The following detail plans show examples which are difficult to show on other traffic control plans or where additional guidance is necessary.

TCD 1 ***Shoulder Work Area Protection During Non-Working Hours***
(This detail provides guidance to drop-off protection and providing a recoverable slope if a vehicle were to drive off the edge of the roadway in a work zone during non-work hours.

TCD 2 ***Typical Example – Motorcycle Warning Sign Detail***
(This detail provides examples for sign placement in using the Motorcycles Use Extreme Caution sign in coordination with specific warning signs. Place the warning sign in advance of the Motorcycle warning sign. (See RCW 47.36.200 and WAC 468-95-305.)

TCD 3 ***Typical Example – Lane Closure With Shift***
(For use on multi-lane roadways where the work operation goes to the lane line and the traffic is shifted over onto the existing shoulder in order to maintain some buffer space between the work and traffic.) Use caution shifting traffic onto shoulders as traffic may approach a bridge structure and the shoulder may narrow and additional devices may be needed to make drivers aware of the condition

TCD 4 ***Typical Example – Speed Zone Detail for Chip Seal Project***
(Guidance for the signing requirements in chip seal projects with reduced work zone speed limits.)

TCD 5 ***Typical Example – Work Beyond the Shoulder***
(Typical example taken from MUTCD application that details minimum signing requirements for work within 15 feet of the edge of roadway.)

TCD 6 ***Typical Example – Long-Term Shoulder Closure on Freeway***
(Typical example taken from the MUTCD, this plan depicts the signing and channelizing device requirements for shoulder closure operations, particularly operations with barrier.)

TCD 7 ***Typical Example – Rolling Slowdown***
(See detailed operational guidance that accompanies this plan.)

TCD 8 ***Typical Example – Emergency Operations***
(See detailed operational guidance that accompanies this plan.)

TCD 9 ***Temporary Pavement Marking Details***
(This detail sheet provides descriptions and typical layouts as needed.)

TCD 10 ***Typical Example – Temporary Intersection Pedestrian Traffic Control***
(This plan depicts typical signing examples for closing of a sidewalk during work zone operations. Specific pedestrian needs must be considered prior to any work beginning that impacts pedestrian pathways. Special attention must be given to pedestrian ADA accommodations. Consult with Region Traffic Office for assistance with specific issues or needs to provide the appropriate pedestrian controls.)

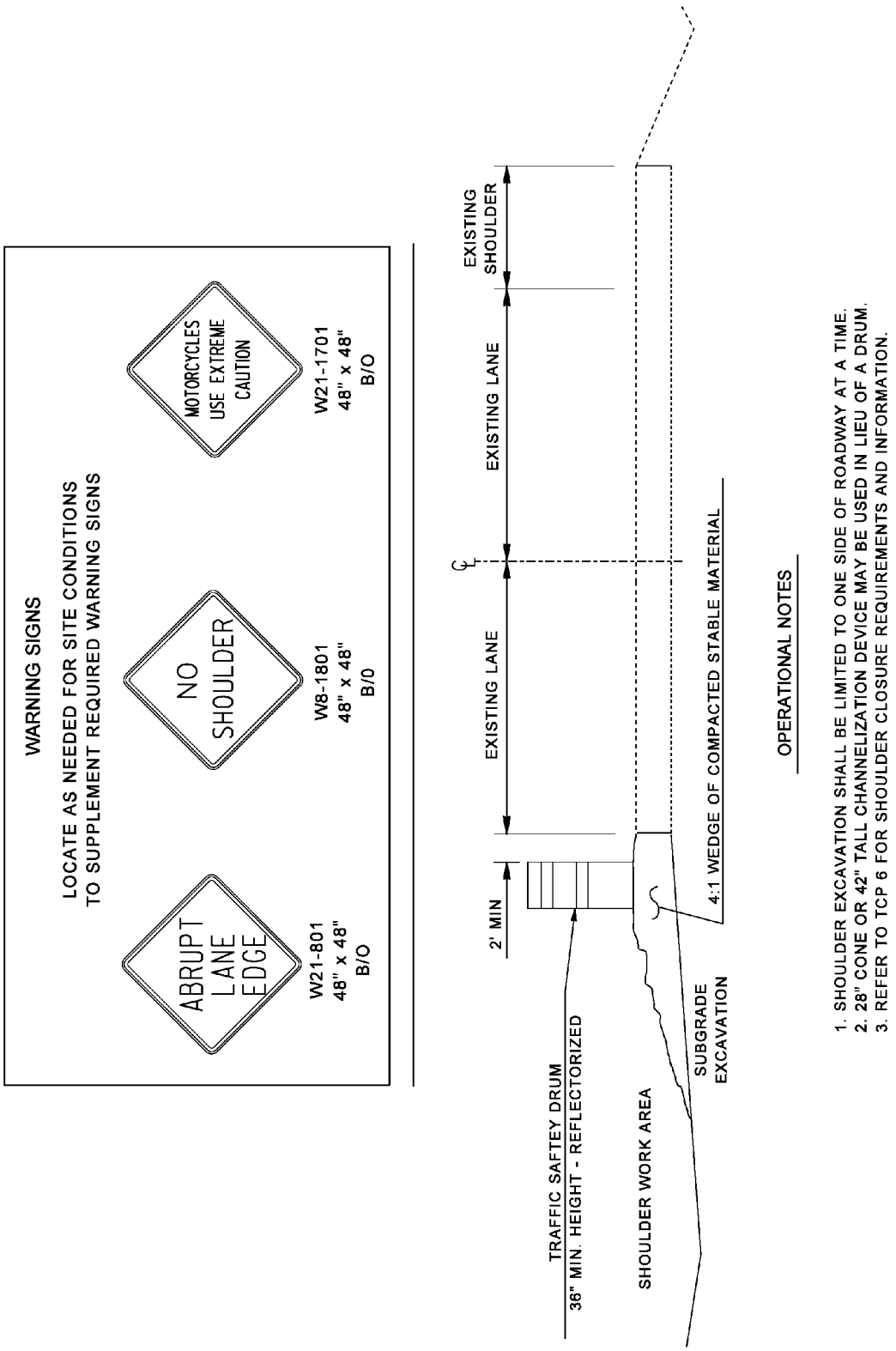
TCD 11 ***Typical Example – Temporary Portable Signal***
(This plan provides example of the traffic control signing and device requirements for a portable signal operation. Assistance from the Region Traffic Office and the Region Signal Superintendent may be necessary to adequately address the signal timing needs and any specific details in regard to the location of the portable signal system. 1,500 feet maximum between signal heads.)

TCD 12 ***Typical Example – Automated Flagger Assistance Device (AFAD)***
(This plan provides an example of the traffic control signing and device requirements for an alternating one-way traffic operation that utilizes an automated flagger assistance device. The AFAD device can be used in any alternating one-way traffic operation that is typically flagger controlled, the AFAD is a device that is used as a safety enhancement that enables the human flagger to be physically away from traffic in a safe location and remotely operate the device. 800 feet maximum between AFAD locations.)

