State of Florida

Department of Transportation

FDOT SS4
Automated Quantities

User Training Guide

February 2019

PRODUCTION SUPPORT / CADD OFFICE

TALLAHASSEE, FLORIDA

http://www.fdot.gov/cadd

FDOT SS4 Automated Quantities

Description

This training course details the Florida Department of Transportation (FDOT) Quantity Workflow developed for the Plan Summary Boxes required in FDOT Plan Sets. The participants will learn the use of FDOT and GEOPAK tools required in the workflow. This includes GEOPAK's Design & Computation (D&C) Manager and Quantity Manager, used to create quantity shapes, calculate quantities, export quantities and generate reports. This course also covers the FDOT Linked Data Manager (LDM), used to generate, link and place Plan Summary Boxes in the MicroStation design file.

This course includes, but is not limited to the following:

- D&C Manager
- Drawing Shapes Representing Pavement and Sidewalk areas
- Generating Quantities in D&C Manager
- Linked Data Manager
- Generating Plan Summary Boxes
- Quantity Manager Basics
- Pay Items and Quantities
- Quantity Manager Reports
- Exporting Data to Designer Interface
- Generating Summary of Pay Items Sheet

Objectives

Students will learn how to use GEOPAK's Design & Computation Manager, Quantity Manager, and the FDOT Linked Data Manager tools to draw, calculate, and document design quantities.

Audience

FDOT Designers and Engineers

Prerequisites

The following course is required:

FDOT Roadway Design and 3D Modeling – Basic 2D Rule Based Design Training

Participants need to have a basic understanding of Computer Aided Drafting and Design (CADD) using MicroStation, a basic understanding of GEOPAK concepts and a solid understanding of the engineering necessary to design a Roadway.

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Table of Contents

1 INTRODUCTION

OBJECTIVES

Review the workflow and components of computing quantities.

- Define the Workflow for Project Quantities and Recommended Tools
- Requirements of Florida Department of Transportation (FDOT)

DOCUMENT STYLE

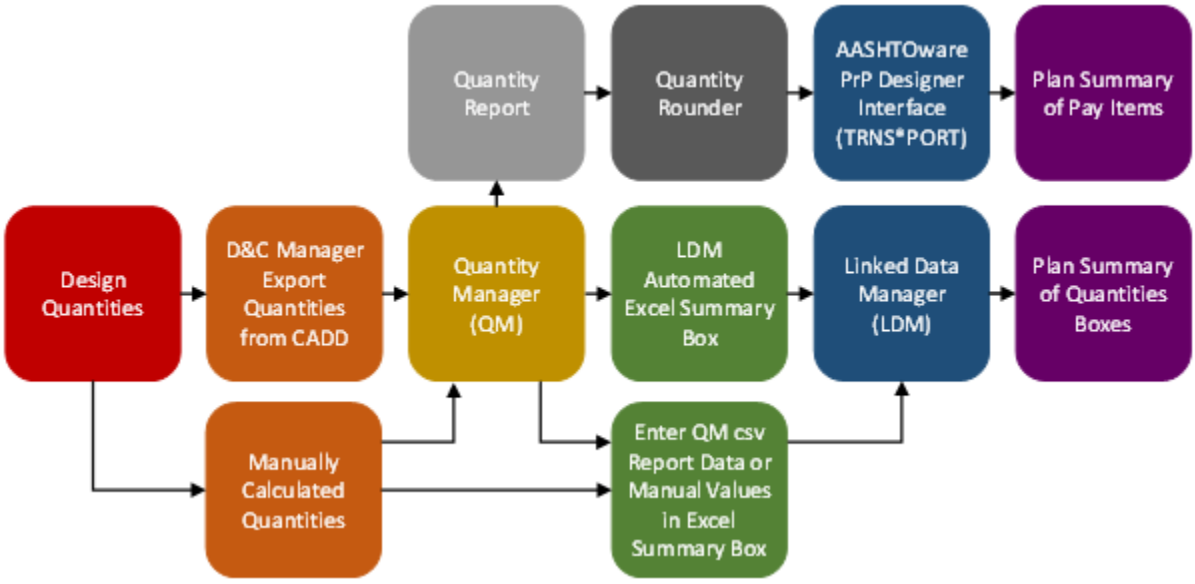
The following table shows the style conventions used throughout the course guide.

Item	Convention	Example
Menu Names and Commands	Bold, names separated with > symbol	File > Open File > Compress > Design
Dialog Box Actions	Bold	Click the **Apply** button. Click the **Graphic Select** button to the right of the *Horizontal Alignment Include* box. In the *Segment Type* list, click **Lines**.
Dialog Box Field Names	Italic	Key in **Hemfield Road** in the *Alignment Name* field. Click the **Graphic Select** button to the right of the *Horizontal Alignment Include* field. In the *Segment Type* list, click **Lines**.
Key-ins	Bold	Key in **Hemfield Road** in the *Alignment Name* field.
File Names	Italic	. Open the file *Working Graphics.dgn* in the C:\Bentley Training\GEOPAK 101\Project Setup\Practice\ directory.
File Paths	Non-italic	. Open the file *Working Graphics.dgn* in the C:\Bentley Training\GEOPAK 101\Project Setup\Practice\ directory.
New Terms or Emphasis	Italic	. The Template Library contains *templates*, which represent typical sections of the proposed roadway.

AUTOMATED QUANTITIES WORKFLOW

Shown in the figure below, is a workflow that represents the process of creating and providing pay item quantities for FDOT projects. GEOPAK supplies a tool called the Design & Computation Manager (D&C Manager) that is both a design tool and a quantity calculator. The FDOT Workspace is set up to use the D&C Manager items to set the Civil Features for linear design elements. Once the elements are drawn and the quantities computed, the data is transferred into Quantity Manager for review and/or modification. Linked Data Manager (LDM), delivered in the FDOT CADD Software, uses the Quantity Manager database to automate summary boxes in Excel and link them to the MicroStation DGN file.

For those summary boxes which are not automated, CSV reports can be generated from Quantity Manager to help speed up the process of populating the summary box Excel templates from LDM. Quantities not automatically computed with D&C Manager are entered manually into Quantity Manger and the summary box template is populated manually. Finally, reports are generated to export all the quantities in the database to Designer Interface.



FDOT STANDARDS

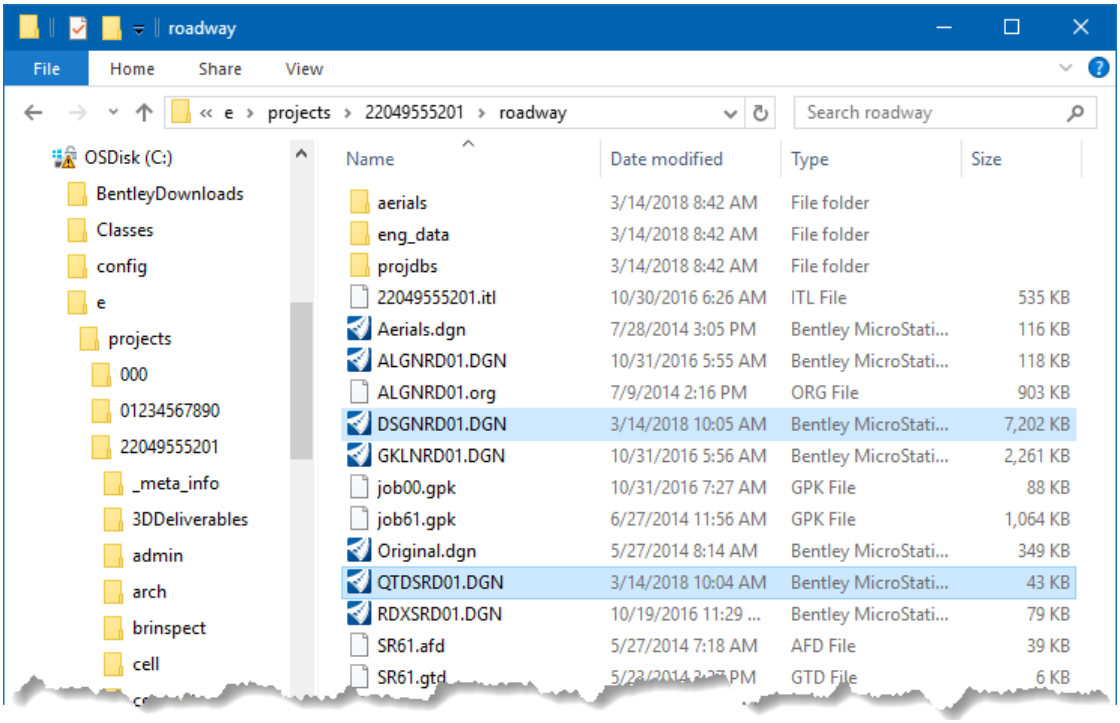
FDOT provides several resources to instruct and aid designers in computing pay item quantities. The Estimates Office publishes the ***Basis of Estimates Manual***, the governing document that specifies how to compute each pay item. The Estimates Office also provides a ***Master Pay Item*** list containing every pay item available for use in Florida. The Production Support CADD Office provides tools to simplify the process of generating quantities. The D&C Manager database (FDOT*.ddb) and several Quantity Manager report styles are delivered with the FDOT CADD Software. The FDOT D&C Manager database is pre-set to comply with both drafting standards specified by the ***CADD Manual*** and the Pay Item Computation Methods supplied by the ***Basis of Estimates Manual***.

FDOT recommends the use of Civil Features for all linear feature drafting to ensure that each element is on the correct symbology and that quantities may be automatically calculated. FDOT also recommends the use of the D&C Manager for all quantity shape drafting for the same reasons. The *FDOT*.ddb* database that is supplied by FDOT includes most of the items that will be used on a FDOT project.

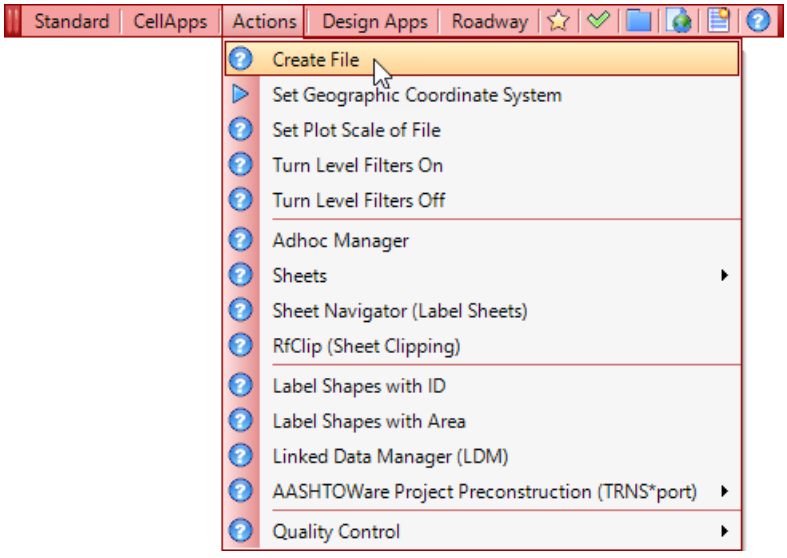
FDOT STANDARD FILES

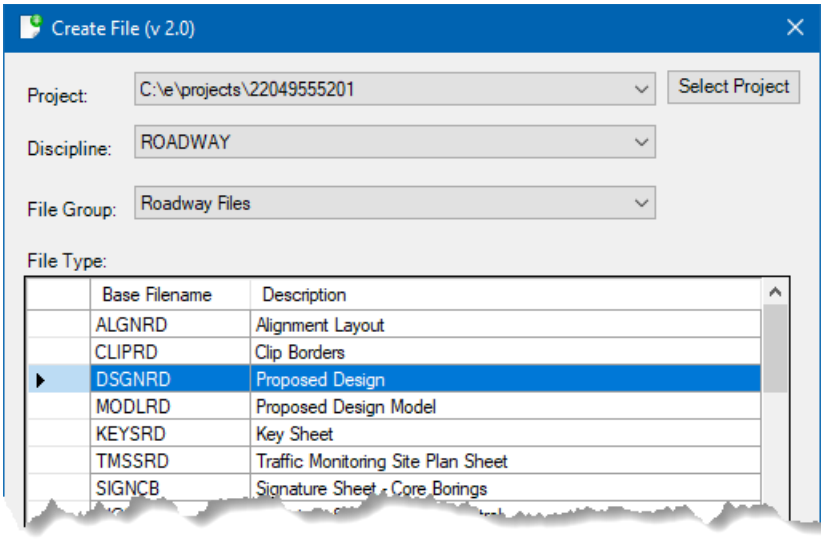
Quantity information is stored in CADD files designated with one of two standard FDOT File Names, located in the appropriate discipline directory:

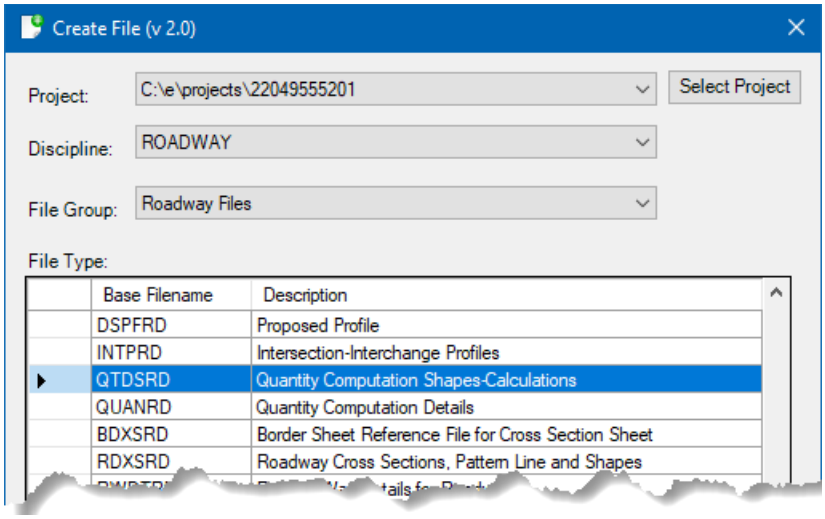
- **DSGN**** – for Linear/Each Features (where ** indicates the 2-letter characters for the discipline)
- **QTDSRD** – for Area/Tonnage/Cubic Yard Features



The FDOT tool Create File available from the FDOT Menu creates these files.







SETTING UP THE QTDSRD FILE

The QTDSRD is the file used to create the shapes required to calculate area quantities. FDOT recommends the use of models within this file instead of creating a separate DGN file for each pay item and its shapes. Each model is named using the pay item number, TRNS*port format or with the use of dashes. Each model should have the Alignment, Design, and TOPO files referenced. These references assist with the creation of the shapes needed as well as to provide helpful information for Construction personnel who need to access this file.

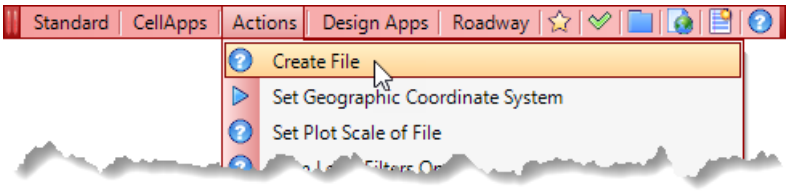
HINT To save time, set up the default model with the desired references, and then copy this model to create the additional models needed for the pay item shapes.

Note Do NOT create shapes for all the area quantities in one model. This makes it difficult for Construction to locate the shapes they need to verify. If the intent is to be able to calculate all the quantities at one time, create the separate models breaking the shapes down by pay item and then reference these models to a single composite model.

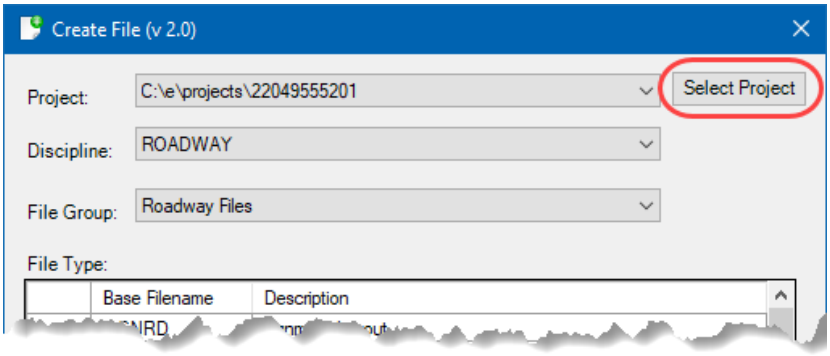
Exercise 1.1 Create and Set Up the QTDSRD File

This exercise uses the Create File tool to create the QTDSRD file. Once created, the user attaches the references to the Default model and copies it to create new models for each pay item number needed to create shapes for generating quantities.

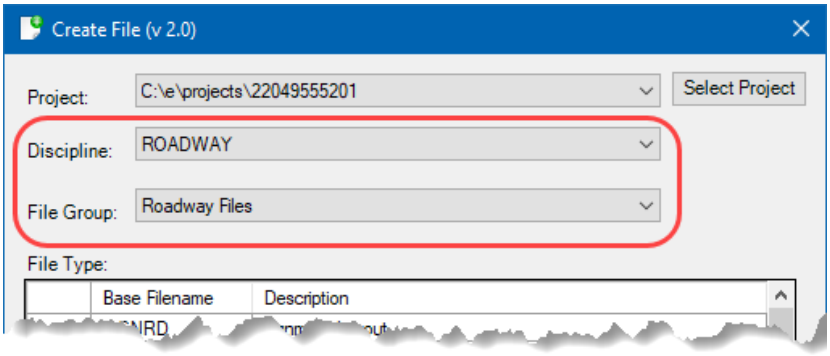
1. Open the MicroStation design file *DSGNRD01.dgn* using the FDOTSS4 icon in the FDOTSS4 folder located on the desktop.
2. On the FDOT Menu, select **Actions > Create File** to open the Create File tool.



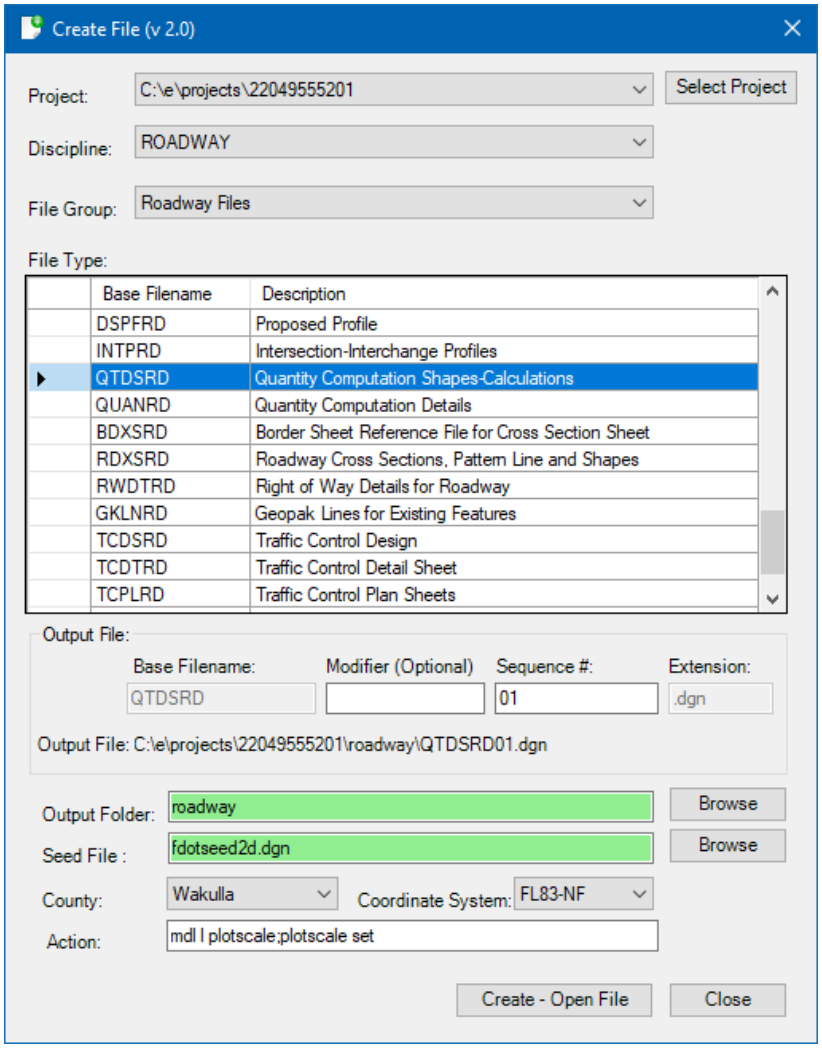
3. In the Create File dialog, click on **Select Project** to set the project directory.



4. Browse to the project directory, C:\e\projects\22049555201\. Click **Select Folder**.
5. In the Create File dialog, complete selection of the *Discipline* and *File Group* as shown below using the drop-down options.

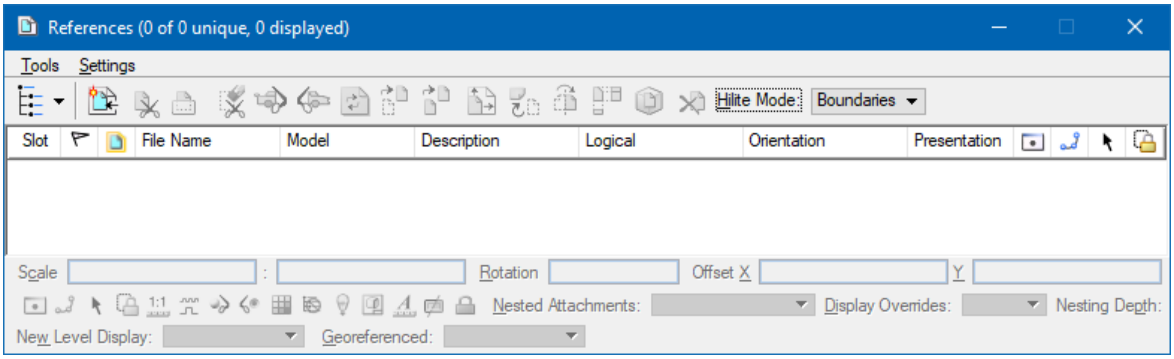


6. Scroll down under *File Type*, select **Quantity Computation Shapes-Calculations** and verify the Output settings. Set *County* as shown and click **Create - Open File**. The application creates the *QTDSRD01.dgn* file and stores it in the *Output Folder* selected.

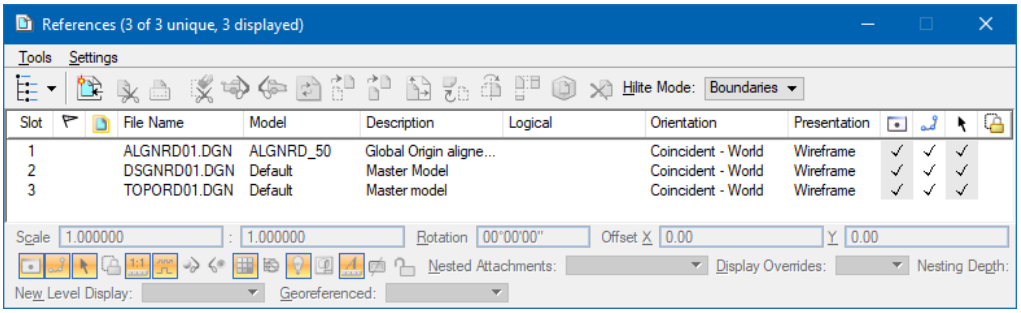


7. Once the new file opens, the Set Plot Scale dialog displays. Click **OK** and then click **Close** on the Create File dialog to close it.

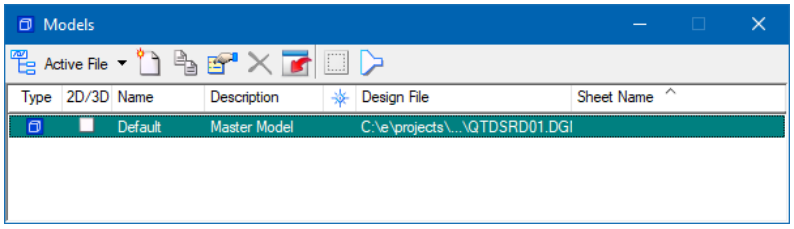
8. On the MicroStation menu select **File > References** to open the References dialog.



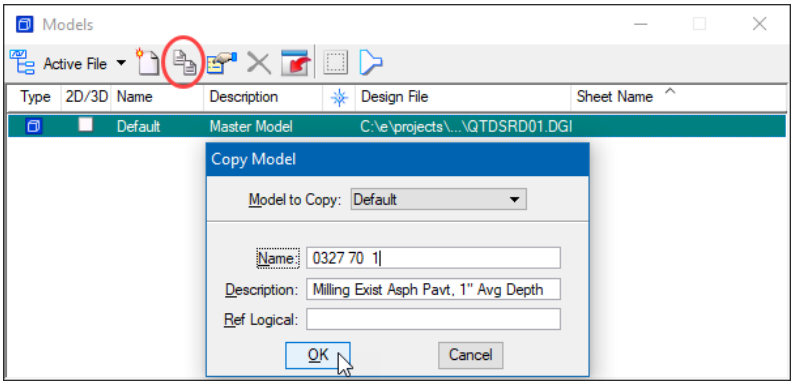
9. Attach the files ...\roadway*ALGNRD01.dgn* model **ALGNRD_50**, ...\roadway*DSGNRD01.dgn* model **Default**, and...\survey*TOPORD01.dgn* model **Default**. (FDOT recommends turning OFF any undesired levels, such as Text, Construction Lines, etc. **Fit the View** and **Save Settings**.)



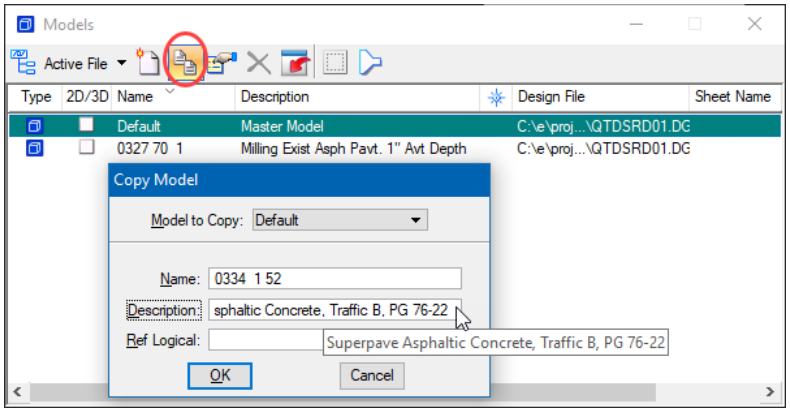
10. On the MicroStation menu select **File > Models** to open the Models dialog.



a. Select the **Copy a Model** icon. Fill out the Copy Model dialog as shown below and click **OK**.



b. Select the **Copy a Model** icon. Fill out the Copy Model dialog as shown below and click **OK**.



11. Close MicroStation.

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2 D&C MANAGER

OBJECTIVES

- Introduce the D&C Manager and Tools
- Explore Identify Item, Display Item
- Set Item Tools in Plans Production

D&C MANAGER DIALOG BASICS

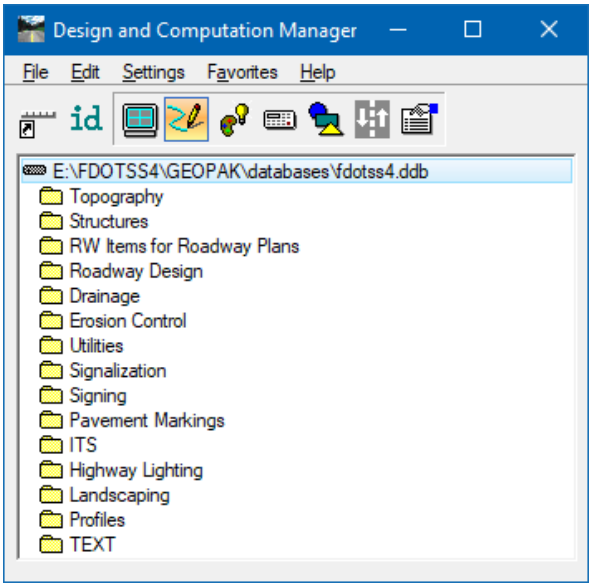
To access D&C Manager, from the *Road* toolbox, click the **Design & Computation Manager** icon. 

<OR>

From the MicroStation menu, select GEOPAK > ROAD > Design & Computation Manager.

<OR>

From the FDOT Plans Development > Quantities Tasks menu, select the D&C Manager icon.



D&C Manager uses a hierarchical database (the *.ddb* file) which stores information concerning functional classification and display preferences for each feature and item used in a MicroStation file. FDOT uses this database to set the Civil Features that control the symbology of elements in the different design Views.

The Production Support CADD Office is responsible for the development of the FDOT standard GEOPAK D&C Manager database. It complies with the CADD Standards as defined in the ***CADD Manual***. This database may need modification for project-specific items or for compliance with District standards. If the user customizes the database, the user saves this customized database into the project directory under the *symb* directory. Saving the database to the project directory is important because this ensures delivery of the modified database with the project. Saving this file to the project directory ensures that the same pay items are available later in the life of the project that are applicable at the time of letting.

MENU ITEMS

The D&C Manager dialog has five menus.

File	This menu creates a new .ddb file, displays an existing .ddb file, saves a .ddb file, save as, merges .ddb files, compresses .ddb files, uses a password for a .ddb file, and exits D&C Manager.
Edit	This menu performs multiple edit functions to the .ddb file: Undo or Redo database changes and Copy, Move, Rename, and Delete database Items and Categories. There are also options to Find an item or Category, Identify a database Item, Create a New Category or New Item, as well as Modify Item and Review Item.
Settings	This menu has six items pertaining to setting default options in D&C Manager and MicroStation, and the methods of computing quantities.
Favorites	This menu allows for storing, recalling and managing frequently used items.
Help	This menu displays the Bentley help files for the D&C Manager. Use this documentation for information not covered by this manual. The exercises in this manual define critical settings required for the FDOT Workflow.

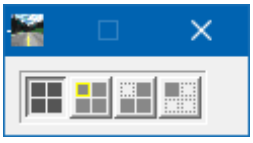
TOOL BAR

D&C Manager has a toolbar for quick access to different modes.

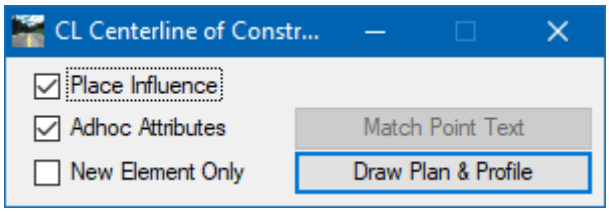
- ***Switch to Toolbox Mode*** - D&C Manager is set up to work in two different modes, dialog box or toolbox. This icon displays the toolbox mode. This toolbox is resizable and dockable. To change the display back to the dialog box, click the Switch to Dialog Mode icon, the last icon on the right. The Place Influence check box is at the left end of the toolbox.

Identify Item - This tool sets the D&C Manager item to match an existing MicroStation element previously drawn by the D&C Manager. If the Identified element does not match an item in the opened database, a message appears in the status bar saying: No matching database item.

- ***Display*** - The Display icon filters the MicroStation elements in the design file to control the display of specific features. This icon expands D&C Manager to show a collection bin. This collection bin is for selecting multiple items at one time. This icon also displays a second toolbox with four icons as seen in the image below. From left to right the icons are Normal Display, Highlight Selection, Hide Selection and Display Only Selection.

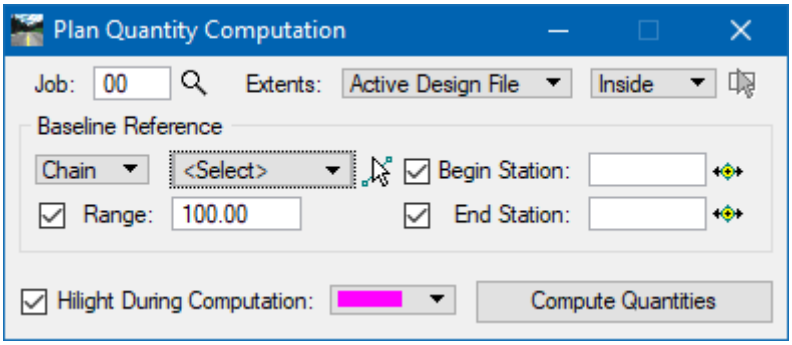


- ***Design*** - The Design icon is used to draw MicroStation elements in the design file with the defined symbology by use of Draw Plan and Profile or in conjunction with MicroStation element placement commands with Place Influence activated.



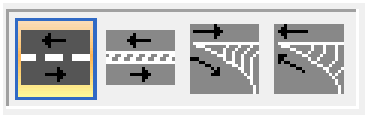
- ***Set*** - The Set icon sets the symbology of previously drawn MicroStation graphic elements in accordance with the parameters of a selected item in the database. This tool applies D&C Manager attributes to an element or selection set of elements drawn without using the Design mode of D&C Manager, or fixes items originally drawn with the wrong symbology. The Set icon also appends, replaces or deletes Adhoc Attributes.

- ***Compute*** - The Compute icon tabulates quantities of items placed as Pay Items using the Design or Set mode. If drafting elements using the MicroStation tools, quantities do not compute unless an attribute is applied using the Set tool. This tool also expands D&C Manager to show the collection bin, allowing for processing multiple pay items at one time. A second toolbox also displays as seen in the figure below.



- ***Shape*** - The Shape icon uses Plan View MicroStation graphics to place shapes required for quantities. This tool displays a second dialog box as shown in the following figure.

- ***Pavement Marking*** - This mode dynamically provides additional options for placing pavement striping and markings. This tool adds four additional tools to D&C Manager as shown in the following figure. The four Pavement Marking tools from left to right are: Striping, Separation, Chevron Diverge, Chevron Merge



Note The FDOT Traffic Plans Course covers the Pavement Marking tools and this manual will not be detailing these tools.

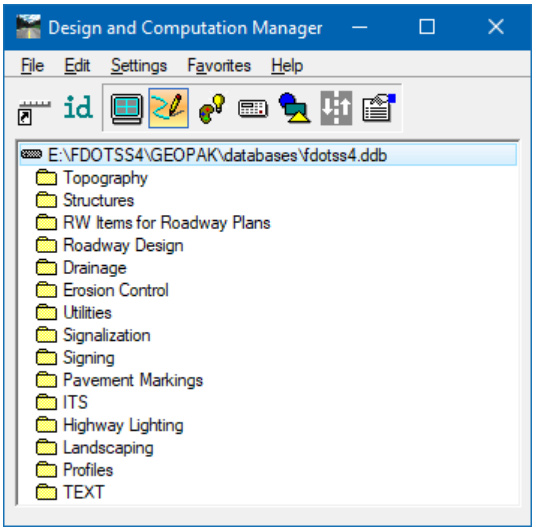
- ***Preference*** - This icon expands the toolbar to include four additional icons to configure D&C Manager. These same tools are also accessible through the Edit menu and Right-click options.

EXPLORING FDOT'S .DDB FILE

FDOT delivers a database file in the FDOTSS4 directory located at GEOPAK\databases*fdotss4.ddb*. FDOT specifically set up this database to create elements with the correct level symbology according to FDOT CADD Standards. The *.ddb* file is set up with discipline directories called Categories. Inside each Category are Items.

Categories

The basic component of the hierarchical tree is the Category, represented by a folder icon. The FDOT database is set up with categories representing the different disciplines. The following figure shows the Categories with a description relative to their discipline. These Categories are composed of Subcategories and/or Items.



Items

The other database component is the Item that correlates to the definition of the elements or feature. This can be a Drafting Item, a Compute Item, a Default Item or a Pavement Item. (FDOT does not use Pavement Items and they are not discussed here). Items contain specific functions related to defined element symbology or quantity calculations.

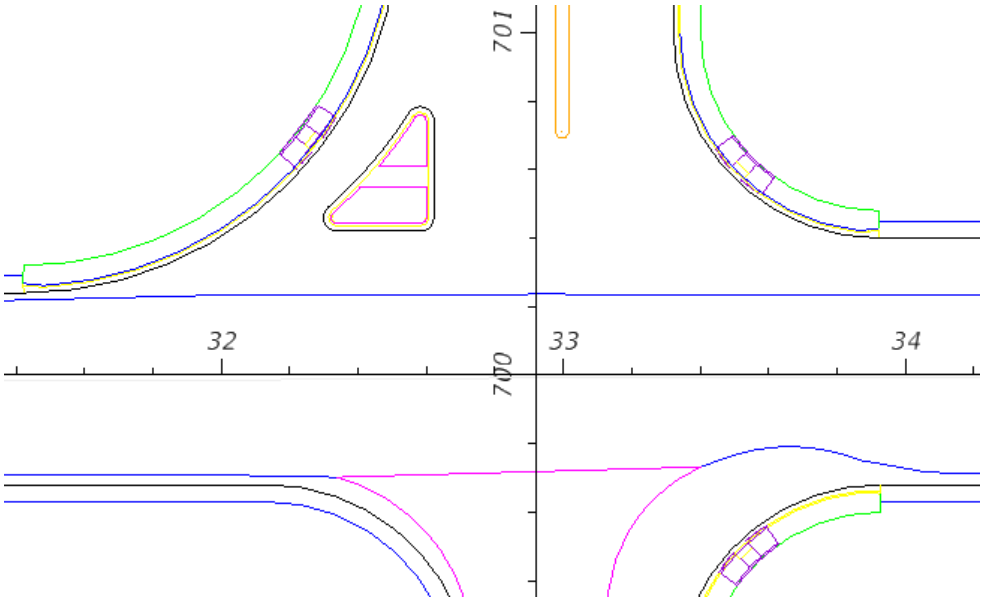
- Opening a Category reveals Items as shown below:

Default	The Default Items set element symbology for drawing elements and search parameters.
Drafting Standards	The Drafting Standards Items set element symbology for the placement of coordinate geometry elements, i.e., points, curves, parcels, chains, and profiles.
Compute Parameters	The Compute Parameters Items set element symbology and parameters associated with computation procedures, i.e., unit of measure, rounding factors, pay item, etc.

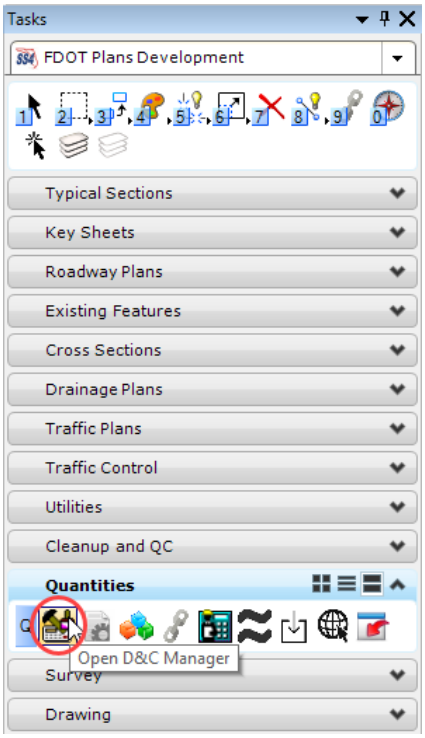
Exercise 2.1 Identify an Existing Element

This exercise uses the ID tool to set the D&C Manager to match the item used to draw an existing element in the design file. It is designed to explore the FDOTSS4.ddb file to get familiar with its contents.

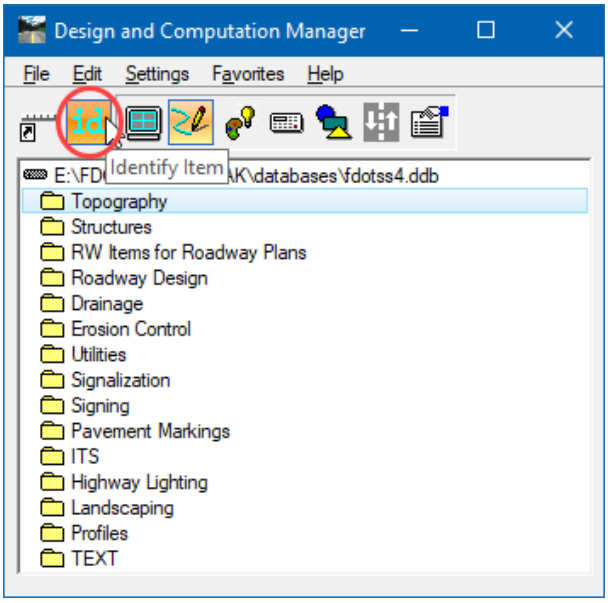
1. Open the MicroStation file C:\e\Projects\2204955201\roadway*DSGNRD01.dgn*.
2. Zoom the MicroStation View to the new intersection near the beginning of the project.



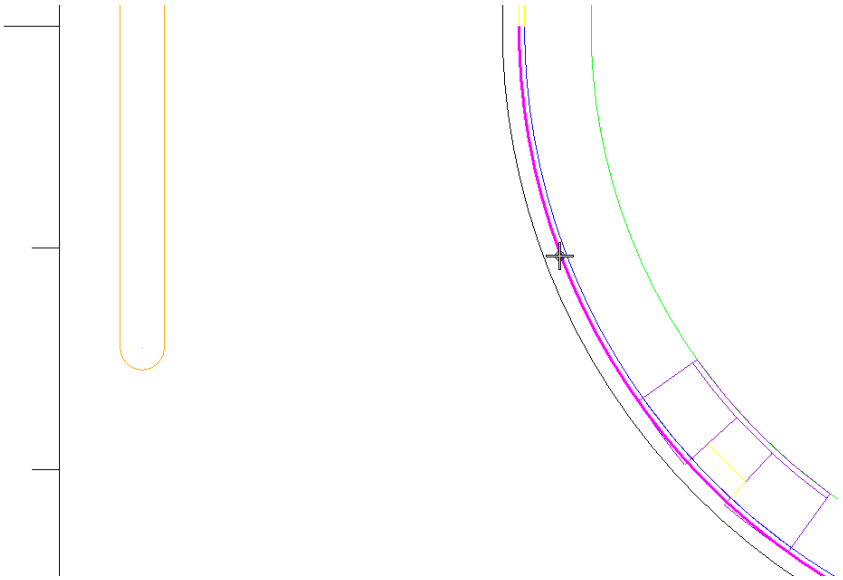
3. From the FDOT Plans Development > Quantities Tasks menu select Open D&C Manager.



