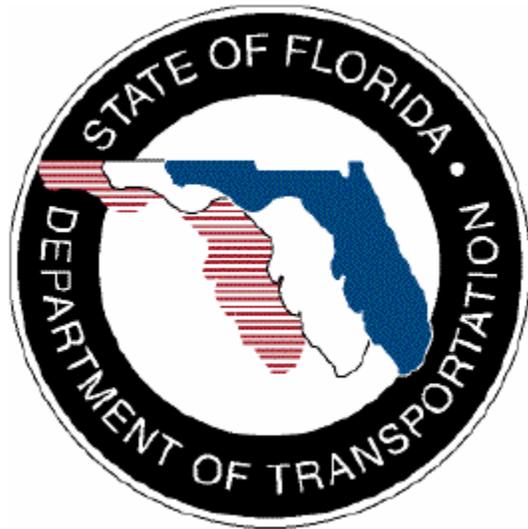


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DEPARTMENT OF TRANSPORTATION**

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**FDOT Traffic Plans Course – Lighting  
CE-11-0118**

**Course Guide  
October 22, 2009**

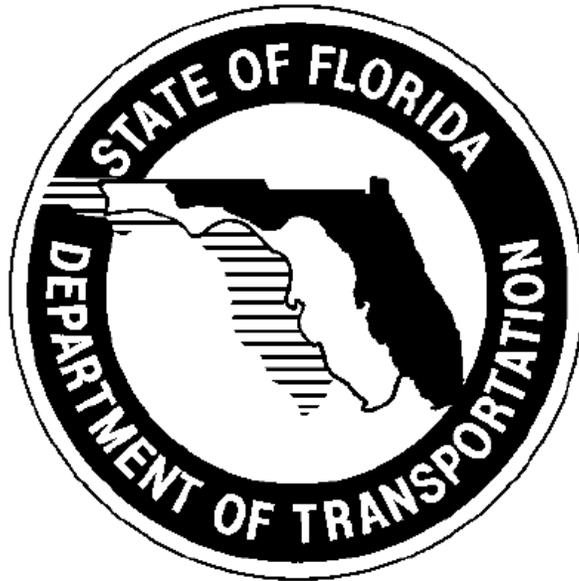
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**ENGINEERING / CADD SYSTEMS OFFICE  
TALLAHASSEE, FLORIDA**

**<http://www.dot.state.fl.us/ecso/>**



**FDOT Traffic Plans Course – Lighting**  
**FDOT Course ID: CE-11-0118**



**ENGINEERING / CADD SYSTEMS OFFICE**  
**TALLAHASSEE, FLORIDA**

**October 22, 2009**

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# **FDOT Traffic Plans Course – Lighting**

## **CE-11-0118**

### **Description**

This course was developed to teach students fundamental use of GEOPAK, MicroStation, and the FDOT CADD standard resources and applications for Traffic Plans and Lighting design based on a typical Traffic Plans design workflow to produce and present Traffic Plans and Lighting design required for Electronic Delivery.

### **Topics Covered**

- General topics on Lighting Plans and File Creation
- Exploring the FDOT desktop folder
- Create File/Project tool for creating base files for a project
- FDOT20XX Traffic Plans Menu bar
- Levels and Level Filters
- Text Styles
- Annotation Scale
- Models
- Creating a Lighting Key Sheet
- Creating a Summary of Pay Items
- Lighting Tools
- Quantities and Reports
- Sheet Navigator/Sheet Labeling Tools
- Plotting Tools

### **Prerequisites**

The following courses and some manual drafting or related CADD product experience is recommended:

- FDOT MicroStation Essentials - Part I (CE-11-0114)
- FDOT MicroStation Essentials - Part II (CE-11-0115)
- FDOT Basic GEOPAK Road (CE-11-0099)

**Duration:** 8 Hours

**Professional Credit Hours:** 6 PDHs

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For information about this and other CADD training courses, publications, videos, and Frequently Asked Questions, visit the Engineering/CADD Systems Office of the Florida Department of Transportation on the world-wide web at <http://www.dot.state.fl.us/ecso/>



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# 1 LIGHTING PLANS

## CHAPTER OBJECTIVES

This chapter is broken into three sections:

### 1. Computer Assisted Drafting and Design (CADD) Standards & File Creation

This section contains:

- General discussion on Lighting Plans and File Creation.
- Exploring the FDOT2008 folder on your desktop.
- Using the FDOT Create File/Project to create the base files for a project.

### 2. Florida Department of Transportation (FDOT) Traffic Plans Menu Bar

This section will discuss setting up the FDOT2008 Menu bar to add the Traffic Plans menu.

### 3. Levels, Text and Models

This section will cover some new features/concepts used in MicroStation XM:

- Levels
- Level Filters
- Text Styles
- Annotation Scale
- Models

## INTRODUCTION

This chapter will review the **FDOT2008** working environment including how to properly create design files that meet FDOT standards. New concepts and some new tools will be introduced that will make producing plans much more efficient.

# CADD STANDARDS & FILE CREATION

## OVERVIEW

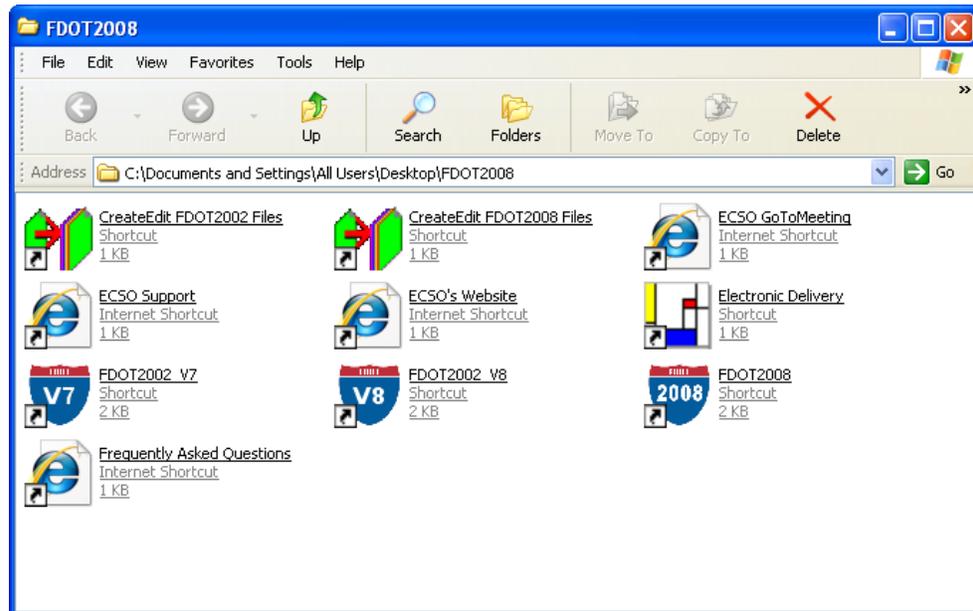
Traffic Plan projects are normally a component of a Roadway plans package. Therefore the project directory structure usually exists prior to beginning work on a Traffic Plans component. If this is not the case, the same directory structure and file standards that applies to Roadway would apply to any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

The Department uses TIMS Document Management software to manage project files and to create the local directory structure. The FDOT Electronic Delivery (EDelivery) software is used to document all project files and track project information. GEOPAK's **Project Manager** creates a set of binary files to keep track of all the files used by GEOPAK and their purpose. The information tracked by GEOPAK is different than that maintained in EDelivery and TIMS.

## EXPLORING THE FDOT2008 DESKTOP FOLDER

When the FDOT software was installed on your computer an FDOT2008 folder was placed on your desktop. This folder contains shortcuts to applications used when working on FDOT projects. Some of the shortcuts are for starting MicroStation and others are for working with Electronic Delivery.

The figure below shows the contents of the FDOT2008 folder.



It is recommended that you use these shortcuts to start MicroStation. Using these shortcuts will start your workspace environment properly which can alleviate, among other things, issues with using the wrong CADD standards.

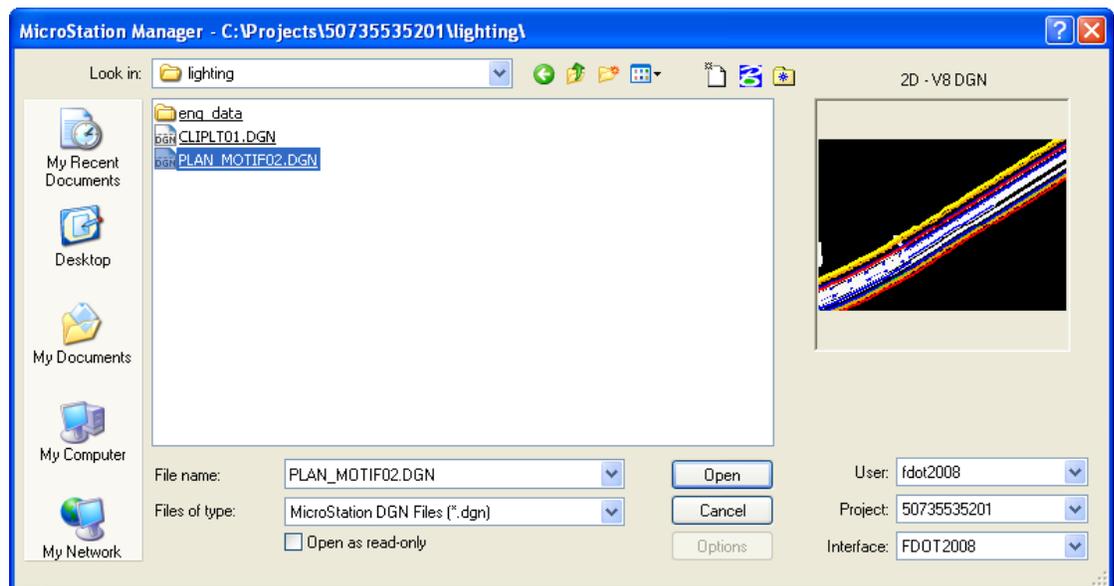
FDOT delivers three shortcuts for starting MicroStation, they are:

- **FDOT2008** – Uses the V8 file format and FDOT2008 CADD standards. This option requires existing files to be converted for both file format and CADD standards. All new support files and programs are accessible.
- **FDOT2002\_V7** – Uses the V7 file format by forcing MicroStation to operate in V7 Workmode. This option uses the FDOT2002 CADD standards. This option requires no conversion, but it does significantly reduce the capabilities of GEOPAK.
- **FDOT2002\_V8** – Uses the V8 file format with the FDOT2002 CADD standards. This option requires the existing files to be converted to the new file format only. This option uses the FDOT2002 support files, (i.e. criteria files, GEOPAK support databases).

You will have to determine based on your projects which workspace to use. In this course we will be using the **FDOT2008** workspace exclusively.

**Note** FDOT2008 does not include a metric workspace. Resource files required to view and print existing metric files are supplied for this purpose only.

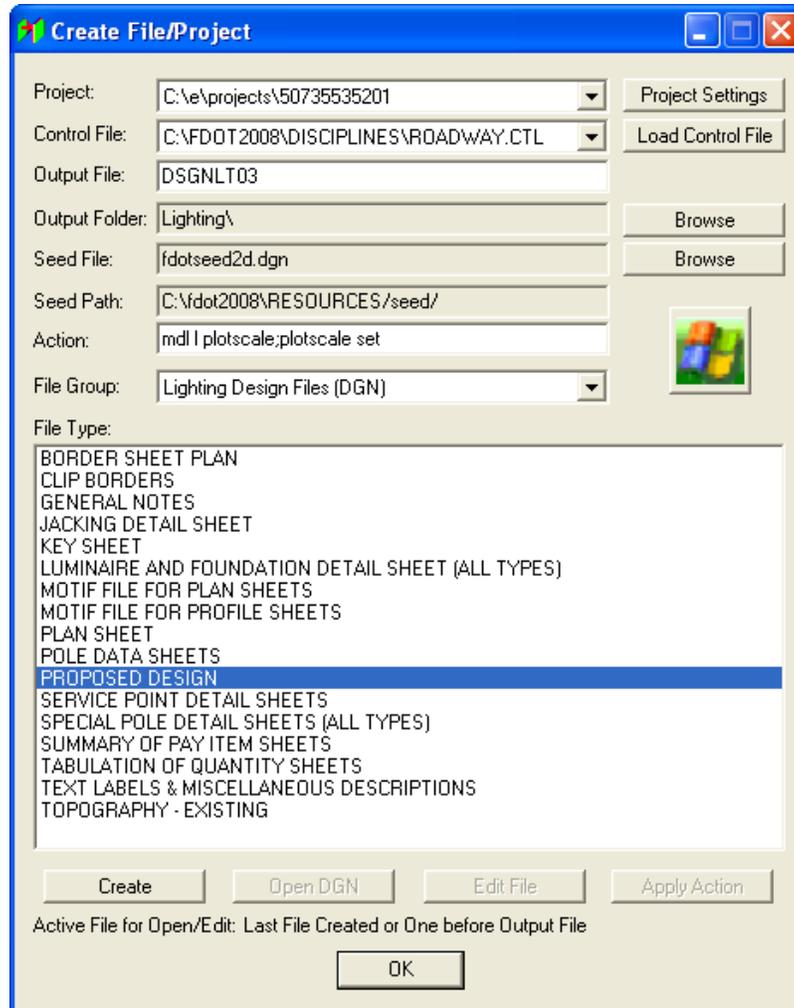
Using these shortcuts to start MicroStation, as mentioned previously, opens MicroStation Manager and sets the workspace but does not set the Project. The Project is set by selecting the drop down arrow and selecting the correct project file or (.pcf) file. The workspace remembers the last project worked in and will use the .pcf file the next time MicroStation is started with that workspace. This is important to watch as you probably work on more than one project at a time. It is recommended that you always use the pcf file. This supplements other tools used to produce your electronic delivery submittal. Discussion provided later in the course.



## Creating Base Project Files with Create File/Project

The *Create File/Project* application is used to create MicroStation design files, Compbook Excel files and other files in accordance with 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 Electronic Delivery is the recommended method for creating new projects. Create File/Project can be accessed from both inside and outside of MicroStation. The advantage to using this tool to create files is that the file will always be named according to FDOT standards and you will always be required to select the project folder.



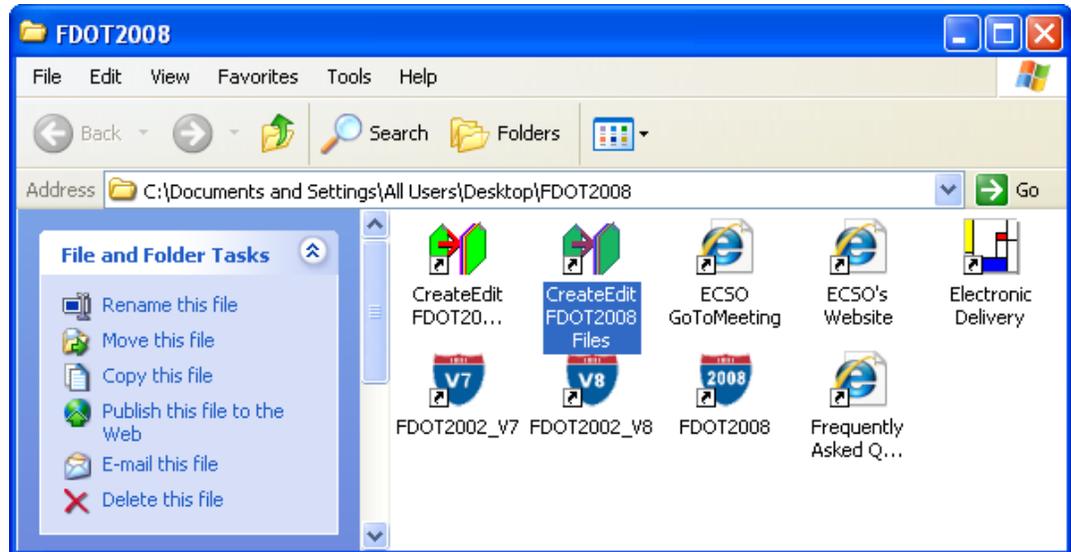
*Create File/Project tool*

**Note** After creating the file the user can immediately open it or create all of the necessary design files and open them at a later time.

## Lab Exercise: creating the base files for a project

### CREATING LIGHTING PLANS DESIGN FILES

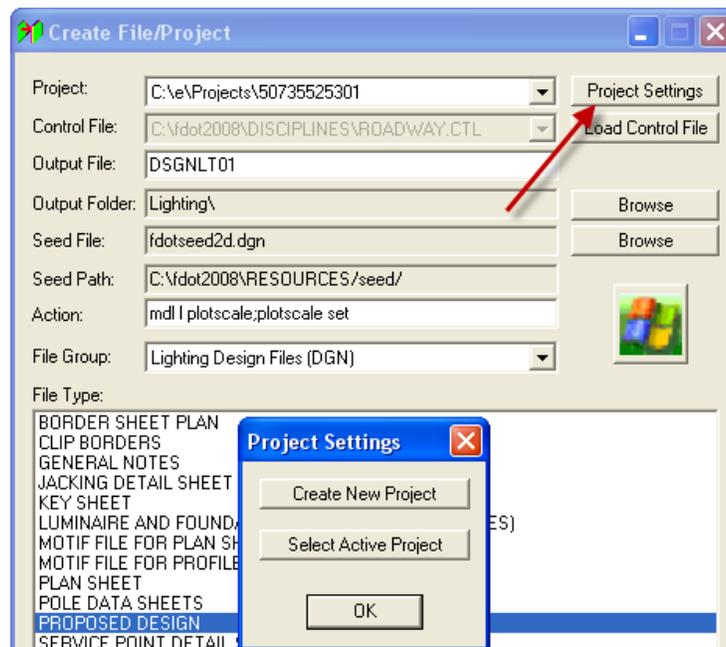
- Open the **FDOT2008** folder on the desktop.



- Double-click on the **Create Edit FDOT2008 Files** icon. This opens Create File/Project.

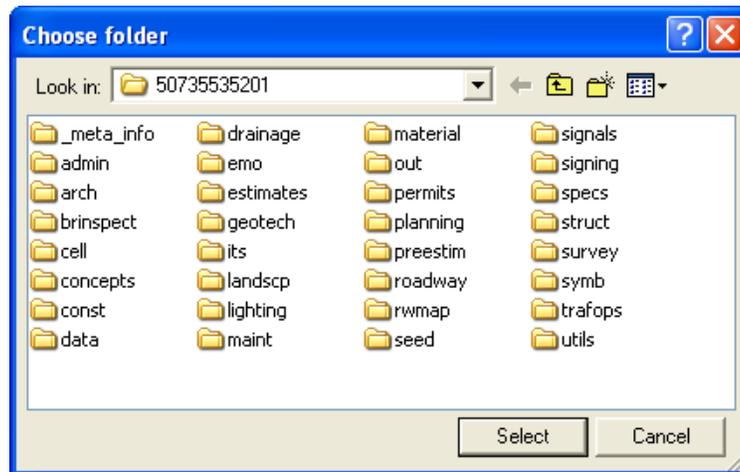
**Note** When training in FDOT offices, the user must click the Project Navigator button to allow the Create File/Project tool to work locally.

- On the top right-hand side of the Create File/Project, select the **Project Settings** button. This opens Project Settings.



- Click the **Select Active Project** button to open Select Active Project.

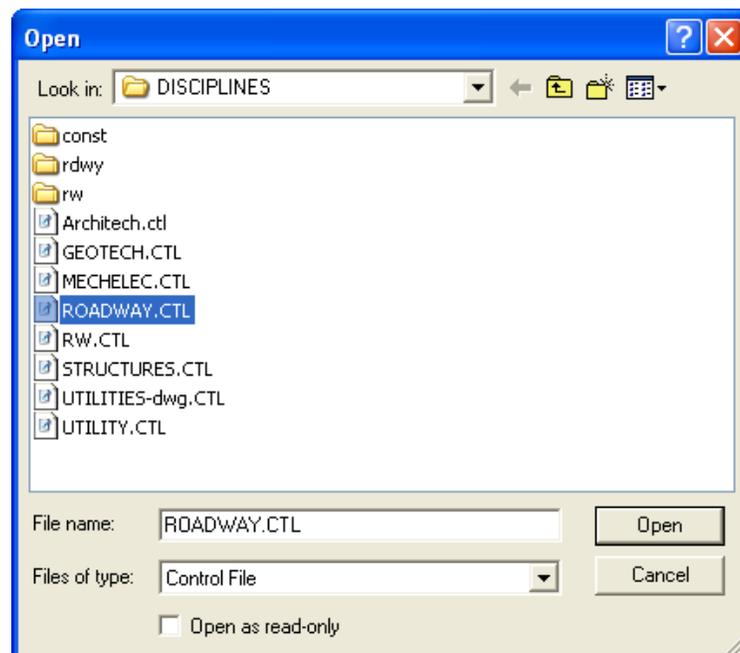
8. Browse to the Projects folder and select **50735535201**. Stop at the root folder.



9. Click on the **Select** button. This selects the project and reopens the Select Active Project dialog.
10. Click **OK** on the Select Active Project dialog.
11. Click **OK** on the Project Settings dialog. This sets the active project.
12. Select the **Load Control File** button, located below the **Project Settings** button to load the appropriate control file.

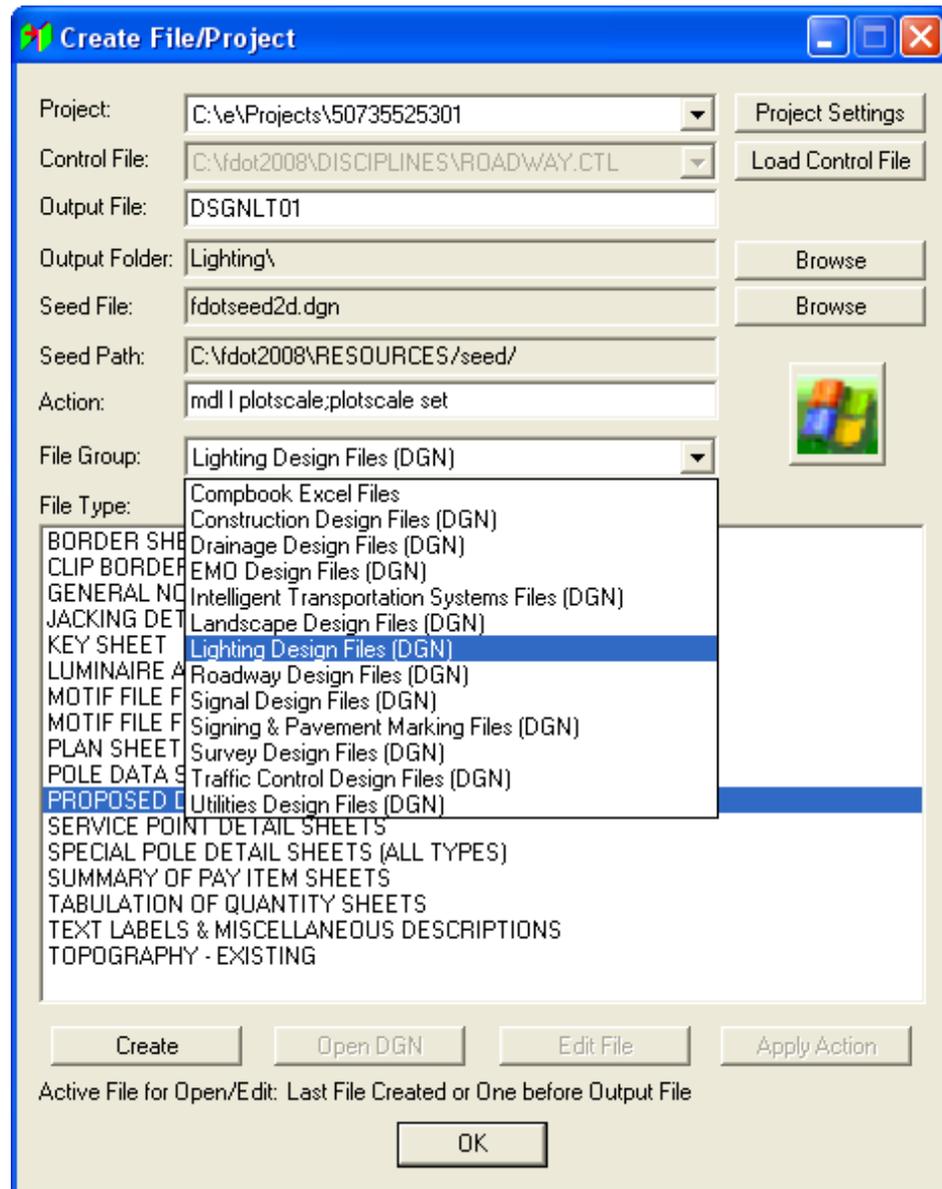
**Note** Remember the control file sets the discipline in which to work in. Lighting plans are part of the Roadway control file.

13. Browse to the **FDOT2008\Group** folder. Depending on how the users software is installed the **FDOT2008\group** folder could be on the server or the local hard drive.



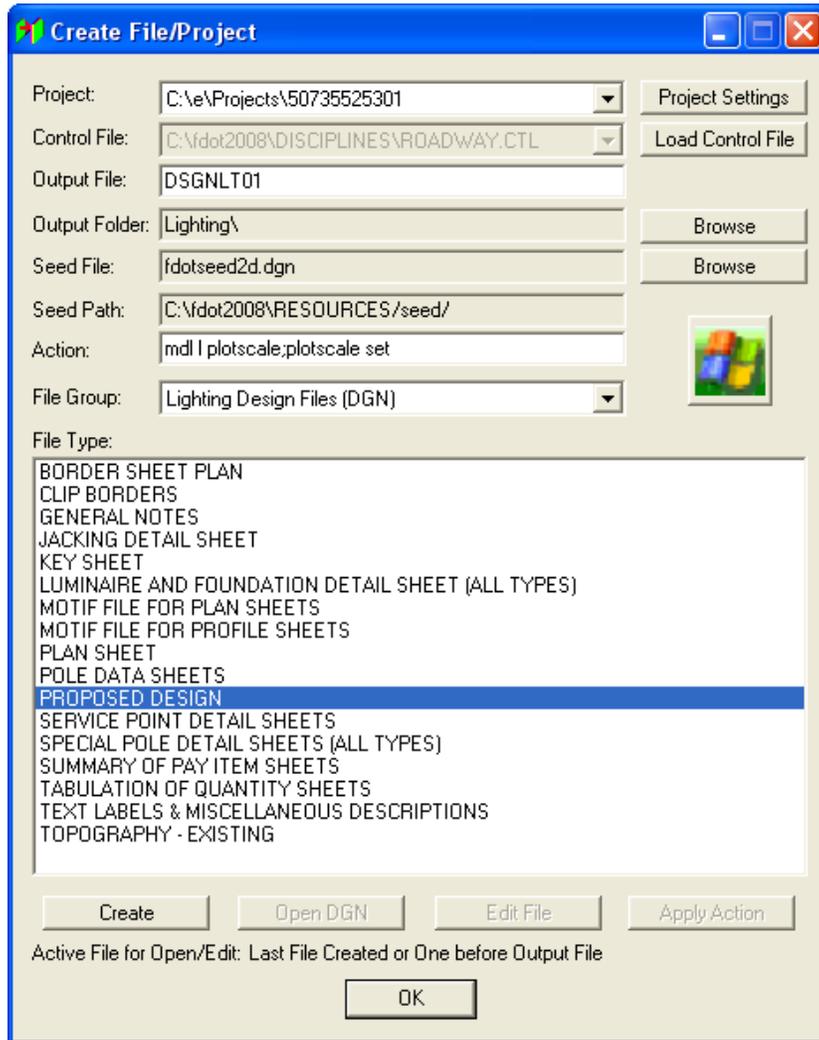
14. Double-click on the **Roadway.ctl** file <OR> select the **Roadway.ctl** file and click **Open**. This loads the control file. The user is now ready to select an output folder and create a design file.

15. In the **File Group** category select **Lighting Design Files (DGN)** from the dropdown menu. This sets the **File Types** to **Lighting** files and the **Output Folder** to **Lighting**.



**Note** This version of Create File/Project allows you to browse to a different **Output Folder** if needed.

- In the **File Type** listing, select **Proposed Design**. This will populate the **Output File** and **Seed File** with the correct information.

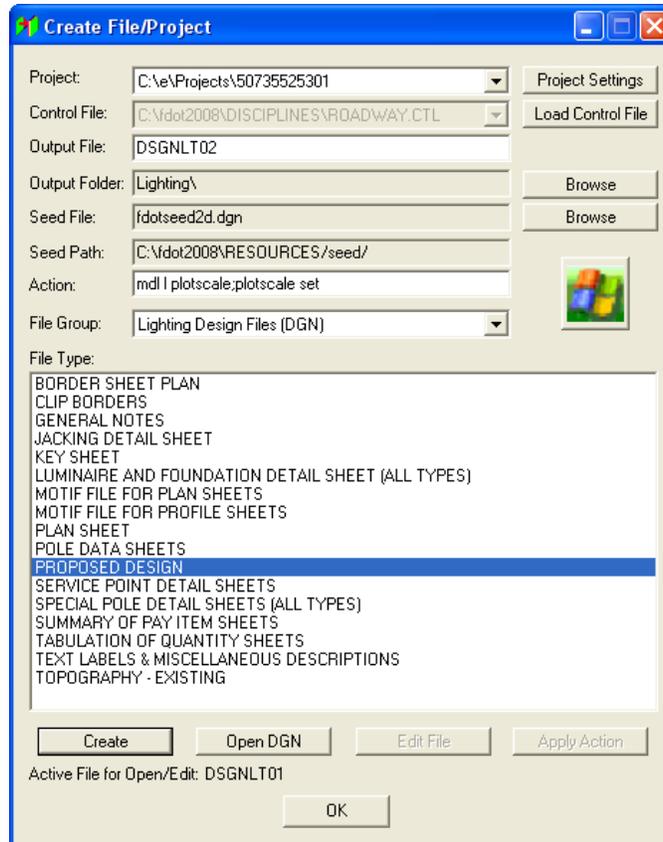


- Click the **Create** button at the bottom of the Create File/Project dialog.
- Click the **OK** button to acknowledge the file creation.



19. Notice the **Open DGN** button is now active, located at the bottom of the dialog next to the **Create** button. This allows the user to open this file.

Also notice that the file name now displays below the **Create** and **Open DGN** buttons. If the file **Dsgnlt01** already exists in this project, the application will increment the file name to **Dsgnlt02** and will not overwrite the existing file.



20. Go on to the **Optional Exercise** or click **OK** to close the **Create File/Project** dialog.

## Optional Exercise: Create Additional Files

### **USE SAME FILE GROUP TO CREATE ADDITIONAL DESIGN FILES**

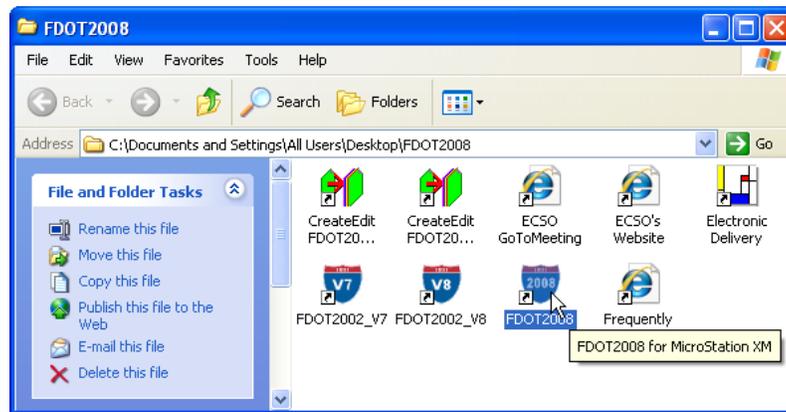
1. Using Create File/Project, select the **Tabulation of Quantity Sheets** file.
2. Click the **Create** button.
3. Click **OK** to acknowledge the file creation.
4. Repeat steps 1 thru 4 to create the **Border for Plan Sheets** file.
5. Click **OK** on the Create File/Project dialog. This will close the tool.

## Lab Exercise: Starting MicroStation through the FDOT2008 folder

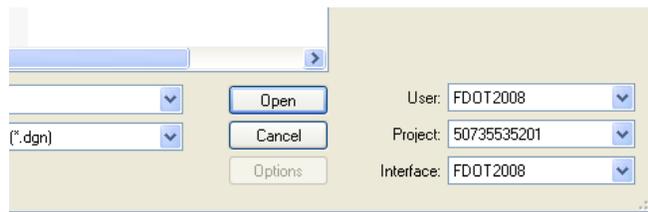
### OPENING MICROSTATION USING SHORTCUTS IN FDOT2008 FOLDER

In this exercise you will use the FDOT2008 folder located on your desktop just like in the previous exercise. This folder contains several shortcut icons, it is important that you review and understand what each icon is used for.

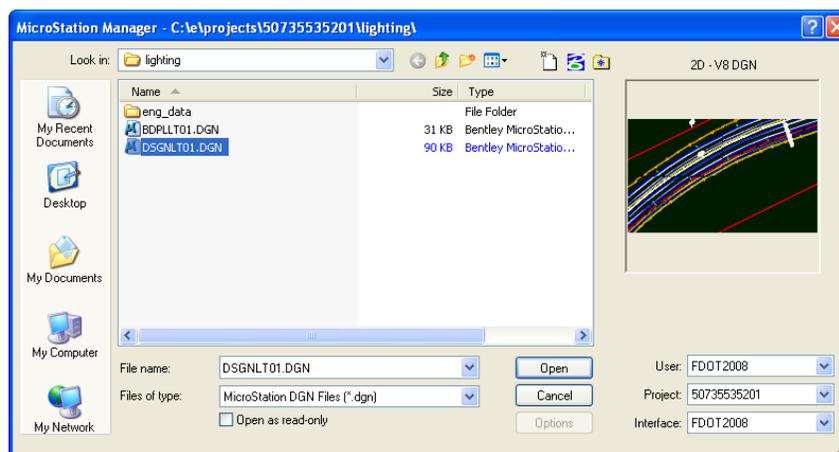
1. From the **FDOT2008** folder double-click on the **FDOT2008** icon. This opens the MicroStation Manager dialog and sets the FDOT2008 Workspace environment.



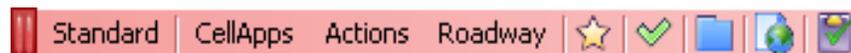
2. In MicroStation Manager, select the project **50735535201**. This will place the user in the correct root directory.



3. Navigate to the **Lighting** folder and select the **Dsgnlt01.dgn** file.
4. Click **OK** <OR> double-click on the file to open it.



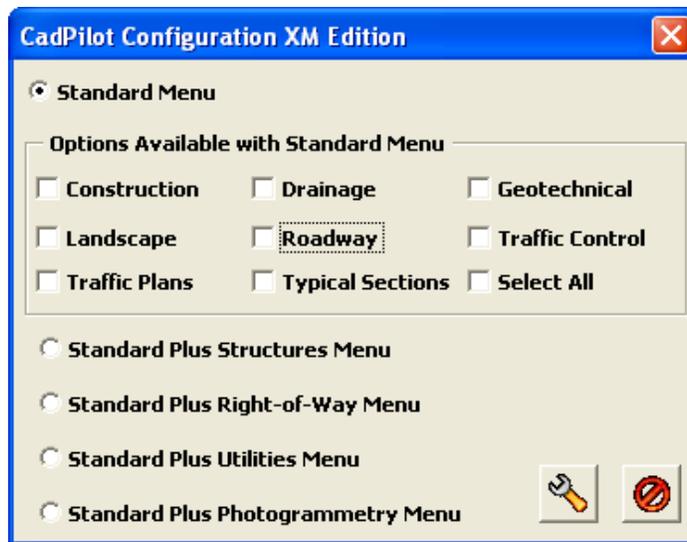
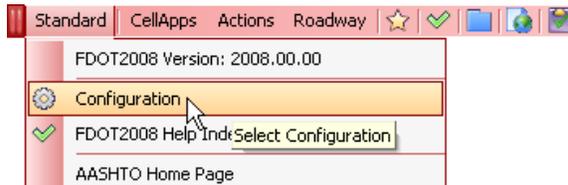
5. Once in MicroStation, notice that the FDOT Menu bar appears. Take a moment to get familiarize with this workspace.



# TRAFFIC PLANS FDOT MENU BAR

## ACTIVATING THE TRAFFIC PLANS FDOT MENU BAR

As seen in the last exercise FDOT Menu bar loads when starting MicroStation through the FDOT delivered workspaces. FDOT Menu bar by default opens with only the Standard menu loaded as shown below, but there are option to configure the FDOT Menu bar to load additional discipline menus as needed.



*All possible FDOT Menu bar Configurations*

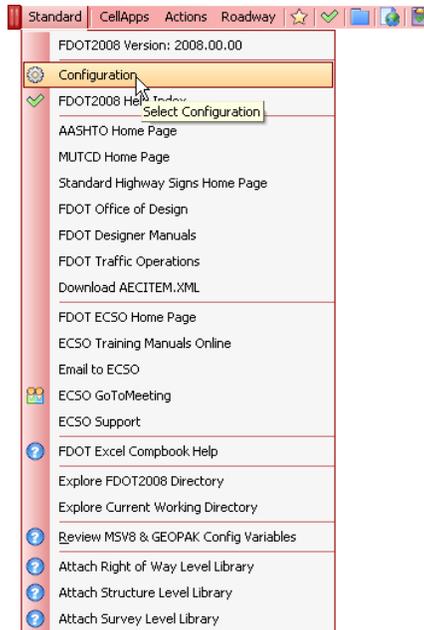
In the top portion of the Configuration dialog, the user has options to load one or all of the **Roadway Standard Menu** options by checking any combination of boxes under the *Options Available with Standard Menu*. For example, **Traffic Plans** can be loaded along with **Roadway** and **Typical Sections** or it can be loaded by itself.

The bottom portion of the dialog offers a listing other discipline menu configurations for the user to load, including **Structures**, **Right of Way**, **Utilities** or **Photogrammetry** menus. These menus cannot be loaded at the same time as the Roadway menus. Once selected, clicking on the **Update** button loads the additional menus, **Exit** closes this dialog without making any changes.

## Lab Exercise: Setting up FDOT Menu Bar to load the Traffic Plans menu

### LOAD TRAFFIC PLANS MENU

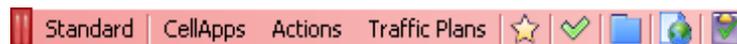
1. Continuing in **Dsgnlt01.dgn**, select the FDOT Menu option **Standard**.
2. Select the first option **Configuration**. This will open the FDOT Menu Configuration dialog.



3. Click the option to load the **Traffic Plans** menu.



4. Click the **Update** button. MicroStation Manager reopens.
5. Simply reopen your **dsgnlt01.dgn** file. You should now see the standard FDOT Menu bar with the **Traffic Plans** menu added at the end.



6. Take some time to get acclimated to the FDOT Menu selections.

# LEVELS, TEXT AND MODELS

## LEVELS

FDOT has created 4 level libraries: **Roadway, Right of Way, Structures** and **Survey**. There are approximately 1500 levels. The appropriate level library is loaded when the user creates or opens a MicroStation file using the FDOT workspaces. The level symbology (or *color, weight* and *style*) are created **ByLevel**. What this means is that each level already has a color, weight and style associated to it. Users cannot create additional levels.

The **Level** is divided into three components:

1. **Level Name** describes the element to be drawn.
2. **State**
  - **e** = Existing
  - **p** = Proposed
  - **d** = Drafting
3. **View**
  - **p** = Plan
  - **r** = Profile
  - **x** = Cross Section

An example of a Plan View Level would be (**ConduitJ\_ep**).

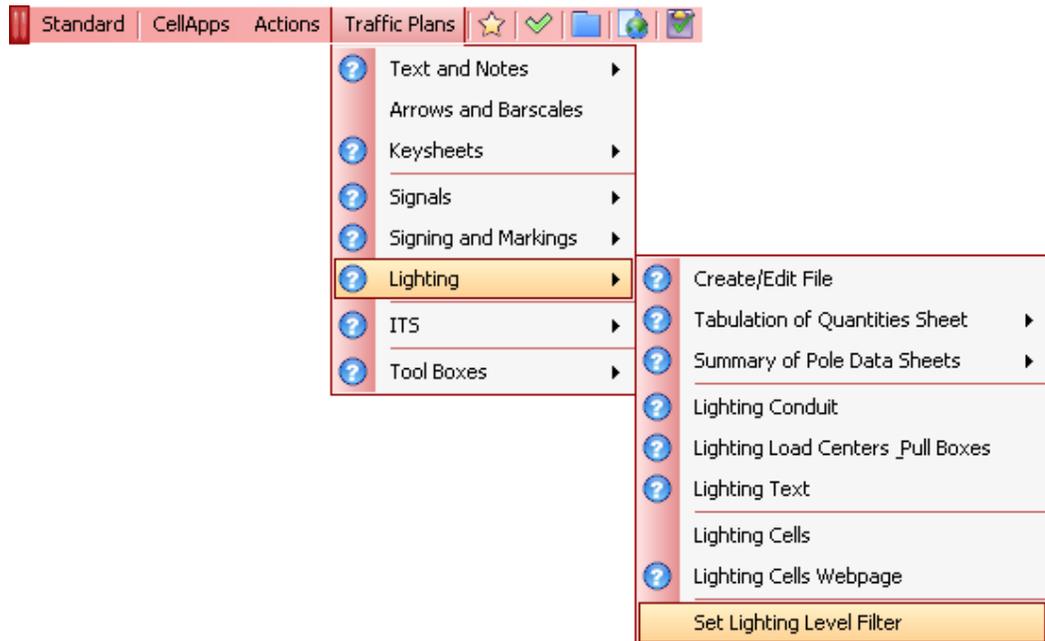
1. Level Name – **ConduitJ**
2. State - **e**
3. View – **p**

**Note** Some levels do not show a **State** or **View** in their name. These levels are set by default to be a proposed plan view element. An example would be the level (**Pullbox**) this level is created for proposed Pull Boxes in the plan view.

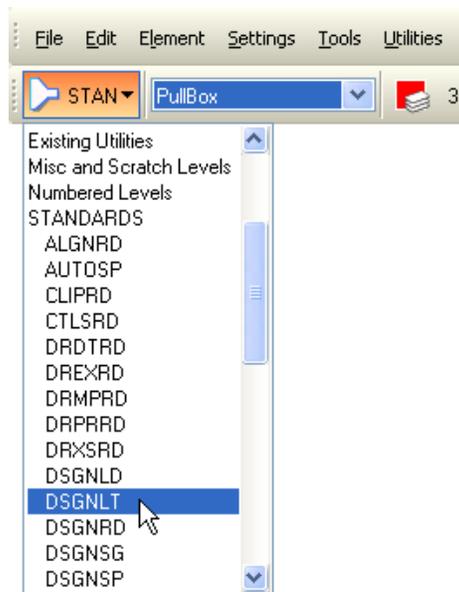
## LEVEL FILTERS

Level filters are used to group levels together. This makes searching through the level menu much easier. FDOT delivers level filters for each level library; we will take a look at these later in this section. Level Filters do not turn levels on or off they simply reduce the number of levels visible in the dialog box.

Activating a level filter is very easy and can be done from several locations. On the FDOT Menu Bar under the Traffic Plans menu you can load the level filters.



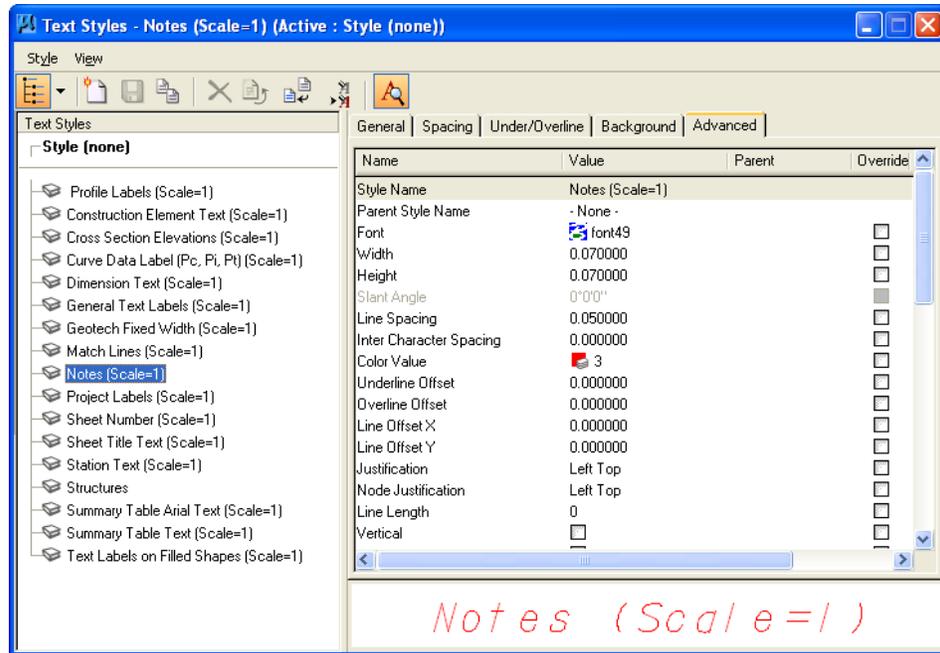
Next to the level name menu there is a drop down menu as seen in the figure below where you can load a level filter. This option is only available if you have “Active Level Filter” turned on.



## TEXT STYLES

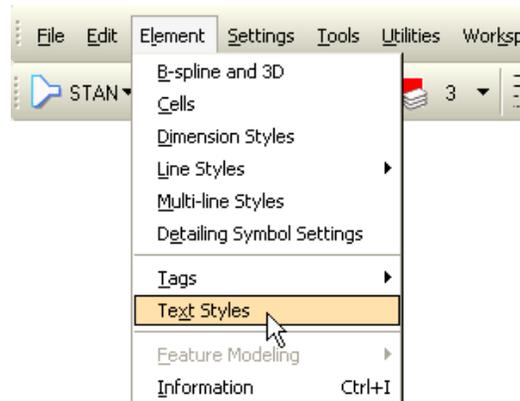
A text style is comprised of a group of text attributes, such as font, width, height, spacing and so on. Text styles take away the burden of having to set all of the individual text parameters as required in previous versions of MicroStation. FDOT delivers predefined text styles which you should use whenever possible. The text styles delivered by FDOT are created at a scale of 1 to 1. This is important to remember when placing text using Annotation Scale. We will discuss Annotation Scale in more detail later in this section.

### TEXT STYLES DIALOG BOX



The text styles dialog box shows all of the text styles that exist in the design file, and all of the parameter settings for each style. When you start a new file or open an existing file based on the **fdot\_v8\_levels.dgnlib** all of the appropriate text styles are loaded. No changes should be made to the delivered text styles.

You can open the text styles dialog by selecting **Element > Text Styles** from the MicroStation menu.

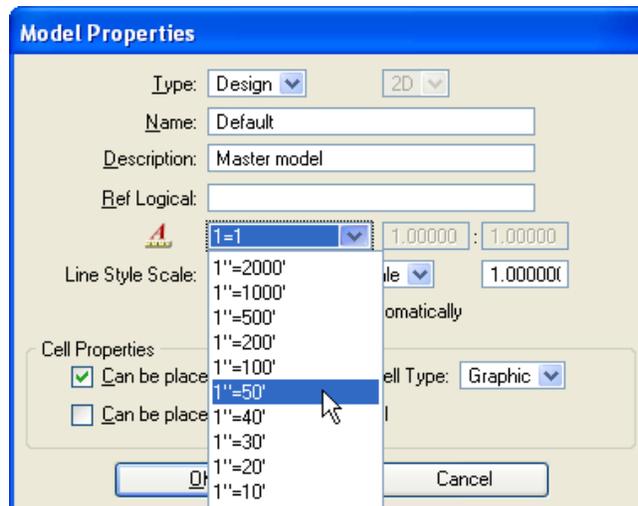


## ANNOTATION SCALE

**Annotation Scale** associates all of the text you have placed in a model to a specific scale so if you need to change the scale of that model the text dynamically changes with it. The caveat is that you must check on the Annotation Scale lock 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 of having to calculate what text height should be used at a particular scale when placing text. Annotation Scale is model specific.

The following figure shows the Annotation Scale options in the Model Properties dialog box.



Important items to remember regarding Annotation Scale

- Model Specific
- Annotation Lock must be on from the start
- Can be synced up to the plot scale using FDOT Menu Bar
- Can be set in the model properties
- Don't switch between Annotation Scale on and off

## MODELS

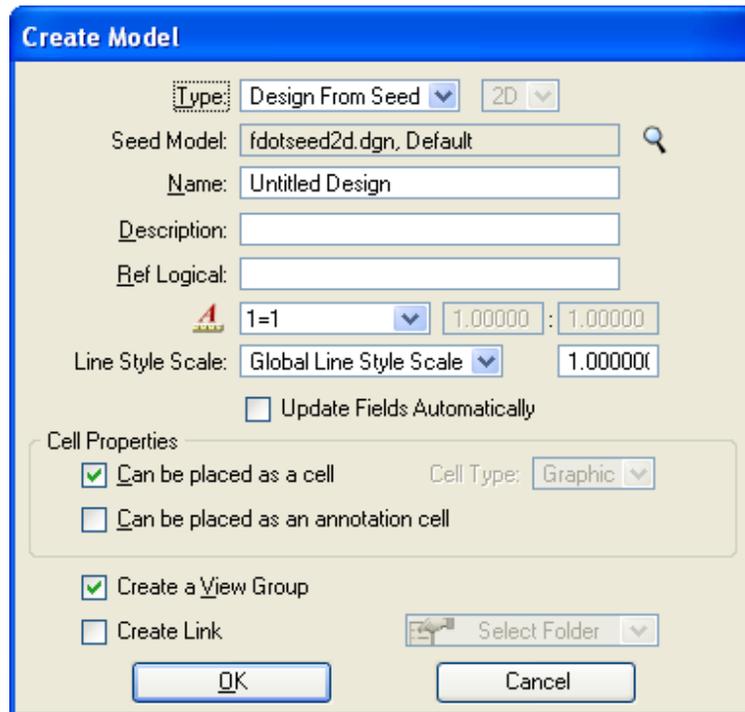
Models are independent sets of design data within the same file. Every MicroStation design file has at least one model and it is named Default. Models will be used to consolidate files that contain data that is used collectively. An example is the cross section file, this one file (Rdxsrd\*.dgn) has four models in it.

1. *Pattrd* – Pattern lines for cross sections
2. *Rdxsrd* – Cross Sections
3. *Xsshrd* – Cross Section Shapes
4. *Rdxsrd\_shg* – Cross Section Sheets

This one file with four models replaces four MicroStation design files.

Another example of how to use a model is with your alignment file or (Algnrd\*.dgn). This file is for displaying the Baseline of Construction. Typically you would have multiple alignment files to cover all of the different scales. Using the model concept you would have one MicroStation (Algnrd\*.dgn) file with several models in it (i.e. a model for each scale).

When you create a new model you have several parameters to define in the model properties, these properties are unique to the model. The figure below shows the model properties dialog box.



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 can be either 2D or 3D and you can reference a 3D model to a 2D design file.

As mentioned earlier in this section Annotation Scale can be set in the model properties. It is recommended that this be set at the time the model is created and that the Annotation Scale lock is turned on. If Annotation Scale is used you could change the scale of a model and all of the text in that model would be globally reset.

**Note** If you use multiple models in your files it is important that you document their name and use in your 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 are reviewing QC reports, if you create temp models to work in and the model fails compliancy you are covered if you have this documented in your Journal, as long as this Model IS NOT referenced to any other design file.

## Lab Exercise: Using the tools (Part 1)

### REFERENCE FILES, MODELS AND PLOT SCALE

In this exercise the user will attach reference files that have multiple models in them. This will reinforce what earlier discussions regarding models inside of a MicroStation file. There is more than one way to load the References dialog. The user should use what is familiar.

