

SEE SHEET 2 FOR  
INDEX OF SHEETS

|                               |               |     |             |
|-------------------------------|---------------|-----|-------------|
| STATE MAINTENANCE PROJECT NO. |               |     |             |
| RMC 6454-87-001               |               |     |             |
| CONT                          | SECT          | JOB | HIGHWAY     |
| 6454                          | 87            | 001 | IH 10, ETC. |
| DIST                          | COUNTY        |     | SHEET NO.   |
| ELP                           | EL PASO, ETC. |     | 1           |

**STATE OF TEXAS**  
**DEPARTMENT OF TRANSPORTATION**

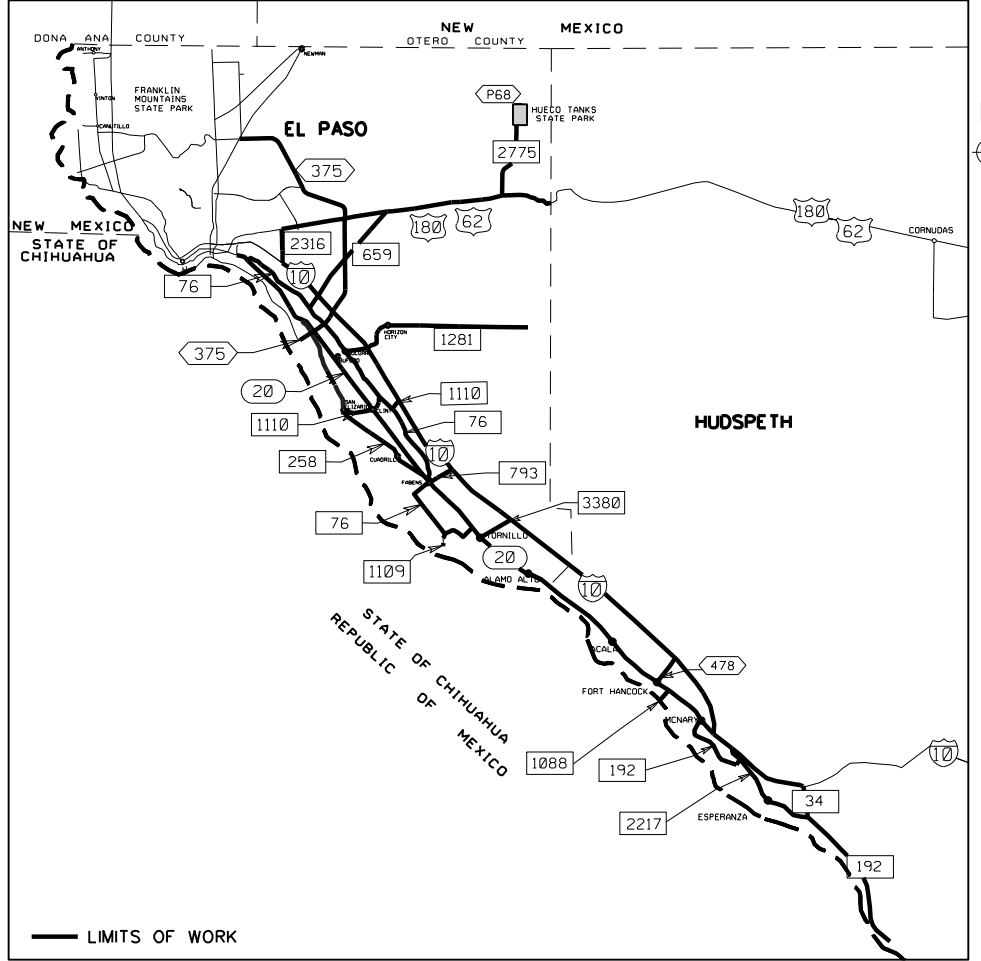
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**PLANS OF PROPOSED**  
**HIGHWAY ROUTINE MAINTENANCE CONTRACT**

**TYPE OF WORK:**  
**BARRICADES, SIGNS,**  
**AND TRAFFIC CONTROL**

PROJECT NO.: RMC 6454-87-001  
 EAST AREA OFFICE

HIGHWAY: IH 10, ETC.  
 LIMITS OF WORK: VARIOUS



— LIMITS OF WORK

EXCEPTIONS: N/A  
 EQUATIONS: N/A  
 RAILROAD CROSSINGS: N/A



DocuSigned by: TING: 10/26/2023  
*Norma Duran*  
 35824181EB4D451...  
 MAINTENANCE ENGINEER/CONTRACT MANAGER

DocuSigned by: 10/26/2023  
*Osmar Medina, P.E.*  
 2D8D998BF780488...  
 DIRECTOR OF MAINTENANCE

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION,  
 NOVEMBER 1, 2014 AND SPECIFICATION ITEMS INCLUDED IN THE CONTRACT  
 SHALL GOVERN ON THIS PROJECT.

DATE: 10/17/2023 10:14:52 AM  
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# INDEX OF SHEETS

**SHEET NO. DESCRIPTION**

**GENERAL**

- 1 TITLE SHEET
- 2 INDEX OF SHEETS
- 3,3A-3D GENERAL NOTES
- 4 ESTIMATE & QUANTITY

**TRAFFIC CONTROL PLAN**

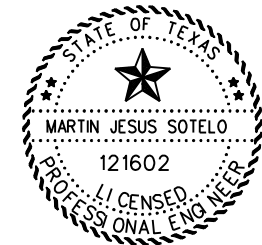
**TRAFFIC CONTROL PLAN STANDARDS**

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- 17-21 TCP (1-1)-18 THRU TCP (1-5)-18
- 22-28 TCP (2-1)-18 THRU TCP (2-7)-18
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**ROADWAY DETAILS**

**ROADWAY STANDARDS**

- 48 ABSORB(M)-19
- 49 SLED-19



THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ON THIS SHEET HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

DocuSigned by:  
*Martin Jesus Sotelo*, 10/26/2023  
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**GENERAL  
INDEX OF SHEETS**

SHEET 1 OF

| Texas Department of Transportation<br><small>TEXAS DEPARTMENT OF TRANSPORTATION ALL RIGHTS RESERVED</small> |               |     |             |
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| 6454  | 87            | 001 | IH 10, ETC. |
| DIST  | COUNTY        |     | SHEET NO.   |
| ELP   | EL PASO, ETC. |     | 2           |

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**CONTROL: 6454-87-001****COUNTY: EL PASO, ETC.****HIGHWAY: IH 10, ETC.****GENERAL NOTES:**

**General Project Description** – This routine maintenance contract is for barricades, signs, and traffic control on various roadways in El Paso and Hudspeth Counties.

The Contract will be managed by the **East Area Office** with participating Area Engineer (AE) and Maintenance Section Supervisor (MSS) listed below:

**Rene Romero, P.E., East AE**  
1430 Joe Battle Blvd.  
El Paso, Texas 79936  
(915) 757-5910

**Manuel Molina, East MSS**  
1430 Joe Battle Blvd.  
El Paso, Texas 79936  
(915) 849-5554

Each Contract awarded by the Department stands on its own and as such, is separate from other contracts. A Contractor awarded multiple contracts, must be capable and sufficiently staffed to concurrently process all contracts at the same time.

**General Requirements**

Various bid items and their associated quantities have been provided within this Contract to establish unit bid prices for the proposed work. The bid items and quantities provided are based on historical data and are not guaranteed. Actual quantities of work to be performed and paid will be determined in the field by the Engineer and will be paid utilizing these unit bid prices with no further compensation made regardless of the final quantities.

Where nighttime work is approved, provide adequate lighting for the entire work site, as directed. This will be subsidiary to the various bid items.

Obtain Engineer approval for all equipment and vehicles prior to use.

Maintain the entire project area in a neat and orderly manner throughout the duration of the work. This work will be subsidiary to the various bid items.

Always provide vehicular and pedestrian access, including Saturdays, Sundays, and holidays. This access includes, but is not limited to, driveways, streets, parking areas, and walkways. This will be considered subsidiary to the various bid items.

Clear and remove from all work sites, surplus and waste materials and leave the site in a neat and aesthetically pleasing condition.

Schedule and perform all work to ensure proper drainage during operations. All labor, tools, equipment and supervision required, to ensure drainage, removal, and handling of water shall be considered incidental work.

Repair any existing pavement, utilities, structures, etc., damaged by the Contractor's operations, at no additional cost to the Department.

**CONTROL: 6454-87-001****SHEET 3****COUNTY: EL PASO****HIGHWAY: IH 10, ETC.****ITEM 2 – INSTRUCTIONS TO BIDDERS**

This Contract includes plan sheets that are not part of the bid proposal.

View plans on-line or download from the web at:

<https://www.txdot.gov/business/letting-bids/plans-online.html>

Order plans from any of the plan reproduction companies shown on the web at:

[http://www.dot.state.tx.us/business/contractors\\_consultants/repro\\_companies.htm](http://www.dot.state.tx.us/business/contractors_consultants/repro_companies.htm)

Questions may be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:

<https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors>

All contractor questions will be reviewed by the Engineer. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page.

The Letting Pre-Bid Q&A web page for each project can be accessed by using the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.

Request a proposal electronically from the Department's website:

<http://www.txdot.gov/business-cq/pr.htm>

Or use the electronic bidding site:

<http://www.txdot.gov/business/letting-bids/ebs.html>

A bid summation will be available on-line at:

<http://www.txdot.gov/business/bt.html>

**ITEM 3 – AWARD AND EXECUTION**

This Contract includes non-site specific work and as-needed work. The type of work identified in the Contract is for locations that have not yet been determined.

Time charges and work will start on the day stated on the Work Authorization letter. The Contract will be in effect until the work on the last callout is completed.

**ITEM 5 – CONTROL OF WORK**

Arrange the operations so that no consecutive exit or entrance ramps will be closed at the same time, unless directed.

Maintain all operations, including equipment and personnel, within TxDOT right-of-way at all times.

**CONTROL: 6454-87-001**

**COUNTY: EL PASO, ETC.**

**HIGHWAY: IH 10, ETC.**

### **ITEM 7 – LEGAL RELATIONS AND RESPONSIBILITIES**

No significant traffic generator events identified.

Abide by Section 7.2.5. Use of Blue Warning Lights related to vehicle lighting. Vehicles equipped with unauthorized lighting will not be permitted to operate on Department highways.

Do not discharge any liquid pollutant from vehicles onto the roadside. Immediately clean spills and dispose in compliance with local, state, and federal regulations to the satisfaction of the Engineer at no additional cost to the Department.

Occupational Safety & Health Administration (OSHA) regulations prohibit operations that bring people or equipment within 10 ft. of an energized electrical line. Where workers and/or equipment may be close to an energized electrical line, notify the electrical power company and make all necessary adjustments to ensure the safety of workers near the energized line.

Provide notification two weeks prior to beginning of construction to the City of El Paso – Streets and Maintenance Department at [tcp@elpasotexas.gov](mailto:tcp@elpasotexas.gov) when traffic control devices encroach City ROW or traffic control setup impacts City streets.

### **ITEM 8 – PROSECUTION AND PROGRESS**

This project is to be completed in **365** calendar days in accordance with **Section 8.3.1.5, “Calendar Day.”**

Provide enough manpower and equipment to accomplish the required work under this contract during the hours agreed upon by the Contractor and Engineer. Failure to do so will constitute grounds for a Noncompliance Penalty.

Work must start within 72 hours of notification or by the time agreed upon with the Engineer.

A Noncompliance Penalty will be assessed for each instance the Contractor is in noncompliance. A noncompliance instance is defined by any of the following:

1. Contractor fails to begin work at the specified time or location(s);
2. Contractor fails to complete work by the time agreed upon with the Engineer;
3. Contractor does not have all the necessary resources (i.e. personnel, equipment, and material) to fulfill the requirement of the Item(s) called out at the specified time or location(s).
4. Contractor fails to submit proper material documentation for material sources by the time agreed upon with the Engineer.

The Noncompliance Penalty will be deducted from any money due or to become due for any completed Item(s) or work. The Noncompliance Penalty will be assessed as follows: **\$1,000** per instance, per location.

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**SHEET 3A**

**COUNTY: EL PASO**

**HIGHWAY: IH 10, ETC.**

Work activities will be limited to the allowed lane closure times defined as daytime hours of 9 A.M. to 4 P.M. Monday through Friday or nighttime hours of 9 P.M. to 6 A.M. Sunday through Thursday, unless otherwise directed by the Engineer.

### **ITEM 500 – MOBILIZATION**

Mobilization will be paid in accordance with the associated Item based on work performed. This will fully compensate for all associated activities.

### **ITEM 502 – BARRICADES, SIGNS AND TRAFFIC HANDLING**

The Contractor and his employees will wear fluorescent orange safety vests, safety shoes/boots, eye protection and hard hats while outside vehicles within the Department’s right of way and will comply with Item 7.2.4. Public Safety and Convenience, and Item 7.2.6. Barricades, Signs, and Traffic Handling.

The Contractor must have enough manpower and equipment to perform any revised traffic control as directed by the Engineer.

The Contractor may be required to furnish and place additional TMAs, Flaggers, Pilot Cars, or Truck Mounted forward facing arrow boards, not shown on the TCP plan sheets, as directed by the Engineer.

Rumble strips will be required as shown on standard WZ (RS) – **22** when directed by the Engineer and shall be subsidiary to the various bid items.

In addition to providing a Contractor’s Responsible Person and a phone number for emergency contact, have an employee(s) available to respond to emergencies on the project and for taking corrective measures within 30 minutes.

Additional signs and barricades placed as directed, will be considered subsidiary to this Item.

In accordance with Section 7.2.6.1, designate, in writing, a Contractor Responsible Person (CRP) and a CRP alternate to take full responsibility for the set-up, maintenance, and necessary corrective measures of the traffic control plan. The CRP or CRP alternate must be present at site and implement the initial set up of every traffic control phase/stage, at each location, and/or each call out, for the entire duration of the project.

At the written request of the Engineer, immediately remove the CRP or CRP alternate from the project if, in the opinion of the Engineer, is not competent, not present at initial TCP set-ups, or does not perform in a proper, skillful, or safe manner. These individuals shall not be reinstated without written consent of the Engineer.

CRP and CRP alternate must be trained using Department approved training. Provide a copy of the certificate of completion to the Engineer for project records. Refer to Table 1 for Department approved Training.

**Table 1**



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COUNTY: EL PASO, ETC.

HIGHWAY: IH 10, ETC.

**Contractor Responsible Person and Alternate**

| Provider  | Course Number | Course Title  | Duration | Notes  |
|---|---------------|---|----------|--|
| American Traffic Safety Services Association                      | TCS           | Traffic Control Supervisor                                    | 2 days   | ATSSA: (540) 368-1701  |
| National Highway Institute  | 133112        | Design and Operation of Work Zone Traffic Control             | 1 day    | Both courses are required to meet minimum required training. |
|   | 133113        | Work Zone Traffic Control for Maintenance Operations          | 1 day    |  |
| National Highway Institute (NHI)                                  | 133112A       | Design and Operation of Work Zone Traffic Control             | 3 days   | Contact NHI: (877) 558-6873                                  |
| Texas A&M Engineering Extension Service                           | HWS 410       | Contractor's Responsible Person for Temporary Traffic Control | 16 hours | TEEX: (800) 723-3811   |
| University of Texas Arlington Division for Enterprise Development | WKZ421        | Traffic Control Supervisor                                    | 16 hours | Contact UTA for training needs.                              |

All contractor workers involved with the traffic control implementation and maintenance must participate and complete a Department approved training course. Provide a copy of the certificate of completion to the Engineer for project records. Refer to Table 2 for Department approved training.

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COUNTY: EL PASO

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**Table 2**  
**Other Work Zone Personnel**

| Provider  | Course Number | Course Title   | Duration   | Notes  |
|---|---------------|--|------------|--|
| American Traffic Safety Services Association                          | TCT           | Traffic Control Technician                                       | 1 day      |  |
| Texas Engineering Extension Services                                  | HWS002        | Work Zone Traffic Control  | 16 hours   | Identical to HWS-410. Counts for 3 years CRP requirement.        |
| National Highway Institute  | 133116        | Maintenance of Traffic for Technicians                           | 5 hours    | Web based  |
| National Highway Institute  | 134109-I      | Maintenance Training Series: Basics of Work Zone Traffic Control | 1 hour     | Free, Web based  |
| University of Texas at Arlington, Division for Enterprise Development | WKZ100        | Work Zone Safety: Temporary Traffic Control                      | 4 hours    | Note name change. Free, Web based                                |
| TxDOT/AGC Joint Development   | N/A           | Safe Workers Awareness   | 16 minutes | Videos available through AGC of Texas offices. English & Spanish |
|   |               | Highway Construction Work Zone Hazards                           | 18 minutes |  |
| AGC America   | N/A           | Highway Work Zone Safety Training                                | 1 day      |  |
| Texas Engineering Extension Service                                   | HWS400        | Temporary Traffic Control Worker                                 | 4 hours    | Contact TEEX, if interested in course                            |
| TxDOT/AGC Joint Development   | N/A           | Work Zone Fundamentals   | 10 minutes | Videos available through ACT of Texas offices. English & Spanish |

Contractor may choose to train workers involved with the traffic control implementation and maintenance with a contractor developed training in lieu of Department approved training. Contractor developed training must be equivalent to the Department approved training shown in Table 2. Provide the Engineer a copy of the course curriculum for pre-approval, prior to conducting the contractor developed training. Provide the Engineer a copy of the log of attendees after training completion for project records.

SHEET 3B

**CONTROL: 6454-87-001****COUNTY: EL PASO, ETC.****HIGHWAY: IH 10, ETC.**

Notify the Department officials when major traffic changes are to be made, such as detours. Coordinate with the Department on all traffic changes. Advance notification for the following week's work must be made by 5 P.M. on Wednesdays.

Any approved change to the sequence of work or TCP, must be signed and sealed by a Contractor's Licensed Professional Engineer assuming full responsibility for any additional barricade signs and devices needed.

Use flashing arrow boards on all tapers for each lane closure.

Some signs, barricades, and channelization devices may not be shown at the precise or measured position. Place the barricades, devices, or signs, with approval, in positions to meet field conditions.

Remove signs that do not apply to current conditions at the end of each day's work.

Contractor to use sign IM 1-1, "INCIDENT AHEAD", for lane closures regarding incidents.

#### **Safety Contingency**

The contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancement, to improve the effectiveness of the TCP that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

#### **ITEM 512 – PORTABLE CONCRETE TRAFFIC BARRIER (PCTB)**

Portable Concrete Traffic Barrier (PCTB) will be provided by the Department. The PCTB will remain property of the Department upon termination for its need. Provide necessary joint connections, as needed, or as directed, subsidiary to this item. Connections will become property of the Department.

Coordinate with the Engineer in advance to schedule pick-up of PCTB from the designated Department stockpile location to transport to the project. Upon completion of its use, disassemble, deliver, and neatly stack PCTB at the designated Department stockpile location, or as directed. The work performed will not be measured or paid for directly but will be subsidiary to pertinent bid items.

This Item will be paid per linear feet if supplied within a 20 mile radius of any PCTB locations in accordance with Item 512.5., "Payment," Sections 5.1, 5.2, and 5.4.

If this Item is used outside of the 20 mile radius of any PCTB location, additional payment will be made in accordance with Article 9.7, "Payment for Extra Work and Force Account Method."

**Table 3** is for clarification on how and what will be paid as part of this work.

**CONTROL: 6454-87-001****COUNTY: EL PASO****HIGHWAY: IH 10, ETC.****SHEET 3C**

**Table 3**  
**Types of Payments**

| <b><u>Within a 20 mile radius of any PCTB location</u></b> | <b><u>Outside of a 20 mile radius of any PCTB location</u></b>                                  |
|--|---|
| Payment per linear feet of PCTB                            | Payment by linear feet of PCTB and payment for extra hauling distance by a force account method |

Clean and/or surface treat any section of the PCTB furnished by the Department or by the Contractor before use, as directed, and will be subsidiary to this pay item. Surface treatment shall be Concrete Paint (match concrete gray color# 35630 with the Federal Standard 595C color swatch) as per Item 427.2.1.1.

#### **ITEM 545 – CRASH CUSHION ATTENUATORS**

The contractor must have an additional crush cushion attenuator on standby at all times, any damaged crash cushion attenuator must be replaced within 7 days.

#### **ITEM 6158 – TRAILER MOUNTED SOLAR POWERED RADAR SPEED CONTROL MONITOR**

Provide units meeting or exceeding this special specification. Contractor is cautioned to read the specification carefully, as there may be special requirements not commonly offered by the equipment manufacturer. The following is a list of models that meet this special specification:

- Kustom Signal, SMART Model II
- McCoy's Law Line, Speedtrak SST
- MPH Speed Monitor, Speed Advisory Trailer
- Might Mover Trailers
- Or TxDOT approved equal

#### **ITEM 6185 – TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA)**

The contractor will be responsible for determining if one or more operations will be ongoing at the same time to determine the total number of TMAs needed for the project. TMAs will be used and positioned per the applicable Traffic Control Plan standard or as directed by the Engineer. Additional TMAs required by the Engineer will be provided by the contractor.

All Truck Mounted Attenuator (TMA) Operators must participate in a TMA workshop to be conducted by the El Paso District Safety Office, on the proper use of TMAs, prior to working on Department Right of Way (ROW). A certificate of completion will be issued to TMA Operators

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that successfully complete the TMA workshop. The certificate of completion must be carried by TMA Operators at all times while working on Department ROW.

Acquire the TCP and TMA Operator's certificates of completion prior to the authorization to begin work. No time suspension will be granted and no traffic control work will be allowed without certificates of completion.

The supporting vehicle for the TMA shall have a minimum gross (i.e. ballasted) vehicular weight of 19,000 pounds.

**ITEM 7148 – LANE CLOSURES**

Time charges begin when the contractor arrives at the location and time as directed by the Engineer. Time charges end when the last traffic control device is removed from the roadway.

The Department will notify the Contractor in advance of any conflicting scheduled lane closures for roadway routine maintenance or repair. Lane closures identified by the Department as emergencies shall be accomplished within one hour from verbal notification.

The closure of turn bays will be required to properly control traffic during closures, this work will be considered subsidiary to pertinent items.

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**HIGHWAY: IH 10, ETC.**

**SHEET 3D**



CONTROLLING PROJECT ID 6454-87-001

DISTRICT El Paso  
HIGHWAY IH0010

COUNTY El Paso

# Estimate & Quantity Sheet

| CONTROL SECTION JOB |           |  |      | 6454-87-001 |       | TOTAL EST. | TOTAL FINAL |
|---------------------|-----------|--|------|-------------|-------|------------|-------------|
| PROJECT ID          |           |  |      | A00203666   |       |            |             |
| COUNTY              |           |  |      | El Paso     |       |            |             |
| HIGHWAY             |           |  |      | IH0010      |       |            |             |
| ALT                 | BID CODE  | DESCRIPTION                            | UNIT | EST.        | FINAL |            |             |
|                     | 500-6001  | MOBILIZATION                           | LS   | 1.000       |       | 1.000      |             |
|                     | 512-6061  | PORT CONC TRAF BAR (STKPL,INSTL&RETRN) | LF   | 200.000     |       | 200.000    |             |
|                     | 545-6002  | CRASH CUSH ATTEN (DES SOURCE)          | EA   | 2.000       |       | 2.000      |             |
|                     | 545-6004  | CRASH CUSH ATTEN (STKPL)               | EA   | 2.000       |       | 2.000      |             |
|                     | 545-6019  | CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)    | EA   | 2.000       |       | 2.000      |             |
|                     | 6001-6001 | PORTABLE CHANGEABLE MESSAGE SIGN       | DAY  | 20.000      |       | 20.000     |             |
|                     | 6158-6001 | TMSP RADAR SPEED CONTROL MONITOR       | EA   | 2.000       |       | 2.000      |             |
|                     | 6185-6002 | TMA (STATIONARY)                       | DAY  | 100.000     |       | 100.000    |             |
|                     | 6185-6003 | TMA (MOBILE OPERATION)                 | HR   | 8,000.000   |       | 8,000.000  |             |
|                     | 7148-6001 | 1 LN CLOSURE 2 LN RD NO SHOULDERS      | HR   | 400.000     |       | 400.000    |             |
|                     | 7148-6002 | 1 LN CLOSURE 2 LN RD PAVED SHOULDERS   | HR   | 25.000      |       | 25.000     |             |
|                     | 7148-6003 | 1 LN CLOSURE 4 LN RD                   | HR   | 50.000      |       | 50.000     |             |
|                     | 7148-6004 | 2 LN CLOSURE 4 LN RD                   | HR   | 100.000     |       | 100.000    |             |
|                     | 7148-6005 | FREEWAY 1 LANE CLOSURE                 | HR   | 175.000     |       | 175.000    |             |
|                     | 7148-6006 | FREEWAY 2 LANE CLOSURE                 | HR   | 15.000      |       | 15.000     |             |
|                     | 7148-6007 | FREEWAY 3 LANE CLOSURE                 | HR   | 10.000      |       | 10.000     |             |
|                     | 7148-6009 | EXIT OR ENTRANCE RAMP CLOSURE          | HR   | 100.000     |       | 100.000    |             |
|                     | 7148-6010 | FREEWAY CLOSURE SEQUENCE DAYTIME ONLY  | HR   | 10.000      |       | 10.000     |             |
|                     | 7148-6011 | COMPLETE FREEWAY CLOSURE               | HR   | 50.000      |       | 50.000     |             |
|                     | 7148-6012 | ONE LANE FRONTAGE ROAD CLOSURE         | HR   | 480.000     |       | 480.000    |             |
|                     | 7148-6013 | TWO LANE FRONTAGE ROAD CLOSURE         | HR   | 300.000     |       | 300.000    |             |
|                     | 7148-6014 | ONE LANE CONNECTING RAMP CLOSURE       | HR   | 15.000      |       | 15.000     |             |
|                     | 7148-6015 | TWO LANE CONNECTING RAMP CLOSURE       | HR   | 10.000      |       | 10.000     |             |
|                     | 7148-6016 | WORK AREA ON SHOULDER                  | HR   | 450.000     |       | 450.000    |             |
|                     | 7148-6017 | TURN AROUND CLOSURE                    | HR   | 80.000      |       | 80.000     |             |
|                     | 7148-6019 | FURNISH ADDITIONAL FLAGGER             | HR   | 25.000      |       | 25.000     |             |
|                     | 7148-6020 | PILOT VEHICLE AND OPERATOR             | HR   | 10.000      |       | 10.000     |             |
|                     | 7148-6021 | FURNISH ADDITIONAL ARROW BOARD         | HR   | 30.000      |       | 30.000     |             |

**BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:**

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.
11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.
12. The Engineer has the final decision on the location of all traffic control devices.
13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

**WORKER SAFETY NOTES:**

1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.
2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

**COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES**


1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.
2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

|  |
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| <p><b>THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT</b><br/> <a href="http://www.txdot.gov">http://www.txdot.gov</a></p> |
| COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)  |
| DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)   |
| MATERIAL PRODUCER LIST (MPL)   |
| ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"   |
| STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)   |
| TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)   |
| TRAFFIC ENGINEERING STANDARD SHEETS  |

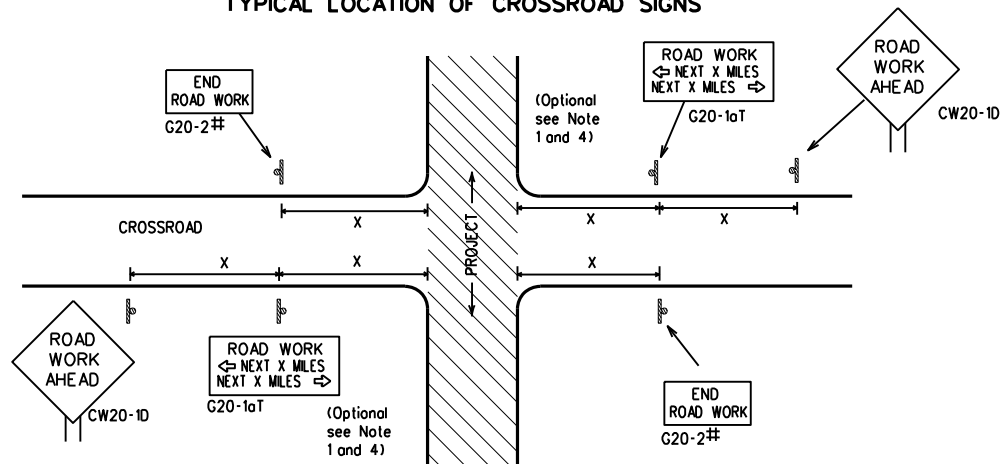
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SHEET 1 OF 12

|  |                      |   |
|--|----------------------|---|
| <br>Texas Department of Transportation              |                      | Traffic<br>Safety<br>Division<br>Standard |
| <p><b>BARRICADE AND CONSTRUCTION<br/>                 GENERAL NOTES<br/>                 AND REQUIREMENTS</b></p> <p><b>BC(1)-21</b></p> |                      |   |
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| 4-03 7-13  | HIGHWAY: IH 10, ETC. |   |
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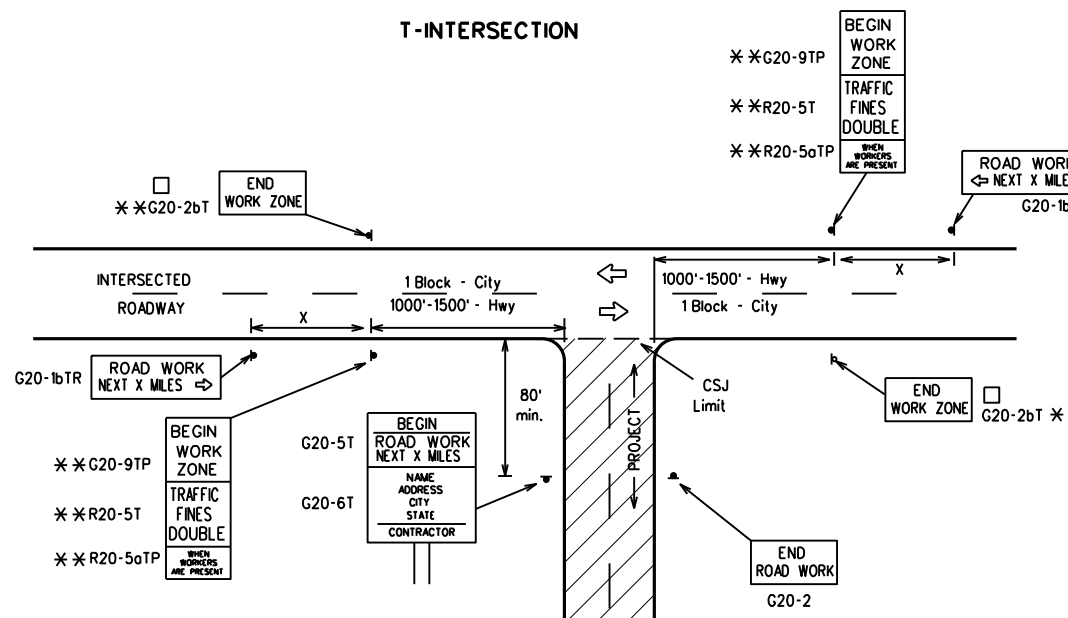
TYPICAL LOCATION OF CROSSROAD SIGNS



# May be mounted on back of "ROAD WORK AHEAD" (CW20-1D) sign with approval of Engineer. (See note 2 below)

- The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D) sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
- The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK" (G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
- Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
- The "ROAD WORK NEXT X MILES" (G20-1aT) sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
- Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
- When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

- The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
- If construction closes the road at a T-intersection, the Contractor shall place the "CONTRACTOR NAME" (G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow (G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR) signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING

| Sign Number or Series                 | SIZE              |                    | SPACING          |                                  |
|---------------------------------------|-------------------|--------------------|------------------|----------------------------------|
|                                       | Conventional Road | Expressway/Freeway | Posted Speed MPH | Sign * Spacing "X" Feet (Apprx.) |
| CW20 <sup>4</sup>                     | 48" x 48"         | 48" x 48"          | 30               | 120                              |
| CW21                                  |                   |                    | 35               | 160                              |
| CW23                                  |                   |                    | 40               | 240                              |
| CW25                                  | 36" x 36"         | 48" x 48"          | 45               | 320                              |
| CW1, CW2, CW7, CW8, CW9, CW11, CW14   |                   |                    | 50               | 400                              |
| CW3, CW4, CW5, CW6, CW8-3, CW10, CW12 |                   |                    | 55               | 500 <sup>2</sup>                 |
|                                       |                   |                    | 60               | 600 <sup>2</sup>                 |
|                                       |                   |                    | 65               | 700 <sup>2</sup>                 |
|                                       | 70                | 800 <sup>2</sup>   |                  |                                  |
|                                       | 75                | 900 <sup>2</sup>   |                  |                                  |
|                                       | 80                | 1000 <sup>2</sup>  |                  |                                  |
| *                                     |                   |                    | *                | * <sup>3</sup>                   |

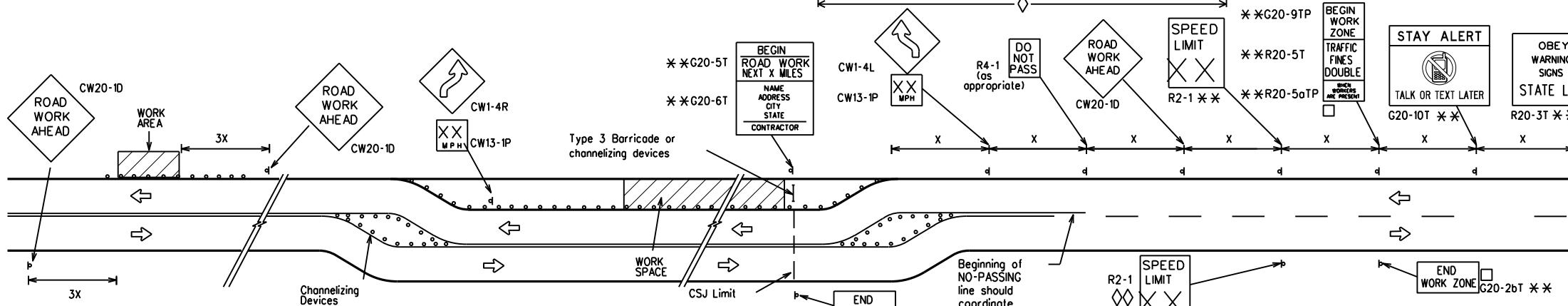
\* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

\* Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

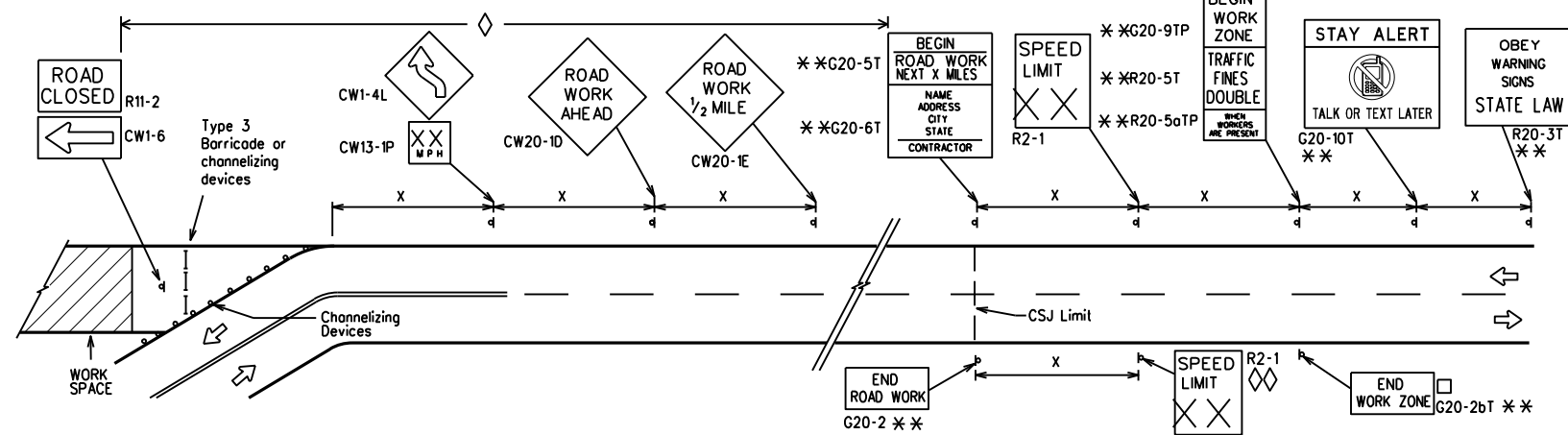
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
- Only diamond shaped warning sign sizes are indicated.
- See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

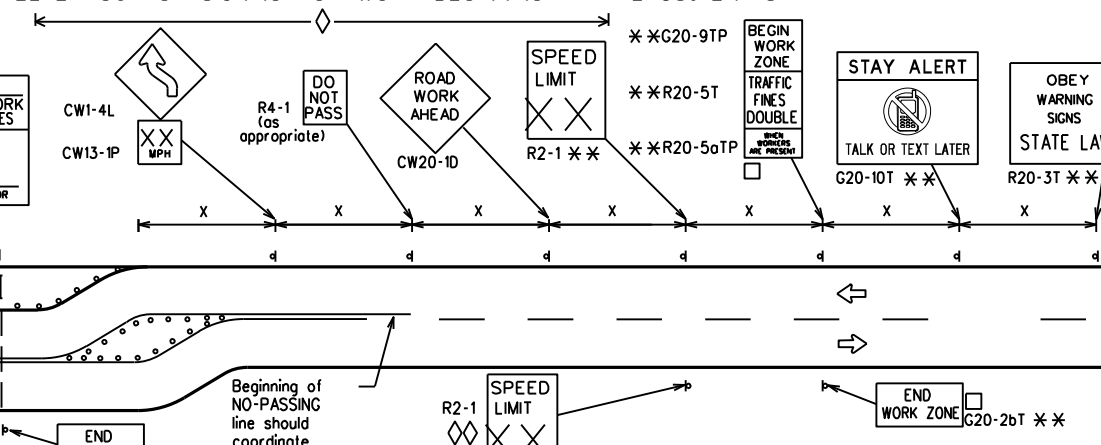


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

- The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
- CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.
- Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
- Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND

|       |   |
|-------|---|
| —     | Type 3 Barricade  |
| ○ ○ ○ | Channelizing Devices  |
| ■     | Sign  |
| X     | See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements. |

SHEET 2 OF 12



BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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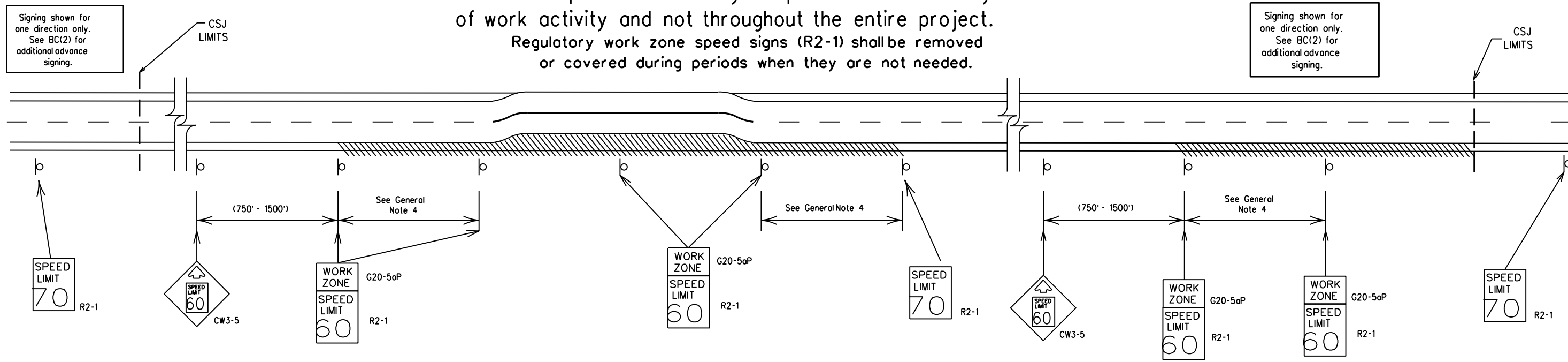
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# TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



## GUIDANCE FOR USE:

### LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present.

Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

- a) rough road or damaged pavement surface
- b) substantial alteration of roadway geometrics (diversions)
- c) construction detours
- d) grade
- e) width
- f) other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

### SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the traveled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered. (See Removing or Covering on BC(4)).

## GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
  - 40 mph and greater 0.2 to 2 miles
  - 35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the "ADVANCE SPEED LIMIT" (CW3-5) sign, "WORK ZONE" (G20-5aP) plaque and the "SPEED LIMIT" (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
  - A. Low enforcement.
  - B. Flagger stationed next to sign.
  - C. Portable changeable message sign (PCMS).
  - D. Low-power (drone) radar transmitter.
  - E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form \*1204 in the TxDOT e-form system.

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SHEET 3 OF 12

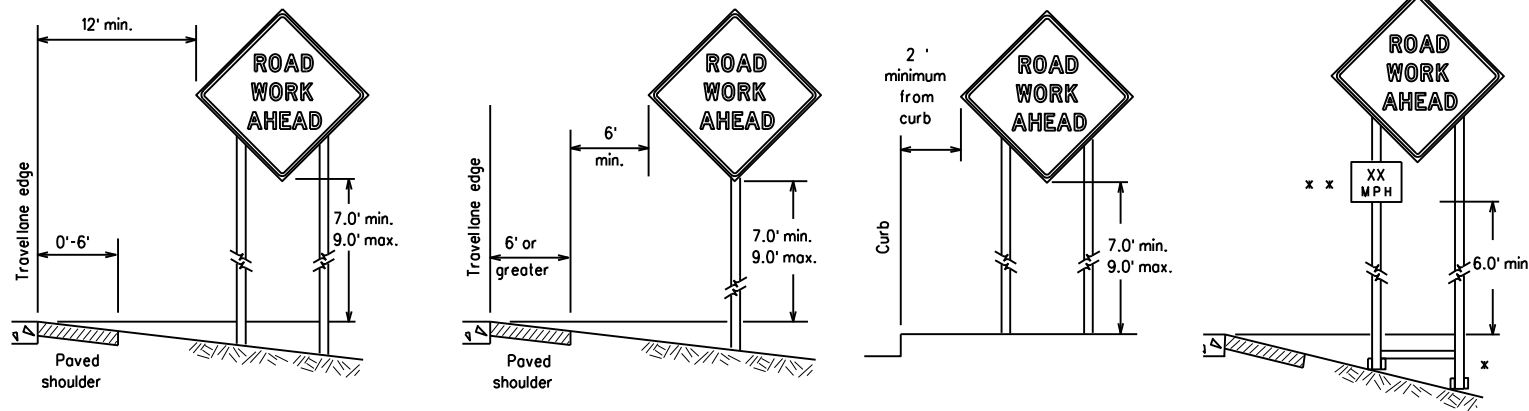


## BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

### BC(3)-21

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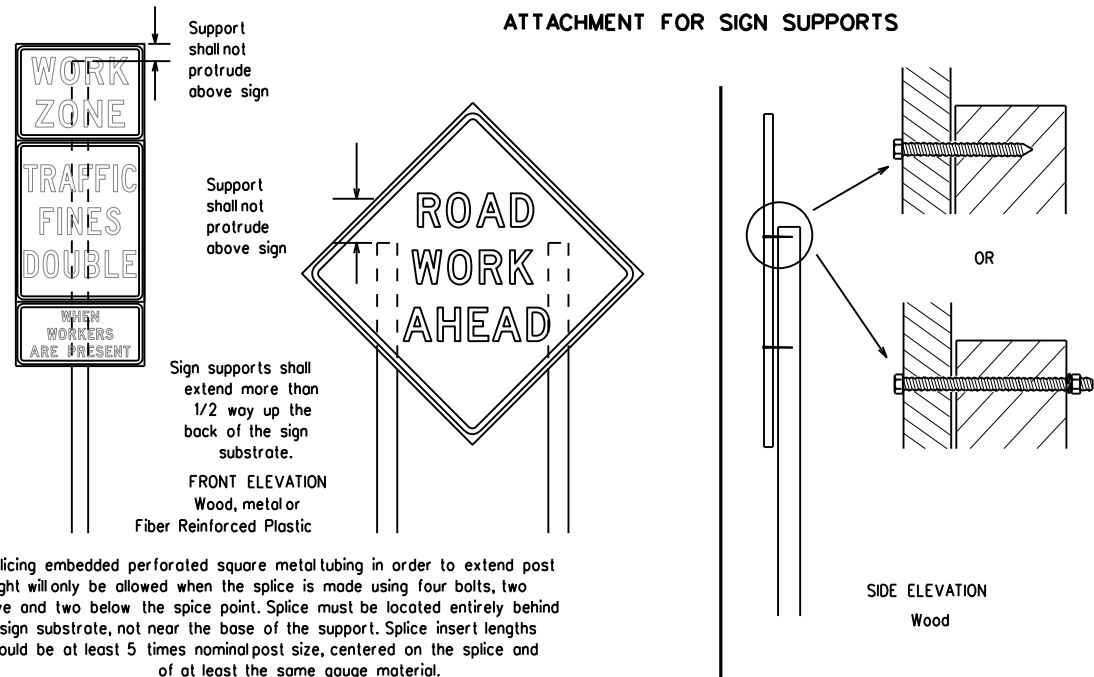
**TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS**



x When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

x x When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

**ATTACHMENT FOR SIGN SUPPORTS**



Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the splice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

**GENERAL NOTES FOR WORK ZONE SIGNS**

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
- The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
- The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets. The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
- The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
- Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
- The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

**DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)**

- The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
  - Long-term stationary - work that occupies a location more than 3 days.
  - Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
  - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
  - Short, duration - work that occupies a location up to 1 hour.
  - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

**SIGN MOUNTING HEIGHT**

- The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
- The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
- Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
- Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
- Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

**SIZE OF SIGNS**

- The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

**SIGN SUBSTRATES**

- The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

**REFLECTIVE SHEETING**

- All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
- Orange sheeting, meeting the requirements of DMS-8300 Type B or Type C, shall be used for rigid signs with orange backgrounds.

**SIGN LETTERS**

- All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

**REMOVING OR COVERING**

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
- Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
- When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
- Burlap shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

**SIGN SUPPORT WEIGHTS**

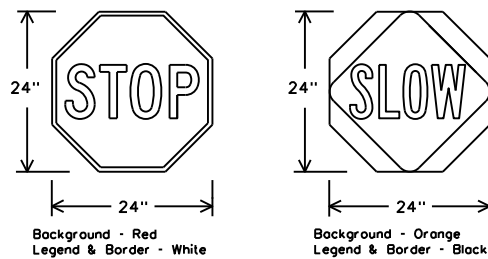
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
- Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
- Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
- Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

**FLAGS ON SIGNS**

- Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

**STOP/SLOW PADDLES**

- STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
- STOP/SLOW paddles shall be retroreflectized when used at night.
- STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
- Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



| SHEETING REQUIREMENTS (WHEN USED AT NIGHT) |        |  |
|--|--------|--|
| USAGE                                      | COLOR  | SIGN FACE MATERIAL                               |
| BACKGROUND                                 | RED    | TYPE B OR C SHEETING                             |
| BACKGROUND                                 | ORANGE | TYPE B <sub>FL</sub> OR C <sub>FL</sub> SHEETING |
| LEGEND & BORDER                            | WHITE  | TYPE B OR C SHEETING                             |
| LEGEND & BORDER                            | BLACK  | ACRYLIC NON-REFLECTIVE FILM                      |

**CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS**

- Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
- When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
- If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
- Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

Texas Department of Transportation  
Traffic Safety Division Standard

**BARRICADE AND CONSTRUCTION  
TEMPORARY SIGN NOTES**

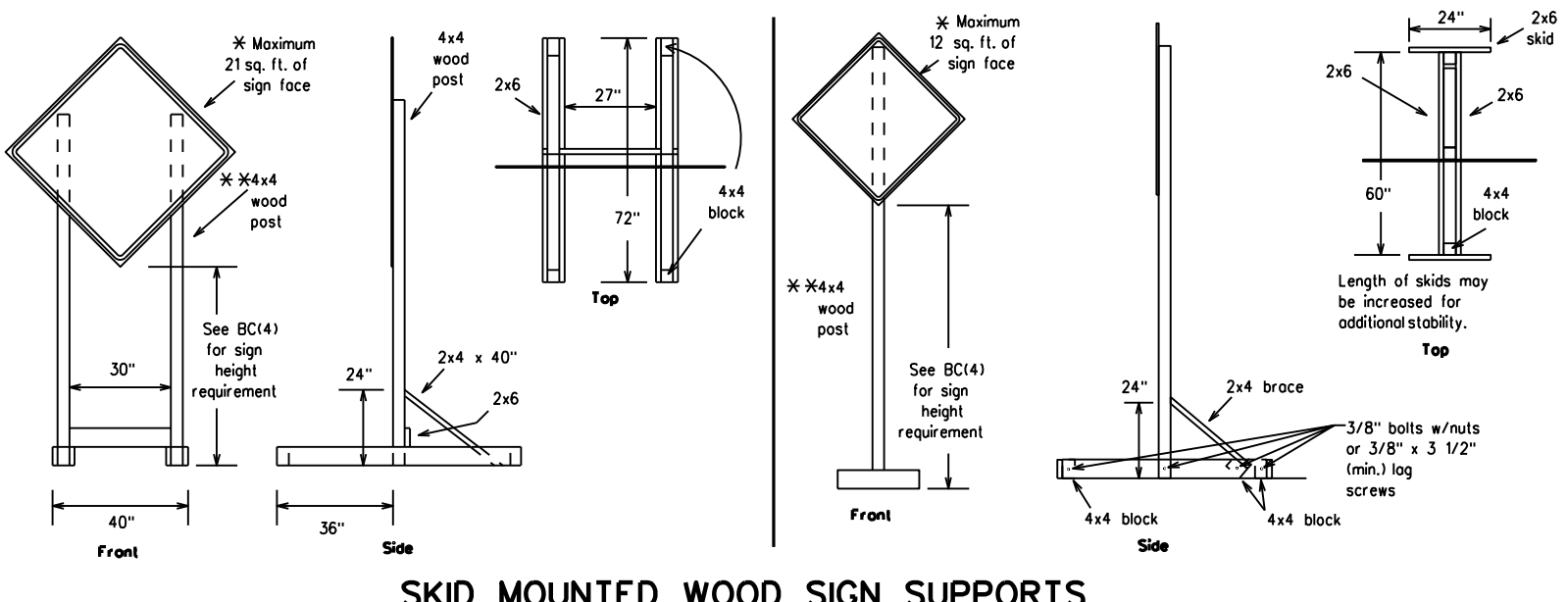
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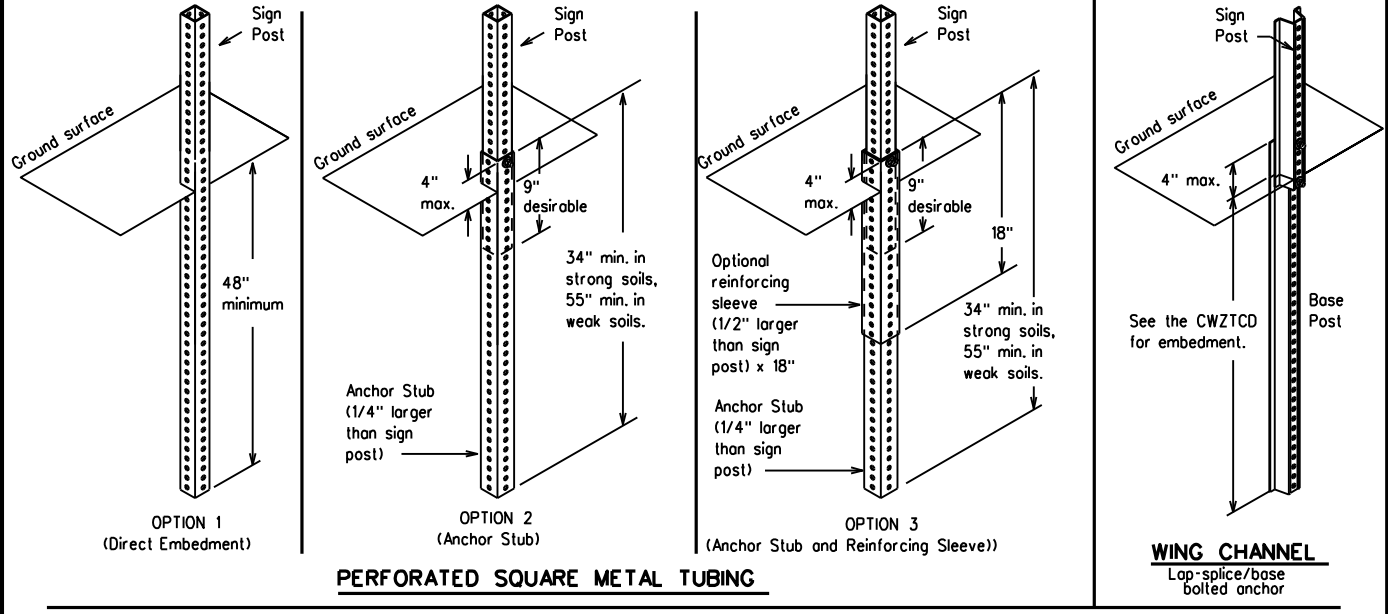
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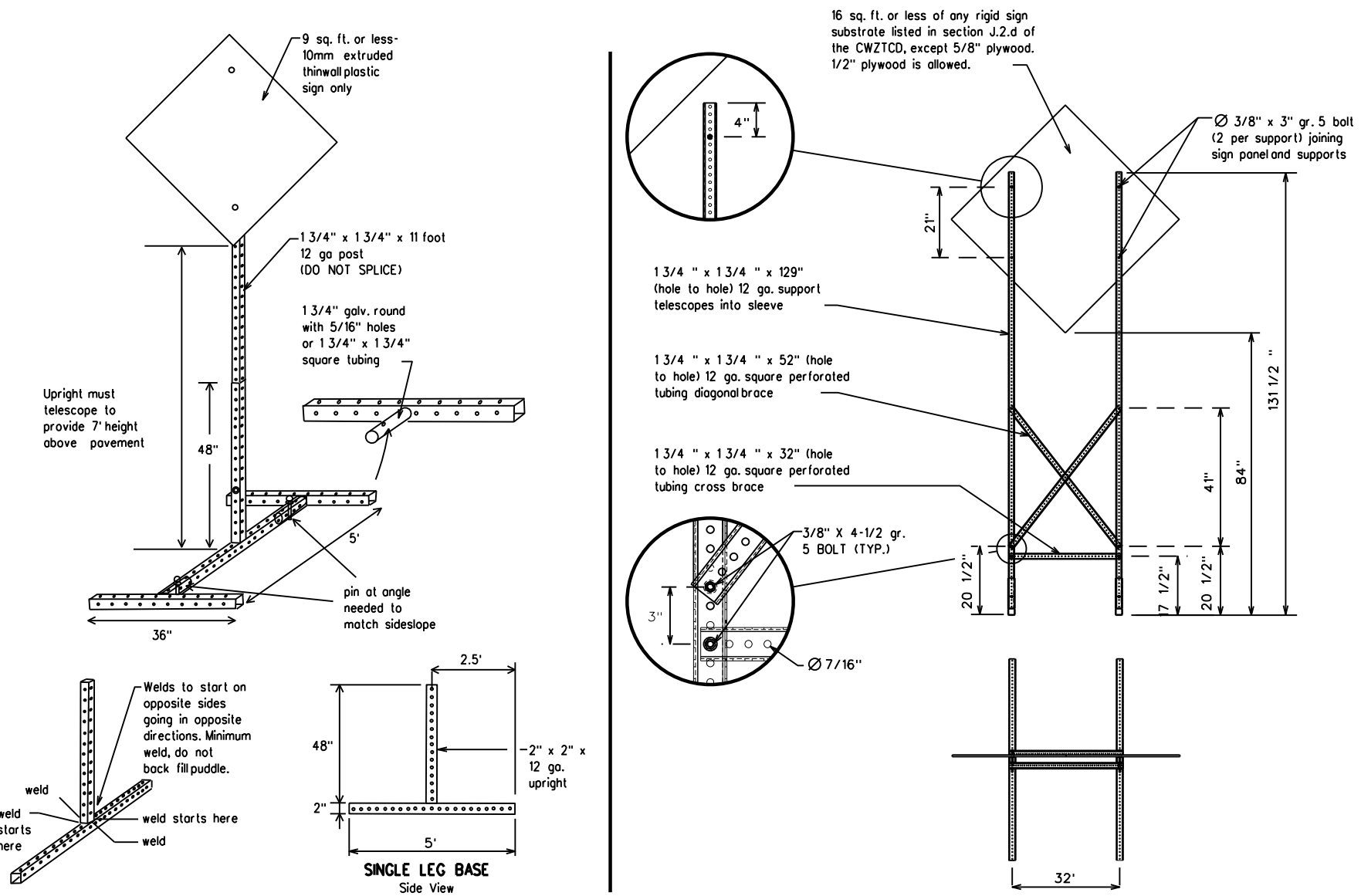
**SKID MOUNTED WOOD SIGN SUPPORTS**

\* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS



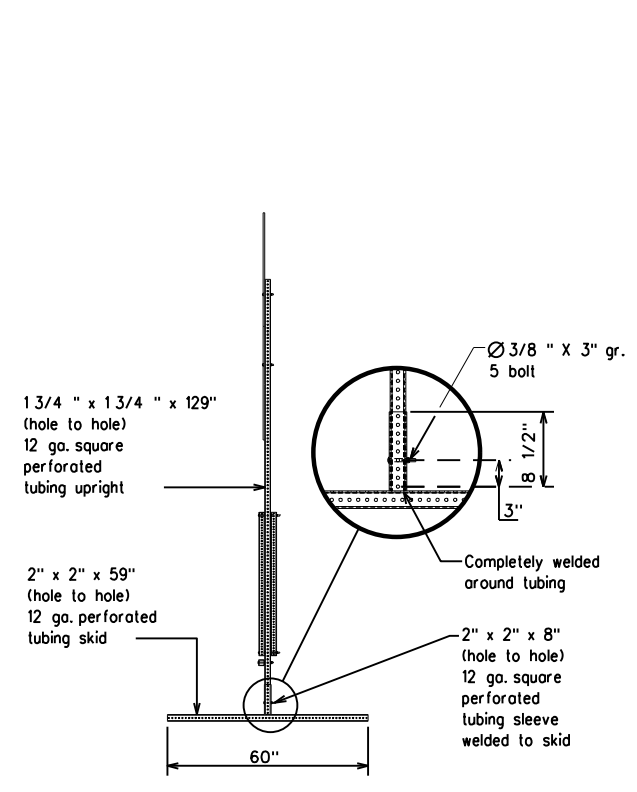
**GROUND MOUNTED SIGN SUPPORTS**

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support. The maximum sign square footage shall adhere to the manufacturer's recommendation. Two post installations can be used for larger signs.



**SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS**

\* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS



**WEDGE ANCHORS**

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

**OTHER DESIGNS**

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

**GENERAL NOTES**

- Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
  - No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
  - When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.
- \* See BC(4) for definition of "Work Duration."
  - \*\* Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
  - See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12



**BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT**

**BC(5)-21**

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

**PORTABLE CHANGEABLE MESSAGE SIGNS**

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
- Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
- The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
- PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
- Each line of text should be centered on the message board rather than left or right justified.
- If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

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| WORD OR PHRASE         | ABBREVIATION | WORD OR PHRASE | ABBREVIATION |
|------------------------|--------------|----------------|--------------|
| Access Road            | ACCS RD      | Major          | MAJ          |
| Alternate              | ALT          | Miles          | MI           |
| Avenue                 | AVE          | Miles Per Hour | MPH          |
| Best Route             | BEST RTE     | Minor          | MNR          |
| Boulevard              | BLVD         | Monday         | MON          |
| Bridge                 | BRDG         | Normal         | NORM         |
| Canot                  | CANT         | North          | N            |
| Center                 | CTR          | Northbound     | (route) N    |
| Construction Ahead     | CONST AHD    | Parking        | PKING        |
| CROSSING               | XING         | Road           | RD           |
| Detour Route           | DETOUR RTE   | Right Lane     | RT LN        |
| Do Not                 | DONT         | Saturday       | SAT          |
| East                   | E            | Service Road   | SERV RD      |
| Eastbound              | (route) E    | Shoulder       | SHLDR        |
| Emergency              | EMER         | Slippery       | SLIP         |
| Emergency Vehicle      | EMER VEH     | South          | S            |
| Entrance, Enter        | ENT          | Southbound     | (route) S    |
| Express Lane           | EXP LN       | Speed          | SPD          |
| Expressway             | EXPWY        | Street         | ST           |
| XXXX Feet              | XXXX FT      | Sunday         | SUN          |
| Fog Ahead              | FOG AHD      | Telephone      | PHONE        |
| Freeway                | FRWY, FWY    | Temporary      | TEMP         |
| Freeway Blocked        | FWY BLKD     | Thursday       | THURS        |
| Friday                 | FRI          | To Downtown    | TO DWNTN     |
| Hazardous Driving      | HAZ DRIVING  | Traffic        | TRAF         |
| Hazardous Material     | HAZMAT       | Travelers      | TRVLR        |
| High Occupancy Vehicle | HOV          | Tuesday        | TUES         |
| Highway                | HWY          | Time Minutes   | TIME MIN     |
| Hour(s)                | HR, HRS      | Upper Level    | UPR LEVEL    |
| Information            | INFO         | Vehicles (s)   | VEH, VEHS    |
| It Is                  | ITS          | Warning        | WARN         |
| Junction               | JCT          | Wednesday      | WED          |
| Left                   | LFT          | Weight Limit   | WT LIMIT     |
| Left Lane              | LFT LN       | West           | W            |
| Lane Closed            | LN CLOSED    | Westbound      | (route) W    |
| Lower Level            | LWR LEVEL    | Wet Pavement   | WET PVMT     |
| Maintenance            | MAINT        | Will Not       | WONT         |

Roadway designation • IH-number, US-number, SH-number, FM-number

**RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES**

(The Engineer may approve other messages not specifically covered here.)

**Phase 1: Condition Lists**

Road/Lane/Ramp Closure List

|                       |
|-----------------------|
| FREEWAY CLOSED X MILE |
| ROAD CLOSED AT SH XXX |
| ROAD CLSD AT FM XXXX  |
| RIGHT X LANES CLOSED  |
| CENTER LANE CLOSED    |
| NIGHT LANE CLOSURES   |
| VARIOUS LANES CLOSED  |
| EXIT CLOSED           |
| MALL DRIVEWAY CLOSED  |
| XXXXXXXX BLVD CLOSED  |

Other Condition List

|                          |
|--------------------------|
| FRONTAGE ROAD CLOSED     |
| SHOULDER CLOSED XXX FT   |
| RIGHT LN CLOSED XXX FT   |
| RIGHT X LANES OPEN       |
| DAYTIME LANE CLOSURES    |
| I-XX SOUTH EXIT CLOSED   |
| EXIT XXX CLOSED X MILE   |
| RIGHT LN TO BE CLOSED    |
| X LANES CLOSED TUE - FRI |

\* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

**Phase 2: Possible Component Lists**

Action to Take/Effect on Travel List

|                      |
|----------------------|
| MERGE RIGHT          |
| DETOUR NEXT X EXITS  |
| USE EXIT XXX         |
| STAY ON US XXX SOUTH |
| TRUCKS USE US XXX N  |
| WATCH FOR TRUCKS     |
| EXPECT DELAYS        |
| REDUCE SPEED XXX FT  |
| USE OTHER ROUTES     |
| STAY IN LANE         |

Location List

|                          |
|--------------------------|
| AT FM XXXX               |
| BEFORE RAILROAD CROSSING |
| NEXT X MILES             |
| PAST US XXX EXIT         |
| XXXXXXXX TO XXXXXXX      |
| US XXX TO FM XXXX        |

Warning List

|                       |
|-----------------------|
| SPEED LIMIT XX MPH    |
| MAXIMUM SPEED XX MPH  |
| MINIMUM SPEED XX MPH  |
| ADVISORY SPEED XX MPH |
| RIGHT LANE EXIT       |
| USE CAUTION           |
| DRIVE SAFELY          |
| DRIVE WITH CARE       |

\* \* Advance Notice List

|                       |
|-----------------------|
| TUE-FRI XX AM-X PM    |
| APR XX-XX X PM-X AM   |
| BEGINS MONDAY         |
| BEGINS MAY XX         |
| MAY X-X XX PM - XX AM |
| NEXT FRI-SUN          |
| XX AM TO XX PM        |
| NEXT TUE AUG XX       |
| TONIGHT XX PM-XX AM   |

\* \* See Application Guidelines Note 6.

**APPLICATION GUIDELINES**

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
- For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

**WORDING ALTERNATIVES**

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

**FULL MATRIX PCMS SIGNS**

- When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
- When symbols/signs, such as the "Flagger Symbol"(CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
- When symbols/signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
- A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.



**BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)**

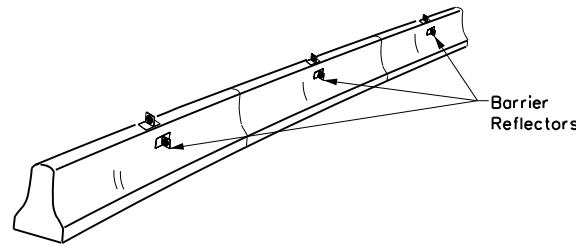
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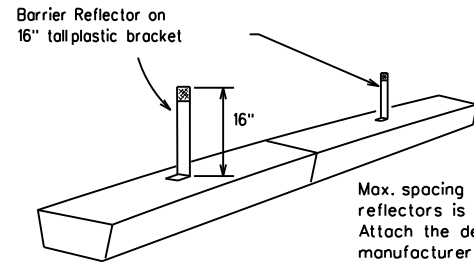


- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



**CONCRETE TRAFFIC BARRIER (CTB)**

- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
- Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional) while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.



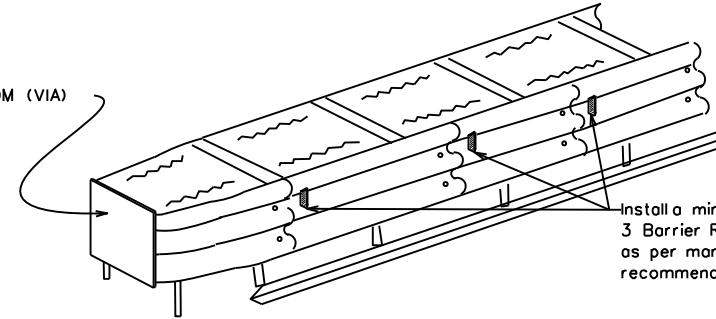
**LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES**

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

**LOW PROFILE CONCRETE BARRIER (LPCB)**

See D & OM (VIA)



**DELINEATION OF END TREATMENTS**

**END TREATMENTS FOR CTB'S USED IN WORK ZONES**

End treatments used on CTB's in work zones shall meet the appropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

**BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS**

**WARNING LIGHTS**

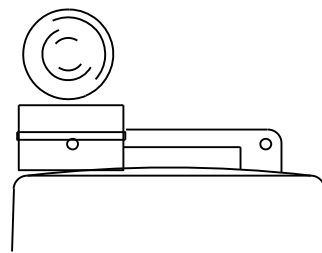
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B or C sheeting, meeting the requirements of Departmental Material Specification DMS-8300.
- Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
- When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

**WARNING LIGHTS MOUNTED ON PLASTIC DRUMS**

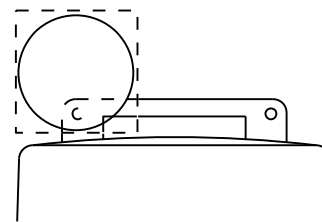
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
- Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

**WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS**

- A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
- The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
- The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.



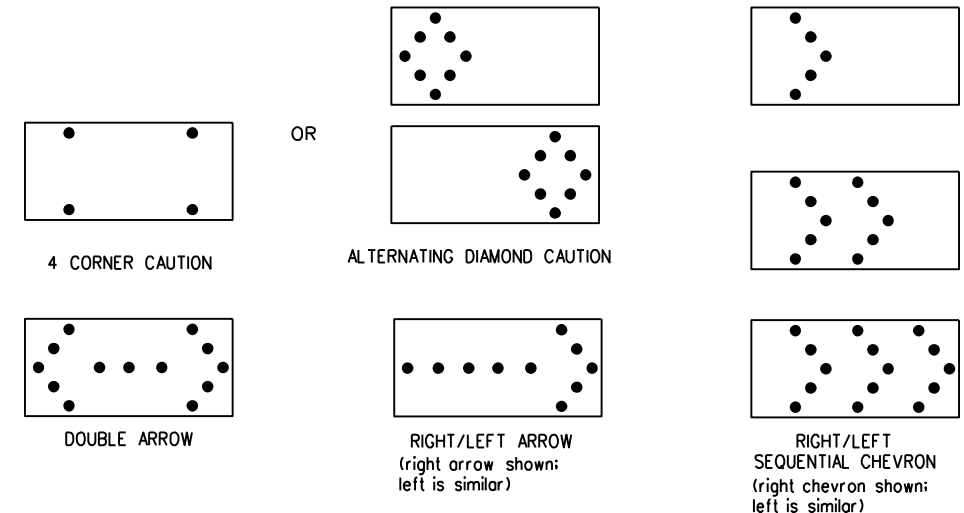
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

- The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
- Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
- The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
- The Flashing Arrow Board should be able to display the following symbols:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
- Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
- Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

| REQUIREMENTS |              |                               |                             |
|--------------|--------------|-------------------------------|-----------------------------|
| TYPE         | MINIMUM SIZE | MINIMUM NUMBER OF PANEL LAMPS | MINIMUM VISIBILITY DISTANCE |
| B            | 30 x 60      | 13                            | 3/4 mile                    |
| C            | 48 x 96      | 15                            | 1 mile                      |

**ATTENTION**  
Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

**FLASHING ARROW BOARDS**

SHEET 7 OF 12

**TRUCK-MOUNTED ATTENUATORS**

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
- The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.



**BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR**

**BC(7)-21**

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**GENERAL NOTES**

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
- For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
- Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
- The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

**GENERAL DESIGN REQUIREMENTS**

Pre-qualified plastic drums shall meet the following requirements:

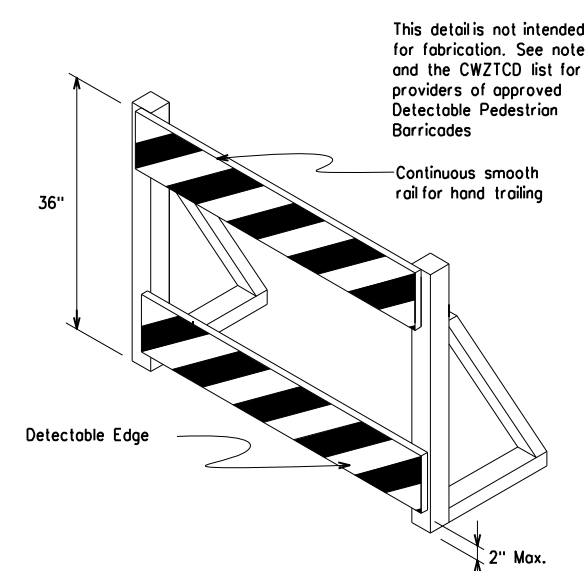
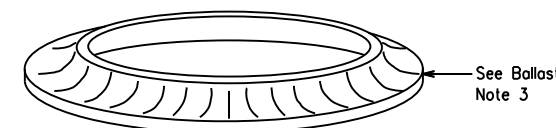
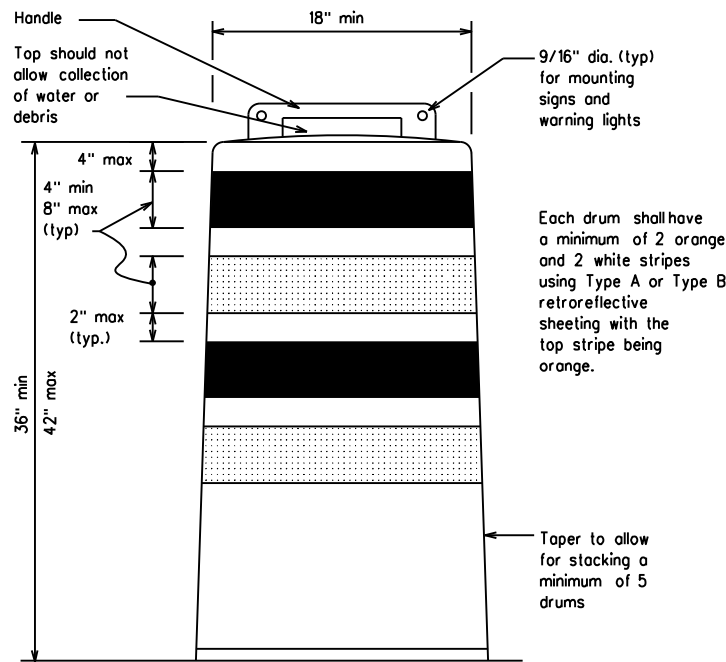
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
- Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
- Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
- The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
- The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectORIZED space between any two adjacent stripes shall not exceed 2 inches in width.
- Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
- Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- Drum body shall have a maximum unballasted weight of 11 lbs.
- Drum and base shall be marked with manufacturer's name and model number.

**RETROREFLECTIVE SHEETING**

- The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
- The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

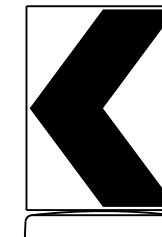
**BALLAST**

- Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
- Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
- Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
- The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
- When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
- Ballast shall not be placed on top of drums.
- Adhesives may be used to secure base of drums to pavement.

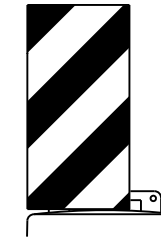


**DETECTABLE PEDESTRIAN BARRICADES**

- When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
- Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
- Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
- Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
- Warning lights shall not be attached to detectable pedestrian barricades.
- Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign  
(Maximum Sign Dimension)  
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24" Vertical Panel  
mount with diagonals sloping down towards travel way

**Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums**

**SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS**

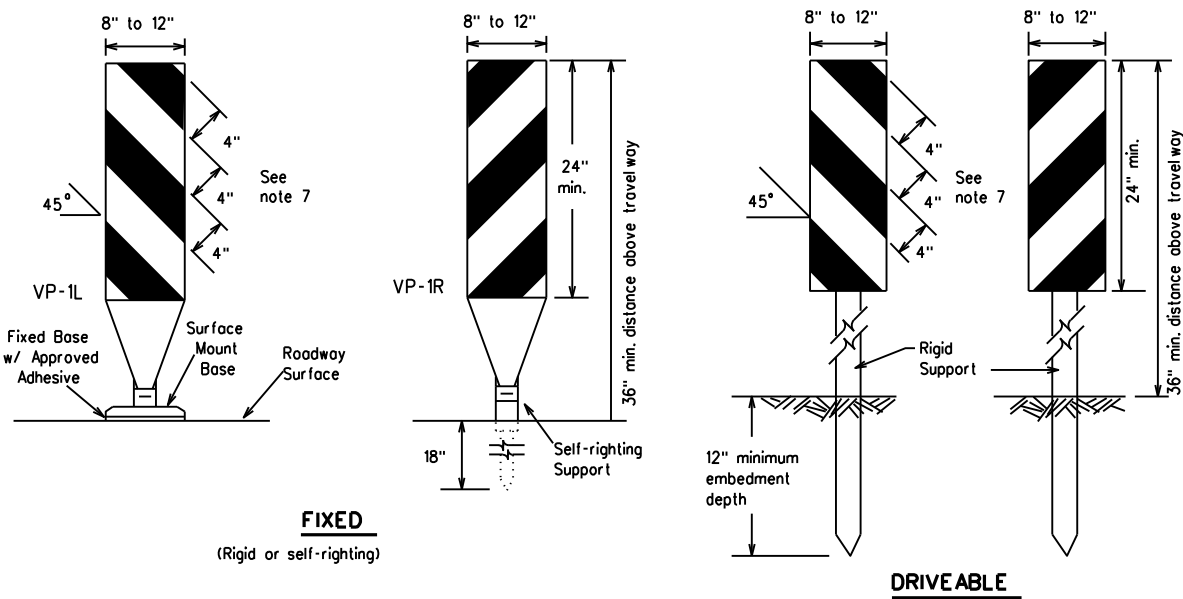
- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- Chevrons and other work zone signs with an orange background shall be manufactured with Type B or Type C Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
- Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
- Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
- Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
- Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
- Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
- R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

|  |                     |            |               |
|--|---------------------|------------|---------------|
|  |                     |            |               |
| <p><b>BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES</b></p> <p><b>BC(8)-21</b></p> |                     |            |               |
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|  |                     | COUNTY:    |               |
|  |                     | SHEET NO.: | 12            |



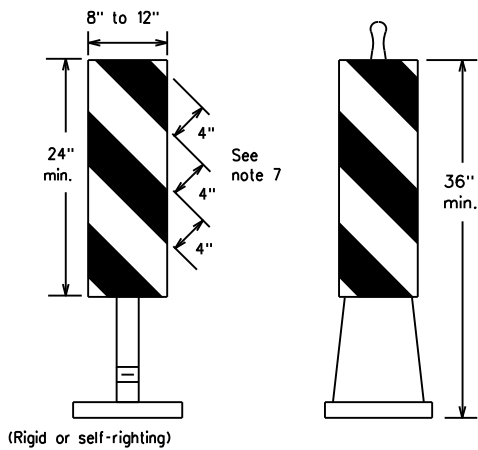
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**FIXED**  
(Rigid or self-righting)

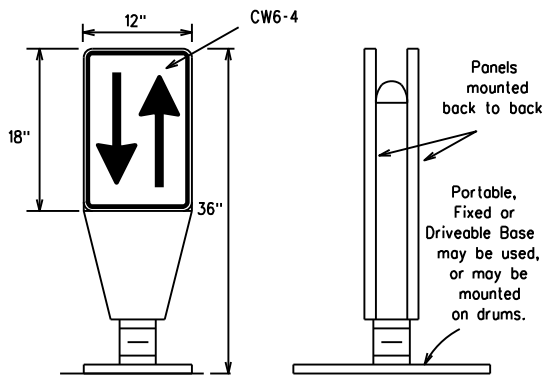
**DRIVEABLE**



**PORTABLE**

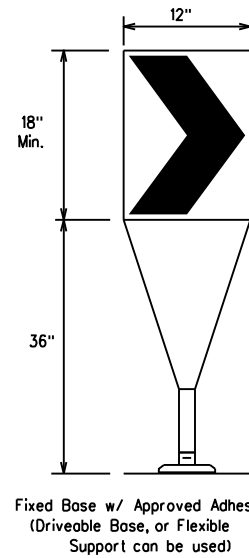
**VERTICAL PANELS (VPs)**

- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
- VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
- VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
- Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
- Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.



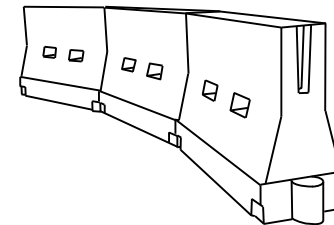
**OPPOSING TRAFFIC LANE DIVIDERS (OTLD)**

- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
- The OTLD may be used in combination with 42" cones or VPs.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
- The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B or Type C conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.



- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
- Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
- To be effective, the chevron should be visible for at least 500 feet.
- Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B or Type C conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

**CHEVRONS**



**LONGITUDINAL CHANNELIZING DEVICES (LCD)**

- LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

**WATER BALLASTED SYSTEMS USED AS BARRIERS**

- Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
- Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
- Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
- When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

**HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS**

**GENERAL NOTES**

- Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
- Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
- The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.

| Posted Speed | Formula                  | Minimum Desirable Taper Lengths x x |            |            | Suggested Maximum Spacing of Channelizing Devices |              |
|--------------|--------------------------|-------------------------------------|------------|------------|---|--------------|
|              |                          | 10' Offset                          | 11' Offset | 12' Offset | On a Taper  | On a Tangent |
| 30           | L = WS <sup>2</sup> / 60 | 150'                                | 165'       | 180'       | 30'   | 60'          |
| 35           |                          | 205'                                | 225'       | 245'       | 35'   | 70'          |
| 40           |                          | 265'                                | 295'       | 320'       | 40'   | 80'          |
| 45           | L = WS                   | 450'                                | 495'       | 540'       | 45'   | 90'          |
| 50           |                          | 500'                                | 550'       | 600'       | 50'   | 100'         |
| 55           |                          | 550'                                | 605'       | 660'       | 55'   | 110'         |
| 60           |                          | 600'                                | 660'       | 720'       | 60'   | 120'         |
| 65           |                          | 650'                                | 715'       | 780'       | 65'   | 130'         |
| 70           |                          | 700'                                | 770'       | 840'       | 70'   | 140'         |
| 75           |                          | 750'                                | 825'       | 900'       | 75'   | 150'         |
| 80           |                          | 800'                                | 880'       | 960'       | 80'   | 160'         |

x x Taper lengths have been rounded off.  
 L- Length of Taper (FT.) W- Width of Offset (FT.)  
 S- Posted Speed (MPH)

**SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS**

SHEET 9 OF 12



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

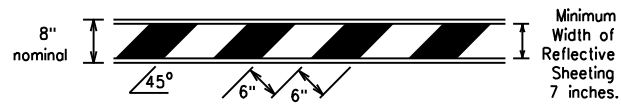
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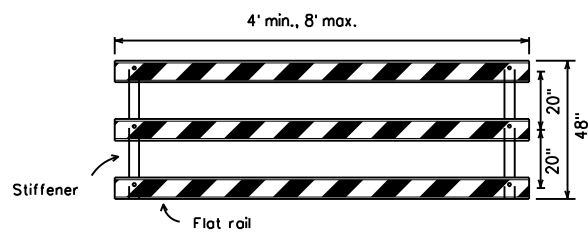
**TYPE 3 BARRICADES**

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

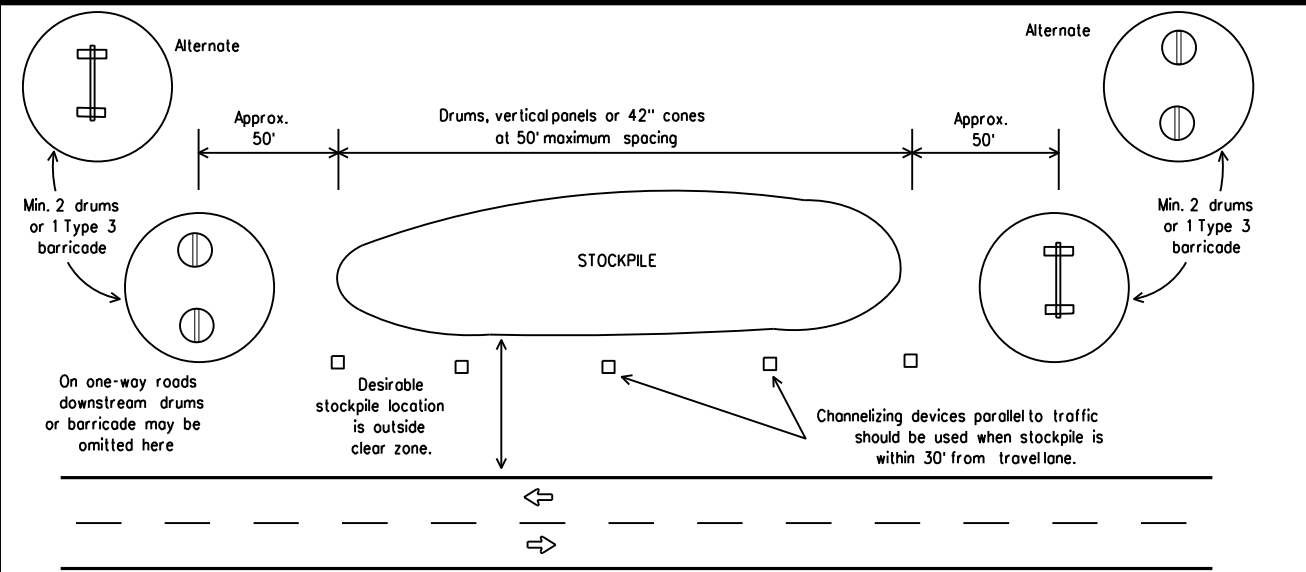
Barricades shall NOT be used as a sign support.



**TYPICAL STRIPING DETAIL FOR BARRICADE RAIL**

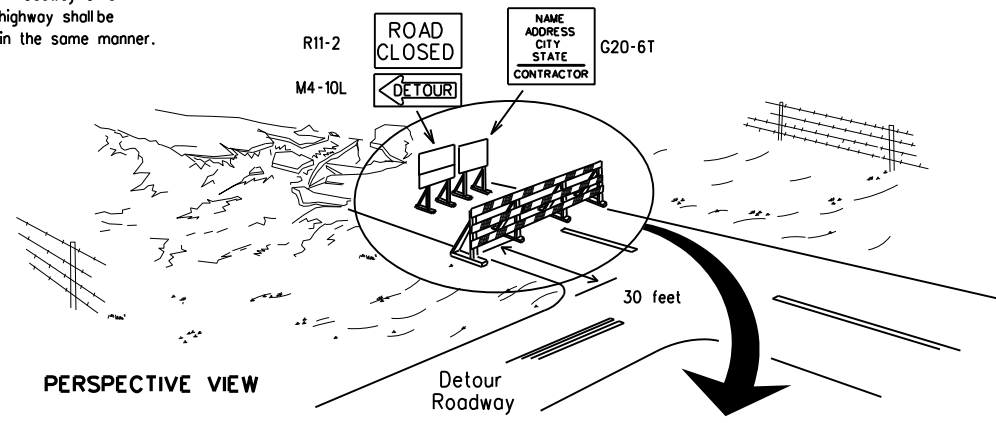


**TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES**



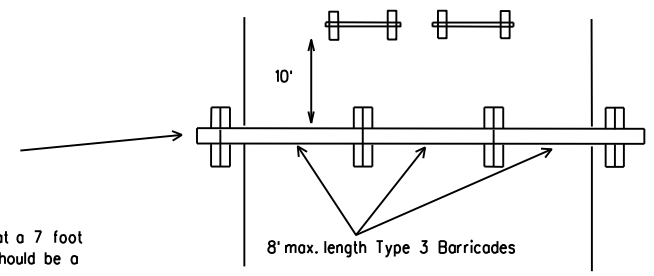
**TRAFFIC CONTROL FOR MATERIAL STOCKPILES**

Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

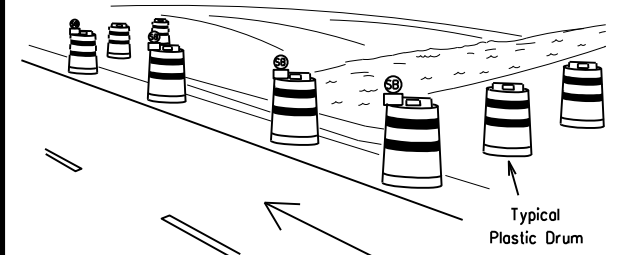
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



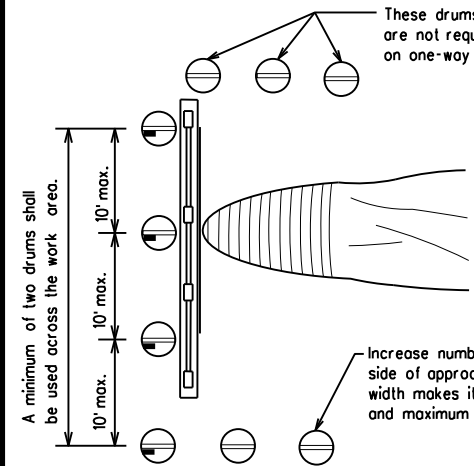
PLAN VIEW

1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

**TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION**



PERSPECTIVE VIEW

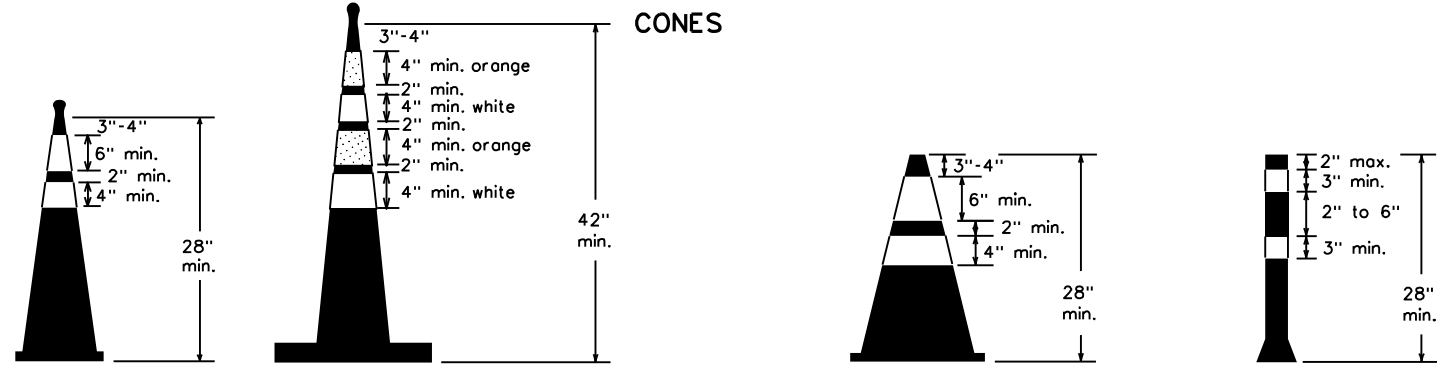


PLAN VIEW

**CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS**

1. Where positive redirection capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.

| LEGEND |   |
|--------|---|
|        | Plastic drum  |
|        | Plastic drum with steady burn light or yellow warning reflector |
|        | Steady burn warning light or yellow warning reflector           |



Two-Piece cones

One-Piece cones

Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.  
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC(10)-21**

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| 9-07 8-14             | DIST      | COUNTY        | SHEET NO. |             |
| 7-13 5-21             | ELP       | EL PASO, ETC. | 14        |             |

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## WORK ZONE PAVEMENT MARKINGS

### GENERAL

- The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
- When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

### RAISED PAVEMENT MARKERS

- Raised pavement markers are to be placed according to the patterns on BC(12).
- All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

### PREFABRICATED PAVEMENT MARKINGS

- Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
- Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

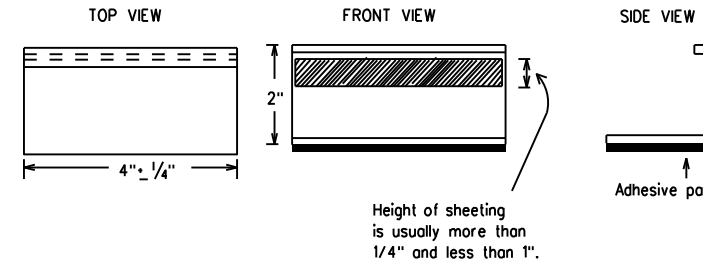
### MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
- The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
- Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

### REMOVAL OF PAVEMENT MARKINGS

- Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
- The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
- Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
- The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
- Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
- Blast cleaning may be used but will not be required unless specifically shown in the plans.
- Over-painting of the markings SHALL NOT BE permitted.
- Removal of raised pavement markers shall be as directed by the Engineer.
- Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
- Block-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

## Temporary Flexible-Reflective Roadway Marker Tabs



**STAPLES OR NAILS SHALL NOT BE USED TO SECURE  
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER  
TABS TO THE PAVEMENT SURFACE**

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
  - Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
  - Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
- Small design variances may be noted between tab manufacturers.
- See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

### RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
- Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:  
 YELLOW - (two amber reflective surfaces with yellow body).  
 WHITE - (one silver reflective surface with white body).

| DEPARTMENTAL MATERIAL SPECIFICATIONS                 |          |
|--|----------|
| PAVEMENT MARKERS (REFLECTORIZED)                     | DMS-4200 |
| TRAFFIC BUTTONS                                      | DMS-4300 |
| EPOXY AND ADHESIVES                                  | DMS-6100 |
| BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS             | DMS-6130 |
| PERMANENT PREFABRICATED PAVEMENT MARKINGS            | DMS-8240 |
| TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS | DMS-8241 |
| TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS   | DMS-8242 |

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

SHEET 11 OF 12

**Texas Department of Transportation**

*Traffic Safety Division Standard*

## BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

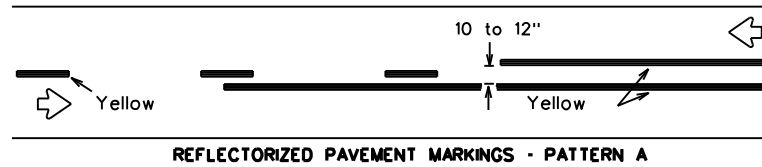
### BC(11)-21

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| © TxDOT February 1998 | CONT      | SECT          | JOB       | HIGHWAY   |
| REVISIONS             |           | 6454          | 87        | 001       |
| 2-98                  | 9-07      | 5-21          |           |           |
| 1-02                  | 7-13      |               |           |           |
| 11-02                 | 8-14      |               |           |           |
|                       | DIST      | COUNTY        | SHEET NO. |           |
|                       | ELP       | EL PASO, ETC. | 15        |           |

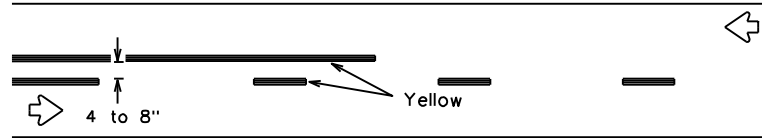
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### PAVEMENT MARKING PATTERNS

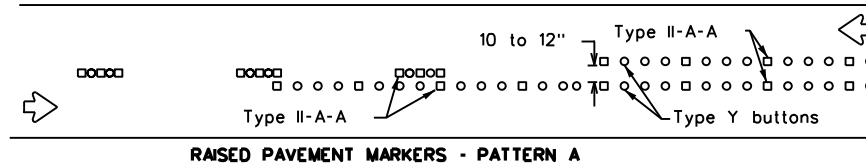


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

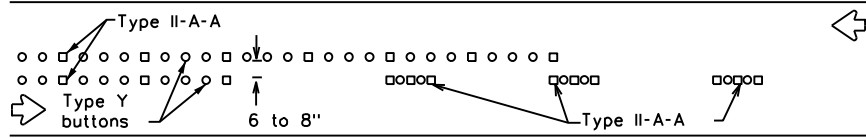


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectorized pavement markings.

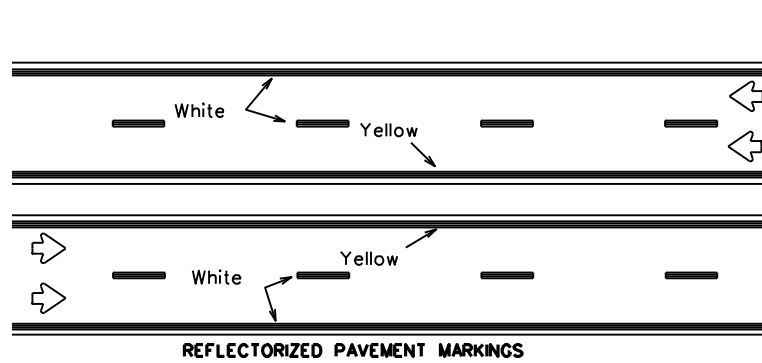


RAISED PAVEMENT MARKERS - PATTERN A



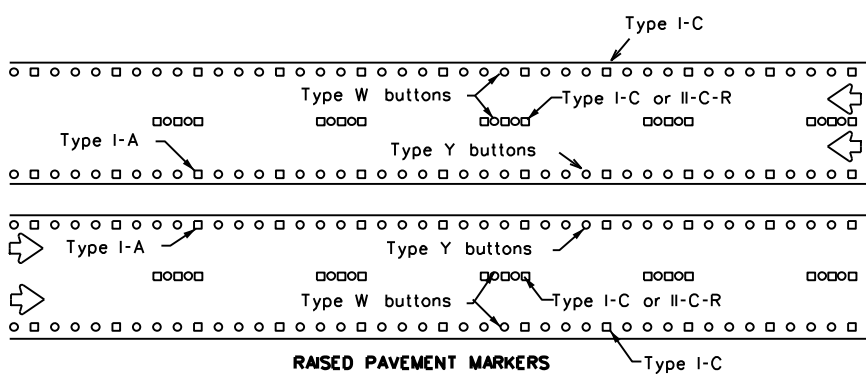
RAISED PAVEMENT MARKERS - PATTERN B

### CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



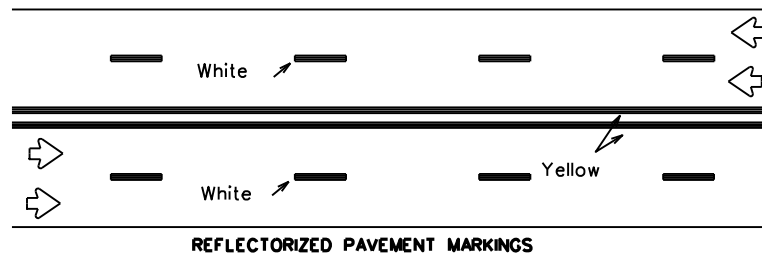
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



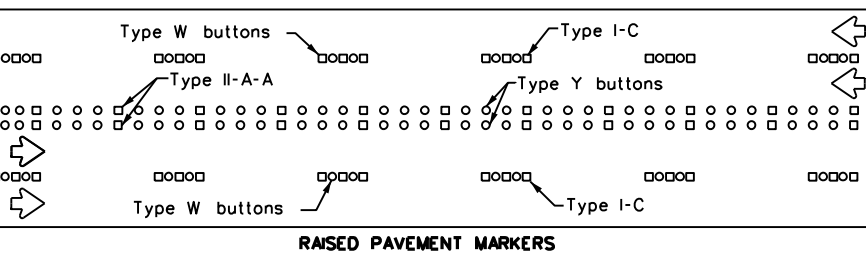
RAISED PAVEMENT MARKERS

### EDGE & LANE LINES FOR DIVIDED HIGHWAY



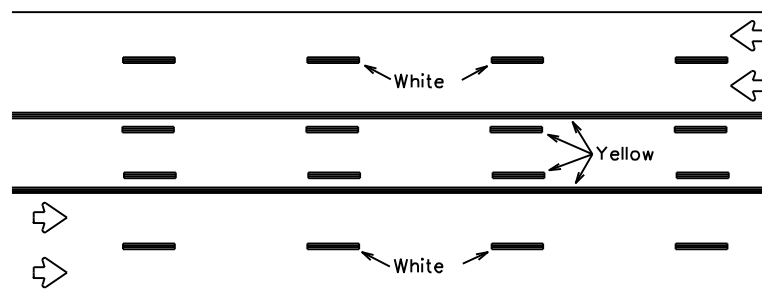
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



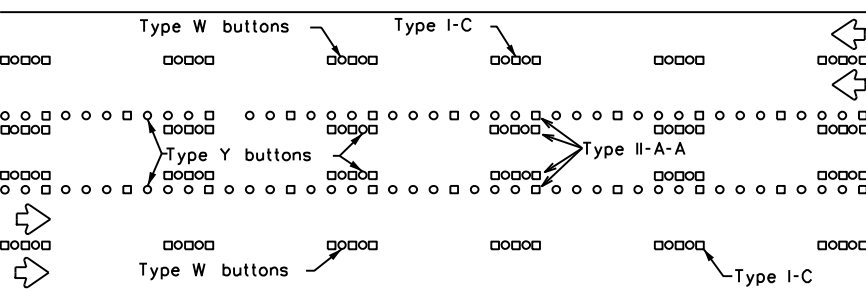
RAISED PAVEMENT MARKERS

### LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

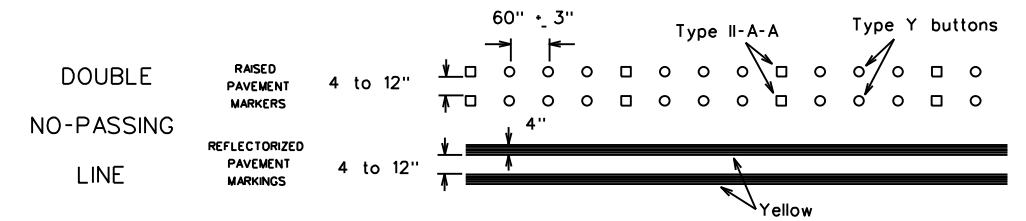
Prefabricated markings may be substituted for reflectorized pavement markings.



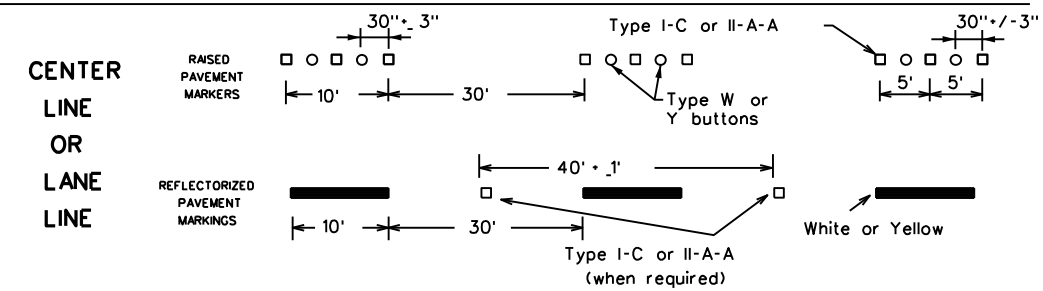
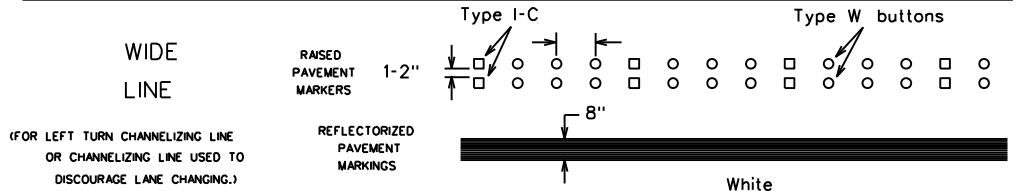
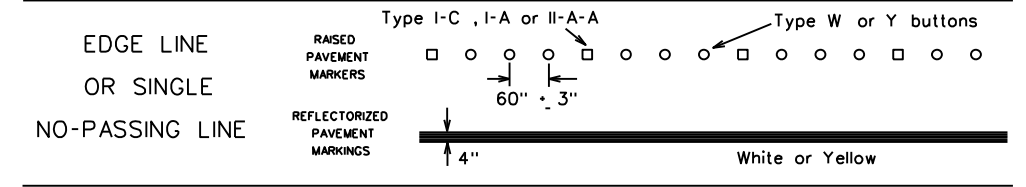
RAISED PAVEMENT MARKERS

### TWO-WAY LEFT TURN LANE

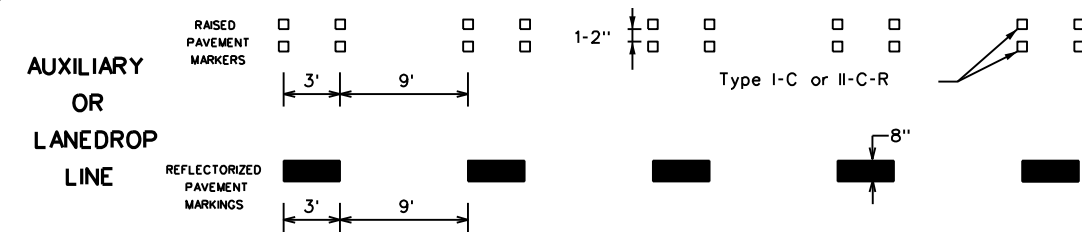
### STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



#### SOLID LINES

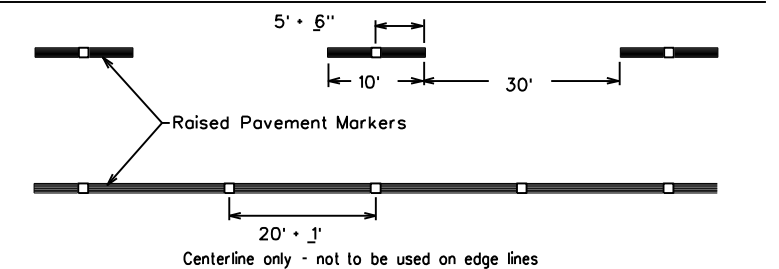


#### BROKEN LINES



#### REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



SHEET 12 OF 12



### BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

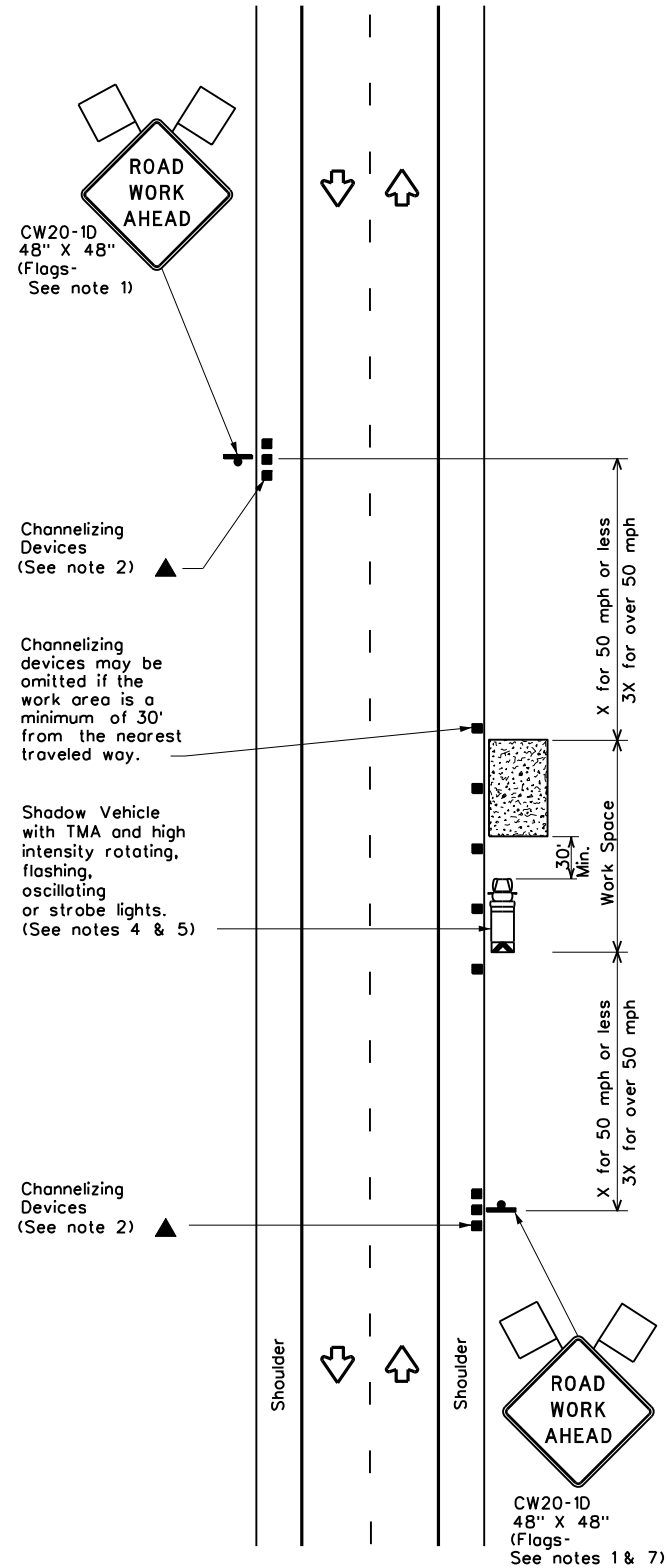
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| © TxDOT February 1998 | CONT      | SECT          | JOB       | HIGHWAY     |
| REVISIONS             | 6454      | 87            | 001       | IH 10, ETC. |
| 1-97 9-07 5-21        | DIST      | COUNTY        | SHEET NO. |             |
| 2-98 7-13             | ELP       | EL PASO, ETC. | 16        |             |
| 11-02 8-14            |           |               |           |             |

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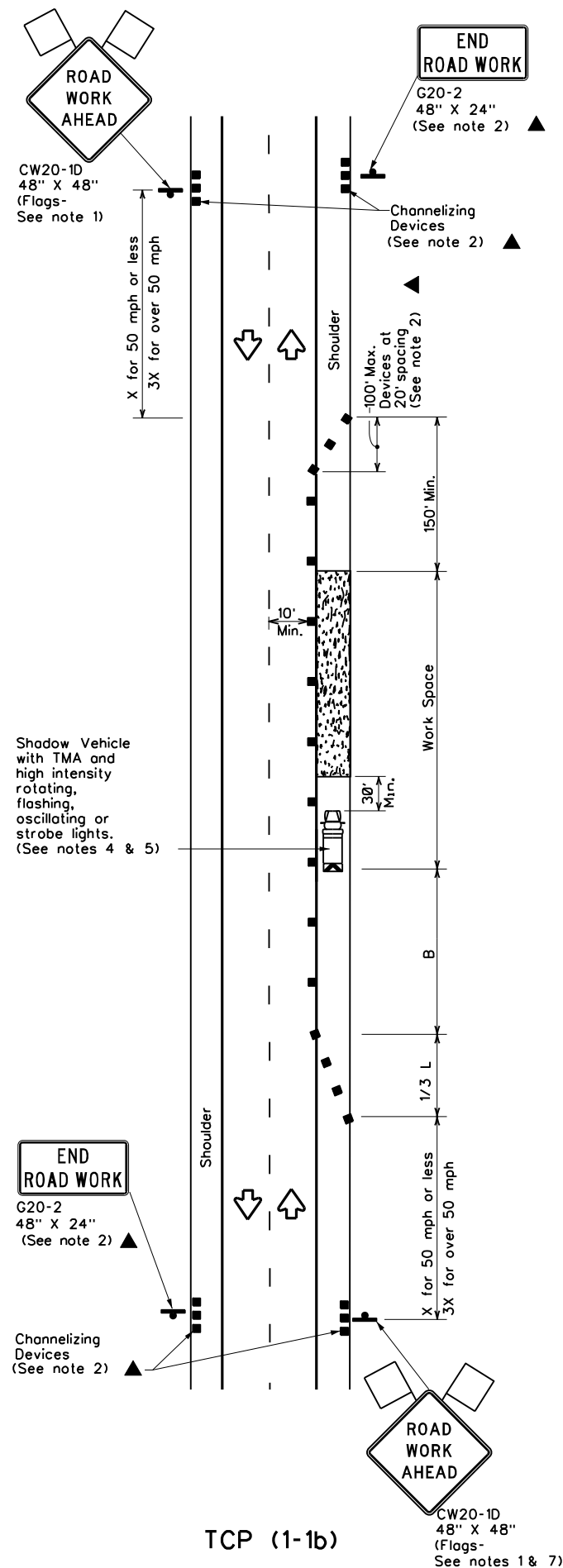
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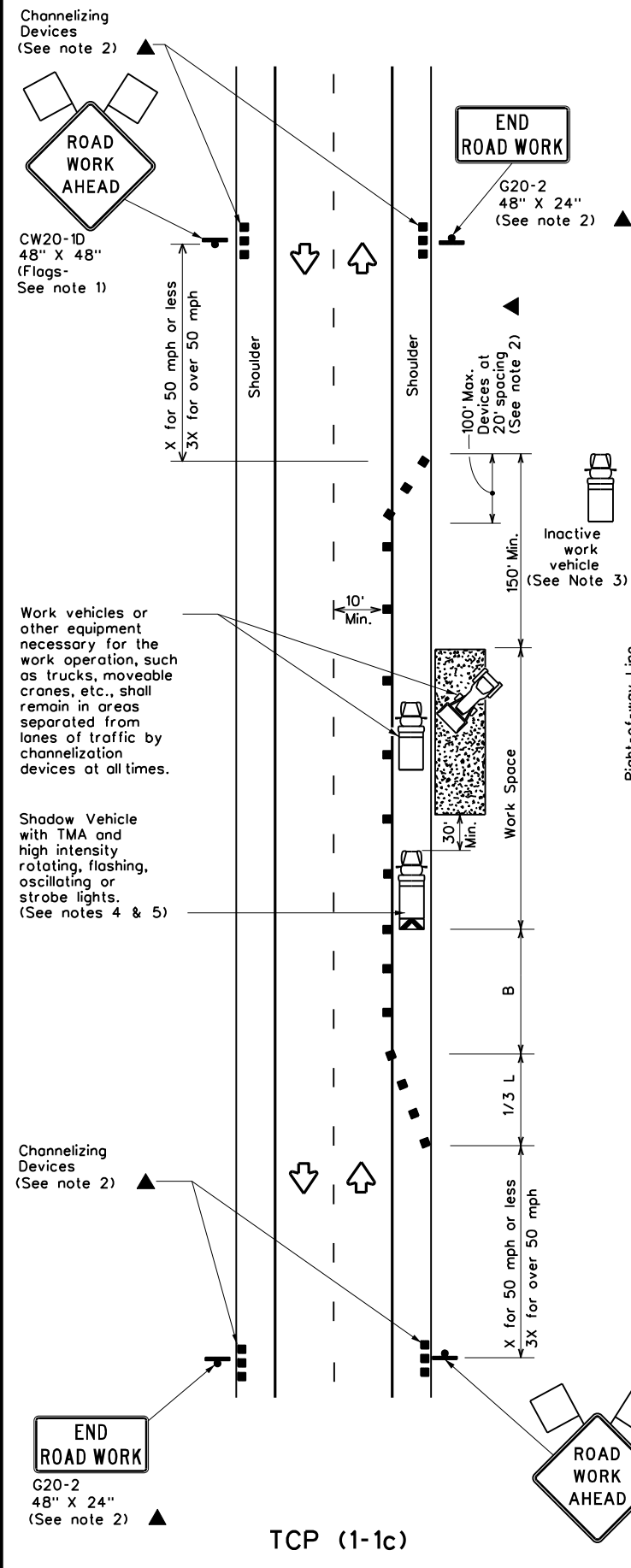
TCP (1-1a)

**WORK SPACE NEAR SHOULDER**  
Conventional Roads



TCP (1-1b)

**WORK SPACE ON SHOULDER**  
Conventional Roads



TCP (1-1c)

**WORK VEHICLES ON SHOULDER**  
Conventional Roads

| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed<br>x | Formula                  | Minimum Desirable Taper Lengths<br>x x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Minimum Sign Spacing<br>"x" Distance | Suggested Longitudinal Buffer Space<br>"B" |
|-------------------|--------------------------|--|------------|------------|---|--------------|--------------------------------------|--|
|                   |                          | 10' Offset                             | 11' Offset | 12' Offset | On a Taper  | On a Tangent |                                      |  |
| 30                | L = WS <sup>2</sup> / 60 | 150'                                   | 165'       | 180'       | 30'   | 60'          | 120'                                 | 90'  |
| 35                |                          | 205'                                   | 225'       | 245'       | 35'   | 70'          | 160'                                 | 120'                                       |
| 40                |                          | 265'                                   | 295'       | 320'       | 40'   | 80'          | 240'                                 | 155'                                       |
| 45                | L = WS                   | 450'                                   | 495'       | 540'       | 45'   | 90'          | 320'                                 | 195'                                       |
| 50                |                          | 500'                                   | 550'       | 600'       | 50'   | 100'         | 400'                                 | 240'                                       |
| 55                |                          | 550'                                   | 605'       | 660'       | 55'   | 110'         | 500'                                 | 295'                                       |
| 60                |                          | 600'                                   | 660'       | 720'       | 60'   | 120'         | 600'                                 | 350'                                       |
| 65                |                          | 650'                                   | 715'       | 780'       | 65'   | 130'         | 700'                                 | 410'                                       |
| 70                |                          | 700'                                   | 770'       | 840'       | 70'   | 140'         | 800'                                 | 475'                                       |
| 75                |                          | 750'                                   | 825'       | 900'       | 75'   | 150'         | 900'                                 | 540'                                       |

x Conventional Roads Only  
 xx Taper lengths have been rounded off.  
 L-Length of Taper(FT) W-Width of Offset(FT) S-Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               | ✓              | ✓                     |                              |                      |

**GENERAL NOTES**

- Flags attached to signs where shown are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
- A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
- See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
- CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.



