

SECTION 10 - WORK ZONE TRAFFIC CONTROL

10.1 DESCRIPTION - This work includes furnishing, installing, maintaining and subsequently removing traffic control devices according to the contract. The work also includes services from flaggers and special duty police officers. The work shall conform to the latest edition of the MUTCD.

10.2 CONSTRUCTION REQUIREMENTS - The Contractor shall furnish, install and maintain barricades, signs, cones, delineators, lights, flashing signals, and other traffic control devices according to the contract.

Traffic control devices including cones, barricades, warning signs with supports, lights, and temporary signals shall conform to 'The Hawaii Administrative Rules, Title 19, Subtitle 5, Chapters 127, 128 and 129', the MUTCD and Section 4 - Scope of Work. Reflectorization for protective devices such as cones, barricades, delineators, and signs, shall conform to the State Highway's Standard Specifications, Subsection 712.20 - Signs.

Sign spacings (D), taper lengths (T), and spacings of cones or delineators shall be as shown in Table 10.1, unless otherwise noted on the Traffic Control Plans.

TABLE 10.1 - FOR TRAFFIC CONTROL PLAN							
POSTED SPEED LIMIT (M.P.H.)	SIGN SPACING (D) (FEET)	TAPER LENGTH (T) (FEET)		LONGI-TUDINAL BUFFER SPACE (B) (FEET)	SPACING OF CONES OR DELINEATORS (FEET)		
		W = 12' OR LESS *	W = GREATER THAN 12' *		TAPER	TANGENT	WORK AREA
20	250	200	W x 17	35	20	20	10
25	250	200	W x 17	55	25	25	10
30	250	250	W x 20	85	30	30	10
35	250	250	W x 20	120	35	35	10
40	500	350	W x 30	170	40	40	10
45	500	550	W x 45	220	45	45	10
50	1000	600	W x 50	280	50	50	10
55	1000	700	W x 55	335	55	55	10

\* W = width of lane or shoulder

Do not use steel drums and steel barrels for traffic controls in construction and maintenance work zones.

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As of 10/01/2000, all new barricades, signs with sign supports and vertical panels without lights shall require an FHWA approval letter certifying that the device is NCHRP Report 350 compliant. Do not use barricades, signs with sign supports, and other traffic control devices purchased before 10/01/2000 that are not certified to be NCHRP Report 350 compliant after 10/01/2003.

Upon request of the Engineer, furnish a self-certified NCHRP Report 350 compliant letter from the vendor for each type of single-piece traffic cone, single-piece drum, tubular marker and delineator.

(A) Signs

(1) General. Install signs ahead of the place where operations may interfere with the use of the road by traffic and at intermediate points where the new work crosses or coincides with an existing road.

Place such signs as specified by the contract and as specified and accepted by the Engineer.

Submit to the Engineer 8 sets of FHWA approval letter certifying that the signs and sign supports are NCHRP Report 350 compliant.

(B) Barricades

(1) General. Apply and install the barricades according to the contract.

Provide, erect, and maintain necessary barricades, suitable and sufficient lighting devices, signs and other traffic control devices, and precautions for the protection of the work and safety of the public

Protect roadways closed to traffic, illuminate obstructions during hours of darkness, and provide warning signs to control and direct traffic according to the contract.

Submit to the Engineer 8 sets of FHWA approval letter certifying that the barricades are NCHRP Report 350 compliant.

Barricades shall be in good condition. Submit barricades for acceptance by the Engineer for use

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within the project limits according to this section. Barricade application and installation shall be according to the contract and as specified by the Engineer

Provide sand bags if required or specified by the Engineer. All sand bags and their method of installation shall comply with the MUTCD and be accepted by the Engineer prior to use. Do not place sand bags on the striped barricade rail.

Install steady burn and/or flashing lamps on selected barricades used during hours of darkness. Locations shall be according to the contract and specified by the Engineer. Attach the lamps on the barricade ends closest to the traveled way. Lamps shall be visible to the motorist.

Do not install signs on barricades unless the sign on barricade system has been crash tested, accepted under NCHRP Report 350, and accepted by the Engineer.

The Contractor may use the accepted barricades for temporary detours, construction phasing, or other temporary traffic control work.

The Contractor may use the accepted barricades used in temporary detours or construction phasing for permanent locations according to the contract.