1. Continuing with **Dsgnlt01.dgn**, open the **References** dialog box. This dialog can be loaded by clicking on the **References** icon on the **Primary Tool Bar**.



2. In the **References** dialog, select the menu option **Tools > Attach**. This opens the Attach Reference dialog.
3. Navigate to the **Roadway** folder and select the **Algnrd01.dgn** file. This is the alignment file that contains the Baseline of Construction.
4. The attachment method should be set to **Interactive** by default. All of the files worked with in this training course are true XM format files so no required use of Coincident World as the attachment method will be necessary.
5. Click on **OK**. This opens the Reference Attachment Settings dialog box.

**Reference Attachment Settings for ALGNRD01.DGN**

File Name: ALGNRD01.DGN  
 Full Path: C:\e\projects\50735535201\roadway\ALGNRD01.DGN  
 Model: Default

Logical Name: Line Only No Stations  
 Description: Global Origin aligned with Master File

Orientation:

View	Description
Coincident	Aligned with Master File
Coincident - World	Global Origin aligned with Master File
Standard Views	
Saved Views (none)	
Named Fences (none)	

Toggles:

Scale (Master:Ref) 1.000000 : 1.000000

Named Group:   
 Revision:   
 Clip Boundary Element: Copy To Master  
 Level:   
 Nested Attachments: No Nesting  
 Display Overrides: Allow  
 New Level Display: Use MS\_REF\_NEWLEVEL  
 Global LineStyle Scale: Master

Depth: 1

OK Cancel

6. Notice the **Model** name defaults to the **Default** model. As discussed earlier in this section, every MicroStation file has at least one model named **Default**, except **Rdxsrd\*.dgn** where the **Default** model has been renamed to **Rdxsrd**.
7. Take a moment to review the additional models in this reference file has to accommodate multiple scales.
8. In the Reference Attachment Settings dialog, set the **Model** to **Default**.

9. Click the **OK** button. This attaches the reference file.
10. In MicroStation click **Fit View** to fit the reference file to the view.
11. Take a moment and zoom in close to the baseline, notice that there are no tick marks or stations.

**Note** The default model in the (**Algnrd01.dgn**) file does not have ticks or stations in it. The stations and ticks are in another model in the same file. The reason for doing it this way is that on Signing and Marking plans sometimes it's more advantages to only display the stations and ticks and not the baseline to avoid confusion if it is close to another pavement marking line. With this set up you can turn of the display of the reference file (**Algnrd01 model Default**).

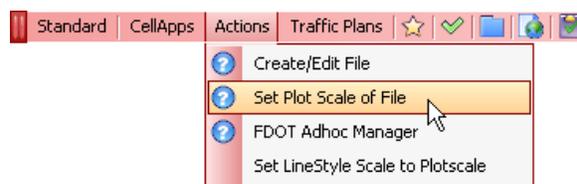
12. Using the same process as above, attach the **Model BL 100** in the **Algnrd01.dgn** file.
13. Zoom in close to the baseline again; notice now that there are tick marks and stations.



14. Attach the reference file **Dsgnrd01.dgn** in the **Roadway** folder, use the **default** model. This will give the proposed Roadway features.
15. Depending on the type of project being working on, it may be necessary to attach the **Topord\*.dgn** file and existing drainage and utility files. If there are conflicts with any of the existing features, that reference file should be displayed.

**Note** Refer to the Plans Preparation Manual Volume II chapter 23 for further guidance.

16. From the FDOT Menu bar, select **Actions > Set Plot Scale of File**. This opens the Set/Update Plot Scale.



17. Change the **Scale** to **100** and click **OK**. This changes the active plot scale of the file from 50 to 100.

**Note** In previous versions of the FDOT Menu bar -9999 was the default scale; this causes problems with other applications like **Sheet Navigator**, so FDOT set the default scale to 50.

## Lab Exercise: Using the tools Part 1 (Cont.)

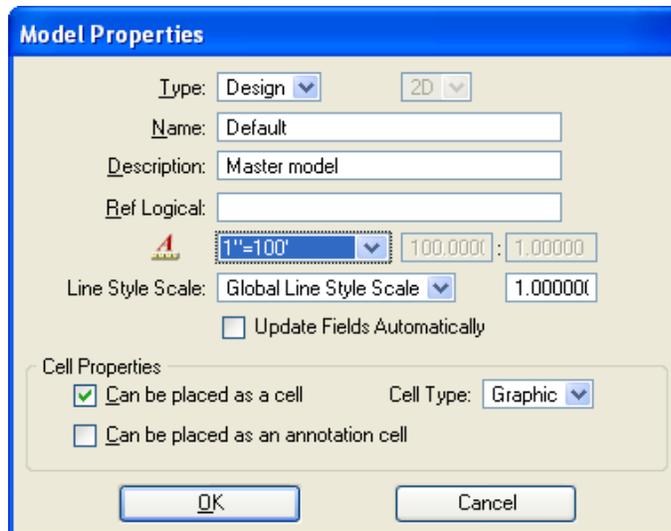
### MODELS

In this exercise, the user will be setting the Annotation Scale for the default model and create a new model. This model will be a place where the user can experiment with some tools without adding junk to the default model.

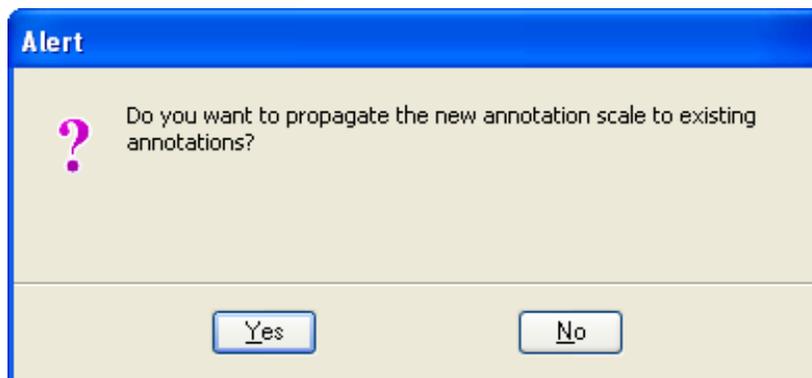
- Continuing in **Dsgnlt01.dgn**, open the Models dialog. This can be opened from the **Primary Tool bar**.



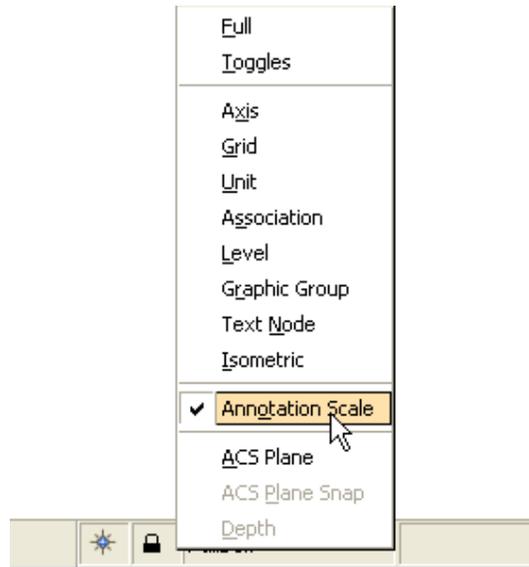
- In the Models dialog, select **Edit Model Properties**. This opens Model Properties.
- Right mouse click on the **Default** model and select **Edit Model Properties**. This opens Model Properties dialog.
- For **Annotation Scale** set this to **1"=100'**.



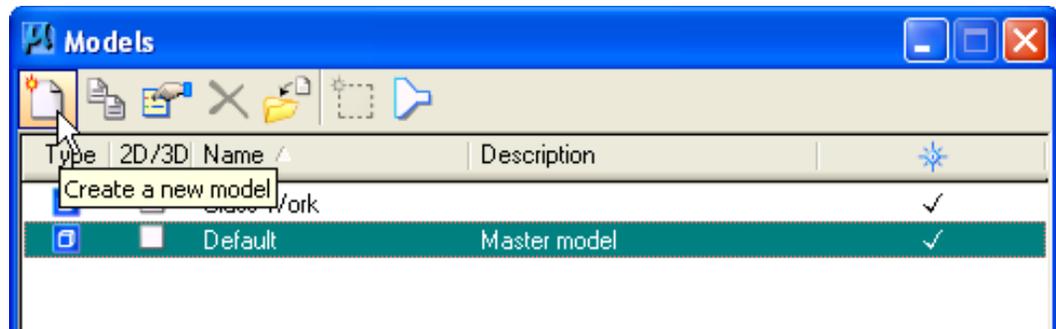
- Click **OK**. This closes the Model Properties dialog.
- Click **Yes** on the **Alert** dialog. Up to this point nothing is in the design file to change.



7. Toggle on the **Annotation Scale** lock in MicroStation.

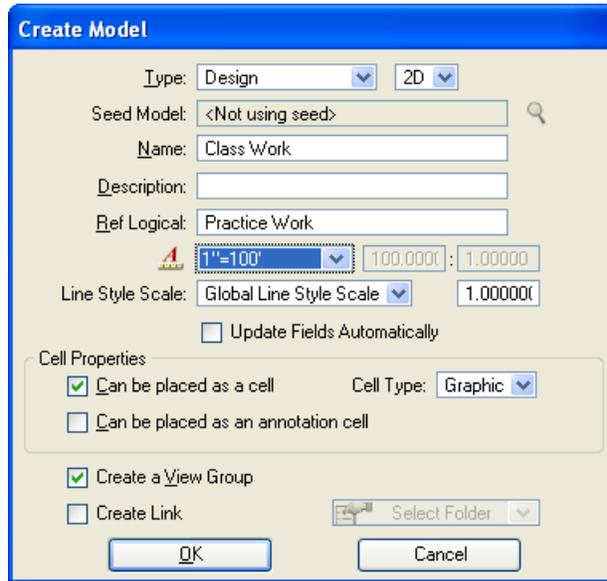


8. In the Models dialog, select **Create** a new model. This opens the Create Model dialog.



9. Set the **Type** to **Design 2D**. These are the default settings.
10. For **Name**, enter **Class Work**. This will be the **Model** name.
11. **Description** can be left blank.
12. For **Ref Logical**, enter **Practice Work**. This field, if populated, will fill in the logical name in the reference palette if you attach this file. This is very helpful.

13. For **Annotation Scale**, set this to **1"=100'**.



14. Click **OK**. This creates the new model and makes it the active model.
15. Set the **Plot Scale** to **100**.
16. Toggle on the **Annotation Scale** lock in MicroStation.
17. Notice now that the new Model shows up in the Models dialog. To switch between models, double-click on the model name. The active model name will be next to the **View 1** name.



## Lab Exercise: Using the tools (Part 2)

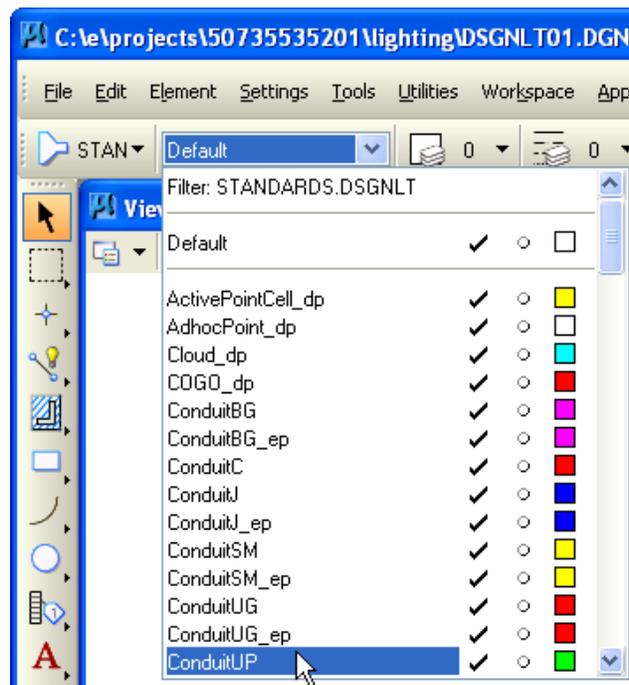
### LEVELS AND FILTERS

In this exercise, the user will investigate the 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.

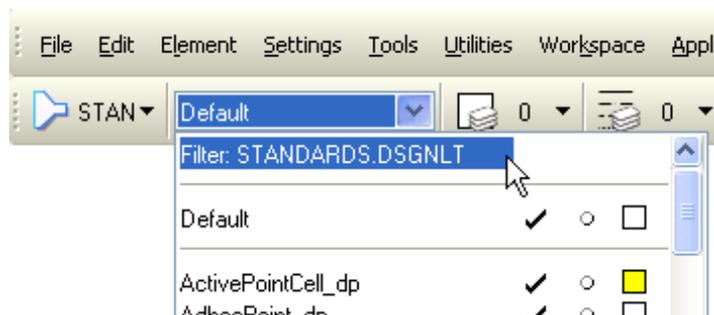
1. Continuing with **Dsgnlt01.dgn** in the **Class Work** model select from the FDOT Menu option **Traffic Plans > Lighting > Set Lighting Level Filter**.

This sets the active level filter. As a refresher, a level filter isolates the levels seen in the level dialog so it is easier to navigate. The level filters are grouped by rule file.

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

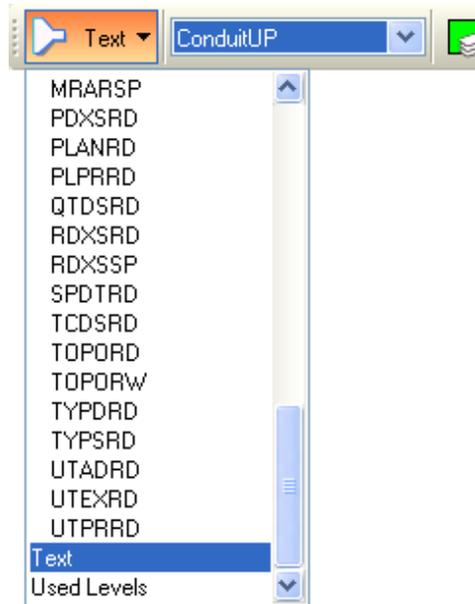


3. Scroll down and select the level **ConduitUP**. This sets the *active level* to **ConduitUP** plus sets the *Color, Weight and Style*, because all levels are set up *ByLevel*.
4. In the **Attributes** menu, select the drop down arrow next to the level name.
5. Scroll all the way to the top and select **Filter: Lighting**. This opens the Recall Filter dialog.



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

6. Scroll down and select **Text**.



7. Take a moment to review the levels in this filter. Notice that is seen are levels associated to text.
8. Now that the Filter is loaded the user can navigate the level drop down menu and select the level that is appropriate to the item being placed.

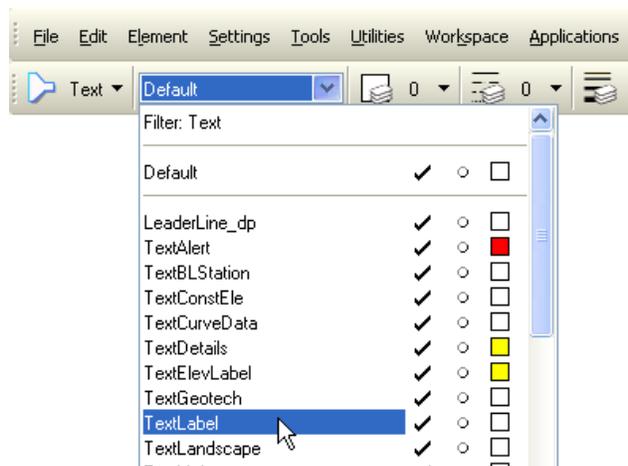
**Note** It is important to understand how useful the level filters are; they will save time when going from Line work to Text and so on.

### Lab Exercise: Using the tools (Part 3)

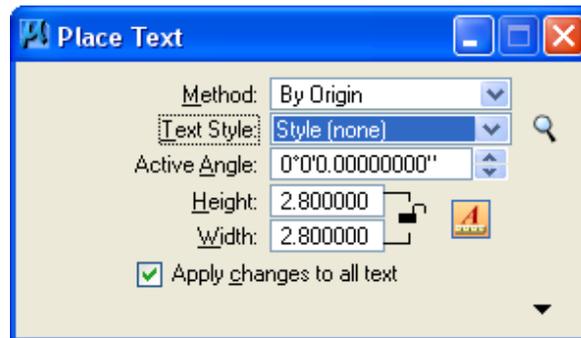
#### ANNOTATION SCALE AND TEXT STYLES

In this exercise, the user will be shown a very brief introduction to placing text using the FDOT delivered **Text Styles**. This will be covered in more detail later in this course.

1. Continuing with **Dsgnlt01.dgn** in the **Class Work** model, set the active level to **TextLabel**.



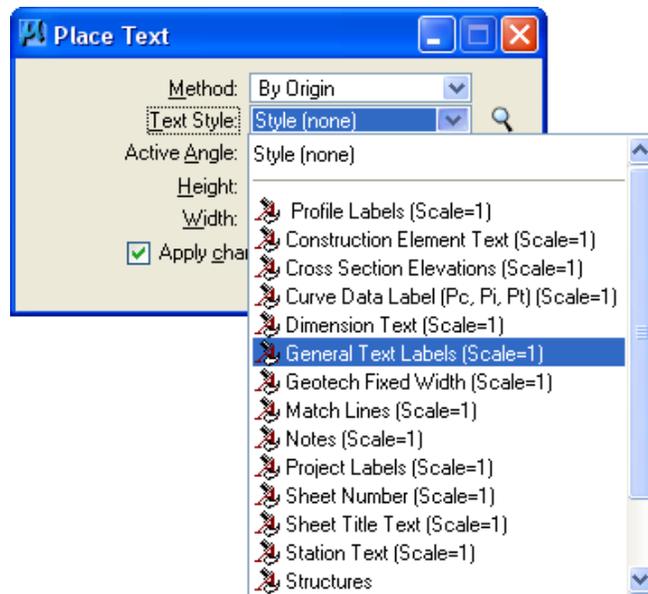
- From the MicroStation Main Menu, select the **Place Text** tool. This opens the Place Text dialog.



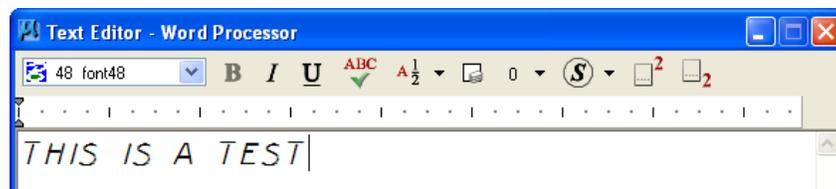
**Note** Notice the **Text Style** option in this dialog. It defaults to **Style (none)** and the Height and Width require user input. Instead of manually defining these settings, a style should always be chosen so that the parameters are automatically populated.

Also notice that the **Annotation Scale** option is active. This was part of the Model Properties set in a previous exercise. Remember with Annotation Scale set it is not necessary to calculate what text height and width to use; this tool does it automatically.

- From the **Text Styles** drop down menu, select the **General Text Labels (Scale=1)** style. This grays out the **Height** and **Width** option.



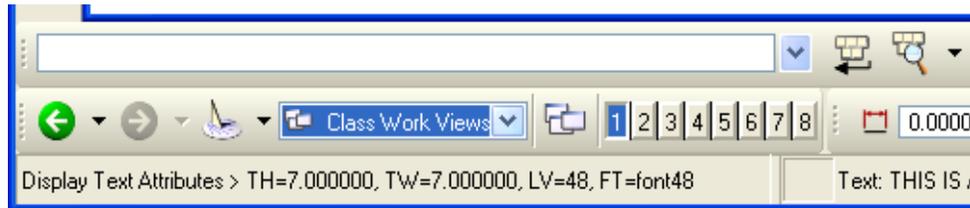
- In the Text Editor dialog, enter a sample piece of text and place it in the design file.



- From the MicroStation Main Menu, select the **Display Text Attributes** tool.



- 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**.



- Take a moment to get familiarized with the **Place Text** dialog and the other delivered **Text Styles**.
- Change the **Model** back to **Default** and select the menu option **File > Save Settings**.

# 2 CREATING A KEY SHEET

## CHAPTER OBJECTIVES

The objective of this chapter is to teach you how to create a Lighting Plans Key Sheet that meets FDOT CADD standards.

## INTRODUCTION

Once you have completed this chapter you will be able to create a Key Sheet and all of its components that follow FDOT standards. The FDOT CADD standards and the Plans Preparation manual will be adhered to for creation of this sheet.

## GENERAL INFORMATION

The key sheet is the first sheet in the set of construction plans. The information shown on the Lighting plans key sheet will vary depending on if the Lighting plans are a component of the Roadway plans or the lead component.

For example, if the Lighting plans are a component of the Roadway plans than a location map or length of project box is not needed because this information is on the lead key sheet. This also applies to the Signalization and Signing and Pavement marking plans key sheets. Refer to Chapter 3 Volume II of the *Plans Preparation Manual* for more information.

During the creation of a Key Sheet, the user is required to take the actions listed below.

1. Produce the *graphical portion* of the sheet with these elements:
  - Place the *Standard Border* cell for a Key Sheet.
  - Place the *Project Location Map* (only on a lead Key Sheet).
  - Place the *Florida Map* cell for a Key Sheet (only on a lead Key Sheet).
  - Place the *Section, Township and Range Lines* (only on a lead Key Sheet).
  - *Begin Milepost* (correct to three decimal places).
  - Place the *North Arrow* cell for a key sheet (only on a lead Key Sheet).
  - Identify all *Railroad Crossings* (only on a lead Key Sheet).
  - Fill in *Component Plans* (Only on a lead Key Sheet).
  - *Index of Sheets*
  - *Revision Box*
2. Fill in the *Project Data*, including the following:
  - Financial Project ID Number
  - Federal Funds (if applicable)
  - County Section Number, County Name and State Road Number
  - Fiscal Year

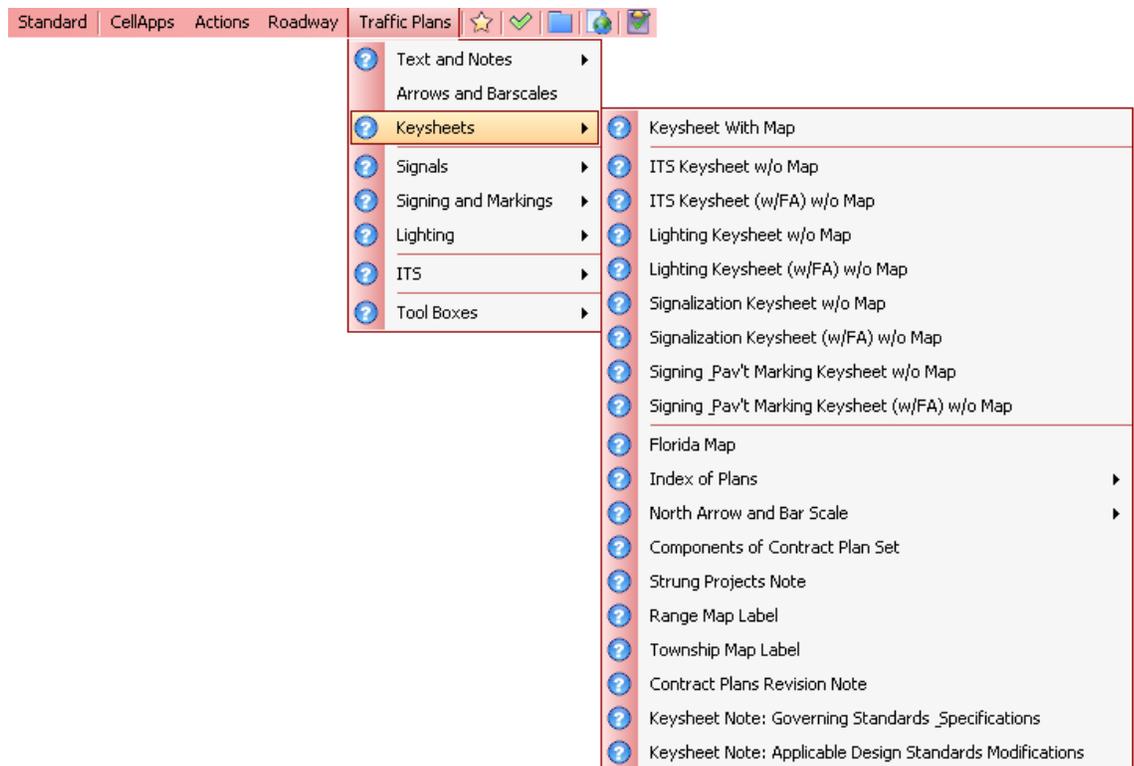
## PROJECT LOCATION MAP

Florida county maps are available for download from FDOT's Surveying & Mapping web page. <http://www.dot.state.fl.us/surveyingandmapping/maps.shtm>

These maps are available in DGN or PDF file format. Download the DGN file into the appropriate project directory. This file is used by another FDOT Menu Bar tool to attach, scale and clip the map to your key sheet. Currently the county map DGN files are available in MicroStation version 7 formats only. In the key map sheet clipping process we will cover how to use the version 7 maps with a Version 8 design file.

The Project Location Map is placed in the center of the sheet and sized so as not to interfere with other elements on the Key Sheet. Its purpose is to provide enough information so that the project location is easily understood. Township, Range, and County lines and numbers are shown to make the location clear.

FDOT Menu bar includes tools to aid in the creation of key sheets with location maps or without. The following figure shows all of the possible scenarios for creating a traffic plans key sheet.



## KEY SHEET WITHOUT MAP

As shown previously there are options to create a Key Sheet with or without a map. If selecting an option without a map, example (**Lighting Keysheet w/o MAP**) the user must first create the Key Sheet design file using the Create File/Project dialog or some other acceptable method to create the design file using the correct seed file and design file naming convention.

## KEY SHEET WITH A MAP

If the project is the lead component the user will need to create the Key Sheet with a map. The **Key Sheet with a Map** option, from FDOT Menu bar, opens the Key Map Sheet Clip dialog box. This tool does not require the user to have a Key Sheet design file already created and will create it automatically.

**Note** The Key Map Sheet Clip dialog default to create the Roadway Key Sheet, even if the user starts the tool in the Lighting folder. The Key Map Type *must* be set first.

**Scale** 1"=2miles, 1"=4miles or 1"=8miles

**Key Map Type** The list of disciplines for creating key sheets. As you select the component the DGN File Name will dynamically change accordingly.

**Use Federal Funds** If checked this will place the (**FEDERAL funds**) text on the Key Sheet.

**DGN File Name** Displays the working directory path and the design file name of the Key Sheet being created. This will dynamically change based on the Key Map Type setting. The New button will create a new file for the sheet cell to be placed in. The file name will default to the next available file number in the standard naming convention for the key map type chosen.

**Co. Map Name** This is the county map file you download from FDOT's Surveying and Mapping web site. Browse to the file in your project directory.

**Clip Area** This portion of the dialog is for setting the clip limits of the map. You can either key in the coordinates, or dynamically select them with the Define Clip Area button.

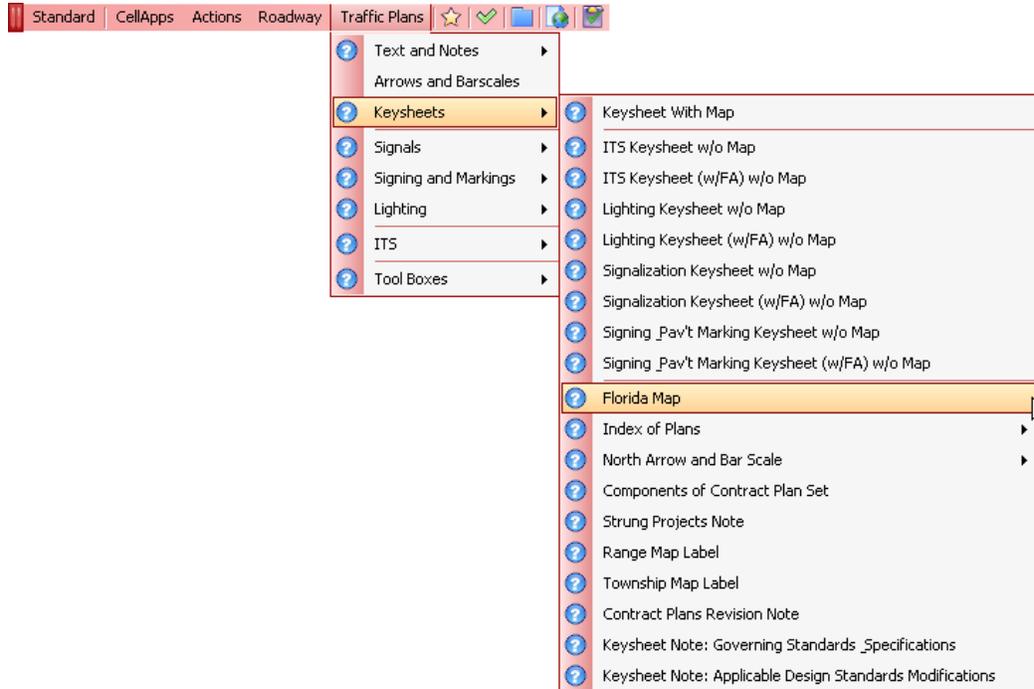
**Define Clip Area** This will open the selected county map so that you can graphically select the area to be clipped. A square will be attached to your cursor. The size of the square is defined by the Scale or Size. Place the square around the area to be clipped and enter a data point. The **Clip Key Map** button will now become active.

**Clip Key Map** This will clip the map, place the sheet cell, and open the file then launch Sheet Navigator.

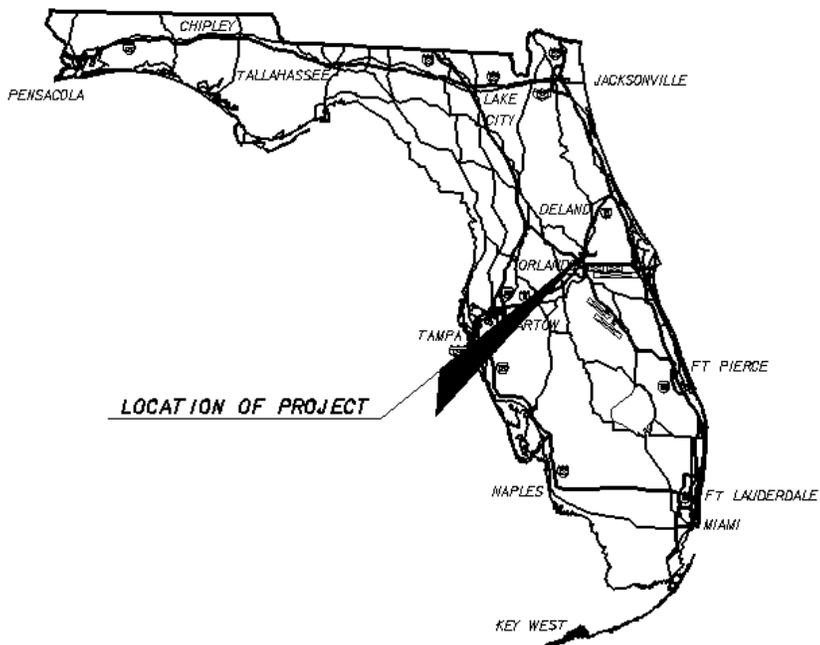
**Note** If a Key Sheet is created in the Roadway directory in error, make sure to delete it to avoid problems with electronic delivery.

## FLORIDA MAP

The Florida map is a cell you can place from FDOT Menu Bar. The Florida Map cell is to be located in the upper right-hand corner of the key sheet. This map is only needed on the key sheets without a location map. Refer to the Plans Preparation Manual Volume II chapter 23.2 for more detail.

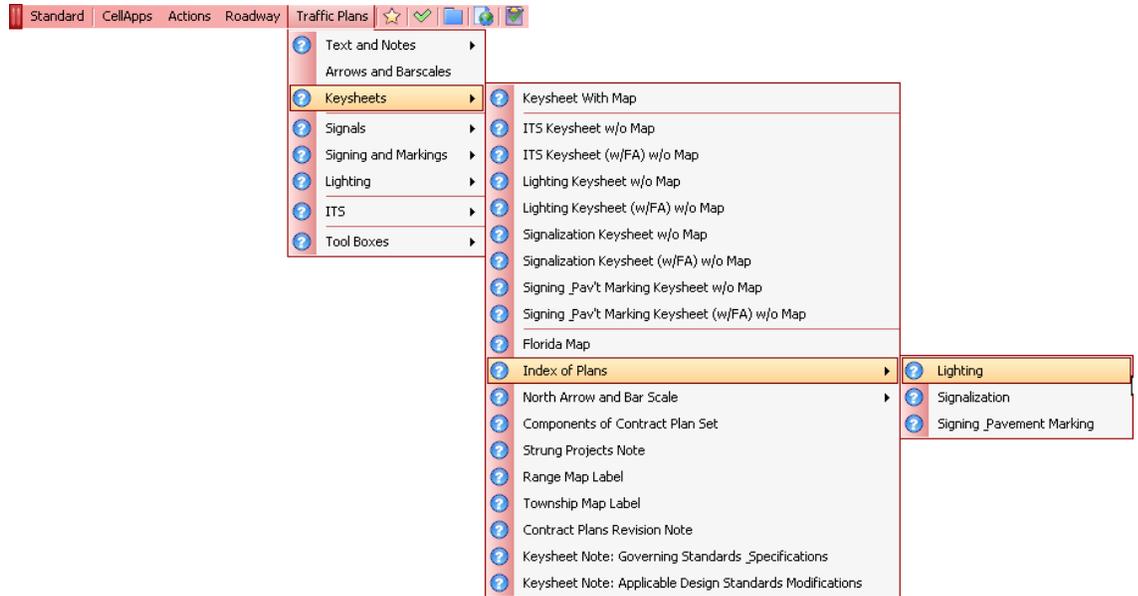


The insertion point is the upper right-hand corner of the border and the cell scale is based on the plot scale. A leader line and text label pointing at the general location of the project are also required.

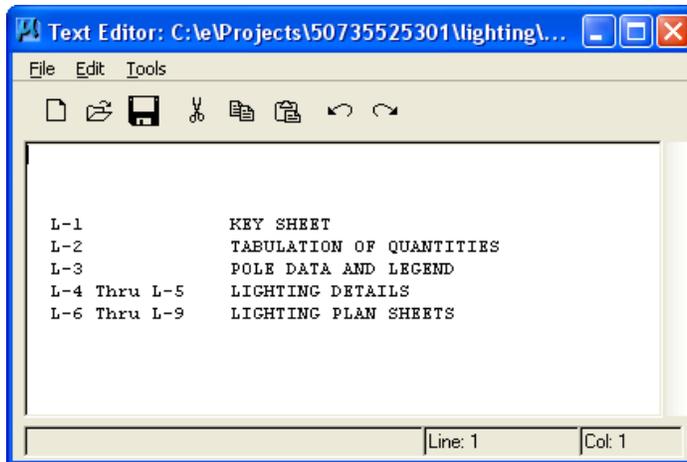


## INDEX OF PLANS

The **Index of Plans** is used to describe what sheets and their corresponding sheet numbers are in the set of plans. This option on the FDOT Menu Bar opens a text editor with a pre-defined index. This text file is editable and can be placed using the text editor.



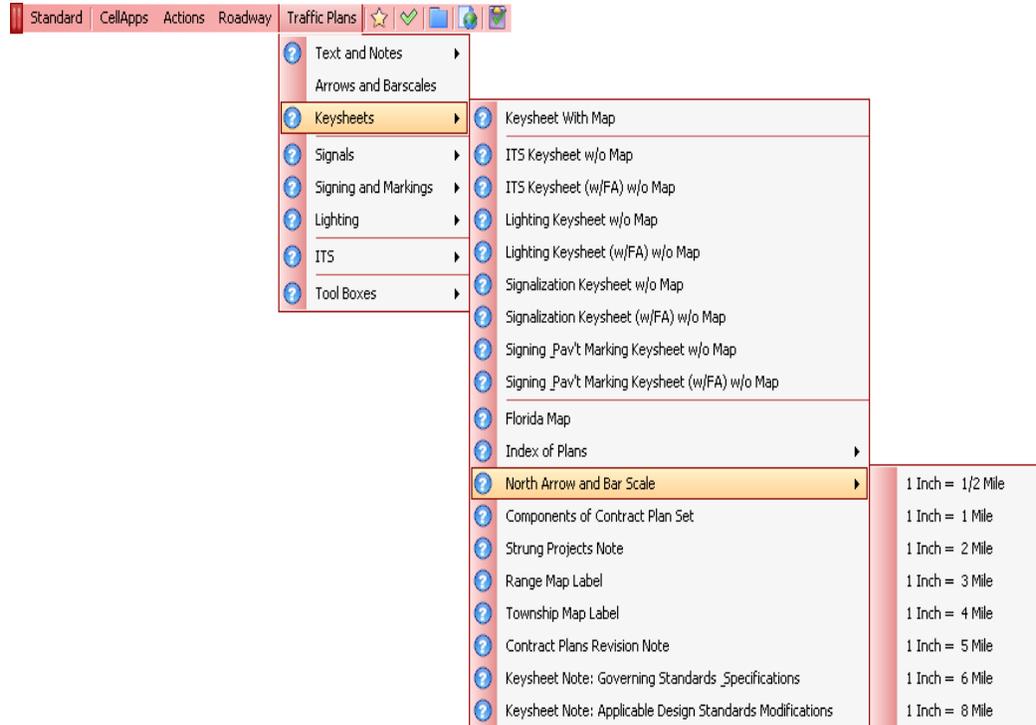
The following figure shows the Lighting plans index text file opened in the text editor. The text size in this file is set up to read the plot scale of the active design file; you do not need to edit the text height and width as long as the plot scale is set correctly in your active file.



Under the Tools menu there is an option to Import text, this is how you place this text in your design file. It is important to use this tool whenever updates or changes are made. This will keep your files consistent.

## NORTH ARROW AND BAR SCALE

The North Arrow and Bar Scale are automatically placed on key sheets with a location map using the Key Map Sheet Clip tool covered earlier in this section. If you created a key sheet by some other means or deleted the North Arrow from you key sheet than this is the tool for you. You select the scale and place the arrow.



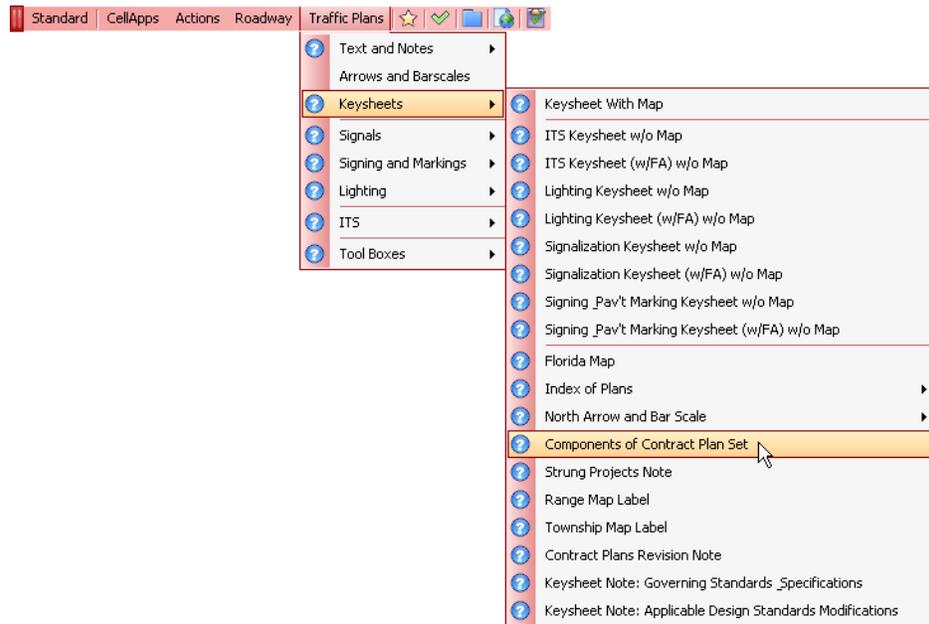
## COMPONENTS OF CONTRACT PLAN SET

The **Components of Contract Plan Set** is a list of all disciplines that are a component to the lead project. The order of the component plans is:

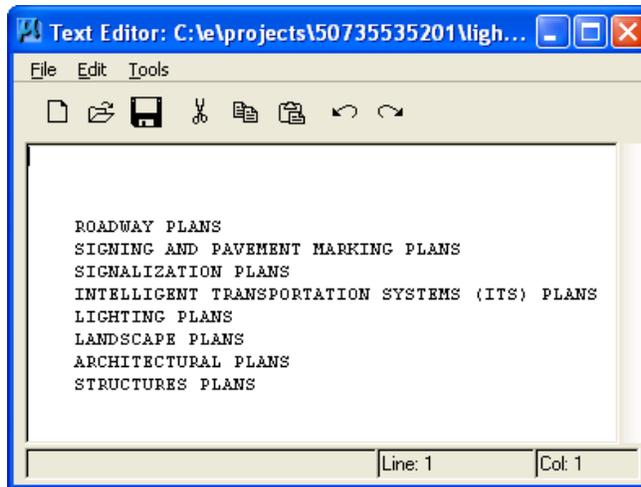
- Roadway
- Signing and Pavement Marking
- Signalization
- Intelligent Transportation Systems (ITS)
- Lighting
- Landscape
- Architectural
- Structures

**Note** Note: If your project includes Lighting, Signing and Pavement Markings, Signalization or other component sheets as part of the Roadway Plans and those sheets are numbered consecutively within the Roadway Plans then these are not to be shown as components of the contract plans set.

The following figure shows the FDOT Menu Bar tool to aid in the production of the Components of Contract Plan Set.



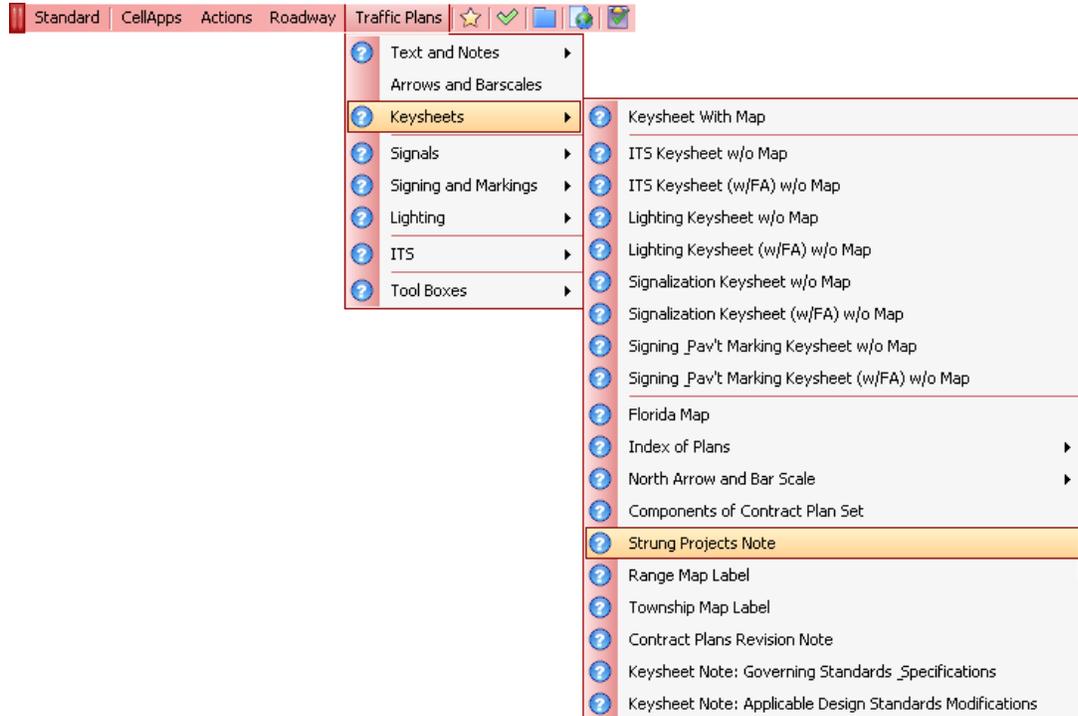
This tool functions just like the Index of Plans. A text file is opened for editing to meet your project requirements. The text size in this file is set up to read the plot scale of the active design file; you do not need to edit the text height and width as long as the plot scale is set correctly in your active file.



This file is set up for the lead key sheet in your set of plans. If you create a Lighting Key Sheet without a map you will not use this file because there are no components hence there is no "COMPONENTS OF CONTRACT PLANS SET" note on the key sheet.

## STRUNG PROJECTS NOTE

Projects that are independently prepared but are let in the same construction contract shall have the additional Financial Project IDs noted on the right side of the key sheet just below the “Plans Prepared By” block. This is a cell that can be placed from FDOT Menu Bar. This tool reads the plot scale for text size.

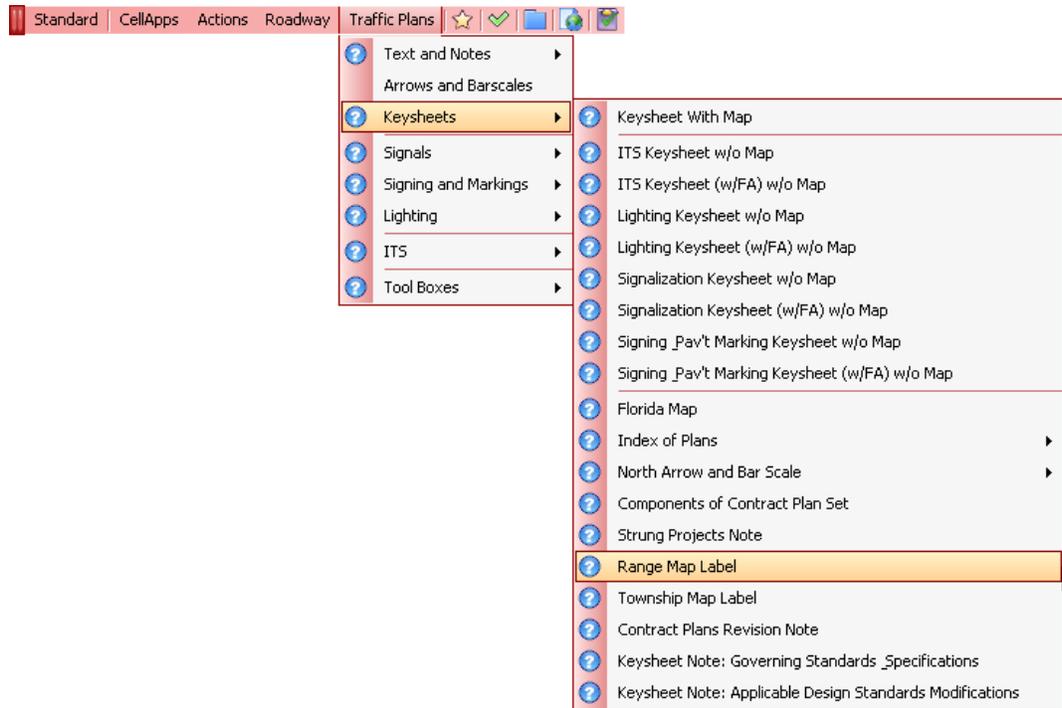


***NOTE: THIS PROJECT TO BE LET TO CONTRACT  
WITH FINANCIAL PROJECT ID 000001-1-52-04***

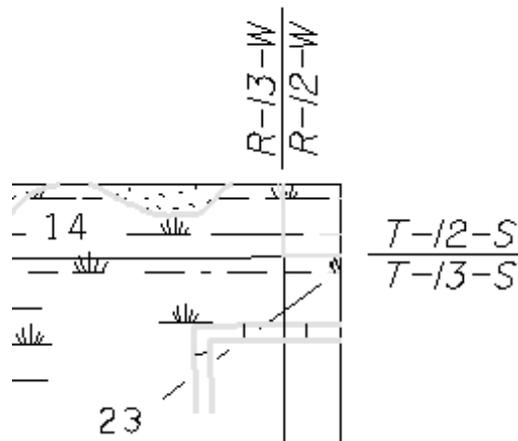
**Note** The FPID numbers in this note are part of a data field; do not drop the cell to edit the text.

## RANGE AND TOWNSHIP MAP LABEL

The **Township and Range** are used to better describe the area of the project. On FDOT Menu Bar there is a tool to help place these labels.

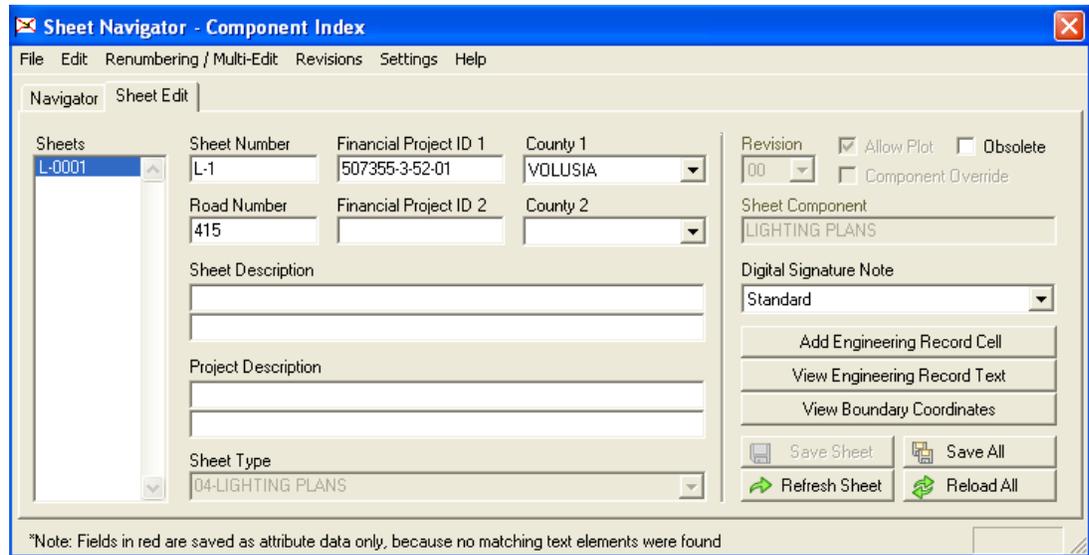


The Township and Range labels are cells with data fields in them, again do not drop the cell to edit the text. The cells are placed based on the plot scale. The figure below shows the Township and Range cells placed from FDOT Menu Bar.



## SHEET NAVIGATOR

**Sheet Navigator** is a tool developed for FDOT to aid in the proper identification of plan sheets in a construction set of plans. Sheet Navigator will tag each sheet with information pertinent to the electronic delivery process. Sheet Navigator can also Auto Number and renumber sheets in a set of plans.



