

*State of Florida*  
*Department of Transportation*



# **Automated Quantities**

CE-11-0103

## **User Training Manual**

October 17, 2015

ENGINEERING / CADD SYSTEMS OFFICE  
TALLAHASSEE, FLORIDA  
<http://www.dot.state.fl.us/ecso/>



# *FDOT Automated Quantities*

## *CE-11-0103*

### *Description*

This training course walks through 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
- Generate Quantities in D&C Manager
- Linked Data Manager
- Generate Plan Summary Boxes
- Quantity Manager Basics
- Pay Items and Quantities
- Quantity Manager Reports
- Export Data to TRNS\*PORT

### *Objectives*

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

### *Audience*

FDOT Designers and Engineers

### *Prerequisites*

The following course is required:

FDOT Roadway Design and 3D Modeling SS3 – Basic 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.

*Duration:* 16 Hours

*Professional Credit Hours:* 16 PDHs



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# 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)

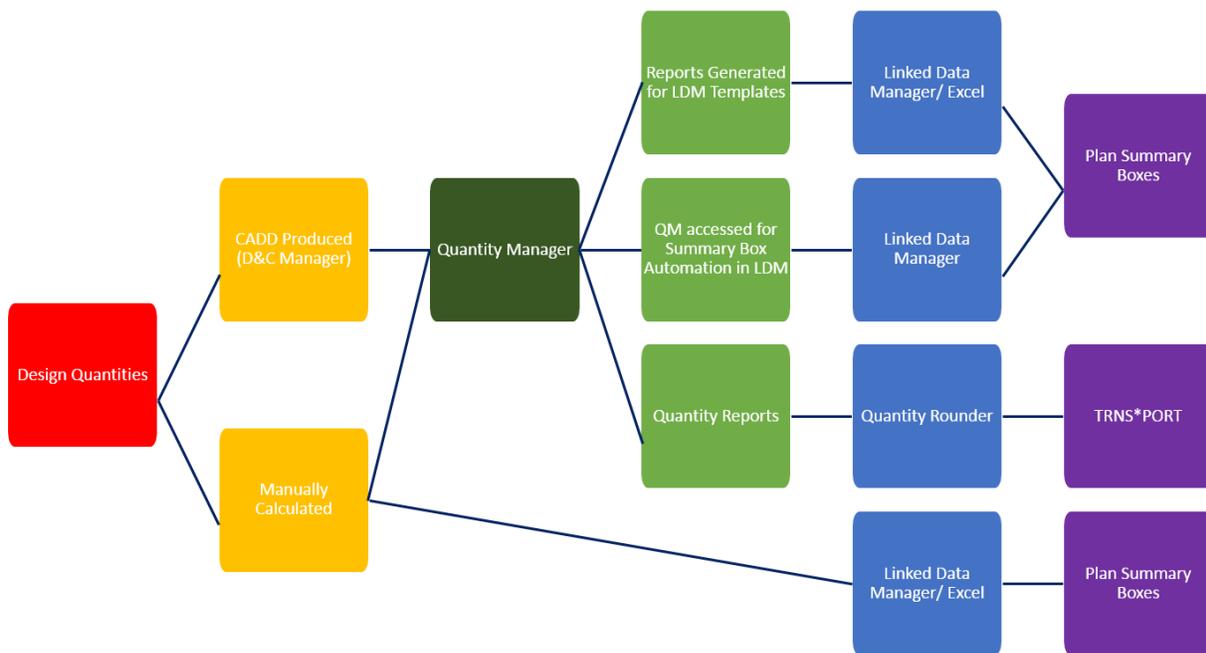
## DOCUMENT STYLE

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

Item	Convention	Example
<b>Menu Names and Commands</b>	Bold, names separated with > symbol	1. <b>File &gt; Open</b> 2. <b>File &gt; Compress &gt; Design</b>
<b>Dialog Box Actions</b>	<b>Bold</b>	3. Click the <b>Apply</b> button. 4. Click the <b>Graphic Select</b> button to the right of the <i>Horizontal Alignment Include</i> box. 5. In the <i>Segment Type</i> list, click <b>Lines</b> .
<b>Dialog Box Field Names</b>	<i>Italic</i>	6. Key in <b>Hemfield Road</b> in the <i>Alignment Name</i> field. 7. Click the <b>Graphic Select</b> button to the right of the <i>Horizontal Alignment Include</i> field. 8. In the <i>Segment Type</i> list, click <b>Lines</b> .
<b>Key-ins</b>	<b>Bold</b>	9. Key in <b>Hemfield Road</b> in the <i>Alignment Name</i> field.
<b>File Names</b>	<i>Italic</i>	10. Open the file <i>Working Graphics.dgn</i> in the C:\Bentley Training\GEOPAK 101\Project Setup\Practice\ directory.
<b>File Paths</b>	Non-italic	11. Open the file <i>Working Graphics.dgn</i> in the C:\Bentley Training\GEOPAK 101\Project Setup\Practice\ directory.
<b>New Terms or Emphasis</b>	<i>Italic</i>	12. The Template Library contains <i>templates</i> , 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 transfers 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 not set up to automate, csv reports can be run 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 enter manually into Quantity Manager and populate the summary box template manually. Finally, reports are generated to export all the quantities in the database to TRNS\*PORT.



## FDOT STANDARDS

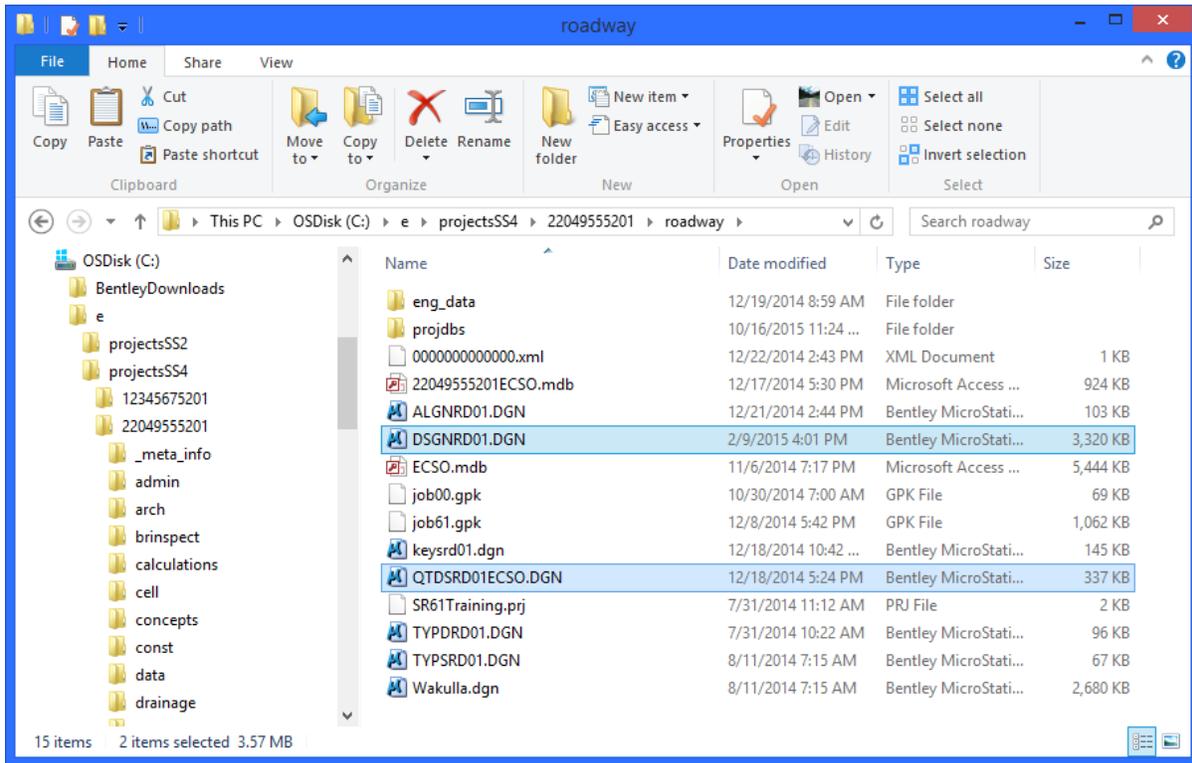
FDOT provides several resources to instruct and aid designers in computing pay item quantities. The Estimates Office publishes the *Basis of Estimates Manual*, the governing document that specifies how to compute each pay item. The Estimates Office also provides a *Master Pay Item* list containing every pay item available for use in Florida. The Engineering/CADD Systems Office (ECSO) 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 features drafting to ensure that each element is on the correct symbology and that quantities are 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 nearly all items that will be used on a FDOT project.

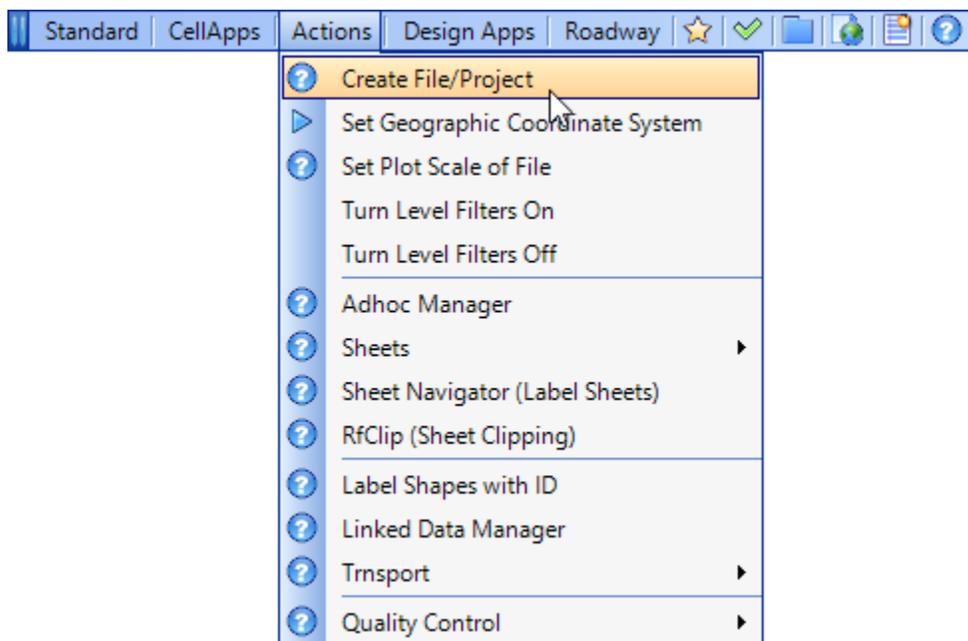
# FDOT STANDARD FILES

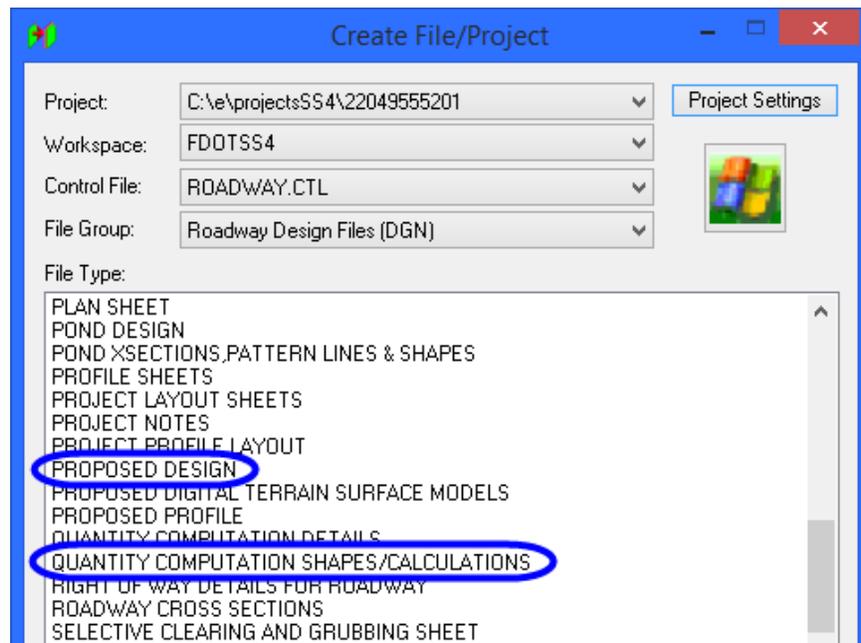
FDOT has two standard File Names, to be located in the discipline directory, for storing quantities:

- 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/Project 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 the 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 uses the pay item number, Transport format or with the use of dashes, in their naming convention. 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.

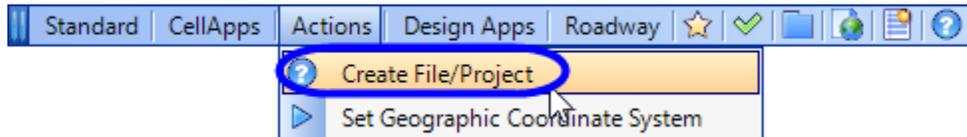
**HINT** To save time, set up the default model with the desired references, and then copy this model to create the additional models needed for the pay item shapes.

**Note** Do NOT create shapes for all of 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 the Default model.

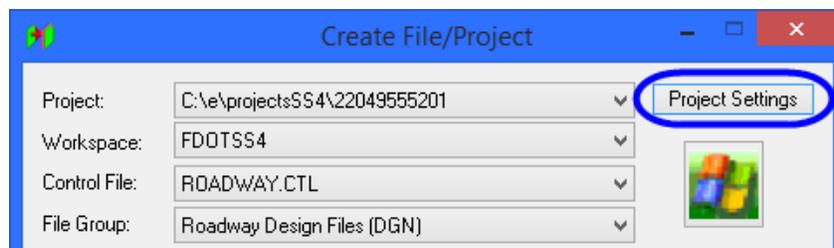
### Exercise 1.1 Create and Set Up the QTDSRD File

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

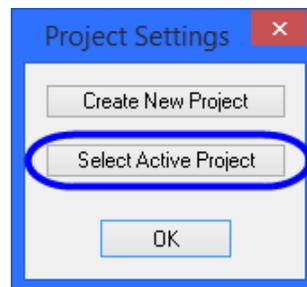
1. Open the MicroStation design file *DSGNRD01.dgn* using the FDOTSS2 icon on the desktop.
2. On the FDOT Menu, select **Actions > Create File/Project** to open Create File/Project.



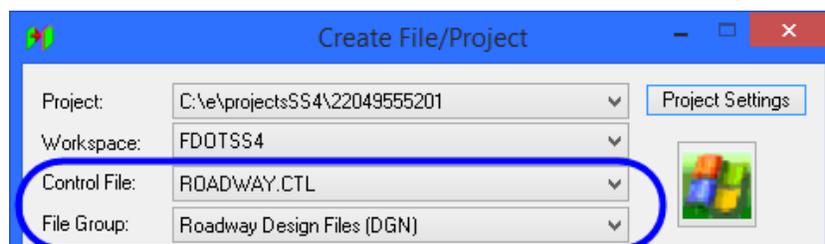
3. On Create File/Project, click on **Project Settings** to set the project directory.



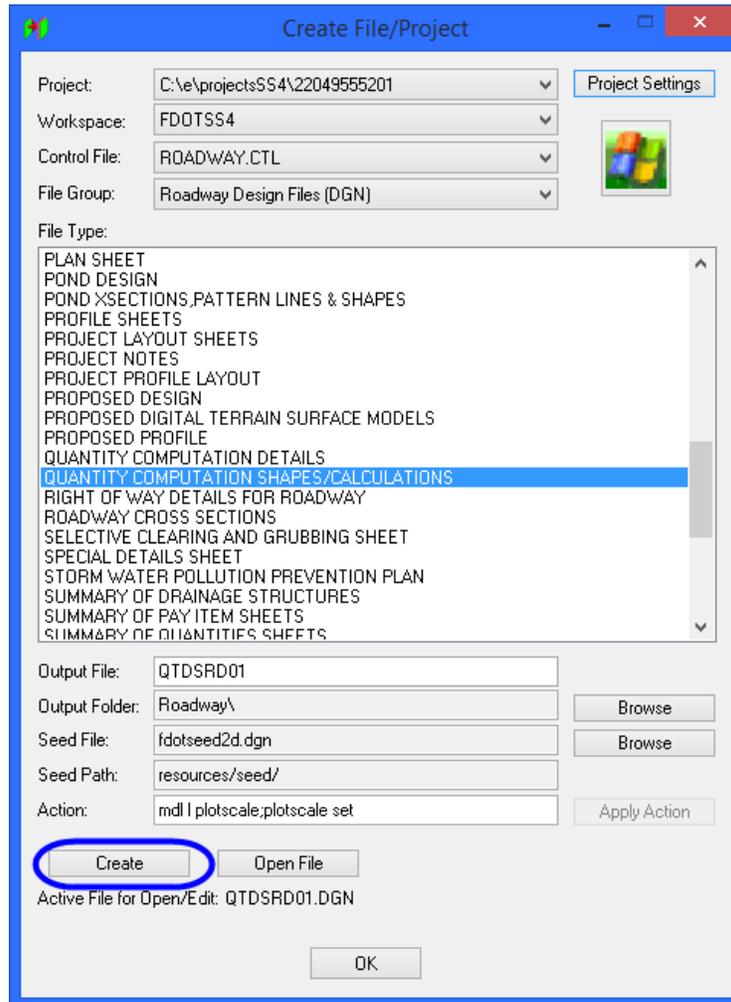
4. On Project Settings, click on **Select Active Project** and browse to the project directory, C:\e\projectsSS3\22049555201\. Click **OK**. Once back to the Project Settings dialog, click **OK**.



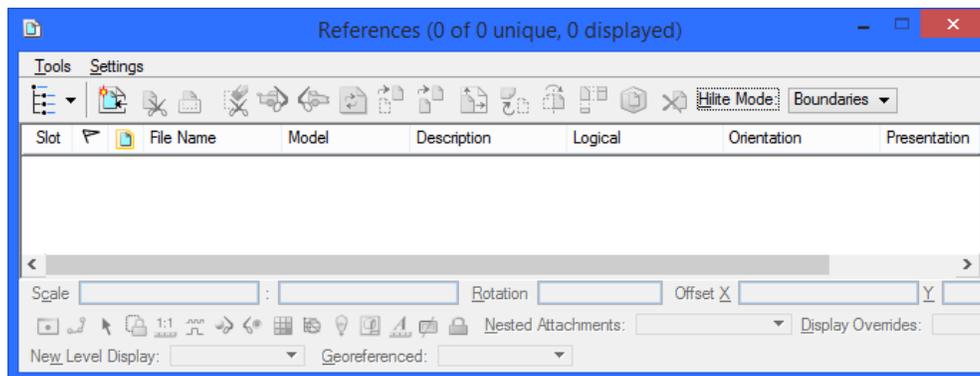
5. On Create File/Project, finish selection of the *Control File* and *File Group* as shown below using the drop down options.



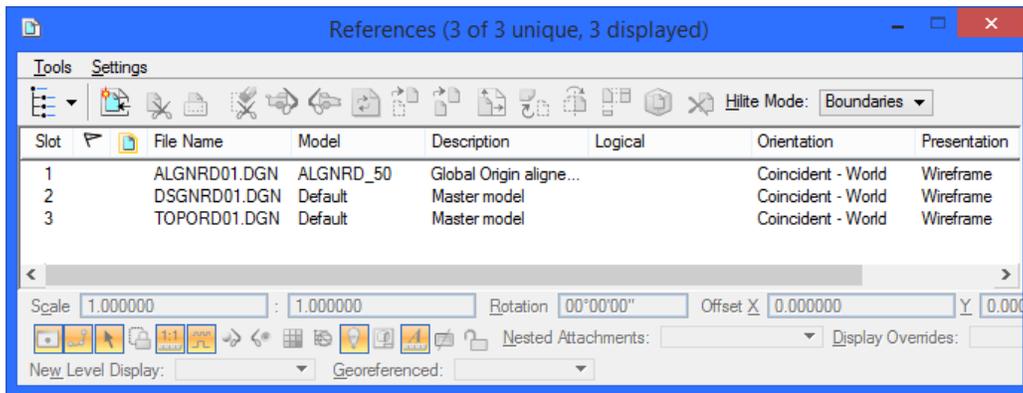
6. Scroll down under *File Type*, select **QUANTITY COMPUTATION SHAPES/CALCULATIONS** and click **Create**. The application creates the *QTDSRD01.dgn* file and stores it in the *Output Folder* selected.



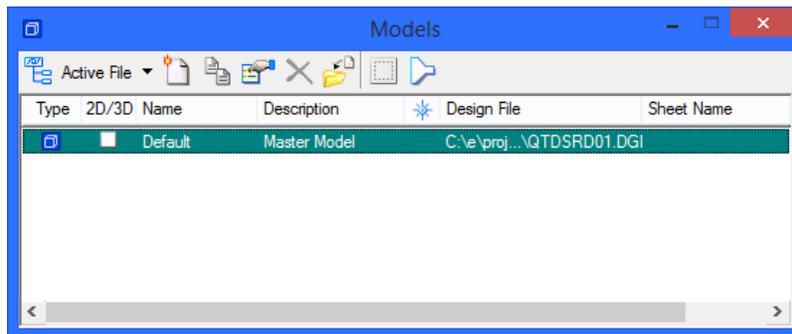
7. Click **Open File** to open the new file. Once the new file displays the Set Plot Scale dialog displays. Click **OK** and then click **OK** on the Create File/Project dialog to close it.
8. On the MicroStation menu select **File > References** to open the References dialog.



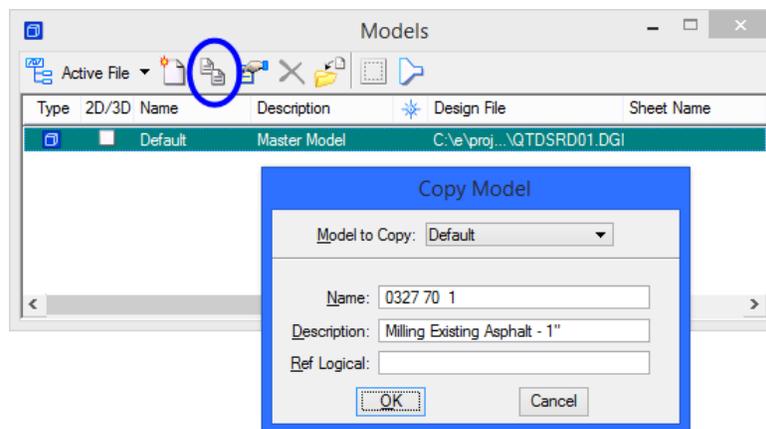
9. Attach the files ...\\roadway\ALGNRD01.dgn model **ALGNRD\_50**, ...\\roadway\DSGNRD01.dgn model **Default**, and...\\survey\TOPORD01.dgn. (FDOT recommends turning OFF any undesired levels, such as Text, Construction Lines, etc. **Fit the View** and **Save Settings**.)



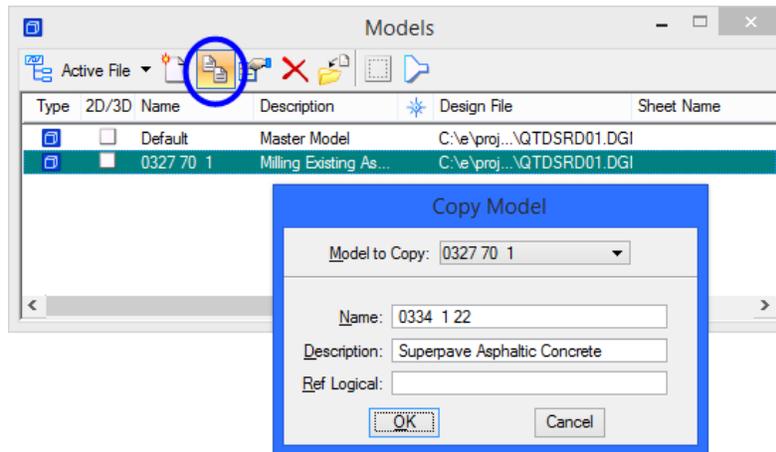
10. On the Primary Tools bar, open the Models dialog.



- 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.

# 2 D&C MANAGER

## OBJECTIVES

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

## D&C MANAGER DIALOG BASICS

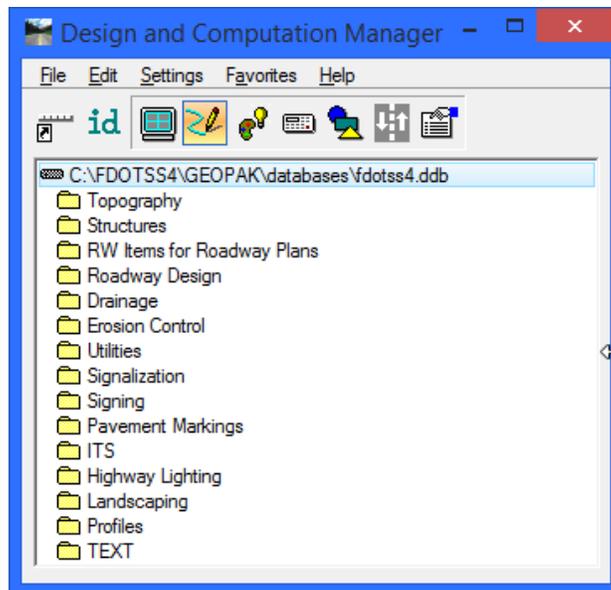
To access D&C Manager, from the *Road* toolbox, click the **Design & Computation Manager** icon.

<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 ECSO 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 complying with District standards. If the user customizes the database, the user saves this customized database into the project directory under the *symp* 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 insures 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 has four 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 eight items pertaining to display options in MicroStation and the method 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. Go to this documentation for information not covered by this manual. The exercises in this manual notates critical settings required for the FDOT Workflow.

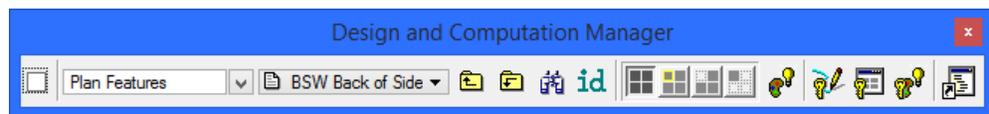
## TOOL BAR

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.



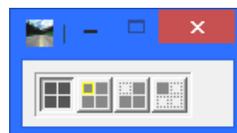
### Identify Item

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

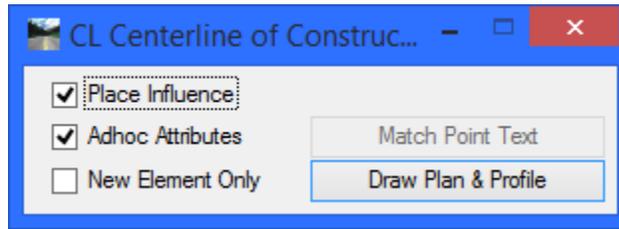
The Display icon filters the MicroStation elements in the design file to control the display of specific features. This icon expands D&C Manager to show a collection bin. This collection bin is for selecting multiple items at one time. This icon also displays a second toolbox with four icons as seen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





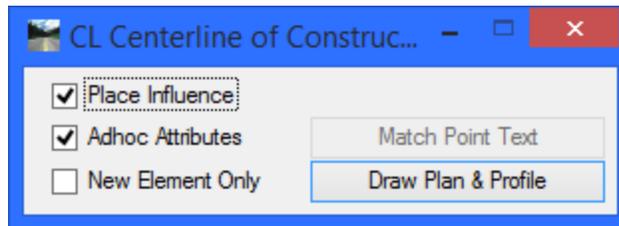
**Design**

The Design icon plots Coordinate Geometry and MicroStation elements into MicroStation with the defined symbology by use of Draw Plan and Profile or in conjunction with MicroStation element placement commands with Place Influence activated.



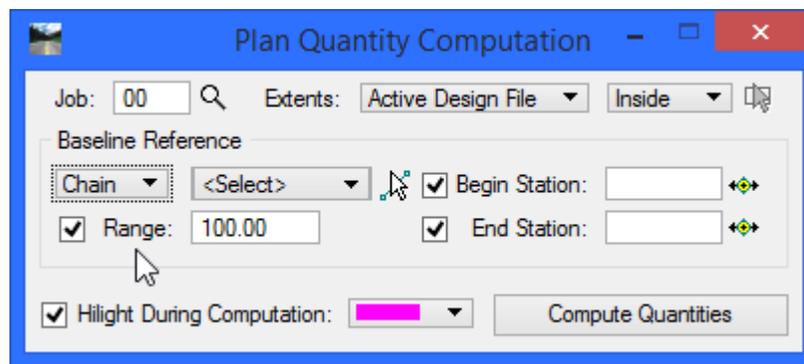
**Set**

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**

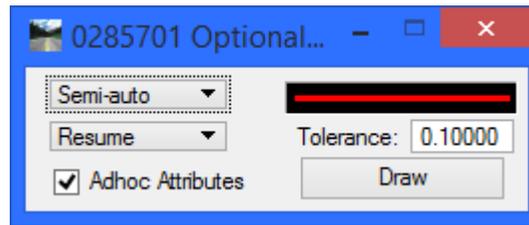
The Compute icon tabulates quantities of items placed as Pay Items using the Design or Set mode. If drafting elements using the MicroStation tools, quantities do not compute unless an attribute is applied using the Set tool. This tool also expands D&C Manager to show the collection bin, allowing for 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



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



### Preference

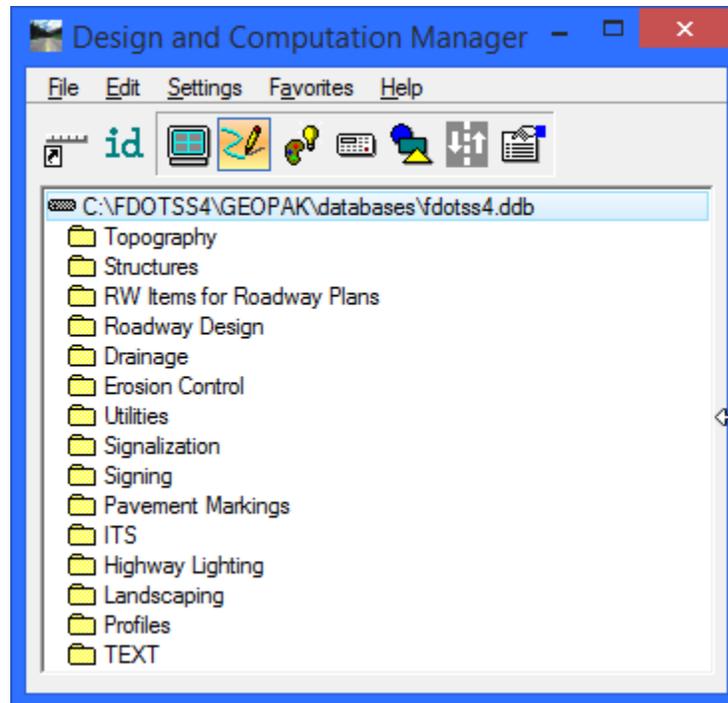
This icon expands the toolbar to include four additional icons to configure D&C Manager. These same tools are also accessible through the Edit menu and Right-click options.



## EXPLORING FDOT'S .DDB FILE

FDOT delivers a database file in the FDOT\*\* directory located at `geopak\databases\FDOT**\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 of 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 covered). 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 drafting standards for MicroStation commands or draw COGO elements without annotation. In some cases, these items will run a 3PC routine.



