USGS~WRD

JOB HAZARD ANALYSIS

JOB: Traffic Control	**Date Created:** 01/20/2010 **~ Date Last Modified:** 01/20/10
PREPARED BY: JBW	
REVIEWED BY:	**Recommended Protective Clothing And Equipment:**
	1) Lime green outer garmet 2) Hazard identification beacons consisting of a flashing or rotating yellow light. 3) Approach warning signs 36inch diamond shaped with retroreflective lettering on a retroreflective orange background, and placed at least 1 foot above the pavement 4) 36-inch tall cones with 6-inch wide white reflective band 3 to 4 inches from the top and a 4 inch wide white reflective band located at least 2 inches below the 6-inch wide band inches from the top and a 4 inch wide white reflective band located at least 2 inches below the 6-inch wide band inches from the top and a 4 inch wide white reflective band located at least 2 inches below the 6-inch wide band 5) Sign Paddles with a minimum of 18 inches wide with 6-inch lettering 6) Radios

Sequence of Basic Job Steps	Potential Accidents/Hazards	Recommended Safe Job Procedures
Determine the appropriate Bridge Traffic Control Plan (there are none for interstate bridges) from the attached documentation or locate the Plan maintained in the gaging-station structure.		If the location is an Interstate Bridge, the Department of Transportation, Division of Highways must be contacted to develop a situation-specific Bridge Traffic Control Plan.
		Place signs and cones in the direction of traffic while setting up the traffic control and remove in the opposite direction when work is completed.
Turn on hazard identification beacon	Hit by vehicle	Use beacon while unloading, placing, and reloading cones and signs. Leave beacon on, place vehicle in park, set emergency break, and turn wheels away from the highway while working.

Set-up Signs	Hit by vehicle	As a general rule, signs shall be located on the right side of the road, with the near edge of the sign 6 to 12 feet from the edge of the traveled way, or at least 2 feet outside the face of the curb. All signs should be mounted at right angles to the direction of traffic.
Place cones	Hit by vehicle	Watch traffic carefully when placing cones. Cones should be kept clean to maximize their visibility.
Flaggers	Hit by vehicle	Flaggers should be used to control traffic whenever it becomes necessary for traffic in both directions to use the same lane for a limited amount of distance. This provision is made in order to alternate the one-way direction of traffic in the available lane, through the work zone. The number of flaggers depends on the length and type of obstructions. Since flaggers are responsible for the safety of motorists and workers, and make the greatest number of contacts with the public at the work site, a qualified person should be selected to perform the duties of flagging traffic. A flagger should possess the following qualifications: a.) average intelligence b.) good physical condition, good eyesight and good hearing c.) mental alertness d.) courteous but firm manner e.) neat appearance f.) sense of responsibility for the safety of the public and fellow workers. Flaggers should be located far enough away from the work zone so that the approaching traffic will have sufficient distance to reduce their speed before entering the work zone. This distance is related to the approach speed and physical conditions of the site, however a distance of 200 to 300 feet is desirable. Flaggers should stand either on the shoulder adjacent to the traffic they are controlling or in the barricaded lane. Under no circumstances should the flagger stand in the lane being used by moving traffic. In work zones where two flaggers are necessary, one flagger should be designated as the chief flagger, and both flaggers should have good visual contact or radio contact with one another. Precautions should be taken to avoid hand signals between flaggers because these could be misinterpreted by the motorist as signals for them.

		Signaling devices to be used by flaggers are STOP/SLOW sign paddles only, NO FLAGS. The paddles are the preferred devices since they convey the clearest instructions to the motorists. Flags should be used in emergency situations only. Requirements and methods of signaling with a sign paddle are as follows: (i) Sign paddles shall be a minimum of 18 inches wide with 6-inch lettering (ii) To stop traffic, the flagger shall face the traffic and extend the stop sign paddle in a stationary position with arm extended horizontally away from the body. The free arm is raised with palm toward the approaching traffic. (iii) When it is safe for traffic to proceed, the flagger shall face the traffic with the slow sign held in a stationary position with arm extended horizontally away from the body. The flagger motions the traffic ahead with the free hand. (iv) When it is desired to alert or slow traffic, the flagger shall face the traffic with the slow sign paddle as before and may motion with free hand (palm down) up and down, indicating that the vehicle should slow down.

