| STATE PROJECT NO. | | | |
|---|---|---|---|
| C 132-1-55 | | | |
| CONT | SECT | JOB | HIGHWAY |
| 0132 | 01 | 055,ETC | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 1 |

# STATE OF TEXAS
## DEPARTMENT OF TRANSPORTATION

## PLANS OF PROPOSED
## STATE HIGHWAY IMPROVEMENT

**STATE PROJECT NO. C 132-1-55**

# US 82
# DICKENS COUNTY
## FOR THE CONSTRUCTION OF ACP OVERLAY

CONSISTING OF: ACP, PAVEMENT MARKINGS, AND MBGF

DESIGN SPEED = 35 MPH
A.D.T. (2021) = 1,000
A.D.T. (2041) = 1,400

THE TCP HAS BEEN REVIEWED BY TRAFFIC SAFETY COMMITTEE

Jack R. Sloan, P.E.

TRAFFIC SAFETY CHAIRMAN

REQUIRED SIGNS SHALL BE IN ACCORDANCE WITH BC (1)-21 THRU BC (12)-21 AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

CSJ: 0132-01-055

LIMITS: FROM 1,186.00 FT. EAST OF DICKENS ECL, EAST TO 9.483 MILES WEST OF KING C/L (WBL)

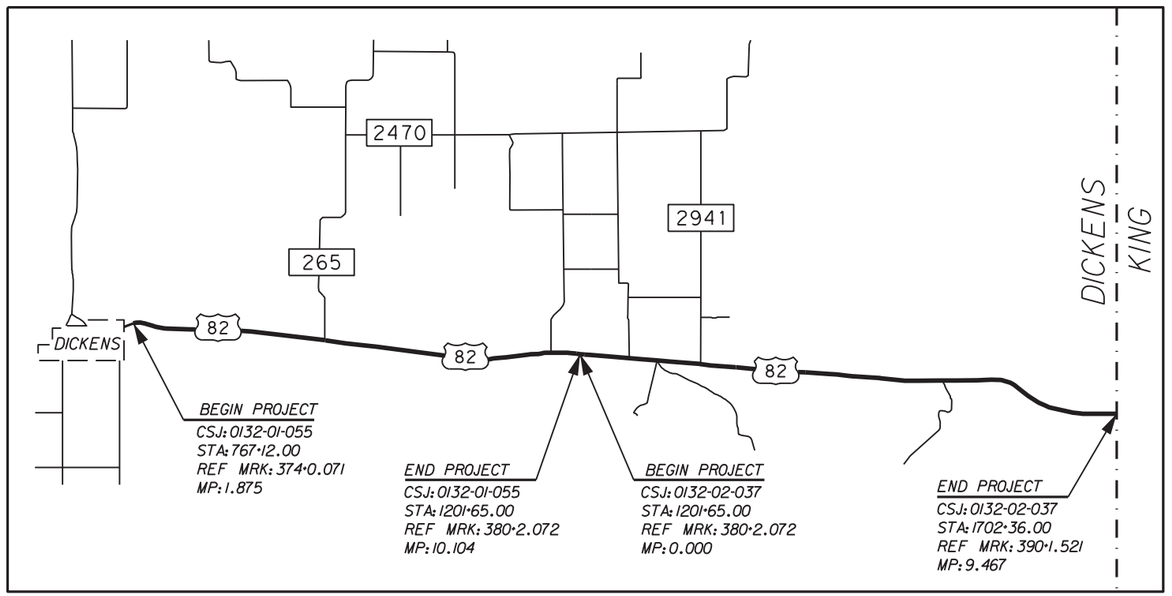
NET LENGTH OF ROADWAY = 43,166.00 FT. = 8.175 MI.

CSJ: 0132-02-037

LIMITS: FROM 9.483 MILES WEST OF KING C/L, EAST TO KING C/L (WBL)

NET LENGTH OF ROADWAY = 49,686.00 FT. = 9.410 MI.

NET LENGTH OF PROJECT = 92,852.00 FT. = 17.586 MI.




SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED SPECIAL LABOR PROVISIONS FOR ALL STATE CONSTRUCTION PROJECTS. (SP 000---008)

EXCEPTIONS: STA. 1110+58.00 TO STA. 1111+93.00 = 135.00 FT. (BRIDGE)
STA. 1162+00.00 TO STA. 1163+52.00 = 152.00 FT. (BRIDGE)
STA. 1519+53.00 TO STA. 1521+73.00 = 220.00 FT. (BRIDGE)
STA. 1647+49.00 TO STA. 1649+14.00 = 165.00 FT. (BRIDGE)

EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

DATE: DATE TIME
FILE: FILE

## FINAL PLANS

CONTRACTOR NAME: _____

CONTRACTOR ADDRESS: _____

_____

LETTING DATE: _____

DATE TIME CHARGES BEGAN: _____

DATE WORK BEGAN: _____

DATE WORK COMPLETED: _____

DATE OF WORK ACCEPTANCE: _____

I, _____, P.E. DO HEREBY CERTIFY THAT THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS, CONTRACT, AND CHANGES THERETO.

_____ AREA ENGINEER

_____ DATE

Texas Department of Transportation


RECOMMENDED FOR LETTING: 11/02/2023

Jack R. Sloan, P.E.

AREA ENGINEER

SUBMITTED FOR LETTING: 11/02/2023

Charles D. Stout, P.E.

TP&D DIRECTOR

APPROVED FOR LETTING: 11/02/2023

DISTRICT ENGINEER

| SHEET NO. | DESCRIPTION |
|---|---|
| | **GENERAL** |
| 1 | TITLE SHEET |
| 2 | INDEX OF SHEETS |
| 3-6 | TYPICAL SECTIONS |
| 7,A-C | GENERAL NOTES |
| 8-8A | ESTIMATE & QUANTITY SHEET |
| 9-10 | QUANTITY SUMMARY |
| | **TRAFFIC CONTROL PLAN STANDARDS** |
| *11-22 | BC(1)-21 THRU BC(12)-21 |
| *23 | TCP(1-5)-18 |
| *24 | TCP(3-2)-13 |
| *25 | TCP(3-3)-14 |
| *26 | WZ(STPM)-23 |
| *27 | WZ(UL)-13 |
| *28 | WZ(RS)-22 |
| 29 | EDGE CONDITION TREATMENT |
| | **ROADWAY DETAILS** |
| 30 | CURVE DATA |
| 31-32 | PLANING DETAILS |
| 33 | CROSSOVER DETAILS |
| 34-35 | INTERSECTION & DRIVEWAY DETAILS |
| | **ROADWAY DETAIL STANDARDS** |
| *36 | TE (HMAC)-11 |
| *37 | BED-14 |
| *38 | GF(31)-19 |
| *39-40 | GF(31)TRTL3-20 |
| *41 | GF(31)DAT-19 |
| *42 | GF(31)MS-19 |
| *43 | SGT(10S)31-16 |
| *44 | SGT(11S)31-18 |
| *45 | SGT(12S)31-18 |
| 46 | T202 TRANSITION RETROFIT GUIDE MOD |
| | **PAVEMENT MARKINGS & DELINEATION STANDARDS** |
| *47 | PM(1)-22 |
| *48 | PM(2)-22 |
| *49 | RS(1)-23 |
| *50 | FPM(1)-22 |
| *51 | FPM(2)-22 |
| *52 | FPM(5)-22 |
| *53 | D&OM(1)-20 |
| *54 | D&OM(2)-20 |
| *55 | D&OM(6)-20 |
| *56 | D&OM(VIA)-20 |

| SHEET NO. | DESCRIPTION |
|---|---|
| | **ENVIRONMENTAL ISSUES** |
| 57-61 | SWP3 LAYOUT |
| 62 | SWP3 SUMMARY |
| 63-64 | STORM WATER POLLUTION PREVENTION PLAN (SWP3) |
| 65 | ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC) |
| | **ENVIRONMENTAL ISSUE STANDARDS** |
| *66-68 | EC(9)-16 |

STATE OF TEXAS
CHARLES B. STEED
88647
LICENSED
PROFESSIONAL ENGINEER
Charles B. Steed, P.E.