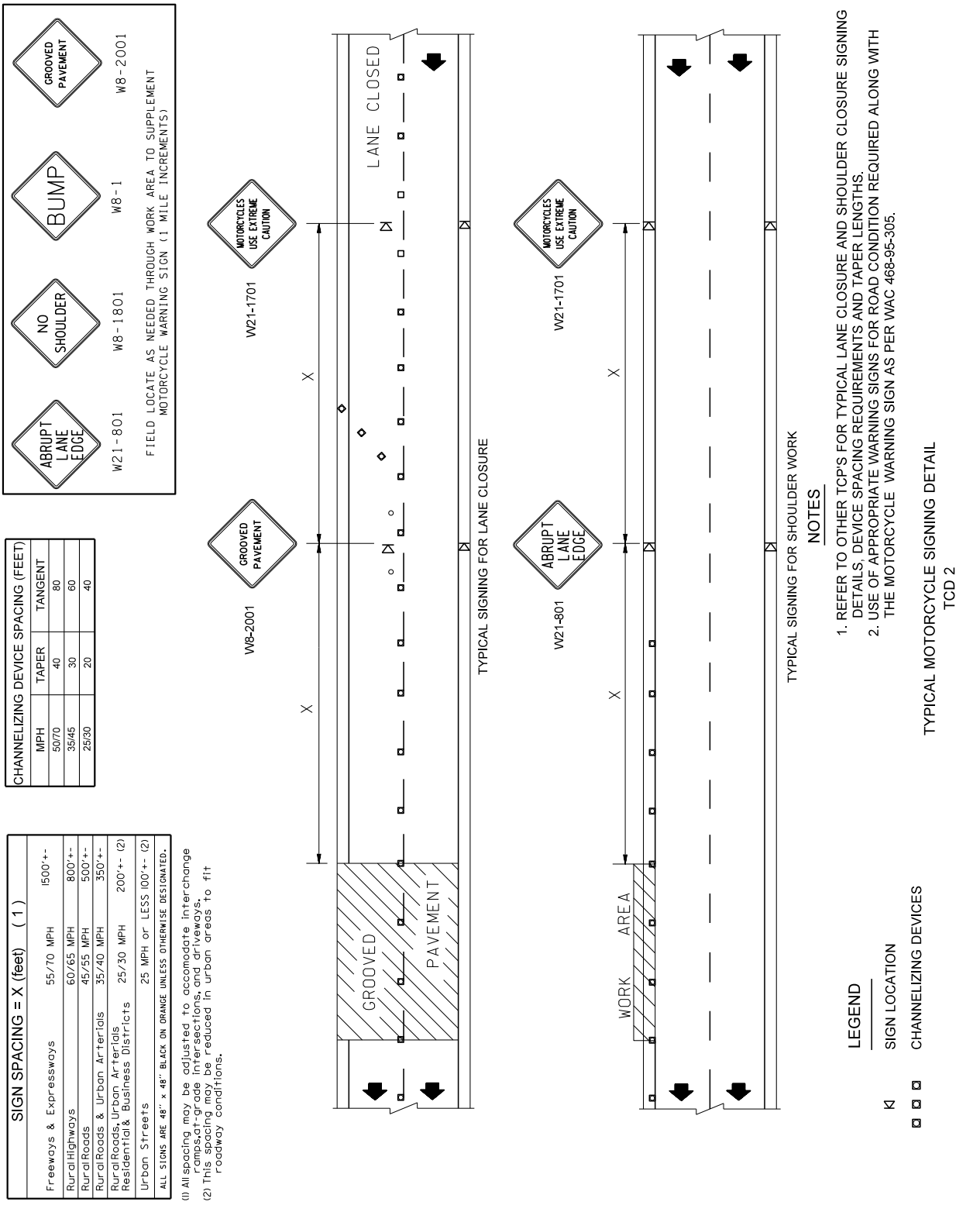
TCD 13 ***Typical Example – Work Within a Roundabout***
(This example provides general guidance on the signing and device requirements for maintenance work in and around a roundabout location. Each roundabout location is unique and a site specific traffic control plan should be developed for the work operation.)

TCD 14 ***Typical Mobile Shoulder Operation With Encroachment on a Two-Lane Roadway***
(For mobile operations on a rural two-lane, two-way roadway with lane encroachment and limited sight distance.)

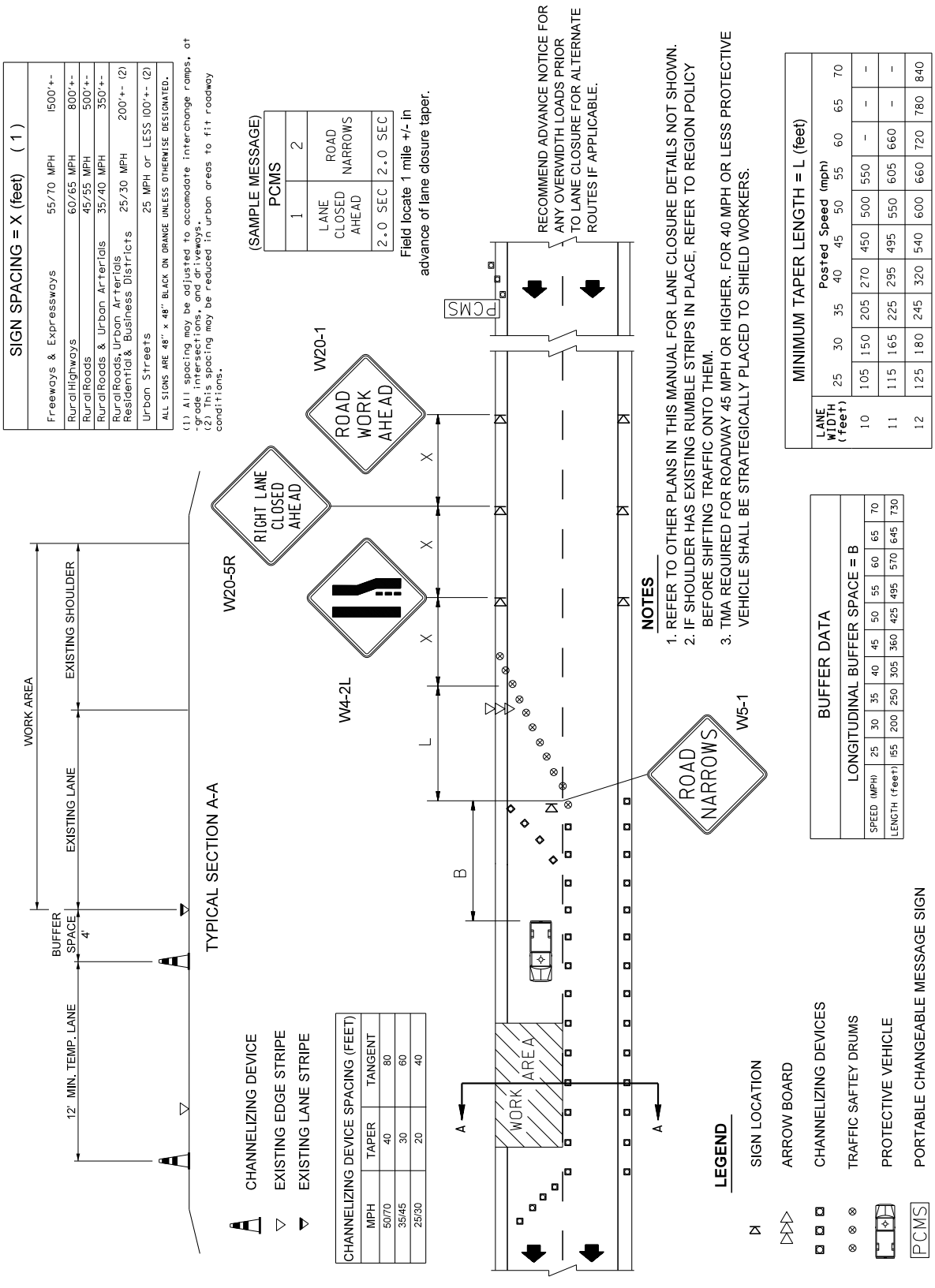
TCD 15 ***Typical Temporary Exit Gore Channelization Plan***
(This example is for use during paving operations in the vicinity of an exit gore, the existing pavement markings are commonly covered by new pavement and the markings are not visible so this detail shows a method to create a temporary physical gore for use until the permanent pavement marking is installed.)