#### **Drafting Standards**

The Drafting Standards Items set drafting standards for MicroStation commands or draw COGO elements with annotation.



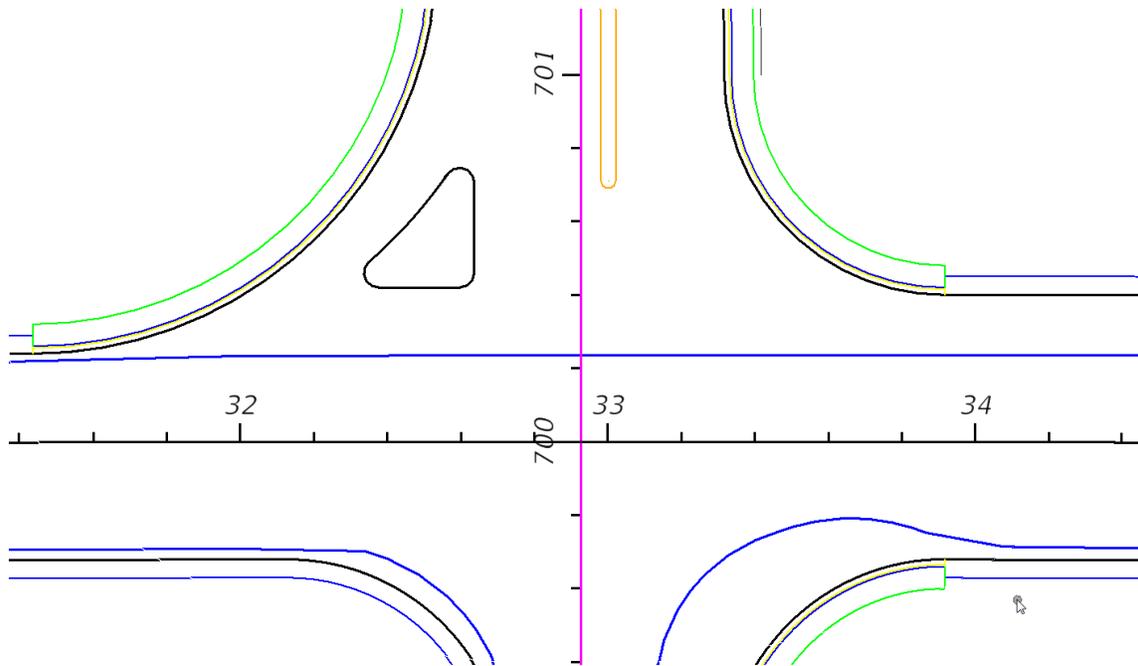
#### **Calculator**

The Calculator Items set drafting standards for MicroStation commands or draw COGO elements. These tag graphics with a pay item attribute used to calculate plan quantities.

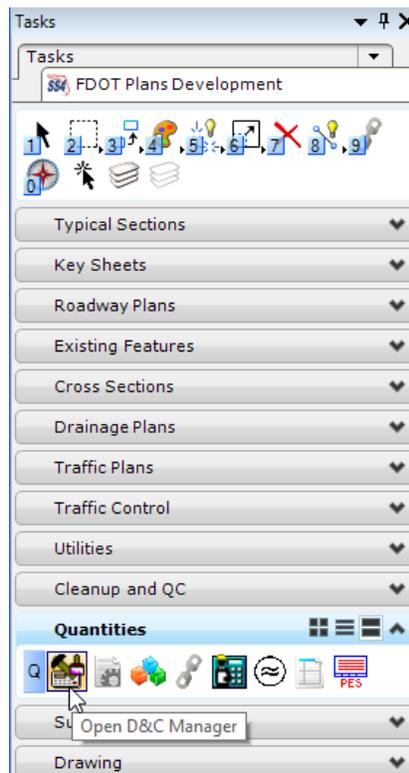
### Exercise 2.1 Identify an Existing Element

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 FDOT\*\*.ddb file to get familiar with its contents.

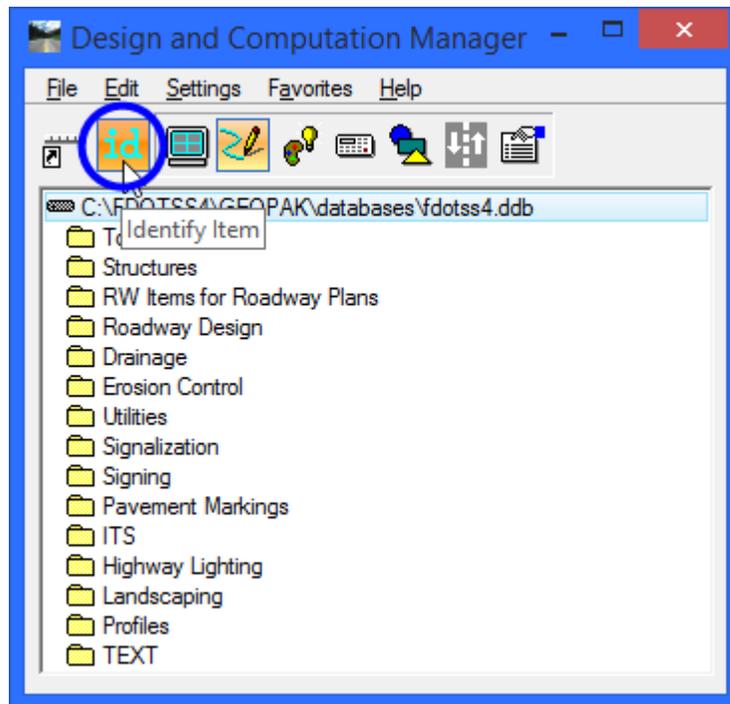
1. Open the MicroStation file C:\e\SS3Projects\2204955201\roadway\DSGNRD01.dgn.
2. Zoom the MicroStation View to the new intersection near the beginning of the project.



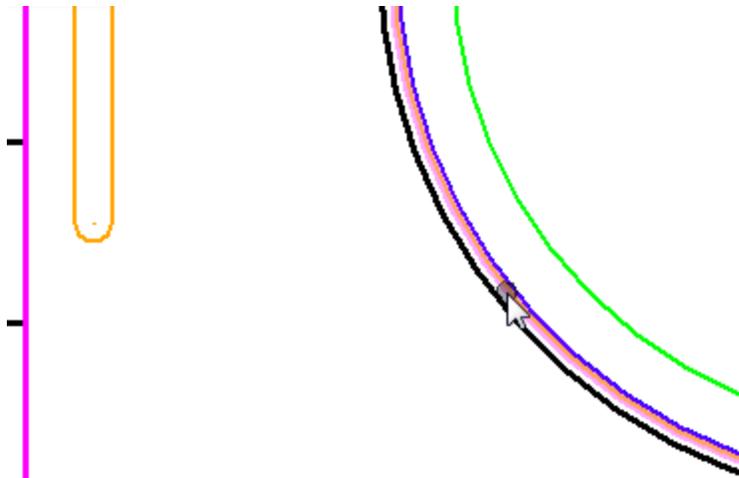
3. From the *FDOT Plans Development* > *Quantities* Tasks menu select **Open D&C Manager**.



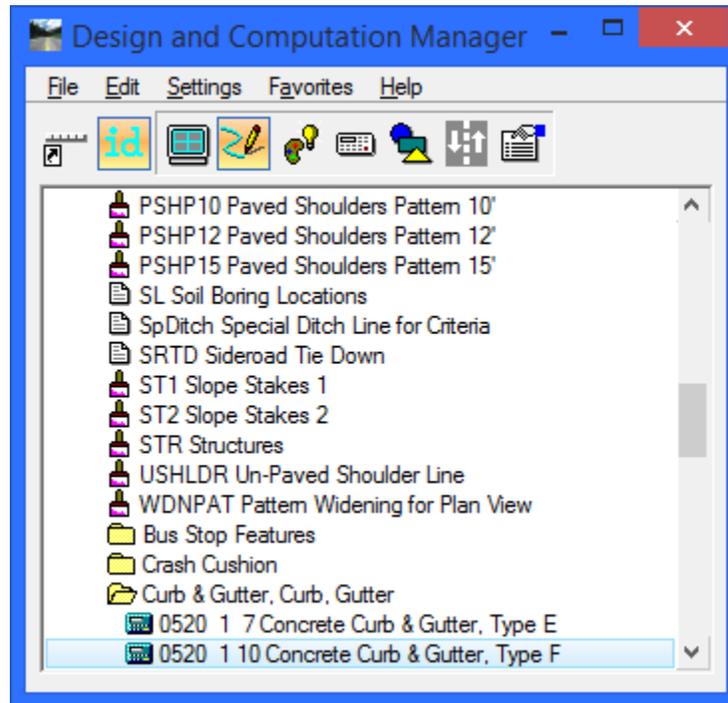
- From D&C Manager click the **Identify Item** icon.



- 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.



- 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.

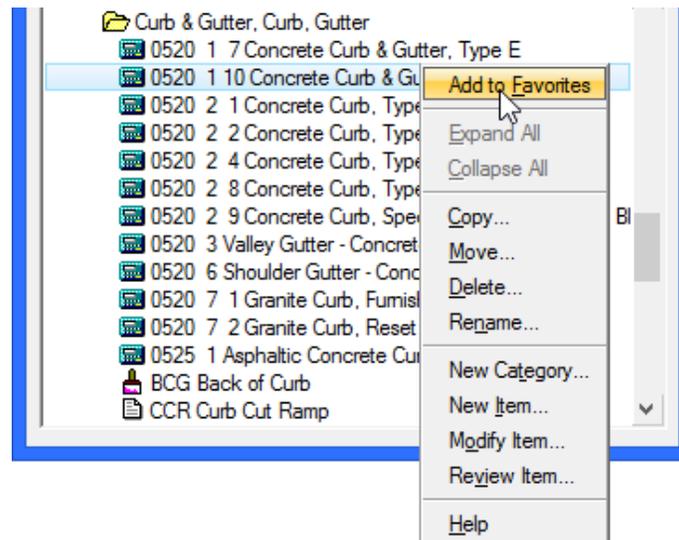


- With the *Concrete Curb & Gutter, Type F* selected, click on the **Display** icon.
- On the display settings toolbox, select **Highlight Selection**. Note all the face of curb elements matching the settings for the *Concrete Curb & Gutter, Type F* highlight.

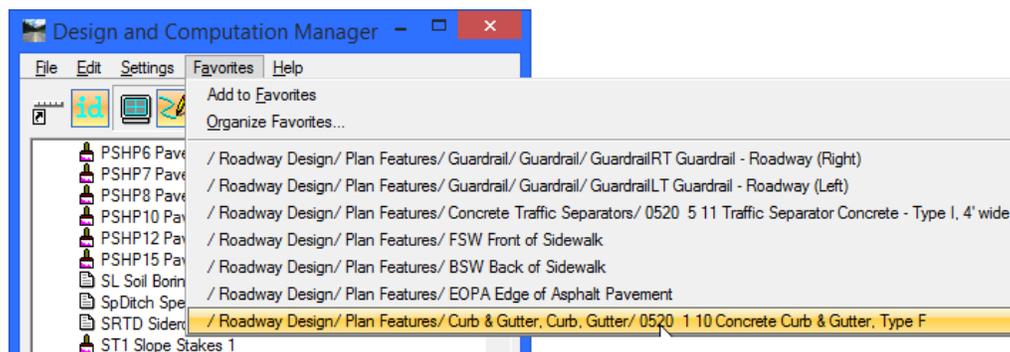
## Exercise 2.2 Create a Collection Set and add to Favorites

In this exercise, a collection set will be created of commonly used items in the D&C Manger and then saved as a Favorite to be recalled later.

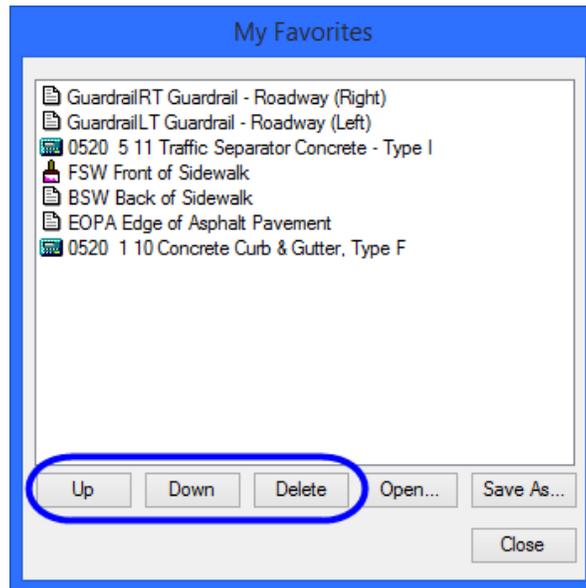
1. Continuing in the D&C Manager, go to **File > Save As > New File**. Save the database as *22049555201.ddb* in the project *symp* directory.
2. Highlight the *Concrete Curb & Gutter, Type F* item, right-click and select **Add to Favorites**.



3. 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
  - 520 5 11 – Traffic Separator Concrete – Type I, 4' wide
  - GuardrailLT – Guardrail – Roadway (Left)
  - GuardrailRT – Guardrail – Roadway (Right)
4. From Design and Computation Manager, 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.



5. 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.



6. On My Favorites dialog, select **Save As**. Save the file as *drafting.col*. Recall this file at any time by using the **Open** option. Collections can be created 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.

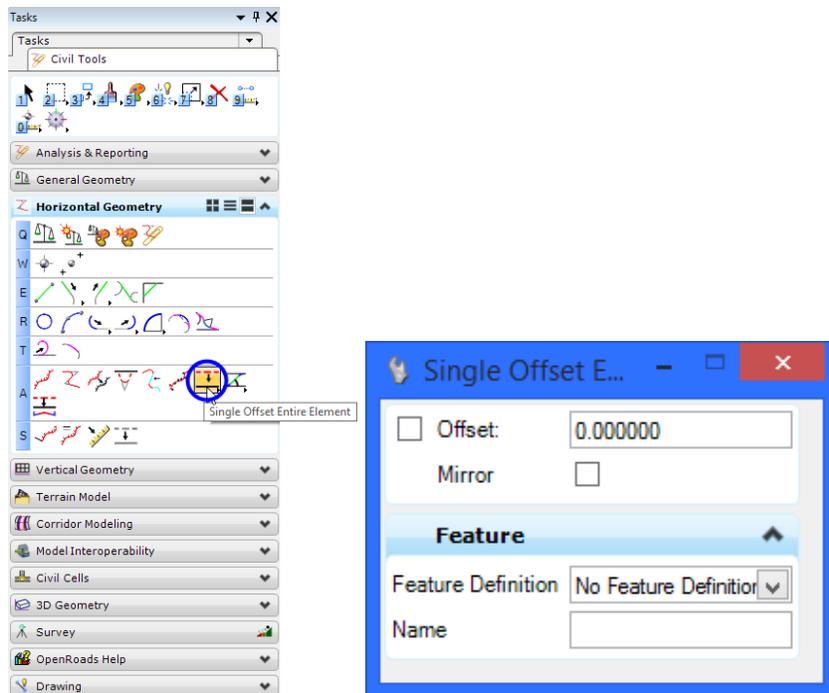
### Exercise 3.1 Draw Guardrail with Civil Tools

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

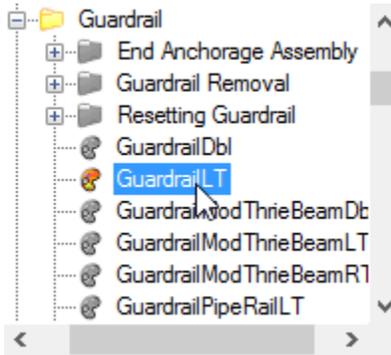
1. Open the MicroStation file C:\e\SS3Projects\2204955201\roadway\DSGNRD01.dgn.

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

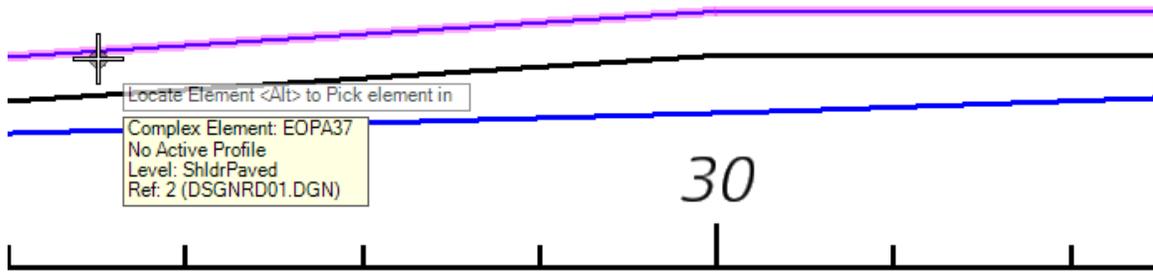
2. Zoom into the NW corner of the new intersection.
3. On the *Civil Tools > Horizontal Geometry* Tasks menu, select the **Single Offset Entire Element** tool.



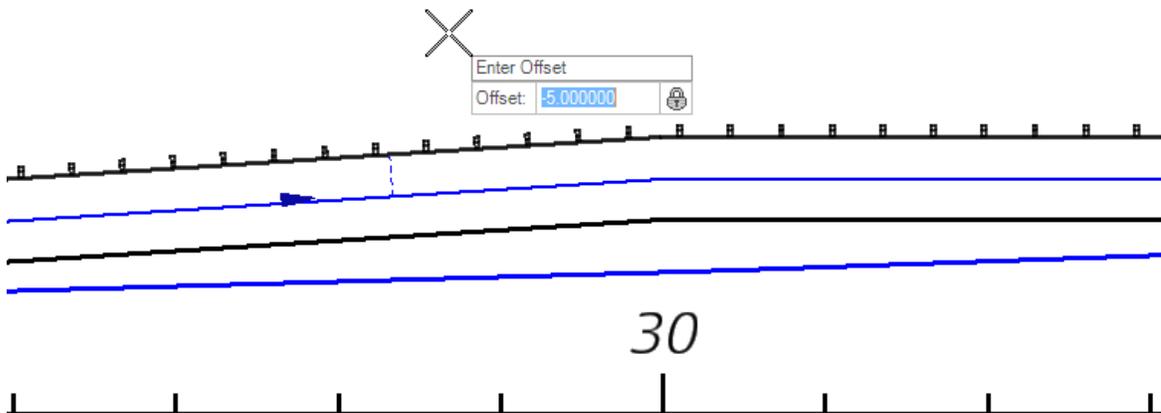
- Set the *Feature*. From the *Feature Definition* drop down arrow, navigate to *Plan (2D) > Guardrail* and select the *Feature GuardrailLT*. Accept the default *Name* set.



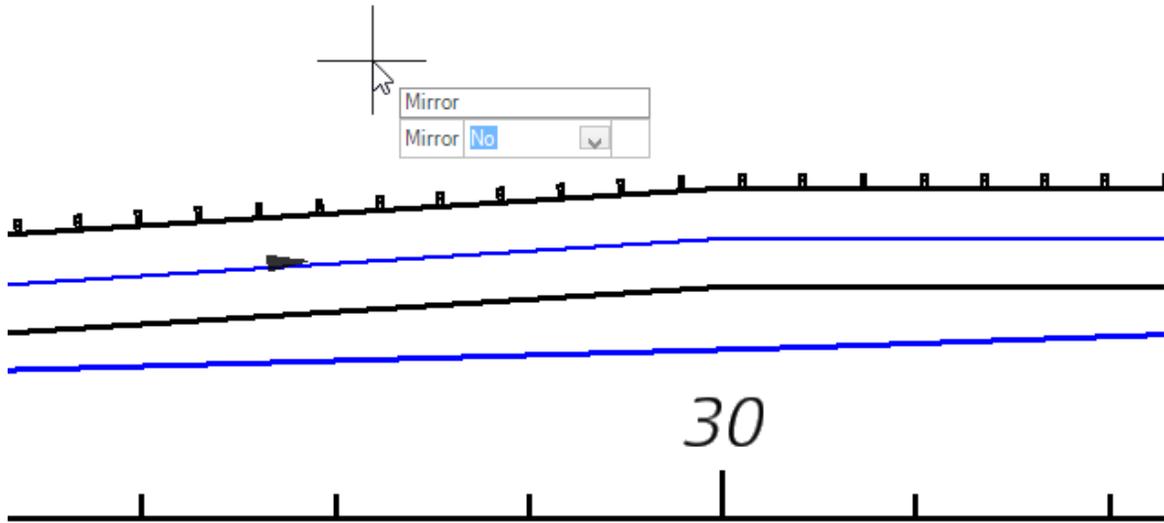
- Follow the prompts on the cursor to **Copy Parallel** the *Paved Shoulder line 5 feet* for the *Guardrail line*.
- Select the **Paved Shoulder** line.



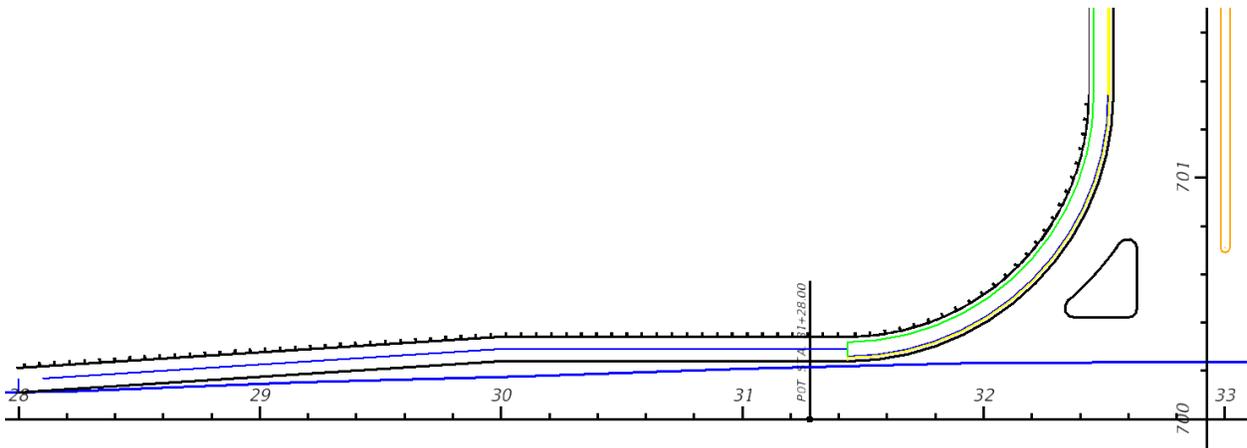
- Enter **-5** and press **Enter <OR> Data Point** in the file to accept.



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 all **Guardrail** behind the sidewalk. Use an *Offset* value of **2 feet**.
10. Use the MicroStation modify tool **Trim to Intersection** to connect the segments together.



**Note** The process tags 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 a number of 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 modifying 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.

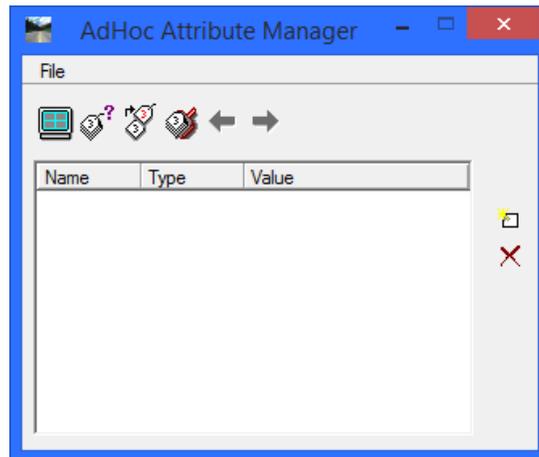
**Note** Place these adhocs on the elements BEFORE exporting the quantities to Quantity Manager.

<u>Name</u>	<u>Type</u>	<u>Default Value</u>	<u>Description</u>
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 and then by station.
SYSTEM CBW	STRING		Permanent crash cushion details – see Index 430 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 – see Index 430 for more information. 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		
LOCDESCRIPTION	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.

<u>Name</u>	<u>Type</u>	<u>Default Value</u>	<u>Description</u>
FUNCTION	STRING	UNDER GUARDRAIL	Used in automation to determine documentation on which column the quantity needs in the Summary of Miscellaneous Asphalt.
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	VARIABLES	Extra guidance provided to help determine the value of another adhoc. These adhoc do not pull over into Quantity Manager.
VARIOUS ITEMS***	UNIT/QTY	Varies	Sets pay item quantities
DAYS	NUMERIC	VARIABLES	Used in formula to calculate pay item.
LIFT	NUMERIC	1	Used in formula to calculate pay item.
THICKNESS	NUMERIC	VARIABLES	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**.



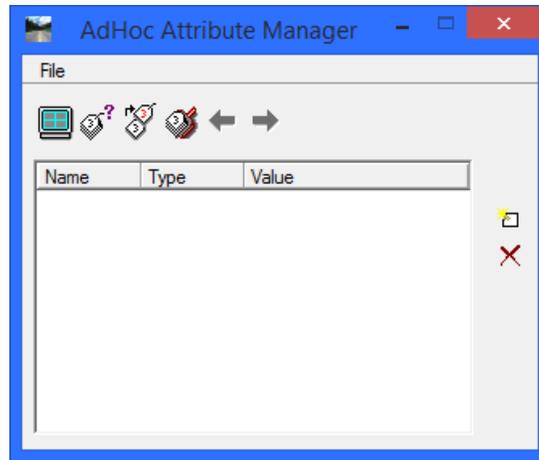
The Adhoc Attribute Manager has four icons on the tool bar for viewing and tagging elements with Adhoc Attributes. From left to right these icons are: *Attribute Display Filter*, *Identify Element*, *Set Attribute*, and *Adhoc Scooper*. The two icons on the right side are *Create New Row* and *Delete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

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

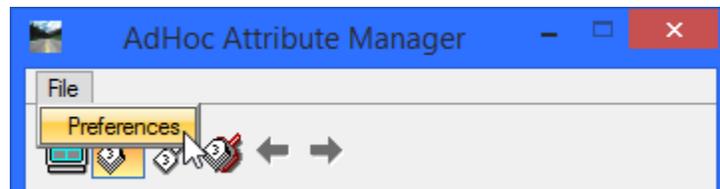
### Exercise 3.2 Tagging Adhoc Attributes

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

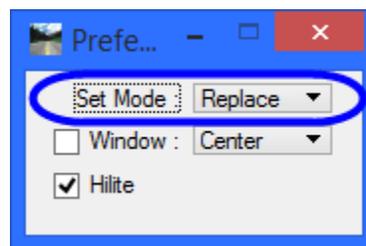
1. Continuing in the *DSGNRD01.dgn* file, from the MicroStation Menu, select **GEOPAK > ROAD > GEOPAK 3pc Adhoc Attributes**. Adhoc Attribute Manager displays.



2. Select **File > Preferences**.

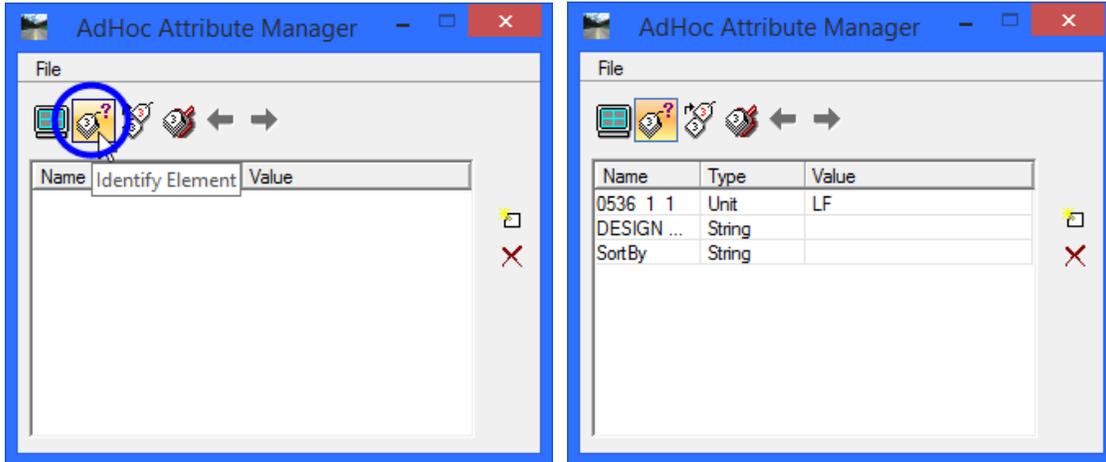


3. On the Preferences dialog, select **Replace** from the drop down menu for the *Set Mode*.

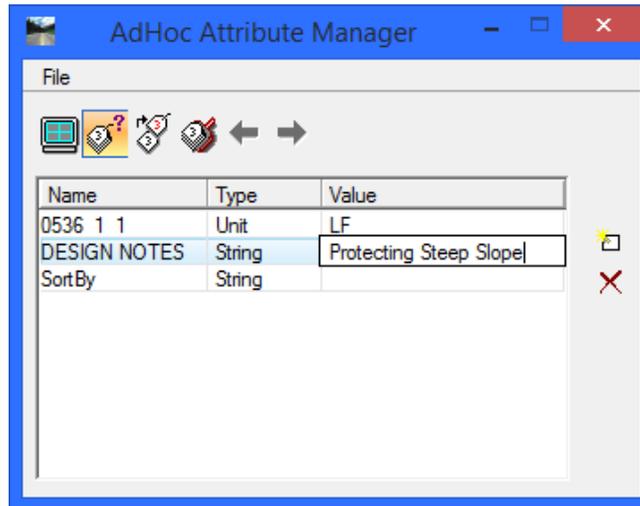


4. Click on the red **X** to close the dialog.

- Click the **Identify Element** icon, and then select the **Guardrail** drawn in Exercise 3.1. The dialog populates with the *Adhocs* attached to the selected element.



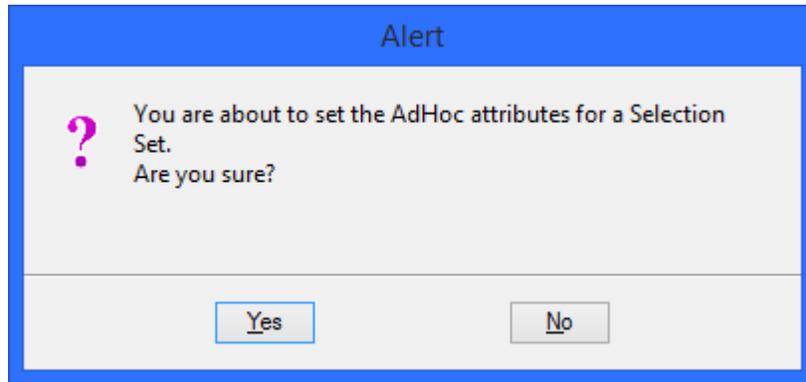
- Select the **Value** field and type in a value. This text will populate later into the quantity summary box.