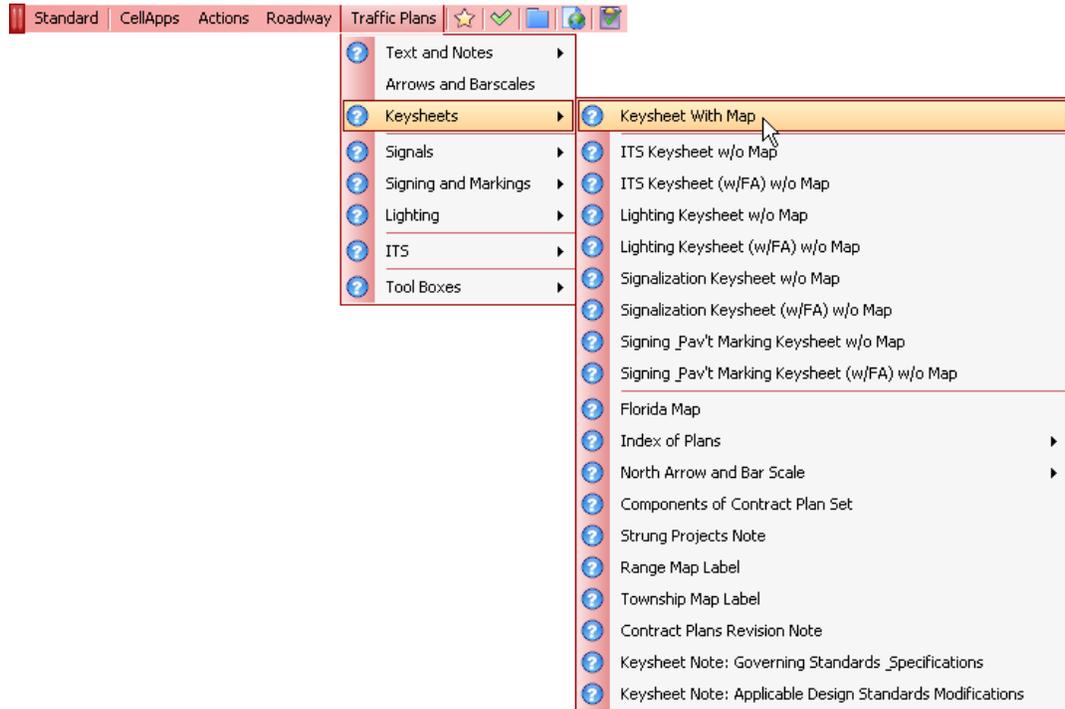
It is important to remember not to put sheet borders in design files that are not going to be part of your plan set. Sheet Navigator along with the electronic delivery indexer will look for all files that have sheet borders in them and will tag them as sheets. If you absolutely have to put a sheet border in a file that is not part of the plan set than check the **Obsolete** option in this dialog so that indexer will not pick the file up as a sheet file.

We will cover this tool in great detail later in this course guide when we clip plan sheets.

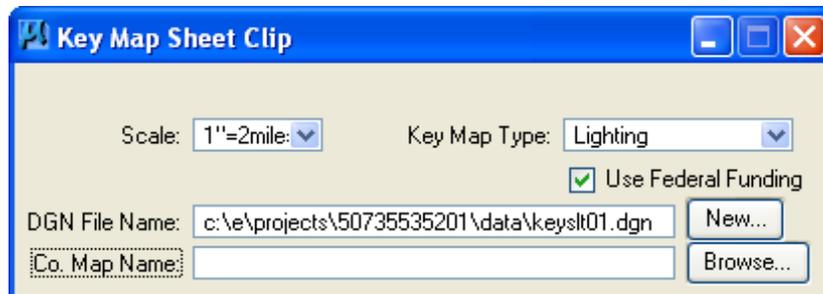
## Lab Exercise: Creating a Key Sheet with a Location Map (Part 1)

### CREATE THE KEY SHEET

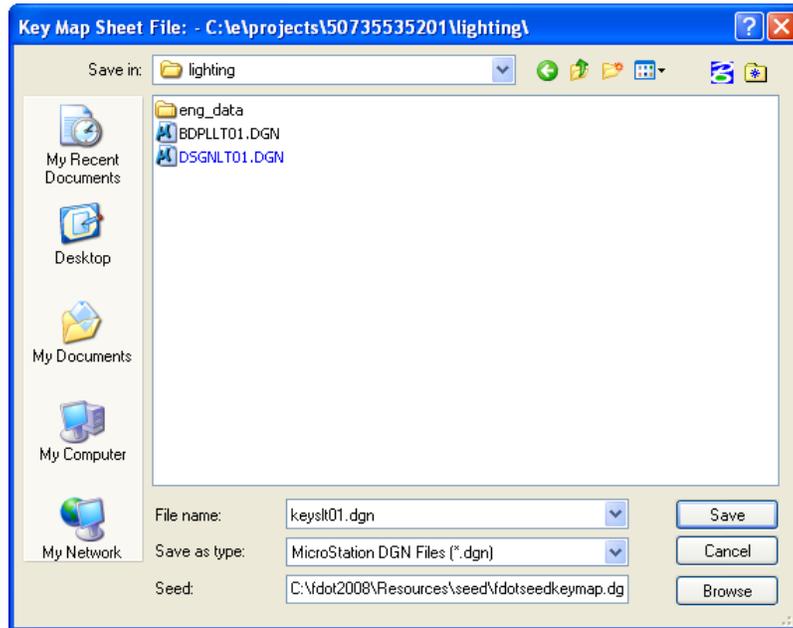
1. Open **Dsgnlt01.dgn** in the lighting folder.
2. From FDOT Menu bar, select **Traffic Plans > Keysheets > Keysheet With Map**. This opens the Key Map Sheet Clip dialog.



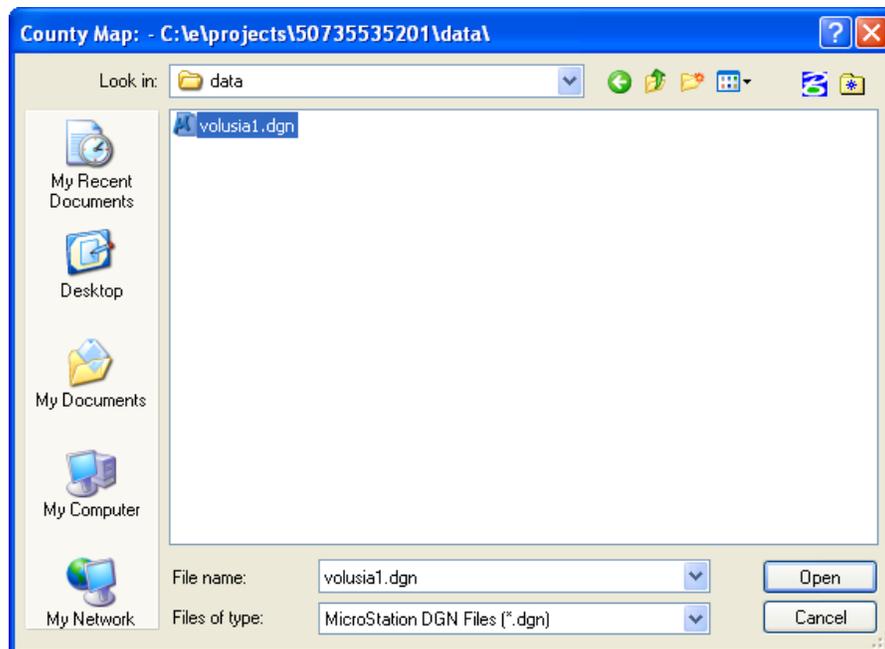
3. Set the top portion of the dialog as follows:
  - **Scale** – 1”=2miles
  - **Key Map Type** – Lighting
  - Check to **Use Federal Funding**
4. The next figure shows how the dialog should look up to this point. Notice the file name is set and there is a new item for **Ref File Name**.



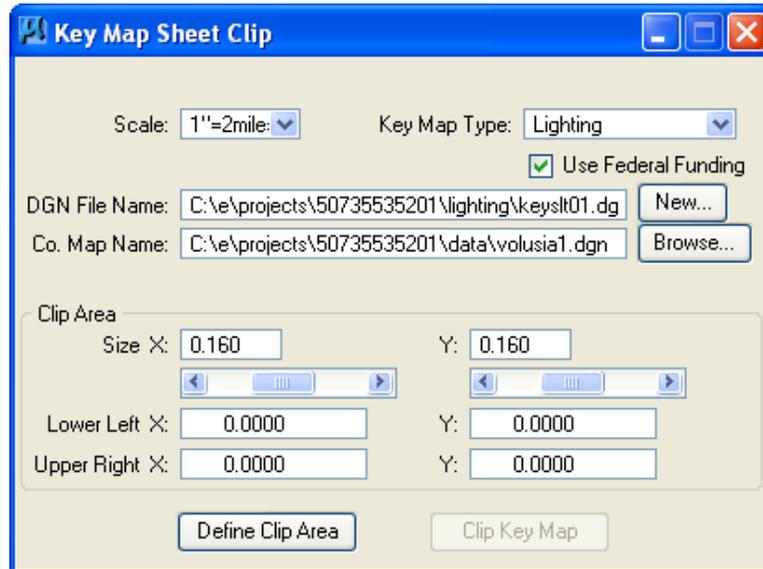
5. Click the **New** button next to the **DGN File Name**. This will open the Key Map Sheet File dialog. This dialog allows the user to enter a different file name and select a different folder.



6. Click the **Save** button. This will create the **Key Sheet File** however, it is an empty file.
7. Click the **Browse** button next to **Co. Map Name**. This is where the user selects the full county map MicroStation file downloaded from the Survey and Mapping web site.
8. Navigate to the **data** folder in the project. The location of the county map will vary from district to district. The **data** folder selected in this exercise is not the only folder utilized for this purpose within the districts.
9. Select the **Volusia1.dgn** file and click **OK**. This will populate the **Co Map Name** field in the Key Map Sheet Clip dialog.

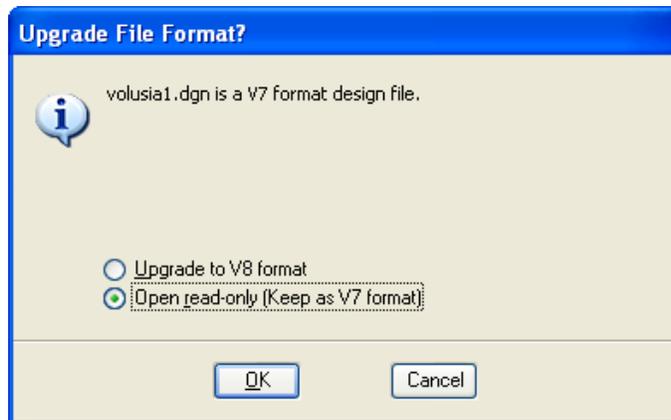


- The next figure shows how the dialog should look up to this point. Notice all of the fields are populated.



- Click the **Define Clip Area** button. This opens an information dialog asking to either **Upgrade the file to V8** or **Open read only (Keep as V7)**.

*Note* This is happening because the county maps from FDOT are still in V7 format. For this exercise we will open the file as Read Only. In the future these county maps will be converted to V8 and you will not receive this warning.



- Select **Open read-only (Keep as V7 format)** and click **OK**. This opens the county map design file where the clip border is positioned around the area to be clipped.
- In MicroStation, use any of the zoom or pan tools to move around the file to an area where the clip border will have maximum coverage. This area is not important for this exercise; it is just a general location.
- Issue a **Data Point** to place the clip border.
- Click the **Define Clip Area** button to place a different clip boundary, if it is necessary to correct the positioning.
- Click the **Clip Key Map** button. This will process for a moment and open the key sheet. Sheet Navigator will also open requiring user input.
- Close Sheet Navigator.

## Lab Exercise: Creating a Key Sheet with a Location Map (Part 2)

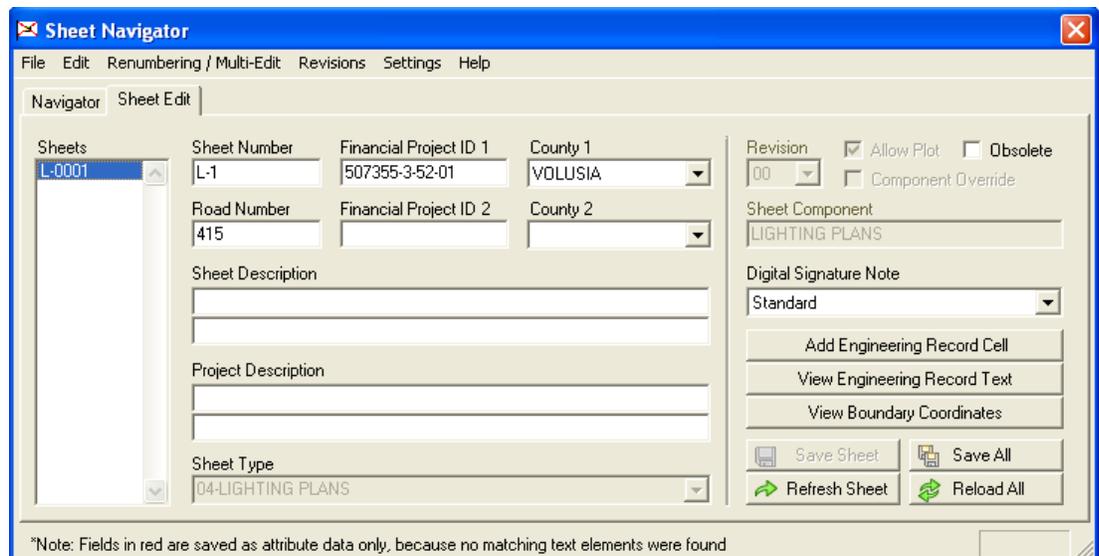
### SHEET NAVIGATOR

- Continuing in **Keyslt01.dgn**, from FDOT Menu bar set the **Plot Scale** to **10560**. This is equal to a 1"=2mile scale.



**Note** It is very important to set the plot scale before completing Sheet Navigator; the Digital Signature Note is dependent on the scale.

- Click **OK** to set the plot scale of the file.
- From FDOT Menu bar, open Sheet Navigator.
- In Sheet Navigator, fill in the **Sheet Number** with **L-1**.
- For the **Financial Project ID 1**, click inside the blank field. This will populate the field with the correct **Financial Project ID**.
- For the **County**, select the drop down arrow and navigate to **Volusia** County.
- For the **Road Number**, type in **415**. Do not include **SR** in the field; it is part of the sheet file.
- For the **Digital Signature Note**, select the drop down and choose **Standard**.
- Click the **Save** button. This will tag the file with all of the pertinent information for creating the electronic delivery index and also populates the fields in the key sheet.

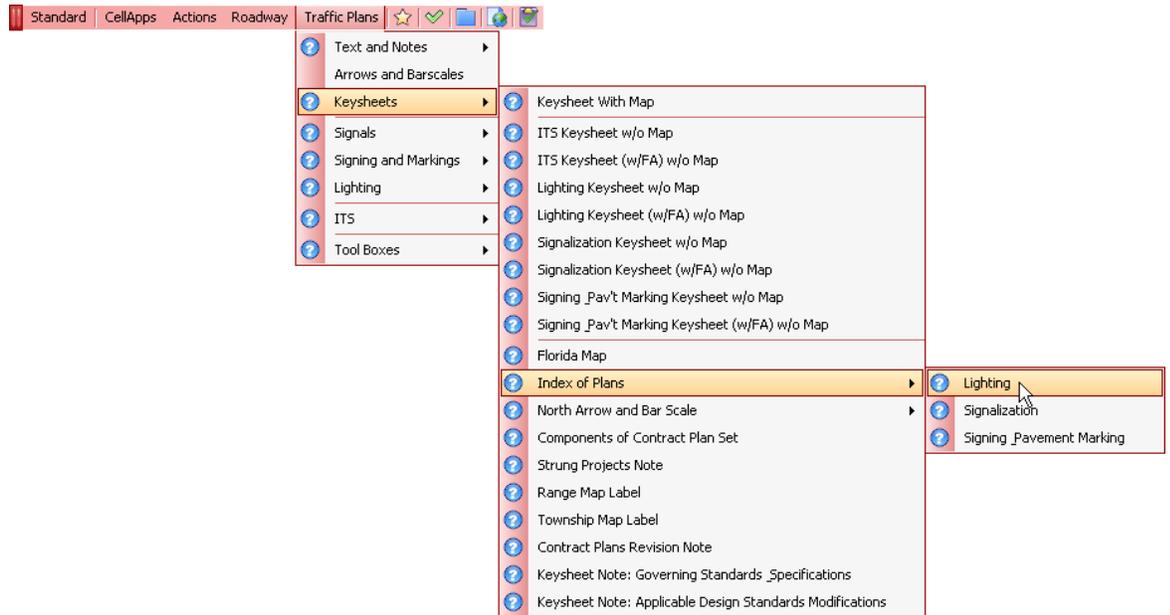


- Click the **X** in the upper right-hand corner to close Sheet Navigator.
- Take a moment to review the key sheet.

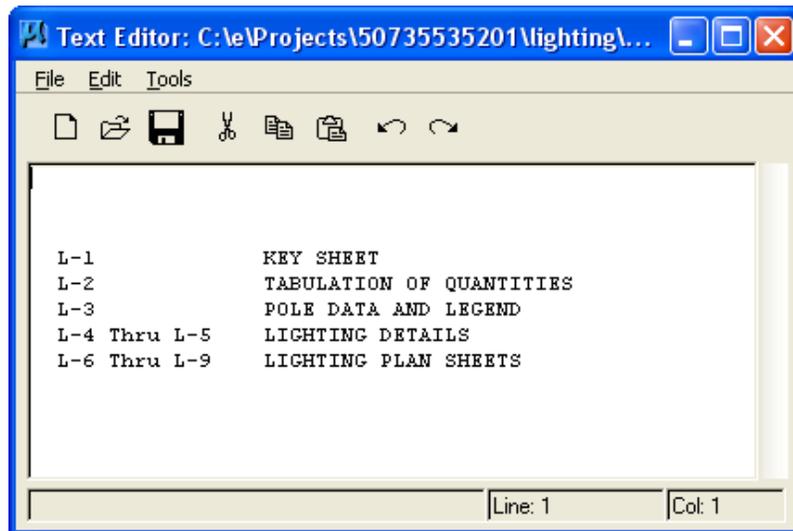
### Lab Exercise: Creating a Key Sheet with a Location Map (Part 3)

#### ADD INDEX OF SHEETS

- Continuing in **Keysl01.dgn**, zoom in around the text “INDEX OF LIGHTING PLANS” located on the left hand side of the sheet.
- From FDOT Menu bar, select **Traffic Plans > Keysheets > Index of Plans > Lighting**.



- On the Alert dialog click **OK**. This is a warning for organizations that use a document management system such as TIMS or ProjectWise.



- In the Text Editor, click **Tools > Import Text**.

5. Read the status bar in MicroStation, this provides information for the next step required.



6. Snap to the origin of the text label SHEET. This will line up the text properly.



7. Issue a **Data Point** to place the text.
8. Close the Text Editor.

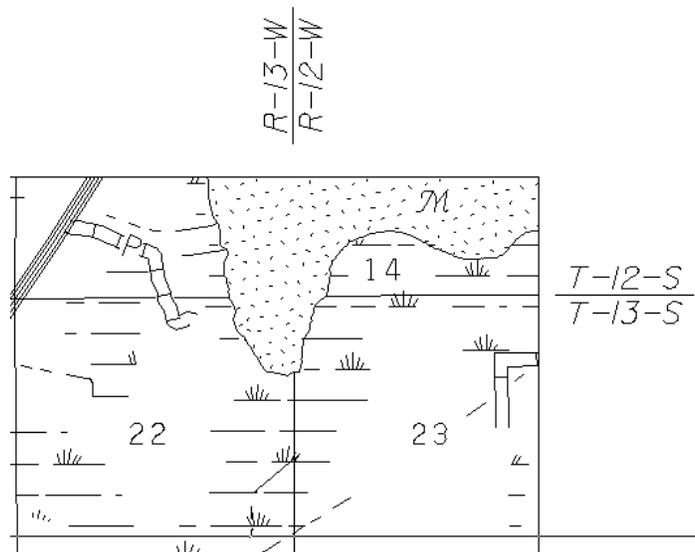
## Lab Exercise: Creating a Key Sheet With a Location Map (Part 4)

### ADD THE TOWNSHIP AND RANGE LABELS

1. Continuing in **Keyslt01.dgn**, zoom in around location map in the center of the sheet.
2. From FDOT Menu bar, select **Traffic Plans > Keysheets > Range Map Label**. This attaches the Range cell at the active plot scale.
3. Locate where to place the label and issue a **Data Point** to place the **Range cell**.

**Note** This cell contains data fields so it is not necessary to drop it, use the edit data field tool to edit the label.

4. From FDOT Menu bar, select **Traffic Plans > Keysheets > Township Map Label**.
5. Locate where to place the label and issue a **Data Point** to place the **Township Label**.
6. The next figure shows what the map with labels would look like. These labels come with the default text built into them, this will have to be changed based on the project.



## Lab Exercise: Creating a Key Sheet With a Location Map (Part 5)

### PLACING PROJECT LOCATION LABEL

In this exercise the user will draw a leader line with arrow pointing at the general location of the project on the Florida Map, then the note “LOCATION OF PROJECT” will be added. This exercise will require the use of some concepts covered earlier in the course.

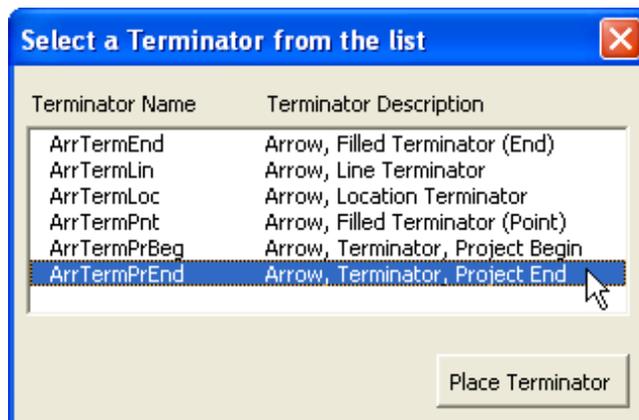
- Continuing in **Keyslt01.dgn**, zoom to the **Florida Map** area of the key sheet.



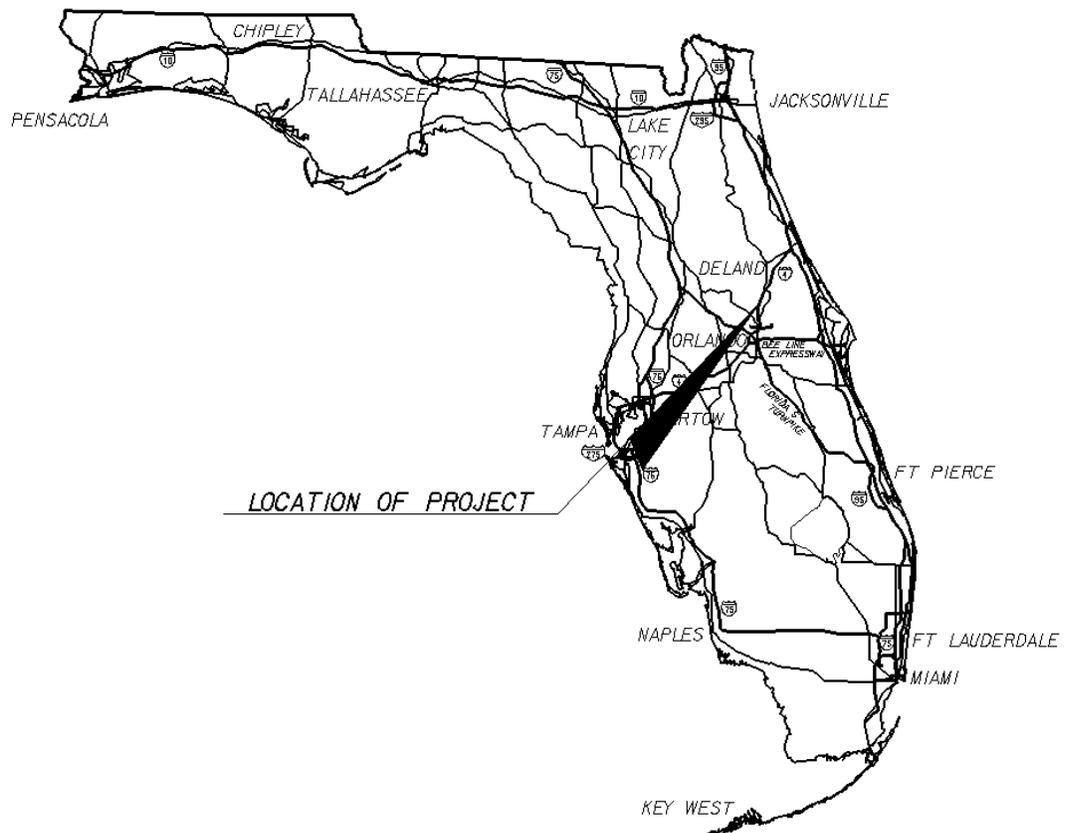
- Set the MicroStation level to **Leaderline\_dp**. Use the drafting filter to make this easier.
- Place a line starting from a point near the label **DELAND** on the map. The leader line will be a two piece line or smart line.
- Draw the second part of the leader line horizontal. The length needs to be long enough to hold the text “LOCATION OF PROJECT”. The length can be adjusted after the text is placed.
- From FDOT Menu select **Traffic Plans > Arrows and Barscales**.
- Select the **Place Terminator Arrows** tool on the **Place Arrows and Barscales XM Edition** toolbar. (Terminator icon.)



- Set the **Terminator** to **ArrTermPrEnd** located in the **rdwyeng.cel** library. This terminator is a user preference, use whichever arrow meets the current needs.



8. Pick the leader line and accept the line to place the arrow. Pick near the end of the line.
9. Set the MicroStation level to **TextLabel**.
10. From the MicroStation main menu, select **Place Text**.
11. Set the **Text Style** to **General Text Label**.
12. Check on the **Height and Width** and set them to **739.20**. This is **0.07 x 10560**.
13. In the Text Editor, key in **LOCATION OF PROJECT**.
14. Place the text above the leader line.
15. Adjust the length of the leader line if needed.
16. The next figure shows the label and leader line pointing at the project location.



## Optional Exercise: County Number

### ***PLACE COUNTY NUMBER NEXT TO COUNTY NAME***

In this exercise the user will use the **Fill in Single-Enter Data Field** tool to place the county number next to the county name. The county number is made up of five numbers, the first two numbers are the county and the next three numbers represent the section of the road being worked on. This county number can be found on the straight line diagrams.

1. Continuing in **Keyslt01.dgn**, zoom to the top center of the key sheet next to the text "VOLUSIA COUNTY".

***STATE OF FLORIDA***  
***DEPARTMENT OF TRANSPORTATION***

***CONTRACT PLANS***

FINANCIAL PROJECT ID 507355-3-52-01  
(FEDERAL FUNDS)  
VOLUSIA COUNTY (       )  
STATE ROAD NO. 415

2. From the MicroStation main menu, select the **Fill in Single-Enter Data Field** tool.
3. Issue a **Data Point** in between the parenthesis. A box will appear inside of the parenthesis, this lets you know you got the data field.

VOLUSIA COUNTY (  )

4. In the Text Editor dialog type in the county number **79120**.
5. Issue a **Data Point** in the view. This will fill in the data field with the county number.
6. Right mouse-click to reset/cancel the command.

VOLUSIA COUNTY (79120)



# 3 SUMMARY OF PAY ITEMS

## CHAPTER OBJECTIVES

The objective of this chapter is to teach you how to create the Summary of Pay Items sheet.

## INTRODUCTION

The summary of pay items sheet is generated from data outputted from TRNS\*PORT PES. In TRNS\*PORT, there are two different outputs produced for pay item summaries, the Project Summary of Pay Items and the Proposal Summary of Pay Items. Use the appropriate report, based on the project's phase.

For early phase reviews (up to Phase III, or until the proposal has been created), the designer must use the Project Summary of Pay Items Report (the proposal report is not available during this phase of a project). If a designer anticipates the simultaneous release of multiple projects, he should print each project's Summary of Pay Items for review. These reports are printed on standard 8.5" by 11" paper. A Project's Summary of Pay Items sheet does not have to be in CADD sheet format for phase review submittals.

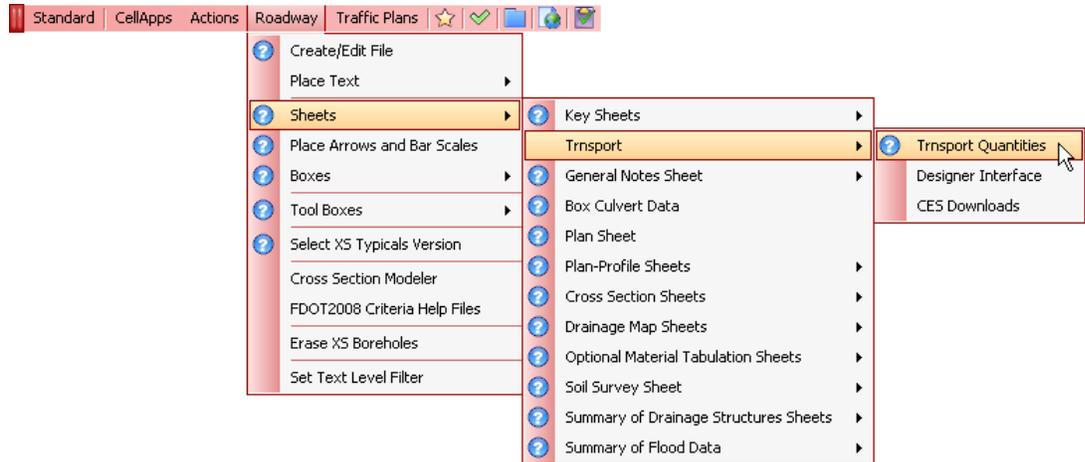
For later phase reviews (Phase III or after the proposal has been created), the designer uses the Proposal Summary of Pay Items Report. After the designer submits the report from the designer interface menu, the output is sent to the CADD FTP site, <ftp.dot.state.fl.us/outgoing/ces/> normally within 5-10 minutes. The output is transferred to a MicroStation graphics design file and placed on a standard formatted plan sheet via a program available in the FDOT Engineering/CADD Systems Office (ECSO) software. The quantities listed in the plans must be kept current with the quantities in TRNS\*PORT. Any revisions to the quantities in TRNS\*PORT must be transferred and update in the graphics design file. The TRNS\*PORT quantities are used to prepare the bid documents and the quantities listed in the plans must match.

When Lighting Plans are a component of the Roadway plans, the Summary of Pay Items Sheet is part of the Roadway plan set and is not included as part of the Lighting Plans.

The CADD version of the Summary of Pay Items Sheet is created by a program, TRNS\*PORT Quantities option that is available on the FDOT Roadway Menu bar. This tool transfers the PES Output file and imports it into a design file and places it on a plan sheet.

## GENERAL INFORMATION

The TRNS\*PORT Quantities tool gives you the option to place a border sheet file into the design file or to only import the PES text file so as not to override the border and its settings. The figure below shows how to access the tool.



The figure below shows the TRNS\*PORT Quantities tool loaded from FDOT Menu bar. The dialog is broken into two parts; the top portion of the dialog defines the sheet information and search paths. The bottom part of the dialog defines the label for the title block on the sheet border.

The screenshot shows the FDOT TRNS\*port 2.01.00 dialog box with the following fields and options:

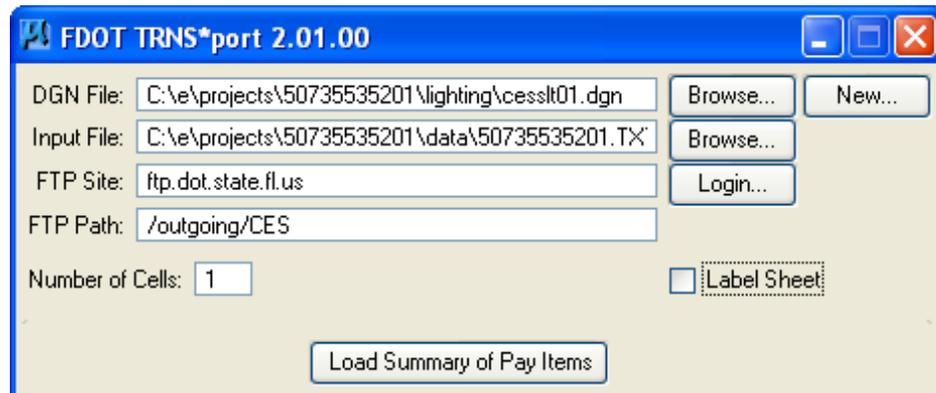
- DGN File: C:\e\projects\50735535201\lighting\cesslt01.dgn (Browse... New...)
- Input File: C:\e\projects\50735535201\data\50735535201.TXT (Browse...)
- FTP Site: ftp.dot.state.fl.us (Login...)
- FTP Path: /outgoing/CES
- Number of Cells: 1
- Label Sheet
- Label Sheet section:
  - Road Number: SR415
  - County: VOLUSIA (dropdown)
  - Financial Number: (empty)
  - Sheet Title: SUMMARY OF PAY ITEMS
  - Sheet Number Prefix: L- Lighting (dropdown) Number: 3
- Load Summary of Pay Items (button)

**DGN File Name** - The path and name of the design file that the PES data will be placed into. It is not necessary to key-in the filename only the sequence number, (i.e. key in cessrd.dgn). The first sheet is placed at 10000,10000 and the rest are stacked one above the other.

**Input File Name** - The name of the PES data input file, for example: p723423.dat. It doesn't matter where the PES data file is located as long as it is accessible by the file list box. This file may also be a text file, for example: 50735535201.txt.

**Number of Cells** - This is read from the PES data input file and is set when it is created. If the cell 'SBCES cannot be found' a warning comes up prompting the user to attach the correct cell library.

**Label Sheet** - If these fields are filled in, the program will place the *sheet number*, the *title*, and the *project number* in the appropriate fields on the sheet cell when it is placed. Keep in mind that these fields need to be all upper case not lower case as this tool defaults to. The only field that the user can not change to all upper case with this tool is the County name. The Sheet Navigator tool can be used to fix this issue.



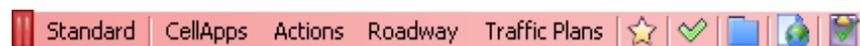
## Lab Exercise: Loading the Roadway FDOT Menu Bar

In this exercise, the user will open the Roadway configuration in the FDOT Menu bar.

1. From MicroStation, open **Keyslt01.dgn**.
2. From the FDOT Menu bar, select **Standard > Configuration**.
3. Add **Roadway** and **Traffic Plans** to the menu options.



4. Click the **Update**  icon to make the configuration changes.
5. Notice that Roadway and Traffic Plans menus are now on the FDOT Menu bar. This allows the user to gain access to tools found only under these menus to use in the next exercise.

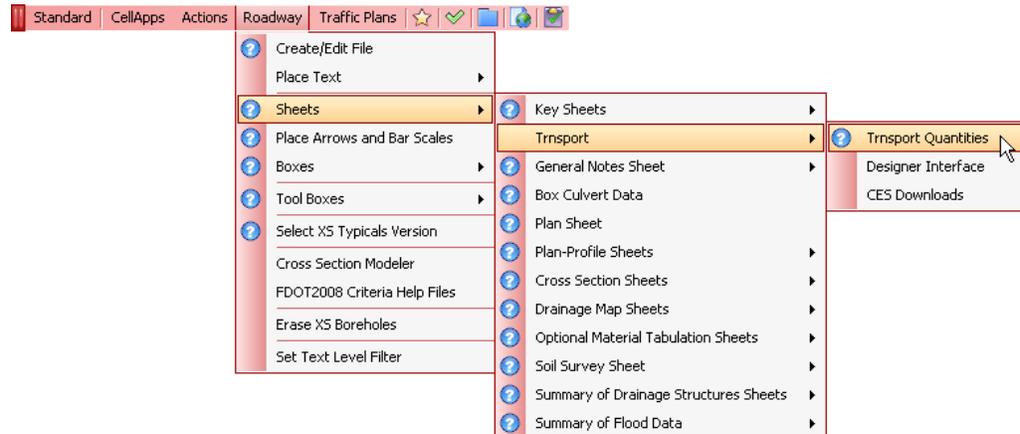


## Lab Exercise: Transferring PES Data to Plan Sheet

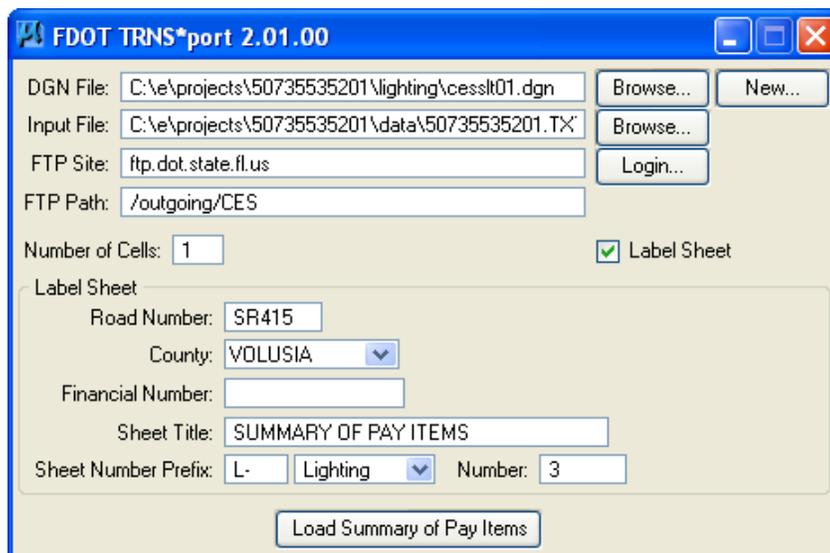
### CREATE SUMMARY OF PAY ITEMS SHEET

In this exercise, the user will create a new design file and import the TRNS\*PORT text all at one time. FDOT delivers a tool to automate this process called TRNS\*PORT. This tool can be started from any open MicroStation file.

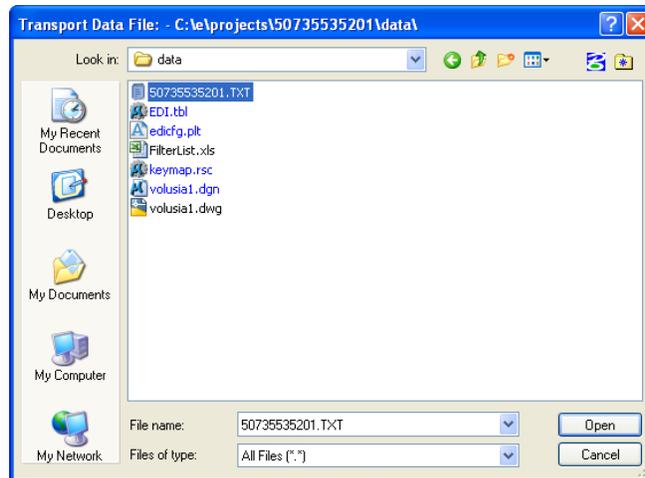
- Continuing in **Keyslt01.dgn** from FDOT Menu bar, select **Roadway > Sheets > Transport Quantities**. This opens TRNS\*PORT.



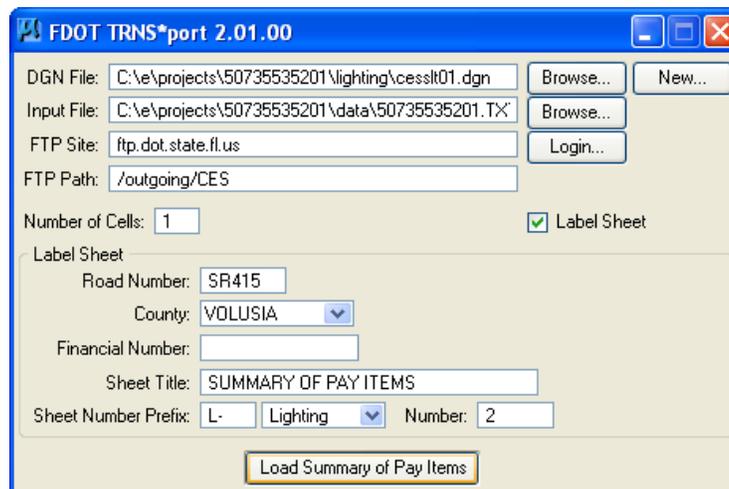
- In TRNS\*PORT, set the units to **English**.
- Select **New** in the **DGN File** field. This opens **CES DGN** file.



- For the file name, change it from **Cessrd01** to **Cesslt01.dgn**.
- Click **SAVE**. This fills in the DGN File name in the TRNS\*PORT dialog.
- For the **Input File** Select **Browse**. This opens TRNS\*PORT Data File.
- Browse to the **data** folder in the project.
- Select the **50735535201-2.txt** file.



9. Click **Open** in the TRNS\*PORT Data File dialog. This fills in the Input File name in the TRNS\*PORT dialog and populates the **Number of Cells** needed.
10. Fill in the **Road Number** with **SR 415**.
11. Select **Volusia** as the **County**.
12. **Financial Number** - leave this blank. Sheet Navigator will populate this.
13. For the **Sheet Title**, leave the default text. Sheet Navigator will change the case to all upper.
14. Set the discipline to **Lighting**. This will set the **Sheet Number Prefix** to **L-**.
15. Set the **Number** to **2**. This will number the sheet **L-2**.



16. Click **Load Summary of Pay Items**. This will load the CES text file and place a border in the file.
17. Close the TRNS\*PORT dialog.

## Lab Exercise: Update Sheet with Sheet Navigator

### ADD DIGITAL SIGNATURE NOTE AND UPDATE LABELS

- Continuing in **Cesslt01.dgn** from FDOT Menu bar, launch Sheet Navigator.

- Notice the fields that are populated. Also, notice that all of the fields are upper case. Sheet Navigator by default places all text as uppercase; that is why the text was left in lower case in the TRNS\*PORT, Sheet Navigator will fix it.
- For the **Financial Project ID 1**, click inside the blank field. This will populate the Project ID with the correct number.
- Set the **Digital Signature Note** to **Standard**.
- Click **Save**. This updates the sheet border.
- Close Sheet Navigator.

# 4 LIGHTING TOOLS

## CHAPTER OBJECTIVES

The objective of this chapter is to teach you how to use Design and Computation (D&C) Manager, the FDOT Menu bar and other GEOPAK tools to create proposed lighting features.

## INTRODUCTION

The Lighting Tools section introduces several applications that help you create Lighting plans.

As explained in Chapter 1 of this course material, the user will create a new file, **dsgnlt01.dgn**, in which the Lighting proposed design will be drawn. In addition, the user must reference the proposed Roadway design file, **dsgnrd01.dgn**, existing Topographic file, **topord01.dgn**, existing Utilities, **utexrd01.dgn**, existing Drainage, **drexrd01.dgn**, existing and proposed Right-of-Way files, and any additional files containing existing features along the project.

After the above is done, you are ready to clip the sheets. To aid in this task, you have two options available, the FDOT Menu bar Clipping program, commonly known as rfclip, and the GEOPAK's Sheet Clipping program.

The next step is to draw/place the proposed Lighting features in accordance with FDOT CADD Standards. The FDOT Menu bar provides tools with the active settings (Level and Symbology) used to create the Lighting features. There are additional tools available to help in the efficient placement of Light poles and Pull Boxes: D&C Manager and the GEOPAK Draw Cell Group by Feature.

Refer to Chapter 25 in the *Plans Preparation Manual*, Volume II, for more detail on developing the Lighting plans. Refer to the Design Standards indexes for design criteria.

The Labeling of the plan sheet items has been made easier with the use of GEOPAK's Plan Labeler, which allows you to create styles for the placement of repetitive labels.

To assure that you are adhering to the *Traffic Plans CADD Standards*, the FDOT Menu bar provides an easy way to check and fix symbology to match the CADD standards.

Finally, you must compute the pay items used and populate the Tabulation of Quantities Sheet. GEOPAK's D&C Manager can count and report every "each" and "linear" item. Design and Computation Manager generates a report that can be finalized in Microsoft Excel and then imported into the MicroStation Tabulation of Quantities design file.

## CLIPPING LIGHTING PLAN SHEETS

Clipping Lighting Plan Sheets is very similar to clipping Roadway or Signing and Pavement Marking Sheets. The user will use GEOPAK to layout and clip the sheets. On simple projects it may be possible to double stack the plans one below the other. A scale that presents a clear representation of the project should be used. However, the scale should not be smaller than 1" = 100'.

If a Motif file is used, this should be set up prior to starting the clipping process. A Motif file is basically a template MicroStation file with all of the reference files attached that the user wants attached to each plan sheet. There is an option to use the active file when clipping.

## PLAN SHEET LAYOUT TOOL

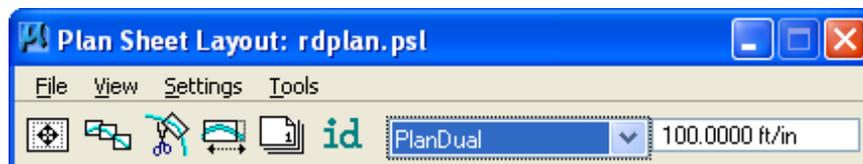
1. From MicroStation, click **Applications > Road > Plans Preparation > Plan/Profile Sheet Composition**.

<OR>

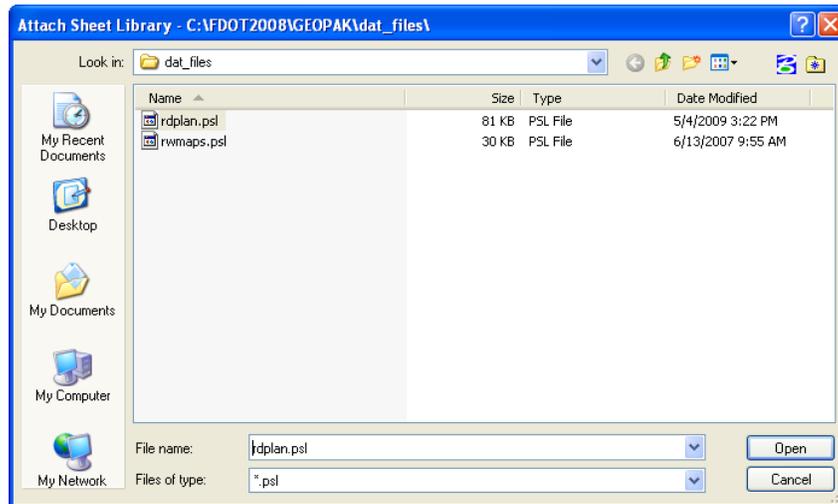
From the **Road** tool box, click the **Plan/Profile Sheet Composition** button.



2. Once activated the Plan Sheet Layout dialog opens as shown below.



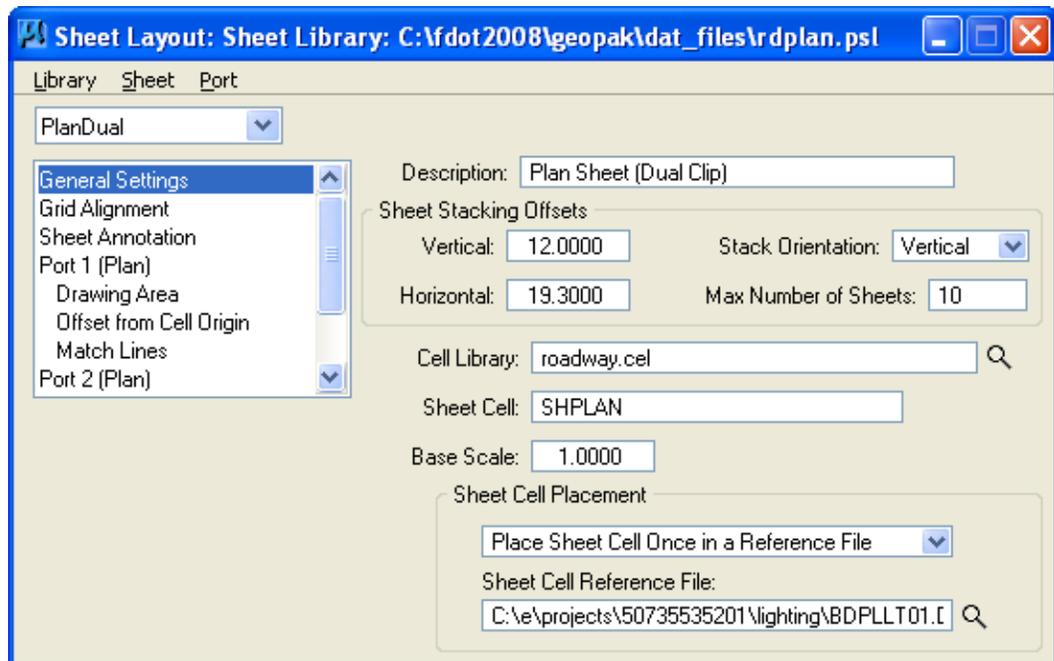
- Plan Sheet Layout uses an attached library that controls what sheet types are available. The Plan Sheet Library or “**psl**” files are located in the **FDOT2008\geopak\dat\_files** folder.



- FDOT delivers these files ready to use, they cover the most common of the sheet configurations used. By default the **rdplan.psl** library is attached. Look at the header of the dialog box to see which library is currently attached.

## SHEET LIBRARY

The Sheet Library dialog is accessed from the Plan Sheet Layout menu option **File > Sheet Library > Edit**. When selected the Sheet Library dialog opens as shown below.



The most important parameters in **Sheet Layout: Sheet Library** are the following:

**Cell Library** Make sure the correct cell library is attached.

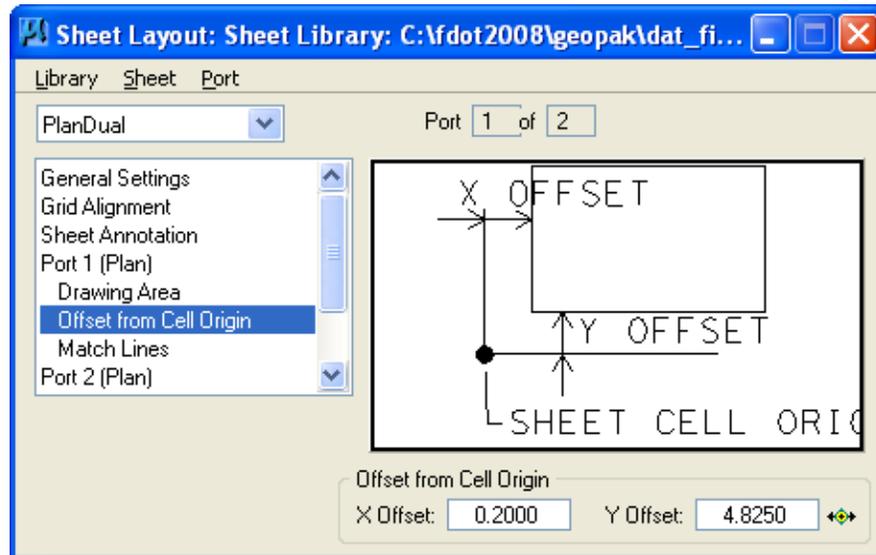
**Sheet Cell** This is the name of the cell representing the border.

**Sheet Cell Placement** Select how the Sheet Cell, Border, is to be placed. Either Place the sheet cell in each file or place it once in a border reference file.

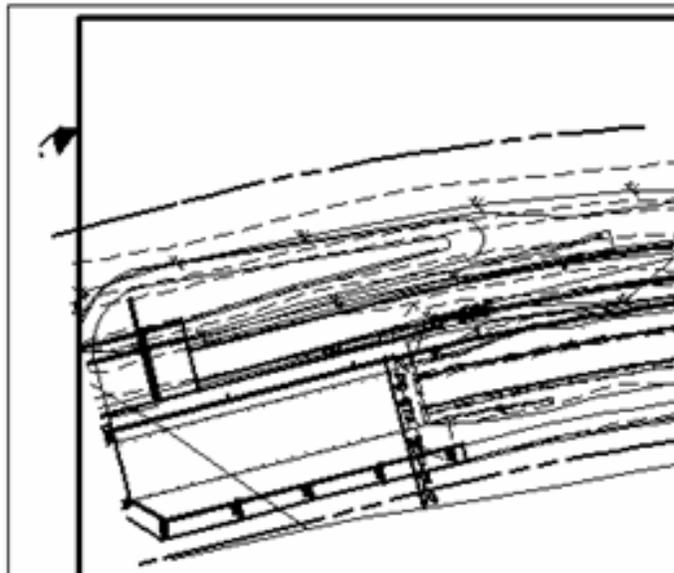
## SHEET LIBRARY ITEMS

There are some settings in the Sheet Library that the user may need to adjust to make the plan sheets look the way they want. For example, if after the sheets are clipped and you notice that the offset for the left edge of the border to the clip limit is too small this can be adjusted in the library and the sheets re-cut.

