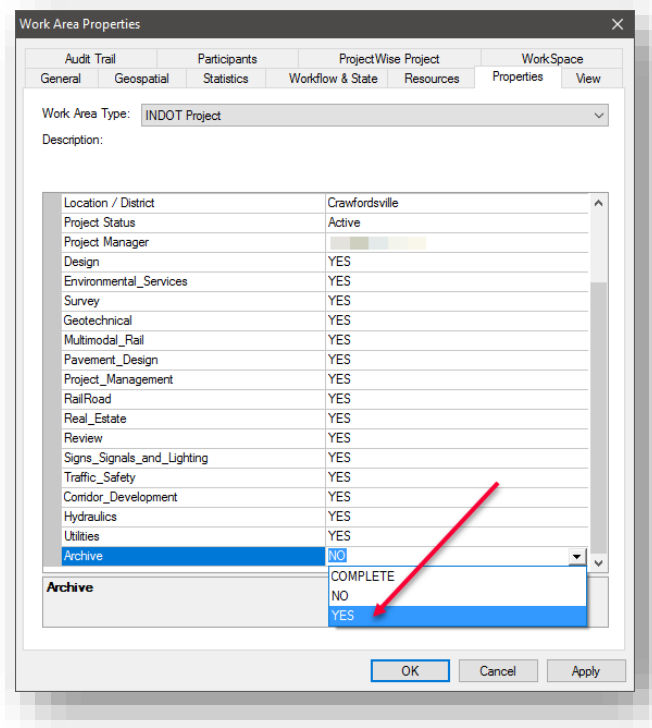


With the appropriate documents in the Ready for Archiving state, this portion of the archival process is complete. The complimentary portion of the process where the PM sends the entire project will be completed at the appropriate milestone at which time the data will be sent to ERMS. Until that time, the project data will continue to reside in ProjectWise for all users.

2.23-5 PM project management of ProjectWise projects to flag Archive – YES

Throughout the development of a project, each discipline will complete their steps as shown in the previous section. Once all disciplines have prepared their portions of the project, the Project Manager can then flag the full project for archiving. Please note that considerations should be made if the project is undergoing continuing mitigation studies.

1. As Project Manager of a Des No. project in ProjectWise it is expected that the Final Status for moving the project to ERMS/UCM will be determined by you. It will be your responsibility to check SPMS and with the disciplines prior to setting the property Archive to YES. This is done as shown in the following screen shot by going to the properties tab of the Des No. Work Area.



When this status is checked, the tool developed to move the files to ERMS will see the property and move the files from ProjectWise (they will then disappear from your datasource view). This process is not instantaneous, and the project may continue to be viewable for a day after the archiving has been requested. This is due to the scheduled nature of the process and care should be made to not modify documents after the project has been set to Archive: YES.

3. MicroStation and V8i Interface

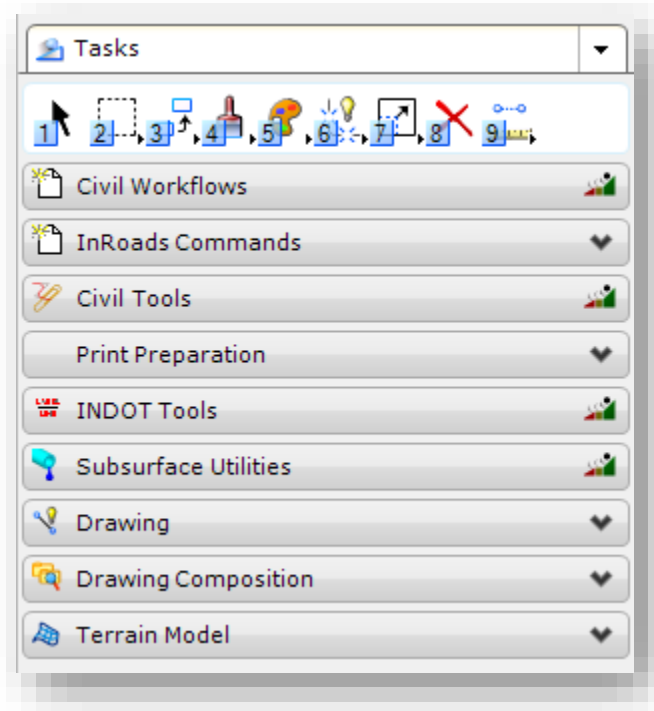
3.1 What's New in MicroStation V8i

MicroStation V8i SS4 has continued with the interface enhancements that have been present since the initial release of MicroStation V8i. Our goal in this chapter is to provide you with a guide to the interface and some of the options that you will see.

3.1-1 Application Window Layout Changes

The *Tasks dialog* is the default task navigation interface. This dialog is docked to the left-hand edge of the application window.

The Main task is embedded in the Tasks dialog.

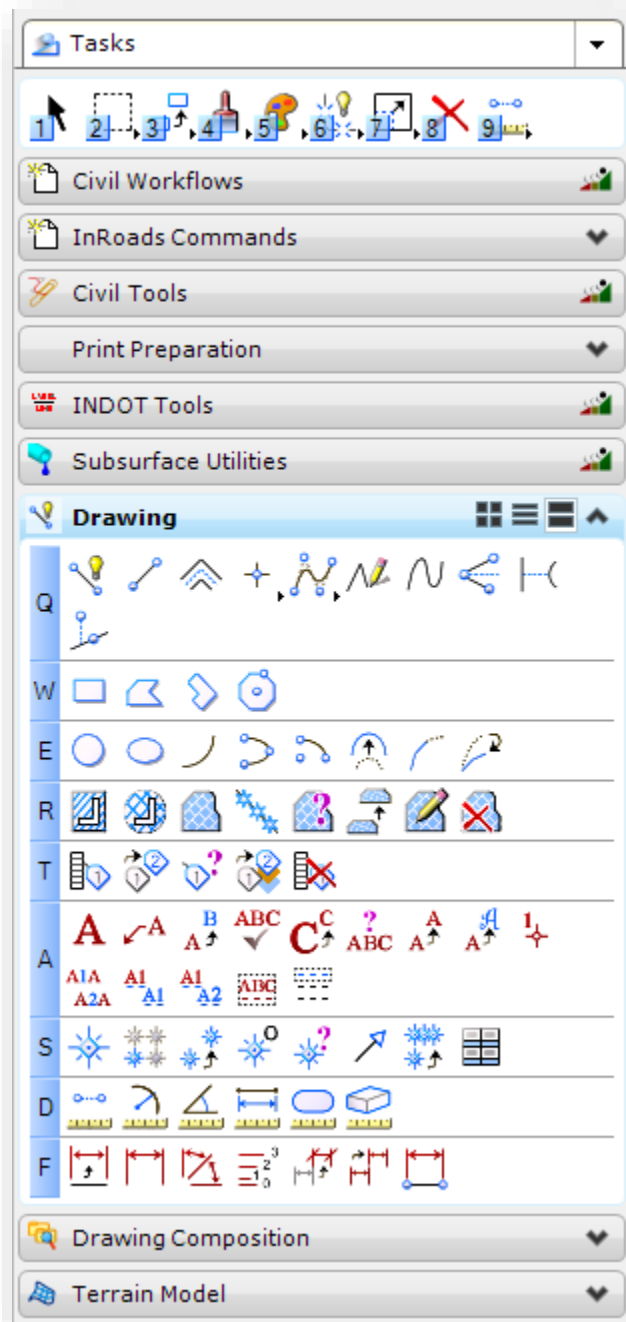


Task Navigation in the INDOT Workspace

3.1-2 Tasks dialog

Used to view the Task List and to select the tasks, workflows, and tools with which you need to work.

The size of the icons in the Tasks dialog is set in the Preferences dialog. You also can choose to show or hide Navigation icons. In the default setup, tools from the Main toolbox have been integrated into the Tasks dialog in a Main task.



The Drawing Task

You can **dock** the Tasks dialog to the left or right edge of the application window. By default, the Tasks dialog is docked to the left edge of the application window, and the active task is the Drawing task.

You can resize, minimize, dock, undock, open, and close the Tasks dialog. You can also theopen a workflow in a separate instance of the Tasks dialog.

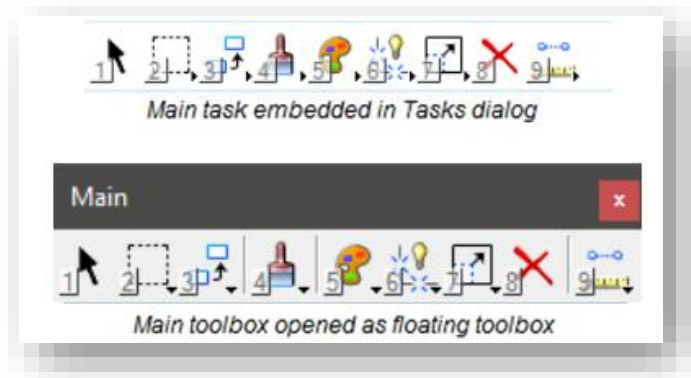
If you have position mapping turned on, the keys are displayed next to the tools in the Tasks dialog. When the position mapping keys have focus, they appear on a dark background. When they do not have focus, they appear on a light background.

If you hide tools while viewing tasks in the Tasks toolbox or in views, these tools will be hidden in the Tasks dialog.

3.1-2a Main toolbox

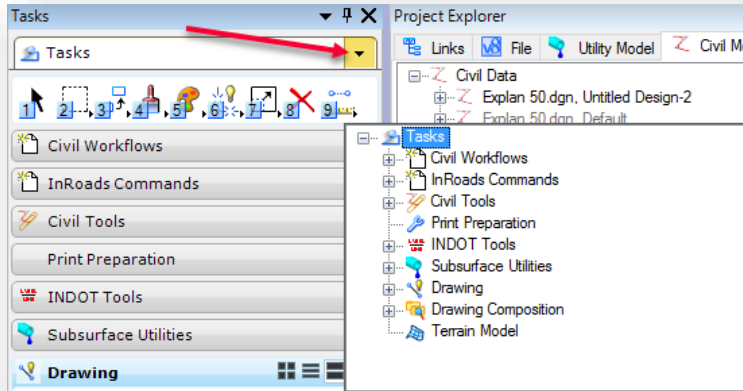
The Main task is used to select general usage element selection, manipulation, and modification tools.

The Main task, containing tools from the Main toolbox, is open when you start the program for the first time. By default, tools from the Main toolbox appear as a Main task in the Tasks dialog, which is docked to the left-hand edge of the application window. The Tasks dialog can be undocked or docked to the right-hand edge. Right-clicking in the Main task and selecting Open 'Main' as Toolbox opens the toolbox as a floating toolbox.



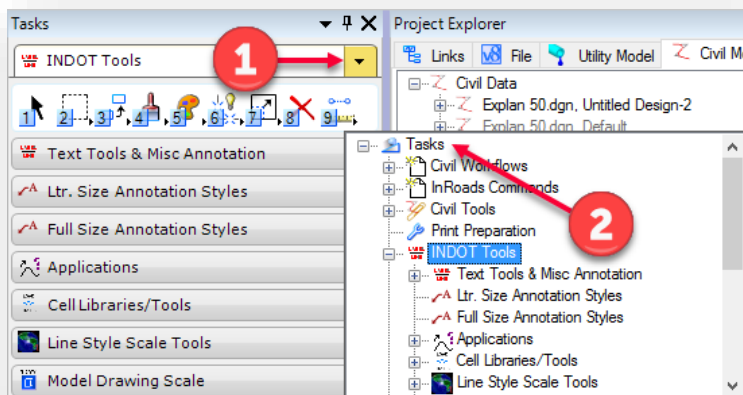
3.1-3 Tasks

By clicking the drop arrow next to the Tasks heading, all tasks will be displayed in a hierarchical tree. Clicking a task in the tree expands the task—making it the root task—and hides the other tasks.



Task Navigation Flyout Menu

Once a subordinate task has replaced Tasks as the root task, clicking the task's tab displays all tasks in a hierarchical tree. Clicking Tasks in the tree resets Tasks as the root task.



Resetting the Tasks Dialog

3.1-3a Main task tools

In the default setup, tools from the Main toolbox have been integrated into the Tasks dialog in a Main task. You can hide the Main task tools in the Tasks dialog by clearing the Show Main Task Tools check box in the Task Navigation category of the Preferences dialog. You also can customize the Main task tools.

3.1-3b Task Tabs

Clicking the down arrow on a task's tab expands the task so you can see the tasks and tools in it. Clicking the up arrow collapses the task and hides them.

You can click the icons on a task's tab to view the tools in one of several layout modes:

- Icon Layout mode
- List Layout mode
- Panel Layout mode (the default)

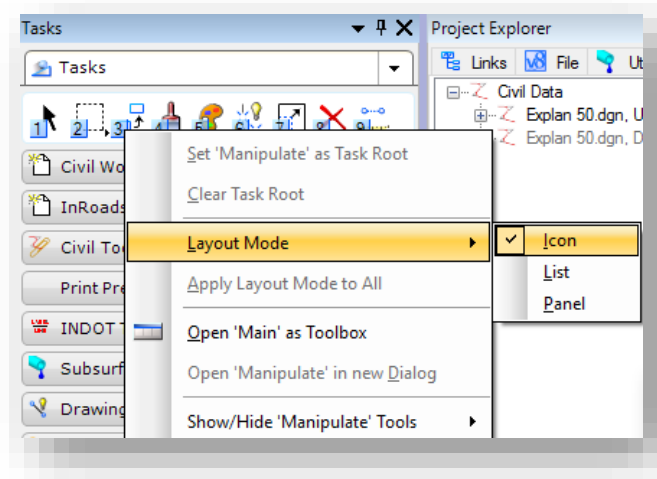
The icon belonging to the first tool in a task is displayed on the task's tab. You can select a different icon for the task in the Customize dialog.

In the default setup of the INDOT Workspace the following tabs are visible:

- Civil Workflows (InRoads only)
- InRoads Commands (InRoads only)
- Civil Tools (InRoads only)
- Print Preparation
- INDOT Tools
- Subsurface Utilities
- Drawing
- Drawing Composition
- Terrain Model
- Solids Modeling (3D only)
- Surface Modeling (3D only)
- Mesh Modeling (3D only)
- Feature Modeling (3D only)
- Visualization (3D only)
- Animation (3D only)

3.1-3c Pop-up menu for the selected task

Right-clicking a task presents a list of settings for the task.



Task Layout Options

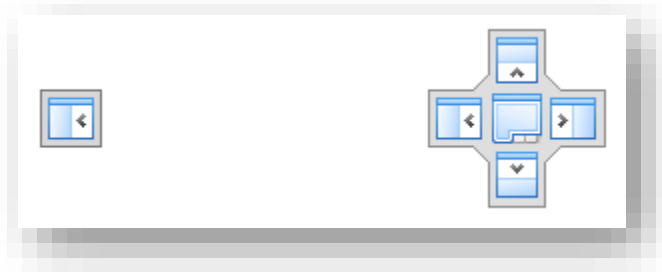
- Set as Task Root – The selected task becomes the root task, which moves it to the top of the Tasks dialog and hides the other tasks.
- Clear Task Root – Resets the task so that it is no longer the root task.
- Layout Mode > Icon – Displays the tools as icons only.
- Layout Mode > List – Displays the tools' icons, position mappings, and names.
- Layout Mode > Panel – Displays the tools' position mappings and icons.
- Apply Layout Mode to All – Applies the current task's layout mode to all tasks.
- Open as Toolbox – Opens the selected task as a toolbox.
- Open in new Dialog – It must be a workflow and must have child tasks in it in order to open it in a separate dialog. When the Tasks dialog is docked, the new dialog appears on a separate tab at the bottom of the Tasks dialog.
- Display Help – Available only if a help topic is linked to the selected custom tool, task, or workflow. Opens the help topic.
- Show/Hide Tools > (Tools' names) – Allows you to show or hide individual tools.
- Show/Hide Tools > Show All – Shows all of the tools.
- Show/Hide Tools > List – Lists the tools in a dialog in which you can choose which to show or hide them.

3.1-4 Dockable Dialogs

To gain more screen space, there are many dialogs that you can dock to the edges of the MicroStation application window.

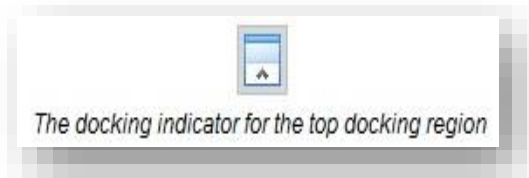
3.1-4a To dock a dockable dialog

1. Select a dockable dialog's title bar. Most dialogs in MicroStation are able to be docked, and if they are able to, docking indicators similar to the below example will be displayed.



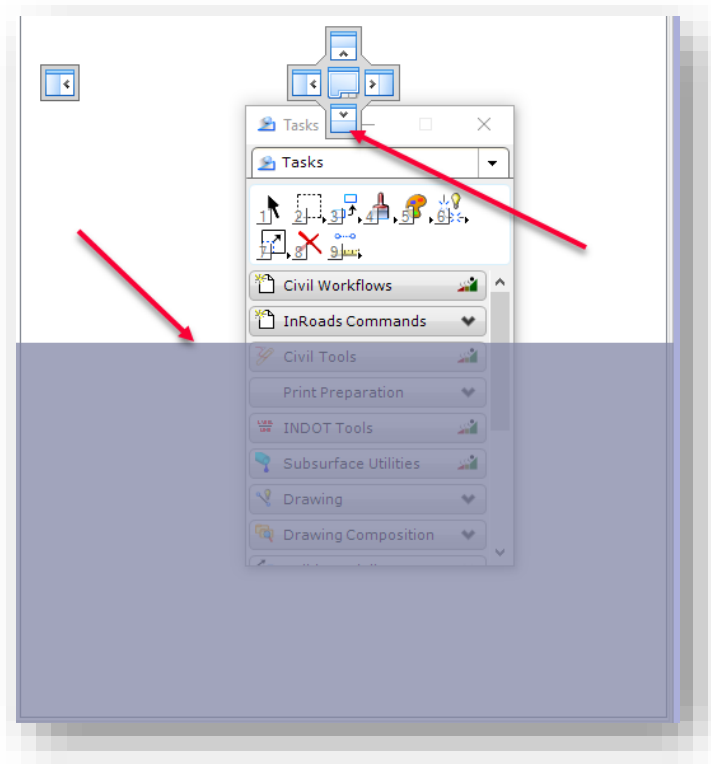
Single Docking Indicator (Left) & Full Docking Indicator (Right)

2. Drag the dialog over one of the docking indicators that appear in the center of the screen or along the edges of the application window.



3. As soon as you begin to drag a dockable dialog, a transparent block representing the dialog is attached to your pointer, and moves with the pointer until you release the mouse button.

4. Place the pointer over one of the docking indicators. This highlights the available docking region along the corresponding edge of the application window.

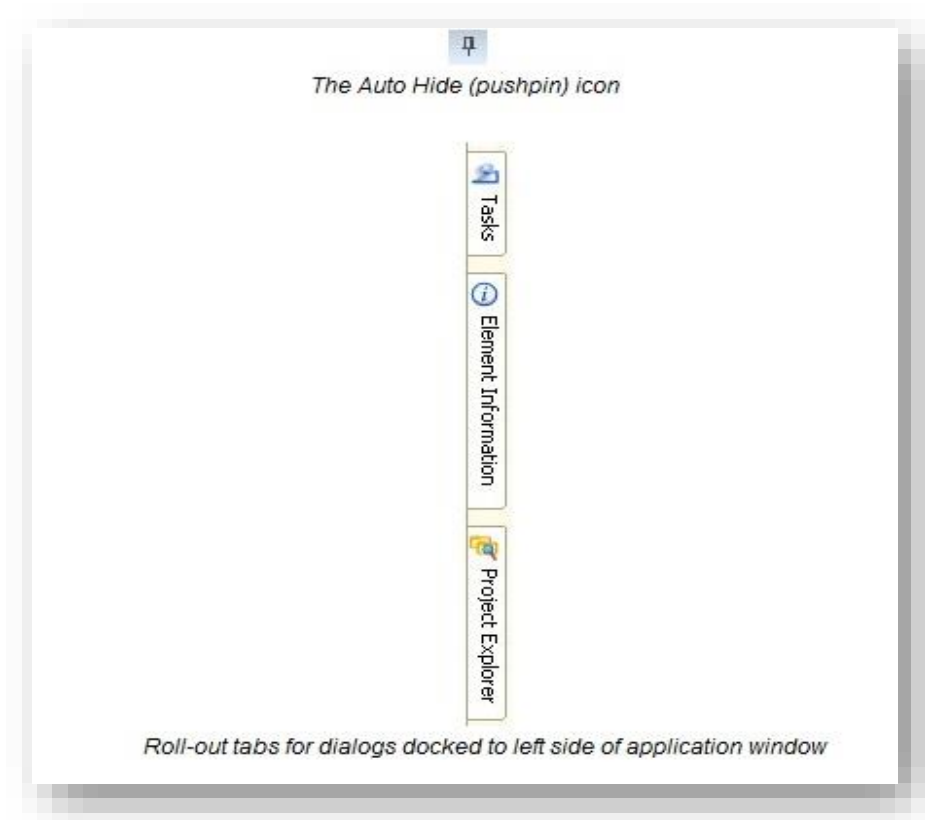


Bottom Docking Indicator with Possible Docking Region

5. Release the mouse button. The dialog is docked within the selected docking region, and is displayed in its entirety.

3.1-4b To turn on Auto Hide for a docked dialog

1. Dock a dockable dialog to an edge of the application window.
2. Click the Auto Hide (pushpin) icon in the upper-right corner of the docked dialog. The docked dialog disappears from view, and a roll-out tab appears in its place along the same edge of the application window.



3.1-4c To turn off Auto Hide for a docked dialog

1. Place the pointer over a docked dialog's roll-out tab.
2. While the dialog is displayed, click the Auto Hide icon. The dialog is re-docked along the same edge of the application window.



3.1-4d To undock or float a docked dialog

Double-click the title bar of a docked dialog. The dialog returns to the position in which it was last floating.

3.1-4e *To re-dock a floating dockable dialog*

Double-click the title bar of a floating dockable dialog which has been docked at least once. The dialog returns to the location where it was last docked.

3.1-4f *To close a docked dialog*

If the dialog is docked, simply click the dialog's Cancel icon (next to the Auto Hide icon). If Auto Hide is enabled, first pause the pointer over a docked dialog's roll-out tab, then while the dialog is displayed, click the dialog's Cancel icon, or simply enter the key-in that is normally used to close the dialog.

If you close a dialog while it is docked, and later click the icon or enter the key-in that normally opens the dialog, the dialog will open again to the position it was last docked.

If a dialog is docked when MicroStation exits it will be docked in the same position the next time you start the product.

3.1-4g *List of dockable dialogs*

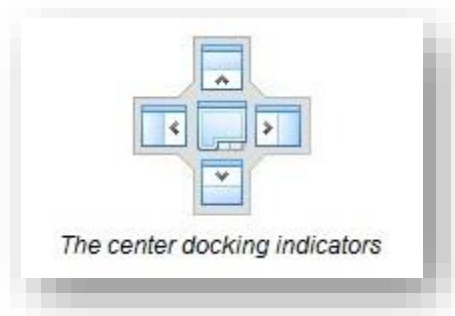
The following is the list of dockable dialogs and which edges they can be docked to:

- Tool Settings window (left or right)
- Element Information dialog (left or right)
- Project Explorer dialog (left or right)
- Link Sets dialog (left or right)
- Tasks dialog (left or right)
- Markups dialog (left, right, top, or bottom)
- Item browser (left or right)
- Details dialog (left, right, top, or bottom)
- Feature Manager dialog (left or right)
- References dialog (top or bottom)
- Raster Manager dialog (top or bottom)
- Models dialog (top or bottom)
- Saved Views dialog (top or bottom)
- Level Manager dialog (top or bottom)
- Level Display dialog (left, right, top, or bottom)

The way in which you dock one of these dialogs is different from the way in which you dock a toolbox.

3.1-4h Using Docking Indicators

As you drag a dockable dialog, docking indicators appear on the screen. These docking indicators indicate which edges of the application window the selected dialog can be docked to. In most cases, a dockable dialog can only be docked either horizontally or vertically; however some dialogs, like the Level Display dialog, can be docked both horizontally and vertically.



If the selected dialog can be docked horizontally, then the docking indicator at the center of the screen will have arrows that point toward the top and bottom edges of the application window, and matching docking indicators appear along the top and bottom edges. If the selected dialog can be docked vertically, then the docking indicator at the center of the screen will have arrows that point toward the left and right edges of the application window, and matching docking indicators appear along the left and right edges.



You can release the dialog over any of these arrows, and the dialog will be docked to the corresponding docking region. While it is mostly a matter of preference whether you use the docking indicator at the center of the screen or the ones at the edge of the application window, there is a slight difference in the two.

Using the center docking indicators will position the dialog so that it takes up the remaining free space along the length of the selected edge of the application window. For example, if there is already a dialog that is docked vertically on the left edge of the application window, then dropping a horizontally docking dialog over the center docking indicator, pointing toward the top edge of the application window, will dock the dialog so that it fits in the remaining space along the top edge.

Using the docking indicators at the edges of the application window let you decide where specifically along the selected edge you want to dock the dialog. For example, if there is already a dialog docked to the left edge, you can use the edge docking indicators to select whether you want to dock the new dialog on top of the existing dialog, or to the left or right of it, or above or below it.

If you are moving a dockable dialog and there are no dockable dialogs currently docked to the edge of the application window that the selected dialog can be docked to, then the center controls will not display.

3.1-4i *Other dialogs that can be docked*

The following dialogs are also dockable; however their docking behavior follows the standard docking behavior for toolboxes:

- Key-in window
- View Groups window
- AccuDraw window
- Drawing Scale window
- Snap Mode button bar

3.1-4j *Dialogs that are docked by default*

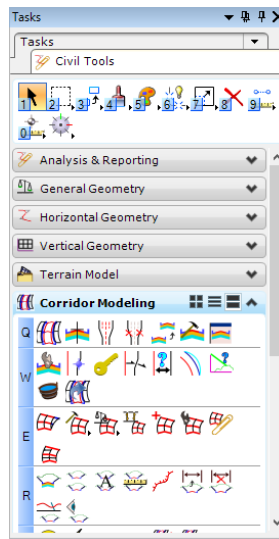
When you start MicroStation for the first time and open a file, certain dockable dialogs are already docked. This is because the product delivers a docking preference file that defines which dialogs are docked by default, and where. As you make changes to the location of docked dialogs, that information is saved in your personal docking preference file, rather than in the delivered default docking preference file.

3.1-5 Workflows

A workflow can consist of one or more tasks. In most cases, a workflow consists of a collection of tasks organized in the order that you will use them to complete a project or job. Each task contains the tools you need to complete the task. The Drawing Composition workflow is delivered with MicroStation.



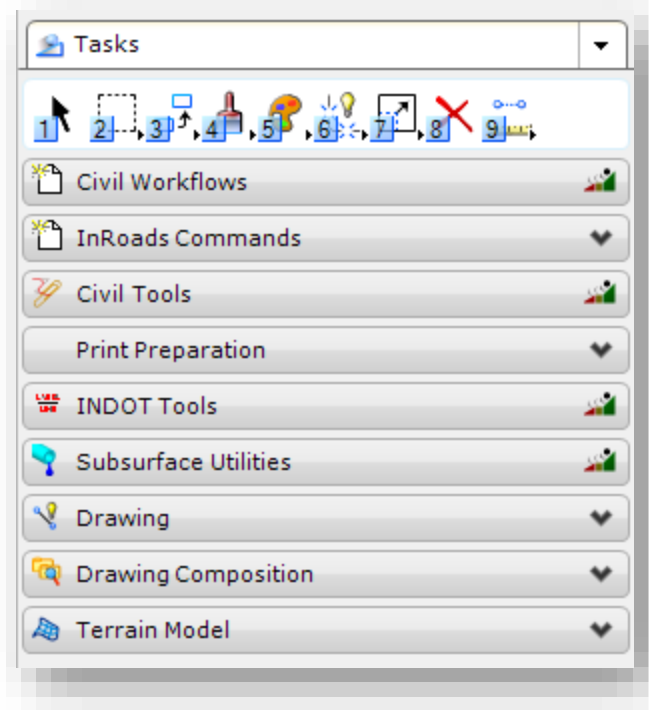
Workflow icon



The Civil Tools Workflow

3.1-6 INDOT Dialogs, Tasks and Workflows

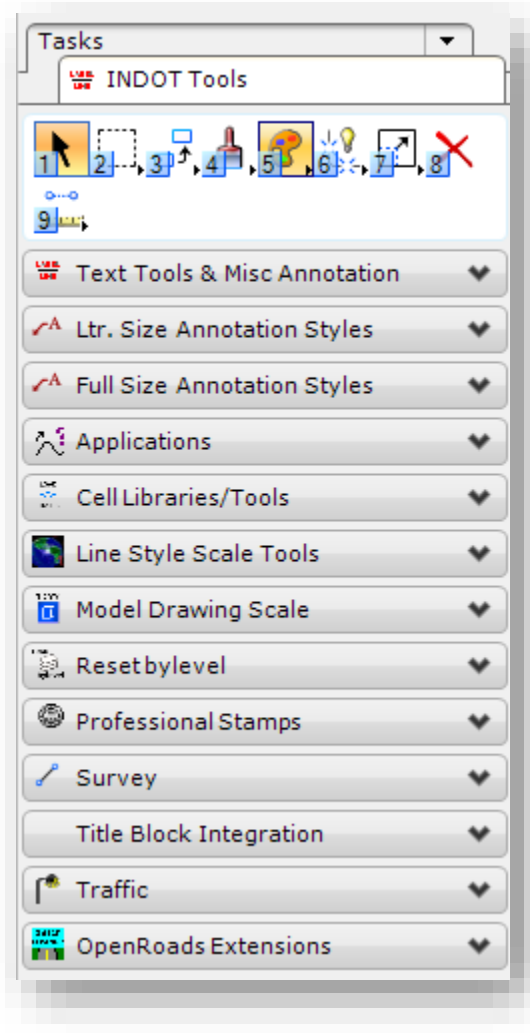
A new .dgnlib will accompany this document that has many new and exciting changes and enhancements that leverage the latest version of MicroStation. We (CAD Support) have taken a few steps to organize the task navigation section of the Application Window to make it more user friendly and INDOT specific. Via the managed workspace in ProjectWise, when a .dgn file is opened, the Task Navigation will appear as follows: (See INDOT Tools)



Task Navigation with INDOT Tools

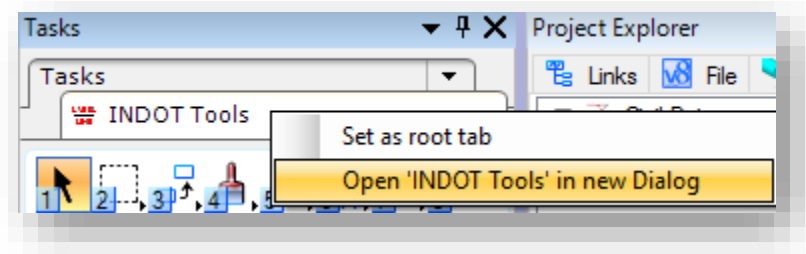
3.1-6a INDOT Tools Workflow

This new INDOT Tools workflow has separated the INDOT specific applications, tools, tasks and dialogs. Once activated (by selecting) it will appear as in the following image:



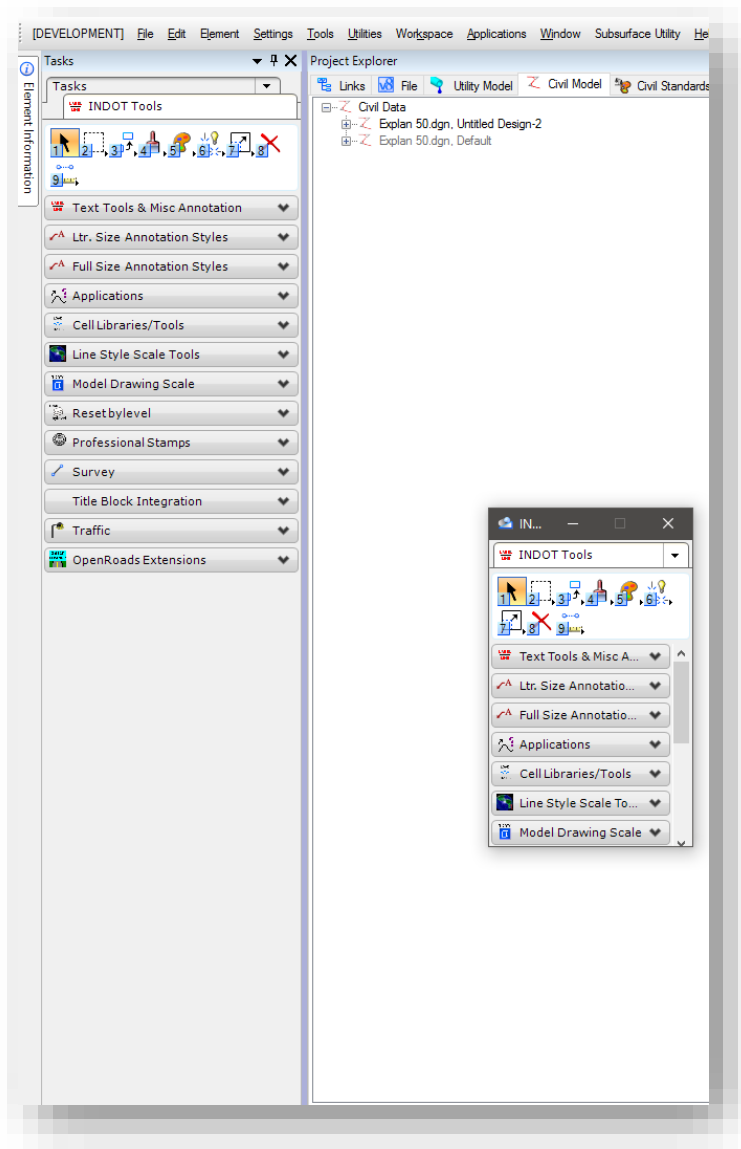
The INDOT Tools Workflow

1. Right mouse click in the INDOT Tools tab and select Open 'INDOT Tools' in a new Dialog and you will be provided a separate dialog containing these tools.



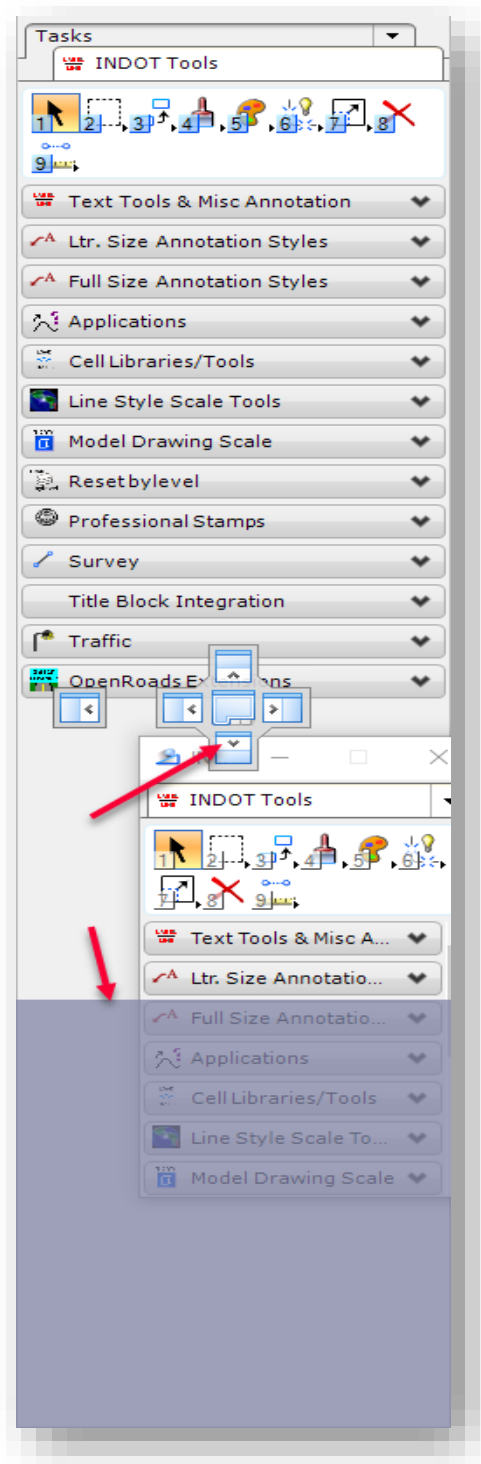
Opening INDOT Tools Separately

This will allow you to dock it as a separate dialog below the existing Main Tasks dialog.



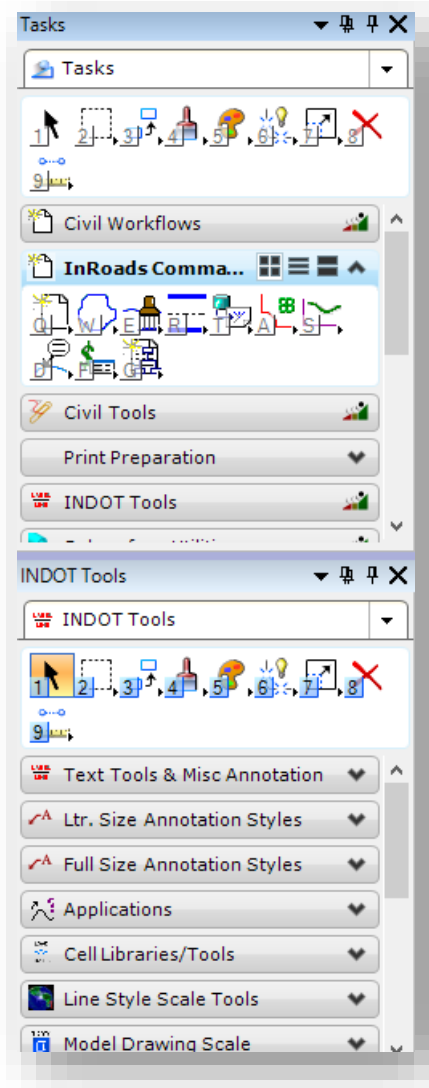
Docking the INDOT Tools Workflow

- Using the docking indicators, select the bottom arrow to place the new INDOT Tools dialog below the other Tasks dialog.



Split Task/Workflow Docking

3. Clicking this task displays all tasks in a hierarchical tree. Clicking a task in the tree expands the task, making it the root task, and hides the other tasks.
4. Once a subordinate task has replaced Tasks as the root task, clicking the task's tab displays all tasks in a hierarchical tree. Clicking Tasks in the tree resets Tasks as the root task.
5. It will then appear as shown, giving you access to both dialogs, but keeping them specific and separate.



Docked/Combined Workflows

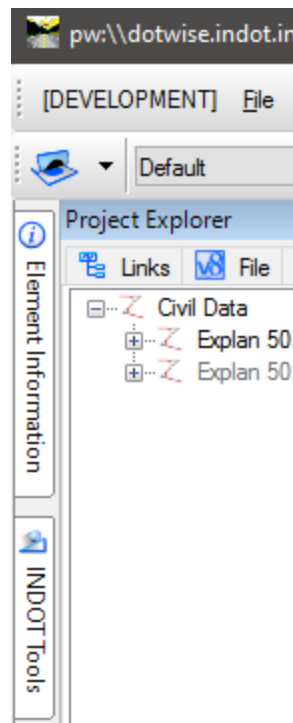
The other option is to use The Auto Hide (pushpin – icon) pointing down, hiding each of the task dialogs off to the left of the screen. The pushpin will then point left.



Docked

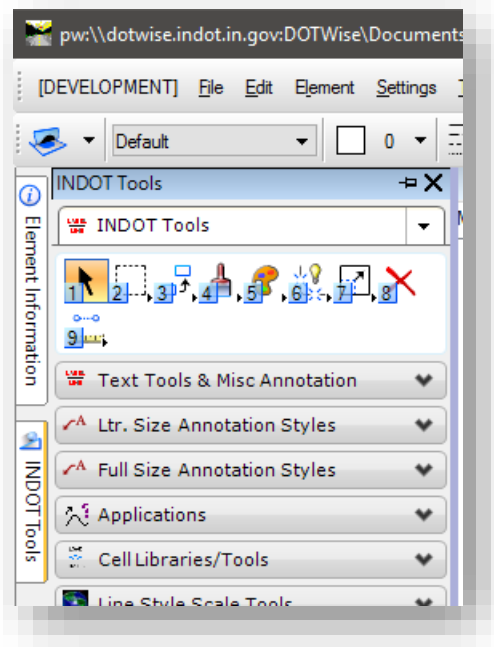


Hidden



Un-Pinned Tasks

When you hover over the tools you wish to use/see they will appear as shown in the following picture:

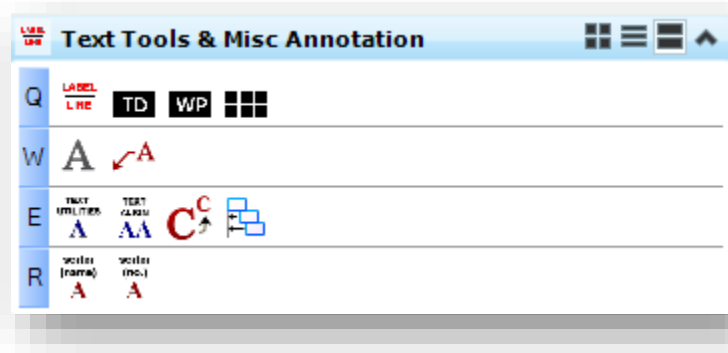


Task Flyout

If you wish to place/dock the tasks dialog back out in the application window again, click on the pushpin as it points left and make it point down by selecting it.

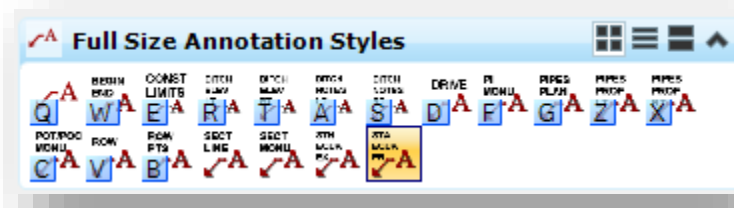
3.1-6b Tools Included in the INDOT Tools Task Navigation

To ease many steps in the Drafting and Design processes that are discussed in this document, numerous tools have been created to the INDOT Tools workflow. This section will discuss the various tools included.



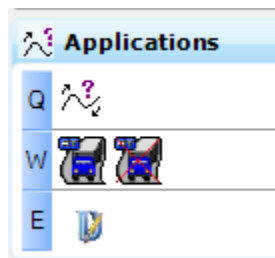
Text Tools

The tools contained in this tool box are used to quickly change text case, alignment, and other text functionality.



Annotation Styles

These tool task contain a wide variety of annotation text and dimension styles in both Letter and Full size formats.



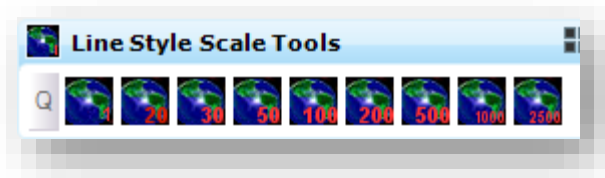
Applications

The Applications tool box contains quick links that can be used to quickly start and stop the MicroStation plug-in applications that are currently available. These are AutoDesk Vehicle Tracking and Descartes. InRoads no longer shows as an option as it can only be launched directly and not from within MicroStation.



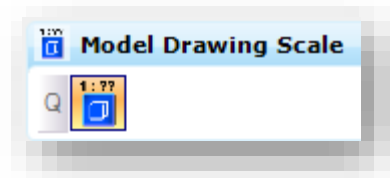
Cell Libraries/Tools

The Cell Libraries/Tools tool box contains quick links to loading each of the INDOT cell libraries. It also contains cell based tools such as the MDL based cell tools application.



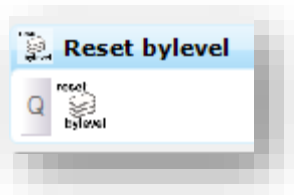
Line Style Scale Tools

The Line Style Scale tools provide a series of scaling options to override any annotation scale or global scale linestyle scaling options. These should only be used on legacy drawings.



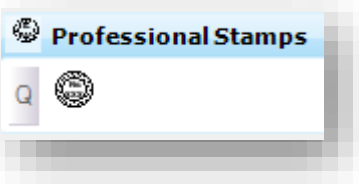
Model Drawing Scale

The Model Drawing Scale tool provides quick access to the drawing scale toolbar where working units and annotation scale can be adjusted.



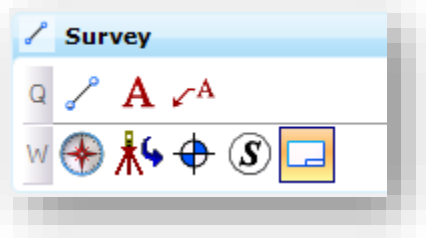
Reset Bylevel

The Reset bylevel tool resets all active element symbologies to their current ByLevel state.



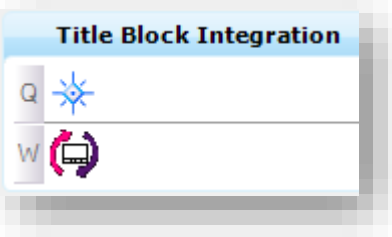
Professional Stamps

The Professional Stamps tool loads the PE/LS Stamp cell library.



Survey

The Survey tool box contains quick links to some of the most commonly used survey-related tools with their default settings. It also provides access to the Survey cells via the Cell Selector.



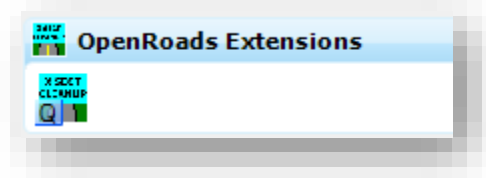
Title Block Integration

The Title Block Integration tools provide access to the cell library containing the cells used for ProjectWise titleblock integration, along with a tool used to force a synchronization of title block attributes from ProjectWise.



Traffic

The Traffic tool box contains links to all the traffic cell libraries, along with a shortcut to the AutoDesk Vehicle Tracking software.



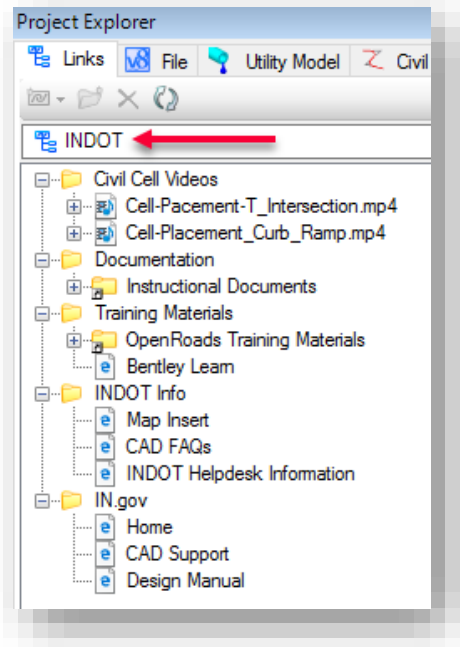
OpenRoads Extensions

This toolbar contains any OpenRoads Extensions that have been added to the workspace. Currently only the Cross Section Synchronization tool resides in this toolbar. Note that it will only function in InRoads or PowerInRoads.

3.1-6c INDOT – INFO

With the release of the new workspace, the INDOT-INFO tools along with others have been moved into a Project Explorer linkset. To view this information, start the Project Explorer under the MicroStation File menu.

On the Project Explorer you'll see a Links tab. Included in this tab are a number of resources both from Bentley and INDOT to assist in your usage of the workspace. With the INDOT option in the dropdown selected, you'll see numerous options.



Various help resources can be found in this command. For items developed within INDOT or to reach the helpdesk select the appropriate option. Additionally, many other ProjectWise resources have been included so they are easily accessible.

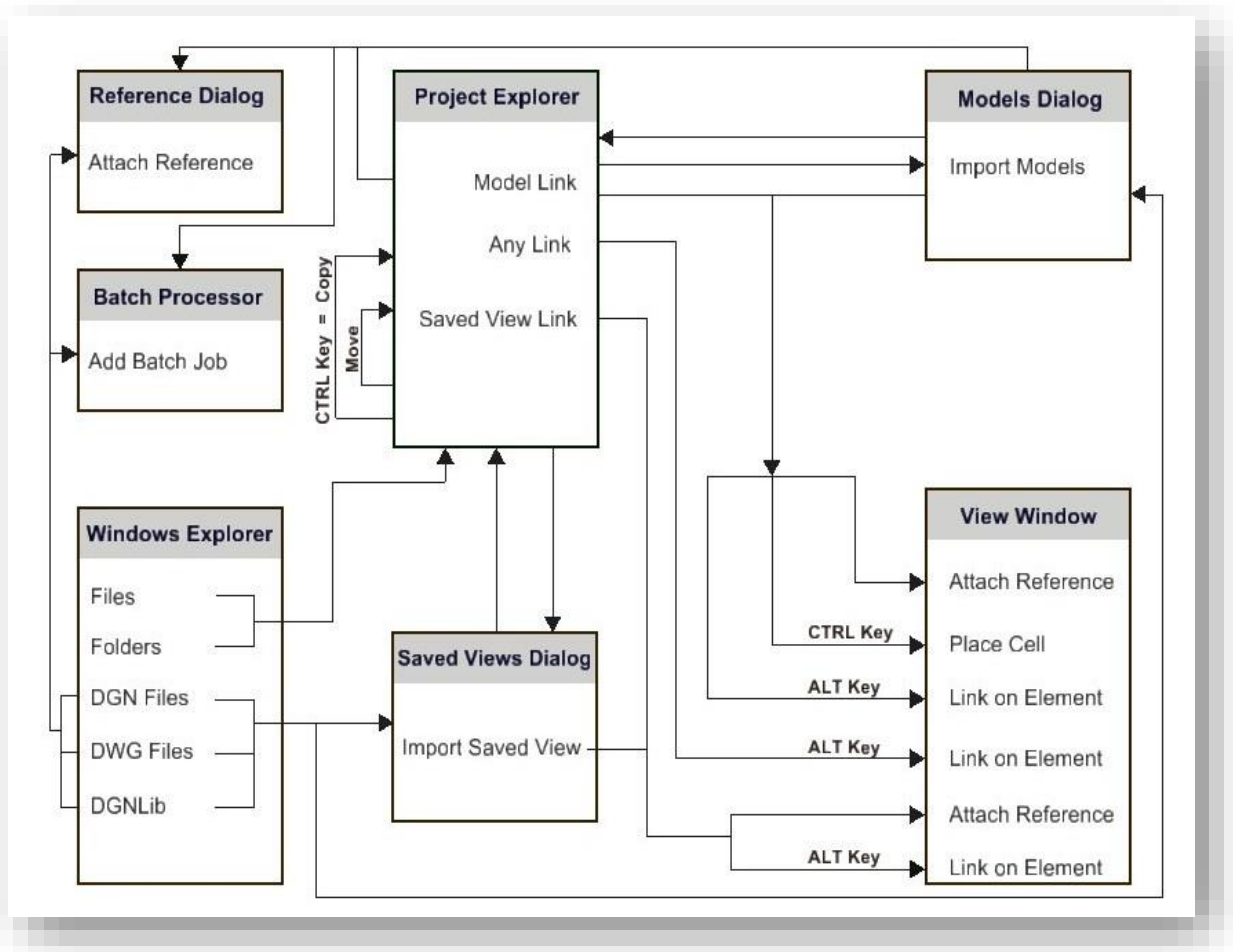
3.2 User Interface Enhancements

The addition of drag-and-drop support, the ability to customize right-click menus and the Tasks dialog, and three new ways to customize the status bar make the interface easier to use.

3.2-1 Drag-and-drop support

As of MicroStation V8i (SELECTSeries 1), additional drag-and-drop functionality has been added.

Note: Not all functionality will be available when working within ProjectWise.



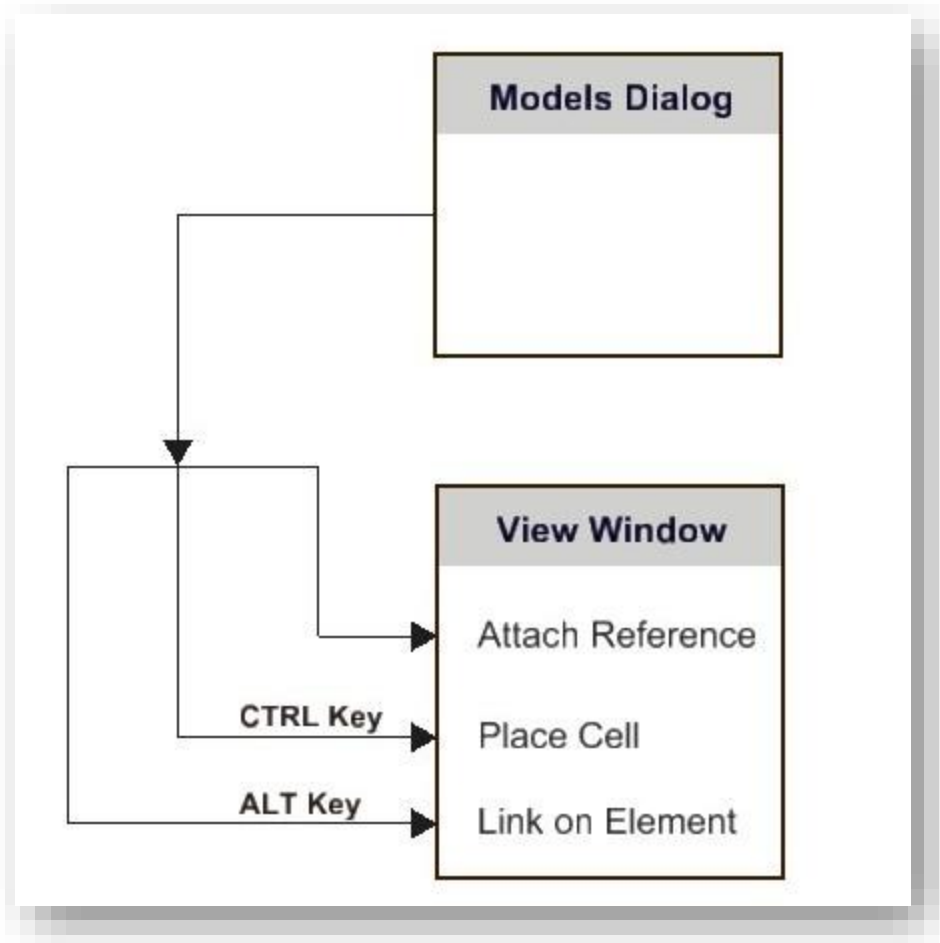
MicroStation Native Drag and Drop Operations

Some of the possible drag and drop operations are:

- Drag and drop models from the Models dialog to the Project Explorer dialog
- Drag and drop a saved view from the Saved Views dialog to the Project Explorer dialog
- Drag and drop files and folders from Windows Explorer to the Project Explorer dialog
- Drag and drop links from the Project Explorer dialog to a view window
- Drag and drop links within the Project Explorer dialog
- Drag and drop saved views from the Saved Views dialog to a view window

- Drag and drop models from the Models dialog to a view window
- Drag and drop DGN, DWG, and DGNLIB files from Windows Explorer to the Saved Views dialog

One common use of the drag and drop feature is between the Models dialog and a view window.



Drag and Drop Functions with Command Modifiers

3.2-2 Right-click context menus based on named expressions

When customizing right-click context menus and menu items (*Workspace > Customize > Context Menus* dropdown), you can show or hide and enable or disable them based on tests created in the Named Expressions dialog. For example, you can create a right-click menu item that will be visible only when you are working on a sheet model by setting the menu item's Show/Hide Test property to "IsSheetModel." Or you can create a right-click menu item that will be visible but enabled only when you are working on a sheet model by setting the menu item's Enable/Disable Test property to "IsSheetModel." You can determine where the context menu or context menu item will be placed in the right-click menu by setting its Priority field.

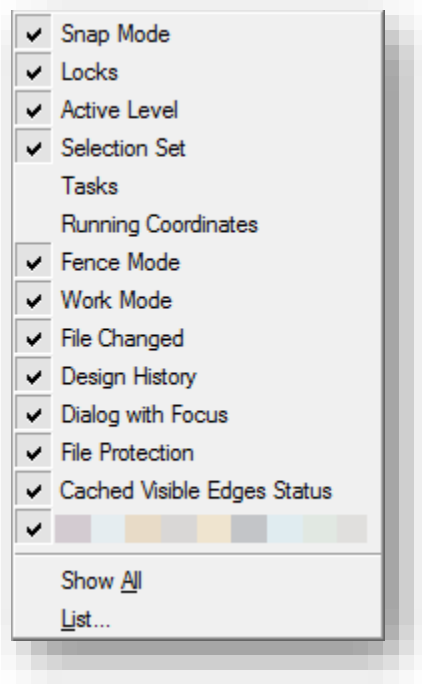
3.2-3 Show/Hide support in Tasks dialog

Right-clicking a task in the Tasks dialog opens a menu that allows you to show or hide the following:

- Show/Hide Tools > (Tools' names) – Allows you to show or hide individual tools.
- Show/Hide Tools > Show All – Shows all of the tools.
- Show/Hide Tools > List – Lists the tools in a dialog in which you can choose which to show or hide them.

3.2-4 Show/Hide support in status bar

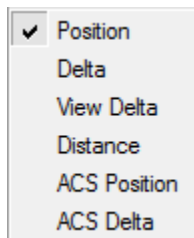
Right-clicking in the status bar opens a menu allowing you to show or hide sections of the status bar.



Status Bar Options

3.2-5 Coordinates display in status bar

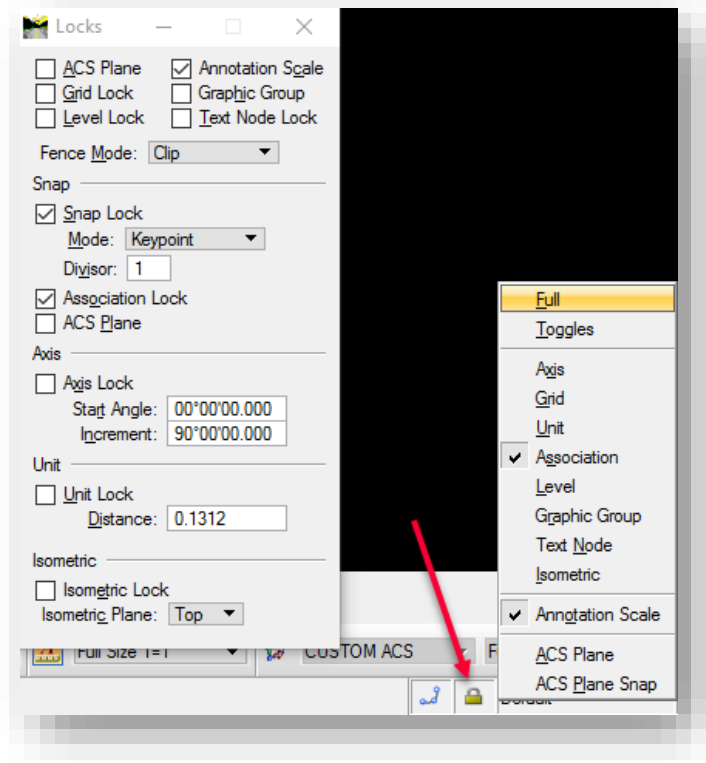
Left-clicking in the Running Coordinates section of the status bar turns on the coordinates display. As you move your cursor, the coordinates of your current position display according to the active Tentative Point Mode. When you left-click, a menu displays six options. The Delta modes show the X, Y, and Z displacement from the last data point. The Distance modes show the distance and direction from the last data point.



Coordinate Formats

3.2-6 Locks dialog

Left-clicking the Locks icon on the status bar and selecting Full on the popup menu opens the Locks dialog.



Locks Dialog and Menu

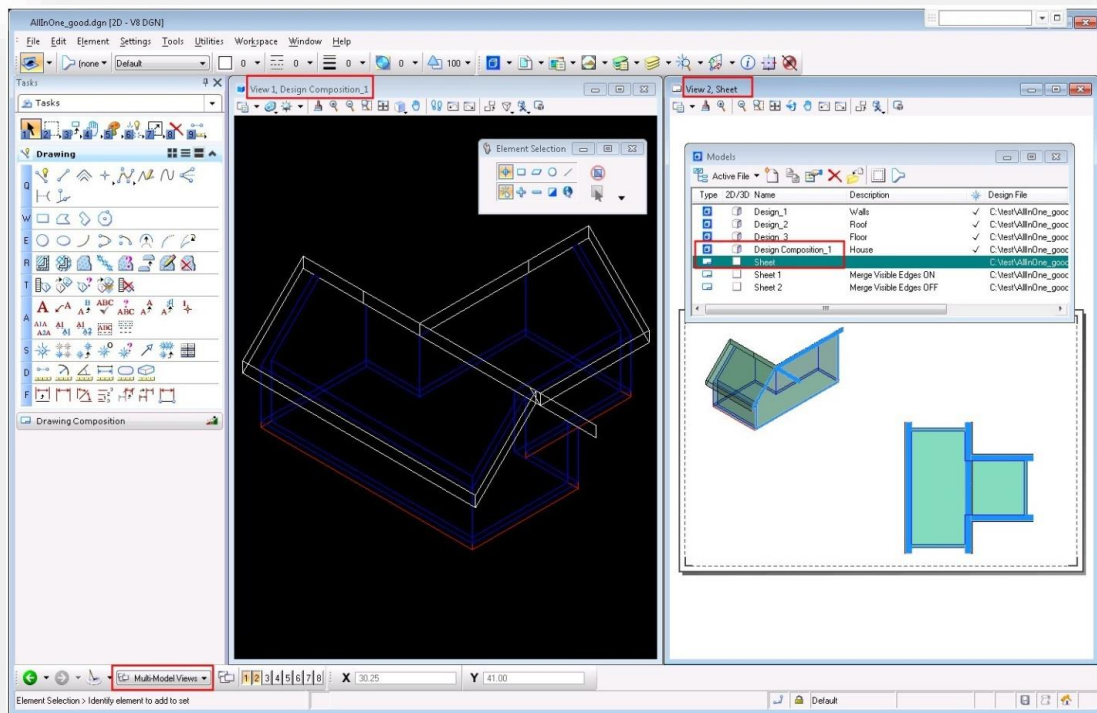
3.3 Models Enhancements

The enhancements to Models include additional viewing capabilities, Project Explorer integration with the Models dialog, and sheet name display in the Models dialog.

Models have additional new features in MicroStation V8i (SS1 and SS2).

3.3-1 View different models from the same file in each view

You can view more than one model from the same file in separate views. In the example below, notice that the “Multi-models View” view was created and the titles of the two views match two separate models in the Models dialog.

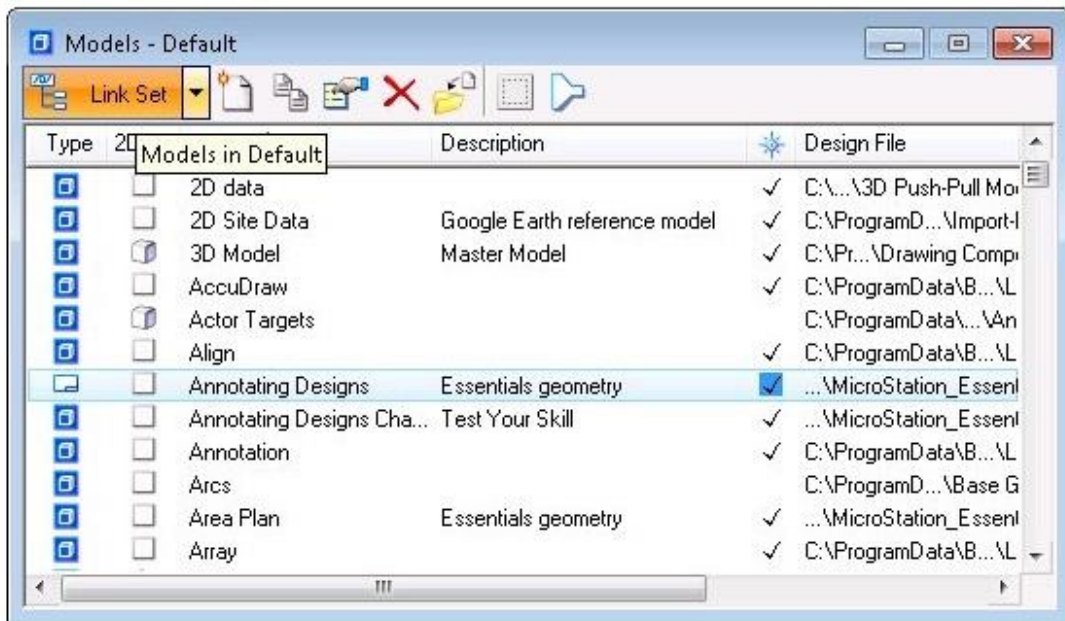
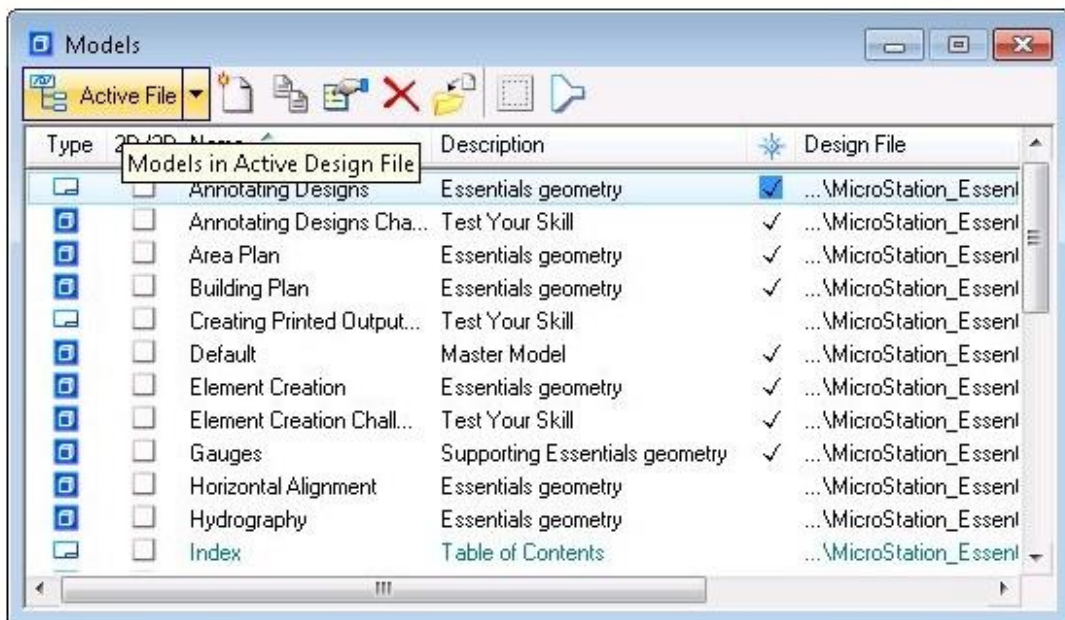


Multiple Model Display

3.3-2 Project Explorer integration in Models dialog

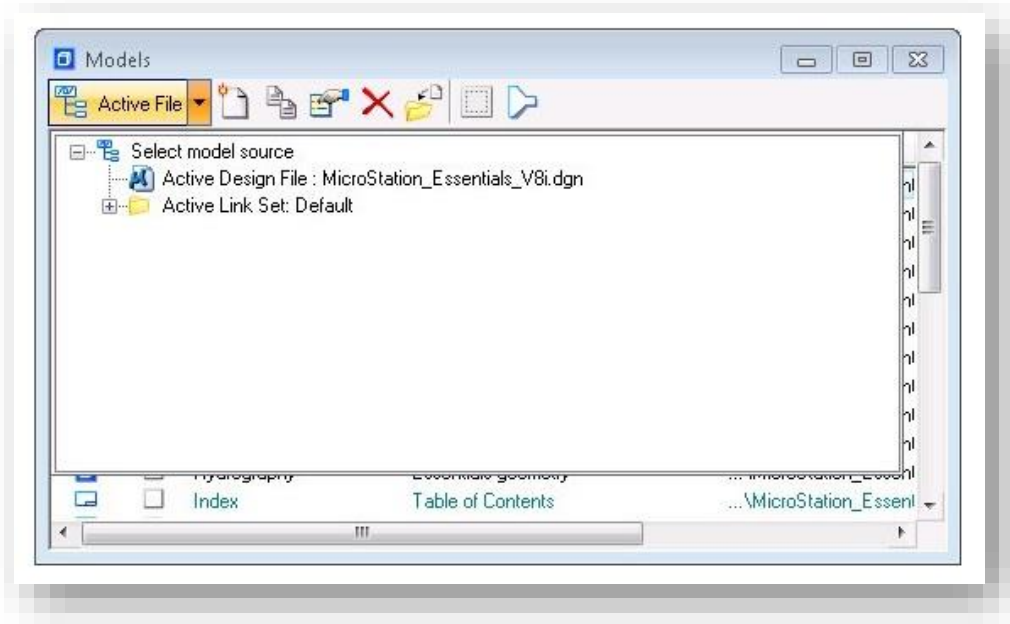
An icon has been added to the Model Manager dialog. The icon puts the dialog into one of two modes:

Active File Mode: Shows the current source of the models. If set to Active File, the models are in the master file. If set to Link Set, the models are in Project Explorer.



Active Files/Link Set Models

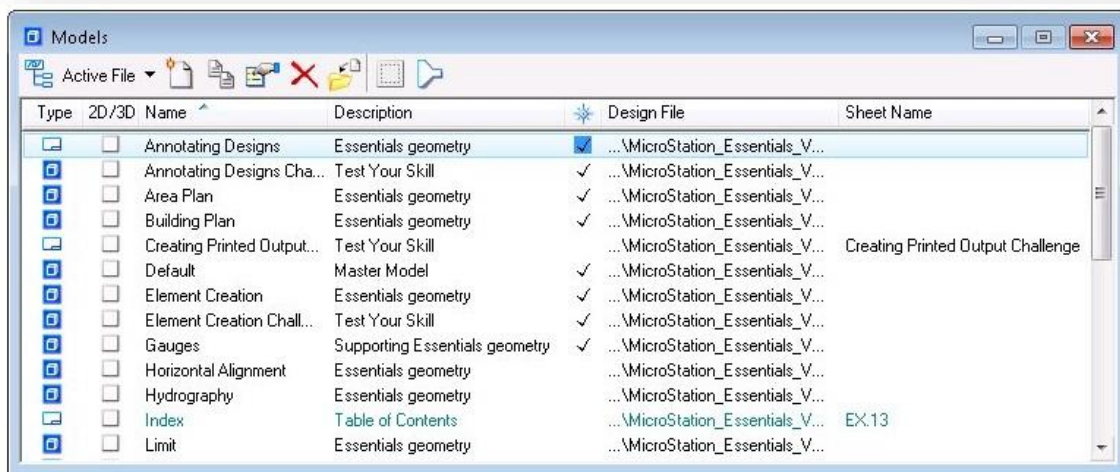
Link Set Mode: Shows a Project Explorer layout, allowing you to select an active file or folder from the active project in Project Explorer.



Active File Model Options

3.3-3 Models dialog displays the sheet name

The Sheet Name column has been added to the Models dialog in support of sheet sequencing. The sheet name should match the corresponding sheet link name in Project Explorer. If the two get out of sequence (that is, the sheet link name was changed in Project Explorer or in the Model Properties in the Model dialog), the new sheet name can either be pushed out from Project Explorer to the model or pulled from the model back to Project Explorer so they are synchronized.



Models with Sheet Names

3.4 Menu Changes

The following sections list changes in the menu structure. The Edit, Workspace, Window, and Help menus are unchanged.

3.4-1 File menu changes

- Selecting Import > CAD Files opens the Import dialog.
- Selecting Export > SVG opens the Export SVG dialog.
- As of MicroStation V8i SELECTSeries 1, exporting to Maxwell Scene has been replaced by exporting to Luxology.
- Selecting Export > OBJ opens the OBJ Export Settings dialog.
- Batch Print is removed and has been replaced by Print Organizer. Selecting Print Organizer opens the Print Organizer dialog.
- Selecting File > Publish i-model opens the Publish i-model dialog.
- Selecting Export > Luxology opens the Create Luxology File dialog, which is used to export the .ixo file.
- Selecting File > Point Clouds opens the Point Clouds dialog.

3.4-2 Element menu changes

- Detailing Symbol Settings is removed. It is replaced by Detailing Symbol Styles, which opens the Detailing Symbol Styles dialog. In this dialog you can create and edit detailing symbols.
- Selecting Element Templates opens the Element Templates dialog, which in the previous edition was accessible in the Customize dialog.

3.4-3 Settings menu changes

- Selecting Display Styles opens the Display Styles dialog.
- Locks > Depth Lock is removed. It is no longer used.
- The Rendering submenus have been reorganized. Selecting Rendering > Settings opens the Render Settings dialog.
- Snaps > Tangent From has been renamed Tangent Point.
- Snaps > Perpendicular From has been renamed Perp Point.
- Rendering > Light Setup is removed. The Light Setups and Light Manager dialogs have been consolidated into a new Light Manager dialog, which is opened by selecting Rendering > Light Manager.

3.4-4 Tools menu changes

- The Tools menu has been reorganized. All toolboxes are accessible from the Tools menu. Each tool appears in only one toolbox.
- You can select tools and view controls directly from the Tools menu.
- For example to select the *Scale* tool, select Tools > Manipulate > Scale. To open the Manipulate toolbox, select Tools > Manipulate > Open as ToolBox.
- The Main submenu returns to provide more convenient access to child toolboxes of the Main toolbox.
- The Geographic submenu provides access to geographic tools.
- The Clash Detection menu item provides access to the Clash Detections toolbox.

- The Point Clouds menu item provides access to the Point Cloud toolbox.

3.4-5 Utilities menu changes

- The Render menu item's submenus have changed. The submenus are Fly Through, Solar Study, Animation, and Luxology.
- Selecting Named Expressions opens the Named Expressions dialog.
- The Generate Section menu item is removed.
- The Install Fonts menu item is removed.
- The Render > View menu item is removed.
- The DWG > Audit menu item is removed.
- The DWG > Recover menu item is removed.

3.4-6 Application menu

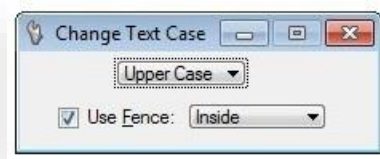
- No significant changes
- Due to inconsistencies with AutoTrack, SignCAD, and InRoads; multiple Application menus may appear.

3.5 Text Enhancements

Text enhancements include the ability to change case by a selection set or fence. The Advanced tab allows for comparisons between styles. Word Processor updates include an insert field, subscript and superscript icons and right-click operation to change the case. The Edit Text tool retains its text settings and the Find/Replace Text tool supports data fields.

3.5-1 Change case by selection set or fence.

This tool is used to change the case of a piece of text. Case change options include Upper Case, Lower Case, Title Case, and First Capital. This tool also supports text selection via a fence. This tool can be found under the **Tools > Text** menu, labeled as **Change Case**. This tool supersedes the previous version included with the TextUtil.ma package.



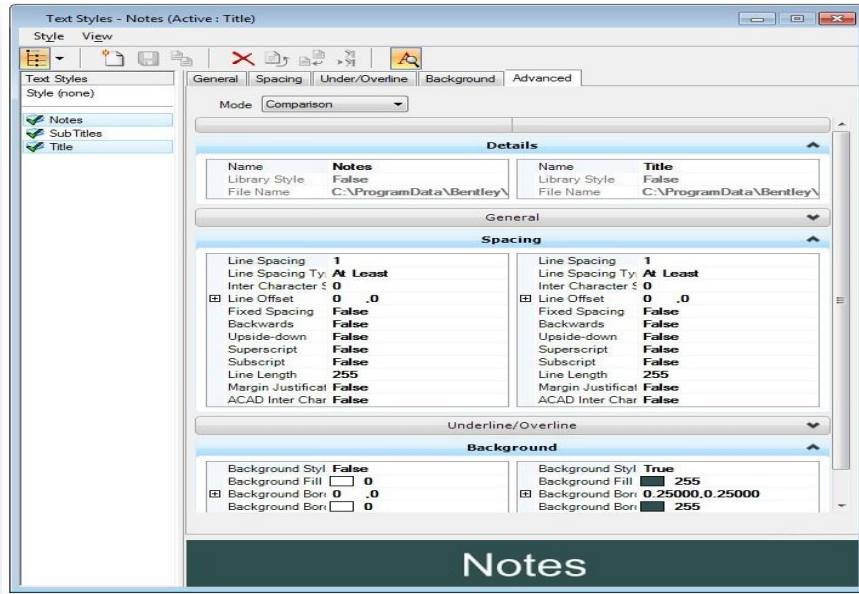
Change Text Case

3.5-2 Text Style dialog enhancements

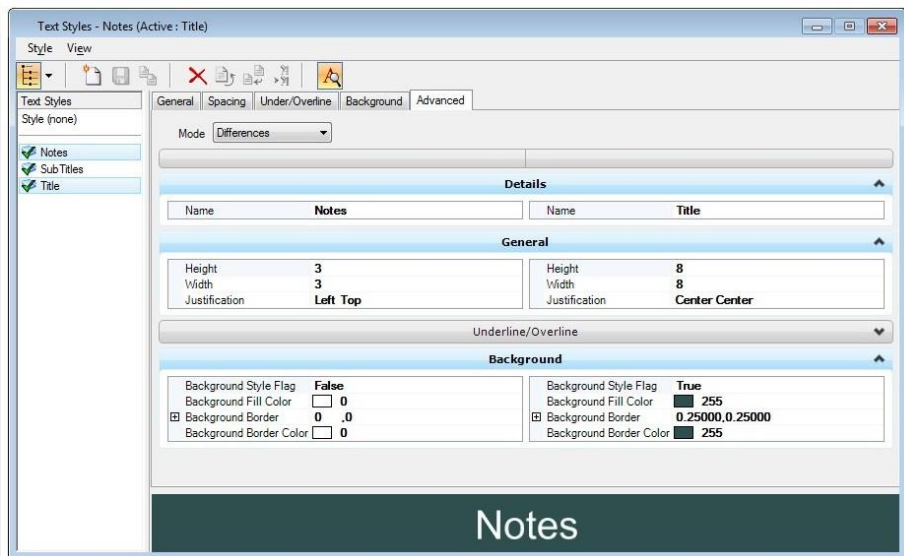
For information on INDOT Specific fonts, please see Appendix B.

3.5-2a Advanced tab allows comparison between styles

Two new modes (Comparison and Differences) have been added to the Advanced tab of the Text Styles dialog. Comparison mode shows a side by side comparison of the properties of two selected text styles. Differences mode shows the differences of the properties of two selected text styles.



Text Style Comparison



Text Style Differences

3.5-3 Word Processor enhancements

Three new icons have been added to the Text Editor – Word Processor dialog.

The Insert Field icon opens the new Field Type Picker dialog, used to select the type of field to be created. See Placeholder fields for more information.



Text Functions

The Superscript icon allows you to create text with superscript by typing in the text, clicking the superscript icon, then typing in the number. The Apply Changes to all Text check box must be toggled off to place superscript.



Superscript Text

The Subscript icon allows you to create text with subscript by typing in the text, clicking the subscript icon, then typing in the number. The Apply Changes to all Text check box must be toggled off to place subscript.



Subscript Text

3.5-3a Right-click to change case

The Change Case > Upper Case and Change Case > Lower Case menu items have been added to the right-click menu of the Text Editor – Word Processor dialog.

3.5-4 Using Fonts

MicroStation supports three types of fonts: True Type, RSC (MicroStation Resource Font) and SHX (AutoCAD Fonts).

3.5-4a True Type Fonts

Many TrueType fonts are delivered with Windows, and many more are available from various vendors for free or for purchase. **TrueType is an industry standard format supported by MicroStation.** In general, this is the recommended font type for use in MicroStation. TrueType fonts also include full

Unicode support (note: not all TrueType fonts contain characters for all languages). TrueType fonts are always filled, and therefore do not provide good support for “stick” fonts (as opposed to SHX and RSC fonts).

3.5-4b RSC (MicroStation Resource Font)

This font format is MicroStation-specific, and RSC fonts are stored in MicroStation resource (.rsc) files. A single resource file may contain several RSC fonts. RSC fonts have a number and a name, but only one font by a given number can be used at a time during a MicroStation session. If multiple RSC fonts share the same number, the last one to be loaded is the font assigned to that number in a given session. RSC fonts are locale-encoded, but support more than 255 characters (e.g. for some Asian languages). The code page of RSC fonts is specified in the font configuration file. If you use font characters for symbols, use RSC fonts rather than TrueType fonts.

Due to various compatibility issues, and lack of customization tools, RSC other than those provided with SignCAD are no longer available for use in the INDOT Workspace.

3.5-4c SHX (AutoCAD Fonts)

MicroStation supports AutoCAD’s font format (including normal SHX fonts, SHX Unifonts, and SHX Bigfonts). You should use SHX fonts only when you must ensure AutoCAD compatibility, and TrueType fonts are not a viable option. SHX Unifonts are the current standard, and allow a single font (and font file) to contain characters in the entire Unicode range. Older SHX fonts only support up to 255 characters, and thus require a paired SHX Bigfont to support languages with more than 255 characters (e.g. Asian languages). In MicroStation, specifying a paired SHX Bigfont is optional, and is recommended if you require characters that cannot be provided by the base SHX font.

If AutoCAD is installed, MicroStation searches for SHX fonts in AutoCAD’s Fonts directory (the “Fonts” folder in the installation directory of the most recently used version of AutoCAD). With or without AutoCAD, MicroStation searches the directories specified by MS_FONTPATH, as well as the same directory as the design file requesting the font.

DWG Export: AutoCAD natively supports SHX fonts, and no special export is performed.

3.5-5 Edit Text tool retains text settings

In the past, the Edit Text tool would change the active settings whenever you edited a piece of text. This behavior has been changed so settings revert to the previous settings when the Edit Text tool is closed. This change affects the active settings only and not the text styles.

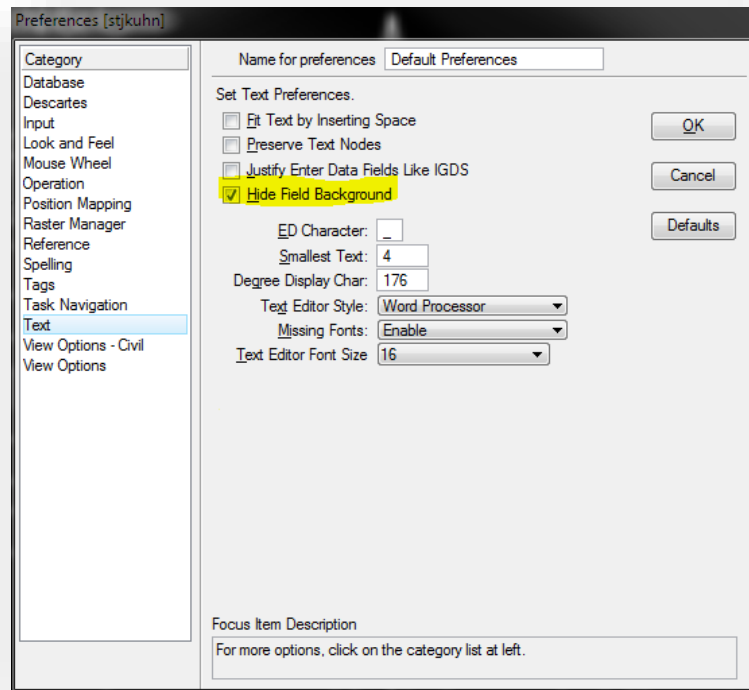
3.5-6 Find/Replace Text supports data fields

The Find/Replace Text tool can now find and replace text in enter data fields.

3.5-7 Disabling Text Field Backgrounds

Various text tools may take advantage of MicroStation fields, tying Model or other properties to a piece of text. Depending on the workflow, it may be desirable to disable the background of the text field for use in other applications.

To disable the field background, go to the **Workspace -> Preferences** menu and navigate to the Text option on the left. Enable the fourth option, Hide Field Background.



Disabling Field Backgrounds

3.6 References Enhancements

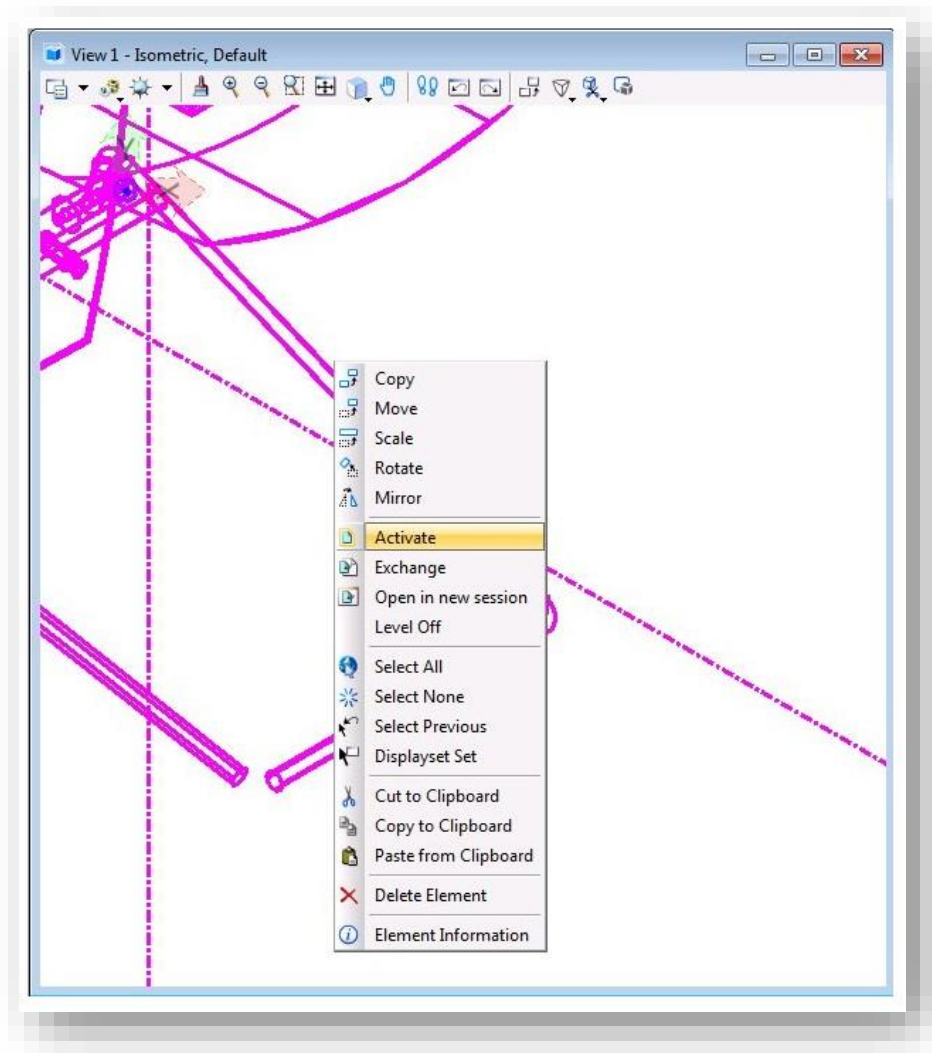
A major enhancement to references is the ability to edit a reference from within the active model.

In addition, the active model's annotation scale applies to annotations in references.

References have additional new features in MicroStation V8i (SELECTSeries 1).

3.6-1 Activate reference for in-place editing

A new capability lets you edit a reference in-place. That is, you can edit a reference from within the active model. To do this you first must activate the reference.



Reference Activation

When a reference is activated:

- Only operations on the activated reference are permitted.
- By default, all elements in references above the activated reference in the file hierarchy, as well as the active model, are displayed with an override color. You can control whether or not an override color is used, and what the color is.
- If you activate another reference, the currently activated reference is automatically deactivated.
- The reference is locked so that it cannot be edited in another session.
- DGN library data, such as levels and level filters, is not available in an activated reference file.
- Activated referenced in InRoads allows for the interaction with underlying civil data such as terrains and alignments.

3.6-2 References support active model annotation scale

In the past you may have added annotations to design models that are referenced into sheets. You also may have added annotations directly on the sheet. If the annotations were too small, you would have changed the model's annotation scale, but that would have affected only the annotations directly on the sheet. The annotations in the reference were not changed. Therefore, the only way you could change the annotations was to exchange into the reference and scale them.

Now the active model's annotation scale applies to annotations in references, too. If you change the scale of the annotations on the sheet, the scale of the annotations in the references changes as well.

To make a reference's annotations use the active model's annotation scale, you must turn on this option. In the References dialog there is a new column named Use Active Annotation Scale. If this column is not visible, right-click in the column headings and turn it on. To turn on this option for a reference, click in this column to make a check mark appear.

3.6-3 Detail scale

Detail scale helps you represent the Master:Ref scale in terms of the sheet scale. For example, if your sheet scale (annotation scale) is $1/8" = 1'$ and you want to place a detail reference of scale $1/4" = 1'$, simply pick the new scale from the Detail Scale combo box. It automatically computes the Master:Ref scale as 2:1.

3.6-4 Synchronize with saved view

When you attach a saved view, you can specify that the display of the reference should always be synchronized with the original saved view. In the Reference Attachment Settings dialog, turn on the Synchronize with Saved View check box.

In order to change the appearance of a reference, you have to modify the saved view that it is synchronized with. This is to ensure fidelity of display properties such as view attributes, level masks, clip volume, display styles and others.

When synchronized, the reference location is also realigned. Specifically, when the reference is synchronized with the saved view, the reference center and saved view center remain aligned. You can see the effect of this in two ways:

In an unsynchronized state, the reference is first shifted and then synchronized.

When synchronized, the saved view center is changed; for example, the saved view is stretched.

3.6-5 Drawing title

When attaching a reference on a sheet, you can optionally create a drawing title. A drawing title describes a drawing on a sheet. If there are four references on a sheet (top, front, right, and isometric), you create four drawing titles to demarcate the four references. It plays a crucial role in automatically linking call-outs across sheets. Properties such as Name, Detail Scale, and Identifier are displayed in the call-outs in the form of fields.

3.6-6 Change Attachment Orientation

In this edition you can change the orientation of the reference attachment by clicking the reference's Orientation column in the References dialog.

3.6-7 Reference Detail Scale

When attaching a reference (a design or drawing model) into a sheet model, the referenced model's annotation scale is applied as the detail scale, and the Reference Scale (Master:Ref Scale) is calculated from the referenced model's annotation scale and the active model's annotation scale.

3.6-8 Working with RDL Files

With this release of the CAD Workspace, ProjectWise and redlining capabilities are available via a web browser at dotwise.indot.in.gov. Please note that this site is not available internally. The .rdl file is a redlining file created by using these tools and can be attached as a standard reference in MicroStation and used in the same manner.

4. Plotting

As of this latest release, CAD Support is advocating the use of the Print Organizer tool in OpenRoads Designer and MicroStation to create plots—which will eventually replace ProjectWise InterPlot Organizer once the OpenRoads Designer rollout occurs. As with prior releases of the INDOT Workspace, users can continue to use the ProjectWise InterPlot Software to fulfill their plotting needs for the foreseeable future; however, it is strongly suggested by CAD Support to transition to using Print Organizer to create plots. This chapter will discuss the processes needed to create and print plot sets for each method. Also, with the update to Adobe Acrobat DC, we will discuss the steps to create and implement your digital signature on plan sheets for each method as well.

All of the enhancements to the plotting environment are a product of countless hours of research based on the lessons that CAD Support has learned over previous releases of the workspace and best practices in place within INDOT and other agencies.

It should also be noted that Print Organizer can facilitate all the same functionality as InterPlot Organizer, except that it does require some minor changes to the document signature process—which will be covered later in this chapter.

4.1-1 PDF Support Only

First up, we'd like to provide some notes on how plotting is supported. Due to the number of different plotter and printer configurations currently available across all INDOT locations, CAD Support is now using a) preconfigured Print Styles for use with Print Organizer, and b) a single driver/multiple plotter setup for exporting files to PDF using InterPlot Organizer. As PDF is largely becoming the standard format for the publishing of documents to ERMS and for transport across the agency, CAD support has found that this method will allow better control for the consistency of plots, while maintaining the flexibility to send the completed PDF to any preferred hardcopy device (printer/plotter).

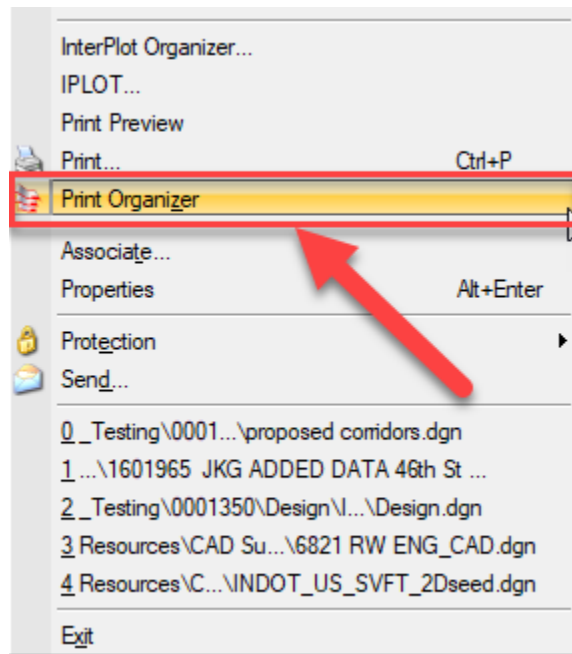
The attempted usage of any non-supported Print Style, plot queue, or hard copy device can potentially result in application instability, or the failure of the application to generate the appropriately formatted end product. Please ensure that you're using the appropriate methods discussed in the following sections.

4.2 How to Create a Plot Set with Print Organizer

This section will cover the necessary steps to create a plot set using the INDOT CAD Workspace and the Print Organizer tool in MicroStation. Then after covering the process, a subsection is provided with tips on how to use Print Organizer most effectively and troubleshooting common issues that may arise when using the tool.

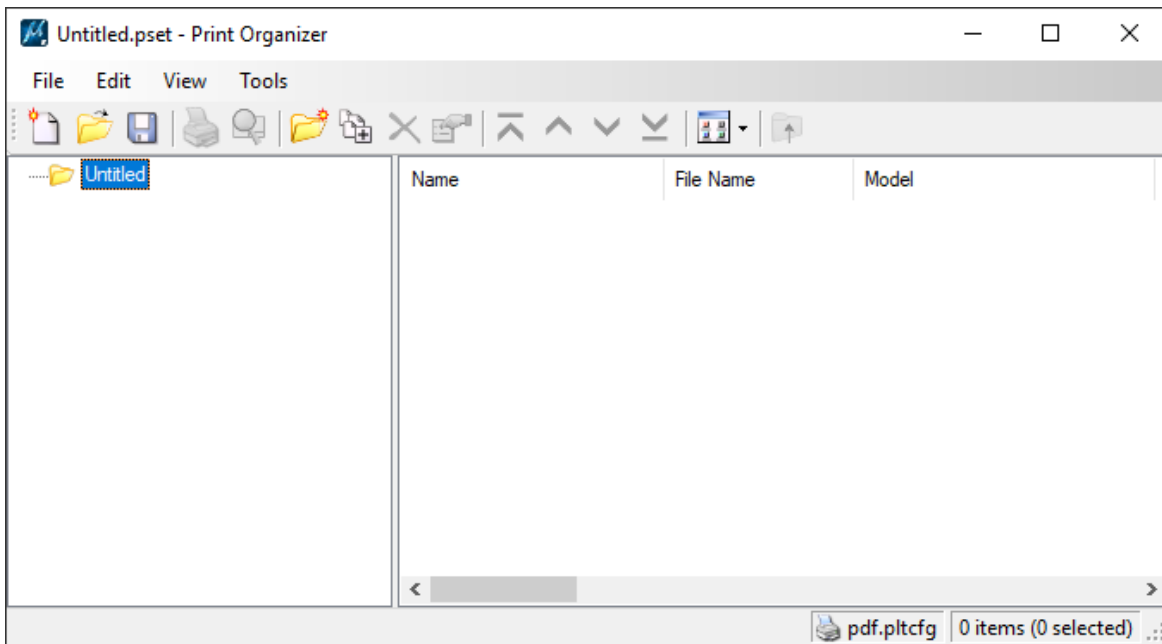
4.2-1 Creating the Plot Set

1. The Print Organizer tool can be accessed by going to File > Print Organizer... in the MicroStation menu bar.



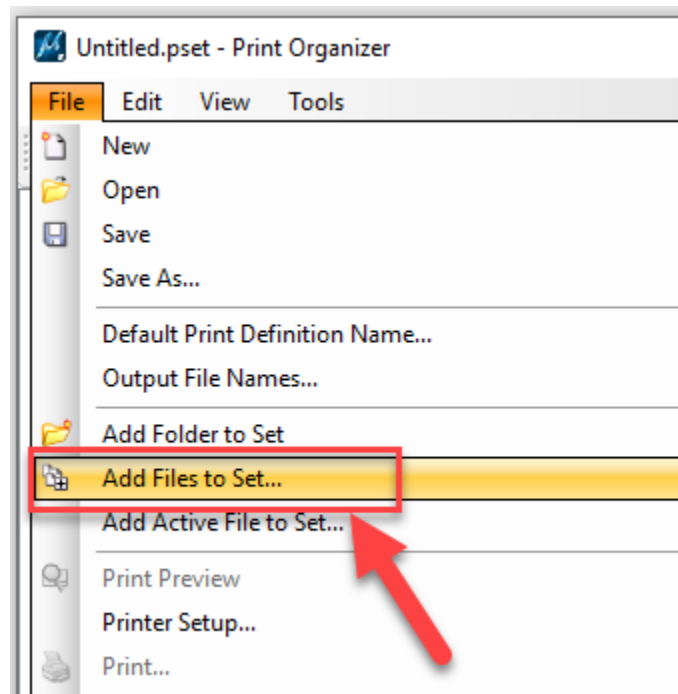
Accessing Print Organizer

The Print Organizer dialog will then appear as shown:



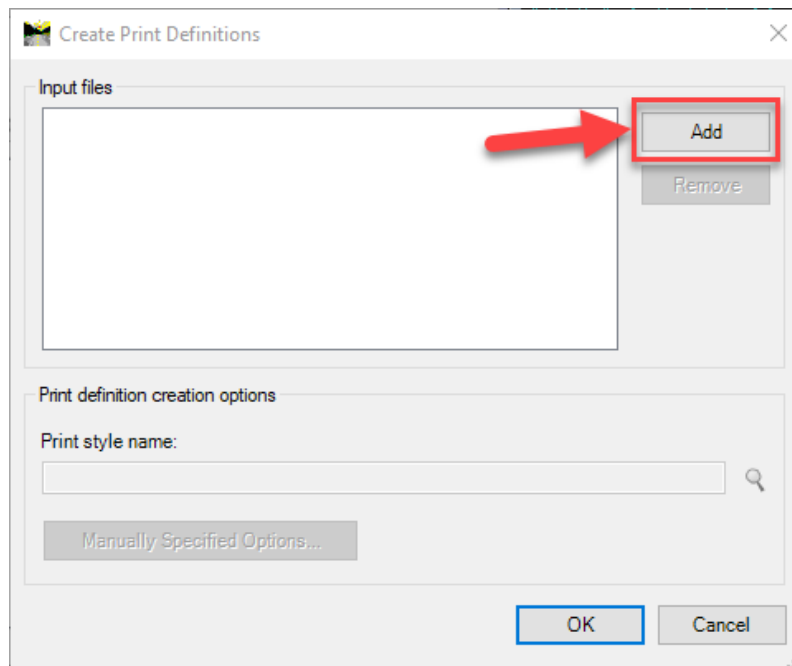
Print Organizer Dialog

2. To add files to the plot set, click on File > Add Files to Set... in the Print Organizer dialog.



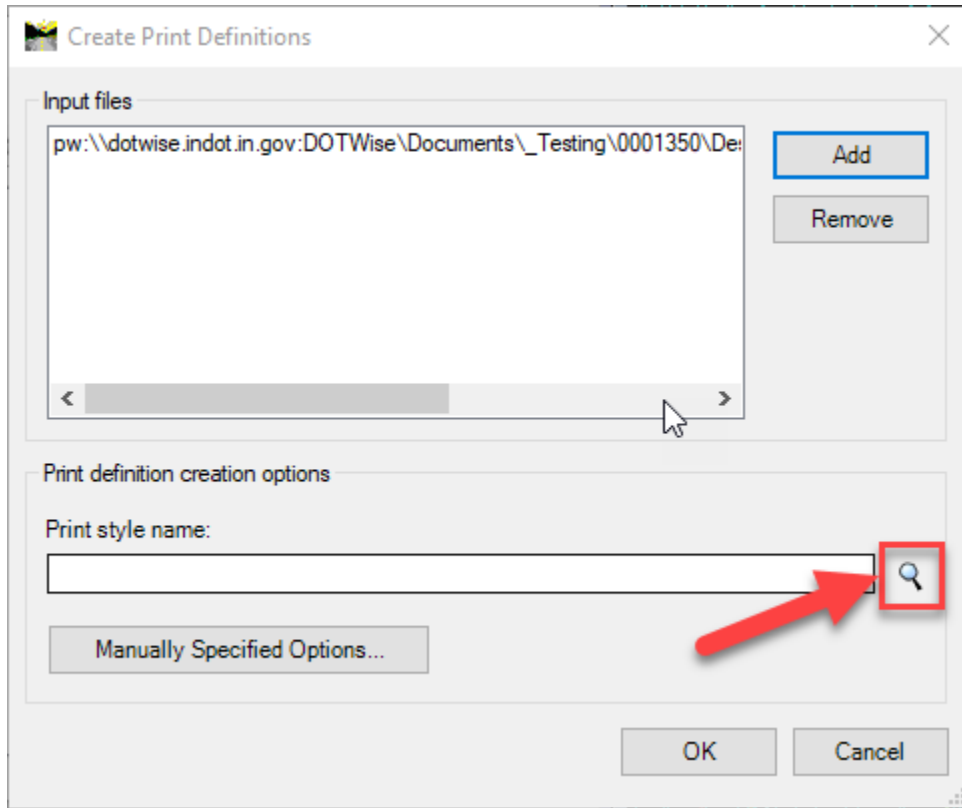
Add Files to Set

3. This will open the Create Print Definitions dialog. On this dialog, click on the Add button to add the necessary files to the plot set.



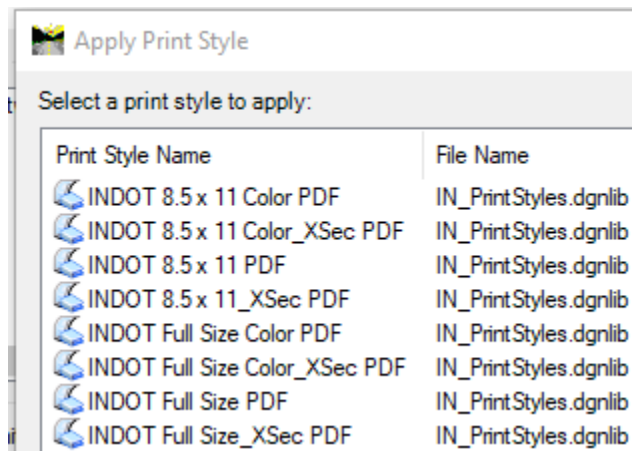
Add button

- Once the desired files have been added, the fields in the “Print definition creation options” section will then become enabled. To apply a Print Style to the files, click on the magnifying glass icon to the right of the “Print style name:” field.



Selecting a Print Style

Upon clicking on the icon, the user will be presented with a list of preconfigured Print Styles to apply.

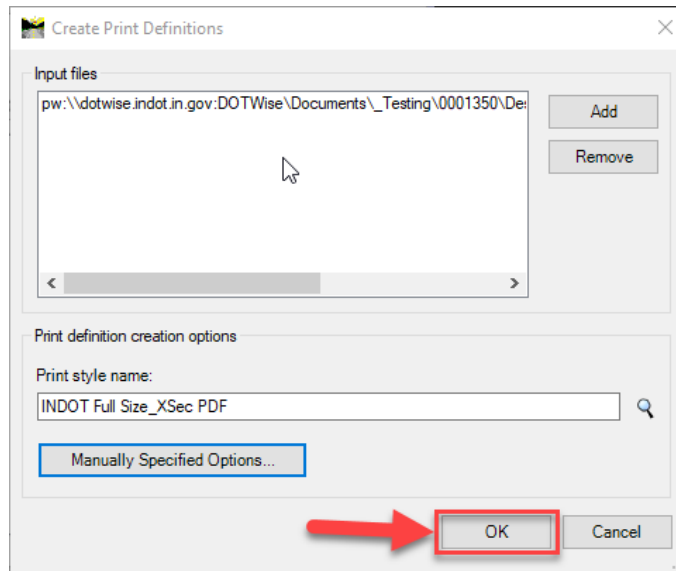


Preconfigured INDOT Print Styles

To provide clarity, here is an explanation of the naming convention for these print styles:

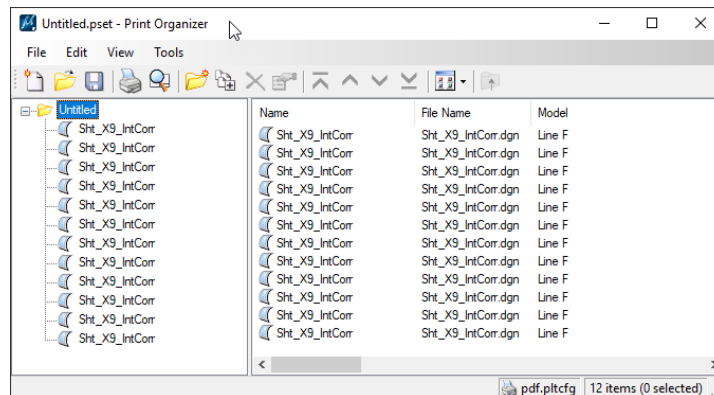
8.5 x 11	Configured for use with 8.5 x 11 sheets.
Full Size	Configured for use with Full Size sheets.
Color	Configured specifically for use if plotting in color is desired.
XSec	Configured specifically for use with cross section sheets.

5. Select the desired Print Style from the list and click OK to exit the Apply Print Style dialog. With the files added and the Print Style applied, proceed to click OK on the Create Print Definitions dialog to apply the Print Style to the files—which will then be added to the plot set.



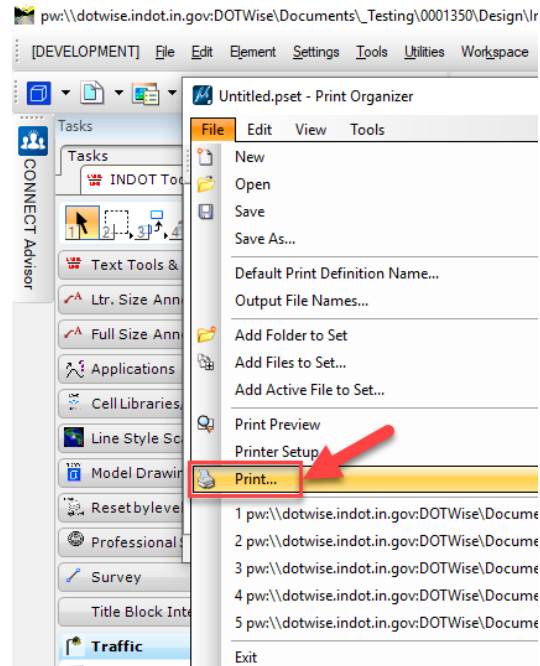
Applying Print Style to the Added Files

Upon completion of the processing, the Print Style will be applied to the selected files, and the resulting plots will be added to the plot set in the Print Organizer dialog. The example shown below results from applying the INDOT Full Size_XSec PDF Print Style to a cross section drawing.



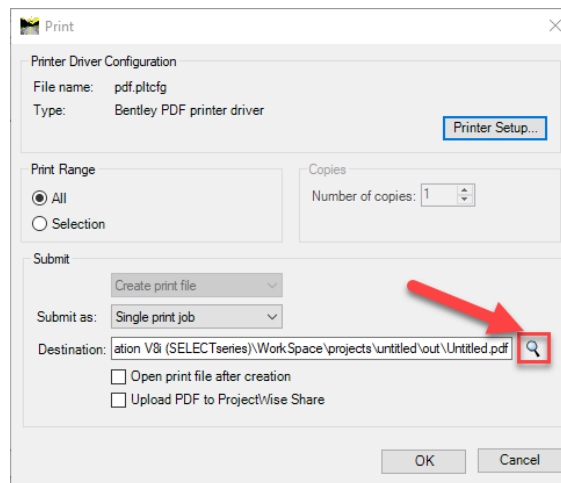
Plots Created and Added to Plot Set

6. Once all of the desired plots have been created, it is highly recommended to first save the plot set for future use. To accomplish this, click on File > Save As... in the Print Organizer dialog, and select the No Wizard option when prompted. It is suggested to save this under the Plot Sets folder for the ProjectWise project being worked from. Name the plot set as desired, and click Save to save the plot set file (.pset) to ProjectWise.
7. To print the plot set to PDF format, click on File > Print... in the Print Organizer dialog.



File > Print...

8. On the Print dialog that appears, click on the magnifying glass icon in the Submit section to save the resulting PDF file to a desired destination (it is suggested to save this outside of ProjectWise).



Selecting Desired Destination of PDF File

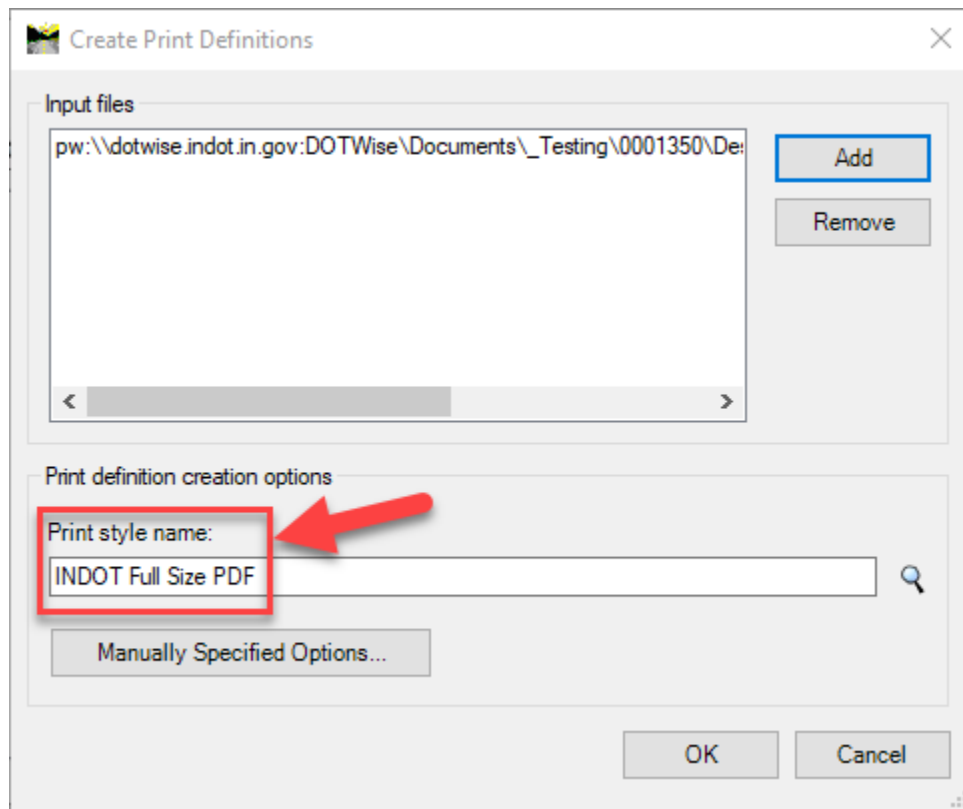
9. After selecting the destination, click OK to print the plot set to PDF format. Once completed, the PDF file will be created and placed in the desired location.

4.2-2 Print Organizer Tips and Troubleshooting

This section will cover some tips and best practices when it comes to using Print Organizer. Troubleshooting common issues in Print Organizer will also be covered.

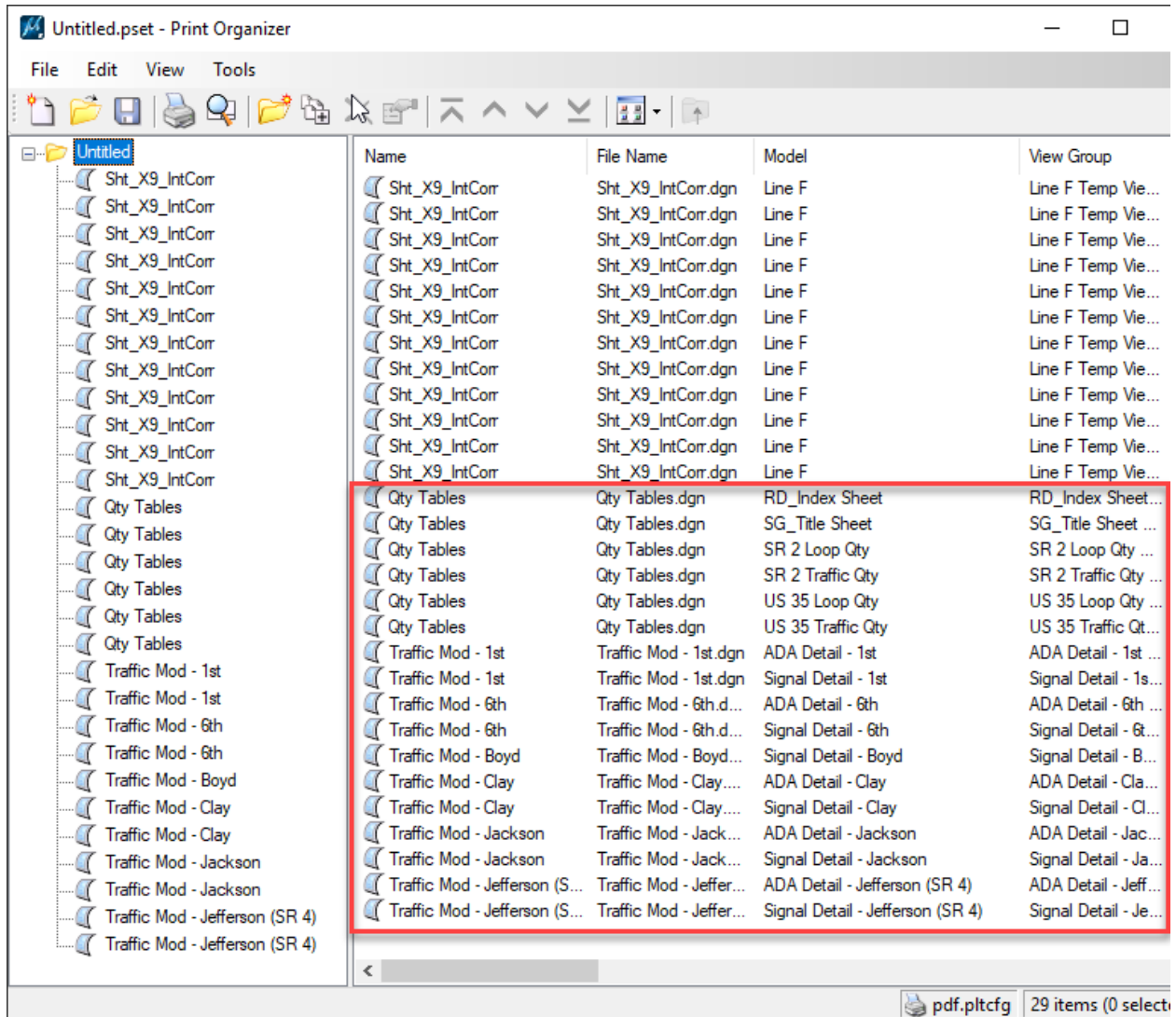
4.2-2a Creating a Plot Set Using Multiple Print Styles

It could be a common occurrence to need to use multiple Print Styles to create a plot set. In a much similar fashion to the current process with InterPlot Organizer, if a user needed to create a plot set that contained sheets with cross sections AND ALSO contained sheets without cross sections (Plan and Profile sheets for example), the process for adding files to the set would need to be run twice: once for the cross sections file using a cross section-specific Print Style, and a second time for the other sheets that are not cross sections. To continue from where Section 1.2-3 left off, if it was necessary to add other sheets to the plot set, the process would need to be run a second time. This time, the Create Print Definitions dialog would look similar to the following:



Adding Sheets to a Plot Set with a Separate Print Style

Note that the Print Style chosen is not associated with cross sections. Separate print styles are needed in this scenario, as the sheet border frames are addressed differently between cross section sheets and any other sheet—which is how the plot extents are determined. The resulting plot set would now look like the following:

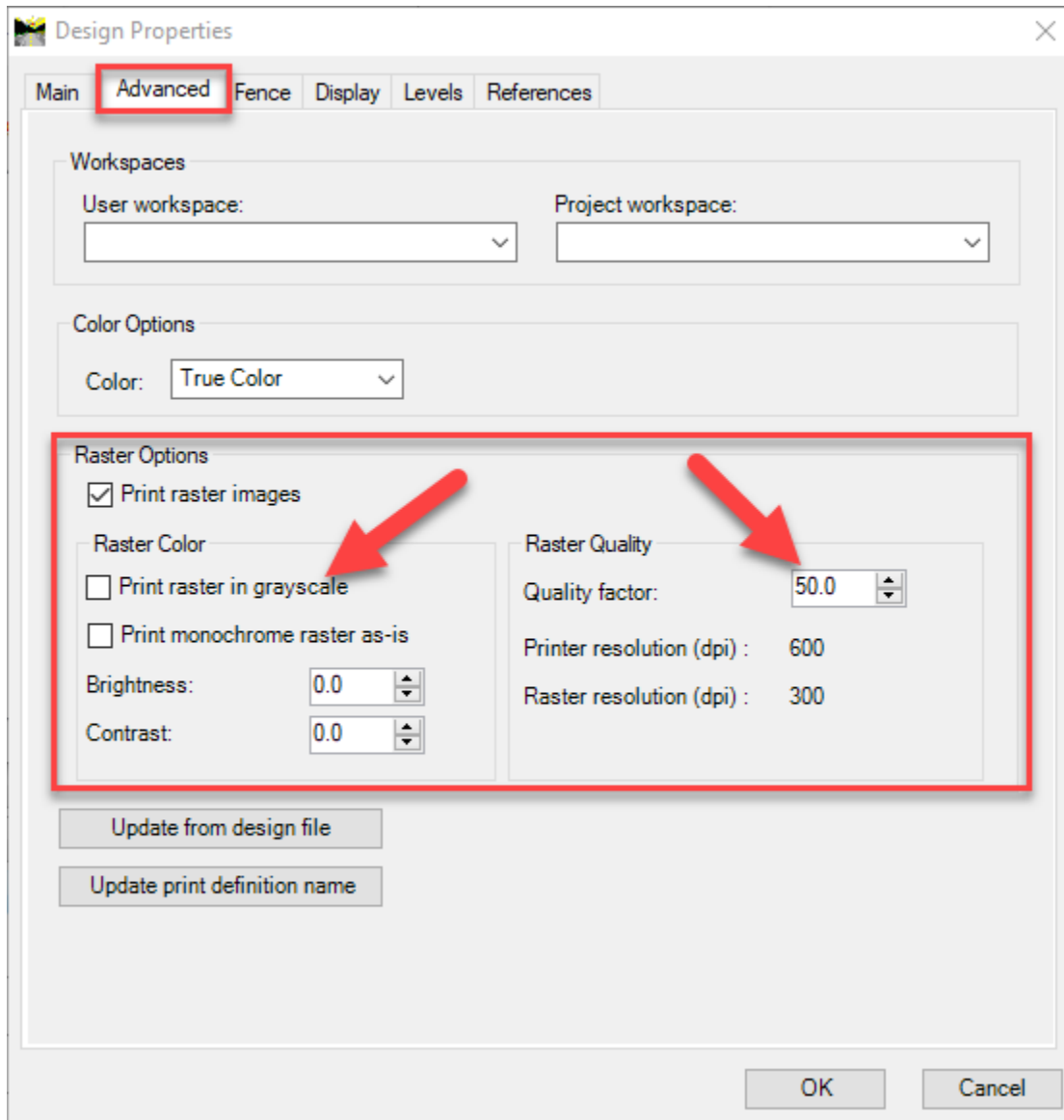


Completed Plot Set with a Second Print Style

When completed, the second set of sheets will be placed into the plot as denoted above.

4.2-2b Adjusting Raster Options on Plots

If a plot in the plot set contains raster imagery, the user can adjust the Raster Options on it if desired. To access these settings, right-click on the plot in the plot set and select Properties. Then click on the Advanced tab in the Properties dialog that appears to view the raster settings.

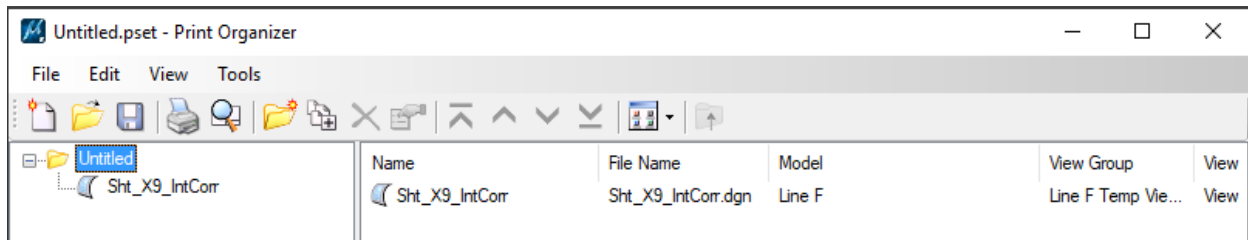


Raster Options

Of particular note is the “Print raster in grayscale” setting, which allows the user to have the raster image plotted in grayscale vs. color. There is also the Raster Quality setting, where a user can set the Quality factor as a percentage of the printer resolution (dpi). The default setting that has been configured with the Print Styles is a factor of 50 (percent). This can be adjusted if desired, but note that a higher factor could have a significantly negative effect on the time it takes for Print Organizer to process the plot.

4.2-2c Using an Incorrect Print Style to Add Files to a Plot Set

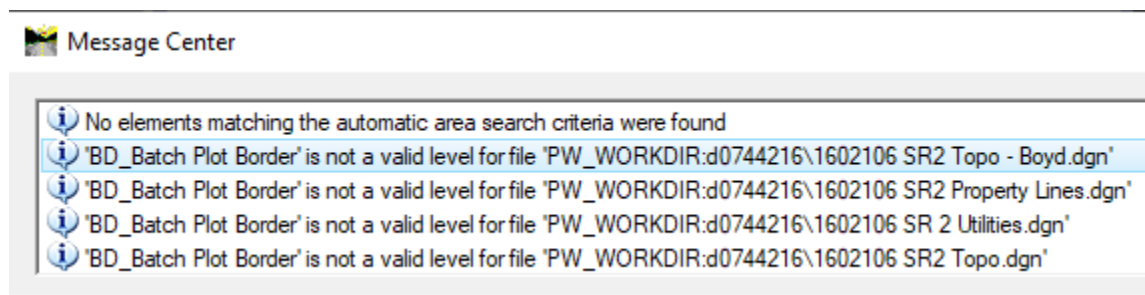
If an incorrect Print Style is chosen to add plots to a plot set, undesirable results will occur. Here is an example of what occurs when a non-cross section Print Style is applied to a cross section drawing:



Applying Non-Cross Section Print Style to a Cross Section Drawing

What ends up happening is that only one plot gets created—and that one plot contains all of the sections. This is why it's important to use a cross section specific Print Style when working with cross sections—as these Print Styles have been configured to split the cross sections into their separate sheets.

Conversely, if a cross section specific Print Style is applied to a drawing that does not contain cross sections, no plots will get created in the plot set. Instead, notifications will appear in the Message Center in MicroStation to notify you of the issue:



Applying Cross Section Print Style to a Non-Cross Section Drawing

No plots get created in this scenario because the cross section Print Styles are configured to specifically look for cross section border frames to create the separate sheets. All sheets other than cross sections do not have these border frames, so the Print Style is not able to create plots from them.

4.3 How to Create a Plot Set with ProjectWise InterPlot Organizer

This section will cover these necessary steps to creating a plot set using the INDOT CAD Workspace and InterPlot Organizer software. The following subsections are presented in the order these steps should be performed in order to make sure that each step is appropriately covered, and the specifics of each feature are discussed.

4.3-1 Attaching Plot Drivers

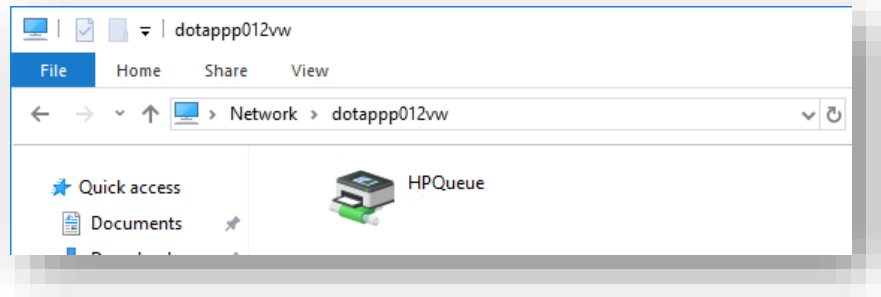
When using ProjectWise InterPlot Organizer, one must first attach an eligible print driver from the ProjectWise InterPlot Server. For the agency, we have provided a PDF plot queue to spool against using an HP plotter driver that provides excellent performance to quality in a mixed raster/vector plot environment which is typical of the plots generated by design staff. All files plotted from IPLOT or ProjectWise InterPlot Organizer will be plotted using this plot queue. It can be attached from the following server location, and this should be completed prior to creating a plot set:

DOTAPPP012VW

You will need to type the following into the address bar... \\DOTAPPP012VW\

At this location, there will be one plot queue for your usage.

- HPQueue



DOTAPPP012VW HP Queues

This can be selected by simply double clicking on the queue in your Windows Explorer which will connect it to your computer and make it available for use with InterPlot.

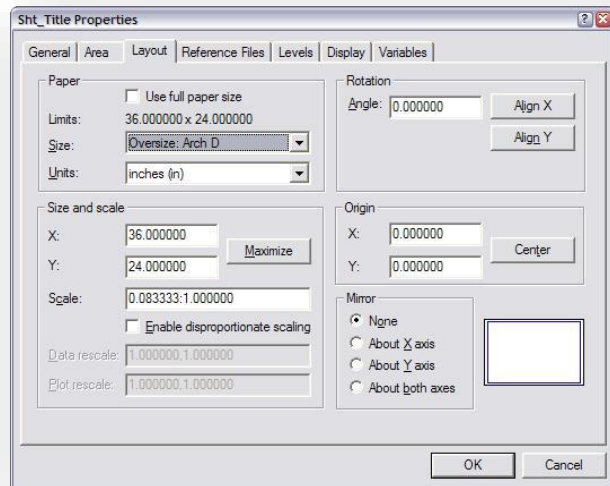
4.3-2 HP Plot Queue Settings

In order for our sheets to align properly on the page, we have enabled a number of form sizes to best accommodate most plotting situations. As part of these form sizes, we have enabled the full bleed form sizes allowing for minimal setup to place our plots with the correct margins when using our settings files.

The most commonly used form sizes on the HP are listed below:

<i>HP Form Sizes</i>
Oversize: Arch D
Oversize: Arch B
Oversize: ANSI B (Tabloid)

As previously mentioned, Interplot Settings Files (.set) will be provided to quickly apply a common set of plotting settings using these and other common form sizes. Should any manual adjustments to plots be needed, a number of different possible settings will need adjusted, which will be discussed later in this chapter after we've created a plot set and investigated the settings.



Iplot Properties

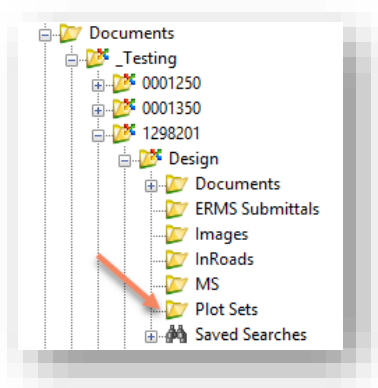
The changes for using the HP forms are as follows:

1. Make sure you've selected the appropriate form size from the chart earlier in this section.
2. Do **NOT** check "Use full paper size". HP Forms have a built in margin factor that will cause the scaling of your prints to be incorrect. By disabling the full paper size setting, it will recognize only the printable area which is consistent with the old OCE forms.
3. All other settings should remain the same. There may be specific adjustments that need to be made on a per-sheet basis.

4.3-3 Launching the ProjectWise InterPlot Organizer

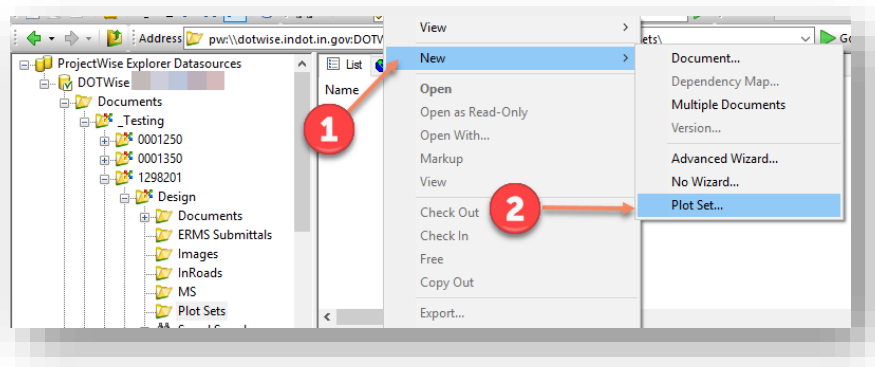
InterPlot Organizer can be launched in a number of ways. As with most other applications such as MicroStation and InRoads, it's highly advised to launch the software from within ProjectWise so all integrated functions are enabled. To do so:

1. Locate the Plot Sets folder under your Design project



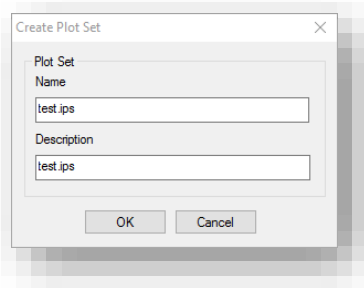
The Plot Sets Folder

2. In the Document pane, right click and select **New > Plot Set** (if this option is unavailable, please submit a ticket to INDOT CAD Support)



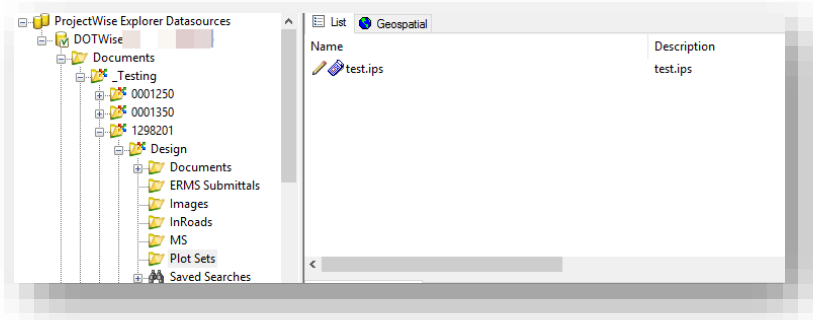
Creating a New Plot Set in ProjectWise

3. A Create Plot Set window will be displayed. Type in your Plot Set name, followed by the appropriate file extension of .ips. As always, it's recommended that the Name and Description be kept the same.



Creating the .ips File

4. Upon selecting OK on the previous dialog, your plot set file will be created. You may then double click the file to launch the ProjectWise InterPlot Organizer:



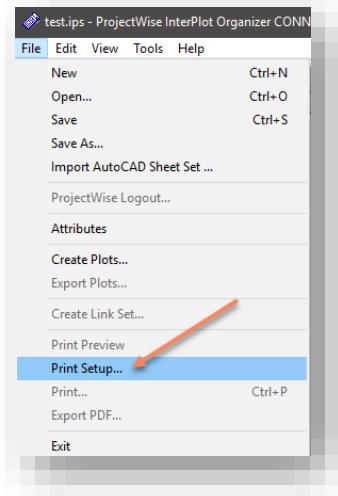
The Created Plot Set

5. This will launch the application and you can proceed with plot creation.

4.3-4 Creating Plots in the ProjectWise Plot Organizer

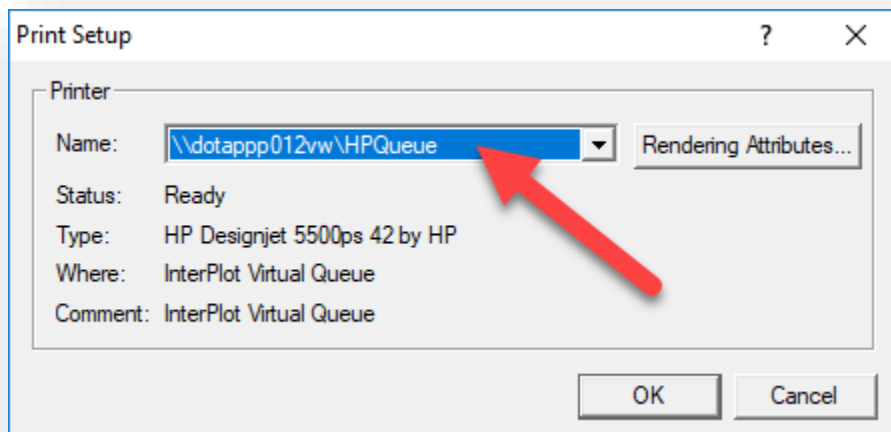
With a file to place our plots into, we can begin the process of creating the actual plots themselves. This section will cover the initial setup of our plot file, along with creating the plots from pre-defined extents, and using a settings file and design script to configure these plots in the appropriate ways

1. With the plot set open in the InterPlot Organizer, select the File > Print Setup menu item.



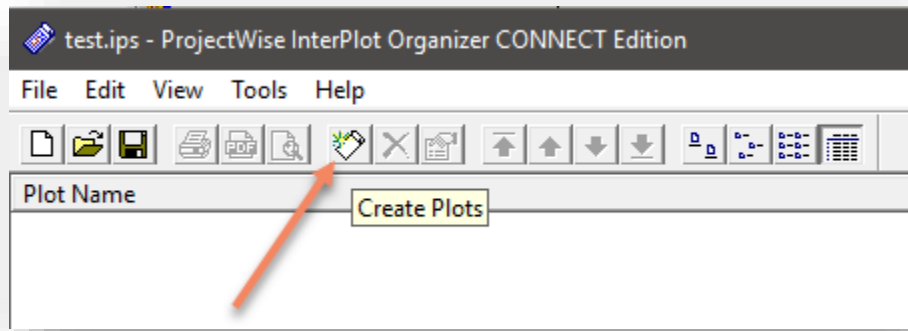
Printer Setup

2. On the presented Printer Setup window, make sure that the Printer Name is set to the HPQueue device from DOTAPPP012VW, listed earlier in this section. Select OK when ready.



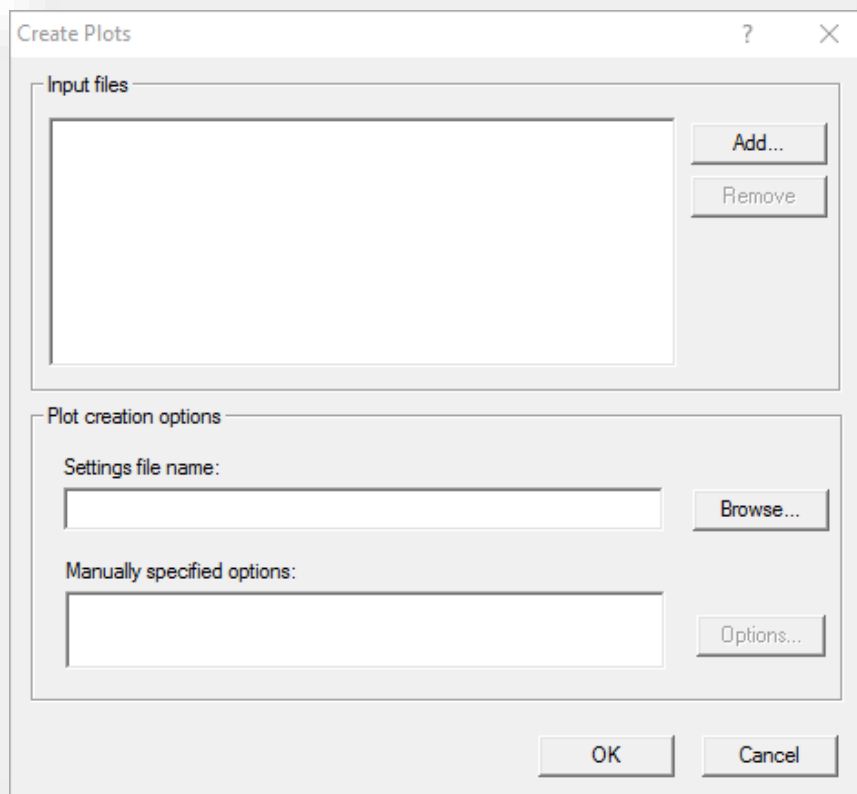
Setting the HPQueue

- Next, select either File > Create Plots, or the Create Plots button on the toolbar



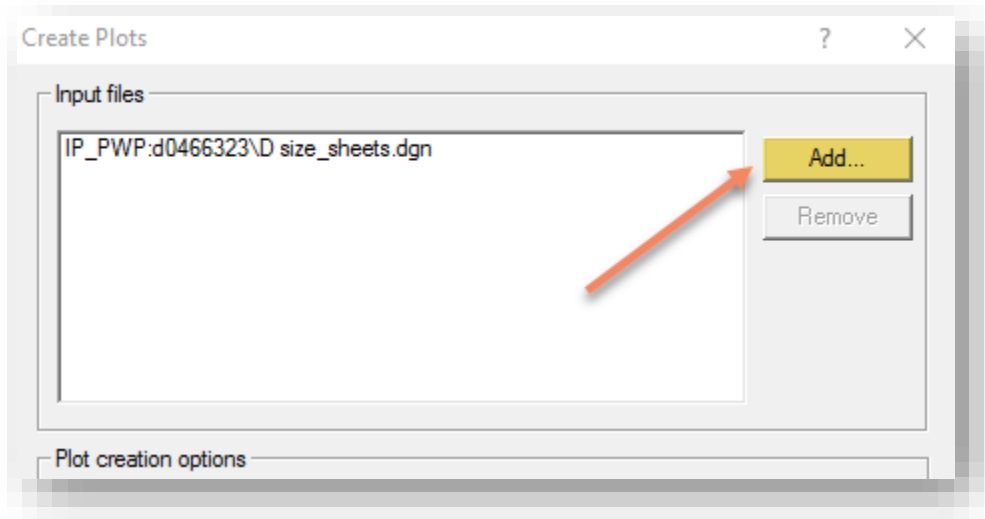
Creating Plots

- At this time, you'll be presented with the Create Plots Dialog. However, prior to proceeding, we will be looking at some of the options that will be needed on this panel, specifically how to define your plotting extents using InterPlot Search Variables, and the usage of Settings Files and their Design Scripts.



The Create Plots Dialog

5. On the Create Plots dialog, select the Add button and browse to and select the file you'd like to add to your plot set. For this example, the test data will be using a copy of our template D size_sheets.dgn to illustrate advanced functionality.



Adding DGN Files

6. Before proceeding further, we will be looking at some of the options that are presented on this panel; specifically how to define your plotting extents using InterPlot Search Variables, and the usage of Settings Files and their Design Scripts.

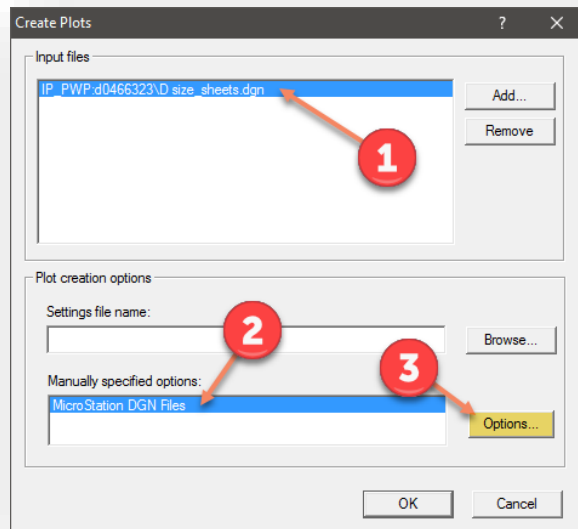
4.3-4a Using IPLLOT Search Variables

When initially creating plots, it is possible to use pre-defined model definitions to define individual plots. Times where this could be used are situations where there may be multiple sheet models in a single DGN where you want to have each sheet represented included in your plot set without defining each and every model. This can also be extended to basic design models.

Note: *The usage of these variables must be done at the time the plots are created using the Create Plots dialog. If not used at this time, you cannot go back and extract the models from the created plot, you must delete the plot entry and re-create it.*

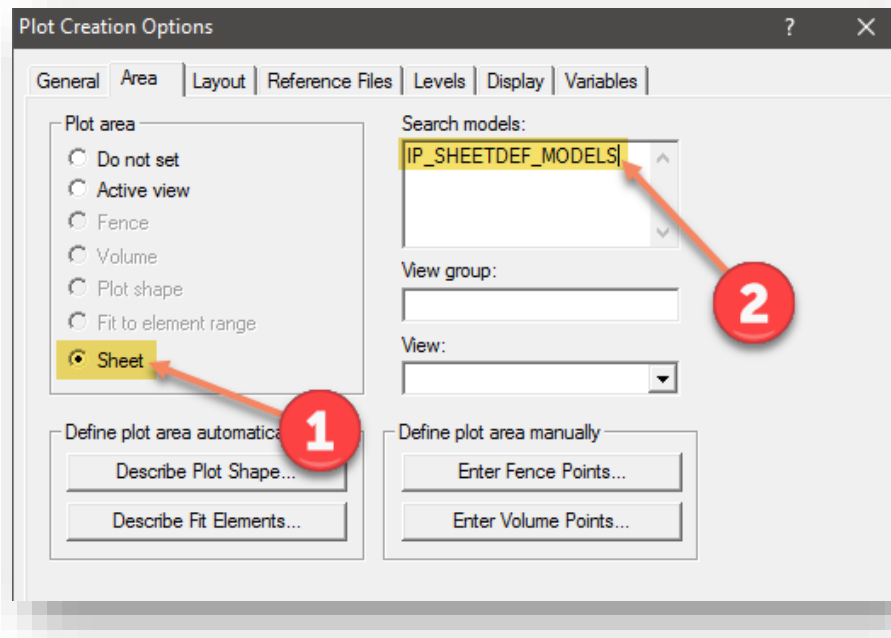
Both of the model extractions are done through the same process, only changing the variable used. This section will cover how and when to use these variables. As we're using the D size_sheets.dgn in this example, we may wish to create a plot for each of the sheet models that are contained in this file.

1. Select the plot you've added in the upper section of the Create Plots dialog. Under Manually specified options, click on MicroStation DGN files and then click Options.



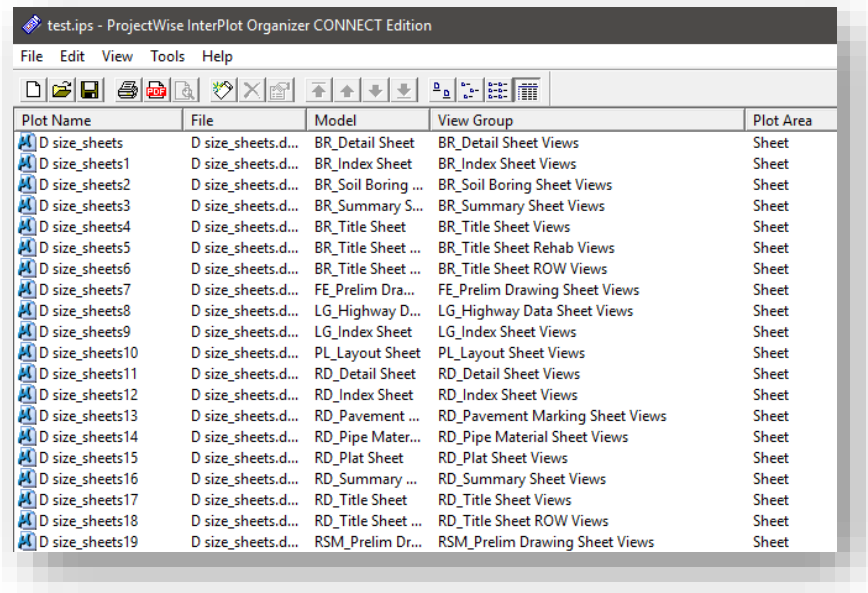
Changing DGN Plot Options

2. On the Plot Creation Options dialog, click on the Area tab. Under Plot area, enable Sheet, and under Search models, type IP_SHEETDEF_MODELS to create a plot for each sheet model. To create a plot for each design model, use IP_DESIGN_MODELS instead.



Using IP_SHEETDEF_MODELS

- When completed, select OK on the Plot Creation Options dialog, and then again on the Create Plots dialog. The result will look similar to the following:



Plots After Searching for Sheet Models

At this time, every sheet model and sheet definition now has a configured plot in the Plot Organizer, however they don't have the appropriate form sizes or scaling. In the next section, we'll look at the settings files and how to apply these to your plots at the time you create them.

4.3-4b Design Scripts and Settings Files

In this section, we'll be covering the usage of Settings Files and their associated Design Scripts. When used at the time of plot creation, these tools can do a number of things that can assist in the setup of your plots, such as applying form sizes and adjusting scaling. A full list of the features we've enabled for the Settings File and Design Scripts can be found below:

Settings Files	Design Scripts
Applies pre-defined form sizes	Defines percentage based screening on color
Configures appropriate margins for plots	Provides global screening based on element level
InRoads Only: Extracts plots based on a predefined plot shape (typically for use with Cross Sections)	Enables text replacement for page numbering, model name, plot date, plot time, and signature date
Automatically attaches the appropriate Design Script	Creates Digital Signature block for active placement in Adobe Acrobat
	Sets appropriate pen thickness

Also as a further integration into ProjectWise, all Design Scripts and Plot Settings files have been stored in ProjectWise. This insures that all users have access to the most up to date file(s) at all times. These can be found at:

<pw:\\indot-pw.bentley.com:indot-pw-01\Documents\Resources\Plotting\>

- INDOT HPQueue_AN.set - to be used with Electronic Signatures and Auto Page Numbering (for use with the HP Plot Queues for full size sheets).
- INDOT HPQueue_NN.set - to be used with Electronic Signatures and no Page Numbering (for use with HP Plot Queues for full size sheets).
- INDOT HP_Letter_AN.set - to be used with Electronic Signatures and Auto Page Numbering (for use with HP Plot Queues, and letter size sheets).
- INDOT HP_Letter_NN.set - to be used with Electronic Signatures and no Page Numbering (for use with HP Plot Queues, and letter size sheets).

