2008 Roads and Bridges User Conference - East

WS 22
Quantity Manager
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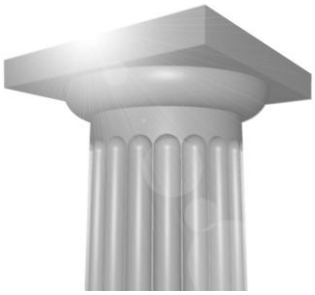

Quantity Manager

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Introduction

In this workshop we will review the workflow, processes and tools used to generate and report quantities. The Design & Computation Manager (D&C Manager) settings will be reviewed as they relate to quantity computations. D& C Manager recommended defaults will be discussed along with project specific modifications. Each student will compute graphical quantities and export these quantities to a database format that can be opened in Quantity Manager. After an introduction to Quantity Manager, its functions and interface, we will review the steps involved in defining project properties, project preferences and the project funding. We will add categories, pay items and quantities for non-graphical quantities and graphically review all the quantities. Additional functions such as generating reports will be covered.

Workshop Objectives

Upon completion of this module, you will:

- Know the recommended workflow for generating and managing quantities.
- Understand how Design and Computation Manager (D&C Manager) generates quantities and know how to navigate its various modes of operation.
- Compute quantities from graphical elements that were drawn or modified by the D&C Manager.
- Export the quantities computed by D&C Manager to Quantity Manager.
- Be able to navigate and customize the Quantity Manager interface.
- Review quantities created by D&C Manager.
- Define the project properties and preferences in Quantity Manager.
- Assign funding rules and define payers.
- Review the quantities in a Quantity Manager database graphically.
- Add categories, pay items and quantities manually.
- Define report style sheets and create various reports.

Workflow

The figure at right demonstrates the recommended workflow for generating pay item quantities. Any quantities that can be generated from measuring an element in a design file or that can be based on the existence of different item in the design file should be quantified via the D&C Manager database. This procedure reduces errors because quantities are then a by-product of the design drawings. However, there are some quantities that have no graphical representation, such as calculating man-hours for certain construction tasks. These items are entered "manually" into Quantity Manager.

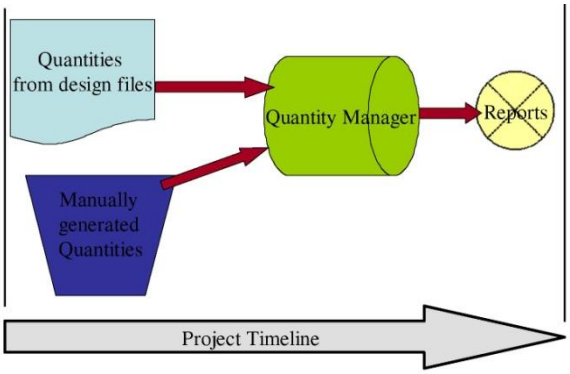


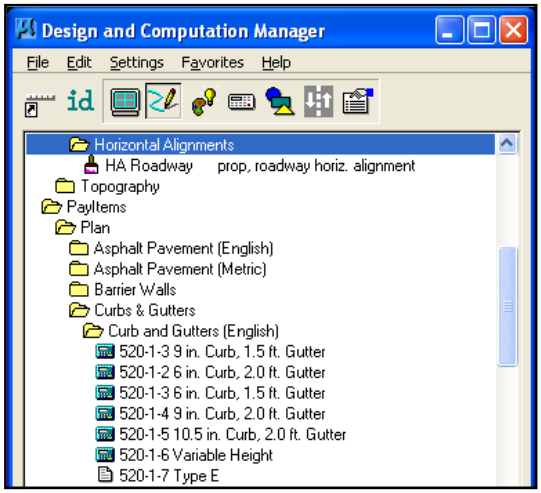
Figure 1-1: Workflow

Once the quantities for these elements are computed, the data is taken into Quantity Manager for review and/or modification. Then the pay items that are computed manually or computed external to CAD are entered in Quantity Manager. After the pay items and quantities have been entered, funding sources are assigned. Finally, reports are generated and the pay items and their respective quantities are exported from Quantity Manager to Trns*Port.

D&C Manager Overview

The D&C Manager standardizes graphic elements for drafting and quantity purposes. It is a proprietary hierarchical database that contains categories of items. The database file extension is DDB, hence this file is commonly referred to as the ddb file (*.ddb).

Categories are used to group and classify the items into functional and relative folders.

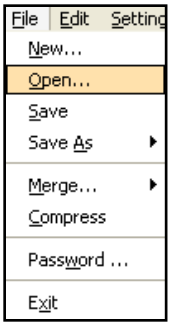


Each item represents a definition of a specific design feature. An icon is shown with each item that represents the function of the item as defined in the database. The 3 icons are:

- Calculator (Defines quantity parameters)
- Paintbrush (Drafting settings)
- Report icon (default – minimum settings)

Starting the Design and Computation Manager in GEOPAK

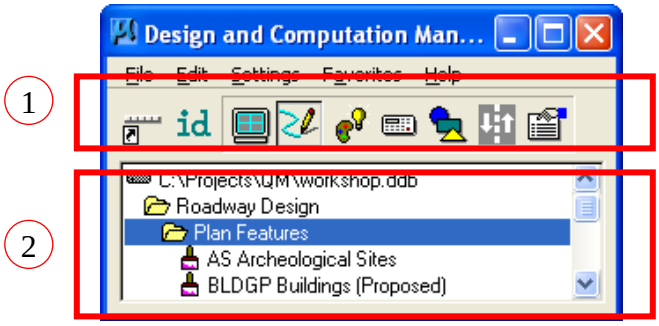
The D&C Manager can be accessed by selecting *Applications* > *GEOPAK ROAD* > *Design & Computation Manager*. It can also be invoked from the GEOPAK ROAD Tools tool frame and the Plan View Design tool box in Project Manager. In GEOPAK V8i, it can be accessed from the Task Navigation tools – GEOPAK Suite.



Getting Started

The D&C Manager *File* > *Open* command allows the user to navigate to the desired database. Databases may be company specific, project specific or user specific. The last opened database is stored in a resource file and is the one opened initially unless a specific database is forced by a configuration variable.

The main D&C Manager dialog is composed of two distinct areas: 1) across the top are icons for the various modes of operation, below that is the second area, 2) the Path list box. This area displays the name of the attached database file and your current position within the database structure. It lists the categories, sub-categories and items available for selection. This hierarchical data structure functions much like a directory. Double clicking enables the user to move up or down within the database.



D&C Manager Operational Modes

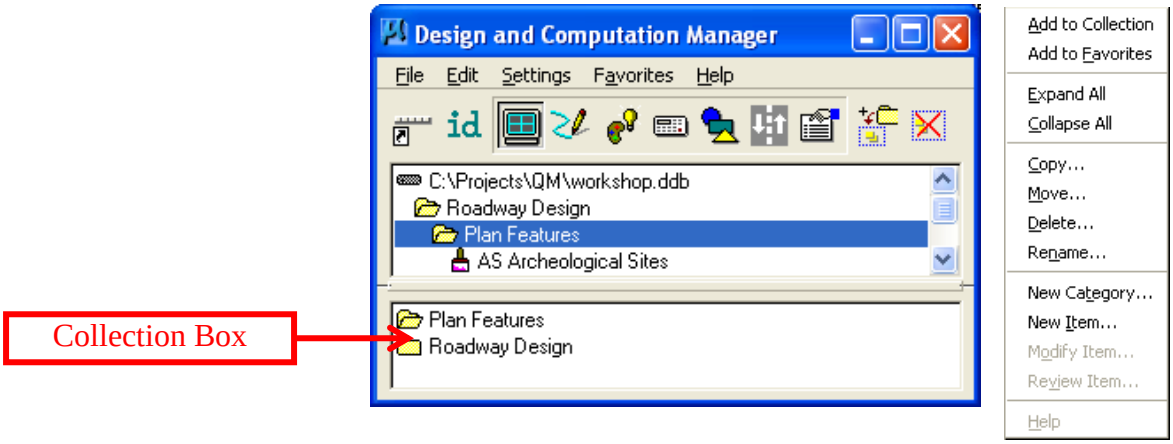
The D&C Manager dialog changes to accommodate nine different modes of operation: *Display*, *Design*, *Set*, *Compute*, *Shape*, *Pavement Marking* and *Preferences*. When certain modes are selected, additional icons are displayed within this area.

Switch to Toolbox Mode - This is a toolbar version of the D&C Manager dialog that is dockable. The most common use of this option is for drawing with Place Influence activated.

Identify - Identifies the D&C item that corresponds to a selected MicroStation element and highlights the item in the database. If no matching item is found in the specified database, the message "No matching database item" is displayed in the prompt field.

Display – Uses D&C Manager to create display filters for the view to manage the viewing and location of elements in the design file. The items to be shown or hidden are added to the Collection box, at the bottom of the D&C Manager dialog. Individual

items or entire categories can be placed in the collection by using the "Add to Collection" drop down menu as shown below. This menu is activated by right clicking on an item or category.

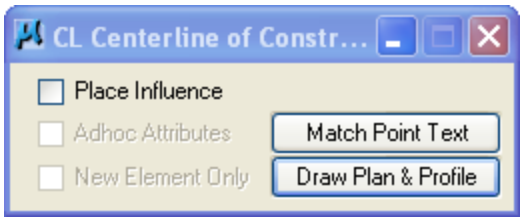


Four options are available for controlling the display of elements in the design file. These are described below from left to right.

Normal Display – The MicroStation view display is normal.
Highlight Selection - Highlights those items stored in the collection area in the MicroStation highlight color.
Hide Selection - Turns off the display of the collection items while leaving all other elements as is.
Display Only Selection - Turns off the display of everything but the collection items.

Design – This mode is used for plan and profile plans production. COGO elements are drawn into MicroStation files via the Draw Plan and Profile dialog. The Design mode enables the user to draw each roadway COGO element (and associated attributes) in the design file based on standard drafting parameters. This mode also allows the user to set MicroStation symbology when using native MicroStation commands for drawing or modifying elements. This is achieved by selecting a specific item in the database and toggling on the "Place Influence" toggle. "Place Influence" sets the active MicroStation symbology as defined in the selected D&C Manager item and tags any defined attributes to the elements that are drawn.

To draw a COGO element in design mode the desired item is highlighted from the path list box, i.e., alignment, edge of pavement, etc., from the second dialog box, "Draw Plan & Profile" is selected. The user is then prompted for a COGO database name. After the COGO database is entered, the user can select the name and type of COGO element to be plotted according to the definition of the D&C Manager database feature that has been selected.

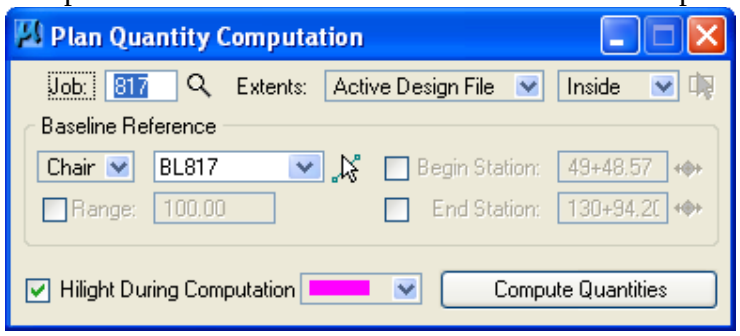


If the D&C Manager item selected is not a drafting item, then the button changes to display "Draw COGO Element".

Set - The Set mode is used to change existing MicroStation elements to the symbology and attributes of the selected item from the D&C Manager database. Elements can be selected by a Complex Chain, View, Fence, or Selection Set. The Set mode will append or modify the user data linkage to match the attribute assigned to the active Item.

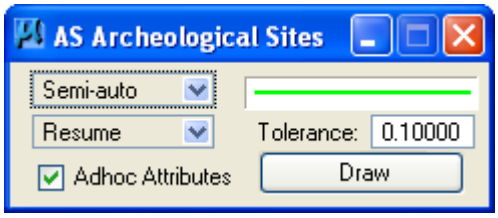
If the database Item has Adhoc Attributes associated with it, select the "Adhoc Attribute" check box to Append or Replace the attributes.

Compute – The Compute mode is used for generating quantities of items that have been placed as pay items by the Design or Set mode. This tool expands the D&C Manager dialog to add the collection bin. Multiple pay items or entire categories can be processed in one computation. In Compute mode the second toolbox shown below is opened.



Note: The Compute mode is discussed in detail later in this workshop.

Shape (GEOPAK only) - Creates shapes in 2d for generating area quantities. In order to place a shape, D&C Manager must identify a closed area. This area can be defined by intersecting elements, which do not have to be clipped or shortened to define the closed area. There are three options for placing shapes:

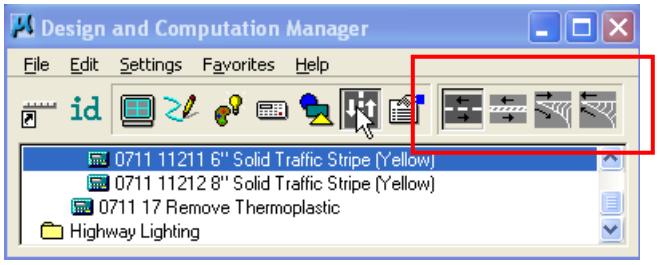


- **Semi-auto** - Used when the plan view has conflicting elements or where the selection of an area produces very small shapes. In this method, the user is prompted as each element is selected to determine the path the software takes to produce the shape.
- **Automatic** – Works best when the elements forming the shape do not conflict with other elements in the view.
- **Exclusive** - This option uses the automatic option, but in addition prompts the user to identify an area inside the original shape that is excluded from the external area quantity.

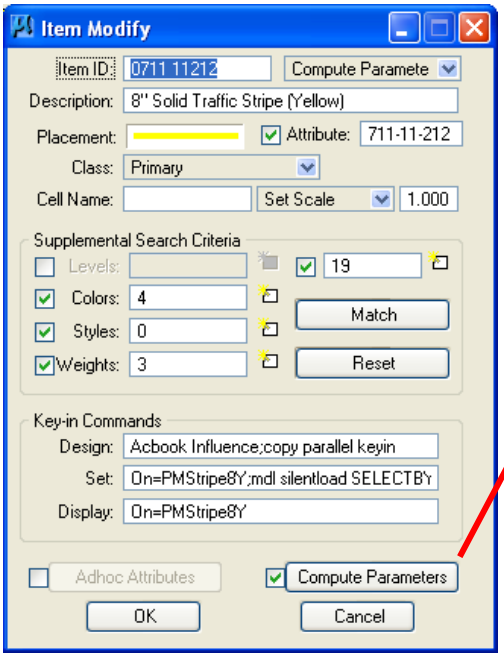
Adhoc Attributes can optionally be placed at the time of creating the shape. If enabled, a new window will open prompting the user for value(s) for each adhoc before the shape is created.

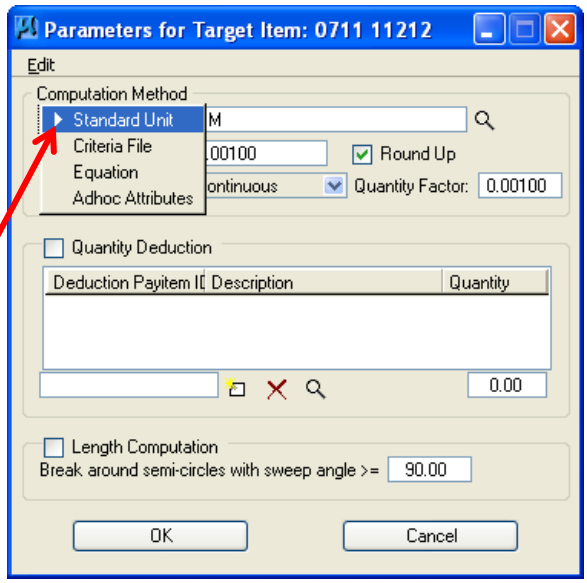
Pavement Marking – Four options are available for drawing pavement striping. The various tools from left to right are detailed below. This is not covered in this workshop

- **Striping -** Places single or double, solid or skip pavement stripes.
- **Separation -** Places traffic separation pavement marking.
- **Chevron Diverge -** Places pavement chevrons in areas of diverging traffic.
- **Chevron Merge -** Places pavement chevrons in areas of merging traffic.



Preferences – Configuration of an item. This includes the symbology for drawing the element and if and how the item is to be quantified. The compute parameters can be set to "Standard Unit, Criteria File, Equation, or Adhoc Attributes".





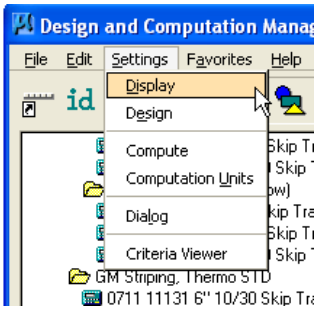
There are several GEOPAK applications that use D&C Manager in the background to automate the drawing of elements with D&C Manager attributes and facilitate automated quantities. Some examples are the DrawSign application and the Landscape application. These applications not only provide a mechanism to create discipline specific elements but also to continue the workflow of generating quantities for all types of designs.

Exercise: Using the Identify option and the Display Mode in D&C Manager

1. Start MicroStation. In the MicroStation open file dialog select the untitled workspace then navigate to the QM worshop directory as defined by the instructor.
2. Open the file dsgnrd01.dgn.
3. Activate D&C Manager.
4. Select File > Open from the D&C Manager dialog.
5. Select the D&C Manager database file 'workshop.ddb' from the workshop project directory.
6. Make sure all the levels are on in the design file then select the **id** icon.
7. Data point and accept one of the filled yellow shapes in the view.
8. Review the item in the database.
9. Data point and accept one of the filled green shapes in the view.
10. Review the item in the database.
11. Navigate to the Quantity Features folder under the Roadway folder.
12. Click on the Display mode icon.
13. Right click on the Quantity Features folder and add it to the collection box.
14. Select the **Display Only Selection** from the Display mode supplemental dialog.
15. Review the results in the view.
16. Right click in the collection box area, and then select the option to clear the collection box and again using the ID icon select one of the yellow shapes.
17. Find the pay item 0110 1 1 in the database using the ***Edit > Find*** command, then with only the item 0110 1 1 selected, click on the Display mode and select the Display Only Selection icon.
18. Also try the **Highlight Selection** and **Hide Selection** icons.
19. Select the **Normal Display** icon.

