

|         |             |          |             |
|---------|-------------|----------|-------------|
| CCS#    | 6370-91-001 | ITEM NO. | 6370-91-001 |
| STATE   | TEXAS       | SECTION  | VARIOUS     |
| PROJECT | VAL VERDE   | DATE     | VARIOUS     |

# STATE OF TEXAS TEXAS DEPARTMENT OF TRANSPORTATION

## PLANS OF PROPOSED HIGHWAY ROUTINE MAINTENANCE CONTRACT

PROJECT NO. RMC 6370-91-001  
PROJECT LENGTH : VARIOUS  
PROJECT LIMITS : VARIOUS

VAL VERDE  
HIGHWAY : VARIOUS  
CCSJ# 6370-91-001

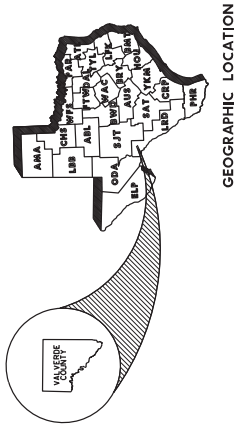
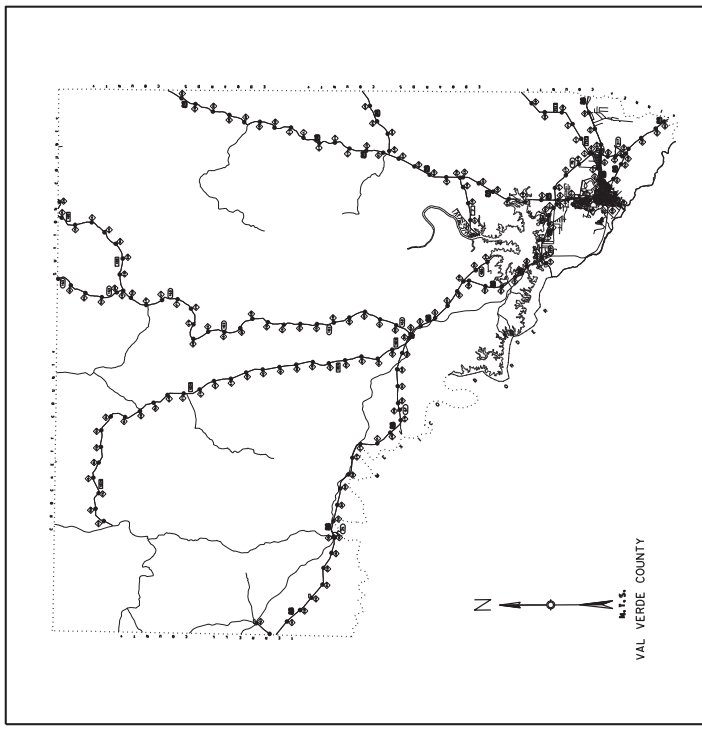
FOR CALL-OUT MILL-INLAY & SPOT BASE REPAIR

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**FINAL PLANS**

|                 |  |
|-----------------|--|
| Letting Date :  |  |
| Work Began :    |  |
| Date Accepted : |  |
| Contractor :    |  |
| Total Cost :    |  |



**TEXAS DEPARTMENT OF TRANSPORTATION**

SUBMITTED FOR LETTING: 11/19/2020

APPROVED FOR LETTING: 11/19/2020

Drawn and sealed by: Luis Castillo Jr.  
 CIVIL ENGINEER  
 TEXAS DEPARTMENT OF TRANSPORTATION  
 DIRECTOR OF MAINTENANCE

RECOMMENDED FOR LETTING: 11/19/2020

Drawn and sealed by: Jose Franco III  
 AREA ENGINEER

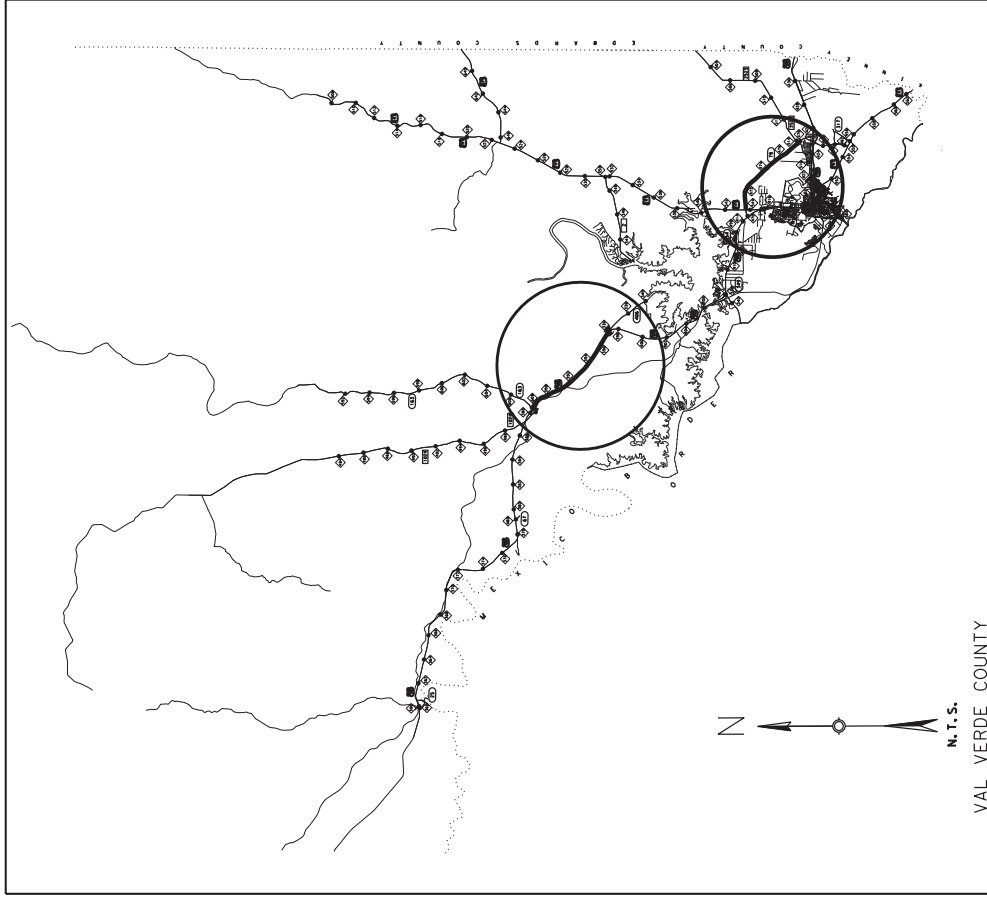
THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH A SINGLE ASTERISK (\*) ARE THE RESPONSIBLE SUPERVISION BEING APPLICABLE TO THIS PROJECT.

**11/19/2020**

DATE: \_\_\_\_\_

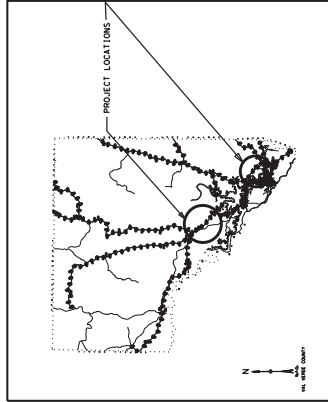
Drawn and sealed by: Luis Castillo Jr.  
 CIVIL ENGINEER  
 TEXAS DEPARTMENT OF TRANSPORTATION

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, JUNE 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT.

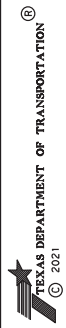


| VAL VERDE COUNTY |           |                         |           |         |                |
|------------------|-----------|-------------------------|-----------|---------|----------------|
| HIGHWAY          | TRACT NO. | LIMITS                  | APPROX.   |         | LENGTH (Miles) |
|                  |           |                         | FROM RMN. | TO RMN. |                |
| US 90            | 1         | FROM SH 163 TO SPUR 406 | 470       | 478     | 9.0            |
| LP 7B            | 2         | FROM US 277 TO FM 2523  | 388       | 398     | 7.0            |
| <b>TOTAL</b>     |           |                         |           |         | <b>16.0</b>    |

**NOTE: SPECIFIC LIMITS OF MILL/INLAY OR BASE REPAIR WILL BE IDENTIFIED BY THE MAINTENANCE SUPERVISOR IN THE WORK ORDER**



**VAL VERDE COUNTY MAP**  
NOT TO SCALE



**VAL VERDE COUNTY LOCATION MAP**

|                  |           |           |              |           |
|------------------|-----------|-----------|--------------|-----------|
| DR. M. M.        | DR. M. M. | STATE     | SHEET NUMBER | SHEET NO. |
| OS. L. C.        | OS. L. C. | TEXAS     |              |           |
| FED. NO. 307(70) | COUNTY    | CONTRACT  | SECTION      | JOB       |
| 6                | 22        | VAL VERDE | 6370         | 91        |
|                  |           |           |              | 001       |
|                  |           |           |              | VARIOUS   |

## GENERAL NOTES

### GENERAL NOTES:

This routine maintenance contract is for flexible pavement structure repair on various sections of roadways within Val Verde County.

Contractor questions on this project are to be emailed to the following individual(s): Sergio Reyna at [Sergio.Reyna@txdot.gov](mailto:Sergio.Reyna@txdot.gov).

Contractor questions will only be accepted through email to the above individuals. All contractors' questions will be reviewed by the Area 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/>

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

Plans may be reviewed at Laredo District office of the Texas Department of Transportation, 1817 Bob Bullock Loop, Laredo, Texas 78043. The contact person is Sergio Reyna at [Sergio.Reyna@txdot.gov](mailto:Sergio.Reyna@txdot.gov)

Questions concerning the specifications, work requirements, etc. of this contract should be directed to Luis Castillo Jr., P.E., Transportation Engineer at [Luis.Castillo@txdot.gov](mailto:Luis.Castillo@txdot.gov).

Arrange a Pre-work Meeting between representatives of the State and the Contractor prior to beginning work. Outline the proposed work and submit plans for performing the work while providing safe passage of traffic at all times. Access is available to the TxDOT Maintenance yard during normal working hours only.

Maintain the right-of-way in a satisfactory appearance as shown in the plans and/or as approved by the Engineer.

Perform work expeditiously during daylight hours.

Each project location shall be opened to traffic at the end of the workday.

Equipment that remains in the ROW outside of working hours must be parked outside of the clear zone and in a way that does not obstruct sight distance for the traveling public.

Conform to the Texas Manual on Uniform Traffic Control Devices (TMUTCD) for sign types for which details are not shown in the plans.

Existing flexbase material removed become property of TxDOT, coordinate with Maintenance Supervisor for stockpile location.

Maintain the roadway surface and work zone striping within the project limit while the traffic control plan is in effect.

Furnish crew(s) and equipment capable of maintaining work in a continuous manner for the completion of the work listed on the work order.

When working near aerial electrical lines and/or utility poles, provide adequate safety measures as needed to comply with the appropriate sections of Federal and State regulations.

### SUPERVISION:

Prior to beginning work each day, meet with the respective Maintenance Supervisor. Discuss times, places, Contractor inspections and all other issues of the day or topics as directed by the Engineer.

The Maintenance Supervisor contacts for this contract is:

Val Verde County  
Francis Shell  
319 East Gibbs Street  
El Paso, Texas  
[Francis.Shell@txdot.gov](mailto:Francis.Shell@txdot.gov)

### ITEM 3. AWARD AND EXECUTION OF CONTRACT:

Employees are required to wear proper safety equipment. Contractor is responsible for supplying proper safety equipment for employees.

This Contract includes non-site specific work. Multiple work orders will be used to procure work of the type identified in the contract at locations that have not yet been determined.

Each work order will include the type of work, the location and limits, estimated quantities, and number of days allowed for work order completion. Work orders may consist of multiple locations at different sites or different highways.

The time allowed for each work order will be based on a production rate of five hundred (500) square yards per day.

This contract duration is for 12 months. Time charges and work will start on the day stated on the Work Authorization letter. The contract will be in effect until the work on the last callout is completed.

### ITEM 4. SCOPE OF WORK:

If agreed upon in writing by both parties to the Contract, the Contract may be extended for an additional period of time not to exceed the original Contract time period. The extended Contract shall be for the original bid quantities, terms and conditions plus any approved, applicable change orders.

When the Contract is extended by agreement, a performance and/or payment bond, if required shall be executed in the amount of the extension before the additional work begins

### ITEM 5. CONTROL OF WORK:

Reference all existing striping and pavement markings in a manner which allow the markings to be re-established if necessary. Place extra reference (if needed) to ensure that the markings (lane lines, edge lines, ramp gores, etc.) are in-line with signs on USB's, TMS arrows, etc.

Questions regarding the plan work limits should be brought to the Engineer's attention prior to commencing work. Measuring equipment will be in working condition and calibrated to the manufacturer's specifications.

Field verify all dimensions and notify Engineer prior to initiating any work.

### ITEM 8. PROCESCUION AND PROGRESS:

This project to be completed in 365 calendar days in accordance with Section 8.3.1.5 "Calendar Days".

No closures will be allowed on the weekends which include the following holidays: January 1, the last Monday in May, July 4, the first Monday in September, the fourth Thursday in November, December 25 and Easter weekend.

The usual open season for application of asphalt is from April 1<sup>st</sup> to September 30<sup>th</sup>, or as approved in writing by the Engineer. The late start date for the project is April 1<sup>st</sup> to coincide with the end of the asphalt season. The minimum temperature requirements should be followed for the application of asphalt outside these dates.

The Engineer may consider extending working days beyond the end of the seal coat season.

### ITEM 9. MEASUREMENT AND PAYMENT:

Submit Material on hand (MOH) payment requests at least 5 working days prior to the end of the month for payment on that month's estimate. For out of town MOH submit requests at least 10 working days prior to the end of the month.

### ITEM 110. EXCAVATION:

Pay item is only for excavated subgrade material removed from soft spot locations. Material excavated on soft spots will be property of the contractor.

### ITEM 316. SUREACE TREATMENTS:

Addition of baghouse fines will not be permitted in the production of pre-coated material. The usual open season for application of asphalt is from April 1<sup>st</sup> to September 30<sup>th</sup>. The minimum temperature requirements should be followed for the application of asphalt outside these dates.

The primary asphalt option to be used is AC-15P, the secondary option is RC 250 which can only be used during cold weather unless otherwise approved by the engineer.

All asphalt & aggregate tickets must be submitted for payment and project closure.

Remaining aggregate stockpiles must be removed no later than 30 days after all roadway locations have been sealed, unless approved by the Director of Maintenance. After this period the aggregate becomes property of the state.



### GENERAL NOTES

| DR. M.M. | DR. M.M. | STATE          | SHEET NUMBER |
|----------|----------|----------------|--------------|
| DR. L.C. | DR. L.C. | TEXAS          | SHEET 1 OF 2 |
| FILE NO. | DATE     | CONTRACT       | SECTION      |
| 6        | 22       | VAL VERDE 6310 | 911 001      |
|          |          |                | various      |

# GENERAL NOTES

**ITEM 330 LIMESTONE ROCK ASPHALT PAVEMENT**

| TY | Grade | Application Rate | Lab Density |
|----|-------|------------------|-------------|
| II | CS    | 110 #/SY/IN      | 89% ± 2     |

| TY | Grade | Application Rate | Lab Density |
|----|-------|------------------|-------------|
| I  | AA    | 105 #/SY/IN      | 89% ± 2     |

At the expense of the contractor and to the satisfaction of the Engineer, remove and replace any mixture that does not bond to the existing pavement or that has other surface irregularities.

Contractor will not be allowed to place LRA Pavement with moisture content of 8% or higher as determined by T1103. When moisture content is 8% or higher, contractor must let breathe LRA stockpile to bring moisture content down, or as approved by the Engineer.

Furnish 15-ton or heavier Pneumatic Roller, and 12-ton or heavier Steel Wheel Roller. Contractor must ensure that rollers water flow is shut off when stopping rollers on pavement.

LRA tack coat requirements are the same as for their HMA/CP counterparts, or as approved in writing by the Engineer.

**ITEM 351 FLEXIBLE PAVEMENT STRUCTURE REPAIR**

Minimum production rate is five hundred (500) square yards per day.

Locations and quantities will vary as per work order, the minimum total area per work order will be 2000 SY (not necessarily on the same location).

Flexible Pavement Structure Repair shall be limited to the amount that can be repaired per day and must match existing surface elevation. No exposed drop offs shall be left over night.

Excavation of the existing flexible base material to the required 8" or 10" inches depth, will be in accordance with item 110 and will not be paid directly but will be subsidiary to item 351. In addition, all flexible material removed under this item will remain the property of the Contractor.

Square the sides of the repair area saw-cutting or other approved methods. Remove loose and foreign materials. Clean and dry the repair area. Apply SS-1H as a tack coat in accordance with Item 300 at 0.15 gal/sy to surfaces of the repair area, unless otherwise directed. Saw cutting, finishing and applying tack coat will not be measured but will be subsidiary to Item 351 "Flexible Pavement Structure Repair".

Provide 8" or 10" inches of LRA TY I Grade AA in accordance with Item 330 for all repairs, as specified by the work order or Maintenance Supervisor. LRA TY I Grade AA will not be measured but will be subsidiary to Item 351 "Flexible Pavement Structure Repair".

The quantity of material must be agreed upon by the Contractor and Engineer prior to being ordered.

Furnish equipment in accordance with pertinent items. Finish to grade and compact to conform to roadway surface. Compact with pneumatic and flat wheel rollers as directed or approved. Vibratory roller may not be used.

Clean roadway surface after repair operations. Dispose of materials removed as directed or approved.

All the necessary equipment, material, personnel, and any incidentals needed to carry out all work mentioned above, will be subsidiary to item 351 "Flexible Payment Structure Repair".

**ITEM 500 MOBILIZATION:**

"Materials-on-Hand" payments will not be considered in determining percentages used to compute mobilization payments.

Only one (1 EA) mobilization callout will be paid per Work Order, regardless of the number of locations and type of work identified in the Work Order

**ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING:**

Designate, as the Contractor Responsible Person (CRP), an English-speaking employee on-call nights and weekends (or any other time that work is not in progress) with a local address and telephone number for maintenance of signs and barricades. This employee will be notified of the time of the start of the work, the location of the project, and the location of the CRP. The CRP shall be available to the Engineer at all times. Furnish this information to local law enforcement officials.

The time frame for the Contractor to provide properly maintained traffic control devices before they are considered to be in non-compliance with this item, is 48 hours regardless of the days of the week involved after notification is done in writing by the Engineer.

When advanced warning flashing arrow panel(s) is/are specified, maintain one standby unit in good condition at the job site ready for immediate use is required.

Place eight inches of both red and white stripes in an inverted "v" design on the back of all TMA S. Conform all sheeting to Departmental Material Specification D-9-B300, Type C.

Provide two-way radios in areas where flagmen do not have visual contact with one another or cannot communicate with one another.

Provide shadow vehicles equipped with Truck Mounted Attenuators (TMA) as shown on Traffic Control Plan (TCP) standards (2 series).

Limit lane closures to a maximum of 2 miles. If more than one lane closure location is desired, provide a minimum of a 2 mile passing zone between locations. Provide a separate sign set up for each location.

Ensure equipment not in use, stockpile aggregate, and other working materials are:

- A minimum of 30 feet from the edge of the travel lane;
- Do not obstruct traffic or sight distance;
- Do not interfere with the access from abutting property; or
- Do not interfere with roadway drainage.

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

During the holiday time frame of December 21<sup>st</sup> through January 1<sup>st</sup>, every effort should be taken to ensure that all travel lanes remain open where possible.

The Contractor Force Account "Safety Contingency" that has been established for this project 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 506 TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS:**

Silt Fence item to be used to mitigate erosion and sedimentation that can be caused by the removed flexible base stockpile. Installation location of the silt fence to be determined on the field as per Maintenance Supervisor.

