



CONTROLLING PROJECT ID 6363-78-001

DISTRICT Dallas
HIGHWAY IH0035W

COUNTY Denton

QUANTITY SHEET

| CONTROL SECTION JOB | | | | 6363-78-001 | | TOTAL EST. | TOTAL FINAL |
|---------------------|----------|---|------|-------------|-------|-------------|-------------|
| PROJECT ID | | | | A02737661 | | | |
| COUNTY | | | | Denton | | | |
| HIGHWAY | | | | IH0035W | | | |
| ALT | BID CODE | DESCRIPTION | UNIT | EST. | FINAL | | |
| | 500-6033 | MOBILIZATION (CALLOUT) | EA | 12.000 | | 12.000 | |
| | 666-6006 | REFL PAV MRK TY I (W)4"(DOT)(100MIL) | LF | 500.000 | | 500.000 | |
| | 666-6036 | REFL PAV MRK TY I (W)8"(SLD)(100MIL) | LF | 2,500.000 | | 2,500.000 | |
| | 666-6048 | REFL PAV MRK TY I (W)24"(SLD)(100MIL) | LF | 250.000 | | 250.000 | |
| | 666-6054 | REFL PAV MRK TY I (W)(ARROW)(100MIL) | EA | 10.000 | | 10.000 | |
| | 666-6057 | REFL PAV MRK TY I(W)(DBL ARROW)(100MIL) | EA | 10.000 | | 10.000 | |
| | 666-6063 | REFL PAV MRK TY I(W)(UTURN ARW)(100MIL) | EA | 2.000 | | 2.000 | |
| | 666-6078 | REFL PAV MRK TY I (W)(WORD)(100MIL) | EA | 10.000 | | 10.000 | |
| | 666-6141 | REFL PAV MRK TY I (Y)12"(SLD)(100MIL) | LF | 200.000 | | 200.000 | |
| | 666-6167 | REFL PAV MRK TY II (W) 4" (BRK) | LF | 20,000.000 | | 20,000.000 | |
| | 666-6170 | REFL PAV MRK TY II (W) 4" (SLD) | LF | 100,000.000 | | 100,000.000 | |
| | 666-6171 | REFL PAV MRK TY II (W) 6" (BRK) | LF | 500.000 | | 500.000 | |
| | 666-6174 | REFL PAV MRK TY II (W) 6" (SLD) | LF | 500.000 | | 500.000 | |
| | 666-6178 | REFL PAV MRK TY II (W) 8" (SLD) | LF | 5,000.000 | | 5,000.000 | |
| | 666-6207 | REFL PAV MRK TY II (Y) 4" (SLD) | LF | 100,000.000 | | 100,000.000 | |
| | 666-6210 | REFL PAV MRK TY II (Y) 6" (SLD) | LF | 100.000 | | 100.000 | |
| | 666-6211 | REFL PAV MRK TY II (Y) 8" (SLD) | LF | 100.000 | | 100.000 | |
| | 666-6260 | RE PM TY I(W)8"(SLD)(100MIL)(CALLOUT) | LF | 5,000.000 | | 5,000.000 | |
| | 666-6300 | RE PM W/RET REQ TY I (W)4"(BRK)(100MIL) | LF | 10,000.000 | | 10,000.000 | |
| | 666-6303 | RE PM W/RET REQ TY I (W)4"(SLD)(100MIL) | LF | 35,000.000 | | 35,000.000 | |
| | 666-6306 | RE PM W/RET REQ TY I (W)6"(BRK)(100MIL) | LF | 500.000 | | 500.000 | |
| | 666-6309 | RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) | LF | 500.000 | | 500.000 | |
| | 666-6315 | RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL) | LF | 15,000.000 | | 15,000.000 | |
| | 666-6321 | RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) | LF | 500.000 | | 500.000 | |
| | 677-6001 | ELIM EXT PAV MRK & MRKS (4") | LF | 60,500.000 | | 60,500.000 | |
| | 677-6002 | ELIM EXT PAV MRK & MRKS (6") | LF | 1,600.000 | | 1,600.000 | |
| | 677-6003 | ELIM EXT PAV MRK & MRKS (8") | LF | 7,600.000 | | 7,600.000 | |
| | 677-6005 | ELIM EXT PAV MRK & MRKS (12") | LF | 200.000 | | 200.000 | |
| | 677-6007 | ELIM EXT PAV MRK & MRKS (24") | LF | 250.000 | | 250.000 | |
| | 677-6008 | ELIM EXT PAV MRK & MRKS (ARROW) | EA | 10.000 | | 10.000 | |
| | 677-6009 | ELIM EXT PAV MRK & MRKS (DBL ARROW) | EA | 10.000 | | 10.000 | |
| | 677-6012 | ELIM EXT PAV MRK & MRKS (WORD) | EA | 10.000 | | 10.000 | |
| | 677-6036 | ELIM EXT PAV MRK & MRKS (UTURN ARROW) | EA | 2.000 | | 2.000 | |
| | 678-6001 | PAV SURF PREP FOR MRK (4") | LF | 60,500.000 | | 60,500.000 | |
| | 678-6002 | PAV SURF PREP FOR MRK (6") | LF | 1,600.000 | | 1,600.000 | |
| | 678-6004 | PAV SURF PREP FOR MRK (8") | LF | 7,600.000 | | 7,600.000 | |
| | 678-6006 | PAV SURF PREP FOR MRK (12") | LF | 200.000 | | 200.000 | |



Report Generated By: txdotconnect_internal_ext

Report Created On: Jan 7, 2021 3:51:06 PM

| DISTRICT | COUNTY | CCSJ | SHEET |
|----------|--------|-------------|-------|
| Dallas | Denton | 6363-78-001 | 2A |



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DISTRICT Dallas
HIGHWAY IH0035W

COUNTY Denton

QUANTITY SHEET

| CONTROL SECTION JOB | | | | 6363-78-001 | | TOTAL EST. | TOTAL FINAL |
|---------------------|-----------|-----------------------------------|------|-------------|-------|------------|-------------|
| PROJECT ID | | | | A02737661 | | | |
| COUNTY | | | | Denton | | | |
| HIGHWAY | | | | IH0035W | | | |
| ALT | BID CODE | DESCRIPTION | UNIT | EST. | FINAL | | |
| | 678-6008 | PAV SURF PREP FOR MRK (24") | LF | 250.000 | | 250.000 | |
| | 678-6009 | PAV SURF PREP FOR MRK (ARROW) | EA | 10.000 | | 10.000 | |
| | 678-6010 | PAV SURF PREP FOR MRK (DBL ARROW) | EA | 10.000 | | 10.000 | |
| | 678-6012 | PAV SURF PREP FOR MRK (UTURN ARR) | EA | 2.000 | | 2.000 | |
| | 678-6016 | PAV SURF PREP FOR MRK (WORD) | EA | 10.000 | | 10.000 | |
| | 6001-6001 | PORTABLE CHANGEABLE MESSAGE SIGN | DAY | 2.000 | | 2.000 | |
| | 6185-6002 | TMA (STATIONARY) | DAY | 100.000 | | 100.000 | |
| | 6185-6003 | TMA (MOBILE OPERATION) | HR | 1,000.000 | | 1,000.000 | |

| DISTRICT | COUNTY | CCSJ | SHEET |
|----------|--------|-------------|-------|
| Dallas | Denton | 6363-78-001 | 2B |

Project Number: RMC-636378001

Control: 6363-78-001

County: Denton

Highway: IH0035W

GENERAL NOTES:

General:

This project consists of performing "On-Call Reflectorized Pavement Markings" on various roadways in the Denton County Maintenance Section.

The Department reserves the right to revise schedule as it deems necessary.

Provide and maintain a dedicated email address for receipt of work orders and correspondence throughout the term of this contract. Acknowledgement of emailed work order/callouts is required no more than 12 hr. from notification.

Contractor's attention is called to the fact that all adjoining pavement sections will be protected during all phases of construction and any damages incurred due to Contractor's operation will be repaired and replaced at the Contractor's expense.

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

Coordinate work through:

Billy Meador
Denton County Maintenance Supervisor
2624 West Prairie
Denton, Texas 76201
940-387-1324

Bids will be received at 4777 E. Hwy 80, Mesquite, Texas 75150-6643.

Contractor questions on this project are to be emailed to the following individual(s):

Tina Massey, P.E. Tina.Massey@txdot.gov
Christopher Rocha, P.E. Christopher.Rocha@txdot.gov

Contractor questions will only be accepted through email to the above individuals.

All Contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following address:

<https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting Responses/>

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All questions submitted that generate a response will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

Attention is directed to the possible presence of underground utilities owned by the Texas Department of Transportation (irrigation, signal, illumination and surveillance, communication, and control) on the right of way. Call the Department for locates at 214-320-6682 and 214-320-6205 48 hr. in advance of excavation. Contact the appropriate department of the local city or town a minimum of 48 hr. in advance of excavation.

If overhead or underground power lines need to be de-energized, contact the electrical service provider to perform this work. Cost associated with de-energizing the power lines or other protective measures required are at no expense to the Department.

If working near power lines, comply with the appropriate sections of Texas State Law and Federal Regulations relating to the type of work involved.

Item 2 - Instruction to Bidders:

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

Order plans from any Reproduction Company listed at:

http://www.dot.state.tx.us/business/contractors_consultants/repro_companies.htm

View or download plans at:

<http://www.dot.state.tx.us/business/plansonline/plansonline.htm>

Item 3 – Award and Execution of Contract:

This contract is Non-Site Specific.

After written notification, work request will be on a callout basis.

Each callout work request will be continuously prosecuted to completion.

Work site is defined as the locations presented on the written callout work request.

Minimal quantity is 1,000 LF per written callout work request.

Begin physical work within 48 hr. of each written callout work request.

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All work locations will be marked by the Engineer.

Schedule and begin physical work in each written callout work request within 48 hr. or as directed.

Item 7 – Legal Relations and Responsibilities:

Pre-construction safety meeting will be conducted with Contractor’s personnel prior to work beginning on a continuously prosecuted contract or before each callout work request.

Attendance of this meeting will not be paid directly but considered subsidiary to the various bid items.

Holiday restrictions – the Engineer may decide that no lane closures or construction operations will be allowed during the restricted periods listed in the following holiday schedule. TxDOT has the right to lengthen, shorten, or otherwise modify these restricted periods as actual, or expected, traffic conditions may warrant. Working days will not be charged for these restricted periods. No additional compensation will be allowed for these restricted closures (i.e., overhead, delays, stand-by, barricades or any other associated cost impacts).

- New Year’s Eve and Day (noon on December 31 thru 10 P.M. January 1)
- Easter Holiday weekend (noon on Friday thru 10 P.M. Sunday)
- Memorial Day weekend (noon on Friday thru 10 P.M. Monday)
- Independence Day (noon on July 3 thru 10 P.M. on July 5)
- Labor Day weekend (noon on Friday thru 10 P.M. Monday)
- Thanksgiving Holiday (noon on Wednesday thru 10 P.M. Sunday)
- Christmas Holiday (noon on December 23 thru 10 P.M. December 26)

Holiday restrictions for Independence Day, Thanksgiving Holiday, and the Christmas Holiday may be extended for the “week of” due to the nature of work being performed and the work location at the discretion of the Engineer for safety of the traveling public.

There are no significant traffic generators identified for this project.

Item 8 – Prosecution and Progress:

Working days will be charged in accordance with Section 8.3.1.5., “Calendar Day”.

The response time specified in this contract is an essential element. Liquidated damages will be assessed when the Contractor fails to begin work within the specified response time and/or the Contractor does not have all of the personnel and pieces of equipment necessary to fulfill the requirement of the item(s). The dollar amount specified in this contract will be deducted from

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any money due or to become due for any Item(s) and will continue to be deducted for each day until work begins. This amount will be assessed not as a penalty, but as liquidated damages.

The continuous prosecution of each callout work request is an essential element of the contract. Failure to respond to a callout work request in the time frame allowed or discontinuance of the prosecution of work on any callout work request without the Engineer’s approval will result in liquidated damages being charged each working day that the callout work request remains incomplete. The dollar amount specified in the contract will be deducted from any money due or to become due the Contractor. This amount will be assessed not as a penalty but as liquidated damages.

The continuous prosecution to completion is an essential element of the contract. Failure to continuously prosecute the work without the Engineer’s approval will result in liquidated damages being charged each working day until work commences. The dollar amount specified in the contract will be deducted from any money due or to become due to the Contractor. This amount will be assessed not as a penalty but as liquidated damages.

When a minimum production rate is shown in the plans, liquidated damages will be charged for each working day the minimum production rate is not met.

Notify the TxDOT office a minimum of 24 hr. before beginning striping operations.

Item 500 – Mobilization:

Mobilization is call-out.

Item 502 – Barricades, Signs, and Traffic Handling:

Provide traffic control in compliance with the latest edition of the “Texas Manual on Uniform Traffic Control Devices” (TMUTCD), the “Traffic Control Standard Sheets” (TCSS), and as directed.

Perform work Monday through Friday during daylight hours. Do not begin work until 30 minutes after sunrise and cease operations 30 minutes before sunset.

If closing a lane is necessary, closure times will be Monday through Friday, 9 A.M. to 3:30 P.M. except for otherwise noted roadways within these plans. Close no more than one lane at a time, unless otherwise approved. Provide proposed lane closure information to the Engineer by 1 P.M. on the day prior to the proposed closures. Furnish information for Monday closures or closures following a national or state holiday on the last office workday prior to the closures. Do not close lanes if the above reporting requirements have not been met.

Nighttime and weekend work will be allowed with prior approval, except for emergency work.

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Lane closures on IH35, IH35W, IH35E, US380 and SH114 main lanes, frontage roads, and ramps will be allowed only at night between 10 P.M. and 5 A.M.

Maximum length of lane closure will be 2 miles.

Traffic Control Plans with a lane closure causing backups of 20 minutes or greater in duration will be modified by the Engineer.

Erect barricades and signs in locations not obstructing the traveling public's view of the normal roadway signing or necessary sight distance.

Provide sufficient and qualified staff and equipment to revise the traffic control as directed.

Trailer all slow-moving vehicles (designed to operate 25 mph or less) crossing freeway main lanes.

When moving unlicensed equipment on or across any pavement or public highways, protect the pavement from all damage using an acceptable method.

Equipment and materials will not be left within 30 ft. of the travel lane during non-working hours.

The work performed, materials furnished and all labor, tools, and equipment necessary to complete the work for Non-Site Specific locations under this Item will not be measured or paid for directly but will be considered subsidiary to the various bid items of this contract.

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

Item 666 – ReflectORIZED Pavement Markings:

The minimum production rate for long line striping is equal to the Material Placement Requirements.

Pavement marking words and arrows details are contained in the Standard Highway Sign Designs for Texas (SHSD).

Placement of markings in proper alignment will be strictly enforced. Irregular lines placed on both sides of the existing markings will not be accepted.

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A gravity flow applicator will be used to funnel the beads onto the stripe. Truck speed will be slow enough to ensure that the beads drop onto the stripe and do not roll in the paint film.

All stripes will be applied in 1 coat.

Layout work will be required where markings have been obliterated, sealed, or overlaid.

All equipment will be capable of maintaining a continuous work schedule to the satisfactory completion of the project. Equipment used for the contract will be equipped with footage counters capable of measuring the linear footage placed. Counters must be calibrated prior to the beginning of striping operations.

Dispose of all empty marking material containers in accordance with all federal, state, and local regulations.

Item 677 – Eliminating Existing Pavement Markings and Markers:

Surface Treatment Method will not be allowed for removal of pavement markings.

Grinding of pavement is not allowed to eliminate pavement markings.

Eliminate existing pavement markings on concrete surfaces before new pavement markings are applied.

A water blasting method approved by the Engineer will be the only method allowed for the removal of permanent and temporary pavement markings except on a seal coat surface. A 2 foot wide seal coat will be required on seal coat surfaces to eliminate permanent and temporary pavement markings.

Item 678 – Pavement Surface Preparation for Markings:

Per Item 9, plans quantity measurement requirements are not applicable.

Item 6001 – Portable Changeable Message Sign:

Provide Portable Changeable Message Signs (PCMS) units as approved.

PCMS will be placed 7 days or as directed prior to the ramp/lane closures.

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Item 6148 – Inverted Profile Pavement Marking (Audible):

Use a crew experienced in the application of the Audible Reflective Pavement Markings, capable of placing the marking in neat straight lines, and in a safe and timely manner. Place the reflective pavement markings in such a manner as to match the existing markings in location, spacing and length. Placement of markings in proper alignment will be strictly enforced. Irregular lines placed on both sides of the existing markings will not be accepted.

Ensure that all equipment will be capable of maintaining a continuous work schedule to the satisfactory completion of the project. Make certain that equipment used for the contract will be equipped with footage counters capable of measuring the linear footage placed. Calibrate counters prior to the beginning of striping operations.

Item 6185 – Truck Mounted Attenuators (TMA):

The total number of truck mounted attenuators (TMA) required when utilizing the traffic control standards are shown in the tables below.

| TCP 1 Series | Scenario | Required TMA |
|--------------|----------|--------------|
| (1-2)-18 | | 1 |
| (1-3)-18 | A | 1 |
| | B | 2 |
| (1-4)-18 | | 1 |

| TCP 3 Series | Scenario | Required TMA |
|--------------|----------|--------------|
| (3-1)-13 | All | 2 |
| (3-2)-13 | All | 3 |
| (3-3)-14 | A | 2 |
| | B | 2 |
| | C | 3 |
| | D | 2 |

| TCP 6 Series | Scenario | Required TMA |
|--------------|----------|--------------|
| (6-1)-12 | A | 1 |
| | B | 2 |
| (6-2)-12 | All | 1 |
| (6-3)-12 | All | 1 |

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| | | |
|----------|-----|------------|
| (6-4)-12 | A | 1 |
| | B | 2 |
| (6-5)-12 | A | 1 |
| | B | 2 |
| (6-6)-12 | All | 1 Per Lane |

Shadow vehicles equipped for truck mounted attenuators (TMA) for mobile and stationary operations must be available for use at any time as determined by the Engineer.

The Contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA needed for the project for those times per plan requirements. Additional TMAs used that are not specified in the plans in which the Contractor expects compensation will require prior approval from the Engineer.

SUMMARY OF PAVEMENT MARKING ITEMS

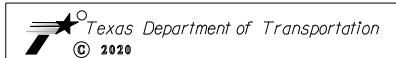
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|-----------------------|---------------------------------------|---------------------------------------|--|---------------------------------------|---|---|--------------------------------------|--|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| | REFL PAV MRK TY I (W)4"(DOT)(10 OMIL) | REFL PAV MRK TY I (W)8"(SLD)(10 OMIL) | REFL PAV MRK TY I (W)24"(SLD)(10 OMIL) | REFL PAV MRK TY I (W)(ARROW)(10 OMIL) | REFL PAV MRK TY I(W)(DBL ARROW)(100MIL) | REFL PAV MRK TY I(W)(UTURN ARW)(100MIL) | REFL PAV MRK TY I (W)(WORD)(10 OMIL) | REFL PAV MRK TY I (Y)12"(SLD)(10 OMIL) | REFL PAV MRK TY II (W) 4" (BRK) | REFL PAV MRK TY II (W) 4" (SLD) | REFL PAV MRK TY II (W) 6" (BRK) | REFL PAV MRK TY II (W) 6" (SLD) | REFL PAV MRK TY II (W) 8" (SLD) |
| | LF | LF | LF | EA | EA | EA | EA | LF | LF | LF | LF | LF | LF |
| NON-SITE SPECIFIC | 500 | 2500 | 250 | 10 | 10 | 2 | 10 | 200 | 20000 | 100000 | 500 | 500 | 5000 |
| PROJECT TOTALS | 500 | 2500 | 250 | 10 | 10 | 2 | 10 | 200 | 20000 | 100000 | 500 | 500 | 5000 |

| LOCATION | 666 6207 | 666 6210 | 666 6211 | 666 6260 | 666 6300 | 666 6303 | 666 6306 | 666 6309 | 666 6315 | 666 6321 | 677 6001 | 677 6002 | 677 6003 |
|-----------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------------|--|--|--|--|--|--|------------------------------|------------------------------|------------------------------|
| | REFL PAV MRK TY II (Y) 4" (SLD) | REFL PAV MRK TY II (Y) 6" (SLD) | REFL PAV MRK TY II (Y) 8" (SLD) | RE PM TY I(W)8"(SLD)(100MIL)(CALLOUT) | RE PM W/RET REQ TY I (W)4"(BRK)(10 OMIL) | RE PM W/RET REQ TY I (W)4"(SLD)(10 OMIL) | RE PM W/RET REQ TY I (W)6"(BRK)(10 OMIL) | RE PM W/RET REQ TY I (W)6"(SLD)(10 OMIL) | RE PM W/RET REQ TY I (Y)4"(SLD)(100 MIL) | RE PM W/RET REQ TY I (Y)6"(SLD)(100 MIL) | ELIM EXT PAV MRK & MRKS (4") | ELIM EXT PAV MRK & MRKS (6") | ELIM EXT PAV MRK & MRKS (8") |
| | LF | LF | LF | LF | LF | LF | LF | LF | LF | LF | LF | LF | LF |
| NON-SITE SPECIFIC | 100000 | 100 | 100 | 5000 | 10000 | 35000 | 500 | 500 | 15000 | 500 | 60500 | 1600 | 7600 |
| PROJECT TOTALS | 100000 | 100 | 100 | 5000 | 10000 | 35000 | 500 | 500 | 15000 | 500 | 60500 | 1600 | 7600 |

| LOCATION | 677 6005 | 677 6007 | 677 6008 | 677 6009 | 677 6012 | 677 6036 | 678 6001 | 678 6002 | 678 6004 | 678 6006 | 678 6008 | 678 6009 | 678 6010 |
|-----------------------|-------------------------------|-------------------------------|---------------------------------|-------------------------------------|--------------------------------|---------------------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|-------------------------------|-----------------------------------|
| | ELIM EXT PAV MRK & MRKS (12") | ELIM EXT PAV MRK & MRKS (24") | ELIM EXT PAV MRK & MRKS (ARROW) | ELIM EXT PAV MRK & MRKS (DBL ARROW) | ELIM EXT PAV MRK & MRKS (WORD) | ELIM EXT PAV MRK & MRKS (UTURN ARROW) | PAV SURF PREP FOR MRK (4") | PAV SURF PREP FOR MRK (6") | PAV SURF PREP FOR MRK (8") | PAV SURF PREP FOR MRK (12") | PAV SURF PREP FOR MRK (24") | PAV SURF PREP FOR MRK (ARROW) | PAV SURF PREP FOR MRK (DBL ARROW) |
| | LF | LF | EA | EA | EA | EA | LF | LF | LF | LF | LF | EA | EA |
| NON-SITE SPECIFIC | 200 | 250 | 10 | 10 | 10 | 2 | 60500 | 1600 | 7600 | 200 | 250 | 10 | 10 |
| PROJECT TOTALS | 200 | 250 | 10 | 10 | 10 | 2 | 60500 | 1600 | 7600 | 200 | 250 | 10 | 10 |

| LOCATION | 678 6012 | 678 6016 | 6148 6005 | 6148 6006 |
|-----------------------|-----------------------------------|------------------------------|-------------------------------------|-------------------------------------|
| | PAV SURF PREP FOR MRK (UTURN ARR) | PAV SURF PREP FOR MRK (WORD) | INV PROV PAV MRK (AUD) (Y) 4" (SLD) | INV PROV PAV MRK (AUD) (Y) 4" (BRK) |
| | EA | EA | LF | LF |
| NON-SITE SPECIFIC | 2 | 10 | 8000 | 2000 |
| PROJECT TOTALS | 2 | 10 | 8000 | 2000 |

SHEET 1 OF 1

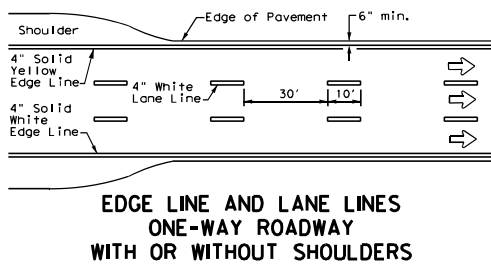


SUMMARY SHEET

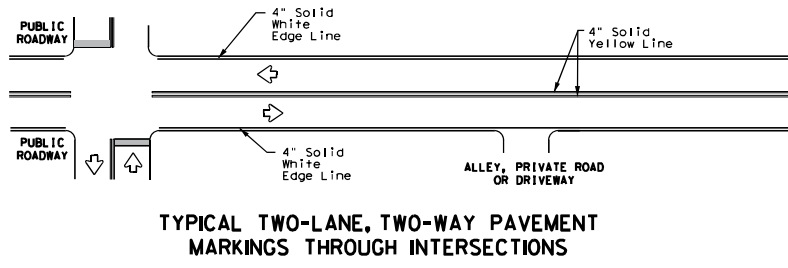
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| SCALE: | | | |
| DESIGN DMH | FED. RD. DIV. NO. | MAINTENANCE PROJECT | HIGHWAY NO. |
| GRAPHICS DMH | 6 | RMC-636378001 | H0035W |
| CHECK DMH | STATE | DISTRICT | COUNTY |
| CHECK DMH | TEXAS | DALLAS | DENTON |
| CHECK DMH | CONTROL | SECTION | JOB |
| | 6363 | 78 | 001 |
| | | | 4 |

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

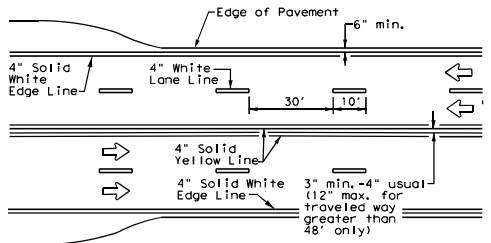
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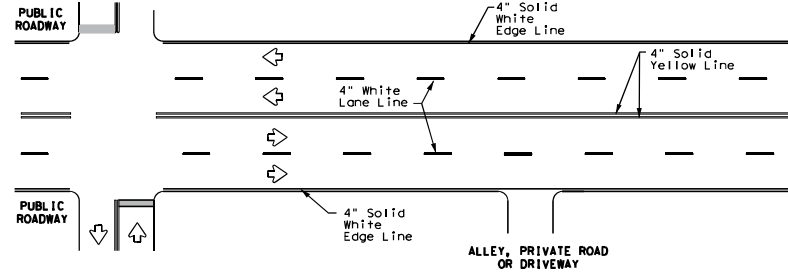
**EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



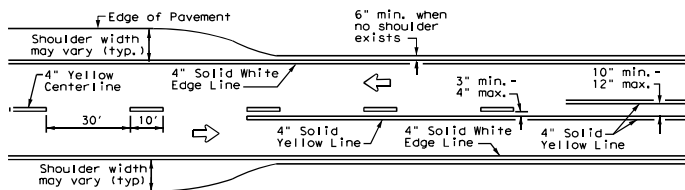
**TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



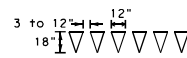
**CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



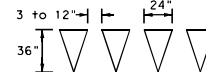
**TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



**TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**

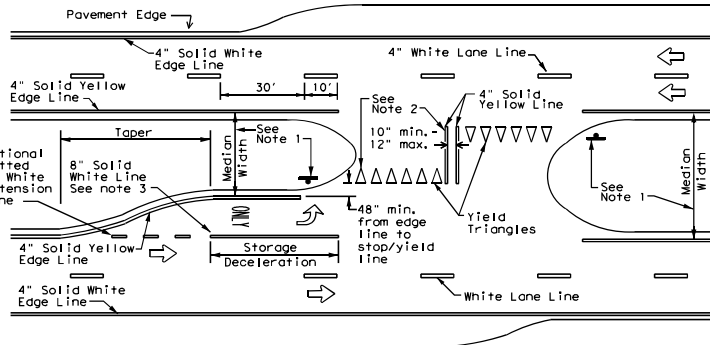


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater centerline can be placed. Stop bars shall only be used with stop signs. Yield triangles shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

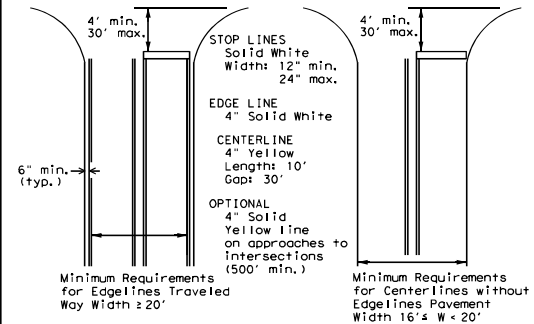
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement leveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of the edgeline to the inside of edgeline of a two lane roadway.

MATERIAL SPECIFICATIONS

| | |
|---|----------|
| PAVEMENT MARKERS (REFLECTORIZED) | DMS-4200 |
| EPOXY AND ADHESIVES | DMS-6100 |
| BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS | DMS-6130 |
| TRAFFIC PAINT | DMS-8200 |
| HOT APPLIED THERMOPLASTIC | DMS-8220 |
| PERMANENT PREFABRICATED PAVEMENT MARKINGS | DMS-8240 |

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Minimum Requirements for Edgelines Traveled Way Width $\geq 20'$

Minimum Requirements for Centerlines without Edgelines Pavement Width $16' \leq W < 20'$

**GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE**

Based on Traveled Way and Pavement Widths for Undivided Highways



Texas Department of Transportation
Traffic Safety Division Standard

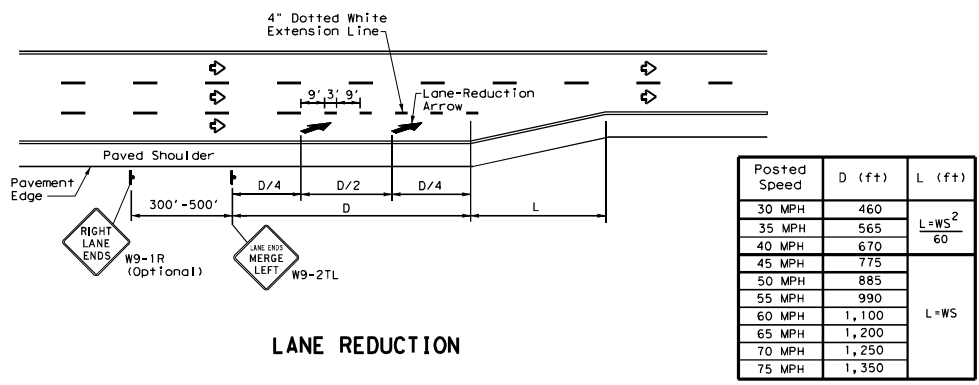
**TYPICAL STANDARD
PAVEMENT MARKINGS**

PM(1)-20

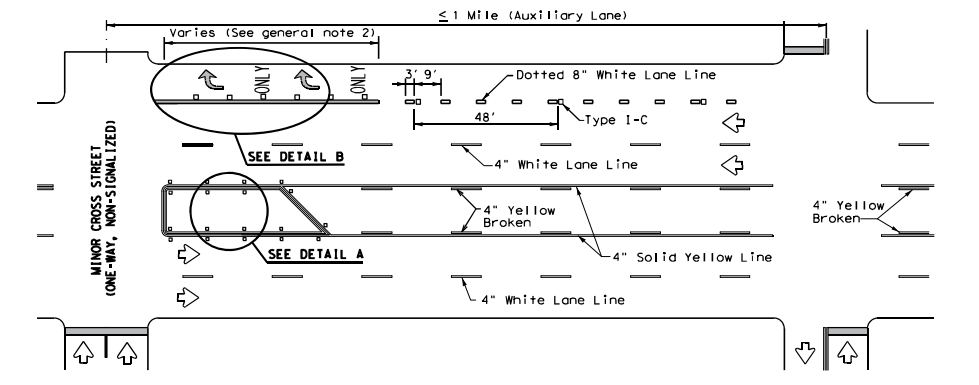
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| FILE: pml-20.dgn | DATE: 11/01/2018 | BY: [initials] | CHK: [initials] | DATE: [initials] | CHK: [initials] |
| © TxDOT November 1978 | CONT: 6363 | SECT: 78 | JOB: 001 | HIGHWAY: IH0035W | SHEET NO.: |
| 8-95 3-03 REVISIONS | DIST: 5-00 | 2-12 | COUNTY: DAL | DENTON | 5 |
| 8-00 6-20 | | | | | |

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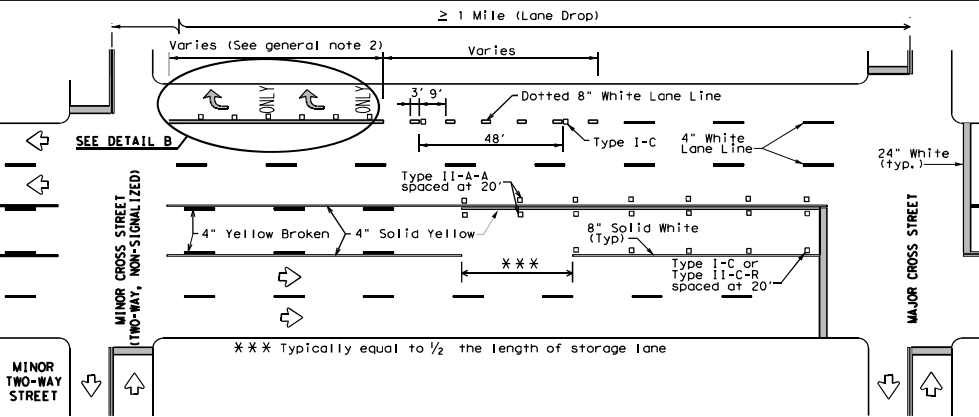
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LANE REDUCTION



TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



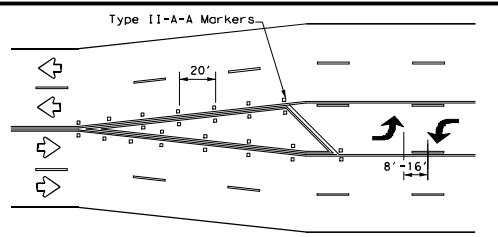
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP

NOTES

- Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
- On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
- Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
- For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

GENERAL NOTES

- Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
- When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
- Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
- Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

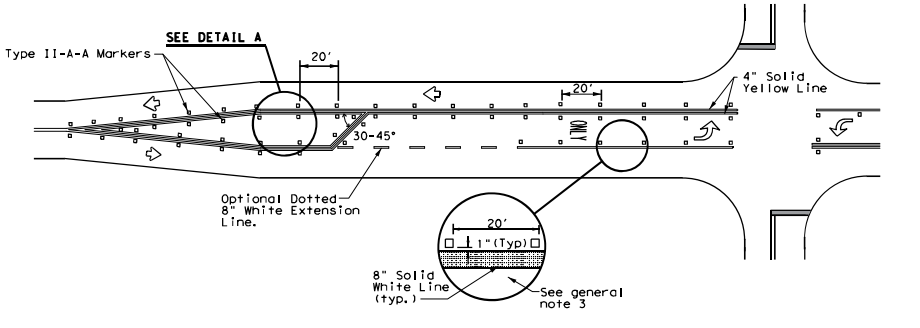


A two-way left-turn (TWLTL) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

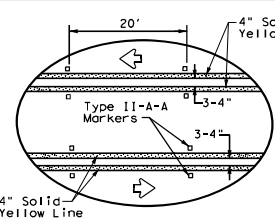
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

| MATERIAL SPECIFICATIONS | |
|---|----------|
| PAVEMENT MARKERS (REFLECTORIZED) | DMS-4200 |
| EPOXY AND ADHESIVES | DMS-6100 |
| BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS | DMS-6130 |
| TRAFFIC PAINT | DMS-8200 |
| HOT APPLIED THERMOPLASTIC | DMS-8220 |
| PERMANENT PREFABRICATED PAVEMENT MARKINGS | DMS-8240 |

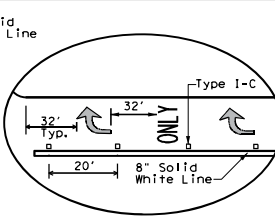
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A



DETAIL B

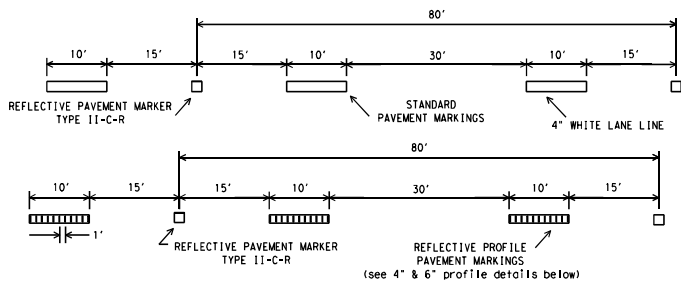
Texas Department of Transportation
 Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

| | | | | |
|---------------------|-------|---------|-----------|----------|
| FILE: pm3-20.dgn | DATE: | CHK1: | CHK2: | CHK3: |
| © TxDOT April 1998 | CONT: | SECT: | JOB: | HIGHWAY: |
| 5-00 2-10 REVISIONS | 6363 | 78 | 001 | IH0035W |
| 8-00 2-12 | DIST: | COUNTY: | SHEET NO. | |
| 3-03 6-20 | DAL | DENTON | 7 | |

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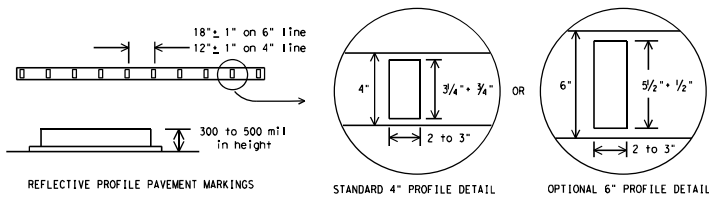
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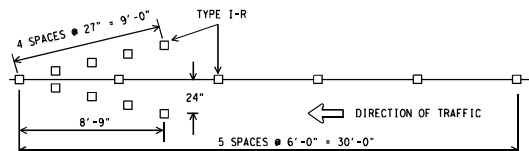
PAVEMENT MARKERS (REFL) TYPE II-C-R SHALL BE SPACED ON 80' CENTERS WITH THE CLEAR FACE TOWARD NORMAL TRAFFIC AND THE RED FACE TOWARD WRONG WAY TRAFFIC.

TRAFFIC LANE LINES PAVEMENT MARKING DETAILS

EDGE LINES SHOULD TYPICALLY BE 4" WIDE AND THE MATERIALS SHALL BE AS SPECIFIED IN THE PLANS. IF RAISED PROFILE PAVEMENT MARKINGS ARE USED SEE DETAILS BELOW.

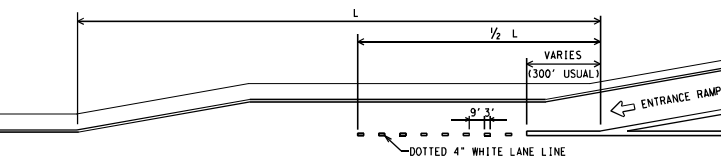


EDGE LINE PAVEMENT MARKINGS

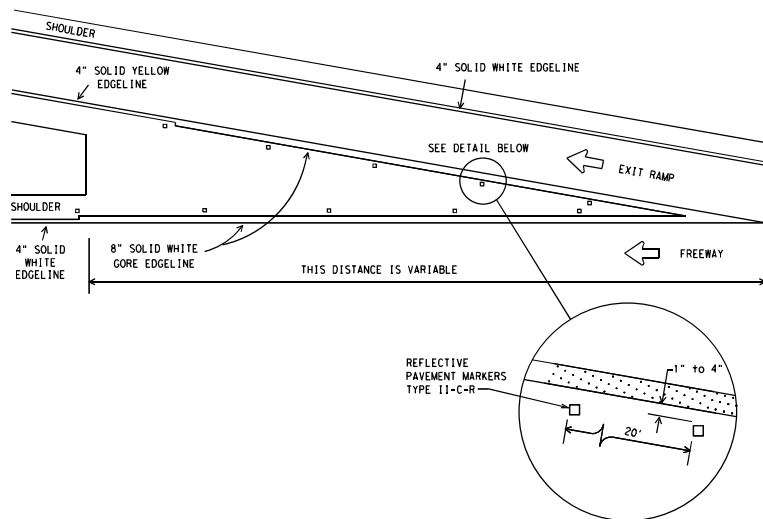


ALL RAISED MARKERS IN THE WRONG WAY ARROW SHALL BE TYPE I-R REFLECTORIZED PAVEMENT MARKERS WITH THE REFLECTORIZED SURFACE FACING THE WRONG WAY TRAFFIC. TYPE II-C-R SHALL NOT BE USED. REFLECTORIZED WRONG WAY ARROWS, NOT TO EXCEED TWO, MAY BE PLACED ON EXIT RAMP. LOCATION OF THE ARROWS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

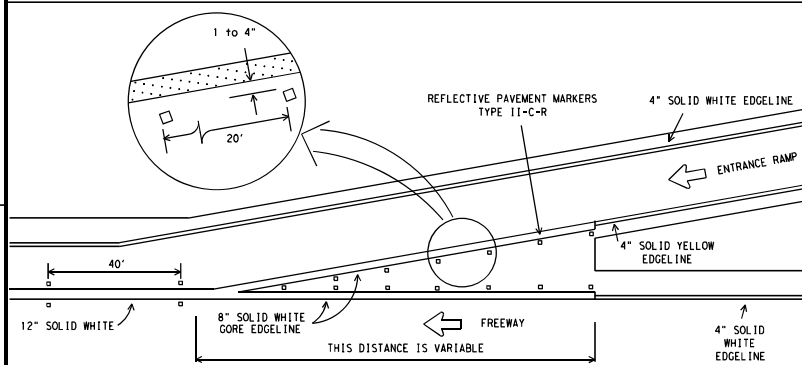
WRONG WAY ARROW DETAIL



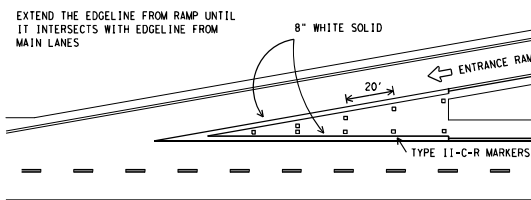
PARALLEL ACCELERATION LANE



TYPICAL EXIT RAMP GORE MARKING



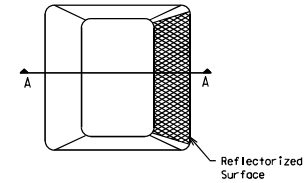
TYPICAL ENTRANCE RAMP GORE MARKING



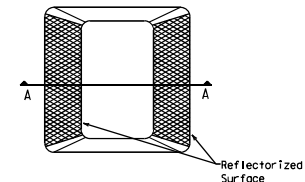
TAPERED ACCELERATION LANE

| MATERIAL SPECIFICATIONS | |
|---|----------|
| PAVEMENT MARKERS (REFLECTORIZED) | DMS-4200 |
| EPOXY AND ADHESIVES | DMS-6100 |
| BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS | DMS-6130 |
| TRAFFIC PAINT | DMS-8200 |
| HOT APPLIED THERMOPLASTIC | DMS-8220 |
| PERMANENT PREFABRICATED PAVEMENT MARKINGS | DMS-8240 |

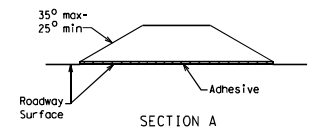
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS WITH RAISED PAVEMENT MARKERS

FPM(1)-12

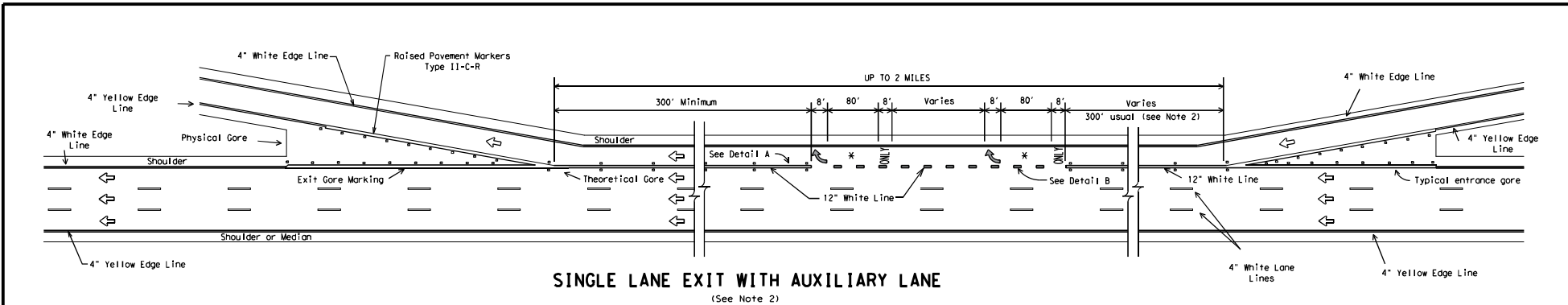
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|-----------|------|------|----|------|------|----|------|
| 4-92 | 2-10 | | | | | | |
| 5-00 | 2-12 | | | | | | |
| 8-00 | | | | | | | |
| 2-08 | | | | | | | |

| CONTRACT NO. | SECTION | JOB NO. | HIGHWAY |
|--------------|---------|-----------|---------|
| 6363 | 78 | 001 | 1H0035W |
| DISTRICT | COUNTY | SHEET NO. | |
| DAL | DENTON | 8 | |

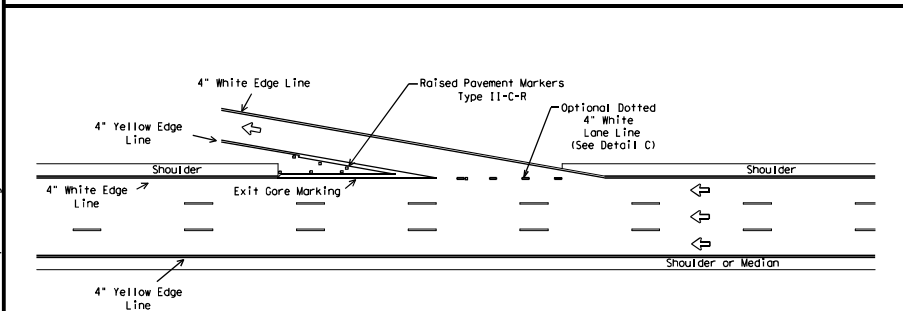
23A

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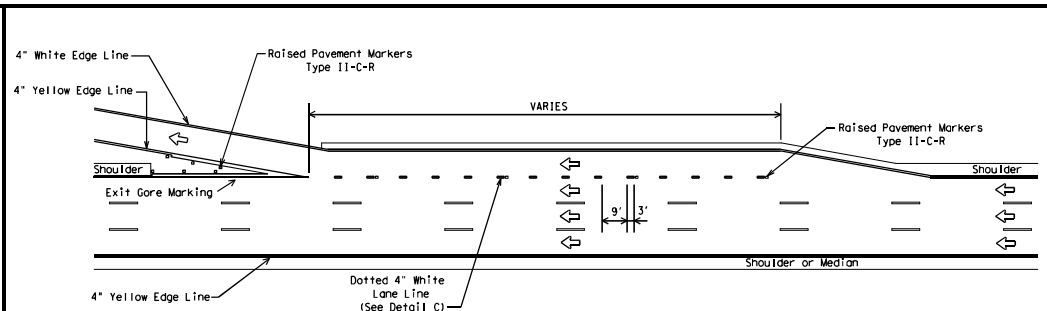
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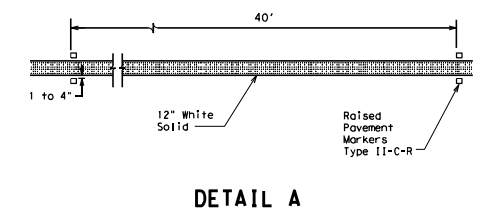
SINGLE LANE EXIT WITH AUXILIARY LANE
(See Note 2)



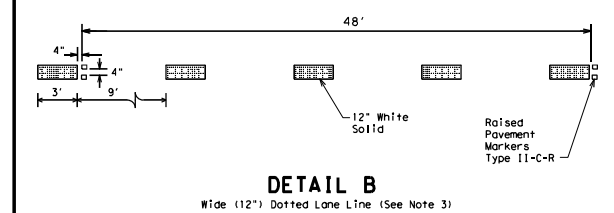
TAPERED DECELERATION LANE



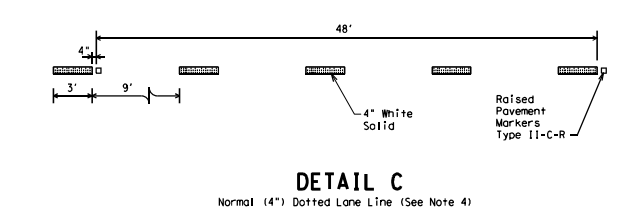
PARALLEL DECELERATION LANE



DETAIL A



DETAIL B
Wide (12") Dotted Lane Line (See Note 3)



DETAIL C
Normal (4") Dotted Lane Line (See Note 4)

GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") Dotted Lane Line (See Detail B) is used to separate a through lane from a lane drop at normal exit ramp and from an auxiliary lane between an entrance and exit ramp.
4. Normal (4") Dotted Lane Line (See Detail C) is used at parallel acceleration and deceleration lanes.

| LEGEND | |
|--------|--|
| ← | Denotes direction of traffic. |
| ↔ | Pavement marking arrows (white) |
| ✱ | Arrow markings are optional, however "ONLY" is required if arrow is used |

| MATERIAL SPECIFICATIONS | |
|---|----------|
| PAVEMENT MARKERS (REFLECTORIZED) | DMS-4200 |
| EPOXY AND ADHESIVES | DMS-6100 |
| BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS | DMS-6130 |
| TRAFFIC PAINT | DMS-8200 |
| HOT APPLIED THERMOPLASTIC | DMS-8220 |
| PERMANENT PREFABRICATED PAVEMENT MARKINGS | DMS-8240 |

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

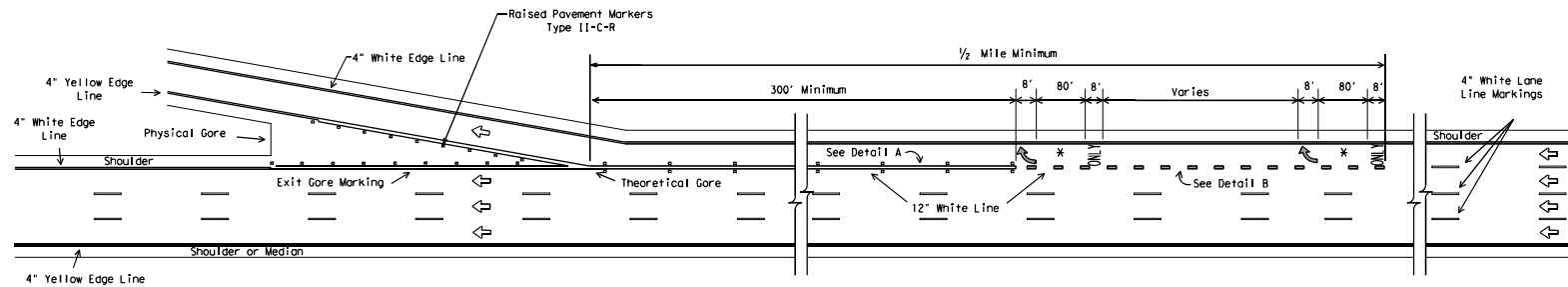


**TYPICAL STANDARD
FREEWAY PAVEMENT MARKINGS
ENTRANCE AND EXIT RAMP**
FPM(2)-12

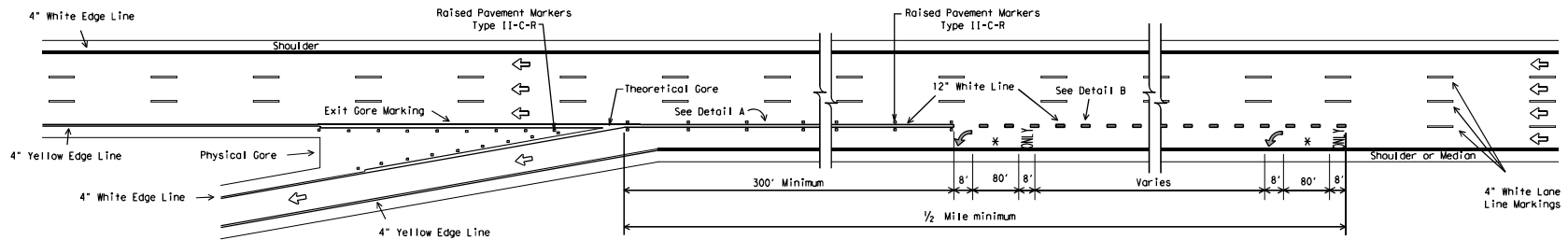
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| © TxDOT February 1977 | | DN: TXDOT | CK: TXDOT | DN: TXDOT | CK: TXDOT |
| REVISIONS | | CONT | SECT | JOB | HIGHWAY |
| 4-92 | 2-10 | 6363 | 78 | 001 | IH0035W |
| 8-95 | 2-12 | | | | |
| 5-00 | | DIST | | COUNTY | SHEET NO. |
| 8-00 | | DAL | | DENTON | 9 |

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DATE: 10/29/2020 7:26:09 PM
 FILE: t:\denmont\print_projects\004_rmc\1-6363-78-001-oncall pavement_markings\plans\10-fpm3-12.dgn



SINGLE LANE EXIT - LANE DROP OR EXIT ONLY

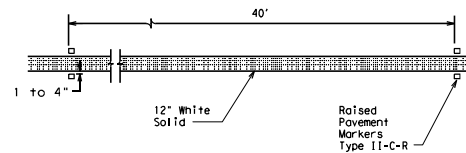


SINGLE LANE EXIT - LANE DROP OR EXIT ONLY (LEFTHAND)

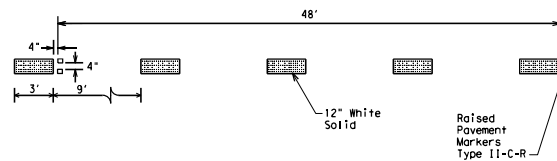
| LEGEND | |
|--------|--|
| | Denotes direction of traffic. |
| | Pavement marking arrows (white) |
| | Arrow markings are optional, however "ONLY" is required if arrow is used |

GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") Dotted Lane Line (See Detail B) is used to separate a through lane from a lane drop at normal exit ramp and from an auxiliary lane between an entrance and exit ramp.



DETAIL A



DETAIL B

Wide (12") Dotted Lane Line (See Note 3)

| MATERIAL SPECIFICATIONS | |
|---|----------|
| PAVEMENT MARKERS (REFLECTORIZED) | DMS-4200 |
| EPOXY AND ADHESIVES | DMS-6100 |
| BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS | DMS-6130 |
| TRAFFIC PAINT | DMS-8200 |
| HOT APPLIED THERMOPLASTIC | DMS-8220 |
| PERMANENT PREFABRICATED PAVEMENT MARKINGS | DMS-8240 |

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

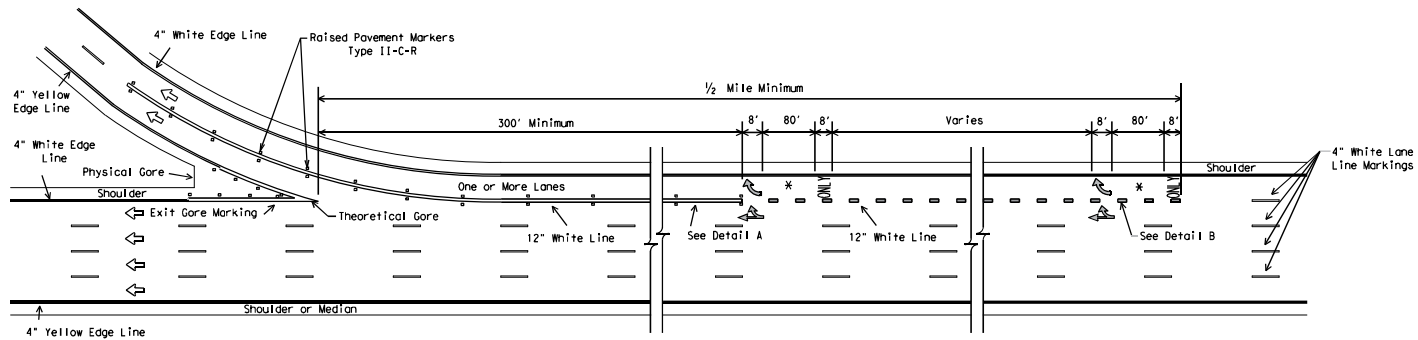


**TYPICAL STANDARD
FREEWAY PAVEMENT MARKINGS
LANE DROP (EXIT ONLY) EXIT RAMP
FPM(3)-12**

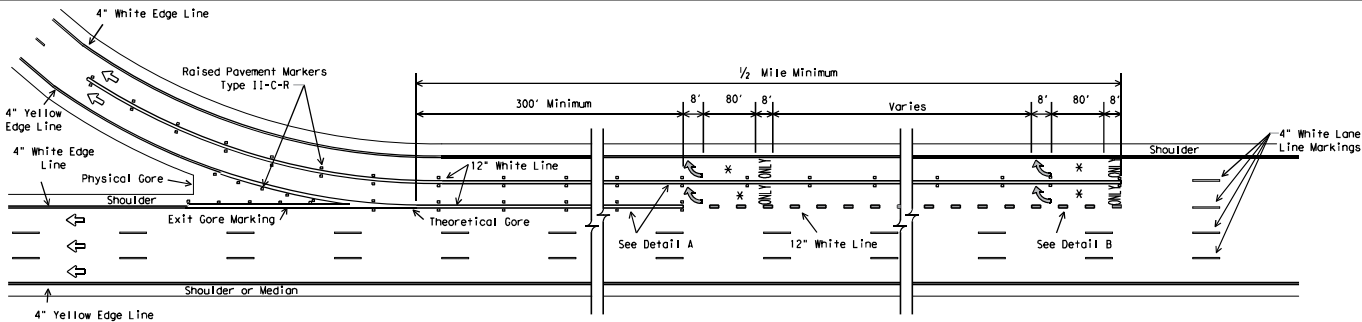
| REVISIONS | | DATE | BY | CHKD | APP'D | JOB | HIGHWAY |
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| 5-00 | | 08-00 | 6363 | 78 | 001 | IH0035W | |
| 2-10 | | | | | | | |
| 2-12 | | | | | | | |
| | | DIST | COUNTY | SHEET NO. | | | |
| | | DAL | DENTON | 10 | | | |

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DATE: 10/29/2020 7:26:13 PM
 FILE: t:\denmont\mnt\proj\projects\004_rmc\1-6363-78-001-oncall pavement_markings\plans\11-fpm4-12.dgn



MULTIPLE LANE EXIT - EXIT ONLY WITH OPTION LANE

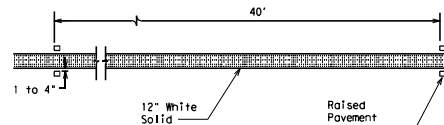


MULTIPLE LANE EXIT ONLY

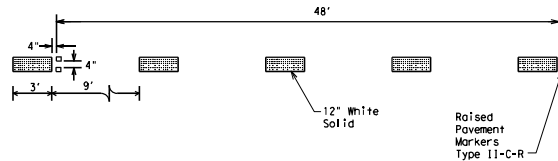
| LEGEND | |
|--------|--|
| ← | Denotes direction of traffic |
| ↪ | Pavement marking arrow (white) |
| ↪ | Optional Pavement Marking Arrows (white) |
| * | Arrow markings are optional, however "ONLY" is required if arrow is used |

GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") Dotted Lane Line (See Detail B) is used to separate a through lane from a lane drop at normal exit ramp and from an auxiliary lane between an entrance and exit ramp.



DETAIL A



DETAIL B

Wide (12") Dotted Lane Line (See Note 3)

| MATERIAL SPECIFICATIONS | |
|---|----------|
| PAVEMENT MARKERS (REFLECTORIZED) | DMS-4200 |
| EPOXY AND ADHESIVES | DMS-6100 |
| BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS | DMS-6130 |
| TRAFFIC PAINT | DMS-8200 |
| HOT APPLIED THERMOPLASTIC | DMS-8220 |
| PERMANENT PREFABRICATED PAVEMENT MARKINGS | DMS-8240 |

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

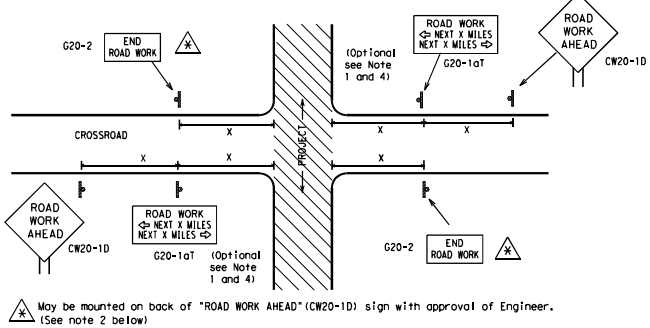


**TYPICAL STANDARD
 FREEWAY PAVEMENT MARKINGS
 LANE DROP (EXIT ONLY) DETAILS
 FPM(4)-12**

| REVISIONS | | DATE | BY | CHKD | DATE | BY |
|-----------|--|------|----|------|------|----|
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| 8-00 | | | | | | |
| 2-10 | | | | | | |
| 2-12 | | | | | | |

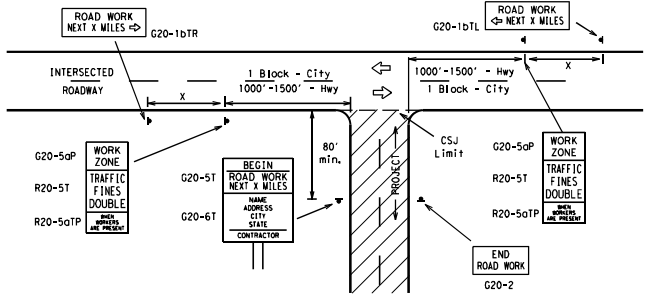
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TYPICAL LOCATION OF CROSSROAD SIGNS



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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING¹⁵⁻⁶

| Sign Number or Series | SIZE | | SPACING | |
|---------------------------------------|-------------------|--------------------|------------------|-------------------|
| | Conventional Road | Expressway/Freeway | Posted Speed MPH | Sign Spacing "X" |
| CW20 ⁴ | 48" x 48" | 48" x 48" | 30 | 120 |
| CW21 | | | 35 | 160 |
| CW22 | | | 40 | 240 |
| CW23 | | | 45 | 320 |
| CW25 | | | 50 | 400 |
| CW1, CW2, CW7, CW8, CW9, CW11, CW14 | 36" x 36" | 48" x 48" | 55 | 500 ² |
| | | | 60 | 600 ² |
| | | | 65 | 700 ² |
| | | | 70 | 800 ² |
| | | | 75 | 900 ² |
| CW3, CW4, CW5, CW6, CW8-3, CW10, CW12 | 48" x 48" | 48" x 48" | 80 | 1000 ² |
| | | | * | * |
| | | | * | * |

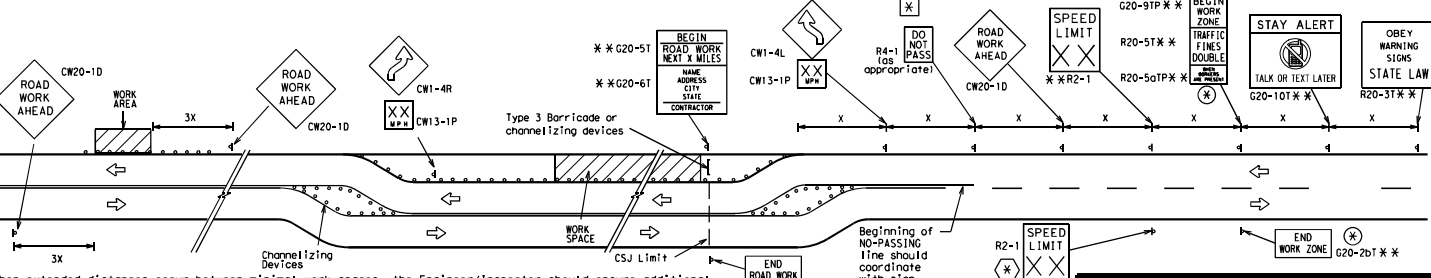
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

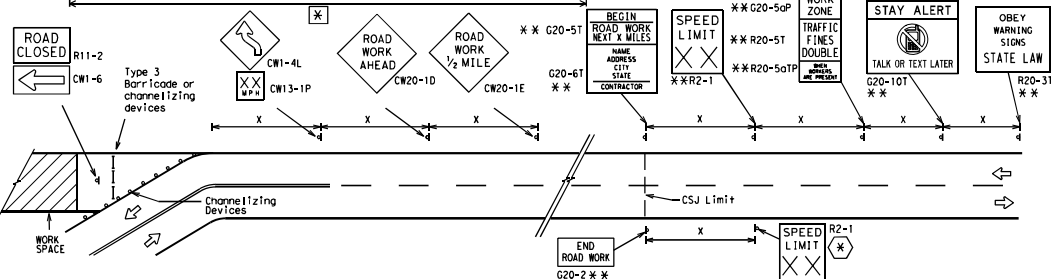
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



NOTES

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "x" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- (*) The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
- ** Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.
- (X) Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
- (*) Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND

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

SHEET 2 OF 12

Texas Department of Transportation
Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

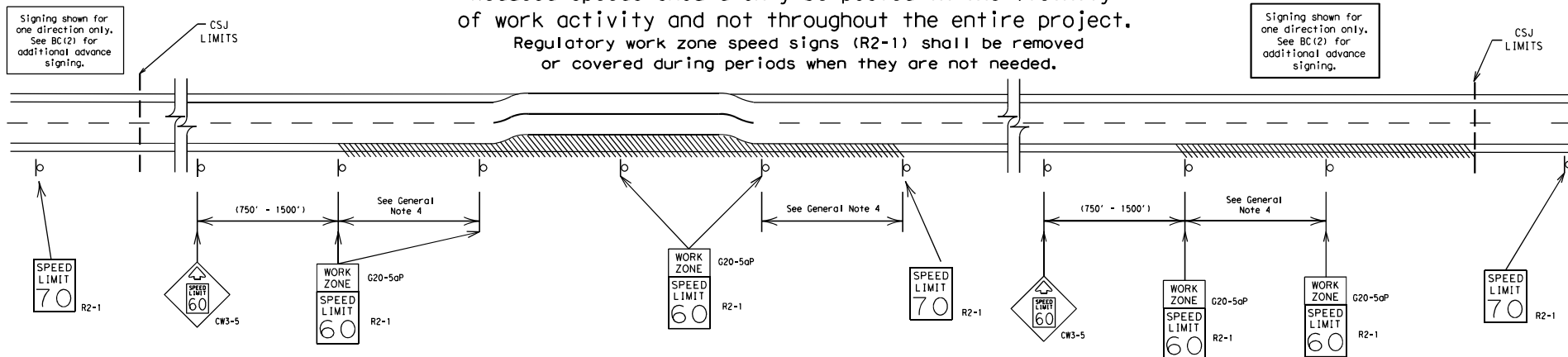
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| 9-07 8-14 | DIST: | COUNTY: | SHEET NO. | |
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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

- 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 travelled 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" (CW3-5) sign, "WORK ZONE" (G20-5aP) plaque and the "SPEED LIMIT" (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
- 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.

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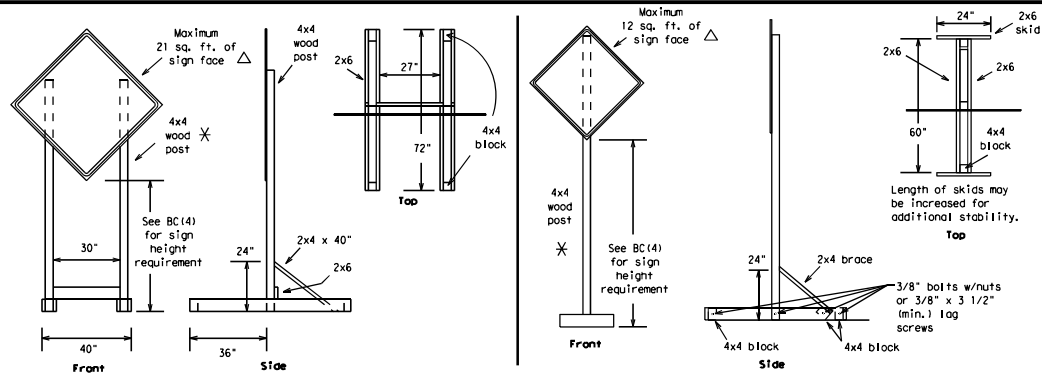
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SHEET 3 OF 12

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| Texas Department of Transportation | | Traffic Operations Division Standard |
| <h2 style="margin: 0;">BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT</h2> | | |
| <h3 style="margin: 0;">BC (3) - 14</h3> | | |
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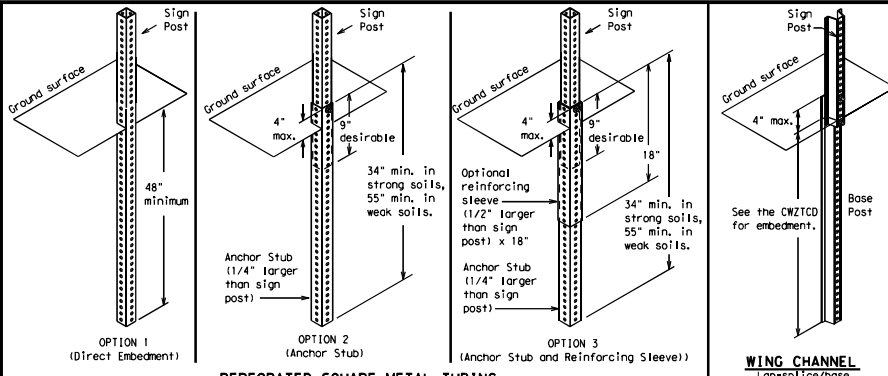
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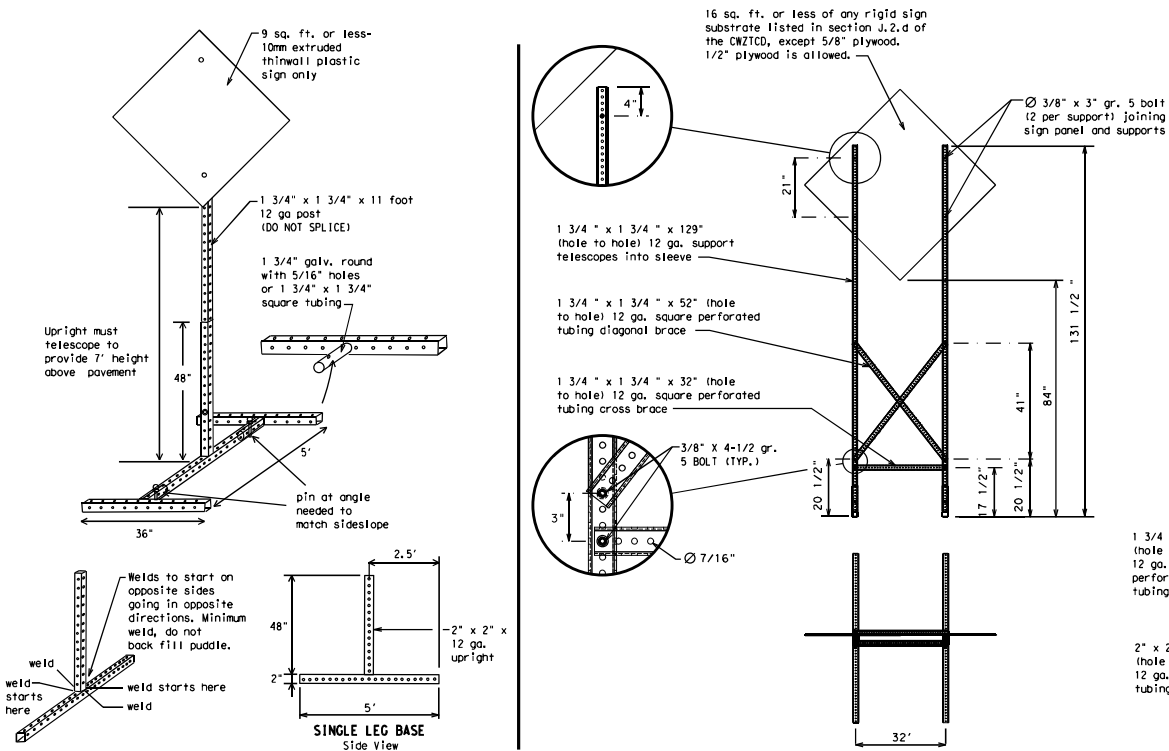
SKID MOUNTED WOOD SIGN SUPPORTS

LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □



GROUND MOUNTED SIGN SUPPORTS

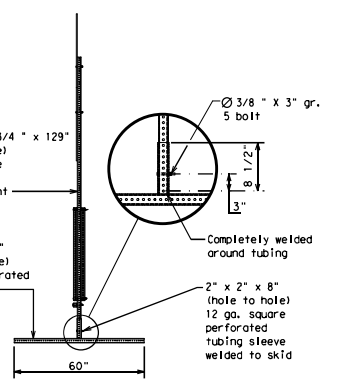
Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support. The maximum sign square footage shall adhere to the manufacturer's recommendation. Two post installations can be used for larger signs.



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS

| Nominal Post Size | Number of Posts | Maximum Sq. feet of Sign Face | Minimum Soil Embedment | Drilled Hole(s) Required |
|-------------------|-----------------|-------------------------------|------------------------|--------------------------|
| 4 x 4 | 1 | 12 | 36" | NO |
| 4 x 4 | 2 | 21 | 36" | NO |
| 4 x 6 | 1 | 21 | 36" | YES |
| 4 x 6 | 2 | 36 | 36" | YES |



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

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

GENERAL NOTES

- Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 1 1/2" lag screws must be used on every joint for final connection.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
- When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

□ See BC(4) for definition of "Work Duration."
 ✕ Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
 △ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12
 Texas Department of Transportation
 Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 14

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

| | |
|-----------------------|--------------------------|
| FREEWAY CLOSED X MILE | FRONTAGE ROAD CLOSED |
| ROAD CLOSED AT SH XXX | SHOULDER CLOSED XXX FT |
| RIGHT X LANES CLOSED | RIGHT LN CLOSED XXX FT |
| CENTER LANE CLOSED | DAYTIME LANE CLOSURES |
| NIGHT LANE CLOSURES | I-XX SOUTH EXIT CLOSED |
| VARIOUS LANES CLOSED | EXIT XXX CLOSED X MILE |
| EXIT CLOSED | RIGHT LN TO BE CLOSED |
| MALL DRIVEWAY CLOSED | X LANES CLOSED TUE - FRI |
| XXXXXXXX BLVD CLOSED | |

Other Condition List

| | |
|--------------------------|-------------------------|
| ROADWORK XXX FT | ROAD REPAIRS XXXX FT |
| FLAGGER XXXX FT | LANE NARROWS XXXX FT |
| RIGHT LN TRAFFIC XXXX FT | TWO-WAY TRAFFIC XX MILE |
| MERGING TRAFFIC XXXX FT | CONST TRAFFIC XXX FT |
| LOOSE GRAVEL XXXX FT | UNEVEN LANES XXXX FT |
| DETOUR X MILE | ROUGH ROAD XXXX FT |
| ROADWORK PAST SH XXXX | ROADWORK NEXT FRI-SUN |
| BUMP XXXX FT | US XXX EXIT X MILES |
| TRAFFIC SIGNAL XXXX FT | LANES SHIFT * |

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

| | |
|----------------------|----------------------|
| MERGE RIGHT | FORM X LINES RIGHT |
| DETOUR NEXT X EXITS | USE XXXXX RD EXIT |
| USE EXIT XXX | USE EXIT I-XX NORTH |
| STAY ON US XXX SOUTH | USE I-XX E TO I-XX N |
| TRUCKS USE US XXX N | WATCH FOR TRUCKS |
| WATCH FOR TRUCKS | EXPECT DELAYS |
| EXPECT DELAYS | PREPARE TO STOP |
| REDUCE SPEED XXX FT | END SHOULDER USE |
| USE OTHER ROUTES | WATCH FOR WORKERS |
| STAY IN LANE * | |

Location List

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

Warning List

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

**** Advance Notice List**

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

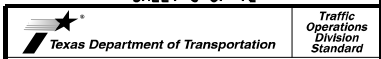
PCMS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE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

FULL MATRIX PCMS SIGNS

- When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
- When symbol signs, such as the "Flagger Symbol" (CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
- When 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.
- A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

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

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



BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

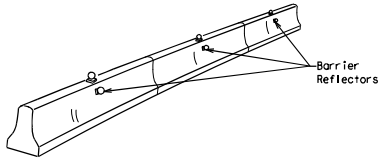
BC (6) - 14

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| 9-07 | 8-14 | DIST | COUNTY | SHEET NO. | |
| 7-13 | | DAL | DENTON | 17 | |

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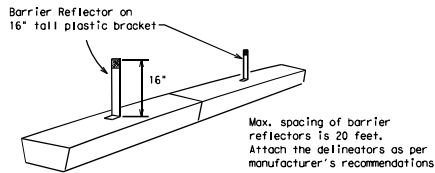
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors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

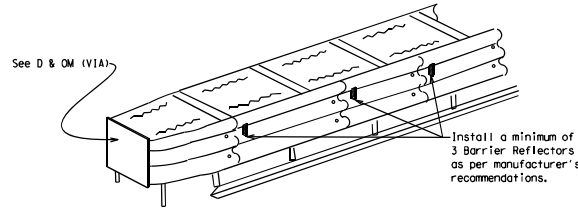


CONCRETE TRAFFIC BARRIER (CTB)

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



LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

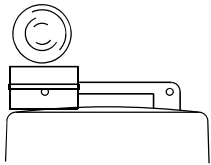
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B₁ or C₁ Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
- Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
- When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.



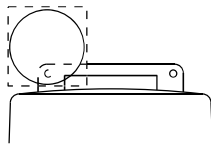
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

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

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

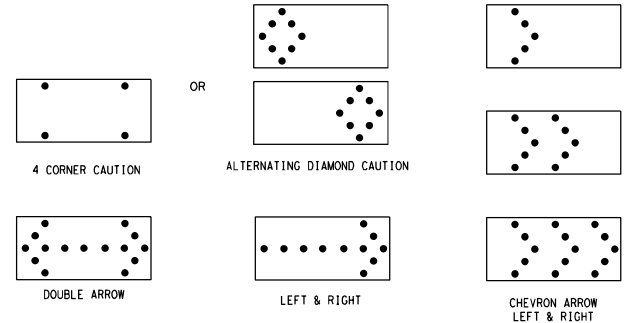
- A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
- The warning reflector shall be yellow in color and shall be manufactured using a sign substrate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



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

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

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



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

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

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

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

FLASHING ARROW BOARDS

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
- The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.



Traffic Operations Division Standard

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

BC(7) - 14

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| REVISED: November 2002 | CONT: 6363 | SECT: 78 | JOB: 001 | HIGHWAY: IH0035W |
| 9-07 | DIST: DAL | 8-14 | COUNTY: DENTON | SHEET NO: 18 |
| 7-13 | | | | |

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

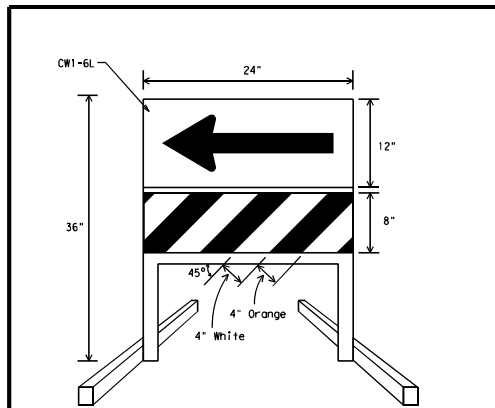
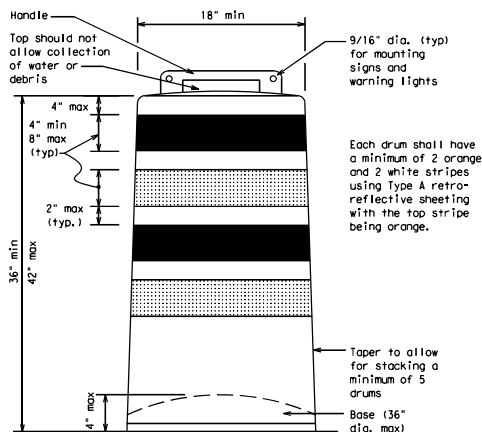
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

RETROREFLECTIVE SHEETING

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

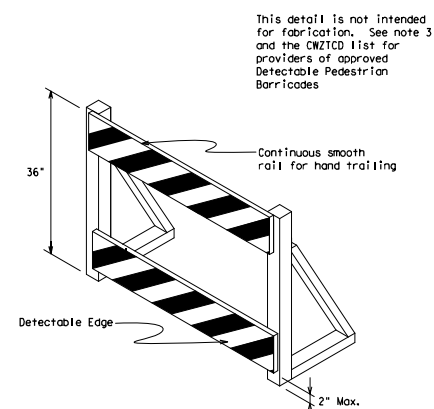
BALLAST

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



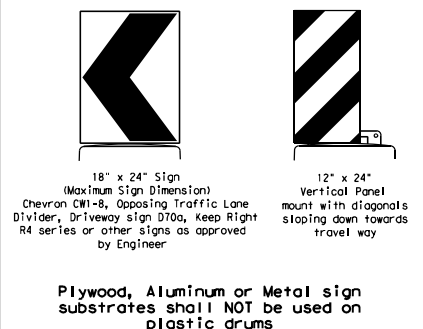
DIRECTION INDICATOR BARRICADE

- The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
- If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
- The Direction Indicator Barricade shall consist of one-Direction Large Arrow (CW1-6L) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
- Double arrows on the Direction Indicator Barricade will not be allowed.
- Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.



DETECTABLE PEDESTRIAN BARRICADES

- When existing pedestrian facilities are disrupted, closed, or relocated in a TIO zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.
- Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
- Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, or wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
- Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" and should not be used as a control for pedestrian movements.
- Warning lights shall not be attached to detectable pedestrian barricades.
- Detectable pedestrian barricades may use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

SHEET 8 OF 12

Texas Department of Transportation
 Traffic Operations Division Standard

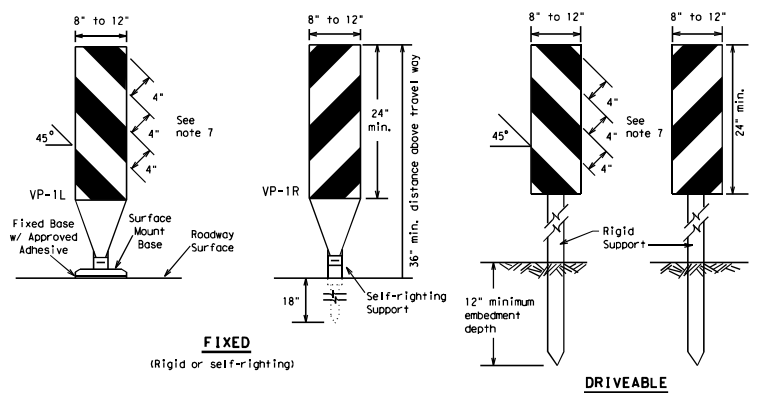
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (8) - 14

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| REVISED: November 2002 | CONT: 6363 | SECT: 78 | JOB: 001 | HIGHWAY: IH0035W |
| DATE: 4-03 7-13 | DIST: 01 | COUNTY: DENTON | SHEET NO. 19 | |
| DATE: 9-07 8-14 | DIST: DAL | COUNTY: DENTON | SHEET NO. 19 | |

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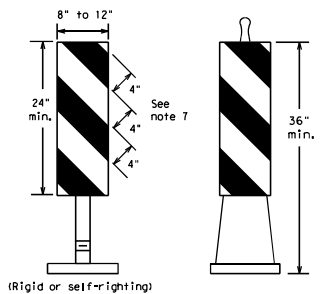
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FIXED
(Rigid or self-righting)

DRIVEABLE

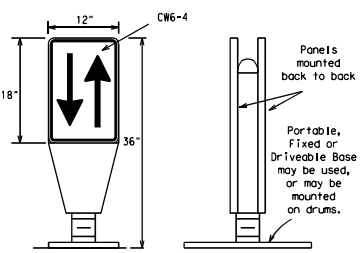
- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



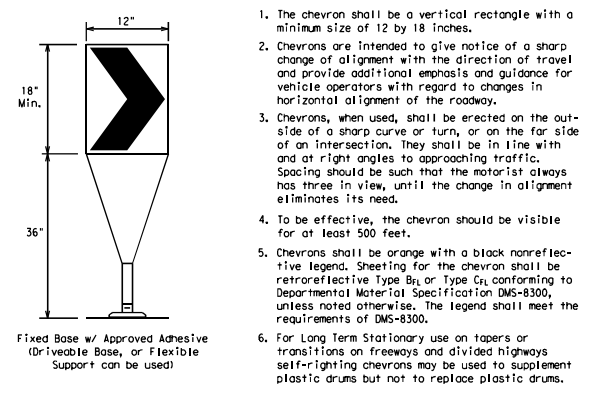
PORTABLE
(Rigid or self-righting)

VERTICAL PANELS (VPs)

- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
- The OTLD may be used in combination with 42" cones or VPS.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPS placed between the OTLD's should not exceed 100 foot spacing.
- The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B₁ or Type C₁ conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.



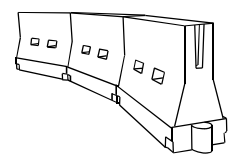
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



Fixed Base w/ Approved Adhesive or Flexible Support can be used

- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
- Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
- To be effective, the chevron should be visible for at least 500 feet.
- Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B₁ or Type C₁ conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- For Long Term Stationary use on tapers or transitions on freeways and divided highways self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

- LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- LCDs used as barricades perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10) placed 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 NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
- Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
- Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
- When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

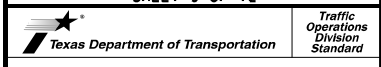
- Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control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

| Posted Speed % | Formula | Minimum Desirable Taper Lengths ** | | | Suggested Maximum Spacing of Channelizing Devices | |
|-------------------|--------------------------|---------------------------------------|------------|------------|---|--------------|
| | | 10' Offset | 11' Offset | 12' Offset | On a Taper | On a Tangent |
| 30 | L = WS ² / 60 | 150' | 165' | 180' | 30' | 60' |
| 35 | | 205' | 225' | 245' | 35' | 70' |
| 40 | L = WS | 265' | 295' | 320' | 40' | 80' |
| 45 | | 450' | 495' | 540' | 45' | 90' |
| 50 | L = WS | 500' | 550' | 600' | 50' | 100' |
| 55 | | 550' | 605' | 660' | 55' | 110' |
| 60 | L = WS | 600' | 660' | 720' | 60' | 120' |
| 65 | | 650' | 715' | 780' | 65' | 130' |
| 70 | L = WS | 700' | 770' | 840' | 70' | 140' |
| 75 | | 750' | 825' | 900' | 75' | 150' |
| 80 | L = WS | 800' | 880' | 960' | 80' | 160' |
| 85 | | 850' | 945' | 1020' | 85' | 170' |

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (9) - 14

| FILE: | bc-14.dgn | DATE: | TxDOT | DATE: | TxDOT | DATE: | TxDOT |
|----------|---------------|----------|----------|---------------|--------|----------|---------------|
| REVISED: | November 2002 | DATE: | REVISED: | November 2002 | DATE: | REVISED: | November 2002 |
| DATE: | 9-07 | REVISED: | 6363 | DATE: | 001 | REVISED: | I10035W |
| DATE: | 7-13 | REVISED: | DIST | DATE: | COUNTY | REVISED: | SHEET NO. |
| DATE: | | REVISED: | DAL | DATE: | DENTON | REVISED: | 20 |

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

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

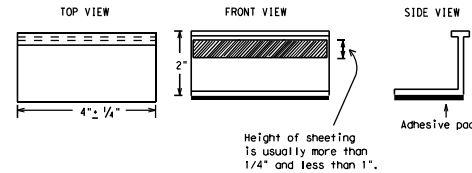
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

SHEET 11 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(1) - 14

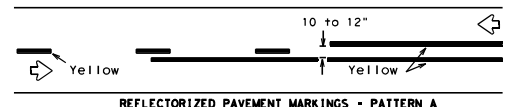
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| REVISONS | 6363 | 78 | 001 | 1 | H0035W | |
| 2-98 | 9-07 | DIST | COUNTY | | SHEET NO. | |
| 1-02 | 7-13 | DAL | DENTON | | 22 | |
| 11-02 | 8-14 | | | | | |

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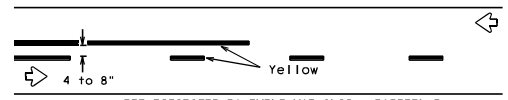
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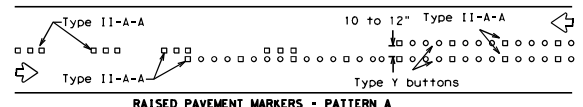
PAVEMENT MARKING PATTERNS



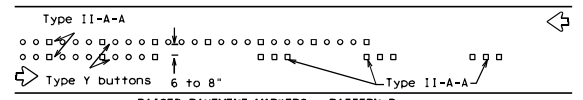
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REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



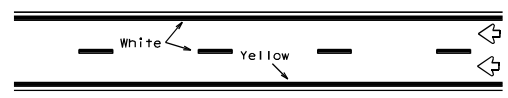
RAISED PAVEMENT MARKERS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN B

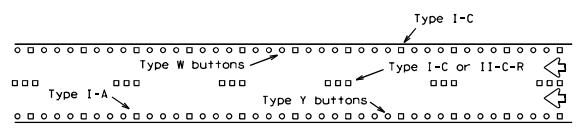
Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectORIZED pavement markings.

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



REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.

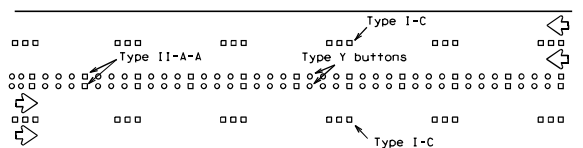


RAISED PAVEMENT MARKERS



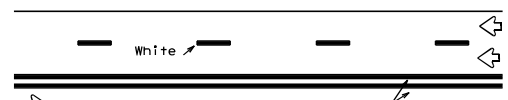
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



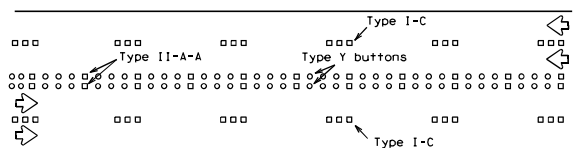
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



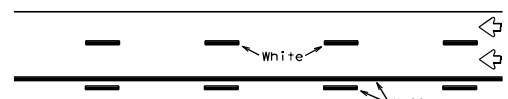
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



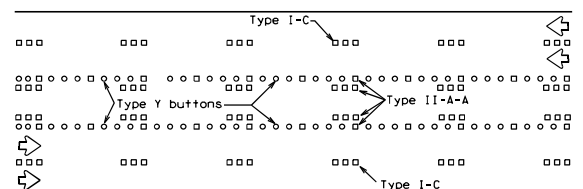
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

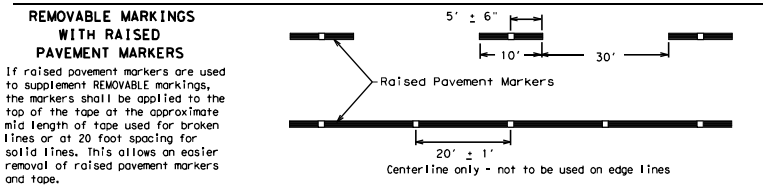
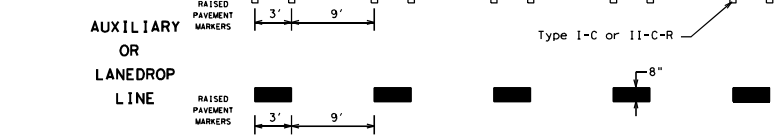
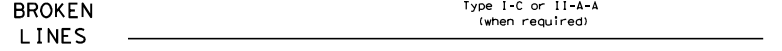
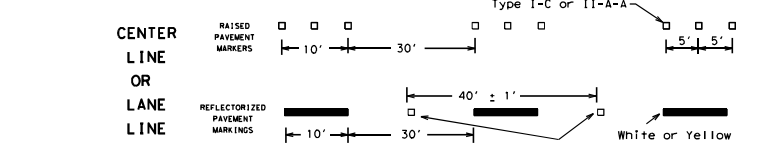
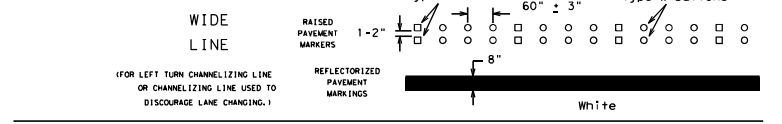
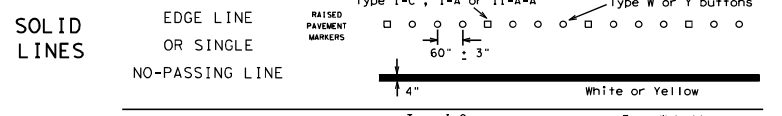
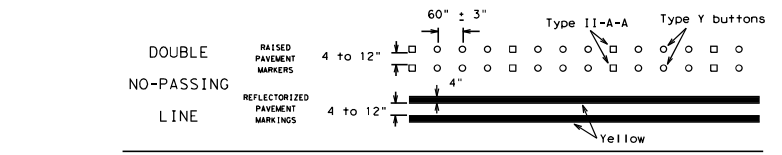
Prefabricated markings may be substituted for reflectORIZED pavement markings.



RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



SHEET 12 OF 12

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

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

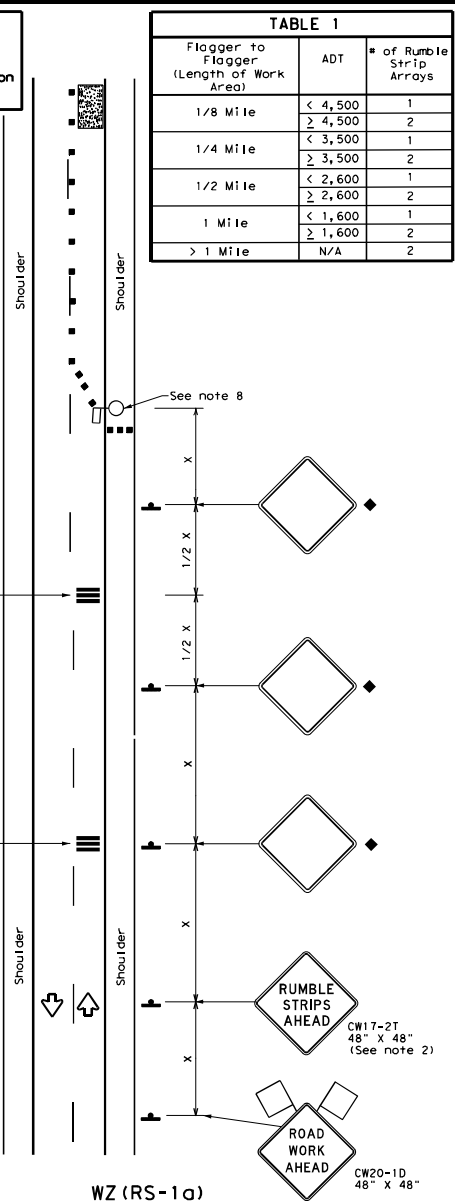
BC(12)-14

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| © TXDOT February 1998 | CONT | SECT | JOB | HIGHWAY |
| 1-97 9-07 REVISIONS | 6363 | 78 | 001 | I10035W |
| 2-98 7-13 | DIST | COUNTY | SHEET NO. | |
| 11-02 8-14 | DAL | DENTON | 23 | |

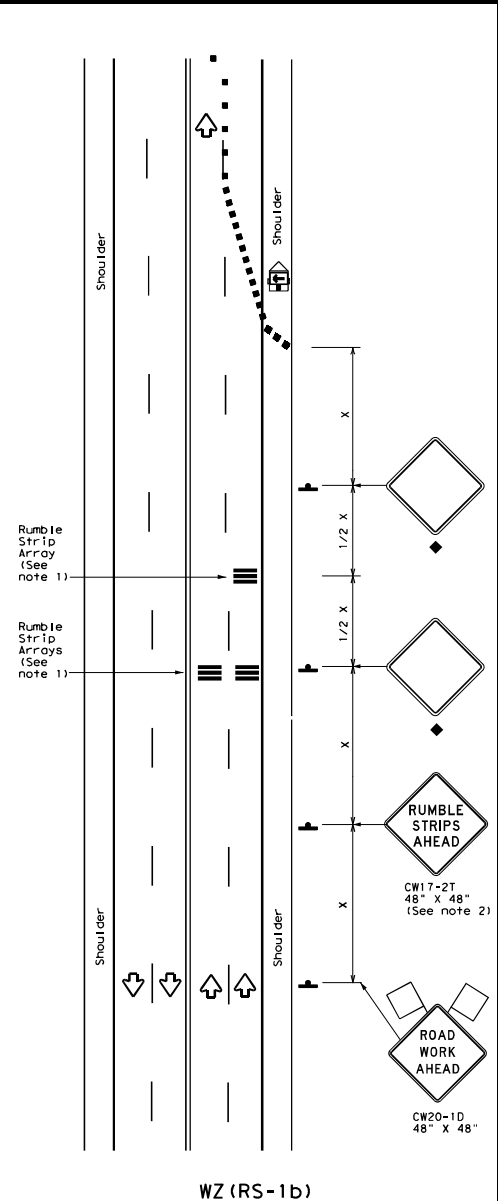
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units or for the use of this standard on projects where the use of units other than those shown may be required.

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



WZ (RS-1a)
75 mph or Less
RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ (RS-1b)
75 mph or Less
RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

| Speed | Approximate distance between strips in an Array |
|---------------------|---|
| ≤ 40 MPH | 10' |
| > 40 MPH & ≤ 55 MPH | 15' |
| > 55 MPH | 20' |

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

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

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

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

◆ Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.

Texas Department of Transportation
 Traffic Operations Division Standard

TEMPORARY RUMBLE STRIPS

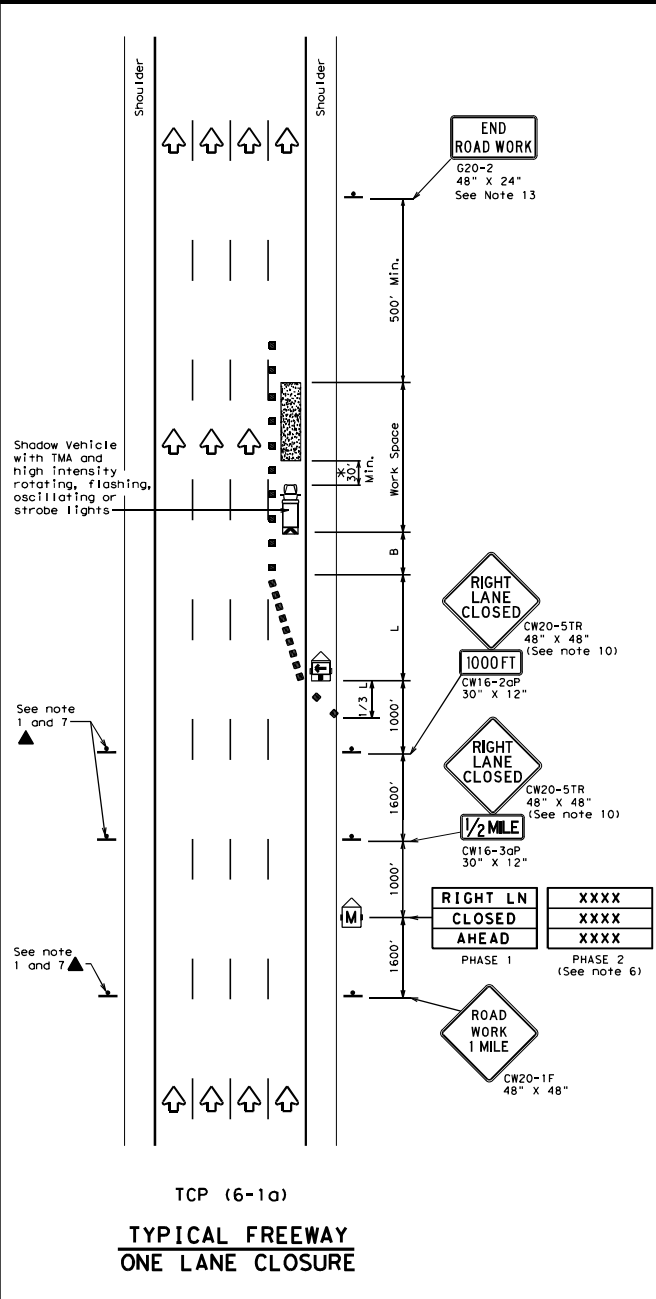
WZ (RS) - 16

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| REVISIONS | | DIST: DAL | COUNTY: DENTON | SHEET NO. 24 | |

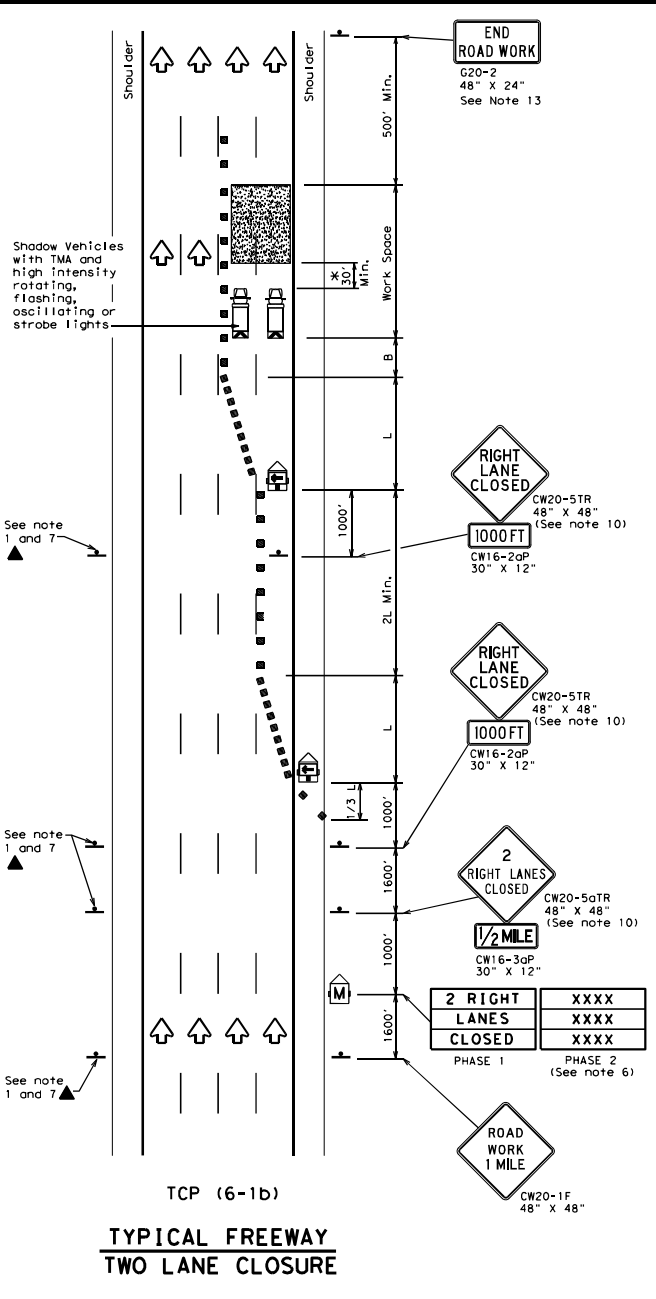
118

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TCP (6-1a)
**TYPICAL FREEWAY
 ONE LANE CLOSURE**



TCP (6-1b)
**TYPICAL FREEWAY
 TWO LANE CLOSURE**

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

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

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

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

GENERAL NOTES

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- Drums or 42" cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
- All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
- The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
- Static message boards or changeable message signs stating the date and duration of ramp or freeway lane closures shall be placed a minimum of seven (7) calendar days in advance of the actual closure.
- Phase 2 of the PDMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.
- Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
- The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the MUTCD.
- Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
- Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
- When possible, PDMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
- For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
- The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

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



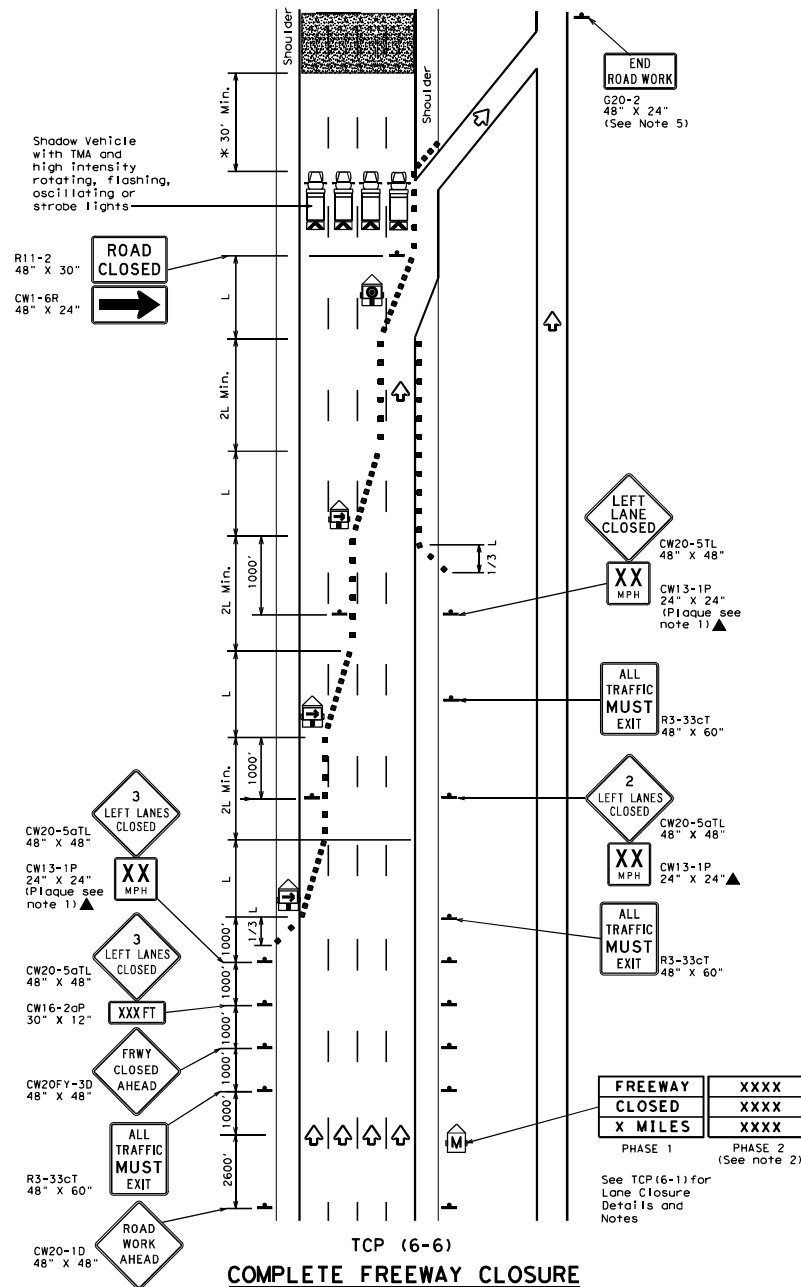
**TRAFFIC CONTROL PLAN
 FREEWAY LANE CLOSURES**

TCP (6-1) - 12

| | | | | | |
|------------------|---------------------------|------------|----------------|--------------|------------------|
| FILE: top6-1.dgn | DATE: TXDOT February 1998 | CONT: 6363 | SECT: 78 | JOB: 001 | HIGHWAY: IH0035W |
| 8-12 | REVISIONS | DIST: DAL | COUNTY: DENTON | SHEET NO. 31 | |

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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) |
| | Flashing Arrow Board in Caution Mode | | Traffic Flow |
| | Sign | | |

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

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

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

GENERAL NOTES

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

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

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

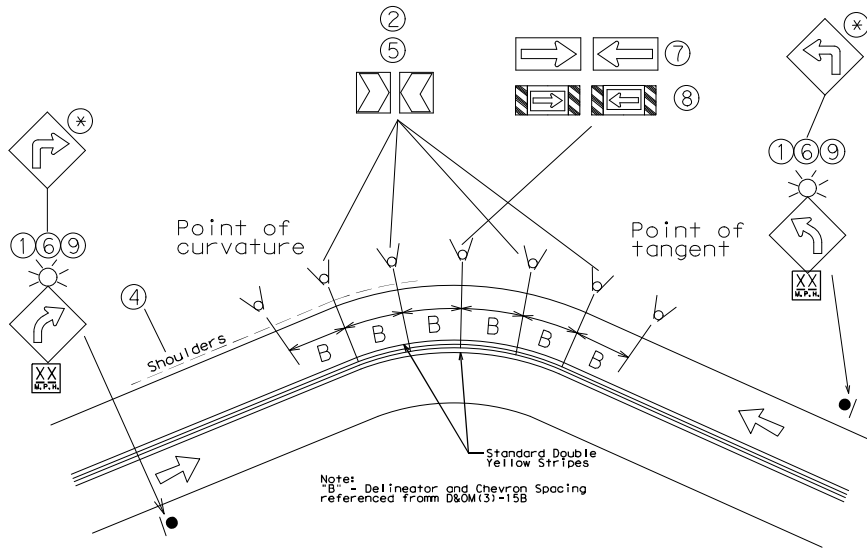


**TRAFFIC CONTROL PLAN
FREEWAY CLOSURE**

TCP (6-6) - 12

| FILE: | tcp6-6.dgn | DATE: | TxDOT | DATE: | TxDOT | DATE: | TxDOT | DATE: | TxDOT |
|-----------|---------------|-------|--------|-----------|----------|-------|-------|-------|-------|
| © TxDOT | February 1994 | CONT | SECT | JOB | HIGHWAY | | | | |
| REVISIONS | | 6363 | 78 | 001 | I H0035W | | | | |
| 1-97 | 8-98 | DIST | COUNTY | SHEET NO. | | | | | |
| 4-98 | 8-12 | DAL | DENTON | 36 | | | | | |

Dallas District Standard for Two-Lane Highway Curve Signing/Markings



Notes:
"B" - Delineator and Chevron Spacing
referenced from D&M131-15B

Curve Safety Sequence

Applicable Minimum Measures

| Advisory Speed 55 mph or higher | Advisory Speed 40-50 mph | Advisory speed 35 mph or less | Curve signing, delineation and pavement markings (listed in order from minimum to maximum level of treatment as needed) |
|---------------------------------|--------------------------|-------------------------------|--|
| + | + | + | 1 Advance warning and advisory mph (36" x 36") |
| + | + | + | 2a Delineators if advisory speed is 10 mph or less than posted speed |
| + | + | + | 2b Chevron alignment signs if advisory speed is 15 mph or greater than posted speed |
| | + | + | 3 Edge Lines |
| | | | 3a Pavement width 24' or greater 6" solid white edge line |
| | | | 3b Pavement width 20' - 24' 4" solid white edge line |
| | | | 3c Pavement width 20' or less no edge line |
| Supplemental Measures | | | |
| | | # | 4 Add shoulders and edge line (see #3a) |
| | | # | 5 Yellow high intensity fluorescent chevron alignment signs - add reflective sheeting to sign support from bottom edge of sign |
| # | # | # | 6 Large advance warning (48" x 48") and advisory mph (30" x 30") |
| # | # | # | 7 Arrow sign (48" x 24") |
| # | # | # | 8 Large arrow sign with diagonals (96" x 48") |
| # | # | # | 9 Add flashers to advance warning signs |
| # | # | # | 10 Surface treatment to improve friction |
| | | * | The W1-IR or L sign shall only be used when the advisory speed is 30 mph or less |

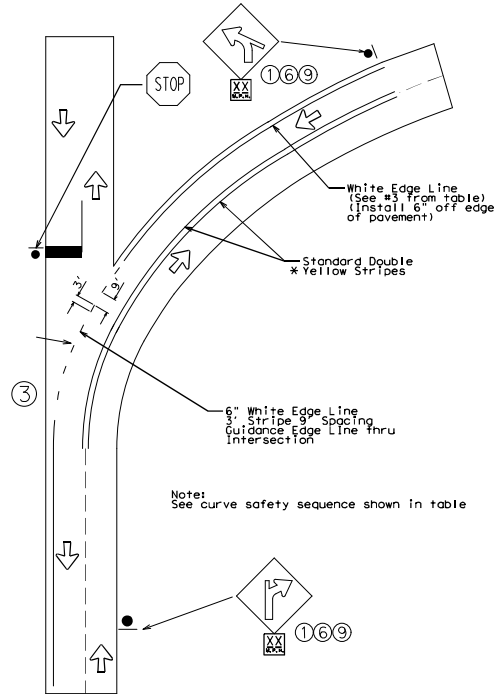
+ = required
= optional

Applications 4 - 10 are additional supplemental applications which may be added as directed by the Area Engineer.

Notes:

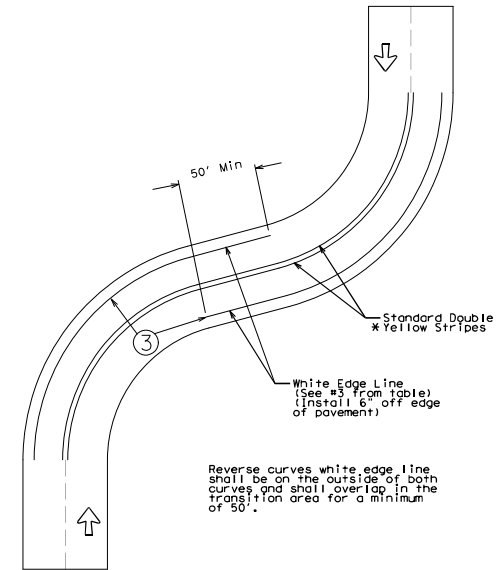
- Two methods will be used to determine the appropriate advisory speed for curves, the GPS Method (existing curves) and the Design Method (new curves).
- Notify the Traffic Engineering Section for all requests on advisory speeds for existing curves.

Typical Curve Treatment with Intersection



Note:
See curve safety sequence shown in table

Typical Reverse Curve Edge Line Treatment



Reverse curves white edge line shall be on the outside of both curves and shall overlap in the transition area for a minimum of 50'.

* Standard Double Yellow Stripes shall be dropped through a non-signalized intersection within the city limit. Outside the city limit, the Standard Double Yellow Strip shall be carried through all non-signalized intersections.

| | | | | |
|---------------------------|--|-------------------|-------------------------|-------------|
| OCT-2014 UPDATED NOTES | | | | |
| JAN-2016 NOTE ADDED | <p>TWO-LANE HIGHWAY CURVE SIGNING & MARKINGS</p> <p>DALLAS DISTRICT STANDARD</p> | | | |
| SEPT-2016 NOTE ADDED | <p>SCALE: NTS SHEET 1 OF 1</p> | | | |
| FOR STRIPING IN CURVE | DESIGN/CHECK | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | HIGHWAY NO. |
| | BLS | 6 | RMC-636378001 | I10035W |
| CHECK | STATE | DISTRICT | COUNTY | SHEET NO. |
| BLS | TEXAS | DALLAS | DENTON | 37 |
| CHECK | CONTROL | SECTION | JOB | |
| FRC | 6363 | 78 | 001 | |
| CHECK | ARO | | | |