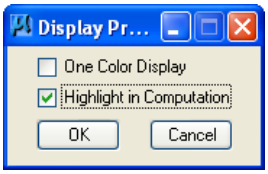
D&C Manager Settings and Prefs

D&C Manager Settings



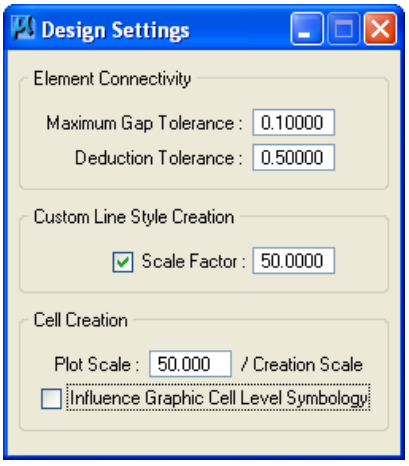
The D&C Manager Settings menu contains several commands that are important to the quantity computation process. Defining the options and values within these dialogs are fundamental to accurate results. The key dialogs on the Settings pull down menu are:

- Display
- Design
- Compute
- Computation Units.



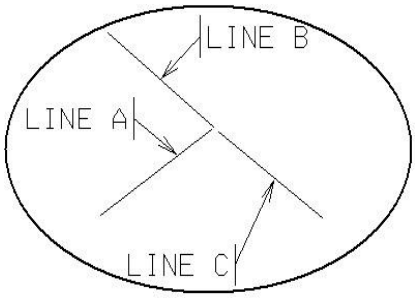
Display Settings – The "One Color Display" toggle temporarily changes the display of elements on the screen to one common color, and then the user may specify additional elements to be viewed in their original colors. This tool enhances visualization when reviewing quantities. The toggle "Highlight in Computation" highlights each element as it is computed.

Design Settings



Element Connectivity - sets the maximum gap tolerance and deduction tolerance used in computations and the drawing scale for cells and line styles.

If the distance between two specified elements in a MicroStation file is smaller than the **Maximum Gap Tolerance**, the software assumes the two elements intersect and treats the elements as if they are connected and continuous when computed. If the distance is larger than the **Maximum Gap Tolerance**, GEOPAK assumes the two elements do not connect and are separate instances of the same item. In the following figure, Line A and B are 0.05 feet apart, which is less than the Max Gap Tolerance of 0.1.

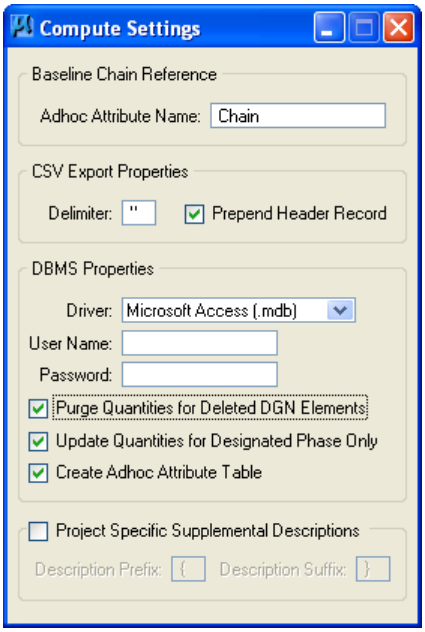


However, Line C is 0.2 feet from either of the other two lines and as such is not considered connected. Element Connectivity is used in computing quantities and generating reports. The **Deduction Tolerance** is also used when computing quantities. For example, if the pay item specified is a curb line, and within its compute parameters a deduction of six feet is defined for each curb inlet when a curb inlet is found within the deduction tolerance of the curb line, the length is automatically deducted from the quantity of the curb.
Compute Settings - The **Compute Settings** are applied during the computation process and impact the resulting output. Compute Settings contains four sections:

- Baseline Chain Reference
- CSV Export Properties
- DBMS Properties
- Project Specific Supplemental Descriptions.

When quantities are computed a single baseline is referenced for station/offset values. The **Adhoc Attribute Name** field is used to attach an adhoc to one or more elements that tie those elements to a specific chain for any station/offset values derived during computation by the Plan Quantity Computation dialog.

The **CSV Properties** are used when exporting any pay item quantities to a CSV file. Two CSV file formats are supported.
These will not be covered in this workshop.
The **DBMS Properties** are applied when exporting quantity information to a database for use with Quantity Manager.
Driver – This determines the database format to be used for the resulting Quantity Manager database. Supported databases are Microsoft Access, Oracle or SQL Server.
Username/Password – Secures the database with a username and password.
Purge Quantities for Deleted DGN Elements - As quantities are computed, GEOPAK checks if the element has been previously computed. If it has been computed, it checks to see if the element has been modified and adjusts the quantity according to the modification. If the element has been added since the last computation, the quantity is added to the database. However, if an element has been deleted, GEOPAK does not automatically delete the quantity, as this may not be the action desired by the user. For example, if the quantity was originally calculated in a reference file, and then file is detached by mistake, the user still needs the quantities. Therefore, the user must decide when to delete quantities for which there are no longer graphic elements. If toggled on any quantity which does not have an associated element is eliminated.



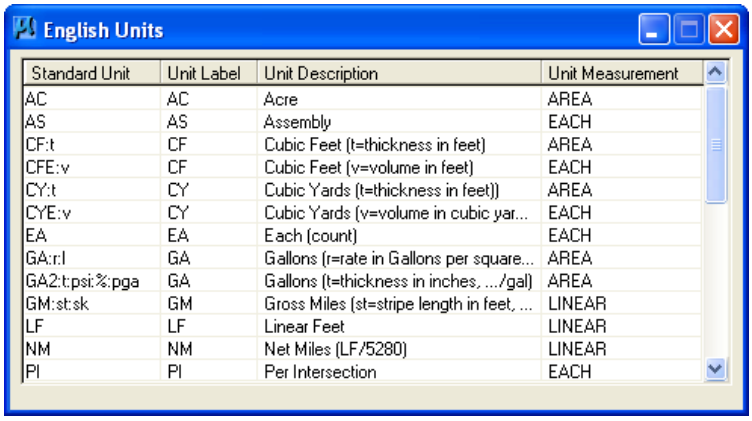
Update Quantities for Designated Phase Only – When the toggle is disabled, an element can appear in multiple phases. This was the behavior prior to the 8.08 release. With the toggle enabled, an element appears in only the selected phase and removed from any other phases when appending to an MDB file.

Create Adhoc Attribute Table - When toggled on, adhocs attached to elements being computed are stored in the ad hoc table within the Quantity Manager database.
Project Specific Supplemental Descriptions - When toggled on, the specified Prefix and Suffix are used for the Supplemental Descriptions. By default, if you create multiple items with the same name, then the quantities for the separate items will be summed into a single quantity when computed and exported to Quantity Manager. Supplemental descriptions are a provision by which multiple items that have the same name and general description will be treated as distinct items during quantity computation. For example:

Item = "123-456" Description = "Removal {Concrete}"
Item = "123-456" Description = "Removal {Pavement}"
Item = "123-456" Description = "Removal {Building}"

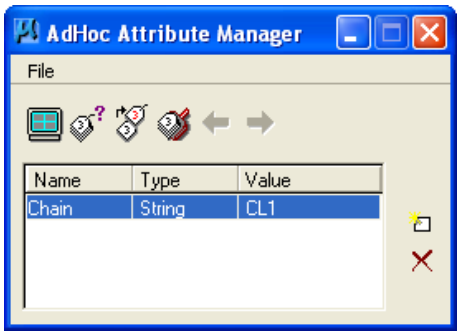
The three items above are all separate items, with the same item ID. The description is composed of two parts: a "general" description (normally identical, in this case "Removal") and a "supplemental" description. The supplemental description is being embedded between "{ }". Basically any character may be used but the recommended characters are: { } or < > or ( ) or [ ] or others. The selected character is then defined in the Compute Settings dialog. The three items shown above when computed will be quantified individually and maintained as unique item quantities even when exported to Quantity Manager and eventually to Trns*prt.

Computation Units – D&C Manager supplies standard units of measure in both English and Metric format. To access a listing of these units, select **Settings > Computation Units**. The units are stored in .CSV files contained in the product installation folder. The file names are: ComputationUnitDefinitionEnglish.csv and ComputationUnitDefinitionMetric.csv. If additional units are needed, these files can be modified for custom units.



Standard Unit	Unit Label	Unit Description	Unit Measurement
AC	AC	Acre	AREA
AS	AS	Assembly	EACH
CF:t	CF	Cubic Feet (t=thickness in feet)	AREA
CFE:v	CF	Cubic Feet (v=volume in feet)	EACH
CY:t	CY	Cubic Yards (t=thickness in feet))	AREA
CYE:v	CY	Cubic Yards (v=volume in cubic yar...	EACH
EA	EA	Each (count)	EACH
GA:r:l	GA	Gallons (r=rate in Gallons per square...	AREA
GA2:t:psi:%:pga	GA	Gallons (t=thickness in inches, .../gal)	AREA
GM:st:sk	GM	Gross Miles (st=stripe length in feet, ...	LINEAR
LF	LF	Linear Feet	LINEAR
NM	NM	Net Miles (LF/5280)	LINEAR
PI	PI	Per Intersection	EACH

Adhoc Attribute Manager



The Adhoc Attribute Manager is used to attach, review and modify adhoc attributes. Adhoc Attributes are tags that are linked to graphic elements to provide more information about that element, like an adjective to a noun. These tags can then be retrieved and used by subsequent processes. One of the main uses of adhocs is to define quantity information on elements, especially to define quantities for items that are based on the presence of another and separate item. An adhoc is comprised of pieces of information that must be defined for each adhoc:

- Name - An identifier used by applications when searching for a specific Adhoc Attribute.

- Type - Defines the nature of the information. The options are Numeric, String, Unit, Quantity, and Remarks.
- Value - The actual information used by the application. What the value can be is restricted by the Type. For example, if the Type is set to Numeric then the Value must be a number.

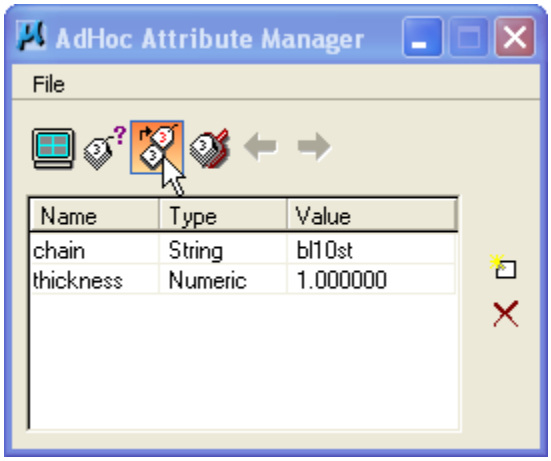
To access Adhoc Attribute Manager, click on Applications from the MicroStation menu, then select GEOPAK Road > GEOPAK 3pc Adhoc Attributes.

The Adhoc Attribute Manager has four buttons on the tool bar for viewing and tagging elements with Adhoc Attributes. From left to right these buttons are:

- Attribute Display Filter
- Identify Element
- Set Attribute
- Adhoc Scooper.

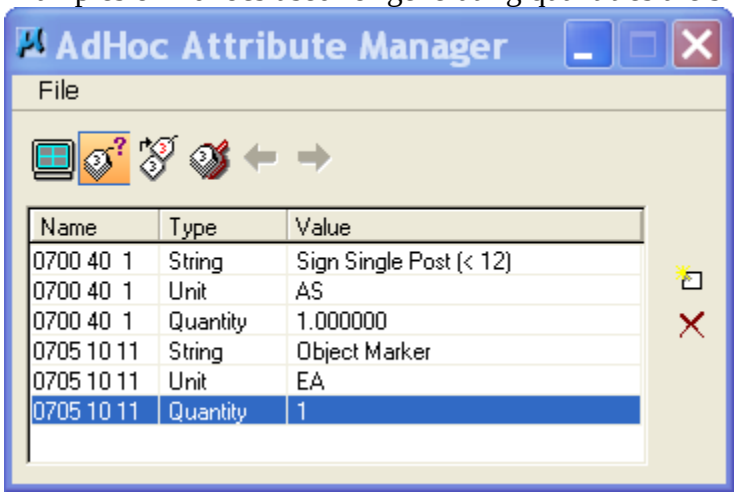
The two buttons on the right side are Create New Row and Delete Row.

To add an Adhoc to an element(s), define the adhoc in the Adhoc Attribute Manager dialog as shown right using the New icon to add it to the list, then either by selection set or by individually selecting the elements use the Set attribute icon  to tag it to the selected elements.



To define a specific chain for generating computation reports for certain elements, create an adhoc named “chain” or whatever was defined in the compute settings dialog for baseline chain reference. Set the type to string and the value to the chain name that the reports should be based on. See image right.

Examples of Adhocs used for generating quantities are shown in the image below.



Exercise: Configure Design and Compute Settings

1. Open the design file (dsgnrd01.dgn) from the previous lab.
2. Activate D&C Manager and select **Settings > Design** from the D&C Manager dialog.
3. Set the Maximum Gap Tolerance to **0.2**.
4. Set the Deduction Tolerance to **1.0**.
5. Close the **Design Settings** dialog.
6. Select **Settings > Compute** from the D&C Manager dialog.
7. Set the Adhoc Attribute Name to **Chain.**
8. Enable the toggle for Purge Quantities for Deleted DGN Elements.
9. Close the **Compute Settings** dialog.
10. Select all of the elements that are on the side street at the approximate station 85+50 using PowerSelector and place in selection set. Open the Adhoc Attribute Manager dialog and a new adhoc. Define the adhoc as: Adhoc name = chain, type = string, value = bl10st. Click on the Set Attributes button on Adhoc Manager to add the adhoc to the elements.

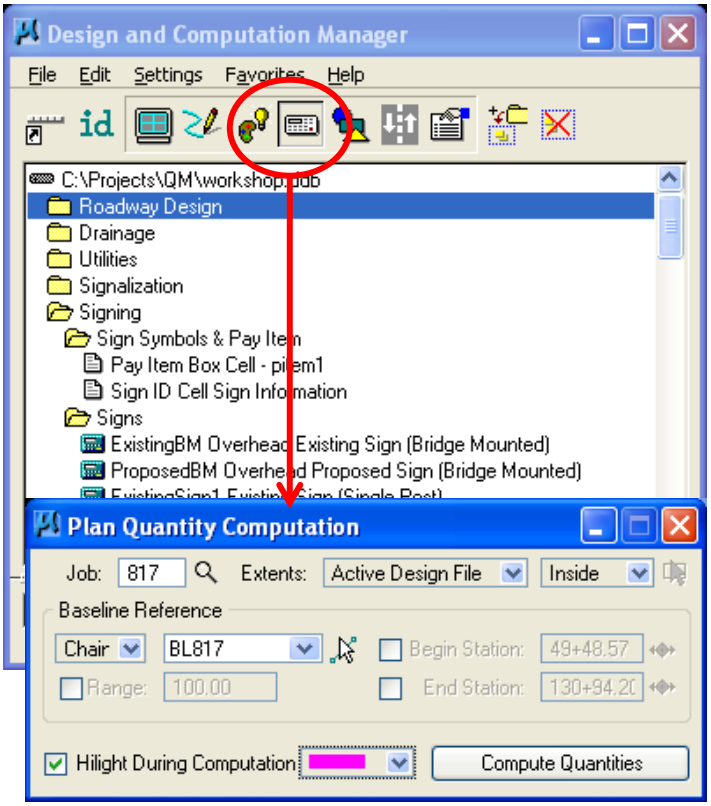
D&C Manager Computations

Once the desired graphical elements have been drawn into a design file, the process of computing quantities to export to Quantity Manager is a relatively simple process. After verifying the values in the *Settings* > *Design* and *Settings* > *Compute* dialog is correct, the pay items to be computed are added to the collection box. The next step is to define the extents of the design file from which the elements are calculated and the reference element/chain from which the station/offset will be oriented. The final step is to output the quantities to a DBMS formatted file to be opened in Quantity Manager.

Compute Mode

An important, yet time-consuming part of any project is the computation of quantities. Through the Compute mode of the D&C Manager, the completion of this task is much quicker and easier. In addition, since the application uses the plan view of the design to compute quantities, discrepancies between the drawings and the bid quantities should be virtually non-existent.

When the D&C Manager Compute mode is selected an additional dialog is invoked as depicted right.



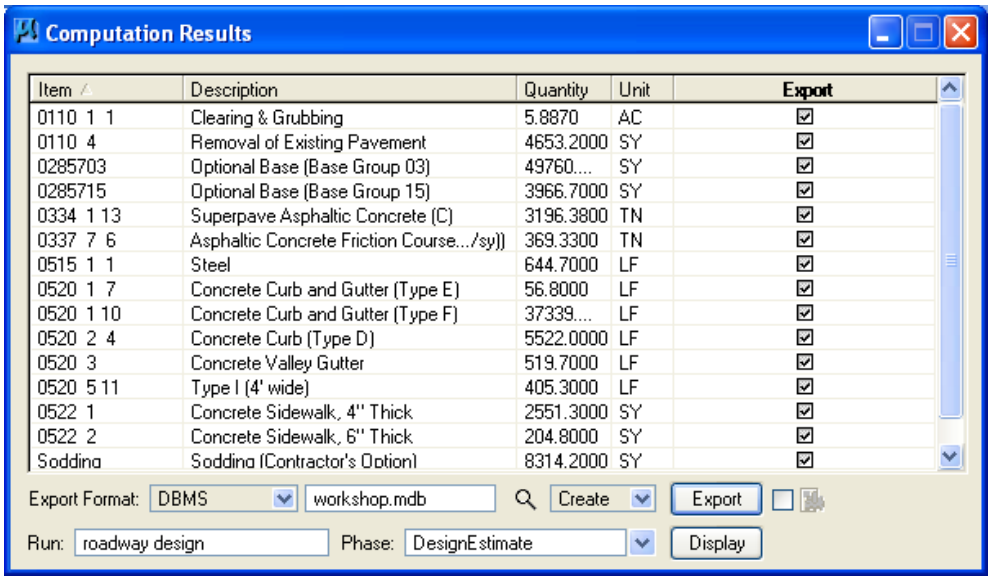
The next step is the selection of the pay items and/or categories to be computed. Even though a drawing may contain many graphical elements representing various pay items, the user determines which pay items will be selected for the computation process. Just like Display mode, Compute mode has a collection pane at the bottom of the dialog. When computing quantities for a single pay item it is not necessary to use the collection box as long as the collection box is empty.

