



18,876-1

1700 Swift Street, North Kansas City, Missouri, 64116
Phone: 816.741.4600
www.garney.com

Commissioner Hutchins
Hunt County Courthouse
Greenville, TX 75401

FILED FOR RECORD
at 12:30 o'clock PM **05/22/2024**

JUN 25 2024

Re: County Road 1101 Road Crossing

BECKY LANDRUM
County Clerk, Hunt County, Tex.
By [Signature]

Dear Hunt County,

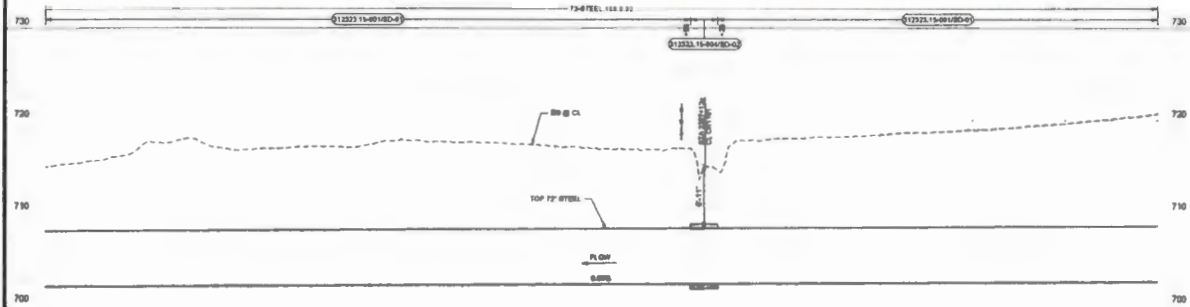
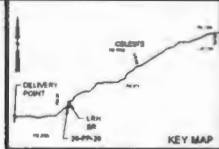
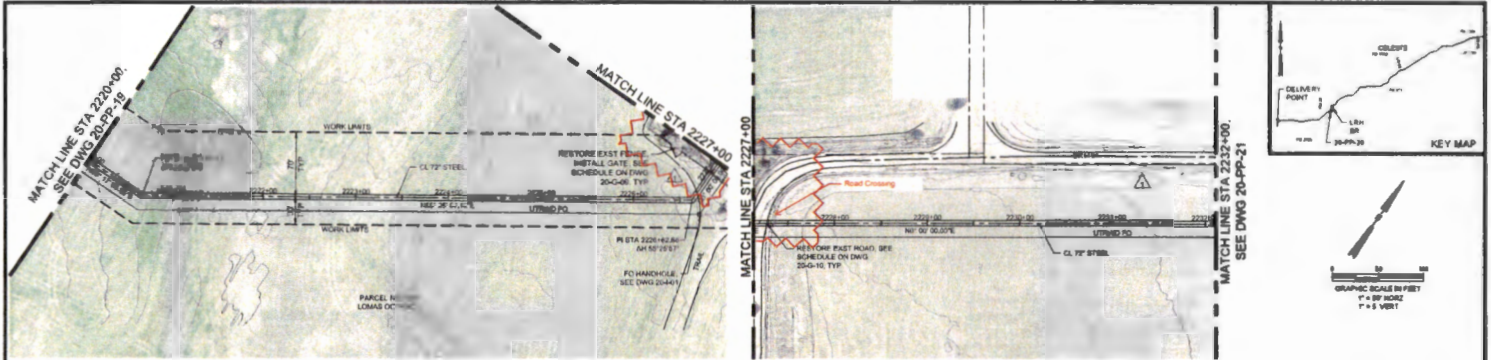
Garney Construction is seeking permission from Hunt County to cross County Road 1101 with the Lake Ralph Hall Pipeline. Garney Construction will be crossing the road following the attached construction details. The access road will be re-routed during the utility crossing utilizing proper TXDOT detour signs. Construction will take roughly three days with the road detour in place. Garney Construction will notify the residents of the road closure in advance.

Sincerely,

GARNEY CONSTRUCTION

Nicholas Crenshaw
Project Engineer
c. (469) 215-6966





2220+00	2221+00	2222+00	2223+00	2224+00	2225+00	2226+00	2227+00	2228+00	2229+00	2230+00	2231+00	2232+00
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ISSUED FOR CONSTRUCTION

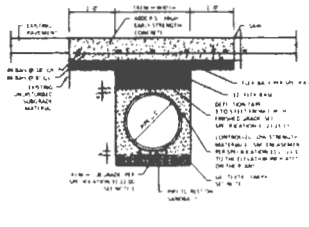
NO	DATE	BY	CHKD	REVISIONS

DATE	2023.05.15
SCALE	AS SHOWN
DESIGNED BY	
CHECKED BY	
DATE	
APP'D	
DATE	

UPPER TRINITY REGIONAL WATER DISTRICT
 LAKE RALPH HALL RAW WATER PIPELINE
 20 - PIPELINE - DELIVERY POINT TO BALANCING RESERVOIR
 PIPELINE PLAN AND PROFILE
 STA 2220+00 TO STA 2232+00

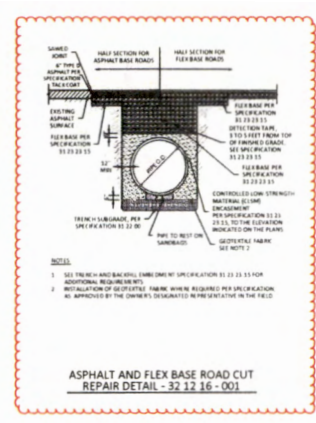
PROJECT DATE: 6/28/2023
 SHEET: 20-PP-20
 OF: 33

PROJECT: UPPER TRINITY REGIONAL WATER DISTRICT, LAKE RALPH HALL RAW WATER PIPELINE
 SHEET: PROGRAM STANDARD DETAIL SHEET 3, ROADWAY CUT AND REPAIR DETAILS
 DATE: 03/09/2023
 DRAWN BY: J. HARRIS
 CHECKED BY: J. HARRIS
 APPROVED BY: J. HARRIS



- NOTES:**
1. THE RADIUS OF THE CURB SHALL BE THE SAME AS THE RADIUS OF THE ADJACENT PAVEMENT.
 2. THE CURB SHALL BE CONCRETE OR THE EQUIVALENT MATERIAL.
 3. THE GUTTER SHALL BE 12 INCHES WIDE AT THE TOP AND 12 INCHES WIDE AT THE BOTTOM.
 4. THE GUTTER SHALL BE 12 INCHES DEEP AT THE TOP AND 12 INCHES DEEP AT THE BOTTOM.

CONCRETE PAVING CUT DETAIL - 32.13.13 - 001



ASPHALT AND FLEX BASE ROAD CUT REPAIR DETAIL - 32.12.16 - 001

ISSUED FOR CONSTRUCTION

NO.	DATE	DESCRIPTION



UPPER TRINITY REGIONAL WATER DISTRICT
 LAKE RALPH HALL RAW WATER PIPELINE
 PROGRAM STANDARD DETAIL SHEET 3
 ROADWAY CUT AND REPAIR DETAILS



REVISION DATE	03/09/2023
SHEET	SD-03
NO.	

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).

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

DATE: _____
 TITLE: _____
 THIS SHEET IS CONTROLLED BY THE "Traffic Engineering Standard Sheets" (TESS) SYSTEM. ANY CHANGES TO THIS SHEET MUST BE APPROVED BY THE ENGINEER AND THE TRAFFIC ENGINEERING DIVISION.

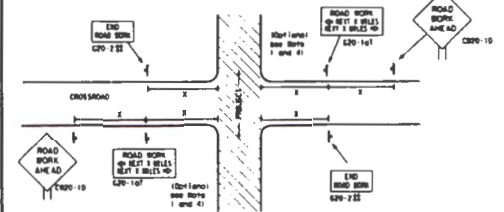
Texas Department of Transportation

Traffic
Survey
Division
Standard

BARRICADE AND CONSTRUCTION
 GENERAL NOTES
 AND REQUIREMENTS
 BC(1)-21

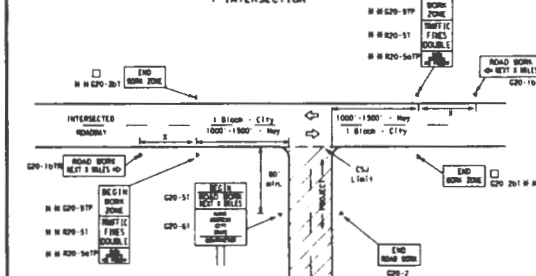
REV.	BY	DATE	DESCRIPTION	APP.	DATE
1	1001	10/01/2002	REVISED TO REFLECT THE LATEST TMUTCD		
2	1001	1-15			
3	1001	8-14			
4	1001	5-21			

TYPICAL LOCATION OF CROSSROAD SIGNS



- May be mounted on back of "ROAD WORK AHEAD" (CW20-10) sign with approval of Engineer. (See note 2 below)
- The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-10) sign and a "ROAD WORK NEXT 2 MILES" (CW20-11) sign, unless noted otherwise in plans.
 - The Engineer may use the reduced size 36" x 36" "ROAD WORK AHEAD" (CW20-10) sign mounted back to back with the reduced size 36" x 18" "ROAD WORK NEXT 2 MILES" (CW20-11) sign on low volume crossroads. See Note 4 under "Typical Construction Warning Sign Size and Spacing". See the "Standard Highway Sign Design 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 MUTCD 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, LODGE CLOSED, or other restriction 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 Signs.
 - The "ROAD WORK NEXT 2 MILES" (CW20-11) sign shall be required at high volume approaches 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 approaches.
 - 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" (CW20-87) sign behind the Type 3 Barricade for the road closure. See BC(10) sheet. The "ROAD WORK NEXT 2 MILES" (left arrow) (CW20-10L) and "ROAD WORK NEXT 2 MILES" (right arrow) (CW20-10R) 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 Feet (ADDITIONAL)
CW20 ¹	48" x 48"	48" x 48"	30	120
CW22			35	160
CW23			40	240
CW25			45	320
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	50	400
CW1, CW2, CW7, CW8, CW9, CW11, CW14			55	500 ²
CW1, CW2, CW7, CW8, CW9, CW11, CW14			60	600 ²
CW3, CW4, CW5, CW6, CW8-5, CW10, CW12	48" x 48"	48" x 48"	65	700 ²
CW3, CW4, CW5, CW6, CW8-5, CW10, CW12			70	800 ²
CW3, CW4, CW5, CW6, CW8-5, CW10, CW12			75	900 ²
			80	1000 ²
			a	a ¹

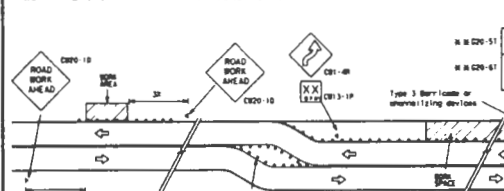
a. For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUCD) typical application diagrams or TCD Standard Signs.

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

GENERAL NOTES

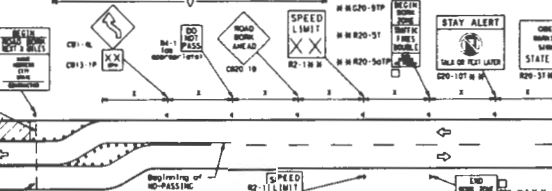
- Select or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 Feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-10) signs may be used on low volume approaches at the discretion of the Engineer as per MUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
- Only advance warning sign sizes are indicated.
- See sign size listing in "TMUCD", Sign Appendix or the "Standard Highway Sign Design for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



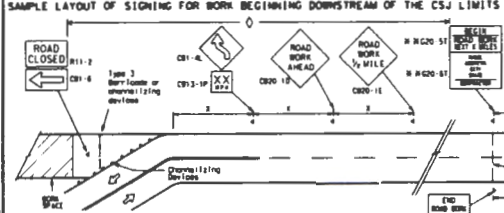
When extended distances occur between similar work areas, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-10) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCD sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



Beginning of NO-PASSING line should coordinate with sign location.

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



NOTES

- The Contractor shall determine the appropriate distance to be placed on the (CW20-12) series signs and "BEGIN ROAD WORK NEXT 2 MILES" (CW20-11) sign for each specific project. This distance shall replace the "2" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- The "BEGIN ROAD WORK NEXT 2 MILES" (CW20-11) sign shall be used as shown on the sample layout unless 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" (CW20-10) sign and other signs or devices is called for on the Traffic Control Plan.
- Contractor will install a regulatory speed limit sign at the end of the work zone.

DATE: _____

LEGEND

- Type 3 Barricade
- ○ ○ Channelizing Devices
- ▲ Sign

See Typical Construction Warning Sign Size and Spacing chart for the TMUCD for sign spacing requirements.

SHEET 2 OF 12

Texas Department of Transportation
Traffic Safety Division

BARRICADE AND CONSTRUCTION PROJECT LIMIT

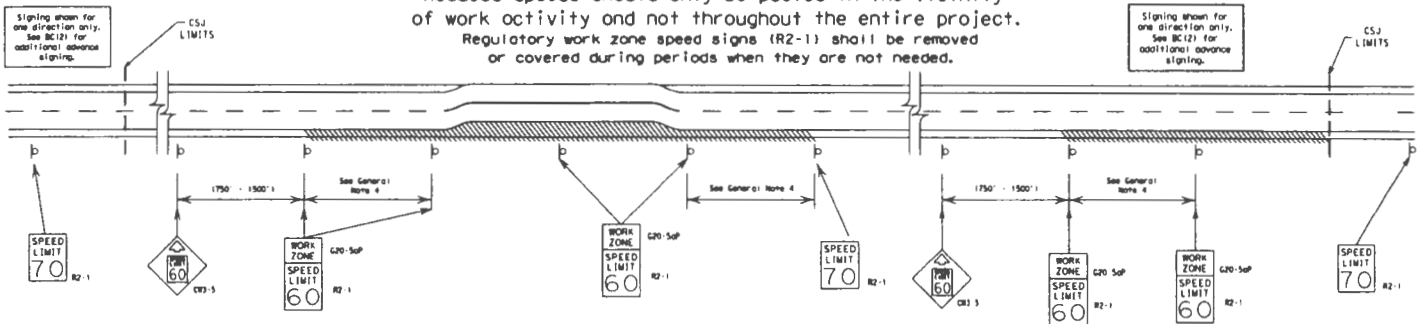
BC(2)-21

11-11 BC 2-21
1-2007 November 2007
9-07 8-14
7-13 5-21

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:

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- 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

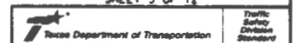
This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the traveled way.

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

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports of a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- 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
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- Fabrication, erection and maintenance of the "ADVANCE SPEED LIMIT" (C20-51) sign, "WORK ZONE" (C20-50P) plaque and the "SPEED LIMIT" (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
 - A. Law enforcement.
 - B. Flagger stationed next to sign.
 - C. Portable changeable message sign (PCMS).
 - D. Low power (dome) radar transmitter.
 - E. Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT Form #204 in the TxDOT e-form system.

SHEET 3 OF 12



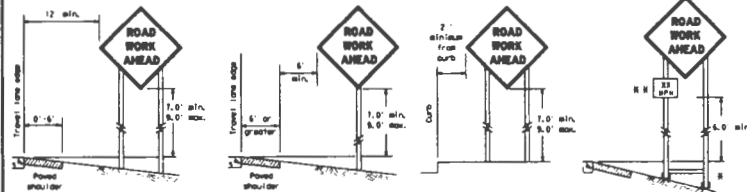
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

REV	DATE	BY	CHKD	APP'D	DESCRIPTION
1	9-07	8-18			
2	7-13	5-21			

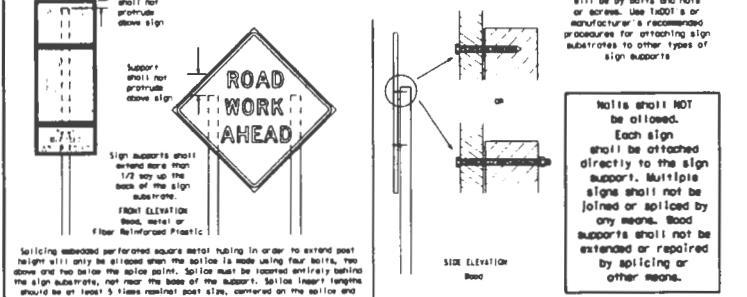
DATE FILED
 THIS SHEET OR THIS STANDARD IS GOVERNED BY THE "Texas Engineering Practice Act". The authority of any other laws, rules, regulations, orders, or standards of the State of Texas shall prevail over this standard.

TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



If when placing sign supports on uneven ground, the leg post lengths must be adjusted so the sign supports are straight and plumb. Objects shall not be placed under signs as a means of leveling.
 If when plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (vertical or diagonal) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



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.
- Broken sign posts shall be replaced with new.
- Barbed wire 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 submittal or the sign submittal in the 'Standard Highway Sign Design for Texas' (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the SHSD but may have been omitted from the plans. Any variation in the signs 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 field 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' (CZTCDL) for all roadwork signs. Supports for temporary large roadwork signs shall meet the requirements detailed on the Temporary Large Roadwork 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 to the Engineer can verify the correct procedure 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 cracked reflective sheeting as directed by the Engineer/Inspector.
- Identification markings may be shown only on the back of the sign substrates. The maximum height of letters and/or company logos used for identification shall be 1 inch.
- The Contractor shall replace damaged wood posts, use or damaged wood sign posts shall not be spliced.

- DEFINITIONS OF WORK ZONE SIGNS BY THE "Texas Manual on Uniform Traffic Control Devices" Part 6A**
- 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-term mobile - 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 temporary large roadwork 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 pavement surface.
 - Long-term/intermediate-term signs may be used in lieu of short-term/short duration signs.
 - Short-term/short duration signs shall be used only during daylight and shall be removed at the end of the workday or related to complete 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.

- 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 CZTCDL lists each substrate that can be used on the different types and models of sign supports.
 - 'Beam' type materials are not an approved sign substrate, regardless of the thickness of the beam.
 - All wooden individual sign panels fabricated from 2 or more plies shall have one or more plywood clasp, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The clasp 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 spaced on both sides of the splice and spaced at 6" centers. The Engineer may approve other means of applying the sign face.

- REFLECTIVE SHEETING**
- All signs shall be retroreflective and constructed of sheeting meeting the color and retroreflectivity requirements of DMS 8300 for night signs or DMS 8310 for non-lights signs. The use approved for DMS specifications is shown on BC11.
 - 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 C₁, shall be used for night signs with orange backgrounds.
- SIGN LETTERS**
- All sign letters and numbers shall be clear, and non-reflective type approved sheeting 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 Signage and Specifications.

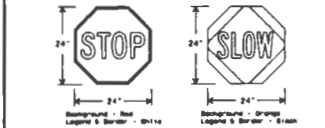
- REMOVING OR COVERING**
- When sign messages may be confusing or do not apply, the sign shall be removed or completely covered.
 - Long-term stationary or intermediate-term signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the section of divided highways or near any interchange where the sign may be seen from approaching traffic.
 - Signs installed on wooden poles shall not be turned 90 degrees to the roadway. These signs should be removed or completely covered when not required.
 - When signs are removed, the material used to secure the sign shall be removed, such as heavy all-steel plastic, or other materials which will cover the entire sign face and maintain their above ground position under automatic headlights of night, without damaging the sign sheeting.
 - During night work, signs shall not be used to cover signs.
 - Best face or other adhesive material shall not be applied to a sign face.
 - Signs and anchor studs shall be removed and holes backfilled upon completion of work.

- SIGN SUPPORT HEIGHTS**
- When sign supports require the use of weights to keep from turning over, the use of sandbags with 6" x 6" concrete base shall be used to maintain a constant weight.
 - Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
 - Sandbags shall weigh a minimum of 25 lbs and a maximum of 50 lbs.
 - Sandbags shall be made of a durable material that holds upon vertical impact. Rubber launch or ring inner tubes shall not be used.
 - Rubber dollies designed for channeled devices should not be used for the traffic control device and shall not be supported above ground level or hung with rope, wire, chain or other fastener. Sandbags shall be placed along the length of the poles to weigh down the sign support.
 - Sandbags shall not be placed under the sign and shall not be used to level sign supports placed on slopes.

- FLAG ON SIGNS**
- Flags may be used to draw attention to warning signs. When used, the flag shall be 15 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 device to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
- STOP/SLOW paddles shall be retroreflective when used at night.
- STOP/SLOW paddles may be attached to a staff with a minimum length of 8' to the bottom of the sign.
- Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6C.03 Work Signaling Devices in the Manual.



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B, OR C ₁ 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, scientific service (CSD), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally provided on a roadway without construction.
- When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent sign until the permanent sign message across the roadway condition. For details for covering large guide signs see the T-102 standard.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists on all times.
- If existing signs are to be relocated on their original supports, they shall be installed on temporary bases as shown on the SBD Standard sheets. The sign shall meet the required mounting heights shown on the BC Sheets or the SBD Standard. 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 temporary supports as shown on the BC Standard sheets, TLR Standard sheets or the CZTCDL list. The signs shall meet the required mounting heights shown on the BC, or the SBD 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.

SHEET 4 OF 12

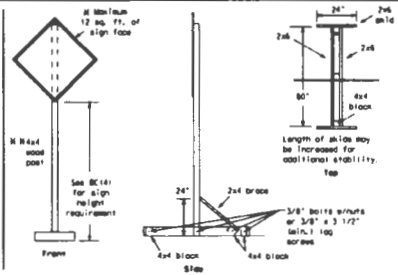
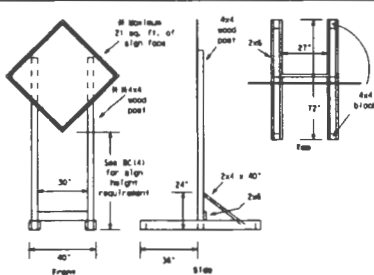
Texas Department of Transportation
Traffic Safety Division Standard

**BARRICADE AND CONSTRUCTION
TEMPORARY SIGN NOTES**

BC (4) - 21

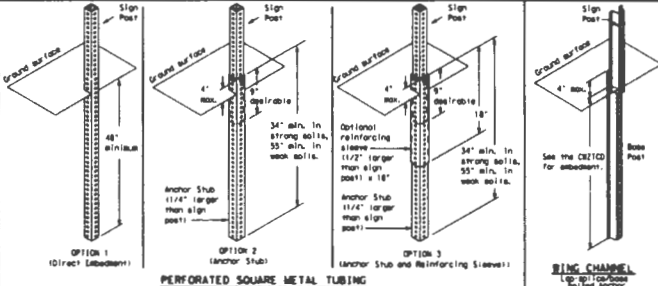
REVISED: November 2004
 DATE: 9-07 8:14
 TIME: 7:13 5:21

CALCULATIONS: The use of any sign supports is governed by the Traffic Engineering Practice Manual, 2007, Appendix A, 10.1. The use of any sign supports is governed by the Traffic Engineering Practice Manual, 2007, Appendix A, 10.1. The use of any sign supports is governed by the Traffic Engineering Practice Manual, 2007, Appendix A, 10.1.



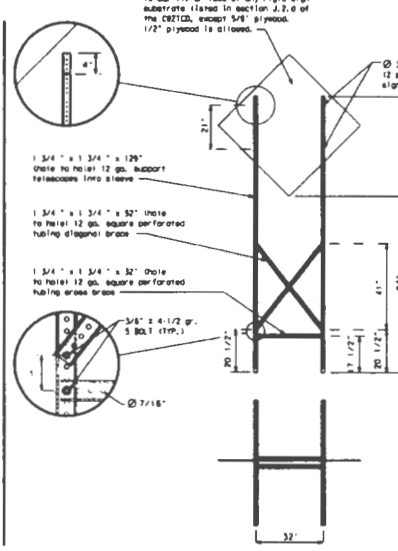
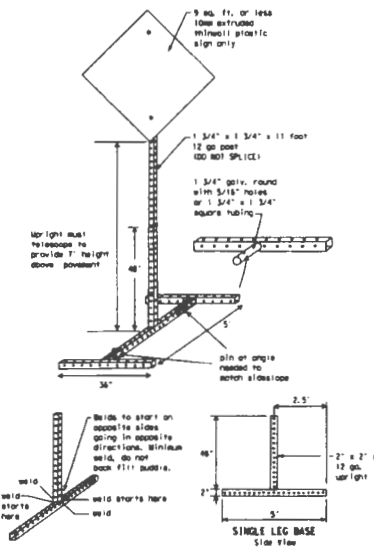
SKID MOUNTED WOOD SIGN SUPPORTS

LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS



GROUND MOUNTED SIGN SUPPORTS

Refer to the CRITCO and the manufacturer's installation procedure for each type sign support. The minimum 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

Born steel and plastic Wedge Anchor Systems as shown on the WED Anchor 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 steel as is approved by the Engineer. Use the address for Traffic Engineering, Standard Sheets, on BC(11).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CRITCO LIST. SEE BC(11) FOR WEBSITE LOCATION.

GENERAL NOTES

1. Holes 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 flange connection.
 2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CRITCO List.
 3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 302.
- * See BC(6) for definition of "Dark Surfaces."
 ** Road sign signs MUST be one piece. Splicing will NOT be allowed. Posts shall be galvanized.
 See the CRITCO 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

REV	NO	DATE	BY	CHKD	APP'D
1	1	11/07	...	...	...
2	1	11/07	...	...	...
3	1	11/07	...	...	...
4	1	11/07	...	...	...
5	1	11/07	...	...	...
6	1	11/07	...	...	...
7	1	11/07	...	...	...
8	1	11/07	...	...	...
9	1	11/07	...	...	...
10	1	11/07	...	...	...

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES
(The Engineer may approve other messages not specifically covered here.)

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

- 1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including alpha words such as "TO," "ON," "AT," etc.
3. Messages should consist of a single phase, or two phases not otherwise...
4. Use the word "EXIT" to refer to an exit ramp on a freeway, i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or Interstate designation (I#, US, SR, FM) along with the number when referring to a roadway.
6. When in use, the bottom of a preliminary PCMS message sheet should be a minimum 7 feet above the roadway, where possible.
7. The message term "MESSAGE" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS.
9. Do not "front" messages or words included in a message.
10. Do not present redundant information in a two-phase message.
11. Do not use the word "DANGER" in a message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS.
15. PCMS character height should be at least 18 inches for trailer mounted units...
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not cause distraction and will only be used to alert workers that the PCMS has malfunctioned.

Phase 1: Condition Lists

Table with 4 columns: Road/Lane/Ramp Closure List, Other Condition List, Roadwork, and Road Repairs. Includes various closure types like 'FREEWAY CLOSED', 'ROAD CLOSED', 'ROADWORK', etc.

Phase 2: Possible Component Lists

Table with 5 columns: Action to Take/Effect on Travel, Location List, Warning List, and Advance Notice List. Includes actions like 'MERGE RIGHT', 'DETOUR', and warnings like 'SPEED LIMIT', 'MAXIMUM SPEED'.

Table with 2 columns: WORD OR PHRASE and ABBREVIATION. Lists various abbreviations for roadwork signs, such as 'Access Road', 'Alleyway', 'Avenue', etc.

APPLICATION GUIDELINES

- 1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase for both should be selected from the "Roadwork/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel", "Location", "Warning", or "Advance Notice" Phase Lists.
4. A Location Phase is necessary only if distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be revised to days of the week.

BORDING ALTERNATIVES

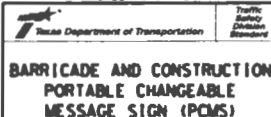
- 1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations I#, US, SR, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH for abbreviations E, W, N and S can be interchanged as appropriate.
4. Highway names and numbers may be replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as appropriate.
6. AHEAD may be used instead of distance, if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distance 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

- 1. When full matrix PCMS signs are used, the character height and legibility/visibility requirements shall be as defined in Item 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol" (C020-7) 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.
3. When symbol 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.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the legibility, flash rate and clearing requirements on BC171, for the same size arrow.

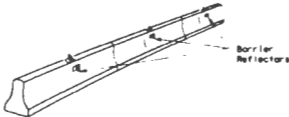
SHEET 6 OF 12



BC(6)-21

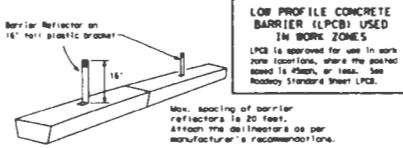
Revision table with columns for revision number, date, and description. Shows revisions 1 through 4.

- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DOT-360. A list of pre-qualified Barrier Reflectors can be found on the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the MUTCD. The cost of the reflectors shall be considered subsidiary to Item 312.

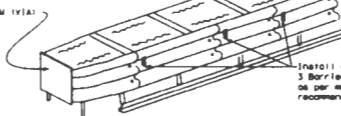


CONCRETE TRAFFIC BARRIER (CTB)

- 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 on 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 attenuates 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 (all-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 shall be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the existing being replaced.
- Minimum spacing of Barrier Reflectors is forty (40) feet.
- Permanent signage 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.
- Wisting 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)



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 CRITCD List for approved end treatments and manufacturers.

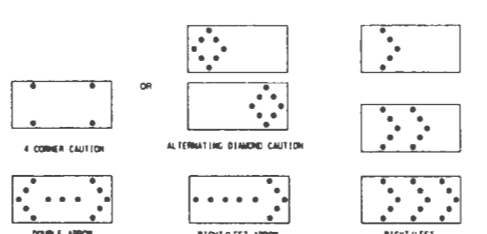
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

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

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 lane saving delineations 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 options:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond 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 intensity of 25 percent for each sequential mode of the flashing chevron.
- The sequential arrow display is NOT ALLOWED.
- The Flashing arrow display is the MUTCD standard; however, the sequential chevron display may be used during daylight operation.
- 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 guide traffic.
- A full width PCB may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and flashing requirements on this sheet for the same display mode.
- The sequential arrow display is NOT ALLOWED.
- 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 guide traffic.
- A full width PCB may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and flashing requirements on this sheet for the same display mode.
- Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

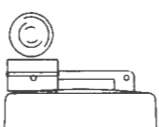
- Warning lights shall meet the requirements of the MUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of work in a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "L". The Type A Warning Lights shall not be used with signs manufactured with Type B₁ or C₁ sheeting meeting the requirements of Departmental Specification 805-8306.
- 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 "S".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control device.
- 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 on drilled 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

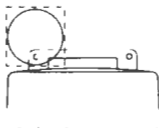
- Type A flashing warning lights are intended to warn of work areas that may be approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing devices to form a warning 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 warning zone. 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 in 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 curve.
- The minimum 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 on the delineation 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 CRITCD.
- 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 shall 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 of DOT-360 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 panel nearest approaching traffic.
- The minimum 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 but have a yellow reflective surface area of at least 30 square inches.

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 (TMAs) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
- Refer to the CRITCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CRITCD 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 work measure without adversely affecting the work performance.
- The only reason a TMA should not be required is when a work area is located near the roadway and the work area is an extended distance from the TMA.

Texas Department of Transportation
Traffic Safety Division

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

BC(7)-21

REV. 02-2000
0-07 8-14
7-13 5-21

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 on 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 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" (TMUD) and the "Canadian Basic Zone Traffic Control Devices List" (CETCD).
- Drums, bases, and related materials shall exhibit good workmanship and shall be free from disfigurements or defects that could adversely affect their appearance or serviceability.
- The Contractor shall have a minimum of 24 hours to replace any plastic drum identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

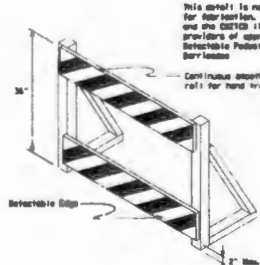
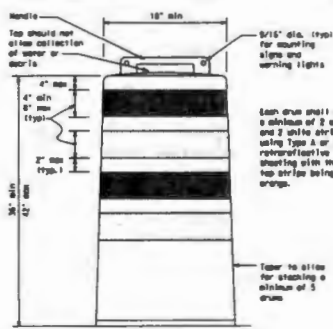
- Pre-qualified plastic drums shall meet the following requirements:
- Plastic drums shall be a two-piece design the "body" of the drum shall be the top portion and the "base" shall be the bottom.
 - The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 30 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 plastic, and reflective material. The Contractor shall NOT use metal drums or single piece plastic drums or channelization devices or sign supports.
 - Drums shall present a profile that is a minimum of 18 inches in view of 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 safety spaced 3/16" high cleaver holes to allow attachment of a warning sign, warning reflector unit or approved channel 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 6 inches in width. Any non-retroreflective 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 footcandle 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 stabilizer, orange, high-density polyethylene (HDPE) or other approved material.
 - Drum body shall have a maximum unobstructed weight of 11 lbs.
 - Drum one base shall be marked with manufacturer's name and model number.