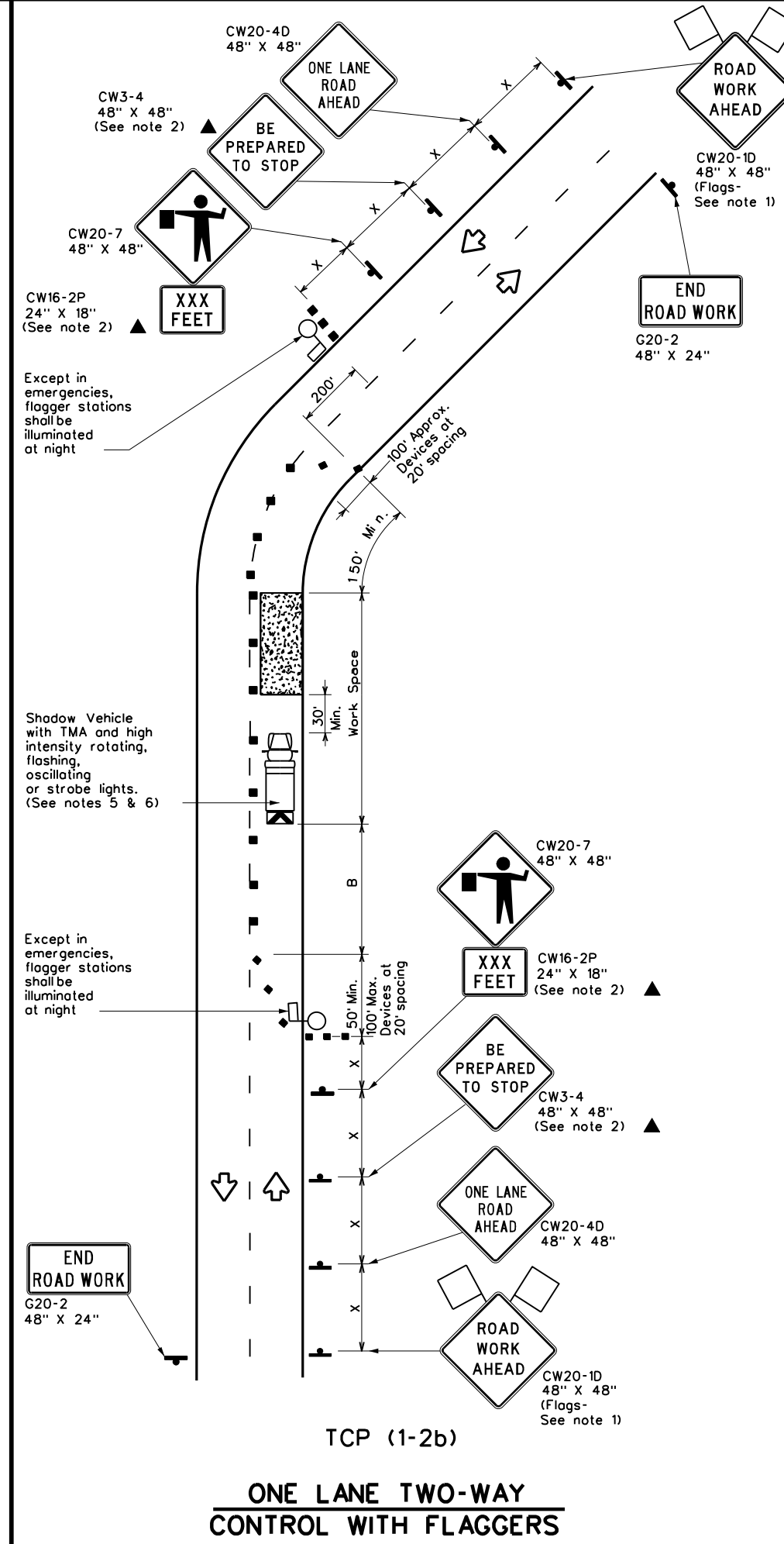
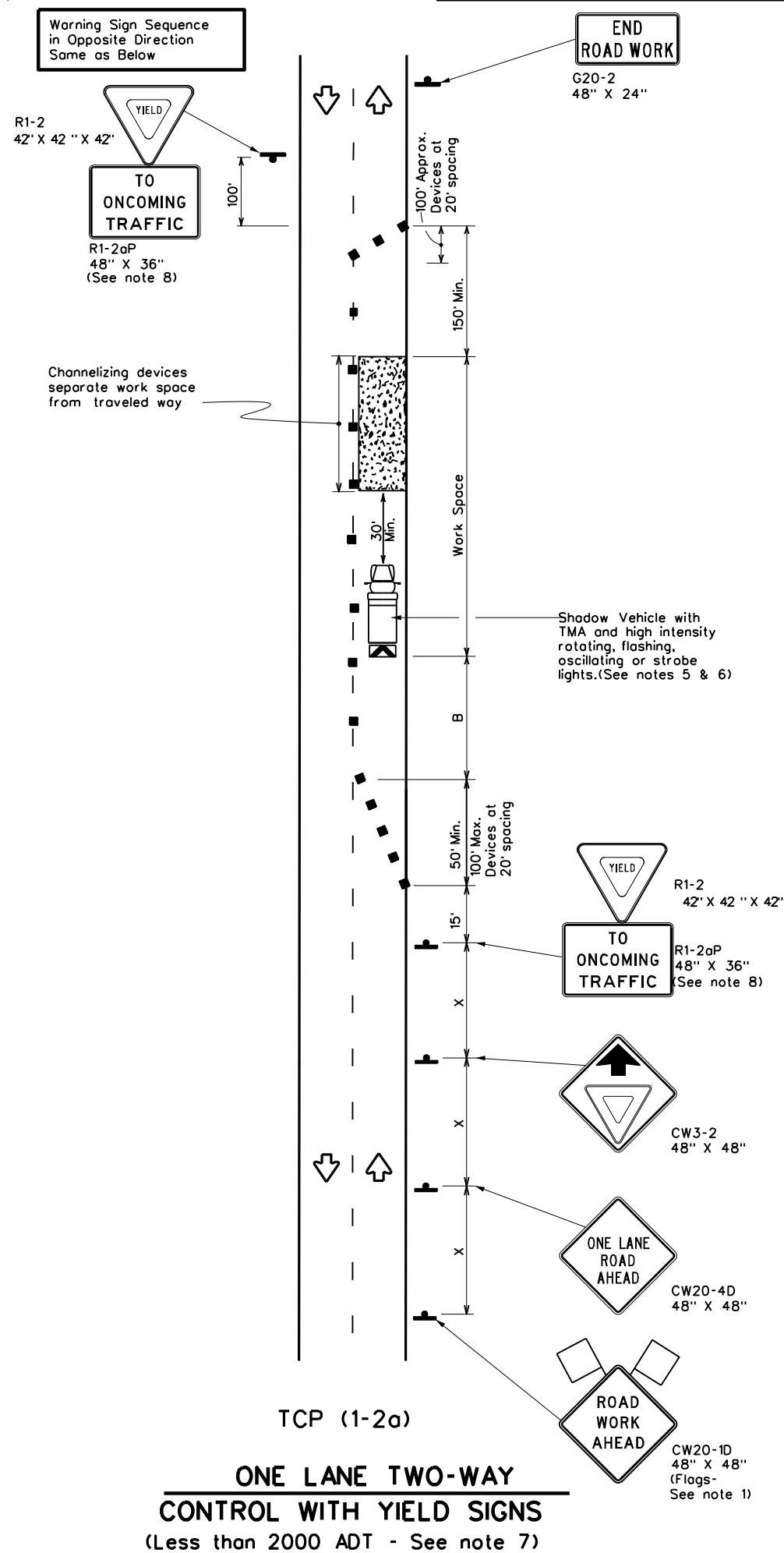
**TRAFFIC CONTROL PLAN  
CONVENTIONAL ROAD  
SHOULDER WORK**

**TCP(1-1)-18**

|                       |      |               |           |             |
|-----------------------|------|---------------|-----------|-------------|
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| © TxDOT December 1985 | CONT | SECT          | JOB       | HIGHWAY     |
| REVISIONS             | 6454 | 87            | 001       | IH 10, ETC. |
| 2-94 4-98             | DIST | COUNTY        | SHEET NO. |             |
| 8-95 2-12             | ELP  | EL PASO, ETC. | 17        |             |
| 1-97 2-18             |      |               |           |             |

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| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed<br>x | Formula                  | Minimum Desirable Taper Lengths<br>x x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Minimum Sign Spacing<br>"x"<br>Distance | Suggested Longitudinal Buffer Space<br>"B" | Stopping Sight Distance |
|-------------------|--------------------------|--|------------|------------|---|--------------|---|--|-------------------------|
|                   |                          | 10' Offset                             | 11' Offset | 12' Offset | On a Taper  | On a Tangent |   |  |                         |
| 30                | L = WS <sup>2</sup> / 60 | 150'                                   | 165'       | 180'       | 30'   | 60'          | 120'                                    | 90'  | 200'                    |
| 35                |                          | 205'                                   | 225'       | 245'       | 35'   | 70'          | 160'                                    | 120'                                       | 250'                    |
| 40                |                          | 265'                                   | 295'       | 320'       | 40'   | 80'          | 240'                                    | 155'                                       | 305'                    |
| 45                | L = WS                   | 450'                                   | 495'       | 540'       | 45'   | 90'          | 320'                                    | 195'                                       | 360'                    |
| 50                |                          | 500'                                   | 550'       | 600'       | 50'   | 100'         | 400'                                    | 240'                                       | 425'                    |
| 55                |                          | 550'                                   | 605'       | 660'       | 55'   | 110'         | 500'                                    | 295'                                       | 495'                    |
| 60                |                          | 600'                                   | 660'       | 720'       | 60'   | 120'         | 600'                                    | 350'                                       | 570'                    |
| 65                |                          | 650'                                   | 715'       | 780'       | 65'   | 130'         | 700'                                    | 410'                                       | 645'                    |
| 70                |                          | 700'                                   | 770'       | 840'       | 70'   | 140'         | 800'                                    | 475'                                       | 730'                    |
| 75                |                          | 750'                                   | 825'       | 900'       | 75'   | 150'         | 900'                                    | 540'                                       | 820'                    |

\* Conventional Roads Only  
 \*\* Taper lengths have been rounded off.  
 L- Length of Taper (FT) W- Width of Offset (FT) S- Posted Speed (MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               | ✓              | ✓                     |                              |                      |

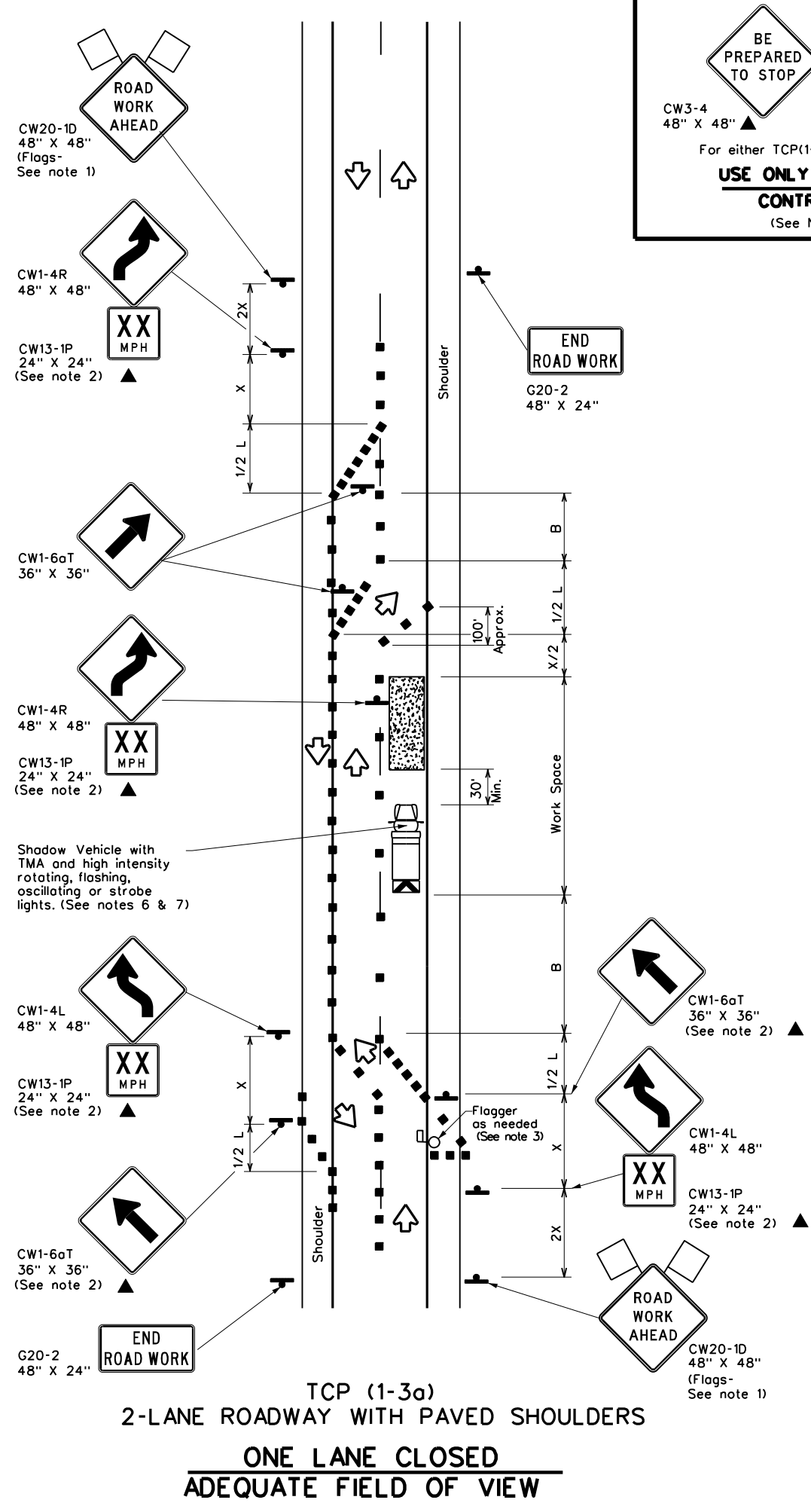
**GENERAL NOTES**

- Flags attached to signs where shown are REQUIRED.
  - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
  - The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
  - Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
  - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
  - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
- TCP (1-2a)**
- R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
  - R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.
- TCP (1-2b)**
- Flaggers should use two-way radios or other methods of communication to control traffic.
  - Length of work space should be based on the ability of flaggers to communicate.
  - If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
  - Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
  - Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.



|                             |                       |                                      |             |
|-----------------------------|-----------------------|--------------------------------------|-------------|
|                             |                       | Traffic Operations Division Standard |             |
| <b>TRAFFIC CONTROL PLAN</b> |                       |                                      |             |
| <b>ONE-LANE TWO-WAY</b>     |                       |                                      |             |
| <b>TRAFFIC CONTROL</b>      |                       |                                      |             |
| <b>TCP(1-2)-18</b>          |                       |                                      |             |
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| © TxDOT December 1985       | CONT: 6454            | SECT: 87                             | JOB: 001    |
| REVISIONS:                  | 2-94                  | 2-12                                 | 1H 10, ETC. |
| 4-90                        | 4-98                  |                                      |             |
| 1-97                        | 2-18                  |                                      |             |
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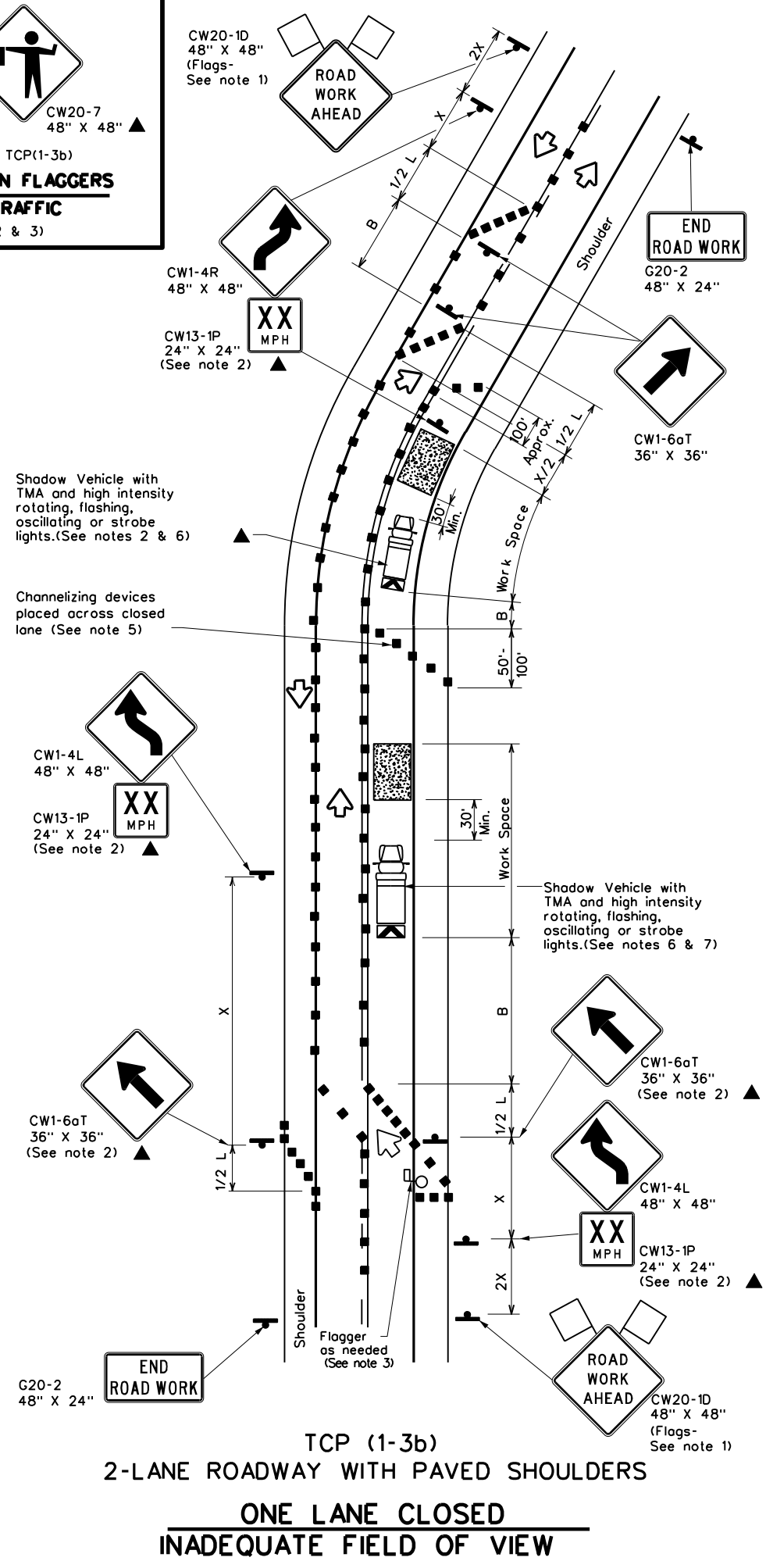


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











**TCP (1-3a)**  
**2-LANE ROADWAY WITH PAVED SHOULDERS**  
**ONE LANE CLOSED**  
**ADEQUATE FIELD OF VIEW**


  
 CW3-4 48" X 48" ▲ CW20-7 48" X 48" ▲  
 For either TCP(1-3a) or TCP(1-3b)  
**USE ONLY WHEN FLAGGERS CONTROL TRAFFIC**  
 (See Notes 2 & 3)



**TCP (1-3b)**  
**2-LANE ROADWAY WITH PAVED SHOULDERS**  
**ONE LANE CLOSED**  
**INADEQUATE FIELD OF VIEW**


| LEGEND  |                                      |   |   |
|---|--------------------------------------|---|---|
|  | Type 3 Barricade                     |  | Channelizing Devices                    |
|  | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|  | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|  | Sign                                 |  | Traffic Flow                            |
|  | Flag                                 |  | Flagger                                 |

| Posted Speed *<br>x | Formula                  | Minimum Desirable Taper Lengths x x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Minimum Sign Spacing "x" Distance | Suggested Longitudinal Buffer Space "B" |
|---------------------|--------------------------|-------------------------------------|------------|------------|---|--------------|-----------------------------------|---|
|                     |                          | 10' Offset                          | 11' Offset | 12' Offset | On a Taper  | On a Tangent |                                   |   |
| 30                  | L = WS <sup>2</sup> / 60 | 150'                                | 165'       | 180'       | 30'   | 60'          | 120'                              | 90'                                     |
| 35                  |                          | 205'                                | 225'       | 245'       | 35'   | 70'          | 160'                              | 120'                                    |
| 40                  |                          | 265'                                | 295'       | 320'       | 40'   | 80'          | 240'                              | 155'                                    |
| 45                  | L = WS                   | 450'                                | 495'       | 540'       | 45'   | 90'          | 320'                              | 195'                                    |
| 50                  |                          | 500'                                | 550'       | 600'       | 50'   | 100'         | 400'                              | 240'                                    |
| 55                  |                          | 550'                                | 605'       | 660'       | 55'   | 110'         | 500'                              | 295'                                    |
| 60                  |                          | 600'                                | 660'       | 720'       | 60'   | 120'         | 600'                              | 350'                                    |
| 65                  |                          | 650'                                | 715'       | 780'       | 65'   | 130'         | 700'                              | 410'                                    |
| 70                  |                          | 700'                                | 770'       | 840'       | 70'   | 140'         | 800'                              | 475'                                    |
| 75                  |                          | 750'                                | 825'       | 900'       | 75'   | 150'         | 900'                              | 540'                                    |

\* Conventional Roads Only  
 \*\* Taper lengths have been rounded off.  
 L- Length of Taper (FT) W- Width of Offset (FT) S- Posted Speed (MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               | ✓              | ✓                     |                              |                      |

- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
  - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
  - Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
  - DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
  - When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
  - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
  - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
  - Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

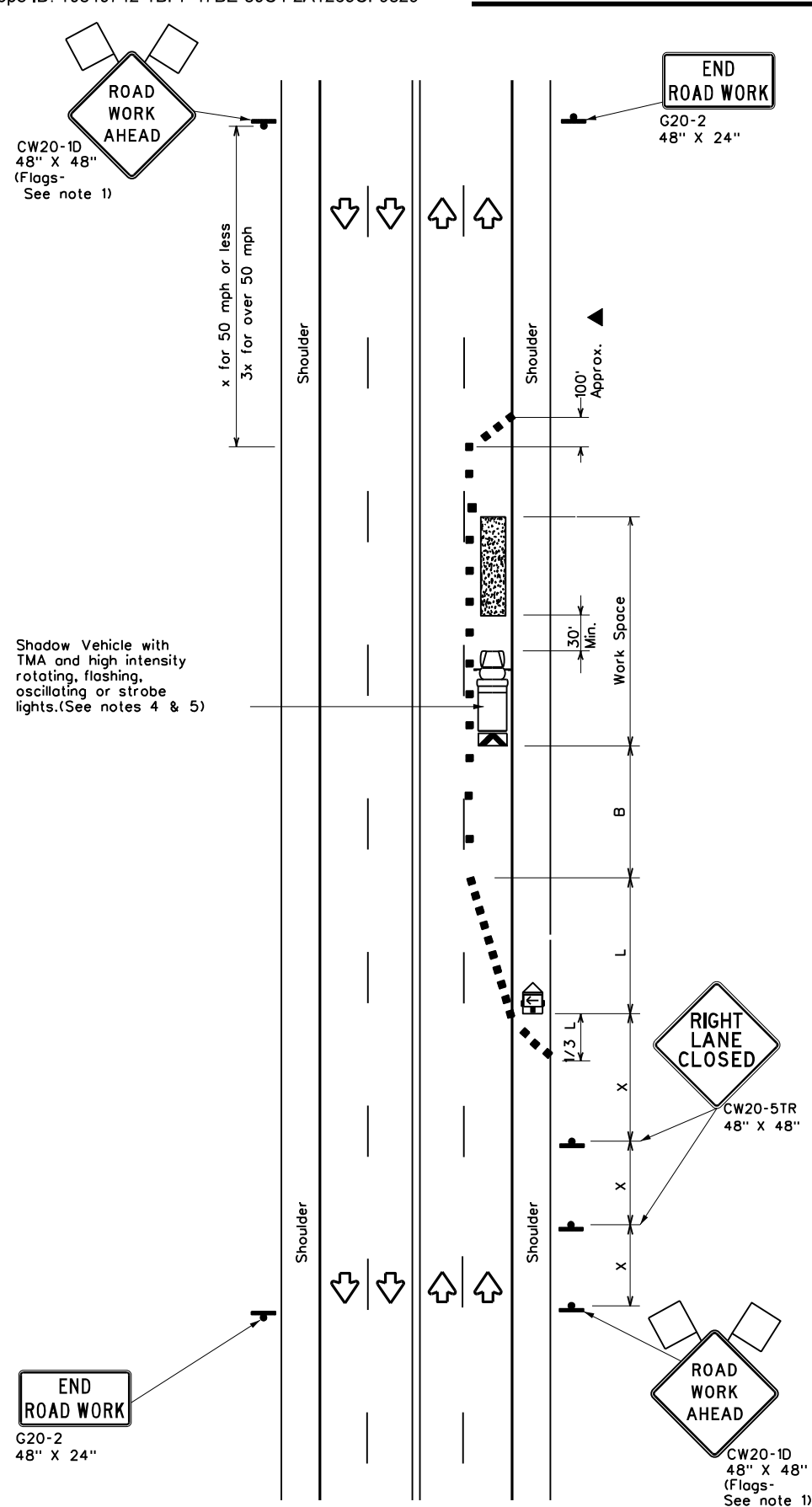

 Texas Department of Transportation  
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN**  
**TRAFFIC SHIFTS ON**  
**TWO LANE ROADS**  
**TCP(1-3)-18**

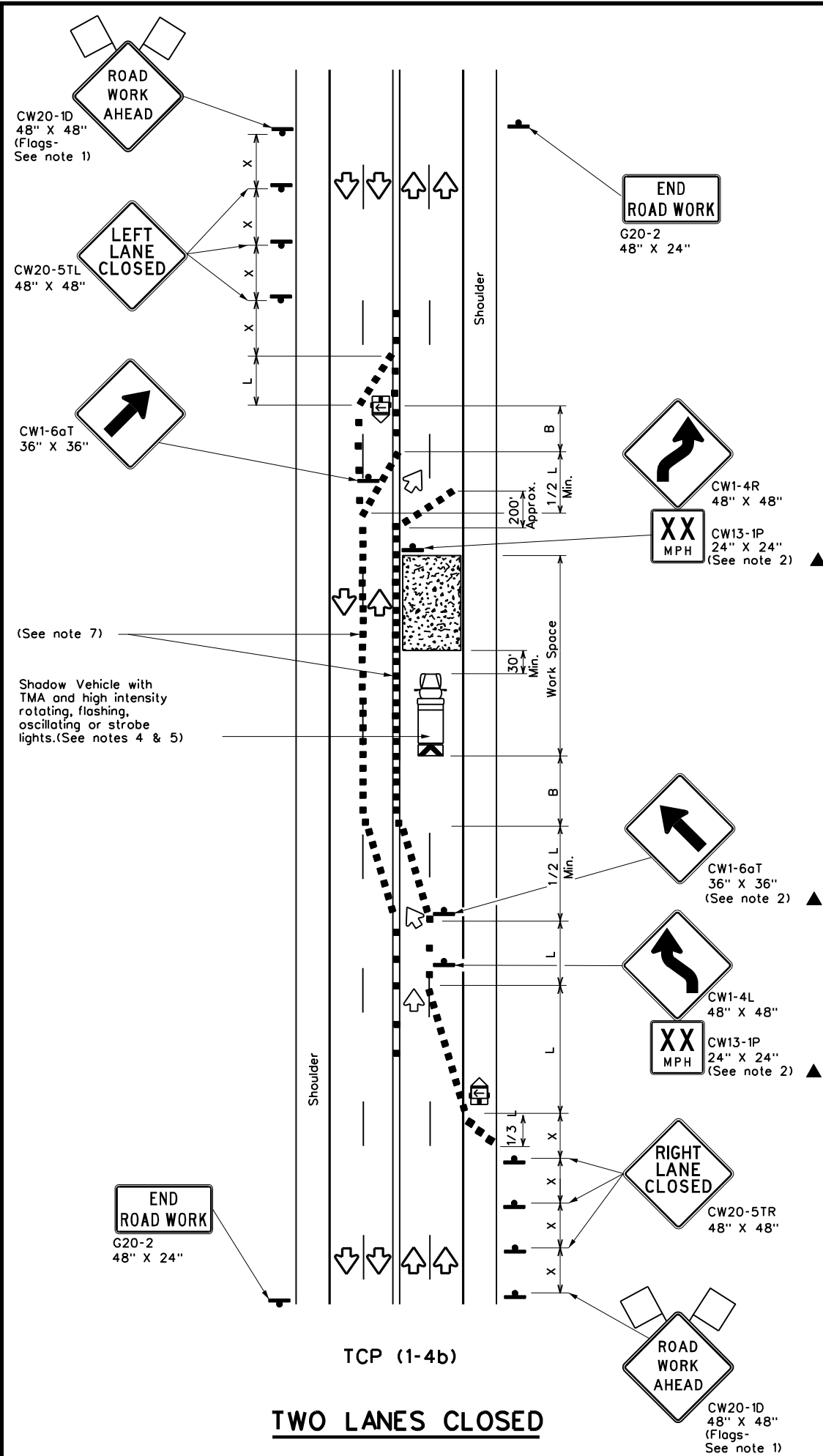
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| FILE: tcp1-3-18.dgn   | DN:        | CK:                   | DW:           | CK:                  |
| © TxDOT December 1985 | CONT: 6454 | SECT: 87              | JOB: 001      | HIGHWAY: IH 10, ETC. |
| REVISIONS:            | 2-94       | 4-98                  |               |                      |
|                       | 8-95       | 2-12                  |               |                      |
|                       | 1-97       | 2-18                  |               |                      |
|                       | DIST: ELP  | COUNTY: EL PASO, ETC. | SHEET NO.: 19 |                      |

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TCP (1-4a)  
**ONE LANE CLOSED**



TCP (1-4b)  
**TWO LANES CLOSED**

| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed<br>x | Formula                  | Minimum Desirable Taper Lengths<br>x x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Minimum Sign Spacing<br>"x"<br>Distance | Suggested Longitudinal Buffer Space<br>"B" |
|-------------------|--------------------------|--|------------|------------|---|--------------|---|--|
|                   |                          | 10' Offset                             | 11' Offset | 12' Offset | On a Taper  | On a Tangent |   |  |
| 30                | L = WS <sup>2</sup> / 60 | 150'                                   | 165'       | 180'       | 30'   | 60'          | 120'                                    | 90'  |
| 35                |                          | 205'                                   | 225'       | 245'       | 35'   | 70'          | 160'                                    | 120'                                       |
| 40                |                          | 265'                                   | 295'       | 320'       | 40'   | 80'          | 240'                                    | 155'                                       |
| 45                | L = WS                   | 450'                                   | 495'       | 540'       | 45'   | 90'          | 320'                                    | 195'                                       |
| 50                |                          | 500'                                   | 550'       | 600'       | 50'   | 100'         | 400'                                    | 240'                                       |
| 55                |                          | 550'                                   | 605'       | 660'       | 55'   | 110'         | 500'                                    | 295'                                       |
| 60                |                          | 600'                                   | 660'       | 720'       | 60'   | 120'         | 600'                                    | 350'                                       |
| 65                |                          | 650'                                   | 715'       | 780'       | 65'   | 130'         | 700'                                    | 410'                                       |
| 70                |                          | 700'                                   | 770'       | 840'       | 70'   | 140'         | 800'                                    | 475'                                       |
| 75                |                          | 750'                                   | 825'       | 900'       | 75'   | 150'         | 900'                                    | 540'                                       |

x Conventional Roads Only  
 xx Taper lengths have been rounded off.  
 L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               | ✓              | ✓                     |                              |                      |

**GENERAL NOTES**

- Flags attached to signs where shown are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
- A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

**TCP (1-4a)**

- If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.

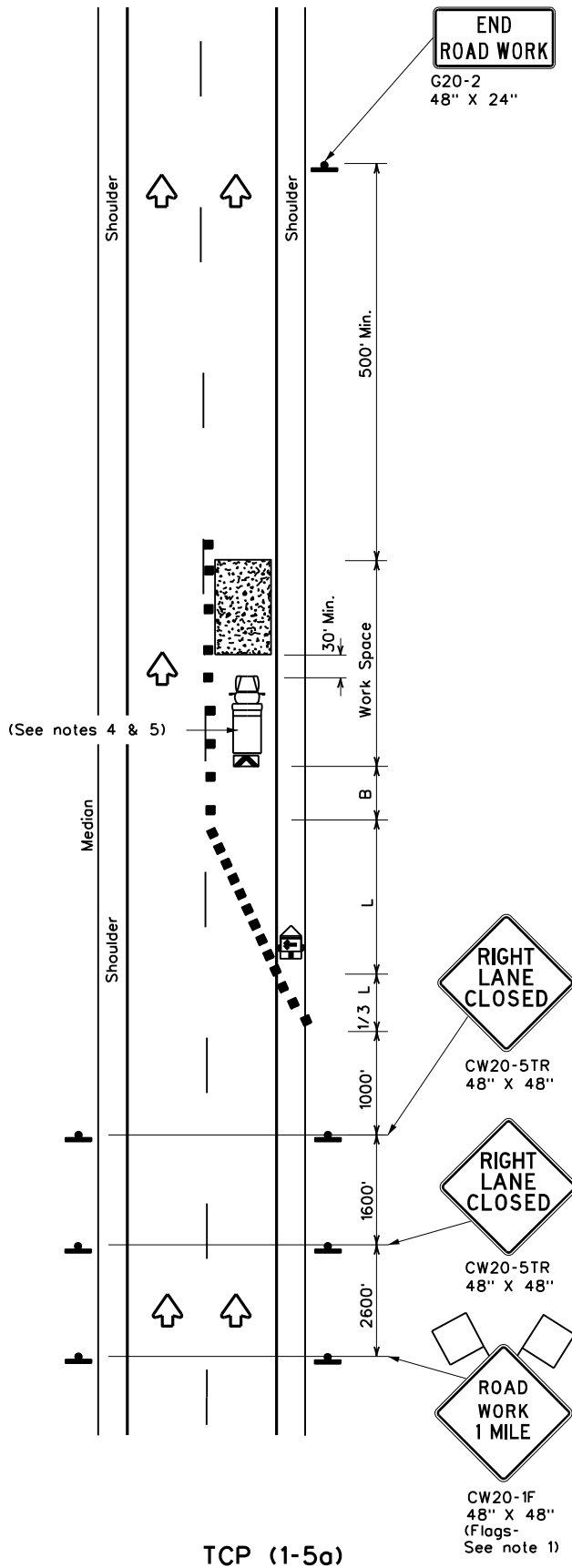
**TCP (1-4b)**

- Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

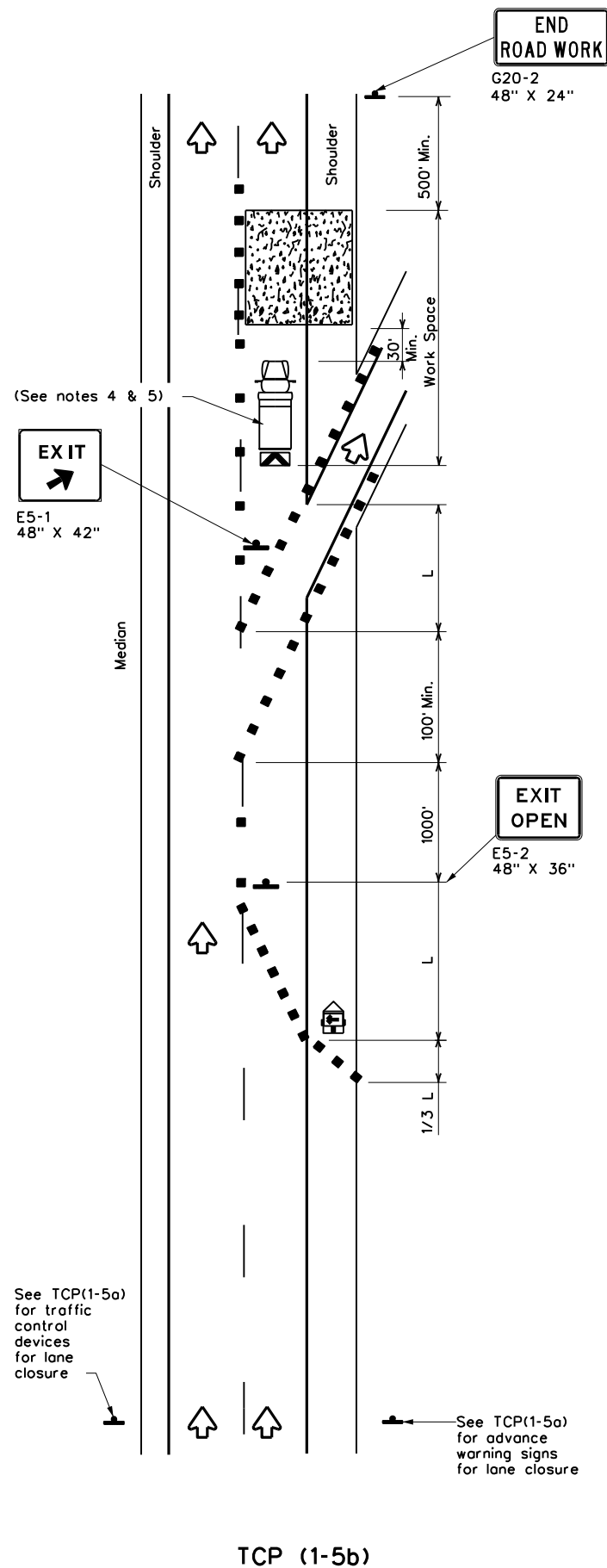
|   |               |                                      |               |
|---|---------------|--------------------------------------|---------------|
|   |               | Traffic Operations Division Standard |               |
| <b>TRAFFIC CONTROL PLAN</b><br><b>LANE CLOSURES ON MULTILANE</b><br><b>CONVENTIONAL ROADS</b> |               |                                      |               |
| <b>TCP(1-4)-18</b>  |               |                                      |               |
| FILE:   | tcp1-4-18.dgn | DN:                                  | CK:           |
| © TxDOT   | December 1985 | CON:                                 | SECT:         |
| REVISIONS:  | 6454          | JOB:                                 | 001           |
| 2-94  | 4-98          | HIGHWAY:                             | IH 10, ETC.   |
| 8-95  | 2-12          | DIST:                                | EL PASO, ETC. |
| 1-97  | 2-18          | COUNTY:                              | EL PASO, ETC. |
|   |               | SHEET NO.:                           | 20            |

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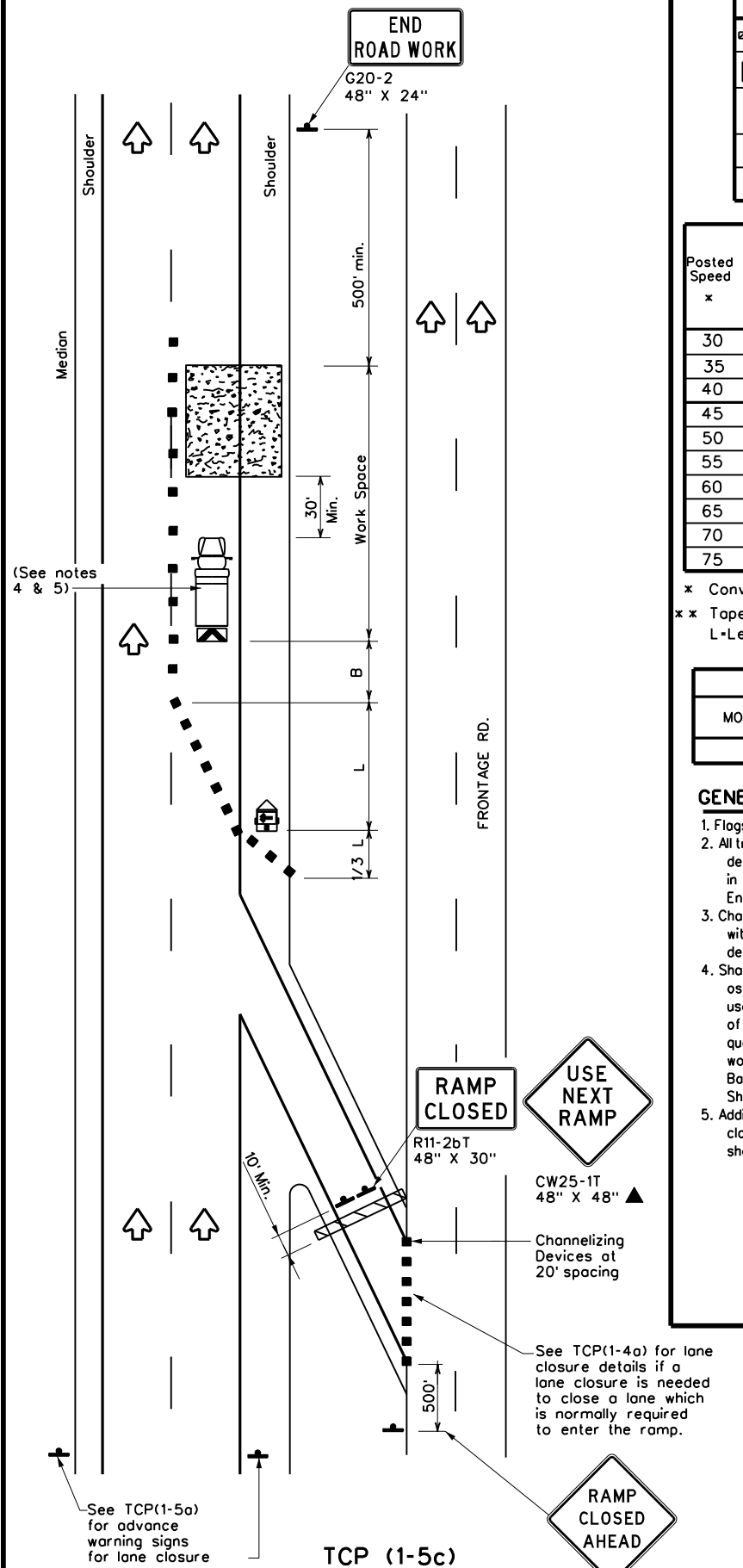
DATE: 10/17/2023 10:14:57 AM  
 FILE: I:\ELP\MAINT\Contracts\East Area\Office\RMC 6454-87-001\_TCP\1 - DESIGN\Plan\518-001-001.dgn



**ONE LANE CLOSURE**



**LANE CLOSURE NEAR EXIT RAMP**



**LANE CLOSURE NEAR ENTRANCE RAMP**

| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed *<br>x | Formula                  | Minimum Desirable Taper Lengths * x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Minimum Sign Spacing "x"<br>Distance | Suggested Longitudinal Buffer Space "B" |
|---------------------|--------------------------|-------------------------------------|------------|------------|---|--------------|--------------------------------------|---|
|                     |                          | 10' Offset                          | 11' Offset | 12' Offset | On a Taper  | On a Tangent |                                      |   |
| 30                  | L = WS <sup>2</sup> / 60 | 150'                                | 165'       | 180'       | 30'   | 60'          | 120'                                 | 90'                                     |
| 35                  |                          | 205'                                | 225'       | 245'       | 35'   | 70'          | 160'                                 | 120'                                    |
| 40                  |                          | 265'                                | 295'       | 320'       | 40'   | 80'          | 240'                                 | 155'                                    |
| 45                  | L = WS                   | 450'                                | 495'       | 540'       | 45'   | 90'          | 320'                                 | 195'                                    |
| 50                  |                          | 500'                                | 550'       | 600'       | 50'   | 100'         | 400'                                 | 240'                                    |
| 55                  |                          | 550'                                | 605'       | 660'       | 55'   | 110'         | 500'                                 | 295'                                    |
| 60                  |                          | 600'                                | 660'       | 720'       | 60'   | 120'         | 600'                                 | 350'                                    |
| 65                  |                          | 650'                                | 715'       | 780'       | 65'   | 130'         | 700'                                 | 410'                                    |
| 70                  |                          | 700'                                | 770'       | 840'       | 70'   | 140'         | 800'                                 | 475'                                    |
| 75                  |                          | 750'                                | 825'       | 900'       | 75'   | 150'         | 900'                                 | 540'                                    |

\* Conventional Roads Only  
 \*\* Taper lengths have been rounded off.  
 L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               |                | ✓                     |                              |                      |

**GENERAL NOTES**

- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
- Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.



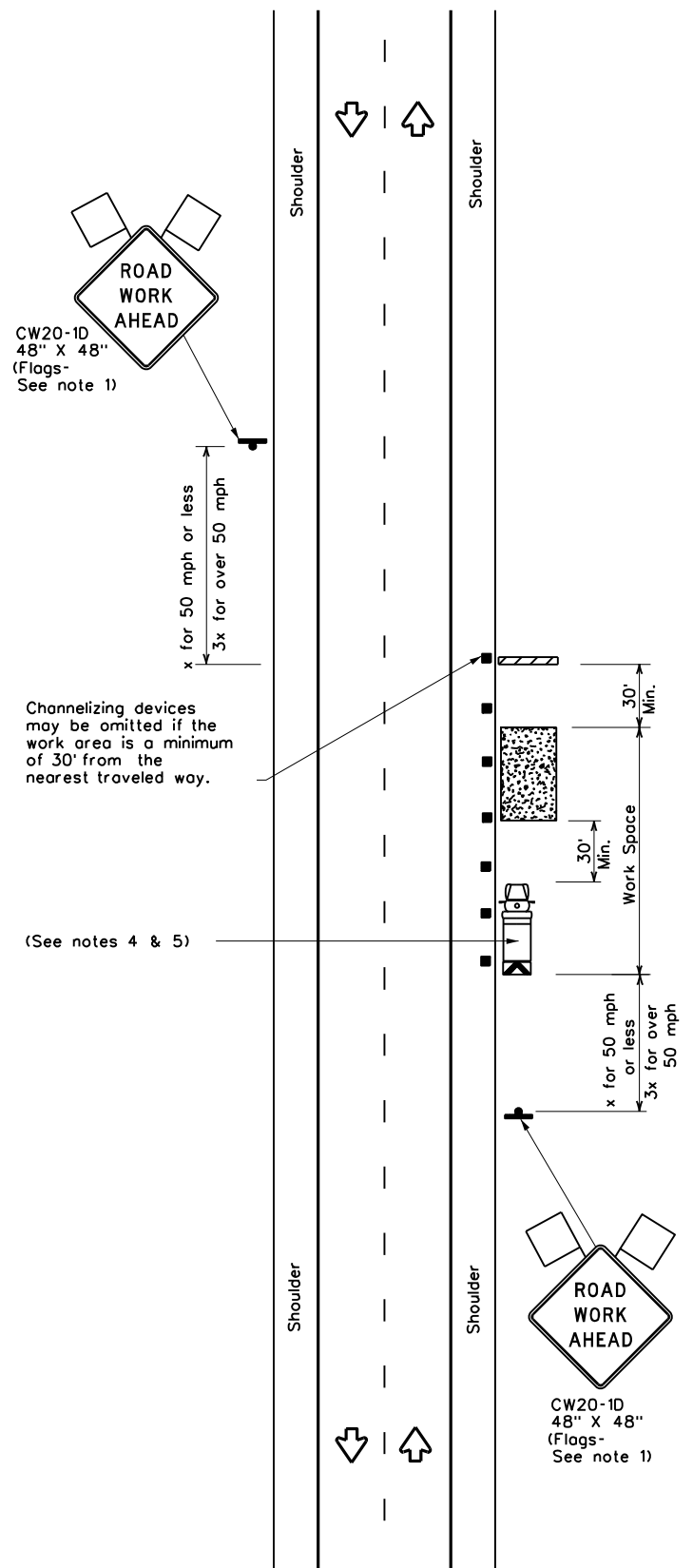
**TRAFFIC CONTROL PLAN  
 LANE CLOSURES FOR  
 DIVIDED HIGHWAYS**

**TCP(1-5)-18**

|                       |           |               |           |             |
|-----------------------|-----------|---------------|-----------|-------------|
| FILE: tcp1-5-18.dgn   | DN:       | CK:           | DW:       | CK:         |
| © TxDOT February 2012 | CONT      | SECT          | JOB       | HIGHWAY     |
| 2-18                  | REVISIONS | 6454 87       | 001       | IH 10, ETC. |
|                       | DIST      | COUNTY        | SHEET NO. |             |
|                       | ELP       | EL PASO, ETC. | 21        |             |

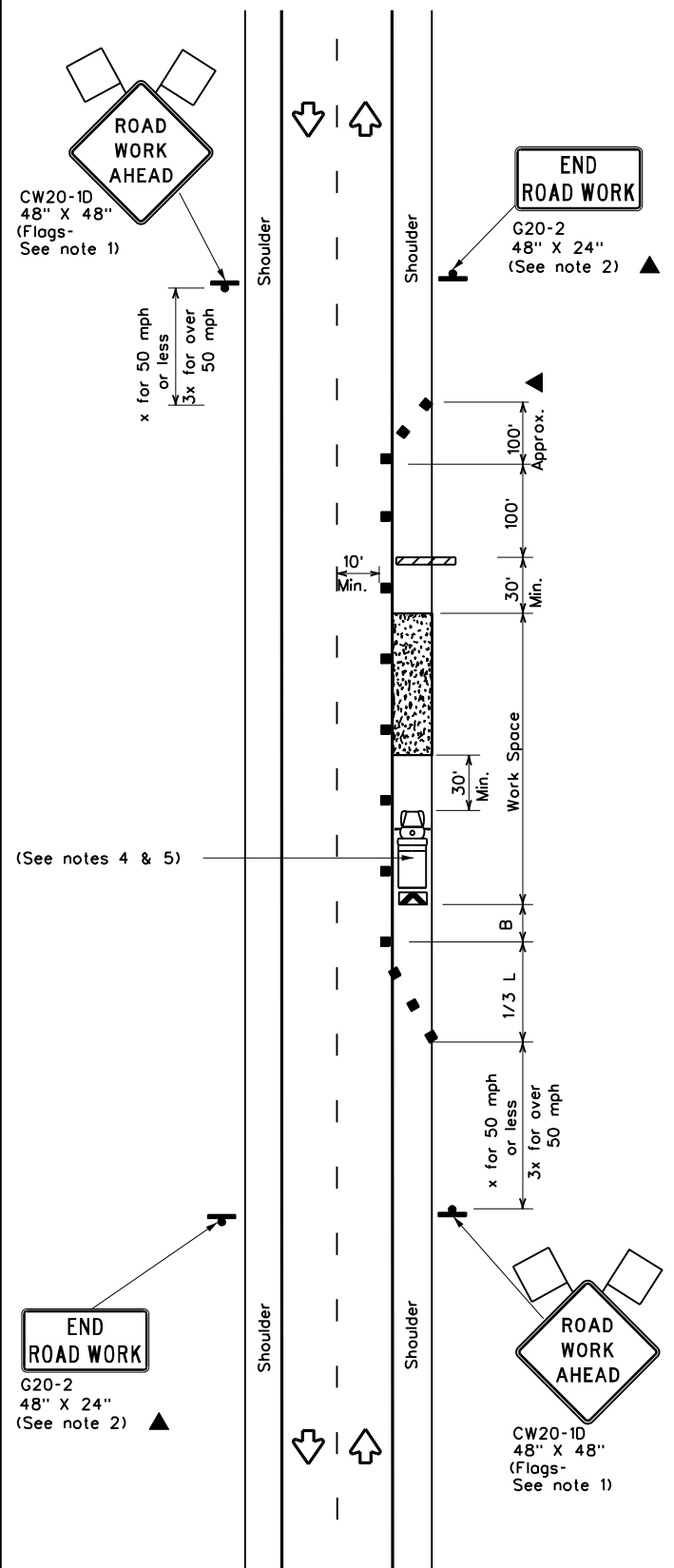
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DATE: 10/17/2023 10:14:58 AM  
 FILE: I:\ELP\MAINT\Contracts\East Area Office\RMC 6454-87-001 TCP\1 - DESIGN\Plan\515 Standard.dgn



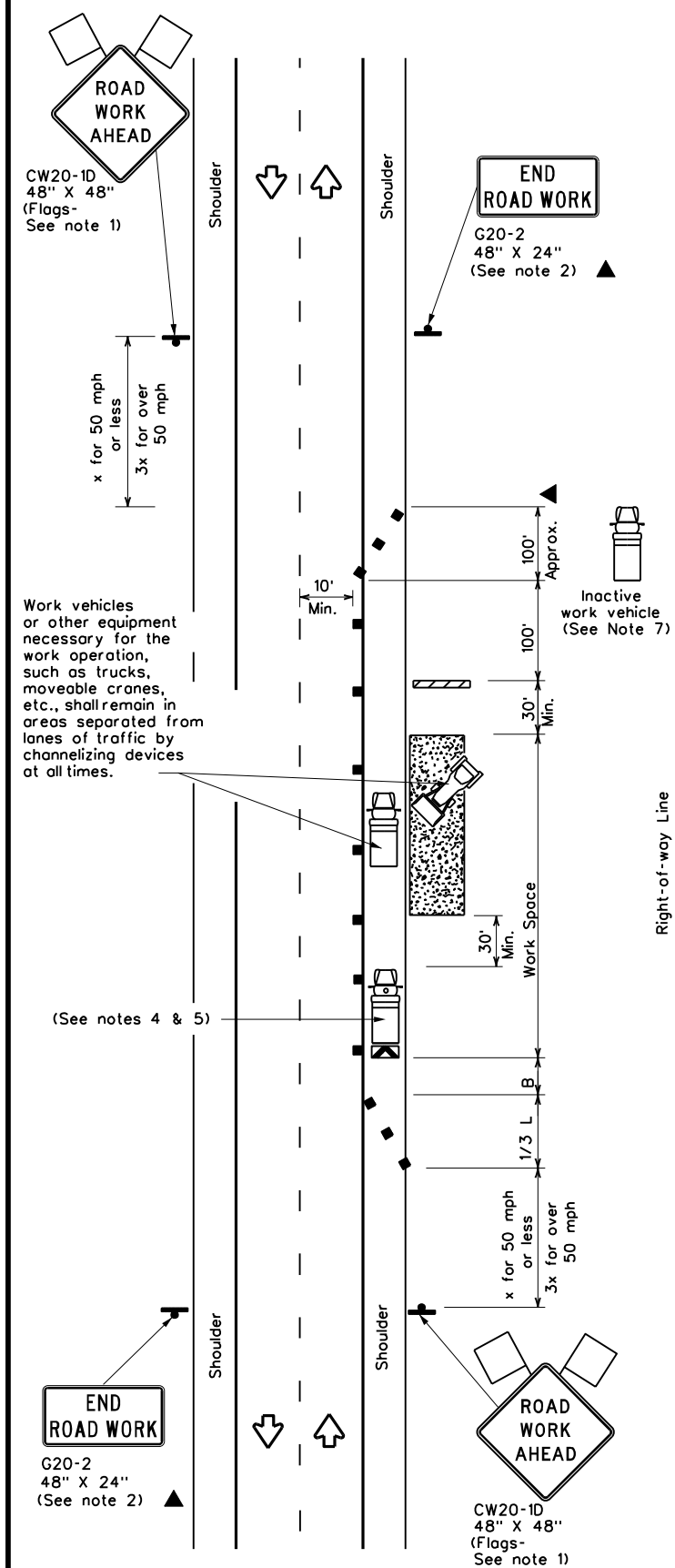
TCP (2-1a)

**WORK SPACE NEAR SHOULDER**  
 Conventional Roads



TCP (2-1b)

**WORK SPACE ON SHOULDER**  
 Conventional Roads



TCP (2-1c)

**WORK VEHICLES ON SHOULDER**  
 Conventional Roads

| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed<br>x | Formula                      | Minimum Desirable Taper Lengths<br>x |               |               | Suggested Maximum Spacing of Channelizing Devices |              | Minimum Sign Spacing<br>"X"<br>Distance | Suggested Longitudinal Buffer Space<br>"B" |
|-------------------|------------------------------|--------------------------------------|---------------|---------------|---|--------------|---|--|
|                   |                              | 10'<br>Offset                        | 11'<br>Offset | 12'<br>Offset | On a Taper  | On a Tangent |   |  |
| 30                | L = $\frac{W \cdot S^2}{60}$ | 150'                                 | 165'          | 180'          | 30'   | 60'          | 120'                                    | 90'  |
| 35                |                              | 205'                                 | 225'          | 245'          | 35'   | 70'          | 160'                                    | 120'                                       |
| 40                | L = WS                       | 265'                                 | 295'          | 320'          | 40'   | 80'          | 240'                                    | 155'                                       |
| 45                |                              | 450'                                 | 495'          | 540'          | 45'   | 90'          | 320'                                    | 195'                                       |
| 50                |                              | 500'                                 | 550'          | 600'          | 50'   | 100'         | 400'                                    | 240'                                       |
| 55                |                              | 550'                                 | 605'          | 660'          | 55'   | 110'         | 500'                                    | 295'                                       |
| 60                |                              | 600'                                 | 660'          | 720'          | 60'   | 120'         | 600'                                    | 350'                                       |
| 65                |                              | 650'                                 | 715'          | 780'          | 65'   | 130'         | 700'                                    | 410'                                       |
| 70                |                              | 700'                                 | 770'          | 840'          | 70'   | 140'         | 800'                                    | 475'                                       |
| 75                | 750'                         | 825'                                 | 900'          | 75'           | 150'  | 900'         | 540'                                    |  |

\* Conventional Roads Only  
 \*\* Taper lengths have been rounded off.  
 L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               | ✓              | ✓                     | ✓                            | ✓                    |

**GENERAL NOTES**

- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
- Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
- Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
- Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
- CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.