08/24/2023

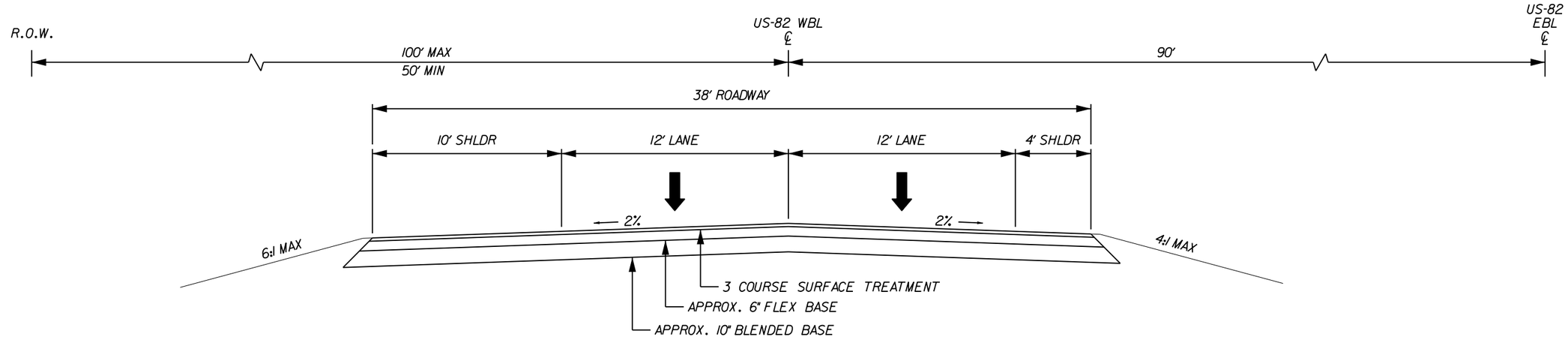
*THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ON THIS SHEET HAVE BEEN ISSUED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

# INDEX OF SHEETS


Texas Department of Transportation
SHEET 1 OF 1

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055,ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 2 |

DN=
DATE: $DATE$ $TIME$
FILE: $FILE$



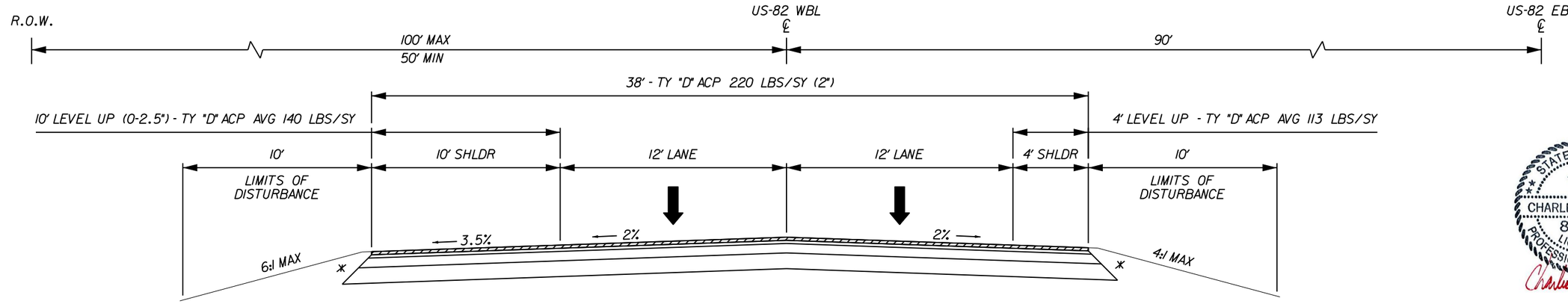

## EXISTING SECTION (1)

### CSJ: 0132-01-055

STA. 767+12.00 TO STA 860+87.00 = 9,375.00 FT.
STA. 867+42.00 TO STA 882+43.00 = 1,501.00 FT.
STA. 887+09.00 TO STA 1201+65.00 = 31,456.00 FT.

### CSJ: 0132-02-037

STA. 1201+65.00 TO STA 1702+36.00 = 50,071.00 FT.





08/24/2023

## PROPOSED SECTION (1)

### CSJ: 0132-01-055

STA. 767+12.00 TO STA 860+87.00 = 9,375.00 FT.
STA. 867+42.00 TO STA 882+43.00 = 1,501.00 FT.
STA. 887+09.00 TO STA 1201+65.00 = 31,456.00 FT.

