Work Zone Field Manual: Quick Reference Guide

For Maintenance Operations

TN TDOT Department of Transportation

Updated 2021

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TYPICAL APPLICATION ACTIVITY MATRIX

GENERAL ACTIVITY

TYPICAL APPLICATION	POTHOLE REPAIR	PAVING ACTIVITIES	SHOULDER MAINTENANCE	STORM SEWER MAINTENANCE	ROW/ROOM/SLOPE MOWING	LITTER/ANIMAL/LARGE DEBRIS CLEARING	OFF-SHOULDER MAINTENANCE	STREET CLEANING	BRIDGE REPAIR	PAVEMENT MARKING/STRIPING	GUARDRAIL/CRASH REPAIR	SINKHOLE/SLOPE REPAIR	EMERGENCY MANAGEMENT	CHEMICAL APPLICATION/SPRAYING
(4) Shoulder Closure			x	x	x	x			x		x	x	x	x
(5) Off Shoulder				x	x	x	x				x	x		x
(8) 2-Lane Mobile Lane Closure		x			x			x		x				x
(9) 2-Lane Stationary Lane Closure	x	x	x	x		x			x	x	x		x	
(20) Multi-Lane Undivided Left Lane Closure	x	x				x				x			x	
(21) Multi-Lane Undivided Outside Lane Closure	x	x	x	x		x			x	x	x		x	
(23) Multi-Lane Divided Mobile Shoulder > 8ft Closure	x		x		x	x								x
(24) Multi-Lane Divided Mobile Shoulder < 8ft Closure	x		x		x	x								x
(25) Multi-Lane Divided Mobile Lane Closure		x			x			x		x				x
(26) Freeway Mobile Double Lane Closure	x	x												
(28) Multi-Lane Divided Short Duration Lane Closure					x			x						x
(29) Multi-Lane Divided Outside Lane Closure Nighttime	x		x	x					x		x		x	
(31) Multi-Lane Divided Outside Lane Closure	x	x	x	x		x			x	x	x		x	
(32) Multi-Lane Stationary Inside Lane Closure	x	x		x		x			x	x				
(33) Multi-Lane Divided Left Two Lanes Closed	x	x				x			x	x			x	
(34) Multi-Lane Divided Right Two Lanes Closed	x	x				x			x	x			x	
(35) Freeway Double Lane Closure	x	x				x			x	x			x	
(57) Multi-Lane Divided Median Closure						x								

The drawings listed in the table above are provided in this Quick Reference Guide. All other applications can be found in the full Work Zone Field Manual.

Recommended method for using the matrix:

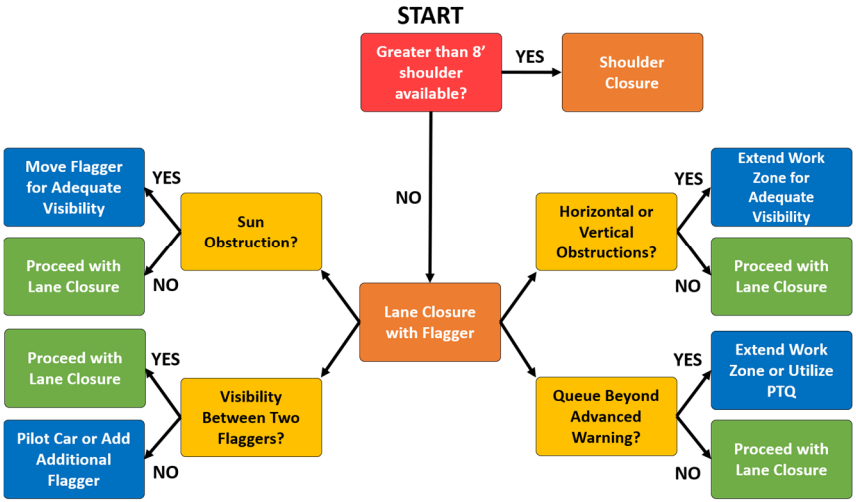
- Determine the work activity and find it, or an activity similar to it, in the matrix.
- Determine the location of the work activity. The location of the work affects the type of Typical Application used.
- Determine duration of the activity. Again, the duration of work affects the type of Typical Application that can be used.
- Review all suggested Typical Applications to see which best fits the operation.

Special Considerations

Experiential and engineering judgment, supervisory support, and proper planning should be exercised and communicated with crews to address site-specific positioning of devices due to horizontal/vertical alignment challenges and work activities.

Typical layouts contained in this manual may need to be modified to fit more complex roadway conditions or operations. Special considerations to be considered include, but are not limited to, the following: shoulder width, horizontal and vertical geometry, lighting conditions, presence of fog, weather conditions, and queuing activity. The figure below is provided to help determine if adjustments should be made for scenarios that would normally call for a shoulder closure typical application.

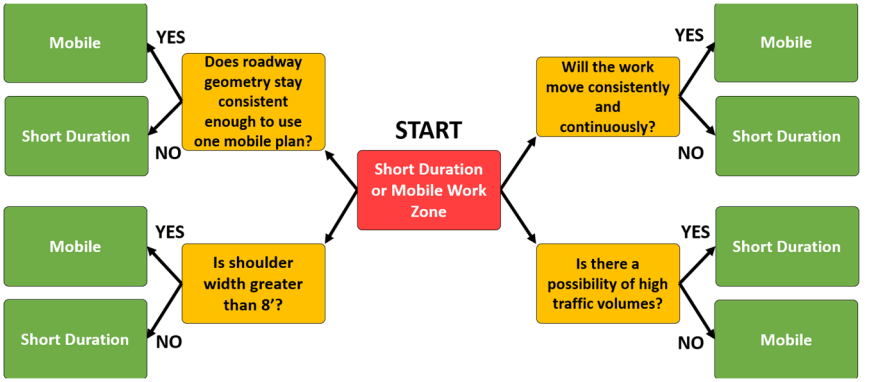
Shoulder Closure vs Lane Closure with Flaggers



Another situation that requires adjustments based on the special considerations is whether a mobile operation or a short duration work zone should be set up. A mobile operation is continuously moving or stopped in one location for periods of 15 minutes or less and traffic control devices are typically mounted on work vehicles. Short duration work zones stay in one location during daylight conditions from 15 minutes to one hour and minimal TTC devices are deployed.

The figure below is provided to help determine whether to use a mobile operation or short duration work zone.

Mobile vs Short Duration



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TYPICAL APPLICATIONS

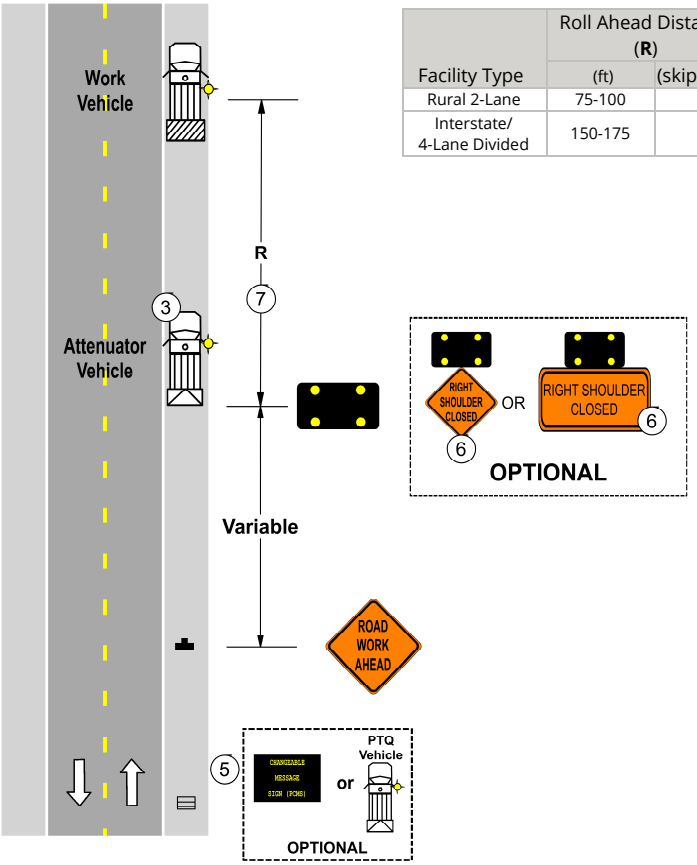
Notes:

(4) Shoulder Closure – Mobile and Short Duration
Two-Lane, Two Way

NOTES:

1. A work vehicle without a flashing arrow board shall be followed by an Attenuator vehicle at a distance of R. The Attenuator vehicle shall be equipped with a flashing arrow panel and have a truck or trailer mounted attenuator.
2. Any Attenuator vehicle or PTQ vehicle operating totally or partially in a traffic lane shall be equipped with a truck or trailer mounted attenuator following the requirements in *TDOT's SOG 477-01* and the *Truck and Trailer Mounted Attenuators Manual*.
3. The Attenuator vehicle or PTQ vehicle may encroach into the traffic lane when the shoulder is too narrow to drive on.
4. Any vehicle not displaying a flashing arrow board shall display high-intensity rotating, flashing, oscillating, or strobe lights.
5. The PCMS shall be used for nighttime operations.
6. When the PCMS is used, the RIGHT (LEFT) SHOULDER CLOSED sign becomes optional.
7. The distance between the work area and the Attenuator vehicle should be adjusted between R and F based on traffic volume and sight distance.

