

TRAFFIC CONTROL ESTIMATE SYSTEM

Introduction

The Traffic Control Estimate System is an integrated estimating system to be used to create project quantity estimates. This system will allow the user to create a SPECS quantity estimate, Pavement Marking Schedule and detailed project estimate documentation. All of this specific estimate data can be printed and exported to text files, from one single data entry of the estimate values, eliminating the need for up to four separate entries, as it was done with previous non-unified systems.

The system is based on a MS Access database, but requires little if any knowledge of how to run Access. The system is a graphic interface that allows the user to navigate through the system by clicking on buttons, tabs or using pull-down menus. Many automated features have been built into the system. For example a library of commonly used signs can be accessed to automatically enter default sign sizes.

In addition, the system provides a feature that will import the items used in Roadway Standard Drawings, requiring the user to only specify needed parameters, and the modification created import the resultant quantities for unique project applications.

This system will create standard estimate data and reports that can be exported for use with other programs such as SPECS or Microstation.

Select Estimate

The Estimate Selector window (Fig 1) allows the user to select what estimate to open, either an estimate that has already been created, or create a new project estimate. If the user wishes to access an already existing estimate, click on "Open Existing Estimate". The user will then be prompted to select a TIP project number that the estimate was saved under. Select the project from the available projects listed in the pull-down menu. Once a project has been selected, the user will be directed to the Estimate Worksheet where items can be added or adjusted.

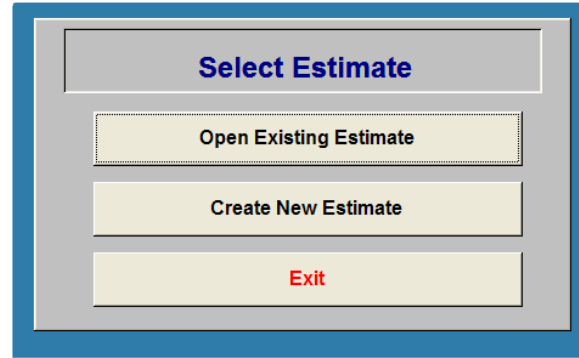


Figure 1

Otherwise, if the user wishes to create an estimate for a new project, click on "Create New Estimate". This will send the user to a Project Data form (Figure 2) where the user can specify all of the pertinent project data. Be sure to enter in the TIP Number, since this is the value that is required when an existing project is retrieved. Enter all of the other project data as completely as possible, because this data will be used on the estimate cover sheet.

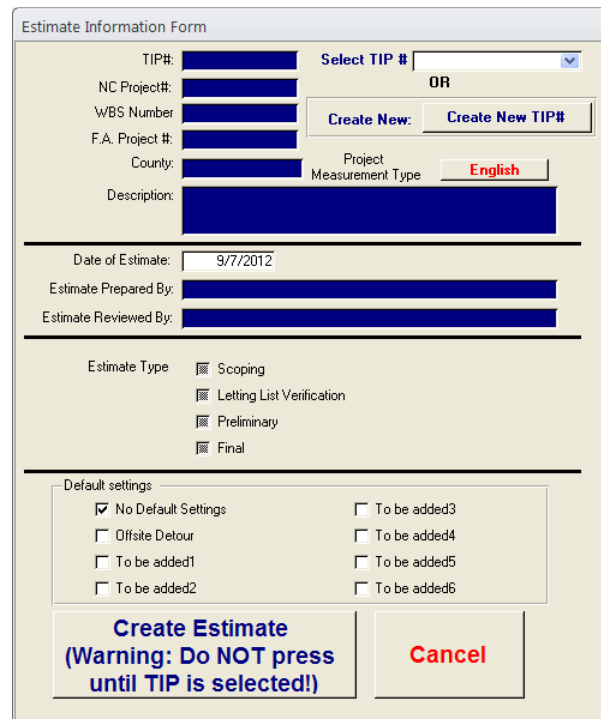


Figure 2

In particular, setting the Project Measurement Type is important. Clicking on the measurement button and toggling between "English" and "Metric" sets this. Be sure to set this value properly when the Project is being created. Although this value can be edited after the project is created, it will cause serious problems, since it will be possible to have a mix of items of both English and Metric. When the user does switch the measurement type after the project is created, the user must edit the items already entered. If any already entered items are affected by the Project Measurement Type, such as pavement markings or pavement marker spacing, they must be adjusted to be consistent with the new Project Measurement Type.