Plan I - Traffic Control Safety Plan for Bridge Measurements

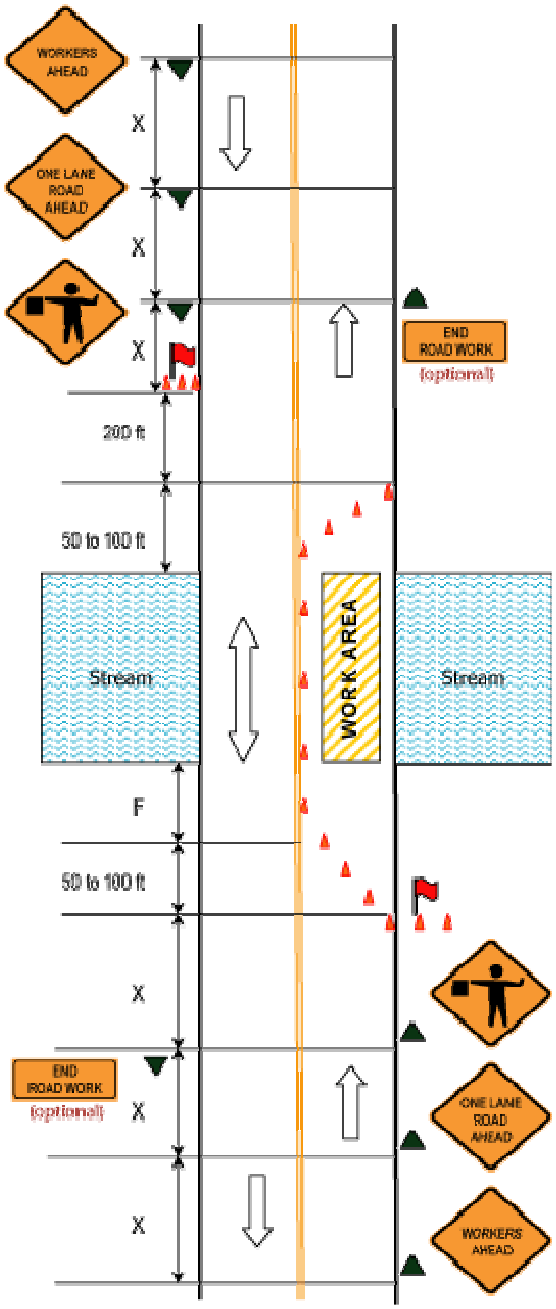
Lane Closure for One Lane - Two Way Traffic Control -

Note: Plan is for daylight hours, short term (1-12 hrs) work. Remaining travel lane must be a minimum of 10 ft. in width. For short duration work (<1 hr.), "End Road Work" signs are optional.

Direction: ⇨ **Traffic Cone:**

Flagger Station:

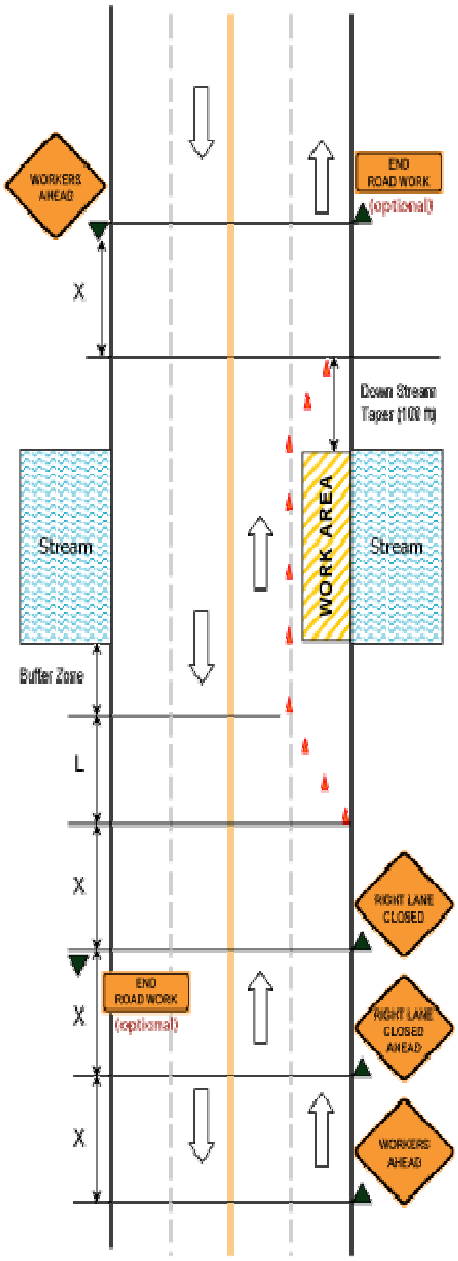
Speed Limit (MPH)	Suggested Max Spacing of Cones		Advanced Warning Sign Spacing "X" (ft)	Flagger Station Buffer "F" (ft)
	On a Taper (ft)	On a Tangent (ft)		
20	20	60 - 75	120	35
25				55
30				85
35		70 - 90	160	120
40		80 - 100	240	170
45		90 - 110	320	220
50		100 - 125	400	280
55		110 - 140	500	335
60		120 - 150	600	415
65		130 - 165	700	485
70		140 - 175	800	585
75		150 - 185	900	720



Plan II - Traffic Control Safety Plan for Bridge Measurements

Lane Closure on Four Lane - Two Way Road -

Note: Plan is for daylight hours, short term (1-12 hrs) work. Remaining travel lane must be a minimum of 10 ft. in width.



