1 INTRODUCTION

OBJECTIVE

This chapter divides into three sections:

- Computer Aided Drafting and Design (CADD) Standards & File Creation:
  - FDOTSS4 Desktop Folder
  - File Creation
  - Base Project File Creation
- FDOT Traffic Plans Menu Configuration
- MicroStation V8i Features/Concepts:
  - Levels
  - Civil Features
  - Text Styles
  - Annotation Scale
  - Models

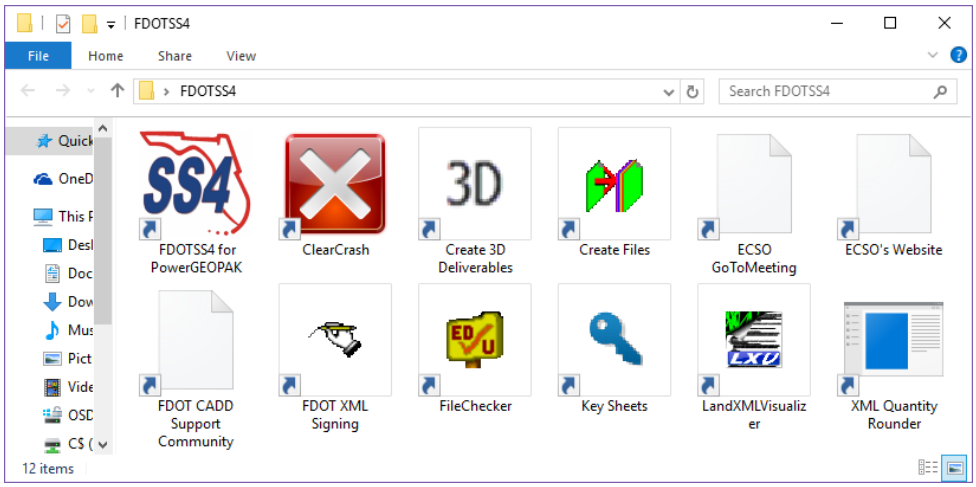
GENERAL INFORMATION

This chapter reviews the FDOTSS4 working environment including how to create design files properly that meet Florida Department of Transportation (FDOT) CADD standards and introduces concepts and tools used to make producing plans much more efficient.

EXPLORING THE FDOTSS4 DESKTOP FOLDER

The FDOT CADD software installation installs a folder named FDOTSS4 on the desktop. This folder contains shortcuts to applications used when working on the FDOT projects.

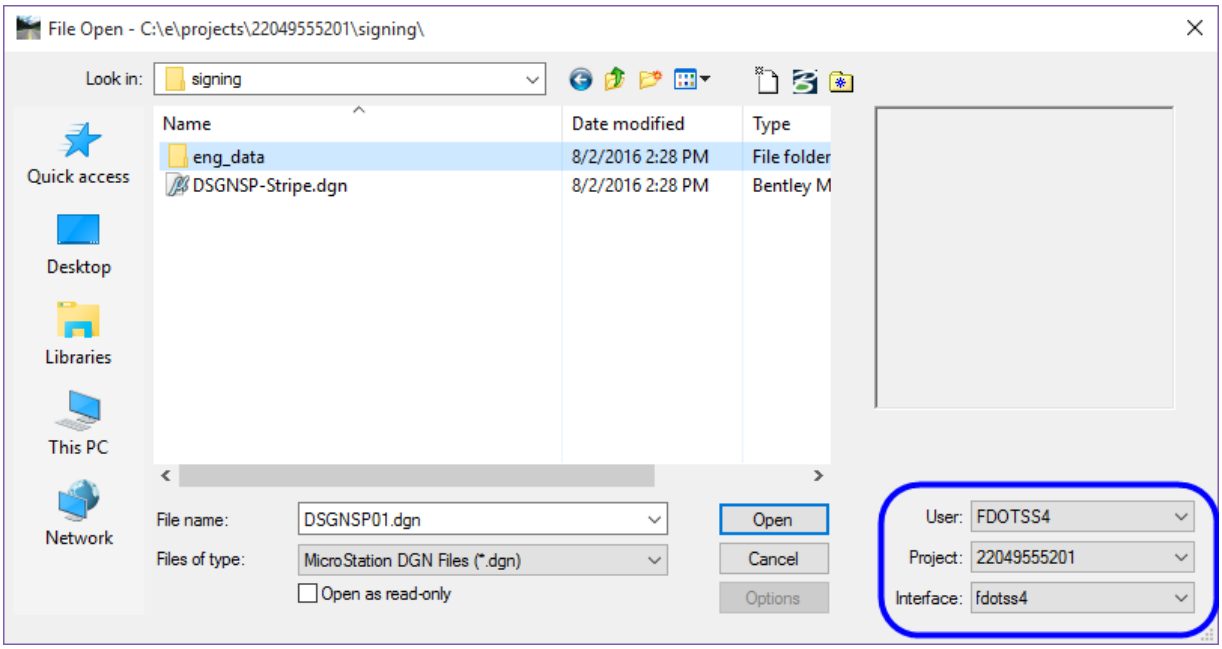
The figure below shows the contents of the FDOTSS4 folder.



Using these shortcuts to start MicroStation will start the FDOT Workspace environment properly with the FDOT CADD standards. The FDOT delivers shortcuts for starting PowerGEOPAK, MicroStation or MicroStation with GEOPAK Suite depending on the registry configuration.

> ***Note*** *When systems have MicroStation with GEOPAK Suite installed, there are two icons created to open the MicroStation session. One will open with GEOPAK activated and the other will not. To access some of the tools used with this course the icon to open with GEOPAK will be required.*

Using this shortcut to start MicroStation opens MicroStation Manager and sets the workspace, but does not set the Project. Set the Project by selecting the drop down arrow and selecting the correct project configuration file or *.pcf* file. The workspace remembers the last project worked in and will use the *.pcf* file the next time MicroStation opens with that workspace. This is important to watch as most designers probably work on more than one project at a time. FDOT recommends always to use the *.pcf* file. If a *.pcf* file does not exist for the project or the project does not exist, use the Project drop down and select New Project to create the project and/or *.pcf* file. This does not overwrite any existing files that may already be in the project directory.

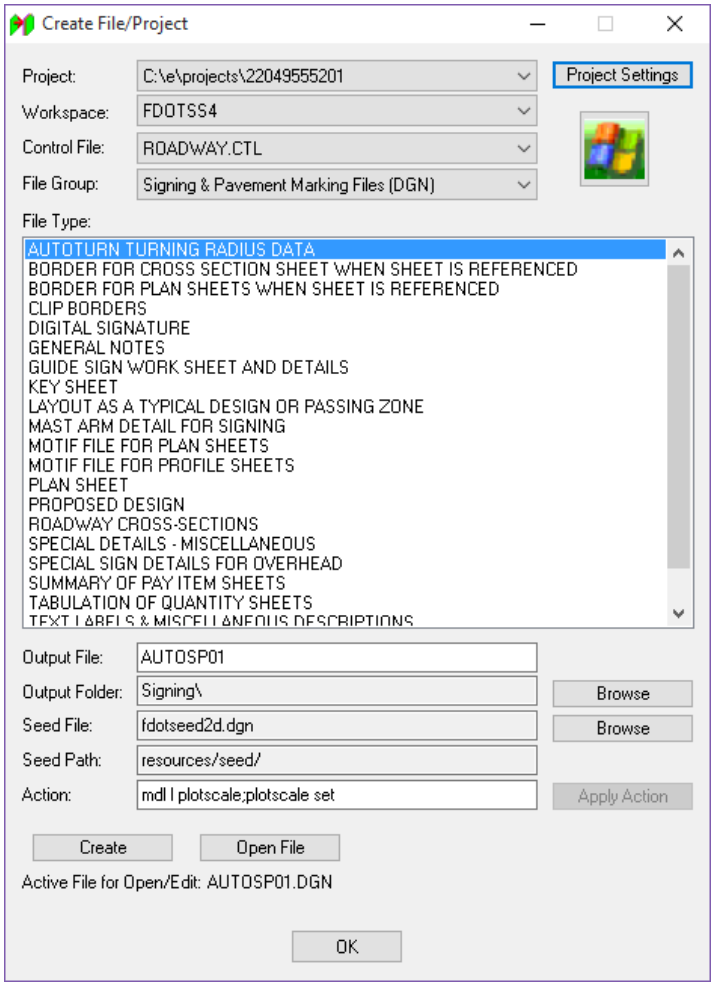


CADD STANDARDS & FILE CREATION

Traffic Plan projects are normally a component of a Roadway plans package. Therefore, the project directory structure usually exists prior to beginning work on a Traffic Plans component. If this is not the case, the same directory structure and file standards that apply to Roadway apply to any other lead component. The FDOT ***CADD Manual*** defines the naming convention used to create the different types of design files required in a project.