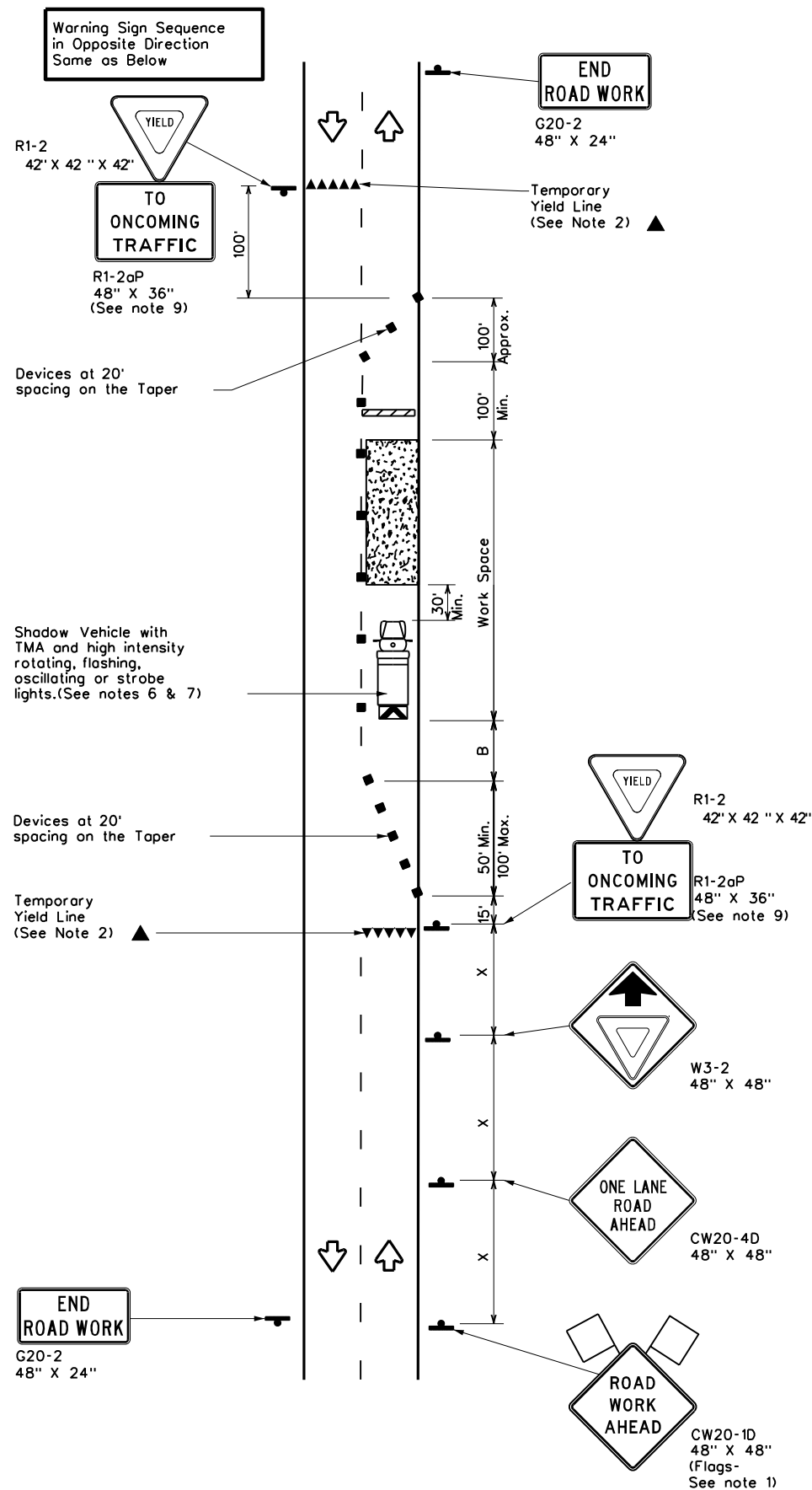
**TRAFFIC CONTROL PLAN**  
**CONVENTIONAL ROAD**  
**SHOULDER WORK**

**TCP(2-1)-18**

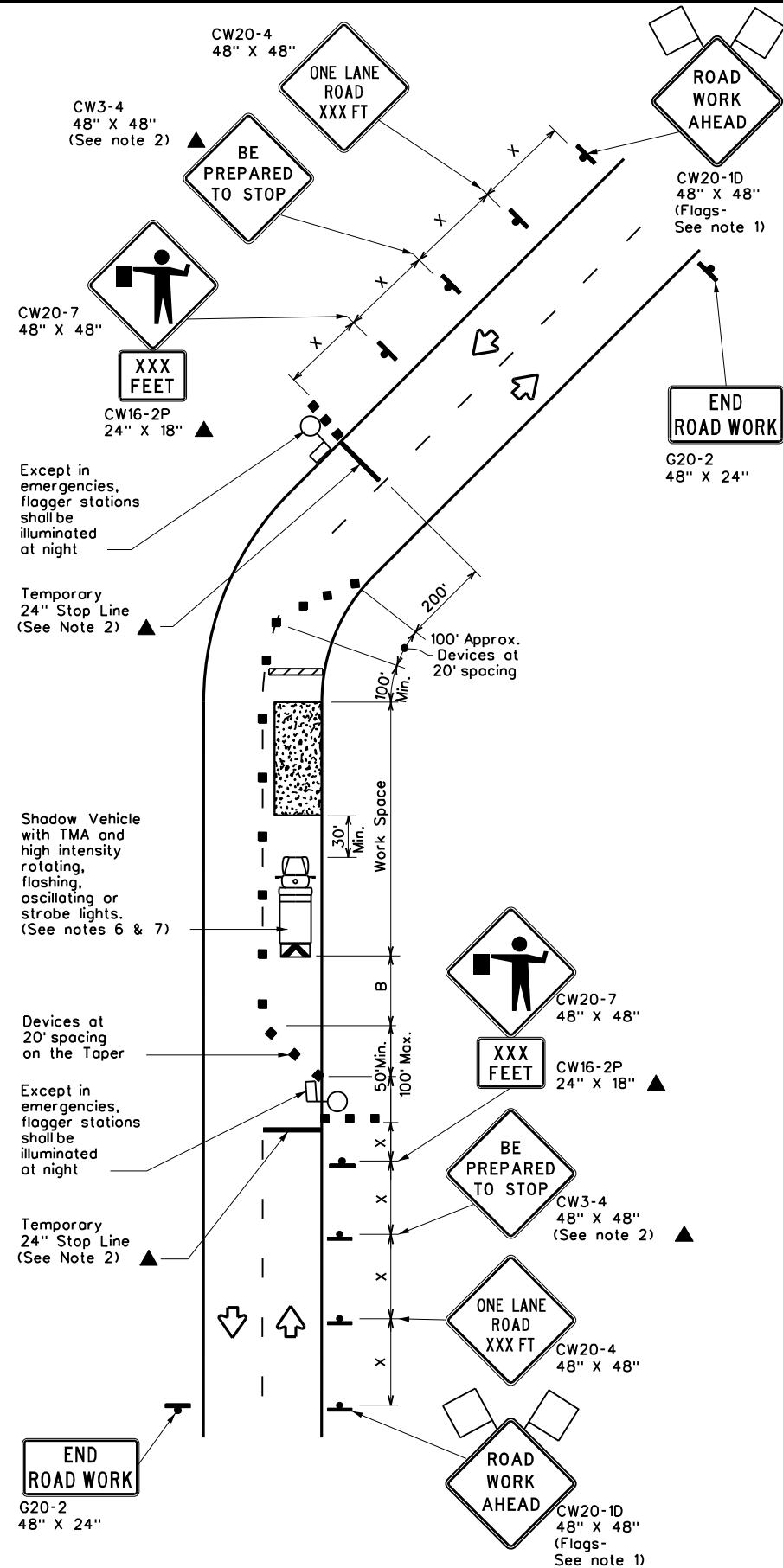
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|-----------|---------------|-------|-----|-------|---------|---------------|--|--------------|--|
| FILE:     | tcp2-1-18.dgn | DN:   |     | CK:   |         | DW:           |  | CK:          |  |
| © TxDOT   | December 1985 | CONT: |     | SECT: |         | JOB:          |  | HIGHWAY:     |  |
| REVISIONS |               | 6454  | 87  | 001   |         | IH 10, ETC.   |  |              |  |
| 2-94      | 4-98          |       |     |       |         |               |  |              |  |
| 8-95      | 2-12          |       |     |       |         |               |  |              |  |
| 1-97      | 2-18          |       |     |       |         |               |  |              |  |
|           |               | DIST: | ELP |       | COUNTY: | EL PASO, ETC. |  | SHEET NO. 22 |  |

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DATE: 10/17/2023 10:14:58 AM  
 FILE: I:\ELP\MAINT\Contracts\East Area\Office\RMC 6454-87-001 TCP\ - DESIGN\Plan05\TCP(2-2)-18.dgn



**TCP (2-2a)**  
**2-LANE ROADWAY WITHOUT PAVED SHOULDERS**  
**ONE LANE TWO-WAY**  
**CONTROL WITH YIELD SIGNS**  
 (Less than 2000 ADT - See Note 9)



**TCP (2-2b)**  
**2-LANE ROADWAY WITHOUT PAVED SHOULDERS**  
**ONE LANE TWO-WAY**  
**CONTROL WITH FLAGGERS**

| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed *<br>x | Formula               | Minimum Desirable Taper Lengths * x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Minimum Sign Spacing "x" Distance | Suggested Longitudinal Buffer Space "B" | Stopping Sight Distance |
|---------------------|-----------------------|-------------------------------------|------------|------------|---|--------------|-----------------------------------|---|-------------------------|
|                     |                       | 10' Offset                          | 11' Offset | 12' Offset | On a Taper  | On a Tangent |                                   |   |                         |
| 30                  | L = $\frac{WS^2}{60}$ | 150'                                | 165'       | 180'       | 30'   | 60'          | 120'                              | 90'                                     | 200'                    |
| 35                  |                       | 205'                                | 225'       | 245'       | 35'   | 70'          | 160'                              | 120'                                    | 250'                    |
| 40                  |                       | 265'                                | 295'       | 320'       | 40'   | 80'          | 240'                              | 155'                                    | 305'                    |
| 45                  | L = WS                | 450'                                | 495'       | 540'       | 45'   | 90'          | 320'                              | 195'                                    | 360'                    |
| 50                  |                       | 500'                                | 550'       | 600'       | 50'   | 100'         | 400'                              | 240'                                    | 425'                    |
| 55                  |                       | 550'                                | 605'       | 660'       | 55'   | 110'         | 500'                              | 295'                                    | 495'                    |
| 60                  |                       | 600'                                | 660'       | 720'       | 60'   | 120'         | 600'                              | 350'                                    | 570'                    |
| 65                  |                       | 650'                                | 715'       | 780'       | 65'   | 130'         | 700'                              | 410'                                    | 645'                    |
| 70                  |                       | 700'                                | 770'       | 840'       | 70'   | 140'         | 800'                              | 475'                                    | 730'                    |
| 75                  |                       | 750'                                | 825'       | 900'       | 75'   | 150'         | 900'                              | 540'                                    | 820'                    |

\* Conventional Roads Only  
 \*\* Taper lengths have been rounded off.  
 L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               | ✓              | ✓                     | ✓                            |                      |

**GENERAL NOTES**

- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
- Flaggers should use two-way radios or other methods of communication to control traffic.
- Length of work space should be based on the ability of flaggers to communicate.
- A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

**TCP (2-2a)**

- The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
- The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

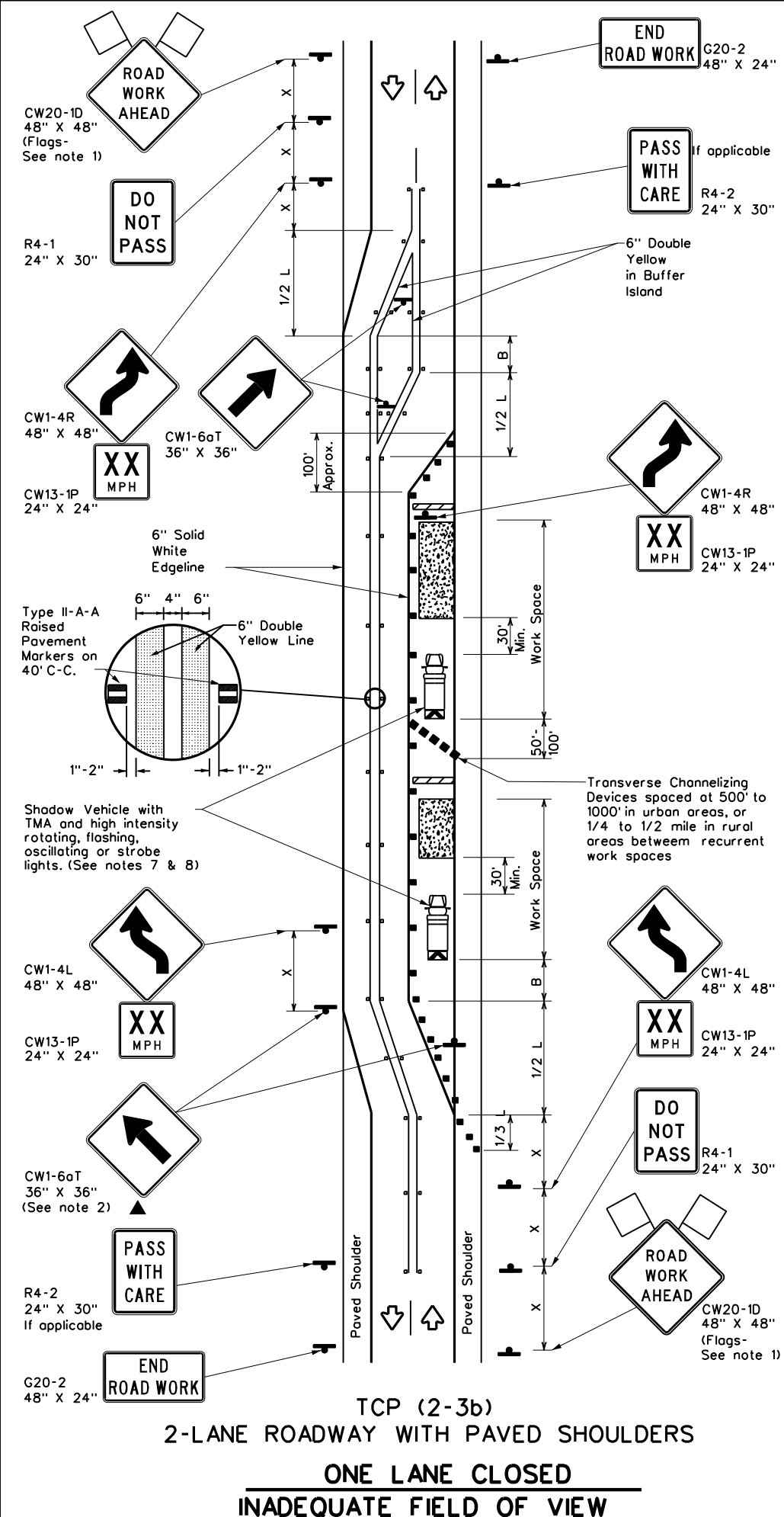
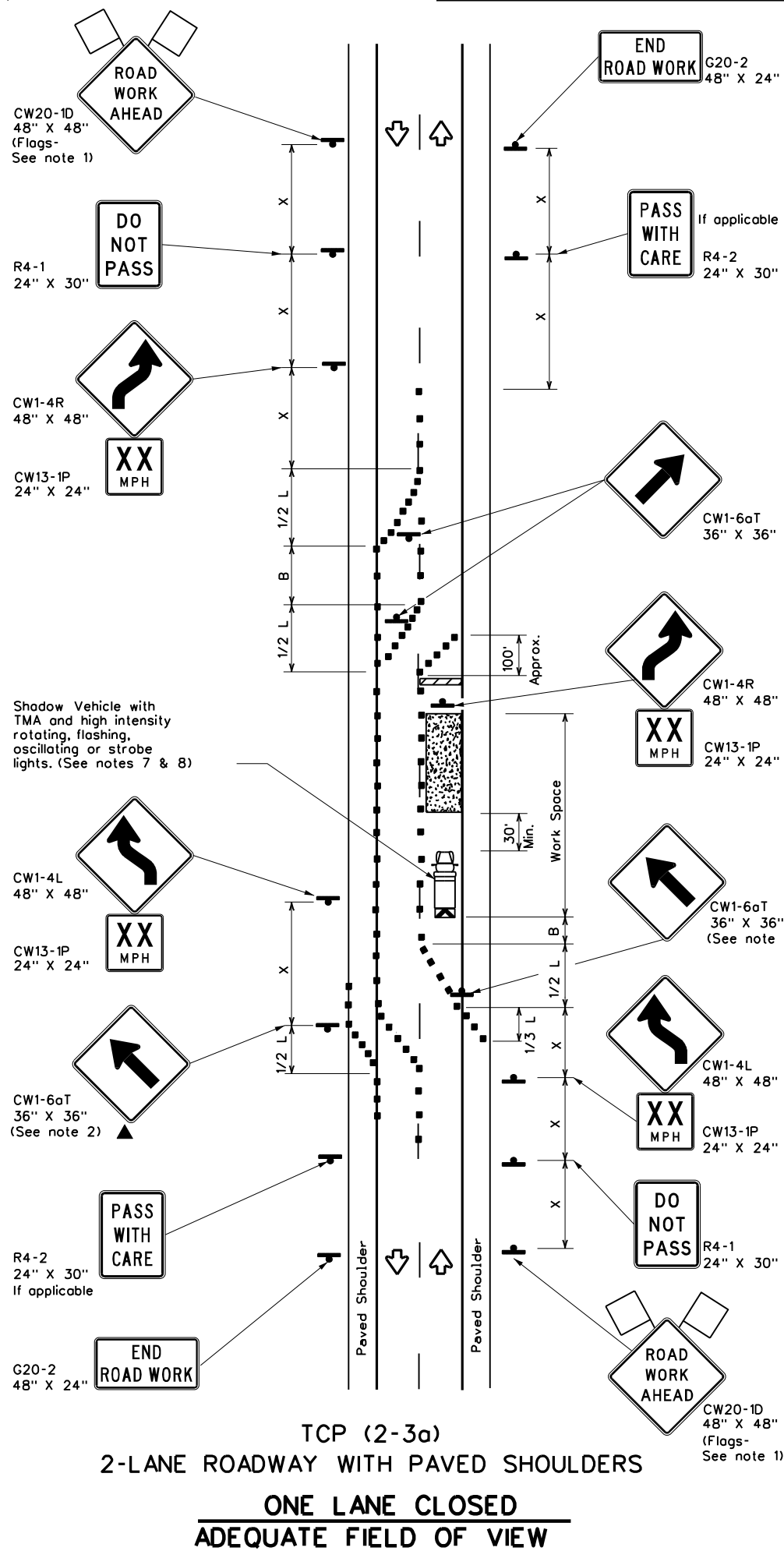
**TCP (2-2b)**

- Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
- If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
- Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

|  |               |                                      |               |
|--|---------------|--------------------------------------|---------------|
| Texas Department of Transportation   |               | Traffic Operations Division Standard |               |
| <b>TRAFFIC CONTROL PLAN</b><br><b>ONE-LANE TWO-WAY</b><br><b>TRAFFIC CONTROL</b><br><b>TCP(2-2)-18</b> |               |                                      |               |
| FILE:  | tcp2-2-18.dgn | DN:                                  | CK:           |
| © TxDOT  | December 1985 | CONT:                                | SECT:         |
| REVISIONS  | 6454          | JOB                                  | HIGHWAY       |
| 8-95   | 3-03          | 001                                  | IH 10, ETC.   |
| 1-97   | 2-12          | DIST:                                | COUNTY        |
| 4-98   | 2-18          | ELP                                  | EL PASO, ETC. |
|  |               |                                      | SHEET NO.     |
|  |               |                                      | 23            |

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DATE: FILE:



| LEGEND |                                      |  |                                  |
|--------|--------------------------------------|--|----------------------------------|
|        | Type 3 Barricade                     |  | Channelizing Devices             |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)   |
|        | Trailer Mounted Flashing Arrow Board |  | Raised Pavement Markers Ty II-AA |
|        | Sign                                 |  | Traffic Flow                     |
|        | Flag                                 |  | Flagger                          |

| Posted Speed<br>x | Formula               | Minimum Desirable Taper Lengths<br>x x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Minimum Sign Spacing<br>"x"<br>Distance | Suggested Longitudinal Buffer Space<br>"B" |
|-------------------|-----------------------|--|------------|------------|---|--------------|---|--|
|                   |                       | 10' Offset                             | 11' Offset | 12' Offset | On a Taper  | On a Tangent |   |  |
| 30                | L = $\frac{WS^2}{60}$ | 150'                                   | 165'       | 180'       | 30'   | 60'          | 120'                                    | 90'  |
| 35                |                       | 205'                                   | 225'       | 245'       | 35'   | 70'          | 160'                                    | 120'                                       |
| 40                | L - WS                | 265'                                   | 295'       | 320'       | 40'   | 80'          | 240'                                    | 155'                                       |
| 45                |                       | 450'                                   | 495'       | 540'       | 45'   | 90'          | 320'                                    | 195'                                       |
| 50                | L - WS                | 500'                                   | 550'       | 600'       | 50'   | 100'         | 400'                                    | 240'                                       |
| 55                |                       | 550'                                   | 605'       | 660'       | 55'   | 110'         | 500'                                    | 295'                                       |
| 60                | L - WS                | 600'                                   | 660'       | 720'       | 60'   | 120'         | 600'                                    | 350'                                       |
| 65                |                       | 650'                                   | 715'       | 780'       | 65'   | 130'         | 700'                                    | 410'                                       |
| 70                | L - WS                | 700'                                   | 770'       | 840'       | 70'   | 140'         | 800'                                    | 475'                                       |
| 75                |                       | 750'                                   | 825'       | 900'       | 75'   | 150'         | 900'                                    | 540'                                       |

x Conventional Roads Only  
 \*\* Taper lengths have been rounded off.  
 L-Length of Taper(FT) W-Width of Offset(FT) S-Posted Speed(MPH)

| TYPICAL USAGE  |                |                       |                              |                      |
|----------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE         | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|                |                |                       | ✓                            | ✓                    |
| TCP(2-3b) ONLY |                |                       |                              |                      |

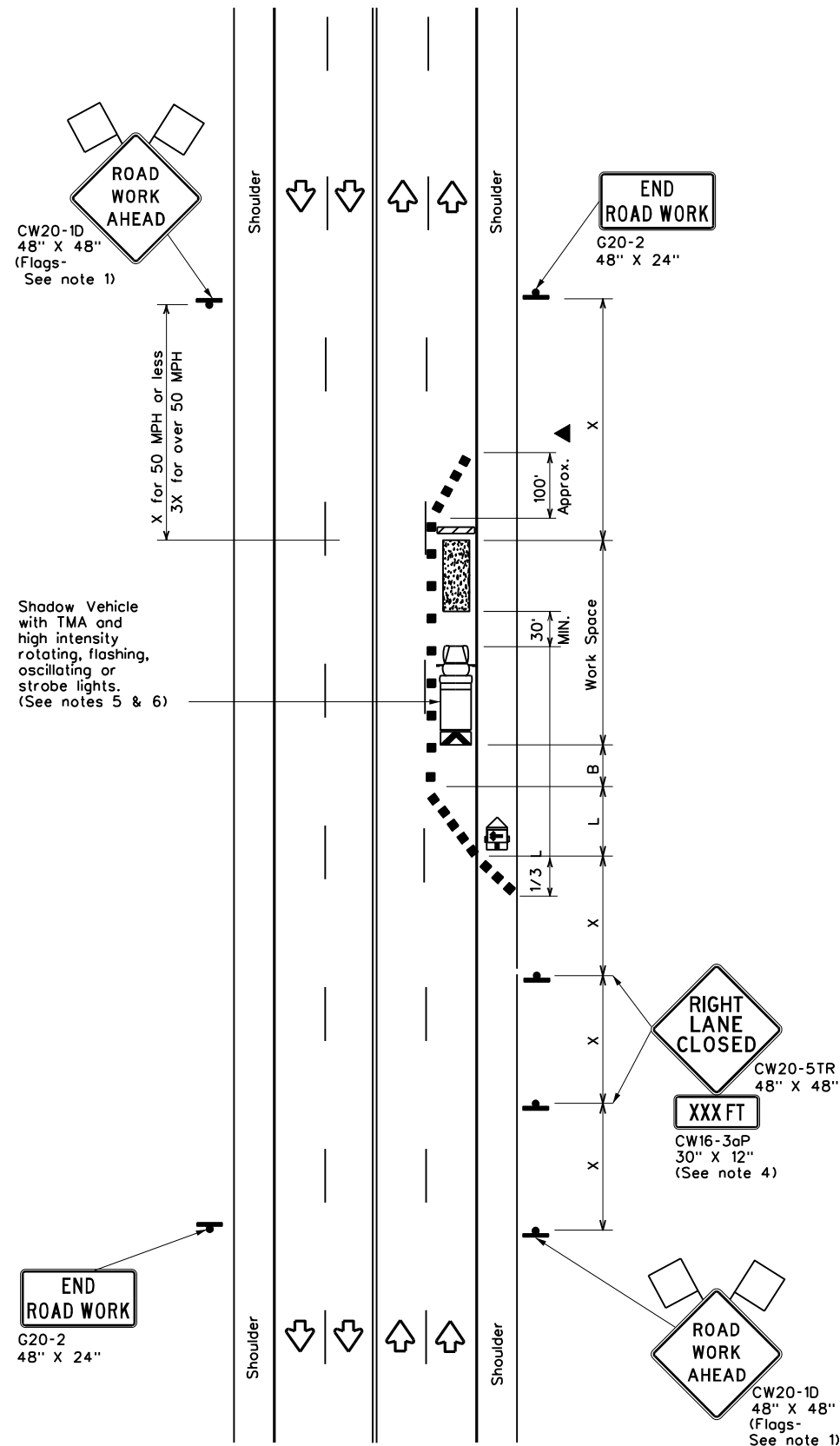
- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
  - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
  - When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
  - Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
  - The R4-1 "DO NOT PASS," R4-2 "PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
  - Conflicting pavement marking shall be removed for long term projects.
  - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted.
  - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- TCP (2-3a)**
- Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

|   |       |                                  |               |
|---|-------|----------------------------------|---------------|
|   |       | Traffic Safety Division Standard |               |
| <b>TRAFFIC CONTROL PLAN</b>             |       |                                  |               |
| <b>TRAFFIC SHIFTS ON TWO-LANE ROADS</b> |       |                                  |               |
| <b>TCP(2-3)-23</b>                      |       |                                  |               |
| FILE: tcp(2-3)-23.dgn                   | DN:   | CK:                              | DW:           |
| © TxDOT April 2023                      | CON:  | SECT:                            | JOB:          |
| REVISIONS                               | 6454  | 87                               | 001           |
| 12-85 4-98 2-18                         | DIST: | COUNTY:                          | EL PASO, ETC. |
| 8-95 3-03 4-23                          | 1-97  | 2-12                             | SHEET NO. 24  |



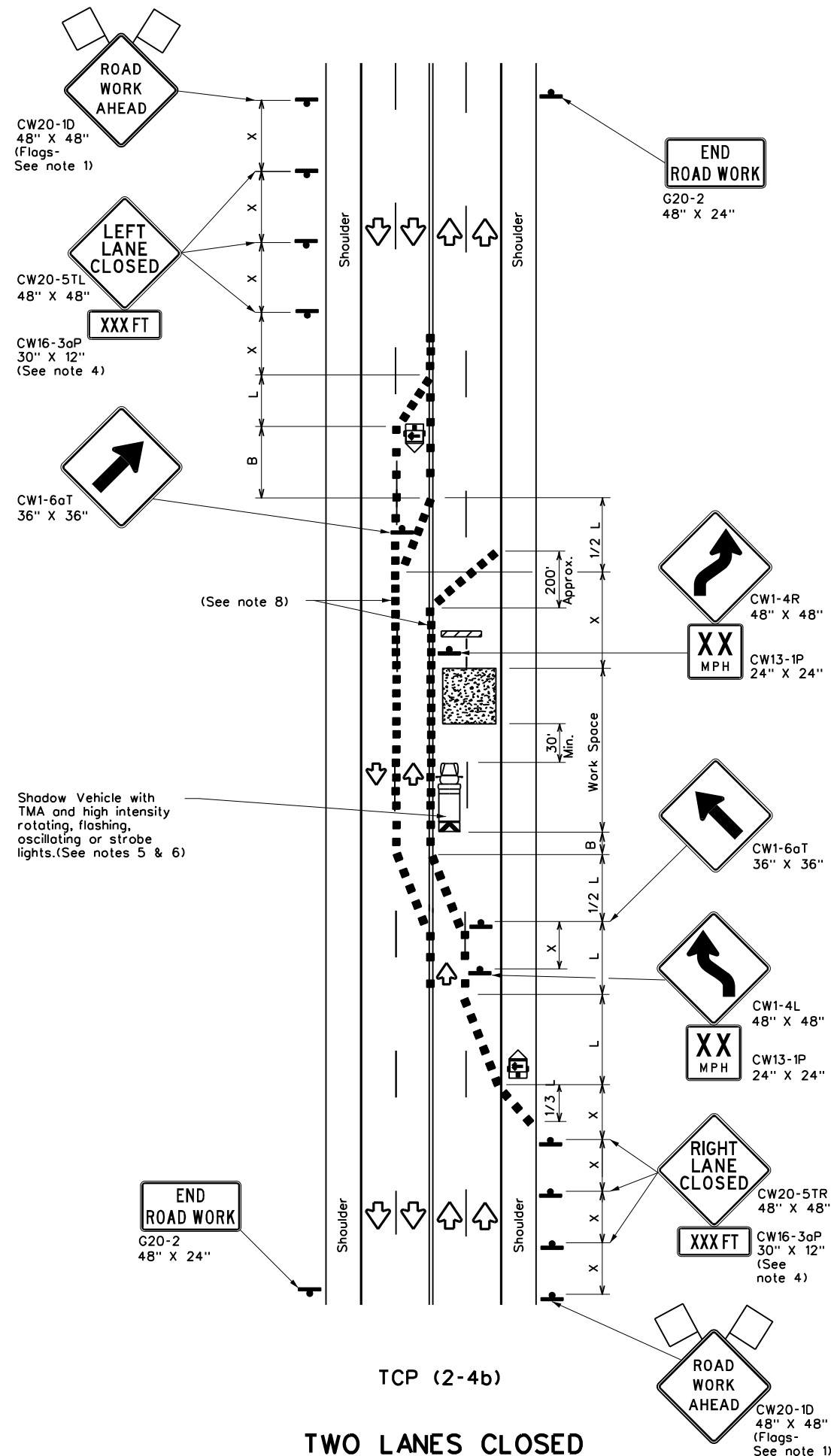
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DATE: 10/17/2023 10:14:59 AM  
 FILE: I:\ELP\MAINT\Contracts\East Area\Office\RMC 6454-87-001 TCP\1 - DESIGN\Plan\515-18.dgn



TCP (2-4a)

**ONE LANE CLOSED**



TCP (2-4b)

**TWO LANES CLOSED**

| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed *<br>x | Formula<br>L = WS <sup>2</sup> / 60 | Minimum Desirable Taper Lengths x x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Minimum Sign Spacing "x" Distance | Suggested Longitudinal Buffer Space "B" |
|---------------------|-------------------------------------|-------------------------------------|------------|------------|---|--------------|-----------------------------------|---|
|                     |                                     | 10' Offset                          | 11' Offset | 12' Offset | On a Taper  | On a Tangent |                                   |   |
| 30                  | L = WS <sup>2</sup> / 60            | 150'                                | 165'       | 180'       | 30'   | 60'          | 120'                              | 90'                                     |
| 35                  |                                     | 205'                                | 225'       | 245'       | 35'   | 70'          | 160'                              | 120'                                    |
| 40                  | L = WS                              | 265'                                | 295'       | 320'       | 40'   | 80'          | 240'                              | 155'                                    |
| 45                  |                                     | 450'                                | 495'       | 540'       | 45'   | 90'          | 320'                              | 195'                                    |
| 50                  | L = WS                              | 500'                                | 550'       | 600'       | 50'   | 100'         | 400'                              | 240'                                    |
| 55                  |                                     | 550'                                | 605'       | 660'       | 55'   | 110'         | 500'                              | 295'                                    |
| 60                  | L = WS                              | 600'                                | 660'       | 720'       | 60'   | 120'         | 600'                              | 350'                                    |
| 65                  |                                     | 650'                                | 715'       | 780'       | 65'   | 130'         | 700'                              | 410'                                    |
| 70                  | L = WS                              | 700'                                | 770'       | 840'       | 70'   | 140'         | 800'                              | 475'                                    |
| 75                  |                                     | 750'                                | 825'       | 900'       | 75'   | 150'         | 900'                              | 540'                                    |

\* Conventional Roads Only  
 \*\* Taper lengths have been rounded off.  
 L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               |                | ✓                     | ✓                            |                      |

**GENERAL NOTES**

- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
- For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
- A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

**TCP (2-4a)**

- If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the merging taper.

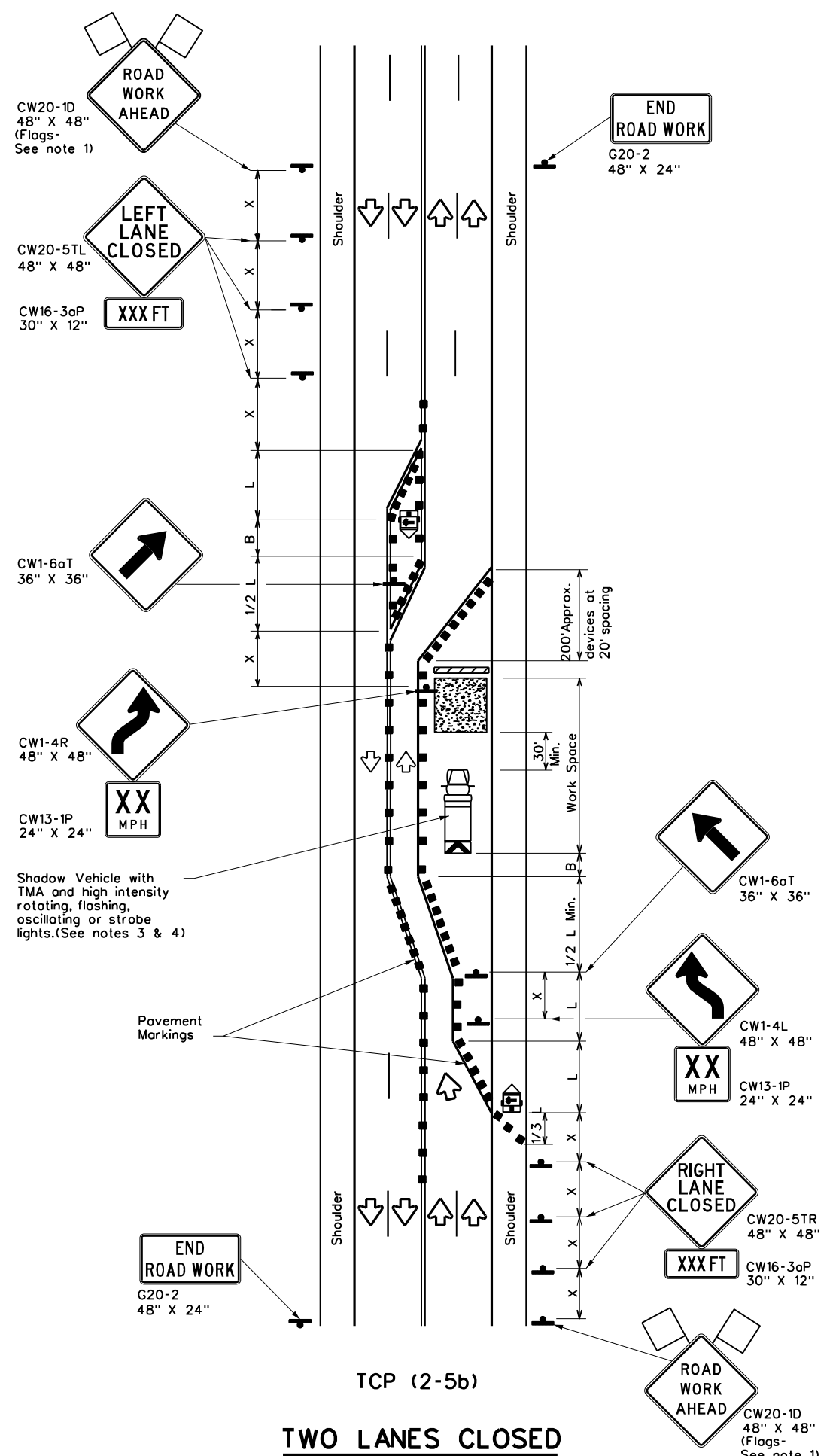
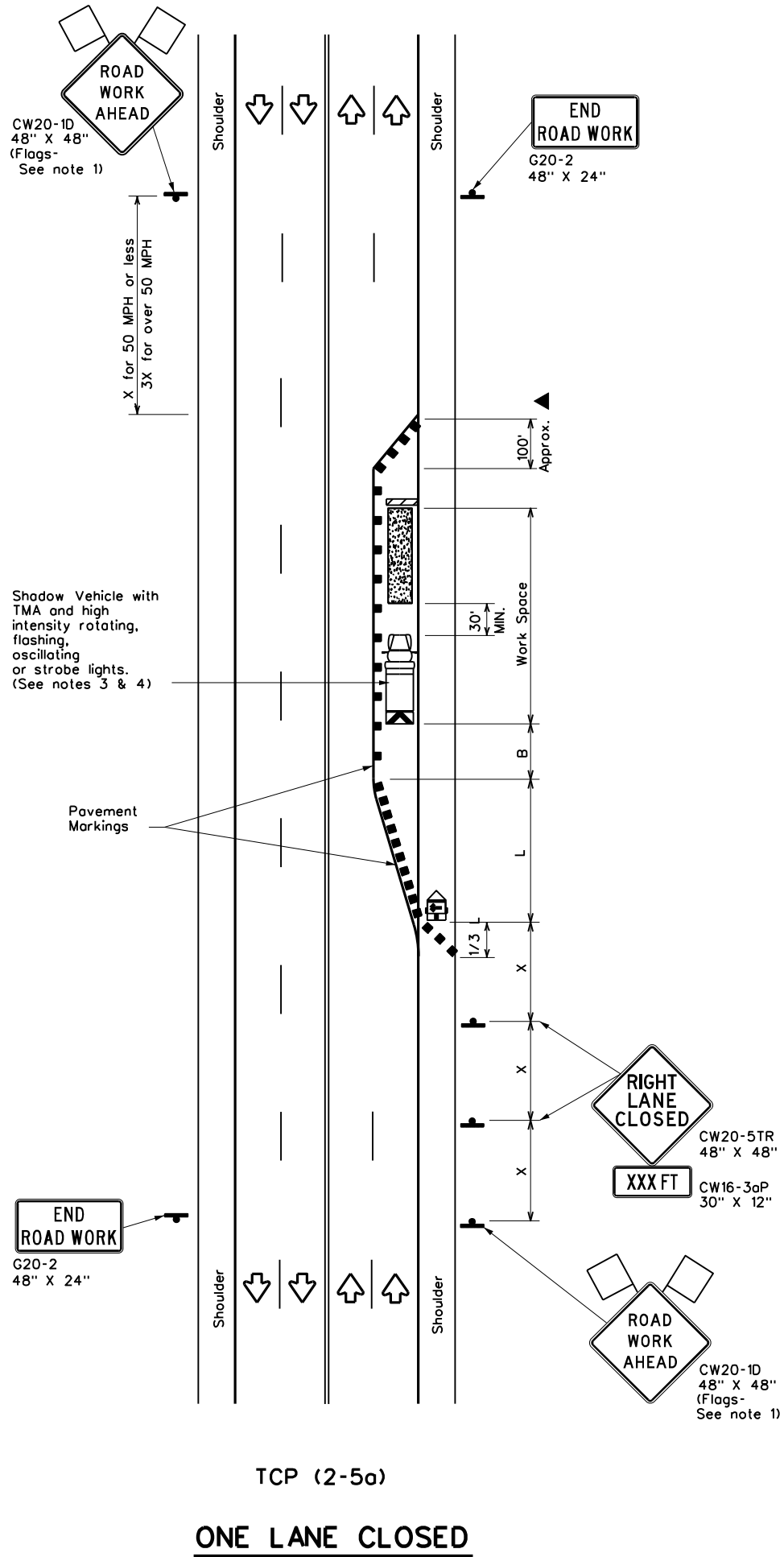
**TCP (2-4b)**

- For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter devices spacing is intended for the area of conflicting markings, not the entire work zone.

|   |       |                                      |             |
|---|-------|--------------------------------------|-------------|
|   |       | Traffic Operations Division Standard |             |
| <b>TRAFFIC CONTROL PLAN<br/>                 LANE CLOSURES ON MULTILANE<br/>                 CONVENTIONAL ROADS</b> |       |                                      |             |
| <b>TCP(2-4)-18</b>  |       |                                      |             |
| FILE: tcp2-4-18.dgn   | DWG:  | CK:                                  | DW:         |
| © TxDOT December 1985   | CONT: | SECT:                                | JOB:        |
| REVISIONS   | 6454  | 87                                   | 001         |
| 8-95 3-03   |       |                                      | IH 10, ETC. |
| 1-97 2-12   | DIST: | COUNTY:                              | SHEET NO.   |
| 4-98 2-18   | ELP   | EL PASO, ETC.                        | 25          |

DATE: 10/17/2023 10:14:59 AM  
 FILE: I:\ELPM\MAINT\Contracts\East Area\Office\RMC 6454-87-001 TCP\1 - DESIGN\Plan\CP2-5-18.dgn

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| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed<br>x | Formula               | Minimum Desirable Taper Lengths<br>x x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Minimum Sign Spacing<br>"x"<br>Distance | Suggested Longitudinal Buffer Space<br>"B" |
|-------------------|-----------------------|--|------------|------------|---|--------------|---|--|
|                   |                       | 10' Offset                             | 11' Offset | 12' Offset | On a Taper  | On a Tangent |   |  |
| 30                | $L = \frac{WS^2}{60}$ | 150'                                   | 165'       | 180'       | 30'   | 60'          | 120'                                    | 90'  |
| 35                |                       | 205'                                   | 225'       | 245'       | 35'   | 70'          | 160'                                    | 120'                                       |
| 40                |                       | 265'                                   | 295'       | 320'       | 40'   | 80'          | 240'                                    | 155'                                       |
| 45                | L = WS                | 450'                                   | 495'       | 540'       | 45'   | 90'          | 320'                                    | 195'                                       |
| 50                |                       | 500'                                   | 550'       | 600'       | 50'   | 100'         | 400'                                    | 240'                                       |
| 55                |                       | 550'                                   | 605'       | 660'       | 55'   | 110'         | 500'                                    | 295'                                       |
| 60                |                       | 600'                                   | 660'       | 720'       | 60'   | 120'         | 600'                                    | 350'                                       |
| 65                |                       | 650'                                   | 715'       | 780'       | 65'   | 130'         | 700'                                    | 410'                                       |
| 70                |                       | 700'                                   | 770'       | 840'       | 70'   | 140'         | 800'                                    | 475'                                       |
| 75                |                       | 750'                                   | 825'       | 900'       | 75'   | 150'         | 900'                                    | 540'                                       |

x Conventional Roads Only  
 x x Taper lengths have been rounded off.  
 L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               |                |                       | ✓                            | ✓                    |

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
  - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
  - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
  - Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
  - The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

**TCP (2-5a)**

- If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic, with the arrow board placed in the closed lane near the end of the merging taper.

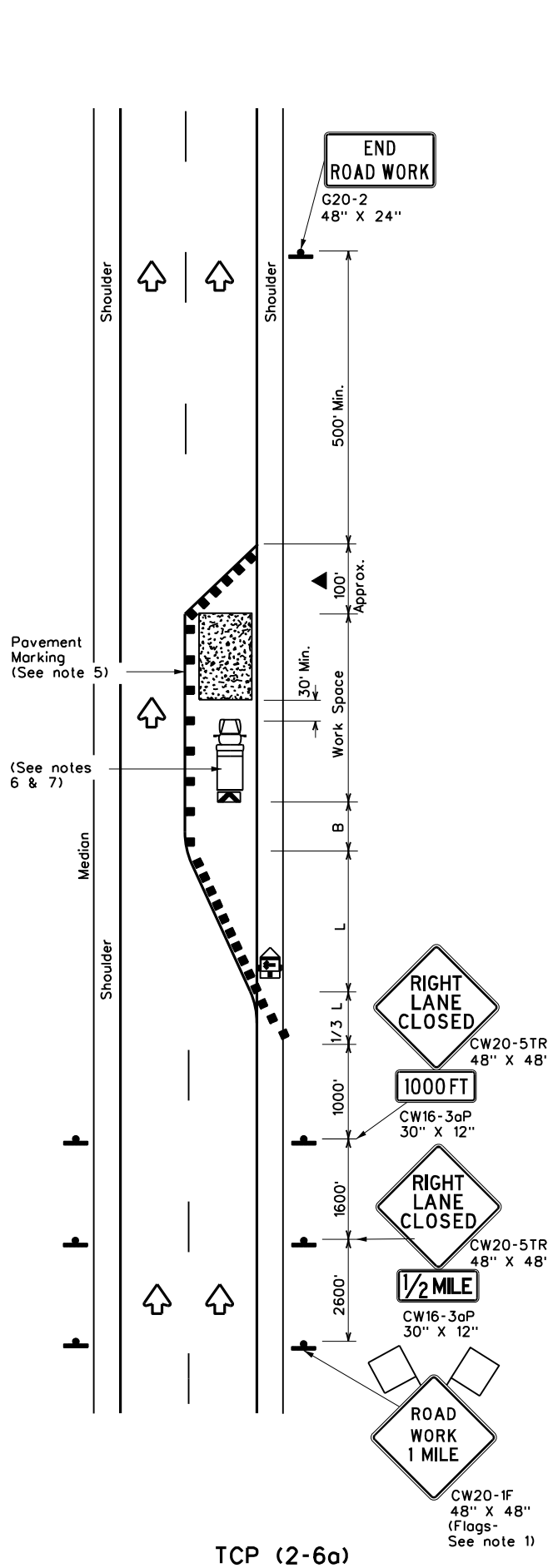
**TCP (2-5b)**

- Conflicting pavement markings shall be removed for long-term projects.

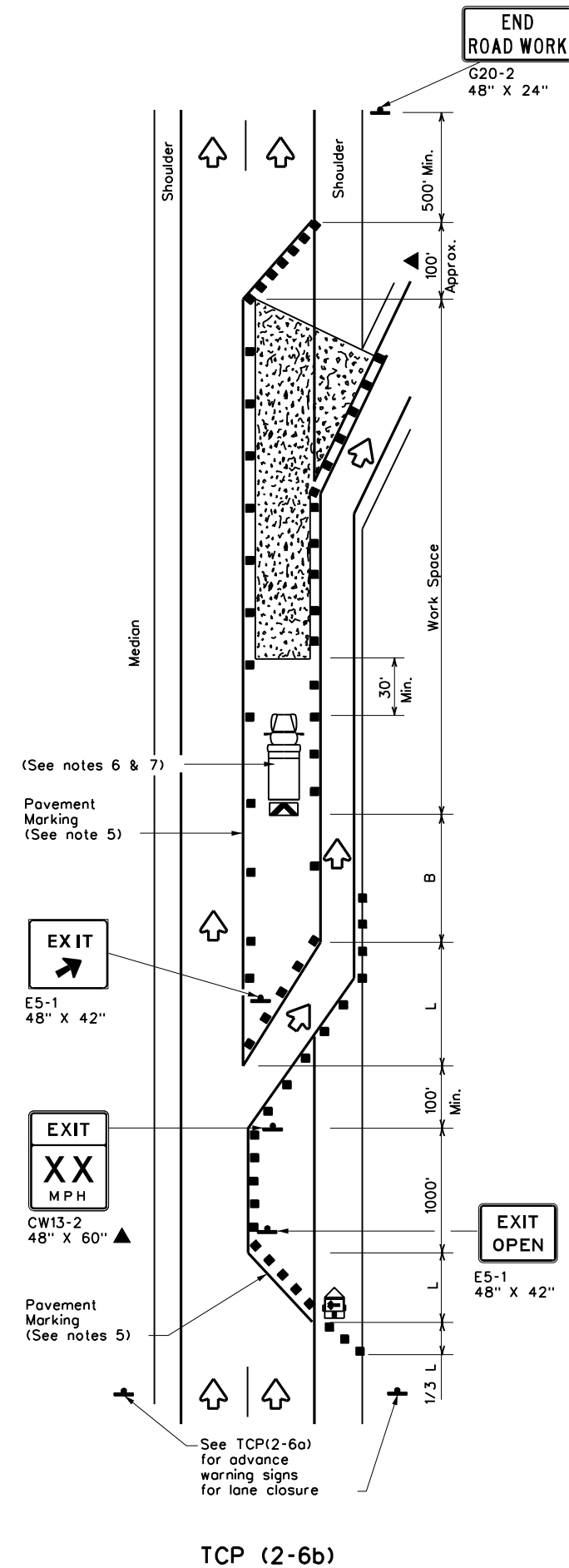
|  |               |       |                                      |      |             |
|--|---------------|-------|--------------------------------------|------|-------------|
|  |               |       | Traffic Operations Division Standard |      |             |
| <h2 style="margin: 0;">TRAFFIC CONTROL PLAN</h2> <h3 style="margin: 0;">LONG TERM LANE CLOSURES</h3> <h3 style="margin: 0;">MULTILANE CONVENTIONAL RDS.</h3> |               |       |                                      |      |             |
| <h1 style="margin: 0;">TCP(2-5)-18</h1>  |               |       |                                      |      |             |
| FILE:  | tcp2-5-18.dgn | DN:   | CK:                                  | DW:  | CK:         |
| © TxDOT  | December 1985 | CONT: | SECT:                                | JOB: | HIGHWAY:    |
| 8-95 2-12  | REVISIONS     | 6454  | 87                                   | 001  | IH 10, ETC. |
| 1-97 3-03  |               | DIST: | COUNTY:                              |      | SHEET NO.   |
| 4-98 2-18  |               | ELP   | EL PASO, ETC.                        |      | 26          |

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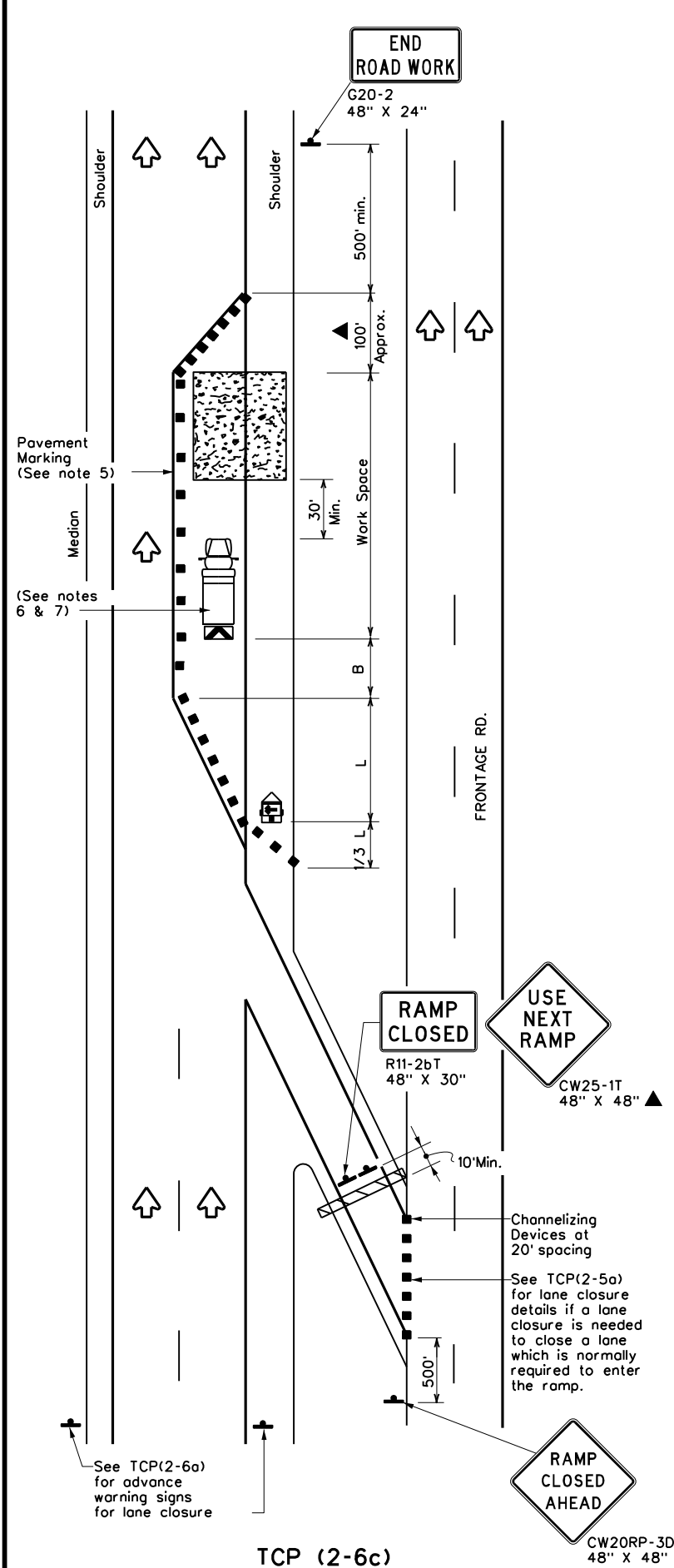
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FILE: I:\ELP\MAINT\Contracts\East Area Office\VC\6454-87-001\_TCP\1 - DESIGN\Plan\051118\TCP(2-6)-18.dgn



TCP (2-6a)  
**ONE LANE CLOSURE**



TCP (2-6b)  
**LANE CLOSURE NEAR EXIT RAMP**



TCP (2-6c)  
**LANE CLOSURE NEAR ENTRANCE RAMP**

| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed<br>x | Formula               | Minimum Desirable Taper Lengths<br>x x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Minimum Sign Spacing<br>"x"<br>Distance | Suggested Longitudinal Buffer Space<br>"B" |
|-------------------|-----------------------|--|------------|------------|---|--------------|---|--|
|                   |                       | 10' Offset                             | 11' Offset | 12' Offset | On a Taper  | On a Tangent |   |  |
| 30                | $L = \frac{WS^2}{60}$ | 150'                                   | 165'       | 180'       | 30'   | 60'          | 120'                                    | 90'  |
| 35                |                       | 205'                                   | 225'       | 245'       | 35'   | 70'          | 160'                                    | 120'                                       |
| 40                |                       | 265'                                   | 295'       | 320'       | 40'   | 80'          | 240'                                    | 155'                                       |
| 45                | L = WS                | 450'                                   | 495'       | 540'       | 45'   | 90'          | 320'                                    | 195'                                       |
| 50                |                       | 500'                                   | 550'       | 600'       | 50'   | 100'         | 400'                                    | 240'                                       |
| 55                |                       | 550'                                   | 605'       | 660'       | 55'   | 110'         | 500'                                    | 295'                                       |
| 60                |                       | 600'                                   | 660'       | 720'       | 60'   | 120'         | 600'                                    | 350'                                       |
| 65                |                       | 650'                                   | 715'       | 780'       | 65'   | 130'         | 700'                                    | 410'                                       |
| 70                |                       | 700'                                   | 770'       | 840'       | 70'   | 140'         | 800'                                    | 475'                                       |
| 75                |                       | 750'                                   | 825'       | 900'       | 75'   | 150'         | 900'                                    | 540'                                       |

\* Conventional Roads Only  
\*\* Taper lengths have been rounded off.  
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               |                |                       | ✓                            | ✓                    |

**GENERAL NOTES**

- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
- Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on every other channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
- The placement of pavement markings may be omitted on intermediate-term stationary work zones with the approval of the Engineer.
- Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.