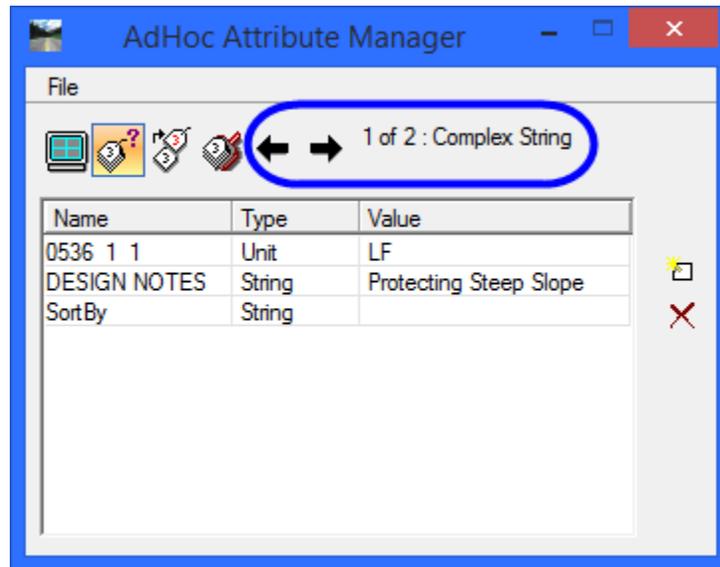
- Create a **Selection Set** of the *guardrail elements*.
- Click the **Set Attribute** icon. An Alert displays.



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



10. With the *Selection Set* still active, select the **Identify Element** icon. The Adhocs for all of 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.

# 4 CALCULATING QUANTITIES

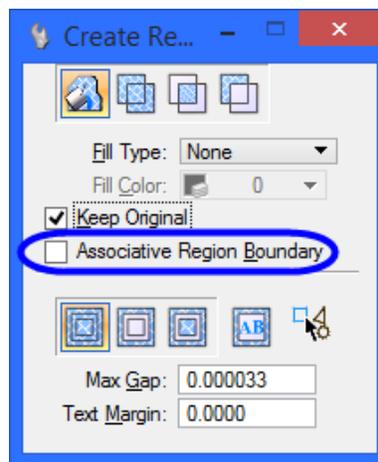
## OBJECTIVES

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

## CREATING SHAPES

Shape creation is generally not during the design process. As such, quantity shapes for these areas need to be created. The quantity shape file (*qtdsrd01ECSO.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, ECSO 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.

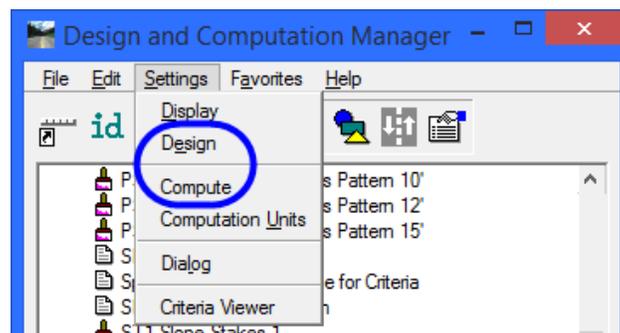
## CALCULATING QUANTITIES WITH D&C MANAGER

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

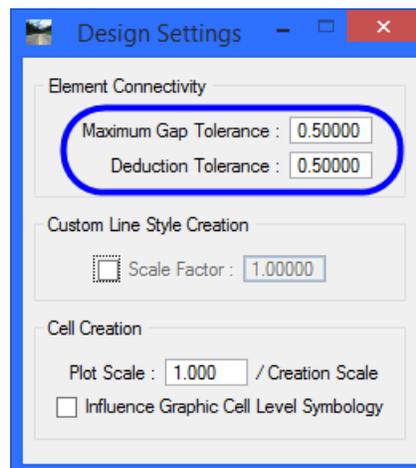
### SETTINGS TO CONSIDER

The D&C Manager has many Settings options to consider. For many of these, ECSO 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.

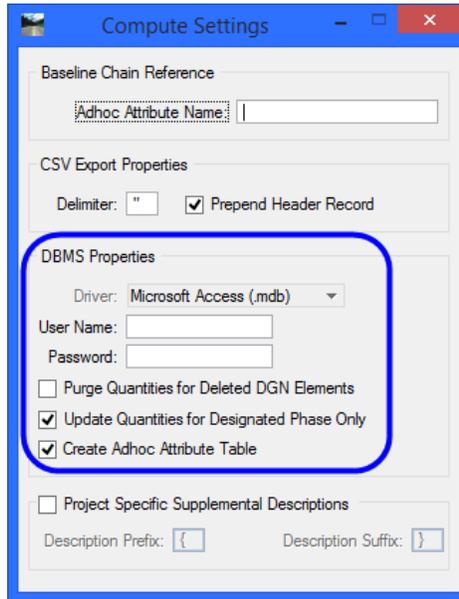


- Maximum Gap Tolerance – The application uses this to determine whether two elements are connected. FDOT recommends Maximum Gap Tolerance be set no higher than 0.2.
- Deduction Tolerance – The application uses this in the Compute Mode, the deduction tolerance sets the distance used to search for other 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 Microsoft Access (.mdb) set as the Driver. Having these options set insures 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 insure accurate quantity generation. This manual will focus on the DBMS Properties.

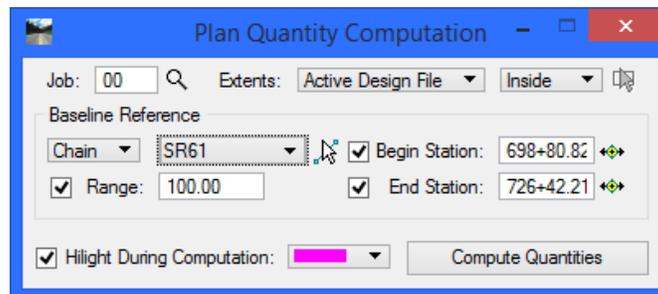


- **Driver** – FDOT recommends using Microsoft Access (.mdb), which does not require a User Name and Password.
- **Purge Quantities** – Scans the design file for elements previously quantified and purges the quantity database of any elements not found in the file. This is not automatic by default. Use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

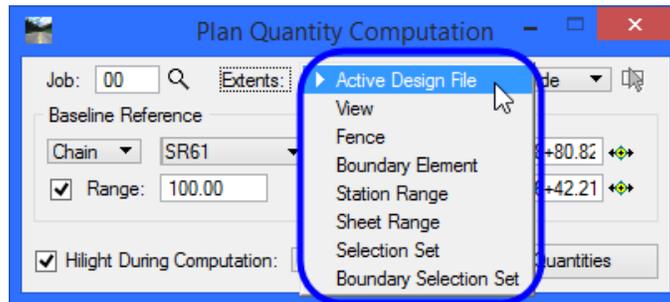
## COMPUTE MODE

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.



- **Driver** – The COGO 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.



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

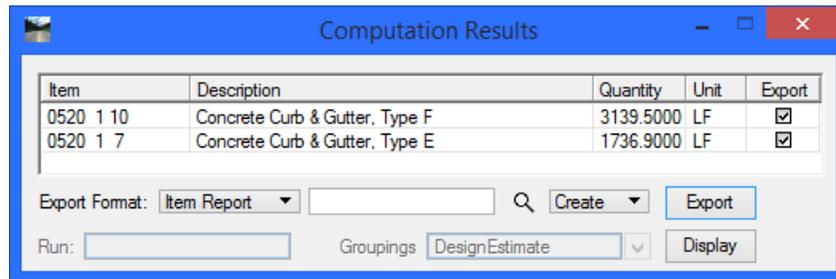
**Note** When selecting Categories, all Items in the Categories present in the DGN file will compute.

#### ➤ **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 number. 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**

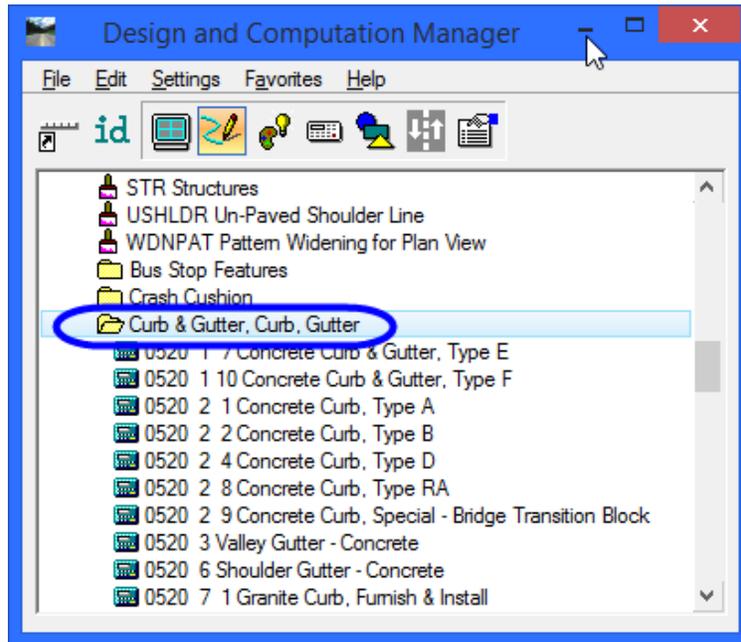
1. Clear the *check box* in the **Export** column for any individual items excluded.

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 Trnsport. Linked Data Manager (LDM) uses the Quantity Manager database to automate summary boxes.

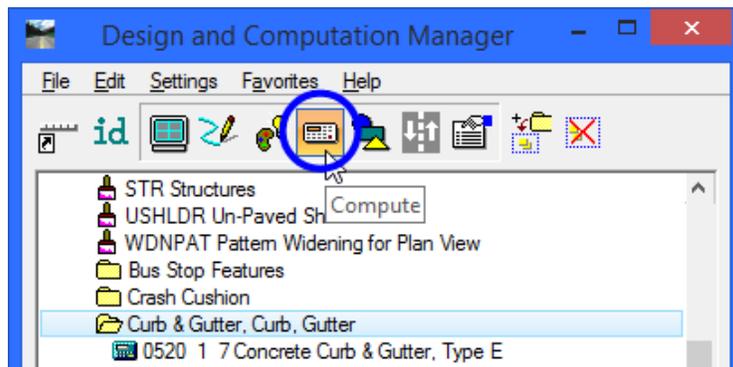
**Exercise 4.1** *Calculating Linear Foot Quantities with D&C Manager*

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

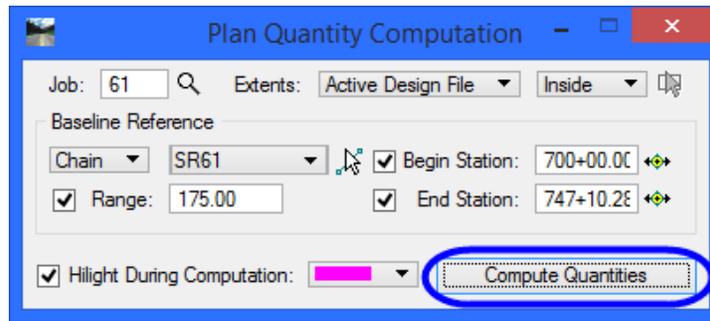
1. Open the design file *DSGNRD01.dgn*.
2. In the D&C Manager, navigate to **Roadway Design > Plan Features > Curb & Gutter, Curb, Gutter** and select the **Curb & Gutter, Curb Gutter** category.



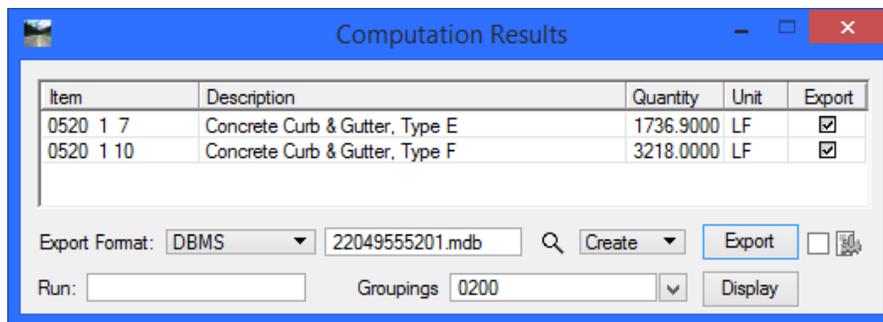
3. Select the **Compute Mode**.



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



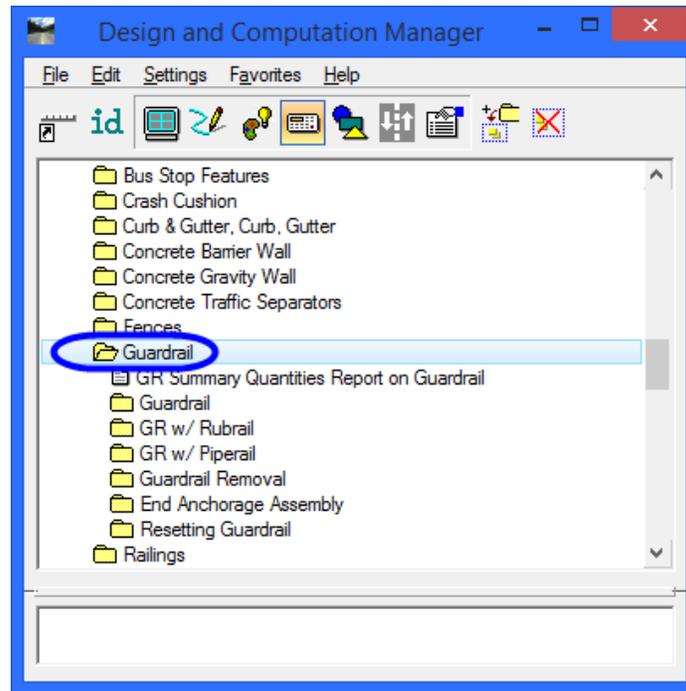
- On the Computation Results dialog, set the *Export Format* to **DBMS**, type in the *project number* for the file name, and click inside the box for the *Groupings* and type in **0200**. With the *Mode* set to **Create**, click **Export**.



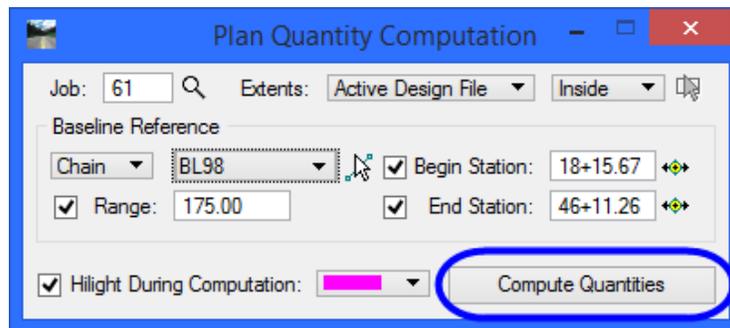
**Note** It is very important to change the Groupings value before exporting. The default value, Design Estimate, will result in errors when importing quantities through Designer Interface.

- Close the Computation Results dialog.

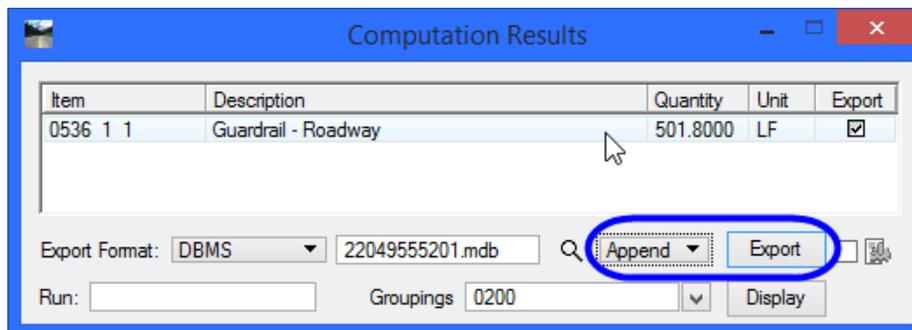
7. In the D&C Manager, navigate to and select the **Guardrail** category.



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**.

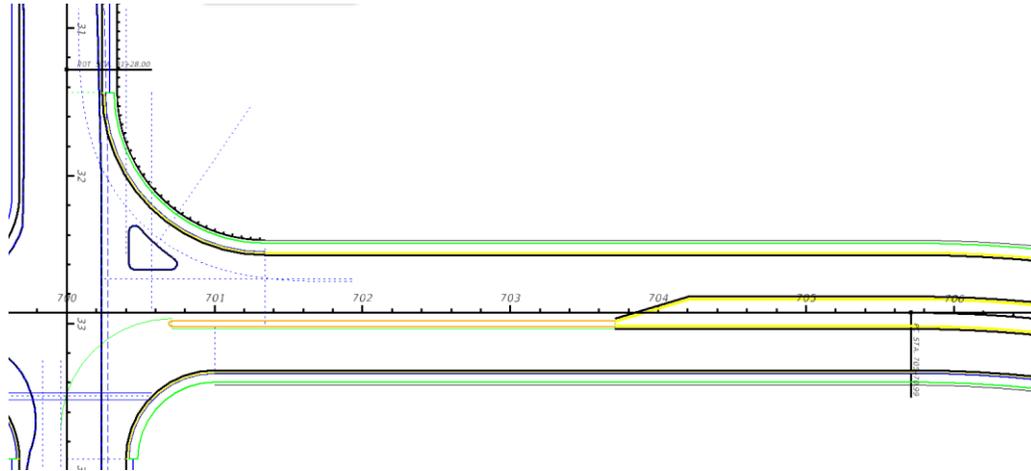


10. Change the D&C Manager back to the **Design Mode**.

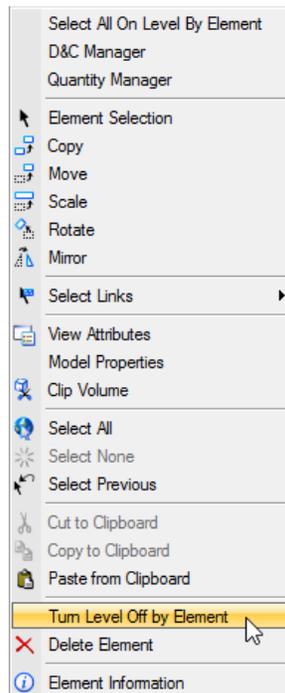
### Exercise 4.2 Calculating Area Quantities with D&C Manager

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

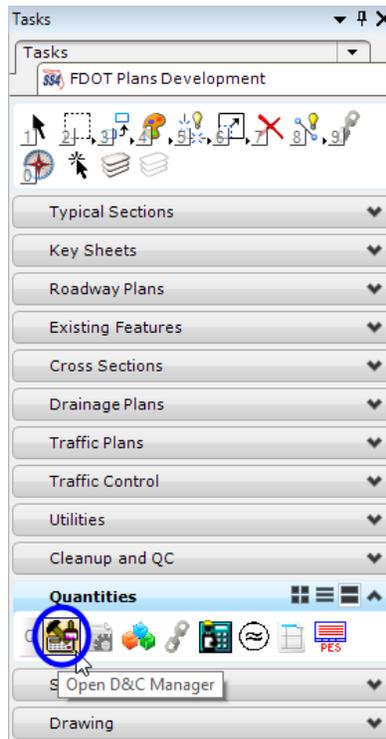
1. Open the design file *QTDSRD01.dgn* , **Model 0334 1 22** from Exercise 1.1.
2. Rotate the view and zoom to the beginning of the new construction.



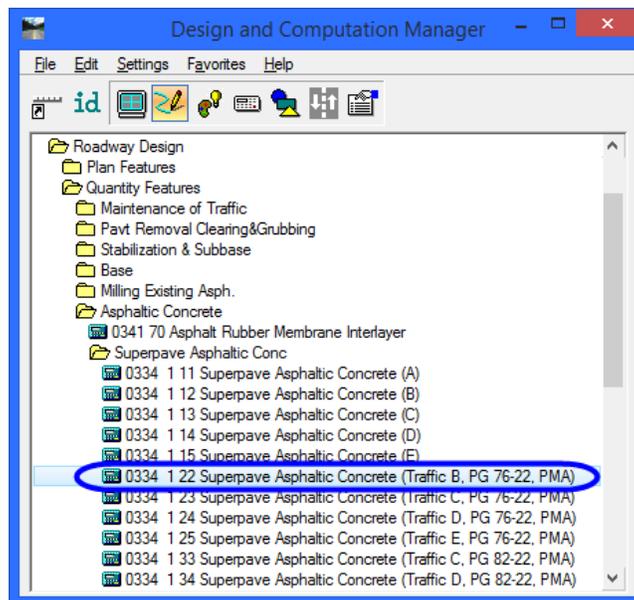
3. Right-click to display the *popup menu* and select **Turn Level Off by Element**. Click on the existing elements inside the area of new construction, *baselines*, *station text* and *tick marks* to turn **Off** the levels.



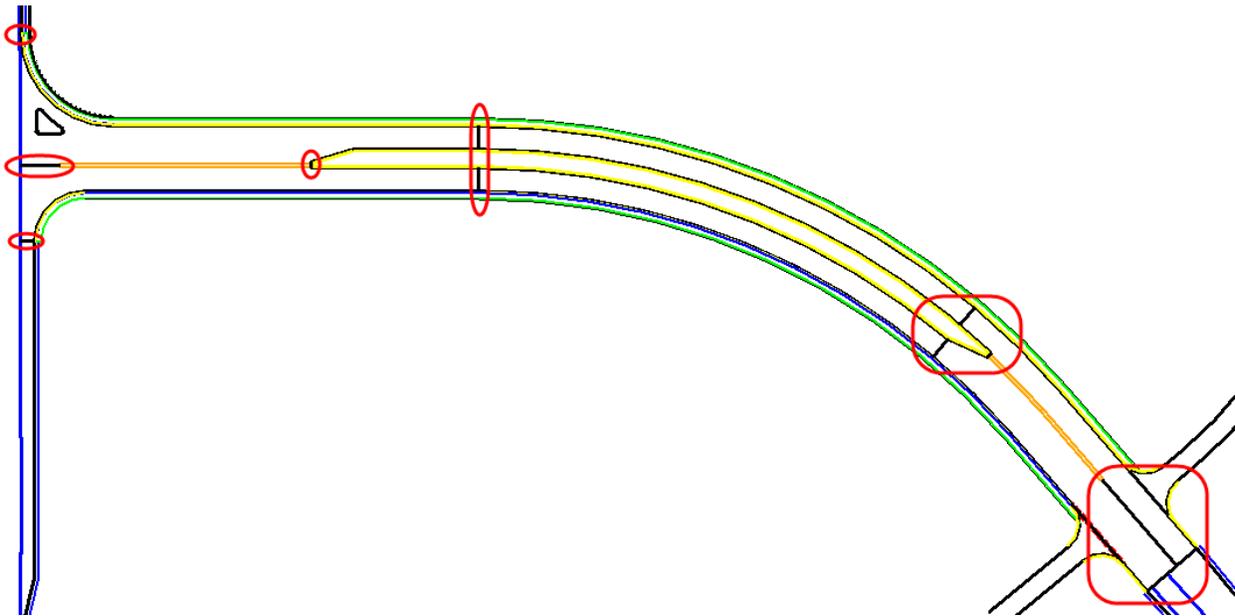
4. From the *FDOT Plans Development* > *Quantities* Tasks menu, select the **Open D&C Manager** icon.



5. Navigate to *Roadway Design* > *Quantity Features* > *Asphaltic Concrete* > *Superpave Asphaltic Conc* and select **0334 1 22**.

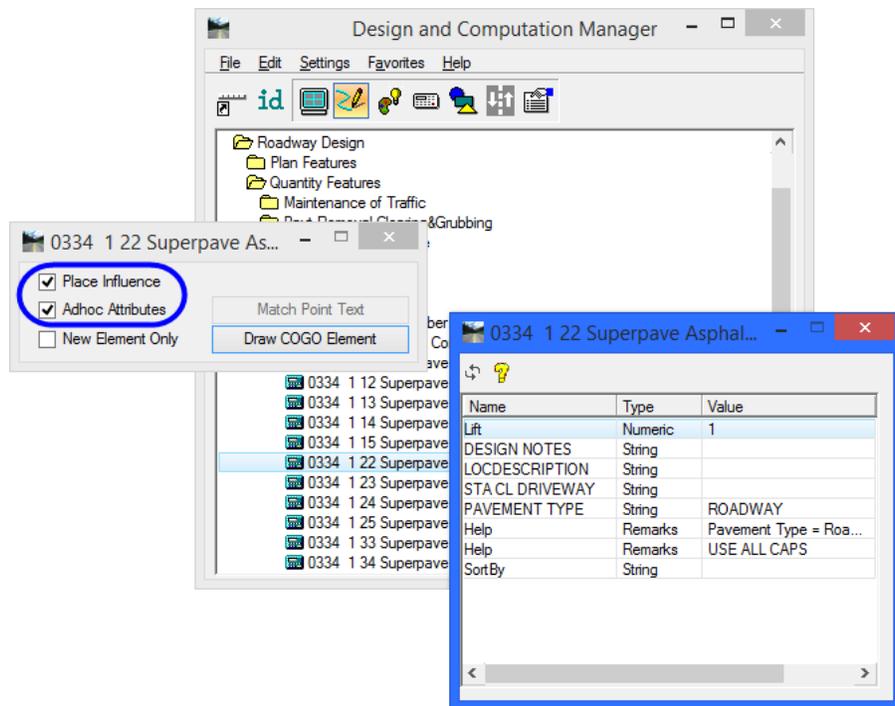


- Using the MicroStation **Place Line** command, draw in lines to segment the new construction area into smaller areas for reporting purposes.

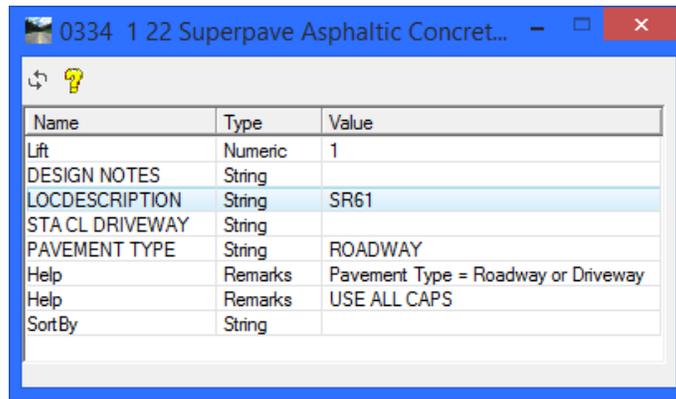


**Note** Make sure to trim the elements to intersection insuring the elements do not cross or overlap each other.

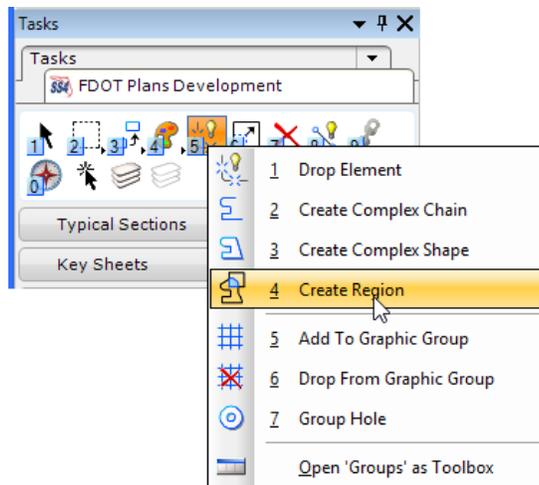
- The D&C Manager should still be up. Make sure the Adhoc Attributes dialog displays. If it does not, toggle **On** the *Place Influence* and *Adhoc Attributes* in the *Place Influence* dialog box.



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

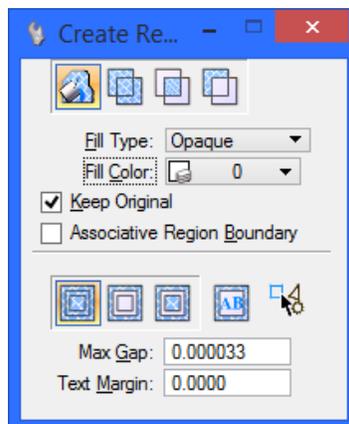


9. Open the MicroStation tool **Create Region**.



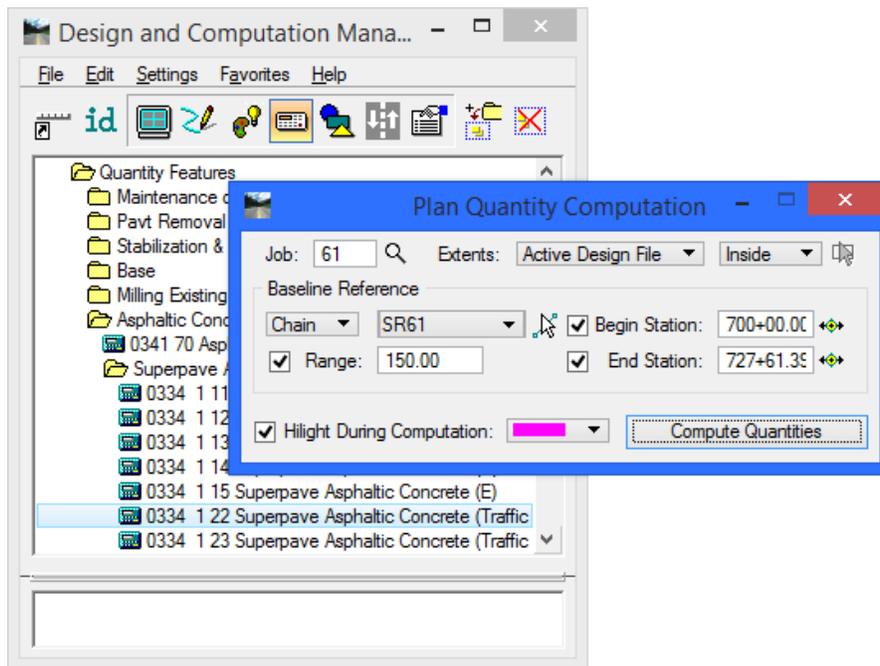
10. Define the settings in the dialog as shown.

It is **VERY** important that the Associative Region option **IS NOT** toggled ON; otherwise, the D&C Manager will not recognize the shape when calculating.

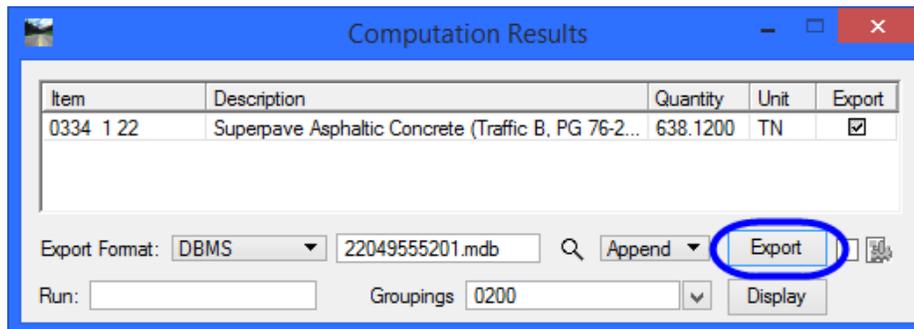


**Note** Using a Fill Type is optional.

11. **Data Point** inside of one of the *mainline areas*. Continue selecting areas to create shapes for the remaining mainline areas.
12. Change the D&C Manager *Mode* to **Compute**.