RETROREFLECTIVE SHEETING

- The stripes used on drums shall be constructed of shearing meeting the color and retroreflectivity requirements of Departmental Standard Specification for "Sign Face Materials," Type A or Type B reflective sheeting shall be applied 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 attached to the drum and shall not disintegrate, crumple, or lose of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

- Unfilled 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 or more sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting device as approved by the Engineer. Sheeting of sandbags will be allowed, however height of sandbags above drum surface may not exceed 12 inches.
- Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast shall be constructed of integral drum rubber base or a built rubber base.
- Recycled tires (no aluminum) may be used for ballast on drums approved for this type of ballast on the OCTCD list.
- The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or operators when the drums is struck by a vehicle.
- When used in regions susceptible to freezing, drums shall have drainage holes in the bases so that water will not collect and freeze causing 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

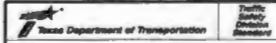
- When existing pedestrian facilities are disrupted, closed, or reopened in a TTC zone, the temporary facilities shall be constructed and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to OCTCD-21 for Pedestrian Control requirements for Standard Bicycles, Standard Bicycles and Crosswalk Churners.
- When pedestrian facilities are disrupted, closed, or reopened, the use of a detectable pedestrian barricade shall be placed across the full width of the street sidewalk instead of a Type 3 barricade.
- Detectable pedestrian barricades similar to the one pictured above, hand-rolled channelizing devices, base concrete barriers, and sand or other fill forming a continuous detectable edge shall not be used as a detectable pedestrian barrier.
- Tank, ramp, or plastic sheeting between devices are not detectable, do not comply with the design standards in the "Manual on Uniform Traffic Control Devices" Guidelines (MUTCD) and shall not be used as a detectable pedestrian barrier.
- Warning lights shall not be attached to detectable pedestrian barricades.
- Detectable pedestrian barricades shall use 8" nominal diameter rolls as shown on BC(10) provided that the top roll provides a smooth continuous roll for hand rolling with no splines, burrs, or sharp edges.



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 OCTCD.
- Chevrons and other work zone signs with orange background shall be manufactured with Type B, or Type C, orange shearing meeting the color and retroreflectivity requirements of OCTCD-21a, "Sign Face Materials," unless otherwise specified in the plans.
- Vertical Panels shall be manufactured with orange and white shearing meeting the requirements of OCTCD-21a Type A or Type B. Sheeting stripes on Vertical Panels shall extend down toward the impacted traveled lane.
- Other sign messages (short or parallel) may be used as approved by the Engineer. Sign elevations shall not exceed 18 inches in view or 24 inches in height, except for the 18 inch sign dimensions in note 3 below.
- Signs shall be mounted using a 1/2 inch bolt (minimum) and nut, 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 bridge spans or on adjoining roads. When used in these locations, they may be placed on every drum or placed not more than an every third drum. A minimum of three (3) should be used on each location called for in the plans.
- 20", 20-1/2", 20-1/4" and 20-1/8" Standard Chevrons signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.



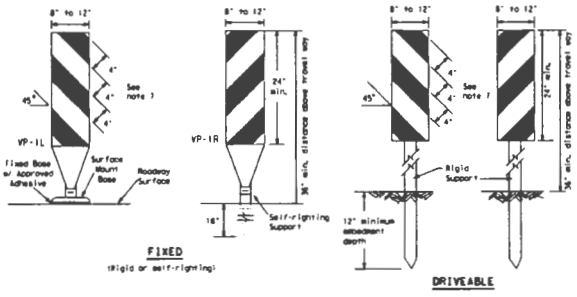
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (8) - 21

Rev	By	Date	Revised	By	Date
1	BC	7-20-00	10-14-01	BC	10-14-01
2	BC	11-05-01	11-05-01	BC	11-05-01
3	BC	11-05-01	11-05-01	BC	11-05-01
4	BC	11-05-01	11-05-01	BC	11-05-01
5	BC	11-05-01	11-05-01	BC	11-05-01

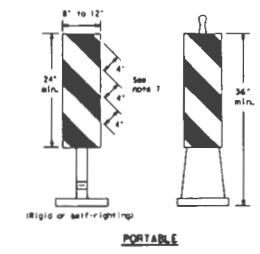
OBTAINERS OF THIS DOCUMENT ARE ADVISED THAT THE INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE. IT IS THE POLICY OF THE FEDERAL GOVERNMENT TO MAKE AVAILABLE TO THE PUBLIC INFORMATION THAT IS NOT OTHERWISE RESTRICTED BY LAW.

DISCLAIMER: The use of this information is governed by the terms and conditions of the contract. The user of this information shall be responsible for any damage resulting from its use.



FIXED
(rigid or self-lighting)

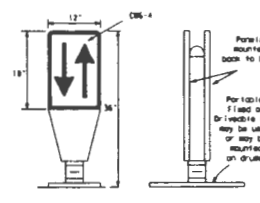
DRIVABLE



PORTABLE

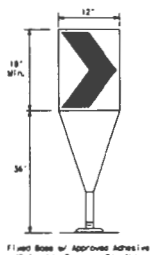
- Vertical Panels (VPs) are normally used to channelize traffic or divide opposing lanes of traffic.
- VPs may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where daytime daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use of VP's for drop-offs.
- VPs 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.
- VPs used on expressways and freeways or other high speed roadways, may have more than 200 square inches of retroreflective area facing traffic.
- Self-lighting supports are available with portable bases. See "Portable Work Zone Traffic Control Devices List" (CETCD).
- Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DM-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.

VERTICAL PANELS (VPs)



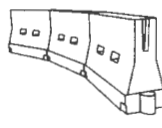
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert to narrow 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 VP's.
- Spacing between the OTLD shall not exceed 500 feet, 42" cones or VP's placed between the OTLD's should not exceed 100 feet spacing.
- The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B₁ or Type C₁ conforming to Departmental Material Specification DM-8300, unless noted otherwise. The legend shall meet the requirements of DM-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 change of alignment with the direction of travel and provide additional warning and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
- Chevrons, when used, shall be placed on the outside of a curve or turn, or on the far side of an intersection. They shall be in line with one or right angles to approaching traffic. Spacing should be such that the nearest 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 non-reflective legend. Sheeting for the chevron shall be retroreflective Type B₁ or Type C₁ conforming to Departmental Material Specification DM-8300, unless noted otherwise. The legend shall meet the requirements of DM-8300.
- For Long Term Stationary use on hoarers or transients on freeways and divided highways, self-lighting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

- LCDs are orange, highly reflective, 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 CETCD list.
- LCDs should not be used to provide positive protection for motorists, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(1) when placed roughly parallel to the travel lanes.
- LCDs used on berms should be placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade poles as shown on BC(1D). 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 barriers (MASH) or performance requirements based on roadway based 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 CETCD list.
- Water ballasted systems used as barriers should not be used for a merging taper except in low speed areas 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 sightlines 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 fitted to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems shall have a continuous detachable bottom for users of long cones 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" (MUTCD).
- Channelizing devices shown on this sheet may have a drivable, fixed or portable base. The requirement for self-lighting channelizing devices must be specified in the General Notes or other plan sheets.
- Channelizing devices on self-lighting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicles related to the queue spacing alignment of the channelizing device difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the MUTCD and the "California Work Zone Traffic Control Devices List" (CETCD).
- The Contractor shall maintain devices in a clean condition and replace damaged, non-reflective, 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 surface, including pavement surface deterioration or surface integrity. Drivables 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 in ft.			Suggested Maximum Spacing of Channelizing Devices
		10'	11'	12'	
30	L = 50 + 500 / S	150	185	185	30'
35		205	225	245	30'
40	L = 75	265	295	320	40'
45		450	495	540	45'
50	L = 75	500	550	600	50'
55		550	605	660	55'
60	L = 75	600	660	720	60'
65		650	715	780	65'
70	L = 75	700	770	840	70'
75		750	825	900	75'
80	L = 75	800	880	960	80'
85		850	940	1020	85'

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (9) - 21

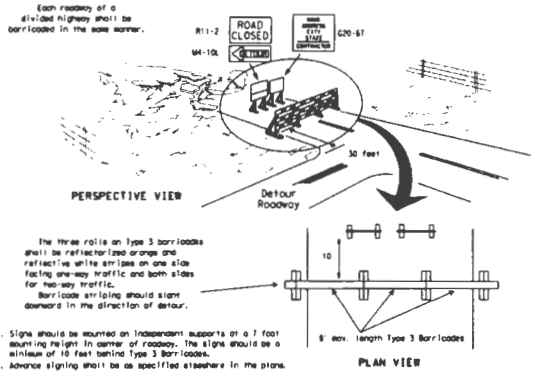
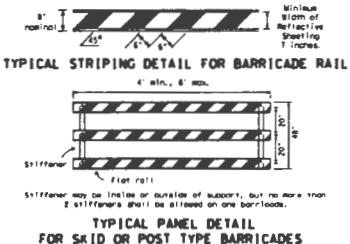
REV.	DATE	BY	CHKD.	APP'D.
1	10/12/10	J. S.	J. S.	J. S.
2	10/12/10	J. S.	J. S.	J. S.
3	10/12/10	J. S.	J. S.	J. S.

DISTANCE OF THIS STANDARD IS GOVERNED BY THE "TRAFFIC ENGINEERING PRACTICE ACT". IN THE EVENT OF ANY CONFLICT BETWEEN THIS STANDARD AND THE "TRAFFIC ENGINEERING PRACTICE ACT", THE "TRAFFIC ENGINEERING PRACTICE ACT" SHALL PREVAIL.

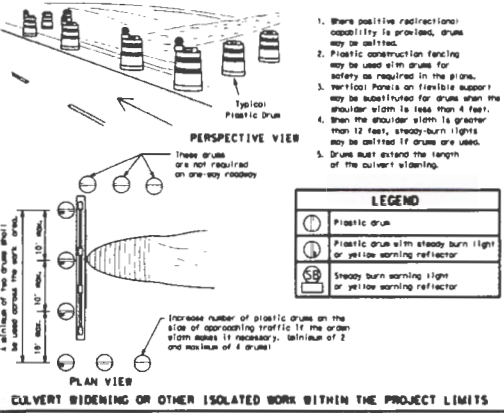
TYPE 3 BARRICADES

- Refer to the Compliant Mark Zone Traffic Control Devices List (CMZCL) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
- Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
- Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic was turned in detouring. When both right and left turns are provided, the downward sloping stripe 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.
- Striping of rolls, 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.
- Identification markings may be shown only on the back of the barricade rolls. The maximum height of letters and/or company logo used for identification shall be 1".
- Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
- Warning lights shall NOT be installed on barricades.
- Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, compression zone 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 rolls reflective sheeting. Rocks, concrete, tires, steel or other metal 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 holds upon vehicular impact. Rubber fenders or fire liner 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 wire, steel, chains or other fasteners.
- Sheeting for barricades shall be retroreflective Type A or Type B conforming to the latest Federal Specification 805-1300 unless otherwise noted.

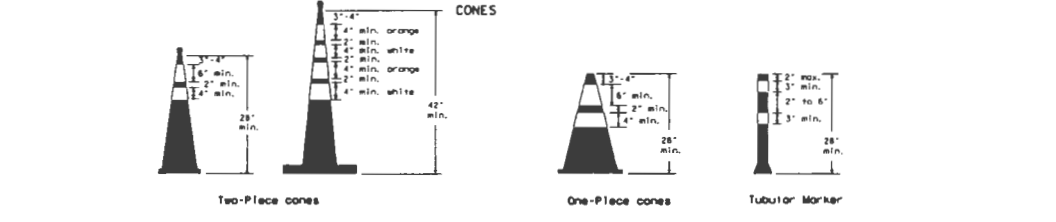
Barricades shall NOT be used as a sign support.



TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION

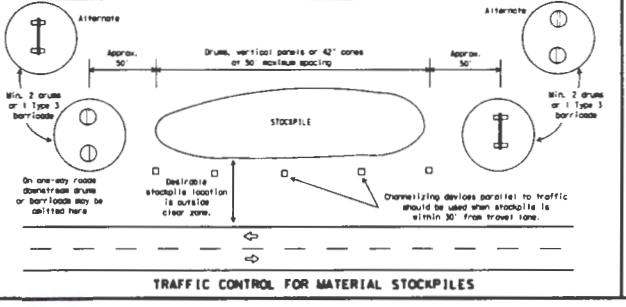


CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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.

- Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
- 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.
- 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.
- Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, beaded burner surface and meet the requirements of Departmental Material Specification 805-1300 Type A or Type B.
- 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined in BC(10)-21. 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.
- 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
- Cones or tubular markers used on each project should be of the same size and shape.



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10)-21

REV	DATE	BY	CHKD	APP'D	DESCRIPTION
1	9-01	8-14			
2	7-13	5-21			

DATE: _____
 DRAWN BY: _____
 CHECKED BY: _____
 THE USE OF THIS STANDARD IS GOVERNED BY THE "STANDARD SPECIFICATIONS FOR ROADWAY PAVEMENT MARKINGS" AND THE "STANDARD SPECIFICATIONS FOR ROADWAY PAVEMENT MARKINGS" OF THE STANDARD SPECIFICATIONS FOR ROADWAY PAVEMENT MARKINGS. THE USER OF THIS STANDARD IS GOVERNED BY THE "STANDARD SPECIFICATIONS FOR ROADWAY PAVEMENT MARKINGS" AND THE "STANDARD SPECIFICATIONS FOR ROADWAY PAVEMENT MARKINGS" OF THE STANDARD SPECIFICATIONS FOR ROADWAY PAVEMENT MARKINGS.

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 CDJ limits unless otherwise stated in the plans.
- Color, pattern and dimensions shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUCD and as shown on the plans.
- When short term markings are required on the plans, short term markings shall conform with the TMUCD, the plans and details as shown on the Standard Plan Sheet 82(5)PM1.
- When standard pavement markings are not in place and the roadway is opened to traffic, 30 FOOT 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 82, "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 87, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

- Reusable prefabricated pavement markings shall meet the requirements of DMS-8241.
- Non-reusable prefabricated pavement markings (fall back) shall meet the requirements of DMS-8240.

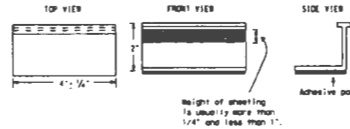
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- 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 595.
- The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 150 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometry.
- 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 82.

REMOVAL OF PAVEMENT MARKINGS

- Pavement markings that are no longer applicable, could create confusion or direct a driver 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 discernible marking. This shall be by any method approved by Item 877 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 877.
- Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
- Blade cleaning may be used but shall 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 877, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
- Blade-out marking tapes 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 asphalt 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 20 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 82(5)PM for tab placement on new pavements. See Standard Sheet TDP(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 not applied or buffed rubber pad for all surfaces, or thermoplastic for concrete surfaces.
- Colors shall be designated as:
 - YELLOW - Two color reflective surface with yellow body.
 - WHITE - Two color 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-6150
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prefabricated 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(11).



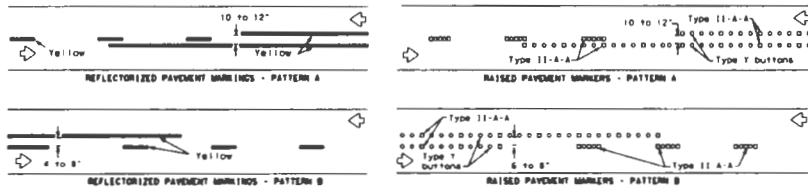
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

DATE	BY	CHKD	APPD
01/22/11	1/22/11		
1:00	9:07	9:27	
1:00	7:12		
1:00	8:11		

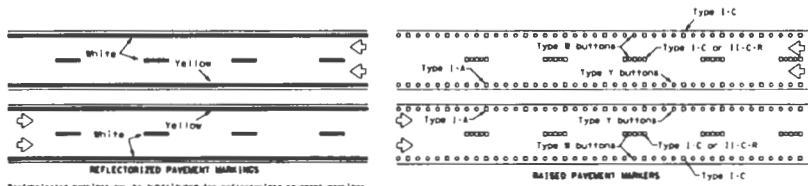
DISCUSSION: THIS STANDARD IS DERIVED FROM THE "TRAFFIC ENGINEERING HANDBOOK, 3rd EDITION, 1985, PREPARED BY THE TRAFFIC ENGINEERING COMMITTEE OF THE INSTITUTE OF TRANSPORTATION ENGINEERS, INC. (ITE) AND THE TRAFFIC ENGINEERING COMMITTEE OF THE INSTITUTE OF HIGHWAY ENGINEERS, INC. (IHE). THIS STANDARD IS A REVISION OF THE 1973 STANDARD.

PAVEMENT MARKING PATTERNS



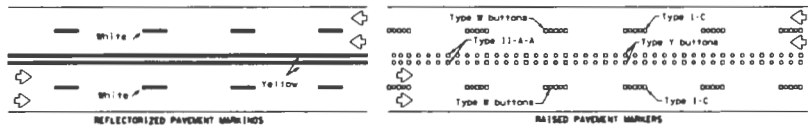
Pattern A is the TxDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectorized pavement markings.

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



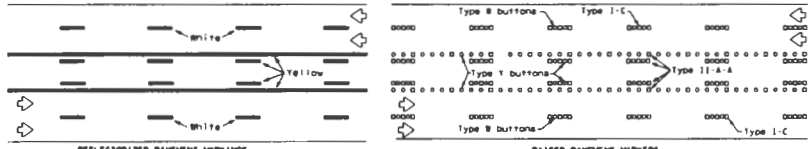
Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



Prefabricated markings may be substituted for reflectorized pavement markings.

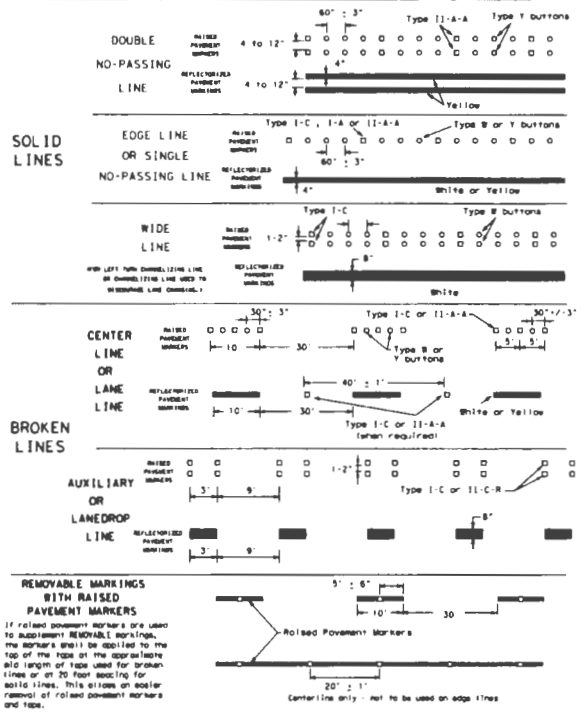
LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



SHEET 12 OF 12

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

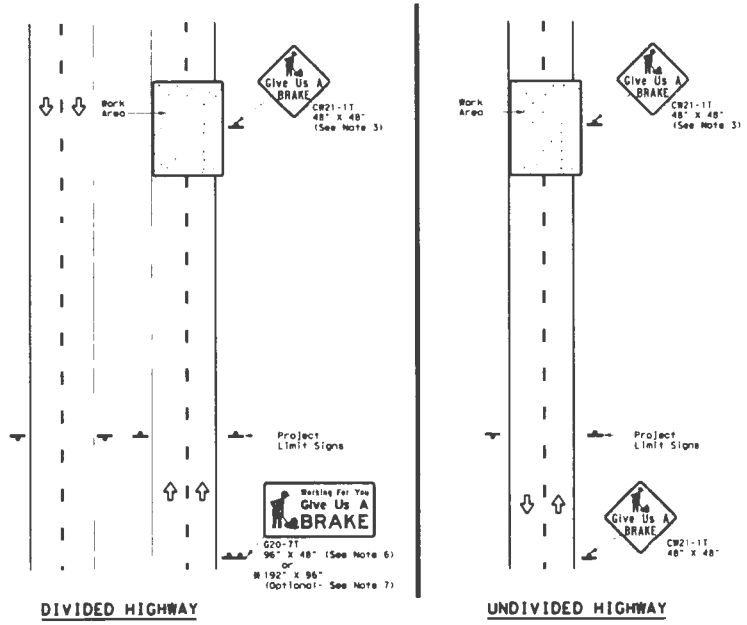
BC (12) - 21

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

REV.	BY	DATE	DESCRIPTION
1	...	...	...
2	...	...	...
3	...	...	...
4	...	...	...

DATE: FILE:

DISTANCE: The use of this signpost is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by the State of Texas for the use of this signpost for any purpose other than that for which it was designed.



DIVIDED HIGHWAY **UNDIVIDED HIGHWAY**

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-71) 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	SQ FT	GALVANIZED STRUCTURAL STEEL		DRILLED SHAFT 24" DIA. (L.F.)
						SIZE	(L.F.)	
Orange	G20-71		96" x 48"	Type B ₁ or C ₁	32	▲	▲	▲
Orange	G20-71		192" x 96"	Type B ₁ or C ₁	128	WBx18	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 ₁ OR TYPE C ₁
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 (CW21-11) 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 (CW21-11) 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 (G20-71) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 8" wood posts with drilled holes for overdrive as per BC(5) and will be subsidiary to Item 502.
- The Working For You Give Us A BRAKE (G20-71) 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

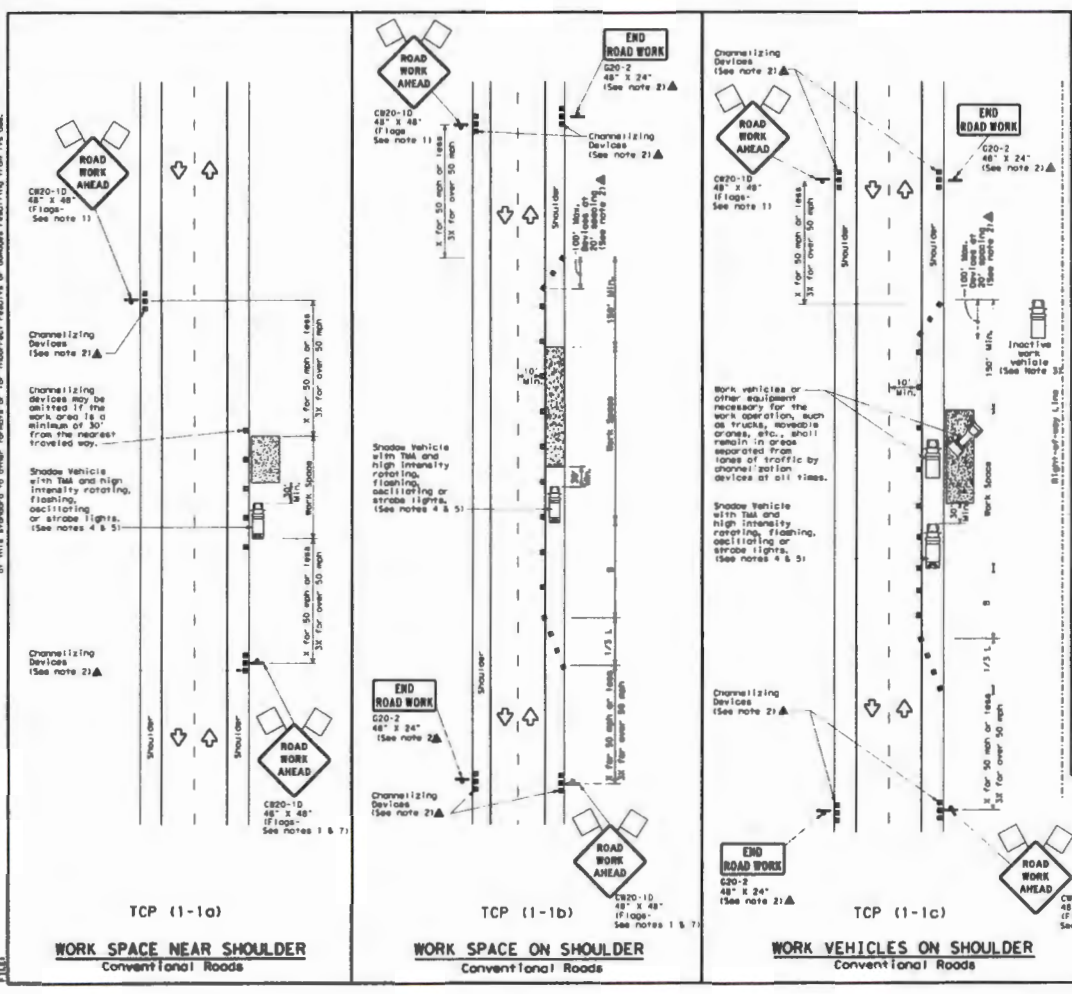
**WORK ZONE
"GIVE US A BRAKE"
SIGNS**

WZ(BRK)-13

REV.	DATE	BY	CHKD.	APP.	DESCRIPTION
1	8-16-88	1-13			
2	8-16-88	3-03			

DATE: 8/16/88

DISCLAIMER: This plan is governed by the "Traffic Engineering Practice Act". No warranty of any kind is made by the Department of Transportation for the use of this plan or for any results resulting therefrom.



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 Safe/Trailer Lengths			Suggested Minimum Spacing of Channelizing Devices		Minimum Sign Spacing "r"	Suggested Longitudinal Buffer Space "b"
		10'	11'	12'	On a Taper	On a Taper		
30	L = 50	150'	165'	180'	30'	60'	120'	90'
35	L = 50	205'	225'	245'	35'	70'	160'	120'
40	L = 50	265'	295'	320'	40'	80'	240'	155'
45	L = 50	450'	485'	540'	45'	90'	320'	195'
50	L = 50	500'	550'	600'	50'	100'	400'	240'
55	L = 50	350'	405'	460'	55'	110'	500'	295'
60	L = 50	600'	660'	720'	60'	120'	600'	350'
65	L = 50	850'	915'	980'	65'	130'	700'	410'
70	L = 50	700'	770'	840'	70'	140'	800'	475'
75	L = 50	750'	825'	900'	75'	150'	900'	540'

3. Conventional Roads Only
 4. Taper lengths have been rounded off.
 L = Length of Taper (FT) r = Radius 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 omitted with the triangle symbol may be omitted when stored 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 end of one 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 side work areas.
 - See TCP15-11 for shoulder work on divided highways, expressways and freeways.
 - CB2-5 "SHOULDER WORK" signs may be used in place of CB20-10 "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

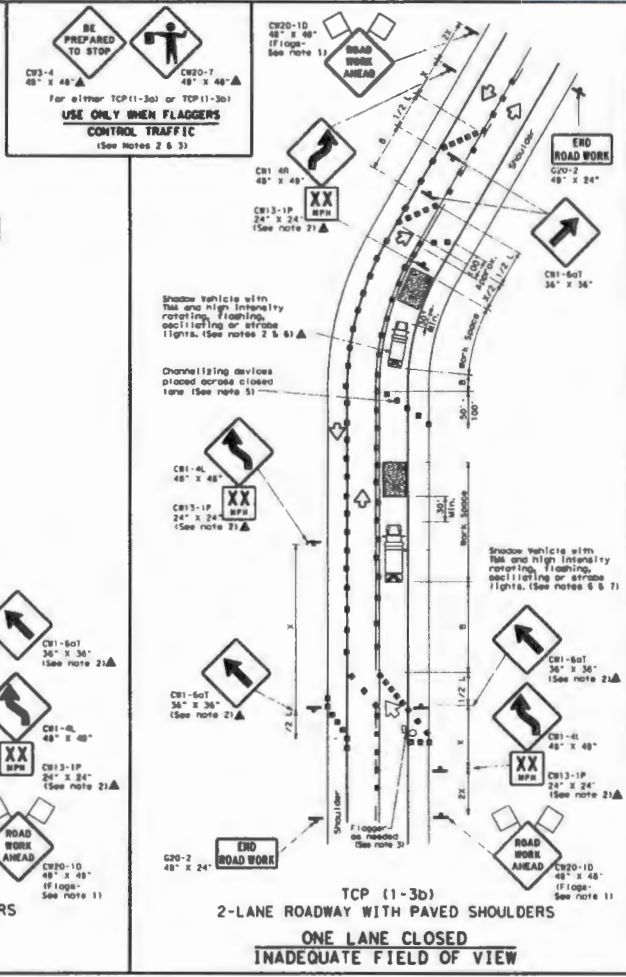
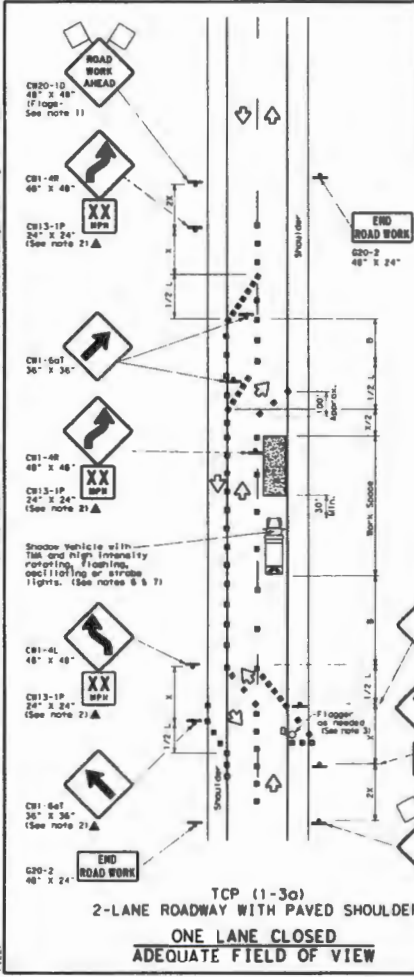
Texas Department of Transportation
 Traffic Control Division
 Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP (1-1)-18

Date: 11/10/07
 Revision: 1997
 2-94 4-98
 8-98 2-01
 1-97 2-18

DISCLAIMER: This manual is intended to provide information for the user's reference only. It is not intended to be used as a substitute for professional engineering or other expert advice. The user assumes all liability for any use of this manual. The user agrees to hold the Department of Transportation harmless for any use of this manual.



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
Flagger	Flagger

Posted Speed	Formula	Minimum Distance to Advance	Suggested Maximum Spacing of Channelizing Devices	Minimum Spacing	Suggested Length of Buffer Space
		in ft	in a Year	in ft	in ft
30	$1.5S^2$	150	185	180	120
35	$1.5S^2$	205	225	245	160
40	$1.5S^2$	265	295	320	240
45	$1.5S^2$	330	370	400	320
50	$1.5S^2$	400	450	500	400
55	$1.5S^2$	480	540	600	500
60	$1.5S^2$	570	640	720	600
65	$1.5S^2$	670	750	840	700
70	$1.5S^2$	780	870	960	800
75	$1.5S^2$	900	1000	1100	900

GENERAL NOTES

- Flagger positioned to signs where shown are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol, which may be omitted when stored 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 volumes require additional assistance to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to start traffic to reduce queues.
- 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 1/2 to 1/2 mile in rural areas.
- A shadow vehicle with TMA should be used (unless TMA can be positioned 30 to 100 feet in advance of the area of work 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 TMA may be positioned off the paved surface, next to those shown in order to protect other work spaces.
- When traffic is directed over a service center line, channelizing devices which separate heavy traffic should be spaced on topers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/25 where S is the speed in mph. This lighter device spacing is intended for the area of conflicting workings not the entire work zone.