Direction: ⇨ **Traffic Cone:**

Posted Speed (MPH)	Minimum Desirable Taper Lengths "L"				Work Area Buffer Zone (ft)	Advanced Warning Sign Spacing "X" (ft)	Suggested Max Spacing of Cones	
	Formula	10' Offset	11' Offset	12' Offset			On a Taper (ft)	On a Tangent (ft)
20	$L=\frac{WS^2}{60}$	70	75	80	35	120	30	60-75
25		105	115	125	55			
30		150	165	180	85			
35		205	225	245	120	160	35	70-90
40		265	295	320	170	240	40	80-100
45	L=WS	450	495	540	220	320	45	90-110
50		500	550	600	280	400	50	100-125
55		550	605	660	335	500*	55	110-140
60		600	660	720	415	600*	60	120-150
65		650	715	780	485	700*	65	130-165
70		700	770	840	585	800*	70	140-175
75		750	825	900	720	900*	75	150-185

*Increase distance between signs to have 1500 ft advance warning.
[L=Length of Taper (ft); W=Width of Offset; S=Posted Speed (MPH)]

Plan III - Traffic Control Safety Plan for Bridge Measurements

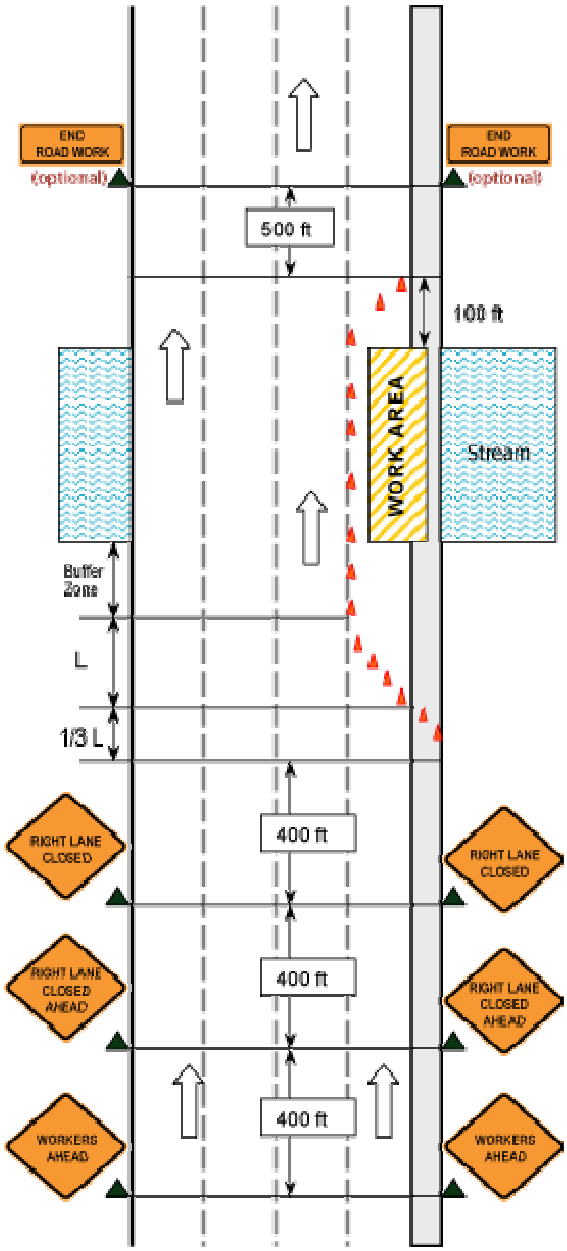
Lane Closure on Multi-Lane, Divided Highway -

Note: Plan is for daylight hours, short term (1-12 hrs) work, on Highways and Expressways.