Facility Type	Roll Ahead Distance (**R**) (ft)	(skip lines)
Rural 2-Lane	75-100	3
Interstate/ 4-Lane Divided	150-175	5



(5) Shoulder Closure – Work On or Near Shoulder
Two-Lane, Two Way

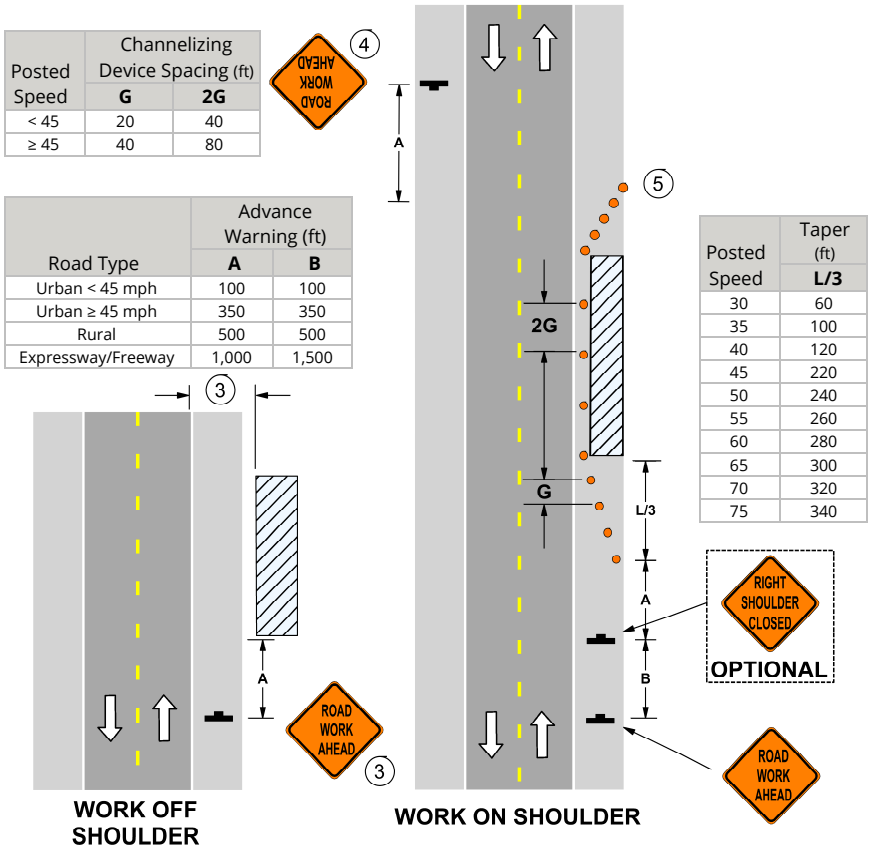
NOTES:

1. All signs, barricades and channelizing devices may be omitted when the work occupies an isolated shoulder location for less than one hour and it has little or no interference with traffic.
2. An operation which moves between workspaces that are less than the Decision Sight Distance along the shoulder should use a stationary or mobile shoulder closure.
3. The ROAD WORK AHEAD sign may be omitted for short term daylight operations if:
   a. the distance from curb face to the workspace is at least 2 feet, or
   b. the distance from the edge of travel way to the workspace is at least 15 feet **and** a vehicle displaying a 360-degree flashing beacon is operating.
4. The ROAD WORK AHEAD sign shall be installed on two-lane, two-way roads if traffic control devices are installed for a workspace in the opposite shoulder.
5. The downstream taper should be 50-100 feet using five equally spaced channelizing devices.

Posted Speed	Channelizing Device Spacing (ft)	
	G	**2G**
< 45	20	40
≥ 45	40	80

Road Type	Advance Warning (ft)	
	A	**B**
Urban < 45 mph	100	100
Urban ≥ 45 mph	350	350
Rural	500	500
Expressway/Freeway	1,000	1,500

Posted Speed	Taper (ft)
	L/3
30	60
35	100
40	120
45	220
50	240
55	260
60	280
65	300
70	320
75	340

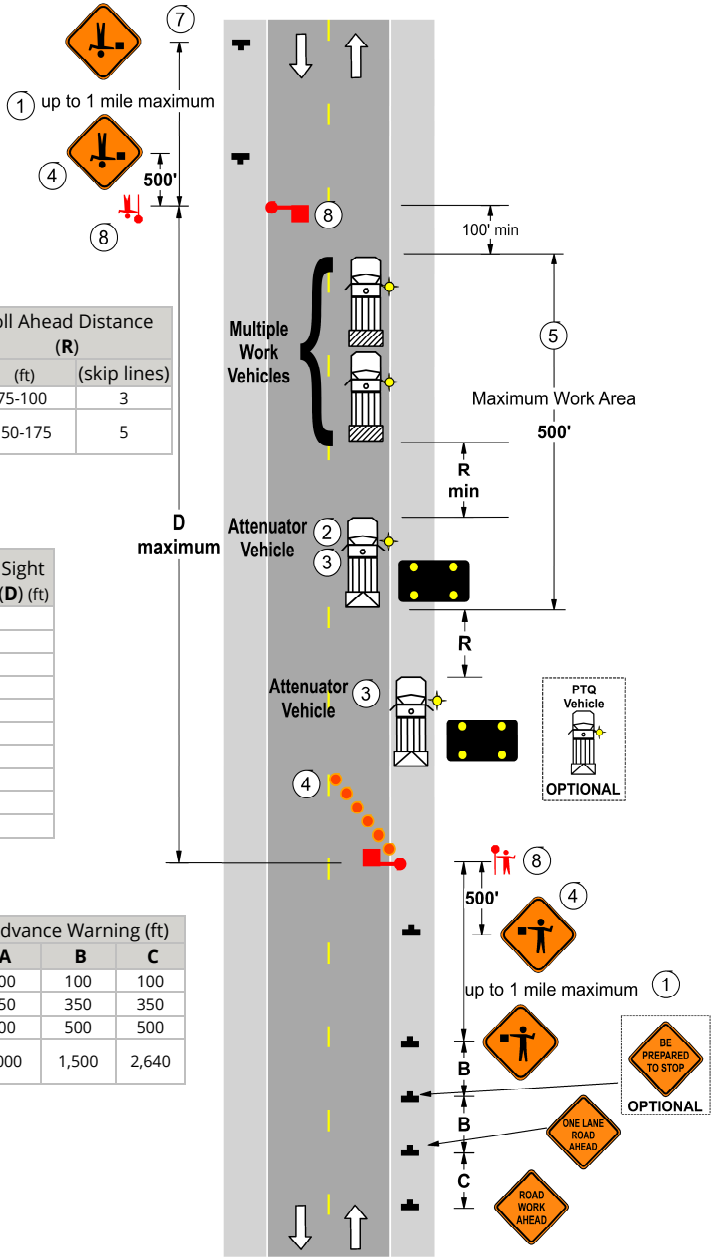


(8) Lane Closure – With a Moving Work Area
Two-Lane, Two Way

NOTES:

1. The advance warning signs should be moved or reset after each major road intersection or after each mile, whichever comes first.
2. Any Attenuator vehicle or PTQ vehicle operating totally or partially in a traffic lane shall be equipped with a truck or trailer mounted attenuator following the requirements in *TDOT's SOG 477-01* and the *Truck and Trailer Mounted Attenuators Manual*.
3. In the case of shoulders less than 8-feet wide, one attenuator truck minimum is required and the PTQ vehicle, if used, shall remain clear of obstructing motorist visibility of the flagger, taper, and buffer. Acceptable locations include the edge of the roadway of the closed lane as far outside the travel lane as practical. Where shoulders are greater than 8-feet wide, a second attenuator or PTQ vehicle should be located on the shoulder as to not block visibility of the flagger and a distance, F, from the downstream attenuator.
4. The two-way taper should be 50 feet using 5 equally spaced channelizing devices.
5. A compact work area should be maintained with minimum space allowed between work vehicles. When the work area extends beyond 500 feet in total length, other traffic control layouts should be considered.
6. This layout may be used for nighttime operations only in locations where the posted speed limit is 40 mph or less.
7. The advance warning sign sequence is shown for one-way direction only. The other direction shall be identical.
8. Flaggers shall be used when the approach sight distance is restricted, the motorists cannot see beyond the work area, or traffic volumes do not allow safe passage.
9. Keep the work zone area as compact as possible to reduce driver confusion and accidental re-entry into mobile lane closure.