TYPICAL USAGE

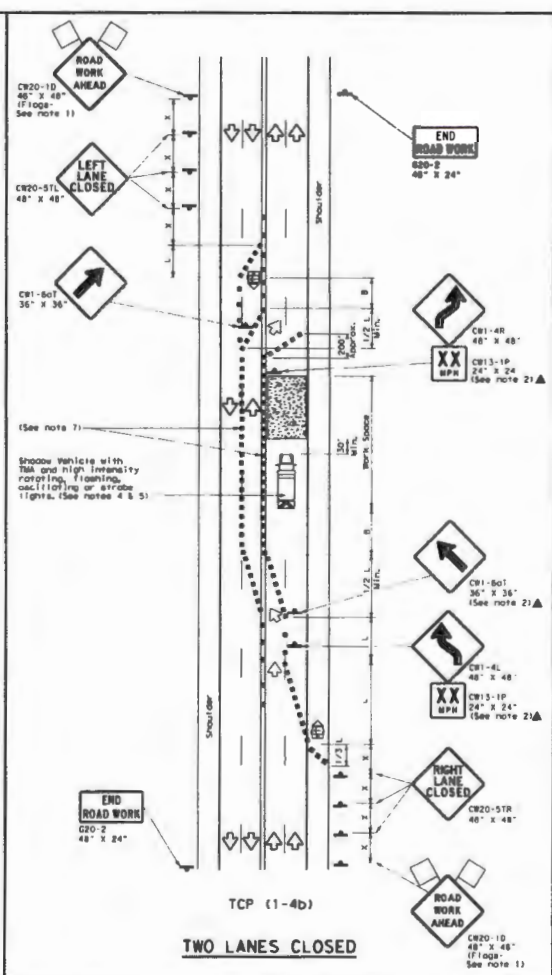
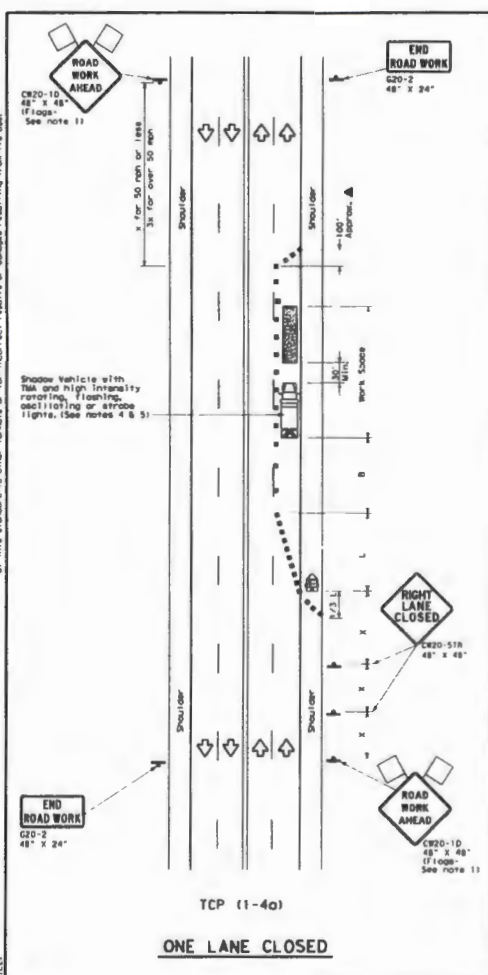
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY

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

File No. TCR-13-18 (Rev. 11/83)
 Date: 11/83
 1-18

DISCLAIMER: The use of this standard is governed by the "Traffic Engineering Practice Act". No warranty of any kind is made by the Department of Transportation for the use of this standard or for damages resulting from its use.

DATE: _____ FILE: _____



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	Flopper

Posted Speed (mph)	Formula	Minimum Distance Taper Lengths # ft	Suggested Minimum Spacing of Channelizing Devices On O On a Taper	Minimum Sign Spacing Distance	Suggested Buffer Space ft
30	L=50	150' 165' 180'	30' 60'	120'	90'
35		205' 225' 245'	35' 70'	160'	120'
40	L=60	265' 295' 320'	40' 80'	240'	155'
45		450' 495' 540'	45' 90'	320'	195'
50	L=75	500' 550' 600'	50' 100'	400'	240'
55		550' 605' 660'	55' 110'	500'	295'
60	L=85	600' 660' 720'	60' 120'	600'	350'
65		650' 715' 780'	65' 130'	700'	410'
70	L=100	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) S=Spacing of Offset (ft) S=Posted Speed (mph)

TYPICAL USAGE

MOBILE	SHORT DURATION	STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY

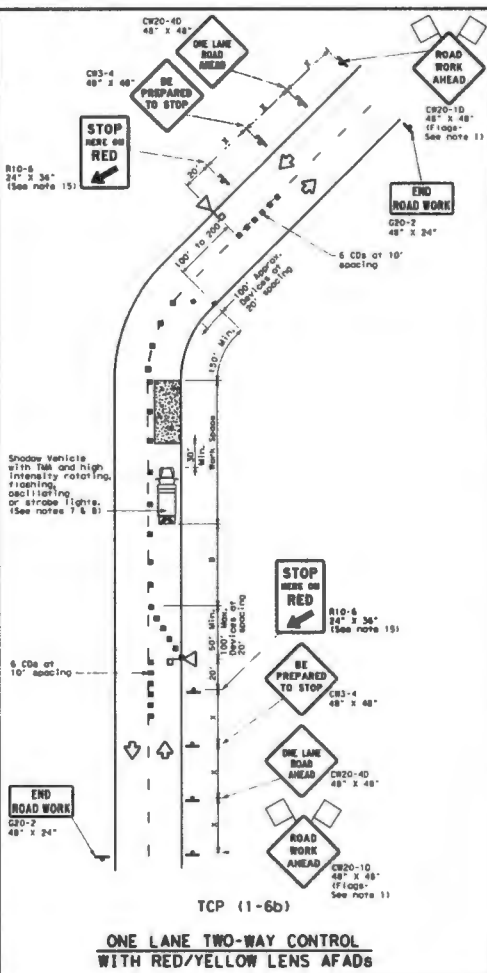
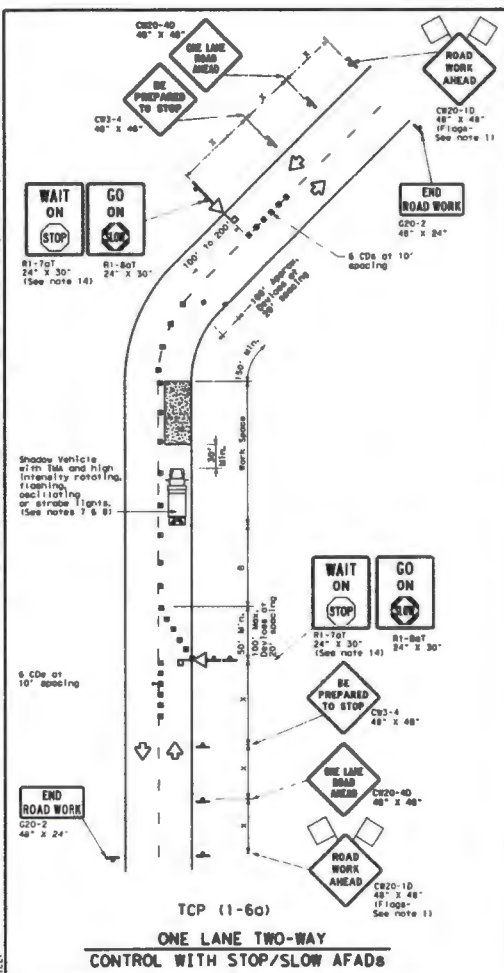
- GENERAL NOTES**
- Flags attached to signs with arrow sign required.
 - All traffic control devices illustrated are required, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plan, or for routing reference work, when approved by the Engineer.
 - The C20-10 "ROAD WORK AHEAD" sign may be replaced if the visibility of the work zone is less than 1000 feet.
 - A Shadow Vehicle with TMA should be used daytime if can be positioned 50 to 100 feet in advance of the area of work 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 TMA 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, C20-51L "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 working taper.
- TCP (1-4b)**
- When traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on centers of 20' or 15' if posted speeds are 30 mph or slower, and for tangent sections, of 1/25 where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting workings, not the entire work zone.

Texas Department of Transportation
 Traffic Control Plan
LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS
TCP (1-4)-18

REV:	1-11-18	REV:	1-11-18
2-14-18	REV:	1-11-18	REV:
2-14-18	REV:	1-11-18	REV:

DISCLAIMER: This plan is prepared in accordance with the "Traffic Engineering Practice Act". No warranty of any kind is made by the State of Texas for any use of this plan. The user of this plan assumes all liability for any consequences resulting from its use.

DATE: _____



LEGEND

	Type 3 Barricade		Channelizing Device (CD)
	Heavy Work Vehicle		Traffic Signal
	Automated Flagger Assistance Device (AFAD)		Portable Changeable Message Sign (PCMS)
	Sign		Flagger

Posted Speed (mph)	Vehicle Lanes	Minimum Taper Lengths (ft)	Suggested Maximum Spacing of Channelizing Devices (ft)	Minimum Sign Spacing (ft)	Suggested Longitudinal Buffer Spacing (ft)	Stopping Sight Distance (ft)
30		10'	15'	10'	30'	200'
35	L-S	205'	225'	245'	35'	160'
40		265'	285'	320'	40'	240'
45		450'	485'	540'	45'	320'
50	L-S	500'	550'	600'	50'	400'
55		550'	605'	660'	55'	500'
60		600'	650'	720'	60'	600'
65		650'	715'	780'	65'	700'
70		700'	770'	840'	70'	800'
75		750'	825'	900'	75'	900'

*R: Conventional Roads Only
 S: 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.
 - AFADs shall only be used in situations where there is one lane of approaching traffic in the direction to be controlled.
 - Minimum stopping sight distance must be provided to each AFAD location for approaching traffic. (See table above).
 - Each AFAD shall be operated by a qualified/certified flagger. Flaggers operating AFADs shall not leave when unattended while they are in use.
 - One flagger may operate two AFADs only when the flagger has an unobstructed view of both AFADs and of the approaching traffic in both directions.
 - When pilot cars are used, a flagger controlling traffic shall be located on each approach. AFADs shall not be operated by the pilot car operator.
 - All AFADs shall be equipped with some area with an orange or fluorescent red-orange flag attached to the end of the zone arm. The flag shall be a minimum of 16" square.
 - A shade vehicle with a flag 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 shade vehicle and flag.
 - Additional shade vehicles with flags may be positioned off the paved surface, next to those shown in order to protect other work zones.
 - Flaggers should use two-way radios or other means 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 stopping sight distance to the AFAD.
 - Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
 - The R1-70 "BE PREPARED TO STOP" sign and the R1-801 "STOP ON SLOW" sign shall be located at the AFAD location on separate supports or they may be attached on the 48" x 30" sign. They shall not obscure the face of the STOP/SLOW AFAD.
 - The R10-6 "STOP HERE ON RED" arrow sign shall be offset so as not to obscure the lenses of the AFAD.

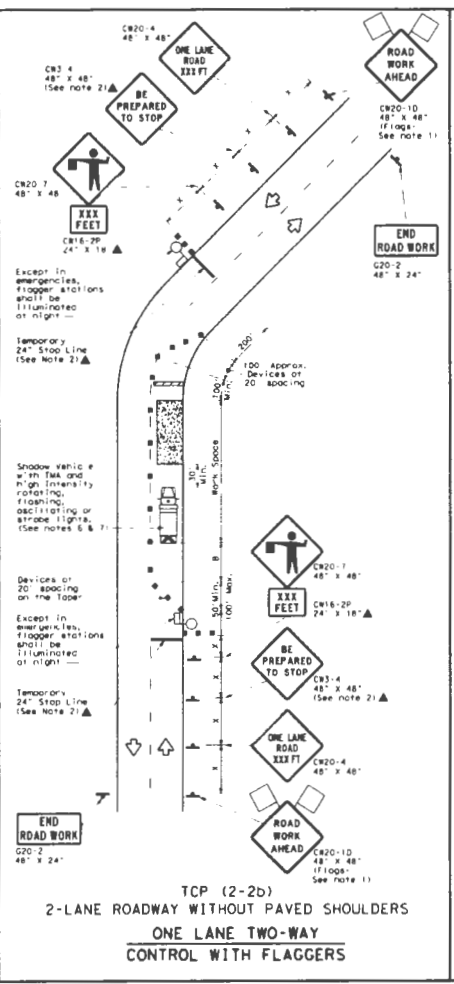
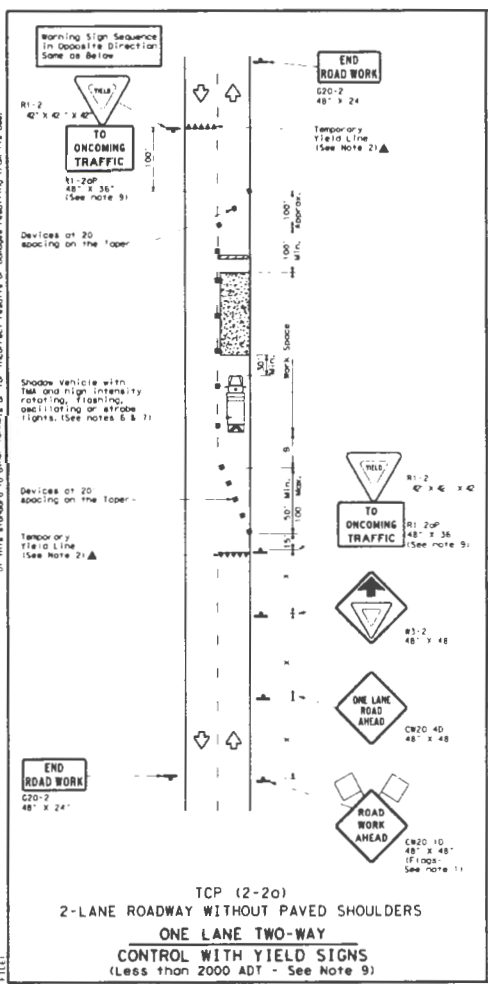
Texas Department of Transportation
 Traffic Operations Division
 (Hwy 180)

**TRAFFIC CONTROL PLAN
 AUTOMATED FLAGGER ASSISTANCE DEVICES (AFADs)**

TCP (1-6)-18

Scale:	1" = 60'	DATE:	11/18/2017	BY:	WJL	CHK:	WJL
Project:	1807	Sheet No.:	18	Total Sheets:	24	Project No.:	1807

DISCUSSION: The use of this standard is governed by the Texas Engineering Practice Act. No portions of any of this standard shall be construed to be a contract or to be subject to any other provisions of law.



LEGEND

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

Posted Speed Limit (mph)	Formula	Minimum Desirable Taper Lengths (ft)			Suggested Maximum Spacing of Channelizing Devices		Minimum Spacing (ft)	Superiority Longitudinal Buffer Space (ft)	Stopping Sight Distance (ft)
		10'	11'	12'	On a Taper	On a Taper			
30	150	185	180	30'	60'	120'	90'	200'	
35	150	225	245	35'	70'	160'	120'	250'	
40	150	265	295	320'	40'	80'	240'	305'	
45	150	450	495	540'	45'	90'	320'	360'	
50	150	500	550	600'	50'	100'	400'	425'	
55	150	550	605	660'	55'	110'	500'	495'	
60	150	600	660	720'	60'	120'	600'	570'	
65	150	650	715	780'	65'	130'	700'	645'	
70	150	700	770	840'	70'	140'	800'	730'	
75	150	750	825	900'	75'	150'	900'	820'	

Note: Conventional Roads Only. Taper lengths have been rounded off. Length of Taper (ft) = Width of Offset (ft) x Posted Speed (mph).

TYPICAL USAGE			
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	LONG TERM STATIONARY

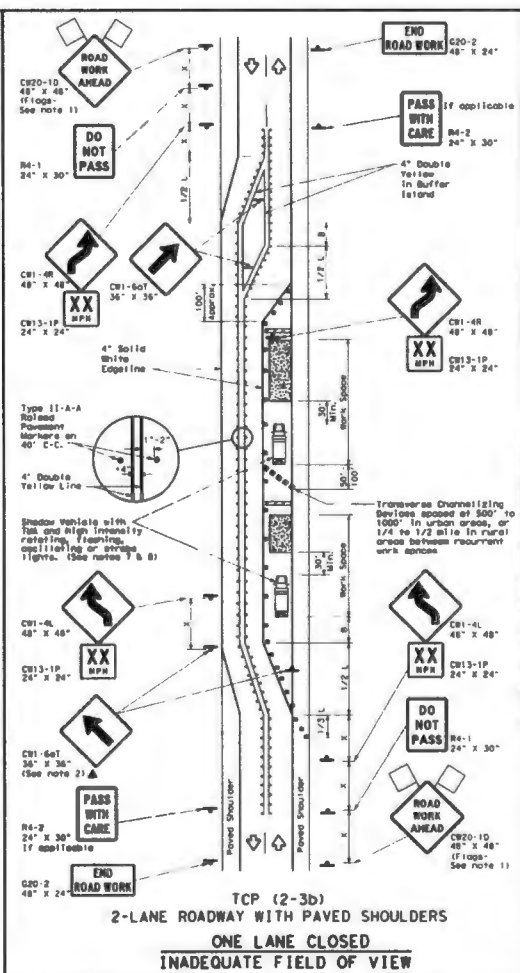
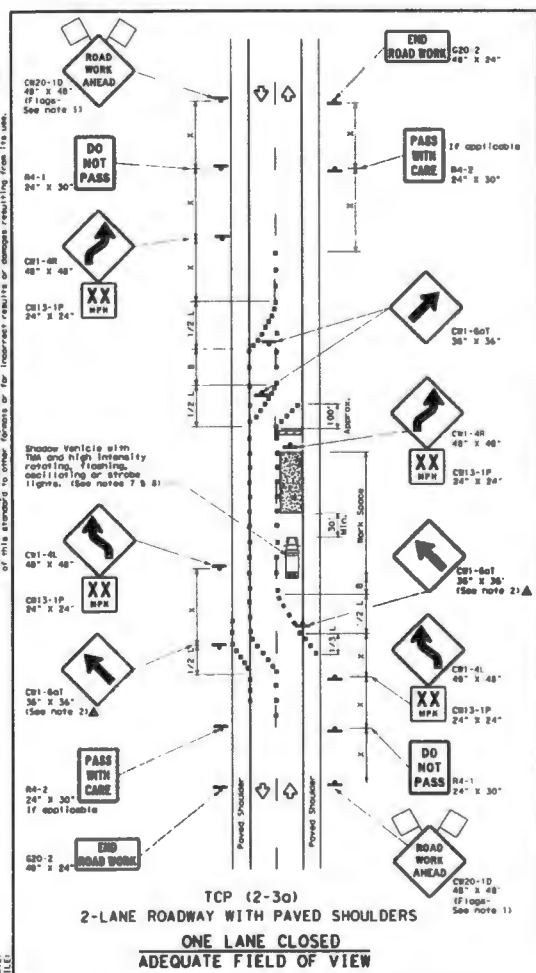
- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol, which may be omitted when stored elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - The C82-4 "BE PREPARED TO STOP" sign may be installed after the C82-4 "ONE LANE ROAD 333 FT" sign, but proper sign spacing shall be maintained.
 - Flagger's 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.
 - Shadow vehicle with a flag 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 flag.
 - Additional shadow vehicles with flags 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 R1-2a "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support of 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 distance should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
 - Flagger's should use 24" STOP/GO paddles to control traffic. Flag should be limited to emergency situations.

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL
TCP (2-2) - 18

Project No.	Sheet No.	Date	Scale
0-96-3-03	215	1-97	1" = 40'
1-97-2-12		1-98	2" = 18'
1-98-2-18			

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LEGEND

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

Posted Speed "h"	Formula "L"	Minimum Desirable Taper Lengths "ft"		Suggested Minimum Spacing of Channelizing Devices "ft"		Minimum Sign Spacing "ft"	Suggested Longitudinal Buffer Spacing "ft"
		On a Taper	Off a Taper	On a Taper	Off a Taper		
30	$L = 3.5S$	150	165	30'	60'	120'	90'
35	$L = 3.5S$	205	225	35'	70'	160'	120'
40	$L = 3.5S$	265	285	40'	80'	240'	155'
45	$L = 3.5S$	450	495	45'	90'	320'	195'
50	$L = 3.5S$	500	550	50'	100'	400'	240'
55	$L = 3.5S$	550	605	55'	110'	500'	295'
60	$L = 3.5S$	600	660	60'	120'	600'	350'
65	$L = 3.5S$	650	715	65'	130'	700'	410'
70	$L = 3.5S$	700	770	70'	140'	800'	475'
75	$L = 3.5S$	750	825	75'	150'	900'	540'

h Conventional Roads Only
ft Taper lengths have been rounded off.
L Length of Taper (FT) S-Bottom of Offset (FT) S-Posted Speed (MPH)

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
				TCP (2-3a-d)

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those devices with the triangle symbol which may be omitted when stated elsewhere in the sign, or for routine maintenance work, when approved by the Engineer.
 - When work areas 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 methods to safely control traffic. Flaggers 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 600-10 "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
 - Conflicting pavement markings shall be removed for long term projects.
 - A shadow vehicle with a TMA should be used devices if can be positioned 30 to 100 feet in advance of the area of work 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 TMA may be positioned off the paved surface, next to most open in order to protect a wider work space.

TCP (2-3a)
5. 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 at 20' or 15' if posted speeds are 35 mph or slower, and for highway sections, at 1/2 mile 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 Department of Transportation **Traffic Operations Division**

TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON
TWO-LANE ROADS

TCP (2-3) - 18

REV	DATE	BY	CHK	APP	APP
1	12/12/18	gms			
2	12/12/18	gms			
3	12/12/18	gms			



18,876-2

1700 Swift Street, North Kansas City, Missouri, 64116
Phone: 816.741.4600
www.garney.com

Commissioner Hutchins
Hunt County Courthouse
Celeste, TX 75401

FILED FOR RECORD
at 12:30 o'clock P M

05/31/2024

Re: County Road 1108 Road Crossing

JUN 25 2024

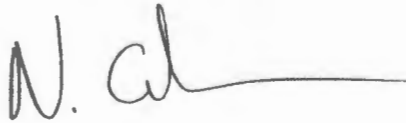
BECKY LANDRUM
County Clerk, Hunt County, Tex.
By 

Dear Hunt County,

Garney Construction is seeking permission from Hunt County to cross County Road 1108 with the Lake Ralph Hall Pipeline. Garney Construction will be crossing the road following the attached construction details. The access road will be re-routed during the utility crossing utilizing proper TXDOT detour signs. Construction will take roughly three days with the road detour in place. Garney Construction will notify the residents of the road closure in advance.

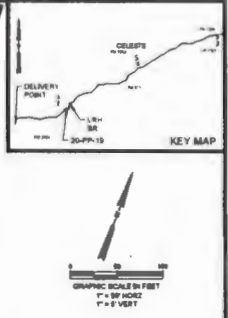
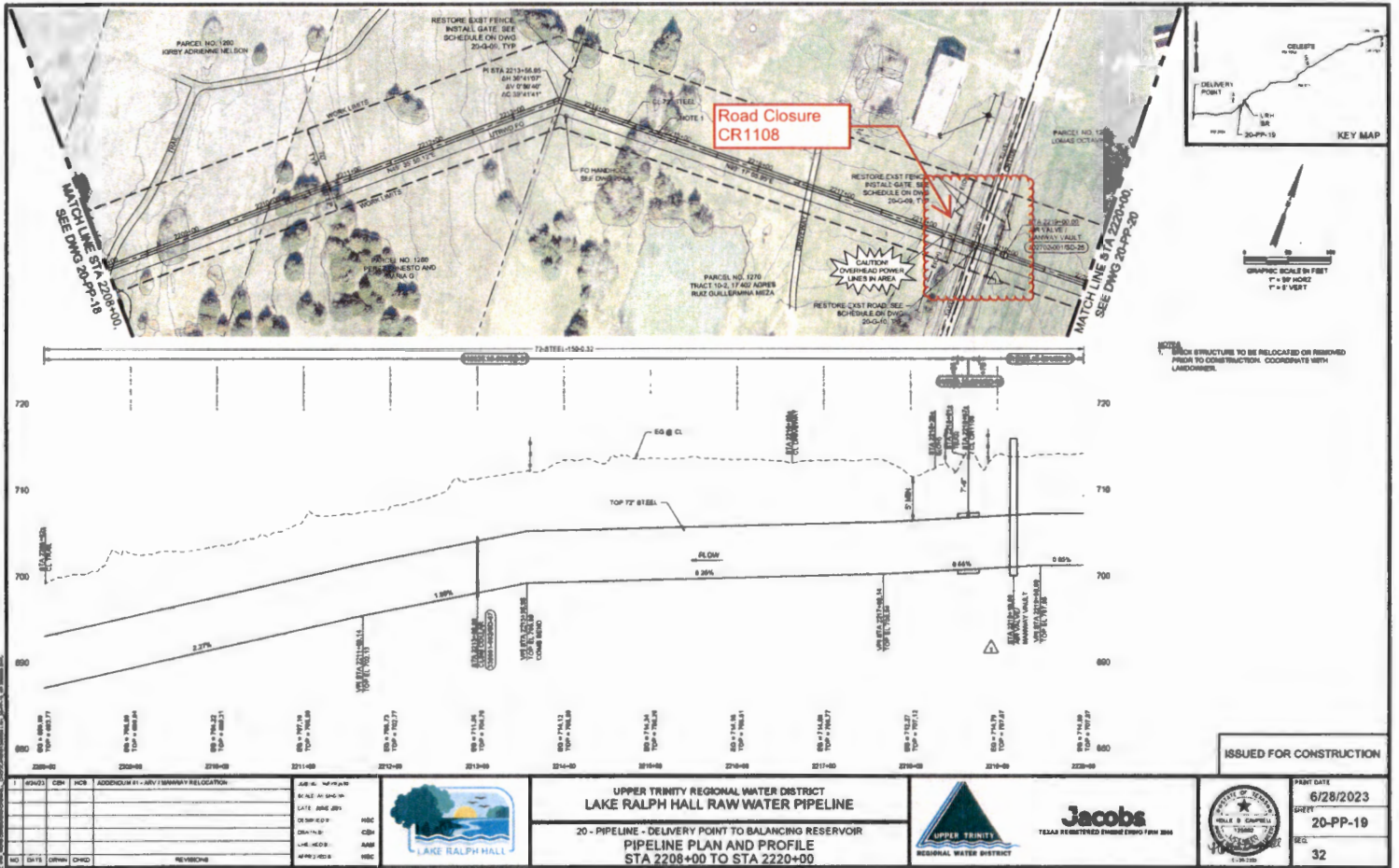
Sincerely,

GARNEY CONSTRUCTION



Nicholas Crenshaw
Project Engineer
c. (469) 215-6966





BRICK STRUCTURE TO BE RELOCATED OR REMOVED PRIOR TO CONSTRUCTION. COORDINATE WITH LANDOWNER.

ISSUED FOR CONSTRUCTION

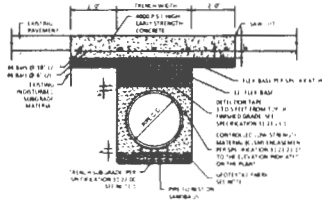
NO	DATE	BY	CHKD	REVISIONS

ADDENDUM #1 - ARI / BIRNBY RELOCATION

UPPER TRINITY REGIONAL WATER DISTRICT
 LAKE RALPH HALL RAW WATER PIPELINE
 20 - PIPELINE - DELIVERY POINT TO BALANCING RESERVOIR
 PIPELINE PLAN AND PROFILE
 STA 2208+00 TO STA 2220+00

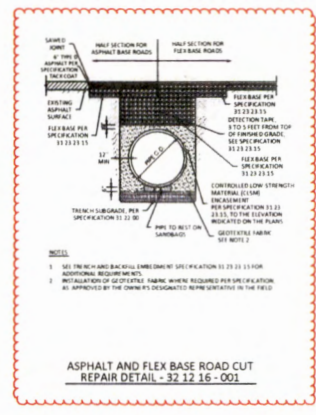
PROJECT DATE: 6/28/2023
 DRAWN BY: GREEN
 20-PP-19
 SHEET NO.: 32

17/03/2023 08:34 AM C:\Users\jblab\OneDrive\Documents\Lake Ralph Hall Raw Water Pipeline - Appendix 0313 13 13 - 001.dwg - User: jblab - 3/13/2023 8:34 AM C:\Users\jblab\OneDrive\Documents\Lake Ralph Hall Raw Water Pipeline - Appendix 0313 13 13 - 001.dwg



1. CON. SHALL BE 28 DAYS APPROX. AROUND THE 10' MAX. FULL DEPTH.
2. BE SURE THAT ALL REPAIRS TO THE CONCRETE SURFACE ARE MADE TO THE ORIGINAL FINISH AND ALL JOINTS ARE PROPERLY SEALED.
3. INSTALLATION OF GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

CONCRETE PAVING CUT DETAIL - 32 13 13 - 001



1. SEE THE REPAIR AND BACKFILL EMBLEMMENT SPECIFICATION 32 23 13 FOR ADDITIONAL REQUIREMENTS.
2. INSTALLATION OF GEOTEXTILE FABRIC WHERE REQUIRED PER SPECIFICATION SHALL BE APPROVED BY THE OWNER'S DESIGNATED REPRESENTATIVE IN THE FIELD.

ASPHALT AND FLEX BASE ROAD CUT REPAIR DETAIL - 32 12 16 - 001

ISSUED FOR CONSTRUCTION

NO.	REV.	DATE	DESCRIPTION

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UPPER TRINITY REGIONAL WATER DISTRICT
 LAKE RALPH HALL RAW WATER PIPELINE
 PROGRAM STANDARD DETAILS SHEET 3
 ROADWAY CUT AND REPAIR DETAILS



REVISION DATE
 03/09/2023
 SHEET
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 OF

DISCLAIMER: THIS STANDARD IS GOVERNED BY THE "TRAFFIC ENGINEERING PRACTICE ACT," THE VENDOR OF RECORD SHALL BE RESPONSIBLE FOR THE ACCURACY OF THIS STANDARD. ANY CHANGES RESULTING FROM THE USE OF THIS STANDARD SHALL BE THE RESPONSIBILITY OF THE USER.

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES

- 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).
- The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Traffic control devices should be in place only while work is actually in progress or a definite need exists.
- The Engineer has the final decision on the location of all traffic control devices.
- 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

- 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.
- Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

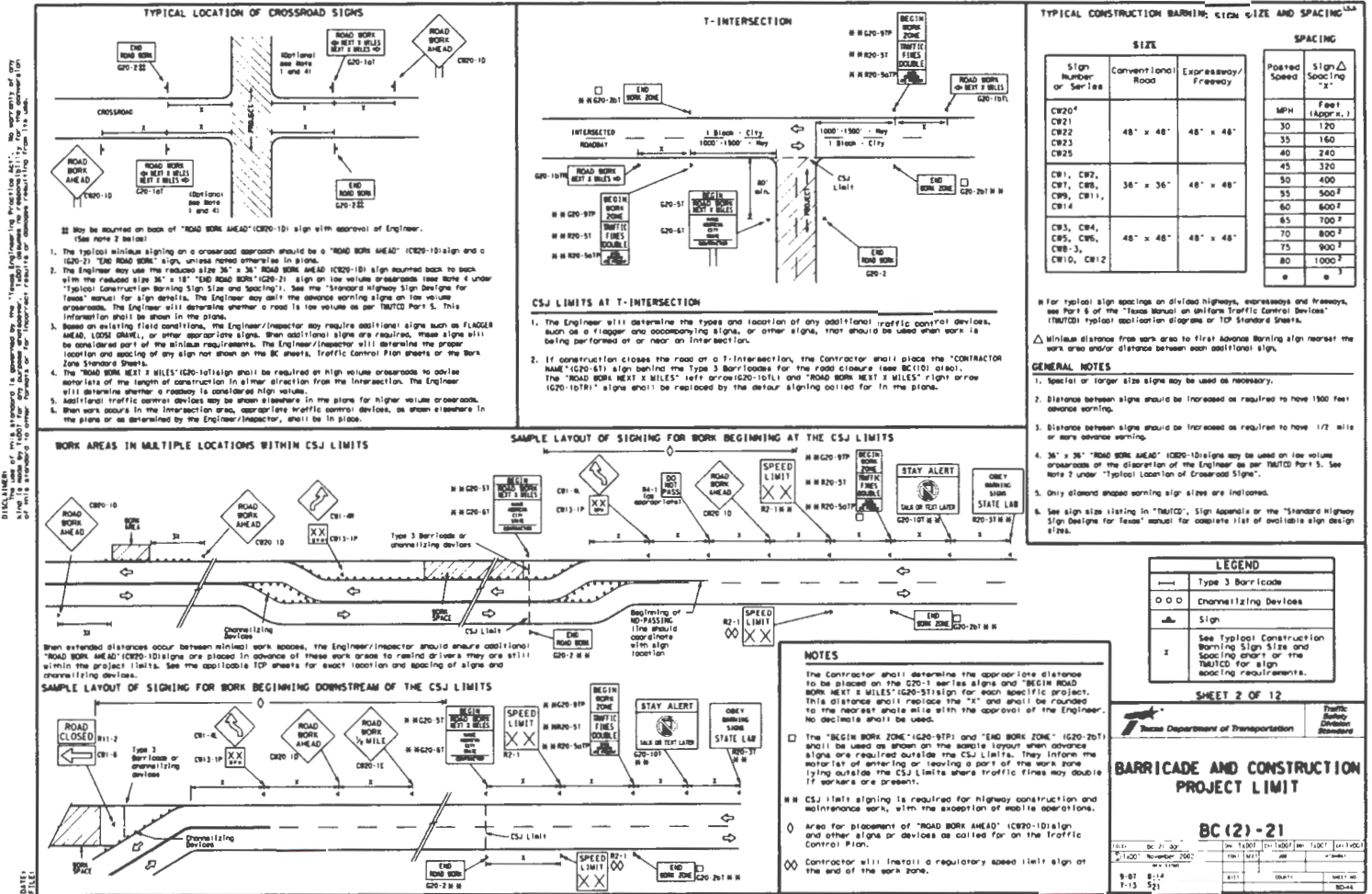
COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

<p>THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov</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

SHEET 1 OF 12

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS			
BC (1) - 21			
Rev.	By	Date	Description
1		4-03	1-13
2		8-07	8-14
3		5-10	5-21
			Sheet No.
			3045



TYPICAL CONSTRUCTION BARRIERS: SIGN SIZE AND SPACING

Sign Number or Series	Conventional Road	Expressway/Freeway	SPACING	
			Posted Speed	Sign Spacing "x"
CW20 ⁴ CW21 CW22 CW23 CW25	48" x 48"	48" x 48"	MPH	Feet (Approx.)
			30	120
			35	160
			40	240
CB1, CB2, CB3, CB4, CB14	36" x 36"	48" x 48"	45	320
			50	400
			55	500 ⁷
			60	700 ⁷
CB3, CB4, CB5, CB6, CB7-9, CB10, CB12	48" x 48"	48" x 48"	65	700 ⁷
			70	800 ⁷
			75	900 ⁷
			80	1000 ⁷
			9	3

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 TDP Standard Sheets.

Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between work area signs.

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" (CW20-10) 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 Design for Texas" manual for complete list of available sign design sizes.

LEGEND

	Type 3 Barricade
	Channelizing Devices
	Sign
	See Typical Construction Barricade Sign Size and Spacing Requirements

NOTES

The Contractor shall determine the operation distance to be placed on the CW20-10 signs and "BEGIN ROAD WORK 1/2 MILE" (C20-51) signs for each specific project. This distance shall replace the "1/2" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

The "BEGIN ROAD WORK 1/2 MILE" (C20-51) and "END ROAD WORK 1/2 MILE" (C20-52) signs 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 Limits signing is required for highway construction and maintenance work, with the exception of mobile operations.

Area for placement of "ROAD WORK AHEAD" (CW20-10) 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.

Texas Department of Transportation Traffic Safety Division

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC (2) - 21

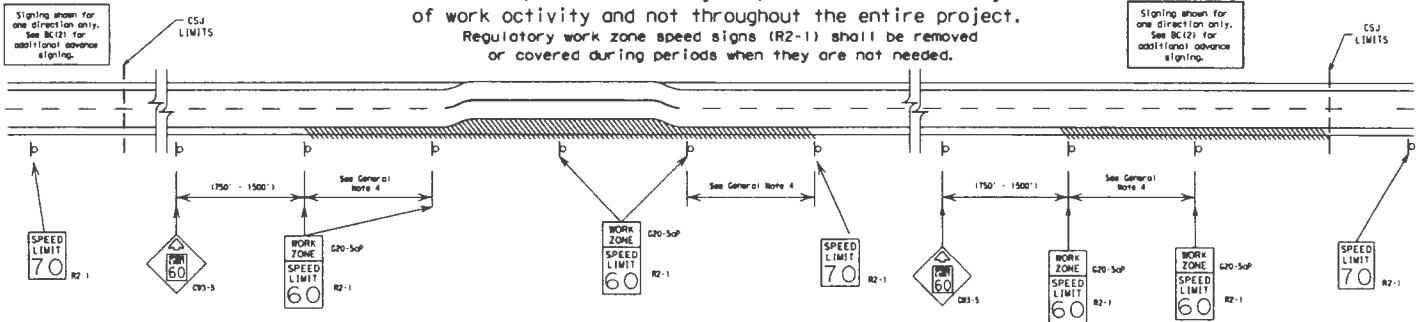
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10	11-01-00	JAB	JAB		

DISCLAIMER: THE INFORMATION CONTAINED HEREIN IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT TO BE USED AS A BASIS FOR ANY CONTRACT OR AGREEMENT. THE USER ASSUMES ALL LIABILITY FOR ANY DAMAGE, LOSS, OR INJURY RESULTING FROM THE USE OF THIS INFORMATION.

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 of 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" (CB-3) sign, "WORK ZONE SPEED LIMIT" (G20-50p) 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. Law enforcement.
 - B. Flagger stationed next to sign.
 - C. Portable changeable message sign (PCMS).
 - D. Low-power (dome) 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.

01/11/2007: This document is governed by the Texas Engineering Practice Act. The authority of any sign or sign system shall be subject to the Texas Engineering Practice Act. The authority of any sign or sign system shall be subject to the Texas Engineering Practice Act.

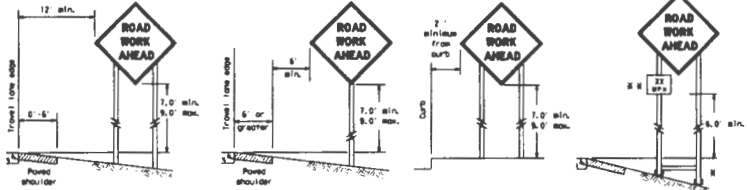
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SHEET 3 OF 12

Texas Department of Transportation		Traffic Safety Division Standards
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT		
BC (3) - 21		
FILED: BC 21-207 9-07 8:14 1-13 5-21	REVISED: 11/2002 DATE: 11/11/02 BY: [] CHECKED: [] DATE: []	SHEET NO. 3047

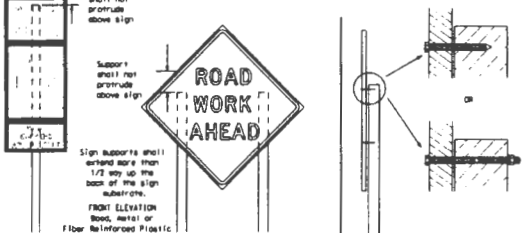
DISCLAIMER: This drawing is governed by the Texas Engineering Practice Act. No warranty of any kind is made by the State of Texas or any of its agencies for any damages resulting from the use of this drawing.

TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



If when placing side supports on uneven ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall not be placed under signs as a means of leveling.
 If when plaques are placed on dual leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (vertical or diagonal) should not cover the surface of the 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. Splices must be located entirely behind the sign substrate, not near the base of the support. Splice length shall 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.
- Wood sign posts shall be galvanized.
- Bar loaded signs 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 sheet in the plans or in the "Standard Highway Sign Design for Texas" (MSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the MSD but may have been deleted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Parties. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TADOT 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" (CWDZTL) for small roadwork signs. Supports for temporary large roadwork signs shall meet the requirements detailed on the Temporary Large Roadwork 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 to the Engineer for verification of the correct procedures are being followed.
- The Contractor is responsible for installing signs on approved supports and retaining signs with damaged or cracked substrates and/or damaged or corroded 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.

DEFINITION OF WORK ZONE DEFINED BY THE "Texas Manual on Uniform Traffic Control Devices" (Part 4)

- Types of sign supports, sign mounting height, the size of signs, and the type of sign substrates may vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate sign support 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 other dimensions and duration of work requirements.
- Short-term stationary - work that occupies a location more than 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 height of long-term/intermediate-term signs shall be at least 1 foot, but not more than 9 feet, above the paved surface, except when for supplemental plaques mounted below other signs.
- The height of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but not more than 2 feet above the pavement surface.
- Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signaling.
- Short-term/Short Duration signs shall be used only during daylight and shall be removed from 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 (1) 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 CWDZTL lists each substrate that can be used on the different types and models of sign supports.
- "Beam" type materials are not an approved sign substrate, regardless of the firmness of the wood.
- All wooden individual sign panels fabricated from 2" or more plies shall have one or more plywood clear, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The clear 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 retroreflectivity requirements of DMS-330 for night signs or DMS-330 for night signs. The web contractor for DMS specifications is shown on BC(1).
- White sheeting, meeting the requirements of DMS-330 Type A, shall be used for signs with white backgrounds.
- Orange sheeting, meeting the requirements of DMS-330 Type B, or Type C₁, shall be used for night signs with orange backgrounds.

SIGN LETTERS

- All sign letters and numbers shall be clear, and contain rounded typeface characters 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 appearance 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 30 degrees when the sign message is not applicable. This technique may not be used for signs installed in the section of divided highways or near any intersections where the sign may be seen from opposing traffic.
- Signs installed on wooden poles 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 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.
- Barrel shall not be used to cover signs.
- Back tapes or other adhesive material shall not be applied to a sign face.
- Signs and anchor studs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT HEIGHTS

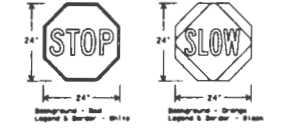
- When sign supports require the use of weights to keep from turning over, the use of sandbags with 20% cementitious sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- Sandbags shall 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 fire inner tubes) shall not be used.
- Rubber pellets designed for chocking devices shall not be used for ballast on portable sign supports designed and manufactured with rubber bases may be used when shown on the CWDZTL list.
- Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be supported above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the sign to weigh down the sign support.
- Sandbags shall not be placed under the sign and shall not be used to level sign supports placed on slopes.

FLAG ON SIGNS

- Flags may be used to draw attention to warning signs. When used, the flag shall be 18 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 retroreflective 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 BC(3) Hand Signaling Device in the MSD(TD).



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)

USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B OR C 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 (ADOD), or cultural information. Drivers proceeding through a work zone need the same. If an alternate route guidance or warning is presented 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 restores the roadway condition. For details for covering large guide signs see the TS-CD standard.
- When existing permanent signs are moved or 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 temporary bases as shown on the SD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SD Standard. 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 temporary supports as shown on the BC Standard sheets. TLR Standard sheets or the CWDZTL list. The signs shall meet the required mounting heights shown on the BC, or the SD 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 another contractor equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the operator. This will be subsidiary to Item 502.

SHEET 4 OF 12

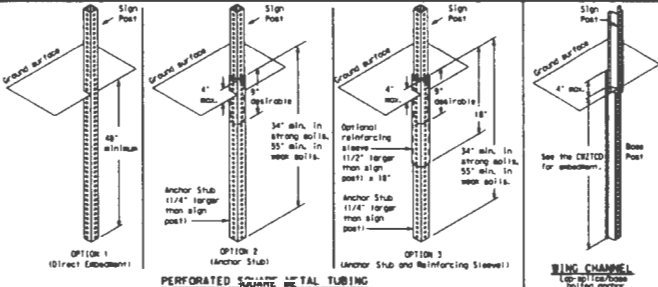
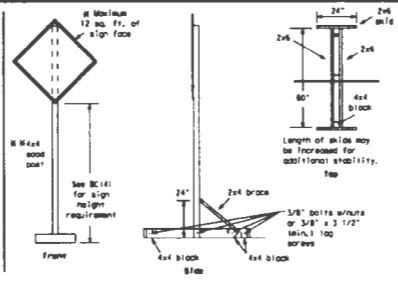
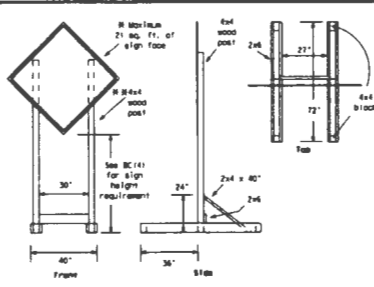
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21

DATE: 9-07-2007	BY: TADOT	REVISED: 11-14-2007	TADOT
9-07-2007	01	01	01
11-13-2007	01	01	01

DISCREPANCY: If any discrepancy is observed by the Contractor, the Engineer or the Department of Transportation, the Contractor shall immediately notify the Engineer in writing. The Contractor shall be responsible for any and all costs resulting from any such discrepancy.



SKID MOUNTED WOOD SIGN SUPPORTS

LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

GROUND MOUNTED SIGN SUPPORTS

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

WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SD 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 CRITCO.

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CRITCO LIST. SEE BC(11) FOR WEBSITE LOCATION.

GENERAL NOTES

1. Posts 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.
 2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific approval noted on the CRITCO List.
 3. When project is completed, all sign supports and foundations shall be removed from the project site. This shall be considered subsidiary to Item 302.
- See BC(4) for definition of "Bare Duration."
 - All wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
 - See the CRITCO for the type of sign subframes that can be used for each approved sign support.

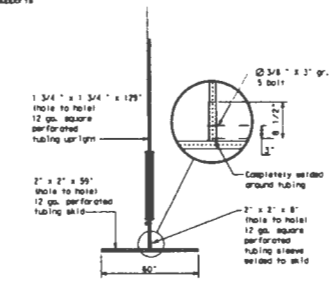
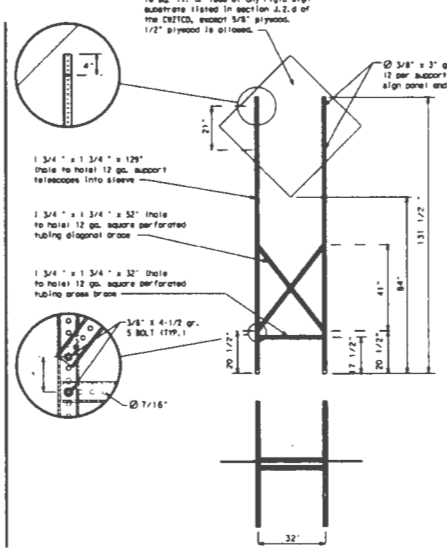
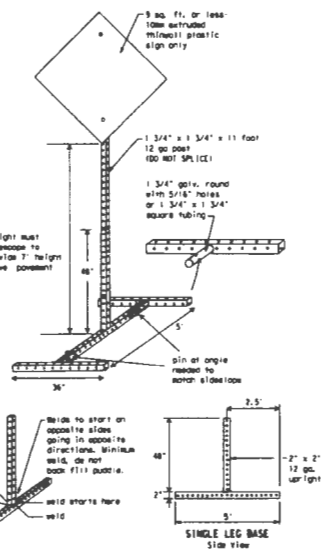
SHEET 5 OF 12

Texas Department of Transportation Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC (5) - 21

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2	100	11/01	2	100	11/01
3	100	11/01	3	100	11/01
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9	100	11/01	9	100	11/01
10	100	11/01	10	100	11/01



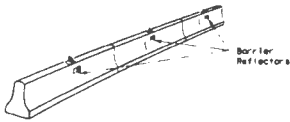
SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

DATE: FILE:

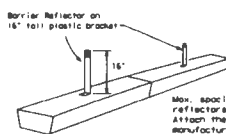
DISCLAIMER: This document is intended to provide information only. It is not intended to be used as a substitute for professional engineering or other services. The user assumes all liability for the use of this document or for information resulting from its use.

- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8800. A list of prequalified Barrier Reflectors can be found on the Internet (Internet URL web address shown on BC11).
- Color of Barrier Reflectors shall be as specified in the MUTCD. The cost of the reflectors shall be considered subsidiary to Item 312.



CONCRETE TRAFFIC BARRIER (CTB)

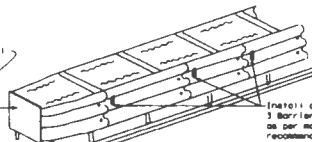
- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the direction of each section of CTB. An alternate mounting location is uniformly spaced on one end of each CTB. This will allow for placement of a barrier groove without damaging the reflector. The 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 (3) directional while the reflector 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 adjoining being substituted.
- 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 adjoining being substituted.
- Minimum spacing of Barrier Reflectors is 60 feet.
- Placement markers or temporary flexible reflective roadway marker have 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 aisle barriers shall be delineated as shown in the above detail.



LOW PROFILE CONCRETE BARRIER (LPCB)

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 LPLC.

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



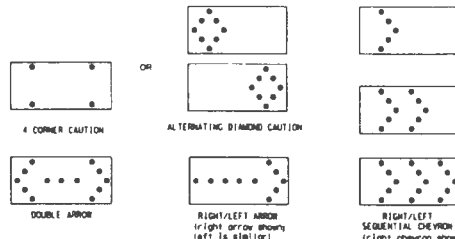
DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

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, bar loads 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 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 80 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 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 width POS 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 arrow.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

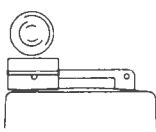
- Warning lights shall meet the requirements of the MUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of work or work in a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "L". The Type A Warning Lights shall not be used with signs manufactured with Type A, B, or C sheeting meeting the requirements of Departmental Manual Specification BMS 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 "S".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control device.
- 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 Specification 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

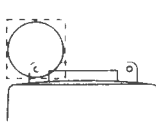
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing 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 55 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 closures, on lane closures, and on other similar conditions.
- Type A, Type C and Type D warning lights shall be installed or located 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 of the delineation 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 MUTCD.
- 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 heavy traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the drum 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, but have a yellow reflective surface area of at least 30 square inches.

TYPE	REQUIREMENTS	
	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS
B	30 x 60	13
C	48 x 96	15

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 (TMAs) used on IADOT facilities shall meet the requirements outlined in the Manual for Assessing Safety Hardware (ASHH).
- Refer to the MUTCD for the requirements of Level 2 or Level 3 TMA.
- Refer to the MUTCD 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 installed 30 to 100 feet in advance of the work area or shoulder 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 area is an extended distance from the TMA.

Traffic Safety Division Standard

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

BC (7) - 21

REV	DATE	BY	CHK	APP	DESCRIPTION
1	11-10-2007	...	...	...	...
2	8-07-2014	...	...	...	...
3	3-13-2021	...	...	...	...

DATE: _____ FILE: _____
 THIS SPECIFICATION IS APPROVED BY THE TEXAS ENGINEERING PROFESSION BOARD, 20 UNIVERSITY OF TEXAS AT AUSTIN, AUSTIN, TEXAS 78712-1000. THE BOARD'S APPROVAL IS LIMITED TO THE SPECIFICATION AS SHOWN ON THIS SHEET. ANY CHANGES TO THIS SPECIFICATION SHALL BE MADE BY THE BOARD.

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 tapered sections by vertical panels, or 40" non-reflective cones. In tapered 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 tapered sections and tapered 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" (TMUD) and the "Compliant Work Zone Traffic Control Device List" (COTCDL).
- 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 minimum of 24 hours to return any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

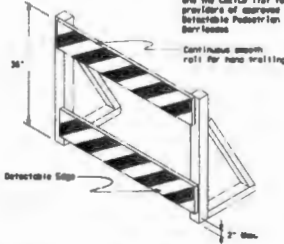
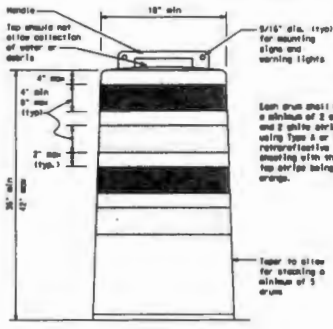
- Manufactured plastic drums shall meet the following requirements:
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
 - The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling in a lane of 10 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 plastic, and inherently reflective. The Contractor shall use white 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 drums with built-in bases shall be a minimum of 36 inches and a minimum 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 5/16 inch diameter holes to allow treatment 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-reflective space between any two adjacent stripes shall not exceed 2 inches in width.
 - Bases shall have a minimum width of 36 inches, a minimum height of 4 inches, and a minimum of two footcandle of sufficient size to allow base to be held down while separating the drum base from the base.
 - Plastic drums shall be constructed of ultra-high molecular weight, high-density polyethylene (UHMWPE) or other approved material.
 - Drum body shall have a maximum unbraked weight of 11 lbs.
 - Drum and base shall be marked with manufacturer's name and model number.

RETROREFLECTIVE SHEETING

- The airframe used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Department Materials Specification 800-2300, "Sign Face Materials," Type A or Type B reflective sheeting shall be modified unless otherwise specified in the plans.
- The sheeting shall be suitable for use on and applied to the drum surfaces such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delamination, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

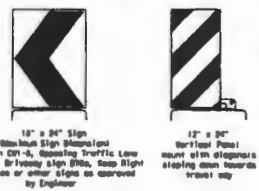
BALLAST

- 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 25 lbs minimum and 50 lbs maximum. The ballast may be sand in one to three sandbags separate from the base, sand in a container plastic base, or other ballasting devices as approved by the Engineer. Sealing 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 grade rubber base or a solid rubber base.
- Recycled truck tire shavings may be used for ballast on drums approved for this type of ballast on the COTCDL 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 ballast 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.
- Ballast may be used to secure base of drums to pavement.



DETECTABLE PEDESTRIAN BARRICADES

- When entering pedestrian facilities or structures, closed, or restricted in a TTC zone, the necessary facilities shall be detectable and include accessibility features consistent with the features shown in the existing pedestrian facility. Refer to COTCDL-21 for Pedestrian Control requirements for Standard Bicycles, Strollers, Bicycles and Carts, and Carts.
- Where pedestrian facilities with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barriera shall be placed across the full width of the closed sidewalk instead of a Type 3 Barriera.
- Detectable pedestrian barriera shall be to the one placed above, longitudinal channelizing devices, some concrete barriers, and used or similar line marking with a continuous detectable edge on satisfactorily delineate a pedestrian path.
- Text, color, or plastic chain along 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 barrier for pedestrian movement.
- Warning lights shall not be attached to detectable pedestrian barriera.
- Detectable pedestrian barriera should use 2" nominal barriera rolls as shown on BC(6) provided when the roll provides a smooth continuous roll suitable for hand rolling with no splinters, burrs, or sharp edges.



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

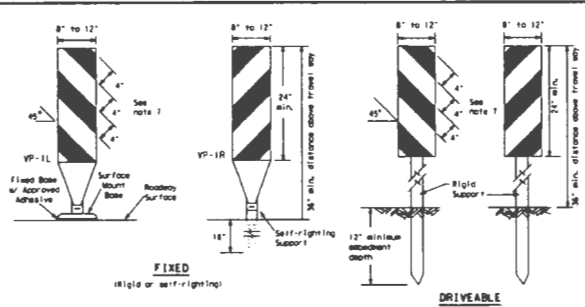
SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

- Signs used on plastic drums shall be manufactured using substrates listed on the COTCDL.
- Chevrans and other work zone signs with an orange background shall be manufactured with Type B_o or Type C_o orange sheeting meeting the color and retroreflectivity requirements of 800-2300, "Sign Face Materials," unless otherwise specified in the plans.
- Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of 800-2300 Type A or Type B. Biagonal stripes on Vertical Panels shall slope down toward the intended travel lane.
- Other sign messages (text or symbols) 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 18 inch signs discussed in note 8 below.
- Signs shall be mounted using a 1/2 inch bolt, washer, and nut, 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.
- Chevrans may be placed on drums on the outside of drums, on existing barriers or on existing signs. When used in these locations, they may be placed on every drum or spaced not more than every third drum. A minimum of three (3) should be used at each location called for in the plans.
- RP-9, RP-10, RP-11 and RP-12 Standard Channel signs shall not 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

SHEET 8 OF 12

Texas Department of Transportation		Traffic Safety Division	
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES			
BC (6) - 21			
REV	DATE	BY	CHKD
01-000	November 2007	Jim Smith	Jim Smith
4-03	8-14		
9-07	5-21		
7-11			

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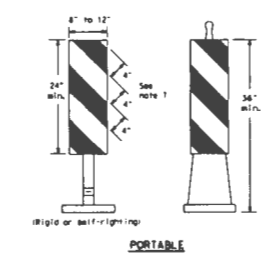
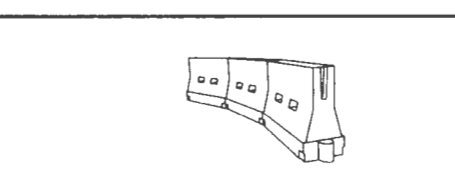


- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the 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 one or right angles to approaching traffic. Spacing should be such that the material always has time in view, until the change in alignment attaches 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 III 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 ramps or transitions on Freeways and divided highways, self-lighting chevrons may be used to supplement plastic drums but not to replace plastic drums.

GENERAL NOTES

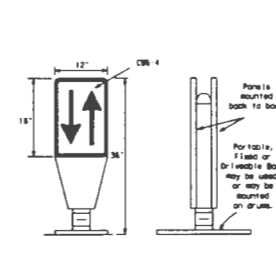
- Barricade channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUD).
- Channelizing devices on self-lighting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicles related wind gusts causing alignment of the channelizing device difficult to maintain. Location of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUD and the "Compliance Barricade Channelizing Device List" (CCBCL).
- 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.
- Placement surfaces shall be prepared in a manner that ensures proper bonding between the adhesive, 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 first pavement surface, including pavement surface deterioration or surface integrity. Drivable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.

CHEVRONS



- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- VP's may be used in day/night or night/night situations. They may be used on 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 of VP's for drop-offs.
- VP's should be mounted back to back. If used on the edge of curb adjacent to two-way two-lane roadways, stripes or a 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 70 square inches of retroreflective area facing traffic.
- Self-lighting supports are available with portable base. See "Compliance Barricade Channelizing Device List" (CCBCL).
- 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.

VERTICAL PANELS (VP's)



- Opposing Traffic Lane Dividers (OTLD) are channelizing 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 seal to minimize movement caused by a vehicle impact or wind gust.
- The OTLD may be used in combination with 42" cones or W's.
- Spacing between the OTLD shall not exceed 500 feet, 42" cones or W's 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 III or Type C, conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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 CCBCL list.
- LCDs should not be used to provide positive protection for obstacles or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BCT's when placed roughly parallel to the travel lanes.
- LCDs used as barricades should conform to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rolls as shown on BCT's. 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 level for Assessing Safety Barriers (ASB) or other minimum 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 day/night/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 CCBCL list.
- Water ballasted systems used as barriers should not be used for a turning taper except in low speed areas 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 experience considering the available geometric conditions.
- When water ballasted systems used as barriers have burst ends exposed to traffic, they should be structured as per manufacturer recommendations or fixed to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems shall have a continuous detachable bottom for users of long zones 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

Spaced Bases	Form No.	Minimum Desirable Taper Lengths			Suggested Maximum Spacing of Channelizing Devices	
		10' or less	11' - 18'	19' or more	On a Taper	On a Tangent
30	L-30	150	185	180	30'	60'
35	L-35	205	225	245	35'	70'
40	L-40	285	295	320	40'	80'
45	L-45	450	495	540	45'	90'
50	L-50	500	550	600	50'	100'
55	L-55	550	605	660	55'	110'
60	L-60	600	660	720	60'	120'
65	L-65	650	715	780	65'	130'
70	L-70	700	770	840	70'	140'
75	L-75	750	825	900	75'	150'
80	L-80	800	880	960	80'	160'

Minimum taper lengths have been rounded off. Length of taper shall be in increments of 5 feet (5' - 160' based upon).

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

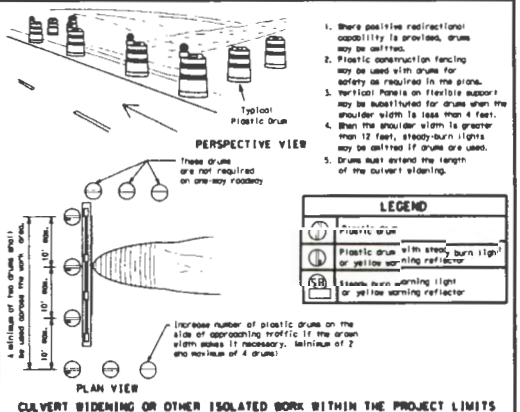
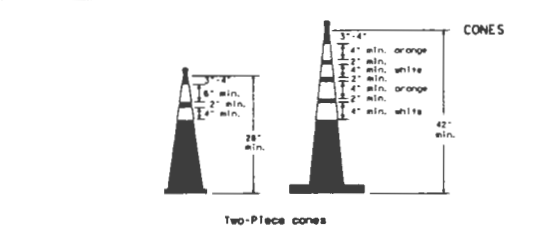
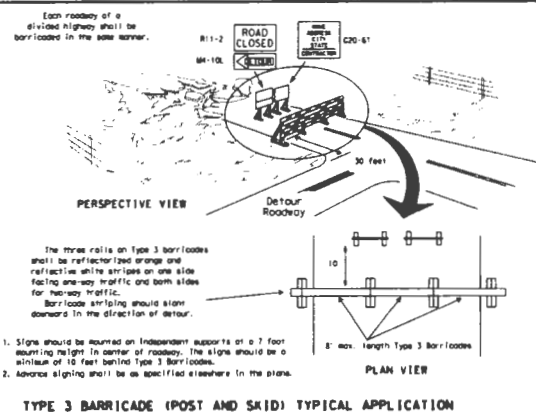
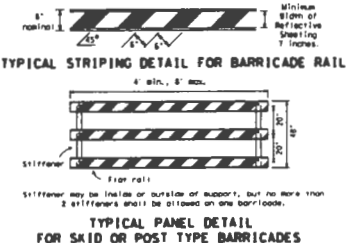
BC (9) - 21

Rev.	Date	Description	By	App'd
1	8-14			
2	8-21			

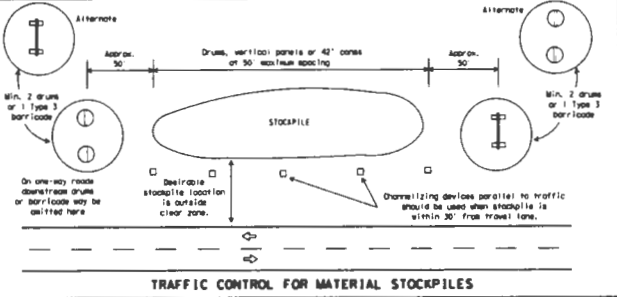
DISCLAIMER: THIS SPECIFICATION IS BASED ON THE CURRENTLY AVAILABLE INFORMATION AND IS SUBJECT TO CHANGE WITHOUT NOTICE. THE USER SHALL BE RESPONSIBLE FOR VERIFYING THE ACCURACY OF THE INFORMATION AND FOR OBTAINING NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE USER SHALL BE RESPONSIBLE FOR OBTAINING NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE USER SHALL BE RESPONSIBLE FOR OBTAINING NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.

- ### TYPE 3 BARRICADES
- Refer to the Companion Work Zone Traffic Control Devices List (CWZTD) for details of the Type 3 Barricade and a list of all materials used in the construction of Type 3 Barricades.
 - Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
 - 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 stripes showing way slope downward in both directions from the center of the roadway.
 - Striping of rolls, 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.
 - Identification markings may be shown only on the back of the barricade rolls. The maximum height of letters and/or company logos used for identification shall be 1".
 - Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
 - Warning lights shall not be installed on barricades.
 - When barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags shall 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 rolls reflective sheeting. Rock, concrete, iron, steel or other solid objects shall 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 have a top ventricular layer. Rubber (such as fire hose rubber) 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 ropes, wires, chains or other fasteners.
 - Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification BM-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



LEGEND	
	Plastic drum
	Plastic drum with steel, burn light or yellow warning reflector
	Stakes with warning light or yellow warning reflector



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.

- Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
- One-piece cones have the body and base of the cone 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.
- 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.
- 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 BM-8300 Type A or Type B.
- 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(10). 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.
- 42" two-piece cones, vertical panels or drums are suitable for all work zone situations.
- Cones or tubular markers used on each project should be of the same size and shape.