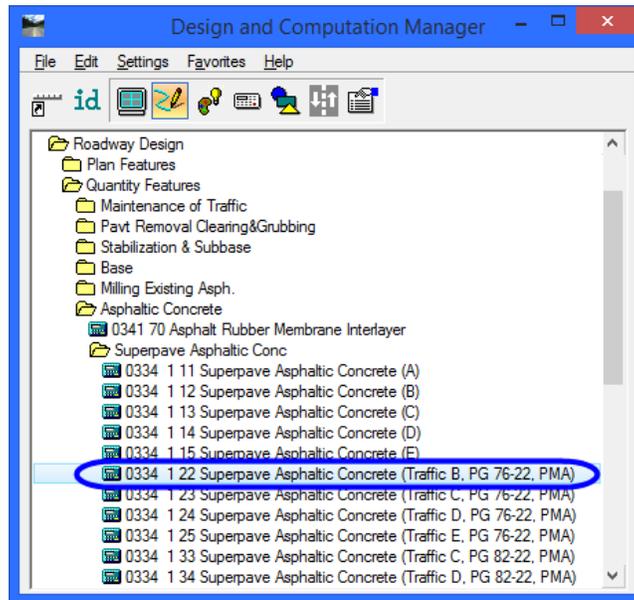
13. Set up the Plan Quantity Computation dialog as shown above and click on **Compute Quantities**. The shapes along the mainline highlight and the Computation Results dialog displays.
14. On the Computation Results dialog make sure to set the *Groupings* to **0200** as shown below and then click **Export**. Close the dialog when export is complete.



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

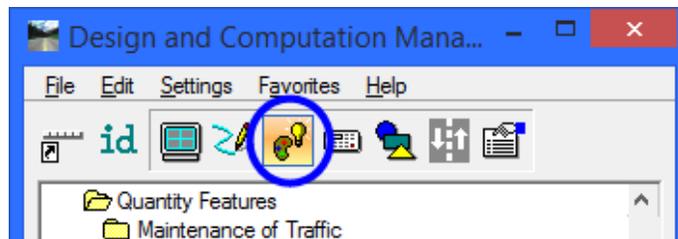
This exercise modifies the Lift Adhoc value on the Asphalt Shapes. LDM automation uses these Adhocs to sort the quantities in the Quantity Manager database into the correct summary box.

1. Open the MicroStation design file, *QTDSRD01.dgn*, **Model 0334 1 22**.
2. Turn **Off** the display for all of the *Reference files*.
3. In the D&C Manager, navigate to *Roadway Design > Quantity Features > Asphaltic Concrete > Superpave Asphaltic Conc* and select **0334 1 22**.

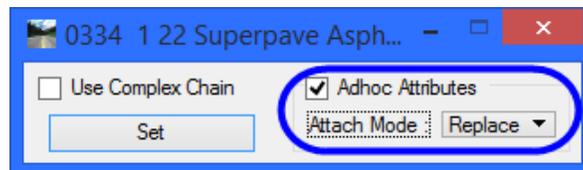


**HINT** You can select the id button and then click on one of the shapes to go directly to the correct item.

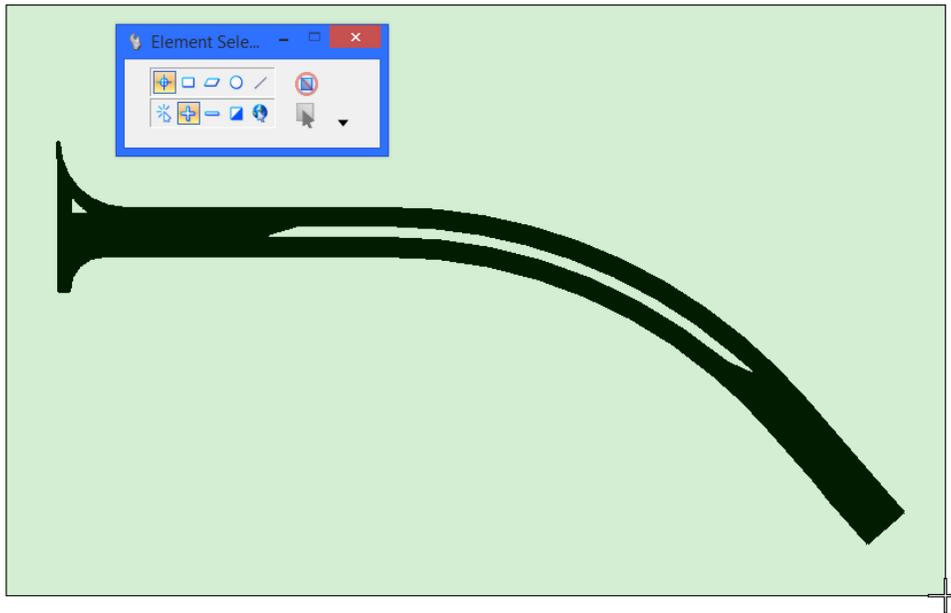
4. Select the **Set** icon.



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

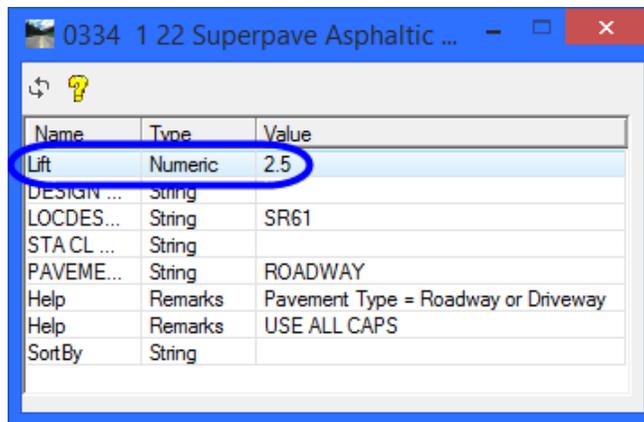


6. Select all of the **Shapes** in the file with the *Element Selection* tool by clicking out to the upper left of the shapes and dragging the mouse to encompass all of the shapes.

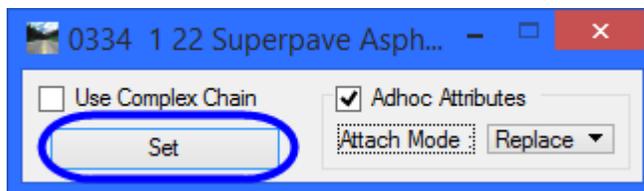


**Note** Take care when setting Adhoc values to Selection Sets. Make sure NOT to overwrite other Adhoc values that may be different on individual elements.

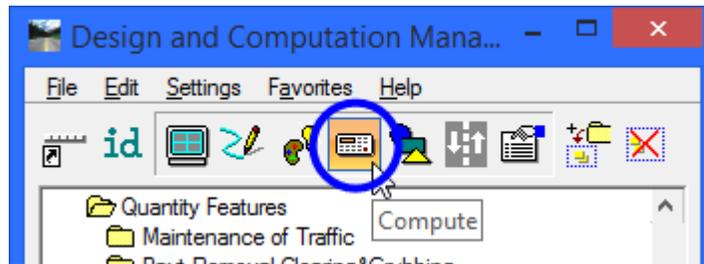
7. In the Adhoc Attributes dialog, set the *Lift Adhoc Value* to **2.5**.



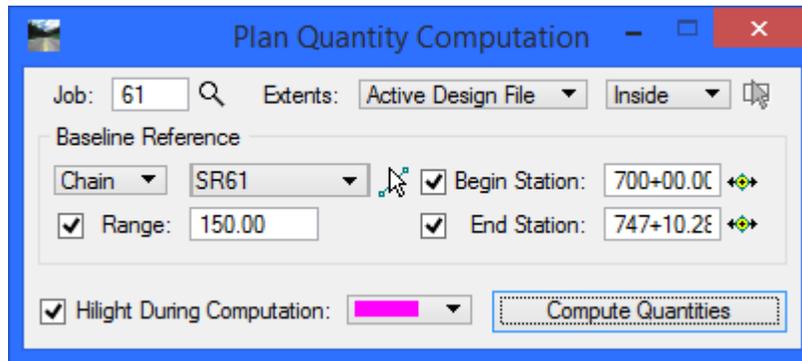
8. In the Set dialog, click the **Set** button.



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

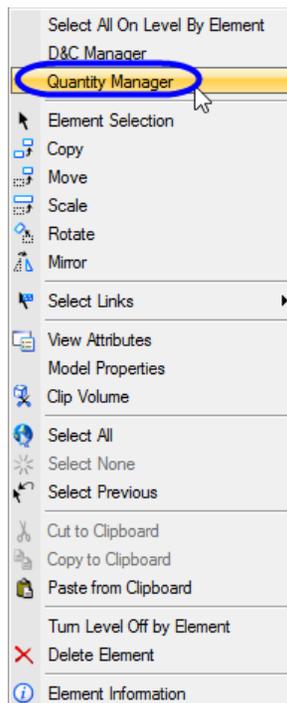


10. Modify the *Settings* as shown and click **Compute Quantities**.

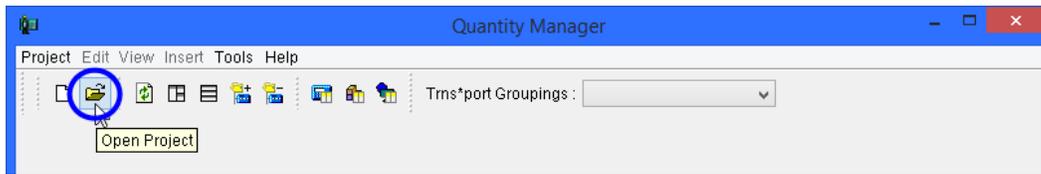


**Note** In the previous exercise, the user exported a quantity for the same pay item to the database. Re-exporting the quantity will NOT overwrite what is already in the database. Delete the quantity from Quantity Manager before exporting the new quantity. The next steps will define the basics for doing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

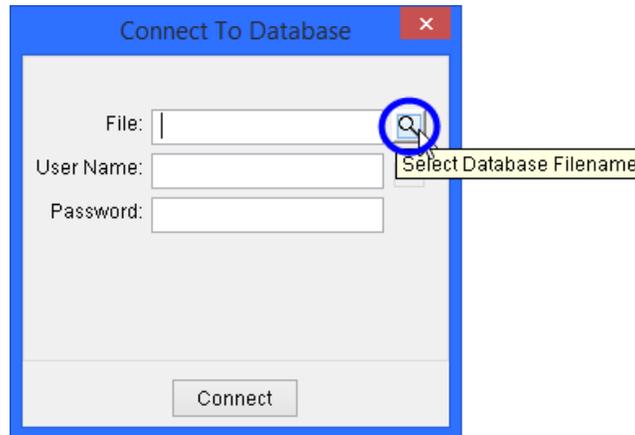
11. In the MicroStation View, right-click and select **Quantity Manager**.



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

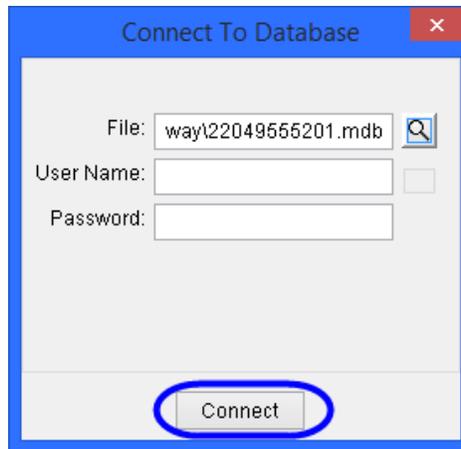


13. On the Connect To Database dialog, click **ON** the icon to *Select Database Filename*.

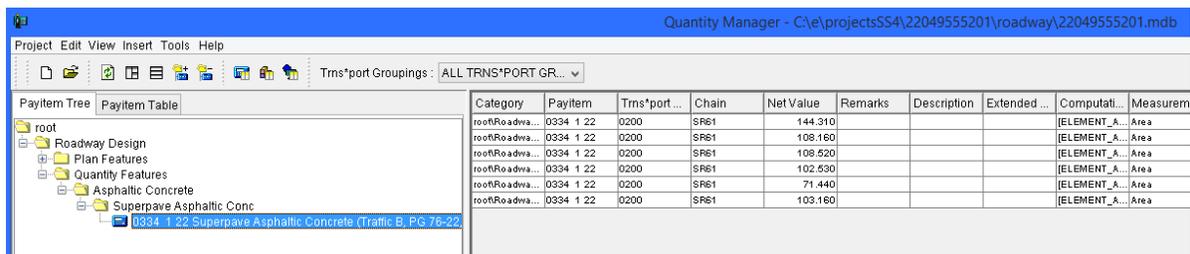


14. Navigate to C:\e\projects\22049555201\roadway\ and select the 22049555201.mdb file. Click **Open**.

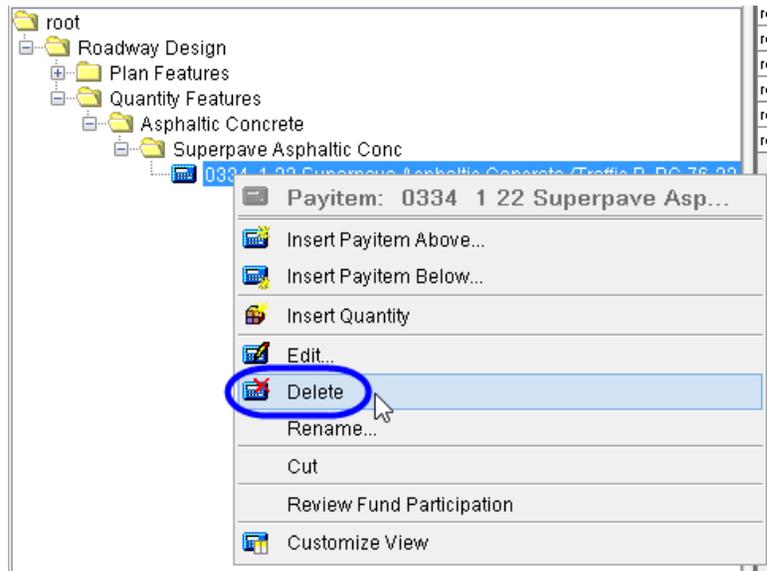
15. On the Connect To Database dialog, click **Connect**.



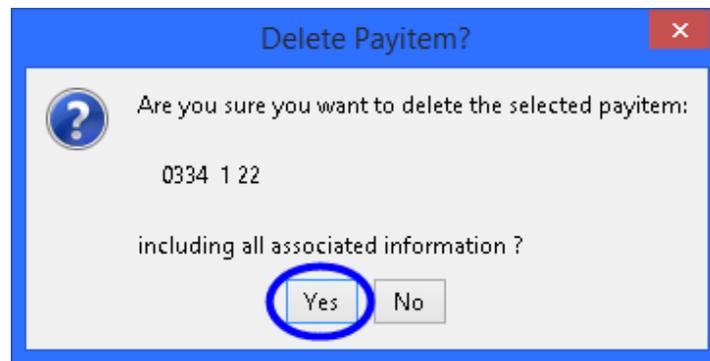
16. Navigate to the *asphalt quantity* under **Roadway Design > Quantity Features > Asphaltic Concrete > Superpave Asphaltic Conc.**



17. Right-click on the *Pay Item 0334 1 22* and select **Delete**.

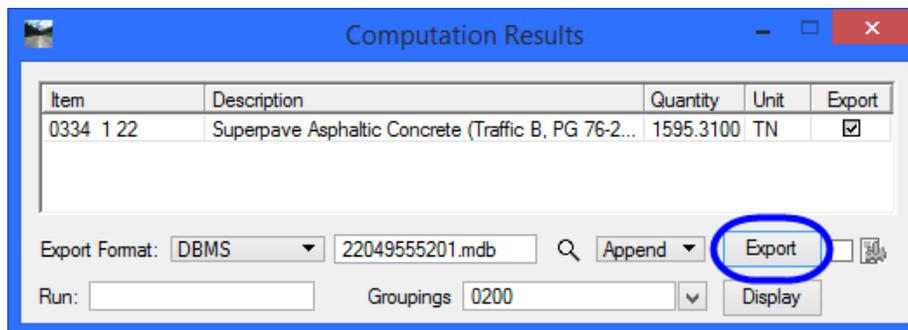


18. On the Delete Payitem? alert dialog, click **Yes** to delete the selected *Pay Item*.



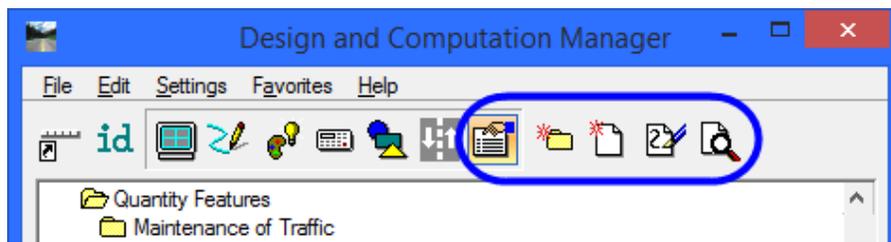
19. Close Quantity Manager.

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



## PREFERENCES MODE

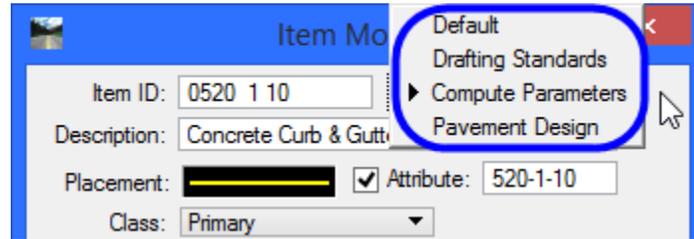
Use the Preferences Mode of the D&C Manager to create, review, and modify items.



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. 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.

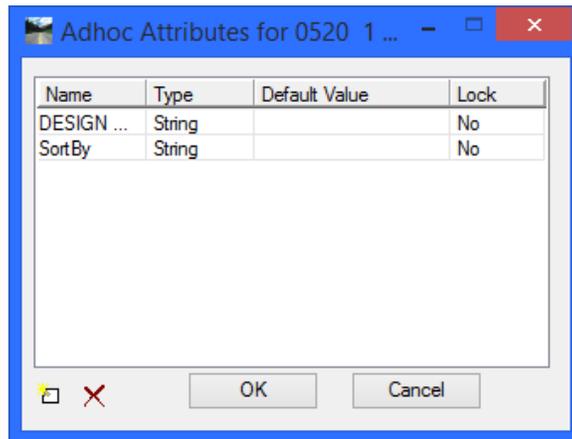
- **Classification** - The Extents determines which elements are included in the set. If selecting the Range check box, the element must exist within the extents and range (distance left and right of the baseline) for the element computed.



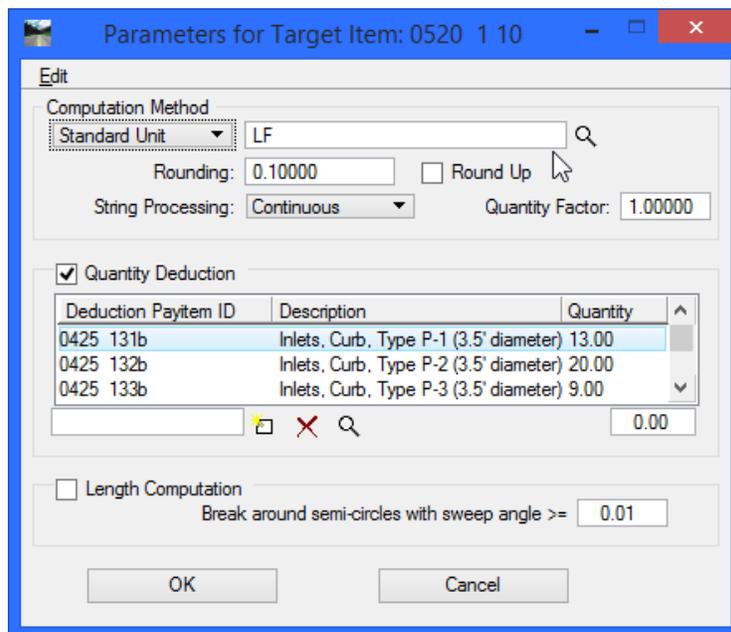
<i>Default</i>	Identifies element symbology for drawing elements and search parameters.
<i>Drafting Standards</i>	Defines element symbology for the placement of coordinate geometry elements, i.e. points, lines, curves, parcels, chains, and profiles.
<i>Compute Parameters</i>	Identifies parameters associated with calculating quantities, i.e. unit of measure, rounding factors, pay item, formulas.
<i>Pavement Design</i>	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 toggle ON, assigns adhoc attributes to elements with Place Influence or using the Set command.



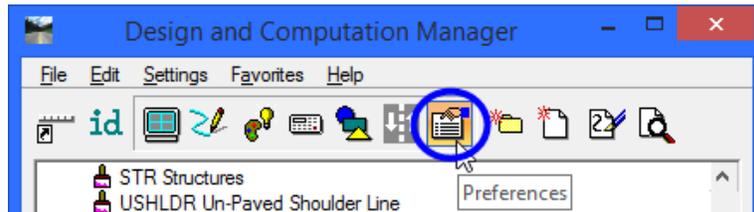
- **Compute Parameter** - When setting Classification to Compute Parameters, toggled ON. Defines how to calculate the item, and sets the Units and rounding.



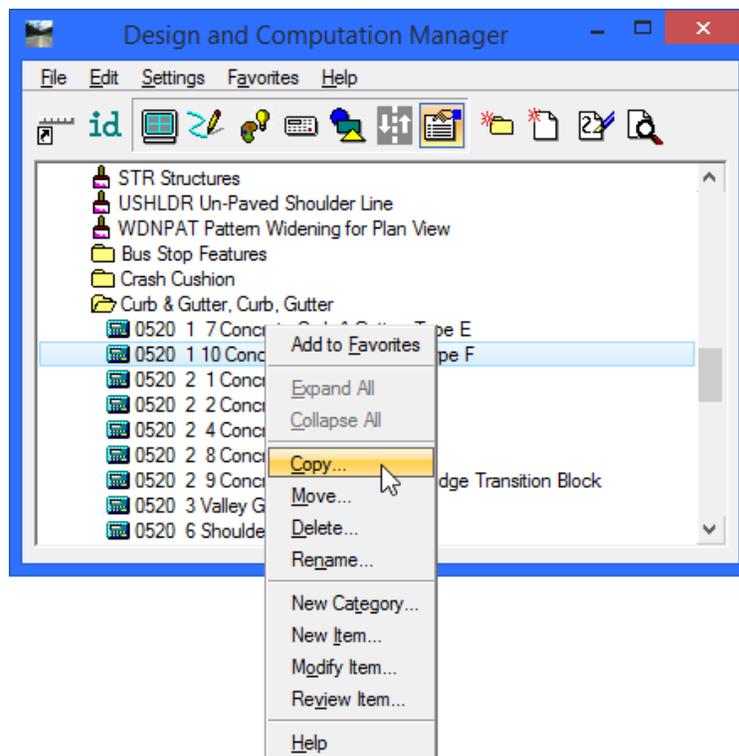
**Exercise 4.4 Add an Item to the D&C Manager**

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, navigate to the item **520-1-10 Curb & Gutter, Type F**.
2. Select the **Preferences Mode**.

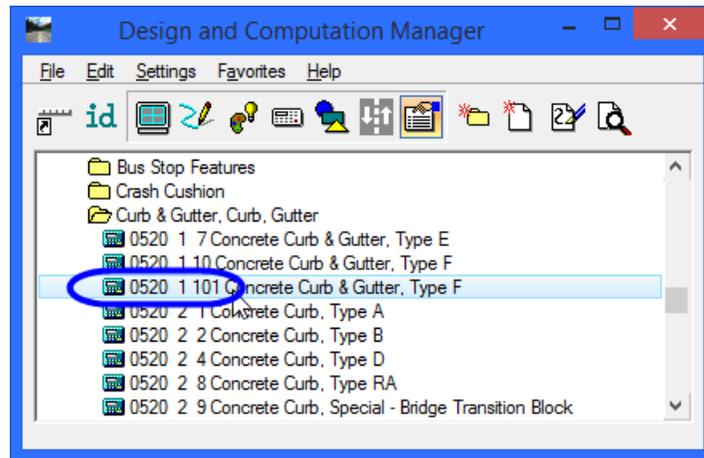


3. Right-click and select **Copy**.

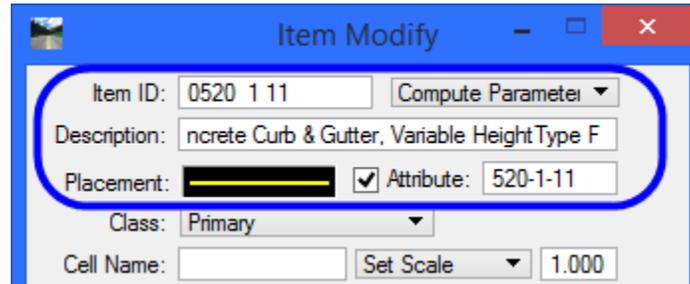


4. On the Copy to... dialog box scroll down to the **0520 1 10 item** and select **OK**. When copying or moving items or categories, the item places below the item or category selected.

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



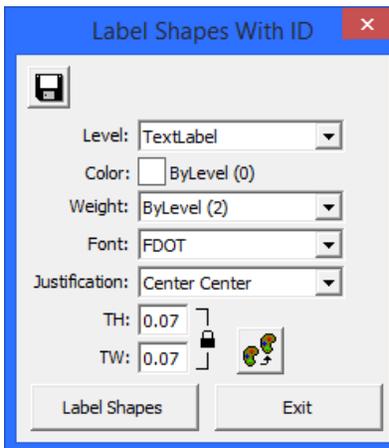
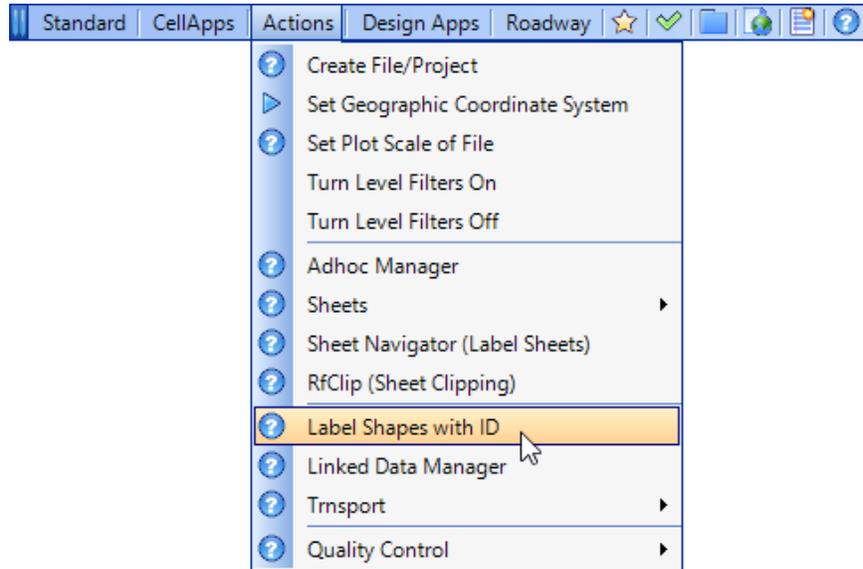
6. On the Item Modify dialog, edit the *Item ID*, *Description* and *Attribute* values as shown below.



7. Click OK. The item is now ready to use to draw/set elements and calculate the quantity.

## 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* Task menu.

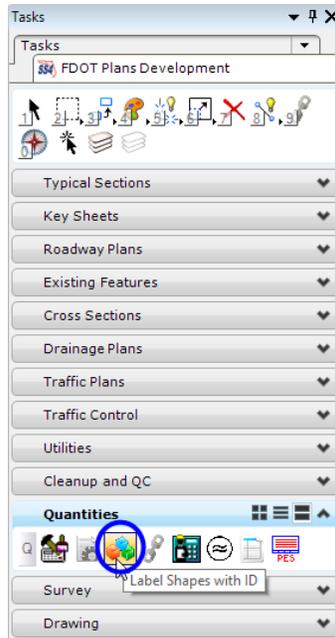


This tool can label all the shapes in a model at one time by creating a selection set of all the elements in the file and then clicking Label Shapes. FDOT recommends creating the labels at a larger scale than for normal drawings. These labels are not printed. The intent of these labels is to help downstream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

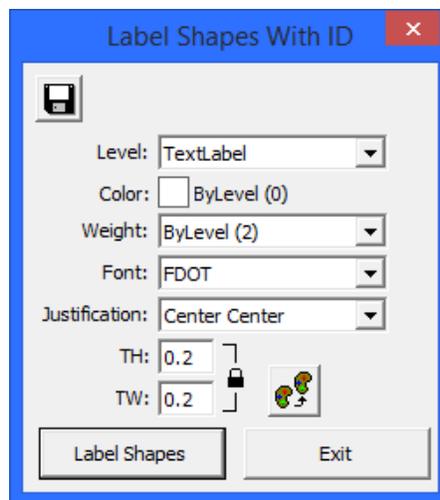
### Exercise 4.5 Label Areas

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* Task menu select **Label Shapes with ID**.



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



3. Using the *Element Selection* tool, select **ALL** of 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 of 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, 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.

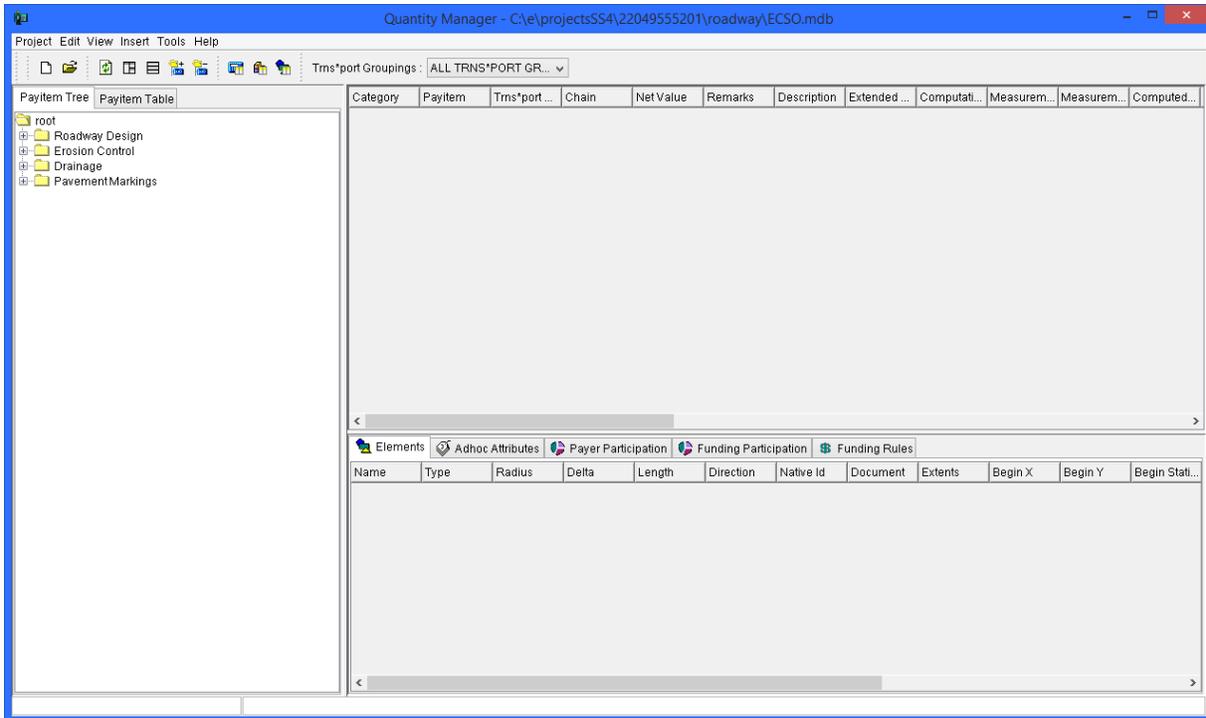
<OR>

From the MicroStation, Right-click menu, select **Quantity Manager**.