At the bottom of the page the user can select default settings. These default settings allow the user to automatically import standard items into the initial estimate for common project types, such as Offsite Detours. Keep in mind that these are only the standard items, and specific projects may require additional or a reduced number of items. It is the responsibility of the

user to adjust the imported items to correspond to the needs of their particular project. Adjustments to the items can be made once the user is working within the Estimate Worksheet. Once all of the project data has been set and any default settings are made, click on "Create Estimate" and the user will be directed to the Estimate Worksheet where items can be added or adjusted.

Setting Pay Items in Estimate

Once the user has selected either an existing project, or created an estimate for a new project, the user can now enter in pay items into the estimate on the Estimate Worksheet (Fig 3). Across the top of the Estimate Worksheet, several tabs show various product classifications. These classifications are broken down into categories of items that are keyed in similarly. For example, flashing arrow boards, changeable message signs, flaggers and police are all entered with some length of time specified. Each of these tabs allow for the entry of items in a slightly different fashion. Entry of items for each of the tabs is described below:

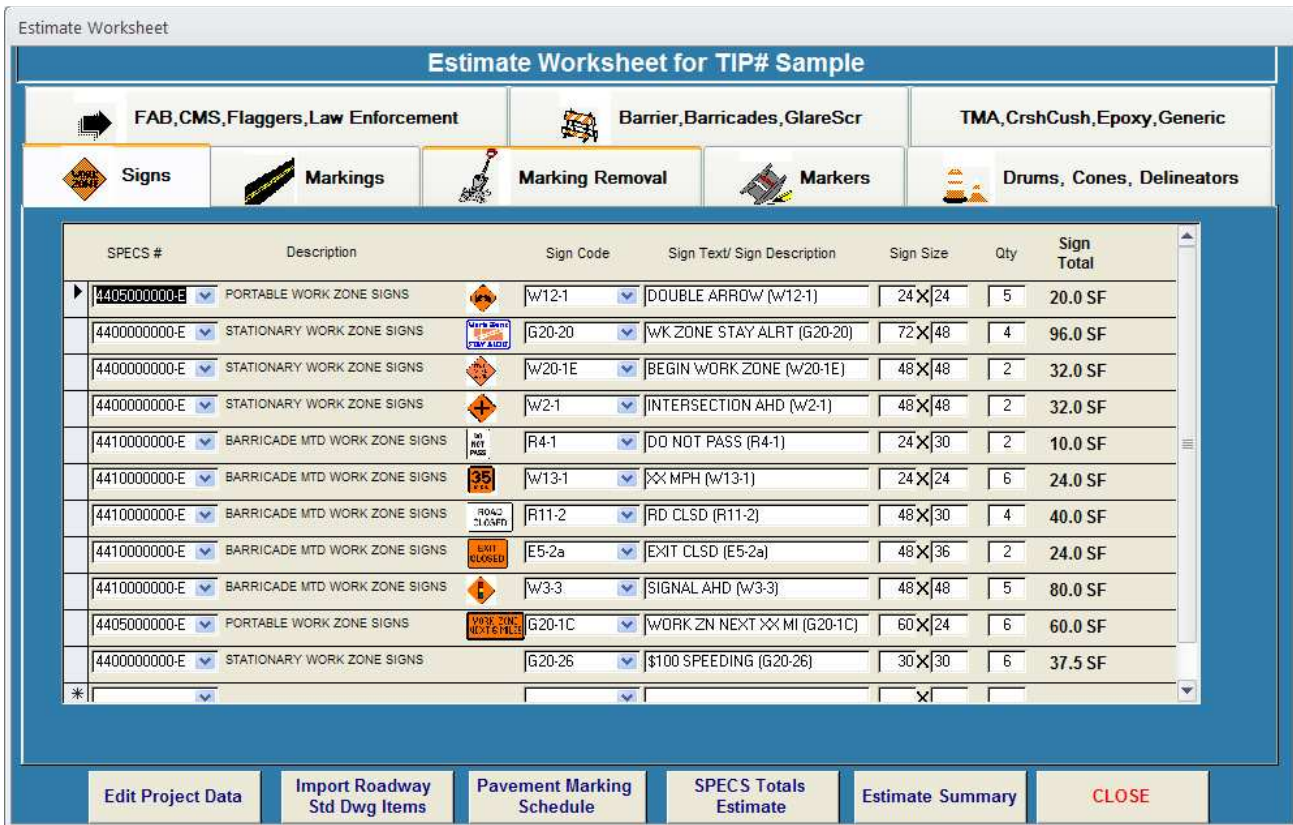


Figure 3

- **Signs (Fig 3)** - Enter each of the different signs that will be used on the project separately. For each sign, first select from the SPECS# pull-down menu the type of sign, either Stationary, Portable or Barricade Mounted. Be sure to select a SPECS# first, or else various error messages will be displayed if other fields are entered in before the SPECS# is selected.

the value that will be shown on all reports will only be what the user enters in the "Sign Text/Sign Description" field.

Next the user must specify the quantity for each type of sign. After the user has entered in the quantity of signs, the total square footage for the sign type is calculated.

At any time, the user can specify a different sign text/description over what is automatically inserted, but when doing so, please note that the thumbnail image of that sign will no longer be visible.

If a sign line item needs to be deleted, click on the record selector to the left of the line

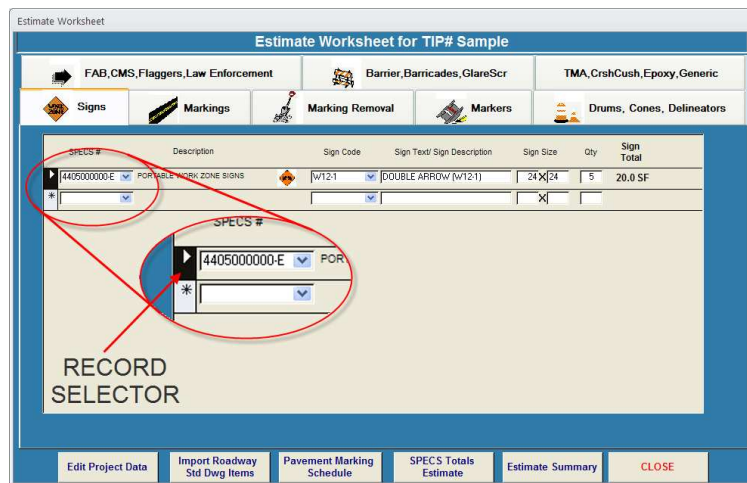


Figure 5

item. A small triangle should now be displayed in the record selector for that item as seen in Figure 5. Now right click and select "Cut" from the pop-up menu. Lastly, confirm that this item is to be deleted by clicking "Yes" in the confirmation dialog box. This same technique can be used to delete items from other line items as well.

- **Markings** (Fig 6) - Enter each marking line by selecting the marking line code from the pull down menu on the left. Prior to selecting marking line codes from the pull down menu on the left, select the desired pavement marking (PM) type by clicking the appropriate radio button. This will cause the items listed in the pull down menu to correspond to the type selected. Once you have selected the desired type and marking code, be sure to indicate whether or not the marking is temporary or final. You may indicate the marking type by toggling the button. If selecting temporary, be sure to indicate the number of times you estimate the quantity will be reapplied/refreshed in the field during construction.

If the radio button that was selected was either "Cold Applied" or "Polyurea", select the appropriate option. This field will be greyed out if Thermoplastic or Paint is selected.

For pavement marking lines, the length can either be entered by specifying the starting and ending stations OR by specifying total linear length of the marking length.

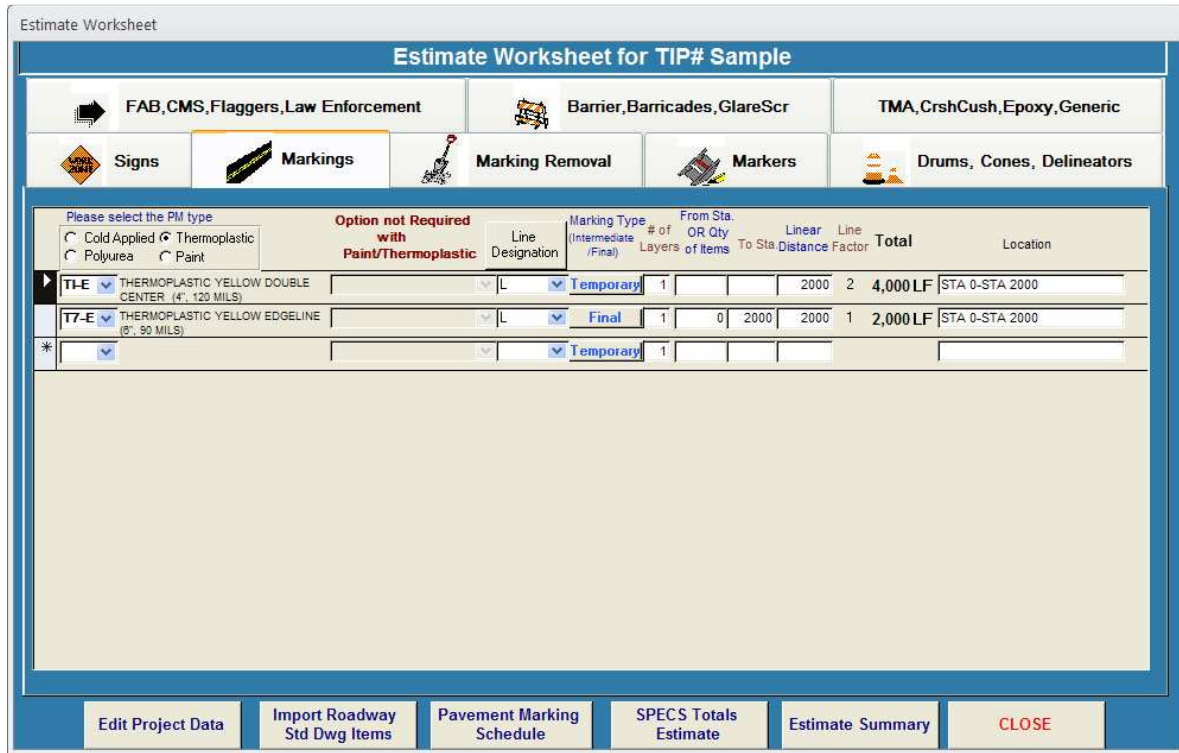


Figure 6

After all of these values are entered, the total length for line markings will be calculated, factoring in actual length of pavement marking material that will be applied. For example, the total linear length for double yellow lines will be double the value of the linear length, since two yellow lines will actually be applied.

For pavement marking symbols, only the quantity of symbols are to be entered. The quantity is entered in the same field as the From Station would have been entered.

The final entry is the Location field. This field is important to fill out so that the location of each line can be specified or described. This field is used to create detailed estimate summary reports. If the starting and ending stations have been specified, a default location specification can be created by double clicking on the Location field. Doing so will create a Location formatted as such: "STA XXXX-STA YYYY".