### CSJ: 0132-02-037

STA. 1201+65.00 TO STA 1702+36.00 = 50,071.00 FT.

TRANSITION FROM (1) TO (2)

STA. 860+87.00 TO STA. 863+87.00 = 300.00 FT.

EXCEPTIONS:
STA. 1110+58.00 TO STA. 1111+93.00 = 135.00 FT.
STA. 1162+00.00 TO STA. 1163+52.00 = 152.00 FT.
STA. 1519+53.00 TO STA. 1521+73.00 = 220.00 FT.
STA. 1647+49.00 TO STA. 1649+14.00 = 165.00 FT.

NOTES:
- REFER TO PLANING DETAIL SHEETS FOR PLANING TRANSITIONS AT BRIDGES AND PROJECT END POINTS.
- OUTSIDE SHOULDER SHALL BE LEVELED UP WITH ACP TO ATTAIN A MAXIMUM SLOPE OF 3.5%.
- QUANTITY FOR 4' LEVEL UP IS INCLUDED IN THE OVERLAY QUANTITY.

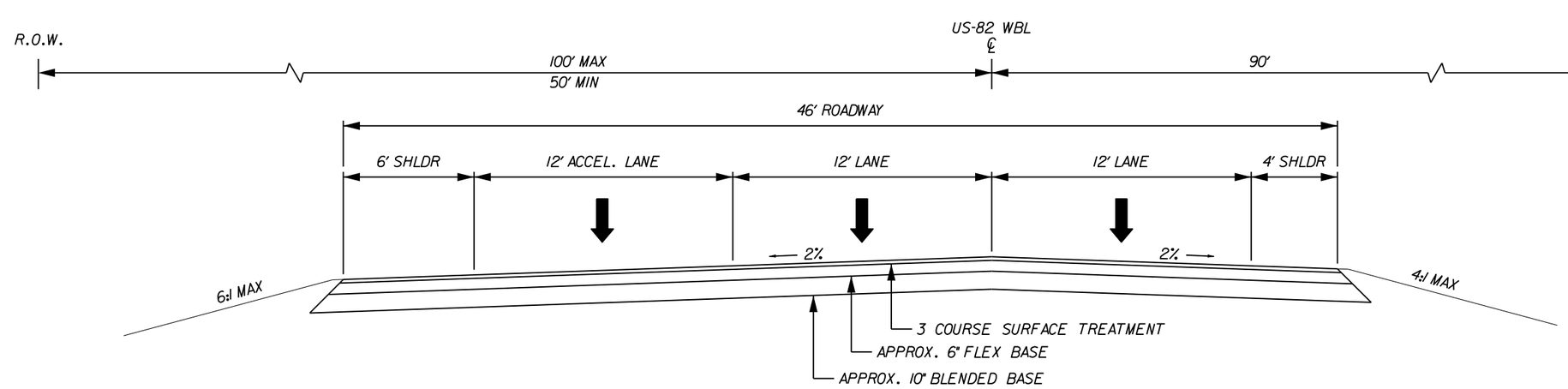
* BACKFILL PAVEMENT EDGES TY A

# TYPICAL SECTIONS


Texas Department of Transportation
SHEET 1 OF 4

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055,ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 3 |