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

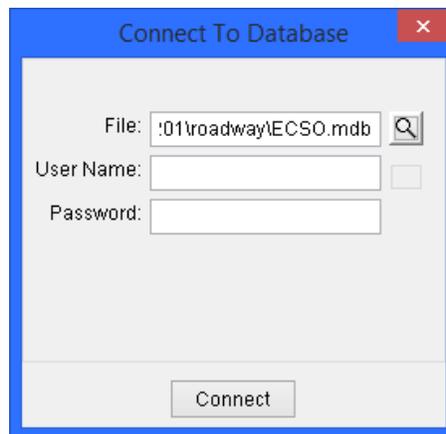
## QUANTITY MANAGER DIALOG

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

**Note** For the purpose of example, this course will use the pre-existing *ECSO.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 exactly to the Pay Item aecXML file.

The screenshot shows the 'Project Properties' dialog box with the following fields and values:

- Project Number:** 000000000000
- Description:** CADD office testing
- Unit System:** ENGLISH
- Spec Year:** 13
- Project Chain:** (empty dropdown)
- Station Range:** Begin (empty dropdown), End (empty dropdown)
- Mile Post / Reference Point:** Begin (empty text box), End (empty text box)
- Midpoint Coordinates:** Latitude (empty text box), Longitude (empty text box)

➤ **To Define Project Properties using Designer Interface, if TRNS\*PORT Login Exists.**

If user has a TRNS\*PORT login, this is the preferred method for populating the Project Properties.

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.

**Centennial FDOT** 1915 \* 2015

**Designer Interface** Web Trns\*port Preconstruction

Logged in as: rd964db Logout Webgate Reporting Home Help

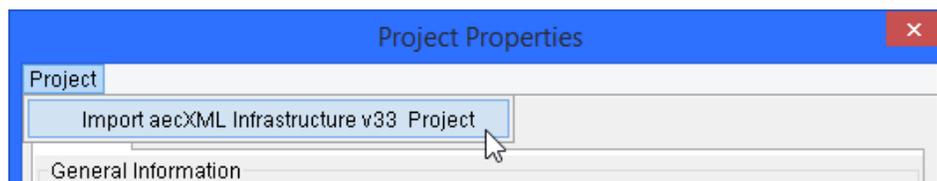
**Project List**

Project S...	Project Number	aecXML Proc...	Description	Letting Date	Unit Sys...	Proposal	District	Designer
Update	0000000000000	<b>Export Header Import</b>	CADD office testing		English	T8888	00	
Update	19363715201	Export Header Import	DESIGN CES TRAINING - TRAINING	01/29/2030	English		00	W705
Update	19442525201	Export Header Import	SR 17 (SE LAKEVIEW) FROM US 27/98 TO KENILWORTH BLVD - RESURFACING	02/24/2016	English	T1657		W213
Update	19801765201	Export Header Import	US 41 -VENICE BYPASS FROM CENTERROAD TO GULF COAST BLVD - ADD LANES & RECONSTRUCT	10/17/2018	English		01	X879
Update	19801765601	Export Header Import	US 41 -VENICE BYPASS FROM CENTERROAD TO GULF COAST BLVD - ADD LANES & RECONSTRUCT	10/17/2018	English		01	X879
Update	20074615201	Export Header Import	I-75 (SR 93/ALLIGATOR ALLEY) AT NORTHSIDE REST AREA - REST AREA	05/25/2016	English	T1644	01	W945

Page 1 of 40 25 Items per page 1 - 25 of 997 Items

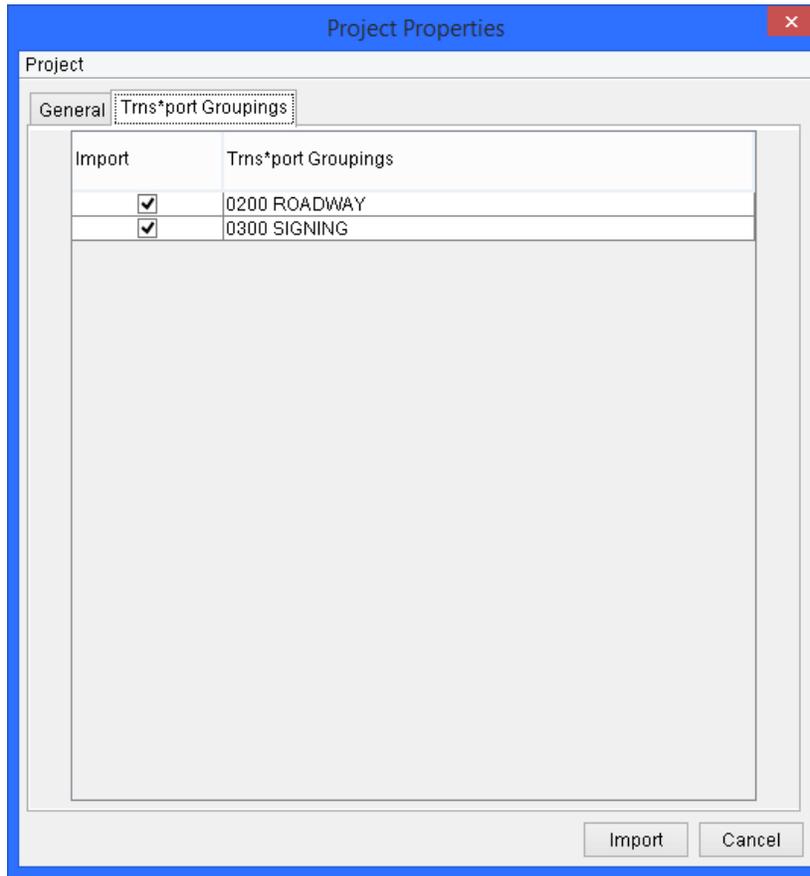
Contact the Service Desk Web Policies & Notices

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



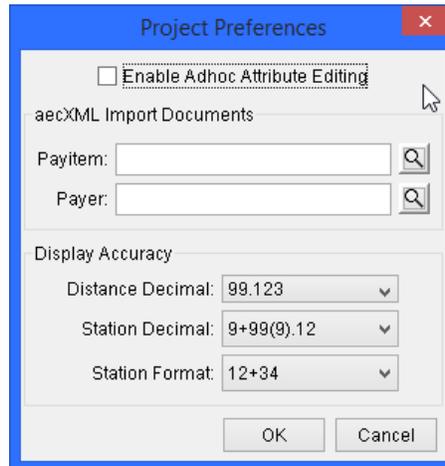
**Note** Notice the creation of the Groupings. See the *Basis of Estimates Manual* for the Grouping definitions.

## PREFERENCES

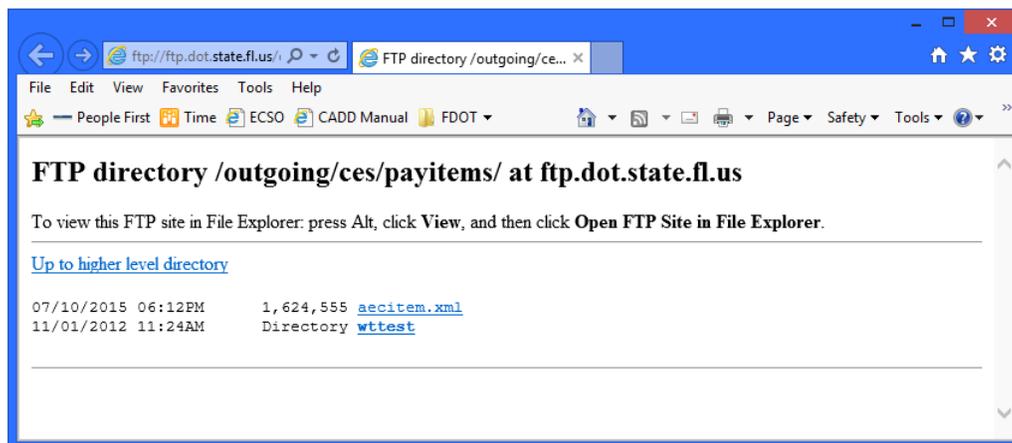
The preferences are set to enable Adhoc Attribute editing, define the aecXML Import Documents file locations, and set the Display Accuracy of Distance Decimal, Station Decimal, and Station Format.

### ➤ 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 TRNS\*PORT master pay item list from FDOT's FTP site into the Project *Symb* directory. There is a link on the FDOT Menu under **Actions > Transport > AECITEM.xml Download**.

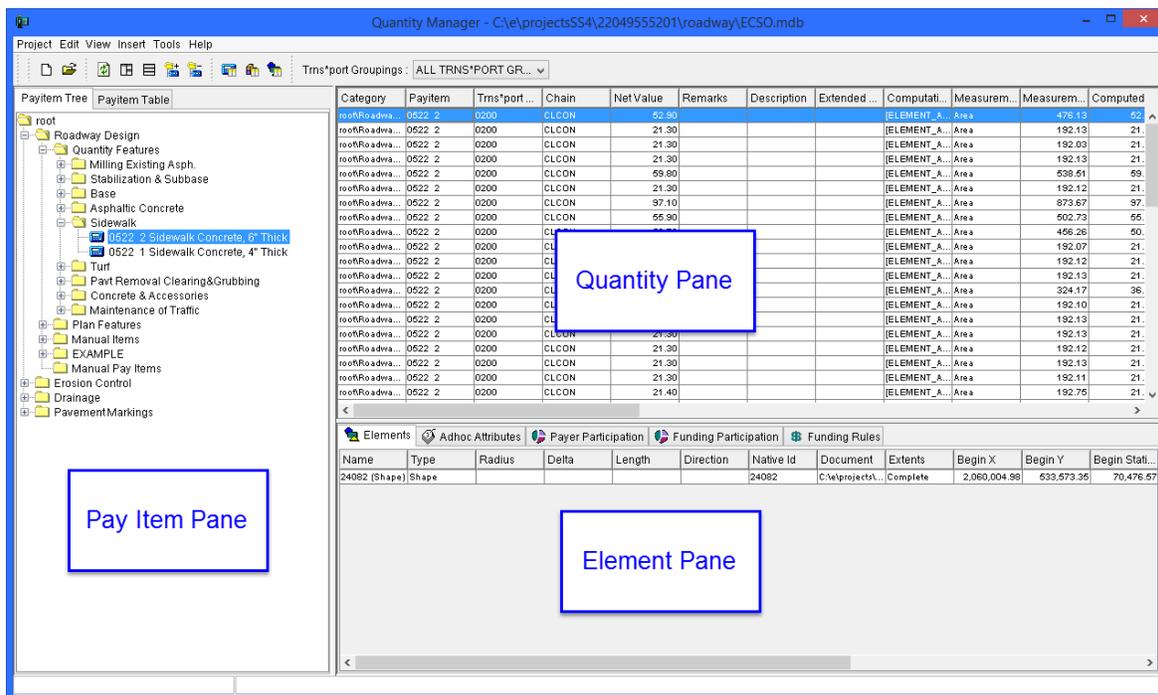


**Note** The aecitem.xml file is exported from TRNS\*PORT. For designers without access to TRNS\*PORT, FDOT maintains current aecXML files for download on their FTP site at:  
<ftp://ftp.dot.state.fl.us/outgoing/ces/payitems/>  
 FDOT updates the FTP site each weekend and recommends downloading periodically to ensure the latest pay item list.

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

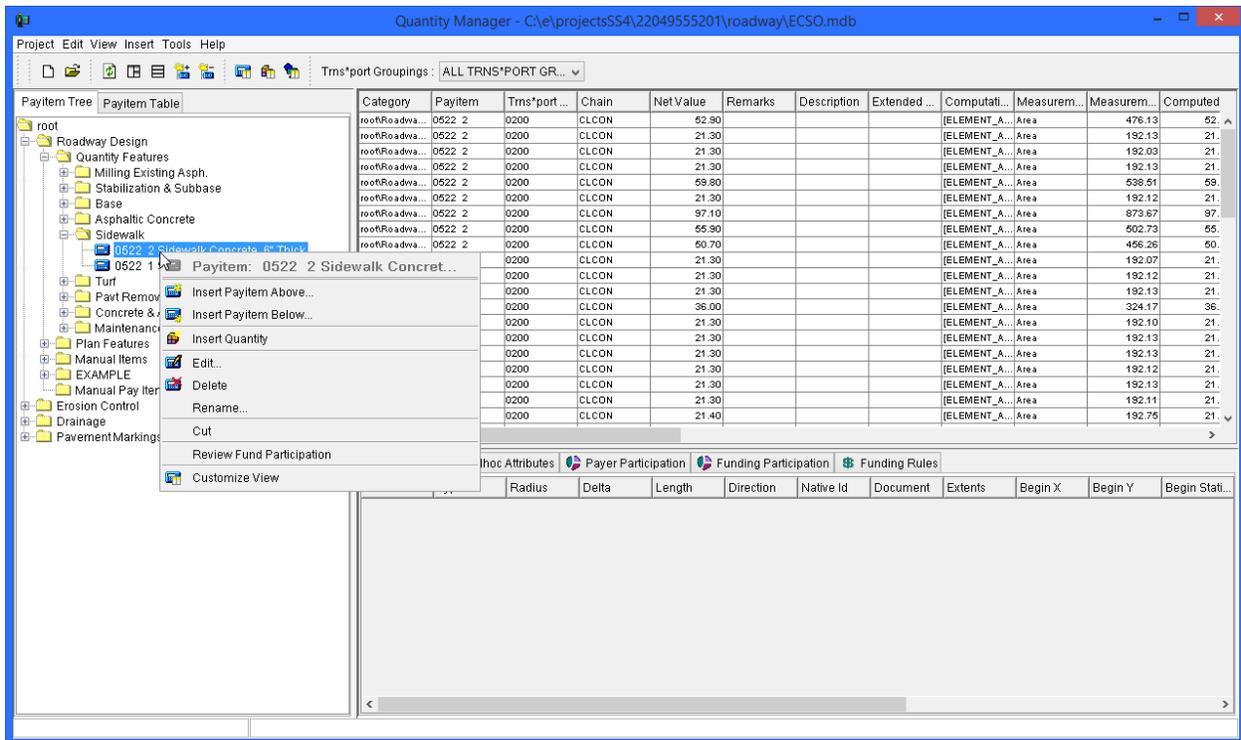
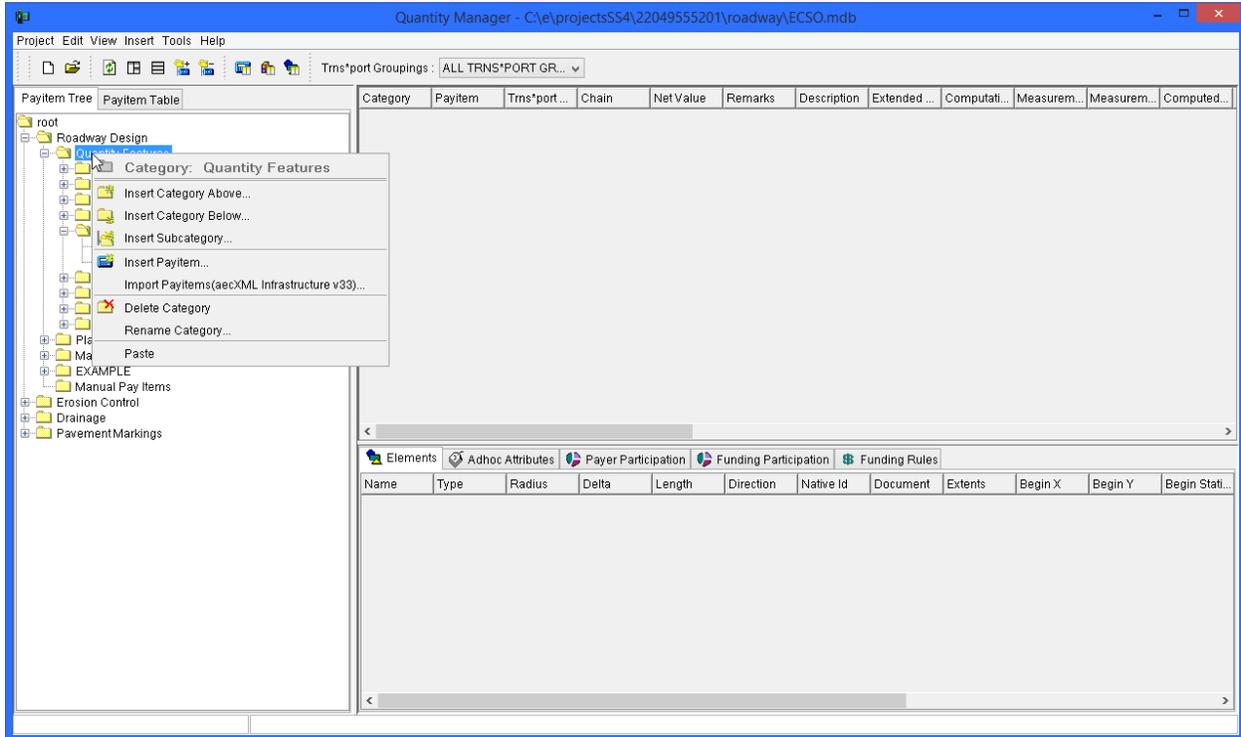
The Quantity Pane displays only quantity information under the current Phase selected on the tool bar about the specifically selected Pay Item or Category. The information is customizable by selecting which columns to display and sorts by clicking on any of the column headers.

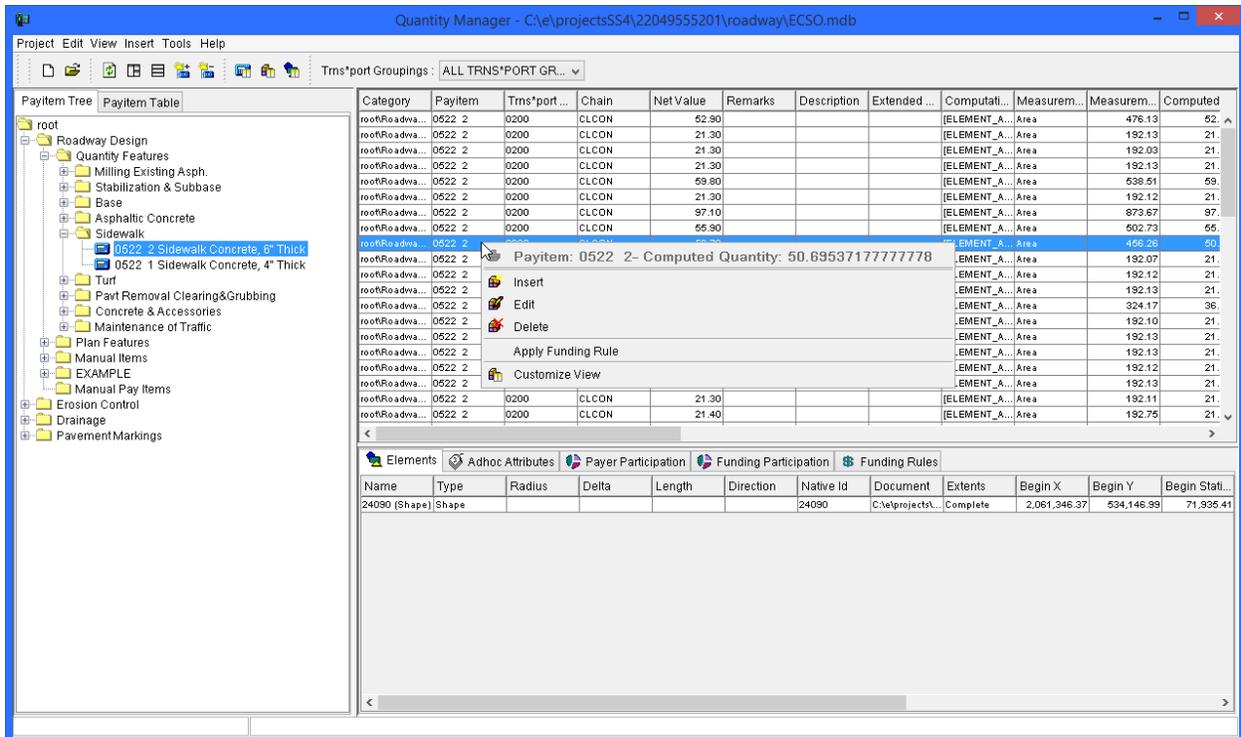
### ELEMENT PANE

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 that 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

Right-click in any *View Pane* to display a popup menu with a list of shortcuts to tools related to the View Pane.





## INSERT OPTIONS

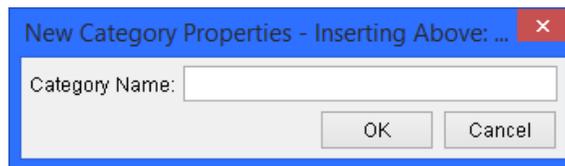
Quantity Manager has an option for manually adding Quantities. The Insert menu has the options to add Categories, Pay Items, and Quantities <OR> access by Right-clicking in the Pay Item Pane of the dialog. The options will vary when accessing through the right-click menus.

### INSERT CATEGORY

A Category is comparable to a folder in a directory structures. 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**.



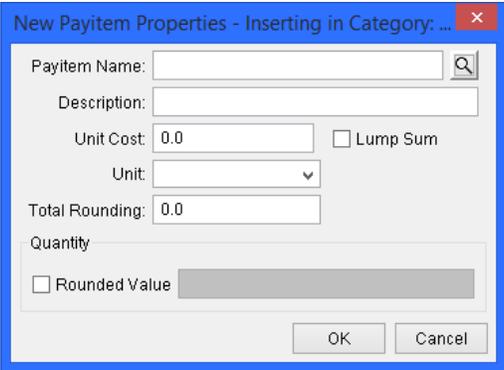
3. On the New Category Properties dialog, enter the new *Category Name*.
4. Click **OK**.

## 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**.



The screenshot shows a dialog box titled "New Payitem Properties - Inserting in Category: ...". It contains the following fields and controls:

- Payitem Name:** A text input field with a search icon on the right.
- Description:** A text input field.
- Unit Cost:** A text input field containing "0.0".
- Lump Sum:** A checkbox that is currently unchecked.
- Unit:** A dropdown menu.
- Total Rounding:** A text input field containing "0.0".
- Quantity:** A section containing a checkbox labeled "Rounded Value" and a corresponding text input field.
- Buttons:** "OK" and "Cancel" buttons at the bottom right.

3. Complete the New Pay Item Properties dialog.

**HINT** The *aecitems.xml* file imports into Quantity Manager and is accessible by clicking on the **Browse** button next to the *Pay Item Name* to select the **Pay Item Number** 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 inputting information.
  - **General Tab** – Input quantity information.

- **Location Tab** – Input Baseline and Station/Offset Information

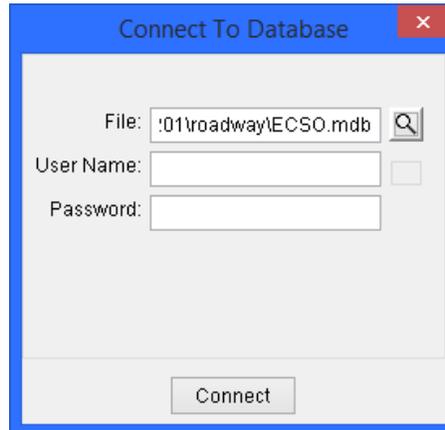
**Note** If either the station or offset information is not given, LDM will not pick up the quantity during automation.

- **Adhoc Attributes Tab** - Add Adhocs - they must match the 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.

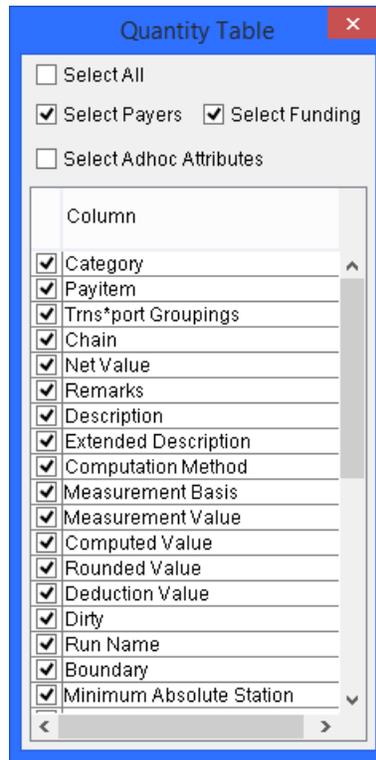
1. From the MicroStation Menu, select **Applications > GEOPAK Road > Quantity Manager**.
2. From the Quantity Manager Menu, select **Project > Open**. Connect to Database displays.



3. In the *File* box, enter the path to *ECSO.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 0285701*.

Computat.	Category	PayItem	Trns*port...	Chain	Net Value	Measurem...	Measurem...	Computed...	Rounded...	Deduction
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	THORNTON	53.80	Area	484.55	53.84	53.80	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	36.40	Area	327.35	36.37	36.40	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	44.10	Area	395.61	44.07	44.10	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	13.60	Area	122.06	13.56	13.60	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	32.40	Area	291.92	32.44	32.40	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	28.60	Area	257.40	28.60	28.60	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	29.80	Area	268.11	29.79	29.80	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	117.80	Area	1,060.50	117.83	117.80	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	71.40	Area	642.32	71.37	71.40	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	59.20	Area	533.14	59.24	59.20	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	130.70	Area	1,176.01	130.67	130.70	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	41.20	Area	370.62	41.18	41.20	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	47.40	Area	426.65	47.41	47.40	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	116.60	Area	1,048.95	116.55	116.60	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	42.70	Area	384.49	42.72	42.70	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	41.70	Area	375.12	41.68	41.70	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	41.00	Area	368.95	40.99	41.00	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	45.90	Area	413.12	45.90	45.90	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	26.80	Area	241.50	26.83	26.80	0.0
[ELEMENT_A_...]	rootRoadwa...	0285701	0200	CLCON	50.60	Area	455.68	50.63	50.60	0.0

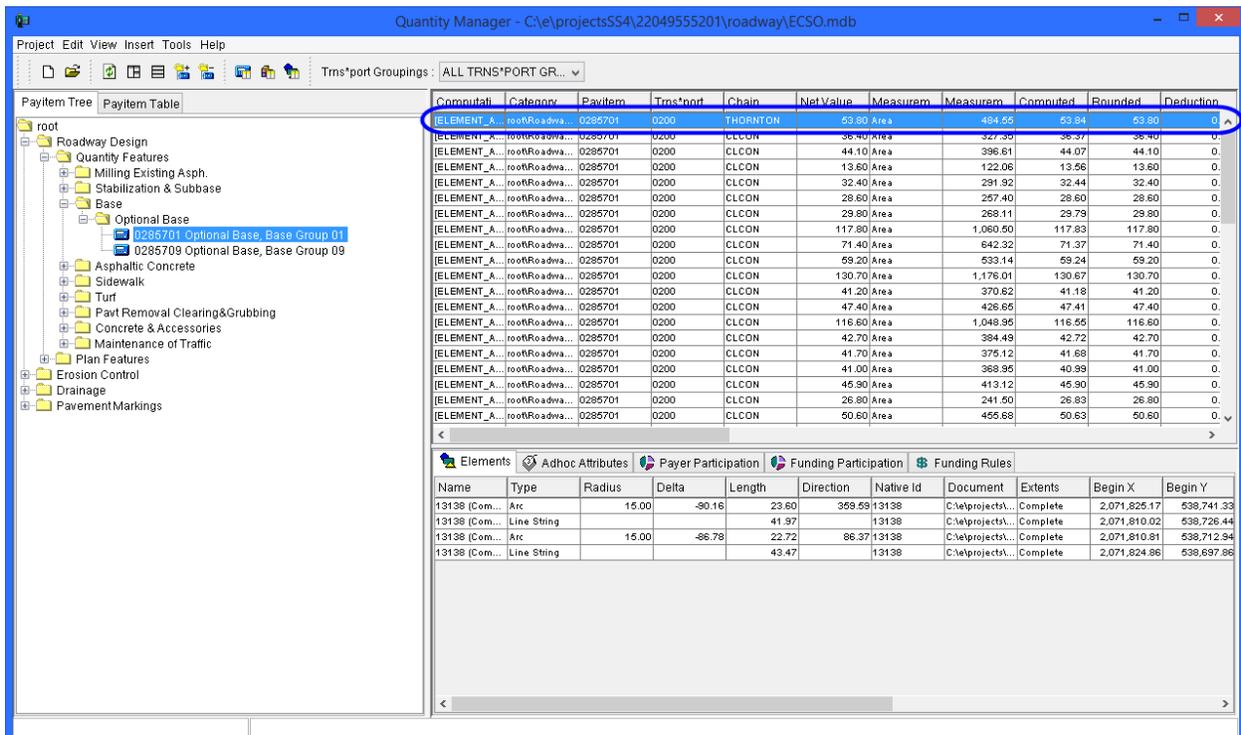
8. In the *Quantity Pane*, right-click on a *column header*. Quantity Table displays.



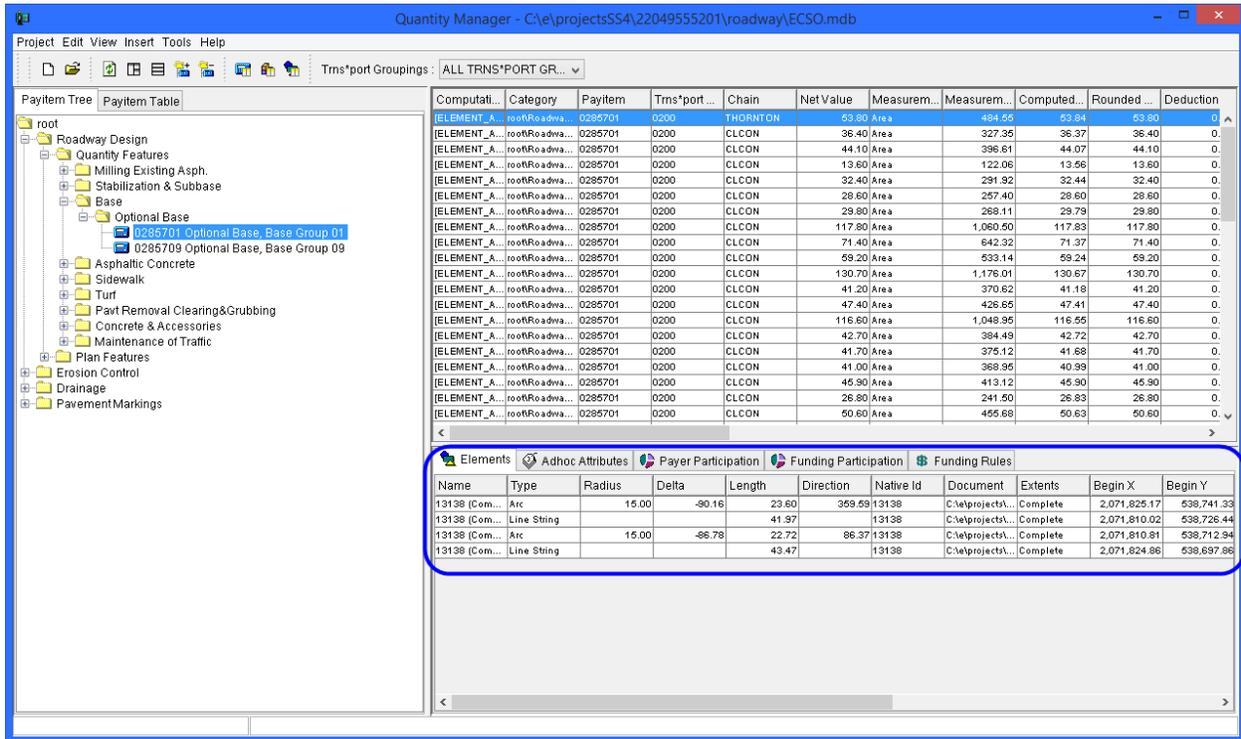
9. Clear the **Remarks**, **Description**, and **Extended Description** check boxes.