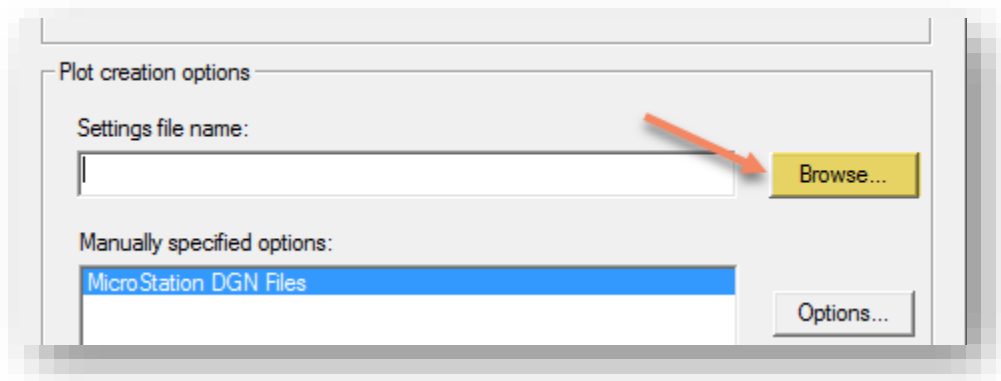
The Design scripts can be found in the “*Design Scripts*” folder directly under the Plotting folder. These will be automatically attached when one of the previously listed .set files are used.

In addition to the above .set files, you will also find a comparable version of the .set to be used with sheets cut from InRoads (ex. INDOT InRoads_HPQueue_AN.set). These sheets do not follow the standard convention of being cut to true sheet models with paper border, rather they are adjusted differently. To compensate, an exterior boundary set to transparent has been created for these borders. These .set files use this shape as the plotting extents for InRoads sheets. Other than that difference, these .set files should be used and configured in the exact same manner as previously shown. It’s highly recommended that the .set files be attached at the time of plot creation to allow all instances of a level name to be found and taken into account. Not doing this may cause InterPlot to find the incorrect instance of a plot shape in a given file and not return the plot expected.

INDOT Pen Table_BW.tbl is automatically attached by the .set files as well, and controls the color table for finished prints. Please note that all these resources are tailored to use with the DOTWise system and are for the creation of PDF output only.

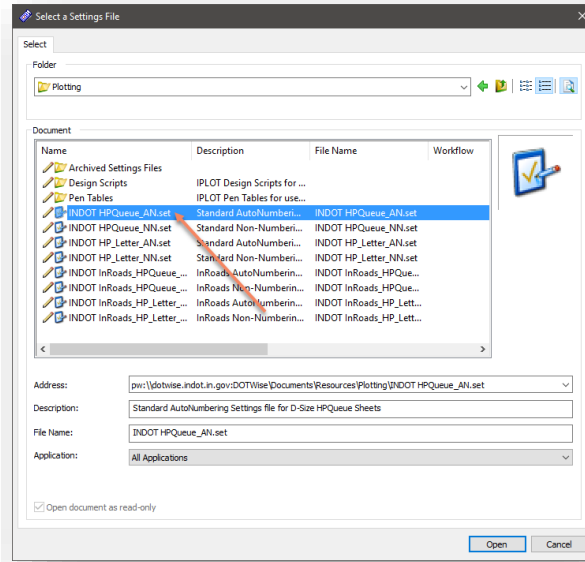
To attach the .set file at the time of plot creation, the following steps should be used:

1. With your Input files added to the Create Plots dialog, select the Browse button on the *Plot creation options > Settings file name:* field.



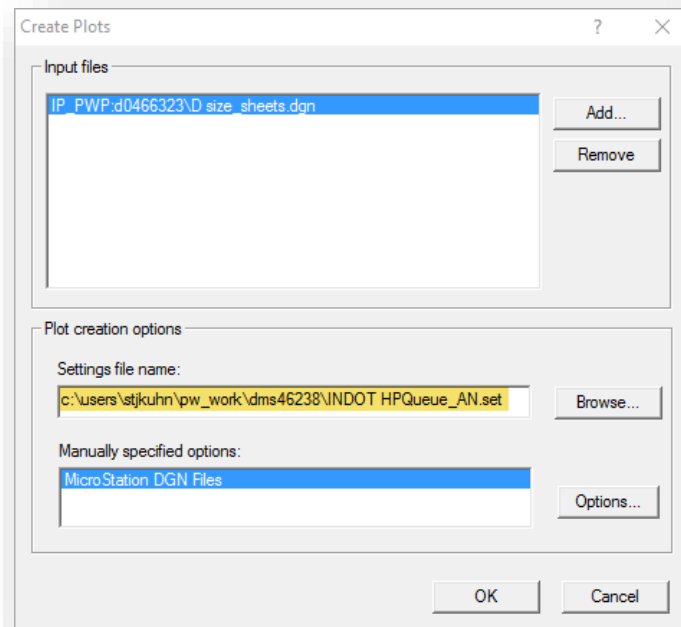
Applying Settings Files

2. Navigate to the **Documents\Resources\Plotting** location in ProjectWise and select the appropriate settings for your needs. In this example, we'll be using the **INDOT HPQueue_AN.set**.



Selecting Settings Files

3. Your Create Plots dialog will then look like this prior to creating the plot entries.



Adding Plots with a Settings File

4.3-5 Creating Plots in the ProjectWise Plot Organizer – Continued

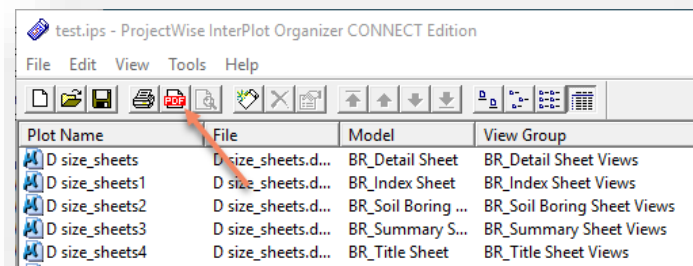
Please note that the number is continued in sequence from section 4.3-4 Creating Plots in the ProjectWise Plot Organizer, not the subsections presented within.

- At this point, we'll continue our sample plots. The sample will be created as discussed in the two prior sections where we defined a Sheet Definition to search for, and the application of the INDOT HPQueue_AN.set file. On the Create Plots dialog shown in the previous section, hit OK and InterPlot will create a series of plots based on the criteria that's been defined.
- With the plots created, you can now see in the Design Script, Pen Table (for colors), Paper Size, Scale, and Plot Size are now pre-set to the appropriate values for a full size D size set of plans.

Design Script	MS Pen Table	Color Ta...	Paper Size	Scale	Size
INDOT Design Script_AN.pen	INDOT Pen Table_BW.tbl	NONE (d...	Oversize: Arch D	0.0833333:1	36, 24
INDOT Design Script_AN.pen	INDOT Pen Table_BW.tbl	NONE (d...	Oversize: Arch D	0.0833333:1	36, 24
INDOT Design Script_AN.pen	INDOT Pen Table_BW.tbl	NONE (d...	Oversize: Arch D	0.0833333:1	36, 24

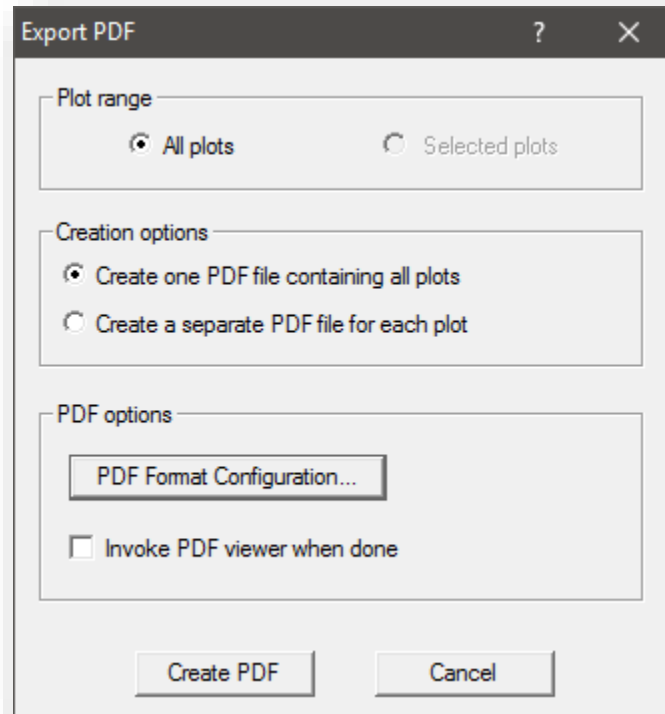
Fully Setup Plots

- At this time, you can now proceed with creating the actual PDF out of the Organizer. On the InterPlot Organizer toolbar, select the PDF button or from the **File > Export** PDF button.



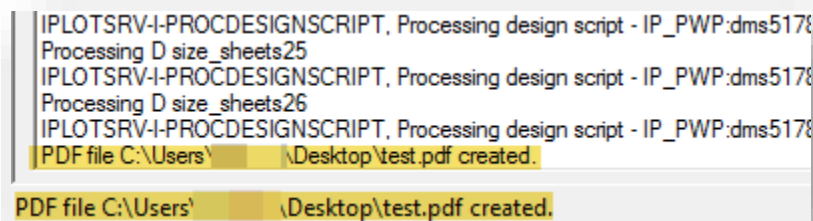
Export to PDF

10. On the Export PDF dialog, set your options as you'd prefer. The most common method is to send all plots to a single PDF file using the settings shown. You can however adjust the plots you want to send by selecting them on the Plot Organizer prior to starting the Export.



Export to PDF Settings

11. Select Create PDF and then place the file where you'd like. It's recommended to send the finished PDF to your PC to validate that the content is correct and then drag and drop it into ProjectWise when confirmed correct.
12. InterPlot Organizer will then process your plots and create the PDF file. When you see the below in the status bar, your plot is completed and can be verified prior to uploading to ProjectWise or sent wherever else it is needed.



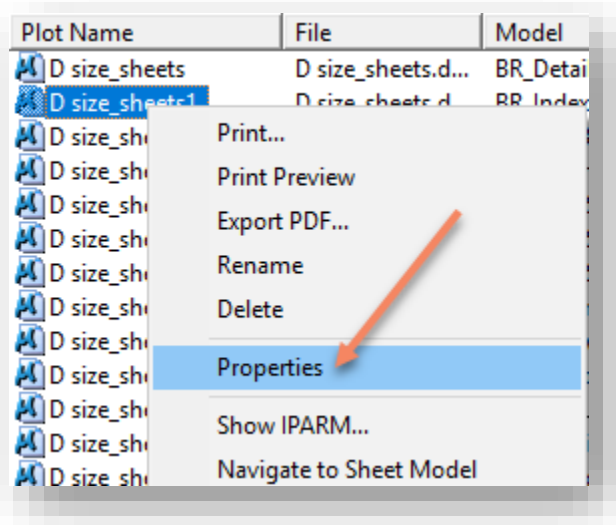
Export to PDF Completed

4.3-6 ProjectWise Tips and Troubleshooting

4.3-6a Additional Notes on Design Scripts and Color Tables

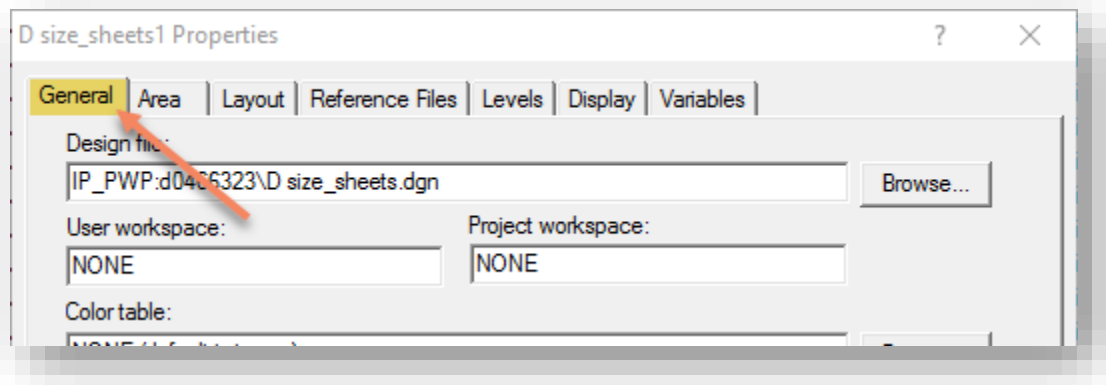
In most instances, the settings provided by the Design Scripts are suitable for most situations. In the event you need to use other Design Scripts or color tables, the following process should be followed. For any plot you need to circumvent the settings on:

1. Right click on the plot to be modified, and select the Properties setting.



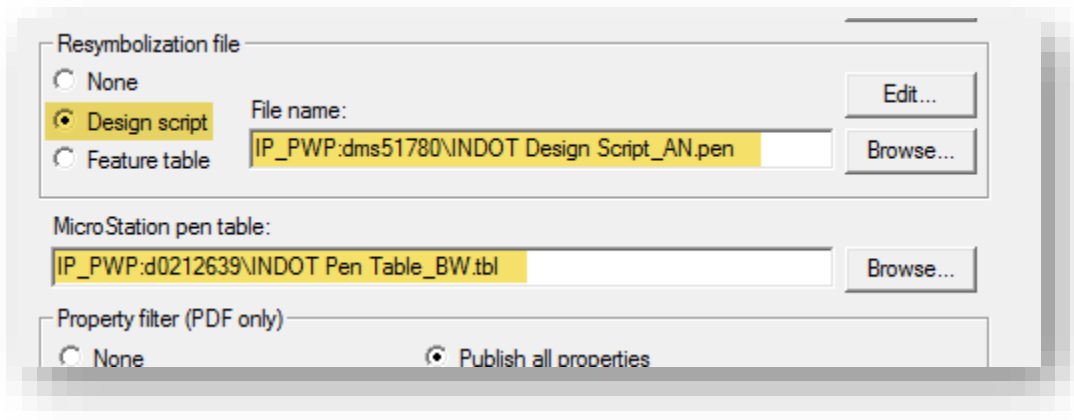
Opening Plot Properties

2. On the displayed Properties panel, select the General tab.



Properties > General Tab

3. On the General tab, the two items that are typically modified would be the Design Script or MicroStation pen table entries shown below:

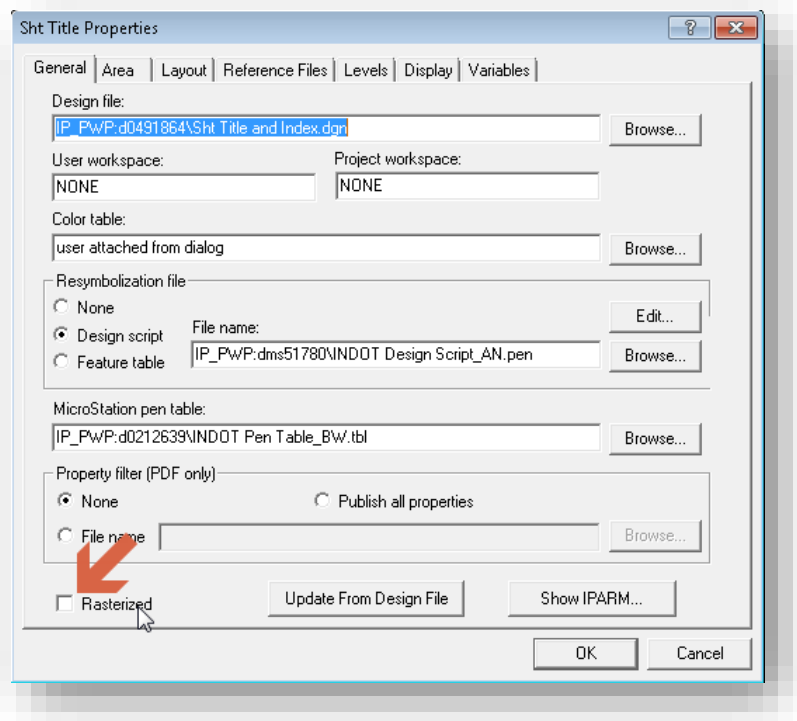


Modifying the Design Script/Pen Table

4. For Design Scripts, at [\Documents\Resources\Plotting\Design Scripts\](#) in ProjectWise you can find No Screening options which remove the automatic plot screening in the default entries.
5. For Pen Tables, at [\Documents\Resources\Plotting\Pen Tables\](#) in ProjectWise you can find a color pen table in addition to the black and white one.
6. When completed, select the OK button on the Properties panel. Note that you can modify multiple plots at once by selecting them and then performing the properties changes.

4.3-6b InterPlot Troubleshooting and the Rasterized setting

One of the most common issues with InterPlot are files that appear to cause the plot set to not process. This is most commonly caused by files that have a large raster image pasted within the plot extents. The first step prior to submitting a problem report should be to enable the Rasterized setting on the affected sheets within the plot set and then resending the plot. To locate the Rasterized setting, right click on the plot in your set and select Properties. In the Properties, select the General tab and check the box for Rasterized at the bottom of the window.



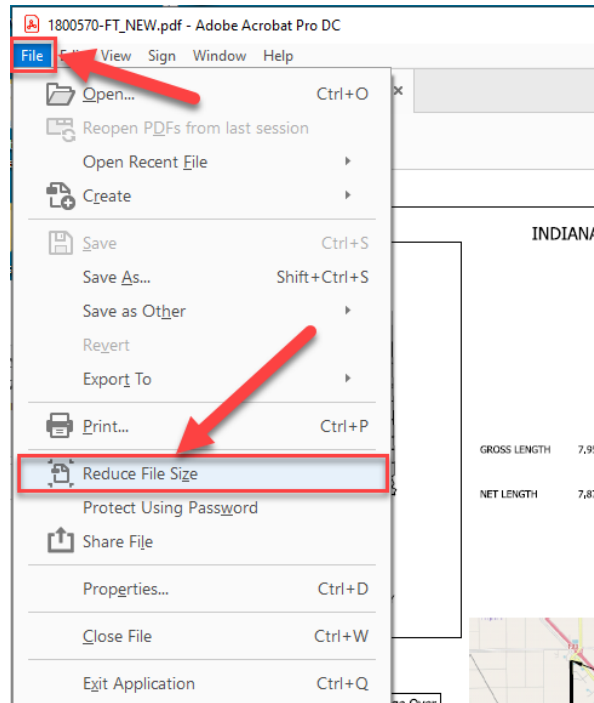
The Rasterized Setting

In many instances, this will resolve issues with plots and allow the set to go through properly. Please be advised that this setting should be used judiciously, as it does increase the amount of time that individual plots can take to be processed.

4.4 Reducing the Size of PDF Files Created from Plot Sets

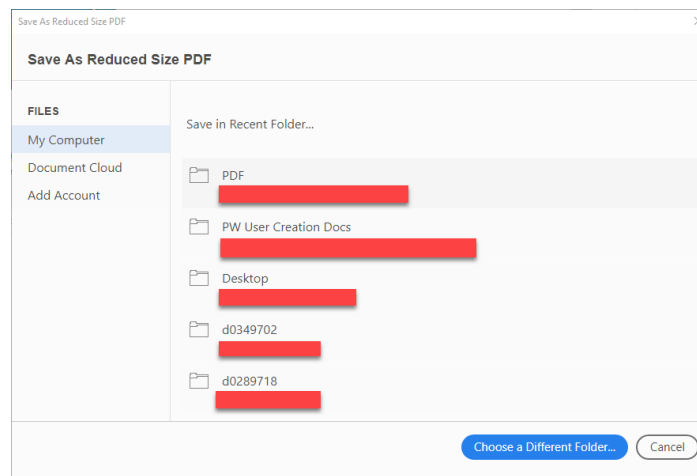
After creating a PDF plot set from either Print Organizer or ProjectWise InterPlot Organizer, it is recommended that users reduce its file size from within Adobe Acrobat. The process for this is described below:

1. With the PDF file open in Adobe Acrobat, click on File > Reduce File Size.



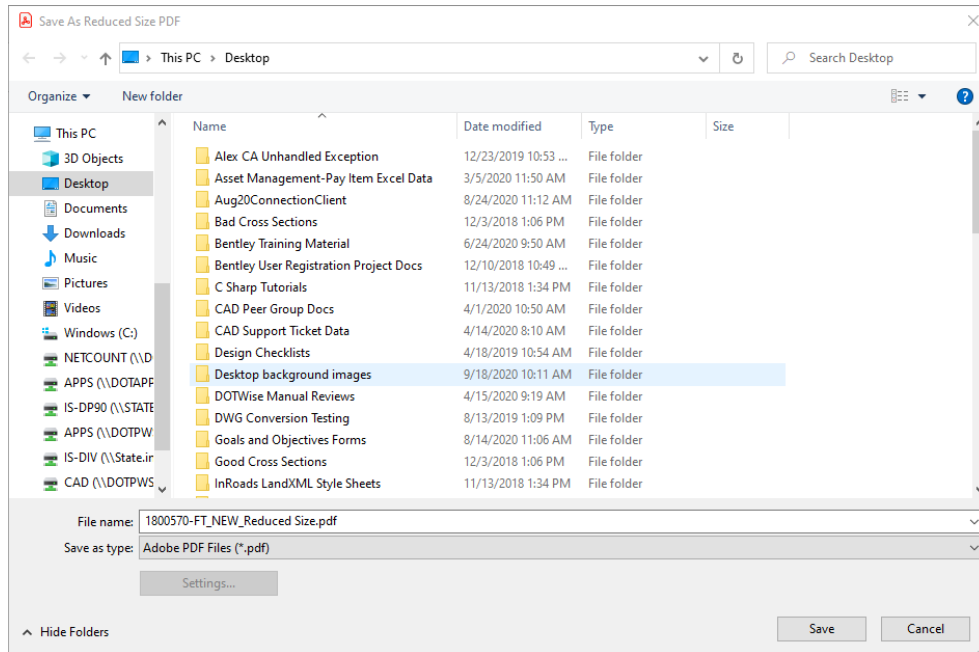
File > Reduce File Size from Acrobat Menu

2. You will then be prompted to select a folder location where your reduced size PDF will be saved. Choose a folder that's already listed, or you can choose a different folder if necessary.



Save As Reduced Size PDF

- As prompted, name the reduced size PDF to be created, and click Save. Saving it to your local computer is shown below.



Naming the Reduced Size PDF

- Adobe will then proceed with the file compression process, which can take a few minutes depending on the amount of data it has to compress. Once completed, the file will be created and placed in the specified location. In addition, a message will appear to let you know how much the original PDF file was compressed.



File Size Reduction Message

4.5 Preparing an Electronic Signature

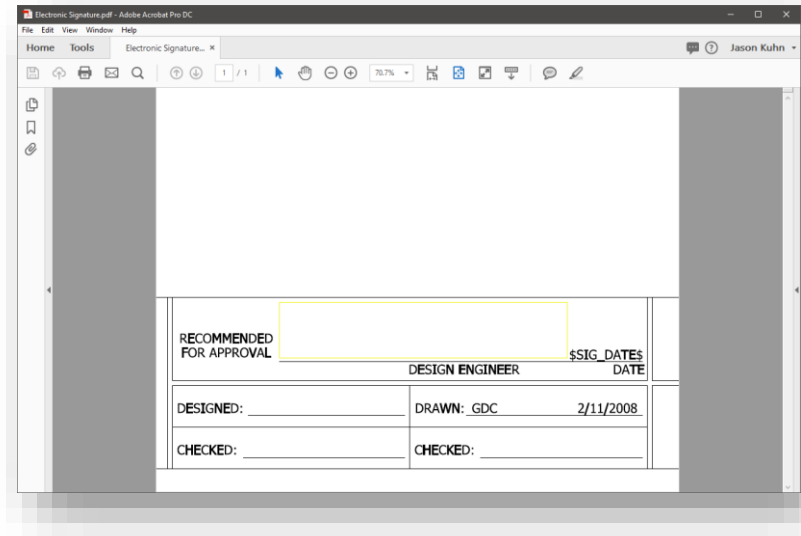
In this section, we will discuss the creation of the Electronic signature and the associated image with it.

4.5-1 Creating a .pdf of your Signature

Note: Before starting this process, you will need to determine where your Digital ID should be saved, which should be in a secure location that only you have access to. One suggestion would be in your Documents folder or your H:\ drive. This will ensure that your Digital ID will be available to you as long as you are logged into the DOT domain.

You will need to locate an INDOT photocopier that also scans images for this next exercise. One that also sends the scanned image to you via email would be a best case scenario.

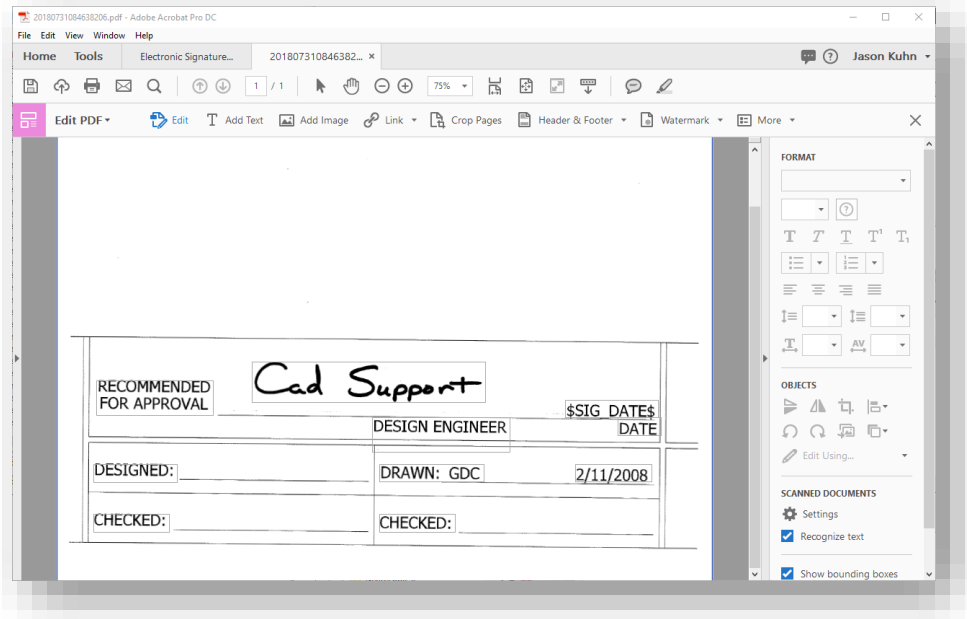
1. Navigate within ProjectWise to ... [\Documents\Resources\Design Information\Electronic Signatures\Electronic Signature.pdf](#). (This folder contains the sheets on 8.5" x 11" paper that you use to scan your signature.)
2. Open (read only) Electronic Signature.pdf (This is an 8.5" x 11" print of the signature area on a large format (D+ 24" x 36") border sheet.)



PDF Electronic Signature Template

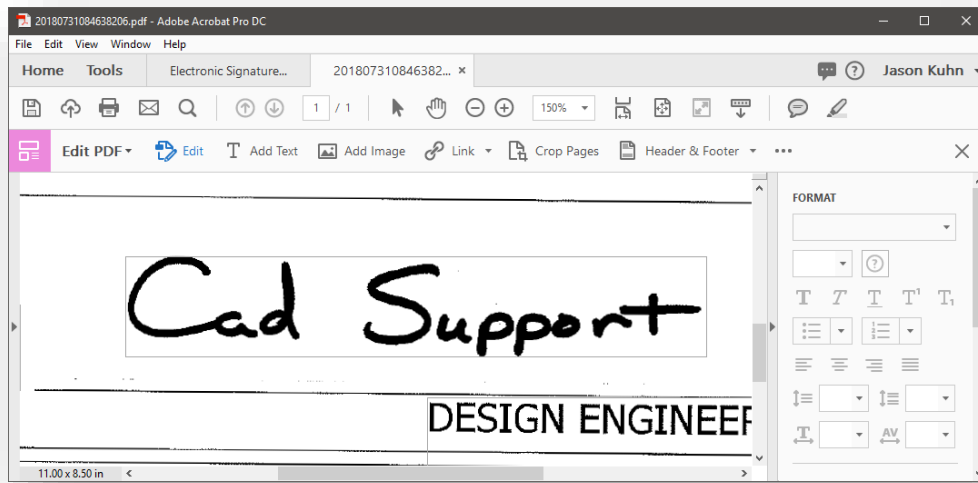
Notice the faint yellow line in the signature area. Your signature must be contained entirely within this area. (Your signature should not cross the line above “DESIGN ENGINEER”.

- Print the .pdf onto an 8.5" x 11" sheet of paper, and then sign the printed piece of paper as you would sign a contract document. Remembering to keep your signature within the now very faint box described in the previous step. Some additional suggestions are:
 - Use a black pen, blue doesn't always cooperate in gray scale situations and can contribute to poor contrast with the finished product.
 - Use a fine point marker or felt tip pen. Both will give the actual signature some weight that will transfer better when inserted/cropped/scaled.
 - Exaggerate the size of your signature. This will also assist in visibility when it is inserted/cropped/scaled.
- 3. Locate a printer/copier with scanning and emailing capabilities. Then scan and email the paper with your signature to yourself.
- 4. Open the .pdf that you previously scanned/emailed using Adobe Acrobat. If you do not have Adobe Acrobat, you will need to locate a machine with this installed. Please contact your supervisor and security coordinator should you require this software.
- 5. You may have to rotate the image so that it is orientated properly. This can be accomplished using the Rotate View tool in Adobe Acrobat.



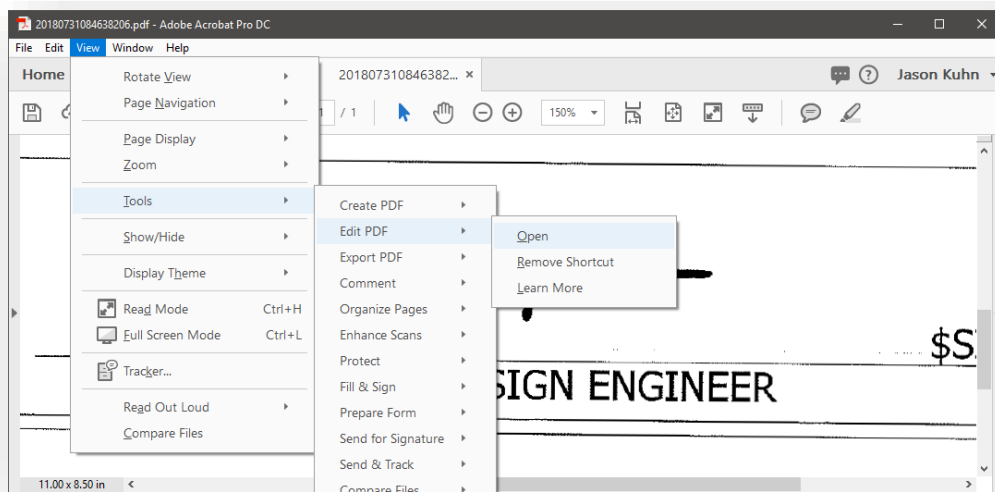
Scanned PDF Signature

- Using the zoom tools, make your signature just large enough that you see it, and a portion of the surrounding data. As shown below.



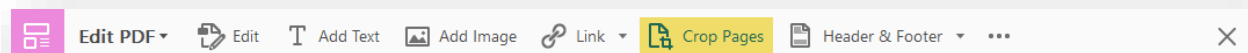
Scanned PDF Signature

- In Adobe Acrobat Reader in the menu bar, go to **View > Tools > Edit PDF > Open**

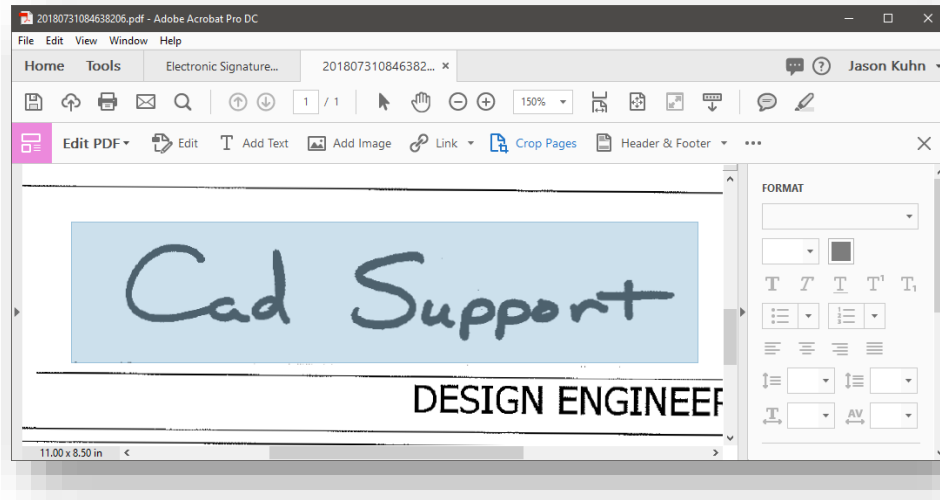


Cropping the PDF Signature

- This will open the Edit PDF toolbar and pane. On the toolbar, select the Crop Pages tool.

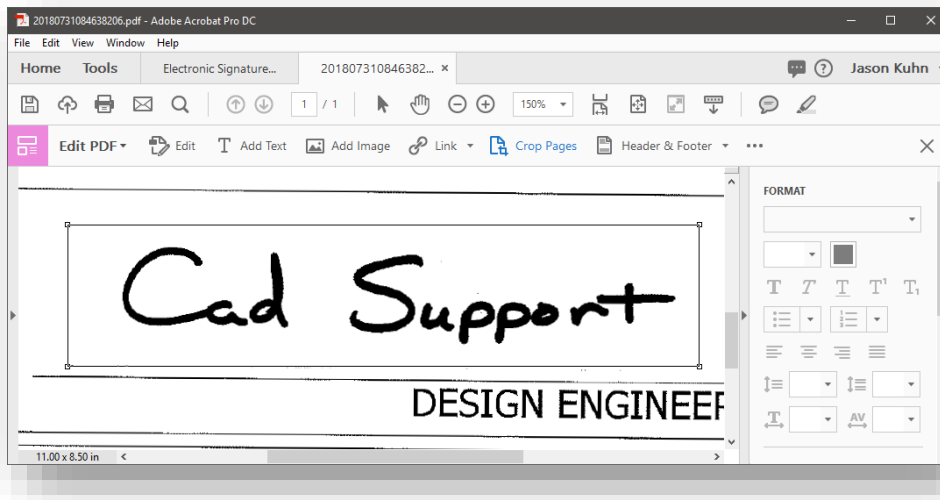


9. Draw a box around your signature by left clicking the mouse button and dragging the mouse. Try to get as close to the outline of the previously mentioned “faint yellow line” as shown in an earlier step in this exercise. If necessary, drag the corner handles of the cropping rectangle until the cropping rectangle is the size you want. Do not cross any of the elements in the border sheet.



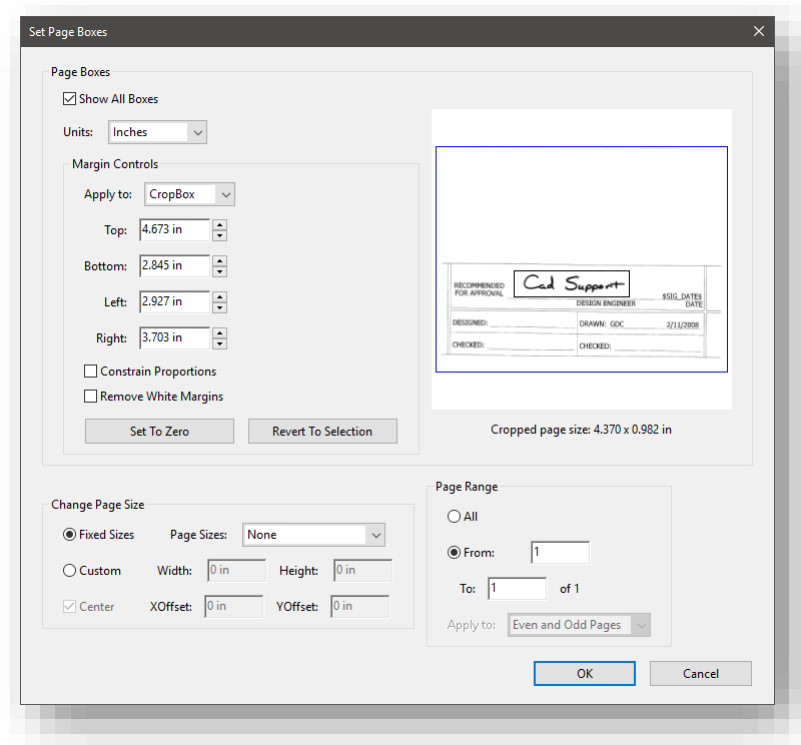
Cropping the PDF Signature

10. Double-click inside the cropping rectangle.



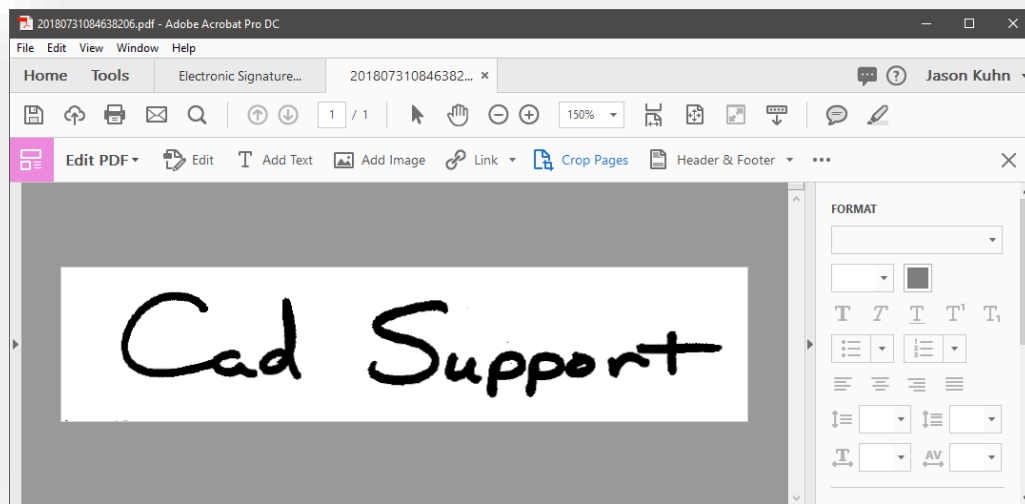
Cropping the PDF Signature

11. This will open the Crop Pages dialog box. Make sure that all of your options match those illustrated below except the margins which may differ for all users.



Cropping the PDF Signature

12. Click Ok.

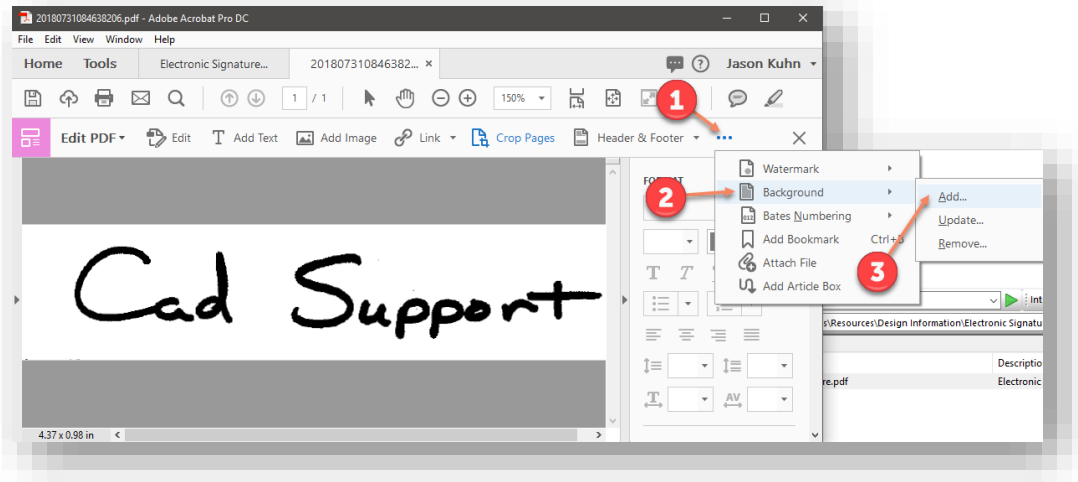


The Finished PDF Signature

13. Save the file making sure to place it in a location that meets the criteria listed in the note at the beginning of this series of exercises.

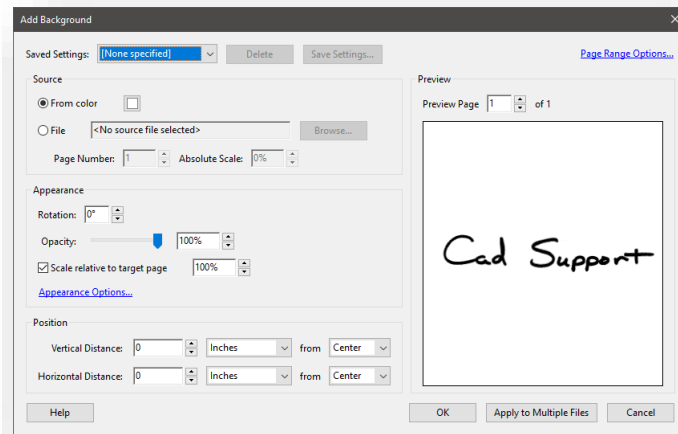
Note: When using Adobe Acrobat Professional DC, you will need to make sure that the background is turned on so that the electronic signature will cover the “this media not considered a certified document” text that is in the signature block on the border sheets.

14. On the Edit PDF toolbar, you may have to select the ellipsis or More menu (depends on if the window is maximized), followed by **Background > Add**.



PDF Signature Background

15. Then, taking the default settings, click OK on the Add Background dialog box.



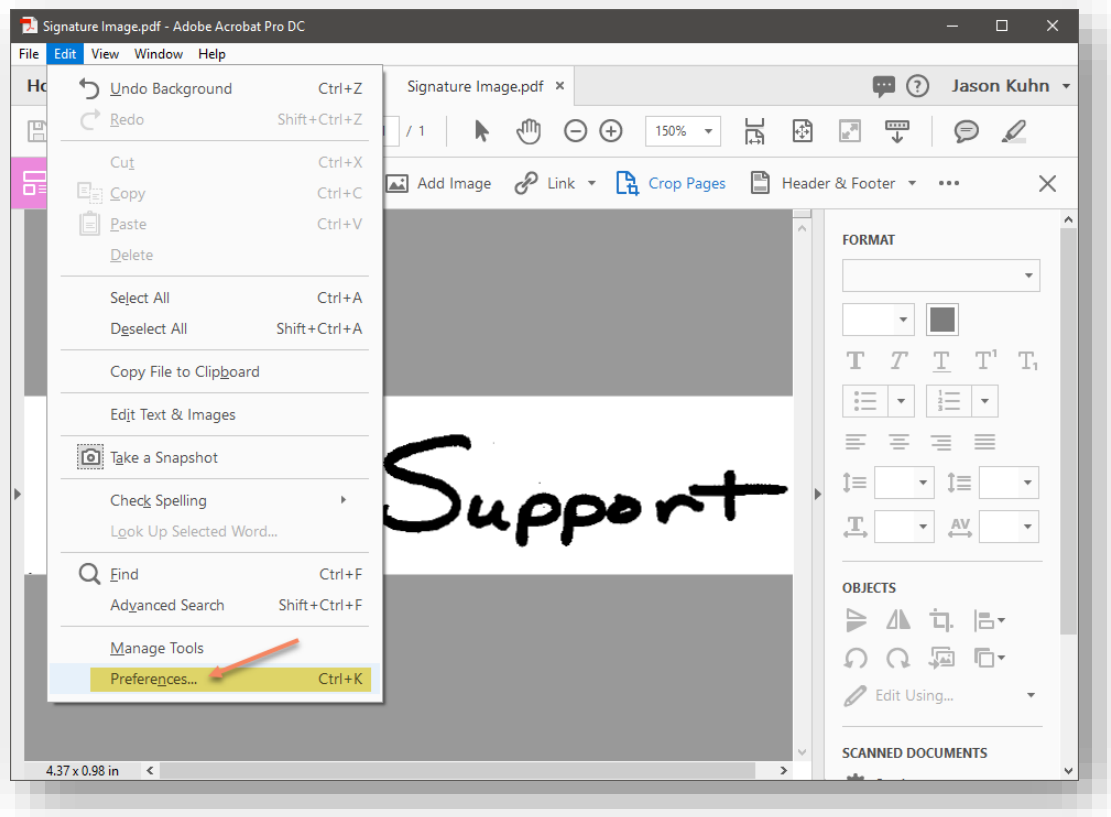
Adding a Signature Background

16. At this time, save your PDF signature image to a location you can locate for the following steps.

4.5-2 Creating an Electronic Certificate

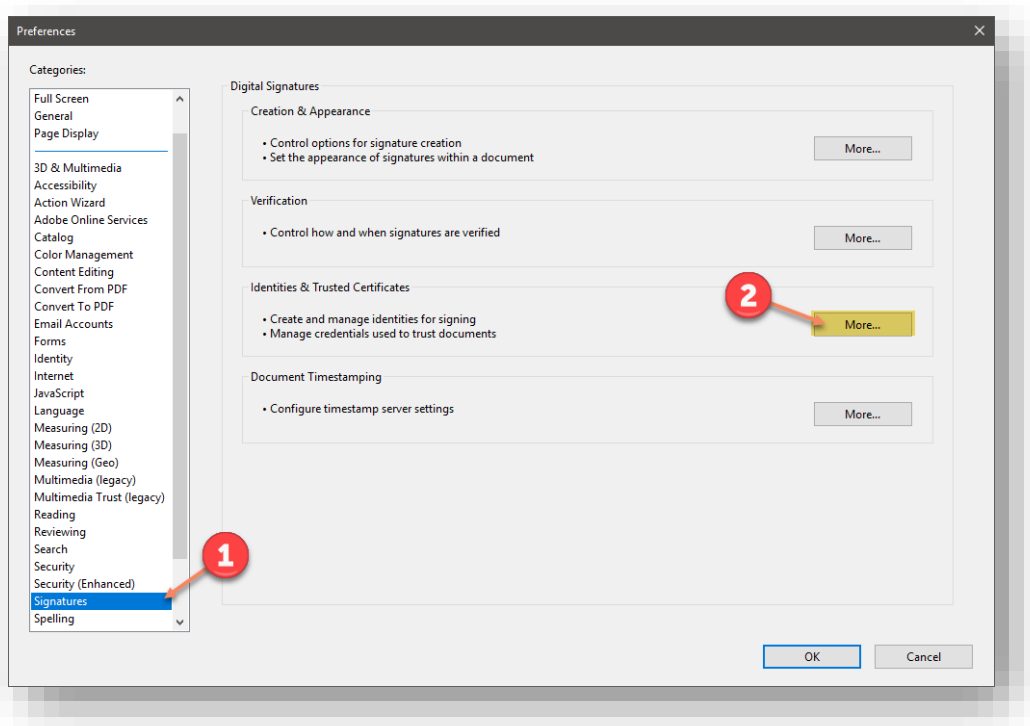
Once you have created a .pdf version of your signature, you then need to create a secure certificate to use to manage your signature. Once created, the certificate will be stored by you in a secure location and you will be required to send the CAD Support staff a version of your certificate so that we may store it in a secure location in ProjectWise, should there be a need to either verify your signature or replace a lost (deleted) local copy. This can be done using either Adobe Acrobat Professional or Acrobat Reader.

1. In the Adobe Acrobat Professional tool bar select **Edit > Preferences**.



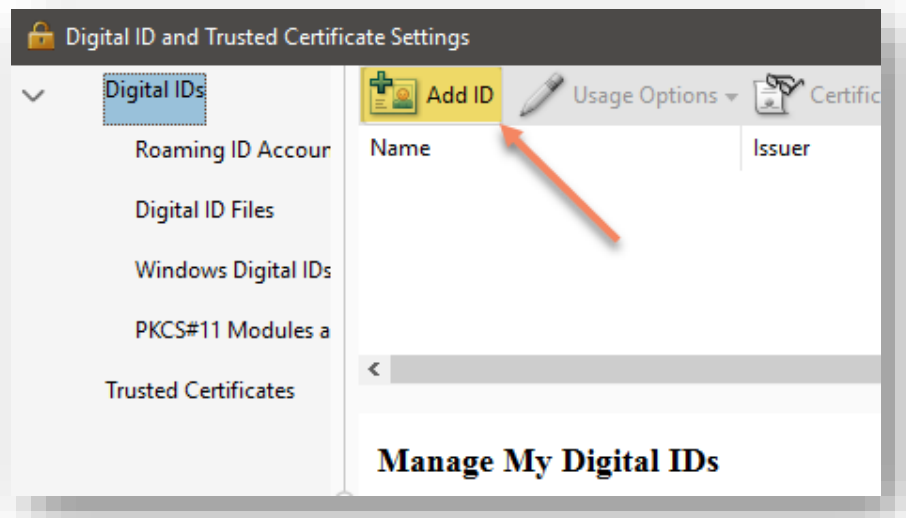
Creating the Electronic Signature

2. In the left column of the Preferences dialog box select Signatures and then click *More* in the Identities & Trusted Certificates area of the dialog box.



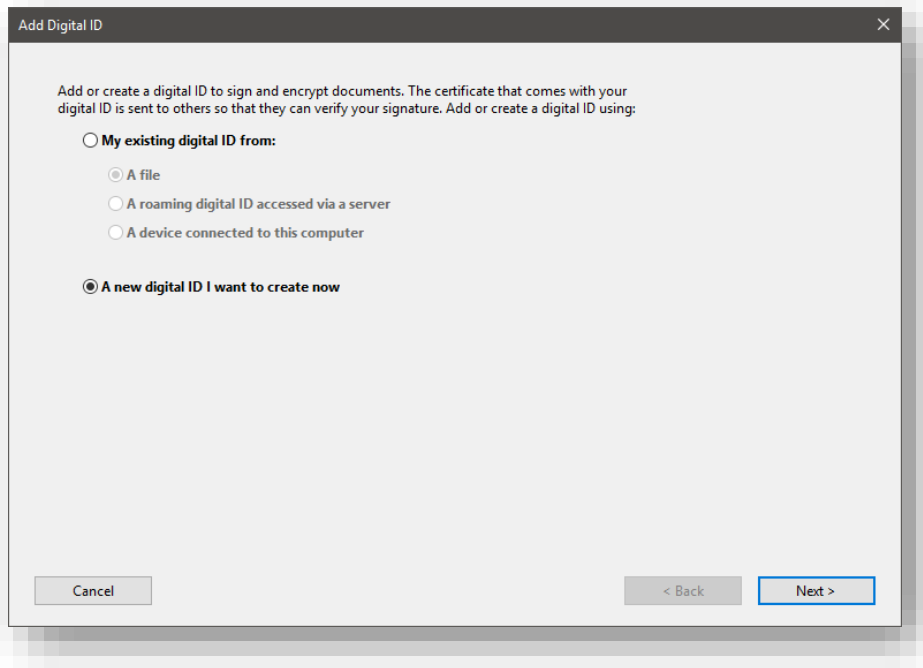
Adobe Signature Preferences

3. In the left column of the Digital ID and Trusted Certificate Settings dialog box select Digital IDs, and then click Add ID.



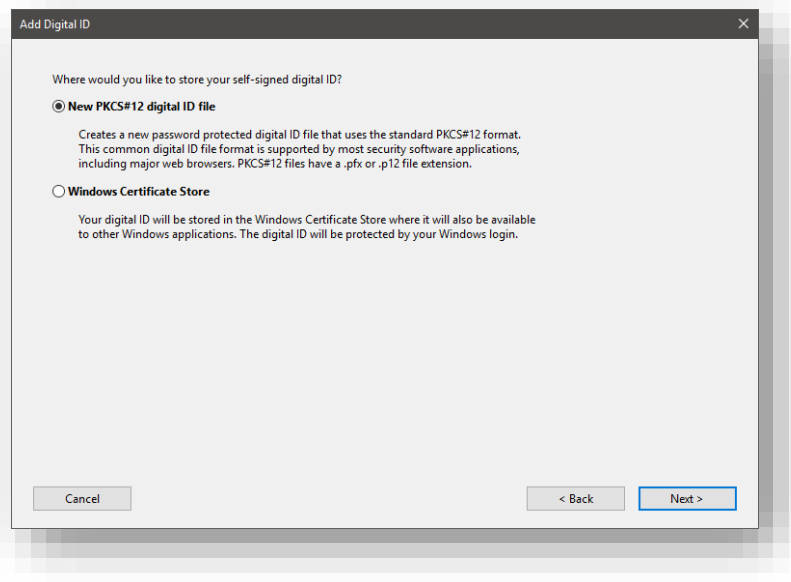
Creating the Electronic Signature ID

4. In the Add Digital ID dialog box, select **A new digital ID I want to create now**, and then select the Next button.



Adding the Digital ID

5. Select the New PKCS#12 Digital ID File and then select the Next button.



Adding the Digital ID

6. Fill out the dialog with the appropriate information. The Organization Unit should be your District and Division. (i.e..... CO – Roadway Services, CO – Structural Services, Vincennes Design, Seymour Design...). All other settings may be left with their default values.

Enter your identity information to be used when generating the self-signed certificate.

Name (e.g. John Smith): CAD Support

Organizational Unit: CO - CAD Support

Organization Name: INDOT

Email Address: indotcadsupport@indot.in.gov

Country/Region: US - UNITED STATES

Key Algorithm: 2048-bit RSA

Use digital ID for: Digital Signatures and Data Encryption

Cancel < Back Next >

Adding the Digital ID

- Now you will need to save the Digital ID. Make sure to place the file into a location that meets the criteria described in the note at the beginning of this series of exercises. When saving the PFX file (Digital ID), make sure you use the following file naming convention. Date is necessary in the event another Digital ID is created in the future. The Adobe version is important for compatibility reasons.

Userid_YYYYMMDD.pfx [CADSupport_20180731.pfx]

You will need to create a password that you will use every time you apply your Digital ID. Don't forget your password or you will need to create a new Digital ID. The password has to be a minimum of 6 characters and it is case sensitive.

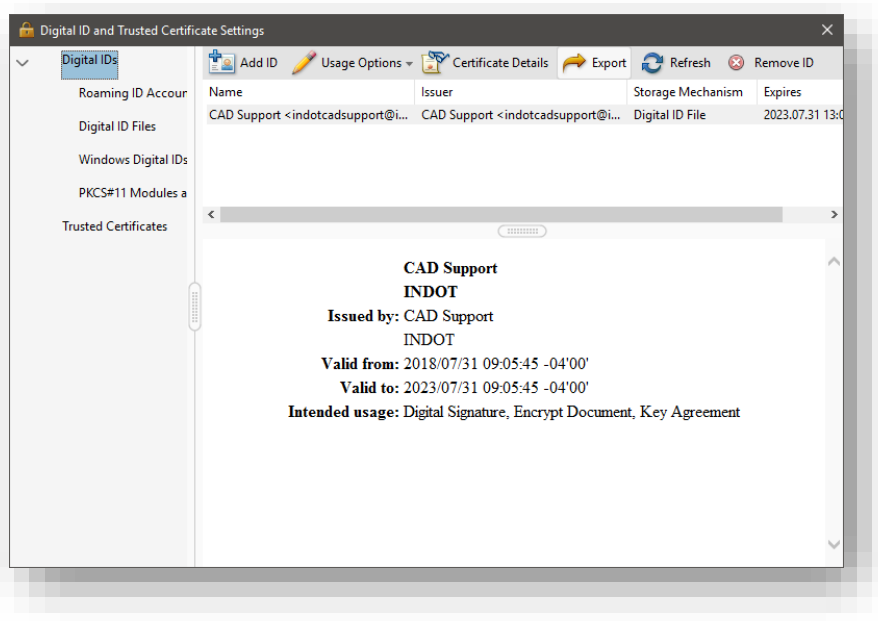
The screenshot shows a dialog box titled "Add Digital ID". It contains the following elements:

- Instructions: "Enter a file location and password for your new digital ID file. You will need the password when you use the digital ID to sign or decrypt documents. You should make a note of the file location so that you can copy this file for backup or other purposes. You can later change options for this file using the Security Settings dialog."
- File Name: A text input field containing "D:\Electronic Signature\CADSupport_20180731.pfx" and a "Browse..." button.
- Password: A text input field with masked characters "*****". Below it is a strength indicator consisting of four green bars and the word "Best".
- Confirm Password: A text input field with masked characters "*****".
- Buttons: "Cancel", "< Back", and "Finish".

Adding the Digital ID

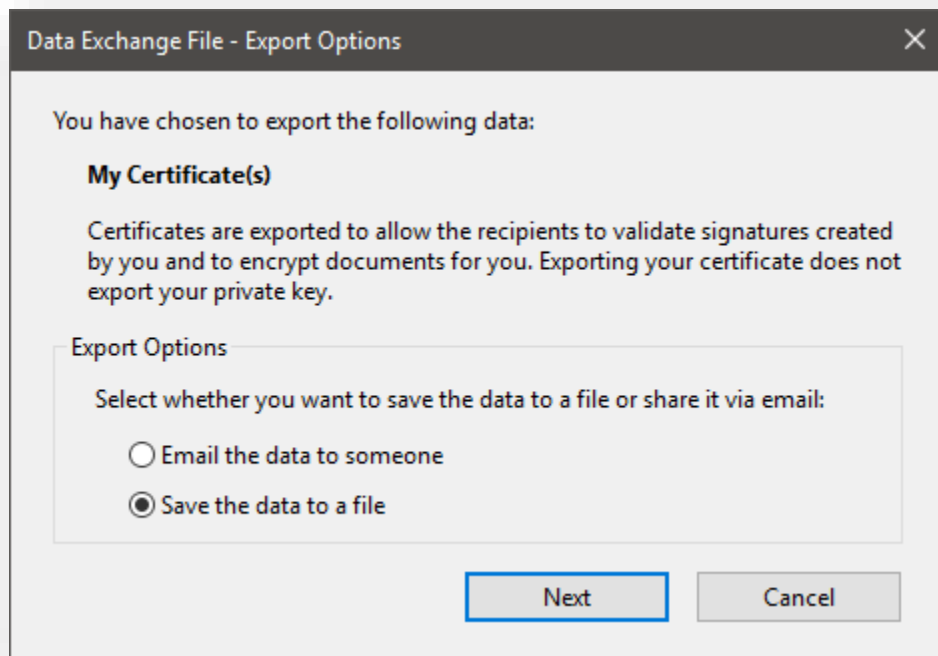
- Select Finish.

9. Now, highlight your name and select the Export option. The file created in this can be used to validate your Digital ID.



Exporting the FDF File

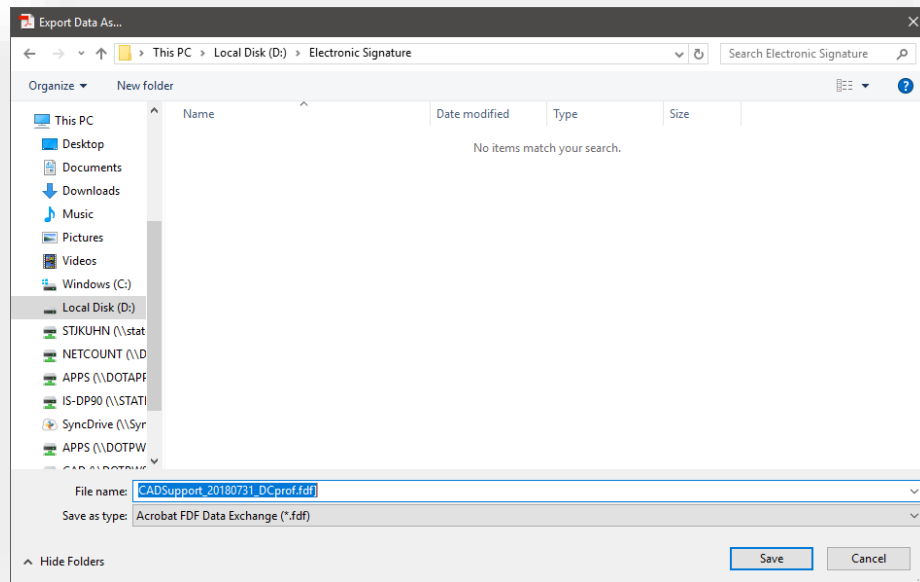
10. Select the Save the data to a file option and click **Next**.



Exporting the FDF File

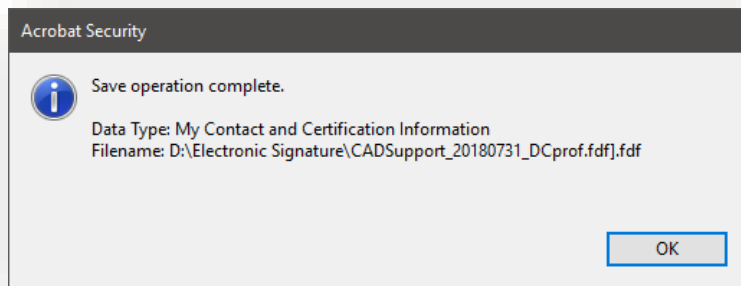
11. When saving the exported file, make sure that the path is to the same location as your Digital ID. The Save As type should be set to Acrobat FDF Data Exchange.

UserId_YYYYMMDD_ver.fdf [CADSupport_20180731_DCprof.fdf]



Exporting the FDF File

12. Now that you have created a certification file to validate your Digital ID, you will need to email that .fdf file to INDOT CAD Support (indotcadsupport@indot.in.gov). INDOT will then be the holder of this file to validate any contract plans that you have signed electronically. The .fdf file will be kept in a secure location within ProjectWise where it cannot be altered in any way.



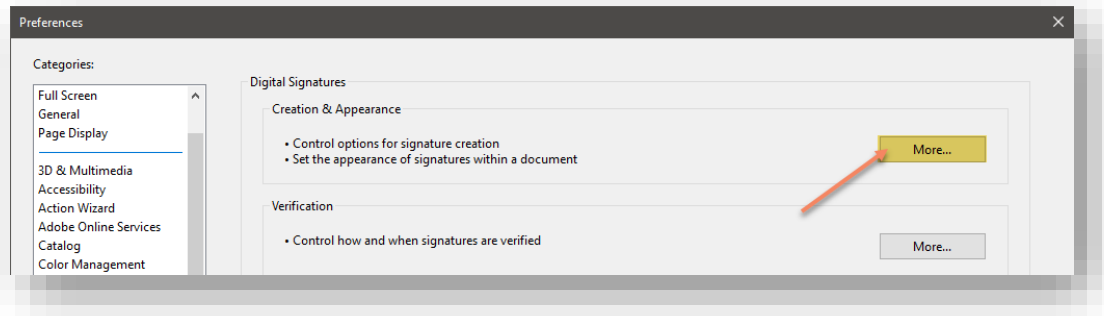
Exporting the FDF File

Note: If you would like for CAD Support to store a copy of the .pdf of your signature, make sure to forward a copy of the .pdf at the same time that you send the copy of your .fdf file.

4.5-3 Creating the Electronic Signature Image

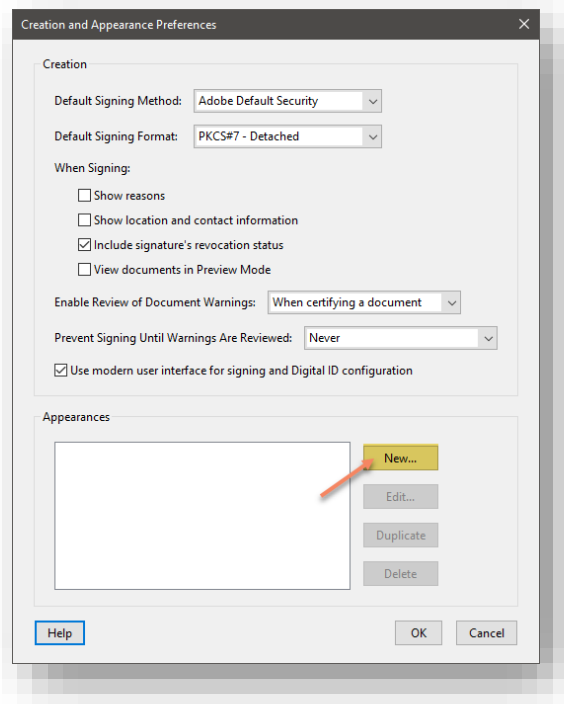
Now, using either Adobe Acrobat, you'll need to generate the graphical appearance of your signature. For this, we'll return to the scanned image of the signature you generated earlier in this section.

1. Click More in the Creation & Appearance area of the Preferences dialog box.



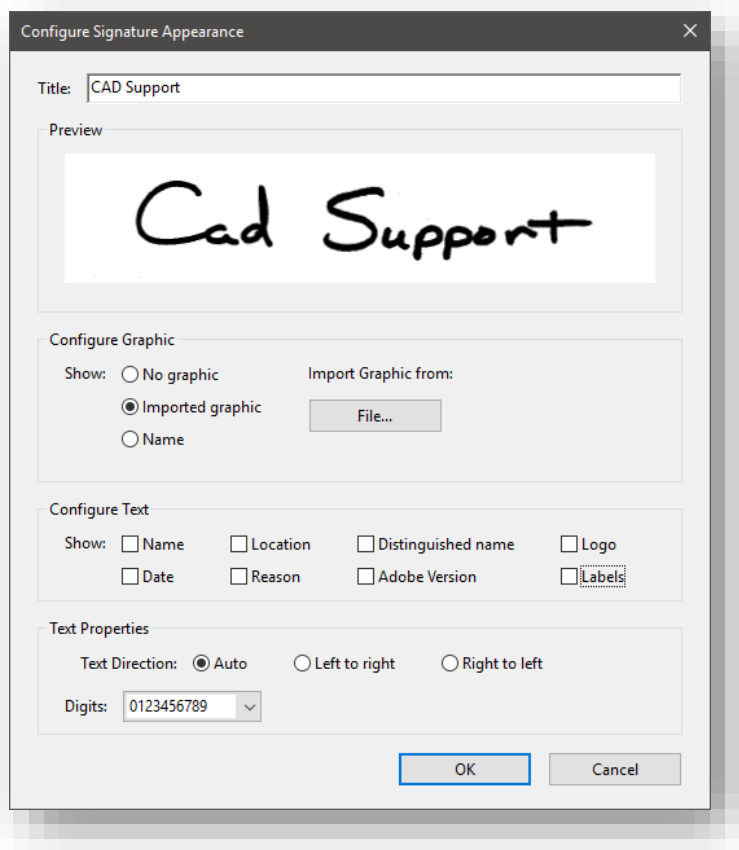
PDF Signature Properties

2. In the Appearances area of the Creation and Appearances Preferences dialog box, click New.



Combining the PDF & FDF Signatures

3. This opens the Configure Signature Appearance dialog box. Configure this dialog as described below.



Combining the PDF & FDF Signatures

- **Title:** Use the name that you use in your signature.
 - **Configure Graphic:** Select Imported Graphic and select the File button. Browse to the location that you stored the .pdf of your signature.
 - **Configure Text:** Disable all! We will use the functions of IPLOT to fill in the date.
 - **Text Properties:** Use the default selection.
4. Now you have created you Electronic Signature Image. Click the OK button.
 5. Click on the Ok button on the Creation and Appearances Dialog box, this will take you back to the Preferences dialog box, Select OK.

4.6 Applying Electronic Signatures to Exported PDFs

4.6-1 Overview:

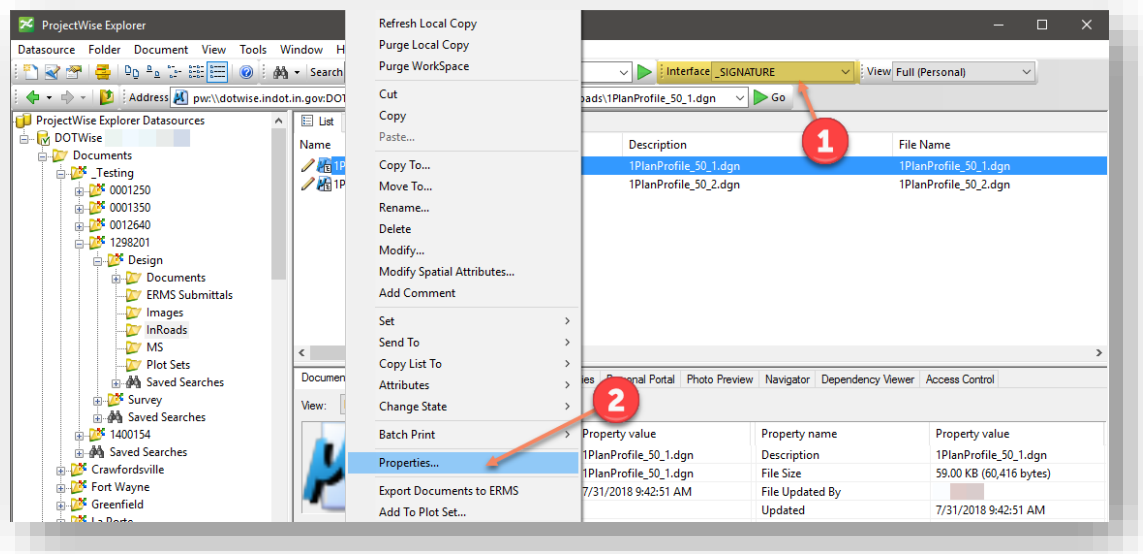
As mentioned at the front of this chapter, the use of Electronic Signatures has been approved and is in use by INDOT. Note that the Electronic Signature is not placed on every sheet in the document, but is used to electronically sign and seal the entire plan set. If, after placing the Electronic Signature any page within the .pdf plan set is altered in any way, the Electronic Signature will appear with a broken indicator.

4.6-2 “Signing” sheets within the plan set

Per the approval INDOT has received, it has been determined that a graphic representation of the Engineers signature responsible for each sheet within a plan set is acceptable. Therefore, an interface has been provided for the purpose of signing the sheets within a plan set. This can be done either individually or as a group function.

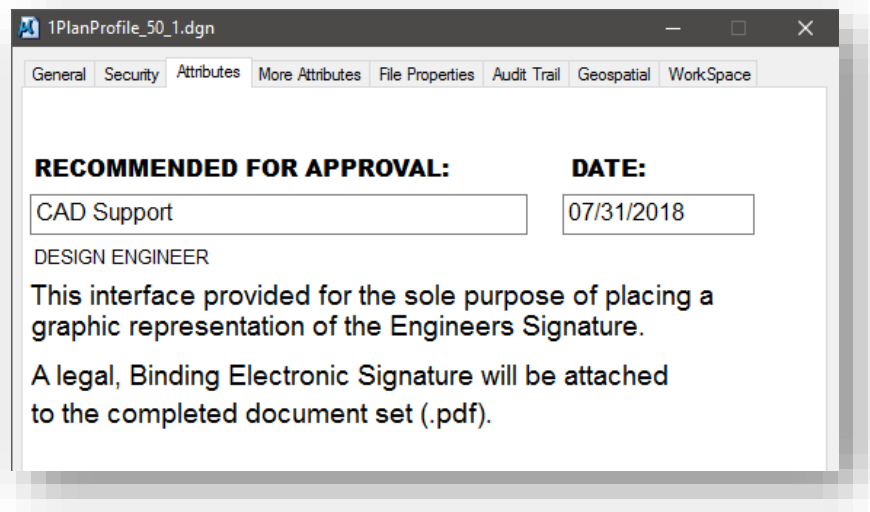
4.6-2a Placing the Graphic Representation of a Signature on individual Sheets:

1. In ProjectWise Explorer, Set your interface to `_Signature`
2. Modify the Properties of the MicroStation file that you want to place the Graphic Representation in.



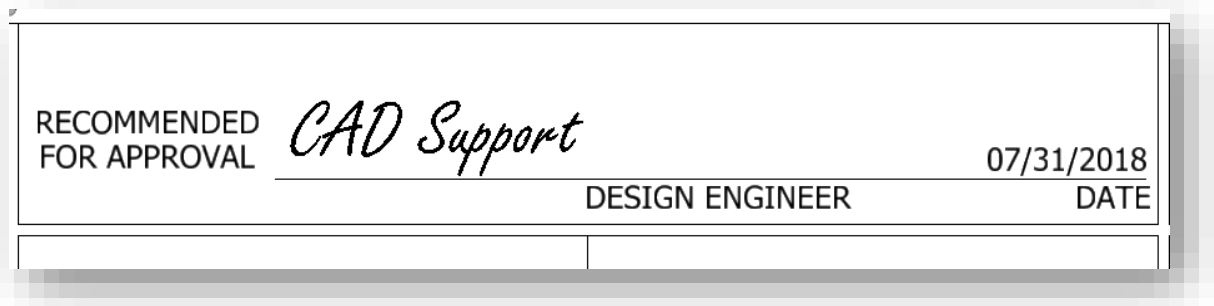
Setting Document Properties

3. Select the Attributes Tab of the Document Properties dialog Box and place the Name of the Responsible Engineer and the Date.



Signature Interface in ProjectWise

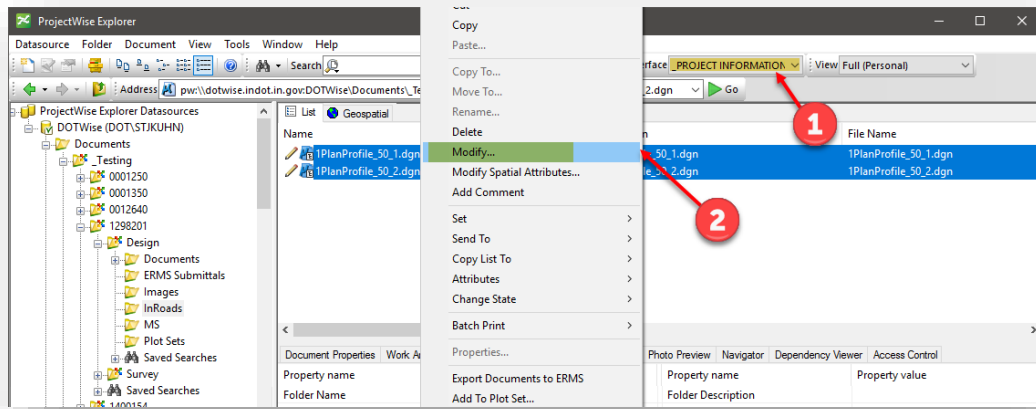
4. The Graphic Representation of the signature will be placed on the sheet model using a script type font.



Printed PDF Signature (prior to Signing)

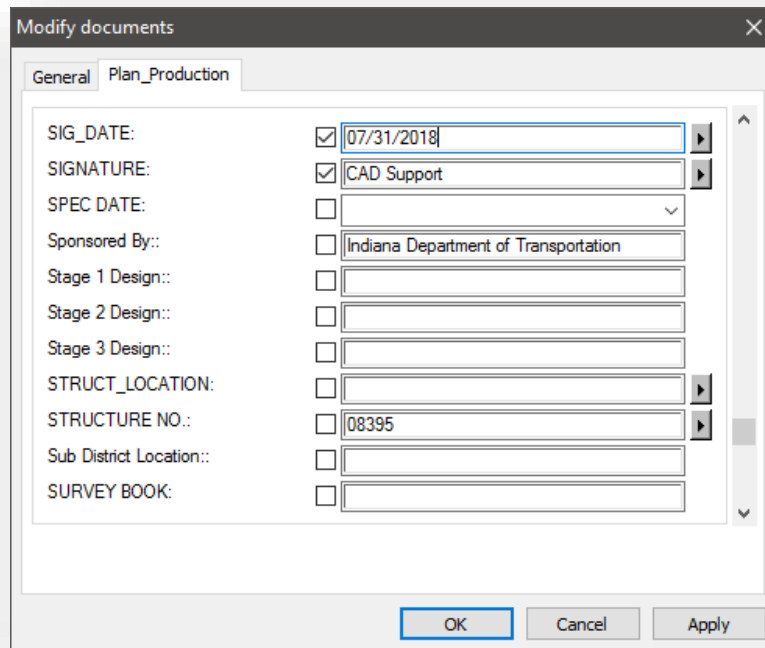
4.6-2b *Placing the Graphic Representation of a Signature on Multiple Sheets*

1. In ProjectWise Explorer, Set your interface to **_PROJECT INFORMATION**.
2. Select the properties of the MicroStation files that you want to place the Graphic Representation in and on the Document menu, select **Modify**.



Modifying Multiple Document Properties

3. Select the **Plan_Production** tab on the Modify documents dialog box and scroll down to the entries for **"SIG_DATE"** and **"SIGNATURE"**.



Modifying Multiple Document Properties

4. Place the name of the Responsible Engineer and date, and then select apply.
5. The Graphic Representation of the signature will be placed on the sheet models using a script type font.

RECOMMENDED FOR APPROVAL	<i>CAD Support</i>	07/31/2018
	DESIGN ENGINEER	DATE

Printed PDF Signature (prior to Signing)

4.6-3 Electronically Signing the Plan Set Created by Print Organizer

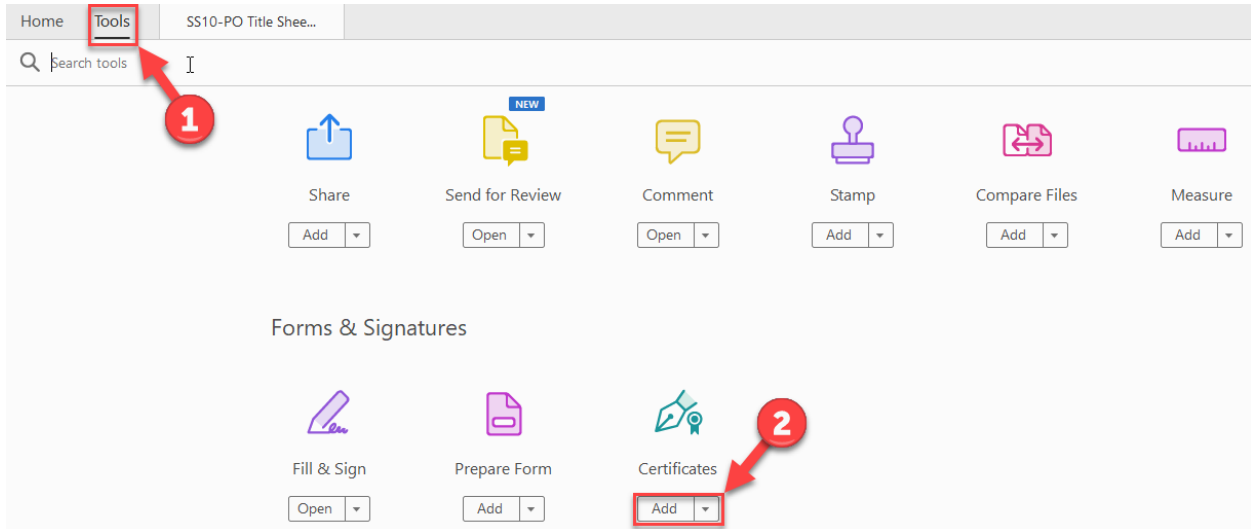
With Print Organizer, the plan set (.pdf) will be signed using the Responsible Engineer’s electronic signature after the plot is created. The process differs slightly from the process that has been used in ProjectWise InterPlot Organizer, in that the user has to manually create the digital signature field to enter their signature.

1. Create your plot set (.pset file) using the necessary Print Styles as discussed in section 4.2.
2. Print the plot set to PDF format and open it using either Adobe Acrobat Professional or Adobe Acrobat Reader.
3. View the Title Sheet and notice the text located in the “CERTIFIED BY:” area, stating that “THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT”. This is the text block that was put in place for ProjectWise InterPlot Organizer. Due to a known functionality issue between Print Organizer and MicroStation SS4 and SS10, this block does not automatically get converted to a digital signature field when exported to PDF format. Instead, the block is essentially treated as text.

PLANS PREPARED BY:	\$PLN_PREP_BY\$	\$PHONE_NO\$ PHONE NUMBER
	"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."	
CERTIFIED BY:		\$SIG_DT\$ DATE
RECOMMENDED FOR LETTING:		
	INDIANA DEPARTMENT OF TRANSPORTATION	DATE

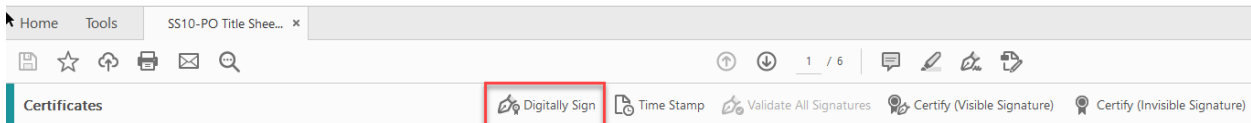
Unsigned PDF Document

- To remedy the issue, a digital signature field needs to be created. This can be accomplished by clicking on the Tools tab and then clicking on the Add button under Certificates in the Forms & Signatures section. The button text will then change to “Open”, and then click the button again.



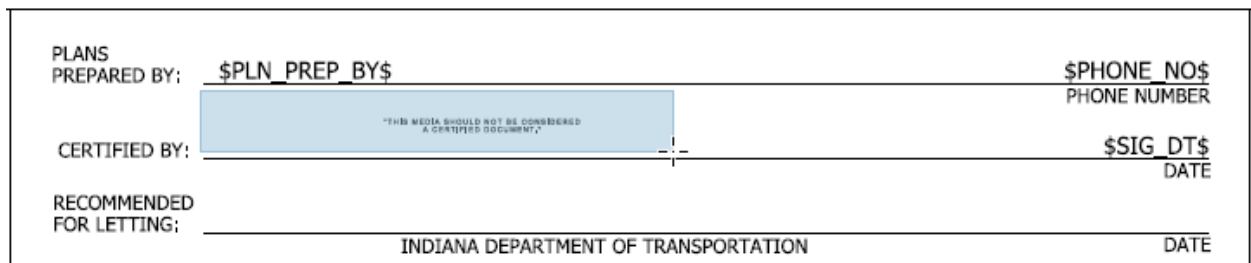
Add Digital Signature Field

- With the Certificates tool set active, click on Digitally Sign in the toolbar.



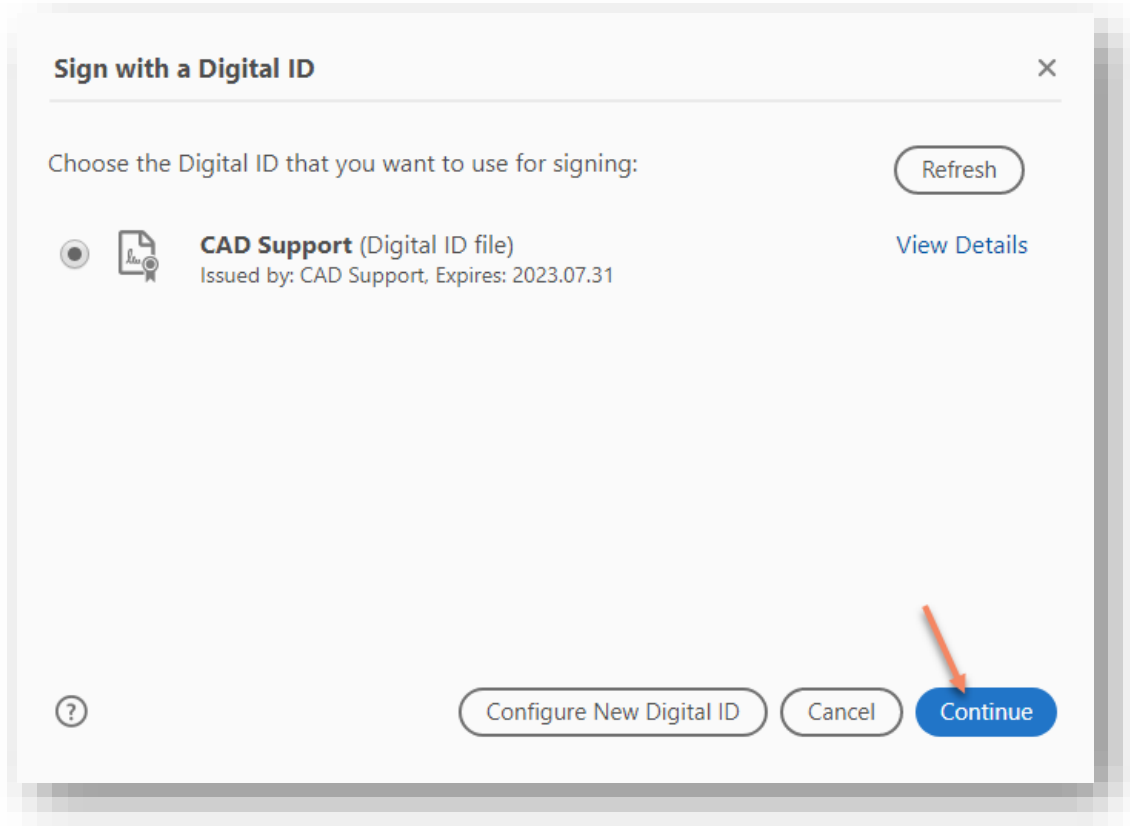
Digitally Sign

- You will then be prompted to click and drag to draw the area of your digital signature field. Proceed to draw the area such that it covers up the text that currently exists in the block. You may receive a warning about the signature field being “fairly small”. This can be disregarded, so click the Sign button to proceed.



Creating Digital Signature Field

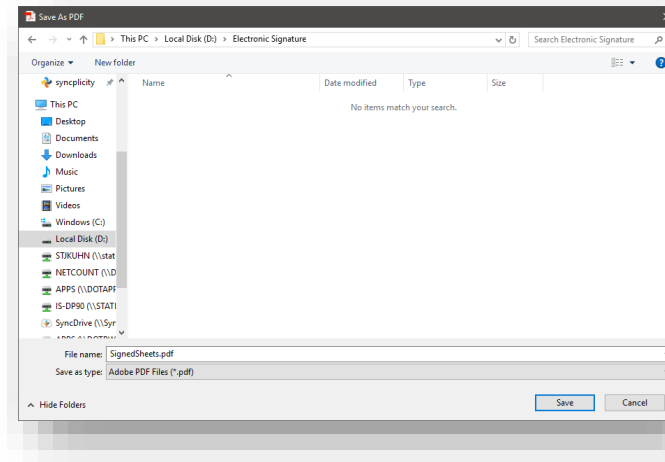
7. This will activate the “Sign with a Digital ID” dialog box. Fill this form out as you see fit. Then after using the password that you chose when you created your Digital ID (4.5-2), select Continue on the first panel, and then Sign once you’ve selected the appropriate image.



Applying the Electronic Signature



- After clicking on Sign in Acrobat DC, you will automatically be prompted to save your signed file in another location. Place this file at a location of your choosing and then drag/drop it into ProjectWise.



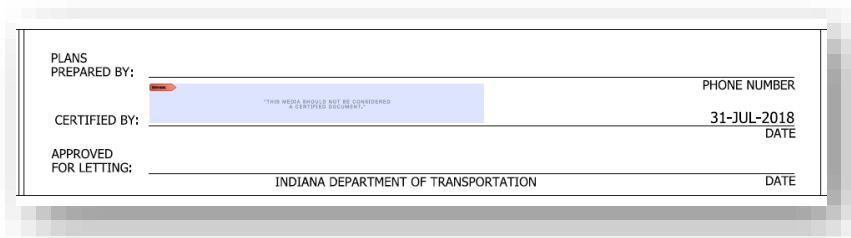
Signature Confirmation

- With the signature applied, you can then validate that the file is signed using the steps outlined in Section 4.6-5.

4.6-4 Electronically Signing the Plan Set Created by ProjectWise InterPlot Organizer

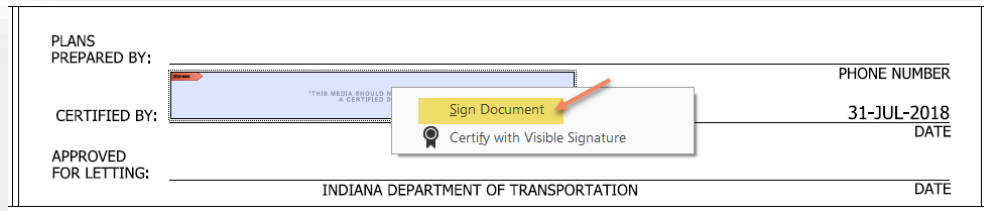
With ProjectWise InterPlot Organizer, the plan set (.pdf) will be signed using the Responsible Engineer’s Electronic signature after the plot is created. This is accomplished by using one of the new design scripts provided.

- Create your plot set (.ips file) using one of the design scripts discussed in Section 4.3-1 of this document.
- Export the .pdf file and open using either Adobe Acrobat Professional or Adobe Acrobat Reader.
- Open the Title Sheet and notice in the “Certified by” area, text stating that “THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT”. This text is in place to ensure that the reviewer knows that the plan set has not yet been signed by the responsible engineer. This text is in place on both the letter size and 24” x 36” title sheets.



Unsigned PDF Document

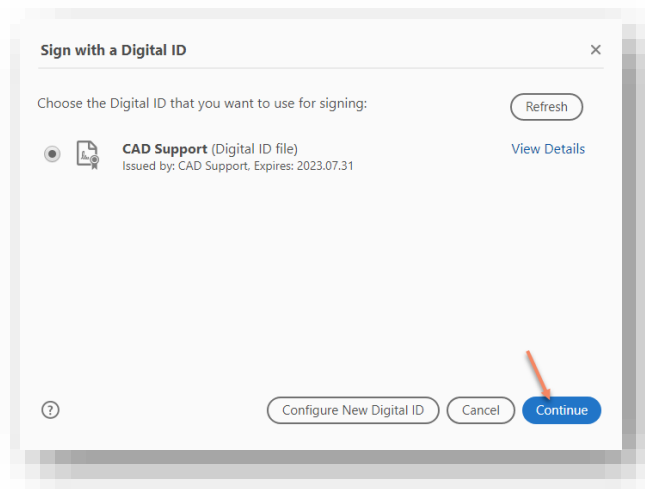
4. To electronically sign the plan set, the responsible engineer can simply left mouse click on shaded signature box. To sign the document select “Sign Document”.



The screenshot shows a form with the following fields: "PLANS PREPARED BY:", "CERTIFIED BY:", and "APPROVED FOR LETTING:". The "CERTIFIED BY:" field is highlighted in blue and contains the text "THIS MEDIA SHOULD BE A CERTIFIED COPY". A yellow button labeled "Sign Document" with a red arrow pointing to it is overlaid on the form. Below the button is a small icon of a person and the text "Certify with Visible Signature". To the right of the "CERTIFIED BY:" field is a "PHONE NUMBER" field and a "DATE" field containing "31-JUL-2018". At the bottom of the form, it says "INDIANA DEPARTMENT OF TRANSPORTATION" and "DATE".

PDF Document Signing

5. This will activate the “Sign with a Digital ID” dialog box. Fill this form out as you see fit. Then after using the password that you chose when you created your Digital ID (4.5-2), select Continue on the first panel, and then Sign once you’ve selected the appropriate image.



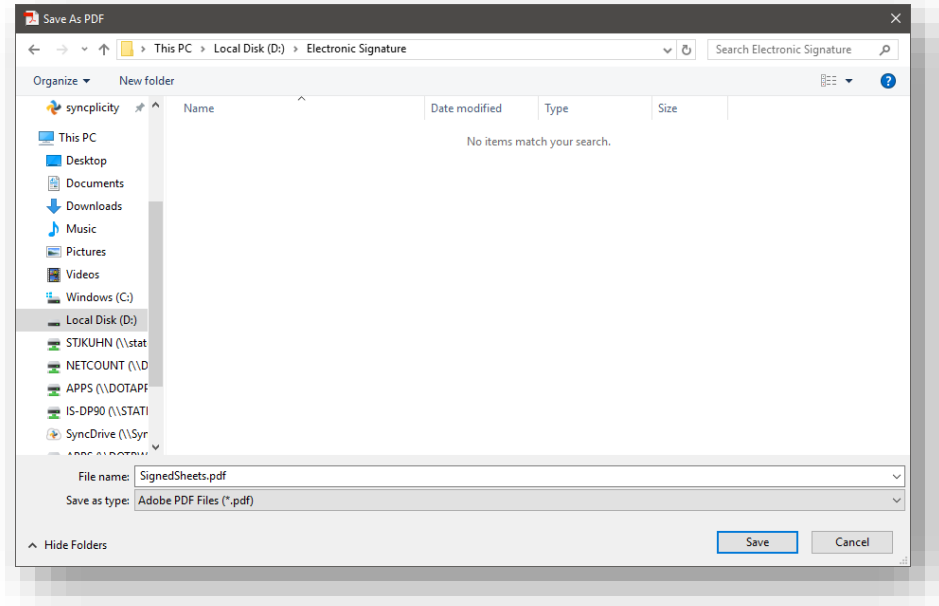
The screenshot shows a dialog box titled "Sign with a Digital ID". It contains the text "Choose the Digital ID that you want to use for signing:" and a "Refresh" button. Below this is a list of Digital IDs, with "CAD Support (Digital ID file)" selected. It also shows "Issued by: CAD Support. Expires: 2023.07.31" and a "View Details" link. At the bottom, there are three buttons: "Configure New Digital ID", "Cancel", and "Continue" (highlighted with a red arrow).

Applying the Electronic Signature



The screenshot shows a dialog box titled "Sign as 'CAD Support'". It has an "Appearance" dropdown menu set to "CAD Support" and "Create" and "Edit" buttons. Below is a large text area containing the handwritten signature "Cad Support". At the bottom, there is a "View Certificate Details" link, a "Back" button, and a "Sign" button (highlighted with a red arrow). There is also a yellow shaded box with a red arrow pointing to it, containing a password field with a masked password ".....".

6. After clicking on Sign in Acrobat DC, you will automatically be prompted to save your signed file in another location. Place this file at a location of your choosing and then drag/drop it into ProjectWise.



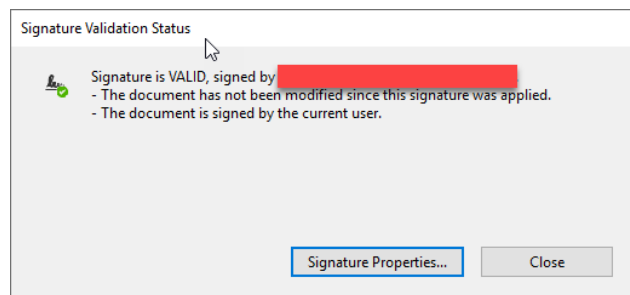
Signature Confirmation

7. With the signature applied, you can then validate the signature using the steps in the following section.

4.6-5 Verification of Signatures

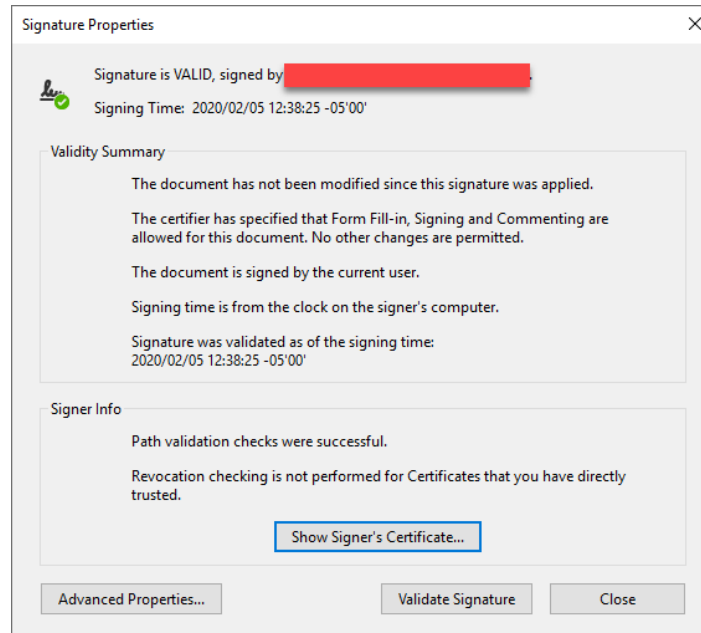
If the need to verify a signature arises, CAD Support will be able to provide the appropriate files for verification provided the end user has provided their .fdf file for storage. Otherwise the signature will present that the file is in its original, unaltered state. To verify signatures in Adobe Acrobat, the following process can be done:

1. After applying the signature to your file, you can then validate that the file is signed by clicking on the signature itself. You will receive a Signature Validation Status dialog similar to what is shown below:



Signature Validation Status

2. You can also further vet the signature at this point by clicking on the Signature Properties button. Note that you can then see all the signatures applied to a single document.



Signature Properties

5. InRoads, OpenRoads and ProjectWise

InRoads and OpenRoads technologies are integrated with both MicroStation and ProjectWise. As such, the ProjectWise Managed Workspace delivers InRoads configurations and template files within the managed ProjectWise environment. Throughout this document, specific functionality of InRoads with ProjectWise will be called out and expanded on in a workflow specific manner.

5.1 InRoads and OpenRoads, What's the Difference?

Throughout the coming chapters, you'll see references to InRoads, OpenRoads, native tools and OpenRoads technologies. It's important to know that in the SS4 version of the software, all of these functionalities are available—it's just a matter of determining which tools belong with each reference. We have tried to distinguish which toolsets are being used, but the following listings will shed some light on the specifics.

InRoads and Native Tools – These are the tools and file formats that are recognizable from the SS2 Version of InRoads. Native tools would be anything that's on the InRoads Explorer, so items like Annotations, Plan and Profile Generator, and the like. These references may also include the old file formats such as ALGs, DTMs, etc.

OpenRoads and OpenRoads Technologies – SS4 is the last version of software that will be branded as InRoads. As such, Bentley has started bringing the branding of the next generation product down to the current release and are calling these OpenRoads Technologies. For INDOT purposes, the major areas where these will be used are items such as OpenRoads Survey, Terrains, Civil Geometry,

Corridor Modeling, and Cross Sections as these all rely on features not found in the old InRoads toolset.

5.2 InRoads Standards and Seed Files

This section will discuss the location of INDOT-specific InRoads standards and seed files for use with the application. All InRoads files except DGN seed files will be found under folders within the following ProjectWise path: <pw:\indot-pw.bentley.com:indot-pw-01\Documents\INDOT Workspace\OpenRoads\Workspace>. It's highly advised that users do not interact directly with files under this location as InRoads and the underlying OpenRoads technology require that the workspace maintains a high degree of integration.

5.2-1 XIN File

The INDOT-configured XIN file can be found in the [XIN](#) folder and is named [INDOT.xin](#). This file contains many of the INDOT-specific customizations for the look and feel of features such as topographical items, alignments, and profiles used by the native InRoads tools. It also contains preferences for a wide variety of functions including stationing, curve sets, and plan and profile sheets, along with many other INDOT specific functions.

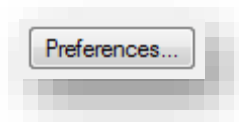
New to the SS4 release of the workspace, the agency INDOT.xin is automatically attached upon starting InRoads. This can be overridden to use personal XIN files by using either Project Defaults or .RWK project files. Please see the following warning about performing this operation.

Warning: *Due to the high level of connectivity between the OpenRoads required DGNLibraries and the XIN, care should be used when modifying a personal XIN. Any user wishing to customize the XIN must start with a fresh copy of the XIN listed previously as legacy XIN files may produce unpredictable results. Be advised that when contacting INDOT CAD Support, setting the XIN back to the agency default will be the first troubleshooting step performed.*

In addition to the warning above, also be warned that if you are using a customized XIN file from prior to the December 2020 ProjectWise migration, processes such as plans production and cross section creation will not work as expected due to these processes using hard-coded ProjectWise paths. In these cases, please use either the default XIN file or submit a helpdesk ticket for assistance.

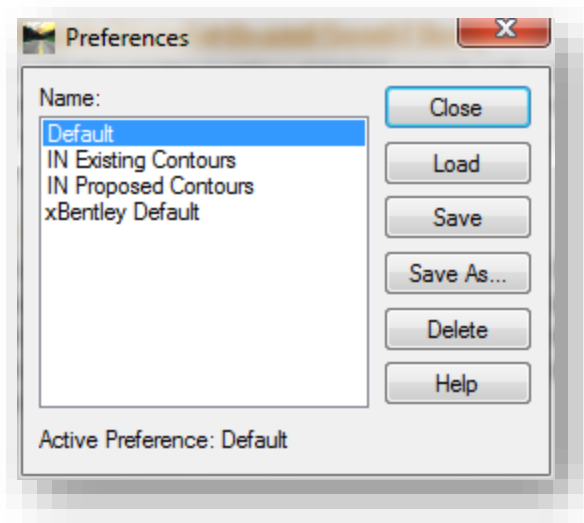
5.2-2 INDOT Specific Preferences

Within the XIN, there are numerous tools that have preferences configured for items and functionality specific to INDOT. When you see the following button when using an InRoads tool, it is recommended to check within and see if there's an INDOT specific setup:



Preferences Button

When inspecting the preferences, you may see a wide variety of preferences for differing situations. The following illustration shows the preferences defined for the View Contours tools:



View Contours Preferences

The naming convention for preferences is as follows:

- Default - A predefined preference. For many tools, this may be setup to be the same as the most commonly used INDOT preference.
- IN ... - An INDOT specific preference.
- IN PW ... - An INDOT specific preference requiring a connection to DOTWISE to use.
- xBentley Default - The default preference as defined by Bentley. In most cases this should not be used except for troubleshooting.

5.2-3 ITL File

With the release of the InRoads/OpenRoads SS4 workspace, a customized agency template library has been created and is now available. It contains a number of default templates configured with agency specific feature, component, and point naming. It also contains the relevant templates used by the agency civil cells.

These templates can be found under the [template library](#) folder, in the [INDOT.itl](#) file. Similar to the XIN, this library is automatically attached at startup.

5.2-4 Civil Cells

With the migration to InRoads SS4 and OpenRoads technology, the workspace now contains a number of Civil Cells. These can be found under the [civil cells](#) folder and are attached automatically at startup. Note that these are DGNLib files, and direct customization will not be available.

5.2-5 Cell Libraries

All INDOT cells for use with InRoads can be found under the [cell](#) folder. There are currently two cell libraries in use under this folder:

- INDOT Aerial Engineering InRoads Cell Library.cel
- IN_InRoads.cel
- IN_MOTCells.cel
- IN_PE-LS-Stamps.cel
- IN_Signs_Construction.cel
- IN_Signs_Guide.cel
- IN_Signs_Recreational.cel
- IN_Signs_Regulatory.cel
- IN_Signs_School-ObjectMarkers.cel
- IN_Signs_Warning.cel

The first library is used by the Aerial Survey group for topographical collection. The second library is used for the display of point features in the topographical surface and other items such as cells placed for title sheet integration and north arrows.

5.2-6 Plans Production

The files located under [Plans Production](#) are used in the creation of cross sections and sheets created using the Plan and Profile Generator. Discussion of these files will be expanded with their usage in the Plans Production workflow.

5.2-7 InRoads DGN Seed Files and the Importance of File Associations

InRoads allows for any DGN or model in a DGN to be a container for InRoads elements at any time. As such, the first item required when starting an InRoads project is the appropriate unit DGN seed file. For all new projects that are created after the Fall 2013 release of the Indiana Design Manual Part 1 (Ch. 106, Section 26-1.01 memo requiring Geo-Coordinated seed files), you will be provided a Survey seed file in the `pw:\\indot-pw.bentley.com:indot-pw-01\Documents\District\Des No.\Survey\Project Files` folder of your project with the following naming convention: `Des #_SRxx Seed 2D.dgn` and `Des #_SRxx Seed 3D.dgn`. These seed files are used to set the coordinate system for every InRoads based file in your project. Each will already have the properly selected working units for your project. If you are a consultant working on an INDOT project and do not have access to the `Survey\Project Files` folder, please contact your Surveyor to request the newly required geo-coordinated seed files.

Your project might fall outside the requirement window of the new design memo, so you may continue to use the previous method of creating your own seed file (or possibly ask the Surveyor if they can create one for you). The files you will need are located with the rest of the INDOT specific ProjectWise seed files. They can be found at [pw:\\indot-pw.bentley.com:indot-pw-01\Documents\Template Documents\SS4 Seed\InRoads\](#).

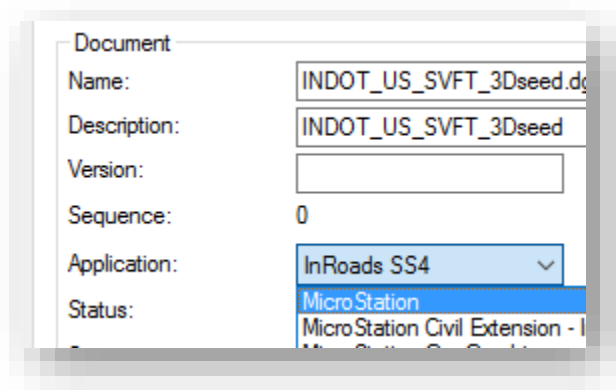
At the root of this location, 2 seed files have been provided, corresponding to the units of measurement used in current INDOT projects. These are:

- [INDOT_US_SVFT_3Dseed.dgn](#)
- [INDOT_US_SVFT_2Dseed.dgn](#)

Please note that in both instances 2D and 3D versions of each file have been made available. OpenRoads technology allows for the full use of civil data regardless of the availability of the Z axis. For instance, when showing 3D OpenRoads elements in a 2D seed file, a 3D model will automatically be created as needed. Throughout the remaining chapters, care should be given to what seed file a particular function would best function in.

These files are configured with Design History disabled to remove compatibility errors caused by the rapid display and deletion of elements during the design process.

Finally, as InRoads is integrated with ProjectWise, these seeds are configured with their application association set to InRoads SS4 causing InRoads to launch when the files are checked out and opened. To disable this functionality, perform a Document -> Properties (Space Bar shortcut) on the document in ProjectWise. When presented with the document properties panel, you can then adjust the application association as shown:



ProjectWise Application Association

5.3 Working with InRoads/OpenRoads

5.3-1 ProjectWise

5.3-1a Project Creation

The first step in working with InRoads and ProjectWise is the creation of your project. At this time, the Design project template has been setup to have distinct InRoads and MS folders to separate your data. As always if your project does not yet have a design folder please create the project/folder using the DOTWise Project Creator.

5.3-1b Survey Provided Files

When starting an InRoads project, you can expect having access to the following InRoads and MicroStation files:

FOR SS2 VERSION PROJECTS

1. Des #_SRxx Control Points.fwd – InRoads survey book with control points
2. Des #_SRxx LCRS Plat.dgn – MicroStation plat DGN
3. Des #_SRxx Survey Alignment.alg – InRoads Survey Alignments
4. Des #_SRxx Survey Surface.dtm – InRoads DTM of Survey processed features
5. Des #_SRxx Survey Surface Boundary.dtm – InRoads DTM of Survey Boundary
6. Des #_SRxx Survey.xin – InRoads XIN, specific to the processed data
7. Des #_SRxx Topo.dgn – MicroStation DGN of topographical features
8. Des #_SRxx Topo.fwd – InRoads FWD containing the processed Survey
9. Des #_SRxxSeed.dgn – Sets the coordinate system for every InRoads based file in your project.
10. IN_GeoCS.dty - This file contains the customized coordinate system information and should not be needed as this is also provided as part of the Seed file.

FOR SS4 VERSION PROJECTS

1. Des #_SRxx Seed 2D.dgn – Sets the coordinate system for every InRoads based file in your project and contains a Default model in 2D.
2. Des #_SRxx Seed 3D.dgn – Sets the coordinate system for every InRoads based file in your project and contains a Default model in 3D.
3. IN_GeoCS.dty - This file contains the customized coordinate system information and should not be needed as this is also provided as part of the Seed file.
4. Des #_SRxx Survey Fieldbook.dgn - Contains Fieldbook information for TOPO and Control Points in the OpenRoads Format (survey fieldbook) along with the existing terrain model. This will be done in a 3D model.
5. Des #_SRxx Survey Alignment.dgn - Contains Survey alignment(s) in the OpenRoads Format (civil data – linear elements). This will be done in a 2D model.
6. Des #_SRxx LCRS Plat.dgn - MicroStation plat DGN
7. Des #_SRxx Survey Alignment.alg – InRoads Survey Alignments, Legacy format for annotation.
8. Des #_SRxx Existing Terrain.dtm – InRoads DTM of Survey terrain model, with applicable triangulation cleanup. This terrain will only contain the existing triangulated terrain and any features that are included in that triangulation. This can be used with the native InRoads

tools for 3D analysis as it will match the OpenRoads existing terrain and is discussed in Chapter 6.3-5

9. Des #_SRxx Annotation Surface.dtm – InRoads DTM of Survey processed features, Legacy format for annotation. This should not be used for any functions beyond the native annotation tools and should be created using the import process described in Chapter 6.3-6.

To begin a project, it's recommended to copy the Alignment and Terrain DGNs that Survey provides into your Design\InRoads folder in ProjectWise. These are the base files you'll start your project from and should be available in a read-write location as you will be directly interacting with them.

With these files copied into your project, it's suggested to rename the DGN containing the survey alignment to Des #_SRxx Design Alignment.dgn. This will alleviate confusion and specifically denote that this file is for the proposed alignments while maintaining the collected information from the Survey alignment.

5.3-1c Base Drawing Creation

To start creating a project, the only item required is a base DGN to start the product with. Using the advanced document creation wizard, you can create your base drawings using the unit appropriate seed file as noted in Section 5.2-7. The INDOT base drawing naming convention will still be used.

Project information will be organized into several base drawings. The information is separated based on categories of information included. These base drawings are the locations for all line work. Most base drawings will be created while in InRoads in MicroStation. By using MicroStation referencing tools, a base drawing can be enhanced to view other base drawing information as a backdrop. Please refer to **Appendix A - Naming Conventions** for a summary of base drawings. Below is a list of Standard Base Drawings to be used at INDOT and descriptions of their contents. Other names are possible based on project needs.

Standard Base Drawings (InRoads created)		
Drawing Names / Logical Names	Descriptions / Reference Descriptions	Examples
Survey Alignment	Survey Centerline	Des #_SRxx Survey Alignment.dgn
Survey Section Corner	US Government Section Corners	Des #_SRxx Survey Section Corner.dgn
Survey Contours	Survey Existing Contours	Des #_SRxx Survey Contours.dgn
Survey Topography	Survey Existing Topography	Des #_SRxx Survey Terrain.dgn
Explan scale	Design Existing Topography	Explan 20.dgn Explan 50.dgn Explan 100.dgn
Prplan scale	Proposed Design Strings	Prplan 20.dgn Prplan 50.dgn Prplan 100.dgn
RW Existing scale	Existing Right of Way	RW Existing 20.dgn RW Existing 50.dgn RW Existing 100.dgn
Design Alignments	Design Alignments	Design Alignments.dgn

If your project is anticipated to require multiple scales, it is desirable to create multiple base drawings at those scales. Creating the multiple scaled drawings is easily done by creating a new plan display titled appropriately for the scale to be created, and then displaying the appropriate models at the desired scale. Some examples of scales and various usages are presented below.

Using this procedure makes it extremely easy to vary the scale of a sheet by simply picking the base drawings that have the desired scaling when referencing into the MicroStation drawings. From this point forward, only a 1" = 50' scale will be used in this documentation, the scale will vary with projects, and other scales can be developed using the same procedures are described.

US Scales

Scale	Typical Uses
1" = 20'	Construction details and other detail drawings.
1" = 30'	Bridge Layouts
1" = 50'	Most common scale used in plan and profile sheets and plan drawings.
1" = 100'	Pavement marking plans, and other miscellaneous sheets.

Note: *OpenRoads technologies make substantive use of the Annotation Scaling tools in MicroStation for element and feature display. When discussing multiple scaled base drawings, it may be beneficial to create a single base drawing and then scale the content through using the scaling settings available on reference files.*

5.4 Starting InRoads

At this point, you should now have your ProjectWise project, and a base sheet created. If using the seed files as defined with InRoads SS4 as the application association, you may Check Out/Open the file directly from ProjectWise, which will start both MicroStation and InRoads Suite.

If you changed the application association for the DGN seed file to MicroStation, you will need to Check Out/Open the file—which will only start MicroStation.

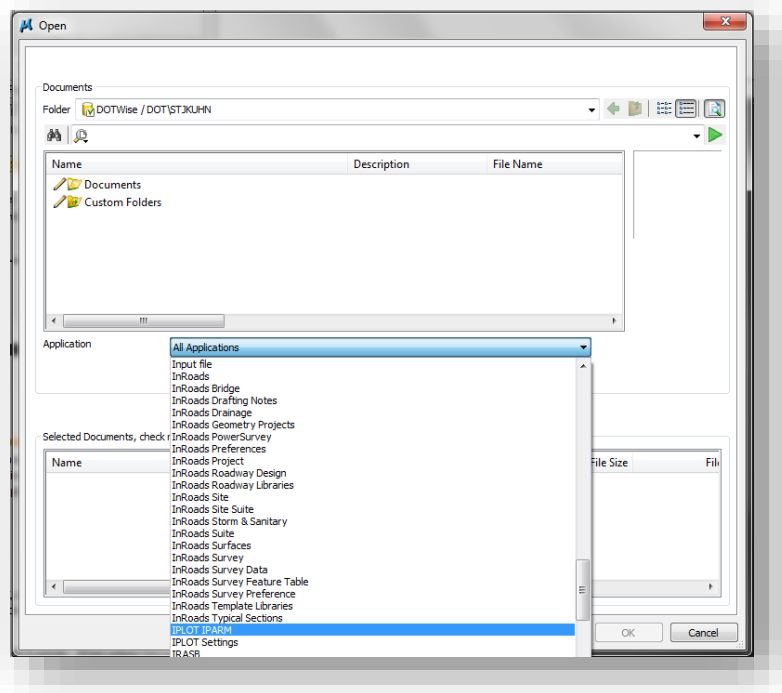
Note with SS4 there is no longer a method to open InRoads from within MicroStation. Files must be associated with InRoads SS4 to open the product.

5.5 Opening, Closing and Saving InRoads Files from ProjectWise

With the integration of InRoads and ProjectWise, procedures for opening, closing, and saving files in InRoads differs from these functions as shown in training. As with MicroStation and other integrated applications, standard Open and Save dialogs are replaced with ProjectWise integrated dialogs with extended functionality. Please keep in mind that these options will be used when working with the legacy file formats of the InRoads software.

5.5-1 Opening Existing Files

Opening files from within InRoads uses the standard ProjectWise Open dialog as shown:

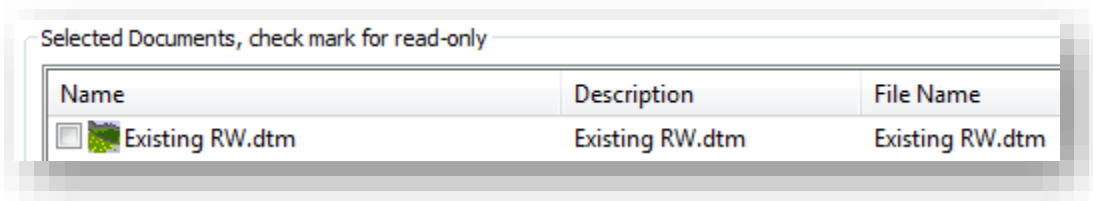


InRoads File types in ProjectWise

To ease finding appropriate file types, the preceding illustration shows the available file types that have been defined in the ProjectWise environment. The following applications correspond to these common InRoads files types:

- InRoads Drafting Notes - .dft
- InRoads Drainage - .sdb
- InRoads Geometry Project - .alg
- InRoads Preference - .xin
- InRoads Project - .rwk
- InRoads Roadway Design - .ird
- InRoads Survey Data - .fwd
- InRoads Template Libraries - .itl

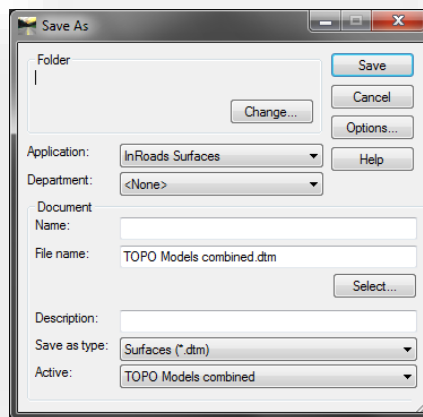
Additionally, you may selectively open files in a read only mode by adding them to the lower portion of the open dialog and enabling the check box for open read only:



Adding Files to an Open list/Read Only

5.5-2 Saving New Files

When performing a Save for the first time, or a Save As on an existing file, you will be presented with an InRoads/ProjectWise specific Save As dialog, as shown below:



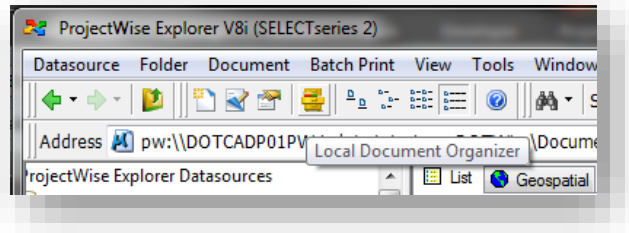
InRoads/ProjectWise Save As Dialog

All ProjectWise Save dialogs require you to define your project folder, document name, file name, and description. It's still recommended that you maintain the same naming convention—at least for the document and file names. Also, it's very important to make sure the application is appropriately set to the InRoads file type you're attempting to save, as the dialog does not assume the file type you're saving.

5.5-3 Closing Files

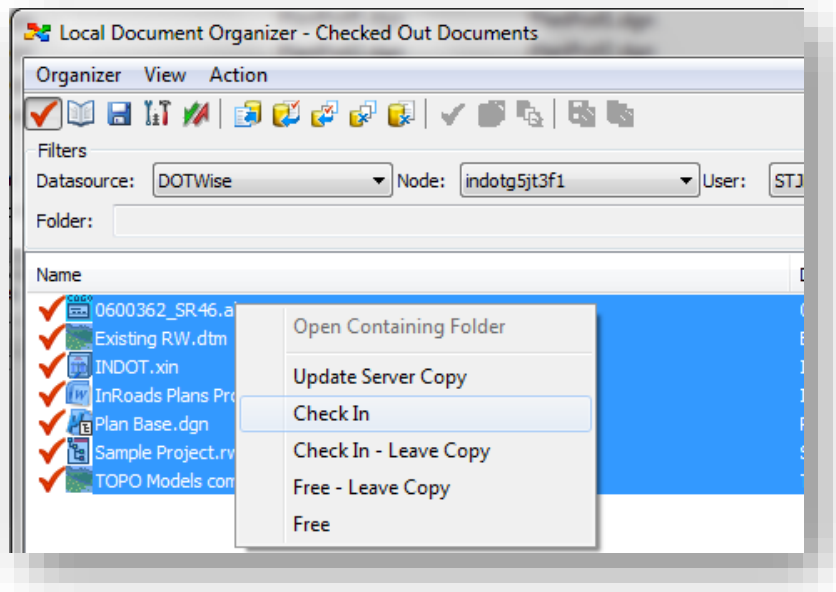
When closing files from within InRoads, the behavior is slightly different from other integrated applications. Due to how ProjectWise functions and InRoads works within MicroStation, there is no automatic prompt for check in, or automatic updating to the ProjectWise datasource. It's recommended that when you've saved your files and have closed InRoads, that you use the ProjectWise Local Document Organizer to check the remainder of your files in. You will be prompted to check-in your DGN per the standard functionality, but it's probable that you have any number of additional InRoads files open that also need checked in.

You can do this by opening the Local Document Organizer from ProjectWise:



Local Document Organizer Button

With the Local Document Organizer open, you can then browse to the checked out option, and then select all of the files you need to check in. Once selected, you can right-click on the highlighted files and perform a check in as shown:

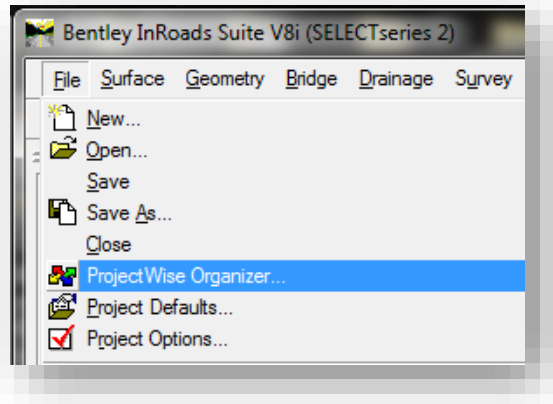


Local Document Organizer Mass Check-In

It's recommended that each check in be accompanied by good comments to allow quick review of anything that may have been done.

5.5-4 InRoads/ProjectWise Organizer

Within the InRoads environment, there is an additional shortcut to the ProjectWise Local Document Organizer and it can be found under the InRoads Explorer -> File -> ProjectWise Organizer... menu item:



Local Document Organizer Access from InRoads

This is a self-contained version of the Local Document Organizer and it acquires application focus from InRoads/MicroStation, preventing you from working within the application.

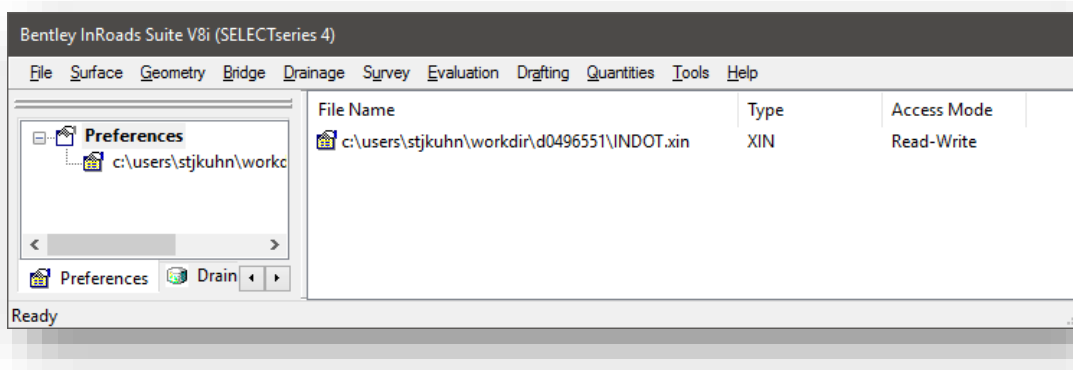
While you're working on the existing files and making/saving changes, you will want to use this tool to update your server copies frequently as not to lose any data.

5.6 Setting Up InRoads

With the switch to OpenRoads, the first two of the following steps are no longer required. These items are automatically attached. The content of these instructions, however, is still valid and useful depending on the situation.

5.6-1 Attaching the XIN

With the SS4 release, it's no longer necessary to attach an XIN. The default INDOT.xin from the workspace will be automatically attached to your project. Should you need to attach a XIN, select **File -> Open** from the InRoads Explorer. When presented with the ProjectWise open dialog, browse the location of your XIN and select the file. Once opened, your InRoads Explorer should look similar to the following showing the location from the Managed Workspace where the file has been downloaded to:



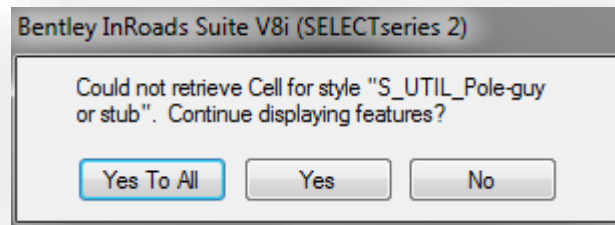
INDOT.XIN Attached

Note that while the Access Mode above shows Read-Write, changes will only be saved to the copy in your working directory and will not be posted back to the server. The working directory copy will be refreshed on subsequent openings of the software and changes will be lost.

If you attached from a local project copy, the path will reflect the XIN location, and the Access Mode will display Read-Write indicating that you can write changes to the XIN file you've selected.

5.6-2 Attaching the Cell Library

With the XIN attached, you may need to attach the cell library prior to drawing any features. If you receive the following error when attempting to draw features:



Cell Library Not Attached

InRoads is indicating that it cannot find the appropriate cells for your features.

To attach the cell library, use the MicroStation Cell Library tool (MicroStation -> Element -> Cells menu option) and browse to [Documents\INDOT Workspace\OpenRoads\Workspace\cell\](#) and select [IN_InRoads.cel](#). At this time, it is recommended that you save the settings for your file prior to continuing (*MicroStation-> File -> Save Settings*).

Note: *ProjectWise automatically attaches this cell library on startup via the Managed Workspace. Instances of this error will only occur if you're working disconnected from ProjectWise.*

5.6-3 Project Defaults/.RWK Files

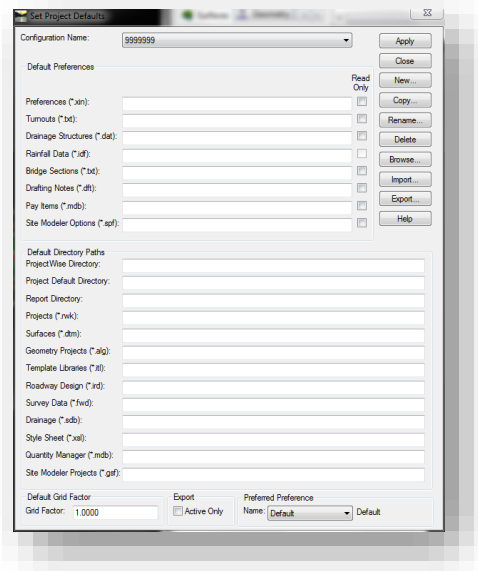
As the InRoads training courses demonstrate, Project Defaults and .RWK files both provide substantial benefit when opening, saving and closing your files. The full functionality of these tools has been maintained in InRoads in ProjectWise, however there are some slight differences in what dialogs are displayed when working with these. First, you will examine Project Defaults.

The Project Defaults (*InRoads Explorer -> File -> Project Defaults*) can be used to pre-open specific InRoads configuration files, while pre-defining paths to save to when creating new surfaces, alignments, corridors, etc.

The top half of the dialog, the Default Preferences section, allows you to pre-open InRoads configuration files such as the .XIN preferences, .DFT drafting notes, and various drainage configuration files. The lower half allows you to define project specific paths for InRoads file types, so that when performing Opens/Save/Save As functions, your default path will take you directly to the folder location specified on your Project Defaults. **Please note that when defining these paths that proper operation will require that the desired path be browsed to and not placed with plain text. This will ensure that the appropriate folder is actually opened when using the Project Defaults.**

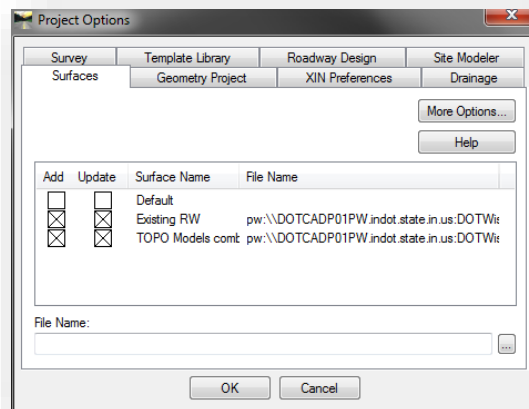
Additionally on this panel, you can define a default preference for all panels that you may interact with. Due to the number of different preferences available in the INDOT.XIN, it's recommended that you leave this setting at Default as shown. In many cases, the default preference is configured to use a commonly scaled INDOT setup.

For more flexible Project Defaults, use of the $\$(_DGNDIR)$ (exactly as shown with the parentheses) variable can be used from the ProjectWise Directory and Project Default Directory. Use of this variable in Project Defaults will have all InRoads dialogs default to the location of the currently open DGN for all file operations (Save, Save As, and Open).



InRoads Project Defaults

For more granular control of the files you open and save, you will want to use the .RWK project files. The .RWK will allow you to define specific files that you'd like to open/update with the project file. The initial Save dialog is the same as the InRoads with ProjectWise save dialog shown in Section 5.5-2. By selecting the Options button in this panel, you will be presented the standard .RWK dialog for adding/updating files. Further discussion of .RWK files can be found in the Bentley InRoads Road Fundamentals documentation.

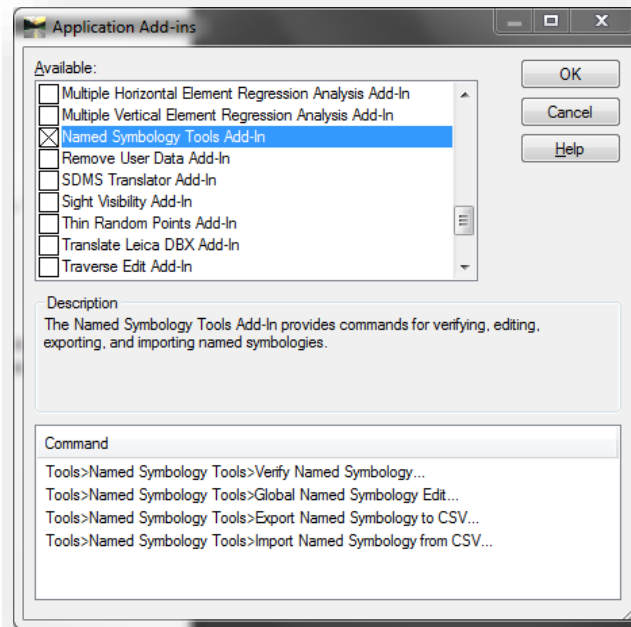


RWK File Saving Options

5.6-4 Enabling Application Add-Ins/Variable Manager

Not all tools within InRoads are immediately available in the base configuration. There are numerous application add-ins that are disabled but are extremely useful for day to day usage. These can be accessed via the *InRoads Explorer -> Tools -> Application Add-Ins* menu option.

The following menu is then presented:



InRoads Application Add-ins

The upper portion of the application add-in dialog presents a list of available application add-ins. The lower portion of the dialog shows where the commands for the add-in can be found. To enable an application add-in, select the check box to its left.

Of the available application add-ins, it will be necessary to enable the following:

- Global Scale Factors Add-In – Enables the global scale factor tool for resizing of InRoads symbols, linestyles and text

Additional useful add-ins may also be enabled, such as:

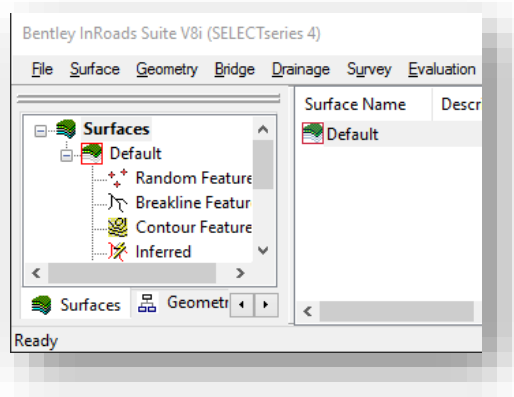
- Active Project Settings Add-In – Used to select active surfaces, alignments, etc. without activating them from the InRoads Explorer
- Copy Preference Add-In – Enables the tools for copying preferences and styles from one XIN to another.
- Horizontal and Vertical Elements Add-In – Alignment creation tools similar to the element method alignment tools in MX.

5.6-5 Variable Manager

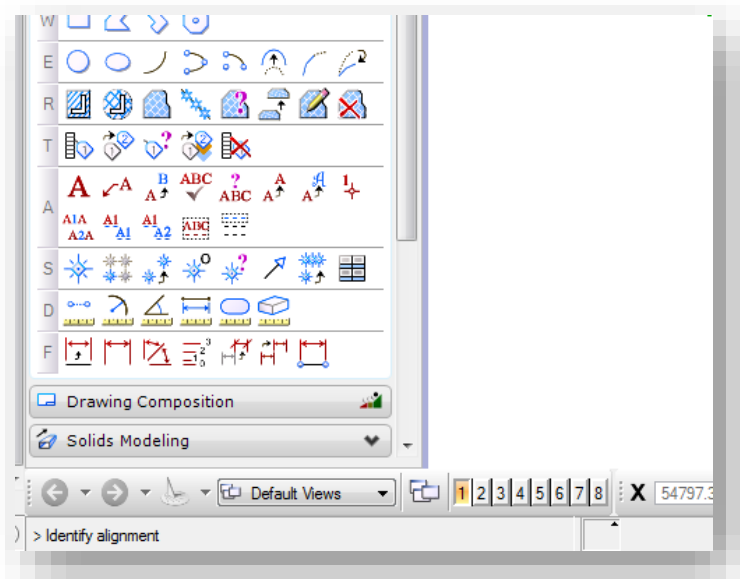
Variable Manager, enabled through the Application Add-Ins, includes a number of additional application customization. Once enabled, to access Variable Manager, you to go to the **InRoads Explorer -> Tools -> Variable Manager**. As these are more situation and usage specific tools, it is recommended you contact CAD Support before using them.

5.6-6 MicroStation and InRoads Status Bars

One convention that requires monitoring while using InRoads is the location of statuses that InRoads uses to prompt for input, or provide information. As it has a high degree of integration with MicroStation, InRoads will use both its own status bar and, depending on the active function, may also use the MicroStation status bar. Below is an example of each form of output and the location where it can be found.



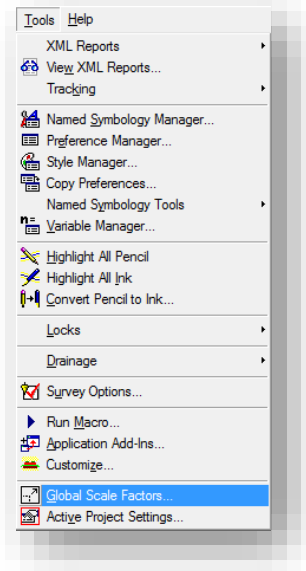
InRoads Status Bar (Lower left corner of InRoads Explorer)



MicroStation Status Bar (Lower left corner of MicroStation Application)

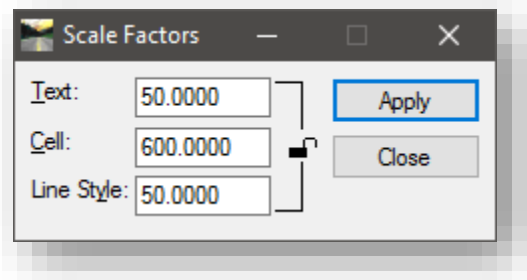
5.7 Global Scale Factors

Due to differences on how InRoads interacts with linestyle scaling, a mixture of both Drawing Scale and directly defined scale factors must be used. When displaying information using OpenRoads technology (survey fieldbooks, terrain models), annotation scale should be used. All InRoads Native Tools (features accessed from the InRoads Explorer) will use an option referred to as Global Scale Factors. As noted in Section 5.6-4, you will need to enable this tool via the Application Add-Ins dialog. When enabled, you will be presented a new menu option under the *InRoads Explorer* -> *Tools* -> *Global Scale Factors*:



Global Scale Factors

The Global Scale Factors tool presents a small dialog box similar to the MicroStation Annotation Scale dialog:

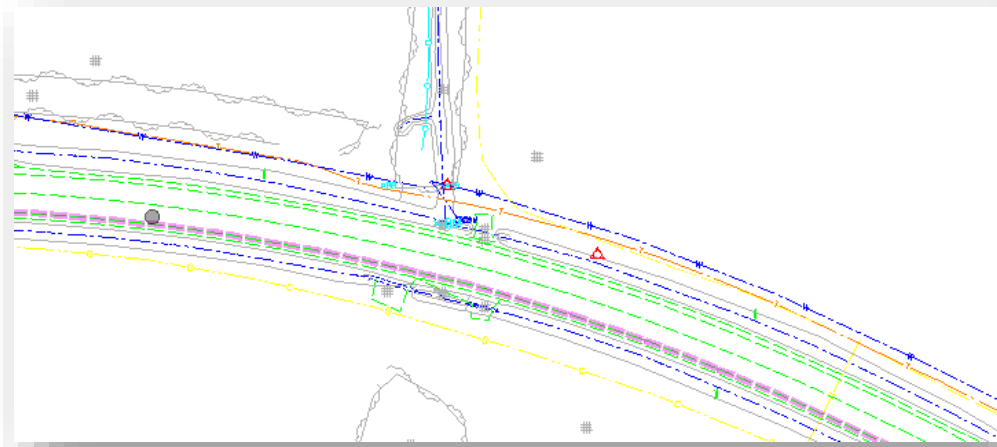


Global Scale Factors

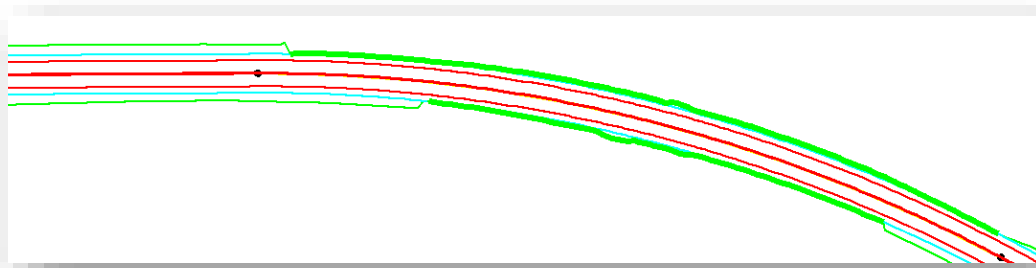
*Note the preceding screen capture illustrates the new 1:50 scaling values. Cells of any scale must now have an additional factor of 12 added in to maintain compatibility with both OpenRoads and InRoads. So an example would be for 1:20, cells would be at 240 (20*12); at 1:30, they would use 360 (30*12).*

This tool allows for the scaling of many InRoads elements including features, annotation text, and cell sizes. Throughout the Plans Production process, you will want to use these tools to create base and text drawings of specific scales.

Included below are samples of some of the most common standard base drawings:



Explan 50



Prplan 50

5.8 OpenRoads Technologies

5.8-1 Using 2D Seed Files/Models for Design

In a departure from previous versions and guidance, OpenRoads technologies highly emphasize the use of 2D models for the Design process. Throughout this document, many instances that previously referred to the use of a 3D seed file/model configuration have been amended to reflect this change in software philosophy.

As part of using a 2D seed file, the OpenRoads product will automatically create a 3D model on the fly. Bentley advises that when performing operations, all work be done in the 2D model with a view of the 3D model open so that modifications can be seen as they occur. This 3D model will only be created once a terrain model has been generated or attached and activated.

A proposed workflow would be to process all survey in a 3D seed file, and then attach this 3D content to a 2D seed file for alignment and design purposes.

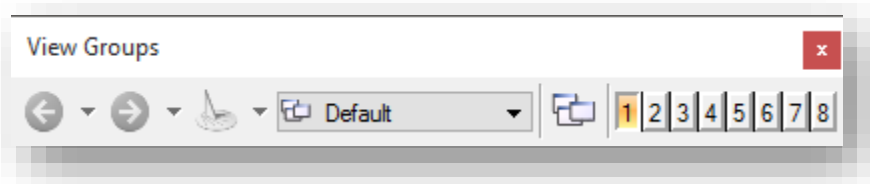
5.8-2 Alignment Naming in OpenRoads

Within the following chapters, in many cases you'll see references to how alignments are or should be named. Convention currently is to name these Line "A", Line "B", etc. Please be advised that while most functions within OpenRoads can accommodate this naming, some features that use this name to preconfigure their output—such as cross sections—may not support the usage of the quotation marks in their naming. Should you run into any issues with a tool that has the alignment name in it, the first step should be to eliminate the quotation marks and attempt the tool again.

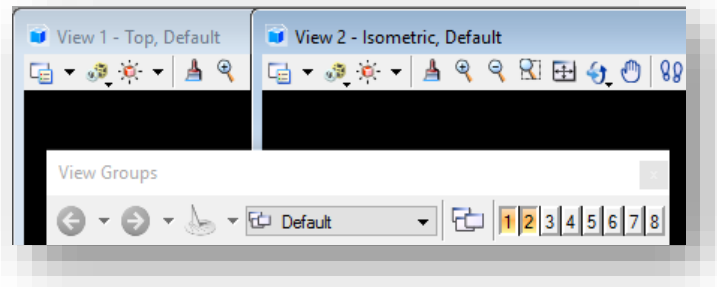
5.8-3 OpenRoads and MicroStation Multi-View Configurations

As discussed in the previous section, OpenRoads will automatically create 3D models when started from a 2D seed. In these instances and others such as profile creation and dynamic cross section review, it may be advantageous or required to open multiple views. The following steps will cover how to open additional views, and then if necessary, how to display content from a different model.

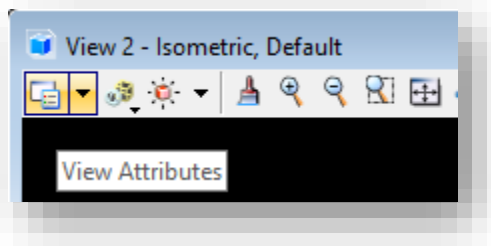
1. When in the product (MicroStation or PowerInRoads), locate the View Groups toolbar. Normally it's docked at the bottom of the display. If not displayed, navigate to **Tools -> Tool Boxes** menu item and locate the View Groups entry to enable it. It can also be enabled with the Ctrl + T shortcut key-in.



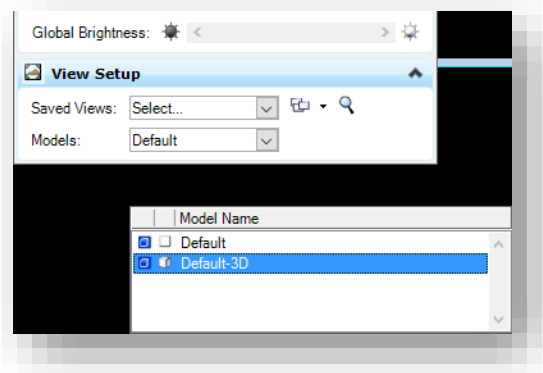
- By default, most files will open with view 1 active as your active display. To open an additional display, select one of the other views so the button is depressed.



- At this point, depending on the tool in use or if you're modifying the display, the steps will branch off. If the tool prompts to select an active display to show content (profile creation, dynamic cross sections), place a data point in the display as requested. If wanting to display content from a different model, continue on.
- With the view open, select the View Properties button.



- On the View Attributes, expand the View Setup leaf. Under the Models dropdown, select the appropriate -3D model. These models will name themselves after the base DGN model that the terrain is created in.

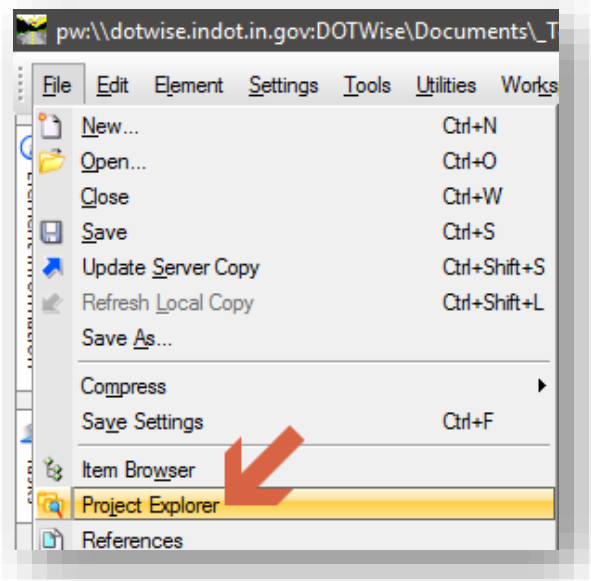


- At this time, two models would be displayed. View 1 would presumably have the 2D Default model displayed, and the Default-3D model will display in View 2.

5.8-4 Project Explorer

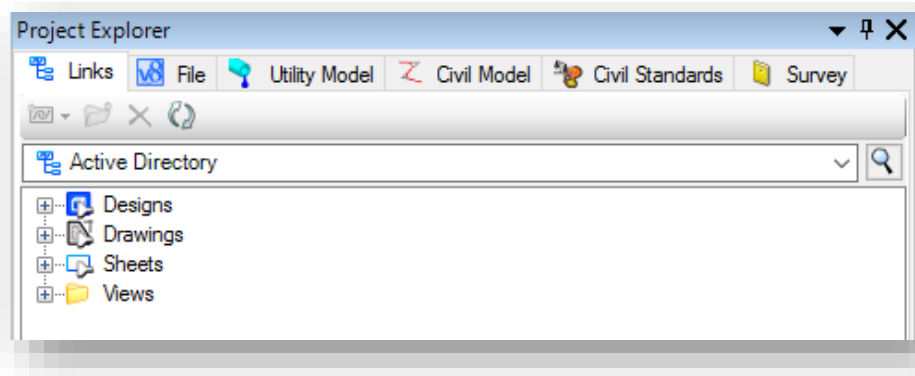
In InRoads SS4, the tools that interact with OpenRoads technology no longer use the external file formats that you're accustomed to from SS2. File types such as DTM, ALG, and FWD are no longer required for many of the tools. Bentley has now made the DGN file the container for much of this data. To access this data, the InRoads Explorer is not used, OpenRoads now uses the MicroStation Project Explorer.

When starting InRoads you may need to enable the Project Explorer. To do so, go to the MicroStation File menu and select the Project Explorer option.



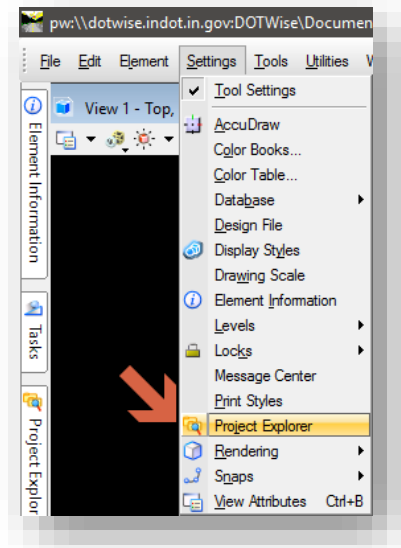
Starting the Project Explorer

With the Project Explorer open, you should see the following tabs when in InRoads. Note that these are not available when using MicroStation only.



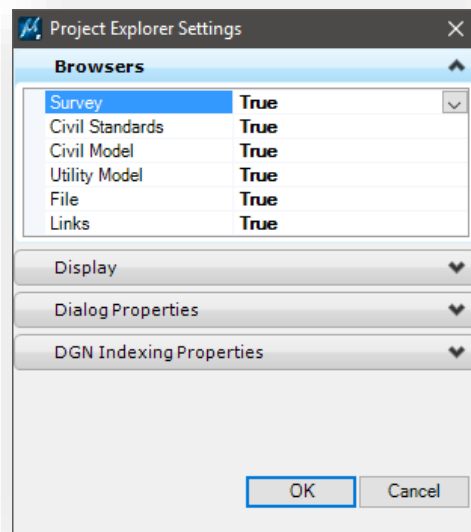
The Project Explorer in InRoads

If your Project Explorer doesn't show the tabs shown above, you may have to enable these. This commonly occurs if multiple sessions of MicroStation and InRoads are accessing the same user preferences at the same time. To enable these, on the MicroStation toolbar go to **Settings -> Project Explorer**.



Project Explorer Settings

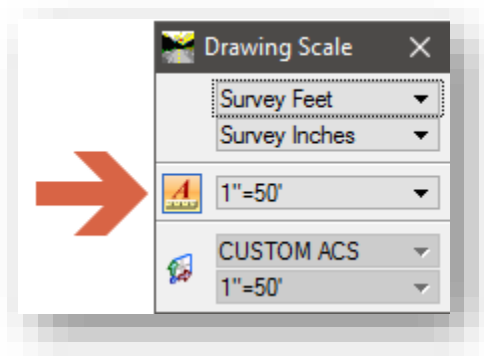
On the Project Explorer Settings, make sure all the Browsers are set to True. This will enable the Civil tabs to the correct state.



Project Explorer Browsers

5.8-5 Drawing Scale

As was briefly discussed earlier in the chapter, OpenRoads tools do not respect the Global Scale Factors that InRoads uses. In lieu of these tools, OpenRoads now leverages the MicroStation Drawing Scale Tools. It's highly recommended that these tools be loaded and docked for quick accessibility at all times. To enable these tools, go to the MicroStation menu and select **Settings -> Drawing Scale**. This will provide a dialog that looks like the following:



The Drawing Scale and Annotation Lock

As shown, this tool controls the scaling of all Annotation enabled elements including linestyles, text, dimensions, and cells. This tool should be used to control the scaling of any OpenRoads data, but will not present proper scaling with all native InRoads tools. Care should be given to using this in addition to other manual scaling factors as the results could be incorrect.

With the Annotation Lock enabled (the orange highlighted “A” icon), changing the scaling value beside it will dynamically rescale all elements by the defined value.