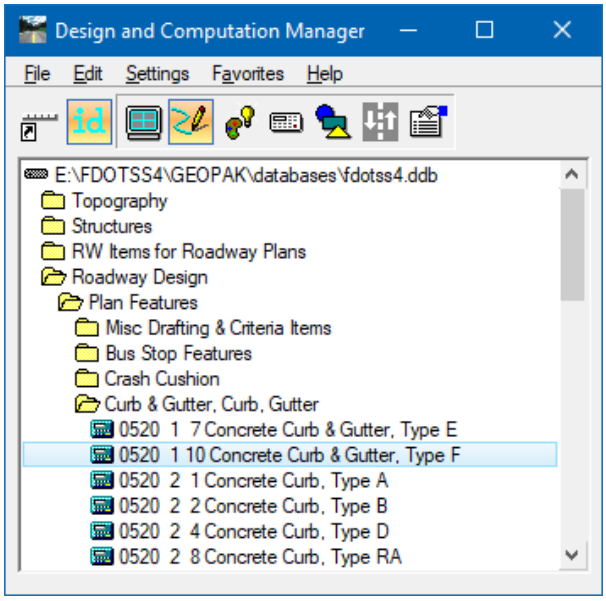
4. From D&C Manager click the **Identify Item** icon.



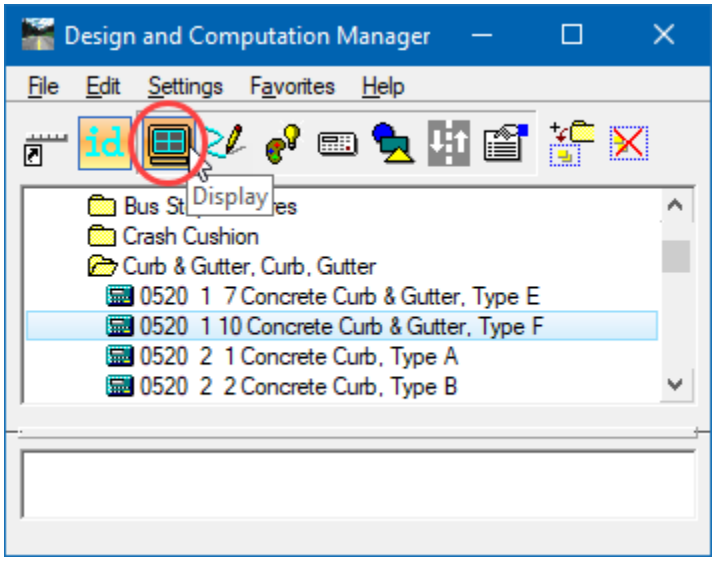
5. In the design file, select the **Face of Curb** on the intersection return in the Northeast quadrant of the intersection. The *Face of Curb* highlights.



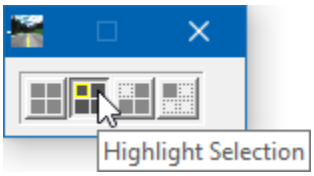
6. Place a **Data Point** in the design file to accept the command. The *Concrete Curb & Gutter, Type F* Item highlights in D&C Manager. This indicates that D&C Manager found a match to the selected element and has set this as the *Active Item*. From this point, the user can implement any other tool from the D&C Manager using this Item.



7. With the *Concrete Curb & Gutter, Type F* selected, click on the **Display** icon.



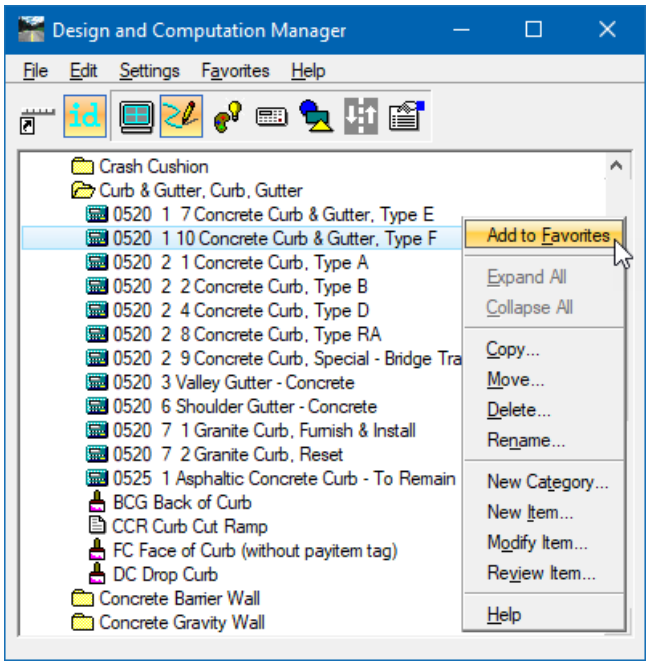
8. On the display settings toolbox, select **Highlight Selection**. Note all the face of curb elements matching the settings for the *Concrete Curb & Gutter, Type F* highlight.



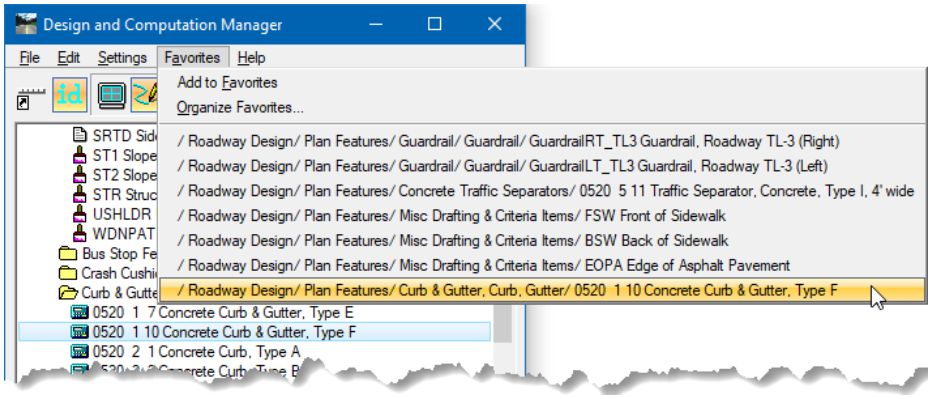
Exercise 2.2 Create a Collection Set and Add to Favorites

In this exercise, you will create a collection set of commonly used items in the D&C Manger and then save as a Favorite to recall later.

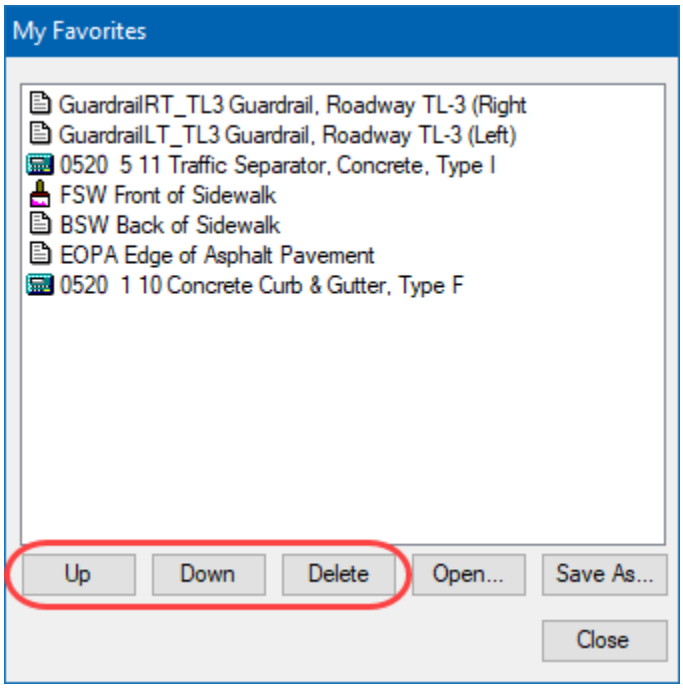
1. Continuing in the D&C Manager, go to **File > Save As > New File**. Save the database as *22049555201.ddb* in the project *symb* directory.
2. Open the saved database by selecting **File > Open** C:\e\Projects\2204955201\symb*22049555201.ddb*
3. Highlight the *Concrete Curb & Gutter, Type F* item, right-click and select **Add to Favorites**.



4. Navigate to the following items in the D&C Manager, right-click and **Add to Favorites**.
   - EOPA – Edge of Asphalt Pavement
   - BSW – Back of Sidewalk
   - FSW – Front of Sidewalk
   - 0520 5 11 – Traffic Separator Concrete – Type I, 4’ wide
   - Guardrail, Roadway TL-3 (Left)
   - Guardrail, Roadway TL-3 (Right)
5. From the D&C Manager dialog, go to the Menu option: **Favorites** and select the **Concrete Curb & Gutter, Type F** item from the list on the bottom. The active item changes to the **Type F** curb.



6. Select **Favorites > Organize Favorites**. The My Favorites dialog opens. On this dialog, modify the order of the list by selecting the **Up** or **Down** button on the bottom and deleting undesired items.



7. On My Favorites dialog, select **Save As**. Save the file as *drafting.col* in the symb folder of the project directory. Recall this file at any time by using the **Open** option. You may create collections for drafting items, calculation/quantity items, groups for specific design areas like drainage, traffic control, S&PM, utilities, erosion control, etc.

3 CIVIL FEATURES AND ADHOC ATTRIBUTES MANAGER

OBJECTIVES

- Introduce Civil Features
- Introduce the Adhoc Attributes Manager

CIVIL FEATURES

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

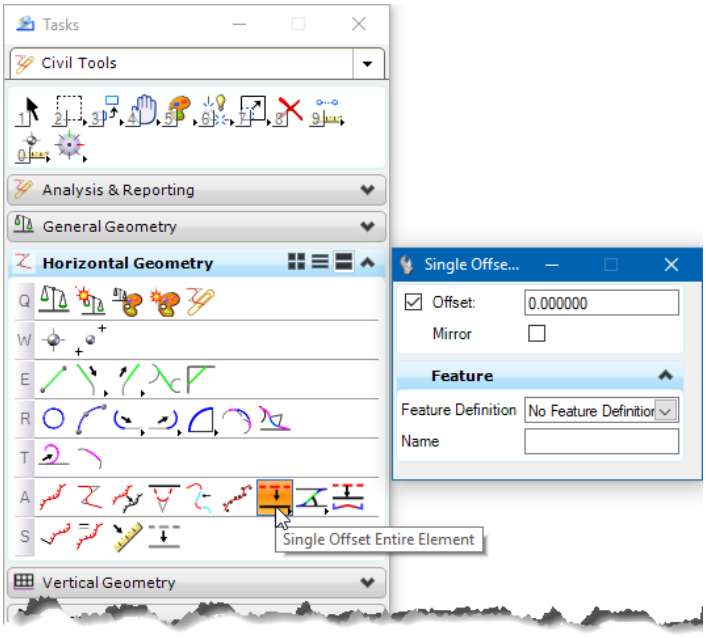
Exercise 3.1 Draw Guardrail with Civil Tools

In this exercise, the students use the back of sidewalk and paved shoulder lines to draw in guardrail using Civil tools and Features.

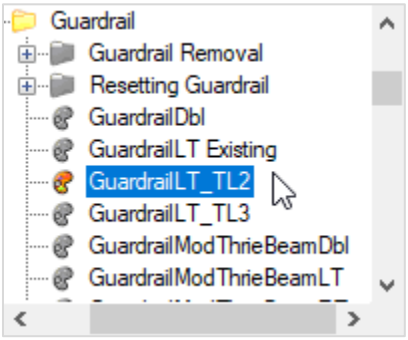
1. Open the MicroStation file C:\e\Projects\2204955201\roadway*DSGNRD01.dgn*.

   Note If continuing from previous exercise, make sure to close D&C Manager before continuing.

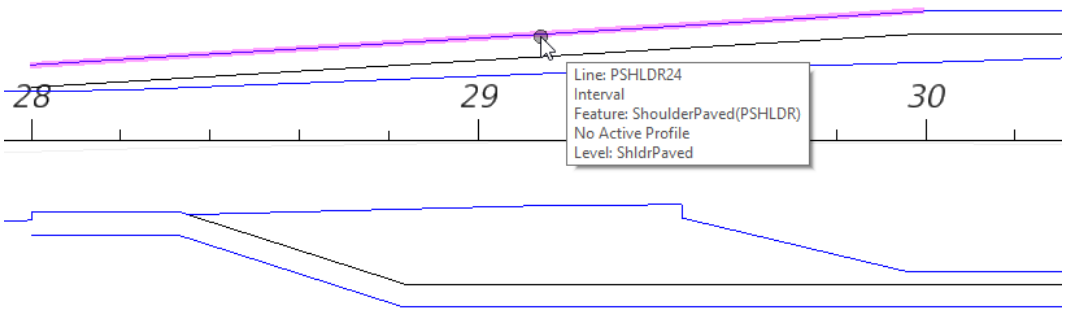
2. Zoom into the *NW corner* of the new intersection.
3. On the *Civil Tools* > *Horizontal Geometry* Tasks menu, select the Single Offset Entire Element tool.



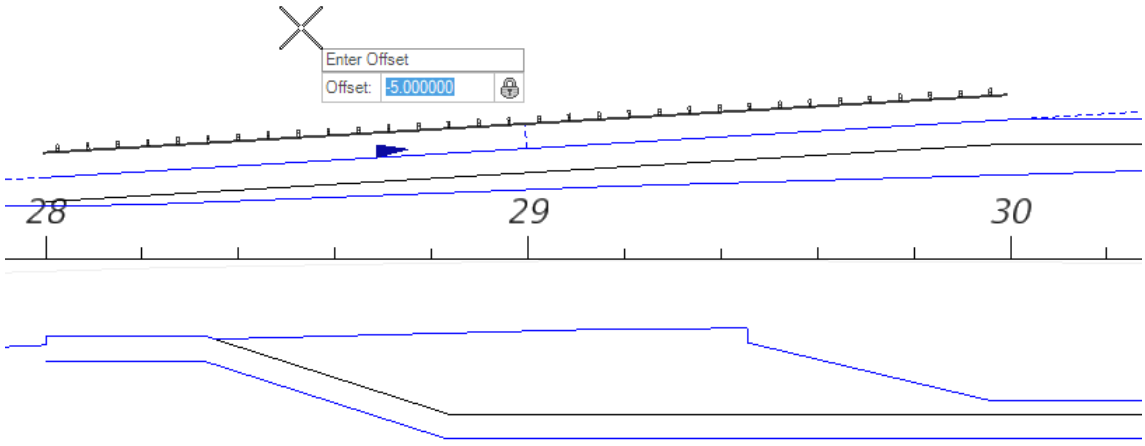
4. Set the *Feature*. From the *Feature Definition* drop down arrow, navigate to *Plan (2D)* > *Guardrail* and select the *Feature* **GuardrailLT_TL2**. Accept the default *Name* set.



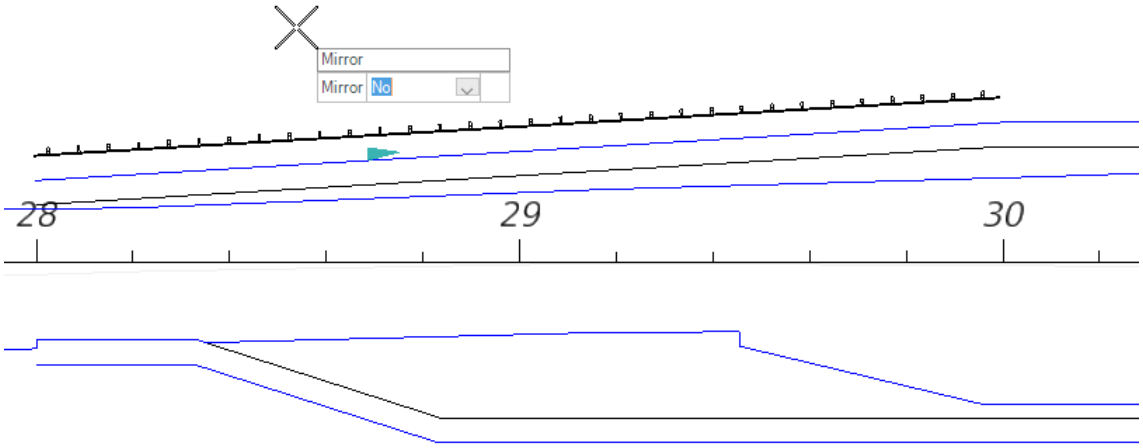
5. Follow the prompts on the cursor to **Copy Parallel** the *Paved Shoulder line* **5 feet** for the *Guardrail line*.
6. Select the **Paved Shoulder** line.



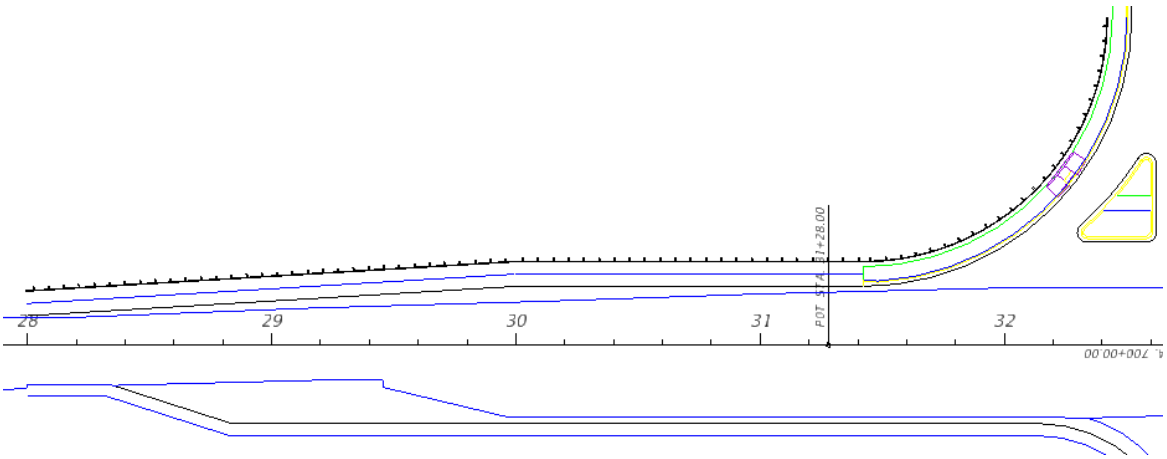
7. Enter **-5** and press **Enter** <OR> **Data Point** in the file to accept.



8. Leave *Mirror* unchecked to the default of **No** and press **Enter** <OR> **Data Point** in the file to accept.



9. Repeat to draw in **Guardrail** as shown. Use an *Offset* value of **2 feet** behind the sidewalk.
10. Use the MicroStation modify tool **Trim to Intersection** to connect the segments together.



Note The process tags the elements created with the DDB Feature attributes. To verify the attributes tagged, open the Application Attribute Viewer by going to **GEOPAK > ROAD > Element Attributes**.

ADHOC ATTRIBUTES

Adhoc Attributes are tags that apply to graphic elements to provide more information. Adhoc Attributes are comprised of three types of information that require mandatory definitions: *Name, Type*, and *Value*.

Name An identifying term used when GEOPAK is searching for a specific Adhoc Attribute.

Type Identifies the nature of the information, and has several different setting options. The options for Type are *Numeric, String, Unit, Quantity,* and *Remarks*.

Value The actual information to be used by GEOPAK, and is determined by the Type. For example, if the Type is Numeric then the Value must be a number.

FDOT has set up Adhoc Attributes for many of the Items in the D&C Manager. The functionality of these Adhocs range from setting variables used in the calculation of quantities to adding notes for later retrieval. It is important to note that in many cases specific projects may require modification of these Adhoc values. The creation process of design elements using the Civil Tools and Features will assign the default. FDOT recommends the review of these elements to ensure the correct values are set on the elements.

Note Place these adhocs on the elements BEFORE exporting the quantities to Quantity Manager.

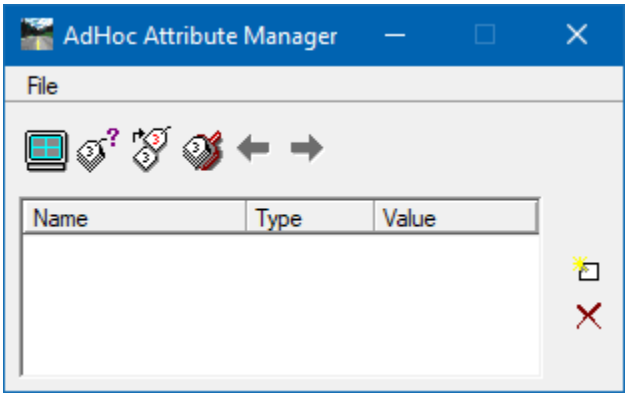
Name	Type	Default Value	Description
DESIGN NOTES	STRING		Used in automation; Provide extra detail or formula used to derive quantity
SortBy	STRING		Extra control for sorting quantities into the summary boxes. Can be alpha or numeric. LDM will sort by the value set with this adhoc first and then sort by station.
SYSTEM CBW	STRING		Permanent crash cushion details – see Standard Plans Index 544-001 and associated Standard Plans Instructions for more information. Used in automation to fill out the summary box information.
SYSTEM GUARDRAIL	STRING		
DESIGN SPEED	STRING		
CRASH TEST LEVEL	STRING		
HAZARD WIDTH	STRING		
LENGTH RESTRICTION	STRING		
TTC PHASE	STRING		Temporary crash cushion details. Used in automation to fill out the summary box information.
WORK ZONE SPEED	STRING		
CRASH TEST LEVEL	STRING		
HAZARD WIDTH	STRING		
LENGTH RESTRICTION	STRING		
OFFSET	STRING		
LOC DESCRIPTION	STRING		Used in automation; gives extra description for the location of the quantity shapes in the pavement summary box, i.e. shoulder, median, side road name, etc.
STA CL DRIVEWAY	STRING		Used in automation when pavement or 6” sidewalk area is documented in a summary for driveways.
PAVEMENT TYPE	STRING	ROADWAY	Used to sort the quantities in a database into either the Summary of Pavement or the Summary of Permanent Driveways.
FUNCTION	STRING	UNDER GUARDRAIL	Used in automation to determine documentation on which column the quantity needs in the Summary of Miscellaneous Asphalt.

Name	Type	Default Value	Description
SW TYPE	STRING	SIDEWALK	Used to sort the quantities in a database into either the Summary of Sidewalk or the Summary of Permanent Driveways.
HELP	REMARKS	VARIES	Extra guidance provided to help determine the value of another adhoc. These adhocs do not pull over into Quantity Manager.
VARIOUS ITEMS***	UNIT/QTY	VARIES	Sets pay item quantities
DAYS	NUMERIC	VARIES	Used in formula to calculate pay item.
LIFT	NUMERIC	1	Used in formula to calculate pay item.
THICKNESS	NUMERIC	VARIES	Used in formula to calculate pay item.
SLOPE	NUMERIC	0	Used in formula to calculate pay item.

ADHOC ATTRIBUTE MANAGER

Adhoc Attribute Manager is the tool used for tagging, reviewing, and manipulating Adhoc Attributes. Access this tool from the MicroStation Menu selecting GEOPAK > ROAD > GEOPAK 3pc Adhoc Attributes.

Or by selecting the Open Adhoc Manager button  on the FDOT Plans Development > Quantities Tasks menu.



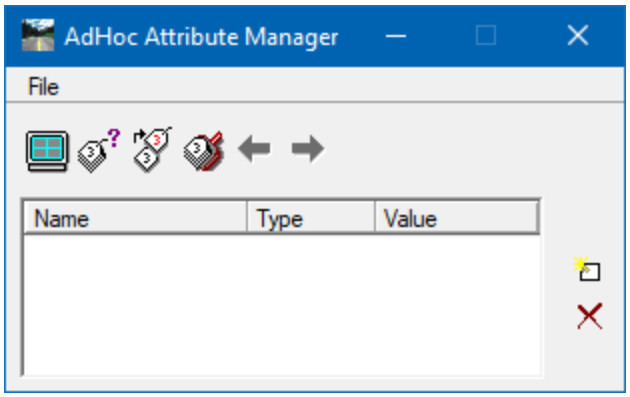
The Adhoc Attribute Manager has four icons on the tool bar for viewing and tagging elements with Adhoc Attributes. From left to right these icons are: *Attribute Display Filter*, *Identify Element*, *Set Attribute*, and *Adhoc Scooper*. The two icons on the right side of the dialog are *Create New Row* and *Delete Row*.

Click **F1** with the toolbox active to see the GEOPAK Help files for more detailed information.

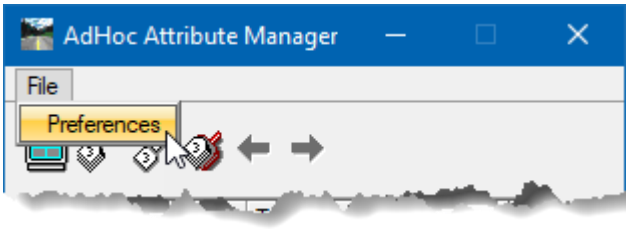
Exercise 3.2 Tagging Adhoc Attributes

In this exercise, the value for the Design Notes adhoc will be set using the 3PC Adhoc Attribute Manager.

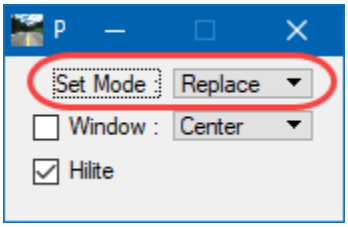
1. Continuing in the *DSGNRD01.dgn* file, from the **FDOT Plans Development > Quantities** Tasks menu, select the **Open Adhoc Manager** button  . Adhoc Attribute Manager displays.



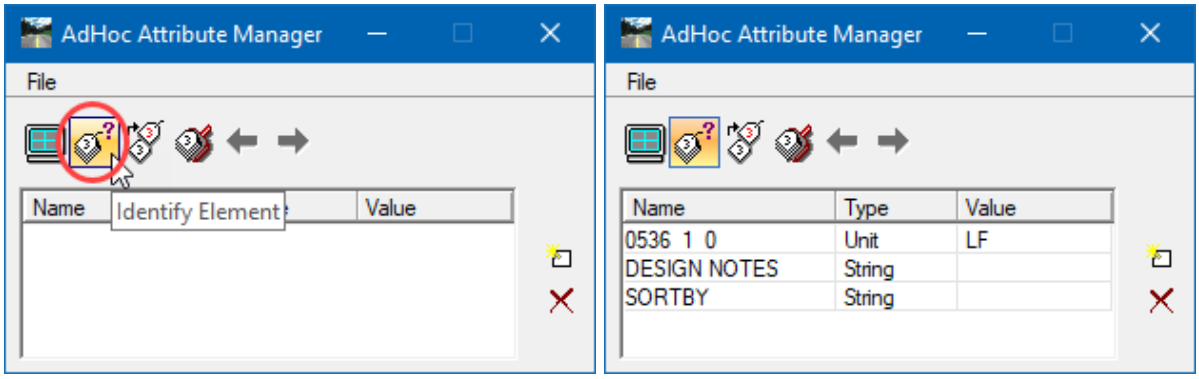
2. Select File > Preferences.



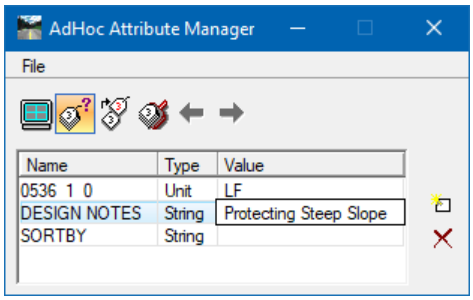
3. On the Preferences dialog, select **Replace** from the drop-down menu for the *Set Mode*.



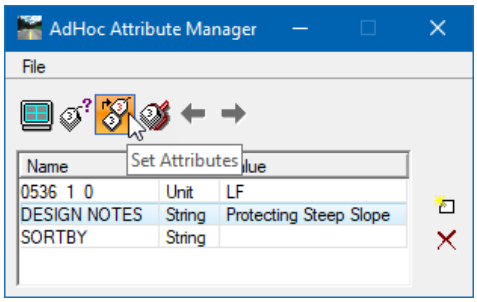
4. Click on the **X** to close the dialog.
5. Click the **Identify Element** icon, and then select the **Guardrail** drawn in Exercise 3.1. Click anywhere in the drawing to accept the selection. The dialog populates with the *Adhocs* attached to the selected element.



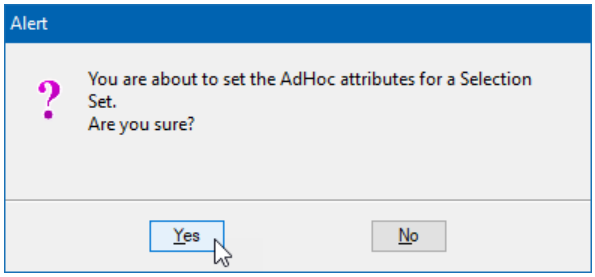
6. Select the **Value** field for **Design Notes** and type in notes as shown. This text will be included later in the quantity summary box.



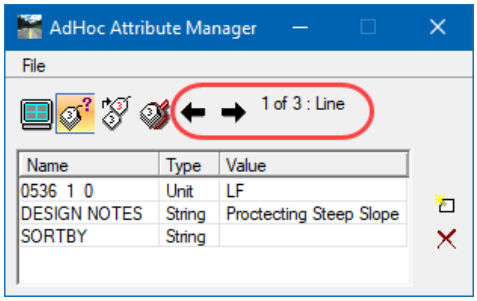
7. Create a **Selection Set** of the *guardrail elements*.
8. Click the **Set Attribute** icon. An Alert displays.



9. From Alert, click **Yes**.



10. With the *Selection Set* still active, select the **Identify Element** icon. The Adhocs for all the elements in the selection are now available in the Adhoc Attribute Manager in *read-only* mode. Use the arrows to scroll through the elements. Selecting the **Identify Element** icon again will empty the *Selection Set*.



11. Close Adhoc Attribute Manager.

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4 CALCULATING QUANTITIES

OBJECTIVES

- Understand D&C Manager Compute Settings
- Understand and Draw Quantity Shapes
- Calculate Area and Linear Quantities with the D&C Manager
- Label Shapes with Area ID

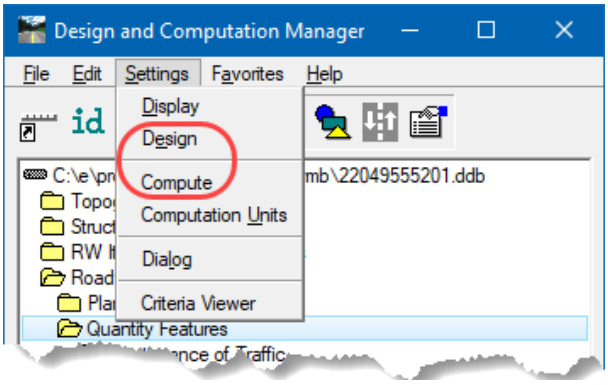
CALCULATING QUANTITIES WITH D&C MANAGER

Once all design elements and quantity shapes are completed, calculating quantities with D&C Manager is a simple process with four parts:

- Settings to Consider
- Selecting Database Items to Compute
- Calculating Quantities
- Exporting Quantities

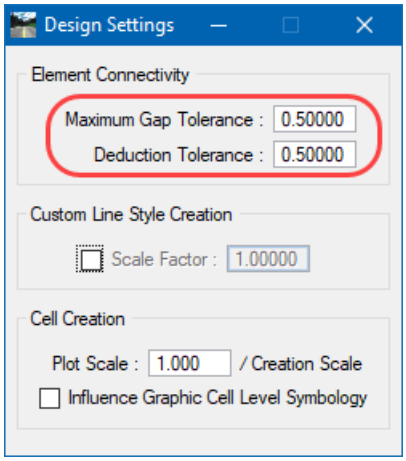
SETTINGS TO CONSIDER

The D&C Manager has many Settings options to consider. For many of these, the Production Support CADD Office recommends the Default Settings.



DESIGN SETTINGS

Within the Design Settings options, there are settings for Element Connectivity. These options set the tolerances used by GEOPAK during different operations.

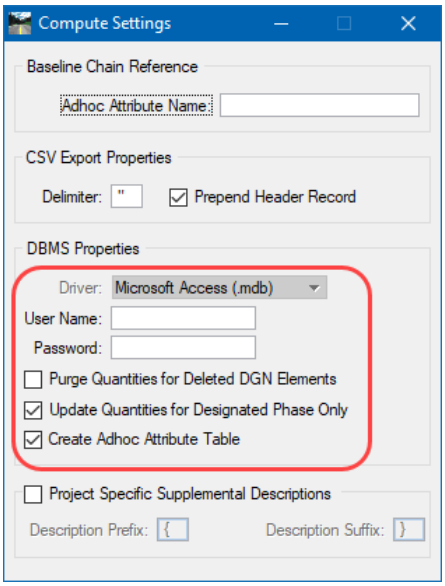


- *Maximum Gap Tolerance* – The application uses this to determine whether two elements are connected. FDOT recommends Maximum Gap Tolerance be set no higher than 0.2.
- *Deduction Tolerance* – The application uses this in the Compute Mode, the deduction tolerance sets the distance used to search for other elements used to subtract a given value from the total quantity. FDOT uses deductions for inlets in the calculation of curb and gutter. Increase the value when drawing curb through inlet cells. The suggested value is 3.0.

COMPUTE SETTINGS

Compute Settings control how D&C Manager processes information gathered when exporting quantities. Review Compute Settings before every session of computing quantities, with careful thought about the desired final product. As a rule, some settings are always the same. The DBMS Properties is always set to Microsoft Access *(.mdb)* as the Driver. Having these options set ensures that the quantity database matches the graphical elements of the *.dgn* file and that all available information carries over to Quantity Manager.

Compute Settings apply during the Compute Mode to help ensure accurate quantity generation. This manual will focus on the DBMS Properties.

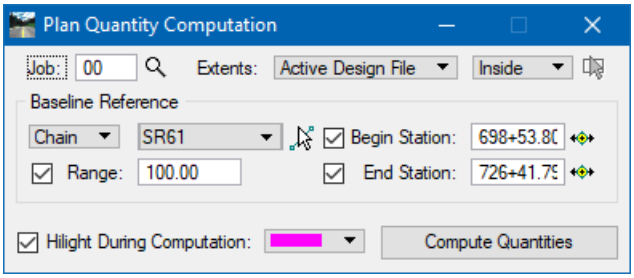


- *Driver* – FDOT recommends using Microsoft Access *(.mdb)*, which does not require a User Name and Password.
- *Purge Quantities* – Scans the design file for elements previously quantified and purges the quantity database of any elements not found in the file. This is not automatic by default. Use this option only if ALL the quantities in the database are contained in the Active Model, otherwise the process will delete the other quantities.

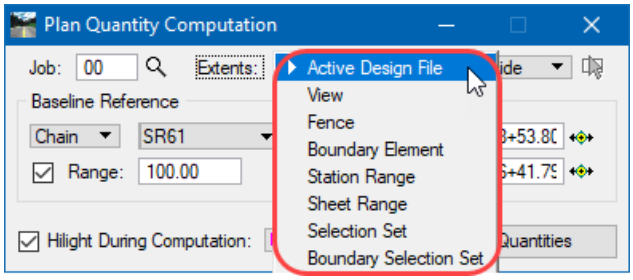
Note With the recommended workflow, FDOT does **NOT** recommend the use of the Purge Quantities for Deleted DGN Elements option.

COMPUTE MODE

The Compute mode tabulates quantities of items placed as Pay Items by the D&C Manger. This option uses the Collection Set option to allow processing of multiple pay items at one time.

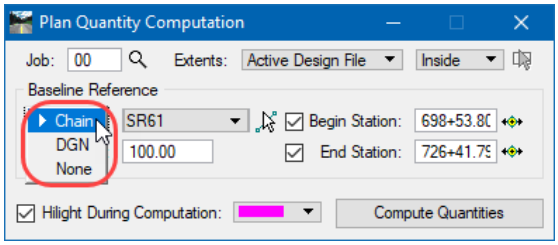


- *Job* – The COGO job**.gpk database for the project used for chain information.
- *Extents* – The Extents determines which elements are included in the set. If selecting the Range check box, the element must exist within the extents and range (distance left and right of the baseline) for the element computed.



Active Design File	All elements in the active Design file that match the selected items.
View	Computes items that display in MicroStation View One.
Fence	Computes items within a MicroStation fence.
Boundary Element	Uses a MicroStation shape to define the boundary of computable elements. The Fence mode affects the computation of elements within the boundary.
Station Range	Computes items using a Baseline Reference (chain or dgn). The Begin and End station limits the extent of the computations.
Sheet Range	Uses the clip borders created with the Plan & Profile Sheet Composition tool to define the area of computation.
Selection Set	Computes those items that are in a previously created selection set that meets the definition of the compute items.
Boundary Selection Set	Computes items that are within a boundary element that is in a selection set that meets the definition of the selected elements.

- *Baseline Reference* – The Baseline Reference section defines the reference element for quantities.



Chain	This uses a previously stored COGO chain.
DGN	This uses a graphic element. The stationing based on the length of the element starting at 0.
None	No reference is required, and the Baseline Reference is blank. This option limits the type of output available, as computations will not have station/offset values.

Note FDOT recommends using the **Chain** option. This option gathers the station/offset information of the elements when calculating. This information is **required** for the Plan Summary Boxes and automation with Linked Data Manager (LDM).

SELECTING DATABASE ITEMS TO COMPUTE

Before computation, the collection set of the Items and/or Categories calculated is set from the D&C Manager database: single Items, multiple Items, multiple Categories, Favorites Collection, or any combination of Items, Categories and Favorite Collections. A collection set is not required when computing quantities for a single Item or Category.

➢ ***To Select Only One Item***

1. In D&C Manager, select the **Item** for computation.

➢ ***To Select Multiple Items***

1. In D&C Manager, select an **Item** for computation.
2. Right-click the selected *Item*. A menu displays.
3. From the menu, click **Add to Collection**. The Item displays in the collection box at the bottom of D&C Manager.

Note The collection box appears when D&C Manager is in Compute Mode.

4. Repeat steps 1 through 3 to add *Multiple Items* to the collection box.

➢ ***To Select Categories***

1. In D&C Manager, select the desired **Category** for computation.
2. For multiple categories, right-click the *Category*. A menu displays.
3. From the menu, click **Add to Collection**. The Category places in the collection box at the bottom of D&C Manager.
4. Repeat steps 1 through 3 to add *Multiple Categories* to the collection box.

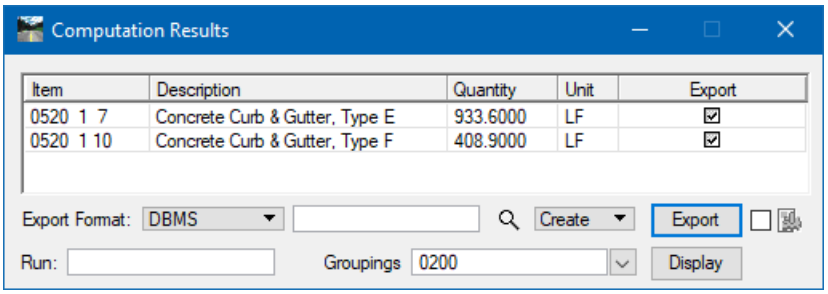
Note When selecting Categories, all Items in the Categories present in the DGN file will compute.

➢ ***To Select a Favorites Collection***

1. Right-click in the collection box and select **Open a Collection**.
2. Select the desired collection file and click **Open**.
3. Repeat steps 1 and 2 to add multiple collections.

COMPUTATION RESULTS

After defining the settings, clicking on **Compute Quantities** opens the Computation Results dialog.



Computation Results displays a table of all computed Items processed during computation. From here, the user can review the results and export quantity computations to a variety of formats. The box to the right of the Export Format is for supplying a file name for the report or quantities database. The computation can *Create* or *Append* the report or quantity database by making the selection to the right of the file name box. The *Run* box identifies the session when the quantities compute. *Groupings* is used to identify the TRNS*PORT Grouping in Quantity Manager. The *Display* button highlights any item selected in the Table View in the design file.

➢ ***To Sort Items in the Table***

1. In the table, click the **column header**. All Items will sort by that column.

➢ ***To Exclude Individual Items***

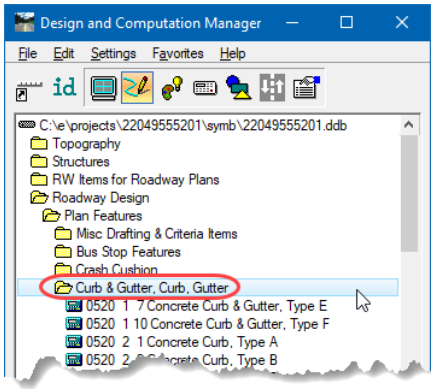
1. Clear the *check box* in the **Export** column for any individual items excluded.

FDOT recommends using the **Export Format** option **DBMS** to export quantities to Quantity Manager. From Quantity Manager, reports can be generated to help fill out non-automated summary boxes as well as generate the xml file that can be used to upload the pay items and quantities to AASHTOWare Project Preconstruction (formerly known as Trns*port). Linked Data Manager (LDM) uses the Quantity Manager database to automate summary boxes.

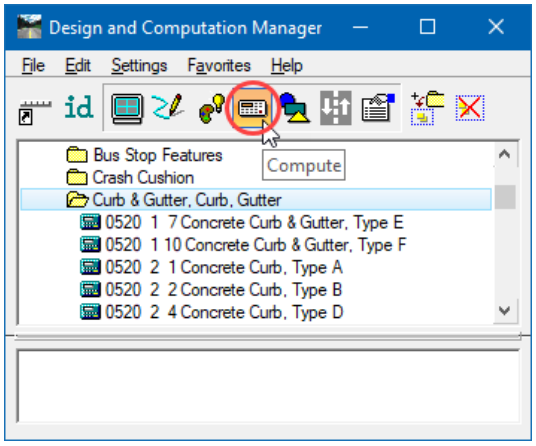
Exercise 4.1 Calculating Linear Foot Quantities with D&C Manager

This exercise calculates and exports linear foot quantities to a Quantity Manager database using the D&C Manager.