CREATING THE PROJECT BASE FILES

The FDOT recommends using the Create File/Project application to create MicroStation design files and other files in accordance with the FDOT standard file naming conventions. Create File/Project uses an ASCII text file, called a Control File *(*.ctl)* to perform these task(s). This application can also create projects, although there are other recommended methods for creating new projects. Create File/Project can be accessed from both inside and outside of MicroStation.

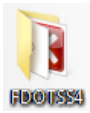


Note *The designer has the option to open the file after creation or create all the design files and open them later. Some files have an associated action such as setting the plot scale or creating models. Using the Open File option at the time of creation initiates these actions to occur. The Create File/Project dialog will remain open in the newly opened file.*

Exercise 1.1 Creating the Base Files for a Project

- ***In this exercise, you will create Signing and Pavement Marking design files.***

> ***Note*** *This process is the same for any Traffic Plans discipline.*

1. Open the FDOTSS4 folder 

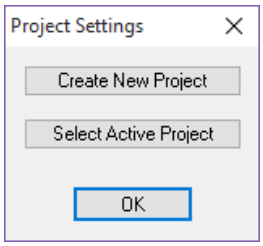
on the desktop.

2. Double click on the **Create Files** icon 

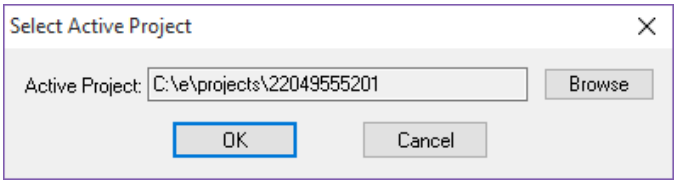
. This will open the Create File/Project tool.

> ***Note*** *When training in the FDOT offices, the user must click the Project Navigator button to allow the Create File/Project tool to work locally.*

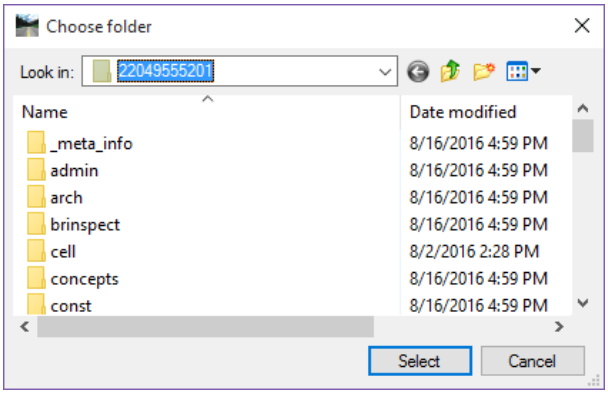
3. On the top right hand side of the Create File/Project tool, select the **Project Settings** button. This will open Project Settings.



4. Click **Select Active Project**. This will open the Select Active Project dialog.



5. Browse to the *Projects* folder and select **22049555201**. Stop at the root folder.



6. Click the **Select** button. This selects the project, dismisses the Choose Folder dialog and returns to the Select Active Project dialog.

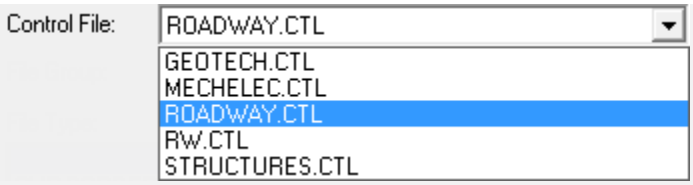
7. Click **OK** on the Select Active Project dialog.

8. Click **OK** on the Project Settings dialog. This sets the active project.

➢ *Load Appropriate Control File*

The control file sets, for lack of a better term, the discipline to work in. Traffic Plan files are part of the Roadway control file. It is important to know how to do this in case it is required to use a different control file in the future or if the standards ever change.

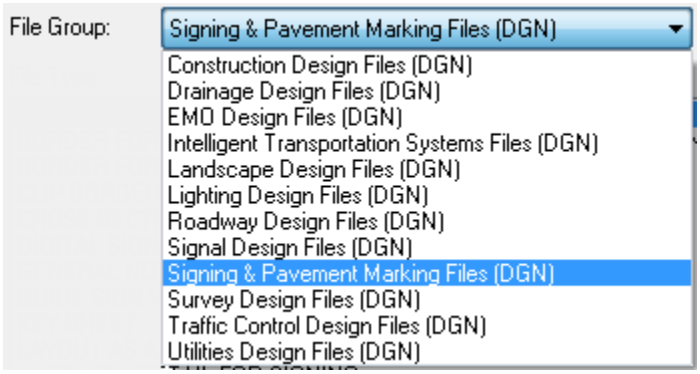
1. Click the down arrow on the **Control File** combo box.



Note

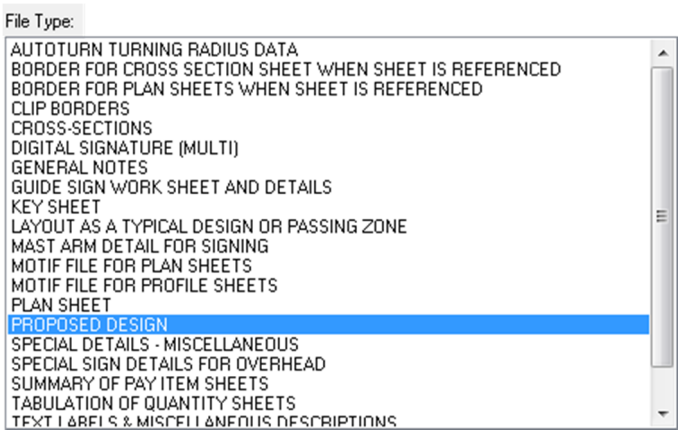
2. Click on **Roadway.ctl**. This loads the control file and the Create File/Project application now has enough information to begin creating design files in the specified Output folder.

3. In the *File Group* category, use the drop down arrow to select **Signing & Pavement Marking Files (DGN)**. This sets the file types to Signing & Pavement Marking files and sets the output folder to Signing.



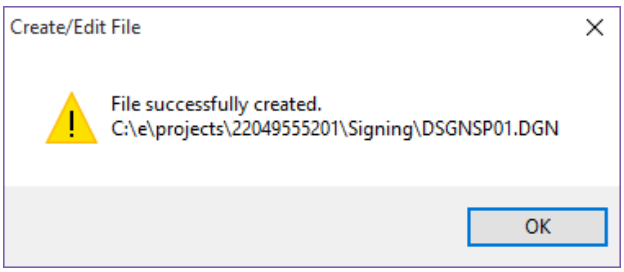
4. In the *File Type* category select the file **Proposed Design**. This selection populates the *Output File and Seed File* with the correct information.

Note *Create File/Project allows the designer to browse to a different **Output Folder** if needed. In addition, the Workspace field is set to FDOTSS4 by default.*

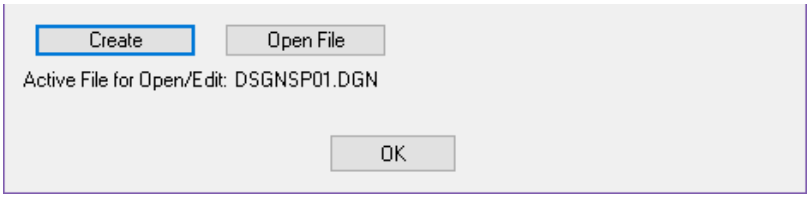


5. Click the **Create** button at the bottom of the dialog.

6. Click the **OK** button to acknowledge the file creation. Notice below the Create and Open File buttons that the file name now display. If the file Dsgnsp01 already exists in this project, the application will automatically increment the file name to Dsgnsp02 and will not overwrite the file.



Note *Clicking the Open File button next to the Create button at the bottom of the dialog can be used to open the file with this tool, which also registers and checks the file out in Project Navigator when the Create Edit Application is in TIMS mode. Also, notice below the Create and Open File buttons that the file name is shown. If the file Dsgnsp01 already exists in this project, the application will increment the file name to Dsgnsp02 and will not overwrite the existing file.*



7. (OPTIONAL) From Create File/Project, click the **Open File** button next to the *Create* button at the bottom of the dialog. MicroStation will open the newly created file. Review file and then **Close** MicroStation

   <OR> Click **OK** to close Create File/Project, close MicroStation and go on to the (*Optional*) Exercise.