TCD 1 – Shoulder Work Area Protection During Non-Working Hours

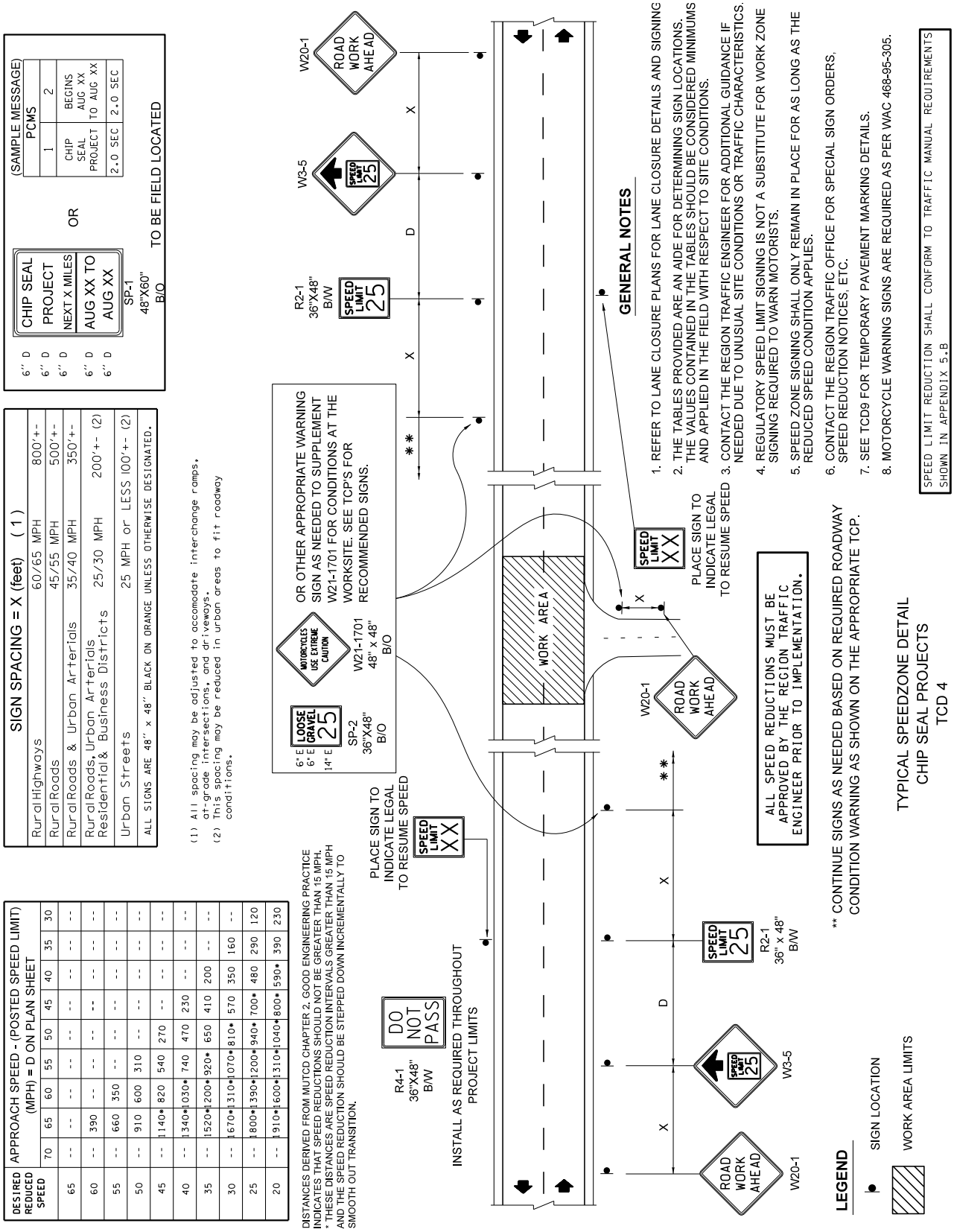


TCD 2 – Typical Example – Motorcycle Warning Sign Detail

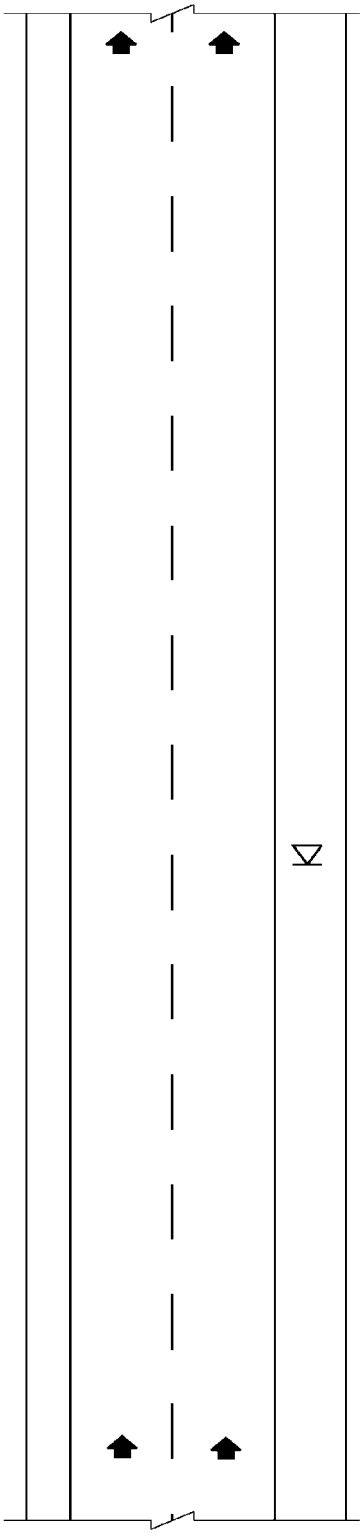


TYPICAL SHORT DURATION LANE CLOSURE WITH SHIFT
TCD 3

TCD 3 – Typical Example – Lane Closure With Shift



TCD 4 – Typical Example – Speed Zone Detail for Chip Seal Project



SIGN SPACING = X (feet) (1)		
Freeways & Expressways	55/70 MPH	1500'+-
Rural Highways	60/65 MPH	800'+-
Rural Roads	45/55 MPH	500'+-
Rural Roads & Urban Arterials	35/40 MPH	350'+-
Rural Roads, Urban Arterials Residential & Business Districts	25/30 MPH	200'+- (2)
Urban Streets	25 MPH or LESS	100'+- (2)
ALL SIGNS ARE 48" x 48" BLACK ON ORANGE UNLESS OTHERWISE DESIGNATED.		

(1) All spacing may be adjusted to accomodate interchange ramps, at-grade intersections, and driveways.
(2) This spacing may be reduced in urban areas to fit roadway conditions.

X

LEGEND

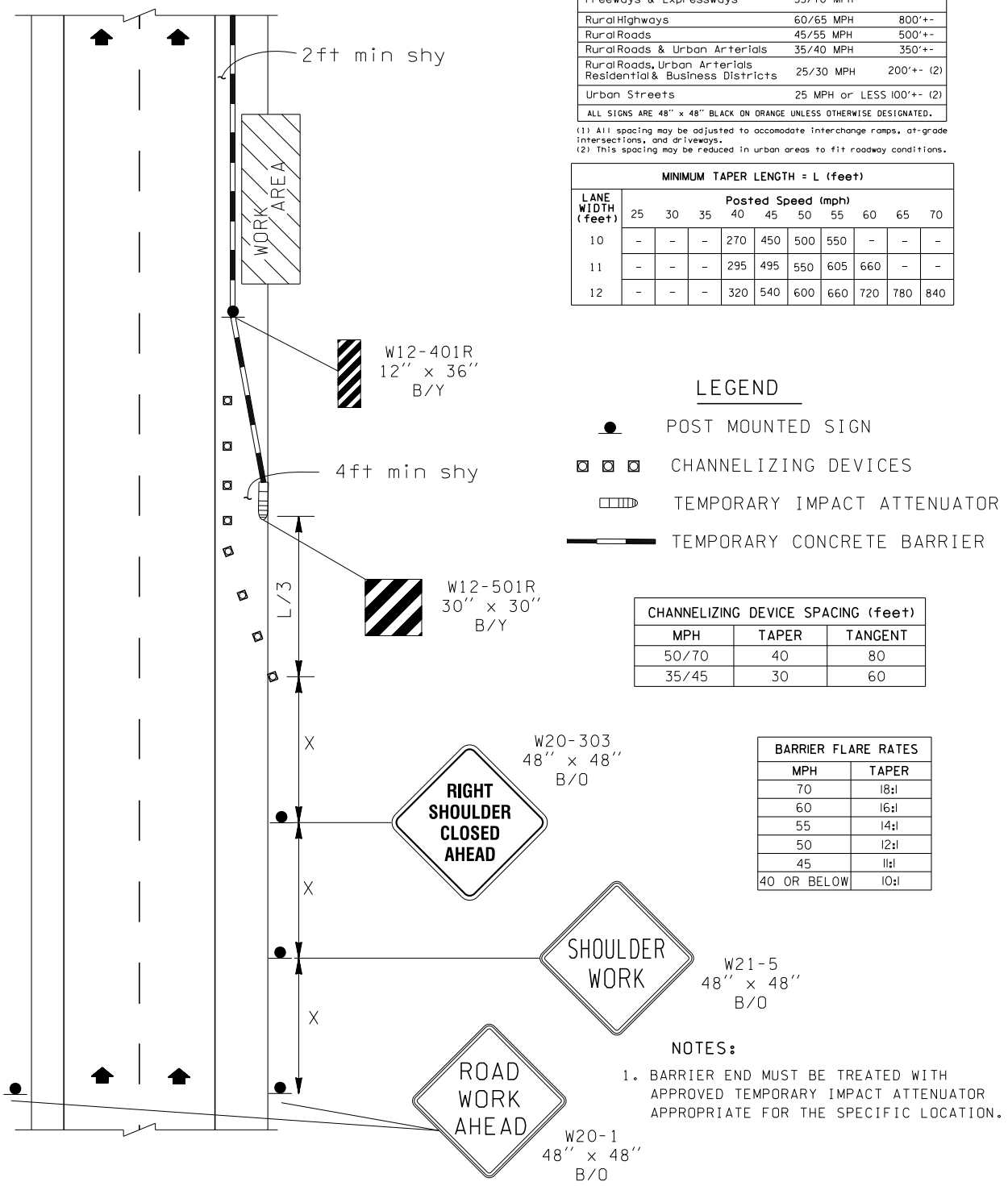
SIGN LOCATION

W20-1
48" x 48"
B/O

NOTES:

1. THE ROAD WORK AHEAD SIGN MAY BE REPLACED WITH OTHER APPROPRIATE SIGNS SUCH AS SHOULDER WORK.
2. THE ROAD WORK AHEAD SIGN MAY BE OMITTED WHERE THE WORK SPACE IS BEHIND BARRIER, MORE THAN 24 INCHES BEHIND THE CURB OR 15 FEET OR MORE FROM THE EDGE OF ANY ROADWAY.
3. IF WORK VEHICLES ARE ON THE SHOULDER, A SHOULDER WORK SIGN MAY BE USED. FOR MOWING OPERATIONS THE SIGN MOWING AHEAD MAY BE USED.
4. A GENERAL WARNING SIGN SUCH AS ROAD MACHINERY AHEAD SHOULD BE USED IF WORKERS AND EQUIPMENT MUST OCCASIONALLY MOVE ONTO THE SHOULDER.
5. WORK OPERATIONS SUCH AS MOWING WHERE THE MOWER IS OFF THE SHOULDER IS ALLOWED UNDER THIS PLAN.
6. THE PARKING OF ADDITIONAL EQUIPMENT USED TO LOAD/UNLOAD EQUIPMENT ARE NOT CONSIDERED A WORK ZONE OF ITS OWN AND CAN BE PARKED ON THE SHOULDER BUT NNEEDS TO HAVE AT LEAST 3 DEVICES TO CLOSE THE SHOULDER. REFER TO 3.1 FOR ADDITIONAL INFORMATION.