Note: *Initially all items should be drawn up at a Full Scale 1:1 setting. Drawing items up at higher scales may cause them to improperly display in your drawing. This can be resolved by setting the scale back to Full Scale 1:1 and then selecting the desired scale from the listing.*

5.8-6 File Referencing

As discussed previously, OpenRoads data is now all stored directly in DGN files. One major advantage of this functionality is that standard MicroStation referencing allows for OpenRoads data to be visible through the reference documents. Examples of this functionality will be discussed further in the coming chapters, particularly in areas such as the creation of a terrain model from a referenced survey field book, and in the modeling of a corridor from referenced terrain and geometry files.

6. Using InRoads for Survey/Routeplat Production

The following sections discuss the usage of InRoads for Routeplat development. These procedures should be used for the development of survey deliverables as noted in Chapter 106 (formerly chapter 26) of the [INDOT Design Manual](#). Additionally, they cover the new OpenRoads processes used out of the SS2 Workspace. More in-depth discussion of these procedures can be found in the

[2016 INDOT InRoads for Survey Using OpenRoads](#) learning path published on the Bentley Learning Network.

In addition to the InRoads specific tools noted throughout this section, also keep in mind the Survey tools provided on the INDOT Tools task navigation pane in MicroStation. Details on these items can be found in section 3.1-6b: Tools Included in the INDOT Tools Task Navigation.

6.1 What's Changed with Survey in OpenRoads

With the release of OpenRoads Survey, the following coding changes have been necessitated:

New Control Codes have been incorporated to replace the +O, +D, +H InRoads offset note commands. Note that the (-) indicates which direction would be a negative value:

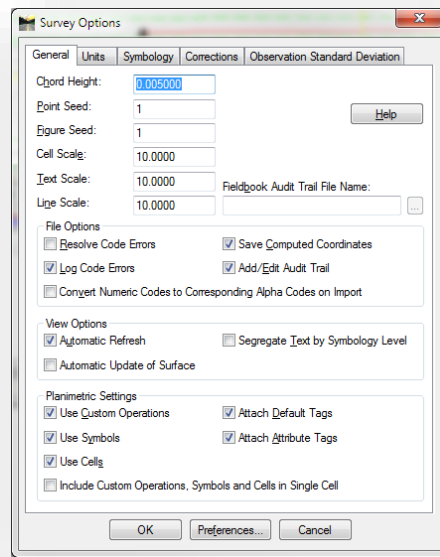
- AD* is for vertical offsets, Up/Down(-)
 - Example: AD*-2 UE02 B would result in UE02 2 feet below the observation at the start of the string.
- NF* is for distance offset, Front(-)/Back
 - Example: NF*4.5 PTCS would result in PTCS 4.5 feet back from the observation.
- LR* are for left/right offsets, Up/Down(-)
 - Example: LR*-7 TB04 would result in TB04 7 feet to the left of the observation.

The EXTARC code can no longer be used to create a closed 3 point circle. Advisement from Bentley is that circles should have 4 shots, with the fourth shot being near the first shot so only a small linear element closes out the circle.

Planimetric graphics no longer function on native InRoads Surveys (.FWD files), as Bentley has changed the graphical functions to accommodate OpenRoads. OpenRoads will automatically draw up and place text consistent with the old planimetric graphics. However, these do not dynamically scale and now rely on MicroStation Drawing Scale tools.

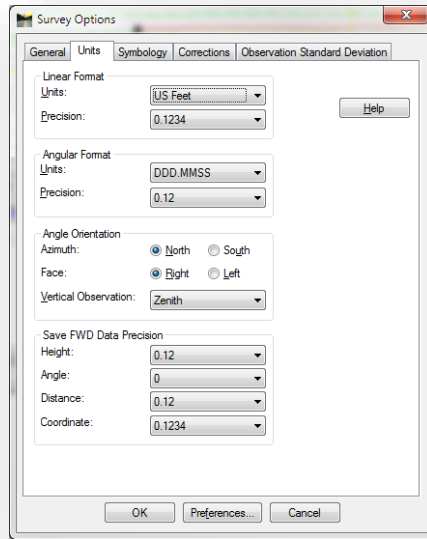
6.2 InRoads Survey Options

When working with the InRoads Survey tools, knowledge of the InRoads Survey Options (**Tools -> Survey Options**) is beneficial. This section will touch on some of the more important options that you may have to interact with.



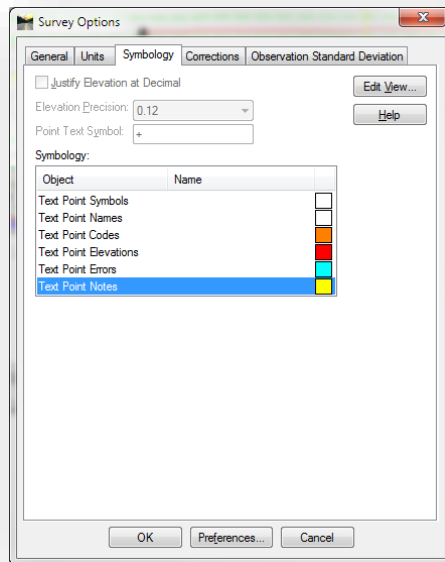
General

On the General tab, the three scaling options for cell, text and line may need adjusted depending on the desired scale of your graphics. Additionally, there are the options for Automatic Refresh which will affect when InRoads will update the planimetric graphics while working on the fieldbook. Depending on the type and volume of changes, disabling this setting may be advantageous, as the interactive graphics refresh can cause system slowdowns depending on the size of your survey.



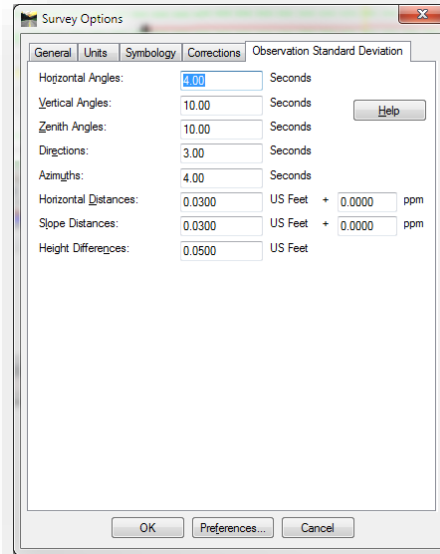
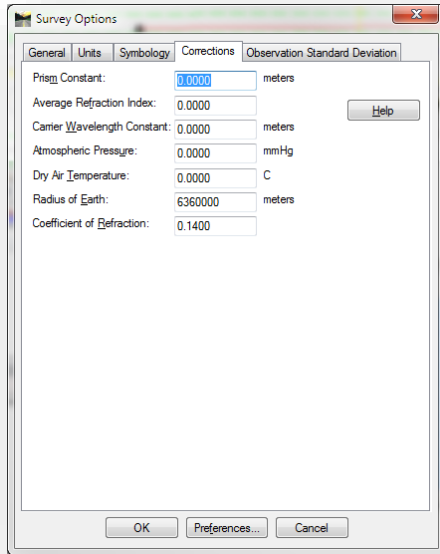
Units

On the Units tab, you have the option of changing the unit format, angular format and precision.



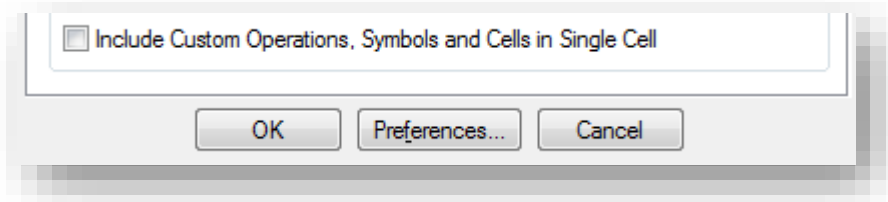
Symbology

The items on the Symbology tab can be used to override the default symbology of graphics created from planimetrics.



Corrections and Observation Standard Deviations

These tabs control how InRoads interprets input from data collector files.



The Preferences Button

On all tabs of the Survey Options dialog, there is a Preferences button. This button allows you to load pre-defined settings for the Survey options. Currently there are pre-defined options for both 10 and 50 scale setups. More information on preferences can be found in section 5.2-2 INDOT Specific Preferences.

With the switch to OpenRoads, these functions will not be used as much as previously. All settings have been moved to the relevant dgnlib files that are automatically attached. There are still some options that these settings influence, largely on the text display side of the equation.

6.3 Creating InRoads Survey Deliverable Files

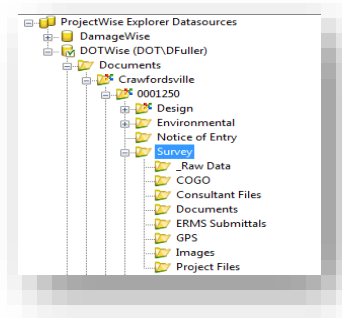
With the move to OpenRoads technology for Survey, there are some slight changes to the deliverables for an InRoads SS4 project. The following workflow will step through the process of creating each file for a survey project.

As the intent is that every project should now be geocoordinated, the first document in the workflow will be the geocoordinated seed files. These will allow for all project files to be created and based off the same coordinate system, allowing the file content to be shown spatially without the need to configure each individual file.

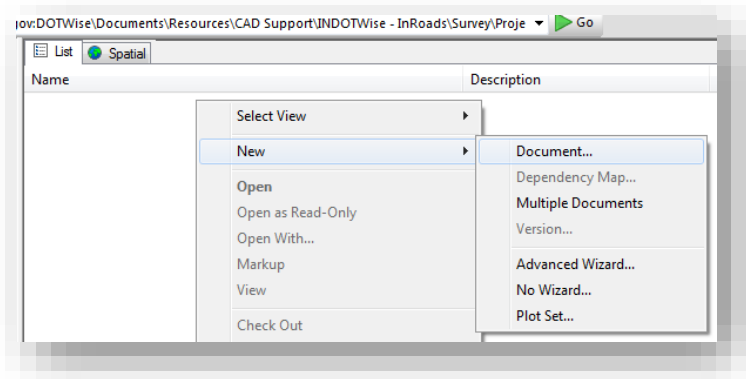
6.3-1 Creating the Geocoordinated Seed Files (2D and 3D)

The following procedure steps through the process for creating the Geocoordinated Seed file for use through the project lifecycle. The creation of these files allow for any CAD files based on the created seed file to be instantly consumed by the ESRI ArcGIS Products and made available for a variety of other uses. With OpenRoads changes to document handling and civil information, these steps should be performed for both a 2D and 3D file (shown).

1. After creating your Survey Work Area in your DES No. specific project via the DOTWise Project Creator, navigate to the Project Files folder:

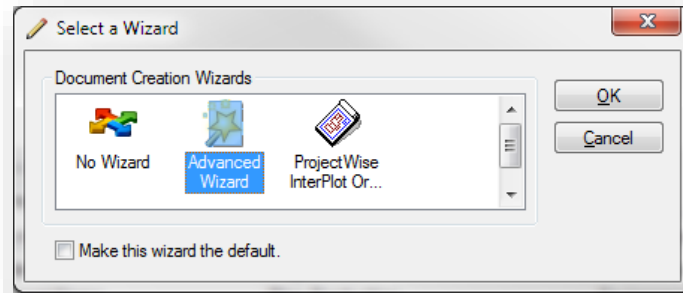


2. With the Project Files folder selected and its contents displayed in the Document pane, right click in the document pane and select **New -> Document**.



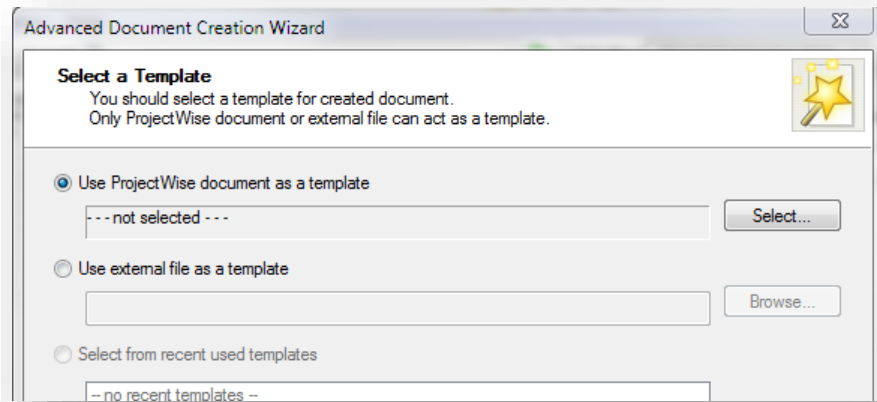
Starting the New Document Wizard

3. You'll then be presented with a series of options; we'll use the Advanced Wizard option.



Using InRoads for Design/Plans Production

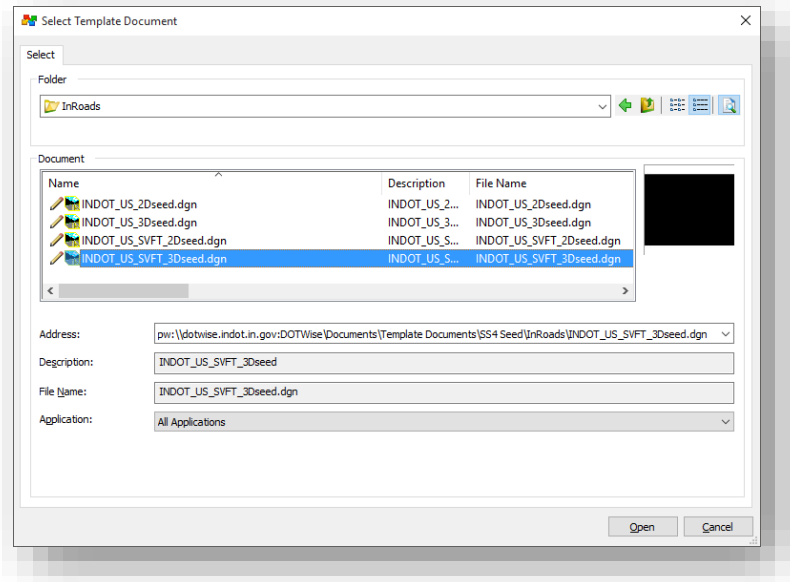
4. This will start the Advanced Documentation Creation Wizard. The first panel is informational and can be bypassed. The second panel confirms your location. If for some reason you didn't have the correct folder active in your document panel, you can select it now or confirm the path shown.
5. The next panel allows us to select our template document we'd like to use. On the first line "Use a ProjectWise document as a template" option and then press the select button.



Select a Template dialog

- In the “Select Template Document” panel, navigate to the InRoads Seed files in the ProjectWise System and select the appropriate unit files for your project and that the file you select is the 3D version:

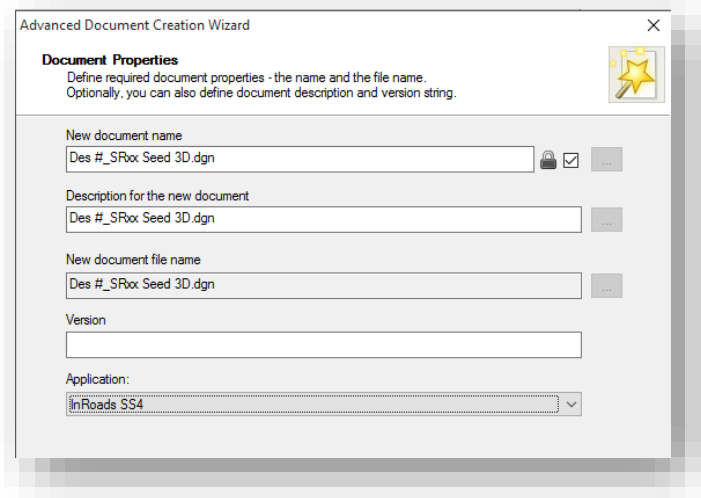
<pw:\\indot-pw.bentley.com:indot-pw-01\Documents\Template Documents\SS4 Seed\InRoads\>



Selecting a US Survey Foot InRoads Seed File

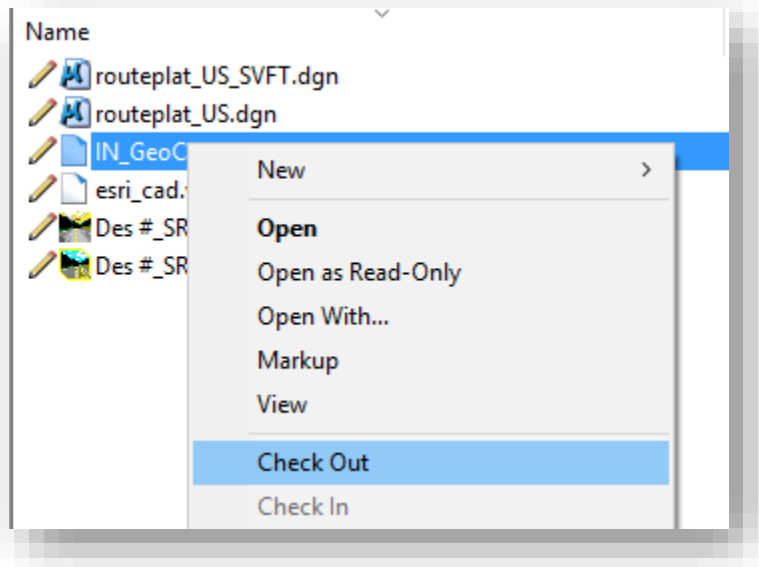
- With your file selected, you can then proceed to the next screen. If you are prompted for Document Attributes, you may proceed beyond this screen as well.

- The final step in creating the document is to provide a name. Seed drawings should be titled with the following format: Des #_SRxx Seed 3D.dgn. To ease document searches and for consistency purposes, all three names should be the same as shown. Also worth noting is the Application dropdown, as it illustrates the InRoads SS4 association as shown in the screen capture.

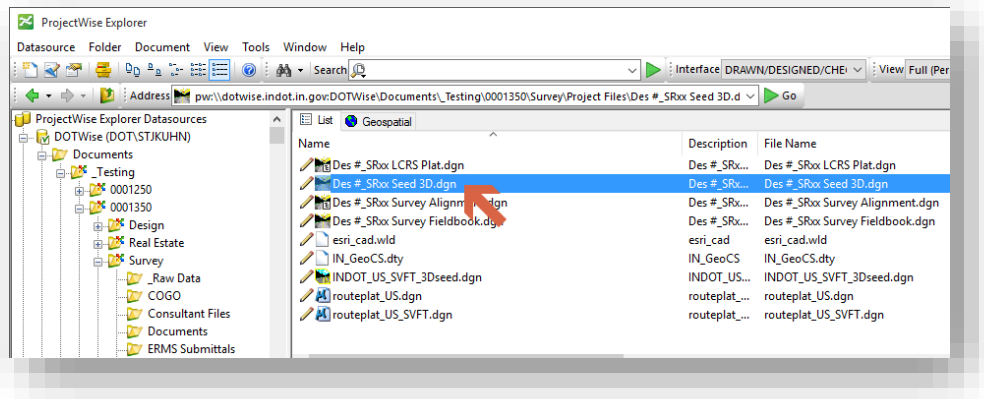


Document Properties and Naming

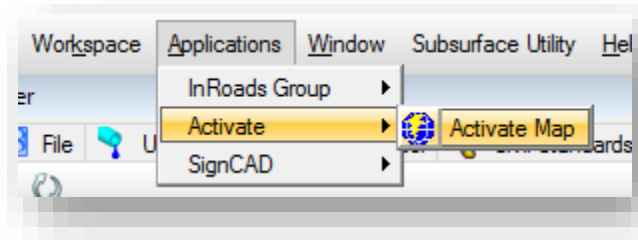
- Select Next to complete the document naming process. The final two pages of the wizard confirm the document properties and create the document. Proceed through these and then continue on in the same Project Files folder.
- From your Project Files folder, right-click and Check Out your IN_GeoCS.dty file locally.



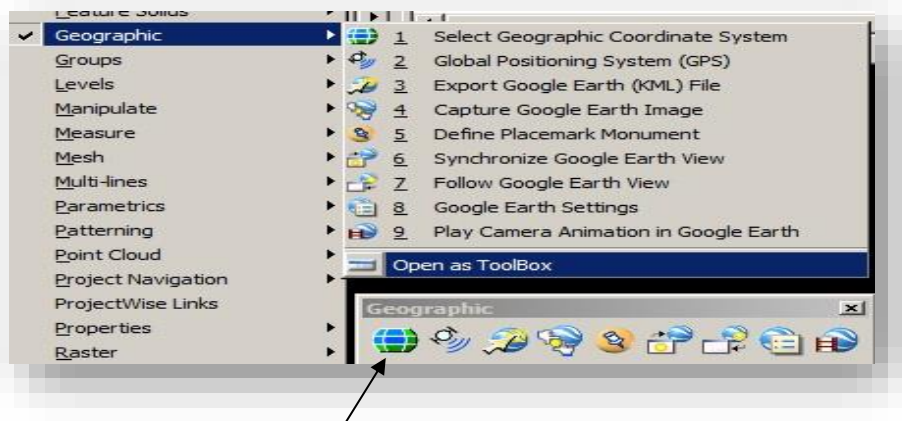
11. Navigate to your newly created seed file in the Survey\Project Files folder & double click on the file to open it in InRoads. (Allow for Managed Workspace to download).



12. Once InRoads has started, start Bentley Map software by selecting **Applications->Activate->Activate Map** from the Applications pull-down beneath the InRoads Group.

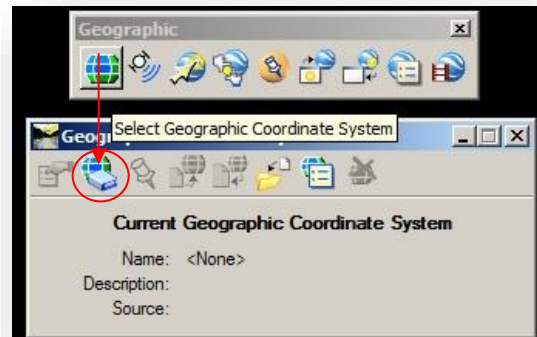


13. Open the Geographic tool in MicroStation by selecting **Tools->Geographic->Open as Toolbox**.



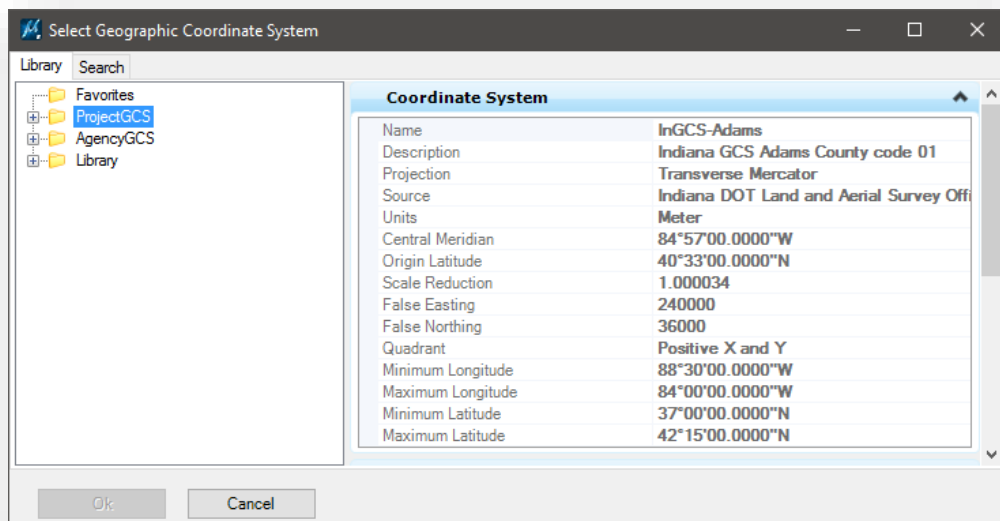
14. Click on the Select Geographic Coordinate System tab within the Geographic toolbox.

15. In the Geographic Coordinate System (GCS) toolbox select the From Library tab.

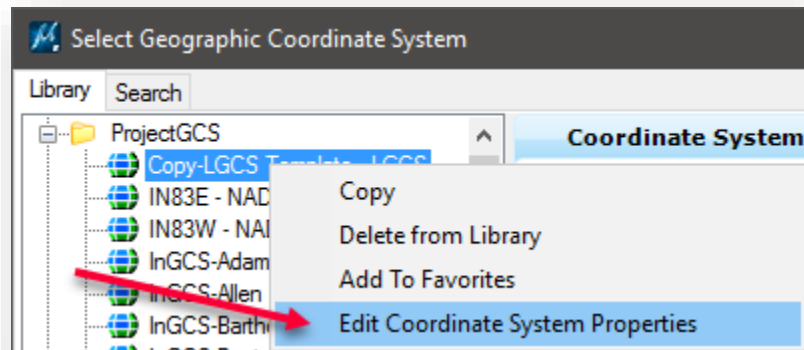


The Library tab contains folders with all the available coordinate systems. The Favorites, ProjectGCS, AgencyGCS, and Library are the folders you will see. In the ProjectGCS as well as the AgencyGCS folders, there will be a list of coordinate Systems for Indiana State Plane East and West and the Local Ground Coordinate System (LGCS) templates. New in the SS4 release are the newly adopted county coordinate systems used statewide.

16. At this point in the process, you may have data that can use one of the newly adopted county coordinate systems. If your data conforms to this configuration, please select and apply the correct coordinate system at this time and proceed to the next section on creating the world file. If you have legacy data that is using a false northing and easting, continue on with the remaining steps in this section to complete customizing and applying your LGCS.



17. If you have a legacy project where geocoordination information must be entered manually, you will need to select and modify the Local Ground Coordinate System definition titled “Copy-LGCS Template – LGCS” by right clicking on it in the ProjectGCS list and choosing Edit Coordinate System Properties.

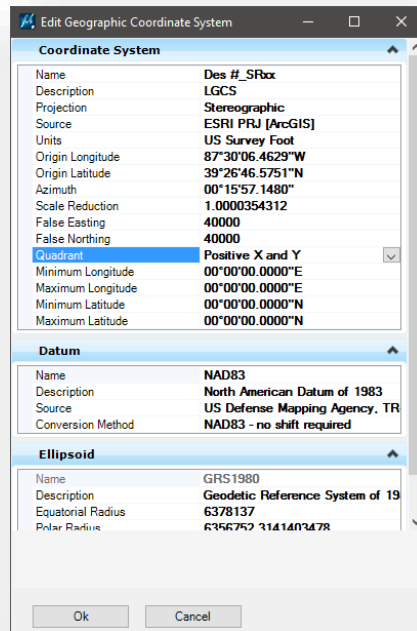


18. You will need to modify the Name, Description, Origin of Latitude, Origin of Longitude, Azimuth, Scale Reduction, False Easting and False Northing to the appropriate values from metadata for the User Defined Local/Ground Coordinate System of the project.

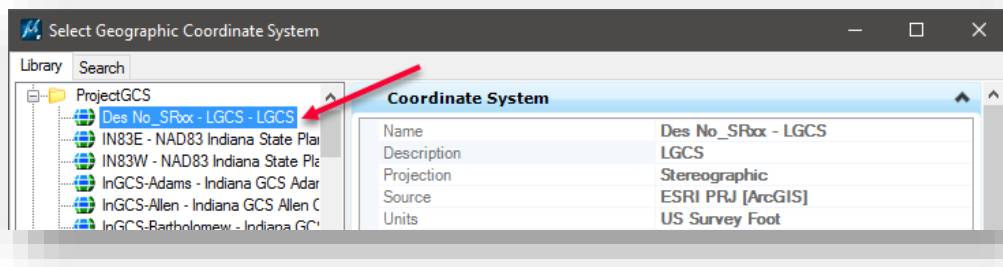
These values can be obtained from the Local Ground Coordinate System (LGCS) metadata you created for the survey. The name and description should be related to the INDOT project, DES number and road designation (ex. Des #_SRxx). The Azimuth is the Convergence Angle at the origin point for the Local Ground Coordinate System. The convergence angle can be obtained by using Corpscon (U.S. Army Corps of Engineers) or from Trimble Business Center (TBC). If the convergence angle is a negative value it will need to be input in decimal degree format. An example of the Corpscon output with the convergence angle is below. Depending on the units of the survey you may need to change from US Survey Feet to International Feet of Meters. The scale reduction is the combined scale factor (CSF) from the TBC for the LGCS you created for the Survey.

Office Project	
28 February 2013	
INPUT	OUTPUT
State Plane, inhpgn - Indiana HPGN 1302 - Indiana West, U.S. Feet	Geographic, inhpgn - Indiana HPGN
PSSA 301	
Northing/Y: 1529272.1771	Latitude: 39 26 46.57515
Easting/X: 2834574.7158	Longitude: 87 30 06.46291
Convergence: -0 15 57.14803	
Scale Factor: 0.999982635	

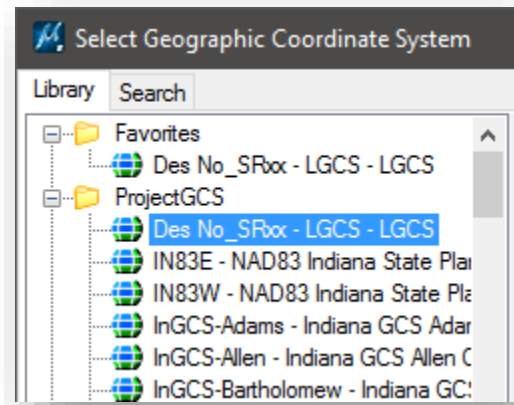
Here is an example of the Coordinate System definition once the Parameters have all been input.



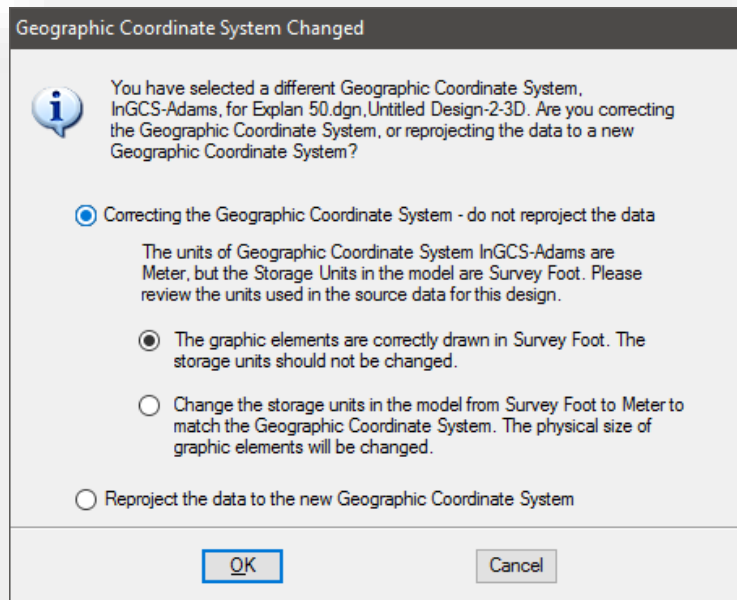
19. Once you have updated the necessary information, select OK and the new coordinate system will be stored. It will now be listed along with the originals as shown. (It will retain this information in the IN_GeoCS.dty file).



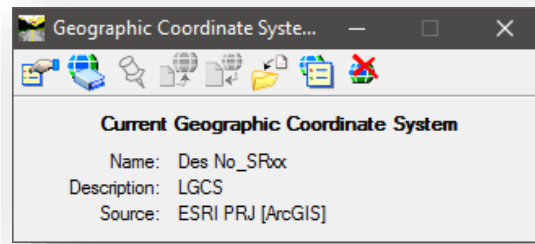
20. Now that the new Coordinate System has been created, you can select it and assign it to the drawing by double left clicking on it in the list.



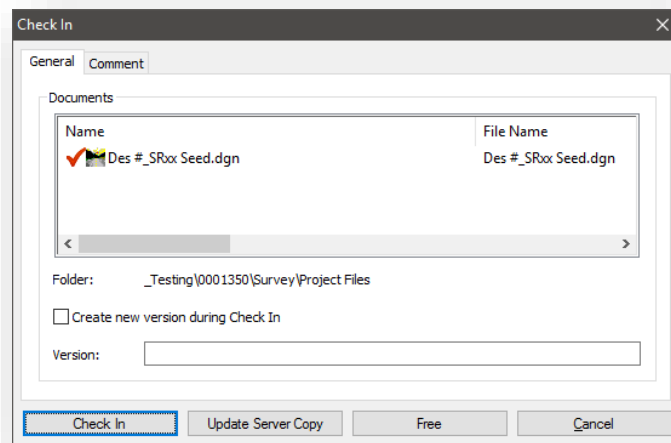
21. A pop-up dialog may appear asking you to choose: Be sure to select the option to keep the storage units as they are (shall not be changed) as shown below.



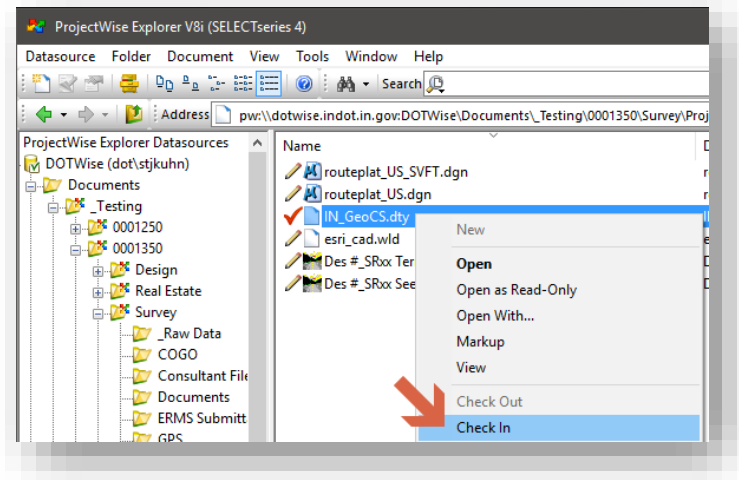
22. The newly selected Coordinate System will now appear in the Geographic Coordinate System dialog window as shown:



23. Upon completion of these steps you will need to exit MicroStation and Check-in your CAD file. This will only check in the active .dgn file and not the .dty file. Please add comments upon check-in.



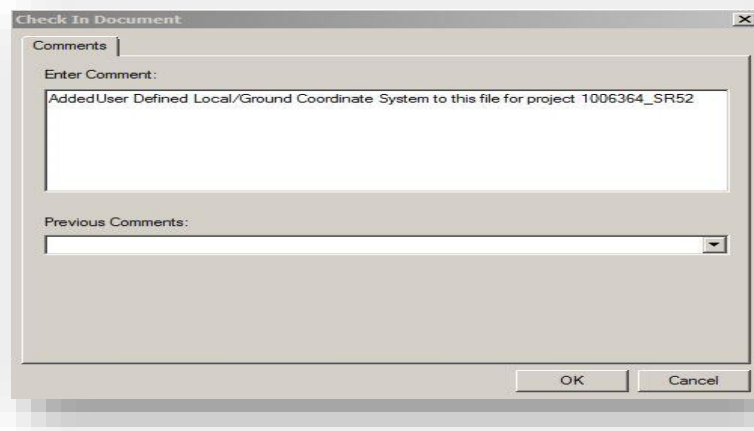
24. Go to the active Project Files folder in the appropriate project location in ProjectWise and check-in the IN_GeoCS.dty file.



25. Right click on the file in the list and select Check-In.

These steps should be repeated to create a 2D version of the seed file. In all steps where 3D is specified, replace the 3D with the appropriate 2D equivalent or naming.

This will place the checked out copy back into your Project Survey location with the updated information and the time file was last updated. (Be sure to add comments as to what changes you made to this file). Any time you wish to edit the data in the IN_GeoCS.dty file related to the active project, it must be checked out first and then checked back in to ensure it remains current to that project.



With the LGCS defined within the dgn file the survey can be processed through InRoads in the typical manner. The only difference is that MicroStation knows the parameters to convert data in any other standard coordinate system to the LGCS. This means that ortho-imagery, GIS files, etc. can be

referenced to the dgn file and MicroStation will re-project them to the LGCS on-the-fly so that the data is all spatially referenced.

6.3-2 Creating a World File

In the same ProjectWise folder as the MicroStation dgn and IN_GeoCS.dty files for your survey are stored ***you will need to create a .wld file***. The .wld file contains the necessary parameters to transform the dgn files to the State Plane Coordinate system. This allows the data in the files to be re-projected on-the-fly to its appropriate location on the ground in the real world.

The .wld file is ASCII format and can be created in Notepad or any other editor. The name of the file needs to be esri_cad.wld. By using this naming convention only one .wld file is necessary and the ESRIGIS Products will automatically associate the esri_cad.wld file to all the dgn files in that directory folder.

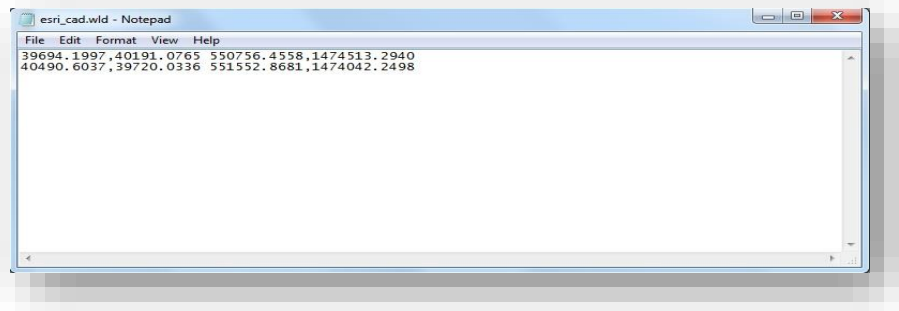
The data in the .wld file will consist of the Local Ground Coordinate System for two well established control points and the corresponding State Plane Coordinates for the same two points.

The format of the coordinates in the esri_cad.wld will be the following:

Line 1: [LGCS Easting (CP 1)] [LGCS Northing (CP 1)] [SPCS Easting (CP 1)] [SPCS Northing (CP 1)]

Line 2: [LGCS Easting (CP 2)] [LGCS Northing (CP 2)] [SPCS Easting (CP 2)] [SPCS Northing (CP 2)]

Note: LGCS = Local Ground Coordinate System
SPCS = State Plane Coordinate System
CP = Control Point



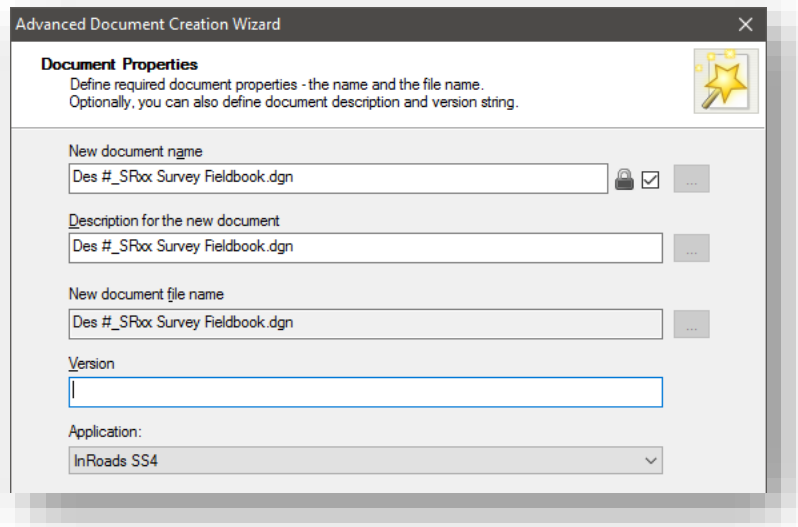
Here is an example esri_cad.wld file:

6.3-3 Creating the Survey Fieldbook DGN file

Creating the fieldbook DGN file is the first instance where we find the need to choose a particular seed file. In this instance, you'll need to start with the 3D geocoordinated seed file you created earlier.

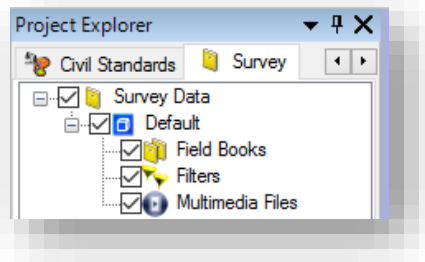
1. Using the Des #_SRxx Seed 3D.dgn you created earlier in this chapter, create a new document under your Survey\Project Files folder. Use the Advanced Document Wizard and instead of pointing to a pre-existing seed file, point back to the Des #_SRxx Seed 3D.dgn. Name this file Des #_SRxx Survey Fieldbook.dgn.

Note: By using the seed file we created in the previous steps you will ensure starting off with a correctly geocoordinated file. All subsequent DGNs should be created using this seed as your starting file.



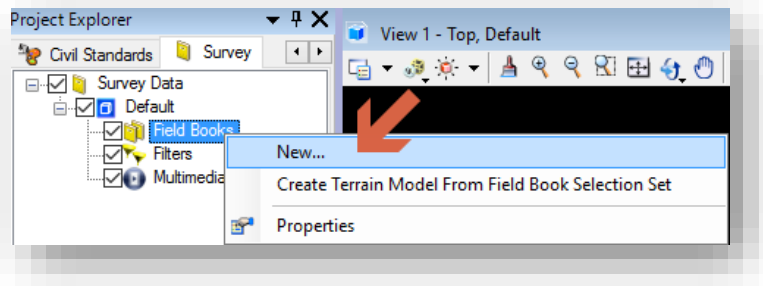
Creating the Survey Fieldbook DGN

2. Launch the DGN file from the ProjectWise Explorer by double clicking on it. Wait for InRoads to start up.
3. Once InRoads has started, locate the Project Explorer and navigate to the Survey Tab. Expand the Default tab so that Field Books are visible.



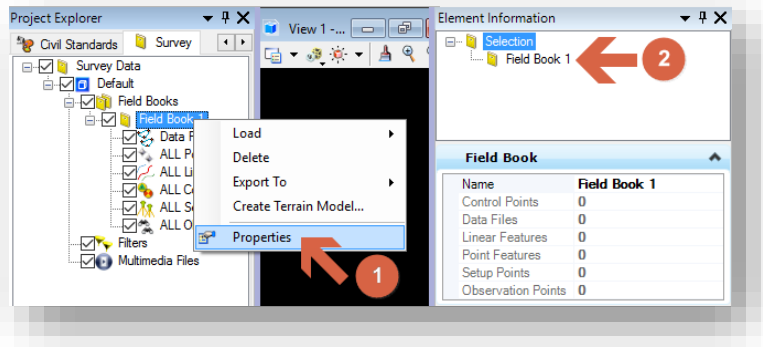
Survey Project Explorer

4. With the Field Books shown, right click on their entry. Select New... entry.



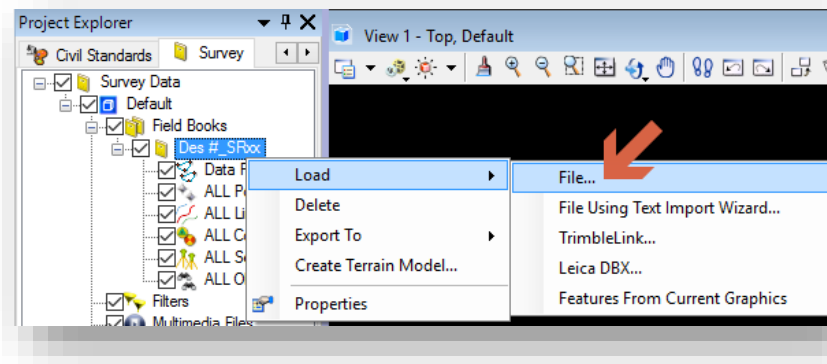
Creating a New Field Book

5. A field book will then be created. Note that you are not initially given the option to give it a name, it will be automatically created as Field Book 1. To change this, right click on the field book and select Properties. The field book information will then show up in the MicroStation Element Information panel, similar to any other MicroStation element. You can rename it in the Name field, it's recommended to maintain the Des #_SRxx convention.



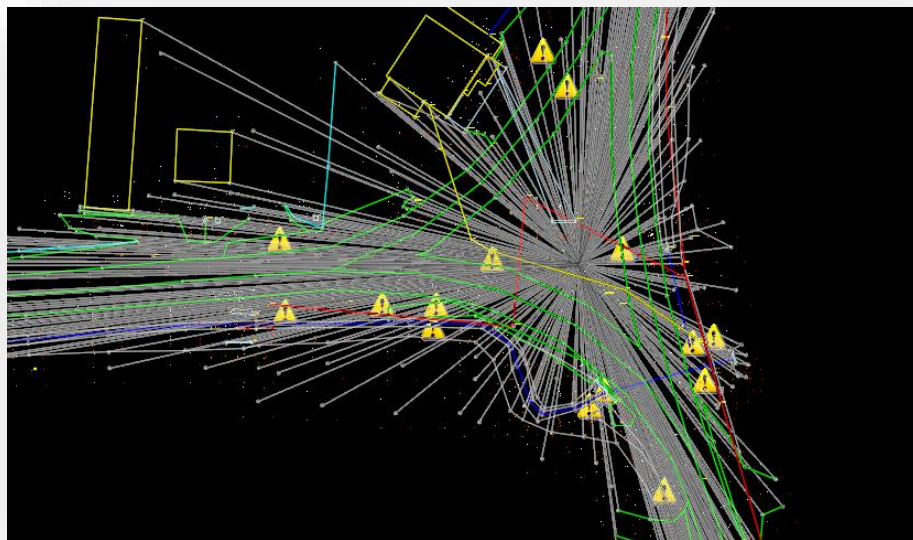
Renaming a Field Book

6. With the field book renamed, you can now import your data. Right click on the field book and select Load > File... Similar to SS2, OpenRoads field books allow for the import of a wide variety of data types and formats. Additionally existing FWD surveys from SS2 can be directly imported into the OpenRoads environment using this tool.



Loading Survey Data

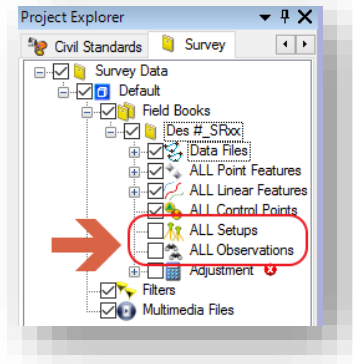
7. On the presented ProjectWise Open dialog, navigate to your Survey_Raw Data folder and locate your data collector file(s).
8. With your data files attached, you'll see output similar to the following.



Raw Survey Data in OpenRoads

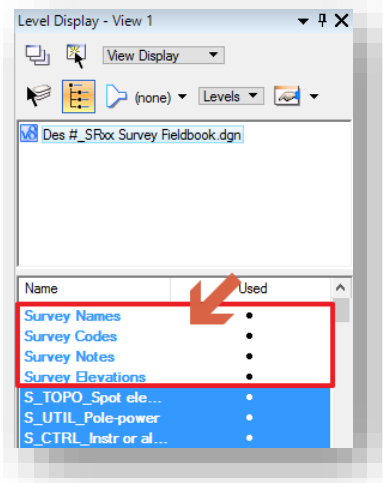
9. As you can see, there appear to be numerous issues with the TOPO display.
 - a. First are the points denoted with the exclamation point (!) icon. These are points that the OpenRoads environment does not have codes for. These should be adjusted to known codes within the environment.

- b. Point symbols and linestyles are not displaying properly. Using the Drawing Scale tools mentioned in Chapter 5, first enable Annotation Scale Lock, and then pick your required scale. This example will proceed with using 1"=50'.
- c. Linework denoting both the observations themselves, along with the instrument setups will be displayed. On the Survey Project Explorer, disable these two options prior to handing your data to design.

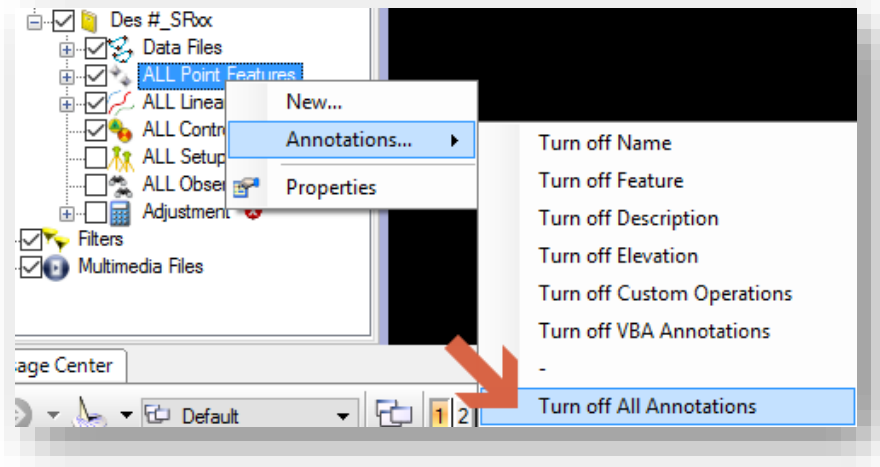


Disabling Setups and Observations

- d. Finally, survey notation information will appear around each point, similar to the old planimetric graphics in SS2. To disable these, open the Level Display and disable the levels shown. Alternatively, you can right click on the ALL Point Features in the Survey Fieldbook and select Annotations -> Turn Off All Annotations.

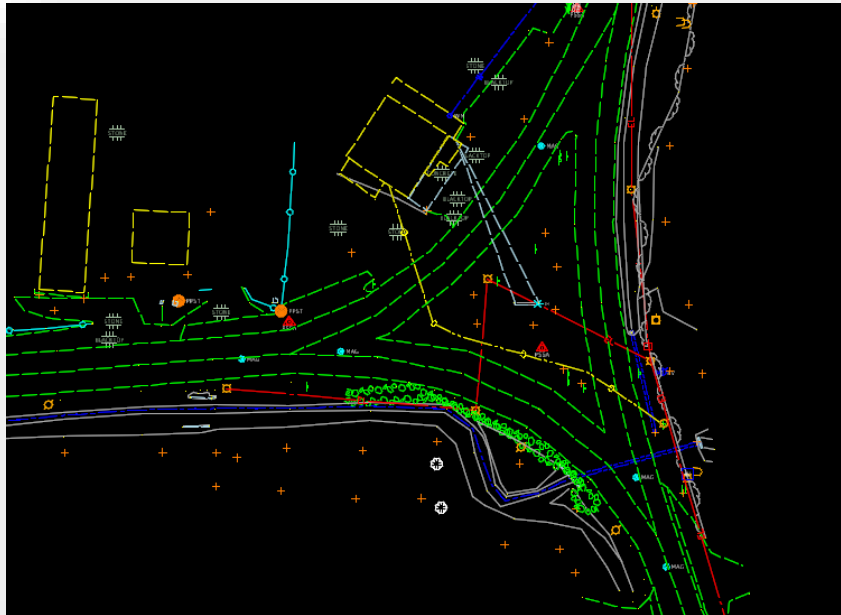


Disable Survey Notation Graphics



Turn Off All Annotations

10. With these previous items resolved, your TOPO display will now look like the following and in line with expectations.



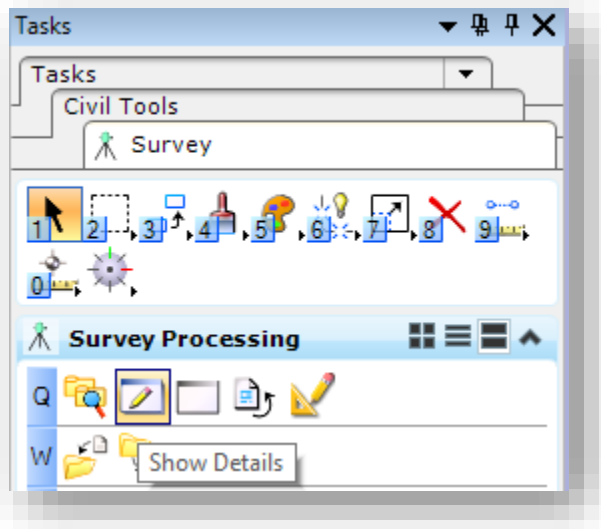
Cleaned up TOPO Display

11. With the fieldbook now created, you can proceed to saving your file back to ProjectWise. Before closing the document, first save the settings. This can be done by selecting Save Settings from the MicroStation File menu, or using the Ctrl+F hotkey combination. When done, close the application and Check In your file.

6.3-3a Editing Fieldbook Features

Unlike the previous version where all features were edited in the fieldbook in line with how they were shot, OpenRoads Survey prioritizes the individual features from an editing standpoint. To interrogate individual features you have multiple options on how to interact with them. This section will take a brief look at two of the more immediate methods.

First up is the table based editor. With your fieldbook open and selected, drill down to either the ALL Point or ALL Linear Features and select one of the codes. Keep in mind that all breaklines will also have point definitions as that's how OpenRoads defines them. With a point or linear feature selected, go to the Survey Task under Civil Tools and expand the Survey Processing. Locate the Show Details button shown.



This will open a tabular view of the selected feature. Depending on the feature selected, you can change the name of the feature or shot, if it's included in the triangulation, or northing/easting/elevations, and other items. To modify any field, place your cursor within it, if it's a dropdown, one will be presented with the applicable options. If it's a text entry field, enter the appropriate information. In both instances, once complete, hit the Tab key to confirm the change.

Name	Display	Feature Definition	Link Code	Zone	Description	Terrain Model At...	Attributes Pair	Control Codes	Easting	Northing	Elevation
552	True	PSSA	None	1	OPUS 2 THIS IS...	Determine By Fe...			2969025.055	1379089.246	561.229
553	True	PSSA	None	1	OPUS 3 THIS IS...	Determine By Fe...			2973212.346	1378265.417	507.838
551	True	PSSA	None	1	PRE5 W/TIBBE...	Determine By Fe...			2963614.959	1379081.119	533.388
200	True	PSSA	None	1	CAMPBELL RE...	Determine By Fe...			2970475.044	1377689.203	0.000
204	True	PSSA	None	1	NW COR NE N...	Determine By Fe...			2970454.347	1380426.279	0.000
208	True	PSSA	None	1	CAMPBELL RE...	Determine By Fe...			2970470.857	1378243.650	0.000
211	True	PSSA	None	1	IRON PIN 7 TH...	Determine By Fe...			2971171.841	1377834.551	0.000
212	True	PSSA	None	1	SMITH REBAR ...	Determine By Fe...			2963912.662	1380393.576	0.000
213	True	PSSA	None	1	NW COR SEC 2...	Determine By Fe...			2966529.472	1380407.787	0.000
214	True	PSSA	None	1	WEST 1/4 SEC ...	Determine By Fe...			2961258.099	1377725.240	0.000
215	True	PSSA	None	1	PRE4 UP 1.6 A...	Determine By Fe...			2963912.785	1375034.118	0.000
216	True	PSSA	None	1	SMITH REBAR ...	Determine By Fe...			2963912.785	1380400.852	499.999
412	True	PSSA	None	1	DELETED 3.05...	Determine By Fe...			993894.955	2867575.137	438.764
413	True	PSSA	None	1	DELETED 3.05...	Determine By Fe...			993104.939	2866941.939	405.750
414	True	PSSA	None	1	DELETED 3.05...	Determine By Fe...			993578.856	2867100.497	414.891
415	True	PSSA	None	1	DELETED 3.05...	Determine By Fe...			993995.435	2867402.010	420.882
416	True	PSSA	None	1	DELETED 3.05...	Determine By Fe...			994296.921	2867695.711	453.802

Survey Details

The other method of editing surveyed features is graphically. In the main display that shows your TOPO elements, you can select on any feature and review its properties in the Element Information panel. In this view you can edit the same data as you can in the details. Additionally, in the graphical side, all elements will be given heads up element handles that you can grab and manipulate.

The screenshot shows a graphical interface for editing survey data. On the left, a map displays several survey features, including a purple line and green dashed lines. A tooltip for a selected 'Linear Feature' is visible, showing details such as Name: FV3_1, Feature Definition: FV3, Zone: 1, and Line String: S_PROP_Line-field division. On the right, the 'Element Information' panel is open, displaying the following properties for the selected 'Linear Feature':

- General**
 - Description: Line String
 - Level: S_PROP_Line-field divi
 - Color: 4
 - Line Style: befield
 - Weight: 0
 - Class: Primary
 - Template: None
 - Transparency: 0
 - Priority: 0
- Geometry**
- Extended**
- Linear Feature**
 - Name: FV3_1
 - Display: True
 - Feature Definition: FV3
 - Zone: 1
 - Description: Determine By Feature C
 - Attributes Pair: 222.5512

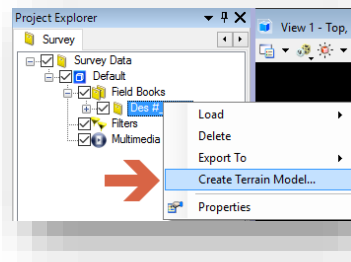
Graphically Editing Survey Data

6.3-4 Creating the Terrain Model

With our Survey Fieldbook now created, we need to create the OpenRoads Terrain model. Note that it's no longer necessary to create a boundary surface as it is automatically created when the terrain model is generated. This boundary is automatically defined by the extents of the triangulation and will automatically update as you're editing features or the triangulation itself.

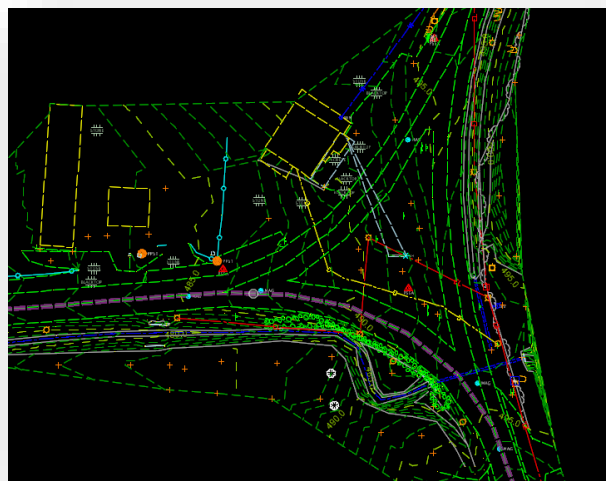
If you've used the new county geocoordinate system for your files, please refer to section 6.3-4a for additional information on generating a correct DTM.

1. To proceed with terrain generation, re-open your survey field book DGN from the previous steps.
2. Navigate to the Survey tab on the Project Explorer. Right click on your Des #_SRxx field book and select the Create Terrain Model... option.



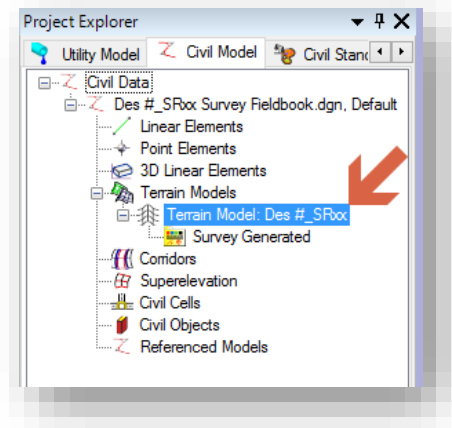
Create Terrain Model

3. When completed processing, the terrain model will be created and displayed. The default display style is to show Existing Contours at a 5:1 scale. The display will look similar to the following.



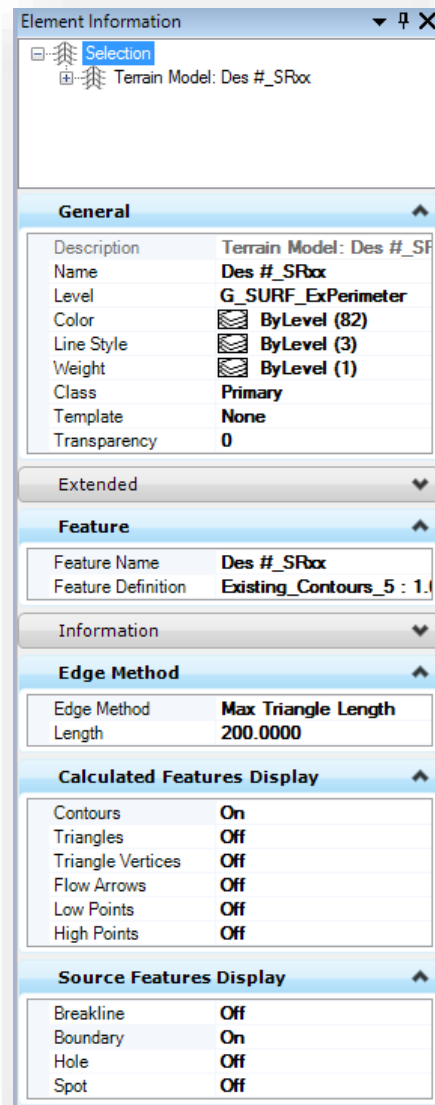
Survey with Created Terrain Model

4. At this time, you can investigate the terrain model. To select it, go to the Civil Model tab on the Project Explorer. Expand out the Terrain Model listing on the tree and select Des #_SRxx.



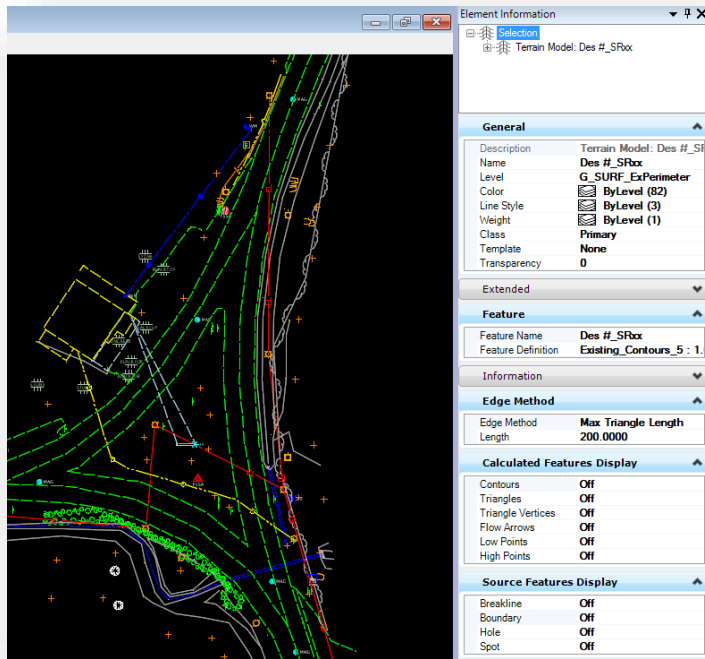
The Terrain Model

5. By selecting the Terrain Model, you can then interrogate its properties in the Element Information panel. Reviewing the terrain in the panel allows you to control display items such as the maximum length of triangles, whether or not contours should be displayed, displaying the triangulation, etc. The following shows all the relevant settings for controlling the terrain display.



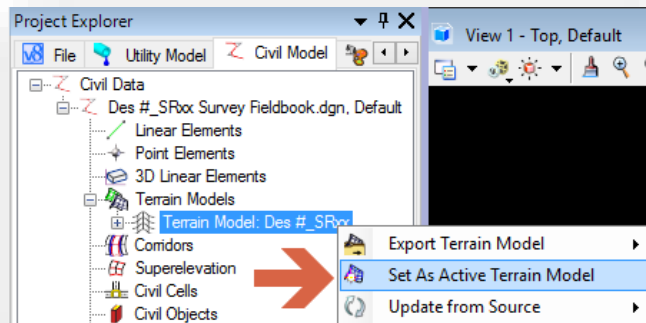
Terrain Model Element Information

- With the terrain model now having display settings for items such as the perimeter, contours and triangulation; it's no longer necessary to use the Level Display to disable these items. Simply use the Element information panel to shut these items off in preparation for the final deliverables.



TOPO Display with Terrain Display Off

7. At any time, these features can be redisplayed simply by toggling the relevant feature on.
8. For the terrain to correctly display in referenced documents, make sure it has been activated. Again on the Civil Model tab in Project Explorer, right click on your terrain and select the Set As Active Terrain Model option.



Set As Active Terrain Model

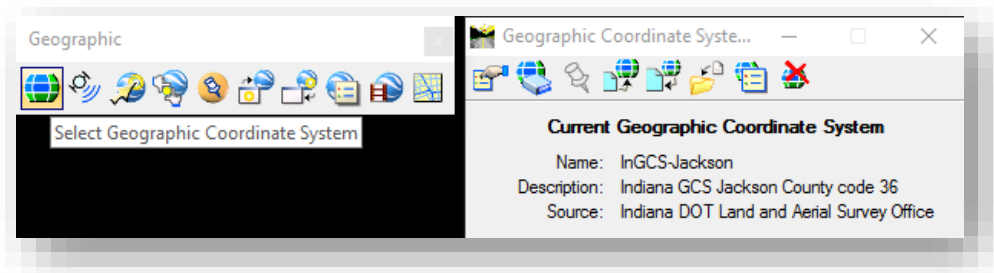
Note: This workflow no longer allows for the editing of features once they've been sent to the terrain model as it becomes a "ruled" feature. If any changes are needed to surveyed features, the terrain should be deleted and recreated from the field book once the changes have been made.

6.3-4a DTM Export Issues with Metric Geocoordination

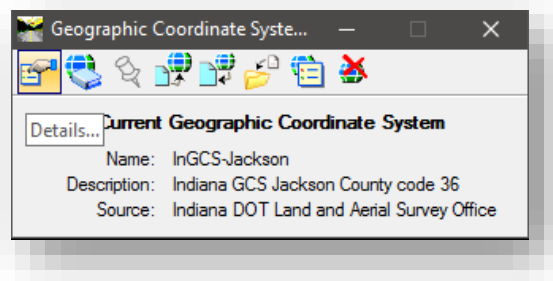
The CAD Peer Group and CAD Support have identified an issue with how MicroStation/InRoads is exporting OpenRoads terrain models to the native InRoads DTM. This issue occurs when exporting from a file where the Geocoordination has been enabled, and the units for the geocoordination are in metric. This will most commonly occur in newer surveys that are geocoordinated using the new country coordinate system, which is configured in metric.

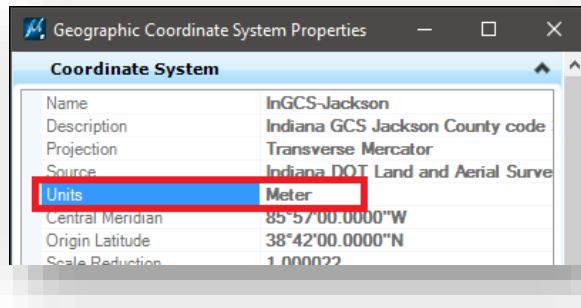
How to check if the issue will occur.

1. Load the Geographic toolbar from the **MicroStation Tools > Geographic > Open as Toolbox** menu.
2. Click on the Select Geographic Coordinate System button on the left side of the toolbar. It will load the Geographic Coordinate System dialog shown on the right.



3. On the Geographic Coordinate System dialog, select the details button. This will display the properties for the coordinate system applied. If the highlighted Units field shown lists metric, your file will be affected by the issue and DTM exports will need to be performed using the following method.

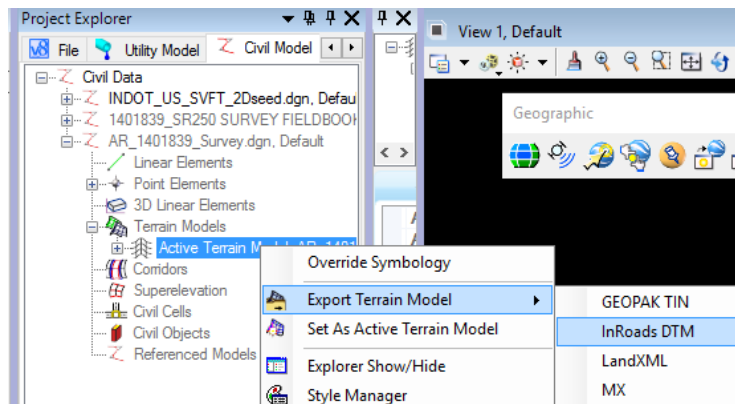




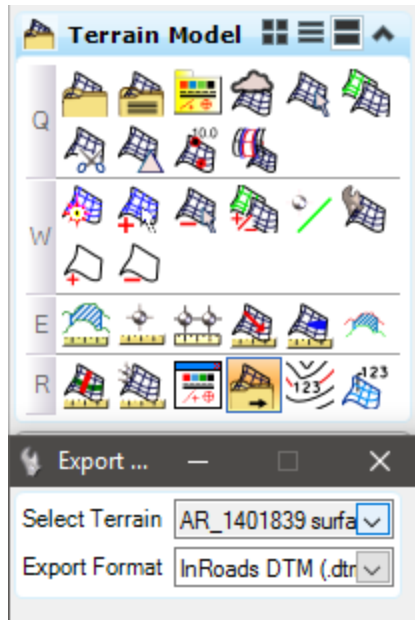
How to Export if the Issue Occurs

After identifying if your data will be affected, the following process should be used to avoid the export scaling issue.

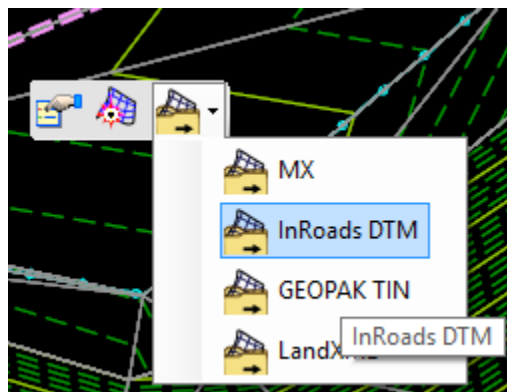
1. Copy a blank 2D seed file into your project folder. Rename the file to designate that it's used for DTM export. Unlike most other files, do not use a provided geocoordinated seed file or apply geocoordination to this file.
2. Reference attach any files with terrains that you want to export to DTM. This can include survey fieldbook files, corridor models, or any other terrains that you want to export.
3. By reference attaching these files, you may interact with the terrain models and export the data without the scaling being influenced by the Geographic Coordinate System. From either the Project Explorer, **Civil Tools > Terrain Model > Export to File**, or heads up display with the terrain selected; export the terrain to .DTM



Export from Project Explorer



Export from Civil Tools



Export from Heads Up

4. Upon completion, you will have a created DTM that you may use from your data. You can validate the exported data by displaying it using the native InRoads surface display toolset and overlaying the referenced data to confirm that it falls in the same location.

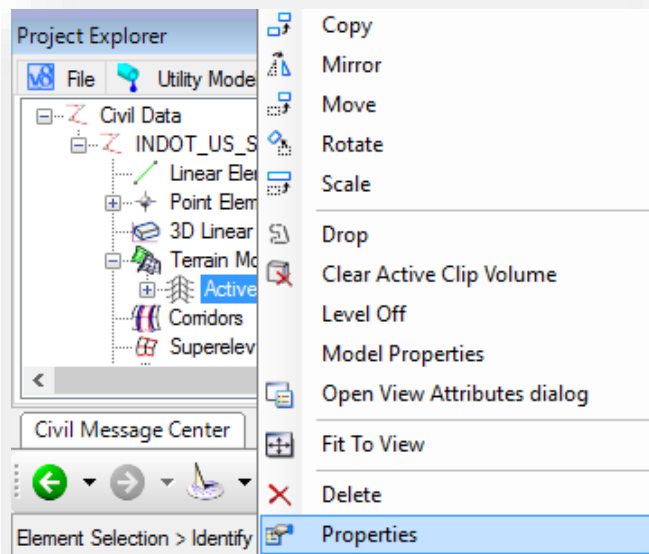
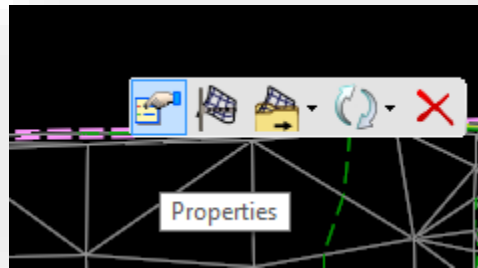
6.3-4b Missing Features

With changes to the modeling engine in OpenRoads technologies, random elements with connecting lines are no longer included as part of a terrain model. Some features that may have been coded and setup this way in the previous environment would be items such as fences and pipes. If you have these features in your survey and they are not showing up properly, make sure that you're connected to the correct XIN. Definitions for these features have been changed in the default agency XIN to change them from random with connecting lines to breaklines that are not triangulated.

6.3-4c Triangulation Clean Up and Terrain Editing

OpenRoads terrains have similar commands to the previous version of InRoads allowing for the modification of a triangulated terrain. The first option to clean up the triangulation extents is to adjust the max length of the triangles it creates.

In the software, select your terrain either from the Project Explorer, or graphically select the terrain perimeter on the screen. In either instance, select the Properties button.

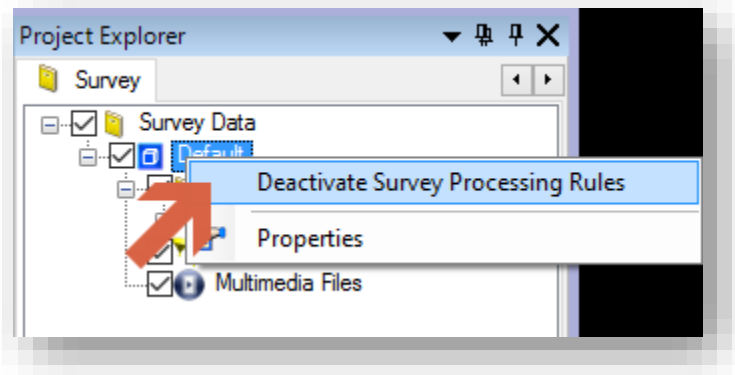


On the properties panel for your terrain, locate the Edge Method heading and from there you can adjust the max length as you did when triangulating a DTM in the old version. From here you can tighten up the triangle lengths to get a more defined perimeter for your project without editing the terrain content.

Note: Changing the triangles max length will force the full triangulation to re-process. Please make sure to have this value finalized prior to performing any further terrain edits.

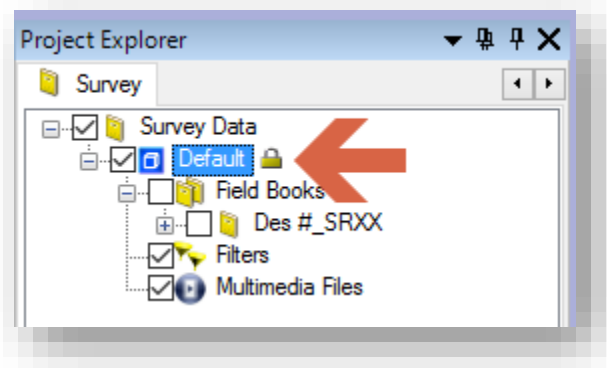
Additionally, you can directly edit the terrain by disconnecting the survey processing rules to allow for such functions as cleaning up any unnecessary triangles. These steps will look at how to disconnect the terrain from the survey for editing.

1. Locate the Survey tab on the Project Explorer. Right click on the model name (in this example, Default)
2. Select the Deactivate Survey Processing Rules option.



Deactivate Survey Processing Rules

3. Once deactivated, a small lock icon will appear next to the model name noting that rules have been disabled.



Deactivated Survey Rules

This process disconnects your field book and terrain completely. Changes made to the field book will no longer be automatically be reflected to the terrain. This is similar to how the DTM and FWD were disconnected outside the Survey Data to Surface process. Although they're in the same file, they co-exist as two separate entities.

With this disconnection completed, you can then use the terrain editing tools to interact with the terrain for functions such as cleaning up triangles. Please keep in mind that all terrain edits must occur in a 3D model. For instance, to delete triangles:

1. Continuing from the previous steps where we disconnected our survey and terrain model, expand the Terrain Model task.



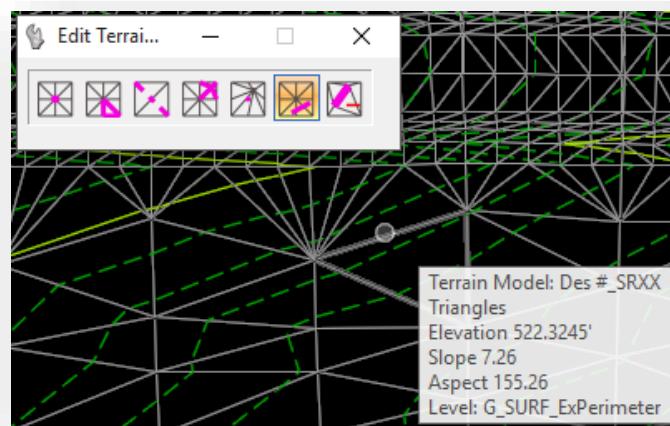
Terrain Model Task

2. Locate the Edit Terrain Model tool.



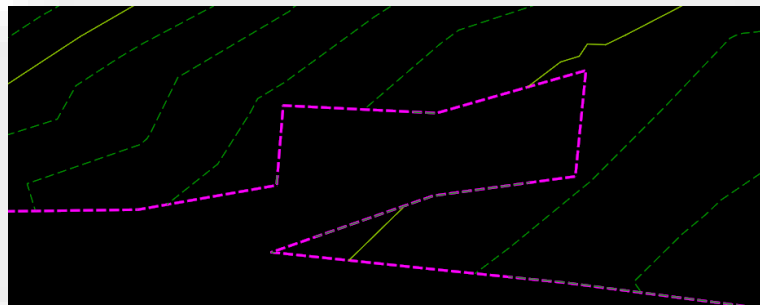
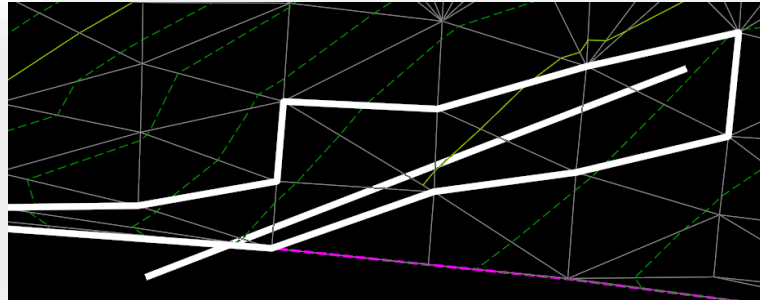
Edit Terrain Model

3. At this point you can modify the triangulation in a number of ways. One of the most useful is the ability to remove triangles with a crossing line. The 6th tool on this panel (highlighted) is the Delete Triangle by Line command. Select it and then click on your terrain model.



Delete Triangle by Line

4. With the terrain selected, draw a line as prompted across all the triangles that you wish to remove. The bold lines indicate the crossing line as well as the outline of the triangles to be removed. Confirm what's to be cut with a single data point click.

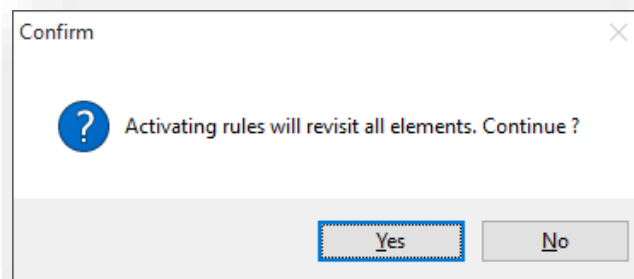


Top – Before Trimming

Bottom – Trimmed Result

This same methodology can be applied to most of the terrain editing tools. It's imperative however, that as we did earlier in this chapter that the survey and terrain be disconnected through the survey rule deactivation.

Throughout this section we've looked at how terrain editing works with the survey disconnected. As an extension of this, one may ask what happens if they turn the survey rules back on. To do so, reverse the process in the first part of this section and you'll receive the following prompt:



Reactivation of Survey Rules

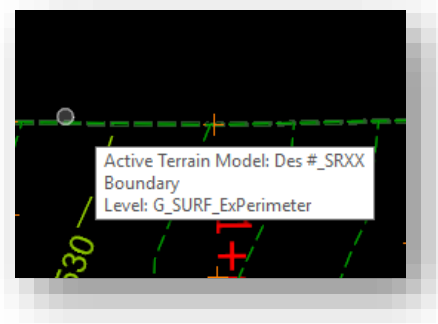
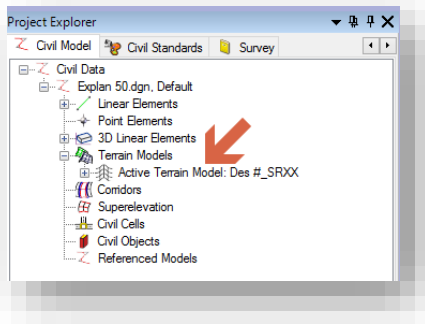
Selecting Yes will cause the terrain and survey to relink. It will also re-establish the terrain back to how it was created from the survey, removing any changes or cleanup performed.

With the terrain model cleaned up and prepared for design, a pair of native InRoads DTMs should be produced that accurately reflect this information for additional design purposes. The next two sections cover the steps required, and why these need done.

6.3-5 Creating the Native InRoads DTM Existing Terrain

With the terrain now created and cleaned up, a version of this information should be created for use with the native InRoads toolset. Unlike the following process, this DTM will contain the accurate triangulation with applicable edits, and triangulated features, and can be used with 3D analysis tools in native InRoads by the design staff. To export this DTM:

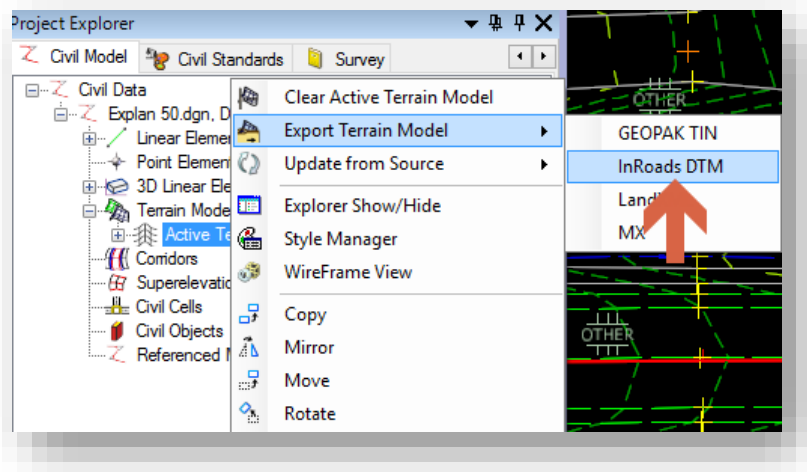
1. Locate your Des #_SRxx Terrain model either in the display, or on the Project Explorer.



or

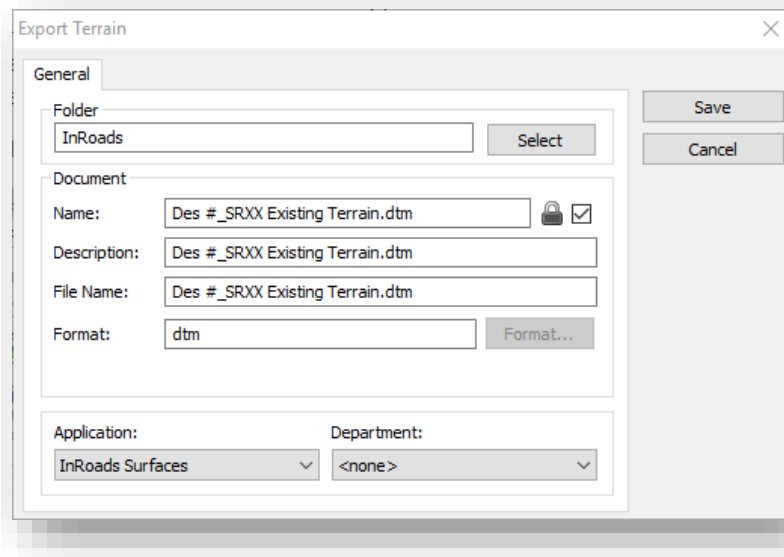
Locating the Terrain Model

2. If you've located your terrain on the Project Explorer, right click on it, and select Export Terrain Model > InRoads DTM.



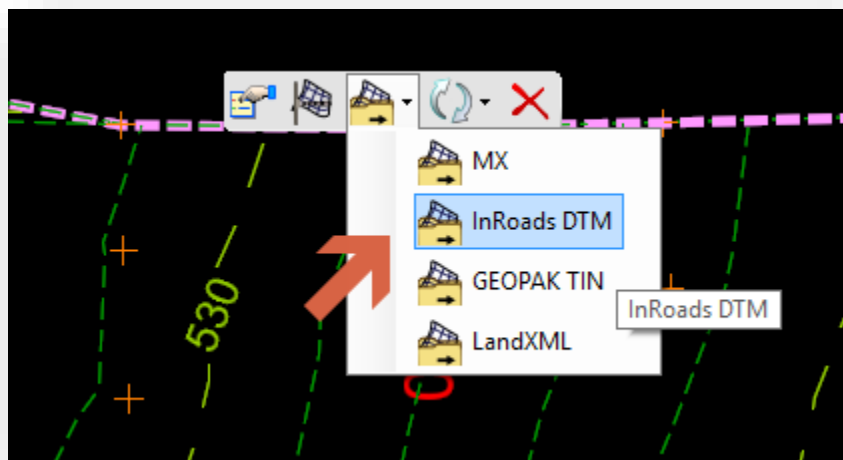
Exporting from the Project Explorer

3. You will then be prompted to save a copy of Des_SRxx.dtm to your project. Adjust the naming to reflect that this file should be named as Des_SRxx Existing Terrain.dtm. Completing this will then provide a follow up prompt to check in the DTM. Please do so.



Saving and Checking the DTM In

4. The other method, using the graphical location of the terrain, will be done as follows. After locating the terrain as shown in step 1, click on it, and select the Export Terrain Model command, followed by InRoads DTM.



Exporting the Terrain by Graphical Selection

5. At this point, complete step 3 in the exact same manner to complete saving the file.

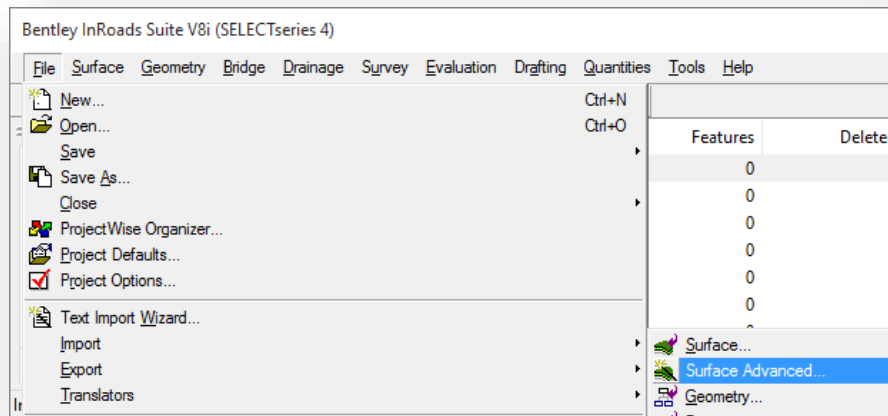
6.3-6 Creating the Native InRoads DTM for Annotation

Any project that is surveyed using OpenRoads will not have an associated DTM file that contains the survey surface that was previously used to annotate the appropriate points from. To accommodate this annotation need, a special graphical import tool has been configured to import the survey data into the InRoads DTM format for annotation.

The reason for using this process instead of the direct export to DTM functionality that OpenRoads contains is due to the differing content between the OpenRoads terrain and the fieldbook. As OpenRoads terrains do not carryover point features that aren't triangulated, the graphical capture of these points is the most direct method of capturing all points that have been surveyed and displayed in a fieldbook for annotation purposes.

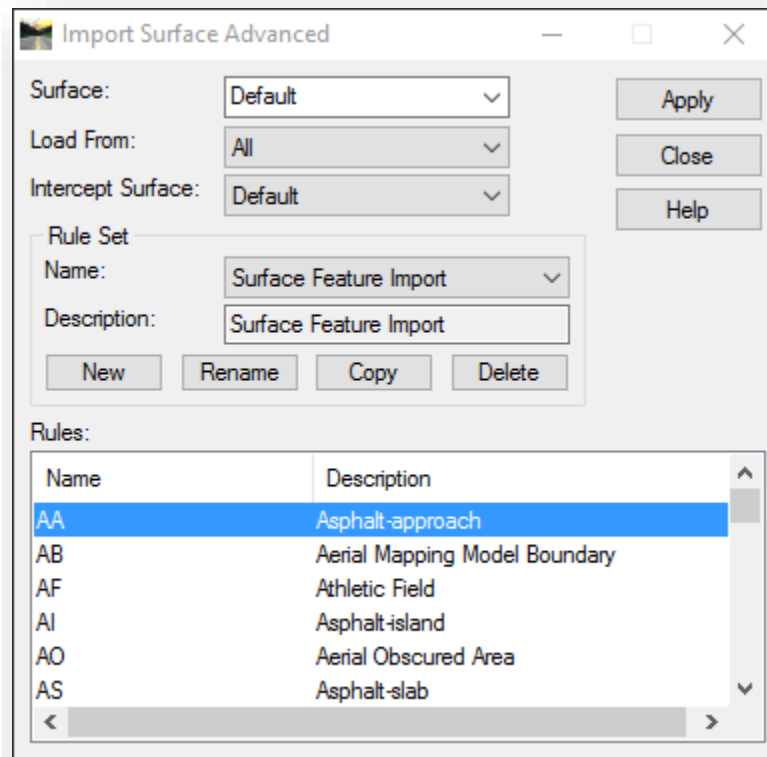
The following steps look at creating the required DTM:

1. With your Des #_SRxx Survey Fieldbook.dgn open, navigate to File -> Import -> Surface Advanced on the InRoads Explorer.



Import -> Surface Advanced

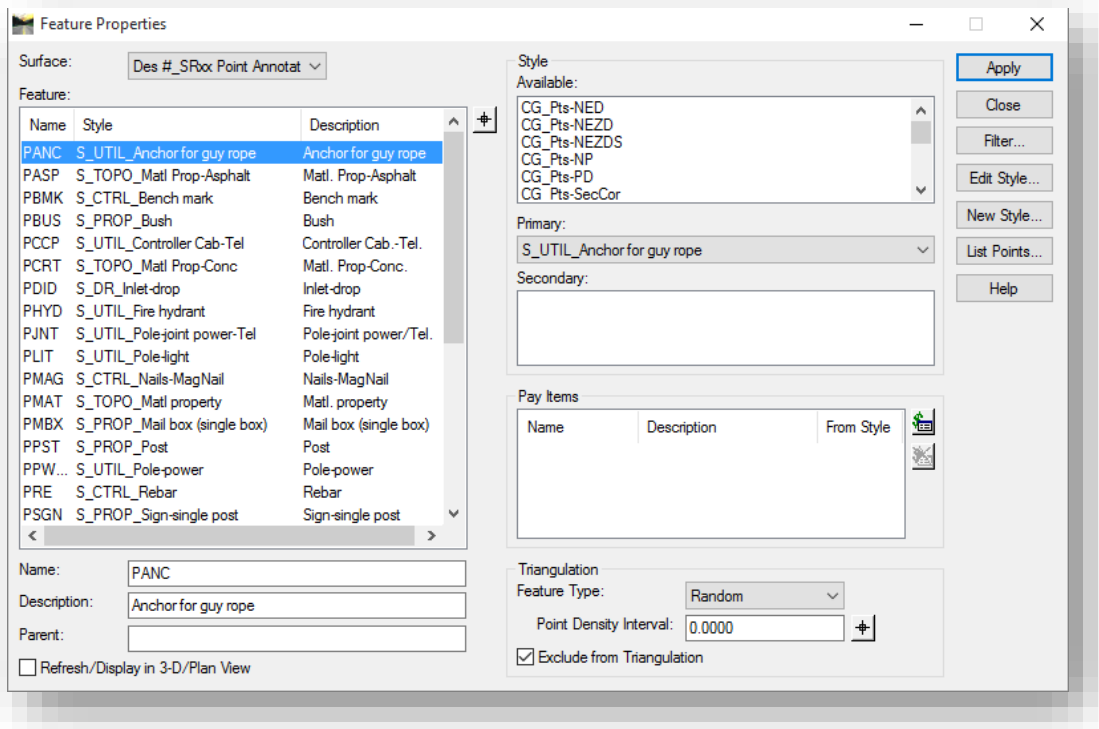
2. This will present the Import Surface Advanced Window.



Import Surface Advanced

3. In the Rule Set field, set the value to **Surface Feature Import** as shown in the previous illustration.
4. Set your Surface name to Des #_SRxx Annotation Surface, the Load From should be set to All.
5. When prepared, select the Apply button. InRoads will begin processing your features from graphics and creating a DTM with those features included.
6. Once complete, make sure to save your DTM file to ProjectWise with your other project data.

With the DTM created, you can view its contents on the **Surface -> Features -> Feature Properties** command on the InRoads Explorer. With the import complete you will see the surface features similar to this illustration:



Graphically Imported Features

Note: The annotation DTM that you create as part of this process should not be used for any other processes other than various surface annotation processes. It may not include all features and does not have the appropriate triangulation information.

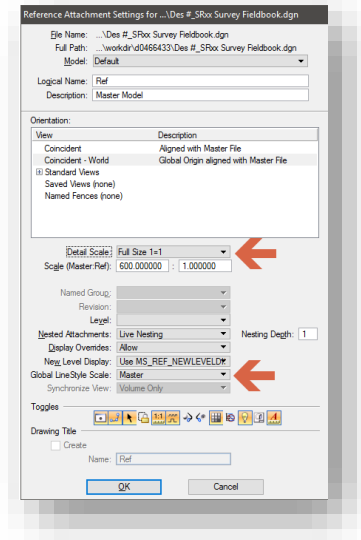
6.3-7 Creating the Geometry/Alignments DGN

One of the major enhancements by moving to OpenRoads technology is that the DGN container allows for OpenRoads data to be available to other files simply by referencing them together. This workflow will look at referencing the terrain model and using it and the survey features within to create your survey geometry.

This section is the first area where one needs to be careful in regards to the usage of 2D/3D models. At any time when the OpenRoads Horizontal Geometry tools are being used, a 2D model should be used as when using 3D, reference elements are created at a 0 elevation regardless of vertical profile. This can cause complications further downstream such as when cross sections are cut.

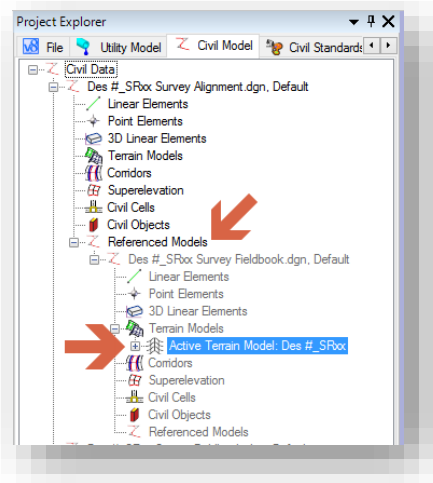
1. Create a new DGN using the same steps as the survey field book. Using the Des #_SRxx Seed 2D.dgn, create a new file called Des #_SRxx Survey Alignment.dgn.
2. Open the newly created DGN in InRoads.

- At this time, we now need to access our survey field book DGN to access our terrain model, and TOPO features. As we've created this in the field book DGN file, we can use MicroStation file referencing to make the field book available to our terrain DGN. On the MicroStation menu select **File -> References** and proceed to attach the file as you would any other CAD file.



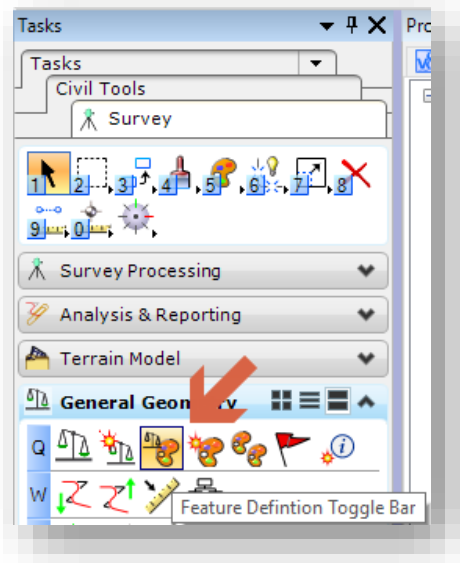
Reference Attachment Settings

- As shown in the previous capture, there are two settings specifically called out for Detail Scale and Global Line Style Scale. These two settings should always be set as shown in order for Drawing Scale to scale them correctly. As we did in the previous drawing, set your Annotation Lock on, and enable the scale at 1"=50' for TOPO elements to display properly.
- With the survey field book and terrain model attached, you'll now see the referenced terrain model in your Civil Model tab, under the Reference Model listing.



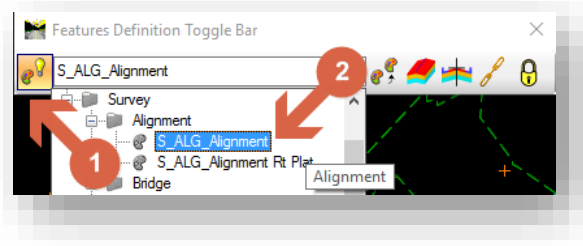
Referenced Civil Data

- At this time, you can begin preparing to create your survey alignment. The first step is to set the feature you'll be using. To do this, enable the Feature Definition Toggle Bar. This can be found on the Task Navigation panel under **Civil Tools-> General Geometry > Feature Definition Toggle Bar**.



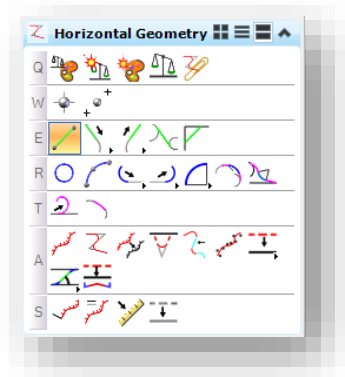
Feature Definition Toggle Bar

- With the Feature Definition Toggle Bar turned on, first toggle on the Use Active Feature Definition button, second select the **Survey -> Alignment -> S_ALG_Alignment** feature shown.



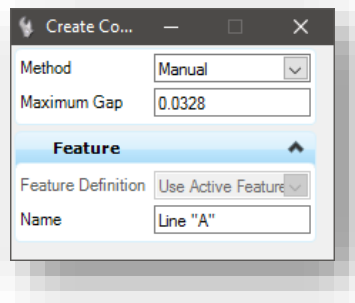
Survey Alignment Feature

- After setting the correct feature, go to the task navigation panel again, and select the appropriate tool from the Horizontal Geometry tools to start the creation of your alignment.



Horizontal Geometry Tools

- Upon completion of creating geometry, you'll need to create a complex element. Select the appropriate geometry command. For this example we'll be looking at the Complex By Elements command. When prompted on the heads up display, enter the name of your alignment. This example will use Line "A"; once entered, select the elements to create your alignment.



Create Complex and Alignment Naming

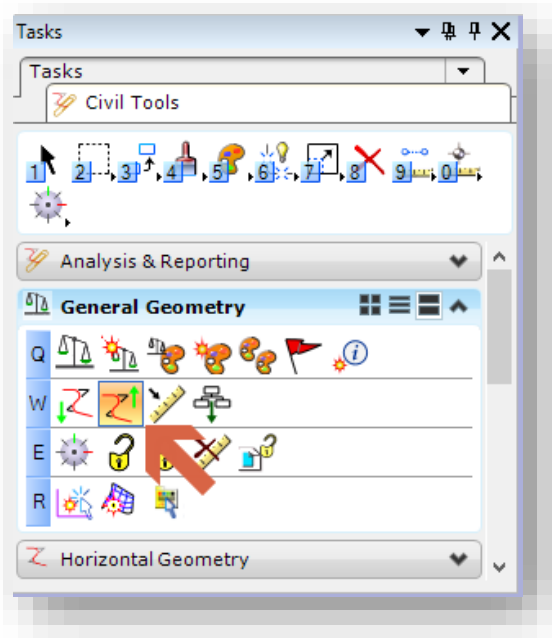
Note: The previous workflow example could be superseded depending on project requirements. In those instances know that the general flow is the same, only the tool content may be slightly different.

6.3-8 Creating the Native InRoads Alignment

Similar to the need for a native DTM file, for OpenRoads SS4, alignment annotation must continue to take place using legacy InRoads tools requiring that alignments be sent back to an ALG. This will allow for Stationing annotation to be placed on your alignment, along with preparing the alignment for the Design staff to use for their annotation needs.

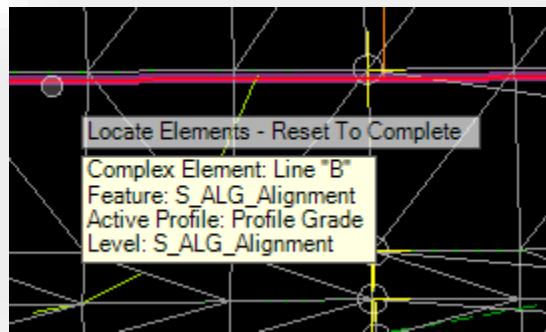
To send your alignments back to the InRoads ALG format, perform the following steps:

1. Go to the **Civil Tools -> General Geometry -> Export to Native** command on the Task Navigation panel.



Export to Native

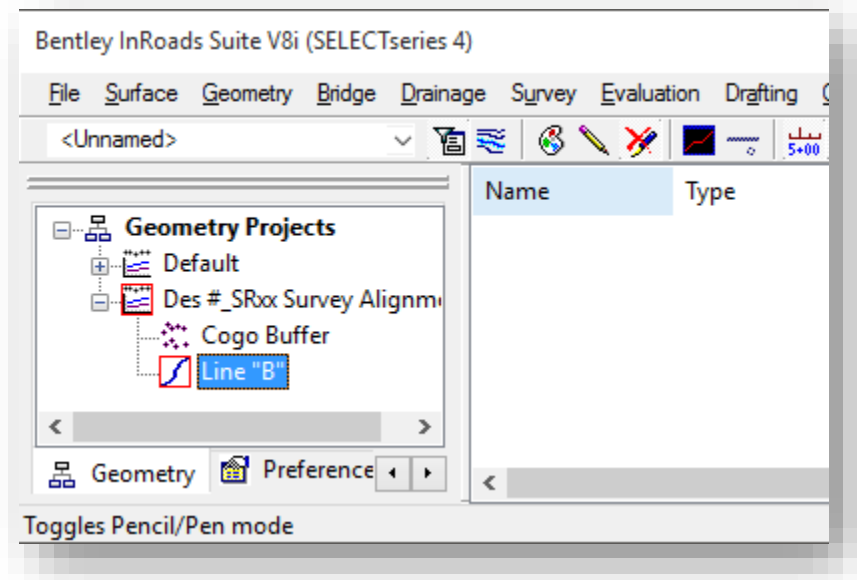
2. The command will activate and you'll be presented with a heads up tooltip in the drawing window requesting that you select the element.



Locate Element Prompt

3. As shown in the previous screen capture, the tooltip will also show element information for the item you're currently hovering over. Select all the geometry elements you wish to send back to ALG at this time.

- When satisfied with your selections, right-click to Reset and complete the command. Your alignment(s) will then be sent back to the native InRoads ALG format for your use with that toolset.



OpenRoads Alignments Sent to InRoads ALG

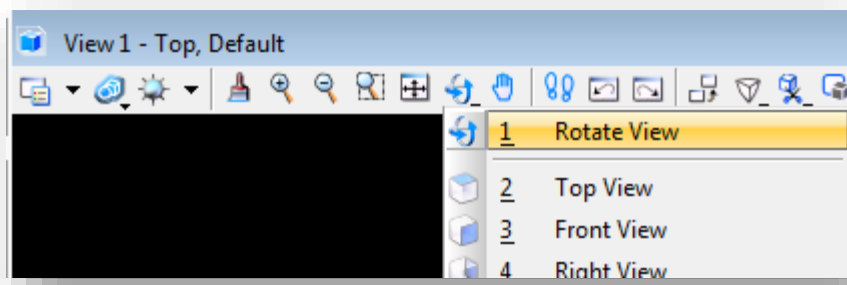
Note: When sending alignments back to the native InRoads format, OpenRoads will assume that your currently active Geometry Project on the InRoads Explorer is where it should place the alignment information. If you wish to have your alignments placed in a Geometry Project of your choosing, make sure that you first create and activate the Geometry Project on the InRoads Explorer prior to sending the alignments over.

- With the alignments now showing in an InRoads Geometry Project, you can proceed to save the .ALG file with the rest of your project data. The file should be named Des #_SRxx Survey Alignment.alg.

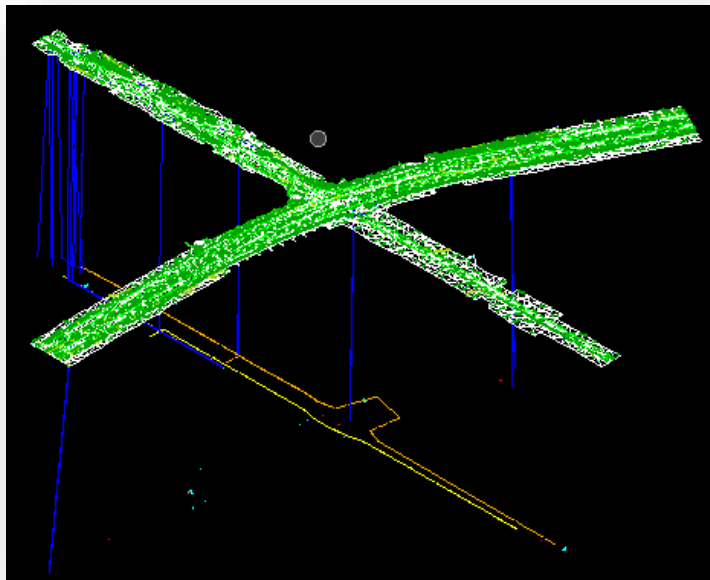
6.3-9 Verifying Topo using 3D Rotation and Shading the Triangulation

The View toolbar (located in the upper left of the view window) gives us access to rotate 3D drawings to any one of 9 predefined Views.

Isometric Views and Right Isometric View are the most useful to rotate quickly to a 3D orientation. Option number 1 – Rotate View allows dynamic view rotation.

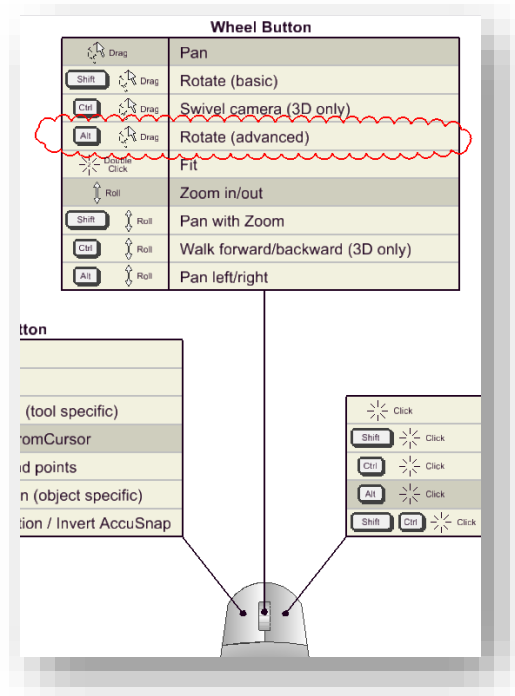


Results will be similar to below.

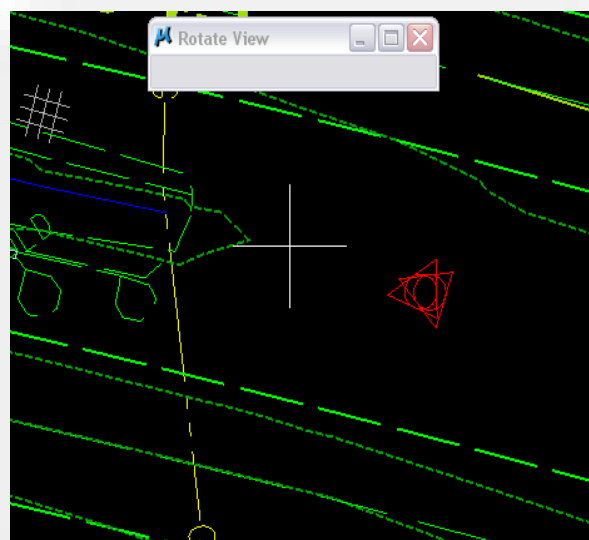


Note: Alternate access to 3D rotation can be obtained from mouse functions. This involves the Alt-Middle dynamic rotation. This is also the same as Option 1 Rotate View - dynamically

Alt & Middle click

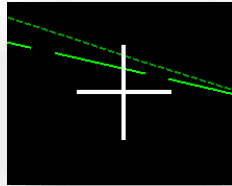


The Drawing View will have a crosshair placed in the drawing. This is automatically placed at the center of the graphical elements in the drawings.



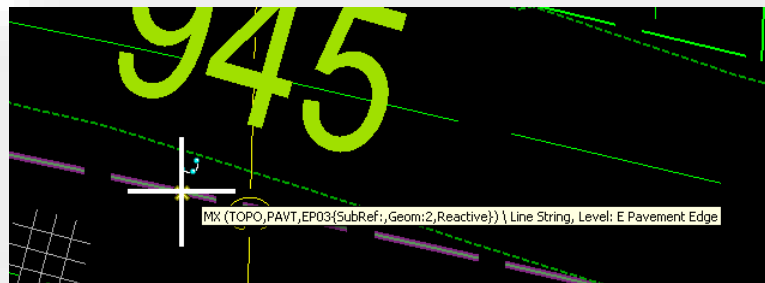
Any subsequent rotation will be about this point unless you dictate otherwise. (This is rarely the desired location.)

The rotation origin can be modified by tentatively snapping to the desired location (left right chord) or by graphically dragging the cursor to a new location. When the cursor is moved over the crosshairs they become highlighted as shown.

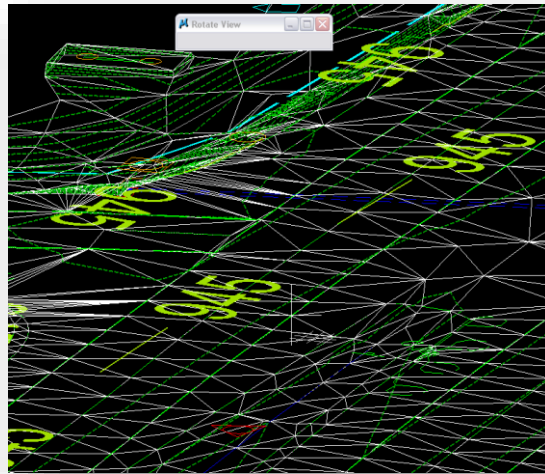


Press and hold the left mouse to graphically drag to a new rotation origin. AccuSnap is particularly useful in this operation. When the left button is released, so is the cursor at the new location.

Subsequent left mouse dragging will dynamically rotate the drawing. (Make sure you are no longer over the origin.)



Results of left drag with triangulation displayed as reference:

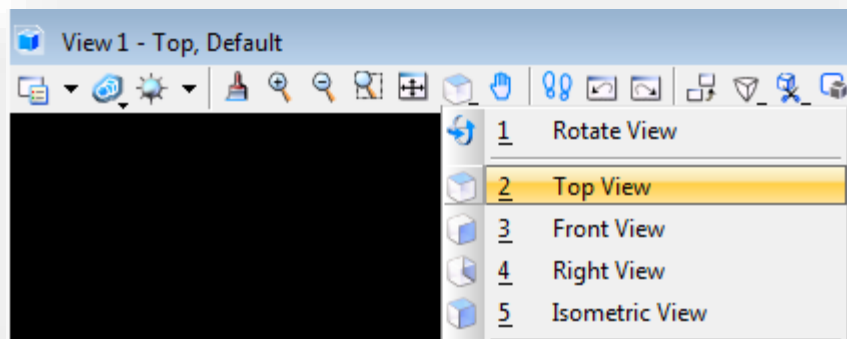


Note: Subsequent panning and additional Dynamic rotation will change the perspective, allowing us to see any portion of the project from any angle

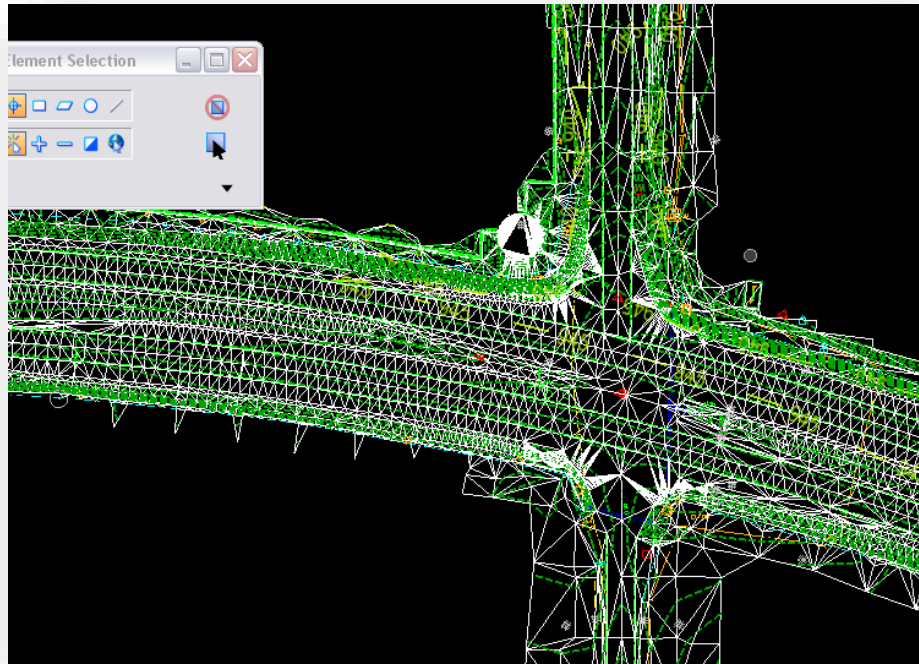
Returning to Plan View

In CAD, the normal Plan View as we are accustomed to describing it is referred to as Top View.

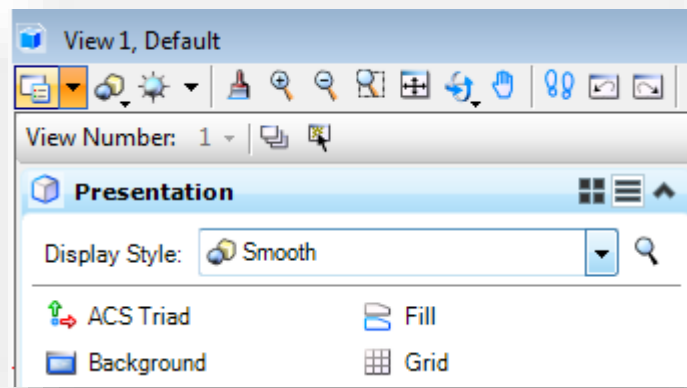
Simply select the icon to the right of Fit view.



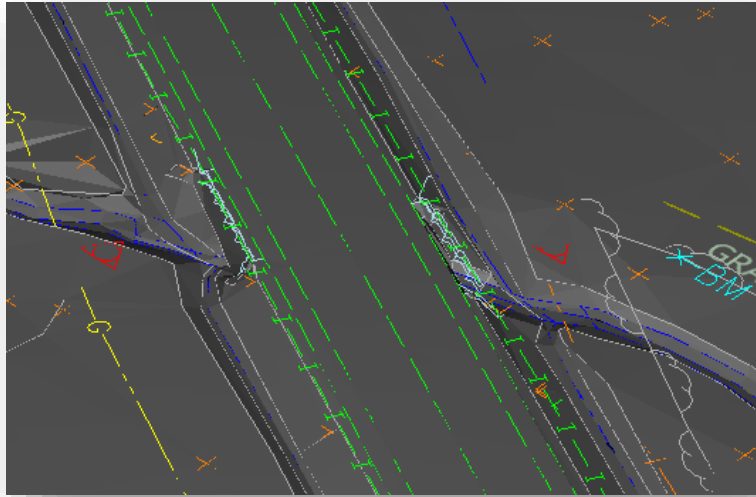
Resulting view:



You also may wish to verify the triangulation by applying shading to see if any holes exist. With your triangulation displayed, click on the View Attributes button on the upper left hand corner of your active MicroStation view. The very top option for presentation will be listed as wireframe by default. Change this setting to smooth as shown, and your triangulation will look as shown.



Smooth Shading on View Attributes



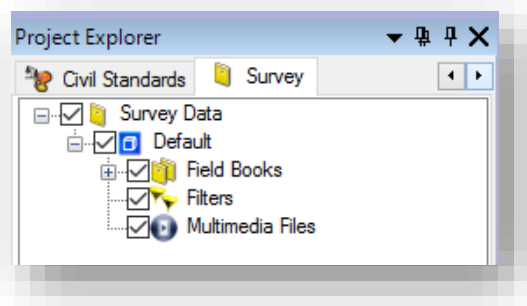
Topo with Smooth Shading

You can switch back to the wireframe display by performing the same steps, changing from Smooth and back to Wireframe. Note that there are additional display styles available that can also be used.

6.3-10 Updating SS2 Survey Data to SS4

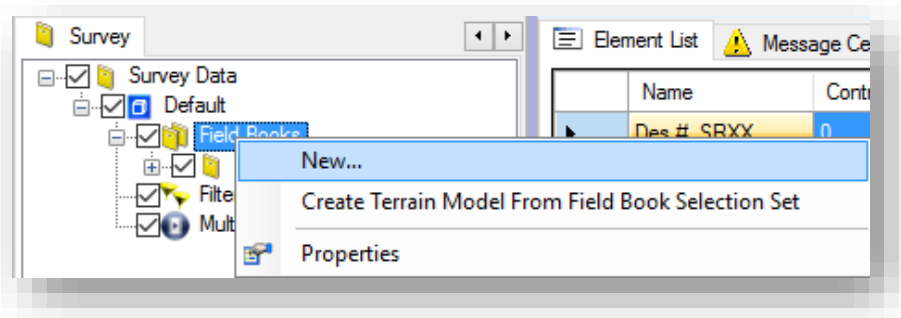
Depending on what features of InRoads Survey in SS2 were used, importing a field book from the old format can be a very straightforward process. Please keep in mind that while reviewing these instructions, the extent of additional cleanup that will need to occur will depend heavily on if 3 point circles were created using the EXTARC command or if offsets were coded as part of the notes (+O, +D, +H). The following steps will cover how to import the FWD files, and in the case of the offsets, how to find and modify the shot so the output is correct.

1. To import a FWD field book file from SS2, navigate to the OpenRoads Survey tab on the Project Explorer.



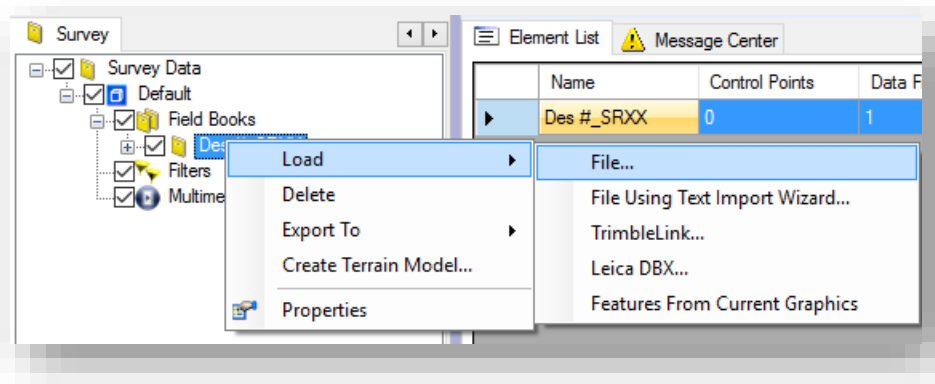
Survey Field Books/Project Explorer

2. On the Field Books heading, right click and create your Field Book. Please use the standard Des #_SRXX naming conventions.



New Field Book

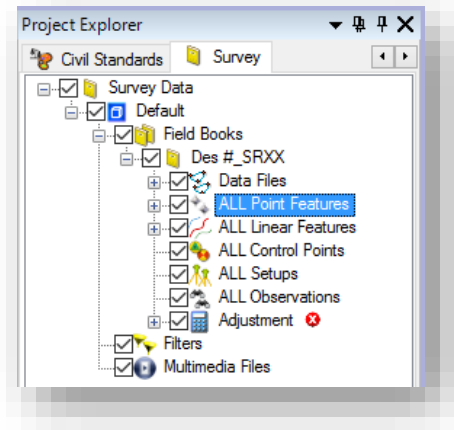
3. Right click on the newly created field book entry and select the Load -> File... option. Navigate to your FWD file from SS2 and open it.



Load Field Book from File

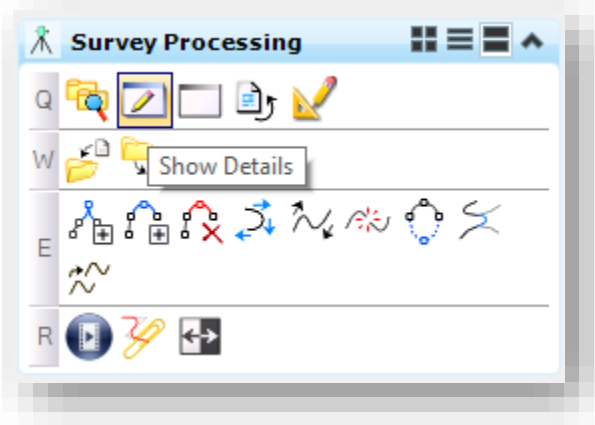
4. OpenRoads Survey will now import this data and create the field book and graphics.
5. If your survey didn't use any offsets in the Note field (Descriptions in OpenRoads), you can proceed to work with the survey using the OpenRoads tools as we have throughout this chapter.
6. If your survey contains offset notes, at this time these will need cleaned up so your data is consistent across versions. Continue on for how to resolve these changes.

7. Select the All Point Features from the field book on the Project Explorer.



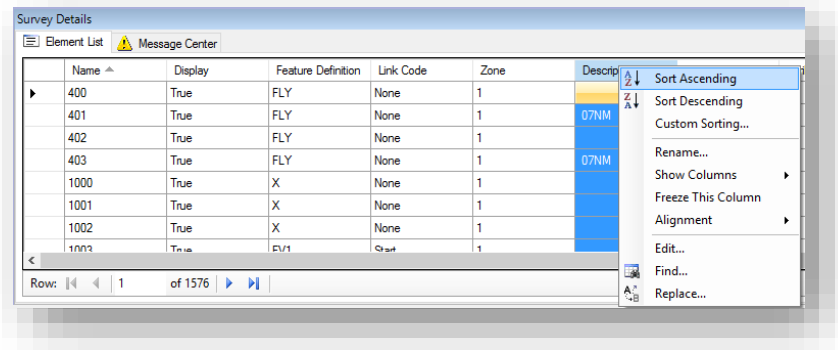
ALL Point Features Selected

8. On the Survey task, select the Show Details tool from the Survey Processing toolbox. This will open the table view with all your points.



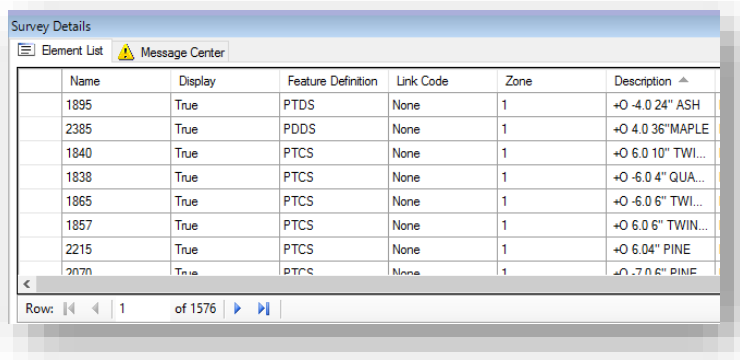
Show Details

- On the table view, right click on the Description field and use one of the sorting methods. Be advised that this is just a single method, and you can also use the find commands, or even drill down to specific features and perform similar steps. For this example we'll be using the Sort Ascending command.



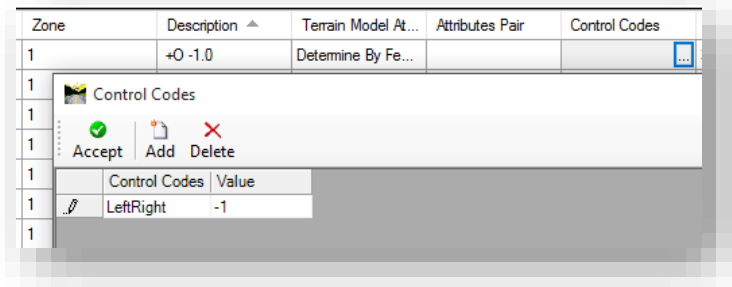
Sorting Point Features

- With the list sorted, all common offset notes in the Description field will be grouped together. You may either scroll down to where these are, or use the Find... command to quickly jump to these in the list.



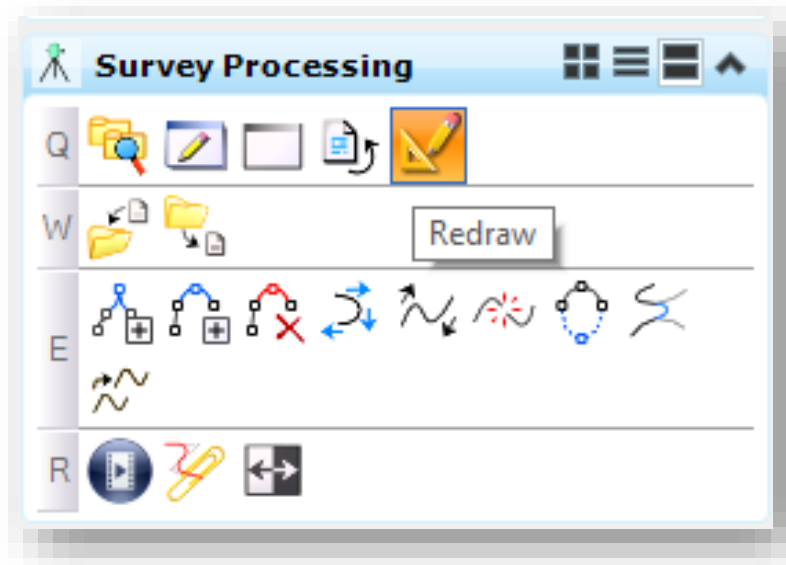
Sorted by Description

- Click on the Control Codes field for one of the entries. Unfortunately this tool does not support bulk edits. In the case of the following example, we have a left offset of 1 foot, so the Control Code will be set to LeftRight and a value of -1 entered. Please keep in mind that you must use the Tab Key in the value field for the record to be confirmed. Repeat this step for any point necessary.



Modifying/Adding a Control Code for Left/Right Offsets

- Locating your point in the display, it will appear that it hasn't moved to the offset entered. Much like InRoads before, the display will need redrawn. To do so, go to the Survey Task, and under Survey Processing, select the Redraw command. Your observation will then be reflected in the TOPO.



Redraw the Survey

At this point you'll have the SS2 survey migrated over to SS4/OpenRoads. Note that there will still be clean up needed, such as resolving any 3 point circles or other coding issues that the above did not fix. In many instances, bringing the survey forward should be a quick and painless process however.

6.4 Routeplat, Reference Box and Section Corner Card Creation

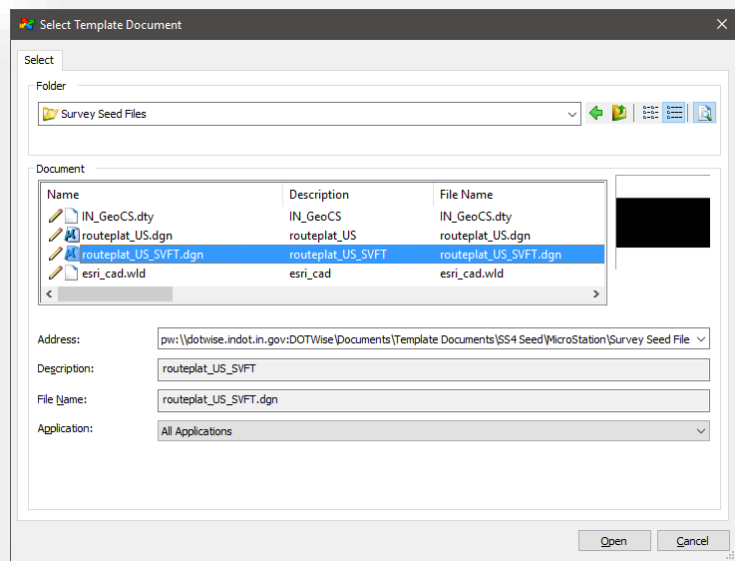
The following sections will walk through the process to create a complete route plat sheet. This will include creating the file in ProjectWise, examining its contents, and working with/referencing section corners.

6.4-1 Creating the Route Plat .dgn file

Prior to placing any content into the route plat, we need to create a drawing to work in. This process will be same to the steps performed in section 6.3-1.

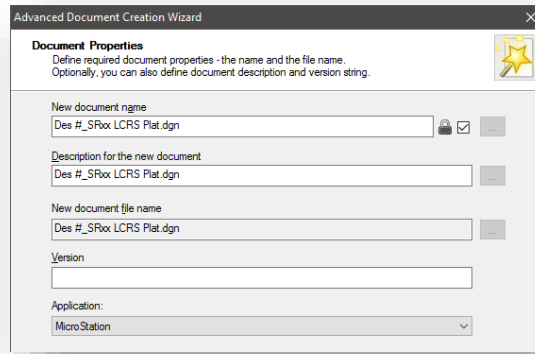
Using these steps, you'll need to make two adjustments.

1. When selecting your seed file, select the appropriate unit file from:
<pw:\\indot-pw.bentley.com:indot-pw-01\Documents\Template Documents\SS4 Seed\MicroStation\Survey Seed Files>



Selecting a Route Plat Seed

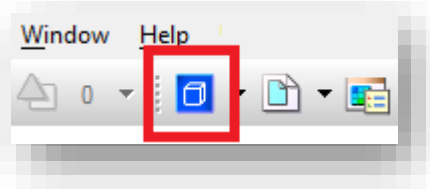
2. Your document name, description and file name should all be set in the Des #_SRxx LCRS Plat.dgn format.



Route Plat naming

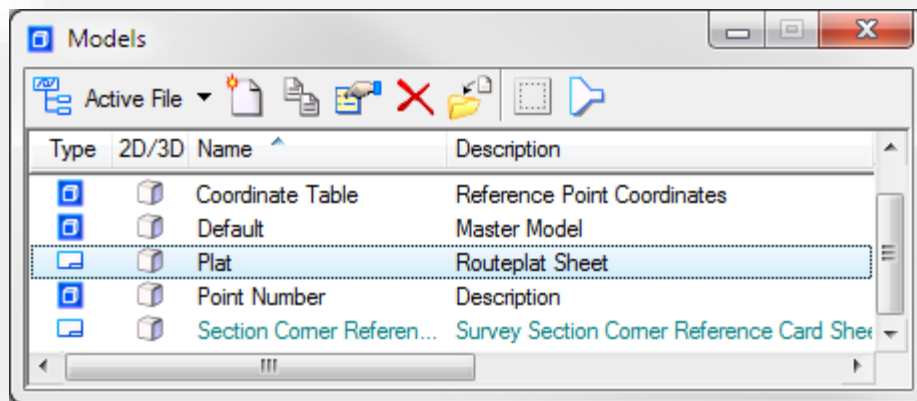
6.4-2 Contents of the Route Plat template files

Each of the route plat templates contains five models. These can be accessed by going to the model icon in your MicroStation toolbars:



Accessing the Models Dialog

By selecting this icon, you'll be presented with the following window and list of available models. The plat sheet will come up by default:



Available models in the template

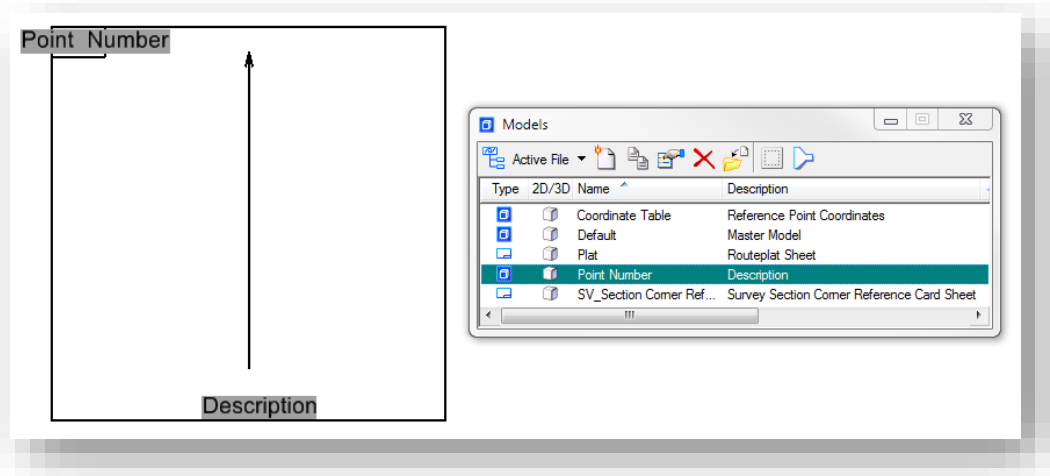
The five models available are:

1. Coordinate Table – This is the template Reference Point Coordinate Table.
2. Default – This is the default MicroStation model, and is available in all .dgn files.
3. Plat – This is the template route plat sheet model.
4. Point Number – This is the template reference box model.
5. Section Corner Reference Card Sheet – This is the template Section Corner Reference Card Model.

6.4.3 Creating Reference Boxes

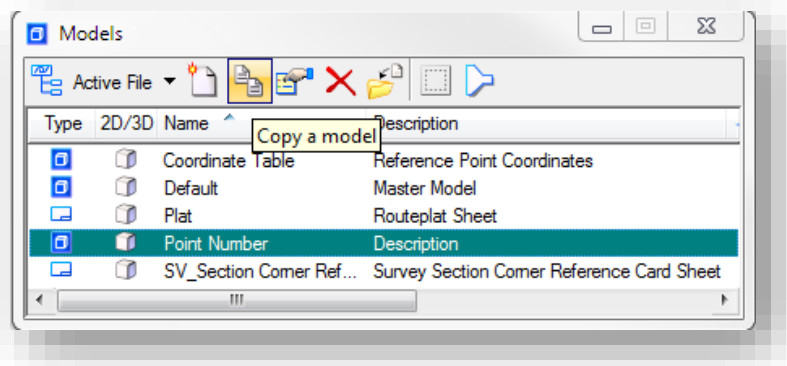
The following steps go through the process of creating a model containing the control point reference box for use in either Route Plat Sheets or the Section Corner Reference Card.

1. Open your Des #_SRxx LCRS Plat.dgn from ProjectWise.
2. As shown in the previous section, open the models dialog from the toolbar icon.
3. On the Models dialog, double click on the Point Number model to open it.



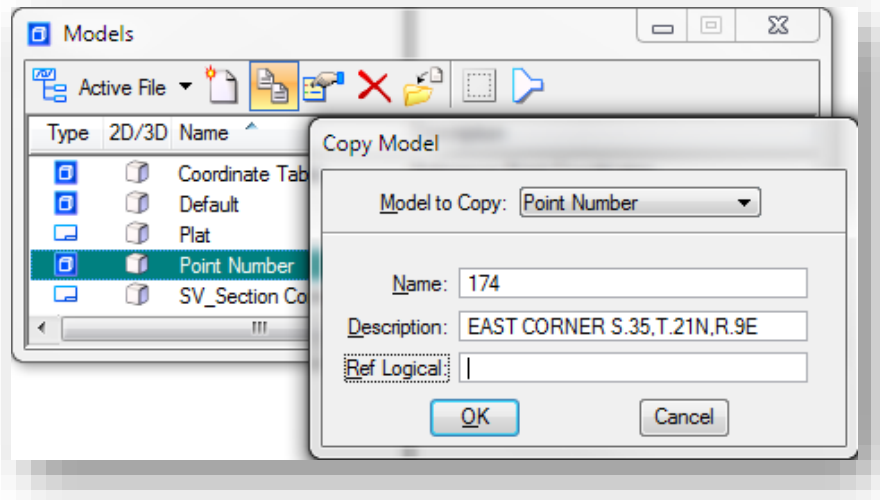
The Point Number model open in MicroStation

4. Select the Copy Model icon from the Models dialog.



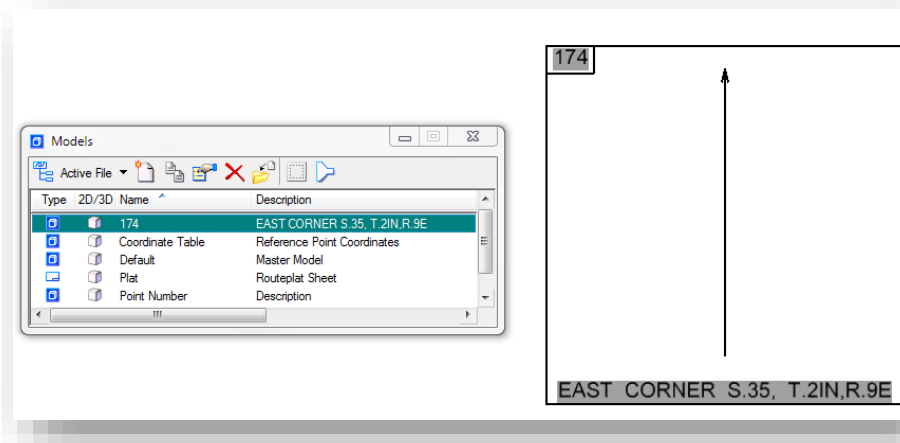
Copying a Model

- The Point Number model has active field as shown in the earlier capture (the gray shaded areas for Point Number and Description). During the model copying process, you'll be prompted to create the new model with a new name and description. The values for point name and description should be entered as you'd like them to appear on the completed control point.



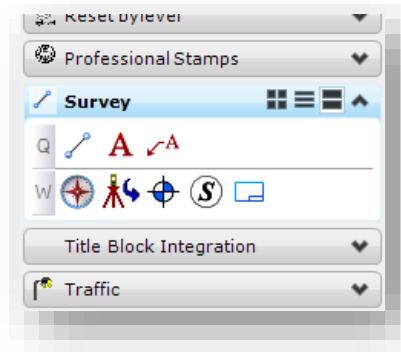
Point Number Model Copy

- Once the model information has been entered, select OK. The completed model copy will become active, and will show the name and description in the control point as shown. Repeat steps 4 and 5 for each additional reference box you require.



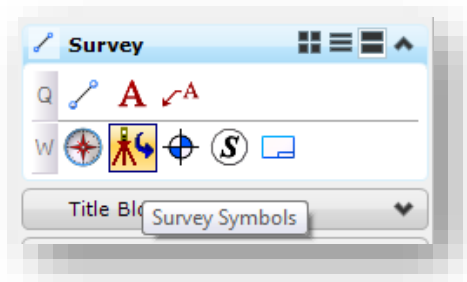
Completed Point Number Model Copy

- Next, the control point content needs created. If not active from the previous steps, enter your control point model by double clicking on its listing in the Models dialog. Once in the appropriate model, open the Survey task from the INDOT Tools workflow in MicroStation:



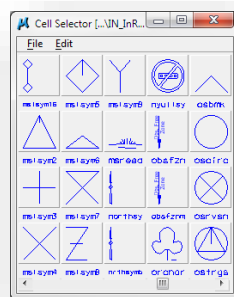
Survey Tasks

- First we'll add the north arrow. Load the Survey Symbols library from the Survey task.



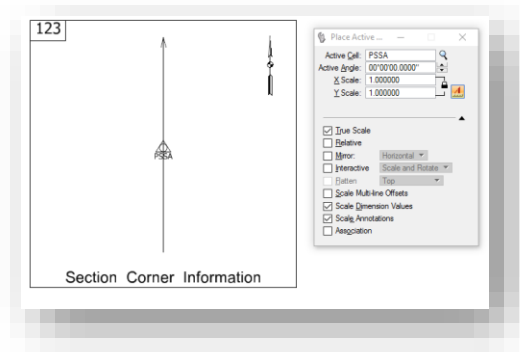
Survey Symbols

- This will load the Survey Cell Selector. On the displayed panel, locate the cell called northsy. **Do not use northsy as it is scaled differently.** Clicking on the northsy button will bring up the cell placement tools at the appropriate scale. At this time, place the cell in the correct spot in the control point border. Note that cells are sorted by letter case then alphabetical order. (PSSA would show up in the list before northsy as the capital P takes precedence)



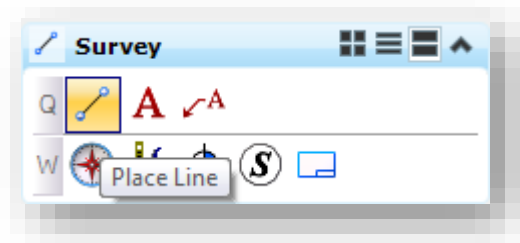
The Survey Cell Selector

10. Next locate the cells for the traverse station cell (PSSA) and any other object that needs placed. In each of these instances, a scale of 1 should be used. Snap this cell to the center of the provided centerline.



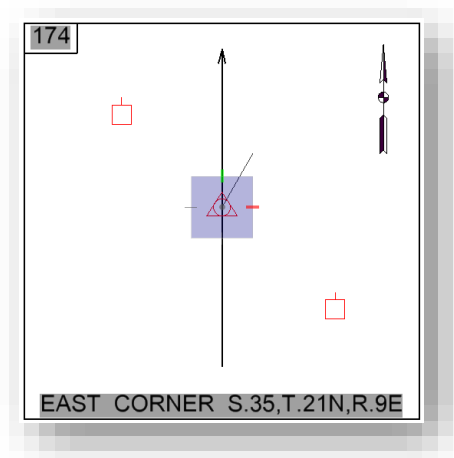
PSSA Cell Placement

11. After placing additional cells such as power poles (PPWP), you will need to place the lines for the dimension ties. From the Survey task, select the Place Line command.



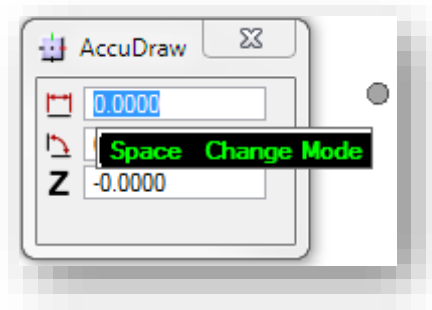
Place Line

12. While in the place line command, you'll want to snap your initial point to the center of the PSSA symbol on the centerline.



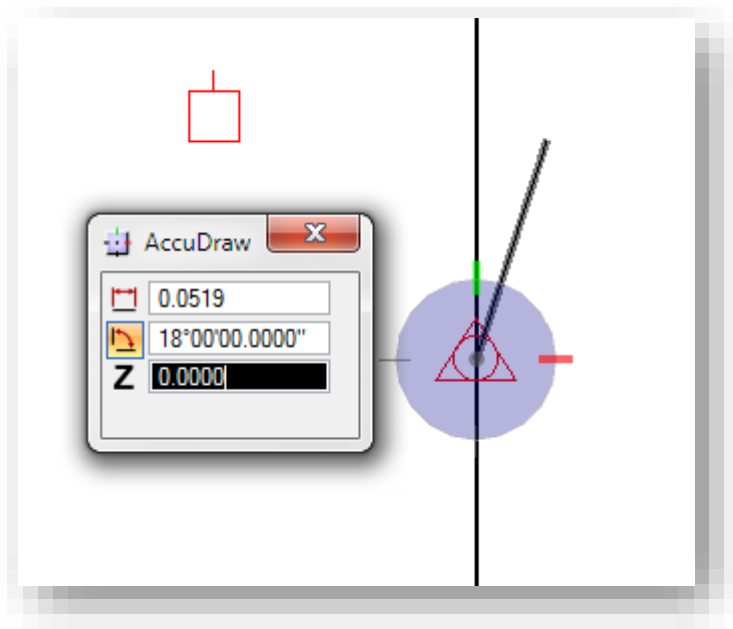
Drawing Dimension Ties

13. Next, in your AccuDraw toolbar/window, place your cursor in any of the fields and hit the space bar to set it to angular mode.



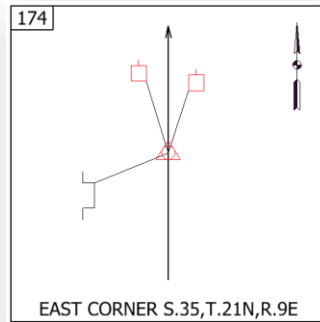
AccuDraw Mode

14. At this time, place your cursor in the angle field and enter the appropriate value. This will also lock the angular value in allowing you to draw the line along the bearing you've specified. Remember to specify degrees, using the ^ symbol (shift key + 6).



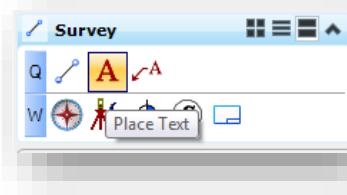
Dimension tie

15. With the lines drawn, you can now adjust the placement of any cells that you've placed and your resulting reference box should look similar to the following:



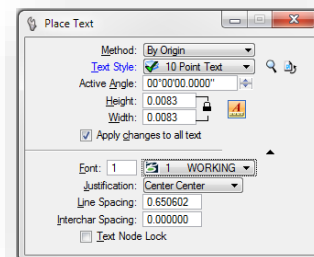
Reference Box

16. Next, you'll need to add the text labels to the Reference Box. Start by selecting the Place Text tool from the task navigator. You can find this either on the Drawing task, or from the INDOT Tools -> Survey Task.



Place Text

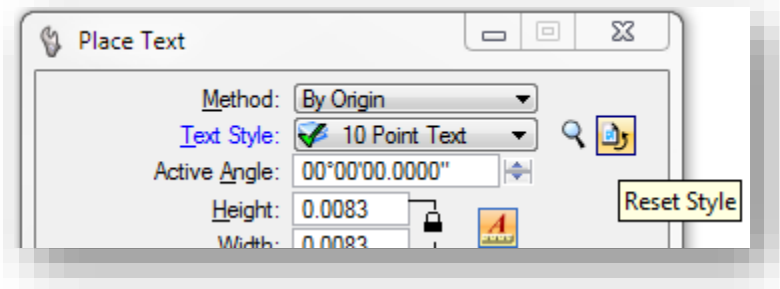
17. With the Place Text tool active, first set your Text Style to 10 Point Text. This will initiate the appropriate justifications and sizes. Due to the constrained size of the reference boxes, we will adjust our font to the Bentley WORKING font as shown. Expand the dialog by clicking on the arrow in the lower right hand corner and select 1 WORKING from the Font section. Note that upon changing the font, the Text Style field highlights itself blue. This denotes that you've adjusted the font from the default style.



Place Text Settings

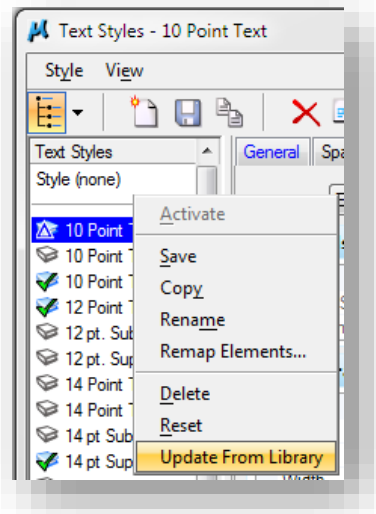
A note on Text Styles

As shown in the previous steps, we are deviating from the standard font applied to the 10 Point Text style, which will cause your text styles to become out of sync with the dgnlib. In order to revert your text style to the appropriate values, either select the Reset Style button on the Place Text panel as shown:



Reset Style

Or you can reset the style from the Text Styles dialog located under **Element -> Text Styles** on the MicroStation menu. When you locate the style that no longer matches (it will be denoted with a Δ), right click on it and select “Update from Library”.