Upon completion of the construction work, leave the barricades in place, relocate the barricades, or remove and dispose the barricades according to the contract or as specified by the Engineer. Barricades left in place or relocated to new permanent locations shall become the property of the State. Barricades removed and disposed of shall become the property of the Contractor.

(2) Reflectorization. Reflectorize barricade rails and the attachment with reflective sheeting - Type III or IV Retroreflective Sheeting (High or specified and accepted by the Engineer).

Reflectorize both vertical faces of each barricade rail according to the contract.

(3) Color. Rails, frames, and braces shall be white. The front and back faces of barricade rails

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shall have 6-inch wide alternate colored and white stripes sloping downward toward the traveled way at an angle of 45 degrees with the vertical. The colored stripes shall be either orange or red according to the following requirements:

(a) Use orange and white stripes for construction, detour or maintenance work.

(b) Use red stripes and white stripes on roadways with no outlet such as dead-ends and cul-de-sacs ramps or lanes closed for operational purposes or permanent or semi-permanent closure or termination of a roadway.

(4) Maintenance. Keep the barricades in good condition throughout their usage during construction

(a) To remain their effectiveness and appearance, repair, clean, or replace the required barricades as specified by the manufacturer guidelines and as specified by the Engineer.

(b) Immediately replace, lost, stolen, or damaged barricades, lamps, and sand bags.

Clean and repair the barricades used during construction phasing, temporary detours or other temporary traffic control work before relocating to permanent locations according to the contract or as specified by the Engineer.

The Engineer will not make payment for repair work or cleaning of barricades. The Engineer shall decide the suitable condition of each barricade and when each barricade needs repairing or cleaning.

(C) Traffic Delineators. Install traffic Delineators to show the temporary alignment of detour roads according to the contract or as specified by the Engineer.

Upon request of the Engineer, submit to the Engineer FHWA letter certifying that the device is NCHRP Report 350 compliant.

Maintain the traffic delineators and keep the traffic delineators clean and repair. Replace lost, stolen, or damaged traffic delineators immediately.

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At the end of a detour phase, relocate the traffic delineators and keep the traffic delineators clean and in good condition to the next detour phase. At the end of the construction period, leave in place or remove the traffic delineators according to the contract or as specified by the Engineer. The traffic delineators will become the property of the Contractor when no longer required on the project.

(D) Cones. Install traffic cones according to the contract or as specified by the Engineer.

Upon request of the Engineer, submit to the Engineer an FHWA approval letter certifying that the cones are NCHRP Report 350 compliant.

Maintain the traffic cones and keep traffic cones clean and in good repair. Replace lost, stolen, or damaged traffic cones as needed.

10.3 METHOD OF MEASUREMENT - The Engineer will measure Additional Police Officers And/Or Additional Traffic Control Devices such as hiring the services of additional Police Officers that the Engineer requested; furnishing, installing, maintaining and removing the additional devices; and inserting the legal notices required by the Engineer on a force account basis according to the contract and as specified by the Engineer.

The Engineer will not measure traffic control, barricade or barricade with lamp, traffic delineator, and construction and maintenance of detours for payment.

10.4 BASIS OF PAYMENT - The Engineer will pay for the accepted Additional Police Officers And/Or Additional Traffic Control Devices on a force account basis according to Section 9 - PAYMENT. The Engineer will compute the actual amount paid for force account work. The amount may be more or less than the estimated amount shown in the proposal. The force account work includes hiring the services of additional Police Officers beyond the one minimum required that the Engineer requested; furnishing, installing, maintaining and removing the additional devices; inserting the legal notices; furnishing labor, materials, tools, equipment, and incidentals necessary to complete the work. The Contractor shall submit a paid invoice for the legal notice.

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The Engineer will make payment under:

Pay Item	Pay Unit
Additional Police Officers And/Or Additional Traffic Control Devices	Force Account