TCD 5 – Typical Example – Work Beyond the Shoulder



SIGN SPACING = X (feet) (1)		
Freeways & Expressways	55/70 MPH	1500'+-
Rural Highways	60/65 MPH	800'+-
Rural Roads	45/55 MPH	500'+-
Rural Roads & Urban Arterials	35/40 MPH	350'+-
Rural Roads, Urban Arterials Residential & Business Districts	25/30 MPH	200'+- (2)
Urban Streets	25 MPH or LESS	100'+- (2)
ALL SIGNS ARE 48" x 48" BLACK ON ORANGE UNLESS OTHERWISE DESIGNATED.		

(1) All spacing may be adjusted to accomodate interchange ramps, at-grade intersections, and driveways.
(2) This spacing may be reduced in urban areas to fit roadway conditions.

MINIMUM TAPER LENGTH = L (feet)										
LANE WIDTH (feet)	Posted Speed (mph) 25	30	35	40	45	50	55	60	65	70
10	-	-	-	270	450	500	550	-	-	-
11	-	-	-	295	495	550	605	660	-	-
12	-	-	-	320	540	600	660	720	780	840

LEGEND

- POST MOUNTED SIGN
- CHANNELIZING DEVICES
- TEMPORARY IMPACT ATTENUATOR
- TEMPORARY CONCRETE BARRIER

CHANNELIZING DEVICE SPACING (feet)		
MPH	TAPER	TANGENT
50/70	40	80
35/45	30	60

BARRIER FLARE RATES	
MPH	TAPER
70	18:1
60	16:1
55	14:1
50	12:1
45	11:1
40 OR BELOW	10:1

NOTES:

1. BARRIER END MUST BE TREATED WITH APPROVED TEMPORARY IMPACT ATTENUATOR APPROPRIATE FOR THE SPECIFIC LOCATION.

TCD 6 – Typical Long-Term Shoulder Closure on High Speed Roadway

TCD 7 – Rolling Slowdown

A rolling slowdown is a legitimate form of traffic control commonly practiced by the WSP and highway maintenance crews. This use is valuable for emergency, or **very specific** short duration closures (e.g. to pick debris from the roadway, to push a blocking disabled to the shoulder, or to pull power lines across the roadway). The traffic control vehicles form a moving blockade across all lanes, which reduce traffic speeds and create a large gap in traffic, or clear area, allowing very short-term work to be accomplished **without completely stopping the traffic**.

Other traditional forms of traffic control such as lane closures should be considered first and as the primary choice when possible. If the slowdown is to be a scheduled operation, then the Regional Traffic Office needs to be contacted with a work request so a site specific traffic control plan (TCP) can be developed and/or reviewed and approved. The gap in traffic created by the rolling slowdown, and other traffic issues, should be addressed on an approved TCP. Also, use of WSP is encouraged whenever possible, at a minimum coordination with WSP is necessary.

In the event of debris in the roadway, a blocking disabled vehicle, or other **emergency**, the use of experience and resources at hand, along with sound judgment and common sense, will suffice in lieu of an approved, site specific, TCP. TCD 7 has been developed as a guideline to represent the basic requirements for performing a safe and effective rolling slowdown. Site specific TCPs can be developed based on this plan.

Equipment availability is a prime consideration. Before starting this operation, ensure there are at least one traffic control vehicle (with flashing amber lights) per two lanes, **and** one vehicle to cover every point of access onto the "rolling slowdown" segment of roadway. (Only during emergencies should less than one traffic control vehicle per lane be considered.) Truck mounted PCMS boards stating, "Slow or Stopped Vehicles" are very helpful. **Be sure that every crewmember participating is well briefed and knows what is needed from them. Good communications for this operation are essential!**

The traffic control vehicles leading the rolling slowdown must enter the roadway far enough upstream from the work operation site to allow a clear area in front of them to develop. The traffic control vehicles will work into position so that each lane is controlled. As in every other form of traffic control, sight distance is important, so that drivers are not surprised. While traveling at a fixed and reduced rate of speed, a gap in traffic must be created which is long enough to provide the estimated time needed for the work to be done.

A separate traffic control vehicle, "chase vehicle," shall follow the slowest, or last, vehicle ahead of the blockade. When that last vehicle passes, the crew can begin the work operation.

All ramps and entrances to the roadway between the moving blockade and work operation must be temporarily closed using traffic control equipment and personnel. Each of those ramps must remain closed until the crew doing the work gives the "all clear" signal, **or** until the front of the moving blockade passes the closed on-ramp(s).

Radio communications between the work crew and the moving blockade are required so the speed of the blockade can be adjusted, if necessary, to increase or decrease the closure time. Release traffic only after you have confirmation that all workers and their vehicles are clear of the roadway.

Rolling Slowdown Calculations

Known:

T = Time needed with no traffic (in minutes)

V_s = Speed of slowdown vehicles (in mph) 20 mph minimum recommended

V_c = Speed of chaser vehicle in front of slowdown (in mph) generally it should be the posted speed

Calculations:

G = Gap needed (in miles)

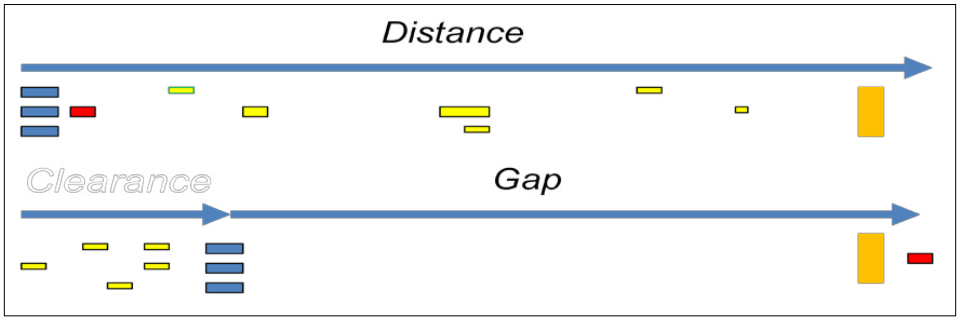
$G = T (V_s/60)$

C = Clearance time needed to create the gap (in minutes)

$C = G / (V_c/60 – V_s/60)$

D = Distance ahead of the work area to start the slowdown (in miles)

$D = C (V_c/60)$



Example:

You need a 5 minute gap on a 60 mph freeway to cross a large piece of equipment into the median work area, so you propose a 20 mph rolling slowdown during the off-peak or lowest traffic volume hours for the freeway.