**ITEM 666 REELECTRIFIED PAVEMENT MARKINGS:**

Reflectivity requirements for Type I will be as per Item 666.

**ITEM 6185 TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER:**

Provide ONE (1) Truck Mounted Attenuator for stationary operations and TWO (2) Truck Mounted Attenuators for mobile operations as required by the Engineer. Provide backup and keep operational and available of the jobsite at all times during traffic control operations. The TMA will be made available for utilization for the entire duration of the project.

**GENERAL NOTES**

|           |           |            |              |
|-----------|-----------|------------|--------------|
| DR. M. M. | DR. M. M. | STATE      | SHEET NUMBER |
| DR. L. C. | DR. L. C. | TEXAS      | SHEET 2 OF 2 |
| DR. M. M. | DR. M. M. | CONTRACT   | SECTION      |
| DR. M. M. | DR. M. M. | DATE       | JOB          |
| DR. M. M. | DR. M. M. | VAL. VERDE | 6310 91 001  |
| DR. M. M. | DR. M. M. | VARIOUS    | VARIOUS      |

| RMC:6370-91-001 | ALT   |       | ITEM CODE |          |       | DESCRIPTION                                 | UNIT | FINAL  |       |
|-----------------|-------|-------|-----------|----------|-------|---|------|--------|-------|
|                 | EST   | FINAL | ITEM NO   | DES CODE | SP NO |   |      | EST    | FINAL |
|                 | 900   |       | 110       | 6001     |       | EXCAVATION (ROADWAY)                        | CY   | 900    |       |
|                 | 100   |       | 216       | 6001     |       | PROOF ROLLING                               | HR   | 100    |       |
|                 | 900   |       | 247       | 6060     |       | FL BS (CMP IN PLC) (TY E GR 4) (FINAL POS)  | CY   | 900    |       |
|                 | 11700 |       | 316       | 6001     |       | ASPH (MULTI OPTION)                         | GAL  | 11700  |       |
|                 | 325   |       | 316       | 6238     |       | AGGR (TY-PD GR-3 SAC-B)                     | CY   | 325    |       |
|                 | 2070  |       | 330       | 6010     |       | LRA PAV TY-II GR-CS                         | TON  | 2070   |       |
|                 | 10000 |       | 351       | 6026     |       | FLEXIBLE PAVEMENT STRUCTURE REPAIR (8"-10") | SY   | 10000  |       |
|                 | 18000 |       | 354       | 6002     |       | PLAN & TEXT ASPH CONC PAV(0" TO 2")         | SY   | 18000  |       |
|                 | 1260  |       | 3084      | 6001     |       | BONDING COURSE                              | GAL  | 1260   |       |
|                 | 5     |       | 500       | 6033     |       | MOBILIZATION (CALLOUT)                      | EA   | 5      |       |
|                 | 12    |       | 502       | 6001     |       | BARRICADES, SIGNS AND TRAFFIC HANDLING      | MO   | 12     |       |
|                 | 500   |       | 506       | 6038     |       | TEMP SEDMT CONT FENCE (INSTALL)             | LF   | 500    |       |
|                 | 500   |       | 506       | 6039     |       | TEMP SEDMT CONT FENCE (REMOVE)              | LF   | 500    |       |
|                 | 250   |       | 510       | 6002     |       | ONE-WAY TRAF CONT (PILOT CAR)               | HR   | 250    |       |
|                 | 2500  |       | 662       | 6111     |       | WK ZN PAV MRK SHT TERM (TAB)TY Y-2          | EA   | 2500   |       |
|                 | 16500 |       | 666       | 6283     |       | REF PROF PAV MRK TY (W)4"(SLD)(090MIL)      | LF   | 16,500 |       |
|                 | 16500 |       | 666       | 6283     |       | REF PROF PAV MRK TY (Y)4"(SLD)(090MIL)      | LF   | 16,500 |       |
|                 | 5481  |       | 666       | 6287     |       | REF PROF PAV MRK TY (Y)4"(BRK)(090MIL)      | LF   | 5,481  |       |
|                 | 550   |       | 666       | 6009     |       | REFL PAV MRKR TY II-A-A                     | LF   | 550    |       |
|                 | 60    |       | 672       | 6001     |       | PORTABLE CHANGEABLE MESSAGE SIGN            | EA   | 60     |       |
|                 | 60    |       | 6001      | 6002     |       | TMA (STATIONARY)                            | DAY  | 60     |       |
|                 | 20    |       | 6185      | 6003     |       | TMA (MOBILE OPERATION)                      | DAY  | 20     |       |

**ESTIMATE & QUANTITY**


|                     |           |                 |                |
|---------------------|-----------|-----------------|----------------|
| DR. M. M.           | DR. M. M. | STATE           | SHEET NUMBER   |
| DR. L. C.           | DR. L. C. | TEXAS           | SHEET 1 OF 1   |
| FILE NO. 0000000000 | CONTRACT  | CONTRACT        | JOB            |
| 6                   | 22        | VAL. VERDE 6370 | 91 001 various |

REVISED 12/10/2020

| SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS |                        |                                 |                               |                                    |                                  |                  |                        |      |      |
|---|------------------------|---------------------------------|-------------------------------|------------------------------------|----------------------------------|------------------|------------------------|------|------|
| LOCATION                                  | 500                    | 502                             | 510                           | 6001                               | 6001                             | 6001             | 6185                   | 6185 | 6185 |
|   | 6033                   | 6001                            | 6002                          | 6001                               | 6001                             | 6001             | 6002                   | 6002 | 6005 |
|   | MOBILIZATION (CALLOUT) | BARRICADES AND TRAFFIC HANDLING | ONE-WAY TRAF CONT (PILOT CAR) | WK ZN PAV MRK SHT TERM (TAB)TY Y-2 | PORTABLE CHANGEABLE MESSAGE SIGN | TMA (STATIONARY) | TMA (MOBILE OPERATION) |      |      |
| EA  | MO                     | HR                              | EA                            | DAY                                | DAY                              | DAY              | DAY                    | DAY  | DAY  |
| ALL LOCATIONS                             | 2                      | 12                              | 250                           | 2500                               | 60                               | 60               | 60                     | 60   | 20   |
| PROJECT TOTALS                            | 2                      | 12                              | 250                           | 2500                               | 60                               | 60               | 60                     | 60   | 20   |

| SUMMARY OF ROADWAY ITEMS |                      |               |  |                     |                          |                                     |                                      |                     |                |
|--------------------------|----------------------|---------------|--|---------------------|--------------------------|-------------------------------------|--------------------------------------|---------------------|----------------|
| LOCATION                 | 110                  | 216           | 247                                      | 316                 | 316                      | 351                                 | 354                                  | 330                 | 3084           |
|                          | 6001                 | 6001          | 6060                                     | 6001                | 6238                     | 6028                                | 6002                                 | 6010                | 6001           |
|                          | EXCAVATION (ROADWAY) | PROOF ROLLING | FLBS (CMP IN PLC) (TY E GR 4) (FNAL POS) | ASPH (MULTI OPTION) | AGGR (TY-P D GR-3 SAC-B) | FLEX PAVE STRUCTURE REPAIR (8"-10") | PLAN & TEXT ASPH CONC PAV (0" TO 2") | LRA PAV TY-II GR-CS | BONDING COURSE |
| CY                       | HR                   | CY            | CY                                       | GAL                 | CY                       | SY                                  | SY                                   | TON                 | GAL            |
| ALL LOCATIONS            | 900                  | 100           | 900                                      | 11,700              | 325                      | 10,000                              | 18,000                               | 2,070               | 1,260          |
| PROJECT TOTALS           | 900                  | 100           | 900                                      | 11,700              | 325                      | 10,000                              | 18,000                               | 2,070               | 1,260          |

| SUMMARY OF PAVEMENT MARKING ITEMS |   |   |   |                        |                        |                        |                        |                        |                        |
|-----------------------------------|---|---|---|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| LOCATION                          | 666                                       | 666                                       | 666                                       | 672                    | 672                    | 672                    | 672                    | 672                    | 672                    |
|                                   | 6283                                      | 6287                                      | 6291                                      | 6009                   | 6009                   | 6009                   | 6009                   | 6009                   | 6009                   |
|                                   | REF PROF PAV MKR TY I(W)4"(S LD)(Ø90MI L) | REF PROF PAV MKR TY I(Y)4"(S LD)(Ø90MI L) | REF PROF PAV MKR TY I(Y)4"(B RK)(Ø90MI L) | REFL PAV MKR TY II-A-A | REFL PAV MKR TY II-A-A | REFL PAV MKR TY II-A-A | REFL PAV MKR TY II-A-A | REFL PAV MKR TY II-A-A | REFL PAV MKR TY II-A-A |
| LF                                | LF  | LF  | LF  | EA                     | EA                     | EA                     | EA                     | EA                     | EA                     |
| ALL LOCATIONS                     | 16500                                     | 16500                                     | 5481                                      | 550                    | 550                    | 550                    | 550                    | 550                    | 550                    |
| PROJECT TOTALS                    | 16500                                     | 16500                                     | 5481                                      | 550                    | 550                    | 550                    | 550                    | 550                    | 550                    |



TEXAS DEPARTMENT OF TRANSPORTATION  
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**SUMMARY SHEET**

|           |           |            |                     |
|-----------|-----------|------------|---------------------|
| DR. M. M. | DR. M. M. | STATE      | SHEET NUMBER        |
| DR. L. C. | DR. L. C. | TEXAS      | SHEET 1 OF 1        |
| DR. M. M. | DR. M. M. | CONTRACT   | SECTION             |
| DR. M. M. | DR. M. M. | JOB        | WORK NO.            |
| 6         | 22        | VAL. VERDE | 6310 91 001 various |

REVISED 12/10/2020

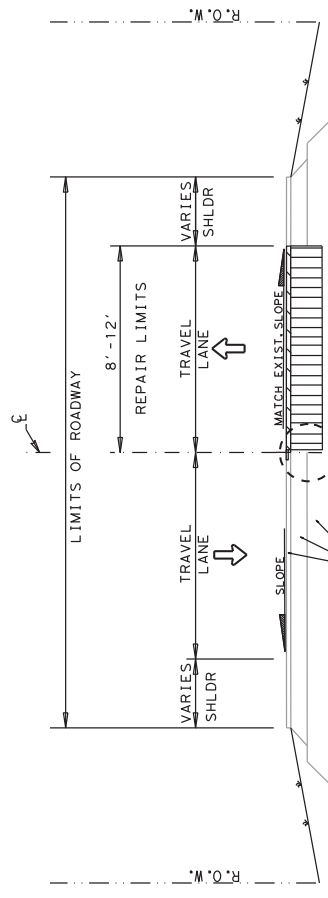


\*RATES OF APPLICATION

|                                       |
|---------------------------------------|
| <b>SURFACE TREATMENTS:</b>            |
| AGGR (TY PD, GR 3) (90 SY/CY)         |
| ASPH (AC-15P OR RC 250) (0.4 GAL/SY)  |
| <b>SPOT BASE REPAIRS:</b>             |
| LRA TY-I GR-AA (110LB/SY/IN)          |
| <b>BASE:</b>                          |
| LRA TY-I GR-AA (0.15 GAL/SY/IN)       |
| <b>TACK COAT:</b> SS-1H (0.15 GAL/SY) |

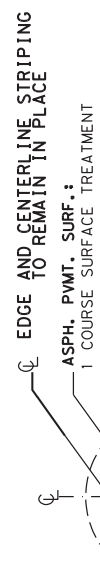
**LEGEND**

- EXISTING ACP
- PROPOSED SURF. TREAT
- SPOT BASE REPAIR
- OVER SIZE CRUSHED ROCK



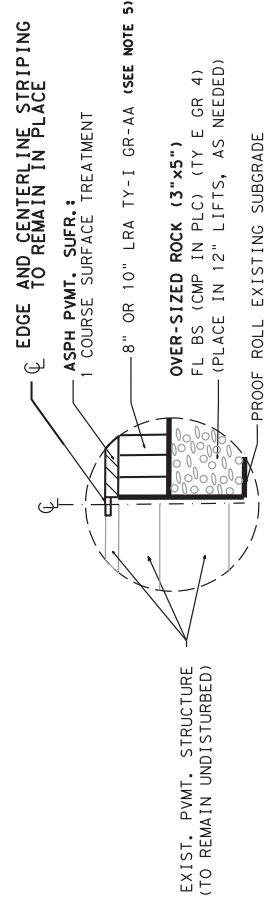
SEE INSET BELOW FOR MORE DETAILS

**SPOT BASE REPAIRS (SEE NOTE 4)**  
**TYPICAL SECTION**



EXIST. PAVMT. STRUCTURE (TO REMAIN UNDISTURBED)

**INSET "A"**  
**USAGE WHEN DEPTH REPAIR IS ONLY 8" OR 10" (SEE NOTE 5)**



**INSET "B"**

**USAGE FOR DEPTH REPAIRS GREATER THAN 8" OR 10" (SEE NOTE 6)**

**NOTES:**

- APPLICATION RATES ARE FOR ESTIMATION PURPOSES ONLY. THESE RATES MAY BE ADJUSTED ON THE FIELD AS PER ENGINEER.
- MAINTAIN EXISTING PGL THROUGHOUT THE PROJECT. CONCRETE PAVEMENT SECTIONS WILL BE LEFT UNDISTURBED UNLESS SPECIFIED BY THE ENGINEER.
- REFER TO CALLOUT/WORK ORDER FOR LIMITS INFORMATION.
- TYPICAL SECTIONS SHOWN DEPICT TYPICAL WORK TO BE DONE THROUGHOUT PROJECT. TYPICAL SECTION LANE(S) WIDTHS MAY CHANGE DUE TO EXISTING ROADWAY CONDITIONS FOR ALL LOCATIONS REQUIRING SPOT BASE REPAIRS.

**USAGE OF INSET "A"**

DEPTH OF THE REPAIR AND PLACEMENT OF LRA TY-I GR-AA WILL VARY BETWEEN 8" TO 10", OR AS DIRECTED BY THE ENGINEER. USE DETAIL "B", IF SOFT SPOTS ARE ENCOUNTERED DURING PROOF ROLLING AFTER VERIFICATION AND APPROVED BY MAINTENANCE SUPERVISOR. LRA MATERIAL WILL BE PLACED IN A MAXIMUM 4" LIFT THICKNESS.

**USAGE OF INSET "B"**

IF SOFT SPOTS ARE ENCOUNTERED AND ADDITIONAL DEPTH REQUIRES REPAIR AND APPROVED BY MAINTENANCE SUPERVISOR, REMOVAL OF 12" EXISTING MATERIAL IN THIS SCENARIO WILL BE PAID FOR THROUGHOUT THE EXCAVATION (ROUND) OVER-SIZED ROCK (3"x5") MATERIAL AND PLACEMENT WILL BE PAID UNDER ITEM 247.

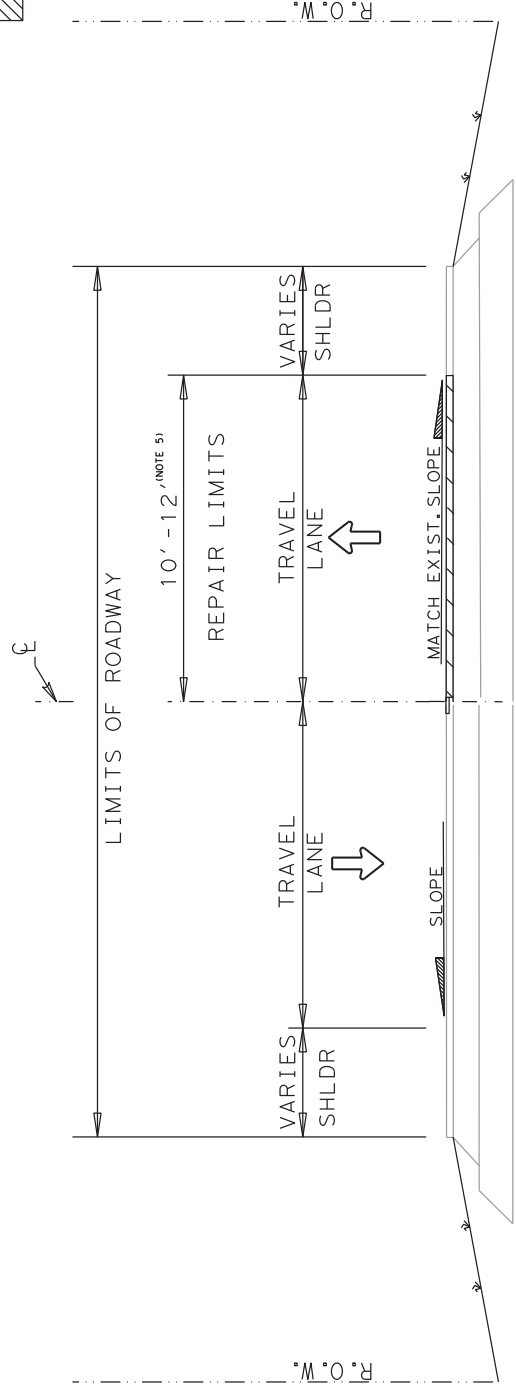
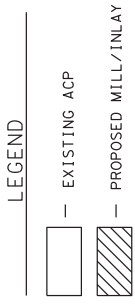


The seal appearing on this document was authorized by  
**LUIS CASTILLO JR**  
**11/19/2026**

Documented by:  
**Luis Castillo Jr.**  
LUTHERAN UNIVERSITY OF TEXAS  
TEXAS DEPARTMENT OF TRANSPORTATION  
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**SPOT BASE REPAIR DETAIL**

|                       |           |                   |                    |
|-----------------------|-----------|-------------------|--------------------|
| DR. M. M.             | DR. M. M. | STATE             | SHEET NUMBER       |
| DR. L. C.             | DR. L. C. | TEXAS             | SHEET 1 OF 1       |
| FILE NO. (01/18/2020) | CONTRACT  | SECTION           | JOB                |
| 6                     | 22        | VAL. VERDE (6370) | 91   001   various |



**TYPICAL SECTION - PROPOSED 2" MILL WITH 2" INLAY (LRA CS) W/ BONDING COURSE**

- NOTES:
1. APPLICATION RATES ARE FOR ESTIMATION PURPOSES ONLY. THESE RATES MAY BE ADJUSTED ON THE FIELD AS PER ENGINEER.
  2. MAINTAIN EXISTING PGL THROUGHOUT THE PROJECT. CONCRETE PAVEMENT SECTIONS WILL BE LEFT UNDISTURBED UNLESS SPECIFIED BY THE ENGINEER.
  3. REFER TO CALLOUT/WORK ORDER FOR LIMITS INFORMATION.
  4. TYPICAL SECTIONS SHOWN DEPICT TYPICAL WORK TO BE DONE THROUGHOUT PROJECT. TYPICAL SECTION LANE(S) WIDTHS MAY CHANGE DUE TO EXISTING ROADWAY CONDITIONS FOR ALL LOCATIONS REQUIRING SPOT BASE REPAIRS.
  5. MILL/INLAY LIMITS SHALL BE LESS THAN 12" FROM THE INSIDE OF THE LANE STRIPE AND LESS THAN 12" INSIDE OF THE EDGE STRIPE OF A LANE.



The seal appearing on this document was authorized by  
**LUIS CASTILLO JR**  
 P.E. 124814, on  
**11/19/2020**

Drawn/signed by:  
**Luis Castillo Jr.**  
 DT-80CA2273'8'...