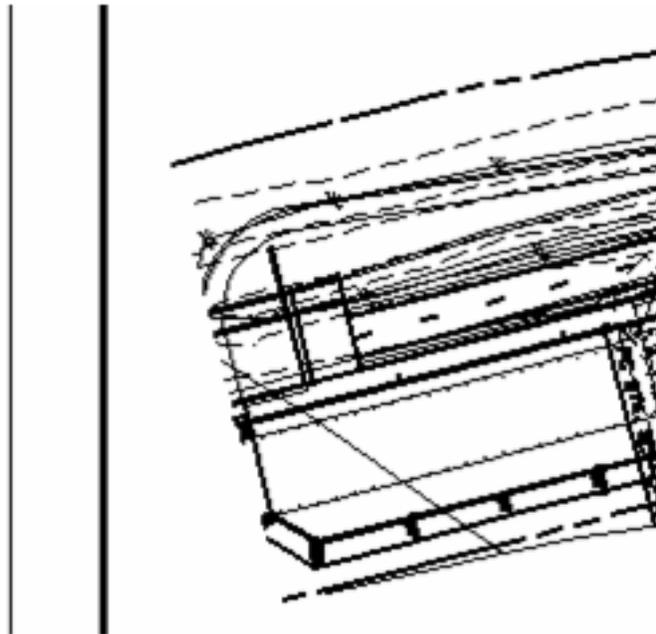
The figure below shows the Offset from Cell Origin as 0.200. This is the default as delivered from FDOT. When the sheets are clipped you will notice that the space from the left edge of the border to where the clip sheet starts is too small.



The image below shows the top panel with the Offset from cell origin set at 0.200. Changing this value to 0.800 will shift the clip area over to a much better looking condition.



The next figure shows the results after changing the Offset from Cell Origin.



## SHEET LAYOUT SETTINGS

The Sheet Layout Settings dialog is loaded from the Plan Sheet Layout menu option **Settings > Sheet Layout**. This dialog instructs the sheet clipping to cut sheets a certain way. For example: do you want the clipping to go from Left to Right, is there a lot of elevation relief on the project, if so then set the stair stepping ON and how do you want the sheet view attributes set up, use the current design file or a Motif file.

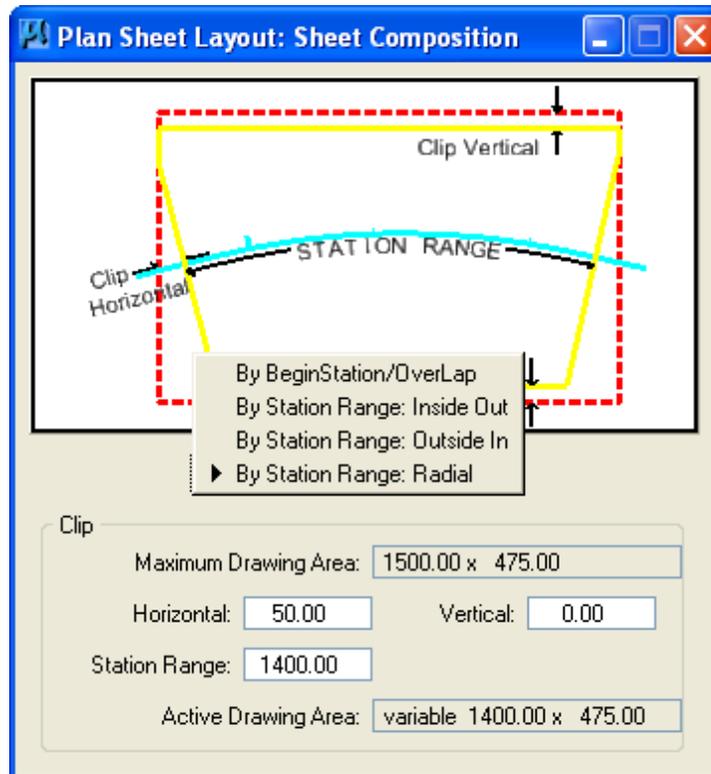


A Motif file is nothing more than a MicroStation design file with reference files attached and level symbology set up the way you want the plan sheets to look when clipped. FDOT has established a standard design file name **MTPLLT.dgn**. Once the Motif file is created the user would attach the appropriate reference files and turn on or off the levels to make the file look the way the user wants the plan sheets to look. The user can also set up any level symbology that is required.

## SHEET COMPOSITION

The Sheet Composition dialog, loaded from the Plan Sheet Layout menu option **Tools > Sheet Composition**, controls how the limits of the sheets are handled. The options are:

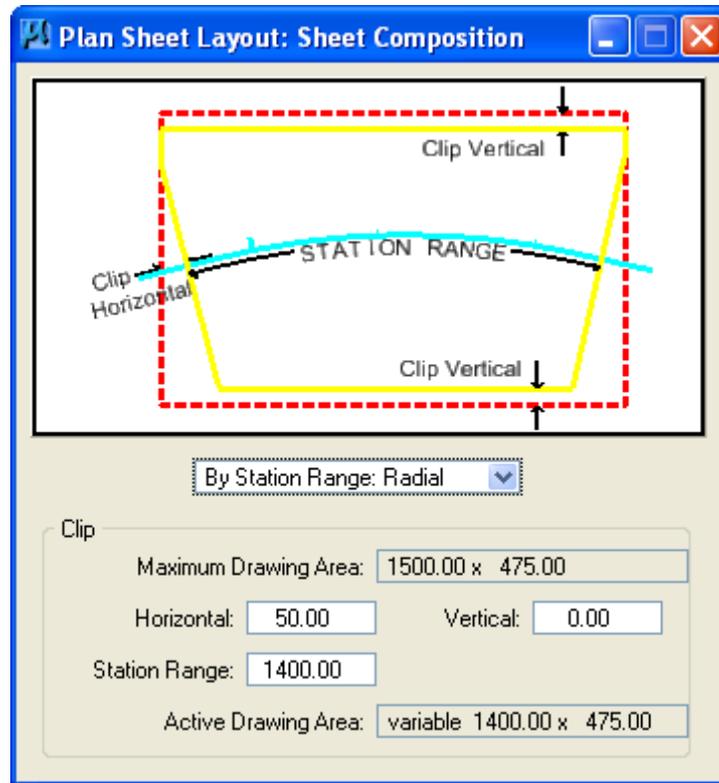
- By Begin Station/Overlap
- By Station Range: Inside Out
- By Station Range: Outside In
- By Station Range: Radial



The **Station Range** is a factor of the Clipping Scale. Look in the PPM, Volume 2, chapter 10, for the values to be used in the **Station Range**. These values are filled in based on the scale entered, but may need to be adjusted to fix areas in sharp curves where portions of the design files are missed.

These four options are covered in great detail in the Basic GEOPAK for Roadway Designers training guide. In this training course the user will use the option **By Station Range Radial**.

With the **By Station Range Radial** option the **Horizontal** distance is used to trim the Station Range. The Maximum Drawing Area, Horizontal and Station Range are inter-related. The resultant clipping shapes are not rectangular; instead the Vertical edges are oriented perpendicular to the alignment, which results in rectangular shapes along tangent sections and more of a trapezoidal shape along curved sections. Adjusting the Station Range will fix missed areas in curves but it is still a sort of pie shape.



The critical value in this option is the **Station Range**. This should be set based on the standards delivered in the PPM. For example, for 100 scale sheets the Station Range should be set to 1400. This is the maximum value and may be decreased to handle alignments with unique conditions like sharp curves or intersections.

**Horizontal** is used for the clipping limits at the ends of the sheet. If the user adjusts the **Horizontal** distance the **Station Range** will dynamically change by the Horizontal distance times 2.

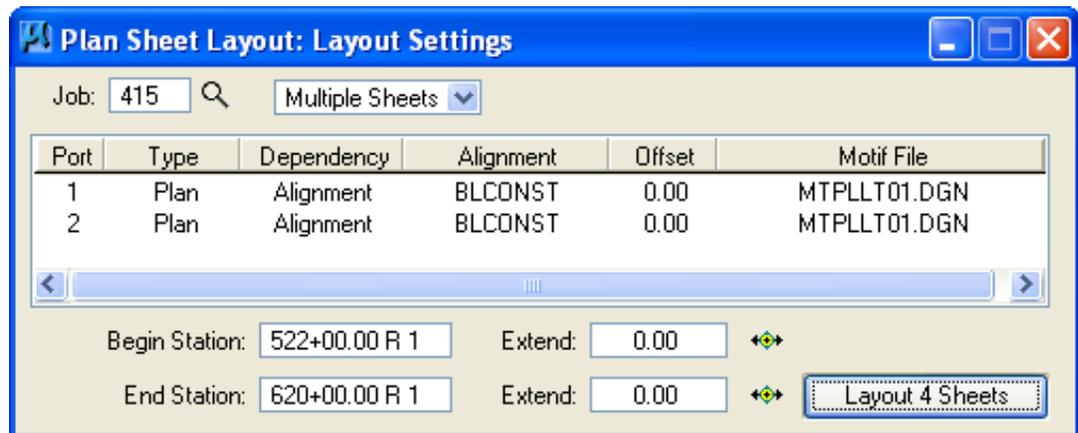
**Vertical** sets an additional clip limit from the defined sheet width. In the figure above, the red dashed rectangle represents the **Maximum Drawing Area**. Entering a value other than zero will reduce the clip limit by this amount.

The sheet layout process is a multiple step process because of the items mentioned earlier, curves and intersections. There are three ways to approach this:

1. Layout all of the clip sheets from begin project to end project then adjust the sheets at the intersections and around curves to clean up the pie shaped wedges.
2. Layout single sheets at all of the intersections then run the remaining clip sheets up to the intersections and after the intersections. It is good practice to try and center intersections on the plan sheets if possible.
3. Get the clipped sheets from the Roadway group and rename them to signing and pavement marking sheets. As long as the scales are the same this option works fine.

## SHEET LAYOUT

The Sheet Layout dialog is used to define the Ports and alignments and station range to run the layout along.



**Job** This is the gpk. If Project Manager is used, this will be filled in automatically. If Project Manager is not used you will have to select it using the magnifying glass icon.

**Multiple Sheets** The user is clipping more than one sheet.

**Single Sheet** The user is clipping only one sheet.

**Port** In a Plan/Profile scenario Port 1 would be the Plan view and Port 2 would be the Profile. For Plans that are double stacked with two plan views both Port 1 and 2 would be Plan.

**Type** This is either the Plan or Profile area. In a scenario like Lighting there will only be a Plan port.

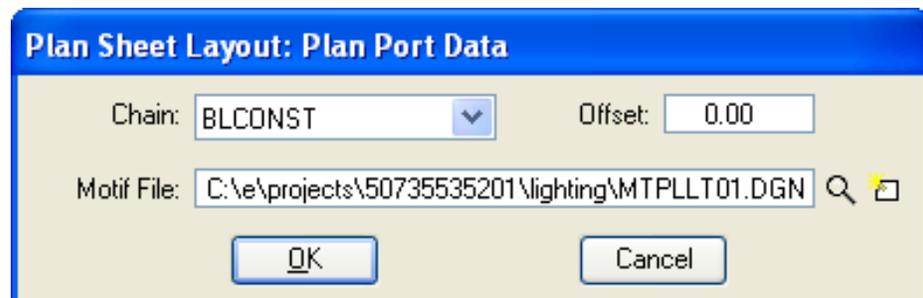
**Dependency** instructs the Port to either be dependent on an Alignment or another port.

**Alignment** a GEOPAK chain that the sheets are clipped along.

**Offset** allows the user to set the clip borders at an offset from the Alignment.

**Motif File** shows whether a motif file is used and if so what the name is.

*Note* Double-clicking on one of the **Plan** ports in the **Layout Settings** tool opens the **Plan Port Data** dialog as seen below. This is where modifications are made to set up the **Layout Settings** dialog.



**Begin and End Station** Defines where the first sheet starts and the last sheet ends. The user can either key in the values or use the Select icons to dynamically pick the stations. It is highly recommended that you select and even station or snap to an even tick mark for the begin station so that the sheets will all fall on even stations.

- Extend** Allows the user to start the first sheet a defined distance prior to the Begin Station. This is good for leaving space to General Notes or if you anticipate additional design may occur before the Begin Station this can be used to account for that. The same applies for the End Station.
- Layout Sheets** Dynamic button that shows the user the number of sheets needed based on the Begin and End Stations. Clicking this button will draw the clip borders into the active design file.

## SHEET CLIP

This actually clips the plan sheets based on all of the previous settings.

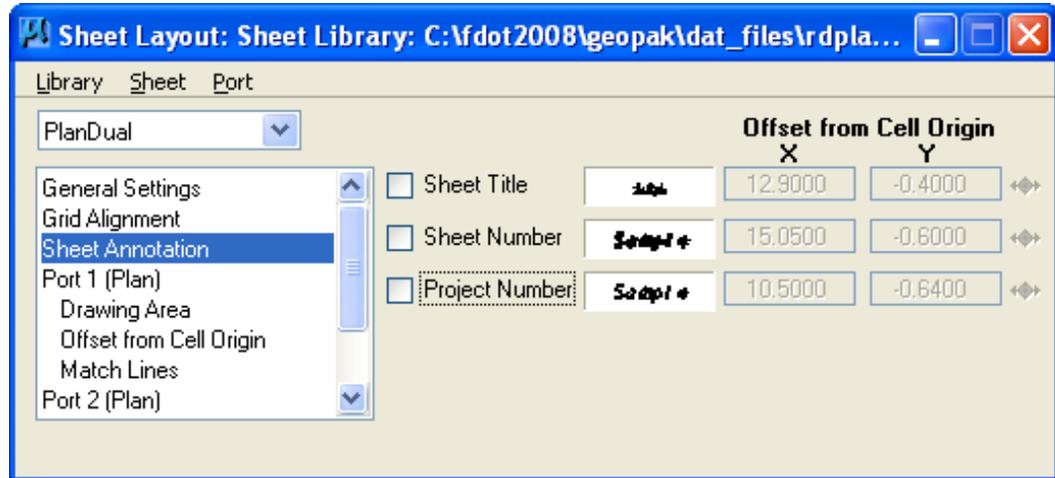
- Output File** Allows the user to specify where sheet files are created and what to name them.
- Directory** Select the path where the new sheet files are to be placed.
- Sheet Name Prefix** Type the name of the sheet file. Type only the first part of the file name; the software supplies a numerical suffix that corresponds with the sheet number. For example, if PLANLT is entered as the prefix, as the sheets are clipped the files are named PLANLT01.DGN, PLANLT02.DGN, PLANLT03.DGN, etc.
- Rotate Reference** or **Rotate View** Both options will allow you to place more than one sheet per file. The difference is that rotate reference, rotates the referenced files so that the sheet is at an angle of zero. Rotate view maintains the coordinate value and then rotates the view. This is the recommended method.

**Sheets per File** Type the number of sheets to be created in each design files.

**Sheet Range Begin and End** Select the range of sheets to be created from the clip borders.

**Labels and Annotations** Allows the user to enter a **Sheet Title** and **Project Number**, as well as **Match Line** text when applicable. The user cannot enter this information if the annotation information is not set up in the Sheet Library. Typically the user would not use this section to label the sheets.

**Note** If this section is grayed out that is because of the Sheet Annotation settings in the attached library are toggled off as seen in the figure below.

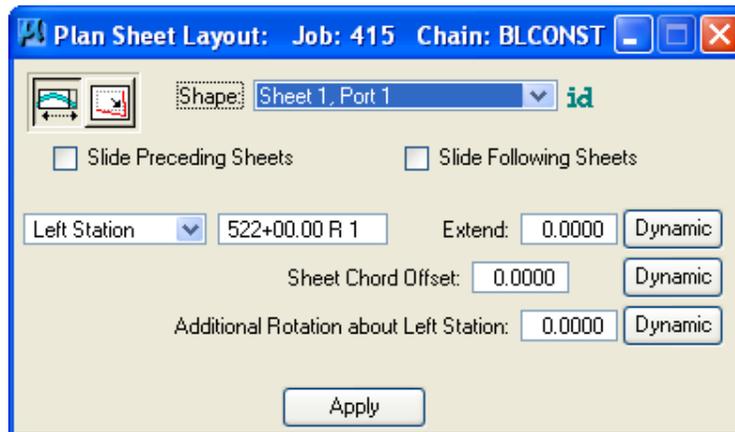


**Process Sheets** This button, when clicked, starts the sheet clipping process.

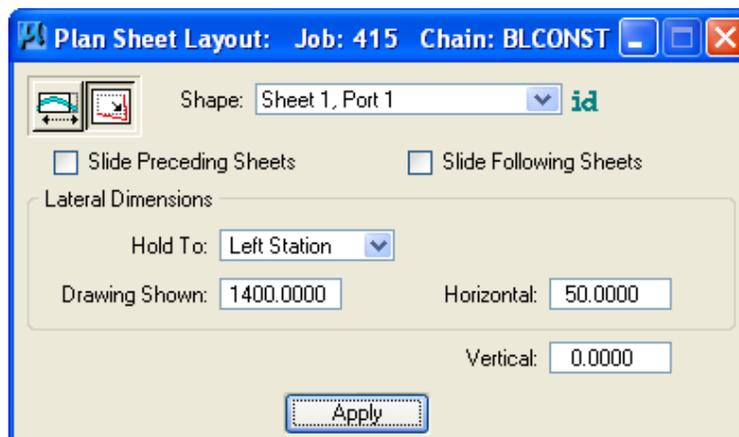
## SHEET MODIFY

This option allows the clip sheet borders to be adjusted prior to actually clipping the sheets. The Sheet Modify command opens Plan Sheet Layout: Modify, which operates in two modes, **Slide Sheets** or **Modify Drawing Area**, represented by the two buttons in the upper left corner. The following figure shows the **Slide Sheets** mode.

**Slide Sheets** is used to move the clip borders along the alignment. Type a specific station in the box and choose the **Left Station**, **Center Station**, or **Right Station** to apply the new station. **Left Station**, **Center Station**, or **Right Station** refers to the portion of the clip border that is located at that station. Another option is to change the **Sheet Chord Offset** of the border to allow the movement of the sheet parallel to the alignment in either direction for a given distance. **Additional Rotation** can also be applied. This angle is measured from the left station and is in reference to the alignment. Perform any of these three actions dynamically with the **Dynamic** buttons to the right of the respective function.



**Modify Drawing Area** changes the composition of the borders. Type the appropriate dimensions in the **Drawing Shown**, **Horizontal**, and **Vertical** boxes, and then select **Left Station**, **Center Station**, or **Right Station** from the **Hold To** list.

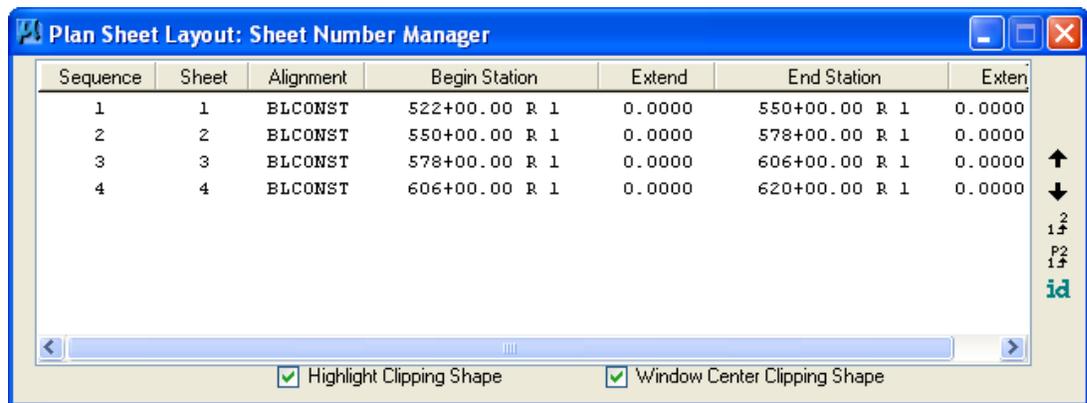


In either mode, select which sheet is being modified from the **Shape** list, or click the **Identify** button to do so graphically. Select the **Slide Preceding Sheets** check box and/or the **Slide Following Sheets** check box to indicate if the sheets preceding and following the modified sheet are to be slid to compensate for the changes made to the current sheet border. To make any changes effective, click the **Apply** button.

## SHEET NUMBER MANAGER

Sheet Number Manager provides a method for applying sheet and sequence numbers to the clip borders. The main window contains a list of the sheet borders contained in the file. In the case of dual clip borders for a single sheet, i.e. Plan/Profile sheets, the borders are grouped together and only listed once in this window. Select a line in the window and click the up and down arrow buttons to move the Sheet in the sequence order. The next two buttons allow for the manual editing of sequence and sheet numbers. The **ID** button is used to graphically select a sheet to modify. Select the **Highlight Clipping Shape** check box or **Window Center Clipping Shape** if applicable.

Keep in mind that this is the MicroStation design file name for the sheet not the actual sheet number that is placed in the title block. Knowing this, the user should always run Sheet Number Manager and add a Prefix of '0' to the sheets so when the sheets are clipped the file names will be, as an example: **Plansp01.dgn** not **Plansp1.dgn**. This will make organizing and managing the files in explorer much easier.



## Lab Exercise: Create Plan Sheet Border

In this exercise the user will create the Plan Sheet Border.

### CREATE THE BORDER REFERENCE FILE



1. Open the **FDOT2008** folder on the desk top
2. Start Create File/Project using the icon from **FDOT2008** folder.
3. From Create File/Project set the **File Type** to **Lighting Design Files (DGN)**.
4. Select **Border Sheet Plan** and click **Create**. This will create the file **Bdpllt01.dgn** and place it in the Lighting folder.
5. Click **OK** to acknowledge the file creation.
6. Click **OK** on the Create file/Project dialog to close it.
7. Start MicroStation and open the **Border** file just created.
8. Set the **Plot Scale** to **1.0**. No need to place a sheet border at this time, the sheet clipping process will place the border sheet cell.

## Lab exercise: Clip Sheets

In this exercise the user will start Project Manager and clip sheets

### START PROJECT MANAGER AND CREATE A NEW RUN

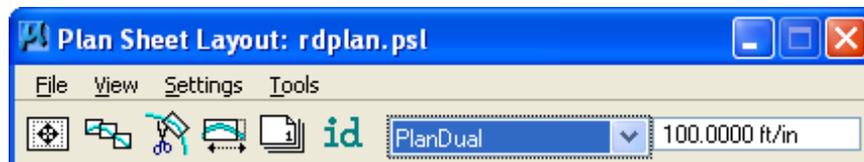
1. Open **Cliplt01.dgn** in the Lighting folder.
2. Zoom to a **Fit View**.
3. Continuing in **Clipsp01.dgn** select **Plan/Profile Sheet Composition** from the GEOPAK Road tools palette or from the **Applications > Road > Plans Preparation>Plan/Profile Sheet Composition** pull down.



4. Select the **SR415.prj** file located in the **Roadway** folder. This opens Plan Sheet Layout.

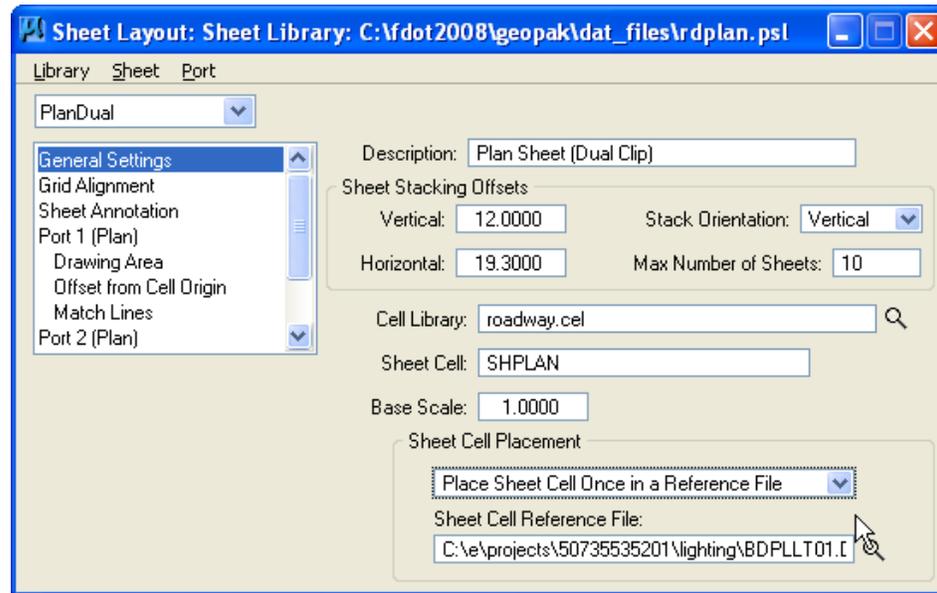
### SHEET SETTINGS

1. In Plan Sheet Layout select the sheet type **PlanDual** from the drop down menu on the right hand side of the dialog.
2. Set the Scale to **100.00** next to the sheet type.

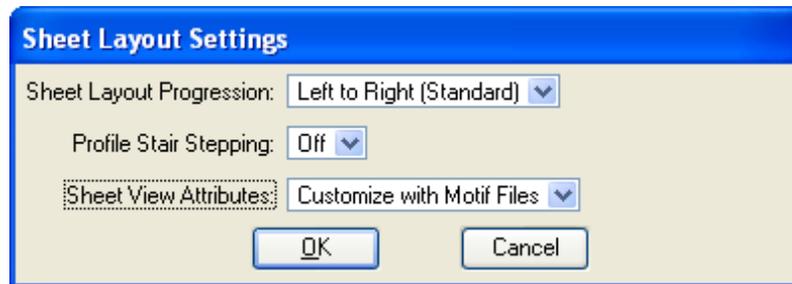


3. In Plan Sheet Layout select **File > Sheet Library > Edit**. This opens Sheet Library.

- In the **Sheet Cell Placement** portion of the dialog, select **Place Sheet Cell Once in a Reference File**. Use the magnifying glass icon to browse to the border sheet created earlier.



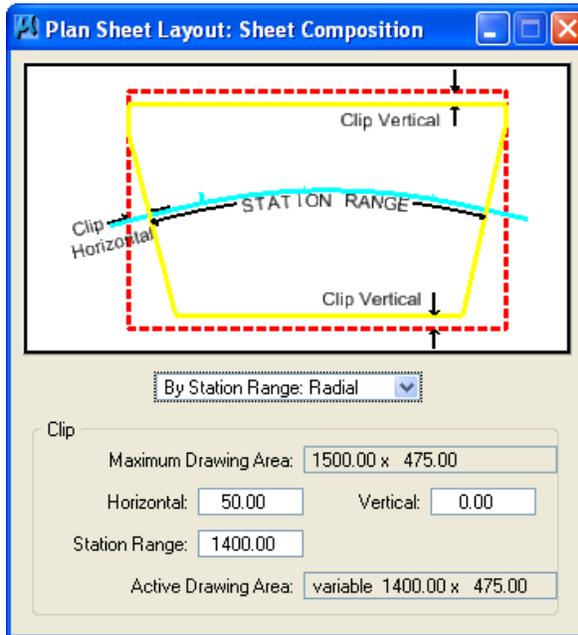
- Close Sheet Library by clicking on the **X** in the upper right hand corner.
- Click **Yes** to save changes made to the library.
- In Plan Sheet Layout, select **Settings > Sheet Layout**. This opens Sheet Layout Settings.



- Set **Sheet Layout Progression** to **Left to Right (Standard)**.
- Set **Profile Stair Stepping** to **Off**.
- Set **Sheet View Attributes** to **Customize with Motif Files**.
- Click **OK**.

## SHEET COMPOSITION

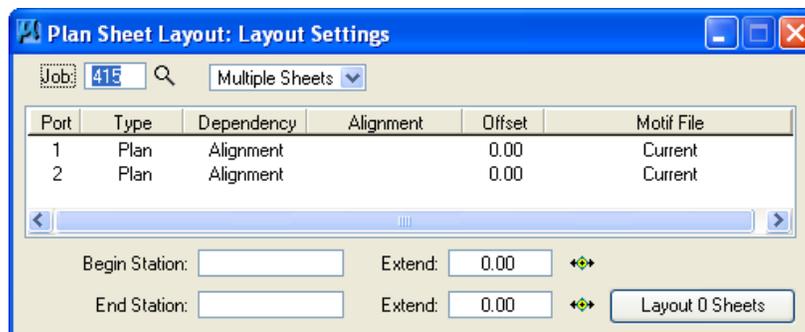
1. Open Sheet Composition . This can also be loaded from the **Tools** menu.



2. Set the method to **By Station Range: Radial**.
3. Set the **Station Range** to **1400.00**. This is the maximum length allowed for a 100 scale sheet as per PPM Vol. II Chapter 10. This will automatically set the Horizontal clipping to 50.00.
4. Close **Sheet Composition**.

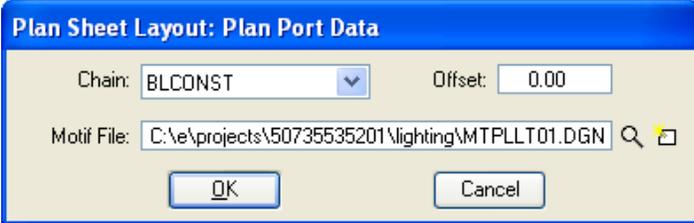
## LAYOUT SHEETS

1. Click the **Layout Sheets** icon  or select from the **Tools** menu.



2. The **Job** number should be set to **415**. If you do not use Project Manager you will have to browse and select the gpk.
3. Set the method to **Multiple Sheets**. The options are Single or Multiple.

- Double-click on **Port 1**. This opens Plan Port Data.

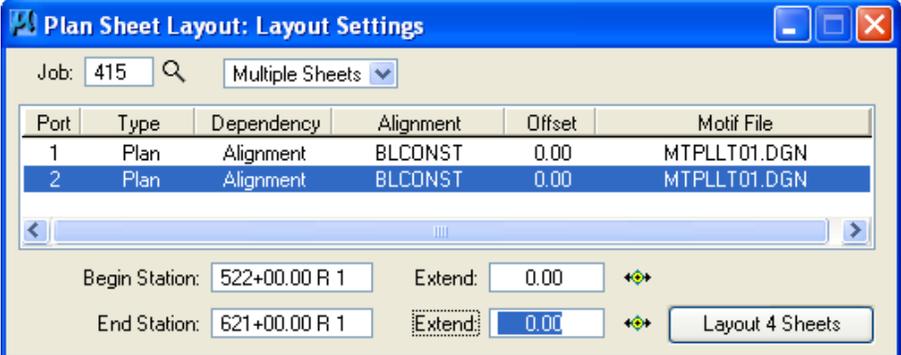


Plan Sheet Layout: Plan Port Data

Chain:  Offset:

Motif File:

- Set the **Chain** to **BLCONST**.
- Set the **Offset** to **0.00**.
- For **Motif File**, browse to the **MTPLLT01.dgn** in the **Lighting** folder.
- Click **OK**.
- Double-click on **Port 2**.
- Populate **Port 2** with the same settings as port 1.
- Click **OK**.
- Set the **Begin Station** to **522+00**.
- Set the **End Station** to **621+00**.



Plan Sheet Layout: Layout Settings

Job:

Port	Type	Dependency	Alignment	Offset	Motif File
1	Plan	Alignment	BLCONST	0.00	MTPLLT01.DGN
2	Plan	Alignment	BLCONST	0.00	MTPLLT01.DGN

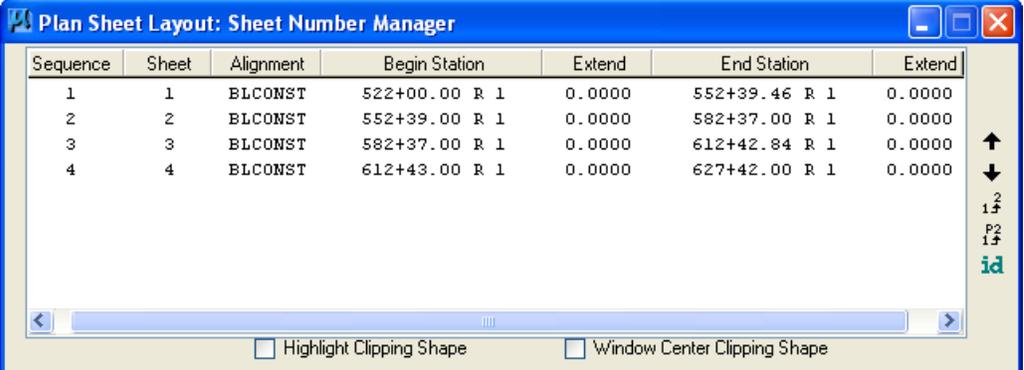
Begin Station:  Extend:

End Station:  Extend:

- Notice the sheet count is calculated in the Layout button.
- Click the **Layout 4 Sheets** button. This will draw the clip shapes into the design file.
- Close Layout Settings.

### SHEET NUMBER MANAGER

- Click the **Sheet Number Manager** icon . This opens Sheet Number Manager.

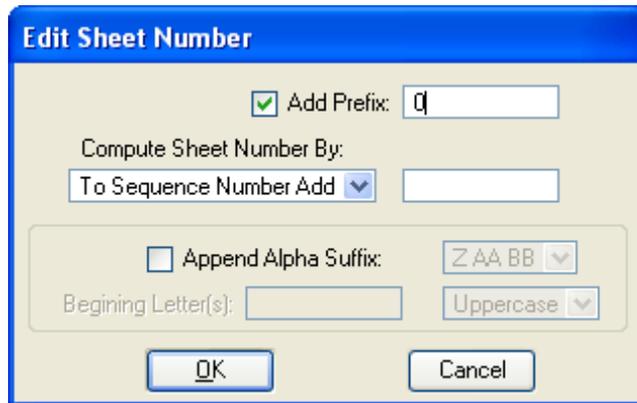


Plan Sheet Layout: Sheet Number Manager

Sequence	Sheet	Alignment	Begin Station	Extend	End Station	Extend
1	1	BLCONST	522+00.00 R 1	0.0000	552+39.46 R 1	0.0000
2	2	BLCONST	552+39.00 R 1	0.0000	582+37.00 R 1	0.0000
3	3	BLCONST	582+37.00 R 1	0.0000	612+42.84 R 1	0.0000
4	4	BLCONST	612+43.00 R 1	0.0000	627+42.00 R 1	0.0000

Highlight Clipping Shape  Window Center Clipping Shape

2. Select the four sheets by clicking and dragging across them.
3. On the right hand side of the dialog, click the **Edit Sheet Number** button . This opens Edit Sheet Number.

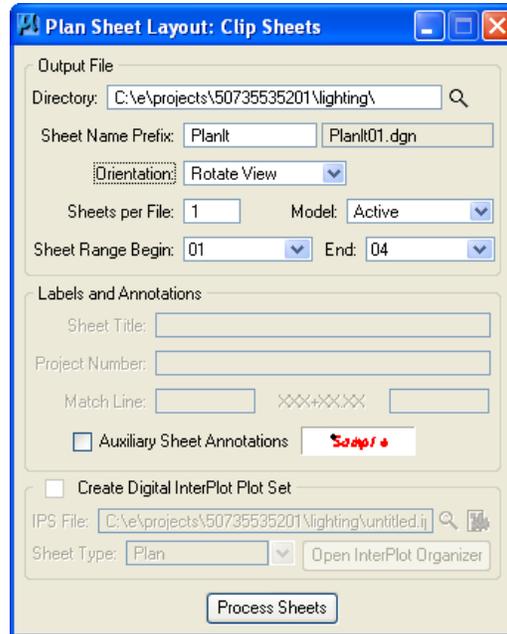


4. Toggle on **Add Prefix**.
5. Enter a **0** for the **Prefix**.
6. Click **OK**. This will change the sheet numbers to 01, 02, 03, 04.
7. At the bottom of Sheet Number Manager dialog, toggle on **Window Center Clipping Shape**.
8. Select **Sheet 01**. This will zoom and center on sheet 1.
9. Next, select **Sheet 02**.
10. Take a moment to familiarize yourself with this function.
11. Close Sheet Number Manager.
12. Click **Yes** to Save Sheet Number Changes.

### CLIP SHEETS

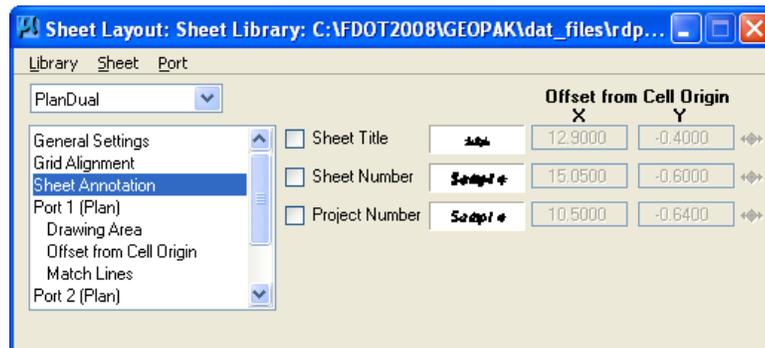
1. Click the **Clip Sheets** button . This opens Clip Sheets.
2. For the **Directory**, use the magnifying glass to browse to the project **Lighting** folder.
3. **Sheet Number Prefix** enter **Planlt**. The full file name will appear to the right of the prefix space.
4. For **Orientation**, select **Rotate View**. The options are Rotate View or Rotate Reference. This is a personal preference.
5. Set the **Sheets per File** to **1**.
6. Set the **Model** to **Active**.
7. **Sheet Range Begin** set to **01**.
8. **End** set to **04**.

**Note** The sheet range settings allow the user to pick a range of sheets to clip in case you do not want to clip all of the sheets at this time. This is useful as a check to make sure all of the settings are the way you want them before clipping a mass number of sheets.

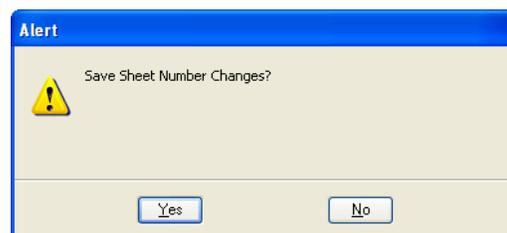


**Note** Labels and Annotations, this will be grayed out as seen in the figure above if the options are turned off in the sheet library. If they are active, it is not necessary to fill them in as you will use **Sheet Navigator** to populate the title block.

- The next figure shows the Sheet Library and the Sheet Annotation options toggled off.



- Click **Process Sheets**. This will start the sheet clipping process.
- Close Clip Sheets.
- Open **Plansp01.dgn** in the **Lighting** folder.
- Take a moment to review the sheet and reference files and level settings. If the settings are not the way you want them, go into the Motif file and fix them then go back into the **ClipIt01.dgn** file and re-clip the sheets.
- Close **Plan Sheet Layout**.
- Click **Yes** to save settings to Project Manager.



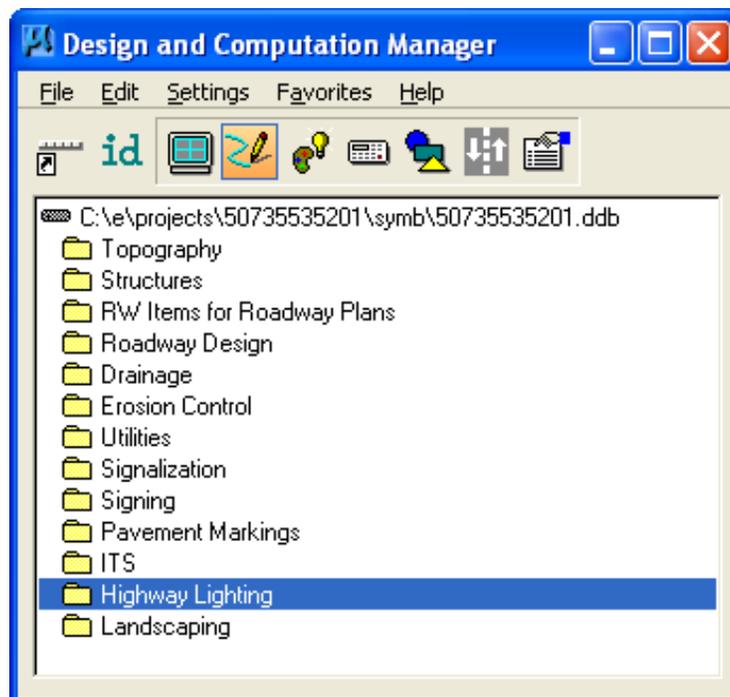
## EXPLORING D&C MANAGER

The D&C Manager uses a proprietary database that is provided by FDOT. When the FDOT software is installed, the latest D&C Manager database (DDB) is placed either on your server or on your local hard drive. For new projects, it is recommended that you copy the latest DDB file from the FDOT installation folder into your project SYMB folder and rename it to the eleven digit FIN number.

For the **50735535201** project used as the example in this manual, the **fdot2008.ddb** is renamed to **50735535201.ddb**. This allows the user to modify the database for specific parameters, and protect it from being overwritten by any future maintenance updates. For XM the latest FDOT **.ddb** file is in the **\FDOT2008\geopak\databases\** folder. The naming format is **fdot####.ddb** where **####** is the year of the **.ddb** file.

Once D&C Manager is opened during a design session it should remain open. The dialog can be minimized so that it is not obtrusive. This is especially important since this tool loads slowly because of the number of items in the database.

FDOT highly recommends that every user that works on projects becomes very familiar with D&C Manager and consider it a standard tool used by everyone whether to draw simple lines or design major interchanges. Many other applications and processes rely on the features that D&C Manager places on elements. If these features are not found then drawing cross sections, for example, would be nearly impossible.



This database has been set up specifically by FDOT to create elements with the correct level symbology according to FDOT CADD Standards. The **.ddb** file is set up with discipline folders called **Categories**. Inside of each Category are **Items** which are represented by one of (3) three icons.

**Categories** - The basic component of the hierarchical tree is the Category, which is represented by a folder icon. The **fdot2006.ddb** database categories are divided by discipline. The figure above shows the Categories with a description relative to their discipline. Inside these Categories you have either *subcategories* or *Items*. **Items** are represented by one of three icons as described below.

**Items** - The other database component is the item. An item could be a drafting item, a compute item or a default item. Items contain specific functions related to defined element symbology or quantity calculations. Items are represented by one of three icons:



**Default Icon** - These items are used to set drafting standards for MicroStation commands or 3PC routine.



**Drafting Standards Icon** - These items are used to set drafting standards for MicroStation commands or to draw COGO elements with annotation.



**Calculator Icon** - These items are used to set drafting standards for MicroStation commands or to draw COGO elements. The graphics can be tagged with a pay item attribute for additional stratification of features when running computations. Computation parameters are defined for these items.

## D&C MANAGER MENU BUTTONS

D&C Manager has a toolbar to quickly access different modes. The function of each button is summarized below. The tools used to create pavement marking plans will be covered in more detail later in this chapter.



### Switch To Toolbox Mode

D&C Manager is set up to work in two different modes, as a dialog box or a toolbox. This button activates the toolbox mode. This toolbox can be resized and docked. To change the display back to the whole dialog box, click the Switch to Dialog Mode button. The Place Influence check box is at the left end of the toolbox.



### Identify Item

The **Identify Item** button is used to locate the D&C Manager item that matches a selected MicroStation element previously drawn by the D&C Manager or elements drawn with Graphical COGO and the SMD file. If the item you ID does not match an item in the active database, a message appears in the status bar saying: **No matching database item**. This is a very useful tool for new users learning the hierarchy of the database.



### Display

The **Display** button filters the display of MicroStation elements in the design file so only the selected features are displayed, highlighted or hidden. This button expands Design and Computation Manager to show a collection bin. This collection bin is for controlling the display of multiple items at one time. To add items to the collection bin, double-click the item. This tool also opens a second tool box with four buttons as seen in the figure below.



From left to right the buttons are: **Normal Display**, **Highlight Selection**, **Hide Selection** and **Display Only Selection**. We will cover all of these in the exercises.



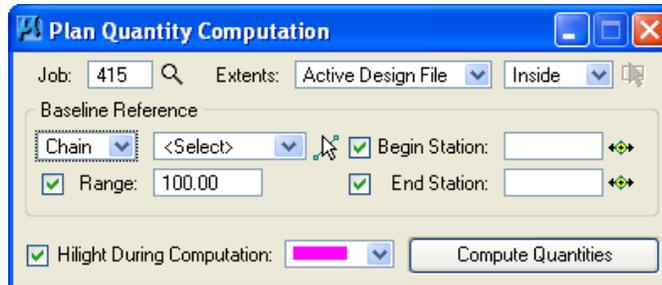
**Design** The **Design** button is used to plot COGO and MicroStation elements into MicroStation, with the defined symbology, using Draw Plan and Profile dialog or in conjunction with MicroStation commands when **Place Influence** is toggled on.



**Set** The **Set** button is used to set the symbology of previously drawn MicroStation graphic elements in accordance with the parameters of a selected item in the database. This is the tool you use if an element needs to be fixed to meet CADD standards.



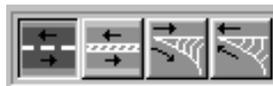
**Compute** The **Compute** button is used for tabulating quantities of items that have been placed as a Pay Item by use of the Design or Set mode or have been drawn in MicroStation and they match the search criteria of the ddb file. This tool also expands D&C Manager to show the collection bin; this allows you to process multiple pay items at one time. A second dialog box containing the computation results is opened after computation. Computing is covered later in this course.



**Shapes** The **Shapes** button uses plan view MicroStation graphics that defines an enclosed area to create a filled shape for computing area quantities. This tool will not be used in the creation of Pavement Marking Plans.



**Pavement Marking** This mode provides additional options for placing pavement striping and markings. This tool adds four additional tools to D&C Manager as shown in the figure below.



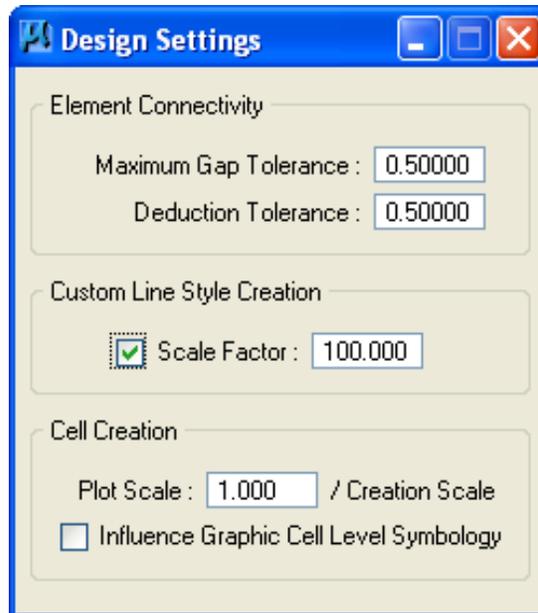
The four tools from left to right are: **Striping**; **Separation**; **Chevron Diverge** and **Chevron Merge**.



**Preference** This expands the toolbar to include four additional buttons to configure D&C Manager. These tools are also accessible from the **Edit** menu.

## DESIGN SETTINGS

There are some settings that need to be addressed before using D&C Manager to draw or compute items. These are the Design Settings loaded from the **Settings > Design** menu in D&C Manager.



**Maximum GAP Tolerance** If the distance between two specified elements in a MicroStation file is smaller than the **Max Gap Tolerance**, the software assumes the two elements intersect and act accordingly. If the distance is larger than the **Max Gap Tolerance**, GEOPAK assumes the two elements do not connect.

**Deduction tolerance** The **Deduction Tolerance** is utilized in the Compute mode. For example, if the pay item is specified for a curb line, and for each manhole (drawn in as a cell), there is a deduction of six feet. The origin of the cell does not have to be on the curb line, but must be within the deduction tolerance in order for the element to be recognized and the deduction to be made.

**Custom Line Style Creation** The Custom Line Style **Scale Factor** utilized during the Draw Plan & Profile dialog. Note this scale is only for custom line styles. Text and other labeling are controlled by the Label Scale on the Draw Plan & Profile dialog.

**Cell Creation** **Plot Scale** is utilized as a ratio with the **Creation Scale** within the setup of D&C Manager. If the Cell Creation Scale is 10 and the designer wants the cell twice as large as a cell placed with D&C Manager, utilize 20 as the Drawing Scale.

If a drawing scale is entered all subsequent cells that are placed from the D&C Manager are scaled accordingly if the item is set to use creation scale. When the user places a cell with place influence on, GEOPAK utilizes the drawing scale setting to compute an X & Y scale for use in the MicroStation place cell dialog. Why do this? Otherwise, the user has to key- the X & Y scale in the place cell dialog whenever you change the item to be placed in D&C Manager. This also allows you to use a metric ddb with English cells by using a different creation scale.

**Influence Graphic Cell Level Symbology** – When active, GEOPAK utilizes the symbology within the D&C Manager, ignoring the element symbology defined in the cell.

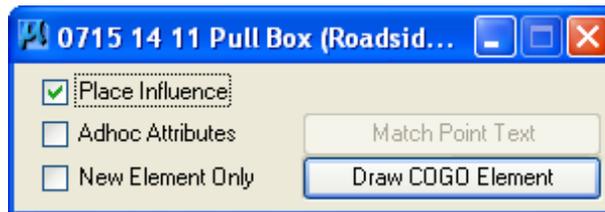
## DESIGN MODE

**Design Mode** is the default mode when the D&C Manager is opened. **Design Mode** is used for the following functions:

- Set Drafting Standards by use of the **Place Influence** command for the placement of MicroStation elements using MicroStation commands.
- Plot COGO elements into the design file according to the drafting standards set by the item's defined parameters.
- Place Adhoc Attributes on an element.

Whether an item is placed in the file by generic MicroStation commands or plotted from the COGO database, the items can be placed as pay items for future tabulation. The following sections will detail the procedure to set drafting standards for MicroStation commands and for the plotting of COGO elements.

By selecting **Place Influence**, you can use MicroStation commands to place elements utilizing the element attributes established for the currently selected item in the GEOPAK D&C Manager database. With some items, a GEOPAK attribute is placed with the element for calculating quantities.



When **Place influence** is selected the MicroStation level symbology is set. Any MicroStation command to draw a line, copy a line or place a cell is set to this symbology.



When the user is finished placing the elements for a selected item it is important to remember to turn off **Place Influence**.

It cannot be stressed enough how important it is that all users working on projects become familiar with D&C Manager and use this tool for everything they do. D&C Manager should be the first tool opened when MicroStation is started and the last tool closed when the work day is done.

## ADHOC ATTRIBUTES

An **Adhoc Attribute** is additional information about a particular element. Look at it as just another property for the MicroStation element. Example, a line has this fundamental data associated to it:

- Level
- Color
- Weight
- Style

By placing an **Adhoc** on the line you are giving that line additional information. That information could be a chain name, cross slope, profile name, thickness, etc. It is almost limitless as to what can be associated to an element with Adhocs. These **Adhocs** can be used by other applications downstream to generate quantities, draw cross sections or many other tasks.

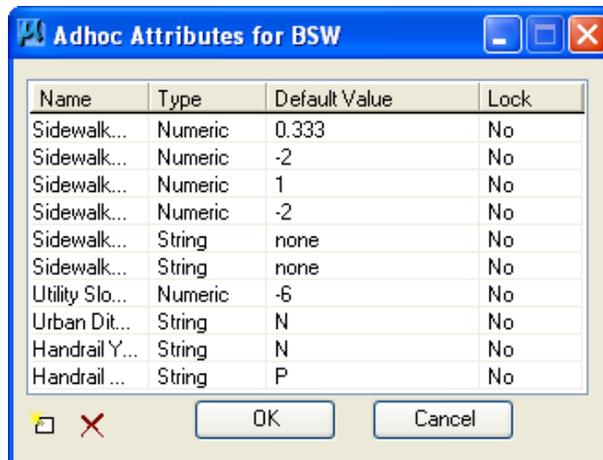
Some **Adhocs** are placed in the background and the user has no interaction with them for, example when a pavement message is placed with **D&C Manager** there is an Adhoc placed on the pavement message for computing quantities.

The next figure shows the **Adhocs** that are associated to an item from **D&C Manager**. These **Adhocs** are part of the item and are set by default. The user would never know these were set.