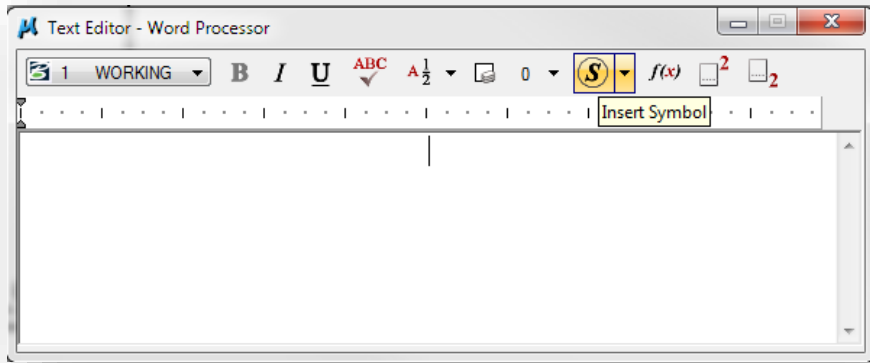
Update from Library

In addition to adjusting the font, it may also be desirable to adjust the Justification options to more appropriately place your text along, above or below elements. Again, you can revert back to the default text style settings using the methods shown above.

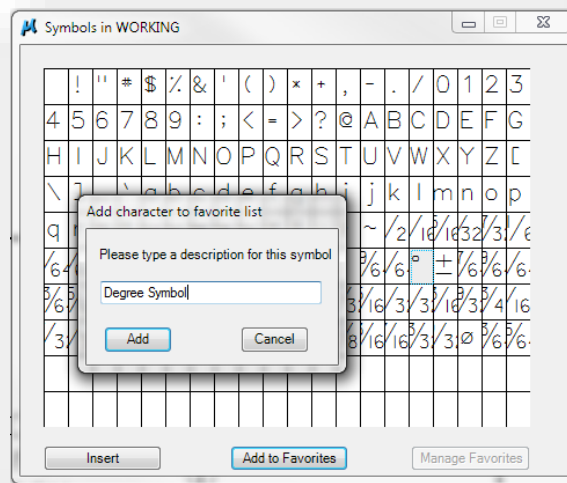
More notes on Text Placement

Various notes may require the use of special characters not directly accessible via the keyboard, such as the degree symbol. There are two ways to place this and other symbols. The first method is

via the Insert Symbol button on the Text Editor. Selecting this button will bring up a fully illustrated list of the available characters in the active font. Via this browser you can find the symbol, insert it into your text and quickly add it to the symbols favorite list.



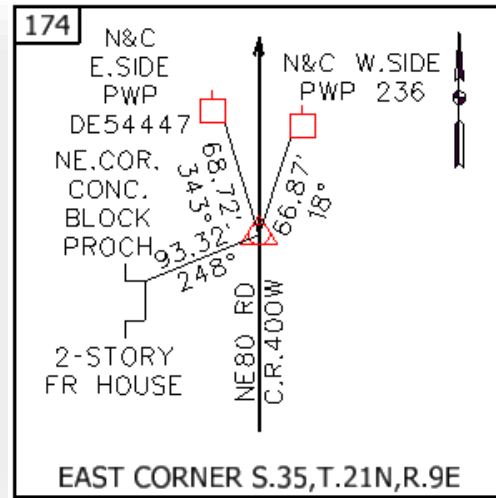
The Insert Symbol Tool



The Symbol Browser and Adding to Favorites

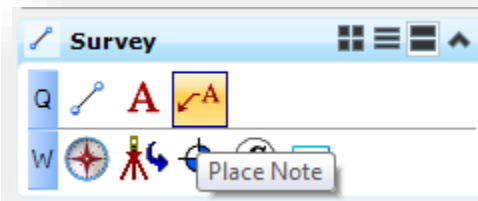
Additionally, if you know the appropriate key-in sequence, you can type the symbol in. In the case of the degree symbol and the Working font, you can type it in by holding down the ALT key, then typing 9 then 4. This will place a ^ in the text editor, however when going to place the line of text, a degree symbol will appear.

18. After placing the appropriate labels, your reference box should look similar to the following.



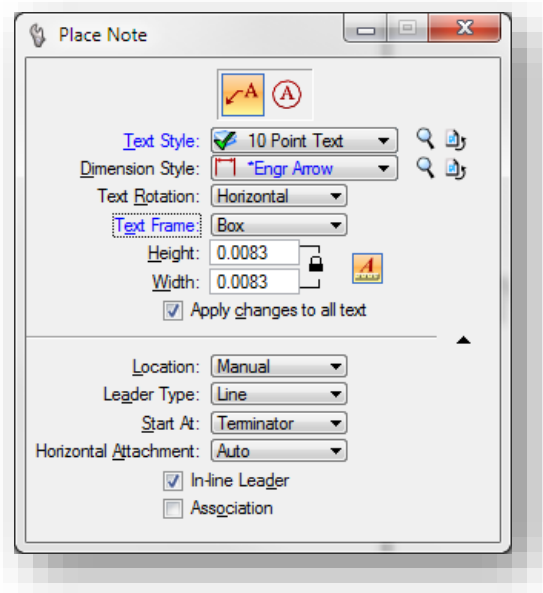
Reference Box with Labels

19. Finally we need to place the note describing the monument type. Similar to the Place Text tool, we will need to start the Place Note tool. This tool can also be found in both the locations mentioned in step 16.



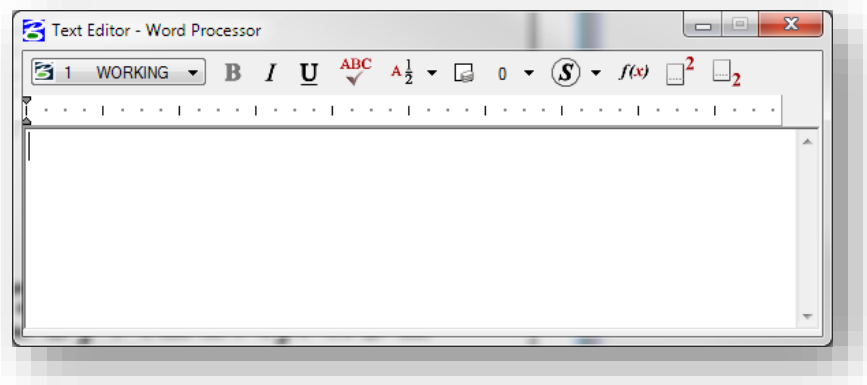
Place Note

20. With the place note tool active, set your Text Style to 10 Point Text, the Dimension Style to Engr Arrow, and your Text Frame to Box as shown.



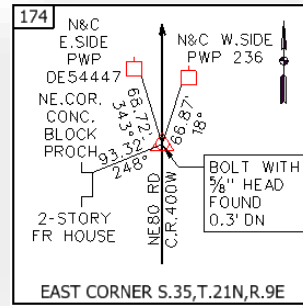
Place Note Settings.

21. Next, on the Text Editor, change your active font from Tahoma to the Bentley WORKING font.



Setting the WORKING Font

22. With the Place Note tool configured, type the monument information into the Text Editor. When the text is typed, place your cursor on the monument in the reference box and select the location where you'd like to start the terminator. A second placement will determine the leader length and direction and place the text box. The resulting reference box will appear as follows:



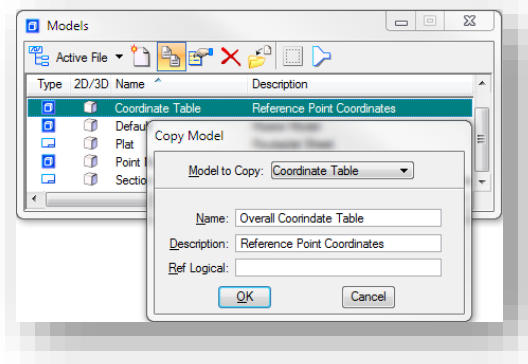
Completed Reference Box

23. At this time you may need to restore your text and dimension settings to their default configuration. These steps are noted in tips throughout this section and are similar for text and dimension styles. With this first reference box created, you can now create additional reference boxes for each point in the plat.

6.4.4 Creating the Reference Point Coordinate Table

Since the coordinates for the Reference Points are no longer contained in the Reference Box, a Coordinate Table will need to be created. It is recommended to create one overall coordinate table for the Route Plat. The following steps go through the process of creating a Coordinate Table.

1. As we did with the reference box, we're going to use the Models dialog to copy the template model included in our .dgn file. Open the Models dialog and copy the Coordinate Table model.



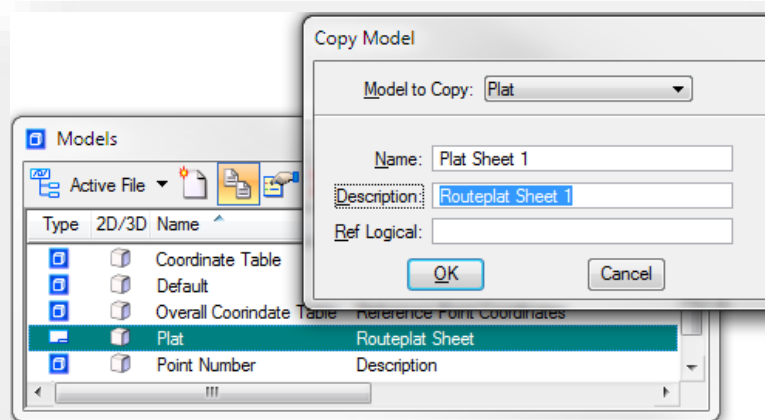
Copying the Coordinate Table

2. With our table copied, make sure the new model you created is active. If not, double click on it in the Models dialog to activate it.
3. All the text in this table is editable via the standard text editing tools in MicroStation. Using either the Edit Text tool, or by double clicking on the pieces of text, edit the values for your coordinate table accordingly.

6.4-5 Adding the TOPO to the Routeplat Sheet

With our reference boxes and coordinate tables created, we can now begin the process of creating the route plat sheets and populating the file with content.

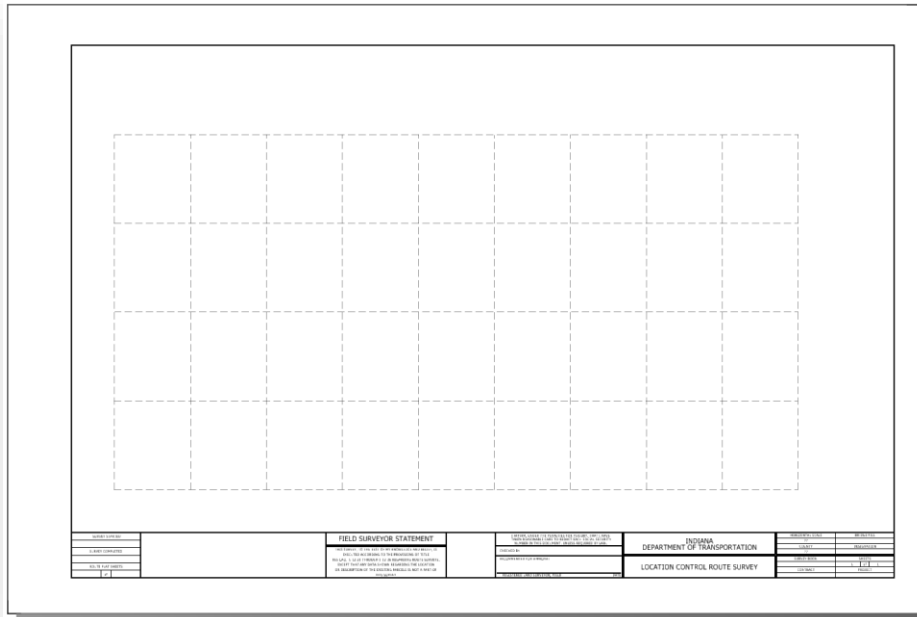
1. As we've done in the previous two examples, take the template routeplat provided in the .dgn and copy it to a new model.



Copying the Plat Model

2. If not opened automatically, double click on your newly created model to activate it. Should you need additional plat sheets, repeat step 1 as needed.

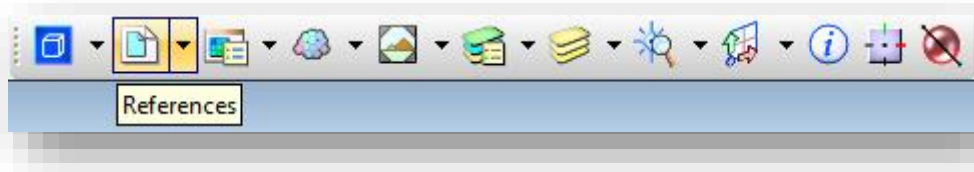
- Now that we have a new routeplat model created and open, we can begin adding the various pieces of content. When first entering the new routeplat model, you will see the following template information:



The Template Routeplat

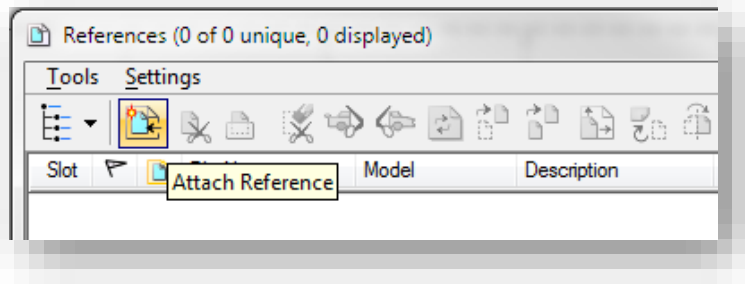
As you can see in the following illustration, the template contains the appropriate border file and a grayscale border all in a sheet model (denoted by the virtual paper size around the border).

- At this time, we're now ready to begin adding content to this file. The vast majority of content that we'll be adding will be via MicroStation references. Open the References dialog from the MicroStation toolbar.



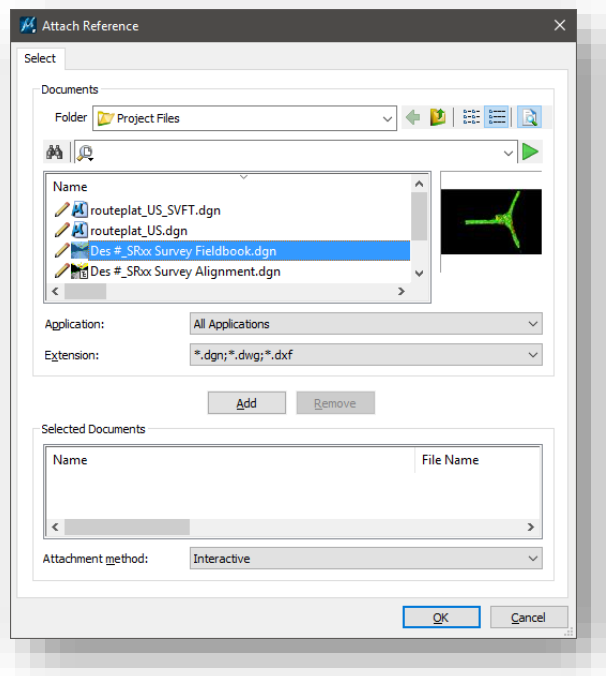
MicroStation References

5. The first item we'll attach is the topo drawing we've created for our project. Start by selecting the Attach Reference button from the Reference dialog.



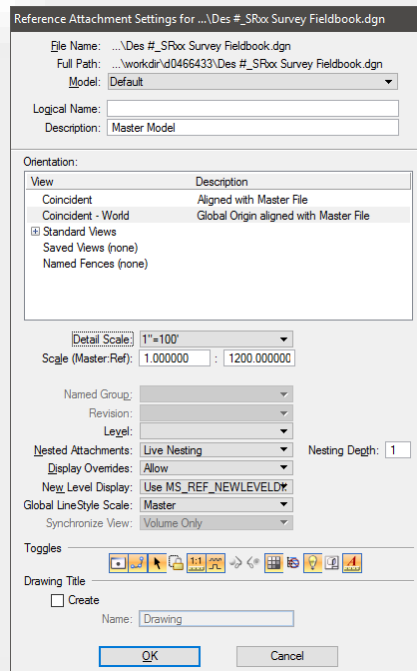
Attaching References

6. Unlike the prior version of our referencing procedures, we've created all our content in a single survey fieldbook DGN. As such, when prompted for the file you'd like to attach, select your single topo drawing as shown. Make sure to set the attachment method to Interactive so you can adjust the scaling and view orientation.



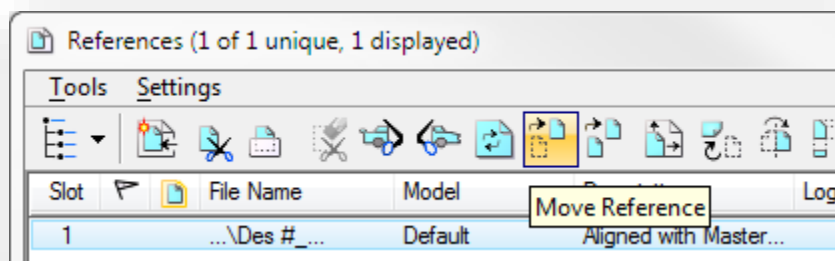
Reference Attachment

7. With your topo selected, select OK and configure the additional settings for your attachment. The following illustration shows the attachment made at 1"=100'. Please note that on this panel we've selected Coincident-World as our Orientation.



Attachment Settings

- As we've selected a Coincident-World attachment, your topo will not appear within the border. We need to move our topo back into the border. Start by zooming extents, and then in the References dialog box, choose all the attached reference filenames you want to move, and select the **Move Reference** button.

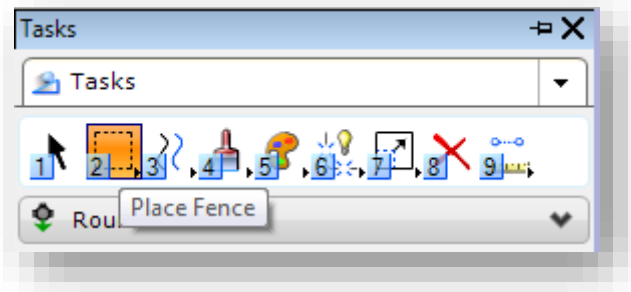


Move Reference

Left click at the location in the drawing you want to move the files from and then left click at the location in the drawing you want to move the files to. This will move all the selected files to the new location.

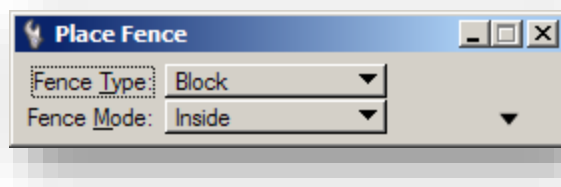
- Be sure to save settings by hitting **Ctrl + F**, or selecting **File -> Save Settings**. This will ensure that the changes you made to the reference files will be saved for next time.

10. If you need to clip the reference, the easiest way is to use a fence. Select the Fence tool from the Task Navigator.



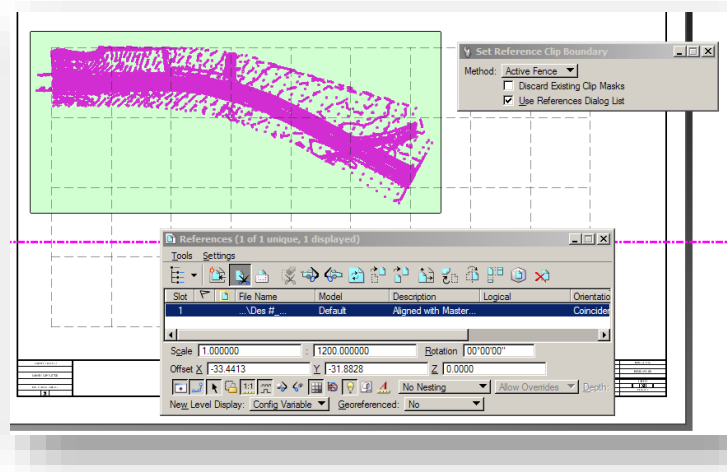
Place Fence

11. On the place fence tool, make sure your Fence Mode is set to Inside. In most instances, you can leave the Fence Type set to Block, however it may be advantageous to use one of the other fence methods to achieve a tighter clip around your topo.



Place Fence Tool Settings

12. With your fence placed around your topo, you now need to select Clip Reference from the References dialog as shown. On the Set Reference Clip Boundary dialog, make sure the Method is set to Active Fence. When satisfied with the boundary fence you've defined and the clipping settings, left-click in the drawing area to accept the clipped reference settings.



Reference Clipping

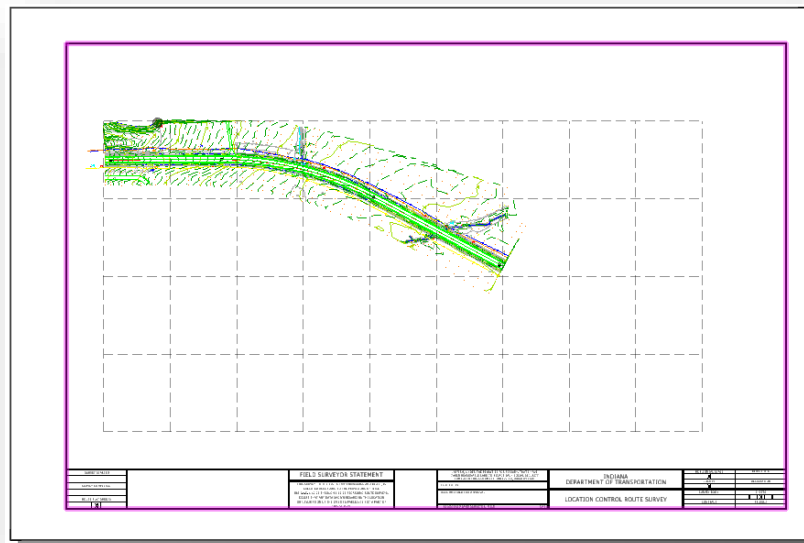
Note: You could draw a polygon and change its Class to Construction. Then by changing the Fence Type to Element you can create the fence by selecting the polygon. This would give you a way of recreating the same clip area for additionally attached reference files.

13. Be sure to save settings by hitting **Ctrl + F**, or selecting **File -> Save Settings**. This will ensure that the changes you made to the reference files will be saved for next time.

6.4-6 Adding Reference Boxes to the Routeplat Sheet

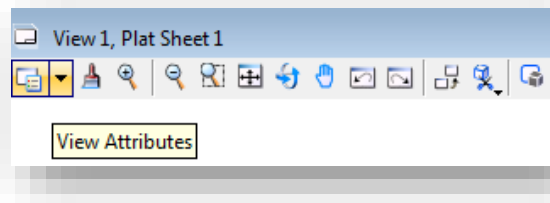
Now that we've added the topo to the route plat, we need to add the reference boxes to the sheet. Continuing from the previous set of steps, make sure that you're in the appropriate Plat model; otherwise open it via the models dialog as noted in step 2 of the previous section.

1. With the plat sheet showing in our MicroStation view, you should see the frame of your topo and a dashed grid setup in the sheet. If you don't see the dashed grid, we need to enable it with the following steps.



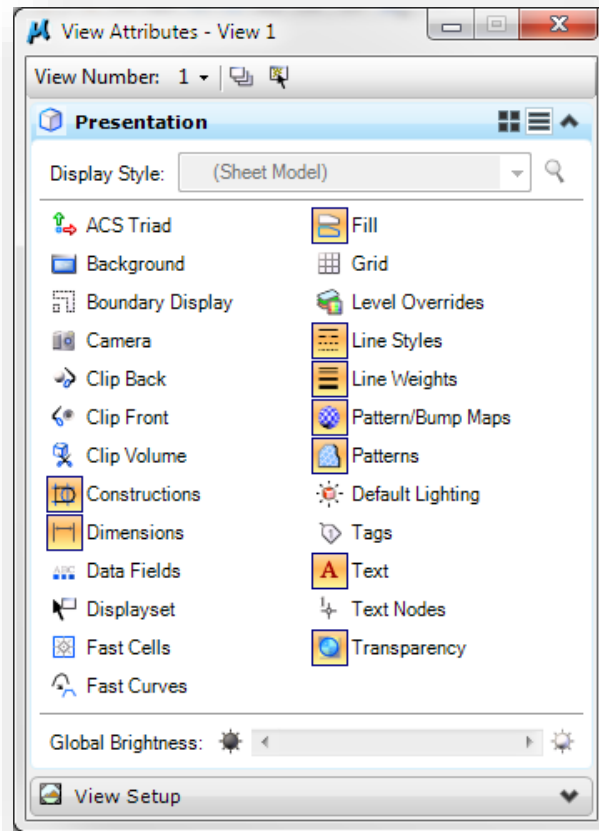
Routeplat with Topo and Grid

2. If the grid isn't visible, enable the Constructions option on the View Attribute panel. This panel can be found on the View toolbar.



View Attributes

3. The Constructions item can be found on the left side of the panel. Make sure it's highlighted as shown in the following capture:



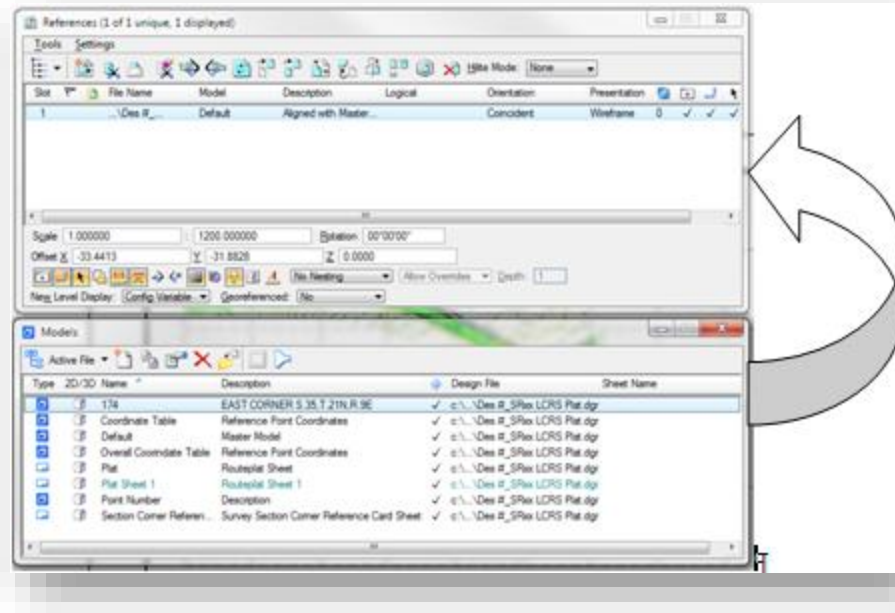
Constructions Elements Enabled

4. At this time, we want to open both the Models and References dialog boxes from our Primary Tools toolbar. They sit next to each other as shown:



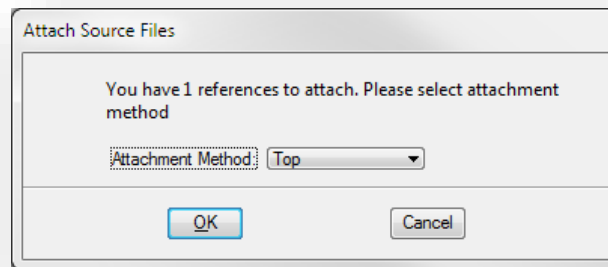
Models and References

- With both dialogs open, we can now drag our Reference Box models from the models dialog and directly attach them to our Plat as references. Note that you can drag and drop multiple references boxes at the same time on this dialog. For this example we will only be attaching a single reference box.



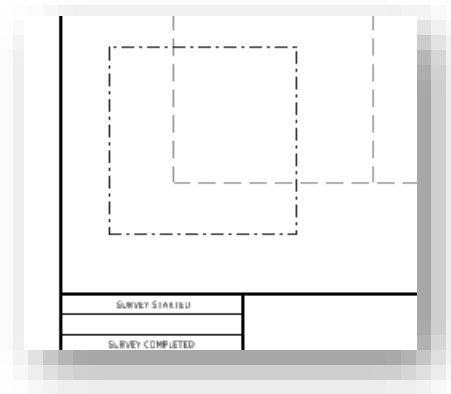
Reference Box Attachment Drag and Drop

- Upon completion of the drag and drop, you will be prompted with the **Attach Source Files** dialog requesting you to adjust the alignment of the references being attached. For our reference boxes, we want to use the Top attachment method as shown:



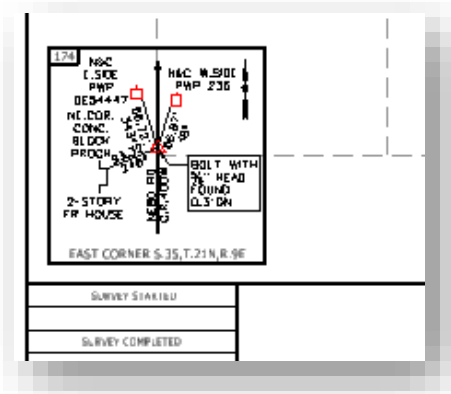
Attach Source Files

- After accepting the attachment method, you will see an outline of the reference extents that you're trying to attach. Note that the attachment point is the center of the reference.



Reference Attaching

- At this time, you need to position your cursor and snap to the appropriate grid location where you'd like to place the reference box. When satisfied with your location, place the reference by a left-click.



Placed Reference Box

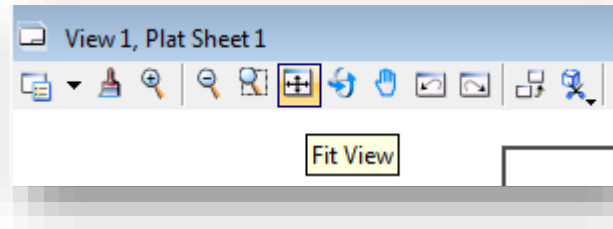
- Repeat steps 5-8 for each successive reference box. Finally, to disable the reference grid, disable the Constructions view attribute that we enabled in step 3.

6.4-7 Adding the Coordinate Table to the Route Plat

Next we need to add our Coordinate Table to our plat sheet.

- If not open and active, open your route plat and make sure the plat sheet is open in MicroStation.

2. Make sure you've fit the entire sheet in your view. Do this by either performing a Fit View Zoom from the View toolbar or by double clicking your middle/mouse button.



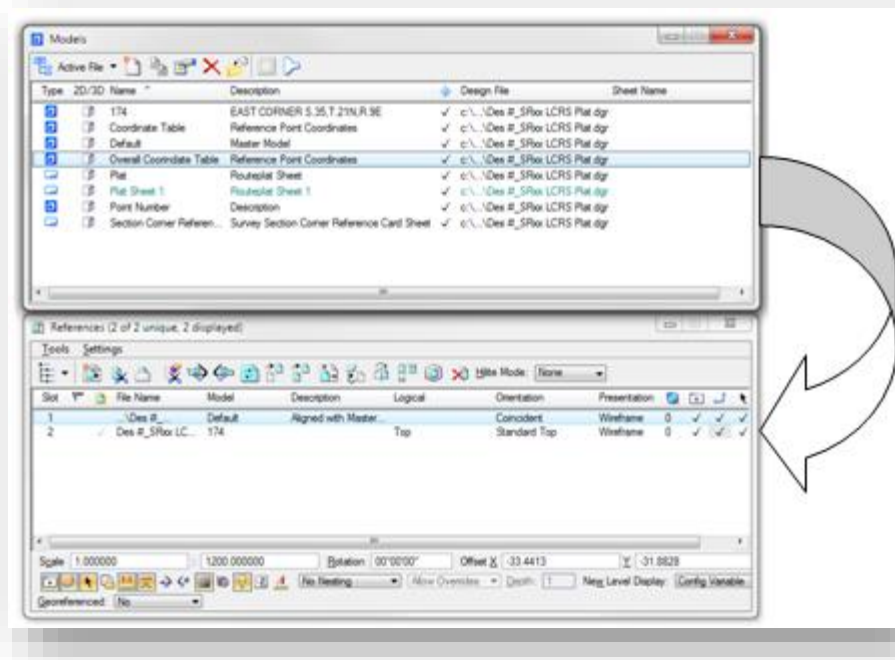
Fit View

3. At this time, we want to open both the Models and References dialog boxes from our Primary Tools toolbar. They sit next to each other as shown.



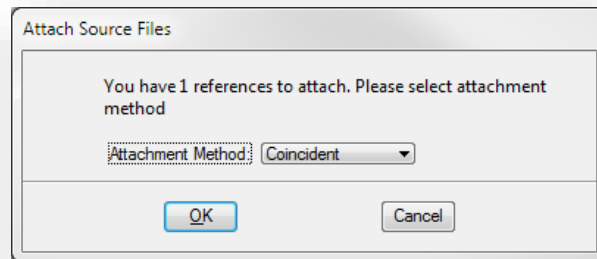
Models and References

4. With both dialogs open, we can now drag our Overall Coordinate Table model from the models dialog and directly attach it to our Plat as a reference.



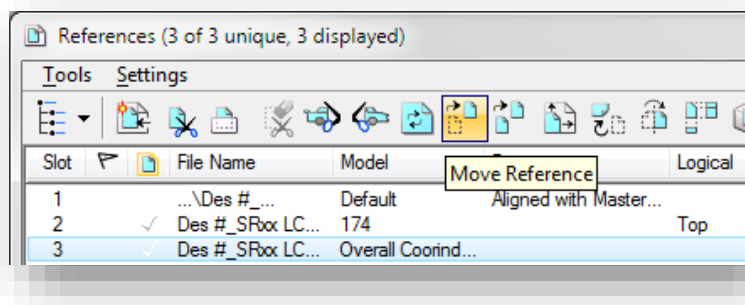
Attaching the Overall Coordinate Table

- When prompted with the **Attach Source Files** dialog, set your attachment method to Coincident.



Coincident Attachment

- This will attach the coordinate table to your routeplat sheet. You can adjust this reference placement by highlighting it on the Reference dialog and selecting the Move References tool and moving the reference as you would any other element.

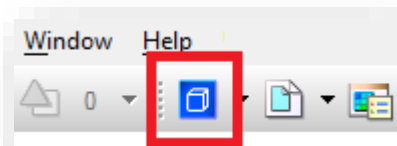


Move References

6.4-8 Creating Section Corner Cards

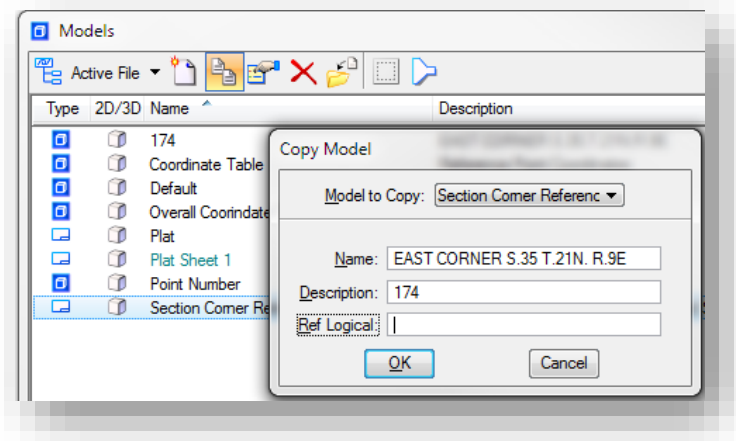
This section will walk you through the creation of Section Corner Cards and attaching the appropriate reference boxes.

- Make sure your route plat file is open. At this time you do not need to be in a specific model.
- Open the Models dialog. As we have done in previous examples, we'll be copying the template Section Corner Reference Card Sheet model as we did with both the reference boxes and the plat sheet.



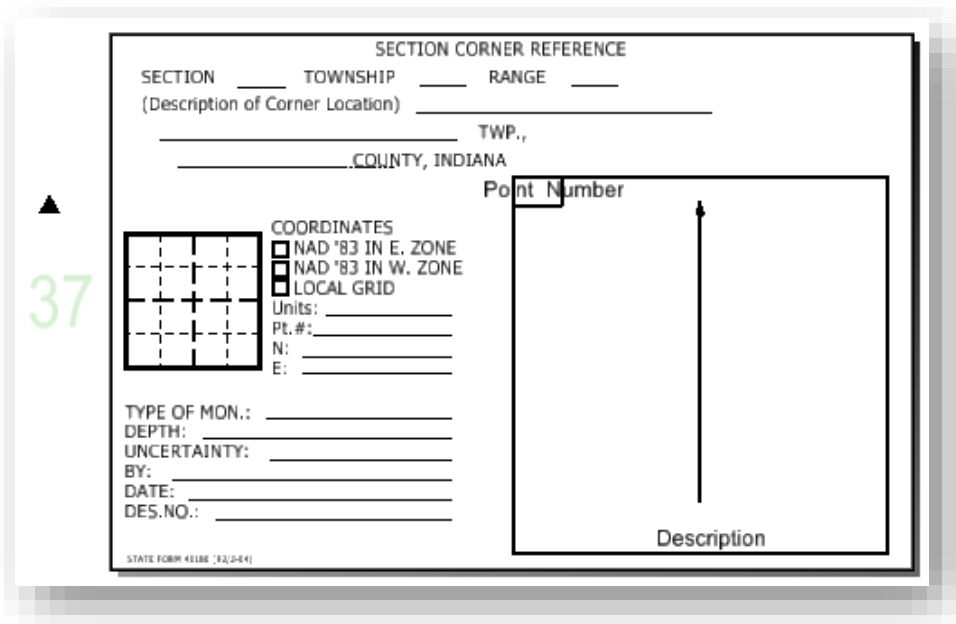
Accessing the Models Dialog

- With the Models dialog open, highlight the Section Corner Reference Card Sheet model, then select the Copy Models button from the toolbar.



Copying the Section Corner Reference

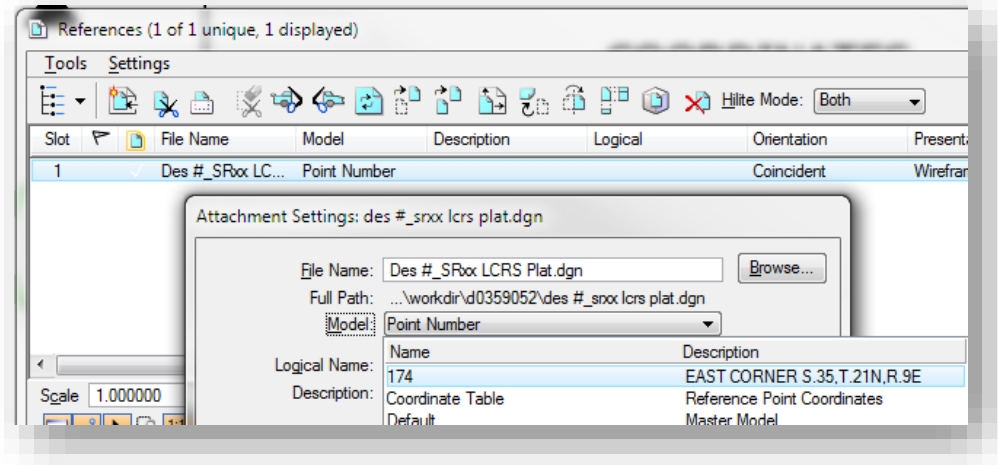
- In the Copy Model dialog, type the name and description of the reference card as shown in the previous illustration and hit OK. This will copy the model and should open it in the MicroStation session. If it doesn't open automatically, switch to it by double left-clicking on the model in the Models dialog.



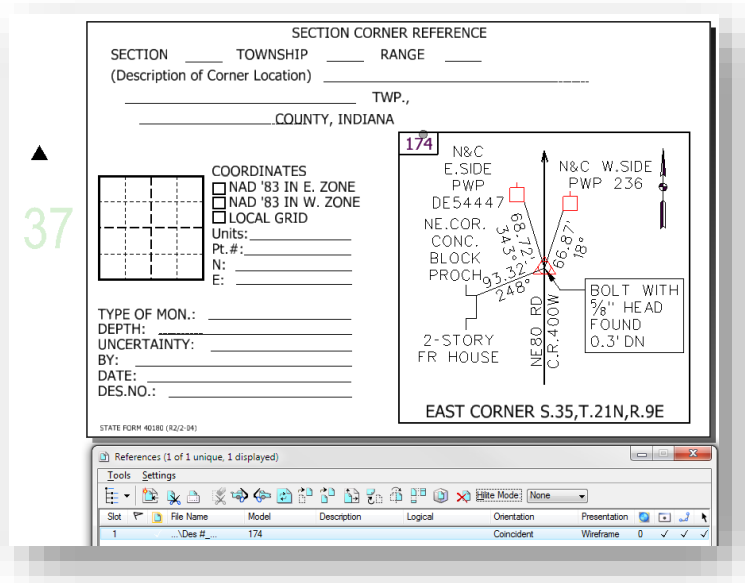
Section Corner Card with Reference Box

- Open the References dialog from the Primary toolbar. You'll find that this model already has a reference back to the blank Point Number model in our active file. This is pre-attached to appropriately place the reference and allow you to quickly select the appropriate point number attachment.

- In the reference dialog, double-click on the reference with the Model named Point Number and when prompted, change the model on the Attachment Settings to the appropriate reference box as shown.

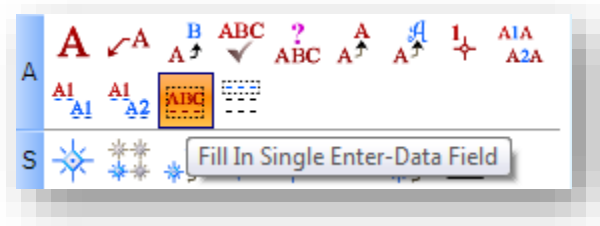


Adjusting Reference Box Attachments



Reference Box Attachment

7. At this time, you may conclude filling in the fields on the reference box and moving the section corner elements as needed. To edit the text, use the Fill In Single Enter-Data Field tool found on the task navigator under the Drawing task.



Editing Section Corner Fields

8. Repeat the previous steps for each reference box as needed.

6.5 OpenRoads/InRoads Reporting

6.5-1 Exporting OpenRoads Survey Data

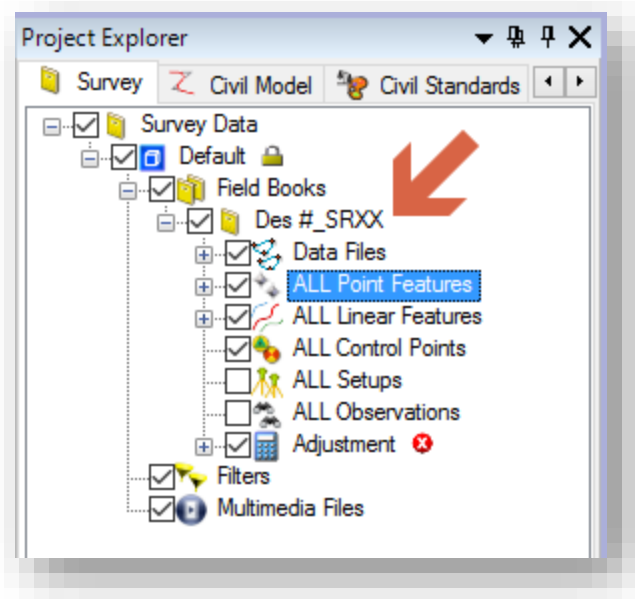
For Survey Data, OpenRoads technology uses different methodology for the reporting tools. Using the built-in survey processing and display tools, reporting can be far more specific—down to the feature level. This section will look at two different export methods: direct export to .csv and usage of the OpenRoads reporting tools.

Please keep in mind that these methods are not a way to directly export data to a ready-made format and are more akin to a direct coordinate export. Any output that these methods produce may need some clean up and modification if the intention is to use the data these provide in other ways.

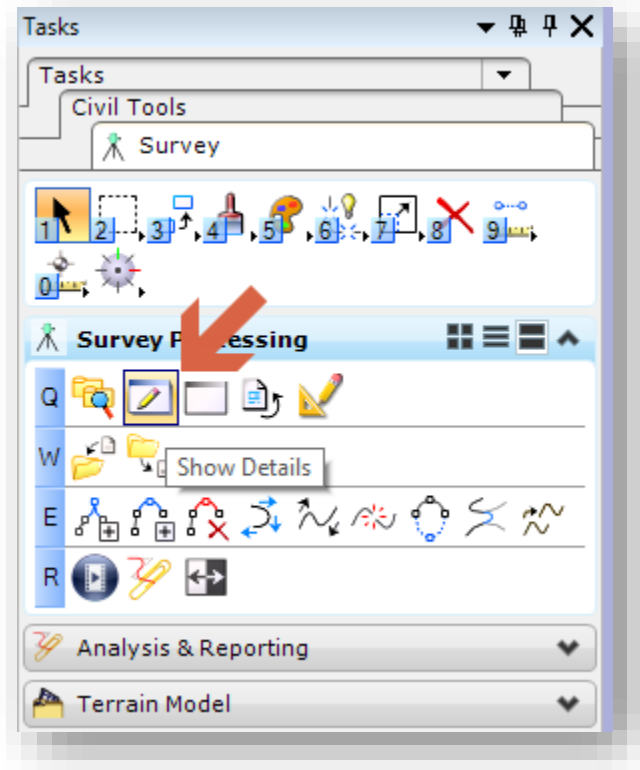
6.5-1a Reporting on Survey Information

The following steps look at how to turn OpenRoads survey information into a reported format similar to those provided in SS2. This example will show reporting on Point Features.

1. With your DGN open, navigate to the Survey tab of the Project Explorer. Locate your fieldbook.



2. Locate the Point Features highlighted in the previous screen capture. On the Survey task, under Survey Processing, select the Show Details entry.



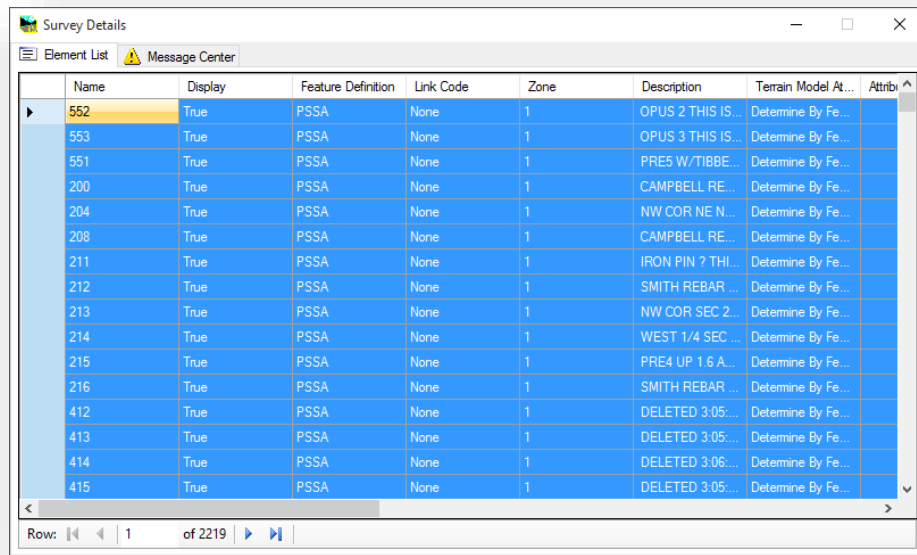
3. This will bring up the Survey Details for all the points. Should you wish to only report on a certain feature, or subset thereof, you can continue to drill down under the All Point Features on the Project Explorer to the feature you'd like.

The 'Survey Details' window displays the following table:

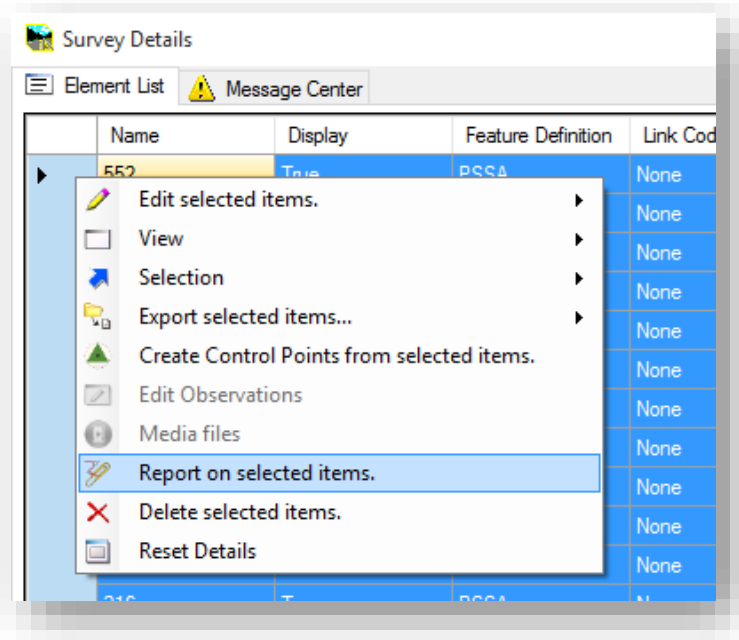
Name	Display	Feature Definition	Link Code	Zone	Description	Terrain Model At...	Attrib...
552	True	PSSA	None	1	OPUS 2 THIS IS...	Determine By Fe...	
553	True	PSSA	None	1	OPUS 3 THIS IS...	Determine By Fe...	
551	True	PSSA	None	1	PRE5 W/TIBBE...	Determine By Fe...	
200	True	PSSA	None	1	CAMPBELL RE...	Determine By Fe...	
204	True	PSSA	None	1	NW COR NE N...	Determine By Fe...	
208	True	PSSA	None	1	CAMPBELL RE...	Determine By Fe...	
211	True	PSSA	None	1	IRON PIN ? THI...	Determine By Fe...	
212	True	PSSA	None	1	SMITH REBAR ...	Determine By Fe...	
213	True	PSSA	None	1	NW COR SEC 2...	Determine By Fe...	
214	True	PSSA	None	1	WEST 1/4 SEC ...	Determine By Fe...	
215	True	PSSA	None	1	PRE4 UP 1.6 A...	Determine By Fe...	
216	True	PSSA	None	1	SMITH REBAR ...	Determine By Fe...	
412	True	PSSA	None	1	DELETED 3:05:...	Determine By Fe...	
413	True	PSSA	None	1	DELETED 3:05:...	Determine By Fe...	
414	True	PSSA	None	1	DELETED 3:06:...	Determine By Fe...	
415	True	PSSA	None	1	DELETED 3:05:...	Determine By Fe...	

Row: 1 of 2219

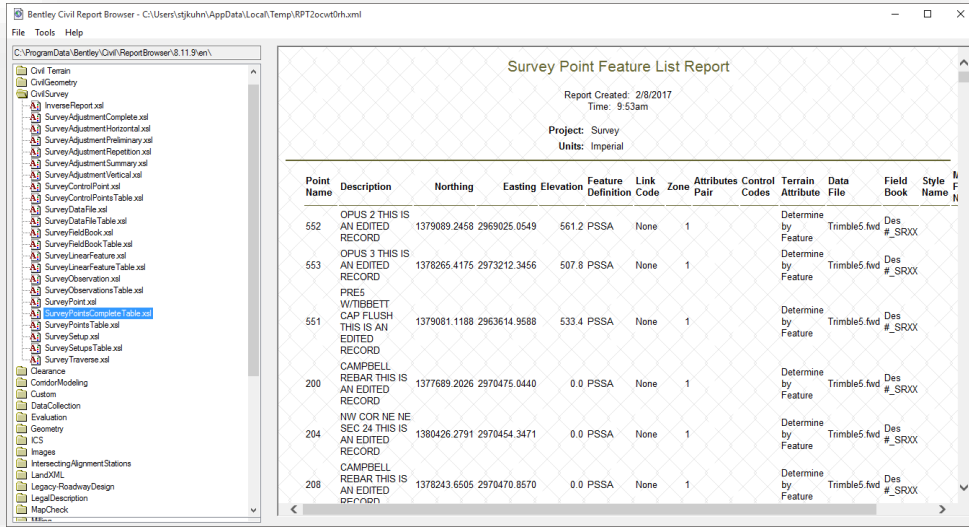
4. On the Survey Details display, you can select as much or a little as necessary. This dialog adheres to standard Windows conventions of Ctrl-click and Shift-click methods to select multiple entries either one at a time or in a sequence. For this example, all points have been selected by using the Ctrl+A (select all) command.



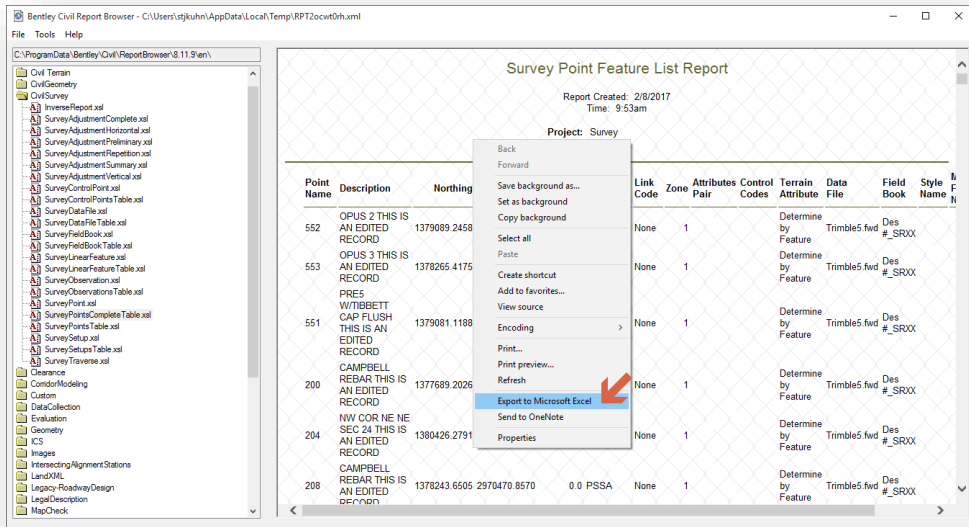
5. With your points selected, right click on the far left hand column (to the left of the point names, the upper left box will not work), and select **Report on selected items.**



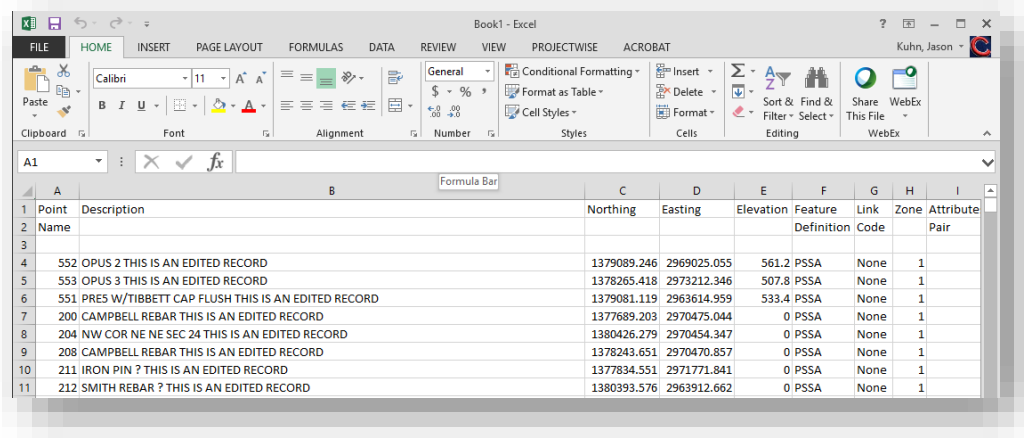
- This will start the Bentley Civil Report Browser and initialize the SurveyPointsCompleteTable.xsl.



- You can then save the output to a number of formats, along with printing it to a printer or PDF file. Additionally, by right-clicking on the report background, you can bring up a context menu that allows you to export the format directly to Excel.



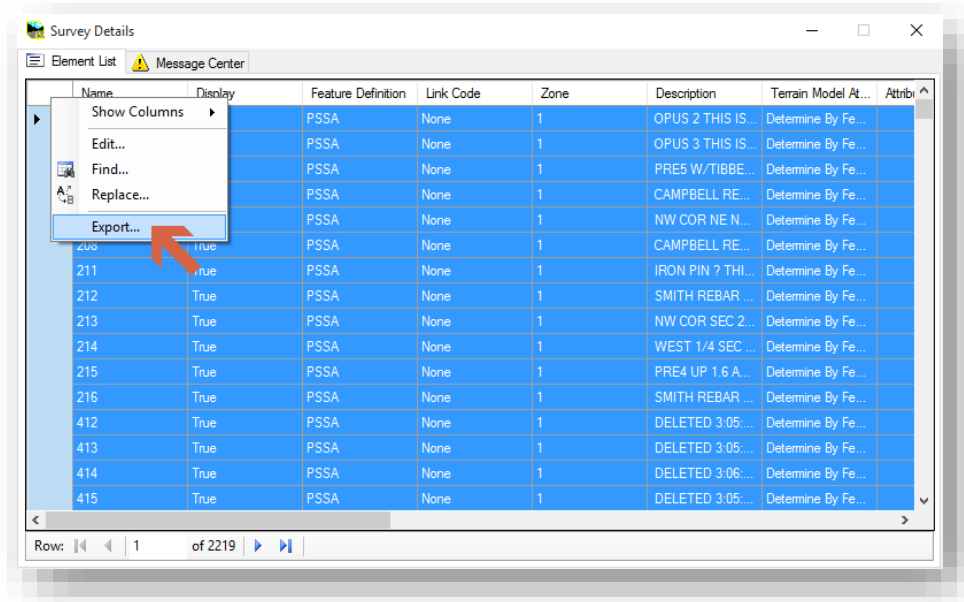
By exporting to Excel, you will get a tabular file with all the data in the report shown in their appropriate columns. This will allow for the data to be quickly adjusted, and then if needed, saved to a .csv or other needed formats.



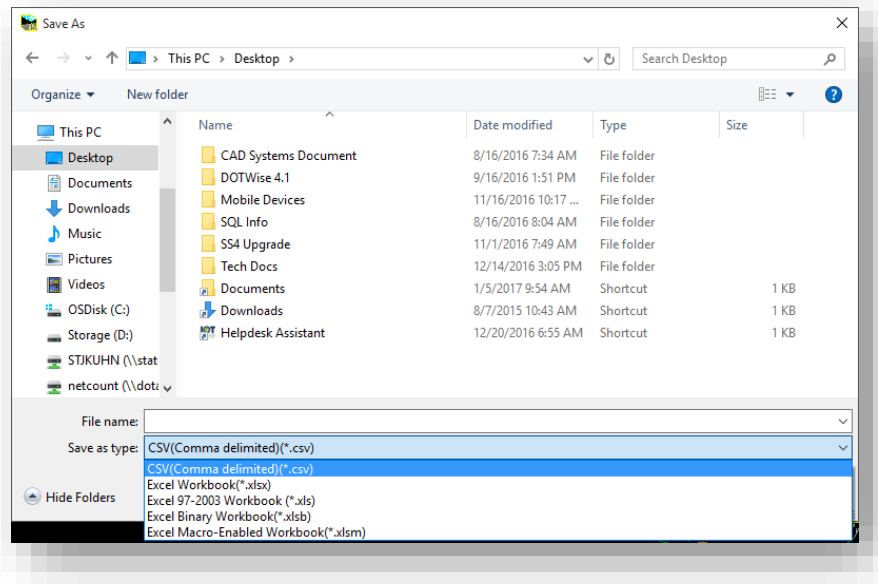
6.5-1b Direct Export

The steps for this process are similar to those in the previous section. Perform steps 1 through 3 as shown.

4. To export the points directly out without reporting, you'll right click on the upper left hand cell in the table (to the left of the Name field header). Select the Export option shown.



- You will be presented a Save As dialog. Selecting the Save as type will present the different options you can save your file out as.

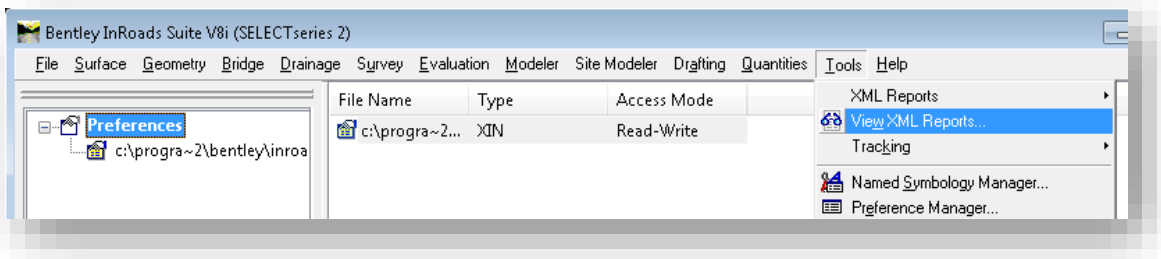


Depending on the format chosen, you can then open the file either directly in Excel, a text editor, or a number of different applications.

6.5-2 InRoads XIN Code Report

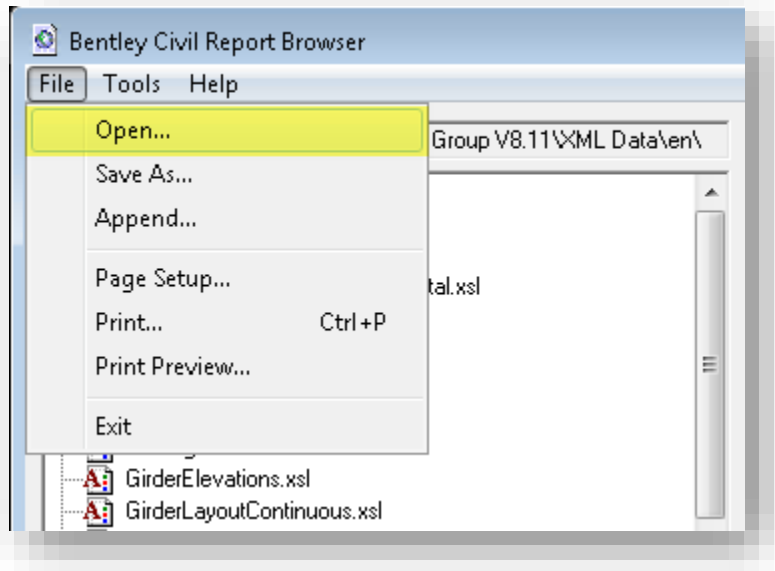
Within the InRoads environment, it's possible for each user to export a list of the survey codes from an InRoads report. To do so, the following steps should be performed:

- Start MicroStation and InRoads, any DGN will work as no items need drawn up.
- On the InRoads Explorer, navigate to the **Tools -> View XML Reports....** Option.



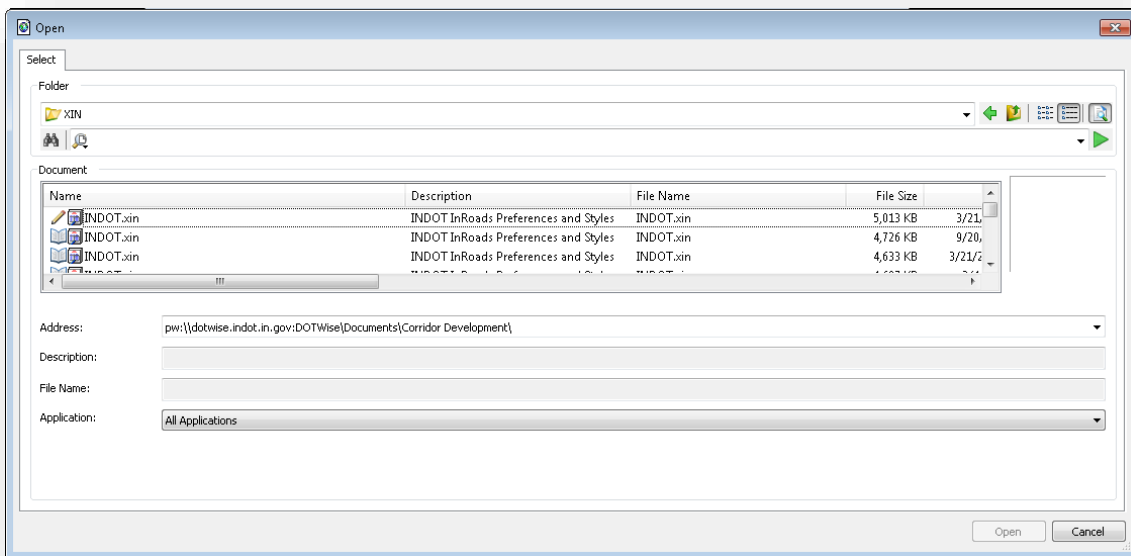
View XML Reports

3. With the Bentley Civil Report Browser open, go to the **File -> Open** option.



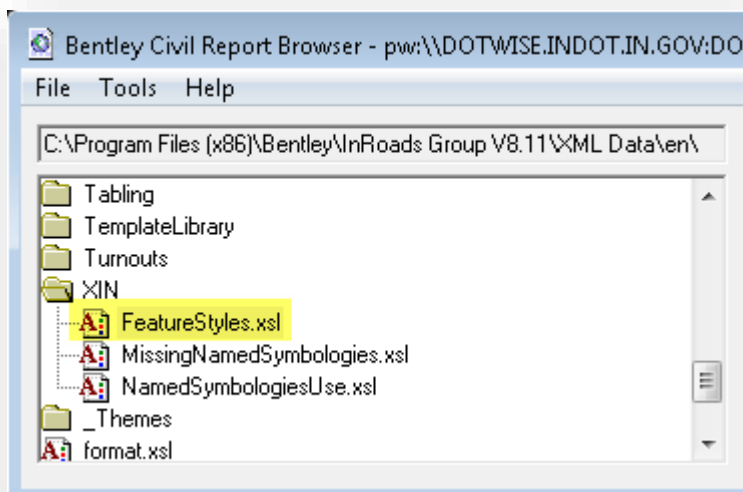
Report Browser

4. Navigate to the location of the Production XIN in ProjectWise. This location is under Documents\INDOT Workspace\OpenRoads\Workspace\xin\INDOT.XIN. **The Application dropdown will need changed to All Applications**. Select **Open**.



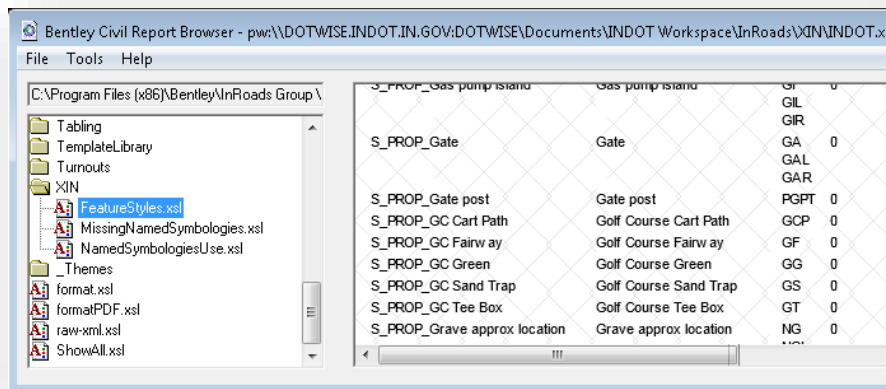
Browsing for the Production XIN

- With the XIN now open in the Report Browser, select the XIN folder in the left panel, and expand it. Under this folder, select the FeatureStyles.xml report type.



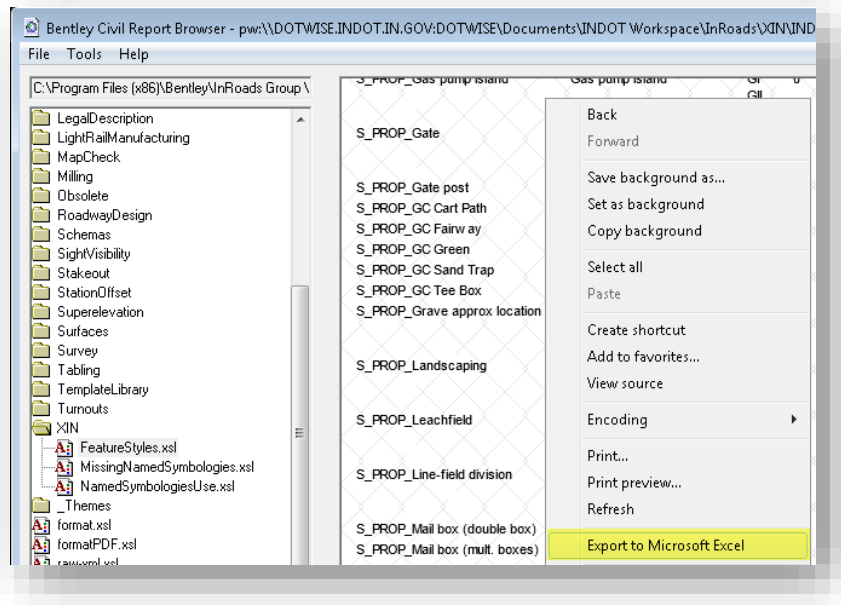
The XIN Reports, and FeatureStyles.XSL

- This will process the opened XIN through the appropriate report and will provide a list of all features and where applicable, the Survey Codes used.



XIN Report

7. With the XIN report open, there are a number of addition items that can be performed with the visible data. Of particular note is the ability to print, and export to a variety of formats. To export to a different format such as Excel, right click in the report and select Export to Microsoft Excel. With the report in other formats, the data can be adjusted to fit specific needs.



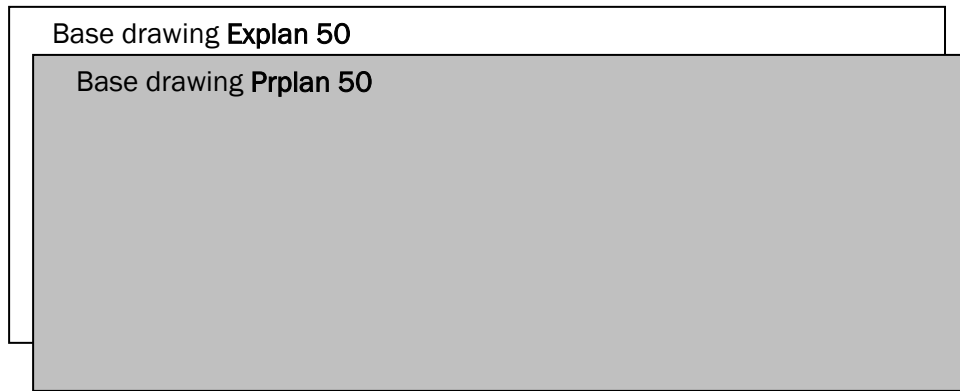
Export to Excel

7. InRoads Plans Production for Design

The following sections discuss the usage of InRoads for INDOT Plans Production purposes. We are continuing to employ the same layered approach to the drawing composition process. These sections discuss how the drawings are created, layered and pieced together to form a fully realized data set that can then be turned into a plan set.

7.1 Referenced Base Drawings

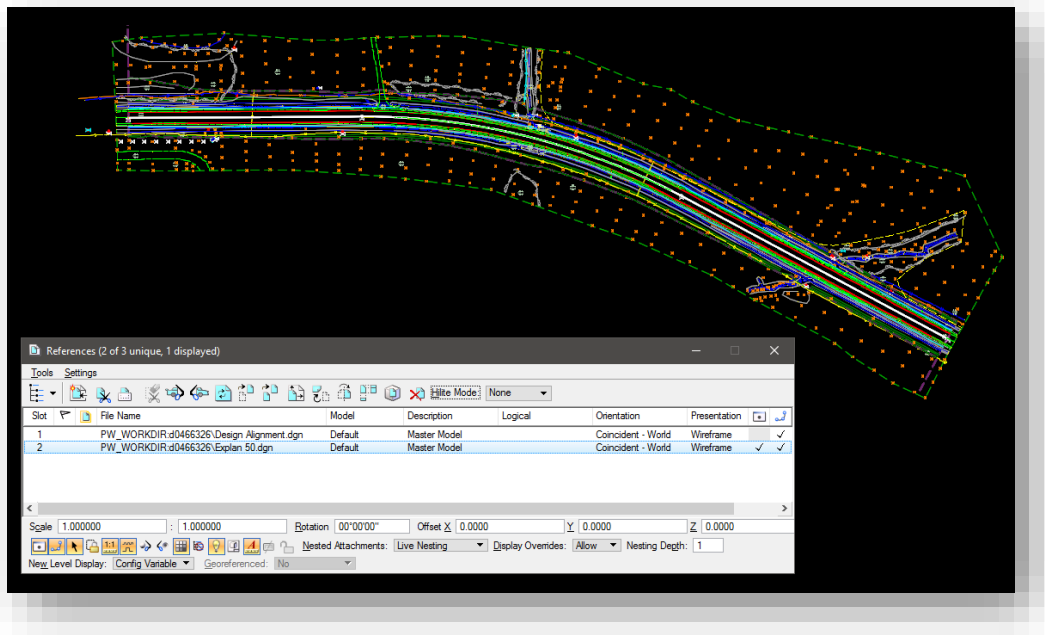
As previously mentioned, we employ a layered drawing process allowing for maximum flexibility in configuring data to be displayed, referenced, and reused. The base drawings for all these steps can be easily referenced together. The only possible difficulty might be differences in coordinate systems between the files. This may be resolved using MicroStation tools. This problem is not likely unless you have drawings (MicroStation or AutoCAD) with information from sources outside of INDOT. Despite this problem, it can be fixed. The following figure displays how base drawings are placed together.



Conceptual view of Base Drawings Referenced Together

Note: With the combination of the Survey TOPO and Terrain model information being in a single DGN, it's no longer necessary to create discreet contour drawings. The following workflow will describe the process of acquiring and using this data for your project.

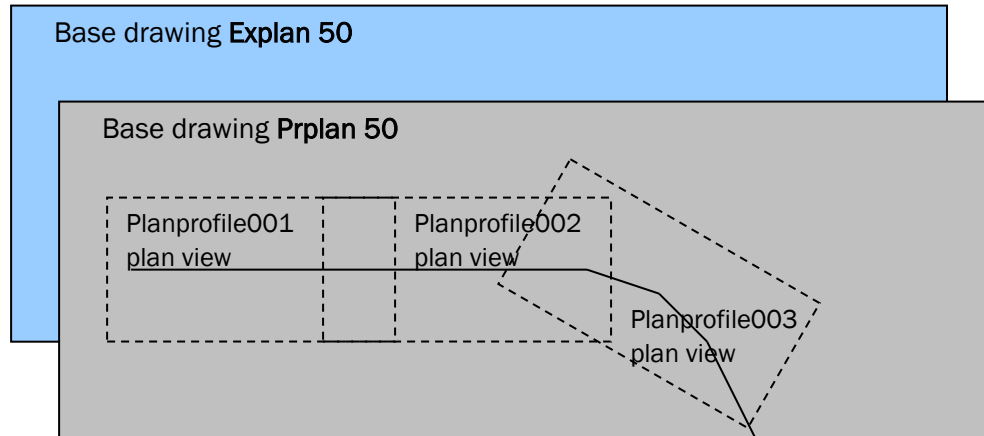
This figure displays a view with Prplan set as the active drawing and with Explan referenced into Prplan. The actual results would look like the illustration below.



Prplan 50 with Explan 50 referenced

7.2 Reference Windows

The base drawings will have reference window views that show through to all of the base drawings. The tools contained in the Plan and Profile Generator are used to create plan profiles, bridge layouts, construction details, and other drawings. The following figure displays how reference windows with multiple base drawings are placed together.



Base Drawings Referenced Together with Reference Windows.

The above figure displays a view with Prplan set as the active drawing and Explain referenced. The addition to the figure is how reference windows are included, which is accomplished by using the Plan and Profile Generator.

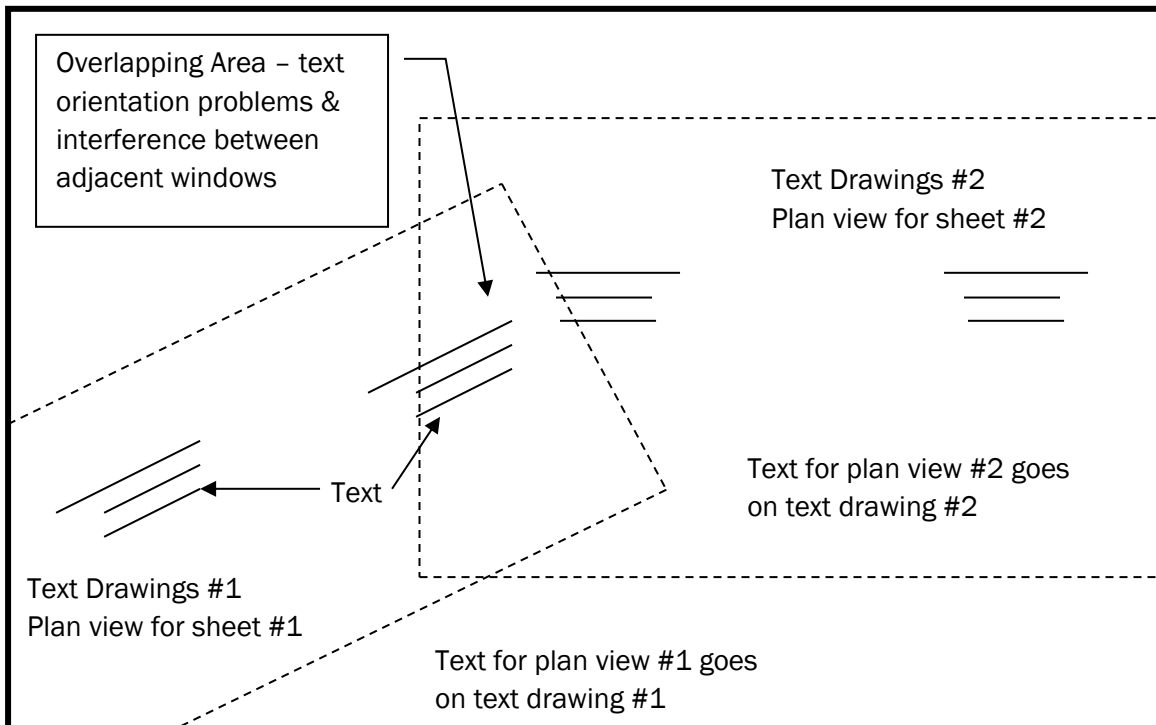
Each of the plan views represents a plan view area that is clipped into a given plan profile drawing. These same concepts apply to both plan and profile views.

Construction details, Bridge Layouts, and other drawings use the same principles for each type of drawing but with different view sizes and layouts for each.

InRoads will create saved drawings utilizing base drawings and then apply saved reference windows to each respectively based on the type of drawing and scale selected.

7.3 Text Drawings

A common CAD technique is the incorporation of text drawings. Text drawings are CAD drawings that only contain text elements. These text drawings facilitate drawing file organization and make plan set creation easier. When these text drawings are referenced together with base drawings and other drawings, they form composite drawings representing finished sheets. One major advantage of these drawings is that they eliminate problems with text orientation and overlap. The problem is related to the two possible locations to place text annotation on a set of drawings, in the base drawings and in the sheet (text) drawings. Annotation placed in the base drawings is usually oriented with North being up. This causes annotation to be readable only from one orientation. Text could be rotated for each window, but this does not fix problems occurring in overlapping plan areas. See the following figure.



Problem with Overlapping Text Area

As seen in the above window, orientation of text in the overlap area is a problem. The preferred method for text placement is in the reference view text drawing. These reference view text drawings are the plan profile drawings, Bridge Layouts, construction detail, or other drawings. The practical result of this is each drawing is a text drawing with no line work drawn in it. For the most part, the only elements which reside in the sheet (text) drawings are text elements.

Please note editing done on text drawings in overlapping areas will not be reflected in adjacent areas without editing each adjacent sheet.

The InRoads Plan and Profile Generator automatically creates sheet text drawings for plan profiles, Layouts, Construction Details, and other InRoads created sheets. The saved plan profiles, Layouts, and Construction details are essentially composite drawings made up of references for border,

existing topography, proposed design, etc. with reference windows clipped to match the size of the border. These saved sheets are ready to accept text and are text drawings.

It is also recommended that text drawings be used with cross section drawings. When used with cross sections they are created as blank drawings that will then have the border and cross section referenced in. This technique helps to preserve manual annotations on cross sections. Please note that these drawings will need created manually.

Annotations on the base drawings can be copied to each sheet. On each requisite sheet the annotations can be moved, modified, and rotated as needed. In order to prevent duplicate text coming from the base drawings, annotations can be changed to construction elements with the change element attributes tool in the base drawing. Constructions can then be turned off in each text drawing while they will remain in the base drawings. Use of save settings is important with these operations. This will allow the sheet drawings to have construction elements turned off, prohibiting duplication.

7.4 Creating Base Drawings

With the move to OpenRoads technology, a number of changes have been made to the base drawing process. The most obvious change is that some of the supplemental files that were used by InRoads are no longer necessary for the creation of the base sheets, particularly the DTM file (surface).

As the DTM content has now been split into various data containers within the DGN, there is some additional flexibility that has come about. First, contours and triangles are no longer separate drawing steps, instead they are displayable portions of the terrain model that can be enabled/disabled with a toggle. Additionally, as the DGN is now the container, standard MicroStation referencing can be used to make data available across files, while even allowing editing when used in conjunction with the **Reference -> Activate** command.

This section looks at creating comparable base drawings to how processes in the past have compiled them. This allows us to maintain a vast majority of our current workflow while maintaining flexibility in providing the base data across the project. In that regard, the biggest change is that a drawing for existing contours will no longer be created separately.

Next, a note on scaling. OpenRoads tools are no longer dependent on a specific scale being assigned at the time they are drawn, and are now using Drawing Scale instead. This allows for the scaling of data to be done on the fly as discussed in Chapter 5.8. For the purposes of this document we will continue advocating that if possible a scale be given to the file. Should multiple scales be unnecessary, the omission of the scaling is acceptable (ex. Explan 50.dgn becomes Explan.dgn). Also, be advised that once native InRoads tools are being used (Feature Annotation, Geometry Annotation, Plan and Profile Generator) the Global Scale Factors tool should be used.

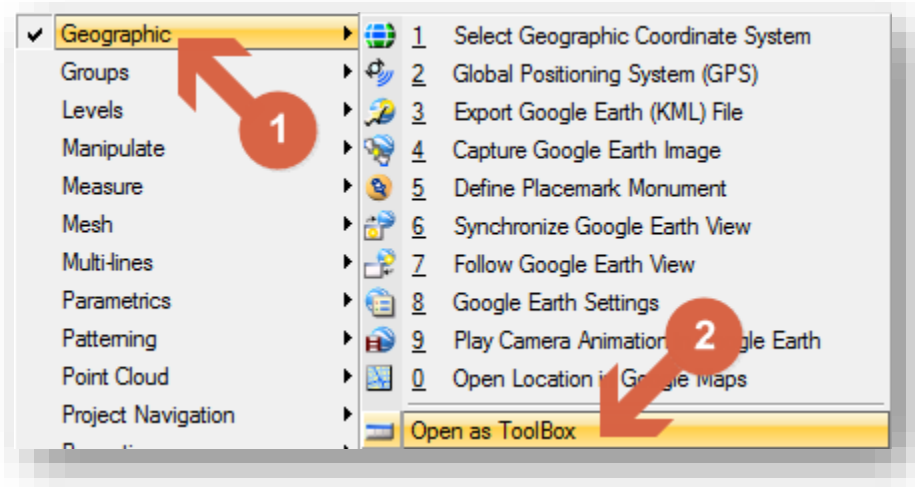
As a reminder and reinforcement from the previous sections, please pay special attention to the seed files that are recommended for use throughout this chapter. Geometry elements drawn in a 3D seed file will cause issues with cross section generation even after a vertical profile has been applied, so it's very important that content is placed in the right file to eliminate potential issues.

7.4-1 Geocoordinating Base Drawings

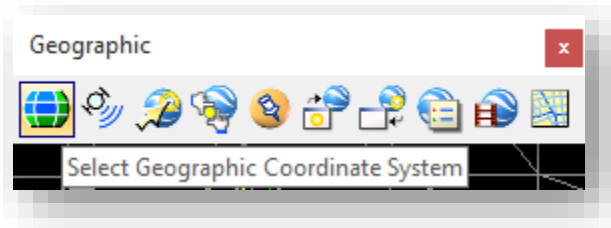
Depending on the methodology used to start your base drawings, you may opt to start from fresh seed files. The following documentation assumes the usage of already provided files that will be preset with the appropriate geocoordination information. This section, however, covers the process of geocoordinating individual files and may not apply/be necessary in all workflow situations.

One can easily geocoordinate a DGN file through the following process. This process is not dependent on having InRoads running and can be accomplished in a regular MicroStation session.

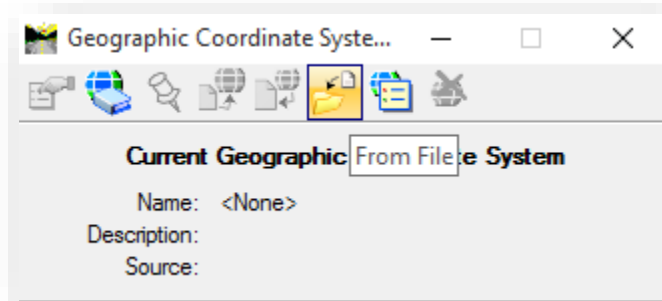
1. In MicroStation, go to the Tools > Geographic menu option, and select Open as Toolbox.



2. On the Geographic toolbox, select the “Select Geographic Coordinate System” button.



3. On the Geographic Coordinate System window, select the From File option.



4. This will present a ProjectWise file browser, navigate to your Survey/Project Files folder and select the Des #_SRxx Seed 3D.dgn or the 2D version.
5. With the .dgn highlighted, select Open and the geocoordinated definition for the selected file will be imported into your active DGN configuring it for further operations that can use the coordinate system such as attaching rasters, and other project data.

7.4-2 Creating the Existing Plan Drawing

Note: The following exercises are based upon a production drawing example.

With the move to OpenRoads technology, it's no longer necessary to create a specific existing plan drawing. All topographical elements are displayed directly from the Des #_SRxx Survey Fieldbook.dgn called out in the chapter 6. As this file should be created from the Survey geocoordinated seed file, no adjustments should be needed and a copy of the file can be pulled directly into your project for design use.

One of the many benefits to the OpenRoads technology is how the use of this data as a reference makes the underlying surface elements available without having to be directly in the file you're interfacing your design with. We'll look at the different methods of showing the data necessary using this file as a reference throughout this section.

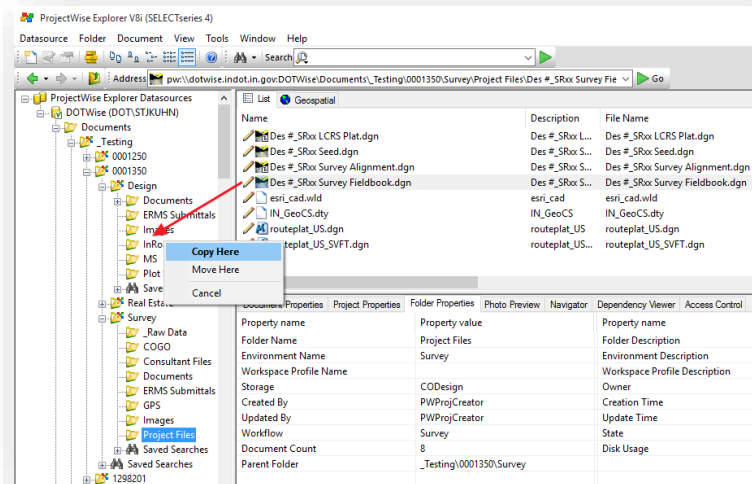
To start acquiring your data, the first stop should be your survey project. As the survey department updates their deliverable requirement, you should have access to a Des #_SRxx Survey Fieldbook.dgn file. Copy this file to your Design\InRoads folder. This file can be located under Survey\Project Files for internally surveyed projects or from your survey consultant.

Once you've located the Des #_SRxx Survey Fieldbook.dgn, you have two methods to get this data into your project:

1. You can drag/drop/copy the data in the ProjectWise Explorer and rename the file.
2. Use the ProjectWise New Document -> Advanced Wizard

7.4-2a Creating Explan Using Drag/Drop/Copy

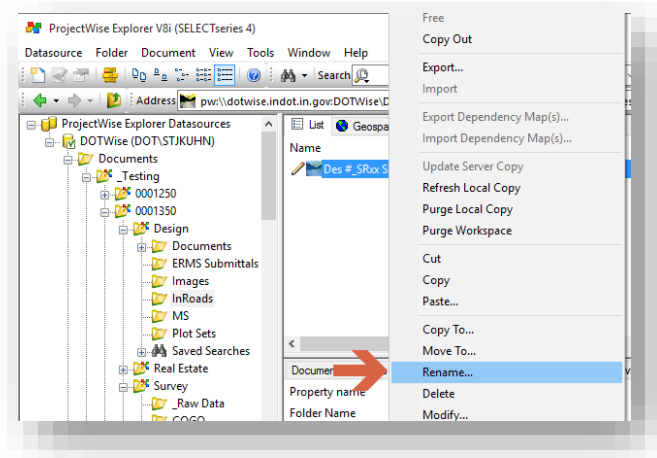
With your file located in the Survey\Project Files folder, Right click on the Des #_SRxx Survey Fieldbook.dgn, do not let go of the right mouse button. While continuing to hold the right button down, drag the file from its current location to your Design\MS folder as shown.



Right Click Dragging a File

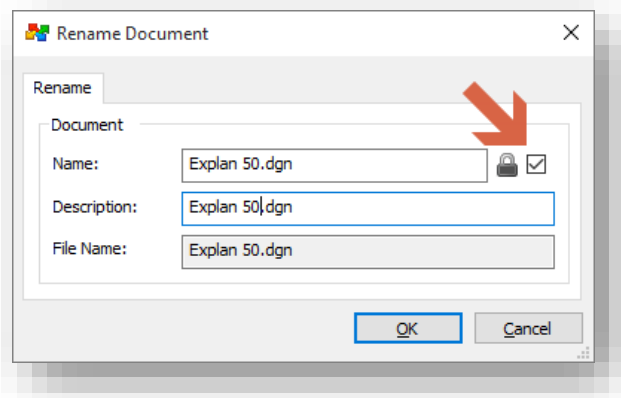
With your cursor over the InRoads Folder, release the right click. At this time you'll be presented with the Copy Here/Move Here/Cancel options shown in the previous illustration. Select Copy Here and ProjectWise will make a direct copy of the Des #_SRxx Survey Fieldbook.dgn in your InRoads folder.

Now the file can be renamed in line with convention to Explan XX where XX is the scale. Highlight the Des #_SR xx Survey Fieldbook.dgn under your InRoads folder and right click on it. When you release the button, locate the Rename option on the displayed menu (these settings can also be located under the Document menu with the appropriate file highlighted).



Renaming the File

On the Rename command window, make sure that all 3 fields show Explan XX.dgn for the name where XX is the scale. Note the lock icon and check box on the following illustration. If enabled, ProjectWise will automatically keep the document and file name the same. The description will still need copied/pasted.

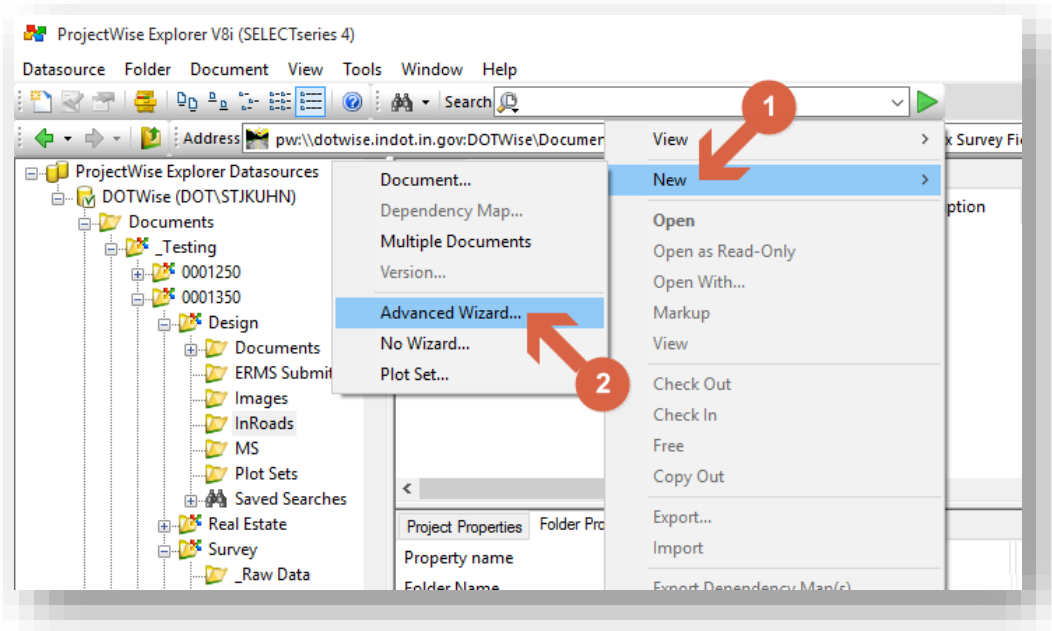


Renaming the File

At this time you now have your existing plan, contours, and triangulation data.

7.4.2b Using the New Document -> Advanced Wizard

The alternative method to creating your Explan file is to use the **New Document -> Advanced Wizard** to copy and rename the Des #_SRxx Survey Fieldbook.dgn in a streamlined process. To start this process, right click in an open area in the upper right document panel in ProjectWise and select the **New -> Advanced Wizard...** option. If you happen to have or inadvertently select a document, this wizard option will not be available and you should adjust your cursor placement to attempt this sequence again.



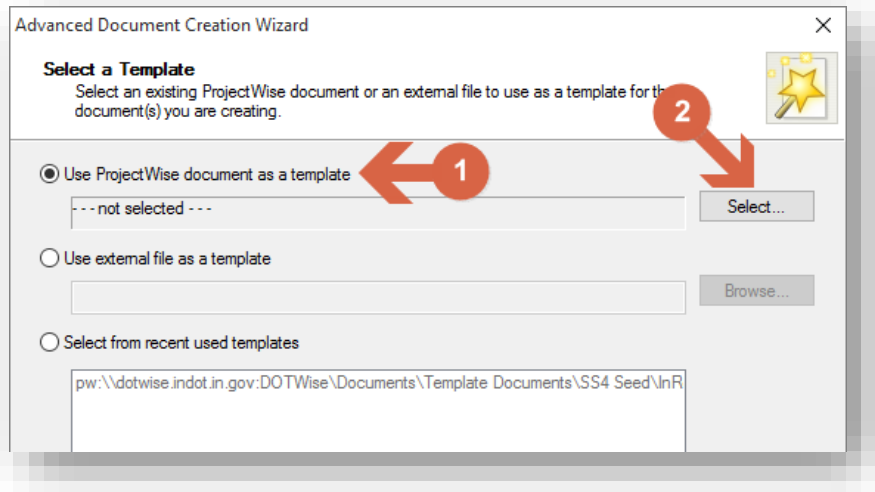
Starting the Advanced Wizard

This will initiate the Advanced Wizard for document creation. The first panel is just information and the Next button can be selected to move to the second panel. The second panel allows for a brief review of the location where you're placing the new file. Adjust the location if necessary and select Next.

The third panel allows for the specification of the file that you'd like to use as a template. There are 3 major options:

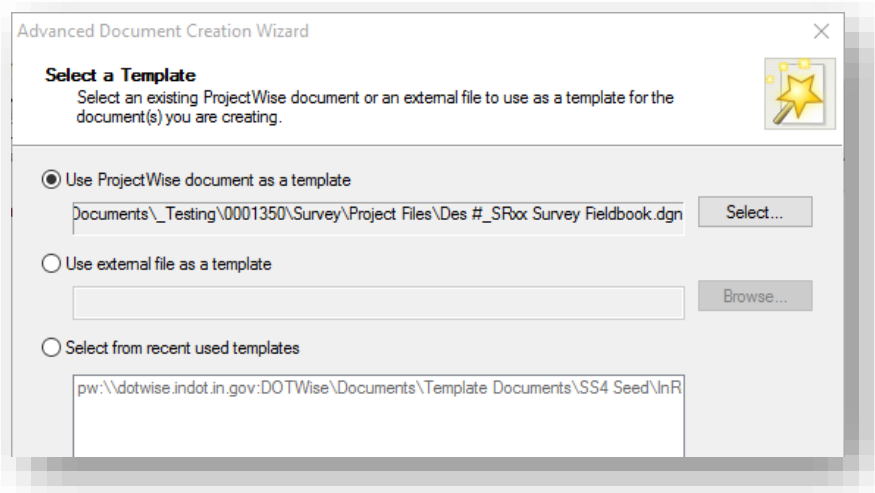
1. Use a ProjectWise document as a template – Allows for the selection of a file already in the datasource to copy as your new file.
2. Use external file as a template – Allows for a file outside ProjectWise to be brought in as the new file. This could be used to bring a copy of the survey data in if it's not already located in the datasource.

3. Select from recent used templates – As one uses ProjectWise and the Advanced Wizard, this selection window will populate with recently used files. These can be selected to quickly locate items such as seed files.



Selecting a Template Document

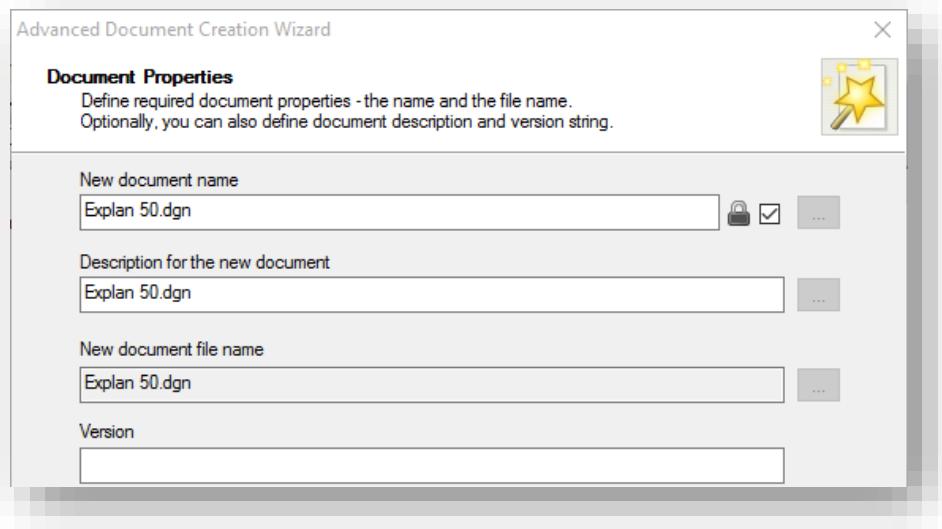
For this example, we'll be looking at using the first option, Use a ProjectWise document as a template. As shown in the previous illustration, first make sure the radio button for the first option is selected, then use the Select button that's active on the right side of the window. After picking the Select button, you'll be presented a ProjectWise browsing dialog. Navigate to and select your Des #_SRxx Survey Fieldbook.dgn.



With Des #_SRxx Survey Fieldbook.dgn Selected

After you've selected the file, pick the Next button to proceed through the next steps of the wizard. The first two panels you'll see are for document properties which you can define at this time or defer

to later. The third panel allows for the renaming of the file prior to it being created. Enter your Explain XX.dgn in the fields shown. Note that the operation of the lock icon is the same as on the Rename tool discussed in the previous example. When finished, select next and complete the wizard.



Setting the Document Name

At this time, you should open the file and verify that the contents are 3D.

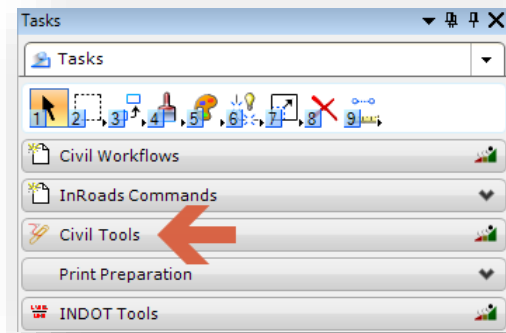
7.4-2c **Creating Explain from a SS2 DTM**

During the transition period between workspaces, it will be common to find surveys that have been done in SS2 InRoads formats while being designed in SS4. In these instances, you will need to bring this data into the appropriate SS4 containers.

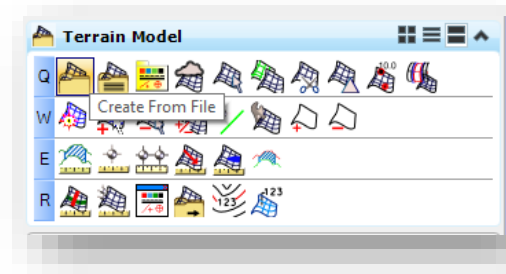
The most direct way to convert terrain data from SS2 will be through importing the existing DTM file. This process has been fixed to allow for the import of all TOPO elements for display and review in the terrain model. To import the DTM, the following steps should be performed:

1. Create a new Explain XX.dgn using the appropriate 3D seed file for the project. This can be done either as Drag and Drop, or through the advanced wizard as noted in the previous section. Use the seed files located at:
<pw:\\indot-pw.bentley.com:indot-pw-01\Documents\Template Documents\SS4 Seed\InRoads\>
2. Make sure that the file association points to the correct product (InRoads SS4 or PowerInRoads), and open the file.

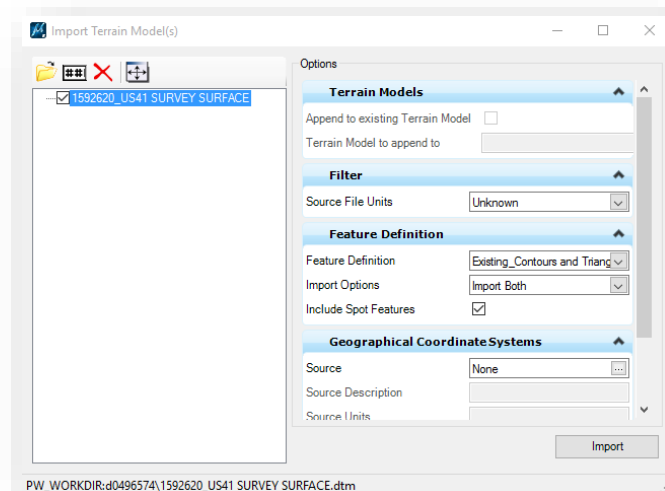
3. Start on the Civil Tools option on the Task Navigation panel.



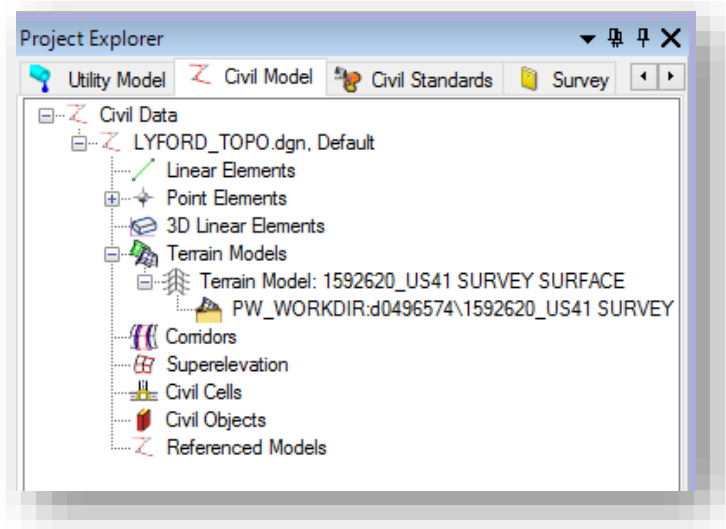
4. On the Civil Tools, expand the Terrain Model task and select Create from File.



5. On the Import Terrain Model(s) Dialog, make sure that for the Feature Definition you pre-set one of the Display Styles. For this example, the Existing_Contours and Triangles style has been selected. Also make sure that the Import Options are set to both. This will bring in both linear and point features as defined in the DTM.



6. Select Import and the DTM will be imported as a Terrain Model. Selecting the Feature Definition display style upfront will bring the data in and show it triangulated and contoured. You can use the Element Information to disable these as needed.
Note that after you select Import, the window doesn't close, you will need to X it out in the upper right corner.
7. Reviewing the Project Explorer to look at the Terrain Models will show your new model and how it's linked to the DTM that was brought in.



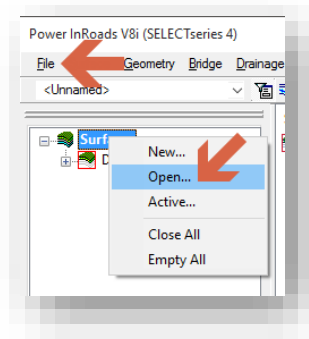
Importing the DTM will give a terrain model that is consistent with the legacy format, including any survey adjustments, offsets, boundaries and other model content.

Note: DTMs and Random Features

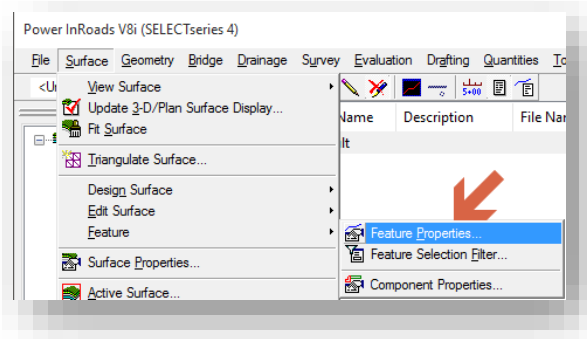
One major difference in how OpenRoads interacts with elements is how they are defined coming from a DTM. OpenRoads is very explicit about how it translates DTM features into the terrain model and it can lead to some inconsistency in data display. Particularly, features that are defined as Random in the DTM file and are not triangulated will only come across as a small point on the terrain. This causes issues identifying items that may have been coded this way such as pipes, fences, etc. This has come about as InRoads SS2 allows for connecting lines to be drawn between random points, which OpenRoads does not.

The following steps should be used to check your data and then remedy any issues you may encounter:

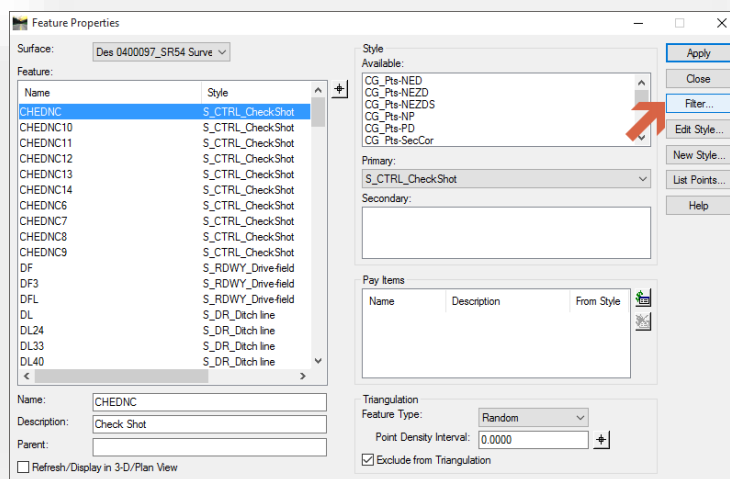
1. Open your DTM on the InRoads Explorer using either **File -> Open**, or right clicking on the Surfaces and selecting Open.



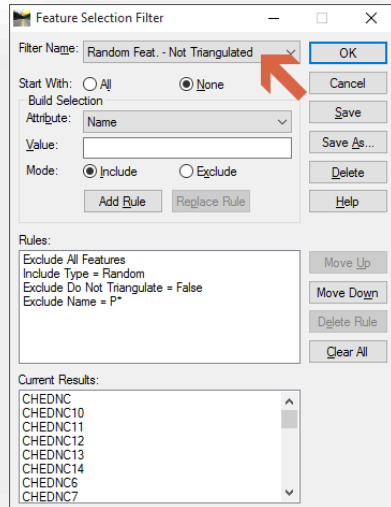
2. With your DTM open, open the **Surface -> Feature -> Feature Properties** tool.



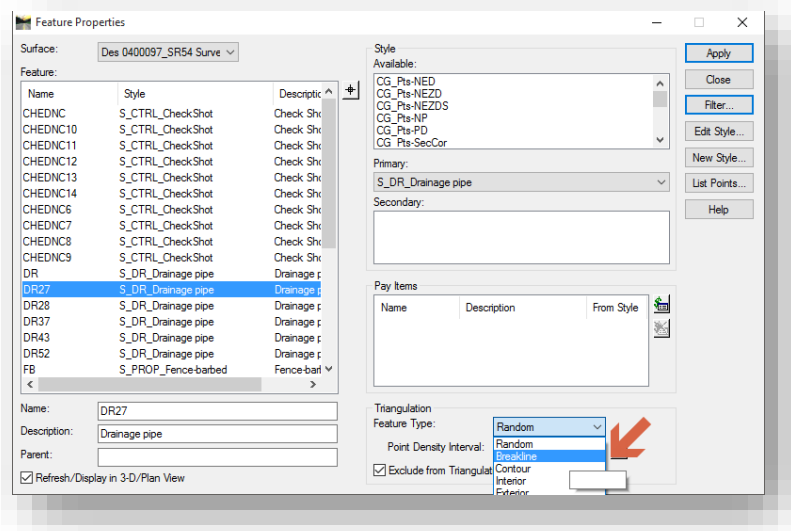
3. On the Feature Properties window, select the Filter button.



- On the Feature Selection Filter window, select the Random Feat. – Not Triangulated option. This will display all random features that are not part of the triangulated and excludes point features.



- Back on the Feature Properties window, you'll see a truncated list of the filtered features. To resolve any features that you want displayed in the terrain model, select one of the features. In this example, we'll select a DR (Pipe) feature
- With the DR feature selected, select the **Triangulation -> Feature Type** dropdown, and change the type from Random to Breakline. Make sure the Exclude from Triangulation checkbox remains filled in. Note that you can make bulk edits using Ctrl + Click or Shift + Click to select multiple or ranges of features.



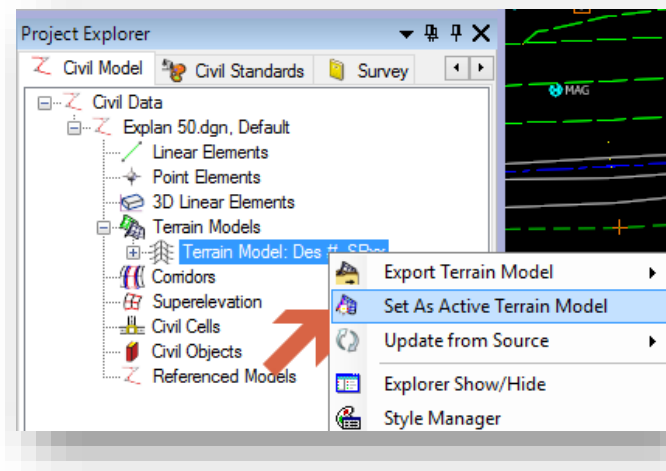
7. With the filter active, as you make this modification you'll see the features start to disappear. This is due to them no longer fitting the filter criteria. Shut off the filter we enabled in Step 3 to see all features again.

7.4-2d *Displaying Contours and Triangulations*

One of the major changes in moving to OpenRoads terrain models is that there are no longer discreet commands to create and display contours and triangulations. These options have been moved to the OpenRoads display styles and are now accessible via the Element Information panel in MicroStation. As they are directly associated with the terrain model, it will no longer be possible to create/display these features without duplicating the entire terrain, which is not recommended due to the possibility of data getting out of sync.

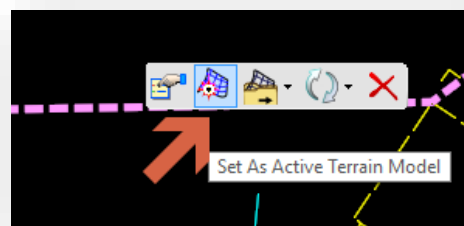
To display the existing contours:

1. First make sure your terrain model is active. This can be done by locating it on the Civil Model tab of Project Explorer and right clicking on it. Select Set As Active Terrain Model.



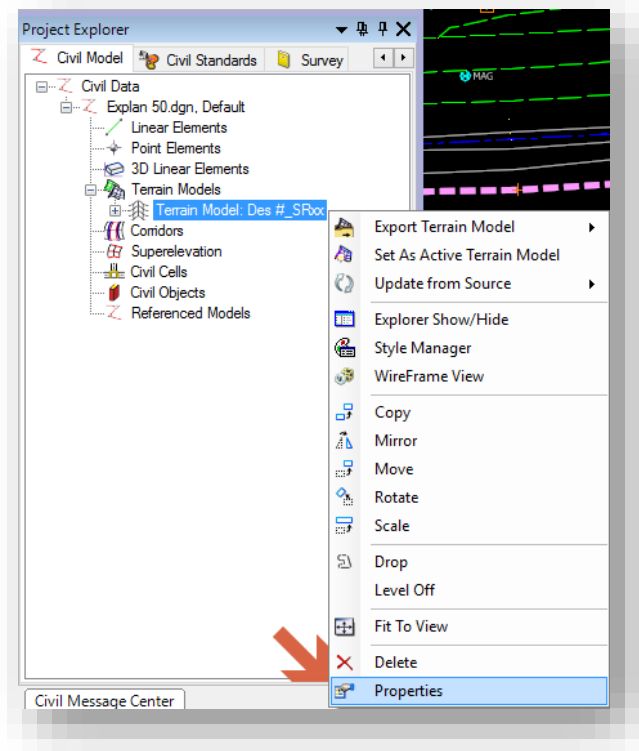
Set As Active Terrain Model

2. Alternatively, you can select the terrain in the heads up display in the drawing window and use the heads up display to make it active. To enable the heads up display, locate the terrain boundary and click on it. Hover over the location briefly until the toolbar pops up.



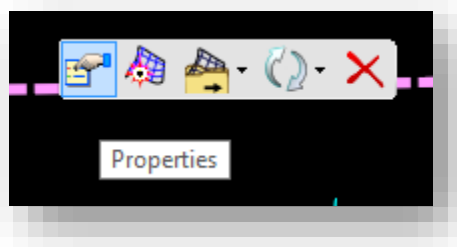
Using the Heads Up Display

3. With the terrain now active, you can review its setting in the Element Information panel. Again there are two options for this process. First is to again locate the terrain in the Project Explorer. Right click on it and select Element Information from the bottom of the presented menu.



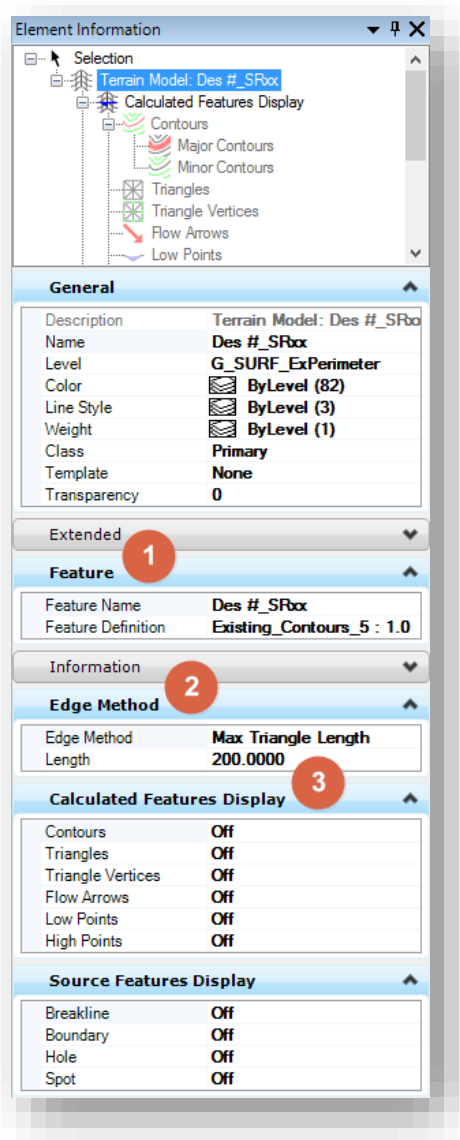
Terrain Properties

4. The second option is again on the heads up display. Using the same process as step 2, select the first button on the menu.



Terrain Properties on the HUD

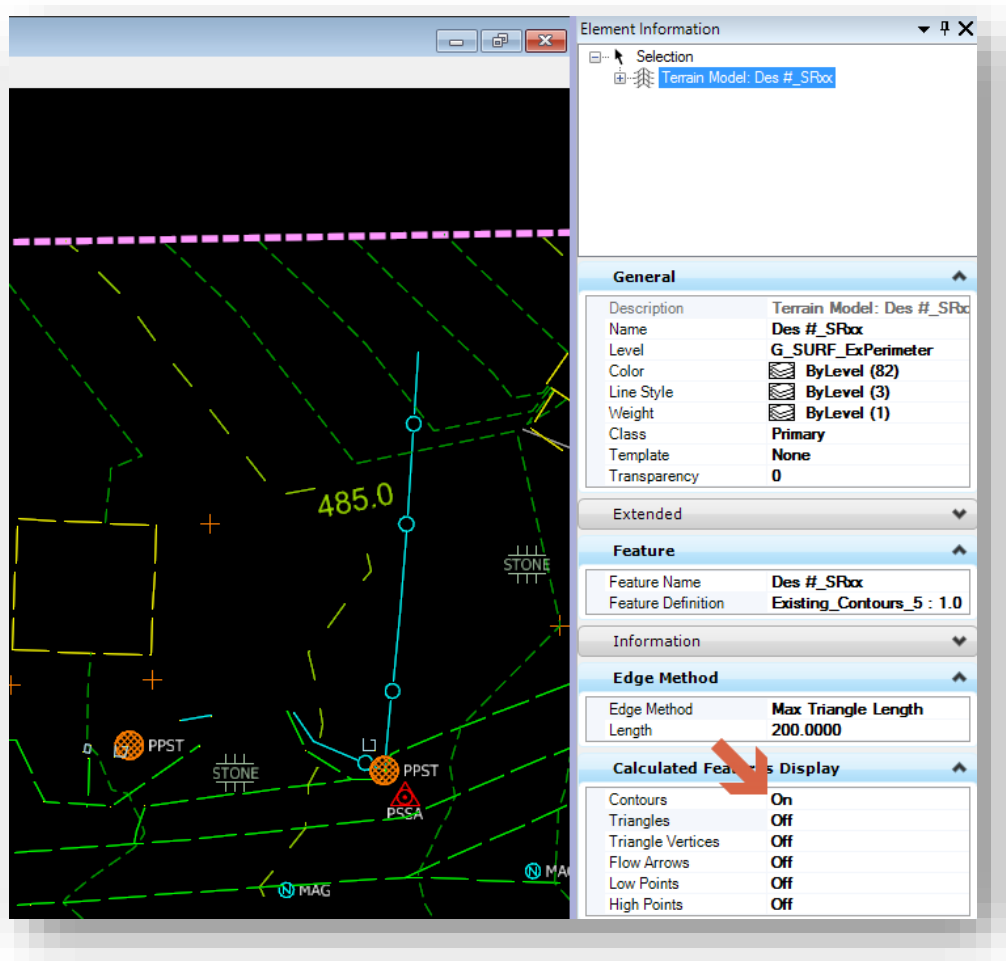
- The terrain should now be shown in the Element Information panel. The following screen capture highlights the major areas of note:



Terrain Element Information

- 1. Feature – This lists the Feature Definition/Display Style that was used for the terrain. In most instances Existing_Contours will be used. Additional styles for different scales, or different displays (triangulations, thematic height, etc.) are also available.
- 2. Edge Method –All triangles are displayed as long as they respect the Max Triangle Length which can be adjusted in this panel.
- 3. Calculated Features Display – These can be used to override the default features displayed as part of the style. For instance with contours and triangles can both be displayed by turned their entry to On.

- Using the Element Information panel, set the Contours to the On position. Your display will look similar to the following:



Contours Turned On

7.4-2e Additional Notes for Creating Explan XX.dgn

Remember any projects that fall under Section 5.1-6 will have their geo-coordinated seed file provided as part of the survey deliverables. This would be used when creating a file from legacy SS2 data.

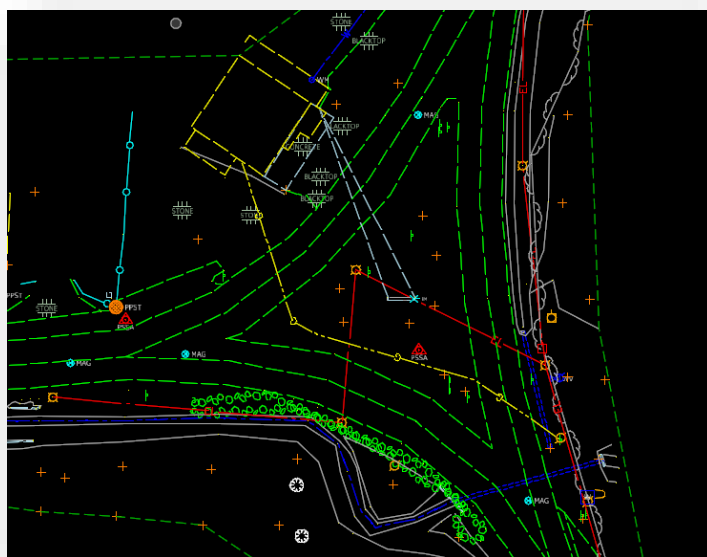
Additionally, you may create these base drawings externally of MicroStation/InRoads using the document creation wizards and tools in ProjectWise as discussed in Section 5.3-1c.

You may need to do a fit view command to see the elements drawn. If you'd like to control the display of your contours and triangulation, you can additionally use the Level Display and select those specific levels. Do not use the off by element command as the terrain is a single element (triangles and contours included) and it will shut off the entire terrain not just the specific level.

CAD Menu -> File -> Save Settings at this point to retain the information, additionally, you may use the Ctrl+F hotkey combination. This also extends to OpenRoads commands as they are now part of base DGN functionality. Save your settings and files early and often.

Optional Steps:

This process could be repeated for **1"=20'** and **1"=100'**. These scales are anticipated to be utilized in some plan sets.



Topo surface as displayed in Explan 50

At this point, it is desirable to add any other base drawings in the same manner as used for **Explan** and **Excont**. These could include proposed contours (**Prcont**), existing right of way (**RW existing**), or any other drawing needed.

Not all of these drawings will need to be referenced into the Prplan base drawing prior to creating any sheets (plan profiles, layouts, construction details, etc.). All that is required is an alignment to orient the sheets.

Next you will create the geometry dgn, Design Alignments.dgn

7.4-3 Creating a Geometry DGN/Prplan

Corridor Modeling in OpenRoads means that Alignments must exist as information within a Civil Model instead of part of an ALG file. An ALG file is still needed for items such as feature annotation and plans production, but it will not be provided from survey unless it's a legacy project. The expectation for projects surveyed in OpenRoads is that a Des #_SRxx Survey Alignments.dgn will be provided as part of the project. As with the other survey deliverables, this file and content will be geocoordinated and based off the provided Des #_SRxx Seed.dgn that's part of the survey project.

Please keep in mind that whether you have a survey provided alignment in a DGN or ALG, the model with the alignment in it should be a 2D file, or if creating from legacy data, based on the provided 2D seed file for your project.

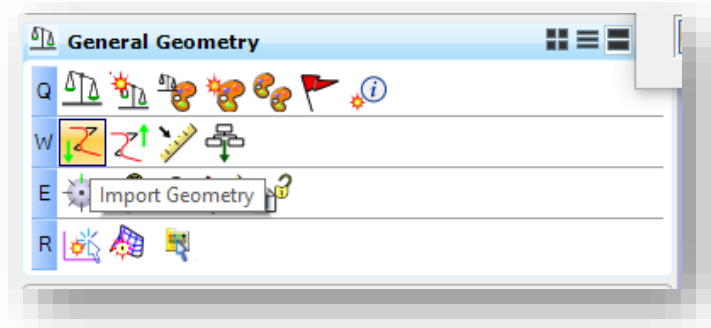
For the purposes of this example we will be looking at keeping a separate DGN file for our alignment information and then creating the model and Terrain in the Prplan XX.dgn which we'll create at a later time.

To create the file you can use the processes outlined in 7.4-1a or 7.4-1b. For this file however, your base file will be Des #_SRxx Survey Alignments.dgn. With this file created and named Design Alignments.dgn, you can then proceed to modifying your survey alignments or creating additional alignments. Again with the ability to reference the DGNs together to share the civil data, this alignment file can then be attached as needed for the purposes of corridor modeling.

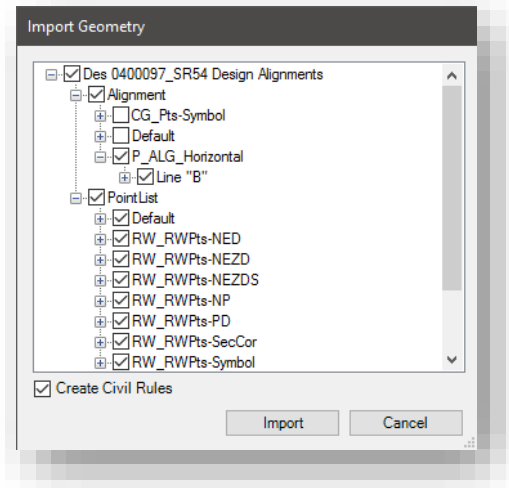
7.4-3a Creating Geometry from an SS2 ALG

Should you have a SS2 project, and associated ALG file, the following steps will illustrate how to bring that information into your DGN. These can either be work in progress or just the survey alignments provided.

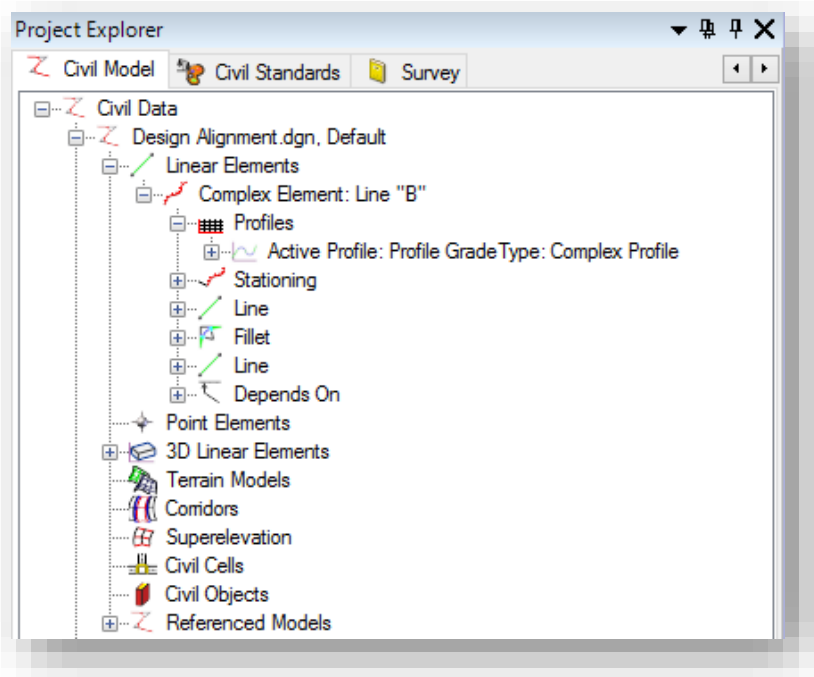
1. On the Civil Tools panel, go to the General Geometry task and select Import Geometry.



2. Navigate to your file and select Open. On the Import Geometry, select the Alignments and points you want to bring in. If you want to make sure the Civil Rules are enabled, the toggle for Create Civil Rules should be on. Select Import when ready.



3. In your Civil Model Project Explorer browser, you can then expand the Linear elements and see your Alignments and continue working on them using InRoads tools.



Alignments in the Civil Model

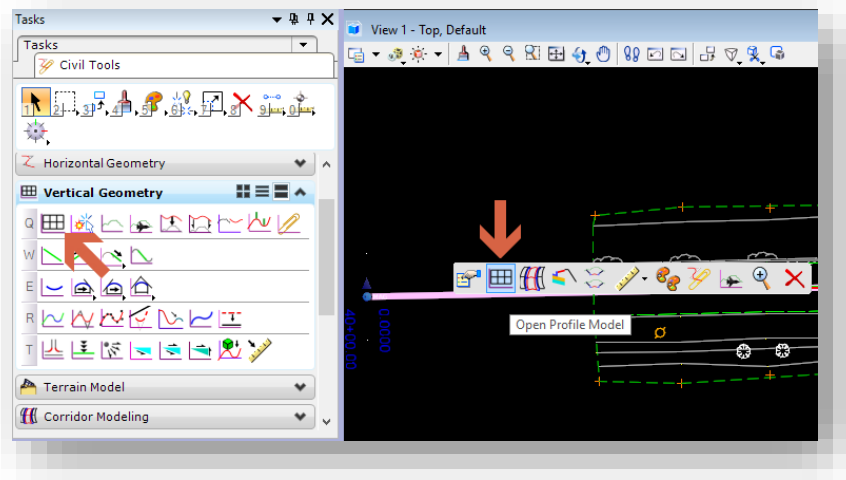
7.4.3b Drawing the Proposed Profile to the Design Alignments.dgn

Moving to OpenRoads technology requires a new mindset when it comes to working with profiles. In the previous version of InRoads all profile work was used drawing directly on top of profile graphics in your base drawing file. This was possible as the ALG file was portable across any file that was open with InRoads. Due to the change of how an alignment is stored, we will look at process of creating a profile using the OpenRoads tools in preparation for plans production. This example will assume that you're starting with a Des #_SRxx Survey Alignment.dgn file that you've copied and renamed to Design Alignments.dgn.

Please keep in mind, that this file should be 2D in nature. A 3D model will be automatically created by the software and is reference attached as soon as a terrain is referenced and made active and when a vertical profile is being displayed. OpenRoads will automatically generate the 3D geometry elements from the 2D information.

To create a profile display in OpenRoads:

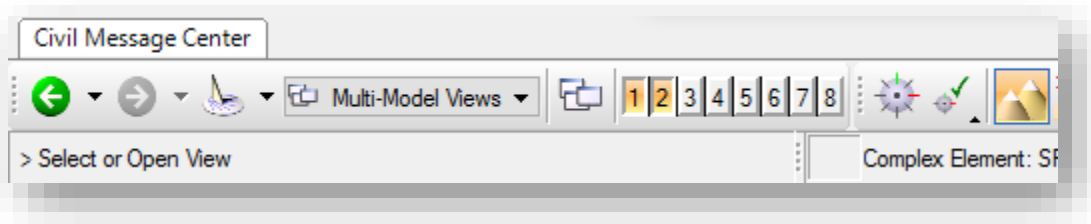
1. Locate the **Civil Tools -> Vertical Geometry -> Open Profile Model** tool on the Task Navigation panel. Alternatively you can locate this tool by highlighting the alignment and selecting the tool from the heads up display when hovering over the alignment.



Open Profile Model

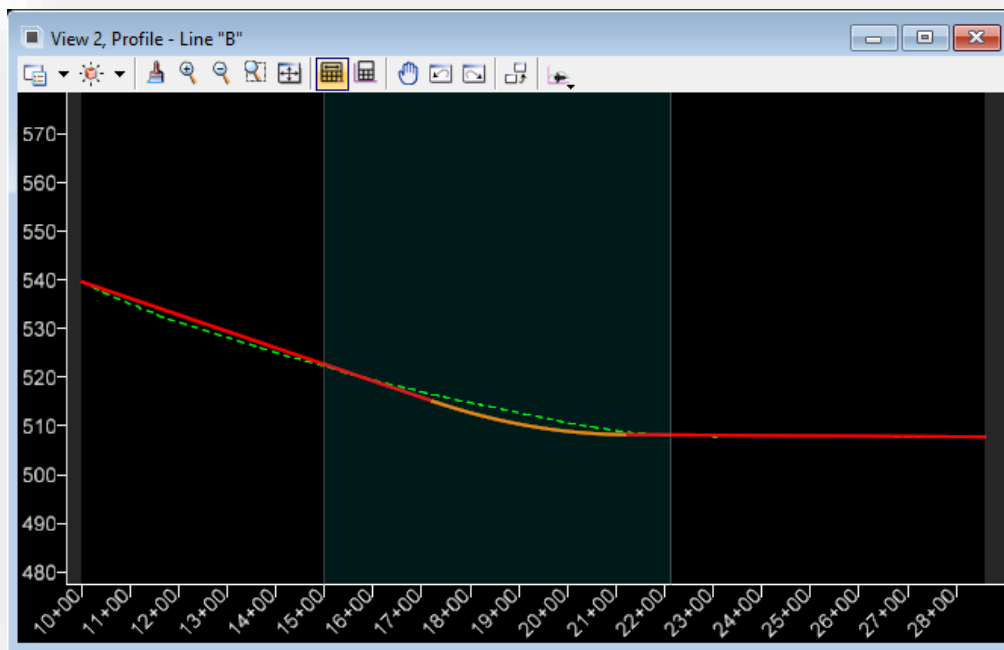
2. If selected from the Task Navigation panel, the tool will prompt you to first locate the plan element. Select the plan view representation of your alignment.

3. With the alignment selected, OpenRoads will then prompt for a view to be selected or opened.



Select or Open View for Profile

4. Use the View Groups toolbar to open an additional view. Any of the view 2-8 are acceptable. Left click in the opened display to confirm the profile creation. Note that the tool will redisplay in any view you select potentially erasing any data displayed. In the event you overwrite a profile display know that only the graphics are lost. The actual alignment information will persist as part of the Civil Model.



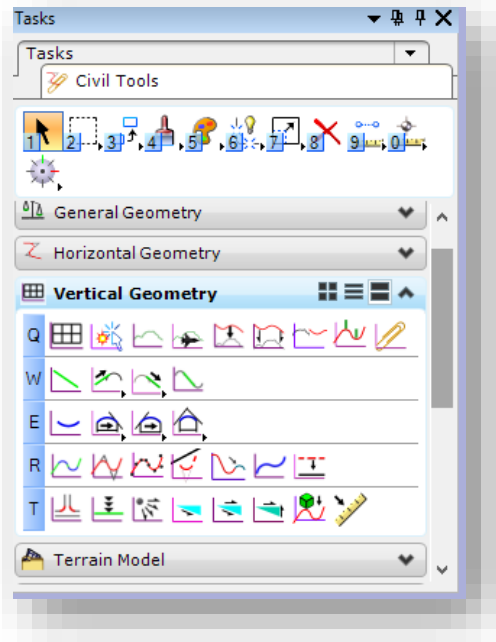
Profile Display

Note: In the previous version of InRoads, we needed to manually select the feature that the existing surface was on in order to have it display properly in profile. In OpenRoads this is no longer necessary as the terrain model uses the same feature for the boundary and profile display. The above illustration shows how the existing appears in OpenRoads (dashed green line).

With the existing profile now displayed, we can proceed to creating a proposed profile. Please keep in mind that this profile display is not actually part of the base model in the DGN itself, rather it's a dynamic view that allows for the creation of the civil data that makes up the profile.

7.4-3c Adding the Proposed Vertical Alignment

With the profile now displayed its own view, you can now begin placing the elements that will be used for the vertical profile. For this process you'll need to use the toolset under **Civil Tools -> Vertical Geometry**.



Vertical Geometry Tools

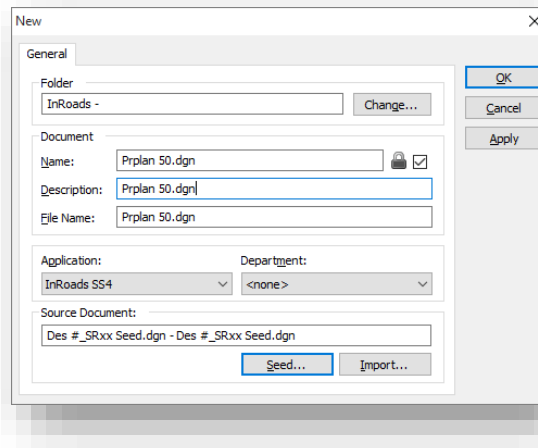
7.4-4 Creating the Proposed Plan Drawing

With our existing plan and design alignments in separate DGNs, it's time to bring the base sheets together as preparation for plans production. The following steps assume that the corridor model and proposed terrain have been created and are prepared to be attached to the proposed plan drawing.

Use **MicroStation -> File -> New** to create the drawing Prplan 50.

This will create and open a .dgn with this name in the folder you specify in the New Document dialog. Make sure to select the Des #_SRxx Seed 2D.dgn from under your Survey\Project Files folder if available, make sure to create a 2D design model in this file for design purposes. If no geocoordinated seed file is available, use the appropriate 2D seed file from under

<pw:\\indot-pw.bentley.com:indot-pw-01\Documents\Template Documents\SS4 Seed\InRoads\>

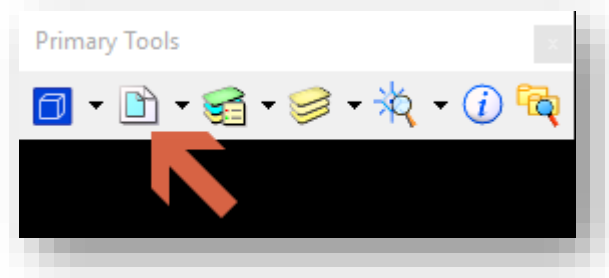
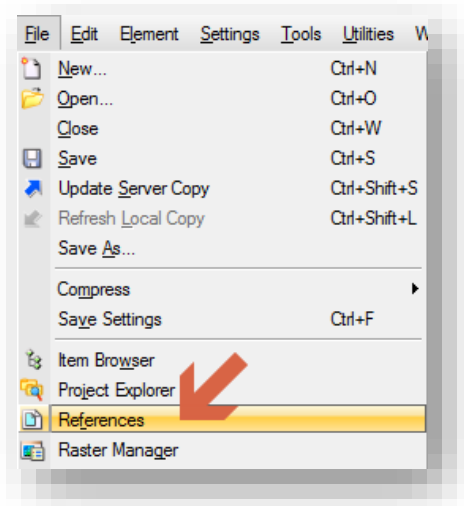


The New Document, No Wizard dialog

Click OK – a blank drawing is opened, and a new MicroStation/InRoads drawing is created.

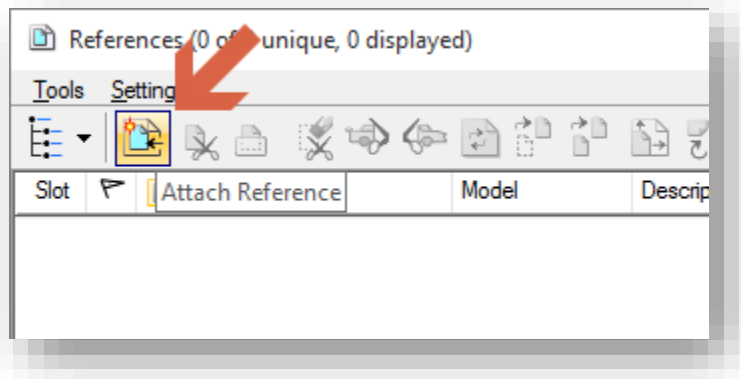
At this time, you can begin by referencing your Explan XX and Design Alignment DGN files.

1. Open the References window from either **File -> References** on the MicroStation menu, or from the References button on the Primary Tools toolbar.



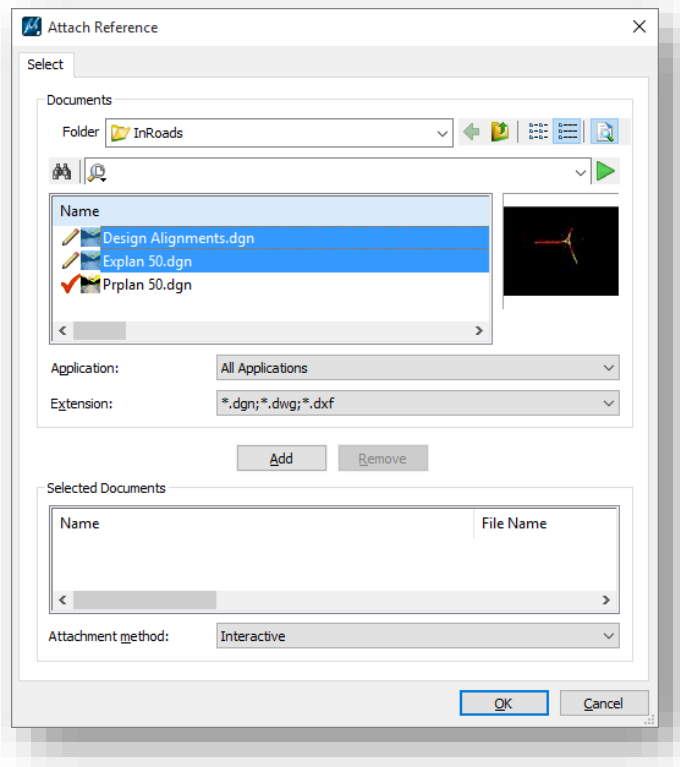
References

2. On the References window, select the Attach References button.



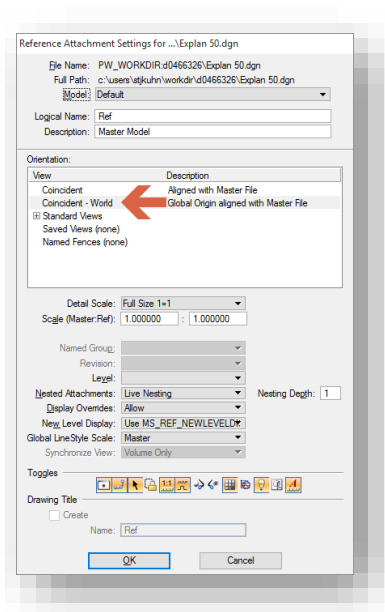
Attaching References

3. Select both the Explan and Design Alignments DGN files. This can be done by holding the Ctrl key on the keyboard while left clicking on each file. Select OK when ready to proceed.



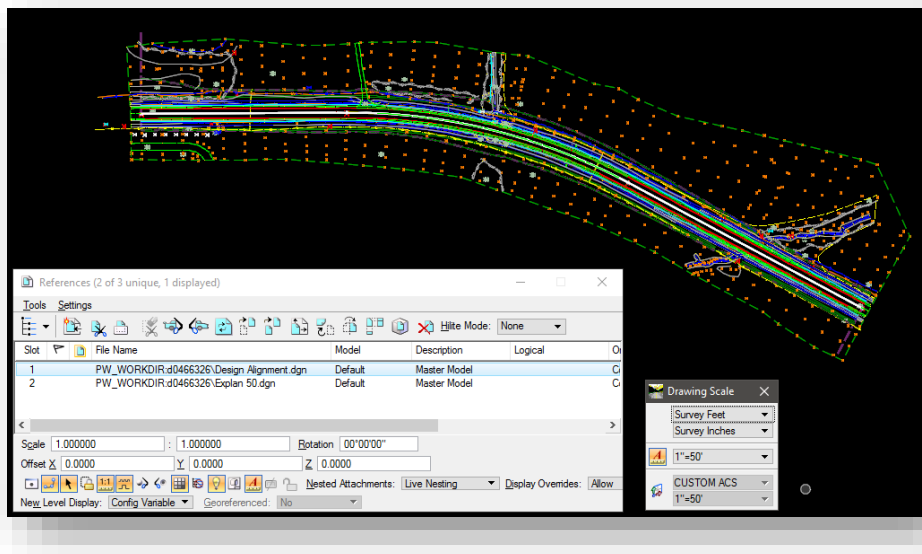
Selecting the File to Attach

- As all files should be in the same coordinate system, the Coincident – World orientation setting should be used. All other settings can be left to their default values. When ready select the OK button.



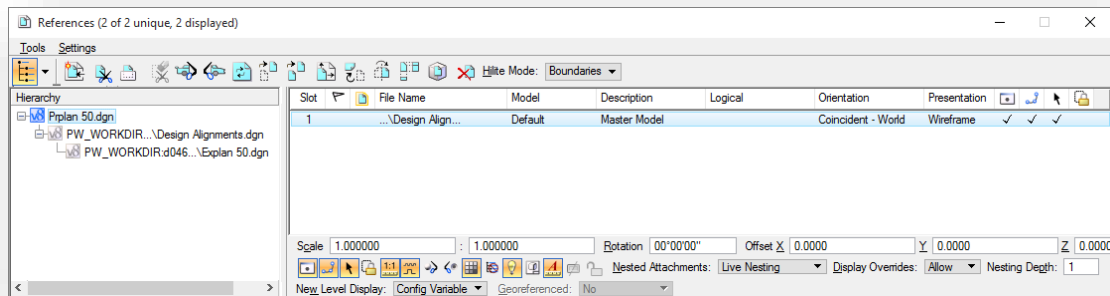
Attachment Settings

- Repeat this process for all the files you're attaching.
- Finally, adjust your Drawing Scale to the appropriate value. For this example we'll be using 1"=50'.

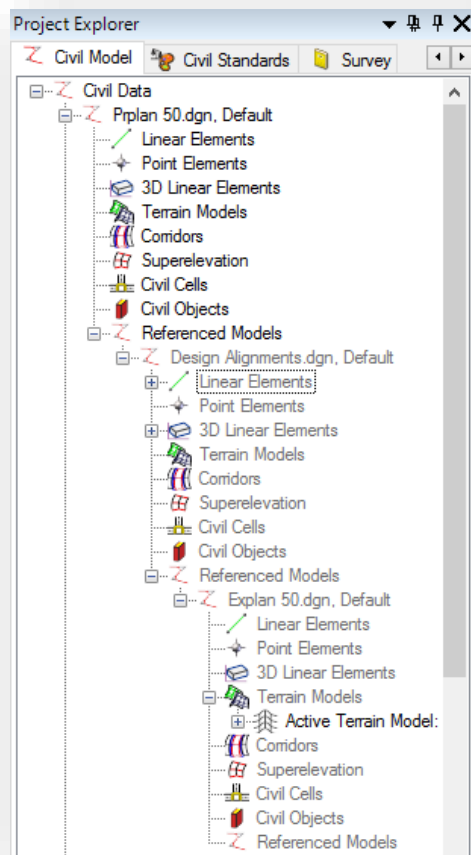


References Attached and Displayed a 1"=50'

As an alternative to attaching each file in specific, you could also use Live Nesting to attach Explain XX.dgn to the Design Alignments.dgn and then into Prplan XX.dgn. Just make sure that the Nested Attachments are set to Live Nesting and that the depth is 1 or greater depending on your project needs. In that instance, your reference dialog may look similar to the following:



Using Nested References



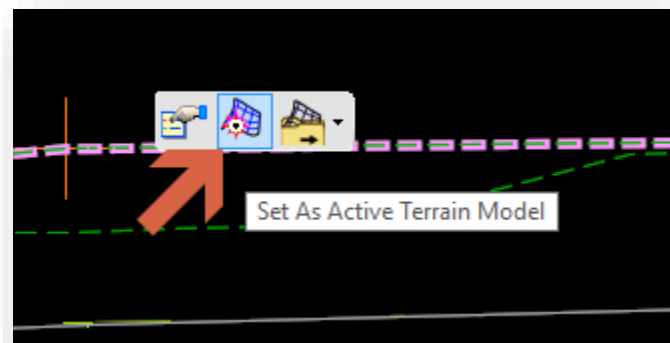
Civil Model with Nested References

At this point you'll have the required data to begin the corridor modeling process. Upon completion of your modeling, you'll be prepared to continue in Prplan XX.dgn.