SHEET 10 OF 12

Traffic Safety Channelizing Devices

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILED	IN 2007	BY 1001	DATE 10/07	TIME 11:00
NOV 07	NOVEMBER 2007	CH	101	101
9-07	8-16	1-1	101	101
7-13	5-21			

WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings. In accordance with the standard specifications and special provisions, all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. 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 6215(PH).
6. When standard pavement markings are not in place and the roadway is opened to traffic, 30 inch PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS 31th C&M signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(112).
2. 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

1. Retro-reflective prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-retro-reflective prefabricated pavement markings (flat back) shall meet the requirements of DMS-8240.

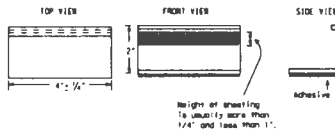
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. 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 Item 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 180 feet when illuminated by automobile low beam headlights at night, unless sight distance is restricted by roadway geometry.
4. Markings failing to meet the 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

1. 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.
2. 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.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a disconcerting marking. This shall be by any method approved by IADOT Specification Item 617 for "Maintaining Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but shall not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT be permitted.
8. Removal of raised pavement markers shall be directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "MAINTAINING EXISTING PAVEMENT MARKINGS AND MARKERS", unless otherwise stated in the plans.
10. 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

1. Temporary flexible reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not necessarily required, however at the option of the Engineer, either "A" or "B" below may be required to assure quality before placement on the roadway.
 - A. 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.
 - B. 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 plow, 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.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet 6215(PH) for tab placement on new pavements. See Standard Sheet 1217(1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product (11), and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material not applied or buried rubber pad for all surfaces, or thermoplastic for concrete surfaces.

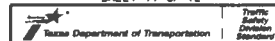
Guidemarks shall be designated as:
 YELLOW - two other reflective surfaces with yellow body.
 WHITE - one silver reflective surface with white body.

DEPARTMENTAL MATERIAL SPECIFICATIONS

PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVE	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(11).

SHEET 11 OF 12



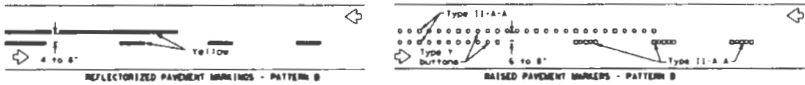
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

REV	DATE	BY	CHKD	APP'D
1	10/20/01	...	...	...
2	08/01/02	...	...	...
3	01/13/03	...	...	...
4	01/13/03	...	...	...

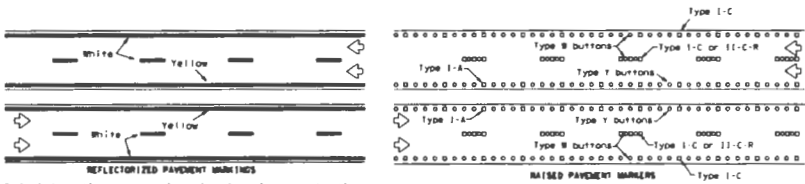
DISCLAIMER: THIS DOCUMENT IS PROVIDED AS A SERVICE TO THE PUBLIC. IT IS NOT TO BE USED FOR ANY OTHER PURPOSE. THE IADOT MAKES NO WARRANTY, REPRESENTATION OR GUARANTEE OF ANY KIND, AND IS NOT RESPONSIBLE FOR ANY DAMAGE, INCLUDING REASONABLE ATTORNEY'S FEES, THAT MAY BE INCURRED BY ANY USER OF THIS DOCUMENT.

PAVEMENT MARKING PATTERNS



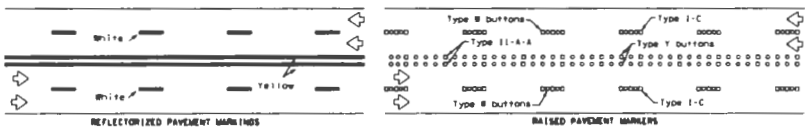
Pattern A is the TSDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectORIZED pavement markings.

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



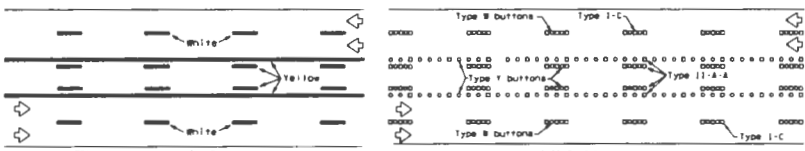
Prefabricated markings may be substituted for reflectORIZED pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



Prefabricated markings may be substituted for reflectORIZED pavement markings.

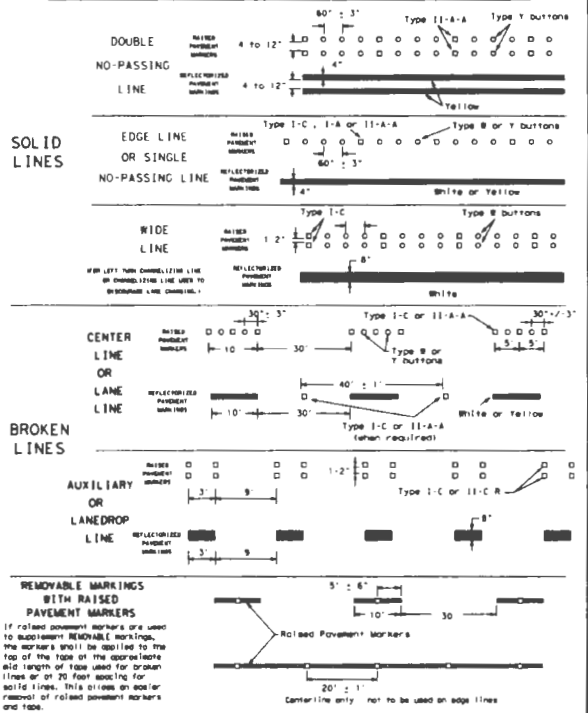
LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



Prefabricated markings may be substituted for reflectORIZED pavement markings.

TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



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 top of the appropriate old length of tape used for broken lines or on 20 foot spacing for solid lines. This allows on-site removal of raised pavement markers and tape.

SHEET 12 OF 12

Traffic Safety Division Standards

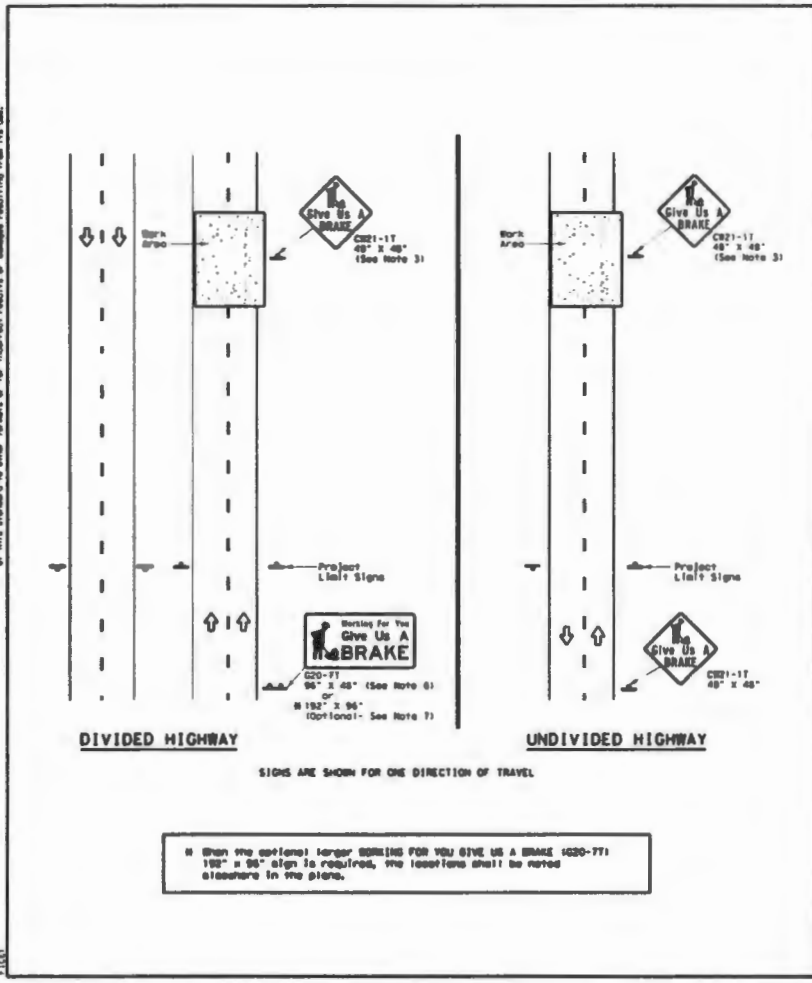
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC (12) - 21

DATE:	FILE:	DRAWN BY:	CHECKED BY:

DISCLAIMER: THIS DOCUMENT IS APPROVED BY THE TRAFFIC SAFETY DIVISION OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION. IT IS THE USER'S RESPONSIBILITY TO VERIFY THE ACCURACY OF THE INFORMATION PROVIDED HEREIN. THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION IS NOT RESPONSIBLE FOR ANY DAMAGE TO PROPERTY OR PERSONS RESULTING FROM THE USE OF THIS DOCUMENT.

REVISIONS: The work of this program is governed by the "Standardizing Practices Act", the authority of which is hereby acknowledged. The work of this program is hereby acknowledged.



SUMMARY OF LARGE SIGNS								
BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	90 FT	SALVANIZED STRUCTURAL STEEL		DRILLED SHEET
						180	94" DIA. S/F	
Orange	G20-7T		96" x 48"	Type B ₁ or C ₁	32	Δ	Δ	Δ
Orange	G20-7T		192" x 96"	Type B ₁ or C ₁	126	96x18	10	17

Δ 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	INSERTING MATERIAL
ORANGE	BACKGROUND	TYPE B ₁ OR TYPE C ₁
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

GENERAL NOTES

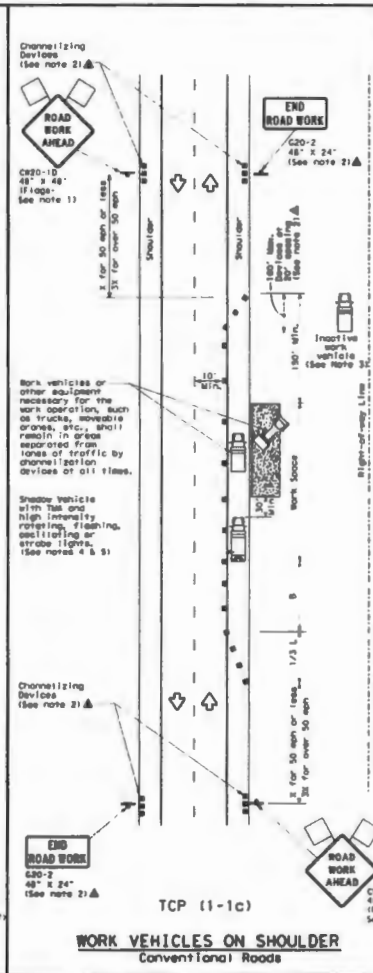
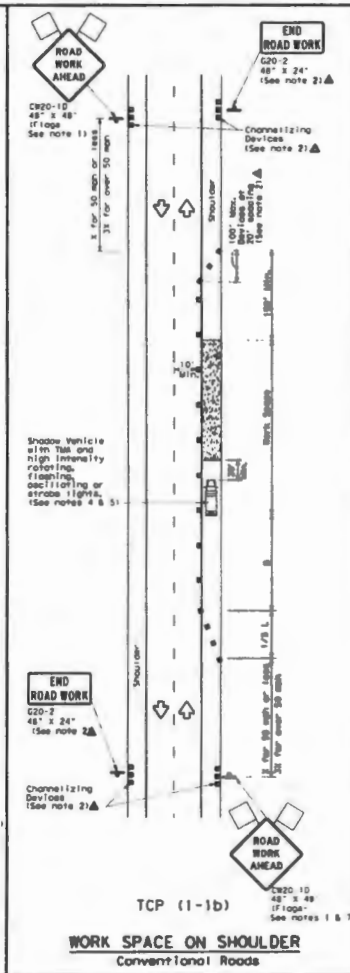
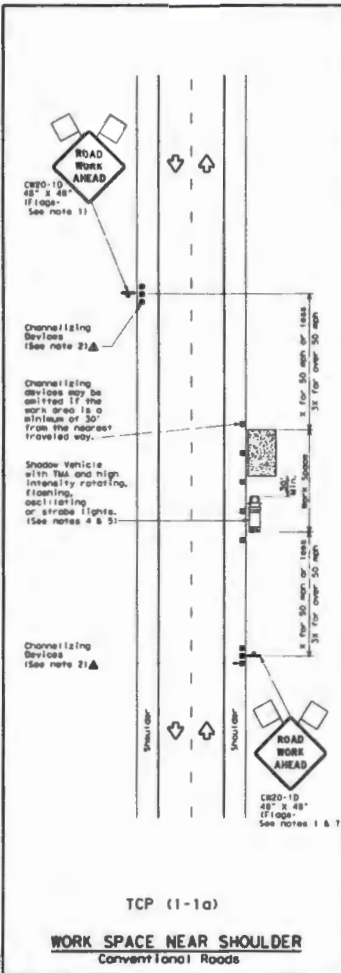
- See BC and SMD sheets for additional sign support details.
- Sign locations shall be approved by the Engineer.
- For projects more than two miles in length, Give Us a BRAKE sign should be repeated halfway through the project. The Give Us a Brake (CR21-11) may be used for this purpose.
- Work zone speed 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 (CR21-11) signs and supports shall be considered subsidiary to Item 502, "Bar/Loops, 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 anodized substrate and may be supported by two 4" x 6" wood posts with drilled holes for roadway 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 sold for under the following specification items:
 - Item 636 - Aluminum Signs
 - Item 647 - Large Portable Sign Supports and Assemblies.
 - Item 416 - Drilled Sheet 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.

WORK ZONE
"GIVE US A BRAKE"
SIGNS

WZ (BRK) - 13

REV	NO	DATE	BY	CHKD	APP'D
1	1	August 1997			
DATE PLOTTED			SCALE		
8-26 9-28 9-15			1:1" = 1'-0"		
8-26 2-93			1:1" = 1'-0"		

DATE: _____
 TITLE: _____



LEGEND

[Symbol]	Type 3 Barricade	[Symbol]	Channelizing Devices
[Symbol]	Truck Mounted Attenuator (TMA)	[Symbol]	Truck Mounted Attenuator (TMA)
[Symbol]	Trailer Mounted Flashing Arrow Board	[Symbol]	Portable Changeable Message Sign (PCMS)
[Symbol]	Sign	[Symbol]	Traffic Flow
[Symbol]	Flag	[Symbol]	Flagger

Posted Speed (mph)	Formula	Minimum Distance (ft)	Minimum Taper Length (ft)	Suggested Maximum Spacing of Channelizing Devices (ft)	Minimum Sign Spacing (ft)	Suggested Longitudinal Buffer Spacing (ft)
30	L-5	150'	165'	180'	30'	60'
35	L-5	205'	225'	245'	35'	70'
40	L-5	265'	285'	320'	40'	80'
45	L-5	330'	360'	400'	45'	90'
50	L-5	405'	440'	480'	50'	100'
55	L-5	495'	540'	600'	55'	110'
60	L-5	600'	660'	720'	60'	120'
65	L-5	720'	795'	870'	65'	130'
70	L-5	855'	930'	1020'	70'	140'
75	L-5	1005'	1080'	1170'	75'	150'

TYPICAL USAGE

WORK	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
[Symbol]	✓	✓	✓	✓

GENERAL NOTES

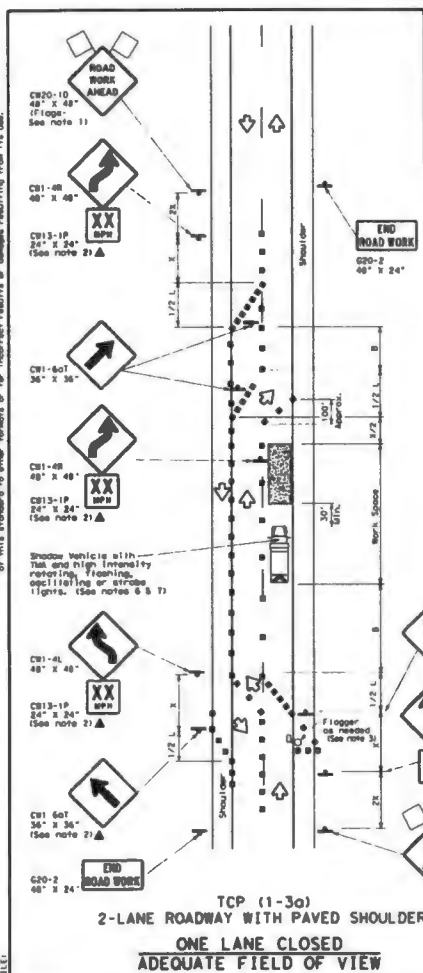
- Flags attached to signs where shown are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol which may be omitted when stored elsewhere in the area, or for routine maintenance work, when approved by the Engineer.
- Inactive work vehicles or 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 work measure 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 other work areas.
- See TCP 1-1 for shoulder work on divided highways, expressways and freeways.
- C20-5 "SHOULDER WORK" signs may be used in place of C20-10 "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

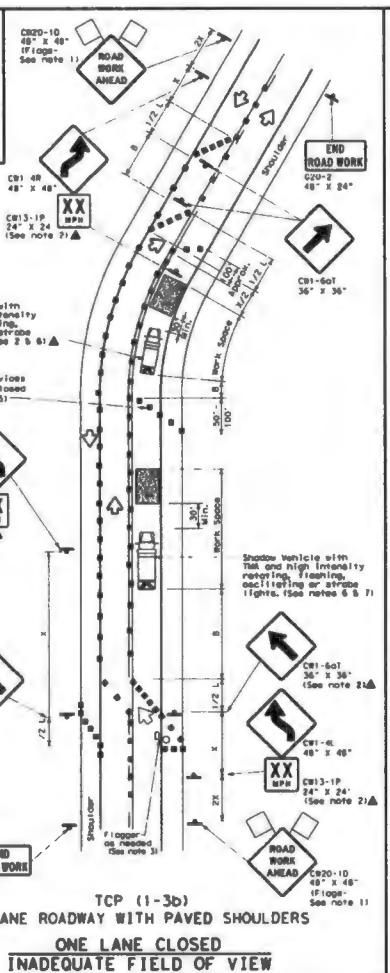
TCP (1-1)-18

1	2	3	4	5	6	7	8	9	10
11/10/18	11/10/18	11/10/18	11/10/18	11/10/18	11/10/18	11/10/18	11/10/18	11/10/18	11/10/18
2:34	4:48	6:11	7:34	8:57	10:20	11:43	13:06	14:29	15:52
1-18	2-18	3-18	4-18	5-18	6-18	7-18	8-18	9-18	10-18

DISCUSSION: This plan is prepared in accordance with the "Traffic Engineering Practice Act", the authority of which is hereby granted to the Department of Transportation for the purpose of providing for the safety of the public and the efficient operation of the State's highways.



BE PREPARED TO STOP
 C81-4R 48" X 48"
 C81-4L 48" X 48"
 C81-5P 24" X 24"
 C81-6A 36" X 36"
 C81-6B 36" X 36"
 For either TCP (1-3a) or TCP (1-3b)
USE ONLY WHEN FLAGGERS CONTROL TRAFFIC
 (See notes 2 & 3)



LEGEND

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

Posted Speed	Formula	Minimum Taper Lengths	Suggested Maximum Spacing of Channelizing Devices	Minimum Sign Spacing	Suggested Limitation Buffer Spacing
30	$10 + \frac{1}{2} S$	10'	30'	120'	90'
35	$150 + \frac{1}{2} S$	150'	30'	120'	90'
40	$205 + \frac{1}{2} S$	205'	35'	180'	120'
45	$265 + \frac{1}{2} S$	265'	40'	240'	155'
50	$325 + \frac{1}{2} S$	325'	45'	300'	195'
55	$385 + \frac{1}{2} S$	385'	50'	360'	240'
60	$445 + \frac{1}{2} S$	445'	55'	420'	295'
65	$505 + \frac{1}{2} S$	505'	60'	480'	350'
70	$565 + \frac{1}{2} S$	565'	65'	540'	410'
75	$625 + \frac{1}{2} S$	625'	70'	600'	475'
80	$685 + \frac{1}{2} S$	685'	75'	660'	540'

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L = Length of Taper (FT); S = Speed of 0.5 Feet (FT) 5-Posted Speed (MPH)

TYPICAL USAGE

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

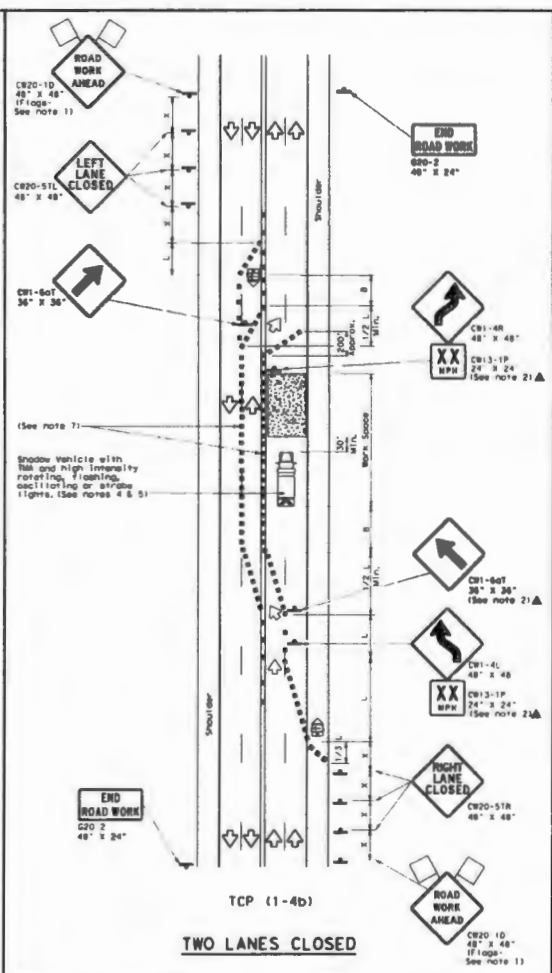
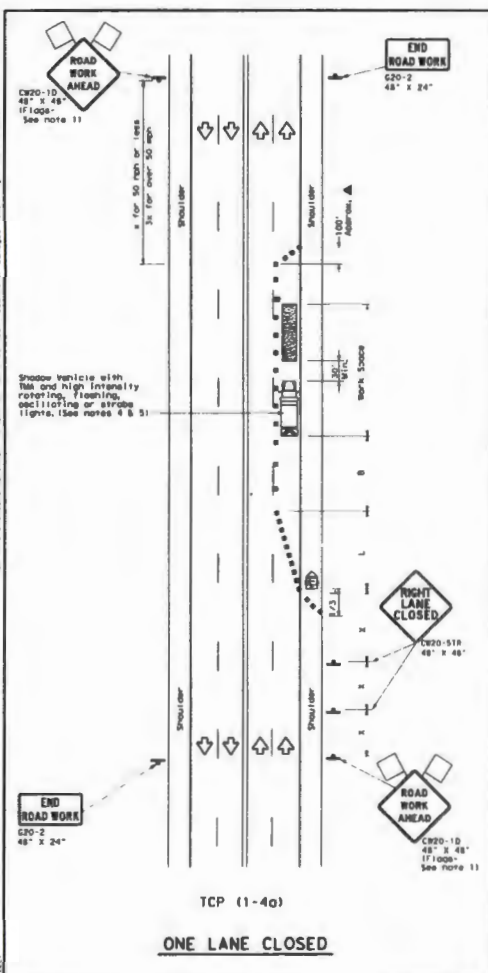
- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol, which may be omitted when shown elsewhere in the plan, or for routine maintenance work, when approved by the Engineer.
 - Flagger control should NOT be used unless roadway conditions or heavy traffic volumes require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to clear traffic to reduce queues.
 - DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be retained downstream of the ROAD WORK AHEAD sign.
 - When the work zone is made up of several work zones, 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 on 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 TMA may be positioned off the paved surface, next to those shown in order to protect wider work areas.
 - Where traffic is directed over a yellow converging, channelizing devices which separate roadway traffic should be spaced on tapers of 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 taper device spacing is intended for the use of conflicting markings not the entire work zone.

Florida Department of Transportation
 Traffic Operations Division (approved)

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

File	101-3-18-001	Date	12/15/95
Drawn	J. J. ...	Checked	...
Scale	1" = 40'	Sheet No.	1 of 1
Project	...	Contract	...
Location	...	Stationing	...

REVISIONS: The work of this office is controlled by the Traffic Engineering Section (see note 1). No work of this office shall be done without the approval of the Traffic Engineering Section. The work of this office is controlled by the Traffic Engineering Section (see note 1). No work of this office shall be done without the approval of the Traffic Engineering Section.



LEGEND

Type 3 Barricade	B B	Channelizing Devices
Heavy Work Vehicle	W	Truck Mounted Attenuator (TMA)
Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
Sign	S	Traffic Flow
Flag	F	Flagger

Posted Speed (mph)	Formula	Minimum Distance	Minimum Taper Lengths	Suggested Maximum Spacing of Channelizing Devices	Minimum Sign Spacing	Suggested Longitudinal Buffer Space
30	$L = 5S$	10'	11' 12'	30'	60'	90'
35	$L = 5S$	205'	225' 245'	35'	70'	120'
40	$L = 5S$	265'	295' 320'	40'	80'	155'
45	$L = 5S$	450'	495' 540'	45'	90'	195'
50	$L = 5S$	500'	550' 600'	50'	100'	240'
55	$L = 5S$	550'	605' 660'	55'	110'	295'
60	$L = 5S$	600'	660' 720'	60'	120'	350'
65	$L = 5S$	650'	715' 780'	65'	130'	410'
70	$L = 5S$	700'	770' 840'	70'	140'	475'
75	$L = 5S$	750'	825' 900'	75'	150'	540'

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

TYPICAL USAGE

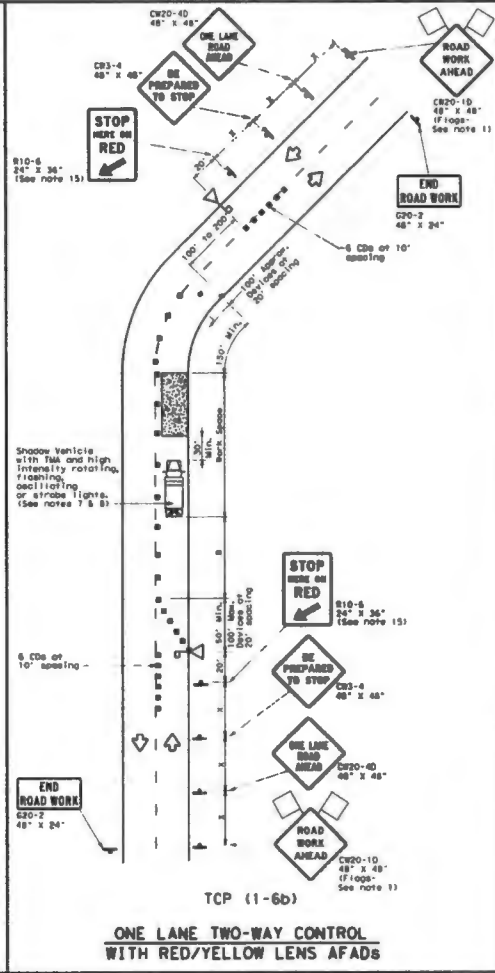
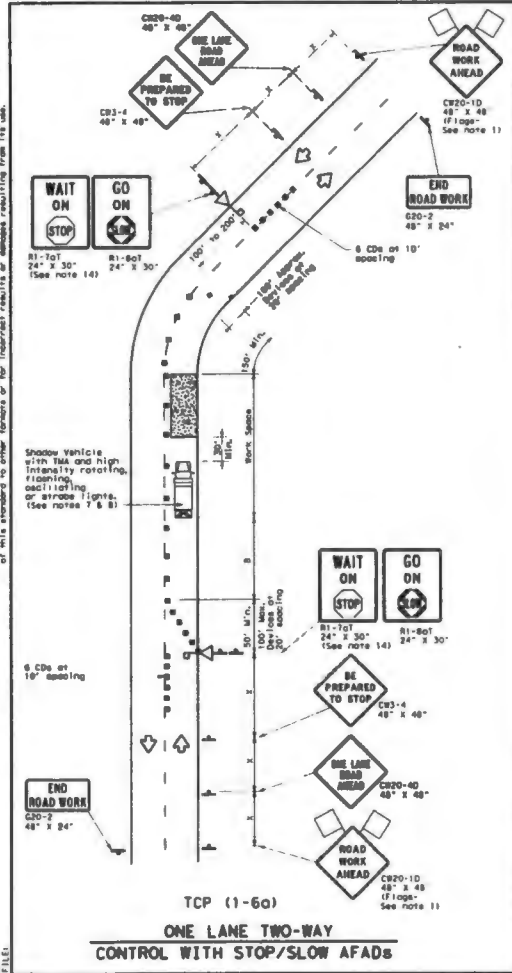
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY

- GENERAL NOTES**
- Flags attached to signs when 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 plan, or for routine maintenance work, when approved by the Engineer.
 - The C20-10 "ROAD WORK AHEAD" sign may be replaced if the visibility of the work zone is less than 1000 feet.
 - A shadow vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the work zone 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 other work zones.
- TCP (1-4a)**
- If this TCP is used for a left lane closure, C20-5L "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the shoulder where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the taper lane.
- TCP (1-4b)**
- When traffic is directed over a median barrier, channelizing devices shall separate opposing traffic on the median 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 signer device spacing is intended for the case of conflicting markings, not the entire work zone.

Texas Department of Transportation
 Traffic Operations Division
TRAFFIC CONTROL PLAN
LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS
TCP (1-4) - 18

Rev.	1-11-11	Rev.	1-11-11
2-14-11	2-14-11	2-14-11	2-14-11
2-14-11	2-14-11	2-14-11	2-14-11
2-14-11	2-14-11	2-14-11	2-14-11

This plan is to be prepared by the engineer in charge of the project. It is to be prepared in accordance with the provisions of the Manual of Practice for Traffic Control Plans, 1987 Edition, published by the American Road & Builders Builders Association, Inc. (ARBA). The plan shall be prepared in accordance with the provisions of the Manual of Practice for Traffic Control Plans, 1987 Edition, published by the American Road & Builders Builders Association, Inc. (ARBA). The plan shall be prepared in accordance with the provisions of the Manual of Practice for Traffic Control Plans, 1987 Edition, published by the American Road & Builders Builders Association, Inc. (ARBA).