(8) Lane Closure – With a Moving Work Area
Two-Lane, Two Way



Facility Type	Roll Ahead Distance (**R**)	
	(ft)	(skip lines)
Rural 2-Lane	75-100	3
Interstate/ 4-Lane Divided	150-175	5

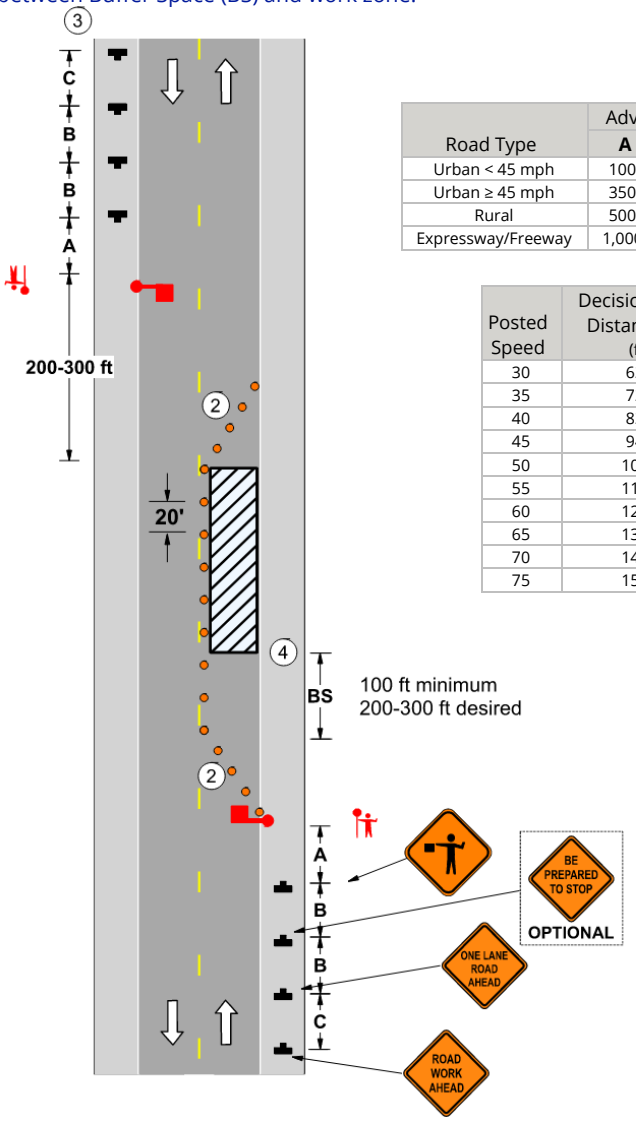
Posted Speed	Decision Sight Distance (**D**) (ft)
30	620
35	720
40	820
45	940
50	1040
55	1140
60	1280
65	1380
70	1480
75	1580

Road Type	Advance Warning (ft)		
	A	**B**	**C**
Urban < 45 mph	100	100	100
Urban ≥ 45 mph	350	350	350
Rural	500	500	500
Expressway/ Freeway	1,000	1,500	2,640

(9) Lane Closure – Two Flaggers
Two-Lane, Two Way

NOTES:

1. The approach sight distance to the flagger shall be at least the Decision Sight Distance (D) or 500 feet, whichever is greater.
2. The two-way taper should be 50 feet and the downstream taper should be 50 to 100 feet and using five equally spaced channelizing devices.
3. The advance warning sign sequence is shown for one-way direction only. The other direction shall be identical.
4. On roadways with speed limits greater than 45 mph, attenuator is required between Buffer Space (BS) and work zone.



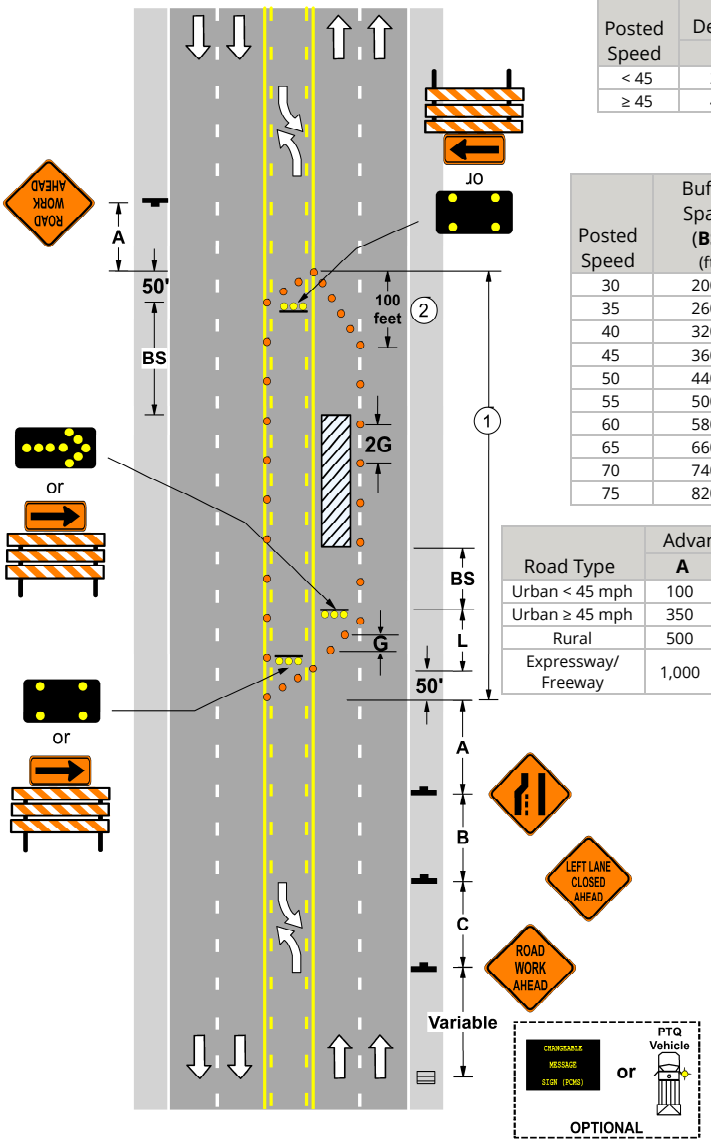
Road Type	Advance Warning (ft)		
	A	**B**	**C**
Urban < 45 mph	100	100	100
Urban ≥ 45 mph	350	350	350
Rural	500	500	500
Expressway/Freeway	1,000	1,500	2,640

Posted Speed	Decision Sight Distance (**D**) (ft)
30	620
35	720
40	820
45	940
50	1040
55	1140
60	1280
65	1380
70	1480
75	1580

(20) Left Lane Closure – With Two-Way Left Turn Lane
Multi-Lane, Undivided

NOTES:

1. Parking, stopping and left turning vehicles may be prohibited along the workspace and taper.
2. The downstream taper should be 100 feet in length using five equally spaced channelizing devices.



Posted Speed	Channelizing Device Spacing (ft)	
	G	**2G**
< 45	20	40
≥ 45	40	80

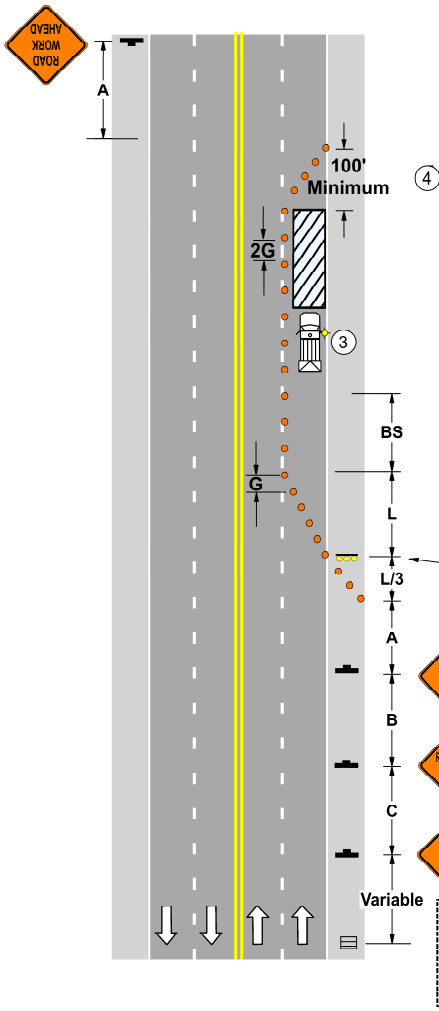
Posted Speed	Buffer Space (**BS**) (ft)	Taper Length (**L**) (ft)
30	200	180
35	260	260
40	320	320
45	360	660
50	440	720
55	500	780
60	580	840
65	660	900
70	740	960
75	820	1020

Road Type	Advance Warning (ft)		
	A	**B**	**C**
Urban < 45 mph	100	100	100
Urban ≥ 45 mph	350	350	350
Rural	500	500	500
Expressway/ Freeway	1,000	1,500	2,640

(21) Right Lane Closure
Multi-Lane, Undivided

NOTES:

1. When paved shoulders having a width of 8 feet or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.
2. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.
3. An Attenuator vehicle may be used at the beginning of the work zone. The Attenuator vehicle shall be equipped with a truck or trailer mounted attenuator.
4. The downstream taper should be 100 feet in length using five equally spaced channelizing devices.