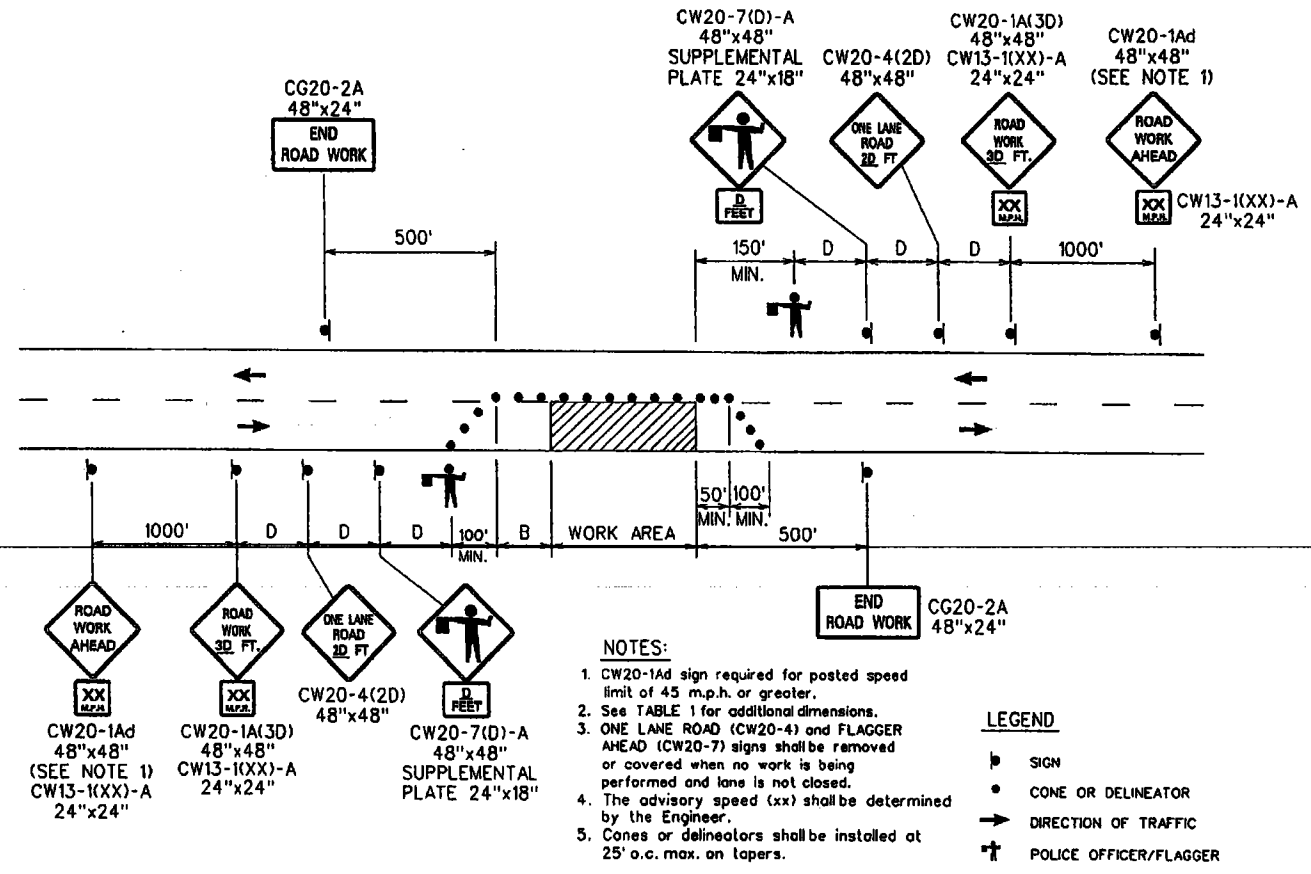
The Engineer will not pay for Traffic Control separately. The Engineer will consider the cost for Traffic Control as included in the contract price of the various contract items. The cost is for hiring the services of the flaggers and/or police officers; furnishing, installing, maintaining and removing all traffic controls shown in the traffic control plans; and furnishing labor, materials, tools, equipment, and incidentals necessary to complete the work.

The Engineer will not pay for Barricade or Barricade With Lamp separately. The Engineer will consider the cost for Barricade or Barricade With Lamp as included in the contract price of the various contract items. The cost is for furnishing, delivering, installing, maintaining, relocating, and removing the barricade and furnishing and installing sand bags and other accepted weights; and furnishing labor, materials, tools, equipment, and incidentals necessary to complete the work.

The Engineer will not pay for delineators separately. The Engineer will consider the cost for delineators as included in the contract price of the various contract items. The cost is for furnishing; installing; cleaning; maintaining correct placement; removing when required; and furnishing and installing sand bags or other accepted weights; and furnishing labor, materials, tools, equipment, and incidentals necessary to complete the work.