Corridor Modeling with Referenced Geometry and Terrains

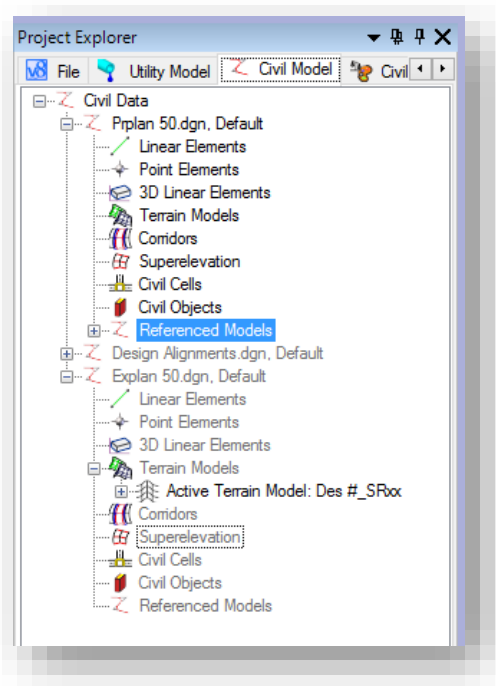
As we've discussed at numerous points throughout this document, OpenRoads allows for the separation of design items by placing them in separate DGN files and then referencing them back together. While a very powerful tool to have, there are a few items to keep in mind while working with referenced elements.

The first item to keep in mind is making sure you activate the terrain properly. In our above example we've attached our Explan 50.dgn which contains the terrain model that we'll be targeting. Prior to performing any modeling process, we first must make sure it's the active model. Unfortunately, it won't show up in the Civil Model dialog until we activate it. To do so, hover over the perimeter of the terrain. When the heads up display appears, select the Set As Active Terrain Model option.



Set As Active Terrain Model

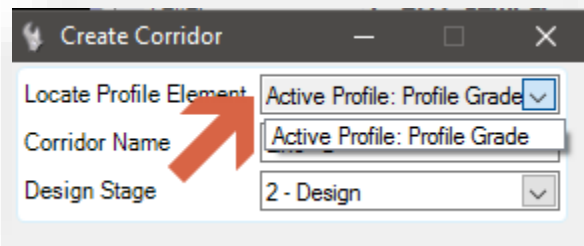
With the terrain activated, your Civil Model tab will then populate with the referenced information and look similar to the following:



Civil Model with Active Reference Data

At this point, a new 3D model will be created and referenced back in. Please keep in mind the multi model display process from section 5.7-2 as having both 2D and 3D views will be beneficial.

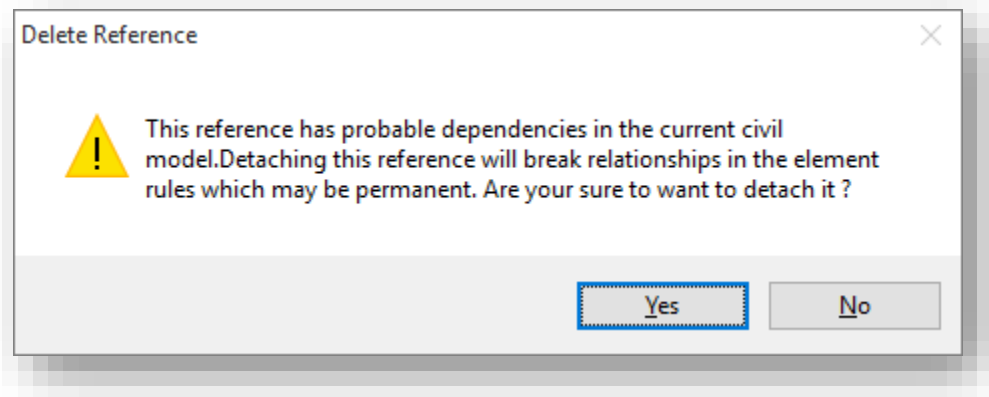
Next, while modeling with referenced alignment information, know that you will not be able to graphically pick vertical profiles as they won't be able to be drawn up from a referenced file. To further that, please keep in mind that the horizontal alignment and its vertical profile **MUST** reside in the same DGN file. When creating a corridor, you'll first select the plan view alignment. On the following dialog requesting the Profile Element, select the appropriate vertical from the Locate Profile Element dialog.



Selecting the Vertical Profile

With the terrain active, and the horizontal and vertical profiles selected, you can then proceed to create your corridor in Prplan XX.dgn

Note: *One thing to be very careful when working with referenced civil data is the detaching references. All civil data is based on an ever-evolving set of rules and connections to available data in your project. Should you have civil data that is connected in this manner and then go to detach a file, you may see the following dialog.*



Civil Dependencies and References

When displayed this means that there are civil dependencies that exist with your data. Special care should be used, and best practice is to avoid detaching references when possible as not to break any civil references.

With your design completed and being displayed over your existing, you can now being the final preparation steps for creating cut sheets.

7.5 Preparing Files for Plans Production

As we've seen in the previous sections, there's numerous changes to the base drawing creating process. As illustrated, many of the design tools have now moved to those in the OpenRoads environment except the InRoads Plan and Profile Generator.

This section will look at some of the specifics needed to prepare your data for Plans Production, and where data needs to be migrated back to standards InRoads formats (DTMs, ALGs) for use in the sheet generation and annotation processes.

A note on file management: Throughout the following section we'll be looking at processes to create InRoads files from OpenRoads data. To allow for full flexibility, these tools are not set to automatically keep OpenRoads and existing formats in sync. Please keep in mind that for any iterations of OpenRoads data that you'll need to re-push your data back to their legacy formats for use. Doing so does lend itself to creating multiple files and versions which may cause confusion. Please use detailed naming where possible, and discard old data as needed to minimize this possibility.

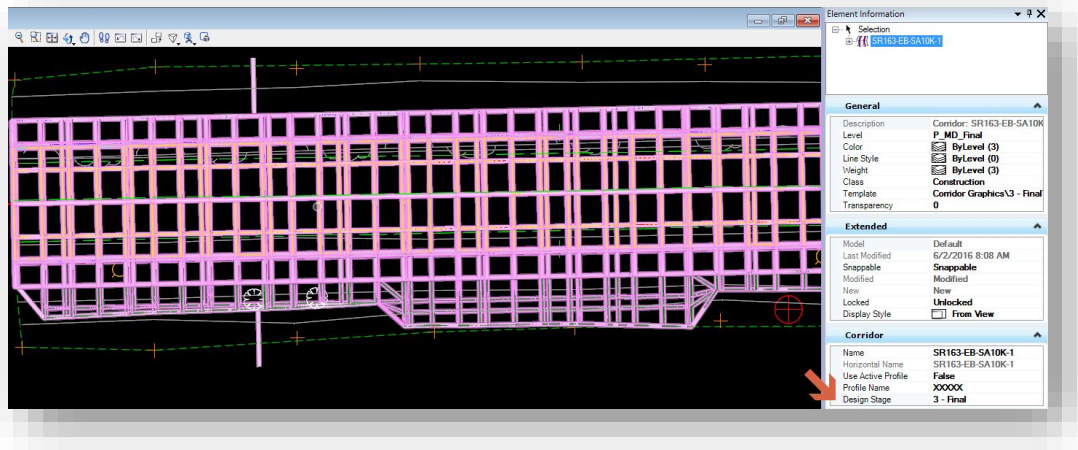
7.5-1 Adjusting your Design Stage for Plans Generation

As you work on your design, much of the display control on your corridor will be through the use of the options in the Design Stages. Design Stages are a combined set of rules that govern how your corridor is displayed and the level of accuracy which it's modeled.

As your design is completed, you'll notice that there are a number of different Final Design Stages such as:

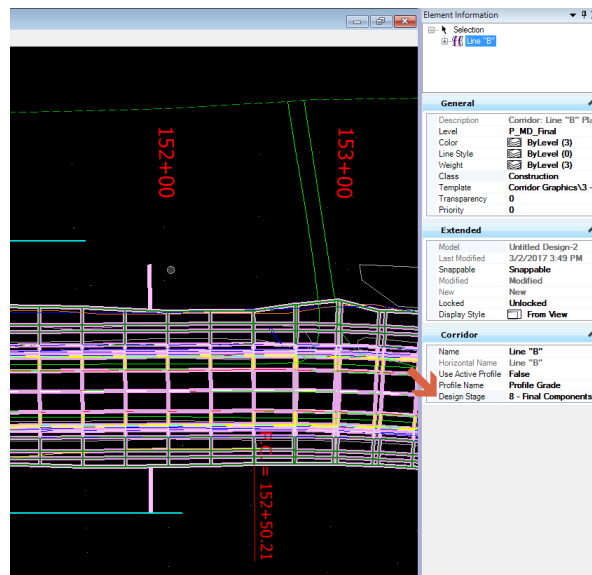
- 3 – Final
- 4 – Final w/Meshes
- 5 – Final – Top Mesh
- 6 – Final – Bottom Mesh
- 7 – Final Linear Features
- 8 – Final Components

These options all allow for different representations of the corridor and how it displays in the plan view. While each of these have different uses the 3 – Final is the one that will be used most commonly as it allows for the most thorough display of all corridor information. However, this display setting contains far more information than is needed for plans generation:



Corridor Using 3 – Final Design Stage

For the purposes of plans generation, most instances will need to display the final linear elements of the corridor. The recommended Design Stage to display just this information is 8 – Final Components. This corridor stage has been modified to display both the components and linear features allowing for the display of the components in cross sections.



Corridor Using 8 – Final Components

This is the most appropriate display for plans generation and should be used when displaying the corridor to cut plan sheets and cross section and will be reflected in the ModelName-3D that's created. At this point you can control the display of any subgrade features by shutting the relevant levels off in the level display.

7.5-2 Creating Native Formats

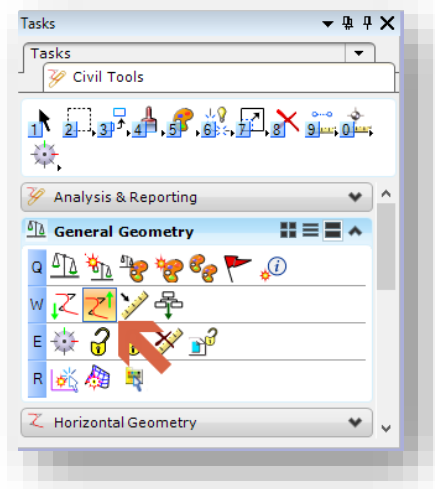
The next two sections cover the creation of civil data in native InRoads formats. Depending on the tool set necessary, these formats may be needed for tools such as annotation. For some of these items, the provided files as part of the survey or legacy project may be suitable, and these steps could be optional depending on need.

7.5-3 Generating a Native InRoads ALG

Plan and Profile Generator is one of the major tools that has not been integrated into the OpenRoads toolset and still uses the existing InRoads tool. In order to use this tool, OpenRoads alignments must be sent backward to their InRoads counterpart in the ALG file. This accomplishes two items, first is that the alignment will be available for plan and profile generator, second is that it will be in the correct format for all the existing InRoads annotation tools.

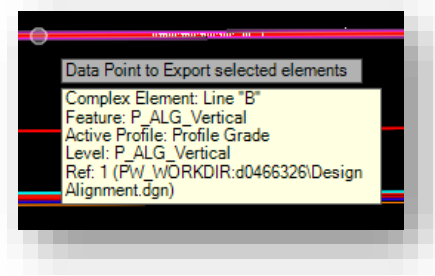
To send your alignments back to the InRoads ALG format, perform the following steps:

6. Go to the **Civil Tools -> General Geometry -> Export to Native** command on the Task Navigation panel.



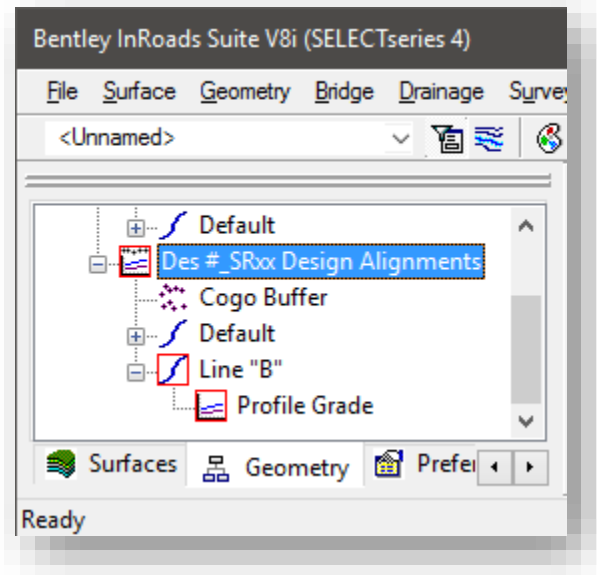
Export to Native

7. The command will activate and you'll be presented with a heads up tooltip in the drawing window requesting that you select the element.



Locate Element Prompt

8. As shown in the previous screen capture, the tooltip will also show element information for the item you're currently hovering over. Select all the geometry elements you wish to send back to ALG at this time.
9. When satisfied with your selections, right click to Reset and complete the command. Your alignment(s) will be sent back to the native InRoads ALG format for your use with that toolset.



OpenRoads Alignments Sent to InRoads ALG

Note: When sending alignments back to the native InRoads format, OpenRoads will assume that the currently active Geometry Project on the InRoads Explorer is where it should place the alignment information. If you wish to have your alignments placed in a Geometry Project of your choosing, make sure that you first create and activate the Geometry Project on the InRoads Explorer prior to sending the alignments over.

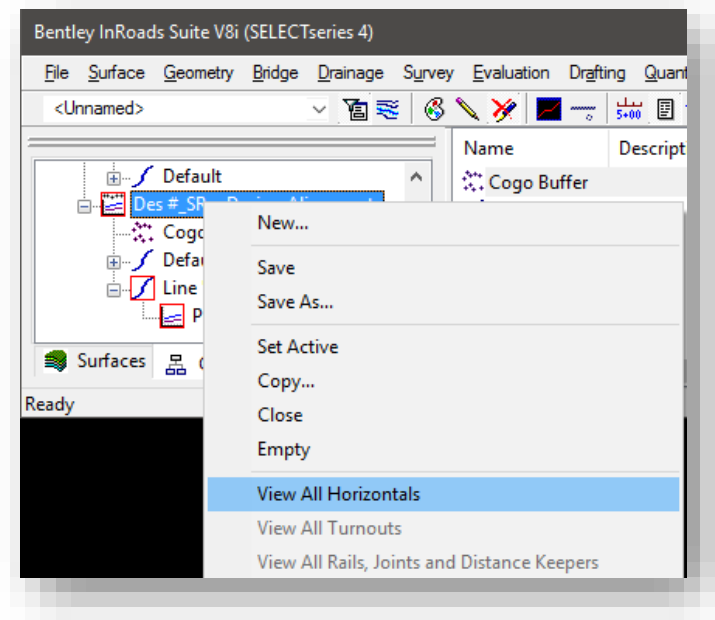
10. With the alignments now showing in an InRoads Geometry Project, you can proceed to save the .ALG file with the rest of your project data.

7.5-3a Displaying Alignments

Since InRoads requires you to use alignments to layout sheets and display annotation, you will display each alignment. Also, you want to have sheets laid out beyond the project limits to show incidental construction limits and some of the existing survey beyond.

To display the alignments, you can perform 1 of 3 methods. The first is quick display of all horizontal alignments via the InRoads Explorer.

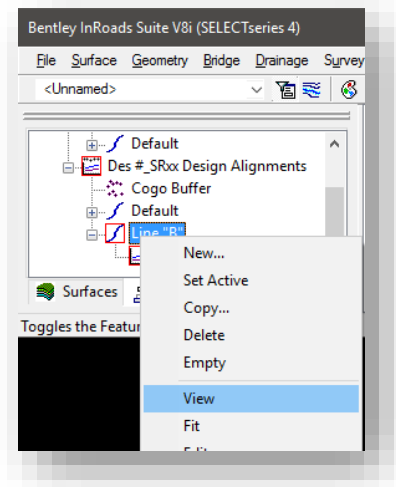
To display the alignments in this fashion, right click on the name of your geometry project on the InRoads Explorer's Geometry tab and select **View All Horizontals** as shown:



View All Horizontal Alignments

This will have InRoads display all horizontal alignments defined in your geometry project.

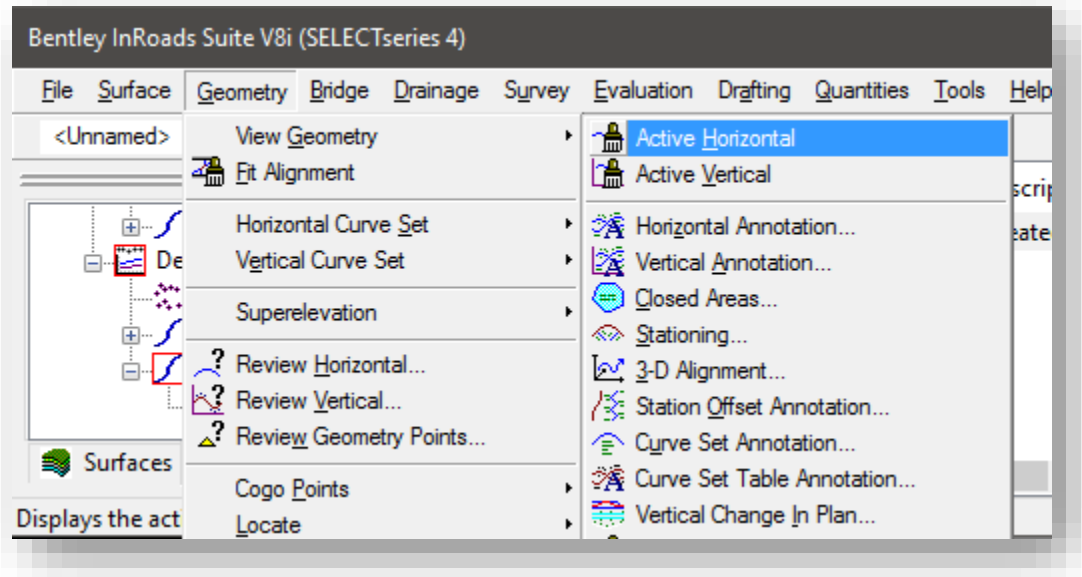
The next method is displaying a single horizontal alignment from the InRoads Explorer. As in the previous example, you will need to browse to the Geometry tab and expand your project so it shows the horizontal alignment you'd like to display. You will then right click on the alignment and select **View** as shown:



Viewing a Single Horizontal Alignment

This will display only the selected horizontal alignment in your DGN.

The final method is displaying the active horizontal alignment from the *InRoads Explorer -> Geometry -> View Active Horizontal* menu item.



View Active Horizontal

This will display the currently active InRoads horizontal alignment in your DGN.

7.5-4 Generating a Native InRoads DTM

Similar to alignments, so far all surface data has been processed as an OpenRoads terrain. For the purposes of profile generation, the legacy InRoads tools will need an existing surface to exist so that profiled can be generated. Additionally, should any projected profile elements been needed from the corridor model, InRoads will need those features brought into a proposed surface. The steps in this section will cover both of these processes.

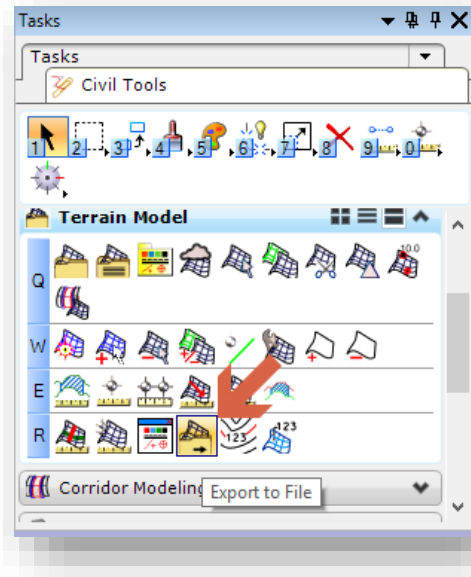
If you're working with data that was created with the newest version of the county geocoordination system, please see 7.5-4c for additional information on this process and a workaround to generate the appropriate data.

Note: If your source terrain was generated from OpenRoads Survey tools, it will only contain those elements which were included in the triangulation. It will not be complete and have features that were excluded. This DTM should only be used generate the surface that will be displayed in the native InRoads Profile tools. This DTM should not be used for any other function, especially for station offset point annotation as it does not include all features.

7.5-4a Creating an Existing Surface DTM from OpenRoads Terrain Models

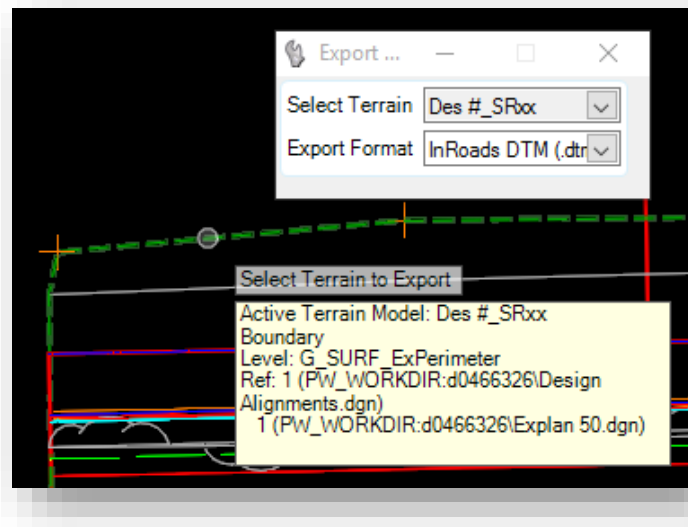
To create a DTM file containing your existing terrain, the following should be performed.

1. Go to the **Civil Tools -> Terrain Model -> Export to File** command on the Task Navigation Panel.



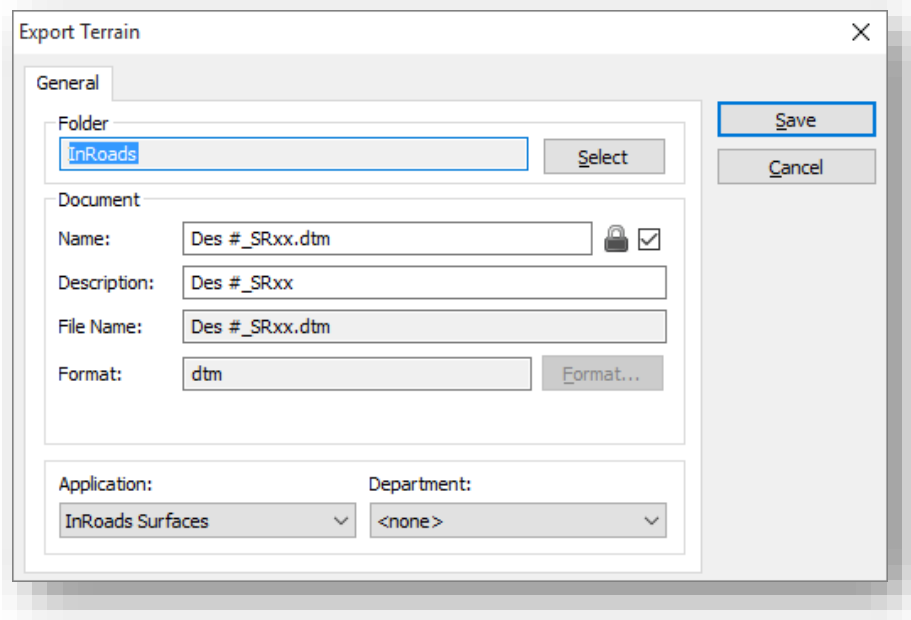
Export to File

2. The command will activate, similar to the Geometry tool, with a heads up tooltip in the drawing area. This tooltip will prompt you to select your terrain.



Select Terrain to Export

3. This command will also show element information when you're hovered over an element. Select the boundary of the terrain you wish to export. Additionally, you can also select the terrain directly in its tool window as shown in the previous screen capture.
4. Once the appropriate terrain has been selected, the second prompt will be for the format that the surface should be sent to. This tool will default to the format of your currently active product, in this case it will automatically select InRoads DTM (.dtm).
5. When satisfied with the selection, data select on the screen. You will be then prompted to save the .DTM file directly to ProjectWise in the same folder as the currently active DGN file. Adjust any naming and save the file, and then check it in when prompted.



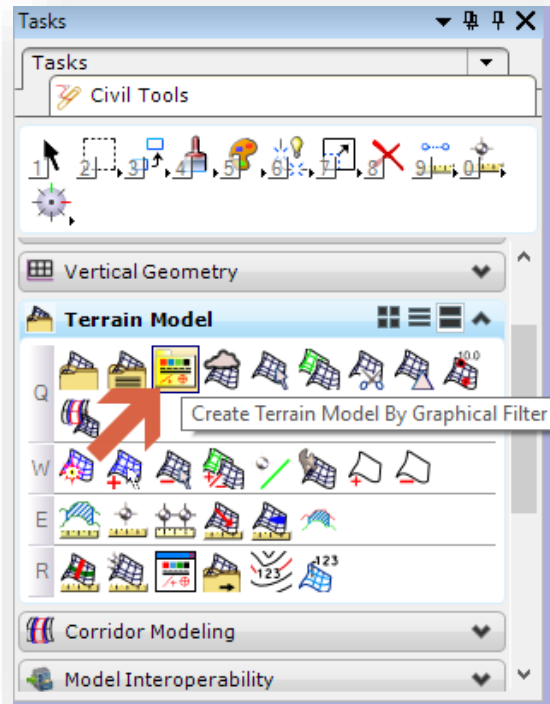
Export Terrain – Save to ProjectWise

6. Slightly different from how the ALG export works, the surface you've created will not be automatically attached to the InRoads Explorer, however the file will be saved and posted to ProjectWise already. If needed, open the DTM on the InRoads Explorer for additional use.

7.5-4b Creating a Proposed Surface DTM from an OpenRoads Corridor

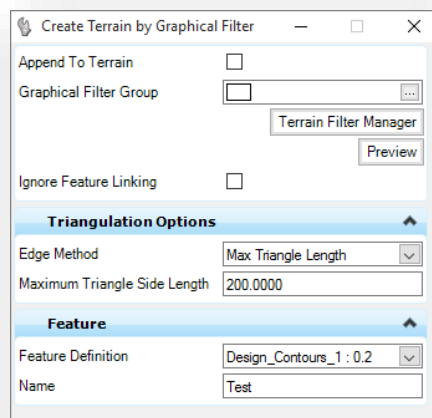
For the purposes of creating profiles with projected features, it may be beneficial to have the OpenRoads corridor carried over to an InRoads DTM file as well. This process will examine the combination of OpenRoads and InRoads commands that must be used in order to create this content.

1. In the DGN file with your corridor (presumably Prplan XX.dgn), go to the Task Navigation panel and located the following command: **Civil Tools -> Terrain Model -> Create Terrain Model by Graphical Filter** command.



Create Terrain Model by Graphical Filter

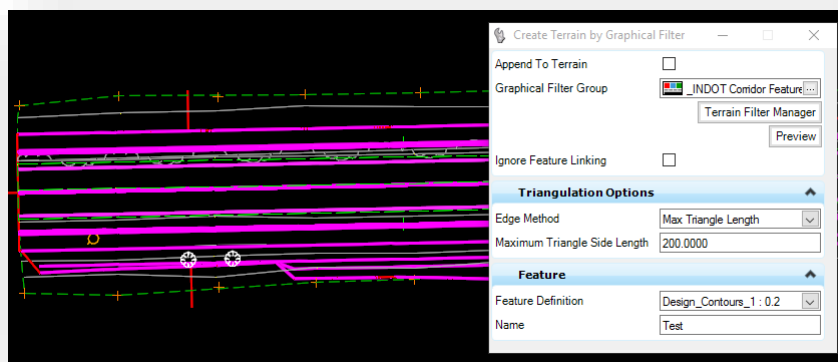
2. This will activate the command and the following dialog. The commands on this panel will be used to define the graphical filter and other aspects of the terrain that is created.



Tool Settings

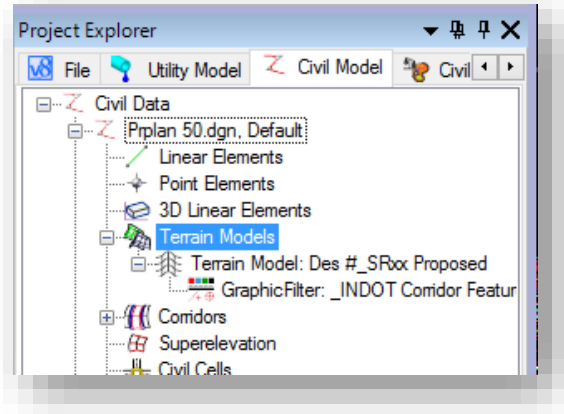
To briefly cover each of the options:

- Append To Terrain – Allows for the graphical selection to be added to an existing terrain model. In this instance, the elements should not be appended and a new terrain will be created.
 - Graphical Filter Group – This defines the rule set that governs how the data should be brought into a terrain model. To bring in INDOT corridor data created with our template library, use the _INDOT Corridor Features filter set.
 - Terrain Filter Manager – This will display a graphical picklist of all available filter groups in both the base DGN and any attached Dgnlib files with filters in them.
 - Preview – This will highlight any elements that would be selected by the Graphical Filter Group.
 - Edge Method – This determines how the triangulation would be created for the terrain. As we're using this as a purely translational method to get the breaklines for the corridor into a DTM, this setting is inconsequential.
 - Maximum Triangle Side Length – This is only displayed when the Edge Method is set to Max. Triangle Length.
 - Feature Definition – This defines the feature that the terrain will be created as. In this instance one of the Design_ Terrain Display features should be used.
 - Name – Defines the name of the terrain that will be created.
3. As was briefly alluded to above, the Graphical Filter Group to be used should be used when bringing in an INDOT generated corridor.
- Note: This graphical filter has been built to automatically select all XS_TL_ features that are created as part of the corridors breakline features. If you deviate outside the provided feature naming, this graphical filter will need amended to include these additional features. As with other OpenRoads features, the first time you use the filter in a DGN, it will be copied into the file where you can amend its settings to your needs.**
4. Prior to committing the command and creating the terrain, it's highly advised to use the Preview command to verify that the elements you're needing are captured. An example of what the previewed elements look like are in the following illustration.



Graphical Filter Preview

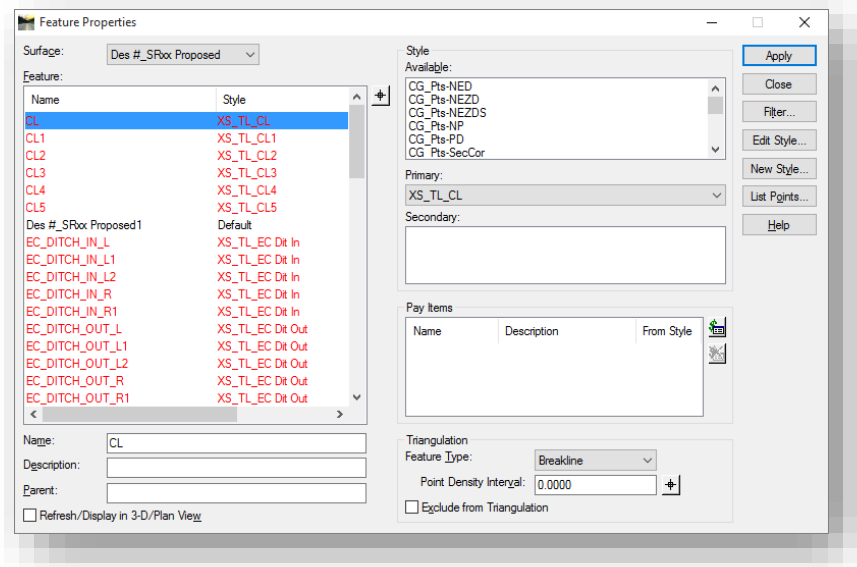
- With the settings configured, confirm the selection in the drawing window by left clicking to accept each setting. Under your Civil Model a new terrain will be created with the name you provided.



New Terrain Created

- At this time with your terrain created, you can then send the terrain back to the Native DTM using the same steps as the previous section. Again, when prompted provide an appropriate name and check your file into ProjectWise and re-open the DTM in InRoads if needed.

Note: As we discussed earlier, it's very important that you use provided point names and their associated features from the INDOT template library for the terrain and subsequently the DTM to have the correct features. The following screen capture is an illustration of what may occur when the features used do not match what's available in the XIN.



Features Not In the XIN

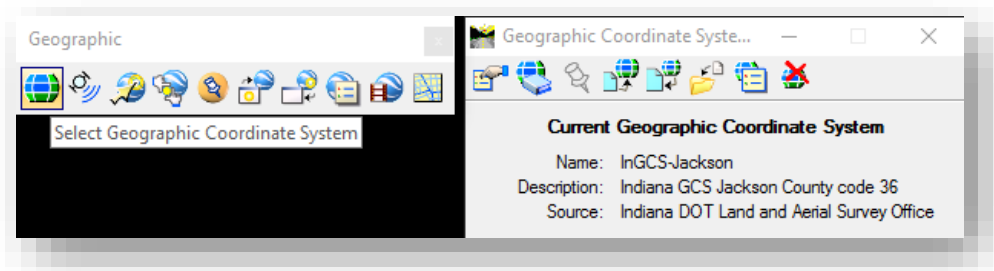
In the above example, this is what can potentially occur if the features do not exist in the XIN used. Those listed above do exist in the newest XIN. This illustration shows those features not being found in the instance that this may be using an old XIN that doesn't contain the data necessary. These features can still be used and projected, however they will have no symbology associated. Alternatively, they can be mapped to other features that may exist in the XIN for display purposes.

7.5-4c DTM Export Issues with Metric Geocoordination

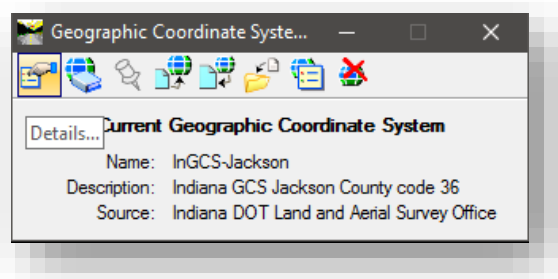
The CAD Peer Group and CAD Support have identified an issue with how MicroStation/InRoads is exporting OpenRoads terrain models to the native InRoads DTM. This issue occurs when exporting from a file where the Geocoordination has been enabled, and the units for the geocoordination are in metric. This will most commonly occur in newer surveys that are geocoordinated using the new county coordinate system, which is configured in metric.

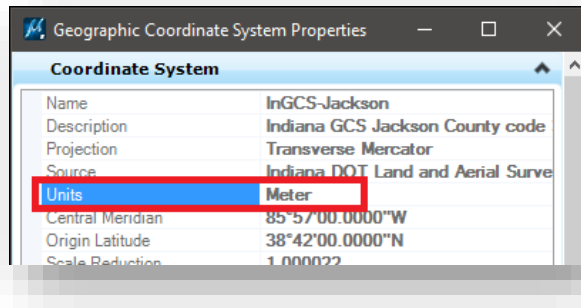
How to check if the issue will occur.

4. Load the Geographic toolbar from the **MicroStation Tools > Geographic > Open as Toolbox** menu.
5. Click on the Select Geographic Coordinate System button on the left side of the toolbar. It will load the Geographic Coordinate System dialog shown on the right.



6. On the Geographic Coordinate System dialog, select the details button. This will display the properties for the coordinate system applied. If the highlighted Units field shown lists metric, your file will be affected by the issue and DTM exports will need to be performed using the following method.

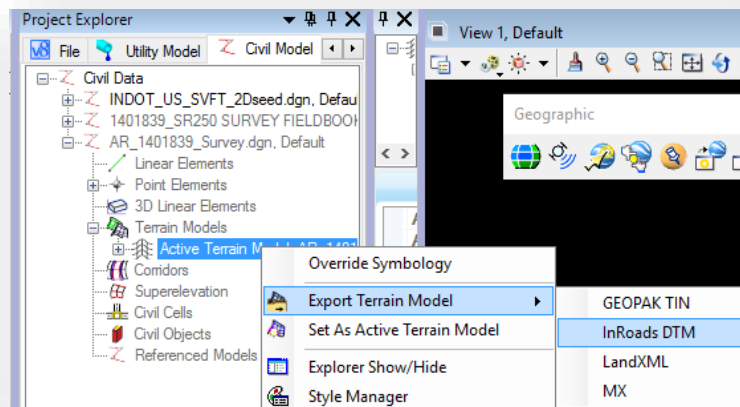




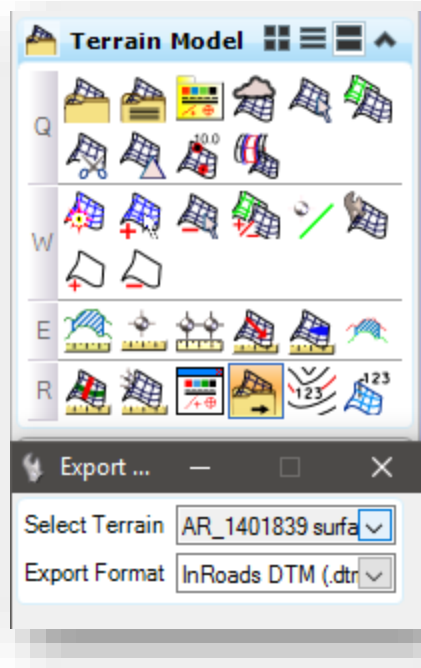
How to Export if the Issue Occurs

After identifying if your data will be affected, the following process should be used to avoid the export scaling issue.

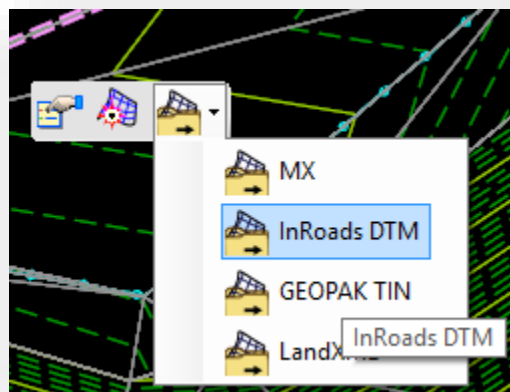
5. Copy a blank 2D seed file into your project folder. Rename the file to designate that it's used for DTM export. Unlike most other files, do not use a provided geocoordinated seed file or apply geocoordination to this file.
6. Reference attach any files with terrains that you want to export to DTM. This can include survey fieldbook files, corridor models, or any other terrains that you want to export.
7. By reference attaching these files, you may interact with the terrain models and export the data without the scaling being influenced by the Geographic Coordinate System. From either the Project Explorer, **Civil Tools > Terrain Model > Export to File**, or heads up display with the terrain selected; export the terrain to .DTM



Export from Project Explorer



Export from Civil Tools



Export from Heads Up

8. Upon completion, you will have a created DTM that you may use from your data. You can validate the exported data by displaying it using the native InRoads surface display toolset and overlaying the referenced data to confirm that it falls in the same location.

7.6 Sheet Layout and Creation (Plan Profile Sheets)

One of the major items that has not yet been transitioned to OpenRoads technology is the Plan and Profile Generator. The steps in this section assume that you've stepped through all other preceding steps to generate your native file formats.

Note: Unless otherwise specified, please keep in mind that these tools will fall back and rely on the Global Scale Factor Application Add-In for InRoads. Further discussion of this tool can be found in Chapter 5.6. Also, due to a requested change, the Station Lock tool has been set to be on by default. This can cause plan sheet creation to shorten the first sheet in the plan set by forcing the 2nd and subsequent sheets to start on even stations. Disable the station lock prior to cutting sheets.

The following section discusses the various functions included in the Plan and Profile Generator. This will include reviewing some of the differences between creating a profile using the previously discussed method, and how Plan and Profile Generator will create its own for use during the sheet cutting process. For further reference on this tool and its functionality, please refer to the Bentley InRoads Plans Production course via the Bentley Learn Network.

7.6-1 Files Required for Plans Production

Throughout the document to this point we've largely been working in the OpenRoads format directly with DGNs except where we've created native InRoads format files (DTM, ALG). To this point, the assumption is that while you've created these files, they may not actually be open in InRoads to be used. For the purposes of plans production make sure you have the following three items open:

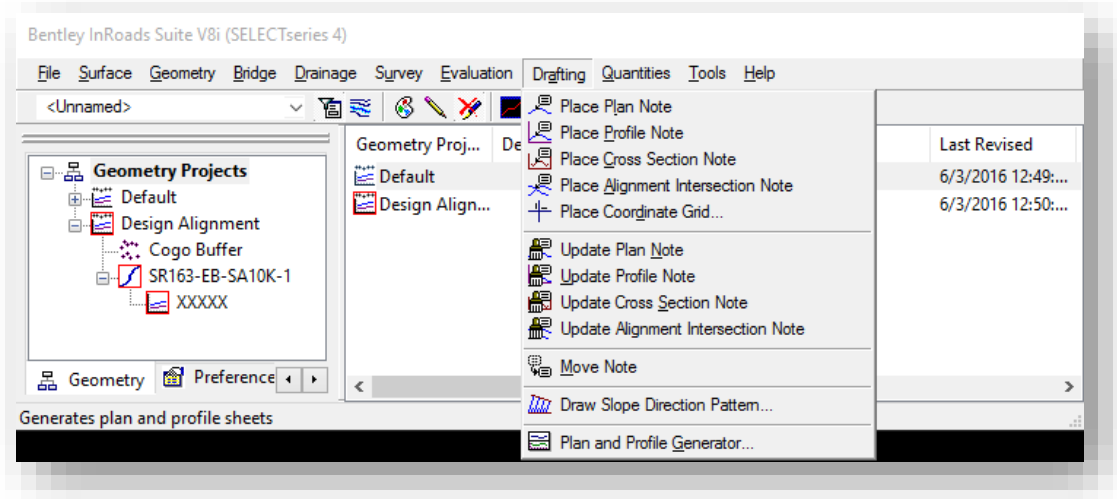
- Your geometry ALG file with the appropriate alignments included.
- Your surface DTM file created from the survey generated terrain model.
- Your Prplan XX.dgn (which you should initiate Plan and Profile Generator from), which references your Explan XX.dgn. Specifically you should be working out of the ModelName-3D model so all civil content is displayed.

As a slight deviation from the SS2 method, we'll not be drawing any elements from the ALG and DTM except for the legacy SS2 profile which Plan and Profile Generator relies on when cutting sheets. All other plan elements will be displayed as their OpenRoads format elements and will be displayed based on their reference attachments.

Also remember that you can use a .RWK project file to compile all your InRoads native files for ease of use.

7.6-2 Plan and Profile Generator

While in the prplan.dgn, open the Plan and Profile Generator from the **Drafting -> Plan and Profile Generator** as shown in the following illustration:



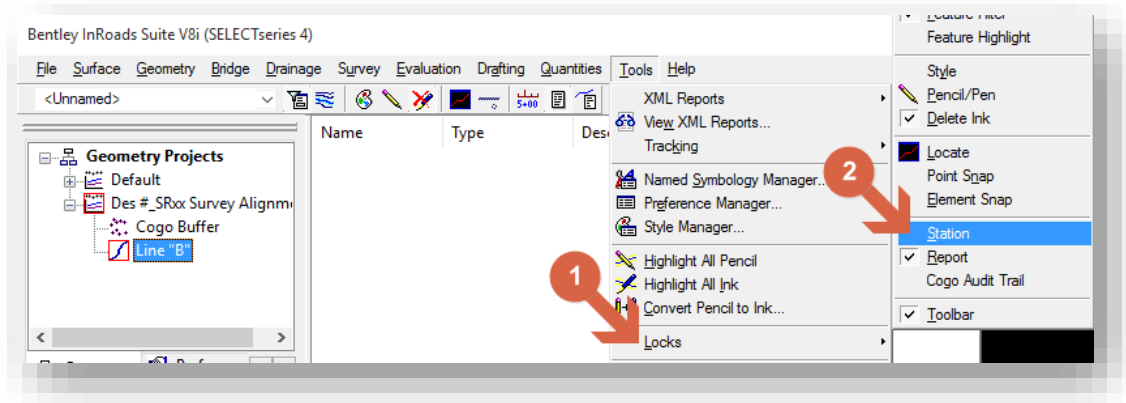
Plan and Profile Generator

This will present the Plan and Profile Generator window. With the sheer number of options available in this tool, it is highly advised that one use the preferences that are provided. These correspond to the INDOT standard sheets. As there are numerous preferences available, please refer to the following table for a listing of the preferences and their function. For all preferences listed as IN PW, please note that these are configured to attach the appropriate border from within the ProjectWise system.

Default	Default Preference, settings are configured the same as IN PW Plan Profile 50 Scale
IN PW Bridge Layout XX Scale	INDOT Bridge Layout sheet, available in 30 and 50 scales
IN PW Dbl Plan XX Scale	INDOT Double Plan sheet, available in 10, 20, 30, 50, and 100 scales
IN PW Ltr Dbl Plan XX Scale	INDOT Double Plan sheet, letter size in 200 scale.
IN PW Ltr Plan XX Scale	INDOT Plan only sheet in 200 scale.
IN PW Plan XX Scale	INDOT Plan only sheet, available in 10, 20, 30, 50, and 100 scales
IN PW Plan Profile XX Scale	INDOT Plan Profile sheet, available in 20, 30, 50, and 100 scales
IN PW Profile XX Scale	INDOT Profile only sheet, available in 20, 30, and 50 scales.
INPWPlanProfileXXScaleLargePlan	INDOT Plan Profile sheet, available in 20, 30, 50, and 100 scales
xBentley Default	Original, as shipped Bentley Default preference

To illustrate the most extensive sheet cutting path, you will review the process for cutting a 50 scale Plan Profile sheet.

Prior to cutting sheets, please ensure that the InRoads Station Lock is turned off. If it's left on, sheets may not cut using the full extents of the plan and profile views until even stations are found. To disable the Station Lock, go to Tools > Locks on the InRoads Explorer and make sure that the Station option is not checked.



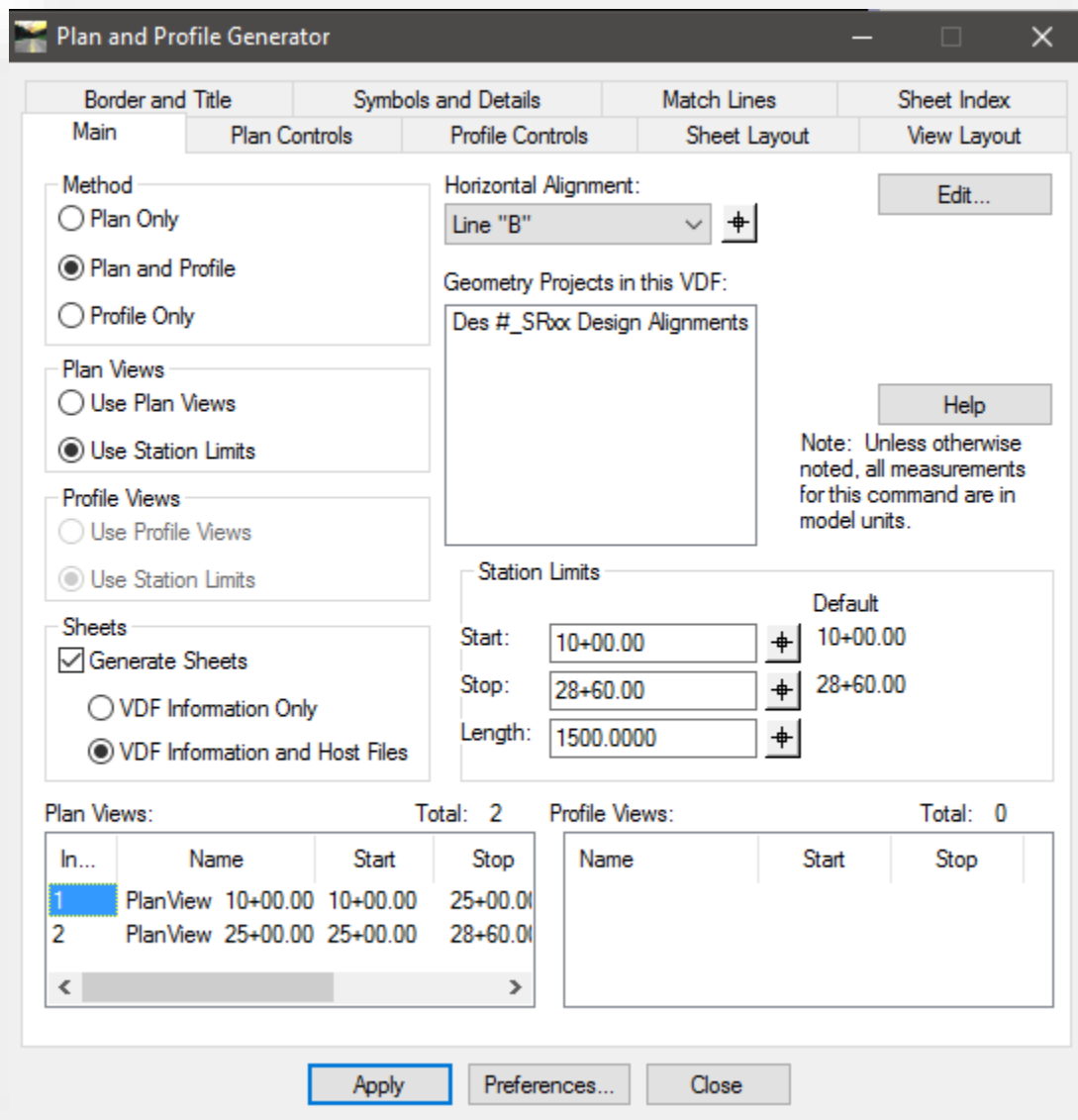
Disabling Station Lock

7.6-3 Sheet Creation

Like numerous other InRoads tools, Plan and Profile Generator defaults to using the active geometry project and subsequent horizontal and vertical alignments. One can either pre-activate each alignment prior to opening the tool, or they can interactively select these items from within the Plan and Profile Generator.

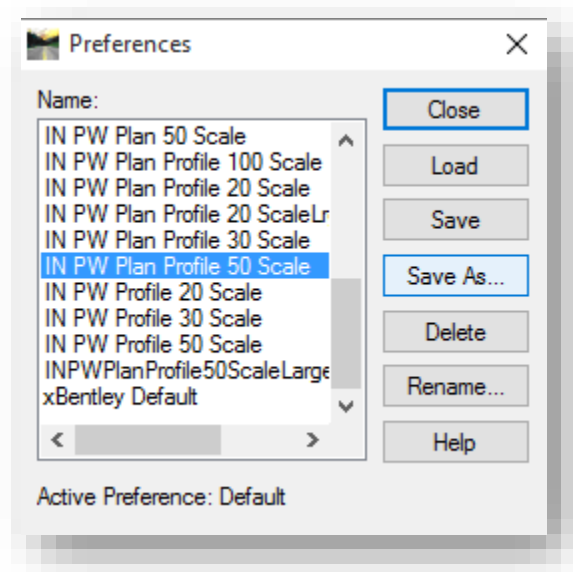
Note: The various text and symbology functions within the Plan and Profile Generator all respect the values in the Global Scale Factors add-in. For the correct display of these elements, make sure that Global Scale Factors are consistent with the scale sheet being cut.

When first starting the tool, the following window will be displayed:



Plan and Profile Generator Main Tab

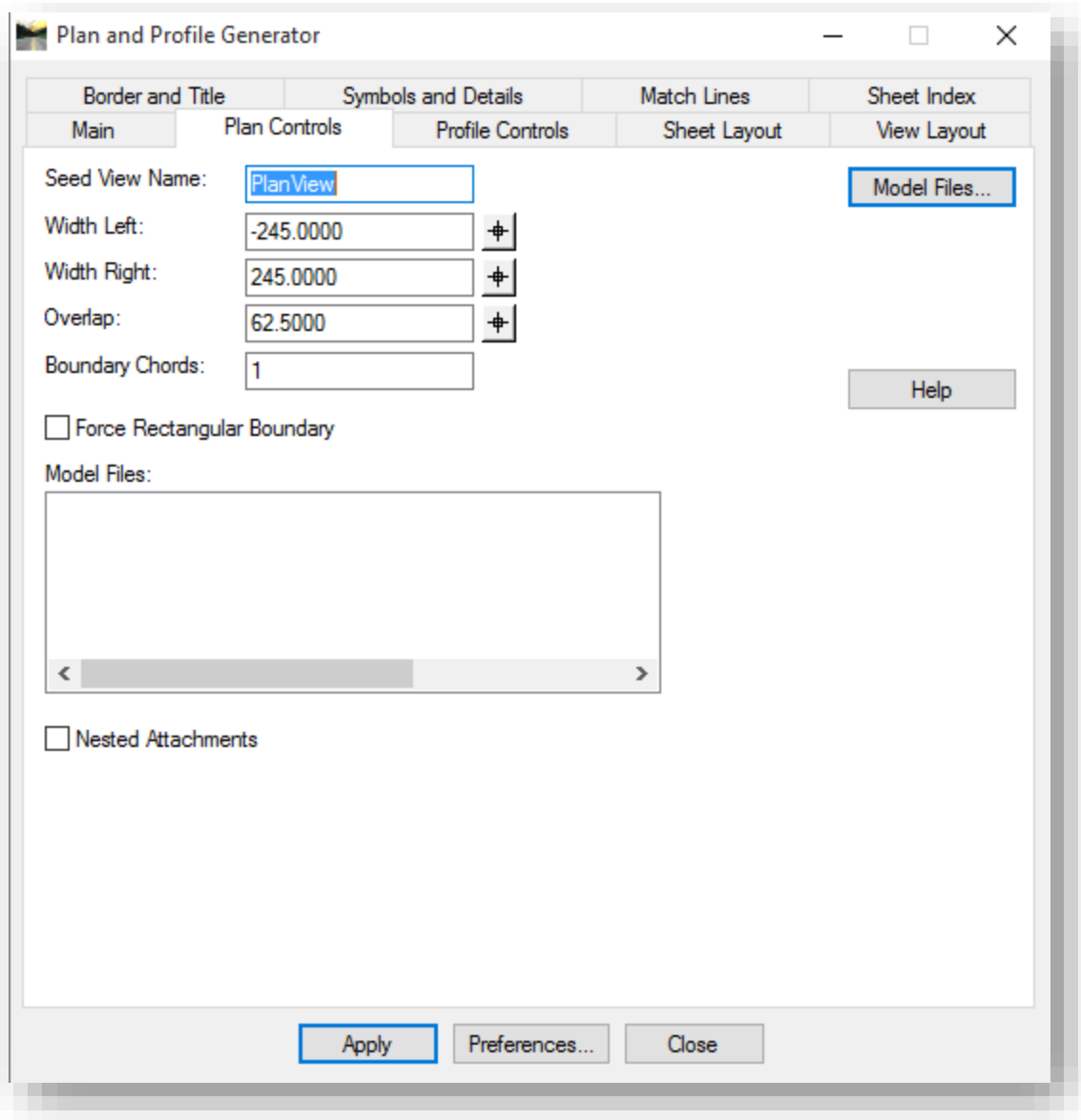
With this tab displayed, select the Preferences button in the bottom center. You'll start by loading the appropriate preference for a 50 scale plan profile sheet.



Loading IN PW Plan Profile 50 Scale

With the preference loaded, you can now start reviewing the options that are loaded for an INDOT specific sheet. For specific information on each of these settings, please refer to the online help in the software, or the InRoads Plans Production course guide.

Note: *SS4 and SS10 InRoads have a bug during the selection of the Plan Profile Generator preferences that may result in this panel only displaying the preferences for Profile generation. This typically occurs when using one of the preferences that are setup for plan and profile or profile only sheet generation. If this bug occurs, the only way to get the appropriate preferences to load again is to restart the InRoads/MicroStation session.*



Plan Controls Tab

For the features on this tab, the preference defines the seed view name, the left and right widths and the sheet overlap. You can attach additional base drawings (Explan, etc.) by attaching these in the Model Files portion of the dialog. If you maintain the attachments to Prplan and do not attach files with this tool, you will need to adjust your reference settings to enable Live Nesting via the Nested Attachments button. Both are suitable methods, where possible, nested attachments have been enabled to enable maximum flexibility.

Nested Attachments

Nested Attachments

The screenshot shows the 'Plan and Profile Generator' software window. The 'Profile Controls' tab is active, displaying various settings for profile generation. The 'Surface' section has 'Des #_SRFox' selected. 'Profile Elevation Shifts' is set to 'Shift at Major Stations'. 'Horizontal Spacing' is 'Right to Left' with a distance of 400.0000. 'Vertical Spacing' is 'Top to Bottom' with a distance of 100.0000. 'Profile Height' is 90.000 and 'Profiles per Column' is 1. Margins are set to Top: 1.0000, Bottom: 15.0000, Left: 62.5000, and Right: 62.5000. An 'Example' section shows a grid of profile views with red arrows indicating alignment. Buttons for 'Apply', 'Preferences...', and 'Close' are at the bottom.

Border and Title	Symbols and Details	Match Lines	Sheet Index
Main	Plan Controls	Profile Controls	Sheet Layout

Seed View Name: ProfileView
Set Name: Line "B"
Profile Preference: IN Profile 50
Vertical Alignment: Profile Grade

Surface:
 Default
 Des #_SRFox
 Des #_SRFox Point Anr
 Des #_SRFox Proposed

Profile Elevation Shifts
 Shift at Major Stations
 Shift at Minor Stations
 Shift Where Needed
 Do Not Shift
Note: Highlighted surfaces control elevation shifts.

Horizontal Spacing
 Left to Left Right to Left
Distance: 400.0000

Vertical Spacing
 Bottom to Bottom Top to Bottom
Distance: 100.0000

Profile Height: 90.000
Profiles per Column: 1

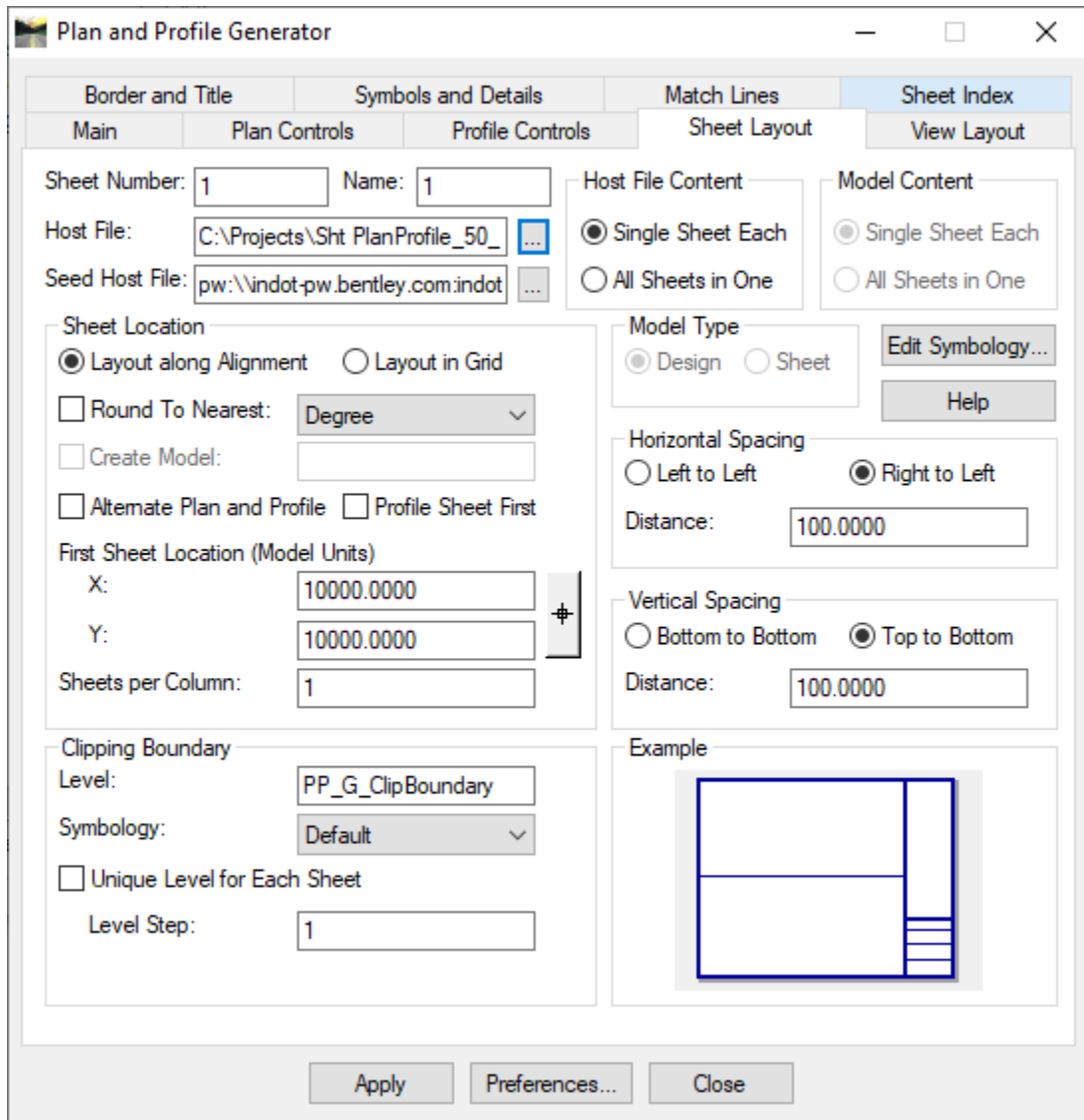
Margins
Top: 1.0000 Bottom: 15.0000
Left: 62.5000 Right: 62.5000

Example

Apply Preferences... Close

Profile Controls Tab

On this tab, customized values from the preference are the profile height, horizontal and vertical spacing, and the left and right margins. Additionally, the Profile Preference is set to the IN Profile 50 consistent with this layout. An item to note, no vertical alignment is defined. Should the sheet be cut with these settings as is, the profile will only display the existing surface along the horizontal alignment.



Sheet Layout Tab

The first items on this tab defined are the Sheet Number and Name. These are incrementing numbers and used in the Sheet Index for reviewing sheets. It should be noted that any value defined in these fields is only for reference in the Plan and Profile Generator and do not influence the naming of the sheet DGN files.

The Host File is the name of the first finished DGN from the sheet cutting process. Additional sheets are named sequentially from the last character of the file name. In the above example, the name is Sht PlanProfile_50_1.dgn; each additional sheet would be Sht PlanProfile_50_2.dgn, _3.dgn, etc. Also, the preference defaults for the process of cutting a set of test sheets. As such, the file path has been set to the local C:\Projects\ folder. This has been done to alleviate issues with the cutting and re-cutting of sheets into ProjectWise. Sheets should be cut into this location until the desired end result is achieved at which point the sheets can be cut directly into the appropriate project path in ProjectWise.

Note: The C:\Projects folder is no longer automatically provided on new/refreshed PCs and will not be available for new users. Prior to cutting sheets, the end user needs to verify that this folder is available and accessible in Windows Explorer prior to cutting sheets to this location.

The Seed Host File is the MicroStation seed file that InRoads will use as a base sheet when creating, clipping and bordering the references. This file will be copied and renamed each time a new sheet is cut.

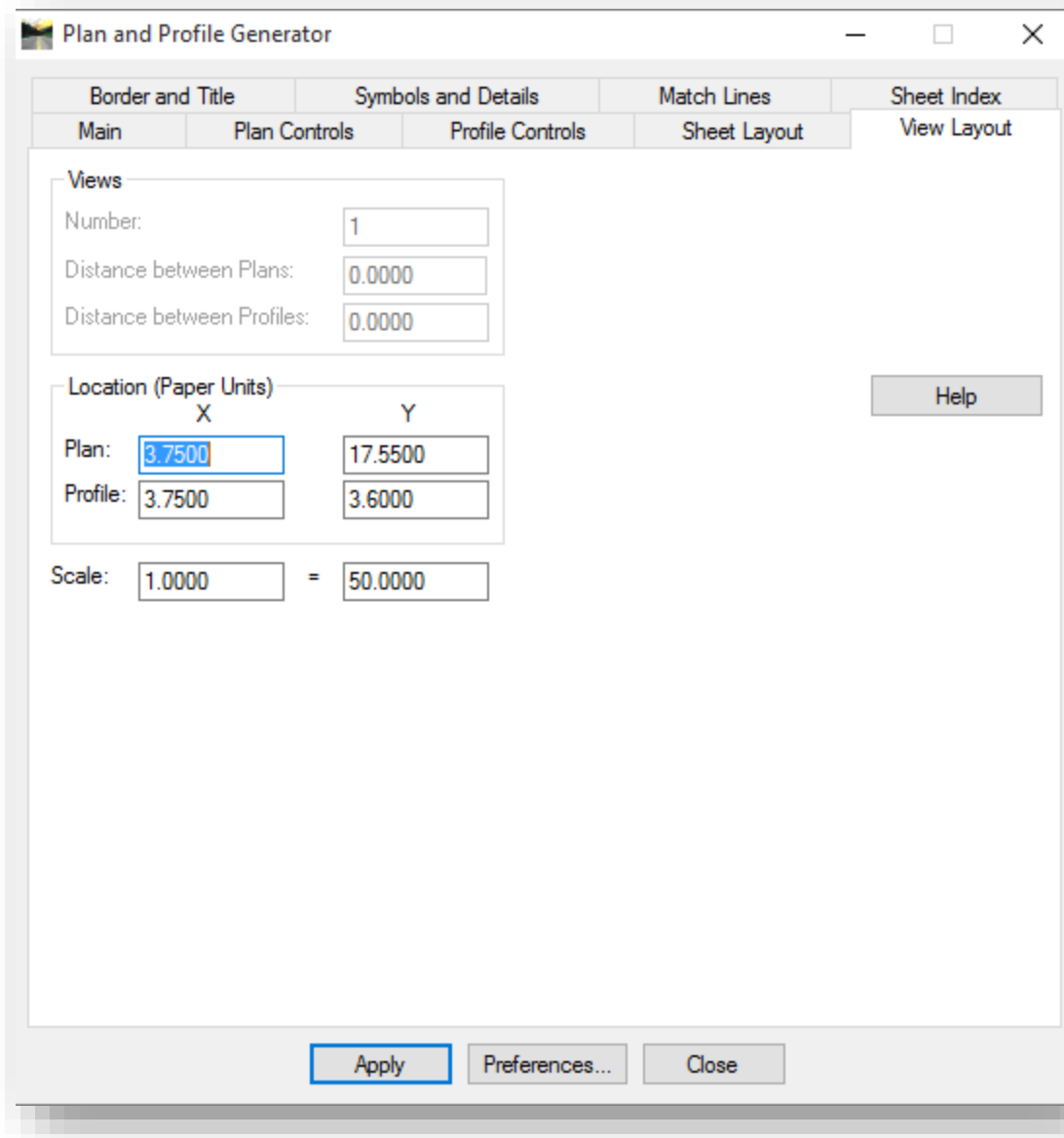
The clipping boundary is an element that follows the end of the clipped reference for both the plan and profile. This feature is enabled and also enumerated to coincide with the names of the sheets for quick referencing to adjust annotation that may need to carry through from the base sheets.

Host File Content defines how the finished sheets are provided when cut. Single Sheet places each cut sheet into a separate DGN which is the normal convention. All Sheets in One places to the border and references next to each other in a single DGN and is dependent on the Sheet Location setting.

Sheet Location determines how the sheets are aligned when cut. The default behavior is to place the sheets along the alignment. One can adjust these to show up in a grid view as well. If Layout in Grid is selected, the Horizontal and Vertical Space items become available.

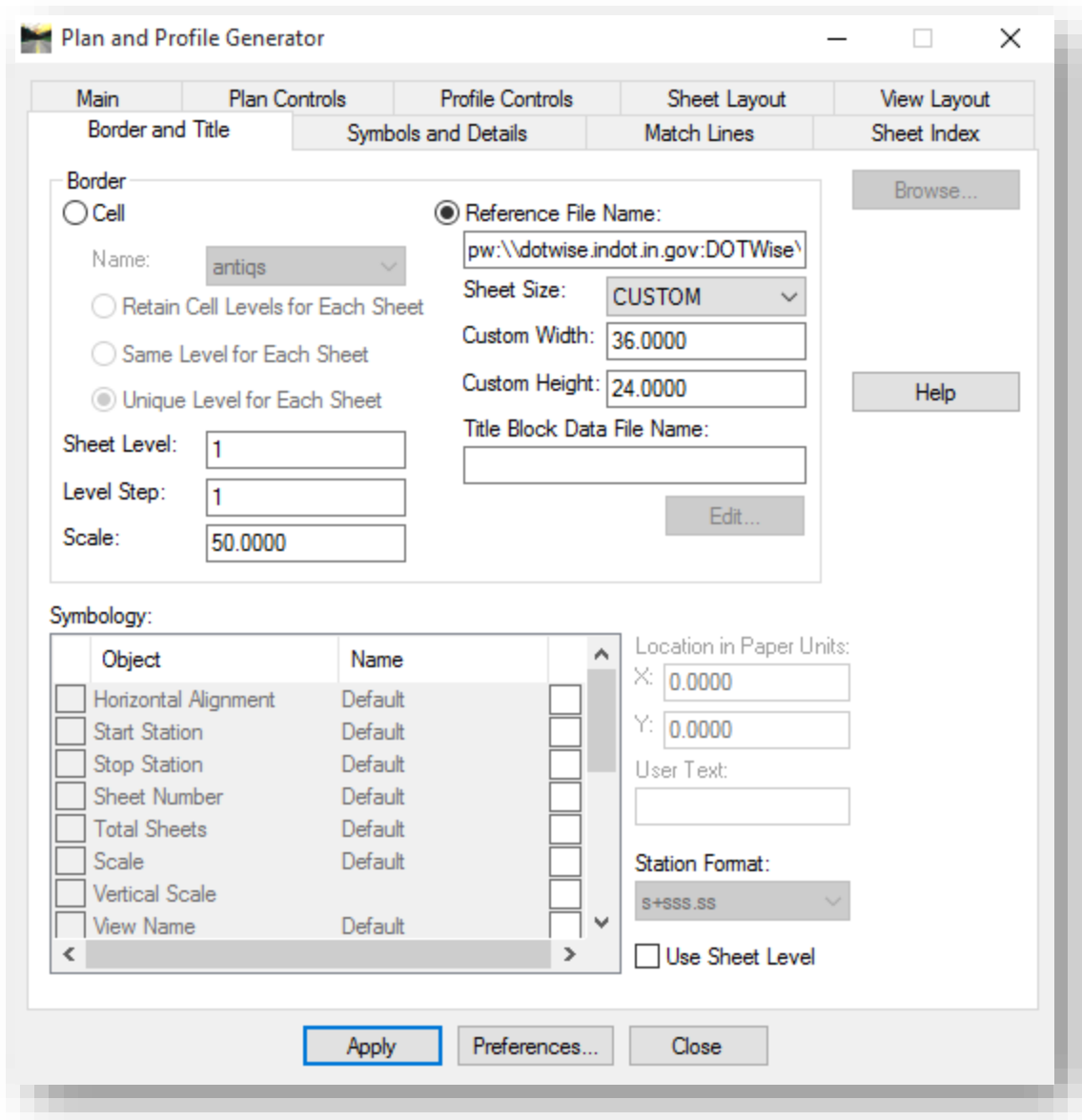
Note: Sheets in InRoads are laid out along the alignment in the INDOT preferences. When viewing the finished sheets, InRoads does rotate the view to appear aligned with the border, however if one adjusts the view rotation, the border and references will adjust their rotation and will appear rotated at the appropriate angle.

Also, if All Sheets in One is selected and used, the borders and references will be cut along the alignment and will appear overlapped as they are cut along the alignment.



View Layout Tab

On this tab, one will find the values used to determine how the plan and profile line up on the sheet. When cutting INDOT sheets, these should not be adjusted from the values loaded with the preference. Also, the Scale value should be consistent with the scale of the sheet being cut.

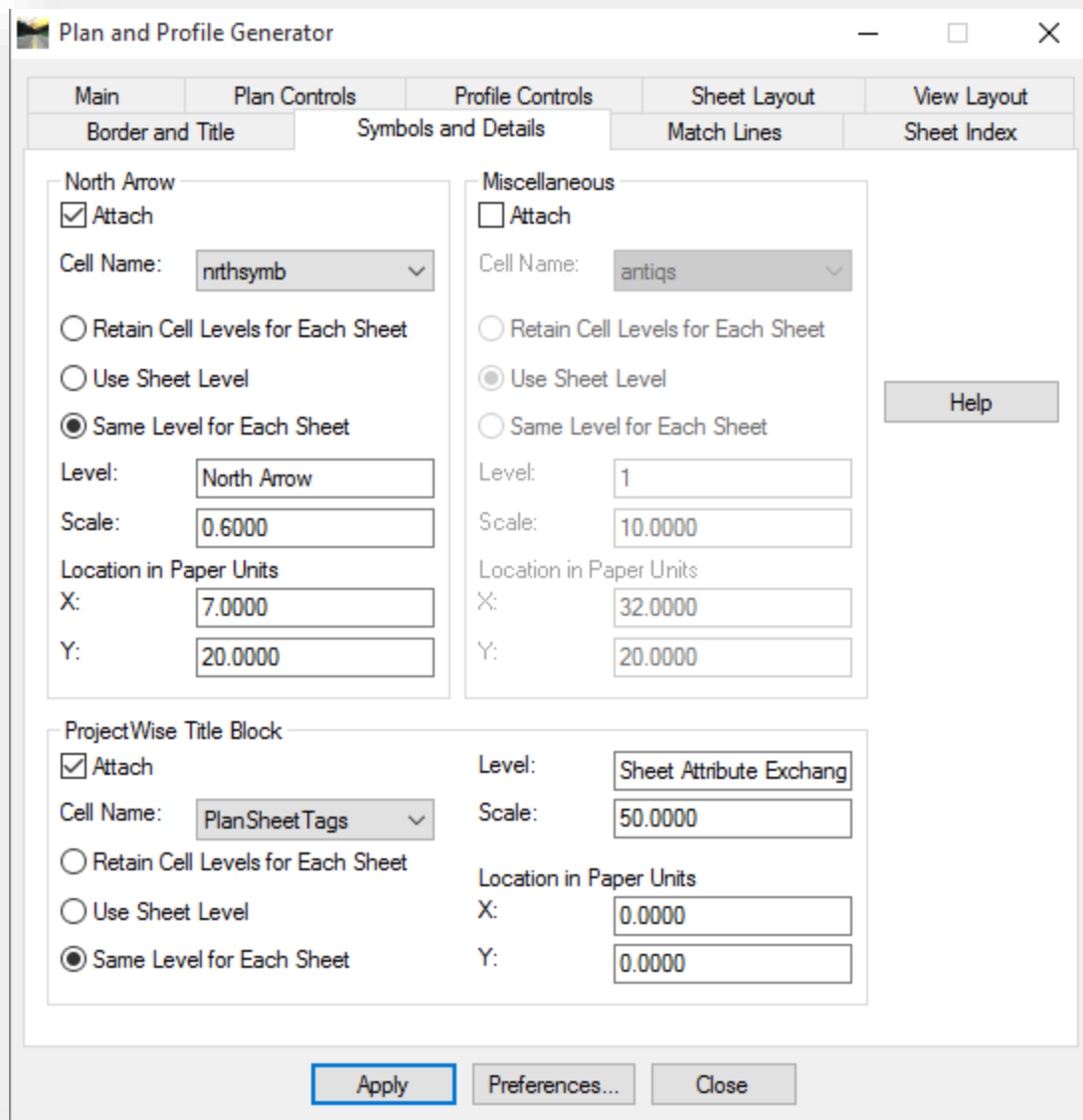


Border and Title Tab

The values customized on this tab are the Scale, Reference File Name, and Custom Width and Height. As with the scale value on the previous panel, this should be consistent with the scale value of the sheet being cut.

The Reference File Name is the name of the appropriate border for the sheet being cut. In this example, the border is INDOT_Border.dgn, and can be found in ProjectWise. This is preset in the preference and should not be adjusted.

The Sheet Size should be set to CUSTOM to enable the Custom Width and Height options. As shown, the 36 x24 is the standard size for a full size INDOT sheet.



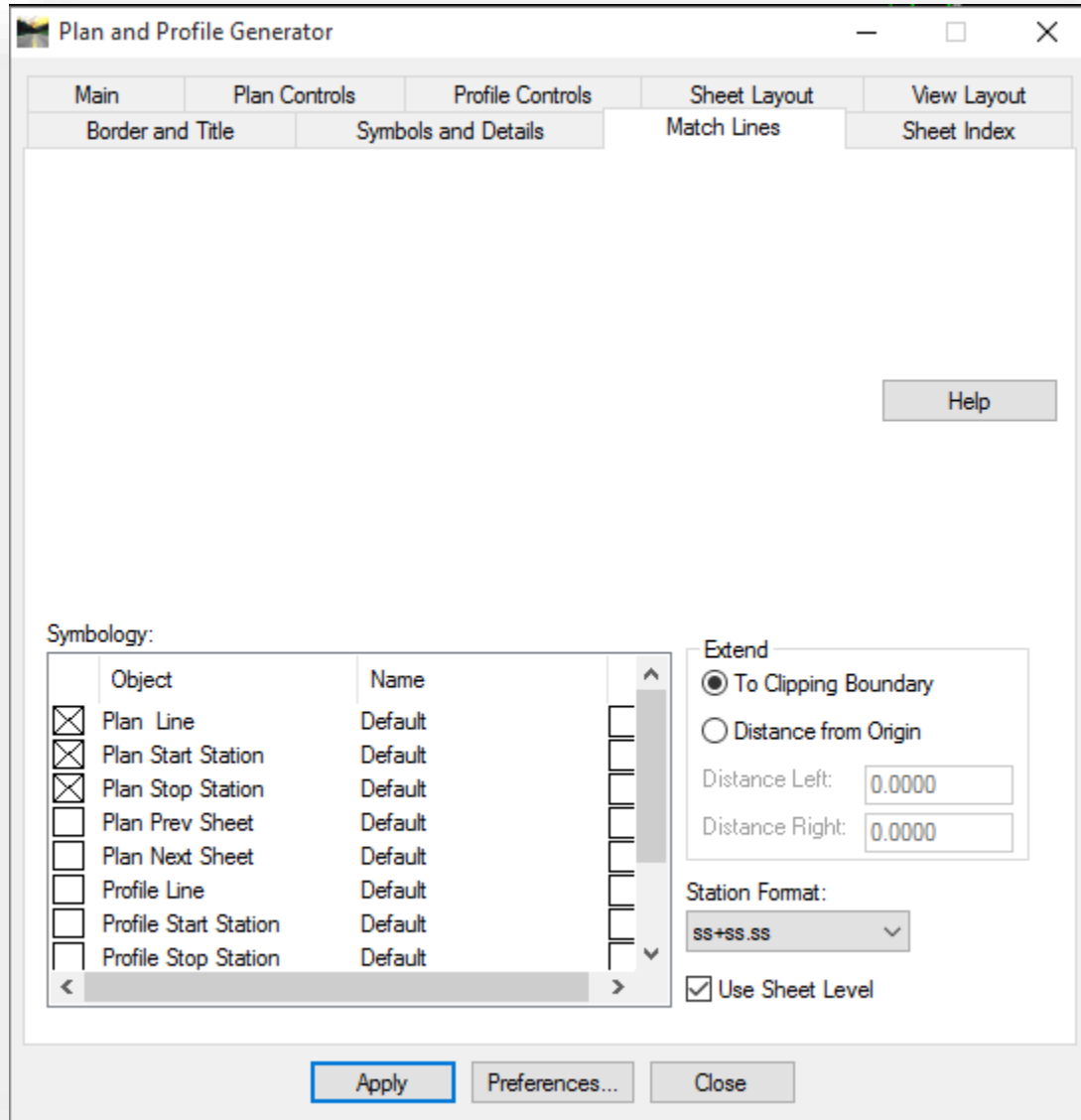
Symbols and Details Tab

On this tab, the North Arrow, and ProjectWise Title Block are enabled.

This tab is where having the INDOT_InRoads.cel attached is of paramount importance. Without the cell library attached, the default values of the cell names for both features will be “antiquis” (the first cell alphabetically in the library) if the cells are not attached, and upon sheet creation, the incorrect cell will be placed.

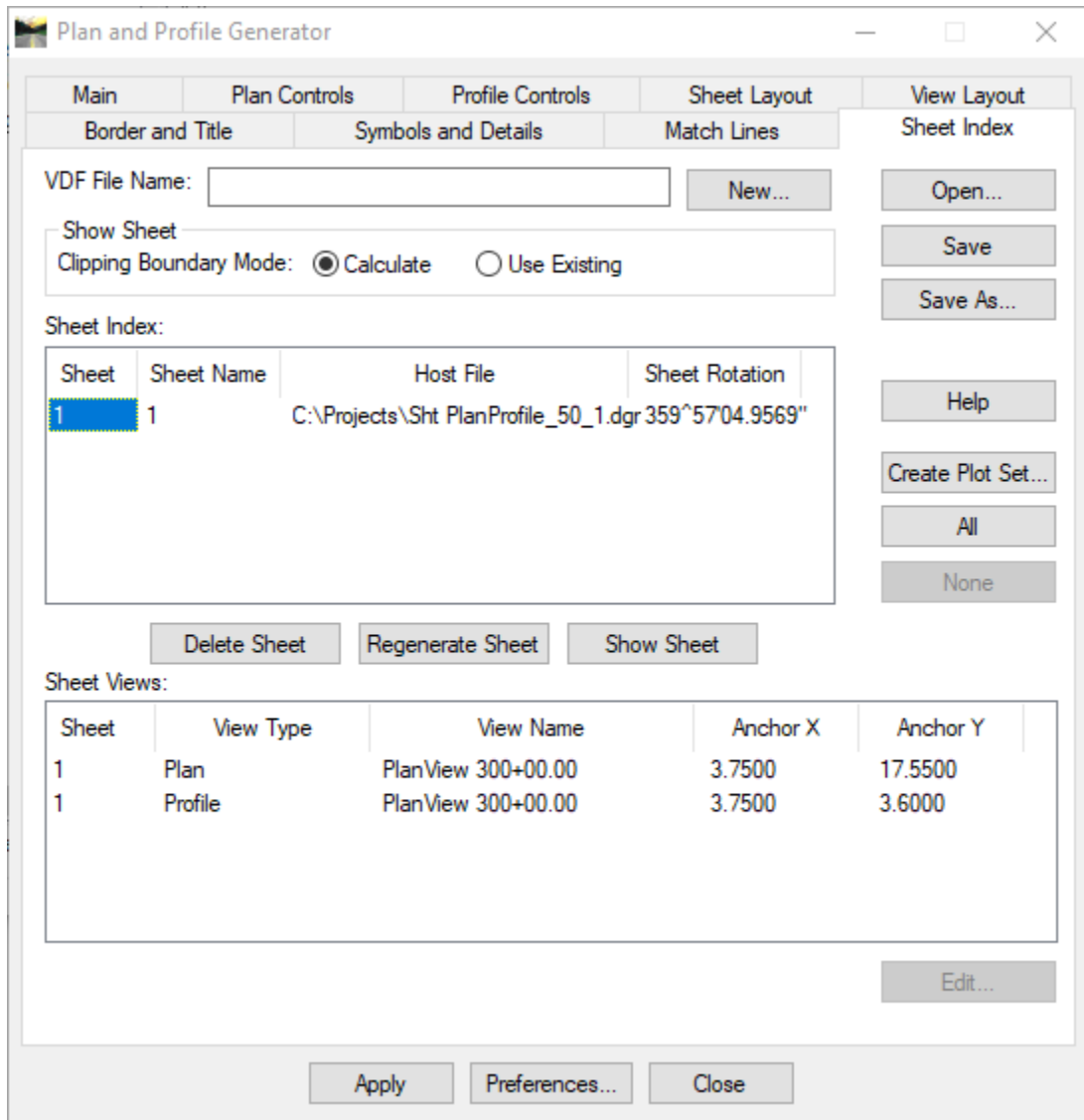
The North Arrow is enabled, and given a defined scale, and location on the cut sheet. It is placed on the same level as the sheet border and can be moved as necessary.

The high level of ProjectWise integration is evident in the inclusion of the ProjectWise Title Block option on this tab. This cell is placed automatically when the sheets are created, and should not be modified in any way for the title block integration to function properly.



Match Lines Tab

On the Match Lines tab, the Start and Stop stations and linear indicator are all enabled, along with the placement of the station at the match lines.



Sheet Index Tab

This tab becomes populated once sheets have been cut and are ready to be reviewed. Further discussion of the features on this tab will be covered later in this section once the sheet cutting process is complete.

7.6-4 Cutting Sheets

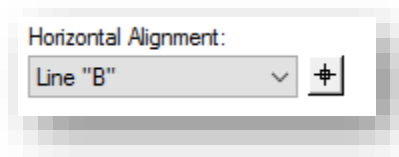
At this point, you've reviewed the preferences and the information that is pre-populated on each tab of the Plan and Profile Generator. For the next example, you'll be looking at a three sheet plan profile set and run the steps required to cut the sheet. This procedure will follow the process provided in the Bentley InRoads Plans Production course guide. To recap this process:

1. Start Plan and Profile Generator and select a preference
2. Set horizontal alignment and station limits
3. List model files

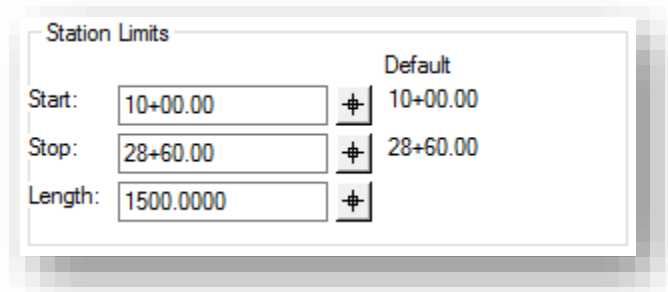
4. Define vertical alignments and surface for profiles
5. Set the host file
6. Set the title block data
7. Set plan views
8. Set profile views based on plan limits
9. Save the VDF file

1. As noted previously, start the Plan and Profile Generator from the **Drafting -> Plan and Profile Generator** menu item. With the generator loaded, select the Preferences... button and select IN PW Plan Profile 50 Scale.

2. With the preference loaded, navigate to the Main tab. Select the appropriate horizontal alignment that sheets should be laid out along. This can be preset with the active Horizontal Alignment, or can be picked interactively.



With the Horizontal Alignment selected, the Station Limits will default to the full extents of the alignment. If you want to cut a different station range; adjust the start and stop accordingly. The Length should be left alone, as this is a predefined value determined by the scale and stored in the preference. The full extents will be used in this example.



3. List Model files on the Plan Controls tab. This tab will be populated automatically with the name of the base drawing currently open. If additional files such as the existing contours or additional base drawings are not included in this list, the live nesting for each base drawing reference in the finished sheet (normally Prplan 50.dgn) may need enabled. Additionally, the Live Nesting toggle on this panel can be enabled as well.

4. Now that you have a horizontal alignment and associated vertical alignment, you can define the profile information on the Profile Controls tab. In the following illustration, one can see the appropriate Profile Preference that coincides with the scale of our finished sheet is enabled. Additionally, the appropriate Vertical Alignment has been selected.

Seed View Name:	<input type="text" value="ProfileView"/>
Set Name:	<input b""="" type="text" value="Line "/>
Profile Preference:	<input type="text" value="IN Profile 50"/> ▾
Vertical Alignment:	<input type="text" value="Profile Grade"/> ▾

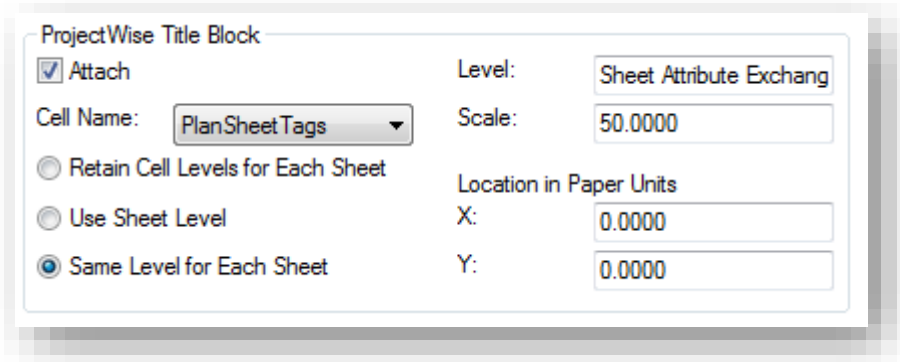
Next, in the Surface section, you've selected the surface representing your TOPO model with its associated triangulation.

Surface:	
<input type="checkbox"/>	Default
<input type="checkbox"/>	Des #_SRxx Proposed
<input checked="" type="checkbox"/>	Des #_SRxx

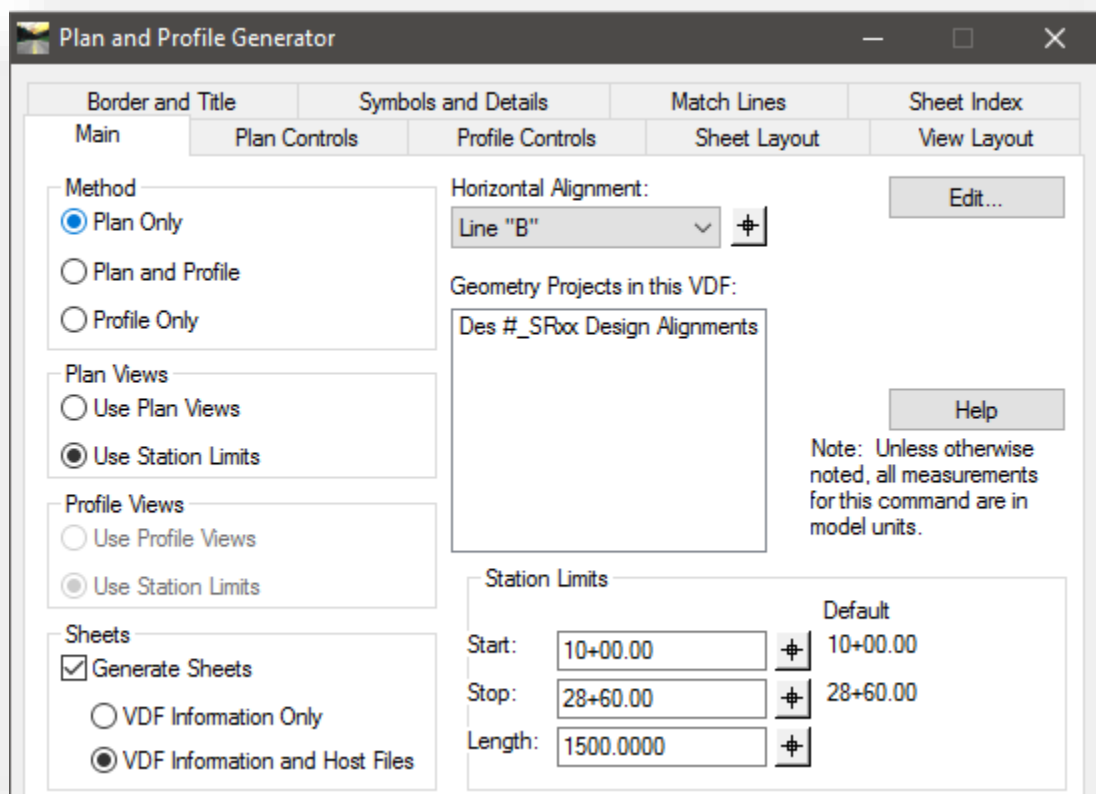
5. For the next item, the Host File needs to be defined. Navigate to the Sheet Layout tab. With the InRoads/ProjectWise integration, our Seed Host File will be located in ProjectWise, and is preset in the preference. The Host File itself can be placed in on the local PC for test cuts, or in ProjectWise for finished sheets.

Host File:	<input type="text" value="C:\Projects\Sht PlanProfile_50_"/>	...
Seed Host File:	<input type="text" value="pw:\indot-pw.bentley.com.indot"/>	...

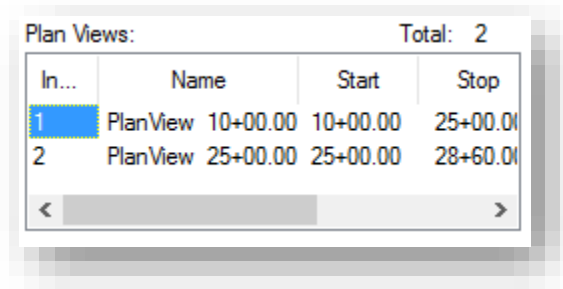
6. In a diversion from the InRoads Plans Production course guide, this step six leads to the Symbols and Details tab to verify that the ProjectWise Title Block is enabled. This is defined in the preference, however if you see a cell name other than PlanSheet Tags, verify that your cell library is attached and re-start the Plan and Profile Generator and reload the appropriate preference.



7. The next step is to define the plan views. Navigate back to the Main tab. Set the Method to Plan Only, and then enable the Use Station Limits option. Make sure that Generate Sheets is disabled, and finally verify that Station Lock (**Tools -> Locks -> Station**) is disabled as well. When appropriately configured your panel should look like the following:



Now, select Apply, and note the information populated in the Plan Views region of the tab. Note that this example a 50 scale sheet will encompass the entire alignment.



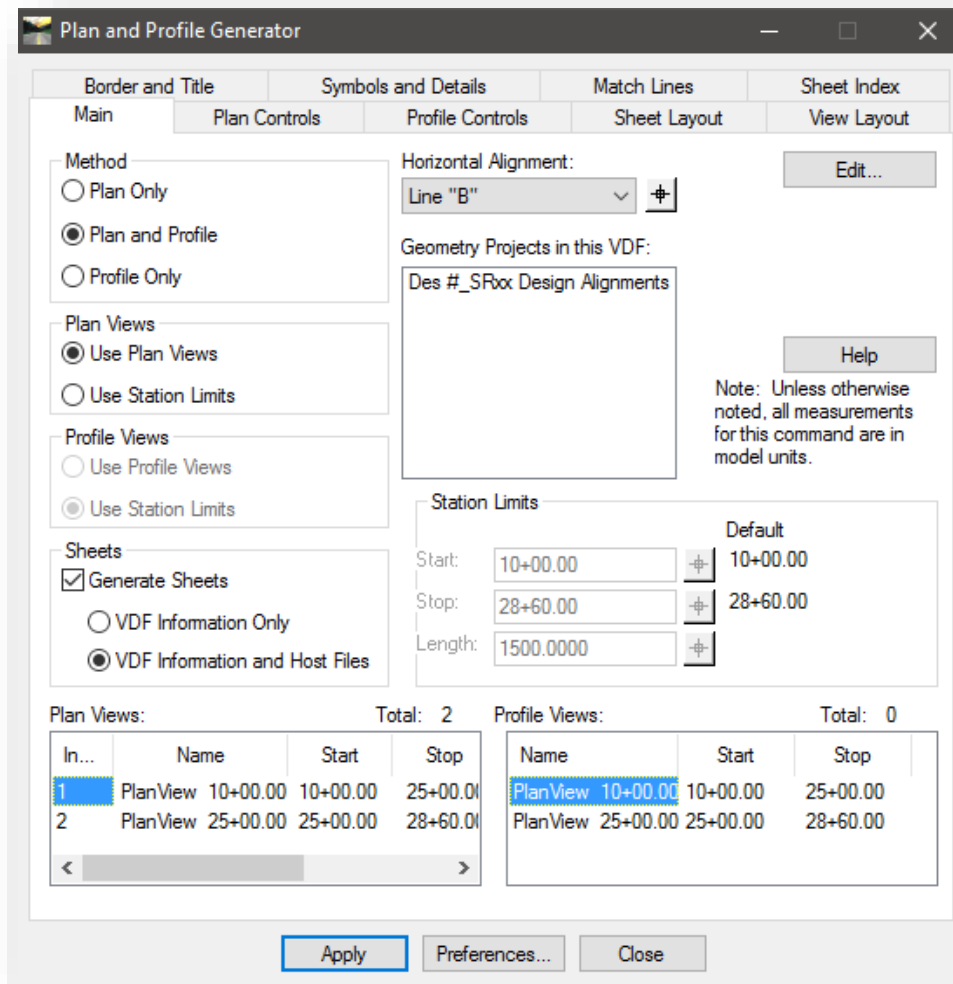
The screenshot shows a dialog box titled "Plan Views:" with a "Total: 2" indicator. It contains a table with four columns: "In...", "Name", "Start", and "Stop". The first row is highlighted in blue and shows "1", "PlanView", "10+00.00", and "25+00.00". The second row shows "2", "PlanView", "25+00.00", and "28+60.00". Below the table is a horizontal scrollbar.

In...	Name	Start	Stop
1	PlanView	10+00.00	25+00.00
2	PlanView	25+00.00	28+60.00

By defining our plan views in this way (with station lock off, and not generating the sheets) the first sheet in the set is ensured to be a complete sheet. If station lock is on, the potential for a partial first sheet exists in order to start subsequent sheets on an even station. Station Lock should remain disabled through the next step.

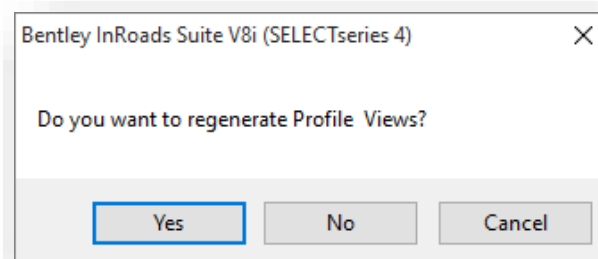
8. With the plan view stationing defined, one can now look at defining the coincident profile views. As discussed earlier in this document, a profile drawn up using the **Evaluation -> Profile -> Create Profile** tools is not usable by the Plan and Profile Generator. Due to this, InRoads will prompt you to regenerate and replace your profile as part of the sheet creation process.

Again, on the Main tab, the Method needs to be adjusted. Set this to Plan and Profile. Then change the Plan Views to Use Plan Views. This will have InRoads create the profiles and sheets using the same per sheet station ranges as you just defined in the previous step. Finally, the Generate Sheets option needs enabled. When the tab looks similar to the following, select Apply to create the sheets:



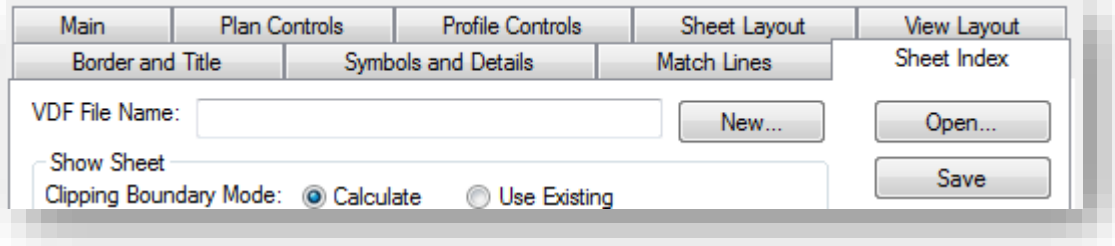
After hitting Apply, InRoads will prompt in one of two ways. If there is no existing profile created by Plan and Profile Generator, you will receive a notification in the lower left corner of the MicroStation window prompting for the location to place these new profiles.

If there's a series of pre-existing profiles, InRoads will prompt to regenerate and replace the existing ones. If this is the case, the following dialog will be shown:



If Yes is selected InRoads will create a completely new set of profiles along with any required adjustments to the layout range and location. If No is picked, InRoads will prompt for a location, but will not re-create the profiles.

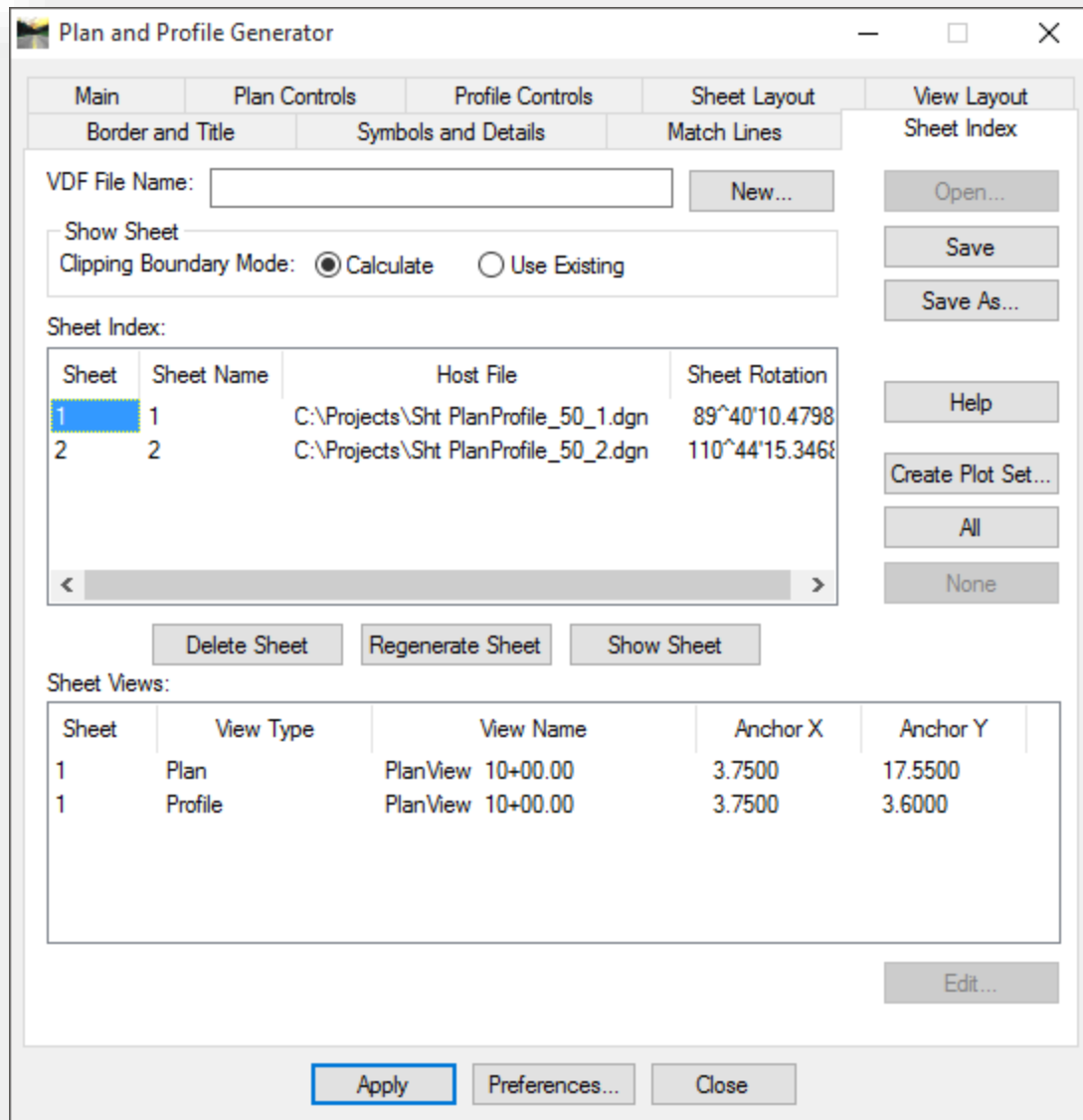
9. With the sheets completely created at this point, one can now create a VDF file. Navigate to the Sheet Index tab. The very first area is where this file is defined:



To create a new VDF, select the Save/Save As option from the right side of the tab. This will provide either a ProjectWise or Windows Save dialog depending on where InRoads was started from. Navigate to the project location, and provide a file name, then select Save. This will place a copy of the VDF in the location specified. With the VDF saved, one can reload this file in order to re-cut, or review sheets already cut.

Note: *In order to preserve finalized sheet layouts, do NOT select the New... button. This will prompt to save the existing VDF and clear out any sheet information in the Plan and Profile Generator that has been filled in since the last VDF save.*

At this point, the Sheet Index should be completely populated with data regarding the finished sheets. The functionality of this page allows for the fine adjustment of sheets, removal of unnecessary sheets, regeneration of sheets, or the ability to browse between sheets.

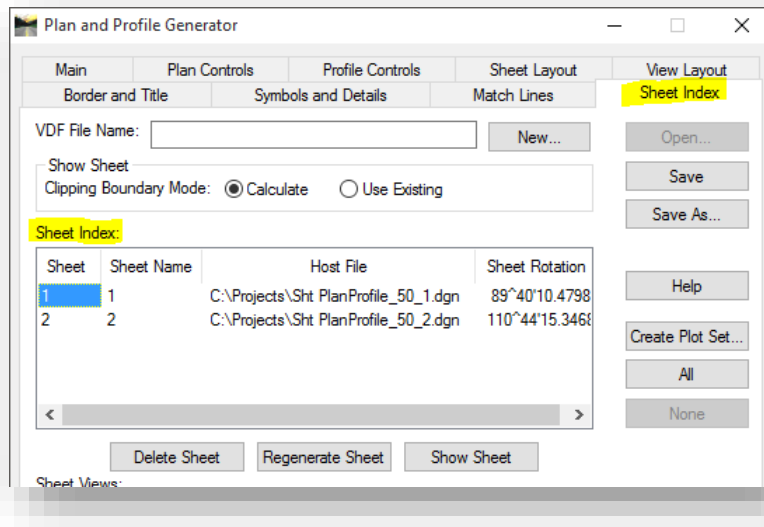


7.6-5 Saving Sheets to ProjectWise and Resolving References

The previous section shows how to create your sheets to a local folder on your hard drive. Previous versions of the DOTWise document have advised re-publishing your files to ProjectWise by re-running the Plan and Profile generator and placing your files directly into ProjectWise. Due to the function of the managed workspace, this process is no longer recommended as it can occasionally lock up, and requires manual intervention as each sheet is cut.

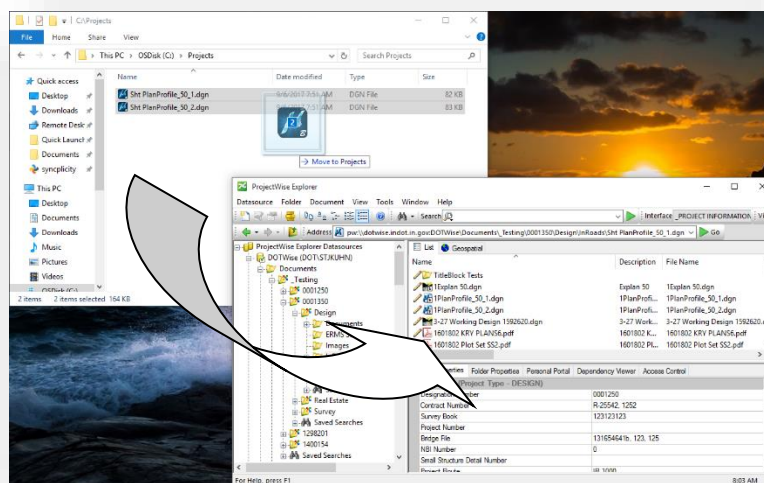
Going forward, the recommended method will be an extension of the previous section. Continuing from the previous section, locate the Sheet Index list on the Sheet Index Tab. This will provide the location of your cut sheets.

Note that the default for all sheet creation preferences is to place files under C:\Projects. This folder is no longer automatically provided on new/refreshed PCs and will not be available for new users. Prior to cutting sheets, the end user needs to verify that this folder is available and accessible in Windows Explorer prior to cutting sheets to this location.



Sheet Index

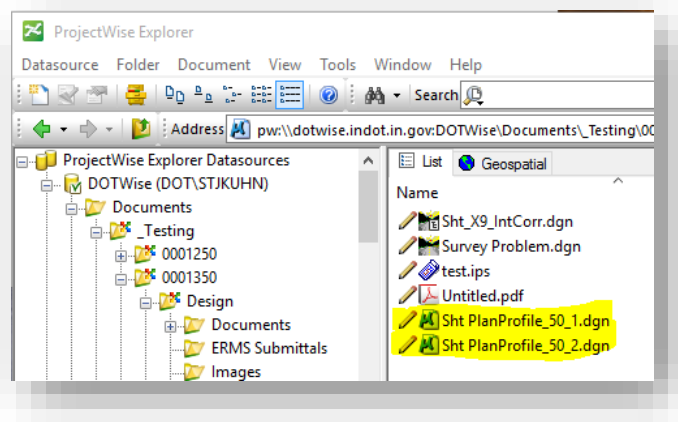
Navigate to this location in Windows Explorer and close your InRoads session. Check in your files. Then select the cut sheets and drag and drop them into ProjectWise into your project folder. For this example we will place these within the InRoads folder to ease subsequent steps. You can place these under subfolders or other locations, but be advised that the next steps may need adjusted to accommodate your situation. In most instances, the following will resolve anything that is placed under the InRoads folder and subfolders beneath it.



Drag and Drop Cut Sheets

If you have not selected a default method for new document creation, proceed with either the Advanced Document Wizard or No Wizard. Either option will allow you to place/create your files in the system. Note that upon conclusion of the drag and drop process, you will still have copies of these files on your local hard drive. Please retain these copies until you've completed all steps of the process in case you need to bring them in again.

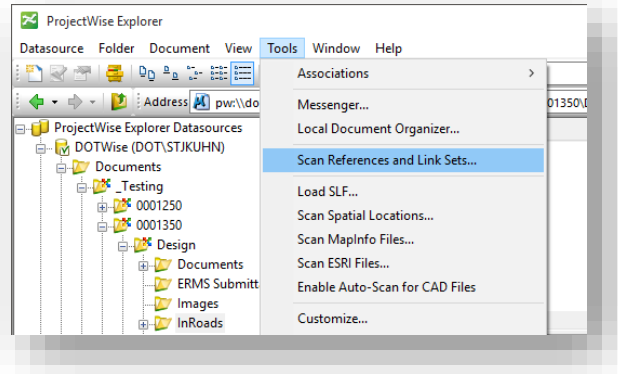
Once placed into ProjectWise, you will see the files placed in system and associated with MicroStation. These may stay associated with MicroStation and do not need opened with InRoads. You will notice that the files do not show that they have any references, which is a side effect of this method. References to the plan and profile views must be re-established for the files to view properly.



Files after Import, No References

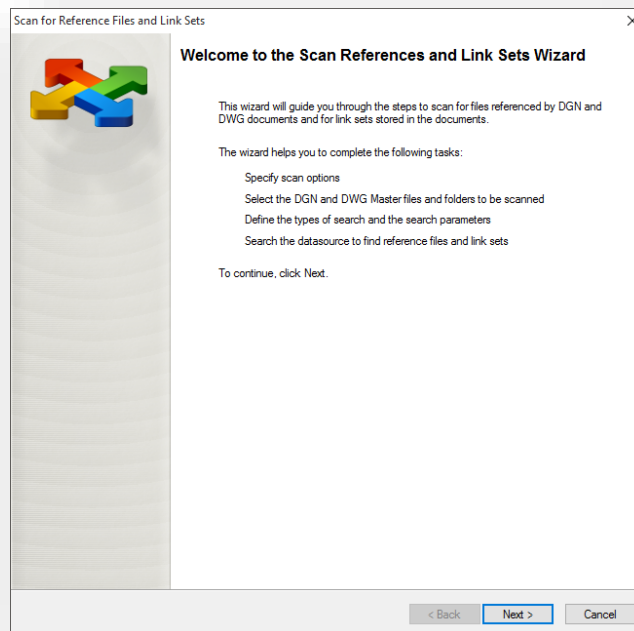
Be aware that opening these files prior to re-establishing the references may make it appear that the files are already fixed. The references that are being shown point to local locations on your PC that may or may not be out of date and should not be considered complete.

With the base files and cut sheets all in ProjectWise, we will use the **Tools -> Scan References and Link Sets** command. You can also start the wizard by Right Clicking on your folder and locating the option near the bottom of the context menu.

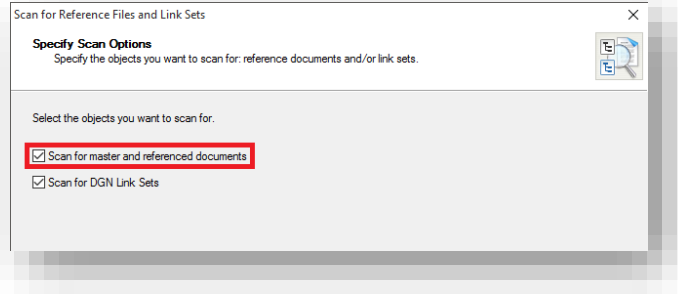


Scan References and Link Sets

The Scan References and Link Sets wizard (will be referred to by ScanRef throughout the remainder of the section) will launch. Select Next to proceed.

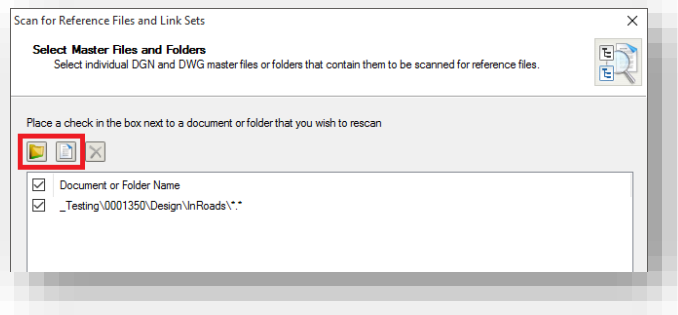


On the next panel, make sure that Scan for master and referenced document is enabled as shown. The DGN Link Sets option can either be disabled or left enabled, it will make minimal difference in scan performance.

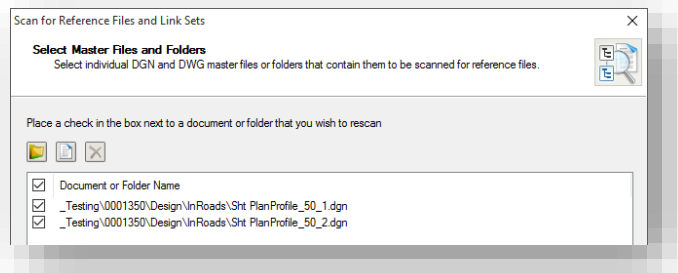


Scan Master and Referenced Documents

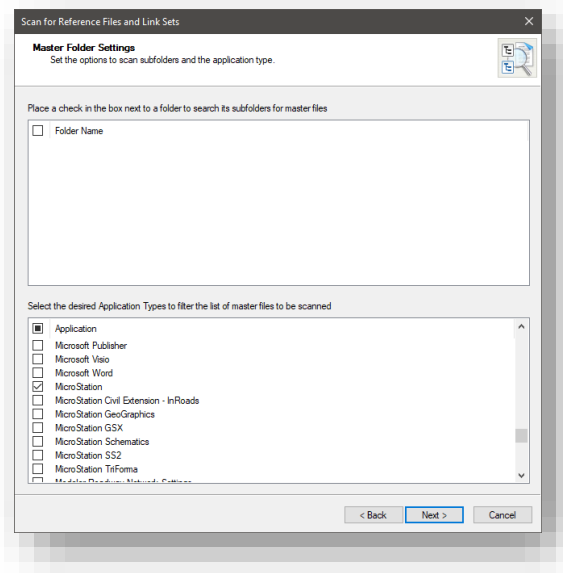
If you start the Wizard from the right click menu on your folder, it will pre-populate the folder location as shown. To add additional folders or documents, select the appropriate icon on the panel.



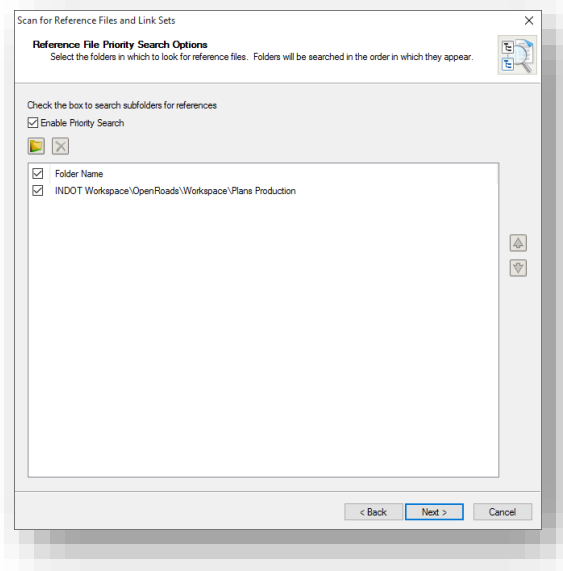
For this example, we will be looking and scanning just the files we're wanting to put back together. In this case, select the document icon, and browse the ProjectWise location where you placed your cut sheets. Select Next when the appropriate files/location have been set.



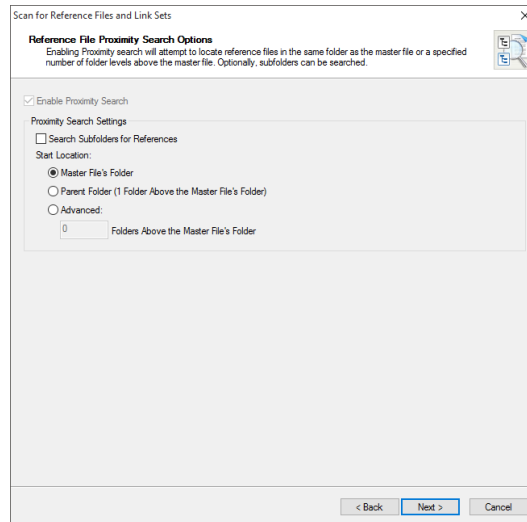
On the next panel, select the applications associations that will be searched when re-assembling the references. These will be applications such as MicroStation, InRoads SS4, etc. that use DGN files that make up your sheets. This will allow the tool to scan these documents to put the references back together. Select Next when ready to proceed.



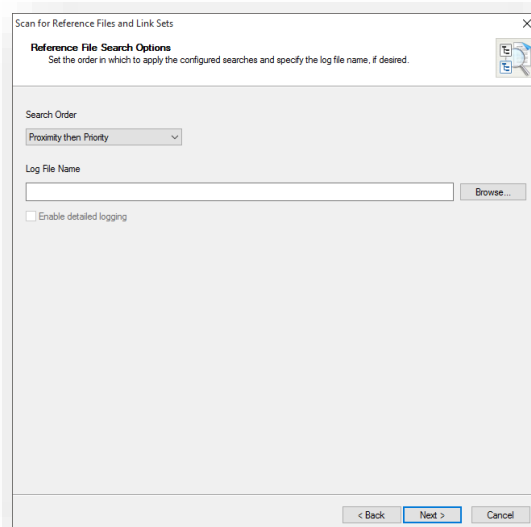
The next panel is where you begin setting your locations to scan for potential reference files. If your files reside in a folder different from where the base files (PrPlan, ExPlan, etc.) reside, you can define that folder path here. In all instances, you will need to place the path to the border in this panel. This path should point to <pw:\indot-pw.bentley.com:indot-pw-01\Documents\INDOT Workspace\OpenRoads\Workspace\Plans Production>. Select Next to proceed once configured.



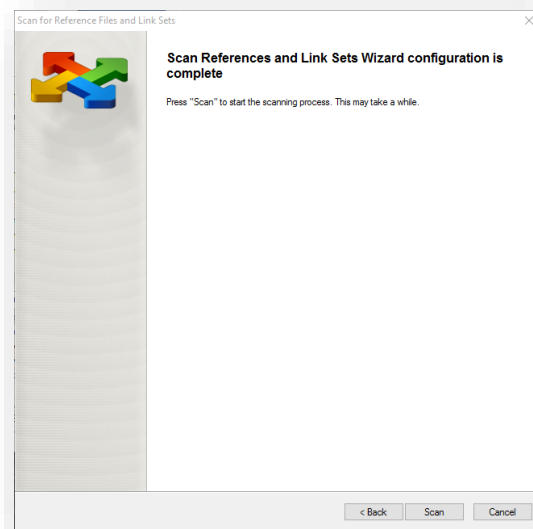
If you bypass the priority search, the next panel for Proximity search will be automatically enabled. For this example, we can select the search to occur in the same folder as the files we've selected, and then subfolders if any may exist. If your imported sheets are in a subfolder, you can select a higher level folder for it to also search in by selecting the Parent folder or the Advanced X folders above option. In this example, we will be searching the Master File's Folder as shown and then select Next to proceed.



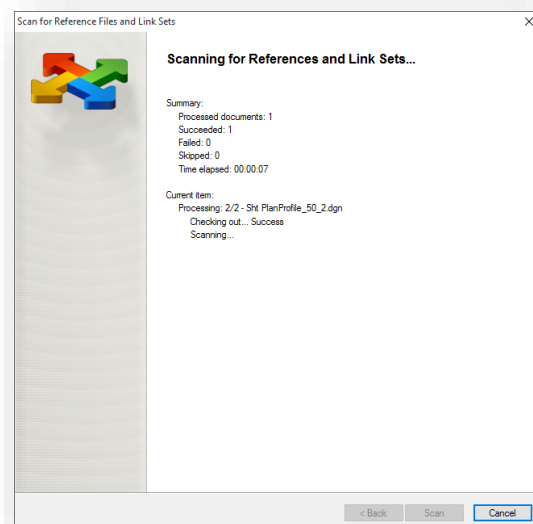
On the final panel, you can define your search order and a log file if you wish to debug the command once it's completed. The search order will default to whichever of the search methods you enabled, and if both were selected, allow you to define the order the scan will run them. This example will want a Proximity then Priority search to reference the border location and then base sheets. Select Next to proceed.



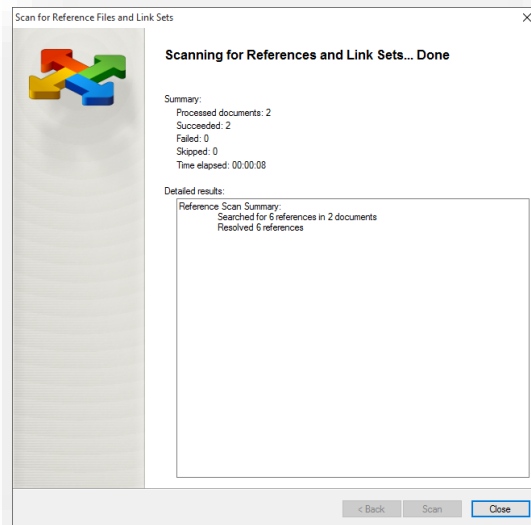
Finally, select Scan to proceed with the command.



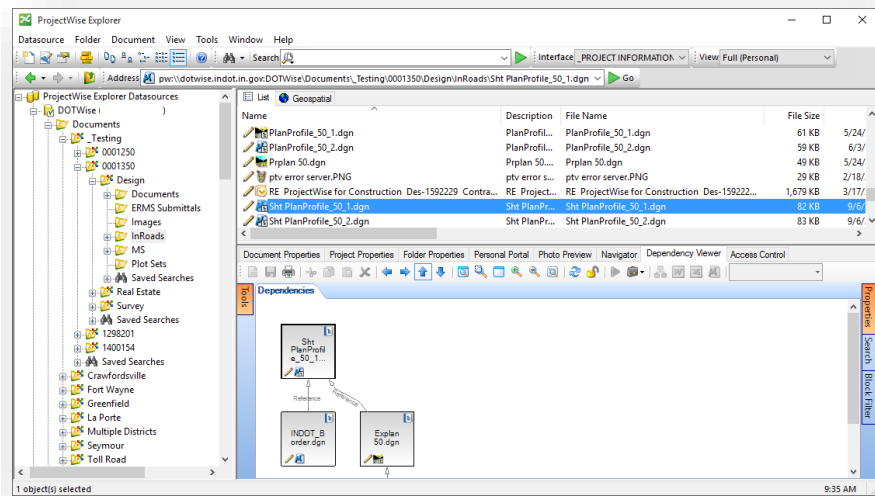
The scan will then run, and provide a status of which file is being worked on, and if it was able to succeed in finding references.



Finally, the scan will give the summary of its results, similar to what is shown below. Select Close to exit the wizard.



At this time, you can then review the files with the scan completed. As shown, you can see that the cut sheets now show that they're attached to ProjectWise reference files, and the dependency viewer shown, shows the file connections in this instance and how they are referenced together.



Opening the files will show the file and references directly out of ProjectWise illustrating that the files have been re-assembled.

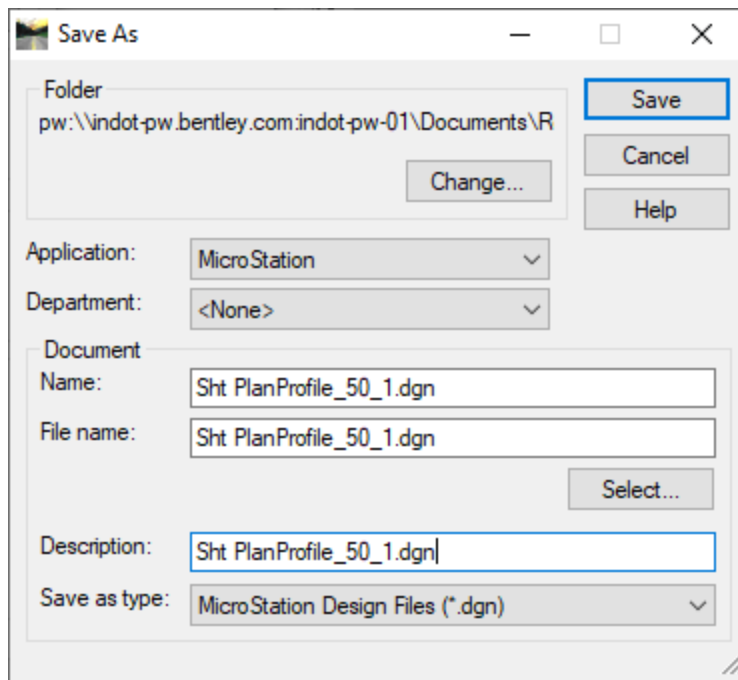
7.6-6 Publishing Sheets to ProjectWise Directly

Should you have a small set and opt to publish directly to ProjectWise instead of the previous recommendation, you can use the following instructions to adjust your publishing to ProjectWise directly. All steps are exactly the same, except for step 5, which is where the change to publish to ProjectWise is made.

From the IN PW PlanProfile 50 Scale preference, the Host File defaults to the C:\Projects path, outside of ProjectWise:

Host File: C:\Projects\Sht PlanProfile_50_ ...
Seed Host File: pw:\indot-pw.bentley.com.indot ...

To change the location where the files are saved, select the browse button at the end of the Host File line and you will be presented with an InRoads/ProjectWise Save As dialog where the appropriate path can be selected. The completed Save As window is shown below:



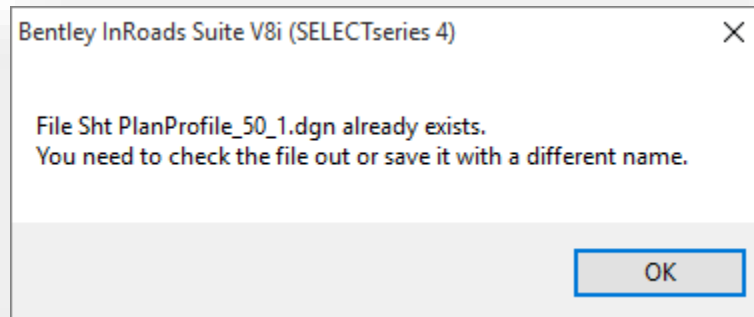
Like other ProjectWise file functions, it's highly recommended to keep the Name, File name, and Description consistent. The Host File line will now show the ProjectWise path that was specified:

Host File: pw:\indot-pw.bentley.com.indot ...
Seed Host File: pw:\indot-pw.bentley.com.indot ...

Once the sheets have been created, the Sheet Index tab will now show the following information in the Sheet Index section now show the appropriate ProjectWise paths.

In addition to creating the files, InRoads will also make sure the new sheets are checked out.

In the event you receive the following dialog, make sure that sheets you're either recreating or editing are checked out.



7.7 Annotation and Text Drawing Cleanup

In this section, you will review the process of adding various annotations to InRoads drawings, and the process of cleaning this data up after it's been created. Most of the procedures for clean-up are performed with a combination of InRoads and MicroStation tools, and will require that you continue using InRoads to interact with your drawing in particular situations.

7.7-1 Setting Up an Annotation Drawing

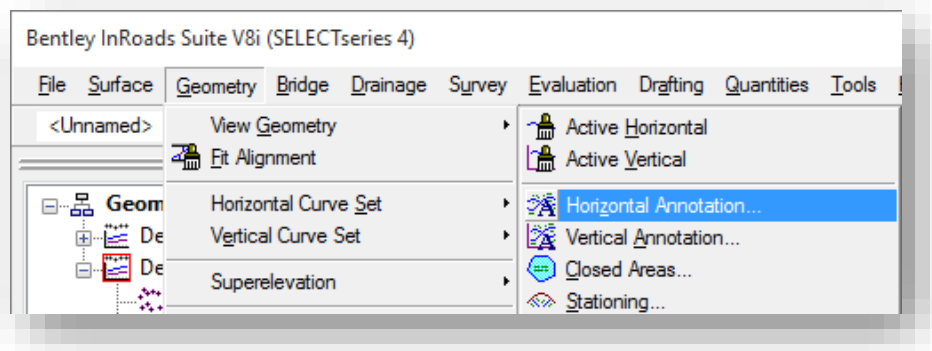
All plan view annotation will be drawn in a new drawing in InRoads. The new drawing of the alignment annotation should be called **Annotate Alignment <Alignment Name> <Scale>.dgn**. If you have multiple alignments that you wish to have annotated, you will need to repeat all of the following steps for each string in a new plan display with similar naming. PlanProfile sheets will need to have been created in order to properly align the text for these other M-string annotations.

Using standard ProjectWise functionality, create a new DGN in the project path named Annotate Alignment <Alignment Name> <Scale>.dgn (Ex. Annotate Alignment LineA 50.dgn). Make sure to use the same 2D seed file for your project

7.7-2 Adding Horizontal Alignment Annotation

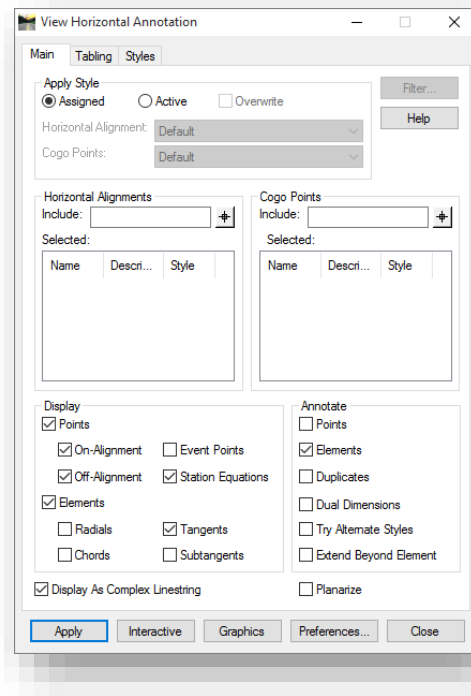
InRoads does not integrate the alignment annotation commands into the alignment/profile creation tools. In order to annotate your profile, you need to first have a horizontal alignment for horizontal annotation purposes; and a vertical alignment and profile for vertical annotation purposes.

With a horizontal alignment drawn in the display (**Geometry -> View Geometry -> Active Horizontal**), navigate to **Geometry -> View Geometry -> Horizontal Annotation**.



Horizontal Annotation Menu Location

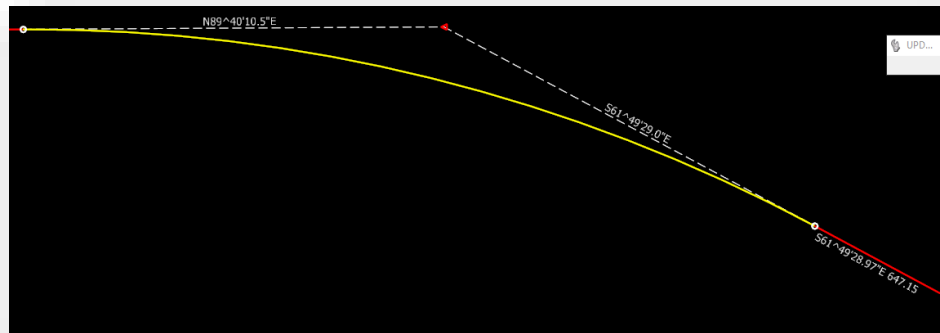
This will present the View Horizontal Annotation tools.



View Horizontal Annotation

In order to use this tool, one should first load the INDOT specific preference, and then select their alignment. To select the alignments that should be annotated, select the graphical selector under the Horizontal Alignments portion of the Main tab. You will then be prompted to select the alignment to annotate.

With the alignment now listed in the Horizontal Alignments section, select Apply. This will place annotation on the alignment listed. Note that InRoads will allow the annotation of multiple horizontal alignments at the same time, as long as they are in the same active geometry project.



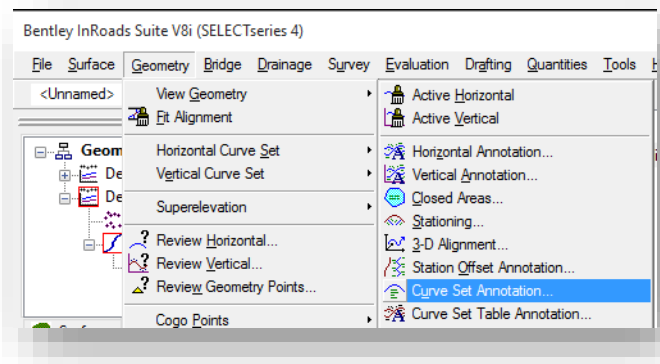
Horizontal Annotation Sample

Due to the methodology that InRoads uses for text placement in conjunction with Styles and Named Symbolologies, you may see results similar to the previous illustration. In this instance, you will note that on a right hand curve, the Bearing and Radius values are upside down when related to final sheet placement (legible from left to right when view in landscape or right hand portrait). Therefore, you must clean these annotations manually prior to plan completion.

7.7-3 Adding Horizontal Curve Set Annotation

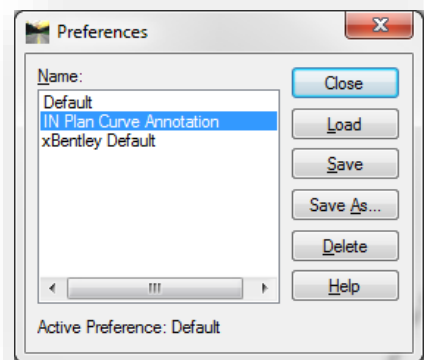
InRoads splits the various annotation functions in to numerous tools, providing a higher degree of customization and additional flexibility. This can be found in the placement of horizontal curve annotation separate from other Horizontal Annotation tools. As shown in the previous section, horizontal annotation for bearings, distances, radii, etc. can be found in the View Horizontal Annotation tools. Curve annotation is placed by a separate tool called **Curve Set Annotation**.

This tool is found under **Geometry -> View Geometry -> Curve Set Annotation**.



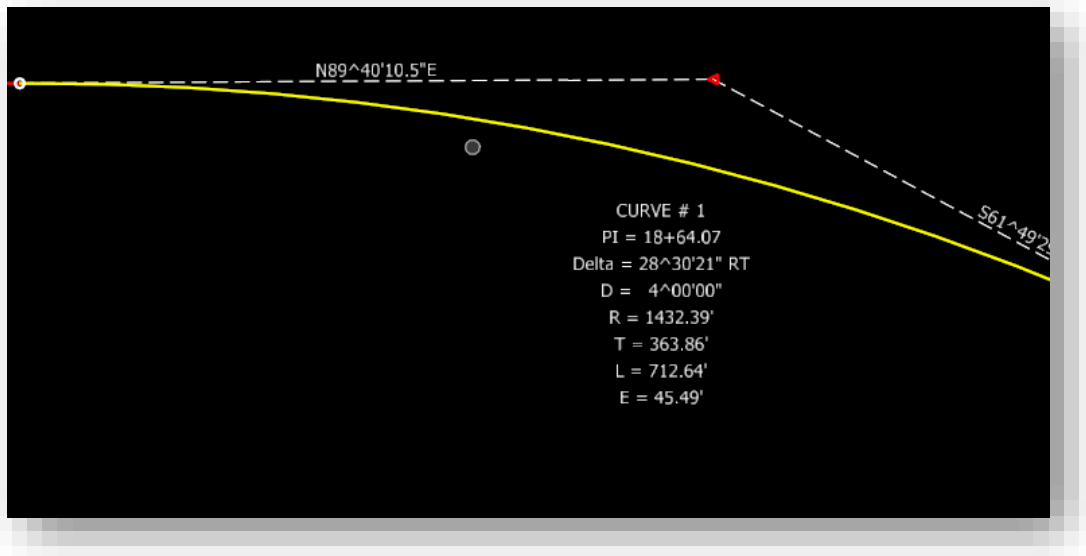
Curve Set Annotation Menu Location

Similar to other InRoads tools, the Curve Set Annotation tool will open with the active horizontal alignment selected. With this preset, verify that the correct preference is loaded. INDOT customized preferences are provided.



Curve Set Annotation Preferences

With the preference loaded, make any necessary adjustments then select Apply. This will place the curve annotation at the center of the curve. This will need moved as part of plan clean up.



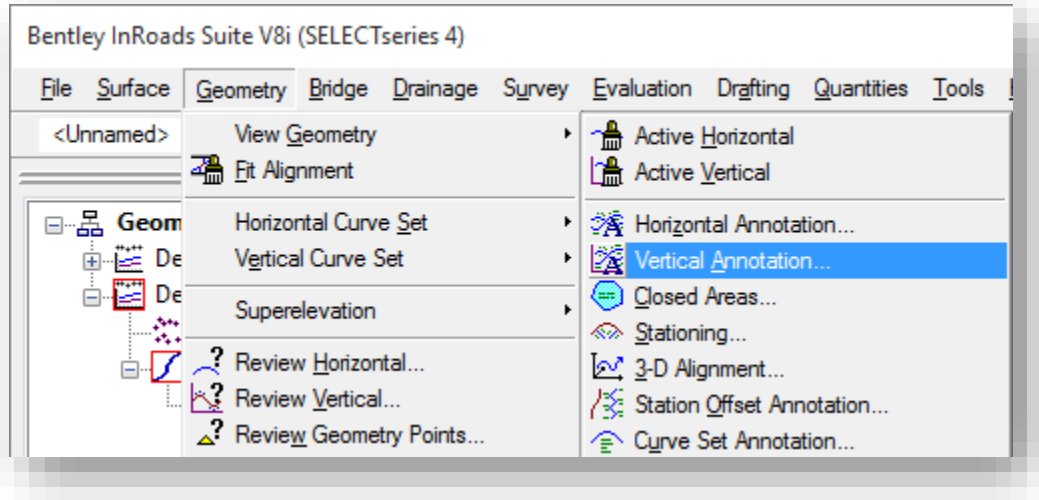
Finished Curve Set Annotation

7.7-4 Adding Profile Annotation

To add vertical annotation, a similar process will be followed only using the vertical versions of the tools used previously. Unlike the previous steps for adding horizontal annotation, profiles and profile annotation cannot be placed without the final cut profile displayed. Since your sheets will be cut from Prplan XX.dgn, your profile will be displayed and annotated in this drawing.

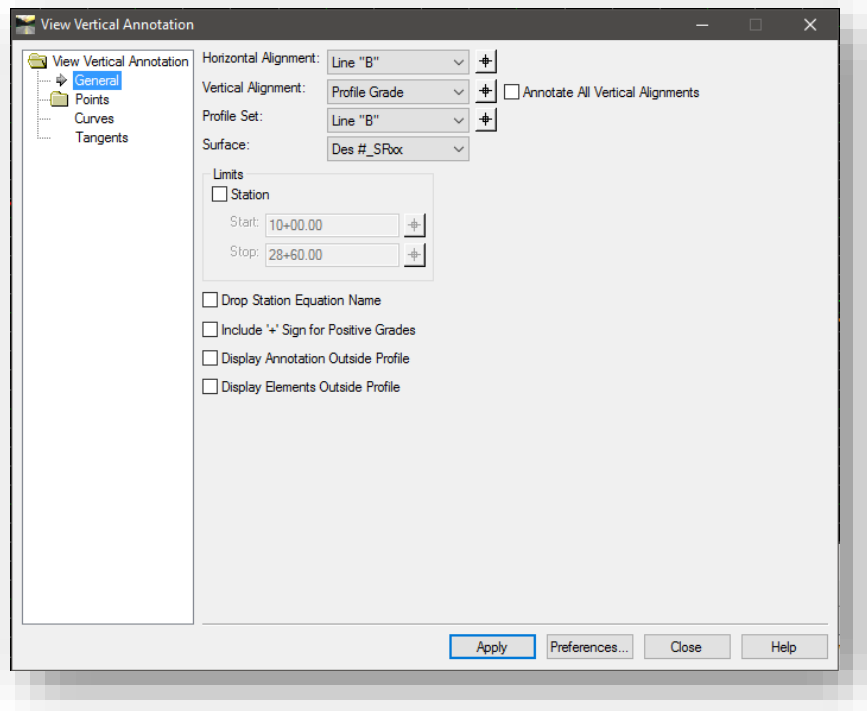
Note: Remember that a vertical alignment and its associated annotation cannot be created without a pre-existing profile. Additionally, for annotation to properly carry through nested references, you must make sure that annotations are placed on the appropriate split profile created by the Plan and Profile Generator.

With the existing profile and proposed vertical alignment drawn on it (*Evaluation -> Profile -> Create Profile* and *Geometry -> View Geometry -> Active Horizontal*), navigate to *Geometry -> View Geometry -> Vertical Annotation*.



Vertical Annotation Menu Location

This will open the View Vertical Annotation tools.



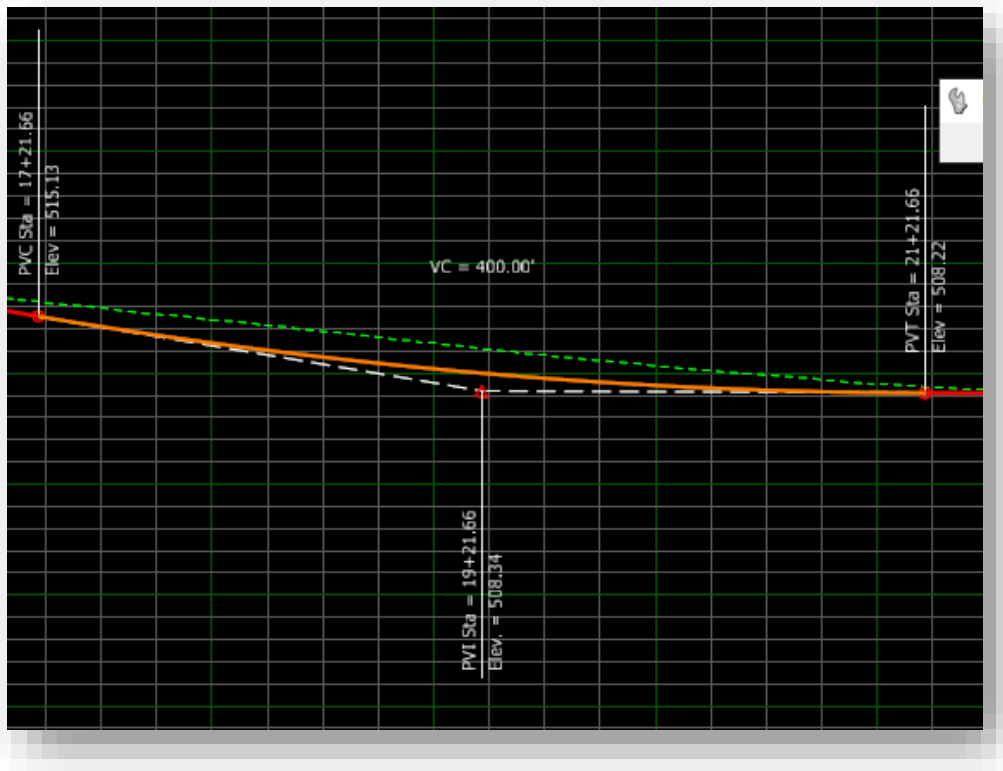
View Vertical Annotation

In order to use this tool, you should first load the INDOT specific preference, and then select their alignment. To select the alignments that should be annotated, select the graphical selector under the Horizontal Alignments portion of the General leaf. You will then be prompted to select the alignment to annotate.

As shown in the previous screen capture, you must define the appropriate horizontal, vertical and profile set to place your alignment on. Additionally, there is an INDOT specific annotation preference to display the appropriate information in the correct format.

When placing the Vertical Annotation, there will be some manual clean up required as InRoads preferences don't allow for the specific configuration of all annotation as is considered INDOT standard.

In the following screen capture, the default vertical profile annotation is shown. What is immediately noticeable is that the PVI Station and Elevation are annotated below the PVI and not with the Vertical Curve (VC) length.



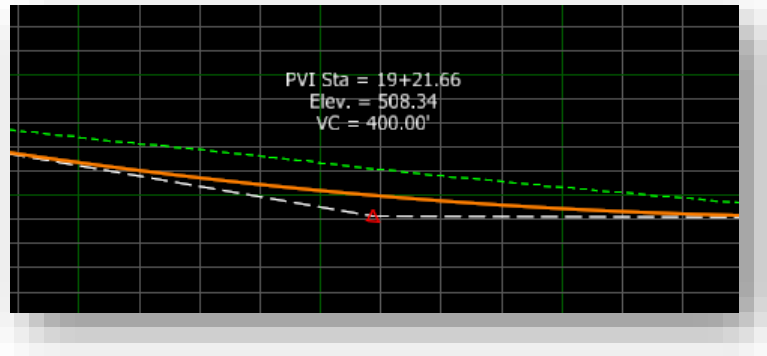
Vertical Annotation Sample

In order to appropriately clean up the annotation:

1. Use the Edit Text tool and select the PVI Sta text to your clipboard.
2. Use the Edit Text tool and select the VC text.
3. Place your cursor to the right of the VC text and make sure that it's not highlighted.

4. Place a single return and then paste the PVI Sta text on the empty line from the previous step.
5. Repeat steps 1-4 for the Elevation text.
6. Adjust the placement of the merged PVI Sta/Elev/VC text node.
7. Delete the PVI Sta and Elev text along with the leaders from the display.

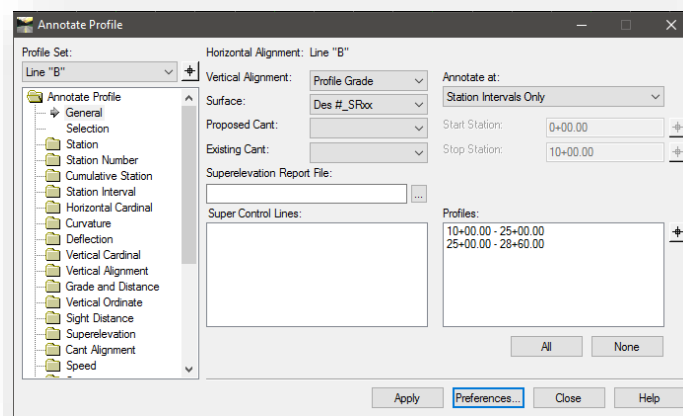
Upon the conclusion of these edits, a finished vertical profile annotation will appear similar to the following.