Road Type	Advance Warning (ft)		
	A	**B**	**C**
Urban < 45 mph	100	100	100
Urban ≥ 45 mph	350	350	350
Rural	500	500	500
Expressway/Freeway	1,000	1,500	2,640

Posted Speed	Buffer Space (**BS**) (ft)	Taper Length (**L**) (ft)
30	200	180
35	260	260
40	320	320
45	360	660
50	440	720
55	500	780
60	580	840
65	660	900
70	740	960
75	820	1020

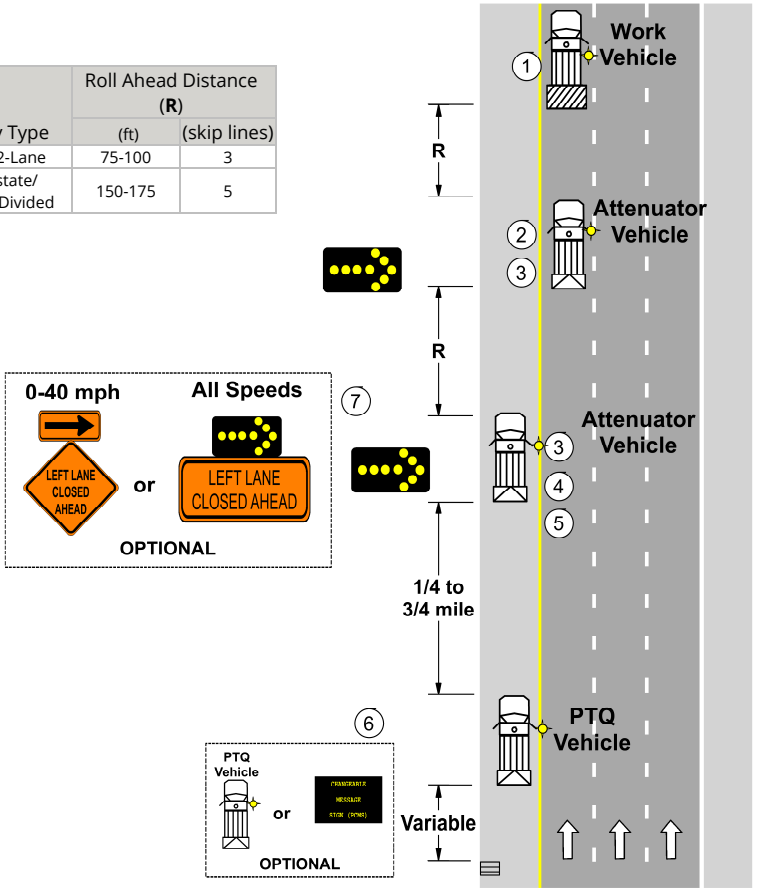
Posted Speed	Channelizing Device Spacing (ft)	
	G	**2G**
< 45	20	40
≥ 45	40	80

(23) Mobile Inside Shoulder > 8ft Closure
Multi-Lane, Divided

NOTES:

1. The work vehicle may either occupy the shoulder or the left travel lane.
2. A work vehicle without a flashing arrow board shall be followed by an Attenuator vehicle at a distance of R. The Attenuator vehicle shall be equipped with a flashing arrow board and have a truck or trailer mounted attenuator.
3. Any Attenuator vehicle or PTQ vehicle operating totally or partially in a traffic lane shall be equipped with a truck or trailer mounted attenuator following the requirements in *TDOT's SOG 477-01* and the *Truck and Trailer Mounted Attenuators Manual*.
4. The lateral placement of the Attenuator Vehicle may be adjusted to create a taper when an Attenuator vehicle is used.
5. If the operation does not move at least the Decision Sight Distance, D, every 15 minutes, the appropriate stationary layout should be used.
6. The PCMS shall be used for nighttime operations.
7. When the PCMS is used, the LEFT LANE CLOSED sign becomes optional.
8. The presence of a law enforcement officer in the work zone is optional.

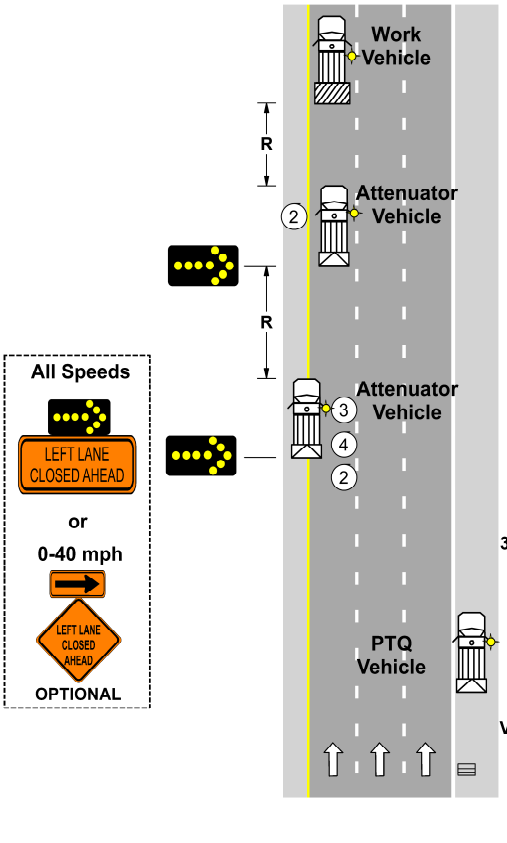
Facility Type	Roll Ahead Distance (**R**)	
	(ft)	(skip lines)
Rural 2-Lane	75-100	3
Interstate/ 4-Lane Divided	150-175	5



(24) Mobile Inside Shoulder < 8ft Closure
Multi-Lane, Divided

NOTES:

1. A work vehicle without a flashing arrow board shall be followed by an Attenuator vehicle at a distance of R. The Attenuator vehicle shall be equipped with a flashing arrow board and have a truck or trailer mounted attenuator.
2. Any Attenuator vehicle or PTQ vehicle operating totally or partially in a traffic lane shall be equipped with a truck or trailer mounted attenuator following the requirements in *TDOT's SOG 477-01* and the *Truck and Trailer Mounted Attenuators Manual*.
3. The lateral placement of the Attenuator vehicle may be adjusted to create a taper when an Attenuator vehicle is used.
4. The Attenuator vehicle may encroach into the traffic lane when the shoulder is too narrow to drive on.
5. If the operation does not move at least the Decision Sight Distance, D, every 15 minutes, the appropriate stationary layout should be used.
6. The PCMS shall be used for nighttime operations.
7. The use of a second PTQ vehicle is recommended for additional advanced warning when sight distance challenges exist.
8. The presence of a law enforcement officer in the work zone is optional.

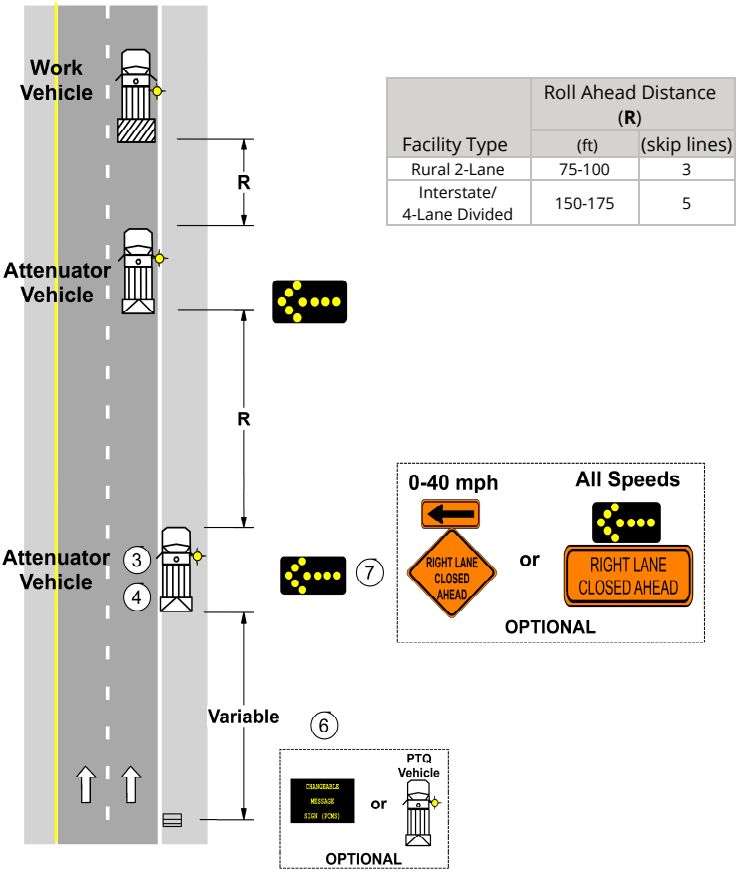


Facility Type	Roll Ahead Distance (**R**) (ft)	(skip lines)
Rural 2-Lane	75-100	3
Interstate/ 4-Lane Divided	150-175	5

(25) Mobile Lane Closure
Multi-Lane, Divided

NOTES:

1. A work vehicle without a flashing arrow board shall be followed by an Attenuator vehicle at a distance of R. The Attenuator vehicle shall be equipped with a flashing arrow board and have a truck or trailer mounted attenuator.
2. Any Attenuator vehicle or PTQ vehicle operating totally or partially in a traffic lane shall be equipped with a truck or trailer mounted attenuator following the requirements in *TDOT's SOG 477-01* and the *Truck and Trailer Mounted Attenuators Manual*.
3. The lateral placement of the Attenuator vehicle may be adjusted to create a taper when an Attenuator vehicle is used.
4. The Attenuator vehicle may encroach into the traffic lane when the shoulder is too narrow to drive on.
5. If the operation does not move at least the Decision Sight Distance, D, every 15 minutes, the appropriate stationary layout should be used.
6. The PCMS shall be used for nighttime operations.
7. When the PCMS is used, the RIGHT LANE CLOSED sign becomes optional.
8. The presence of a law enforcement officer in the work zone is optional.

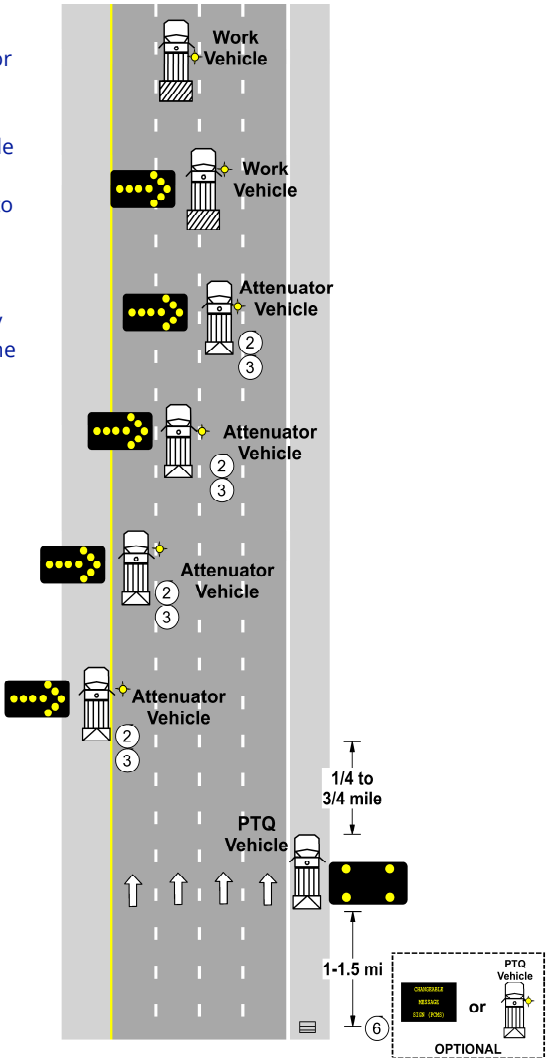


Facility Type	Roll Ahead Distance (**R**) (ft)	(skip lines)
Rural 2-Lane	75-100	3
Interstate/ 4-Lane Divided	150-175	5

(26) Mobile Freeway Double Lane Closure
Multi-Lane, Divided

NOTES:

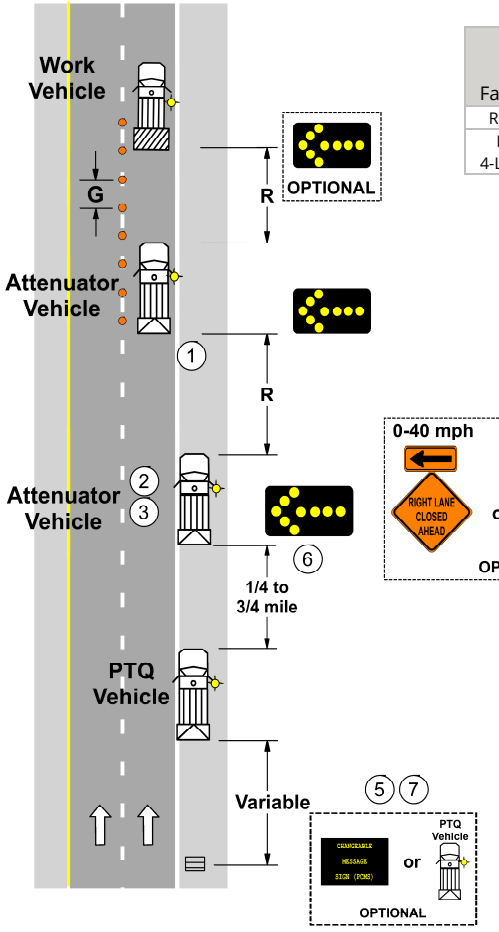
1. A work vehicle without a flashing arrow board shall be followed by an Attenuator vehicle equipped with a flashing arrow board and have a truck or trailer mounted attenuator.
2. Any Attenuator vehicle or PTQ vehicle operating totally or partially in a traffic lane shall be equipped with a truck or trailer mounted attenuator following the requirements in *TDOT's SOG 477-01* and the *Truck and Trailer Mounted Attenuators Manual*.
3. The lateral placement of the Attenuator vehicle may be adjusted to create a taper when an Attenuator vehicle is used.
4. A second work vehicle should occupy the space between the first Attenuator vehicle and the primary work vehicle. The second work vehicle should straddle the working lane and the Attenuator vehicle lane as to create a visual taper and prevent traffic from reentering the work area.
5. The Attenuator vehicle may encroach into the traffic lane when the shoulder is too narrow to drive on.
6. The PCMS shall be used for nighttime operations.
7. Extensive planning is required for this layout. **Regional Operations Engineer or Traffic Engineer approval is required.**
8. The presence of a law enforcement officer in the work zone is optional.



(28) Short Duration Lane Closure
Multi-Lane, Divided

NOTES:

1. Any Attenuator vehicle or PTQ vehicle operating totally or partially in a traffic lane shall be equipped with a truck or trailer mounted attenuator following the requirements in *TDOT's SOG 477-01* and the *Truck and Trailer Mounted Attenuators Manual*.
2. The lateral placement of the Attenuator vehicle may be adjusted to create a taper.
3. The Attenuator vehicle may encroach into the traffic lane when the shoulder is too narrow to drive on.
4. If the operation does not move at least the Decision Sight Distance, D, once each hour, the appropriate stationary layout should be used.
5. The PCMS shall be used for nighttime operations.
6. When the PCMS is used, the RIGHT LANE CLOSED sign becomes optional.
7. A typical message should be ROAD WORK AHEAD and RIGHT LANE CLOSED.
8. The presence of a law enforcement officer in the work zone is optional.



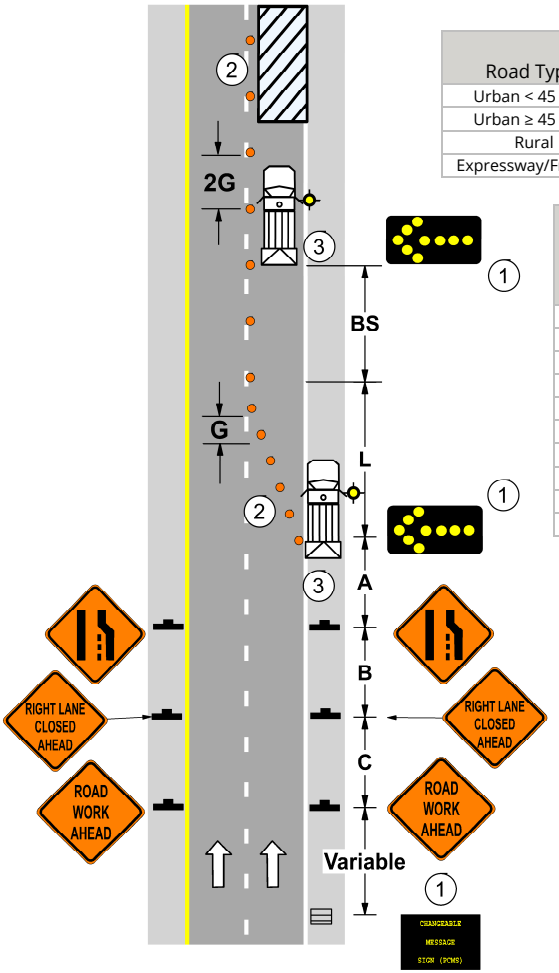
Facility Type	Roll Ahead Distance (**R**)	
	(ft)	(skip lines)
Rural 2-Lane	75-100	3
Interstate/ 4-Lane Divided	150-175	5

Posted Speed	Channelizing Device Spacing (ft)	
	G	**2G**
< 45	20	40
≥ 45	40	80

(29) Lane Closure – Occupied Nighttime Workspace
Multi-Lane, Divided

NOTES:

1. In order to use this layout, two flashing arrow boards, at least one PCMS, and advance warning signs shall be used. If these devices are not available, the "Right Lane Closure, Multi-Lane Divided Road" Layout on page 82 of the Work Zone Field Manual should be used.
2. When using a combination of cones (28-inch minimum height) and Direction Indicator Barricades, every third device in the merge taper and every tenth device in the tangent area shall be a Directional Indicator Barricade.
3. Any Attenuator vehicle or PTQ vehicle operating totally or partially in a traffic lane shall be equipped with a truck or trailer mounted attenuator following the requirements in *TDOT's SOG 477-01* and the *Truck and Trailer Mounted Attenuators Manual*.
4. The presence of a law enforcement officer in the work zone is optional.