The Engineer will not pay for construction and maintenance of detours separately. The Engineer will consider the cost for construction and maintenance of detours as included in the contract price of the various contract items. The cost is for replacing installed traffic delineators that are lost, stolen, or damaged and not due to the Contractor's negligence; relocating of traffic delineators to the next detour phase; and furnishing labor, materials, tools, equipment, and incidentals necessary to complete the work.

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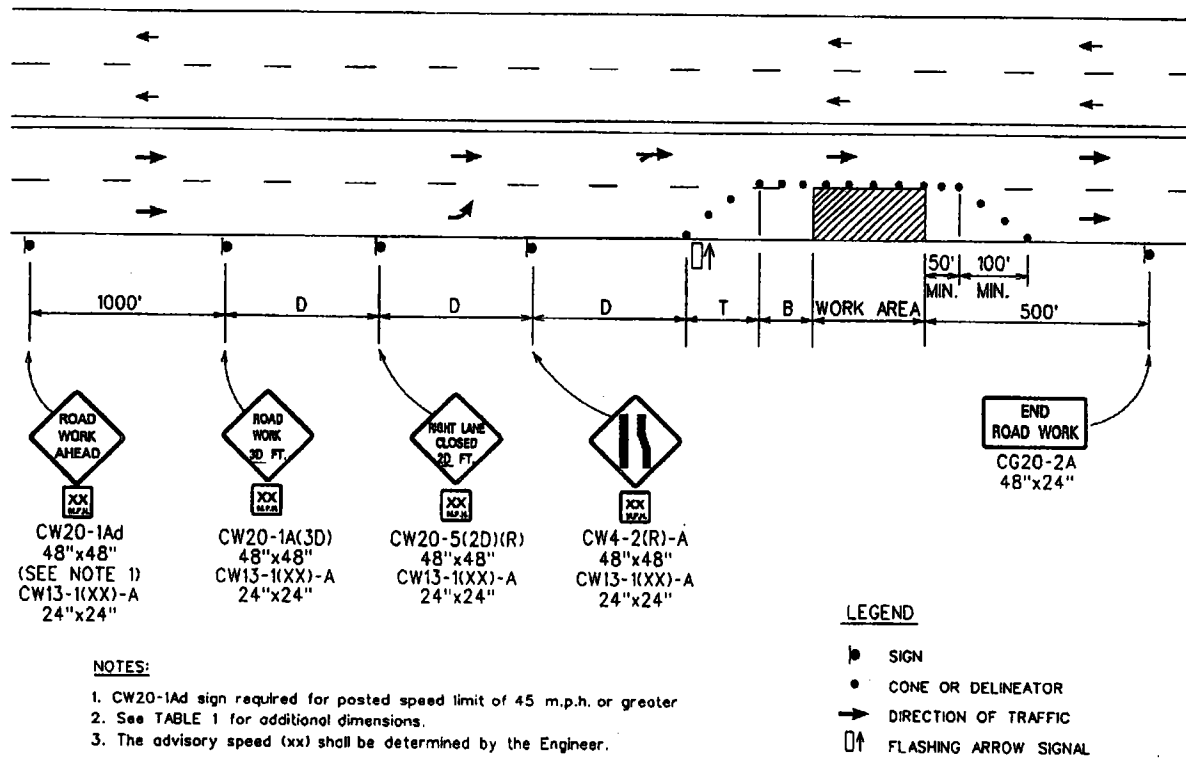
**NOTES:**

1. CW20-1Ad sign required for posted speed limit of 45 m.p.h. or greater.
2. See TABLE 1 for additional dimensions.
3. ONE LANE ROAD (CW20-4) and FLAGGER AHEAD (CW20-7) signs shall be removed or covered when no work is being performed and lane is not closed.
4. The advisory speed (xx) shall be determined by the Engineer.
5. Cones or delineators shall be installed at 25' o.c. max. on tapers.

**LEGEND**

- ▬ SIGN
- CONE OR DELINEATOR
- ➔ DIRECTION OF TRAFFIC
- ⚓ POLICE OFFICER/FLAGGER

TWO-LANE HIGHWAY - ONE LANE CLOSED  
FIGURE 1 - TRAFFIC CONTROL PLAN



ROAD WORK AHEAD  
XX  
CW20-1Ad  
48"x48"  
(SEE NOTE 1)  
CW13-1(XX)-A  
24"x24"

ROAD WORK 20 FT.  
XX  
CW20-1A(3D)  
48"x48"  
CW13-1(XX)-A  
24"x24"