**MILL/INLAY TYPICAL SECTION**

|        |                         |                       |
|--------|-------------------------|-----------------------|
| STATE  | FEDERAL AID PROJECT NO. | FEDERAL AID DIST. NO. |
| Texas  | 06                      | 06                    |
| COUNTY | CONTRACT NO.            | SECTION NO.           |
| 22     | 6370 91                 | 001                   |

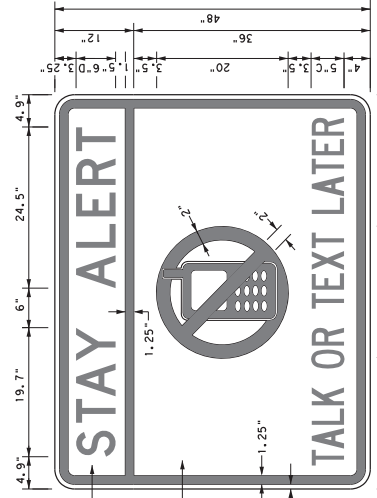


**BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:**

- The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
- The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
- The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
- Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
- When projects about, the Engineer (s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
- The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
- All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
- The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
- As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.
- Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.
- The Engineer has the final decision on the location of all traffic control devices.
- Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

**WORKER SAFETY APPAREL NOTES:**

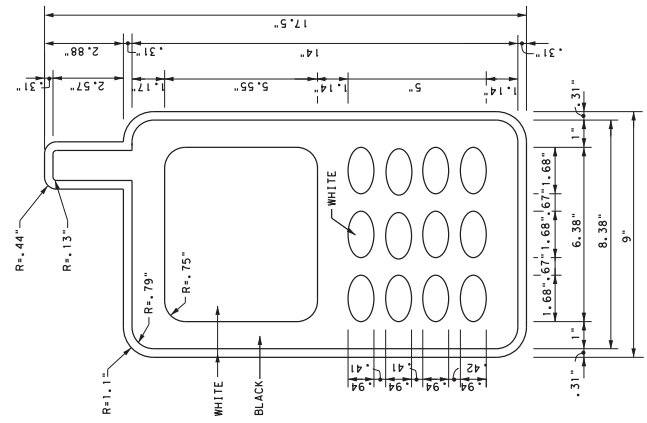
- Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance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



3.0" Radius, 1.25" Border, 0.75" Indent, Block on Yellow;  
(STAY ALERT) Font: D  
3.0" Radius, 1.25" Border, 0.75" Indent, Block on Orange;  
(TALK OR TEXT LATER) Font: C specified length;

COLORS:  
FLUORESCENT  
YELLOW  
BACKGROUND  
BLACK  
BORDER AND  
LEGEND

ORANGE  
FLUORESCENT  
BACKGROUND  
BLACK  
LEGEND,  
AND SYMBOL



**SIGN DETAIL (G20-10T)**

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation  
Traffic Operations Division - TE  
Phone (512) 416-3118

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

|   |
|---|
| COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD) |
| DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)                |
| MATERIAL PRODUCER LIST (MPL)                              |
| ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"    |
| STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)            |
| TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)  |
| TRAFFIC ENGINEERING STANDARD SHEETS                       |

SHEET 1 OF 12

Texas Department of Transportation  
Traffic Operations Division Standard

**BARRICADE AND CONSTRUCTION  
GENERAL NOTES  
AND REQUIREMENTS**

**BC (1) - 14**

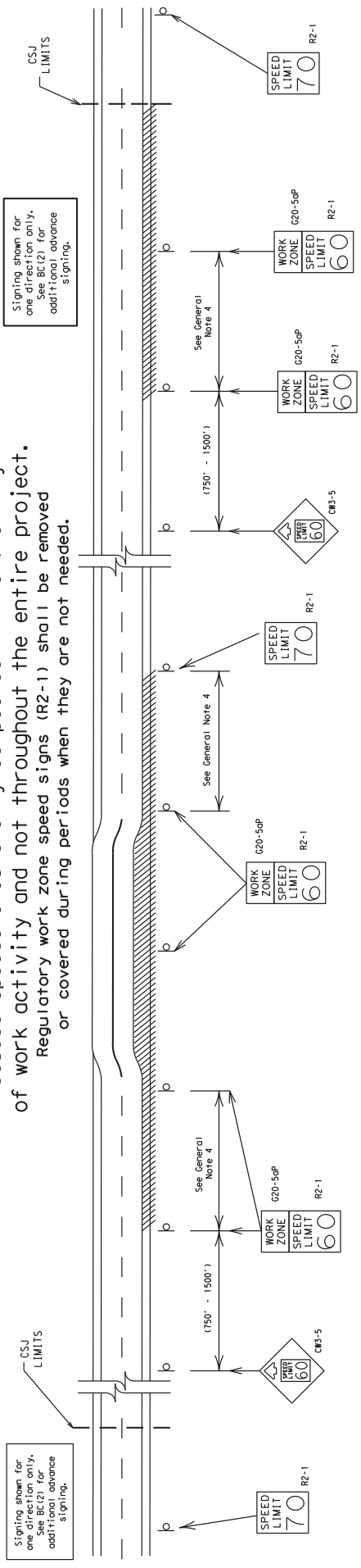
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| FILED | DC-14.dgn     | DR. M.M. | CH. L.C. | DR. M.M. | CH. L.C.  |
| DATE  | November 2002 | CONTRACT | SECTION  | DATE     | REVISION  |
| 4-03  | 5-13          | 6370 91  | 001      | VARIOUS  |           |
| 9-07  | 7-13          | DIST     | 22       | COUNTY   | VAL VERDE |
|       |               |          |          |          | SHEET NO. |



# TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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



## GUIDANCE FOR USE:

### LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

### SHORT TERM WORK ZONE SPEED LIMITS

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

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

SHEET 3 OF 12



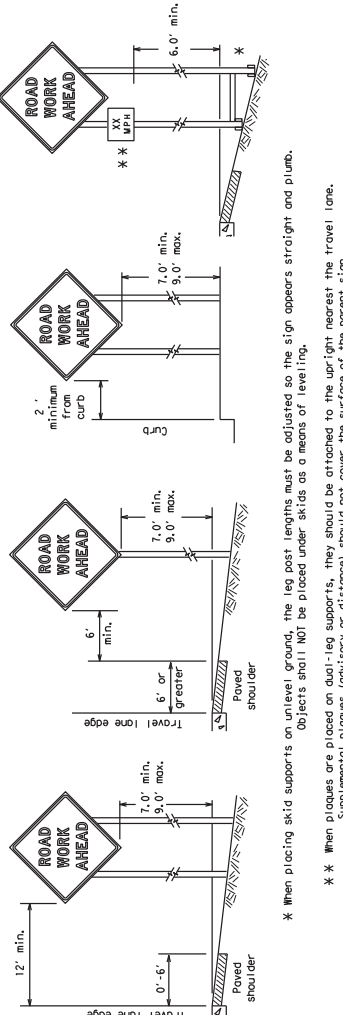
# BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC (3) - 14

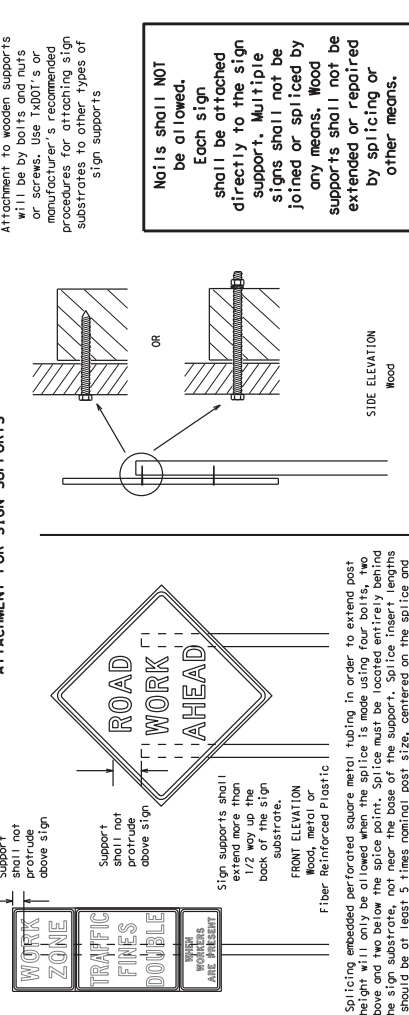
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|       | November 2002 | CONTR | ECT  | JOB |        |    |      |    |      |
|       | 9-07          | 6370  | 91   | 001 |        |    |      |    |      |
|       | 7-13          |       |      |     |        |    |      |    |      |
|       |               |       |      |     |        |    |      |    |      |
|       |               |       |      |     |        |    |      |    |      |



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



**ATTACHMENT FOR SIGN SUPPORTS**

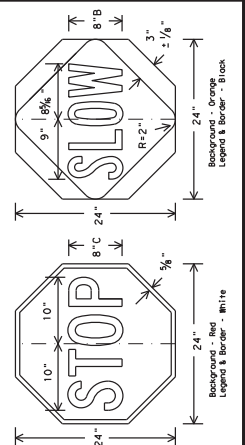


**CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS**

- Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information.
- When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- Contractor shall be responsible for maintaining permanent signs. They shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
- If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
- Any sign or traffic control device that is struck or damaged by the Contractor or his/her contractor equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 302.

**STOP/SLOW PADDLES**

- STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
- When used at night, the STOP/SLOW paddle shall be retroreflective.
- STOP/SLOW paddles may be attached to a staff with a minimum 3/8" diameter eye-bolt on the back of the sign.
- Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the MUTCD.



**GENERAL NOTES FOR WORK ZONE SIGNS**

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
- Signs shall be installed in the "Standard Highway Sign Locations for Texas" (SHSL). The Engineer/Inspector may require the Contractor to furnish other zone signs that are shown in the MUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's responsible person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TADOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
- The Contractor shall furnish sign supports listed in the "Compliance Work Zone Traffic Control Device List" (CMTZCDL). The Contractor shall provide a copy of the manufacturer's installation recommendations to the Engineer for review and approval. The Contractor shall verify the correct procedures are being followed.
- The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector. The maximum height of letters and/or company logos used for identification shall be 1 inch.
- Labels shall be placed on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.

**DURATION OF WORK LOGS DEFINED BY THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES - PART 6J**

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

**SIGN MOUNTING HEIGHT**

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

**SIZE OF SIGNS**

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

**SIGN SUBSTRATES**

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

**REFLECTIVE SHEETING**

- All signs shall be retroreflective and constructed of sheeting meeting the color and retroreflectivity requirements of DMS-8300 (Type A, B, or C) white sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
- Orange sheeting, meeting the requirements of DMS-8300 Type B, or Type C, shall be used for rigid signs with orange backgrounds.

**SIGN LETTERS**

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

**REMOVING OR COVERING**

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- When signs are removed, the sign message is not applicable, this technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
- Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
- When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the sign message.
- Burlap shall NOT be used to cover signs.
- Signs and anchor studs shall be removed and holes backfilled upon completion of work.

**SIGN SUPPORT WEIGHTS**

- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to prevent the sandbags from being used as a projectile.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- Sandbags shall weigh a minimum of 35 lbs and a maximum of 50 lbs.
- Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber, such as tire inner tubes shall NOT be used.
- Rubber ballasts designed for opening devices should not be used for sign support weights.
- Sign supports shall be placed on a level surface. The manufacturer's instructions shall be followed.
- Traffic control devices shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed on a level surface. The manufacturer's instructions shall be followed.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

**FLAGS ON SIGNS**

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

**TEXAS DEPARTMENT OF TRANSPORTATION**

**OPERATIONS DIVISION**

**STANDARD**

**BARRICADE AND CONSTRUCTION**

**TEMPORARY SIGN NOTES**

**BC (4) - 14**

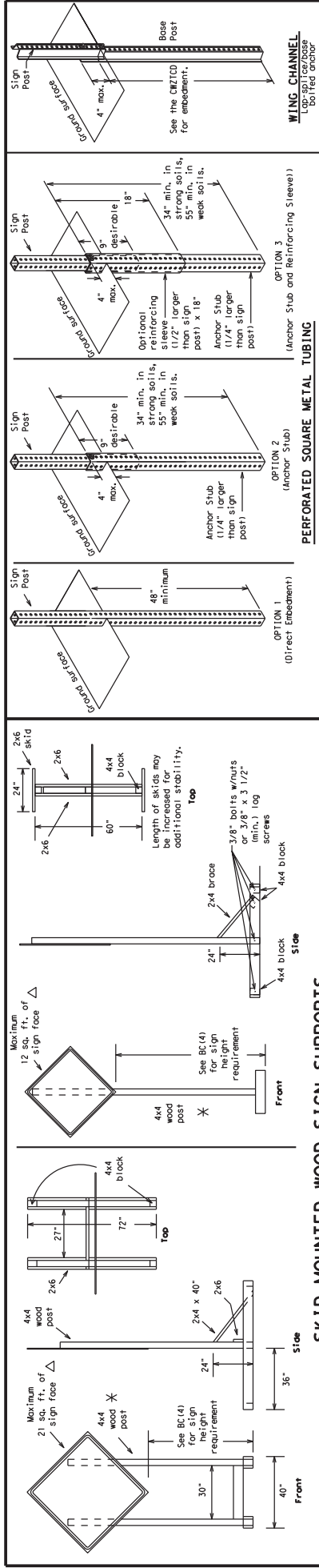
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REVISION: 09/07/2014    DIST:    COUNTY:    SHEET NO.:

REVISION: 07/13/2022    DIST:    COUNTY:    SHEET NO.:

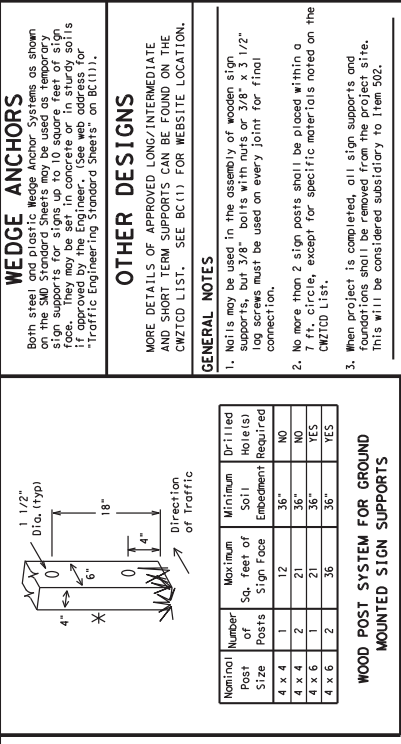
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**SKID MOUNTED WOOD SIGN SUPPORTS**

LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

Refer to the CWZTCO 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.



**GROUND MOUNTED METAL TUBING**

WEDGE ANCHORS

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS

Both steel and aluminum wedge anchors are shown on the SMO Standard Sheets. They may be set in concrete or in sturdy soils. They may be set in concrete or in sturdy soils. Traffic Engineering Standard Sheets, 2018BC(11).

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

GENERAL NOTES

- Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCO 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 CWZTCO for the type of sign substrate that can be used for each approved sign support.

**WING CHANNEL**  
Lap splice/brace bolted anchor

**PERFORMED SQUARE METAL TUBING**  
(Anchor Stub)

**OPTION 1**  
(Direct Embedment)

**OPTION 2**  
(Anchor Stub)

**OPTION 3**  
(Anchor Stub and Reinforcing Sleeve)

**WEDGE ANCHORS**

**WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS**

**SKID MOUNTED WOOD SIGN SUPPORTS**

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

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

**SINGLE LEG BASE**  
Side View

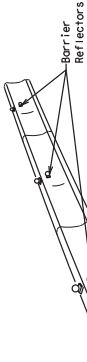
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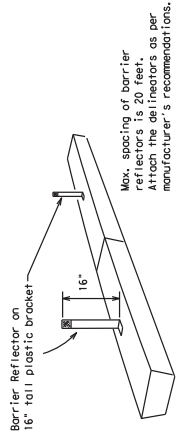


- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address.
- Color of Barrier Reflectors shall be as specified in the TMA/CD. The cost of the reflectors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

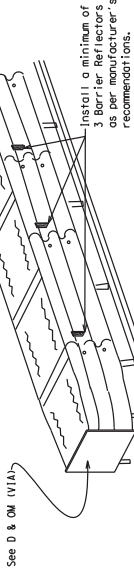


**CONCRETE TRAFFIC BARRIER (CTB)**

- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in a row on the side of the CTB. The reflectors shall be mounted in a row on the side of the 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 CTB. 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 diagram.
- Where 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 edge line being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Barrier Reflector units shall be yellow or white in color to match the edge line being supplemented.
- 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)**



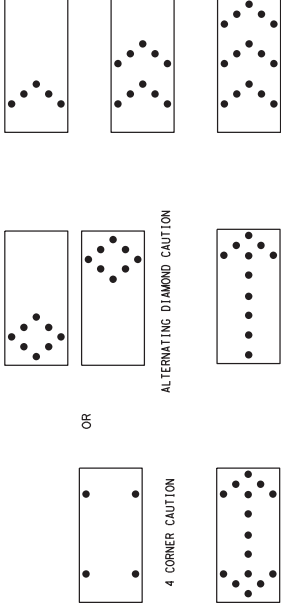
**DELINEATION OF END TREATMENTS**

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

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

Arrow Boards may be located behind channelizing devices in place for a shoulder or travel lane. Arrow Boards shall be 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 traffic 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:



DOUBLE ARROW

CHEVRON ARROW LEFT & RIGHT

ALTERNATING DIAMOND CAUTION

CORNER CAUTION

- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond display.
- The straight line caution display is NOT ALLOWED.
- The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
- The flashing rate of the lamps shall be in 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 night operations.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- A full matrix PDS 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.
- The height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

| TYPE | MINIMUM SIZE | MINIMUM NUMBER OF PANEL LAMPS | MINIMUM VISIBILITY DISTANCE |
|------|--------------|-------------------------------|-----------------------------|
| A    | 30 x 60      | 13                            | 3/4 mile                    |
| 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 TRAFFIC BARRIER OR GUARDRAIL.

**FLASHING ARROW BOARDS**

SHEET 7 OF 12



Texas Department of Transportation

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

BC (7) - 14

|         |               |           |            |           |           |
|---------|---------------|-----------|------------|-----------|-----------|
| FILED   | DC-14, sign   | Rev. M.M. | Ch. L.L.C. | Rev. M.M. | Ext. L.C. |
| REVISED | November 2002 | COM. BCT  | JOB        | HISTORY   | MAR1005   |
| DATE    | 9-07          | 8-14      | COUNTY     | SHEET NO. |           |
|         | 7-13          | 22        | VAL VERDE  |           |           |

**TRUCK-MOUNTED ATTENUATORS**

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report 350 (NCHRP 350) and the Manual on Assessing Traffic Severity for Level 2 or 3 TMA's.
- Refer to the CWZTD for the requirements of Level 2 or Level 3 TMA's.
- Refer to the CWZTD for a list of approved TMA's.
- TMA's shall be installed 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.
- The only person on a TMA should not be equipped with a work area is spread down the roadway and the work crew is on extended distance from the TMA.

**WARNING LIGHTS**

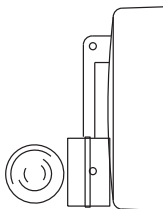
- Warning lights shall meet the requirements of the TMA/CD.
- Warning lights shall NOT be installed on barricades.
- Type A Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "EL". The Type A Warning Lights shall not be used with signs manufactured with Type B<sub>1</sub> or C<sub>1</sub> 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. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification, the warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
- When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

**WARNING LIGHTS MOUNTED ON PLASTIC DRUMS**

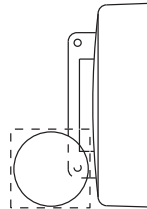
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.
- The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.
- 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.
- 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 location of a warning light. 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 CWZTD.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- The warning reflector shall be fully reflectorized, including the area where attached to the drum.
- Round substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it is used on the side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.