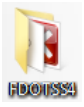
Exercise 1.2 (Optional) Create Additional Files

Use the Same File Group to Create Additional Design Files

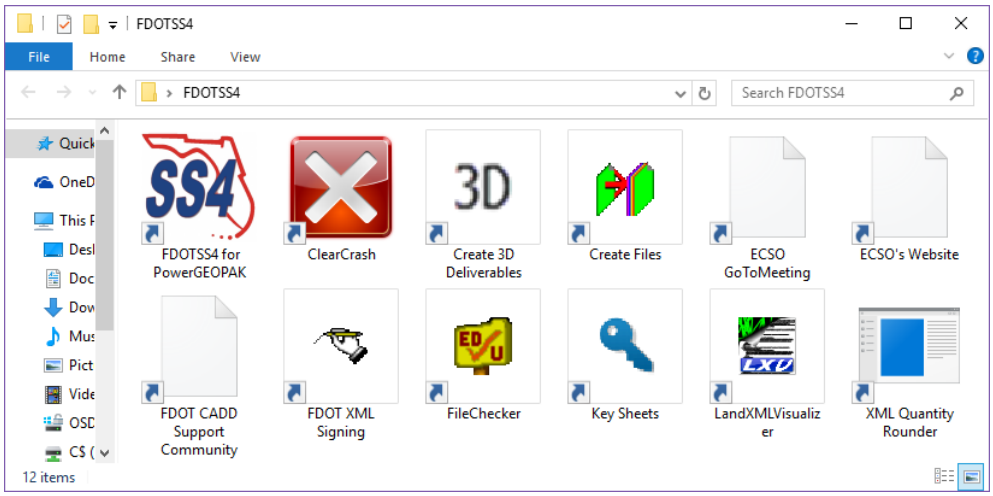
1. Using the Create File/Project tool select the **Tabulation of Quantity Sheets** file.
2. Select the **Create** button.
3. Click **OK** to acknowledge the file creation.
4. Repeat steps 1 thru 4 to create the **Border for Plan Sheets When Sheet is Referenced** file.
5. Repeat steps 1 thru 4 to create the **Summary of Pay Item Sheets** file.
6. Click **OK** on the Create File/Project tool. This will close the tool.

Exercise 1.3 Starting MicroStation through the FDOTSS4 Desktop Folder

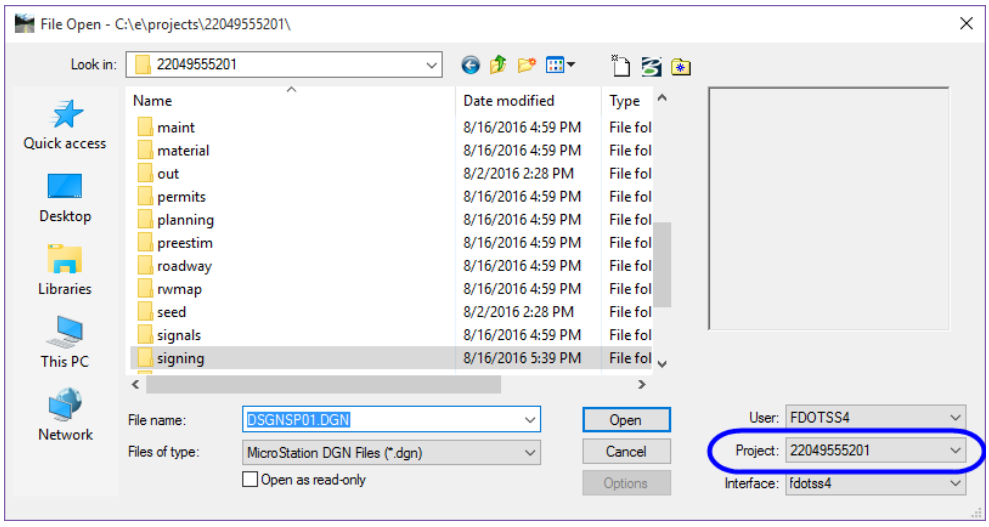
In this exercise, use the FDOTSS4 folder located on the desktop similar to the previous exercise. This folder contains several shortcut icons. It is important to review and understand the use of each icon.

1. From the FDOTSS4 folder 

double click on the icon labeled **FDOTSS4**. This opens the MicroStation Manager dialog and sets the *Workspace* environment.



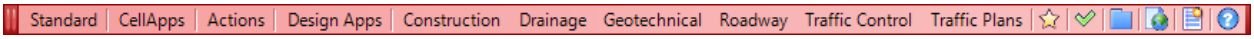
2. In MicroStation File Open, select the *Project* **22049555201**. This selection opens the project in the correct root directory.



3. Navigate to the *Signing* folder.

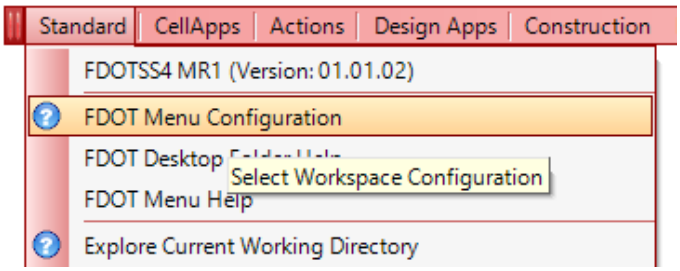
4. Select the **Dsgnsp01.dgn** file and click **Open** or double click on the file to open it.

5. Once in MicroStation notice that the FDOT Menu appears. Take a moment to become familiar with this workspace configuration.

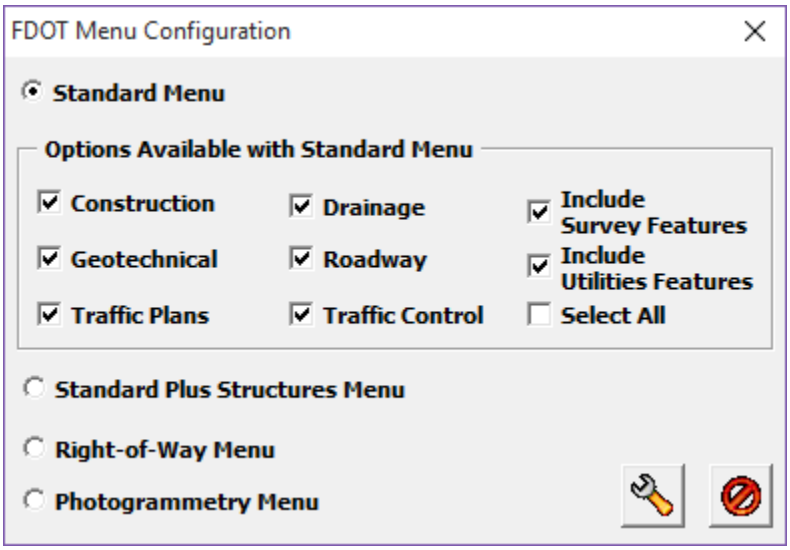


TRAFFIC PLANS MENU

As seen in the last exercise, FDOT Menu loads when MicroStation is loaded through the FDOT delivered workspace. The FDOT Menu, by default, opens in the Standard menu; the FDOT provides the option to configure FDOT Menu to load additional discipline menus as needed.



The figure below shows the possible FDOT Menu configurations.



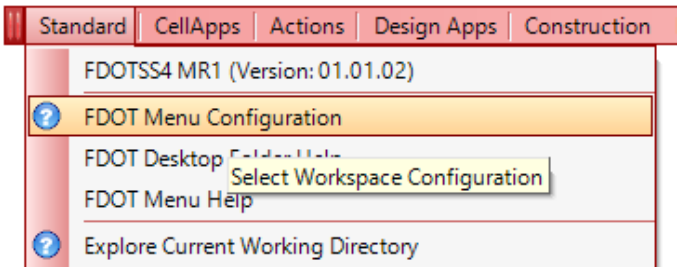
The top portion of the FDOT Menu Configuration dialog provides the option to load one or all of the Standard (Roadway) Menu options. For example, one can load Traffic Plans along with Roadway or by itself.

The bottom portion of the dialog provides options to load the Structures, Right of Way, or Photogrammetry menus. The discipline options are available with the Standard (Roadway) and Standard plus Structures Menu, but only loading Right of Way or Photogrammetry menus as separate workspaces. Once the options have been selected click the **Update** (wrench icon) button to load/unload menu options or **Exit** (slashed circle icon) closes this dialog without making any changes.