Road Type	Advance Warning (ft)		
	A	**B**	**C**
Urban < 45 mph	100	100	100
Urban ≥ 45 mph	350	350	350
Rural	500	500	500
Expressway/Freeway	1,000	1,500	2,640

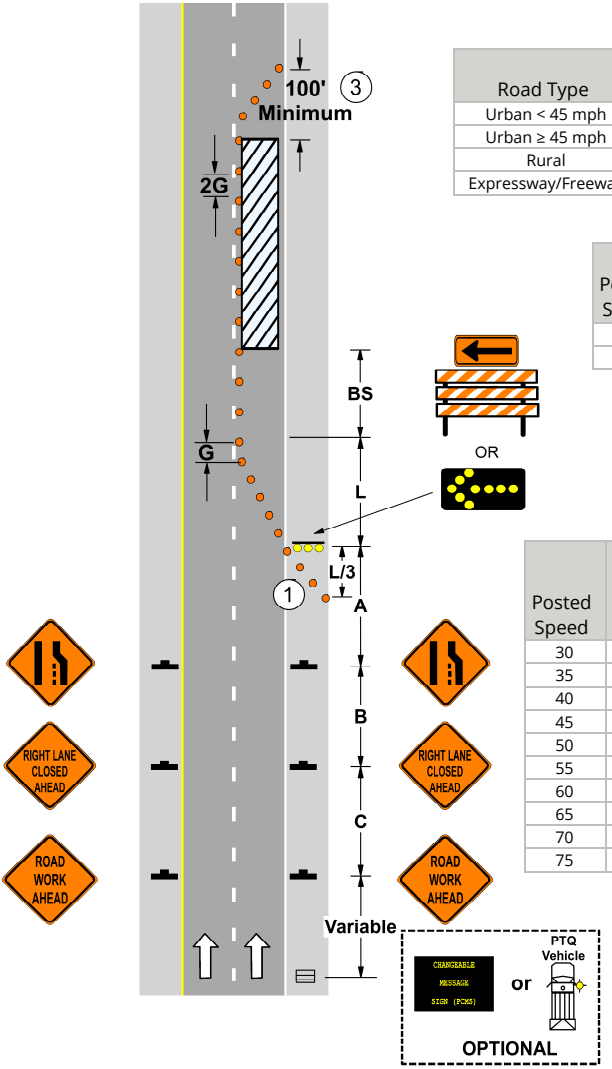
Posted Speed	Buffer Space (**BS**) (ft)	Taper Length (**L**) (ft)
30	200	180
35	260	260
40	320	320
45	360	660
50	440	720
55	500	780
60	580	840
65	660	900
70	740	960
75	820	1020

Posted Speed	Channelizing Device Spacing (ft)	
	G	**2G**
< 45	20	40
≥ 45	40	80

(31) Right Lane Closure
Multi-Lane, Divided

NOTES:

1. When paved shoulders having a width of 8 feet or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.
2. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.
3. The downstream taper should be 100 feet in length using five equally spaced channelizing devices.
4. The presence of a law enforcement officer in the work zone is optional.



Road Type	Advance Warning (ft)		
	A	**B**	**C**
Urban < 45 mph	100	100	100
Urban ≥ 45 mph	350	350	350
Rural	500	500	500
Expressway/Freeway	1,000	1,500	2,640

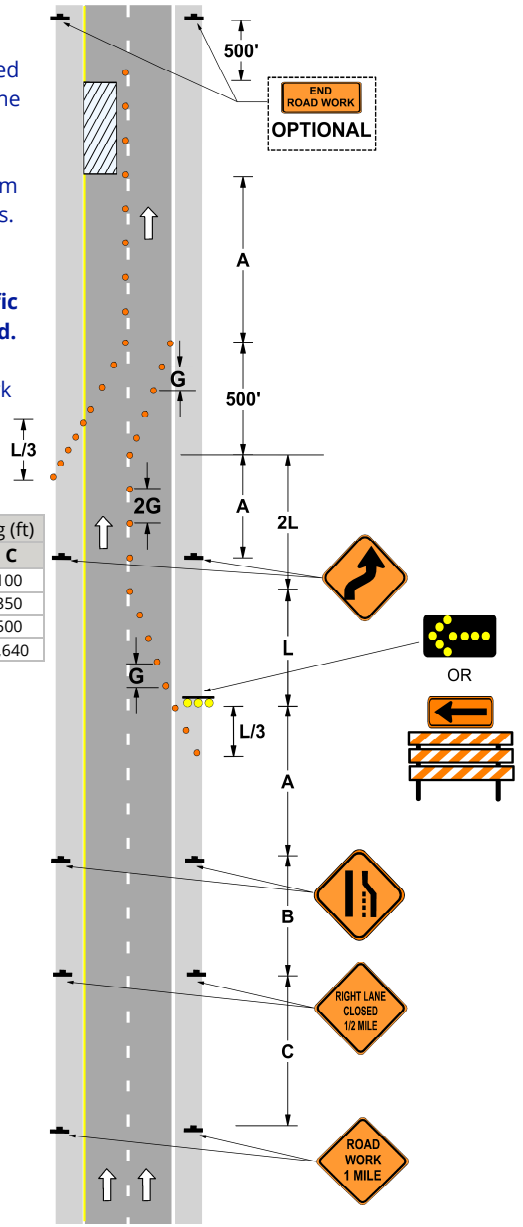
Posted Speed	Channelizing Device Spacing (ft)	
	G	**2G**
< 45	20	40
≥ 45	40	80

Posted Speed	Buffer Space (**BS**) (ft)	Taper Length (ft)	
		(L)	**(L/3)**
30	200	180	60
35	260	260	100
40	320	320	120
45	360	660	220
50	440	720	240
55	500	780	260
60	580	840	280
65	660	900	300
70	740	960	320
75	820	1020	340

(32) Lane Closure with Left Hand Merge and Lane Shift
Multi-Lane, Divided

NOTES:

1. This configuration should be used on roadways where excessive speed and volumes are a concern because a right lane closure is a more typical merge for drivers. For low speed roadways, refer to the "Left Lane Closure" Layout on page 81 of the Work Zone Field Manual.
2. Lane widths shall be a minimum of 11 feet with 2-foot shoulders.
3. Extensive planning is required for this layout. **Regional Operations Engineer or Traffic Engineer approval is required.**
4. The presence of a law enforcement officer in the work zone is optional.



Road Type	Advance Warning (ft)		
	A	**B**	**C**
Urban < 45 mph	100	100	100
Urban ≥ 45 mph	350	350	350
Rural	500	500	500
Expressway/Freeway	1,000	1,500	2,640

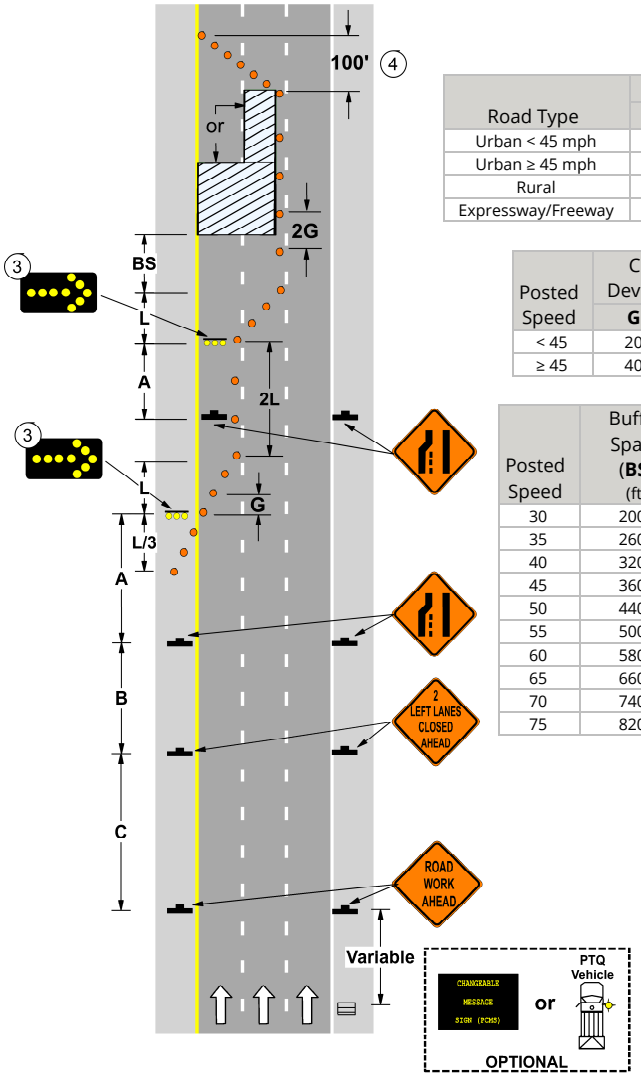
Posted Speed	Taper Length (ft)	
	(L)	**(L/3)**
30	180	60
35	260	100
40	320	120
45	660	220
50	720	240
55	780	260
60	840	280
65	900	300
70	960	320
75	1020	340

Posted Speed	Channelizing Device Spacing (ft)	
	G	**2G**
< 45	20	40
≥ 45	40	80

(33) Left Two Lanes Closed
Multi-Lane, Divided

NOTES:

1. If the flashing arrow board will not fit entirely on the left shoulder, it should be placed behind the taper, encroaching on the lane as little as possible.
2. When the Lane Drop symbol sign is used, the same sign shall be used for both lane closures in each direction.
3. Directional Indicator Barricades are optional substitutions for the flashing arrow board.
4. The downstream taper should be 100 feet in length using five equally spaced channelizing devices.
5. The presence of a law enforcement officer in the work zone is optional.