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



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



**GENERAL NOTES**

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device. Intermediate term devices may be used as specified in the Traffic Control Manual, Chapter 12, section 12.12.2.2, for intermediate 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.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent areas by the Engineer. Intermediate term devices may be used as approved by the Engineer.
4. Drums, bases, and related materials shall exhibit good workmanship and current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and affect their appearance or serviceability.
6. 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**

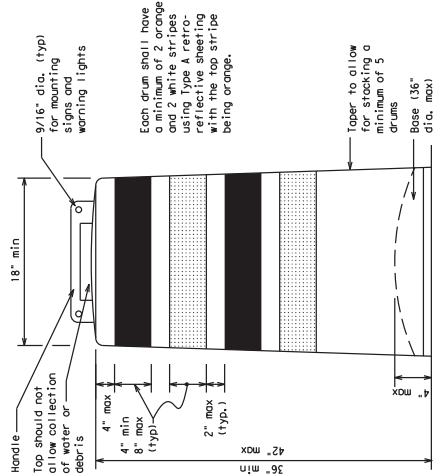
- Pre-qualified plastic drums shall meet the following requirements:
1. Plastic drums shall be a two-piece design: the "body" of the drum shall be the top portion and the "base" shall be the bottom portion.
  2. The body shall have a maximum of 24 inches in height and the body shall separate from the 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.
  3. Plastic drums shall be constructed of lightweight flexible, and noncombustible materials. The Contractor shall NOT use metal drums or drums with any sharp edges or protrusions.
  4. Drums shall have a top surface that is 36 inches in diameter and 18 inches in depth.
  5. 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 be attached to the drum body in a manner that does not require the use of a warning light, warning reflector unit or approved compliant sign.
  6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches greater than 8 inches in width. Any non-reflectORIZED space between any two adjacent stripes shall not exceed 2 inches in width, and a minimum of two footcandles of sufficient size to allow base to be held down while separating the drum body from the base.
  7. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
  8. Drum body shall have a maximum unballasted weight of 11 lbs.
  9. Drum and base shall be marked with manufacturer's name and model number.

**RETROREFLECTIVE SHEETING**

1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Department Materials Specification DMS-8300, "Sign Face Materials." Type A reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface. The sheeting shall be applied in a manner that does not have adhered in-place and exhibit no delimiting, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

**BALLAST**

1. 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 ballast should not exceed 12 inches.
2. 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.
3. Recycled truck tire sidewall is to be used for ballast on drums approved by the Engineer.
4. 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.
5. 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.
6. Ballast shall be stored in a container of drums.
7. Adhesives may be used to secure base of drums to pavement.



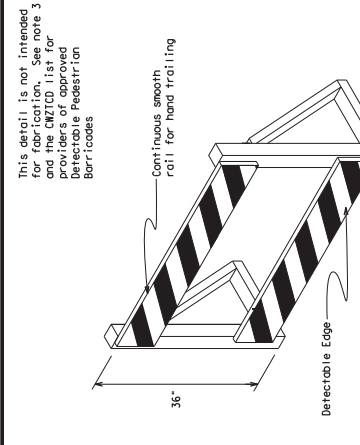
18" x 24" Sign  
(Maximum Sign Dimension)  
Chevron on CW-8, Opposing Traffic Lane  
Diagonal; Driveway Sign Only; Keep Right  
in series or as approved  
by Engineer

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

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

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

1. Signs used on plastic drums shall be manufactured using substrates listed on the QZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B1 or Type C1, Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material", unless otherwise specified in the plans.
3. 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.
4. 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.
5. Signs shall be installed using a 1/2" inch bolt (vertical) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. 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 one every third drum. A minimum of three (3) should be used of each location called for in the plans.
8. 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.



This detail is not intended for fabrication. See note 3 and the QZTCD list for approved materials for Detectable Pedestrian Barricades

**DETECTABLE PEDESTRIAN BARRICADES**

1. When existing pedestrian facilities are disrupted, closed, or transitions, and other areas where specific directional detectable and include accessibility features consistent with the features present in the existing pedestrian facility.
2. Where pedestrians with visual disabilities normally use the intended travel lane, barricades shall consist of two (2) large cones with a visual disability traveling with the aid of a long cone.
3. Detectable pedestrian barricades similar to the one pictured shall be used in conjunction with a detectable pedestrian path, cones, or plastic chain strings between devices are not acceptable. 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 for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades may use 8" nominal diameter ballast as shown on BC(10) provided that the top ballast is secured with a chain link fence or other hand trailing with no splinters, burrs, or sharp edges.

**DIRECTION INDICATOR BARRICADE**

1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional detectable and include accessibility features consistent with the features present in the existing pedestrian facility.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. Large arrow (AR-16) signs in the size shown with a black arrow on a background of Type B1 or Type C1, Orange retroreflective sheeting above a roll with Type A retroreflective sheeting in alternating 4" wide bands of the arrows sloping downward at an angle of 45 degrees from the vertical shall be used. Sheet types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Ballast shall be as approved by the manufacturer's instructions.

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**SHEET 8 OF 12**

**Texas Department of Transportation**

**Traffic Operations Division Standard**

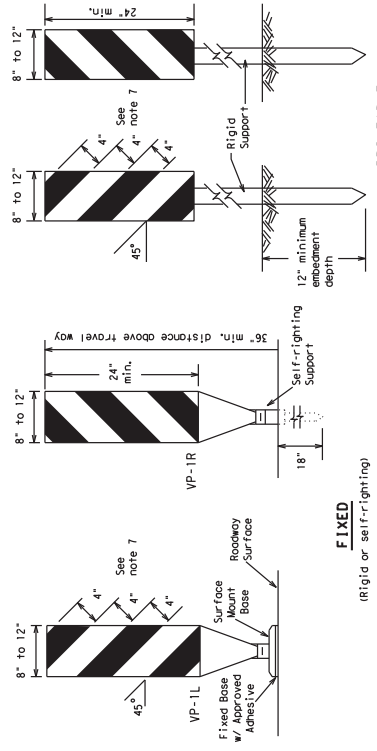
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**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (8) - 14**

|         |               |            |             |          |           |      |      |      |      |
|---------|---------------|------------|-------------|----------|-----------|------|------|------|------|
| FILE:   | BC-14.dgn     | Dwg. No.:  | BC (8) - 14 | Rev.:    | M.M.      | Ch.: | M.M. | Ex.: | L.C. |
| ADDT:   | November 2002 | Rev.:      | 001         | Revised: |           |      |      |      |      |
| CDT:    | 3/10/01       | Rev.:      | 001         | Revised: |           |      |      |      |      |
| CDT:    | 7-13          | Rev.:      | 001         | Revised: |           |      |      |      |      |
| CDT:    | 9-01-8-14     | Rev.:      | 001         | Revised: |           |      |      |      |      |
| COUNTY: |               | SHEET NO.: | 22          | TITLE:   | VAL VERDE |      |      |      |      |

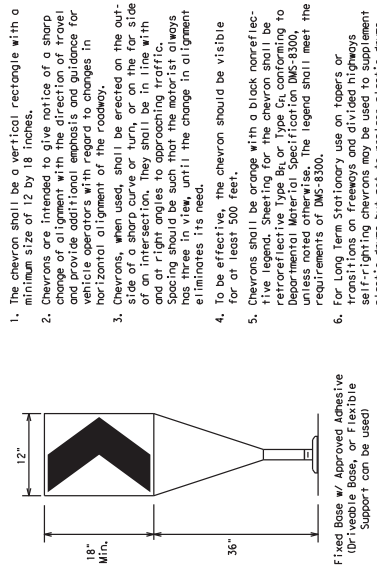
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- FIXED**  
(Rigid or self-righting)
- PORTABLE**  
(Rigid or self-righting)
- Vertical Panels (VPs) are normally used to channelize traffic or divide opposing lanes of traffic.
  - VPs may be used in daytime or nighttime situations. They may be used at the edge of the roadway, drop-offs, and work zones. For additional information on the use of 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 VPs.
  - VPs should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
  - Speed caution messages and temporary traffic control reflective area facing traffic.
  - Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" on the TxDOT website for the requirements of VPs.
  - Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" on the TxDOT website for the requirements of VPs.
  - Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

- VERTICAL PANELS (VPS)**
- Opposing Traffic Lane Dividers (OTLD) 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 travel. 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. The OTLD's should not exceed 100 foot spacing.
  - The OTLD shall be orange with a black non-reflective top. The OTLD's shall be retroreflective Type B or Type C, conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- 

**OPPOSING TRAFFIC LANE DIVIDERS (OTLD)**



- CHEVRONS**
- The chevrons 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 the roadway centerline. The legend shall always have three in view, until the change in alignment eliminates its need.
  - For at least 500 feet.
  - Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B<sub>1</sub> or Type C<sub>1</sub> 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, chevrons shall be made of plastic drums but not to replace plastic drums.

- 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 shall be placed in accordance to application and installation requirements specific to the device, and shall be placed in accordance to application and installation requirements specific to the device, and shall be placed in accordance to application and installation requirements specific to the device, and shall be placed in accordance to application and installation requirements specific to the device.
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**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 (TMUDCD).
  - Channelizing devices shown on this sheet may have a drivable, fixed or portable base. The Engineer/Inspector shall ensure that 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 TMUDCD and the requirements of DMS-8300.
  - 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 weigh a minimum of 30 lbs. that ensures proper bonding to the pavement surface. The Contractor shall ensure 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 cracking. The Contractor shall ensure that the Engineer/Inspector shall approve all application and removal procedures of fixed bases.

| Posted Speed * | Formula               | Minimum Desirable Taper Lengths * x *                            | Suggested Maximum Channelizing Devices |
|----------------|-----------------------|--|--|
| 30             | $MS^2$                | 10' - 11' - 12' (base-to-base) / 150' - 165' - 180' (top-to-top) | On or On a Taper / 30' - 60'           |
| 35             | $L = \frac{MS^2}{60}$ | 205' - 225' - 245'   | 35' - 70'                              |
| 40             |                       | 265' - 295' - 320'   | 40' - 80'                              |
| 45             |                       | 450' - 495' - 540'   | 45' - 90'                              |
| 50             |                       | 500' - 550' - 600'   | 50' - 100'                             |
| 55             | $L = WS$              | 605' - 660' - 720'   | 55' - 110'                             |
| 60             |                       | 600' - 660' - 720'   | 60' - 120'                             |
| 65             |                       | 650' - 715' - 780'   | 65' - 130'                             |
| 70             |                       | 700' - 770' - 840'   | 70' - 140'                             |
| 75             |                       | 750' - 825' - 900'   | 75' - 150'                             |
| 80             |                       | 800' - 880' - 960'   | 80' - 160'                             |

\*X\* 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 DESTRIBABLE TAPER LENGTHS**

**SHEET 9 OF 12**

Texas Department of Transportation

Division Operations Standard

**BC (9) - 14**

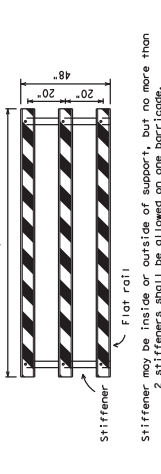
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| FILE#   | DC-14.dgn     | DR. M.M. | CH. L.L.C. | MR. M.L.  | EX. L.C.  |
| DATE    | November 2002 | COM. BCT | JOB        | HIGHWAY   |           |
| PROJECT | HOUSTON       | 6370     | 91         | 001       | VARIOUS   |
| DATE    | 9-07          | 6-14     | DIST       | COUNTY    | SHEET NO. |
| DATE    | 7-13          |          | 22         | VAL VERDE |           |

**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**TYPE 3 BARRICADES**

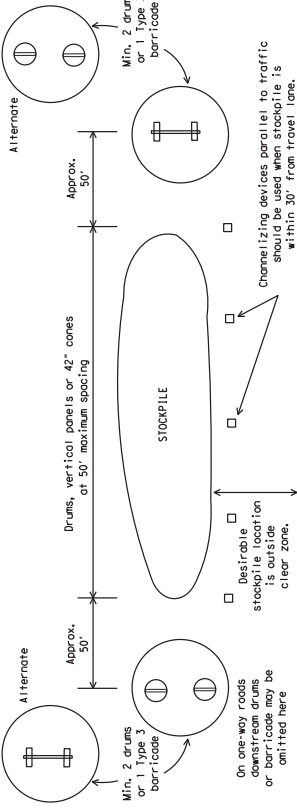
- Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for a complete list of all materials used in the construction of Type 3 Barricades.
- Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
- Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn. Barricades should be placed in both directions from the center of the roadway. Where no turns are provided at a closed road striping should slope downward in both directions toward the center of roadway.
- Striping of rolls, for the right side of the roadway, should slope downward toward the right. For the left side of the roadway, striping should slope downward to the right.
- Identification markings may be shown only on the back of the barricade rolls. The maximum height of letters and/or company logos used for identification shall be 1".
- Barricades shall be placed parallel to traffic unless an adequate clearance is provided.
- Warning lights shall NOT be installed on barricades. The use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to prevent the sand from blowing away. Barricades shall be constructed in a manner that covers any portion of a barricade roll's reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon impact. Barricades shall be constructed on a level surface. Sandbags for sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
- Sheeting for barricades shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



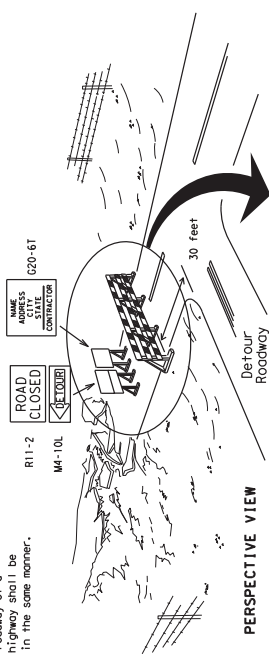
**TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES**

Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.



**TRAFFIC CONTROL FOR MATERIAL STOCKPILES**

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

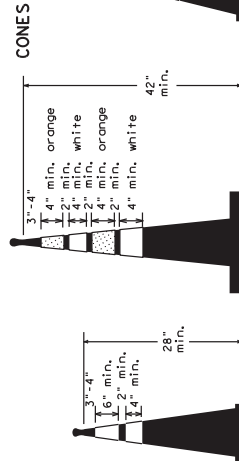


**PERSPECTIVE VIEW**

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

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

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

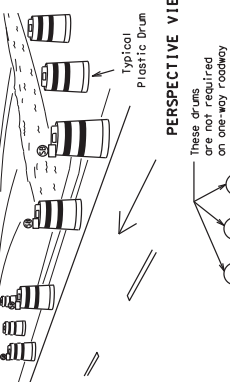


**Two-Piece cones**

**One-Piece cones**

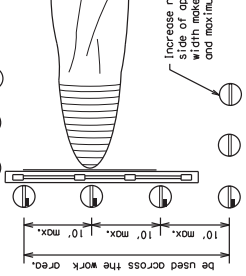
28" Cones shall have a minimum weight of 9 1/2 lbs.  
42" 2-piece cones shall have a minimum weight of 30 lbs, including base.

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



**PERSPECTIVE VIEW**

These drums are not required on one-way roadway



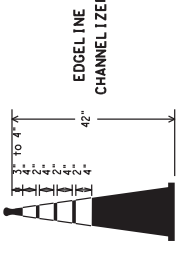
**PLAN VIEW**

Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary, minimum of 2 and maximum of 4 drums

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

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

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



**EDGE LINE CHANNELIZER**

- This device is intended only for use in place of a vertical panel to delineate traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
- This device shall not be used to separate lanes of traffic opposing or otherwise or warn of objects.
- This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an appropriate number of the edge line yellow for left edge line correspond to the top of the edge line yellow for left edge line white for right edge line) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
- The base must weigh a minimum of 30 lbs.

SHEET 10 OF 12

Texas Department of Transportation  
Operations Division Standards

**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

BC (10) - 14

|           |            |            |             |            |            |
|-----------|------------|------------|-------------|------------|------------|
| FILE#     | DC-14.dgn  | DRW. M.M.  | CHK. L.L.C. | ISS. M.M.  | EX. L.C.   |
| DATE      | 11/08/2020 | 9:52:30 AM |             |            |            |
| REVISIONS | 01         | 001        | 001         | 001        | 001        |
| DATE      | 11/08/2020 | 9:07       | 11/08/2020  | 11/08/2020 | 11/08/2020 |
| BY        | VAL        | VERDE      |             |            |            |
| SHEET NO. | 22         |            |             |            |            |



### WORK ZONE PAVEMENT MARKINGS

#### GENERAL

- The Contractor shall be responsible for maintaining work zone and markings in accordance with the 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 (TMUCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUCD and as shown on the plans.
- When short term markings are required on the plans, short term markings shall conform with the TMUCD, the plans and details as shown on the Standard Plan Sheet WZ(SPM).
- When standard pavement markings are not in place and the roadway is to be opened to traffic, the contractor shall install and maintain PASS WITH CARE signs at the beginning of sections where passing is permitted.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

#### RAISED PAVEMENT MARKERS

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

#### PREFABRICATED PAVEMENT MARKINGS

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

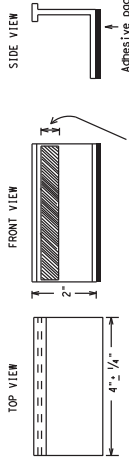
#### MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 959.
- 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 are a safety hazard on all roadways open to traffic 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 confine the detour route.
- Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernible marking. This shall be by any method approved by Item 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.
- Blot 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 shall be paid for by the Contractor. The contractor shall submit the 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



Height of sheeting is usually more than 1/4" and less than 1".

#### 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 to be required, however at the option of the Engineer, either "as is" or "as shown" 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 truck. Drive the vehicle at a constant 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(SPM) for tab placement on new pavements. See Standard Sheet TOP(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)                     |
| TRAFFIC BUTTONS                                      |
| EPOXY AND ADHESIVES                                  |
| BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS             |
| PERMANENT PREFABRICATED PAVEMENT MARKINGS            |
| TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS |
| TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS   |

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(11).

SHEET 11 OF 12



Texas Department of Transportation

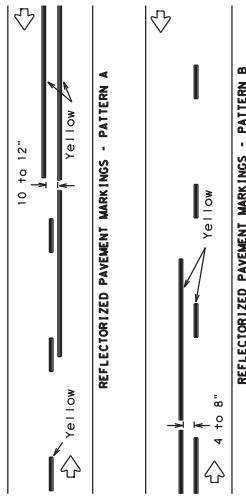
## BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11) - 14

|           |               |      |      |     |      |    |      |    |           |
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| DATE      | February 1998 | CON  | ECT  | JOB |      |    |      |    |           |
| REVISIONS |               | 6370 | 91   | 001 |      |    |      |    |           |
|           | 2-98          | 9-07 |      |     |      |    |      |    |           |
|           | 1-02          | 7-13 |      |     |      |    |      |    |           |
|           | 11-02         | 8-14 |      |     |      |    |      |    |           |
| SHEET NO. |               | 22   |      |     |      |    |      |    |           |
|           |               |      |      |     |      |    |      |    | VAL VERDE |

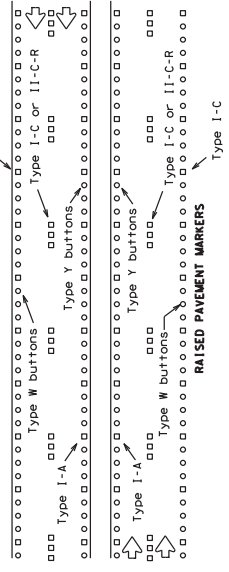
105

### PAVEMENT MARKING PATTERNS

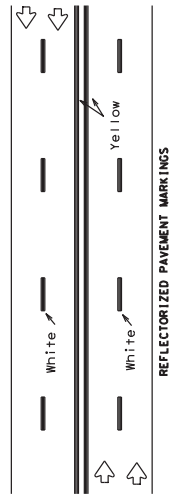


Pattern A is the TxDOT Standard, however, Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectorized pavement markings.

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

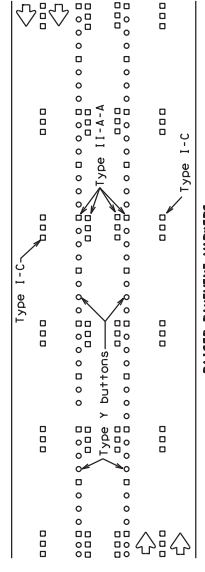


### EDGE & LANE LINES FOR DIVIDED HIGHWAY



Prefabricated markings may be substituted for reflectorized pavement markings.