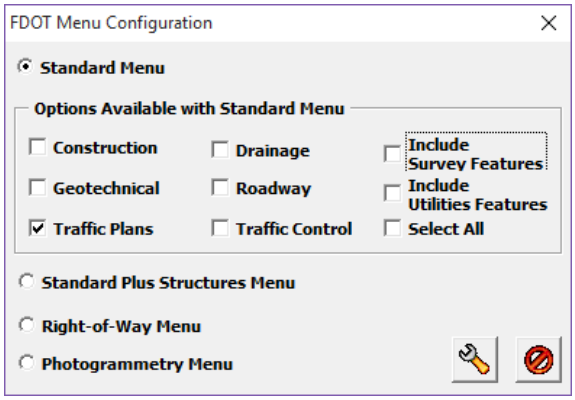
Note *The options selected on the FDOT Menu Configuration dialog control the resources attached to the MicroStation session. If there are resources needed (levels, cells, features, etc.) that are not available, check the FDOT Menu options and reset as needed to access the resources.*

Exercise 1.4 Setting up FDOT Menu to Load the Traffic Plans Menu

1. Continuing in Dsgnsp01.dgn, select the FDOT Menu option Standard > FDOT Menu Configuration to open the FDOT Menu Configuration dialog.



2. Change *Configuration* options to load the **Traffic Plans** menu.

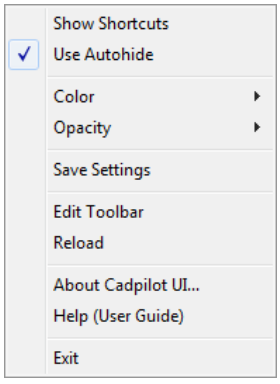


3. Click the **Update** (*Wrench icon*) button. This will close down MicroStation and reopen the File Open dialog. Select Open to re-open the same file.

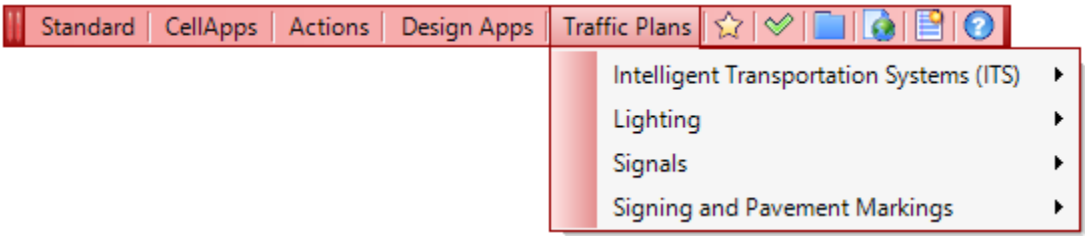
4. Select and hold the **solid bar** on the left of the FDOT Menu to drag it to a convenient location.

5. Right click anywhere on the FDOT Menu to access the *Context Menu*.

6. From the *Context Menu*, select **Save Settings** to set the FDOT Menu settings.



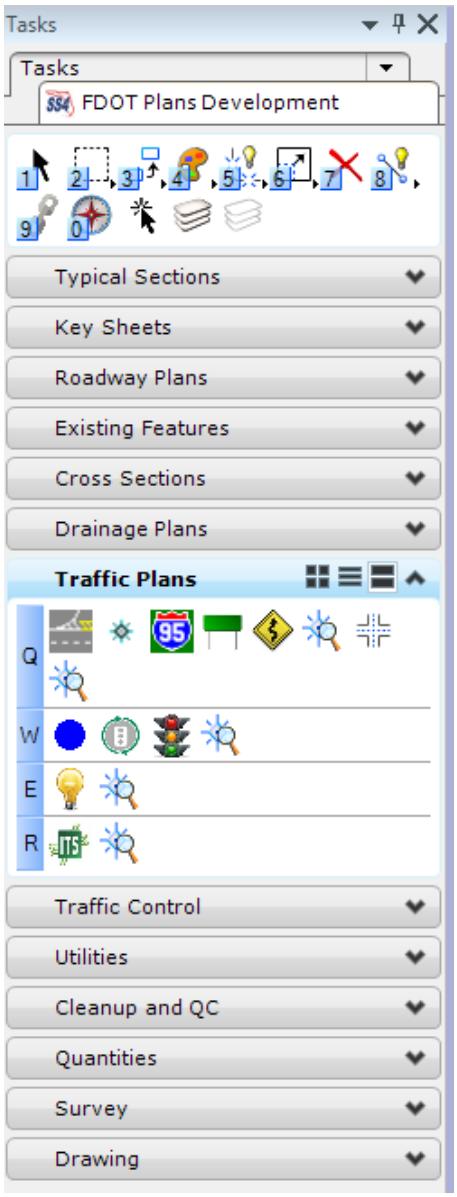
7. When the FDOT Menu reloads, the **Traffic Plans Menu** is the only discipline menu displayed. Take a moment to become familiar with this workspace configuration and the FDOT Menu.



TASK NAVIGATION WORKFLOW

FDOT PLANS DEVELOPMENT > TRAFFIC PLANS

The FDOT CADD software includes a customized Task menu, *FDOT Plans Development*. This menu is comprised of smaller discipline/task specific menus containing tools and links organized in step-by-step workflows.



ATTRIBUTES, TEXT AND MODELS

LEVELS

The FDOT has created six Standard Level libraries: Common, Survey, Right of Way, Roadway, Photogrammetry and Structures. There are approximately 1400 levels. The appropriate level library loads upon the creation or opening of a MicroStation file using the FDOT workspaces. The level name is a maximum of 18 characters and has three components: Level Name, State and View with the format: ***object_sv***

Where: (**object** = Level) _(**s** = State) (**v** = View)

(S)tate Designations	**(V)iew Designations**
p (proposed)	**p** (plan)
d (drafting element)	**r** (profile)
e (existing)	**x** (cross section)
	m (model)

An example of a plan view level is: **PavtMessage_ep**, where: *Level* = **PavtMessage,** *State* = **e** and *View* = **p**

> ***Note*** *Some levels do not show a State or View in their name. These levels are by default set to be a proposed plan view element. An example is the level (RPM1), created for proposed RPM's in the plan view.*

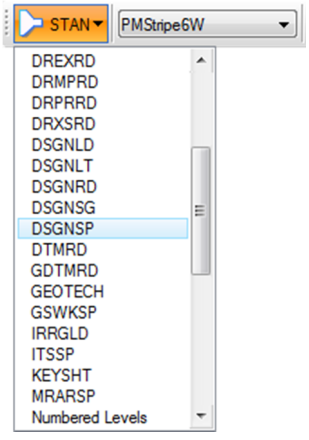
The levels symbology (color, weight and style) are set to *ByLevel*. What this means is that each level already has a color, weight and style associated to it. Designers cannot create additional levels.

RULES & FILTERS

FDOT has also created a set of Standard Rules that group the Standard Levels together for the purpose of Quality Control (QC) checking of the FDOT Standard design files ensuring compliance with the FDOT CADD Standards. FDOT delivers MicroStation Filters to reflect each of these Standard Rules to assist in users searching through the level menu. Discussion on these filters continues later in this section. The Standard Level Filters do not turn levels on or off, but they reduce the number of levels visible in the dialog box.

There are several location to very easily active a Standard Level Filter. Level filters can be loaded from the MicroStation Attributes Tool Palette, Level Manager, Level Display dialog, etc. There is a drop down menu as seen in the figure below to load level filters, but is option is only available when selecting "*Active Level Filter*".

> ***Note*** *FDOT presets Standard Level Filters to each Standard File Name. The filters automatically set by default to those specific file names upon opening of the design file.*



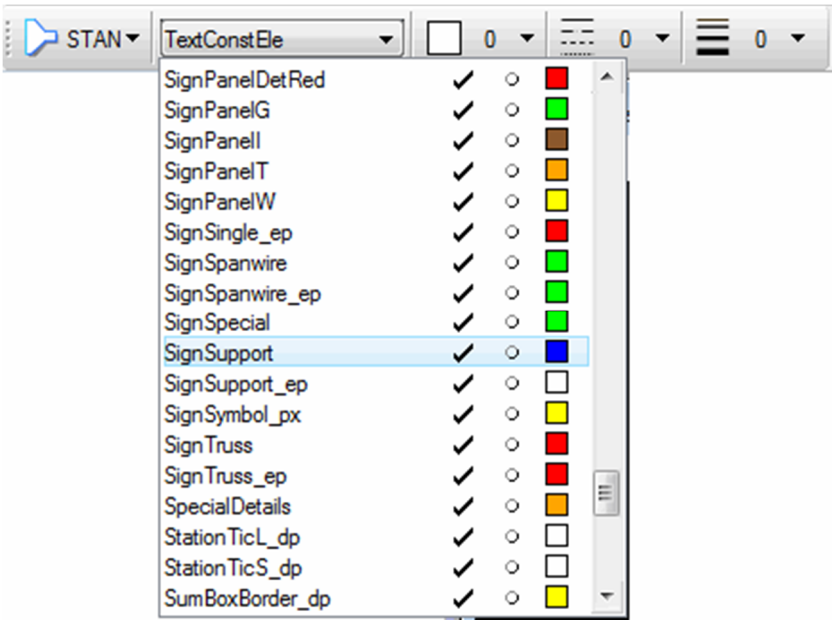
Exercise 1.5 Levels and Filters

This exercise will cover investigating Levels and Level Filters delivered by FDOT. The elements placed in this exercise are not part of the final design; they are for experimenting and practicing only.