Direction: ⇨ **Traffic Cone:**

Posted Speed (MPH)	Minimum Desirable Taper Lengths "L"				Work Area Buffer Zone (ft)	Suggested Max Spacing of Cones	
	Formula	10' Offset	11' Offset	12' Offset		On a Taper (ft)	On a Tangent (ft)
20	$L=\frac{WS^2}{60}$	70	75	80	35	30	60-75
25		105	115	125	55		
30		150	165	180	85		
35		205	225	245	120	35	70-90
40		265	295	320	170	40	80-100
45	L=WS	450	495	540	220	45	90-110
50		500	550	600	280	50	100-125
55		550	605	660	335	55	110-140
60		600	660	720	415	60	120-150
65		650	715	780	485	65	130-165
70		700	770	840	585	70	140-175
75		750	825	900	720	75	150-185

[L=Length of Taper (ft); W=Width of Offset; S=Posted Speed (MPH)]



Plan IV - Traffic Control Safety Plan for Bridge Measurements

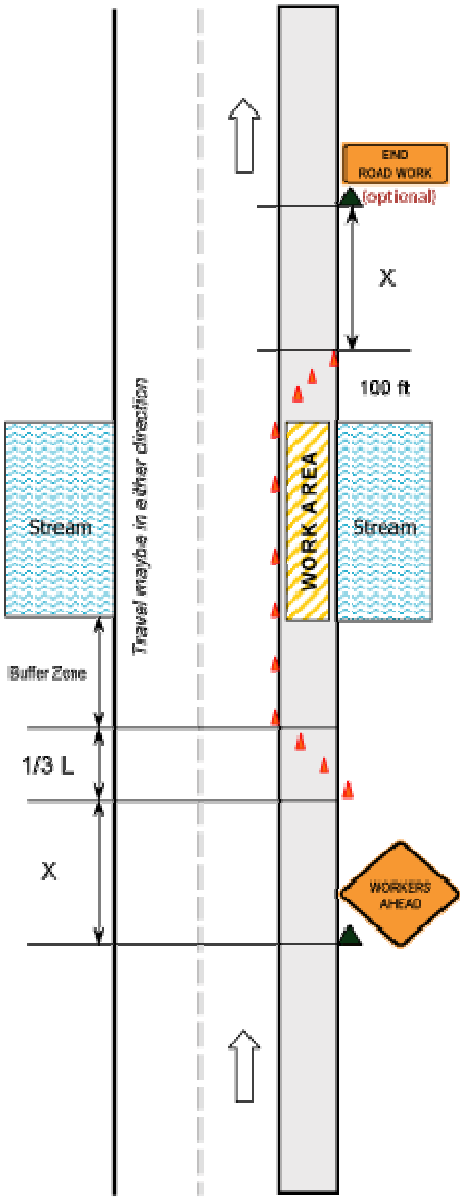
Shoulder Work -

Note: Plan is for daylight hours, short-term (1-12 hrs) work, done on the shoulder, outside of travel lanes. For short-duration work (less than 1 hr.), all signs and channelizing devices may be eliminated if a vehicle with activated rotating lights or strobe lights is placed 30 ft. before the work area. The vehicle will be parked with the emergency brake set, transmission in park, and front wheels turned outward.

Direction: ⇨ **Traffic Cone:**

Posted Speed (MPH)	Minimum Desirable Taper Lengths "L"				Work Area Buffer Zone (ft)	Advanced Warning Sign Spacing "X" (ft)	Suggested Max Spacing of Cones	
	Formula	10' Offset	11' Offset	12' Offset			On a Taper (ft)	On a Tangent (ft)
20	$L=\frac{WS^2}{60}$	70	75	80	35	120	30	60-75
25		105	115	125	55			
30		150	165	180	85			
35		205	225	245	120	160	35	70-90
40		265	295	320	170	240	40	80-100
45	L=WS	450	495	540	220	320	45	90-110
50		500	550	600	280	400	50	100-125
55		550	605	660	335	500	55	110-140
60		600	660	720	415	600	60	120-150
65		650	715	780	485	700	65	130-165
70		700	770	840	585	800	70	140-175
75		750	825	900	720	900	75	150-185

[L=Length of Taper (ft); W=Width of Offset; S=Posted Speed (MPH)]



Plan V - Traffic Control Safety Plan

Work Behind a Barrier or Beyond the Shoulder -

Note: Plan is for daylight hours, short term (1-12 hrs) work. For short-duration work (less than 1 hr), all signs and channelizing devices may be omitted if all vehicles within the work area display activated rotating lights or strobe lights. Signs and channelization devices may be omitted where the work area is behind a barrier or 30 ft or more from the edge of any roadway. If the work area is in the median of a divided highway, advanced warning signs and channelization devices shall also be placed on the left side of the directional roadway.

Posted Speed (MPH)	Advanced Warning Sign Spacing "X" (ft)	Suggested Max Spacing of Cones
20	120	30
25		
30		
35	160	35
40	240	40
45	320	45
50	400	50
55	500*	55
60	600*	60
65	700*	65
70	800*	70
75	900*	75

*Increase distance between signs to have 1500 ft advance warning.

Direction: ⇨

Traffic Cone: