

Chapter 6: Traffic Control Cost Estimating

6.1 Key Topics Covered in this Chapter

- TCP Cost Estimator.
- Traffic Control Plan Pay Items.
- Quantity Calculations.
- Temporary Protection and Direction of Traffic.
- TCD Cost Estimate.

6.2 TCP Cost Estimator

ODOT has developed an Excel-based spreadsheet to help organize and manage traffic control devices, quantities, and costs. The use of the spreadsheet is not mandatory and should be considered as yet another tool available to Designers in developing their temporary traffic control plans.

The *TCP Cost Estimator* is available on the ODOT Traffic Control Plans Unit website. The file is updated on a regular basis, so download a new copy from the TCP Unit website before beginning your estimate.

Designers should be aware that the estimator does have some limitations. For very complex staging plans, it may be necessary to run through the process more than once to calculate quantities for a particular pay item.

In generating quantities, many of the calculations are rounded up to the nearest whole unit or the nearest factor of five. Some quantities include a percentage for the anticipated replacement of damaged devices. Some devices, however, require the TCP designer to manually enter a percentage for replacement devices.

Read all Notes and Comments ('mouse-over') within the estimator before completing an estimate. All of the adjustments mentioned above are based on historical observations and the dynamic and widely variable nature of this discipline.

The first worksheet of the Cost Estimator is titled, "INSTRUCTIONS – Read First". Read this before using the Cost Estimator for the first time. If you have any questions or find errors within the Cost Estimator, please contact the Traffic Control Plans Unit.

6.3 Traffic Control Plan Pay Items

A number of traffic control devices are used to assemble a traffic control plan. TCP Designers will quickly become familiar with the more frequently-used devices. This chapter hopes to introduce the extensive list of TCD, as well as information and practices available in calculating quantities for these devices.

The TCP Cost Estimator includes the temporary traffic control devices currently being used by ODOT (and most city and county agencies) within its highway construction contracts. Designers should become familiar with the technical *pay item name* for each item and their unit of measure. A sample of the bid pay item list is shown in Table 6-1. For the complete list of TCP pay items visit the [Standard Specification](#) Website.

Table 6-1: TCP Pay Item Sample

Item Number	Item Description
0221-010000A	Temporary Protection and Direction of Traffic
0221-010100A	Temporary Work Zone Traffic Control, Complete
0222-010200J	Temporary Signs
0222-016200E	Sequential Arrow Signs
0222-016400E	Portable Changeable Message Signs
0222-0167300E	Portable Changeable Message Signs, Roller Mounted
0222-0167500E	Radar Speed Trailer
0223-016800T	Flaggers
0223-016900E	Traffic Control Supervisor
0223-0168100E	Flagger Station Lighting
0223-017200T	Pilot Cars
0223-017400T	Pedestrian Transport Vehicles
0223-020000E	Automated Flagger Assistance Device
0223-017000E	Rail Road Flagger Services
0223-017500T	Tow Truck
0224-014200E	Surface mounted tubular markers
0224-014300E	Replace Surface Mounted Tubular Markers
0224-014500E	Temporary Plastic Drums

6.4 Quantity Calculations

In developing the cost estimate for a Traffic Control Plan, there are two important tasks to focus on:

- A complete list of TCP pay items (and accompanying Special Provisions).
- Adequate quantities for those pay items.

Having both the right type of TCD and sufficient quantities, helps avoid the need for inconvenient and often costly Contract Change Orders (CCO). Therefore, carefully compare the contents of their Special Provisions and plan sheets (if applicable), as well as the list of appropriate Standard Drawings, to the list of pay items in the TCP Cost Estimator. And, in confirming the complete list of devices, ensure that an adequate quantity has been provided in the TCP – including a small percentage as a contingency or to account for damage by traffic, vandalism, etc.