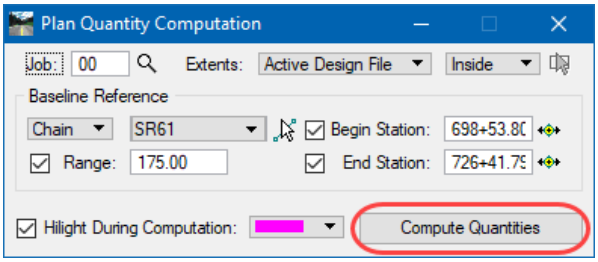
1. Open the design file *DSGNRD01.dgn*.
2. In the D&C Manager, navigate to Roadway Design > Plan Features > Curb & Gutter, Curb, Gutter and select the Curb & Gutter, Curb Gutter category.



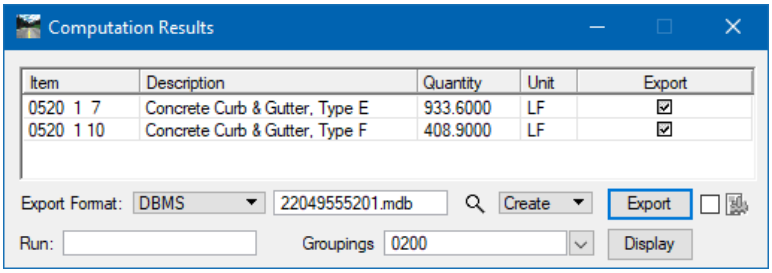
3. Select the **Compute** *Mode*.



4. Set the Plan Quantity Computation dialog as shown and click **Compute Quantities**.



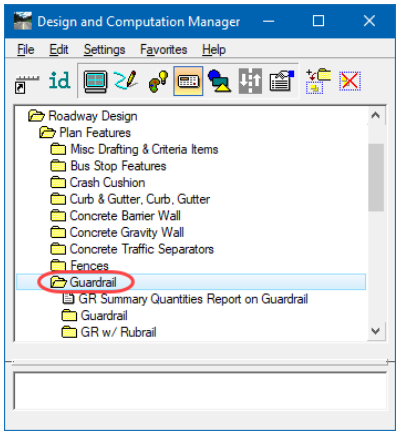
5. On the Computation Results dialog, set the *Export Format* to **DBMS**, type in the *project number* for the *file name* with the *Mode* set to **Create**, and for *Groupings* type in **0200**. Click **Export**.



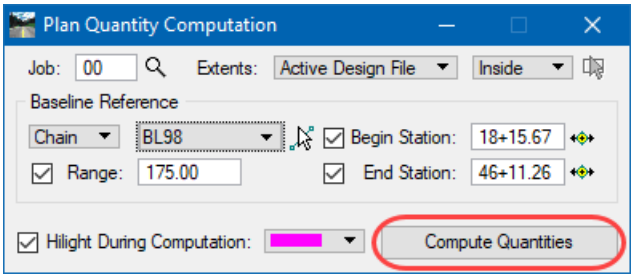
Note It is very important to change the Groupings value before exporting. The default value, Design Estimate, will result in errors when importing quantities through Designer Interface.

6. Close the Computation Results dialog.

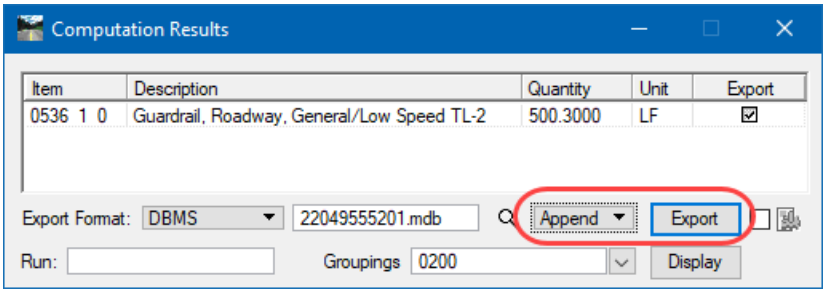
7. In the D&C Manager, navigate to and select the **Guardrail** *category*.



8. On the Plan Quantity Computation dialog, change the *Chain* to **BL98** and then click **Compute Quantities**.



9. On the Computation Results dialog, change the *Export* option to **Append** and click **Export**.

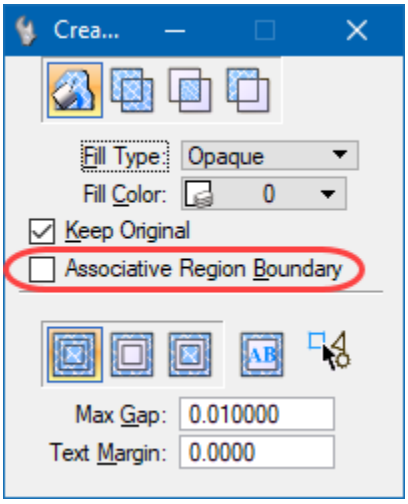


10. Change the D&C Manager back to the **Design** *Mode.*

CREATING SHAPES

Shape creation is generally not done during the design process. As such, quantity shapes for these areas need to be created. The quantity shape file (*qtdsrd01AQT.dgn*) provided with this course already has most of the needed shapes built. This course focuses on creating shapes near the existing intersection. It is important to remember that the methods of computation shown in this manual may not be complete, and the designer should consult the appropriate governing documents for calculation procedures.

With the introduction of Open Roads Civil Tools, the Production Support CADD Office recommends using the MicroStation Create Region tool to create quantity shapes. The Shape Mode of the D&C Manager is accessible; however, this tool does not function properly with some civil elements, especially Civil Cells. When creating quantity shapes with the Create Region tool, it is very important to turn **OFF** the **Associative Region Boundary** option. If it is on, D&C Manager will NOT recognize the elements for computations.



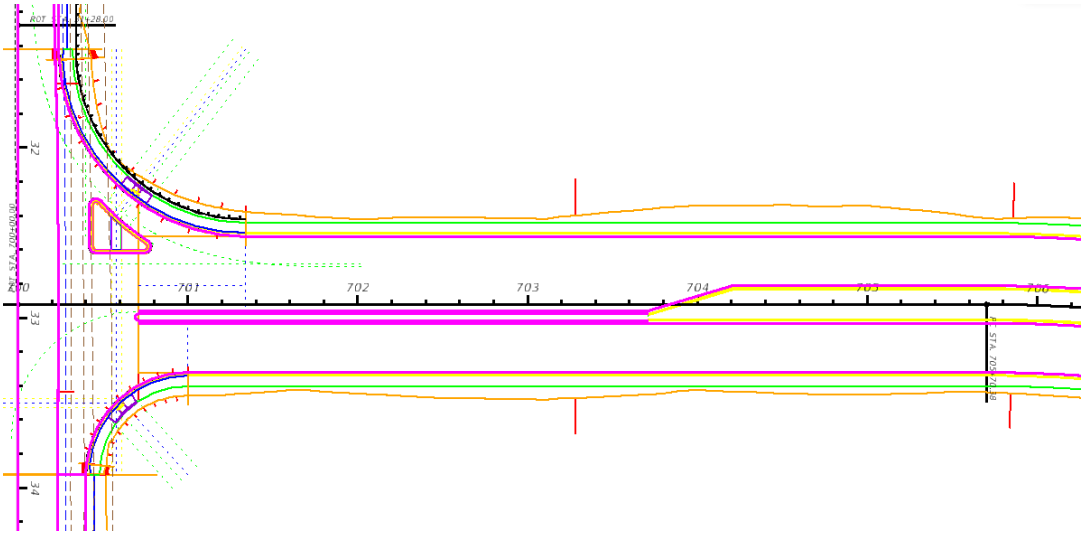
Although it is possible for quantity shapes to span the entire length of the project, FDOT recommends that they be broken into intervals. The designer can choose to break the shapes at intersections, or at a set distance.

Note For area shapes with "holes", the **Locate Interior Shapes** option is not recommended, as the stationing is not exported properly to Quantity Manager for Grouped Holes. Creating two or more shapes may be necessary to quantify the area.

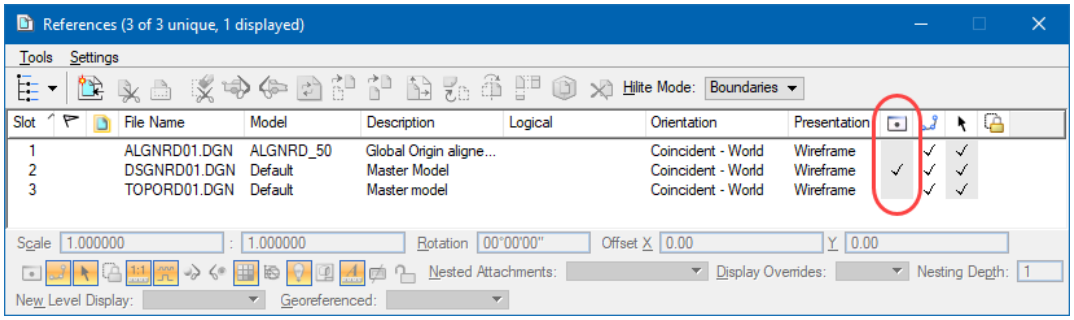
Exercise 4.2 Calculating Area Quantities with D&C Manager

This exercise creates, calculates and exports quantity shapes to a Quantity Manager database using the D&C Manager.

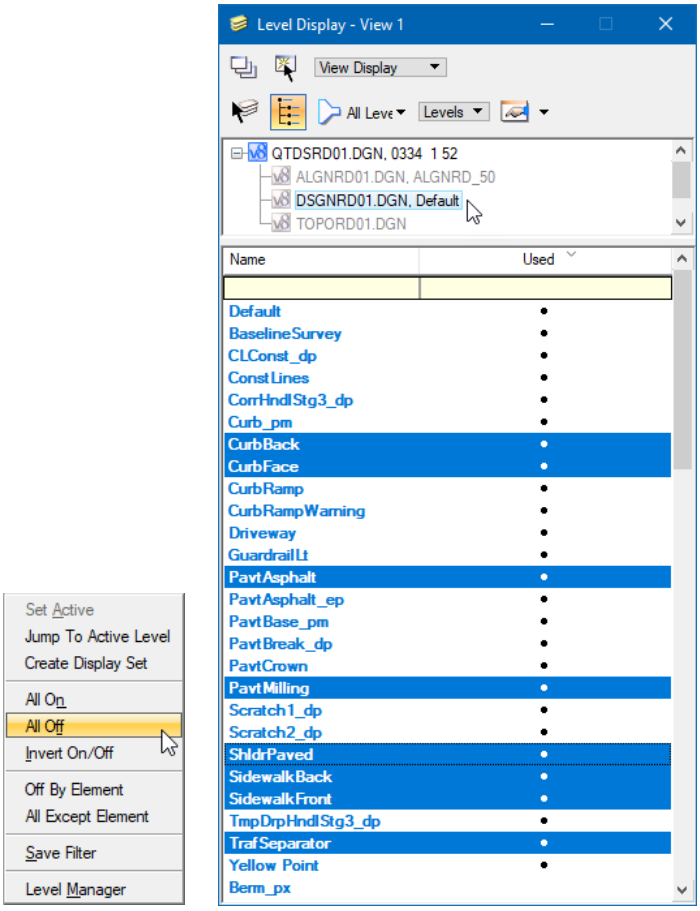
1. Open the design file *QTDSRD01.dgn*, **Model 0334 1 52** from Exercise 1.1.
2. Rotate the view and zoom to the beginning of the new construction.



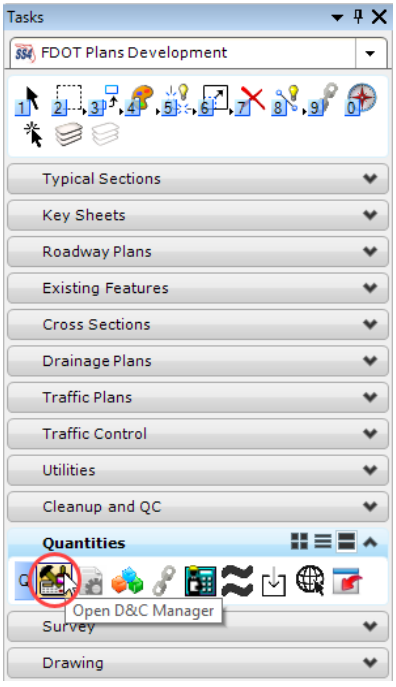
3. On the MicroStation menu select **File > References** to open the References dialog and turn off the display for the *ALGNRD01.dgn* and *TOPORD01.dgn reference files*.



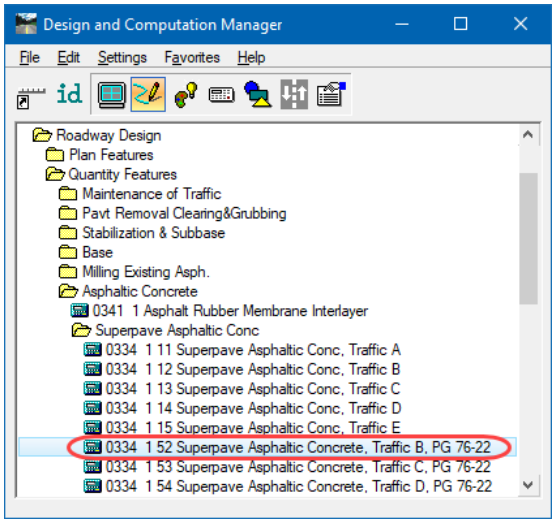
4. On the MicroStation menu select **Settings > Levels > Display** (or click the Level Display button) to open the Level Display dialog and select the *DSGNRD01.dgn, Default* attachment. Right-click in the Level Name area and select **All Off** then select the level names to turn back **On** as shown below.



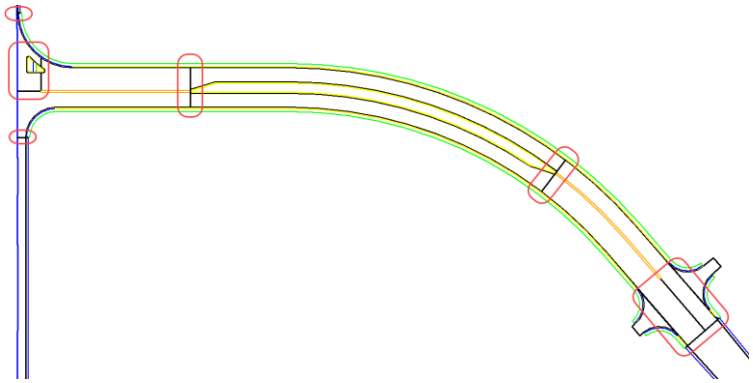
5. From the FDOT Plans Development > Quantities Tasks menu, select the Open D&C Manager icon.



6. Navigate to Roadway Design > Quantity Features > Asphaltic Concrete > Superpave Asphaltic Conc and select 0334 1 52.

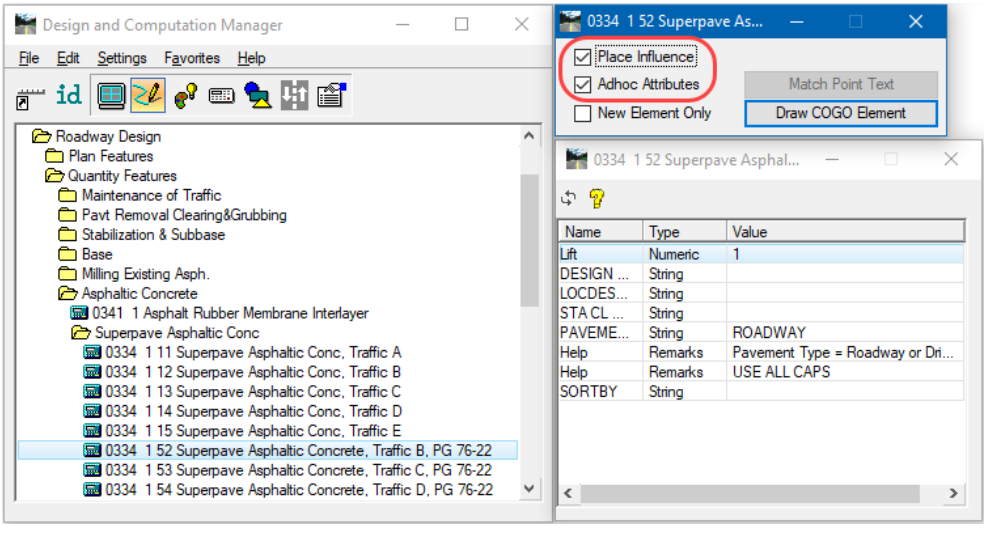


7. Using the MicroStation **Place Line** command, draw in lines to segment the new construction area into smaller areas for reporting purposes.

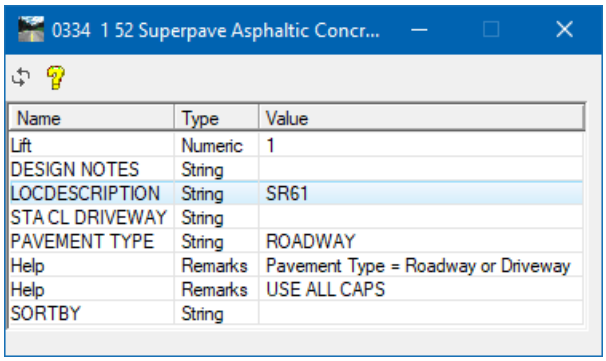


Note Make sure to trim the elements to intersection ensuring the elements do not cross or overlap each other.

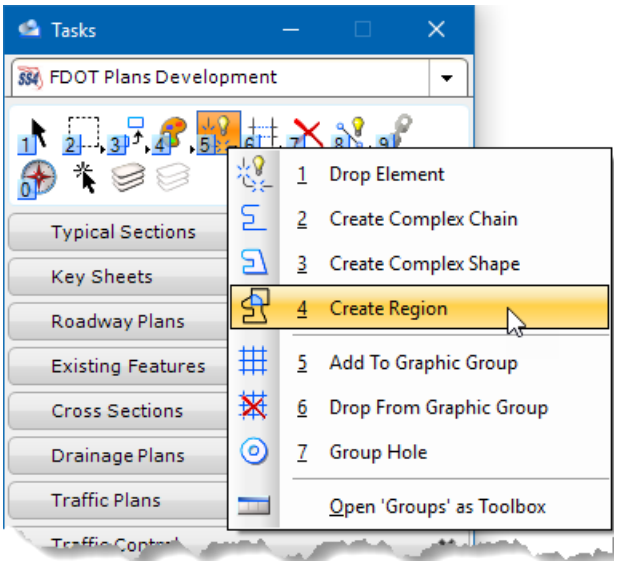
8. The D&C Manager should still be open. Make sure the Adhoc Attributes dialog displays. If it does not, toggle **On** the *Place Influence* and *Adhoc Attributes* in the Place Influence dialog box.



9. In the Adhoc Attributes dialog box, add the *Value*, **SR61**, for the Adhoc *LOCDESCRIPTION*.

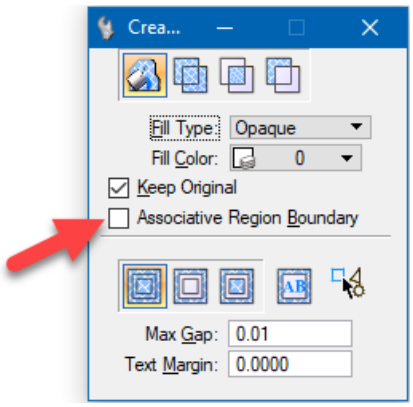


10. Open the MicroStation tool **Create Region**.



11. Define the settings in the dialog as shown.

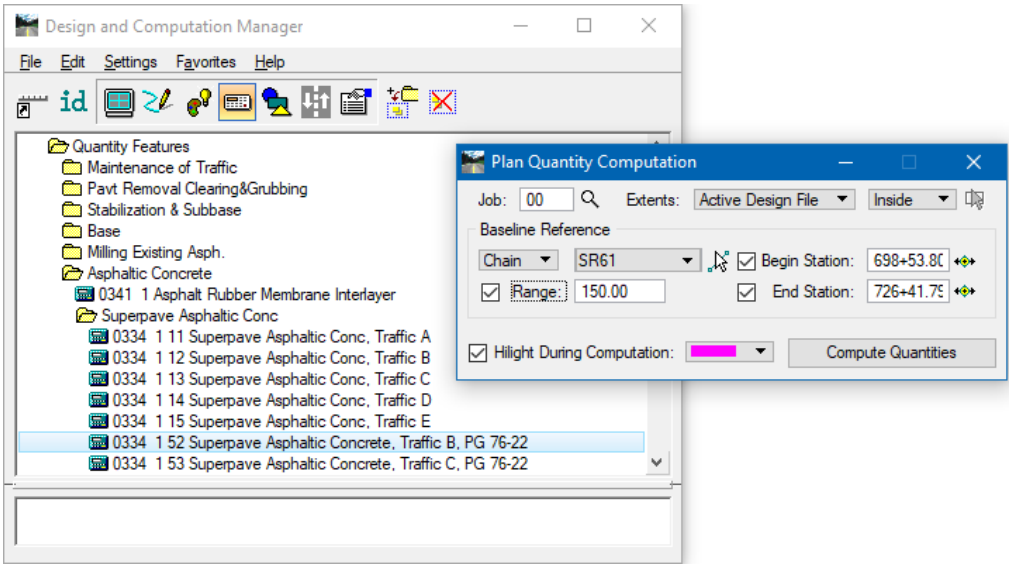
Important! ***DO NOT*** *check* ***ON*** *the Associative Region Boundary option; otherwise, the D&C Manager will not recognize the shape when calculating.*



Note Using a Fill Type is optional.

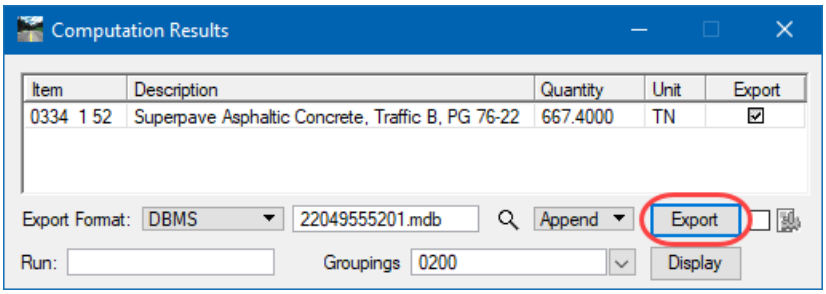
12. **Data Point** inside of one of the *mainline areas* to flood the area and create the quantity shape. Continue selecting areas to create shapes for the remaining mainline areas.

13. Change the D&C Manager *Mode* to **Compute**.



14. Set up the Plan Quantity Computation dialog as shown above and click on **Compute Quantities**. The shapes along the mainline highlight and the Computation Results dialog displays.

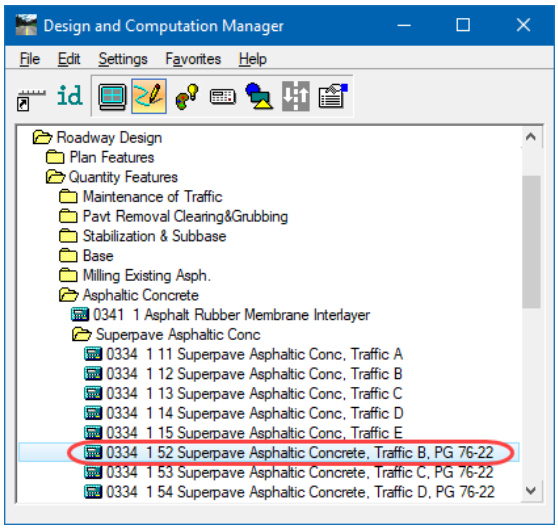
15. On the Computation Results dialog, make sure to set the *Groupings* to **0200** as shown below and then click **Export**. Close the dialog when export is complete.



Exercise 4.3 Modifying Adhocs with D&C Manager for Quantity Calculations

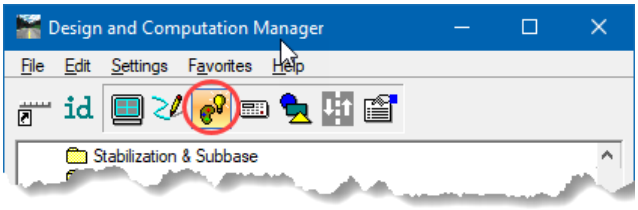
This exercise modifies the Lift Adhoc value on the Asphalt Shapes. LDM automation uses these Adhocs to sort the quantities in the Quantity Manager database into the correct summary box.

1. Open the MicroStation design file, *QTDSRD01.dgn*, **Model 0334 1 52**.
2. Turn **Off** the display for all the *Reference files*.
3. In the D&C Manager, navigate to Roadway Design > Quantity Features > Asphaltic Concrete > Superpave Asphaltic Conc and select 0334 1 52.

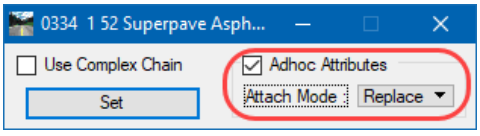


HINT You can select the id button, then click one shape to go directly to the correct item.

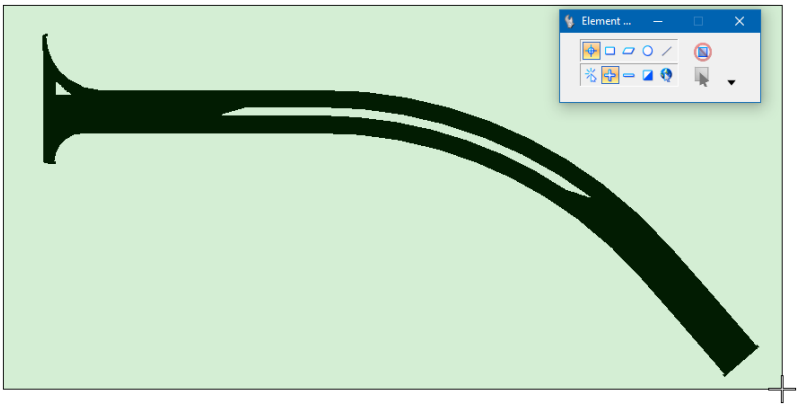
4. Select the **Set** icon.



5. Toggle **On** the *Adhoc Attributes* option and set the *Attach Mode* to **Replace**.

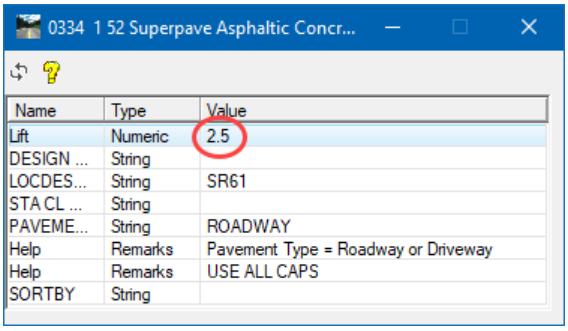


6. Select all the **Shapes** in the file with the *Element Selection* tool by clicking out to the upper left of the shapes and dragging the mouse to encompass all the shapes.

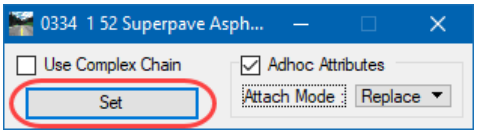


Note Take care when setting Adhoc values to Selection Sets. Make sure NOT to overwrite other Adhoc values that may be different on individual elements.

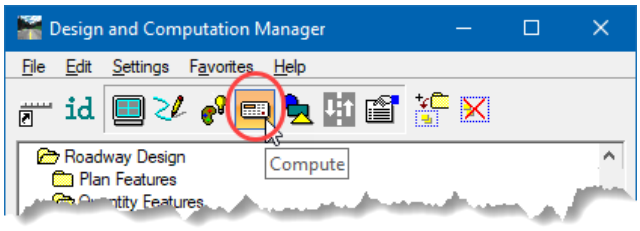
7. In the Adhoc Attributes dialog, set the *Lift Adhoc Value* to **2.5**.



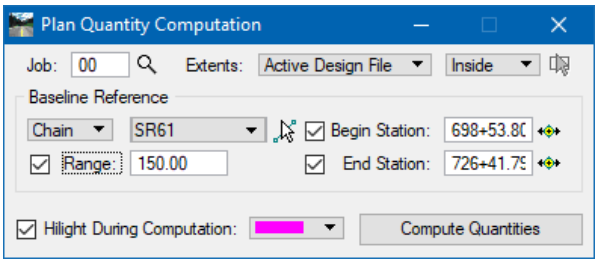
8. In the Set dialog, click the **Set** button.



9. Change the D&C Manager *Mode* to **Compute**.



10. Modify the *Settings* as shown and click **Compute Quantities**.

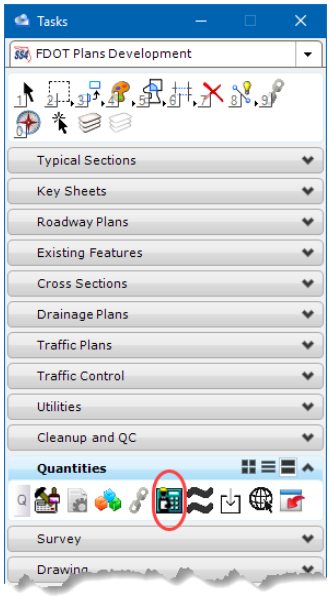


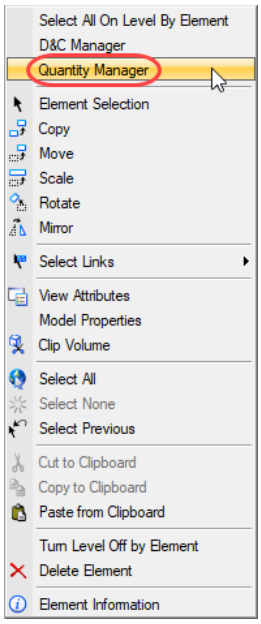
Note In the previous exercise, the user exported a quantity for the same pay item to the database. Re-exporting the quantity will NOT overwrite what is already in the database. Delete the quantity from Quantity Manager before exporting the new quantity. The next steps will define the basics for doing this. The next chapter covers the Quantity Manager.

11. From the FDOT Plans Development > Quantities Tasks menu select Open Quantity Manager.

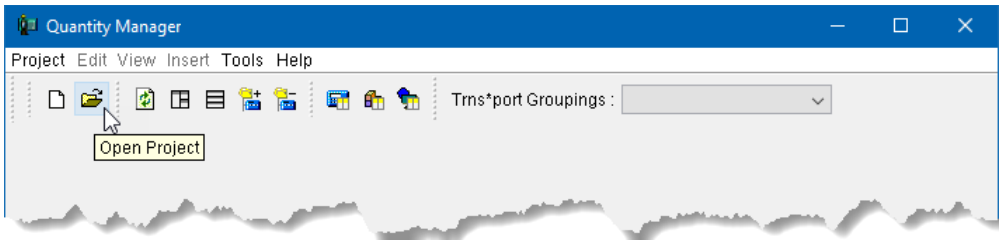
    < OR >

    In the MicroStation View, right-click and hold for the context menu, then select **Quantity Manager**.

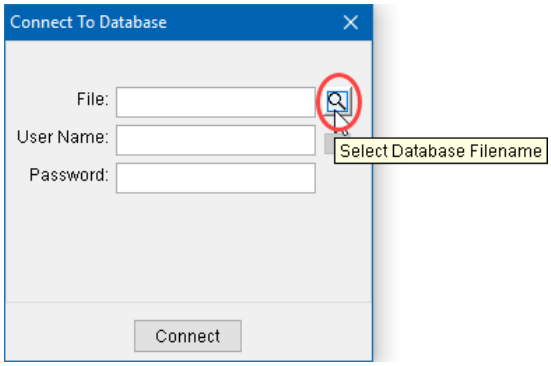




12. On the Quantity Manager dialog, click on **Open Project**.

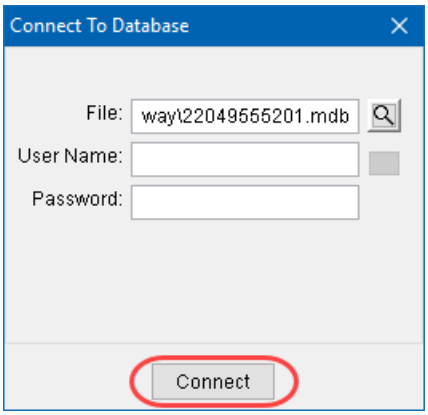


13. On the Connect To Database dialog, click on the icon to *Select Database Filename*.

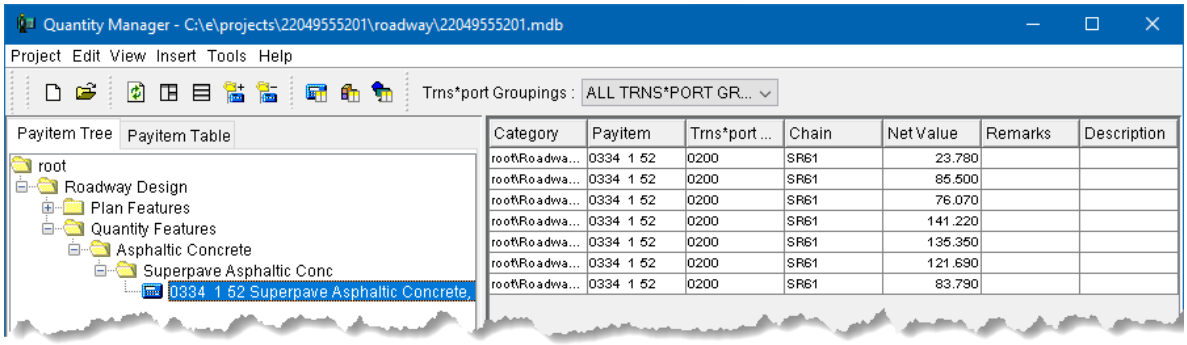


14. Navigate to C:\e\projects\22049555201\roadway\ and select the *22049555201.mdb* file. Click **Open**.

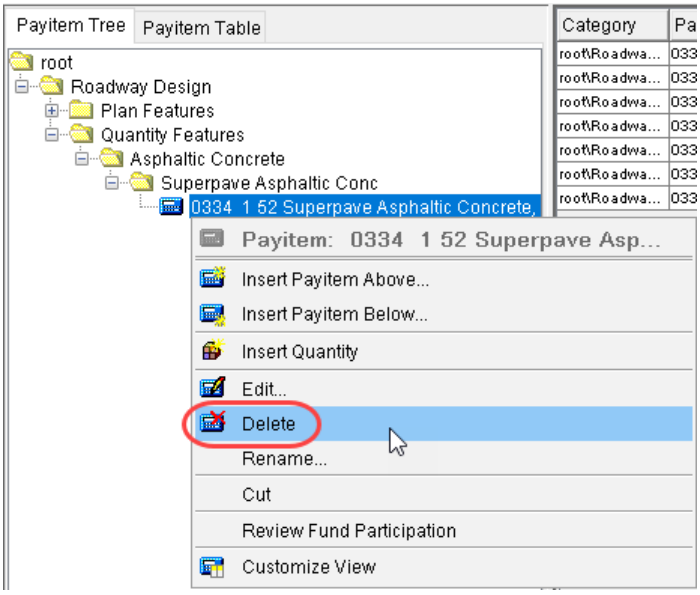
15. On the Connect To Database dialog, click **Connect**.



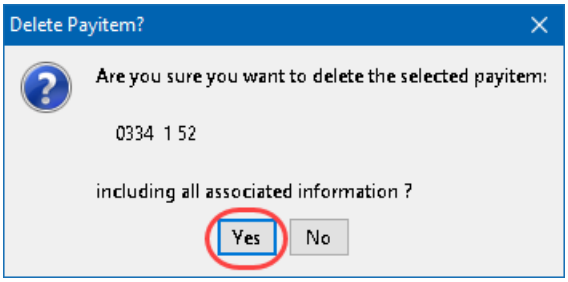
16. Navigate to the *asphalt quantity* under Roadway Design > Quantity Features > Asphaltic Concrete > Superpave Asphaltic Conc.



17. Right-click on the *Pay Item* **0334 1 52** and select **Delete**.

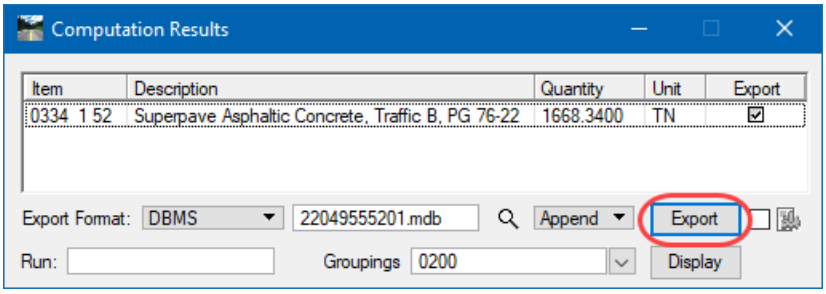


18. On the Delete Payitem? Alert dialog, click **Yes** to delete the selected *Pay Item*.



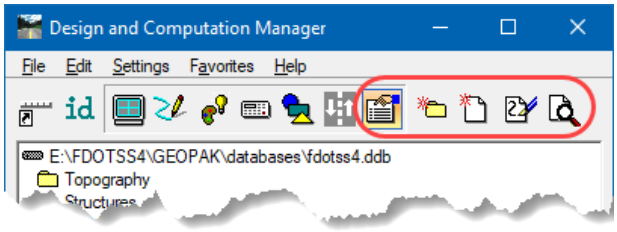
19. Close Quantity Manager.

20. In MicroStation, on the Computation Results dialog, use the same settings shown to *Export* the **Asphalt Quantities**.

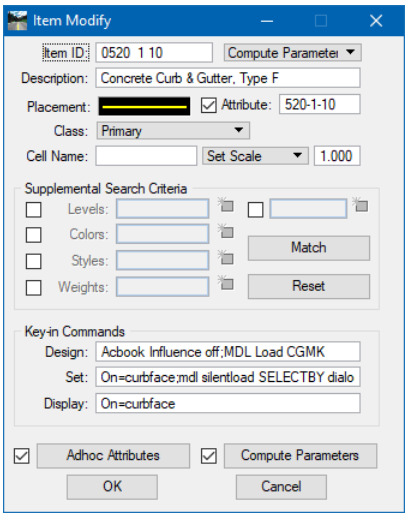


PREFERENCES MODE

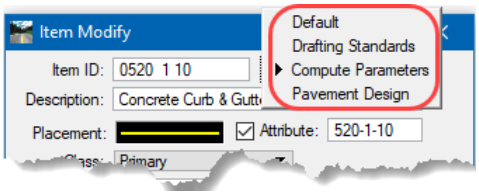
Use the Preferences Mode of the D&C Manager to create, review, and modify items.



There are times when items needed are not included in the D&C Manager database. For example, a pay item is needed or an item to count elements in a design file. In these situations, toggle on the icon for Preferences. This is an administrative mode to make it easier to modify items in the database. With Preferences Mode active, double clicking on a database item opens the Item Modify dialog box.

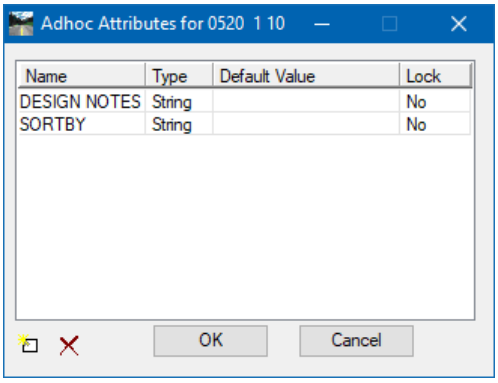


- *Item ID* - Name of the database item. For Compute Parameter items, it is important to name the item using the Project Preconstruction formatting.
- *Type* - Four types are supported: Default, Drafting Standards, Compute Parameters, and Pavement Design.

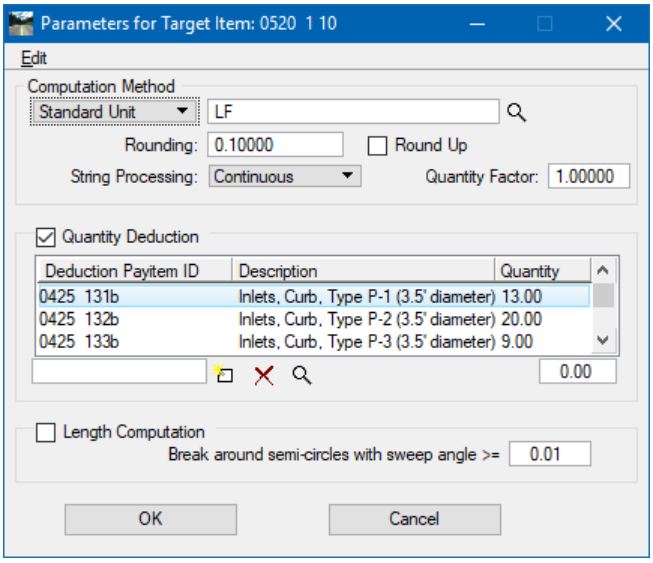


Default	Identifies element symbology for drawing elements and search parameters.
Drafting Standards	Defines element symbology for the placement of coordinate geometry elements, i.e. points, lines, curves, parcels, chains, and profiles.
Compute Parameters	Identifies parameters associated with calculating quantities, i.e. unit of measure, rounding factors, pay item, formulas.
Pavement Design	FDOT does not use this classification and this manual will not cover.

- *Description* - Description of the item.
- *Placement* - Sets the symbology for elements drawn or set using this item.
- *Attribute* - When toggled ON, adds a special adhoc to the element used to make the element unique for identification purposes.
- *Class* - Primary or Construction.
- *Cell Name* - Sets the cell name.
- *Scale* - Sets how the scale of the cell is determined when placing.
- *Supplemental Search Criteria* - Defines additional symbology parameters to identify elements for the item.
- *Key-In Commands* - MicroStation key-in commands executed when double clicking on an item when in the different modes.
- *Adhoc Attributes* - When toggled ON, assigns adhoc attributes to elements with Place Influence or using the Set command.