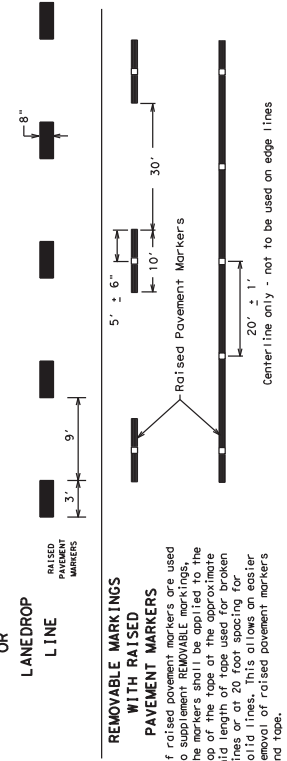
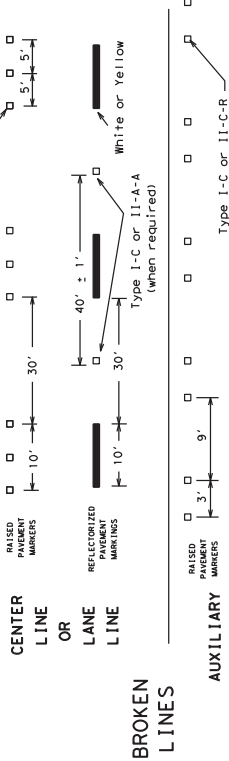
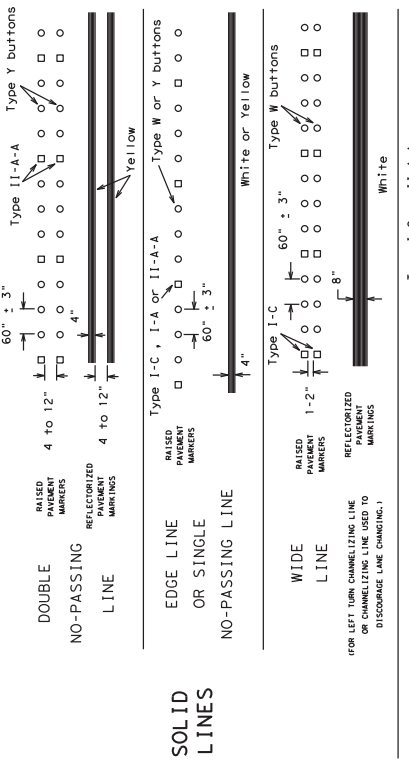
### LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



Prefabricated markings may be substituted for reflectorized pavement markings.

### TWO-WAY LEFT TURN LANE

### STANDARD WORK ZONE PAVEMENT MARKING DETAILS



SHEET 12 OF 12

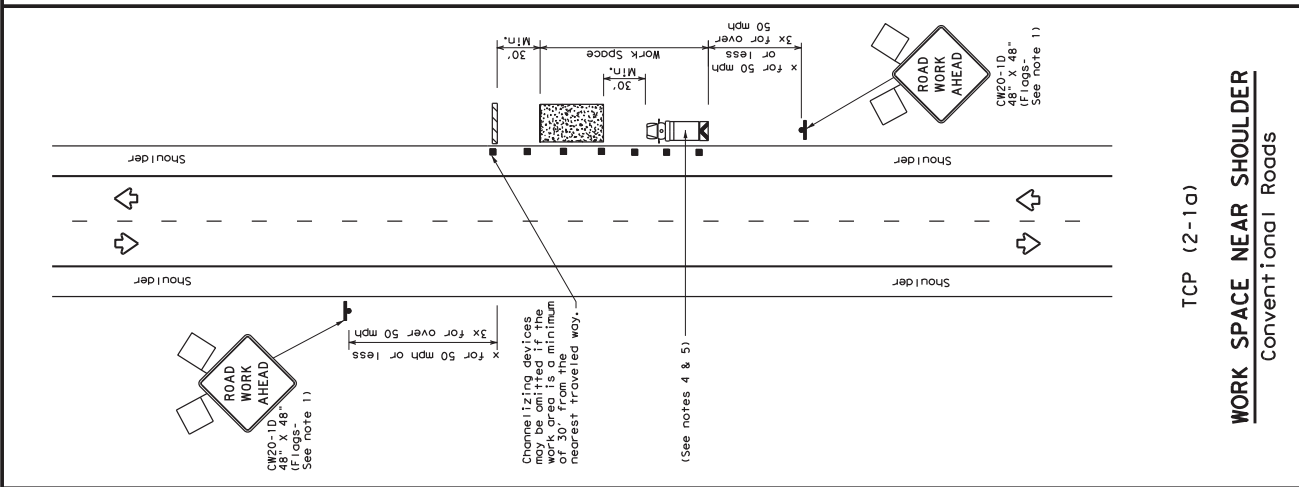


### BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC (12) - 14

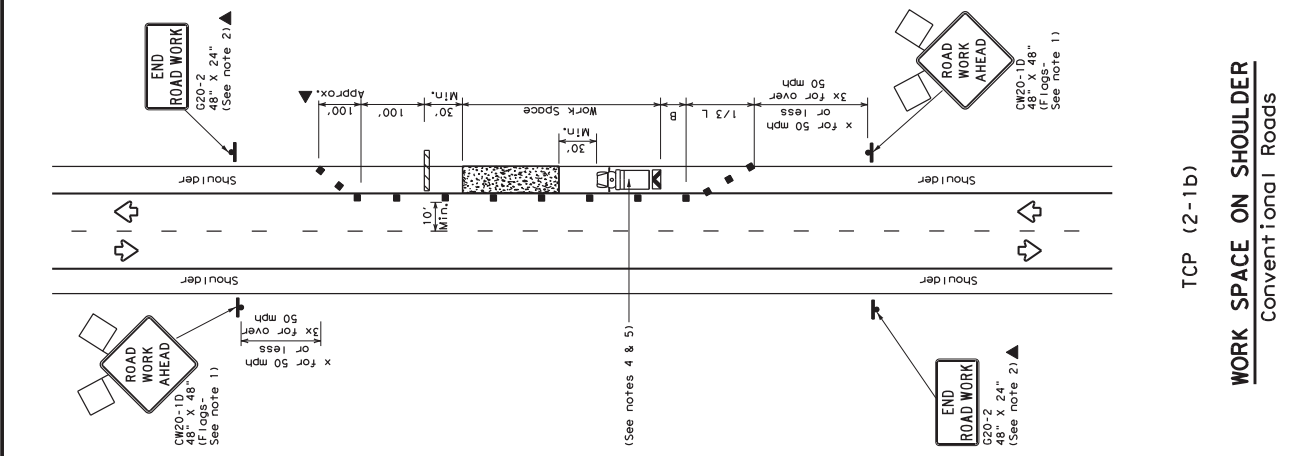
|              |  |           |           |          |         |       |            |       |            |
|--------------|--|-----------|-----------|----------|---------|-------|------------|-------|------------|
| FILE:        | DC-14.dgn  | DR:       | M.M.      | CHK:     | L.C.    | DR:   | M.M.       | CHK:  | L.C.       |
| DATE:        | 11/18/2020 9:32:38 AM  | PROJECT:  | 1-97 9-07 | SECTION: | 6370 91 | DATE: | 11-02 8-14 | DATE: | 11-02 8-14 |
| DESCRIPTION: | CONTRACTS/M11-1109 & SPOT BASE REPAIR - VOYAGER/CAD/XPOT Standards/bc-14.dgn | CONTRACT: | 1-97 9-07 | SECTION: | 6370 91 | DATE: | 11-02 8-14 | DATE: | 11-02 8-14 |
| DESIGNED BY: | 11/18/2020 9:32:38 AM  | CONTRACT: | 1-97 9-07 | SECTION: | 6370 91 | DATE: | 11-02 8-14 | DATE: | 11-02 8-14 |
| CHECKED BY:  | 11/18/2020 9:32:38 AM  | CONTRACT: | 1-97 9-07 | SECTION: | 6370 91 | DATE: | 11-02 8-14 | DATE: | 11-02 8-14 |
| DATE:        | 11/18/2020 9:32:38 AM  | CONTRACT: | 1-97 9-07 | SECTION: | 6370 91 | DATE: | 11-02 8-14 | DATE: | 11-02 8-14 |
| DESCRIPTION: | CONTRACTS/M11-1109 & SPOT BASE REPAIR - VOYAGER/CAD/XPOT Standards/bc-14.dgn | CONTRACT: | 1-97 9-07 | SECTION: | 6370 91 | DATE: | 11-02 8-14 | DATE: | 11-02 8-14 |
| DESIGNED BY: | 11/18/2020 9:32:38 AM  | CONTRACT: | 1-97 9-07 | SECTION: | 6370 91 | DATE: | 11-02 8-14 | DATE: | 11-02 8-14 |
| CHECKED BY:  | 11/18/2020 9:32:38 AM  | CONTRACT: | 1-97 9-07 | SECTION: | 6370 91 | DATE: | 11-02 8-14 | DATE: | 11-02 8-14 |
| DATE:        | 11/18/2020 9:32:38 AM  | CONTRACT: | 1-97 9-07 | SECTION: | 6370 91 | DATE: | 11-02 8-14 | DATE: | 11-02 8-14 |

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.



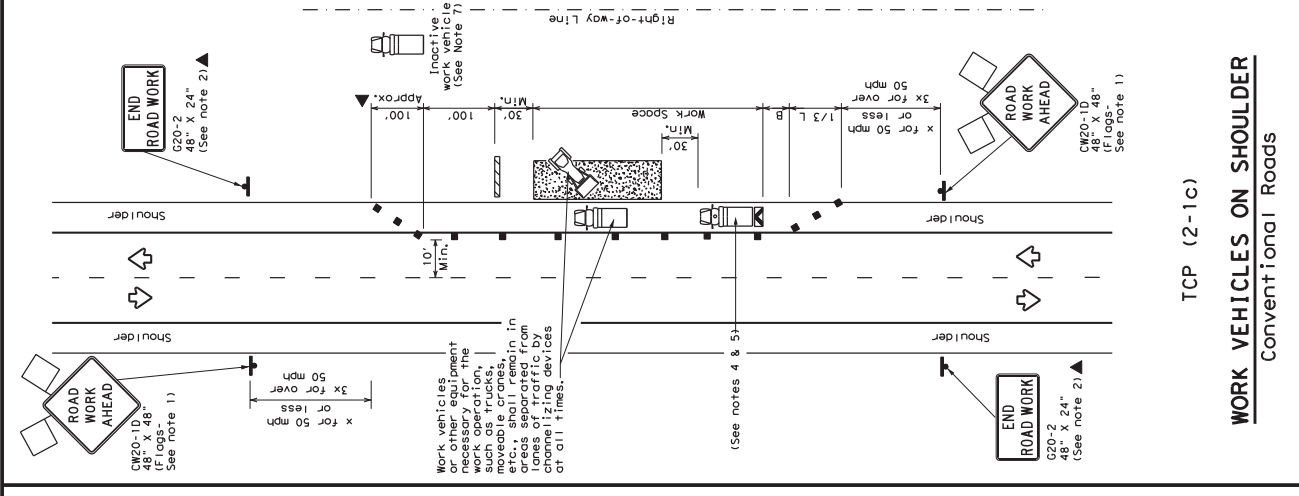
TCP (2-1a)

**WORK SPACE NEAR SHOULDER**  
Conventional Roads



TCP (2-1b)

**WORK SPACE ON SHOULDER**  
Conventional Roads



TCP (2-1c)

**WORK VEHICLES ON SHOULDER**  
Conventional Roads

| LEGEND                               |  |
|--------------------------------------|--|
| Channelizing Devices                 | Truck Mounted Attenuator (TMA)         |
| Heavy Work Vehicle                   | Portable Changeable Message Sign (PMS) |
| Trailer Mounted Flashing Arrow Board | Traffic Flow                           |
| Sign                                 | Flag                                   |
| Flag                                 | Logger                                 |

| Posted Speed *K | Formula  | Minimum Taper Lengths *K | Suggested Maximum Spacing of Channelizing Devices | Minimum Sign Spacing | Suggested Maximum Spacing of Channelizing Devices |
|-----------------|----------|--------------------------|---|----------------------|---|
| 30              | $L = WS$ | 10' 11'                  | 12'   | On a Tangent         | 90'   |
| 35              | $L = WS$ | 150' 165'                | 180'  | 30'                  | 120'  |
| 40              | $L = WS$ | 205' 225'                | 245'  | 35'                  | 160'  |
| 45              | $L = WS$ | 265' 295'                | 320'  | 40'                  | 155'  |
| 50              | $L = WS$ | 450' 495'                | 540'  | 45'                  | 195'  |
| 55              | $L = WS$ | 550' 605'                | 660'  | 55'                  | 240'  |
| 60              | $L = WS$ | 600' 660'                | 720'  | 60'                  | 295'  |
| 65              | $L = WS$ | 650' 715'                | 780'  | 65'                  | 350'  |
| 70              | $L = WS$ | 700' 770'                | 840'  | 70'                  | 410'  |
| 75              | $L = WS$ | 750' 825'                | 900'  | 75'                  | 475'  |
| 80              | $L = WS$ | 800' 880'                | 960'  | 80'                  | 540'  |

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

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

**GENERAL NOTES**

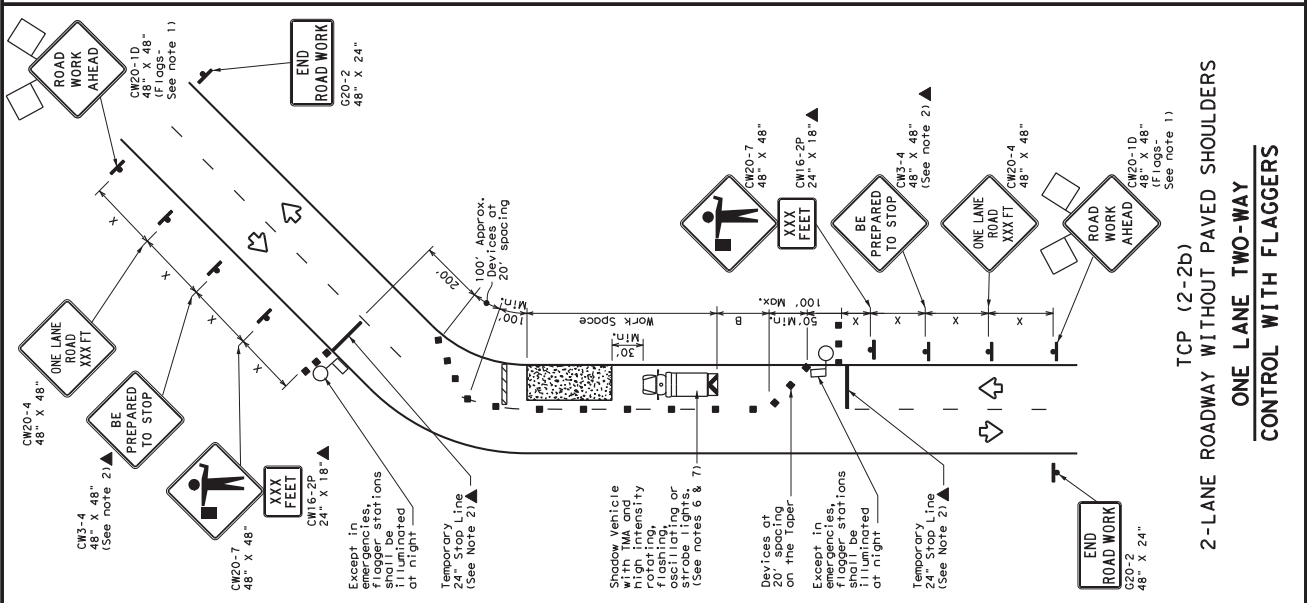
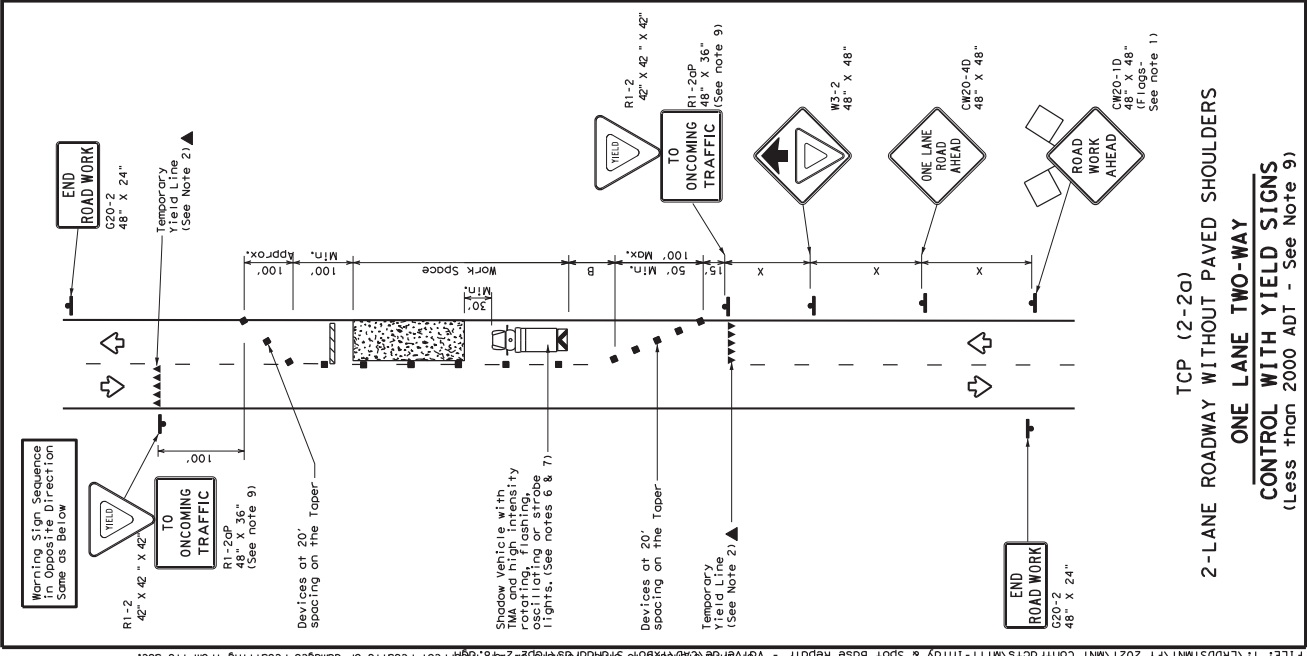
- Flags attached to signs, where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol which may be omitted when stored in the plans, or for routine maintenance work, when approved by the Engineer.
- Stockpiled material should be placed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

Texas Department of Transportation  
 Traffic Operations Division Standard

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

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

|            |               |             |           |               |
|------------|---------------|-------------|-----------|---------------|
| FILE:      | tcp2-1-18.dgn | REV. M.M.   | REV. M.M. | EXT. L.C.     |
| PROJECT:   | December 1985 | CONT. SECT. | 6370 91   | HIGHWAY       |
| REVISIONS: | 2-94 4-98     | DATE        | 001       | VOL. T.O.U.S. |
| 8-95 2-12  |               | DIST.       |           | COUNTY        |
| 1-97 2-18  |               | SHEET       | 22        | VOI. VerDate  |



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

| Posted Speed *<br>MPH | Formula | Minimum Taper Lengths **<br>(ft) | Suggested Maximum Channelizing Devices<br>On a Taper (X) | On a Taper (X) | On a Taper (X) | On a Taper (X) | Minimum Sign Spacing<br>Distance (ft) | Suggested Longitudinal Sign Buffer Spacing<br>Distance (ft) |
|-----------------------|---------|----------------------------------|--|----------------|----------------|----------------|---------------------------------------|---|
| 30                    | WS      | 150'                             | 165'   | 180'           | 30'            | 60'            | 120'                                  | 90'   |
| 35                    | L       | 205'                             | 225'   | 240'           | 35'            | 70'            | 160'                                  | 120'  |
| 40                    | L       | 265'                             | 295'   | 320'           | 40'            | 80'            | 240'                                  | 155'  |
| 45                    | L       | 325'                             | 365'   | 400'           | 45'            | 90'            | 320'                                  | 195'  |
| 50                    | L-WS    | 385'                             | 435'   | 480'           | 50'            | 100'           | 400'                                  | 240'  |
| 55                    | L-WS    | 445'                             | 505'   | 560'           | 55'            | 110'           | 500'                                  | 295'  |
| 60                    | L-WS    | 505'                             | 575'   | 640'           | 60'            | 120'           | 600'                                  | 350'  |
| 65                    | L-WS    | 565'                             | 645'   | 720'           | 65'            | 130'           | 700'                                  | 410'  |
| 70                    | L-WS    | 625'                             | 715'   | 800'           | 70'            | 140'           | 800'                                  | 475'  |
| 75                    | L-WS    | 685'                             | 785'   | 880'           | 75'            | 150'           | 900'                                  | 540'  |

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

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

**GENERAL NOTES**

- Flags attached to signs where shown, are REQUIRED, except those denoted with the triangle symbol.
- Flags may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
- Flagger stations shall be established at 200-foot intervals along the work zone. Flagger stations shall be located in the travel lane, in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Flagger stations with TMA may be positioned off the paved surface, next to those shown in order to protect a wider work space.