Finished Vertical Annotation at PVI

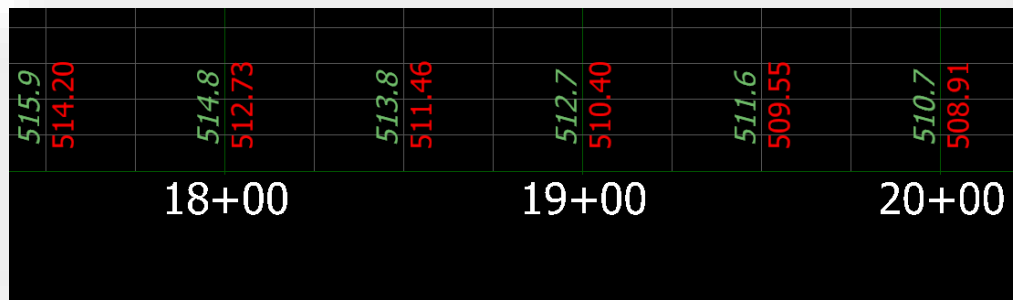
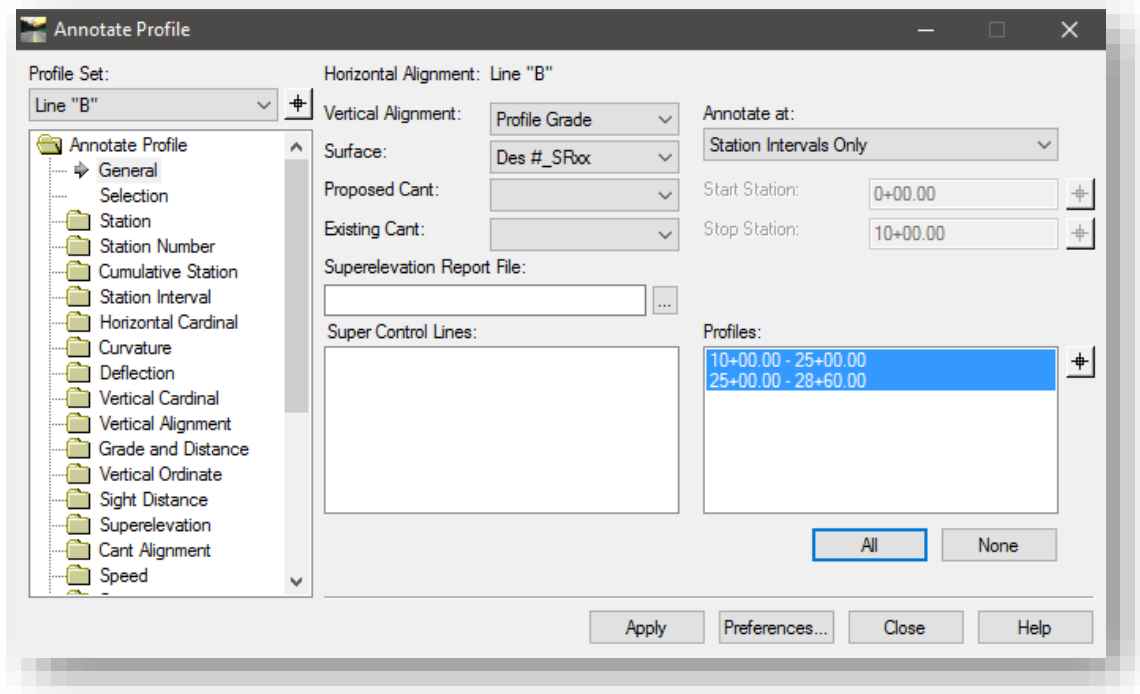
The basic geometry annotation tools only provide annotation for the actual alignment features of the profile, which does not include the existing and proposed elevation annotations. These features are annotated by a separate set of profile annotation tools.

To add the elevations, one needs to use the tools located under *Evaluation -> Profile -> Annotate Profile*. Much like the vertical alignment annotation tools, an existing profile must exist before you're able to annotate the information. A preference has been created, adhering to INDOT annotation standards, and is named *IN ProfileElevations*.



Profile Annotation Panel

Selecting the appropriate Profile Set, Vertical Alignment and Surface will allow InRoads to appropriately annotate the profile elevations. When annotating multiple portions of a profile set (finished profiles cut for plan profile sheets), it is necessary to make sure that the relevant station ranges are selected in the Profiles are of the General section as shown below:



Existing/Proposed Profile Elevation Annotation

7.7-5 Station Offset Feature Annotation

Next is the placement of Station/Offset annotation. This will provide the appropriate station offset and feature names at the location of the feature in the plan view. This example will provide the necessary steps to adjust and move the annotations appropriately after they have been placed.

InRoads will scale and rotate the border along your alignment. With this change, it's to your advantage to place your annotations directly on the cut sheet, leveraging the rotation of the border

and view to align them. With this being the more flexible and direct method of placing annotation on our sheets, this will be the example you use going forward.

Alternatively, you can have a drawing created specifically for this kind of annotation and for each alignment. This will require creating a new drawing within InRoads called **Annotate station offset <Alignment Name> <Scale>.dgn**. Using standard ProjectWise functionality, create a new DGN in the project path named Annotate station offset <Alignment Name> <Scale>.dgn (Ex. Annotate station offset mcac 50.dgn). Make sure to use the same seed file as your base drawing to maintain the geocoordination setup.

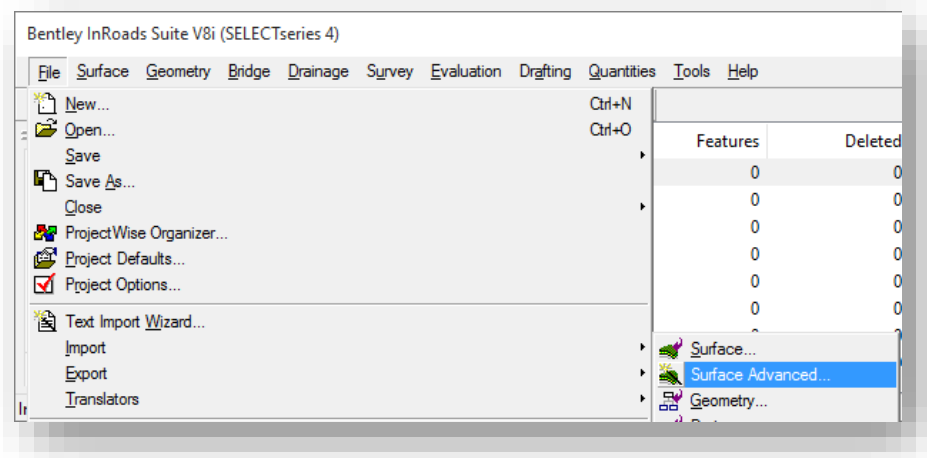
If you have multiple sheets or for your second method, M-strings, that you wish to annotate about, you will need to repeat all of the following steps for each sheet/string in a new plan display with similar naming. For both methods, make sure that your Survey Surface DTM file is open and active for use with the Annotation tools.

7.7-5a Acquiring the Point Features from OpenRoads Survey

Any project that is surveyed using OpenRoads should now have an associated DTM file that contains the survey features that was previously used to annotate the appropriate points from. If it does not, this DTM will need created to accommodate this annotation need, a special graphical import tool has been configured to import the survey data into the InRoads DTM format for annotation.

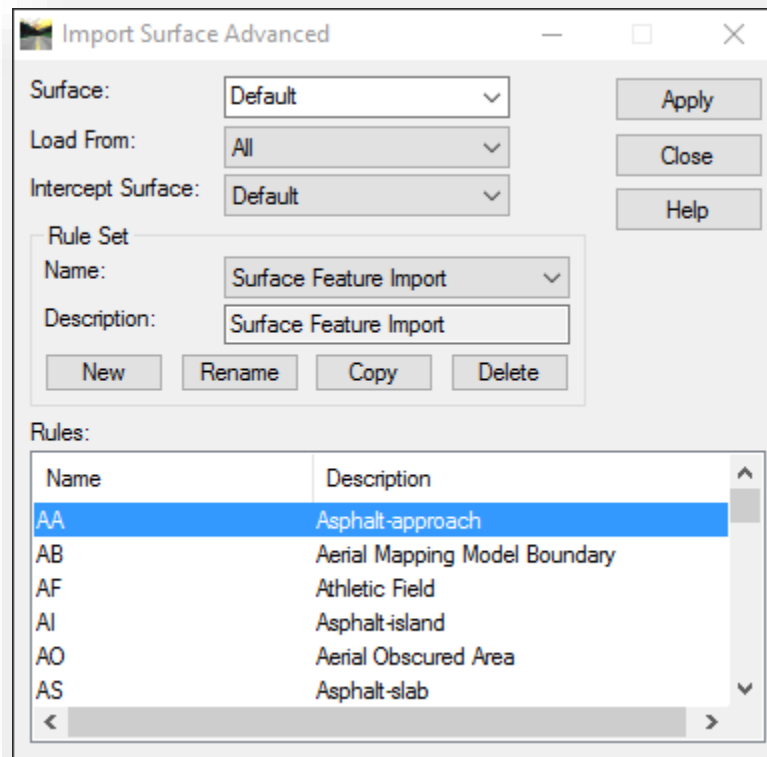
The following steps look at creating the required DTM:

1. With your Explan XX.dgn open, navigate to File -> Import -> Surface Advanced on the InRoads Explorer.



Import -> Surface Advanced

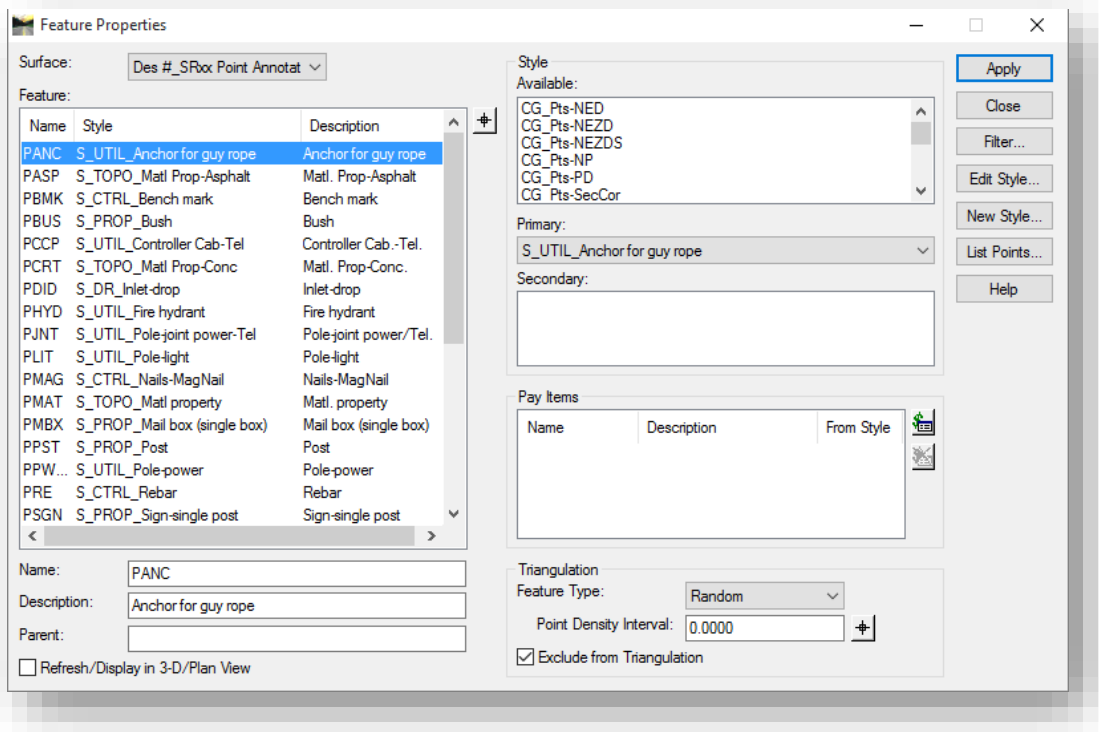
2. This will present the Import Surface Advanced Window.



Import Surface Advanced

3. In the Rule Set field, set the value to **Surface Feature Import** as shown in the previous illustration.
4. Set your Surface name to Des #_SRxx Annotation Surface, the Load From should be set to All.
5. When prepared, select the Apply button. InRoads will begin processing your features from graphics and creating a DTM with those features included.
6. Once complete, make sure to save your DTM file to ProjectWise with your other project data.

With the DTM created, you can view its contents on the **Surface -> Features -> Feature Properties** command on the InRoads Explorer. With the import complete you will see the point features similar to this illustration:

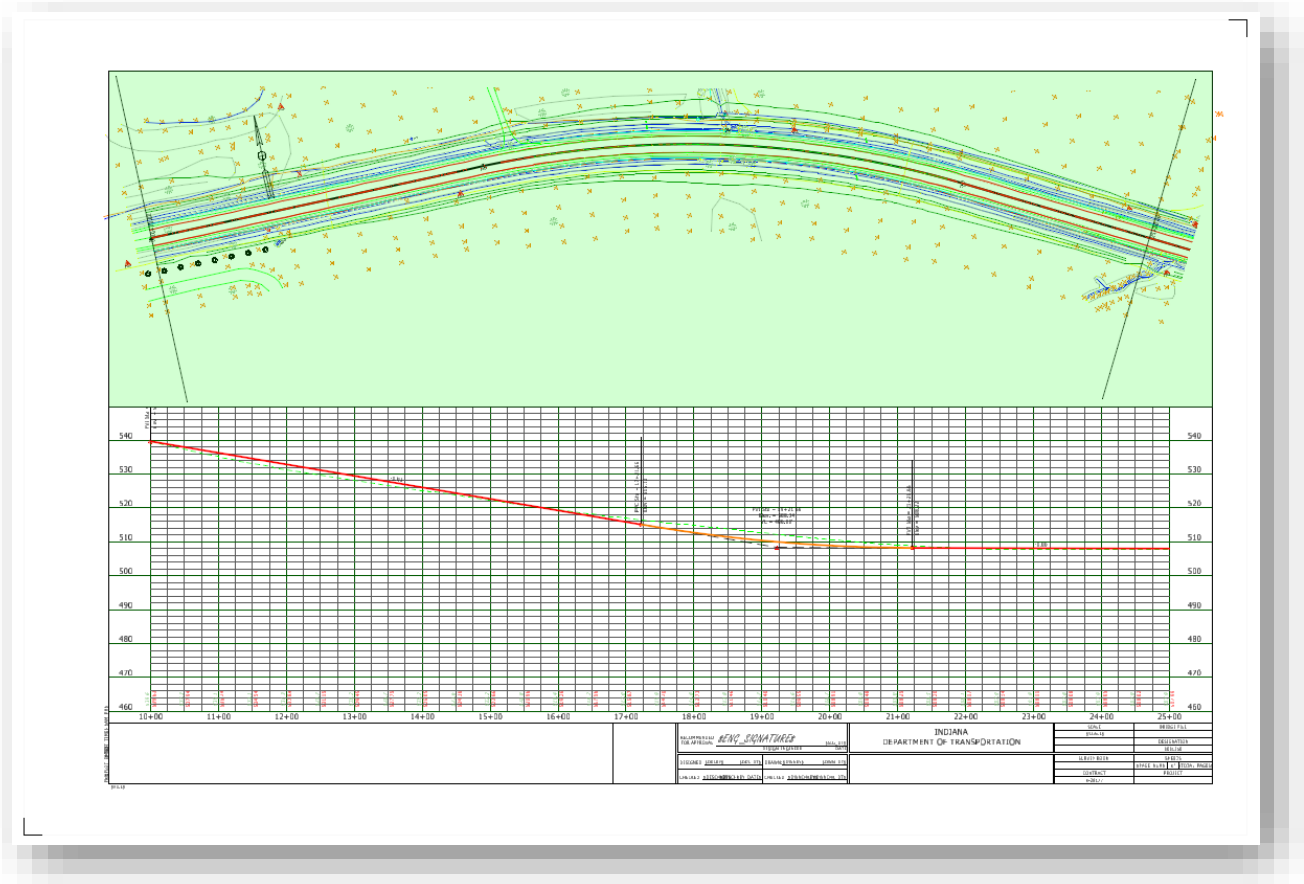


Graphically Imported Point Features

Note: The annotation DTM that you create as part of this process should not be used for any other processes except station offset annotation. It will not include all features and does not have the appropriate triangulation information.

7.7-5b Feature Annotation

With your drawing opened, you can now look at using the **Surface -> View Surface -> Annotate Feature...** tool to place the station and offset of your survey features. This tool, along with many others in the InRoads Suite, allows you to specify a fenced area that you'd like to work within or outside of. As shown in the following screen capture, place a fence over the plan portion of your DGN, which is denoted by the shaded block.

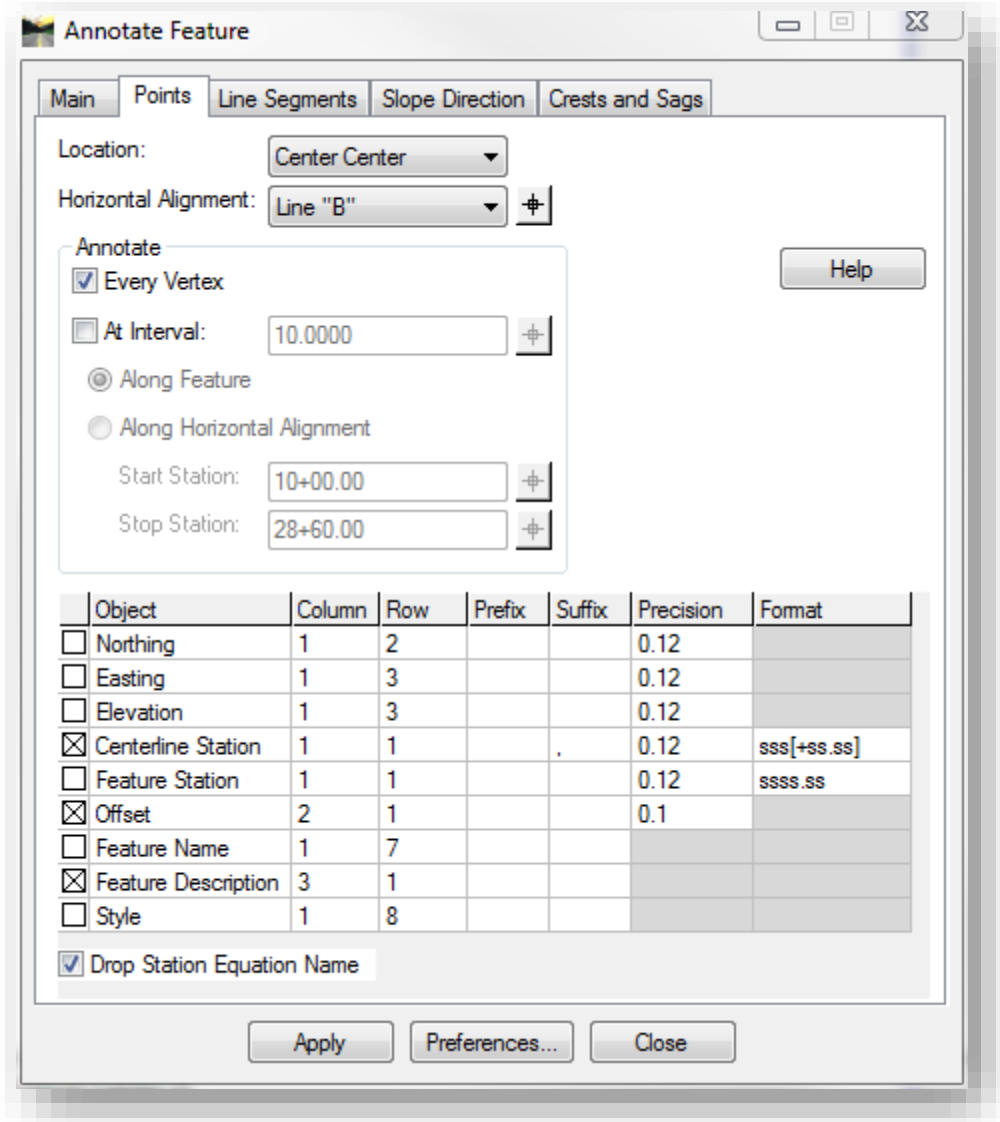


The Plan View Highlighted

Remember, the color of this shading is dependent on the Mode of the fence that you've placed, in the above example, the block was placed with an Inside Fence Mode. For the purposes of the InRoads tools that use this functionality, the actual fence type isn't important, as each tool allows you to define how InRoads should respect the fence.

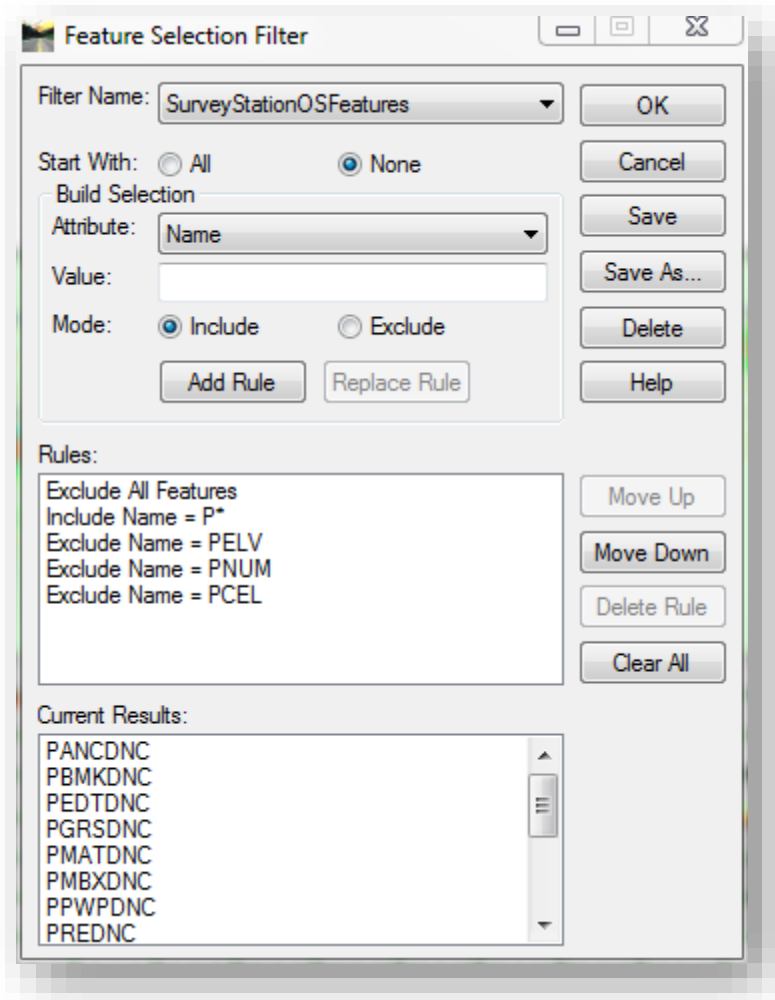
With your plan area now highlighted, start the **Annotate Feature** tool from the **Surface -> View Surface** menu. This tool can place various pieces of annotation relative to your survey surface features and their type, be it a point or linear feature. Some examples that both will annotate are the Feature Name, Description and Style. Point features (which you will look at for Station/Offset annotation) include items such as Northing, East, and Elevation, and the selected station of a Centerline. Linear features will annotate items such as Length, Bearing, and Slope.

Of particular interest, we want to examine what is included for point features using the IN Survey Sta Offset preference. Select the Preferences button and load this preference at this time. For your Station/Offset annotation, you'll see that on the Points tab Centerline Station, Offset and Feature Description are all enabled, along with the precision and format being adjusted accordingly. These items will all be annotated with respect to the features Default Text style setting.



Annotate Features/Points Tab

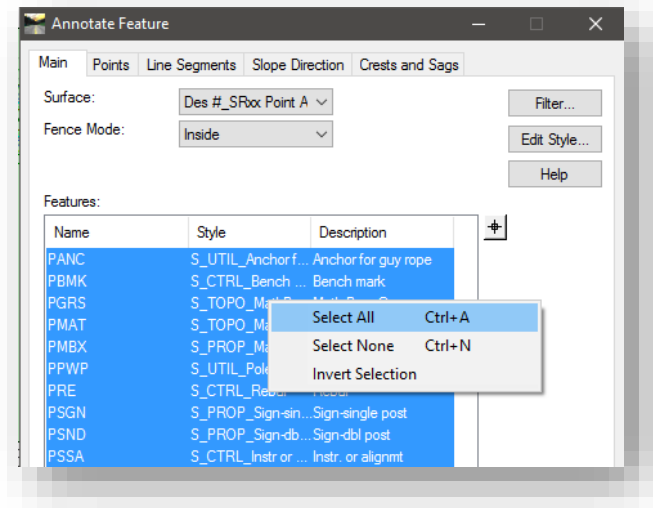
To limit the features being annotated, you'll use a pre-made filter to assist in the selection of your items. On the Main tab of the Annotate Feature dialog, select the filter button. On the filters, you want to use the SurveyStationOSFeatures filter option as shown.



Station Offset Filter Settings

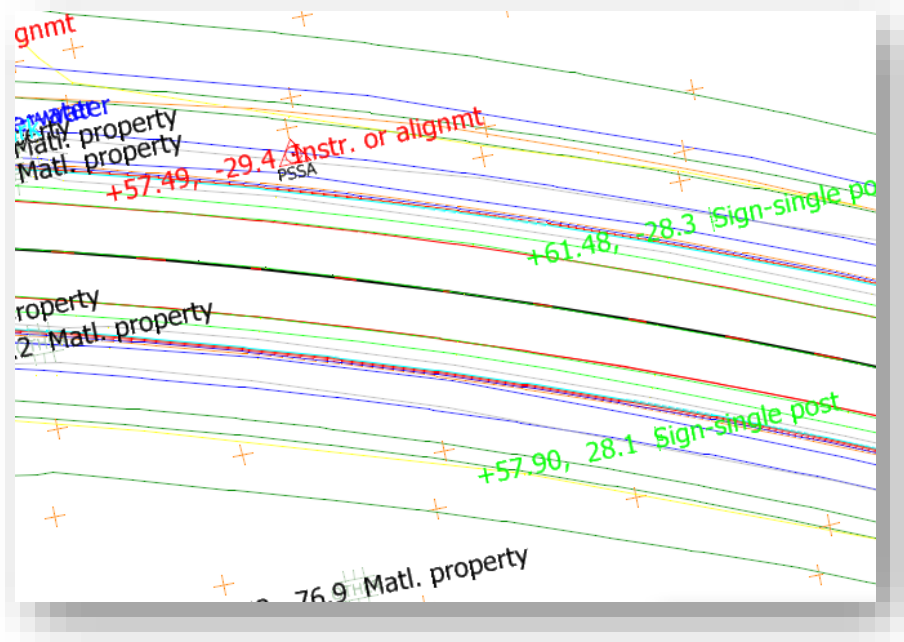
With the filter selected, you'll see your list of features shrink greatly to only those features that are allowed through the filter. Be aware that should you not have any features show up, you may have the wrong surface selected, so verify that the Annotation Surface is selected on the main tab.

Next, you need to set the fence mode. With your fence around the plan view of the sheet, make sure the Fence Mode is set to inside. This will restrict annotation to only being placed on features that exist in this fence; anything that falls outside it will not be included. Finally, you need to select your features by right clicking in the Features: area and selecting all.



Selecting All Features

All other settings have been set appropriately with the Preference loaded earlier in the exercise. Go ahead and select Apply at this time.

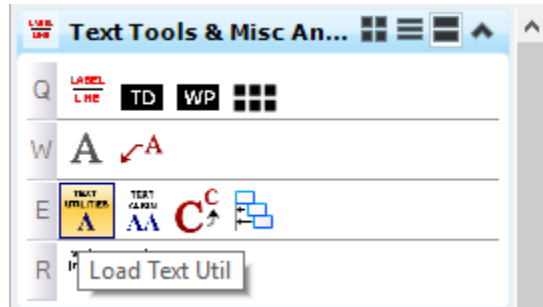


Example Annotations

7.7-5c Feature Annotation Clean Up

Unlike DCRepo and Geometric Annotation, InRoads does not provide capabilities to automatically align annotations to the border as shown in the previous example. In order to get the annotations placed appropriately, you will need to look at using standard MicroStation tools.

First you need to enable the TextUtil tools. These can be found under the Text Tools & Miscellaneous Annotation task on the Task Navigator.

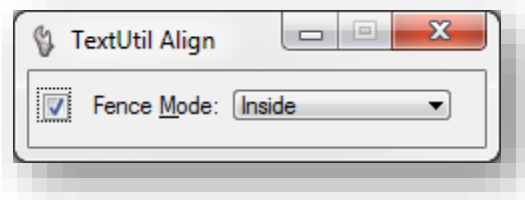


TextUtil Task Button

By loading the TextUtil tools, you will now have access to the TextAlign tool that is found next to the TextUtil button on the Task Navigator. Just as you placed a MicroStation fence over the plan view to place our annotations, you will do the same thing, as TextAlign will use this fence as a limiting factor in what text to rotate. TextAlign also uses the active angle relative to your view. In this instance, you want to use an active angle of 90 degrees.

To set the active angle, you can use one of three methods. The first is to set it under the Active Angle leaf of the **Settings -> Design File** menu item. The second is via the MicroStation key-in AA=90. Finally, the active angle can be set by invoking any tool that uses this value in its configuration such as the Rotate tool.

With the active angle and fence set and the TextAlign tool started, set the tool configuration as shown.



TextAlign Settings

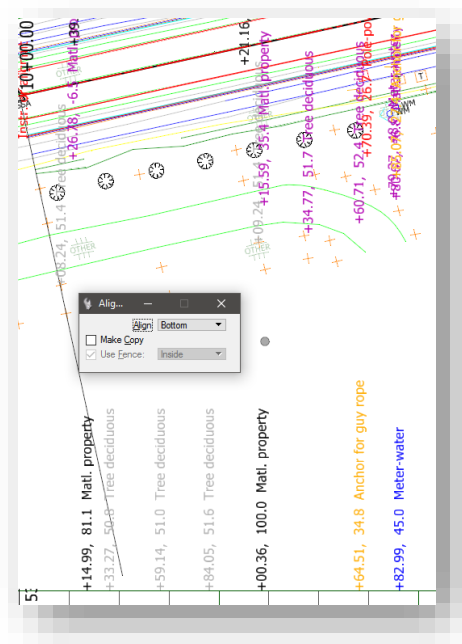
When ready, select a data point any place in your MicroStation view. Almost all plan text should now be rotated 90 degrees and aligned properly with the frame. Some annotations may not have been picked up in the fence however, so these should be aligned by selecting them individually (these are normally along the edges of the plan view where the fence would have crossed but not included them). Finally, remember, should any additional text have been placed prior to these annotations,

it's likely they too will have been rotated, so be careful when selecting what text you're rotating. Depending on the situation, it may be to your advantage to use the MicroStation Element Selection tools to have more discreet control over the text you're selecting for alignment.

With the text now rotated appropriately, you'll now begin the process of moving your text to the edges of the plan view. For this, we will be using the Align Elements by Edge tool which can be found either under the Main tools, or has been included as part of the Annotation Text task for convenience. To use this tool, first select the annotations you'd like to move either to the top or the bottom.

This tool will work with multiple items selected, so it is very easy to adjust the alignment of numerous annotations at once. Using the MicroStation Element Selection tools, select some of your annotations to one side of the alignment. As shown in the following illustration, you'll see that elements below the alignment have been selected. For the Align Edges tool in this instance, you'll want to have the Align option set to bottom and then when prompted, select the top gridline of the profile which will align all the text to it.

For elements above the alignment, the same procedure is used, however the Align should be set to top and the top edge of the border should be selected to align those items to that element. As this only pushes the annotations to the edge of the sheet, overlap is still an issue and additional clean up may be needed to separate annotations that are overlapping.



Align Edges

7.8 Additional Sheet Types

You can create a wide variety of sheets from the InRoads Plan Profile Generator. The process you've stepped through for the Plan Profile sheets can be applied to these other sheet types such as Bridge Layouts, Large Plan sheets, and Double Plan sheets; all of which have preferences created for their setups.

Be aware that the Station Offset annotation procedure that you've examined will not work properly when annotating double plan sheets as the sheet rotation is not the same. In this instance, you will need to create an intermediary text drawing and annotate the features in that file instead of directly on the sheet. This procedure is identical to that which we performed previously, however both the base drawing and the frames must be referenced to achieve the appropriate text alignment.

7.9 Adding Other Base Drawings to Sheets

Other base drawings such as Existing Right of Way can be added to InRoads created sheets such as Plan Profiles, Layout sheets, etc. The user must first obtain right of way drawings from whatever sources are available. For most projects, the existing right of way information will come from Route Survey Plat drawings and these should exist in the same coordinate system for any new projects and will line up automatically. (These are provided by your Surveyor). Other sources may include CAD drawings from Real Estate consultants (following complete abstracting and title searches). Throughout this section, Existing Right of Way drawings are referenced as being created. The same processes work for adding any additional information to the sheets.

Depending on your surveyor, it is entirely possible that you may receive your Existing Right of Way in InRoads native surface features or as alignments. Be aware you may still have to graphically convert either of these data types into the other for the purpose of cross section display (Right of Way must be a surface feature if you wish for it to display on cross sections).

7.9-1 Combine multiple drawings into one base drawing

If you have more than one existing right of way drawing for your project, you will want to combine all of the drawings into one. Reference the drawings into each other. If the drawings do not line up automatically, you will need to move the files based on corresponding coordinates present in both drawings. Next copy the reference files into the base drawing. Repeat procedure if you have multiple files to copy in.

When you have completed the above steps, the desired result is one combined existing right of way drawing.

7.9-2 Move to same coordinates system as Prplan.dgn

In order for the combined existing right of way drawing to be used in the plan profile sheets, the elements must exist in the same coordinate system. To accommodate this, you will reference in the Prplan drawing. If the drawings do not line up automatically, you will need to move the files based on corresponding coordinates present in both drawings.

The resulting existing right of way drawing is now ready to be added into other proposed drawings.

7.9-3 Graphically Importing Existing Right of Way

As the procedures necessary vary depending on the source of your Right of Way data, you will examine a few of the more common methods for importing this data and working with it in InRoads and making it available to others.

Data which is graphical in nature can be converted to a format InRoads will interact with. MicroStation, AutoCAD, and DXF files are all supported for this process. Utilizing the File import tools available allows vector graphics data to be converted to geometry or surface features. Often-times the largest barrier to conversion is the sheer volume of data in the CAD file provided. Disseminating the contents requires patience and organization.

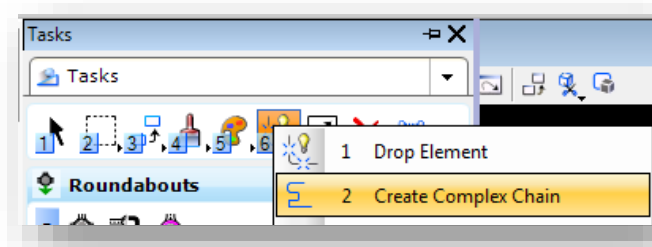
In both instances, be aware that the element must be drawn up graphically, as there is no direct translation method from Surface Features to Geometry Alignments.

7.9-3a Importing to Geometry

Using an existing CAD file provided by either Survey or a Consultant, you will convert the vector graphics representing Right of Way elements to InRoads Geometry. If data provider is an INDOT employee, then the file is accessible through ProjectWise from the design folder structure. Files provided by external consultants can be imported to a convenient location in ProjectWise by dragging and dropping. Select no wizard for the creation option.

First you need to reference and possibly merge your data into our base drawing (alignments can be imported from reference elements). Attach your file using either the **MicroStation -> File -> References** menu item or by the Reference toolbar button. With the references dialog open, attach the file containing your right of way. This may be the LCRS Plat provided by survey or another file provided by a consultant. Note that the file you attach may have additional data displayed that you do not wish to import. Should this be the case, you can use your level display to disable the levels of features you don't wish to display.

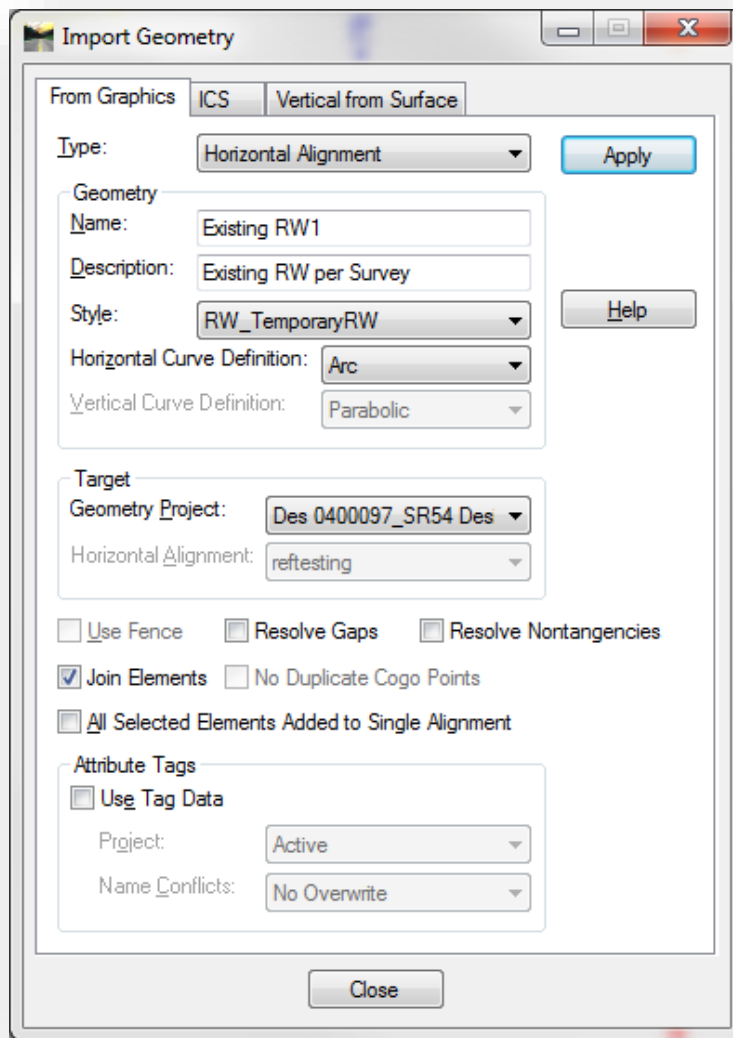
At this point you will no doubt recognize the Right of way elements in the drawing. Elements can be converted to InRoads Geometry. Careful inspections of right of way elements may show elements that have been constructed, segmented, and are not joined. For convenience in later operations, you may wish to join them to be continuous. To join these elements using MicroStation, use the Create Complex Chain tool. Create Complex Chain will generate a new chain from the selected elements on the active MicroStation level. Because you don't want the level of the element to change, first match the attributes of the element you are chaining.



Create Complex Chain

Selection of elements is possible utilizing Element Selection or Select by Element Attributes. Note: the element selection window using selections around elements is suggested. Alternately the “select all” (world icon) will add all elements to selection sets (even levels turned off). Elements may be converted one at a time, however for speed of conversion, you will convert by level. Different data may require various methods.

With your elements selected, you can now import them into Geometry features. For this, you will use the **File -> Import -> Geometry** menu item on the InRoads Explorer. On this panel, you will want to define settings similar to the following illustration. Of particular note, notice the Style selected, and make sure that you use good naming so each feature you include is clear.



Import Geometry

With your settings configured, you can now select Apply to begin the import. During the import process, InRoads will enumerate the name of the alignments, should you have more than one

distinct item selected (Existing RW1, Existing RW2, RW3... etc.). At this time, you can either delete any graphics merged in from the references or detach your referenced file depending on the method used. Then, you can redisplay the alignments from InRoads Geometry menu.

7.9-3b Importing to a Surface

Again, you will be starting with existing data provided in the same manner as the Geometry import. As such, the steps preceding the actual import process are the same.

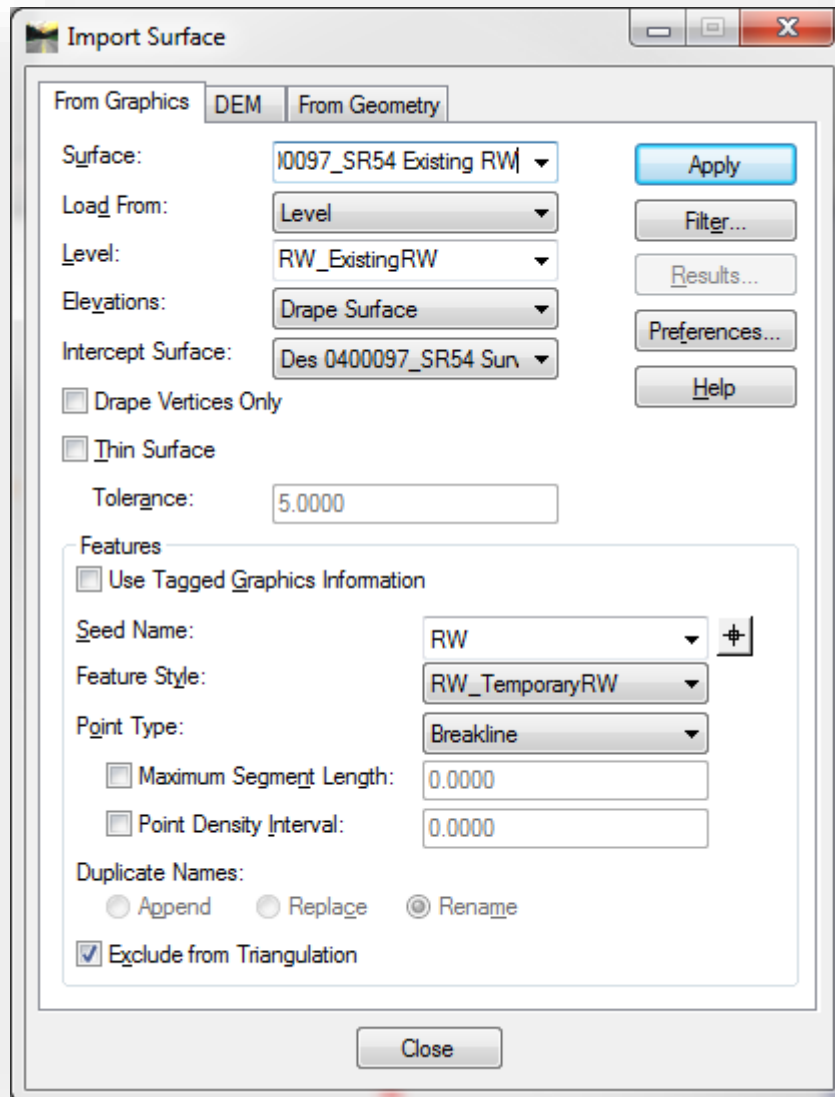
With the data prepared, you can now look at importing the graphics into Surface Features. This time, you'll use the **File -> Import -> Surface** menu item on the InRoads Explorer. On this panel, you will want to define settings similar to the following illustration. Here you have a few more options that require adjustment than in the Geometry panel.

First, you need to define where you'd like your new features to be created. As you can add the new features to existing cross sections, you'll create a new DTM names Des XXXXXX_SRXX Existing RW.dtm. With this defined, you need to determine what you're loading the data from; particularly for internal data you'll be able to use the Level option, as any existing RW should be on the RW_ExistingRW level. This could vary however, depending on the source of your data and could possibly require that you potentially use the Single Element or Fence options.

Next, you need to determine how the elevations of the RW lines will be determined, which will influence their display on the cross sections. To adjust these appropriately, make sure your Elevations are set to Drape Surface and that your Intercept Surface is set to your projects Survey Surface. This will drape the feature over the existing triangulation and display the features properly on the cross sections.

Finally, you need to define the style these features should be imported as. As you can see, you've defined our import to use a seed name of RW. Place the imported features into the RW_TemporaryRW style with a point type of Breakline which is being excluded from the triangulation.

With these settings, you can go ahead and select Apply and the features will be created in a new DTM. Make sure you save this DTM back to ProjectWise so it's available later when you'd like to display the Right of Way features on your cross sections.



Import Surface

7.10 Cross Sections

In OpenRoads, Cross Sections have undergone a major revamp to now work with the OpenRoads terrain models and corridors. While using the Cross Section tools, you will see many familiar settings to the InRoads cross section tools. However, it should be noted that the OpenRoads cross sections do not have all the functionality that the old tools did.

7.10-1 Cross Section Changes

The following functions have been removed/changed from Cross Sections in OpenRoads:

- Update Cross Sections – The update cross sections command is no longer available. Existing sections must be re-cut for any changes to be displayed.
- Cross Sections now cut through graphical elements directly instead of re-drawing and projecting the sections. For surfaces and components they must be active and displayed using the correct Terrain Display.
- Cross Section Annotation has been migrated to its own command.
- The terrain model will be displayed using its defined perimeter feature, XE and XP linestyles are no longer supported.
- Cross Sections no longer use Global Scale Factors, being an OpenRoads based tool these now use Drawing Scale. This is automatically adjusted via the scaled preferences.
- Stationing now uses DGN Settings to control significant figures. These will need changed prior to cutting sheets.

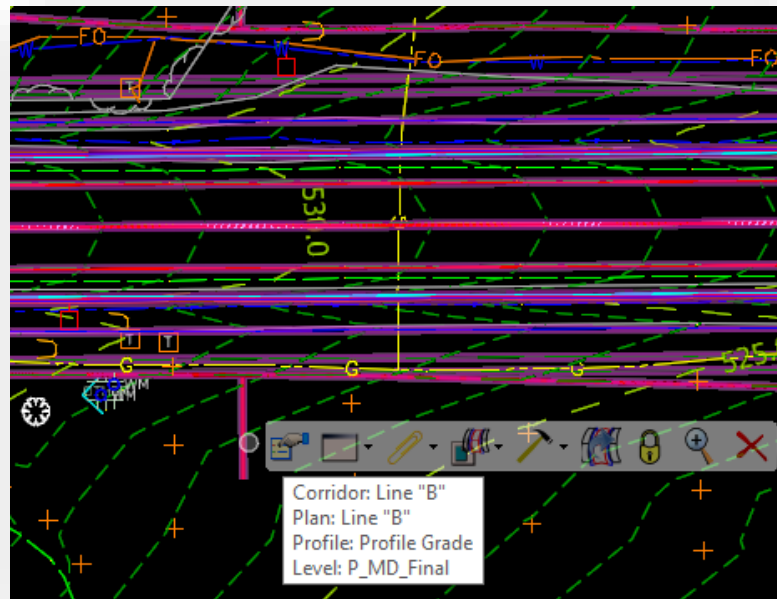
With OpenRoads, the InRoads Explorer is no longer used to create cross sections. The appropriate tools can be found on the MicroStation Task Navigation panel under Civil Tools > Corridor Modeling. The only legacy component to remain on the InRoads Explorer is the reporting functionality, which does still work with OpenRoads created sections.

7.10-2 Preparing Prplan XX.dgn for Cross Sections

As we discussed in the previous section on changes, for the proposed corridor to display on your sections, it must be displayed with the proper Design Stage in the Prplan.dgn. To adjust the setting accordingly:

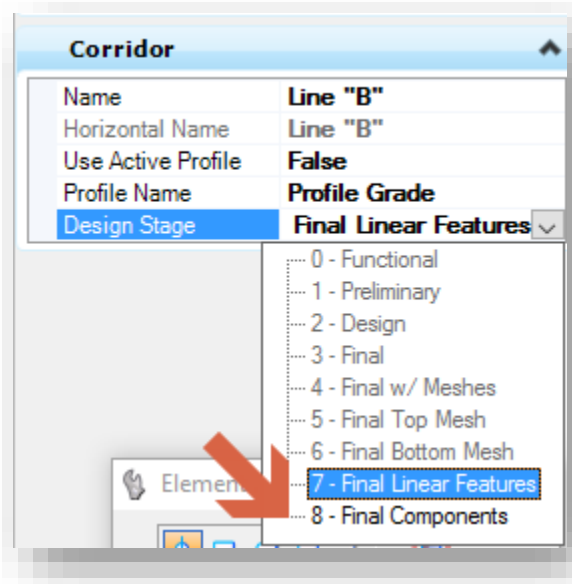
1. Open your Prplan XX.dgn.

2. Select the corridor model by its handle.



Selecting the Corridor

3. Examine the corridor in the Element Information panel. Locate the Design Stages setting.
4. Set the Design Stages to 8 - Final Components.



Design Stages

5. With the setting adjusted, save your settings and check your file back into ProjectWise.

7.10-3 Cross Section DGN

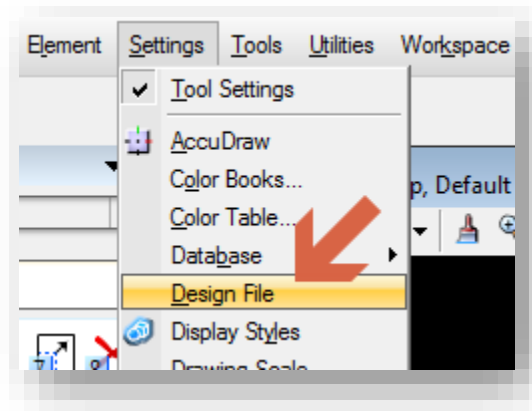
OpenRoads will only cut cross sections to a model in your currently active DGN. InterPlot will continue to extract the cross section borders and content as they are based on a plot shape surrounding the border. Using the following naming suggestions, create/open a DGN named for your proposed sections.

Cross Section Drawings		
Drawing Names	Descriptions	Examples
exSections_LineA	Existing Sections along Line "A"	exSections_LineA.dgn
prSections_LineA	Proposed Sections along Line "A"	prSections_LineA.dgn

Unlike the original method of cutting InRoads Cross sections, Global Scale Factors no longer need set to properly display the sections. Even though these tools rely heavily on the XIN for configuration and preference, the Drawing Scale dropdown on the Create Cross Sections dialog now governs the scaling of elements.

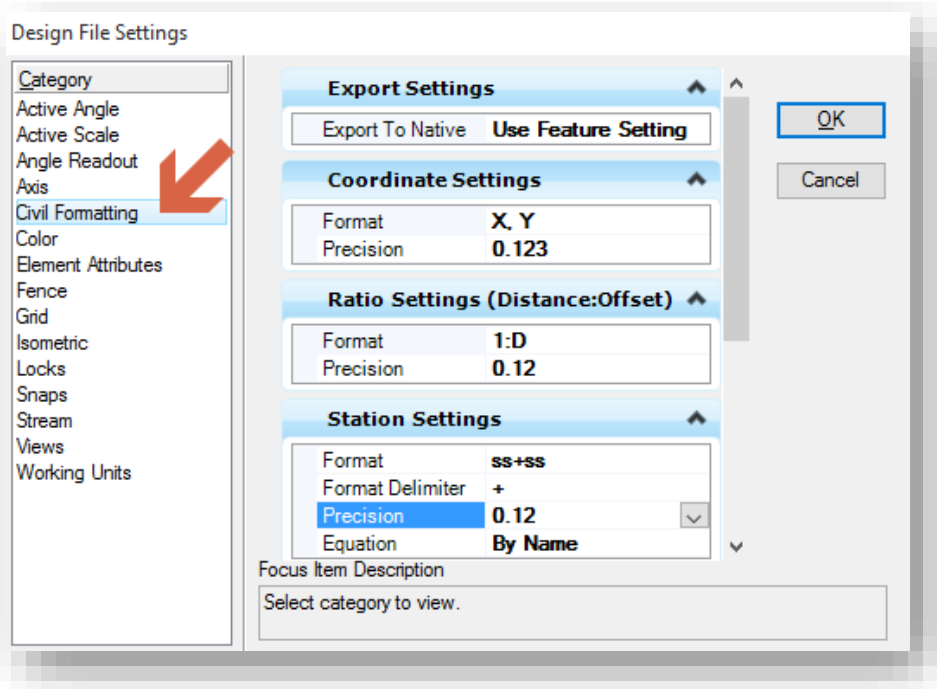
Additionally, as mentioned in the changes section, station text now uses DGN settings to control the number of significant figures displayed on the sections. The following steps will briefly describe how to adjust these.

1. In the DGN file, locate the Settings -> Design File menu from the MicroStation toolbar.



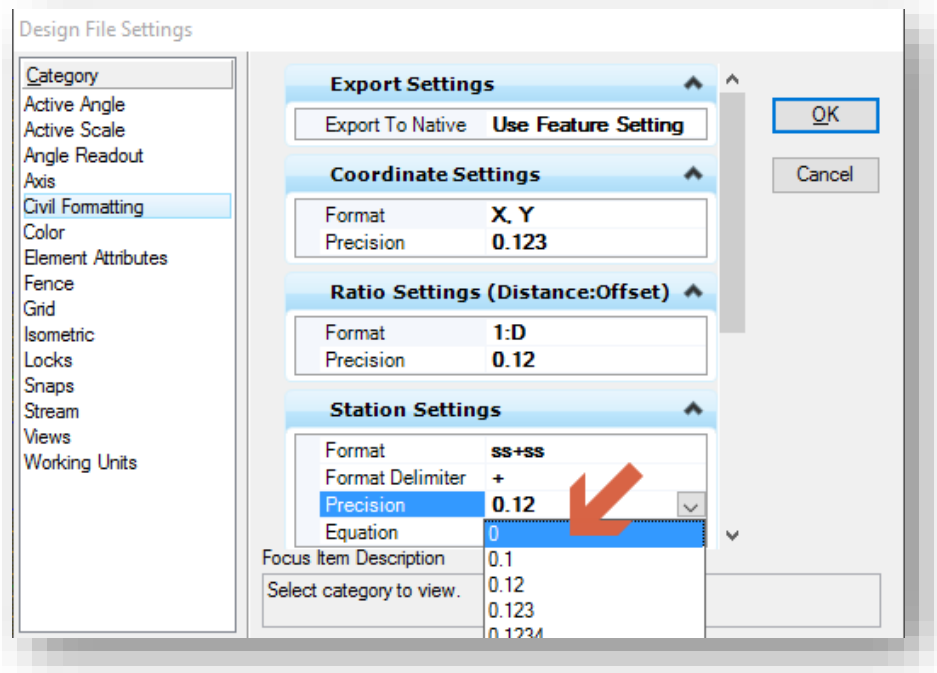
Design File Settings

2. On the Design File settings panel, go to the Civil Formatting entry.



Civil Formatting

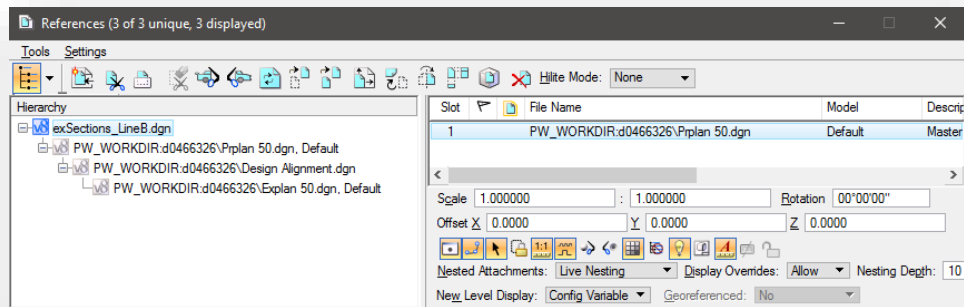
3. In the Station Settings leaf, change the Precision from .12 to 0



Setting Precision

With OpenRoads using the DGN stored corridors and terrains we can now use MicroStation referencing to make all the civil components we need available for cross sections. This replaces the need for DTMs and ALG alignments in the cutting process.

In your new DGN, reference attach the Explan XX.dgn, Design Alignments.dgn, and Prplan XX.dgn. Remember that depending on your referencing scheme you may be able to attach a single file and use nested references to attach the other content. The following illustration shows this process in practice.

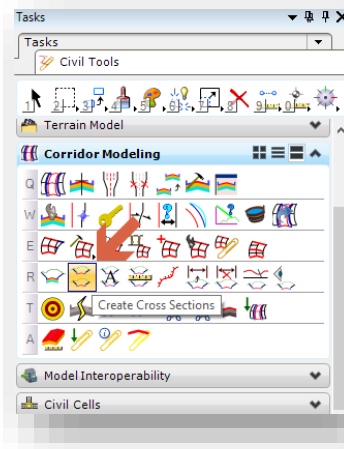


Nested References

With all the files attached, you're almost prepared to cut your sections. As a final preparation step, locate the terrain model and make it active. This can be done either through the heads up display or on the Civil Model. Note that the terrain will be listed under Referenced Models.

7.10-4 Cross Section Creation

With your files attached and your corridor model displayed using the correct design stage, sections can now be cut. The cross section tools can be found on the Task Navigation panel under **Civil Tools** -> **Corridor Modeling** -> **Create Cross Sections** tool.



Create Cross Section

With the tool active, you will be prompted to select the alignment you'll be cutting your sheets along. Select the appropriate alignment to finish initializing the command.

7.10-4a Cross Section Preferences

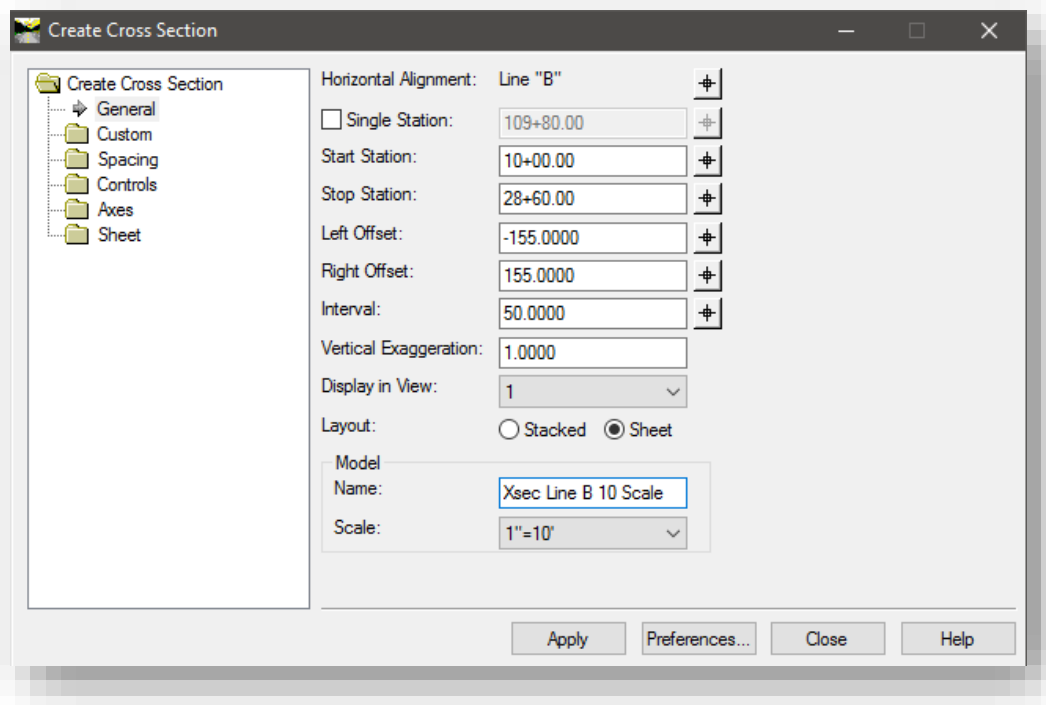
Cross sections in OpenRoads are still largely based on the existing tool set from SS2, as such, our existing INDOT customized preferences are available for use. As discussed in the section on changes, note that cross sections no longer use Global Scale Factors, favoring Drawing Scale instead. For the purposes of the following examples, you'll look at the settings used in the IN PW XSec 10 Scale Sheets preference.

7.10-4b The General Leaf

With the 10 Scale preference loaded, you'll examine many of the settings that are pre-configured for use in this scale. First, look at the General Leaf.

The General Tab contains settings such as the Section Set Name, the interval between sections, the left/right offsets, and the vertical exaggeration. Additionally, there is a new Scale setting that will create the sections using the appropriate drawing scale. These settings are preset via the use of the Preference, except the Set Name. The Set Name can be set one of two ways, the first being it assumes the name of the active Horizontal Alignment set via the Source leaf or it can be keyed in directly.

Note: Please keep in mind that if you named your alignment with quotation marks, that these characters will not be accepted for the set name, they should simply be removed for the section set to function properly.



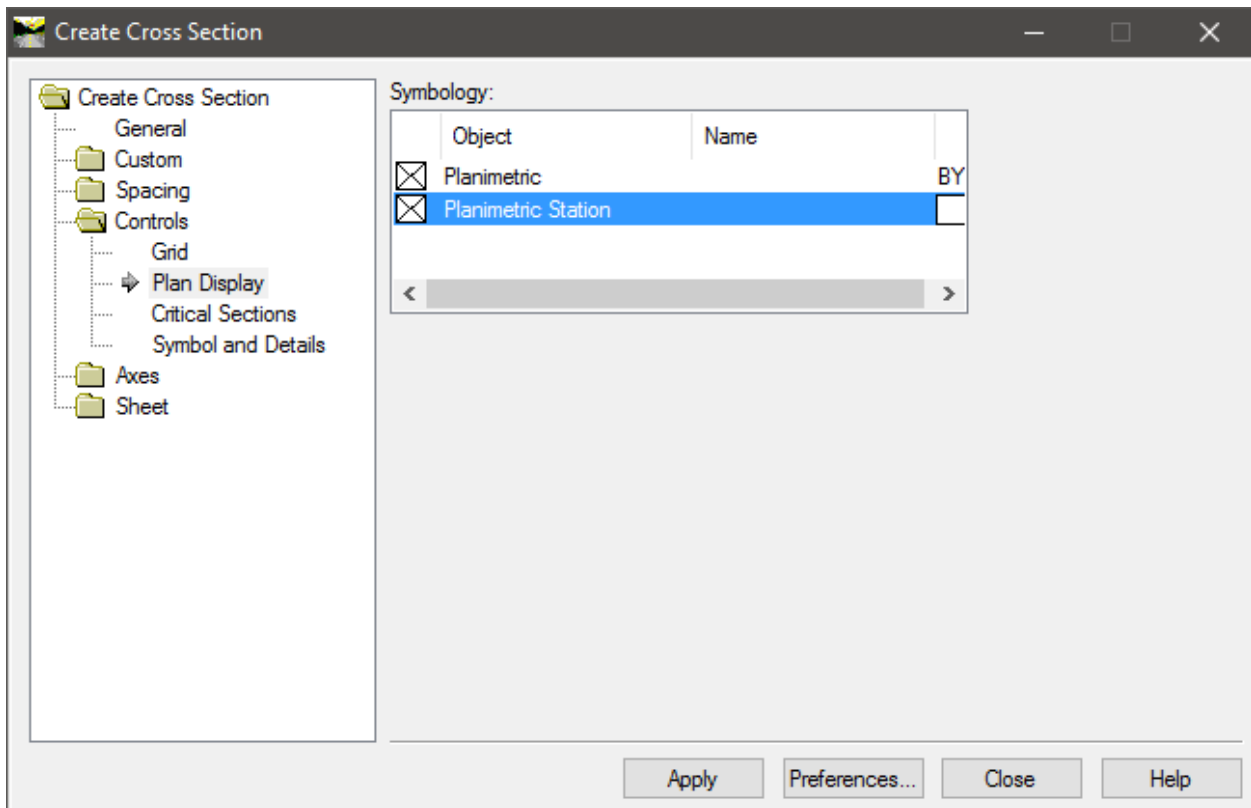
Cross Sections – General Leaf

As we no longer have the ability to define the surface being cut through, the features you have displayed will determine the content of your sections. In the instance of existing sections you will only want to have your Explan XX.dgn and Design Alignments.dgn attached. For proposed sections you will want to have Explan XX.dgn, Design Alignments.dgn, and Prplan XX.dgn all attached.

7.10-4c The Controls Leaf

The items in the Controls Leaf allow us to define the station range of the sections. The default is for the entire length of the selected alignment. In addition to this, the Critical Sections sub-item allows for the creation of sections at a series of pre-defined InRoads points.

Should you need to display the section cut lines in the plan view, navigate to the Plan Display option and enable the Planimetric and Planimetric Stations options as shown:



Plan View Section Items

7.10-4d The Custom Leaf

The Custom tools allow for the definition of custom section ranges within your section set as a whole. For instance, you can define a station range within your set that has a smaller interval, or instead of being perpendicular to the alignment, is skewed with different offsets should you need to include more information. For these custom sections, you can also define whether or not crossing and projected features are included, independently of the full set definition.

7.10-4e Everything Else

The remaining items under the Create Cross Section Leaf are all predefined using INDOT standard values for sheet borders, grid values, etc. In most instances, these values can be left as is, as they come in from the appropriate preference. With all the settings defined, select Apply and InRoads will create the Cross Sections using the settings you've defined throughout this example.

7.10-4f Cross Section Notes

1. Be careful when working with the sections once they're created. Deleting or modifying parts of the sections can cause InRoads to lose the ability to identify and Annotate/Update your sections.
2. ProjectWise title block integration is enabled on these sheets and is immediately available if you create the sections in a DGN opened from ProjectWise. A new DGN that has not been checked in will display the placeholder tags until the file is checked in and re-opened.
3. When cross section components are displayed, these are closed shapes that can be measured for area at the scale drawn.

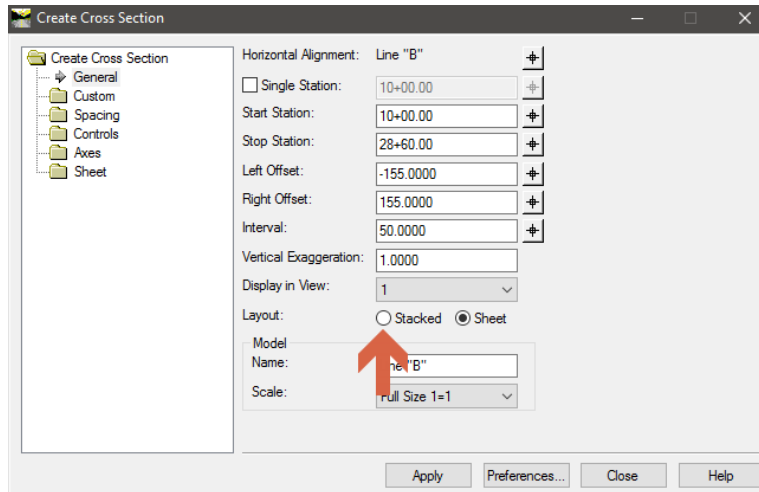
7.10-4g Crossing Features

With the changes to how OpenRoads now cuts sections, the process for showing point symbols for specific crossing features (guardrail, R/W lines, underground utilities) has slightly changed. Instead of adding these features to an existing set of sections after they have been cut, now all that needs to occur is that the features use the appropriate style and are displayed at the time the sections are cut. They will then be automatically displayed when the sheets are created and no longer require any special configuration.

7.10-4h Cross Section Troubleshooting

During the process of Cross Section creation, one of the most common issues is an error that specifies a section is out of range. This is most commonly caused by a section that is cutting through a surface that has triangulated features that are located at 0 elevations or is from a 3D model where geometry elements have been created. The latter causes a reference element to be placed at a 0 elevation. In this instance, you might want to cut the sections without sheet borders in order to locate the item in question.

To cut sections without sheet borders select the Stacked option on the General tab of the Cross Section tool.

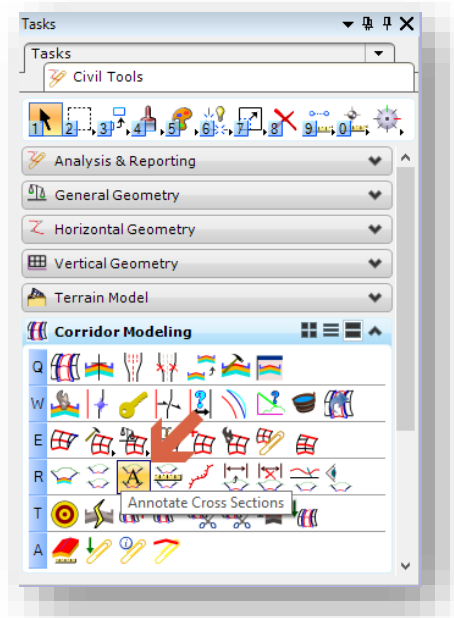


Cross Section Layout

This will allow InRoads to create all specified sections without limits on the horizontal extents and allow for the inspection of sections to locate the area where the triangulation may be an issue.

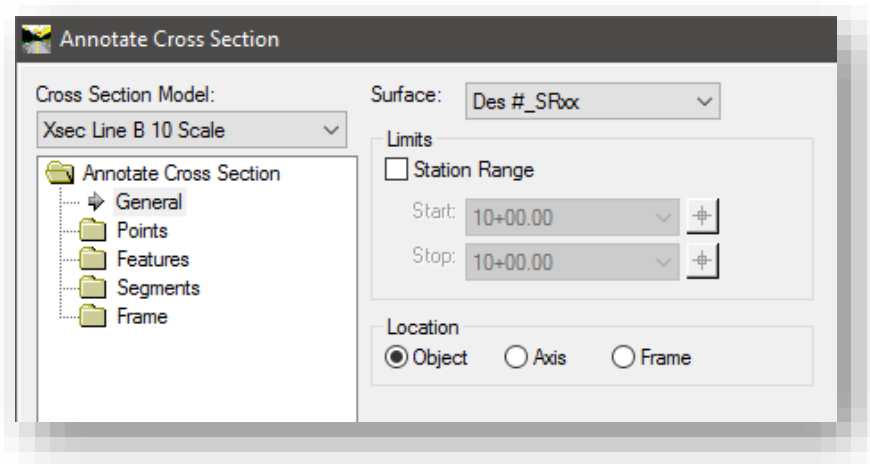
7.10-5 Cross Section Annotation

With a section set created, you'll now look at the annotation process. For OpenRoads, the Cross Section Annotation tools have been moved to their own tool. This can be located on the Task Navigation panel under *Civil Tools -> Corridor Modeling -> Annotate Cross Sections*.



Annotate Cross Sections

The first thing you should notice when activating this leaf is the Cross Section Model: option becomes active.



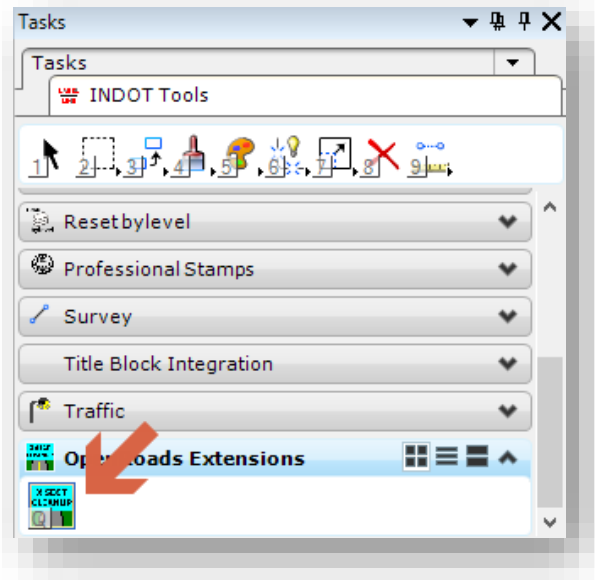
Cross Section Set Active

In the instance that the DGN has multiple section sets defined, this will allow you to specify which section set you'd like to interact with. In most cases, you'll only need to select the surface you'd like to annotate, along with the corresponding Preference. This will appropriately define all the remaining features in the Annotate Cross Section tree. When you're satisfied with the setup, select Apply, and the annotation selected will be placed on your sections.

7.10-6 Update Cross Sections

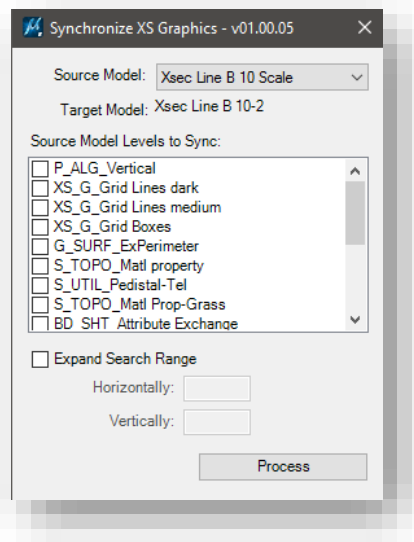
One of the more important changes to the OpenRoads sections is the lost ability to update cross sections directly to an existing set. As previously discussed, any section iterations must be cut as a new section. To somewhat alleviate this process Bentley has provided a tool that will update new sections from an existing set.

With multiple sets of sections in the same DGN, locate the Cross Section Synchronization tool on the Task Navigation Panel. It can be found under **INDOT Tools -> OpenRoads Extensions -> Cross Section Synchronization**. This should be started when you're in the cross section model you want to pull existing data into.



Cross Section Synchronization

Once running, the following panel will be displayed.

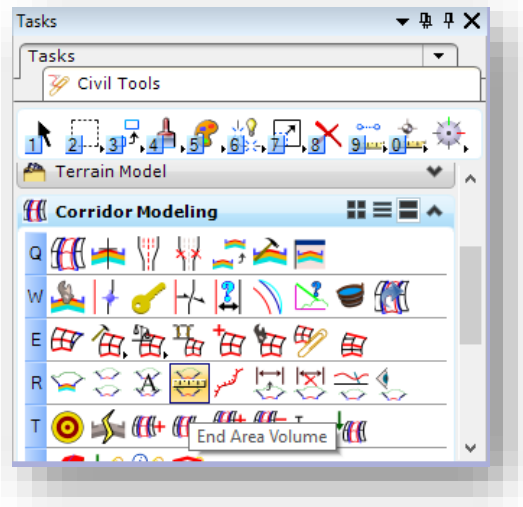


Synchronize Settings

The source model defines the section set you wish to pull information from. The target model is the file you're currently in. The Source Model Levels to Sync allow for the granular selection of information that you wish to bring forward. By selecting the appropriate levels and selecting process, the content of these levels will be synchronized at the appropriate stations on your sections.

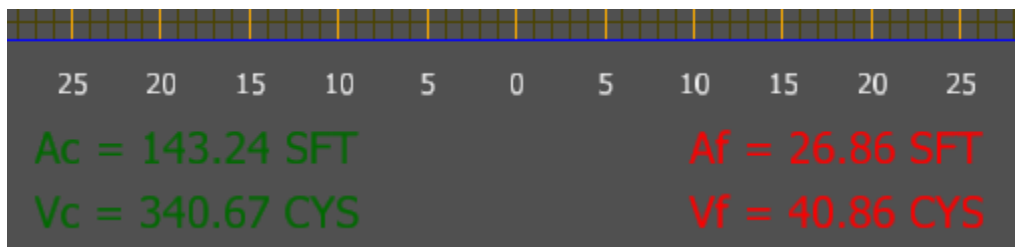
7.10-7 End Area Volumes

To get End-Area Volumes displayed on the sections, you'll use the **End Area Volumes** command on the **Civil Tools -> Corridor Modeling Task Navigation** panel.



End Area Volumes

Currently, this tool is configured to place this annotation below each related section. Along with your other cross section tools, you do have appropriately scaled preferences. For this example, you'll be placing the annotation using the EndAreaVolume10scale. With this Preference, all other items will be appropriately configured per INDOT standards. When ready, select Apply, and the annotations will be placed.



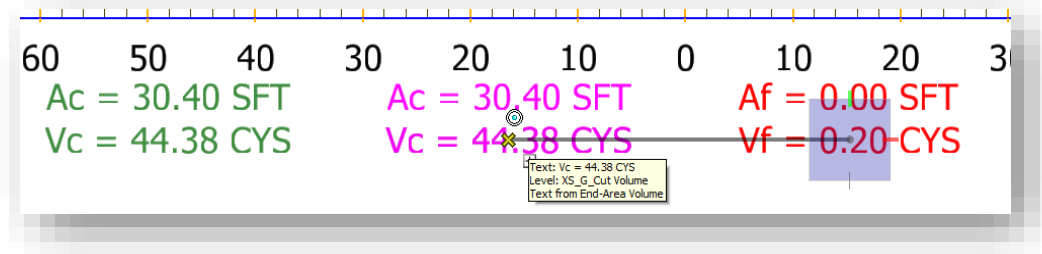
End-Area Volumes

7.10-8 Benching Area Volumes

As the InRoads cross section annotation tools do not allow for the placement of the Benching Area and Volumes, the following process is recommended:

1. Select the Cut Area and Volume with the Power Selector.

2. Select the Copy tool for the Task Navigator.
3. Using the center snap mode, snap to the center of the Fill Volume and then drag to the left, and again center snap to the Cut Volume. This will ensure consistent spacing between all text as shown:



4. The newly copied text should be modified so it's on the level XS_G_Benching Area and XS_G_Benching Volume respectively.

7.10-9 InRoads RW Modeling and Cross Section Tips (courtesy H. Brown)

While no longer explicitly used as most modeling has been moved to the OpenRoads terrain models, these following information has been kept as reference in the event existing data exists that used this functionality.

7.10-9a Steps to Model Right-of-Way in InRoads Using Cogo Points:

1. Open the InRoads Geometry Project that will be used to store R/W Cogo Points and R/W alignments.
2. Create a Cogo Point for each R/W point using Geometry/Cogo Points/New. Select Station/Offset for the Define By field. Enter the desired point number in the Name field. For the Horizontal Alignment field, enter the alignment from which the R/W point is described. Enter the appropriate values in the Station and Offset fields. Leave the Elevation field as 0.00. For the Style field, select RW_ProposedRW. Click Apply when finished. (Note: Example is for Permanent R/W on left side for US 231, Des. No. 0800856. See attached plan sheets.)

- For parallel R/W on curves, three points should be created at the following locations: beginning of parallel R/W on curve, curve center, and end of parallel R/W on curve. The same curve center point can be used for multiple arcs on the same curve.
- After Cogo Points are created, they can be edited if needed using Geometry/Cogo Points/Edit.

Edit Cogo Point

Define By:

Name:

Nothing:

Easting:

Elevation:

Horizontal Alignment:

Station:

Offset:

Elevation:

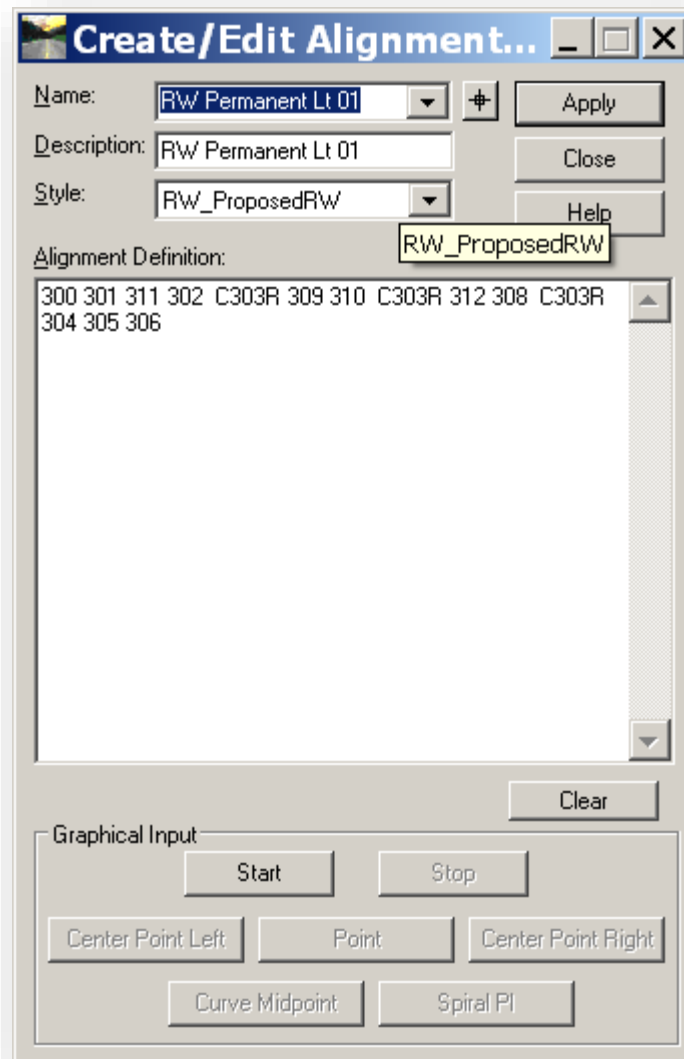
Description:

Style:

Shared Points

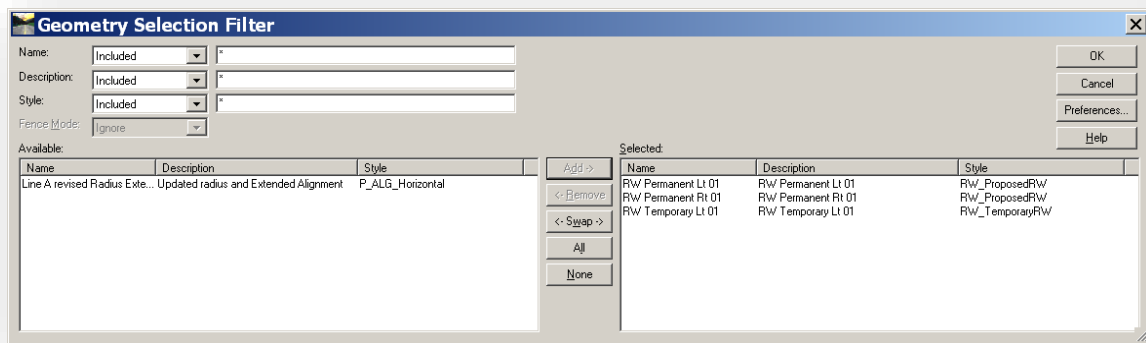
POB	RW Permanent Rt 01
-----	--------------------

- After the Cogo Points have been created, create the alignment using Geometry/Utilities/Create Edit Alignment by Cogo Points. **Enter the appropriate Alignment Name and Description in the Name and Description fields. It's recommended that a new alignment name be used in the Name field to prevent the accidental overwriting of an existing alignment.** Use the style RW_ProposedRW (for permanent R/W) or RW_TemporaryRW (for temporary R/W). In the Alignment Definition field, enter each point number separated by a space. For a point that represents a curve center, use the prefix "c" and suffix "l" (curve to the left) or "r" (curve to the right). In this example, point number 303 is the curve center for a curve to the right (Station = 449+26.05, Offset = 1432.44'). Click Apply when finished.

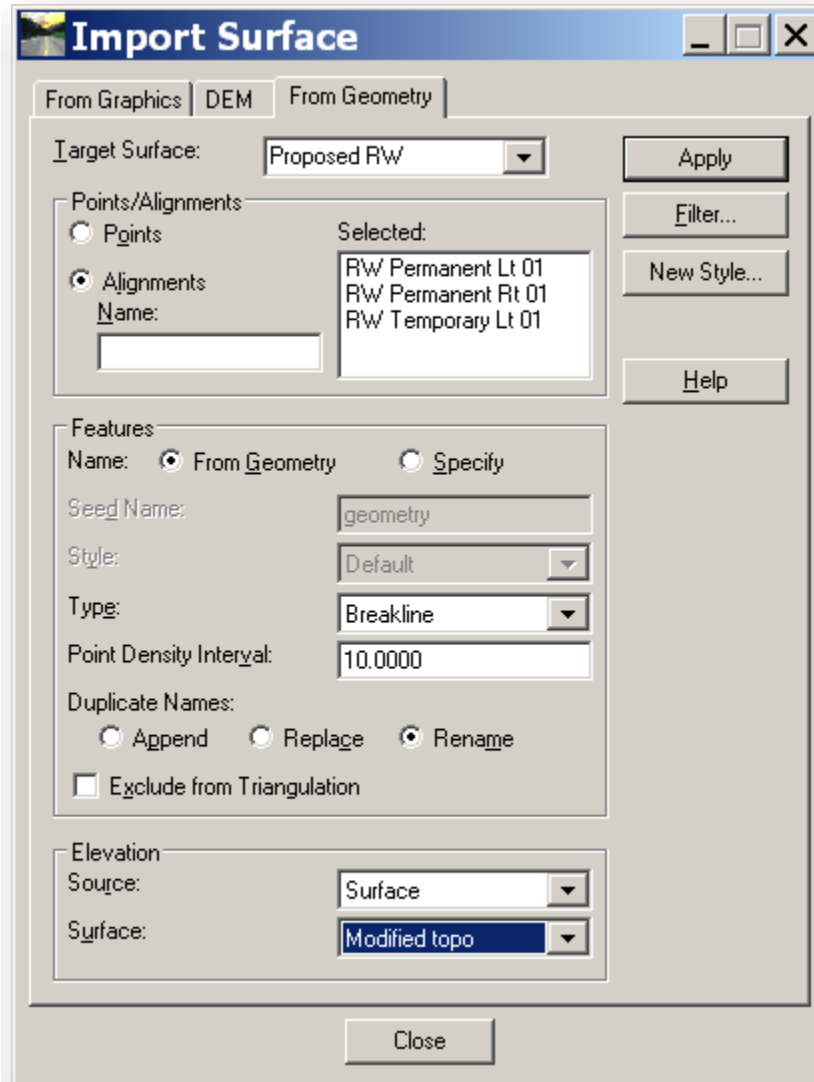


- After the R/W Alignment is created, points can be added to or removed from the R/W alignment using Geometry/Utilities/Create Edit Alignment by Cogo Points.

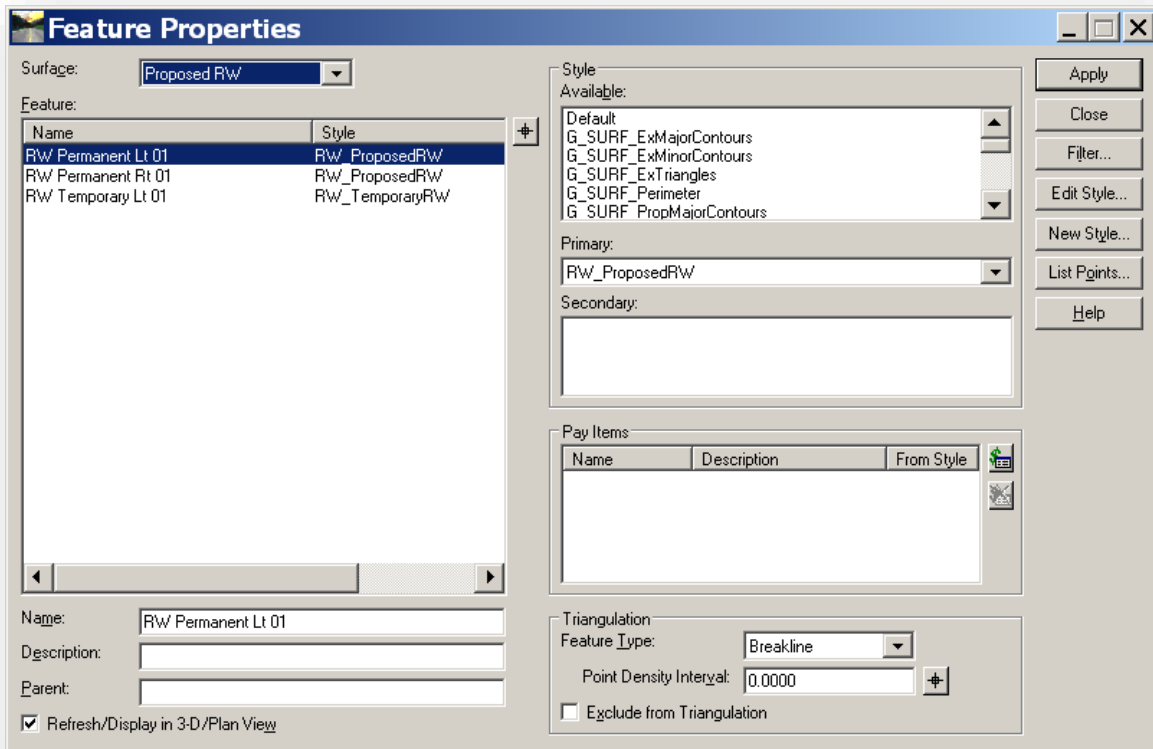
7. Individual points can be edited after the alignment is created (refer to Step 4). The alignment will automatically be updated when a point on the alignment is edited. To edit points that are part of an arc for parallel R/W on curves, change the Alignment Definition to remove the “c” prefix and “l” or “r” suffix and click Apply (refer to Step 5). After the arc points are edited, the “c” prefix and “l” or “r” suffix should then be added again to the alignment description.
8. The R/W alignments can be drawn in plan view using Geometry/View Geometry/Active Horizontal. All horizontal alignments in a Geometry Project can be drawn using Geometry/View Geometry/All Horizontals. The linestyles can be changed using MicroStation commands.
9. To show R/W on cross sections, R/W surface features need to be created from the R/W Alignments. The features can be created using File/Import/Surface/From Geometry. Set the Target Surface to the surface that will be used to store R/W features. Check the Alignments radio button and use the Filter button (after clicking in the Alignment field) to select the alignments that will be used to create features. The Geometry Selection Filter panel is shown below:



10. On the Import Surface panel, select the following settings in the Features section: Name = From Geometry, Type = Breakline, Point Density Interval = Value Selected by User (10.00 in this example), Duplicate Names = Rename, Exclude from Triangulation = unchecked. In the Elevation section, select Surface in the Source field and select the Surface used to generate the R/W feature elevations in the Surface field. Click Apply when finished.



11. Check to ensure that the features have been created with the correct styles using Surface/Feature/Feature Properties.



12. Triangulate the surface containing the right-of-way features using Surface/Triangulate Surface.

7.11 InRoads Performance Tips

While working with InRoads, DGNs have a tendency to become bloated due to many of the automated processes that occur during day to day use of the software. To alleviate some of these issues that result in poor performance, these items should be tried prior to contacting CAD Support:

1. Make sure the appropriate seed files are being used. These files can be found at <pw:\\indot-pw.bentley.com:indot-pw-01\Documents\Template Documents\SS4 Seed\InRoads\>. These seed files are configured without Design History enabled to prevent the historical recording of subsequent display commands and to maintain a manageable file size.
2. Compress DGNs regularly. Again, displaying items repeatedly can also build up in the DGN buffer, which can be alleviated by using the File -> Compress -> Design and Options items in MicroStation. It's advised to perform both types of compression, and enabling all features on the options panel, as each function removes cached items from the DGN.
3. After performing any plans production operations (plan profile sheets, cross sections, etc.) that place sheets in the base drawing, consider the following:
 - a. Detach any unneeded references (borders, etc.)
 - b. Delete and compress any unneeded elements.
 - c. Remove tag sets (Element -> Tags -> Define), highlight each tag set and select Remove.
4. Isolate long sets of cross sections, and dispose of draft copies when possible.

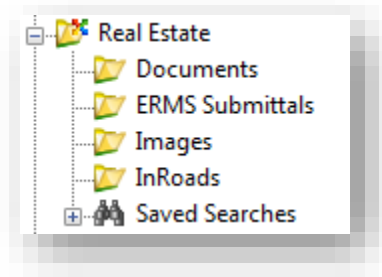
By performing these operations throughout the design process, performance will be increased by minimizing the amount of data in a single DGN. Additionally, this will limit the number of instances of ProjectWise title block integration that must be resolved prior to a DGN becoming available to use once open.

8. Using InRoads and ProjectWise for Real Estate

The following chapter will examine possible workflows for numerous Real Estate functions, such as the development of Parcel Plats, Exhibits, Right of Way plans; along with the review of the custom reporting functions that have been created. Note that this chapter is procedural in nature, so further review of ProjectWise, MicroStation and InRoads functions and integrations should be reviewed in their respective chapters.

8.1 The Real Estate Project Structure.

When creating a Real Estate Project using the DOTWise Project Creator, all Real Estate projects will be provided the following folder structure:



The Real Estate Folder Structure

In these folders, the following types of data are recommended:

- Documents – Any project documentation, correspondence, or other files relevant to the project including spreadsheets, PDFs, etc.
- ERMS Submittals – These should include any documents that are prepared and finalized in preparation to upload to the INDOT ERMS system.
- Images – Any imagery for the project can be stored in this folder. This can include aerials, or on site digital photos.
- InRoads – This folder should include all the project CAD data such as MicroStation and InRoads data.

In addition to the provided folder structure, additional folders can be created under the Real Estate level and each of the provided sub folders to fit the needs of the projects. These are merely the folders that are initially provided.

8.2 Required InRoads Application Add Ins

As part of the InRoads Real Estate process, there are specific Application Add-Ins that need enabled in the InRoads environment. These Add-Ins can be enabled from the *InRoads Explorer -> Tools -> Application Add-Ins menu option*. The following Add-Ins should have their respective check boxes enabled:

- Lot Layout Add-In – Commands for the creation and manipulation of lots, setbacks and rights-of-way.
- Traverse Edit Add-In – Tool used to create horizontal alignments from deed/plat descriptions.
- Multiple Horizontal Element Regression Analysis Add-In – Commands for horizontal alignment creation and editing with the inclusion of regression by least squares analysis.

Additional Add-Ins such as those discussed in Chapter 5.5.4 can/should be enabled as needed as they will simplify locating tools and features, and ease the development of finalized deliverables.

8.3 Incorporating and Converting Survey Data

Incorporation of survey data will insure a logical starting point for Real Estate activities. Survey Data for many projects will be available in ProjectWise in the Survey folder. If the survey has been completed in InRoads much of the data will be available with minimal effort.

8.3-1 Inspecting the Survey Folder in ProjectWise

Upon inspection of the Survey folder in ProjectWise, you are likely to find numerous relevant files in ProjectWise. Per the most recent revisions to the Indiana Design Manual:

“Each InRoads survey file submitted to INDOT shall use the format and provide the content as described below.

DES#_SRxx Name.extension

Key:

- DES#: designation number for project as provided by INDOT
- SRxx: route number of project, for example: SR37, SR162, I64, US150
- Name: descriptive name of information in file, for example: Topo, LCRS Plat
- Extension: file extension name, for example, .xin, .dgn, .fwd

The files to be submitted to INDOT for each survey are as follows:

FOR SS2 VERSION PROJECTS

11. Des #_SRxx Control Points.fwd – InRoads survey book with control points
12. Des #_SRxx LCRS Plat.dgn – MicroStation plat DGN
13. Des #_SRxx Survey Alignment.alg – InRoads Survey Alignments
14. Des #_SRxx Survey Surface.dtm – InRoads DTM of Survey processed features
15. Des #_SRxx Survey Surface Boundary.dtm – InRoads DTM of Survey Boundary
16. Des #_SRxx Survey.xin – InRoads XIN, specific to the processed data
17. Des #_SRxx Topo.dgn – MicroStation DGN of topographical features
18. Des #_SRxx Topo.fwd – InRoads DTM containing the processed Survey
19. Des #_SRxxSeed.dgn – Sets the coordinate system for every InRoads based file in your project.
20. IN_GeoCS.dty - This file contains the customized coordinate system information and should not be needed as this is also provided as part of the Seed file.

FOR SS4 VERSION PROJECTS

10. Des #_SRxx Seed 2D.dgn – Sets the coordinate system for every InRoads based file in your project and contains a Default model in 2D.
11. Des #_SRxx Seed 3D.dgn – Sets the coordinate system for every InRoads based file in your project and contains a Default model in 3D.
12. IN_GeoCS.dty - This file contains the customized coordinate system information and should not be needed as this is also provided as part of the Seed file.

13. Des #_SRxx Survey Fieldbook.dgn - Contains Fieldbook information for TOPO and Control Points in the OpenRoads Format (survey fieldbook) along with the existing terrain model. This will be done in a 3D model.
14. Des #_SRxx Survey Alignment.dgn - Contains Survey alignment(s) in the OpenRoads Format (civil data – linear elements). This will be done in a 2D model.
15. Des #_SRxx LCRS Plat.dgn - MicroStation plat DGN
16. Des #_SRxx Survey Alignment.alg – InRoads Survey Alignments, Legacy format for annotation.
17. Des #_SRxx Existing Terrain.dtm – InRoads DTM of Survey terrain model, with applicable triangulation cleanup. This terrain will only contain the existing triangulated terrain and any features that are included in that triangulation. This can be used with the native InRoads tools for 3D analysis as it will match the OpenRoads existing terrain and is discussed in Chapter 6.3-5
18. Des #_SRxx Annotation Surface.dtm – InRoads DTM of Survey processed features, Legacy format for annotation. This should not be used for any functions beyond the native annotation tools and should be created using the import process described in Chapter 6.3-6.

In some instances, survey data has not been placed in the Survey folder. This is often the case when surveyed by non-INDOT staff. It can be located as a subfolder to Design. As can be expected when the data is not present in the Survey folder, further investigation by the responsible party is necessary.

ROUTE SURVEY

The Route Survey (LCRS) document for the project is also likely to be present with the above referred to Survey documentation. It likely exists in Cad file format as well as the recorded adobe pdf document. Both of these types of data are readily utilized in MicroStation.

8.3-2 Copying Data from within ProjectWise

Data present in the Survey folder may need to be accessible in a read/write manner to perform further Coordinate geometry operations. ProjectWise permissions ensure that users only have the ability to modify files in their folders. Because of these permissions, data is protected from groups other than their creators and is visible in a read only fashion to everyone else. When read/write is required the most straightforward workflow is to copy the file(s) in question to the user(s) folder. For example dragging files from Survey\Project Files folder to Real Estate\InRoads.

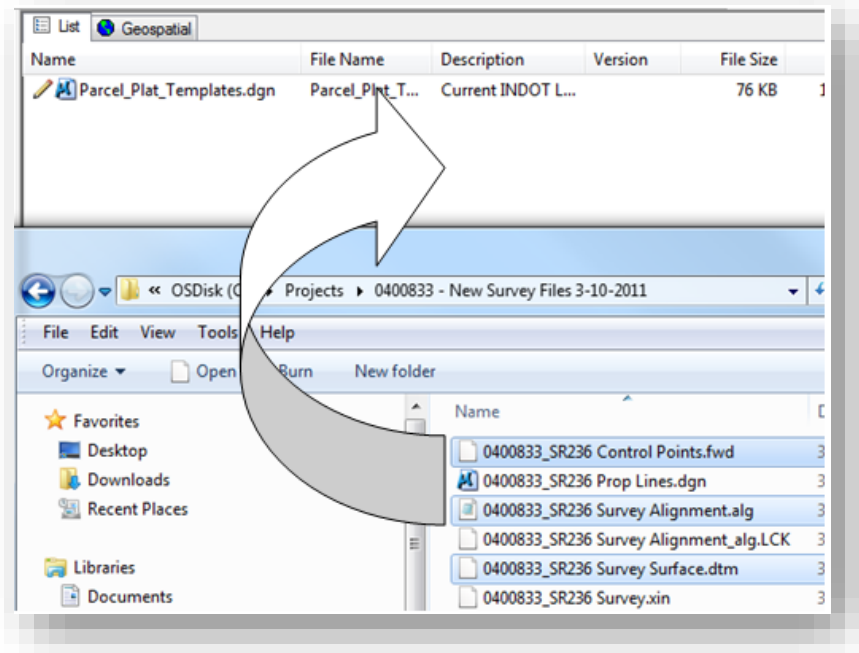
8.3-3 Copying Data from Other Sources

In some cases, you may receive your data from sources that don't have access to ProjectWise. In these instances, you could possibly receive your information via e-mail, CD, or ERMS. For these situations, we will look at using a Drag and Drop import to bring this information into our datasource.

For ERMS file transfers, you must first get the documents to a folder on your local PC, in a folder you have access to. Some suggested locations could be a folder on your desktop, a C:\Projects location, or perhaps C:\temp. As the steps to extract data from ERMS are specific to the application, we will not discuss them here.

With the files in a location that you can access, open your ProjectWise Explorer to the appropriate folder in the Real Estate folder structure. With this location now open, navigate in Windows Explorer

or your Outlook E-mail client and select the file or files (using either Ctrl+Click or Shift+Click selection methods), and continue holding your left mouse button down while dragging the selection into the Document Panel of ProjectWise.

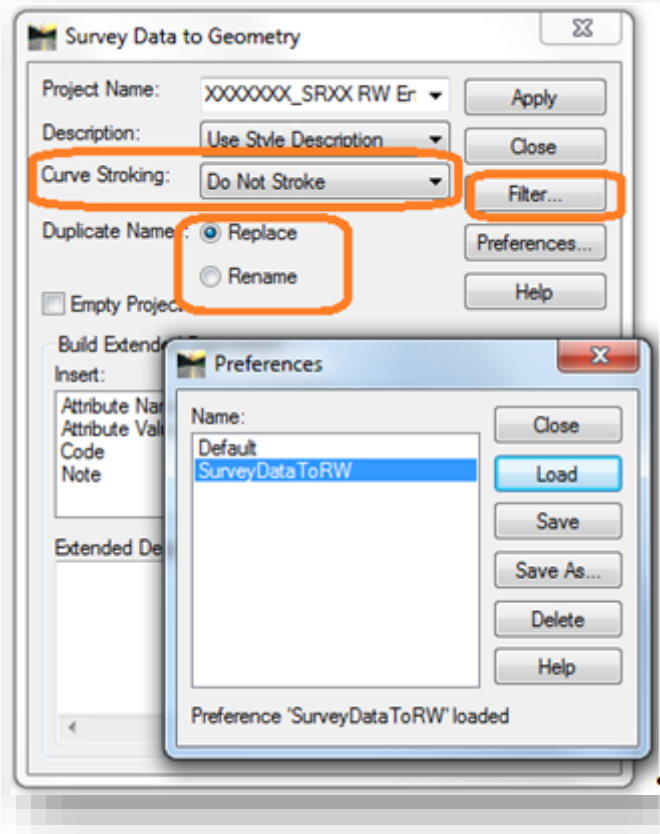


Drag and Drop from a PC

8.3-4 Converting Survey Data to Geometry

Incorporation of Survey field book data (*.fwd) into Geometry Project Data can be accomplished using the Survey Data to Geometry functionality from the Survey menu. Survey data will be available with the same code numbers used by survey for all data collected. Survey alignment geometry *.alg files are likely to only contain what the surveyor thought was necessary for creation of survey geometry elements. Any remaining surveyed points can be published to COGO geometry if it is felt desirable items is missing. Using the option to replace data will insure that no duplicates are created with the Survey Data to Geometry functionality.

On the Survey Data to Geometry panel, options to filter the data being copied are available. Filter is consistent throughout InRoads. Utilize filter to restrict; points by code range, random vs breaklines, specific style names, and numerous other alternatives. Curve stroking option inserts vertices in linear elements based on a chord to arc tolerance. This may not be desirable as more points that were collected in the field are generated. Duplicate Name set to Replace or rename will dictate the copy behavior when the same COGO point names already exist in the destination geometry project. Preferences button reveals specific settings predefined for a particular reason (ex. SurveyDataToRW).



Survey Data to Geometry

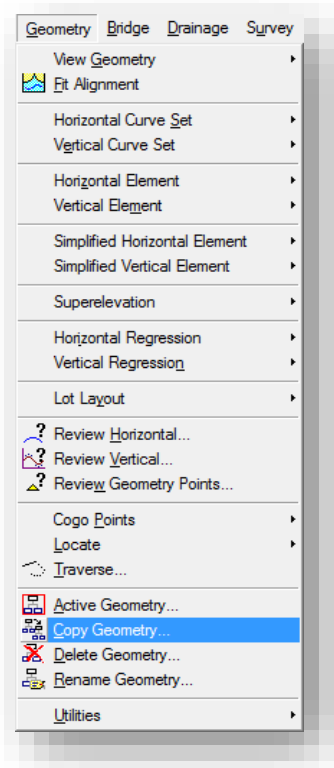
8.4 Incorporating Proposed Right of Way Data from Design

Design right of way information can be included in the project process through a number of different methods depending on the type of data available. The most desirable form of data would be Geometry defined in a designers InRoads geometry file or .alg. InRoads geometry files will require virtually no manipulation of data to incorporate the details of the proposed right of way into coordinate geometry calculation. In the event that the designer does not provide InRoads geometry, conversion of cad graphics is likely the next most practical vehicle for incorporation of geometry data in the project.

Cad data is probably the most readily available data, especially from INDOT consultants. When cad data is not available, and the range or information available is more likely an adobe PDF file, proposed alignments can be created using the methods described in the InRoads Right of way training. Coordinates file type data can also be incorporated using the InRoads text import wizard utility. Typical examples might be Traverse PC, PC Survey, MX, PDF files, OCR PDF file, or other ASCII type data.

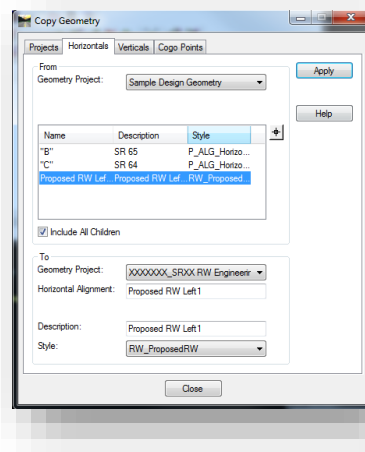
8.4.1 Right of Way from InRoads Geometry

When Project data is available via InRoads Geometry Project, users should open the appropriate designer's alg file. Using the **Geometry > Copy Geometry** tool will allow elements to be copied from the designer's alg to your current geometry project. This ensures you will have full access to the alignments, and COGO points as needed



Copy Geometry

From this panel, you can select all the various components of a Geometry project and copy them to a differing file. This includes horizontal alignments, vertical alignments, and COGO Points.

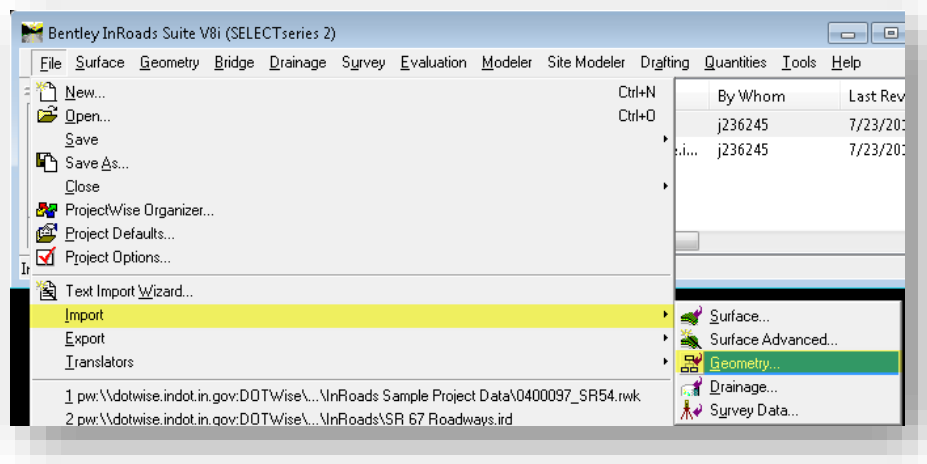


Copy Geometry

Once data Geometry data has been copied, it may be necessary to rename the data for clarity purposes. This can be accomplished using the Geometry -> Rename Geometry tool on the InRoads Explorer.

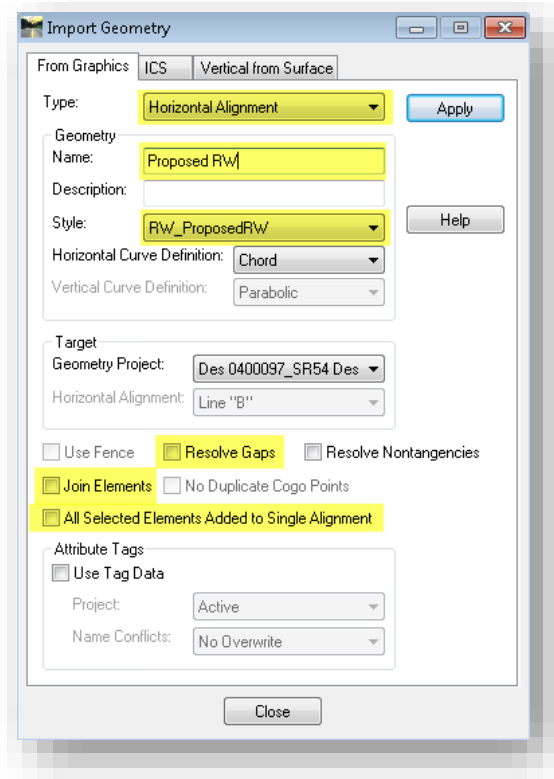
8.4-2 Right of Way from Graphical Data

In many instances, Right of Way information may only be provided via a CAD file (DGNs, DWGs, DXFs, etc.). InRoads can accommodate this via the **File -> Import -> Geometry** option on the InRoads Explorer.



Importing Geometry Data

When in the Geometry import tool, the first option presented will be the **Graphical** option. On this panel one can configure all the relevant options to capture a pre-existing CAD element and turn it into Geometry data.



Graphical Geometry Import

The highlighted options in the previous illustration should be configured as necessary. A brief description of each option:

- **Type** – This is the type of Geometry element that will be created upon import. For the purposes of Right of Way, this should only be Horizontal Alignment or COGO Points.
- **Name** – This is the name of the element that will be created in the Geometry project. Note that when multiple elements are selected for import, this name will be enumerated so it may be advantageous to have the name end in a number.
- **Style** – This is the style that each element will be defined with upon import. Most instances should have this as one of the RW_ (Right of Way) or CG_ (COGO Point) feature styles.
- **Resolve Gaps** – Closes gaps between adjacent linear elements. The software passes across the data and removes gaps between adjacent linear elements.
- **Join Elements** – If checked, joins two adjacent elements provided that they are joinable (like elements, coincident common points, like tangential directions, like radii for circular).
- **All Selected Elements Added to Single Alignment** – If checked, imports all elements of a selected multi-element graphic to a single alignment. If not checked, imports each element of a multi-element graphic into different alignments.

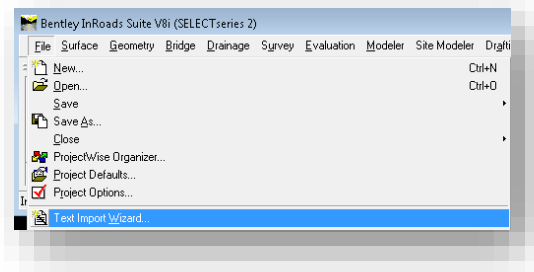
Once configured, selecting the Apply button will switch back to MicroStation allowing for the graphical selection of the CAD elements. This selection follows all MicroStation conventions for element selection so Shift + Click, Ctrl+Click, and Drag/Window selection methods are all viable for selecting the elements.

In addition to this method, elements can also be pre-selected prior to starting the Import -> Geometry tool using the standard MicroStation element selection tools such as Power Selector. When used in this manner, any pre-selected elements will automatically be added to the Geometry project when the Apply button is selected.

8.4-3 The Text Import Wizard

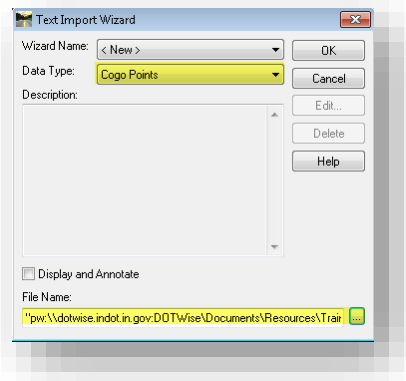
In addition to InRoads Surface data, and CAD data; text data may also be provided specifically for COGO points as their nature lends itself to being transferred as tabular data. In these instances one may receive data in TXT or CSV formats which can be brought directly into InRoads via the Text Import Wizard.

The Text Import Wizard can be found on the InRoads Explorer under **File -> Text Import Wizard**.



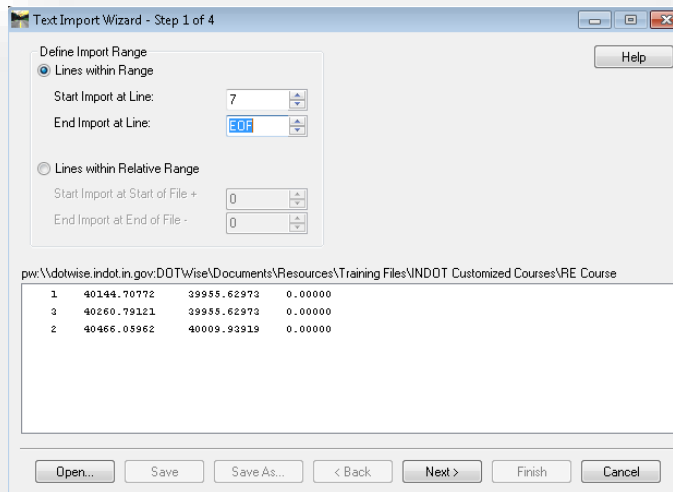
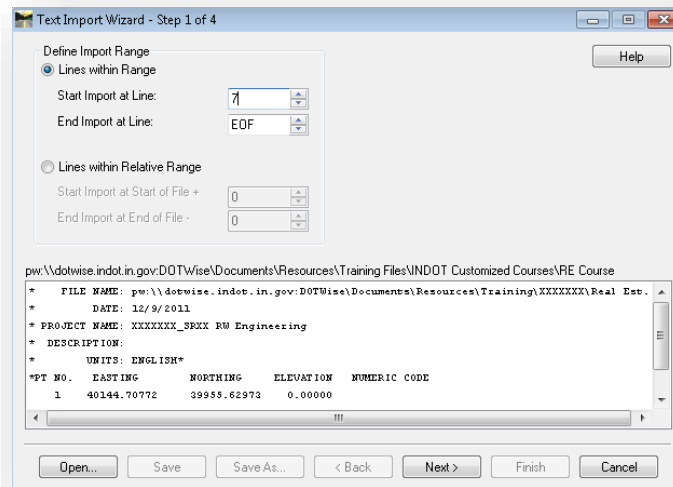
Text Import Wizard

When starting the Text Import Wizard, one must first select the Data Type being imported, along with the file name where the data can be found. **Note that when selecting a file from ProjectWise, the Application Type on the ProjectWise Open dialog may need changed to All Applications as this data is not limited to text only formats.**



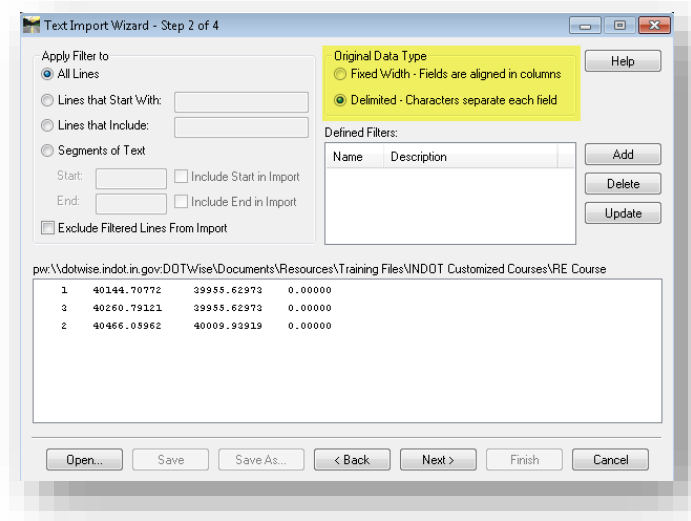
Text Import Wizard – Setting Data Type and File

Upon selecting the OK button, the Wizard will begin with the process of configuring the data. The first panel allows for the definition of the Import Range. This is provided by giving the start and end lines of the data being imported. Depending on the source there may be header or other data that needs excluded as in the following illustration. As shown, starting at line 7 will exclude the header information from the import.



Changing the Import Range

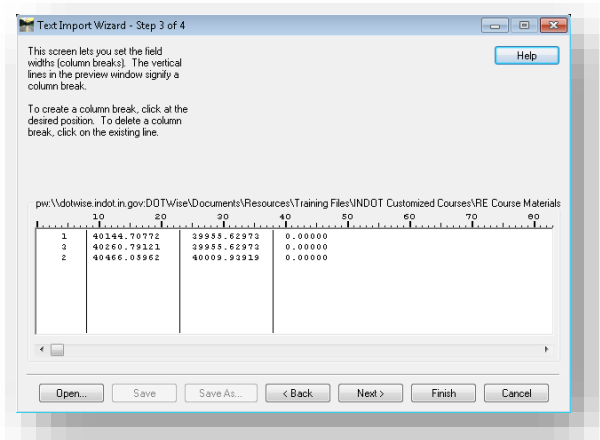
With the Import Range set, one can proceed to the next panel and start setting up the data type and any filters.



Filters and Data Types

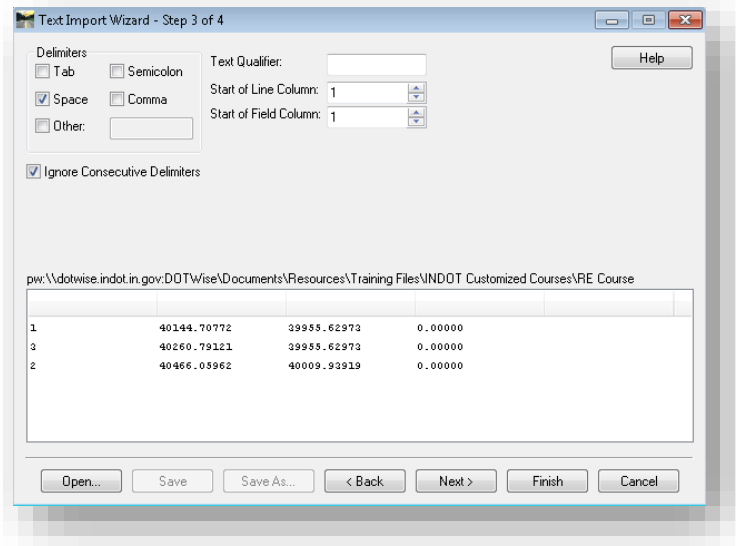
Depending on the source data, there may be rows that need filtered out for a clean import. Often times this will be items such as embedded time stamps/dates or page numbers. On this panel these types of data can be filtered out as necessary. Also, this panel contains the definition for how the data should be separated. Again depending on the source and file type, the provided data may be in a Fixed Width (consistent column layout) or Delimited (common field separator) format. This should be identified on this panel.

The next panel allows for the definition of the data columns and changes depending on the Original Data Type defined. The following illustrations show both potential options.



Fixed Width

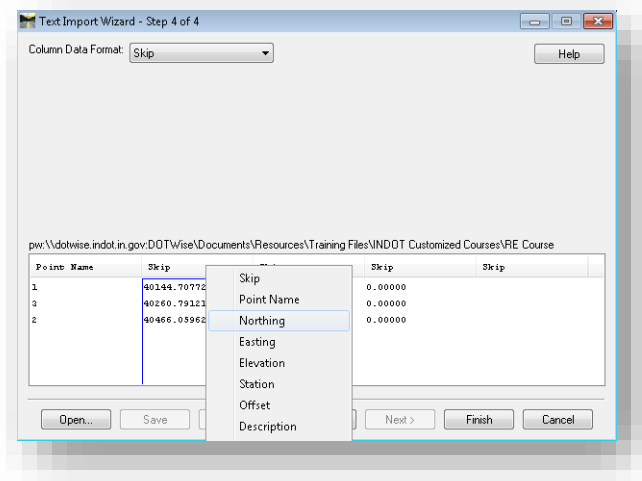
The fixed width option allows for the separation of data columns through consistent spacing. When using this method, one only needs to click on the appropriate space between columns to set the column definition.



Delimited

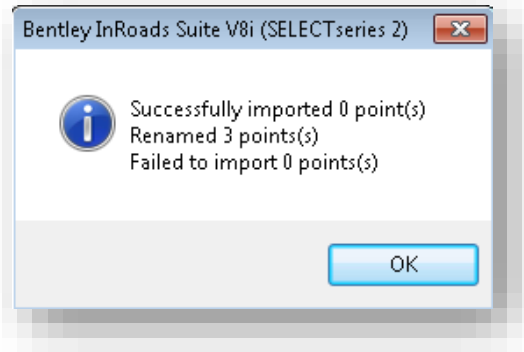
When using Delimited, this panel will allow for the configuration of the columns based on a consistent character. Often this will be spaces or commas depending on the original data source and the selection should be made appropriately to separate the data.

In both instances a live preview will show how the columns are separated allowing for adjustment as needed. Once setup, proceeding to the next panel allows for the definition of each columns data type.



Setting Column Data Types

On this panel one can define the type of data each column contains. There are a variety of different data types, but the primary ones used are Point Name, Northing, Easting and Elevation. The other options can be reviewed via the Help file. Once the column data is defined, selecting Finish will kick off the import process. Upon completion, InRoads will provide an import status as follows.



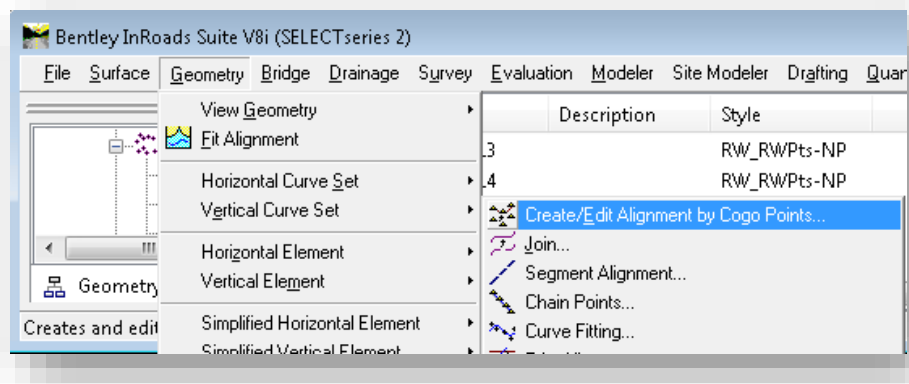
Import Status

8.5 Creating Parcels from COGO Points

The previous sections have discussed the process of gathering and getting data from a variety of sources prepared for use. This section will review creating parcels and the various manipulation tools that are used throughout this process.

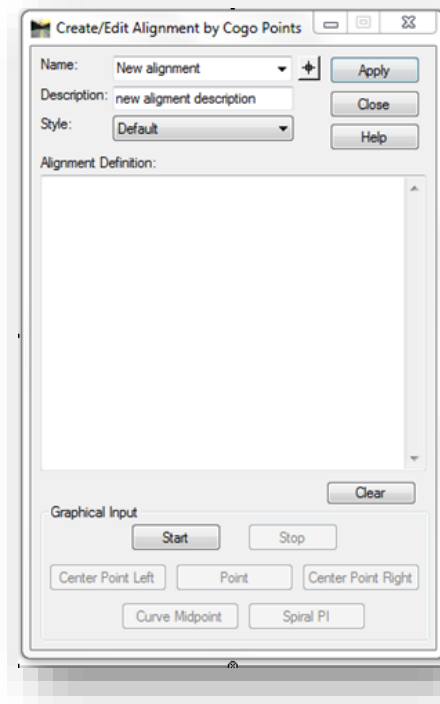
8.5-1 Create/Edit Alignment by COGO Points

Geometry Alignments often follow Existing COGO points that have been observed through field data collection. When these points are provided and brought into the geometry project through one of the methods described in the previous section, creating the Parcels is often as easy as “connecting the dots”. This method is accomplished through the Create/Edit Alignment by COGO points tool which can be found under the **Geometry -> Utilities -> Create/Edit Alignment by COGO points** option on the InRoads Explorer.



Create/Edit Alignment by COGO Points

When starting this tool, the following window is presented.



Create/Edit Alignment by COGO Points

When using this tool, one can provide a new alignment name and description directly on the tool. Once these have been defined the appropriate Style should be selected, again this will be one of the RW_ (Right of Way) styles provided in InRoads. With these items configured, the alignment can then be created. There are two methods to do so:

- Manual Key-In – When using this method, the cursor should be placed in the Alignment Definition portion of the window. COGO point names can then be keyed in with a space between each point name. To close the alignment, the first point should also be entered as the last as well.
- Graphical Input – This method uses the Graphical Input buttons on the lower portion of the panel and allows for the graphical selection of the points. When selecting points this way, their names will be populated in the Alignment Definition section allowing for the adjustment of COGO point names as needed.

When satisfied, selecting the Apply button will confirm the alignment definition and create it in the Geometry project. It will also display a graphical representation of the alignment in the CAD file using the defined InRoads style.

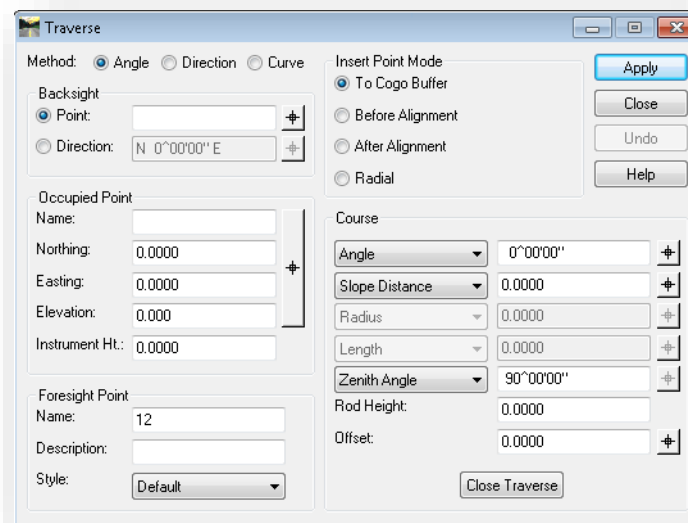
8.5-2 The Traverse Tool

An additional method to creating the Alignment (Parcels, deeds, plats, or otherwise) is through the Traverse command. This command isn't part of the base InRoads setup, and has to be enabled as an Application Add-In which is discussed in Chapter 5.

With the Add-In enabled, the following new commands will show up under *Geometry -> Utilities*.

- Traverse Edit
- Metes and Bounds
- Traverse Adjustments

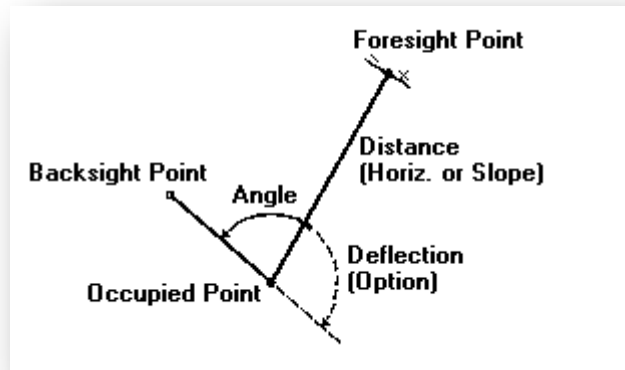
This section will look at the Traverse tool found under *Geometry -> Traverse*.



The Traverse Tool

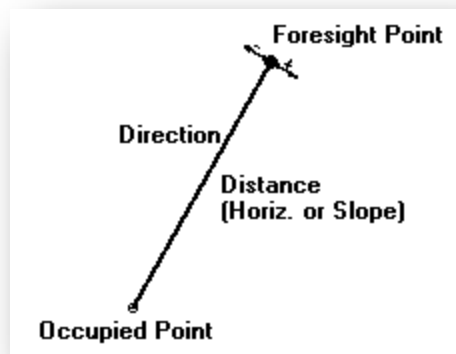
The Traverse tool has 3 separate methods for alignment creation: Angle, Direction, and Curve. Each of these methods behaves differently so the following discusses each briefly.

Angle Method locates new foresight points by specifying the angle and distance from a known occupied point and backsighting another point.



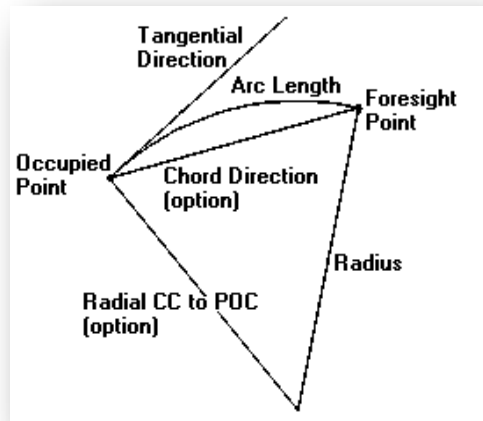
Angle Method

Direction Method locates new points by starting at a known point and going in direction for given distance. For example: from point 1 a distance of 120 ft. at a bearing of $N85^{\circ}50'34''E$.



Direction Method

Curve Method creates points along curved paths such as lots on curves.



Curve Method

The Traverse command had several ways to deal with how the new points are added. These options are:

- **To COGO Buffer** – Creates new points in the geometry COGO buffer.
- **Before Alignment** – creates new segments on the active alignment before the beginning of the selected element. COGO points are referred to but not created in the COGO buffer.
- **After Alignment**– creates new segments on the active alignment after the end of the selected element. COGO points are referred to but not created in the COGO buffer.
- **Radial** - holds the occupied point, computing new coordinate geometry points radially from of this point. COGO points are created and placed in the COGO buffer.

The circumstances of creation will dictate which Insertion Point mode is needed. If alignment modes are used, but COGO buffer points are desired, other methods will be required to generate the buffer points. One such tool is **Geometry > Utilities -> Assign Names**.

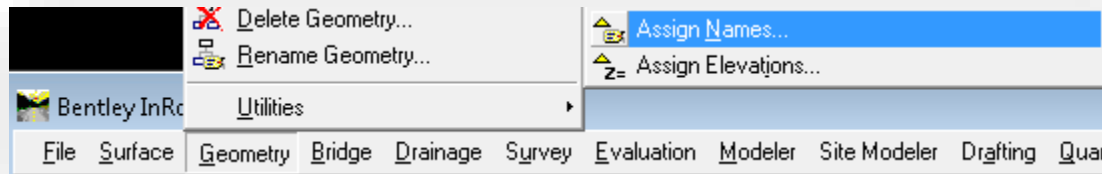
Foresight point options allow the new points names to be specified as well as description and style. Course provides an interface to enter the appropriate Direction, distance, etc. For 2d entry verify distances are set to horizontal.

Close traverse button will create a closed element after other elements have been added. Graphic Selection buttons throughout the panel allow screen interaction to set distances, select

COGO points, and set bearings. Be aware InRoads locks will affect the behavior of these tools. An example of this might be using element lock when picking the direction will allow a graphical pick of an existing geometry element to match the bearing.

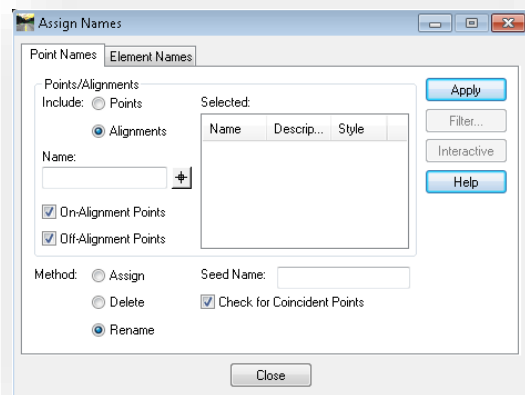
8.5-3 Assign Names

In addition to using COGO points to create an alignment, alignments can be used to create COGO points. In order to do this, the **Geometry -> Utilities -> Assign Names** should be used.



Assign Names

When using the Assign Names tool, one can take a pre-existing alignment and create COGO points at each vertex. In addition to the creation of the COGO points, this tool also associates the COGO points to the alignment they're created from.



Assign Names Tool

On this panel a few of the items of note:

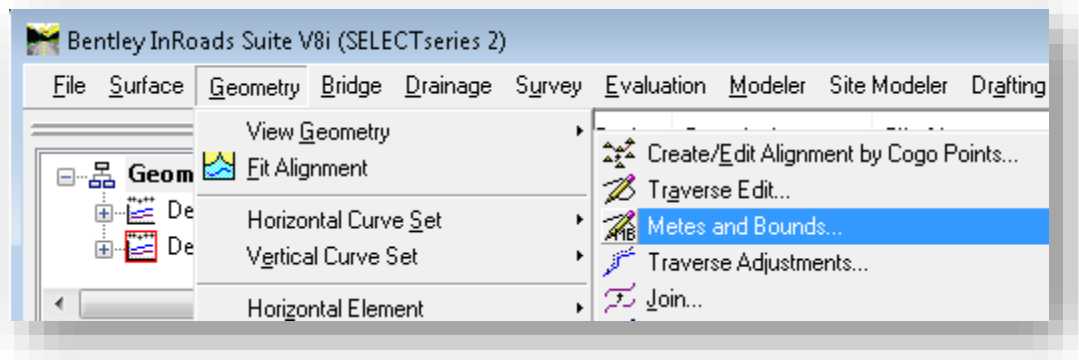
- **Include** – Determines the types of elements to have names assigned, in most instances this should be set to Alignments.
- **Name** – The name of the element to have names assigned, the values for this entry can be either graphically selected or setup using the InRoads Filter command.
- **On/Off-Alignment Points** – Specifies the point types to be consumed and assigned names.
- **Method** – Determines how points are created. Assign creates new COGO Points, Delete will delete COGO points along an Alignment, and Rename will create duplicated points with a new name.
- **Seed Name** – Specifies the starting point for the assigned names. Commonly numeric, this value will increment starting at the entered number for each subsequent point in the alignment.

- **Check for Coincident Points** – Will cause the alignment association to use an existing point when the coordinates are identical to a pre-existing point.

Upon selection of an alignment, and Applying the selection, COGO points coincident with each point of the alignment. These points can then be used for parcel reporting and other functions. The assign names is especially useful when converting a CAD element into an Alignment and then to derive the COGO points off that Alignment.

8.5-4 Metes and Bounds

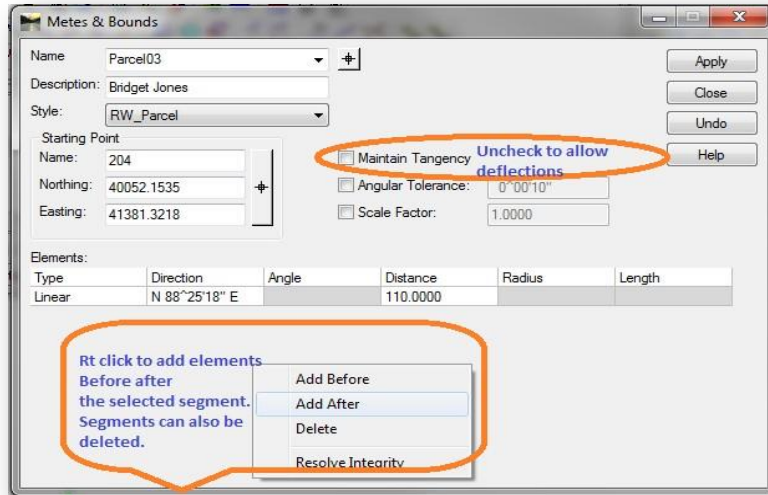
Metes and Bounds is an application add-in best suited for deed entry when data is simply keyed in from known deed data. It can be found under **Geometry -> Utilities -> Metes and Bounds**.



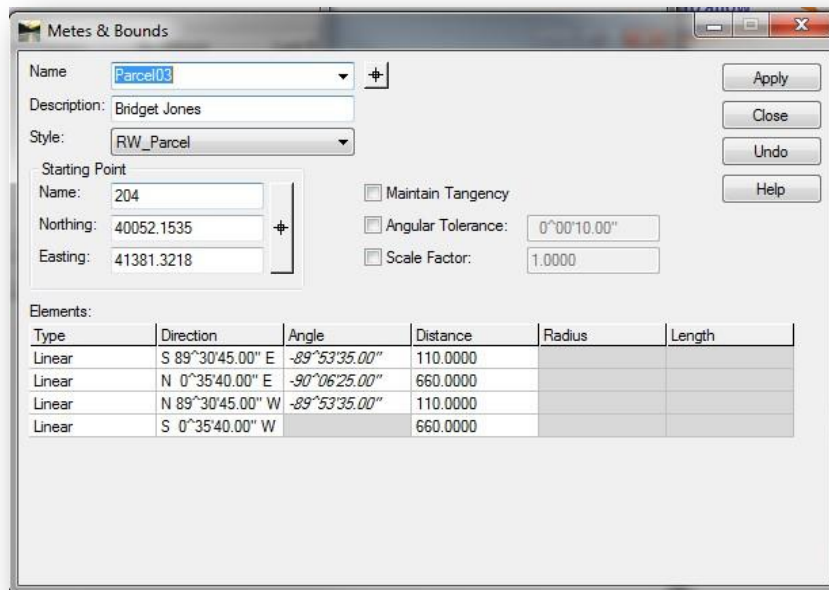
Metes and Bounds

On the Metes & Bounds tool, both the Name (of the created Alignment) and description can be keyed-in. The defining style should be set to the appropriate InRoads Style for the type of element being created. To allow for angular deflections, the Maintain Tangency box should be unchecked.

The starting point should be selected either via graphical selection or by direct key-in of the starting COGO point. Subsequent segments can then be added and removed by right clicking in the Elements section. When creating each segment, the CAD graphics will update dynamically throughout the process. These fields also allow for the use of mathematical functions directly on the tool. For each segment and vertex, COGO points are not automatically created. To create these points the Assign Names tool discussed in the previous section can be used.



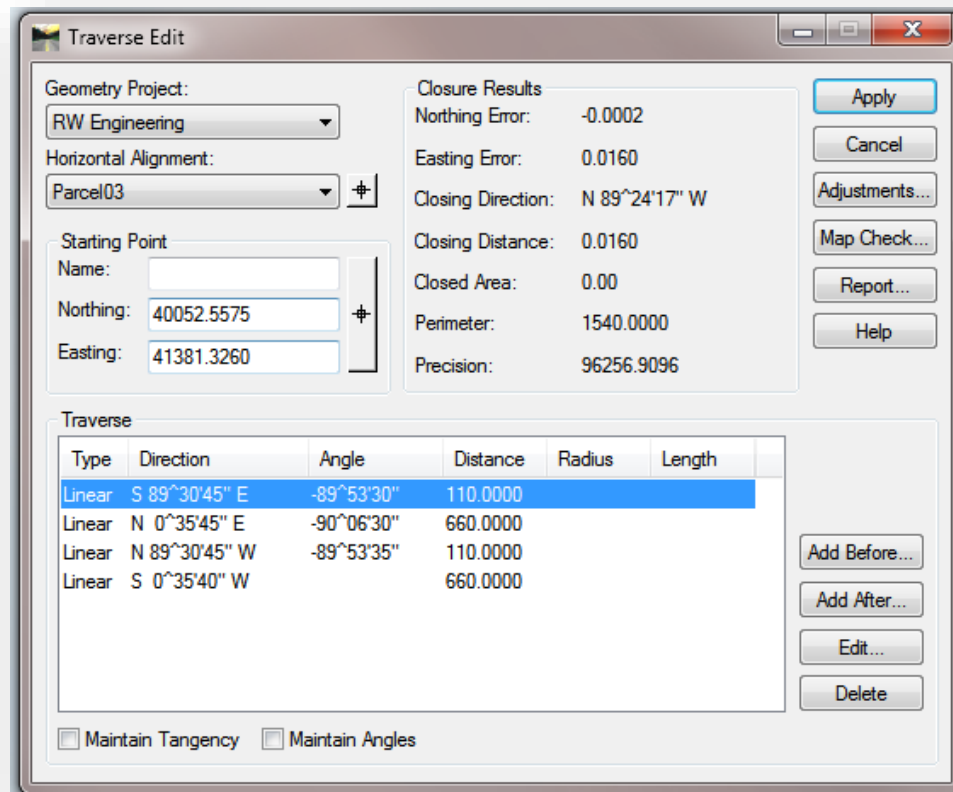
Metes and Bounds



Example of a Completed Alignment/Parcel

8.5-5 Traverse Edit

After Property alignments have been constructed, opportunities to examine/edit them in further detail can be achieved with the Traverse edit command. Traverse Edit is accessed from *InRoads Explorer -> Geometry -> Utilities -> Traverse Edit*. Both the geometry project and horizontal alignment can be selected.

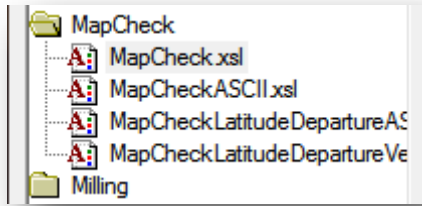


Traverse Edit

The Traverse edit dialog has a number of useful tools/features that may be advantageous during the Real Estate workflow:

- Individual alignment segments can be selected for modification, or for the insertion of new segments before or after the selected segment.
- Traverse closure results such as closing distance, precision, etc. are based on the as entered data on the alignment.
- Using the Map Check option allows for the investigation of Traverses that are not closed.
- The Adjustments option allows for the elements to be adjusted using mathematic methods such as Compass, Crandall, and Transit Rule.

When using the Traverse edit command, usage of the Map Check option will initiate the InRoads Civil Report Browser. The default report provided is the generic Map Check format, however there are a series of additional report types that are available and may be more relevant to the data at hand.



Map Check Report Types

Map Check Report results will resemble those shown below. Report results be saved, printed, or copied to other documentation.

Alignment Name: Parcel03				
Alignment Description:				
Type	Point Name/ Direction	Northing/ Length	Easting	Elevation
POB		40052.56	41381.33	0.00
	S 89°30'45" E	110.0000		
P.I.		40051.62	41491.32	0.00
	N 0°35'45" E	660.0000		
P.I.		40711.59	41498.19	0.00
	N 89°30'45" W	110.0000		
P.I.		40712.52	41388.19	0.00
	S 0°35'40" W	660.0000		
POE		40052.56	41381.34	0.00
Northing Error:		-0.0002 ft		
Easting Error:		0.0160 ft		
Closing Direction:		N 89°24'17" W		
Closing Distance:		0.0160 ft		
Closed Area:		0.0 sq ft 0.0 ac		
Perimeter:		1540.0000 ft		
Precision:		96256.9096		

Map Check Report Sample

8.5-6 Other Traverse Command Alternatives

The following tools can also be used to create parcel (alignment) geometry, each having their own merits. As with all operations, care should be taken to use the appropriate tool from both a usability and comfort level:

- **Geometry -> Utilities -> Metes and Bounds** (Application Add in)
- **Geometry -> Horizontal Curve Set** commands
- **Geometry -> Horizontal Element** commands
- **MicroStation-> Place Smartline** using **AccuDraw** in conjunction with InRoads import geometry.

HORIZONTAL CURVE SET

Horizontal Curve Set commands allow for the creation of alignments by specifying the location of PI's. InRoads will auto connect these elements. Precision input of PI location can be specified by using the MicroStation key in dialog.

HORIZONTAL ELEMENT

Horizontal Element commands allow for the creation of alignment elements individually by specifying the location of each of the various elements. Elements are connected together with various horizontal element commands. Precision input of element locations can be specified by using the MicroStation key in dialog.

MICROSTATION AND ACCUDRAW

Precision input of element data in CAD has long been available in MicroStation using AccuDraw in conjunction with Place smartline. Most often elements are entered using accudraw's polar mode, available by pressing spacebar. MicroStation design file settings can be adjusted to have angular readout set to Bearing, or Azimuth. Save setting to keep these changes in subsequent sessions. Precision input data can be imported to InRoads geometry using File -> import -> Geometry using the graphical import method discussed earlier in this chapter.

8.5-7 MicroStation and Civil AccuDraw

As a highly flexible solution for creation of coordinate geometry, Civil AccuDraw performs similarly to MicroStation AccuDraw but with expanded capabilities to augment any placement tool. This tool can be used in conjunction with the tools discussed in the previous section.

It is advised to suspend MicroStation AccuDraw when using Civil AccuDraw as much of their functionality does overlap. Should both be active during the element placement process, one may witness unpredictable behavior, or results.



Make sure to disable the standard AccuDraw tool!

Locate Civil AccuDraw from the Tools -> Civil AccuDraw -> Active Toolbar menu option in MicroStation. Remember to perform as **Save Settings** to insure MicroStation will keep this toolbar open and located were you placed it from the **File -> Save Settings** menu option.

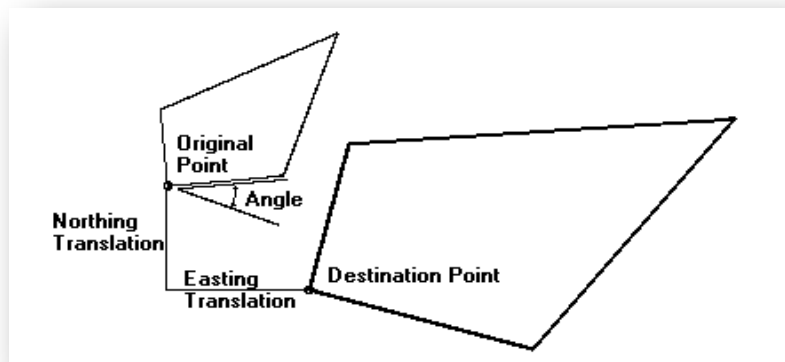


The Civil AccuDraw Window

AccuDraw Help is available. Included in the help is an overview of the specific key-ins that the tool accepts, along with information on creating custom modes to streamline the data entry process.

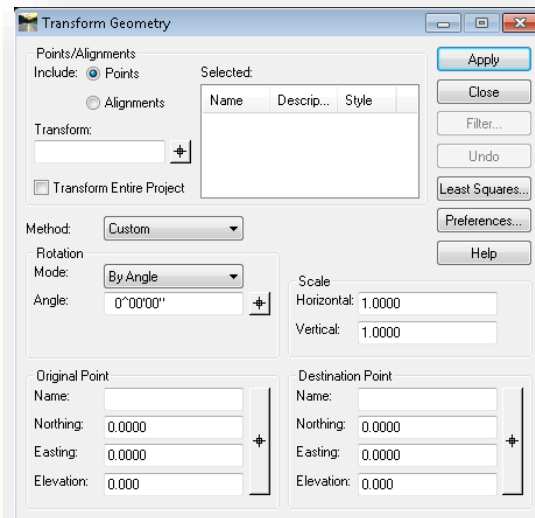
8.5-8 Translation and Rotation (Transform)

Alignment information is often available without regard to how it fits into a specific coordinate system. Use of the InRoads command *Transform Geometry* allows alignments or COGO points to be moved, rotated, or scaled accordingly. This tool allows for the graphical selection of individual geometry elements, or has a provision to transform all data contained within the selected Geometry Project. Additionally, this tool can also convert data from one set of units to another, for example metric to imperial.



Transformation Types

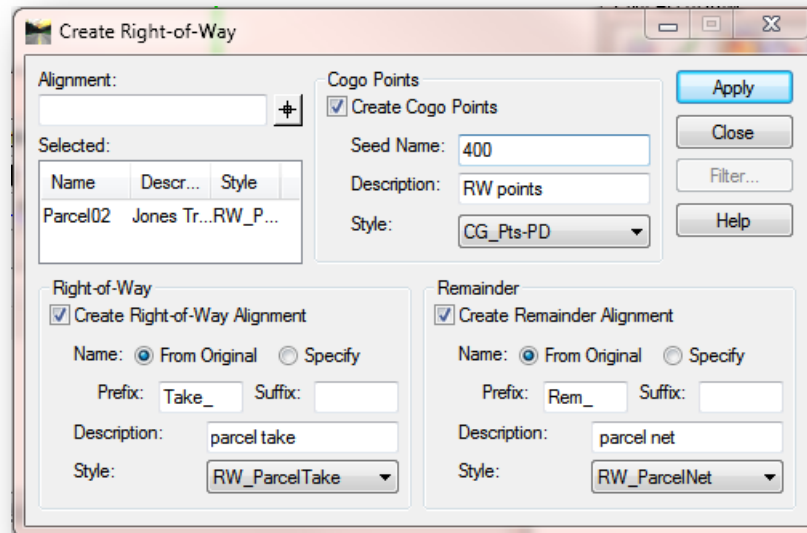
User can select the original Point as well as destination point for translation. When rotation is desired, user may select angle to specify amount of rotation, or by direction mode to specify original direction as well as destination direction.



Transformation Dialog

8.6 Right of Way Tools

Through use of previously discussed tools, a project should have both completed property parcels and Right of Way alignments that cross them. Through the use of the Right of Way tool, one can create parcel takes and the net or remainder. This tool can be found under **Geometry -> Utilities -> Create Right of Way** and must be loaded as an Application Add In to be visible. To load the application add-in refer to Chapter 5.5.4 for this process. This tool in particular is part of the Lot Layout Add-Ins as noted in Chapter 8.2.



Create Right-of-Way

The Create-Right of Way tool allows for the graphical selection of closed alignments, or the multiple selection of closed alignments via the Filter option. The selection of multiple alignments allow for the quick processing of a series of parcels when the Right of Way line crosses them. Additionally, these tools are valuable for Right of Way processes for many types of projects including Permanent, Temporary, etc. In addition to this tool creating both the takes and the net/reminders; it can do the following:

- The Cogo Points section allows for the creation of new COGO points at the intersection of the parcel and the right of way alignment. The naming, description, and InRoads style can all be defined.
- The Right of Way section allows for the creation of the Right of Way alignment, while adding options for Prefixes and Suffixes. These are concatenated with the source name. Additionally the description and InRoads Style can be defined.
- The Remainder section allows for the creation of the net/remainder alignment, while adding options for Prefixes and Suffixes. These are concatenated with the source name. Additionally the description and InRoads Style can be defined.