1. Continuing with *DSGNSP01.dgn* in the *Class Work* model, select the **STANDARDS:DSGNSP** option from MicroStation *Attributes* tool palette. This sets the active level filter.

> ***Note*** *As a refresher, a level filter isolates the levels seen in the level dialog so it is easier to navigate. FDOT groups the level filters by discipline and sets them by the filename.*

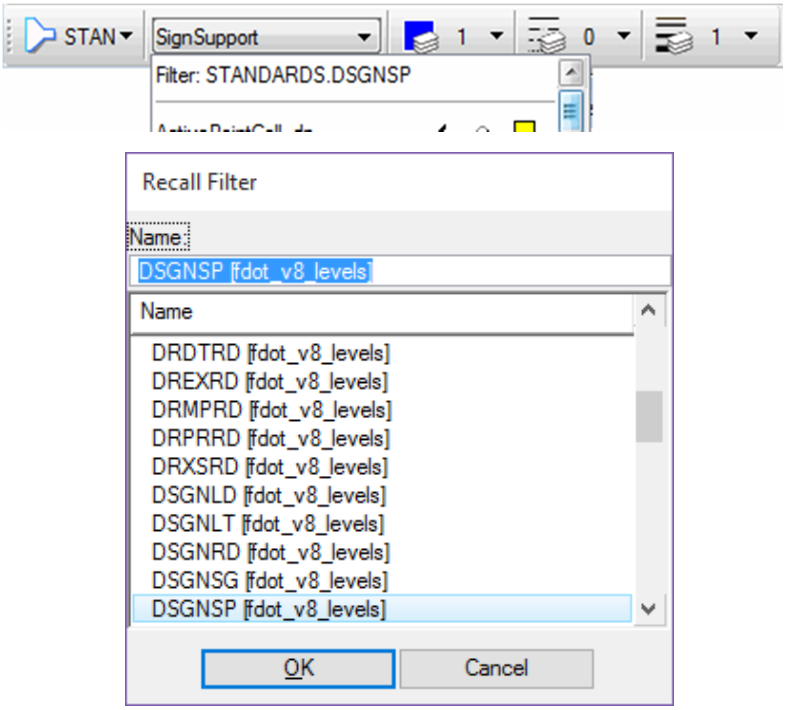
2. In the ***Attributes*** tool palette, select the drop down arrow next to the level names.



3. Scroll down and select the *level* **SignSupport** that sets the active level and sets the Color, Weight and Style to ByLevel.

4. In the *Attributes* tool palette, select the drop down arrow next to the level name.

5. Scroll all the way to the top and select **Filter: STANDARDS:DSGNSP.** This opens the Recall Filter dialog.



Note *This is another way to load level filters.*

6. Scroll down and select **Text (fdot_v8_levels)**.

7. Click **OK**. This loads ***Text Levels*** filter.

8. Take a moment to review the levels in this filter. Notice that all levels visible are associated to text.

9. Now that the *Filter* is loaded, navigate the level drop down menu and select the level appropriate to place the item. Level filters can save time when going from Line work to Text and so on.

CIVIL FEATURES

Civil Features define the symbology of elements much like using Place Influence with D&C Manager. The difference is, only the civil tools use the Feature definitions. Each design Feature has only one definition. Within this definition, symbology is set up for each design View. The tools use the correct symbology for the elements drawn based on the type of model or design View (Plan, Cross Section, Profile, or 3D). FDOT has set up the Feature tables using Native Style for quantity calculations. Native Style looks in the GEOPAK DDB file for the symbology settings, including the GEOPAK attribute tag and any Adhocs defined in the DDB file.

FEATURE DEFINITIONS

Feature Definitions control symbology, annotation, and various other properties applied to the geometric elements.

FDOT built the Feature Definitions by using an existing feature table from the GEOPAK (DDB). One utilizes these existing feature tables by way of a link to the file, plus the addition of more settings to enhance capabilities. One uses these feature definitions to:

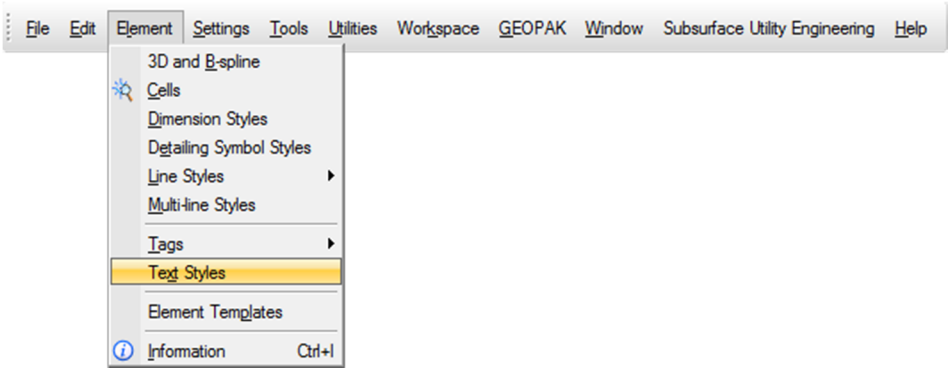
- Define what the geometric elements actually are; what is being modeled such as curb, centerline, edge of pavement, etcetera.
- Control symbology in various views, including capability to define differing symbology in plan, profile, and 3D spaces.
- Define terrain model attributes (spot, break line, void, etcetera).
- Define surface display characteristics.

TEXT STYLES

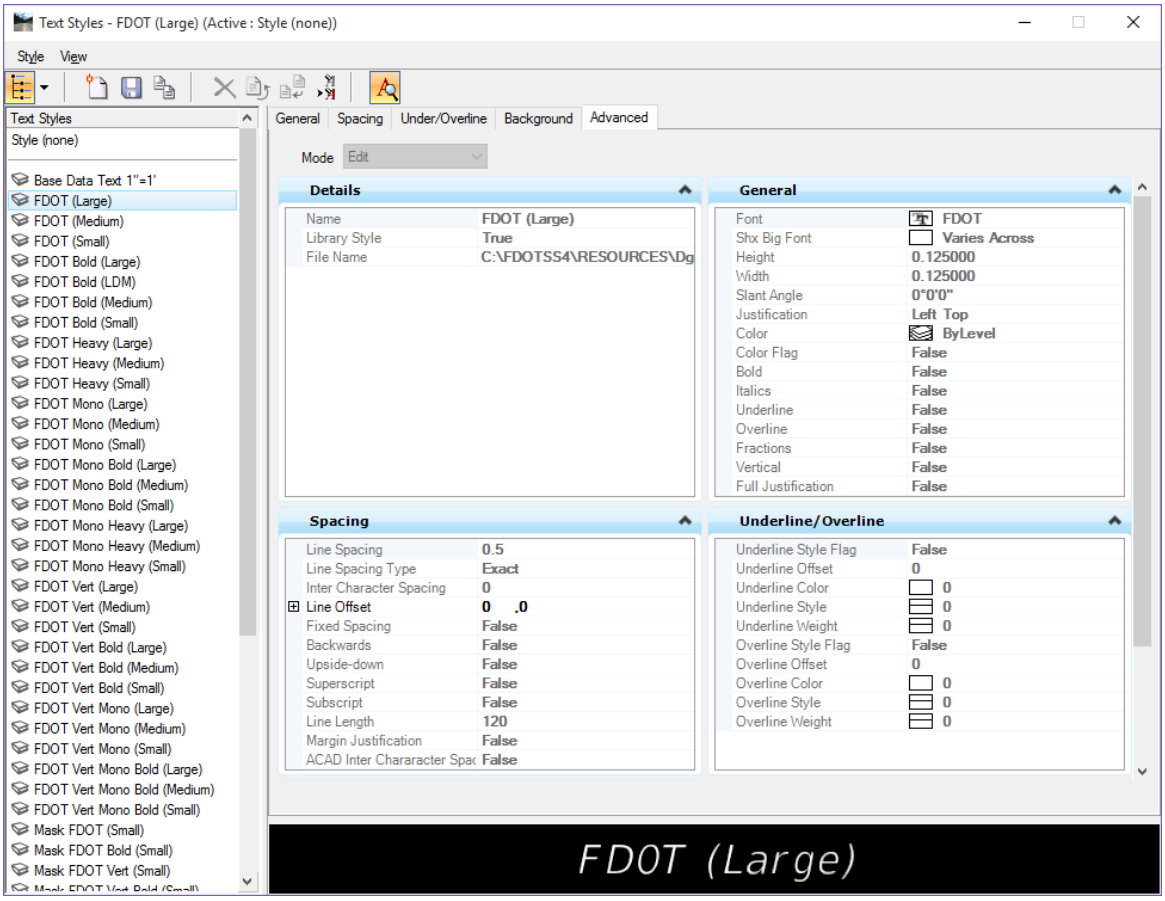
A text style is comprised of a group of text attributes, such as font, width, height, spacing and so on. Text styles take away the burden of having to set all of the individual text parameters. FDOT delivers predefined text styles for use whenever possible. The text styles delivered by FDOT are at a scale of 1 to 1. This is important to remember placing text using Annotation Scale. A more detailed discussion of Annotation Scale comes later in this section.