10. Close Quantity Table.

11. From Quantity Manager, select the **first item** in the *Quantity Pane*.



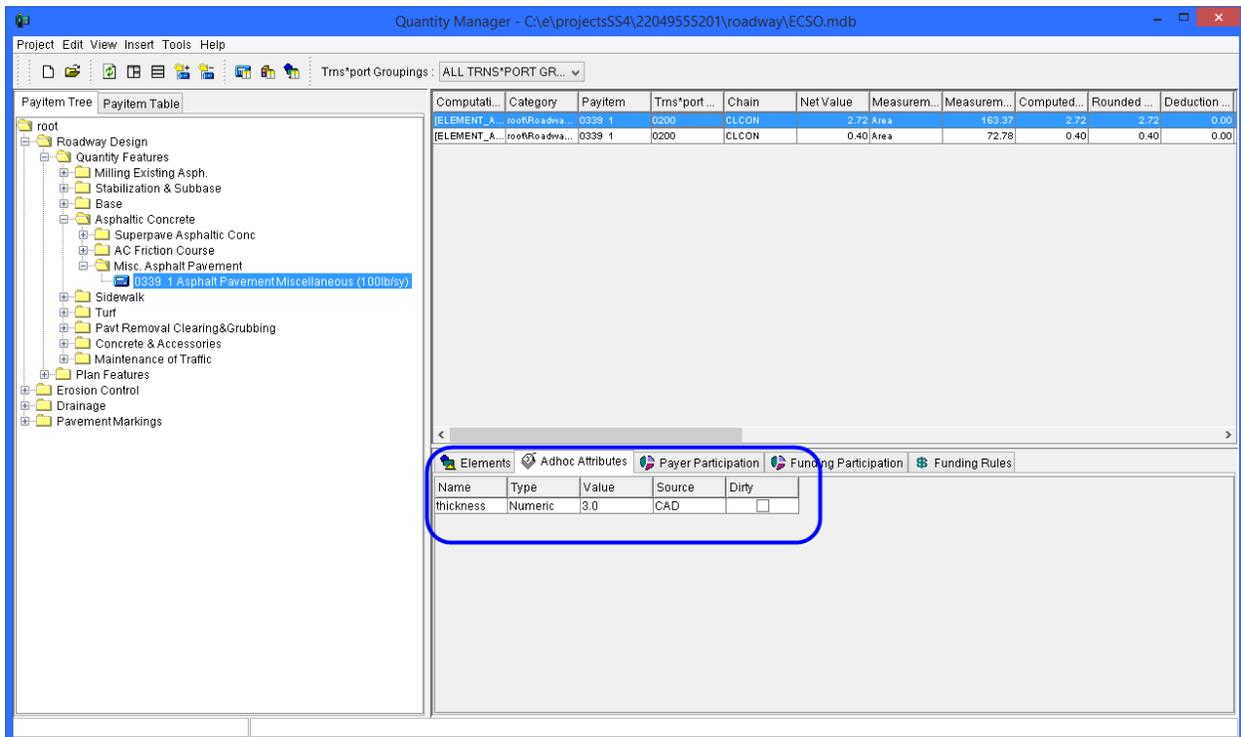
12. In the *Elements Pane*, select the **Elements** tab and review the components of the selected quantity.



13. In the *Payitem Pane*, select the *Payitem Tree* tab and navigate the database to **Item 0339 1 (Asphalt Pavement Miscellaneous (100 lb/sy))**.

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

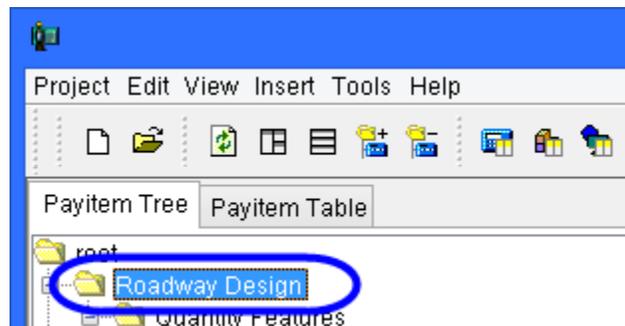
15. In the *Element Pane*, select the **Adhoc Attributes** tab. The Adhoc tags display for this element.



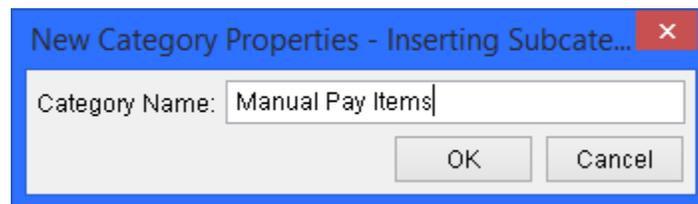
### Exercise 5.2 Creating a Category

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.

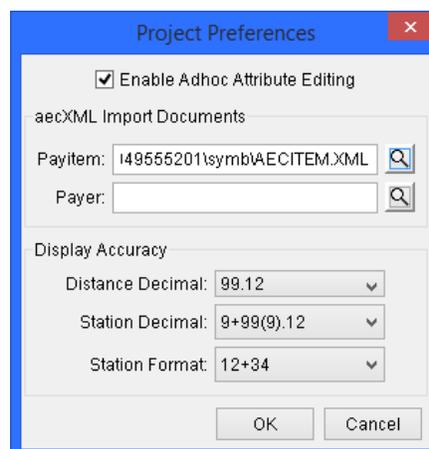


4. Click the **OK** button to create the new Category.

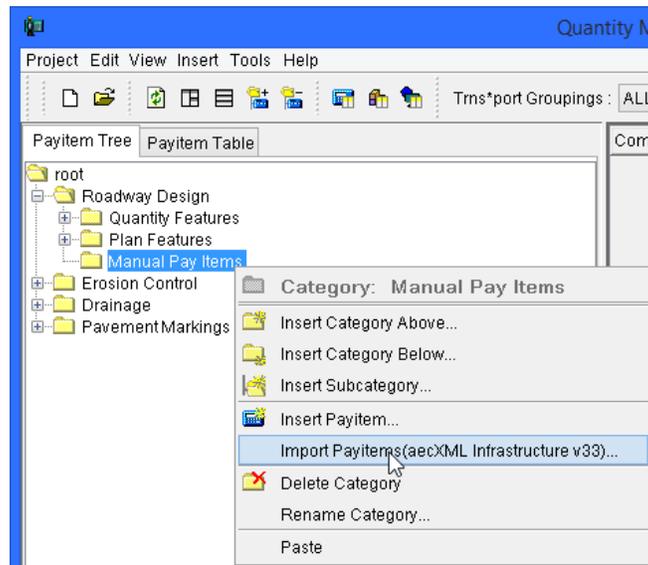
### Exercise 5.3 Importing Pay Items

This exercise sets the preferences to find the *AECITEM.XML* file and imports Pay Items to the database.

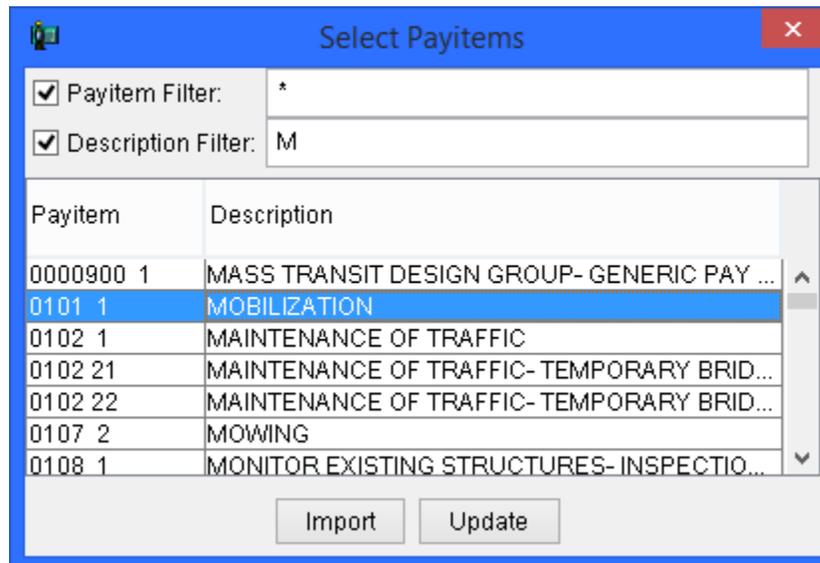
1. From Quantity Manager, select **Project > Preferences**.
2. On the Project Preferences dialog, check **On** the *Enable Adhoc Attribute Editing*.
3. Click on the **Browse** icon next to the *Payitem* box, browse to the Project **Symb** directory, and select the *AECITEM.xml* file.
4. Set the *Display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



5. From Quantity Manager, select the **Payitem Tree** tab and then select the **Manual Pay Items Category**.
6. Right-click and select **Import Payitems (aecxml Infrastructure v33)** from the popup menu. Select Payitems displays.



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

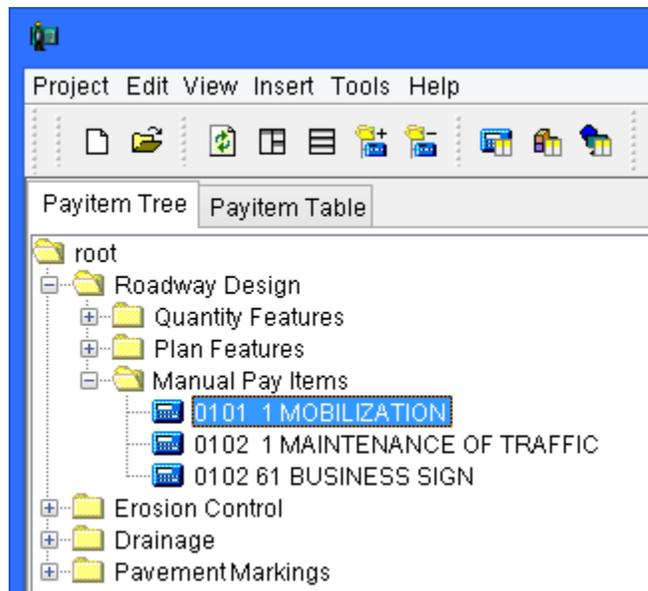


8. In the table, select **0101 1 Mobilization**.
9. Click the **Import** button. The *Mobilization Payitem* adds to Quantity Manager.
10. Repeat steps 7 through 9 to import *Payitem 0102 1 Maintenance of Traffic* and *Payitem 0102 61 Business Sign*.
11. Close *Select Payitems*.

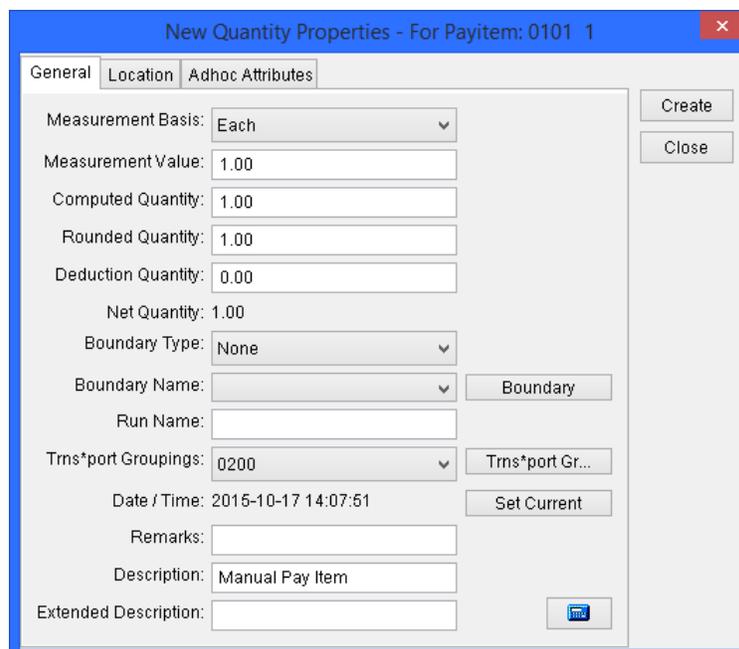
### Exercise 5.4 Creating Quantities

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

1. From Quantity Manager, select *Pay Item 0101 1 Mobilization*.



2. In the *Payitem Tree* tab, right-click and select **Insert Quantity**. New Quantity Properties displays.
3. In the *Measurement Basis* box, select **Each**.
4. In the *Measurement Value* box, enter **1**.
5. In the *Computed Quantity* box, enter **1**.
6. In the *TRNS\*PORT Grouping* box, select **0200**.
7. In the *Description* box, enter **Manual Pay Item**.



8. Click the **Create** button. The new quantity adds to Quantity Manager.

9. In the *Payitem Tree* tab, select *Manual Pay Item 0102 1 Maintenance of Traffic*.
10. From *New Quantity Properties*, in the *Measurement Value* box, enter **60**. This value is the number of days for the project.
11. In the *Computed Quantity* box, enter **1**. This Pay Item is an example of a *Hybrid Lump Sum Quantity*.

The screenshot shows the 'New Quantity Properties - For Payitem: 0102 1' dialog box with the 'General' tab selected. The fields are as follows:

- Measurement Basis: Each (dropdown)
- Measurement Value: 60.00 (text box)
- Computed Quantity: 1.00 (text box)
- Rounded Quantity: 1.00 (text box)
- Deduction Quantity: 0.00 (text box)
- Net Quantity: 1.00 (text box)
- Boundary Type: None (dropdown)
- Boundary Name: (text box) with a 'Boundary' button next to it.
- Run Name: (text box)
- Trns\*port Groupings: 0200 (dropdown) with a 'Trns\*port Gr...' button next to it.
- Date / Time: 2015-10-17 14:07:51 (text box) with a 'Set Current' button next to it.
- Remarks: (text box)
- Description: Manual Pay Item (text box)
- Extended Description: (text box) with a small icon button next to it.

Buttons on the right side include 'Create' and 'Close'.

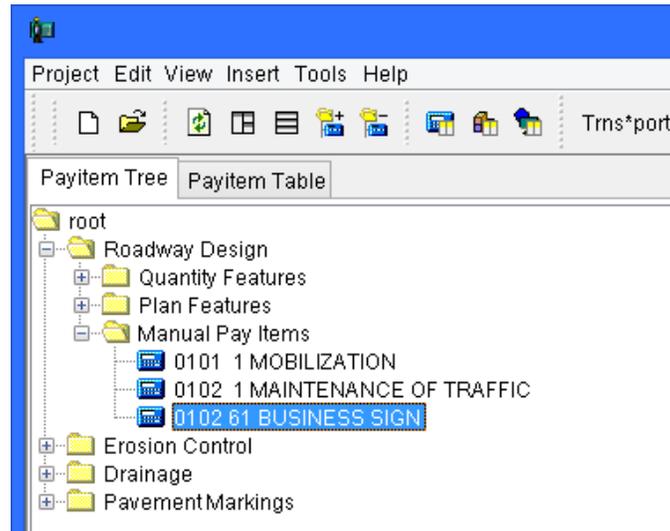
12. Select the **Location** tab.
13. In the *Baseline Chain* box, select **CLCON (JOB10L.GPK)**. The *Minimum Station* and *Maximum Station* will populate from the chain automatically.

The screenshot shows the 'New Quantity Properties - For Payitem: 0102 1' dialog box with the 'Location' tab selected. The fields are as follows:

- Baseline Chain: CLCON (JOB10L.GPK) (dropdown)
- Minimum Station section:
  - Station: 690+00.00 (text box)
  - Region: 1 (dropdown)
  - Offset: (text box)
- Maximum Station section:
  - Station: 887+00.65 (text box)
  - Region: 1 (dropdown)
  - Offset: (text box)

Buttons on the right side include 'Create' and 'Close'.

14. Click the **Create** icon. The *Quantity* adds to Quantity Manager.
15. In the *Payitem Tree* tab, select **Pay Item 0102 61 Business Sign**.



16. From New Quantity Properties, select the **General** tab.
17. In the *Measurement Value* box, enter 1.
18. Select the **Location** tab.
19. In the *Baseline Chain* box, select **CLCON (JOB10L.GPK)**.
20. Under *Minimum Station*, enter **706+00** in the *Station* box and enter **100** in the *Offset* box.
21. Under *Maximum Station*, enter **706+00** in the *Station* box and enter **100** in the *Offset* box.
22. Click the **Create** icon. The Quantity adds to Quantity Manager.
23. Under *Minimum Station*, enter **782+00** in the *Station* box and enter **-100** in the *Offset* box.
24. Under *Maximum Station*, enter **782+00** in the *Station* box and enter **-100** in the *Offset* box.
25. Click the **Create** icon. The Quantity adds to Quantity Manager.
26. Under *Minimum Station*, enter **791+00** in the *Station* box and enter **100** in the *Offset* box.
27. Under *Maximum Station*, enter **791+00** in the *Station* box and enter **100** in the *Offset* box.
28. Click the **Create** icon. The Quantity adds to Quantity Manager.
29. Close New Quantity Properties.

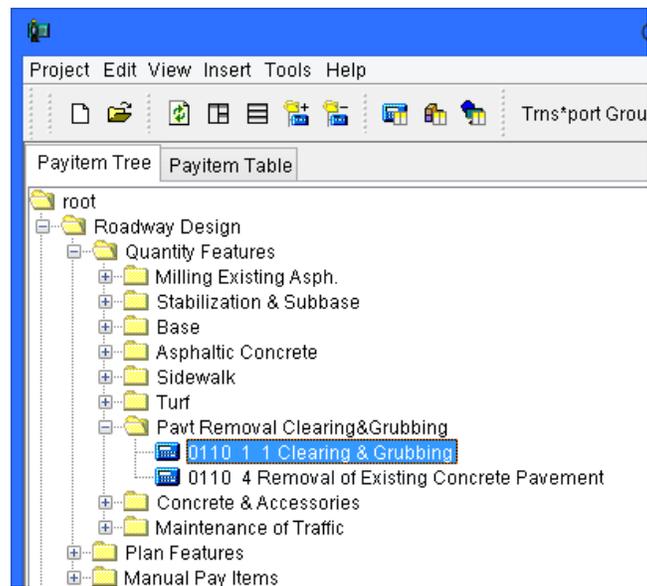
## REPORTS

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.

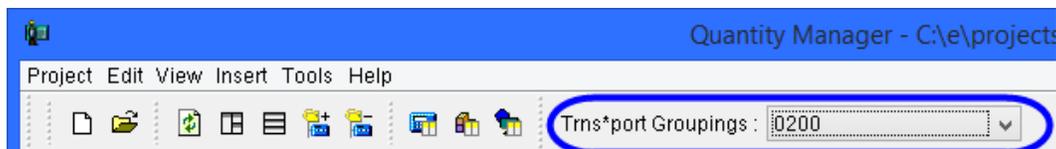
### Exercise 5.5 Creating CSV Reports

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

1. Continuing in the *ECSSO.mdb* file, navigate to **Roadway Design > Quantity Features > Pavt Removal Clearing & Grubbing** and select the *Pay Item 0110 1 1 Clearing & Grubbing*.



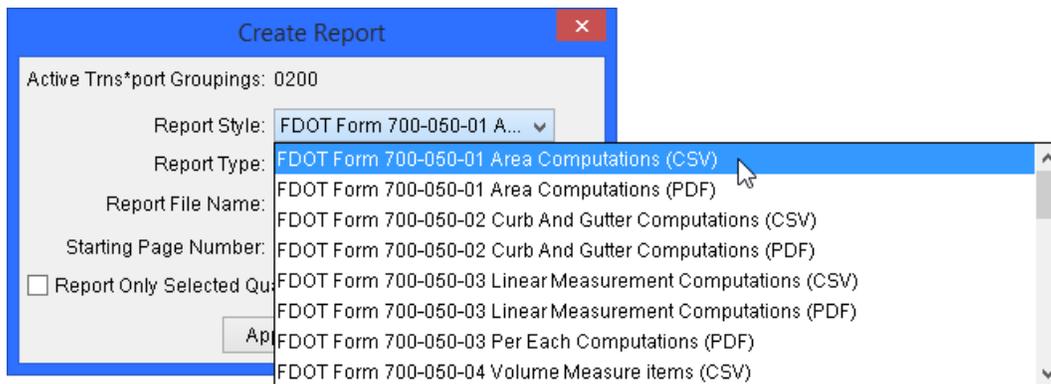
2. Change the *Trns\*port Groupings* to **0200**.



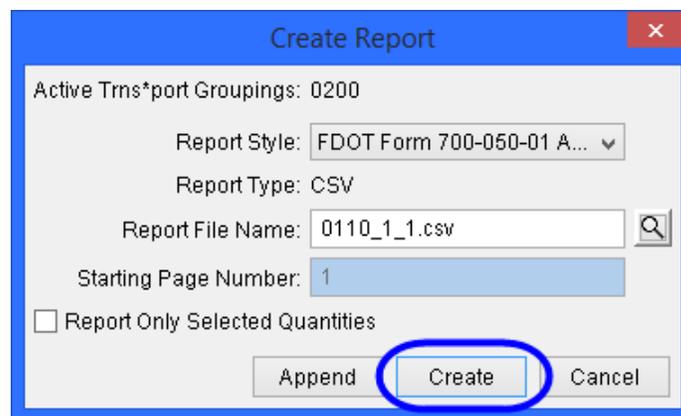
3. Select *Item 0110 1 1* and then select **Tools > Reports > Create**.



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



- In the *Report File Name*, enter **0110\_1\_1.csv** and then click **Create**.



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

- Repeat steps 3 – 5 for the *Pay Item* **0110 4 Removal of Existing Concrete Pavement**.
- 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 is now requiring all quantities 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. With the implementation of the new Plan Summary Boxes, there are some general rules set up. The *Plans Preparation Manual (PPM)* and the *Structures Design Manual* along with the *CADD Manual* and the *Basis of Estimates* post documentation to reinforce the following.

### PLAN SET LOCATION

- Roadway – Keep in same sequence order behind Typical Sections.
- Structures – Directly after the Summary of Pay Items in the General Bridge Section (or behind Key Sheet if no Summary of Pay Items)

### 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 formatting through Excel spreadsheet files.
- FDOT delivers Summary Box templates formatted for use:
  - Barrier Walls - \*\*
  - Box Culverts
  - Curb and Traffic Separators - \*\*
  - Ditch Pavement - \*\*
  - Driveways - \*\*
  - Earthwork
  - Edgedrain - \*\*
  - Erosion Control - \*\*
  - Fencing - \*\*
  - French Drain - \*\*
  - General Items
  - Geotechnical Items
  - Guardrail - \*\*
  - Litter Removal and Mowing
  - Lump Sum Items
  - Mailboxes - \*\*
  - Miscellaneous Asphalt - \*\*
  - Miscellaneous Drainage
  - Pavement - \*\*
  - Permanent Crash Cushions - \*\*
  - Railing - \*\*
  - Removal Items
  - Side Drain and Mitered End Sections
  - Side Drain and Mitered End Sections with Flow lines
  - Sidewalk - \*\*
  - Special Detour
  - Structures Quantities
  - Temporary Crash Cushions - \*\*
  - Temporary Driveways
  - Temporary Signalization
  - Temporary Traffic Control Items
  - Trench Drain - \*\*
  - Turf and Prepared Soil Layer - \*\*
  - Turnouts - \*\*
  - Underdrain - \*\*
  - Utility Adjustments - \*\*
  - Walls

**Note** \*\* - Denotes summary boxes that are automated with LDM.

Keep all Excel files or other files (*pdf or output from other programs*) in a directory named “*Calculations*” under the root Project Directory. (Use Roadway and Structures subdirectories 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.

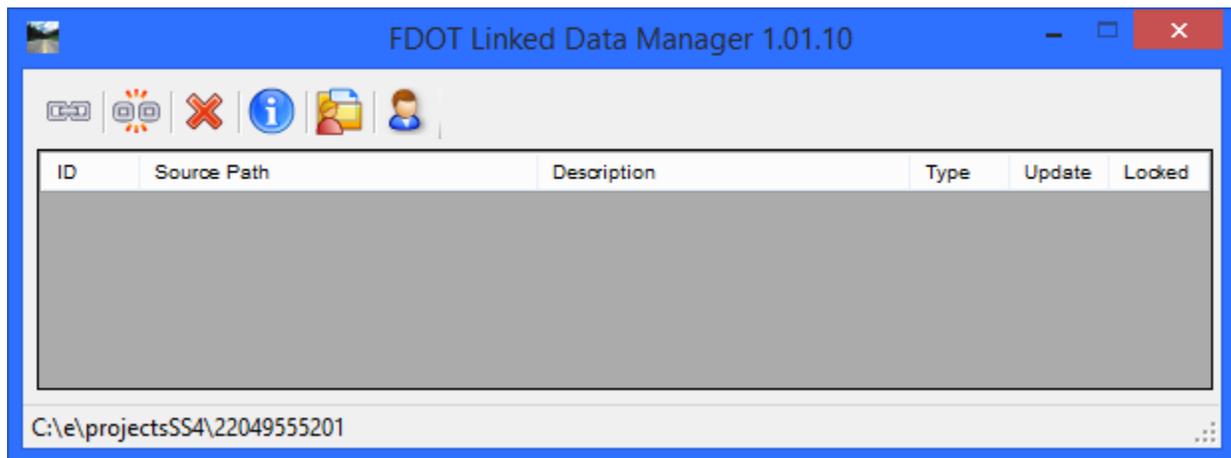
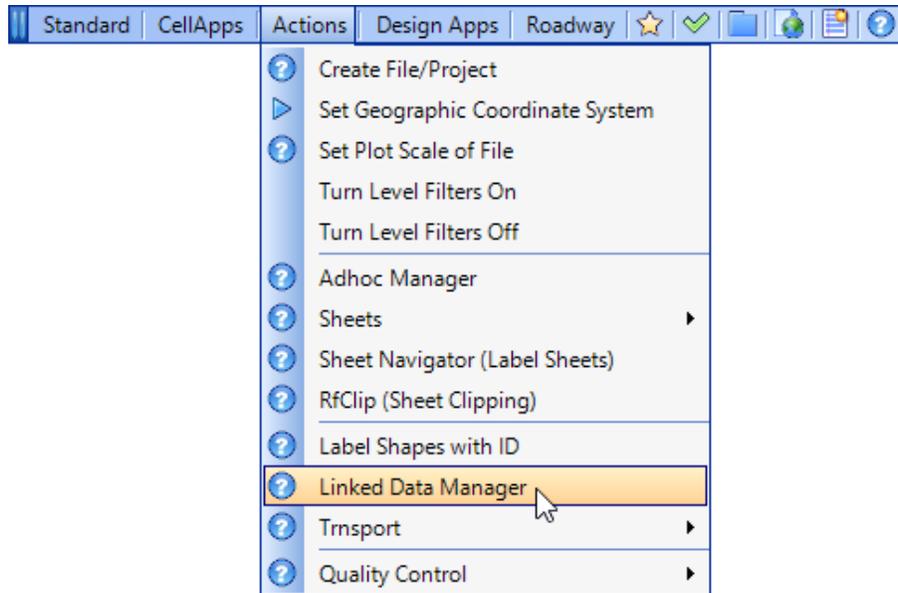
## LDM BASICS

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.

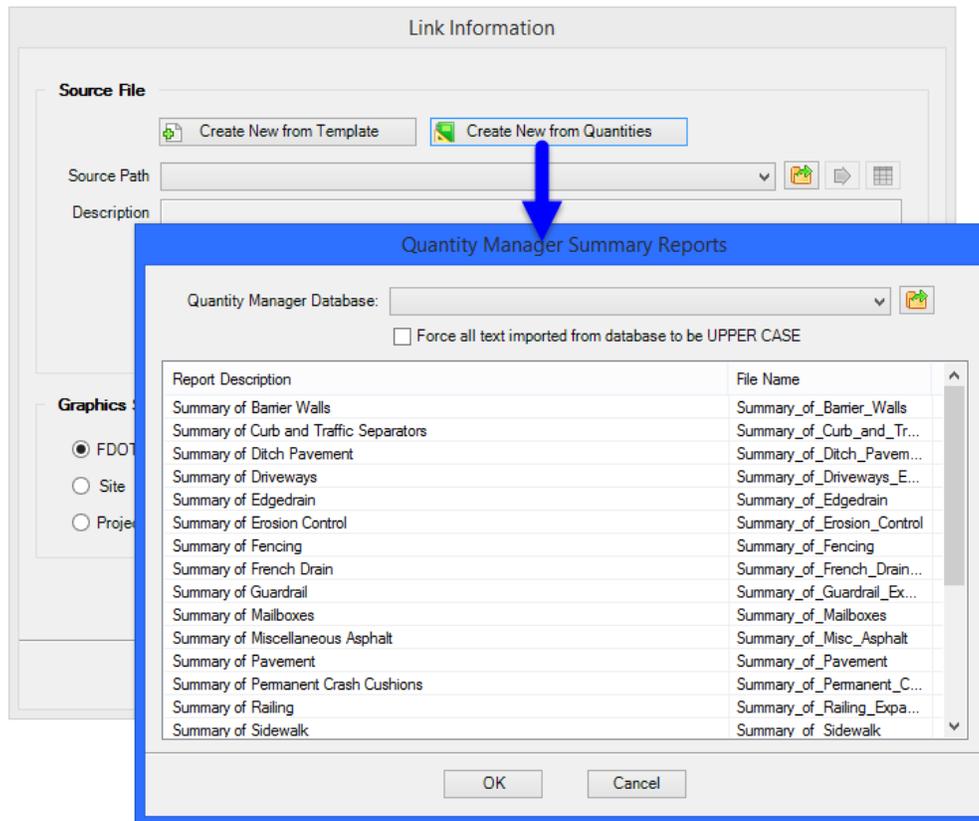


**Note** For more in-depth information on the features of this tool, refer to the LDM Help file or Posted Webinars.

## CREATE SUMMARY BOXES FROM QUANTITY MANAGER

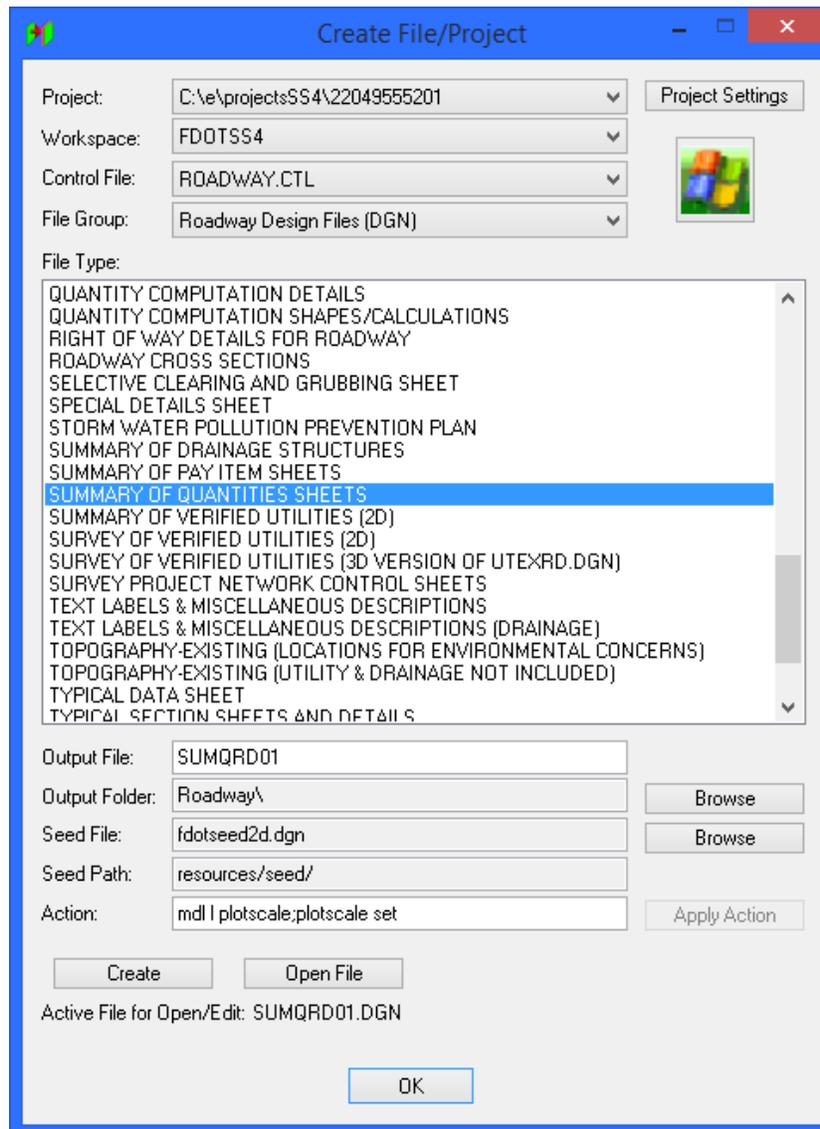
LDM provides an automated option (*Create New from Quantities*) to create FDOT Summary Boxes that only need to be run once to generate an Excel template file from Quantity Manager with all worksheets created and contained in a single file.