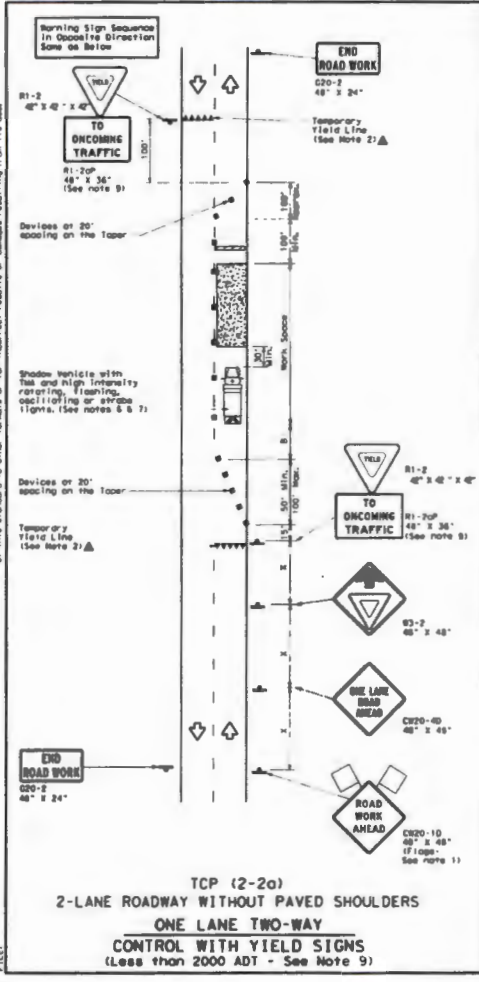


LEGEND										
Type 3 Barricade			Channelizing Devices (CDs)		Other					
Posted Speed	Formulas	Minimum Spacing of Devices	Suggested Spacing of Devices	Minimum Sign Spacing	Suggested Spacing	Stopping Distance	Stopping Distance	Stopping Distance	Stopping Distance	Stopping Distance
30	18'	150'	185'	180'	30'	60'	120'	90'	200'	
35	20'	205'	225'	245'	35'	70'	160'	120'	250'	
40	22'	235'	255'	300'	40'	80'	240'	155'	305'	
45	24'	265'	285'	340'	45'	90'	320'	195'	360'	
50	26'	300'	330'	400'	50'	100'	400'	240'	425'	
55	28'	330'	360'	460'	55'	110'	500'	295'	495'	
60	30'	360'	390'	520'	60'	120'	600'	350'	570'	
65	32'	390'	420'	580'	65'	130'	700'	410'	645'	
70	34'	420'	450'	640'	70'	140'	800'	475'	730'	
75	36'	450'	480'	700'	75'	150'	900'	540'	820'	

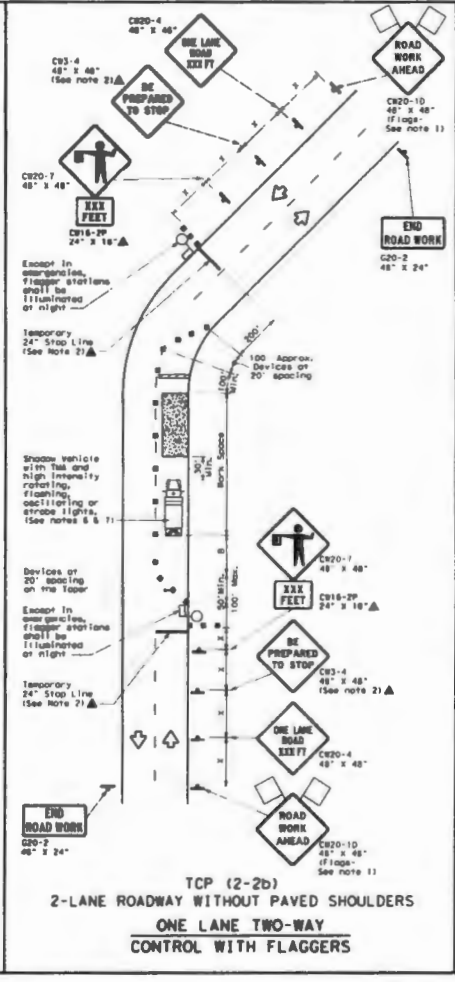
- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
 - AFADs shall only be used in situations where there is one lane of approaching traffic in the direction to be controlled.
 - Minimum stopping sight distance must be provided to each AFAD location for approaching traffic. (See table above).
 - Each AFAD shall be operated by a qualified/authorized flagger. Flaggers operating AFADs shall not leave their stations while they are in use.
 - One flagger may operate two AFADs only when the flagger has an unobstructed view of both AFADs and of the approaching traffic in both directions.
 - When pilot cars are used, a flagger controlling traffic shall be located on each approach. AFADs shall not be operated by the pilot car operator.
 - All AFADs shall be equipped with gate arms with orange or fluorescent red-orange flag attached to the end of the gate arm. The flag shall be a minimum of 16" square.
 - A shadow vehicle with a hat should be used only if it can be positioned 30' to 100' feet in advance of the area of one exposure without adversely affecting the performance or quality of the work. If workers are no longer present but cars or work equipment require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and Hat.
 - Additional Shadow Vehicles with Hats may be positioned off the paved surface, next to roads shown in order to protect other work spaces.
 - 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 stopping sight distance to the AFAD.
 - Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
 - The R1-701 "STOP" sign and the R1-801 "GO ON SLOW" sign shall be installed on the AFAD location on concrete supports or they may be fabricated on an 48" x 36" sign. They shall not obscure the face of the STOP/SLOW AFAD.
 - The R1-8 "STOP HERE ON RED" arrow sign shall be offset so as not to obscure the message of the AFAD.

		Florida Department of Transportation	
TRAFFIC CONTROL PLAN AUTOMATED FLAGGER ASSISTANCE DEVICES (AFADS)			
TCP (1-6) - 18			
Plan No.	18-18-18	Date	11/18/18
Project No.	18-18-18	Project Name	18-18-18
Sheet No.	18-18-18	Sheet Total	18-18-18
Scale	1" = 100'	Author	18-18-18
Drawn by	18-18-18	Checked by	18-18-18
Approved by	18-18-18	Project Manager	18-18-18

DISCUSSION: This plan is prepared in accordance with the "Traffic Engineering Practice Act" and the authority of the Department of Transportation. It is intended to be used as a guide for the design of traffic control plans for one-lane two-way roadways. The use of this plan is subject to the approval of the Engineer in Charge of the project.



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
	Truck Mounted Attenuator (TMA)		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed MPH	Formula	Minimum Taper Lengths ft			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing ft - Distance	Suggested Longitudinal Buffer Spacing ft	Stopping Distance ft
		10'	15'	17'	On a Taper	On a Tangent			
30		150'	185'	180'	30'	60'	120'	90'	200'
35	L+S	205'	225'	245'	35'	70'	150'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45		450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55	L+S	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.
 * Length of Taper (ft) = 8.5(L) + 1.5(S) + 1.5(P) + 1.5(M)

TYPICAL USAGE			
MOBILE	SHORT DURATION	SHORT 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 plan, or for routine maintenance work, when approved by the Engineer.
- The C20-4 "BE PREPARED TO STOP" sign may be installed after the C20-10 "ONE LANE ROAD AHEAD 333 FT" sign, but proper sign spacing shall be maintained.
- Flaggers should use two-way radios or other methods of communication to control traffic.
- Sign spacing should be based on the ability of flaggers to communicate.
- A shadow vehicle with a flag 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 flag.
- Additional shadow vehicles with flags may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

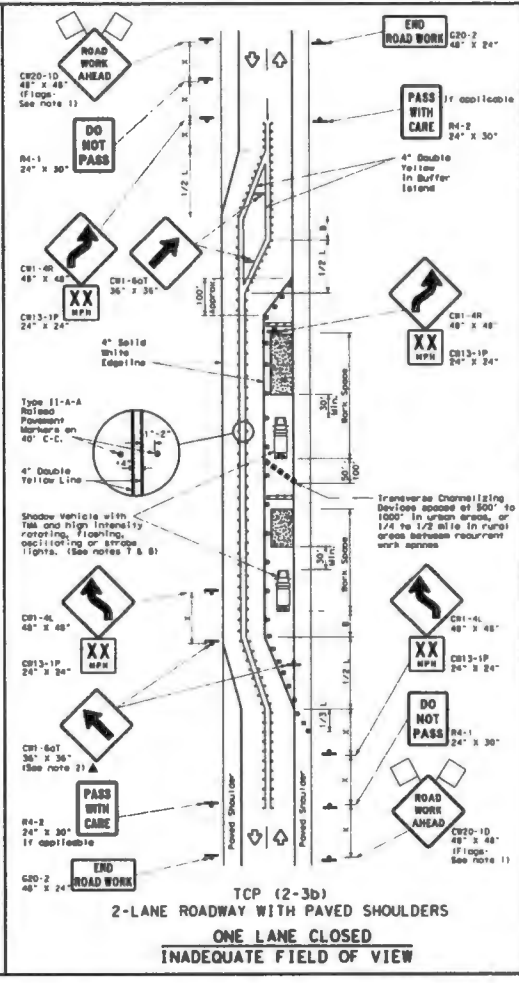
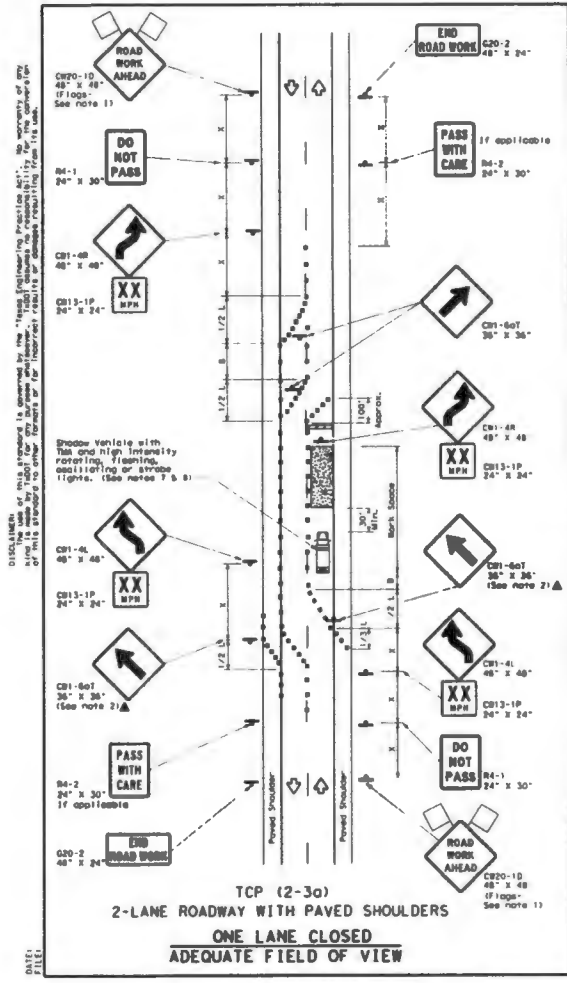
- The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sign distance. For projects in urban areas, work zones should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work zones should be no longer than 400 feet.
- The R1-2P "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a quarter of a mile station spacing 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 zone is located near a horizontal or vertical curve, the buffer distance 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 Control Plan
**ONE-LANE TWO-WAY
 TRAFFIC CONTROL**
TCP (2-2) - 18

Rev:	1-02	3-83	03	04	05
DATE:	1-02	3-83	03	04	05
BY:	1-02	3-83	03	04	05
CHK:	1-02	3-83	03	04	05



LEGEND

■	Type 3 Barricade	■	Channelizing Devices
■	Heavy Work Vehicle	■	Truck Mounted Attenuator (TMA)
■	Trailer Mounted Flashing Arrow Board	■	Revised Pavement Markings by 11-aa
■	Sign	■	Traffic Flow
■	Flag	■	Flagger

Posted Speed (mph)	Formula	Minimum Distance (ft)	Suggested Maximum Spacing of Channelizing Devices (ft)	Minimum Sign Spacing (ft)	Suggested Longitudinal Buffer Space (ft)		
30	150'	165'	180'	30'	60'	120'	90'
35	205'	225'	245'	35'	70'	180'	120'
40	265'	295'	320'	40'	80'	240'	155'
45	330'	375'	405'	45'	90'	320'	195'
50	400'	450'	500'	50'	100'	400'	240'
55	480'	550'	600'	55'	110'	500'	295'
60	570'	640'	720'	60'	120'	600'	350'
65	670'	745'	840'	65'	130'	700'	410'
70	780'	870'	960'	70'	140'	800'	475'
75	900'	1005'	1100'	75'	150'	900'	540'

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 plan, 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 measures to safely control traffic. Flagger should be positioned at end of traffic queue.
- The 48" "DO NOT PASS," 48" "PASS WITH CARE" and construction regulatory speed zone signs may be installed within CR20-10 "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
- Conflicting pavement markings shall be removed for long term projects.
- A shadow vehicle with this should be used anytime it can be positioned 50 to 100 feet in advance of the area of the work 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 TMA's may be positioned off the paved surface, next to those shown in order to protect a side-work space.

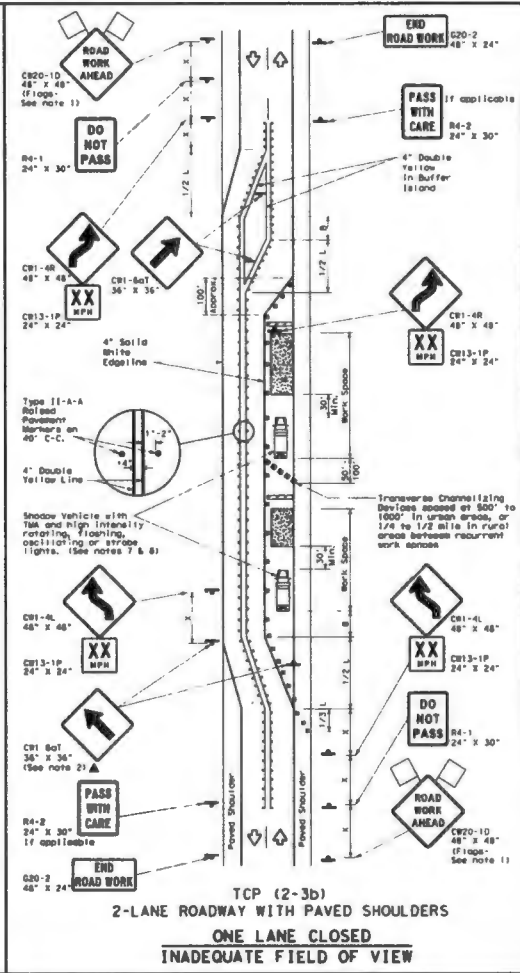
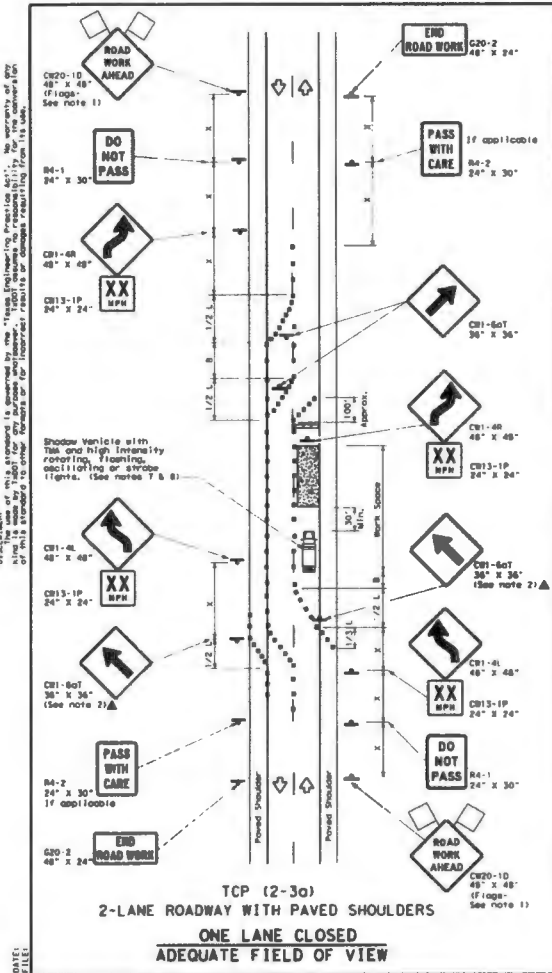
TCP (2-3b)

Traffic Department of Transportation

TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON
TWO-LANE ROADS

TCP (2-3)-18

DATE: _____



LEGEND

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

Posted Speed (M)	Formula	Minimum Desirable Taper Lengths (ft)		Suggested Minimum Spacing of Channelizing Devices (ft)		Minimum Sign Spacing (ft)	Suggested Longitudinal Buffer Spacing (ft)
		On a Taper	On a Taper	On a Taper	On a Taper		
30	150'	165'	180'	30'	60'	120'	90'
35	200'	225'	245'	35'	70'	160'	120'
40	255'	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'

M Conventional Roads Only
 M Taper lengths have been rounded off.
 L-Lengths of Taper (ft) 5-MPH or Greater (ft) 5-Posted Speed (MPH)

TYPICAL USAGE

MOBILE	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			TCP 2-30/31

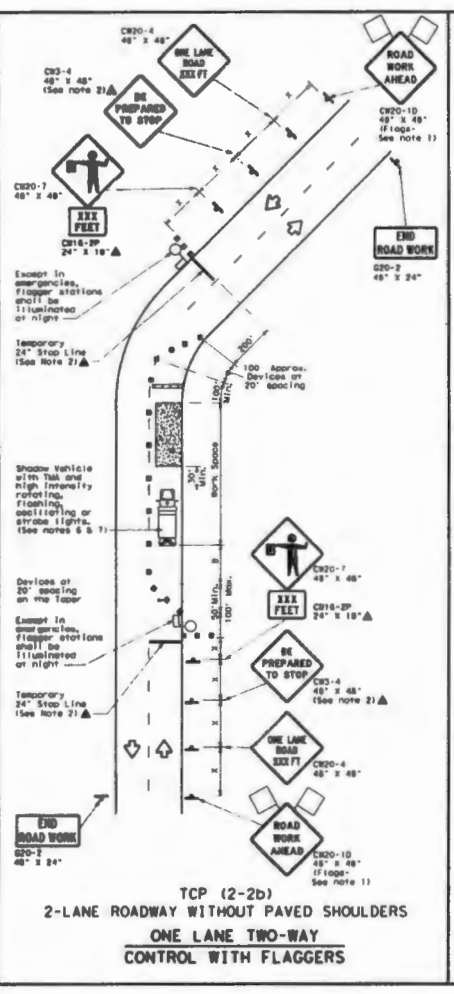
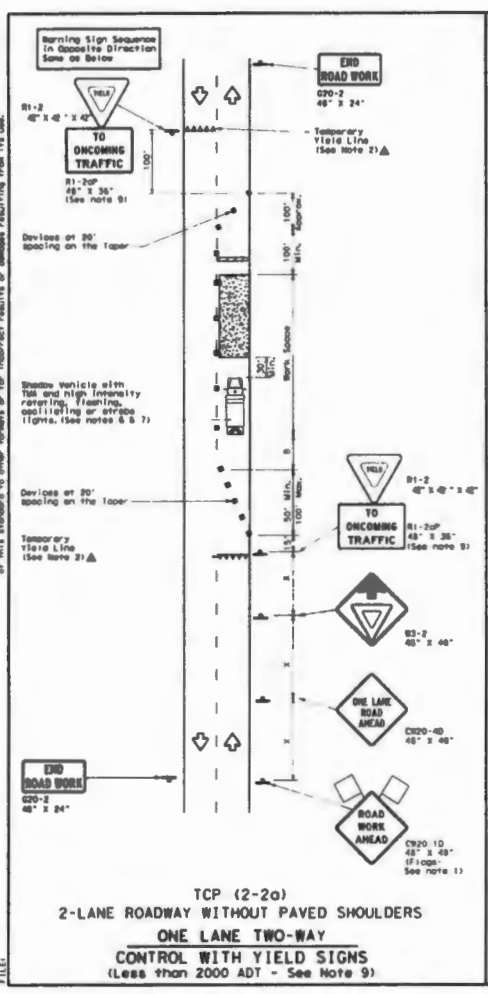
- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those omitted with the triangles symbol may be omitted when stated otherwise in the plan, or for routine maintenance work, when approved by the Engineer.
 - When work zones 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. Flaggers should be positioned at end of traffic queue.
 - The 8x11 "DO NOT PASS," 8x2 "PASS WITH CARE," and construction regulatory speed zone signs may be installed within C20-10 "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
 - Conflicting pavement markings shall be removed for long term projects.
 - A shadow vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. (See notes 7 & 8)
 - Additional shadow vehicles with TMA may be positioned off the paved surface, next to those shown in order to protect a wider work space.

- TCP (2-30)**
- 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 tapered or 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(15) where 5 is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

Texas Department of Transportation
 Traffic Control Plan
 TRAFFIC CONTROL PLAN
 TRAFFIC SHIFTS ON
 TWO-LANE ROADS
TCP (2-31-18)

REVISED: December 1987
 2-95 3-83
 1-87 2-72
 1-88 2-78
 1-82

ALL SIGNAGE OF THIS STANDARD IS GOVERNED BY THE "TRAFFIC ENGINEERING HANDBOOK" AS APPLICABLE TO THE JURISDICTION OF THE USER. THE USER SHALL BE RESPONSIBLE FOR THE PROPER INSTALLATION AND MAINTENANCE OF THE SIGNAGE. THE USER SHALL BE RESPONSIBLE FOR THE PROPER INSTALLATION AND MAINTENANCE OF THE SIGNAGE.



LEGEND

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

Posted Speed (mph)	Formula	MINIMUM Barrier Spacing (ft)		Suggested Minimum Spacing of Channelizing Devices (ft)		Sign Spacing (ft)	Longitudinal Buffer Space (ft)	Sign Distance (ft)
		10' Taper	12' Taper	On a Taper	On a Tangent			
30	L-80	150'	185'	180'	30'	50'	120'	90'
35	L-80	205'	225'	245'	35'	70'	160'	120'
40	L-80	285'	295'	320'	40'	80'	240'	155'
45	L-80	450'	485'	540'	45'	90'	320'	195'
50	L-80	500'	550'	600'	50'	100'	400'	240'
55	L-80	550'	605'	660'	55'	110'	500'	295'
60	L-80	600'	660'	720'	60'	120'	600'	350'
65	L-80	650'	715'	780'	65'	130'	700'	410'
70	L-80	700'	770'	840'	70'	140'	800'	475'
75	L-80	750'	825'	900'	75'	150'	900'	540'

*A Conventional Roads Only
 All taper lengths have been rounded off.
 L-Length of Taper (ft) S-Sign of Offset (ft) S-Posted Speed (mph)*

TYPICAL USAGE			
MOBILE	SHORT DURATION	SHORT 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 CS-2 "BE PREPARED TO STOP" sign may be installed after the CS-2 "ONE LANE ROAD AHEAD" 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.
- Shadow vehicle with a flag should be used anytime it can be positioned 30 to 100 feet in advance of the area of work 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 flag.
- Additional shadow vehicles with flags 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 sign clearance. 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 800 feet.

TCP (2-2b)

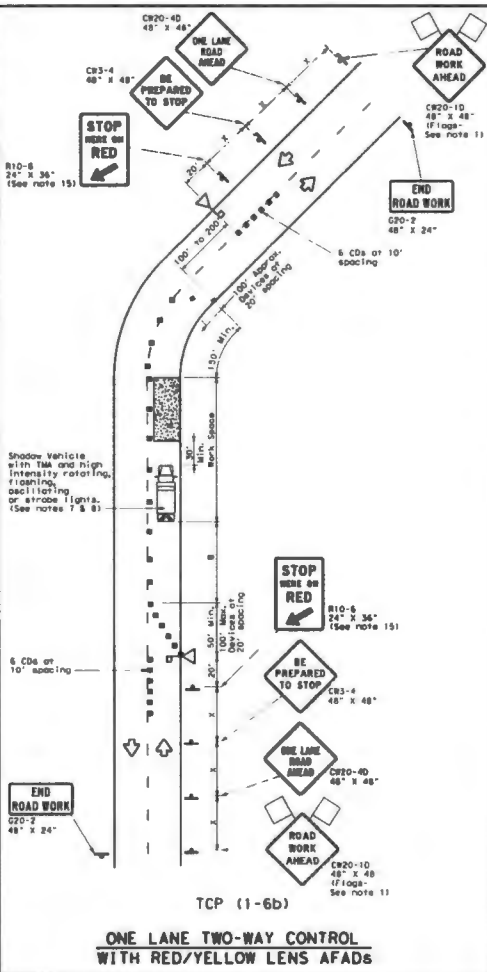
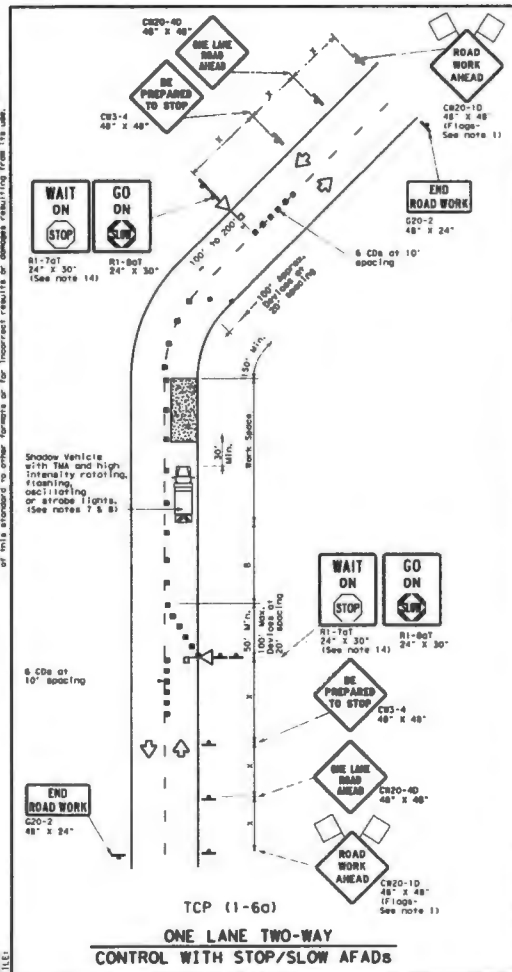
- Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
- If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain signing sight distance to the flagger and a queue of stopped vehicles. (See table above).
- Flaggers should use 36" SVP/SLB postures to control traffic. Flags should be raised in emergency situations.

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP (2-2) - 18

REV:	DATE:	BY:	CHK:	APP:	DATE:
1	10/27/18	...	...	...	...
2	10/30/18	...	...	...	...
3	11/01/18	...	...	...	...
4	11/01/18	...	...	...	...
5	11/01/18	...	...	...	...

DISCUSSION OF THIS STANDARD IS CONTAINED IN THE "TRAFFIC ENGINEERING HANDBOOK, 4TH EDITION, VOLUME 1, PART 1, CHAPTER 10, SECTION 10.10.1, AND VOLUME 2, PART 1, CHAPTER 10, SECTION 10.10.2. THE STANDARD IS THE PROPERTY OF THE NATIONAL TRANSPORTATION BUREAU, INC. (NTB). PERMISSION TO REPRODUCE THIS STANDARD IN WHOLE OR IN PART FOR NON-COMMERCIAL PURPOSES IS GRANTED BY THE NTB. PERMISSION TO REPRODUCE THIS STANDARD FOR COMMERCIAL PURPOSES MUST BE OBTAINED FROM THE NTB. CONTACT INFORMATION: 1000 EAST 17TH AVENUE, SUITE 100, DENVER, CO 80202, (303) 733-8000, WWW.NTB.ORG



LEGEND									
	Type 3 Barricade		Channelizing Device (CD)						
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)						
	Automated Flagger Assistance Device (AFAD)		Portable Changeable Message Sign (PCMS)						
	Sign		Traffic Flow						
	Flag		Flagger						

Posted Speed	Forward Lane	Minimum Taper Lengths	Suggested Maximum Spacing of Channelizing Devices	Minimum Sign Spacing	Suggested Local Taper Distance	Shooting Distance
30	10'	11'	30'	60'	120'	200'
35	15'	17'	30'	70'	140'	250'
40	20'	23'	30'	80'	160'	300'
45	25'	29'	30'	90'	180'	350'
50	30'	35'	30'	100'	200'	400'
55	35'	41'	30'	110'	220'	450'
60	40'	47'	30'	120'	240'	500'
65	45'	53'	30'	130'	260'	550'
70	50'	59'	30'	140'	280'	600'
75	55'	65'	30'	150'	300'	650'

* Conventional Roads Only
 † Upper lengths have been rounded off.
 ‡ Length of Taper (T) † Depth of Offset (D) ‡ Posted Speed (MPH)

TYPICAL USAGE			
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓

- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
 - AFADs shall only be used in situations where there is one lane of opposing traffic in the direction to be controlled.
 - Adequate stopping sight distance must be provided to each AFAD location for opposing traffic. (See table above).
 - Each AFAD shall be operated by a qualified/certified flagger. Flaggers operating AFADs shall not leave them unattended while they are in use.
 - One flagger may operate two AFADs only when the flagger has an unobstructed view of both AFADs and of the approaching traffic in both directions.
 - When pilot cars are used, a flagger controlling traffic shall be located on each approach. AFADs shall not be operated by the pilot car operator.
 - All AFADs shall be equipped with galleys with an orange or fluorescent red-orange flag attached to the end of the galleys. The flag shall be a minimum of 16" square.
 - 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 on the center line may be utilized when a pilot car is leading traffic and approved by the Engineer.
 - The R1-707 "WAIT ON STOP" sign and the R1-801 "GO ON SLOW" sign shall be installed at the AFAD location on opposite approaches or they may be relocated on one 48" x 30" sign. They shall not obscure the face of the STOP/SLOW AFAD.
 - The R10-6 "STOP HERE ON RED" arrow sign shall be affixed so as not to obscure the lenses of the AFAD.

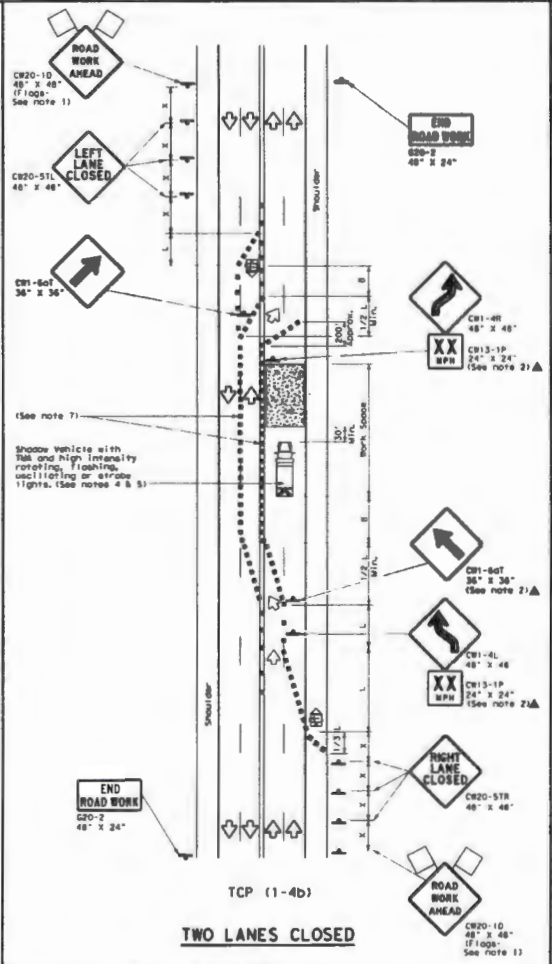
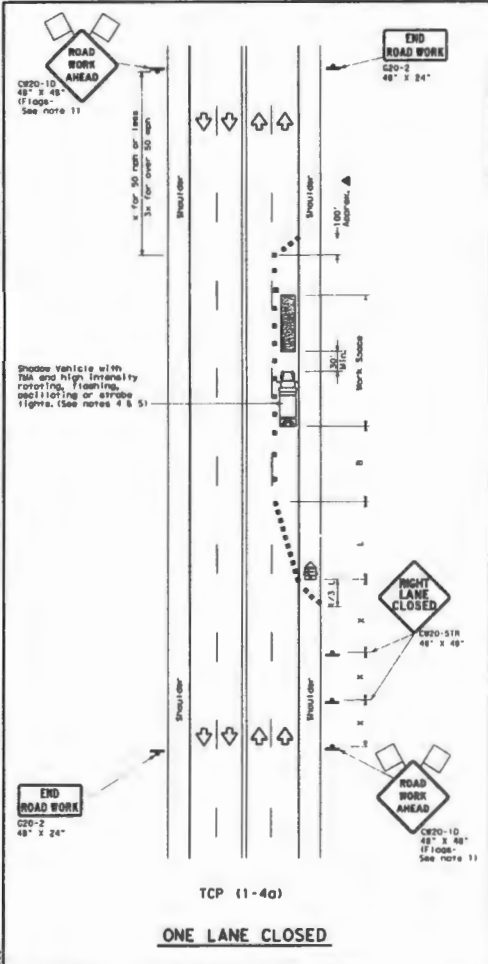
Traffic Operations Division

TRAFFIC CONTROL PLAN
AUTOMATED FLAGGER ASSISTANCE DEVICES (AFADs)
TCP (1-6) - 18

DATE	SCALE	PROJECT	NO.	REV.	BY	CHKD.	APP.	DATE
10/20/20	1" = 40'	100th St & 10th St	18	1	JLS			10/20/20

DISCLAIMER: The use of this document is governed by the "Traffic Controlling Practice Act". No warranty of any kind is made by the Department of Transportation for incorrect results or damages resulting from its use.

DATE: _____ FILE: _____



LEGEND

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

Posted Speed	Formula	Minimum Taper Lengths	Suggested Maximum Spacing of Channelizing Devices	Minimum Sign Spacing	Suggested Longitudinal Buffer Space
15	$10' + 11' \frac{S-15}{15}$	10'	30'	60'	90'
20	$15' + 11' \frac{S-20}{20}$	15'	30'	60'	90'
25	$20' + 11' \frac{S-25}{25}$	20'	35'	70'	120'
30	$25' + 11' \frac{S-30}{30}$	25'	40'	80'	155'
35	$30' + 11' \frac{S-35}{35}$	30'	45'	90'	195'
40	$35' + 11' \frac{S-40}{40}$	35'	50'	100'	240'
45	$40' + 11' \frac{S-45}{45}$	40'	55'	110'	295'
50	$45' + 11' \frac{S-50}{50}$	45'	60'	120'	350'
55	$50' + 11' \frac{S-55}{55}$	50'	65'	130'	410'
60	$55' + 11' \frac{S-60}{60}$	55'	70'	140'	475'
65	$60' + 11' \frac{S-65}{65}$	60'	75'	150'	540'
70	$65' + 11' \frac{S-70}{70}$	65'	80'	160'	610'
75	$70' + 11' \frac{S-75}{75}$	70'	85'	170'	685'

GENERAL NOTES

- Flags attached to signs shown on the diagram.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when approved by the Engineer.
- The C20-10 "ROAD WORK AHEAD" sign may be replaced 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 other work spaces.

TYPICAL USAGE

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

TCP (1-4a)
If this TCP is used for a left lane closure, C20-51L "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the shoulder where needed to protect the work space from opposing traffic in the closed lane.

TCP (1-4b)
If separate two-way traffic should be spaced on tapers of 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 warnings, not the entire work zone.

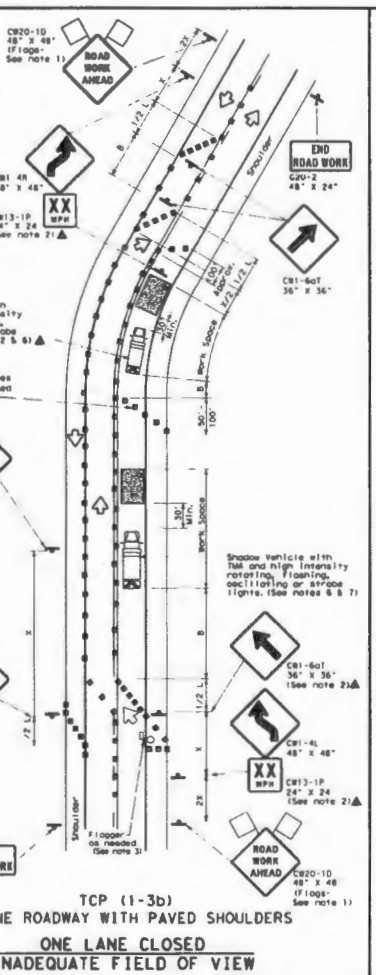
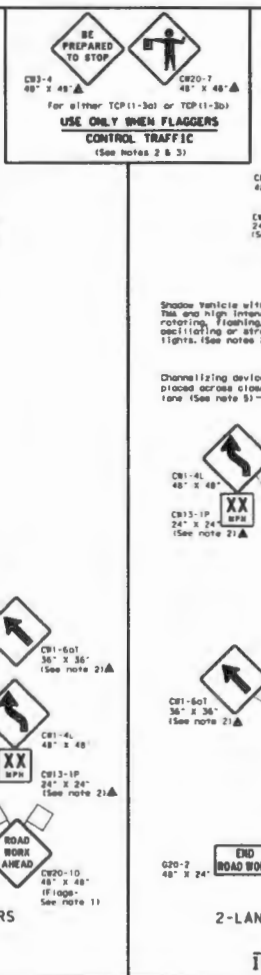
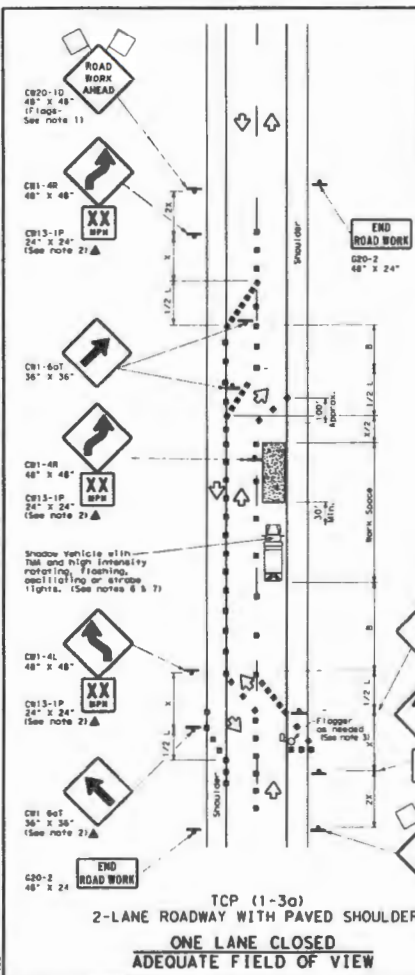
Texas Department of Transportation
Traffic Operations Division

**TRAFFIC CONTROL PLAN
LANE CLOSURES ON MULTILANE
CONVENTIONAL ROADS**

TCP (1-4) - 18

FILE: 1100-1-18-02	REV: 02	DATE: 11/02	BY: []	CHK: []
01/001	December 1995	12/95	[]	[]
2-94	4-94	8-94	[]	[]
2-95	2-95	2-95	[]	[]
1-97	2-98		[]	[]

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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	Formulas	Minimum Desirable Taper Lengths	Suggested Maximum Spacing of Channelizing Devices	Minimum Sign Spacing	Suggested Longitudinal Buffer Spacing
30	$L = 10 + 1.5V$	150' 185' 180'	30' 30'	60'	120'
35	$L = 10 + 1.5V$	205' 225' 245'	35' 35'	70'	140'
40	$L = 10 + 1.5V$	265' 285' 320'	40' 40'	80'	160'
45	$L = 10 + 1.5V$	450' 495' 540'	45' 45'	90'	180'
50	$L = 10 + 1.5V$	500' 550' 600'	50' 50'	100'	200'
55	$L = 10 + 1.5V$	550' 605' 660'	55' 55'	110'	220'
60	$L = 10 + 1.5V$	600' 660' 720'	60' 60'	120'	240'
65	$L = 10 + 1.5V$	650' 715' 780'	65' 65'	130'	260'
70	$L = 10 + 1.5V$	700' 770' 840'	70' 70'	140'	280'
75	$L = 10 + 1.5V$	750' 825' 900'	75' 75'	150'	300'

Conventional Roads Only
 Taper lengths have been rounded off.
 Length of Taper (T) = 9 ft/m of Offset (F) = 5-Peaked Speed (MPH)

TYPICAL USAGE

MOBILE	SHORT DURATION	STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY

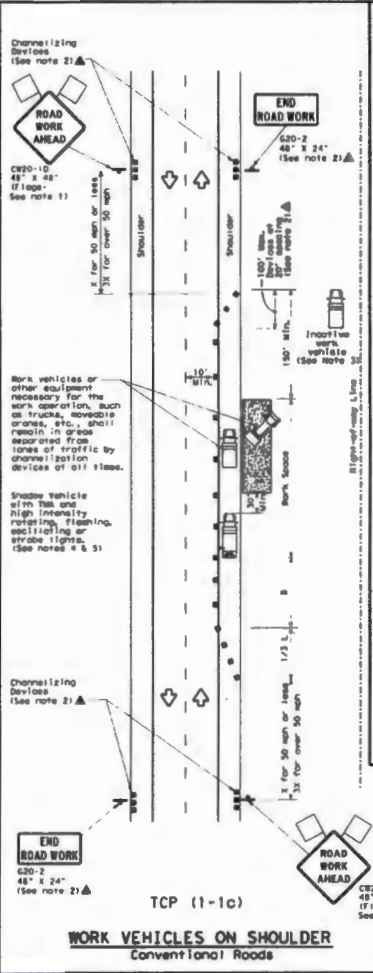
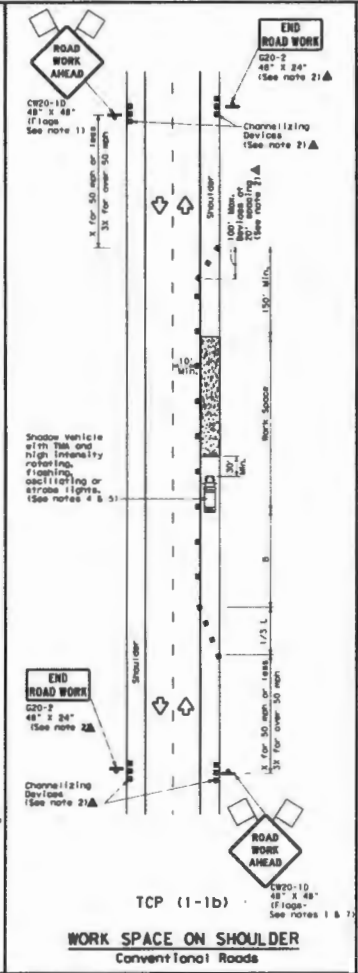
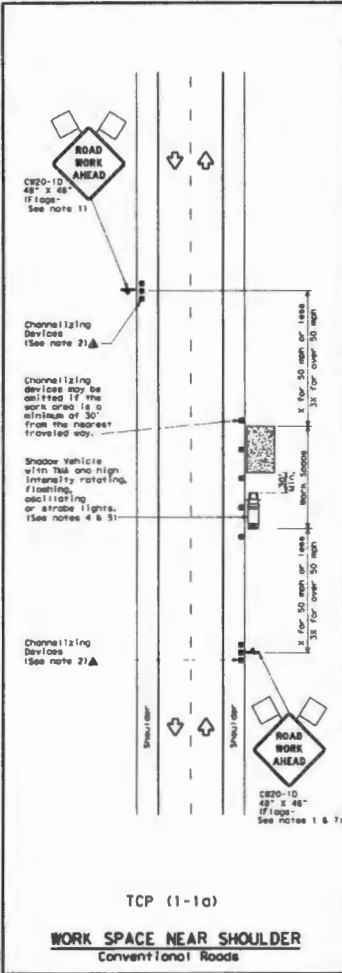
- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plan, or for routine maintenance work, when approved by the Engineer.
 - Flagger control 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 start traffic to release queues.
 - 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 spaced every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
 - A Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. (See notes 6 & 7)
 - Additional Shadow Vehicles with TMA may be positioned off the paved surface, next to those shown in order to protect older 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 narrow sections, at 1/25 where S is the speed in mph. This tighter device spacing is intended for the area of conflicting warnings not the entire work zone.

Texas Department of Transportation
 Traffic Operations Division

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

FILE NO.	DATE	BY	CHKD.	APP.
1-18-18	December 1985

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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 (mph)	Formula	Minimum Distance (feet)	Top of Length (ft)	Suggested Maximum Spacing of Channelizing Devices (ft)	Minimum Sign Spacing (ft)	Sign Spacing (ft)	Longest Lane Buffer (feet)
30	$10' + 11' \frac{S-30}{10}$	150'	185'	180'	30'	60'	120'
35	$15' + 11' \frac{S-35}{10}$	205'	225'	245'	35'	70'	160'
40	$20' + 11' \frac{S-40}{10}$	265'	295'	320'	40'	80'	240'
45	$25' + 11' \frac{S-45}{10}$	325'	365'	390'	45'	90'	320'
50	$30' + 11' \frac{S-50}{10}$	390'	435'	460'	50'	100'	400'
55	$35' + 11' \frac{S-55}{10}$	455'	505'	530'	55'	110'	500'
60	$40' + 11' \frac{S-60}{10}$	520'	575'	600'	60'	120'	600'
65	$45' + 11' \frac{S-65}{10}$	590'	645'	670'	65'	130'	700'
70	$50' + 11' \frac{S-70}{10}$	660'	715'	740'	70'	140'	800'
75	$55' + 11' \frac{S-75}{10}$	735'	785'	810'	75'	150'	900'

TYPICAL USAGE

WORK	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
WORKSPACE NEAR SHOULDER	✓			
WORKSPACE ON SHOULDER		✓		
WORK VEHICLES ON SHOULDER			✓	

GENERAL NOTES

- Flags attached to signs where shown are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol which may be omitted when shown elsewhere in the plan, 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 TCP15-11 for shoulder work on divided highways, expressways and freeways.
- C20-5 "SHOULDER WORK" signs may be used in place of C20-10 "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation
Traffic Operations Division

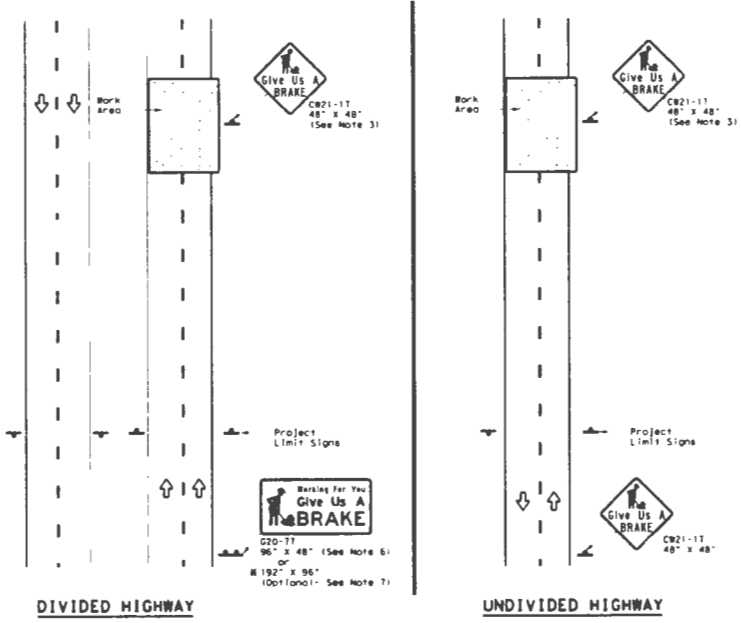
TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP (1-1)-18

Rev	1	2	3	4	5
Date	April 1, 83	July 1, 83	October 1, 83	December 1, 83	February 1, 84
By	...	...	...	...	...
Checked	...	...	...	...	...
Approved	...	...	...	...	...

DISCLAIMER: This drawing is provided as a guide only. It is not intended to be used as a legal document. The user of this drawing assumes all liability for any use of this drawing. No warranty of any kind is made by the Department of Transportation for any use of this drawing. The Department of Transportation is not responsible for any errors or omissions in this drawing.

DATE: _____
FILE: _____



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	SQ FT	GALVANIZED STRUCTURAL STEEL		DRILLED SHAFT
						Size	Ø	
Orange	G20-7T		96" x 48"	Type B ₁ or C ₁	32	▲	▲	▲
Orange	G20-7T		192" x 96"	Type B ₁ or C ₁	128	88x18	16	17

A See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENT OF TRANSPORTATION	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300
COLOR	USAGE
ORANGE	BACKGROUND
BLACK	LEGEND & BORDERS
REFLECTIVE MATERIAL	
TYPE B ₁ OR TYPE C ₁	
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 (CB21-11) may be used for this purpose.
- Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC13 for location and spacing of construction speed zone signing when required.
- Give Us A Brake (CB21-11) signs and supports shall be considered subsidiary to Item 502, "Bar/Loops, 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 predrill as per BC15) 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

WORK ZONE
"GIVE US A BRAKE"
SIGNS

WZ (BRK) - 13

Scale	1" = 100'
Date	5-98
Drawn by	3-13
Checked by	3-03

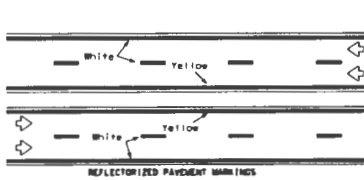
DISCLAIMER: THIS DOCUMENT IS PROVIDED AS A GUIDE ONLY. THE USER SHALL BE RESPONSIBLE FOR THE PROPER USE OF THIS DOCUMENT. THE TEXAS DEPARTMENT OF TRANSPORTATION AND ITS EMPLOYEES MAKE NO WARRANTY, REPRESENTATION OR GUARANTEE OF ANY KIND, EXPRESS OR IMPLIED, REGARDING THE ACCURACY, COMPLETENESS, OR SUITABILITY OF THIS DOCUMENT FOR ANY PARTICULAR PURPOSE. THE USER SHALL INDEMNIFY AND HOLD THE TEXAS DEPARTMENT OF TRANSPORTATION AND ITS EMPLOYEES HARMLESS FROM AND AGAINST ALL CLAIMS, DAMAGES, LOSSES AND EXPENSES, INCLUDING REASONABLE ATTORNEY'S FEES, ARISING OUT OF OR RESULTING FROM THE USE OF THIS DOCUMENT.

PAVEMENT MARKING PATTERNS

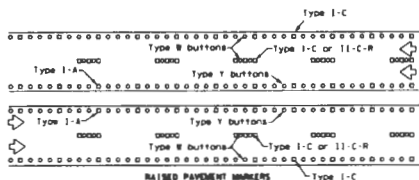
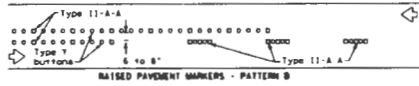
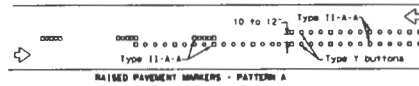


Pattern A is the TSDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectorized pavement markings.

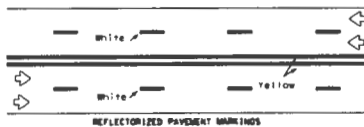
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



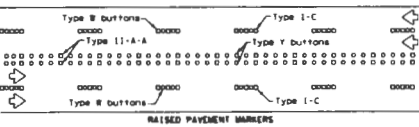
Prefabricated markings may be substituted for reflectorized pavement markings.



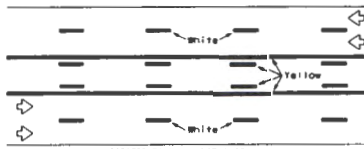
EDGE & LANE LINES FOR DIVIDED HIGHWAY



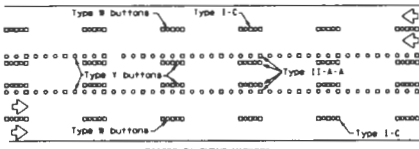
Prefabricated markings may be substituted for reflectorized pavement markings.



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS

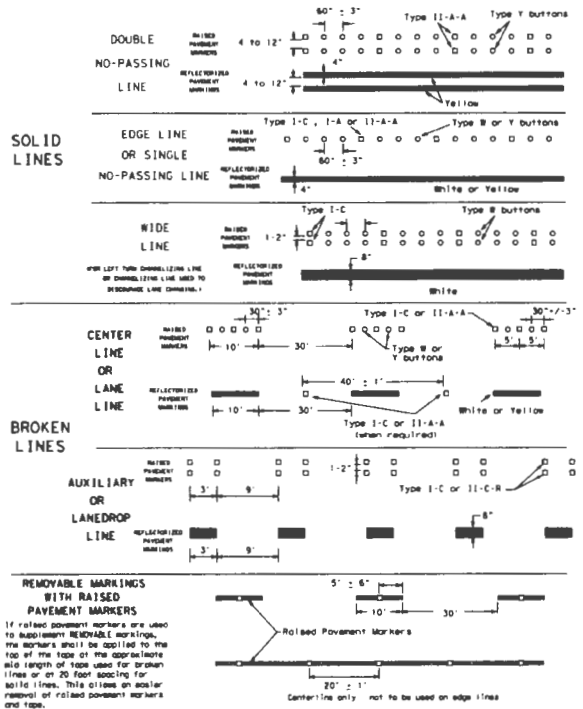


Prefabricated markings may be substituted for reflectorized pavement markings.



TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



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

SHEET 12 OF 12

Texas Department of Transportation
Traffic Safety Division
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

DATE	BY	CHKD	APP'D
1-27-97	9-07-97	5-27	5-27
1-28-97	7-13		
1-28-97	8-14		

WORK ZONE PAVEMENT MARKINGS

GENERAL

1. 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.
2. Color, patterns and dimensions shall be in accordance with the "Treatise Manual on Uniform Traffic Control Devices" (TMUCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUCD, the plans and details as shown on the Standard Plan Sheet 82(15)PM.
6. 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 section where passing is prohibited and PASS WITH CARE signs at the beginning of section where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 602, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(11)-21.
2. 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

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

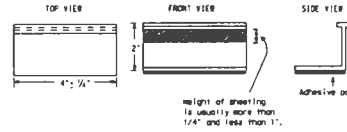
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. 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.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 140 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometry.
4. 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 602.

REMOVAL OF PAVEMENT MARKINGS

1. 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.
2. 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.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernible marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers shall be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS", unless otherwise stated in the plans.
10. Break-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

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. 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.
 - A. 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.
 - B. Select five (5) tabs and perform the following test. Affix five (5) tabs of 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.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet 82(5)PM for tab placement on new pavements. See Standard Sheet TP(17)-11 for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
 2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
 3. Adhesive for guidemarks shall be bituminous material not applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.
- Guidemarks shall be designated as:
 YELLOW - (two other 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(11)-21.

SHEET 11 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

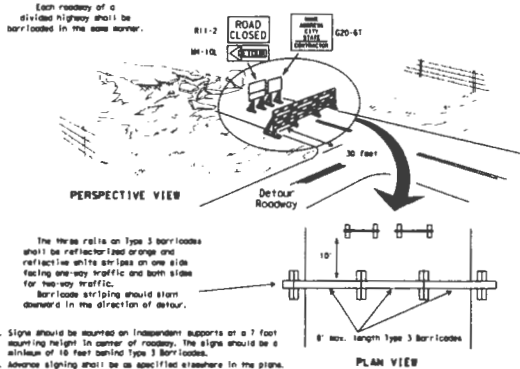
REV	DATE	BY	CHKD	APP'D	REASON
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2	08-09-11				
3	08-09-11				
4	08-09-11				

DISCUSSION: The use of this drawing is governed by the "Terms and Conditions of Use" located on the back cover of this standard. For information on the availability of this standard, contact the Texas Department of Transportation, Materials and Pavement Section, 1100 West 17th Street, Austin, Texas 78761.

TYPE 3 BARRICADES

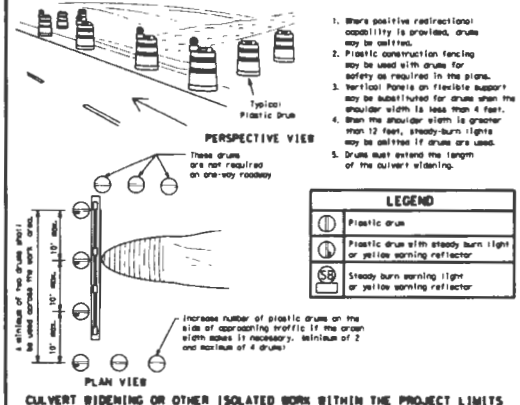
1. Refer to the Compliant Work Zone Traffic Control Devices List (CBTCD) for details of the Type 3 Barricade and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used on each end of construction projects closed to all traffic.
3. Barricades extending 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 closures extending any slope downward in both directions from the corner of the barricade. When no turns are provided on a closed road, striping should slope downward in both directions toward the corner 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 minimum 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, clean sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a consistent weight. Sand bags shall not be attached in a manner that causes any portion of a barricade rail's reflective striping. Rocks, 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 holds 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 ropes, wires, chains or other fasteners.
9. Striping for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification BMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.

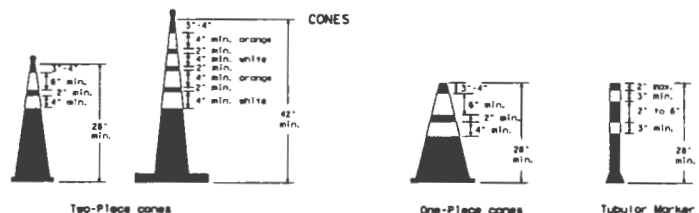


1. Signs should be mounted on independent supports of a 7-foot mounting height in center of roadway. The sign should be a minimum of 18 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION

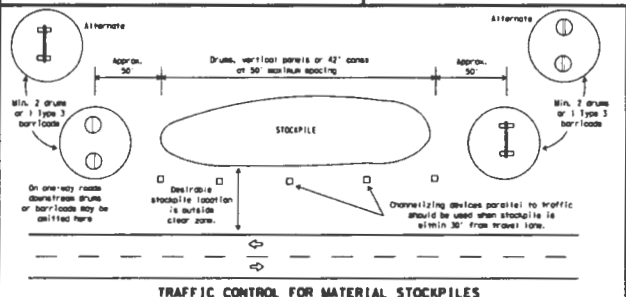


LEGEND	
(Symbol)	Plastic drum
(Symbol)	Plastic drum with steady burn light or yellow warning reflector
(Symbol)	Steady burn warning light or yellow warning reflector



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 formed 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 yellow 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 BMS-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 BCI-1. 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 situations.
7. Cones or tubular markers used on each project should be of the same size and shape.



SHEET 10 OF 12

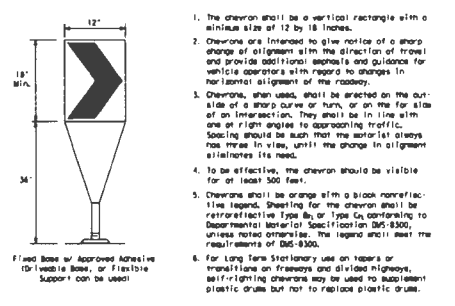
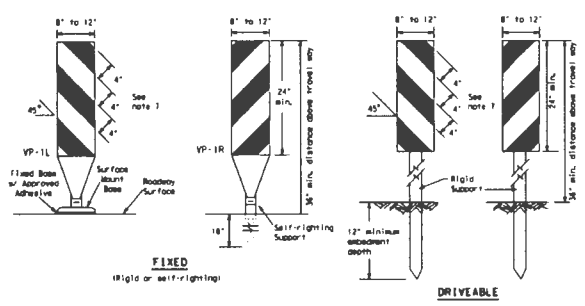
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 21

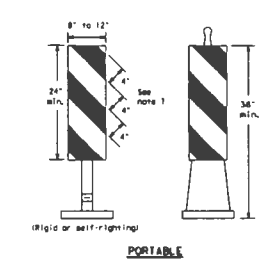
REV	DATE	BY	CHKD	APP'D	DESCRIPTION
1	11/20/02	...	...	...	...
2	11/13/02	...	...	...	...

DISCLAIMER: THIS PLAN IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT TO BE USED FOR CONSTRUCTION OR FOR FINANCIAL RESULTS OR DAMAGES RESULTING FROM ITS USE.

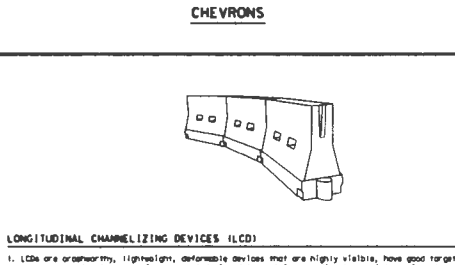
DISCLAIMER: THE USER SHALL BE RESPONSIBLE FOR THE PROPER APPLICATION OF THE PRODUCTS DESCRIBED IN THIS MANUAL. THE USER SHALL BE RESPONSIBLE FOR THE PROPER APPLICATION OF THE PRODUCTS DESCRIBED IN THIS MANUAL. THE USER SHALL BE RESPONSIBLE FOR THE PROPER APPLICATION OF THE PRODUCTS DESCRIBED IN THIS MANUAL.



- 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 "Manual on Uniform Traffic Control Devices" (MUTCD).
 - 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 sign 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 device difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the MUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWTCDL).
 - The Contractor shall maintain devices in a clean condition and replace damaged, non-reflective, 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 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 adhesive, 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 surface, including pavement surface displacement or surface irregularity. Driveable bases shall not be permitted on final pavement surface. The Engineer/Inspector shall approve all application and removal procedure of fixed bases.



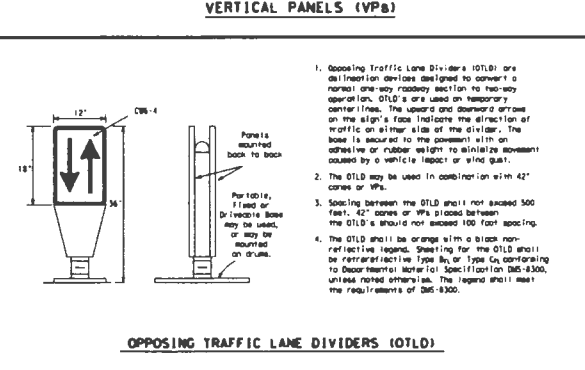
- Vertical Panels (VPB) are normally used to channelize traffic or define opposing lanes of traffic.
- VPB's may be used in daytime or nighttime situations. They may be used on the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime or nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use of VPB's for drop-offs.
- VPB's should be mounted back to back if used on the edge of work 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.
- VPB's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of reflective area facing traffic.
- Self-righting supports are available with portable bases. See "Compliant Work Zone Traffic Control Devices List" (CWTCDL).
- Spacing for the VPB's shall be retroreflective Type A or Type C conforming to Departmental Specification DS-8300, unless noted otherwise.
- where the height of reflective section on vertical panels is 36 inches or greater, a panel stripe of 6 inches shall be used.



CHEVRONS

Postered Speed	Formula	Minimum Desirable Taper Lengths	Suggested Maximum Spacing of Channelizing Devices
30	L = 8S	10' 11"	On a Taper
35		150'	30' 80'
40	L = 8S	150'	30' 80'
45		205'	35' 70'
50	L = 8S	265'	40' 80'
55		320'	45' 100'
60	L = 8S	380'	50' 120'
65		440'	55' 130'
70	L = 8S	500'	60' 140'
75		560'	65' 150'
80	L = 8S	620'	70' 160'
85		680'	75' 170'

L=8S Taper Lengths have been rounded off. L=Length of Taper (ft.), S=Speed of Drive (ft.). S=Posted Speed (mph).



- LONGITUDINAL CHANNELIZING DEVICES (LCD)**
- LCDs are a category of lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or deflect 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 CWTCDL 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(1) when placed roughly parallel to the travel lanes.
 - LCDs used on barricade platoon perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rolls 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 Barriers (ASB) or other manual 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 CWTCDL list.
 - Water ballasted systems used as barriers should not be used for a warning 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 device geometric conditions.
 - When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be constructed as per manufacturer recommendations or fixed to a point outside the clear zone.
- 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 W's.
 - Spacing between the OTLD shall not exceed 500 feet. 42" cones or W's placed between the OTLD's should not exceed 100 foot spacing.
 - The OTLD shall be orange with a black non-reflective legend. Spacing for the OTLD shall be retroreflective Type A or Type C conforming to Departmental Specification DS-8300, unless noted otherwise. The legend shall meet the requirements of DS-8300.

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation Traffic Safety Division

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9) - 21

REV	DATE	BY	CHKD	APP'D	DESCRIPTION
1	11/13/2007
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3

DATE: 11/13/07

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long cones 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

ATTENTION: THIS SPECIFICATION IS SUBJECT TO THE "Texas Department of Transportation Manual of Specifications and Standards for Construction Materials and Methods of Construction" and the "Texas Department of Transportation Manual of Specifications and Standards for Construction Materials and Methods of Construction" which may be updated from time to time.

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 tapered sections by vertical panels, or 42" two-face cones. In tapered sections, one-face 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 tapered sections and tapered sections by vertical panels, two-face cones or one-face 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" (TMUD) and the "California Work Zone Traffic Control Device List" (CWCZD).
- Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that could adversely affect their appearance or effectiveness.
- The Contractor shall have a minimum of 24 hours to replace any plastic drum identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

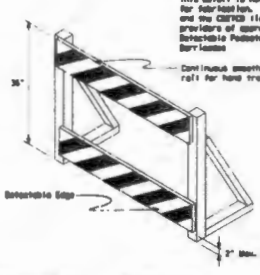
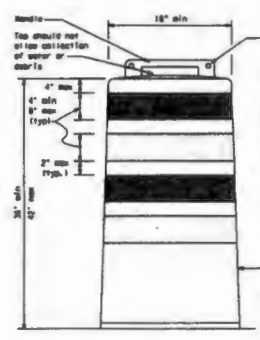
- Pre-qualified plastic drums shall meet the following requirements:
 - Plastic drums shall be a two-piece design the "body" of the drum shall be the top portion and the "base" shall be the bottom.
 - The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 30 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 fibreglass and composite materials. The Contractor shall not use metal drums or single piece plastic drums or intermediate drums 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 minimum 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 3/16 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-retroreflective space between any two adjacent stripes shall not exceed 2 inches in width.
 - Bases shall have a minimum width of 36 inches, a minimum height of 4 inches, and a minimum of top footprint of sufficient size to allow bases to be held down while separating the drum body from the base.
 - Plastic drums shall be constructed of ultra-high molecular weight polyethylene (UHMWPE) or other approved material.
 - Drum body shall have a minimum unobstructed weight of 11 lbs.
 - Drum and base shall be marked with manufacturer's name and model number.