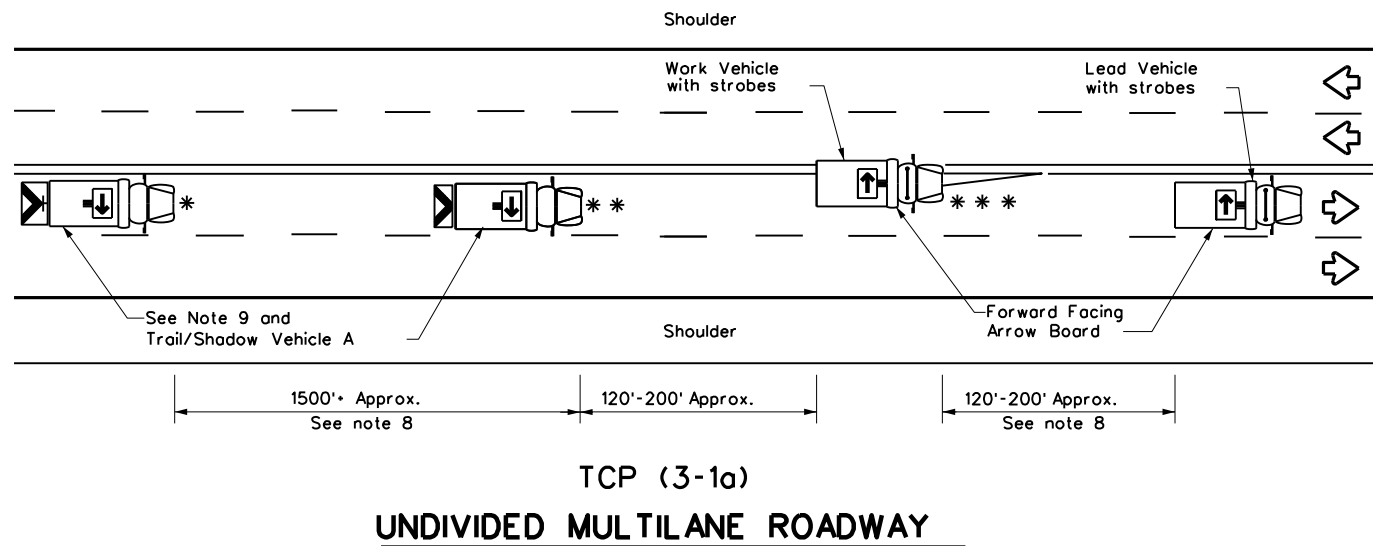
**TRAFFIC CONTROL PLAN  
LANE CLOSURES ON  
DIVIDED HIGHWAYS**

**TCP(2-6)-18**

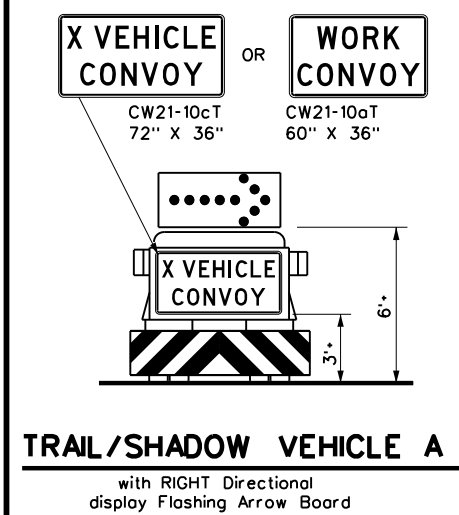
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| © TxDOT December 1985 | CONT: 6454 | SECT: 87              | JOB: 001 | HIGHWAY: IH 10, ETC. |
| REVISIONS:            | 2-94 4-98  |                       |          |                      |
|                       | 8-95 2-12  |                       |          |                      |
|                       | 1-97 2-18  |                       |          |                      |
|                       | DIST: ELP  | COUNTY: EL PASO, ETC. |          | SHEET NO.: 27        |

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DATE: 10/17/2023 10:15:00 AM  
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**TCP (3-1a)**  
**UNDIVIDED MULTILANE ROADWAY**



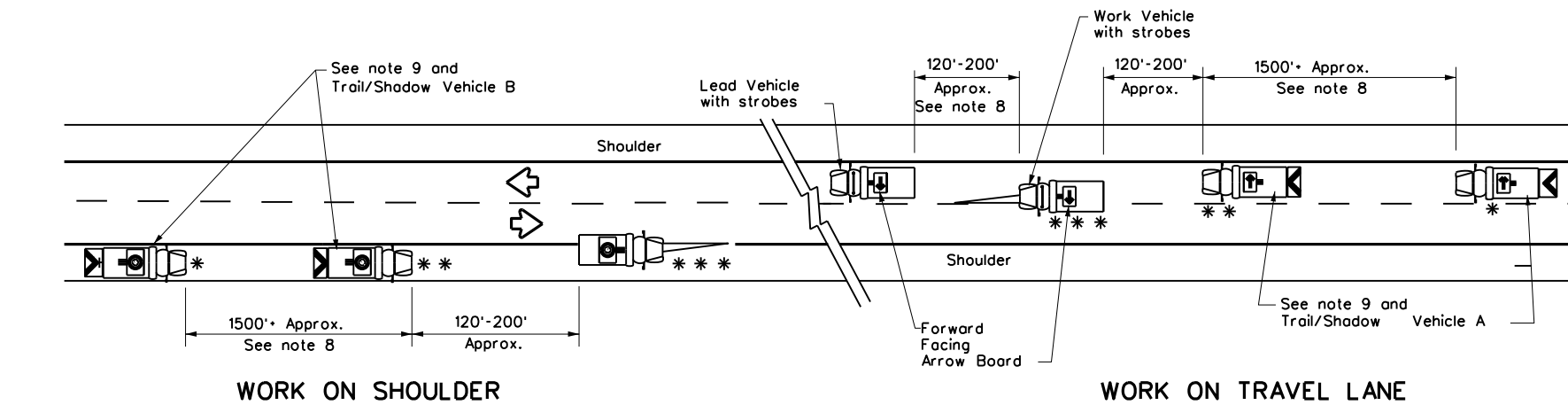
**TRAIL/SHADOW VEHICLE A**  
with RIGHT Directional display Flashing Arrow Board

| LEGEND |                                |                     |   |
|--------|--------------------------------|---------------------|---|
| *      | Trail Vehicle                  | ARROW BOARD DISPLAY |   |
| **     | Shadow Vehicle                 |                     |   |
| ***    | Work Vehicle                   |                     | RIGHT Directional                               |
|        | Heavy Work Vehicle             |                     | LEFT Directional                                |
|        | Truck Mounted Attenuator (TMA) |                     | Double Arrow                                    |
|        | Traffic Flow                   |                     | CAUTION (Alternating Diamond or 4 Corner Flash) |

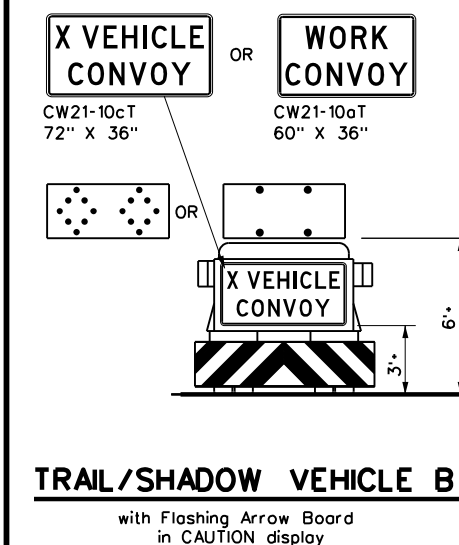
| TYPICAL USAGE                       |                          |                          |                              |                          |
|-------------------------------------|--------------------------|--------------------------|------------------------------|--------------------------|
| MOBILE                              | SHORT DURATION           | SHORT TERM STATIONARY    | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> |

**GENERAL NOTES**

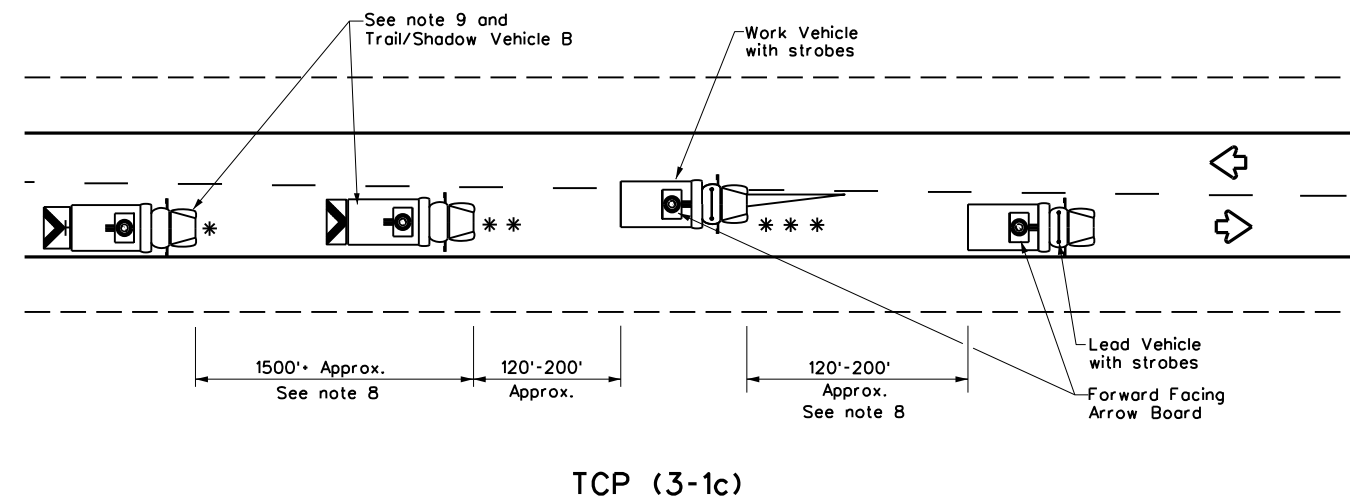
- TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
- The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
- The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and TRAIL VEHICLE are required.
- Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
- Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
- Each vehicle shall have two-way radio communication capability.
- When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
- Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
- "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY" (CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
- On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.



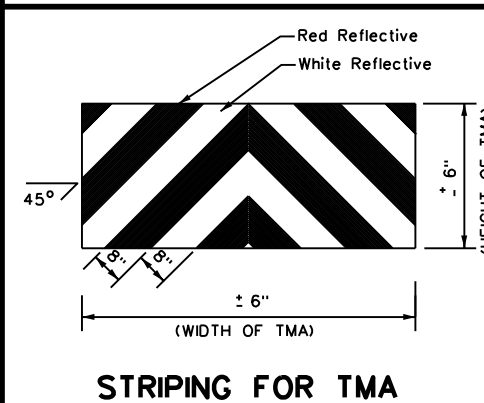
**TCP (3-1b)**  
**TWO-WAY ROADWAY WITH PAVED SHOULDERS**



**TRAIL/SHADOW VEHICLE B**  
with Flashing Arrow Board in CAUTION display



**TCP (3-1c)**  
**TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS**



**STRIPING FOR TMA**

Traffic Operations Division Standard

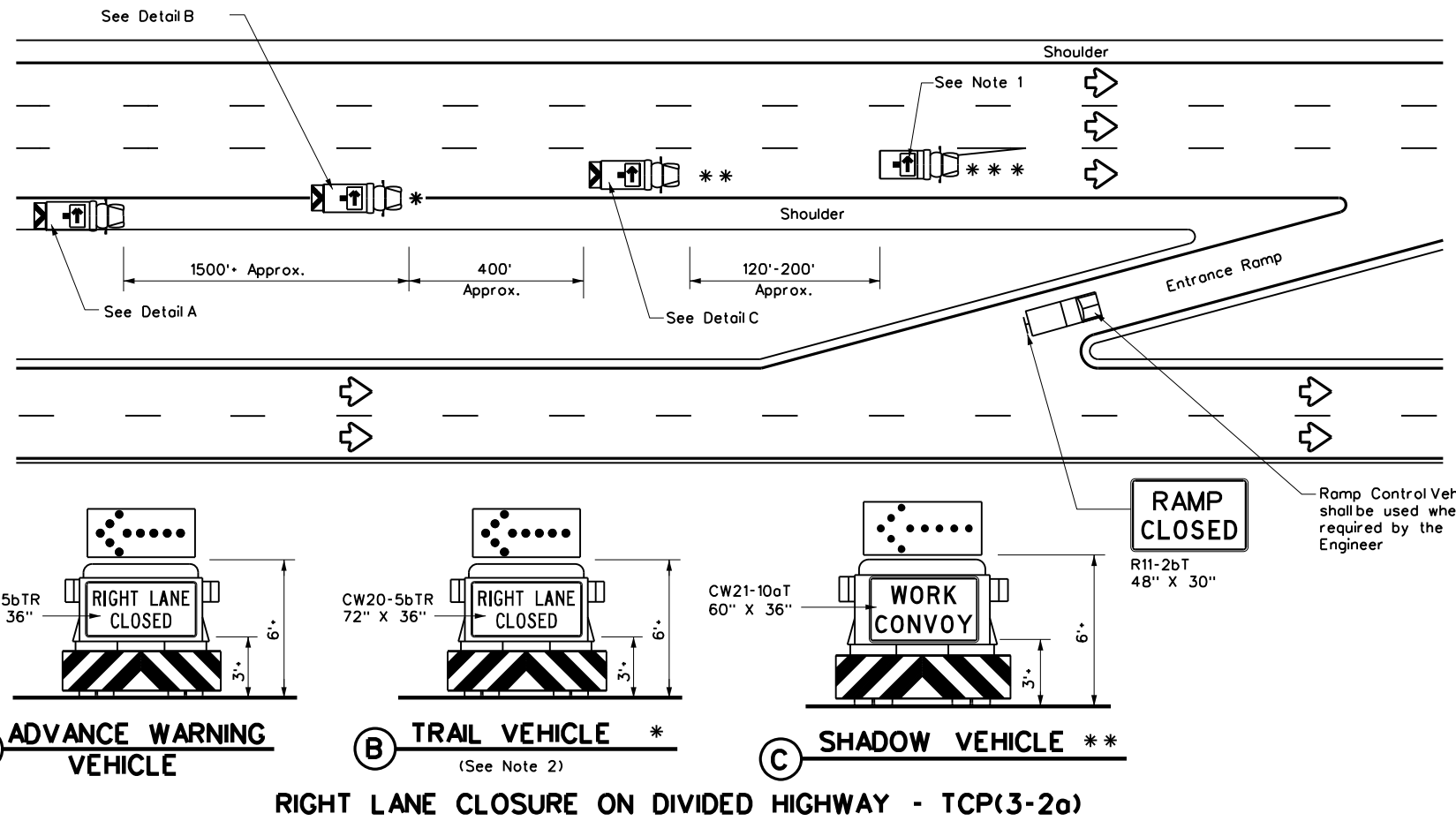
**TRAFFIC CONTROL PLAN  
MOBILE OPERATIONS  
UNDIVIDED HIGHWAYS**

**TCP(3-1)-13**

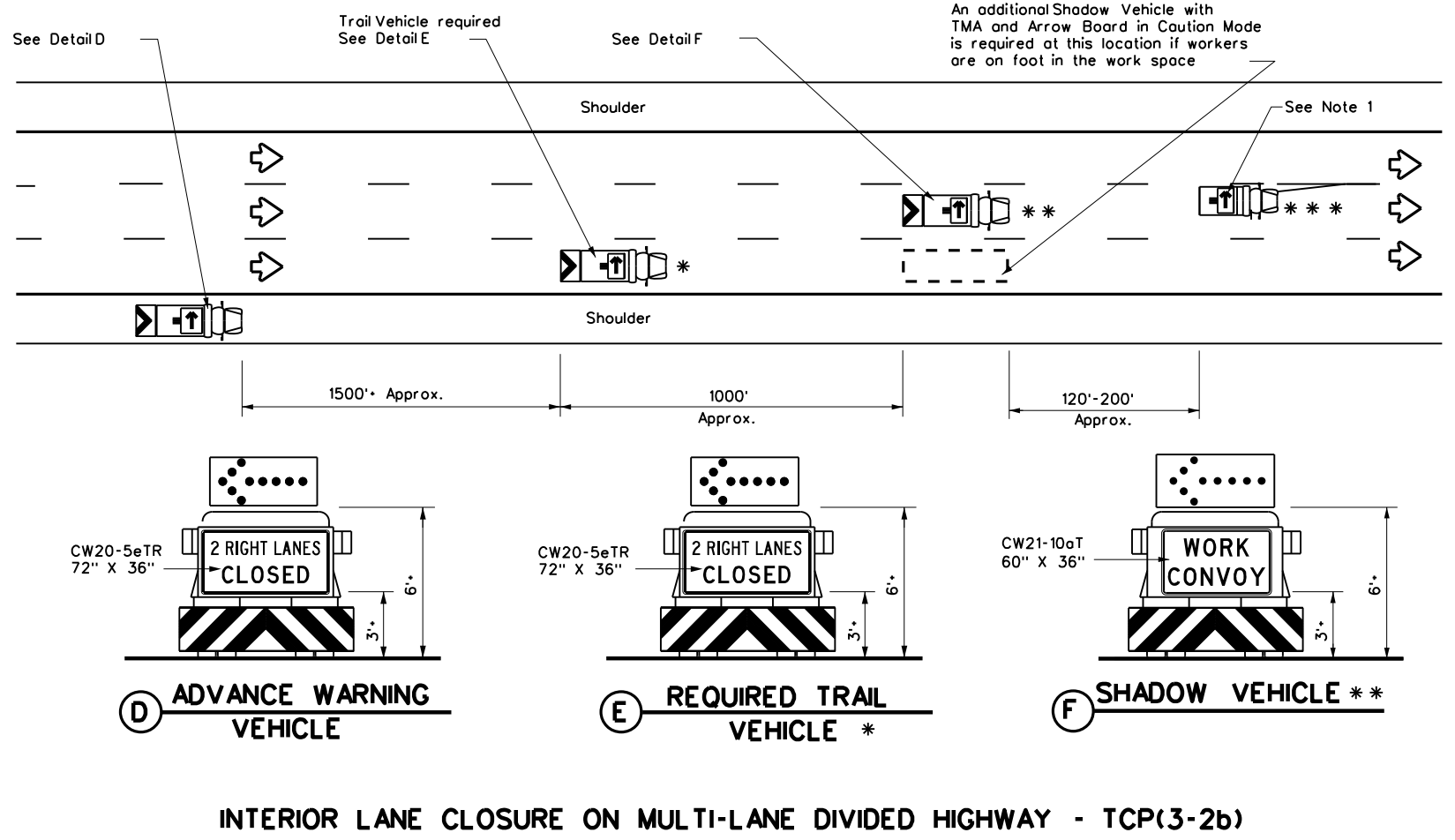
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| © TxDOT December 1985 | CONT      | SECT          | JOB       | HIGHWAY     |
| REVISIONS             | 6454      | 87            | 001       | IH 10, ETC. |
| 2-94 4-98             | DIST      | COUNTY        | SHEET NO. |             |
| 8-95 7-13             | ELP       | EL PASO, ETC. | 28        |             |
| 1-97                  |           |               |           |             |

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DATE: 10/17/2023 10:15:00 AM  
FILE: I:\ELP\MAINT\Contracts\East Area\Office\RMC\_6454-87-001\_TCP\1 - DESIGN\Plan\513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000



**RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)**



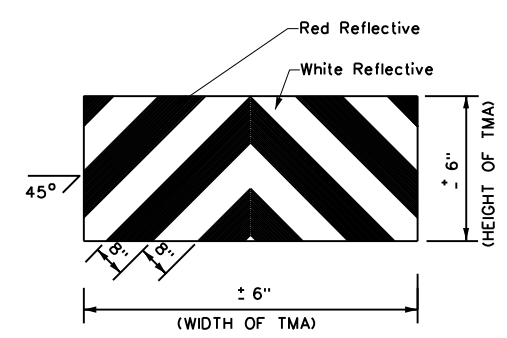
**INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)**

| LEGEND |                                |                     |   |
|--------|--------------------------------|---------------------|---|
| *      | Trail Vehicle                  | ARROW BOARD DISPLAY |   |
| **     | Shadow Vehicle                 |                     |   |
| ***    | Work Vehicle                   | →                   | RIGHT Directional                               |
| ☐      | Heavy Work Vehicle             | ←                   | LEFT Directional                                |
| ▲      | Truck Mounted Attenuator (TMA) | ↔                   | Double Arrow                                    |
| ⬅      | Traffic Flow                   | ⚠                   | CAUTION (Alternating Diamond or 4 Corner Flash) |

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
| ✓             |                |                       |                              |                      |

**GENERAL NOTES**

- ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the vehicle.
- For TCP(3-2a) the Engineer will determine if the TRAIL VEHICLE is required based on prevailing roadway conditions, traffic volume, and sight distance restrictions. All other vehicles shown for both TCP(3-2a) and TCP(3-2b) are required.
- The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
- The use of truck mounted attenuators (TMA) on the ADVANCE WARNING, SHADOW, and TRAIL vehicles are required.
- Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DMS 8300, Type A.
- Each vehicle shall have two-way radio communication capability.
- When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
- Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE may vary according to terrain, work activity and other factors.
- Standard 48" X 48" diamond shaped warning signs with the same message as those shown may be used where adequate mounting space exists.
- The signs shown should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or a truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board, must be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
- Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
- The principles on this sheet may be used to close lanes from the left side of the roadway considering the number of lanes, shoulder width, sight distance, and ramp frequency.
- Signs and flashing arrow board modes shall be appropriately altered when implementing left lane closures or interior closures which close the left lanes.
- The Advance Warning Vehicle may straddle the edgeline when shoulder width makes it necessary.



**STRIPING FOR TMA**

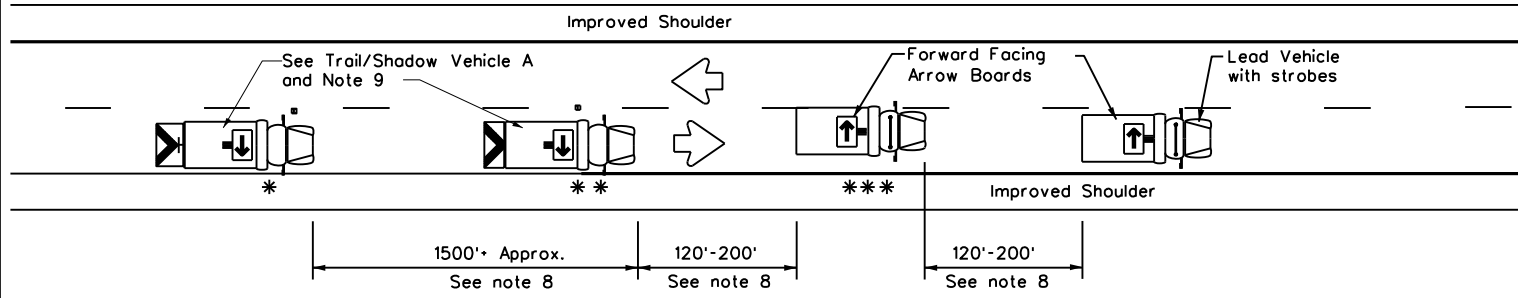
**Texas Department of Transportation**  
Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN  
MOBILE OPERATIONS  
DIVIDED HIGHWAYS**

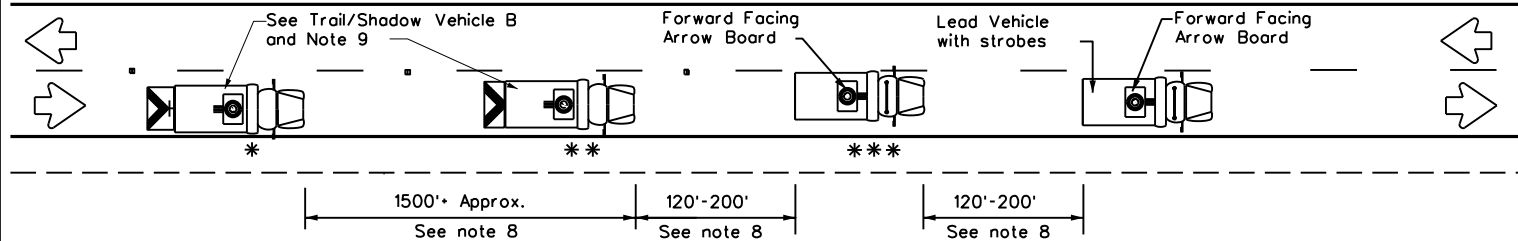
**TCP(3-2)-13**

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|-----------------------|-----------|---------------|-----------|-------------|
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| © TxDOT December 1985 | CONT      | SECT          | JOB       | HIGHWAY     |
| REVISIONS             | 6454      | 87            | 001       | IH 10, ETC. |
| 2-94 4-98             | DIST      | COUNTY        | SHEET NO. |             |
| 8-95 7-13             | ELP       | EL PASO, ETC. | 29        |             |
| 1-97                  |           |               |           |             |

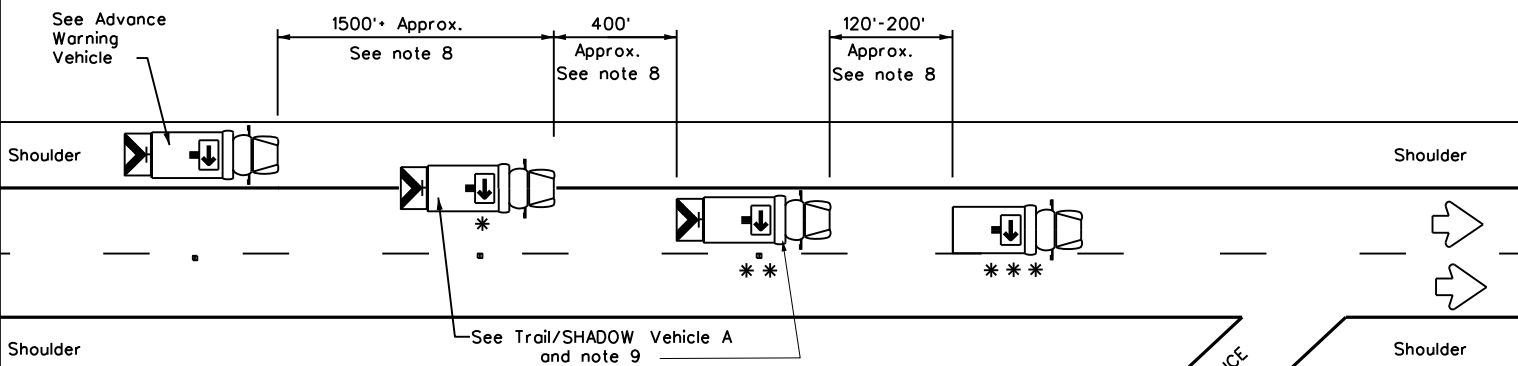
DATE: 10/17/2023 10:15:01 AM  
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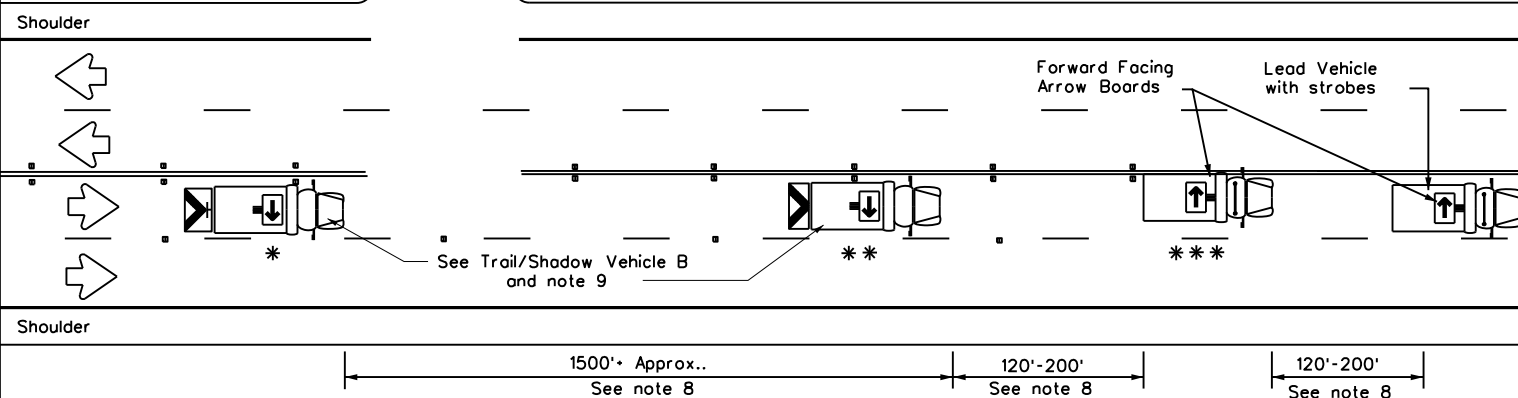
**TCP (3-3a)  
TWO LANE HIGHWAY WITH PAVED SHOULDERS  
(WORK ON TRAVEL LANE)**



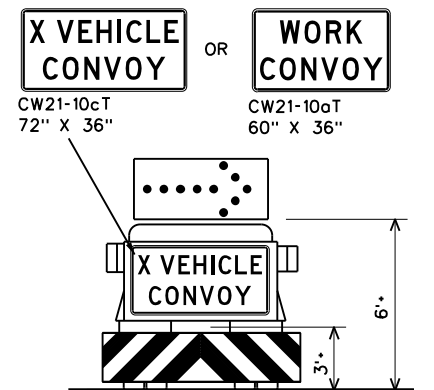
**TCP (3-3b)  
TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS  
(WORK ON TRAVEL LANE)**



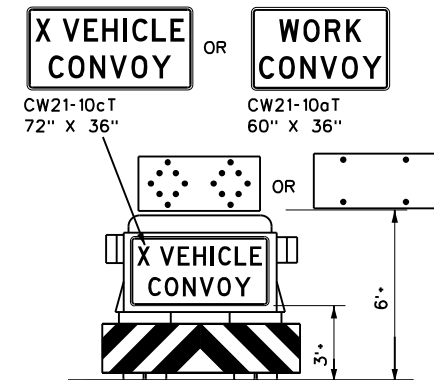
**TCP (3-3c)  
DIVIDED MULTILANE HIGHWAY**



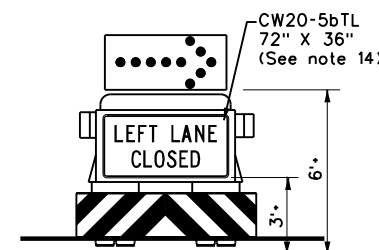
**TCP (3-3d)  
UNDIVIDED MULTILANE HIGHWAY**



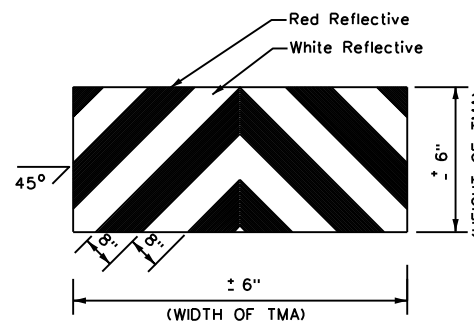
**TRAIL/SHADOW VEHICLE A**



**TRAIL/SHADOW VEHICLE B**



**ADVANCE WARNING VEHICLE**



**STRIPING FOR TMA**

| LEGEND            |   |             |             |
|-------------------|---|-------------|-------------|
| * Trail Vehicle   | ARROW BOARD DISPLAY                             |             |             |
| ** Shadow Vehicle |   |             |             |
| *** Work Vehicle  |   | RIGHT       | Directional |
|                   | LEFT  | Directional |             |
|                   | DOUBLE  | Arrow       |             |
|                   | CAUTION (Alternating Diamond or 4 Corner Flash) |             |             |

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
| ✓             |                |                       |                              |                      |

**GENERAL NOTES**

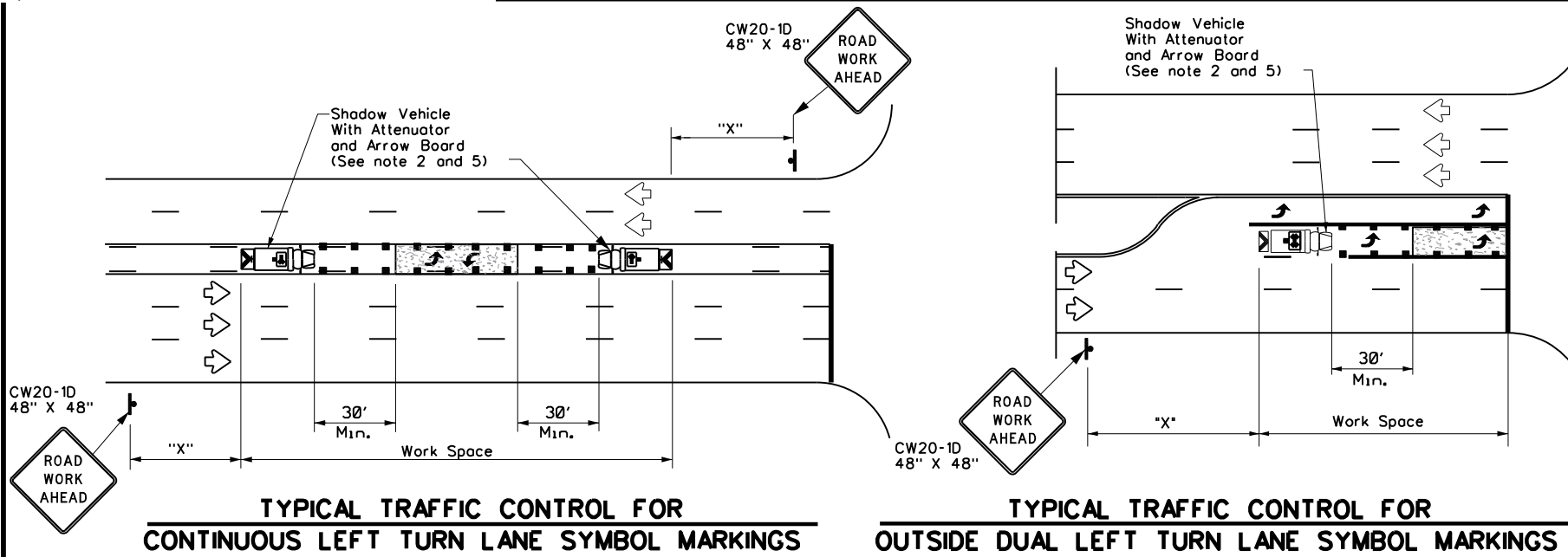
- TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
- The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
- The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
- Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
- Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
- Each vehicle shall have two-way radio communication capability.
- When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
- Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
- X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
- For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
- A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
- For divided highways with three or four lanes in each direction, use TCP(3-2).
- Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
- The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
- On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

|  |           |               |                                      |             |  |
|--|-----------|---------------|--------------------------------------|-------------|--|
|  |           |               | Traffic Operations Division Standard |             |  |
| <b>TRAFFIC CONTROL PLAN<br/>MOBILE OPERATIONS<br/>RAISED PAVEMENT<br/>MARKER INSTALLATION/<br/>REMOVAL<br/>TCP(3-3)-14</b> |           |               |                                      |             |  |
| FILE: tcp3-3.dgn   | DN: TxDOT | CK: TxDOT     | DW: TxDOT                            | CK: TxDOT   |  |
| © TxDOT September 1987   | CONT      | SECT          | JOB                                  | HIGHWAY     |  |
|  | 6454      | 87            | 001                                  | IH 10, ETC. |  |
| 2-94 4-98  |           |               |                                      |             |  |
| 8-95 7-13  |           |               |                                      |             |  |
| 1-97 7-14  | DIST      | COUNTY        |                                      | SHEET NO.   |  |
|  | ELP       | EL PASO, ETC. |                                      | 30          |  |



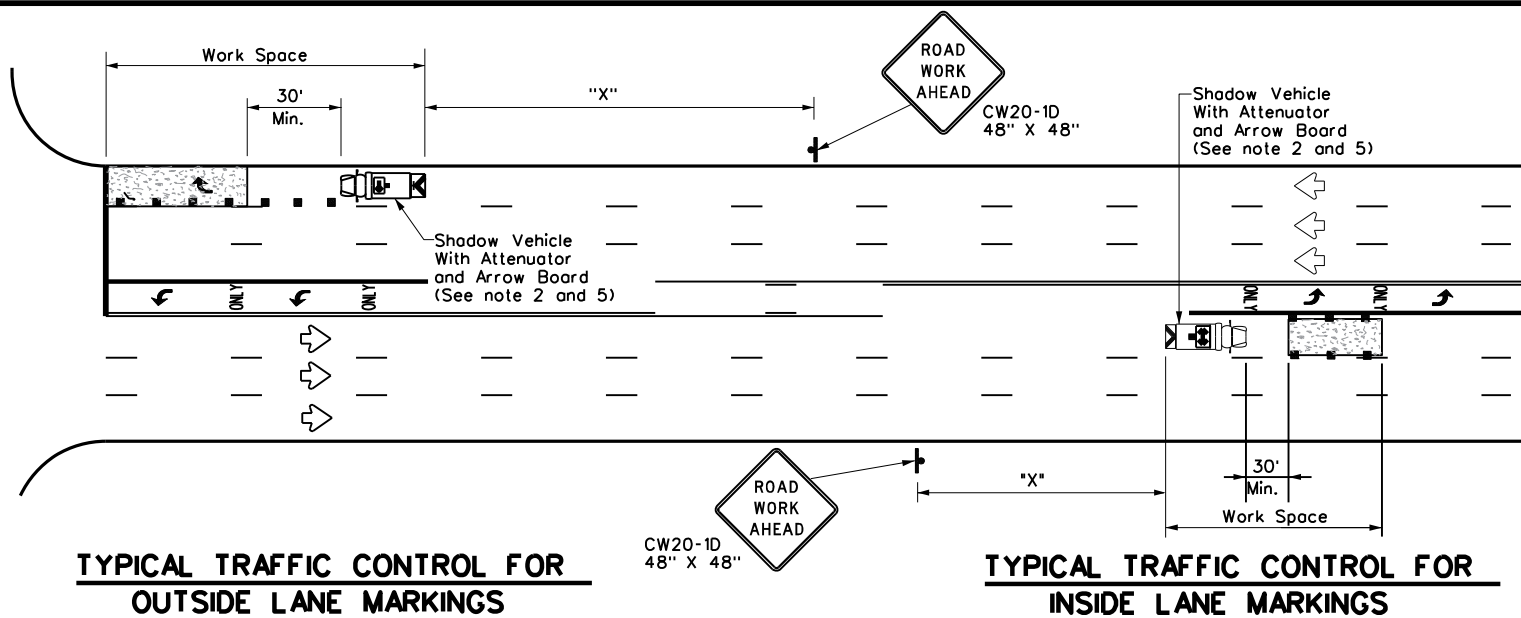
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DATE: FILE:



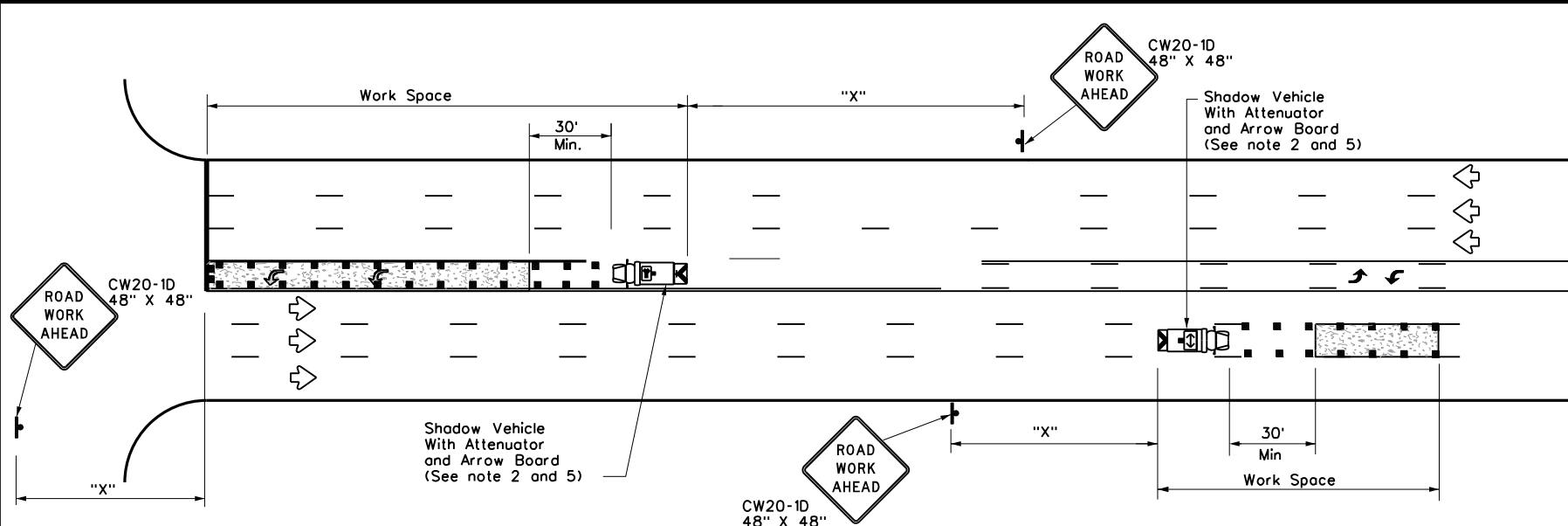
**TYPICAL TRAFFIC CONTROL FOR CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS**

**TYPICAL TRAFFIC CONTROL FOR OUTSIDE DUAL LEFT TURN LANE SYMBOL MARKINGS**



**TYPICAL TRAFFIC CONTROL FOR OUTSIDE LANE MARKINGS**

**TYPICAL TRAFFIC CONTROL FOR INSIDE LANE MARKINGS**



**TYPICAL TRAFFIC CONTROL FOR LEFT TURN LANE MARKINGS**

**TYPICAL TRAFFIC CONTROL FOR CENTER LANE MARKINGS**

| LEGEND |                                |                      |
|--------|--------------------------------|----------------------|
| *      | Trail Vehicle                  | ARROW BOARD DISPLAY  |
| **     | Shadow Vehicle                 |                      |
| ***    | Work Vehicle                   | RIGHT Directional    |
|        | Heavy Work Vehicle             | LEFT Directional     |
|        | Truck Mounted Attenuator (TMA) | Double Arrow         |
|        | Traffic Flow                   | Channelizing Devices |

| Posted Speed<br>* | Formula               | Minimum Desirable Taper Lengths<br>* x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Minimum Sign Spacing<br>"X"<br>Distance | Suggested Longitudinal Buffer Space<br>"B" |
|-------------------|-----------------------|--|------------|------------|---|--------------|---|--|
|                   |                       | 10' Offset                             | 11' Offset | 12' Offset | On a Taper  | On a Tangent |   |  |
| 30                | $L = \frac{WS^2}{60}$ | 150'                                   | 165'       | 180'       | 30'   | 60'          | 120'                                    | 90'  |
| 35                |                       | 205'                                   | 225'       | 245'       | 35'   | 70'          | 160'                                    | 120'                                       |
| 40                |                       | 265'                                   | 295'       | 320'       | 40'   | 80'          | 240'                                    | 155'                                       |
| 45                | L = WS                | 450'                                   | 495'       | 540'       | 45'   | 90'          | 320'                                    | 195'                                       |
| 50                |                       | 500'                                   | 550'       | 600'       | 50'   | 100'         | 400'                                    | 240'                                       |
| 55                |                       | 550'                                   | 605'       | 660'       | 55'   | 110'         | 500'                                    | 295'                                       |
| 60                |                       | 600'                                   | 660'       | 720'       | 60'   | 120'         | 600'                                    | 350'                                       |
| 65                |                       | 650'                                   | 715'       | 780'       | 65'   | 130'         | 700'                                    | 410'                                       |
| 70                |                       | 700'                                   | 770'       | 840'       | 70'   | 140'         | 800'                                    | 475'                                       |
| 75                |                       | 750'                                   | 825'       | 900'       | 75'   | 150'         | 900'                                    | 540'                                       |

\* Conventional Roads Only

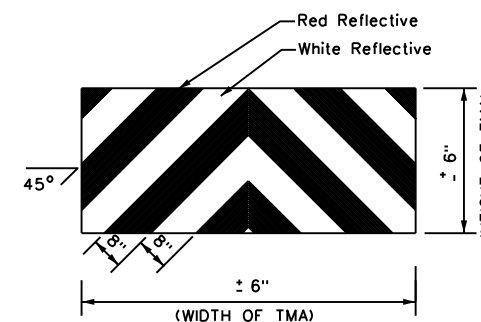
\*\* Taper lengths have been rounded off.

L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
| ✓             |                |                       |                              |                      |

**GENERAL NOTES**

- This traffic control plan is for use on conventional roads posted at 45 mph or less and is intended for mobile operations that move continuously or intermittently (stopping up to approximately 15 minutes) such as short-line striping and in-lane rumble strips. When activities are anticipated to take longer amounts of time or traffic conditions warrant, a short duration or short-term stationary traffic control plan should be used.
- A Truck Mounted Attenuator shall be used on Shadow Vehicle. Striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of departmental material specification DMS-8300, Type A.
- All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
- The use of yellow rotating beacons or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the drivers side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
- Flashing arrow board shall be used on Shadow Vehicle. Flashing arrow board shall be Type B or Type C as per BC Standards. The arrow board operation shall be controlled from inside the truck.



**STRIPING FOR TMA**

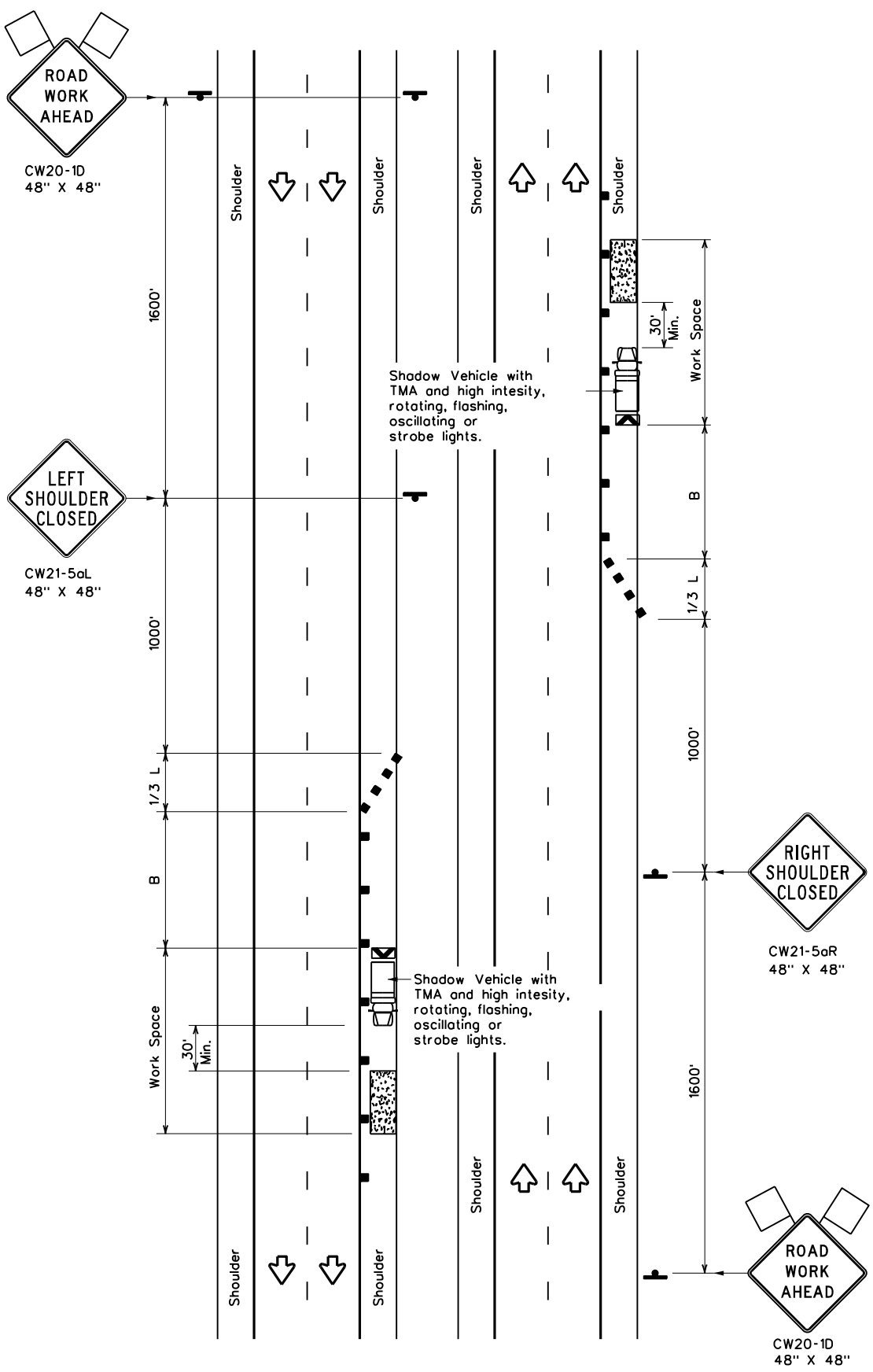
Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN  
MOBILE OPERATIONS FOR  
ISOLATED WORK AREAS  
UNDIVIDED HIGHWAYS  
TCP(3-4)-13**

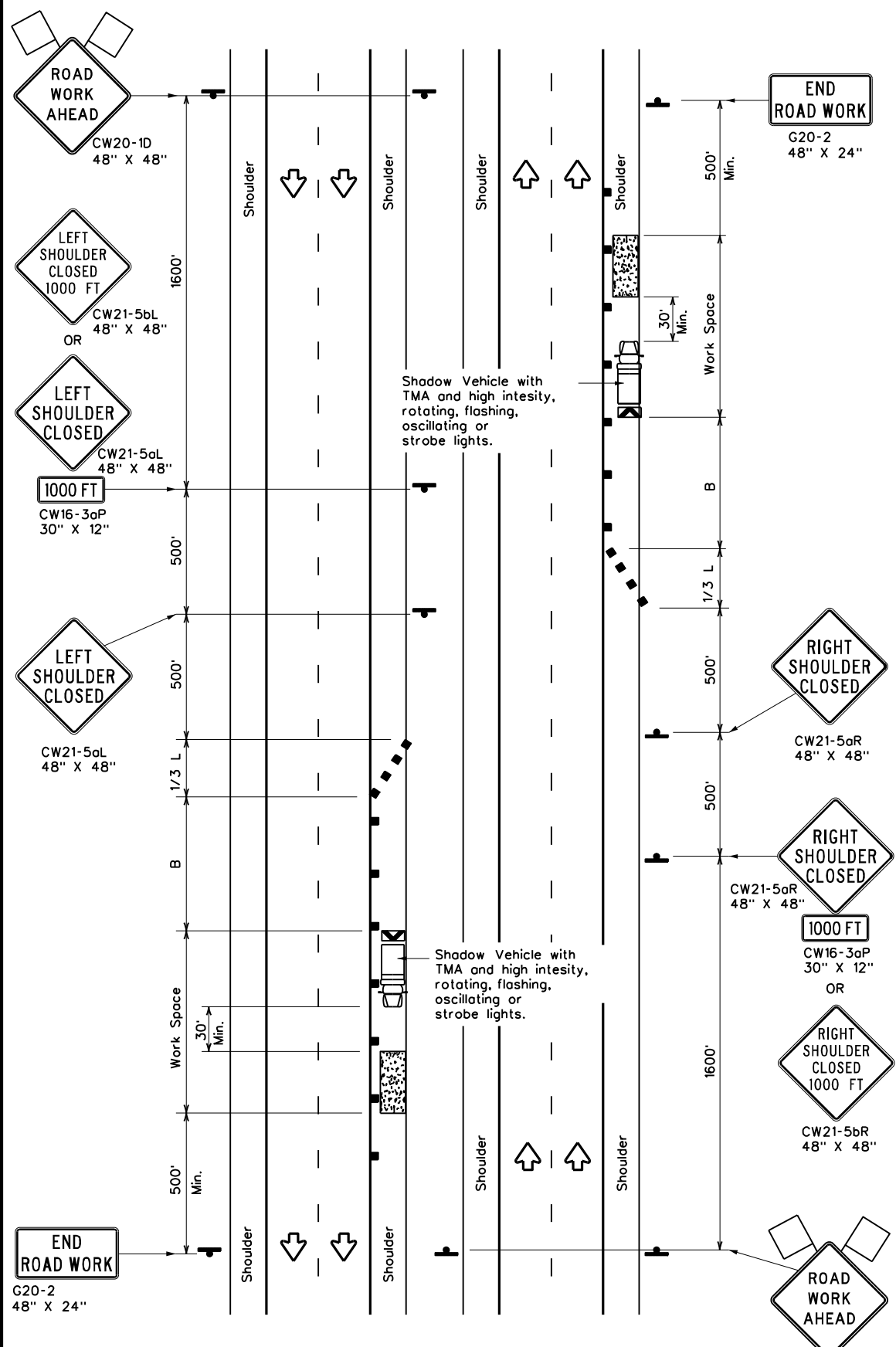
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|--------------------|------------|-----------------------|---------------|----------------------|
| FILE: tcp3-4.dgn   | DN: TxDOT  | CK: TxDOT             | DW: TxDOT     | CK: TxDOT            |
| © TxDOT July, 2013 | CONT: 6454 | SECT: 87              | JOB: 001      | HIGHWAY: IH-10, ETC. |
| REVISIONS:         | DIST: ELP  | COUNTY: EL PASO, ETC. | SHEET NO.: 31 |                      |

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 FILE: I:\ELP\MAINT\Contracts\East Area\Office\RMC\_6454-87-001\_TCP\1 - DESIGN\Plan\051518.dgn



TCP (5-1a)  
**WORK AREA ON SHOULDER**



TCP (5-1b)  
**WORK AREA ON SHOULDER**

| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed *<br>x | Formula                  | Minimum Desirable Taper Lengths x x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Suggested Longitudinal Buffer Space "B" |
|---------------------|--------------------------|-------------------------------------|------------|------------|---|--------------|---|
|                     |                          | 10' Offset                          | 11' Offset | 12' Offset | On a Taper  | On a Tangent |   |
| 30                  | L - WS <sup>2</sup> / 60 | 150'                                | 165'       | 180'       | 30'   | 60'          | 90'                                     |
| 35                  |                          | 205'                                | 225'       | 245'       | 35'   | 70'          | 120'                                    |
| 40                  |                          | 265'                                | 295'       | 320'       | 40'   | 80'          | 155'                                    |
| 45                  | L - WS                   | 450'                                | 495'       | 540'       | 45'   | 90'          | 195'                                    |
| 50                  |                          | 500'                                | 550'       | 600'       | 50'   | 100'         | 240'                                    |
| 55                  |                          | 550'                                | 605'       | 660'       | 55'   | 110'         | 295'                                    |
| 60                  |                          | 600'                                | 660'       | 720'       | 60'   | 120'         | 350'                                    |
| 65                  |                          | 650'                                | 715'       | 780'       | 65'   | 130'         | 410'                                    |
| 70                  |                          | 700'                                | 770'       | 840'       | 70'   | 140'         | 475'                                    |
| 75                  |                          | 750'                                | 825'       | 900'       | 75'   | 150'         | 540'                                    |
| 80                  |                          | 800'                                | 880'       | 960'       | 80'   | 160'         | 615'                                    |

\* Conventional Roads Only  
 \*\* Taper lengths have been rounded off.  
 L-Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               | TCP(5-1a)      | TCP(5-1b)             | TCP(5-1b)                    |                      |

- GENERAL NOTES**
- A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.
  - 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece cones.