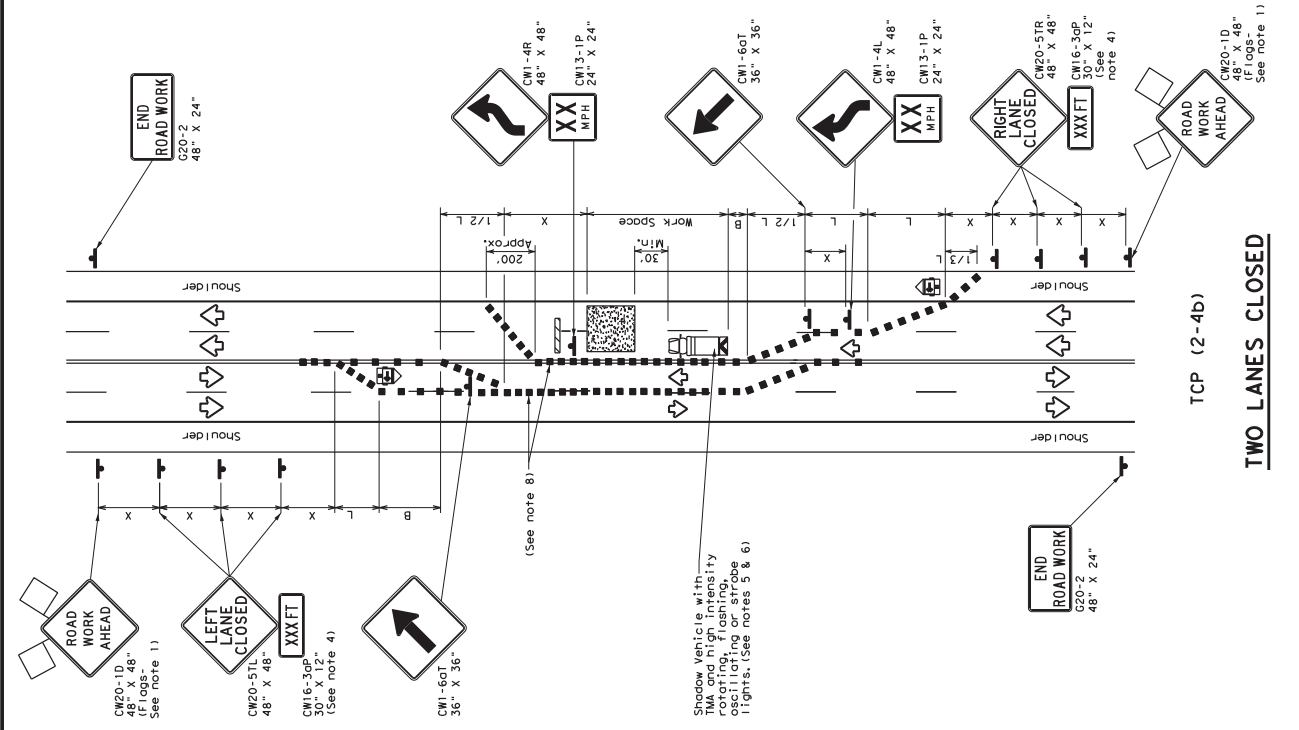
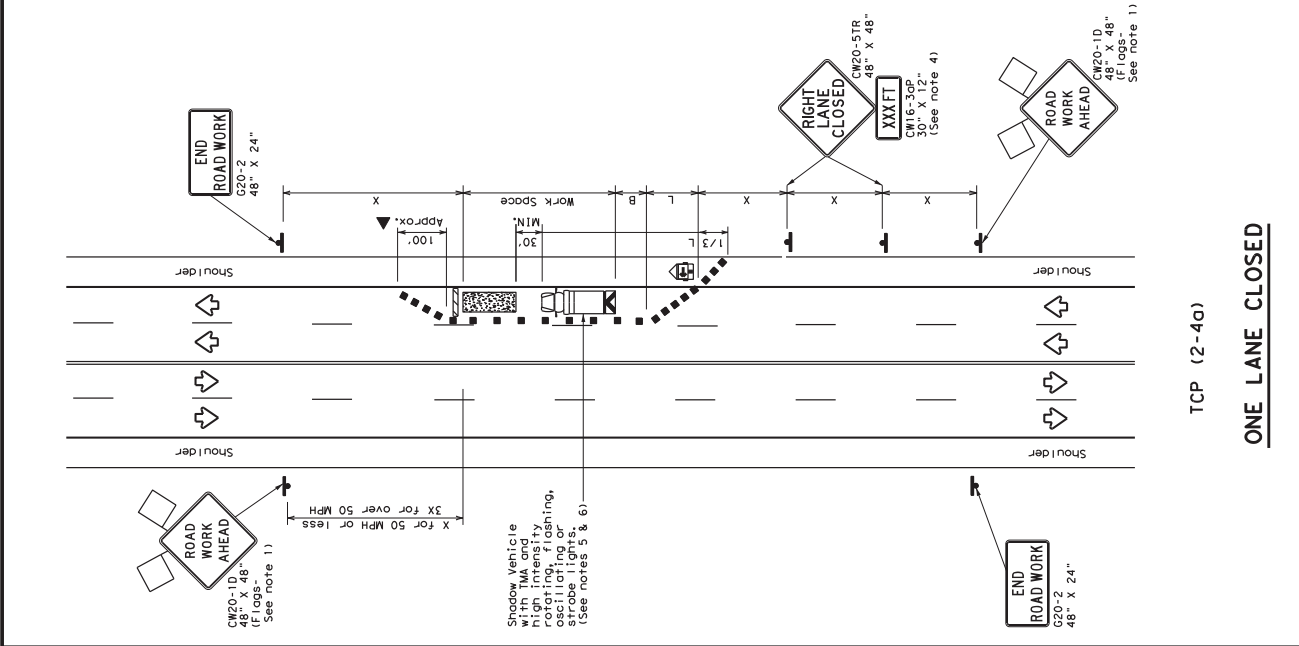
**TCP (2-2a)**

- The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance for the approach.
- The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

**TCP (2-2b)**

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





**LEGEND**

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

| Posted Speed * | Minimum Taper Lengths ** | Suggested Maximum Spacing of Channelizing Devices *** | Minimum Sign Spacing Distance | Suggested Buffer Spacing Distance |
|----------------|--------------------------|---|-------------------------------|-----------------------------------|
| 30             | 10' 11' 12'              | On a Tangent  | 60'                           | 120'                              |
| 35             | 150' 165' 180'           | On a Curve  | 70'                           | 120'                              |
| 40             | 205' 225' 245'           | On a Tangent  | 80'                           | 155'                              |
| 45             | 265' 295' 320'           | On a Curve  | 90'                           | 195'                              |
| 50             | 325' 365' 400'           | On a Tangent  | 100'                          | 240'                              |
| 55             | 395' 445' 495'           | On a Curve  | 110'                          | 295'                              |
| 60             | 475' 535' 600'           | On a Tangent  | 120'                          | 350'                              |
| 65             | 565' 635' 720'           | On a Curve  | 130'                          | 410'                              |
| 70             | 665' 745' 840'           | On a Tangent  | 140'                          | 475'                              |
| 75             | 775' 865' 960'           | On a Curve  | 150'                          | 540'                              |

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

**TYPICAL USAGE**

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

**GENERAL NOTES**

- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stored elsewhere in the plans, when the work area is less than 100 feet long. When used, it should be 100 feet minimum length per lane.
- For short-term applications, when post-mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3ap supplemental plaque.
- Shadow vehicles with a TMA should be used anytime it can be positioned 300 feet or more in advance of the work. If workers are no longer present but road work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned in each closed area of the shoulder or on the paved surface, next to those shown in order to protect the wider work space.

**TCP (2-4a)**

7. If this TCP is used for a left lane closure, CW20-51L "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the taper.

**TCP (2-4b)**

8. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 17.5' where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings, not the entire work zone.

Texas Department of Transportation  
Operations Division  
Standard

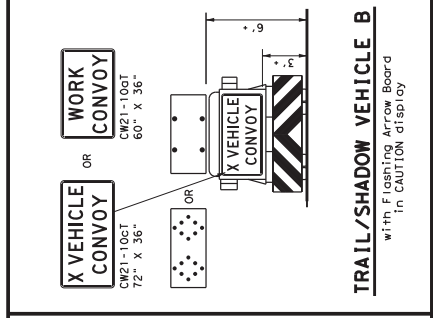
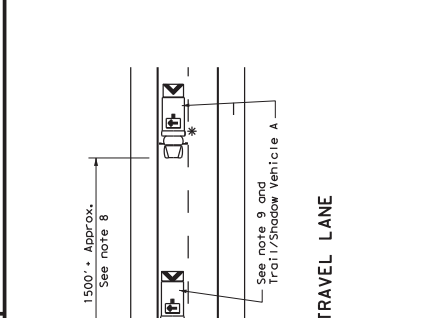
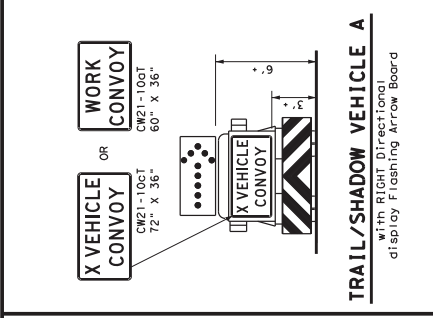
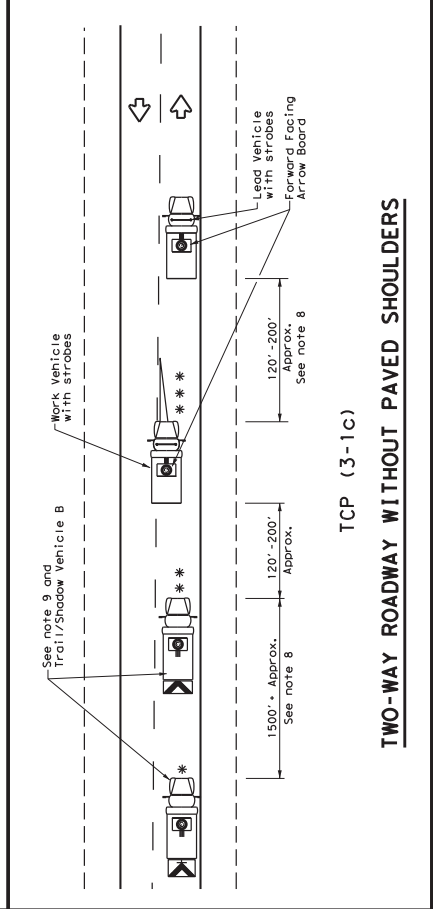
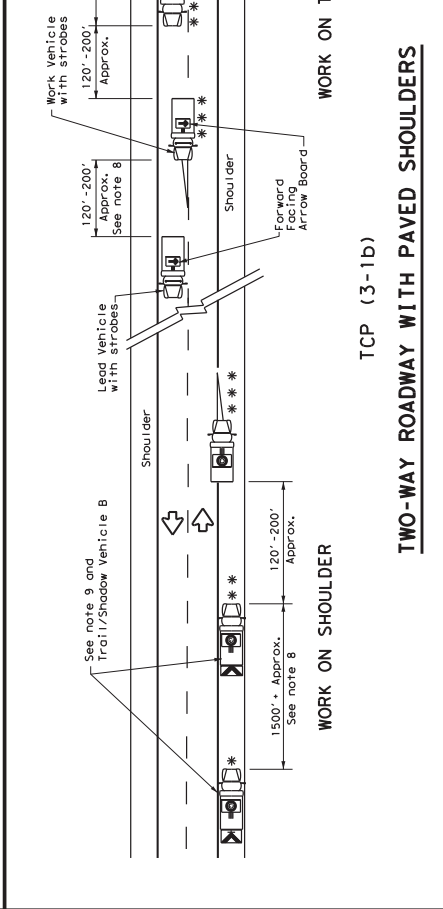
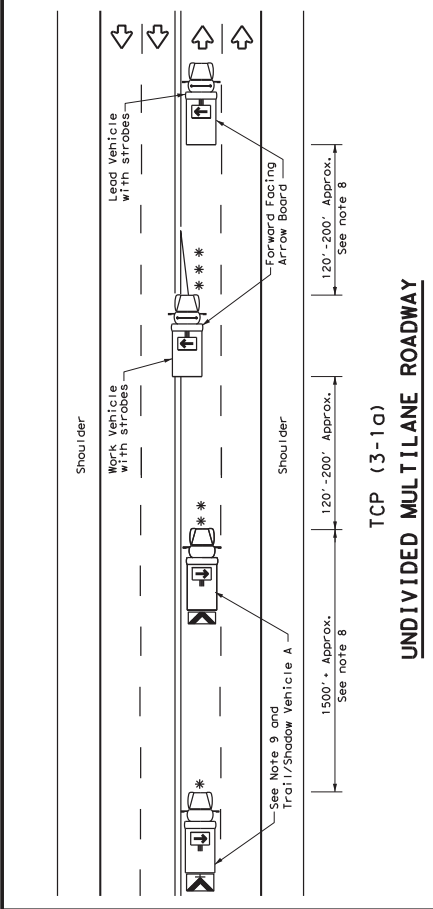
**TRAFFIC CONTROL PLAN**  
**LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS**

**TCP (2-4) - 18**

|           |              |           |           |           |           |
|-----------|--------------|-----------|-----------|-----------|-----------|
| FILE#     | 1022-1-18-09 | REV. DATE | 11/8/2020 | REV. DATE | 11/8/2020 |
| REV. NO.  | 001          | REV. NO.  | 001       | REV. NO.  | 001       |
| PROJECT   | 6370 91      | PROJECT   | 6370 91   | PROJECT   | 6370 91   |
| DATE      | 1-97 2-12    | DATE      | 1-97 2-12 | DATE      | 1-97 2-12 |
| DIST.     | 22           | DIST.     | 22        | DIST.     | 22        |
| COUNTY    | VAL VERDE    | COUNTY    | VAL VERDE | COUNTY    | VAL VERDE |
| SHEET NO. |              | SHEET NO. |           | SHEET NO. |           |

DATE: 11/18/2020 9:33:01 AM FILE: I:\RDS\TNT\2021\MT\CONTRACTS\11-1109 & 500T Base Report - V01\The Work Zone 5760nd0909321qgnncorrecr results or damages resulting from its use.

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to any other format or for any errors or omissions in the standard.



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

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

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

Texas Department of Transportation

**TRAFFIC CONTROL PLAN**  
**MOBILE OPERATIONS**  
**UNDIVIDED HIGHWAYS**

TCP (3-1) - 13

FILE: tcp3-1.dgn  
DATE: December 1985  
REV: 2-94 4-98  
REV: 8-95 7-13  
REV: 1-97

DESIGNED BY: [ ]  
CHECKED BY: [ ]  
DATE: [ ]  
SCALE: [ ]  
SHEET NO. [ ]

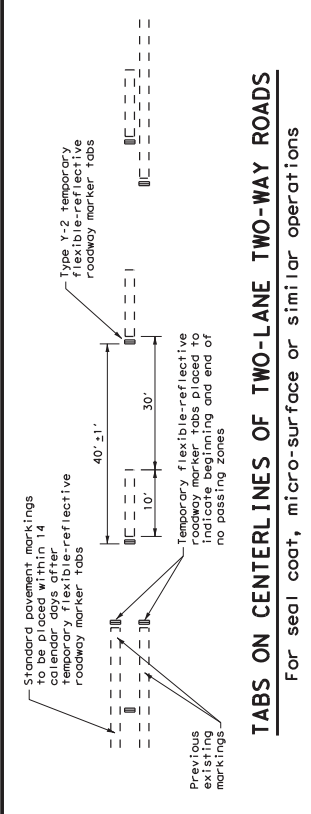
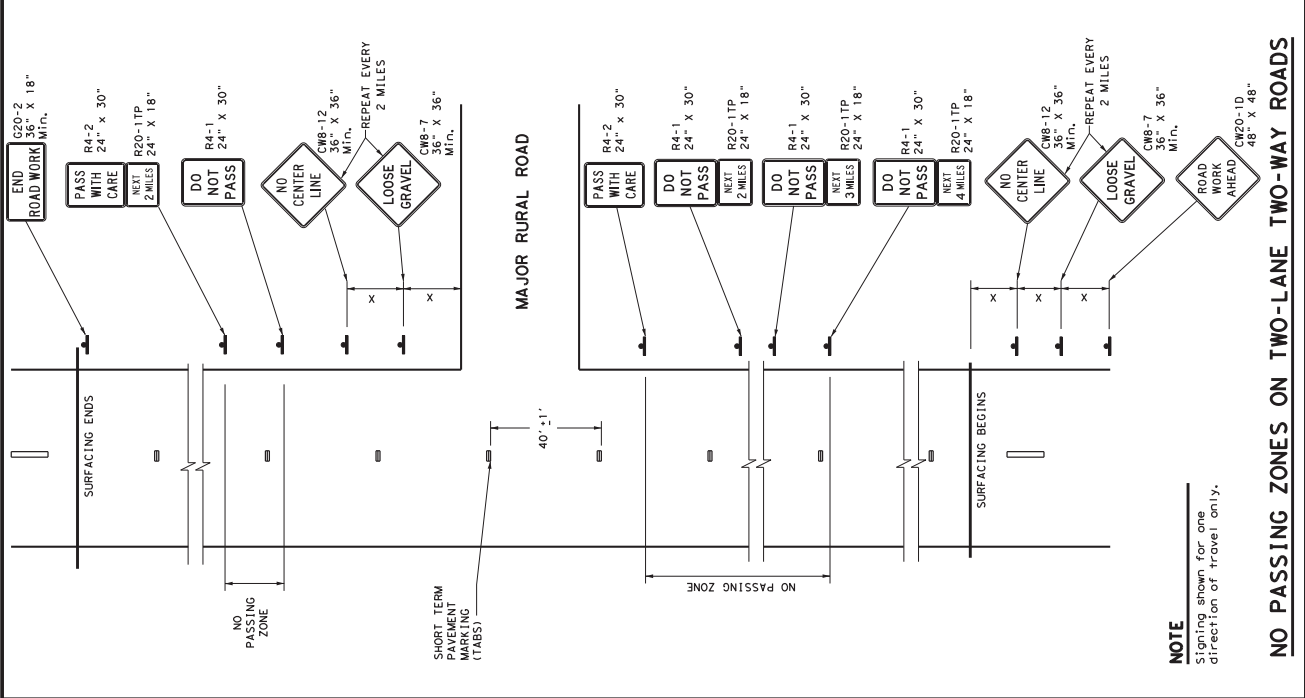
TRAFFIC OPERATIONS DIVISION STANDARD

**STRIPING FOR TMA**

Red Reflective  
White Reflective

HEIGHT OF TMA  
6' ±

WIDTH OF TMA  
6' ±



**"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES**

A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.