Two selection methods can be employed.

- The first method is to select an entire category. D&C Manager computes quantities for every item found in the selected category as well as any child categories. To do this single click on the desired category and then right click and select the *Add to Collection* option at the top of the list.
- The second method is the selection of individual items. This is accomplished by selecting the desired item from the hierarchy list box, then right clicking to select *Add to Collection* to place the item in the Collection box.

Note: It is recommended to individually check the quantities for each item during a preliminary compute, to ensure all of the elements are being calculated. Also the design file should be checked for duplicate and overlapping elements prior to running quantities. This can be accomplished with the MicroStation cleanup tool.

After the selected items have been computed, a second dialog will open that contains the computed quantities. The dialog is shown below.

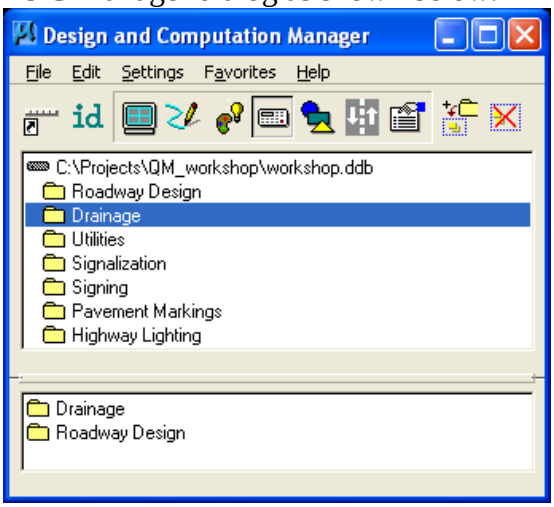


The Export Format must be set to DBMS to create the correct file type for Quantity Manager. The database is created using the software format defined in the D&C Compute settings dialog. The database contains detailed information about each item including calculated and rounded quantities, geometric properties, pay item numbers, descriptions, station/offset values, etc. When the DBMS option is selected from the *Computation Results* dialog several other enter data fields are made available for input. These fields are:

- *Advanced Project Settings* - Additional Project specific information that is added to the QM database. This information can be passed to Trns*prt via the aecXML file.
- *Run* - A method of grouping various quantities and / or pay items.
- *Phase* - A means to group pay items. Default phases include: Design, Preliminary, and Final. The user can add new phases, but should be aware of naming limitations if exporting to Trns*port.

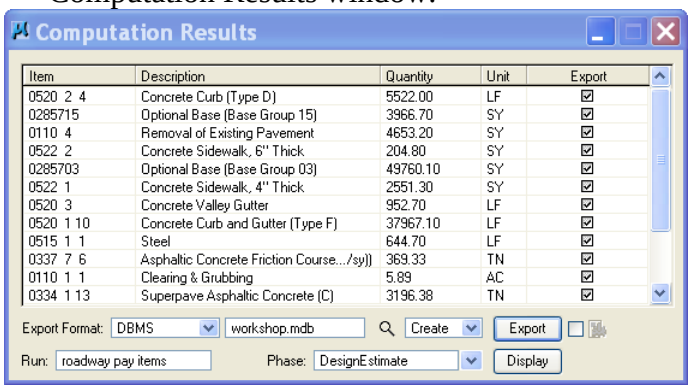
Exercise: Compute Quantities

1. Ensure the design file dsgnrd01.dgn is open.
2. Turn on the display of all reference files and turn on all levels.
3. Add the Roadway Design and Drainage categories to the collection box in the D&C Manager dialog as shown below.



4. Click on the Compute mode icon from the D&C Manager dialog. Use the following settings
   GEOPAK:
   Job 817
   Inside the *Active Design File*
   Baseline Reference is *Chain BL817*

5. Click Compute Quantities. When the process is complete the Computation Results window will open. Set the Export Format to DBMS and fill out the dialog box as shown below. Click on Export. When the process is complete close the Computation Results window.

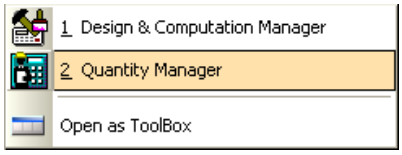


6. Close D&C Manager.

Using Quantity Manager

Quantity Manager (QM) is a standalone Java application that manages all project quantities including those from D&C Manager in addition to quantities that are keyed into Quantity Manager manually. Quantity Manager can receive data from GEOPAK, MX and InRoads. The data for Quantity Manager is stored in one of three user selectable database formats – Access, Oracle or Microsoft Sequel as previously discussed.

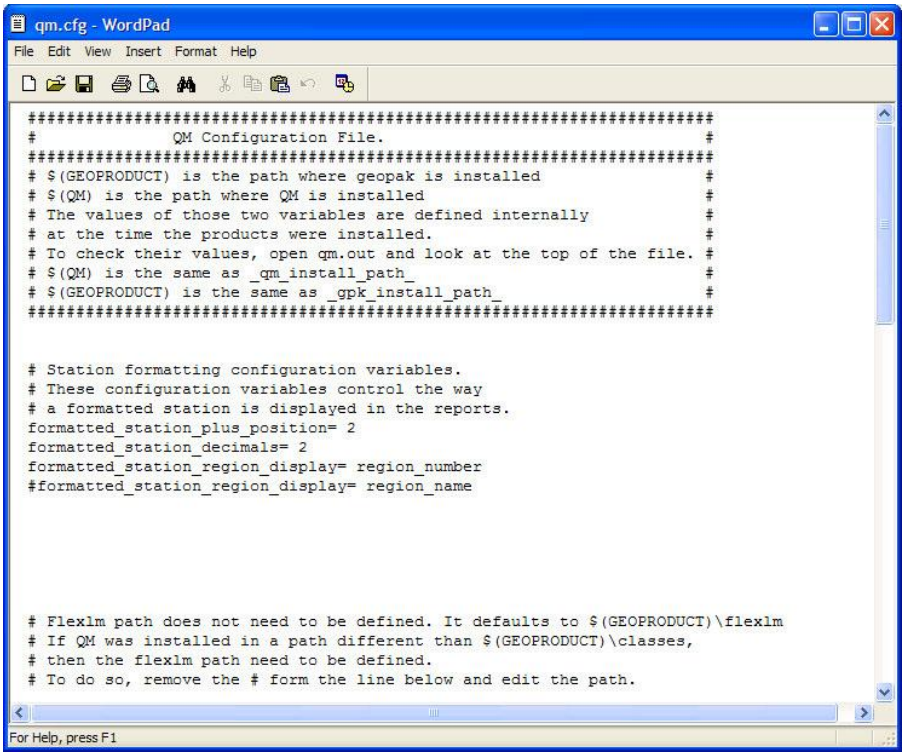
Accessing Quantity Manager



In GEOPAK, Quantity Manager can be accessed from MicroStation by selecting *Applications* > *GEOPAK Road* > *Quantity Manager* or by selecting the icon next to D&C Manager on the *Road Tools* tool frame.

Some of the preferences and functionality of QM is set in the QM configuration file. The configuration file is 'qm.cfg' and it is located in the \program files\bentley\geopak\classes\ folder.

This file contains variables that define the format and location of reports and style sheets for formatting reports. The configuration file also controls the default settings of the interface. This file contains variables for station formatting, report and export paths, and the default locations of the aecXML.files. There are descriptions and instructions in the file for each variable.




```
#############################################################################
#                 QM Configuration File.                                    #
#############################################################################
# $(GEOPRODUCT) is the path where geopak is installed                       #
# $(QM) is the path where QM is installed                                   #
# The values of those two variables are defined internally                  #
# at the time the products were installed.                                  #
# To check their values, open qm.out and look at the top of the file.       #
# $(QM) is the same as _qm_install_path_                                    #
# $(GEOPRODUCT) is the same as _gpk_install_path_                           #
#############################################################################


# Station formatting configuration variables.
# These configuration variables control the way
# a formatted station is displayed in the reports.
formatted_station_plus_position= 2
formatted_station_decimals= 2
formatted_station_region_display= region_number
#formatted_station_region_display= region_name




# Flexlm path does not need to be defined. It defaults to $(GEOPRODUCT)\flexlm
# If QM was installed in a path different than $(GEOPRODUCT)\classes,
# then the flexlm path need to be defined.
# To do so, remove the # form the line below and edit the path.
```

Some of the new configuration variables in the QM.cfg file are:

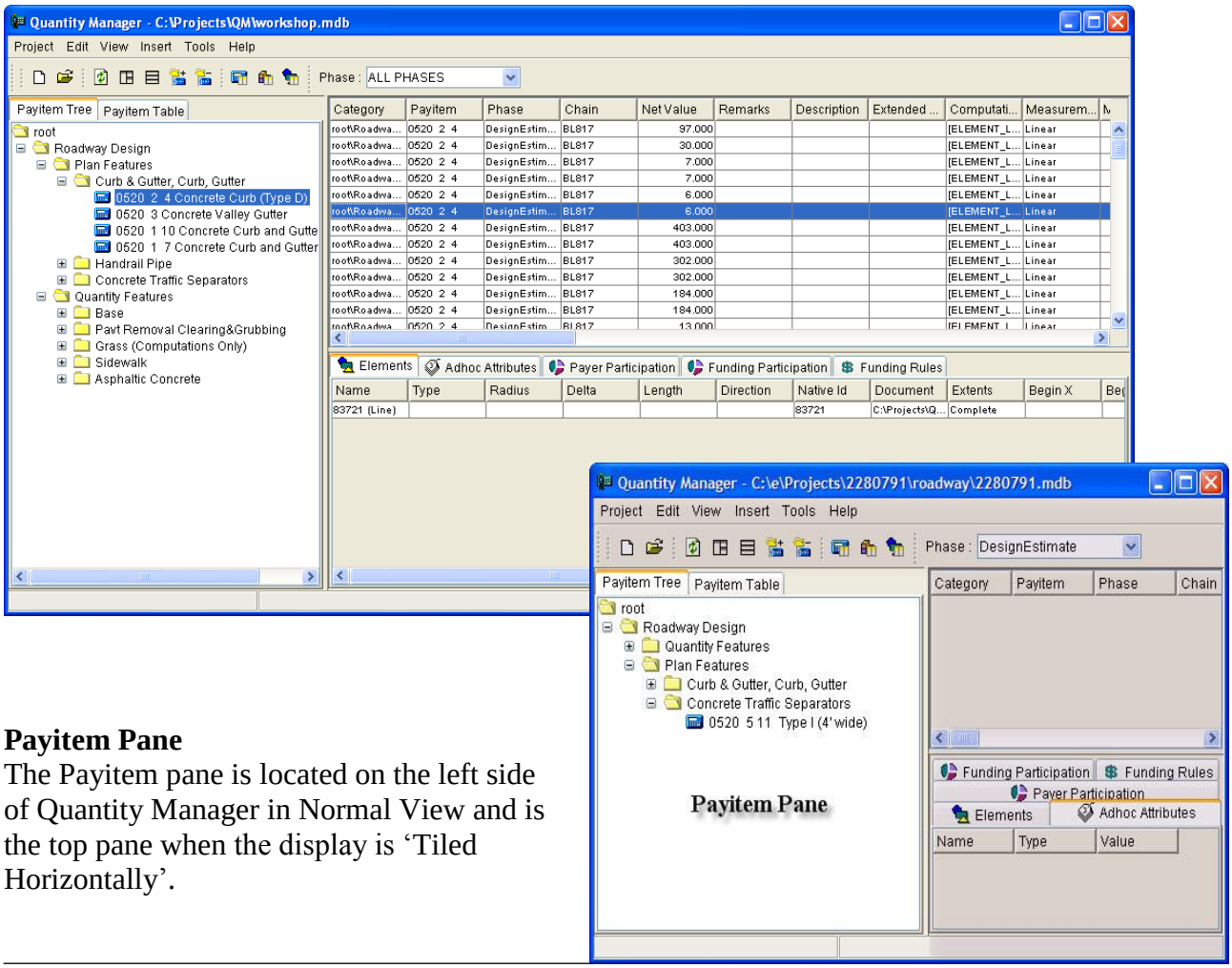
new_phase_label=PES Category (or whatever you want to call it)
new_phases_label=PES Categories (or whatever you want to call it)
import_aecxml_groups_as_phases= true (the default is false which exports as payers)

To implement a "company" QM.cfg file across a worksite, add the MicroStation environment variable GPK_QUANTITYMANAGER_CFGFILE to define the location of your configuration file. This is a customized version of the QM configuration file that is delivered with the product, which Quantity Manager will use at startup.

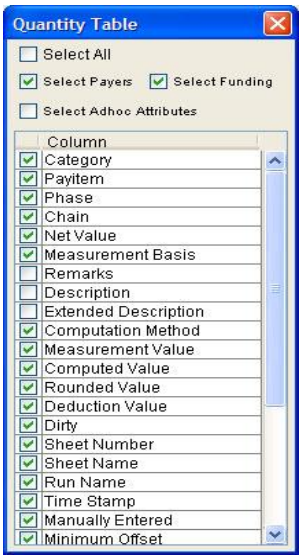
Syntax examples:
GPK_QUANTITYMANAGER_CFGFILE < \\server name\directory name\cfg file name.cfg
GPK_QUANTITYMANAGER_CFGFILE < c:\directory name\cfg file name.cfg

Quantity Manager Interface

The Quantity Manager interface contains a pull down menu, icons and three windows or panes. One pane shows the pay items in a tree or table format, another pane displays the pay item quantities and the third pane contains the element information for each quantity.

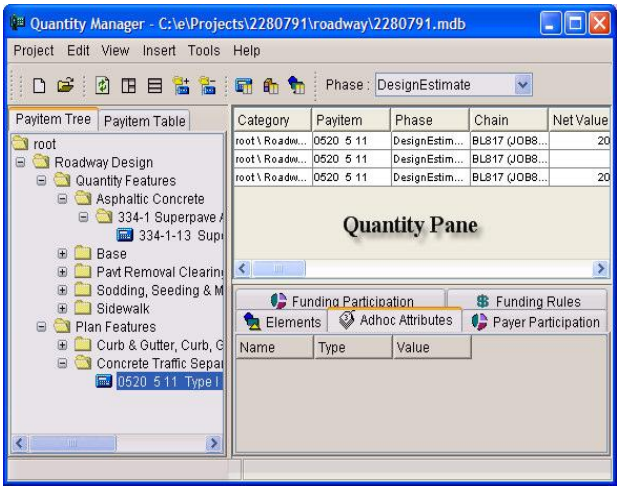


Payitem Pane
The Payitem pane is located on the left side of Quantity Manager in Normal View and is the top pane when the display is 'Tiled Horizontally'.



Two tabs control the display type of the Pay item pane; *Payitem Tree* and *Payitem Table*. The *Payitem Tree* tab displays the contents in a hierarchical structure which is easily navigated in the same manner as Design and Computation Manager.
The *Payitem Table* tab displays the pay items in a table. The pane is customizable and is useful when selecting multiple items. It is also the best display option when generating reports.

Quantity Pane

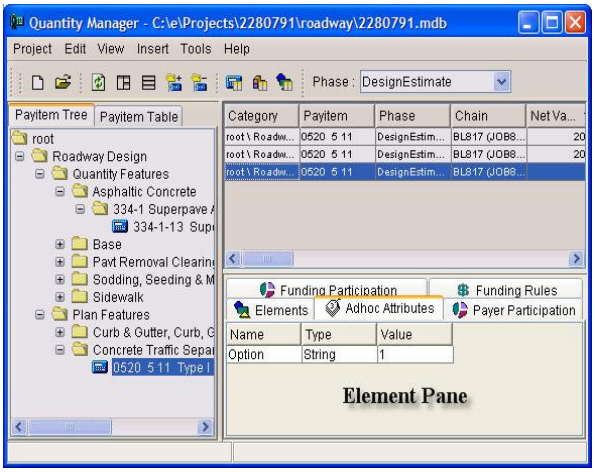


The Quantity pane displays quantity information about the selected Pay item or Category. The information displayed can be customized by selecting which columns to display. Quantity information can be sorted by clicking on any of the column headers. Only the quantities under the current Phase, as selected on the Tool bar, are displayed.

Element Pane

The Element pane displays information about the elements specific to the selected Quantity. Each tab in the Elements pane displays different attributes defined for that element. These tabs are:

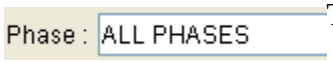
- **Elements -** shows all the elements that make up that Quantity.
- **Adhoc Attributes -** displays any adhoc tags related to the Quantity or tagged to the element.
- **Funding Participation –** the amount of participation per payer.
- **Funding Rules** – how the cost is distributed.
- **Payer Participation -** funding sources.



To access commands specific to a pane, right-click in any view pane and a drop-down menu is displayed that has shortcuts to the tools that relate to that pane.

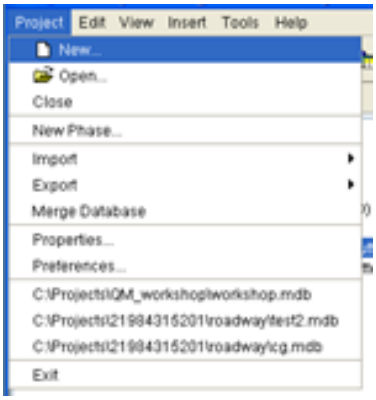
To customize which columns are displayed in the quantity or element pane, right-click on the column header and toggle on and off the available columns.

QM Toolboxes
Located directed below the pulldown menu bar are toolboxes. There are four dock-able toolboxes with ten shortcut icons and one combo box.

	New Project
	Open Project (Project > Open)
	Refresh (View > Refresh)
	Normal View (View > Normal)
	Tile Horizontally (View > Tile Horizontally)
	Expand Tree (View > Expand Tree)
	Collapse Tree (View > Collapse Tree)
	Hide / Show Payitem Table Columns (View > Columns > Payitem Table)
	Hide / Show Quantity Table Columns (View > Columns > Quantity Table)
	Hide / Show Element Table Columns (View > Columns > Element Table)
	The active phase.

QM Pull down Menus
Below is a list of the commands available from the pull down menus. Refer to the online help for complete documentation for each option.

Project Menu



- **New –** Creates a new QM database.
- **Open -** Opens an existing QM database.
- **New Phase –** Creates a new phase in the database.
- **New Phase –** Creates a new phase in the database
- **Import** – Mechanism to import pay items and cost.
- **Export** – Exports pay item information to various formats.
- **Merge** – Will merge multiple QM databases.
- **Properties -** Defines the project number, description, units, Spec Year, and advanced project settings.
- **Preferences -** Provides a toggle for enabling adhoc editing, defining aecXML document file names and setting accuracy.

Edit Menu

- **Select all** – Selects all quantities for the selected pay item.
- **Unselect all** – Deselects all quantities.
- **Delete -** Deletes the highlighted item or category from the database. If a category is deleted, all child categories and pay items are deleted. An Alert message is displayed prior to deleting.
- **Rename -** Renames the selected category or pay item. The highest level category (root) may not be renamed.
- **Phase -** Opens the Phase Properties dialog where phases can be added, deleted.
- **Funding –**
  - **Payer** – List of Payers and description used when defining funding rules. Payers can be added, deleted or imported from an aecXML funding source document.
  - **Rule (Funding Properties)** - Defines the payers and their respective percentages of participation to be associated with quantities.
- **Boundary –** creates or edits boundaries. Boundaries can be defined as sheets or station ranges.

View Menu

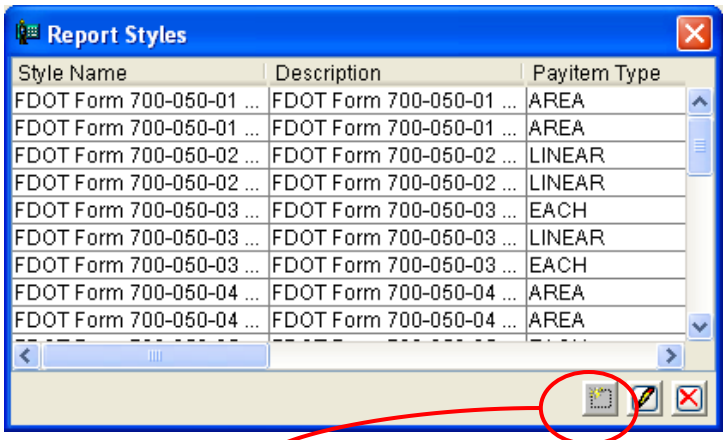
- **Refresh** – View refresh.
- **Columns** – opens dialogs to modify to various columns displayed in each pane.
- **Expand Category Quantities –** This toggle specifies the content of the quantity pane when a category is selected. If toggled on, the quantity of the selected category is displayed, along with all quantities in all subcategories. If toggled off, the quantity pane only shows quantities in the current selected category, one level deep.
- **Expand Tree -** When chosen, all categories, sub-categories, and pay items are expanded in the Payitem Tree (not the Payitem Table).
- **Collapse Tree -** When chosen, all categories, sub-categories, and pay items are collapsed in the Payitem Tree (not the Payitem Table), so that only the highest level category in the hierarchy is shown.
- **Normal –** Displays the panes in normal viewing mode.
- **Tile Horizontally –** Display the 3 panes horizontally.

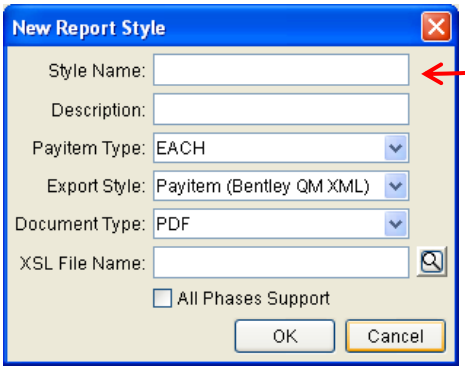
Insert Menu

- **Category -** New categories can be added anywhere within the database hierarchical structure and are inserted from the current selected category. Three operations are supported: *Above*, *Below*, *Sub-Category*.
- **Pay Item -** Insert a pay item from the current selected category or pay item. Three operations are supported: *Above*, *Below*, *In Category*. New pay items can be added anywhere within the database hierarchical structure. To add a single item above or below a pay item already in the table, select that pay item, then use the *Above* or *Below* modes. To add an item at the bottom of a category, select the category first, then use the In Category mode.
- **Quantity -** Insert a quantity to the current selected pay item. Based on the source of the computations, some data may be dimmed and not available for modification. The quantity property dialog is divided into a general tab and a location tab.

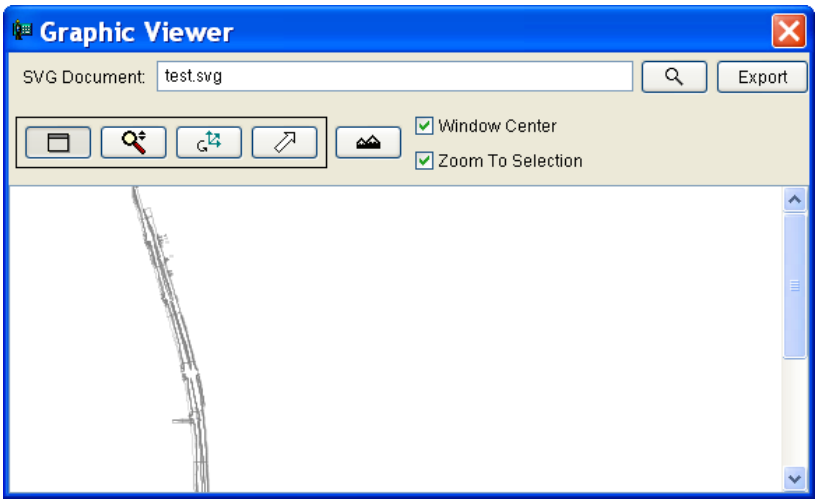
Tools Menu

- **Reports -** Tools to define custom report styles and create reports.
  - **Reports > Create -** Creates a report of the selected payitems for the active phase. The user can choose the report style and the report document type such as PDF, CSV, HTML.
  - **Reports > Define Styles -** Opens the Report Styles dialog shown right, from which new report styles can be added, existing report styles can be modified and report styles deleted. New styles are added by clicking on the *New* icon, which opens the dialog box depicted below.



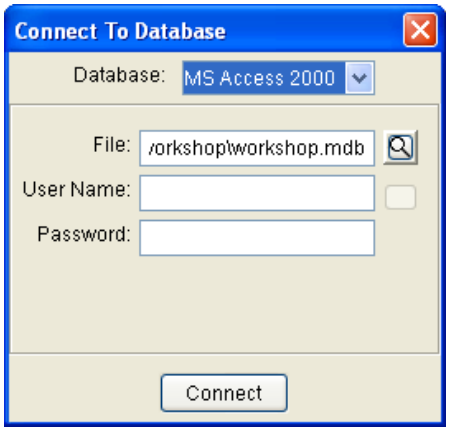


- **Graphic Viewer -** A viewer of the information stored in the QM database. The graphics can be saved as a .SVG (Scalable Vector Graphics) file. SVG is a language for describing two-dimensional graphics and graphical applications in XML.



Exercise: Reviewing Quantities in QM

1. From Windows Explorer, navigate to the installation folder for QM, this will be supplied by the instructor (the default location is: C:\Program Files\Bentley\Geopak\V8.11\Classes\). Open the configuration file QM.cfg. Review the contents. Change the variable "aecxml_import_documents_path= $(QM)\samples\standards\aecxml" to look in the workshop folder. Close the file
2. Open the dsgnrd01.dgn file again and from the GEOPAK menu start **Quantity Manager**.
3. Select **Project > Open** from the QM pull down menu.
4. Click the **Select Database Filename** icon.
5. Navigate to the class dataset folder.
6. Select workshop.mdb file created in the previous exercise and click **Open**.



7. From the Tree view select the **Roadway** category and click on the **Expand Tree** icon.
8. Swap to the Table view and try various sorting options of the pay items.
9. Review the various panes in QM then modify what columns are displayed.
10. Customize the display of the panes to tile them horizontally, then reset to normal view.

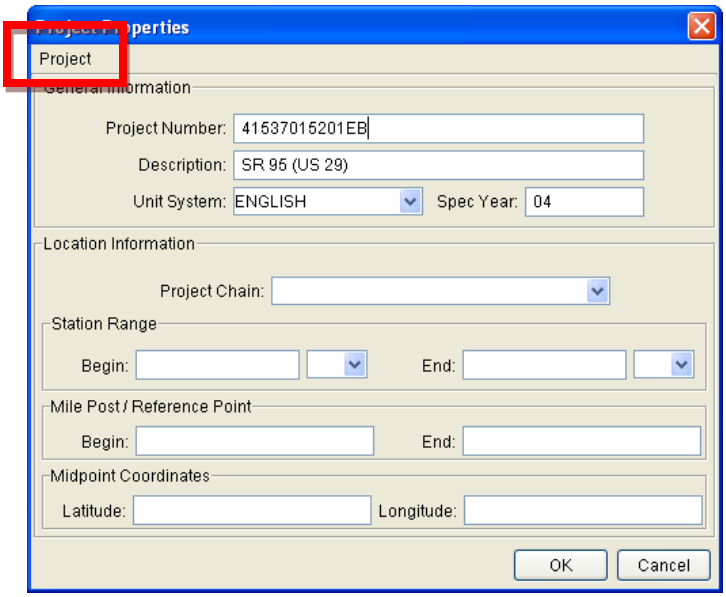
Setting Up a QM Project

Prior to working with the actual quantities it is recommended that the user define and setup the project information. Typical information to be set up includes Project Numbers, Funding Sources, Payers, and Phases.

If the quantities are to be exported to Trns*port from Quantity Manager, the project information in QM must exactly match the project information in Trns*port.

Project Properties

After a project is created in MicroStation and exported to Quantity Manager, the *Project Properties* need to be set. If Trns*port is used, the project information can exported from Trns*port into an XML file that can then be imported into QM. This file contains most of the QM project properties. If this file is accessible to you, save the file to your a local drive from Trns*port then follow the steps below to import it into QM.



1. From the Quantity Manager File menu select *Project* > *Properties*.
2. From Project Properties dialog box select *Project* > *import aecXML Infrastructure V33 Project*.
3. Set the location and file name of the XML file.
4. Click OPEN, the project properties are now populated in QM, click the OK button.

If this information is not available in the XML format, fill it in manually. See the description of each field below:

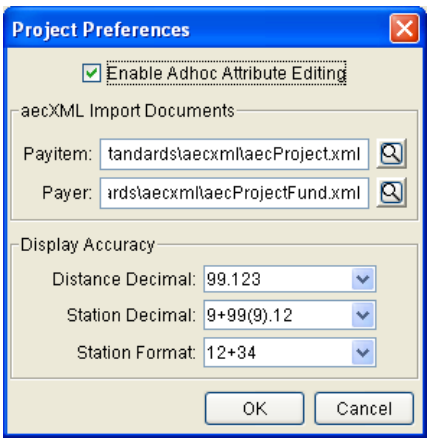
- **Project Number** - Used to identify the Quantity Manager project.
- **Description** - Allows for a brief description of the project, such as the associated road number.

- **Unit System** – Defines which units of measurement are used on the project, English or Metric.
- **Spec Year** - Used to specify the governing Specification year for the project.
- **Project Chain**- Project baseline.
- **Station Range Begin/End** – Station range on baseline chain.
- **Mile Post/Reference Post Begin/End** – used as a means of referencing the location of the project.
- **Midpoint Coordinates Latitude/Longitude** - used as a means of referencing the location of the project.

Project Preferences

When a project is created the accuracy of formatting notations is automatically set. The Project Preferences dialog displays the current settings and allows the user to modify these settings. In addition files containing the valid pay items and payer information in XML format can be imported. See the QM help for more information on the required format.

Note: Pay items can also be imported from a CSV file by using the option File > Import >Payitems >CSV

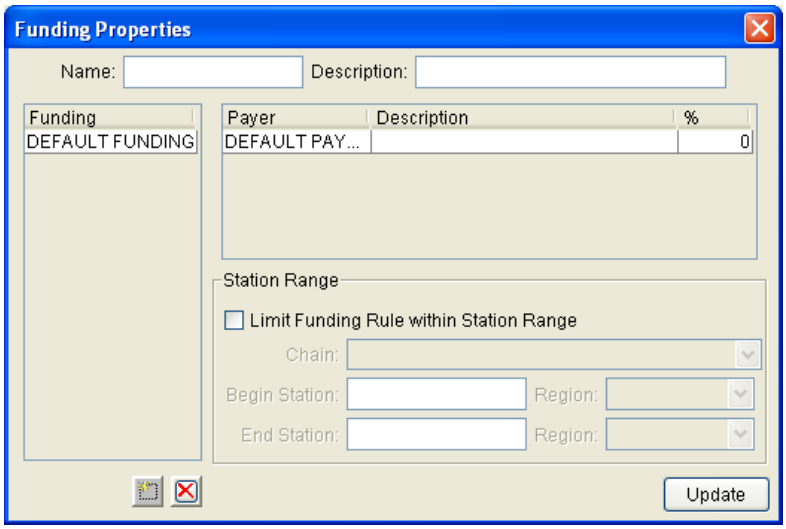


Funding

QM supports the management of quantities grouped by their Payers and Funding Rules. Funding *Rules* defines who is paying what and how much or what percentage. A Default Funding Rule is created and applied automatically if no other Funding Rule is applied. The Default Funding rule is automatically assigned to the Default Phase.

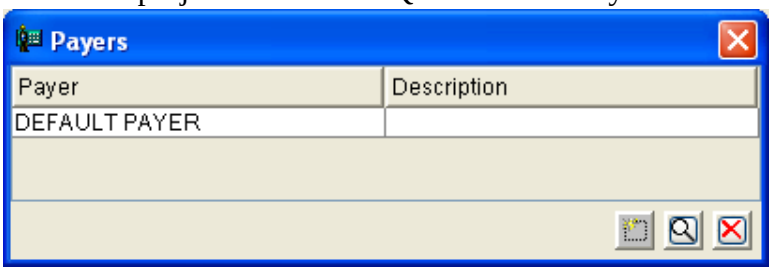
Funding Rules are created and edited in the Funding Properties dialog. To open Funding Properties, from the QM menu select *Edit* > *Funding* > *Rule*.

The Funding Properties dialog contains a list of the available Funding Rules and a table displays the Payers, their Descriptions and percentage of participation for each Payer in the selected funding Rule. Station ranges can also be defined for the funding rule.



Payer

A Payer in QM is a funding source. When a new project is started in QM a Default Payer is created. Additional Payers can be created manually or imported from the Payer aecXML file specified in the Project Properties. Importing payers is preferred because it ensures that the naming convention of the Payer matches exactly what is found in Trns*Port.



To open the Payers dialog box from the QM menu select *Edit* > *Funding* > *Payer*.

To create a new Payer, on the Payers dialog, click on the New Payer icon. A new Payer is added to the list. The payer information can be edited by clicking on the field in the dialog box, the field is editable.

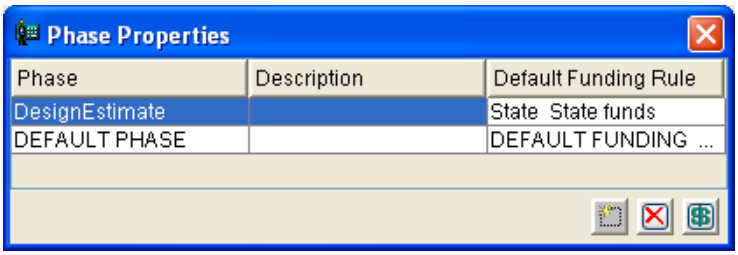
To import a Payer from the previously defined XML file, click the Browse Master Payer Document icon. Select the desired Payer. The Payer is added to the project.

Phase

Phases in QM are used for grouping quantities when creating reports and when assigning default Funding Rules. All QM projects are created with a Default Phase. In the case of databases created with D&C Manager, the Phase defined during export is carried over into QM.

The Default Phase has the Default Funding Rule assigned to it automatically. Additional Phases default to a "Default Funding Rule" with the value of none. Multiple Phases can be created to help divide the project into smaller parts for reporting, alternate designs and cost comparisons.

Phase Properties are managed through the Phase Properties dialog box shown below. From Quantity Manager, click *Edit* > *Phase*. The Phase Properties dialog contains a table of available Phases and displays the Default Funding Rule assigned to each Phase.



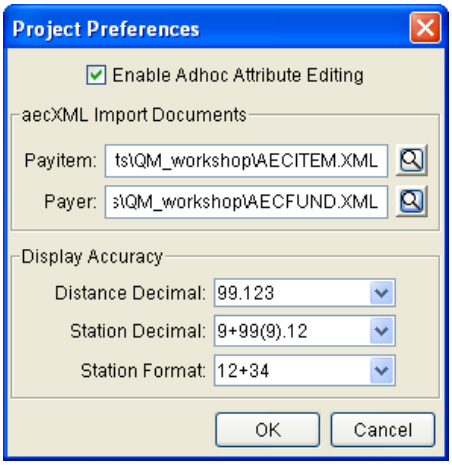
The three buttons in the lower right corner of the Phase Properties dialog are from left to right:

- New Phase
- Delete Phase
- Open Funding Dialog.

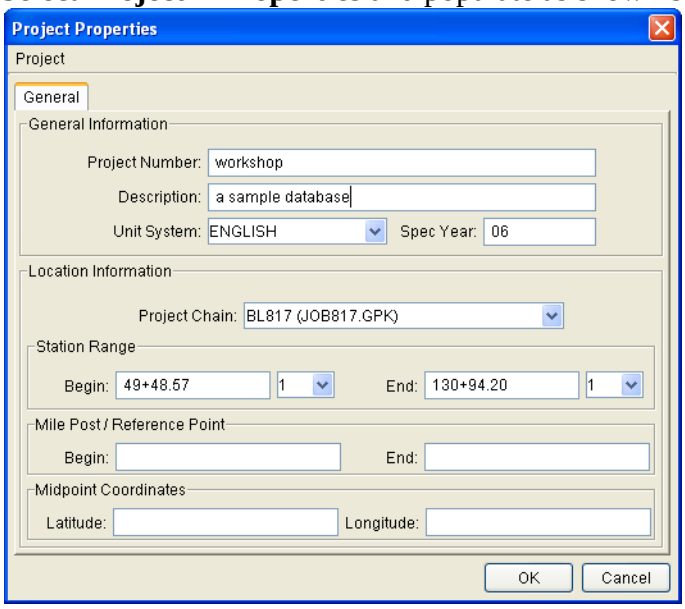
Note: For quantity data exported to Trns*Port, the Phase must be DesignEstimate.

Exercise: Setting up the Workshop Project

1. From the Project menu select **Project** > **Preferences** dialog and fill in the PayItem, and Payer fields using the files in the workshop folder. Set the remaining options as shown in the image below. Click **OK** to complete.



2. Select **Project** > **Properties** and populate as shown below.

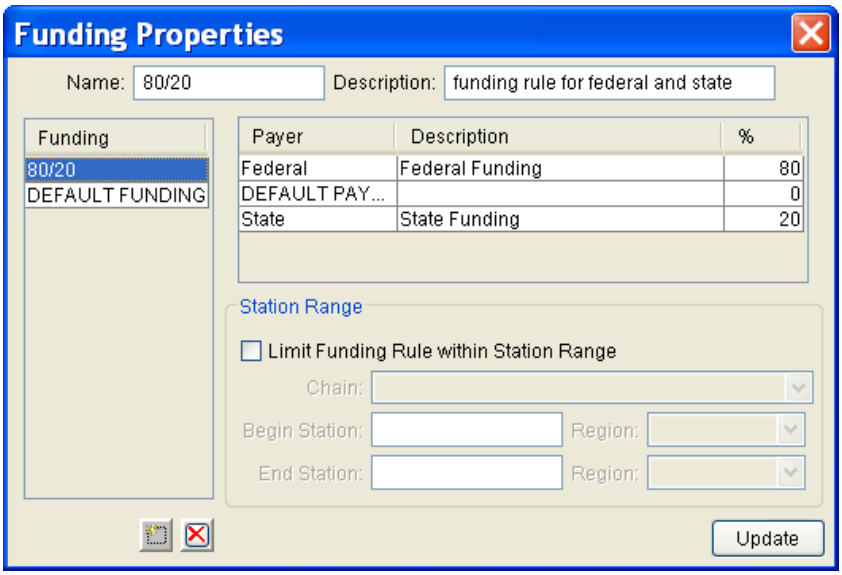


3. Now import the Project information from an XML file by clicking on Project in the upper left corner of the dialog and select the file 22807915201.xml. This will update the fields with the correct info from Trns*port. Click **OK** when completed.

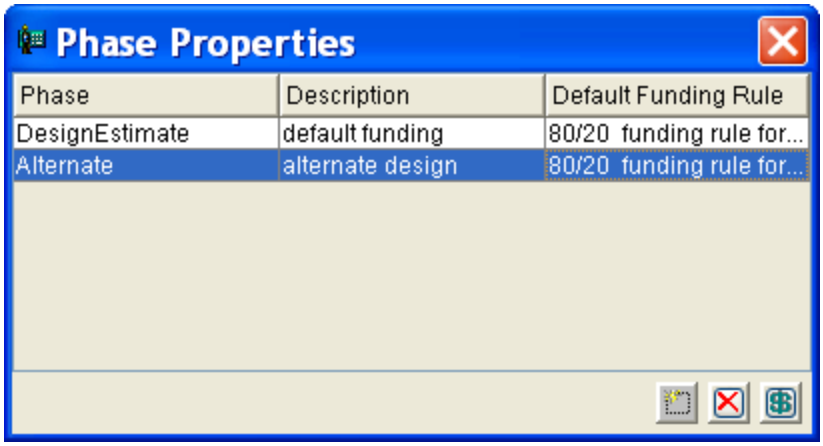
4. Create two new Payers:
   Payer: *State*, Description, *State funds*
   Payer: *Federal*., Description *Federal funds*

5. Remove all payers except Default, State and Federal.

6. Define a funding rule named 80/20, that is an 80/20 split between federal funds and State funds. Then create a state funding rule called State, that is 100% state funds.



7. In the Phase Properties dialog, delete the phase default and set the funding rule for DesignEstimate to 80/20. Create a new phase, for the purpose of grouping quantities. The phase is to be called *Alternate* and define it with a Default Funding Rule of *80/20* as well.

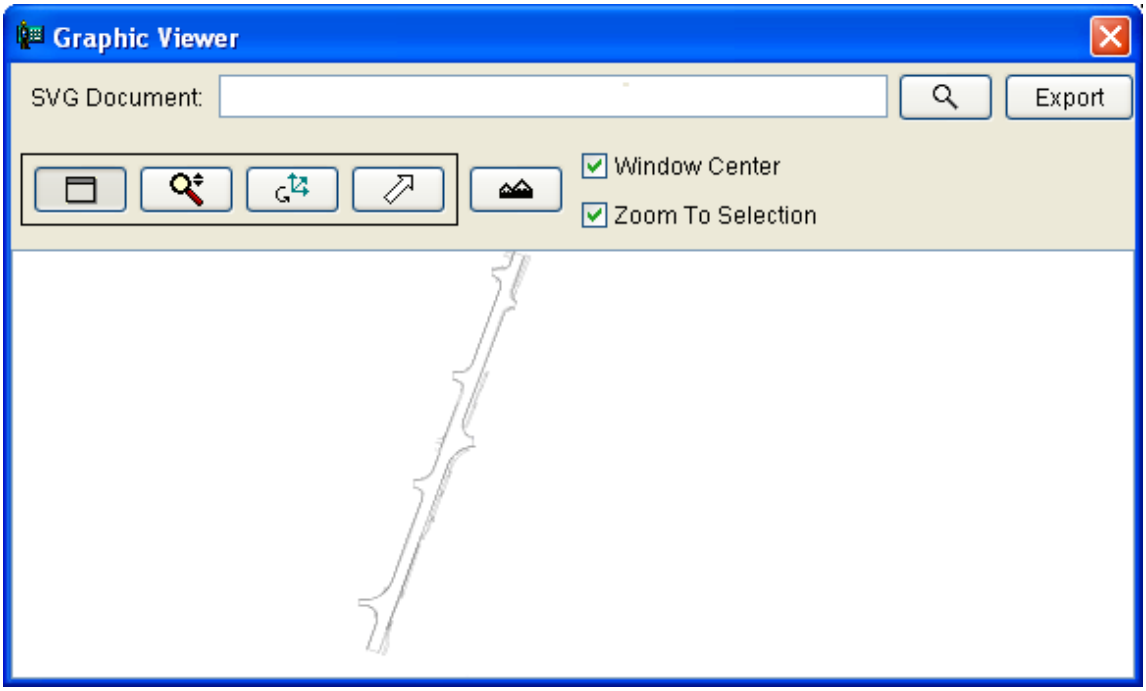


8. Set the payitem pane to table and select all. Right click on the quantity pane. The Apply Funding Rule dialog will open. Select 80/20 from the drop down then click Apply.

QM Graphic Viewer

Graphic Viewer

The graphic viewer dynamically draws the selected pay items in an elemental format. The graphics can then be saved as a SVG (Scalable Vector Graphics) file. SVG is a language for describing two-dimensional graphics and graphical applications in XML. This option is accessed from *Tools > Graphic Viewer.*



The options available for navigating the drawing are:

Window Area

Zoom in/out

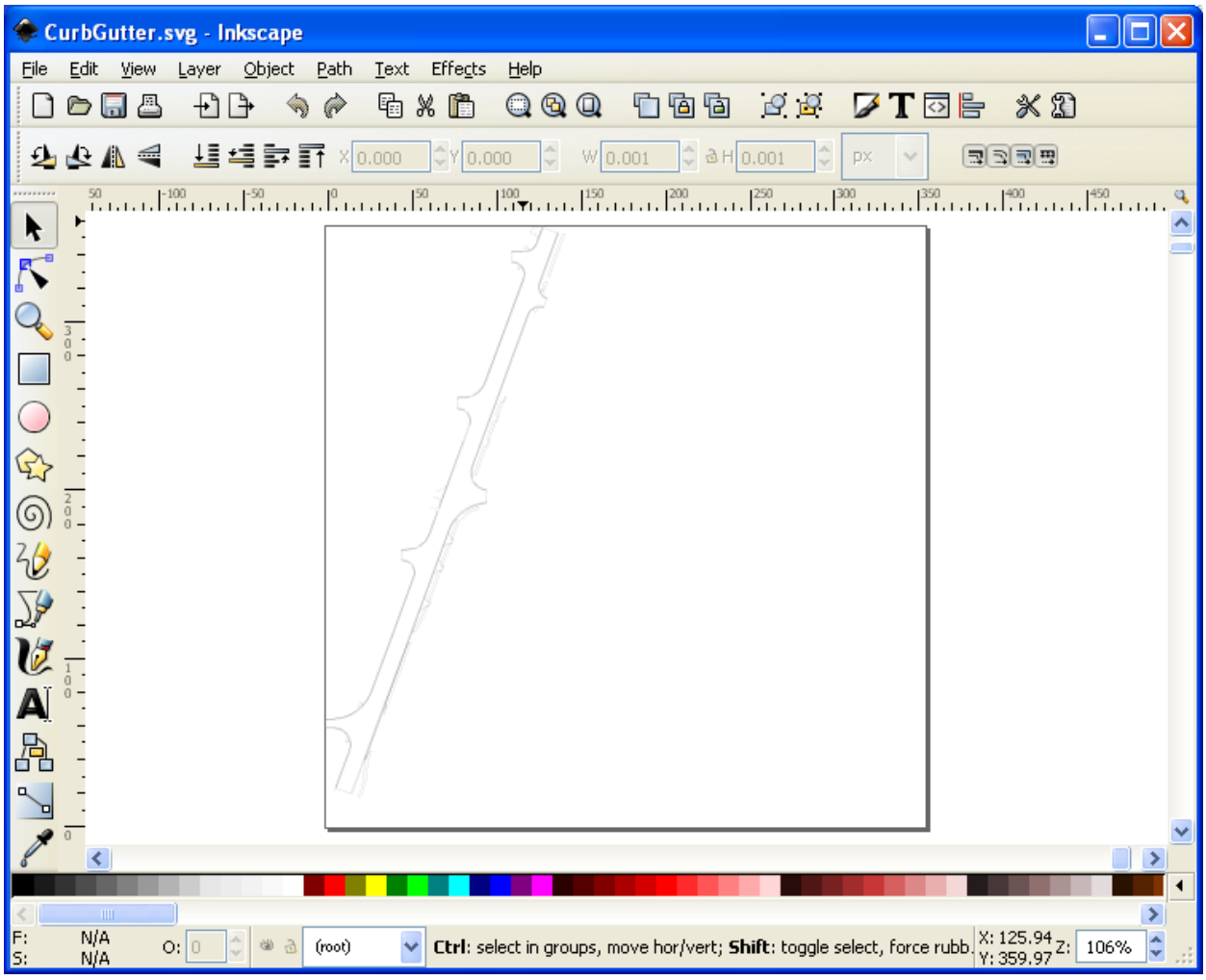
Rotate View

Pan View

Fit View

In addition, the view can be navigated by toggling on *Window Center* and/or *Zoom to Selection*. This allows the user to review each item graphically to see if the Quantity Manager quantities look correct.
If there is a need to save the drawing of the quantity elements for reporting purposes this can be done by entering a file name with the SVG extension and then clicking on *Export*.

Since this is an XML graphics file, this file cannot be reviewed in Microstation or GEOPAK, however there are free SVG viewer/editors available for download on the Internet. One such product is Inkscape. This program will open the file for viewing and editing as shown in the image on the following page. This product will not be covered or used in this workshop.



Exercise: Review graphical quantities

1. Using the same project database from the previous lab, from the Quantity Manager menu select *Tools > Graphic Viewer*.
2. Zoom in on a specific area then click on the Fit view icon on the Graphic Viewer.
3. Review several different payitems graphically.
4. Test the different viewing options available with the Graphic Viewer.
5. Create an SVG file.

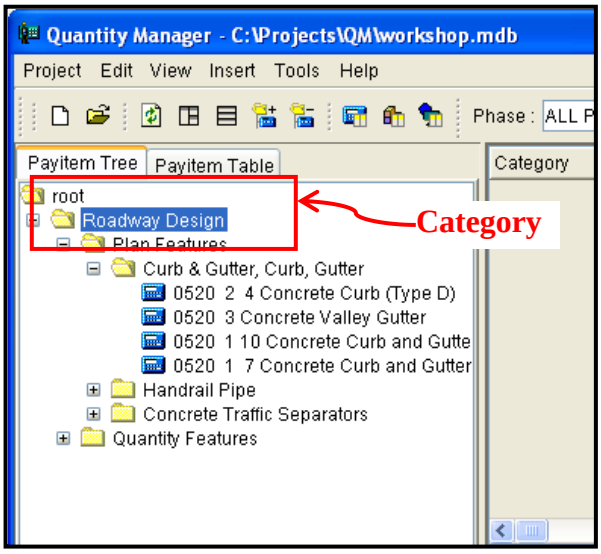
Adding Manual Quantities

Every project has pay items for entities that are not drawn into a CAD design file and therefore cannot be computed by D&C Manager. These quantities are referred to as ‘manual’ quantities. These non-graphical items are manually entered into QM. This allows all quantities for projects to be contained in and reported from a single source, QM.

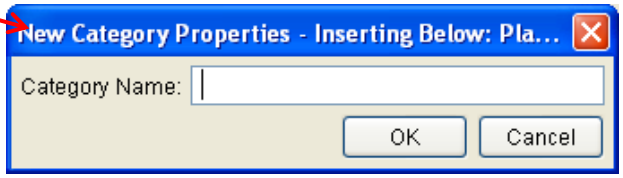
Pay items are defined inside categories. Before quantities can be entered into a Quantity Manager database for a pay item, you must first create the category and pay item name for which the quantity belongs. The following sections discuss these items in details.

Categories

Categories are containers of pay items and other categories. There is no limit to the number of categories that can be created or how deep the categories are nested. A category name is limited to 256 characters.



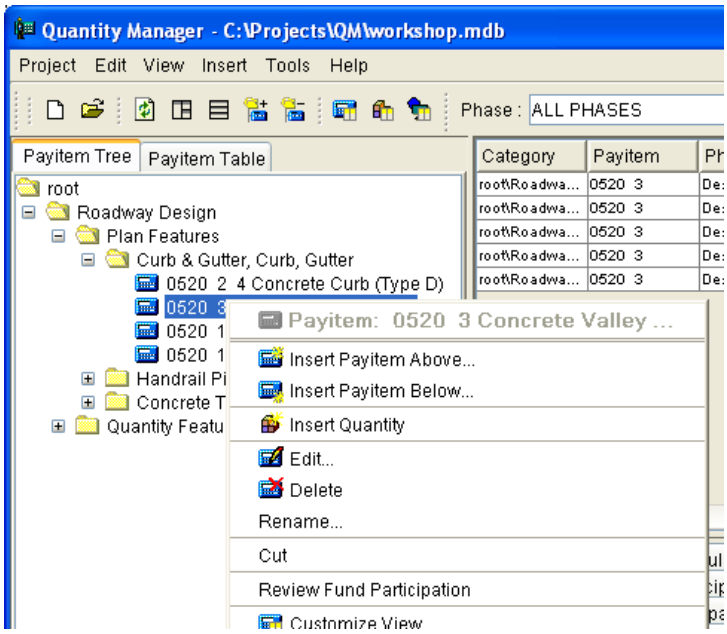
To create a new sub-category, select a category, then select *Insert* > *Category* from the QM pulldown menu or from the popup menu displayed by ‘right-clicking’ in the pane as shown in the image below.



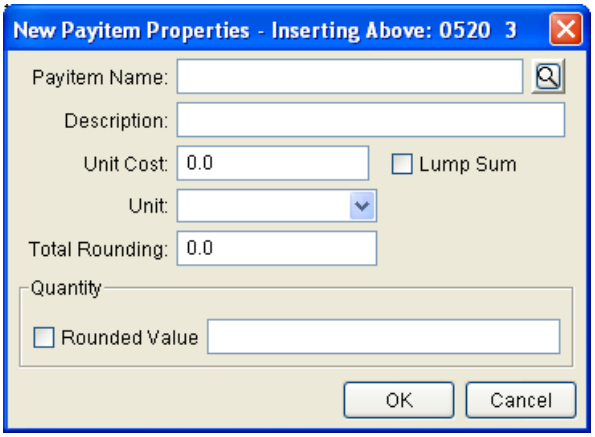
Payitems

Payitems are containers of quantities. There is no limit to how many payitems may be created.

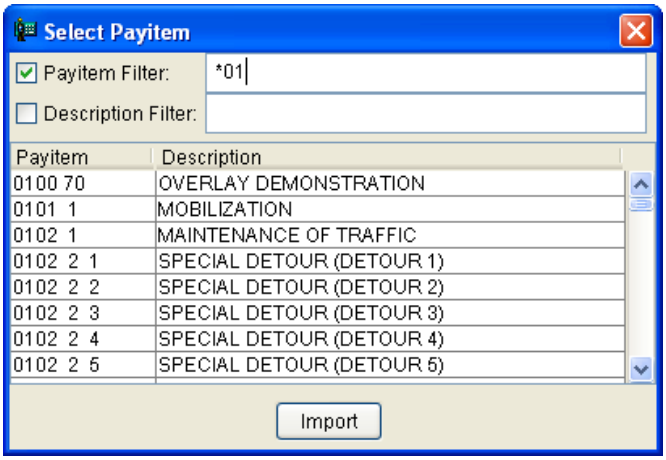
To create a new payitem, select a category or a payitem, then invoke **Insert > Payitem** from the QM pulldown menu or Insert Payitem from the popup menu. The New Payitem Properties dialog is then activated.



The PayItem Properties dialog can be filled out manually or from a previously defined XML file that contains valid pay items and their corresponding definition. This is the recommended method. The fields are defined below:



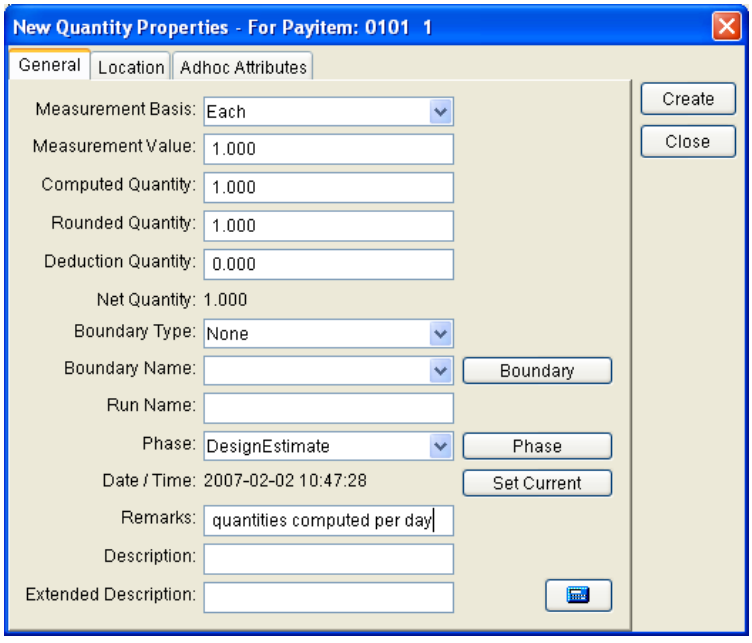
- **Payitem Name** - The Payitem name or number. Limited to 256 characters. The Browse Master Payitem List icon allows payitems stored in the current aecXML payitem document to be selected for import as shown below. Filters are supported for Payitem and Description.



- **Description –** A description of the Pay item. Limited to 256 characters
- **Unit Cost -** Cost of a single unit.
- **Lump Sum -** If toggled on, the item is paid as lump sum. There are two types of lump sum payitems; true lump sum and hybrid lump sum. A true lump sum payitem is one with Unit = "LS" and the Lump Sum toggled on. Payitems of this type will always total 1 unit. Mobilization and training are payitems typically in this category. A hybrid lump sum payitem is one with Unit not equal to "LS" but with the Lump Sum toggled on. These payitems are measured in standard units (SY, LF etc.) but paid in lump sum. One example would be for clearing and grubbing areas which is normally measured in SY and still paid in lump sum. The total quantity will be measured in the specified units.
- **Unit -** Unit of measure for the payitem, i.e. SF, SY, LF, TN etc.
- **Total Rounding –** The total quantity rounded to the user-desired decimal places.
- **Rounded Value -** This can be used for entering quantities for payitems that will have a single quantity such as Mobilization. This eliminates the additional step of adding a quantity to a payitem by adding the payitem and its corresponding quantity with a single dialog.

Quantities - To add a new quantity, select a payitem, then select **Insert > Quantity** from the pulldown menu or Insert Quantity from the popup menu. Two tabs are supported. The **General** tab has a variety of different quantity options, as well as descriptions and other general information. The **Location** tab has key-in fields for minimum and maximum station / offset values. Many of the fields in the Quantity Properties dialog are optional. However, you should provide as much information as possible, as some fields may be utilized and relied upon when reports are generated.

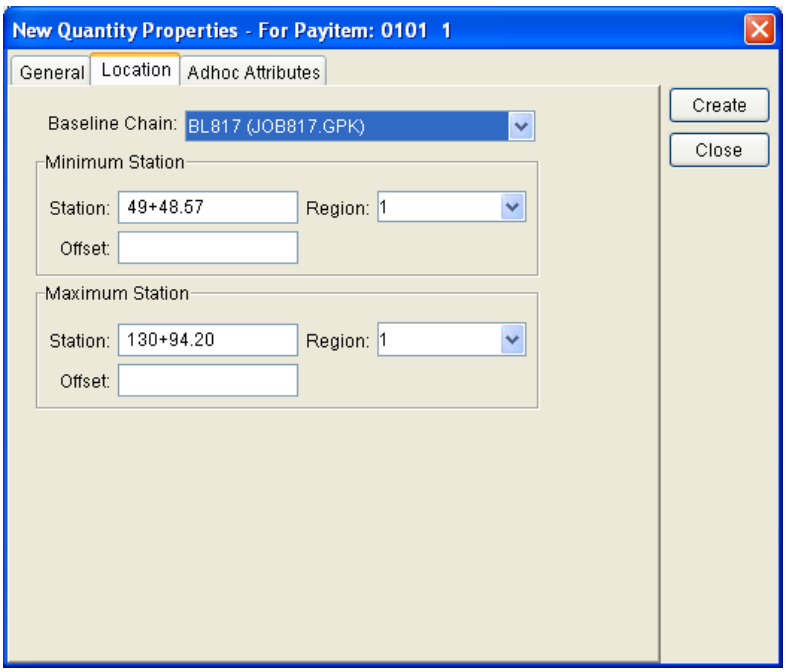
General



- **Measurement Basis -** The measurement basis refers to the graphic element type which was used to derive the quantity. Typically, cells are measured per each, lines and line strings are measured linearly and shapes are measured as areas. An exception would be counts of standard length pipes, which may be drawn as line elements. Three measurement types are supported: Each, Linear, Area.
- **Measurement Value -** The actual measurement with no formulas, adjustments, rounding, etc. For example, when doing pavement computations, the Measurement is the square feet (or square meters) of the closed shape representing pavement.

- **Computed Quantity -** If a formula was used, this field is the result of the computation. Using the pavement example, a formula that uses the square feet of the area from which tons are computed based on thickness would provide a computed tonnage quantity.
- **Rounded Quantity –** the rounded Computed Quantity. This is sometimes referred to as the gross quantity.
- **Deduction Quantity** – A quantity to be deducted from the Rounded Quantity.
- **Net Quantity –** the resulting quantity from the summation of the Rounded Quantity – Deduction Quantity. This is the quantity which contributes to the total quantity for the payitem.
- **Boundary Type –** A defined boundary for the quantity limits. The options are: None, Fence, View, Sheet, Station Range or Element. This can be useful when computations are tabulated by sheets or specific limits.
- **Boundary Name –** The name of the Boundary element. To review boundary properties, click the Boundary button to invoke the Boundary dialog. In this dialog boundaries can be added, reviewed, and / or changed.
- **Run Name –** This is defined by the user. The run name is a grouping mechanism to permit segregation of quantities or payitems.
- **Phase -** The phase to which the quantity belongs. The currently available phases are listed in a drop-down list. To review phase properties, click the phase button to invoke the phase dialog. In this dialog phases and funding rules may be added, reviewed, and / or changed.
- **Date / Time –** This button documents the Date and Time the quantity was computed or updated. Click the Set Current to reset the date / time to the current.
- **Remarks -** Key-in field for remarks. Limited to 256 characters.
- **Description -** Key-in field for Description. Limited to 256 characters.
- **Extended Description -** Key-in field for Extended Description. Limited to 256 characters.
-  - Activates the Windows standard calculator for quick access for manual calculations.

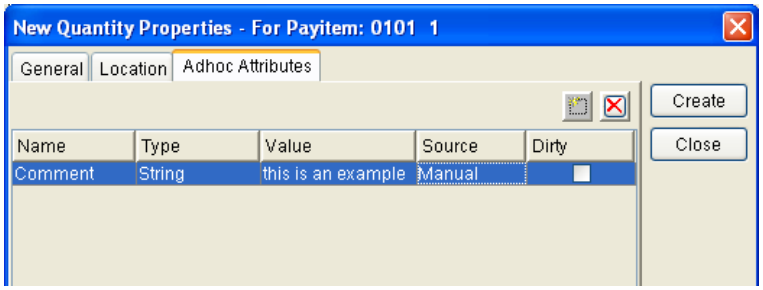
Location



Most quantities are referenced to their location on a project. Since the means of reference used for civil projects is a baseline chain, it is often advantageous to define the quantity based on its location in respect to the project baseline. In the dialog right, the Baseline Chain is selected from the list of chains defined in the Quantity Manager database.

Based on the selected baseline, Minimum and Maximum Stations and Offsets are to be entered. Note that for a linear quantity, minimum and maximum stations do not always correspond to begin and end stations, but to the lowest and highest station points. Similarly for an area item, minimum and maximum stations do not correspond to the lower left / upper right points of a rectangular shape, but to the lowest & highest station points in relation to the baseline. A drop-down list of the valid Regions on the Baseline Chain for station equations is provided. Minimum and maximum stations/offsets are optional items, and are not required unless they are needed for reporting or funding computations.

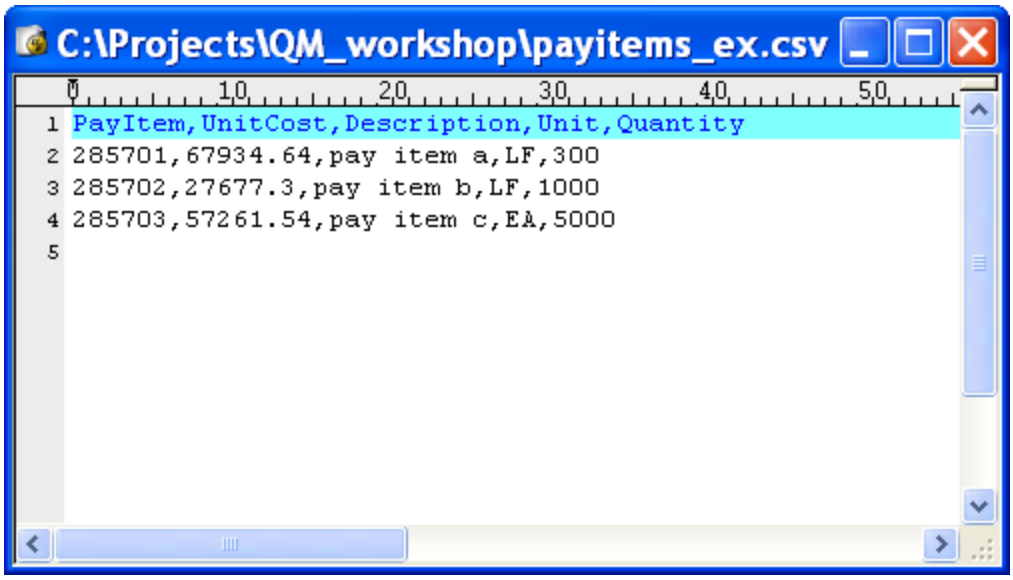
Adhoc Attributes



The Adhoc Attribute tab allows the user to add adhoc information to any quantity. The value of the adhocs can be added to reports. For example if an Adhoc is added named Remarks, its value is automatically displayed on many of the reports.

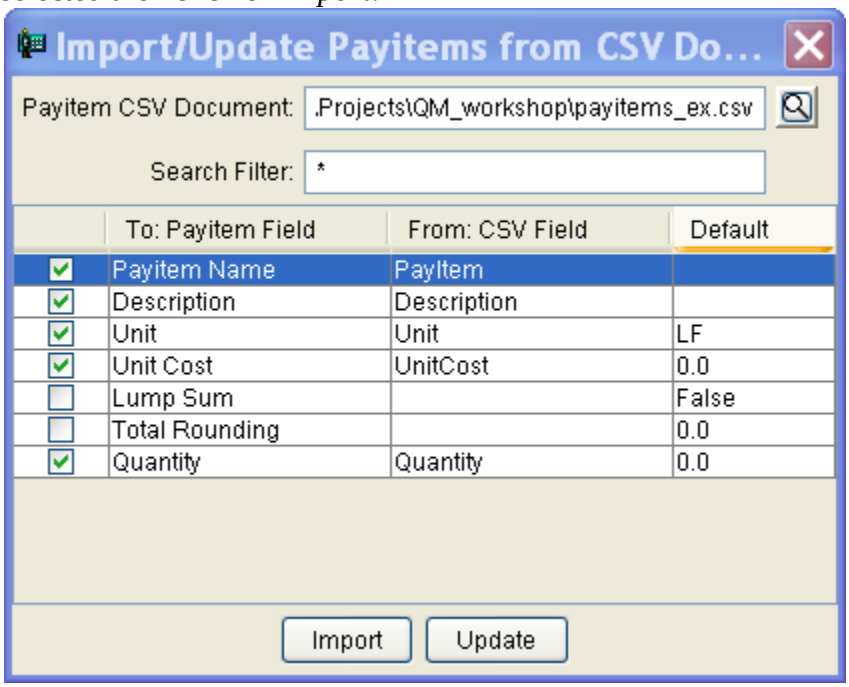
Bulk Loading Pay Items with Quantities

In addition to adding payitems and quantities individually, payitems with their respective quantities can be imported into QM via a CSV file. The CSV file should contain the payitem name, description, unit, and quantity. See the example CSV file below.

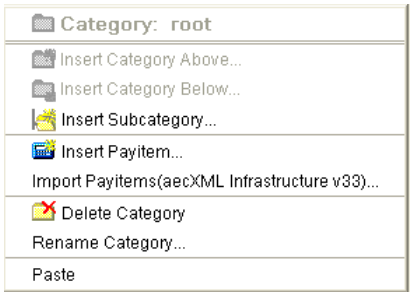


This is simply a text file with a header for each delimited field. The items can be in any order and the header can be any test. The header text is mapped to the appropriate field in the Import PayItems dialog box.

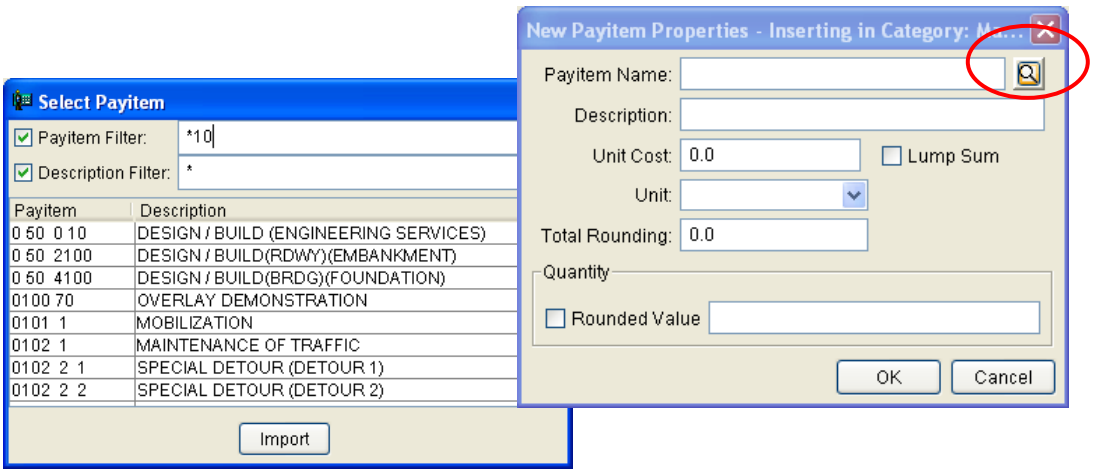
To import payitems and quantities into QM activate the import dialog from *File* > *Import* > *Payitems* > *from CSV*. The fields that are to be imported must be defined with the appropriate header. See the image below. The category that these items are to be imported into must be selected then click on *Import*.



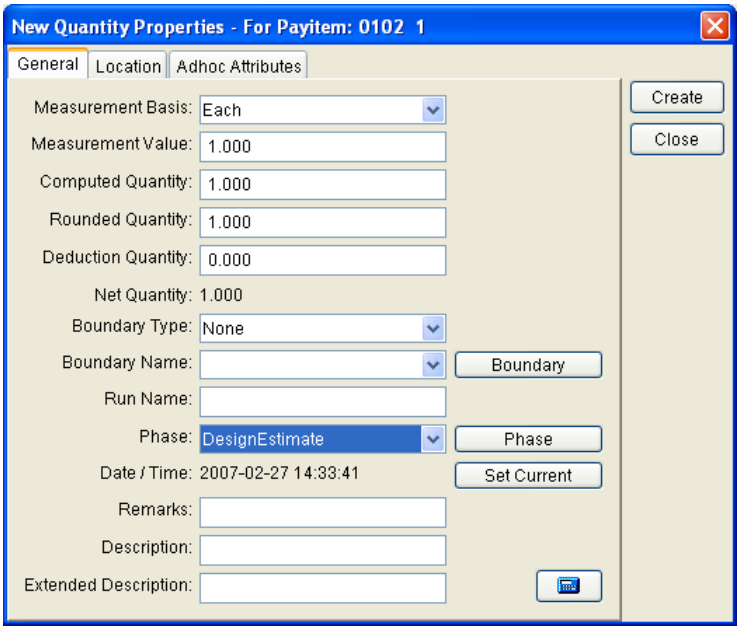
Exercise: Adding Quantities Manually



1. Continuing in the same database from the previous workshop, from the PayItem pane, right click on the PayItems category and select Insert Subcategory. Name the category "Manual Quantities".
2. Right click on the "Manual Quantities" category and select Insert Payitem…. From the New PayItem Properites dialog box, click on the Browse Master PayItem Icon. Set the PayItem Filter as shown in the dialog below.

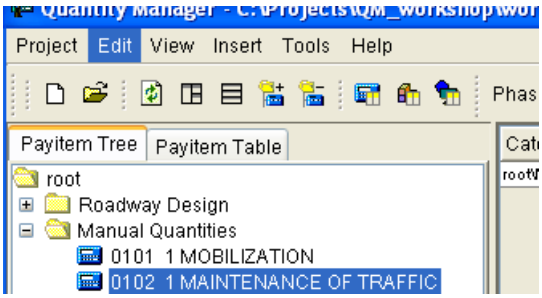


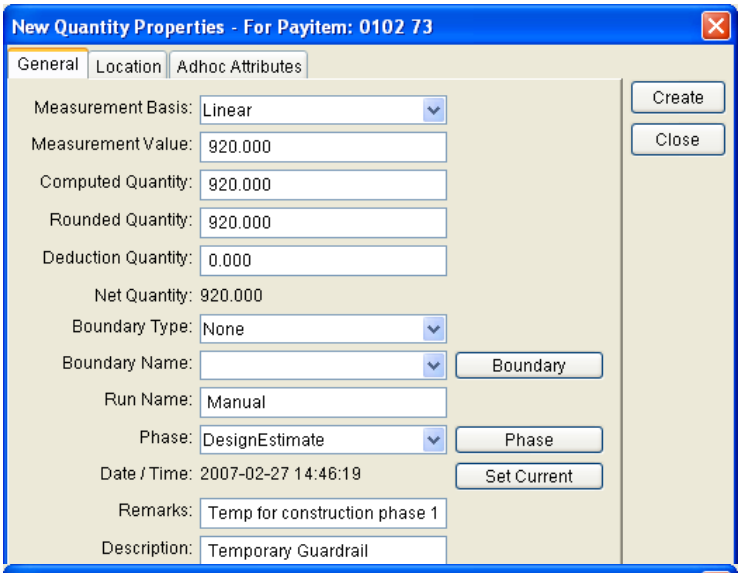
3. Select the PayItem Mobilization. The dialog is automatically filled out with the required information. Click OK when completed.
4. Select the PayItem Mobilization and right click to select *Insert Quantity*. Enter a value of 1 for *Measurement Value* and *Computed Quantity*. Set Phase to DesignEstimate and click on Create. Click Close to close this dialog.
5. Following the same steps add the PayItem 'Maintenance of Traffic' with a value

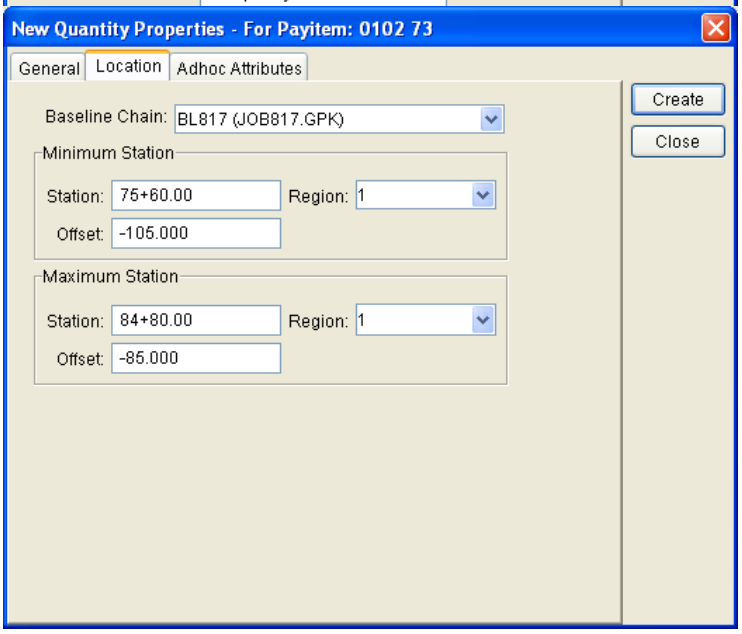


of 1 and arbitrarily fill out additional fields in the general and location tabs. The QM dialog should appear as follows.

6. Right click on the category Manual Quantities and again select to add a new payitem. Select the payitem 0102 73 Guardrail (temporary). Fill out the dialog boxes as shown below. Click on Create and then on Close.



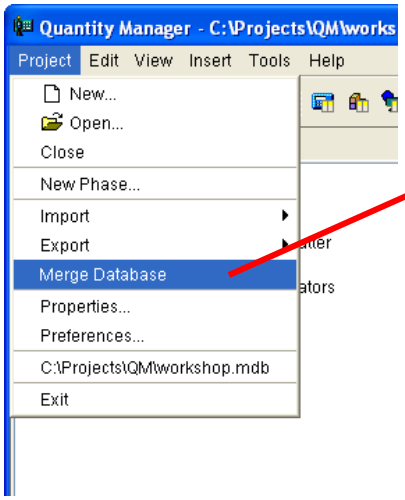




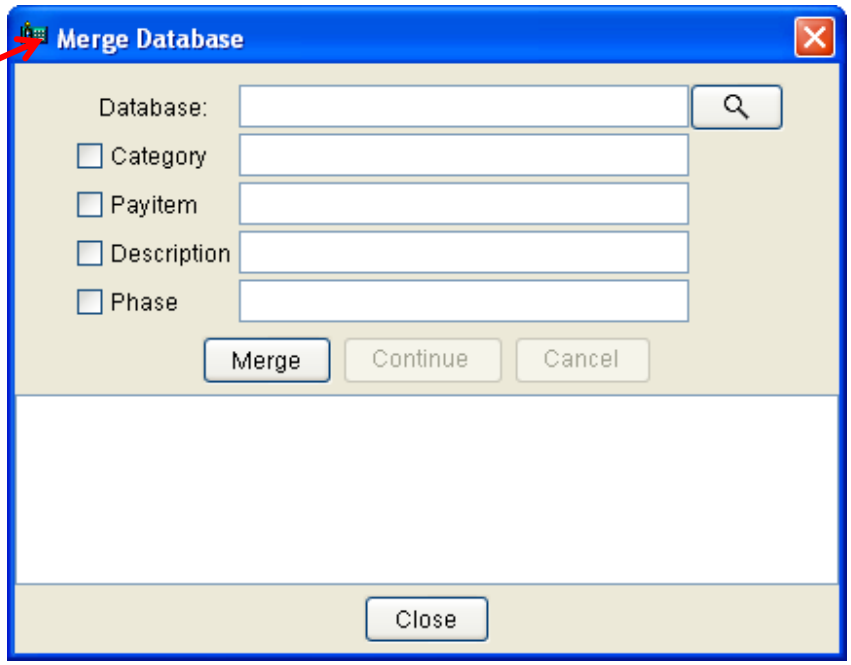
7. Import Payitems and Quantities using the Import dialog and the file payitems_ex.csv.

Merging QM Databases

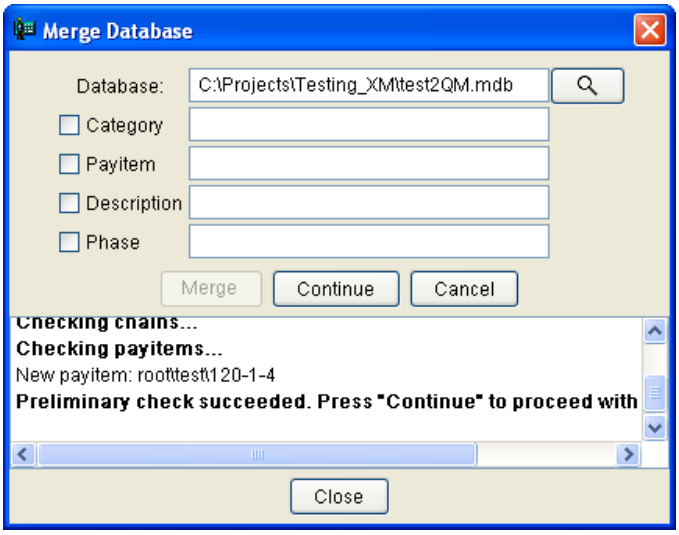
If the quantities for a project were created by multiple users and stored in separate databases, the databases should be merged together prior to exporting the quantities to Trns*port or creating final reports. The main consideration is that the databases must be the same version.

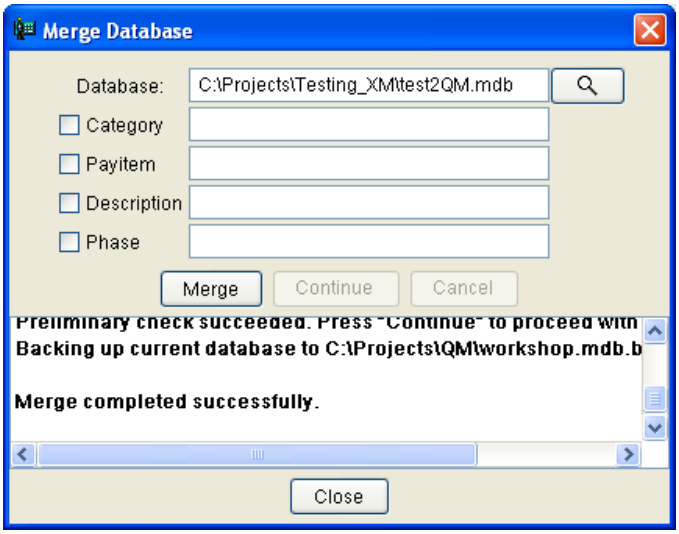


To merge a database into the active database, from the QM menu select *Project* > *Merge Database*.



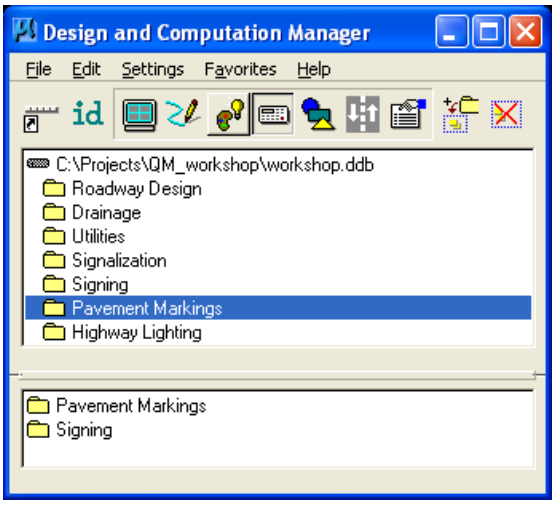
The Merge Database process will merge an entire database or the user has the option to restrict it to specific categories, payitems, descriptions, and phases. If the preliminary check of the database shows that the 2 databases are compatible then the user is prompted to Continue. When the Merge is complete it is displayed in the text box.

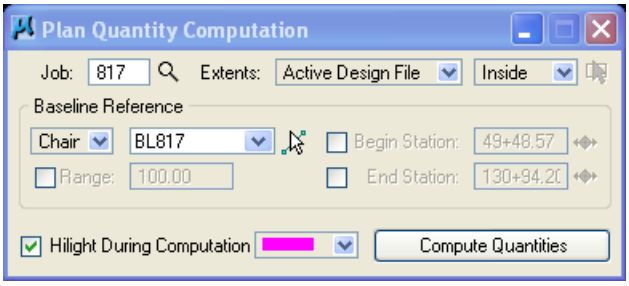


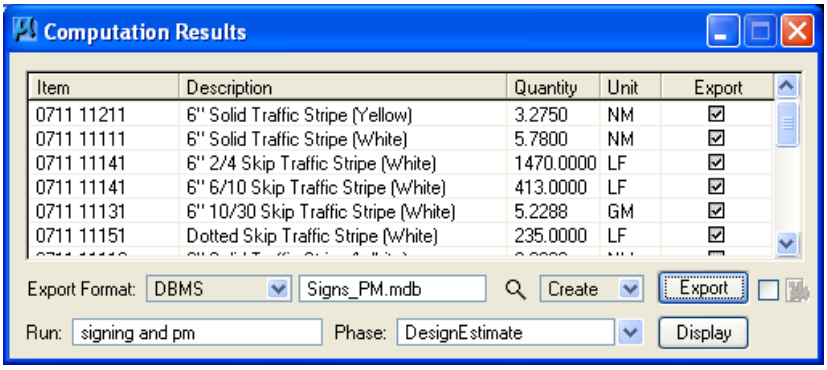


Exercise: Merging Databases

1. In dsgnrd01.dgn, activate the D&C Manager and open the workshop.ddb file. Set the mode to compute and add the Categories “Pavement Markings” and “Signing” to the collection box. Compute quantities for Signing and Pavement Markings as shown in the dialog boxes below. Export the computation results to signs_pm.mdb





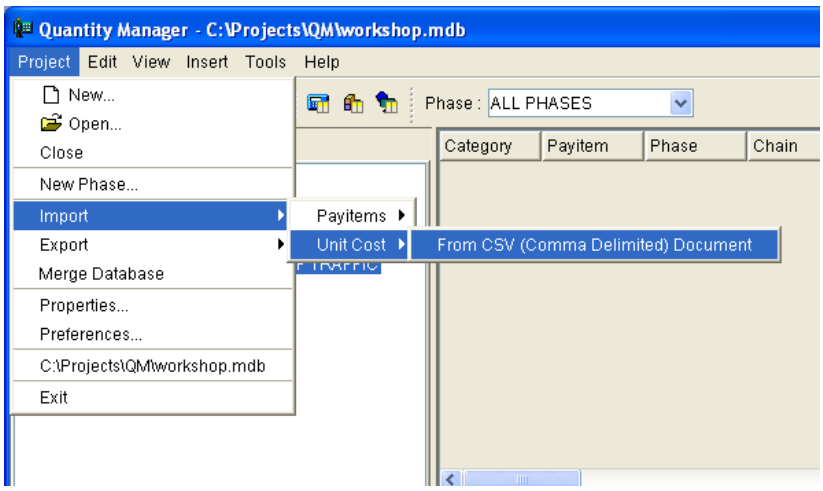


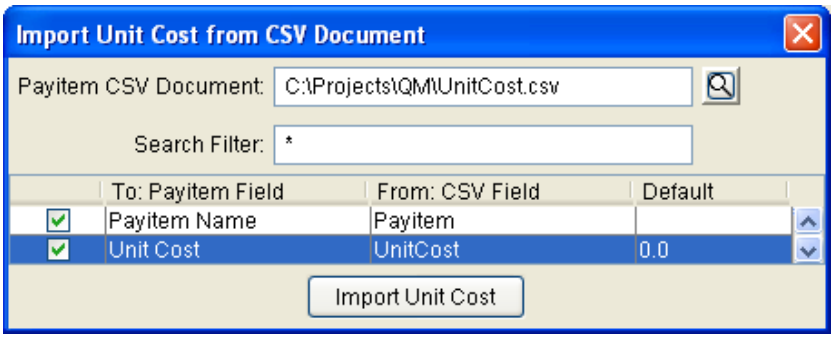
2. While still in the Quantity Manager database created in the previous labs, workshop.mdb, select *Project > Merge Database*. Select the database created for Signing and Pavement Markings and Signals (if created).
3. Click on Merge. After the database is analyzed and the Continue button is activated, click on Continue to complete the merging of the database. Click on close exit the dialog.

Cost Comparisons in QM

Importing Pay Item Cost

The cost of each valid pay item can be imported into a QM project to do cost comparisons. By using phases to segregate payitems, cost comparisons can easily be done for proposed alternates. The import function is accessed from the *File > Import > Unit Cost > From CSV (comma separated) Document.*





Since the file format is CSV it is very flexible. Therefore the fields to import are defined within the dialog, based on key words in the first row of the CSV file. There can be extra fields which are ignored or columns in a different order than shown in the dialog.

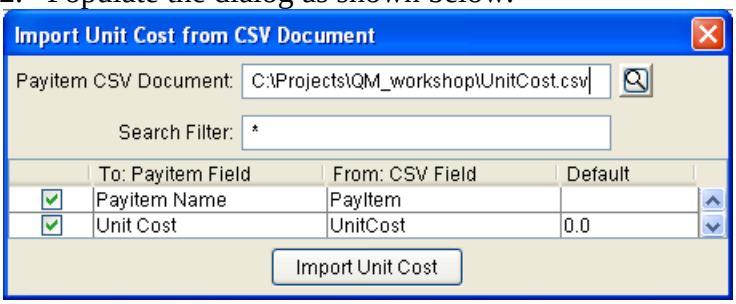
To Import unit cost from a CSV document

1. Open the Import Unit Cost from CSV Document dialog.

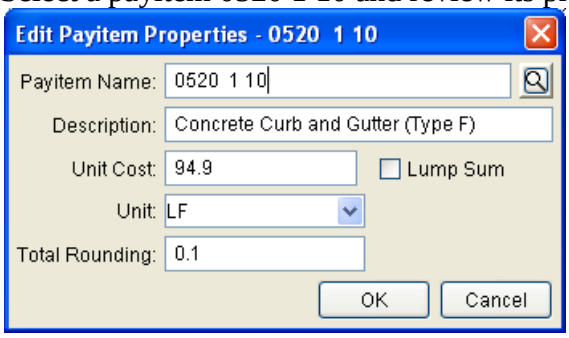
2. Click the Browse icon  and navigate to the CSV file.
3. Set Search filter if you want to import all items, set the filter to *.
4. Toggle on the items that are in the CSV file.
5. For each toggled item, enter the keyword from row 1 in the CSV file in the From: CSV Field in the dialog. It is case sensitive. It must match exactly.
6. If a value for a particular item is missing (for example the UnitCost), enter the Default value (in this case 0.)
7. Click on *Import Unit Cost*.

Exercise: Creating cost estimates

1. From the Quantity Manager menu select *File > Import > Unit Cost > From CSV (comma separated) Document.*
2. Populate the dialog as shown below.



3. Click on *Import Unit Cost*.
4. Select a payitem 0520 1 10 and review its properties as shown below.

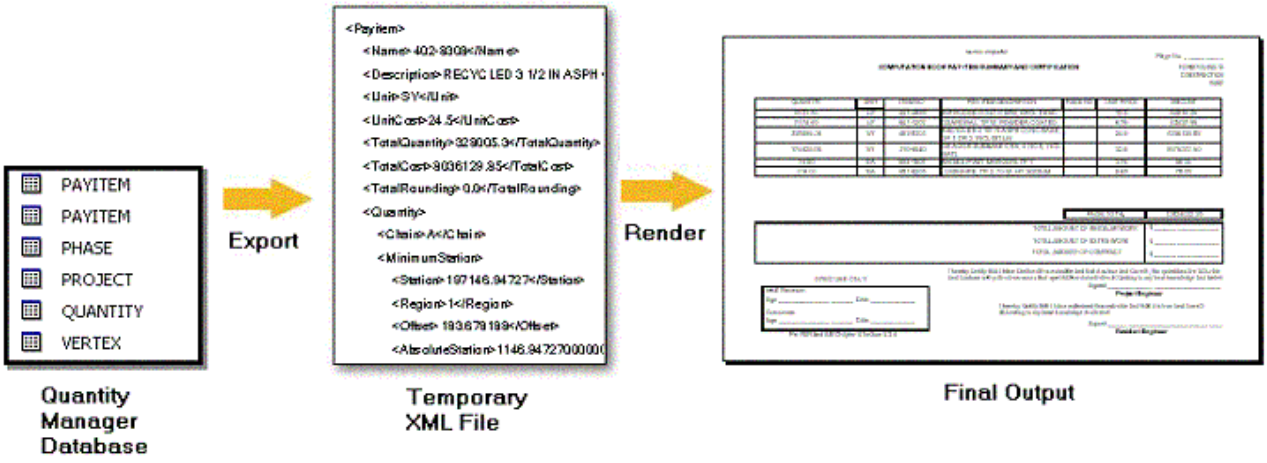


Creating Reports in QM

A variety of reports of the payitems and their respective quantities in a Quantity Manager database can be created using report styles. These styles are defined by the type of Payitems selected. The type is Each, Area, Linear or General.

A basic report may contain only payitems, while a detailed report may have payitems, quantities, and data from the Element Table. XSL style sheets controls the amount of detail in the report and the formatting of the report. A report style must be created prior to the generation of a report. Report styles are not stored in the Quantity Manager database but in an external XML file so it may be shared between projects.

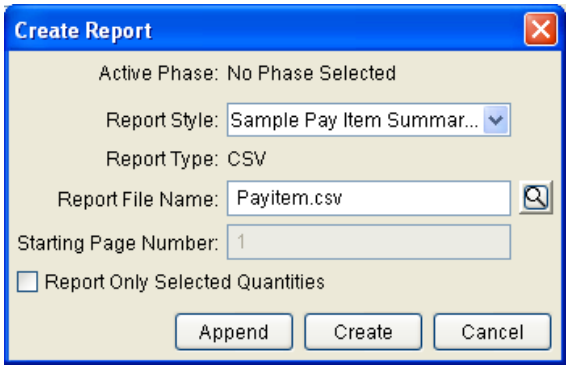
The Behind-the-Scenes Process
When a report is being created, Quantity Manager first exports a temporary XML file from the data stored in the database. This XML file is then "Transformed and Rendered" into the final report. Currently Quantity Manager supports Adobe PDF, CSV, Text and HTML formats. The diagram below depicts this process.



Creating a Report

Once the Report Style has been created, reports can be generated. To create a report, select the categories and / or pay items to be included in the report.

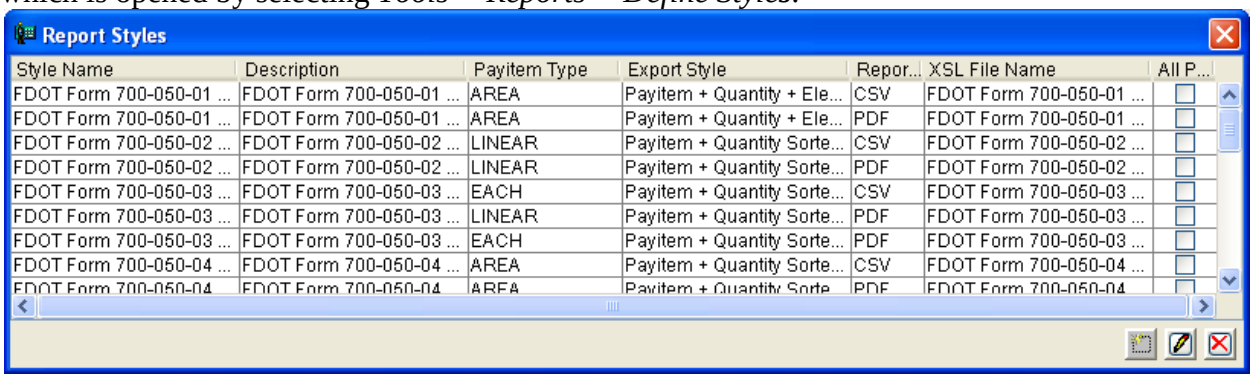
Select **Tools > Reports > Create** to open the dialog depicted below.



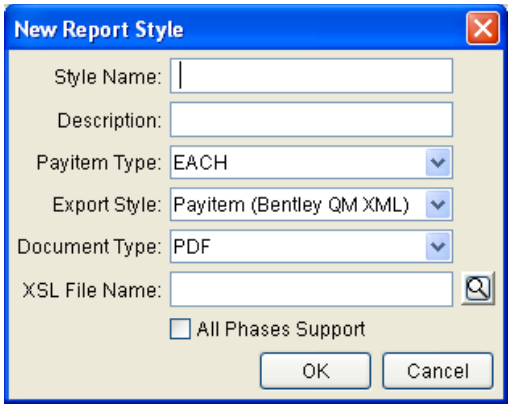
- **Active Phase** - If All Phases is selected, the Create button is disabled unless all phases are supported for this report. Although the Active Phase cannot be changed (display only) in this dialog, a Phase change made in the main dialog automatically changes the Create Report dialog box.
- **Report Style** - Select the Report Style from the list of all Report Styles.
- **Report Type** - PDF, CSV, HTML and TXT are supported. Note the type is display only, as it is determined from the Report Style.
- **Report File Name** - Enter the Report File Name or click the Folder icon to select a pre-existing report.
- **Create / Append** - Click Create to generate the report or Append to append to a previously created report. Once the report is created, the document will be opened by the default associated application.

Creating Report Styles

Report styles can be created, reviewed, modified and deleted from the Report Styles dialog box, which is opened by selecting *Tools > Reports > Define Styles*.



Click the **New** icon at the bottom to open the **New Report Style** dialog seen below.

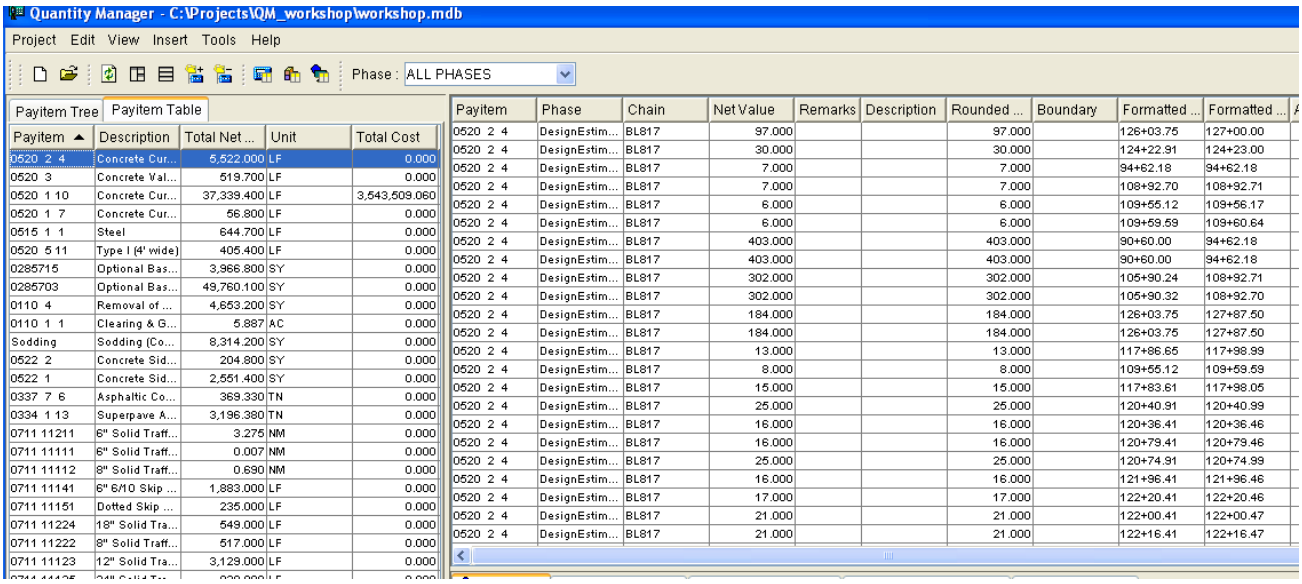


- **Style Name -** Name of Style. Limited to 256 characters.
- **Description -** Description of Style. Limited to 256 characters.
- **Payitem Type -** This specifies the intended payitem type for this style. Four options are supported:
  - EACH
  - LINEAR
  - AREA
  - GENERAL – summary of payitems
- **Export Style -** Nine options are supported which controls the amounts of data in the report:
  - Payitem (Bentley QM XML)
  - Payitem + Finding(Bentley QM XML)
  - Payitem + Quantity (Bentley QM XML 2)
  - Payitem + Quantity + Element (Bentley QM XML)
  - Payitem + Quantity + Element Sorted (Bentley QM XML)
  - Payitem + Quantity Sorted(Bentley QM XML)
  - aecXML
  - aecXML + Funding

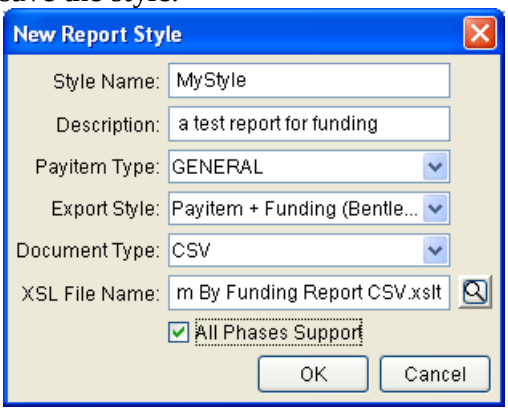
  Note: Typically, you would want to specify the minimum granularity you need for your report. For example, if you are creating a summary report of payitem with totals, the best option is "Payitem". If you select "Payitem + Quantity" the report will still work, but it may be slower in rendering, because extra data is being "published" that is not necessary for the report.
- **Document Type -** HTML, CSV, PDF, and TXT (ASCII text) are supported.
- **XSL File Name -** Name of XSL stylesheet for formatting.
- **All Phases Support -** This report can be used for any Phase.

Exercise: Create Quantity Reports

1. Click on the PayItem Table tab. This will allow us to easily select and sort payitmes for creating reports. Customize the panes to look like the image below.



2. Set the phase to design estimate
3. Select the payitem **0520 1 10** and select all quantities.
4. Create a report, using the report Style **FDOT Form 700-050-02 Curb and Gutter Computations (PDF)**. Use the file name of candg.pdf.
5. **Create** and review the resulting report.
6. Select the payitem **0110 1 1 Clearing and Grubbing**.
7. Create a report using the report style **FDOT Form 700-050-01 Area Computations (PDF)**. Use the file name of clearing.pdf.
8. **Create** and review the resulting report.
9. Create a new report style called 'MyStyle'. Complete the dialog box as shown. Set the XSL file to "Sample pay item by funding report CSV.xslt". Click OK to save the style.



10. Create a report of all the payitems in your database using the ‘MyStyle’ report style just created. Name the report funding.csv.

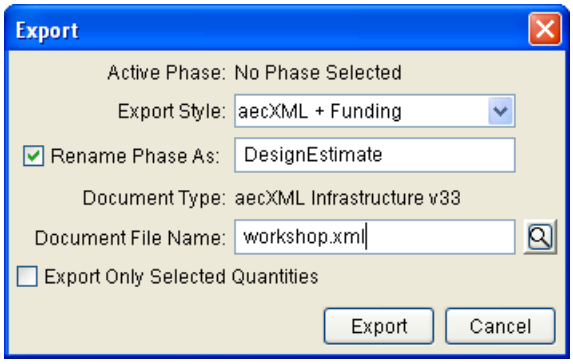
11. Review the new CSV file in Excel. The file should look similar to the image below.

A	B	C	D	E	F	G	H
Payitem	Description	Units	Total Estimated Quantities		State	DEFAULT FUNDING	Federal
					State funds		Rule for applying federal money
0101 1	MOBILIZATION	LS	1		1		
0520 2 4	Concrete Curb (Type D)	LF	5522		5522		
0520 3	Concrete Valley Gutter	LF	519.7		519.7		
0520 1 10	Concrete Curb and Gutter (Type F)	LF	37339.4		37339.4		
0520 1 7	Concrete Curb and Gutter (Type E)	LF	56.8		56.8		
0515 1 1	Steel	LF	644.7		644.7		
0520 5 11	Type I (4' wide)	LF	405.4		405.3		
285715	Optional Base (Base Group 15)	SY	3966.8		3966.7		
285703	Optional Base (Base Group 03)	SY	49760.1		49760.1		
0110 4	Removal of Existing Pavement	SY	4653.2		4653.2		
0110 1 1	Clearing & Grubbing	AC	5.887		5.887		
Sodding	Sodding (Contractor's Option)	SY	8314.2		8314.2		
0522 2	Concrete Sidewalk, 6" Thick	SY	204.8		204.8		
0522 1	Concrete Sidewalk, 4" Thick	SY	2551.4		2551.3		
0337 7 6	Asphaltic Concrete Friction Course (FC-12.5(FC-6)(160lb/sy))	TN	369.33		369.33		
0334 1 13	Superpave Asphaltic Concrete (C)	TN	3196.38		3196.38		
0711 11211	6" Solid Traffic Stripe (Yellow)	NM	3.275		3.275		
0711 11111	6" Solid Traffic Stripe (White)	NM	0.007		0.007		
0711 11112	8" Solid Traffic Stripe (White)	NM	0.69		0.69		
0711 11141	6" 6/10 Skip Traffic Stripe (White)	LF	1883		1883		
0711 11151	Dotted Skip Traffic Stripe (White)	LF	235		235		
0711 11224	18" Solid Traffic Stripe (Yellow)	LF	549		549		
0711 11222	8" Solid Traffic Stripe (Yellow)	LF	517		517		
0711 11123	12" Solid Traffic Stripe (White)	LF	3129		3129		
0711 11125	24" Solid Traffic Stripe (White)	LF	838		838		
0711 11121	6" Solid Traffic Stripe (White)	LF	712		712		
0711 11131	6" 10/30 Skip Traffic Stripe (White)	GM	5.229		5.229		
0102 1	MAINTENANCE OF TRAFFIC	DA	1		1		
0102 73	GUARDRAIL (TEMPORARY)	LF	920		920		
0700 40 1	Sign Single Post (<12)	AS	82		82		
0705 10 11	Object Marker	EA	2		2		
0700 40 2	Sign Single Post (> 12)	AS	2		2		

Exporting Quantities from QM to Trns*port

Quantity Manager includes a utility that facilitates exporting the quantity information into a format that can be imported into Trns*port. The format of the file is a predefined XML format. Only the items displayed in the Quantity Manager payitem table widow will be exported. The Quantity Manager Project Export XML file is used for Trns*port CES and PES which will add/update the pay items, their quantities and funding into Trns*port. The steps required to create this file is listed below:

1. From QM menu, select *Project >Export > Export*
2. Select Export Style "aecXML + Funding"
3. Toggle on *Rename Phase As "DesignEstimate"*
4. Choose file location and name to save XML file.
5. Click the EXPORT button

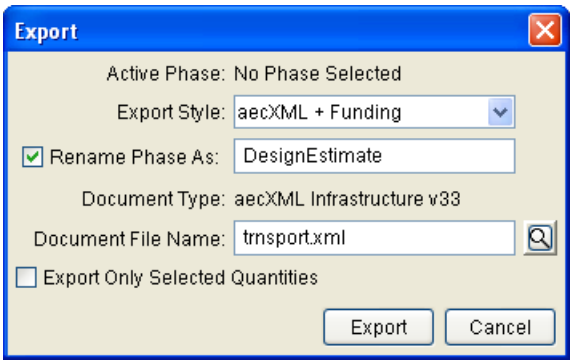


Naming convention when exporting to Trns*port:

Data	Restrictions
Project Names	<= 13 characters
Funding Rules	> 1 and < 9999
Phases	DesignEstimate
Quantity Value	Maximum of 999,999,999.999
Pay Items	Must Exist in Trns•prt
Payers	Must Exist in Trns•prt

Exercise: Exporting Data from Quantity Manager into an XML File for Trns*port.

4. From QM menu, select *Project >Export > Export*
5. Select Export Style “aecXML + Funding”
6. Rename Phase As “DesignEstimate”
7. Set the file location to the workshop folder and name the file Trnsport.xml as shown below.



8. Click the EXPORT button.
9. Review the resulting XML file.