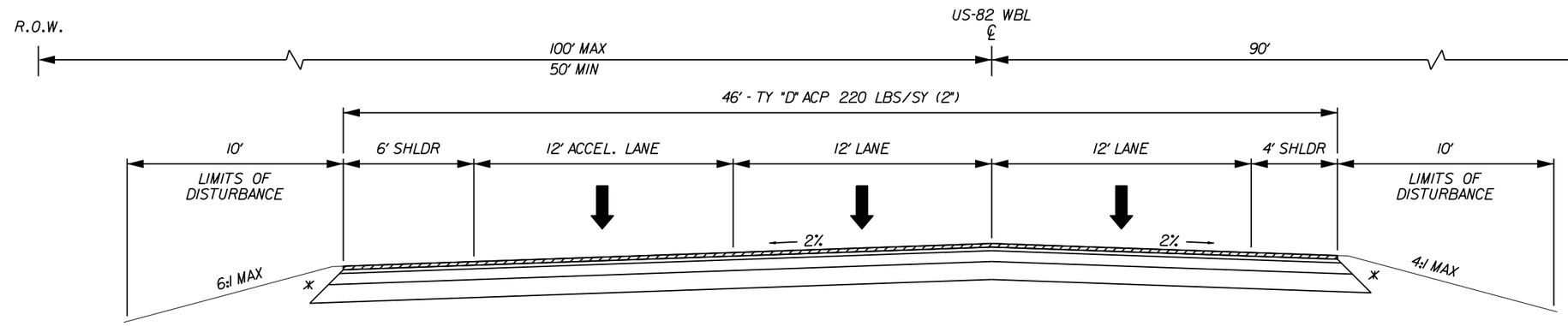
DATE: $DATE$ $TIME$
FILE: $FILE$




## EXISTING SECTION (2)

CSJ: 0132-01-055

STA. 863+87.00 TO STA 865+87.00 = 200.00 FT.




## PROPOSED SECTION (2)

CSJ: 0132-01-055

STA. 863+87.00 TO STA 865+87.00 = 200.00 FT.

* BACKFILL PAVEMENT EDGES TY A

STATE OF TEXAS
CHARLES B. STEED
88647
LICENSED
PROFESSIONAL ENGINEER

Charles B. Steed, P.E.

08/24/2023

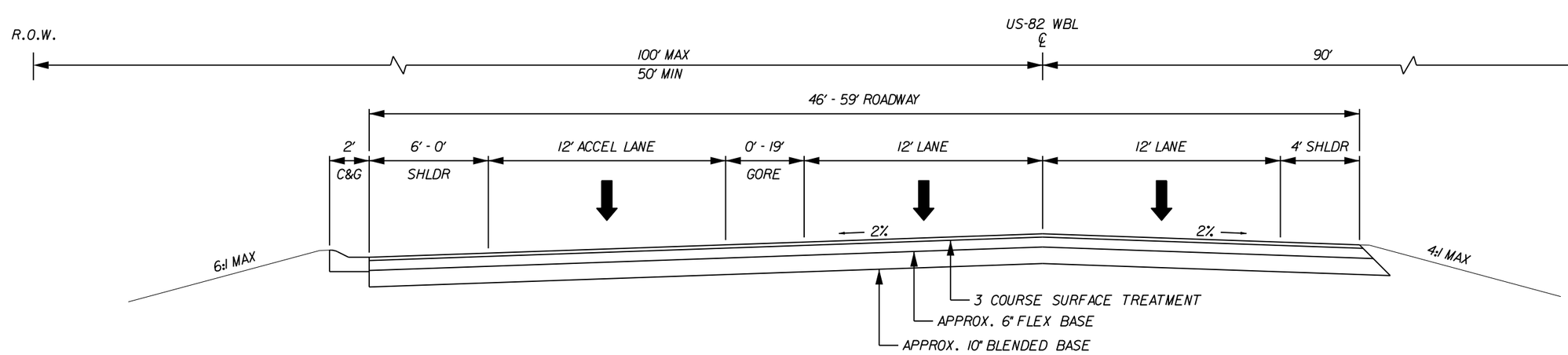
# TYPICAL SECTIONS


Texas Department of Transportation

SHEET 2 OF 4

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055.ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 4 |