Temporary Signs

One of the more important pay items is the quantity for Temporary Signs. Since every project will include some amount of temporary work zone signing, forgetting the pay item is not likely. However, not generating a proper quantity is very easy to do. Below is an excerpt from the list of Temporary Signs that are included on the “SIGNS” workbook within the Estimator.




SIGN NAME / LEGEND	SIGN NUMBER	Width in.	Height in.	Size ft²	Quantity
KEEPING OREGON ON THE MOVE (Rider) 	With CG20-8 or CG20-8s	96	12	8	
YOUR TAX DOLLARS AT WORK (Project Identification sign) 	CG20-8	96	48	32	
YOUR TAX DOLLARS AT WORK (Urban ID sign w/ "ODOT" Rider) 	CG20-8	48	66	22	
ROAD WORK AHEAD	W20-1	48	48	16	
ROAD WORK AHEAD - (Smaller)	W20-1	36	36	9	
BRIDGE WORK AHEAD	CW21-10	48	48	16	
BRIDGE WORK AHEAD - (Smaller)	CW21-10	36	36	9	
SHOULDER WORK	W21-5	48	48	16	
SHOULDER WORK (Smaller)	W21-5	36	36	9	
ON RAMP (Rider)	W13-4	36	36	9	
NEXT XX MILES (Rider)	W7-3a	24	18	3	
ROAD WORK NEXT XX MILES	CG20-1	60	24	10	
ROAD WORK XX MPH (New sign!)	CW20-1a	48	48	16	
INTERMITTENT ROAD WORK NEXT XX MILES	CG20-13	60	36	15	

Figure 6-1: Sign Estimation Worksheet

It is important to remember the following when calculating Temporary Sign quantities:

- In multi-lane sections, a *pair* of signs – one on each side of the roadway, are needed for each direction.
- Sign supports and sign covers, installation, moving, reinstalling and removing are all included in the square-ft. cost of the signs.
- Route Shields are measured separately – even if installed on the face of another temporary sign.
- Examine Stages and Phases of the TCP carefully. Signs may be reusable from one Stage to the next and thus, a new sign is not needed – it can simply be moved to the new location needed for the next Stage. Make references on subsequent plan sheets back to earlier sheets where the same sign is used in the same location. For example:
 - **Sheet EB01:** Shows a “ROAD WORK AHEAD” sign at Sta. 125+00
 - **Sheet EB05:** A leader pointing to a post-mounted sign symbol at Sta. 125+00 says, “See Sheet EB01”
- The “SIGNS” worksheet includes blank lines for project-specific “custom” signs (e.g. “BAKER RD. DETOUR NEXT RIGHT”).
- An additional 5% is automatically added to Temporary Sign quantities at the end bottom

By providing a thorough list of temporary work zone signs from the *MUTCD*, the FHWA *Standard Highway Signs (SHS)* manual, and the *ODOT Sign Policy & Guidelines*, the designer can use the Estimator like a checklist to capture a quantity for each individual sign needed for the project. The Estimator generates the total square footage quantity of temporary signs and adds a small percentage to account for damage, vandalism, oversights, etc.

Accompanying TCD

When a given TCD is normally accompanied by an additional device(s), the Cost Estimator automatically includes those devices. For example, per *Standard Drawing TM800*, for each Portable Changeable Message Sign (PCMS) placed on the roadway, six Plastic Drums and one Type III Barricade are installed in advance of it. Thus, for each PCMS entered into the “PCMS-ARROWS-RADAR” worksheet (*Figure 6.1*), the Estimator automatically adds six Plastic Drums and one Type III Barricade and inserts them into the “ESTIMATE SUMMARY” worksheet. See *Figure 6-2* and *6-3* for this illustration. Additional devices are also added for Portable Traffic Signals, AFADs, and for Smart Work Zone Systems (SWZS).

PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS)			
<i>Each PCMS adds: 1 Type III Barricade and 6 Plastic Drums to the "Estimate Summary"</i>			
Stage/Phase or Operation	NEW PCMS	MOVE PCMS	Comments
EX: North end of Project (for duration)			
For Duration of Project	2		
TOTAL:	2		

Figure 6-2: PCMS Estimator Worksheet

TRAFFIC CONTROL PLANS - PAY ITEM ESTIMATE SUMMARY						
Project:		County:				
Preparer:		Date:		KEY #		
Phone:		Email:				
Pay Item #	PAY ITEM	Unit	Quantity	Unit Cost	TOTAL	
0225-010000A	Temporary Protection & Direction of Traffic	LS	All	---	\$ -	
0225-010200J	Temporary Signs	ft ²	0	\$ 14.50	\$ -	
0225-010400E	Temporary Barricades, Type II	Each	0	\$ 47.00	\$ -	
0225-010400E	Temporary Barricades, Type III	Each	2	\$ 108.00	\$ 216.00	
0225-014000F	Temporary Glare Shields	ft	0	\$ 10.00	\$ -	
0225-014100F	Moving Temporary Glare Shields	ft	0	\$ 3.50	\$ -	
0225-014110E	Temporary Reflective Barrier Panels	Each	0	\$ 12.50	\$ -	
0225-014200E	Surface Mounted Tubular Markers	Each	0	\$ 34.00	\$ -	
0225-014300E	Replace Surface-Mount Tubular Markers	Each	0	\$ 34.00	\$ -	
0225-014700E	Temporary Plastic Drums	Each	12	\$ 40.00	\$ 480.00	
0225-014700E	Temporary Delineators	Each	0	\$ 30.00	\$ -	
0225-014115F	Pedestrian Channelization Devices	ft	0	\$ 26.00	\$ -	
0225-015800A	Temporary Traffic Signal Installation **	Lump Sum	0	\$ -	\$ -	
0225-015800E	Portable Temporary Traffic Signal **	Each		\$ -	\$ -	
0225-016200E	Sequential Arrow Sign (project duration)	Each	0	\$ 2,400.00	\$ -	
0225-016400E	Portable Changeable Message Sign (PCMS)	Each	2	\$ 5,500.00	\$ 11,000.00	
0225-017200T	Pilot Cars	Hour		\$ 60.00	\$ -	
GRAND TOTAL:					\$11,696.00	

Figure 6-3: Estimate Summary Worksheet

6.5 Temporary Protection & Direction of Traffic (TP&DT), Lump Sum Item

The TP&DT Lump Sum item – often misconstrued as being synonymous with the entire Traffic Control Plan (TCP) – is actually a single pay item comprised of several individual Traffic Control items that do not otherwise have their own pay item category, including monies that might be used by the contractor to pay for labor costs related to the installation, maintenance, cleaning and removal of various TCD as called for in the Specifications. It can be considered as a “miscellaneous” item.

Figure 6-4 is an excerpt from the *TCP Cost Estimator* listing some of the items that would be accounted for under the Temporary Protection & Direction of Traffic lump sum item.

ITEM	Unit	Quantity	Unit Cost	TOTALS
<i>Tubular & Conical Markers (Use Worksheet Below)</i>	Each	0		\$0.00
<i>Tubular & Conical Marker MOVES (Use Worksheet Below)</i>	Each	0		\$0.00
<i>Temp. Concrete Barrier To & From Stockpile (Includes Std. & Tall Barrier)</i>	ft	0		\$0.00
<i>Remove Temp. Barrier from Project (Includes Std. & Tall Barrier)</i>	ft	0		\$0.00
<i>Move Concrete ("Zipper") Barrier Laterally</i>	Each	0		\$0.00
<i>Move "Zipper" Machine To/From Storage (Min)</i>	Lump Sum	0		\$0.00
<i>Guard Rail, Anchor Type 1</i>	Each	0		\$0.00
<i>Guard Rail, Anchor Type 1 Modify</i>	Each	0		\$0.00
<i>Guard Rail, Transition 2-Sides</i>	Each	0		\$0.00
<i>Pole Base Excavation Covers</i>	Each	0		\$0.00
<i>Work Zone Delineation Fence (Orange, plastic)</i>	ft	0		\$0.00
<i>Temporary Chain Link Fence</i>	ft	0		\$0.00
<i>Falsework Illumination</i>	ft	0		\$0.00
<i>Incidental Flagging Hours</i>	Hour	0		\$0.00
<i>Blue Tubular Markers</i>	Each	0		\$0.00
Estimated TP& DT:				
Construction Budget:			x 1.0% =	\$0
COMPARED TO ...				
Calculated TP&DT (from items above. Use \$5000 Min.):				\$0
** TP&DT =				
<p>** Typically, use the larger of the two amounts. However, staging complexity and project duration can affect TP&DT amounts. Therefore, if the difference is greater than 100%, consider using the average of the two amounts. See Section 00225.90(a-2) for other items included in the TP&DT lump sum Pay Item.</p>				