1. Select **Create New from Quantities**.
2. Select the Quantity Manager **Database**.
3. Select the **Summary** to create and click **OK**.
4. Save the file in the **Calculations** directory.
5. Place the *Summary Box* in MicroStation.



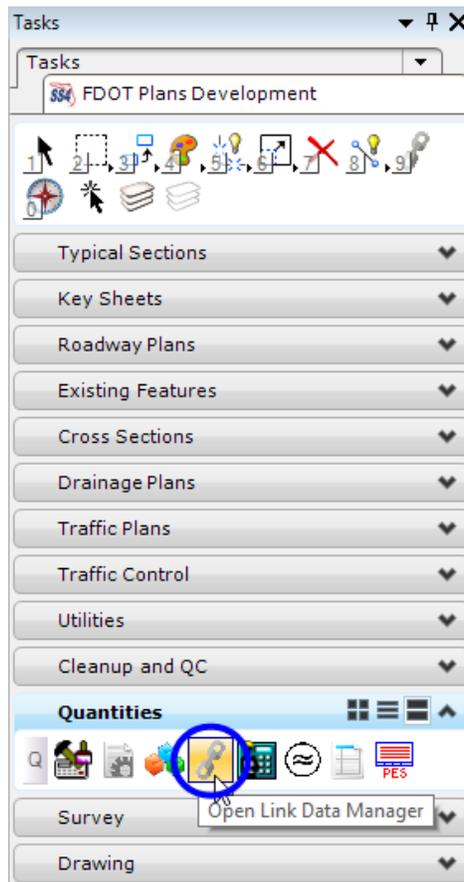
### Exercise 6.1 Create New Summary Boxes from Quantities

1. Open the MicroStation file *QTDSRD01.dgn*.
2. On the FDOT Menu, select **Actions > Create File/Project**.
3. Set the *File Group* to **Roadway Design Files (DGN)**, scroll down the *File Type* list, select **Summary of Quantities Sheets** and click **Create**.

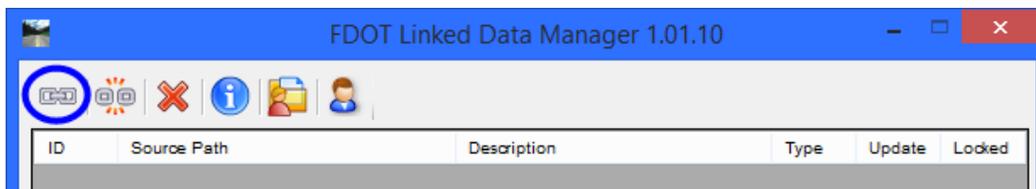


4. Click **OK** confirming that the file successfully created.
5. Select **Open File** to open the new file.
6. Upon opening, click **OK** on the Set Plot Scale dialog, and then **OK** on the Create File/Project dialog to close it.

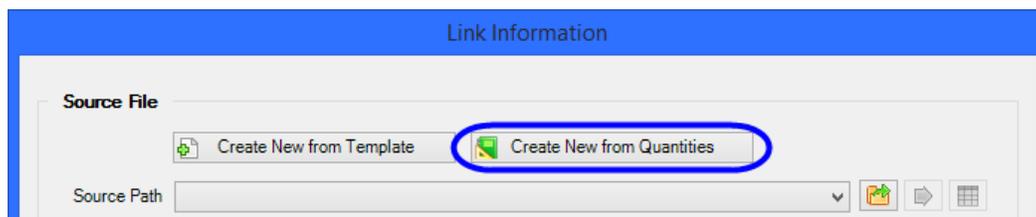
- From the *FDOT Plans Development* > *Quantities* Tasks menu, select the **Linked Data Manager** icon to open LDM.



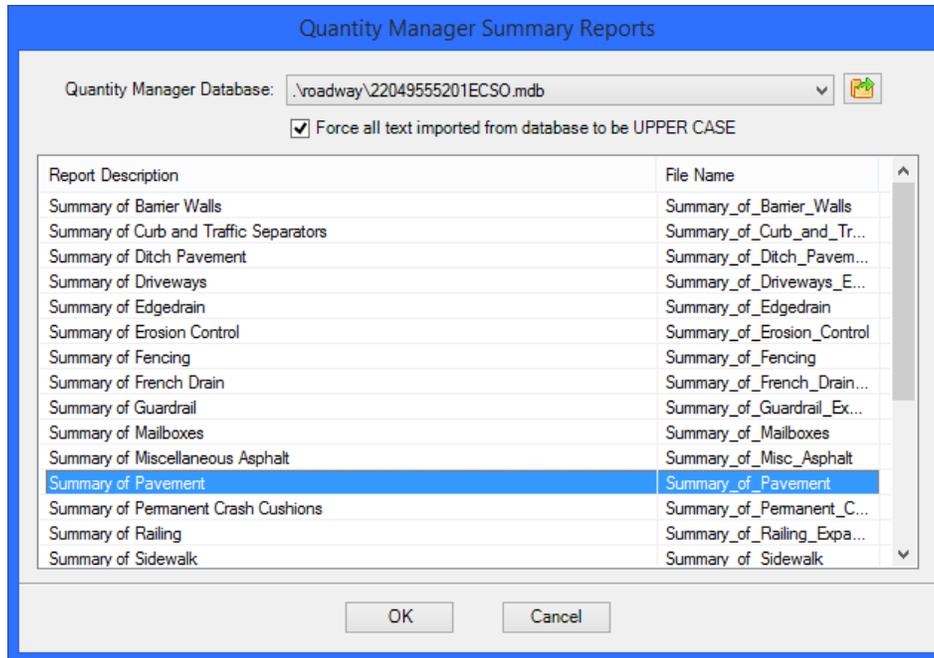
- From LDM, select the **Create Link** button.



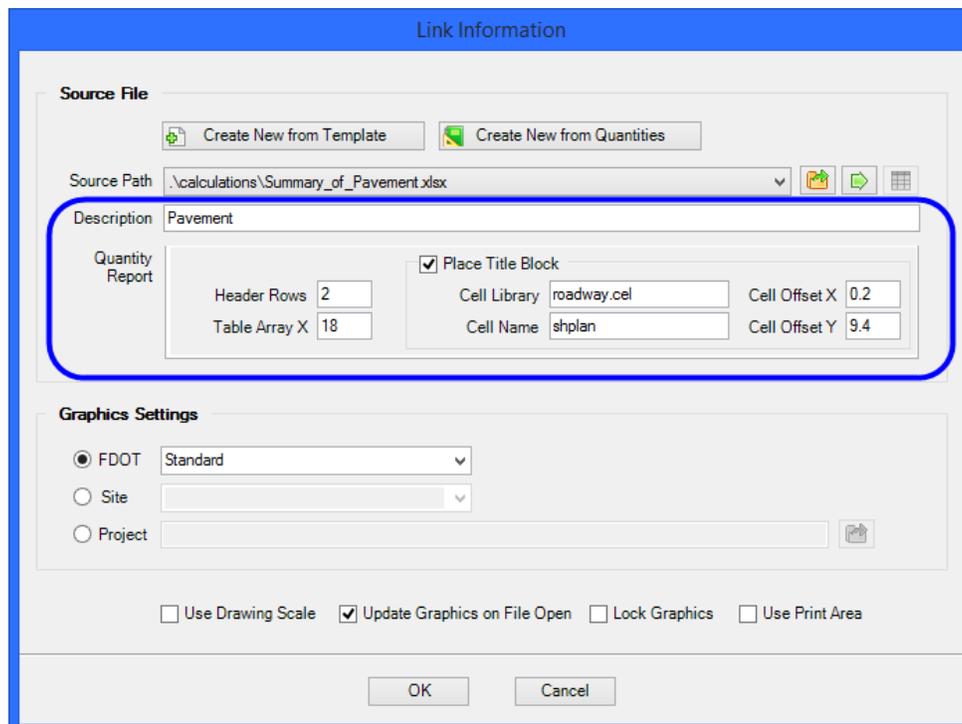
- On the Link Information dialog, select the **Create New from Quantities** button.



10. From the Quantity Manager Summary Reports dialog, click the **Browse** button and select the database file *22049555201ECSO.mdb*.
11. Check **On** the option to *Force all text imported from database to be UPPER CASE*.
12. Select the **Summary of Pavement** report from the list and click **OK**.



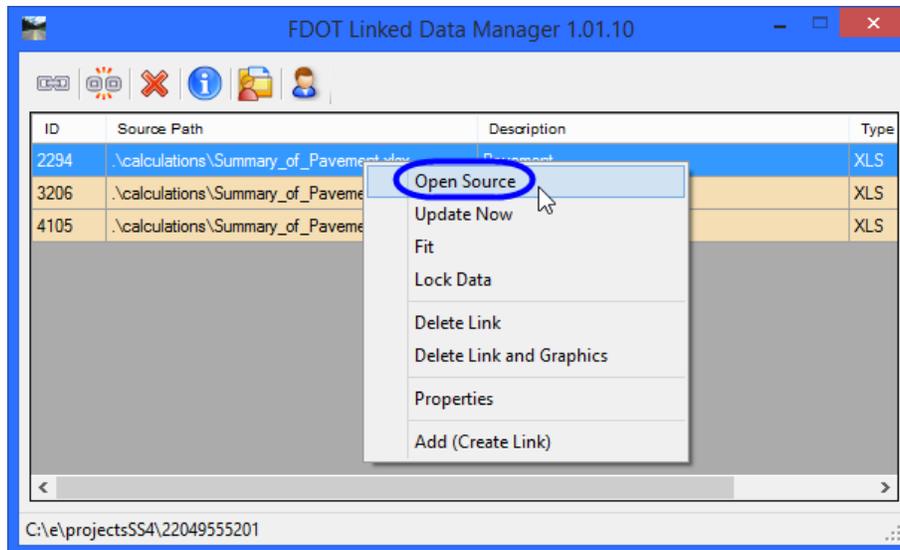
13. Save the Excel file to the project **Calculations** sub-directory.
14. On the Link Information dialog, the *Source Path* populates. Complete the dialog as shown below and click **OK**.



15. 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.

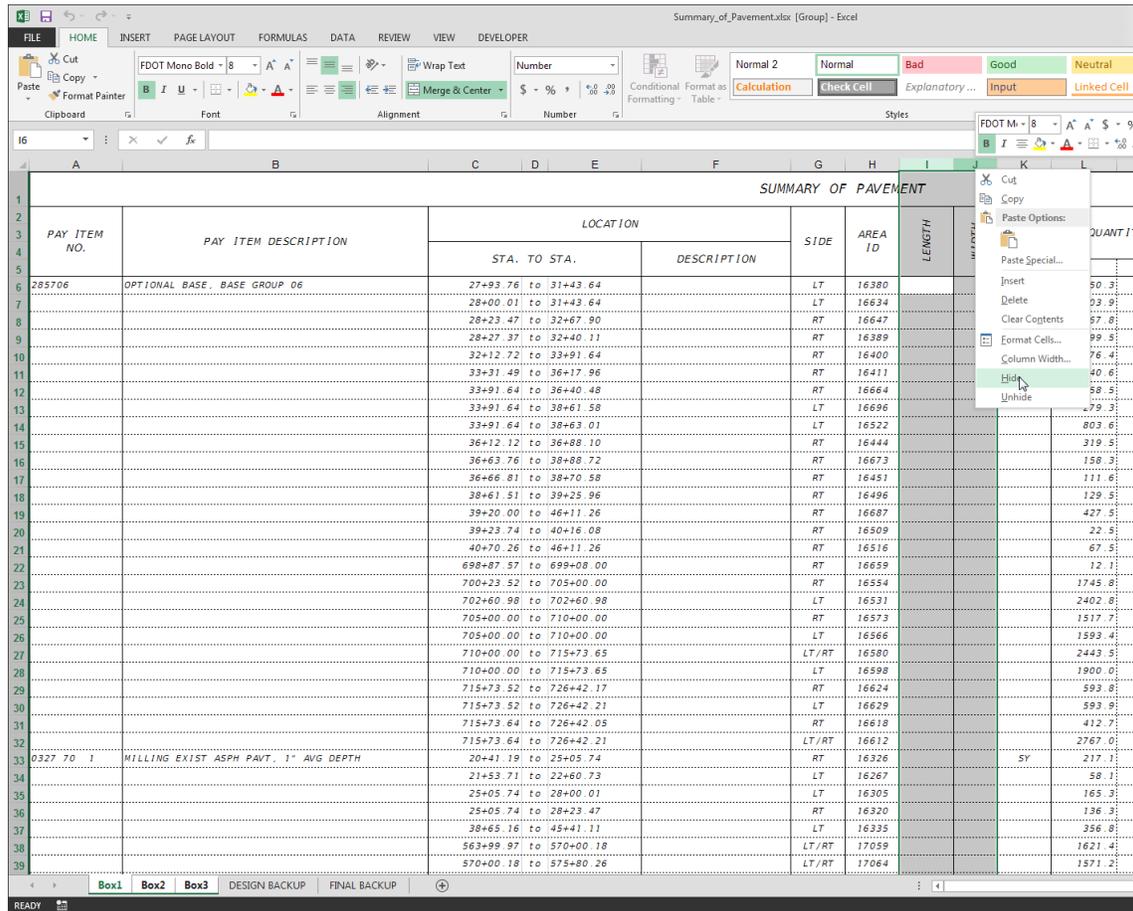


16. Right-click on one of the new links in the LDM dialog for the **Summary of Pavement** and select **Open Source**. Excel opens.



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

18. Select the columns *Length* and *Width*; 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.

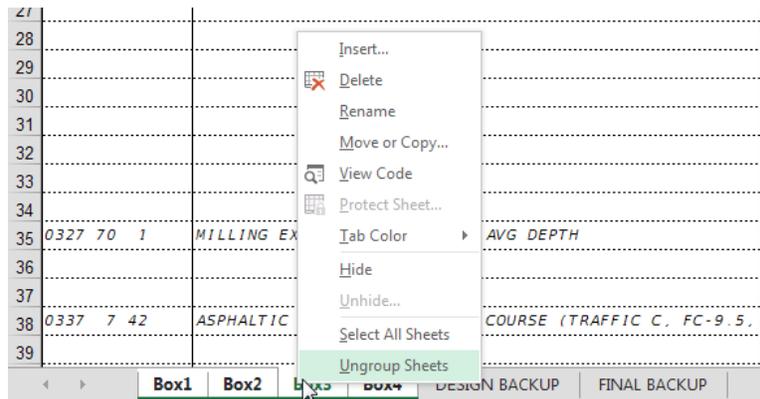


**Note** Delete or hide unused columns in a summary box from the worksheet. The only exceptions are the F quantity columns and the Construction Remarks column.

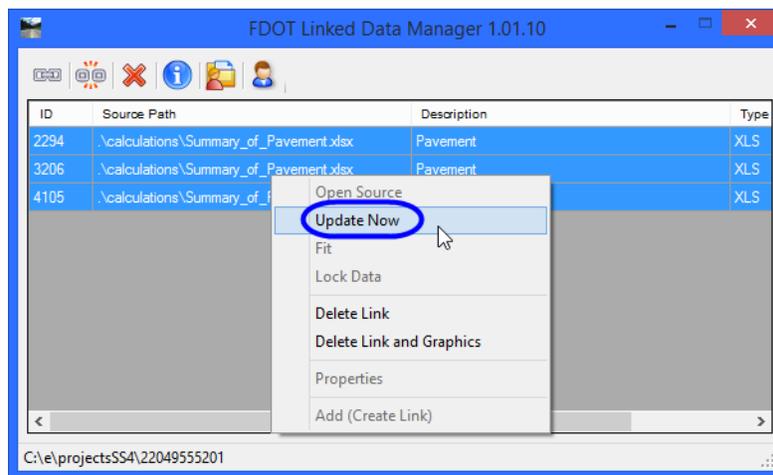
19. **Widen** the *Pay Item Description* column to 90.00.

**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.

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

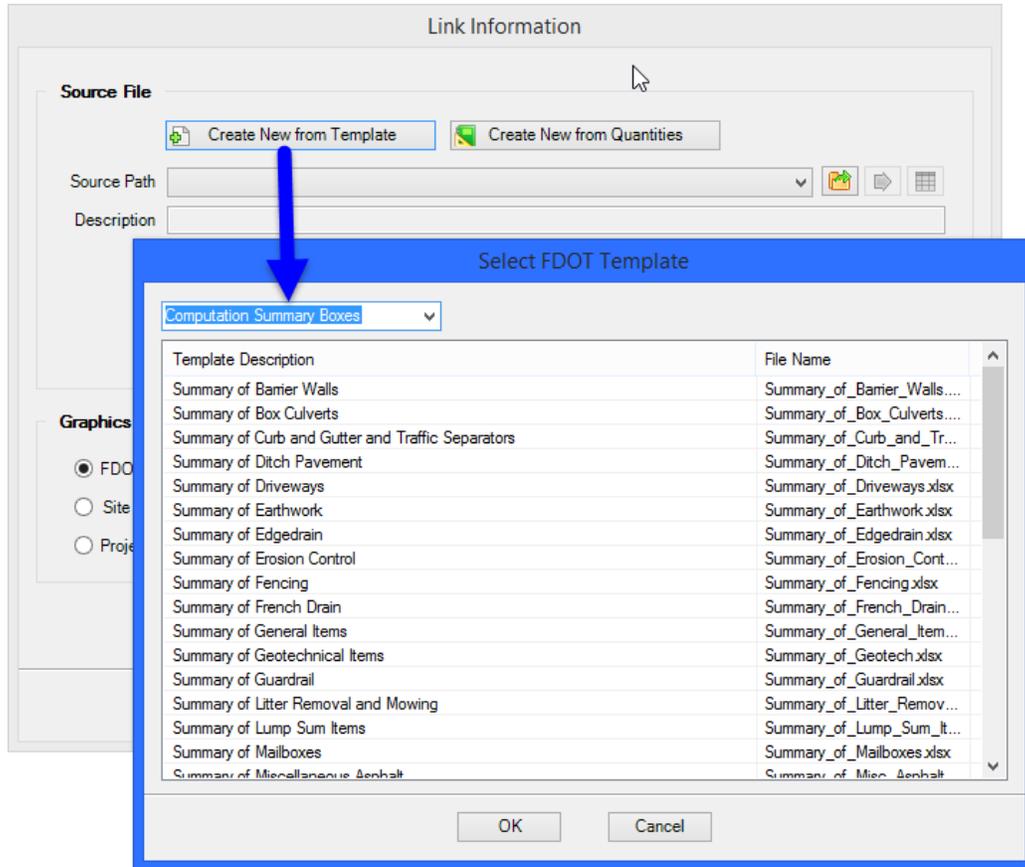


21. In MicroStation, use the shift key to select all the links to the **Summary of Pavement Summary Box**, right-click and select **Update Now**.



## 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 of the FDOT Summary Box templates under the Computation Summary Box 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.

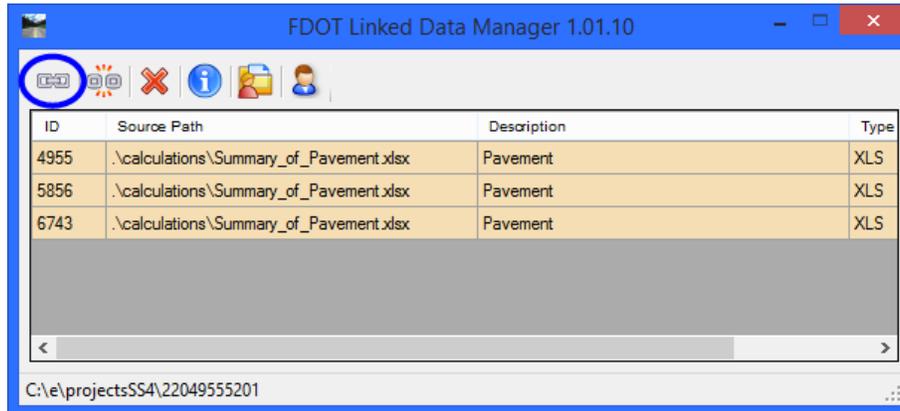
### Exercise 6.2 Create New Summary Boxes from Template

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

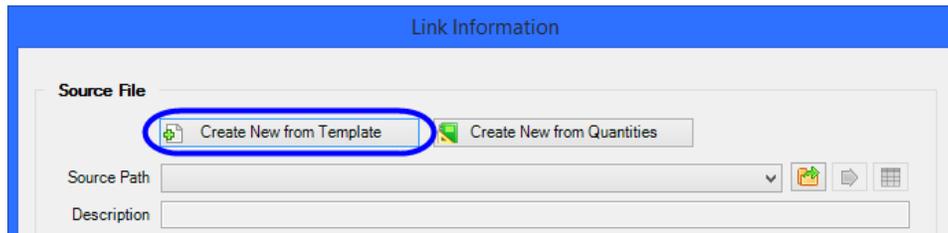
1. From the FDOT Menu, select Actions > Sheets > Plan Sheet.

Data point in the design file to place the border. Place the cell using a scale of 1.

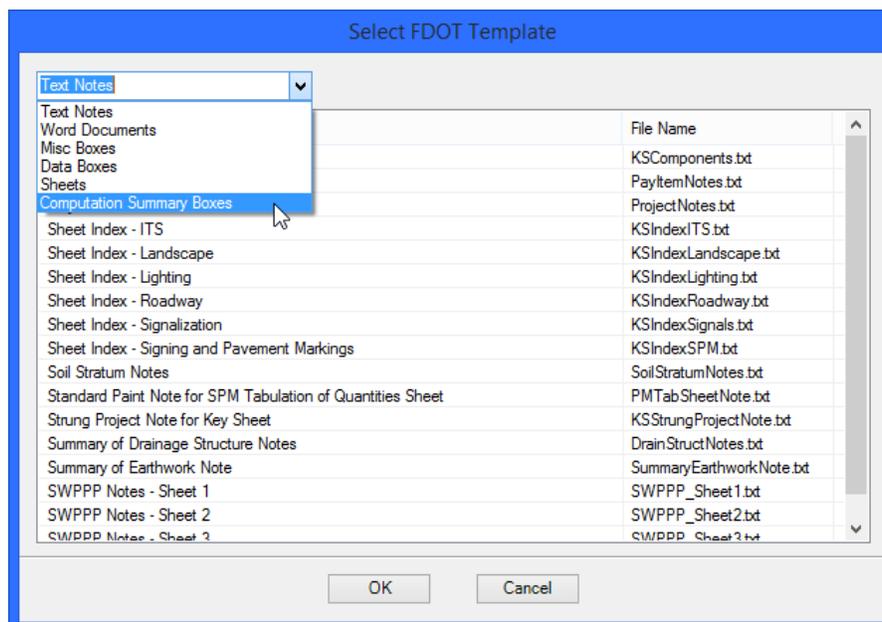
2. From LDM, click the **Create Link** button. Link Information dialog displays.



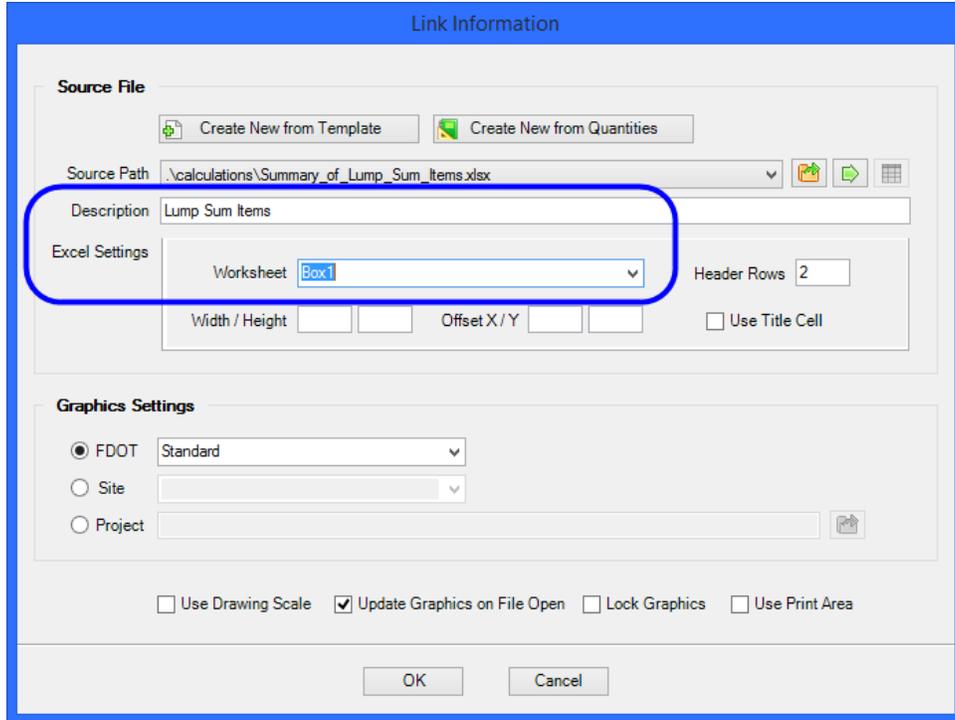
3. On the Link Information dialog, select **Create New from Template**. The Select FDOT Template dialog displays.



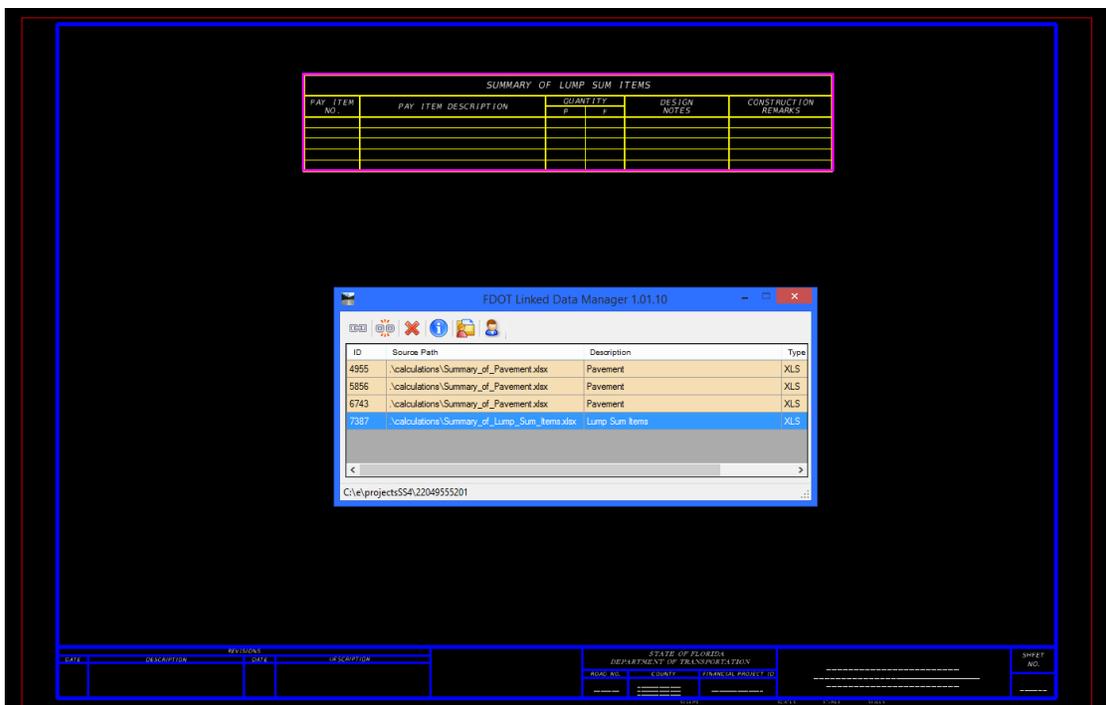
4. From the Select FDOT Template drop down, select **Computation Summary Boxes**.



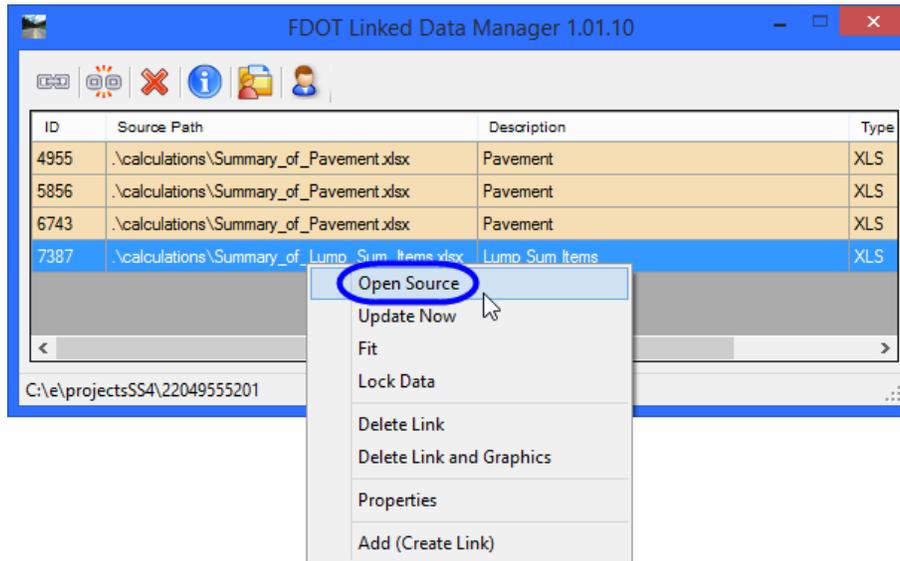
5. Select the **Summary of Lump Sum Items** and click **OK**.
6. On the **Save As** dialog, navigate to the **22049555201/Calculations** directory and click **Save**.
7. The *Source Path* populates on the **Link Information** dialog. Complete the dialog with the information shown below and click **OK**.