**TRAFFIC CONTROL PLAN**  
**SHOULDER WORK FOR**  
**FREWAYS / EXPRESSWAYS**

**TCP(5-1)-18**

|                       |      |               |           |             |
|-----------------------|------|---------------|-----------|-------------|
| FILE: tcp5-1-18.dgn   | DN:  | CK:           | DW:       | CK:         |
| © TxDOT February 2012 | CONT | SECT          | JOB       | HIGHWAY     |
| REVISIONS             | 6454 | 87            | 001       | IH 10, ETC. |
| 2-18                  | DIST | COUNTY        | SHEET NO. |             |
|                       | ELP  | EL PASO, ETC. | 32        |             |

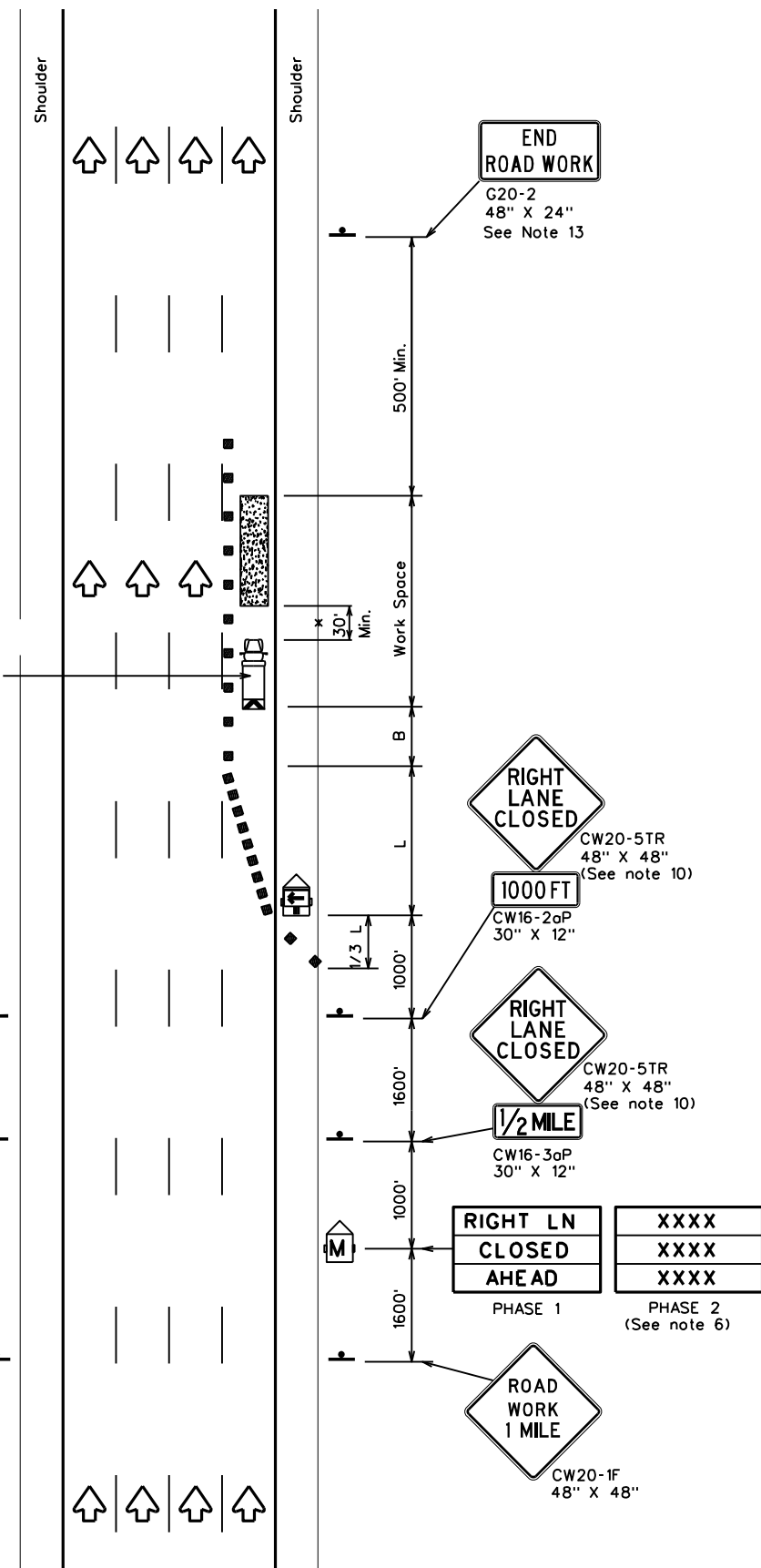
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DATE: 10/17/2023 10:15:02 AM  
 FILE: I:\ELP\MAINT\Contracts\East Area\Office\RMC\_6454-87-001\_TCP\1 - DESIGN\Plan\515 - TMA\TMA\TCP(6-1)-12.dgn

Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights

See note 1 and 7

See note 1 and 7



TCP (6-1a)

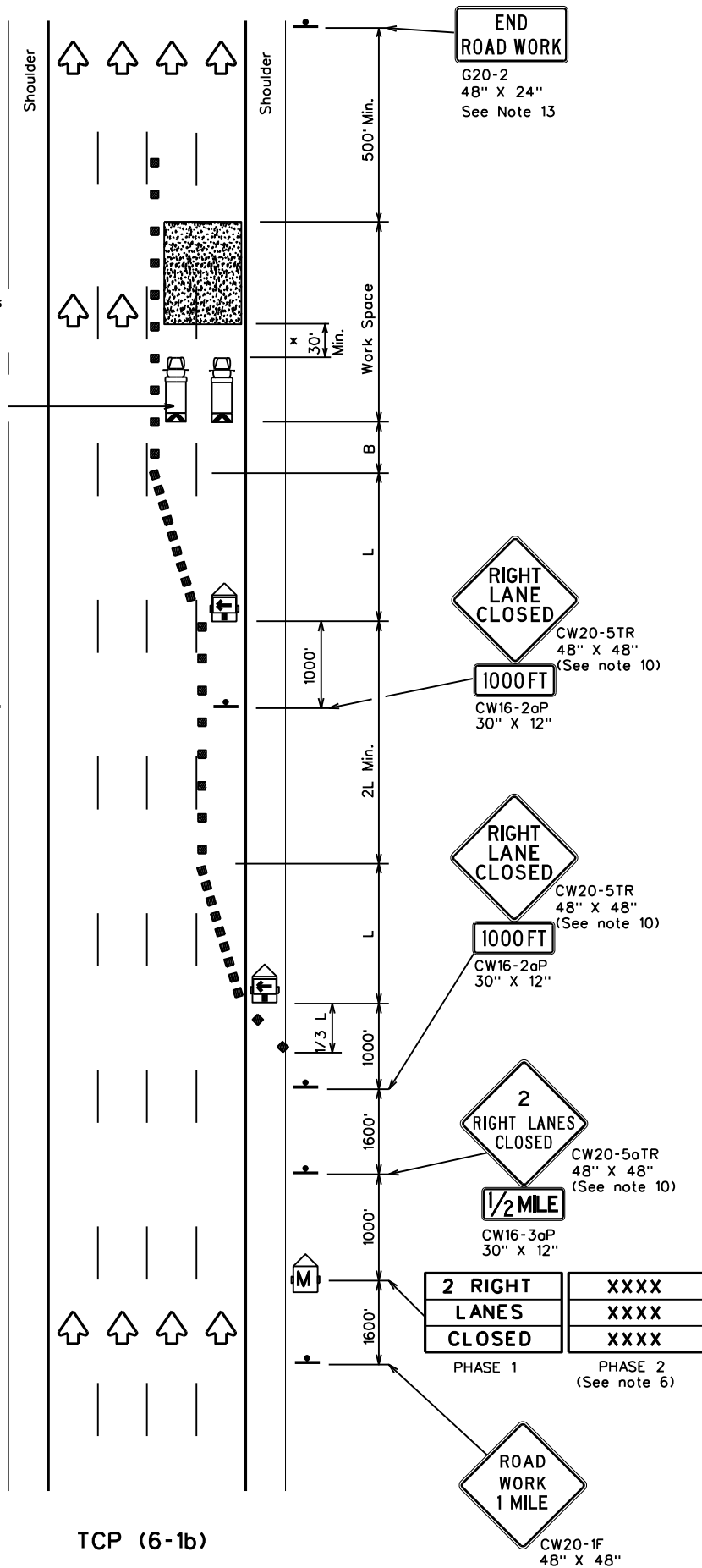
**TYPICAL FREEWAY ONE LANE CLOSURE**

Shadow Vehicles with TMA and high intensity rotating, flashing, oscillating or strobe lights

See note 1 and 7

See note 1 and 7

See note 1 and 7



TCP (6-1b)

**TYPICAL FREEWAY TWO LANE CLOSURE**

| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed | Formula | Minimum Desirable Taper Lengths "L" x x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Suggested Longitudinal Buffer Space "B" |
|--------------|---------|---|------------|------------|---|--------------|---|
|              |         | 10' Offset                              | 11' Offset | 12' Offset | On a Taper  | On a Tangent |   |
| 45           | L = WS  | 450'                                    | 495'       | 540'       | 45'   | 90'          | 195'                                    |
| 50           |         | 500'                                    | 550'       | 600'       | 50'   | 100'         | 240'                                    |
| 55           |         | 550'                                    | 605'       | 660'       | 55'   | 110'         | 295'                                    |
| 60           |         | 600'                                    | 660'       | 720'       | 60'   | 120'         | 350'                                    |
| 65           |         | 650'                                    | 715'       | 780'       | 65'   | 130'         | 410'                                    |
| 70           |         | 700'                                    | 770'       | 840'       | 70'   | 140'         | 475'                                    |
| 75           |         | 750'                                    | 825'       | 900'       | 75'   | 150'         | 540'                                    |
| 80           |         | 800'                                    | 880'       | 960'       | 80'   | 160'         | 615'                                    |

\*\* Taper lengths have been rounded off.  
 L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               | ✓              | ✓                     | ✓                            |                      |

**GENERAL NOTES**

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- Drums or 42" cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
- All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
- The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
- Static message boards or changeable message signs stating the date and duration of ramp or freeway lane closures shall be placed a minimum of seven (7) calendar days in advance of the actual closure.
- Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.
- Duplicate construction warning signs should be erected on the median side of freeways where median width will permit and traffic volume justifies the signing.
- The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the TMUTCD.
- Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
- Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 7' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
- When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
- For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
- The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

\* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.



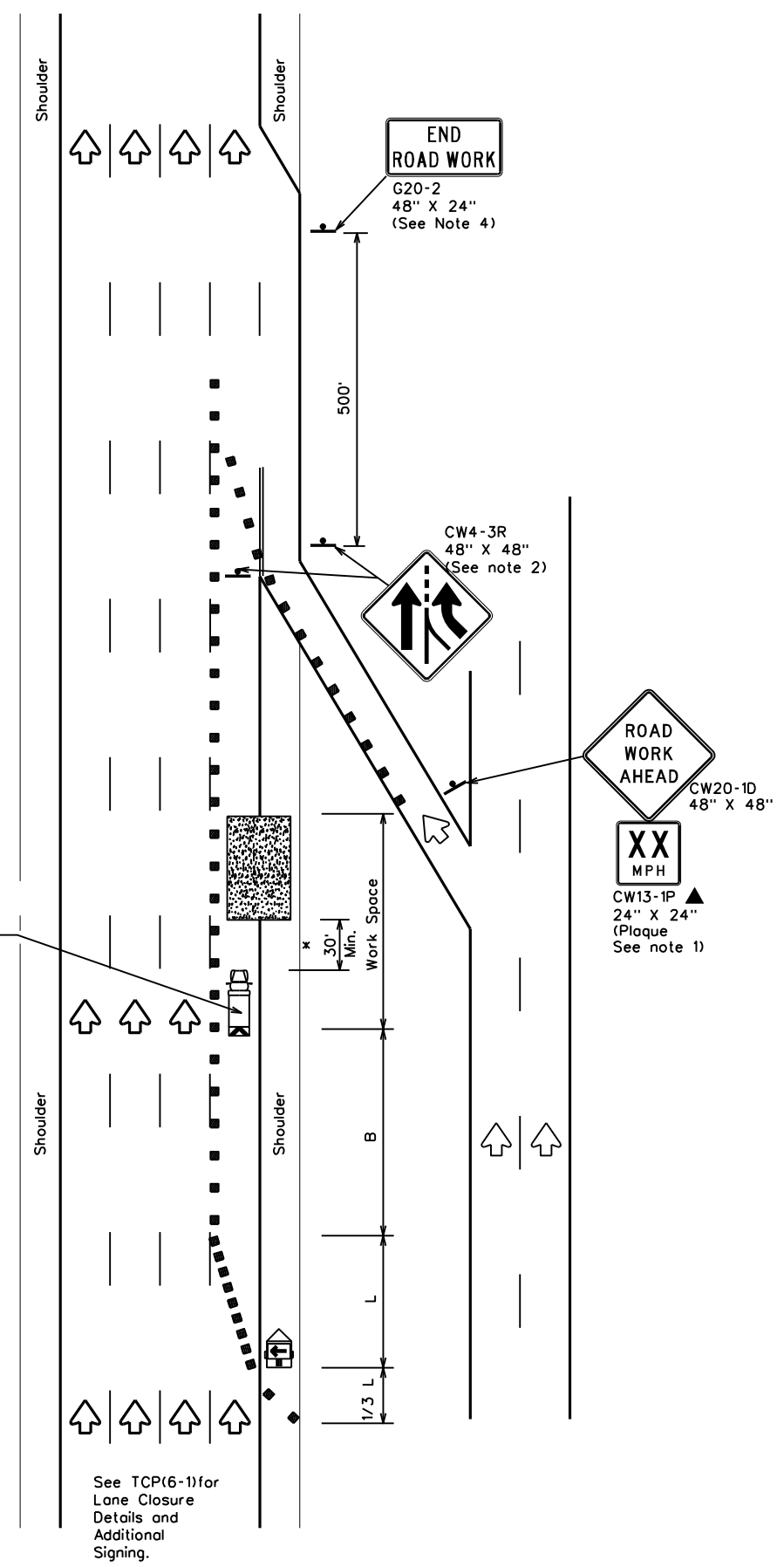
**TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES**

**TCP(6-1)-12**

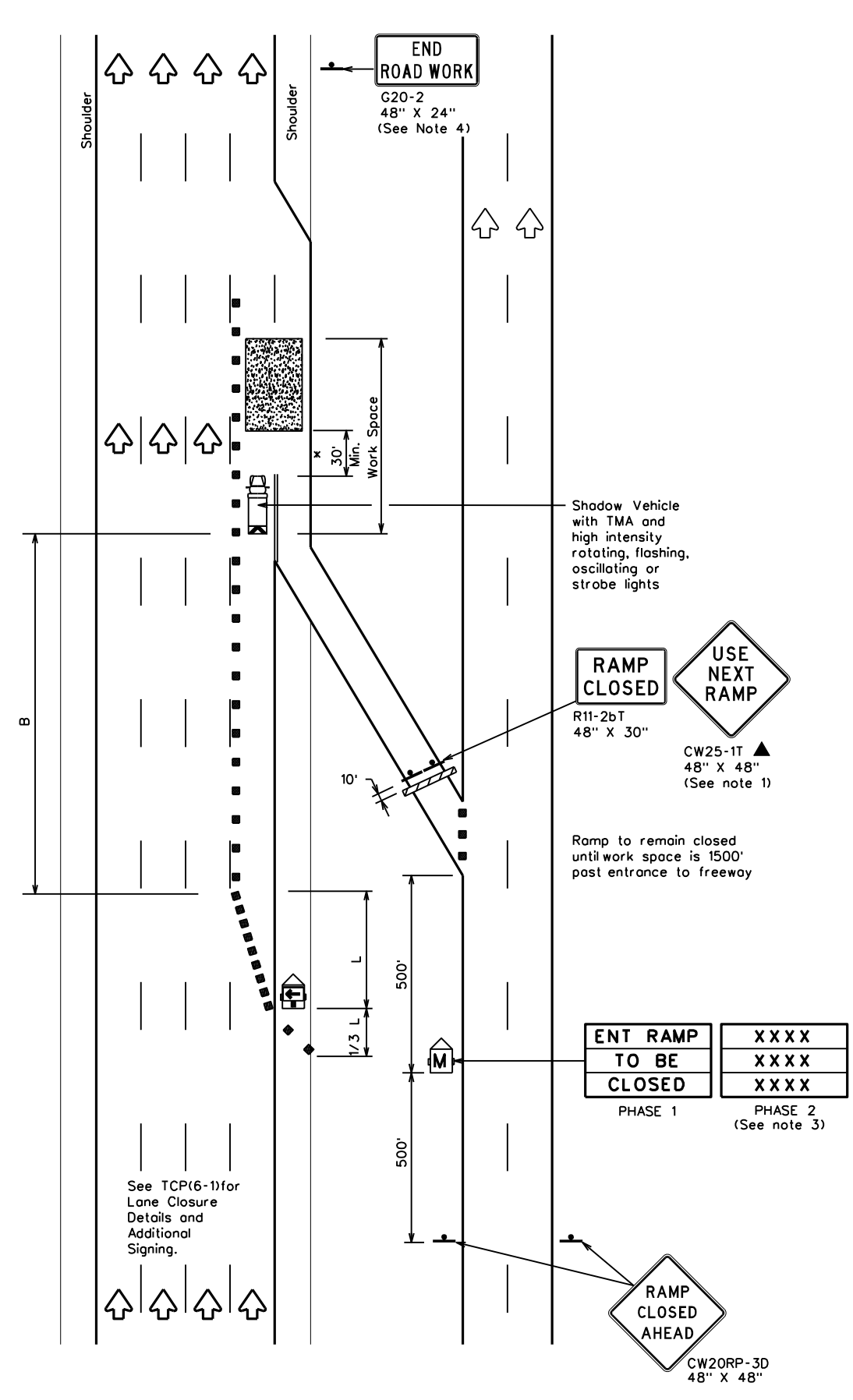
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| © TxDOT | February 1998 | CONT:         | SECT: | JOB:      | HIGHWAY:    |     |       |     |       |
| 8-12    | REVISIONS     | 6454          | 87    | 001       | IH 10, ETC. |     |       |     |       |
|         | DIST:         | COUNTY:       |       | SHEET NO. |             |     |       |     |       |
|         | ELP           | EL PASO, ETC. |       | 33        |             |     |       |     |       |

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 FILE: I:\ELP\MAINT\Contracts\East Area Of fice\RMC 6454-87-001 TCP\1 - DESIGN\Plan\515\TCP6-2.dgn



TCP (6-2a)  
**ENTRANCE RAMP OPEN**  
**WORK WITHIN 500' OF RAMP**



TCP (6-2b)  
**ENTRANCE RAMP CLOSED**

| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed | Formula | Minimum Desirable Taper Lengths "L" |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Suggested Longitudinal Buffer Space "B" |
|--------------|---------|-------------------------------------|------------|------------|---|--------------|---|
|              |         | 10' Offset                          | 11' Offset | 12' Offset | On a Taper  | On a Tangent |   |
| 45           | L = WS  | 450'                                | 495'       | 540'       | 45'   | 90'          | 195'                                    |
| 50           |         | 500'                                | 550'       | 600'       | 50'   | 100'         | 240'                                    |
| 55           |         | 550'                                | 605'       | 660'       | 55'   | 110'         | 295'                                    |
| 60           |         | 600'                                | 660'       | 720'       | 60'   | 120'         | 350'                                    |
| 65           |         | 650'                                | 715'       | 780'       | 65'   | 130'         | 410'                                    |
| 70           |         | 700'                                | 770'       | 840'       | 70'   | 140'         | 475'                                    |
| 75           |         | 750'                                | 825'       | 900'       | 75'   | 150'         | 540'                                    |
| 80           |         | 800'                                | 880'       | 960'       | 80'   | 160'         | 615'                                    |

x x Taper lengths have been rounded off.  
 L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               | ✓              | ✓                     | ✓                            |                      |

**GENERAL NOTES**

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- ADDED LANE Symbol (CW4-3) sign may be omitted when sign between ramp and mainline can be seen from both roadways.
- See "Advance Notice List" on BC(6) for recommended date and time formatting options for PCMS Phase 2 message.
- The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

x A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.



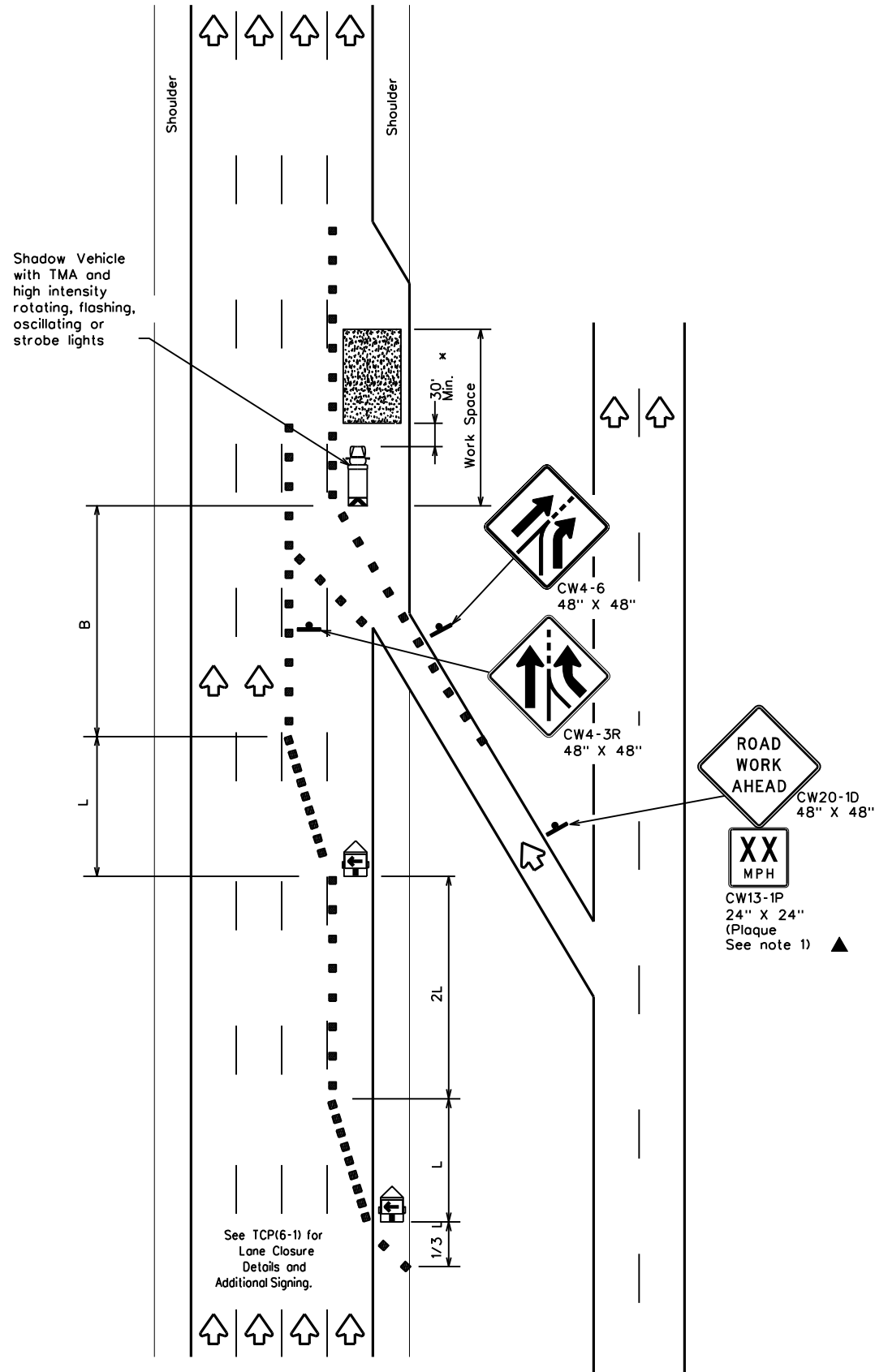
**TRAFFIC CONTROL PLAN**  
**WORK AREA NEAR RAMP**

**TCP(6-2)-12**

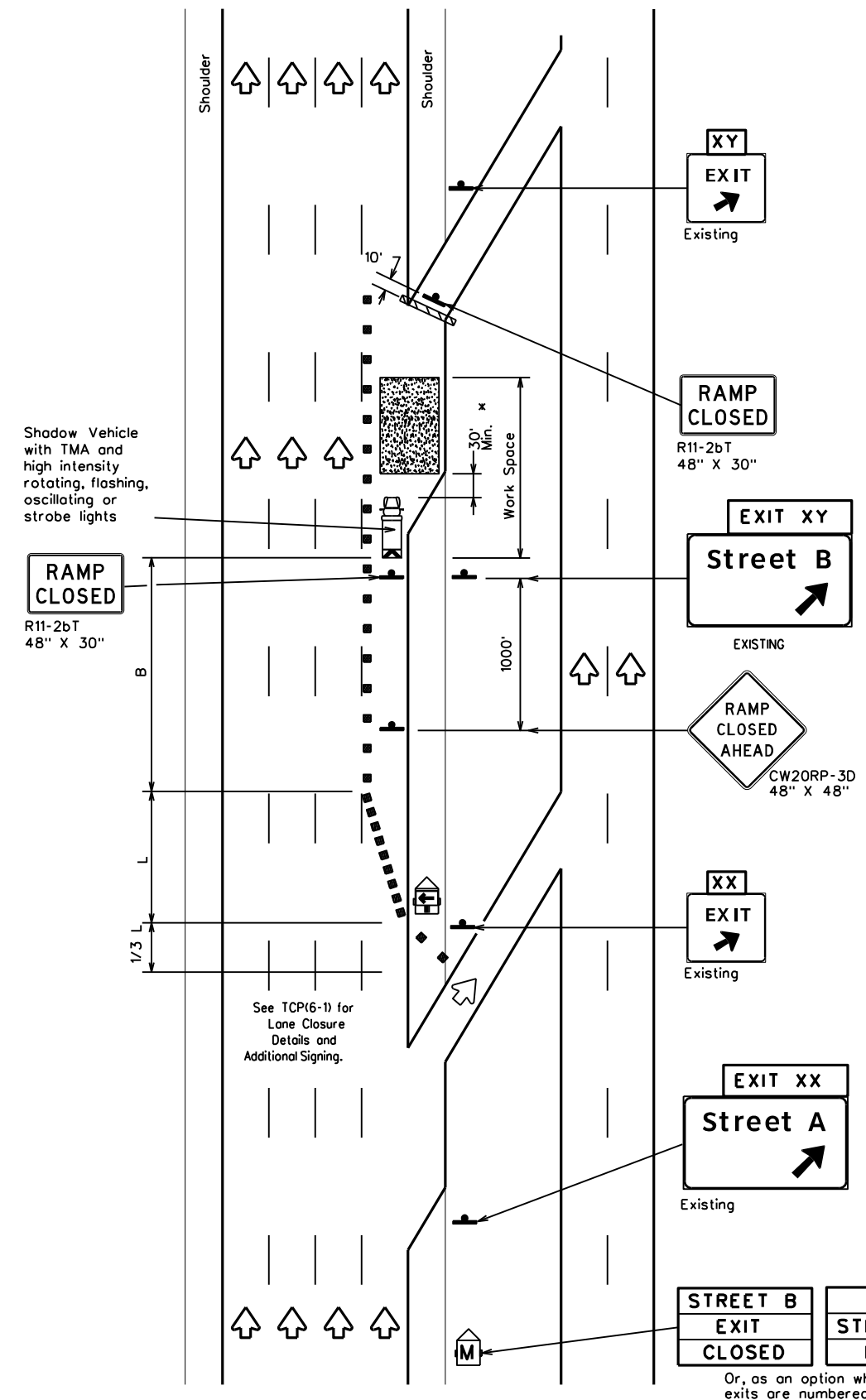
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| © TxDOT   | February 1994 | CONT | SECT          | JOB       | HIGHWAY     |     |       |     |       |
| REVISIONS |               | 6454 | 87            | 001       | IH 10, ETC. |     |       |     |       |
| 1-97      | 8-98          | DIST | COUNTY        | SHEET NO. |             |     |       |     |       |
| 4-98      | 8-12          | ELP  | EL PASO, ETC. | 34        |             |     |       |     |       |

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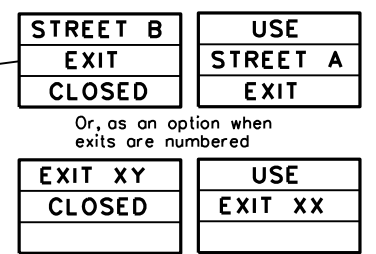
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TCP (6-3a)  
**ENTRANCE RAMP OPEN**



TCP (6-3b)  
**EXIT RAMP CLOSED**  
**TRAFFIC EXITS PRIOR TO CLOSED RAMP**



| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed | Formula | Minimum Desirable Taper Lengths "L" |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Suggested Longitudinal Buffer Space "B" |
|--------------|---------|-------------------------------------|------------|------------|---|--------------|---|
|              |         | 10' Offset                          | 11' Offset | 12' Offset | On a Taper  | On a Tangent |   |
| 45           | L = WS  | 450'                                | 495'       | 540'       | 45'   | 90'          | 195'                                    |
| 50           |         | 500'                                | 550'       | 600'       | 50'   | 100'         | 240'                                    |
| 55           |         | 550'                                | 605'       | 660'       | 55'   | 110'         | 295'                                    |
| 60           |         | 600'                                | 660'       | 720'       | 60'   | 120'         | 350'                                    |
| 65           |         | 650'                                | 715'       | 780'       | 65'   | 130'         | 410'                                    |
| 70           |         | 700'                                | 770'       | 840'       | 70'   | 140'         | 475'                                    |
| 75           |         | 750'                                | 825'       | 900'       | 75'   | 150'         | 540'                                    |
| 80           |         | 800'                                | 880'       | 960'       | 80'   | 160'         | 615'                                    |

\*\* Taper lengths have been rounded off.  
 L=Length of Taper(F) W=Width of Offset(F) S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               | ✓              | ✓                     | ✓                            |                      |

GENERAL NOTES:  
 1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.

\* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation  
 Traffic Operations Division Standard

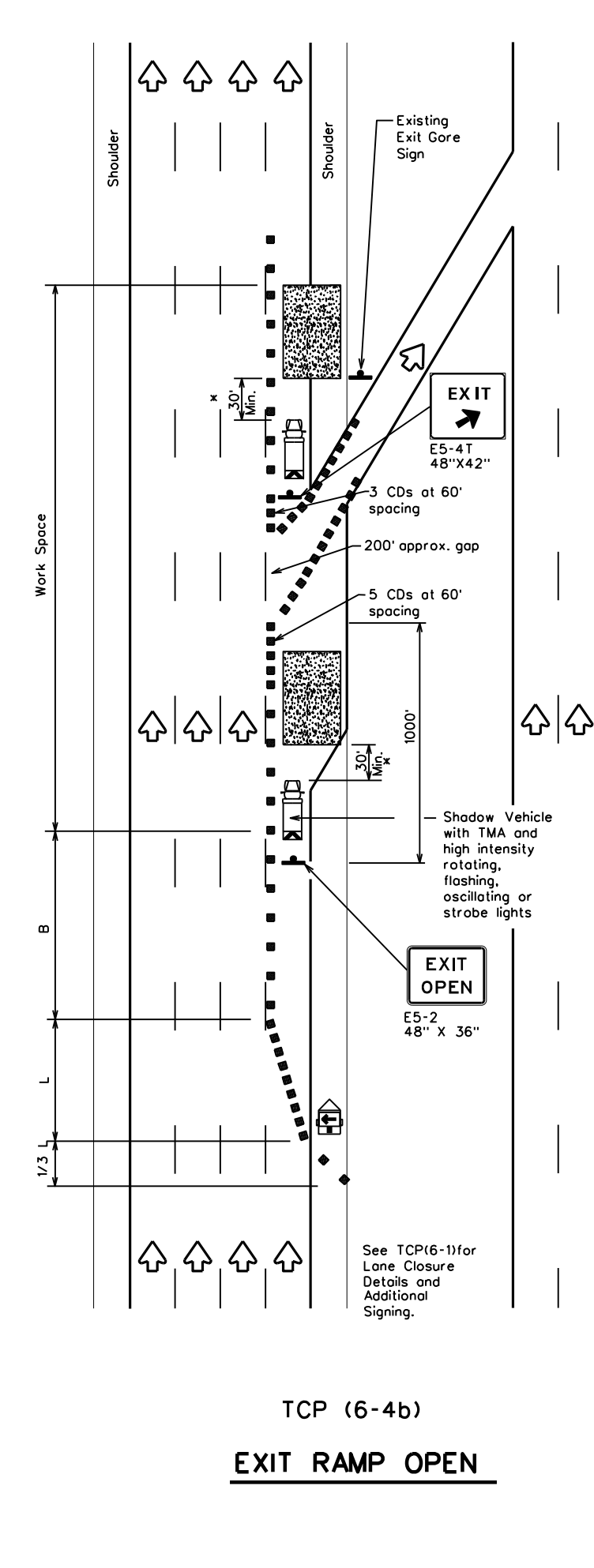
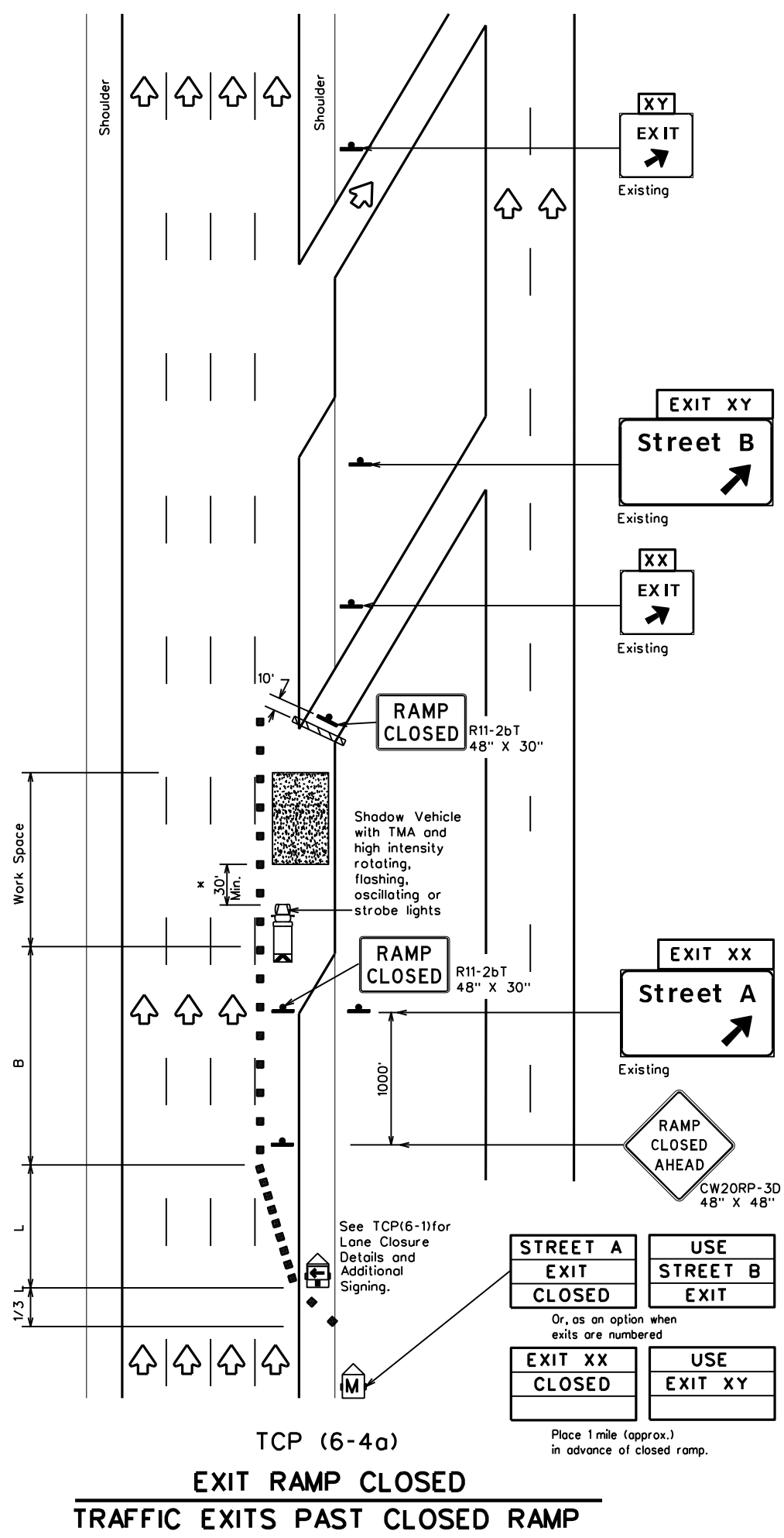
**TRAFFIC CONTROL PLAN  
 WORK AREA BEYOND RAMP**

**TCP(6-3)-12**

|                       |           |               |           |             |
|-----------------------|-----------|---------------|-----------|-------------|
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| © TxDOT February 1994 | CONT      | SECT          | JOB       | HIGHWAY     |
| REVISIONS             | 6454      | 87            | 001       | IH 10, ETC. |
| 1-97 8-98             | DIST      | COUNTY        | SHEET NO. |             |
| 4-98 8-12             | ELP       | EL PASO, ETC. | 35        |             |

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 FILE: I:\ELP\MAINT\Contracts\East Area\Office\RMC 6454-87-001.TCP\1 - DESIGN\Plan\515\std\6454-87-001-01-01.dgn



| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices (CDs)              |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed | Formula | Minimum Desirable Taper Lengths "L" |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Suggested Longitudinal Buffer Space "B" |
|--------------|---------|-------------------------------------|------------|------------|---|--------------|---|
|              |         | 10' Offset                          | 11' Offset | 12' Offset | On a Taper  | On a Tangent |   |
| 45           | L = WS  | 450'                                | 495'       | 540'       | 45'   | 90'          | 195'                                    |
| 50           |         | 500'                                | 550'       | 600'       | 50'   | 100'         | 240'                                    |
| 55           |         | 550'                                | 605'       | 660'       | 55'   | 110'         | 295'                                    |
| 60           |         | 600'                                | 660'       | 720'       | 60'   | 120'         | 350'                                    |
| 65           |         | 650'                                | 715'       | 780'       | 65'   | 130'         | 410'                                    |
| 70           |         | 700'                                | 770'       | 840'       | 70'   | 140'         | 475'                                    |
| 75           |         | 750'                                | 825'       | 900'       | 75'   | 150'         | 540'                                    |
| 80           |         | 800'                                | 880'       | 960'       | 80'   | 160'         | 615'                                    |

x x Taper lengths have been rounded off.  
 L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               | ✓              | ✓                     | ✓                            |                      |

- GENERAL NOTES**
- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
  - See BC Standards for sign details.

x A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.



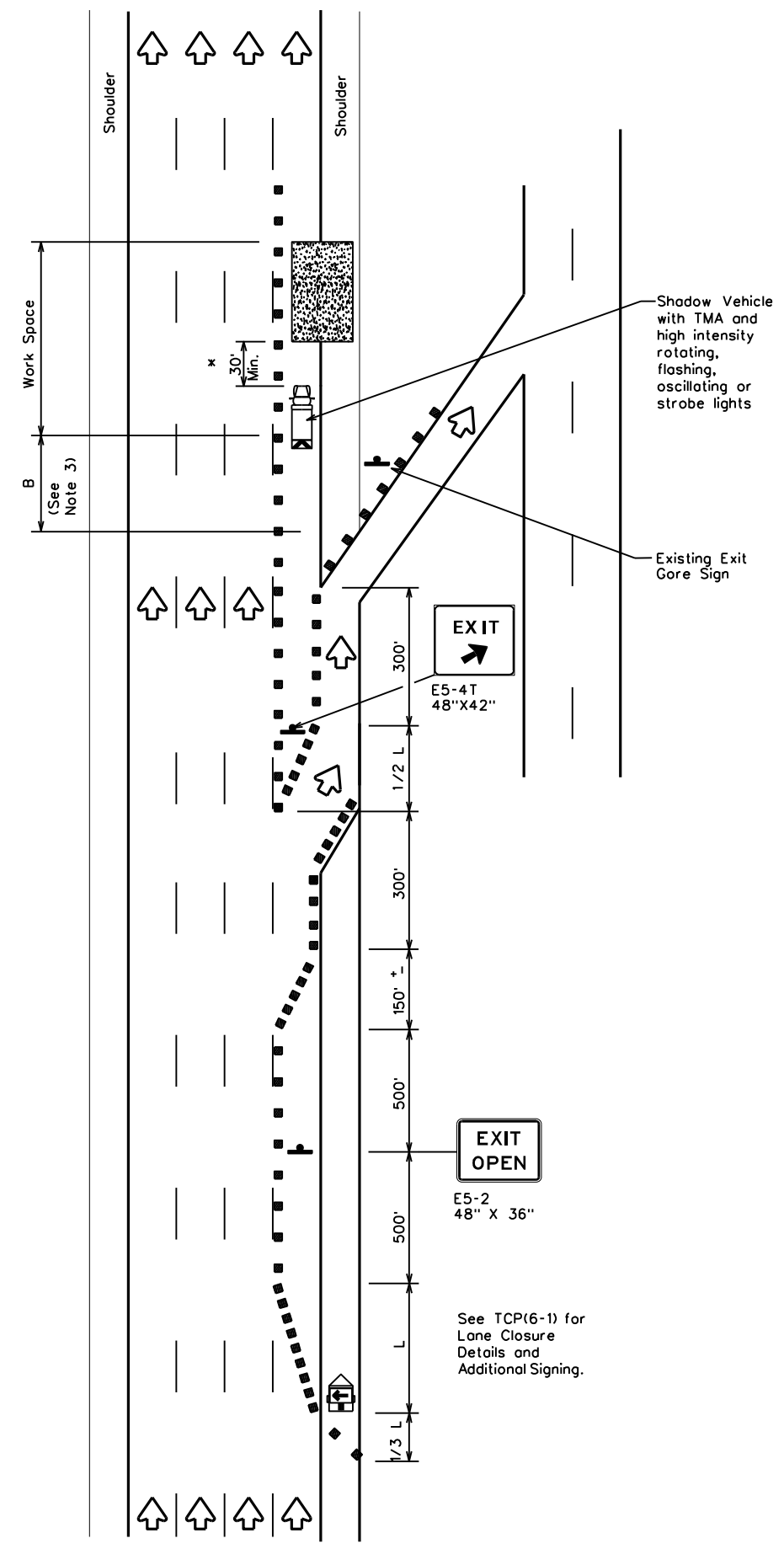
**TRAFFIC CONTROL PLAN**  
**WORK AREA AT EXIT RAMP**

**TCP(6-4)-12**

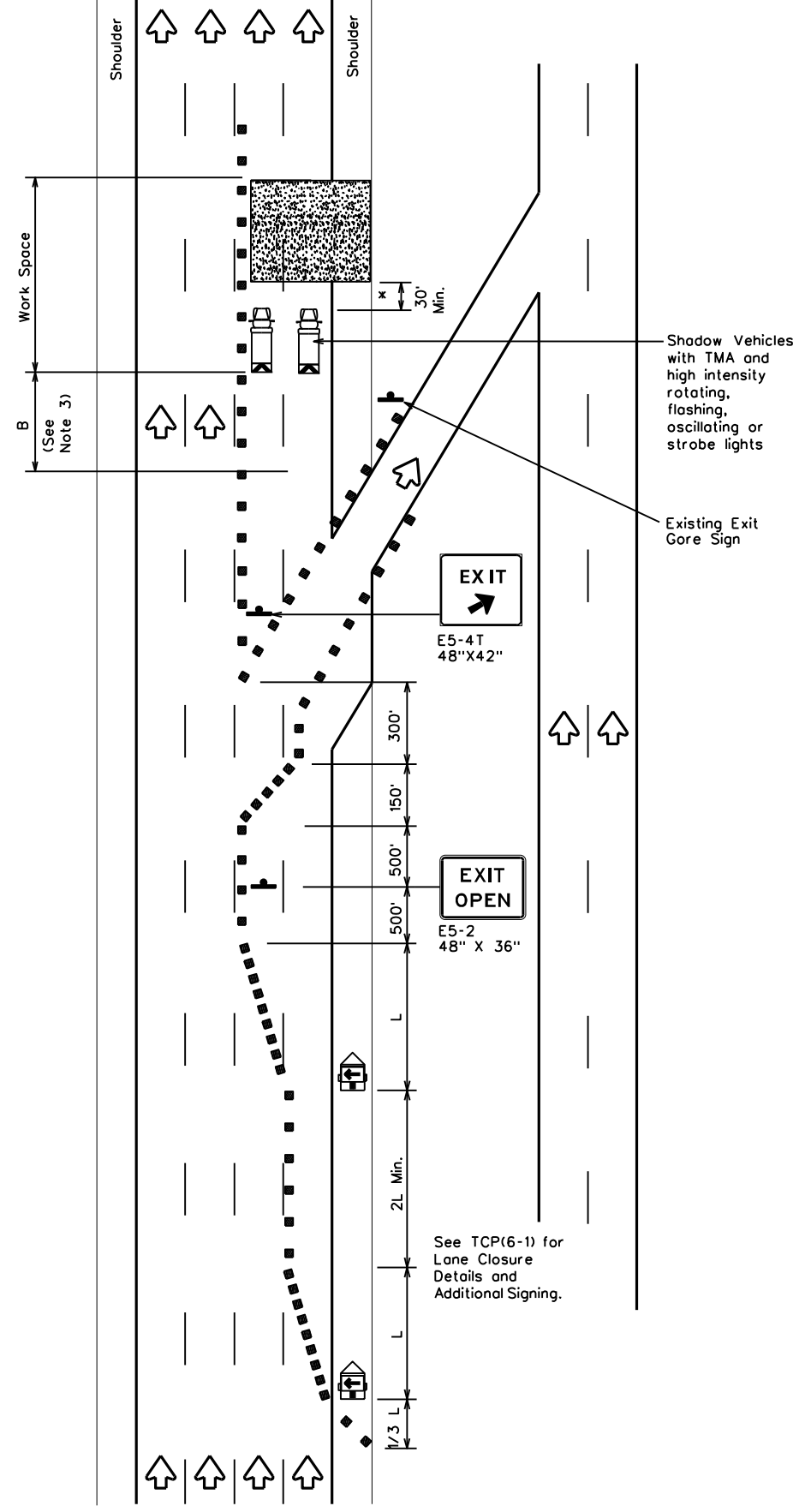
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|----------------------|-----------|---------------|-----------|-------------|
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| 4-98 8-12            | ELP       | EL PASO, ETC. | 36        |             |



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TCP (6-5a)  
**EXIT RAMP OPEN**



TCP (6-5b)  
**EXIT RAMP OPEN  
TWO LANE CLOSURE WITHIN  
1500' PAST EXIT RAMP**

| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed | Formula | Minimum Desirable Taper Lengths "L" |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Suggested Longitudinal Buffer Space "B" |
|--------------|---------|-------------------------------------|------------|------------|---|--------------|---|
|              |         | 10' Offset                          | 11' Offset | 12' Offset | On a Taper  | On a Tangent |   |
| 45           | L = WS  | 450'                                | 495'       | 540'       | 45'   | 90'          | 195'                                    |
| 50           |         | 500'                                | 550'       | 600'       | 50'   | 100'         | 240'                                    |
| 55           |         | 550'                                | 605'       | 660'       | 55'   | 110'         | 295'                                    |
| 60           |         | 600'                                | 660'       | 720'       | 60'   | 120'         | 350'                                    |
| 65           |         | 650'                                | 715'       | 780'       | 65'   | 130'         | 410'                                    |
| 70           |         | 700'                                | 770'       | 840'       | 70'   | 140'         | 475'                                    |
| 75           |         | 750'                                | 825'       | 900'       | 75'   | 150'         | 540'                                    |
| 80           |         | 800'                                | 880'       | 960'       | 80'   | 160'         | 615'                                    |

x x Taper lengths have been rounded off.  
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               | ✓              | ✓                     | ✓                            |                      |

**GENERAL NOTES**

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- See BC standards for sign details.
- If adequate longitudinal buffer length "B" does not exist between the work space and the exit ramp, consideration should be given to closing the ramp.

x A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.



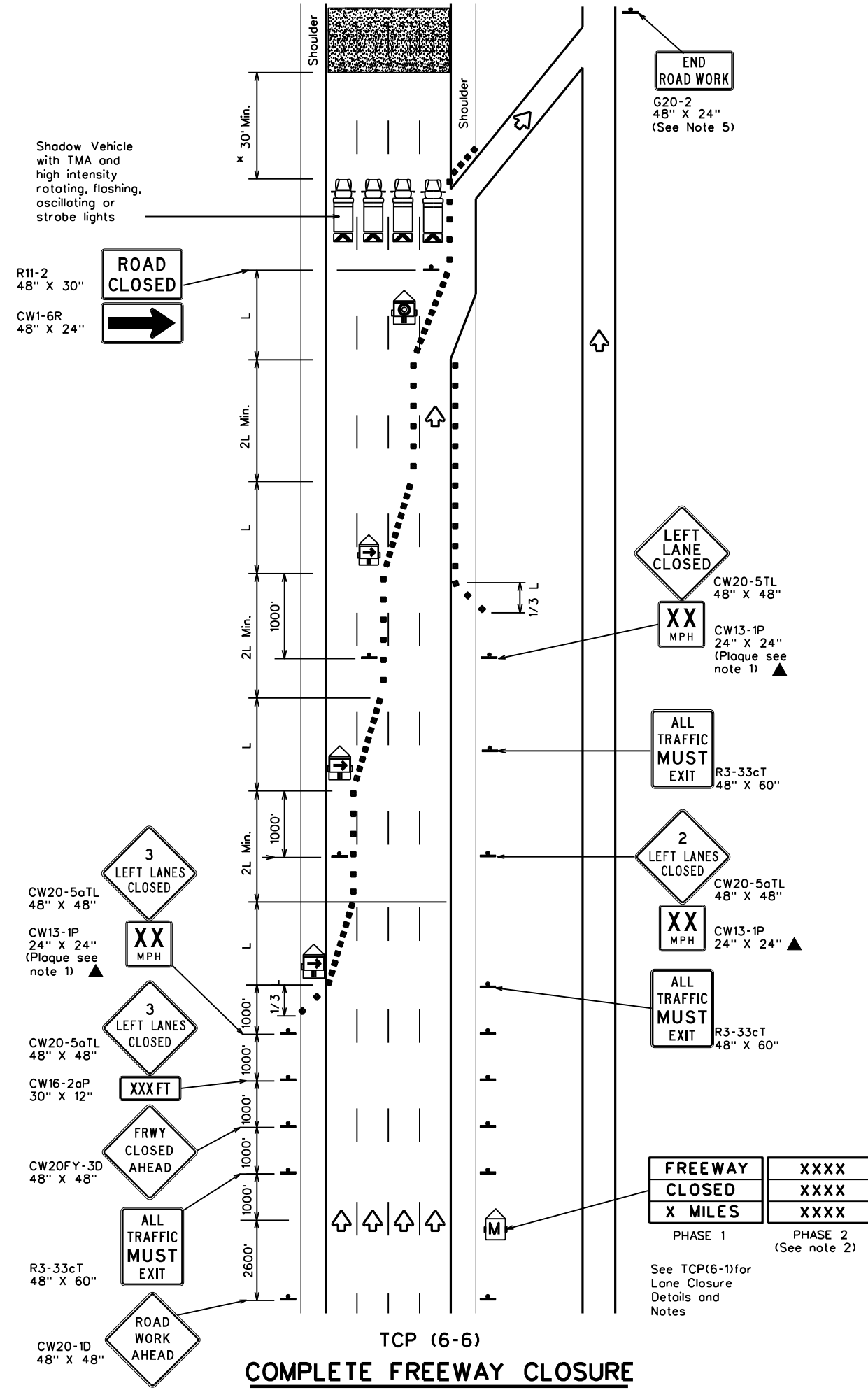
**TRAFFIC CONTROL PLAN  
WORK AREA BEYOND EXIT RAMP**

**TCP(6-5)-12**

|            |                     |       |       |         |               |            |       |          |             |
|------------|---------------------|-------|-------|---------|---------------|------------|-------|----------|-------------|
| FILE:      | tcp6-5.dgn          | DNF:  | TxDOT | CK:     | TxDOT         | DW:        | TxDOT | CK:      | TxDOT       |
| ©          | TxDOT February 1998 | CONT: | 6454  | SECT:   | 87            | JOB:       | 001   | HIGHWAY: | IH 10, ETC. |
| REVISIONS: |                     | DIST: | ELP   | COUNTY: | EL PASO, ETC. | SHEET NO.: | 37    |          |             |

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 FILE: I:\ELP\MAINT\Contracts\East Area Office\RMC 6454-87-001\_TCP\1 - DESIGN\Plan\05\Traffic\TCP(6-6).dgn



| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Flashing Arrow Board in Caution Mode |  | Traffic Flow                            |
|        | Sign                                 |  |   |

| Posted Speed | Formula | Minimum Desirable Taper Lengths "L" |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Suggested Longitudinal Buffer Space "B" |
|--------------|---------|-------------------------------------|------------|------------|---|--------------|---|
|              |         | 10' Offset                          | 11' Offset | 12' Offset | On a Taper  | On a Tangent |   |
| 45           | L = WS  | 450'                                | 495'       | 540'       | 45'   | 90'          | 195'                                    |
| 50           |         | 500'                                | 550'       | 600'       | 50'   | 100'         | 240'                                    |
| 55           |         | 550'                                | 605'       | 660'       | 55'   | 110'         | 295'                                    |
| 60           |         | 600'                                | 660'       | 720'       | 60'   | 120'         | 350'                                    |
| 65           |         | 650'                                | 715'       | 780'       | 65'   | 130'         | 410'                                    |
| 70           |         | 700'                                | 770'       | 840'       | 70'   | 140'         | 475'                                    |
| 75           |         | 750'                                | 825'       | 900'       | 75'   | 150'         | 540'                                    |
| 80           |         | 800'                                | 880'       | 960'       | 80'   | 160'         | 615'                                    |

\*\* Taper lengths have been rounded off.  
 L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               | ✓              | ✓                     | ✓                            |                      |

- GENERAL NOTES**
- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
  - Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE RIGHT," recommended speed, delay, exit information, or other specific warnings.
  - Where queuing is anticipated beyond signing shown, additional PCMS signs, other warning signs, devices or Law Enforcement Officers should be available to warn approaching high speed traffic of the end of the queue, as directed by the Engineer.
  - Entrance ramps located from the advance warning area to the exit ramp should be closed whenever possible.
  - The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

\* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation  
Traffic Operations Division Standard

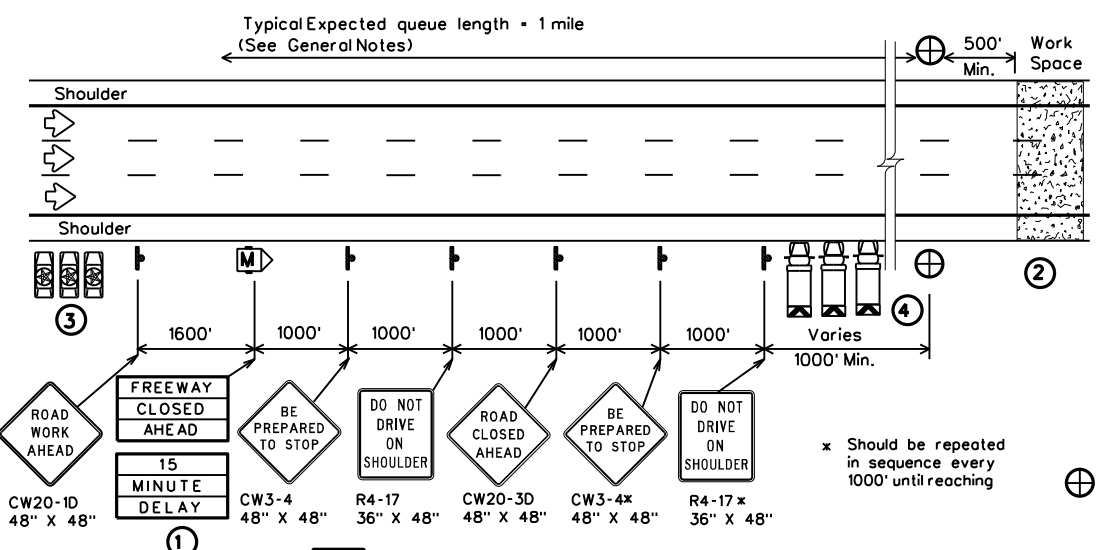
## TRAFFIC CONTROL PLAN FREEWAY CLOSURE

### TCP(6-6)-12

|                      |           |               |           |             |
|----------------------|-----------|---------------|-----------|-------------|
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| 1-97 8-98            | DIST      | COUNTY        | SHEET NO. |             |
| 4-98 8-12            | ELP       | EL PASO, ETC. | 38        |             |

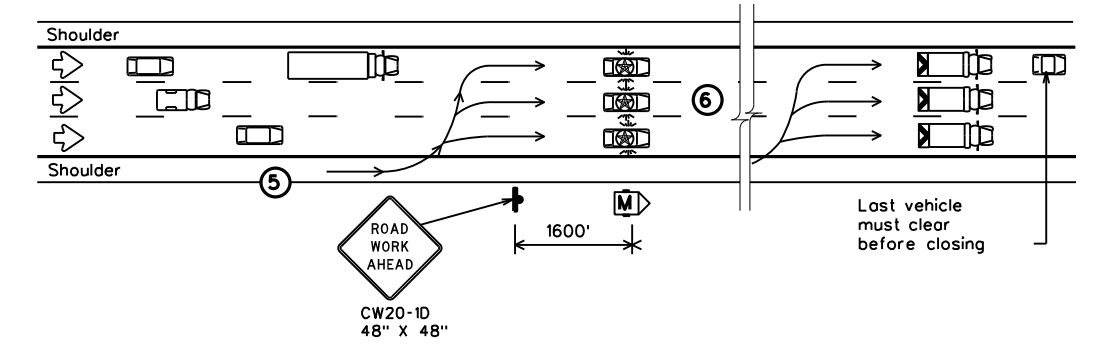
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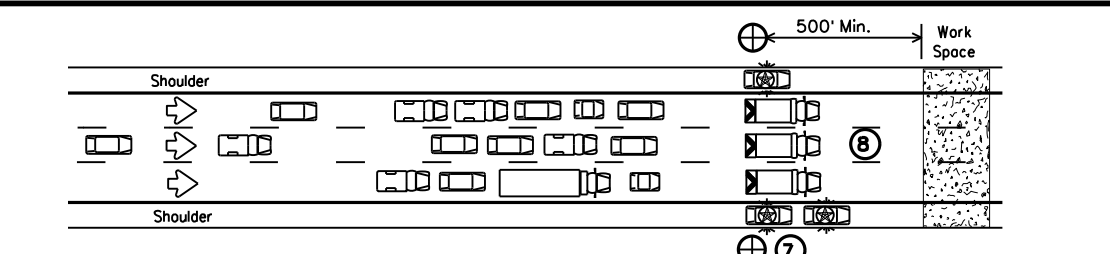
### 1 STARTING POSITION

- 1 Traffic control devices should be installed or located near their intended position prior to beginning temporary roadway closure sequence. Duplicate signs should be erected on the median side of the roadway when median width permits. Warning signs should not be placed on the paved shoulders that will be used by the WARNING LEOV, or where movement of the LEOVs or barrier vehicles will be impeded.
- 2 Prior to beginning the roadway closure sequence, all equipment, materials, personnel, and other items necessary to complete the work should be gathered near the work area. Entrance ramps located in the area where a queue is expected to build should be closed.
- 3 There should be one LEOV for every lane to be controlled, plus a minimum of one to warn traffic approaching a queue. An additional lead law enforcement officer is desirable to remain with the Engineer's or Contractor's point of contact (POC) during the operation in order to improve communication with all LEOVs involved.
- 4 One barrier vehicle with a Truck Mounted Attenuator and amber or blue and amber high intensity flashing/oscillating/strobe lighting shall be used for each lane to be closed.