Name	Type	Default Value	Lock
0715 14 11	String	Pull Box (Roadside) ...	Yes
0715 14 11	Unit	EA	Yes
0715 14 11	Quantity	1.0	Yes
0715 4111	String	Lighting Pole Comple...	Yes
0715 4111	Unit	EA	Yes
0715 4111	Quantity	1.0	Yes

Other **Adhocs** are interactive meaning the user must fill in the parameters, an example of this would be when placing the back of sidewalk. There are several pieces of additional information that the user can add to the sidewalk line. This information is then used to draw the sidewalk in the cross sections.



Name	Type	Default Value	Lock
Sidewalk...	Numeric	0.333	No
Sidewalk...	Numeric	-2	No
Sidewalk...	Numeric	1	No
Sidewalk...	Numeric	-2	No
Sidewalk...	String	none	No
Sidewalk...	String	none	No
Utility Slo...	Numeric	-6	No
Urban Dit...	String	N	No
Handrail Y...	String	N	No
Handrail ...	String	P	No

**Adhoc Attributes** are comprised of three types of information that must be defined:

1. The **Name** is an identifying term used when GEOPAK is searching for a specific Adhoc Attribute.
2. The **Type** identifies the nature of the information, and can be set to various options: Numeric, String, Unit, Quantity, and Remarks.
3. The **Value** is the actual information to be used by GEOPAK, and is determined by the Type. For example, if the Type is set to Numeric then the Value must be a number.

## DRAWING LIGHT POLES

Generating the proposed lighting design is the responsibility of the engineer. It is also the engineer's responsibility to make sure an acceptable program is used to generate the proposed design. Currently FDOT uses AGI 32 when the design is done in-house. It is possible that the proposed design is done by the lighting manufacturer or Power Company; however, they will have to generate an acceptable report that is to be submitted to the FDOT for review. This report can be used by the in-house designers to create the lighting design files i.e. light pole spacing.

There are a couple of ways to approach drawing the Light poles into MicroStation, one is to import the elements from the AGI 32 lighting program into MicroStation and then place the light pole cell on top of the AGI 32 element. Another way is to reference the AGI 32 file into the lighting design file then place the light pole cell on top of the AGI 32 element. A third option is to take the report generated from AGI 32 or another acceptable lighting program which details the spacing of the light poles then use D&C Manager in conjunction with other GEOPAK tools to draw the light poles at the specified spacing.

## DRAWING PULL BOXES

Pull boxes are also an important part of the lighting plans. In this course the user will learn how to place the pull boxes in two different scenarios; one is at driveways or side streets where the conduit may change from underground to under pavement. The other is at the light poles, each proposed light pole has a pull box however these pull boxes are not always drawn in the plans due to plan clarity but they are quantified. The user will learn how to apply an Adhoc attribute on the light poles to include a pull box for automated quantities.

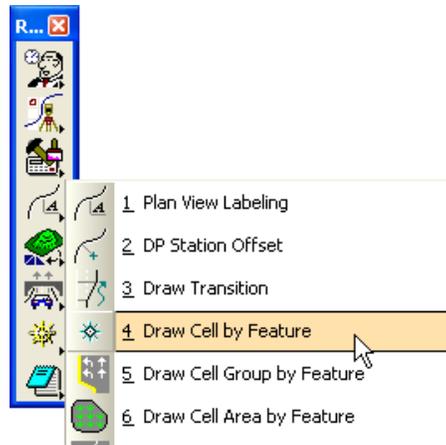
## DRAW CELL BY FEATURE

Another option the user has to draw the light poles is the **Draw Cell by Feature** tool in GEOPAK. This tool is best suited for placing one cell at a time.

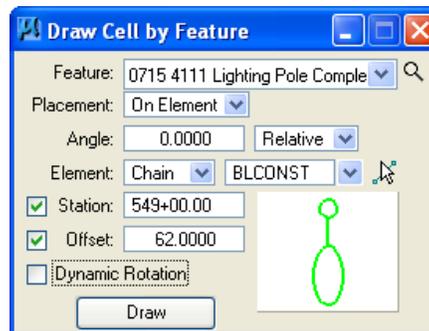
**Note** **Note:** When using the Draw Cell Group by Feature and/or Draw Cell by Feature tools, always ensure to load the correct Geopak Database (\*.ddb) as the tool will 'reset' the Database to the \*.ddb specified in the resource file every time the tool is closed and reopened. This Geopak Database (\*.ddb) may not be the database intended for use with your active project.

The **Draw Cell by Feature** tool can be loaded from the MicroStation menu option **Applications > Road > Plans Preparation > Draw Cell by Feature**.

This tool can also be loaded from the **Road Tools** palette.



The **Draw Cell by Feature** tool is very user friendly and requires little explanation.

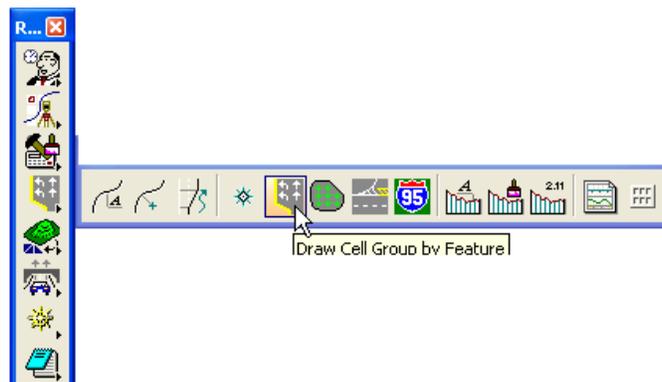


## DRAW CELL GROUP BY FEATURE

Another option the user has to draw the light poles is the **Draw Cell Group by Feature** tool in GEOPAK. This tool works well when placing multiple cells at one time.

The **Draw Cell Group by Feature** tool can be loaded from the Applications pull down **Applications > Plans Preparation > Draw Cell Group by Feature**.

This tool can also be loaded from the **Road Tools** palette.



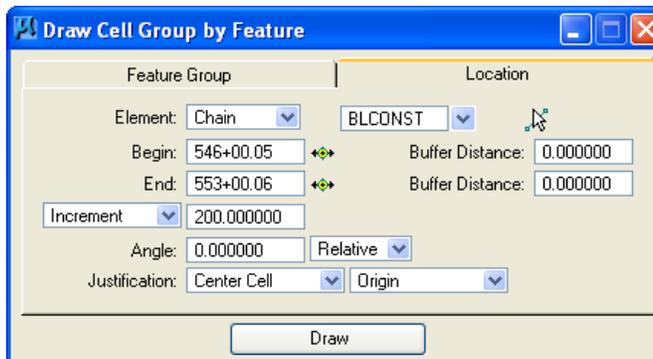
The dialog consists of two tabs:

**Feature Group** – defines the D&C Manager item to use which in turn selects the cell to be placed and the Offset from the selected element to place the item.



Based on the items that are checked you can place up to three different cells with this tool. The Magnifying glass next to each item allows the user to browse to D&C Manager and select the appropriate item which will attach the cell to be drawn. The Offset is the distance off of the selected DGN Element or Chain when drawing the cell.

**Location** – defines whether you use a DGN element or Chain, Begin and End stations and Spacing.



**Element** – This is either a GEOPAK Chain or DGN element. This functions just like the Draw Striping tool. The Begin and End fields will be populated with the appropriate data based on the element selected. They can be modified using the buttons or by keying in the value.

**Buffer Distance** – This is for setting where to start the first cell and end the last cell.

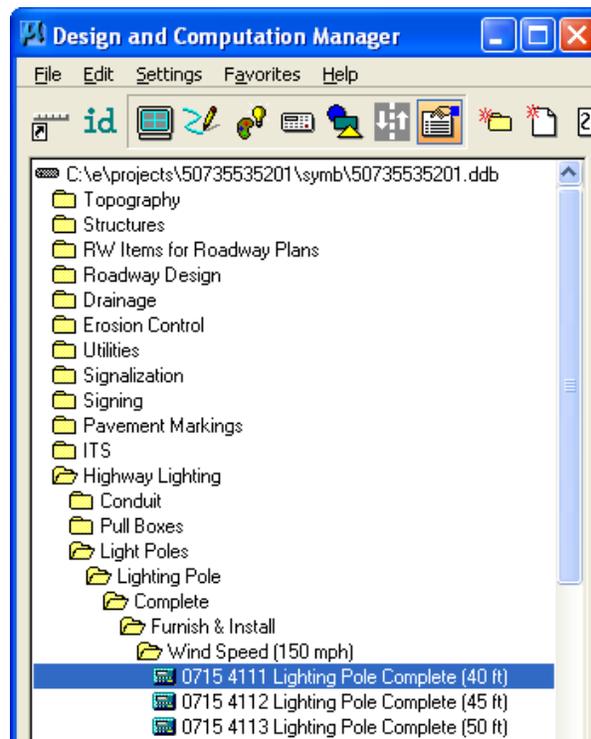
**Spacing** – There are several options available to set the spacing between the cells, they are:

- **Increment** – This is a set value between cells.
- **Even** – Evenly spaces the cells at user specified spacing, the buffer distances are ignored.
- **Max Spacing** – The location of the beginning and ending cell are determined, than a sufficient number of cells are placed in between, so that the distance between them is no more than the specified Max Spacing.
- **Once** – Only one set or cell is placed. The ending buffer distance is ghosted.
- **Each Vertex** – The origin of the cell is placed at each vertex of the selected element. The Begin and End and buffer distances are ghosted.

- **End Points** – The origin of the cell is placed at each end point of the selected element. The Begin and End and buffer distances are ghosted.
- **Angle** – If set to **Absolute** the angle is based on 0 degrees as horizontal. If set to **Relative** the cell is placed relative to the element selected.
- **Justification** - The justification can be based on the center cell (only option if only one row is placed), the upstream or downstream cell. Only those toggled on in the **Feature Group** are available for setting Justification.

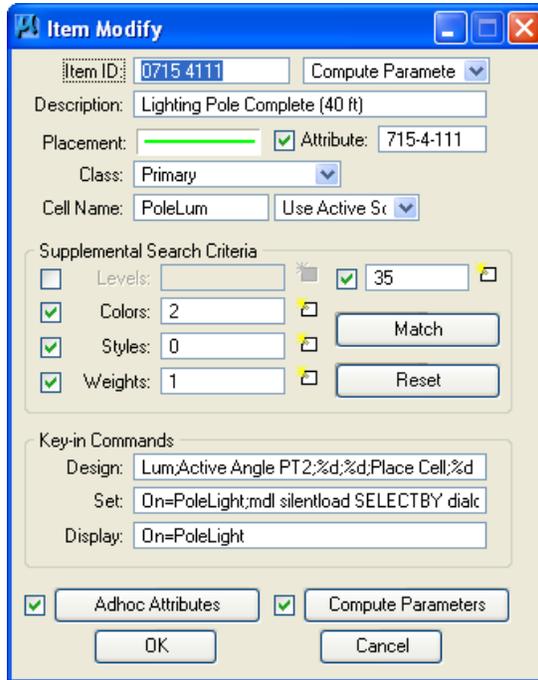
## REVIEW LIGHT POLE ITEM IN D&C MANAGER

Before placing the Light Poles it is important to understand how the Light Pole items are set up. The ddb file that FDOT delivers will have Adhocs assigned to the Light Pole item to account for a Pull Box. This allows Pull Boxes to be automatically quantified without having to draw them. The next figure shows the Light Pole item in D&C Manager.



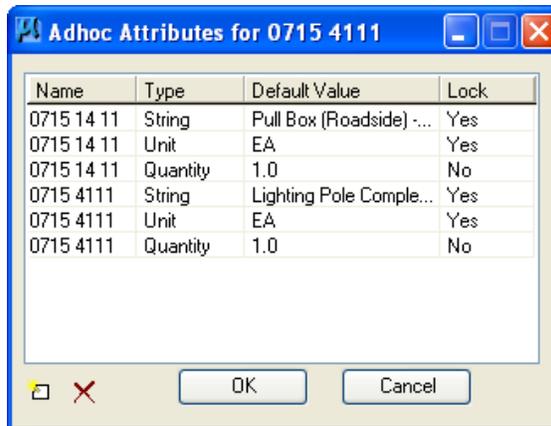
Reviewing the **Light Pole** item the user will notice:

- The Adhoc option is checked on.
- The Compute Parameters have been set to compute by Adhoc.



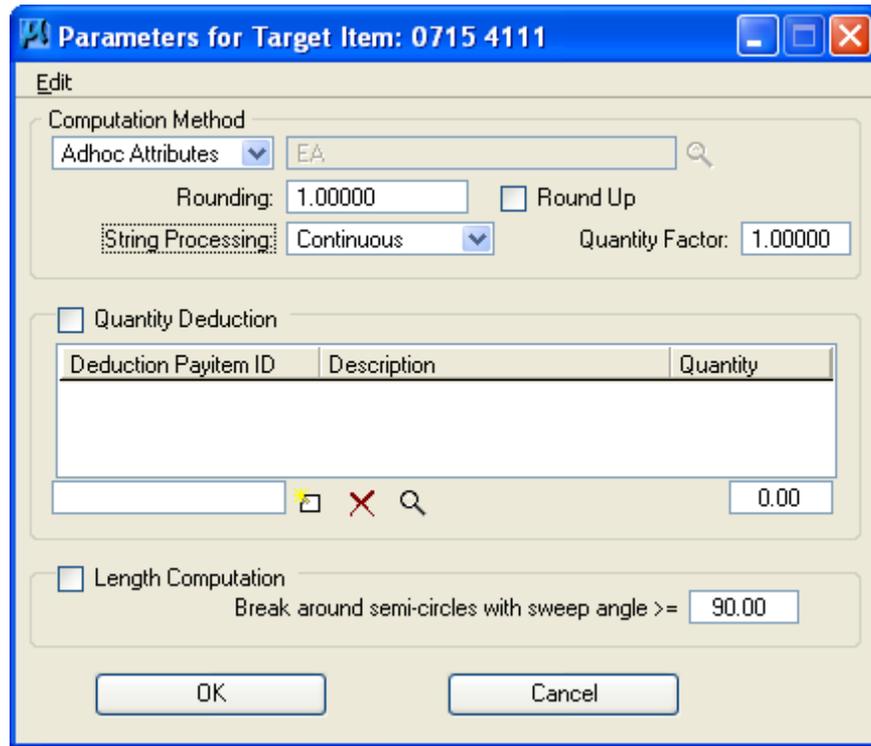
Reviewing the Adhoc Attributes the user will notice that there are two Adhocs assigned to the Light Pole.

- The Pull Box.
- The Light Pole.



The Light Pole has to be assigned as an Adhoc because of how the **Compute Parameters** are set. Notice in the figure above that the Unit for the Light Pole and Pull Box are set to EA. Even though the quantities are being computed using Adhocs, it will still break the items out as EA.

The next figure shows the **Compute Parameters**, notice that the **Compute Method** is set to **Adhoc Attribute**.



### Lab Exercise: Placing Light Poles using Draw Cell Group by Feature (Part 1)

In this exercise the user will place Light Poles at a specified spacing and offset. On a real project this spacing and offset information would come from the AGI 32 Lighting design software or another FDOT acceptable design method.

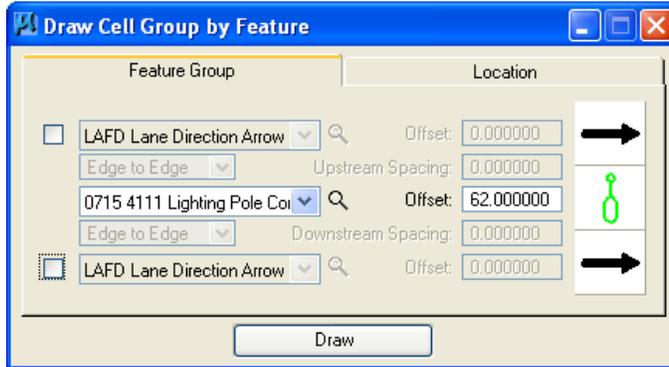
#### LOAD DDB AND SELECT LIGHT POLE ITEM

1. Continuing in **Dsgnlt01.dgn**, zoom to near station **530+00**.
2. From the Road Tools palette, click on the **Draw Cell Group by Feature** tool.



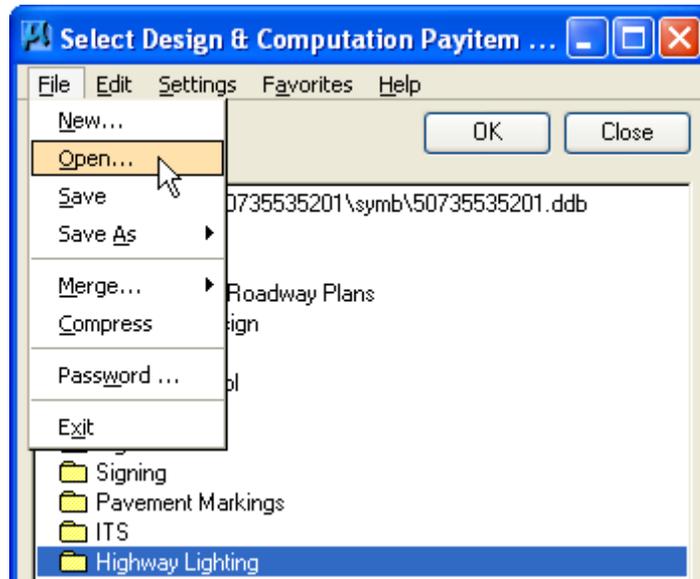
**Note** This tool takes several seconds to open as it is accessing the items in the ddb file.

- On the **Feature Group** tab click on the magnifying glass icon to open **D&C Manager**. This process will take several seconds as it loads the ddb file. Next the user will load the correct ddb file.

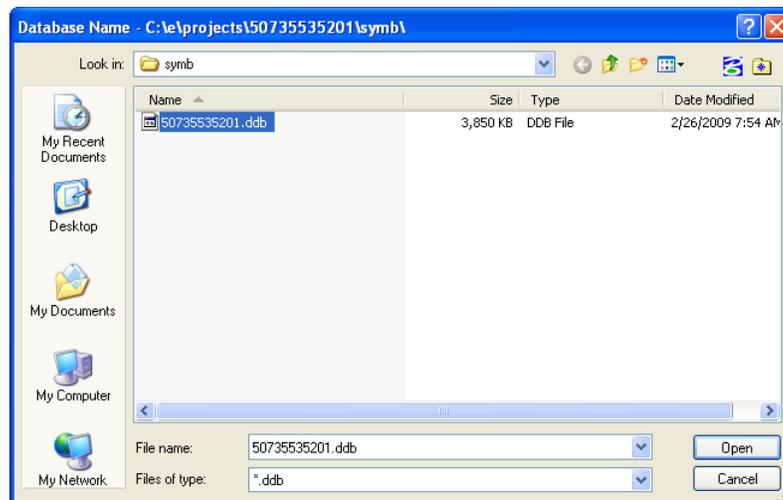


- From **Select Design & Computation Payitem**, click **File > Open**.

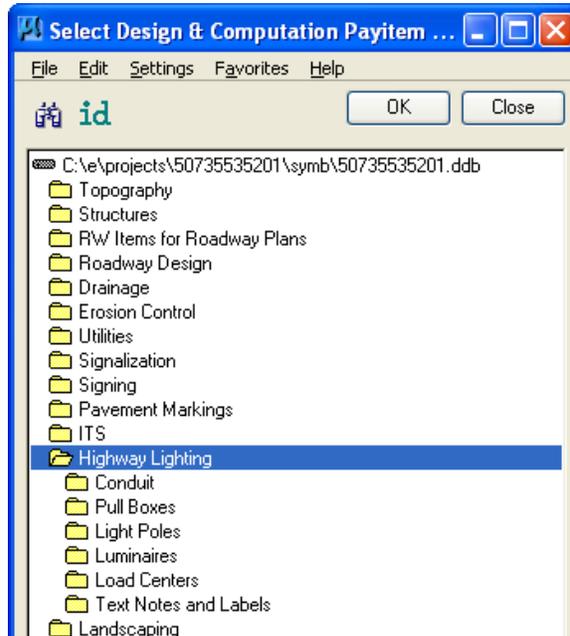
*Note* If the correct ddb file is loaded, skip the following steps and move on to step 7.



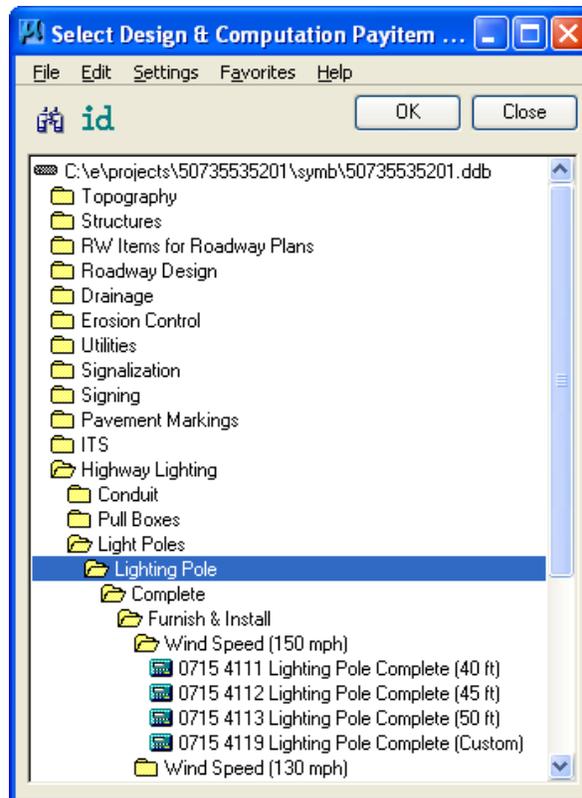
- Navigate to the **sybm** folder and select **50735535201.ddb**. This is the project ddb file; it is a copy of the current FDOT .ddb file renamed to the eleven digit fin number.



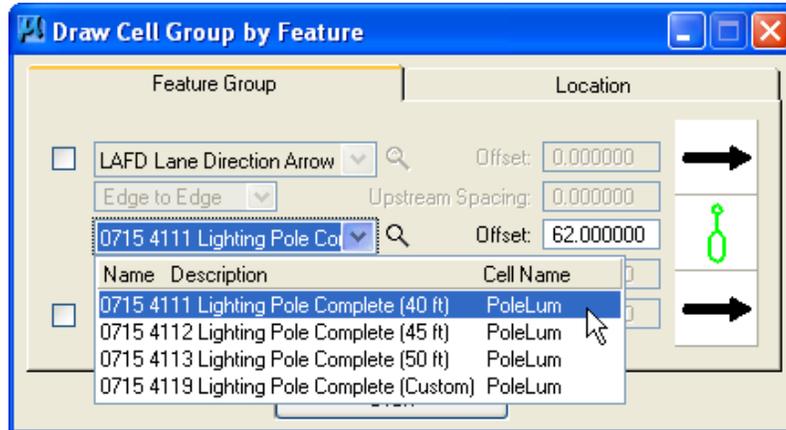
6. Click **OK**. This loads the selected ddb file.
7. From **Select Design & Computation Payitem**, navigate to and double-click on the **Highway Lighting** category. This expands the Highway Lighting category to show sub categories.



8. Navigate to and double-click on the **Light Poles** category.
9. Double-click on the **Lighting Pole** category. This shows the items for Light Poles.



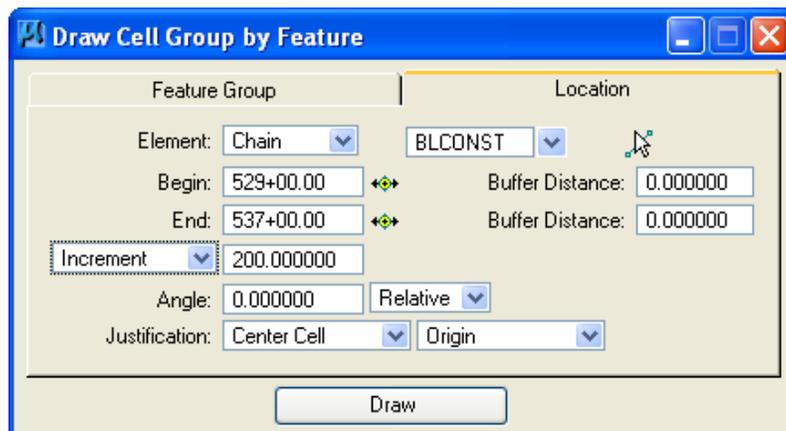
10. Select the Item **0715 4111 Light Pole Complete (40 ft)**. Make sure to pick the item with the calculator icon.
11. Click the **OK** button or double-click on the item. This will close **Select Design & Computation Payitem** and push these items over to the **Feature Group** tab.
12. On the **Draw Cell Group by Feature** tool click on the drop down arrow next to the magnifying glass and select the item **0715 4111 Light Pole Complete (40 ft)**.



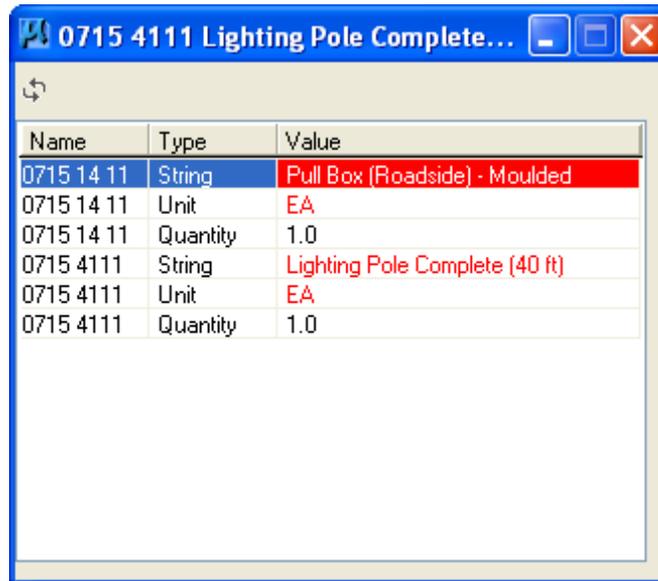
13. Set the **Offset** to **62.0**. This will be the offset from the BL of Construction to the center of the light pole. This information would come from the lighting design software.
14. Click the **Location** tab.

**LOCATION TAB**

1. Continuing in the **Location** tab of the **Draw Cell Group by Feature** set the **Element** to **Chain**.
2. From the chain drop down menu select **BLCONST**.
3. Set the **Begin** station to **529+00**.
4. Set the **End** station to **537+00**.
5. Begin and End **Buffer Distance** should be **0.00**.
6. From the drop down menu, set to **Increment** and the value to **200.00**. This value would come from the lighting design software.
7. The **Angle** should be **0.00** and set to **Relative**. Angle 0.00 is for the left side of the road, 180.00 would be for the right side of the road.
8. Set the **Justification** to **Center Cell** and **Origin**.



9. Click the **Draw** button. Next the user will place the cursor on the left side of the road.
10. This will open the Adhoc editor dialog. This allows the user to edit the default values if needed. Items that are in Red are not modifiable, they are locked.

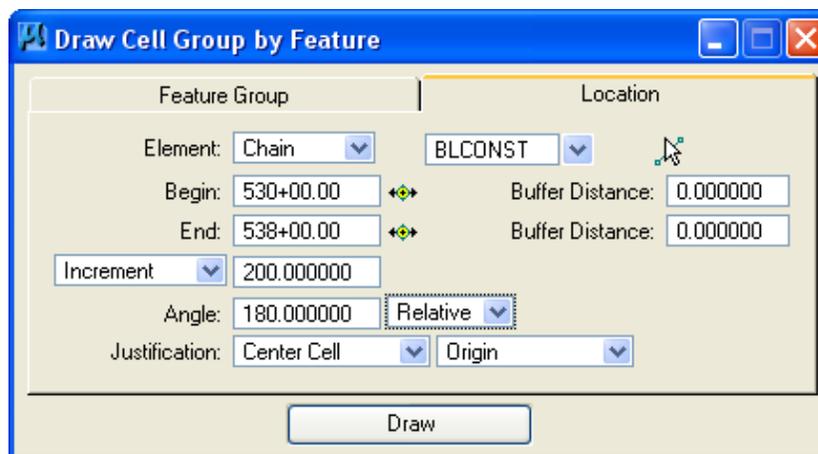


11. Move the pointer to the left side of the road and issue a **data point**. You should now see the light poles.

### **RIGHT SIDE OF ROAD**

In this part of the exercise the user will draw the light poles on the right side of the road. Stagger the placement of the poles by adding 100' to the begin and end stations.

1. Continuing in the **Location** tab of the **Draw Cell Group by Feature**, set the **Begin** station to **530+00**.
2. Set the **End** station to **538+00**.

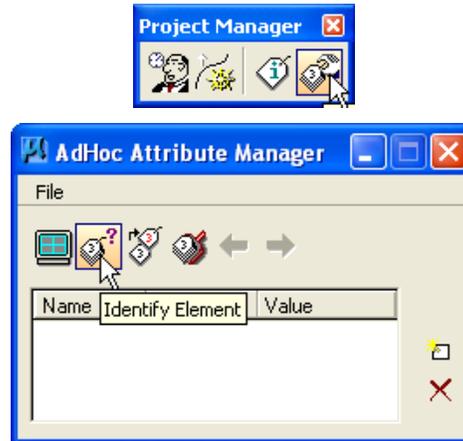


3. Set the **Angle** to **180.00**.
4. Click the **Draw** button. Next the user will place the cursor on the right side of the road.
5. Move the pointer to the right side of the road and issue a **data point**. You should now see the light poles staggered.
6. Close **Draw Cell Group by Feature**.

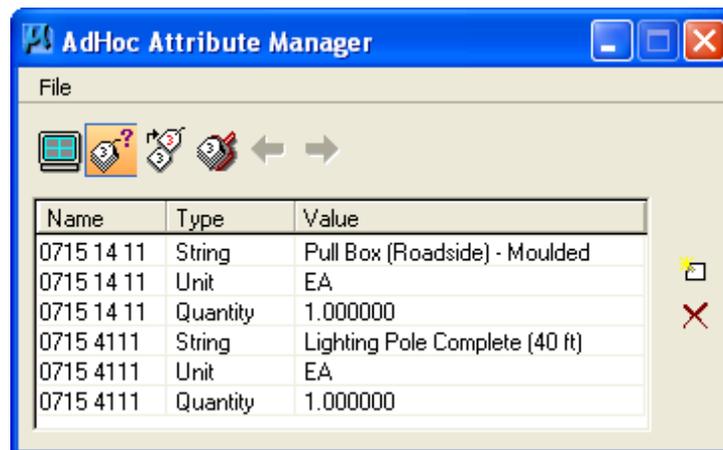
## REVIEW ADHOC ATTRIBUTES

GEOPAK's **Adhoc Attribute Manager** is used to view items placed with D&C Manager to see if any Adhocs have been tagged to elements and if there are Adhocs this tool will allow the user to edit the values if necessary.

The **Adhoc Attribute Manager** tool can be loaded from the Road tools palette.



Clicking on the question mark icon and then picking one of the Light Poles will display any Adhocs tagged to the selected element as shown next.



Users can be assured that any items that display in this dialog will quantify properly.

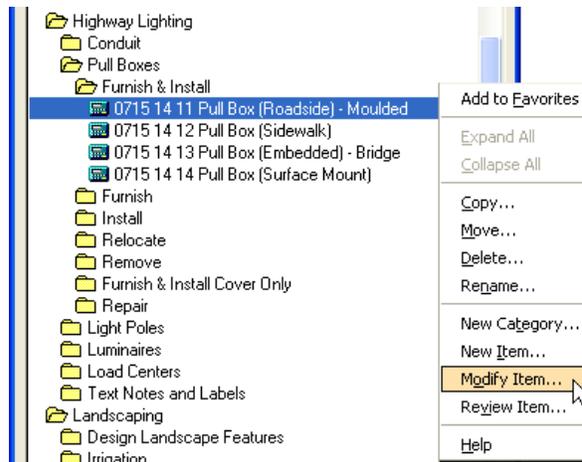
### Lab Exercise: Modify Pull Box Item in Design and Computation Manager

In this exercise the user will edit the pull box item to set the scale option to use active scale. If the Pull Box item is already set to **use Active Scale**, skip this exercise.

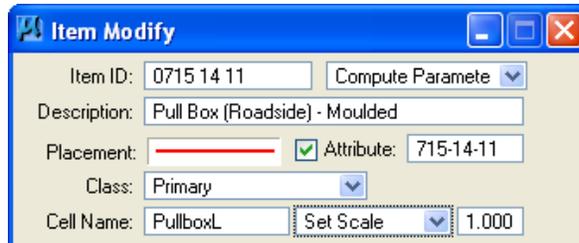
#### **MODIFY PULL BOX**

1. Open D&C Manager if it is closed.
2. From Design & Computation Manager, navigate to and double-click on the **Highway Lighting** category.
3. Double-click on the **Pull Boxes** category.
4. Double-click on the **Furnish & Install** category.

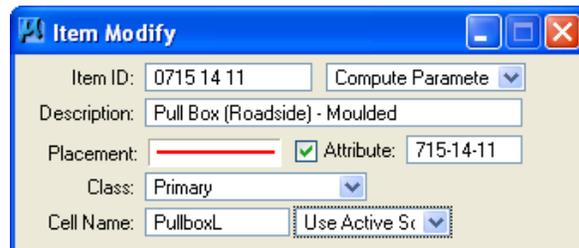
- Right-click on the item **0715 14 11 Pull Box (Roadside) – Moulded**.



- From the popup menu, select **Modify** item. This opens **Item Modify**.



- On the right hand side of the **Item Modify** dialog near the top click on the **Set Scale** drop down menu.
- Set the scale option to **Use Active Scale**.



- Click **OK**.
- In D&C Manager click **File > Save** to permanently save the changes.

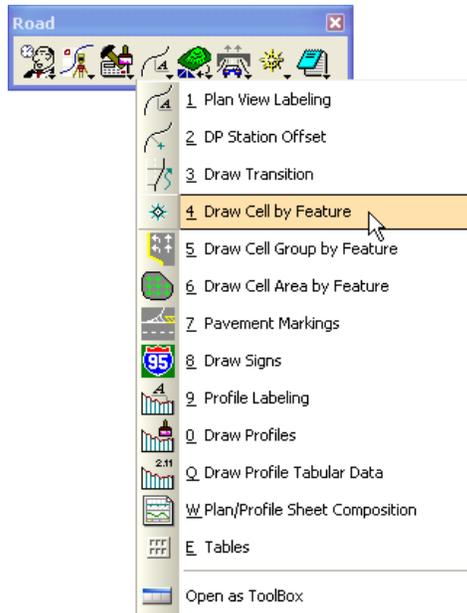
## Lab Exercise: Placing Pull Boxes

In this exercise the user will use the **Draw Cell by Feature** tool in conjunction with D&C Manager to place Pull Boxes at a driveway.

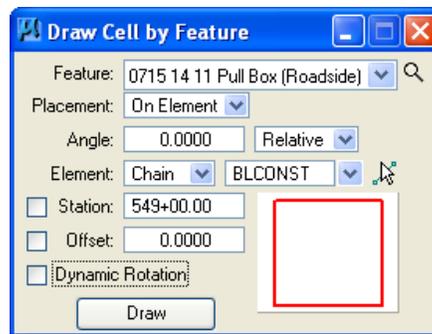
### **DRAW PULL BOX**

- Continuing in **Dsgnlt01.dgn**, zoom to station **545+00**.
- Open D&C Manager if it is closed.

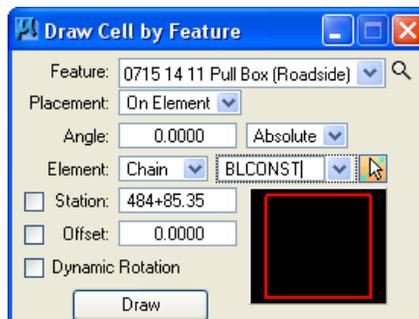
- From the Road Tools palette open **Draw Cell by Feature**.



- This opens **Draw Cell by Feature**.



- To set the **Feature** click on the magnifying glass icon. This opens **Select Design & Computation Payitem**. Make sure the correct ddb file is loaded.
- Navigate to and double-click on the **Highway Lighting** category.
- Double-click on the **Pull Boxes** category.
- Select the item **0715 14 11 Pull Box (Roadside) – Moulded**.
- Click **OK** or double-click on the item. This will close **Select Design & Computation Payitem** and push the pull box items into the **Draw Cell by Feature** dialog.
- On the **Draw Cell Group by Feature** tool click on the drop down arrow next to the magnifying glass and select the item **0715 14 11 Pull Box (Roadside) – Moulded**.

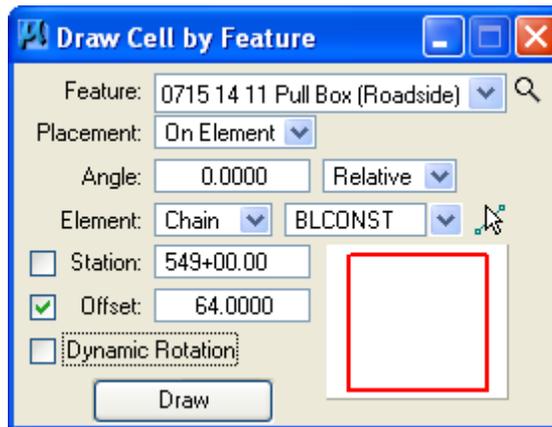


**DRAW CELL BY FEATURE CONTINUED**

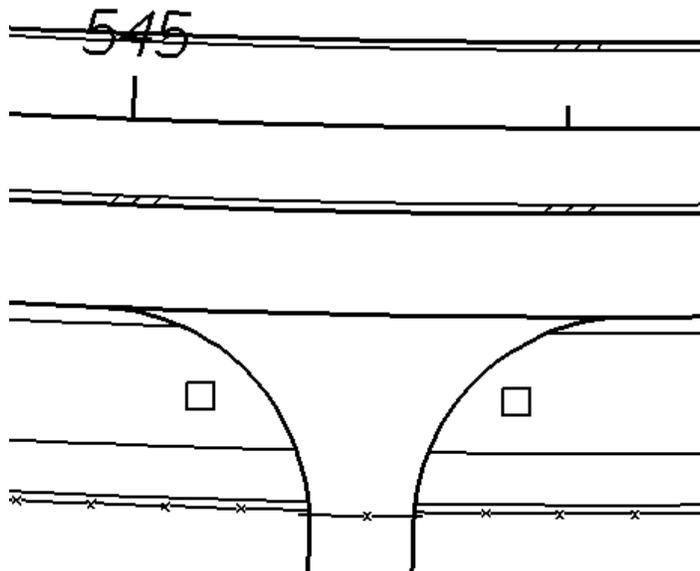
1. Set the **Placement** to **On Element**. The other option is **Point**.
2. Set the **Angle** to **0.00** and **Relative**.

**Note** Relative will rotate the cell dynamically as the user slides along the Chain or MicroStation element.

3. Set **Element** to **Chain**.
4. From the drop down menu, select **BLCONST**.
5. Leave the **Station** option **Un-Checked**, the user will set this dynamically.
6. For **Offset** check it on and enter **64.00**.
7. Leave **Dynamic Rotation** Un-Checked.



8. Click **Draw**.
9. Move the pointer to the right side of the road near the drive way and issue a data point. This will place the pull box in the design file.
10. Place a second pull box on the opposite side of the drive way. The figure below shows the two pull boxes next to the drive way.



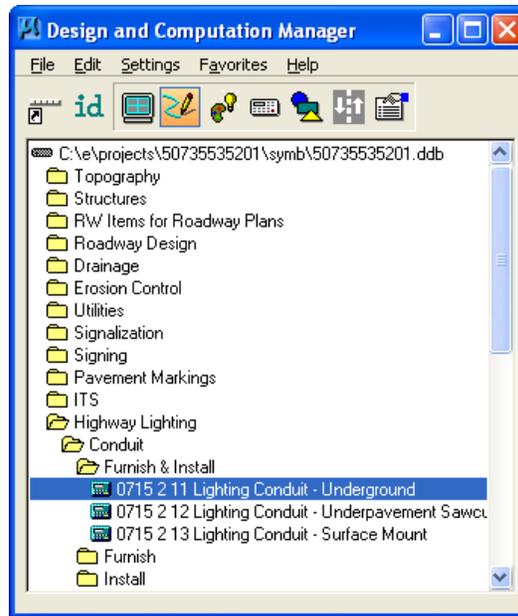
11. Close **Draw Cell by Feature**.

## Lab Exercise: Draw Conduit Between Light Poles

In this exercise the user will use **D&C Manager** to draw the conduit between the light poles and pull boxes.

### ***DRAW CONDUIT UNDER GROUND***

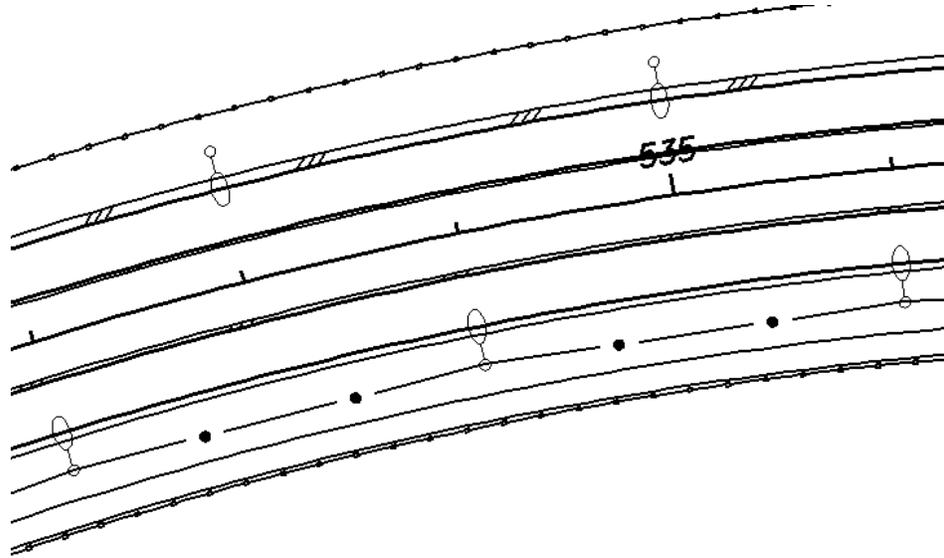
1. Continuing in **Dsgnlt01.dgn**, open D&C Manager.
2. Zoom to station **530+00** the right side of the road.
3. In D&C Manager, open the **Highway Lighting** category.
4. Double-click on the **Conduit** category.



5. Double-click on the **Furnish & Install** category.
6. Select the item **0715 2 11 Conduit (Underground)**.
7. Check on **Place influence** in the **Design** dialog.



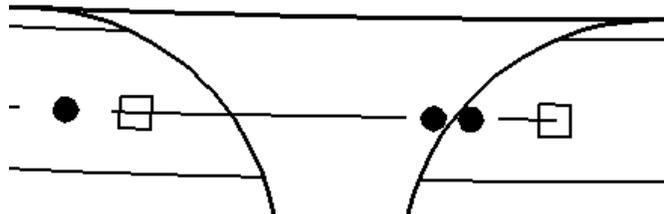
8. Using the MicroStation **Place Line** command, draw a line from the center of one **Light Pole** to the next. Set the **MicroStation** snap to **Origin** to make this task easier.
9. Repeat this process until you get to the last Light Pole on the right side of the road. The figure below shows the **Conduit** passing through the **Light Poles**.



10. To complete this part of the exercise, draw the last **Conduit** line from the last **Light Pole** to the center of the first **Pull Box**.
11. **Reset** to cancel the **Place Line** command.

#### ***DRAW CONDUIT UNDER PAVEMENT***

1. Continuing in **Dsgnlt01.dgn**, select the Item **0715 2 12 Conduit (Underpavement)**.
2. With **Place Influence** still on, draw a line from the center of one **Pull Box** to the center of the next **Pull Box**.

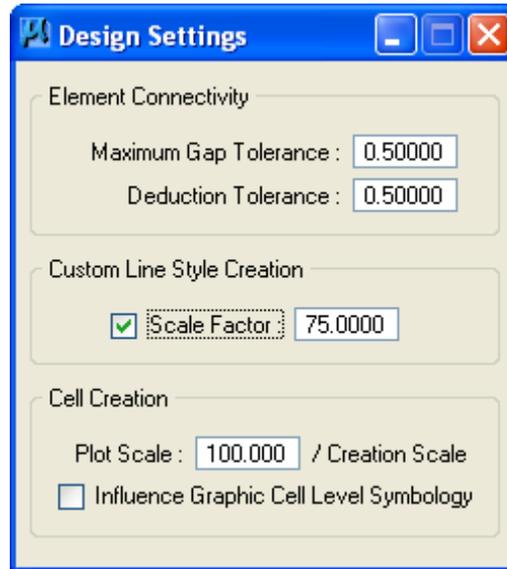


3. **Reset** to cancel the **Place Line** command. The figure above shows the **Conduit** line drawn under the driveway.
4. Turn off **Place Influence**.

## DESIGN SETTINGS

The custom line styles used to draw the **Conduit** lines in the previous exercise can be adjusted so that the line style displays graphically pleasing. At times it may be necessary to adjust the line style scale to get the symbols built into the line style to display.

To adjust the line style scale in D&C Manager the user would go to **Settings > Design** this opens the **Design Settings** dialog.



In the center of the **Design Settings** dialog is the item for **Custom Line Style Creation**. This setting controls how a line style is displayed when drawn with **D&C Manager**. The user should check on the **Scale Factor** and set the scale. In most cases the Plot Scale will work but in some it may be necessary to adjust this value as with the **Conduit** on a 100 scale plan sheet, a scale of **75.0** gives a better representation of the **Conduit** line style. Changing this value will not affect the quantities; however, it is very important that the user communicate any changes to all design team members for consistency.

## PLAN LABELING

GEOPAK delivers a tool, **Plan View Labeler**, to aid in the placement of plan labels. These labels can be simple callouts or complex blocks of text with stations and offsets built into them. It is possible to create custom labels for those pieces of text that are placed repeatedly into a style file similar to a library. FDOT delivers style files with custom labels already created.

Labels created with labeler can be synced with D&C Manager for level symbology. This resolves issues with inconsistency between users. Labels can also be created at a scale of 1 to 1 so that they will work on any scale sheet.

Labels can be created with leader lines and arrow heads as part of the custom label. The arrow heads can be terminators delivered by FDOT or the standard arrows built into the labeler. Again this makes for very consistent plan labeling if all users use the same labels.

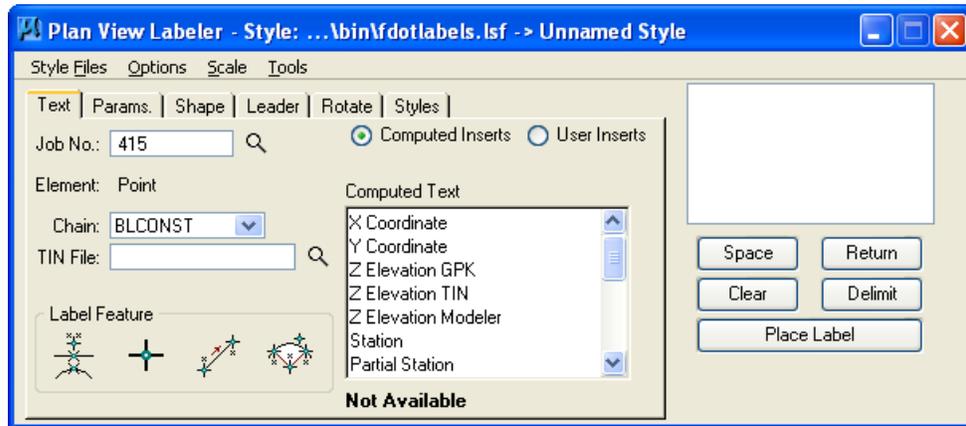
Plan View Labeler can be launched from the Road Tools palette.



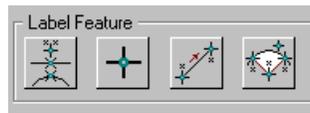
Or from the Applications menu **Applications > GEOPAK ROAD > Plans Preparation > Plan View Labeling**.

The general work flow of the Labeler is:

- Open Labeler.
- Open a Label Style File or .lsf.
- Select a custom label.
- Create a custom label.



The Label Feature buttons on the Text tab are discussed next.



**Select GEOPAK or MS Element** – Prompts the user to select the GEOPAK or MicroStation element. From this selection the user can retrieve the geometry and place that information in MicroStation.



**Data Point Location** – Prompts the user to snap to or issue a data point in the design file. Usually used when placing station and offsets.



**2 GPK Point Line** - Works with visualized points from COGO. When the points are selected, a display line is drawn between the points and a circle is placed at the midpoint. The bearing of that line is displayed and can be placed in MicroStation.



**3 GPK Point Arc** - Works with visualized points from COGO representing the P.C. and P.T. of the curve. When the points are selected, a display curve is drawn and the user is prompted to enter the chord direction point, which is identified dynamically. Now any element of the curve's geometry can be displayed or placed in MicroStation.

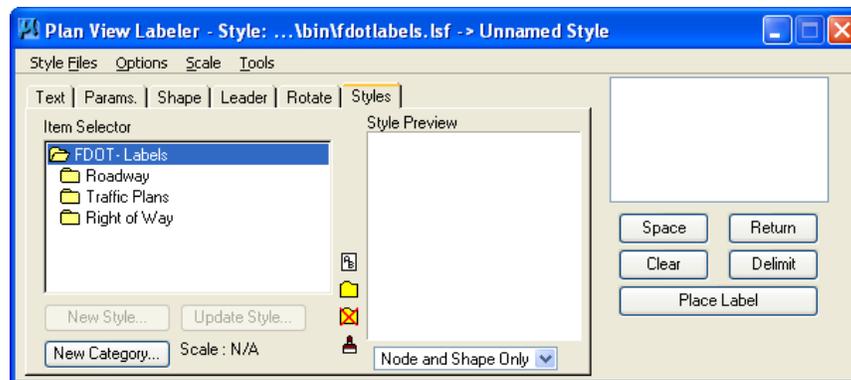
## Lab Exercise: Create a Custom Text Label

In this exercise the user will create a custom label for the Light Poles as shown in the next figure.

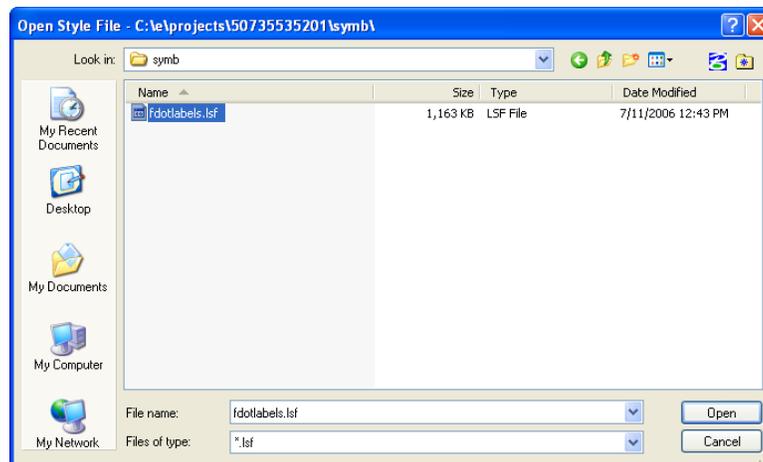
**STA. 530+00**  
**POLE NO. 1 CKT. A-1**

### OPEN PROJECT LSF FILE

1. Open **Dsgnlt01.dgn** in the **Lighting** folder.
2. Open **Project Manager**.
3. Zoom to station **530+00**.
4. Rotate the view by 2 point; use the station tick marks **529+00** and **530+00** as the 2 points.
5. Open **Plan View Labeler**. Either from the Road Tools palette or from the Applications menu.



6. Open the **Styles** tab. Next the user will open the **lsf** file located in the project **sybm** folder.
7. From the **Style Files** pull down menu, select **Open**.
8. Navigate to the project **sybm** folder and select **fdotlabels.lsf**.