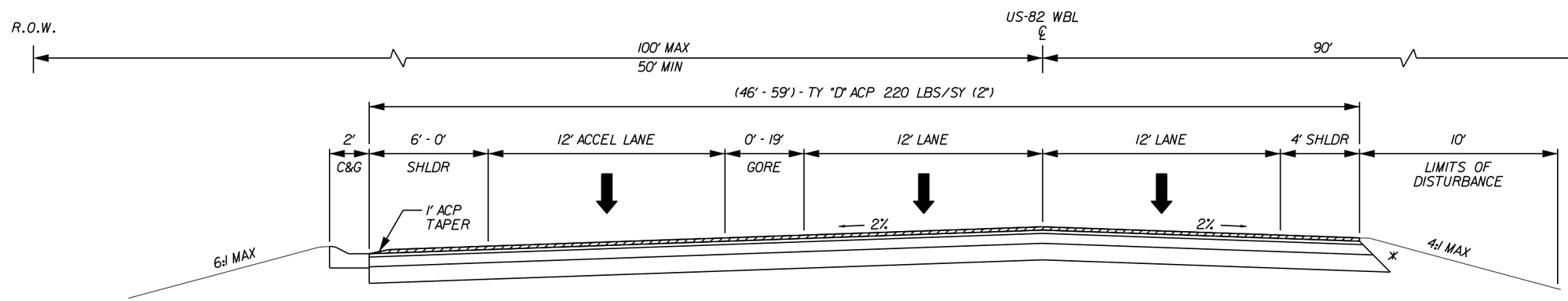
DATE: $DATE$ $TIME$
FILE: $FILE$




## EXISTING SECTION (3)

CSJ: 0132-01-055

STA. 865+87.00 TO STA 867+42.00 = 155.00 FT.




## PROPOSED SECTION (3)

CSJ: 0132-01-055

STA. 865+87.00 TO STA 867+42.00 = 155.00 FT.

* BACKFILL PAVEMENT EDGES TY A

STATE OF TEXAS
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88647
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Charles B. Steed, P.E.

08/24/2023

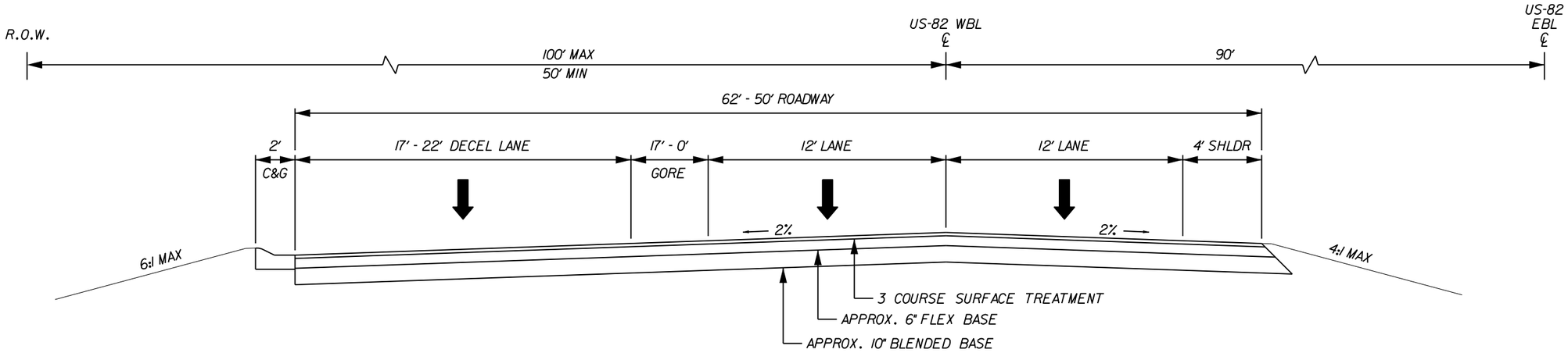
**TYPICAL SECTIONS**


Texas Department of Transportation

SHEET 3 OF 4

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055.ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 5 |