TEXT STYLES DIALOG

The Text Styles dialog can be accessed by selecting **Element > Text Styles** from the MicroStation menu.



The Text Styles dialog shows all of the text styles that exist in the design file, and all of the parameter settings for each style. When a new file is created or opened an existing file based on the **fdot_levels_v8.dgnlib** all of the appropriate text styles are loaded. FDOT expects no changes made to the delivered text styles.



TRUE TYPE FONTS

FDOT has integrated the use of True Type Fonts and restructured the Text Styles. The following implements the True Type Fonts:

- Cell Libraries
- DDB
- VBAs
- MDLs
- Spreadsheets

True Type Fonts will ignore MicroStation weights. The best method to show thicker text is to use the Bold font. The FDOT CADD Software delivers and installs the True Type Fonts in the FDOTSS4\RESOURCES\Fonts\ folder on the server and in the Windows\Fonts folder on the client.

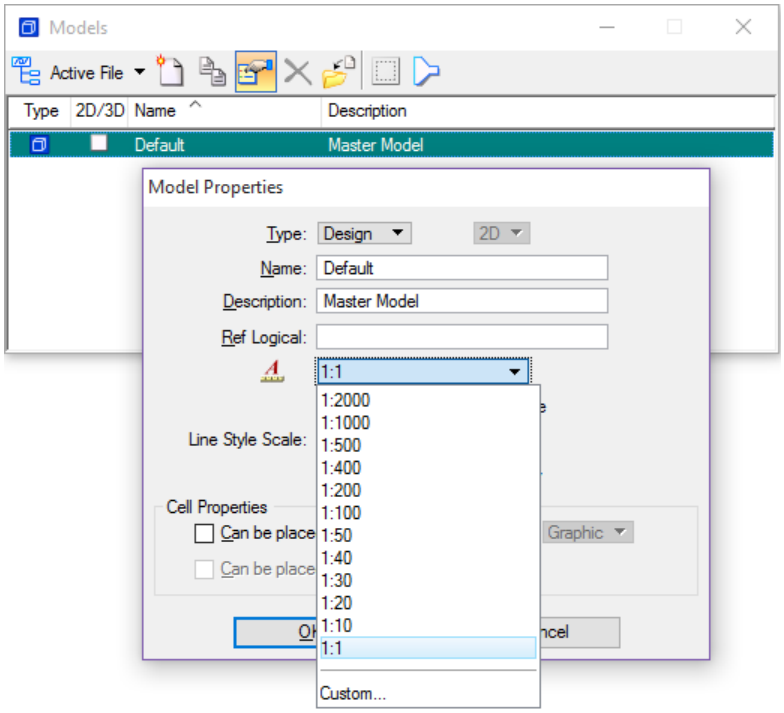
Note *FDOT CADD Software also delivers old fonts, but do not configure the menus and tools to use them.*

STYLE ORGANIZATION

Fonts at Common Sizes	40 Scale	50 Scale
Large = .15 x Scale	5.0	6.25
Medium = .1 x Scale	4	5
Small = .07 x Scale	2.8	3.5

ANNOTATION SCALE

Annotation Scale associates text and linestyles placed in a model to a specific scale so if the scale changes in that model the text dynamically changes with it. The Annotation Scale lock must be check on before placing the first piece of text and continue to use Annotation Scale on all of the remaining text for this to function properly.



Using Annotation Scale also removes the burden calculating text height used at particular scales when placing text. Annotation Scale is model specific.

FDOT recommends to set this at the time the model creation and to select the Annotation Scale lock. This can also be set in the *Model Properties* as seen in the figure above.

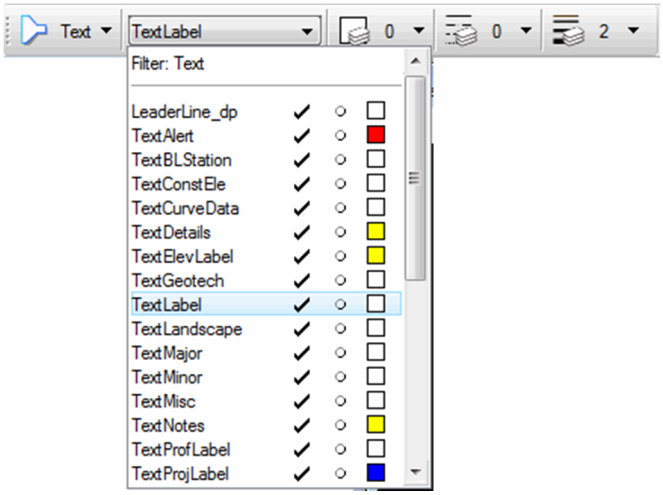
Important items to remember regarding Annotation Scale:

- Model Specific
- Annotation Lock must be on from the start
- Can be synced to the plot scale using FDOT Menu
- Can be set in the Model properties
- Can be changed using the Drawing Scale
- Do Not switch Annotation Scale ON and OFF

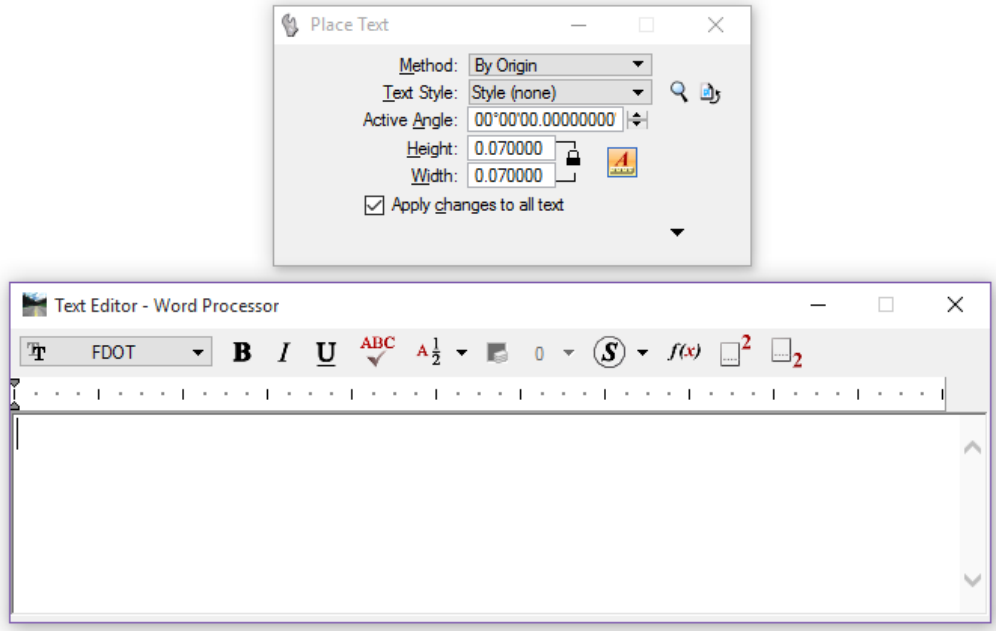
Exercise 1.6 Annotation Scale and Text Styles

This is a brief introduction to placing text using FDOT delivered Text Styles. This discussion is in more detail later in this course.