RETROREFLECTIVE SHEETING

- The surface used on drums shall be constructed of shearing meeting the color and retroreflectivity requirements of Departmental Materials Specification 805-330B, "Sign Face Materials," Type 4 or Type 5 reflective shearing shall be applied unless otherwise specified in the plans.
- The shearing shall be applied for use on and shall adhere to the drum surface both wet, upon vehicular impact, the shearing shall remain adhered to plastic and exhibit no delamination, cracking, or loss of retroreflectivity under such conditions due to abrasion of the shearing surface.

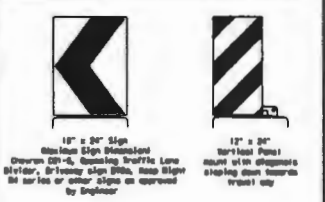
BALLAST

- Unobstructed bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 25 lbs minimum and 50 lbs maximum. The ballast may be sand in one to three inch size aggregate from the base, sand in a sand-filled plastic bag, or other ballasting device as approved by the Engineer. Sealing 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 drum rubber base or a solid rubber base.
- Receptacle trucks (rig elements) may be used for ballast on drums approved for this type of ballast on the CWCZD list.
- The ballast shall not be heavy objects, water, or any material that could 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 bottom 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 damaged, closed, or replaced in a city area, the temporary facilities shall be electrically and tactile detectability features equivalent with the features present in the existing pedestrian facility. Refer to 805-330-21 for Pedestrian Control requirements for Slotted Bicycles, Slotted Bicycles and Crosswalk Clearance.
- When pedestrian with visual disabilities normally use the closed elements, a Detectable Pedestrian Barricade shall be placed across the full width of the closed element instead of a Type 3 Barricade.
- Detectable pedestrian barricades shall be to the same structure shown, longitudinal channelizing devices, some concrete barriers, and used or chain link fencing with a continuous detectable edging on satisfactory delineate a pedestrian path.
- Top, base, or plastic chain spring between devices are not detectable, do not comply with the design standards in the "Manual on Uniform Traffic Control Devices for Accessibility Guidelines (MUTCD)" and should not be used as a barrier for pedestrian movement.
- Warning lights shall not be attached to detectable pedestrian barricades.
- Detectable pedestrian barricades should use 1" diameter ballast rolls as shown on BC(18) provided that the roll provides a smooth continuous roll surface for hand trailing with no splinters, burrs, or sharp edges.



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 CWCZD.
- Chevron and other work zone signs with an orange background shall be manufactured with Type 4a, or Type 5a, Grade shearing meeting the color and retroreflectivity requirements of 805-330B, "Sign Face Materials," unless otherwise specified in the plans.
- Vertical Panels shall be manufactured with orange and white shearing meeting the requirements of 805-330B Type 4 or Type 5. Slanted stripes on Vertical Panels shall slope down toward the intended travel lane.
- Other sign messages (text or symbols) 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 24 series signs discussed in note 3 below.
- Signs shall be supported using a 1/2 inch bolt diameter 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.
- Chevron may be placed on drums on the outside of curves, on merging lanes or on shifting lanes. When used in these locations, they may be placed on every drum or second set more than on every third drum, a minimum of three (3) should be used at each location called for in the plans.
- 20-4, 20-10, 20-11 and 20-12a Slanted Chevrons signs shall be 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

SHEET 8 OF 12

Texas Department of Transportation
Traffic Safety Division
Barricade

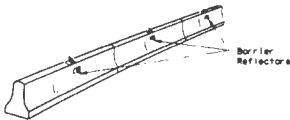
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(18)-21

REV.	DATE	BY	CHKD.	APP.
01	11/01/2002	...	...	...
02	08-14	...	...	...
03	5-21	...	...	...
04	2-13	...	...	...

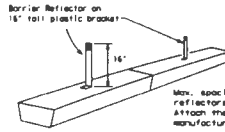
DISCLAIMER: This document is intended to be used as a guide only. It is not intended to be used as a substitute for the manufacturer's instructions or specifications. The user assumes all liability for any damage or injury resulting from its use.

- Barrier Reflectors shall be anti-qualified, and conform to the color and reflectivity requirements of BC-8000. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC11.
- Color of Barrier Reflectors shall be as specified in the MUTCD. 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 placement of a barrier grille 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 (B-direction) and 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 shall be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edge line being supplemented.
- Minimum spacing of Barrier Reflectors is forty (40) feet.
- Permanent markers or temporary flexible reflective roadway marker tabs shall NOT be used on 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.

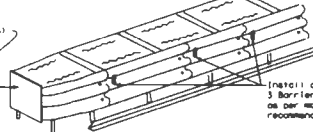


LOW PROFILE CONCRETE BARRIER (LPCB)

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 Striper & Sheet LPS.

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

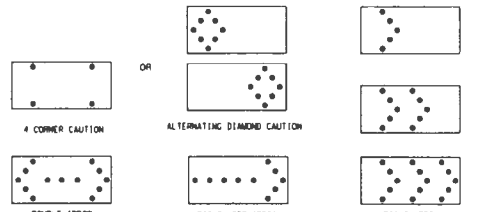


END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

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 I-400 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 temporarily shift traffic.
- A full metric PMS may be used to substitute a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size group.
- Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

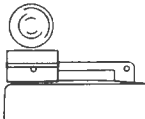
- Warning lights shall meet the requirements of the MUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A, Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of work or potentially hazardous areas. Their use shall be as indicated on this sheet 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, C, or G sheeting meeting the requirements of Departmental Material Specification BMS-8300.
- Type C and Type D Steady Burn Warning 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 device.
- 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

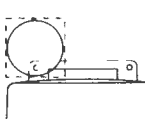
- Type A flashing warning lights are intended to warn of areas that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing 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 operations.
- 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 minimum 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 of the elevation 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 CRD/CED.
- The warning reflector shall have a minimum retroreflective surface area (one side) of 30 square inches.
- Round reflectors shall be fully reflectized, including the area where attached to the drum.
- Source substrates shall have a minimum of 30 square inches of reflector face sheeting. They do not have to be reflectized 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 OMS 8300 Type B or Type C.
- When used near top-way traffic, both sides of the warning reflector shall be reflectized.
- The warning reflector should be mounted on the side of the drum nearest approaching traffic.
- The minimum 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, but have a yellow reflective surface area of at least 30 square inches.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
A	30 x 60	12	3/4 mile
B	30 x 60	12	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 (TMAs) used on TADOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
- Refer to the CRD/CED for the requirements of Level 2 or Level 3 TMA.
- Refer to the CRD/CED for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- A TMA should be used dry-ice mat if it can be positioned 30 to 100 feet in advance of the area of work 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 area is an extended distance from the TMA.

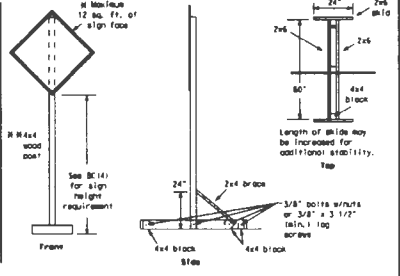
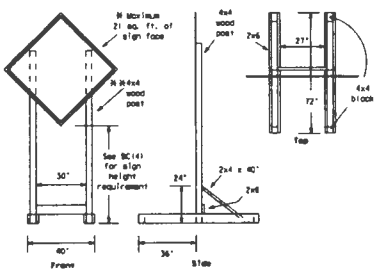
Texas Department of Transportation
Traffic Safety Division Standard

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

BC (7) - 21

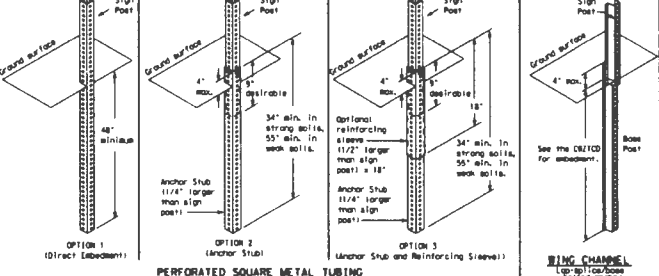
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2	8-14	ETL	WAL	WAL
3	8-14	ETL	WAL	WAL

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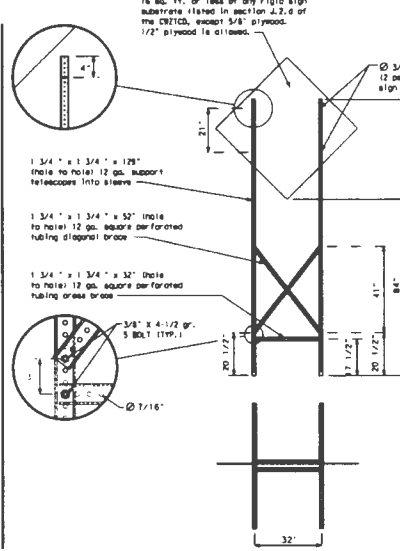
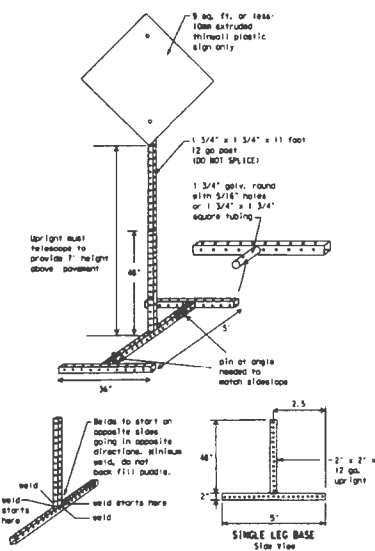
SKID MOUNTED WOOD SIGN SUPPORTS

LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS



GROUND MOUNTED SIGN SUPPORTS

Refer to the CRITCD 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 installation 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 500 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 already set concrete if approved by the Engineer. (See the 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 CRITCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

- Holes 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 CRITCD List.
 - When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered suballatory to Item 502.
- See BC(4) for definition of "Bare Duration."
 Wood sign posts MUST be one piece. Splicing will not be allowed. Posts shall be painted white.
 See the CRITCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12

Texas Department of Transportation
 Traffic Safety Division Standard

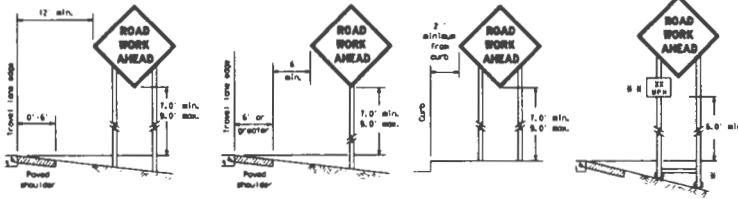
BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

REV.	BC 2-00	DATE	1/2001	BY	1/2001	CHK	1/2001
1	NOVEMBER 2000	DATE	1/2001	BY	1/2001	CHK	1/2001
2	NOVEMBER 2000	DATE	1/2001	BY	1/2001	CHK	1/2001
3	NOVEMBER 2000	DATE	1/2001	BY	1/2001	CHK	1/2001
4	NOVEMBER 2000	DATE	1/2001	BY	1/2001	CHK	1/2001
5	NOVEMBER 2000	DATE	1/2001	BY	1/2001	CHK	1/2001

DATE:

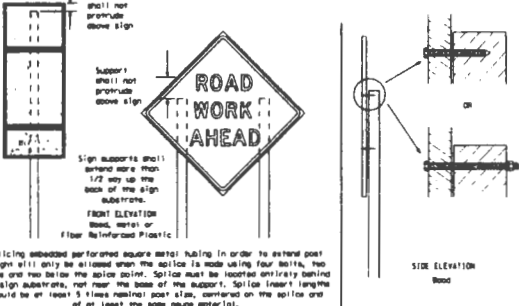
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



If when placing into supports on uneven ground, the leg post lengths must be adjusted so the sign appears straight and true. Objects shall NOT be placed under signs as a means of leveling.

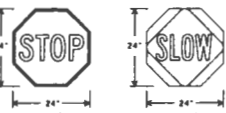
If when plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Substantial plaque width or distance should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



STOP/SLOW PADDLES

- STOP/SLOW paddles are the primary device to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
- STOP/SLOW paddles shall be retroreflective used 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 8.03 and Signaling Devices in the TBCTD.



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B, OR C, 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, arrival, points of interest, and other programmatic, recreational, specific service (LSD), or cultural information. Drivers proceeding through a work zone read the signs, if not better route guidance as normally intended 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 conforms the roadway condition. For details for covering large queue signs see the TBCTD standard.
- When existing permanent signs are removed and replaced due to construction purposes, they shall be visible to motorists on all times.
- If existing signs are to be repositioned in their original supports, they shall be installed on temporary bases as shown on the TBCTD Standard sheets. The signs shall meet the required mounting heights shown on the BC sheets or the TBCTD Standards. This work should be paid for under the appropriate pay item for repositioning existing signs.
- If permanent signs are to be removed and replaced using temporary supports, the Contractor shall use temporary supports as shown on the BC Standard sheets, TBCTD Standard sheets or the TBCTD list. The signs shall meet the required mounting heights shown on the BC, or the TBCTD Standard sheets during construction. This work should be paid for under the appropriate pay item for repositioning 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 satisfactory to Item 902.

GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and true condition and/or as directed by the Engineer.
- Season sign posts shall be galvanized steel.
- Barry poles shall NOT be used as sign supports.
- All sign supports 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 a sign support in the plans or in the Standard Highway Sign Design for Texas (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone sign support that are shown in the TBCTD but may have been deleted 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 TADOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
- The Contractor shall furnish sign supports listed in the "Companion Work Zone Traffic Control Device List" (CWZCD) 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 procedure 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 cracked reflective sheeting as directed by the Engineer/Inspector.
- Identification markings may be shown only on the back of the sign substrate. The minimum height of letters and/or company logos used for identification shall be 1" high.
- The Contractor shall replace damaged sign posts. New or damaged sign posts shall not be spliced.

DEFINITION OF WORK ZONE DEVICES BY THE "Texas Manual on Uniform Traffic Control Devices" Part 8J

- The types of sign supports, sign mounting height, the size of sign, and the type of sign substrate can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate sign 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 construction 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 (keeping 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 Roadway Closure/Queue signs 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 pavement surface.
- 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 replaced 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.

SIGN SIZES

- 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 CWZCD 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 stiffness of the mesh.
- All wooden (including sign panels) fiber-based signs 2' or more shall have one or more plywood sheet, 1/2" thick by 8' wide, fastened to the back of the sign and extending fully across the sign. The sheet 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 sheet 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 M-55 8300 for night signs or M-55 8310 for night signs. The web address for M-55 specifications is shown on BC11.
- All wooden (including sign panels) fiber-based signs 2' or more shall have one or more plywood sheet, 1/2" thick by 8' wide, fastened to the back of the sign and extending fully across the sign. The sheet 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 sheet and spaced at 6' centers. The Engineer may approve other methods of splicing the sign face.
- Orange sheeting, meeting the requirements of M-55 8300 Type A₁ or Type C₁, shall be used for right signs with orange backgrounds.

SIGN LETTERS

- All sign letters and numbers shall be clear, and non 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 Standard and Specifications.

REMOVING OR COVERING

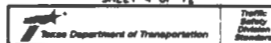
- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- Long-term stationary or Intermediate-term stationary signs installed on square metal hulling may be turned away from traffic 90 degrees when the sign message is not applicable. This measure may not be used for signs installed in the section of divided highways or near any interchange where the sign may be seen from approaching traffic.
- Signs installed on wooden poles 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 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.
- Burial shall NOT be used to cover signs.
- Back logs or other opaque materials shall NOT be affixed to a sign face.
- Signs and anchor studs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT HEIGHTS

- When sign supports require the use of weights to keep from turning over, the use of sandbags with dry, compressed sand should be used.
- The sandbags shall be tied shut to keep the sand from spilling and to maintain a consistent weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- Sandbags shall weigh a minimum of 35 lbs and a maximum of 36 lbs.
- Sandbags shall be used of a durable material that holds upon wetting. Rubber (such as tire inner tubes) shall NOT be used.
- Rubber pellets designed for churning devices should NOT be used for ballast on permanent sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZCD list.
- Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be supported above ground level or hung with rope, wire, chains or other fasteners. The base supports shall be placed along the length of the stakes to weigh down the sign support.
- Sandbags shall NOT be placed under the sign and shall NOT be used to level sign supports placed on slopes.

FLAG 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.



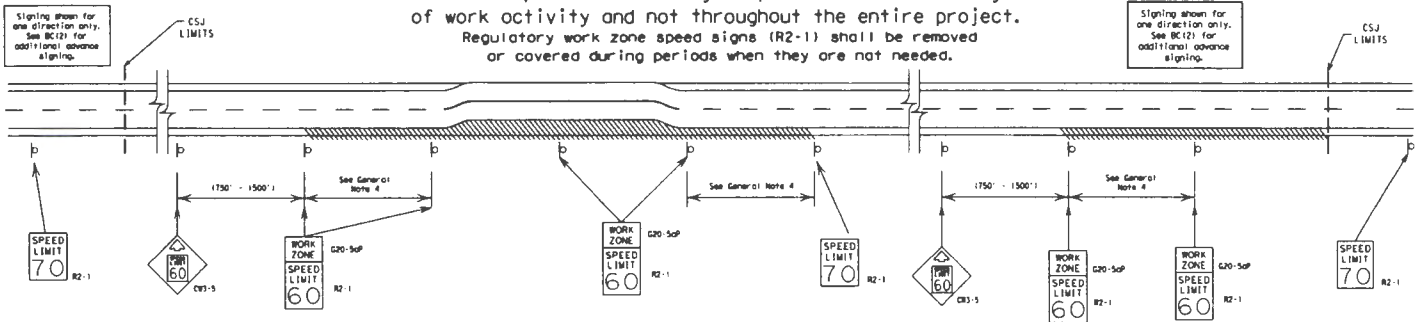
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21		Rev. 12/07	Rev. 11/02	Rev. 11/02	Rev. 11/02	Rev. 11/02
DATE:	11/01	11/01	11/01	11/01	11/01	11/01
TIME:	9:07	8:14	1:13	5:21		

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 in 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:

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- 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 in 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

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:

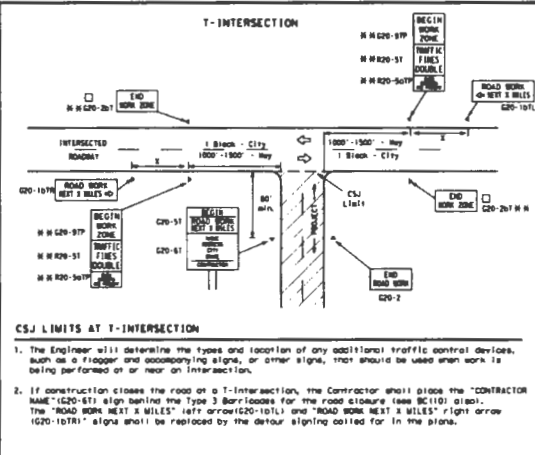
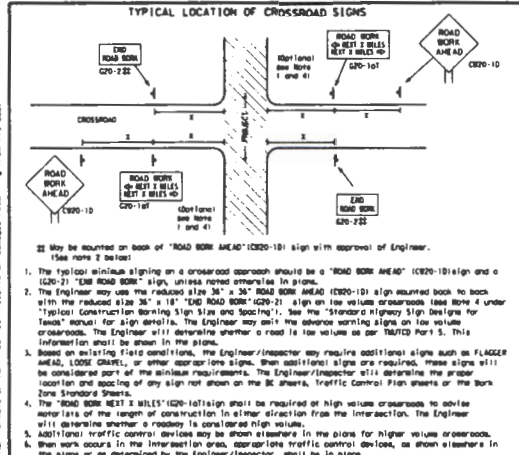
40 mph and greater	0.2 to 2 miles
35 mph and less	0.2 to 1 mile
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- Fabrication, erection and maintenance of the "ADVANCE SPEED LIMIT" (R3-5) sign, "WORK ZONE" (G20-5aP) plaque and the "SPEED LIMIT" (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
 - Low enforcement.
 - Flagger stationed next to sign.
 - Portable changeable message sign (PCMS).
 - Low-power (drone) radar transmitter.
 - Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- 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.

SHEET 3 OF 12

Texas Department of Transportation		Traffic Safety Division Standard
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT		
BC(3)-21		
REV	BY	DATE
11-00	November 2001	MKT/asa
9-01	8-14	MKT/asa
7-13	5-21	MKT/asa

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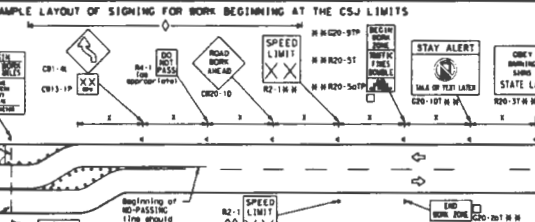
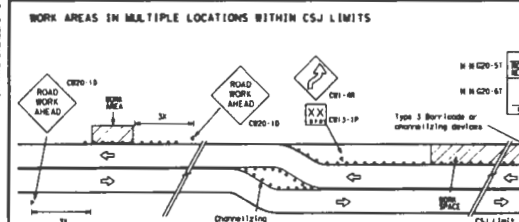
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TYPICAL CONSTRUCTION BARRIAD SIGN SIZE AND SPACING

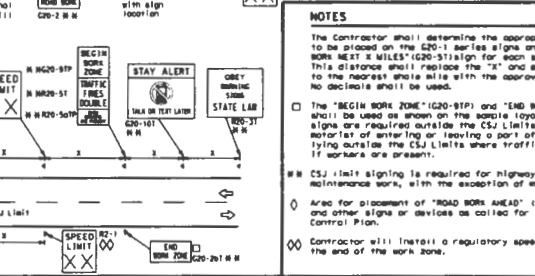
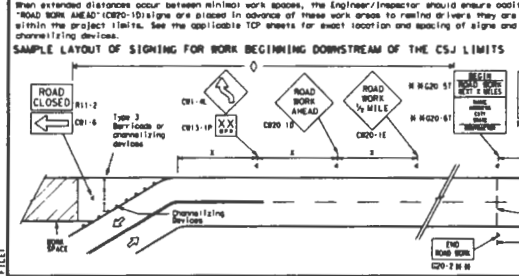
Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed	Sign Spacing "X"
CW20-4			MPH	Feet (Approx.)
CW21	48" x 48"	48" x 48"	30	120
CW22			35	160
CW23			40	240
CW25			45	320
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	50	400
			55	500 ²
			60	600 ²
			65	700 ²
CW3, CW4, CW5, CW6, CW10, CW12	48" x 48"	48" x 48"	70	800 ²
			75	900 ²
			80	1000 ²
			n	n

1. 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 TDP Standard Sheets.
 2. Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.
 3. Section or larger size signs may be used as necessary.
 4. Distance between signs should be increased as required to have 1500 feet advance warning.
 5. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
 6. 36" x 36" ROAD WORK AHEAD (CW20-10) signs may be used on low volume crossroads at the discretion of the Engineer as per MUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
 7. Only standard advance warning sign sizes are indicated.
 8. See sign size listing in "TMUTCD", sign details or the "Standard Highway Sign Design for Texas" manual for complete list of available sign design sizes.



LEGEND

- Type 3 Barricade
- ○ ○ Channelizing Devices
- ▲ Sign
- See Typical Construction Barricade Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.



NOTES

The Contractor shall determine the appropriate distance to be placed on the (CW20-11) series signs and "BEGIN ROAD WORK NEXT 2 MILES" (CW20-51) sign for each specific project. This distance shall replace the "21" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

The "BEGIN WORK ZONE" (CW20-51) and "END WORK ZONE" (CW20-52) signs 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 work is 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" (CW20-10) 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.

SHEET 2 OF 12
 Texas Department of Transportation
 Traffic Engineering Division

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(12)-21

Rev.	Rev. Date	By	Checked	Approved
1	11/13/07	...	...	...
2	11/13/07	...	...	...
3	11/13/07	...	...	...

DATE: _____
FILE: _____

DISCUSSION OF THIS STANDARD IS GOVERNED BY THE TERMS OF THE LICENSE AGREEMENT FOR THE USE OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES. THE USER OF THIS STANDARD IS RESPONSIBLE FOR OBTAINING THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

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.

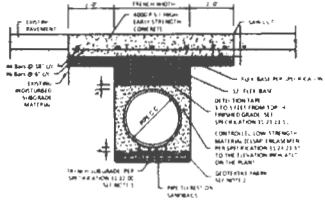
COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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).

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
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

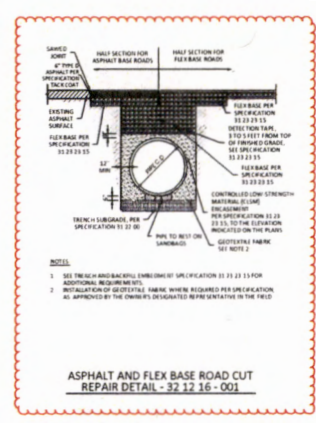
		
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS		
BC (1) - 21		
Date: 4-01 4-01 4-01 4-18	Rev: 1-13 1-14 5-21	2007 2007 2007 2007

3/15/2023 10:14 AM C:\Users\jgarcia\OneDrive\Documents\Projects\Lake Ralph Hall Raw Water Pipeline\Program Standard Details\Roadway\Roadway\Roadway.dwg



- NOTES:**
1. LOW SIDE OF CUT IS APPROX. 1/4\"/>

CONCRETE PAVING CUT DETAIL - 32.13.13 - 001



- NOTES:**
1. SEE TRINCH AND BACKFILL EMBLEM BY SPECIFICATION 32.23.13 FOR ADDITIONAL REQUIREMENTS.
 2. INSTALLATION OF GEOTEXTILE FABRIC WHERE REQUIRED PER SPECIFICATION AS APPROVED BY THE OWNER'S DESIGNATED REPRESENTATIVE IN THE FIELD.

ASPHALT AND FLEX BASE ROAD CUT REPAIR DETAIL - 32.12.16 - 001

ISSUED FOR CONSTRUCTION

NO.	DATE	DESCRIPTION



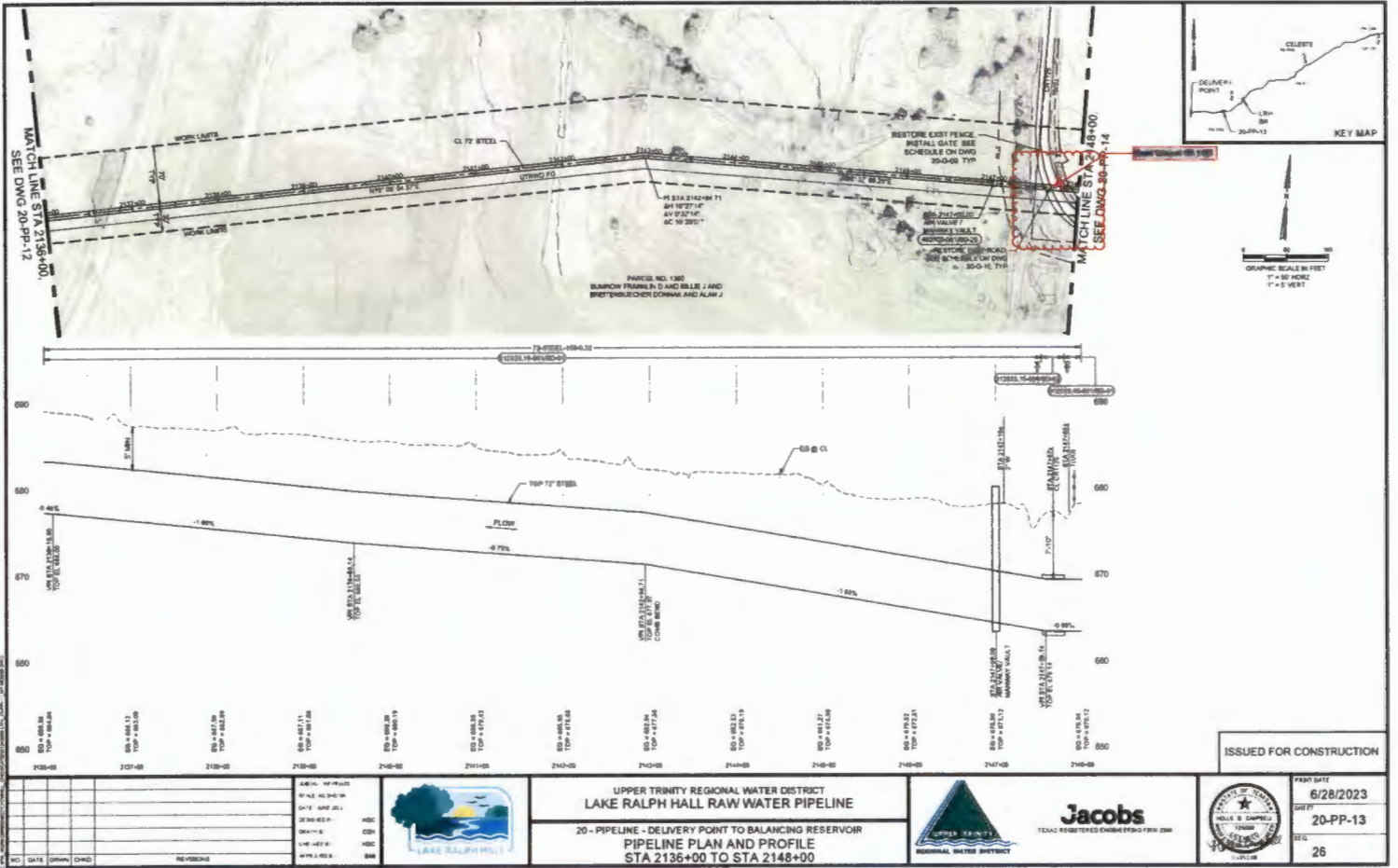
UPPER TRINITY REGIONAL WATER DISTRICT
 LAKE RALPH HALL RAW WATER PIPELINE

PROGRAM STANDARD DETAILS SHEET 3
 ROADWAY CUT AND REPAIR DETAILS



REVISION DATE
 03/09/2023

TITLE
 SD-03



NO.	DATE	BY	CHKD.	REVISIONS



UPPER TRINITY REGIONAL WATER DISTRICT
LAKE RALPH HALL RAW WATER PIPELINE
 20" PIPELINE - DELIVERY POINT TO BALANCING RESERVOIR
 PIPELINE PLAN AND PROFILE
 STA 2136+00 TO STA 2148+00



ISSUED FOR CONSTRUCTION

	PROJECT DATE 6/28/2023
DRAWN BY 20-PP-13	CHECKED BY 20-PP-13
SCALE 26	





18,876-3

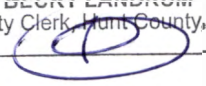
1700 Swift Street, North Kansas City, Missouri, 64116
Phone: 816.741.4600
www.garney.com

Commissioner Hutchins
Hunt County Courthouse
Greenville, TX 75401

FILED FOR RECORD
at 12:30 o'clock PM M05/22/2024

JUN 25 2024

Re: County Road 1125 Road Crossing

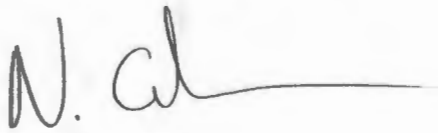
BECKY LANDRUM
County Clerk, Hunt County, Tex.
By 

Dear Hunt County,

Garney Construction is seeking permission from Hunt County to cross County Road 1125 with the Lake Ralph Hall Pipeline. Garney Construction will be crossing the road following the attached construction details. The access road will be re-routed during the utility crossing utilizing proper TXDOT detour signs. Construction will take roughly three days with the road detour in place. Garney Construction will notify the residents of the road closure in advance.

Sincerely,

GARNEY CONSTRUCTION



Nicholas Crenshaw
Project Engineer
c. (469) 215-6966