In order to use the Right of Way tools, the parcel alignments must first be selected. With these showing in the Selected portion of the tool, settings for the Cogo Points, Right of Way and Remainder settings should be configured. The capture on the previous page shows an example of potential style names as they exist in the INDOT XIN file.

With the dialog configured, selecting Apply will send control back to MicroStation with a series of prompts in the status bar. These prompts are as follows:

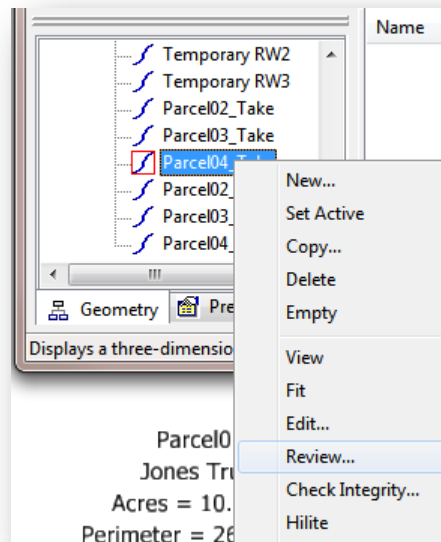
1. Identify Right of Way line - This will be the graphical alignment illustrating the Right of Way.
2. Accept/Reject – A graphical preview of the resulting Right of Way alignment will be shown. Left Clicking will create the alignment using the parameters (prefix/suffix/style) as defined on the Create Right of Way tool. Right clicking will result in InRoads will flip the preview to the opposite side of the alignment for potential creation.

With the Right of Way and net/remainder alignments created, the next step is to review the finished alignments to verify that all values agree.

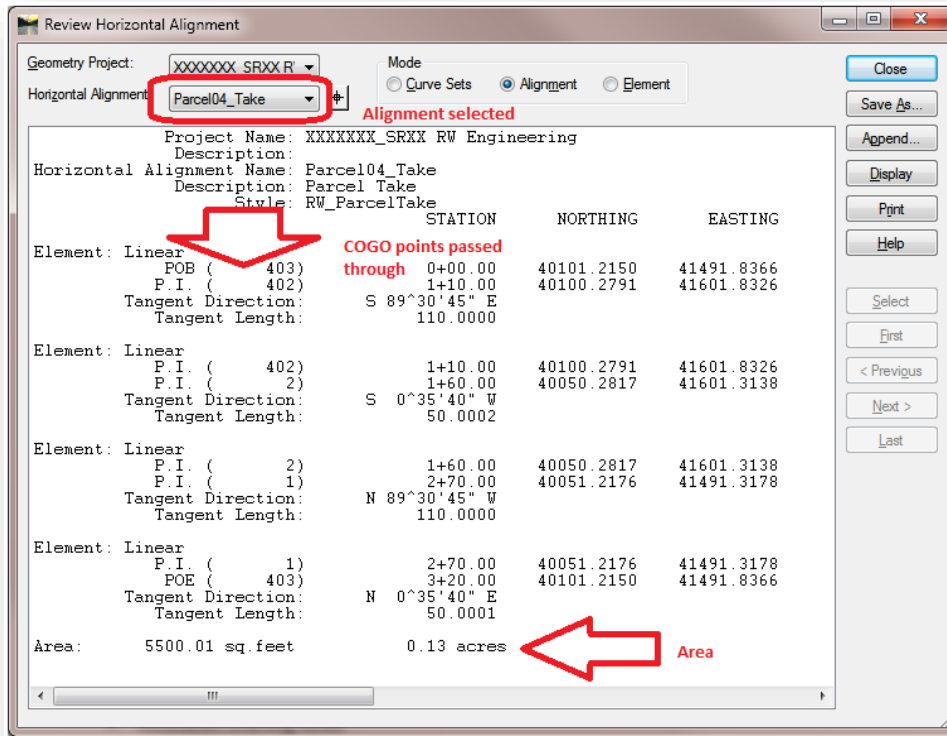
8.6-1 Horizontal Alignment Review

Horizontal alignment reports (Quick Reports) provide an opportunity to verify what has been created. As a follow up to creation of the alignments that are parcel takes, one might want to quickly verify the area of the parcels as well as the COGO points passed through. Quick reports are efficient ways to see this information prior to committing to creating documentation style reports.

To view a Quick Report, simply right click in the workspace bar on the alignment in question. From the context menu that appears, select Review. The quick report dialog will appear. Alternately the report can be generated from the **Geometry -> Review Horizontal** menu option.



Opening a Quick Report



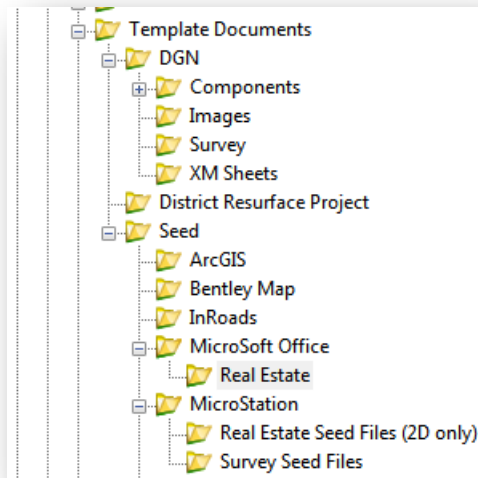
Horizontal Alignment Quick Report

8.7 Exhibit Creation

This section will review the process to create Exhibit documents using ProjectWise templates. This will leverage many of the processes spelled out earlier in this chapter, particularly information on retrieving data from other sources. While not specific to survey files, these procedures can be extended to gather other data such as the templates referred to throughout this section. As always it is recommended to always begin with the default template documents and not to carry project files from one project to the next



8.7-1a Template Real Estate Documents

For Real Estate projects, a pair of document templates have been created to facilitate the creation of the Parcel Coordinate Charts and Exhibit documents. As with other templates, these can be found in ProjectWise under the Template Documents\Seed folder. Specifically, they are located under [MicroSoft Office\Real Estate](#).



Real Estate Document Templates

The two templates reside within the above folder

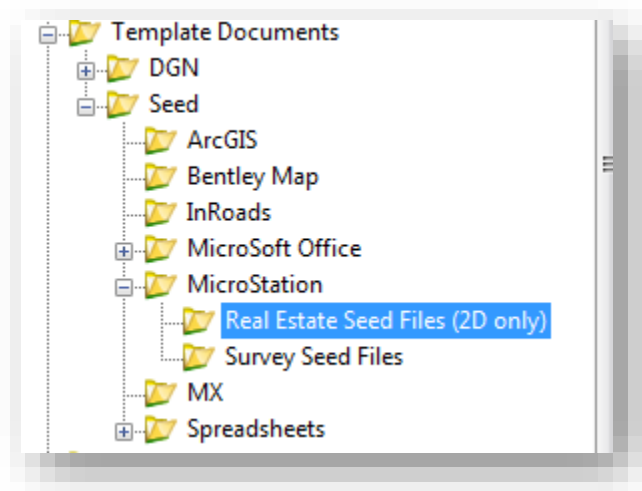
Name	File Name	Description
 Exhibit A Template.docx	Exhibit A Template.docx	Exhibit A Template
 Parcel Coordinate Chart.xlsm	Parcel Coordinate Chart.xl...	Parcel Coordinate Chart

Real Estate Template Files

When working on Real Estate projects, these files should be copied in as needed. There may be instances where multiple copies of the template are needed throughout the life of the project and the files should be renamed accordingly to maintain consistency with other project data.

In addition to the template Microsoft Office documents, a template CAD file has also been created. This file contains standardized borders for both portrait and landscape Exhibit documents. Being a CAD based file, there are certain advantages that can be applied. With the model control in MicroStation, it's possible to host the Exhibit for each parcel in a single file as opposed to a file for each parcel. This cuts down on the required document management; however, it will prevent multiple users from working on the same project CAD file at the same time. In this instance, appropriate care should be taken to determine the best workflow.

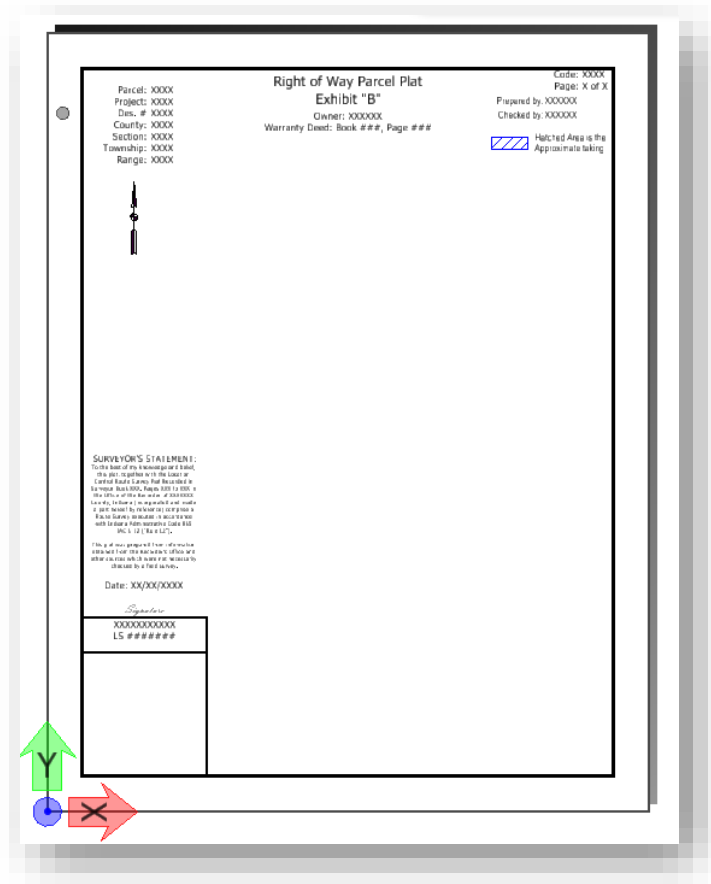
The [Parcel Plat Templates.dgn](#) can be found in ProjectWise under the [Template Documents\Seed\MicroStation\Real Estate Seed Files \(2D only\)](#) folder.



Read Estate CAD Templates

Included in this folder are a series of different files, each of which is described as follows:

- [INDOT US 2Dseed.dgn](#) - This is a 2d blank CAD file in imperial units. This file should be used to draw up InRoads elements such as the alignments and parcels that are part of a project.
- [INDOT US SVFT 2Dseed.dgn](#) - This is a 2d blank CAD file in US Survey Foot units. This file should be used to draw up InRoads elements such as the alignments and parcels that are part of a project.
- [Parcel Plat Templates.dgn](#) - This is the file containing the standardized Real Estate borders in both portrait and landscape orientations. The drawings containing the parcels should be referenced into these borders for sheet composition purposes and printing.



Real Estate Portrait Border

8.7-1b Creating an Exhibit Drawing

The following examples will step through each of the major requirements for creating an Exhibit drawing using InRoads, MicroStation, and ProjectWise.

THE BASE DRAWING

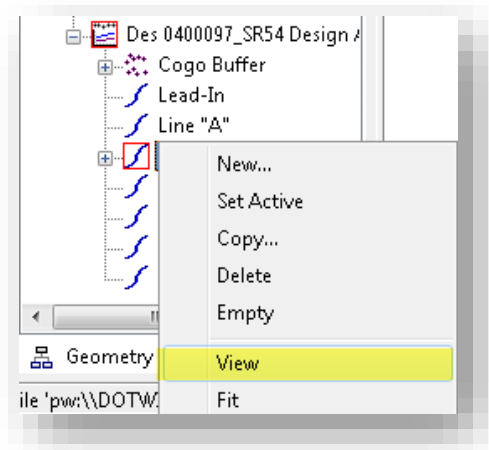
The first step in the creation of any exhibit is to start with a base drawing. As referenced in the previous section, the appropriate seed file should be located in the [Template Documents\SS4 Seed\MicroStation\Real Estate Seed Files \(2D only\)](#) folder. These documents can be copied into the Real Estate\InRoads folder under the appropriate des using the methods described in Chapter 2.8 – Creating New Documents.

With the base drawing created, it should then be opened in MicroStation and InRoads started from within the session. Note that throughout the parcel creation and display process additional MicroStation Drawing models should be used to separate data.

VIEWING PARCELS/HORIZONTAL GRAPHICS

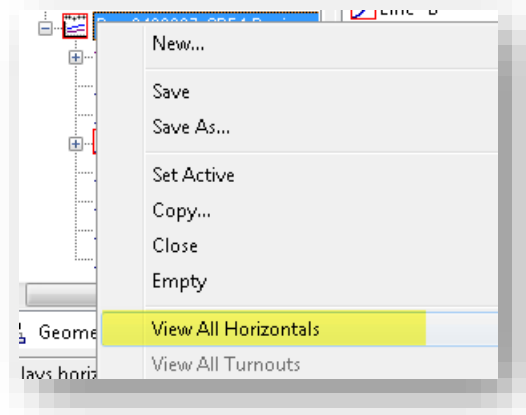
With a base drawing created, it is now time to start displaying the horizontal alignments that form each parcel. As part of the alignment display process, scaling should be considered and set accordingly using the InRoads Global Scale Factors tool as noted in Chapter 5.6 Global Scale Factors. With an appropriate scale selected, the following commands can all be used to display the alignment/parcel in the MicroStation display.

- **Right-Click, View** – This is performed by right clicking on the parcel name as it exists in InRoads Geometry tab. This will display the currently selected alignment. The same process can be reached through the **Geometry -> View Geometry -> Active Horizontal** menu option.



InRoads Geometry, Right Click View

- **Right Click, View All Horizontals** - This command will display all the horizontal alignments in the currently active Geometry project. It is only available by right clicking on the name of the Geometry project. The same process can be found under the **Geometry -> View Geometry -> All Horizontals** menu option

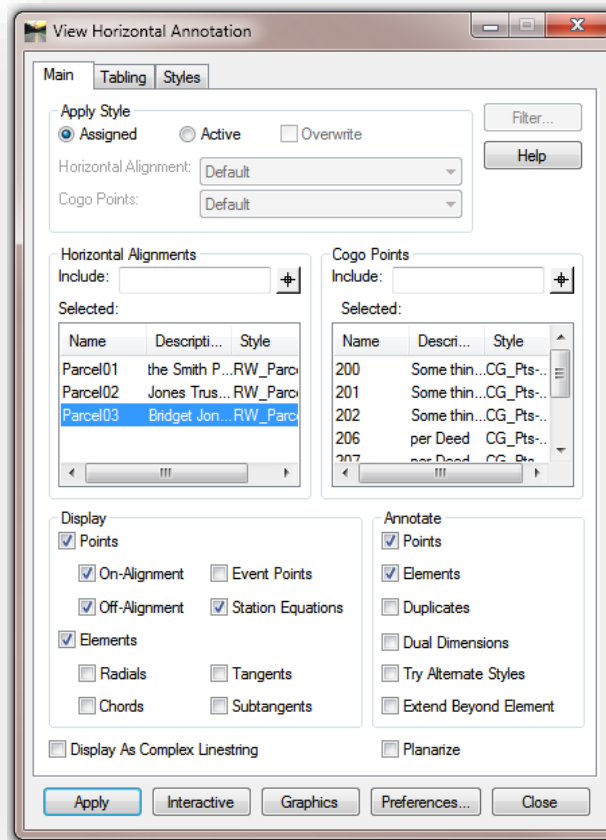


View All Horizontals

HORIZONTAL ANNOTATIONS

With parcels now displayed, annotation may be required to show items such as stationing, COGO point names, and alignment names. Three of the major annotation styles needed are described as follows:

- **Geometry -> View Geometry -> View Horizontal Annotation** – This command contains the bulk of the necessary annotation tools needed throughout the Exhibit creation process. To ease in the usage of this tool, numerous Preferences have been created specifically for Real Estate use and can be accessed through the Preference button on the lower edge of the panel.



View Horizontal Annotations

- **Geometry -> View Geometry -> Stationing** – This tool is used to display the stationing on the design alignment.
- **Geometry -> View Geometry -> View Curve Set Annotation** – Curve set annotations places annotations on horizontal curves. This is highly useful for displaying Degree of Curve, Radius, etc.

- **Geometry -> View Geometry -> View Closed Areas** –This command places area annotations on closed alignment elements.

REFERENCING PARCEL MODELS TO EXHIBIT BORDERS

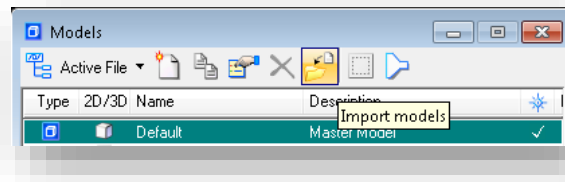
With the parcel drawn and annotated, it's now time to reference this data together with the appropriate border. As discussed previously in this chapter, this can be handled multiple ways. For this example, a model import/referencing process will be reviewed. Additionally, a separate DGN could be used with referencing.

1. To start this process, the first step will be to make sure that the base drawing with the annotated parcel models is open and prepared. InRoads is not required for this step, and does not need to be (or remain) open.
2. In MicroStation, locate the Models button on the Primary Tools toolbar. It can also be found under the **File -> Models** command in the MicroStation menus.



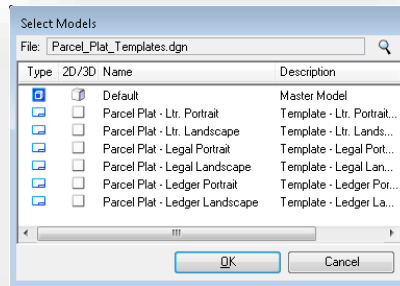
Models Button

3. With the Models dialog open, select the Import Model button. When prompted, navigate to a copy of the [Parcel Plat Templates.dgn](#) that is either in the Template Documents or that has been copied into your project.



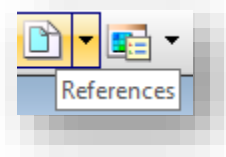
Import Models

- This will open the Select Models dialog where the appropriate borders can be pulled from. Note that multiple models can be selected, and this can be performed multiple times to get the appropriate number of borders for each parcel. With the appropriate border selected, hit OK.



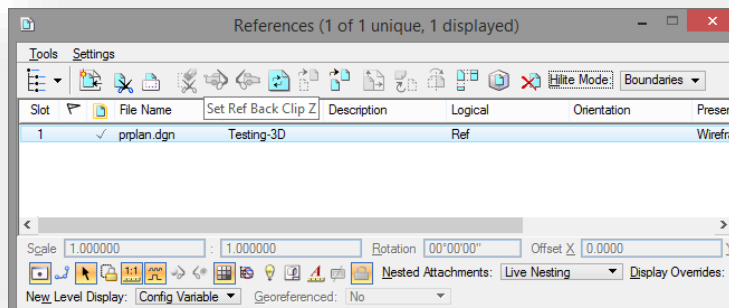
Select Models

- Upon completion of the border import, the appropriate border should be made the active model by double clicking it's entry in the Models dialog.
- With the border model now imported in and selected, the referencing process can begin. This is initiated by selecting the References button from the Standard toolbar.



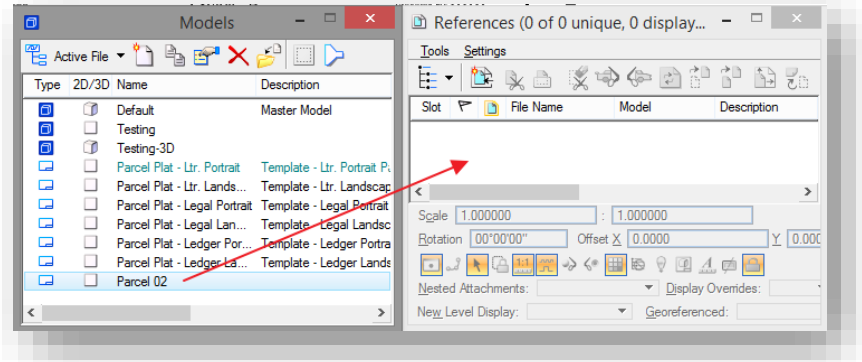
References

- This will open the References dialog, allowing for the attachment of other models or sheets from the current or other DGN. For the purposes of this example, referencing two models from the same DGN will be reviewed.



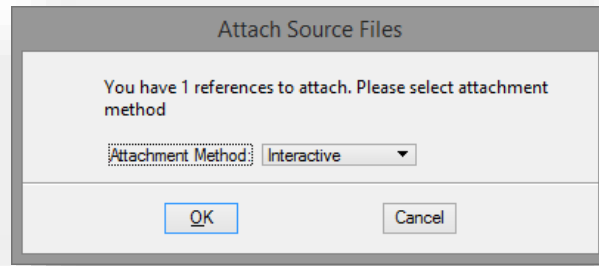
The References Dialog

- Continuing from the previous instructions, both the Models and References dialogs should be open. As the models being referenced are in the same file, a simple drag and drop of the appropriate model from one dialog to the other will initiate the attachment process.



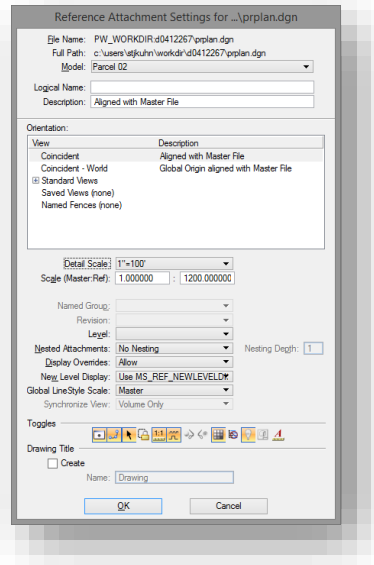
Drag and Drop Referencing

- Once the parcel model is attached, the Attach Source Files dialog will appear, requesting feedback on how the model should be attached. As additional adjustments are required to get the parcel to fit, the Interactive method should be used.



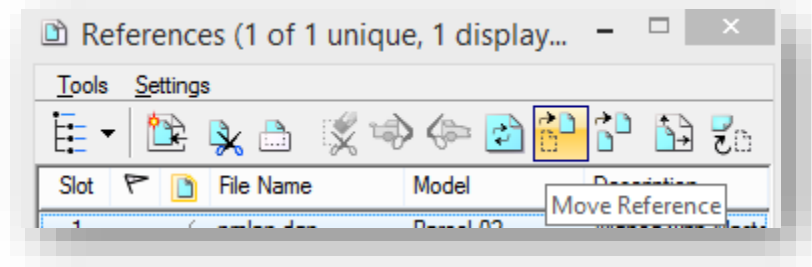
Attach Source Files

10. Selecting Interactive allows for the configuration of additional attachment settings prior to final attachment placement. Note that many of these settings can be adjusted to acquire the desired results. The following screen capture shows an example where the parcel will be aligned to the border, with a 1"=100' scale. As each deliverable is different, these settings should be adjusted as needed.



Reference Attachment Settings

11. At this time, the parcel will be attached to the border using the provided scale and orientation, and in most instances will require movement to fall in the appropriate location on the border. To do so, select the Move Reference tool from the References dialog toolbar.



Move References

12. The parcel should then be moved to the appropriate location within the border. Further adjustments to scaling or placement could be necessary and should be changed using the tools above. Further parcels/exhibit sheets can be created by repeating the above steps as needed.

ANNOTATIONS AND DRAFTING NOTES

Annotation of any InRoads Geometry is available from the usage of the InRoads Plan Drafting notes. The behavior of these tools is covered elsewhere, in documentation such as the InRoads ROW Fundamentals.

8.8 InRoads Reporting

8.8-1 InRoads and Excel – Parcel Coordinate Charts

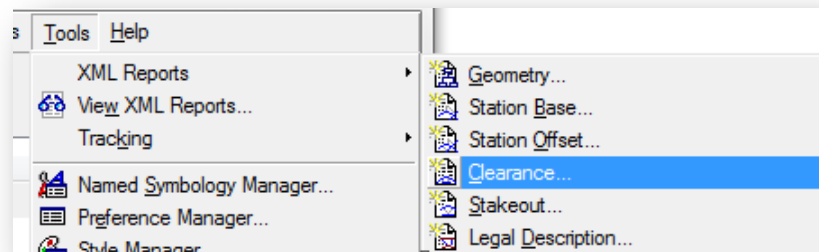
We will examine a method of creating Parcel Coordinate Charts using a combination of InRoads XML Reports and Excel.

Included with each InRoads installation, a customized XML for the parcel coordinate chart has been added. This report will provide a listing of points in a parcel, along with the name, reference alignment, station, offset, northing and easting. For added flexibility, we have also created an Excel workbook that will process InRoads Report data and provide the correct formatting. Using Excel in the method will create a mechanism to edit various aspects of the documentation without the inflexibility of highly customized report.

8.8-1a The Parcel Coordinate Chart Report

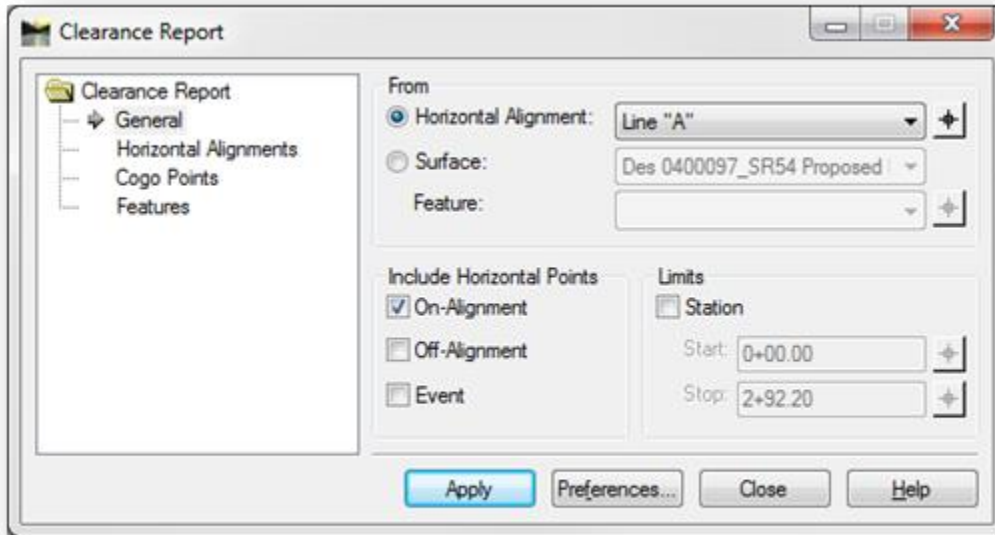
In order to generate the parcel coordinate chart, a modified version of the InRoads clearance report is provided that provides the required information. With an alignment and parcel created, the XML reporting tools will need started in order to acquire our information.

In order to start the clearance reporting tools, navigate on the InRoads Explorer to Tools -> XML Reports -> Clearance... as shown in the following illustration.



Clearance Reporting

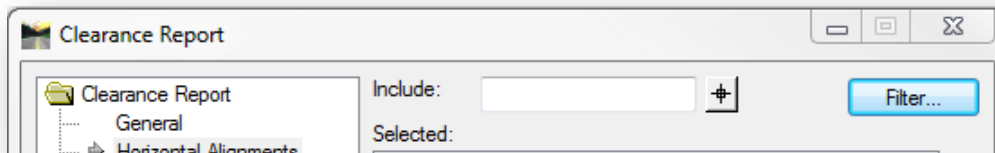
With clearance report dialog now open, the appropriate data fields need populated. First is the General leaf. The information on this leaf defines the mainline alignment to derive the parcel coordinates from, along with what points in particular should be reported. In the following illustration, one can see that for this particular data set, the mainline alignment is defined as Line "A".



Clearance Report Dialog

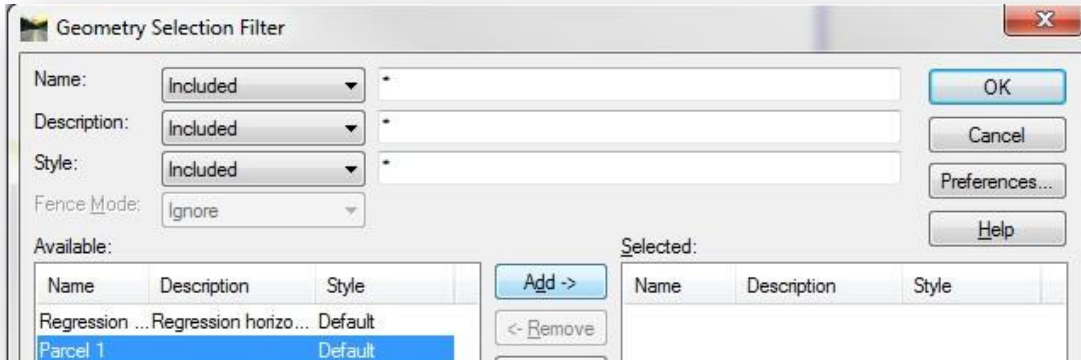
Additionally, as shown, the Include Horizontal Points option has On-Alignment points enabled. This will have the report provide the point information required.

Next, we need to define our parcels on the Horizontal Alignments leaf. There are two methods that can be used to select your parcel. The first is through the usage of the graphical selector. The second is the use of the Geometry Selection Filter. Briefly reviewing this tool, place your cursor in the Include box. This will enable the use of the Filter button.



Filter Button

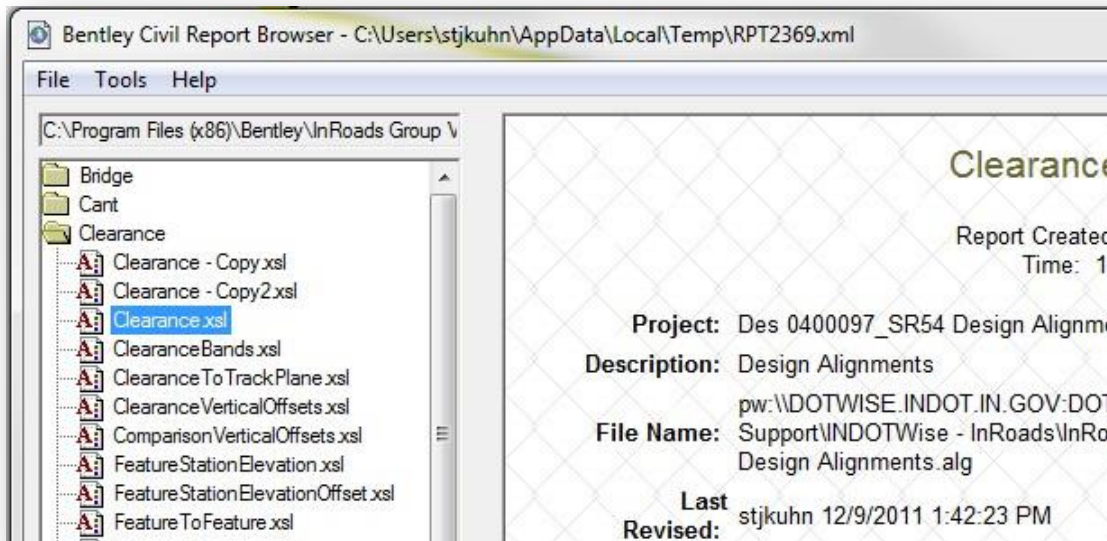
Clicking on the Filter button will bring up the Geometry Selection Filter. For this dataset, Parcel 1 will need moved from the Available to the Selected side of the dialog. This is done by highlighting the appropriate alignment and then selecting the Add button in the middle.



Geometry Filters

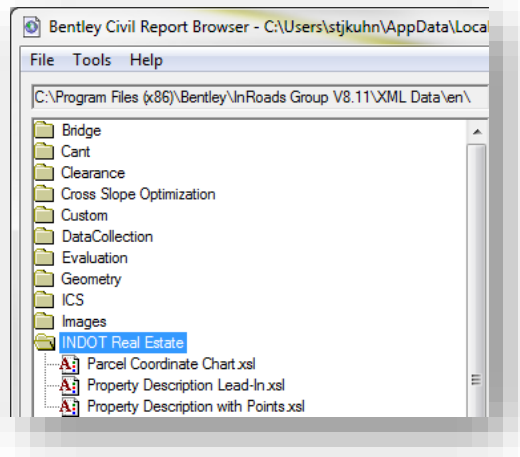
With the parcel alignment moved over, select OK to confirm the alignments. This will then populate the Horizontal Alignments leaf.

As a reminder, nothing should be selected on either the COGO Points or Features tab. When you're satisfied with the setup of the report, select Apply, which will kick off the InRoads Report Browser with the default Clearance report selected.



Clearance Report Example

For the purposes of the Parcel Coordinate Chart, this is not the appropriate report, however the framework for the Clearance report provides the majority of the relevant information. To streamline the coordinate chart creation, a customized report has been provided under the INDOT Real Estate leaf in the Report Browser.



INDOT Real Estate Reports

There are additional report types provided in this location that will be discussed later in this chapter. For right now, the Parcel Coordinate Chart report will provide a table that can be sent to Excel for formatting and placement back into the DGN.

With the Parcel Coordinate Chart selected, one will see something similar to the following.

Parcel Coordinate Chart

Report Created: 12/9/2011
Time: 1:51pm

Project: Des 0400097_SR54 Design Alignments
Description: Design Alignments
 pw:\DOTWISE.INDOT.IN.GOV.DOTWISE\Documents\Resources\CAD
File Name: Support\INDOTWise - InRoads\InRoads Sample Project Data\0400097_SR54 Design
 Alignments.alg
Last Revised: stjkuhn 12/9/2011 1:47:14 PM
Centerline : Line "A"

Note: All units in this report are in feet unless specified otherwise.

Parcel Alignment: Parcel 1					
Point Name	Centerline	Station	Offset	Northing	Easting
15000	Line "A"	2+05.62	13.95	15437.8996	13729.1712
	Line "A"			15454.3637	13883.1816
15001	Line "A"	2+12.28	81.01	15374.0033	13750.3329
15002	Line "A"	1+42.00	86.86	15351.6592	13685.2802
15003	Line "A"	1+35.29	15.64	15419.0835	13661.3753
15000	Line "A"	2+05.62	13.95	15437.8996	13729.1712

Parcel Coordinate Chart

The preceding screen capture shows the full report, which can be sent to a variety of formats for use in other documents. Instead of using one of these differing formats, this content of this chart will be copied to the Windows. In particular, all the data from the leftmost column, first row under the Point Name heading, to the last row, rightmost column available should be copied as shown.

Parcel Alignment:		Parcel 1			
Point Name	Centerline	Station	Offset	Northing	Easting
15000	Line "A"	2+05.62	13.95	15437.8996	13729.1712
	Line "A"			15454.3637	13883.1816
15001	Line "A"	2+12.28	81.01	15374.0033	13750.3329
15002	Line "A"	1+42.00	86.86	15351.6592	13685.2802
15003	Line "A"	1+35.29	15.64	15419.0835	13661.3753
15000	Line "A"	2+05.62	13.95	15437.8996	13729.1712

Parcel Coordinate Copy

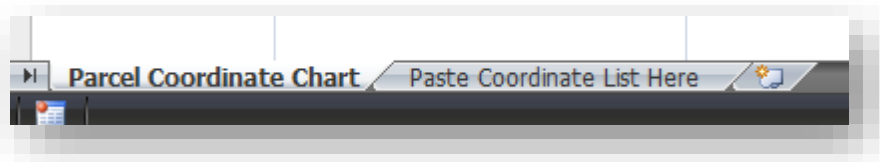
With this data selected, copying the data to the clipboard can be accomplished by using the Window shortcut key Ctrl+C or the rt. click Copy command. With the copy completed, this next steps are to adjust the data into a usable format for the exhibit drawing.

8.8-1b Parcel Coordinates in Excel

Even though the InRoads report appears to have the appropriate formatting, it cannot be directly pasted into the Exhibit drawing. MicroStation interprets this formatting using its own formatting which is inconsistent from the formatting required. To resolve this issue, each Real Estate template has an Excel workbook under the Real Estate\Documents folder named Parcel Coordinate Chart.xlsm. Alternatively, template copies can be found in ProjectWise under the [Template Documents\Seed\Microsoft Office\Real Estate](#) location in ProjectWise. It's recommended that you make a new copy of this file each time you need a new parcel coordinate chart and rename it appropriately.

Note: This is a macro-enabled workbook, which may give a security warning upon opening in Excel. Testing has shown that this should not be an issue on standard user accounts, however if errors or messages regarding the macros are encountered, please contact CAD Support for assistance.

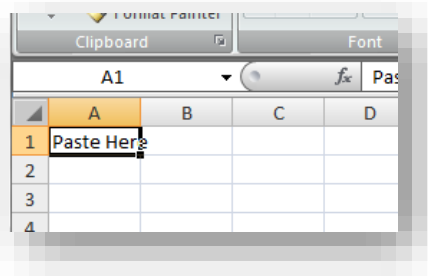
With a new, appropriately named copy of the Parcel Coordinate Chart workbook, open the file in Excel by double clicking on the file in ProjectWise and checking it out. In the Excel workbook two sheets are available.



Parcel Coordinate Sheets

The first sheet, Parcel Coordinate Chart is where to get the finished formatting from. The second sheet, Paste Coordinate List Here, is where the table data copied to the clipboard from the InRoads XML report will be pasted.

First, we need to navigate to the Paste sheet. As shown, place your cursor in cell A1, where the text reads “Paste Here”.



Paste Coordinates Here

Next, paste the contents of the clipboard at this location. This can be done either by using the shortcut key **Ctrl+V**, or using the Paste button the Home ribbon. After the table is pasted, the sheet will look similar to the following.

The screenshot shows the same Excel spreadsheet after data has been pasted. The active cell is A1, which now contains the value "15000". The table data is as follows:

	A	B	C	D	E	F	G
1	15000	Line "A"	2+05.62	13.95	15437.9	13729.17	
2		Line "A"			15454.36	13883.18	
3	15001	Line "A"	2+12.28	81.01	15374	13750.33	
4	15002	Line "A"	1+42.00	86.86	15351.66	13685.28	
5	15003	Line "A"	1+35.29	15.64	15419.08	13661.38	
6	15000	Line "A"	2+05.62	13.95	15437.9	13729.17	
7							

Pasted Parcel Coordinates

Next, navigate back to the first sheet, the Parcel Coordinate Chart. On this sheet, formatting more appropriate for pasting into the plat will be available. This data isn't in the appropriate format yet. The two buttons along the right side of the sheet will bring this data in, format it, and then allow for it to be placed back on the clipboard to paste into MicroStation.

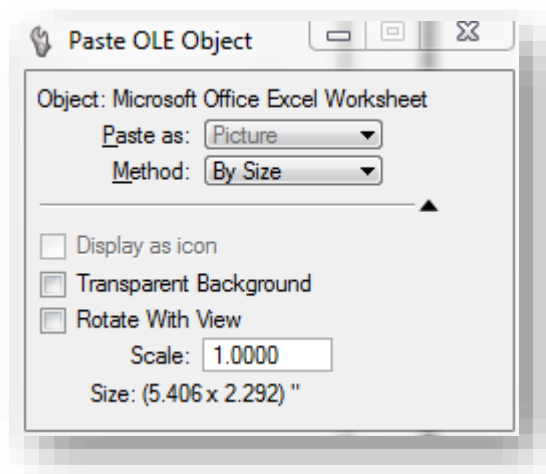
First, select the Create Parcel Table button, this will bring all the information from the second sheet into our table and format it correctly. As there may be some editing required on this sheet, make any adjustments, such as the information regarding the Route Plat location as needed.

1	Parcel Coordinate Chart (shown in Feet)							
2	Point	Line	Station	Offset	Northing	Easting		
3	15000	Line "A"	2+05.62	13.95	15437.8996	13729.1712	Create Parcel Table	
4		Line "A"			15454.3637	13883.1816		
5	15001	Line "A"	2+12.28	81.01	15374.0033	13750.3329	Copy Table to Clipboard	
6	15002	Line "A"	1+42.00	86.86	15351.6592	13685.2802		
7	15003	Line "A"	1+35.29	15.64	15419.0835	13661.3753		
8	15000	Line "A"	2+05.62	13.95	15437.8996	13729.1712		
9	NOTE: Stations and Offsets control over both North & East coordinates and Bearings & Distances.							
10	* See the Location Control Route Survey Plat recorded in Book XX Page XXX in the Office of the Recorder of XXXXXX County.							
11	** Additional calculated corner information from other records.							

Processed Parcel Coordinate Chart

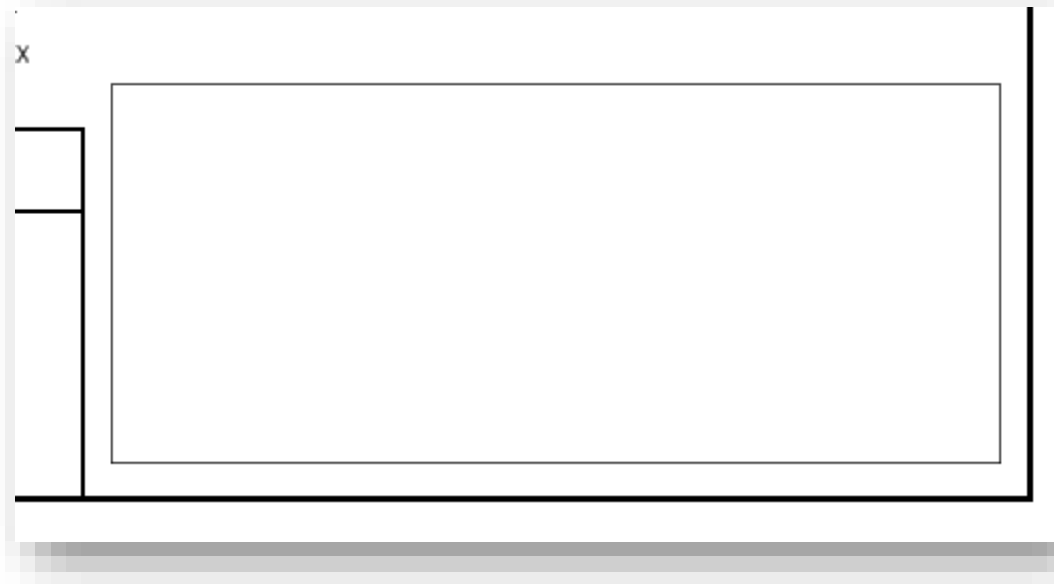
With the table created and adjusted, it can now be placed back on the clipboard. At this time, the Copy Table to Clipboard button can be selected. With the Excel table ready to be pasted, switch back to MicroStation, and to the Parcel Plat model which it belongs on.

As with the Excel process, one needs to paste the chart back into MicroStation. The same paste commands are available as in Excel (**Ctrl+V** or **Edit -> Paste**). With the paste command active, a MicroStation command window for Paste OLE Object will be displayed. MicroStation has the appropriate knowledge of what type of information that is being pasted into the file. Shown below, are the recommended settings for pasting the chart. The other options can be used, but do require additional configuration outside the scope of this procedure. Of particular importance, one needs to verify the Method is set to "By Size" and selecting the expand button on the panel, make sure Scale is set to 1.0. As always, the chart should be rotated relative to the sheet, Rotate With View should be disabled.

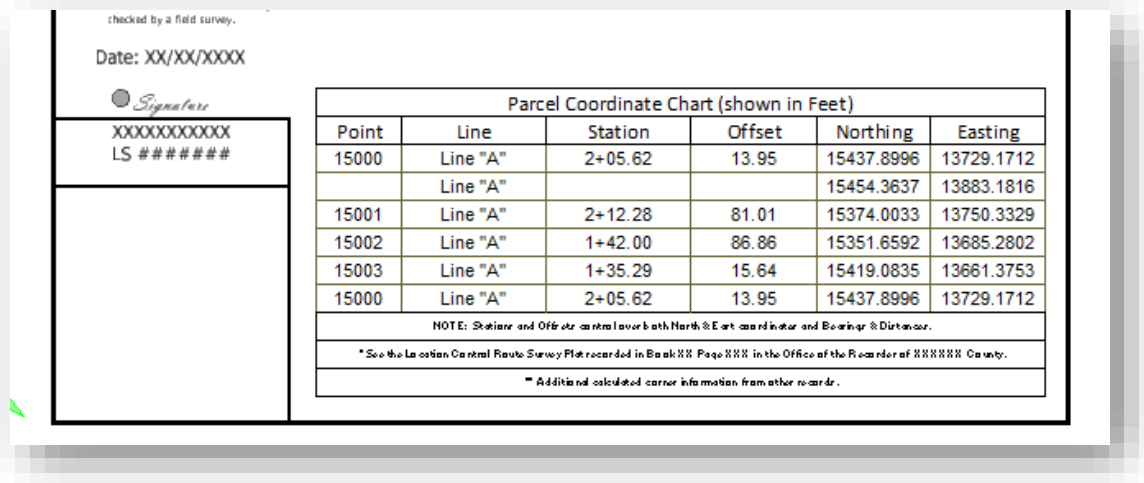


Paste OLE Object

At this time, a rectangular outline of the chart extents will be displayed in MicroStation and follow the cursor. These extents should be set to an appropriate location, and confirmed by a lt. click.



Paste Extents



Pasted Parcel Coordinate Chart

With the chart pasted, the files can now be saved, closed, and checked in; and this procedure should be repeated as necessary for additional parcels.

A few items to note throughout this procedure:

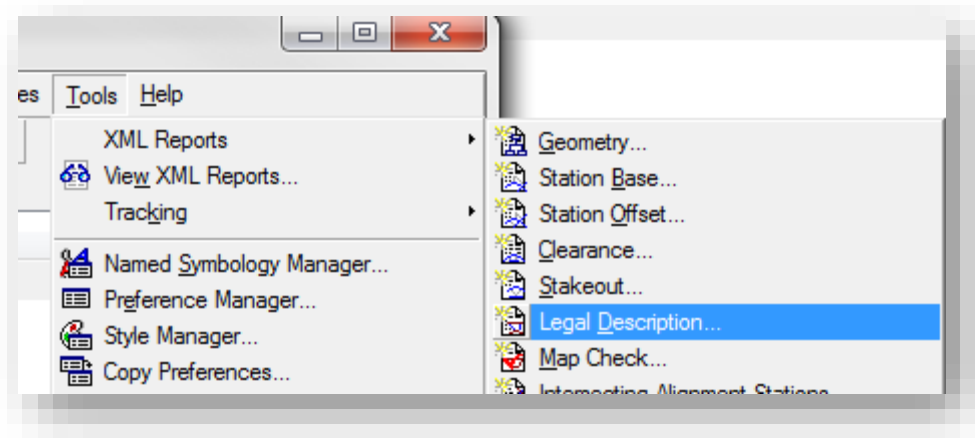
- If there is a need to recreate the chart in Excel and it has already been used with the Create Parcel Table button to bring over the data and reformat it, delete the row that are brought over from the second sheet. Make sure the chart header and footer information is left.
- The pasted picture of the table can be modified in MicroStation like any other element. Moving, stretching and other element functions can be used in the usual manner.
- One can report the coordinates on multiple Parcels by selecting them for reporting. Remember that the report is not automatically saved, so if this function is used, it is beneficial to save the report to another format so it can be reused at a later time.
- As a reminder, the Excel workbook is macro-enabled, so any errors should be reported to CAD Support.

8.8-2 InRoads and Word – Exhibit “A”

In addition to the tools used to generate the Parcel Coordinate Chart, CAD Support has also included customized reports to assist in the creation of Exhibit “A” documents. Like the coordinate chart, these reports will be used to generate the appropriate information for use in other documents.

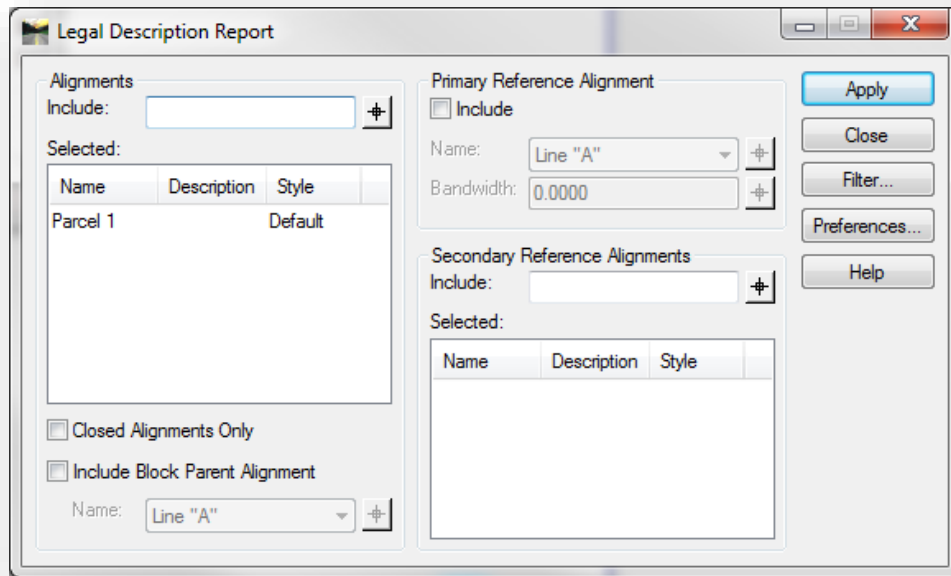
8.8-2a The Property Description Reports

With our data open from the previous section, again navigate to the **Tools -> XML Reports** menu on the InRoads Explorer. For the report type in this section, select Legal Description...



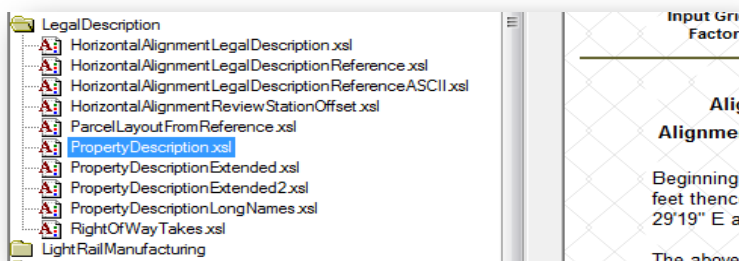
Legal Description Reports

This will present the Legal Description Report dialog. As done in previous sections, the relevant parcel should be selected in the Alignments section. This can be accomplished either by a graphical selection or by using the InRoads Filter dialog option. With the parcel selected, the dialog will look similar to the following:



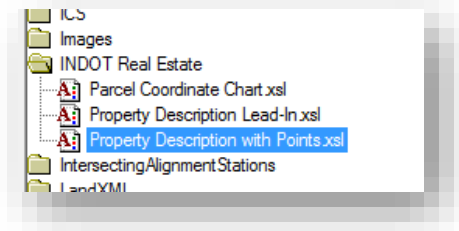
Legal Description Report

Remember that multiple legal descriptions can be generated by adding additional parcels to the Selected section of the dialog prior to selecting Apply. Once satisfied with the report configuration, the Apply button should be selected to start the Bentley Civil Report browser with the default report selected.



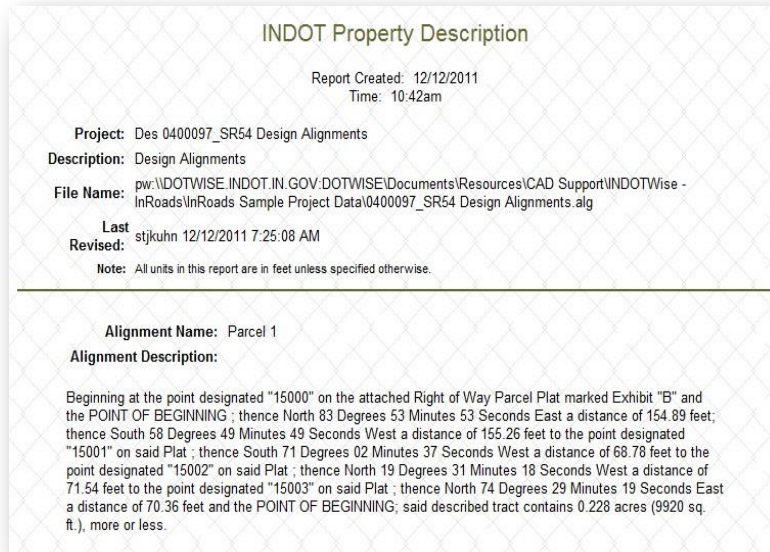
Default Legal Description Report

This report does provide the basic information required, however it does not reflect the appropriate INDOT formatting and verbiage. As with the coordinate chart, navigate in the InRoads Report Browser to the INDOT Real Estate folder, this time selecting the Property Description with Points report.



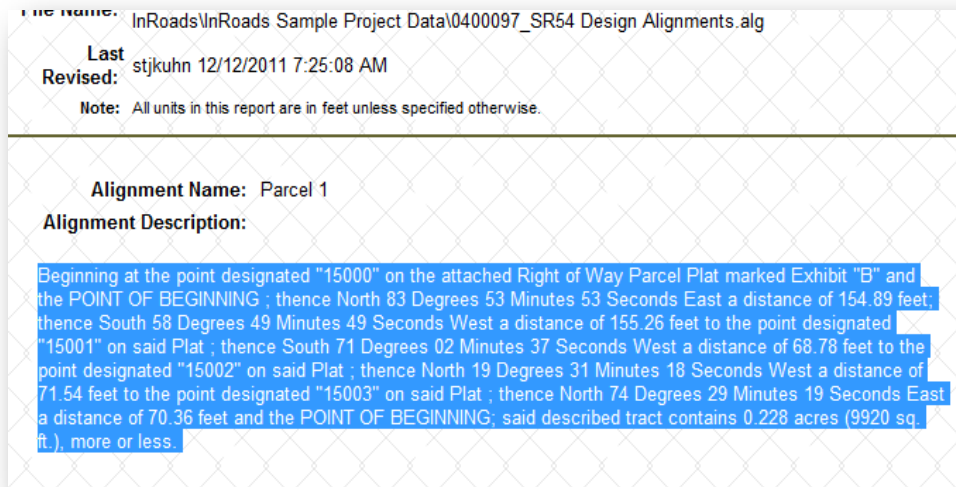
Property Description with Points

This report is configured to adhere to INDOT wording standards and is setup for placement directly into a Word document template.



Property Description Report

With the report generated, we will now copy the parcel description text to our clipboard as we did with the coordinate chart. The following illustration shows the area where the text will be selected from:



Property Description Copy to Clipboard

Next, place this data on the clipboard either by using the shortcut key-in **Ctrl+C**, or rt. clicking on the selected text and select copy. With the text on the clipboard it can now be placed into the Exhibit "A" template Word document.

8.8-3 Parcels with a Lead-In

Due to limitations in the InRoads reporting tools and formatting, if a Lead-In alignment exists for the selected parcel, the Property Description Lead-In report will need used in addition to the preceding report for the Parcel. This report is again formatted specifically to adhere to INDOT verbiage for a Lead-In alignment. The process for acquiring this report is identical to the previous example, instead of selecting the parcel however, select the lead-in alignment. This will then be combined with the text from the parcel report to generate the finished Exhibit "A". Please be aware that one will need to adjust wording between the two reports as some information may be duplicated, or incorrect depending on the circumstance.

8.8-4 The Exhibit "A" Word Document Template

To conform with the appropriate INDOT Exhibit "A" form and to provide as much flexibility as possible, each real estate project has a copy of the Exhibit "A" Word document template. As with the Excel workbook discussed earlier, this file can be found under the Real Estate\Documents folder of a project, or in ProjectWise under the [Template Documents\Seed\Microsoft Office\Real Estate](#) location. As with the coordinate chart, it is recommended to create a copy of this document for each parcel being generated either from the one provided or from the template location. It's again recommended to rename subsequent copies as necessary to keep track of what parcel each document contains.

Navigating to the Real Estate\Documents folder, double click on the Exhibit A Template.docx document, checking it out and opening it for editing.



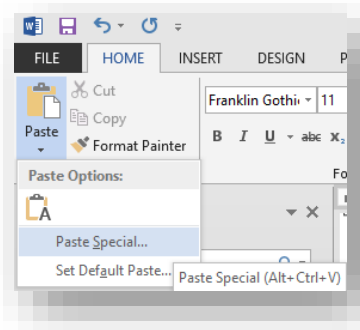
Exhibit "A" Legal Description

Shown above, the Exhibit "A" has numerous areas where data either needs typed in, or edited from the existing. The first item, however, is the pasting of the legal description from the InRoads report.

Located in the body of the document, find the text "Paste Parcel Report Here" and select it so the report data can be pasted over it. When selected, one can either use a **Ctrl+V** to paste the text directly in, or you can use the Paste button on the ribbon. Depending on the method used, there will be supplemental steps required to match the formatting.

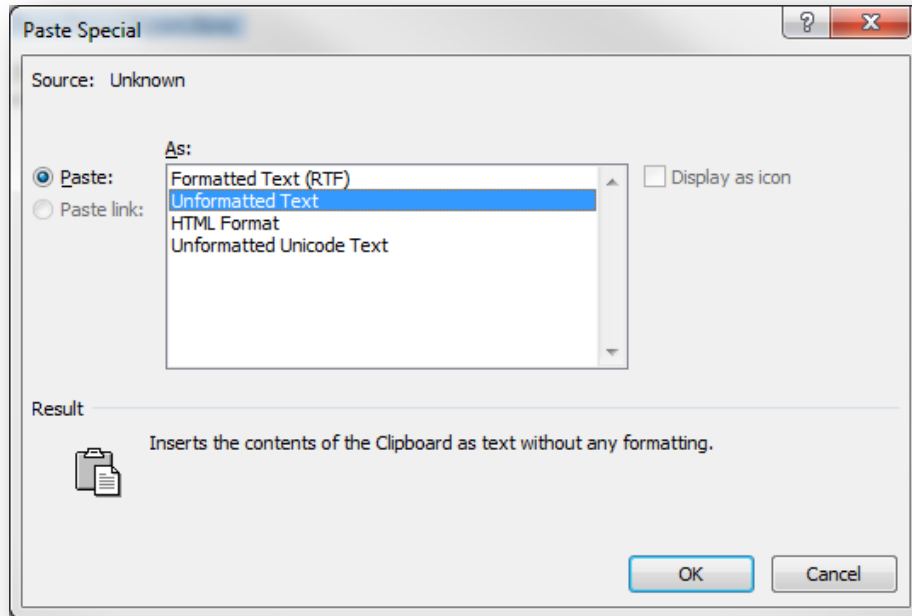
8.8-5 Using the Word Paste Button

To easily match the formatting of the existing text, the Paste button the ribbon provides the preferred method. Selecting the drop arrow below the clipboard button will provide a menu with the following options:



Paste Special

For this example, one should use the Paste Special... option. Once the dialog is presented, select the Unformatted Text option. This will have Word strip all formatting off the clipboard text from the report and use the existing formatting present.

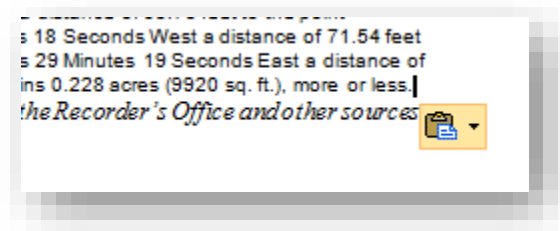


Paste Special

8.8-6 Rt. Click /Ctrl+V Pasting

Alternatively, one can use either a rt. click or the Ctrl+V shortcut key to paste the legal description. Should this method be used, the existing formatting must be matched.

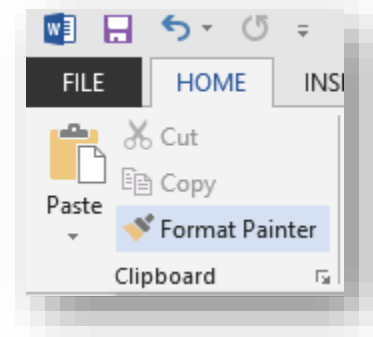
As illustrated, when initially pasted in, the text is rather small, in Arial and not italicized. This is the formatting provided by the InRoads report. After initially pasting this information in, one will see a small clipboard after the last character pasted.



Pasting Method

By selecting this drop menu, one can then determine the appropriate formatting to be used. In this instance, the Match Destination Formatting option should be used; this will cause the text to assume the existing formatting in the correct manner.

As this method is only available immediately after the text is pasted, it is entirely possible to miss the opportunity to adjust the text in this manner. Should this happen, one could then use the Format Painter tools to match the format. To use this, place the cursor in a section of text that matches the formatting needed, for this example, the line of text at the bottom of the body can be used. Next, select the Format Painter tool on the Home ribbon:



Format Painter

After selecting the tool, one needs to then highlight the text and then select the text that should be changed to the new format. This will adjust the text as necessary.

8.8-7 Exhibit "A" Title and Signature

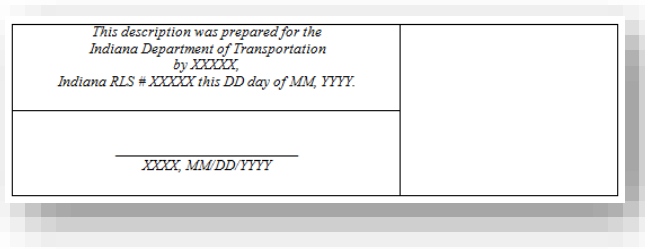
To ease the entry of data into the title and signature areas of the Exhibit A, CAD Support has modified the document to use embedded tables for text alignment. In the title area, if one enables the borders, it would look similar to the following:

A screenshot of a table with borders enabled, used for data entry in the Exhibit A title area. The table is centered on the page and has a title "EXHIBIT 'A'" above it. The table has five rows and three columns. The first row is a header row with the following text: "Project:", "Sheet", "X of X". The second row has "Code:", an empty cell, and an empty cell. The third row has "Parcel:", an empty cell, and an empty cell. The fourth row has "Key No.", an empty cell, and an empty cell. The fifth row has "Form:", an empty cell, and an empty cell. The table is surrounded by a light gray border, and there are small square handles in the corners for resizing.

Table with Borders Enabled

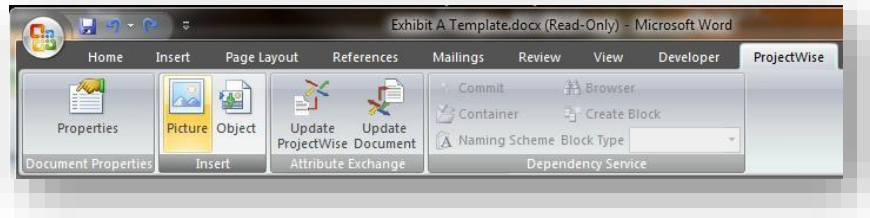
Every field is editable, and prior to completion, one should fill them out as needed. The default template doesn't have the borders enabled, but the cells are aligned so that one should be able to easily pick where to enter data.

The signature area behaves in much the same way. With the cell borders turned on, the alignment is as shown:



Signature Block with Borders Enabled

The cell on the right is for the placement of the PE/LS stamp using imagery included in ProjectWise. To insert the PE/LS Stamp, use the Insert/Picture on the ProjectWise ribbon tab with the cursor in the appropriate location.



Pasting Pictures from ProjectWise

This will open the ProjectWise browser where one can select your PE/LS Stamp image. These can be found in the [INDOT Workspace\PE Stamp Images](#) folder. If a stamp doesn't exist, please contact CAD Support with the information so one can be created.

At this time, select the appropriate stamp and hit open, this will place an appropriately sized image of the stamp. The remainder of the items on this sheet should be edited by hand, as the InRoads reporting tools cannot take this information into account.

Upon completion, the Exhibit should look similar to the following:

EXHIBIT "A"

Project: 1234567 Sheet 1 of 1
Code: XXXX
Parcel: XXXX
Key No. XXXX
Form: XXXX


Beginning at the point designated "15000" on the attached Right of Way Parcel Plat marked Exhibit "B" and the POINT OF BEGINNING; thence North 83 Degrees 53 Minutes 53 Seconds East a distance of 154.89 feet; thence South 58 Degrees 49 Minutes 49 Seconds West a distance of 155.26 feet to the point designated "15001" on said Plat; thence South 71 Degrees 02 Minutes 37 Seconds West a distance of 68.78 feet to the point designated "15002" on said Plat; thence North 19 Degrees 31 Minutes 18 Seconds West a distance of 71.54 feet to the point designated "15003" on said Plat; thence North 74 Degrees 29 Minutes 19 Seconds East a distance of 70.36 feet and the POINT OF BEGINNING; said described tract contains 0.228 acres (9920 sq. ft.), more or less.

This description was prepared from information obtained from the Recorder's Office and other sources which were not necessarily checked by a field survey.

*This description was prepared for the
Indiana Department of Transportation
by XXXXX,
Indiana RLS # XXXXX this DD day of MM, YYYY.*

XXXXXXXXXX

XXXX, MM/DD/YYYY



Sample Exhibit Sheet

With the legal description pasted, the file can now be saved, closed, and checked in and then repeated to create additional Exhibits as necessary. One can report the coordinates on multiple Parcels by selecting them for reporting.

8.9 Report Settings - Unit Format and Report Defaults

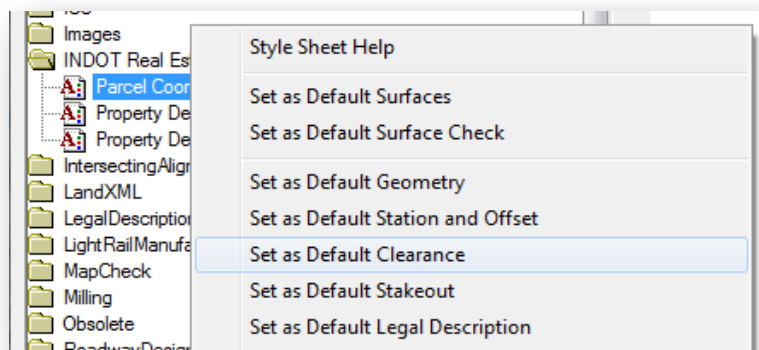
In the previous sections, discussion has looked at procedures for generating different InRoads reports and their associated documents using customized reports. In either situation, one may notice that InRoads may have sent them to a specific report, or that unit readout may have been incorrect. The following sections discuss how to adjust these settings should one like to incorporate the customized reports as defaults and adjusting unit readouts.

8.9-1 Default Reports

Each InRoads report type under the **Tools -> XML Reports** menu item has a corresponding report default in the InRoads report browser. Depending on function, one may wish to change these to a more suitable report for the workflow.

The first step is to open the InRoads report browser using the **Tools -> View XML Reports...** tool on the InRoads Explorer. This will start the report browser without the need to actually create and configure a report. With the report browser now open, one can now navigate down to the INDOT Real Estate folder in the report browser and set the reports to the default report types when running Clearance or Legal Description reports.

To start, set the Parcel Coordinate Chart report as the default clearance report. With the browser open to the appropriate location, rt. click on the Parcel Coordinate Chart.xls, which will present a list of menu items, and then select Set as Default Clearance.



Setting Default Reports

By doing this, each time one run a Clearance report from the **Tools -> XML Reports -> Clearance...** tool, the Parcel Coordinate Chart will be the first report option taken to in the browser. Be aware that the reporting is dynamic, so even though InRoads will send one to the default report defined, it can select different reports which will automatically be updated based on the previously defined criteria. This will only work if the reports are for the same tools, so in this case one would only get data on.

In regards to the Exhibit A/Legal Description, one would perform the same procedure only assigning one of the Property Description reports under the INDOT Real Estate folder (Property Description with Points would be best suited) as the Default Legal Description report that consumes information from the Clearance tools.

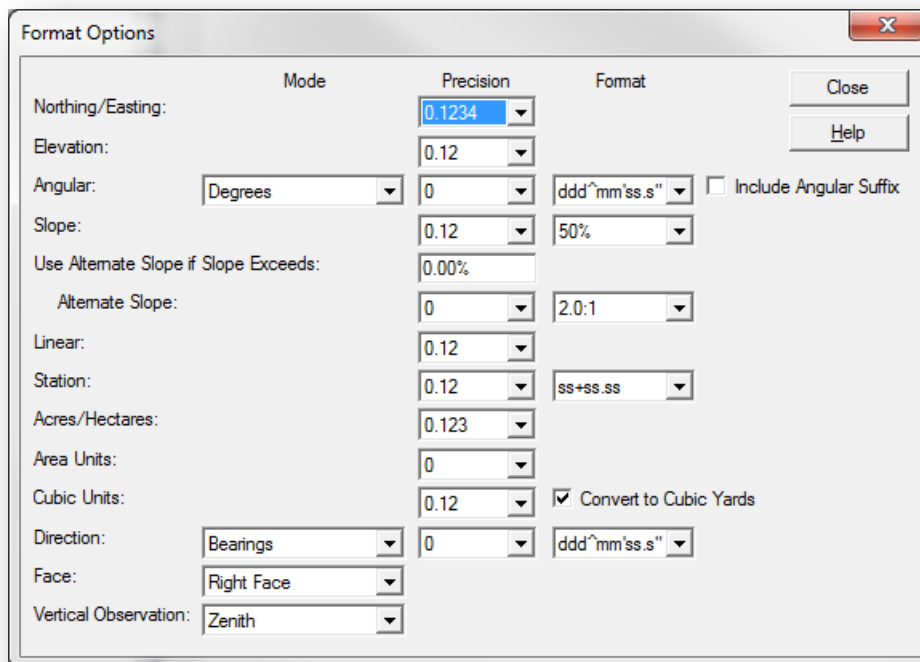
8.9-2 Report Unit Format

During the first run of reports, one may find that the unit readouts do not appropriately reflect the number of significant figures required for the report. To adjust these settings, again on the InRoads Report Browser, navigate to the **Tools -> Format Options...** button from the menu.



Format Options

On the presented panel, one will find numerous settings to adjust the coordinate readout to whatever formatting is required.



Format Options

These settings will be saved between sessions, so one can adjust them initially and they will become the default for subsequent sessions. In the event that the installation be upgraded/reinstalled or new PC be received, these settings will have to be reconfigured.

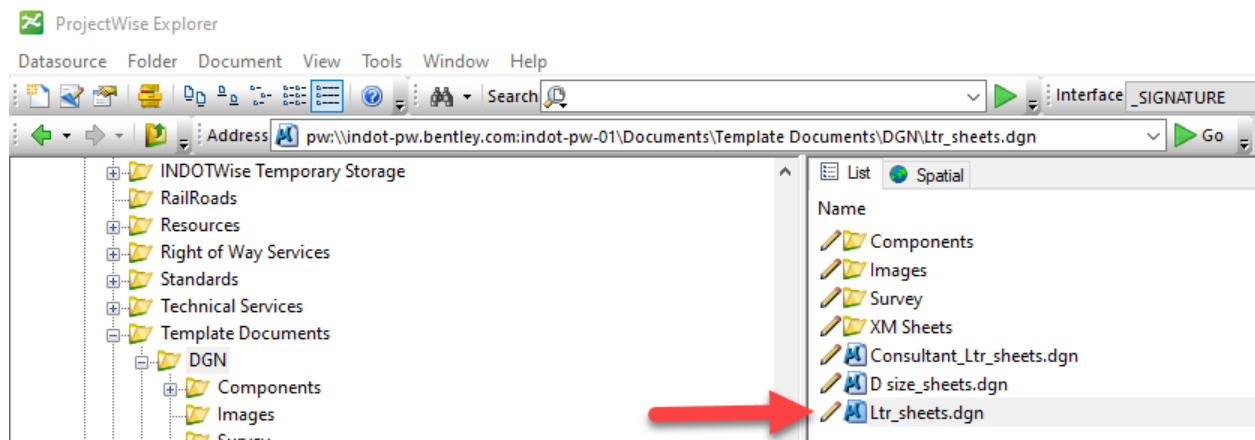
9. MicroStation Plans Production

9.1 Resurface Plans

The following sections discuss MicroStation and Microsoft Excel resources to be used in the development of a set of resurface plans.

Resurface plans can be composed of one .dgn file with multiple sheet models, or several .dgn files each having a single sheet model. Regardless of the method that is used to create these plans, they should be produced using the 8.5" x 11" borders available in the Ltr_Sheets.dgn template file.

pw:\\indot-pw.bentley.com:indot-pw-01\Documents\Template Documents\DGN\Ltr_sheets.dgn



Ltr_sheets.dgn Location

This file contains a title sheet model, along with a set of 4 sheet models that can and should be used to develop each of the sheets in a set of Resurface Plans. These sheet models are:

- ***Ltr. Title Sheet.*** This sheet model is the standard title sheet to be used with 8.5" x 11" plans.
- ***Ltr. Detail.*** This sheet model is a standard, empty 8.5" x 11" border sheet oriented in portrait.
- ***Ltr. Landscape Detail.*** This sheet model is a standard, empty 8.5" x 11" border sheet oriented in landscape.
- ***Ltr. Detour Sheet Signing.*** This sheet model is available to be used for the Recommended Detour Signing sheet.
- ***Ltr. Index*** This sheet model is for index sheet content.

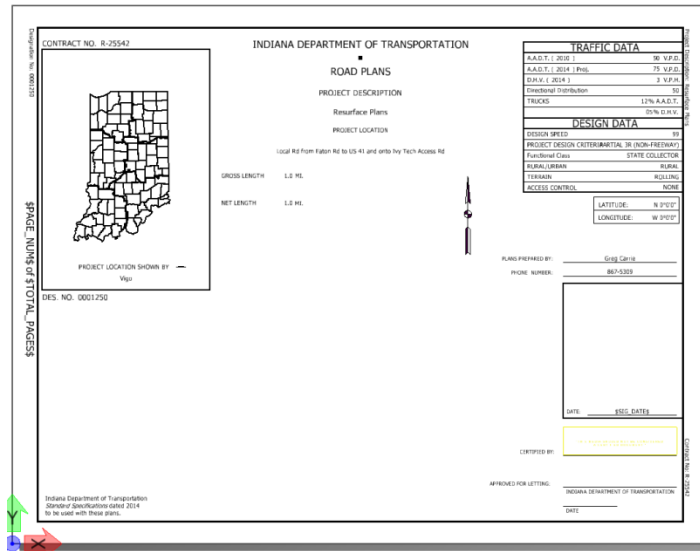
For each of these sheets, there is a corresponding version for the placement of an engineer stamp.

These plan sheets should follow all drafting standards as specified the [INDOT CAD Standards Manual](#), available for download from the [INDOT CAD Support web page](#). See the Indiana Design Manual for information regarding the sheet content.

9.1-1 Ltr. Title Sheet

This sheet model should be used as the title sheet for all plans created using the 8.5” x 11” format. This and all other sheet models in Ltr_Sheets.dgn takes advantage of attribute exchange information which allows population of fields using the Universal Title sheet.

While in the open MicroStation file, import the sheet model titled Ltr. Title Sheet model from Ltr_Sheets.dgn. When you open the newly imported sheet model, it will appear as shown in the illustration below.



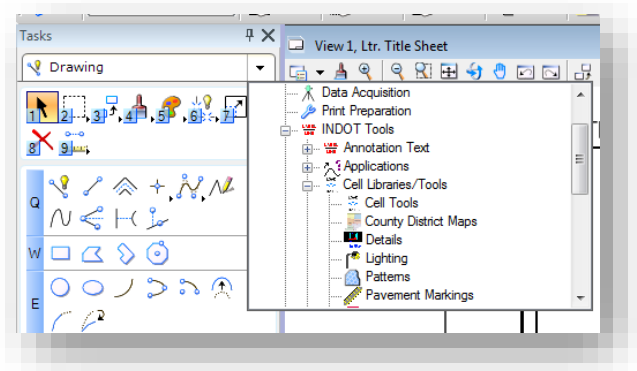
9.1-1a Placing the Location Map

Refer to Chapter 10 for instructions on placing a location map on this sheet.

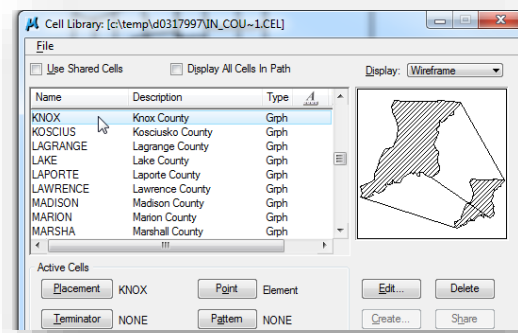
9.1-1b Placement of County Cells and Project Location Symbol

Placement of the county cell and project location symbol are accomplished by using INDOT Tools within the MicroStation tasks tool bar.

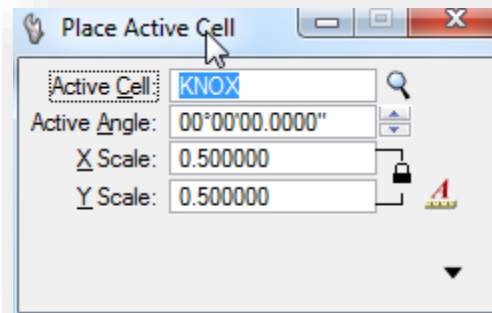
1. Select **INDOT Tools** → **Cell Libraries** → **County District Maps** from the Task bar in MicroStation.



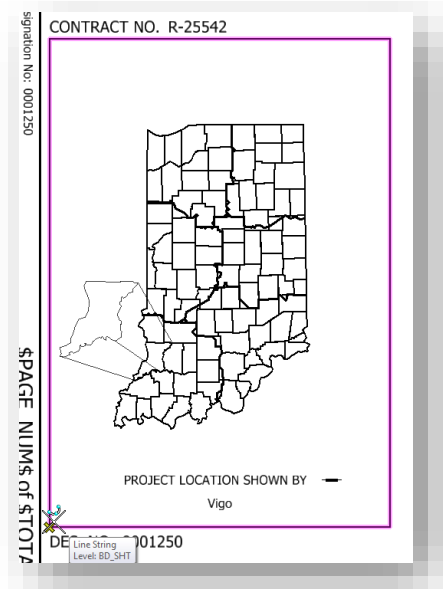
2. Within the Cell Library, navigate to and double left mouse click on the appropriate county or counties.



3. For 8.5" x 11" plans, you will need to set the X and Y scales to 0.50



4. Place the active cell by using the lower left corner of the Project Location box as your hook point.



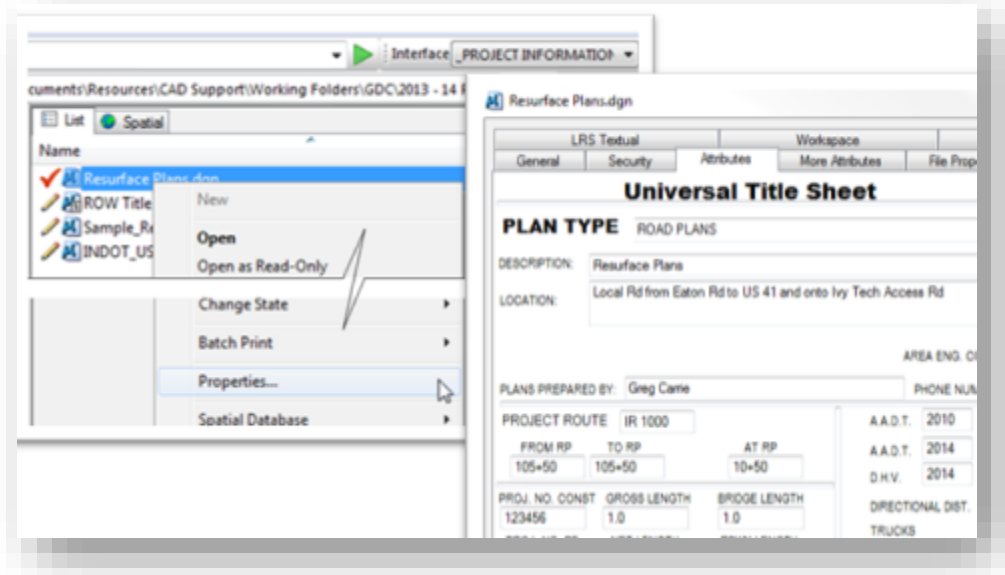
To place the location symbol, use MicroStation commands to copy the symbol from within the Project Location box to its correct positioning.

PROJECT LOCATION SHOWN BY 

9.1-1c Universal Title Sheet

The Universal Title Sheet is used to populate portions of the 8.5" x 11" Title sheet. This information should only be edited using the Universal Title Sheet to insure that that information is populated throughout the entire set of plans.

The Universal Title Sheet is access within ProjectWise by selecting the Attributes Tab of the Properties dialog box of MicroStation design file (.dgn) and ensuring that the Interface is set to **PROJECT INFORMATION**

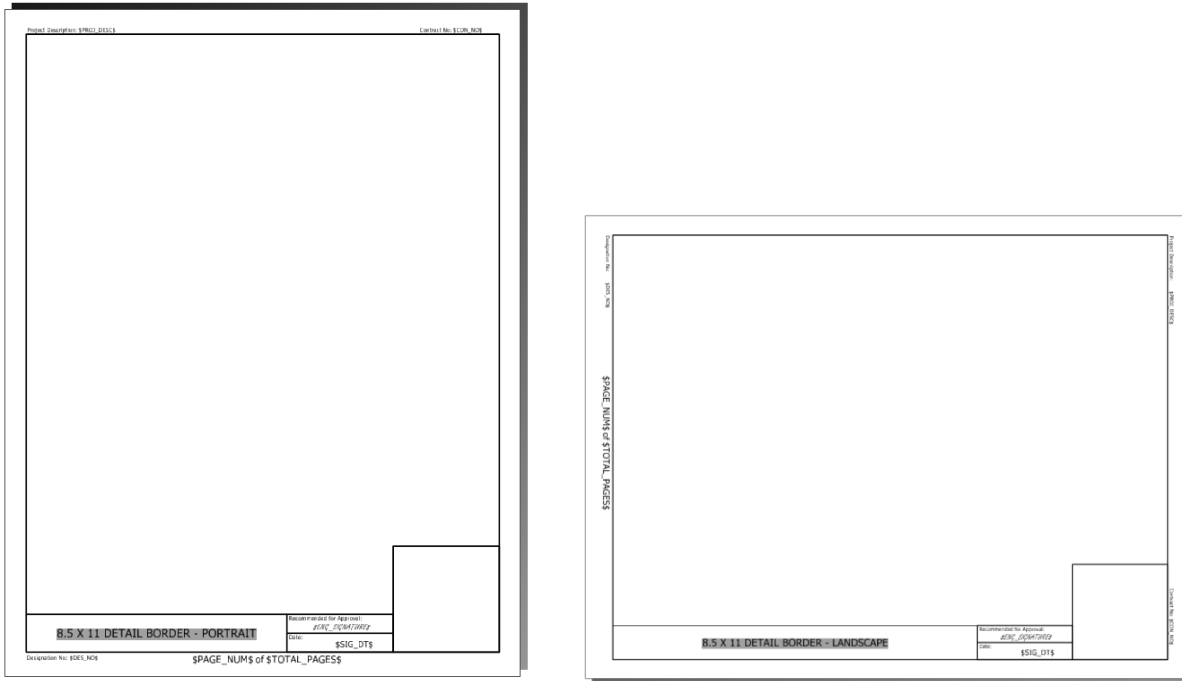


See Chapter 2 for more information regarding use of the Universal Title Sheet.

9.1-2 Ltr. Detail and Ltr. Landscape Detail

These sheet models are standard, empty 8.5” x 11” border sheets oriented in portrait and landscape. This border sheet can be used for any drawing detail or table in a set of resurface plans.

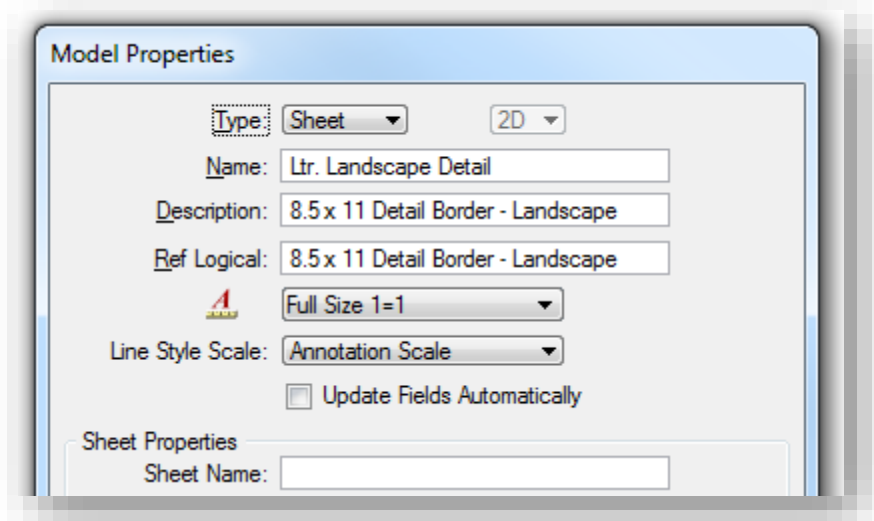
While in the open MicroStation file import the sheet model titled Ltr. Detail Model from Ltr_Sheets.dgn. When you open the newly imported sheet model, it will appear as shown below. Text outside of the border is populated with the Universal Title Sheet. The title of the sheet is edited by changing the description of the sheet model within the *Model Properties* dialog box. Draw or reference details into the area within the border.



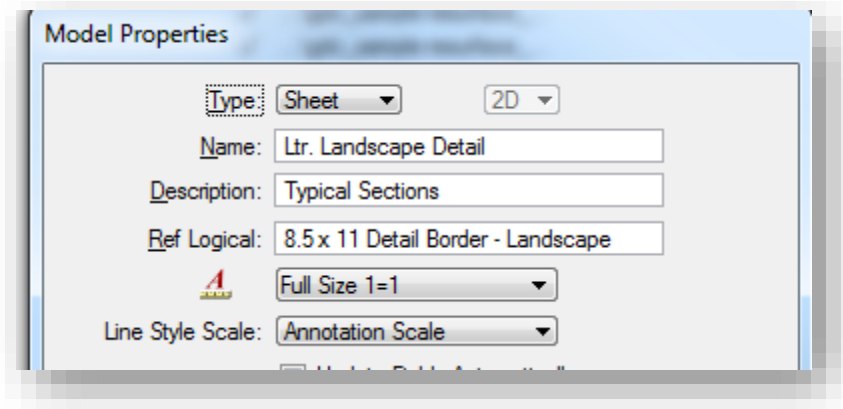
Ltr Detail Sheets w/PE Stamp

9.1-2a Editing the Sheet Title.

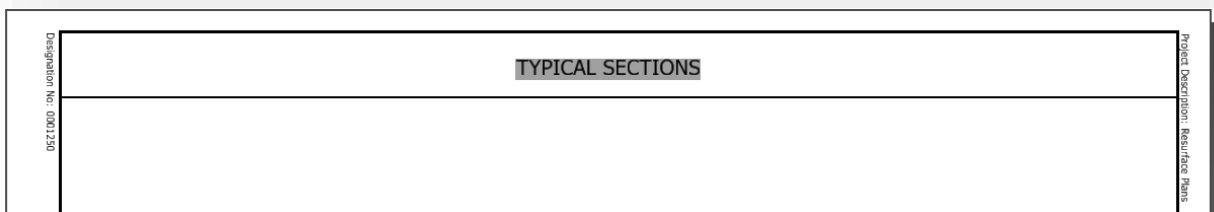
1. Within MicroStation (you do not need to be in the target sheet model) open the **Models Properties** dialog for the target sheet model.



2. Edit the description of the sheet model to reflect the title of the drawing Detail



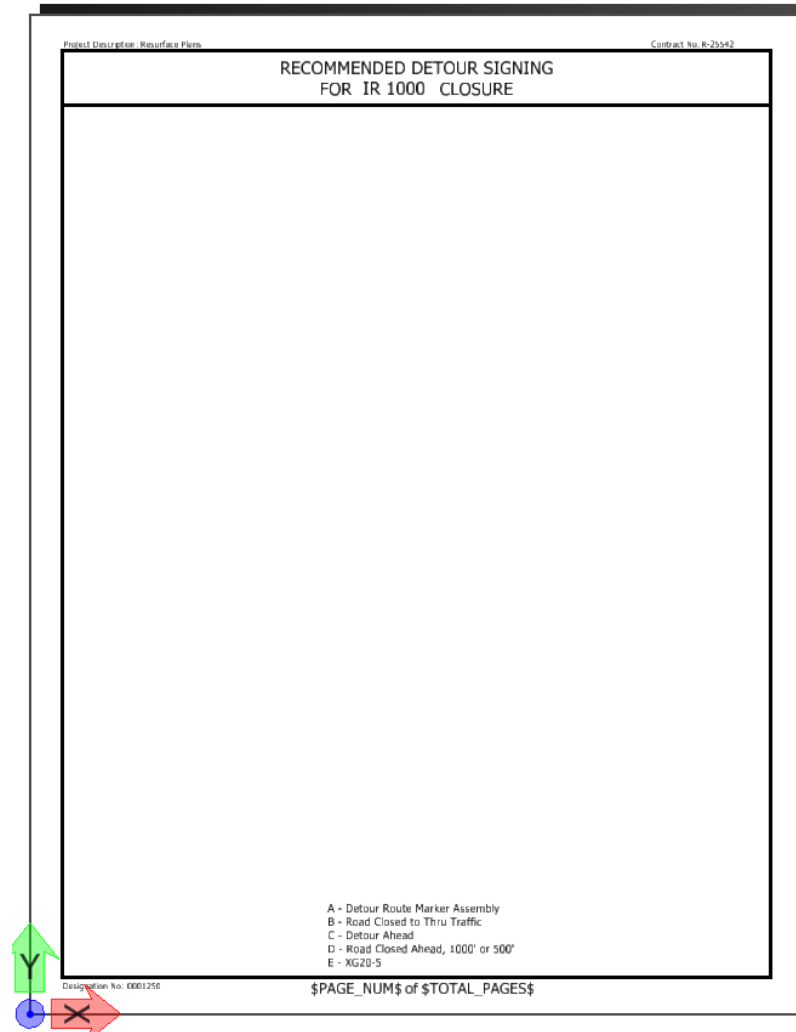
3. The title change will be reflected in your sheet model.



9.1-3 Ltr. Detour Sheet Signing

This sheet model was set up to be used for the Recommended Detour Signing sheet. This sheet model is pre-populated with a standard signing legend and uses the Universal Title Sheet to populate the route into the title of the sheet.

While in the open MicroStation file import the sheet model titled Ltr. Detour Sheet Signing Model from Ltr_Sheets.dgn. When you open the newly imported sheet model, it will appear as shown below.



9.1-4 Miscellaneous Tables and Strip Maps

During the process of creating a set of plans on the 8.5" x 11" border sheets, you will need to add various summary tables and or strip map.

9.1-4a Miscellaneous Tables

INDOT has provided a template Microsoft Excel file that contains several different tables that are commonly used (and some not so commonly used) on resurface plans. These Excel tables have been formatted to be cut/pasted into the provided sheet models at a 1:1 scale.

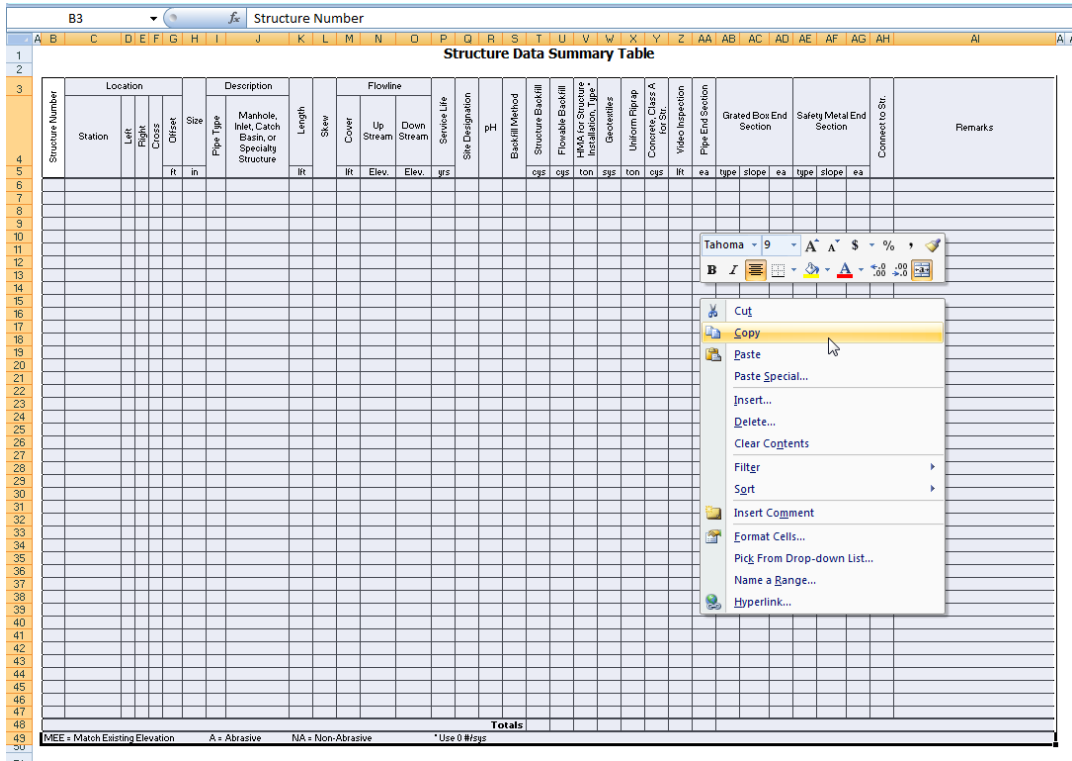
The Microsoft Excel Tables are available in ProjectWise at...

<pw:\\indot-pw.bentley.com:indot-pw-01\Documents\Template Documents\Seed\Spreadsheets\>

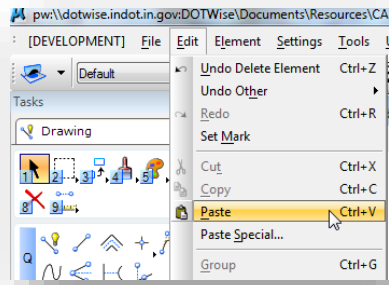
Instructions for each table are included on each sheet within the Microsoft Excel file. Once completed, the tables can then be copied and pasted into a MicroStation sheet model.

Copy and Paste Tables into Sheet Model.

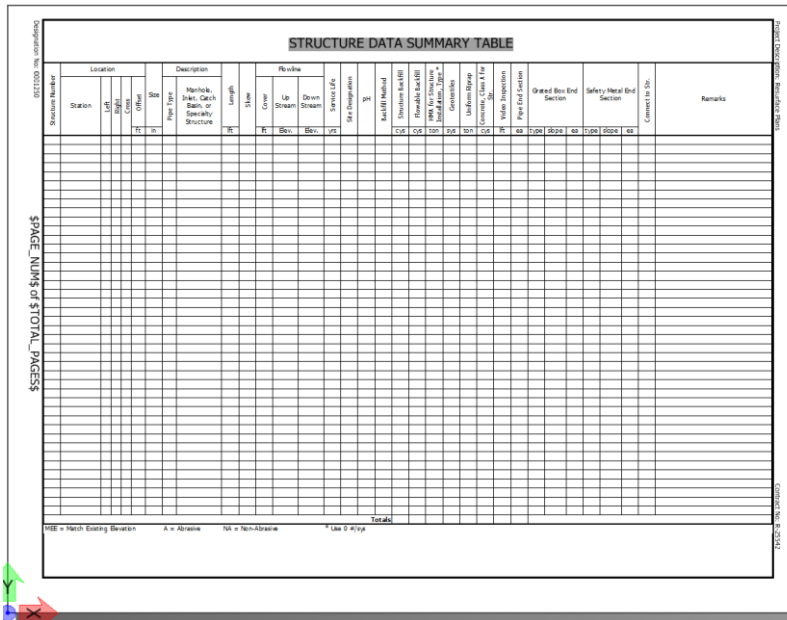
1. Complete the Excel spreadsheet and select the area that you wish to copy into a sheet model. Then either **Right Click** → **Copy** with your mouse or enter **Ctrl + C** on your keyboard to copy that information.



2. In the target sheet model, select **Edit → Paste**



3. Select the area in which you want to paste the table in the sheet model using tentative snaps. This will paste a picture of the table in the sheet model. This image is not editable. To edit the table you will need to edit the spreadsheet file and then repeat the copy – paste operation.

The image shows a screenshot of a CAD sheet model. The main content is a large grid with a header section titled 'STRUCTURE DATA SUMMARY TABLE'. The grid is mostly empty, with a few cells filled with text. The header section contains the following columns: Station, Location, Description, Length, Structure, Results, and Remarks. The 'Results' column is further divided into several sub-columns: Cover, Up Stream, Down Stream, Service LIFT, Size Determination, AASHTO Method, Structure No. (R), Structure No. (S), Rwy. Fr. Structure, Foundation, Jct., Commission, Uniform Name, Structure No. (R), Structure No. (S), Name, Direction, Pipe End Station, Grade Box End Section, Safety Head End Section, and Connect to Stn. The 'Station' column has values 'F', 'E', 'B', 'S', 'V'. The 'Structure' column has values 'R', 'S', 'V'. The 'Results' sub-columns have values 'F', 'B', 'S', 'V'. The 'Remarks' column is empty. At the bottom of the grid, there are some notes: 'Use = Hatch Existing Structure', 'A = Abrasive', 'SA = Non-Abrasive', and 'Use 0 = Key'. The table is titled 'Totals' at the bottom right. The spreadsheet is embedded in a CAD sheet, and the text 'PAGE_NUMB of \$TOTAL_PAGES' is visible on the left side of the grid.

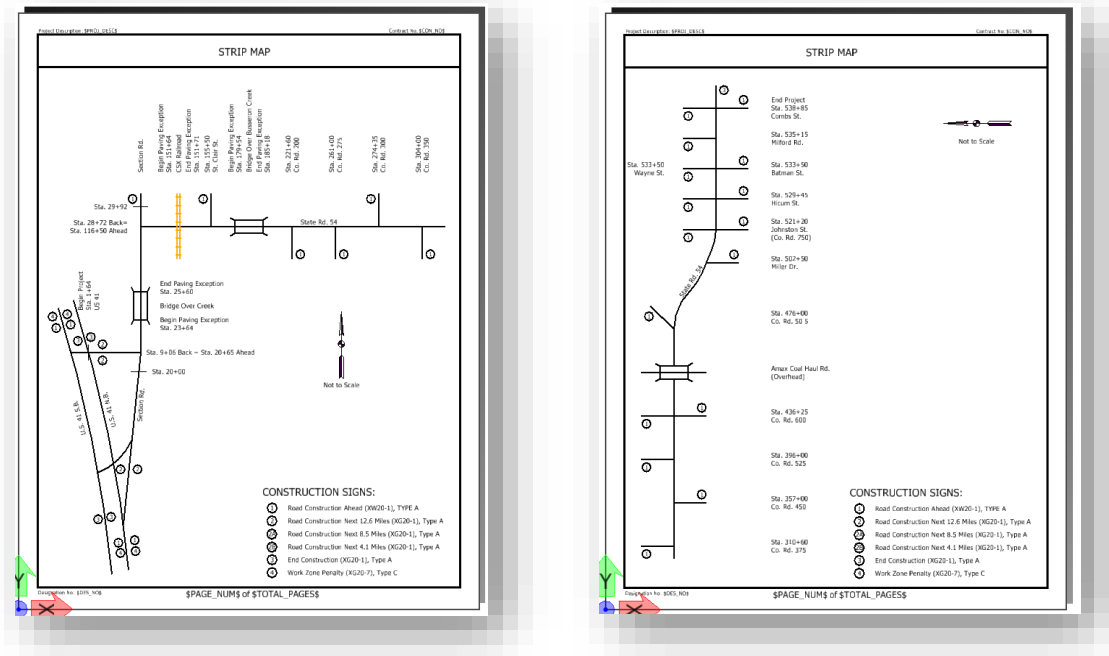
Due to ProjectWise functionality, it's highly recommended that users not embed or link Excel sheets. There are two major issues that make these processes undesirable:

- Embedding – With an embedded spreadsheet, the CAD file must be open and then the Excel content opened from within the DGN. Additionally, one cannot link data across sheets with embedded Excel content.
- Linking – Due to the way ProjectWise functions with unique working directories for all users, linking will not work for any users other than the link creator.

9.1-4b Strip Maps

Additionally, as part of a set of Resurface Plans, per the [Indiana Design manual](#) a Strip Map is required. This should also be created using either the Ltr. Detail or Ltr. Landscape Detail sheet model(s).

Examples of a typical Strip Map are shown here.



9.1-4c Page Numbering and Electronic Signatures.

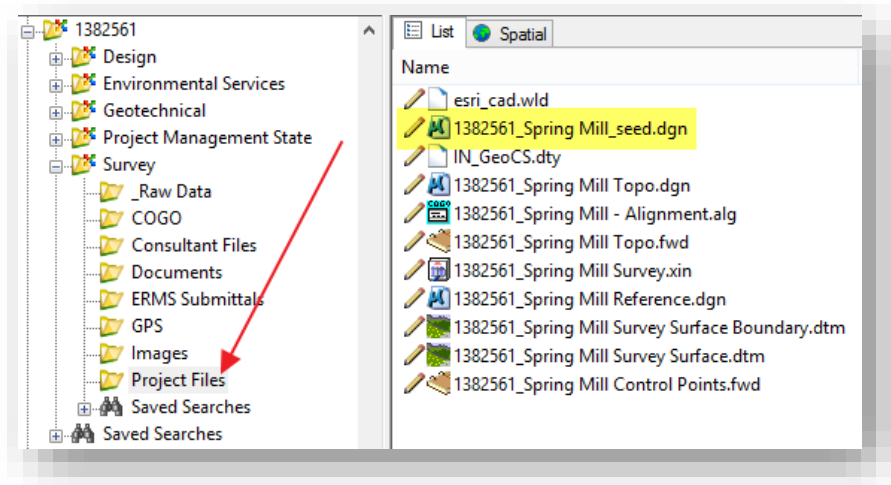
Please refer to Chapter 4 of this document to review usage of ProjectWise InterPlot Organizer to make use of automatic page numbering and electronic Signatures.

9.2 Traffic Plans Production

9.2-1 Signs Signals and Lighting Plans

The following sections discuss MicroStation resources to be used in the development of a set of Traffic plans for Signs Signals or Lighting.

Traffic plans can will normally start from one of two different DGN Seed Files. These can be the US Survey Foot Seed File ([INDOT US SVFT seed.dgn](#)) or the US Unit Seed File ([INDOT US seed.dgn](#)). If the project is newer and has survey related data, a geocoordinated version of one of these files will be found in the Survey Project Files folder.



Example Geocoordinated Seed Location

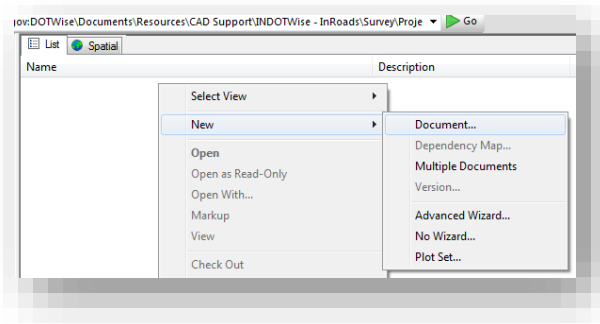
The previous screen capture shows an illustration of where you might find the Geocoordinated Seed files if your project has been setup. This should be the first location where seed files should be located. If there is no survey data and the project has not been geocoordinated, the files will need selected from the Template Documents location shown below. Regardless of which unit of measure you select or which file you are creating you should create the file using the Advanced Document Creation Wizard.

<pw:\\indot-pw.bentley.com:indot-pw-01\Documents\Template Documents\SS4 Seed\MicroStation\>

9.2-2 Base Sheet Creation from Various Seed Files

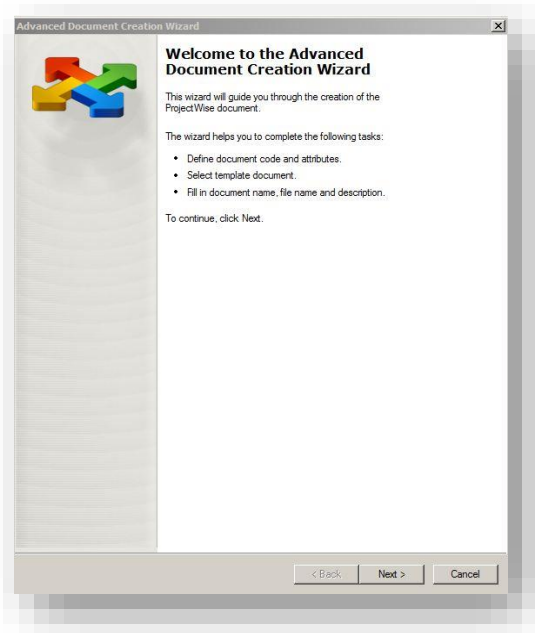
In order to make sure all documents start off with the appropriate metadata, and to enable such features including automatic sheet population; all documents should be created using the Advanced Document Wizard.

For Traffic Plans, locate the *Des Number\Signs Signals and Lighting\MS folder*. With this folder selected, the Document Pane will show the folder contents as they exist currently. To create a new document, right click in the document pane and select *New -> Advanced Wizard*.



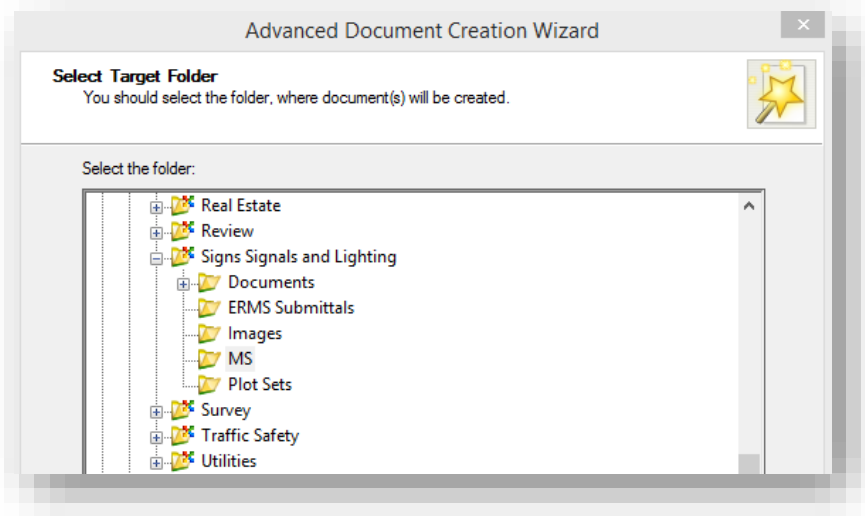
Starting the New Document Advanced Wizard

This will initiate the Advanced Document Creation Wizard dialog.



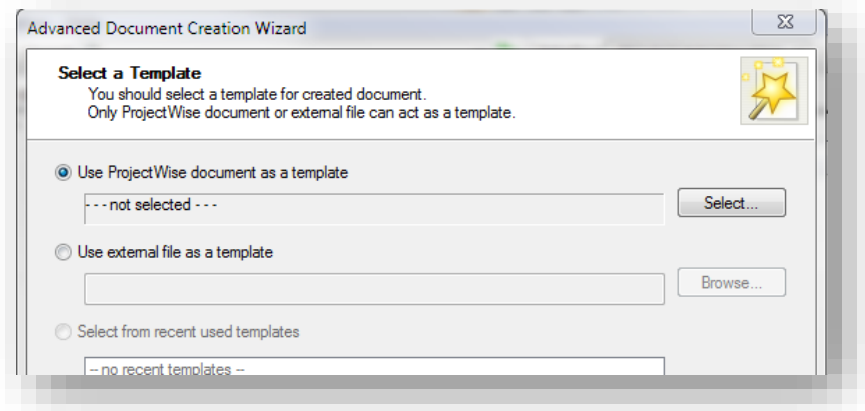
Selecting the Advanced Wizard

The first panel is informational and can be bypassed (*Next*). The second panel confirms your location. If for some reason you didn't have the correct folder active in your document panel, you can select it now or confirm the path shown.



Location Confirmation

The next panel allows you to select the template document you'd like to use. On the first line "*Use a ProjectWise document as a template*" option. Press the select button.

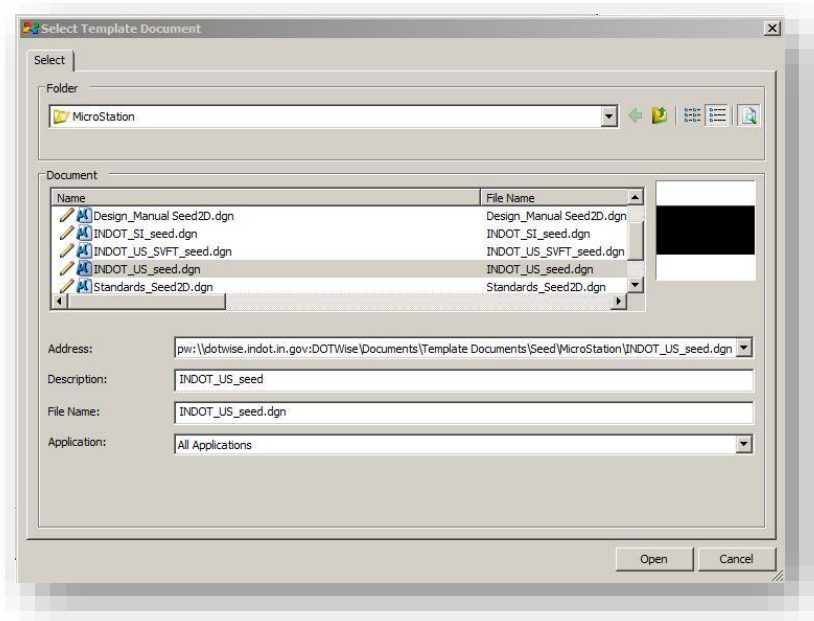


Select a Template dialog

In the "Select Template Document" panel, navigate to the MicroStation Seed files in the ProjectWise System and select the appropriate unit files for your project. These files can be found at:

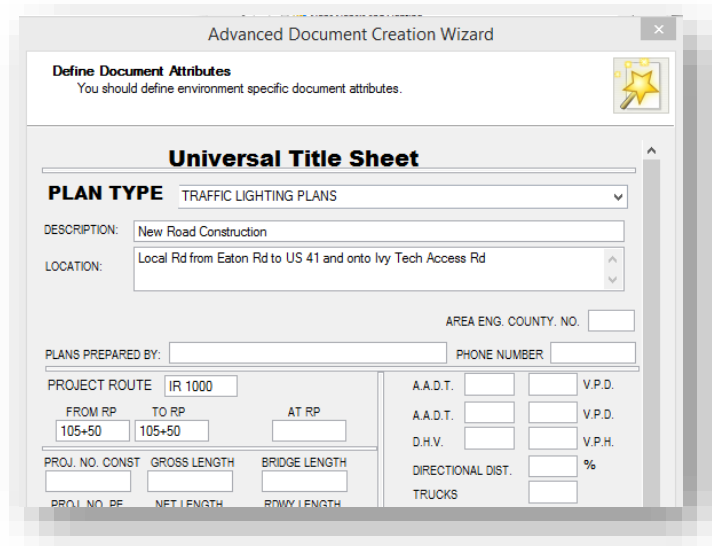
<pw:\\indot-pw.bentley.com:indot-pw-01\Documents\Template Documents\SS4 Seed\MicroStation\>

Or if your project is provided with Survey Geocoordinated Seed files, look under the **Des Number\Survey\Project Files** folder as discussed earlier in this section.



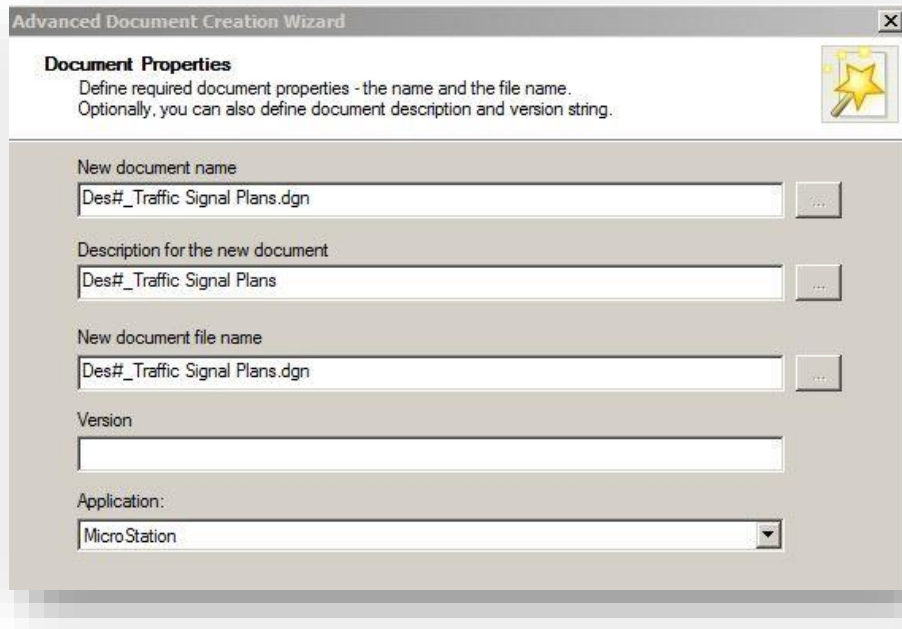
Selecting the Proper Seed File

With your file selected, you can then proceed to the next screen. If you are prompted for Document Attributes, you may proceed beyond this screen as well, however it may be advantageous to populate the contents of this panel for any of the information you may already have. Below is a sample of the type of information that's configured for the auto sheet population for title sheets.



Auto Sheet Population Panel

The final step in creating the document is to provide a name. Traffic Signal Plans should be consistently titled with the following format: Des #_ Traffic Signal Plans.dgn. To ease document searches and for consistency purposes, all three names should be the same as shown.

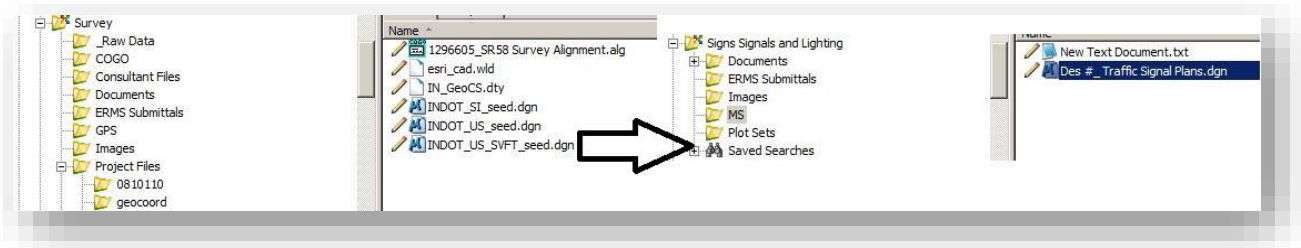


Document Properties and Naming

With the document named, you may now proceed through the remaining panels of the wizard and complete creating the document.

9.2-2a Document Creation via Drag and Drop

In addition to the Advanced Wizard, you can also create files using drag and drop. To do so, you can open the Seed location in another window (right click, Open in New Window) and then drag the file from the seed location to your active project folder.



Drag and Drop File Creation

At this time you'll be prompted if you want to use either the Advanced or No Wizard options. If you select advanced, you'll be prompted through the steps from the previous section. No Wizard will bring the file into the location you've specified without an opportunity to adjust naming, etc.

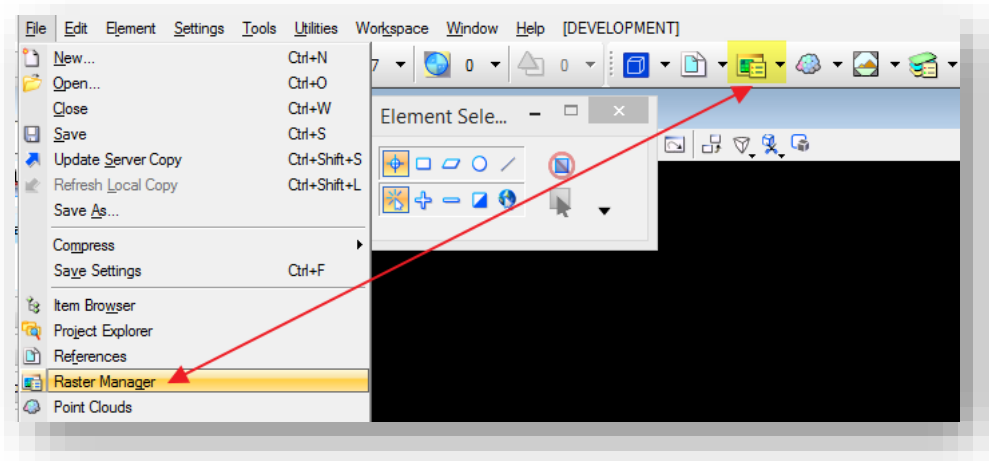
9.2-3 Traffic Plans Creation

With a template document now created, the Traffic Plans can start being assembled. The first portion of the Traffic Plan composition is the creation of the project title sheet. The first method of creation will be from pre-existing plan images.

9.2-3a Creating the Design from As-Built Plan Image

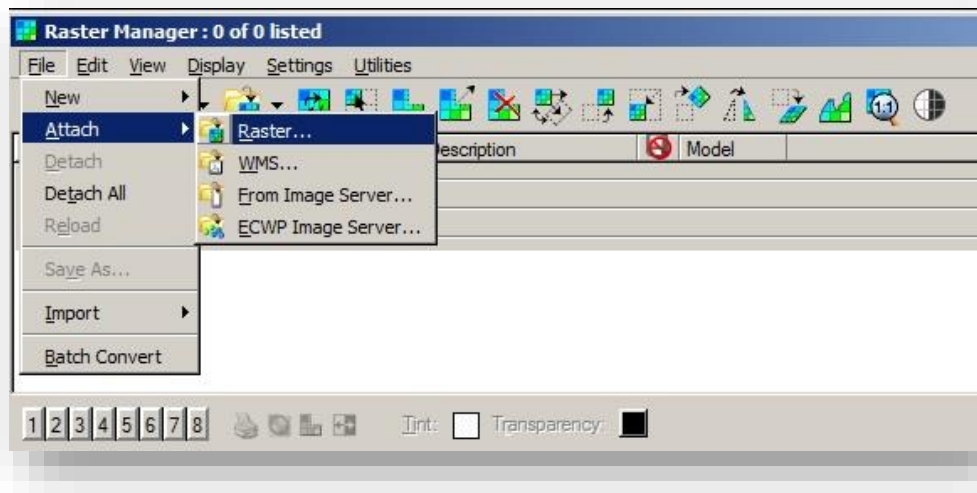
To start this process, first go back to the DGN that was created earlier in this section, Des#_Traffic Signal Plans.dgn. Open the file from ProjectWise and switch to a new model. For more details on creating/editing models, please refer to Appendix C of this document, or the MicroStation help file.

In a new model, start by opening the Raster Manager:



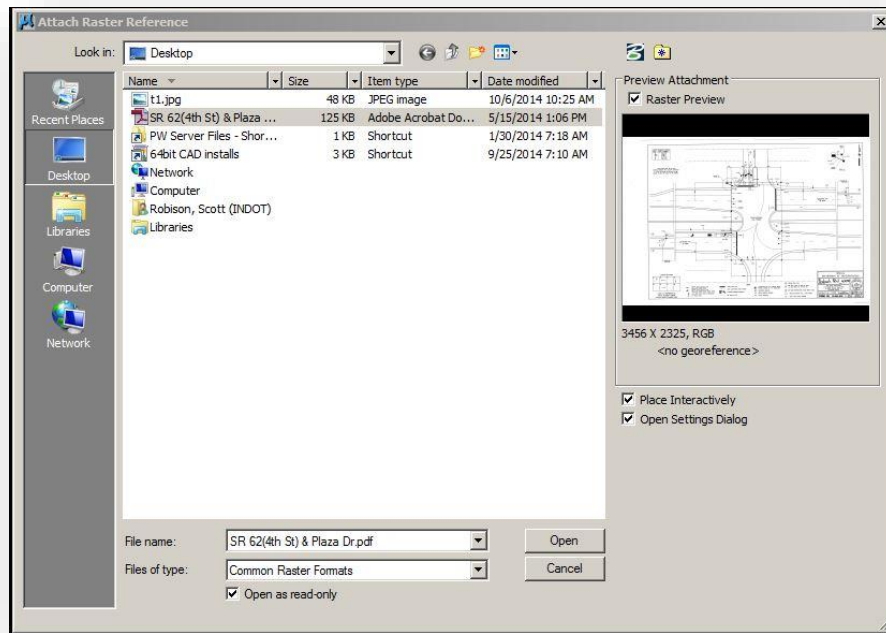
Start Raster Manager

After initiating the Raster Manager from one of the two locations shown above, the Raster Manager dialog will be displayed. On this dialog, select the Attach Reference command from the File menu or toolbar as shown:



Attaching a Raster

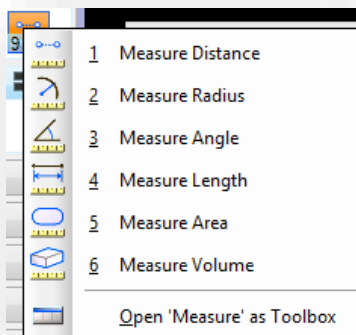
Next, locate the scanned/PDF copy of the As Built Plans for the project. As with most other project deliverables, these should be uploaded to ProjectWise for easy location, management, and security.



Locating the As Built Reference

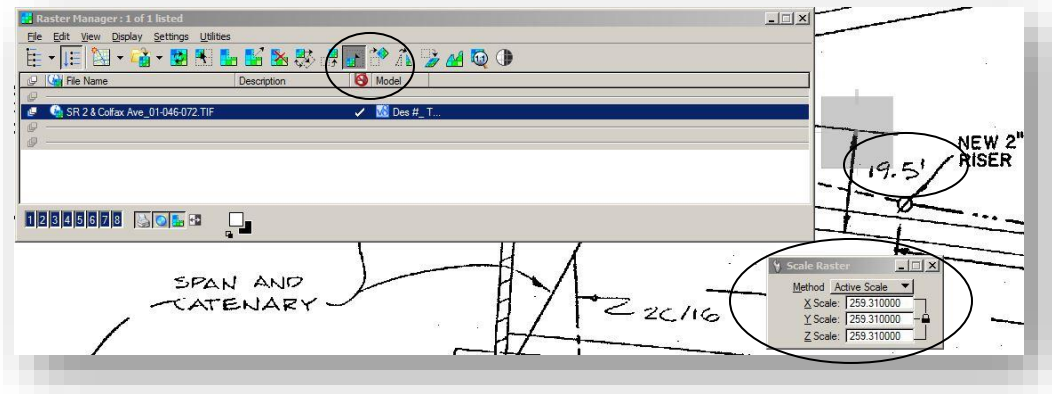
During the attachment process, make sure that the Raster is attached at a 1:1 scale. It's very important that the raster be attached this way in order to determine the necessary scale factor to rescale the raster by.

At this time, scaling of the As Built needs determined in order to draft the elements true scale. In order to determine the scale, locate some of the dimensioned elements on the raster and measure them using the MicroStation measurement tools.



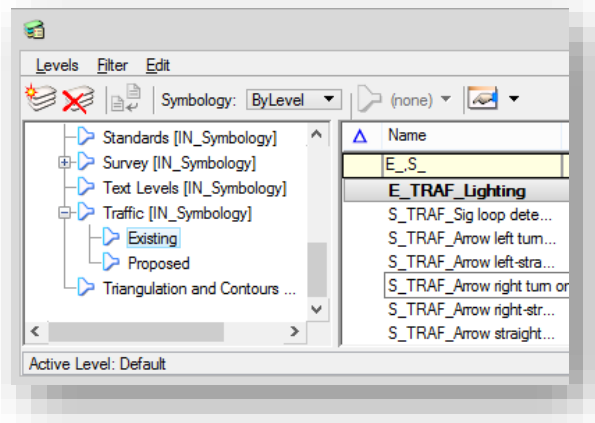
MicroStation Measurement Tools

To determine the scale factor needed to upscale the raster by, take the as dimensioned measurement from the drawing and divide it by the measured value using the MicroStation tools. For example the following illustration shows a dimensioned line that is listed at 19.5'. The MicroStation tools measured this to be displayed as 0.0752'. To calculate the scale factor, divide the dimensioned by the measured (19.5'/0.0752') resulting in a scale factor of 259.31.

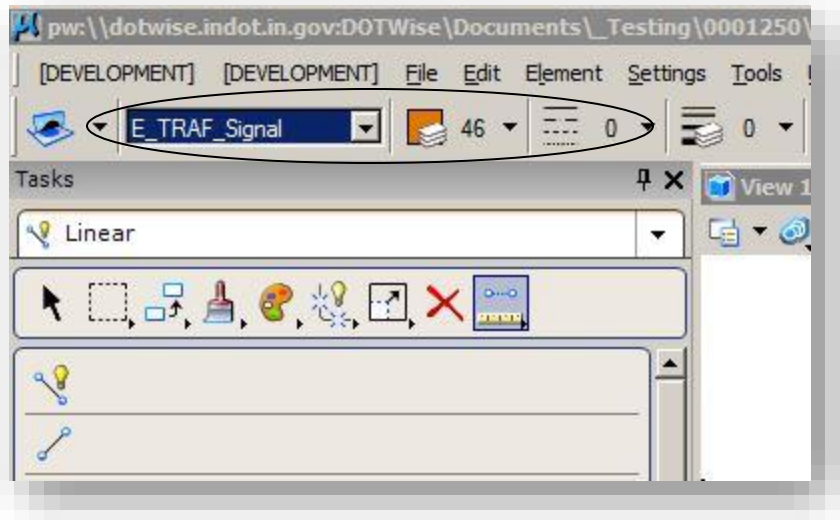


Raster Scaling

With the raster now scaled properly, one can now start drafting based on the As Built raster. Using the standard MicroStation drawing and Level tools, trace the geometry on the appropriate levels as provided in the DGNLib. These levels include the _TRAF_ prefix and can be filtered using the DGNLib filters as shown.

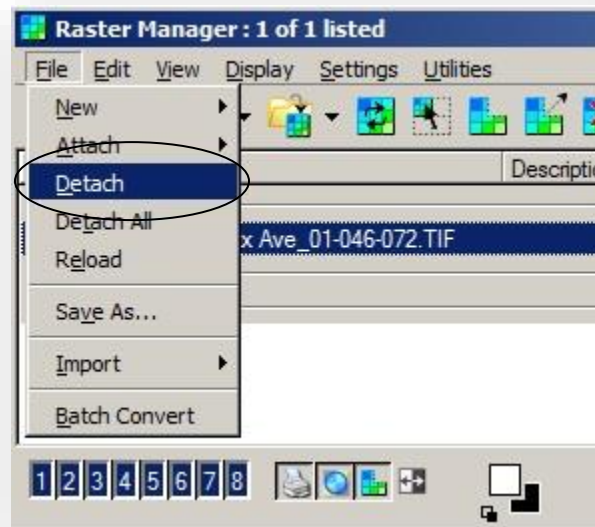


Traffic Proposed and Existing Filters



Setting the Active Level, Color, and Linestyle

Once completed tracing the As Built information, the Raster Image can be detached. Do so by opening the Raster Manager, and highlighting the As Built, and either Right Click -> Detach, or from the File -> Detach menu option shown below.



Detaching a Raster

At this point, the Traffic Plans should be completed using standard MicroStation tools. Later in this chapter, a review of sheet creation will occur. First however, brief explanations of alternate plan creation methods will be discussed.

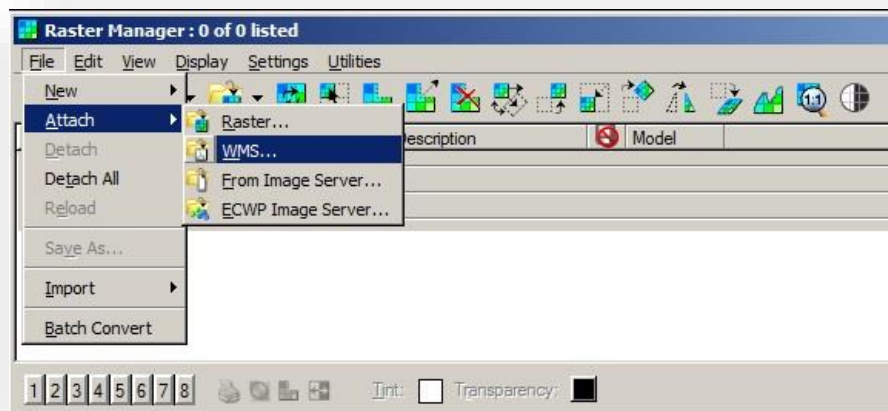
9.2-3b Creating Traffic Plans Without As Built

In many projects, it's quite common to start a project without any As Built data. In this instance, alternate sources of data can be used in order to have a raster image background from which the geometry can be traced.

As with the previous section, start by creating a new model. Once prepared, start the Raster Manager as discussed in the previous section.

In this instance, an As Built will not be available. In lieu of this, the INDOT GIS department has made available a listing of WMS Web Map Services. These map services are discussed further in Chapter 10, however a brief overview of the attachment process is provided here.

The first step is to select the **File -> Attach -> WMS**:



Attaching a WMS Map

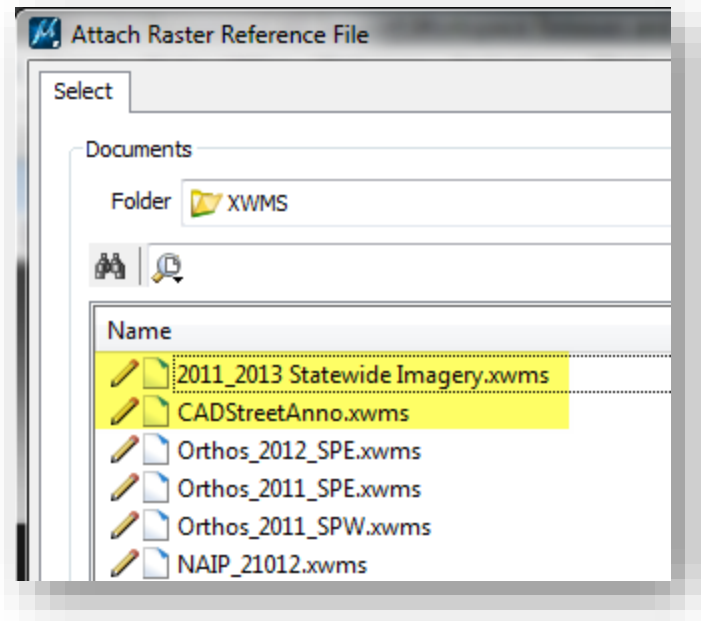
On the presented Attach Raster Reference File dialog, navigate to the **XWMS** folder in ProjectWise. This folder is located at:

<pw:\\indot-pw.bentley.com:indot-pw-01\Documents\Resources\XWMS>

Select the **CADStreetAnno.xwms**, and the **2011_2013 Statewide Imagery.xwms** and select OK. Please note that the GIS staff is constantly acquiring and processing new imagery, so newer versions of these maps may be available, especially the Full Res images. Check often if new images have been made available.

Note: When using the rasters, the following issues may be encountered:

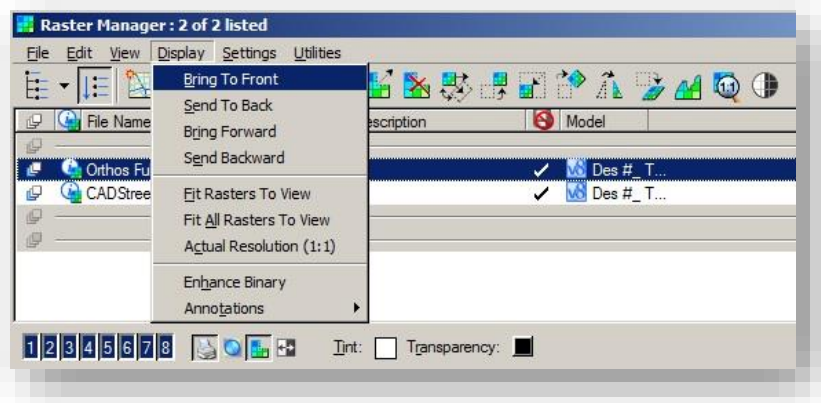
1. *The 2011_2013 Statewide Imagery.xwms may have performance issues during usage. This is a known issue and cannot be resolved by CAD or GIS Support staffs.*
2. *The Orthos Full Res 2005.xmws perform very well, but are out of date.*
3. *Each set of rasters has benefits and disadvantages, use the Orthos that fit your project needs for the best experience.*



WMS Raster Attachment

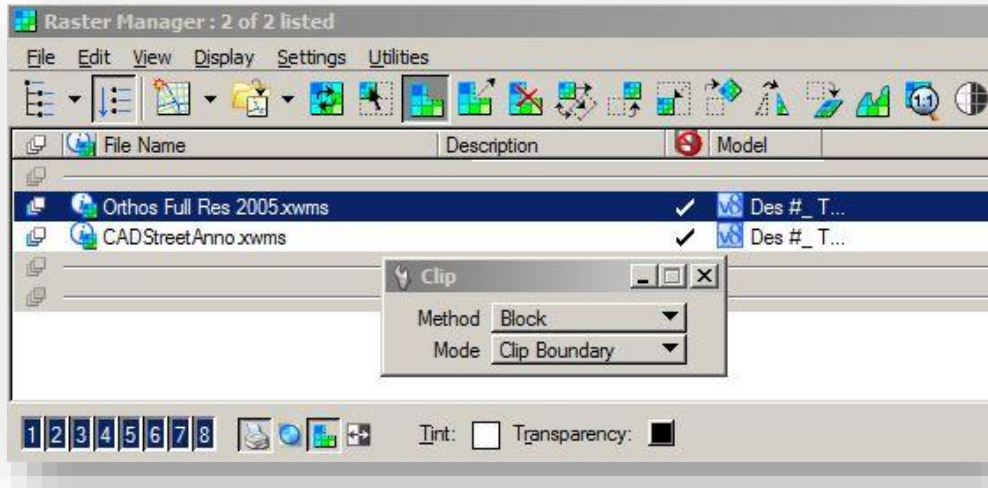
With the images now attached, MicroStation will start streaming the images based on where your view is located. It's highly recommended to zoom all the way out so the entire state map is visible, and then Zoom down to the intersection.

With the location of the intersection found, go back to the Raster Manager. Highlight the CADStreetAnno.xwms, and then select **Display -> Bring to Front** from the Raster Manager toolbar.

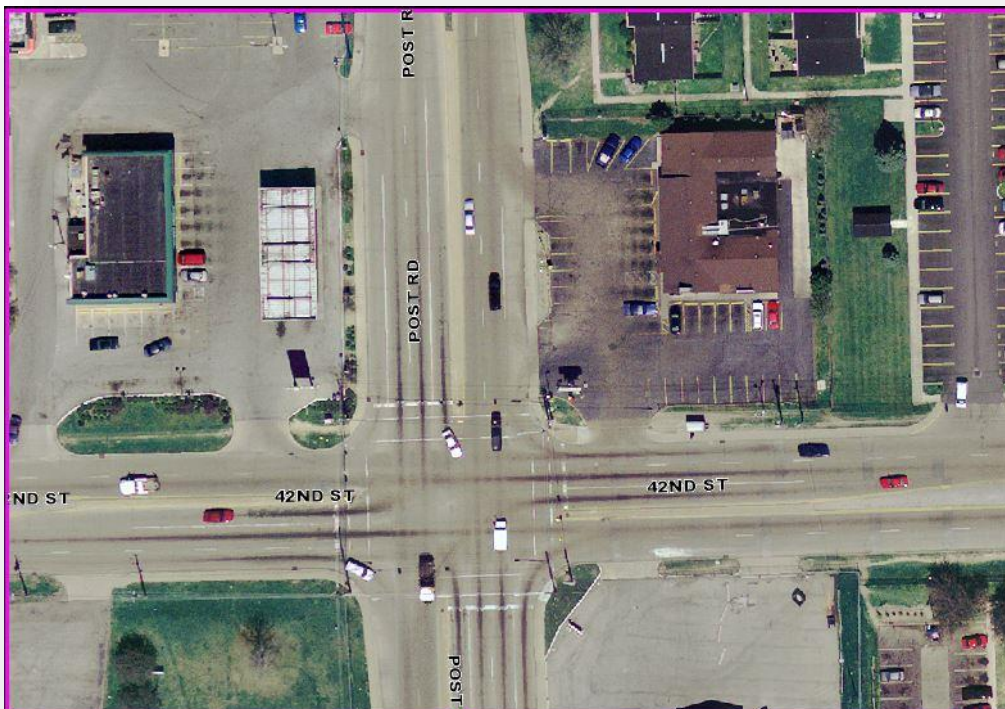


Bringing the CADStreetAnno.xwms to the Front

At this time, the extraneous raster imagery needs cropped out. Select the clip tool from the Raster Manager toolbar and then crop just the rasters to just the needed area.

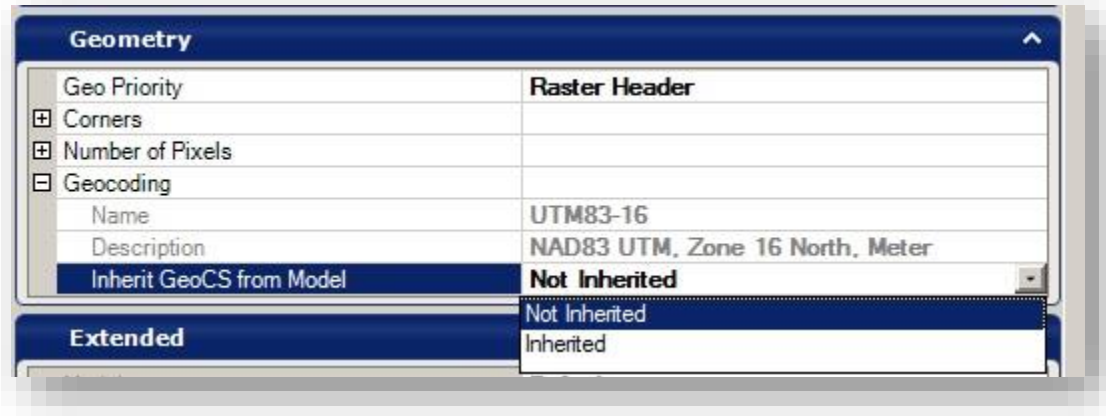


Raster Clipping



Clipped Rasters

Next, the rasters need to have their geolocation enabled so they display in the correct spot on the DGN. To do so, set the Option to Not Inherited under Geometry (as shown below), so that image falls into place.



Setting the GeoCS to Not Inherited

At this point, the plan development process is the same as in the previous example. Trace the geometry using the appropriate symbology, and detach the rasters when completed.

9.2-3c Traffic Plans when Survey or Design Data is Available

In this instance, the traffic plans process will start from pre-existing data directly in a MicroStation format. As was discussed earlier in this chapter, the first place to look for a seed file in this instance will be under the *Survey\Project Files* folder for the project.

At this time, the Survey Geometry can be used directly from the TOPO drawings. Note that there are a variety of methods to get and use this data:

- The data can be referenced and traced.
- The data can be referenced, and merged.
- The data can be referenced and copied directly.

Depending on the method chosen, the data must be modified to the appropriate symbology for Traffic Plans and the development process can occur.

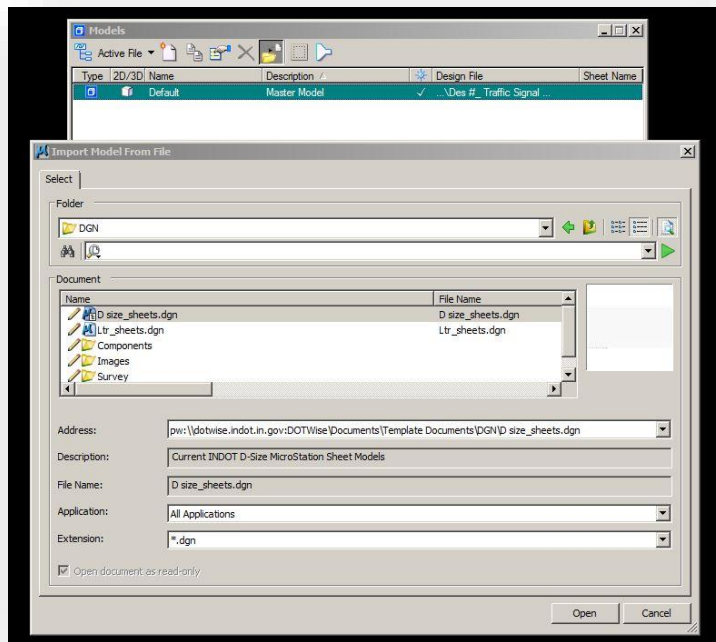
The above processes are also valid when working on Traffic Plans that are part of a broader Design project. In this instance, instead of using the TOPO, the pavement markings will be used in the same fashion listed above.

At this point for all 3 methods, it's time to take the created Traffic Plan and place it appropriately in a MicroStation border.

9.2-3d Creating the Detail Sheet

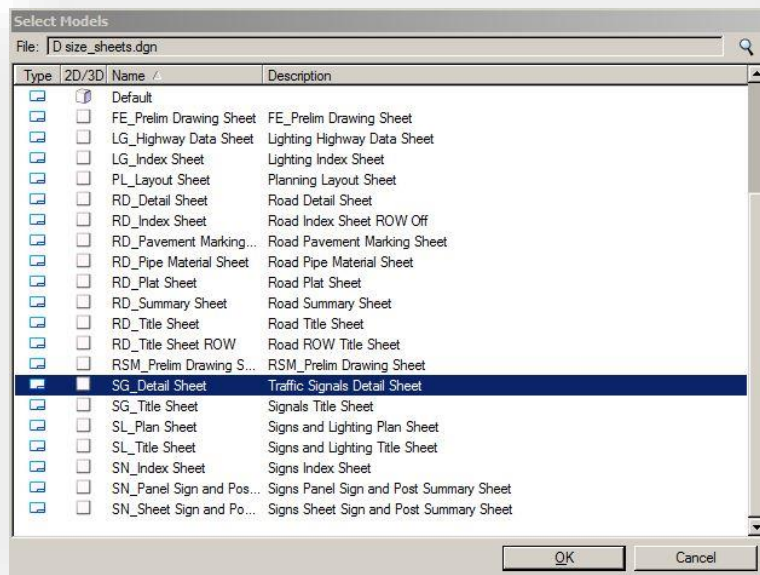
The final steps for completing the Traffic Plans is the creation of the Detail Sheet for the project. Working out of the Signals Plan drawing, import a separate Arch D size sheet model using Models tool with appropriate sheet border. These borders can be found in the *D_size_sheets.dgn* located in ProjectWise at:

<pw:\\indot-pw.bentley.com:indot-pw-01\Documents\Template Documents\DGN\D size sheets.dgn>



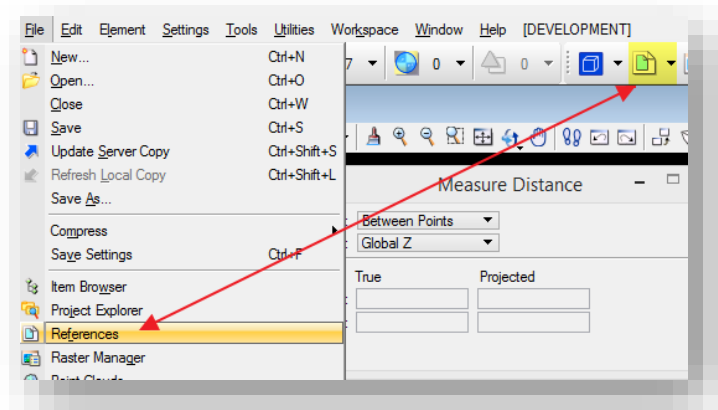
Locating the D_size_sheets.dgn

With the border file located and opened, select the appropriate border from the list to Import into the Open dgn. For example, the SG_Detail Sheet.



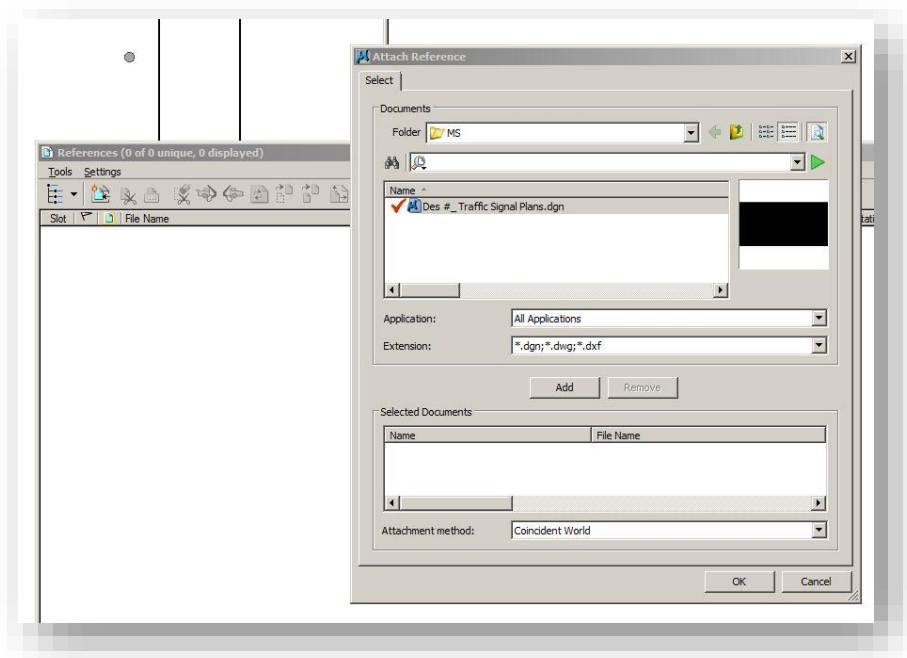
Selecting the Detail Model

This will bring a copy of the model into the active drawing. Select this newly imported model and open the Reference Attachment dialog:



Attaching a Reference

Next, reference in the model containing the Intersection design as required to the appropriate scale (1"=20' or 1"=30' As per IDM). Note that an alternative method would be to drag and drop the model from the Models dialog to the References dialog.



Intersection Attachment

This concludes the Traffic Plans development process. At this time, the final file is prepared for plotting using the tools discussed in Chapter 4 of this document.

10. Using Imagery with CAD and the Map Insert Application

10.1 WMS and Aerial Imagery

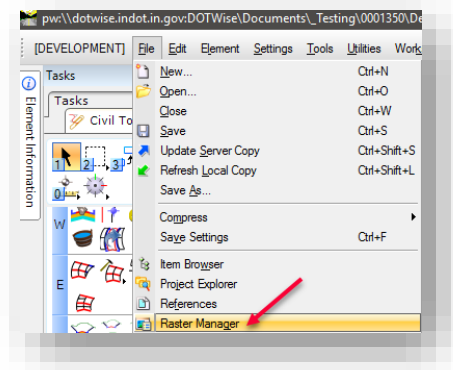
10.1-1 Introduction to WMS

A Web Map Service (WMS) is a standard protocol which provides georeferenced map images over the Internet that have been created by a map server using data from a GIS database. At INDOT the map data is obtained from the ArcGIS Server. MicroStation or Bentley Map via InRoads can then be used to connect to the WMS. The INDOT WMS server connections have already been established and preset WMS map definitions (XWMS files) have been created for the available images. Currently the available map definitions are NAIP 2008, NAIP 2010, NAIP 2012, NAIP 2014, NAIP 2016, Ortho 2005, Quad 24k, 2011_2013 Statewide Imagery, Best Available (which is a constantly updated map containing the most recent and highest resolution imagery, currently the 2011/2013 images), and Most Recent Available Imagery (which is the most recent imagery available, but is not survey grade and will show differences in geocoordinated data situations). These preset map definitions are located in ProjectWise at the following location: [Documents\Resources\XWMS](#).