- **Marking Removal** - Enter each instance of marking removal by selecting the appropriate SPECS item number.

For the removal of pavement marking lines, the length can either be entered by specifying the starting and ending stations OR by specifying total linear length of the marking length.

For the removal of pavement marking symbols, only the quantity of symbols are to be entered. The quantity is entered in the same field as the From Station would have been entered.

The final entry is the Location field. This field is important to fill out so that the location of each line can be specified or described. This field is used to create detailed estimate summary reports. If the starting and ending stations have been specified, a default location specification can be created by double clicking on the Location field. Doing so will create a Location formatted as such: "STA XXXX-STA YYYY".

- **Markers (Fig 7)** - Enter each instance of pavement markers by first selecting the appropriate Marker Code. Next the user enters the linear length that markers will be placed. The linear length can either be entered by specifying the start and ending stations

Marker Code	Description	Line Designation	From Sta.	To Sta.	Distance	Spacing	Additional Number	Total	Location/Description
MG	Type 4, Yellow & Red, Snowplowable raised pavement markers	L	0	1000	1,000	25	5	45	From Sta.0+00 -L- to Sta.10+00 -L-
*						80			

Figure 7

OR by specifying total linear length of the marking length. The user will then either accept the default spacing value or enter in a new spacing value.

If any additional pavement markers are to be added to the calculated total, enter this value in Additional Number. If the user has a predetermined number of markers that is to be used in the estimate, instead of calculating the number of values from a linear length, simply enter this value into the Additional Number field.

The final entry is the Location field. This field is important to fill out so that the location of each line can be specified or described. This field is used to create detailed estimate summary reports. If the starting and ending stations have been specified, a default location specification can be created by double clicking on the Location field. Doing so will create a Location formatted as such: "STA XXXX-STA YYYY".

- **Drums, Cones and Delineators** - Item entry for drums, cones and delineators is the same as that for markers, except that a SPEC's item number is first selected, instead of a marker code.
- **FAB, CMS, Flaggers and Law Enforcement** (Fig 8) - Enter each instance of any of these items by selecting the appropriate SPECS item number. Then enter a quantity of each item.

Next enter in the length of time each item will be used. If the user's time length is defined by the number of months that the item will be used, enter the number of months in the "Months" field , set the number of operational days per month in the "Days/Month" field and set the number of operational hours in a work day in the "Hours/Day" field. The

SPECS #	Description	Qty of Item	Time Data for Each Instance					Total Hrs	Total Days	Total	Location/Description
			Months	Month	Days	Hrs/Day	Hrs				
4415000000-N	FLASHING ARROW BOARD	1	0	30	15	8	120	120	15	1 EA	FOR LANE CLOSURE (1101.02 Sht 3 of 7)
*		1	0	30	0	8	0	0	0		

Figure 8

number of days and hours will then be calculated, and the length of time, in the unit of time defined in SPECS, will be calculated in the totals column. If the user's time length is defined by the number of days that the item will be used, enter the number of days in the "Days" field and set the number of operational hours per day in the "Hours/Day" field. The length of time, in the unit of time defined in SPECS, will be calculated in the totals column.

Otherwise if the user's time length is defined by the number of hours that the item will be used, simply enter in the number of hours in the "Hours" field. Again the length of time, in the unit of time defined in SPECS, will be calculated in the totals column.

Be sure to review the current NCDOT RSD and Specifications relative to these items to assist in your decision.

The final entry is the location field. This field is important to fill out so that the location of each line can be specified or described. This field is used to create detailed estimate summary reports.

- **Barrier, Barricades and Glare Screen** (Fig 9) - Enter each instance of any of these items by selecting the appropriate SPECS item number. For all entries on this page, except for barricades, enter linear length that item will be placed. The linear length can either be entered by specifying the start and ending stations OR by specifying total linear length that the item is to be placed.

