North
Carolina
Department
Of
Transportation

Hydraulics Unit

Instruction Manual For Pay Item Utility VBA

3/12/09

Overview

This program places Geopak Adhoc attributes on hydraulic drainage features for the purpose of preliminary quantities. This current version is called the Preliminary Quantities version and continued development should result in future versions possible for Drainage Summary Sheet automation and Final Quantity calculations. At this time however, this version does not address all drainage features, but rather addresses those used with the highest occurrence within our roadway plans. At the end of this document there is an Exclusion List of those elements that are either partially addressed or not included within this version currently.

Geopak Road documentation provides the following concerning Adhoc placement:

"Adhoc attributes can be used in the computations and provide maximum flexibility. Each element can have a maximum of 255 adhocs and each adhoc has a Name, Type and Value. They can be attached via the adhocs option in D&C, criteria, 3PC, VBA or using the Adhoc Attribute Viewer tool.

There are five types of adhocs:
Numeric - 123.45
String - Used as Description for Pay item - 255 char. max
Unit - Any valid unit as defined in the .CSV file
Quantity - actual numeric value to use as quantity (if present, this will override the graphical quantity that would have been derived from the element)
Remarks - additional information that will be exported to the QM database "

Utilizing this program, several adhocs are placed on each feature based on the feature type. The different types of adhocs are outlined later in this document.

These adhocs are recorded for each feature as they are quantified during the Design and Computation Manager Compute command. From that calculation, the data can then be exported to a MicroSoft Access database format, which in turn can then be sent to the TransPort program for final payment output.

Definition of Terms

Several special terms will be used throughout this document and are outlined below:

Drainage Design - Features placed by the Geopak Drainage program.

Hand Design – Features placed either by selection from the Hydraulics Unit's toolbar or by selection of cells from within MicroStation.

Primary Payitem – The main payitem number for the feature selected.

Secondary Payitem – The payitem number for a feature directly connected to the Primary payitem. (ex. Feature placed is a Catch Basin but every basin must have a Masonry Structure placed as well. Primary = Catch Basin, Secondary = Masonry Structure)

Supplemental Payitem – Adoc which further defines the Primary Adhoc and is necessary for cost determination. (ex. Steel and aluminum pipes have a gage or thickness)

Unapparent Adhoc – Those adhoc values not easily verified by comparison to cell or level names. (ex. Rip Rap fabric area)

Project Procedures

When invoked the VBA makes several passes or iterations through the design file. These passes allow for variations in the design methods. The project may be done completely in Drainage, completely in Hand Design or a combination of both. During each pass the VBA derives information from features, adhocs them and the final pass moves the Drainage Design links (pipes) to the proper level inside Microstation, which assigns the proper symbology. In a project designed in Geopak Drainage, upon completion of the design the User would run the system in Drainage prior to the VBA. This would ensure that all necessary information was in the GDF file, such as station, offset, inverts, pipe sizes, etc.

As the program moves from feature to feature a question dialog appears querying the User for information not able to be determined from within the GDF or from internal sources such as cell name. Care must be taken by the User, as options are available in pull down form and custom key-in boxes.

If it should be necessary to change a design, the VBA has incorporated a Single Edit Tool. This tool removes any previous adhocs and then adds the current information as determined from the internal sources or by question dialog boxes. If the changes are substantial, Drainage Design project may need to have the entire system re run and then the VBA allows the user to select a single system for adhoc attribution. Again, care must be taken by the User to ensure that all features are properly address as the VBA does not validate inform, it just reports it.

File Structure

The VBA requires that supporting files be place into default locations. This structure must be followed for the program to work properly. The directory structure shown is basically a copy of those used on the Project server design.

The dgn file has to be placed in the Drainage folder and if the design was done with Geopak Drainage, the accompanying .gdf file has to be in the gdf sub-directory under the Hydraulics directory.

There can only be one .gdf file in the GDF folder.