C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be placed with the existing pavement markings. Also, unless one day operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.

D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

**"NO CENTER LINE" SIGN (CW8-12)**

A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.

B. At the time construction activity obliterated the existing center line markings (low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning and end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

**"LOOSE GRAVEL" SIGN (CW8-7)**

A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

**PAVEMENT MARKINGS**

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs and Temporary Flexible-reflective Roadway Marker Strips. These markings shall be installed to provide a safe and clear work area for the contractor. Tabs should be applied to the pavement no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

B. Tabs shall not be used to simulate edge lines.

C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

**COORDINATION OF SIGN LOCATIONS**

A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.

B. Where possible, the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the same location as the ROAD WORK AHEAD (CW20-1D) sign. The ROAD WORK AHEAD (CW20-1D) sign should be placed in the same location as the ROAD WORK AHEAD (CW20-1D) sign. The ROAD WORK AHEAD (CW20-1D) sign should be placed in the same location as the ROAD WORK AHEAD (CW20-1D) sign. The ROAD WORK AHEAD (CW20-1D) sign should be placed in the same location as the ROAD WORK AHEAD (CW20-1D) sign.

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

\* Convent Local Roads Only

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

**TYPICAL USAGE**

**GENERAL NOTES**

- The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.
- The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.
- Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.
- When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
- Signs on divided highways, freeways and expressways will be placed on both right and left sides of roadway based on roadway conditions as directed by the Engineer.

Texas Department of Transportation  
Traffic Operations Division Standard

**TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS**

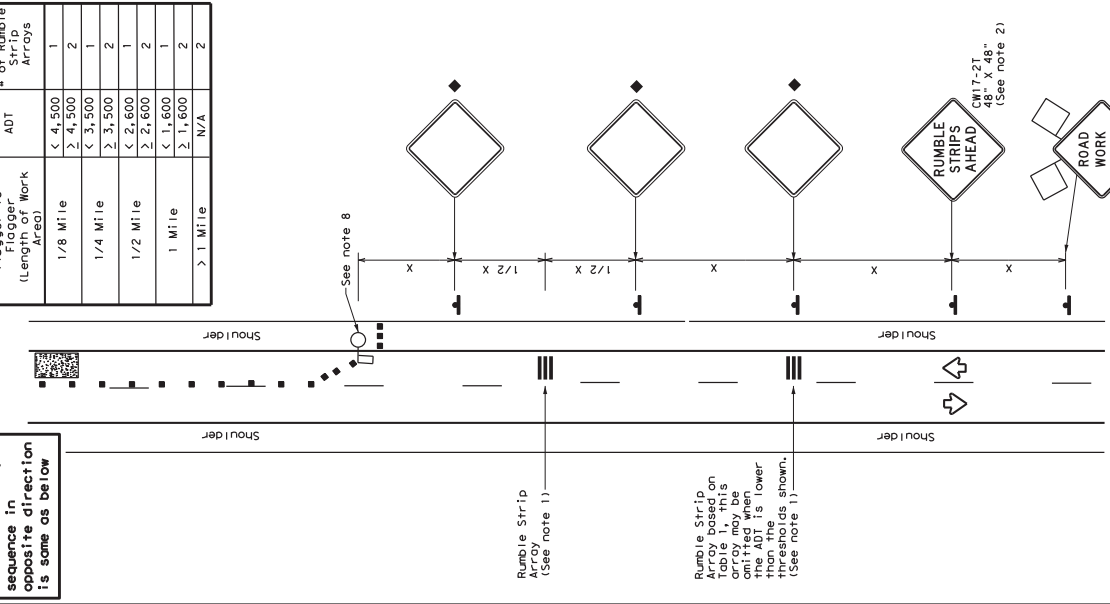
**TCP (7-1) - 13**

|          |            |           |      |            |      |           |      |       |           |
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| DATE:    | March 1991 | CONTRACT: | 000  | SECTION:   | 001  | REVISION: | 001  | DATE: | 03/01/05  |
| PROJECT: | 4-98 M-49  | COUNTY:   |      | SHEET NO.: |      |           |      |       |           |
|          | 1-97 7-13  |           |      |            | 22   |           |      |       | VAL VERDE |

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

**TABLE 1**

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



**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 at the spacing shown in Table 2, placed transverse across the lane at locations shown.
- The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the second rumble strip array. Traffic is expected 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 warning.
- Temporary Rumble Strips will be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
- 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, TMUCD 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.

**LEGEND**

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

| Posted Speed | Formula    | Minimum Taper Lengths | Suggested Maximum Spacing of Devices | Minimum Spacing of Devices | Suggested Longitudinal Buffer Space |
|--------------|------------|-----------------------|--------------------------------------|----------------------------|-------------------------------------|
| 30           | $L = WS^2$ | 150'                  | 30'                                  | 60'                        | 90'                                 |
| 40           | $L = WS^2$ | 205'                  | 35'                                  | 70'                        | 120'                                |
| 45           | $L = WS^2$ | 265'                  | 40'                                  | 80'                        | 155'                                |
| 50           | $L = WS^2$ | 330'                  | 45'                                  | 90'                        | 195'                                |
| 55           | $L = WS^2$ | 405'                  | 50'                                  | 100'                       | 240'                                |
| 60           | $L = WS^2$ | 495'                  | 55'                                  | 110'                       | 295'                                |
| 65           | $L = WS^2$ | 600'                  | 60'                                  | 120'                       | 350'                                |
| 70           | $L = WS^2$ | 720'                  | 65'                                  | 130'                       | 410'                                |
| 75           | $L = WS^2$ | 855'                  | 70'                                  | 140'                       | 475'                                |
| 80           | $L = WS^2$ | 1005'                 | 75'                                  | 150'                       | 540'                                |

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

**TYPICAL USAGE**

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

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

**TABLE 2**

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

Texas Department of Transportation  
 Operations Division  
 Standard

**WZ (RS) - 16**

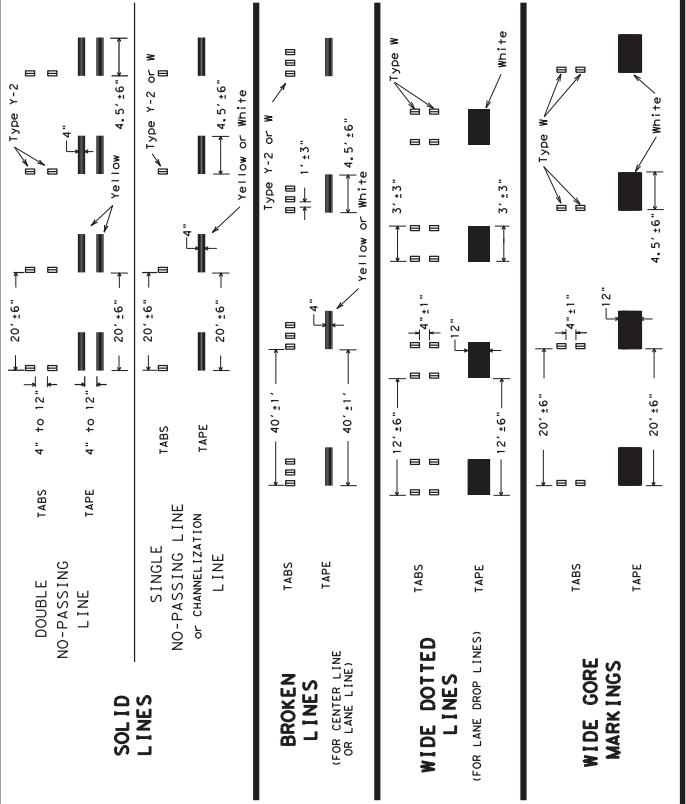
FILE: WZRS16.dgn  
 DATE: November 2012  
 REVISIONS: 2-14, 4-16

DATE: 11/8/2020 9:33:13 AM  
 FILE: I:\RDS\NINT\2021\NMT\CONTRACTS\M11-1109 & SPOT Base Report - VOTR\ENR\K800059\0404-8161.dgn\correct results or damages resulting from its use.

DESIGNER: TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of any information from its use.

REVISIONS: 001 VARIOUS  
 002 HIGHWAY  
 003 I.M.M.  
 004 I.M.M.  
 005 I.M.M.  
 006 I.M.M.  
 007 I.M.M.  
 008 I.M.M.  
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 095 I.M.M.  
 096 I.M.M.  
 097 I.M.M.  
 098 I.M.M.  
 099 I.M.M.  
 100 I.M.M.

### WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



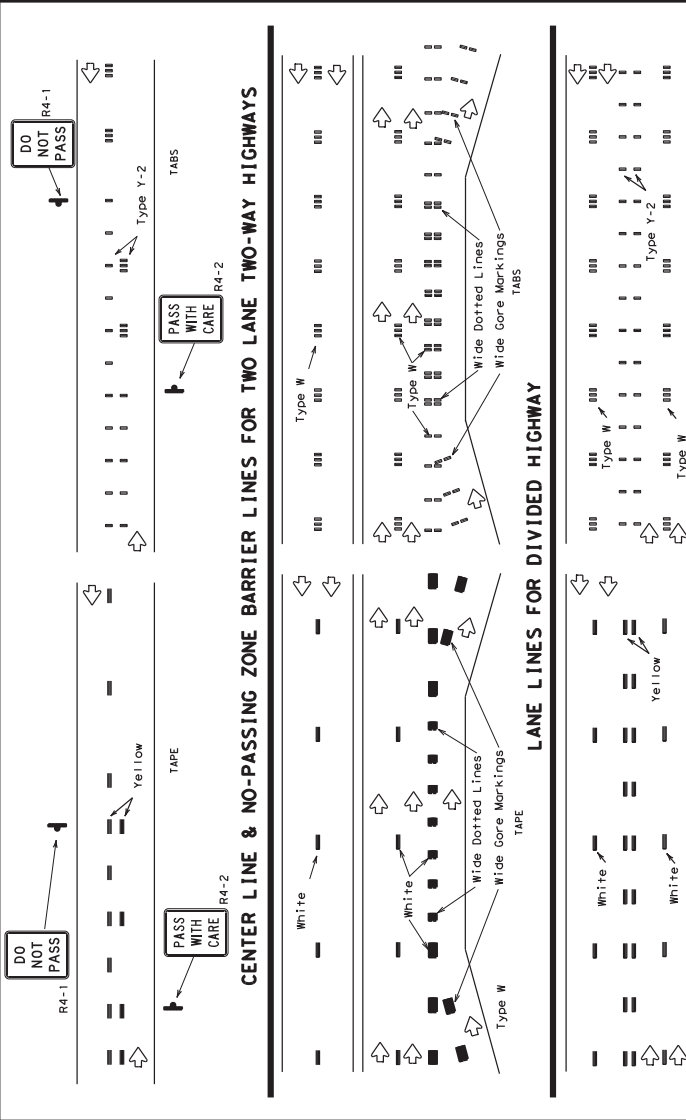
**NOTES:**

- Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-refractive roadway marker tabs unless otherwise specified elsewhere in plans.
- Short term pavement markings shall NOT be used to simulate edge lines.
- Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
- Temporary flexible-refractive roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 1500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
- No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
- For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the Texas Manual on Uniform Traffic Control Devices (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
- For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
- For exit gorges where a lane is being dropped place wide gore markings or retroreflective channelization devices to guide motorists through the gore. Channelizing devices are to be used if it should be needed elsewhere in the plans. One piece cones are not allowed for this purpose.

**TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)**

- Temporary flexible-refractive roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
- TABS shall meet requirements of Departmental Material Specification DMS-8242.
- When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when penetrated by automobile low beam head light at night, unless sight distance is restricted by roadway geometrics.
- No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

### WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



**REMOVABLE Short Term Pavement Marking (Tape)**  
 If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tabs of the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

**RAISED PAVEMENT MARKERS**  
 1. All raised pavement markers used for work zone markings shall meet the requirements of Item 612, "RAISED PAVEMENT MARKERS" and DMS-4200.  
 2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 (Temporary Prefabricated Pavement Markings) or DMS-8243 (Temporary Construction-Grade Prefabricated Pavement Markings).

**TEMPORARY REMOVABLE PREFABRICATED PAVEMENT MARKINGS**  
 1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.  
 2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 (Temporary Prefabricated Pavement Markings) or DMS-8243 (Temporary Construction-Grade Prefabricated Pavement Markings).

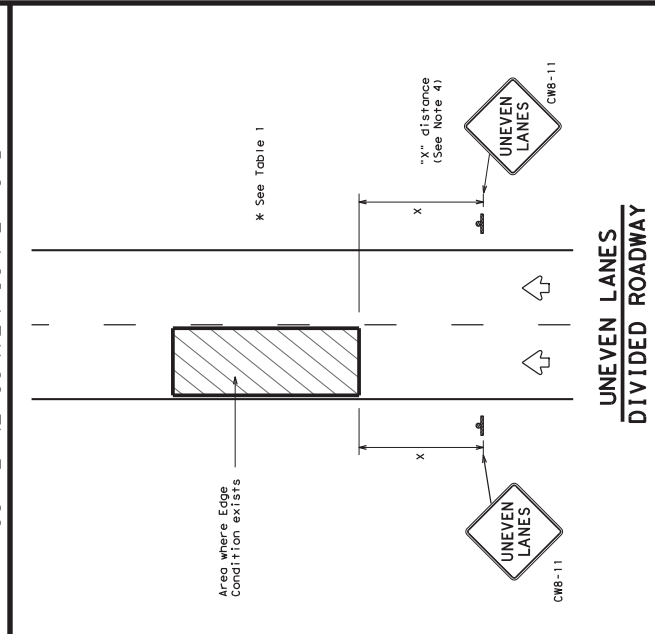
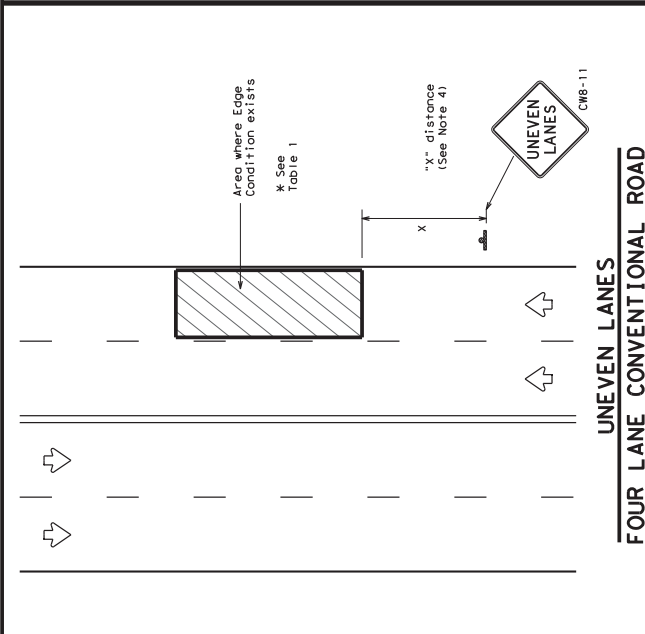
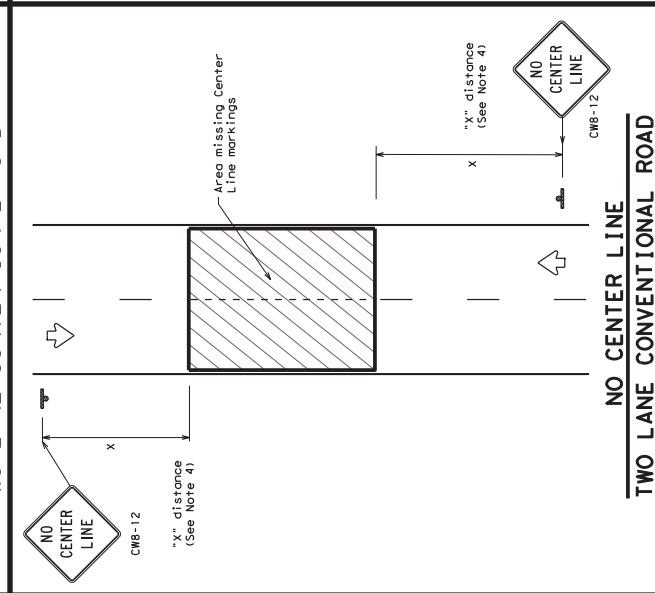
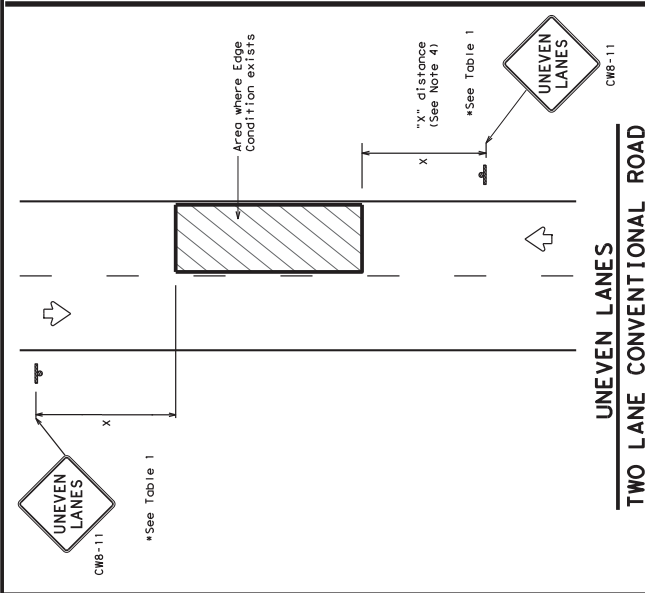
**DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)**  
 1. DMS referenced above can be found along with embedded links to their respective MPLs at the following website:  
[http://www.txdot.gov/business/contractors\\_consultants/material\\_specifications/default.htm](http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm)

| FILE    | WZSTPM-13.dgn | DATE | BY | CHK'D | APP'D   | SCALE | SHEET NO. | TOTAL SHEETS |
|---------|---------------|------|----|-------|---------|-------|-----------|--------------|
| REVISED | APR 11 1992   | 6370 | 91 | 001   | VARIOUS |       | 22        | VAL-VERDE    |

**WORK ZONE SHORT TERM PAVEMENT MARKINGS**  
**WZ (STPM) - 13**

Texas Department of Transportation





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

| SHEETING MATERIAL |   |
|-------------------|---|
| COLOR             | USAGE   |
| ORANGE            | BACKGROUND  |
| BLACK             | LEGEND & BORDERS  |
|                   | TYPE B <sub>1</sub> , L OR TYPE C <sub>1</sub> SHEETING |
|                   | ACRYLIC NON-REFLECTIVE SHEETING                         |

- GENERAL NOTES**
- If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
  - UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-30P) plaque or Advisory Speed (CW13-1P) plaque.
  - NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ (STM) standard shall be installed if yellow center lines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
  - Signs shall be spaced at the distances recommended as per BC standards.
  - Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
  - Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
  - Short term markings shall not be used to simulate edge lines.
  - All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