1. Continuing with *DSGNSP01.dgn* in the *Class Work* model, set the *active level* to **TextLabel.**

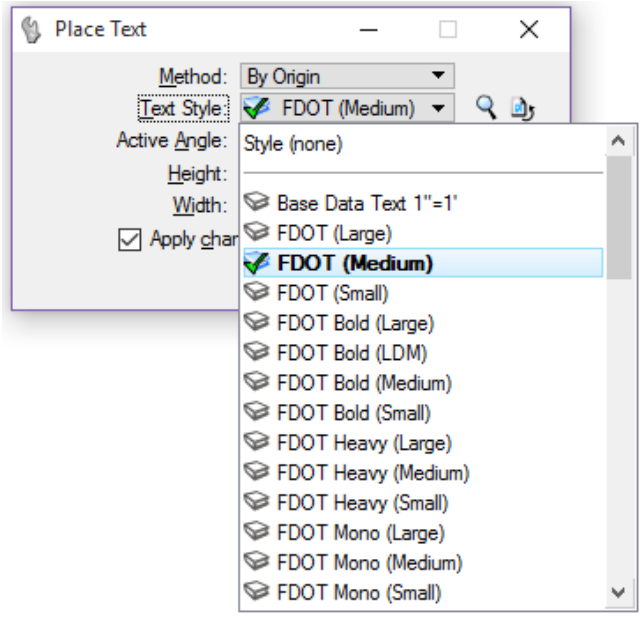


2. From the MicroStation Task Navigator's Main Classic Task, select the **Place Text** tool. This opens the Place Text dialog.



Note	*Notice that the Annotation Scale option is **active**. This was part of our Model Properties set in a previous exercise. Remember with Annotation Scale set there is no need to calculate what text height and width to use; this tool automates the calculation.*

3. From the *Text Styles* drop down menu, select the **FDOT (Medium)** style.

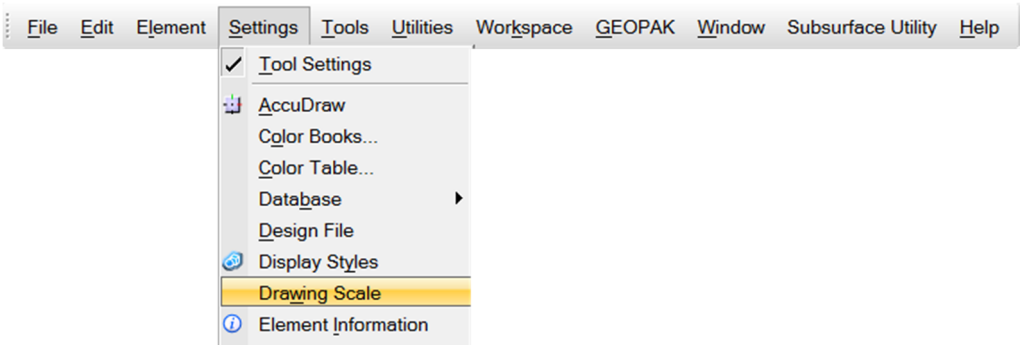


4. In the Text Editor dialog, enter a sample text string and place it in the design file.

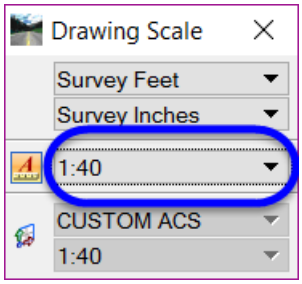
5. From the MicroStation Task Navigator select the **Main Classic Menu > Display Text Attributes** tool  .

6. Select the text just placed and notice the text attributes, the *Height* and *Width* are set to the correct size based on the Annotation Scale. No manual calculation required.

7. Open the Drawing Scale dialog by selecting the MicroStation menu **Settings > Drawing Scale**.



8. Change the Annotation scale from 1:50 to 1:40. Note the change in size of the previously placed text.



9. Take time to familiarize yourself with the Place Text dialog and other delivered Text Styles.

10. Change the *Model* back to **Default** and select **File > Save Settings**.

MODELS

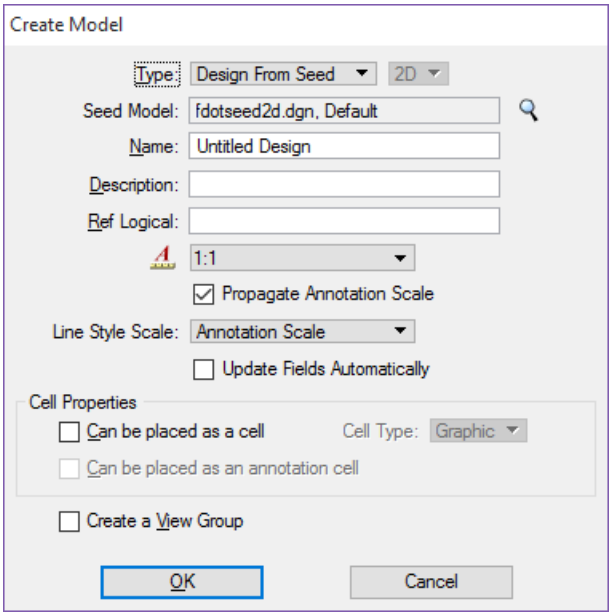
Models are independent sets of design data within the same file. Every MicroStation design file has at least one model named Default. Models consolidate files containing data used collectively.

An example is the cross section file, this one file *(Rdxsrd*.dgn)* has four models in it:

- Pattrd – Pattern lines for cross sections
- Rdxsrd – Cross Sections
- Xsshrd – Cross Section Shapes
- Rdxsrd_shg – Cross Section Sheets

Another example of how to use a model is with the alignment file or *(Algnrd*.dgn)*. This file is for displaying the alignment Stationing, tick marks, PC, PT, PI, and curve data information. Typically, there could be multiple alignment files to cover all of the different scales. Using the model concept only one MicroStation *(Algnrd*.dgn)* file with several models in it (i.e. a model for each scale) has to be created.

When creating a new model there are several options to define in the model properties, these properties are unique to the model. The figure below shows the Create Model dialog.



There are two types of models, Design and Sheet. The Design model is the actual geometry or line work and the Sheet model is the sheet file or border. Models are either 2D or 3D. A 3D model can reference to a 2D design file.

Note	*If DGN files use multiple models, it is important to document their names and uses in the project Journals. This will give downstream users an idea as to what is in the file and whether it is important or not. The same goes for CADD managers who review QC reports. If creating temporary models to work in and the model fails compliancy, the project Journal documentation should provide an explanation, as long as this Model* ***IS NOT*** *referenced to any other design file.*

Exercise 1.7 Using the Tools

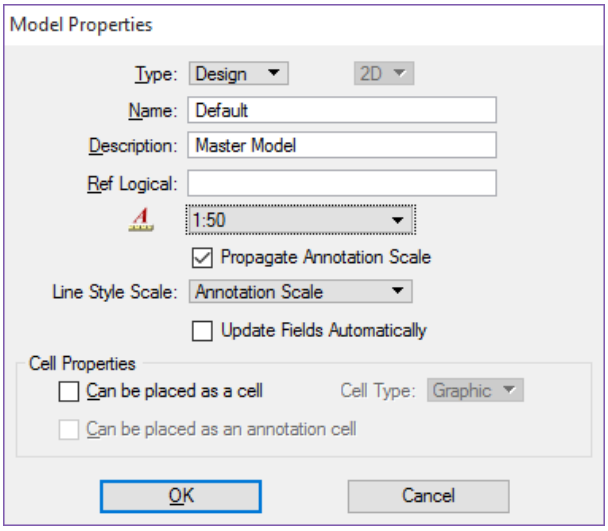
➢ *Models (Part 1)*

This exercise will cover setting the Annotation Scale for the default model and create a new model in this exercise. This model is a place where to experiment with some tools without adding junk to the default model.

1. Continuing in *DSGNSP01.dgn* open the Model Properties dialog. You can also open this from the *Primary Tools* bar.

2. In the Model dialog, highlight the **Default** model.

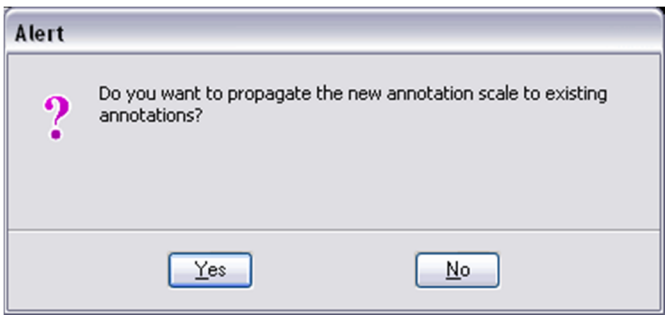
3. Right mouse click on the **Default** model and select **Properties**. This opens the Model Properties dialog.



4. Set Annotation Scale to **1”=50’**.

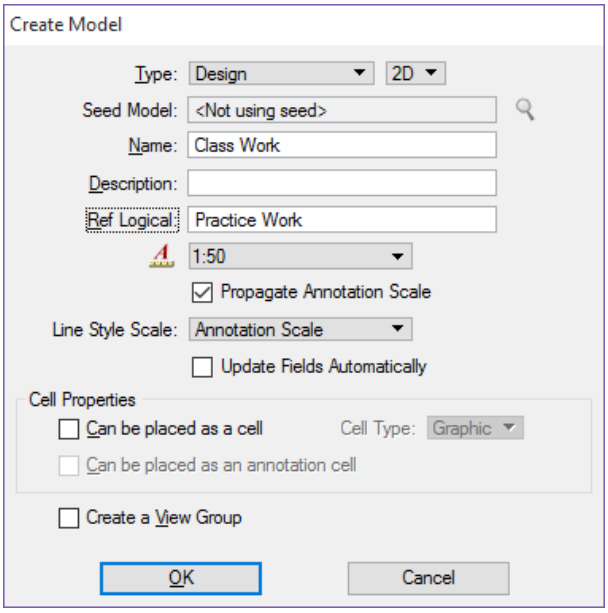
5. Click **OK**. This closes the Model Properties dialog.

6. Click **Yes** on the Alert dialog (if one appears.). Up to this point, nothing is in the design file to change.



➢ ***Create New Model (Part 2)***

1. In the Models dialog, select **Create a new model**  . This opens the Create Model dialog.



2. Set the *Type* to **Design 2D**. These are the default settings.

3. In the *Name***,** enter **Class Work**. This is the **Model** name.

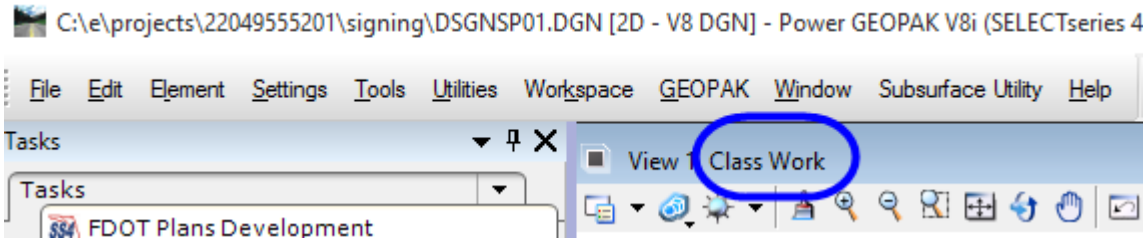
4. You can leave *Description* **blank.**

5. For *Ref Logical* enter **Practice Work**. This field, if populated, fills in the logical name in the reference palette if this file is attached. This is very helpful.

6. For *Annotation Scale* set this to **1"=50'**.

7. Click **OK**. This creates the new model and makes it the active model.

8. Notice now that the new Model shows up in the Model dialog. To switch between models, double click on the model name. The active model name will be next to the **View 1** name.

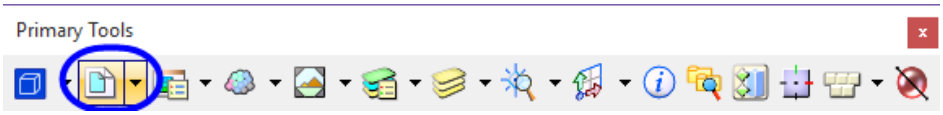


Note *In MicroStation, should already have the Annotation Scale Lock toggled on.*

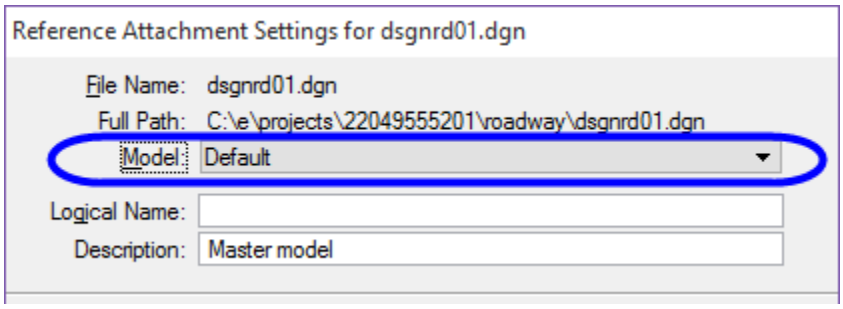
➢ ***Reference Files, Models and Print Scale (Part 3)***

This exercise will cover attaching reference files that have multiple models in them. This reinforces the earlier discussion regarding models inside of a MicroStation file. There is more than one way to load the References dialog. Use the method most familiar.

1. Continuing with *DSGNSP01.dgn* open the References dialog. This dialog is loaded by clicking on the **References** icon on the Primary Tool Bar.



2. In the References dialog, select **Tools > Attach.** This opens the Attach Reference dialog.
3. Navigate to the *Roadway* folder.
4. Attach the reference file **dsgnrd01.dgn** in the *roadway* folder.
5. Click on **Open**. This opens the Reference Attachment Settings dialog.
6. Select the **default** model from the Model drop down list.

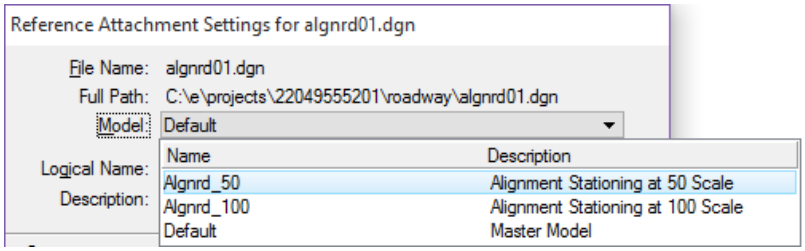


7. Click the **OK** button. This attaches the reference file.
8. In MicroStation do a **Fit View**. This fits the reference file to the active view window. Take a moment and zoom in close to the baseline, notice that there are no tick marks or stations.

Note *The Roadway Design File have the project alignments drawn on the CLConst_dp level, utilizing the Centerline (CL) Feature Definition. Stationing and tick marks are drawn in the Alignment file (algnrd*.dgn) at different scales in separate models.*

9. In the References dialog, select **Tools > Attach.** This opens the Attach Reference dialog.
10. Navigate to the *Roadway* folder and select the reference file: **Algnrd01.dgn**.

11. Click on **Open**. This opens the Reference Attachment Settings dialog. This is the alignment file containing the Stationing and tick marks.



Note *The attachment method should be set to Interactive. Notice the Model name defaults to the Default model. Every MicroStation file has at least one model named Default, except Rdxsrd*.dgn where the default model has been renamed to Rdxsrd. This reference file has additional models to accommodate multiple scales.*

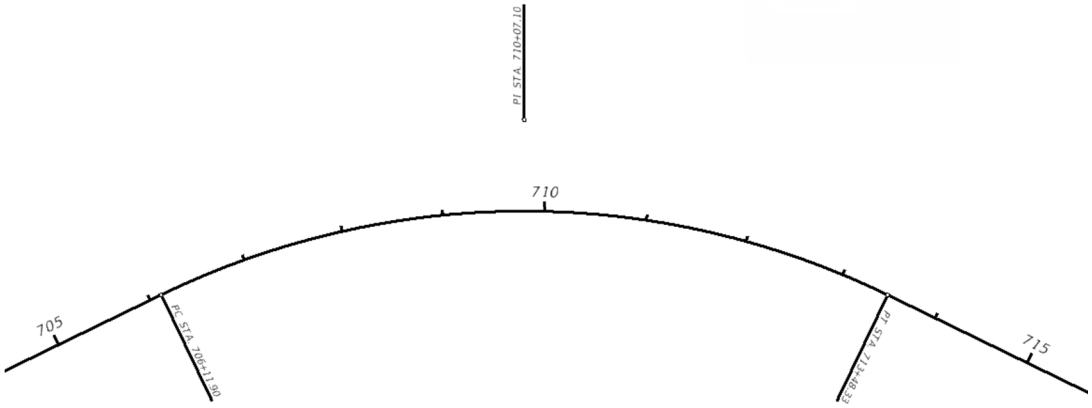
12. In the Reference Attachment Settings dialog set the *Model* to **Algnrd_50**.

13. Click the **OK** button. This attaches the reference file.

14. In MicroStation do a **Fit View**. This fits the reference file to the active view window.

Note *The reason for doing it this way is that on Signing and Marking Plans sometimes it is more advantageous to display only the stations and ticks and not the baseline. This avoids confusion when they are close to another pavement marking line or when displaying them at different scales. This set up makes it easier to turn off the display of the reference file.*

15. Zoom in close to the baseline again; notice now that there are tick marks and stations.



Note *It may be necessary to attach the Topord*.dgn, Utexrd*.dgn and Drexrd*.dgn files depending on the type of project being worked. Conflicts with any of the existing features requires the display of that reference file. Refer to the Plans Preparation Manual Volume II - Chapter 23 for further guidance.*