If the item to be entered is a barricade, the user instead will specify Barricade Quantity (number of barricades to be placed) and Barricade Length (length of each individual barricade). If additional barricade length is to be added to the calculated total, enter this value into the Additional Barricade Length field.

The final entry is the Location field. This field is important to fill out so that the location of each line can be specified or described. This field is used to create detailed estimate summary reports. If the starting and ending stations have been specified, a default location specification can be created by double clicking on the Location field. Doing so will create a Location formatted as such: "STA XXXX-STA YYYY".

SPECS #	Description	From Sta. OR Barricade Quantity	To Sta.	Distance OR Barricade Length	BarricadeA dditional Length	Total	Location/Description
4505000000-E	RESET PORTABLE CONCRETE BARRIER (ANCHORED)	0	100	100		100 LF	STA 0-STA 100
4445000000-E	BARRICADES (TYPE III)	2		12	0	24 LF	
*							

Figure 9

- **TMA, Crash Cushion, Other Sign Items, Generic** - Enter the appropriate SPECS number for each instance of TMA's, crash cushions and other sign items in the upper half of this page. Next for these items, enter in the quantity used. Lastly enter the a description of where and how the item is used in the Location and Use field.

Enter the appropriate SPECS number each instance of generic traffic control items on the lower half of this page. Next enter the total value, per the specified unit of measure shown. Lastly enter an appropriate value in the Description/Location field. In particular it is important to fill in the Description/Location field for generic items because this is the only way to identify what the item is.

Other Functions on the Estimate Worksheet

Other functions that can be used within the Estimate Worksheet can be accessed by the buttons found at the bottom of the window.



Click on this button if the user needs to access the Project Data. The user will be directed to the same window that was used to set up the project data (Fig 2). The user will not be able to change the TIP project number or include any new default settings.

Note that if the user does switch the measurement type after the project is created, it is the responsibility of the user to assure that the items already entered are consistent with the new Project Measurement Type. If any items were entered in using the previous project measurement type and are affected by the Project Measurement Type, such as pavement markings or pavement marker spacing, they must be adjusted to be consistent with the new Project Measurement Type. Changing the Project Measurement Type can potentially cause severe difficulty in creating an accurate estimate and must be done with considerable care. It is the responsibility of the user to ensure that all items are correctly covered to the new measurement type.



Click on this button if the user needs to import the predefined items shown on Roadway Standard Drawings. The user will be directed to a window that allows them to select from a list of Roadway Standard Drawings that can have a list of predefined items automatically created. When the user selects a drawing, the user will be directed to an import screen that will allow the user to enter in all the pertinent variables.