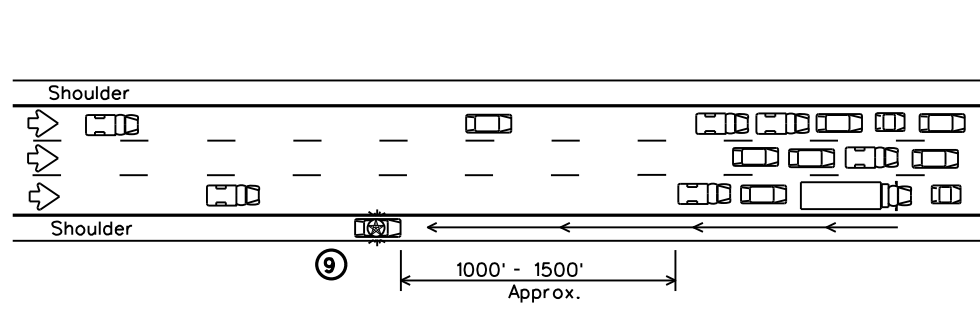
### 2 REDUCING SPEED OPERATION

- 5 Starting position of the LEOVs should be in advance of the most distant warning signs.
- 6 Once the LEOVs have achieved an abreast blocking formation while traveling toward the CP, emergency lights and headlights should be turned "ON". The LEOVs should maintain formation, not allow traffic to pass, and begin to decelerate. The LEOVs should continue to decelerate, giving the barrier vehicles opportunity to be staged upstream of the work space after traffic has cleared. The LEOVs should then continue to decelerate slowly until bringing traffic to a stop near the barrier vehicles.



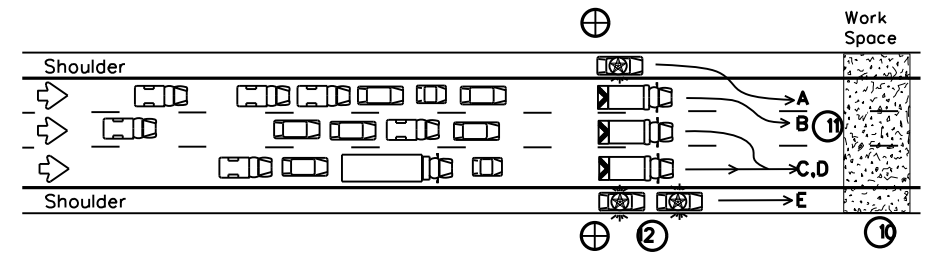
### 3 ALL TRAFFIC STOPPED AT CP

- 7 Once traffic is stopped the LEOVs should park on the shoulders with emergency lighting "ON" in order to provide law enforcement presence at the closure and keep shoulders blocked ahead of the work space. They should stay in radio contact with the WARNING LEOV.
- 8 The barrier vehicles should be parked, one in each lane, the parking brake set, with the high visibility flashing/oscillating/strobe lighting "ON," and the transmission in gear.



### 4 WARNING THE TRAFFIC QUEUE

- 9 The WARNING LEOV should proceed to the right shoulder of the roadway, with emergency lights on approximately 1000' in advance of the traffic queue (stopped traffic) as the queue develops. When determined that limited sight distance situations (crest of hills, sharp roadway curvature, etc.) may occur to motorists approaching the queue, the WARNING LEOV may proceed 1/4 mile or more in advance of the queue.



### 5 RELEASING STOPPED TRAFFIC

- 10 All equipment, materials, personnel, and other items should be removed from the roadway and maintain an adequate clear zone.
- 1 When the roadway is clear for traffic, the LEOV should proceed forward from the left shoulder followed by the barrier vehicles, from left to right, as shown alphabetically in the plan view.
- 2 The LEOV or LEOVs on the right shoulder may remain on the shoulder until satisfied that traffic is moving satisfactorily before merging or proceeding.
- 3 LEOVs and barrier vehicles should re-group at their respective starting positions if necessary.

| LEGEND |  |   |   |
|--------|--|---|---|
| ■      | Channelizing Devices                     | ⊕ | Control Position (CP)                         |
| M      | Portable Changeable Message Sign (PCMS)  | ⊠ | Barrier Vehicle with Truck Mounted Attenuator |
| LEOV   | Law Enforcement Officer's Vehicle (LEOV) | ← | Traffic Flow                                  |

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               | ✓              |                       |                              |                      |

### GENERAL NOTES

1. All traffic control devices shall conform with the latest edition of the Texas Manual on Uniform Traffic Control Devices (TMUTCD). Additional guidelines for traffic control devices may be found in the TMUTCD. Signs conflicting with the roadway closure sequence should be completely removed or covered. Additional traffic control devices may be required for closure of access roads, cross streets, exit and entrance ramps as directed by the Engineer.
2. Law enforcement officers and all workers involved should review and understand all procedures before the roadway closure sequence begins. Pre-work meetings may be held for this purpose. Local emergency services and media should have advance notification of roadway closure, expected dates and approximate times of closures.
3. Law enforcement officers shall be in uniform and have jurisdiction in the locale of the work area. An additional WARNING Law Enforcement Officer's Vehicle (LEOV) may be used on the median side of the roadway where median shoulder width permits (See sequence #9).
4. The roadway closure should be during off-peak hours, as shown in the plans, or as directed by the Engineer.
5. Work should be limited to approximately 15 minutes maximum duration unless otherwise directed by the Engineer based on existing roadway conditions. If the work is not complete within 15 minutes, or if the end of the traffic queue extends past the most distant advance warning signs, the work area should be cleared of all equipment, materials, personnel, and other items, and the roadway reopened. When the queue has dissipated and the traffic flow appears normal the roadway closure sequence may be repeated.
6. For traffic volumes greater than 1000 Passenger Cars Per Hour Per Lane (PCPHPL), or for roadway closures that exceed 15 minutes, see details elsewhere in the plan.
7. If traffic queues beyond the advance warning signs during one road closure sequence, the advance warning should be extended prior to repeating the road closure sequence. When possible, PCMS signs should be located in advance of the last available exit prior to the closure to allow motorists the choice of an alternate route.

THIS PLAN IS INTENDED TO BE USED AT LOCATIONS/TIMES WHEN TRAFFIC VOLUMES ARE LESS THAN 1000 PASSENGER CARS PER HOUR PER LANE.

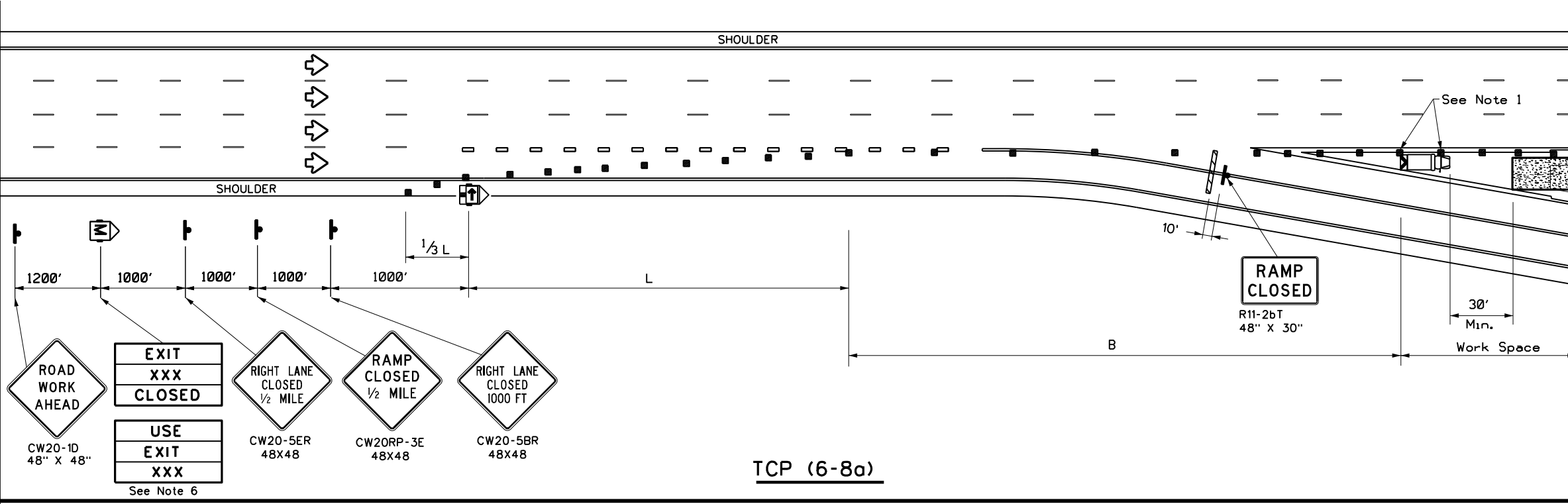
Texas Department of Transportation  
Traffic Operations Division Standard

## TRAFFIC CONTROL PLAN SHORT DURATION FREEWAY CLOSURE SEQUENCE

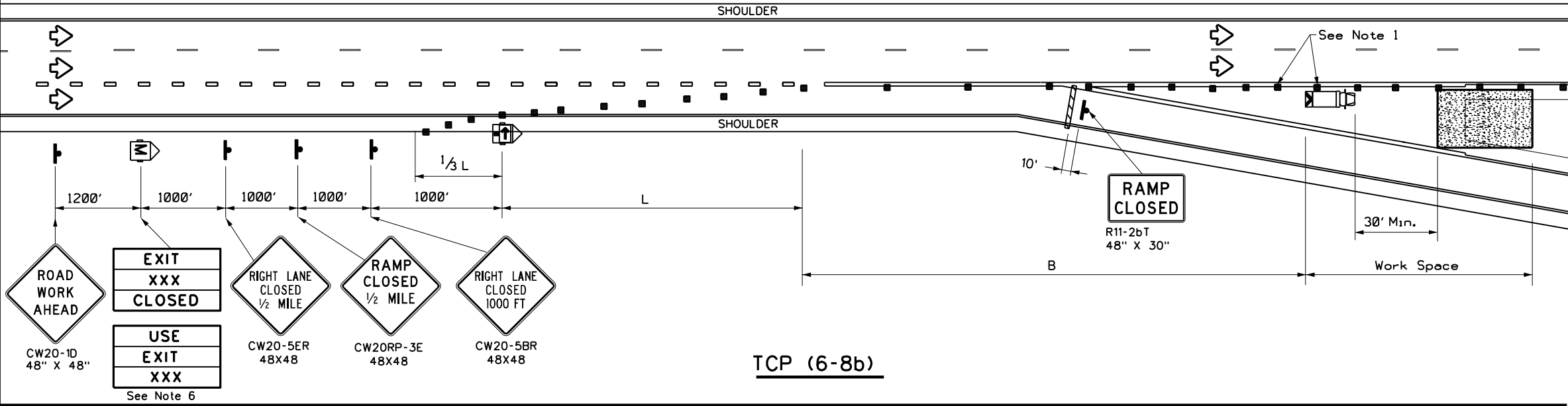
### TCP(6-7)-12

|                       |           |               |           |             |
|-----------------------|-----------|---------------|-----------|-------------|
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| 1-97 8-12             | DIST      | COUNTY        | SHEET NO. |             |
| 4-98                  | ELP       | EL PASO, ETC. | 39        |             |

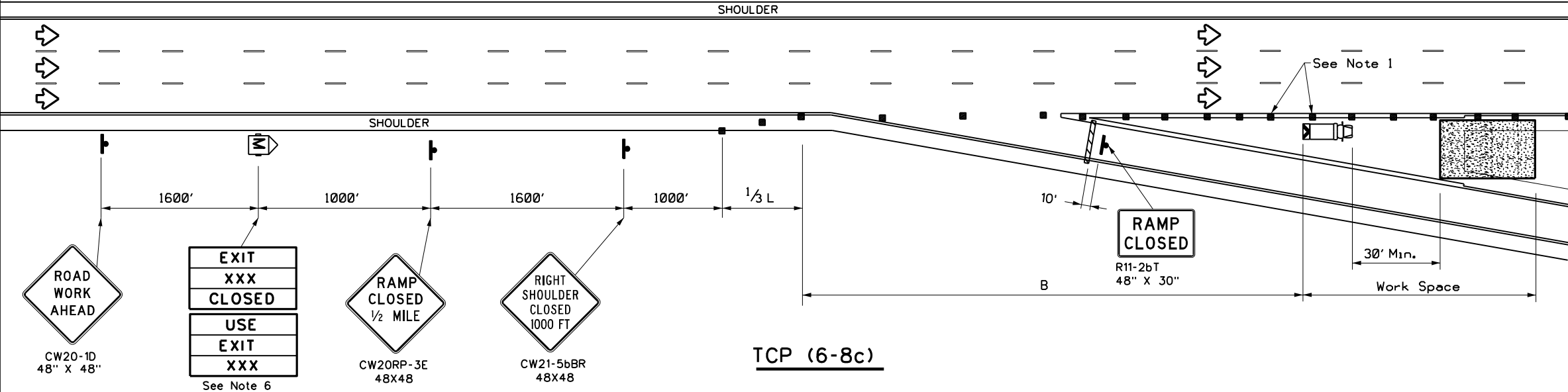
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TCP (6-8a)



TCP (6-8b)



TCP (6-8c)

| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices (CDs)              |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

| Posted Speed | Formula | Minimum Desirable Taper Lengths "L" |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Suggested Longitudinal Buffer Space "B" |
|--------------|---------|-------------------------------------|------------|------------|---|--------------|---|
|              |         | 10' Offset                          | 11' Offset | 12' Offset | On a Taper  | On a Tangent |   |
| 45           | L = WS  | 450'                                | 495'       | 540'       | 45'   | 90'          | 195'                                    |
| 50           |         | 500'                                | 550'       | 600'       | 50'   | 100'         | 240'                                    |
| 55           |         | 550'                                | 605'       | 660'       | 55'   | 110'         | 295'                                    |
| 60           |         | 600'                                | 660'       | 720'       | 60'   | 120'         | 350'                                    |
| 65           |         | 650'                                | 715'       | 780'       | 65'   | 130'         | 410'                                    |
| 70           |         | 700'                                | 770'       | 840'       | 70'   | 140'         | 475'                                    |
| 75           |         | 750'                                | 825'       | 900'       | 75'   | 150'         | 540'                                    |
| 80           |         | 800'                                | 880'       | 960'       | 80'   | 160'         | 615'                                    |

\*\* Taper lengths have been rounded off.  
 L=Length of Taper(FT) W=Width of Offset(FT)  
 S=Posted Speed(MPH)

| TYPICAL USAGE |                |                       |                              |                      |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE        | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|               | ✓              | ✓                     |                              |                      |

- ### GENERAL NOTES
- Place channelizing devices in the gore at 20' spacing.
  - See the Standard Highway Sign Design for Texas (SHSD) for sign details.
  - The PCMS may be omitted when a permanent DMS sign is available in an appropriate location to display a similar message as called for on the PCMS.
  - When it is determined that a through lane should be closed in addition to the exit ramp, refer to TCP(6-4) for traffic control details.
  - Truck mounted attenuator is required.
  - The PCMS may be omitted if replaced with a "RAMP CLOSED" AHEAD (CW20RP-3D) Sign.
  - Roadway ADT should be greater than 10,000.

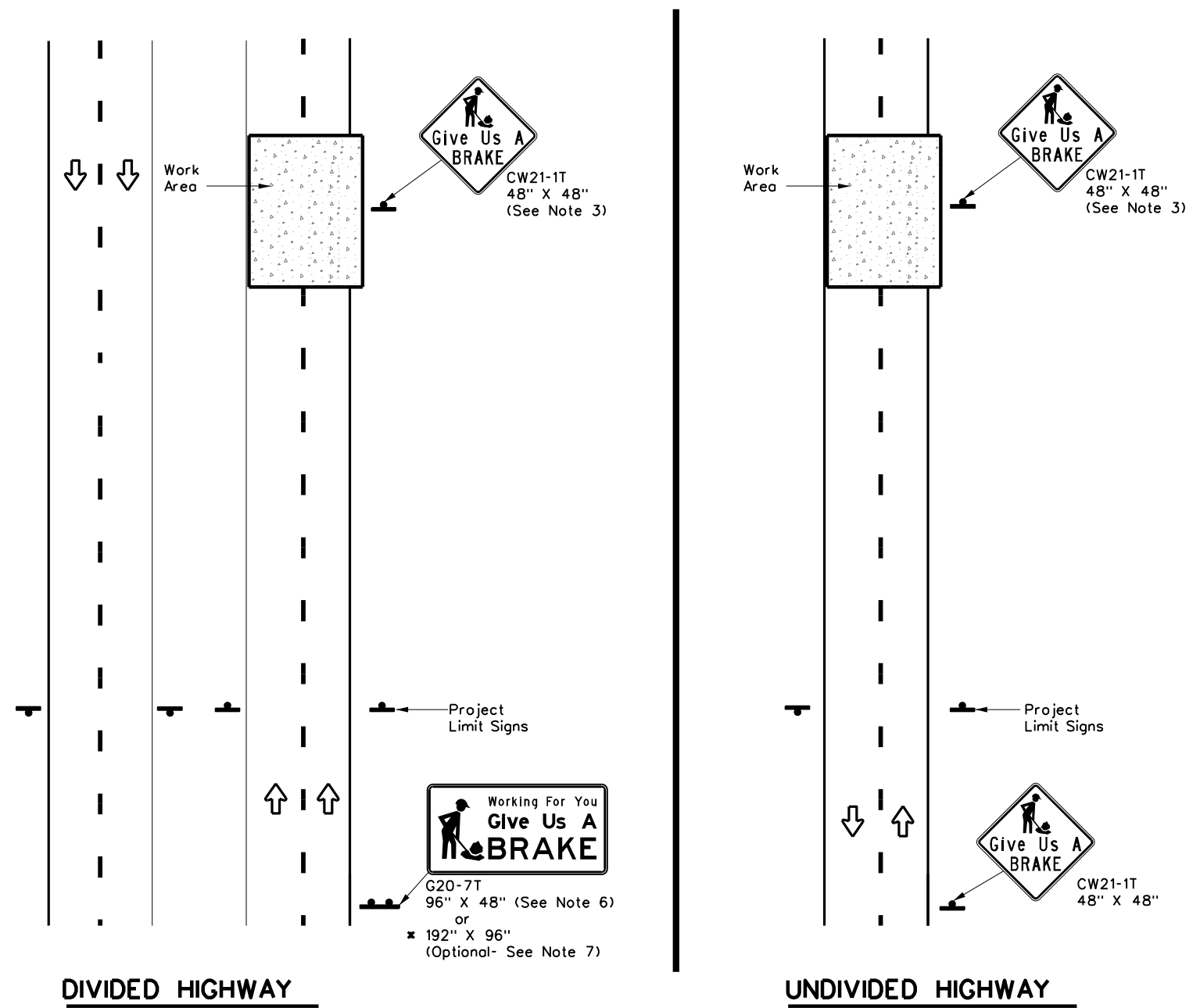


## WORK IN EXIT GORE FOR ADT GREATER THAN 10,000

### TCP(6-8)-14

|                       |            |                       |              |                      |
|-----------------------|------------|-----------------------|--------------|----------------------|
| FILE: tcp6-8.dgn      | DN: TxDOT  | CK: TxDOT             | DW: TxDOT    | CK: TxDOT            |
| © TxDOT February 2014 | CONT: 6454 | SECT: 87              | JOB: 001     | HIGHWAY: IH 10, ETC. |
| REVISIONS:            | DIST: ELP  | COUNTY: EL PASO, ETC. | SHEET NO. 40 |                      |

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 DATE: 10/17/2023 10:15:05 AM  
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SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

\* When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

| SUMMARY OF LARGE SIGNS |                  |      |                 |   |       |                             |      |               |
|------------------------|------------------|------|-----------------|---|-------|-----------------------------|------|---------------|
| BACKGROUND COLOR       | SIGN DESIGNATION | SIGN | SIGN DIMENSIONS | REFLECTIVE SHEETING                     | SO FT | GALVANIZED STRUCTURAL STEEL |      | DRILLED SHAFT |
|                        |                  |      |                 |   |       | Size                        | (LF) |               |
|                        |                  |      |                 |   |       |                             | ①    | ②             |
| Orange                 | G20-7T           |      | 96" X 48"       | Type B <sub>FL</sub> or C <sub>FL</sub> | 32    | ▲                           | ▲    | ▲             |
| Orange                 | G20-7T           |      | 192" X 96"      | Type B <sub>FL</sub> or C <sub>FL</sub> | 128   | W8x18                       | 16   | 17            |

▲ See Note 6 Below

| LEGEND |              |
|--------|--------------|
|        | Sign         |
|        | Large Sign   |
|        | Traffic Flow |

| DEPARTMENTAL MATERIAL SPECIFICATIONS |          |
|--------------------------------------|----------|
| PLYWOOD SIGN BLANKS                  | DMS-7100 |
| ALUMINUM SIGN BLANKS                 | DMS-7110 |
| SIGN FACE MATERIALS                  | DMS-8300 |

| COLOR  | USAGE            | SHEETING MATERIAL                            |
|--------|------------------|--|
| ORANGE | BACKGROUND       | TYPE B <sub>FL</sub> OR TYPE C <sub>FL</sub> |
| BLACK  | LEGEND & BORDERS | NON-REFLECTIVE ACRYLIC FILM                  |

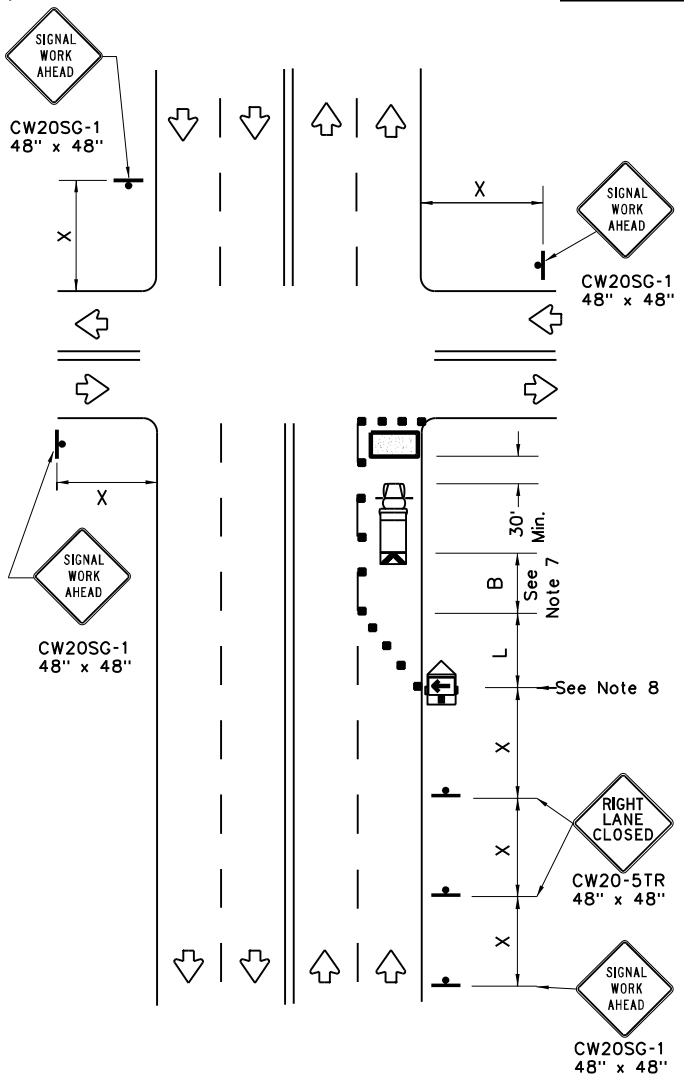
**GENERAL NOTES**

- See BC and SMD sheets for additional sign support details.
- Sign locations shall be approved by the Engineer.
- For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
- Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
- Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
- The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
- The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:  
 Item 636 - Aluminum Signs  
 Item 647 - Large Roadside Sign Supports and Assemblies.  
 Item 416 - Drilled Shaft Foundations
- All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

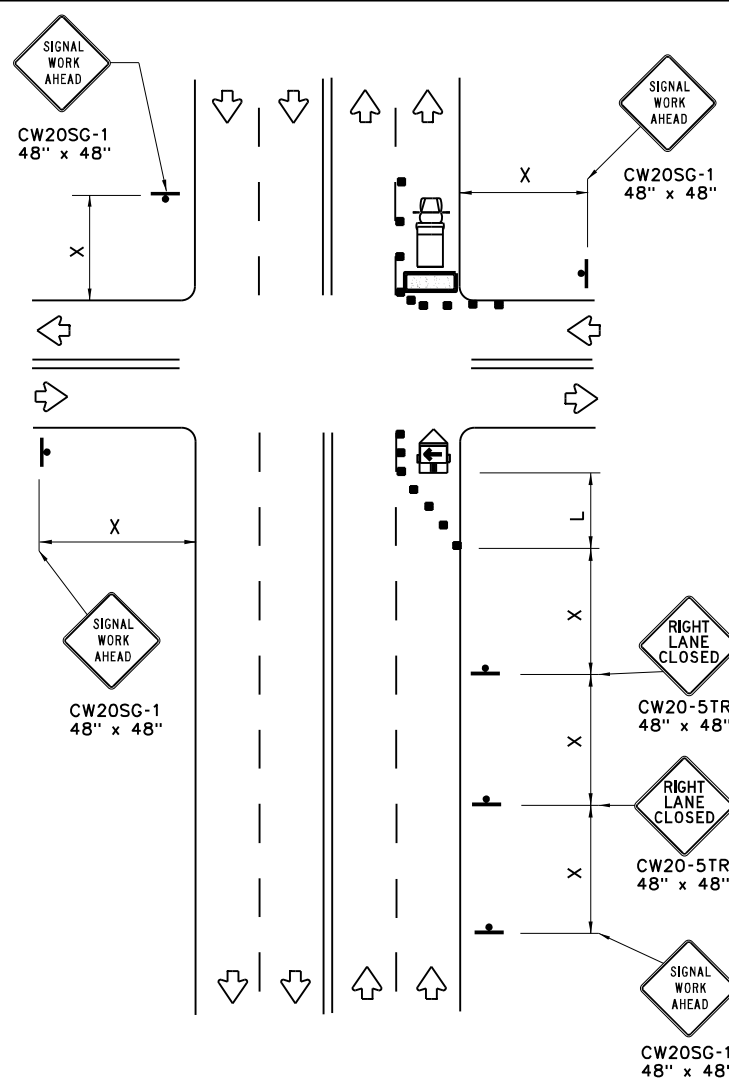
|  |           |               |           |                                      |             |
|--|-----------|---------------|-----------|--------------------------------------|-------------|
| Texas Department of Transportation               |           |               |           | Traffic Operations Division Standard |             |
| <b>WORK ZONE<br/>"GIVE US A BRAKE"<br/>SIGNS</b> |           |               |           |                                      |             |
| <b>WZ(BRK)-13</b>                                |           |               |           |                                      |             |
| FILE: wzbrk-13.dgn                               | DN: TxDOT | CK: TxDOT     | DW: TxDOT | CK: TxDOT                            |             |
| © TxDOT August 1995                              | CONT      | SECT          | JOB       | HIGHWAY                              |             |
| REVISIONS  |           | 6454          | 87        | 001                                  | IH 10, ETC. |
| 6-96   | 5-98      | 7-13          |           |                                      |             |
| 8-96   | 3-03      |               |           |                                      |             |
|  | DIST      | COUNTY        |           | SHEET NO.                            |             |
|  | ELP       | EL PASO, ETC. |           | 41                                   |             |

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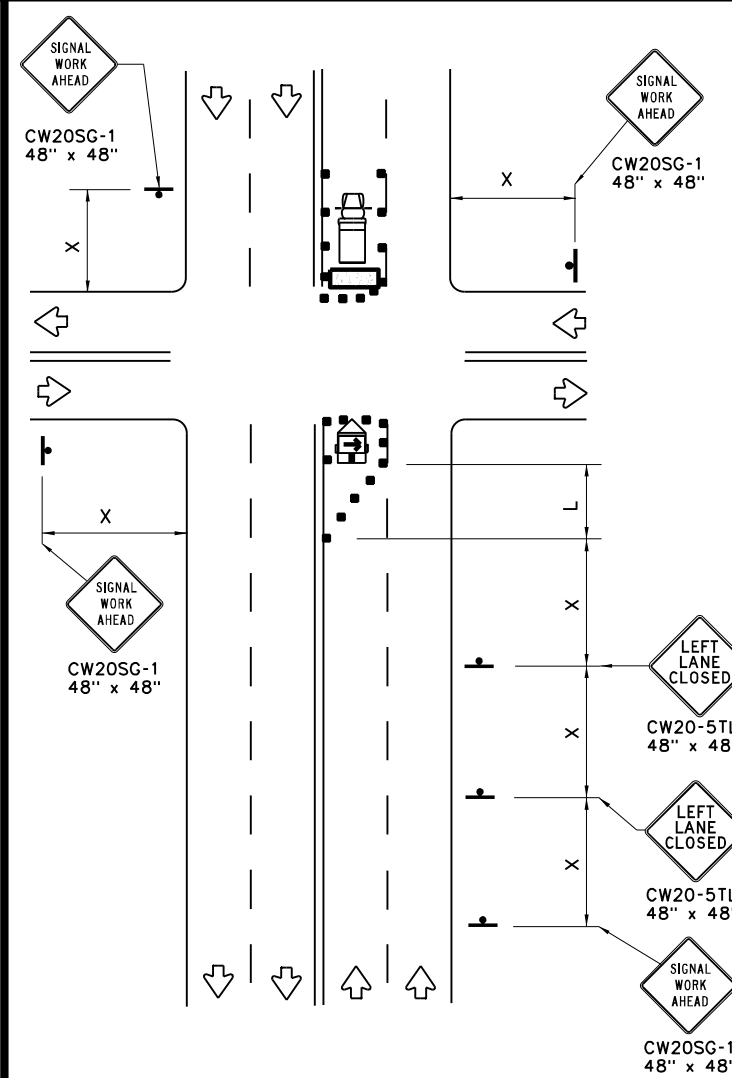
DATE: 10/17/2023 10:15:05 AM  
 FILE: I:\ELP\MAINT\Contracts\East Area\Office\RMC\_6454-87-001\_TCP\1 - DESIGN\Plan\515-100000-1316.dwg



**NEAR SIDE LANE CLOSURE**  
 SHORT DURATION OR SHORT TERM STATIONARY



**FAR SIDE RIGHT LANE CLOSURE**  
 SHORT DURATION OR SHORT TERM STATIONARY



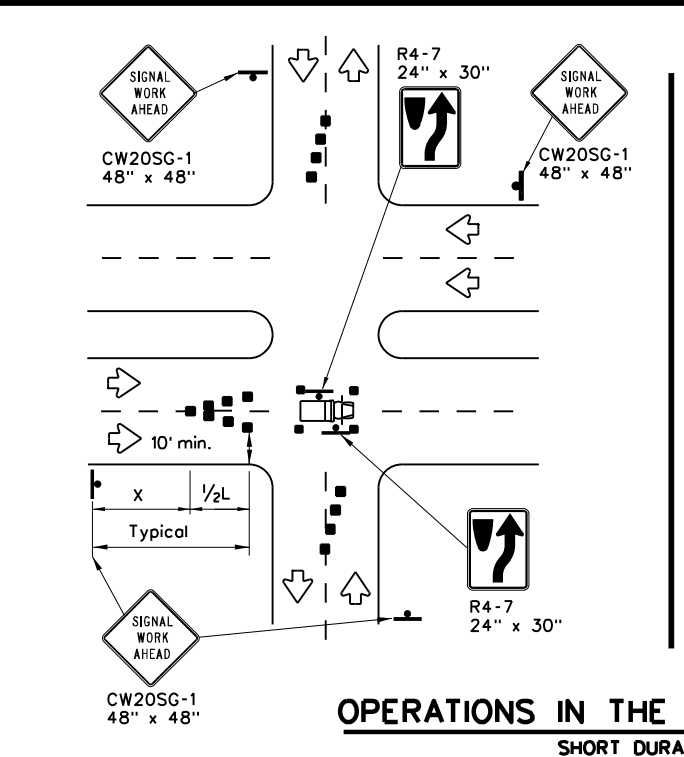
**FAR SIDE LEFT LANE CLOSURE**  
 SHORT DURATION OR SHORT TERM STATIONARY

| LEGEND |                                      |  |   |
|--------|--------------------------------------|--|---|
|        | Type 3 Barricade                     |  | Channelizing Devices                    |
|        | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|        | Trailer Mounted Flashing Arrow Board |  | Portable Changeable Message Sign (PCMS) |
|        | Sign                                 |  | Traffic Flow                            |
|        | Flag                                 |  | Flagger                                 |

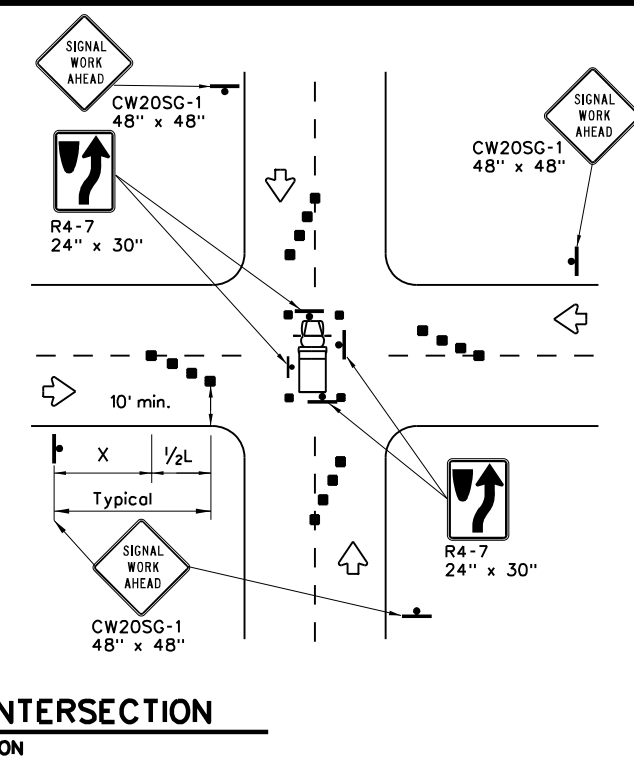
| Posted Speed<br>x | Formula               | Minimum Desirable Taper Lengths<br>x x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Minimum Sign Spacing<br>"x"<br>Distance | Suggested Longitudinal Buffer Space<br>"B" |
|-------------------|-----------------------|--|------------|------------|---|--------------|---|--|
|                   |                       | 10' Offset                             | 11' Offset | 12' Offset | On a Taper  | On a Tangent |   |  |
| 30                | $L = \frac{WS^2}{60}$ | 150'                                   | 165'       | 180'       | 30'   | 60'          | 120'                                    | 90'  |
| 35                |                       | 205'                                   | 225'       | 245'       | 35'   | 70'          | 160'                                    | 120'                                       |
| 40                |                       | 265'                                   | 295'       | 320'       | 40'   | 80'          | 240'                                    | 155'                                       |
| 45                | L = WS                | 450'                                   | 495'       | 540'       | 45'   | 90'          | 320'                                    | 195'                                       |
| 50                |                       | 500'                                   | 550'       | 600'       | 50'   | 100'         | 400'                                    | 240'                                       |
| 55                |                       | 550'                                   | 605'       | 660'       | 55'   | 110'         | 500'                                    | 295'                                       |
| 60                |                       | 600'                                   | 660'       | 720'       | 60'   | 120'         | 600'                                    | 350'                                       |
| 65                |                       | 650'                                   | 715'       | 780'       | 65'   | 130'         | 700'                                    | 410'                                       |
| 70                |                       | 700'                                   | 770'       | 840'       | 70'   | 140'         | 800'                                    | 475'                                       |
| 75                |                       | 750'                                   | 825'       | 900'       | 75'   | 150'         | 900'                                    | 540'                                       |

\* Conventional Roads Only  
 \* \* Taper lengths have been rounded off.  
 L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

**WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.**



**OPERATIONS IN THE INTERSECTION**  
 SHORT DURATION



**GENERAL NOTES**

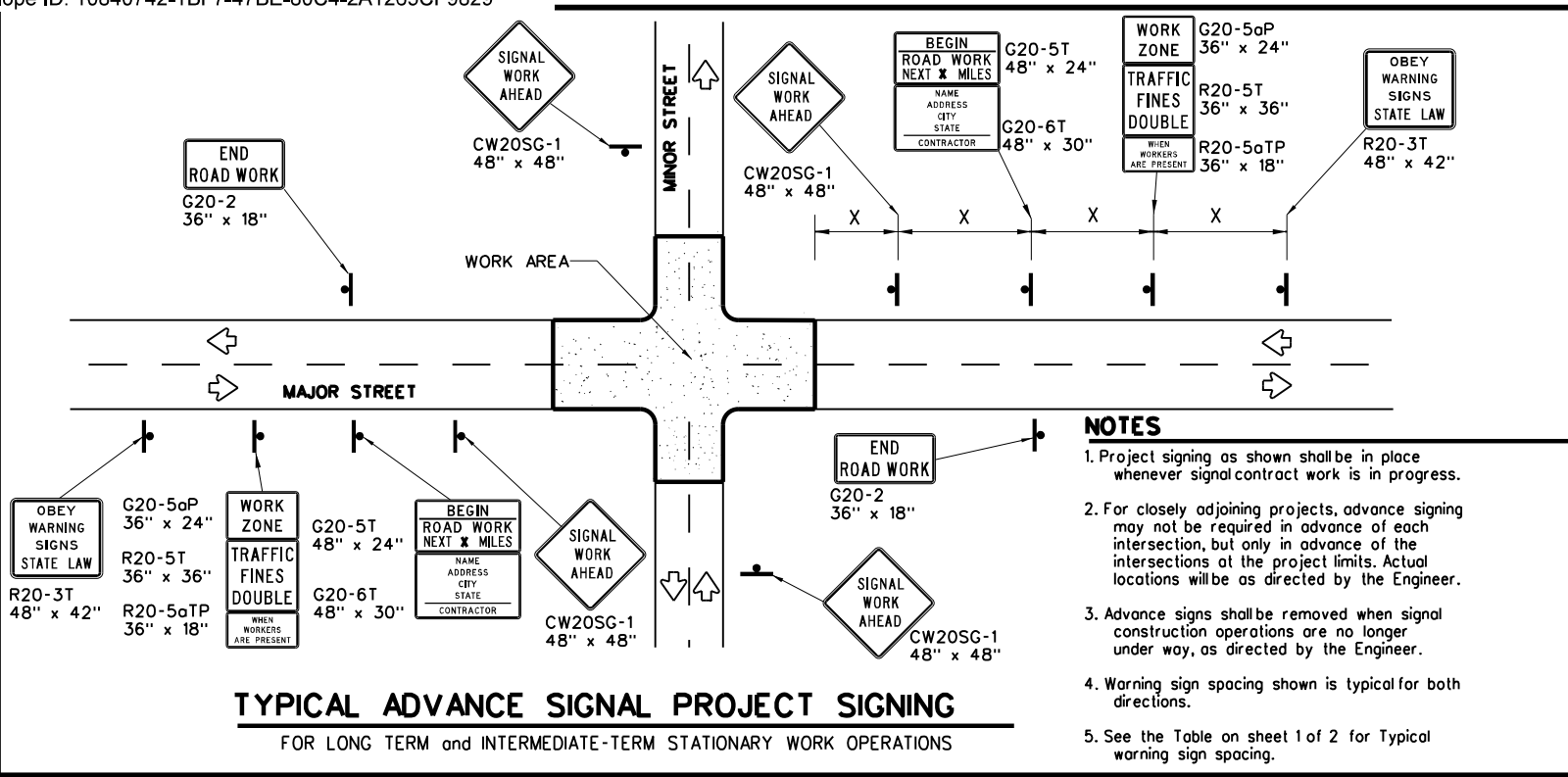
- The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
- Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
- Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
- Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
- High level warning devices (flag trees) may be used at corners of the vehicle.
- When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
- For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
- The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
- Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

|  |            |                                      |                  |
|--|------------|--------------------------------------|------------------|
|  |            | Traffic Operations Division Standard |                  |
| <h2>TRAFFIC SIGNAL WORK TYPICAL DETAILS</h2> |            |                                      |                  |
| <h3>WZ(BTS-1)-13</h3>                        |            |                                      |                  |
| FILE: wzbts-13.dgn                           | DN: TxDOT  | CK: TxDOT                            | DW: TxDOT        |
| © TxDOT April 1992                           | CONT: 6454 | SECT: 87                             | JOB: IH 10, ETC. |
| REVISIONS:                                   | 6454       | 87                                   | 001              |
| 2-98 10-99 7-13                              | DIST: ELP  | COUNTY: EL PASO, ETC.                | SHEET NO. 42     |
| 4-98 3-03                                    |            |                                      |                  |



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**TYPICAL ADVANCE SIGNAL PROJECT SIGNING**  
FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

- NOTES**
- Project signing as shown shall be in place whenever signal contract work is in progress.
  - For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
  - Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
  - Warning sign spacing shown is typical for both directions.
  - See the Table on sheet 1 of 2 for Typical warning sign spacing.

**GENERAL NOTES FOR WORK ZONE SIGNS**

- Signs shall be installed and maintained in a straight and plumb condition.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- Nails shall NOT be used to attach signs to any support.
- All signs shall be installed in accordance with the plans or as directed by the Engineer.
- The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
- The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
- Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
- Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1".
- Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

**DURATION OF WORK**

- Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

**SIGN MOUNTING HEIGHT**

- Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
- Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
- Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

**REMOVING OR COVERING**

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
- When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night without damaging the sign sheeting. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

**REFLECTIVE SHEETING**

- All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

**SIGN SUPPORT WEIGHTS**

- Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support weights.
- Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
- Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber, such as tire inner tubes, shall not be used.
- Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
- Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

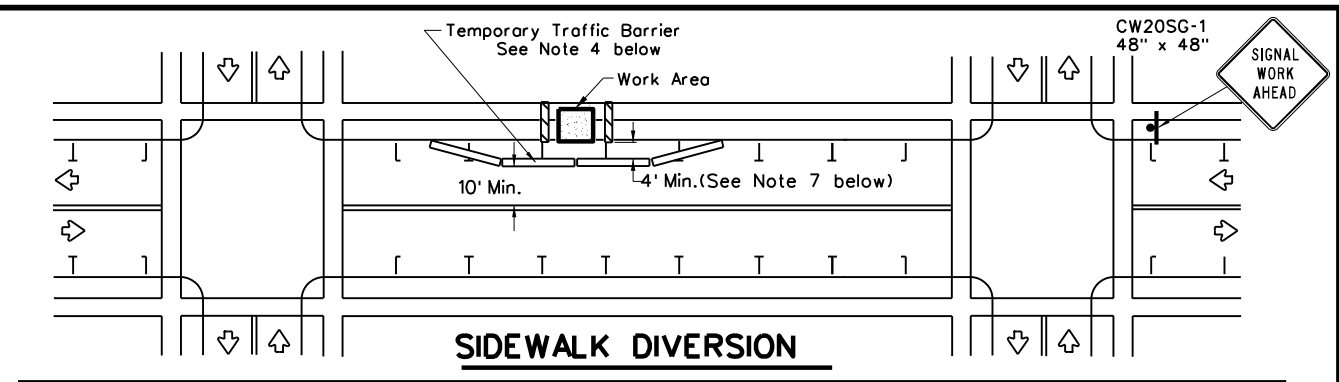
| LEGEND |                      |
|--------|----------------------|
|        | Sign                 |
|        | Channelizing Devices |
|        | Type 3 Barricade     |

**DEPARTMENTAL MATERIAL SPECIFICATIONS**

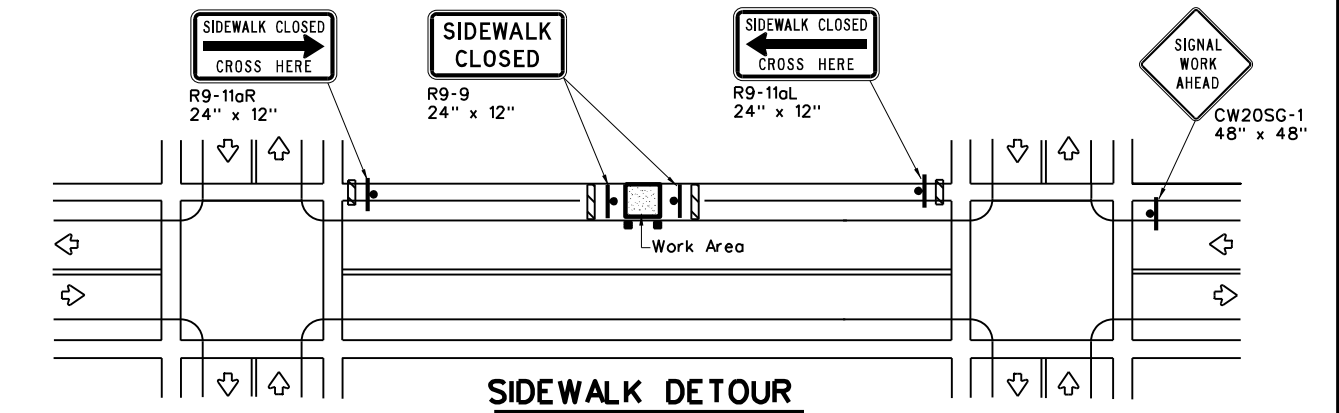
|                                   |          |
|-----------------------------------|----------|
| SIGN FACE MATERIALS               | DMS-8300 |
| FLEXIBLE ROLL-UP REFLECTIVE SIGNS | DMS-8310 |

| COLOR  | USAGE            | SHEETING MATERIAL                                     |
|--------|------------------|---|
| ORANGE | BACKGROUND       | TYPE B <sub>FL</sub> OR TYPE C <sub>FL</sub> SHEETING |
| WHITE  | BACKGROUND       | TYPE A SHEETING                                       |
| BLACK  | LEGEND & BORDERS | ACRYLIC NON-REFLECTIVE SHEETING                       |

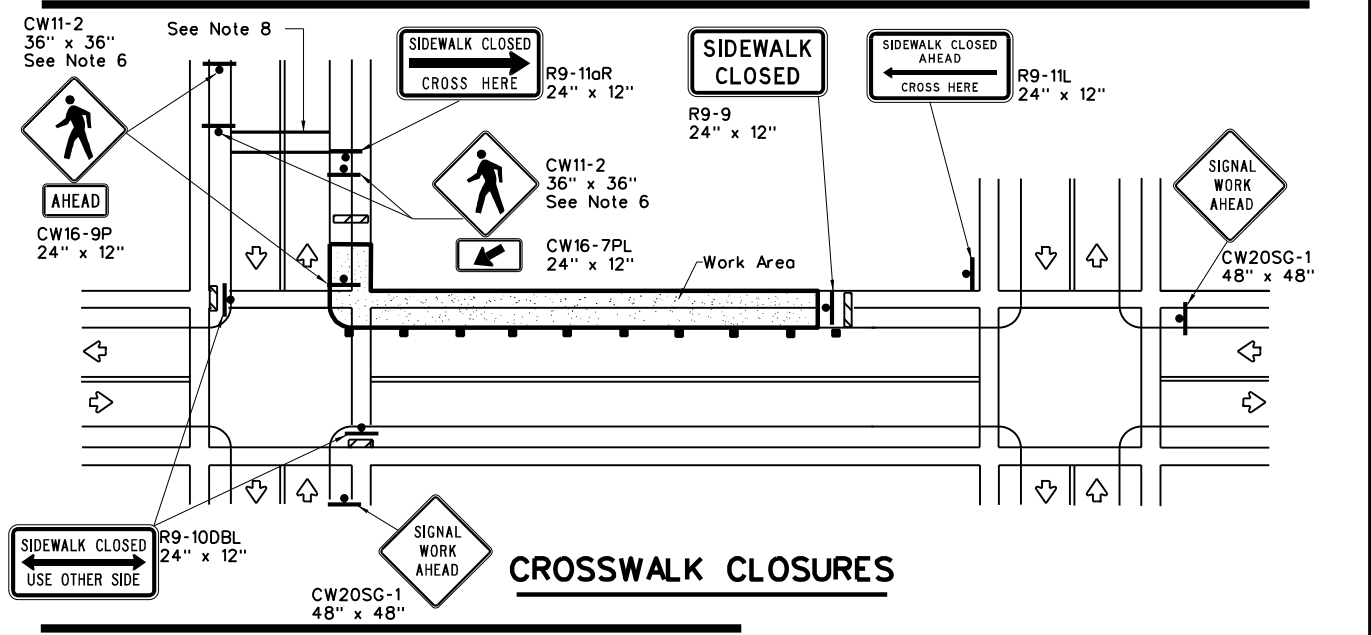
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:  
[http://www.txdot.gov/txdot\\_library/publications/construction.htm](http://www.txdot.gov/txdot_library/publications/construction.htm)



**SIDEWALK DIVERSION**



**SIDEWALK DETOUR**



**CROSSWALK CLOSURES**

**PEDESTRIAN CONTROL**

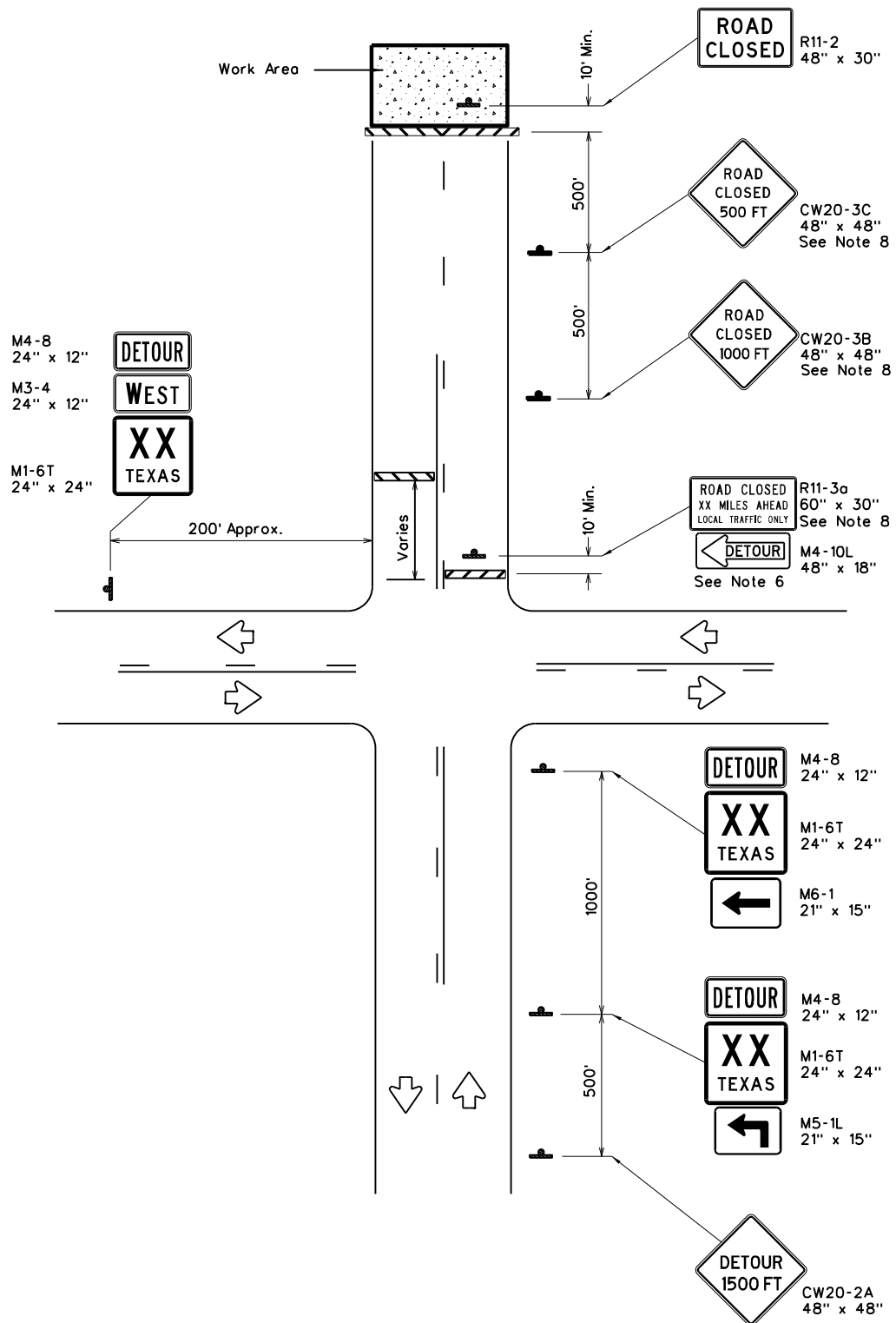
- Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
- "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
- R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
- For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
- Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
- Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
- The width of existing sidewalk should be maintained if practical.
- Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
- When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