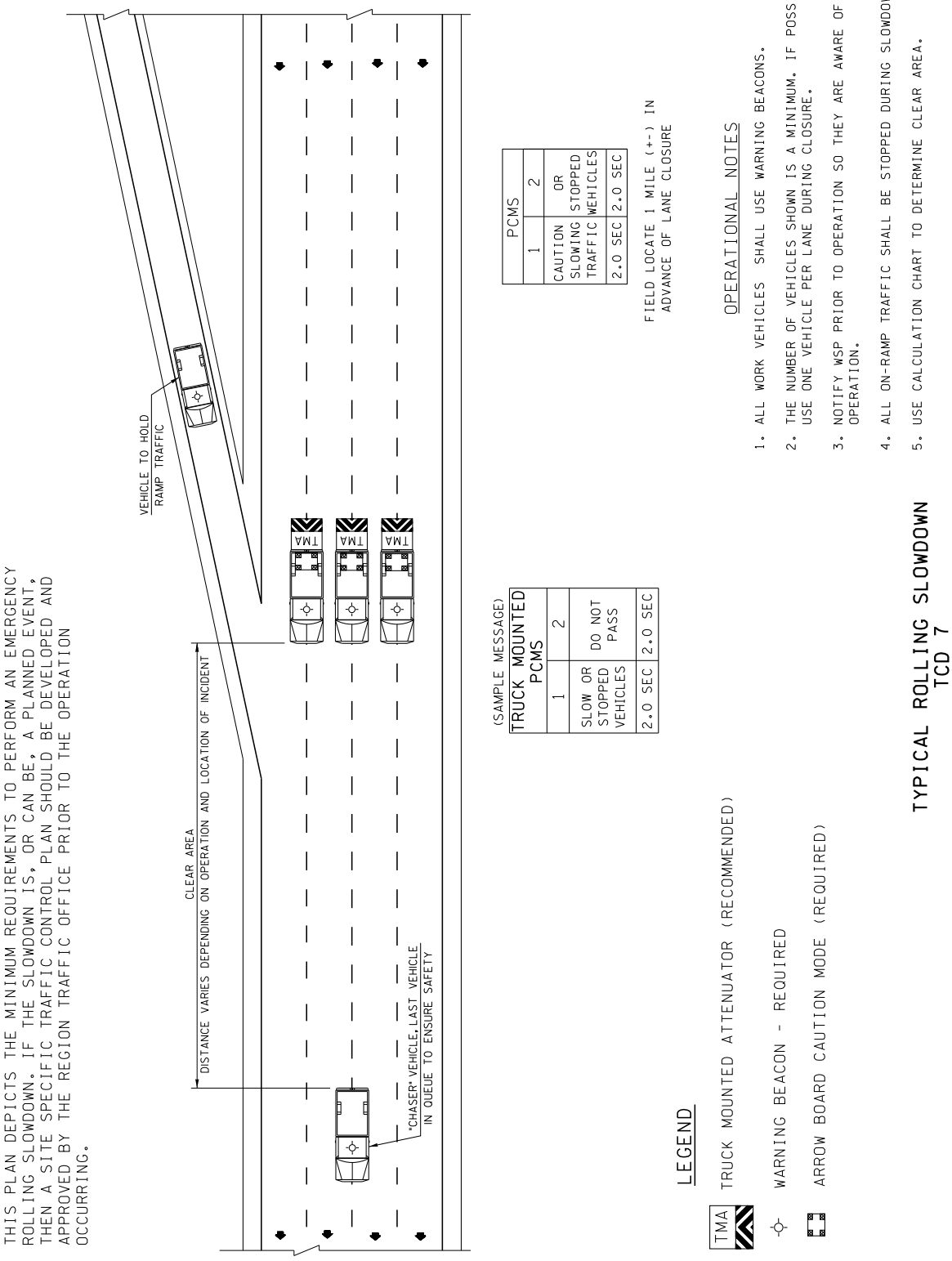
G = 5 (20/60) = 1.67 miles

C = 1.67 / (60-20/60) = 2.5 minutes

D = 2.5 (60/60) 2.5 miles

Links:

For WSDOT maintenance, see the Chapter 6 of this manual.



TCD 7 – Typical Example – Rolling Slowdown

TCD 8 – Emergency Operations

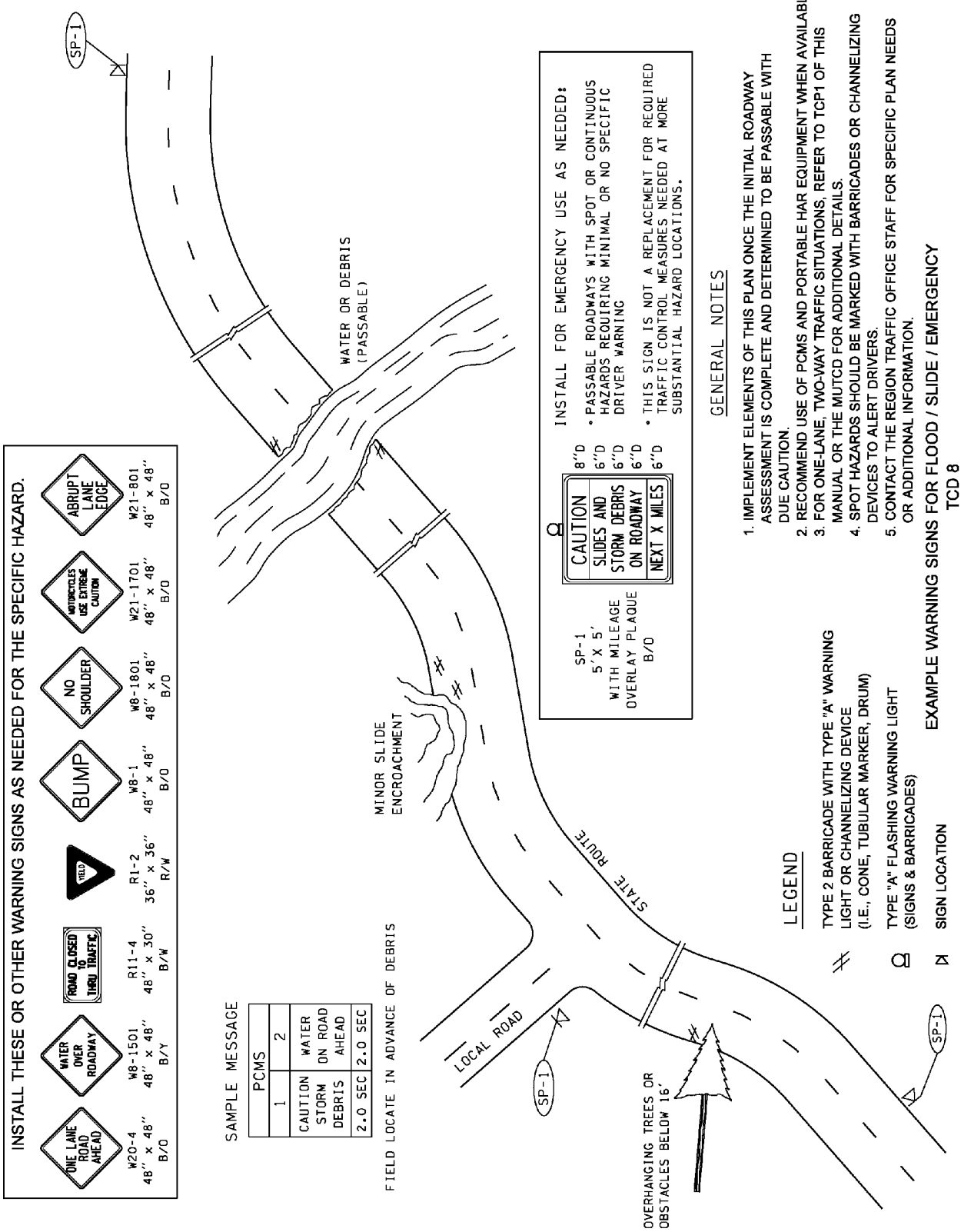
The immediate response to an emergency situation must, by necessity, make use of whatever devices and equipment are available. Assistance from the Washington State Patrol and WSDOT Incident Response Team may be appropriate. The use of flares is allowed unless flammable material is present, electronic flares or glow sticks are an option for this condition.

Implement the appropriate traffic control plan (lane closure, etc.) if the situation is expected to last longer than 60 minutes. This allows for a short duration operation, until traffic control assistance arrives.

It is important to differentiate between an actual emergency and an emergent condition. An actual emergency requires an immediate response to save lives or prevent serious injury using whatever resources are available, usually in response to a crash or incident. An emergent condition requires an expedient yet planned response to a situation that may have the potential to cause a crash, but the crash has not yet occurred or a crash or other event has caused damage needing repair after the crash event. Most "call outs" or damage reports fall into the emergent condition category and although serious to varying degrees, still allow some period of time to plan a reasonable short duration work zone response, even if additional resources are needed once the condition is evaluated on site.

TCD 8 reflects various conditions and measures that might be applied as part of an emergency response for a natural disaster. More commonly, emergencies are those caused by vehicle crashes, breakdowns or spilled or lost cargo. Response to these types of emergencies is urgent and not specifically addressed by work zone standards. Refer to WSDOT Incident Response Program for guidance. Refer to Section 3.2 for additional guidance.

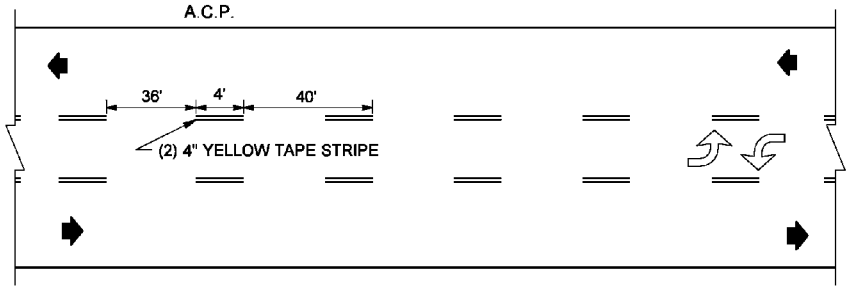
Response to an emergency situation is inherently more dangerous than planned situations. Do not expose yourself to a life-threatening situation. Wait for assistance and protect yourself at all times.