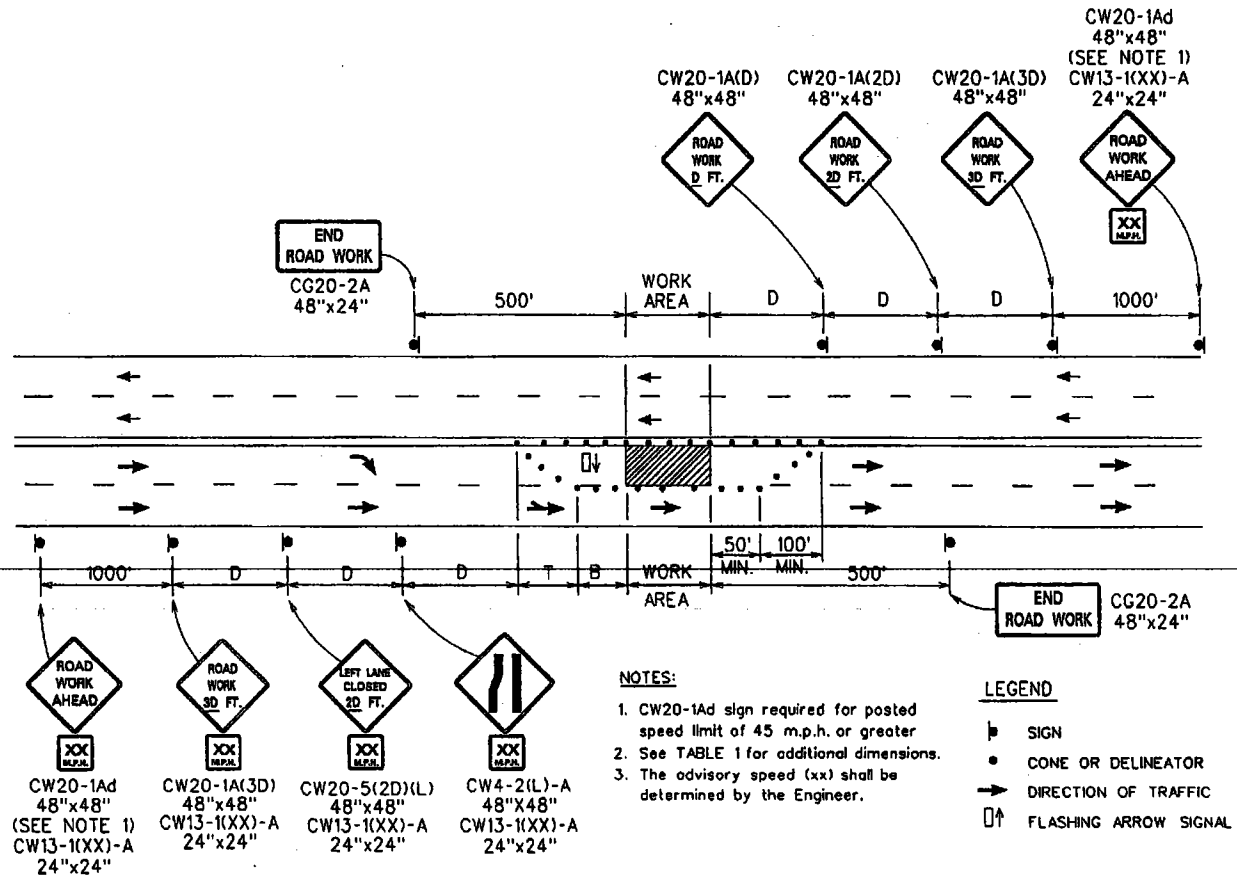
RIGHT LANE CLOSED 20 FT.  
XX  
CW20-5(2D)(R)  
48"x48"  
CW13-1(XX)-A  
24"x24"

ROAD WORK  
XX  
CW4-2(R)-A  
48"x48"  
CW13-1(XX)-A  
24"x24"

END ROAD WORK  
CG20-2A  
48"x24"