Road Type	Advance Warning (ft)		
	A	**B**	**C**
Urban < 45 mph	100	100	100
Urban ≥ 45 mph	350	350	350
Rural	500	500	500
Expressway/Freeway	1,000	1,500	2,640

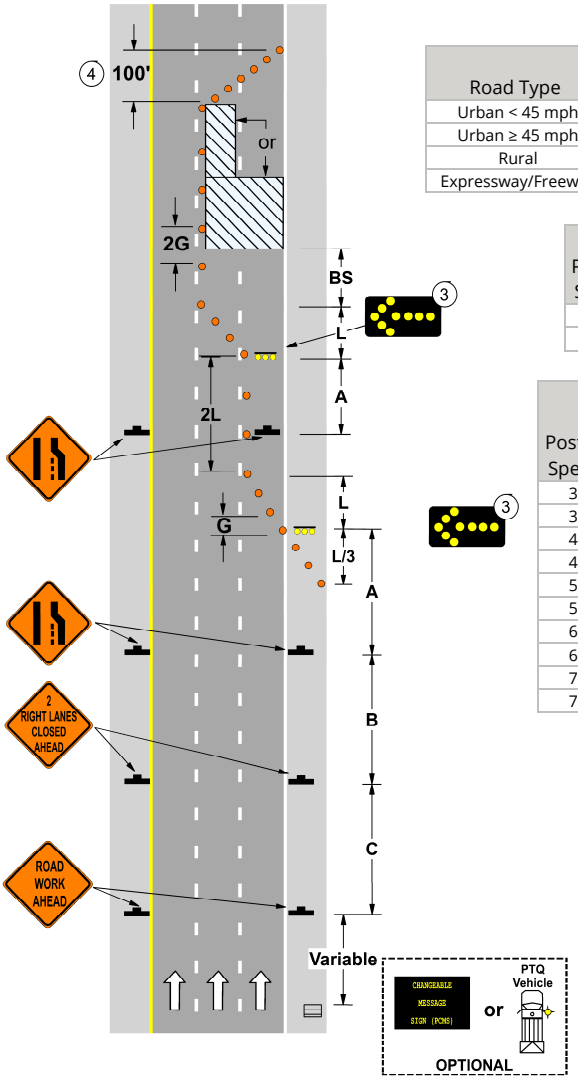
Posted Speed	Channelizing Device Spacing (ft)	
	G	**2G**
< 45	20	40
≥ 45	40	80

Posted Speed	Buffer Space (**BS**) (ft)	Taper Length (**L**) (ft)
30	200	180
35	260	260
40	320	320
45	360	660
50	440	720
55	500	780
60	580	840
65	660	900
70	740	960
75	820	1020

(34) Right Two Lanes Closed
Multi-Lane, Divided

NOTES:

1. If the flashing arrow board will not fit entirely on the right shoulder, it should be placed behind the taper, encroaching on the lane as little as possible.
2. When the Lane Drop symbol sign is used, the same sign shall be used for both lane closures in each direction.
3. Directional Indicator Barricades are optional substitutions for the flashing arrow board.
4. The downstream taper should be 100 feet in length using five equally spaced channelizing devices.
5. The presence of a law enforcement officer in the work zone is optional.



Road Type	Advance Warning (ft)		
	A	**B**	**C**
Urban < 45 mph	100	100	100
Urban ≥ 45 mph	350	350	350
Rural	500	500	500
Expressway/Freeway	1,000	1,500	2,640

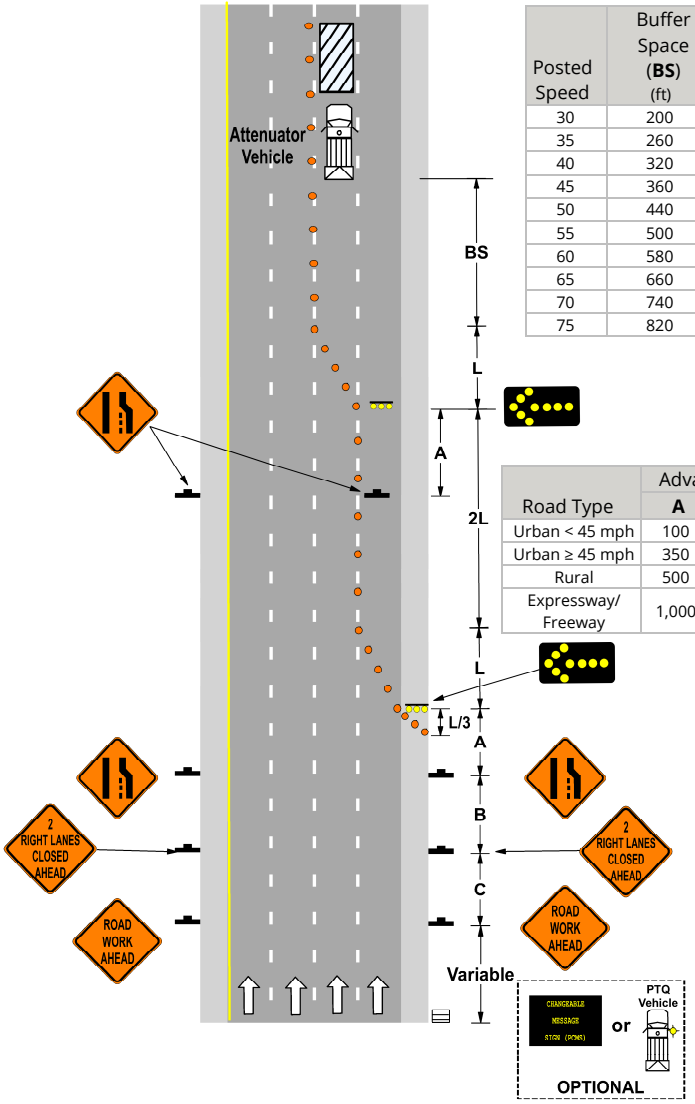
Posted Speed	Channelizing Device Spacing (ft)	
	G	**2G**
< 45	20	40
≥ 45	40	80

Posted Speed	Buffer Space (**BS**) (ft)	Taper Length (**L**) (ft)
30	200	180
35	260	260
40	320	320
45	360	660
50	440	720
55	500	780
60	580	840
65	660	900
70	740	960
75	820	1020

(35) Freeway Double Lane Closure
Multi-Lane, Divided

NOTES:

1. When the Lane Drop symbol is used, ensure that signs are placed on each side of the roadway and that the same sign shall be used for both lane closures.
2. Channelizing device are to be spaced along the taper at 20 feet (G) and along the centerline at 40 feet (2G) for speeds less than 45 mph. Speeds equal to 45 mph or greater are to have the channelized device spacing at 40 feet (G) and 80 feet (2G).



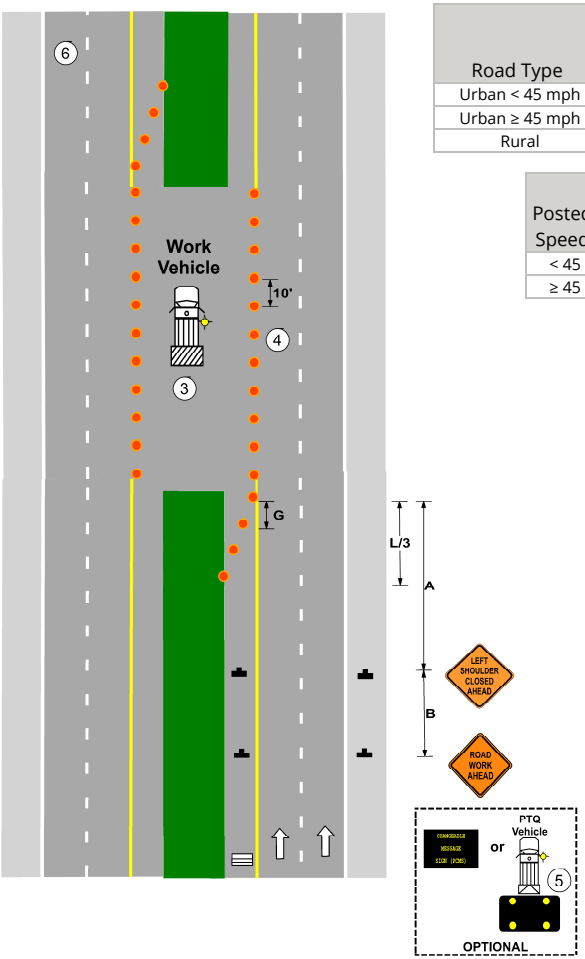
Posted Speed	Buffer Space (**BS**) (ft)	Taper Length (ft)	
		(**L**)	(**L/3**)
30	200	180	60
35	260	260	100
40	320	320	120
45	360	660	220
50	440	720	240
55	500	780	260
60	580	840	280
65	660	900	300
70	740	960	320
75	820	1020	340

Road Type	Advance Warning (ft)		
	A	**B**	**C**
Urban < 45 mph	100	100	100
Urban ≥ 45 mph	350	350	350
Rural	500	500	500
Expressway/ Freeway	1,000	1,500	2,640

(57) Median Closure
Multi-Lane, Divided

NOTES:

1. This layout applies to multi-lane divided roadways with paved median openings for U-turn use only. Do not use this layout for openings with side street access or openings that function within a J-turn intersection.
2. If the median opening includes a left-turn lane, the turn lane shall be closed by channelization devices the full extent of the turn lane.
3. The work vehicle must be able to be oriented parallel to travel lanes.
4. The spacing between devices should be 10 feet within the median closure.
5. If the PTQ vehicle is used instead of the PCMS, it shall be equipped with a truck or trailer mounted attenuator following the requirements in *TDOT's SOG 477-01* and the *Truck and Trailer Mounted Attenuators Manual*. It shall also be equipped with an Advance Warning Arrow Board set on Flashing Four Corners.
6. The advance warning sign sequence is shown for one-way direction only. The other direction shall be identical.