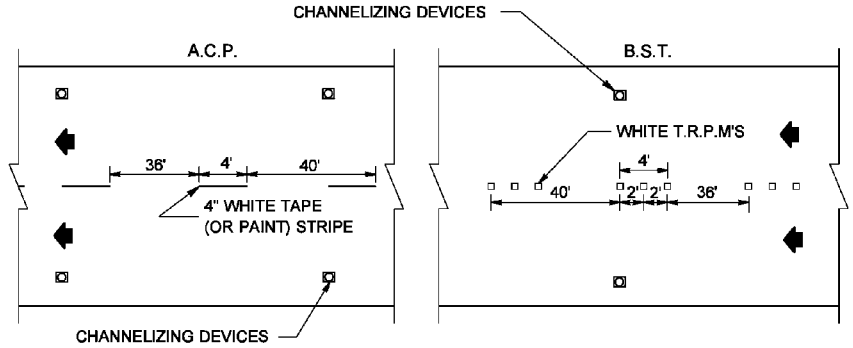


TCD 8 – Typical Example – Emergency Operations

WORK OPERATIONS THAT REMOVE OR OBSCURE EXISTING PAVEMENT MARKINGS MUST PROVIDE FOR TEMPORARY MARKINGS UNTIL THE PERMANENT MARKINGS ARE APPLIED. TEMPORARY MARKINGS MAY BE USED UNTIL IT IS PRACTICAL AND POSSIBLE TO INSTALL PERMANENT MARKINGS. THE DETAILS BELOW SHOW VARIOUS COMMON APPLICATIONS. CONTACT THE REGION TRAFFIC OFFICE FOR ASSISTANCE WITH MORE COMPLEX SITUATIONS.

MULTI-LANE ROADWAYS

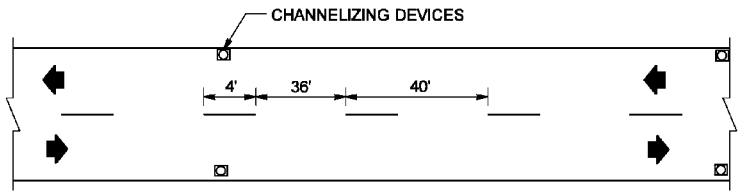




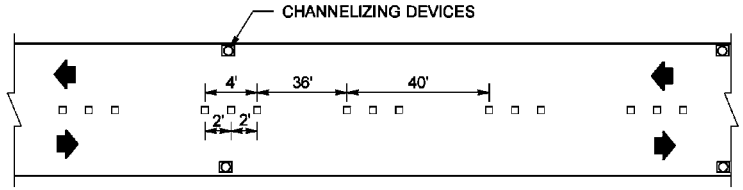
2 LANE ROADWAYS

A.C.P. OVERLAY - TEMPORARY STRIPING TAPE SHALL BE INSTALLED IN CONJUNCTION WITH "PASS WITH CARE" AND "DO NOT PASS" SIGN LOCATIONS.