There are four files currently needed to make the VBA function. The VBA files titled PU.mvba, Siam.mvba and Berg.mvba need to be in the Workspace in the *C:\NCDOT_V8_WORKSPACE\HYDRAULICS_STDS\Standards\vba* directory. There must also be the supporting hydro_payitems.mdb database file located in the *C:\NCDOT_V8_WORKSPACE\HYDRAULICS_STDS \Standards\data* directory as well.
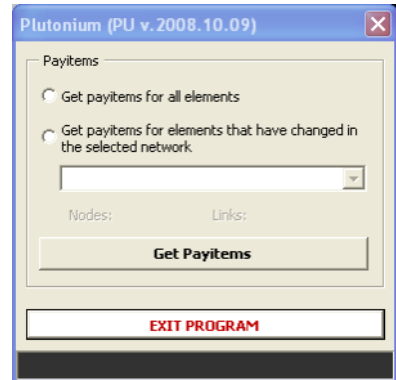
VBA Operation

The VBA can be started in several different ways, but for the sake of ease, it has been added to the bottom of the Hydraulic Unit's V8 Toolbar. The VBA runs at the zoom of the current view and has zooming and panning functions

incorporated into its dialogs. However, the User should zoom into the start of the drainage network to a comfortable view allowing them to distinguish the feature type as the VBA moves them from element to element.

The opening dialog presents the User with several options. The first two radio buttons ask the user what elements they want adhocs on. Selecting the *Get payitems for all elements* will place adhocs on every drainage feature. The *Get payitems for elements that have been changed in the selected network* will only adhoc the features for the Geopak Drainge network selected by the User.

Once the options have been properly set, Select the *Get Payitems* button. This starts the VBA on its first iteration, which will be the assignment of adhocs to the Geopak Drainage Designed features. The User is presented a message noting that the assignment process has begun and that this may take a few minutes to complete. The program then passes through each feature and adds the adhoc information that it can harvest from the .gdf file. Should the file have been run previously, the existing Adhocs will be removed from each element prior to addition of the new information. This information ranges from the feature type, such as drop inlet, catch basin, junction box, station and offset distances, pipe and inverts etc. These adhocs are created, without User input at this point, and then an informational dialog is presented to the User indicating that this first iteration is completed.

After accepting this dialog by pressing OK the program starts over again and in this iteration it begins asking the User for drainage information that cannot be harvested from the gdf file. The dialogs change as different features are occupied and the User is presented pulldowns or lists showing the variable(s) needed. Examples of the different dialogs are shown here:
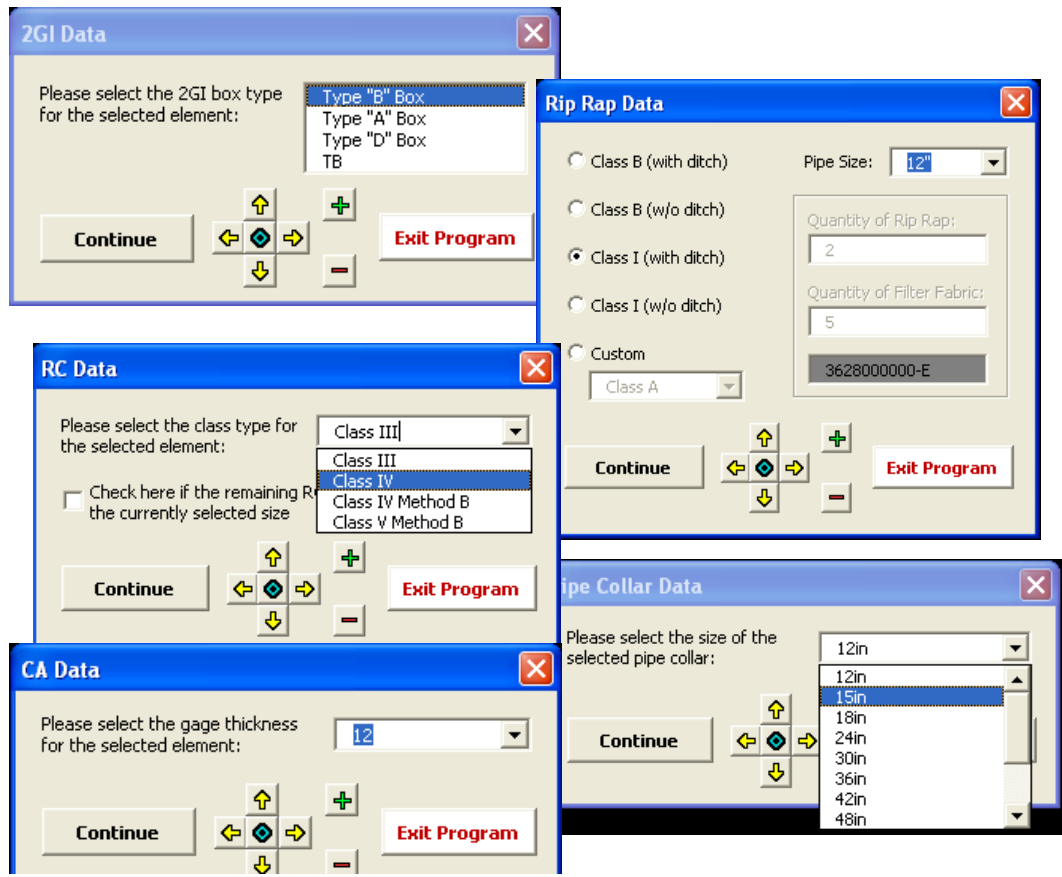
Included on each dialog box is a series of navigation buttons. While the VBA is running, Microstation commands are unavailable. Since the user may need to zoom or move within the drawing to determine information necessary to complete the Adhoc, these buttons were included on each dialog. The green button located in the middle of the four pan buttons is used to bring the current feature back to center.

The dialog for Rip Rap not only has multiple variables, but has a custom option which allows the user to add their own quantity calculation for fabric and stone.

On the RC pipe dialog, should the user want, there is a check box which allows the current Type to used on all remaining pipes without further query.

When this iteration is completed, the program again presents the user with a couple of completion dialogs basically stating that the Drainage Design items have now been adhoced. If there are no Drainage Design features in the file this process will be very quick.

Now the program starts over to place Hand Design (nondrainage) features. The process is the same as outlined above with the exception of no data can be derived from the .gdf file. The User is presented the same dialogs as before.

When this process is completed the User is shown a couple of completion dialogs again and the final interation begins where upon the VBA moves the Drainage links (pipes) to their proper levels within Microstation, which prior to this have been on the Default level.

Lastly the User sees the Main dialog again, should they be running systems separately. Otherwise they can select Exit Program.

Examples of Adhoc

The User is advised to review the Adhoc after each running of the VBA to ensure that all features are Adhoced correctly. Below are shown assigned adhocs from within the Geopak 3P Attribute Manager. This tool location is shown on the Project Manager toolbar.
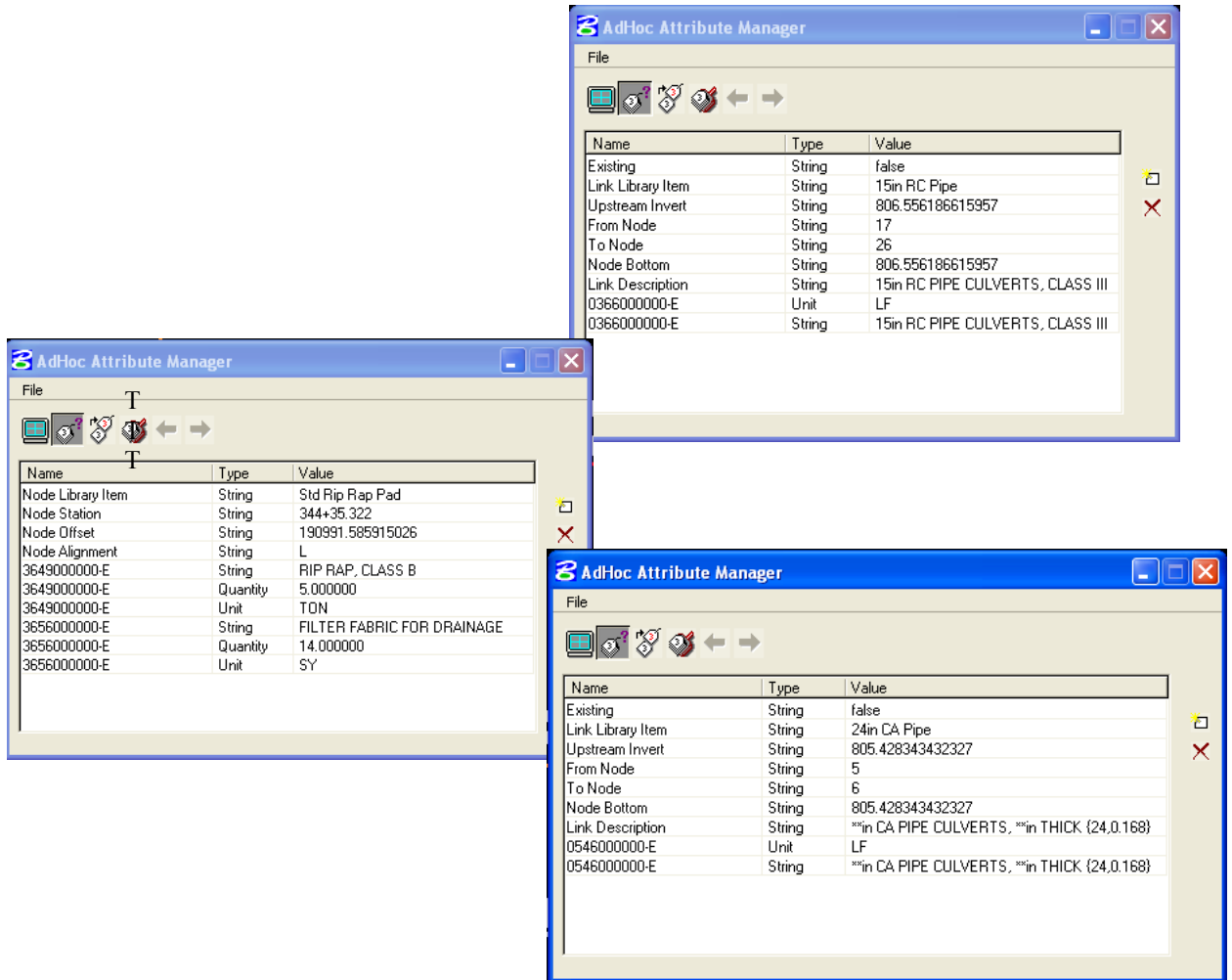