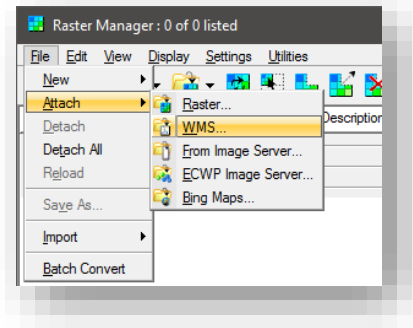
Note: In MicroStation SS4/SS10 there is a bug pertaining to XWMS imagery attachments in a nested references. If you encounter any instances of a CAD file where certain models will not open, please submit a ticket to CAD Support for assistance. Additional resources on what to do if this occurs can also be found later in this section.

10.1-2 Open existing Map Definition

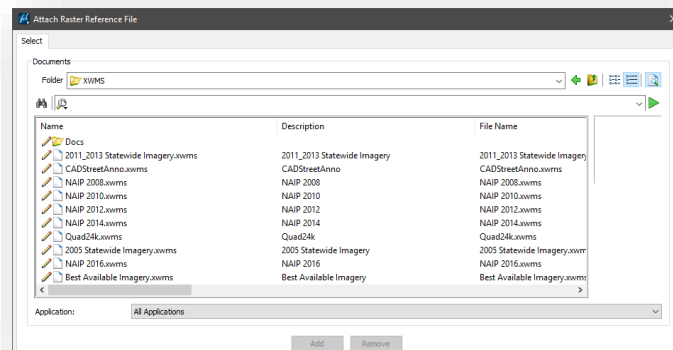
1. Open a MicroStation or Bentley Map session within ProjectWise. Under the **File** dropdown menu open **Raster Manager**, as shown below:



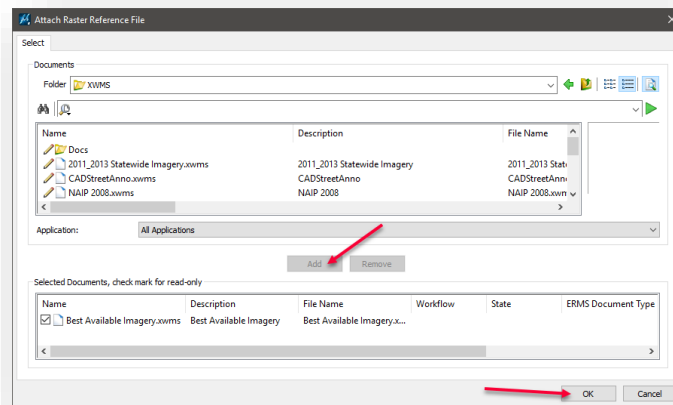
2. On the **Raster Manager** window select **File -> Attach -> WMS**.



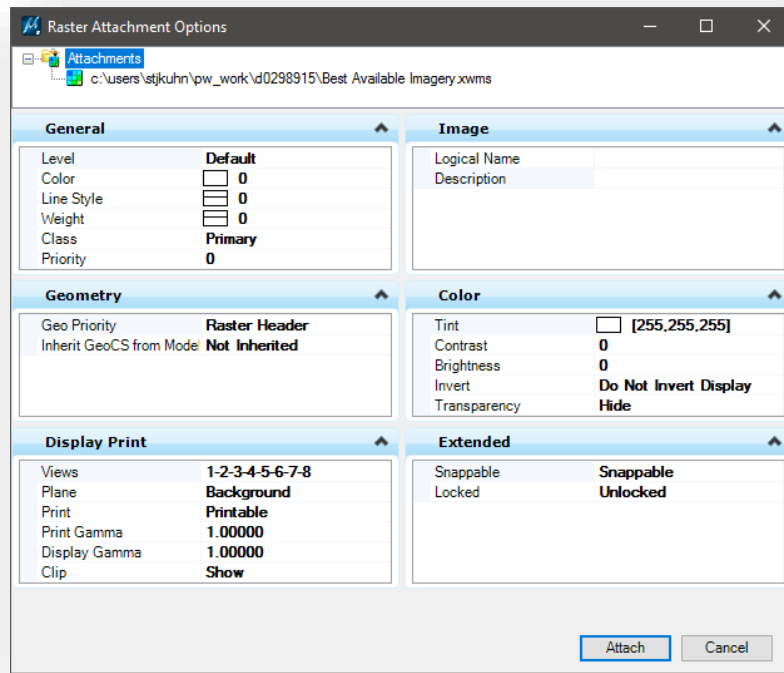
3. ProjectWise's **Attach Raster Reference File** window appears. In ProjectWise navigate to <pw:\\indot-pw.bentley.com:indot-pw-01\Documents\Resources\XWMS\>. Within this folder, select the XWMS resource file you need to attach.



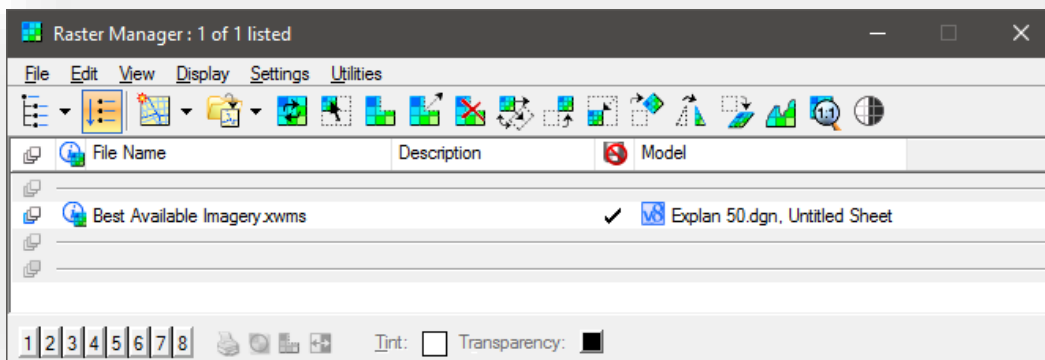
4. Once the XWMS file has been selected, select **Add -> OK**.



- In the **Raster Attachment Options** window make adjustments to options as desired, and then select **Attach** at the bottom of the window.



- The image is now attached to the DGN as shown in the **Raster Manager** window.



10.1-3 WMS Raster Attachment Issues

Per the note earlier in this section, MicroStation SS4 has an inconsistent bug pertaining to the attachment of WMS imagery and is particularly prevalent when this imagery is displayed through a nested attachment (such as plan sheets cut via InRoads, or situations where the reference is manipulated and fit to a border sheet). In this section, we will briefly discuss three methods that can be used to alleviate the impact of this bug.

10.1-3a Saving the DGN in a Model without WMS Imagery

The most common occurrence of this issue is when loading up a file with nested WMS reference attachments in a fresh session of MicroStation/InRoads. If this occurs, please contact CAD Support so we can assist in getting the file so it will open. Once that has been done, the potential for the issue to recur is relatively high. The first method to alleviate this is to make sure a model without imagery is the last one opened and where you **File -> Save Settings** prior to checking the file back in.

10.1-3b Controlling Raster Display via References

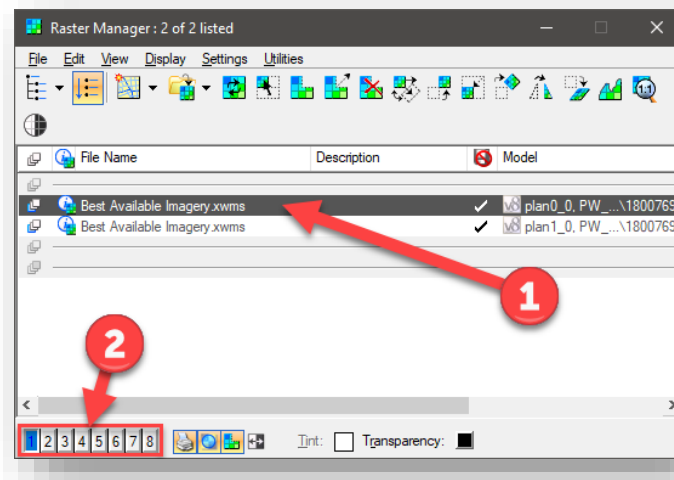
The next option to help with this issue is to use reference control to change where you're controlling the display of the WMS imagery from. In the following steps, we will look at example with the raster attached to a base drawing, but then using files that reference it to control when it's displayed.

1. The first step is to go into your base sheet with the raster attached. On the Raster Manager, locate the .xwms file you need, and ensure that its display is disabled for all views (1-8) as shown.



2. With the raster disabled, do a **File -> Save Settings** and check in your file. Note that you can turn the raster on and off as needed, but it should be left off prior to checking the file in.

- In the sheets that are referencing the base drawing, open the Raster Manager. In this example, we're looking at a double plan sheet, so there are two instances of the raster reference shown. The display for these can be re-enabled in this file as needed in the same location where we disabled them in the base sheet.



Using this method, we have seen greatly decreased instances of the bug occurring but it still allows for flexibility in the attachment method and usage of referencing to get it located properly.

10.1-3c Descartes Tools

In some situations, it might possibly be easier to just export the necessary portion of the WMS image to a separate file. In this situation, the tools provided by the Descartes application can be used (**Tasks -> INDOT Tools -> Applications -> Load Descartes**) to create these files.

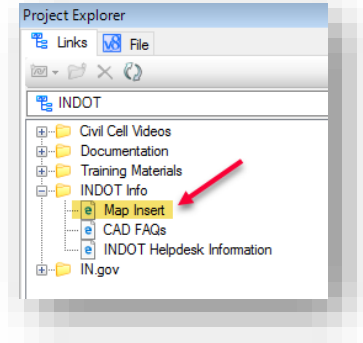
With Descartes loaded, the primary tool is under the Edit -> Merge menu on the Raster Manager.

- Start off by placing a fence or shape around the area you want to turn into an image. Keep in mind that areas that aren't rectangular will expand to a rectangular shape and the maximum extents of the shape.
- Start the Merge command. If you used a shape select its boundary, if you used a fence, make sure to select the checkbox for Use Fence.
- With the shape/fence selected, the Merge Options dialog will be displayed. This dialog will allow you to select a number of options such as resolution, what should be created as the final attachment (image, image plus linework, linework only) and the file type. It's highly advised to review the options for this dialog in the Descartes help file under the **Help -> Contents** menu on the Raster Manager.

This tool will create a direct raster attachment to your dgn which will not result in causing the WMS image bug. **Care should be used as the imagery files created in this way do have the possibility of becoming incredibly large and taking substantial amounts of time to check in/out of ProjectWise.**

10.2 Map Insert Application

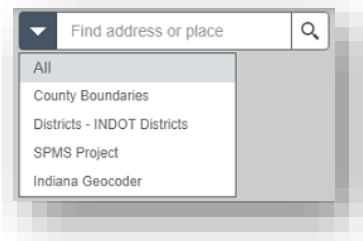
1. Locate the INDOT-Info linkset on the MicroStation Project Explorer. As shown, the Map Insert Link will be available



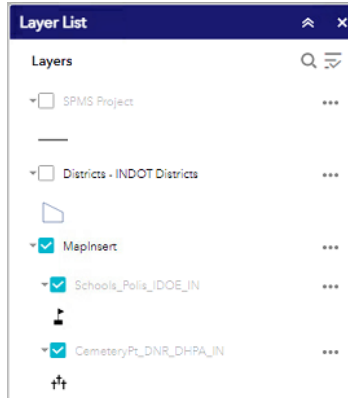
2. Click on the Map Insert link or copy the following URL to the web browser navigation ([INDOT Map Insert \(arcgis.com\)](http://INDOTMapInsert.arcgis.com)). **NOTE: The Map Insert Tool prefers Chrome or Firefox**



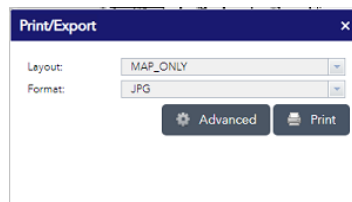
3. At startup the entire State of Indiana is displayed. To zoom in to a specific area of the state you can use the mouse wheel. By clicking the left mouse button and holding it down you can pan the view.
4. Searching: To zoom to a desired location, enter one of the following: county name, district name, project des#, or address. You may optionally select the type of search in the drop down.



- The layer list toolbox allows you to toggle on/off which layers are displayed in the view. Use the arrows to expand the main folders in the list (Projects and Map Insert), and the checkboxes to toggle the layers on/off. Several of the layers are off by default, which means they will not be visible until you check the box to make them visible.



- Once you have the area of interest displayed and the desired layers turned on, use the Print widget to create the Map Insert image.



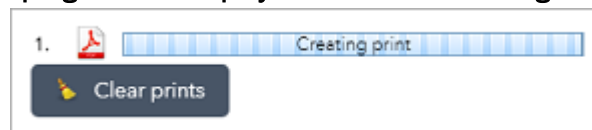
- Select the applicable Layout and Format for the exported map. You may need to test the sizes to find the desired output.
- Type a title for the map in the Map title text box. **Note: The MAP_ONLY format prints only the map, omitting any marginal information from the output.**
- For additional Printing options, click Advanced.



- The following options are available:

- i. **Map scale/extent**—Defines the method that the print service uses to calculate the printed extent of the map.
 - ii. Preserving **map scale** causes the printed map to maintain its scale while recalculating the extent around the existing center point. Preserving **map extent** causes the scale to adjust to fit the current map extent onto the printed map. You can also force a specific scale by clicking the **Force scale** option and providing a scale. Click **current** to populate the value with the present scale of the map.
 - iii. **Output spatial reference WKID**—Defines the output spatial references of the print by specifying a valid well-known ID ([WKID](#)).
 - iv. **Layout metadata**—Allows you to override the default values set in the configuration.
 - v. Specify values for the **Author** and **Copyright** properties to provide current information to the print service. Check the **Include legend** check box to display the legend on the printed map.
 - vi. **MAP_ONLY size**—If the Map_Only format is selected, you can provide dimensions for the **Width** and **Height** properties in pixels. Otherwise, these values are ignored.
 - vii. **Print quality**—Allows you to update the resolution of the printed map.
 - viii. Provide an updated value for the **DPI** (dots per inch) in the text box.
 - ix. **Feature attributes**—If **Include attributes** is checked, the feature's attributes are included in feature collection layers. This is only applicable to custom print services that use the feature attributes, for example, to display a table of features and their attributes.
10. After all options have been set with the applicable values, click Print to submit all information to the print service.

A progress bar displays next to the executing task.



Upon completion of the print job, a link to the print output displays.



- 11. Click the task to open the file in a new window.
- 12. Click Clear prints to clear the print history.

Note: The date and time format of the printout is based on the location of the printer.

11. Appendices

11.1 Appendix A - Naming Conventions

Good naming is required to alleviate many problems when sharing data. The following are recommended names for various design resources. *The following naming conventions can be applied to either DGNs themselves or the models contained in a DGN.*

Note: Throughout Appendix A, LineB is used to indicate a generic alignment

11.1-1 InRoads DTM Names

Uniform model naming is necessary to insure consistency between users and to allow for continuity when projects are passed from one designer to another, or when multiple designers work on the same project. The following list is compiled based on historically used models/surfaces at INDOT.

Tables begin on the next page:

DTM Name	Contents
Des	Proposed design Strings
Des LineA	Proposed design Strings for line LineA
Des Alignments	Proposed Alignments
Des Culvert	Box & Three Sided Culverts Structures
Des Pipes	Drainage Culverts Structures
Des Drive	Drives (if separated from other design strings)
Des Subgrade LineA	Subgrade model for line LineA
Des TEMP RUNAROUND	Temporary Runaround Strings
Underdrain LineA	Underdrains
Hydraulic Surface LineA	Ditches
Sections LineA	Cross Sections for line LineA
Survey alignment	Alignments Created by Survey Unit
Volumes LineA	Volumes calculated along LineA
Topo	Existing Topography information from Survey (provided by the Survey Unit)
Topotria	Triangulated Topo model
Excont	Existing Contours (provided by the Survey Unit)
Prcont	Proposed Contour Models
Merge LineA	Model containing design strings from LineA and topo strings outside the limits of the design
Existing Terrain	Completed and cleaned up Terrain Model surface as created and exported from the OpenRoads Terrain, provided by Survey
Annotation Surface	DTM containing all surveyed features, not to be used for 3D analysis, provided for surface annotation only by Survey
Alternate Naming, Used for larger more complex projects	
Des Roads	Contains Proposed Design strings for all alignments
Des Final	Contains all proposed design strings with all gaps and editing completed
Merge Roads	Model containing design strings from all alignments and topo strings outside the limits of the design
Merge Final	Model containing design strings from all alignments and topo strings outside the limits of the design

Note: Not every project will need every type of suggested model nor is the user restricted to only create the models listed above. Many additional temporary models can be created while using the GUI.

11.1-2 MicroStation Drawing/Model Names

As with the previous section, these are only recommended names for files. Please keep in mind that these can be applied to individual DGN models when one doesn't create a DGN for each file type.

Note: Please abbreviate .dgn/model names as needed using the INDOT standard abbreviations

I.e. Sht – Sheet, MOT - Maintenance of Traffic, etc

nn is used to denote the drawing number when there are multiple DGNs (or sheet files) for the same type of drawing. Users should note that it is acceptable to create multiple sheet models within a single DGN, thus eliminating the need for multiple DGNs with the same description/drawing file name.

<i>Description</i>	<i>Drawing File Name</i>	<i>Examples</i>
Road Project		
Title Sheet	Sht Title.dgn	
Drawing Index and General Notes	Sht Index.dgn	
Typical Cross Sections	Sht Typical_nn.dgn	Sht Typical_07.dgn
Survey Route (Plat No. 1)	Sht Plat1_nn.dgn	Sht Plat1.dgn Sht Plat1_05.dgn
Survey Route Plat with Aerial Photography (Plat No. 3)	Sht Plat3_nn.dgn	Sht Plat3.dgn Sht Plat3_05.dgn
Geometric Tie-Up	Sht Geometric Tie_nn.dgn	Sht Geometric Tie.dgn Sht Geometric Tie_01.dgn
Traffic Maintenance Details	Sht MOT_nn.dgn	Sht MOT 02.dgn
Plan and Profile	Sht PlanProfile_scale_nn.dgn	Sht PlanProfile_50_01.dgn
Superelevation-Transition Diagram	Sht Super_nn.dgn	Sht Super.dgn Sht Super_01.dgn
Details		
Construction Details	Sht Const Detail_scale_nn.dgn	Sht Const Detail_30_01.dgn
Intersection Details	Sht Intersection_scale_nn.dgn	Sht Intersection_30_01.dgn
Spot Elevation Details	Sht Spot Elev_nn.dgn	Sht Spot Elev.dgn Sht Spot Elev_01.dgn
Channel Details	Sht Channel_nn.dgn	Sht Channel_01.dgn
Geometric Details	Sht Geom Detail_nn.dgn	
Right-of-Way Details	Sht ROW Detail_nn.dgn	Sht ROW Detail.dgn Sht ROW Detail_01.dgn
Grading Plan	Sht Grading_scale_nn.dgn	Sht Grading_30_01.dgn
Drainage Details	Sht Drainage_nn.dgn	Sht Drainage_01.dgn
Erosion and Sediment Control Details (plan view)	Sht TEC_scale_nn.dgn	Sht TEC_30_01.dgn
Retaining Wall Details	Sht Retaining Wall_nn.dgn	Sht Retaining Wall.dgn Sht Retaining Wall_01.dgn
Wetland Mitigation Details	Sht Mitigation_scale_nn.dgn	Sht Mitigation_30_01.dgn
Traffic-Work Details		
Signs (if separate traffic-sign plans are not required)	Sht Signs_nn.dgn	Sht Signs.dgn Sht Signs_01.dgn
Signals	Sht Signal_scale_nn.dgn	Sht Signal_30_02.dgn

Lighting (if separate lighting plans are not required)	Sht Lighting_nn.dgn	Sht Lighting.dgn Sht Lighting_01.dgn
Pavement Markings	Sht Pvmt Markings_scale_nn.dgn	Sht Pvmt Markings_30_03.dgn
Road Summary Sheet	Sht Road Summary.dgn	
Description	Drawing File Name	Examples
Bridge Project		
Title Sheet	Sht Title.dgn	
Index	Sht Index.dgn	
Typical Cross Sections	Sht Typical Cross Sections.dgn	
Traffic Maintenance Details	Sht MOT_nn.dgn	Sht MOT_02.dgn
Traffic Detour Details	Sht Detour_nn.dgn	
Temporary Runaround Details	Sht Runaround_scale_nn.dgn	Sht Runaround_50_02.dgn
Road Plan and Profile	Sht PlanProfile_scale_nn.dgn	Sht PlanProfile_50_01.dgn
Superelevation-Transition Diagram	Sht Super_nn.dgn	Sht Super.dgn Sht Super_01.dgn
Roadway Details (see Road Plan sheets)		
Traffic-Work Details (see Road Plan sheets)		
Soil Borings	Sht Borings TB_nn.dgn	Sht Borings TB_01.dgn
Channel Change Layout	Sht Channel_nn.dgn	Sht Channel_01.dgn
Layout	Sht Layout_scale_nn.dgn	Sht Layout_30_01.dgn
General Plan	Sht General Plan.dgn	
Structure Details	Sht Structure.dgn	
Abutment/Bent/Pier Details	Sht End Bent Details_nn.dgn Sht Pier No x_nn.dgn	Sht End Bent Details_02.dgn Sht Pier No 2 and 3_01.dgn
Framing Plan	Sht Framing Plan.dgn	
Structural Steel Details or Precast-Concrete Beam Details	Sht Beam Details_nn.dgn	Sht Beam Details_01.dgn
Bearing Details	Sht Bearings.dgn	
Superstructure/Floor Details	Sht Superstructure_nn.dgn	Sht Superstructure_02.dgn
Railing Details	Sht Railing Details.dgn	
Screeds	Sht Screed_nn.dgn	Sht Screed_02.dgn
Reinforced-Concrete Bridge Approach Details	Sht Approach Slab Details nn.dgn	Sht Approach Slab Details_02.dgn
Bridge Summary	Sht Bridge Summary.dgn	
Road Summary	Sht Road Summary.dgn	
Pipe Materials	Sht Materials.dgn	
Cross Sections	Sht Xsec_scale_nn.dgn	Sht Xsec_50_03.dgn

<i>Description</i>	<i>Drawing File Name</i>	<i>Examples</i>
Traffic-Signs Project		
Title Sheet	Sht Title.dgn	
Index and General Notes	Sht Index.dgn	
Signing Plan	Sht Signing Plan_nn.dgn	Sht Signing Plan_01.dgn
Sign Layout	Sht Panel Sign Layout_nn.dgn Sht Sheet Sign Layout_nn.dgn	Sht Panel Sign Layout_01.dgn / Sht Sheet Sign Layout_01.dgn
Cross Sections	Sht Sign Cross Sections.dgn	
Sign Summary	Sht Panel Sign & Post Summary_nn.dgn Sht Sheet Sign & Post Summary_nn.dgn	Sht Panel Sign & Post Summary_01.dgn Sht Sheet Sign & Post Summary_01.dgn
Footing Details	Sht Signal Footing Details.dgn	
Structural Details	Sht Structural Details.dgn	
Signalization Project		
Title Sheet	Sht Title.dgn	
Index and General Notes	Sht Index.dgn	
Signal Plan	Sht Signal Plan.dgn	Sht US 41 & SR 57 Signal Plan.dgn
Signal Details	Sht Signal Details.dgn	
Lighting Project		
Title Sheet	Sht Title.dgn	
Index and General Notes	Sht Index.dgn	
Lighting Plan	Sht Lighting Plan.dgn	
Cross Sections	Sht Lighting Cross Sections.dgn	
Lighting Details	Sht Lighting Details.dgn	

The following files are required as part of the GIS Data Standards and Validation process. More information on this process can be found in Chapter 9, Section 4.

GIS Deliverables		
GIS Existing Plan	Des #_GIS_explan_stg #.dgn	
GIS Proposed Plan	Des #_GIS_prplan_stg #.dgn	
GIS Right of Way Plan	Des #_GIS_rwplan_stg #.dgn	

Standard Base Drawings		
Drawing Names / Logical Names	Descriptions / Reference Descriptions	Examples
Survey Alignment	Survey Centerline	Survey Alignment.dgn
Survey Section Corner	US Government Section Corners	Survey Section Corner.dgn
Survey Contours	Survey Existing Contours	Survey Contours.dgn
Survey Topography	Survey Existing Topography	Survey Topography.dgn
Survey Triangulation	Existing Triangulation	Survey Triangulation.dgn
Explan scale	Design Existing Topography	Explan 50.dgn Explan 100.dgn
Design Alignment	Design Alignment	Design Alignment.dgn
Prplan scale	Proposed Design Strings	Prplan 50.dgn Prplan 100.dgn
RW Existing scale	Existing Right of Way	RW Existing 50.dgn RW Existing 100.dgn
Annotate Alignment LineB scale	Proposed Alignment Annotation	Annotate alignment LineB 50.dgn Annotate alignment LineB 100.dgn
Annotate Survey Alignment LineB scale	Survey Alignment Annotation	Annotate survey alignment LineB 50.dgn
Annotate station offset LineB scale	Annotation of Survey points with station and offset	Annotate station offset LineB 50.dgn
Annotate survey points LineB scale	Annotation of Survey points	Annotate survey points LineB 50.dgn

Standard Sheet Drawings		
Drawing Names	Descriptions	Examples
Planprofile LineB scale n	Plan & profiles drawings	Planprofile LineB 50 001.dgn PlanProfile LineB 50 002.dgn PlanProfile LineB 50 n.dgn
Layout LineB scale n	Bridge layout sheet	Layout LineB 50 001.dgn Layout LineB 50 002.dgn Layout LineB 50 n.dgn
Const det LineB scale n	Construction details drawings	Const det LineB 50 001.dgn Const det LineB 50 002.dgn Const det LineB 50 n.dgn
Pvmt Markings scale n	Pavement marking details	Pvmt Markings 50.dgn Pvmt Markings 50 01.dgn Pvmt Markings 50 02.dgn Pvmt Markings 50 n.dgn
Runaround LineB scale n	Temporary Runaround plan profile drawings.	Runaround LineB 50 001.dgn Runaround LineB 50 002.dgn Runaround LineB 50 n.dgn
TEC det LineB scale n	Temporary Erosion Control details	TEC det LineB 50 01.dgn TEC det LineB 50 02.dgn TEC det LineB 50 n.dgn
Intersection Det scale n	Intersection details	Intersection det 50 n.dgn

For Sheets created by InRoads, the pertinent Plan Profile Generator Preference should set the default naming appropriately. If this name is incorrect, adjust as necessary.

For all of the above InRoads created sheets, the alignment name, scale, and sheet number indicates which alignment, scale, and sheet number is reflected. Following this convention will allow easy differentiation between alignments and scales.

11.2 Appendix B - MicroStation Libraries

11.2-1 DGN Library

A DGN library is a DGN file used to store:

- Text styles
- Dimension styles
- Levels (Filters)
- Models

These are shared within the workgroup as standards. A DGN library is sometimes referred to as a DGN lib (pronounced with a long 'l'). The recommended file extension for this file is *.dgnlib. Cells/Models, dimension styles, levels, and text styles are created in a DGN library using MicroStation tools, the same way they are created in a DGN file. INDOT DGN libraries are now automatically attached as part of the ProjectWise Managed Workspace. Be aware that if you're not working out of ProjectWise, INDOT specific tools, levels, and customizations will not be available to you.

11.2-2 Text Styles

11.2-2a What Is a Text Style?

MicroStation supports text styles and provides an interface for constructing text using available system fonts and a wide variety of text attributes. A text style comprises a group of text attributes, such as font type, width, height, and color. Text styles enable you to place text within a model in a consistent and automated manner.

The following fonts are supported natively in MicroStation:

- Traditional MicroStation fonts
- TrueType fonts
- AutoCAD Shape fonts (.shx)

Tip1. Fonts are not embedded in the DGN file.

Tip2. If a specific font is not found on the system, MicroStation substitutes font #127, Fast Font.

Tip3. If a Text Style changes in a Text Style library, Text Styles placed in DGN files prior to the change are not automatically updated in the DGN files. To update a DGN file to reflect the changes in the Text Style library, use the dgnlib to **Update from Library** from the text styles dialog.

11.2-2b INDOT Text Styles

Text styles at INDOT have been changed in this new workspace to be more in line with their size and use rather than related to the section of INDOT as in previous workspaces. With the release of this version of the workspace, INDOT has now standardized the use of Tahoma as the primary font used, except in limited circumstances.

You will notice that the Text Styles are now using only True Type fonts. This gives us more flexibility with Bold and Italics settings. The Bentley fonts will only be provided where necessary and will not

be available for new projects. The following tables will show you the settings for each Text Style provided as part of the INDOT Workspace.

<i>Text Style Name</i>	<i>Font</i>	<i>Height (in.)</i>	<i>Width (in.)</i>	<i>Notes/Guidelines for Use</i>
Text Styles for D-Size Plan Sheets				
10 Point Text	Tahoma	0.10	0.10	May be used for table data.
10 Point Text (Existing Elevations)	Tahoma	0.10	0.08	(Italic, Color 222) Use for existing-grade elevations on grid of plan and profile view.
10 Point Text (Survey Text)	Arial Narrow	0.10	0.10	(Color 225) Use for selected survey text.
12 Point Text	Tahoma	0.12	0.12	Use for text callouts, dimensions, and notes. Minimum size for text placed on D-size plans other than text specified under 10 Point Text.
14 Point Text	Tahoma	0.14	0.14	Use for selected text on title block, view subtitles, and column headings in tables.
14 Point Text (Property Owners)	Bookman Old Style	0.14	0.14	Use for parcel-owner text only.
18 Point Text	Tahoma	0.18	0.18	Use for detail and section titles, and table titles on detail sheets.
30 Point Text	Tahoma	0.30	0.30	Use for selected text on title sheet of plans.
GIS Annotation - Full Size	Tahoma	30	30	Used for annotation of GIS Required elements and provided for legacy compatibility.
Text Styles for Ltr-Size Plan Sheets				
6 Point Text	Tahoma	0.06	0.06	May be used for table data, existing-grade elevations on grid of plan and profile view, and selected survey text.
7 Point Text	Tahoma	0.07	0.07	Use for selected text on title block. Column headings in tables, and parcel-owner text.
7 Point Text (Survey Text)	Arial Narrow	0.07	0.07	(Color 222) Use for selected survey text.
9 Point Text	Tahoma	0.09	0.09	Use for text callouts, dimensions, notes, column headings in tables, and parcel-owner text. Minimum size for all text placed on letter-size plans, other than text specified under 6 Point Text.
12 Point Text	Tahoma	0.12	0.12	Use for selected text on title sheet of plans.
14 Point Text	Tahoma	0.14	0.14	Use for detail and section titles, and table titles on detail sheets.

NOTES:

1. All styles are set to 0.65 (exact) line spacing.
2. All styles are Center-Center justified initially.

- All styles are non-bold and non-italic and should remain so unless indicated otherwise above.

(Values in the preceding chart are representative of a 1 to 1 scale)

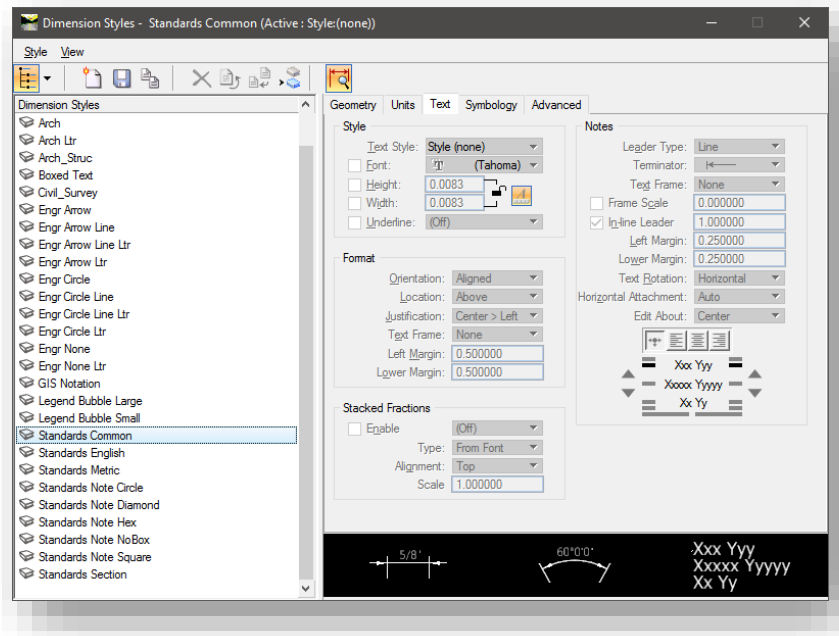
There are additional styles provided from the Bentley default configuration. These named styles come from other application sources and are not used in the INDOT workflow and should not be removed as they are used as part of other default application configurations.

11.2-3 Dimension Styles and Settings

MicroStation dimension styles allow you to save dimension settings by name. This allows for greater unity between groups of dimensions in the file, as several different styles can be used for various models or portions of a model. Dimension styles are managed through the Dimension Styles Settings dialog box.

11.2-3a INDOT Dimension Styles

As with Text Styles, we have made significant changes to our Dimension Styles at INDOT. The first change you will notice is the Dimension Styles Settings dialog box is different. It gives the users more options and breaks the settings down into categories like Geometry, Units, and Text. There is also a preview window at the bottom allowing you to preview the style prior to using it. We have combined all of the old V8 Dimension Styles into 23 styles (7 for full size sheets, 5 for letter size sheets, 2 for architectural sheets, and 9 for standards drawings). These Dimension Styles relate to the size of text and are linked to the appropriate Text Style. The following tables will show you the settings for each Dimension Style that is used in the plans production process:



Text Styles

<i>Dimension Style Name</i>	<i>Text Style</i>	<i>Units</i>	<i>Notes / Settings</i>
<i>Dimension Styles for D-Size Plan Sheets</i>			
Arch	12 Point Text	MU label-SU label, round to nearest 1/16	Arrow terminator, no text frame
Arch_Struc	30 Point Text	MU label-SU label, round to nearest 1/16	Arrow terminator, no text frame
Engr Arrow	12 Point Text	MU label, round to nearest 0.01	Arrow terminator, no text frame
Engr Arrow Line	12 Point Text	MU label, round to nearest 0.01	Arrow terminator, line text frame
Engr Circle	12 Point Text	MU label, round to nearest 0.01	Circle terminator, no text frame
Engr Circle Line	12 Point Text	MU label, round to nearest 0.01	Circle terminator, no text frame
Engr None	12 Point Text	MU label, round to nearest 0.01	No terminator, no text frame
GIS Notation	GIS Annotation – Full Size	MU label, round to nearest 0.01	Arrow terminator, no text frame
<i>Dimension Styles for Ltr-Size Plan Sheets</i>			
Arch Ltr	9 Point Text	MU label-SU label, round to nearest 1/16	Arrow terminator, no text frame
Engr Arrow Ltr	9 Point Text	MU label, round to nearest 0.01	Arrow terminator, no text frame
Engr Arrow Line Ltr	9 Point Text	MU label, round to nearest 0.01	Arrow terminator, line text frame
Engr Circle Ltr	9 Point Text	MU label, round to nearest 0.01	Circle terminator, no text frame
Engr Circle Line Ltr	9 Point Text	MU label, round to nearest 0.01	Circle terminator, no text frame
Engr None Ltr	9 Point Text	MU label, round to nearest 0.01	No terminator, no text frame

NOTES:

1. All styles are set to use Working Units.
2. All styles are set to Dynamic Justify text notes.

(Values in the above chart are representative of a 1 to 1 scale)

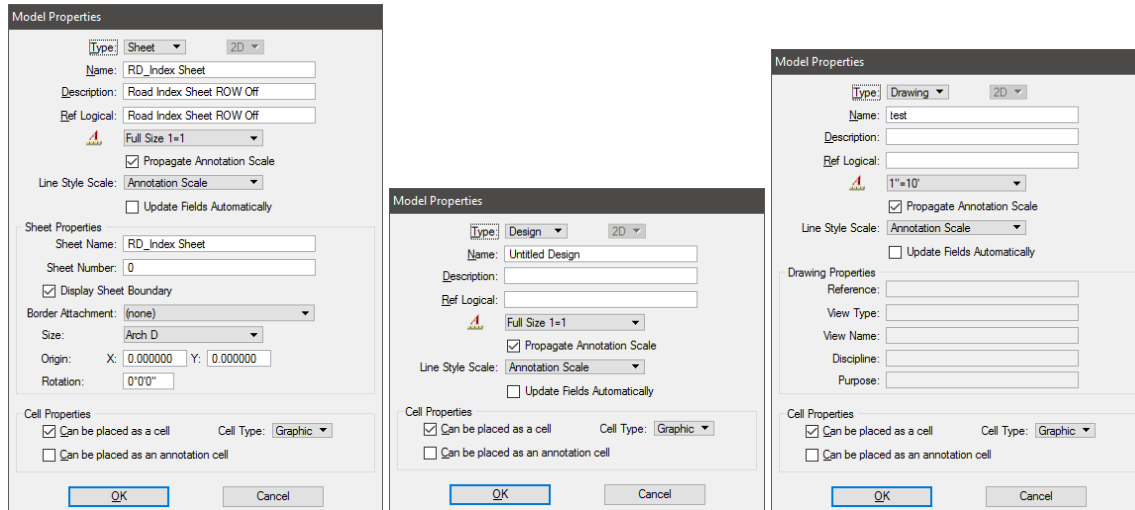
11.3 Appendix C - MicroStation Advanced References

11.3-1 Models

A Model gives you the ability to store multiple independent sets of design data within the same file.

(See Appendix A for recommended naming)

11.3-1a Model Properties



Model Properties dialog box for Sheet (left), Design (center), and Drawing (right)

Type

Sets the model's type (Sheet, Design, or Drawing) and dimensionality (2D or 3D).

Name

Sets the model's name.

Description

Sets the model's description.

Ref Logical

Sets the Reference Logical name for the model. The logical name identifies the model when the DGN file is attached to another file as a reference (see the Reference Attachment Setting dialog box).

Annotation Scale

Switching to InRoads has changed philosophy in regards to the use of annotation scale. Any non-InRoads sheet will continue to use these tools, however those sheets generated either with the Plan and Profile Generator or those created from the Cross Sections tools are maintained at 1:1 scale with the borders scaled up to the data. In these instances, all features, including linestyles, are scaled independently of the Annotation Scale settings.

Display Sheet Boundary

(Sheet Model only) If on, a sheet element will display in the new sheet model.

Size

(Sheet Models only) Sets the sheet size. Standard sheet sizes are available from the drop-down menu, or you can select Custom and input your own size values in the H and W fields. The H and W fields are disabled when a standard sheet size is chosen.

Origin

(Sheet Models only) Sets the origin of the sheet.

Rotation

(Sheet Models only) Sets the rotation angle of the sheet, measured in degrees counter-clockwise from the x-axis (horizontal).

Can be placed as a cell

If on, it is possible to place the model as a cell. (Should be checked by default)

Cell Type

Sets the cell type (Graphic or Point). This option menu is enabled only if ***Can be placed as a cell*** is on.

OK

Accepts the changes and closes the dialog box.

Cancel

Closes the dialog box without making any changes.

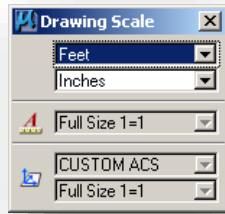
11.3-2 Drawing Scale

The Drawing Scale window is used to adjust drawing scale settings. These settings are particularly relevant to the process of creating sheet models for drawing production.

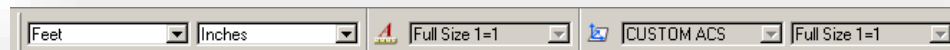
To open the Drawing Scale window, navigate to ***MicroStation > Settings > Drawing Scale***.

Drawing Scale window

The Drawing Scale window is a dockable window that contains controls for viewing and/or modifying working units, the annotation scale factor, and the Annotation Scale Lock.



Drawing/Annotation Scale Dialog



Drawing/Annotation Scale Docked

The units that display in the Master Units and Sub Units option menus can be customized by editing the file "units.def". The scale factors that display in the annotation scale option menu can be customized by editing the file "scales.def" (do not attempt to edit this file).

Note: The selection of controls displayed in the Drawing Scale window can be customized by right-clicking in the window. The technique is the same as that for showing and hiding tools in tool boxes.

Master Units (option menu)

Sets the Master Units component of working units.

Sub Units (option menu)

Sets the Sub Units component of working units.

Annotation Scale (option menu)

Sets the annotation scale factor.

Annotation Scale (Icon)

Sets the Annotation Scale Lock. When this lock is on, the annotation scale is applied to any text that is placed in the model.

Scaling Definitions

The following charts represent the scales defined in the scales.def file.

Note: The scales in this chart are to be used on metric sheets or US sheets (straight ratio) as well as metric base drawings when setting the annotation scale.

Scale Name	Scale Factor
Full Size 1=1	1:1
6"=1'-0"	2:1
3"=1'-0"	4:1
1 1/2"=1'-0"	8:1
1"=1'-0"	12:1
3/4"=1'-0"	16:1
1/2"=1'-0"	21:1
3/8"=1'-0"	32:1
1/4"=1'-0"	48:1
3/16"=1'-0"	64:1
1/8"=1'-0"	96:1
1/16"=1'-0"	192:1
1/32"=1'-0"	384:1
1"=10'	120:1
1"=20'	240:1
1"=30'	360:1
1"=40'	480:1
1"=50'	600:1
1"=60'	720:1
1"=100'	1200:1
1"=200'	2400:1
1"=300'	3600:1
1"=400'	4800:1
1"=500'	6000:1
1"=600'	7200:1
1"=1000'	12000:1

11.3-3 Reference Files and Models

With the emphasis of the use of Models at INDOT it is very important to understand how they are used and how they can be referenced within a dgn (self referencing), to another DGN, and back (Cyclical referencing).

11.3-3a Using References

Elements in a reference display as though they were in the active model. Although you cannot manipulate the elements in a reference, you can snap to them and even copy them into the active model.

The most common usage of references is in the creation of design compositions. Design compositions are used by engineers and other technical professionals to communicate through the visual content of their designs.

To create a **design composition** using MicroStation, you build a design model consisting of a working collection of references used in the performance of particular engineering tasks. For example, you may attach as references a collection of survey points as a guide for placement of additional geometry. Reference attachments in a design composition are usually coincident.

It is sometimes convenient to refer to one part of a model while drawing in another area by attaching the active model to itself.

You can attach a redline file created using Bentley Redline to your model for reviewing purposes.

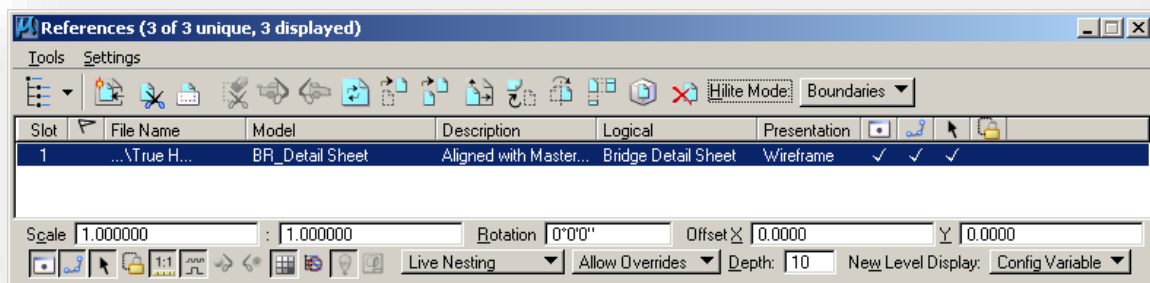
Another common usage of references is in the creation of drawings for publication. This task is called drawing composition. Whereas a design composition is typically contained in a design model, a drawing is composed in a sheet model.

11.3-3b Attaching references

The most common way to attach a reference is to attach it coincidentally, which means that the coordinates of the referenced model's design plane and optionally its Global Origin are aligned with those of the active model, without any rotation, scaling, or offset.

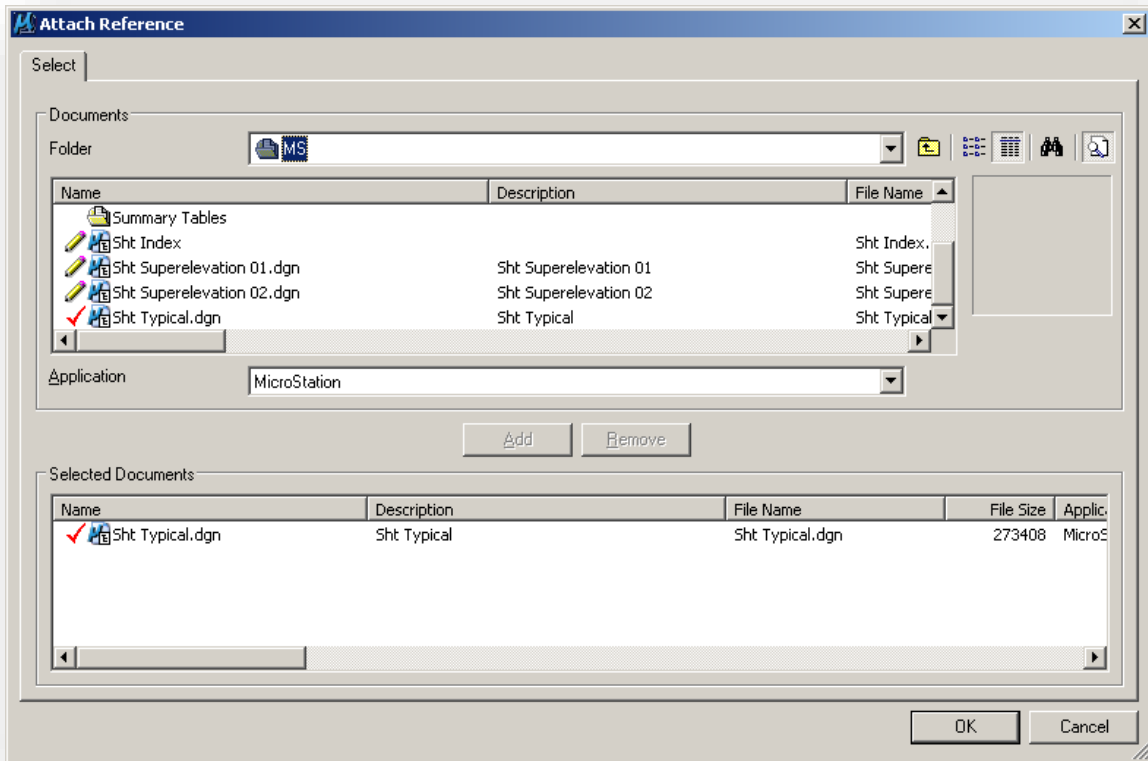
To attach a reference coincidentally:

From the File menu, choose Reference. (The References dialog box opens.)



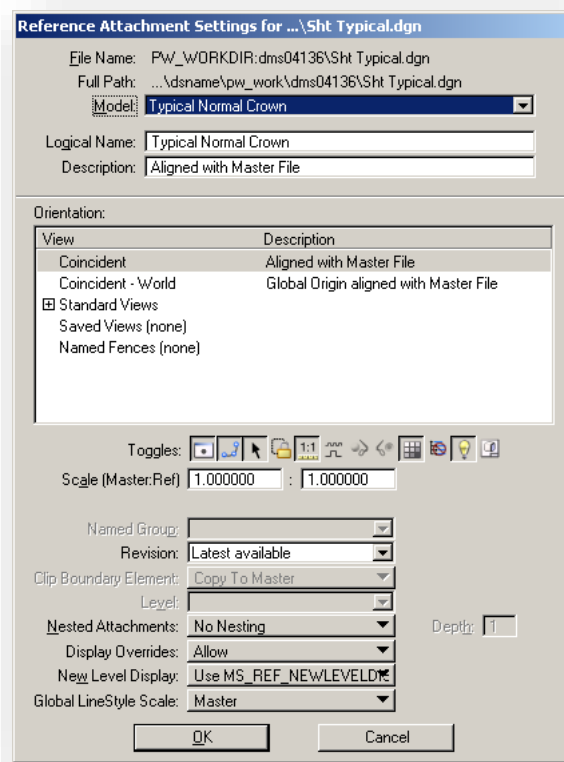
References Dialog

1. From the dialog box's Tools menu, choose Attach. Or In the Reference dialog box, right-click in the list box and choose Attach from the pull down menu. (The Attach Reference dialog box opens.)



ProjectWise Attach Reference Dialog

2. Select the DGN file that contains the model to attach as a reference and click ADD and then click OK. (The Attach Reference Settings dialog box opens.)



Reference Attachment Settings

3. (Optional) From the Model option menu, choose the model to attach.
4. The default is the reference's master model.
5. (Optional) (*unless the selected model is already attached*) In the Logical Name field, key in a brief name for the attachment.
6. (Optional) In the dialog box's Description field, key in a description of the model.
7. To align the reference with the active model with regard to both Global Origin and design plane coordinates, select Coincident - World in the Orientation list box. This option is available only when referencing a model in a DGN file. Or To align the reference with regard to design plane coordinates only, select Coincident in the Orientation list box.
8. (Optional) In the Scale (Master:Ref) fields, define the ratio of the active model's Master Units to the referenced model's Master Units. For example:

To set	Left	Right
One active model master unit per referenced model master unit (the default).	1	1
Five active model master units per referenced model master unit.	5	1

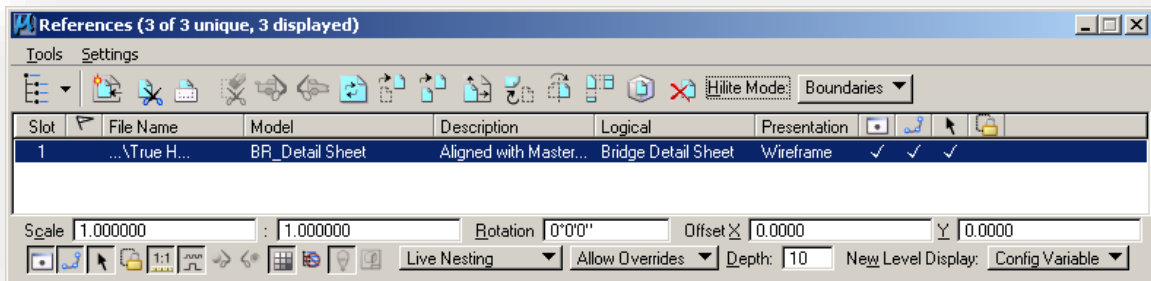
Note: Since the same model can be attached many times, give the references logical names and descriptions that help you remember which reference is which.

11.3-3c Working with nested references

When a MicroStation design file used as a reference has its own attachments, they become nested references. The links between these files can be maintained through many levels (depths) of nesting, so that if you open only one file, you can view the contents of many files. The individual references can be updated, and the changes will be shown in the master (or parent) file. When you attach a parent reference to your model and turn on live nesting, you can also control how many levels of nested references are attached to the model.

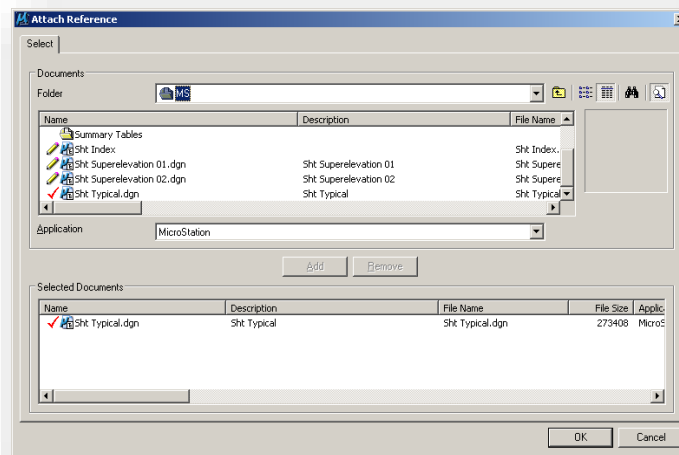
To attach a reference with live nesting

1. In the Primary tool box, click the References icon. (The Reference dialog box opens.)



References Dialog

2. In the dialog box's tool bar, select the Attach Reference tool. (The Attach Reference dialog box opens.)



ProjectWise Attach Reference Dialog

3. Select the DGN file that contains the model to attach as a reference, and click OK. (The Attach References Settings dialog box opens.)
4. From the Nested Attachments options menu, choose Live Nesting.
5. The Nested Attachments options are only available when the selected model has referenced attachments. When the Live Nesting option is on, the hierarchical structure of any nested references are maintained when attaching the parent reference to a model. In MicroStation, a nested attachment is displayed only if the child reference does not have its Ignore Attachment When Live Nesting setting turned on (in the Attachment Settings dialog box), and the parent reference has Live Nesting enabled.
6. In the Nest Depth field, enter a high value (for example, 10).
7. Set the depth setting to a high number to include even the most deeply nested references. Although the nested attachments will display in the view window, you will see only the parent reference in the References dialog box's list box.

Nested Attachments

Determines if referenced models attached to reference models (and so on) are recognized when a model is attached to the active model.

- No Nesting — Models attached to the attached model are not recognized in the active model.
- Live Nesting — Models attached to the attached model are recognized in the active model.
- Copy Attachments — Models attached to the attached model copied into the active model.

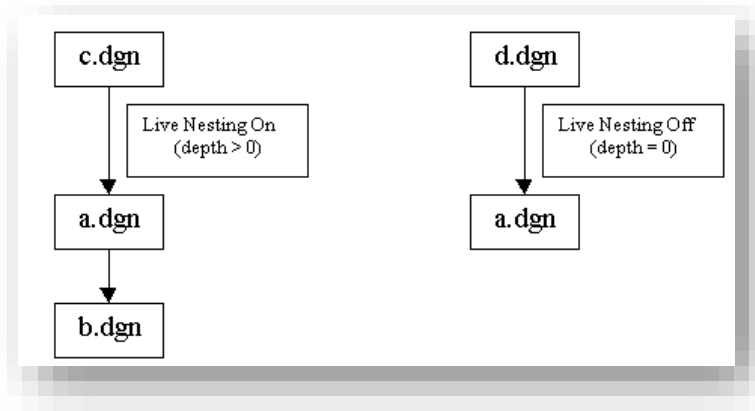
When working in a DWG or DXF file, live nesting is always on, and there is no limit to nest depth. Therefore the Nested Attachments and Depth items are disabled. To control the display of nested attachments, use the Ignore Attachment When Live Nesting setting (on the Attachment Settings dialog box).

Nest Depth

Sets the number of levels of referenced models that are recognized. Models can have their own referenced models, which, in turn, can have more referenced models, and so on.

If Depth is set to 0, only the model is attached to the master model; referenced models in the referenced model are ignored.

MicroStation V8i includes the ability for live nesting of reference files. Essentially this means that referencing a file causes its children (and potentially their children) to be automatically referenced as well. For example, a MicroStation design file a.dgn has a single reference b.dgn that is attached as a standard attachment. In MicroStation, it is possible to attach a.dgn as a reference and include the display of b.dgn (in c.dgn) or to disable the display of children by turning off live nesting (in d.dgn).



Nested Reference Map

11.3-4 Levels

In the new unified workspace environment we have taken and combined the levels from all previous workspaces to eliminate redundancy and establish consistency throughout the agency. The total number of levels is now well over 650. Due to the large number of levels, Filters can be used to limit the level list to only those levels needed.

11.3-4a Level Classifications

With the large number of levels that now exist in the INDOT CAD Workspace; a new level naming scheme has been created to assist in filter creation, and for consistent creation and categorization of levels.

Example: P_RDWY_Guardrail

- P_ - First Position Prefix, indicates that the level contains information related to Proposed work
- RDWY_ - Second Position Prefix, indicates that the level contains information related to Roadway Features
- Guardrail - Brief Description, indicates that the level contains line work specifically related to Guardrail

The following table lists the new level classifications:

<i>First Position</i>	<i>Description</i>	<i>Second Position</i>	<i>Description</i>
G_	Ground Surface	SURF_	Surface Features
P_	Proposed	EW_	Earthworks Features
RW_	Right of Way	HY_	Hydraulics Feature
S_	Survey (TOPO)	RDWY_	Roadway Feature
XS_	Cross Section	ALG_	Alignment
CG_	COGO Points	BR_	Bridge Features
PROF_	Profile Features	CTRL_	Survey Control
ST_	Standards Drawings	DR_	Drainage Features
PP_	Plans Production	PROP_	Property Features
BD_	Border	RW_	Right of Way
E_	Existing Features (non-Survey)	TOPO_	Topographical Features
CC_	Construction	TRAF_	Traffic Features
XT_	Cross Section Template	UTIL_	Utility Features
		G_	Graphical Feature
		TC_	Template Component
		E_	Existing Feature
		OBJT_	Object (Standards Only)
		ANNO_	Annotation (Standards Only)
		REFR_	Reference (Standards Only)
		TTLB_	Title Block (Standards Only)

		TXT_	Text
		SHT_	Sheet
		TL	Template Library
		EC	Erosion Control
		PVMT	Pavement

11.3-4b Level Filters

Filters are a useful way to group associated levels for the purposes of viewing or not viewing as a group. For example, you might have a DGN file with several hundred levels. Within these levels could be filters for different disciplines such as Bridge and Traffic. Within Bridge there might be levels for proposed or existing elements. You could easily define a filter called Bridge that would show only levels that would be associated with Bridge work.

Filters can be named, saved, and recalled as needed or defined on-the-fly for immediate one-time viewing using the Filter Row in the Level Manager dialog box. Filters can be turned on or off using the Level Display dialog box. Filters can be used to turn on or off levels across a model and all of its attached models.

Levels can be filtered by a number of attributes such as filename, color, style, line weight, and level groups, to name a few. To display the levels that are defined in a filter, select the Active Level filter button from the Attributes toolbar and select the filter of choice. This will display those levels only and turn off all other levels in the dgn. Note that the levels will not actually be turned on or off, but the ability to view them in the Level Display will be dictated by the filter selected.

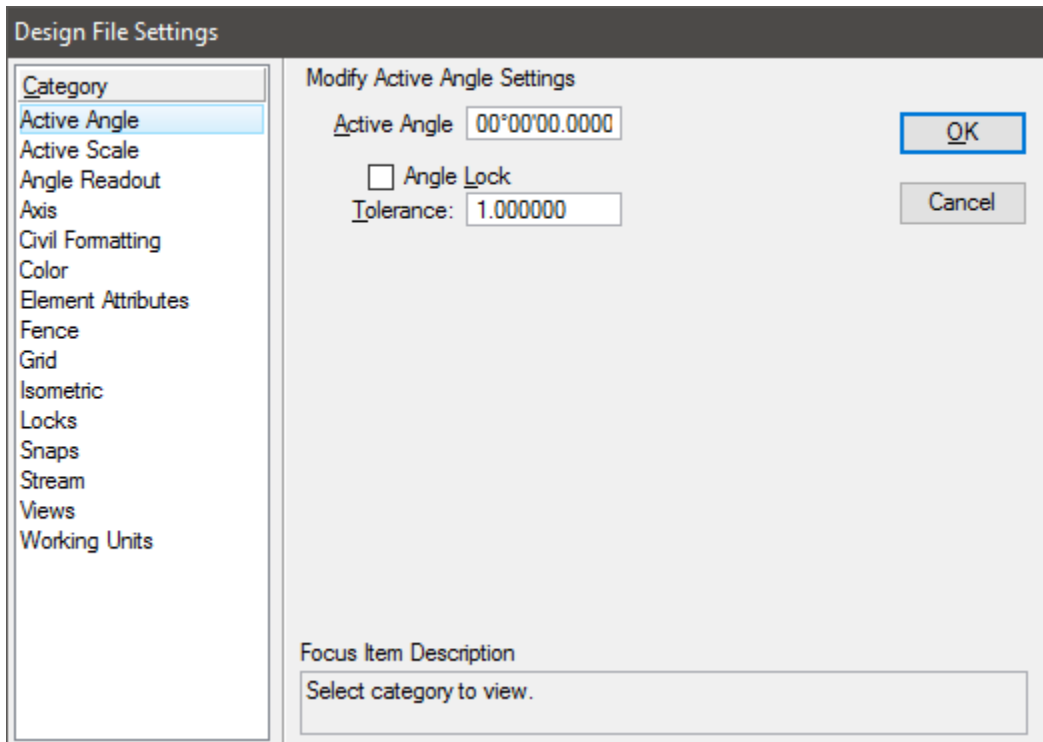
DOTwise now offers an updated set of filters for use within the CAD Workspace. Due to the updated level naming convention, levels are now filtered by categorization instead of rigidly defined level definitions. The following table explains the qualifications for the new filters:

Filter Name	Description
_IN Bridge	Level name contains _BR_
Bridge - Existing	Level name starts with S_BR_ or E_BR_
Bridge - Proposed	Level name starts with P_BR_
IN COGO	Level name starts with CG
_IN Cross Section Components	Level name starts with XS_TC_
_IN Drainage	Level name contains _DR_
Drainage - Existing	Level name starts with S_DR_ or E_DR_
Drainage - Proposed	Level name starts with P_DR_
_IN Erosion Control	Level name contains _EC_
Erosion Control Proposed	Level name starts with P_EC_
_IN Rehab	Custom Level filter as specified by Bridge Rehab
IN Right of Way	Level name contains RW
Right of Way - Existing	Level name starts with S_RW_ or E_RW_
Right of Way - Proposed	Level name starts with RW_
_IN Roadway	Level name contains _RDWY_
Roadway - Existing	Level name starts with S_RDWY_ or E_RDWY_
Roadway - Proposed	Level name starts with P_RDWY_

IN Sheet Component	Level name contains BD, PP_, XS_G_
Sheet Component - Border	Level name contains BD_
Sheet Component - Cross Section	Level name contains XS_G_
Sheet Component - Plans Production	Level name contains PP_
IN Standards	Level name starts with ST
IN Survey	Level name starts with S
Survey - Bridge	Level name starts with S_BR_
Survey - Drainage	Level name starts with S_DR_
Survey - Property	Level name starts with S_PROP_
Survey - Right of Way	Level name starts with S_RW_
Survey - Roadway	Level name starts with S_RDWY_
Survey - Surface	Level name starts with S_SURF_
Survey - Survey Control	Level name starts with S_CTRL_
Survey - TOPO	Level name starts with S_TOPO_
Survey - Traffic	Level name starts with S_TRAF_
Survey - Utilities	Level name starts with S_UTIL_
_IN Text Levels	Level names contain TXT, Text
_IN Traffic	Level names contain _TRAF_
Traffic - Existing	Level names start with E_TRAF_ or S_TRAF_
Traffic - Proposed	Level names start with P_TRAF_
_IN Triangulation and Contours	Level name starts with G_SURF_

11.3-5 Design File Settings

Under Settings> Design File you will see the following screen:



Design Files

Active Angle

Sets the Active Angle — the angle, in degrees, used with tools that require an angle specification, including the Place Line, the Place Active Cell, the Place Text, the Rotate, and the Construct Array. If Angle Lock is enabled, the Active Angle is rounded to the nearest multiple, in degrees, of the specified tolerance.

Active Scale

Consists of controls that are used to set the active scale factors and to toggle Scale Lock.

Angle Readout

Controls how angular measurements are reported.

Axis

Consists of controls that are also available in the Axis section of the Locks dialog box. (Settings menu > Locks > Full)

Axis Lock: If on, each data point is forced to lie at an angle (or multiples of that angle) from the previous data point. The angle is specified by the (Axis) Increment relative to the (Axis) Start Angle.

Civil Formatting

Controls display of Civil Geometry functions and features.

Color

Consists of controls that are used to modify the color settings in the elements and the dynamic X pointer along with the color of a selection set.

Element Attributes

Color, line style, line weight, class, level, and fill. Global Line Scale can also be adjusted here.

Fence

Consists only of a control used to set the fence selection mode.

Grid

Consists of controls that are used to set Grid Lock and the grid's spacing and configuration. If Grid Lock is enabled, each data point is forced to lie on the grid.

Isometric

If Isometric Lock is enabled, each data point is forced to lie on the Isometric Plane.

Locks

Consists of controls that are also available in the Locks dialog box.

Text Node Lock: If on, newly placed text is attached to empty text nodes, and you cannot place text if there aren't any empty text nodes.

Level Lock: If on, you can select elements only on the Active Level; you cannot manipulate elements that are not on the Active Level.

Graphic Group: If on, any manipulation performed on one member of a graphic group is automatically performed on all members. If off, the member elements of a graphic group can be manipulated individually.

ACS Plane: (3D only) If on, each data point is forced to lie on the Active ACS's XY plane ($z=0$). Still you can snap to elements at any depth.

The Active ACS is set in the Auxiliary Coordinates System dialog box, which is opened by choosing Auxiliary Coordinates from the Utilities menu.

Snaps

Consists of controls that are also available in the Locks dialog box.

Association:

If on, an association point is created each time an element is snapped to: Dimensioning tools, the Place Multi-line tool, the Place Active Cell tool or Use Shared Cell.

ACS Plane Snap:

(3D only) If on, and AccuDraw is active, the first snap point is forced to lie on the Active ACS's XY plane ($z=0$).

Depth Lock:

(3D Only) If on, each tentative point is projected along the view z-axis at the Active Depth.

Stream

Consists of controls that are used to set how data points are sampled while using the Place Stream Line String tool and the Place Point or Stream Curve tool.

Stream Delta:

Sets the minimum distance, in working units, between sampled points (vertices in the stream line string or curve).

When the distance between the pointer's location and the previously sampled point exceeds the Active Stream Delta, the point is sampled and the Tolerance, Stream Angle, and Stream Area are applied to see if a data point should be recorded.

Stream Tol(erance):

Sets the maximum distance, in working units, between recorded data points. The distance from the most recently recorded data point is checked for each sampled point. If that distance exceeds the active stream Tolerance, the sampled point is recorded as a data point.

Stream Angle

Set the angle, in degrees, that when exceeded, causes the last sampled point (not the current one) to be recorded as a data point.

Stream Area:

Set the area that, when exceeded, causes a sampled point to be recorded as a data point.

Acceptance Display:

If on, the status bar shows criteria being satisfied as data points are recorded with the Place Stream Line String tool or Place Stream Curve tool.

Views

To edit Pixel width and Height in the corresponding view. Enabling Proportional Resize will maintain the current displays aspect ratio when resizing. Background allow for a user defined background image for the display.

Working Units

The units in which the current dgn is working in.

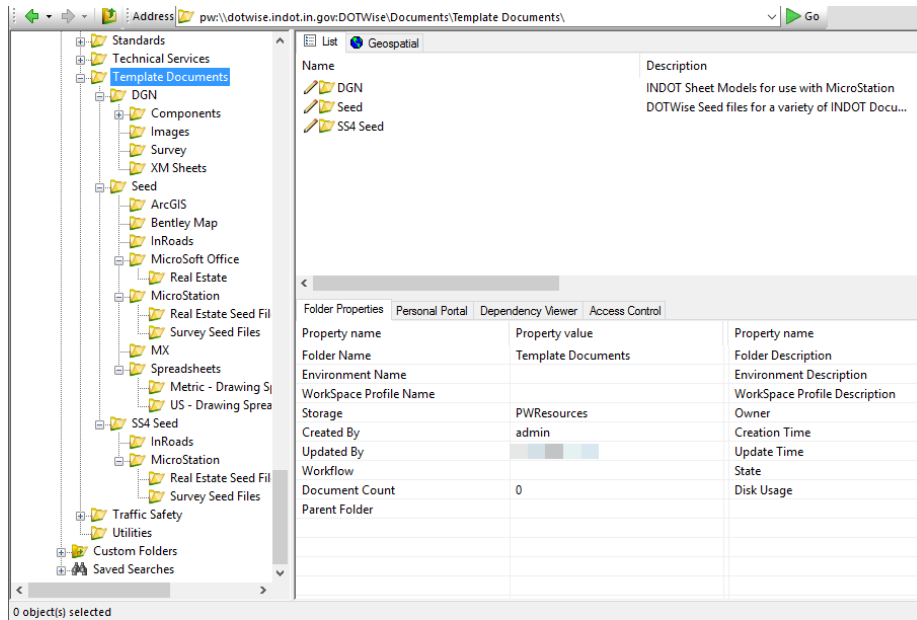
11.3-6 Seed Files – (Template Documents)

The following paragraph is quoted from the *Bentley Institute Course Guide* titled **ProjectWise V8 XM Edition User**.

“A ProjectWise template is the same as a Microsoft template, or a seed file in MicroStation. It is a file that is copied to create a new document. You can use a document stored in ProjectWise or document that resides outside ProjectWise as a template.”

All Seed files can be found under the [Template Documents\SS4 Seed](#) folder in ProjectWise. Each set of seed files (Template Documents) resides within a sub folder describing their specific use. (Example: MicroStation files are stored in the MicroStation folder).

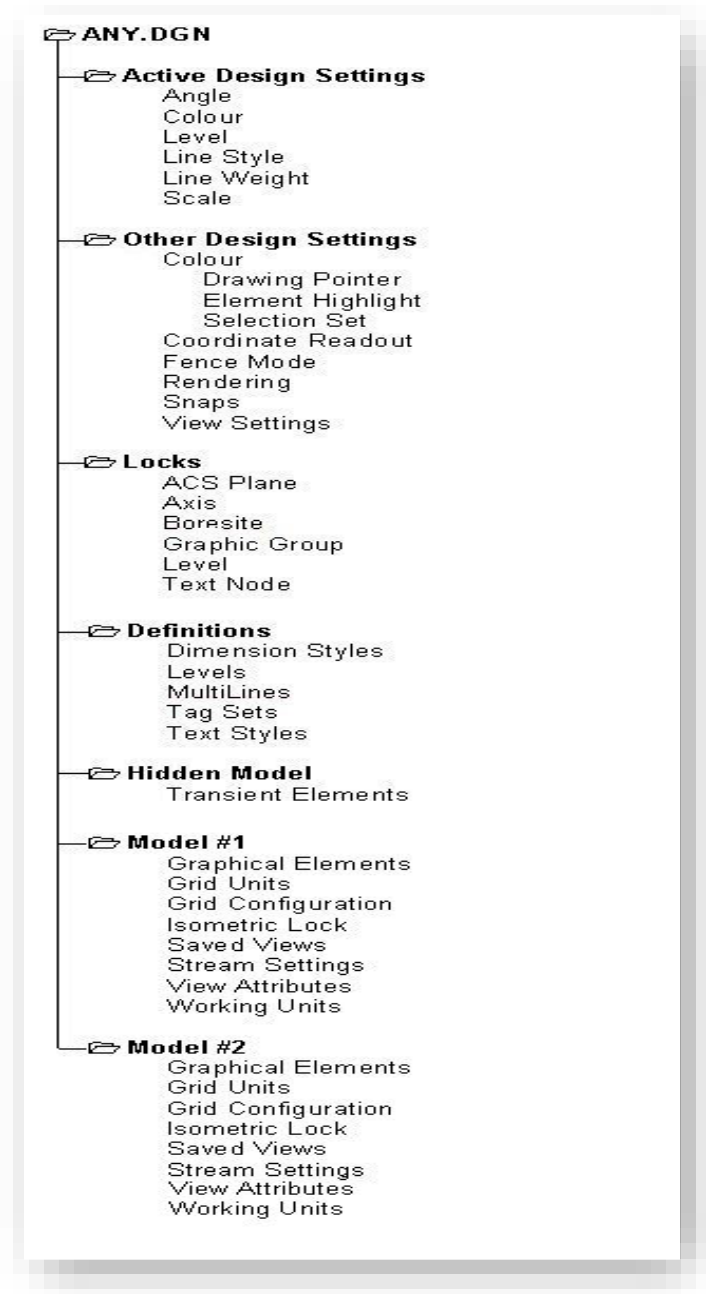
Documents\Template Documents



ProjectWise Template Documents

11.3-7 Structure of a V8 Design File

We've had a number of requests from users for a chart that shows the "structure of a design file" for an understanding of which settings are stored globally and which are stored with the model. The following image is only intended for learning purposes and is *not* a technical representation of the design file structure:



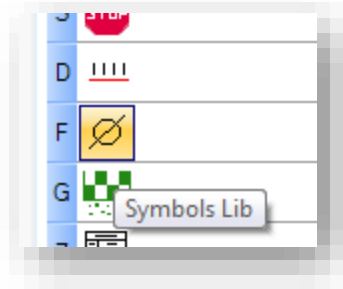
DGN Feature Map

11.3-8 Cell Libraries

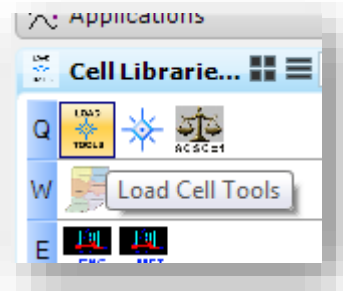
With the move to a ProjectWise Managed Workspace, cells should no longer be directly referenced from outside MicroStation. All Cell Libraries can be found on the **Cell Libraries/Tools** task in the MicroStation interface.

11.3-9 Using Place Cell Along for MOT Barrels

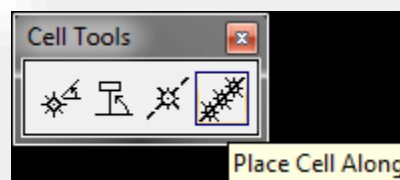
1. Attach the IN_Symbols cell library from either the INDOT Tools -> Cell Libraries -> Symbols Lib task navigator or Element -> Cells and File -> Attach File.



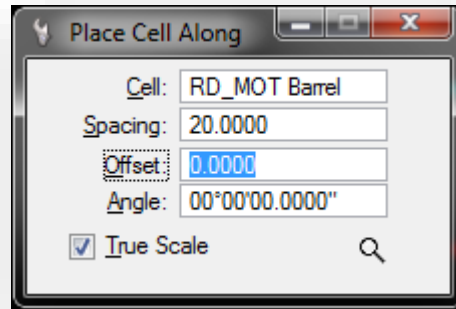
2. In the cell selector, activate RD_MOT Barrel for Placement by double clicking on it.
3. Start the Cell Tools from the task navigator under INDOT Tools -> Cell Libraries -> Load Cell Tools button.



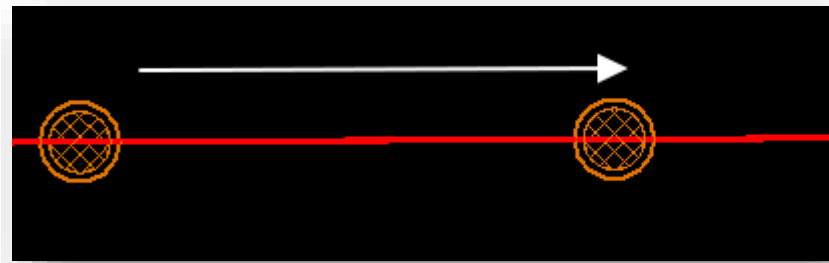
4. Select the Place Cell Along tool from the Cell Tools toolbox.



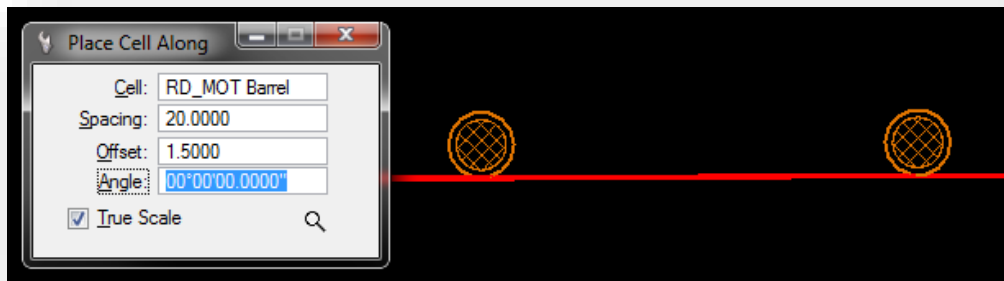
- The RD_MOT Barrel is already active from selecting placement earlier. At this time you can adjust the spacing as needed, along with the angle and offset.



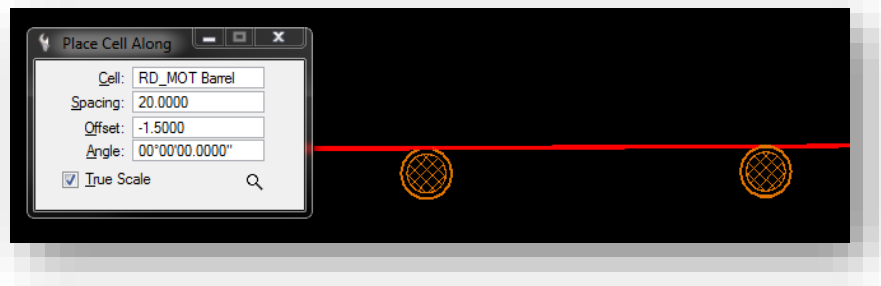
- When satisfied with the settings, click on the line you'd like to place the cells along. Your initial selection point will be the starting point of the cells, so if you require a certain point, make sure to tentative snap to it. Note that the placement of the cell is always in the direction of the element.



- The Offset value should be used when you want to adjust which side of the linear element you'd like to place the cells. Each of the following illustrations shows how the cells behave with a linear element drawn from right to left:



Cells are placed at a positive 1.5 offset, on a line drawn along a line from left to right.



Cells placed at a negative -1.5 offset, on a line drawn along a line from left to right.

A Few Items of Note:

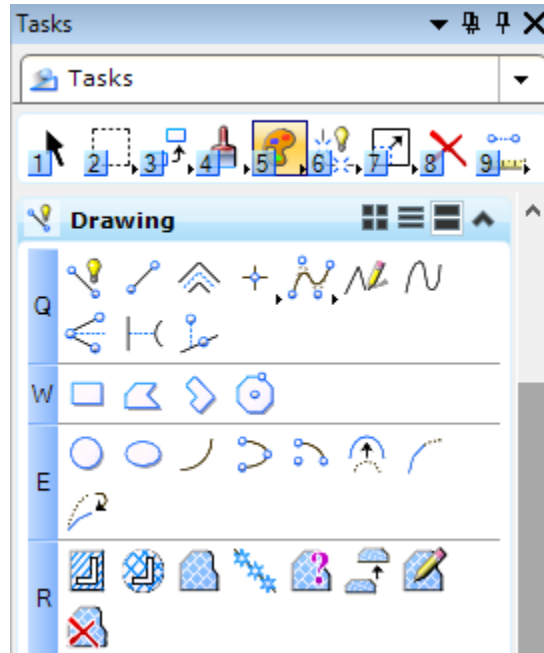
- a. This tool does work with complex chains and graphic groups, so it will work along an alignment
- b. Each cell is a distinct element, so they can be modified after placement without affecting other cells placed along the element.
- c. There is no way to limit the number of occurrences of cell placement, as this tool will place cells along an element to where it ends.

11.4 Appendix D - MicroStation Tips and Functionality

11.4-1 Task Navigation Tips

Task Navigation can be displayed horizontally as well as the default vertical. As with other tool bars in MicroStation, tools can be stretched and reoriented. The default placement for this toolbar is on the right side of the MicroStation window displayed vertically.

Note: The main icons have numbers in the lower left corner for quick activation. Tasks icons have Letters in the lower left corner.

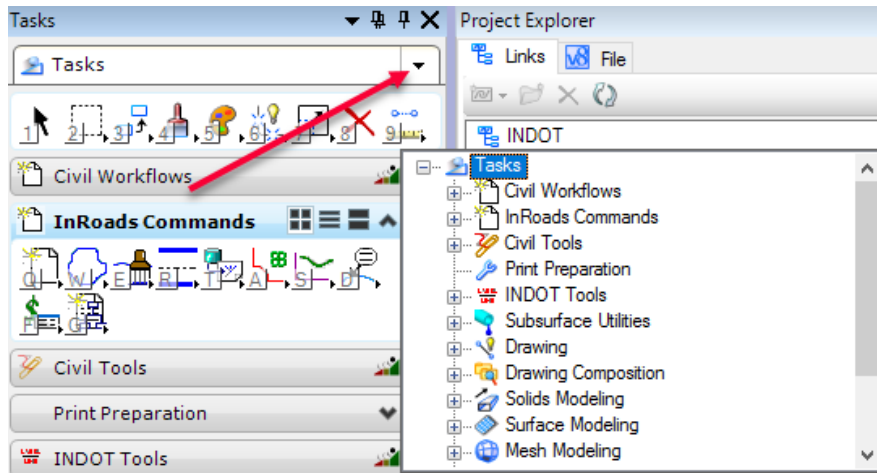


The task list icon allows users to select the appropriate task.

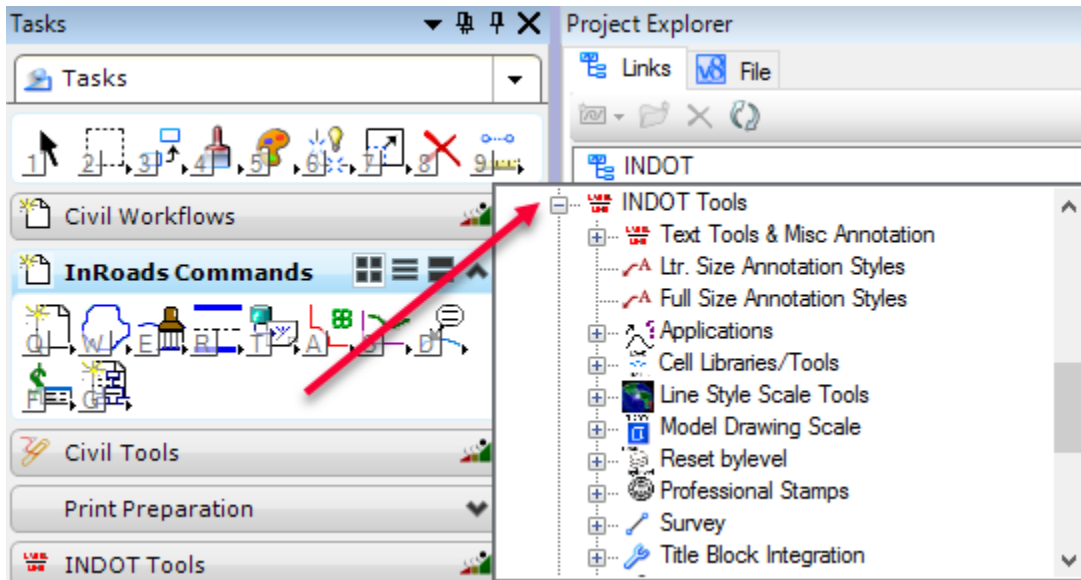


The default tasks are drawing and drawing composition. Since some tasks require the same tools, tasks can include some of the same tools.

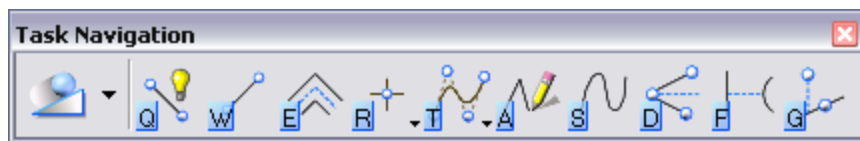
The task list can be expanded where the plus symbols exist.



Certain tasks are subs to other tasks as illustrated in the following image:

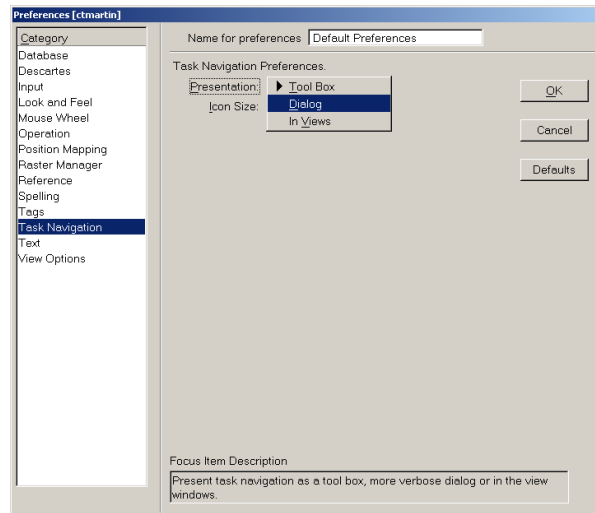


The resulting toolbar would look as follows:

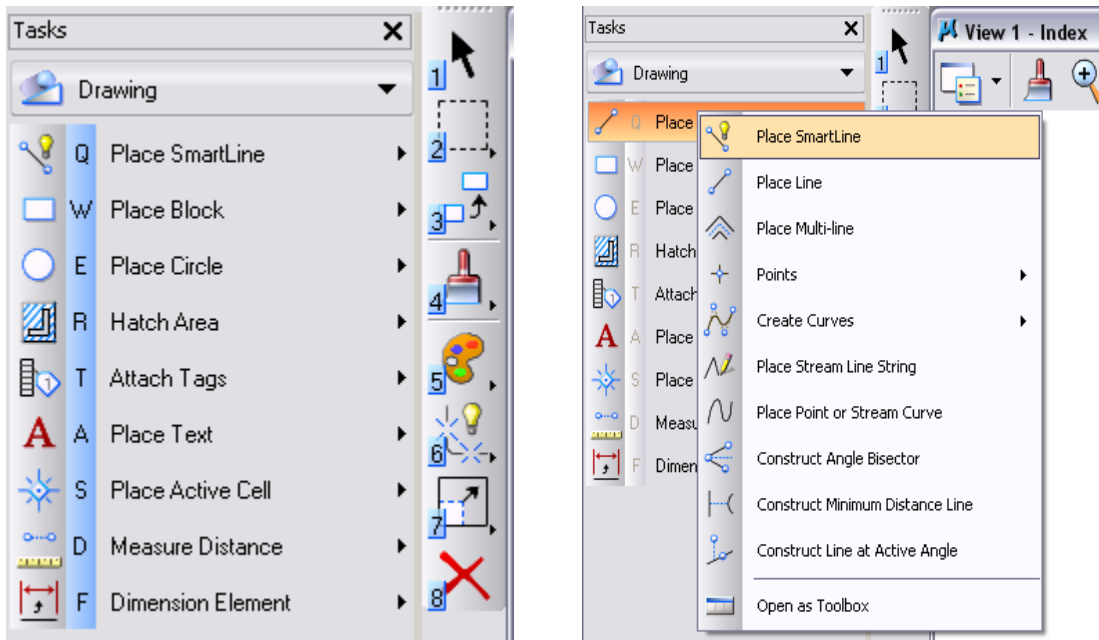


Hint: Simplification of Tasks can be achieved by changing how tasks are displayed in the user preferences. Users who are new to MicroStation may not know what an icon is indicating. This modified view shows the icons in conjunction with text describing the tools.

To implement this change, users should select from the Cad menu. *Workspace -> Preferences -> Task Navigation -> Presentation -> Dialog.*



Resulting Task Navigation dialog:






Sub items can select when the *expand arrow* exists.

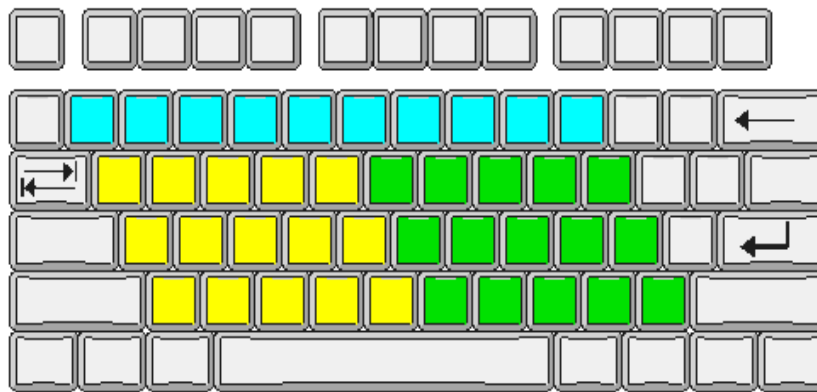
Open as toolbox allows users to work as with previous versions of MicroStation.

11.4-2 Positional keyboard Mapping

Positional mapping allows users to access commands by selecting the items from the Keyboard. The keyboard is divided into zones to group access to commands. Further discussion on how positional mapping works is covered in the following Dialog Focus section.

Positional keyboard navigation is a technique to map user-defined zones of the keyboard to logical collections of interface items. This technique lets you use the keyboard to select tools, open dialogs, and change settings.

-  These Keys are mapped to the Main toolbar.
-  These keys are mapped to the task toolbar.
-  These keys are mapped to tool settings.



11.4-3 Dialog Focus

MicroStation manages the inputs from users for positional mapping by managing the focus (or part of MicroStation you are currently interacting with). Feedback is provided to the user on the MS status bar in the lower right. Focus is indicated with the following icons:



Home focus, tool settings window, Key-in, AccuDraw

When at home focus, the keyboard key selected corresponds to the tool selected. Home focus also allows tools to be changed. To return to home focus Press **Esc**

When placing an element, focus may move to tool settings (as settings are changed), to AccuDraw (as precision input is provided) during placement, and then to home.

Access Tools in the Main Toolbox with Positional mapping:

With focus at home, pressing a number will access the main tool box. For Example selecting 3 will open a menu at the current cursor location listing the manipulate tools. Pressing a second number, let's say 1, will access copy. Remember Esc returns dialog focus to home.

Some examples of the sequence would be:

- Esc -> 3 ->3 Scale
- Esc -> 7 ->1 Modify element
- Esc -> 4 ->4 Window Area

Access Tools in Task Navigation with Positional mapping.

With focus at home, pressing a letter will access the task toolbox. For Example, selecting Q will open a menu at the current cursor location listing the tools. Pressing a second entry, let's say 2, will access Place line. Remember Esc returns dialog focus to home.

Some examples of the sequence would be:

- Esc -> Q ->1 Place Smart line
- Esc -> A ->1 Place Text
- Esc -> D ->5 Measure Area
- Tips: <space> Switches focus to AccuDraw

11.4.4 View toolbar

The view toolbar has been repositioned at the top left of the View window. The default view toolbar for 3D drawings has the following icons. The icons are referenced as listed starting at 1 from left to right.

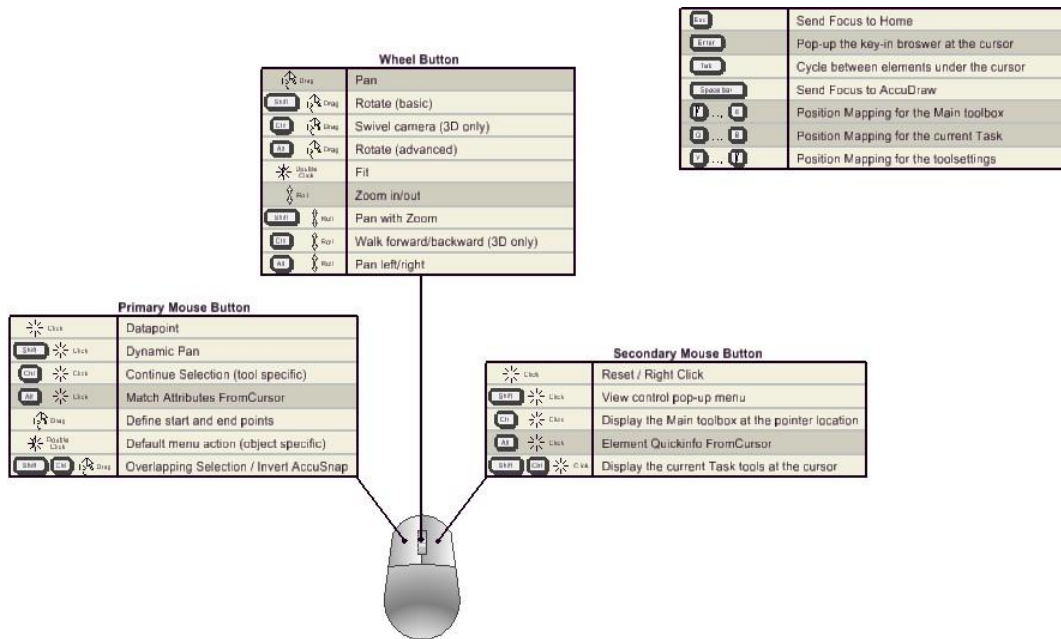


1. View Attributes. Used to select, control and change the type of elements and graphic attributes in the information displayed in the view.
2. View Display Mode. Used to quickly set and customize the display mode such as wireframe, hidden lines, filled, etc.
3. Adjust View Brightness. Used to quickly adjust lighting in the drawing.
4. Update View. Used to refresh the active view.
5. Zoom In. Increase the magnification of a view.
6. Zoom Out. Decrease the magnification of a view.
7. Window Area. Use to magnify an area of the display, in the selected view.
8. Fit View. Used to fit the entire display in a view. Further specific options are available.
9. View Rotation. Used to rotate the display in a view. Select from Top View or one of the other nine variations of rotation available from the fly-out tool bar.
10. Pan view. Used to move (pan) the display without changing the view magnification. Move the display under the cursor by holding the left mouse button down and moving the cursor around the screen.

11. Walk. Used in 3D drawings to show a walking perspective along a path.
12. View Previous. Cancels the last view control operation and returns you to the previous view.
13. View Next. Applies the last undone view control operation.
14. Copy View. Used to copy the active view settings to another view.
15. Change View Perspective. Change the perspective angle of a 3D view.
16. Clip Volume. Clips a view so no elements outside a defined boundary are visible.
17. Clip Mask. Used to clip visible areas in a view.

11.4-5 Mouse Operations

Mouse functionality has been slightly modified and enhanced. The graphic below illustrates current default settings. Changes to defaults are discouraged.



Changes to note: Tentative snapping requires a simultaneous left and right mouse click.

Additions: **Double middle click (wheel)** performs Fit View



Press and hold middle is pan



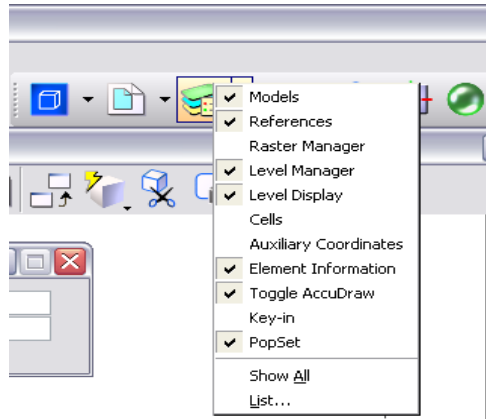
Shift Lt is Dynamic pan

Roll wheel forward and back is zoom in and out

11.4-6 Missing buttons and Toolbars

Right Click to customize the menu Icons displayed.

RT click on nearly every menu allows the user to select which icons are included.



Select by **left clicking** on items to add or remove items. Only items with checks will be displayed.



The standard toolbar

Have you been looking for this toolbar? It is off by default.

To activate it select **CAD Menu -> Tools -> Standard**.

11.4-7 Button Bar

Using the Button Bar to constantly monitor or change snaps will help users to properly utilize CAD snaps at all times. This is especially beneficial when used in conjunction with AccuSnap. **CAD Menu -> Settings Snaps -> Button Bar**



11.4-8 Save Settings

Retaining changes to Menus.

Changes made to customize toolbar layouts and other Menu changes can be retained from one user session to the next by Saving Settings.

Access save setting from the **CAD menu -> File -> Save Settings**.

Alternately, **CTRL + F**

11.5 Appendix E – Reference Documentation

The following references include a wealth of information to supplement the documentation in this publication. Included are standards, policy, and procedural information outside the scope of this document and are provided as an end user reference should further information be needed.

INDOT CAD Support Site - <http://www.in.gov/indot/3084.htm>

INDOT Design Manual - http://www.in.gov/indot/design_manual/index.htm

INDOT Designers - <https://www.in.gov/indot/2731.htm>

Land & Aerial Survey Office - <http://www.in.gov/indot/2715.htm>

Standards & Specifications - <http://www.in.gov/dot/div/contracts/standards/index.html>

ProjectWise Documentation and Resources - [Documentation](#)

11.6 Appendix F – DOTWise Change log

11.6-1 DOTWise 3.x Change logs

- The DOTWise 3.x changelogs have been removed and can be found in ProjectWise at [DOTWise 3.x Change Logs.pdf](#)

11.6-2 DOTWise 4.0 Change log (Released 6/6/16)

Major New Functionality

This release is a full upgrade of the INDOT CAD workspace to make all elements OpenRoads compatible. Due to the no base functionality has been lost and all features still exist. New levels have been added to accommodate required features and will not be listed here.

11.6-2a ProjectWise

- Created the SS4 Workspace Configuration
- Created InRoads SS4 Application Association
- Updated managed workspaces to be applied directly to application associations
 - MicroStation has the legacy SS2 workspace blocks applied for completing existing projects.
 - InRoads SS4 has the OpenRoads Civil workspace blocks assigned.
 - PowerInRoads has the SS4 and OpenRoads workspace blocks assigned.
- New Seed files have been published under [Documents\Template Documents\SS4 Seed](#)

11.6-2b MicroStation

- Upgrade to MicroStation SS4 08.11.09.932
- Full workspace upgrade to SS4 including all DGNLibs, and configurations.
- Updated INDOT Tools task navigation to remove outmoded tools.
- Renamed all level filters to start with _IN so they appear at the top of the list.
- Moved INDOT-INFO from the MicroStation Help menu to a Project Explorer linkset.

11.6-2c InRoads

- Upgrade to InRoads SS4 08.11.09.872
- Current Alternative Upgrade Path – Power InRoads SS4 08.11.09.872
- Reconfigured XIN for SS4 compatibility
- Surface Advanced Imports built for Point Feature Annotation and all graphical elements.
- Scaling adjustments for various text and annotation configurations to maintain backwards compatibility.
- Updated all sheet creation tools to use new SS4 seed files.
- Addition of XS_TL features for standardized template naming.

11.6-3 DOTWise 4.1 Change log (Released 9/16/16)

11.6-3a DOTWise Document

- Substantial changes to Chapters 5-7 to include process changes as determined via coaching sessions.
 - Chapter 5 includes new documentation on the need to work in 2D seed files.
 - Chapter 6 includes new documentation on updated survey coding and how to work with legacy project data in OpenRoads Survey.
 - Chapter 7 includes new documentation on upgrading existing projects and interacting with legacy project data.
 - Chapter 7 Section 7.4-1c includes additional information on survey features that may be captured as random, but that do not draw connecting lines (fences, property lines, etc.)

11.6-3b InRoads

- [INDOT.xin](#)
 - Adjusted corridor features to point to correct levels for more discreet display control.
 - Cross section annotation adjustments for text scaling issues. This included changes to PG Elevations and End Area Volume annotation styles.
 - Included the following new features for Survey. Please see the [IN Design Features ElementTemplates Levels.dgnlib](#) section for symbology specifics for each.
 - Brick Pavers - BK,BKL,BKR
 - Decorative Blocks - BL,BLL,BLR
 - Detectable Warning - PR,PRL,PRR
 - Overhead Utility Line - OV,OVL,OVR
 - Sidewalk Joint - SJ,SJL,SJR
 - Harrison Monument - PHAR
 - Mag Spike - PMSP
 - Overhead Low Point - POHL
 - Pedestrian Signal Pole - PPSP

11.6-3c OpenRoads Technologies

- [IN Survey Features Project Settings.dgnlib](#)
 - Incorporated new Control Codes to replace +O, +D, +H InRoads offset commands. Note that the (-) indicates which direction would be a negative value
 - AD* is for vertical offsets, Up/Down(-)
 - Example: AD*-2 UE02 B would result in UE02 2 feet below the observation at the start of the string.
 - NF* is for distance offset, Front(-)/Back
 - Example: NF*4.5 PTCS would result in PTCS 4.5 feet back from the observation.
 - LR* are for left/right offsets, Up/Down(-)
 - Example: LR*-7 TBO4 would result in TBO4 7 feet to the left of the observation.

- The EXTARC code can no longer be used to create a closed 3 point circle. Advisement from Bentley is that circles should have 4 shots, with the fourth shot being near the first shot so only a small linear element closes out the circle.
- All Survey Point feature definitions were configured to point to the native XIN styles for 3D display. This allows for these features to display properly in a terrain model when imported from DTM.
- Configured linear survey elements to have appropriate cross section native feature definition to allow display in cross sections as crossing features (UG Utils, R/W, etc.)
- Added features and coding definitions for the following survey features, consistent with the XIN:
 - Brick Pavers - BK,BKL,BKR
 - Decorative Blocks - BL,BLL,BLR
 - Detectable Warning - PR,PRL,PRR
 - Overhead Utility Line - OV,OVL,OVR
 - Sidewalk Joint - SJ,SJL,SJR
 - Harrison Monument - PHAR
 - Mag Spike - PMSP
 - Overhead Low Point - POHL
 - Pedestrian Signal Pole - PPSP
- [IN Design Features ElementTemplates Levels.dgnlib](#)
 - All Point feature definitions were configured to point to the native XIN styles for 3D display. This allows for these features to display properly in a terrain model when imported from DTM.
 - Created new levels for all Template Library Features so corridor strings have additional flexibility in displaying discreet levels. Previously all features went to the same level.
 - Incorporated Bentley provided Terrain Filters.
 - Added element templates and levels for use with the noted survey features:

Feature	Linestyle/Cell	Color	Level Name
Brick Pavers	2	115	S_PROP_Brick Pavers
Decorative Blocks	3	96	S_PROP_Decorative Blocks
Detectable Warning	2	46	S_PROP_Detectable Warning
Overhead Utility Line	utoh	0	S_UTIL_Overhead Utility Line
Sidewalk Joint	0	2	S_PROP_Sidewalk Joint
Harrison Monument	PHAR	0	S_CTRL_Harrison Monument
Mag Spike	PMSP	0	S_CTRL_Mag spike
Overhead Low Point	POHL	39	S_UTIL_Overhead Low Point
Pedestrian Signal Pole	PPSP	0	S_UTIL_Pole-Pedestrian Signal

- [Civil Cells](#)
 - INDOT_CurbRamps.dgnlib – Included adjusted curb ramp cells, with additional placement flexibility.
 - Added all default Bentley Civil Cell libraries as xBentley_XXX.dgnlibs.
- [IN InRoads.cel](#)

- Added new cells for the following survey features:
 - Harrison Monument – PHAR
 - Mag Spike – PMSP
 - Overhead Low Points – POHL
 - Pedestrian Signal Pole – PPSP
- [Line Styles.dgnlib](#)
 - Added UTOH linestyle for use with Overhead Utility Line survey features. This is associated with level/element template S_UTIL_Overhead Utility Line.

11.6-3d InterPlot

- [INDOT Design Script_AN.pen](#) & [INDOT Design Script_NN.pen](#)
 - The following existing levels have been removed from the 80% screening when using these pen tables with InterPlot. Please note that * denote wildcards that can be any combination of characters, and the following will include any levels that fit the criteria presented.
 - E_BR_Bridge_Text*
 - E_BR_Text-*
 - E_DR_*-Text
 - E_TRAF_*-Text

11.6-4 DOTWise 4.2 Change log (Released 3/17/17)

11.6-4a DOTWise Document

- All references to PowerInRoads SS4 have been modified to accurately reflect the complete migration to InRoads SS4 and PowerInRoads SS2 for legacy projects.
- Added the following sections:
 - 4.3-2 InterPlot Troubleshooting and the Rasterized Setting
 - 6.3-3a Editing Fieldbook Features
 - 6.3-4b Triangulation Clean Up
 - 6.3-5 Creating the Native InRoads DTM Existing Terrain
 - 6.3-6 Creating the Native InRoads DTM for Annotation
 - 6.3-8 Creating the Native InRoads Alignment
 - 6.5 OpenRoads/InRoads Reporting
 - 7.4-1 Geocoordination Base Drawings
 - 7.10-4hg Crossing Features
- All OpenRoads/InRoads documentation has been revised based on troubleshooting efforts since the 4.1 release, and has had a greater emphasis placed on when drawing content should be 2D or 3D.

11.6-4b InRoads

- [INDOT.xin](#)
 - Set Default Global Scales to 1
 - Station Lock is defaulted to On
 - Set default point symbology for S_TRAF_Loop Detector to use PISL cell from IN_InRoads.cel
 - The following features have been changed to breakline features, excluded from triangulation
 - S_DR_Drainage Pipe
 - S_PROP_Fence-barbed
 - S_PROP_Fence-chain link
 - S_PROP_Fence-Elec.
 - S_PROP_Fence-farm field
 - S_PROP_Fence-iron
 - S_PROP_Fence-metal
 - S_PROP_Fence-other
 - S_PROP_Fence-privacy
 - S_PROP_Fence-woven rail
 - S_PROP_Fence-stone
 - S_PROP_Fence-wood
 - S_UTIL_Hedge
 - Set Project Options to use INDOT Project Options as the Default settings.

11.6-4c OpenRoads Technology

- [IN_InRoads.cel](#)
 - Reduced scaling of left and right guardrail symbols for cross sections

- Removed linear elements from all Material – point cells.
- [Civil.cel](#)
 - Renamed duplicate cell definitions to prevent wrong cells being placed by civil tools.
- [IN Design Features ElementTemplates Levels.dgnlib](#)
 - Fixed working units to use Survey Feet and Survey Inches.
 - Duplicated 3D guardrail feature types to P_RDWY_3D GR Left and P_RDWY_3D GR Right.
 - Revised P_RDWY_GR Left and P_RDWY_GR Right to remove 3d cross section linestyle and replaced with legacy cross section symbol functionality.
 - Added P_RDWY_Filter Sock element template, Civil Style and level (P_RDWY_Filter Sock, color 0, linestyle Filter Sock)
 - Revised Terrain element templates displaying contours to even values for text spacing, major and minor contours.
- [IN Project Settings.dgnlib](#)
 - Adjusted Corridor Design Stage 8 – Final Components to also create linear features, allowing for direct annotation on Cross Sections.

11.6-4d MicroStation

- [IN Symbols.cel](#)
 - Added the following cells:
 - SN_CONSTWARNLGT – Low intensity warning light, Type A
 - SN_ROADCLOSUREASSY – Road Closure Sign Assembly
- [IN PvmtMarkings.cel](#)
 - Added SN_INTSYMACCSY – International Symbol of Accessibility
- [Line Styles.dgnlib](#)
 - Added new linestyles for:
 - gpr – Proposed Guardrail, Right
 - gpl – Proposed Guardrail, Left
 - Filter Sock
- [Ltr sheets.dgn](#)
 - Revised Portrait and Landscape Detail sheets with Stamps to better use available space.
- [D size sheets.dgn](#)
 - Modified the title sheet models to remove the dependency on the INDOT logo image, and replaced the image with vector elements.
- [SS4 Seed](#)
 - All seed files have been modified to resolve unitary inconsistencies.

11.6-5 DOTWise 4.3 Change log (Released 9/15/17)

11.6-5a DOTWise Document

- Added Chapter 7.6-5 Saving Sheets to ProjectWise and Resolving References
- Appendix A – Modified verbiage to indicate that naming can apply to model names as well as file names where applicable.
- Removed previous Appendix F – GIS Conversion Matrix. Following appendices have been renamed to Appendix F – Reference Documentation and Appendix G – DOTWise Changelog.

11.6-5b InRoads

- [INDOT.xin](#)
 - PPSP changed to display the correct symbol
 - PMSP changed to display the correct symbol
 - Changed IN End_Area_Volume preference for End-Area Volumes tool to 0.1 decimal precision for Cut/Fill Area/Volume.
 - Added the following named symbologies for use with the InRoads Drafting Notes tools:
 - PP_DN_Plan
 - PP_DN_Cross Section
 - PP_DN_Profile
 - PP_DN_Plan_RW
 - Added the following preferences to the Plan and Profile Generator
 - IN PW Ltr Dbl Plan 200 Scale
 - IN PW Dbl Plan 200 Scale
- [notes.dft](#)
 - Added Notes folder and added this file. These are the default drafting notes assigned the appropriate symbologies.
- [IN_InRoads.ce1](#)
 - Modified \$FILE\$ tag placement on the TINFO, PlanSheetTags and CrossSectionTags cells to accommodate new text replacement in border files via IPLOT.
 - Added ltrtinfo cell for use with letter size borders on the Plan and Profile Generator.
- [INDOT Border.dgn](#) – Added \$MODEL_NAME\$ to accommodate new text replacement in border files via IPLOT.
- [INDOT_CrossSectionBorder.dgn](#) - Added \$MODEL_NAME\$ to accommodate new text replacement in border files via IPLOT.
- [INDOT_DblPlanBorder.dgn](#) - Added \$MODEL_NAME\$ to accommodate new text replacement in border files via IPLOT.
- [INDOT_Ltr Border.dgn](#) – Added for use with IN PW Ltr Dbl Plan 200 Scale preference.

11.6-5c OpenRoads Technology

- [IN_Survey_Features_Project_Settings.dgnlib](#)
 - Added BPC linking code for StartPC functionality. This resolves issues with using B and PC as separate linking codes to start a survey string on a curve.
 - Change S_UTIL_Pole-Pedestrian Signal style name to S_UTIL_Pole-Pedestrian Signal.
- [IN_Drainage_Features_Defs.dgnlib](#)

- Utility Filters > Gas10
 - Added filter groups: Color: 36, Element Types (Line, Line String, Complex Chain), LineStyle: 10”GAS LINE
- [IN Design Features ElementTemplates Levels.dgnlib](#)
 - Added new OpenRoads Linear Features for the following items
 - P_TRAF_Pavement Marking-Gore Line ((Color 32, Linestyle Gore Line 8”)
 - P_TRAF_Pavement Marking-White Broken Line 4in 10-30
 - P_TRAF_Pavement Marking-White Dotted Line 4in 3-9
 - P_TRAF_Pavement Marking-White Line 12in
 - P_TRAF_Pavement Marking-White Line 24in
 - P_TRAF_Pavement Marking-White Line 4in
 - P_TRAF_Pavement Marking-White Line 8in
 - P_TRAF_Pavement Marking-White Transverse Line 24in
 - P_TRAF_Pavement Marking-White Transverse Line 8in
 - P_TRAF_Pavement Marking-Yellow Diagonal Line 4in
 - P_TRAF_Pavement Marking-Yellow Line 12in
 - P_TRAF_Pavement Marking-Yellow Line 24in
 - P_TRAF_Pavement Marking-Yellow Line 4in
 - P_TRAF_Pavement Marking-Yellow Line 8in
 - P_TRAF_Pavement Marking-Yellow Skip Lt Solid Rt Line 4in
 - P_TRAF_Pavement Marking-Yellow Solid Lt Skip Rt Line 4in
 - P_TRAF_Pavement Marking-Yellow Transverse Line 8in

11.6-5d MicroStation

- Purged unused linestyles from [IN Terrain Model Filters.dgnlib](#) and [Text Styles Dimensions.dgnlib](#)
- [IN Patterns.cel](#)
 - Set all cell definitions to be point instead of graphic cells.
 - Added SAND Pattern
- [IN Design Features ElementTemplates Levels.dgnlib](#)
 - Added Level:
 - Added BD_SHT_Clip Boundary (No Plot) (Color 207)
 - Reduced the lineweight of the following items to 1:
 - XS_TL_CL6
 - XS_TL_CL5
 - XS_TL_CL4
 - XS_TL_CL3
 - XS_TL_CL2
 - XS_TL_CL1
 - XS_TL_CL
 - XS_TC_Struc - Inside Wall Top
 - XS_TC_Sidewalk
 - XS_TC_Retaining Wall
 - XS_TC_Raised Median
 - XS_TC_Proposed

- XS_TC_PCCP
- XS_TC_HMA Pavement
- XS_TC_Guardrail_Post_Only
- XS_TC_Guardrail_Post
- XS_TC_Guardrail_Anchor
- XS_TC_Grass Median
- XS_TC_Grading
- XS_TC_Curb
- XS_TC_Asph_Curb
- XS_TC_Aggregate
- XS_TC_Aggregate
- XS_TL_Centerlines
- Modified the following linestyles to use the Physical attribute. This prevents annotation or global scaling affecting these styles:
 - cl double
 - cl left pass
 - cl no passing
 - cl passing
 - cl right pass
 - Crosswalk
 - curb - 4
 - curb - 6
 - curb - 8
 - curb & gutter - 4
 - curb & gutter - 6
 - curb & gutter - 8
 - ex. c & g - 4
 - ex. c & g - 6
 - ex. c & g - 8
 - ex. curb - 4
 - ex. curb - 6
 - ex. curb - 8
 - exaggerated left pass
 - exaggerated no passing
 - exaggerated right pass
 - MOT Barrels 100
 - MOT Barrels 50
 - RPM 40ft
 - RPM 80ft
 - skip turning
 - Skips
 - stop line
 - Striping
 - TWLTL
- Added the following linestyles

- Prpipe (Proposed pipe)
- Gore Line 8"
- Line (4") 2/2
- Added the following levels:
 - PP_G_Phase 1 (Color 1, Linestyle 0, Lineweight 1, Transparency 80)
 - PP_G_Phase 2 (Color 3, Linestyle 0, Lineweight 1, Transparency 80)
 - PP_G_Phase 3 (Color 5, Linestyle 0, Lineweight 1, Transparency 80)
 - PP_G_Phase 4 (Color 71, Linestyle 0, Lineweight 1, Transparency 80)
 - PP_G_Phase 5 (Color 86, Linestyle 0, Lineweight 1, Transparency 80)
 - PP_G_Phase 6 (Color 112, Linestyle 0, Lineweight 1, Transparency 80)
 - P_TRAF_Pavement Marking-Gore Line ((Color 32, Linestyle Gore Line 8", Lineweight 1)
 - P_TRAF_Pavement Marking-White Broken Line 4in 10-30 (Color 32, Linestyle Line (4") 10/30, Lineweight 1)
 - P_TRAF_Pavement Marking-White Dotted Line 4in 3-9(Color 32, Linestyle Line (4") 3/9, Lineweight 1)
 - P_TRAF_Pavement Marking-White Line 12in (Color 32, Linestyle Line (12"), Lineweight 1)
 - P_TRAF_Pavement Marking-White Line 24in (Color 32, Linestyle Line (24"), Lineweight 1)
 - P_TRAF_Pavement Marking-White Line 4in (Color 32, Linestyle Line (4"), Lineweight 1)
 - P_TRAF_Pavement Marking-White Line 8in (Color 32, Linestyle Line (8"), Lineweight 1)
 - P_TRAF_Pavement Marking-White Transverse Line 24in (Color 32, Linestyle Line (24"), Lineweight 1)
 - P_TRAF_Pavement Marking-White Transverse Line 8in (Color 32, Linestyle Line (8"), Lineweight 1)
 - P_TRAF_Pavement Marking-Yellow Diagonal Line 4in (Color 52, Linestyle Line (4"), Lineweight 1)
 - P_TRAF_Pavement Marking-Yellow Line 12in (Color 52, Linestyle Line (12"), Lineweight 1)
 - P_TRAF_Pavement Marking-Yellow Line 24in (Color 52, Linestyle Line (24"), Lineweight 1)
 - P_TRAF_Pavement Marking-Yellow Line 4in (Color 52, Linestyle Line (4"), Lineweight 1)
 - P_TRAF_Pavement Marking-Yellow Line 8in (Color 52, Linestyle Line (8"), Lineweight 1)
 - P_TRAF_Pavement Marking-Yellow Skip Lt Solid Rt Line 4in (Color 52, Linestyle Line (4") Skip Lt Solid Rt, Lineweight 1)
 - P_TRAF_Pavement Marking-Yellow Solid Lt Skip Rt Line 4in (Color 52, Linestyle Line (4") Solid Lt Skip Rt, Lineweight 1)
 - P_TRAF_Pavement Marking-Yellow Transverse Line 8in (Color 52, Linestyle Line (8"), Lineweight 1)

- Added the Plans Production Graphics template group and following Element Templates
 - PP_G_Phase 1 (Level PP_G_Phase 1, all symbology set to ByLevel except General Setting > Transparencies 80, and Closed Linear Settings > Fill Type Opaque)
 - PP_G_Phase 2 (Level PP_G_Phase 2, all symbology set to ByLevel except General Setting > Transparencies 80, and Closed Linear Settings > Fill Type Opaque)
 - PP_G_Phase 3 (Level PP_G_Phase 3, all symbology set to ByLevel except General Setting > Transparencies 80, and Closed Linear Settings > Fill Type Opaque)
 - PP_G_Phase 4 (Level PP_G_Phase 4, all symbology set to ByLevel except General Setting > Transparencies 80, and Closed Linear Settings > Fill Type Opaque)
 - PP_G_Phase 5 (Level PP_G_Phase 5, all symbology set to ByLevel except General Setting > Transparencies 80, and Closed Linear Settings > Fill Type Opaque)
 - PP_G_Phase 6 (Level PP_G_Phase 6, all symbology set to ByLevel except General Setting > Transparencies 80, and Closed Linear Settings > Fill Type Opaque)
- Added the following Element Templates to Linear > Traffic > Proposed (All symbology set to ByLevel)
 - P_TRAF_Pavement Marking-Gore Line
 - P_TRAF_Pavement Marking-White Broken Line 4in 10-30
 - P_TRAF_Pavement Marking-White Dotted Line 4in 3-9
 - P_TRAF_Pavement Marking-White Line 12in
 - P_TRAF_Pavement Marking-White Line 24in
 - P_TRAF_Pavement Marking-White Line 4in
 - P_TRAF_Pavement Marking-White Line 8in
 - P_TRAF_Pavement Marking-White Transverse Line 24in
 - P_TRAF_Pavement Marking-White Transverse Line 8in
 - P_TRAF_Pavement Marking-Yellow Diagonal Line 4in
 - P_TRAF_Pavement Marking-Yellow Line 12in
 - P_TRAF_Pavement Marking-Yellow Line 24in
 - P_TRAF_Pavement Marking-Yellow Line 4in
 - P_TRAF_Pavement Marking-Yellow Line 8in
 - P_TRAF_Pavement Marking-Yellow Skip Lt Solid Rt Line 4in
 - P_TRAF_Pavement Marking-Yellow Solid Lt Skip Rt Line 4in
 - P_TRAF_Pavement Marking-Yellow Transverse Line 8in
- [Text Styles Dimensions.dgnlib](#)
 - Added the following Dimension Styles
 - Boxed Text
 - All Text styles will be enclosed in a box proportional to the text size.
 - Legend Bubble Large
 - Bubbles used for 10/12/14 Point Text with Spline Leader

- Legend Bubble Small (5/6/7/9 Point Text)
 - Bubbles used for 5/6/7/9 Point Text with Spline Leader
- [IN_Symbols.cel](#)
 - Updated INDOT seals to match Title Sheets
- [IN_Signs.cel](#)
 - Updated all signs.
 - Renamed signs to match MUTCD
 - Sizing and Origin point locations modified
- [IN_Interface.dgnlib](#)
 - Resolved icons for Survey > Quick Tools > Survey Display and Survey > Cell Tools > Survey Topo Symbols
 - Spelling correction for OpenRoads Extensions > Cross Section Synchronization
- Line Styles.dgnlib
 - Removed file and workspace dependency. All Linestyles provided in [IN_Design_Features_ElementTemplates_Levels.dgnlib](#)
- [IN_LevelFilters.dgnlib](#)
 - Added BD_SHT_Clipe Boundary (No Plot) level
- [D_size_sheets.dgn](#) – Added \$MODEL_NAME\$ to accommodate new text replacement in border files via IPLOT.
- [IN_Scales.def](#) – Added 1”=15’ Scale option.

11.6-5e InterPlot

- [INDOT Design Script_AN.pen](#) & [INDOT Design Script_NN.pen](#) – Added text replacement variables to replace newly added \$MODEL_NAME\$ text on all sheet borders.
- Removed INDOT Letter_AN.set and INDOT Letter_NN.set as these have been superseded by the INDOT HP_Letter settings files.

11.6-5f ProjectWise

- Added 2018 as an available SPEC DATE on the _PROJECT INFORMATION Interface for universal title sheets.

11.6-6 DOTWise 4.3.1 Change log (Released on 3/16/18)

11.6-6a DOTWise Documentation

- Added sections 6.3-4a and 7.5-4c regarding DTM exports with metric geocoordination and the applicable workaround.

11.6-6b MicroStation

- [IN_Symbols.cel](#)
 - Added Cells
 - SHT W STAMP LANDSCAPE – Interior layout of 8.5x11 frame for manual layout.
 - SHT W STAMP PORTRAIT – Interior layout of 8.5x11 frame for manual layout.
 - 811Logo_Dsize – Call 811 before you dig logo, for D size index sheets
 - 811Logo_Ltrsize – Call 811 before you dig logo, for letter size index sheets
- [IN_PE-LS-Stamps.cel](#)
 - Cleanup of all Cells for Naming, and Leveling (Thanks to A. Bowen)
 - All PE Stamps have been prefixed with PE.
 - All LS Stamps have been prefixed with LS.
- [D size sheets.dgn](#)
 - All Models – Set Active Scale for XYZ to 1, Active Angle to 0.
 - All Index sheets – Added Call 811 logo
 - All Title sheets – Changed text replacement for Certification date to use ProjectWise _SIGNATURE interface value.
 - SN_Sheet Sign and Post Summary Sheet
 - Removed U-Channel Posts from table (no longer an option for designers). Replaced with the Type 3 Square Post columns.
 - Replaced Mile Marker Post Table with Bridge Reference Post Marker Table.
 - RD_Title Sheet
 - Added Culvert Assets table per Design Memo 17-04
 - Added the following two sheet models, replacing the previous SN_Panel Sign and Post Summary Sheet:
 - SN_Panel Sign and Post Summary Sheet (ASD)
 - SN_Panel Sign and Post Summary Sheet (LRFD)
- [Ltr sheets.dgn](#)
 - All Models – Set Active Scale for XYZ to 1, Active Angle to 0.
 - Ltr. Title Sheet
 - Added Culvert Assets table per Design Memo 17-04
 - Changed text replacement for Certification date to use ProjectWise _SIGNATURE interface value.
 - All Index sheets – Added Call 811 logo
- [IN_Signs.cel](#)
 - Renamed XW2-6 to XW2-6-A, modified text to read Max 6 Yrs.
 - Renamed XW2-6A to XW2-6A-B
 - Renamed XW2-6B to XW-2-6B-B, modified text to ready Max 6 Yrs.
- [IN_Design_Features_ElementTemplates_Levels.dgnlib](#)

- Linestyle Updates:
 - Added RPM 48, Rumble Centerline, Rumble Edgeline LT, and Rumble Edgeline RT linestyles.
 - Imported revised Filter Sock and Silt Fence linestyles. Styles have been recreated from scratch and no longer share a linear pattern.
- Level Additions:
 - P_TRAF_Pavement Rumble Stripes Center (Color 325, Linestyle Rumble Centerline, Lineweight 0)
 - P_TRAF_Pavement Rumble Stripes Edgeline LT (Color 325, Linestyle Rumble Edgeline LT, Lineweight 0)
 - P_TRAF_Pavement Rumble Stripes Edgeline RT (Color 325, Linestyle Rumble Edgeline RT, Lineweight 0)
 - S_PROP_Property Corner (Color 3, Linestyle 0, Lineweight 0)
 - S_UTIL_Sanitary Force Main (Color 2, Linestyle 0, Lineweight 0)
 - S_UTIL_Outlet Box 110v (Color 22, Linestyle 0, Lineweight 0)
 - S_TOPO_Matl Prop-Brick (Color 225, Linestyle 0, Lineweight 0)
 - S_DR_Sewer Cleanout (Color 15, Linestyle 0, Lineweight 0)
 - S_TRAF_ADA Pedestrian Button (Color 52, Linestyle 0, Lineweight 0)
 - P_EC_Splashpad (Color 17, Linestyle 0, Lineweight 1)
 - P_EC_Pump Around (Color 33, Linestyle 0, Lineweight 1)
 - P_EC_Dewatering (Color 186, Linestyle 0, Lineweight 1)
 - P_EC_Filter Berm (Color 79, Linestyle 0, Lineweight 1)
 - P_EC_Cofferdam (Color 21, Linestyle 0, Lineweight 1)
- Renamed the following levels from P_RDWY_ and modified the symbology as listed:
 - P_EC_Check Dam – Riprap (Color 10, Linestyle 0, Lineweight 1)
 - P_RDWY_Check Dam – Straw Bale to P_EC_Check Dam – Traversable (Color 38, Linestyle 0, Lineweight 1)
 - P_RDWY_Ditch Inlet Protection to P_EC_Inlet Protection (Color 36, Linestyle 0, Lineweight 1)
 - P_EC_Erosion Control (Color 87, Linestyle 0, Lineweight 0)
 - P_EC_Erosion Control Txt (Color 0, Linestyle 0, Lineweight 0)
 - P_EC_Filter Sock (Color 12, Linestyle Filter Sock, Lineweight 1)
 - P_EC_Sediment Basin (Color 23, Linestyle 0, Lineweight 1)
 - P_EC_Sediment Trap (Color 202, Linestyle 0, Lineweight 1)
 - P_EC_Silt Fence (Color 13, Linestyle Silt Fence, Lineweight 1)
 - P_EC_Slope Drain (Color 15, Linestyle 0, Lineweight 1)
 - P_EC_Vegatative Filter Strip (Color 26, Linestyle 0, Lineweight 0)
- Added the following Element Templates to Traffic > Proposed (All symbology set to ByLevel)
 - P_TRAF_Pavement Rumble Stripes Edgeline
 - P_TRAF_Pavement Rumble Stripes Edgeline LT
 - P_TRAF_Pavement Rumble Stripes Center
- Added the following Element Templates to Survey (All symbology set to ByLevel)
 - Property\S_PROP_Property Corner
 - Utilities\S_UTIL_Sanitary Force Main

- Utilities\S_UTIL_Outlet Box 110v
 - TOPO\S_TOPO_MatI Prop-Brick
 - Drainage\S_DR_Sewer Cleanout
 - Traffic\S_TRAF_ADA Pedestrian Button
 - Added the following Element Templates to Erosion Control > Proposed (All symbology set to ByLevel)
 - P_EC_Splashpad
 - P_EC_Pump Around
 - P_EC_Dewatering
 - P_EC_Filter Berm
 - P_EC_Cofferdam
 - The following have been renamed and moved from Roadway Proposed
 - P_EC_Check Dam – Riprap
 - P_RDWY_Check Dam – Straw Bale to P_EC_Check Dam – Traversable
 - P_RDWY_Ditch Inlet Protection to P_EC_Inlet Protection
 - P_EC_Erosion Control
 - P_EC_Erosion Control Txt
 - P_EC_Filter Sock
 - P_EC_Sediment Basin
 - P_EC_Sediment Trap
 - P_EC_Silt Fence
 - P_EC_Slope Drain
 - P_EC_Vegetative Filter Strip
- [IN_LevelFilters.dgnlib](#)
 - Added P_EC_ Filtering for Erosion Control level prefix.
- 11.6-6c InRoads/OpenRoads Technology**
- [INDOT.ITL](#)
 - Updated components naming as provided by INDOT Design section.
 - Guardrail components updated to match MASH system.
- [IN_InRoads.cel](#)
 - Renamed PSNDA to PODS to correct the S_TRAF_Sign-Oh double arm cant feature definition.
 - Added the following cells:
 - PCUT – Property Corner Cut X or V
 - PSUM – Sanitary Force Main
 - PEBX – Outlet Box 110v
 - PMBK – Material Property Brick
 - PSCO – Sewer Cleanout
 - PPBN – ADA Pedestrian Button
- [IN_Design_Features_ElementTemplates_Levels.dgnlib](#)
 - Added new OpenRoads Linear\Traffic\Proposed Features for the following items
 - P_TRAF_Pavement Rumble Stripes Center

- P_TRAF_Pavement Rumble Stripes Edgeline LT
 - P_TRAF_Pavement Rumble Stripes Edgeline RT
 - Added new OpenRoads Linear\Erosion Control\Proposed Features for the following items:
 - P_EC_Splashpad
 - P_EC_Pump Around
 - P_EC_Dewatering
 - P_EC_Filter Berm
 - P_EC_Cofferdam
 - The following have been renamed and moved from Roadway > Proposed
 - P_EC_Check Dam – Riprap
 - P_RDWY_Check Dam – Straw Bale to P_EC_Check Dam – Traversable
 - P_RDWY_Ditch Inlet Protection to P_EC_Inlet Protection
 - P_EC_Erosion Control
 - P_EC_Erosion Control Txt
 - P_EC_Filter Sock
 - P_EC_Sediment Basin
 - P_EC_Sediment Trap
 - P_EC_Silt Fence
 - P_EC_Slope Drain
 - P_EC_Vegatative Filter Strip
 - Added new OpenRoads Linear\Survey\ Point and Linear Features for the following items:
 - Property\S_PROP_Property Corner (Survey Code PCUT)
 - Utilities\S_UTIL_Sanitary Force Main (Survey Code PSUM)
 - Utilities\S_UTIL_Outlet Box 110v (Survey Code PEBX)
 - TOPO\S_TOPO_MatI Prop-Brick (Survey Code PMBK)
 - Drainage\S_DR_Sewer Cleanout (Survey Code PSCO)
 - Traffic\S_TRAF_ADA Pedestrian Button (Survey Code PPBN)
- [INDOT.xin](#)
 - Added Styles/Named Symbolologies for the following features:
 - S_PROP_Property Corner
 - S_UTIL_Sanitary Force Main
 - S_UTIL_Outlet Box 110v
 - S_TOPO_MatI Prop-Brick
 - S_DR_Sewer Cleanout
 - S_TRAF_ADA Pedestrian Button

11.6-6d InterPlot

- [INDOT Design Script AN.pen](#) – Changed formatting for Signature Date to SHORT_DATE (m/d/yyyy) from DATE (dd-mmm-yyyy)
- [INDOT Design Script NN.pen](#) – Changed formatting for Signature Date to SHORT_DATE (m/d/yyyy) from DATE (dd-mmm-yyyy)

- [INDOT Design Script AN No Screening.pen](#) – Added pen table to remove S_ and E_ level screening.
- [INDOT Design Script NN No Screening.pen](#) – Added pen table to remove S_ and E_ level screening.

11.6-6e Seed Files

- [TB_SIGN_SHEET_SUMMARY_ms.xlsm](#)
 - Removed U-Channel Posts from table (no longer an option for designers). Replaced with the Type 3 Square Post columns.
 - Replaced Mile Marker Post Table with Bridge Reference Post Marker Table.

11.6-7 DOTWise 4.4 Change log (Released on 9/14/18)

11.6-7a DOTWise Documentation

- Substantial documentation cleanup of all chapters. Updated imagery and example information where needed. No procedural changes.
- Chapter 2 – Added individual sections for each of the LEAP Products/Bentley Structural and their ProjectWise integration methods.
- Chapter 4 – Complete rewrite of plotting chapter. Plotting process via Interplot Organizer is now presented as a full plotting example with supplemental plotting information embedded in the process where applicable. Digital Signature process has been updated using Adobe Acrobat DC as the appropriate version.
- Chapter 10 has been renamed to Using Imagery with CAD and the Map Insert Application (formerly ArcGIS and CAD, Geocoordination and Data Sharing)
- Removed Appendix D – True Scale Linestyles. The material in this section has been depreciated by the adjustment of pavement marking and other needed linestyles being set to have the Physical linestyle attribute, removing their ability to scale by Annotation Scale.

11.6-7b MicroStation

- [IN Design Features ElementTemplates Levels.dgnlib](#)
 - Set linestyle for S_TOPO_Row of trees-coniferous to treeconif
 - Set linestyle for S_TOPO_Row of trees-deciduous to treedecid
 - Level Additions:
 - PP_G_Revision 1 (Color 10, Linestyle cloud, Lineweight 1)
 - PP_G_Revision 2 (Color 10, Linestyle cloud, Lineweight 1)
 - PP_G_Revision 3 (Color 10, Linestyle cloud, Lineweight 1)
 - PP_G_Revision 4 (Color 10, Linestyle cloud, Lineweight 1)
 - PP_G_Construction Change 1 (Color 10, Linestyle cloud, Lineweight 1)
 - PP_G_Construction Change 2 (Color 10, Linestyle cloud, Lineweight 1)
 - PP_G_Construction Change 3 (Color 10, Linestyle cloud, Lineweight 1)
 - PP_G_Construction Change 4 (Color 10, Linestyle cloud, Lineweight 1)
- [D size sheets.dgn](#)
 - RD_Title Sheet – Modified Culvert Asset Table to accommodate a longer text string in the Work Type column.
 - Added KIN Project Information table to the following models: BR_Title Sheet, BR_Title Sheet ROW, BR_Title Sheet Rehab, RD_Title Sheet, RD_Title Sheet ROW, SG_Title Sheet, SL_Title Sheet.
 - Removed No Additional Right of Way notation from BR_Title Sheet ROW and RD_Title Sheet ROW.
- [Ltr sheets.dgn](#)
 - Ltr. Title Sheet – Modified Culvert Asset Table to accommodate a longer text string in the Work Type column.
- MicroStation Steel MDL – Added the Bentley Steel MicroStation MDL application. Details on this tool can be found at [this link](#).
- [IN Lighting.cel](#)
 - Modified cell to remove hatch pattern and use filled shape object.

- LG_HH
- LG_CAMBAR
- LG_SVPT II
- LG_SVPT I

11.6-7c *InRoads/OpenRoads*

- [INDOT.xin](#)
 - Set linestyle for named symbology S_TOPO_Row of trees-coniferous to treeconif
 - Set linestyle for named symbology S_TOPO_Row of trees-deciduous to treedecid
 - Removed point symbol symbology for S_TRAF_Sig Loop Detector
- [notes.dft](#)
 - Adjusted all pre-defined note styles to use INDOT styles and symbology.
 - Adjusted stationing to use correct imperial settings (SS+SS.SS)

11.6-7d *Seed Files*

- [TB_STRUCTUREDATA_ms.xls](#)
 - Modified per M. Bailey/C. Martin

11.6-8 DOTwise 4.4.1 Change log (Released on 3/15/19)

11.6-8a *MicroStation*

- [IN_TitleSheetIntegration.cel](#) – Added PlanSheetTags model from IN_InRoads.cel to allow use on InRoads sheets that these tags do not appear on (Profile Only sheets)
- [IN_Design_Features_ElementTemplates_Levels.dgnlib](#)
 - Added linestyle Line (12”) 2/2
 - Level/Element Template Additions:
 - P_TRAF_Pavement White Broken Line 12in 2-2 (Color 32, Linestyle Line (12”) 2/2, Lineweight 1)
 - P_ALG_Ditch Lt (Color 7, Linestyle 0, Lineweight 1)
 - P_ALG_Ditch Rt (Color 1, Linestyle 0, Lineweight 1)
 - P_ALG_Headwall Lt (Color 10, Linestyle 0, Lineweight 1)
 - P_ALG_Headwall Rt (Color 13, Linestyle 0, Lineweight 1)
 - P_ALG_Horizontal Approach (Color 3, Linestyle 0, Lineweight 1)
 - P_ALG_Horizontal Drive (Color 3, Linestyle 0, Lineweight 1)
 - P_ALG_Horizontal PR (Color 10, Linestyle 0, Lineweight 1)
 - P_ALG_Horizontal Ramp (Color 12, Linestyle 0, Lineweight 1)
 - P_ALG_Horizontal Secondary (Color 13, Linestyle 0, Lineweight 1)
 - P_ALG_Horizontal Stream (Color 1, Linestyle 0, Lineweight 1)
 - P_ALG_Underdrain Lt (Color 119, Linestyle 0, Lineweight 1)
 - P_ALG_Underdrain Rt (Color 17, Linestyle 0, Lineweight 1)
 - P_ALG_Vertical Alt 1 (Color 3, Linestyle 0, Lineweight 1)
 - P_ALG_Vertical Alt 2 (Color 4, Linestyle 0, Lineweight 1)
 - P_ALG_Vertical Alt 3 (Color 5, Linestyle 0, Lineweight 1)
 - P_ALG_Vertical Alt 4 (Color 6, Linestyle 0, Lineweight 1)
 - P_ALG_Vertical RC (Color 134, Linestyle 0, Lineweight 1)
 - Vertical Profile (blue) (Color 1, Linestyle 0, Lineweight 1)

- Vertical Profile (brown) (Color 134, Linestyle 0, Lineweight 1)
 - Vertical Profile (cyan) (Color 7, Linestyle 0, Lineweight 1)
 - Vertical Profile (green) (Color 2, Linestyle 0, Lineweight 1)
 - Vertical Profile (grey) (Color 9, Linestyle 0, Lineweight 1)
 - Vertical Profile (magenta) (Color 5, Linestyle 0, Lineweight 1)
 - Vertical Profile (orange) (Color 6, Linestyle 0, Lineweight 1)
 - Vertical Profile (red) (Color 3, Linestyle 0, Lineweight 1)
 - Vertical Profile (yellow) (Color 4, Linestyle 0, Lineweight 1)
- [IN Interface.dgnlib](#)
 - Added button for IN_MOTCells.cel to INDOT Tools > Cell Libraries/Tools task.
- [Ltr sheets.dgn](#)
 - Modified sheet models for each to have an interior shape for raster/reference clipping.
 - Modified Ltr. Title Sheet model to change the note in the title block from “Approved for Letting” to “Recommended for Letting”.
- [D size sheets.dgn](#) – Modified BR_Title Sheet, BR_Title Sheet Rehab, RD_Title Sheet, SG_Title Sheet, and SL_Title Sheet models to change the note in the title block from “Approved for Letting” to “Recommended for Letting”.
- [Consultant Ltr sheets.dgn](#) – Modified Ltr. Title Sheet model to change the note in the title block from “Approved for Letting” to “Recommended for Letting”.
- IN_MOTCells.cel – Created new cell library to have a centralized location for all MOT-related symbols that are often used in MOT drawings. The following cells are contained in the library:
 - Barrel Plan
 - Barrel Section
 - Barricade Type III-A
 - Barricade Type III-B
 - Cone Large Section
 - Cone Small Section
 - Constr. Sign
 - Constr. Sign Assembly
 - Constr. Sign with Light
 - Constr. Warning Light
 - Flagger
 - Flashing Arrow Sign
 - Flashing Arrow Sign Double
 - Pickup Truck
 - Police Car 1
 - Shadow Vehicle
 - Temp Conc Barrier Plan
 - Temp Conc Barrier Section
 - Traffic Flow Arrow
 - Truck Mounted Attenuator
 - Tubular Marker Section
 - Work Vehicle

- [IN_Signs.cel](#)
 - Added Cells:
 - ASY-BI-DIR (BI-DIRECTIONAL DETOUR ROUTE MARKER ASSEMBLY)
 - ASY-BI-DIR-CONFIRM (BI-DIRECTIONAL CONFIRMING DETOUR ROUTE MARKER ASSEMBLY)
 - W3-5 (REDUCED SPEED LIMIT AHEAD)
 - XW20-YWL(C) (NO LOADS OVER XX FT WIDE)
 - XW20-YWR(A) (WIDE LOAD RESTRICTION XX MILES)
 - XW20-YWR(B) (WIDE LOAD OVER XX FT MUST EXIT)
 - XW20-6 (LANE RESTRICTIONS ON OR AFTER _____)
 - Removed cell for XW21-4 (ROAD WORK AHEAD).
 - Renamed M4-9L and R to M4-10L and R to reflect the correct MUTCD designation.
 - Renamed G20-4 to XG20-4.

11.6-8b InRoads/OpenRoads

- [INDOT.xin](#) -
 - For the Plan, Dbl Plan, Bridge Layout, Plan Profile, and Plan Profile LargePlan sheets, increased the scaling of the north arrow by a factor of 2.0833 to have it conform to the correct sizing per INDOT CAD Standards.
 - S_TRAF_Loop Detector - Adjusted symbology so it appropriately displays the PISL cell for this code.
 - Style/Named Symbologies Added (all use bylevel symbology)
 - P_ALG_Ditch Lt
 - P_ALG_Ditch Rt
 - P_ALG_Headwall Lt
 - P_ALG_Headwall Rt
 - P_ALG_Horizontal Approach
 - P_ALG_Horizontal Drive
 - P_ALG_Horizontal PR
 - P_ALG_Horizontal Ramp
 - P_ALG_Horizontal Secondary
 - P_ALG_Horizontal Stream
 - P_ALG_Underdrain Lt
 - P_ALG_Underdrain Rt
 - P_ALG_Vertical Alt 1
 - P_ALG_Vertical Alt 2
 - P_ALG_Vertical Alt 3
 - P_ALG_Vertical Alt 4
 - P_ALG_Vertical RC
 - Vertical Profile (blue)
 - Vertical Profile (brown)
 - Vertical Profile (cyan)
 - Vertical Profile (green)
 - Vertical Profile (grey)
 - Vertical Profile (magenta)

- Vertical Profile (orange)
 - Vertical Profile (red)
 - Vertical Profile (yellow)
 - [IN Design Features ElementTemplates Levels.dgnlib](#)
 - Added the following styles under Linear\Alignment
 - P_ALG_Ditch Lt
 - P_ALG_Ditch Rt
 - P_ALG_Headwall Lt
 - P_ALG_Headwall Rt
 - P_ALG_Horizontal Approach
 - P_ALG_Horizontal Drive
 - P_ALG_Horizontal PR
 - P_ALG_Horizontal Ramp
 - P_ALG_Horizontal Secondary
 - P_ALG_Horizontal Stream
 - P_ALG_Underdrain Lt
 - P_ALG_Underdrain Rt
 - P_ALG_Vertical Alt 1
 - P_ALG_Vertical Alt 2
 - P_ALG_Vertical Alt 3
 - P_ALG_Vertical Alt 4
 - P_ALG_Vertical RC
 - Vertical Profile (blue)
 - Vertical Profile (brown)
 - Vertical Profile (cyan)
 - Vertical Profile (green)
 - Vertical Profile (grey)
 - Vertical Profile (magenta)
 - Vertical Profile (orange)
 - Vertical Profile (red)
 - Vertical Profile (yellow)
 - [IN Survey Features Project Settings.dgnlib](#)
 - Added the following styles under Survey\Linear\Alignment
 - S_ALG_Alignment Secondary
- 11.1.1.1 Seed Files**
- [TB ROAD SUMMARY ms.xls](#)
 - Added updated Guardrail Summary Table

11.6-9 DOTWise 4.5 Change log (Released on 9/13/19) (Updated 3/20/20 & 12/4/20)

11.6-9a DOTWise Documentation

- Added section 2.2-4 covering the Documentation\Resources folder and contents.
- Added section 2.13 covering ProjectWise Views
- Added section 2.14 covering Versioning

- Added section 2.17-2 covering the additional of Agency Global Folders (Custom Folders)
- Added section 2.20 covering the usage of OpenBridge Designer in addition to LEAP standalone products.
- Added section 10.1-3 covering WMS Raster Imagery issues and workarounds to alleviate it's impact.
- Revised Chapter 4 – Plotting to include updates for Print Organizer usage and updates to signature process when creating plots using this utility in lieu of Interplot Organizer.
- Revised all content to accommodate ProjectWise Cloud migration, screenshot and links updated.

11.6-9b MicroStation

- [Text Styles Dimensions.dgnlib](#) – Changed all dimension styles that do not start with Standards to have Survey Foot (') and Survey Inch (") as the preferred display when the Working Units checkbox is disabled.
- [IN Interface.dgnlib](#) – Updated to include links to new signage cell libraries.
- [D size sheets.dgn](#) – Removed Survey Book notation and tag from all sheet models. Tags for \$PLN_PREP_BY\$, \$ENG_SIGNATURE\$ and \$SIG_DT\$ have been moved to level BD_SHT_Attribute Exchange - Sig-Date to allow for granular display control.
- [Ltr sheets.dgn](#) - Tags for \$PLN_PREP_BY\$, \$ENG_SIGNATURE\$ and \$SIG_DT\$ have been moved to level BD_SHT_Attribute Exchange - Sig-Date to allow for granular display control.
- [IN TitleSheetIntegration.cel](#) – Removed Survey Book tag from all tag set cells in this library.
- IN_Signs.cel has been removed from the workspace. New signs cell libraries have been added to accommodate these cells by their classification in the MUTCD. The newly created cell libraries are:
 - IN_Signs_Construction.cel
 - IN_Signs_Guide.cel
 - IN_Signs_Recreational.cel
 - IN_Signs_Regulatory.cel
 - IN_Signs_School-ObjectMarkers.cel
 - IN_Signs_Warning.cel
- [IN Design Features ElementTemplates Levels.dgnlib](#)
 - Adjusted color of levels G_SURF_ExFlowArrows and G_SURF_PropFlowArrows from color 7 (cyan) to 4 (yellow) to increase visibility with contours and/or triangles enabled.
 - Added HY_DR_Pond (Color 63, Linestyle 0, Lineweight 2)
 - Added HY_DR_Trace Slope (Color 63, Linestyle dpfl, Lineweight 2)
 - Added linestyles:
 - MOT Barrels 20
 - Line (4") Contrast
 - Line (5") Contrast
 - Line (6") Contrast Edge
 - Added the following 3D linestyles (Please note that most have Left and Right variants):
 - 3D Cable Barrier v2

- 3D Concrete Barrier Wall – TL3
- 3D Concrete Barrier Wall – TL4
- 3D Concrete Barrier Wall – TL5
- 3D GRail Post
- 3D Guardrail v2
- 3D Traffic Rails SSTR
- Channelizer Cone (10 ft spacing)
- Construction Barrel (50 ft spacing)
- Guardrail Double Sided v2
- Guardrail Flared End
- Jersey Barrier
- Jersey Barrier w/ Screen
- Traffic Cone 10' Spacing
- Wrought Iron Fence 4'
- [IN_LevelFilters.dgnlib](#)
 - Added filter IN_Drainage > Hydraulics (_DR_,HY_)
- All seed files and template borders under [Template Documents](#) have had design history removed. All except for D_Size_Sheets, Ltr_Sheets, Design_Manual_Seed2D, and Standards_Seed2D have had UTM84-16N geocoordination applied.
- [IN_PrintStyles.dgnlib](#) – Added for usage with the MicroStation based Print Organizer. Contains INDOT customized Print Styles for use with this tool.
 - Adjusted print layouts to accommodate sheet formatting and rotation.
 - Added additional workspace variables to further accommodate maximization of sheet layouts and rotations for scaling purposes.

11.6-9c InRoads/OpenRoads

- [IN_InRoads.cel](#) – Removed Survey Book tag from CrossSectionTags, ltrinfo, and tinfo cells used in cross section and plans profile generation.
 - Added XSECOHLine for use with S_UTIL_Overhead Utility Line cross section display
- [Plans Production](#) – Removed Survey Book notation from each sheet model.
- [IN_Design_Features_ElementTemplates_Levels.dgnlib](#)
 - Added Design_Hydraulic_Terrain_1 : 0.2 Terrain Display and Element Template. Based on Design_Contours_1 : 0.2 with Triangles disabled; Flow Arrows, Low Point, and High Point annotations enabled.
 - Added Existing_Hydraulic_Terrain_1 : 0.2 Terrain Display and Element Template. Based on Existing_Contours_1 : 0.2 with Triangles disabled; Flow Arrows, Low Point, and High Point annotations enabled.
 - Added HY_DR_Pond Linear Feature and Element Template for use with Terrain Model -> Analyze Pond command.
 - Added HY_DR_Trace Slope Linear Feature and Element Template for use with Terrain Model -> Analyze Trace Slope command.
 - Renamed Feature Definition/Element Template for XS_TC_HMA Base to XS_TC_HMA Base1. Changed Level definition to XS_TC_HMA_Base1.
 - Added Feature Definition/Element Template for XS_TC_HMA_Base2.
 - Changed XS_TC_HMA Intermediate Level definition to XS_TC_HMA_INT.

- Changed XS_TC_HMA Surface Level definition to XS_TC_HMA_Surface.
- [IN_Survey_Features_Project_Settings.dgnlib](#)
 - Adjusted S_UTIL_Overhead Utility Line feature to have a native cross section symbology of the same name.
- [INDOT.xin](#)
 - Adjusted Named Symbology for S_UTIL_Overhead Utility Line to show a cross section point symbol.