T.R.P.M. = TEMPORARY RAISED PAVEMENT MARKER



A.C.P. OVERLAY - TEMPORARY STRIPING TAPE - 4" YELLOW CENTER STRIPE

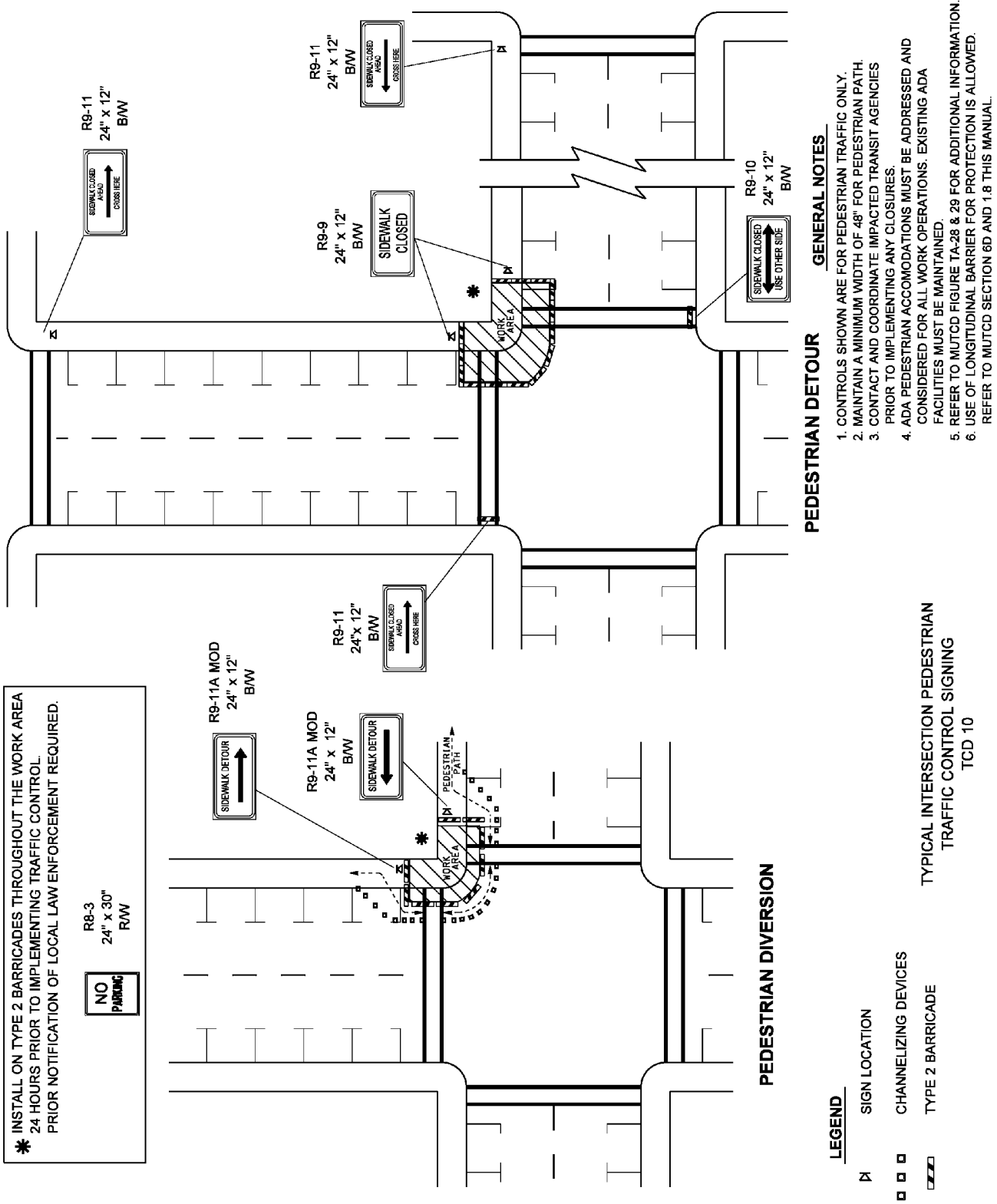


B.S.T. OVERLAY - T.R.P.M.(CHIP SEAL MARKER) - 4" YELLOW CENTER STRIPE

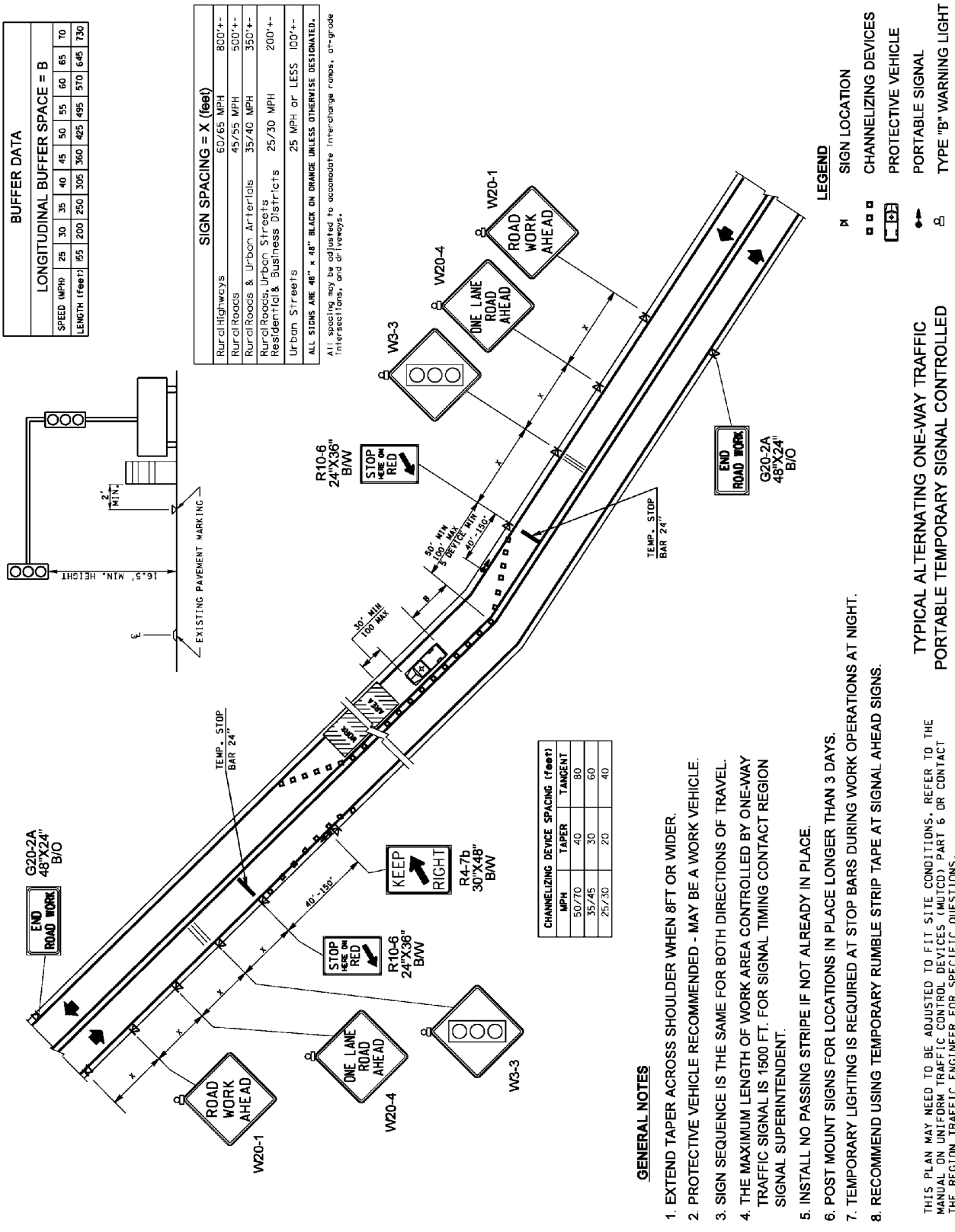
TEMPORARY EDGE STRIPES ARE NOT REQUIRED FOR THE ABOVE SITUATIONS BUT IF USED, T.R.P.M.'S MAY BE USED ON A PATTERN SPACING OF 5'O.C. TO SIMULATE A SOLID LINE. TEMPORARY ROADSIDE DELINEATION WITH CHANNELIZATION DEVICES SHOULD BE CONSIDERED, BUT ARE OPTIONAL.
DO NOT USE A "SKIP" PATTERN OF TAPE STRIPE TO SIMULATE AN EDGE STRIPE.
FOR LONG TERM PROJECTS, A TEMPORARY CHANNELIZATION/PAVEMENT MARKING PLAN SHOULD BE DEVELOPED.

CHANNELIZATION DEVICE SPACING - TANGENT 200' +-
CURVES 100' +- O.C.
TAPERS ½ L

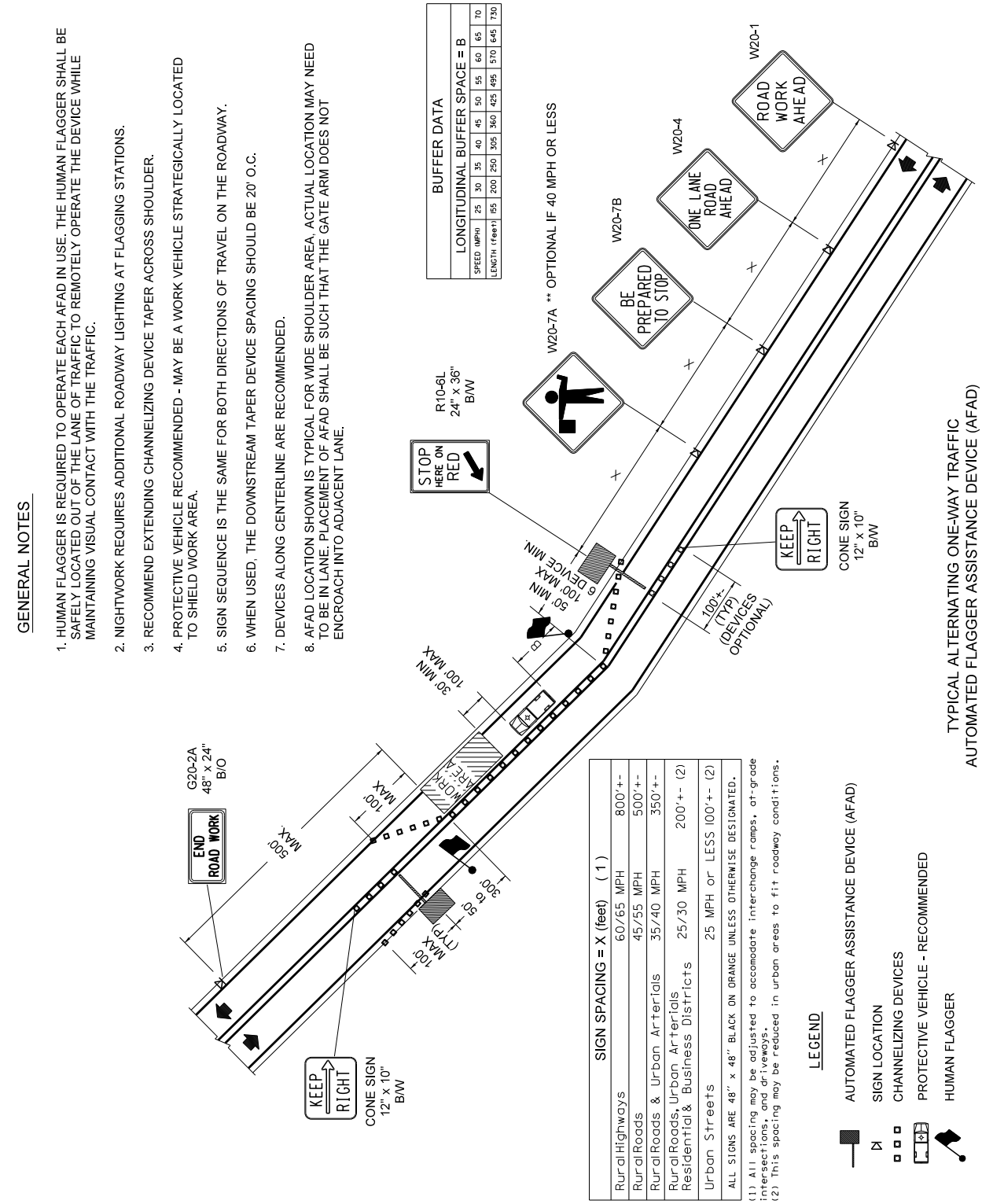
TEMPORARY PAVEMENT MARKING DETAILS
TCD 9



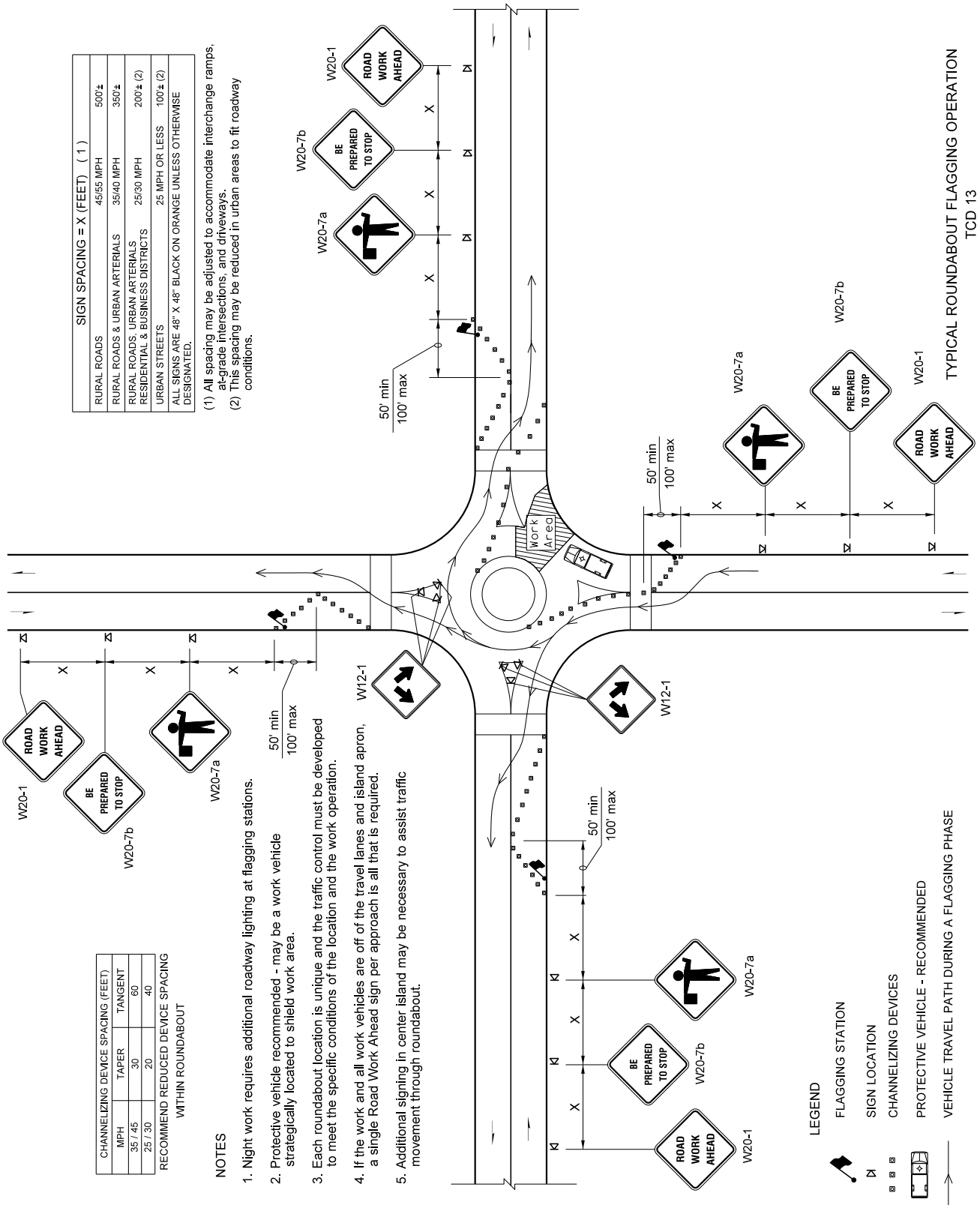
TCD 10 – Typical Example – Temporary Intersection Pedestrian Traffic Control