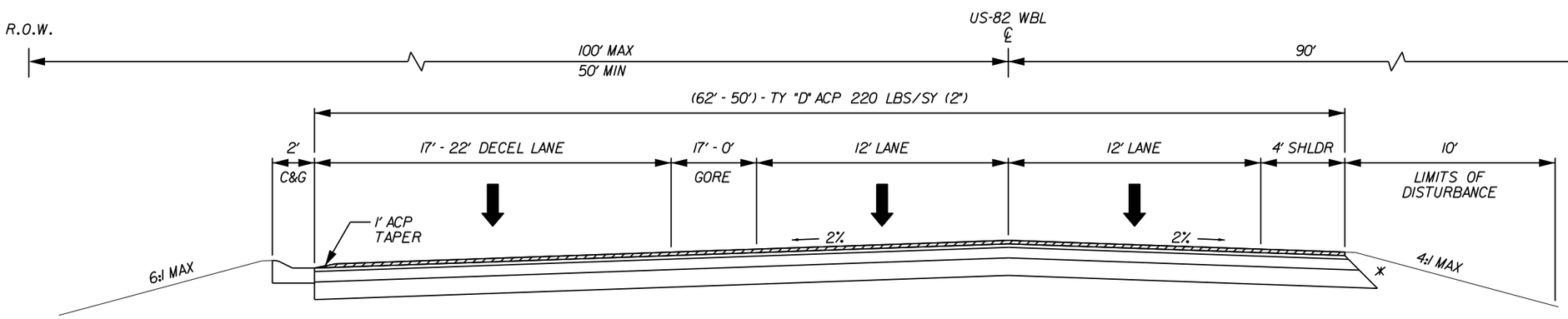
DATE: $DATE$ $TIME$
FILE: $FILE$




## EXISTING SECTION (4)

CSJ: 0132-01-055

STA. 882+43.00 TO STA 883+59.00 = 116.00 FT.




## PROPOSED SECTION (4)

CSJ: 0132-01-055

STA. 882+43.00 TO STA 883+59.00 = 116.00 FT.

TRANSITION FROM (4) TO (1)

STA. 883+59.00 TO STA. 887+09.00 = 350.00 FT.

* BACKFILL PAVEMENT EDGES TY A

STATE OF TEXAS
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88647
LICENSED
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08/24/2023

# TYPICAL SECTIONS


Texas Department of Transportation

SHEET 4 OF 4

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055.ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 6 |

DATE: $DATE$ $TIME$
FILE: $FILE$

## GENERAL NOTES AND SUPPLEMENTAL INFORMATION

| *BASIS FOR ESTIMATE | | |
|---|---|---|
| **ITEM** | **DESCRIPTION** | **RATE** |
| 168 | VEGETATIVE WATERING | 39,000 GAL/ACRE |
| 314 | EMULSIFIED ASPH (CSS-1H) (EROSION CONTROL) | 0.20 GAL/SY |
| 3076 | D-GR HMA (TY-D SAC-A PG70-28) | 110 LB/SY/IN |
| 3076 | TACK COAT (TRAIL) | 0.10 GAL/SY |

*RATES SHOWN IN THIS TABLE HAVE BEEN USED FOR PLAN QUANTITY CALCULATIONS AND MAY BE ADJUSTED BY THE ENGINEER DURING CONSTRUCTION FOR APPLICATION PURPOSES.

CONTRACTOR QUESTIONS ON THIS PROJECT ARE TO BE ADDRESSED TO THE FOLLOWING INDIVIDUAL(S):

**JARED.GROVES@TXDOT.GOV**

QUESTIONS MAY BE SUBMITTED VIA THE LETTING PRE-BID Q&A WEB PAGE. THIS WEBPAGE CAN BE ACCESSED FROM THE NOTICE TO CONTRACTORS DASHBOARD LOCATED AT THE FOLLOWING ADDRESS:

HTTPS://TABLEAU.TXDOT.GOV/VIEWS/PROJECTINFORMATIONDASHBOARD/NOTICETOCONTRACTORS

ALL CONTRACTOR QUESTIONS WILL BE REVIEWED BY THE ENGINEER. ALL QUESTIONS AND ANY CORRESPONDING RESPONSES THAT ARE GENERATED WILL BE POSTED THROUGH THE SAME LETTING PRE-BID Q&A WEB PAGE.

THE LETTING PRE-BID Q&A WEB PAGE FOR EACH PROJECT CAN BE ACCESSED BY USING THE DASHBOARD TO NAVIGATE TO THE PROJECT YOU ARE INTERESTED IN BY SCROLLING OR FILTERING THE DASHBOARD USING THE CONTROLS ON THE LEFT. HOVER OVER THE BLUE HYPERLINK FOR THE PROJECT YOU WANT TO VIEW THE Q&A FOR AND CLICK ON THE LINK IN THE WINDOW THAT POPS UP.

### ITEM 5 - CONTROL OF THE WORK

CONSTRUCTION SURVEYING ON THIS CONTRACT WILL BE IN ACCORDANCE WITH ARTICLE 5.9.3, “METHOD C”. THE CONTRACTOR SHALL PLACE CONSTRUCTION STAKES NEAR THE RIGHT-OF-WAY LINE AT INTERVALS OF NO MORE THAN 200’, OR AS DIRECTED, WITH STATIONING.