SHEET 2 OF 2

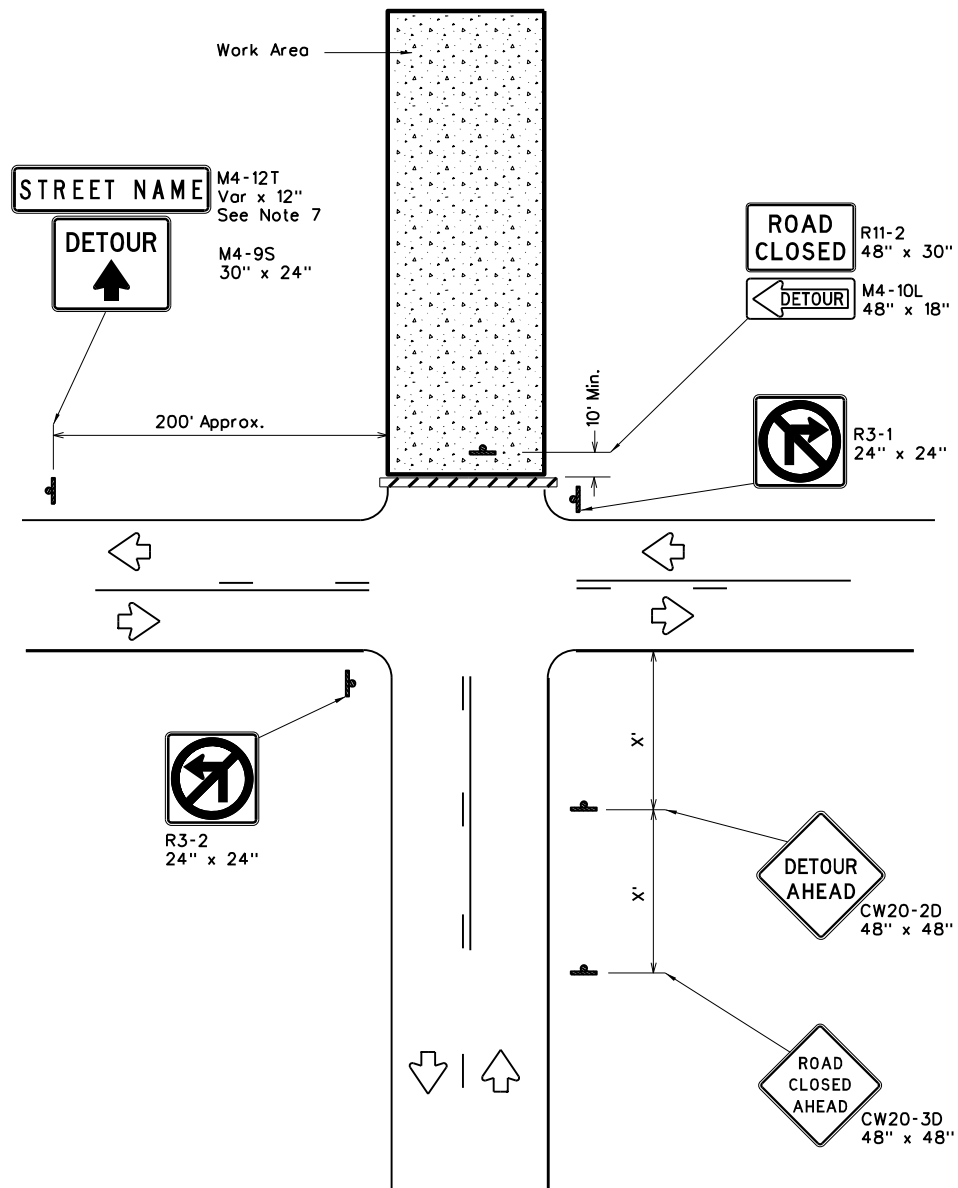
|   |                       |   |           |
|---|-----------------------|---|-----------|
|   |                       | <b>Traffic Operations Division Standard</b> |           |
| <h2>TRAFFIC SIGNAL WORK BARRICADES AND SIGNS</h2> |                       |   |           |
| <h3>WZ(BTS-2)-13</h3>                             |                       |   |           |
| FILE: wzbts-13.dgn                                | DN: TxDOT             | CK: TxDOT                                   | DW: TxDOT |
| © TxDOT April 1992                                | CONT: 6454            | SECT: 87                                    | JOB: 001  |
| REVISIONS   | 4-98                  | 10-99                                       | 7-13      |
| DIST: ELP   | COUNTY: EL PASO, ETC. | SHEET NO. 43                                |           |

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**ROAD CLOSURE BEYOND THE INTERSECTION**  
 Signing for a Numbered Route with an Off-Site Detour



**ROAD CLOSURE AT THE INTERSECTION**  
 Signing for an Un-numbered Route with an Off-Site Detour

| LEGEND |                  |
|--------|------------------|
|        | Type 3 Barricade |
|        | Sign             |

| Posted Speed *<br>x | Minimum Sign Spacing "x"<br>Distance |
|---------------------|--------------------------------------|
| 30                  | 120'                                 |
| 35                  | 160'                                 |
| 40                  | 240'                                 |
| 45                  | 320'                                 |
| 50                  | 400'                                 |
| 55                  | 500'                                 |
| 60                  | 600'                                 |
| 65                  | 700'                                 |
| 70                  | 800'                                 |
| 75                  | 900'                                 |

\* Conventional Roads Only

**GENERAL NOTES**

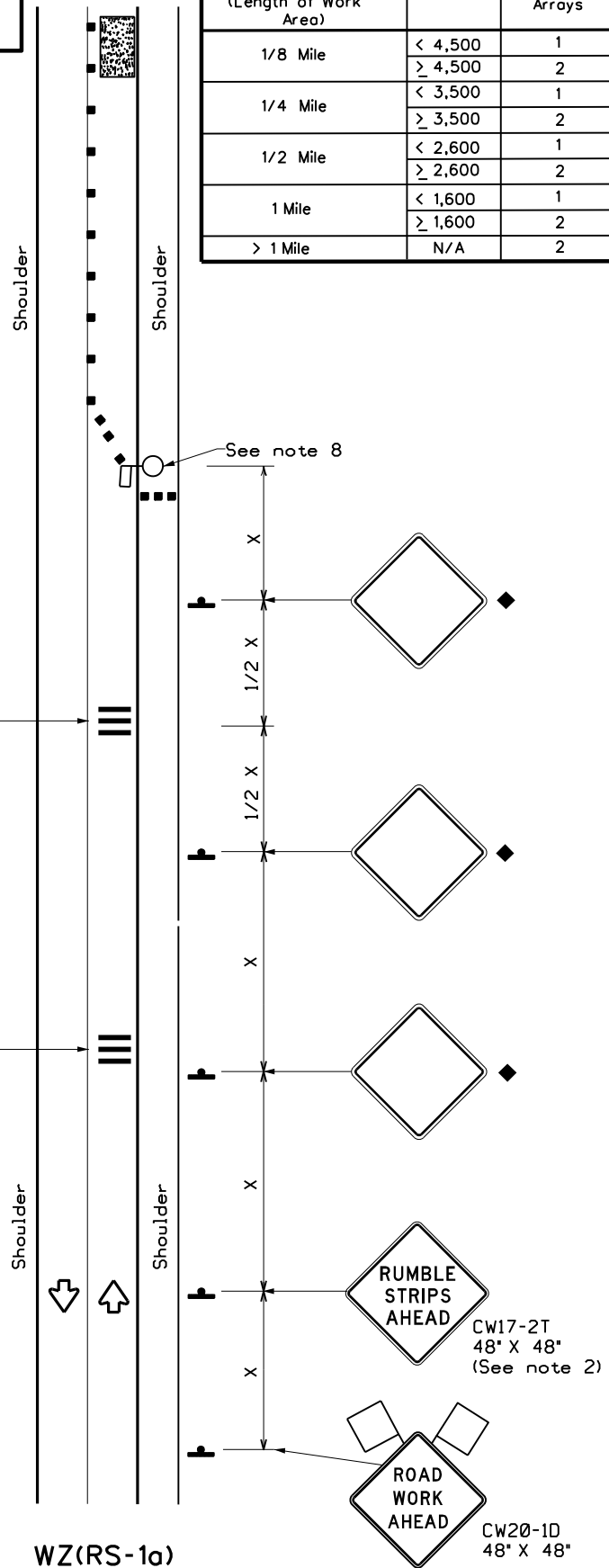
- This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
- Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
- Stockpiled materials shall not be placed on the traffic side of barricades.
- Barricades at the road closure should extend from pavement edge to pavement edge.
- Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
- If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
- The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
- For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
- Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

|                                       |           |                                      |           |
|---------------------------------------|-----------|--------------------------------------|-----------|
| Texas Department of Transportation    |           | Traffic Operations Division Standard |           |
| <b>WORK ZONE ROAD CLOSURE DETAILS</b> |           |                                      |           |
| <b>WZ(RCD)-13</b>                     |           |                                      |           |
| FILE: wzrcd-13.dgn                    | DN: TxDOT | CK: TxDOT                            | DW: TxDOT |
| © TxDOT August 1995                   | CONT      | SECT                                 | JOB       |
| REVISIONS                             | 6454      | 87                                   | 001       |
| 1-97 4-98 7-13                        | DIST      | COUNTY                               | SHEET NO. |
| 2-98 3-03                             | ELP       | EL PASO, ETC.                        | 44        |

Warning sign and rumble strip sequence in opposite direction is same as below.

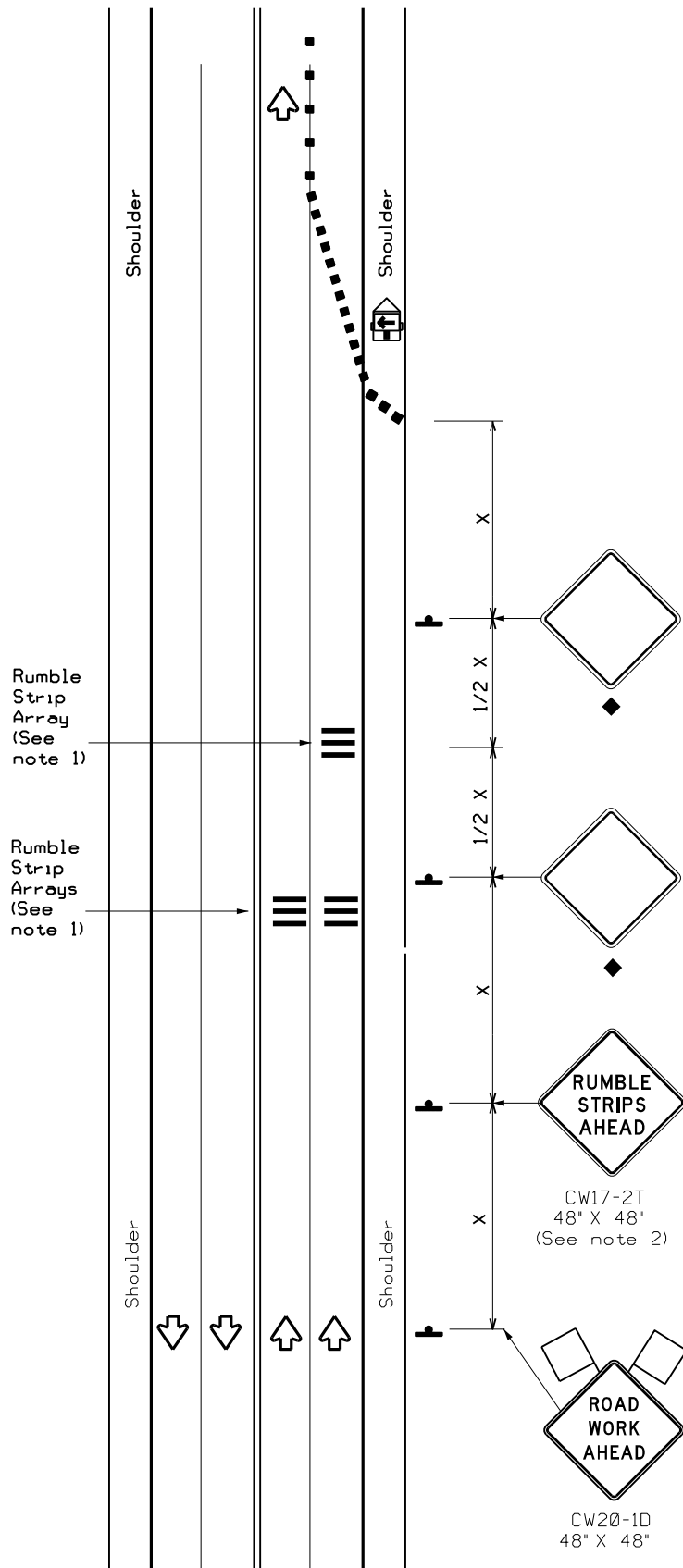
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

| Flagger to Flagger (Length of Work Area) | ADT     | # of Rumble Strip Arrays |
|--|---------|--------------------------|
| 1/8 Mile                                 | < 4,500 | 1                        |
|  | ≥ 4,500 | 2                        |
| 1/4 Mile                                 | < 3,500 | 1                        |
|  | ≥ 3,500 | 2                        |
| 1/2 Mile                                 | < 2,600 | 1                        |
|  | ≥ 2,600 | 2                        |
| 1 Mile                                   | < 1,600 | 1                        |
|  | ≥ 1,600 | 2                        |
| > 1 Mile                                 | N/A     | 2                        |



WZ(RS-1a)

**RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION**



WZ(RS-1b)

**RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY**

**GENERAL NOTES**

- Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
- The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD" sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
- Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
- Remove Temporary Rumble Strips before removing the advanced warning signs.
- Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
- Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
- This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
- The one-lane two-way application may utilize a flagger, an Automated Flagger Assistance Device (AFAD) or a Portable Traffic Signal (PTS).
- Replace defective Temporary Rumble Strips as directed by the Engineer.
- Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment and written direction from the Engineer.

| Speed               | Approximate distance between strips in an array |
|---------------------|---|
| ≤ 40 MPH            | 10'   |
| > 40 MPH & ≤ 55 MPH | 15'   |
| = 60 MPH            | 20'   |
| ≥ 65 MPH            | * 35'+  |

|  |                                      |  |   |
|--|--------------------------------------|--|---|
|  | Type 3 Barricade                     |  | Channelizing Devices                    |
|  | Heavy Work Vehicle                   |  | Truck Mounted Attenuator (TMA)          |
|  | Trailer Mounted Flashing Arrow Panel |  | Portable Changeable Message Sign (PCMS) |
|  | Sign                                 |  | Traffic Flow                            |
|  | Flag                                 |  | Flagger                                 |

| Posted Speed *<br>x | Formula                  | Minimum Desirable Taper Lengths * x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Minimum Sign Spacing "x" Distance | Suggested Longitudinal Buffer Space "B" |
|---------------------|--------------------------|-------------------------------------|------------|------------|---|--------------|-----------------------------------|---|
|                     |                          | 10' Offset                          | 11' Offset | 12' Offset | On a Taper  | On a Tangent |                                   |   |
| 30                  | L = WS <sup>2</sup> / 60 | 150'                                | 165'       | 180'       | 30'   | 60'          | 120'                              | 90'                                     |
| 35                  |                          | 205'                                | 225'       | 245'       | 35'   | 70'          | 160'                              | 120'                                    |
| 40                  | L = WS                   | 265'                                | 295'       | 320'       | 40'   | 80'          | 240'                              | 155'                                    |
| 45                  |                          | 450'                                | 495'       | 540'       | 45'   | 90'          | 320'                              | 195'                                    |
| 50                  |                          | 500'                                | 550'       | 600'       | 50'   | 100'         | 400'                              | 240'                                    |
| 55                  |                          | 550'                                | 605'       | 660'       | 55'   | 110'         | 500'                              | 295'                                    |
| 60                  |                          | 600'                                | 660'       | 720'       | 60'   | 120'         | 600'                              | 350'                                    |
| 65                  |                          | 650'                                | 715'       | 780'       | 65'   | 130'         | 700'                              | 410'                                    |
| 70                  |                          | 700'                                | 770'       | 840'       | 70'   | 140'         | 800'                              | 475'                                    |
| 75                  | 750'                     | 825'                                | 900'       | 75'        | 150'  | 900'         | 540'                              |   |

\* Conventional Roads Only  
 \* \* Taper lengths have been rounded off.  
 L=Length of Taper(FT) W=Width of Offset(FT)  
 S=Posted Speed(MPH)

| MOBILE | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|--------|----------------|-----------------------|------------------------------|----------------------|
|        | ✓              | ✓                     |                              |                      |

◆ Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.  
 \* For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.

Texas Department of Transportation Traffic Safety Division Standard

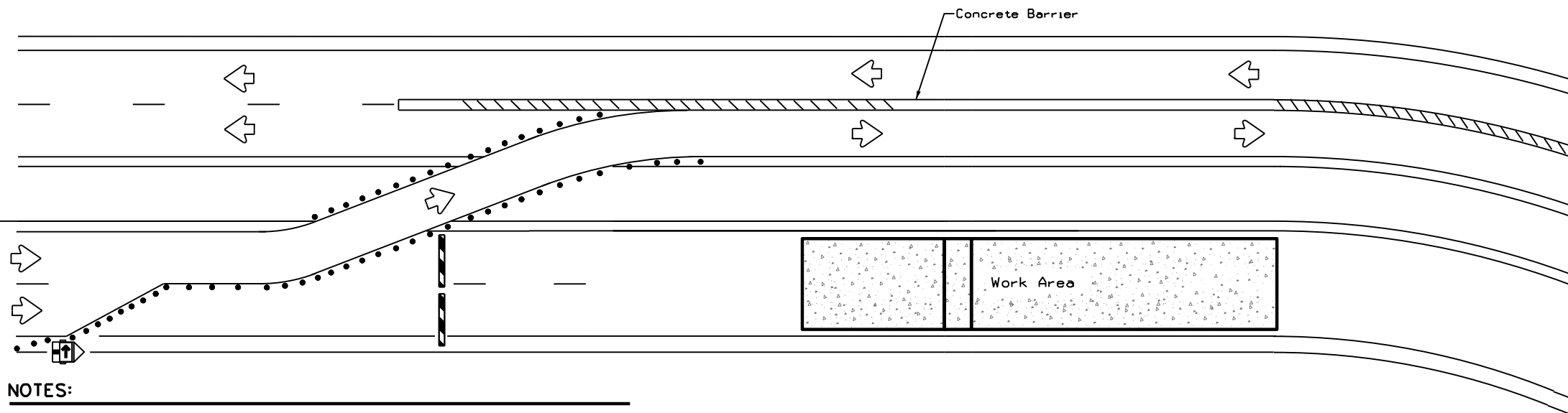
## TEMPORARY RUMBLE STRIPS

### WZ(RS)-22

|                       |           |               |           |             |
|-----------------------|-----------|---------------|-----------|-------------|
| FILE: wzs22.dgn       | DN: TxDOT | CK: TxDOT     | DW: TxDOT | CK: TxDOT   |
| © TxDOT November 2012 | CONT      | SECT          | JOB       | HIGHWAY     |
| REVISIONS             | 6454      | 87            | 001       | IH-10, ETC. |
| 2-14 1-22             | DIST      | COUNTY        | SHEET NO. |             |
| 4-16                  | ELP       | EL PASO, ETC. | 45        |             |

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**NOTES:**

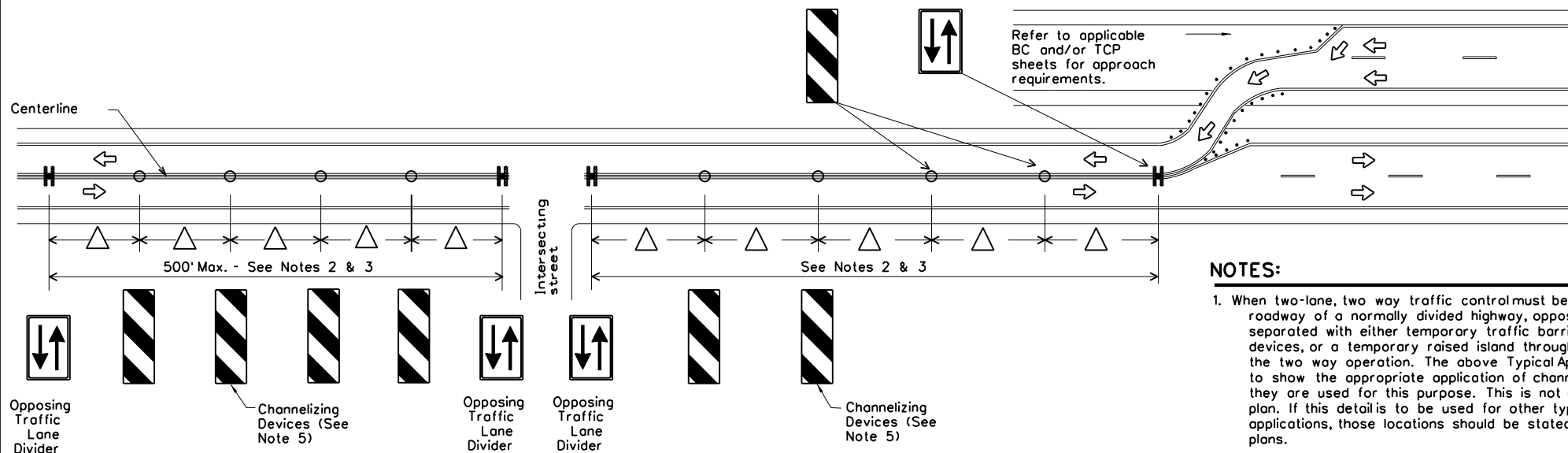
1. Length of Safety Glare screen will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular safety glare screen units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one safety glare screen unit.
3. Screen Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one glare screen panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

**BARRIER DELINEATION WITH MODULAR GLARE SCREENS**

| LEGEND |                                      |
|--------|--------------------------------------|
|        | Type 3 Barricade                     |
|        | Channelizing Devices                 |
|        | Trailer Mounted Flashing Arrow Board |
|        | Sign                                 |
|        | Safety glare screen                  |

| DEPARTMENTAL MATERIAL SPECIFICATIONS        |          |
|---|----------|
| SIGN FACE MATERIALS                         | DMS-8300 |
| DELINEATORS AND OBJECT MARKERS              | DMS-8600 |
| MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER | DMS-8610 |

Only pre-qualified products shall be used. A copy of the Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:  
  
<http://www.txdot.gov/business/resources/producer-list.html>



**NOTES:**

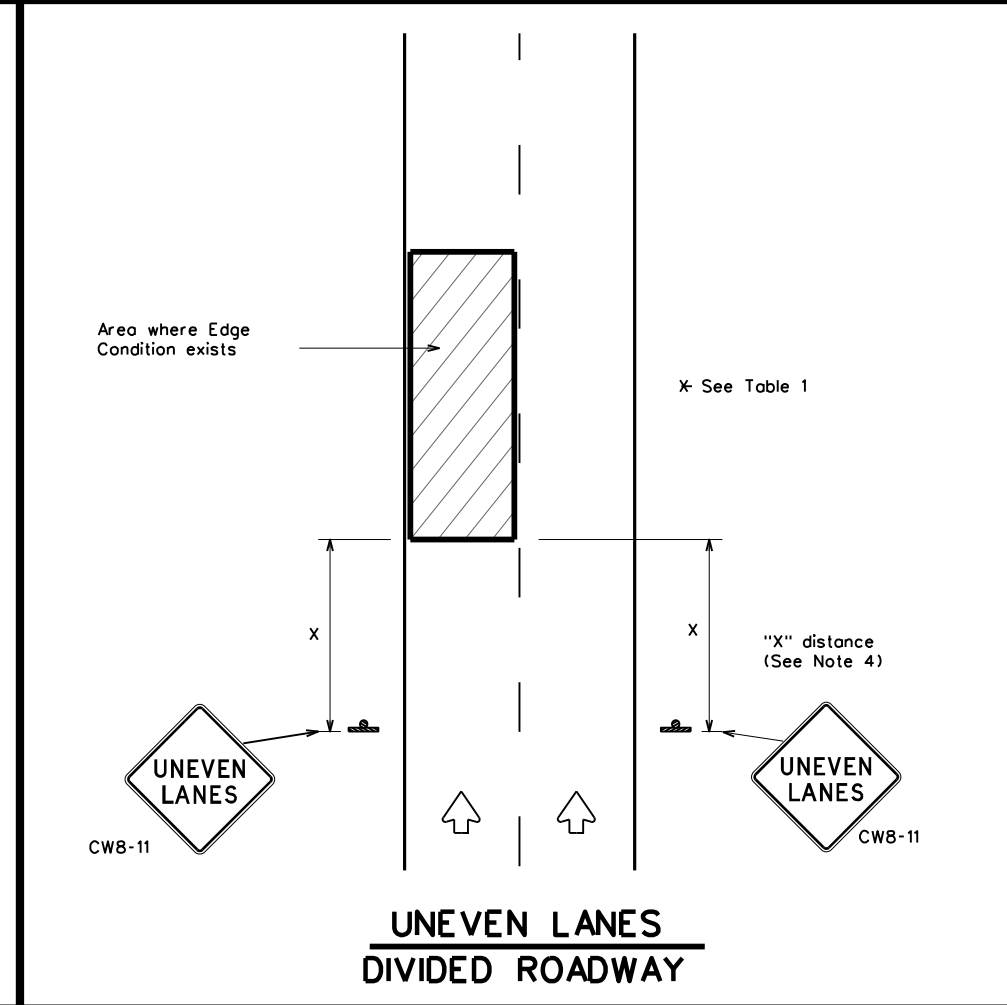
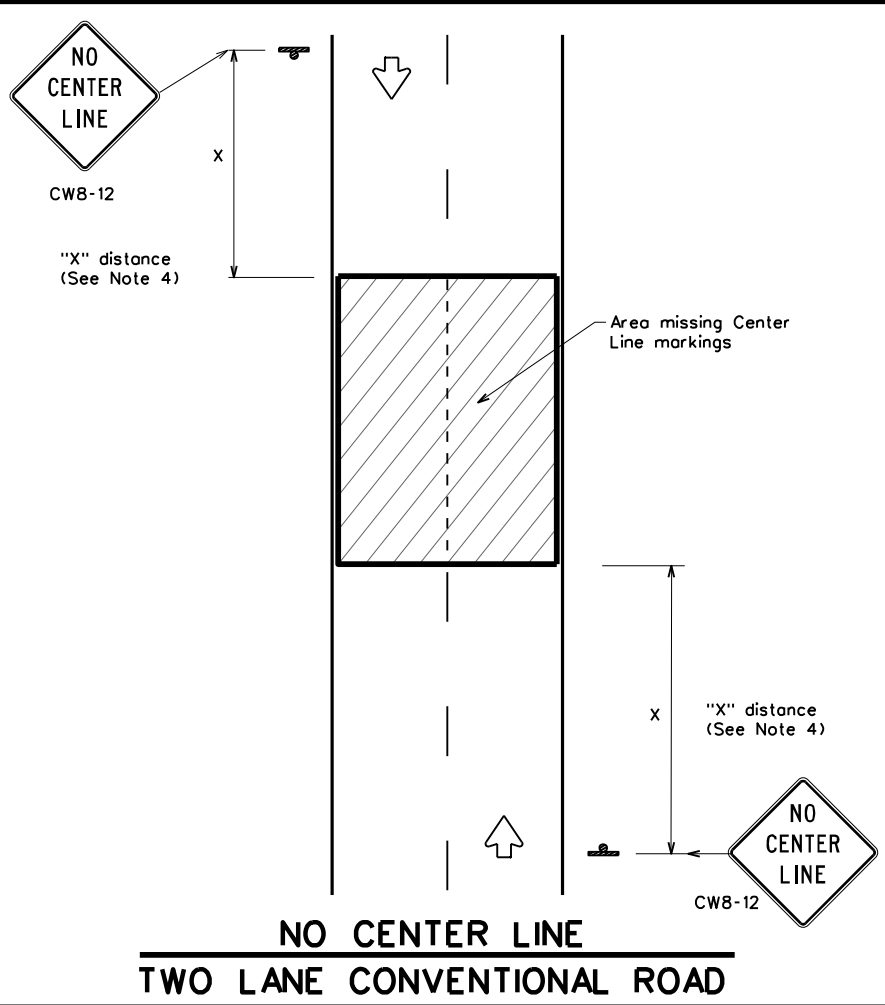
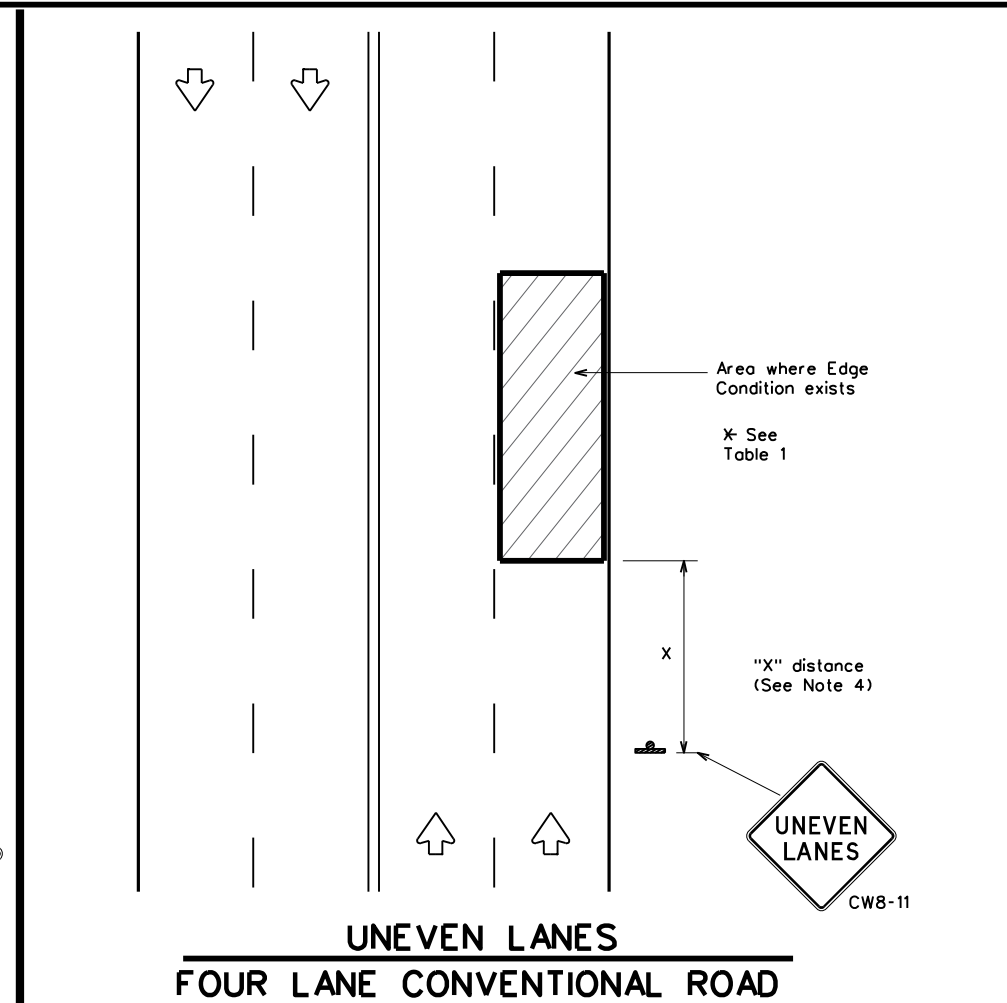
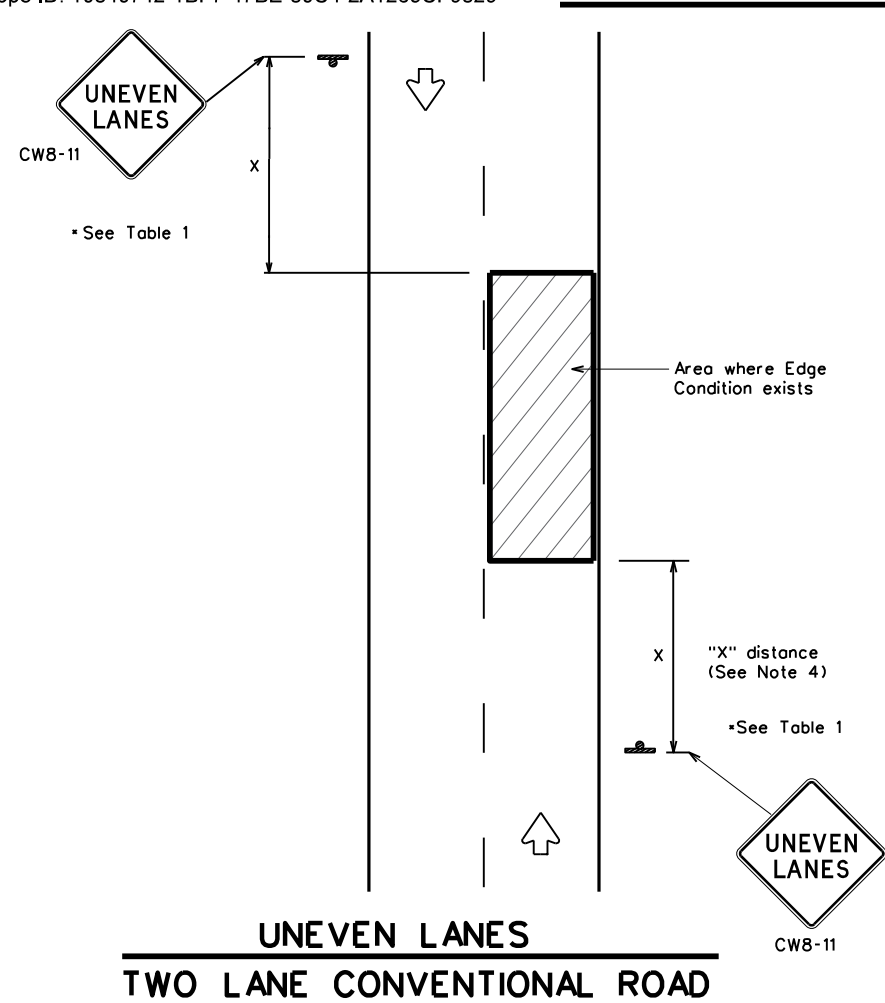
1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100'.
3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

**VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS**

|   |               |                                      |           |
|---|---------------|--------------------------------------|-----------|
|   |               | Traffic Operations Division Standard |           |
| <b>TRAFFIC CONTROL PLAN<br/>TYPICAL DETAILS</b> |               |                                      |           |
| <b>WZ(TD)-17</b>                                |               |                                      |           |
| FILE: wzd-17.dgn                                | DN: TxDOT     | CK: TxDOT                            | DW: TxDOT |
| © TxDOT February 1998                           | CONT          | SECT                                 | JOB       |
| REVISIONS                                       | 6454          | 87                                   | 001       |
| 4-98  | 2-17          |                                      |           |
| 3-03  |               |                                      |           |
| 7-13  |               |                                      |           |
| ELP   | EL PASO, ETC. |                                      | 46        |

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| DEPARTMENTAL MATERIAL SPECIFICATIONS                  |          |
|---|----------|
| PERMANENT PREFABRICATED PAVEMENT MARKINGS             | DMS-8240 |
| TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS | DMS-8241 |
| SIGN FACE MATERIALS                                   | DMS-8300 |

| COLOR  | USAGE            | SHEETING MATERIAL                                     |
|--------|------------------|---|
| ORANGE | BACKGROUND       | TYPE B <sub>FL</sub> OR TYPE C <sub>FL</sub> SHEETING |
| BLACK  | LEGEND & BORDERS | ACRYLIC NON-REFLECTIVE SHEETING                       |

**GENERAL NOTES**

- If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
- UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
- NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
- Signs shall be spaced at the distances recommended as per BC standards.
- Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
- Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
- Short term markings shall not be used to simulate edge lines.
- All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

| Edge Condition | Edge Height (D)   | * Warning Devices |
|----------------|---|-------------------|
| ①              | Less than or equal to:<br>1/4" (maximum-planing)<br>1/2" (typical-overlay)  | Sign: CW8-11      |
| ②              | Less than or equal to 3"  | Sign: CW8-11      |
| ③              | Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3". |                   |

**TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.**

| MINIMUM WARNING SIGN SIZE              |           |
|--|-----------|
| Conventional roads                     | 36" x 36" |
| Freeways/expressways, divided roadways | 48" x 48" |

Texas Department of Transportation

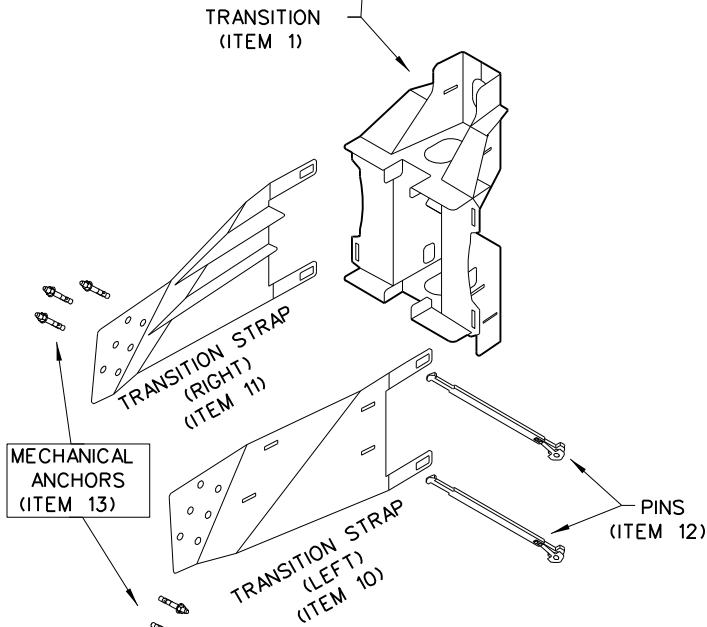
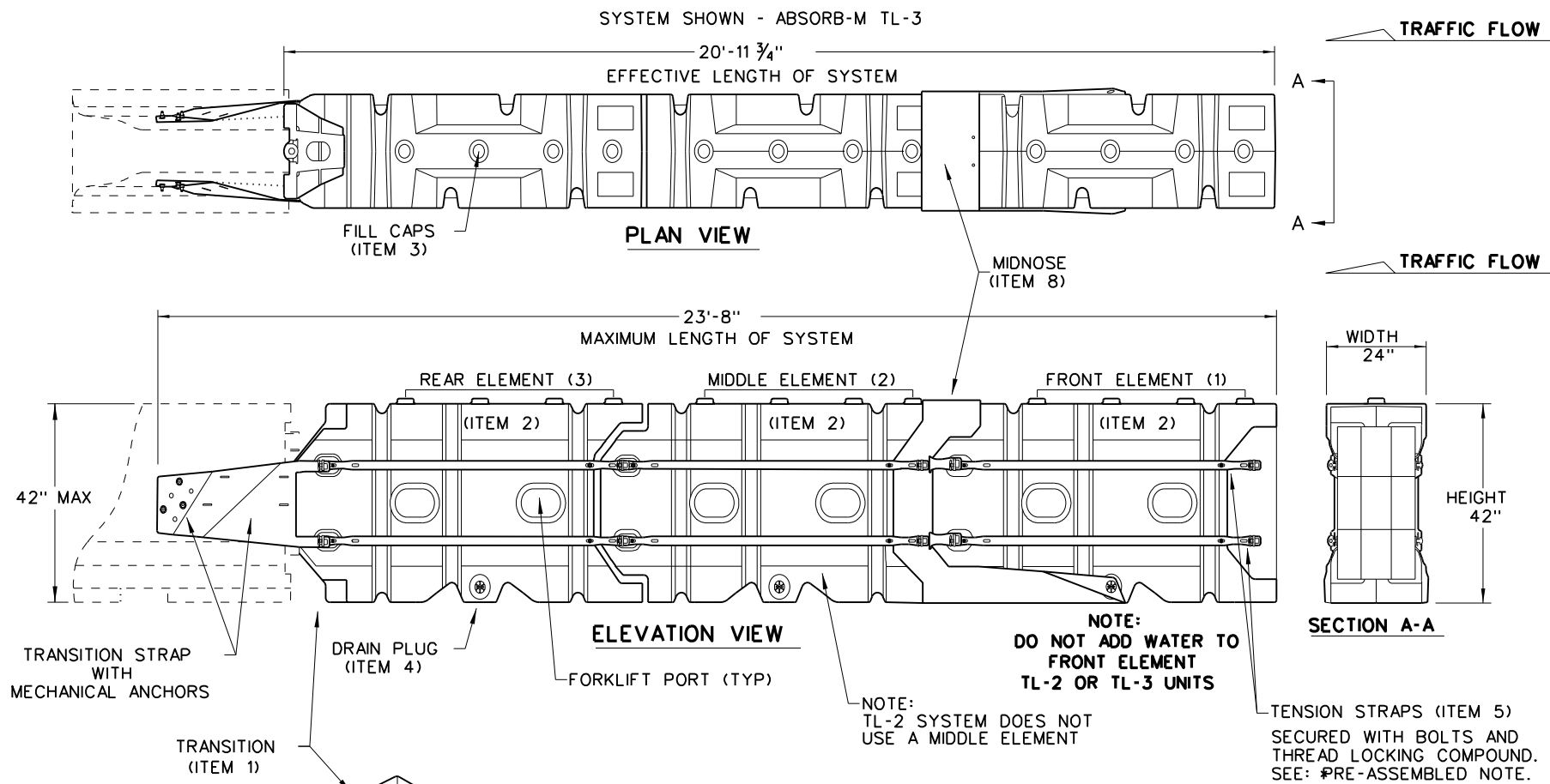
**SIGNING FOR UNEVEN LANES**

**WZ(UL)-13**

|                    |           |               |           |             |
|--------------------|-----------|---------------|-----------|-------------|
| FILE: wzul-13.dgn  | DN: TxDOT | CK: TxDOT     | DW: TxDOT | CK: TxDOT   |
| © TxDOT April 1992 | CONT      | SECT          | JOB       | HIGHWAY     |
| REVISIONS          | 6454      | 87            | 001       | IH 10, ETC. |
| 8-95 2-98 7-13     | DIST      | COUNTY        | SHEET NO. |             |
| 1-97 3-03          | ELP       | EL PASO, ETC. | 47        |             |

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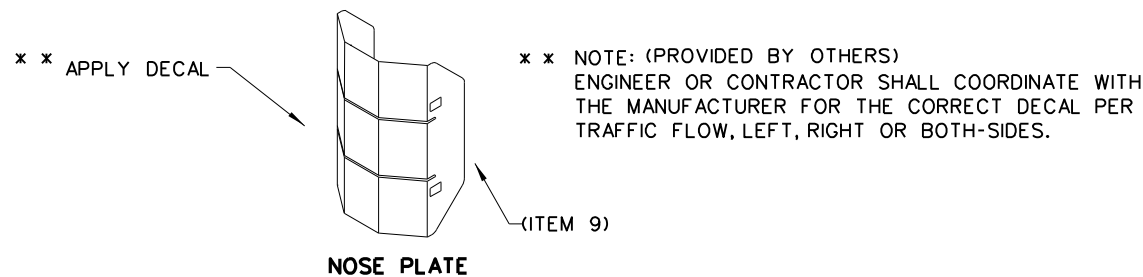
DATE: 10/17/2023  
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THE ABSORB-M IS A NON-REDIRECTIVE, GATING, CRASH CUSHION DESIGNED TO MEET THE LATEST TL-3 & TL-2 MASH REQUIREMENTS.  
 THE SYSTEM IS DESIGNED TO ACCOMMODATE A VARIETY OF F-SHAPE AND SINGLE SLOPE CONCRETE BARRIERS. CONTACT THE MANUFACTURER FOR GUIDANCE REGARDING OTHER ALLOWABLE SHAPES.

| TEST LEVEL | NUMBER OF ELEMENTS | EFFECTIVE LENGTH | MAXIMUM LENGTH |
|------------|--------------------|------------------|----------------|
| TL-2       | 2                  | 14'- 7 3/4"      | 17'- 4"        |
| TL-3       | 3                  | 20'- 11 3/4"     | 23'- 8"        |

NOTE: CROSS SLOPES OF UP TO 8% (OR 1:12 SLOPE) CAN BE ACCOMMODATED WITH STANDARD HARDWARE SHOWN WITHIN THE INSTRUCTIONS MANUAL. FOR SLOPES WITH EXCESS OF 8% (OR 1:12) CONTACT, LINDSAY TRANSPORTATION SOLUTIONS.



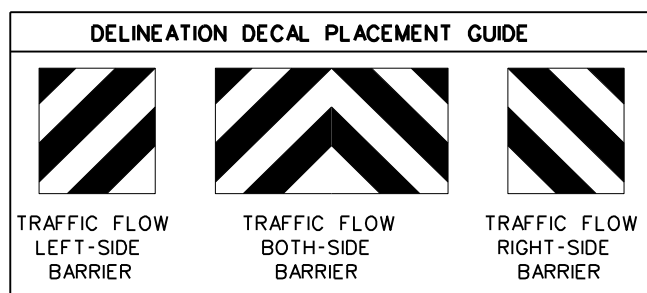
NOTE: APPLY A HIGH REFLECTIVE DECAL TO THE NOSE PLATE. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR (TRAFFIC CONTROL DEVICES). DECALS ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE.

**GENERAL NOTES**

- FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800, 180 RIVER ROAD, RIO VISTA, CA 94571
- THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
- THE ABSORB-M IS A WATER FILLED NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO A FOUNDATION AND CAN BE INSTALLED ON TOP OF CONCRETE, ASPHALT, OR ANY SURFACE CAPABLE OF BEARING THE WEIGHT OF THE SYSTEM.
- MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
- THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
- THE ABSORB-M SHOULD BE LOCATED APPROXIMATELY PARALLEL WITH THE BARRIER.
- THE USE OF THE ABSORB-M IS RESTRICTED TO A BARRIER HEIGHT OF UP TO 42 INCHES.
- DO NOT ADD WATER TO FRONT ELEMENT (TL-2 OR TL-3 UNIT).

| BILL OF MATERIALS (BOM) ABSORB-M TL-3 & TL-2 SYSTEMS |                |                                      | QTY         | QTY         |
|--|----------------|--------------------------------------|-------------|-------------|
| ITEM #   | PART NUMBER    | PART DESCRIPTION                     | TL-2 SYSTEM | TL-3 SYSTEM |
| 1  | BSI-1809036-00 | TRANSITION-(GALV)                    | 1           | 1           |
| 2  | BSI-1808002-00 | PRE-ASSEMBLED ABSORBING (ELEMENTS)   | 2           | 3           |
| 3  | BSI-4004598    | FILL CAPS                            | 8           | 12          |
| 4  | BSI-4004599    | DRAIN PLUGS                          | 2           | 3           |
| 5  | BSI-1809053-00 | TENSION STRAP-(GALV)                 | 8           | 12          |
| 6  | BSI-2001998    | C-SCR FH 3/8-16 X 1 1/2 GR5 PLT      | 8           | 12          |
| 7  | BSI-2001999    | C-SCR FH 3/8-16 X 1 GR5 PLT          | 8           | 12          |
| 8  | BSI-1809035-00 | MIDNOSE -(GALV)                      | 1           | 1           |
| 9  | BSI-1808014-00 | NOSE PLATE                           | 1           | 1           |
| 10   | BSI-1809037-00 | TRANSITION STRAP (LEFT-HAND)-(GALV)  | 1           | 1           |
| 11   | BSI-1809038-00 | TRANSITION STRAP (RIGHT-HAND)-(GALV) | 1           | 1           |
| 12   | BSI-1808005-00 | PIN ASSEMBLY                         | 8           | 10          |
| 13   | BSI-2002001    | ANC MECH 5/8-11X5 (GALV)             | 6           | 6           |
| 14   | ABSORB-M       | INSTALLATION AND INSTRUCTIONS MANUAL | 1           | 1           |

\* COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

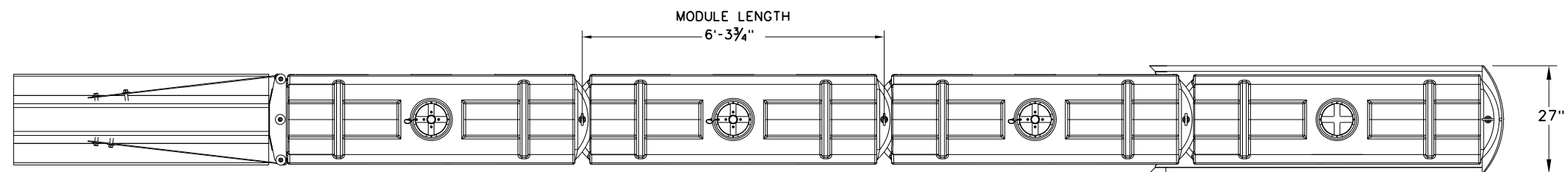


**SACRIFICIAL**

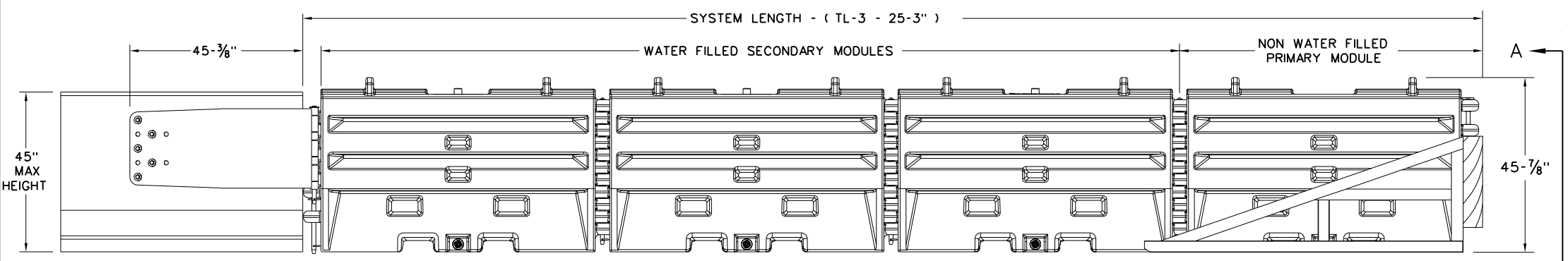
|   |               |                          |             |
|---|---------------|--------------------------|-------------|
|   |               | Design Division Standard |             |
| <b>LINDSAY TRANSPORTATION SOLUTIONS</b><br><b>CRASH CUSHION</b><br><b>(MASH TL-3 &amp; TL-2)</b><br><b>TEMPORARY - WORK ZONE</b><br><b>ABSORB(M)-19</b> |               |                          |             |
| FILE: absorbm19   | DN: TxDOT     | CK: KM                   | DW: VP      |
| © TxDOT: JULY 2019  | CONT SECT     | JOB                      | HIGHWAY     |
| REVISIONS   | 6454/87       | 001                      | IH 10, ETC. |
| DIST  | COUNTY        | SHEET NO.                |             |
| ELP   | EL PASO, ETC. | 48                       |             |



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PLAN VIEW

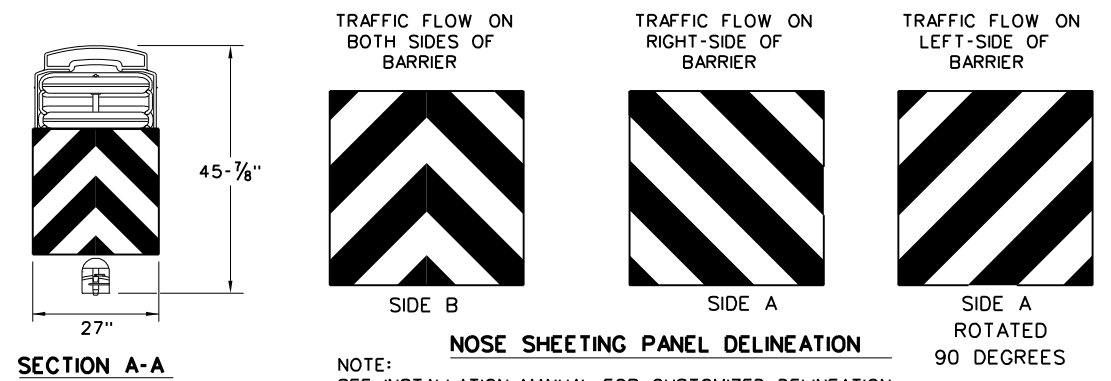


ELEVATION VIEW

**GENERAL NOTES**

1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO THE GROUND AND CAN BE INSTALLED ON CONCRETE, ASPHALT, GRAVEL OR COMPACTED SOIL.
3. MAXIMUM PERMISSIBLE CROSS SLOPE IS 8° (DEGREES)(14%).
4. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
5. THE SLED SYSTEM CAN BE ATTACHED TO:

- CONCRETE BARRIER, TEMPORARY OR PERMANENT, 45" MAXIMUM HEIGHT
- STEEL BARRIER
- PLASTIC BARRIER
- CONCRETE BRIDGE ABUTMENTS
- W-BEAM GUARD RAIL
- THRIE BEAM GUARD RAIL

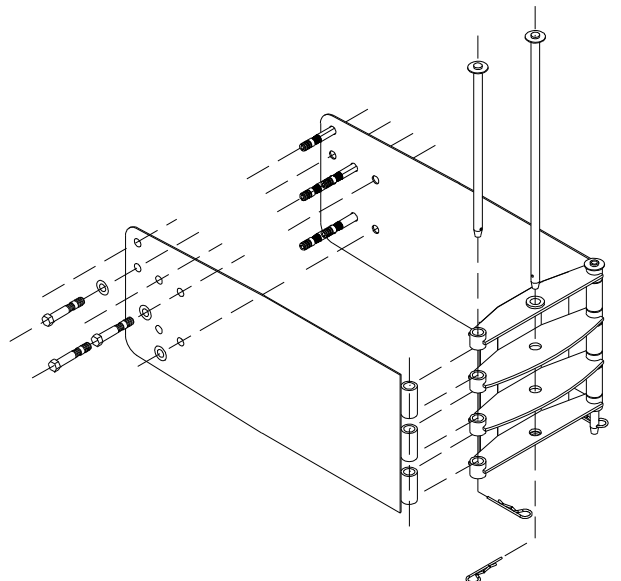


NOSE SHEETING PANEL DELINEATION

NOTE:  
SEE INSTALLATION MANUAL FOR CUSTOMIZED DELINEATION NOSE SHEETING FOR DECAL PLACEMENT.

| TEST LEVEL | NUMBER OF SECONDARY MODULES | SYSTEM LENGTH |
|------------|-----------------------------|---------------|
| TL-3       | 3                           | 25' 3"        |

| BILL OF MATERIAL |   |          |
|------------------|---|----------|
| PART NUMBER      | DESCRIPTION   | QTY:TL-3 |
| 45131            | TRANSITION FRAME,GALVANIZED                         | 1        |
| 45150            | TRANSITION PANEL,GALVANIZED                         | 2        |
| 45147-CP         | TRANSITION SHORT DROP PIN W/ KEEPER PIN, GALVANIZED | 2        |
| 45148-CP         | TRANSITION LONG DROP PIN W/ KEEPER PIN, GALVANIZED  | 1        |
| 45050            | ANCHOR BOLTS  | 9        |
| 12060            | WASHER, 3/4" ID X 2" OD                             | 9        |
| 45044-Y          | SLED YELLOW WATER FILLED MODULE                     | 3        |
| 45044-YH         | SLED YELLOW "NO FILL" MODULE                        | 1        |
| 45044-S          | CIS (CONTAINMENT IMPACT SLED), GALVANIZED           | 1        |
| 45043-CP         | T-PIN W/ KEEPER PIN                                 | 4        |
| 18009-B-1        | FILL CAP W/ "DRIVE BY" FLOAT INDICATOR              | 3        |
| 45033-RC-B       | DRAIN PLUG  | 3        |
| 45032-DPT        | DRAIN PLUG REMOVAL TOOL                             | 1        |



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

NOTE:  
SEE MANUFACTURER'S INSTALLATION MANUAL FOR FURTHER DETAILS.

| TRANSITION OPTIONS   |
|--|
| SLED TRANSITION TO CONCRETE TRAFFIC BARRIER (TEMPORARY OR PERMANENT)                   |
| SLED TRANSITION TO STEEL TRAFFIC BARRIER (CONTACT MFG FOR PROPER TRANSITION)           |
| SLED TRANSITION TO PLASTIC TRAFFIC BARRIER (CONTACT MFG FOR PROPER TRANSITION)         |
| SLED TRANSITION TO W-BEAM OR THRIE BEAM GUARD RAIL (CONTACT MFG FOR PROPER TRANSITION) |
| SLED TRANSITION TO CONCRETE BRIDGE ABUTMENT  |

NOTE:  
THIS STANDARD IS A BASIC REPRESENTATION OF THE SLED, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

**SACRIFICIAL**

*Design Division Standard*

## SLED CRASH CUSHION TL-3 MASH COMPLIANT (TEMPORARY, WORK ZONE) SLED-19

|                        |               |        |           |             |
|------------------------|---------------|--------|-----------|-------------|
| FILE: sled19.dgn       | DW: TxDOT     | CK: KM | DW: VP    | CK:         |
| © TxDOT: DECEMBER 2019 | CONT          | SECT   | JOB       | HIGHWAY     |
| REVISIONS              | 6454          | 87     | 001       | IH 10, ETC. |
| DIST                   | COUNTY        |        | SHEET NO. |             |
| ELP                    | EL PASO, ETC. |        | 49        |             |