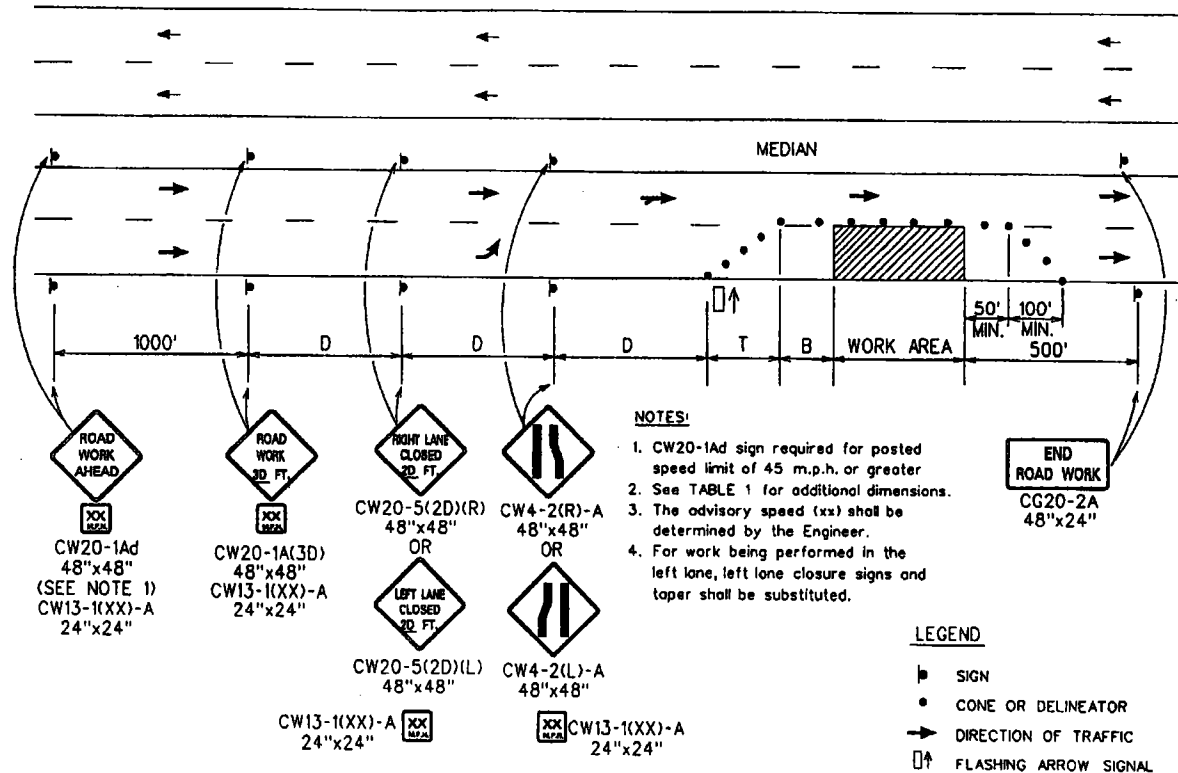
MULTILANE UNDIVIDED HIGHWAY - RIGHT LANE CLOSED  
FIGURE 2 - TRAFFIC CONTROL PLAN