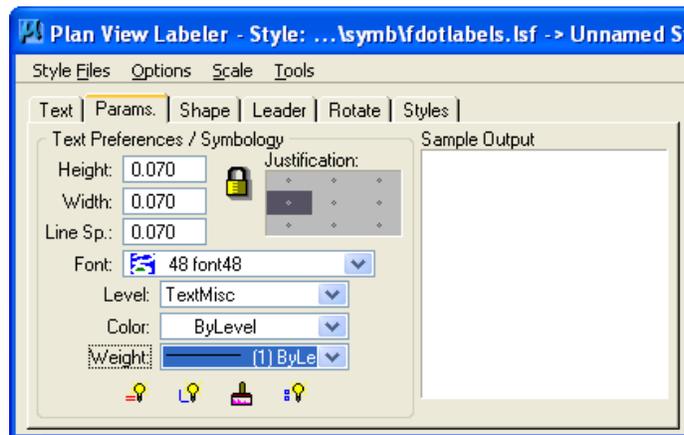
9. Click **Open**. This loads the lsf file in the project folder.
10. In the **Styles** tab, double-click on the **Traffic Plans** category. This expands the category and shows the standard labels delivered by FDOT.

### PARAMS TAB

- Continuing in **Plan View Labeler**, select the **Scale** pull down menu select **Change Scale**. This opens **Scale Style**.



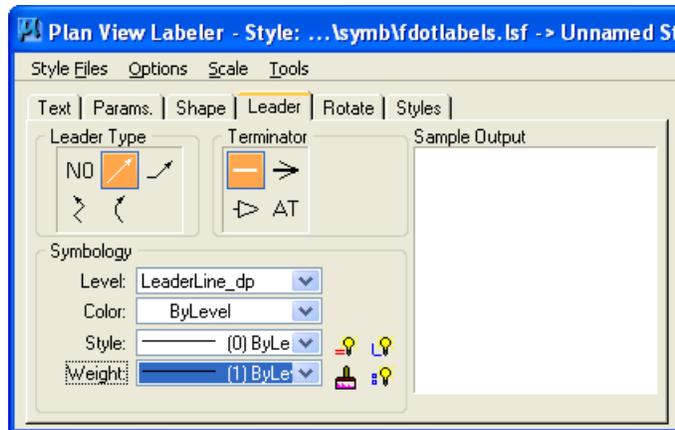
- Set the **New Scale** to 1.00. This allows the user to create a custom label that can be used at any scale.
- Click **OK**.
- Open the **Params** tab. This is where the user will set the text size and symbology.
- Click on the **Paddle Lock** icon to lock it.
- Set the text **Height** to **0.07**. The **Width** automatically matches the height.
- Set the **Justification** to **Left Center**. Click on the nodes to adjust this.
- Set the Font to **48**.
- Set the **Level** to **TextMisc**.
- Set the **Color** and **Weight** to **ByLevel**.



- Open the **Shape** tab.
- Select the first option which is **No Shape**.

### LEADER TAB

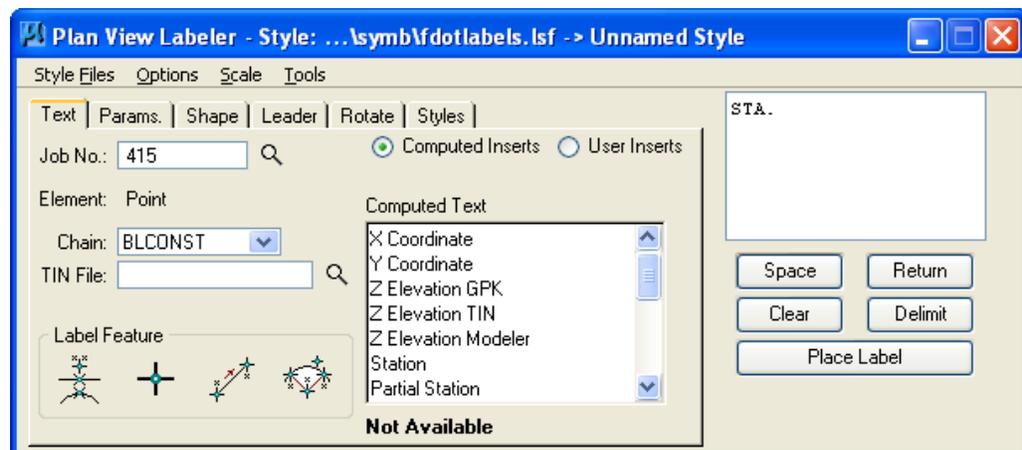
- Open the **Leader** tab.
- Set the **Leader type** to **One Point Leader**.
- Set the **Terminator** to **No Terminator**.
- Set the **Level** to **LeaderLine\_dp**.
- Set the **Color** and **Weight** to **ByLevel**.



6. Open the **Rotate** tab.
7. Set the **Current Angle** to **0.00**. This is not critical at this point as the user can change this as the labels are being placed. Setting this now will make the preview look better.

### TEXT TAB

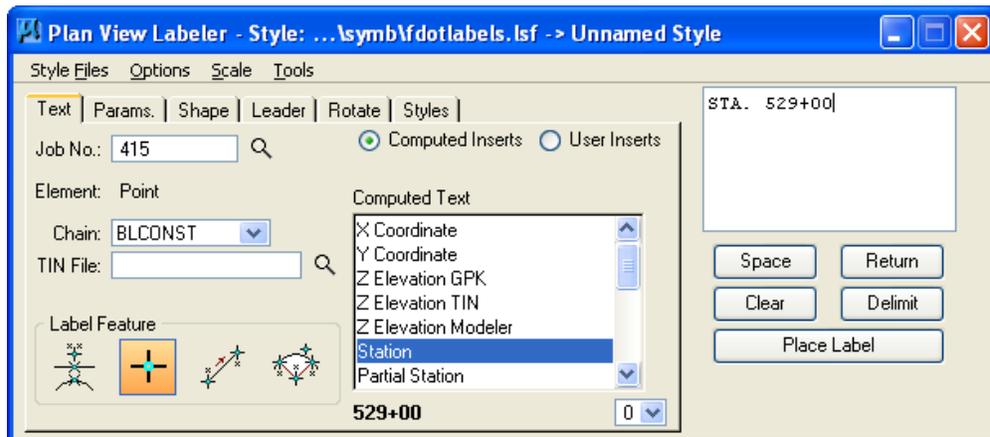
1. Open the **Text** tab.
2. Make sure the **Job No.** is set to **415**. Using **Project Manager** will insure this.
3. Set the **Chain** to **BLCONST**. Use the drop down menu.
4. In the **Key In** field of the Text tab, type in **STA**.
5. Click the **Space** button. This is located under the Key In field.



6. In **Label Feature** pick **Data Point Location**. This is the second icon.
7. Set the snap option to **Origin** and snap to the first light pole on the left side of the road.
8. In **Computed Text** pick **Station**. Do Not double-click on Station.
9. Set the Station rounding to **0**.

**COMPLETE THE LABEL**

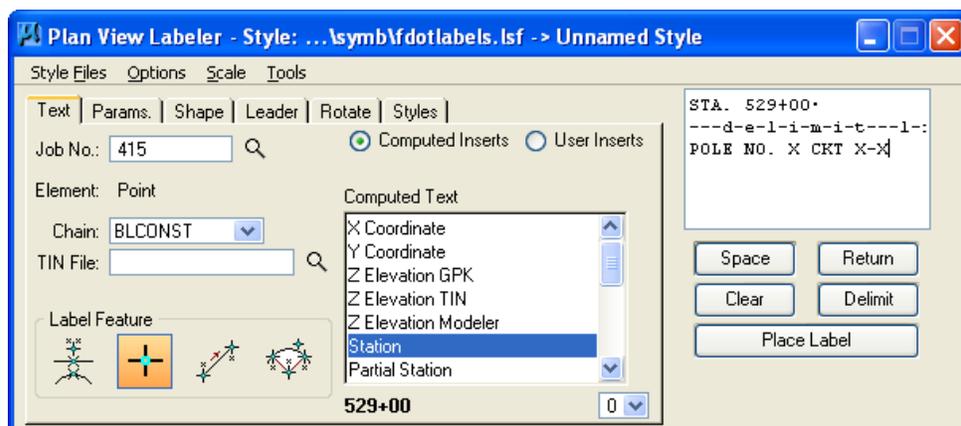
- Now, double-click on **Station**. This pushes the station text over to the Key in field.



- Click the **Delimit** button. This is under the Key In field. This will automatically draw the leader line between two lines of text in the label.

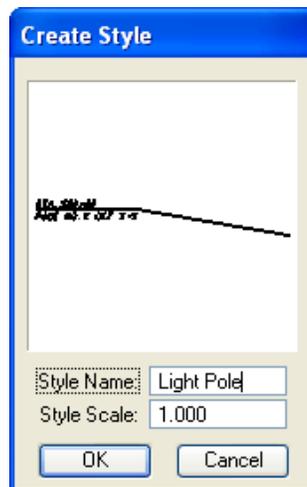
**Hint** It is very important that the user use the Space button when building a label, not the space bar on the key board.

- In the Key In field, type in the word **POLE**.
- Click the **Space** button.
- Type in **NO**.
- Click the **Space** button.
- Type in the letter **X** This is a place holder which will be edited at the time the label is placed.
- Click the **Space** button.
- Type in **CKT**.
- Click the **Space** button.
- Type in **X-X**. This is a place holder which will be edited at the time the label is placed.



**PLACE THE LABEL**

1. Zoom in very close to the center of the light pole. This is necessary because the label being placed in this step is at a scale of 1: 1. This is a temporary label.
2. Click the **Place Label** button.
3. Move the cursor near the light pole and issue a **Data Point** to place it.
4. Move the cursor left and right along the label, notice how the hinge point changes as the cursor gets close to the ends of the label.
5. Issue a **Data Point** to connect the leader line to the light pole and complete the label placement.
6. Next, the user will save this new custom label into the lsf file.
7. Open the **Styles** tab.
8. Make sure the **Traffic Plans** category is selected.
9. Click **New Style**. This opens **Create Style**. The user must place the temporary label before this option is available.
10. Enter the **Style Name Light Pole**.
11. Leave the **Style Scale** to **1.0**.



12. Click **OK**. This adds the new style to the **Item Selector** list.
13. Click the **Styles Files** pull down menu and select **Save**.
14. In MicroStation delete the label just placed; this was only temporary.

## Lab Exercise: Place Custom Text Label

In this exercise the user will place the new custom label on the light poles.

### **PLACE LABELS**

1. Click the **Clear** button. This is located under the Key In window.
2. In the **Item Selector**, select the new style **Light Pole**.
3. Double-click on the style or click the **Blue** check mark icon.
4. On the **Scale** pull down menu, select **Change Scale**.
5. Change the **Scale** to **100.00**.
6. Click **OK**.
7. Zoom out so the label will fit in the view.
8. In the Key In window, edit the Pole Number to be **POLE NO. 1**.
9. Edit the **Circuit** to be **CKT. A-1**.
10. The Station is still set from when the label was originally placed.
11. Click **Place Label**.
12. Move the Cursor to the left and above the light pole and issue a **Data Point**.
13. Move the cursor to the right of the label and issue a **Data Point**. This completes the label placement.

### **LABEL REMAINING POLES**

1. Pan to the second light pole on the right side of the road.
2. Open the **Text** tab.
3. Click the **Data Point Location** button.
4. Snap to the **Origin** of the second light pole. Notice the Station dynamically changes.
5. In the Key In window, edit the Pole Number to be **POLE NO. 2**.
6. Edit the **Circuit** to be **CKT. A-2**.
7. Click **Place Label**.
8. Move the **Cursor** to the left and below the light pole and issue a **Data Point**.
9. Move the **Cursor** to the right of the label and issue a **Data Point**.

STA. 530+00  
POLE NO. 2 CKT. A-2

10. Repeat this process on the remaining light poles.
11. Close **Plan View Labeler**.

### CREATING THE POLE DATA AND LEGEND SHEET

The Pole Data and Legend Sheet contain details and notes pertaining to pole placement and construction. This sheet provides a listing of each pole by pole number. The following information is also provided for each pole:

- Circuit Number
- Roadway Station and Offset
- Arm Length
- Luminaire Wattage
- Mounting Height
- Pay Item Number

FDOT Menu bar provides a tool for the creation and placement of this sheet. The process for developing this sheet is:

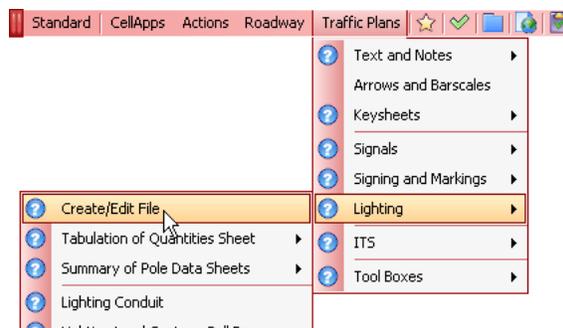
1. Create the **Pldtlt01.dgn** file. This is the standard MicroStation file for the Pole Data and Legend Sheet.
2. From FDOT Menu bar, place the Pole Data and Legend Sheet.
3. From FDOT Menu bar, open and edit the excel spread sheet for the Pole Data and Legend Sheet.
4. From FDOT Menu bar, place the excel data into the Pole Data and Legend Sheet.

### Lab Exercise: Placing the Pole Data and Legend Sheet

In this exercise the user will create the Pole Data and Legend Sheet design file and place the standard sheet and data into the file.

#### CREATE THE MICROSTATION DESIGN FILE

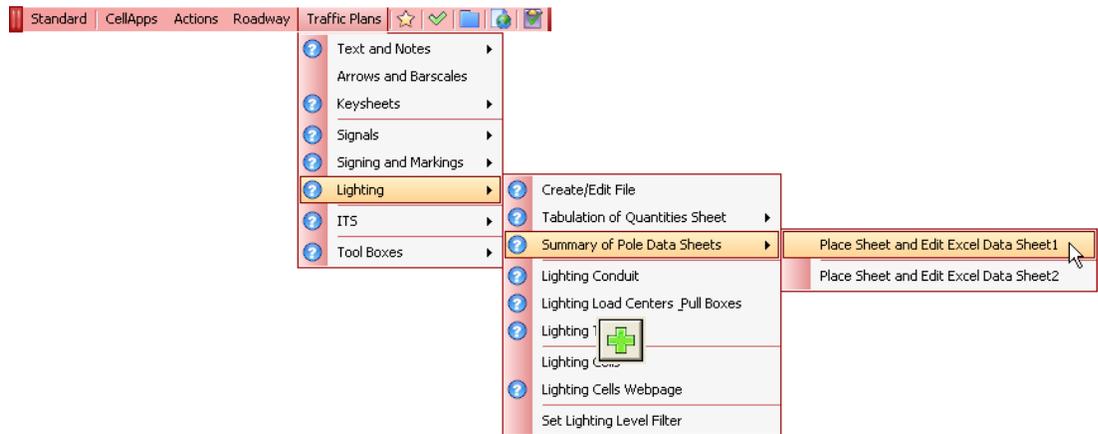
1. From the FDOT Menu bar, select Traffic Plans > Lighting > Create/Edit File.



2. From **File Type**, select **Pole Data Sheets**. This populates the **Output File** name.
3. Click **Create**.
4. Click **OK** to acknowledge the file creation.
5. Click **Open DGN**.
6. Click **OK** on the **Create File/Project** dialog.
7. Click **OK** on the **Set/Update Plot Scale** dialog. The default scale of 50 is fine for this sheet.

## PLACE POLE DATA SHEET

- From Menu bar, select **Traffic Plans > Lighting > Summary of Pole Data Sheets > Place Sheet and Edit Excel Data Sheet 1**. Notice there is options for two Pole Data Sheets.



- In the **Edit Excel Summary Box** dialog, select the  icon to place the sheet.
- Issue a **Data Point** in the drawing to place the sheet.
- Perform a fit view.
- From the **Edit Excel Summary Box** select the Summary of Pole Data (Sheet 1) and then the Edit Input icon . This opens Excel.
- Populate the excel spreadsheet as shown below. To save time only fill in the data for two poles.

	A	B	C	D	E	F	G	H	I	
1										
2										
3		POLE DATA								
4										
5		POLE								
6		NUMBER	CIRCUIT	STATION	DIST.	UMINAIR	MOUNTING	POLE SETBACK	PAY ITEM	
7					OR ARM	WATTAG	HEIGHT			
8	X	1	A-1	529+00 LT	10'	250	40'	20'	715-4-111	
9	X	2	A-2	530+00 RT	10'	250	40'	20'	715-4-111	
10	X									

- Save the excel file, Do Not close the excel file.
- In **MicroStation** zoom in on the upper left corner of the Pole Data Sheet.
- From **Edit Excel Summary Box** select the **Place Text** icon. 
- Snap to the end of the line under the text **POLE NO.** and issue a **Data Point**.
- Close the Excel file.

**Hint** If the data needs to be edited and replaced, In MicroStation delete the data, edit the excel file, save it and then place the data in MicroStation as before.

**Note** Notice in the MicroStation file under the Legend that there are several data fields that should be filled in using the MicroStation **Fill in Single-Enter Data Field** tool.

**FILL IN TITLE BLOCK**

1. From the FDOT Menu bar, open **Sheet Navigator**.
2. Populate **Sheet Navigator** as shown in the next figure.

Sheet Navigator

File Edit Renumbering / Multi-Edit Revisions Settings Help

Navigator Sheet Edit

Sheets  
undefined

Sheet Number: L-3  
Financial Project ID 1: 507355-3-52-01  
County 1: VOLUSIA  
Road Number: SR 415  
Financial Project ID 2:   
County 2:   
Sheet Description: POLE DATA AND LEGEND  
Project Description:   
Sheet Type: 01-PLAN SHEET

Revision: 00  
 Allow Plot  Obsolete  
 Component Override

Sheet Component: UNKNOWN

Digital Signature Note: Standard

Add Engineering Record Cell  
View Engineering Record Text  
View Boundary Coordinates  
Save Sheet Save All  
Refresh Sheet Reload All

\*Note: Fields in red are saved as attribute data only, because no matching text elements were found

3. Click the **Save** button. This fills in the title block and adds the digital signature note for electronic delivery.
4. Close **Sheet Navigator**.



# 5 QUANTITY MANAGER

## CHAPTER OBJECTIVES

In this chapter the following topics will be covered:

- Import Project Properties from Trns\*Port
- Generate quantities and export to Quantity Manager
- Generate CSV file in Quantity Manager
- Export Quantities for Trns\*Port
- Place quantities on Tabulation of Quantities Sheet

## INTRODUCTION

This section covers applications used to produce quantities and then place the quantities on a plan sheet or computation book. Being able to produce quantities based on your design elements should be your ultimate goal. Producing automated quantities shows the users knowledge of the software and best design practices.

## GENERATE QUANTITIES

Quantities are generated from the elements designed and drawn in MicroStation using D&C Manager. All of the elements drawn in the previous exercises are now able to be automatically quantified because D&C Manager was used to draw the elements.

D&C Manager has the ability to generate individual sheet quantities or the entire project at one time. D&C Manager can export to a CSV file that can be imported into the Tabulation of Quantities file or it can export to a data base that can then be opened with Quantity Manager.

Quantity Manager is a standalone program that can organize and manipulate the data created by D&C Manager and quantities generated manually then create reports which can be used to produce an electronic comp book. Quantity Manager can also export the quantities to Trns\*Port which takes away the need to have a user manually enters all of the project pay items. This task alone can save hours over the lifespan of a project, not to mention removing the possibility of human error. Also, Quantity Manager can export to a CSV file which can then be used to create the Tabulation of Quantities sheet.

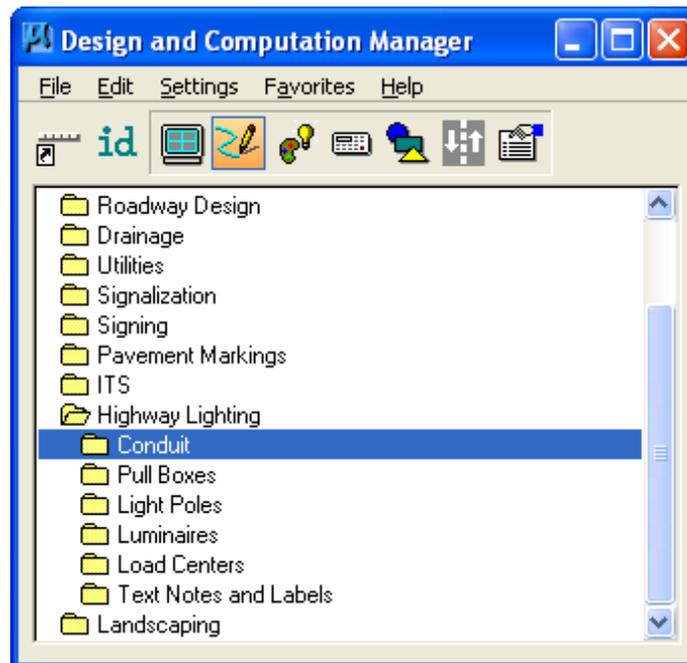
Lighting Plans quantities are considered a sheet quantity which means there is a Tabulation of Quantities sheet in the plan set that breaks down the quantities per sheet. For a roadway project the user would not produce sheet quantities but rather you would create the quantities on a project basis and then using Quantity Manager, create Comp Book forms.

### *QUANTITIES TO TRNS\*PORT WORKFLOW*

1. Generate quantities using D&C Manager then export to a database file.
2. Export the project properties .xml file from Trns\*Port. This can be done any time after the notice to proceed has been executed.
3. Open the project in Quantity Manager; this is the .mdb file you created from D&C Manager.
4. Import the project properties into Quantity Manager; this is the .xml file from Trns\*Port.

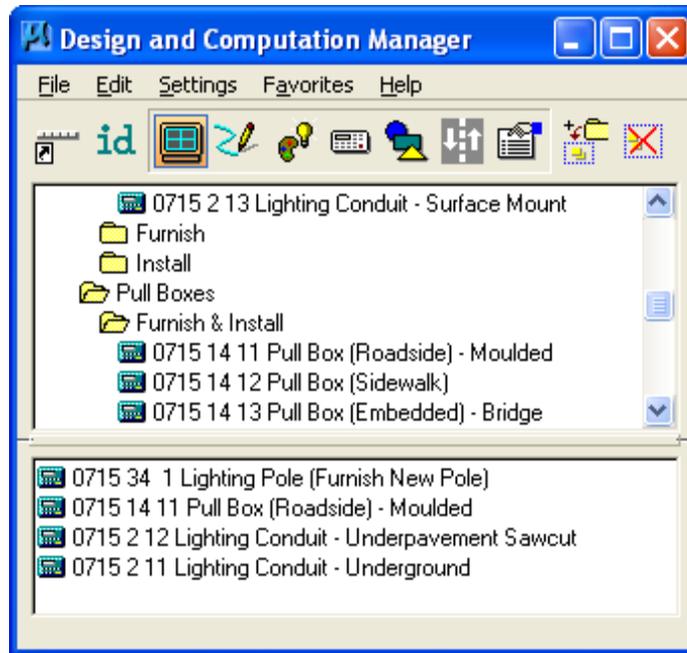
5. Create a funding rule in Quantity Manager; this is really the item category. Example 0400 is the category for lighting plans. This funding rule associates the items in Quantity Manager to a category in Trns\*Port.
6. Apply the funding rule to the appropriate items.
7. Export the Quantities from Quantity Manager to a format Trns\*Port can read. This is an .xml file also. Name it using the 11 digit FIN number .xml.
8. Upload the quantities to Trns\*Port. This alleviates the need for a user to manually enter pay items and quantities.
9. Export the quantities from Quantity Manager into a .csv file to be used on the Tabulation of Quantities Sheet.

### *D&C MANAGER QUANTITIES*



From D&C Manager, when the Compute option is selected, D&C Manager expands to add a list box at the bottom of the dialog. This is the collection bin; this is where the user adds the items from D&C Manager that is to be quantified. To load the items into the collection bin you double-click on the item. To clear the collection bin, right-click in the collection bin area and select clear collection. Once all of the items are added to the collection bin they can be saved of for future use. To save a collection you right-click in the collection bin area and select Save Collection. Save the file to the project.

The next figure shows the collection bin populated with lighting items ready for quantity calculation. The items will not be in numerical order when loaded into the collection bin; they are displayed in the order that they are added.



**TO OPEN AND ORGANIZE THE COLLECTION:**

1. In D&C Manager, go to **Favorites > Organize Favorites**. This opens My Favorites.



2. In **My Favorites**, click **Open**.
3. Browse to the folder where you saved the collection and select the file. The collection file will have a **.col** extension.
4. Use the **Up** and **Down** buttons to organize the items.
5. Click **Save As** to save the changes.

**Note** The items can also be organized in the output from D&C Manager or in Quantity Manager prior to going onto sheets.

### REVIEW ITEMS PRIOR TO COMPUTING QUANTITIES

Prior to computing any quantities it is important to review the items that are about to be computed. D&C Manager's **Display** tool will aid in this task. To activate the **Display** tool, click on the  icon.



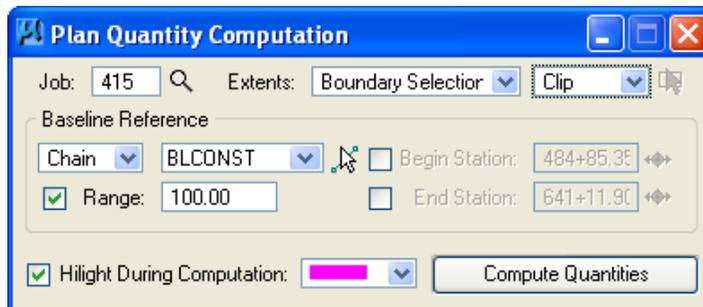
-  **Normal Display** – the items of interest change back to their original element symbology.
-  **Highlight Selection** – the desired elements are displayed in the current MicroStation highlight color, while any other elements remain unchanged.
-  **Hide Selection** – the desired items are not displayed in the view, however all other elements are displayed. This is the reverse of the **Display Only Selection** tool.
-  **Display Only Selection** – only the items in the collection box appear, while the rest are not displayed in the view.

Using the **Highlight Selection** the user would zoom in close to the project elements and make sure that whatever is placed in the collection bin for computing quantities highlights.

*Note* Always set the option back to Normal Display before closing the tool.

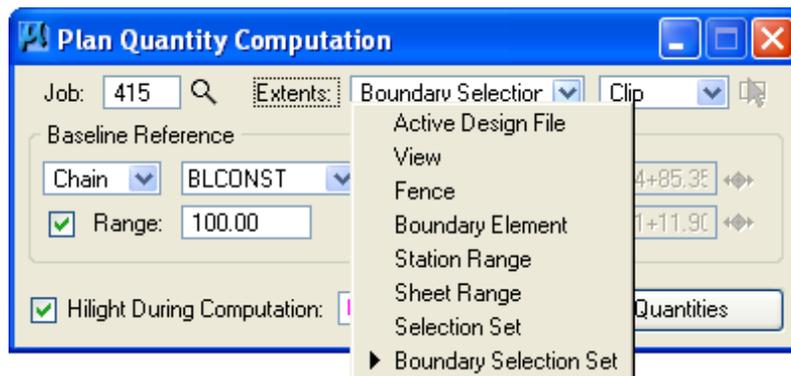
### COMPUTING QUANTITIES

Plan Quantity Computation opens when the Compute is selected.



The **Job** is the GEOPAK gpk file, if the user is using Project Manager than this will be set.

**Extents** are a list of options for limiting the area and elements included in the quantity calculations. The next figure shows the options available.



**Active Design File** All elements in the Active Design File are candidates for computation.

**View** Only the selected items that are displayed in MicroStation view one are computed. If the view includes area outside of the **Range**, the **Range** will override.

**Fence** A MicroStation fence must be placed, and all specified graphical features which satisfy both the fence and the **Range** will be tabulated.

**Boundary Element** A previously drawn closed shape is used to determine quantities. When selected, the user is prompted to select the closed shape. This mode is sensitive to the MicroStation Inside, Overlap and Clip modes.

**Station Range** A Baseline Reference (chain or dgn) must be defined for this option. The range fields default to the extent of the chain. The user can key in a station or by clicking Begin or End Station icons graphically define the station range. Perpendicular projections to the station(s) define the extent of the computations. This option is not ideal for sheet quantities.

**Sheet Range** Sheets placed with the Plan Profile Sheet Composition tool can be utilized. Select the option which displays the sheet range. This option will work in our scenario.

**Selection Set** A MicroStation selection set of the candidate compute elements must be created prior to computing.

**Boundary Selection Set** A MicroStation selection set of the Boundary (not the actual candidate compute elements) must be created prior to computing. This option will work in our scenario. When this option is used it uses the element ID number in Quantity Manager to organize the data for each individual sheet.

**Baseline Reference** allows the user to define a Chain or DGN element for offsets and station values for reports. In addition the **Range**, if set, is measured from the selected Chain or DGN element to search for candidate items. Setting the **Baseline Reference** to **None** limits the type of output that can be generated as no station / offset values can be computed.

When using **Sheet Range** or **Boundary Elements** it is not necessary to toggle on Begin and End Station limits.

**Highlight During Computation** when toggled on, all MicroStation elements computed is highlighted in the selected highlight color.

**Compute Quantities** starts the computation process and when completed opens the **Computation Results dialog box**.

Item	Description	Quantity	Unit	Export
0715 14 11	Pull Box (Roadside)	10.0000	EA	<input checked="" type="checkbox"/>
0715 4111	Lighting Pole Complete (40 ft)	10.0000	EA	<input checked="" type="checkbox"/>
0715 14 11	Pull Box (Roadside) - Moulded	2.0000	EA	<input checked="" type="checkbox"/>
0715 2 11	Lighting Conduit - Underground	2037.9000	LF	<input checked="" type="checkbox"/>
0715 2 12	Lighting Conduit - Underpavement Sawcul	83.9000	LF	<input checked="" type="checkbox"/>

Export Format:

Run:  Groupings:

It is imperative that you review these results before going any further. If there are any errors or omissions now is the time to fix or add them.

**Export Format** sets the type of output the user wants to generate from the reported quantities. There are several formats to choose from.

- Comp Book** – A more detailed report that lists not only quantity summaries, but also geometric properties such as plan view coordinates and station/offsets for located elements. File is in ASCII format.
- Item report** – Quantities Summary listing pay items, descriptions, units and total quantities for located elements. File is in ASCII format.
- Item Table** – Contains the same information as the Item Report, but formatted in tabular form.
- DBMS** – Very detailed information including calculated and rounded quantities, geometric properties, pay item numbers, descriptions, station / offset values, etc. The format is the selected database (i.e., Microsoft Access, Oracle, SQL Server, and dbase is set in the Compute Settings tool). This option is required when taking the quantities into Quantity Manager. This is the option used in this training guide.
- CSV By Item** – Summary listing pay items, descriptions, units and total quantities for located elements. Format is CSV (coma separated values).
- CSV By Element** – A more detailed report that lists not only quantity summaries, but also geometric properties such as plan view coordinates and station/offsets for located elements. Format is CSV (coma separated values).
- Table** – User defined table column properties. A column for designating the appropriate symbol is also included, as well as adhoc attribute data. This option is used to generate legends such as for landscape plans.

Next to the **Export Format** is a field for entering the file name of the output file; using the hourglass allows you to browse to a specific folder.

When exporting the quantities there are two options to choose from, **Create** or **Append**. This will place the quantities into a new file or append them to a previously created file.

**Run** and **Phase** are only used for the DBMS export format to Quantity Manager. The **Run** is a user key in and any logical description, like Lighting Plans or Preliminary, can be used. This description will be passed to Quantity Manager. There is several default **Phases** included in the drop down menu, however, you are only concerned with **Design Estimate**. This is the recommended **Phase** when exporting to Quantity Manager, as this is the only phase that can be passed to Trnsport.

**Export** commences the output file process and creates the quantity file. In this training you will be exporting to DBMS which will create an MDB file that can then be opened with Quantity Manager.

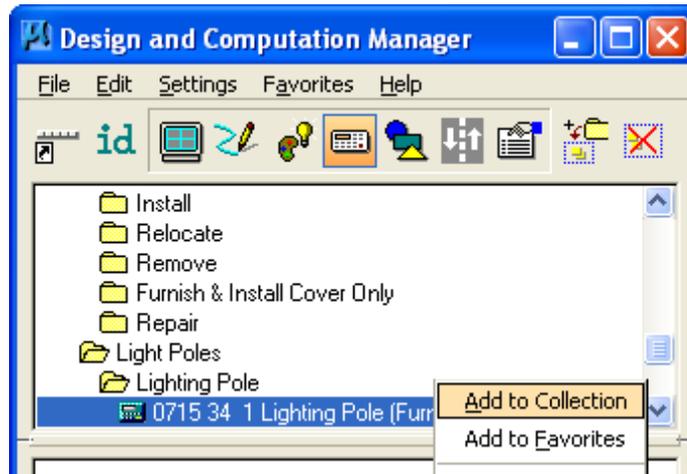
## Lab Exercise: Create and Save a Collection of Favorites

### **CREATE COLLECTION OF ITEMS**

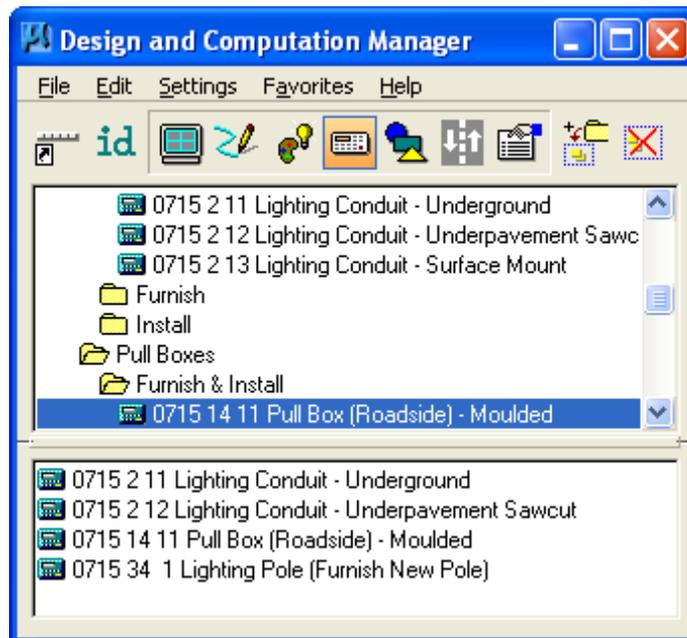
In this part of the exercise you will create a collection of items used to generate quantities and save the collection as a favorite to be used with future processes.

1. If closed, open **Dsgnlt01.dgn** in the Lighting folder.
2. Open D&C Manager.
3. Zoom in near **Sta 535+00**.
4. Click on the **Compute** icon in D&C Manager. This is the calculator icon.
5. If there are items in the collection bin of D&C Manager, right-click in the collection area and select **Clear Collection**.
6. Next, use the ID tool in D&C Manager to identify and add lighting items to the collection. Once all of the items are identified save the collection.

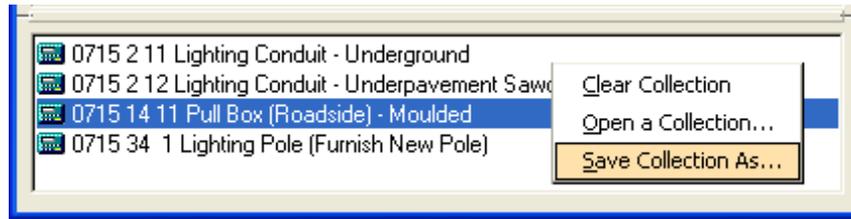
7. Click the **ID** icon in D&C Manager.
8. Pick one of the **Light Poles** and accept it to move to the item **0715 34 1 Lighting Pole (Furnish New Pole)**.



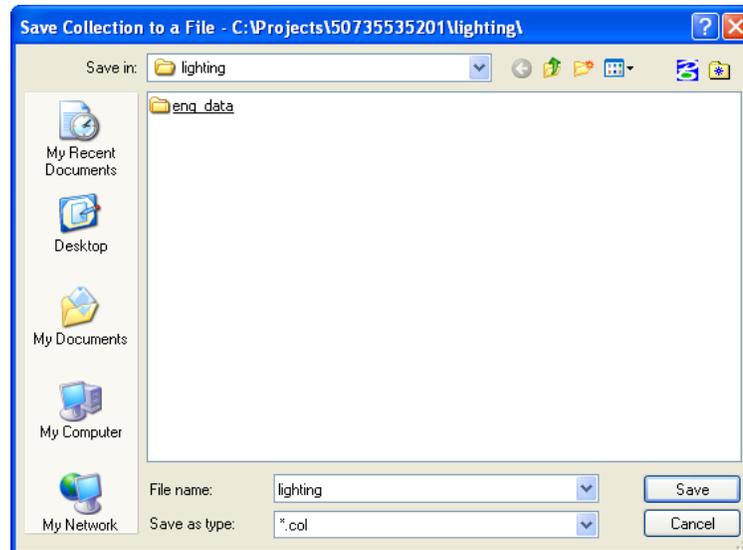
9. Right-click on the item and select **Add to Collection**. This will place the item in the collection bin.
10. Click the **ID** icon and pick the **Conduit** line and accept it.
11. Right-click on the item and select **Add to Collection**.
12. Repeat this process to add the **Pull Boxes** at the driveway.



- Right-click in the collection bin and select **Save Collection As**. This opens **Save Collection to a File**. The location will default to the working directory.



- Enter a file name for the collection, example: **Lighting**. The extension **.col** will be added automatically.



- Click **OK**.

## ORGANIZE THE COLLECTION

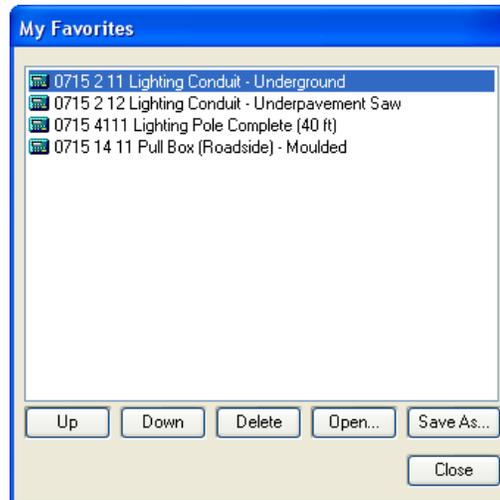
Organizing the collection is only to make it easier on the designer when working with a group of items as they will now be in numerical order. Organizing the collection will have no impact on creating the Tabulation of Quantities Sheet; this is organized in Quantity Manager.

- In D&C Manager, select **Favorites > Organize Favorites**. This opens My Favorites.

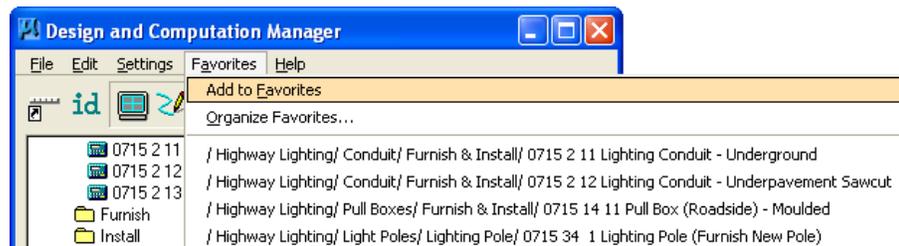


- In My Favorites click **Open**.
- Navigate to the **Signing** folder and select **SAPM.col**. This loads the D&C items into My Favorites.

- Using the **Up** and **Down** buttons, put the items in numerical order from lowest to highest.



- Click **Save As**.
- Select the **Lighting** file and click **OK** to overwrite it.
- Click **OK** on the **Alert** dialog warning you that the file already exists.
- Close My Favorites.
- Right-click in the collection bin and select **Open a Collection**.
- Select the **Lighting** collection in the **Lighting** folder.
- Click **OK** to open the file. This will load the items in the collection in numerical order.
- The collection is also loaded in the **Favorites** pull down menu as seen in the following figure.



## Lab Exercise: Review the Quantity Items

### USE THE DISPLAY TOOL TO REVIEW ITEMS

- Continuing in **Dsgnlt01.dgn**, click the **Display** tool on D&C Manager.

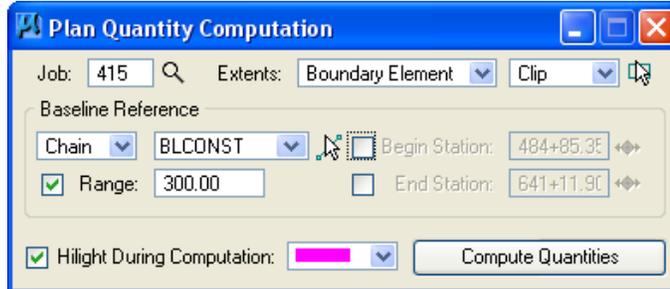


- On the **Display** tool, click the **Highlight** icon. This will highlight all of the items in the collection.
- Take a moment to review the design file and experiment with the other display options.
- Set the display option to **Normal**.
- Close the **Display** tool.

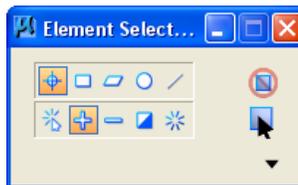
## Lab Exercise: Generate Quantities and Export to Quantity Manager

### COMPUTE QUANTITIES

- Continuing in **Dsgnlt01.dgn**, zoom out so you can see the first four clip borders.
- On D&C Manager, click the **Compute** icon. This opens Plan Quantity Computation.



- The **Job** number is **415**. This will be set using Project Manager.
- Set the **Extents** to **Boundary Selection**.
- Set to method **Clip**.
- Set the **Baseline Reference** to **Chain**.
- Pick the Chain **BLCONST**.
- Toggle on **Range**.
- Set the **Range** value to **300.00**. This is how far from the chain the software will look for items to compute.
- Toggle on **Highlight During Computation**.
- In MicroStation, use **Power Selector** to pick the first four clip borders.



- Click **Compute Quantities**. This opens Computation Results.

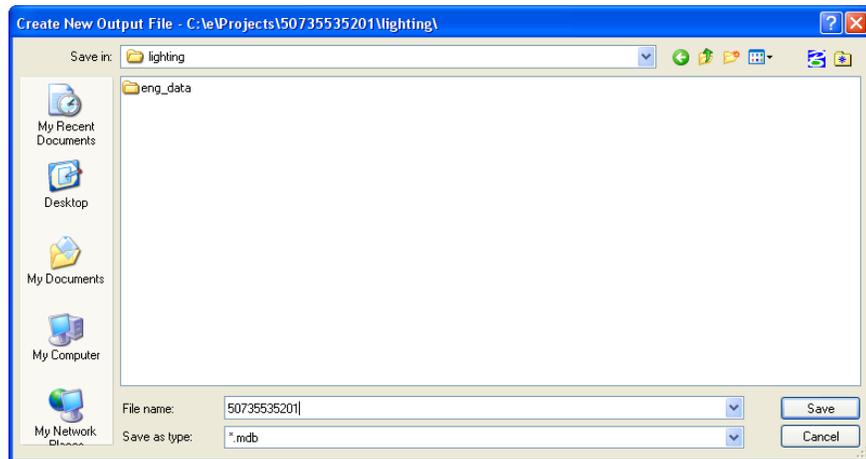
Item	Description	Quantity	Unit	Export
0715 14 11	Pull Box (Roadside) - Moulded	10.0000	EA	<input checked="" type="checkbox"/>
0715 4111	Lighting Pole Complete (40 ft)	10.0000	EA	<input checked="" type="checkbox"/>
0715 14 11	Pull Box (Roadside) - Moulded	2.0000	EA	<input checked="" type="checkbox"/>
0715 2 11	Lighting Conduit - Underground	2237.8000	LF	<input checked="" type="checkbox"/>
0715 2 12	Lighting Conduit - Underpavement Sawcut	83.9000	LF	<input checked="" type="checkbox"/>

Export Format: **Item Report**

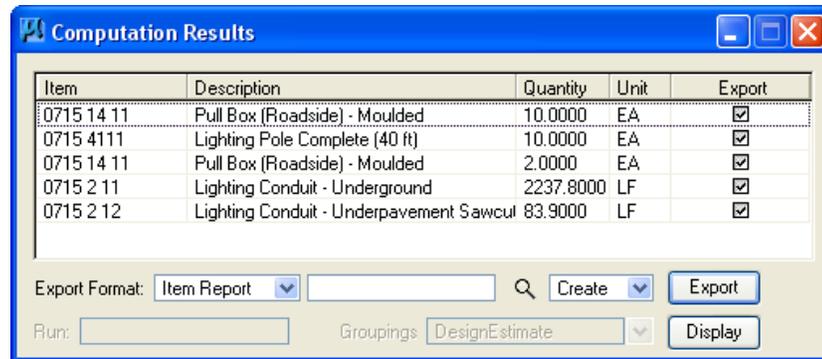
Run:  Groupings: **DesignEstimate**

### EXPORT QUANTITIES TO DBMS FOR QUANTITY MANAGER

1. Set the **Export Format** to **DBMS**. This is the required format for Quantity Manager.
2. Using the **Magnifying Glass** icon, browse to the Lighting folder.



3. Enter a file name; FDOT recommends using the fin number. The MDB file extension will be added automatically.
4. Click **OK**.
5. Set to **Create**. The options are **Create** or **Append**.
6. For **Run** enter **Lighting Plans**.
7. For **Groupings** select or type in 0400. This option must be selected.

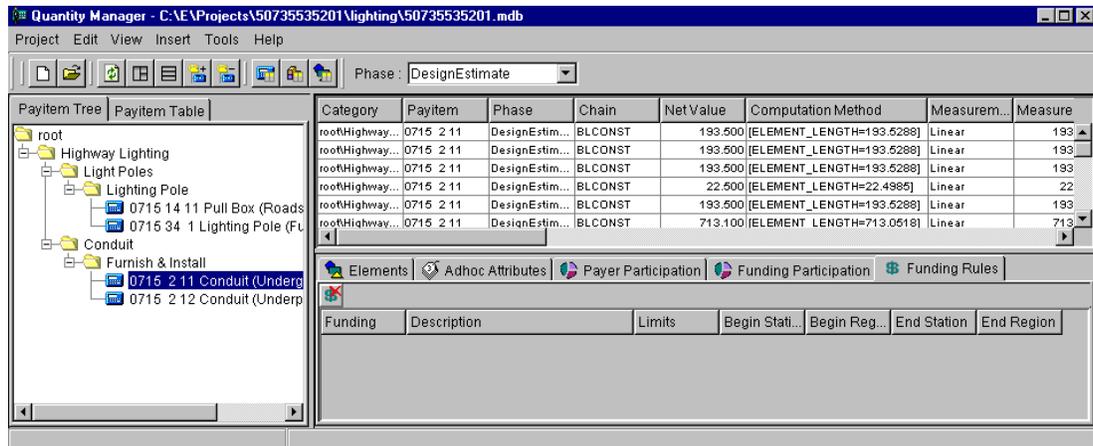


8. Click **Export**. This creates the MDB file.
9. Close **Computation Results**. Next, open Windows Explorer and make sure the file was created.
10. From FDOT Menu bar, select **Standards > Explore Current Working Directory**.
11. You should see the **MDB** file in the **Lighting** folder.
12. Close Windows Explorer.

## QUANTITY MANAGER OVERVIEW

As mentioned earlier in the training guide, Quantity Manager is a stand-alone program that organizes and manages the quantities generated from D&C Manager. Quantity Manager can also be used to enter non graphic quantities such as Mobilization. Once the information is loaded into Quantity Manager the user can then export the data from Quantity Manager into a spreadsheet that can then be placed in CAD on the Tabulation of Quantities sheet. Quantity Manager also creates the Computation Book and can export the quantities to an .xml file to be uploaded into Trns\*Port.

Quantity Manager can be loaded from the Road tools Palette or from the Applications pull down menu.



### QUANTITY MANAGER WORKFLOW

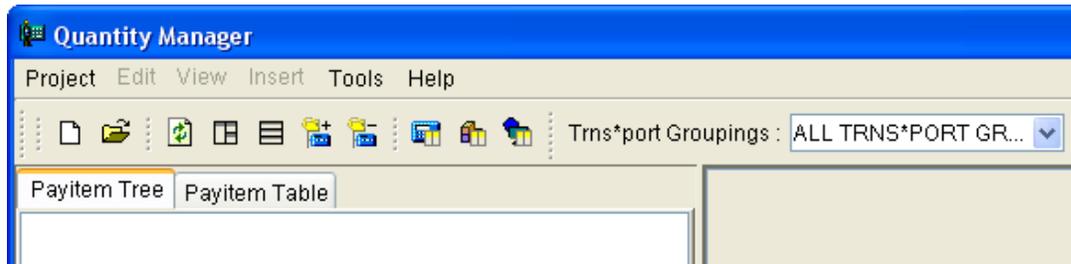
1. Open Quantity Manager.
2. Open the Project created by D&C Manager. This is the MDB file created in D&C Manager.
3. Import the Project Properties .xml file. This is created in TRNS\*PORT then exported to an .xml file.
4. Create **Funding Rules** for all of the categories in the project.
5. Apply the funding rules to appropriate items.
6. Export quantities to .xml file to be loaded into TRNS\*PORT.
7. Create .csv file, using delivered styles from FDOT, to be used to create Tabulation of Quantities sheet.
8. If creating a Comp Book, create .pdf files using delivered styles from FDOT.

**Note** FDOT offers a full training course on Quantity Manager that most users have already attended. In this training guide the user will only use some basic functions of Quantity Manager.

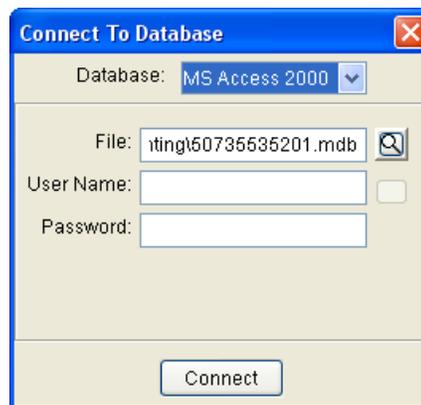
## Lab exercise: Import Project Properties from TRNS\*PORT

### OPEN QUANTITY MANAGER AND IMPORT PROJECT PROPERTIES

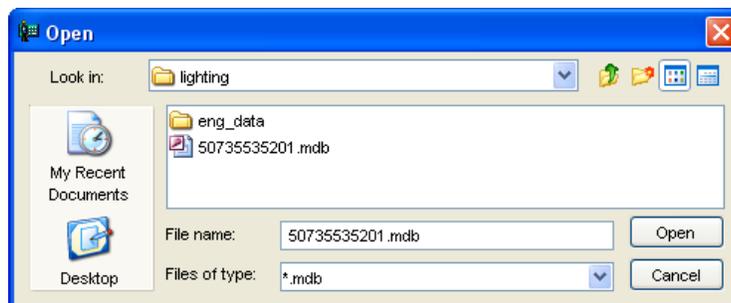
1. Open **Dsgnlt01.dgn**. Quantity Manger can be opened in any design file.
2. From the **Road** tools palette, select **Quantity Manager**. The  icon is located under the Project Manager icon in the same menu as D&C Manager.



3. In Quantity Manager, select **Project > Open**. This opens Connect to Database.



4. Set the **Database** to **MS Access 2000** from the drop down menu.
5. For the **File**, click the **magnifying glass** icon.