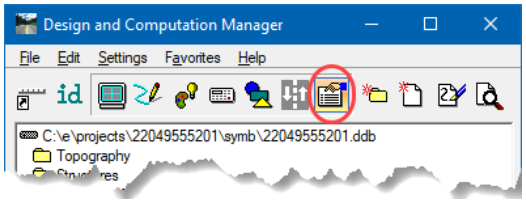
- *Compute Parameters* - When setting Classification to Compute Parameters, toggled ON. Defines how to calculate the item, and sets the Units and Rounding.



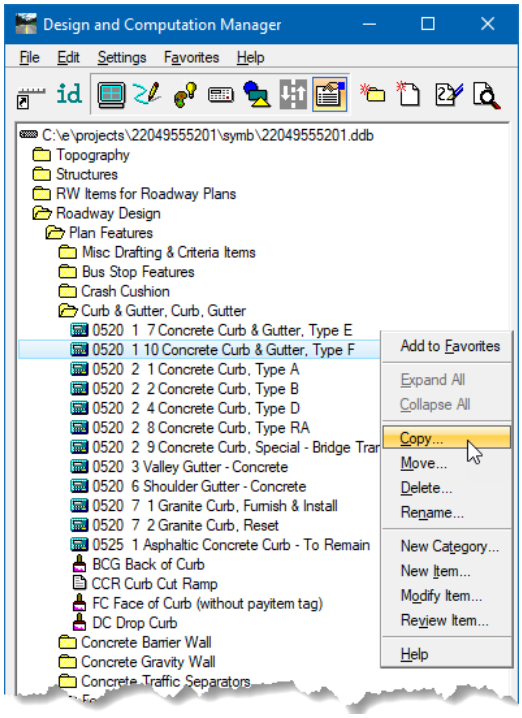
Exercise 4.4 Add an Item to the D&C Manager

This exercise adds an item to the D&C Manager database for pay item 520-1-11, variable height Type F Curb & Gutter. Since we are creating an item to calculate curb and gutter, we going to copy a similar item and then modify the new item to suit the needs for the new pay item required.

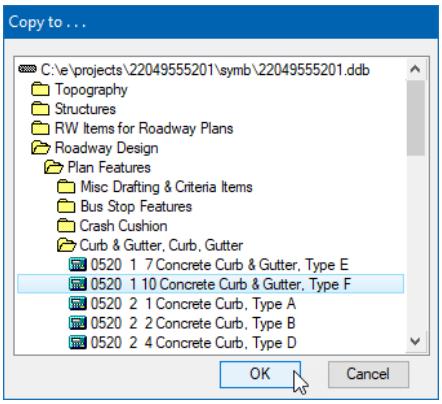
1. Continuing with the D&C Manager in the saved project database *22049555201.ddb*, navigate to the item **520-1-10 Curb & Gutter, Type F**.
2. Select the **Preferences** *Mode*.



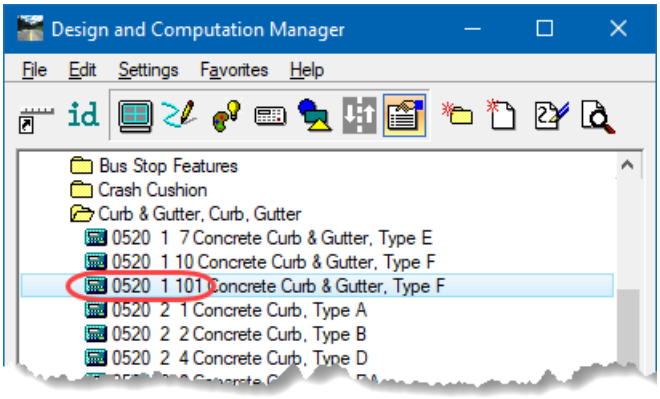
3. Right-click and select **Copy**.



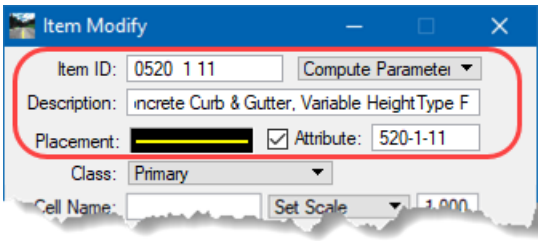
4. On the Copy to… dialog box, scroll down to and select the **0520 1 10** *item* and select **OK**. When copying or moving items or categories, the item places below the item or category selected.



5. Double-click on the new item **0520 1 101** to open *Item Modify*.



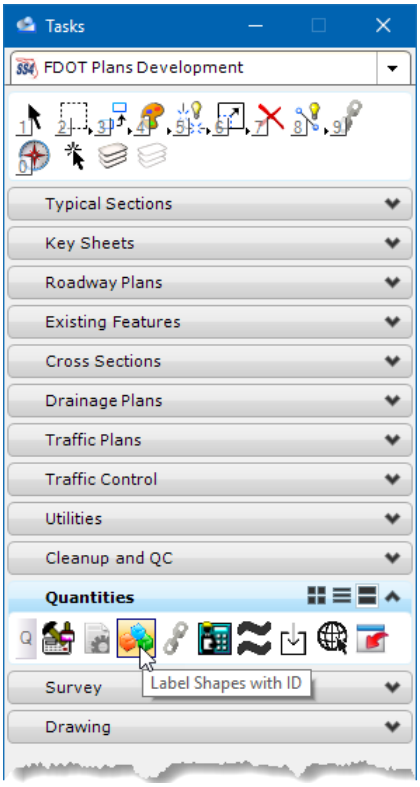
6. On the Item Modify dialog, edit the *Item ID, Description* and *Attribute* values as shown below.

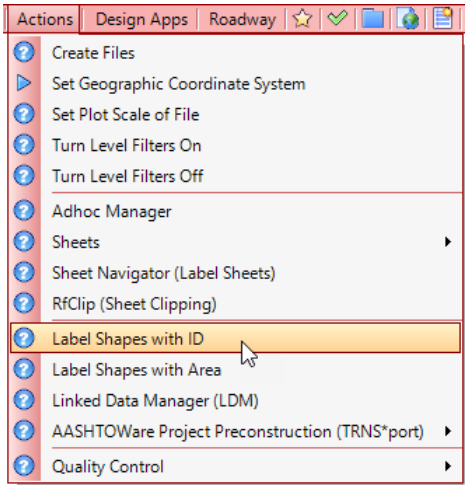


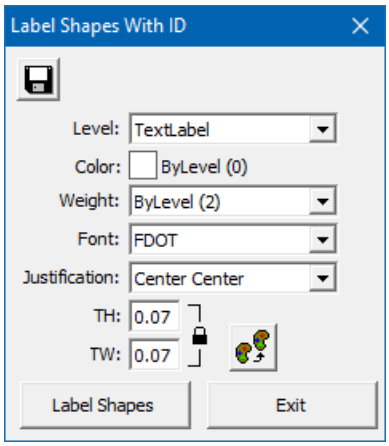
7. Click **OK**. The item is now ready to use to draw/set elements and calculate the quantity.
8. Select **File > Save** to save the modified database to the project symb directory so that the changes will be delivered with the project.

LABEL SHAPES WITH AREA ID

When designing an FDOT project, labeling the areas used to generate quantities is REQUIRED. The delivery to Construction includes the QTDSRD file as part of the backup information for the quantities. FDOT delivers the Label Shapes with ID VBA application on the FDOT Menu to automate labeling: It is also included on the **FDOT Plans Development > Quantities** Tasks menu.





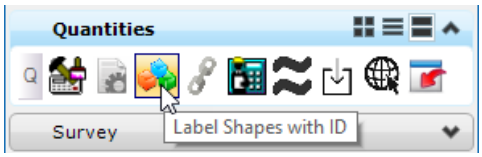


This tool can label all the shapes in a model at one time by creating a selection set of all the elements in the file and then clicking Label Shapes. FDOT recommends creating the labels at a larger scale than for normal drawings. These labels are not printed. The intent of these labels is to help downstream location of specific shapes.

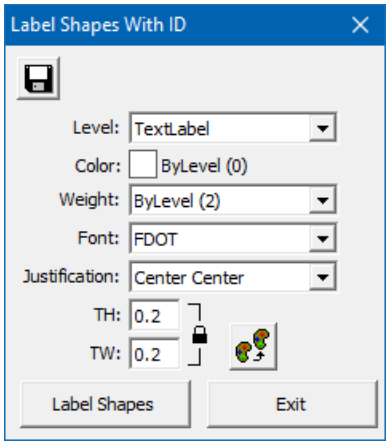
Exercise 4.5 Label Areas

This exercise creates the Area ID Label on the quantity shapes using the Label Shapes with ID tool.

1. On the FDOT Plans Development > Quantities Tasks menu select Label Shapes with ID.



2. Set up the Label Shapes with ID dialog as shown below.



Note This tool works with **Annotation Scale**. If the text comes in too small with the above setting, go to the **Settings > Drawing Scale** dialog and adjust the **Annotation Scale** for the model.

3. Using the *Element Selection* tool, select **ALL** the **Shapes** in the *Model.*
4. Click Label Shapes.
5. Select **CTL-B** on the keyboard to open *View Attributes*. Toggle **OFF** the *Fill* option.
6. **Save Settings** with *CTL-F* on the keyboard.
7. Review the results.

5 QUANTITY MANAGER

OBJECTIVES

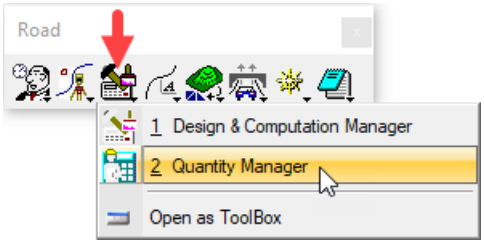
- Detail the Functions of Quantity Manager
- Open a Quantity Database in Quantity Manager
- Detail the Quantity Manager Window
- Navigate Through Quantity Manager
- Generate Quantity Reports

QUANTITY MANAGER OVERVIEW

Quantity Manager is the GEOPAK tool used to store, organize, and manipulate quantities generated by the D&C Manager. Pay items and quantities can also be stored in the database manually. It is not the intent of this chapter is to provide full training on all the functions within Quantity Manager. For more in depth information, see the Bentley Help files.

ACCESS QUANTITY MANAGER

To access Quantity Manager, from the Road toolbox, pull down the options under the D&C Manager icon and click the **Quantity Manager** icon.



<OR>

From the MicroStation menu, select **GEOPAK > ROAD > Quantity Manager**.

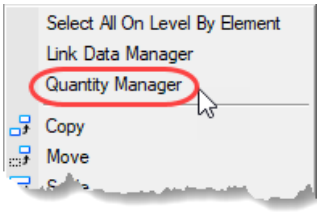
<OR>

From the FDOT Plans Development > Quantities Tasks menu, select the Quantity Manager icon. 

<OR>

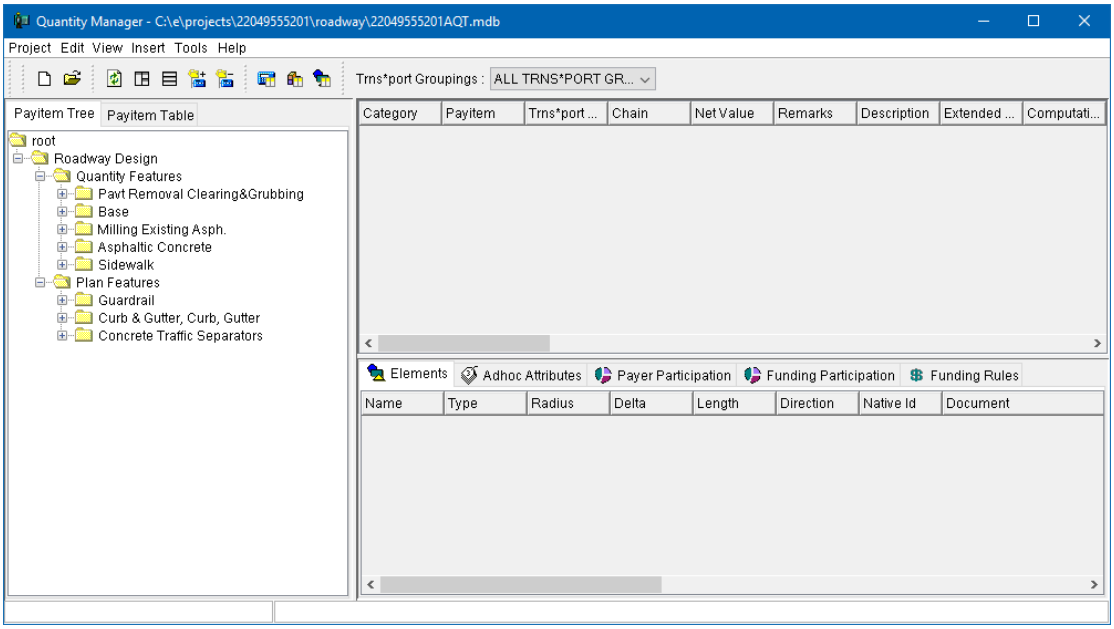
From MicroStation, right-click and hold for the context menu, select **Quantity Manager**.

Note The right-click menu options change with the type of active file open.



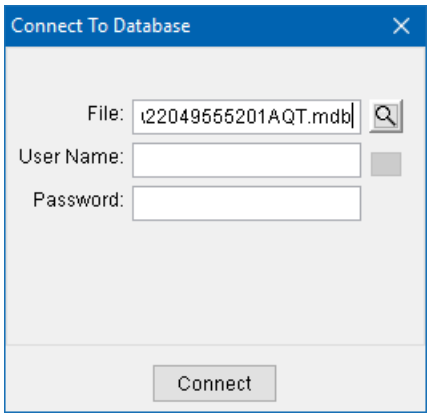
QUANTITY MANAGER DIALOG

Quantity Manager has three parts, as shown in the following figure: *Menu bar*, *Tool Bar* and *Window Area*. The Window area has three panes*: Pay Item*, *Quantity*, and *Element*.



➢ ***Opening a Project***

1. From the MicroStation Menu, select **GEOPAK > ROAD > Quantity Manager**.
2. From the Quantity Manager Menu, select **Project** > **Open**. Connect to Database dialog displays.



3. In the *File* box, enter the path to *22049555201AQT.mdb*

   <OR> click the **Browse** icon and navigate to the file.
4. Leave the *User Name* and *Password* boxes **blank**.

Note For this course will use the pre-existing *22049555201AQT.mdb* file.

5. Click the **Connect** button. The database displays.

PROJECT PROPERTIES

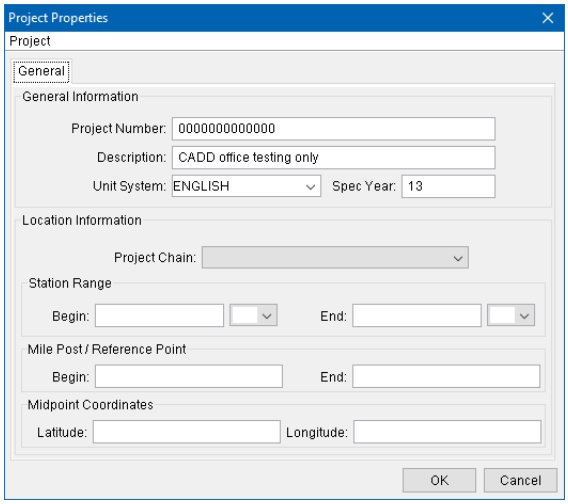
Once a project displays in Quantity Manager, the Project Properties need to be set. There are two methods for setting the project properties. The preferred method is using the Designer Interface, unless the user does not have a TRNS*PORT login.

DEFINING PROJECT PROPERTIES

➢ ***To Define Project Properties from within Quantity Manager, if no TRNS*PORT login.***

1. From the Quantity Manager menu, select **Project** > **Properties**. Project Properties displays.
2. In the *Project Number* box, enter the **Project FIN Number**.
3. In the *Description* box, enter the **Project description**.
4. In the *Unit System* box, select **English**.
5. In the *Spec Year* box, enter the **Specification Year**.

Note The Spec Year definition must match the Pay Item *aecXML* file exactly.

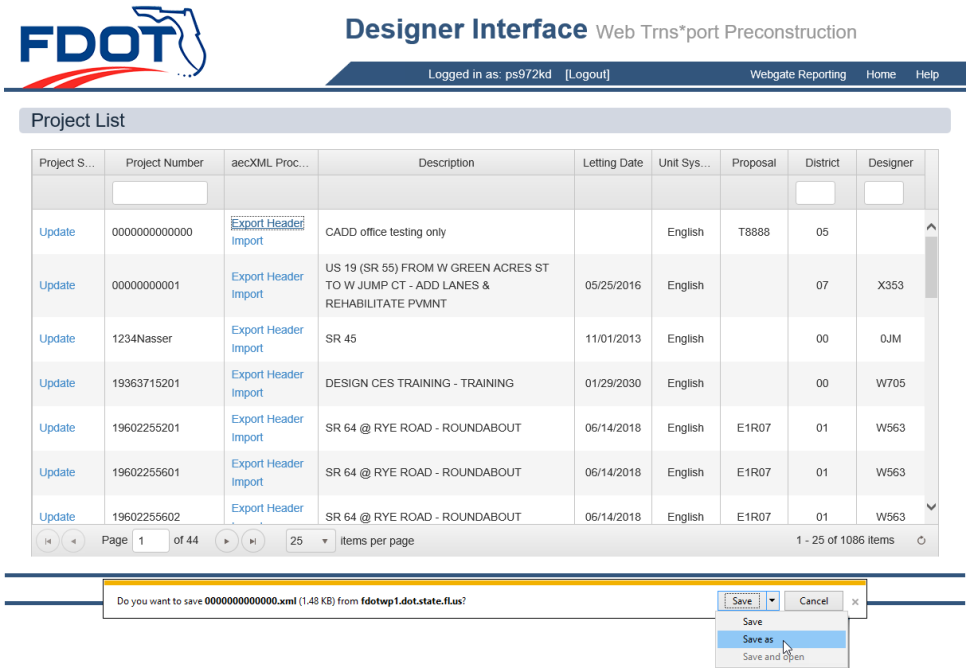


➢ ***To Define Project Properties using Designer Interface, if Login Exists.***

If user has a login to access Designer Interface, this is the preferred method for populating the Project Properties.

Note For illustration purposes in this course, the CADD office test project in Designer Interface will be used.

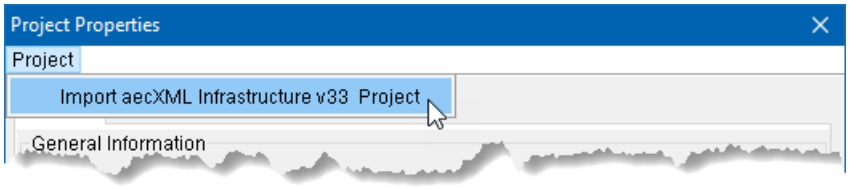
1. Once logged into Designer Interface, use "**Export Header**" to create an *.XML* file to import into Quantity Manager. This file contains the Quantity Manager Project Properties.



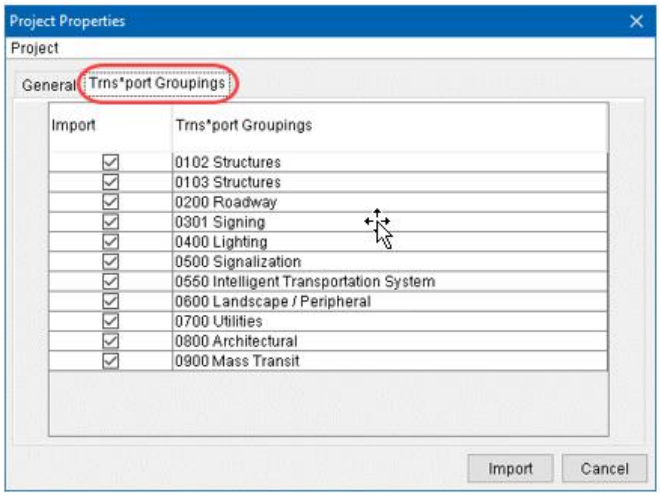
2. Select **Save As** to save the file to your project discipline directory. By default, the filename of this file becomes *[FPID#].xml*.

Note The bar and save options shown are in Internet Explorer. Other internet browsers may save the file directly to the downloads folder. If this happens, simply copy the file from the downloads folder to the project discipline directory.

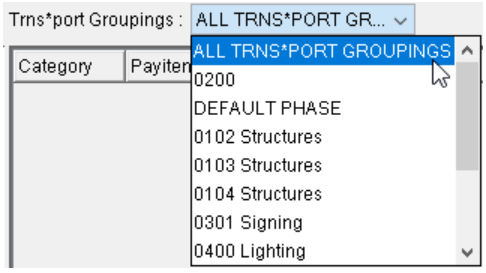
3. In Quantity Manager, open the same Project as selected in Designer Interface.
4. From the Quantity Manager menu, select **Project** > **Properties**.
5. From Project Properties, select Project > Import aecXML Infrastructure V33 Project.



6. Select the **Location** and **File Name** of the *XML* file exported from Designer Interface.
7. Click **OPEN.** The Project Properties populates in Quantity Manager.
8. Select the TRNS*port Groupings tab.



9. Select the **TRNS*PORT Groupings** applicable to your Project. The *Default* checks all **ON**.
10. Select **Import**. Project Properties closes.
11. Select the drop-down list for **TRNS*PORT Groupings**.



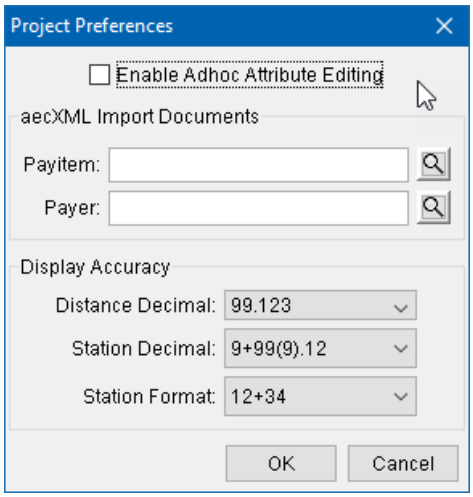
Note Notice the creation of the Groupings. See the ***Basis of Estimates Manual***, Chapter 9 for the Grouping definitions.

PREFERENCES

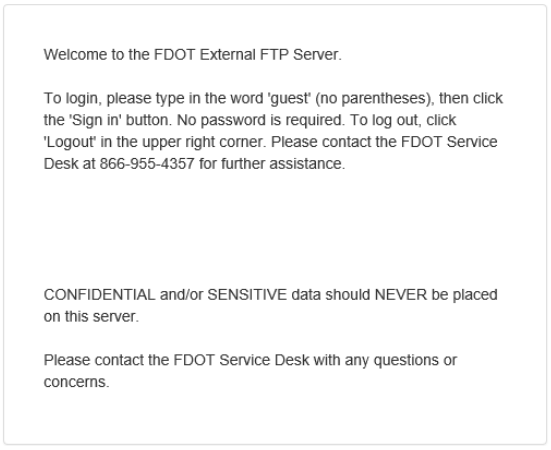
The preferences are set to enable Adhoc Attribute editing, define the aecXML Import Documents file locations, and set the Display Accuracy of Distance Decimal, Station Decimal, and Station Format.

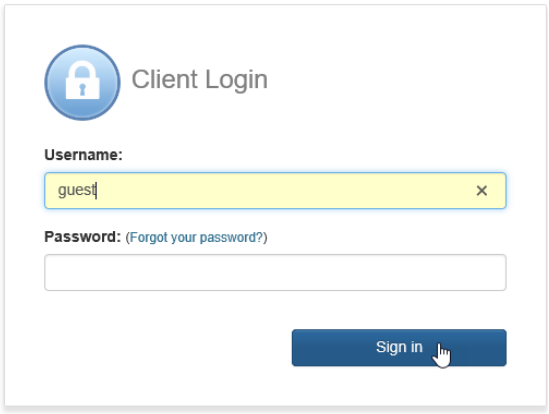
➢ ***To Define Project Preferences***

1. From the Quantity Manager menu, select **Project** > **Preferences**. Project Preferences displays.

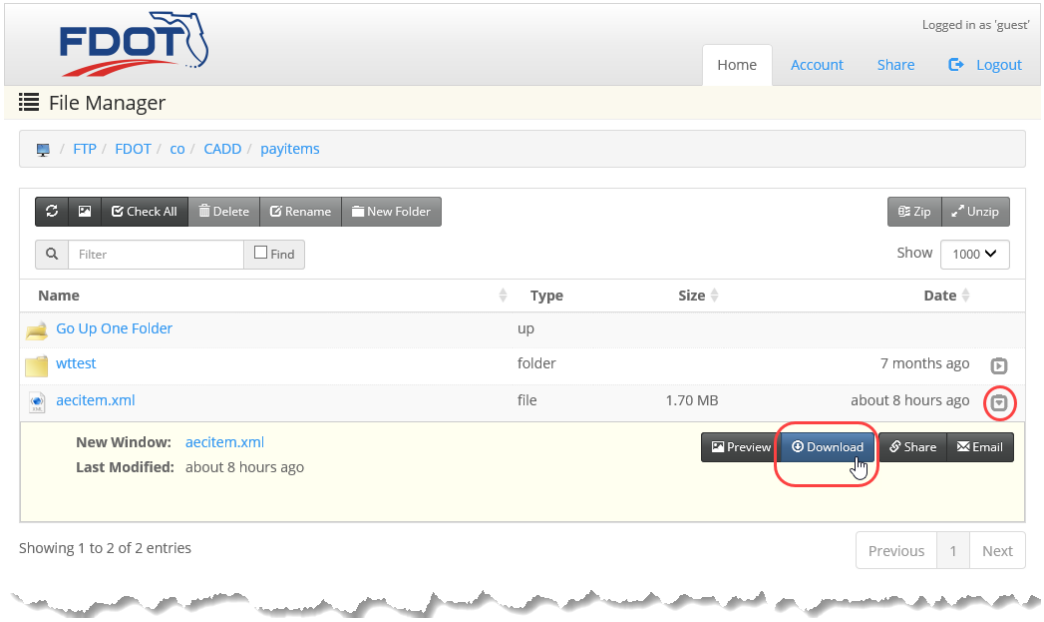


2. Check **On** the Enable Adhoc Attribute Editing.
3. Download the FDOT pay item list from FDOT's FTP site into the Project *Symb* directory. There is a link on the FDOT Menu under **Actions > AASHTOWare Project Preconstruction (TRNS*port) > AECITEM.xml Download**. Login as "guest".





4. Select the **Expand** button at the far-right side of the **aecitem.xml** file link, then select **Download** and save the file to the Project *Symb* directory.



Note FDOT updates the FTP site each morning around 5 am and recommends downloading periodically to ensure the latest pay item list.

5. In the Project Preferences dialog *Pay Item* box, enter the path to **AECITEM.xml,** located in the Project *Symb* directory.

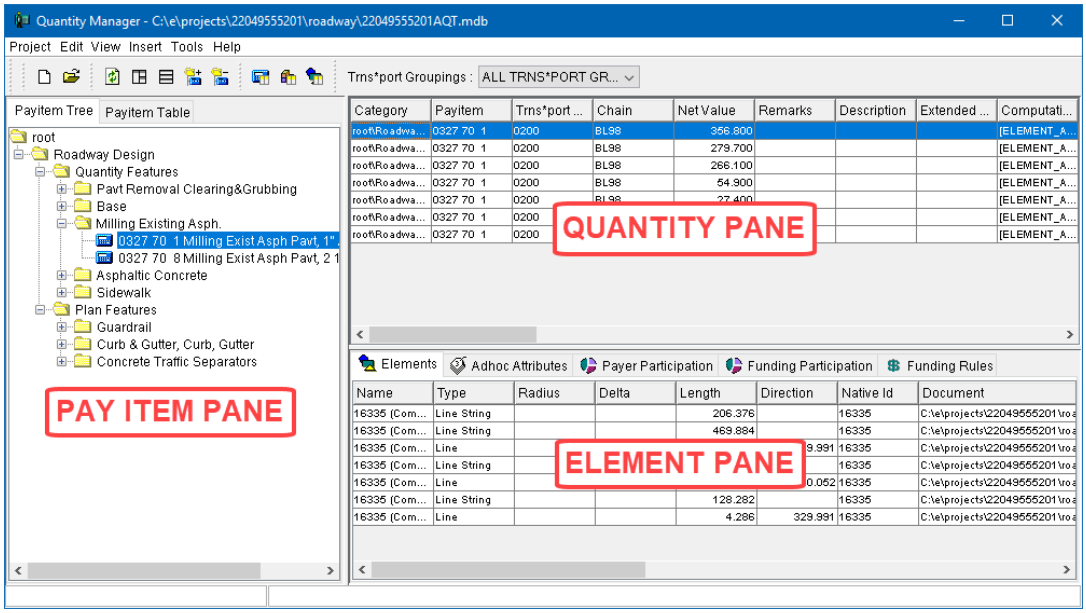
   <OR> click the **Browse** icon  and navigate to the file.

6. In the *Payer* box, leave **blank**.

7. Click the **OK** button. The information saves and Project Preferences closes.

INTERFACE DETAILS

The main body of Quantity Manager comprises three panes: *Pay Item*, *Quantity*, and *Element*.



PAY ITEM PANE

The Pay Item Pane is located on the left side of Quantity Manager in Normal View and is the top pane when tiled horizontally. Two tabs control the display type for the Pay Item pane:

- *Payitem Tree* – This tab displays the contents in a hierarchical structure easily navigated in the same manner as D&C Manager.
- *Payitem Table* – This tab displays the database Pay Items in a table format that contains additional information about Pay Items and is useful for selecting multiple items.

QUANTITY PANE

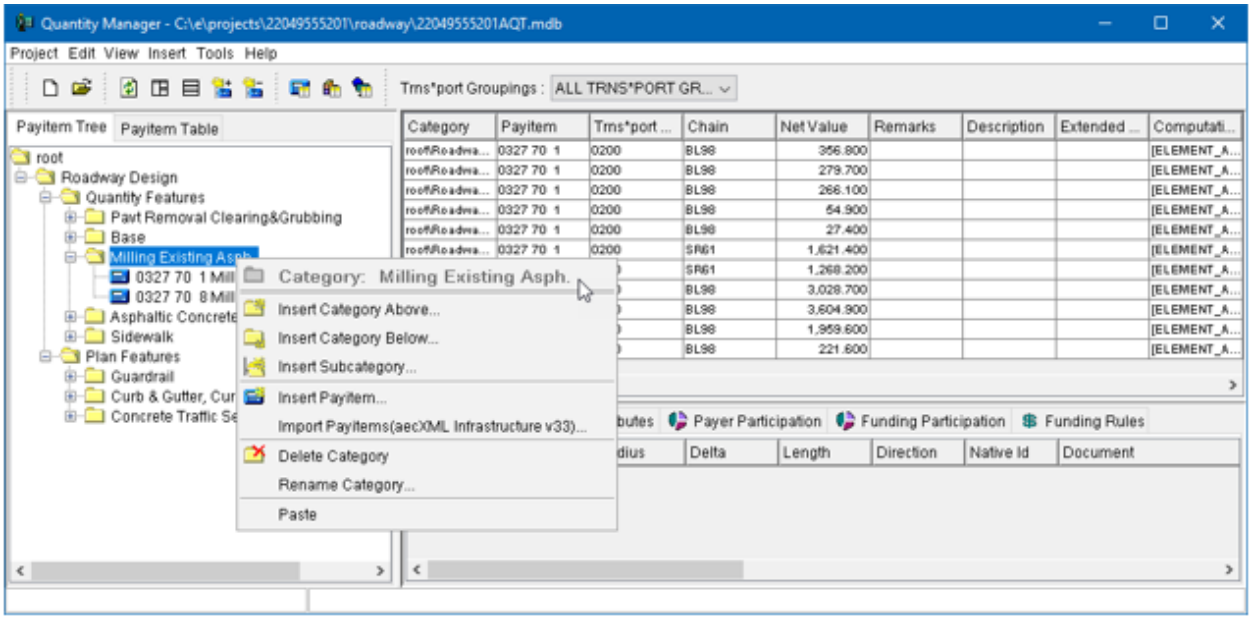
The Quantity Pane displays only quantity information under the current Phase selected on the tool bar about the specifically selected Pay Item or Category. The information is customizable by selecting which columns to display and sorts by clicking on any of the column headers.

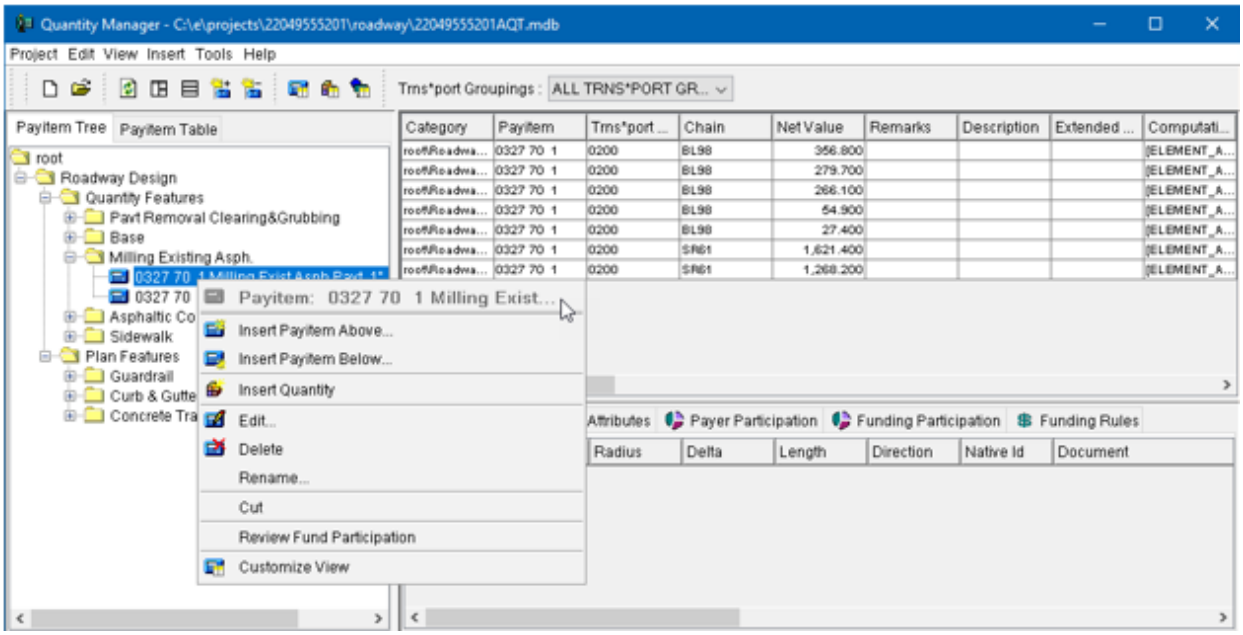
ELEMENT PANE

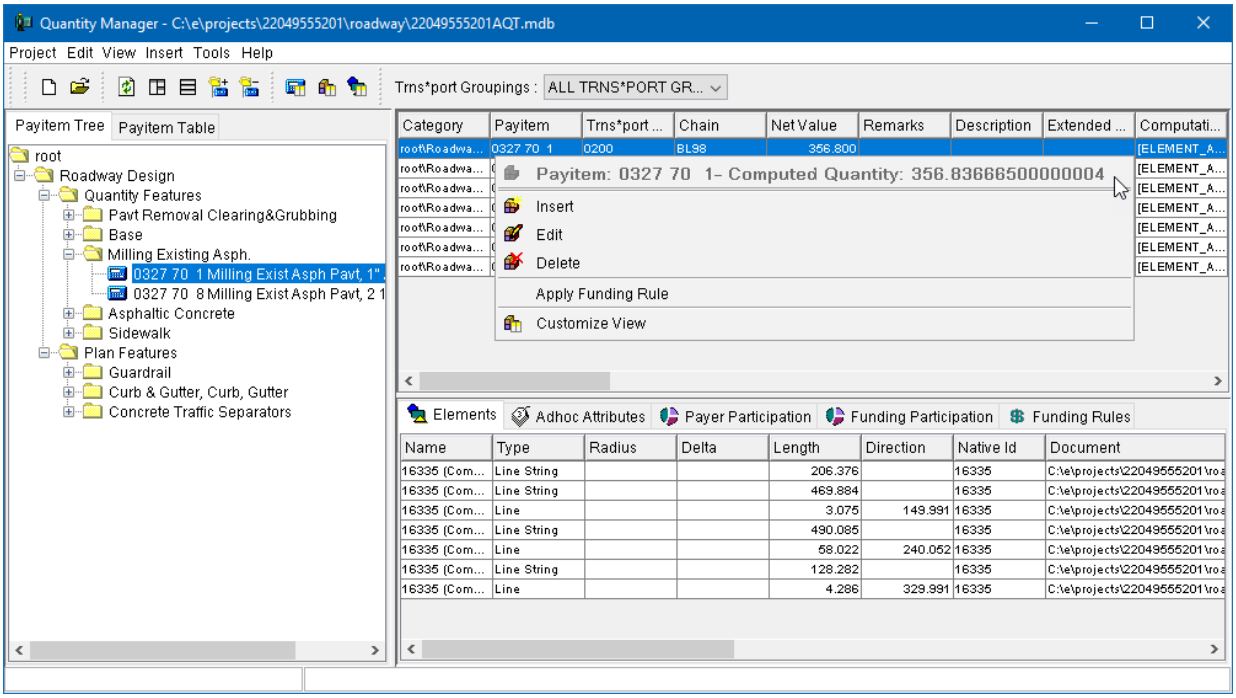
The Element Pane displays information specific to the selected Quantity. Each tab displays different attributes. The Elements tab shows all the elements that make up the selected Quantity. Adhoc Attributes tab displays any Adhoc related to the Quantity. Funding Participation, Funding Rules, and Payer Participation tab displays information related to funding sources.

RIGHT-CLICK MENUS

Select an item or category and right-click in the *Pay Item Pane* or *Quantity Pane* to display a popup menu with a list of shortcuts to tools related to the View Pane.







INSERT OPTIONS

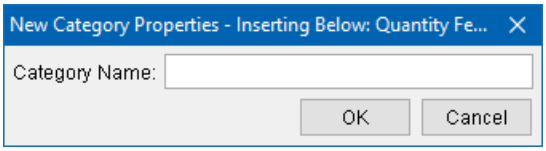
Quantity Manager has an option for manually adding Quantities. The Insert menu has the options to add Categories, Pay Items, and Quantities <OR> access by right-clicking in the Pay Item Pane of the dialog. The options will vary when accessing through the right-click menus.

INSERT CATEGORY

A Category is comparable to a folder in a directory structure. When exporting quantities from D&C Manager, the Categories from the D&C Manager export along with the quantities. Manually create Categories above, below, or as subcategories to the selected Category.

➢ ***To Create a New Category:***

1. Select an existing **Category** in the *Pay Item Pane*.
2. Right-click and select the option to **Insert Above, Below** or **Subcategory**.



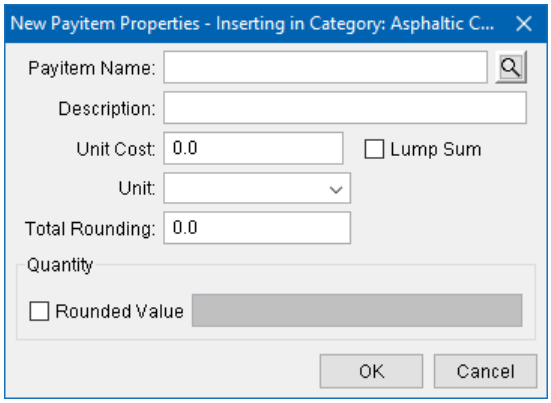
3. On the New Category Properties dialog, enter the new *Category Name*.
4. Click **OK**.

INSERT PAY ITEM

In Quantity Manager, the Pay Item is a special "file" that contains the quantity information. Add Pay Items Above or Below a selected Pay Item. Highlighting a Category and selecting the option to *Insert Pay Item* ensures the new Pay Item adds to the selected Category.

➢ ***To Create a New Pay Item:***

1. Select an existing **Pay Item** or **Category**.
2. Right-click and select the option to **Insert Pay Item**.



3. Complete the New Pay Item Properties dialog.

> ***HINT*** The *aecitem.xml* file is accessible through Quantity Manager by clicking on the **Browse** icon next to the *Pay Item Name,* then the **Pay Item Number** may be selected from the list.

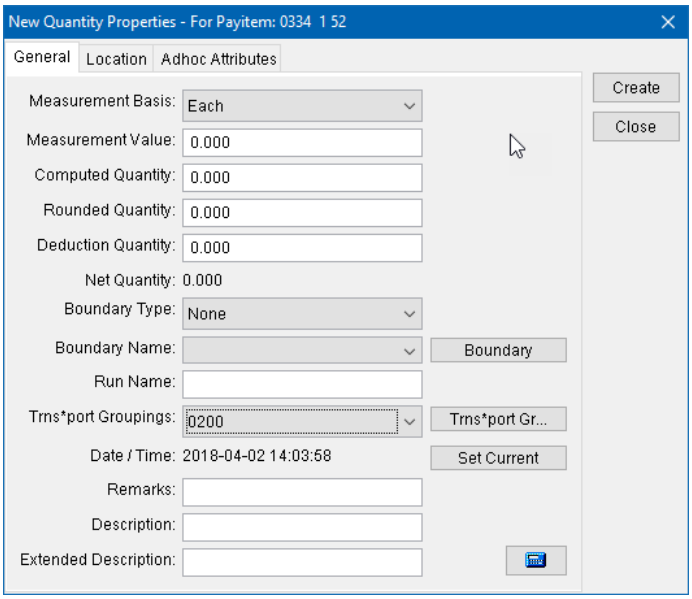
4. Click **OK**.

INSERT QUANTITY

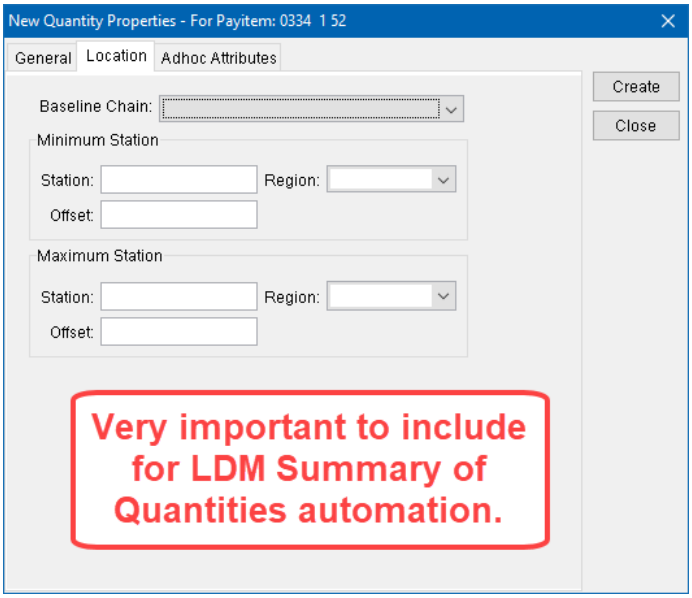
Manually add Quantities to the database by right-clicking on a Pay Item in the Pay Item pane of the dialog. These can be new quantities not calculated by the D&C Manger or could include a contingent quantity added after the project quantities have been calculated.

➢ ***To create a new quantity:***

1. Select the desired **Pay item** to add a new *Quantity*.
2. Right-click and select **Insert Quantity**.
3. Fill out the New Quantities Properties dialog box. There are *three tabs* for entering information.
   a. ***General Tab*** – Enter quantity information.

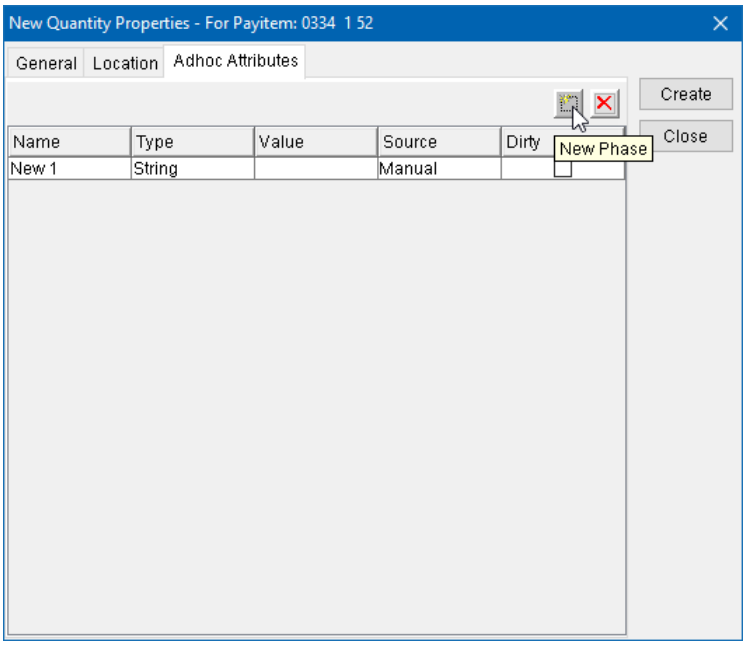


   b. ***Location Tab*** – Enter Baseline and Station/Offset Information



Note If either the station or offset information is not given, LDM will not include the quantity during automation.

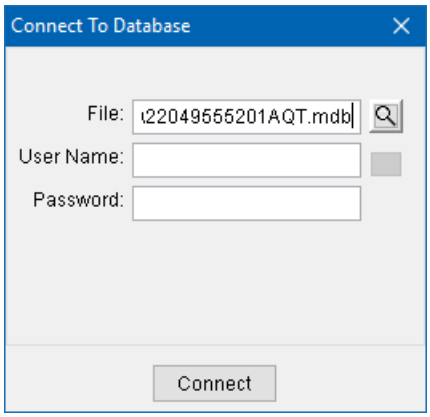
c. ***Adhoc Attributes Tab*** - Add Adhocs - they must match D&C Manager for LDM to use during automation.



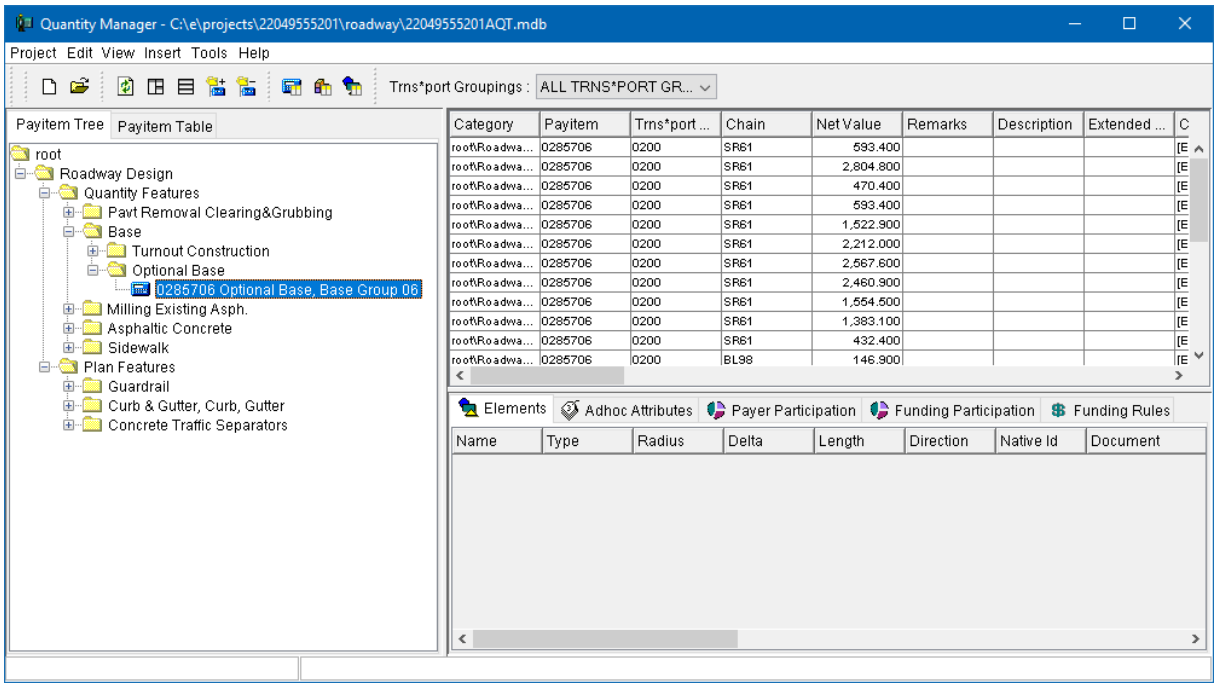
Exercise 5.1 Navigating Quantity Manager

This exercise will explore Quantity Manager to get familiar with how it is set up and displays the contents of the database.

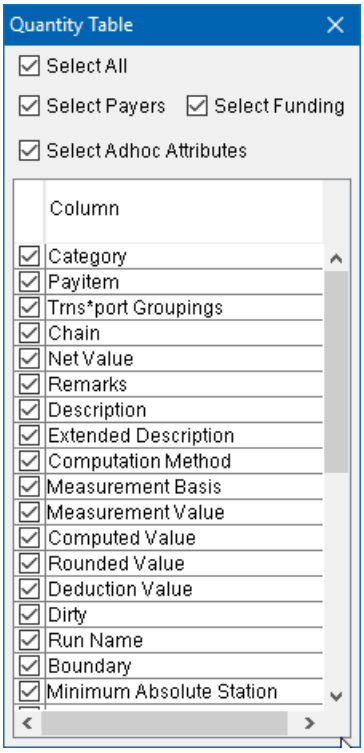
1. From the MicroStation Menu, select Applications > GEOPAK Road > Quantity Manager.
2. From the Quantity Manager Menu, select **Project** > **Open**. Connect to Database dialog displays.



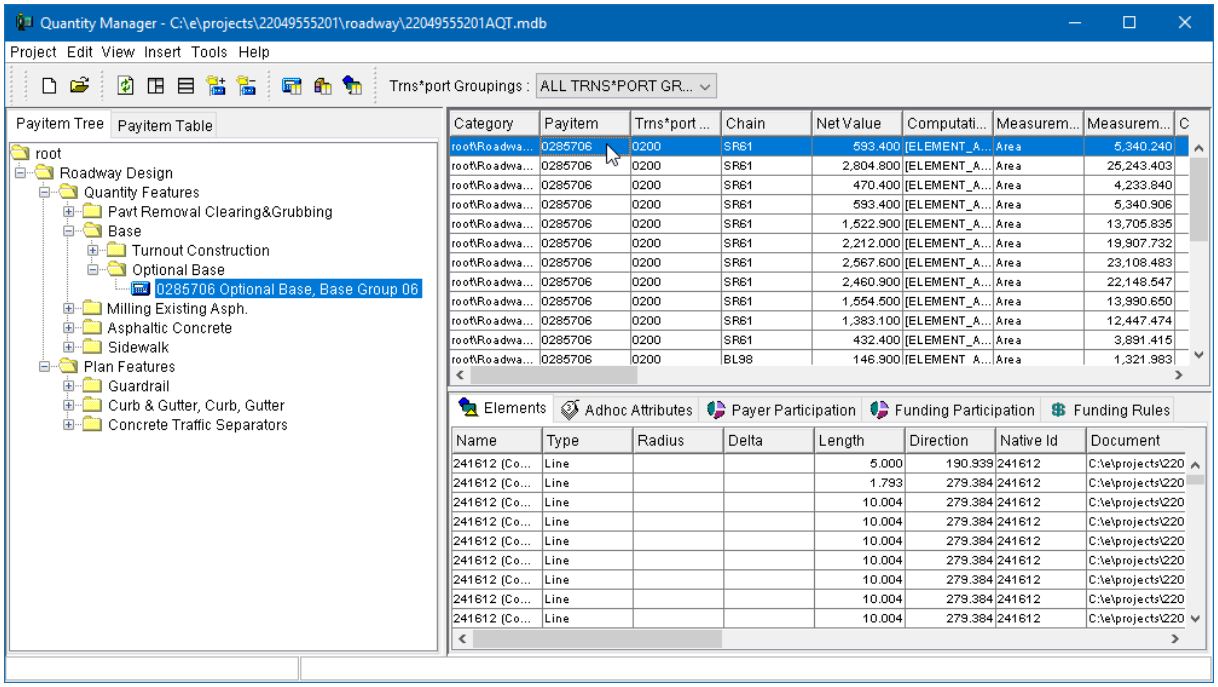
3. In the *File* box, enter the path to *22049555201AQT.mdb* <OR> click the **Browse** icon and navigate to the file.
4. Leave the *User Name* and *Password* boxes **blank**.
5. Click the **Connect** button. The database displays.
6. From Quantity Manager, select the **Pay Item Tree** tab.
7. Navigate through the database and select *Pay Item* **0285706**.



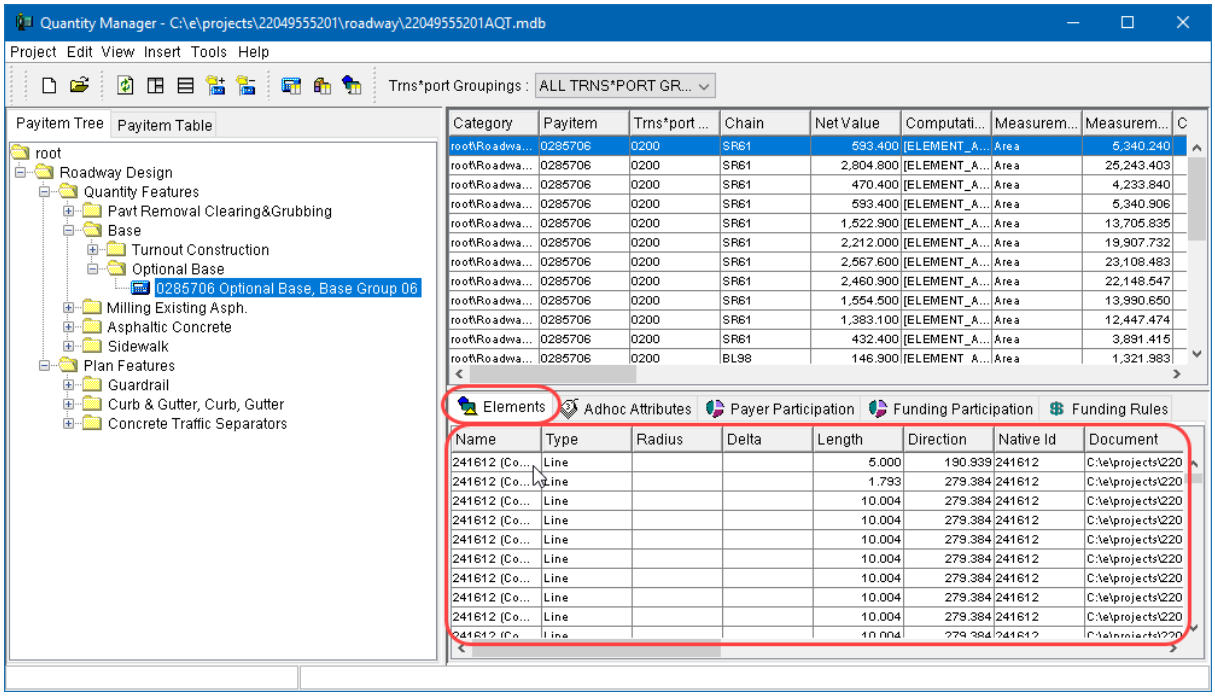
8. In the *Quantity Pane*, right-click on a *column header*. Quantity Table displays.



9. Clear the Remarks, Description, and Extended Description check boxes.
10. Close Quantity Table dialog.
11. From Quantity Manager, select the **first item** in the *Quantity Pane*.



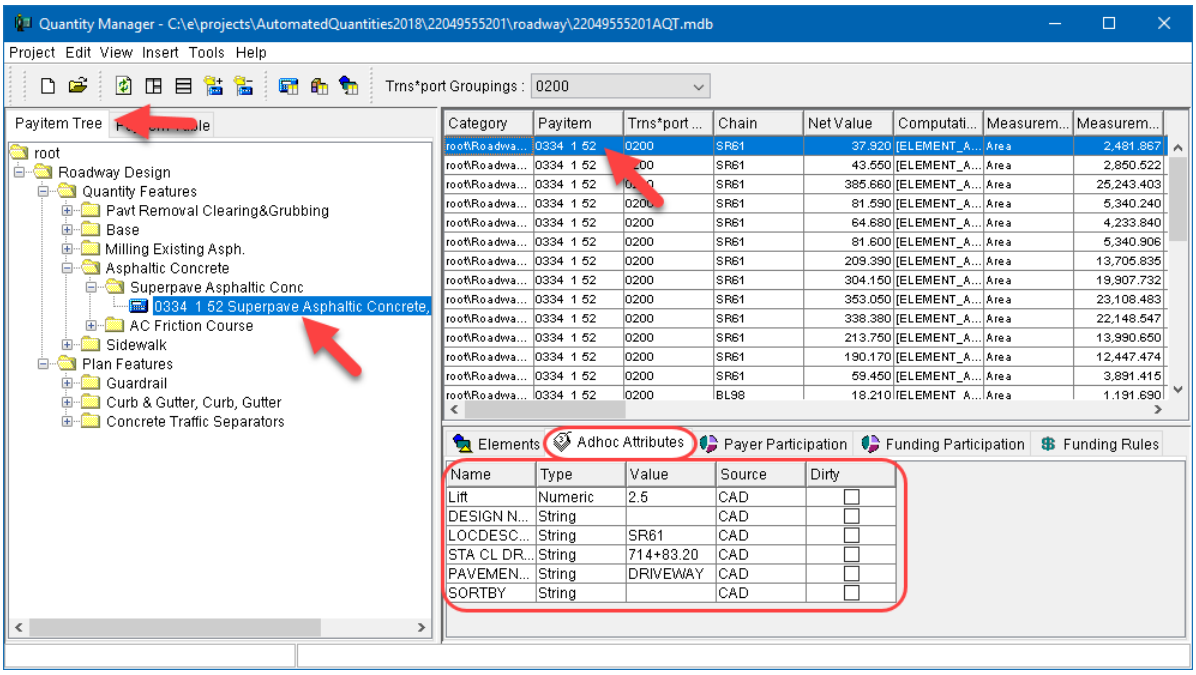
12. In the *Elements Pane*, select the **Elements** tab and review the components of the selected quantity.



13. In the *Payitem Pane*, select the *Payitem Tree* tab and navigate the database to *Item* **0334 1 52 (Superpave Asphaltic Concrete, Traffic B, PG 76-22)**.

14. Select one of the **Quantities** that appears in the Quantity Table.

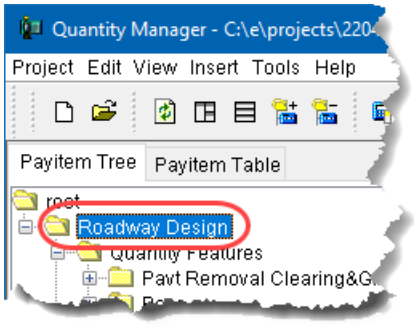
15. In the *Element Pane*, select the **Adhoc Attributes** tab. The Adhoc tags display for this element.



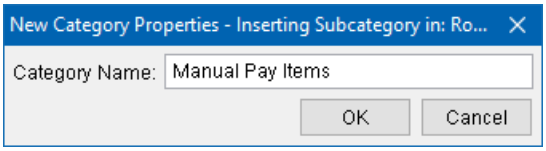
Exercise 5.2 Creating a Category

This exercise creates a new Category for manually added Pay Items.

1. From Quantity Manager, select the **Payitem Tree** tab and then select the **Roadway Design** *Category*.



2. From the Quantity Manager menu, select **Insert** > **Category** > **Subcategory**. New Category Properties displays.
3. From New Category Properties, enter **Manual Pay Items** in the *Category Name* box.

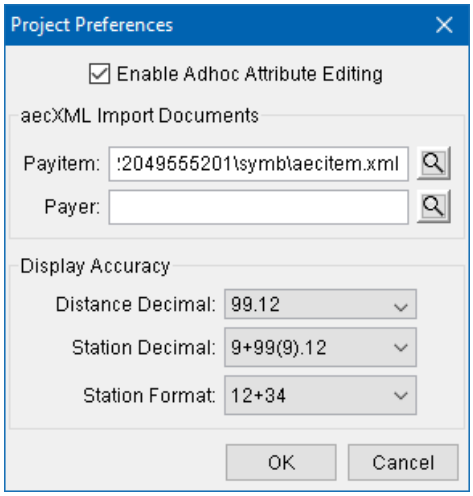


4. Click the **OK** button to create the new Category.

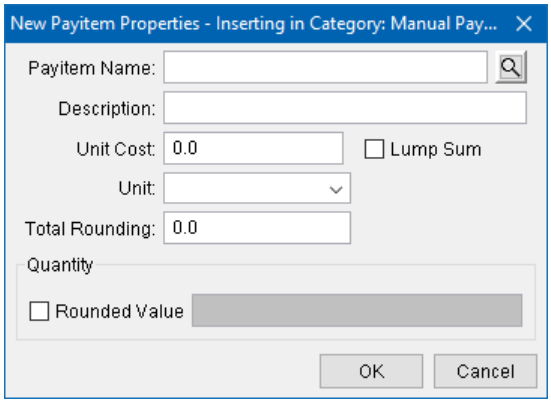
Exercise 5.3 Importing Pay Items

This exercise sets the preferences to find the *aecitem.xml* file and imports Pay Items to the database.

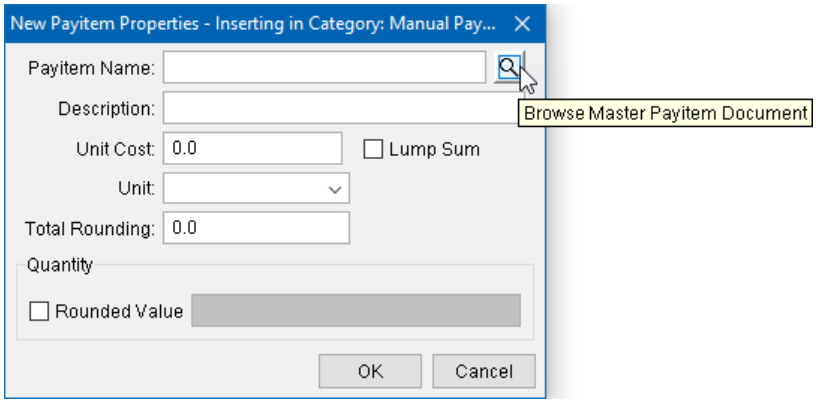
1. From Quantity Manager, select **Project > Preferences**.
2. On the Project Preferences dialog, check **On** the *Enable Adhoc Attribute Editing*.
3. Click on the **Browse** icon  next to the *Payitem* box, browse to the Project **Symb** directory, and select the *aecitem.xml* file.
4. Set the *Display Accuracy* settings as desired and click **OK**.



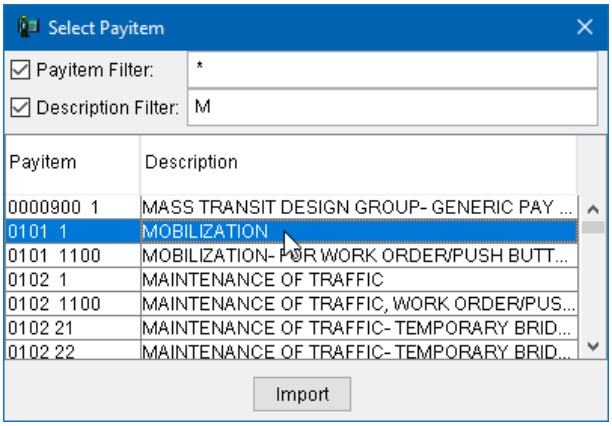
5. From Quantity Manager, Set the **TRNS*PORT Groupings** to **0200**, select the **Payitem Tree** tab and then select the **Manual Pay Items** *Category*.
6. Right-click and select **Insert Payitem…** from the popup menu. New Payitem Properties dialog displays. (This option allows for adding the pay item as well as the quantity.)



7. Click on the Browse Master Payitem Document icon.

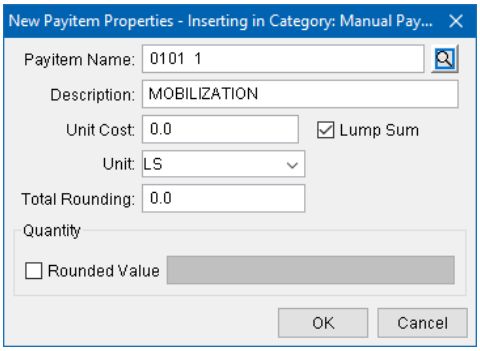


8. In the Select Payitem dialog, clear the *Description Filter* box and then enter **M**. All *Payitems* with Descriptions beginning with the letter *M* display.

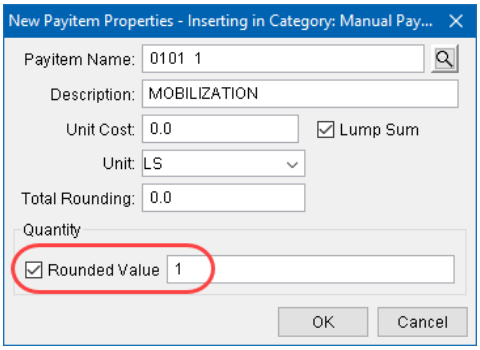


9. In the table, select **0101 1 Mobilization** and click the **Import** button.

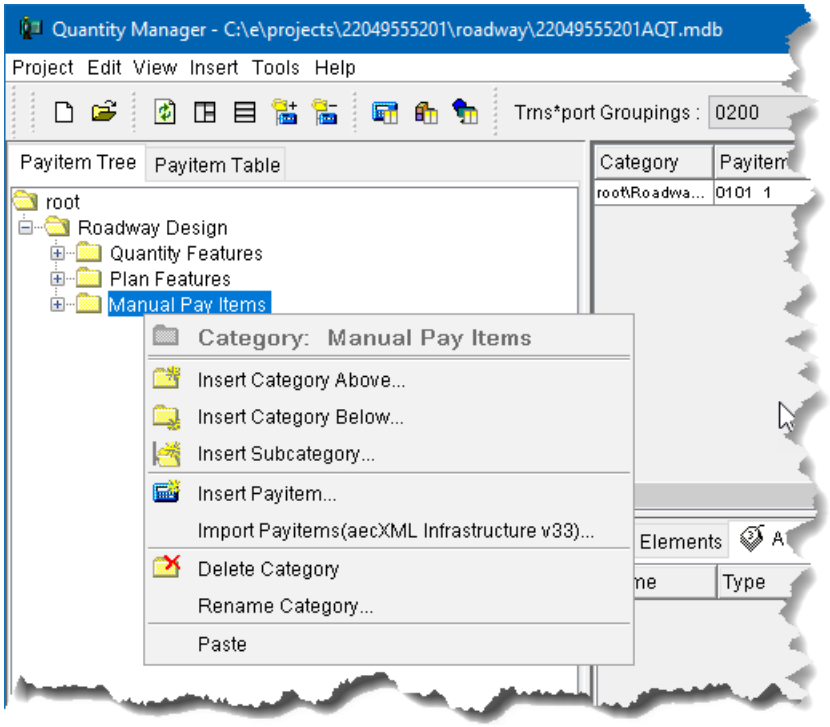
10. The *Mobilization Payitem* information populates on the **New Payitem Properties** dialog.



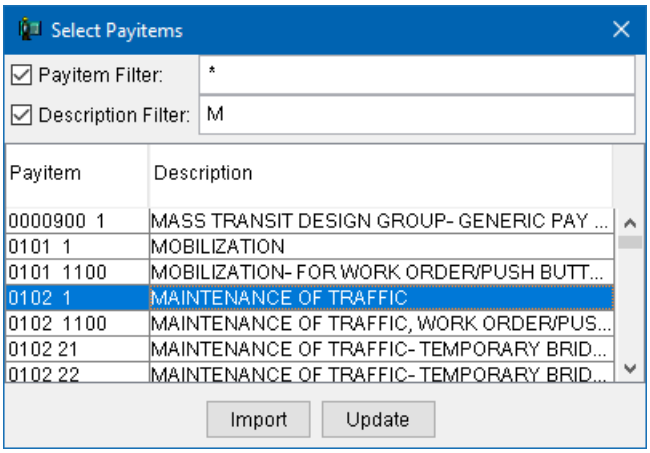
11. Toggle **ON** the option for the *Rounded Value* and type in a value of **1**.



12. Click **OK** to add the pay item and quantity to Quantity Manager.
13. Select the **Manual Pay Items** Category.
14. Right-click and select **Import Payitems (aecxml Infrastructure v33)** from the popup menu. Select Payitems dialog displays. (This option allows for the insertion of pay items only.)



15. On the Select Payitems dialog, clear the *Description Filter* box and then enter **M**. All *Payitems* with Descriptions beginning with the letter *M* display.

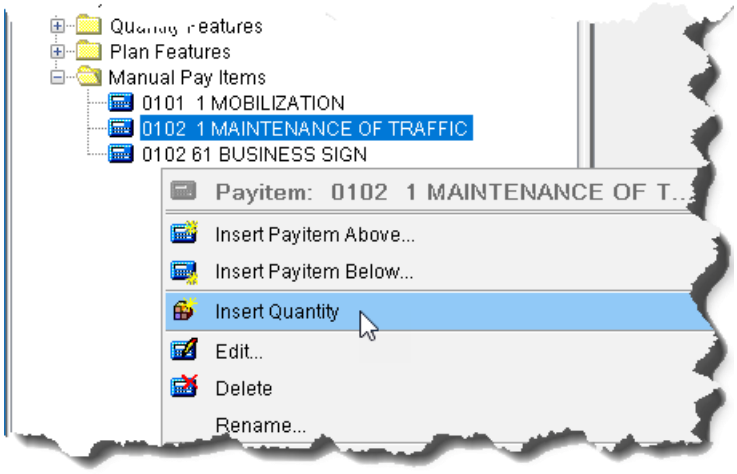


16. In the table, select 0102 1 Maintenance of Traffic.
17. Click the **Import** button. The *Maintenance of Traffic Payitem* adds to Quantity Manager.
18. Repeat steps 15 through 17 to import *Payitem* **0102 61 Business Sign** using **B** in the *Description Filter*.
19. Close Select Payitems.

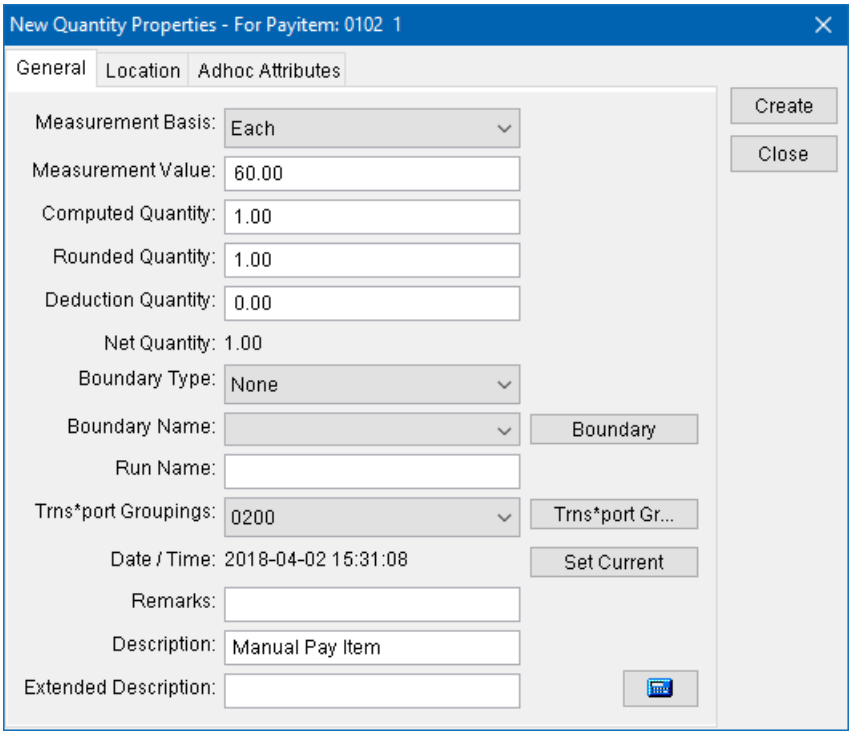
Exercise 5.4 Creating Quantities

This exercise adds quantities to Pay Items included in the database.

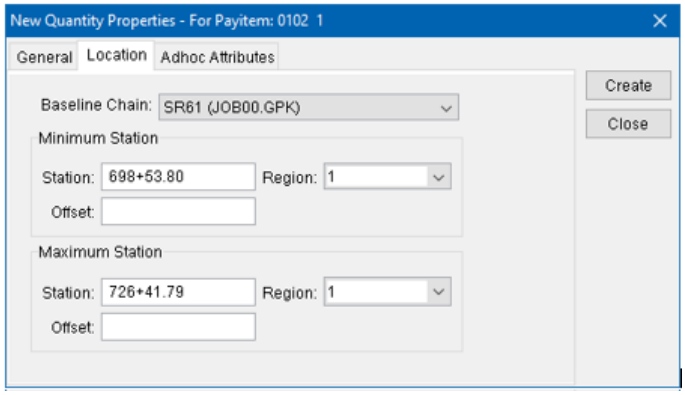
1. In the *Payitem Tree* tab, select *Manual Pay Item* **0102 1 Maintenance of Traffic**.
2. Right click and select **Insert Quantity**.



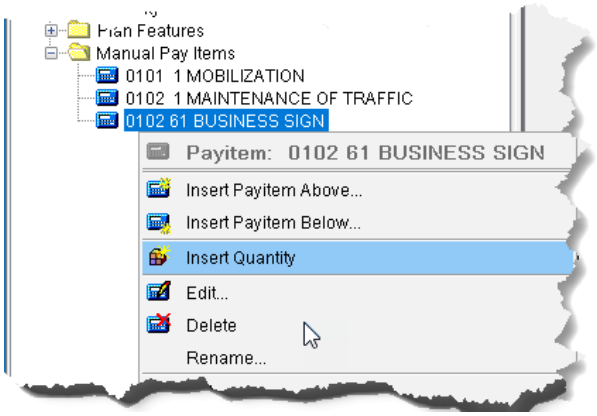
3. From New Quantity Properties, General tab:
   a. In the *Measurement Value* box, enter **60**. This value is the number of days for the project.
   b. In the *Computed Quantity* box, enter **1.** This Pay Item is an example of a *Hybrid Lump Sum Quantity*.



4. Select the **Location** tab.
   a. In the *Baseline Chain* box, select **SR61 (JOB00.GPK)**. The *Minimum* and *Maximum Station* will populate from the chain automatically.



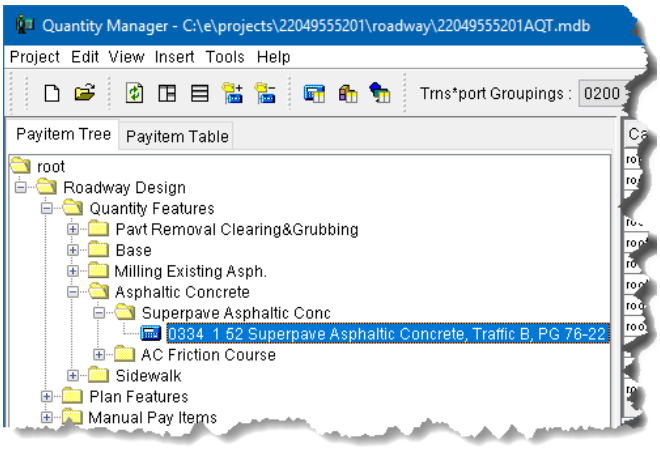
   b. Click the **Create** icon. The *Quantity* adds to Quantity Manager.
5. Close the New Quantity Properties dialog box.
6. In the *Payitem Tree* tab, select *Pay Item* **0102 61 Business Sign.**



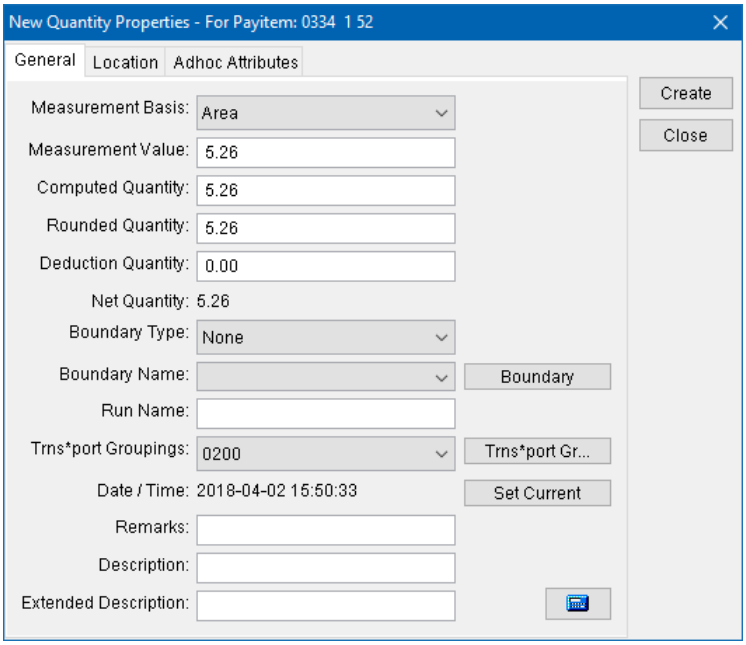
7. Right click and select **Insert Quantity**.
8. From New Quantity Properties, select the **General** tab.
   a. In the *Measurement Value* box, enter 1.
9. Select the **Location** tab.
10. In the *Baseline Chain* box, select **SR61 (JOB00.GPK)**.
    a. Under *Minimum Station*, enter **706+00** in the *Station* box and enter **100** in the *Offset* box.
    b. Under *Maximum Station*, enter **706+00** in the *Station* box and enter **100** in the *Offset* box.
    c. Click the **Create** icon. The Quantity adds to Quantity Manager.
    d. Under *Minimum Station*, enter **782+00** in the *Station* box and enter **-100** in the *Offset* box.
    e. Under *Maximum Station*, enter **782+00** in the *Station* box and enter **-100** in the *Offset* box.
    f. Click the **Create** icon. The Quantity adds to Quantity Manager.
    g. Under *Minimum Station*, enter **791+00** in the *Station* box and enter **100** in the *Offset* box.
    h. Under *Maximum Station*, enter **791+00** in the *Station* box and enter **100** in the *Offset* box.
    i. Click the **Create** icon. The Quantity adds to Quantity Manager.

11. Close New Quantity Properties.

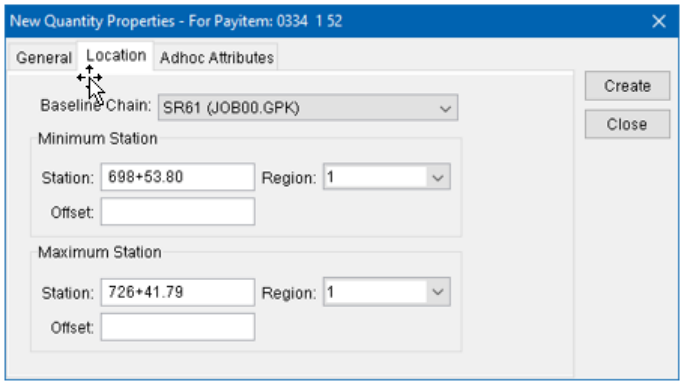
12. In the *Payitem Tree* tab, select *Pay Item* **0334 1 52** Superpave Asphaltic Concrete, Traffic B, PG 76-22.



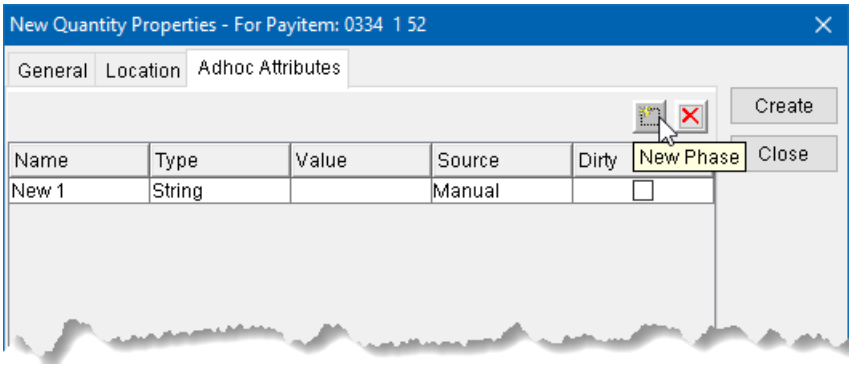
13. Right click and select **Insert Quantity**. From New Quantity Properties, select the **General** tab. Fill out as shown below.



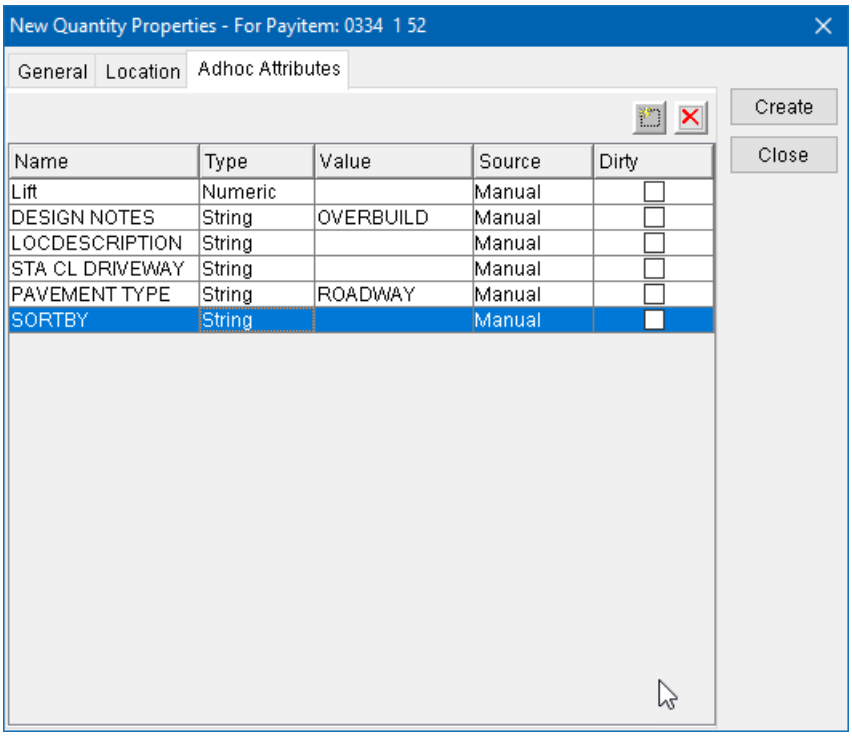
14. Select the **Location** tab. Fill out as shown below.



15. Select the **Adhoc Attributes** tab. Click on the **New Phase** button to add a new adhoc attribute.



16. Add the Adhoc names, types, and values as shown below:



Note The Adhoc Names and Types MUST match the Adhocs of the item in D&C Manager for LDM automation to include the manually created quantity item in the Summary box.

17. Click **Create** to add the quantity.
18. Close the New Quantity Properties dialog box.
19. Click on the new item in the *Quantity Pane*. In the *Element Pane*, select the **Adhoc Attributes** tab. Review the Adhoc values.

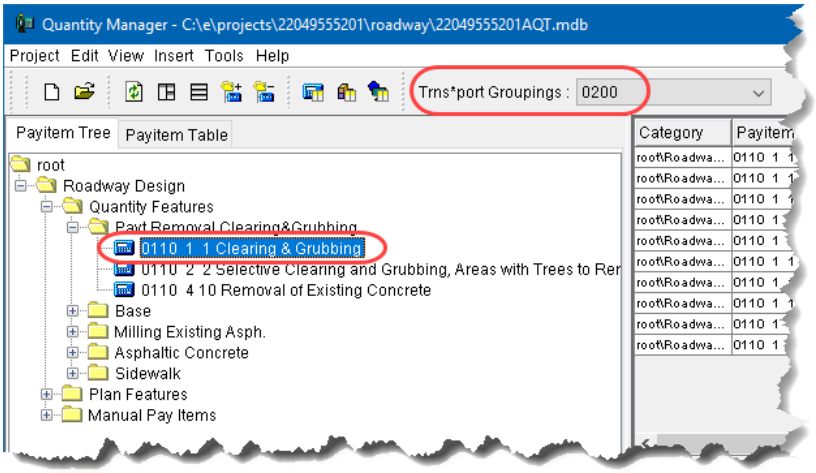
REPORTS

Quantity Manager has the option to create Reports in PDF or CSV formats. For non-automated Plan Summary Boxes, use the CSV Reports to generate the data needed to fill out the summary box Excel templates.

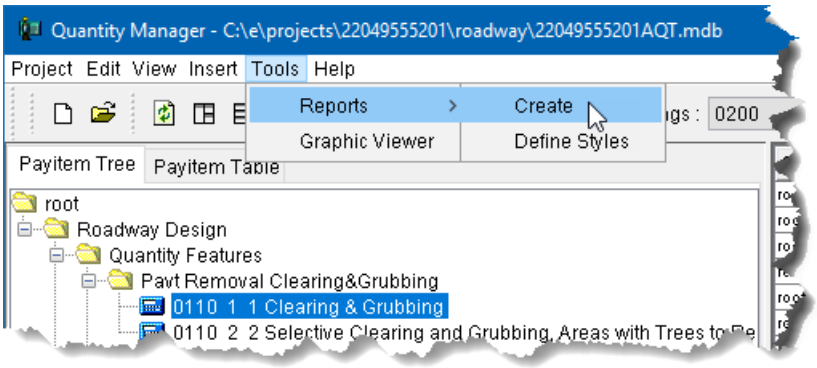
Exercise 5.5 Creating CSV Reports

This exercise generates an Area Report for Clearing and Grubbing and the Removal of Existing Concrete quantities used to fill out the Summary of Clearing and Grubbing and Removal Items.

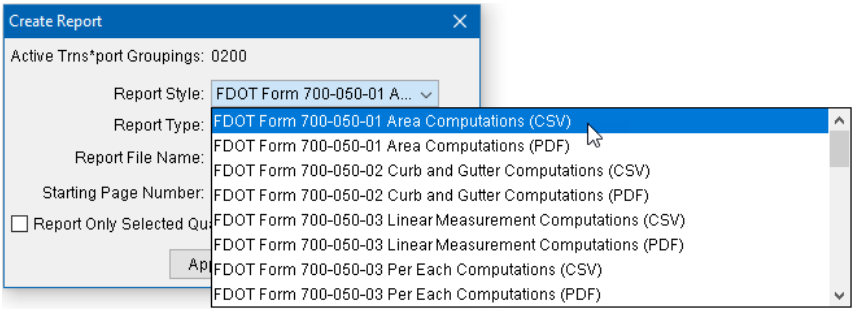
1. Continuing in the *22049555201AQT.mdb* file, navigate to **Roadway Design > Quantity Features > Pavt Removal Clearing & Grubbing** and select the *Pay Item* **0110 1 1 Clearing & Grubbing** and verify that the *Trns*port Groupings* is set to **0200.**



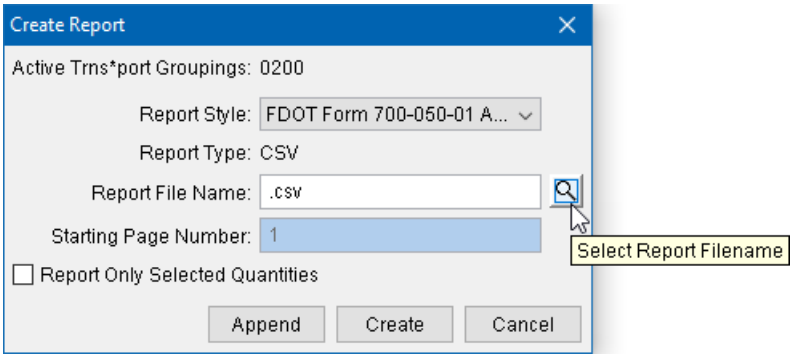
2. Select *Item* 0110 1 1 and then select Tools > Reports > Create.



3. On the Create Report dialog, set the *Report Style* to **FDOT Form 700-050-01 Area Computations (CSV).**

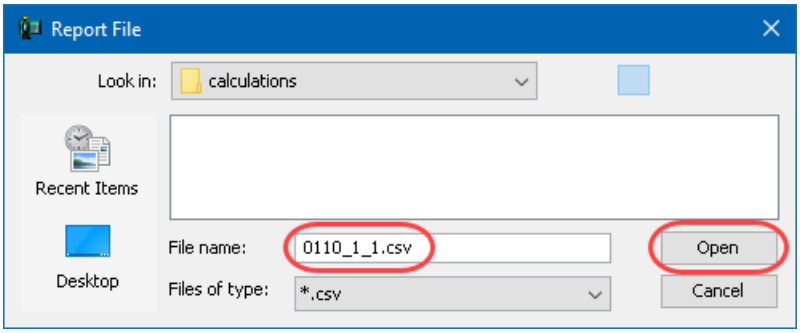


4. In the *Report File Name*, click the **Select Report Filename** icon.

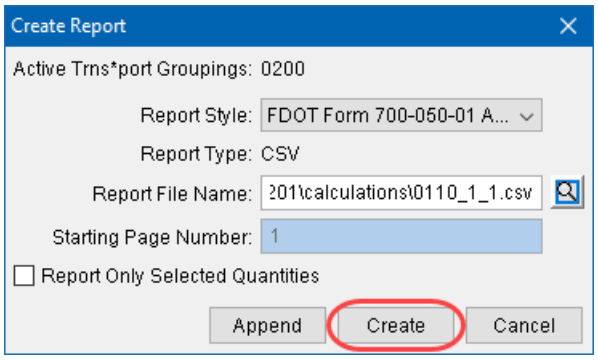


Note The creation process saves the CSV to the GEOPAK working directory when not defining the full path for the Report File Name.

5. Navigate to the project calculations folder, enter **0110_1_1.csv** as the file name and then click **Open**.



6. In the Create Report dialog, click **Create.**



7. Excel opens the CSV spreadsheet. View the exported data. Close Excel.
8. Repeat steps 2 – 5 for *Pay Item* 0110 2 2 Selective Clearing and Grubbing, Areas with Trees to Remain and *Pay Item* 0110 4 10 Removal of Existing Concrete.
9. Close Quantity Manager.

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6 PLAN SUMMARY BOXES & LDM

OBJECTIVES

- Define Plan Summary Boxes and workflow requirements.
- Introduce Linked Data Manager (LDM).
- Create Plan Summary Boxes using LDM and reports.

PLAN SUMMARY BOXES

FDOT requires that all quantities are documented in Plan Summary Boxes located on the Summary of Quantity sheets. Computation Books are no longer required. Do NOT mix and match the old summary boxes with the new ones in the same plan set. The ***FDOT Design Manual (FDM)*** and the ***Structures Design Manual*** along with the ***CADD Manual*** and the ***Basis of Estimates*** post documentation to define the following.

- ***Plan Set Location***
  - Roadway – Summary of Quantities sheets are to be placed after the numbered Plan Sheets.
  - Structures – Directly after the Index/Key Sheet (or after the Summary of Pay Items if the Structures Plans are stand-alone with no Roadway component.)
- ***File Name***
  - Roadway – SUMQRD
  - Structures – B#SumofQuantities*
- ***Sheet Prefix***

FDOT uses Sheet Prefixes to keep separate for re-numbering.

- Roadway – SQ-
- Structures – BQ#-

Note Each Bridge will have a separate Summary of Structure Quantities sheet(s) numbered as: BQ#-#.

For Example, if there are general bridge Pay Items (Mobilization MOT, etc.), the sheet will be the first Summary of Structure Quantities sheet numbered BQ-1. The Summary of Structure Quantities for Bridge 1 will follow with sheet numbers BQ1-1, BQ1-2, etc.; followed by Bridge 2 with sheet numbers BQ2-1, BQ2-2, etc.

➢ ***Formatting***

FDOT controls Summary Box formatting through Excel spreadsheet files.

- FDOT-delivered Summary Box templates for use with LDM in both automated and manual formats:
  - Barrier Walls
  - Curb and Traffic Separators
  - Ditch Pavement
  - Driveways
  - Edgedrain
  - Erosion Control
  - Fencing
  - French Drain
  - Guardrail
  - Mailboxes
  - Miscellaneous Asphalt
  - Pavement
  - Pedestrian Longitudinal Channeling Devices
  - Permanent Crash Cushions
  - Permanent Crash Cushions 2019
  - Railing
  - Sidewalk
  - Temporary Crash Cushions
  - Temporary Driveways
  - Trench Drain
  - Turf and Prepared Soil
  - Turnouts
  - Underdrain
  - Utility Adjustments
- FDOT-delivered Summary Box templates for use with LDM in manual format only:
  - Box Culverts
  - Clearing and Grubbing and Removal Items
  - Earthwork
  - General Items
  - Geotechnical Items
  - Litter Removal and Mowing
  - Lump Sum Items
  - Miscellaneous Drainage
  - Monitor Existing Structures
  - Pedestrian Special Detours
  - Side Drain and Mitered End Sections
  - Side Drains and Mitered End Section with Flowlines
  - Structures Quantities
  - Temporary Traffic Control Plan Items
  - Temporary Highway Lighting
  - Temporary Signalization and Detection
  - Traffic Monitoring Site Items

Keep all summary box Excel files and any other quantity related files *(PDF or output from other programs)* in a directory named "*calculations*" under the root Project Directory. (Roadway and Structures subdirectories within the calculations folder may be used to help organize this directory. This is optional.)

➢ ***Summary Box Exceptions***

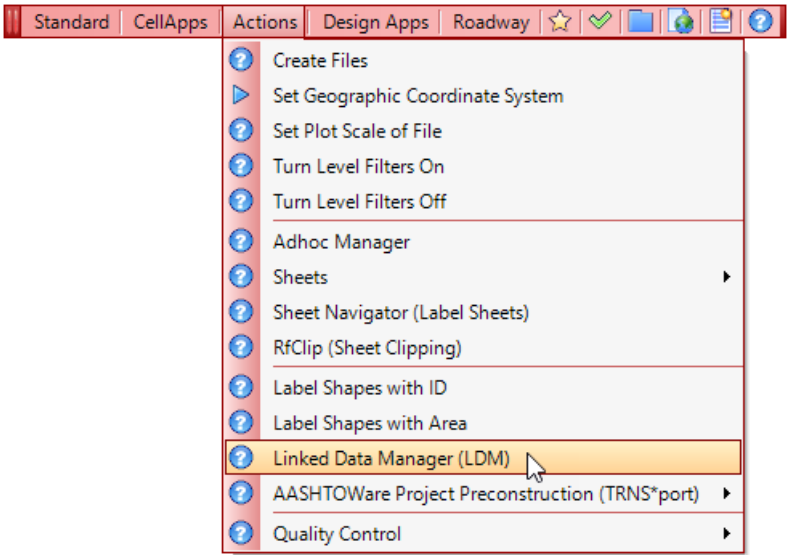
- Component sets of plans currently using Tabulation of Quantities sheets will continue to do so with NO change in their workflow.
- Summary of Drainage Structures Sheets will not change. Do NOT add Pay Items to these sheets.

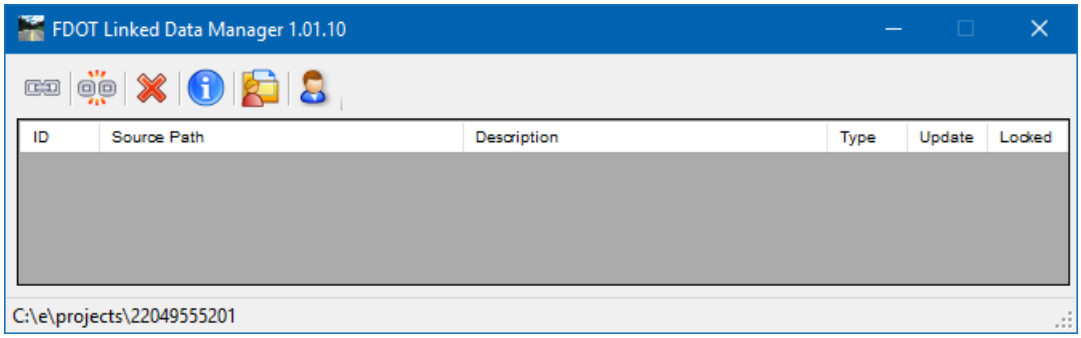
LDM BASICS

Access LDM through the FDOT Menu to create a link between the Summary Excel spreadsheet file and the MicroStation design (DGN) file for easy placement and updating of Summary Boxes. The LDM link provides easy access to the Excel spreadsheet for modification and update with a simple right-click on the link.

Access LDM from the FDOT Menu by selecting **Actions > Linked Data Manager**. <OR>

From the FDOT Plans Development > Quantities Tasks menu, select the Linked Data Manager icon. 



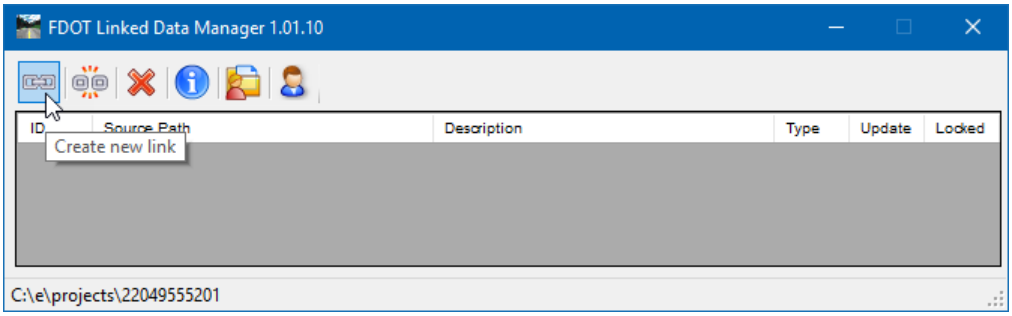


Note For more in-depth information on the features of this tool, refer to the LDM Help file or Posted Webinars.

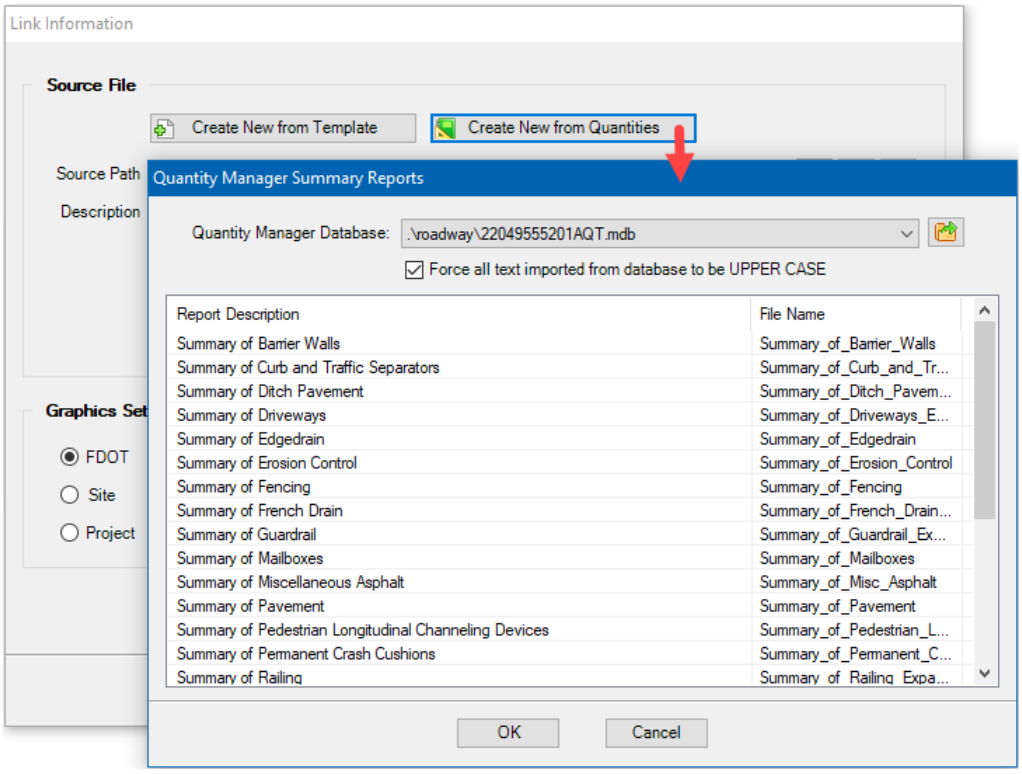
CREATE SUMMARY BOXES FROM QUANTITY MANAGER

LDM provides an automated option (*Create New from Quantities*) to create FDOT Summary Boxes that only need to be run once to generate an Excel file from Quantity Manager with all worksheets created and contained in a single file.

1. Select Create New Link



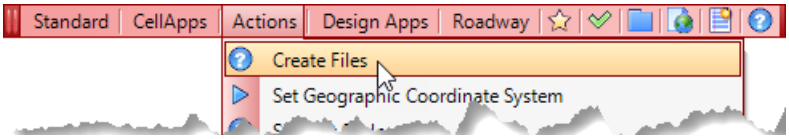
2. For the Source File, select **Create New from Quantities**.
3. Select the Quantity Manager **Database.**
4. Select Report Description/File Name for the desired **Summary** to create and click **OK**.



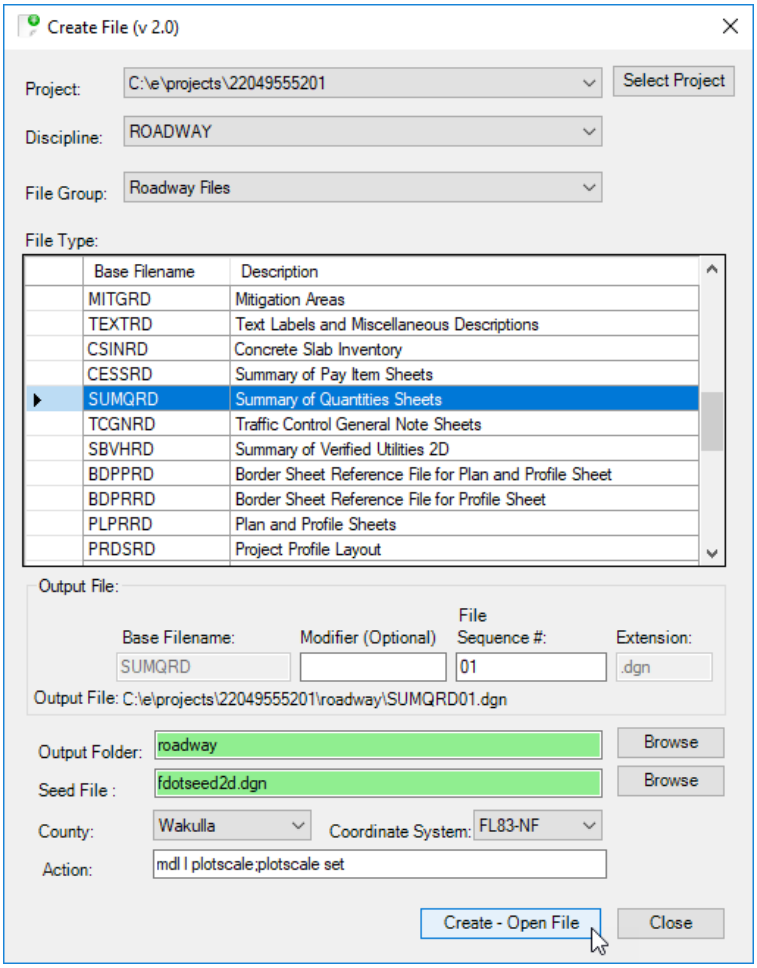
5. Save the file in the project calculations folder.
6. Place the *Summary Box* in MicroStation.

Exercise 6.1 Create New Summary Boxes from Quantities

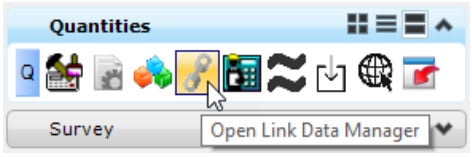
1. Open the MicroStation file *QTDSRD01.dgn*.
2. On the FDOT Menu, select **Actions > Create Files**.



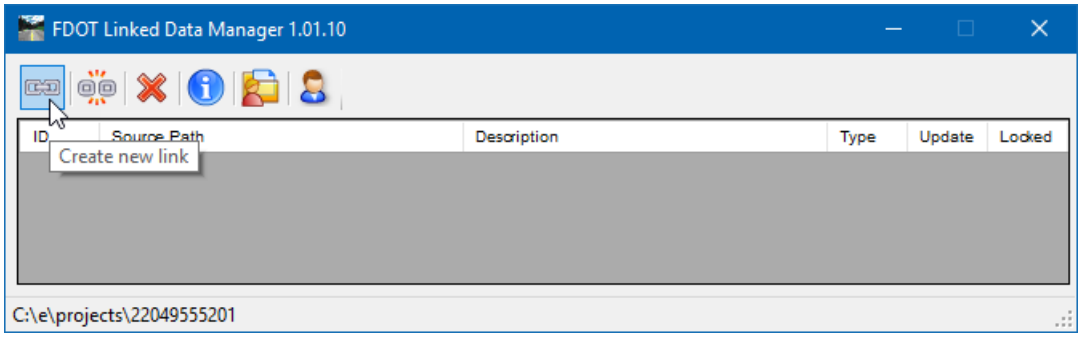
3. Confirm that the Project, Discipline, and File Group are as shown below, scroll down the *File Type* list, select SUMQRD **Summary of Quantities Sheets.** Set county as shown and click **Create – Open File**.



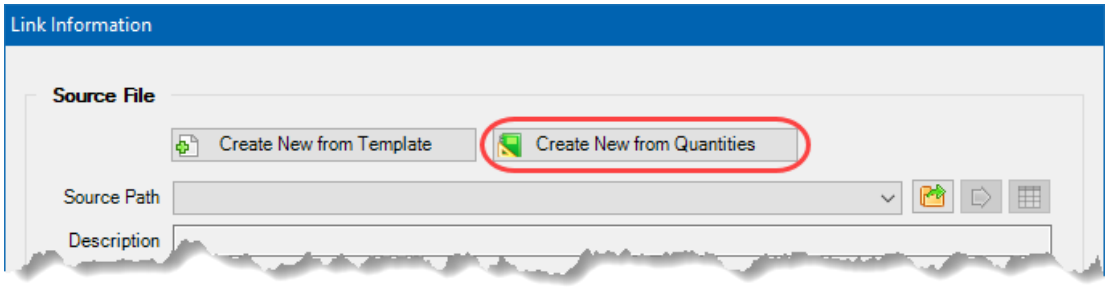
4. Upon opening, click **OK** on the Set Plot Scale dialog, and then **Close** on the Create File dialog to close it.
5. From the FDOT Plans Development > Quantities Tasks menu, select the Linked Data Manager icon to open LDM.



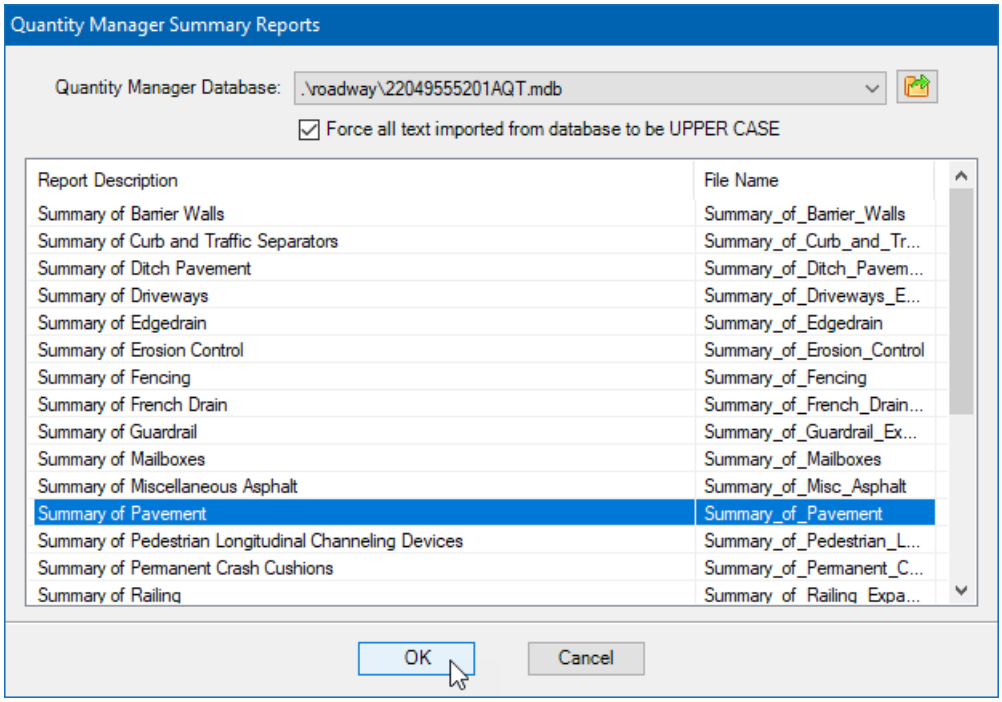
6. From LDM, select the **Create new link** button.



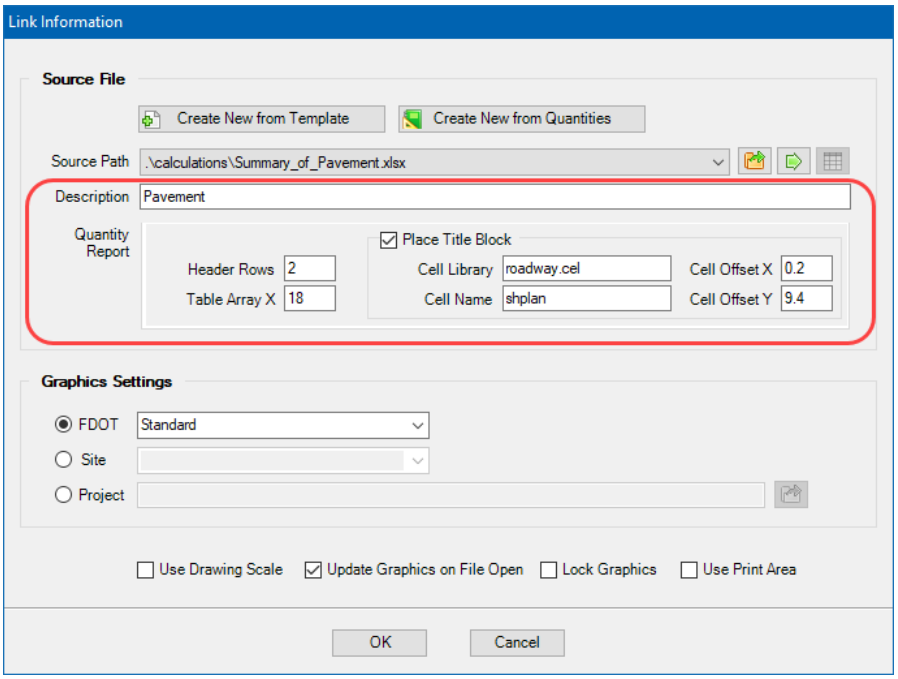
7. On the Link Information dialog, select the **Create New from Quantities** button.



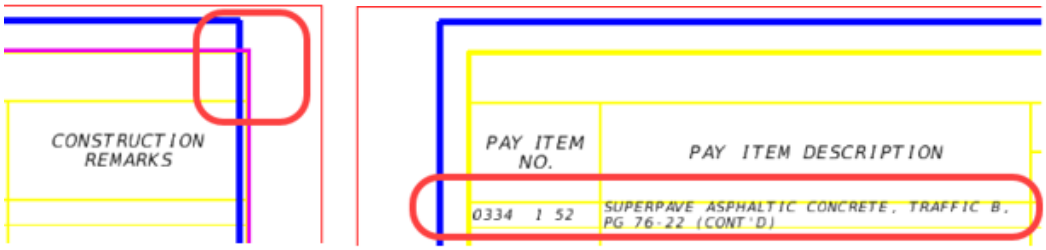
8. From the Quantity Manager Summary Reports dialog, select the Quantity Manager Database. Click the **Browse** icon and select the database file *22049555201AQT.mdb*.
9. Check **On** the option to Force all text imported from database to be UPPER CASE.
10. Select the **Summary of Pavement** report from the list and click **OK**.



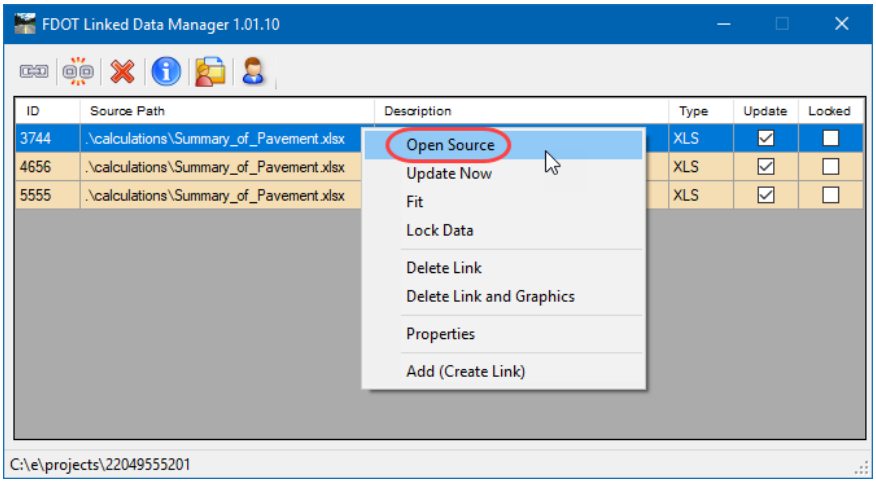
11. Save the *Summary_of_Pavement.xlsx* Excel file to the project calculations folder.
12. On the Link Information dialog, the *Source Path* populates. Complete the dialog as shown below and click **OK**.



13. Data Point in the design file to place the Summary Box sheets. Notice that the Summary Box does not fit on the Plan sheet and the Pay Item description wraps on the line.

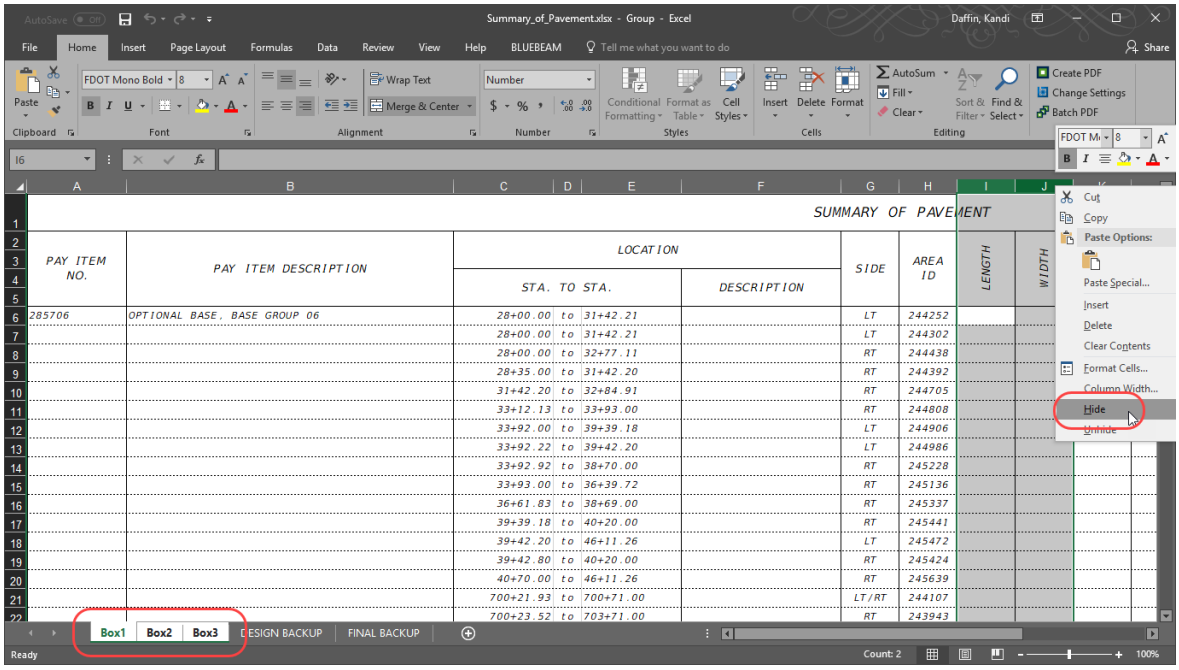


14. Right-click on one of the new links in the LDM dialog for the **Summary of Pavement** and select **Open Source**. Excel opens.



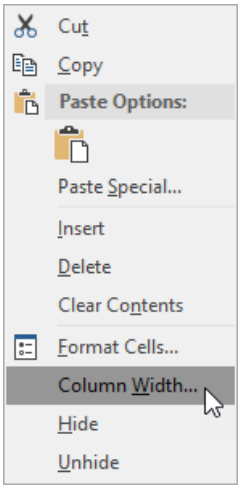
15. Holding down the *shift* key in Excel, select *Worksheets* **Box1** and then **Box3** to select all the Summary Box worksheets.

16. Select the columns *Length* (I) and *Width* (J); right-click and select the popup menu option **Hide** to remove the columns selected from the display. **Hide** the *Location Description* column (F) as well.



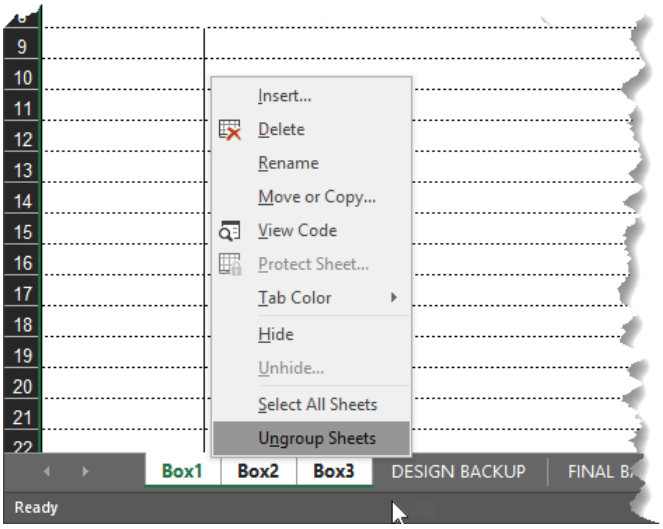
Note Delete or hide unused columns in a summary box from the worksheet. The only exceptions are the F quantity columns and the Construction Remarks column – DO NOT delete or hide these columns.

17. Right click on the *Pay Item Description* column (B) and select **Column Width…**change the column width to 95. Click **OK**.

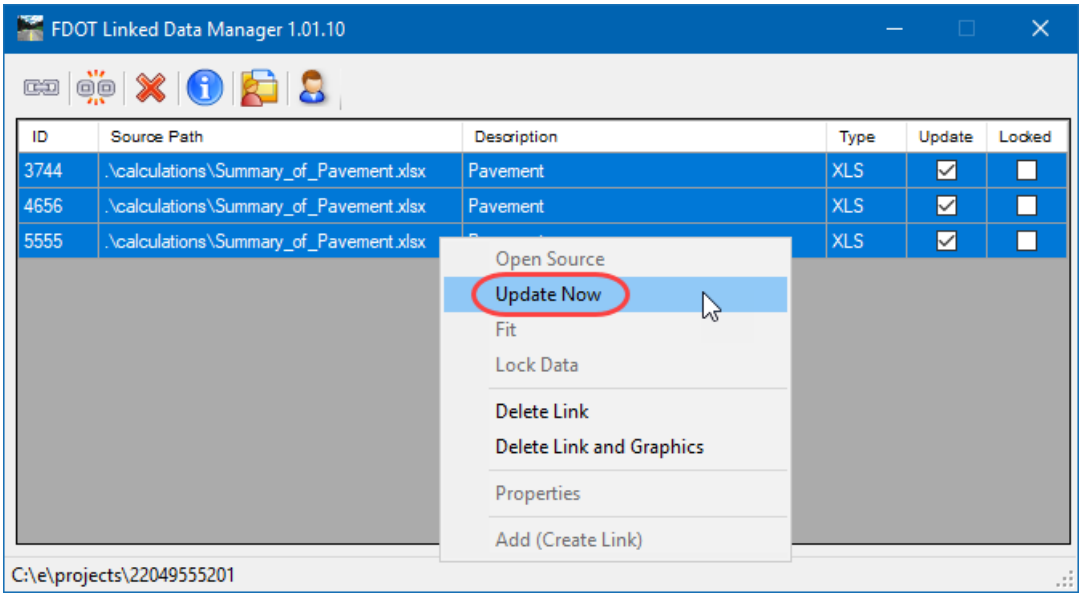


Note To correct the word wrap, the text may be broken up and placed in different rows instead of modifying the column width. Use spaces to create an indent on the second row of the description. Be sure to ungroup the worksheets before modifying individual cells or text.

18. Right-click on the *Worksheet* tabs and select **Ungroup Sheets**. **Save** the file.

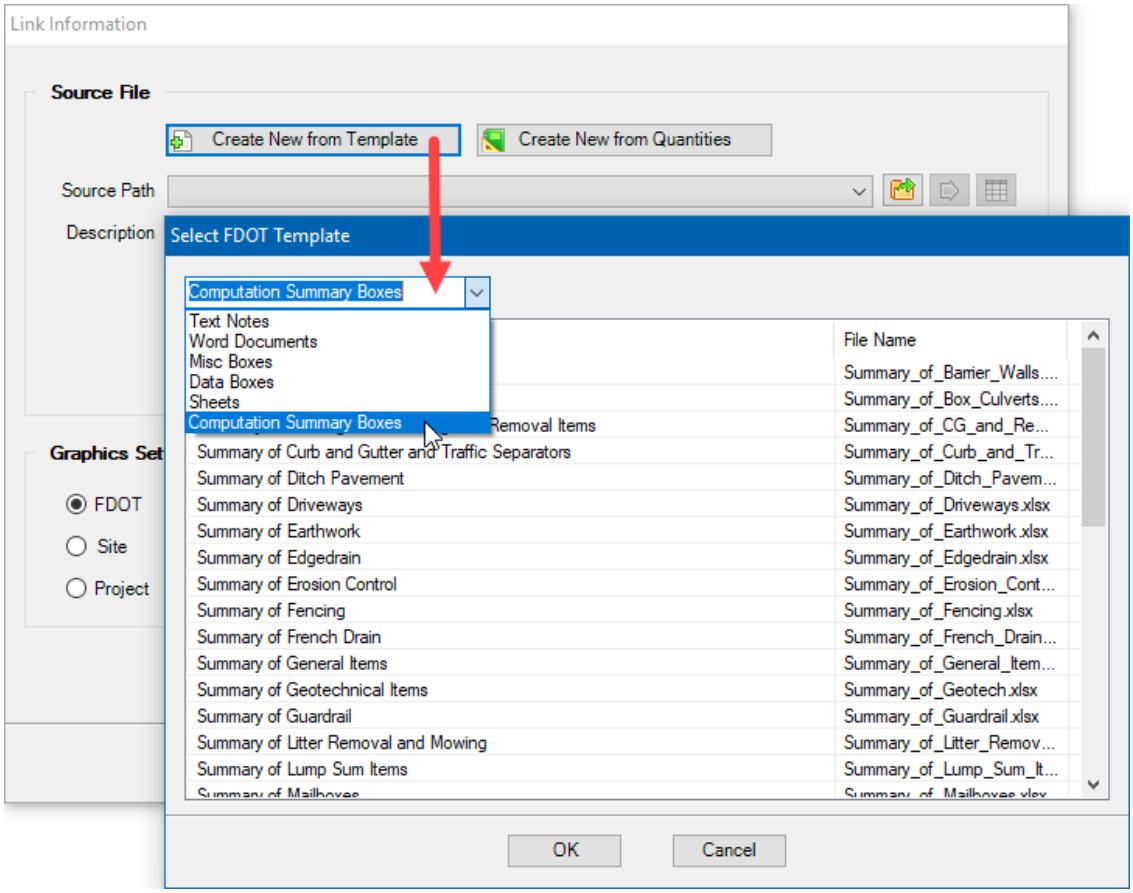


19. In MicroStation, use the shift key to select all the links to the **Summary of Pavement Summary Box**, right-click and select **Update Now**.



CREATE SUMMARY BOXES FROM FDOT TEMPLATES

LDM provides an option (*Create New from Template*) to create FDOT Summary Boxes using the FDOT templates provided in the FDOT CADD software. Access all the FDOT Summary Box templates in the Computation Summary Boxes group from the drop down.

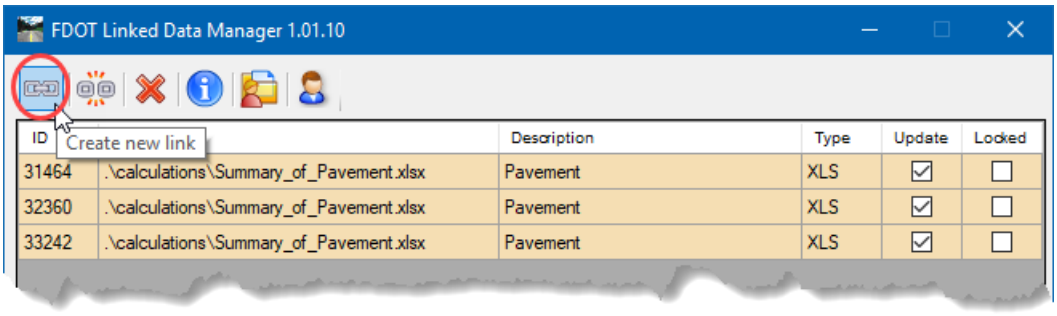


HINT For the Summary of Structure Quantities in the Structures workspace, place the Plan Sheet border at a scale of 12. Do NOT turn on the Use Drawing Scale option when creating a link.