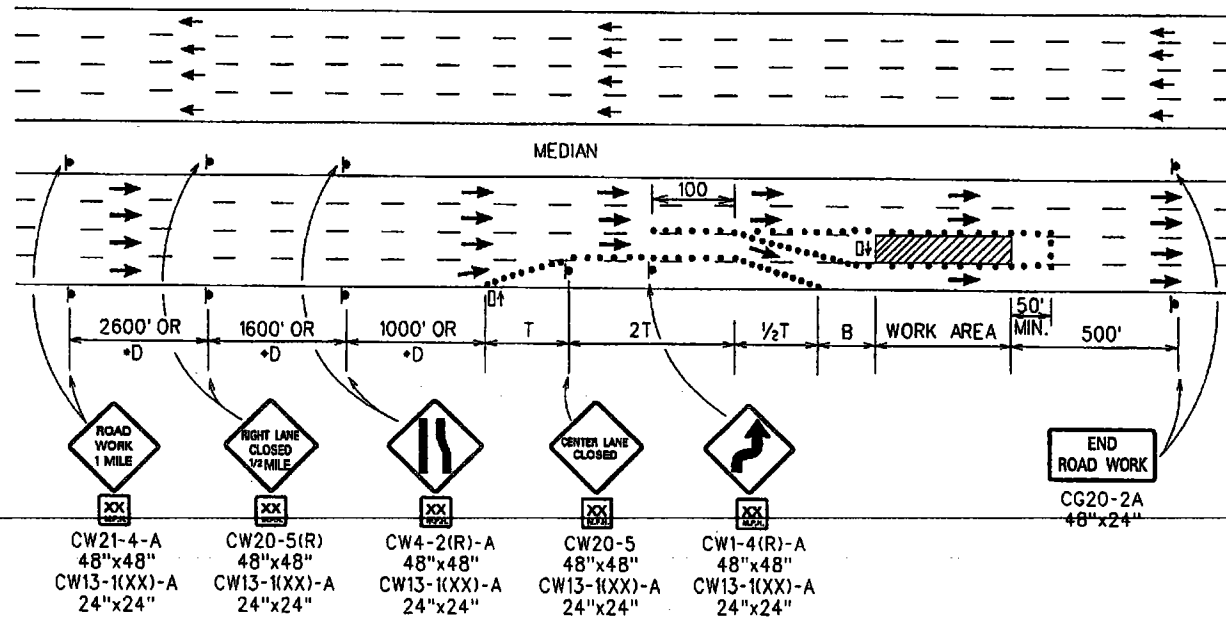


MULTILANE UNDIVIDED HIGHWAY - LEFT LANE CLOSED

FIGURE 3 - TRAFFIC CONTROL PLAN



MULTILANE DIVIDED HIGHWAY - ONE LANE CLOSED  
 FIGURE 4 - TRAFFIC CONTROL PLAN



**NOTES:**

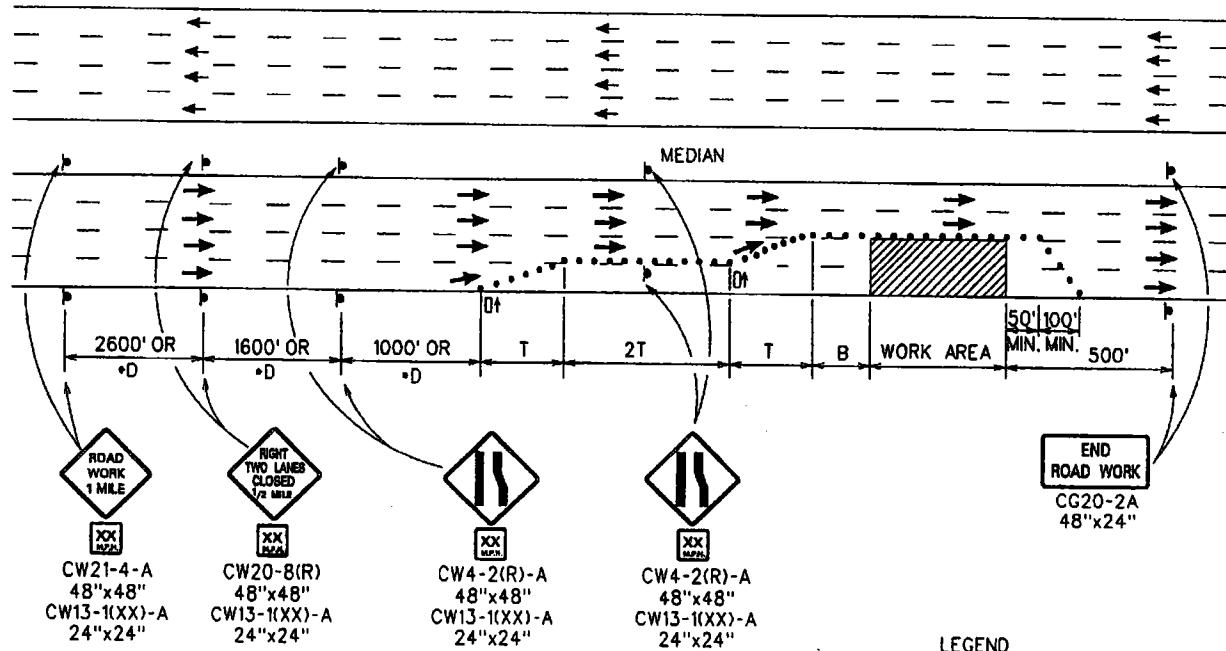
1. For work being performed in the left center lane, use mirror image of above with appropriate left lane closure signs and taper.
2. For undivided highways, delete advance warning signs shown posted in median area.
3. The advisory speed (xx) shall be determined by the Engineer.
4. See TABLE 1 for additional dimensions.
5. For posted speeds of 40 m.p.h. or less, use sign spacings and taper lengths from TABLE 1 and change signs CW21-4-A and CW20-5(R) to CW20-1A(3D) and CW20-5(2D)(R) as shown in Figure 4.