Features vary in the number of Adhocs that are attached after the VBA is run. Some will have the single Primary Payitem, some both Primary and Secondary Payitems and then some will have both along with unapparent adhocs as well. Drainage Design features will have many more adhocs than those in Hand Design in this Preliminary Quantities version of the VBA. Below are shown example of several features.

Format of Adhoc

For an adhoc payitem number and value to be used in the Transport quantity calculation, it must be represented in a specific format.

Using the last example shown above, note that the Link Description and the Payitem Value column uses ** in the first part the string, but at the end the values to replace the ** are enclosed with {}. The information in the brackets are the Supplemental Payitem number used to further define the Primary payitem. This format is mandatory.

Exclusion List for the Preliminary Quantity Version

Headwalls – No payitem number assigned
Flowable Fill – No payitem number assigned
Tees – No payitem number assigned
Elbows – No payitem number assigned

BCCS and PCP (HPDE) pipes – No payitem number assigned
Stub Outs – No payitem number assigned
Funnel Drains – No payitem number assigned
Tapered Ends – No payitem number assigned
Parallel/Flared Ends – No payitem number assigned
Driveway DI – No payitem number assigned
Converts - primary Adhoc are being placed but no Secondarys are assigned
Adjusts - primary Adhoc are being placed but no Secondarys are assigned
Jurisdictional Stream Rip Rap – No payitem number assigned