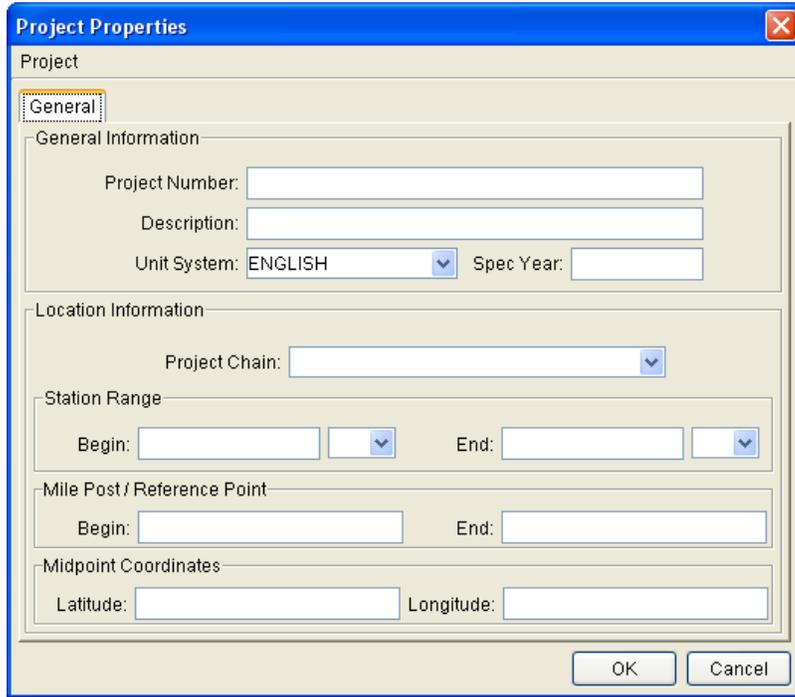
6. Browse to the Lighting folder and select the project mdb file. In this exercise select **50735535201.mdb**. This is the file created in D&C Manager.

**Note** If your discipline is part of the Roadway set of plans you will be required to make sure that all of your MicroStation elements are drawn with D&C Manger and check the quantities but not create a database. The Roadway user will typically create one project database of all quantities. In this example the Lighting plans are stand alone.

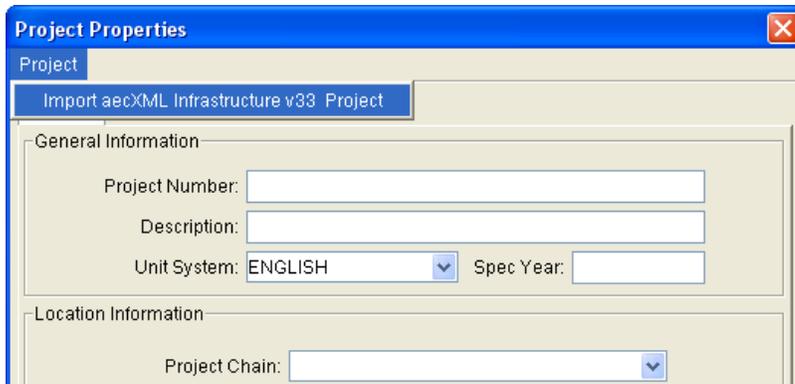
7. Click **Open**. This displays Connect To Database.
8. Click **Connect**. This loads the project database into Quantity Manager.

**LOAD PROJECT PROPERTIES FROM TRNS\*PORT**

1. Continuing in Quantity Manager, select **Project > Properties**. This opens Project Properties.



2. In Project Properties, select **Project > Import aecXML**.



3. Browse to the **Lighting** folder and select **50735535201.xml**. This is the file exported from TRNS\*PORT.

- Click **Open**. This loads the project properties. As seen in the figure below notice that the **General Information** is now filled in.

**Project Properties**

Project

General Trns\*port Groupings

General Information

Project Number: 50735535201

Description: SR 415

Unit System: ENGLISH Spec Year: 07

Location Information

Project Chain: BLCONST (JOB415.GPK)

Station Range

Begin: 484+85.35 End: 641+11.90

Mile Post / Reference Point

Begin: End:

Midpoint Coordinates

Latitude: Longitude:

Import Cancel

- For the **Location Information**, pick the drop down menu and select the chain **BLCONST**. This will populate the **Begin** and **End Station**.
- For the **Begin Mile Post** enter **0.000**.
- For **End Mile Post**, enter **2.407**.
- Select the **TRNS\*PORT Groupings** tab. Check on all the **TRNS\*PORT Groupings** that pertain to the project.

**Project Properties**

Project

General Trns\*port Groupings

Import	Trns*port Groupings
<input checked="" type="checkbox"/>	0000 FM PROJECT FUNDING
<input checked="" type="checkbox"/>	0400 LIGHTING

Import Cancel

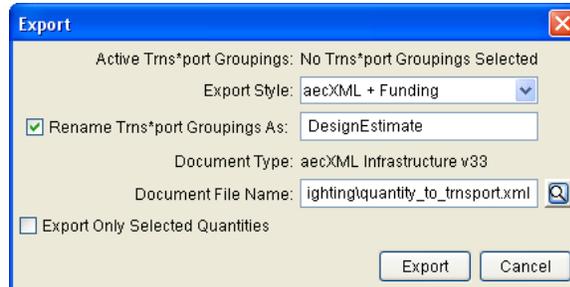
- Click **Import**. This loads the **Project Properties** into Quantity Manager and marries them with the project database, the MDB file.

**Note** Unless something in TRNS\*PORT changes that affects the project properties you will not have to reload the project properties .xml file for this database.

## Lab Exercise: Export Quantities for Trns\*Port

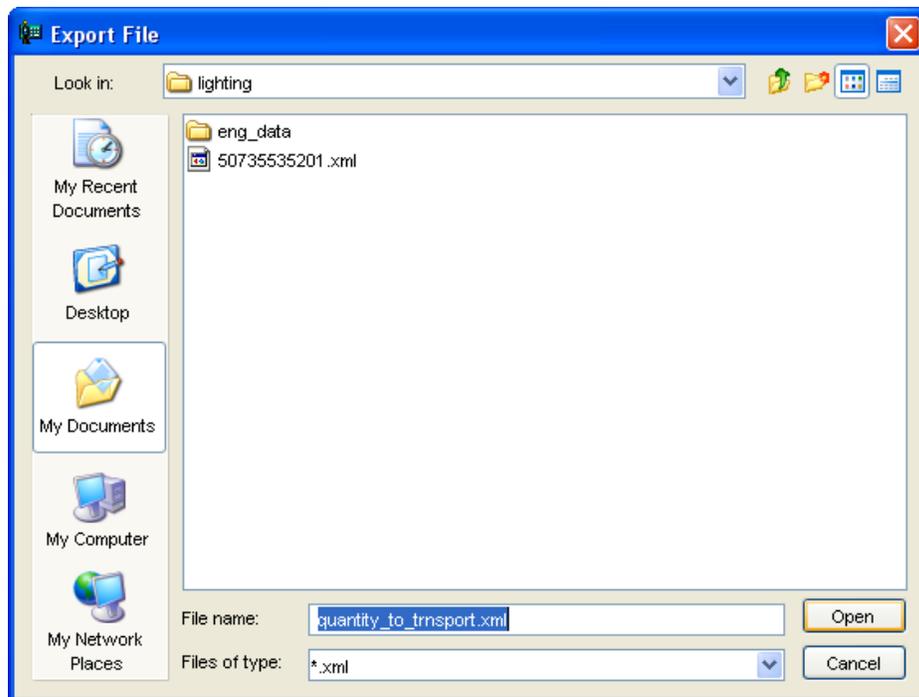
### EXPORT QUANTITIES FOR TRNS\*PORT

1. In the left-hand pane of Quantity Manager, select the tab **Payitem Table**.
2. Select the first item; then, using the **Shift** key on the keyboard, select the last item in the table.
3. Select **Project > Export > Export**. This opens the Export dialog.
4. Set the **Export Style** to **aecXML + Funding**. Use the drop down menu to select this.
5. Toggle on **Rename Phase As DesignEstimate**. This is set by default.



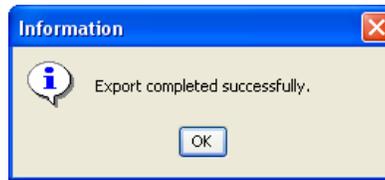
6. For **Document File Name** click the magnifying glass icon and browse to the **Lighting** folder.
7. Enter a new file name for the Trns\*Port .xml. For this example use **quantity\_to\_trnsport**. This name is not important other than you must remember it for the upload process.

**Note** Do not overwrite the .xml file that is in the Lighting folder, this is the project properties .xml file. You may need this to import into Quantity Manager if errors are found.



8. Click **Open**. This loads the file name into the Export dialog.
9. Click **Export**.

- Click **OK** on the Information dialog.



**Note** If all of the information in the Project Properties is not filled in the user will receive a warning stating that some information is missing.

- Click **Cancel** on the **Export** dialog to close it. Do not close **Quantity Manager**.

This data is now ready to be imported back into **Trns\*Port** using the **Designer Interface**. The Designer Interface can be opened from the State Specifications and Estimates Office web page. The link below <http://www.dot.state.fl.us/estimates/BOE/BOEonline.shtm> will take the user to this page.

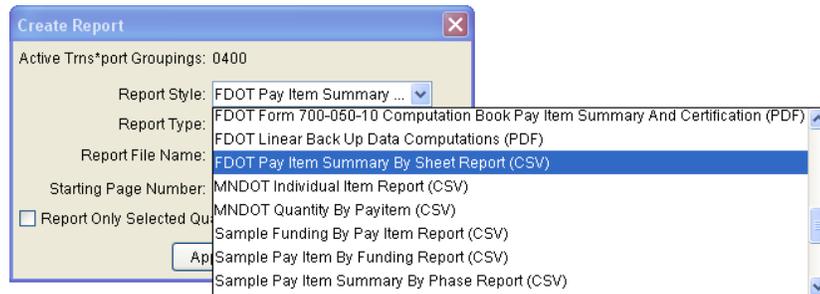
## Lab Exercise: Generate CSV file in Quantity Manager

In this exercise the user will create a .csv output file from Quantity Manager. This .csv file will then be converted to **SBTBLT.xls** which FDOT Menu bar can open and import into the Tabulation of Quantities Sheet.

**Note** It may be necessary to update the lab computers with the latest versions of the reports for the exercise to work correctly.

### CREATE CSV FILE

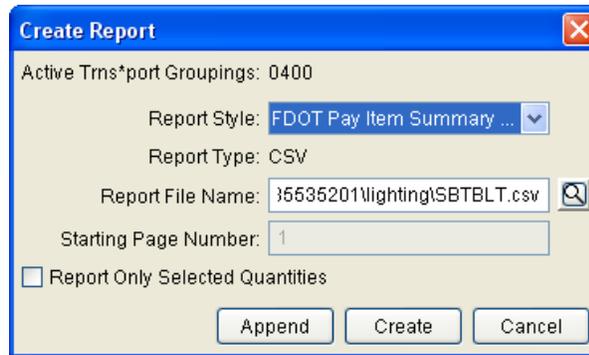
- In Quantity Manager, select **Tools > Reports > Create**. This opens Create Report.



- From **Report Style**, select the drop down arrow and pick **FDOT Pay Item Summary By Sheet report (CSV)**.
- For the **Report File name**, click the magnifying glass icon and browse to the Lighting folder.
- Enter a file name, for this example use **SBTBLT** the .csv extension will be added automatically.



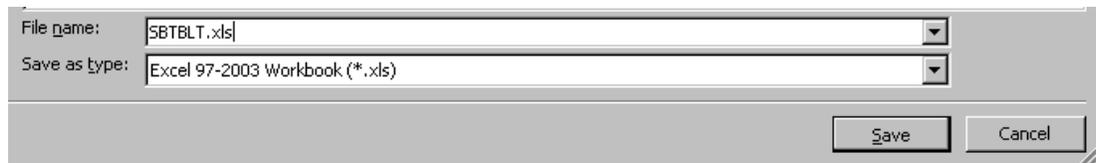
- Click **Open**.



- On the Create Report dialog, click **Create**. This will open the .csv file in **Excel**. Do not close Excel.
- Click **Cancel** on the **Create Report** dialog.
- Close Quantity Manager.

### SAVE .CSV FILE TO .XLS FORMAT AND SORT THE DATA

- In Excel, select **File > Save As**.

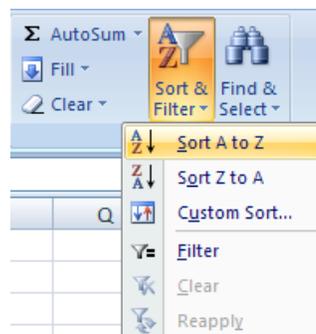


- For the **Save as type**, select **Excel 97-2003 Workbook (\*.xls)**.
- Select the data in **Excel**. Select the data from **Name** column to **Total** column.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Blank	Name	Description	Unit	Sheet 2849 (Shape)	Sheet 2850 (Shape)	Sheet 2854 (Shape)	Sheet 2855 (Shape)	Sheet 2855 (Shape)				Total
2	X	0715 14 11	Pull Box (Roadside)	EA	7	7	5	5					24
3	X	0715 2 11	Lighting Conduit - Underground	LF	1299.4	1050.2	938.4	949.8					4237.8
4	X	0715 2 12	Lighting Conduit - Underpavement Sawcut	LF	0	0	83.9	0					83.9
5	X	0715 4111	Lighting Pole Complete (40 ft)	EA	7	7	3	5					22
6													
7													

**Note** All "X"s must be UPPERCASE or the report will not import correctly into MicroStation.

- Select **Sort** and **Sort A to Z**.



- Click **Save**. Do not close **Excel**.

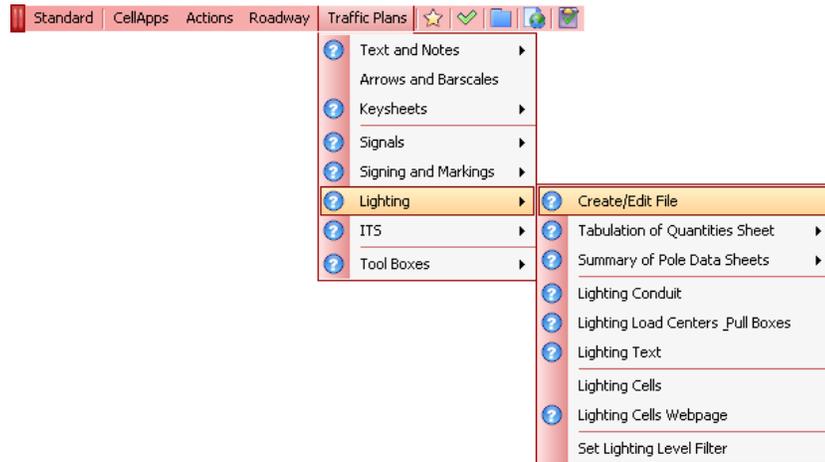
**Note** This process of converting the .csv file to an .xls file is only so the FDOT Menu tool to edit and import the Excel data works properly.

## Lab Exercise: Create Tabulation of Quantities Sheet

Next, the user will create the Tabulation of Quantities Sheet and import the excel data created in Quantity Manager.

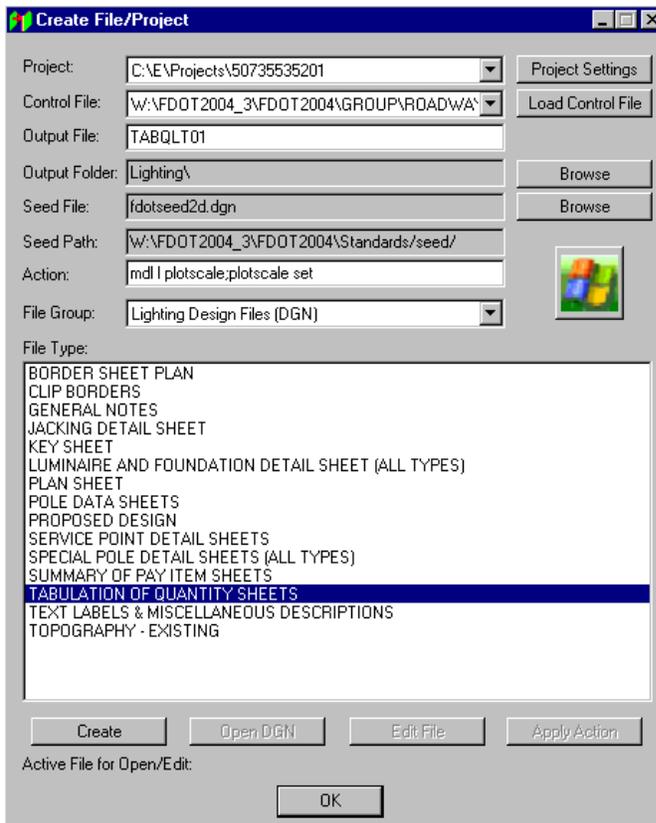
### CREATE TABULATION OF QUANTITY SHEET FROM FDOT MENU

1. Open **Dsgnlt01.dgn** in the **Lighting** folder.
2. From FDOT Menu, select **Traffic plans > Lighting > Create/Edit File**.

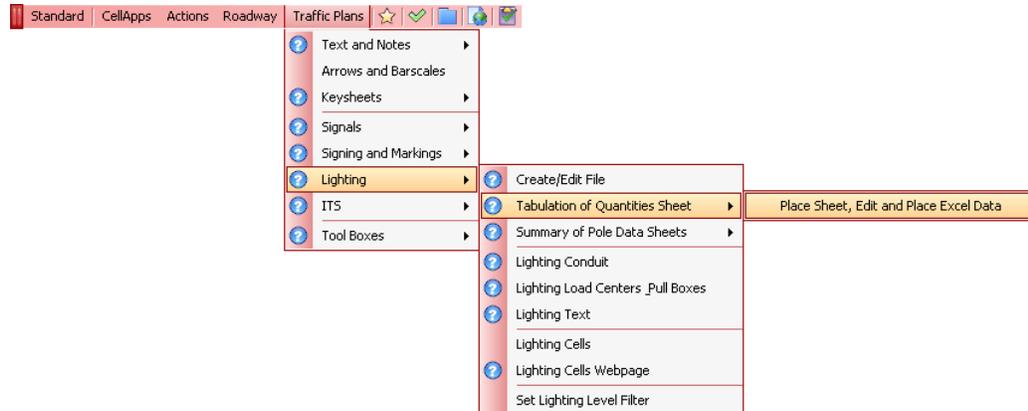


**Note** Loading the Create File/Project tool from the lighting menu will automatically load the correct Control File and File Group.

3. Using Create File/Project, create the **Tabulation of Quantity Sheet**. This file goes in the **Lighting** folder.



4. Open the **Tabqlt01.dgn** file.
5. Accept the **Plot Scale** of **50**.
6. From FDOT Menu, select **Traffic plans > Lighting > Tabulation of Quantities Sheet > Place Tabulation of Quantity Sheet**.

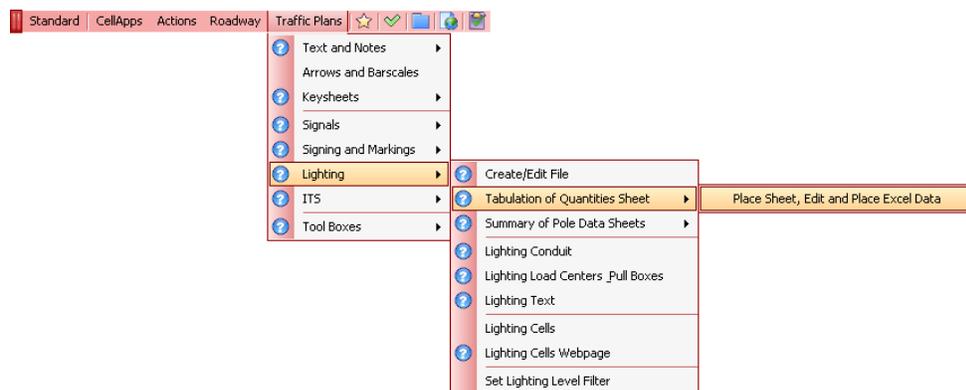


7. Issue a data point in the view to start the place sheet process.
8. Issue a data point to place the sheet file.
9. Reset to cancel the command.
10. Perform a **Fit View**.

### PLACE EXCEL DATA

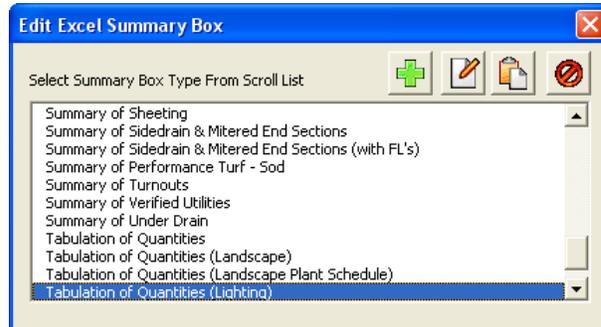
1. Continuing in **Tabqlt01.dgn**, zoom in around the upper left corner of the sheet near the text **PAY ITEM NO**.
2. From FDOT Menu, select **Traffic plans > Lighting > Tabulation of Quantities Sheet > Place Excel Data** to load Edit Excel Summary Box application.

**Note** If the user closed the Excel file then Edit Excel Data would need to be performed first, this will open the Excel file.



**Hint** The Edit Excel Summary Box Application is also available from the other Sheet related Sub Menu to "Place and Edit Excel Data Sheets" from FDOT Menu bar. Generally, the user will navigate to the desired sheet on the FDOT Menu bar from the discipline Sub Menu (i.e., Roadway, Traffic Plans, etc...) and select one of the menu items which automatically open the correct Sheet Cell or Summary Box from the scroll list. There may be an option to Place the Sheet Cell for those sheets known to be placed in a DGN long before any of the excel data is ready to import and will not load this tool.

- Review the Edit Excel Summary Box dialog. This tool is used to Place specific Sheet Cells, Load the Excel Spreadsheet in Excel and Import the Excel Spreadsheet data for placement of text in the Sheet Cell. This tools makes it convenient for the user to produce the correct sheet, load the correct excel spreadsheet for the list selection, and import the Excel Data into MicroStation once the excel data is complete, all from one tool.

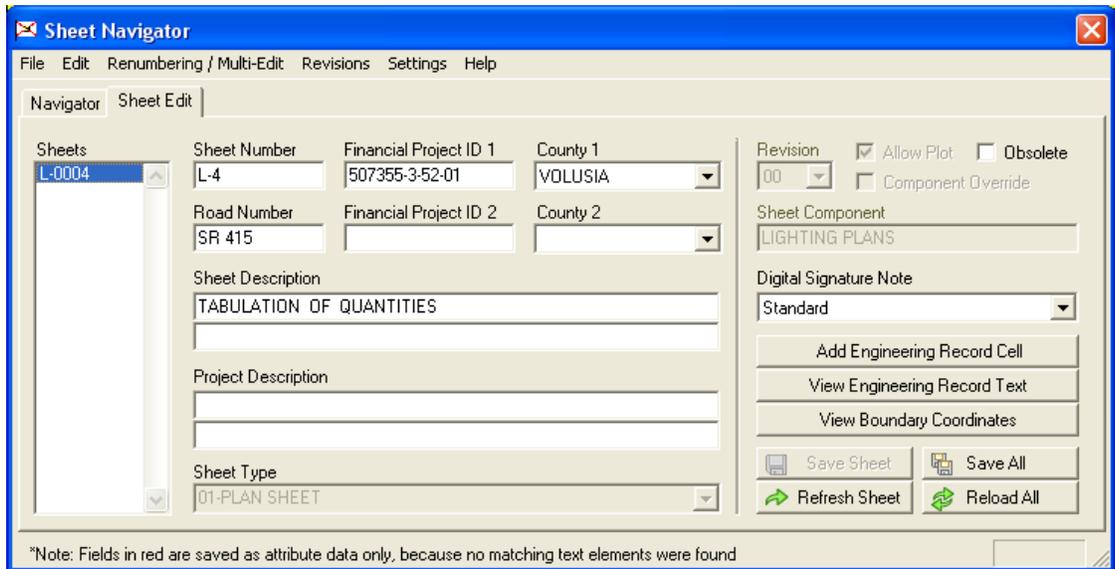


**Hint** For more help using the new FDOT Edit Excel Summary Box tool, please view the training Quick Clip at: [Edit and Place Excel Data for Summary Boxes](#)



- Place Sheet** The first icon (green plus sign), when initialized the sheet cell, according to the sheet or summary box selected in the scroll list, will be attached to the cursor for placement in the DGN. The user does not have to close the tool to place multiple sheets in the same DGN or open other DGN's to place sheets. The tool stays running until the user closes MicroStation, clicks the **Cancel** button (fourth icon) or clicks the red **X** in the corner.
- Edit Input** The Second icon (dog eared paper with over lying pencil), when initialized the correct Excel spreadsheet will open ready for the user to populate with the appropriate data.
- Place Text** The third icon (clipboard with over lying dog eared paper) is for importing the Excel data into MicroStation for placement on the sheet cell or summary box cell. When initialized and the user completes adding, removing or modifying the data in the excel spreadsheet and has saved the spreadsheet to the project discipline folder, the excel data is ready to place on the sheet cell or summary box by an insertion point (top left corner of the first cell of the table grid). If the excel spreadsheet is still open and the user clicks the correct insertion point, the excel data is imported 1 line at a time from left to right and from top to bottom in the order the excel data is displayed in the spreadsheet.
- Cancel** The fourth icon (red slashed circle) closes the Edit Excel Summary Box Application.
- Scroll List** This lists the Sheets and Summary Boxes available for use with the Edit Excel Summary Box Application. The highlighted (selected) Sheet or Summary Box allows the user to place the appropriate Sheet or Summary cell, Edit appropriate Excel Spreadsheet and Import the appropriate data back to MicroStation for that selection in a logical work flow or can place any Sheet or Summary Cell without having to close the to

4. Snap to the end of the first horizontal line under the text **PAY ITEM NO.**
5. Issue a data point to accept the location.
6. Review the data.
7. Using **Power Selector**, select the Totals from the last plan sheet column and move to the correct column in the sheet file. This will be fixed in future release of the .csv style files from FDOT.
8. Run Sheet Navigator to fill in the title block, add the **Digital Signature Note** and **Save Sheet**.



9. Close Sheet Navigator.
10. Close Excel.

# 6 SHEET NAVIGATOR

## CHAPTER OBJECTIVES

In this chapter the following topics will be covered:

- Overview of Sheet Navigator
- Sheet Navigator Work Flow
- Auto Numbering and Renumbering
- Edit Multiple Sheets

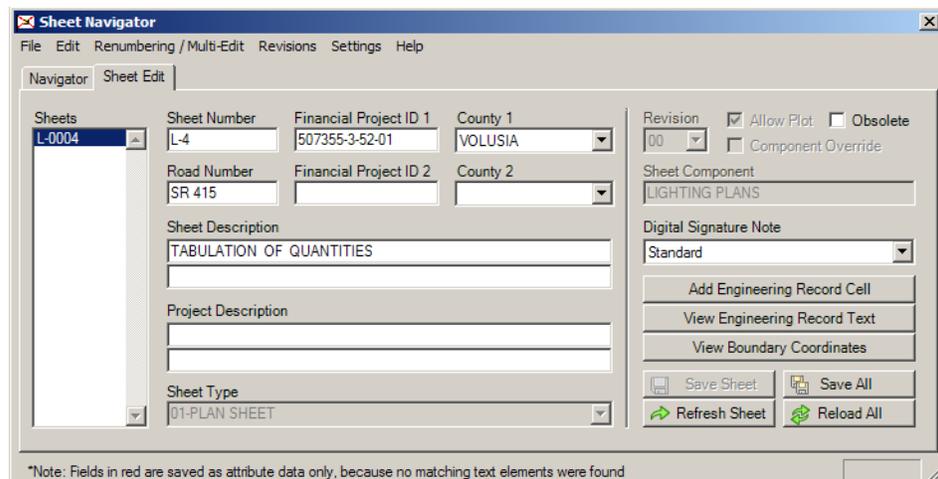
## INTRODUCTION

This section covers the application Sheet Navigator, which is used to label and tag sheets for electronic delivery. Its functions include entering of sheet title block information, auto numbering of sheets, renumbering sheets and performing Multiple Edits on sheets. Using this tool will greatly reduce the time needed to number sheets in a set of plans or even renumber sheets after sheets have been added or removed from the set which is a common occurrence over the life span of a project.

## SHEET NAVIGATOR OVERVIEW

Sheet Navigator is one of the single most important tools in preparing a project for Electronic Delivery. Sheet Navigator has the ability to Auto Number sheets, Number single or multiple sheets and Re-Number sheets. Sheet Navigator can also tag a sheet as Obsolete so that electronic delivery indexer does not pick up the sheet and index it. This allows the user to create exhibits or temporary sheets in the project without the worry of electronic delivery including them in the plans package. Sheet Navigator can also perform multiple sheet edits at one time such as adding the Road Number or the Digital Signature Note to multiple sheets.

Sheet Navigator creates an index named Sheetinfo.xml located in either the root project folder or in the component folder depending on how the user creates the index. This index is crucial to Sheet Navigator functioning properly when working in the Auto Numbering, Renumbering or Multi Sheet Edit mode.



**SHEET NAVIGATOR IS USED TO:**

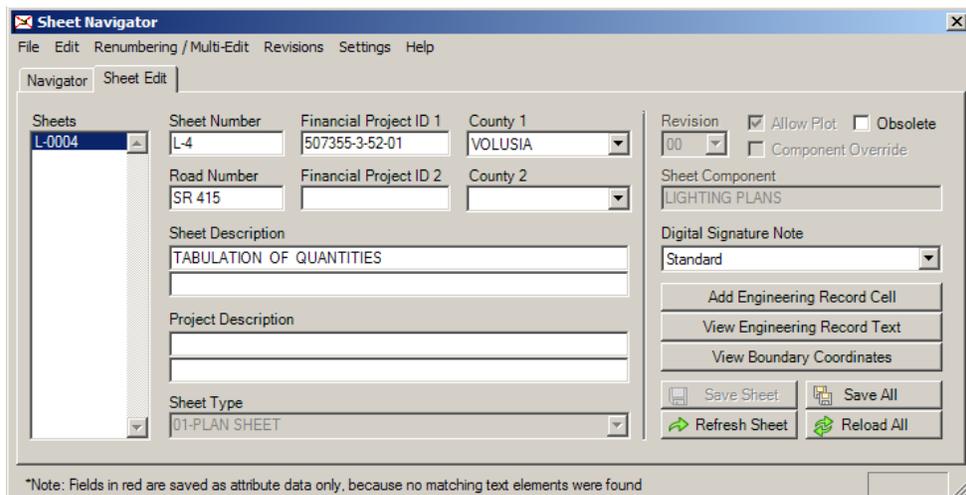
- Tag sheets for Electronic Delivery
- Number Sheets
- Label Sheet Title Blocks
- Auto Number sheets
- Renumber Sheets
- Apply Revision text

**SHEET NAVIGATOR WORKFLOW:**

1. Create Sheet files using **GEOPAK** or **FDOT Menu**.

*Note* The Border can be in the active file or a reference file.

2. Open Sheet file in MicroStation.
3. From FDOT Menu, start Sheet Navigator.
4. Populate fields in Sheet Navigator.
5. Add Digital Signature note.
6. Save data to sheet file.

**SHEET EDIT TAB**

The Sheet Edit tab is used for populating the standard title block information.

**Sheets** This shows the number of sheets in the active file and also the sheet number if they have been numbered. Sheets show as **Undefined** if they have not been numbered.

**Sheet Number** This is the actual sheet number example S-3.

**Financial Project ID 1** Eleven digit FIN number. This is automatically populated by clicking in the field. You must select a project configuration file when opening MicroStation for this to work.

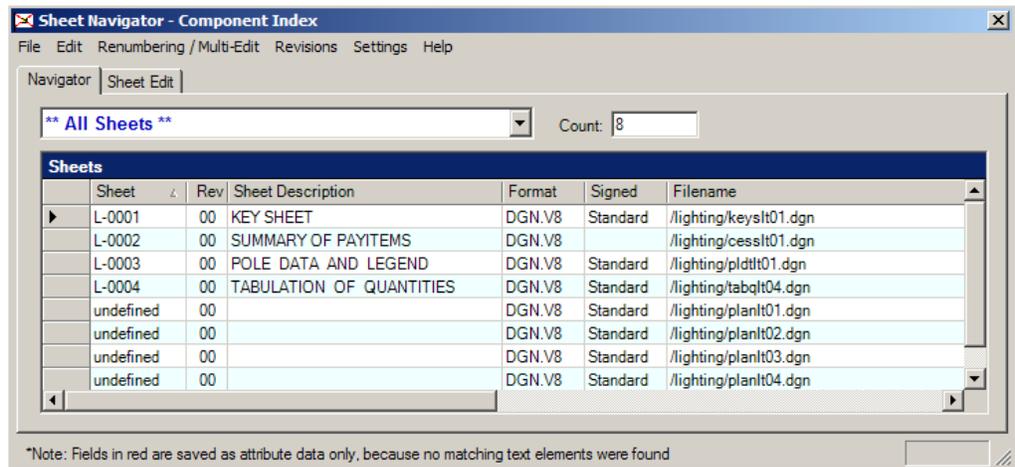
**County 1** If the project spans two counties this is for the first county. From the drop down menu select the county.

**Road Number** This is the State Road number of the project alignment.

- Financial Project ID 2** For stung projects this is for the second project FIN number.
- County 2** This is for the second county name if your project spans two counties.
- Sheet Description** Example, Tabulation of Quantities.
- Project Description** This is used on Structural sheet borders and provides a brief description of the project.
- Sheet Type** This is filled in automatically and is triggered by text in the sheet cell. 01-Plan Sheet is the default sheet type if none of the standard text strings are found. Refer to FDOT menu for more information on this tool.
- Revision** Shows what revision if any the selected sheet has applied to it.
- Allow Plot** Controls whether the sheet will be converted to a PostScript image when using FDOT's Electronic Delivery Software.
- Obsolete** Toggling this on will make the selected sheets obsolete or inactive which means the electronic delivery software ignore these files.
- Component Override** Allows the user to assign a sheet to a different discipline other than the default discipline. The default discipline is the discipline in which the MicroStation file resides.
- Sheet Component** Describes what is the plan set component of the selected sheet based on the sheet number. Example: S-4 would be component Lighting where 4 would be the Primary component.
- Digital Signature Note** From the drop down menu the users selects the type of electronic Delivery Signature to place in the file. This cell uses the plot scale of the file.
- Add Engineering Record Cell** Places the Engineer of Record cell in the file.
- View Engineering Record Text** Reads the data in the Engineer of Record cell and displays it.
- View Boundary Coordinates** Displays the coordinates of the sheet boundary.
- Reload All** Closes and re-opens Sheet Navigator. If changes have been made to Sheet Navigator the user will be warned to save the changes or cancel.
- Refresh Sheet** Refreshes Sheet Navigator and MicroStation. If changes have been made to Sheet Navigator the user will be warned to save the changes or cancel.
- Save Sheet** Saves changes and updates the MicroStation file.
- Save Sheets** Saves changes to all sheets and updates the MicroStation files.

## NAVIGATOR TAB

The Navigator tab is used for the Auto Numbering, Renumbering and Editing of multiple sheets at one time.

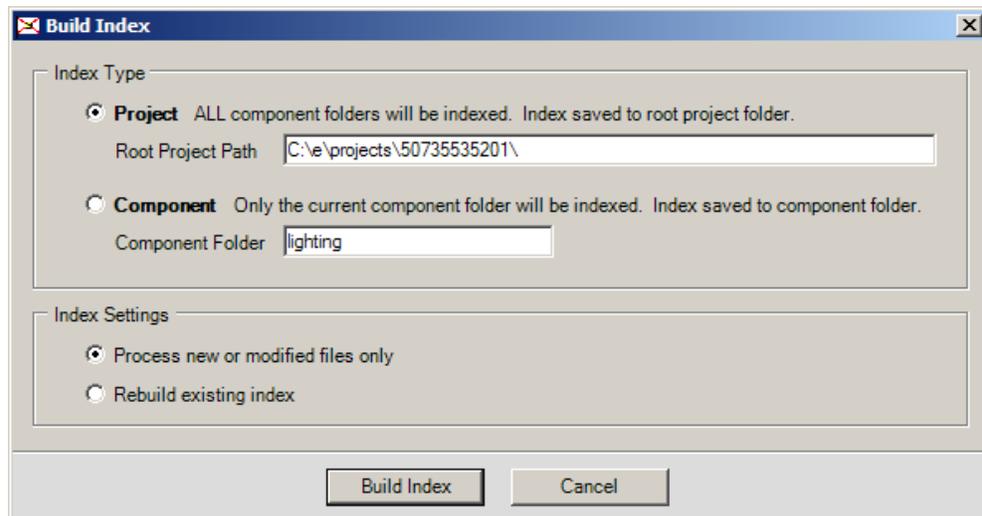


### AUTO NUMBERING AND RENUMBERING

This is a multi step process where you will need to first auto number the sheets then renumber those sheets because the auto numbering process uses arbitrary numbers based on the file name. Example: Keyslt01.dgn is already numbered L-0001, when Auto Numbering is started Planlt01 is auto numbered L-0001. This process can save the users a lot of time on large projects and it takes the tedious operation of having to open every sheet file and run Sheet Navigator manually. If a project has to be renumbered because of adding or removing sheets, Sheet Navigator automates the entire process.

### AUTO NUMBERING OR RENUMBERING WORKFLOW:

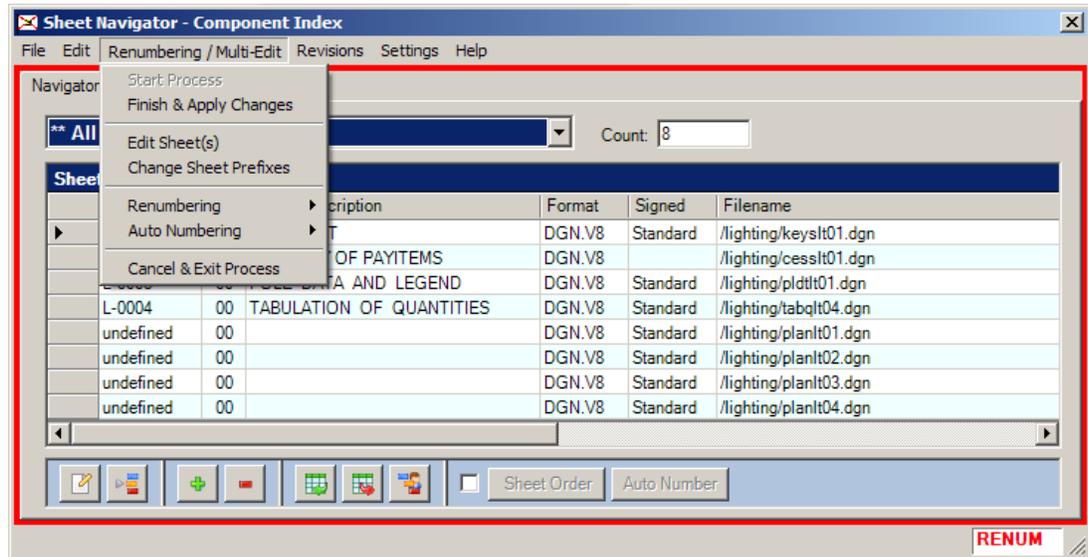
1. Create a Sheet Navigator index file named **sheetinfo.xml**. This can either be a project index or component index.



- Selecting **Project** will create an index file that covers all disciplines in the project; this is the option to use if you are the Prime and need to number all of the sheets on the project.
- Selecting **Component** is used when you are only concerned with a specific discipline. The discipline name will default to the working directory that Sheet Navigator was started in.

**Note** It is very important that the Sheetinfo.xml is always current. If there is any doubt as to how up to date this file is always create a new Sheetinfo.xml. It only takes a short amount of time to create this file and it hurts nothing to overwrite the existing file.

2. Open the **sheetinfo.xml** file.
3. Start the numbering process.
4. Select the process to run: **Auto Number, Renumber or Edit Sheets.**



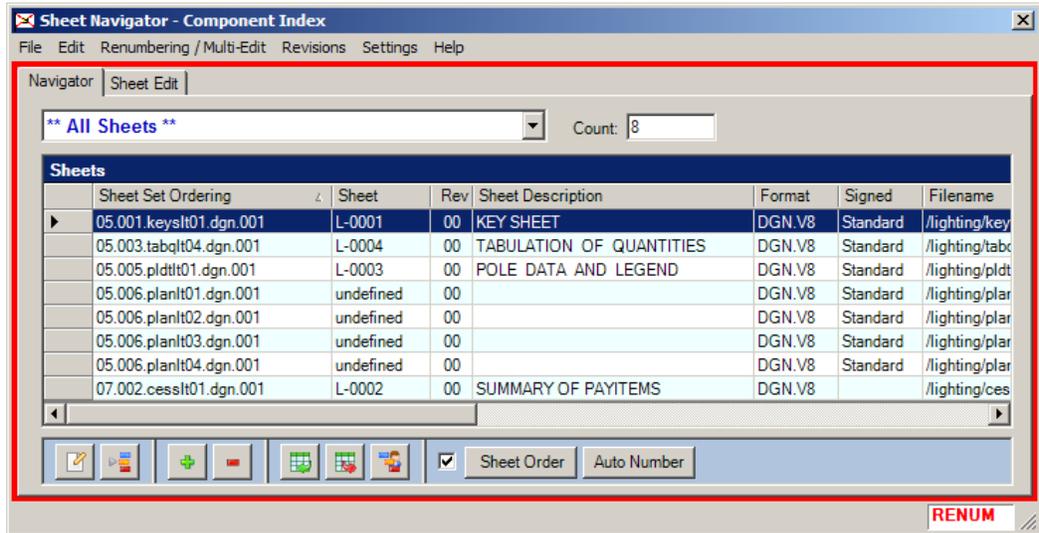
5. Finish and apply changes.
6. The **Cancel & Exit Process** allows the user to stop the process without making any changes just in case an error was made.

## Lab Exercise: Auto numbering and Renumbering

### **AUTO NUMBER THEN RENUMBER SHEETS**

1. Open **dsgnlt01.dgn**. This exercise can be completed from any design file.
2. From FDOT Menu, select **Utils > Label Sheets (Sheet Navigator)**. This opens Sheet Navigator.
3. In **Sheet Navigator**, select the **Navigator** Tab.
4. In the **Navigator** tab, select **File > New**. This opens Create New Index.
5. Select the **Component** option. This creates sheetinfo.xml in the **Lighting** folder. All other discipline folders are ignored.
6. Select **Renumbering/Multi-Edit > Start process**. This adds several options to the dialog.
7. Click **OK** on the Warning dialog. This is message that prompts the user to ensure that the Project Index is current.
8. Select **Renumbering/Multi-Edit > Auto Numbering > Auto Numbering Mode**. The user could also use the check box at the bottom of the dialog to activate this option.

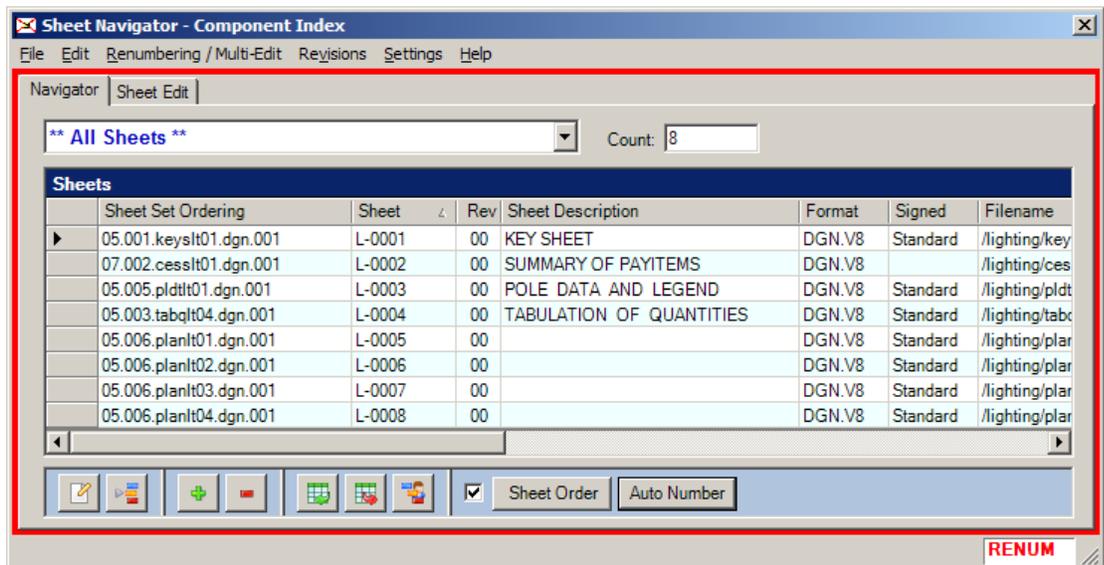
**Note** The following figure shows all of the sheets, some are numbered and others are tagged as undefined, which means that these sheets have not been numbered. When auto numbering is run, plant01 will be numbered L-0001.



**Note** The toggle is on next to Sheet Order / Auto Number at the bottom of the dialog.

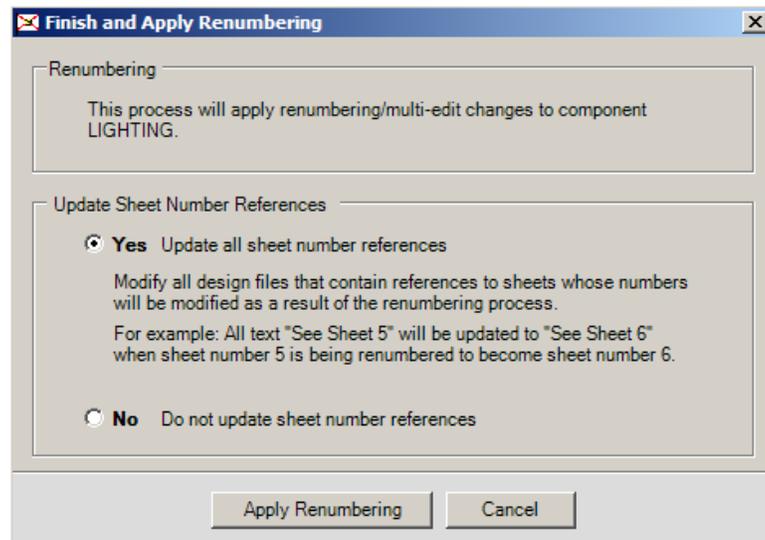


9. Click **Auto Number**.
10. Click **OK** on the **Auto Number Sheets** dialog. This is just information about the logic used to number sheets.
11. Notice in the next figure that the undefined sheets now have numbers.

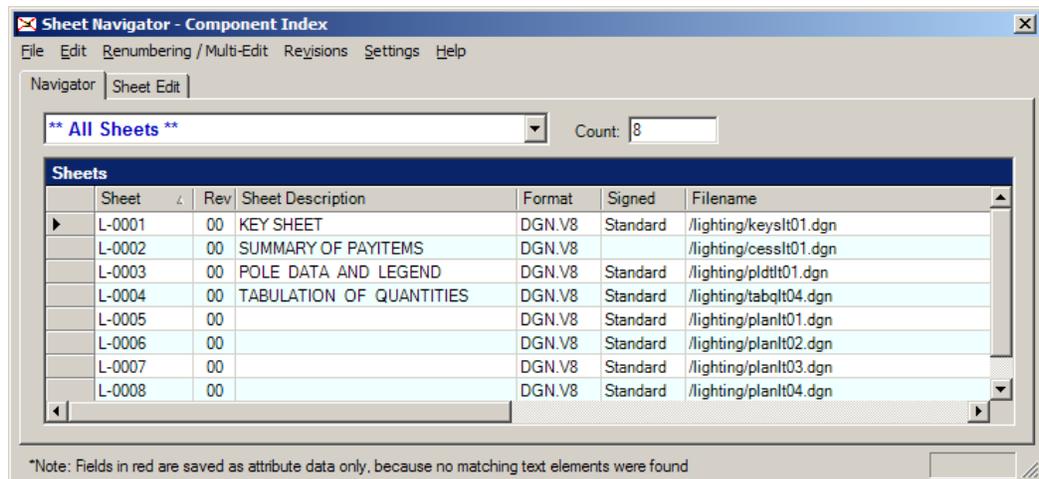


12. Next, save the changes and update the design files.

- Click **Renumbering/Multi-Edit > Finish and Apply Changes**.



- Click **OK** on SheetInfo dialog to apply changes. This will open the MicroStation files and add the sheet numbers to the sheets.
- Notice in the next figure that the sheets are now numbered sequentially. This was accomplished with never entering any of the design files, totally automated. This is a huge time saver on large projects.
- Sheet Navigator can also be used to open files in the index simply by double-clicking on the file.

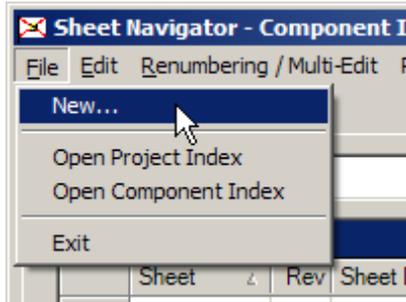


- Double-click on sheet **L-0005**, this will open **planIt01.dgn** and set Sheet Navigator to the **Sheet Edit** tab. Notice that the design file has been edited to have a sheet number.
- In Sheet Navigator, open the **Navigator** tab. Notice that several sheets do not have a **Road Number**. In the next exercise the user will use this tool to add the **Road Number** to multiple sheets.
- Close Sheet Navigator.

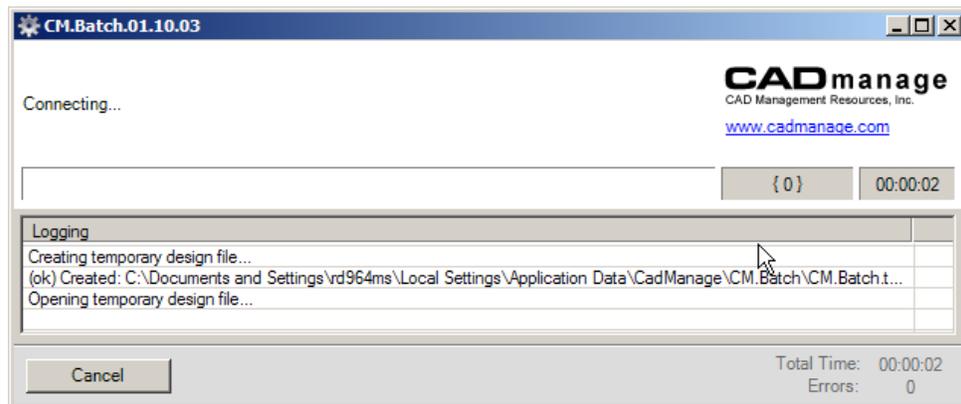
## Lab Exercise: Use Multi-Edit to add Road Number

### ADD SR 415 TO ALL SHEET FILES

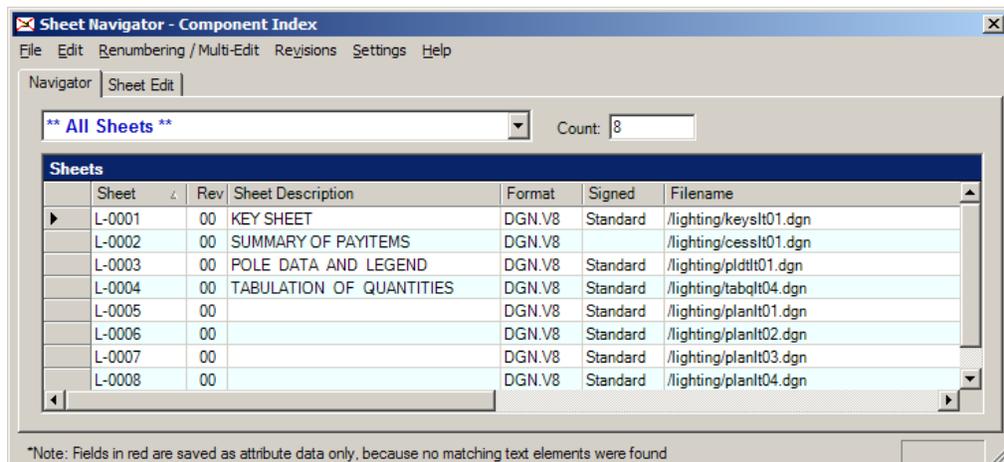
1. Open **Dsgnlt01.dgn**. This exercise can be completed from any design file.
2. From FDOT Menu, open Sheet Navigator.
3. In Sheet Navigator, select **File > New**.



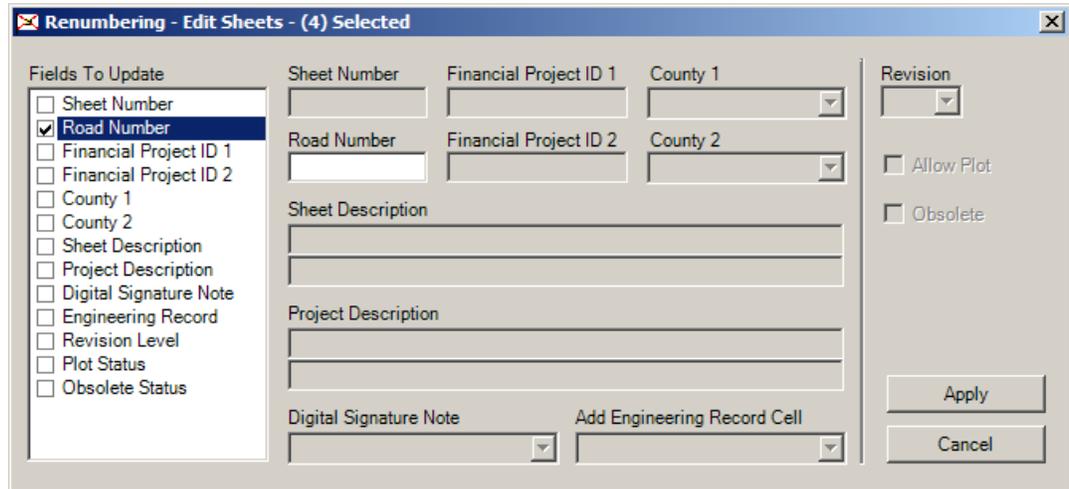
4. Understand that in this exercise the user could have selected **Open Component Index** as we just closed Sheet Navigator and know that it is current. In the real world these files will be accessed by several users, so it is always a good idea to re-create the Index.
5. In Create New Index select **Component**.
6. Click **OK** to overwrite the existing Index file.
7. As the index is being created, view the process in the CM.Batch dialog as shown below.



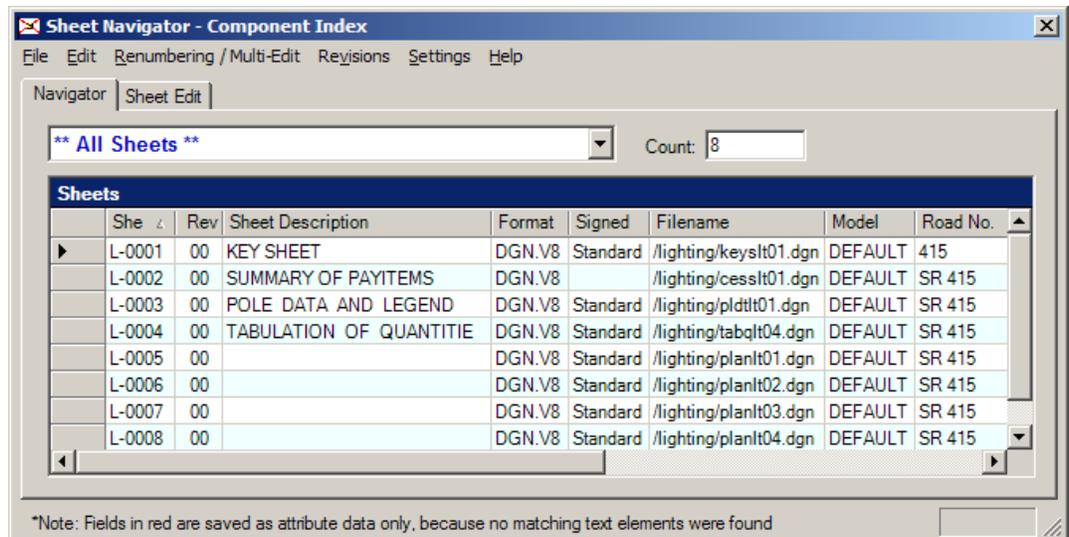
8. When complete, Sheet Navigator will open the component index for review.



9. Select **Renumbering/Multi-Edit > Start process**.
10. Click **OK** on the Warning dialog.
11. Click on sheet **L-0005** and drag down across sheet **L-0008**. This selects the five sheets missing the **Road Number**. The user must click and drag over the box on the far left side next to the **Sheet number** where the black arrow is shown. The user can also use the **Ctrl** and **Shift** keys to select files.
12. Select **Renumbering/Multi-Edit > Edit Sheets**. This opens Renumbering – Edit Sheets.
13. Toggle on **Road Number**. This activates the **Road Number** field in the dialog.



14. Key in **SR 415** in the **Road Number** field.
15. Click **Apply**.
16. Click **OK** on the **Warning** dialog.
17. Click **Renumbering/Multi-Edit > Finish and Apply Changes**.
18. Click **OK** on the **SheetInfo** dialog. This will start the editing process. When finished, **Sheet Navigator** will reload and display the completed index.



19. Double-click on Sheet **L-0005** and review the change.
20. Close **Sheet Navigator**.

## Optional Lab Exercise: Label Sheet Border Title Block

### ***LABEL SHEET BORDER***

In this exercise the user will use Sheet Navigator to fill in the remaining title block information.

1. Open **Bdpllt01.dgn** in the **Lighting** folder.
2. Set the **Plot Scale** to **1.0**.
3. Open **Sheet Navigator**.

4. Populate the **Financial Project ID 1** by clicking in the blank field.
5. Set the **County** to **Volusia**.
6. Set the **Digital Signature Note** to **Standard**.
7. Click **Save**.
8. It is not necessary to fill in the Road Number as we did that in a previous exercise.
9. Close Sheet Navigator.

# 7 PLOTTING TOOLS

## CHAPTER OBJECTIVES

In this chapter the following topics will be covered:

- Plotting In MicroStation
- Plot to PDF
- Save Configuration file

## INTRODUCTION

This section covers the basics of plotting from within MicroStation. FDOT delivers a number of plot drivers that can be used to plot hard copy paper plots or electronic post script or pdf files. The plot drivers control how MicroStation displays the graphics on paper or in an electronic file.

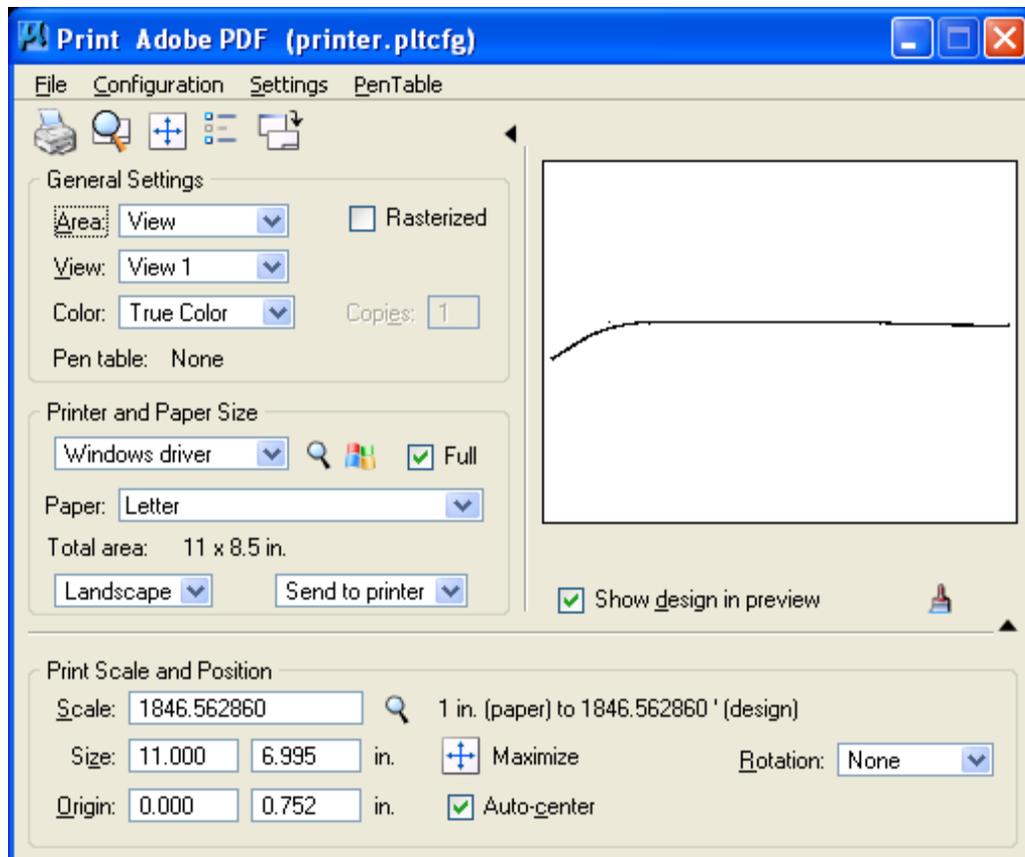
Users can produce plots several different ways through MicroStation. Each district office may have its own set of plotting procedures and plot drivers, contact the CADD manager if there are any questions regarding plotting. The intention of this chapter is to explain two plotting options, Plotting through MicroStation and plotting to a PDF file.

FDOT delivers a document in the FDOT2008\RESOURCES\plot\ directory that better explains all of the delivered plot drivers. Review this document before plotting as there is important information that may be helpful.

## PLOTTING IN MICROSTATION

The plot dialog can be opened from the MicroStation tool bar or menu option **File > Print**. This will open the Print dialog as shown below. Depending on your office/site standards, the print dialog opens with a standard plot driver. This is a Workspace Configuration setting and should be set by the CADD manager. In this course guide, you will be using the **fdotprinter.pltcfg** for plotting to a device. **Fdotprinter.pltcfg**, as described in the help document, is a copy of the Bentley **printer.pltcfg** driver with weights and styles set to FDOT standards.

**Note** Many of the old file formats (PLT, INI, SPC) have changed in MicroStation XM. The old formats can be used in XM, but any files created using the new formats in XM will not be backwards compatible.

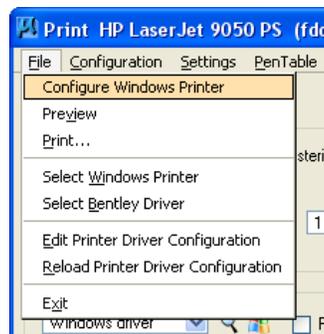


MicroStation's print engine required many changes for the V8 XM Edition to ensure compatibility with this edition's reworked graphics display subsystem. In addition, there are a number of other upgrades to printing functionality.

We will discuss what is new with plotting in MicroStation XM and will see how to edit the new printer drivers and pen tables later in this chapter.

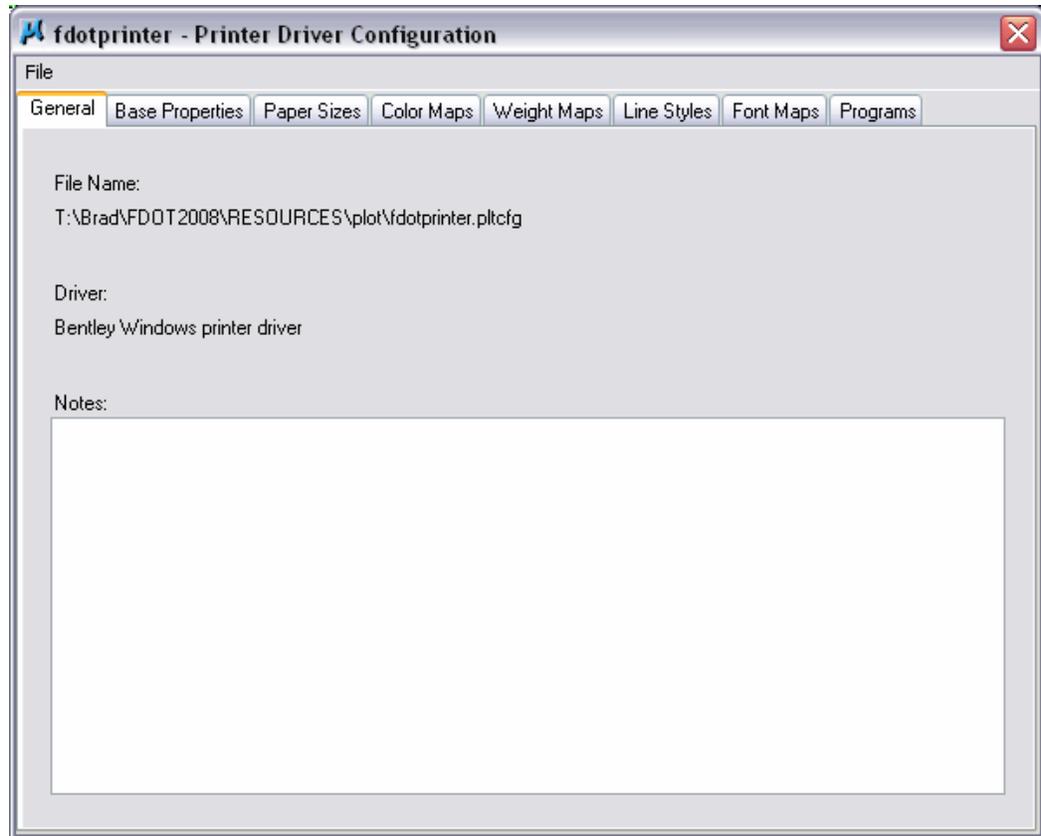
## FILE MENU - PRINT DRIVER CONFIGURATION

The **File** menu contains options for setting up the plots, previewing the plot, selecting and editing a plot driver, and reloading the driver after editing.



The format of the printer drivers has changed to .XML and they now have the extension PLTCFG. MicroStation XM will continue to support many of the old PLT files but Bentley encourages users to convert their existing drivers because they will drop support of the PLT format at some point in the future. FDOT has converted all of the drivers normally provided and include only the PLTCFG version in the FDOT2008 Software Suite.

Since MicroStation XM supports both PLT and PLTCFG files the Print dialog was enhanced to recognize which type of printer driver is currently attached and it opens the appropriate editor when you select "Edit Printer Driver Configuration" from the File menu. PLT files will open in Notepad, just as they did in the past and PLTCFG files will open in a new editor that is included in MicroStation XM.

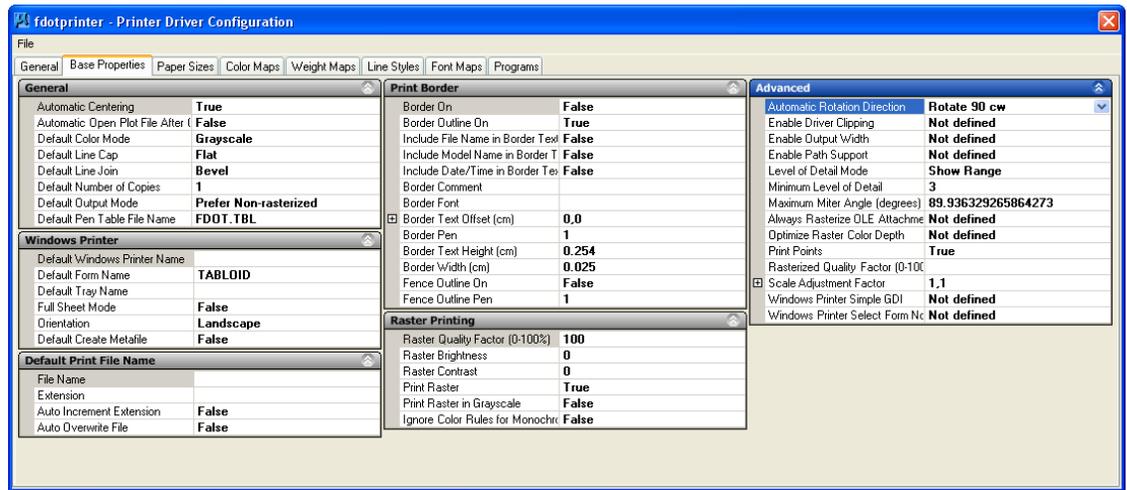


A new user interface is provided for creating and editing the new PLTCFG printer driver configuration files. The new tab based interface with drop-downs to define optional setting will reduce the chance of typos.

### **GENERAL TAB**

The General tab displays the file name and type of driver that is currently being edited. It also provides a notes area where the user can provide a description of the driver and any important instructions for its use. This is equivalent to the comments that were common in the top of many of the old PLT files.

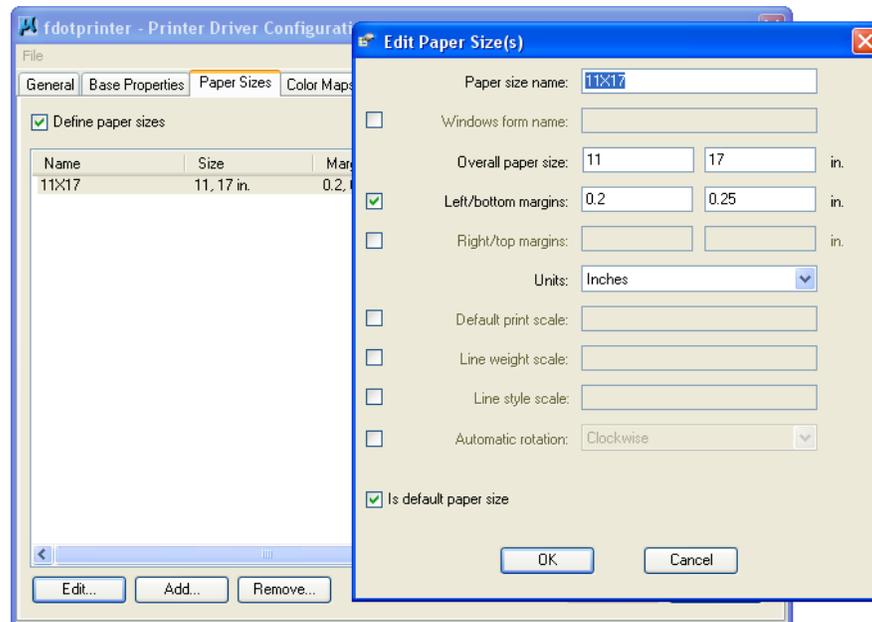
## BASE PROPERTIES TAB



The Base Properties tab is divided into several categories. This is where most changes will be made when customizing a driver. The dialog is resizable and each category can be expanded or minimized individually.

When editing a printer driver, keep in mind that, many of these settings control the default values that will appear in the Print dialog. When a driver is configured properly the end user should not be required to make adjustments in their normal plotting process.

## PAPER SIZES TAB

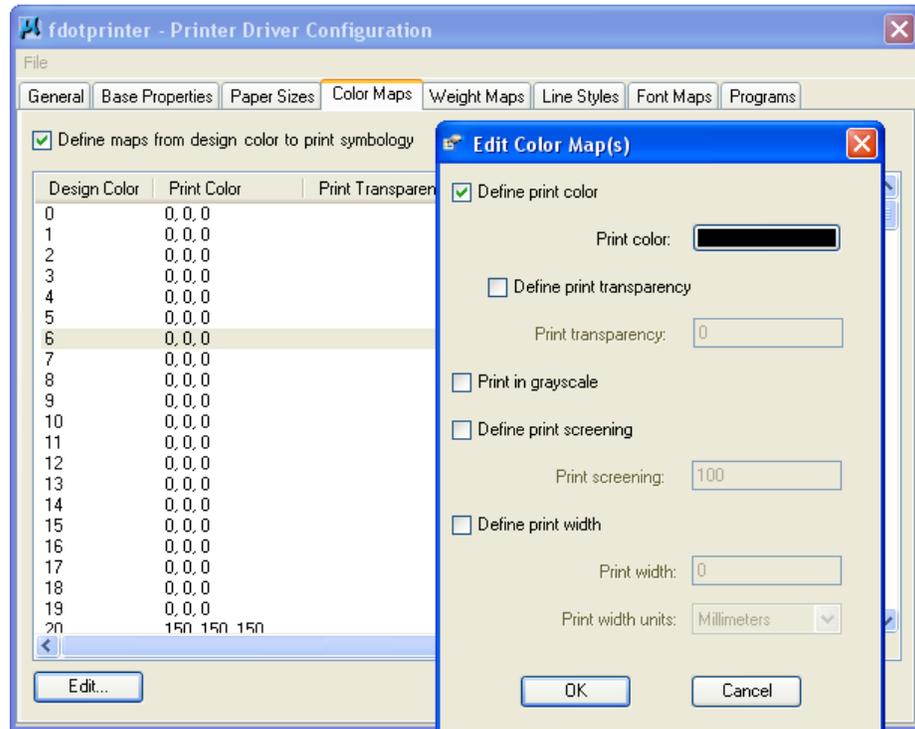


The Paper Sizes tab allows you to define the page size and layout for each paper size that will be available when using the selected driver.

For the sheet to default to the correct scale in the Print dialog the paper size must be properly defined. In MicroStation V8 the size record was equal to the size of the plot border:  $size=(10.600,16.500)/num=11/off=(0.20,0.29)/name=17x11$ .

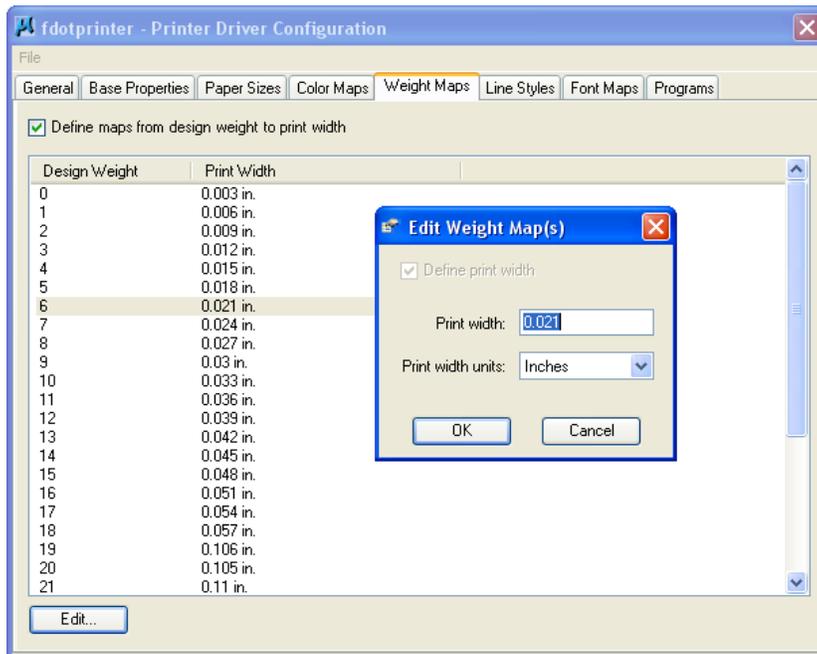
In MicroStation XM the “Size” will equal the paper size, which is 11X17, and the margins are used to adjust the printable area to match the size of the plot borders, which are 10.6 x 16.5.

### COLOR MAPS

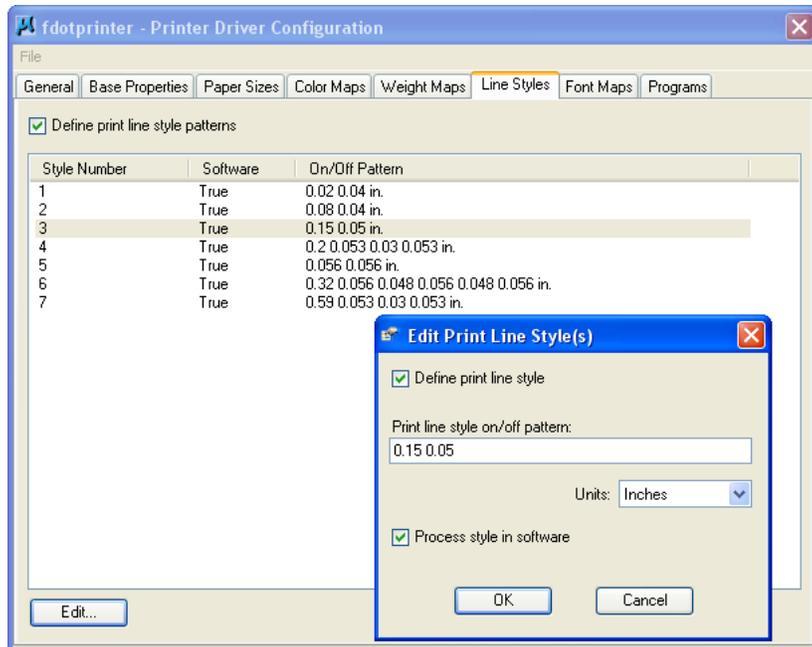


The Color Maps tab allows you to define the color to be printed for each color in the design file. Typically FDOT drivers are configured for black and white printing with only color 20 defined as a grayscale color.

### WEIGHT MAPS

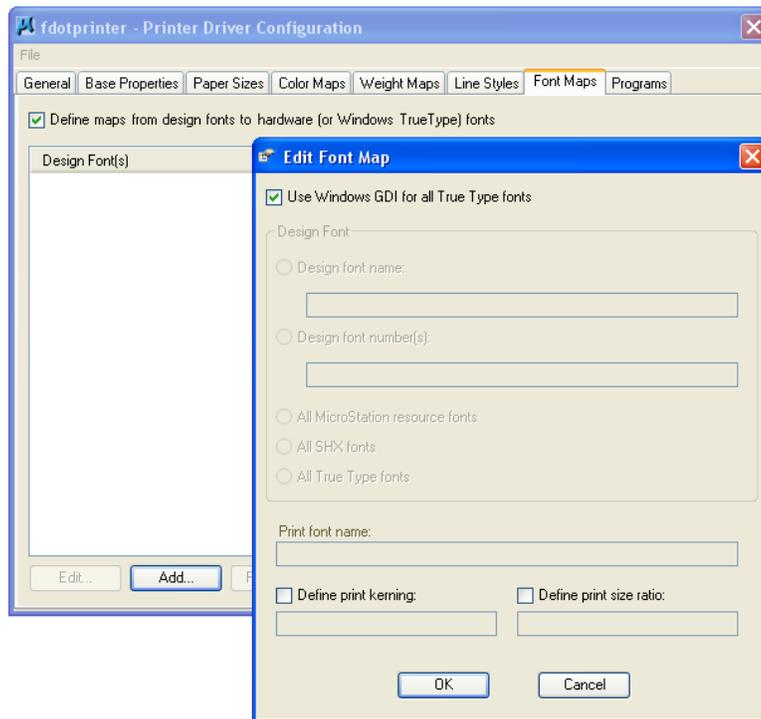


The Weight Maps tab is used to define the thickness each line weight will be printed at. These settings may need to be adjusted, depending on hardware, to get a quality print that can be reproduced or copied well.



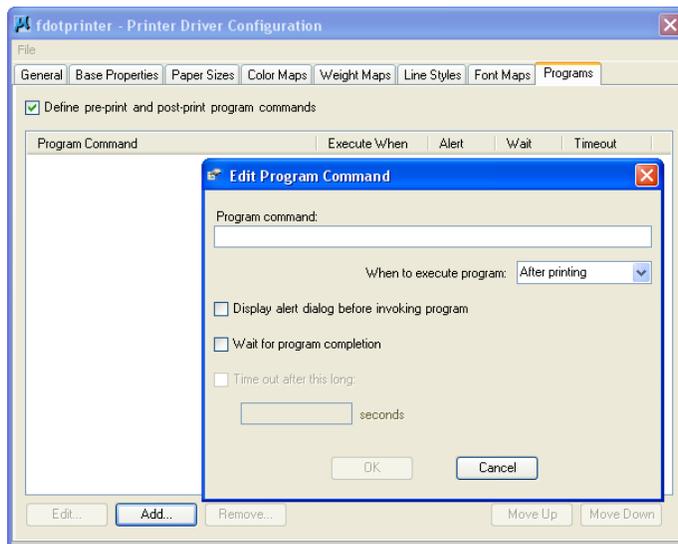
The Line Styles tab is used to define the way each of the standard MicroStation line styles will be printed. These styles have been customized in each of the FDOT printer drivers.

### FONT MAPS



The Font Maps tab allows you to replace the MicroStation fonts with Windows fonts when printed.

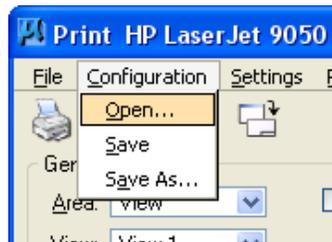
## PROGRAMS



The Programs tab allows run a program either before or after the print is processed.

## CONFIGURATION MENU

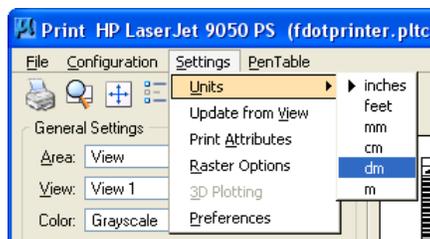
This menu contains options for Opening and Saving **Configuration** files. **Configuration** files are used to store settings that allow users to easily recreate plots.



Example: You have your plot dialog set up with all of the settings needed to produce a paper plot that looks like it is supposed to; you save this by clicking **Configuration > Save**. This creates an .ini file that can be loaded the next time the user needs to plot a sheet. All of the settings will be exactly the same.

## SETTINGS MENU

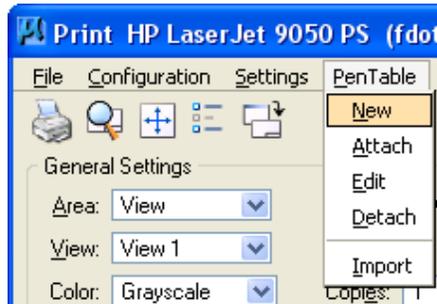
The **Settings** menu contains options for setting the Units (inches, feet, mm, cm, dm, m), Update from View, Print Attributes (like level symbology and whether or not to plot the print border along with several other attributes), Raster Options, 3D Plotting (ghosted) and Preferences.



A new Print Preferences dialog was added enhancing the capabilities in a more user friendly layout.

## PEN TABLE MENU

The **PenTable** menu is for Creating, Attaching and Editing Pen Tables. Pen Tables can be used to do several things during the plot process. FDOT delivers one Pen Table that fills in the fields at the bottom of the plots with the file name, date and user name. This file can be modified to perform other functions but understand that any modifications made will affect all users if the Pen Table is located on the server.



## PRINT ICONS



- Submits the print



- Opens a Print Preview window



- Maximizes the plot to fit the printable area



- Opens the Print Attributes dialog



- Updates the print preview to match the design file

## GENERAL SETTINGS

The **General Settings** area is where you select the plot area and which view to plot from. It also shows which if any pen table is loaded, how many copies to plot and the color status.

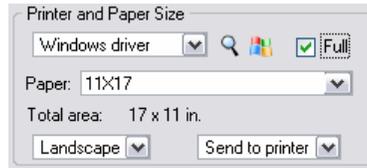


Rasterized option was added in MicroStation XM. This option should only be used for rendering or transparencies because it generates larger plot files and is a considerably slower process. When this option is selected MicroStation will convert both raster and vector data into a single raster image and send it to the printer.

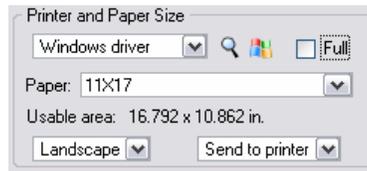
**Note** The Rasterized toggle option is not for printing files.

## PRINTER AND PAPER SIZE

The **Printer and Paper Size** section is for selecting whether to use a Windows Printer or a Bentley Driver. Clicking on the magnifying glass allows you to browse and load a plot driver. Clicking the Windows icon lets you configure the windows printer. You can also select the paper size and whether or not to plot as Landscape or Portrait. The Full Sheet toggle, when on will maximize the print size to the selected paper size as seen in the figure below.

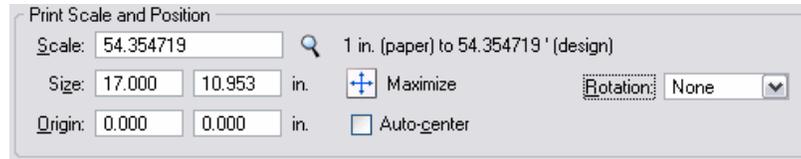


The figure below shows the same plot area with Full Sheet cleared.



## PRINT SCALE AND SIZE

**Print Scale and Size** is where you fill in an exact plot scale. Typically, how this works is you place a fence around the plot border of the design file; this will calculate a scale and display it in this portion of the dialog as seen below. Next, you round this odd number up to the actual scale. In the example shown below the actual print scale is 100.00.



This is one of the settings that can be saved into the settings file so when loaded for each plot the scale will always be set to the correct scale. There is the ability to adjust the X Origin and Y Origin print position. These values change the position on the print on the paper.

## CONVERTING PLT FILES TO PLTCFG

The PLTCFG files are .XML files so just changing the extension will not convert the files. The user must select an existing PLTCFG file to begin because if a PLT file is active in the Print dialog Notepad will be opened when you select Edit Printer Driver instead of the new PLTCFG editor.

### STEPS TO CONVERT PLT TO PLTCFG

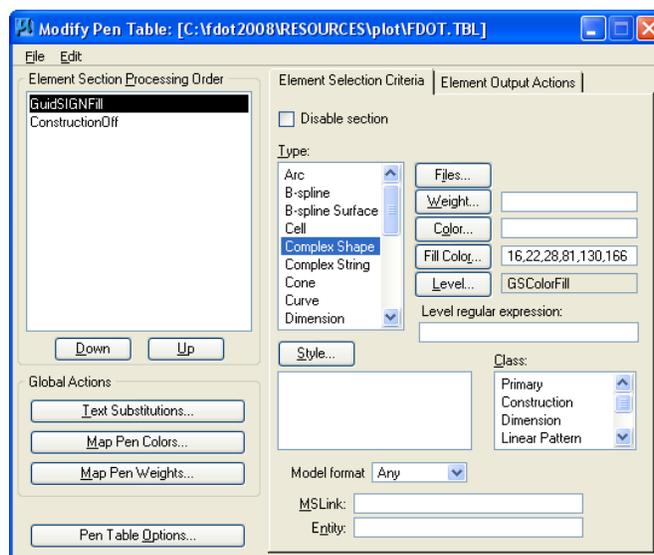
1. Start MicroStation using the FDOT2008 icon and open a file with a sheet border.
2. Fence the sheet border.
3. Select File > Print from the MicroStation menu to open the Print dialog.
4. Select the Bentley driver option and click on the Select Printer Driver Configuration Fill button to select a driver.
5. Navigate to the \FDOT2008\RESOURCES\plot directory and select any PLTCFG file to edit.
6. With a PLTCFG file active in the Print dialog select File > Edit Printer Driver Configuration from the Print dialog menu.
7. The new Printer Driver Configuration editor will open. From the editor select File > Open.
8. Navigate to the PLT file to be converted and click on the open Button.

Notice that the PLT file was opened read only. PLT files opened in this editor can only be opened with read access. To modify the file you will need to save it as a PLTCFG file which will convert it to an .XML file instead of the ASCII text format used for PLT files.

9. Select File > Save As from the menu and save the file as a .pltcfg.
10. Adjust Paper sizes. Now that the printer driver has been converted to the new format you will need to adjust the paper sizes as shown earlier.

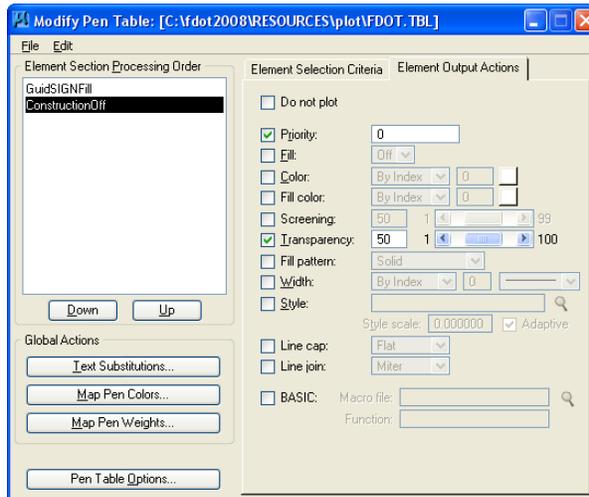
## PENTABLE ENHANCEMENTS

### PENTABLE - ELEMENT SELECTION CRITERIA



Wildcards can be used to select levels by entering the expression in the “Level regular expression” field and Tags have been added to the list of element types available.

## PENTABLE - ELEMENT OUTPUT ACTIONS



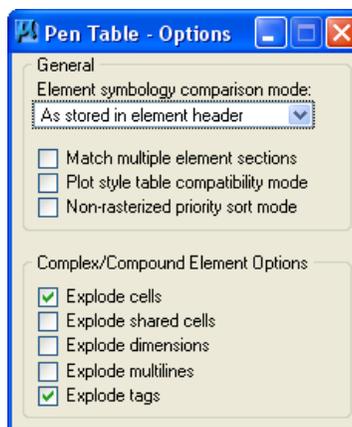
### PEN TABLE TRANSPARENCY

Pen table transparency is supported for any printer driver capable of printing in rasterized mode. If pen table transparency is used when printing in non-rasterized mode, the transparency values do not have any effect.

### PEN TABLE PRIORITY

Pen table priority does not have any effect for printing 3D files. Priority is implemented for printing 3D files through Z depth, using hardware acceleration when possible, so the pen table is no longer required to make multiple passes through the element list. This permits some actions that were not possible with the 2004 Edition, such as assigning different priorities to individual components of a shared cell.

## PENTABLE - OPTIONS



You can set up a pen table to apply more than one section to an element. If Match multiple element sections is on in the Pen Table - Options dialog box, the sections will be selected and applied in descending order, starting at the top of the list and working downwards.

If this setting is off (the default), once a section has been selected by its input criteria and its output actions applied, pen table processing on that element stops. In the V8 XM Edition the Element symbology comparison mode setting in the Pen Table Options dialog box affects only

the manner in which the input criteria treats level symbology. There are two modes from which to choose:

- As stored in element header — the element header symbology is matched against the input criteria.
- As displayed in view — the view symbology is matched against the input criteria.

## PEN TABLE - EDIT

The following are the steps that will modify the standard FDOT pen table (FDOT.tbl) so that all of the elements in a referenced file will be plotted as if they were all color 20.

1. To edit the **Pen Table** select **PenTable > Edit** from the menu. This will open the **Modify Pen Table**.
2. Make a copy of the standard **FDOT pen table** by selecting **File > Save As** from the menu and give it a logical name.
3. Select the last item in the **Processing Order** field and then select **Edit > Insert New Section Below**.
4. The **Insert Section** dialog will appear prompting you for a Name. Enter a logical name.
5. Click **OK** to continue.

**Note** Make sure the new item is selected in the Processing Order field and then select all of the items in the Type field as shown below. The easiest way to do this is to click on any one of the items and then hit Ctrl + A on the keyboard. If you only wanted to gray scale a certain type of element like a shape then you would only select the appropriate items in the Type field.

6. Click the **Files** button to define the references to be processed.
7. The **Identify Files** dialog will appear. In the bottom field enter the logical name of the reference to apply the resymbolization to or part of the name and wildcards for files with multiple sheets.

**Note** When specifying a logical name for a reference in the pen table, you can enter the complete logical name, or you can enter an expression pattern consisting of one or more wild cards. The following table identifies the wild cards that you can use for matching logical names.

### Wild Card Used to

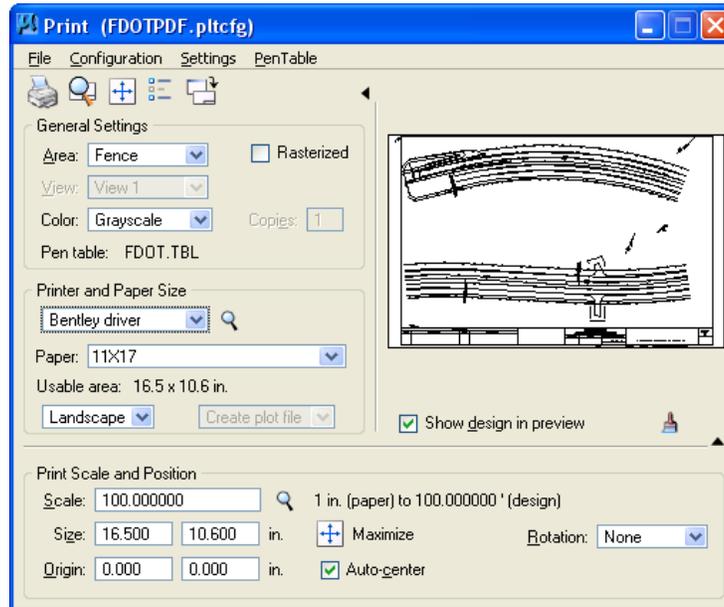
- (.) Match any character. Serves as a single character wild card.
- (\*) Match zero or more occurrences of the preceding character. Used in combination with any character or with the single character wild card (.). Automatically includes the root word.
- (+) Match one or more occurrences of the preceding character. Used in combination with any character or with the single character wild card (.). Automatically excludes the root word.

8. Click **Add**.
9. Add any other logical names to process and then click **OK** to return to the **Modify Pen Table** dialog.
10. From the **Modify Pen Table** dialog box, click on the **Element Output Actions** tab.
11. Select the **Color** checkbox and set the color to **20** as shown below.
12. Select **File > Save** from the menu to save the changes.
13. Close the **Modify Pen Table** dialog.
14. Select **File > Reload Printer Driver Configuration**.

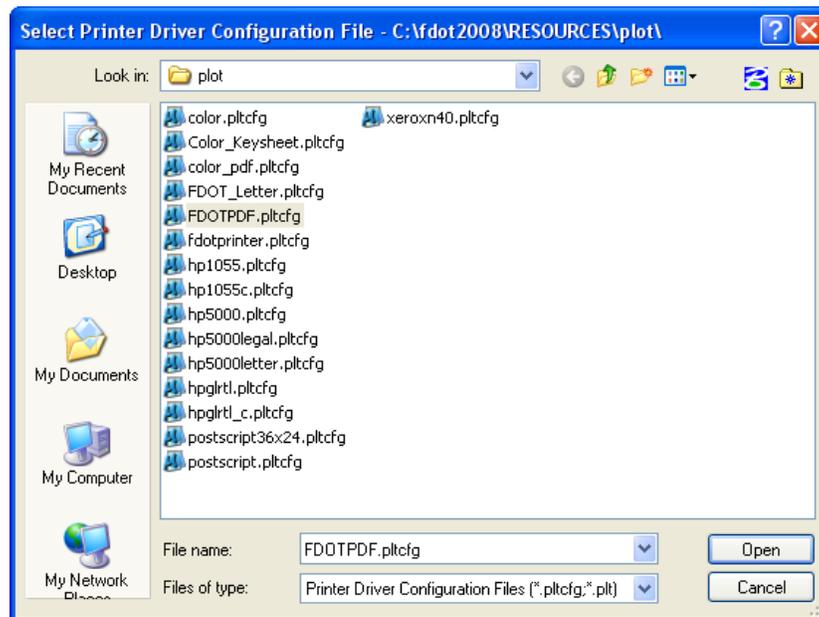
## Lab Exercise: Create A PDF plot file

### PLOT TO A PDF FILE

1. Open **Plant01.dgn** in the Lighting folder.
2. Place a fence on the sheets plot border. This is the red shape around the outside of the border.
3. Click on the **Print** icon or select **File > Print** from the MicroStation menu bar. This opens the Print dialog and sets a default plot driver.

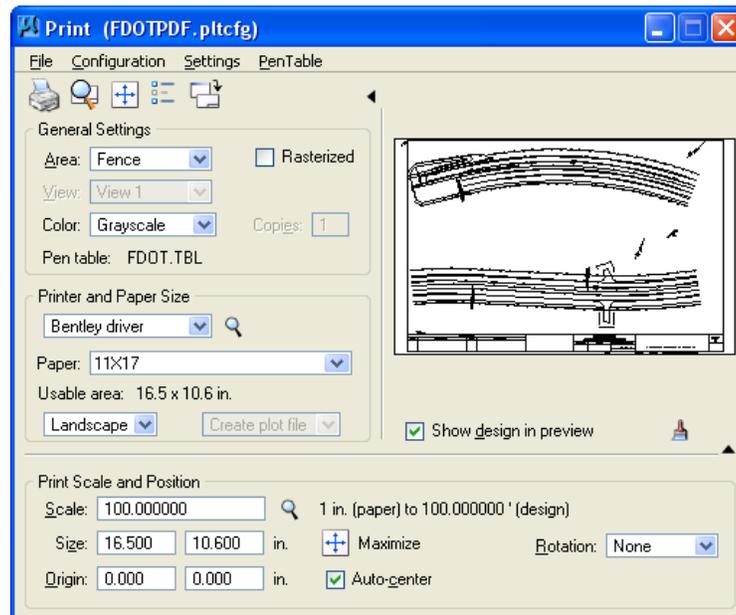


4. In the Print dialog, select **File > Select Bentley Driver**. This opens Select Printer Driver Files.

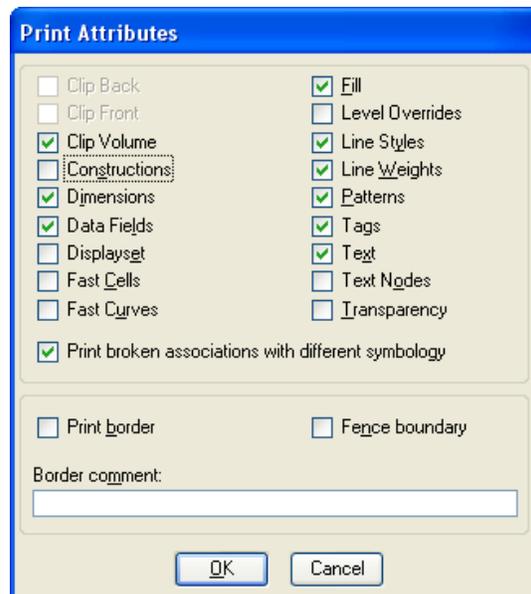


5. Browse to **FDOT2008\RESOURCES\plot** and select **fdotpdf.pltcfg**.
6. Click **OK**. This loads the **fdotpdf** plot driver and changes the settings in the Print dialog.

7. This plot driver automatically loads the fdot.tbl pen table; look at the dialog in the **General Settings** area.



8. Set the Paper Size to **17 x 11**. This is the default setting in the plot driver.
9. Set the **Print Scale** to **100.00**.
10. Click the **Print Attributes** icon  or select **Settings > Print Attributes**. This opens Print Attributes.

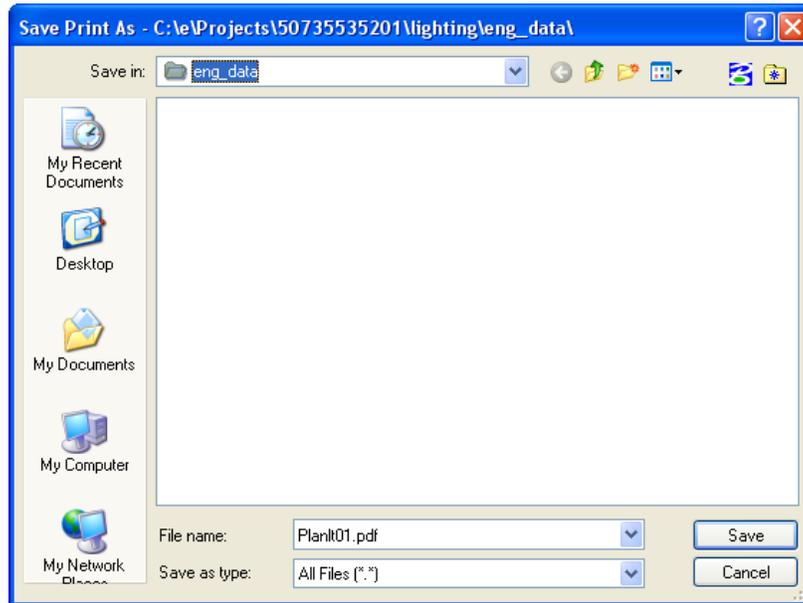


11. Toggle off **Constructions**. This turns off the red plot border.

**Note** It is also recommended to toggle off the Print Border and Fence Boundary options.

12. Click **OK**.
13. Click the **Print** icon. This opens Save Print As.

**Note** The default location for the plot files is the **eng\_data** folder under the discipline folder as shown below.

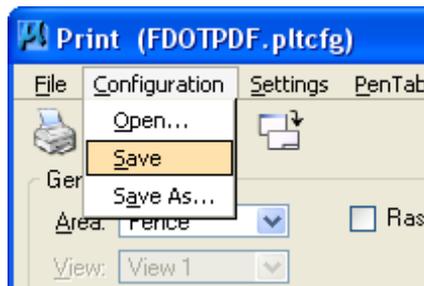


14. Click **OK**. This accepts the default file name and location and creates the pdf file
15. From FDOT Menu, select **Standard > Explore Current Working Directory**.
16. Browse to the **eng\_data** folder.
17. Double-click on **PlanIt01.pdf**. This will open the plot file for review.
18. Close the **pdf** file.

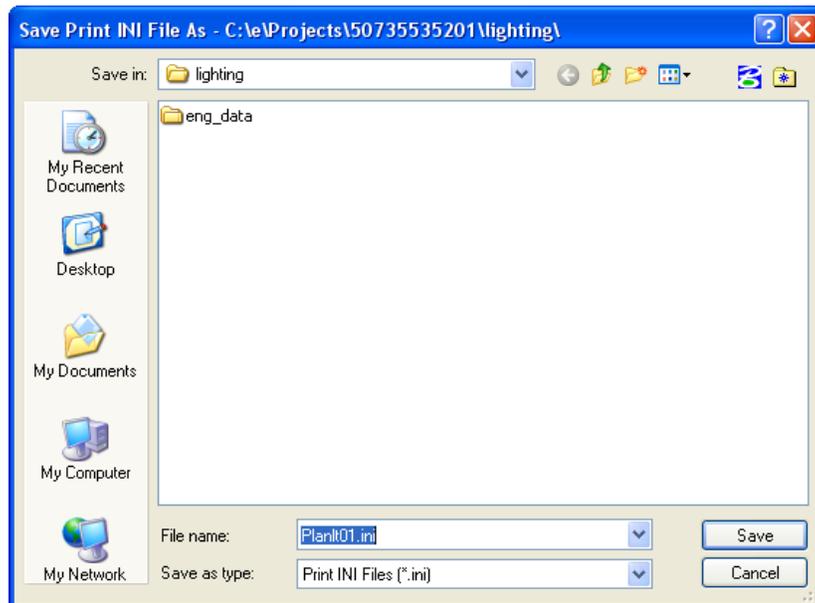
**SAVE THE PRINT SETTINGS**

Now that the user has all of the print settings set, it is recommended to save these settings for future use and also for other users to use for consistent output.

1. In the Print dialog, select **Configuration > Save**. This opens Save Print INI File As.



- In Save Print INI File As, type in **Lighting-PDF**. The file name will default to the MicroStation file name.



- Click **Save**. This saves the settings to an **ini** file that can be used in subsequent plot jobs.
- In the Print dialog, select a different plot driver. **File > Select Bentley Driver**. Select **fdotprinter.pltcfg** for this example.
- Notice how all of the plot settings have changed.
- In the Print dialog, open the Configuration file just saved, **Configuration > Open**.
- In the Lighting folder, select **Lighting-PDF.ini**.
- Click **OK**. This will set all of the plot preferences the way you saved them for the pdf plot.
- Close the Print dialog.