Figure 6-4: TP&DT Estimate Worksheet

6.6 TCP Cost Estimate

Costs for temporary traffic control pay items fluctuate each year. Costs are adjusted annually following the release of the updated average annual pay item price report generated by the ODOT Highway Division's Estimating Unit. Designers working on ODOT construction projects should not make additional modifications to the pay item costs in the Cost Estimator – including regional adjustments. These and other cost adjustments are made during the final stages of project development before the project is released for advertisement.

The last worksheet in the TCP Cost Estimator is called the “ESTIMATE SUMMARY” and summarizes all of the quantities and costs generated for traffic control devices.

Once all preceding worksheets are complete, Designers should remember to complete the cells in **yellow** on the “ESTIMATE SUMMARY”, where applicable to your project.

Before completing the Cost Estimate, revisit the entire workbook looking for any errors, oversights or omissions. In addition, the following items are worth noting:

“CHANNELIZATION” Worksheet

Check for an appropriate percentage of replacement for Plastic Drums and Surface-Mounted Tubular Markers, as appropriate.

“BARRIER-GUARDRAIL” Worksheet

You may prefer to calculate quantities for Barrier and Barrier Moves by hand in lieu of using this worksheet.

“BARRIER Accessories” Worksheet

Quantities for the three new “Repair Temporary Impact Attenuator” pay items should be discussed with construction office staff.

“ESTIMATE SUMMARY” Worksheet

- **Temporary Traffic Signal Installation and Portable Temporary Traffic Signal**
Based on the staging plan, designs for signal installations should come from a traffic signal designer. Approval to add a signal, even a temporary one, must come from the state traffic engineer.
- **Flaggers and Pilot Cars**
Quantities should be calculated very carefully. Flagger hours are likely to be dependent on the scope of work and construction schedule. Designers should communicate with construction management staff who, having reviewed the scope of work and the staging plans, should be able to recommend or confirm quantities for these pay items.
- **Flagger Station Lighting**
Used to light each anticipated Flagger station. Seek guidance from construction staff to refine quantities, as needed.

- **Traffic Control Supervisor (TCS)**

See **Chapter 3** for additional warrants and assistance in determining TCS quantities. Consult with construction staff and the 2018 Standard Specifications to provide additional guidance regarding TCS quantities.

- **Tow Trucks**

A rare pay item, but useful on projects with limited widths and where continuous flow of traffic in a single lane is critical. **MUST** include Special Provision language. Consult with construction offices for use.

When submitting a TCP estimate, the “ESTIMATE SUMMARY” worksheet is typically the only worksheet needed. If sending electronically, the whole Excel file may be sent. Keep a copy of the entire workbook in both electronic and hardcopy formats for your Project File.

All state and local agency Federal-aid project payments for work zone traffic control devices shall be measured per unit basis (Method “A”). Use of Lump Sum Basis (Method “B”) should be rare and reserved for only those small projects where traffic control requirements are not complex and the number, type and location of traffic control devices can be easily and readily identified from the project plans. Incidental Basis (Method “C”) shall not be used on Federal-aid projects.