**TABLE 1**

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

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

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

**SIGNING FOR UNEVEN LANES**

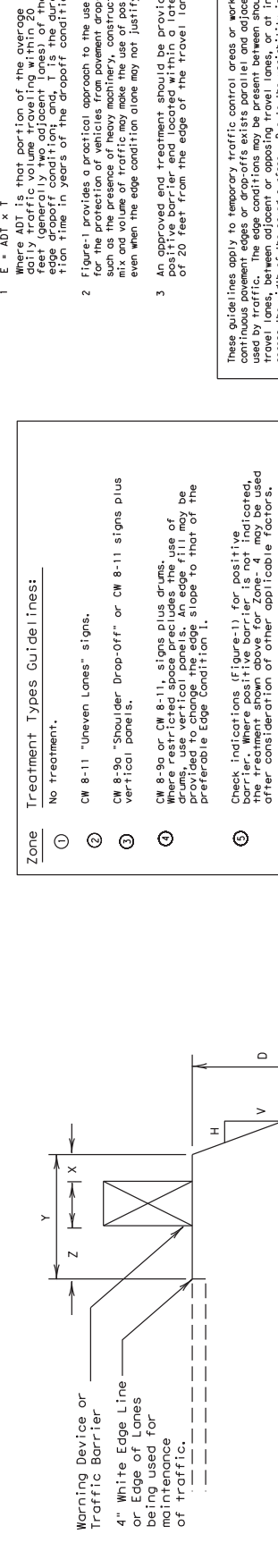
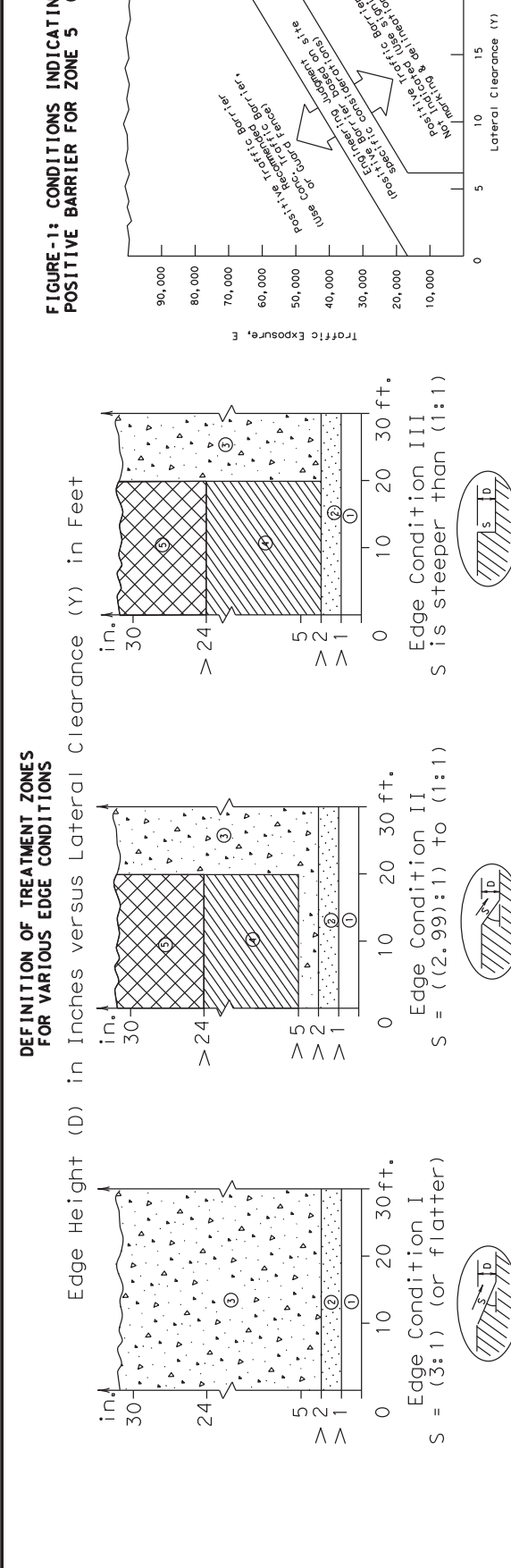
**WZ (UL) - 13**

|           |                |           |            |
|-----------|----------------|-----------|------------|
| FILE      | WZUL-13.dgn    | DATE      | 04/11/1992 |
| PROJECT   | APR 11 1992    | DESIGNER  | 6370 91    |
| REVISIONS |                | CHECKER   | 001        |
| DATE      | 8-98 2-98 7-13 | CONTRACT  | VARIOUS    |
| BY        | 1-97 3-03      | SHEET NO. | 22         |
|           |                | VAL       | VERDE      |

Texas Department of Transportation  
Traffic Operations Division Standard

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 the information contained herein into a physical form or for any errors or omissions in the information. DATE: 11/8/2020 9:33:24 AM FILE: I:\RDS\TMS\VFY 2021\UNT Contracts\M111-1109 & Spot Base Repair - V01\Drawings\WZUL-13.dgn

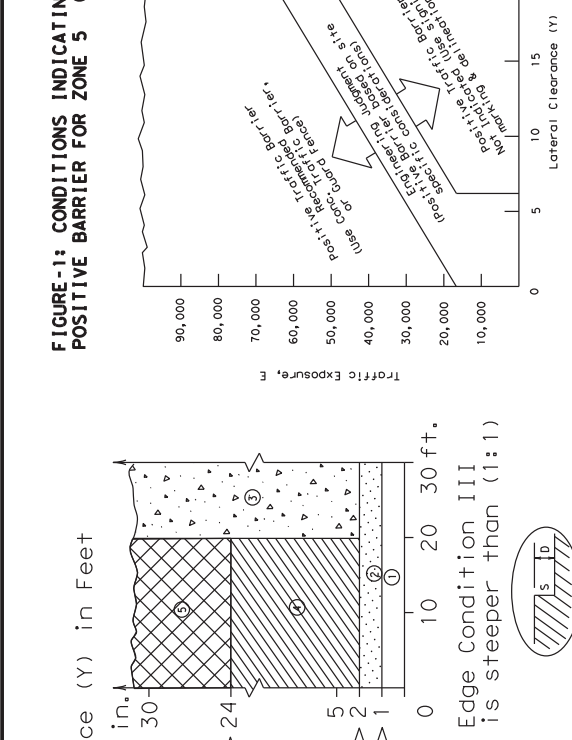
DISCLAIMER: The use of this standard is governed by the Texas Engineering Practice Act. No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



#### FACTORS CONSIDERED IN THE GUIDELINES:

- The "Edge Condition" is the slope (S) of the drop-off (H/V). The "Edge Height" is the depth of the drop-off "D".
- Distance "x" is to be the maximum practical under-lane conditions. Two feet minimum for high speed conditions. Distance "y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "z" does not have a minimum.
- In addition to the factors considered in the guidelines, construction zone drop-off treatment should be analyzed individually taking into consideration the traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.
- The conditions for indicating the use of positive or protective barriers are given by Zones 5 and Figure-1. Traffic barriers are primarily applicable for edge conditions. Two feet minimum for high speed conditions. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.
- If the distance "y" must be less than 3 feet, the use of a positive barrier may be indicated, in such a case, a contractor should be notified of the need to narrow the lanes to a design width of 12 feet or less to meet minimum (see CW20-8 sign), or 21' provide an edge slope such as Edge Condition I.

**FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5**



- $E = ADT \times T$   
Where ADT is that portion of the average annual daily traffic that is expected to travel on the road (Generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.
- Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.
- An approved and treatment should be provided for any positive barrier and located within a lateral offset of 20 feet from the edge of the travel lane.

These guidelines apply to temporary traffic control areas or work zones where cost-effective traffic control devices are used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short-term operations. These guidelines do not constitute engineering judgement. These guidelines may be updated on the Design Division's on-line manual.

Engineer's Seal

Date: \_\_\_\_\_

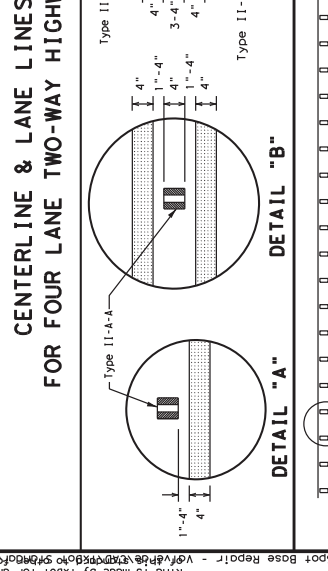
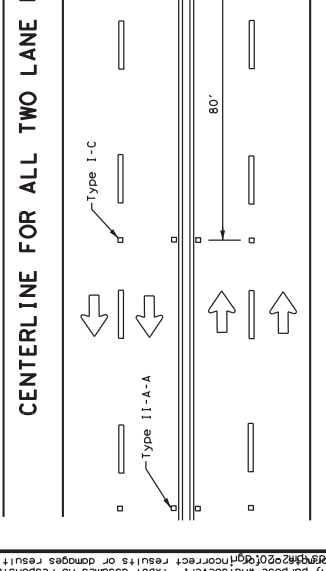
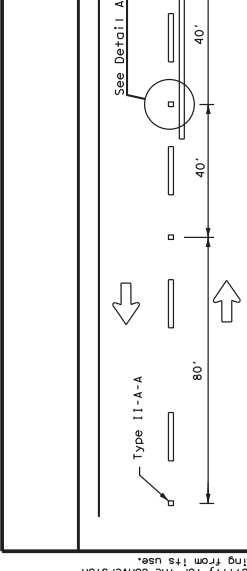
**TREATMENT FOR VARIOUS EDGE CONDITIONS**

| REV.  | DATE  | BY | APP. | DESCRIPTION   |
|-------|-------|----|------|---------------|
| 03-01 | 08-01 |    |      | correct types |
| 08-01 | 08-01 |    |      | correct types |





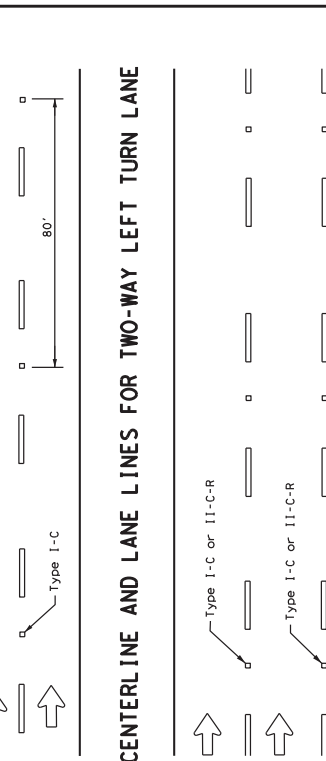
## REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



## 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.



**GENERAL NOTES**

- All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
- On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

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**III. CULTURAL RESOURCES**

Refer to TXDOT Standard Specifications in the event historical issues or archaeological artifacts are found during construction. Upon discovery of work in the immediate area and contact the Engineer immediately.

No Action Required  Required Action

Action No. \_\_\_\_\_

- 1.
- 2.
- 3.
- 4.

**IV. VEGETATION RESOURCES**

Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

No Action Required  Required Action

Action No. \_\_\_\_\_

- 1.
- 2.
- 3.
- 4.

**V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.**

No Action Required  Required Action

Action No. \_\_\_\_\_

- 1.
- 2.
- 3.
- 4.

**VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES**

General applies to all projects: Notify the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used. Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for materials which may be hazardous. Maintain product labeling as required by the Act. Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

- \* Unidentified vegetation (not identified as normal)
- \* Unexplained odors or smells (e.g., petroleum, paint, etc.)
- \* Undesirable smells or odors
- \* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacement bridge class structures not including box culverts?

Yes  No

If "No", then no further action is required.

If "Yes", then TXDOT is responsible for completing asbestos assessment/inspection. Are the results of the asbestos inspection positive (is asbestos present)?

Yes  No

If "Yes", then TXDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TXDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

No Action Required  Required Action

Action No. \_\_\_\_\_

- 1.
- 2.
- 3.

**VII. OTHER ENVIRONMENTAL ISSUES**

(includes regional issues such as Edwards Aquifer District, etc.)

No Action Required  Required Action

Action No. \_\_\_\_\_

- 1.
- 2.
- 3.

| FILE: epic.dgn       | Rev. No. | Rev. Date  | Rev. Description |
|----------------------|----------|------------|------------------|
| TXDOT: February 2015 | 001      | 02/11/2015 | Initial Release  |
| 08-2310-000-001      | 001      | 08/23/2010 | Initial Release  |
| 08-2310-000-001      | 001      | 08/23/2010 | Initial Release  |

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DATE: 11/8/2020  
 FILE: T:\R\POSTMNT\472021\NMT\Contractors\M11-1110y & Spot Base Report - Valverde\CD\TXDOT Standard\epic.dgn  
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 DISCLAIMER

**I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402**

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres of disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 306.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

- 1.
- 2.

No Action Required  Required Action

Action No. \_\_\_\_\_

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

**II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404**

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas. The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

- No Permit Required
- Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
- Nationwide Permit 14 - PCN Required (1/10 to 1/2 acre, 1/3 in tidal waters)
- Individual 404 Permit Required
- Other Nationwide Permit Required: NWP# \_\_\_\_\_

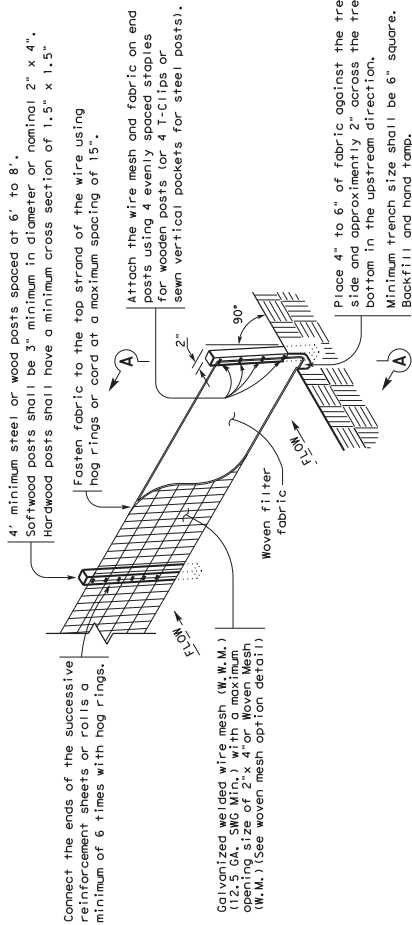
Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

- 1.
- 2.
- 3.
- 4.

| Best Management Practices:                             |  |
|--|--|
| Erosion  | Post-Construction TSS                                  |
| <input type="checkbox"/> Temporary Vegetation          | <input type="checkbox"/> Vegetative Filter Strips      |
| <input type="checkbox"/> Blankets/Matting              | <input type="checkbox"/> Retention/Irrigation Systems  |
| <input type="checkbox"/> Mulch                         | <input type="checkbox"/> Extended Detention Basin      |
| <input type="checkbox"/> Sodding                       | <input type="checkbox"/> Constructed Wetlands          |
| <input type="checkbox"/> Interceptor Swale             | <input type="checkbox"/> Ret Basin                     |
| <input type="checkbox"/> Diversion Dike                | <input type="checkbox"/> Erosion Control Compost       |
| <input type="checkbox"/> Erosion Control Compost       | <input type="checkbox"/> Mulch Filter Berm and Socks   |
| <input type="checkbox"/> Mulch Filter Berm and Socks   | <input type="checkbox"/> Compost Filter Berm and Socks |
| <input type="checkbox"/> Compost Filter Berm and Socks | <input type="checkbox"/> Vegetation Lined Ditches      |
| <input type="checkbox"/> Stone Outlet Sediment Traps   | <input type="checkbox"/> Sand Filter Systems           |
| <input type="checkbox"/> Sediment Basins               | <input type="checkbox"/> Grassy Swales                 |

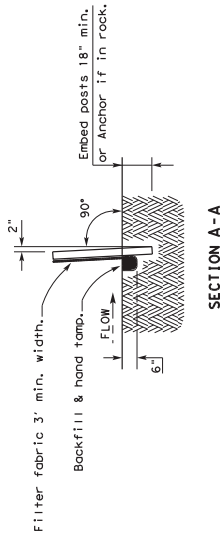
| LIST OF ABBREVIATIONS |  |
|-----------------------|--|
| BMF:                  | Best Management Practice                     |
| COP:                  | Construction General Permit                  |
| DSHS:                 | Texas Department of State Health Services    |
| FEMA:                 | Federal Emergency Management Agency          |
| MCD:                  | Municipal Court District                     |
| MGA:                  | Municipal Government                         |
| MOT:                  | Notice of Termination                        |
| NWP:                  | Nationwide Permit                            |
| NOI:                  | Notice of Intent                             |
| SOPC:                 | Soil Prevention Control and Countermeasure   |
| SW3P:                 | Storm Water Pollution Prevention Plan        |
| PCS:                  | Pre-Construction Notification                |
| PSL:                  | Project Specific Location                    |
| TCEQ:                 | Texas Commission on Environmental Quality    |
| TPDES:                | Texas Pollution Discharge Elimination System |
| TXDOT:                | Texas Department of Transportation           |
| TWRB:                 | Texas Parks and Wildlife Department          |
| USACE:                | U.S. Army Corps of Engineers                 |
| USFWS:                | U.S. Fish and Wildlife Service               |

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS  
**EPIC**  
 Texas Department of Transportation



TEMPORARY SEDIMENT CONTROL FENCE

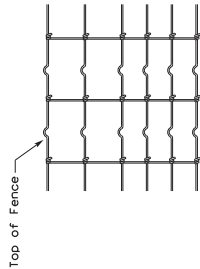
SCF



SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA. SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.



SEDIMENT CONTROL FENCE USAGE GUIDELINES

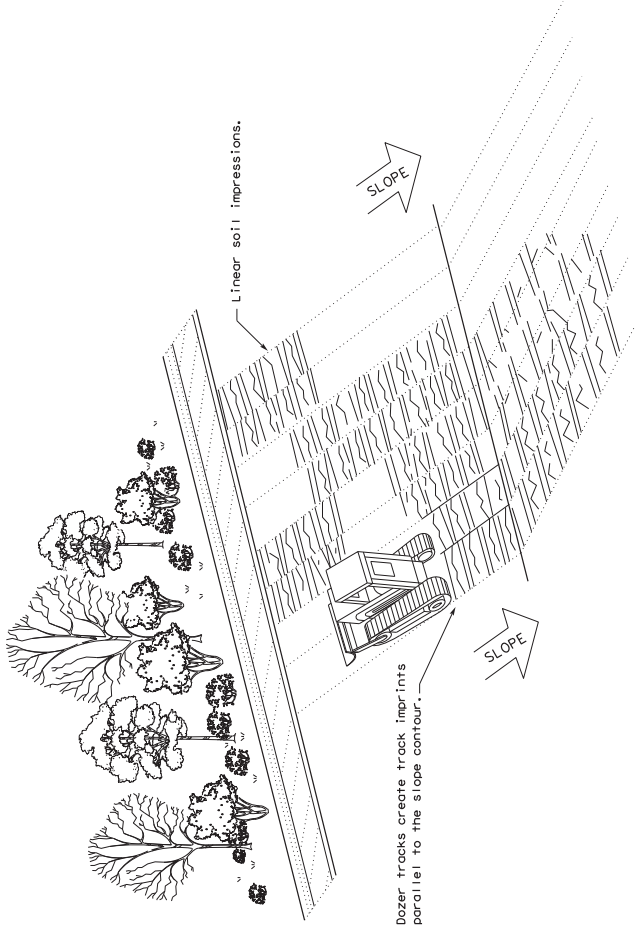
A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered. Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT<sup>2</sup>. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

LEGEND

Sediment Control Fence  
SCF

GENERAL NOTES

- Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
- Perform vertical tracking on slopes to temporarily stabilize soil.
- Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
- Do not exceed 12" between track impressions.
- Install continuous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

|                    |   |          |           |              |
|--------------------|---|----------|-----------|--------------|
|                    | Design  |          | Standard  |              |
|                    | <b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE &amp; VERTICAL TRACKING EC (1) - 16</b> |          |           |              |
| FILE: ec116        | Rev. M.M.   | Or. L.C. | Rev. M.M. | Revised L.C. |
| © TxDOT, JULY 2016 | CONTR. SECT.  | JOB      |           | HOWBY        |
| REVISIONS          | 6370  | 91       | 001       | VBI/DUS      |
|                    | DIST.   |          |           | SHEET NO.    |
|                    |   |          |           | 22           |
|                    |   |          |           | VAL VERBE    |