Road Type	Advance Warning (ft) A	B
Urban < 45 mph	100	100
Urban ≥ 45 mph	350	350
Rural	500	500

Posted Speed	Channelizing Device Spacing (ft) G	2G
< 45	20	40
≥ 45	40	80

Posted Speed	Taper (ft) L/3
30	60
35	100
40	120
45	220
50	240
55	260
60	280
65	300
70	320
75	340

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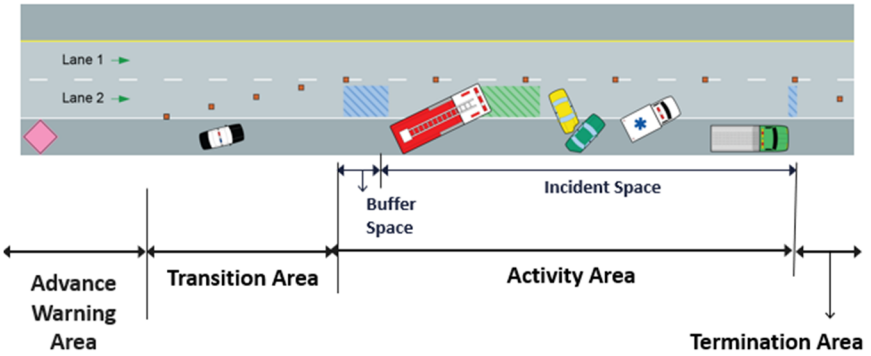
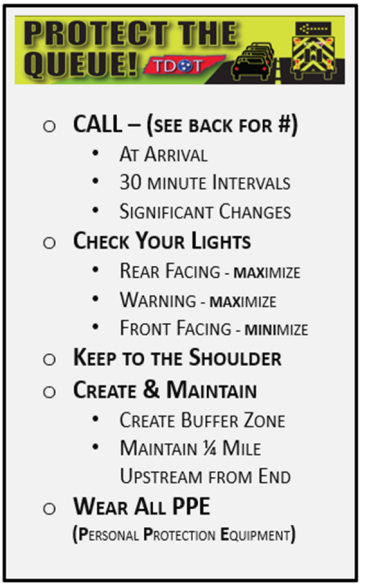
Incident Management

Highway incident management includes the arrival, recovery, clearance, and termination of activities. Keys to the success of incident management include proper and safe traffic control at the incident scene and the areas affected by traffic movement and operation of vehicles approaching, passing, re-directed or otherwise affected by activities causing a disruption of safe travel through the incident scene per *MUTCD, Chapter 6I*.



Protect the Queue

Protect the Queue (PTQ) is a TDOT initiative that emphasizes the importance of providing advance warning to upstream traffic of a downstream incident in order to reduce the likelihood of a secondary accident.



TDOT will deploy resources and staff to establish a safe and mobile traffic control plan, including adequate traffic queue protection and motorist information plan using the following guidance:

- Queue protection activities are to be conducted on the shoulder or closed travel lane.
- Queue protection vehicles shall be placed to create an appropriate buffer zone between the end of the queue and

oncoming traffic to maintain a warning area of approximately 0.25 to 0.75 miles upstream from the end when possible.

- PTQ Responders and Operations personnel shall consider roadway geometrics (hills and curves) as well as sight distance when staging a truck.
- Under no circumstances shall a PTQ truck be staged in an active travel lane.
- When repositioning a PTQ truck to accommodate queue movement, operators should only do so by backing up when there is both a clear sight distance and suitable shoulder width to avoid travel lane encroachment. Special considerations should be given to interchanges, bridges, shoulder width, and shoulder obstructions when backing up. In no case shall a PTQ truck be driven into an active travel lane to circumvent an obstacle while backing.
- For major incidents, as many queue protection vehicles as necessary should be made available. During this case, if the queue extends to the first upstream vehicle, that vehicle should proceed to relocate as the second vehicle remains in place to warn on-coming vehicular traffic of the growing queue, thus trading places with the remaining vehicle to protect the back of the growing queue.
- Queue protection activities shall be reported at these intervals:
    - At arrival
    - At 30-minute intervals
    - At significant changes
    - At conclusion of queue protection assignment

Traffic Management Center Contact Information is provided below:

REGION 1	**REGION 3**
(Knoxville)	**(Nashville)**
865-594-3981	**615-350-3424**
REGION 2	**REGION 4**
(Chattanooga)	**(Memphis)**
423-510-1168	**901-537-2988**

Establishing a Temporary Traffic Control Zone

COMPLETED	ITEM
☐	Determine the activity being performed.
☐	Determine the type of roadway.
☐	Determine the duration of work.
☐	Select the appropriate layout(s) using the **Activity Matrix** on page 1 of this guide.
☐	Determine internal traffic control plan and select hours of work to avoid peak periods.
☐	Determine any modifications to typical layout(s).
☐	Check decision sight distance.
☐	Advance signing distance.
☐	If possible, maintain access to intersections, parking areas, and driveways (public and private)
☐	Allow for **Buffer Space (BS)** free of obstructions.
☐	Contact the proper road authority if the work zone interferes with normal signal operation in the area.
☐	Check the condition of devices. (See the **Device Quality Standards** starting on page 119 of the Work Zone Field Manual)
☐	Install devices beginning with the first device the driver will see.
☐	Conduct a drive thru to check for problems. (See the **Special Considerations** on page 6 of the Work Zone Field Manual)
☐	Document temporary traffic control zone, problems, and major modifications to the layouts.
☐	Traffic should be observed to see if the taper is working correctly.
☐	Remove the devices as soon as work is completed, beginning with the last device seen by the motorist.

CHECKLIST FOR FLAGGER OPERATIONS

- **Remember:** Your job is the most important one on the crew. The lives of all individuals in the workspace depends on YOU!
- For your personal safety as a flagger, NEVER turn your back on or stand in the path of moving traffic.
- CLOTHING:
  - Any flagger on a TDOT project shall be attired with high-visibility safety apparel that meets the Performance Class 3 requirements of the ANSI 107-2015 standard. Refer to *Table A* in *TDOT Policy 305-01* for required clothing for maintenance activities.
- TOOLS:
  - Standard STOP/SLOW paddle (in good condition) shall be used unless it is not available in an emergency situation.
    - 24" x 24" minimum LED octagon with letters at least 6 inches high
    - 7-foot minimum staff (to bottom of the sign), 9-foot is recommended
    - Fully retroreflective in standard colors
  - Illuminated station and flashlights with wand if flagging at night.
  - Two-way radios for multiple flagger situations.
  - Warning signs posted in proper position ahead of the flagger.
- Flagging position on the roadway following Flagging Guidance on page 18 of the Work Zone Field Manual:
  - Be alert, remain **STANDING** at all times.
  - Face oncoming traffic. **NEVER** turn your back to oncoming traffic or stand in the path of moving traffic.
  - A flagger's normal station is on the shoulder of the road.
  - Park your vehicle off the road, away from your station. A flagger is difficult to see when next to a vehicle. Never sit in or on your vehicle while flagging.
  - Know proper hand and flag signals as shown in the Field Manual
  - Stand alone. Do not mingle with work crew or motorists.
  - Make sure you are visible to approaching traffic, not standing where the sun is obstructing visibility or in a shadow.
  - Review the decision sight distance chart in the Work Zone Field Manual. The driver should be able to recognize you as a flagger for at least the decision sight distance. Avoid blind spots past curves in the roadway or just over hills.
  - Emergency vehicles have "priority rights". Allow them to pass as quickly and safely as possible.

INSTALLING LANE CLOSURES

Stationary lane closures should be installed with the flow of traffic in the following sequence:

- Install all advance warning signs.
- Install shoulder taper if necessary.
- Place arrow board on the shoulder at the beginning of the merging taper.
- Install channelizing devices to form a merging taper.
- Install channelizing devices along the buffer space.
- Continue placing channelizing devices along the work area at the appropriate spacing.
- Install channelizing devices for the termination area.
- Install the “END ROAD WORK” sign approximately 500 feet beyond the last device in the lane closure.
- Place a trailer mounted attenuator vehicle, if required, 80-120 feet from the first work crew or hazard approached by motorists.
- Perform a “ride through” through the entire lane closure and make adjustments to the traffic control devices if needed.
- Document any major adjustments to the work zone.

Removing Lane Closures

Stationary lane closures should be removed against the flow of traffic in the following sequence:

- Remove channelizing devices from downstream of closure back to the widest part of the merging taper.
- Place removal vehicle on shoulder and remove devices from taper by hand onto the work vehicle.
- Remove arrow board after ensuring roadway is clear.
- Moving with the flow of traffic, remove all of the advance warning signs beginning with the “ROAD WORK AHEAD” sign and ending with the “END ROAD WORK” sign.
- When the shoulder provides availability, use a TMA vehicle for installing and removing lane closures.
- When a truck or trailer mounted attenuator is used, all devices may be removed with the flow of traffic.
- Workers should not run across an open lane of traffic unless slow roll temporary traffic control operations are being performed.

4Us Checklist

- ☐ **PPE**: Crew to collect PPE per MMS Activity Number using *TDOT Policy 305-01 Table A*.
- ☐ **TTC Inspection/Loading**: Ensure that all TTC complies with the *2009 Manual on Uniform Traffic Control Devices* and any supplemental TDOT policies or procedures.
- ☐ **Vehicle Pre-Trip Inspection**: Perform pre-trip checklist on all vehicles.
- ☐ **Equipment Pre-Trip Inspection**: Perform pre-trip checklist on all equipment.
- ☐ **Attenuator Pre-Trip Inspection**: Perform pre-trip inspection on all attenuators.
- ☐ **Required Tools**: Ensure that all tools needed for the project are loaded and are in good working condition.
- ☐ **Materials and Supplies**: Confirm that all needed supplies for the project have been located and loaded.
- ☐ **Water/First Aid**: Ensure that water, first aid, and preventative measures for job site conditions are available to employees at the project site.