**LEGEND**

- ▬ SIGN
- CONE OR DELINEATOR
- ➔ DIRECTION OF TRAFFIC
- ⬆ FLASHING ARROW SIGNAL

**MULTILANE HIGHWAY - CENTER LANE CLOSED**

**FIGURE 5 - TRAFFIC CONTROL PLAN**



**NOTES:**

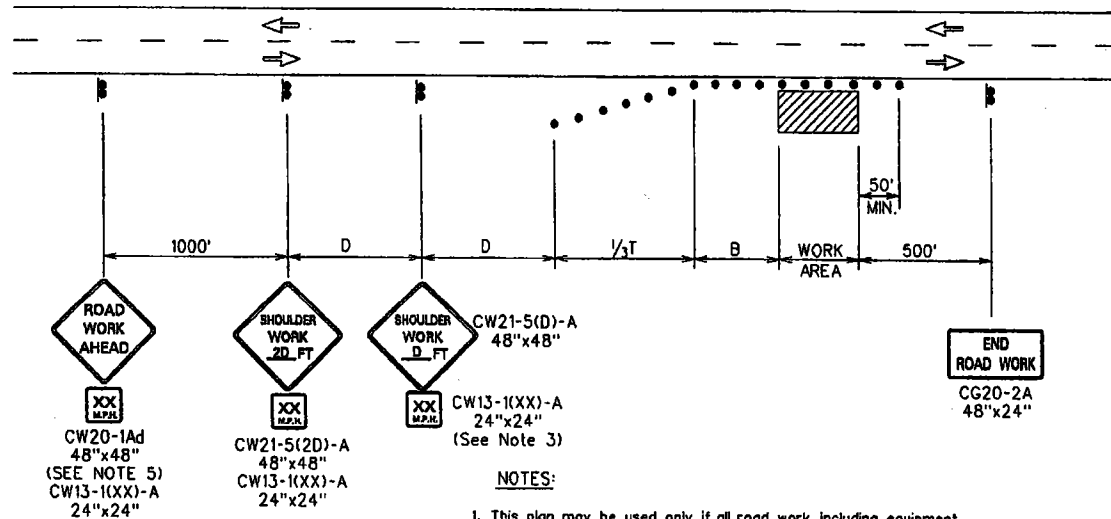
1. For work being performed in the left center lane, use mirror image of above with appropriate left lane closure signs and taper.
2. For undivided highways, delete advance warning signs shown posted in median area.
3. The advisory speed (xx) shall be determined by the Engineer.
4. See TABLE 1 for additional dimensions.
5. For posted speeds of 40 m.p.h. or less, use sign spacings and taper lengths from TABLE 1 and change signs CW21-4-A and CW20-8(R) to CW20-1A(3D) and CW20-8(2D)(R) respectively.

**LEGEND**

- ▬ SIGN
- CONE OR DELINEATOR
- ➔ DIRECTION OF TRAFFIC
- ⬆ FLASHING ARROW SIGNAL

MULTILANE HIGHWAY - MULTIPLE LANE CLOSED

FIGURE 6 - TRAFFIC CONTROL PLAN



ROAD WORK AHEAD  
 XX MPH  
 CW20-1Ad  
 48"x48"  
 (SEE NOTE 5)  
 CW13-1(XX)-A  
 24"x24"

SHOULDER WORK 20 FT  
 XX MPH  
 CW21-5(2D)-A  
 48"x48"  
 CW13-1(XX)-A  
 24"x24"

SHOULDER WORK D FT  
 XX MPH  
 CW21-5(D)-A  
 48"x48"  
 CW13-1(XX)-A  
 24"x24"  
 (See Note 3)

END ROAD WORK  
 CG20-2A  
 48"x24"

**NOTES:**

1. This plan may be used only if all road work, including equipment and workers are off the travel way.
2. See TABLE 1 for additional dimensions.
3. Engineer will determine if Advisory speed sign is necessary.
4. Contractor will provide necessary adjustments to accommodate Bicyclists and Pedestrians.
5. CW20-1Ad sign required for posted speed limit of 45 MPH or greater.
6. Signage is not required if the work area including equipment and workers, is outside the clear zone distance, as specified in the latest AASHTO Roadside Design Guide.

**LEGEND**

- Cone or Deflector
- Direction of traffic
- Sign

WORKING ON SHOULDER OR ROADSIDE  
FIGURE 7 - TRAFFIC CONTROL PLAN