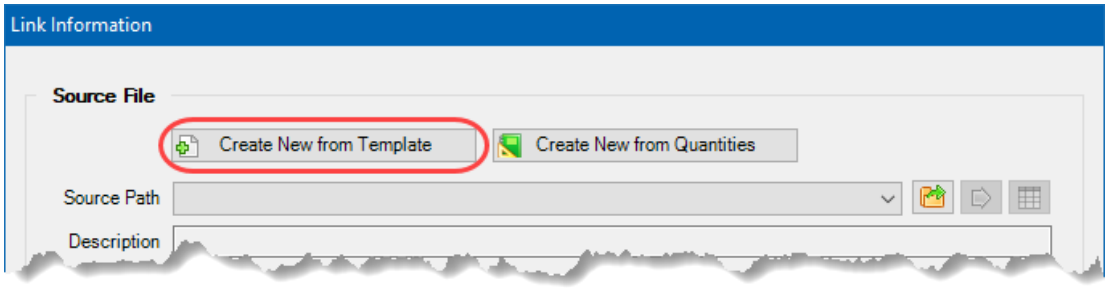
Exercise 6.2 Create New Summary Boxes from Template

This exercise creates the Summary Boxes from FDOT Templates and links to MicroStation using LDM.

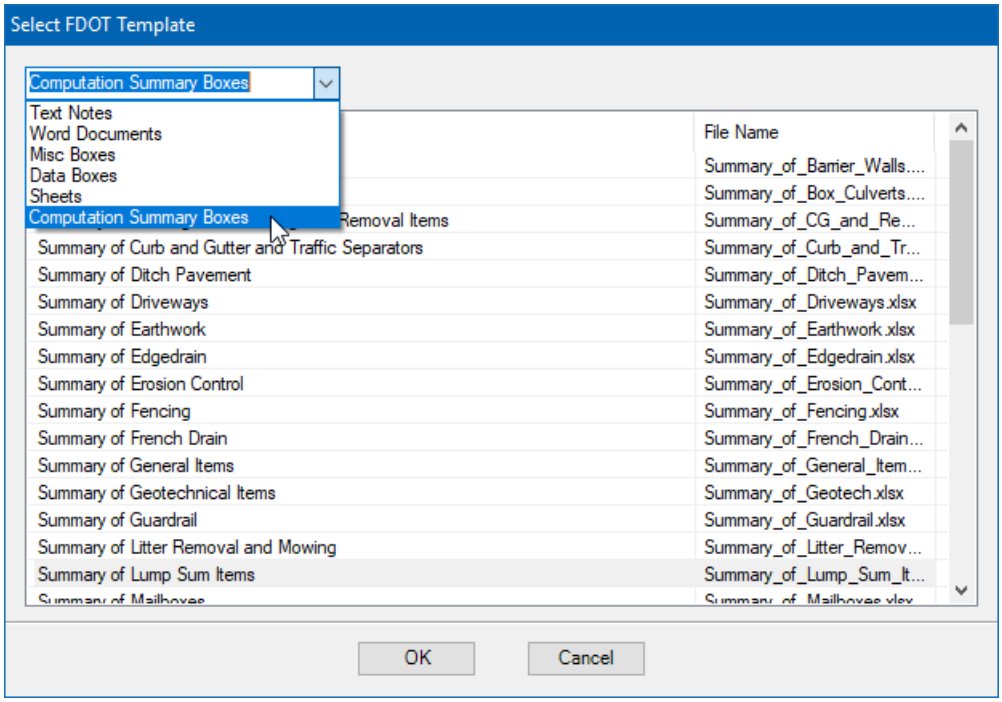
1. From the FDOT Menu, select Actions > Sheets > Plan Sheet.
2. Data point in the design file to place the border. Place the cell using a scale of 1:1.
3. From LDM, click the **Create Link** button. Link Information dialog displays.



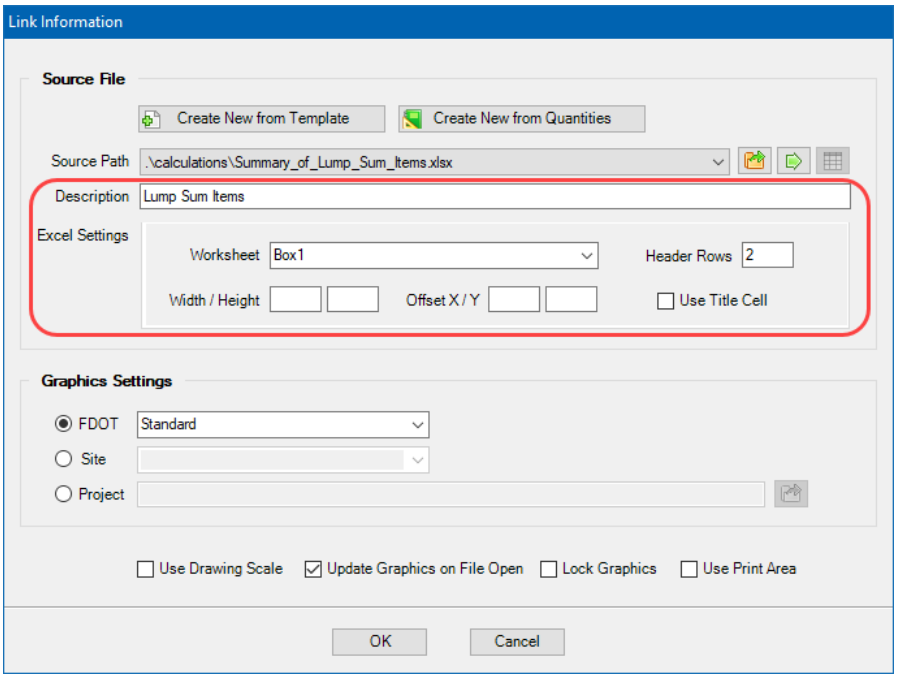
4. On the Link Information dialog, select **Create New from Template**. The Select FDOT Template dialog displays.



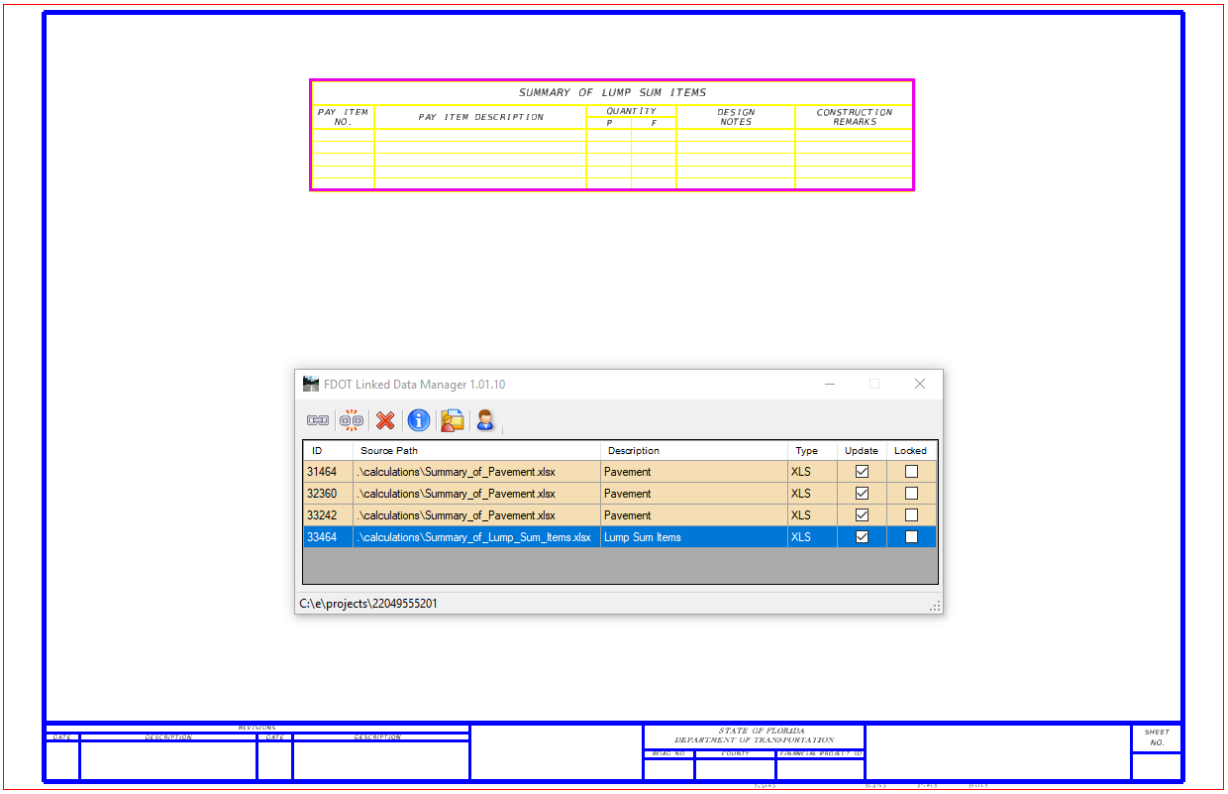
5. From the Select FDOT Template drop down, select **Computation Summary Boxes**.



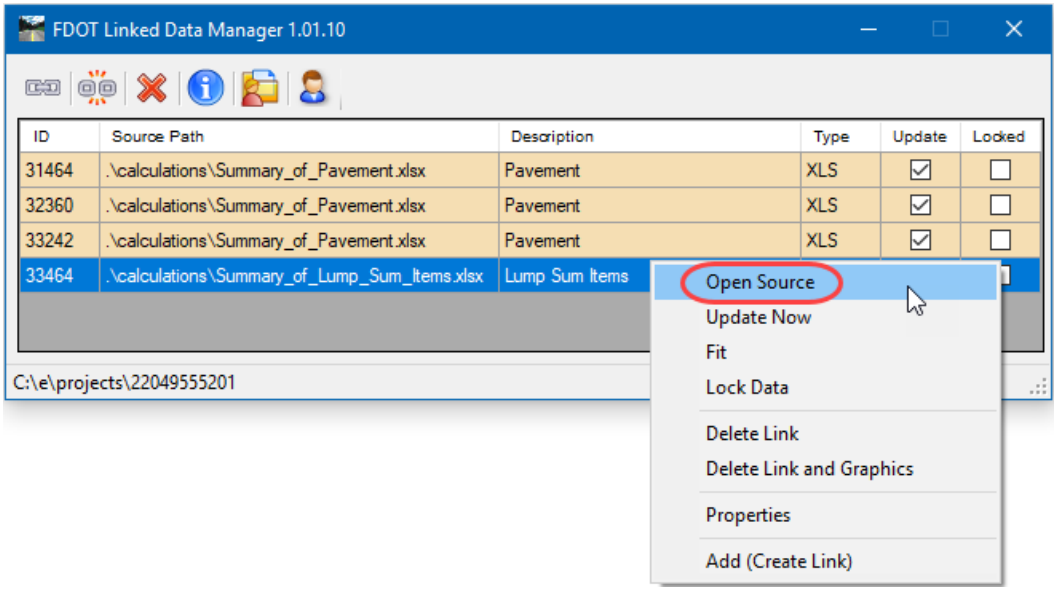
6. Select the Summary of Lump Sum Items and click **OK**.
7. On the Save As dialog, navigate to the 22049555201/calculations folder and click **Save**.
8. The *Source Path* populates on the Link Information dialog. Complete the dialog with the information shown below and click **OK**.



9. The Summary Box attaches to the cursor. Data point inside the Plan Sheet border to place the Summary Box. The link displays in the LDM dialog box.



10. Right-click on the link in LDM and select the popup menu option **Open Source**. The *Summary_of_Lump_Sum_Items.xlsx* opens in Excel.



11. Complete the Summary Box with *Mobilization* pay item information as shown below. **Save** and **Close** the Excel file.

	A	B	C	D	E	F
1	SUMMARY OF LUMP SUM ITEMS					
2	PAY ITEM NO.	PAY ITEM DESCRIPTION	QUANTITY		DESIGN NOTES	CONSTRUCTION REMARKS
3			P	F		
4	0101	MOBILIZATION	1			
5						
6						
7						
8						

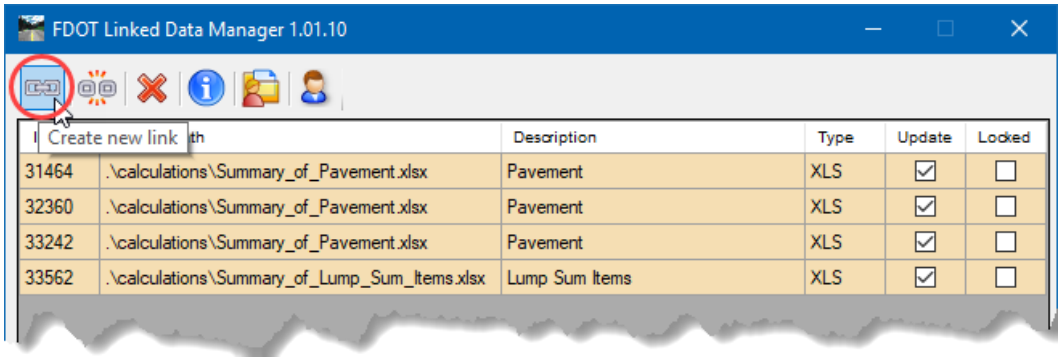
Note If the Pay Item No. auto-corrects/drops the leading zero, you can set the Excel Number format to Text.

12. In MicroStation, right-click on the link in LDM. Select the option to **Update Now**. The Summary Box updates with the new information.

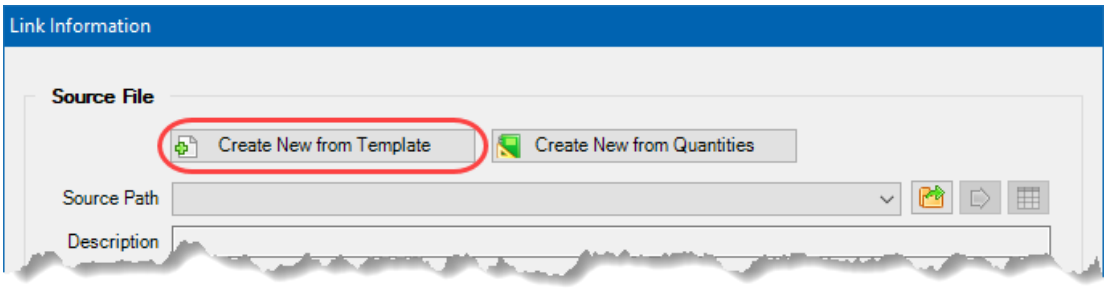
Exercise 6.3 Create Summary Box with LDM and CSV files

This exercise creates a summary box using a LDM template and CSV files generated from Quantity Manager.

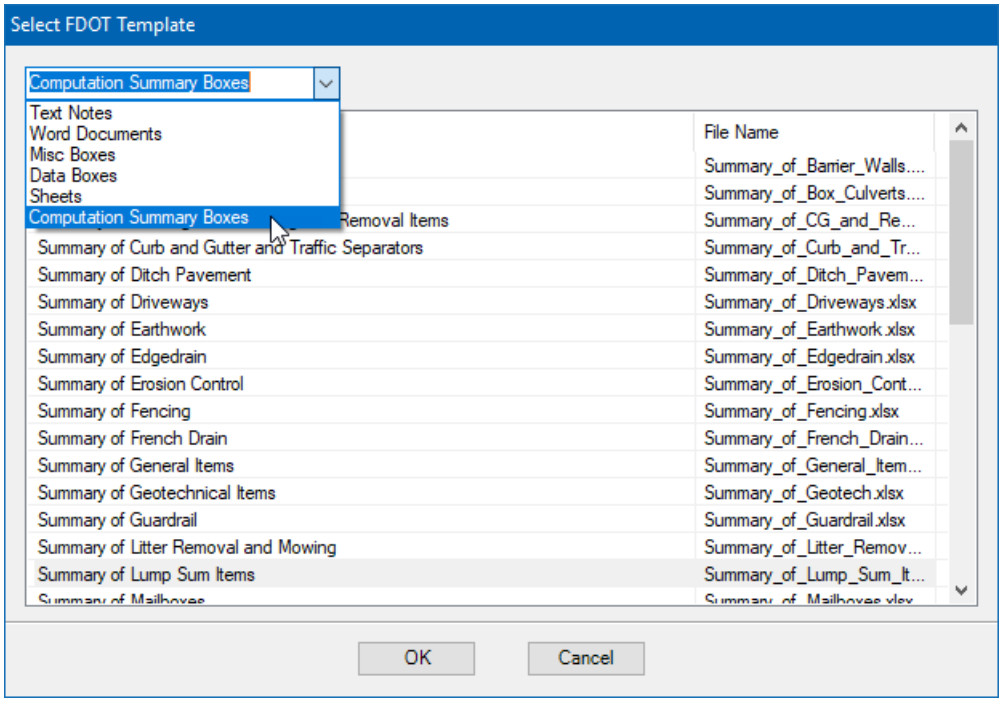
1. Continuing in the file *SUMQRD01.dgn*, place (or copy) a plan sheet border in the file.
2. From LDM, click the **Create new link** button. Link Information dialog displays.



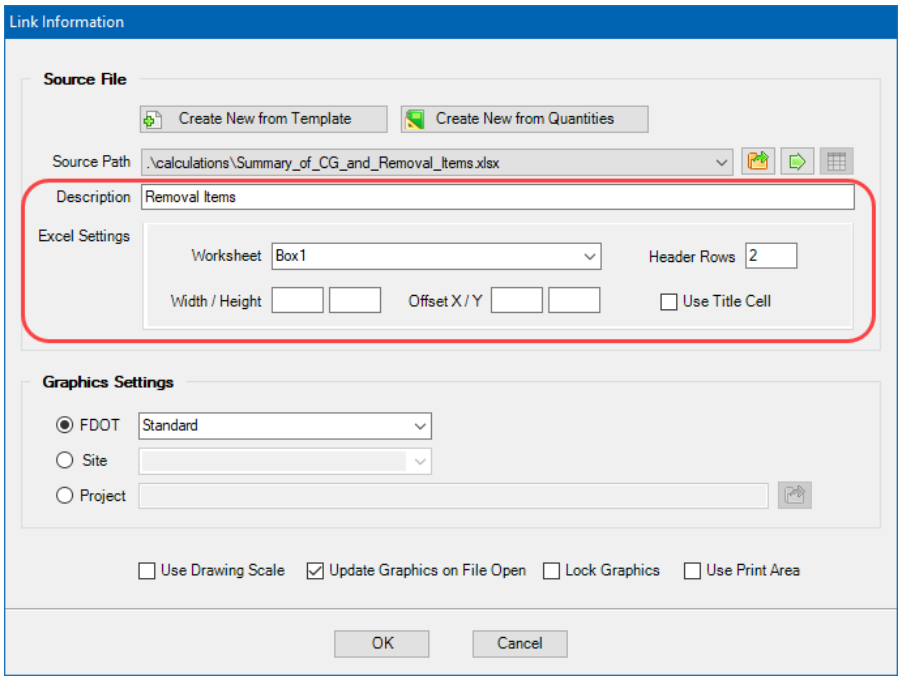
3. On the Link Information dialog, select **Create New from Template**. The Select FDOT Template dialog displays.



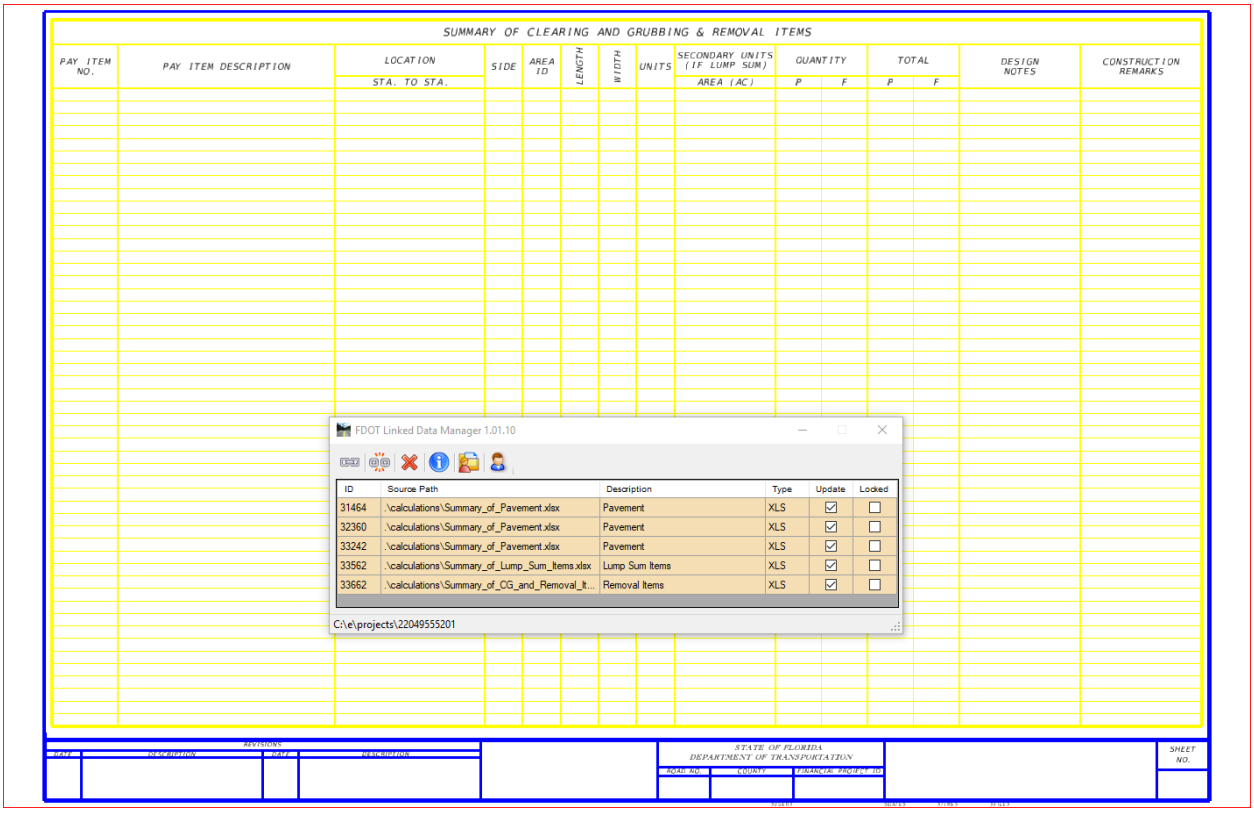
4. From the Select FDOT Template drop down, select **Computation Summary Boxes**.



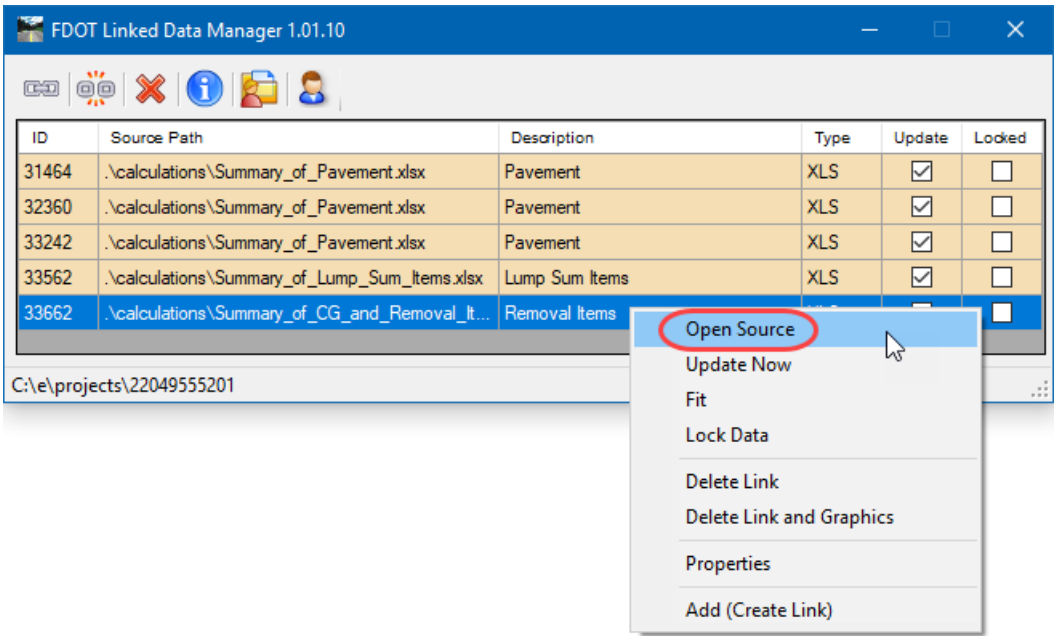
5. Select the **Summary of Clearing and Grubbing and Removal Items** and click **OK**.
6. On the Save As dialog, navigate to the 22049555201/calculations folder and click **Save**.
7. The *Source Path* populates on the Link Information dialog. Complete the dialog with the information shown below and click **OK.**



8. The Summary Box attaches to the cursor. Data point inside the Plan Sheet border to place the Summary Box. The link displays in the LDM dialog box.



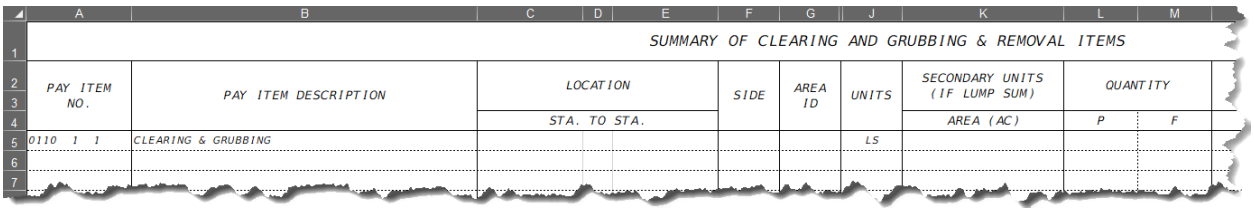
9. Right-click on the link in LDM and select the popup menu option **Open Source**. The *Summary_of_CG_and_Removal_Items.xlsx* opens in Excel.



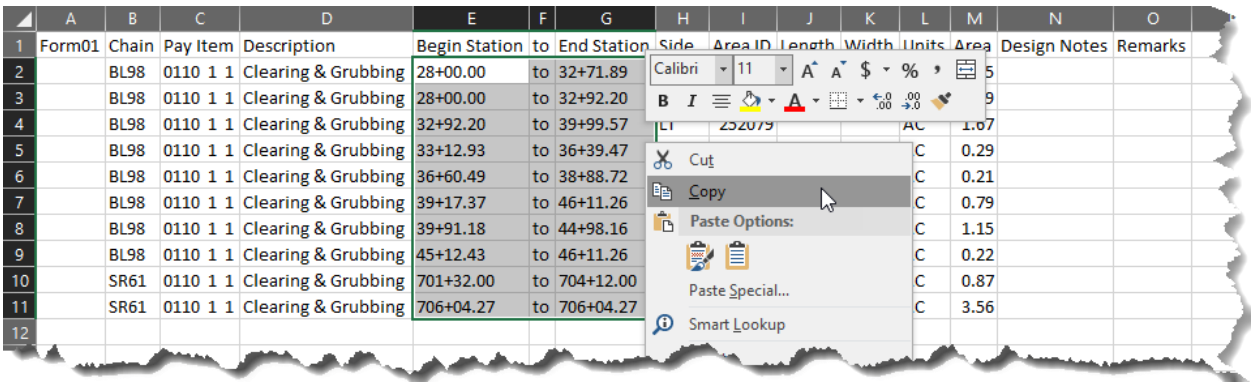
10. In Excel, select the Length and Width columns. Right-click and select Hide.
11. Open the file *0110_1_1.csv* created in Exercise 5.5.
12. Copy the pay item number, pay item description, and units from the CSV and paste VALUES into the first row ONLY for the pay item in the *Summary_of_CG_and_Removal_Items.xlsx*.

Note Since Clearing & Grubbing has primary units of LS and secondary Units of AC, the CSV file shows the units as AC. Be sure to enter the correct Units (LS) in the Units column of the Summary Box and enter the AC Area values in the Secondary Units column.

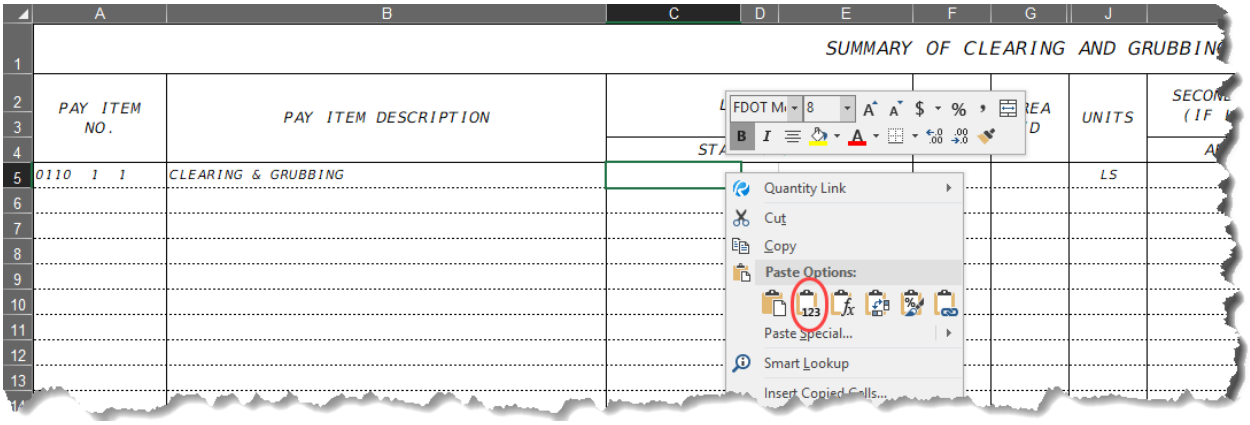
Also, FDOT requires summary box data to be UPPERCASE. If the pay item description is copied from the CSV, it will need to be edited to change it to uppercase text.



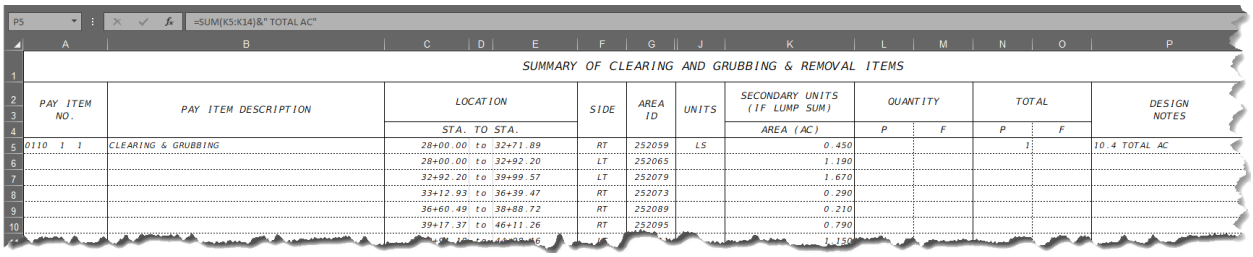
13. Select the values in the CSV for the Begin Station, to, End Station. Right-click and select copy.



14. In *Summary_of_CG_and_Removal_Items.xlsx* click in the cell C5 and select the option to Paste Values.



15. Continue copying and pasting the required values from the CSV file into the summary box template as shown below. Place a value of 1 in the total column since this is a LS pay item.



> ***Note*** If desired, use a formula in the Design Notes column totaling the number of acres for the Clearing & Grubbing. Ex. =SUM(K5:K14)&" TOTAL AC"

16. Open the file *0110_2_2.csv*.

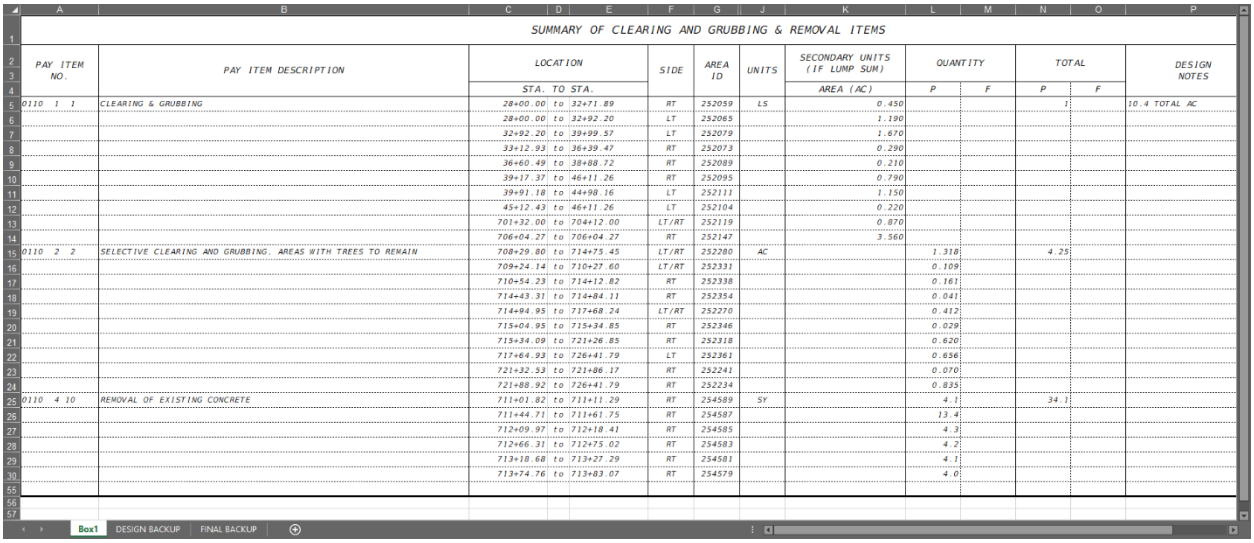
17. Type or copy in the Pay Item Number, Pay Item Description, and Units for **0110 2 2**, **Selective Clearing and Grubbing, Areas with Trees to Remain**.

18. Copy and paste the required information from the CSV file into the summary box template. Place the area quantities in the Quantity (P) column.

19. In the total column, on the first row for the pay item include the formula for the total SY for the pay item. =SUM(L15:L24)

20. Repeat steps 16-19 for *0110_4.csv*.

> ***Note*** Due to the differences in precision required for the different units of measurement, the cell format number of decimal places in the Summary Box will need to be adjusted to the appropriate number of decimal places as indicated in the BOE, Chapter 2.



SUMMARY OF CLEARING AND GRUBBING & REMOVAL ITEMS

PAY ITEM NO.	PAY ITEM DESCRIPTION	LOCATION STA. TO STA.			SIDE	AREA ID	UNITS	SECONDARY UNITS (IF LUMP SUM) AREA (AC)	QUANTITY P	QUANTITY F	TOTAL P	TOTAL F	DESIGN NOTES
0110 1 1	CLEARING & GRUBBING	28+00.00	to	32+71.89	RT	252059	LS	0.450			1		10.4 TOTAL AC
		28+00.00	to	32+92.20	LT	252065		1.190					
		32+92.20	to	39+99.57	LT	252079		1.870					
		33+12.93	to	36+39.47	RT	252073		0.290					
		36+60.49	to	38+88.72	RT	252089		0.210					
		39+17.37	to	46+11.26	RT	252095		0.790					
		39+91.18	to	44+98.16	LT	252111		1.150					
		45+12.43	to	46+11.26	LT	252104		0.220					
		701+32.00	to	704+12.00	LT/RT	252119		0.870					
		706+04.27	to	706+04.27	RT	252147		3.560					
0110 2 2	SELECTIVE CLEARING AND GRUBBING, AREAS WITH TREES TO REMAIN	708+29.80	to	714+75.45	LT/RT	252280	AC		1.318		4.25		
		709+24.14	to	710+27.60	LT/RT	252331			0.109				
		710+54.23	to	714+12.82	RT	252338			0.161				
		714+43.31	to	714+84.11	RT	252354			0.041				
		714+94.95	to	717+68.24	LT/RT	252270			0.412				
		715+04.95	to	715+34.85	RT	252346			0.029				
		715+34.09	to	721+26.85	RT	252318			0.620				
		717+64.93	to	726+41.79	LT	252361			0.656				
		721+32.33	to	721+86.17	RT	252241			0.070				
		721+88.92	to	726+41.79	RT	252234			0.835				
0110 4 10	REMOVAL OF EXISTING CONCRETE	711+01.82	to	711+11.29	RT	254589	SY		4.1		34.1		
		711+44.71	to	711+61.75	RT	254587			13.4				
		712+09.97	to	712+18.41	RT	254585			4.3				
		712+66.31	to	712+75.02	RT	254583			4.2				
		713+18.68	to	713+27.29	RT	254581			4.1				
		713+74.76	to	713+83.07	RT	254579			4.0				

Box1 | DESIGN BACKUP | FINAL BACKUP

21. Delete or Hide rows 31 – 54.
22. Save the file Summary_of_Removal_Items.xlsx.
23. In MicroStation, select the link in LDM. Right-click and select **Update Now**.
24. Review the results in MicroStation.

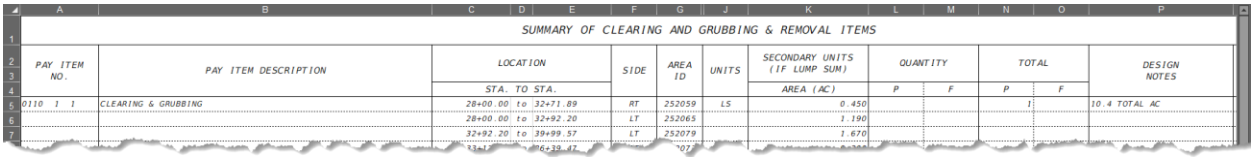
> ***Note*** If word wrapping occurs, Open Source, adjust column widths, save and Update Now until the text fits in the column and Summary Box fits within the sheet border. If necessary, the Pay Item Description can be split into two lines.

HELPFUL INFORMATION

- MicroStation commands will modify the elements drawn by LDM.
  - This is a ONE-WAY process. Make changes within LDM to the Source Excel File and then use the Update Now (right-click) option in LDM to update the design file. Changes made *with* MicroStation tools CANNOT update automatically to the Source Excel File within LDM.
  - Move Summary Boxes or Text linked in with LDM with MicroStation commands and LDM WILL remember the data and location.
- Control formatting for FDOT Summary Boxes through the Excel Template Files created and delivered in the FDOT CADD software, NOT within MicroStation. Use LDM to access those Excel Template Files to populate and make modifications.
  - Within the FDOT Summary Box Excel templates, columns and rows may be adjusted or hidden with changes reflected in MicroStation when updating links.
  - Within the FDOT Summary Box Excel templates, delete any column when not used.

  EXCEPTION: DO NOT delete the "***Construction Remarks"*** or "***F***" columns.
  - DO NOT add columns for additional information, i.e. Sheet Number. The Summary Box format is defined in the BOE and should not be modified. Contact Kandi Daffin or Melissa Hollis if there is justification for modifications to the forms.
  - Most of the FDOT Summary Box Excel templates have been set up to fit on a Plan sheet.

  DO NOT add rows. Copy the Worksheet as needed to create additional Summary Box Worksheets.
- FDOT requires only one Source Excel File for each Summary Box type in FDOT Plans.
- Use Quantity Manager CSV Reports to help populate the Summary Boxes not automated. Be sure to ***Paste*** using ***Values*** only to preserve the cell formatting in Excel.
- Expect to encounter Word wrapping when placing the Summary Box in MicroStation even though the text displays on a single line in Excel. This is due in part because of a variable for a buffer in LDM that keeps the text from overlapping the column lines when placed in MicroStation. Make additional adjustments to the column widths in Excel as needed.
- As shown in the example shown below, the Pay Item No, Description, Unit and Quantity Total is shown only on the **first** line for each Pay Item.



SUMMARY OF CLEARING AND GRUBBING & REMOVAL ITEMS

PAY ITEM NO.	PAY ITEM DESCRIPTION	LOCATION	SIDE	AREA ID	UNITS	SECONDARY UNITS (IF LUMP SUM)	QUANTITY		TOTAL		DESIGN NOTES
		STA. TO STA.				AREA (AC)	P	F	P	F	
0110 1 1	CLEARING & GRUBBING	28+00.00 to 32+71.89	RT	252059	LS	0.450			1		10.4 TOTAL AC
		28+00.00 to 32+92.20	LT	252065		1.190					
		32+92.20 to 39+99.57	LT	252079		1.670					

- Place all Summary Boxes with quantities on the designated Summary of Quantities sheets, not scattered within other areas of the Plans, i.e. Traffic Control Plan items, Earthwork, Bridge sheets, etc.
  - Place Summary Boxes in the Summary of Quantities sheets as close as possible to *numerical order*. See ***Chapter 8*** of the ***Basis of Estimates Manual*** posted on the Estimates website.
- If backup information for the quantity is in the GEOPAK GPK file, FDOT requires NO Printout.
- (Optional) Include Formulas in the Summary Boxes in the Design Notes column, if desired.
  - Formulas or Notes can be stored in the Back Up spreadsheet available in each of the Summary Box Excel files.

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7 SUMMARY OF PAY ITEMS WORKFLOW

OBJECTIVES

- Review the workflow for generating the Summary of Pay Items for Plans
- Export data from Quantity Manager
- Import to Designer Interface
- Generate Summary of Pay Items report from AASHTOWare Project Webgate Reporting
- Create Summary of Pay Items sheets using FDOT TRNS*port tool

SUMMARY OF PAY ITEMS WORKFLOW

The Summary of Pay Items sheet is a required sheet in the plans. It contains the output from AASHTOWare Project Preconstruction (PrP) of all the pay items and quantities loaded for the project.

To get the quantity information to PrP, an XML file generated from the Quantity Manager Export function imports the quantities to Designer Interface. The Designer Interface is a user-friendly interface to PrP. Additional quantities can be manually added, modified and deleted using Designer Interface.