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 file displays in the Source Excel document.



10. Complete the Summary Box with *Mobilization* pay item information. **Save** and **Close** the Excel file.

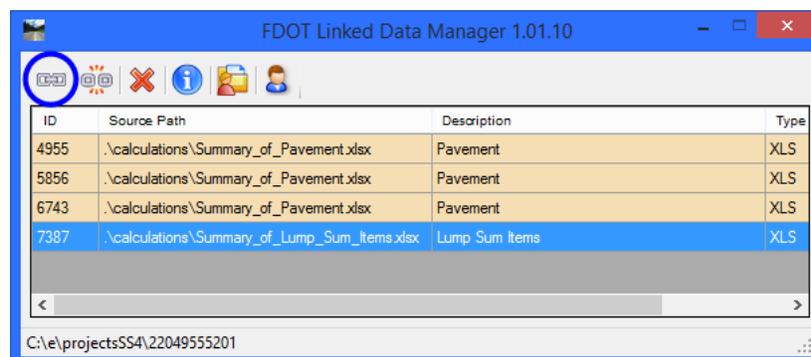
SUMMARY OF LUMP SUM ITEMS					
PAY ITEM NO.	PAY ITEM DESCRIPTION	QUANTITY		DESIGN NOTES	CONSTRUCTION REMARKS
		P	F		
0101 1	MOBILIZATION				

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

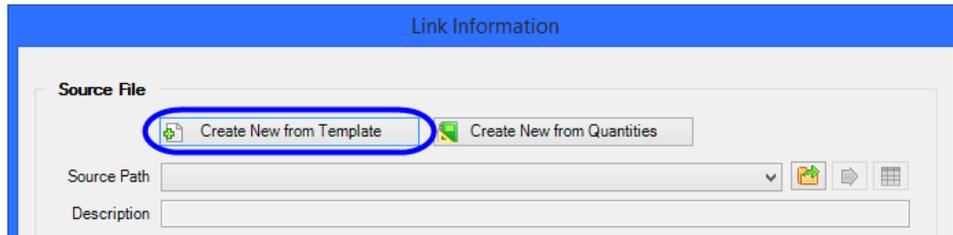
### Exercise 6.3 Create Summary Box with LDM and CSV files

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

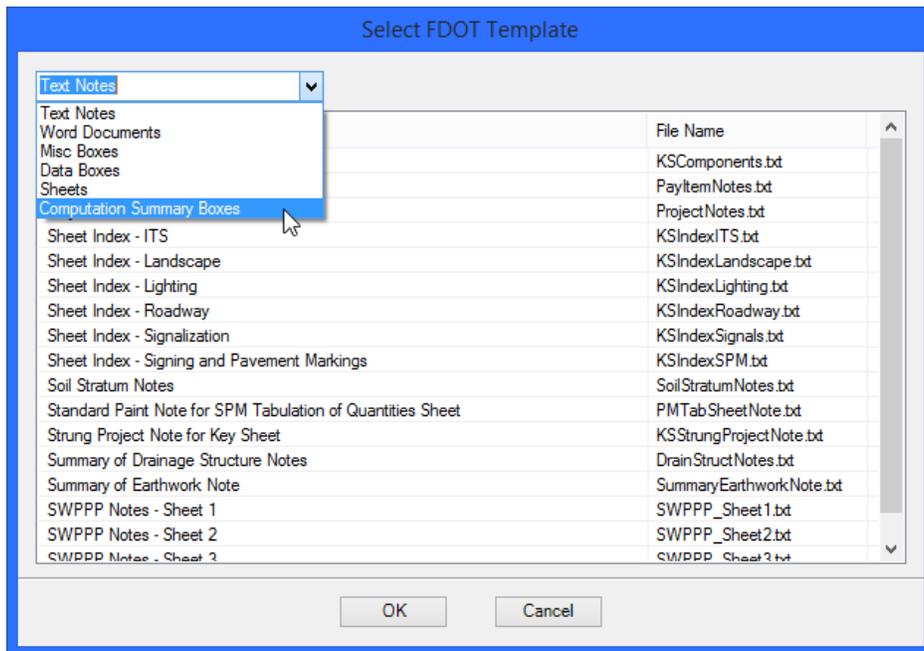
- Continuing in the file *SUMQRD01.dgn*, place (or copy) a plan sheet in the file.
- From LDM, click the **Create Link** button. Link Information dialog displays.



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



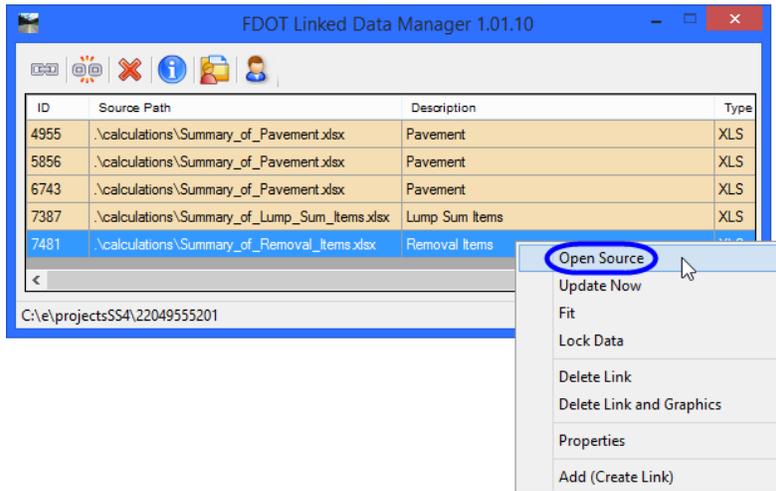
4. From the Select FDOT Template drop down, select **Computation Summary Boxes**.



5. Select the **Summary of Removal Items** and click **OK**.
6. On the Save As dialog, navigate to the **22049555201/Calculations** directory and click **Save**.



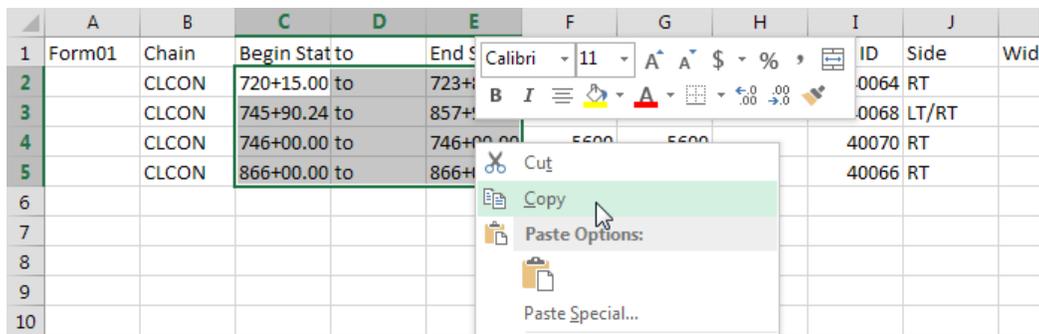
- Right-click on the link in LDM and select the popup menu option **Open Source**. The file displays in the Source Excel document.



- In Excel, select the Length and Width columns Right-click and select Hide.
- Type in the following information; pay item number, pay item description, and units.

SUMMARY OF REMOVAL ITEMS										
PAY ITEM NO.	PAY ITEM DESCRIPTION	LOCATION		SIDE	AREA ID	UNITS	SECONDARY UNITS (IF LUMP SUM)		QUANTITY	
		STA.	TO STA.				AREA (AC)	P	F	
0110 1 1	CLEARING & GRUBBING					L5				

- Open the file 0110\_1\_1.csv created in Exercise 5.5.
- Select the values for the Begin Station, to, and End Station. Right-click and select copy.



14. In Summary\_of\_Removal\_Items.xlsx click in the cell C5 and select the option to Paste Values Only.

SUMMARY OF REMOVAL ITEMS									
PAY ITEM NO.	PAY ITEM DESCRIPTION	AREA ID	UNITS	SECONDARY UNITS (IF LUMP SUM)		QUANTITY			
				AREA (AC)	P	F			
0110 1 1	CLEARING & GRUBBING		LS						

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.

SUMMARY OF REMOVAL ITEMS											
PAY ITEM NO.	PAY ITEM DESCRIPTION	LOCATION		SIDE	AREA ID	UNITS	SECONDARY UNITS (IF LUMP SUM)		QUANTITY		DESIGN NOTES
		STA.	TO STA.				AREA (AC)	P	F	P	
0110 1 1	CLEARING & GRUBBING	720+15.00	to 723+80.00	RT	40064	LS		4.339			64.077 TOTAL AC
		745+90.24	to 857+93.00	LT/RT	40068			41.589			
		746+00.00	to 746+00.00	RT	40070			15.677			
		866+00.00	to 866+00.00	RT	40066			2.472			

**Note** If desired, use a formula in the Design Notes column totaling the number of acres for the Clearing & Grubbing. Ex. =SUM(K5:K8)&" TOTAL AC"

- 16. Type in the Pay Item Number, Pay Item Description, and Units for **0110 4, Removal of Existing Concrete, (SY)**.
- 17. Open the file 0110\_4.csv.
- 18. Copy and paste the required information from the CSV file into the summary box template. Place the area quantities in the Quantity 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(L9:L36)

SUMMARY OF 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	720+15.00	to 723+80.00	RT	40064	LS	4.339				1		64.077 TOTAL AC
		748+90.24	to 857+93.00	LT/RT	40068		41.589						
		748+00.00	to 748+00.00	RT	40070		15.677						
		866+00.00	to 866+00.00	RT	40066		2.472						
0110 4	REMOVAL OF EXISTING CONCRETE	698+80.00	to 702+28.95	LT	42459	SY			332.7		15820		
		702+24.74	to 703+37.26	LT	42507				52.8				
		702+95.87	to 703+63.80	LT/RT	42505				17.5				
		702+96.06	to 703+63.80	LT/RT	42503				17.0				
		703+12.88	to 704+00.13	LT	42493				67.6				
		703+32.66	to 703+32.66	LT	42464				30.7				
		703+35.34	to 703+58.25	LT	42487				9.1				
		703+59.10	to 703+59.10	LT	42557				25.8				
		704+77.58	to 705+04.73	LT	42448				65.9				
		709+74.70	to 709+88.02	RT	42485				21.5				
		709+87.84	to 710+01.38	RT	42483				21.5				
		714+02.15	to 714+60.90	LT	42453				167.4				
		717+01.09	to 717+37.60	LT	42451				190.6				
		717+96.79	to 718+23.61	LT	42449				112.6				
		728+05.00	to 729+75.00	LT/RT	42446				13930.9				
		773+54.51	to 773+75.45	LT	42455				37.8				
		790+96.98	to 795+68.91	LT	42462				601.2				
		795+94.99	to 795+96.92	LT	42474				6.1				
		796+19.74	to 796+29.32	LT	42466				8.2				
		796+28.79	to 796+40.51	LT	42479				8.3				
		796+61.99	to 796+64.26	LT	42468				6.0				
		810+59.70	to 810+63.35	RT	42553				10.3				
		810+74.28	to 810+89.91	RT	42509				12.3				
		810+89.89	to 811+14.27	RT	42516				12.6				
		811+12.60	to 811+29.31	RT	42555				11.8				
		844+34.00	to 844+36.66	RT	42521				9.0				
		844+73.03	to 844+73.37	RT	42457				16.2				
		844+74.23	to 844+74.23	RT	42481				16.3				

20. Delete or Hide rows 37 – 54.

21. Save the file Summary\_of\_Removal\_Items.xlsx.

22. In MicroStation, select the link in LDM. Right-click and select Update Now.

23. Review the results in MicroStation.

## 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.
  - DO NOT *rotate* or *scale* Summary Boxes or Text linked with LDM with MicroStation tools. Subsequent LDM link updates will revert the rotation and scale to the original LDM default.
- 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. These Summary Boxes need to remain consistent. Contact Denise Broom 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 required only one Source Excel File for each Summary Box in FDOT Plans.
- Use Quantity Manager CSV Reports to help populate the Summary Boxes not automated. Be sure to **Paste Special** 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 fine in Excel. This is due in part because of a variable for a buffer in LDM that keeps the text from drawing up against the column lines when placed in MicroStation. Adjust the column widths to fix.
- In the example shown below, you only need the Pay Item No, Description, Unit and Quantity Total shown on the **first** line for that Pay Item.

SUMMARY OF CURB & GUTTER AND/OR TRAFFIC SEPARATORS										
PAY ITEM NO.	PAY ITEM DESCRIPTION	LOCATION		SIDE	AREA ID	UNIT	QUANTITY		TOTAL	
		STA.	TO STA.				P	F	P	F
0520 1 7	CONCRETE CURB & GUTTER, TYPE E	705+16.83	to 705+67.00	LT/RT	21879	LF	51.3		25594	
		705+16.83	to 705+83.27	RT	8689		66.5			
		705+67.00	to 705+83.26	LT	21875		16.3			
		705+83.26	to 709+89.99	LT	21877		406.8			
		705+83.26	to 712+46.15	LT	70151		653.0			

- Place all Summary Boxes with quantities on the 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 the *draft 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 all of the Summary Box Excel files.

# 7 EXPORTING TO TRNS\*PORT

## OBJECTIVE

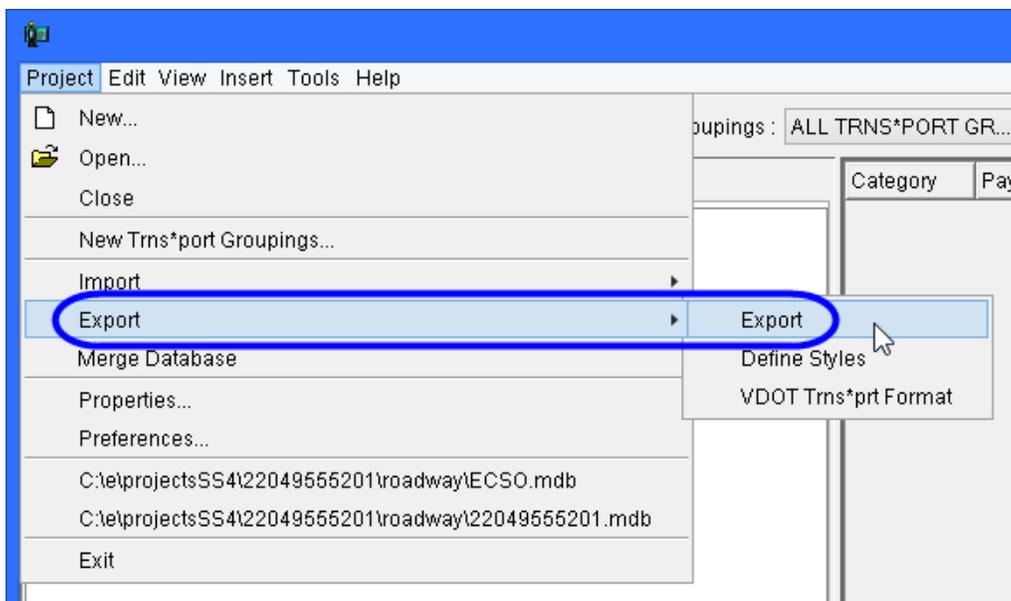
- Detail Export to TRNS\*PORT
- Export Data to TRNS\*PORT

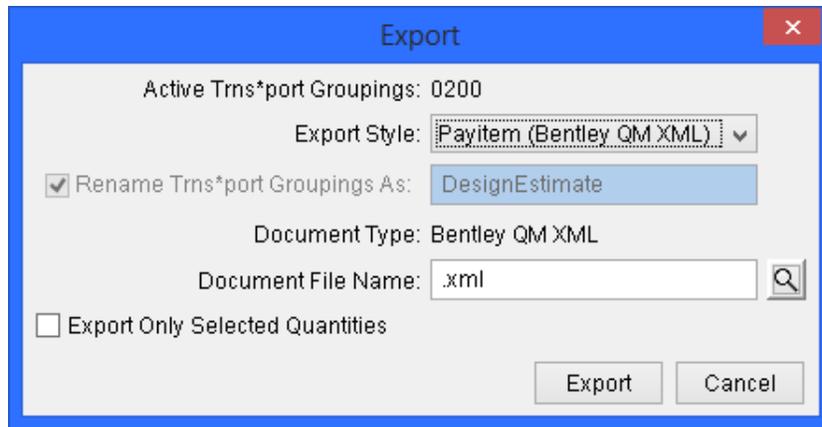
## EXPORT

Quantity Manager includes a utility that facilitates exporting various database information. The format of this information is in .XML file that TRNS\*PORT can import.

## ACCESSING EXPORT

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

The GEOPAK QM XML type supports four Modes:

- Standard
- Pay item
- Pay item + Quantity (*Includes pay items and total quantities*)
- Pay item + Quantity + Element (*Includes pay items, quantities and associated data from the Element table*)

TRNS\*PORT supports only 2 Modes:

- Pay item + Quantity (*Includes pay items and total quantities*)
- Pay item + Quantity + Funding (*Includes pay items, total quantities organized by funding categories*)

---

**Document Type**

There are two supported export schemes, but GEOPAK QM XML is the standard schema used for creating custom reports. FDOT delivers the schema with Quantity Manager.

---

**Document File Name**

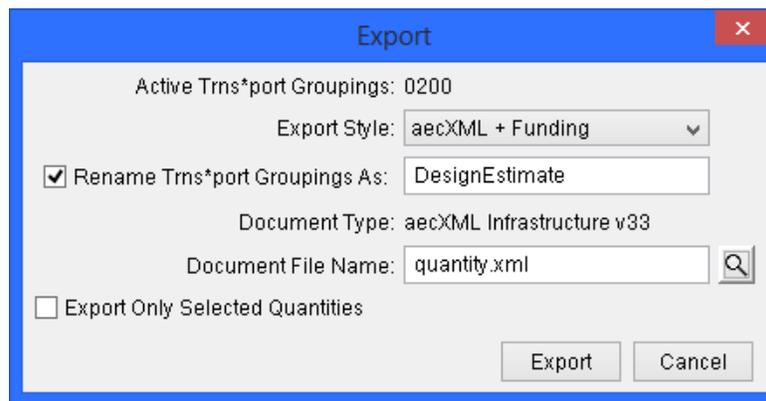
The file name including directory path to which the report will export.

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

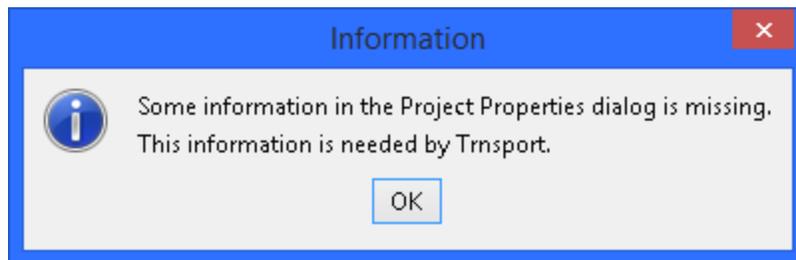
## EXPORTING DATA TO TRNS\*PORT

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

1. In the Quantity Manager Pay Item Table pane, use CTL+A to select all of the pay items. Only the Pay Items included in the active Trns\*port Grouping will be exported.
2. From the Quantity Manager menu, select **Project > Export >Export**. Export displays.
3. In the *Export Style* box, select **aecXML + Funding**.
4. Check **On** the *Rename TRNS\*PORT Groupings As* box and enter **DesignEstimate**.
5. In the *Document File Name*, enter **quantity.xml**. The Designer Interface Project *IMPORT* option uses the file.



6. Click the **Export** button.
7. An Information dialog will appear. This is normal and not an error.



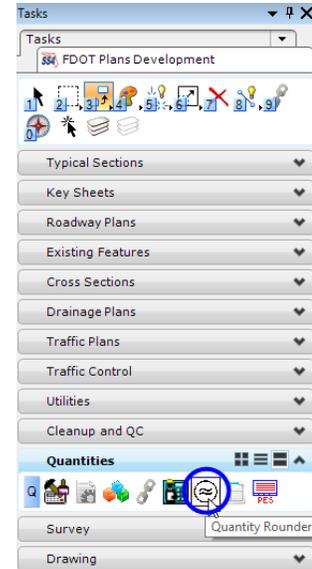
8. Navigate to the *Quantity.xml* file just created and review.

```
<?xml version="1.0" encoding="UTF-8"?><inf:InfrastructureProject xmlns:inf="http://www.aecxml
  <ProjectOverview>
    <aec:ProjectName>000000000000</aec:ProjectName>
    <aec:ProjectNumber>000000000000</aec:ProjectNumber>
    <aec:Description>CADD office testing</aec:Description>
  </ProjectOverview>
  <DefaultUnitSystem>Imperial</DefaultUnitSystem>
  <SpecBookVersion>10</SpecBookVersion>
  <Location locationId="Project">
    <MinimumCoordinate coordinateScheme="ReferencePost">
      <FirstCoordinate/>
      <SecondCoordinate/>
    </MinimumCoordinate>
    <CenterCoordinate coordinateScheme="LatitudeLongitude">
      <FirstCoordinate/>
      <SecondCoordinate/>
    </CenterCoordinate>
    <MaximumCoordinate coordinateScheme="ReferencePost">
      <FirstCoordinate/>
      <SecondCoordinate/>
    </MaximumCoordinate>
  </Location>
  <PayItemGroup groupId="0200">
  </PayItemGroup>
  <PayItemGroup groupId="DesignEstimate">
  </PayItemGroup>
  <PayItemGroup groupId="0300">
  </PayItemGroup>
  <PayItem>
    <PayItemID>
      <ID>0327 70 1</ID>
    </PayItemID>
    <SpecBookVersion>10</SpecBookVersion>
    <PayItemDescription>Milling Exist Asph Pavt, 1" Avg Depth</PayItemDescription>
    <UnitOfMeasure units="SY"/>
    <LumpSum>false</LumpSum>
    <SupplementalDescriptionRequired>false</SupplementalDescriptionRequired>
    <GroupId>0200</GroupId>
    <Cost costType="DesignEstimate">
      <UnitPrice>0.0</UnitPrice>
      <Quantity>4490.1</Quantity>
    </Cost>
  </PayItem>
  <PayItem>
    <PayItemID>
      <ID>0160 4</ID>
    </PayItemID>
    <SpecBookVersion>10</SpecBookVersion>
    <PayItemDescription>Type B Stabilization</PayItemDescription>
    <UnitOfMeasure units="SY"/>
    <LumpSum>false</LumpSum>
    <SupplementalDescriptionRequired>false</SupplementalDescriptionRequired>
    <GroupId>0200</GroupId>
    <Cost costType="DesignEstimate">
      <UnitPrice>0.0</UnitPrice>
      <Quantity>142863.2</Quantity>
    </Cost>
  </PayItem>
  <PayItem>
    <PayItemID>
      <ID>0285701</ID>
    </PayItemID>
    <SpecBookVersion>10</SpecBookVersion>
    <PayItemDescription>Optional Base, Base Group 01</PayItemDescription>
    <UnitOfMeasure units="SY"/>
    <LumpSum>false</LumpSum>
```

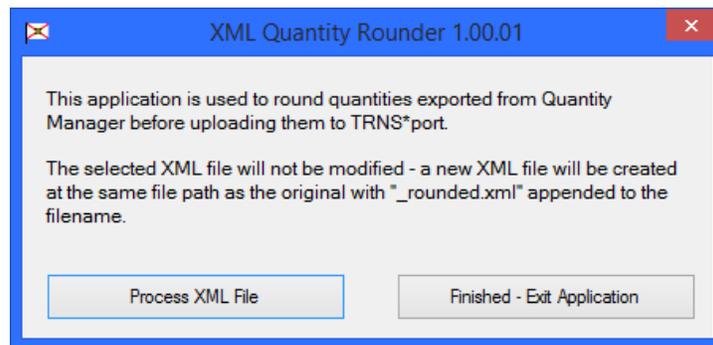
**Note** The rounding for the pay items are to 1 decimal place farther than the unit requirements in the BOE. (See Chapter 2 of the BOE.) FDOT has developed the XML Quantity Rounder tool to round the values in the xml exported by Quantity Manager to the correct decimal place for uploading into Trns\*port.

9. Close XML file.

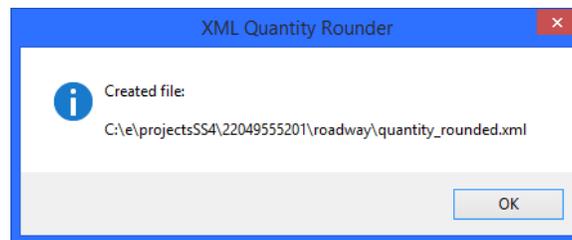
- On the FDOT Plans Development > Quantities Task menu, select Quantity Rounder.



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



- Navigate to the xml file and select open.
- An Information alert pops up when the process is finished. Click OK.



- Click on Finished – Exit Application to close XML Quantity Rounder tool.
- Open the new file, quantity\_rounded.xml, and review.

```

<PayItem>
  <PayItemID>
    <ID>0327 70 1</ID>
  </PayItemID>
  <SpecBookVersion>10</SpecBookVersion>
  <PayItemDescription>Milling Exist Asph Pavt, 1" Avg Depth</PayItemDescription>
  <UnitOfMeasure units="SY" />
  <LumpSum>false</LumpSum>
  <SupplementalDescriptionRequired>false</SupplementalDescriptionRequired>
  <GroupId>0200</GroupId>
  <Cost costType="DesignEstimate">
    <UnitPrice>0.0</UnitPrice>
    <Quantity>4490</Quantity>
  </Cost>
</PayItem>
    
```

## IMPORT PROJECT PAY ITEM TO DESIGNER INTERFACE

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

**Note** Update of PES will only occur if no errors exist in the Quantity Manager EXPORT XML file.

### ➤ To Import Project Pay Item to Designer Interface

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



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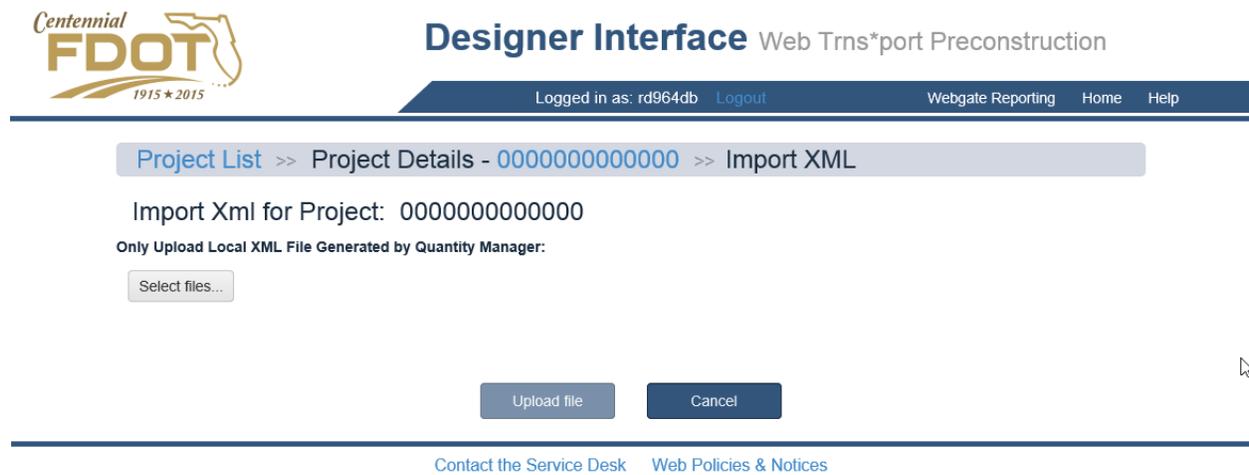
Designer Interface Web Trns\*port Preconstruction

Logged in as: rd964db Logout Webgate Reporting Home Help

Project List

Project...	Project Number	aecXML Pro...	Description	Letting D...	Unit Sy...	Proposal	Dis
Update	0000000000000	Export Header <b>Import</b>	CADD office testing		English	T8888	

3. Click the **Select files...** icon to browse to and select the rounded XML file saved the file from Quantity Manager *Export* function.



Centennial FDOT 1915 ★ 2015

Designer Interface Web Trns\*port Preconstruction

Logged in as: rd964db Logout Webgate Reporting Home Help

Project List >> Project Details - 000000000000 >> Import XML

Import Xml for Project: 000000000000

Only Upload Local XML File Generated by Quantity Manager:

Select files...

Upload file Cancel

Contact the Service Desk Web Policies & Notices

4. Click the **UPLOAD file** button to process the XML file.



## Designer Interface Web Trns\*port Preconstruction

Logged in as: rd964db [Logout](#) [Webgate Reporting](#) [Home](#) [Help](#)

[Project List](#) >> [Project Details - 000000000000](#) >> [Import XML](#)

Import Xml for Project: 000000000000

Only Upload Local XML File Generated by Quantity Manager:

<span style="font-size: 1.2em;">☰</span> quantity_rounded.xml <span style="float: right;">✕</span>
--

[Contact the Service Desk](#) [Web Policies & Notices](#)

- Other updates may be required using Designer Interface once the Pay Items and Quantities import (i.e. mark item non-participating, structure info ...)

If errors exist, you will get a Data Validation Error page (red highlighted title below) listing all errors contained in the XML file. It is required to correct all errors in Quantity Manager, re-exported, and then re-imported 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.



## Designer Interface Web Trns\*port Preconstruction

Logged in as: rd964db [Logout](#) [Webgate Reporting](#) [Home](#) [Help](#)

[Project List](#) >> [Project Details - Project Details](#) >> [Import XML](#)

Import Xml for Project: 000000000000

Only Upload Local XML File Generated by Quantity Manager:

[Data Validation Help](#)

Type	Info	Data Validation Errors
Project Category	Project: Category: DesignEstimate Item: Quantity:	Invalid category number. Must be numeric (E16)

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

- 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.



## Designer Interface Web Trns\*port Preconstruction

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[Project List](#) >> [Project Details - Project Details](#) >> [Import XML](#)

Import Xml for Project: 0000000000000

Only Upload Local XML File Generated by Quantity Manager:

Select files...

Project Load Log Messages		
	Data validation successful.	Project successfully loaded.
UPDATE Project Item	Project: 0000000000000 Category: 0200 Item: 0327 70 1	
UPDATE Project Item	Project: 0000000000000 Category: 0200 Item: 0160 4	
UPDATE Project Item	Project: 0000000000000 Category: 0200 Item: 0285701	
UPDATE Project Item	Project: 0000000000000 Category: 0200 Item: 0285709	
UPDATE Project Item	Project: 0000000000000 Category: 0200 Item: 0285709	

Page 1 of 4 10 items per page 1 - 10 of 31 items