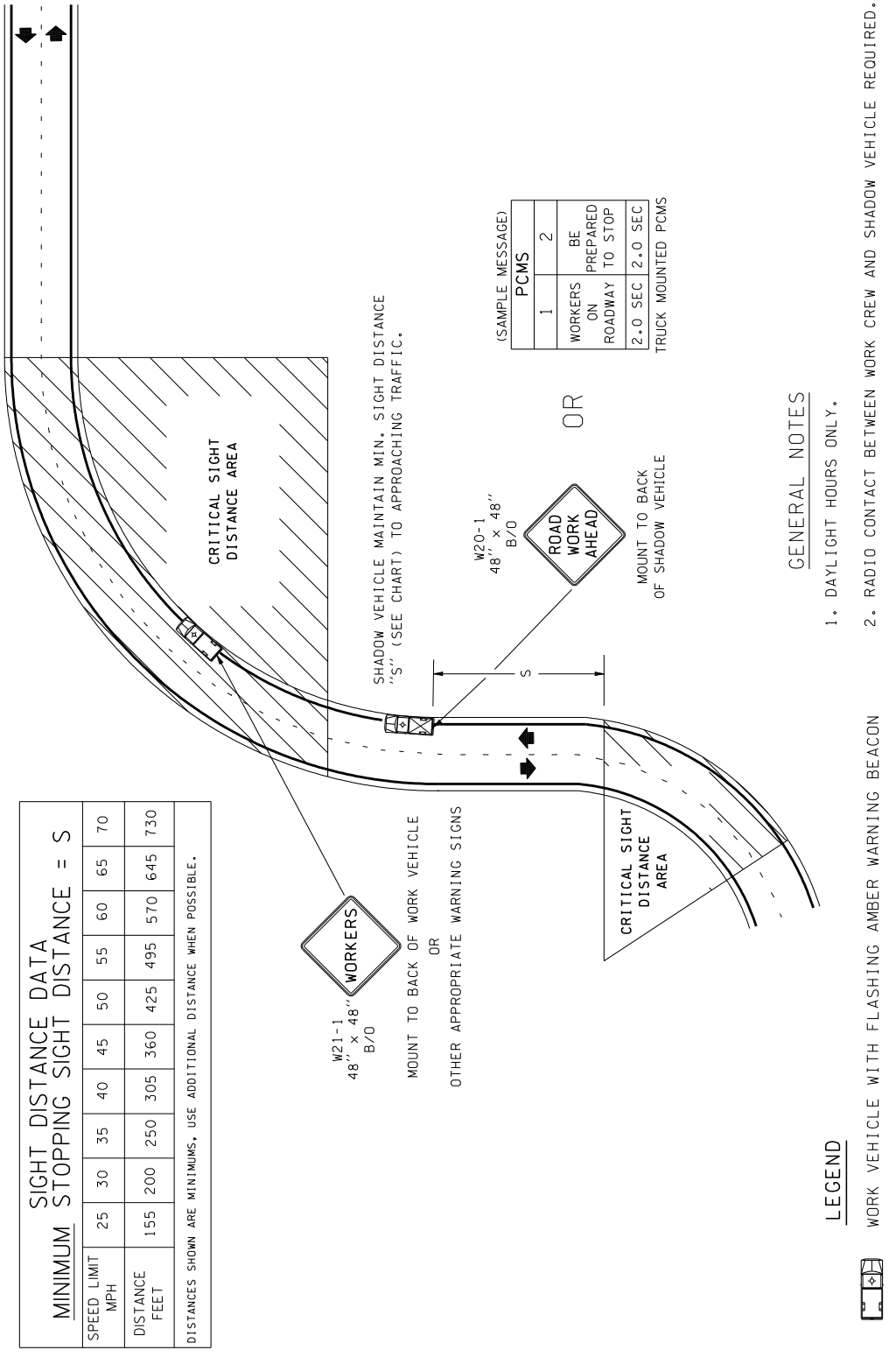
TCD 11 – Typical Example – Temporary Portable Signal



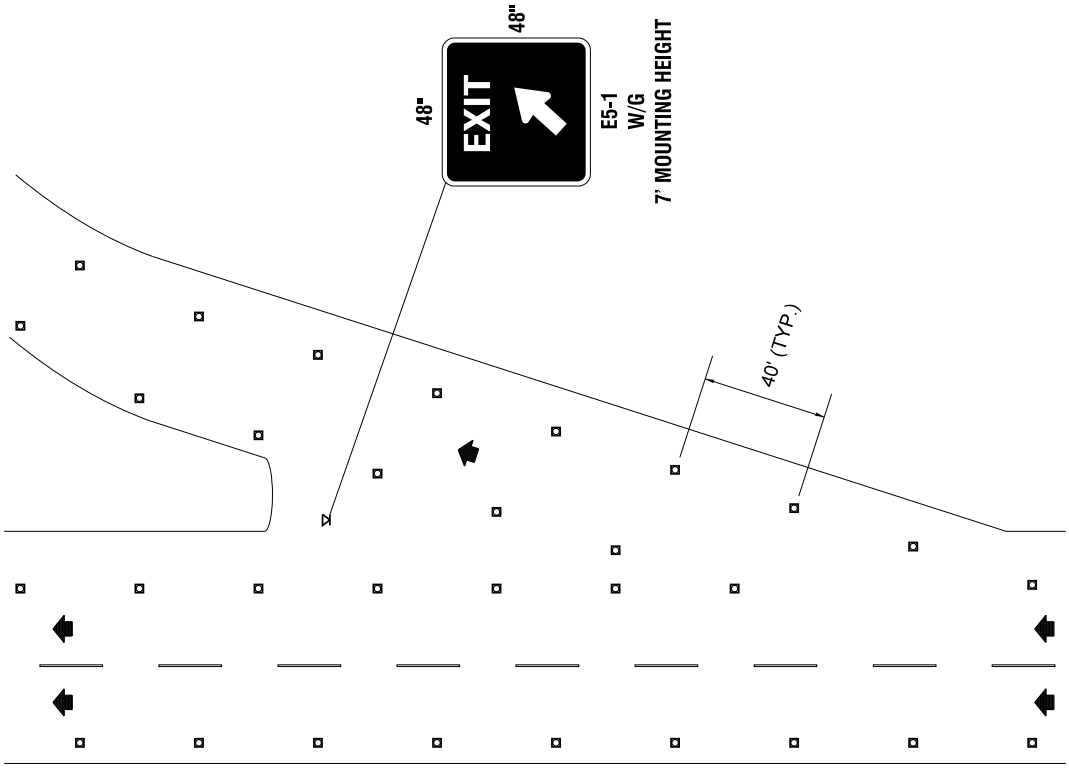
TCD 12 – Typical Example – Automated Flagger Assistance Device (AFAD)



TCD 13 – Typical Example – Work Within a Roundabout



TCD 14 – Typical Mobile Shoulder Operation With Encroachment on a Two-Lane Roadway



TEMPORARY EXIT GORE
TCD 15

LEGEND

CHANNELIZING DEVICES

SIGN LOCATION

GENERAL NOTES

1. Place channelizing devices to form a temporary physical gore until pavement markings are installed.

TCD 15 – Typical Temporary Exit Gore Channelization Plan