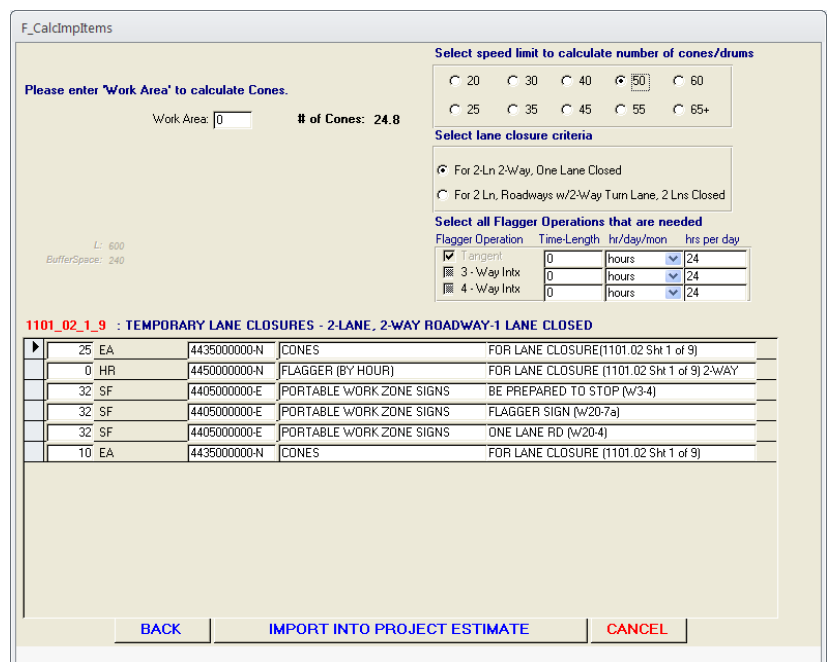


Figure 10

(Fig 10) In addition, the input table shown below the variable inputs can be edited by the user after the variable inputs have been entered. After all modifications to the input list have been made, click on the "Import Into Project Estimate" button. The items from the input list will be imported into the estimate currently being worked on and the user will be returned to the Estimate Worksheet.

Data that must be entered in for each drawing number:

Data to be entered	Reason	Applies to Drawing #
Operational Time Length	Sets time for flagger and warning lights for the operation.	1101.02 Sheets 1 and 3 1101.03 Sheets 4 and 6
Lateral Width	Sets the lateral width of lane closures for the operation. Used to calculate the "L" length value which helps to determine the number of cones/drums needed.	1101.02 Sheet 3 1101.03 Sheets 4 and 6
Work Area	Sets work area for the operation and helps determine the number of cones/drums needed	1101.02 Sheets 1 and 3
TMIA Space	Sets TMIA space for the operation and helps determine the number of cones/drums needed	1101.02 Sheet 3
Speed	Sets speed for the operation. Used to calculate the "L" length value which helps to determine the number of cones/drums needed.	1101.02 Sheets 1 and 3 1101.03 Sheets 4 and 6
Stations specifying Beginning and Ending Crossover	Sets total length of crossover operation. Used calculate number of drums/barrier.	1101.03 Sheets 4 and 6
For 2-Ln 2-Way, One Lane Closed OR For 2 Ln, Roadways w/2-Way Turn Lane, 2 Lns Closed	Sets lane closure type for the operation. Used to calculate cones needed and includes "Center Lane Closed" sign if turn lane is closed.	1101.02 Sheets 1

Pavement Marking Schedule

Click on this button if the user needs to view and/or export the pavement marking schedule. The user will be directed to a report (Fig 11) showing the pavement marking schedule that will be generated from the estimate data that has been entered. This report can either be printed out OR the user can export this data into a text (.txt) file. In order to export this data, the user must right-click on the report and a menu bar will appear with the caption of "Export Pavement Marking Schedule". Click on this menu bar, and the user will be directed to an output file screen where the user can save the file into whatever directory they wish. This file can then be accessed and imported into other applications, such as Microstation CAD file.

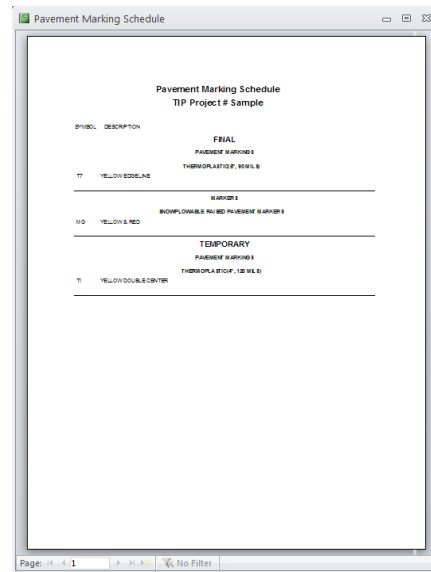


Figure 11

SPECS Totals Estimate

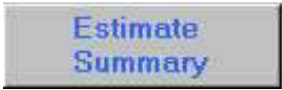
Click on this button if the user needs to view and/or export the SPECS totals. The user will be directed to a report (Fig 12) showing the totals of the SPECS items that will be generated from the estimate data that has been entered. This report can either be printed out OR the user can export this data into a text (.txt) file. In order to export this data, the user must right-click on the report and a menu bar will appear with the caption of "Export SPECS Data". Click on this menu bar, and the user will be directed to an output file screen where the user can save the file into whatever directory they wish. This file can then be accessed and imported into the SPECS system under the GEOPACK import function.