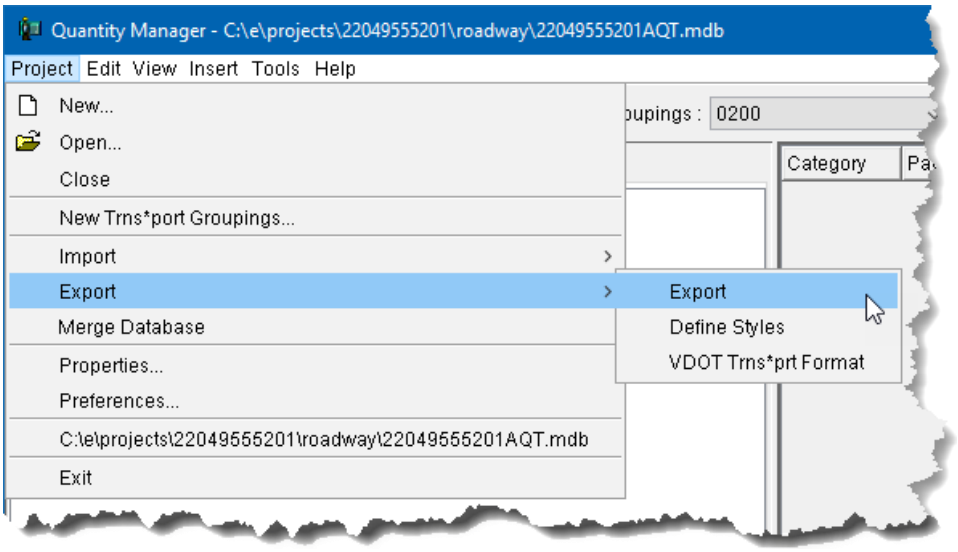
Once the quantities are loaded, access AASHTOWare Project Webgate Reporting to generate the Summary of Pay Items Report. This report for CADD is an XML file used by the FDOT TRNS*port tool to create Summary of Pay Item sheets.

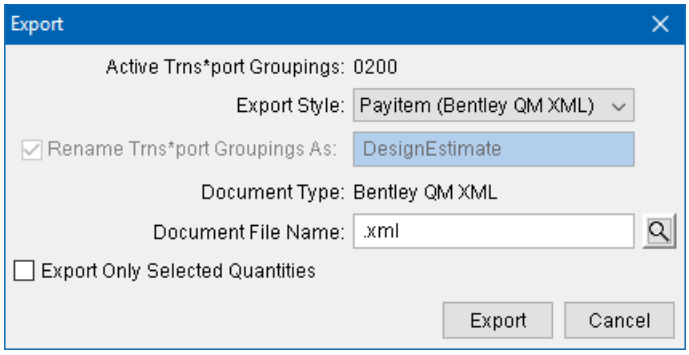
EXPORT

Quantity Manager includes a utility that facilitates exporting various database information. The format of this information is in .XML format that Designer Interface can import.

ACCESSING EXPORT

From the Quantity Manager menu, select **Project** > **Export** > **Export**. Export dialog displays.





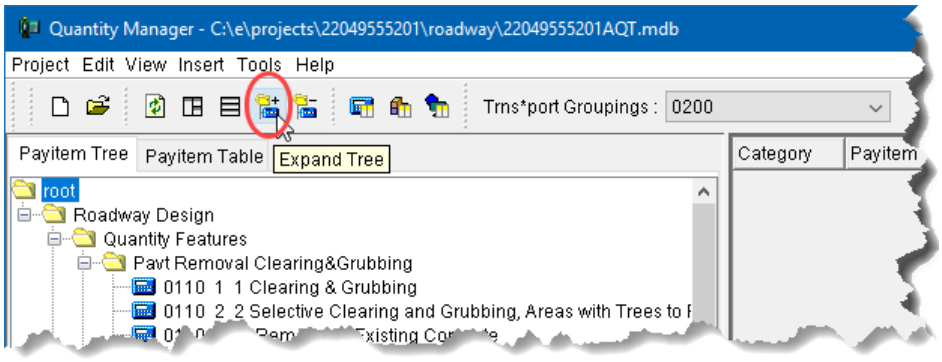
Active Trns*port Groupings	Only a single Trns*port Grouping may be exported at one time. If All Trns*port Groupings are selected, the Export icon is disabled.
Export Style	• Pay item (Bentley QM XML) • Pay item + Funding (Bentley QM XML) • Pay item + Quantity (Bentley QM XML 2) • Pay item + Quantity (Bentley QM XML) • Pay item + Quantity + Element (Bentley QM XML) • Pay item + Quantity + Element Sorted (Bentley QM XML) • Pay item + Quantity Sorted (Bentley QM XML) • aecXML • aecXML + Funding (This is the option used for FDOT projects.)
Rename Trns*port Groupings As	This option renames the XML tag “costType”. For FDOT projects, toggle this option on and set to DesignEstimate. It does not change the Trns*port Grouping (GroupId tag) value set for the quantity.
Document Type	aecXML Infrastructure v33 is the standard schema used for creating custom reports.
Document File Name	The file name including directory path to which the report will export. If the directory path is not defined, the file will be saved to the working directory.
Export Only Selected Quantities	Option to export only selected pay items/quantities into the report.

Only the items *displayed* in the Quantity Manager Pay Item Quantity pane export. The Quantity Manager Export XML file is used for the Designer Interface “import” option which will add/update the Pay Items, their Quantities and add Project Categories into AASHTOWare Project Preconstruction.

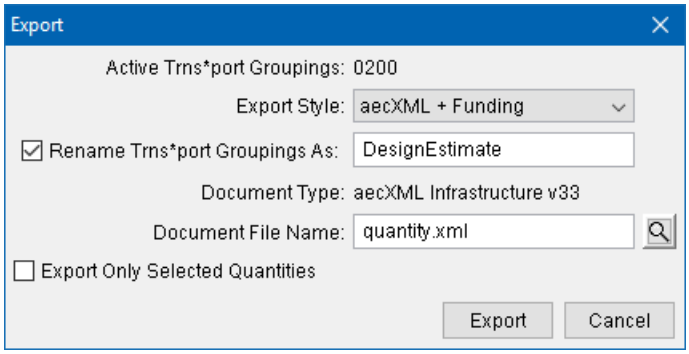
EXPORTING DATA TO XML FILE

➢ ***To export quantity data from Quantity Manager.***

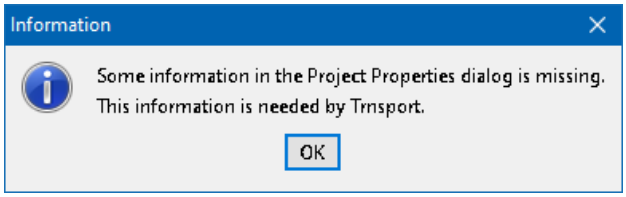
1. Set the Trns*port Groupings to the desired group.
2. In the Quantity Manager Pay Item Table pane, select the root folder and expand all the categories. Use CTL+A to select all the pay items. Only the Pay Items included in the active Trns*port Grouping will be exported.

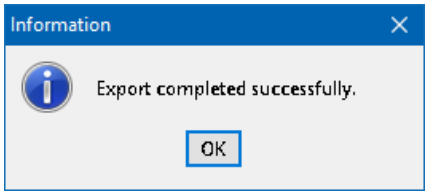


3. From the Quantity Manager menu, select **Project** > **Export** >**Export**. Export displays.
4. In the *Export Style* box, select **aecXML + Funding.**
5. Check **On** the *Rename Trns*port Groupings As* box and enter **DesignEstimate**.
6. In the *Document File Name*, enter **quantity.xml**.



7. Click the **Export** button.
8. An Information dialog displays. This is normal and not an error. Click **OK**. Another Information dialog then displays with the export completed successfully message. Click **OK**.



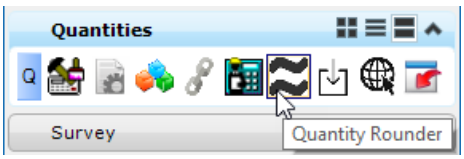


9. Navigate to the *Quantity.xml* file just created and review.

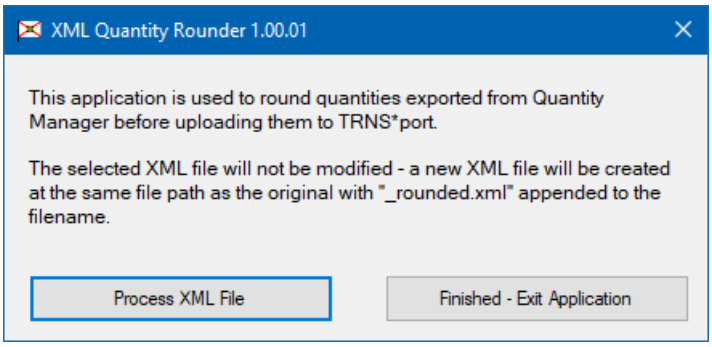
```
    </Cost>
  </PayItem>
- <PayItem>
  - <PayItemID>
      <ID>0110 4 10</ID>
    </PayItemID>
    <SpecBookVersion>13</SpecBookVersion>
    <PayItemDescription>Removal of Existing Concrete</PayItemDescription>
    <UnitOfMeasure units="SY"/>
    <LumpSum>false</LumpSum>
    <SupplementalDescriptionRequired>false</SupplementalDescriptionRequired>
    <GroupId>0200</GroupId>
  - <Cost costType="DesignEstimate">
      <UnitPrice>0.0</UnitPrice>
      <Quantity>34.1</Quantity>
    </Cost>
  </PayItem>
- <PayItem>
  - <PayItemID>
      <ID>0286 1</ID>
    </PayItemID>
    <SpecBookVersion>13</SpecBookVersion>
    <PayItemDescription>Turnout Construction</PayItemDescription>
    <UnitOfMeasure units="SY"/>
    <LumpSum>false</LumpSum>
    <SupplementalDescriptionRequired>false</SupplementalDescriptionRequired>
    <GroupId>0200</GroupId>
  - <Cost costType="DesignEstimate">
      <UnitPrice>0.0</UnitPrice>
      <Quantity>728.1</Quantity>
    </Cost>
  </PayItem>
- <PayItem>
  - <PayItemID>
      <ID>0285706</ID>
    </PayItemID>
    <SpecBookVersion>13</SpecBookVersion>
    <PayItemDescription>Optional Base, Base Group 06</PayItemDescription>
    <UnitOfMeasure units="SY"/>
    <LumpSum>false</LumpSum>
    <SupplementalDescriptionRequired>false</SupplementalDescriptionRequired>
    <GroupId>0200</GroupId>
  - <Cost costType="DesignEstimate">
      <UnitPrice>0.0</UnitPrice>
      <Quantity>20352.5</Quantity>
    </Cost>
  </PayItem>
<PayItem>
```

Note The rounding for the pay items are to 1 decimal place farther than the unit requirements in the BOE. (See Chapter 2 of the BOE.) FDOT has developed the XML Quantity Rounder tool to round the values in the xml exported by Quantity Manager to the correct decimal place for importing in Designer Interface. Incorrect accuracy generates errors when importing.

10. Close the *XML* file.
11. On the FDOT Plans Development > Quantities Tasks menu, select Quantity Rounder.



12. On the XML Quantity Rounder tool, click on **Process XML File**.



13. Navigate to the *quantity.xml* file and select **Open**.
14. An Information alert pops up when the process is finished. Click **OK**.
15. Click on **Finished – Exit Application** to close XML Quantity Rounder tool.
16. Open the new file, *quantity_rounded.xml*, and review.

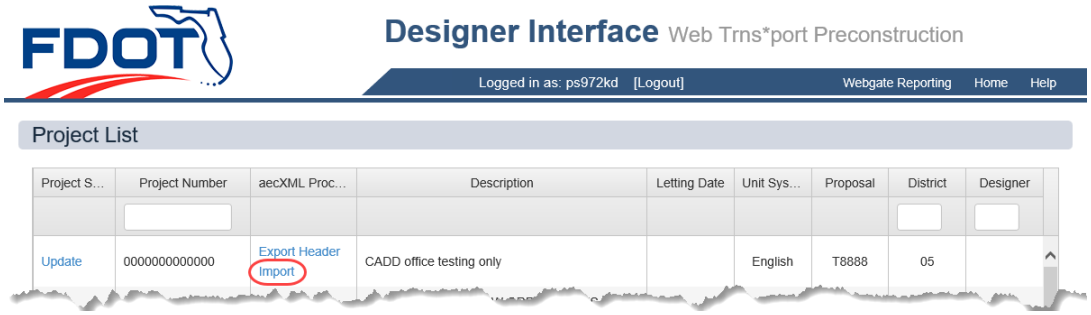
IMPORT QUANTITIES IN DESIGNER INTERFACE

This process imports the XML file saved from the Quantity Manager *Export* function and processed through the XML Quantity Rounder. The XML file should contain the Project Pay Items, Quantities and the Project Categories to which the Pay Items apply.

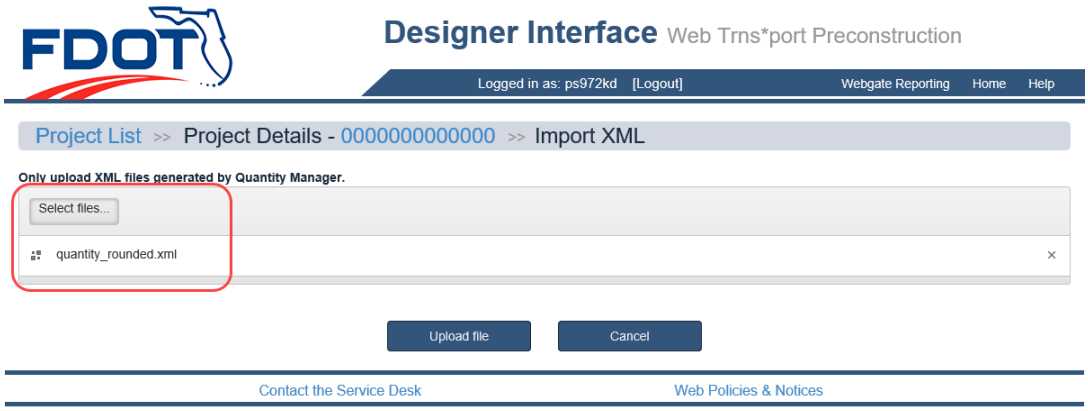
Note Update/Import will only occur if no errors exist in the XML file.

➢ ***To Import Quantities in Designer Interface***

1. Select appropriate **Project Number** from *Designer Interface* for the same Project you performed the Quantity Manager Export function.
2. Click the **IMPORT** link.

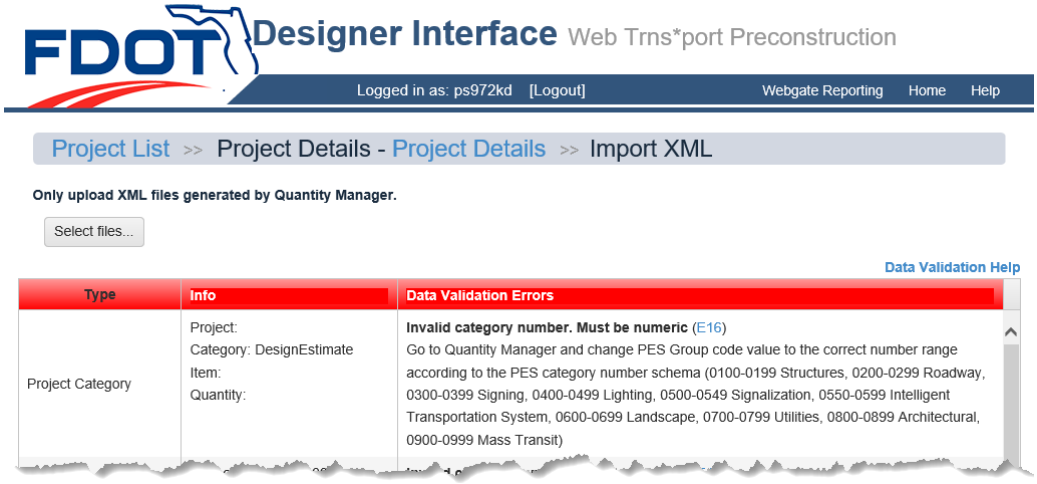


3. Click the **Select files…** icon to browse to and select the *quantity_rounded.xml* file saved from the XML Quantity Rounder tool.



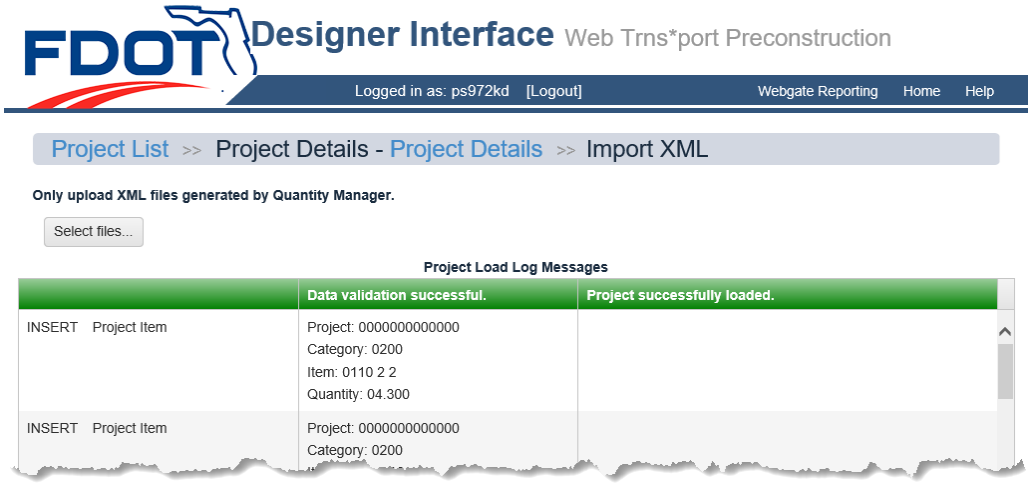
4. Click the **UPLOAD file** button to process the XML file.
5. Other updates may be required using Designer Interface once the Pay Items and Quantities import (i.e. mark item non-participating, structure info …)

6. If errors exist, a Data Validation Error page will show (red highlighted title below) listing all errors in the XML file. It is required to correct all errors in Quantity Manager, re-export, re-process and then re-import into Designer Interface before applying any updates/additions to the Designer Interface database. There are Error Number links to Help Messages to assist in error corrections.



Note If there is a Trns*port Grouping in Quantity Manager for DesignEstimate, this will cause the error shown above. This Trns*port Grouping must be deleted from Quantity Manager before exporting the quantities. Go to the Pay Item Table view of the Pay Item pane. Select the Trns*port Grouping DesignEstimate. You must correct any quantities that are associated with this grouping before it can be deleted. Highlight the pay items (one at a time) and then select all the quantities in the Quantities pane. Right-click, select edit, and correct the Trns*port Grouping value. Repeat this process for all the pay items with quantities under DesignEstimate. Once they are all corrected, go to the menu Edit > Trns*port Groupings. Select DesignEstimate from the list and select Delete. Re-export the XML file, process the Quantity Rounder tool and import the new file into Designer Interface.

7. If no errors exist, you will get a *Project Load Log Message* page (green highlighted title below), listing all updates or inserts performed in Designer Interface for the project.

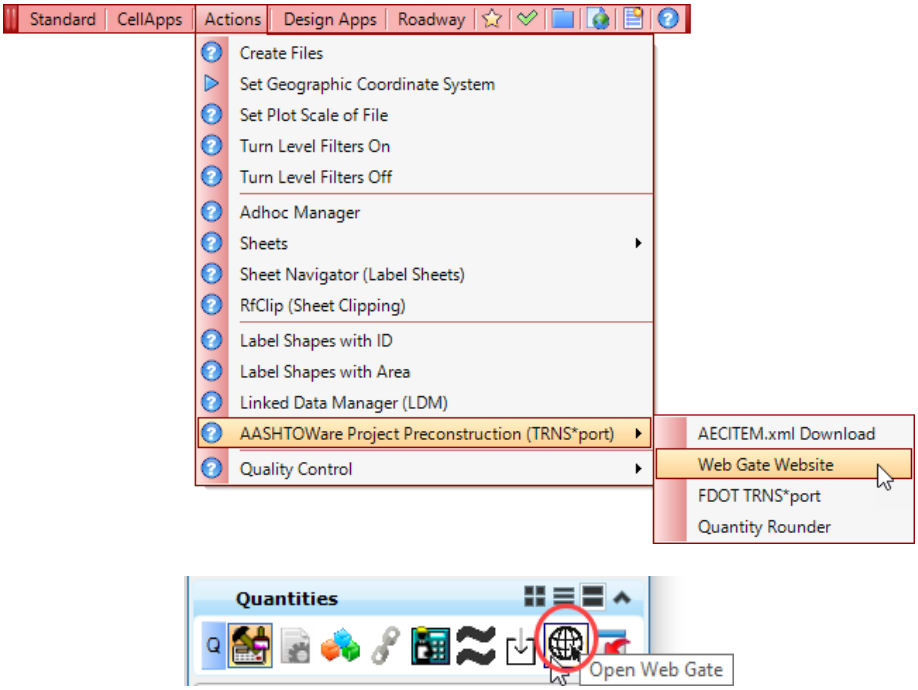


GENERATE REPORTS

Once the pay items and quantities are loaded, either through the import process or manually in Designer Interface, the next step is to run the *Project Edit* and *Summary of Pay Items* reports from AASHTOWare Project Webgate Reporting.

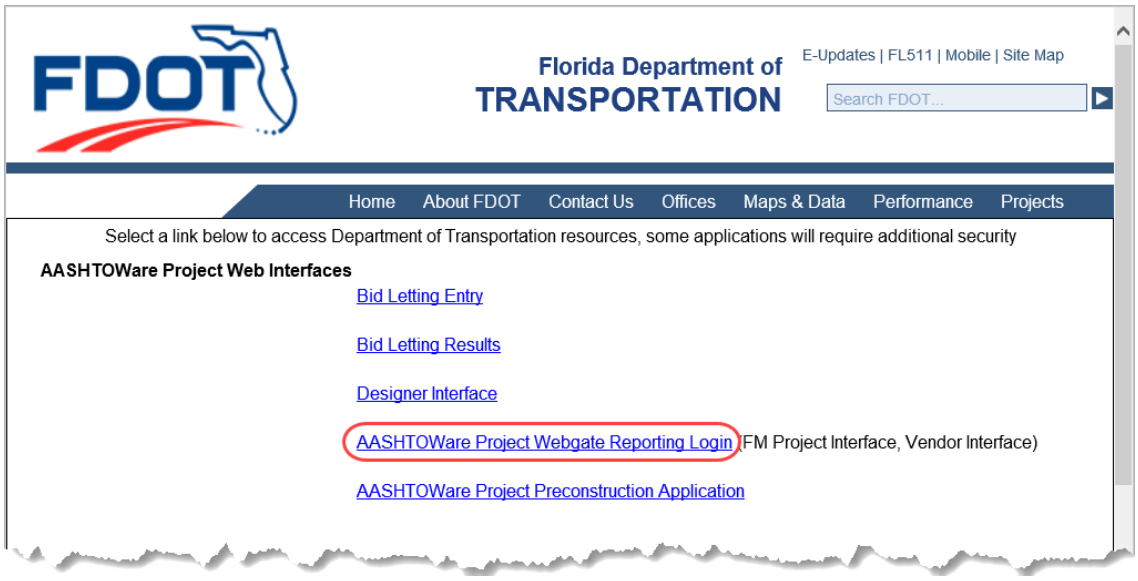
ACCESS AASHTOWARE PROJECT WEBGATE REPORTING

Access the AASHTOWare Project Webgate Reporting through the Web Gate site which is opened from the FDOT Menu option: **Actions > AASHTOWare Project Preconstruction (TRNS*port) > Web Gate Website** <OR> from the **Open Web Gate** icon on the **FDOT Plans Development > Quantities** Tasks menu.



On the Web Gate page, select the link AASHTOWare Project Webgate Reporting Login.

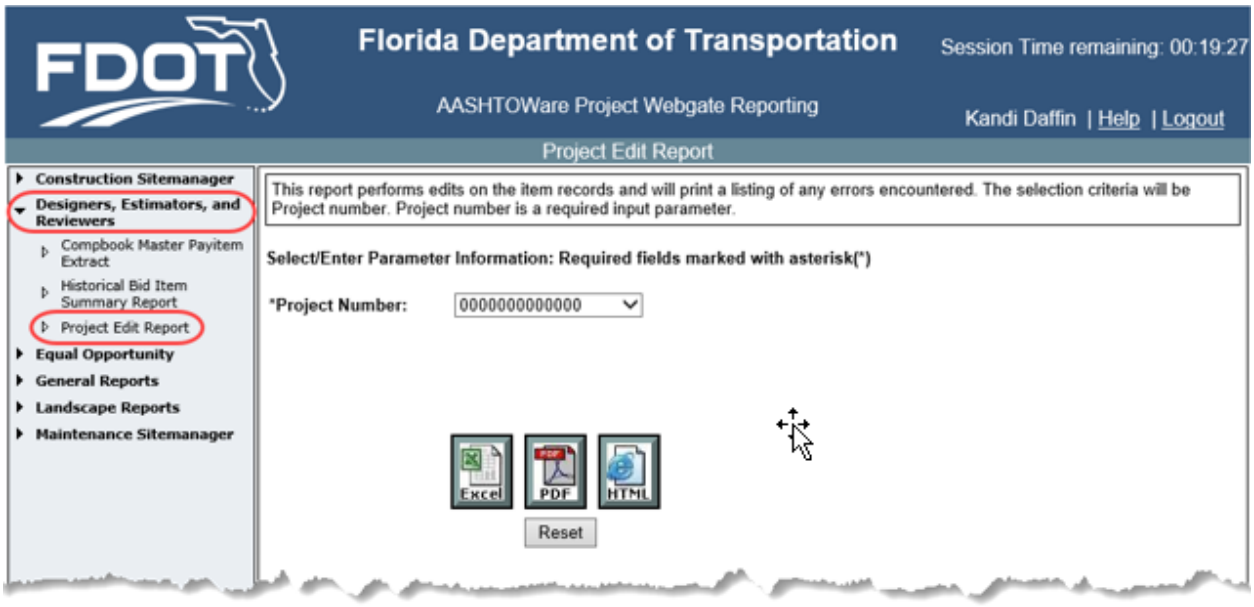
Note To login, an FDOT RACF User ID is required.



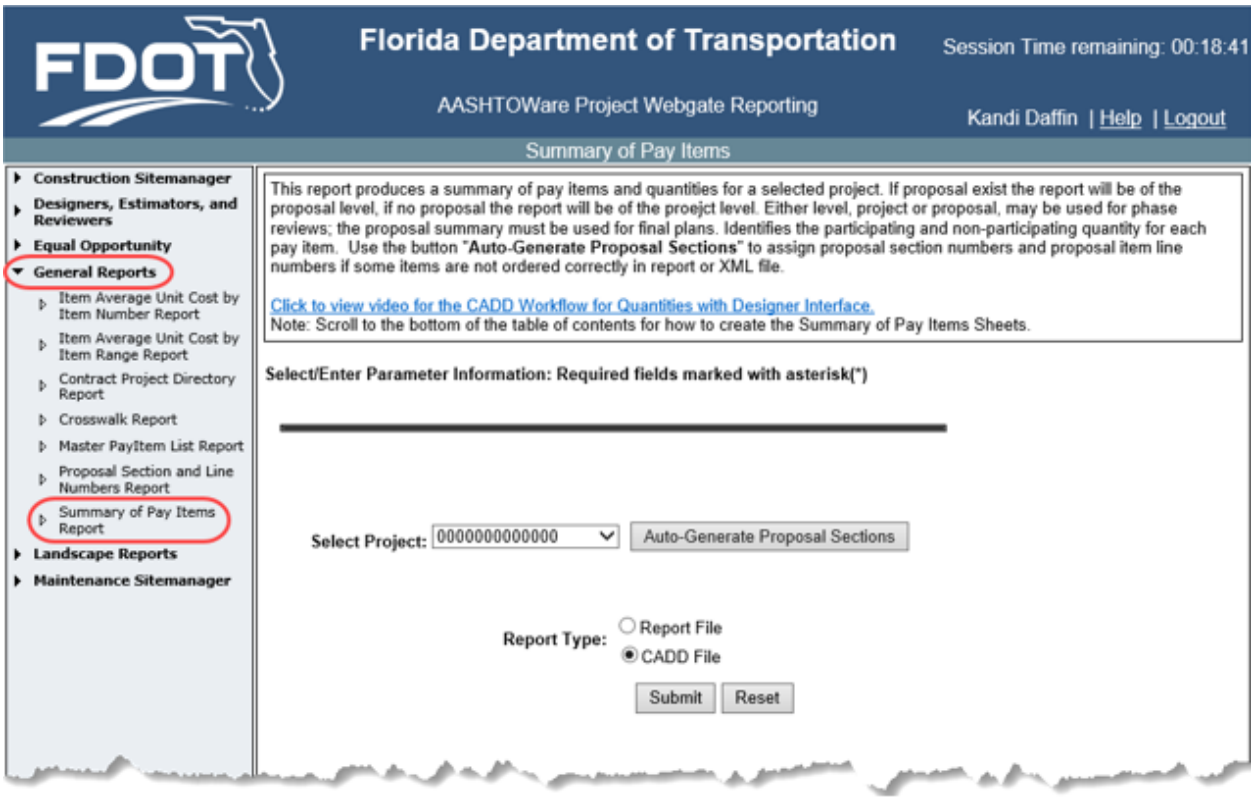
GENERATE SUMMARY OF PAY ITEMS REPORT

Many reports are available within Webgate Reporting. There are two reports important for designer to run for this process:

- *Project Edit Report*, found under Designers, Estimators, and Reviewers, identifies any errors with the pay items loaded on the project. It also identifies pay items that require extra documentation such as a Technical Special Provision (TSP).

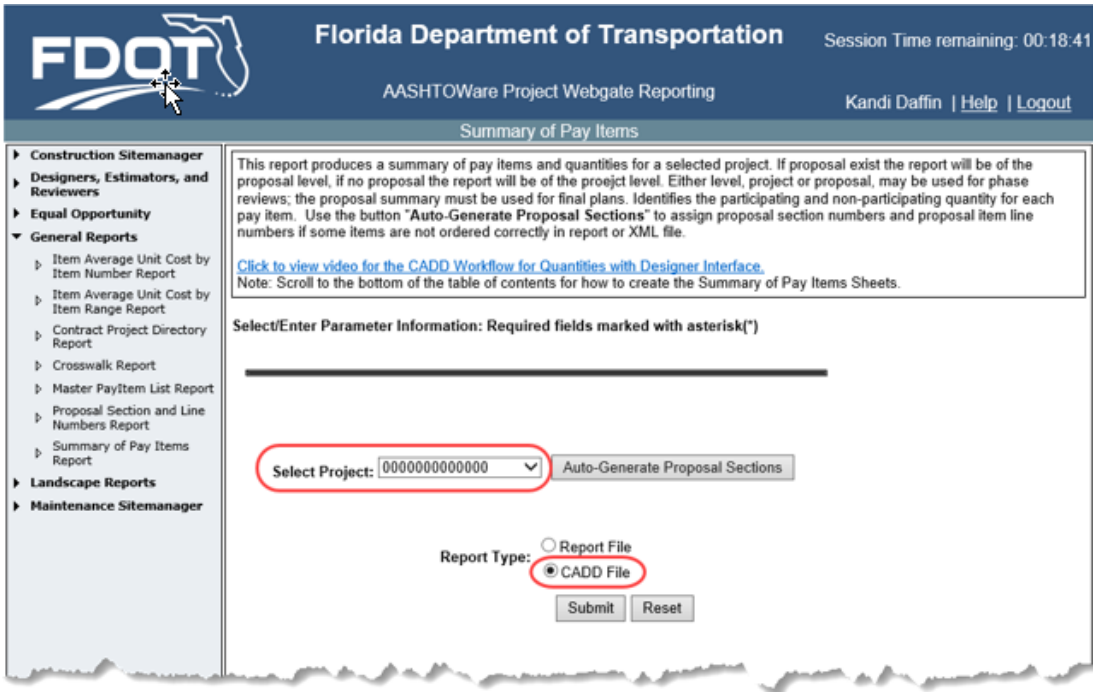


- *Summary of Pay Items*, found under General Reports, is used by CADD to generate the Summary of Pay Items sheet.

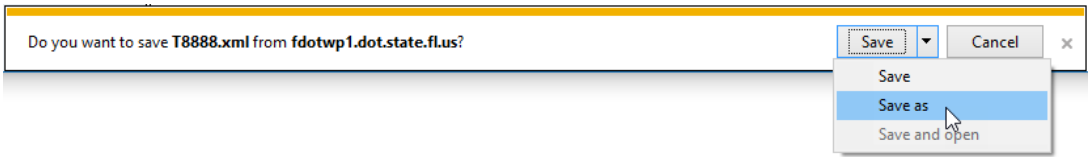


➢ ***Generate the Summary of Pay Items Report***

1. Select the *Project* from the drop-down list.
2. Click on the **Auto-Generate Proposal Sections**. (This process regenerates the section and line numbers for the proposal. It corrects any errors that may result from adding/updating/deleting any pay items or quantities for the project.)
3. Select the *Report Type* **CADD File** to generate the XML file needed in the CADD Software.



4. Click **Submit**.
5. When the option pops up at the bottom of the page, click on the drop-down and select **Save As**. (This may take some time depending on the size of the project and the internet connection speed.)

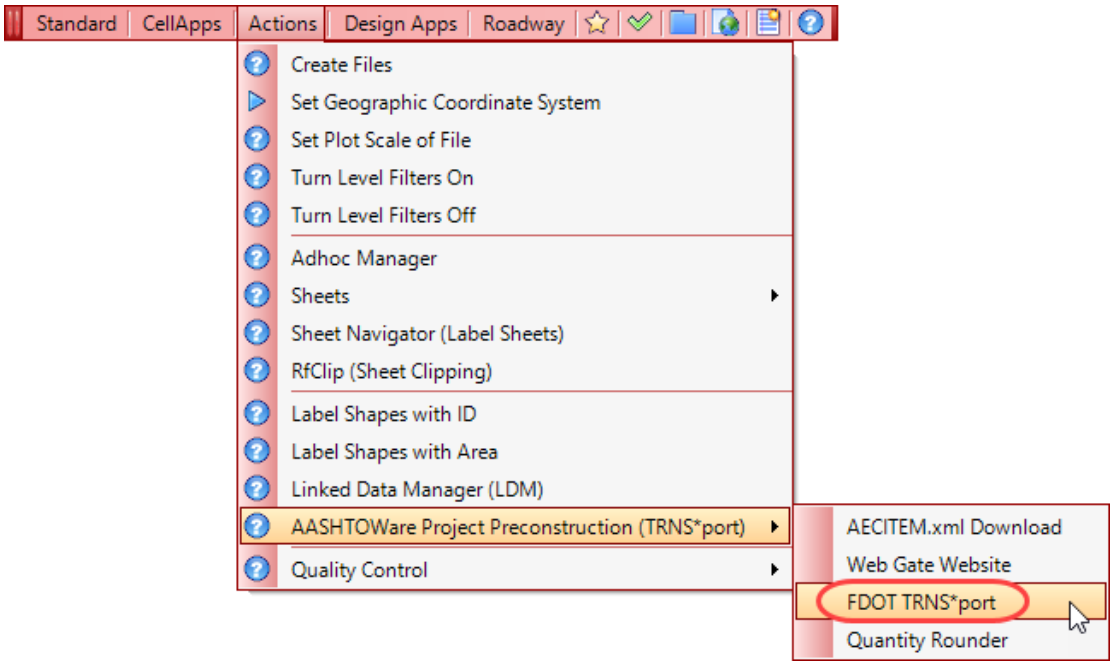


6. Save the XML file to the project directory.
7. Logout of the AASHTOWare Project Webgate Reporting site.

CREATE THE SUMMARY OF PAY ITEMS SHEET

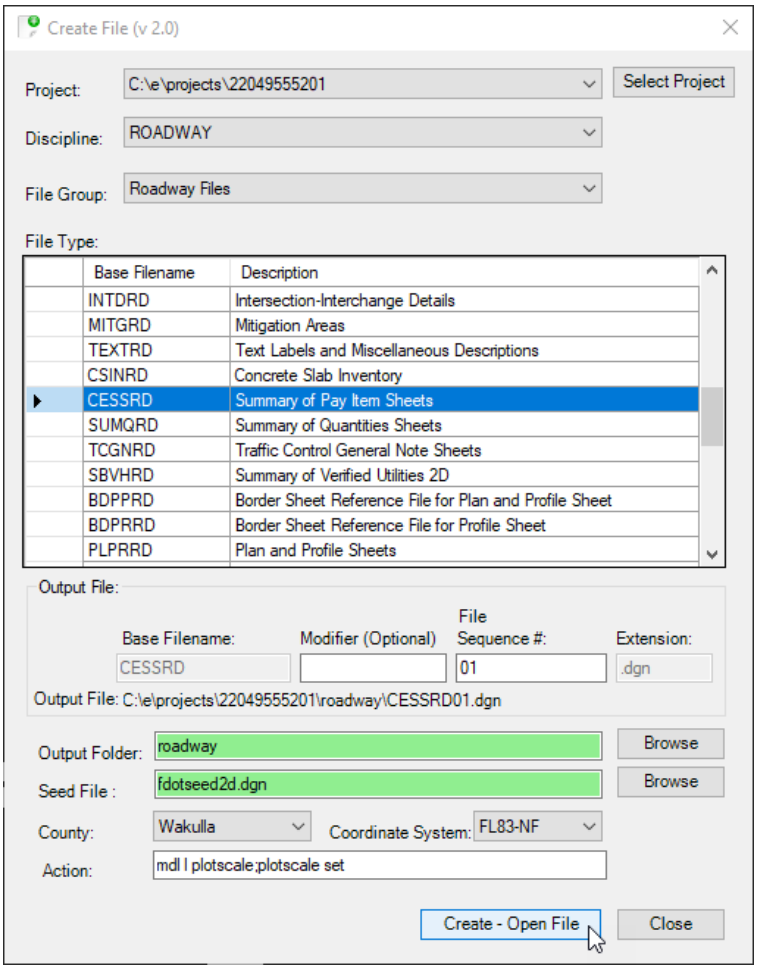
FDOT has an application, FDOT TRNS*port, that will import the data from the **Summary of Pay Items Report** XML file to create the Summary of Pay Items sheet(s) that are required with the lead component of the project.

To access the FDOT TRNS*port tool, on the FDOT Menu select **Actions > AASHTOWare Project Preconstruction (TRNS*port) > FDOT TRNS*port** <OR> click on the Import Pay Item Summaries icon on the **FDOT Plans Development > Quantities** Tasks menu.

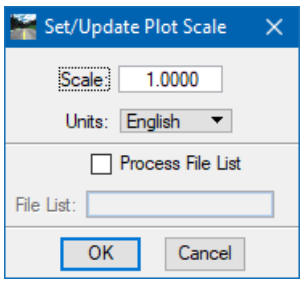


➢ ***Create the Summary of Pay Items Sheet***

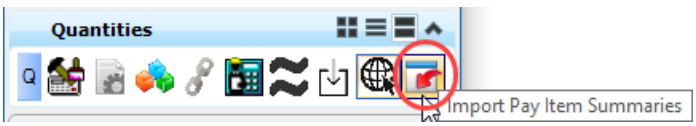
1. On the FDOT Menu, select **Actions > Create File** to open the Create File tool.
2. In the *ROADWAY > Roadway Files* file group, select the **Summary of Pay Items Sheets**. Verify the Project and Output settings are correct, then click **Create-Open File**.



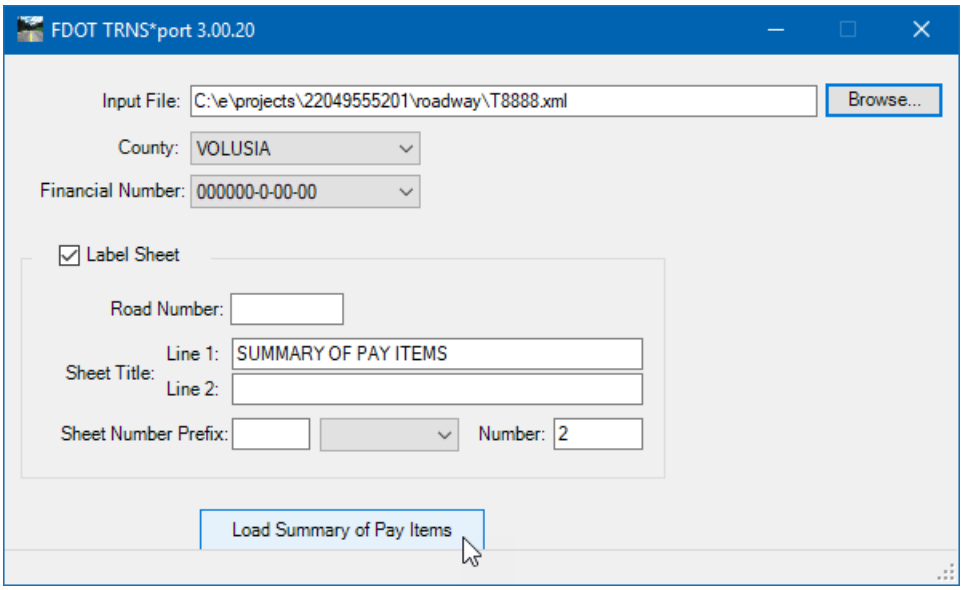
3. Set the *Plot Scale* to **1.0** on the Set/Update Plot Scale dialog box.



4. Click **Close** to close Create File dialog box.
5. Open the FDOT TRNS*port tool (Import Pay Item Summaries).



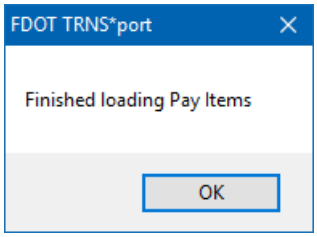
6. Click **Browse** to select the report *XML* file generated from the Webgate Reporting site.
7. Toggle **On** Label Sheet.
8. Complete the information. (By default, the fields - *Sheet Title*: **Summary of Pay Items**, and *Number*: **2**, are populated.)



9. Click Load Summary of Pay Items.

Note If the Load Summary of Pay Items button does not appear on the dialog box, click on the bottom right corner of the dialog to re-size it.

10. Finished loading Pay Items displays. Click **OK**.



11. Fit view in the MicroStation *CESSRD01.dgn* file to view the Summary of Pay Items tables.
12. Save settings. Close MicroStation.