SPECS ESTIMATE TOTALS					
TIP Project # Sample					
Y	4415000000-N	1115	FLASHING ARROW BOARD	1	EA
Y	4445000000-E	1145	BARRICADES (TYPE III)	24	LF
Y	4505000000-E	1170	RESET PORTABLE CONCRETE BARRIER (ANCHORED)	100	LF
PM	4686000000-E	1205	THERMOPLASTIC (4", 120 MILS)	4,000	LF
PM	4688000000-E	1205	THERMOPLASTIC (6", 90 MILS)	2,000	LF
PM	4905000000-N	1253	SNOWPLOWABLE RAISED PAVEMENT MARKERS	45	EA

Figure 12

This text output file can be inputted into SPECS by first opening your project under SPECS. Next click on the Attachment tab. Then double click on the row identified as "GeoPak Line Item Interface". After doing so, a screen similar to that shown in Figure 13 will appear. Click on the "Select File ..." button. From there the user will browse through the file system and locate the SPECS export file that was created by the Traffic Control Estimate System. After selecting this file and clicking on the "OK" button on the GeoPak - Line Item Interface Screen, the items have been imported into SPECS. The imported objects will not be visible initially, the user must close out their project in SPECS and then reopen their project. Once the project is reopened, the imported items will be shown on the SPECS estimate.

Figure 13



Click on this button if the user needs to view or print the detailed estimate summary. The user will be directed to a report (Fig 14) showing a breakdown of all of the items in the estimate.

Estimates Summary for TIP Project # Sample		
NCPProject #: STMP-56787(6-A)	Date of Estimate: 5/17/01	
FAProject#: 8.123456789	Prepared By: Jeff Rom	
County: Wake		
Description: This is a sample project for testing only. Disregard all of the information found in this report it will only act as a means of confusing you ... As it should		
STATIONARY WORK ZONE SIGNS		
RD CLSD XX MI, LOC TRAFFIC ONLY (R11-3a)	2 signs	25.0 SF
WK ZONE STAY ALERT (G20-20)	2 signs	48.0 SF
DETOUR (W20-2)	2 signs w/ 6 Warning Flags	32.0 SF
\$250 PENALTY (W20-1JSP)	2 signs	20.0 SF
TOTAL STATIONARY WORK ZONE SIGNS		125 SF
PORTABLE WORK ZONE SIGNS		
REDUCED SPEED AHD (R2-5a)	3 signs w/ 6 Warning Flags	15.0 SF
EAST (M3-2)	5 signs	10.0 SF
TOTAL PORTABLE WORK ZONE SIGNS		25 SF
BARRICADE MOUNTED WORK ZONE SIGNS		
DETOUR ARROW (M4-10)	2 signs	12.0 SF
(G20-2)	5 signs	70.0 SF
RD CLSD XX MI, LOC TRAFFIC ONLY (R11-3a)	2 signs	25.0 SF
TOTAL BARRICADE MOUNTED WORK ZONE SIGNS		107 SF
FLASHING ARROW PANELS, TYPE C		
FOR LANE CLOSURE (1101.02 Sht 3 of 7)	(1440 hours)	1 EA
CHANGEABLE MESSAGE SIGNS		
(480 hours)		1 EA
WARNING FLAGS		
		12 EA
CONES		
STA 1200-STA 1400, (@ 50 FT spacing)		4 EA
FOR LANE CLOSURE (1101.02 Sht 1 of 7), (@ 50 FT spacing)		19 EA
TOTAL CONES		23 EA

Figure 14