CORRECT ANY DEFICIENCIES IDENTIFIED DURING FINAL INSPECTION, INCLUDING REQUIRED PAPERWORK. SUBMIT ALL REQUIRED DOCUMENTATION WITHIN 14 DAYS OF FINAL ACCEPTANCE AS DIRECTED BY THE ENGINEER.



**CSJ: 0132-01-055**

**COUNTY: DICKENS**

**HIGHWAY: US-82**

### ITEM 6 – CONTROL OF MATERIALS

TO COMPLY WITH THE LATEST PROVISIONS OF BUILD AMERICA, BUY AMERICA ACT (BABA ACT) OF THE BIPARTISAN INFRASTRUCTURE LAW, THE CONTRACTOR MUST SUBMIT A NOTARIZED ORIGINAL OF THE TXDOT CONSTRUCTION MATERIAL BUY AMERICA CERTIFICATION FORM FOR ALL ITEMS CLASSIFIED AS CONSTRUCTION MATERIALS. THIS FORM IS NOT REQUIRED FOR MATERIALS CLASSIFIED AS A MANUFACTURED PRODUCT.

REFER TO THE BUY AMERICA MATERIAL CLASSIFICATION SHEET FOR CLARIFICATION ON MATERIAL CATEGORIZATION.

THE BUY AMERICA MATERIAL CLASSIFICATION SHEET IS LOCATED AT THE BELOW LINK.

HTTPS://WWW.TXDOT.GOV/BUSINESS/RESOURCES/MATERIALS/BUY-AMERICA-MATERIAL-CLASSIFICATION-SHEET.HTML FOR CLARIFICATION ON MATERIAL CATEGORIZATION.

### ITEM 7 - LEGAL RELATIONS AND RESPONSIBILITIES

PROVIDE INGRESS & EGRESS TO THE ADJACENT PROPERTIES IN AREAS UNDER CONSTRUCTION. PHASED CONSTRUCTION OF DRIVEWAYS AND STREETS SHALL BE REQUIRED TO PROVIDE UNINTERRUPTED ACCESS TO ADJACENT PROPERTIES. COORDINATE WORK WITH THE PROPERTY OWNERS BEFORE BEGINNING ANY CONSTRUCTION IN THE VICINITY OF THE DRIVE.

DO NOT INITIATE ACTIVITIES IN A PROJECT SPECIFIC LOCATION (PSL) ASSOCIATED WITH A U.S. ARMY CORPS OF ENGINEERS (USACE) PERMIT AREA THAT HAS NOT BEEN PREVIOUSLY EVALUATED BY THE USACE AS PART OF THE PERMIT REVIEW FOR THIS PROJECT. SUCH ACTIVITIES INCLUDE BUT ARE NOT LIMITED TO, HAUL ROADS, EQUIPMENT STAGING AREAS, BORROW AND DISPOSAL SITES. “ASSOCIATED”, AS DEFINED HEREIN, INCLUDES MATERIALS DELIVERED TO OR FROM THE PSL. THE PERMIT AREA INCLUDES ALL WATERS OF THE U.S. OR ASSOCIATED WETLANDS AFFECTED BY PROJECT ACTIVITIES. SPECIAL RESTRICTIONS MAY BE REQUIRED FOR SUCH WORK. CONSULT WITH THE USACE REGARDING ACTIVITIES, INCLUDING PROJECT SPECIFIC LOCATIONS (PSLS) THAT HAVE NOT BEEN PREVIOUSLY EVALUATED BY THE USACE. PROVIDE THE DEPARTMENT WITH A COPY OF ALL CONSULTATION(S) OR APPROVAL(S) FROM THE USACE PRIOR TO INITIATING ACTIVITIES.
PROCEED WITH ACTIVITIES IN PSLS THAT DO NOT AFFECT A USACE PERMIT AREA IF A SELF DETERMINATION HAS BEEN MADE THAT THE PSL IS NON-JURISDICTIONAL OR PROPER USACE CLEARANCES HAVE BEEN OBTAINED IN JURISDICTIONAL AREAS OR HAVE BEEN PREVIOUSLY EVALUATED BY THE USACE AS PART OF THE PERMIT REVIEW FOR THIS PROJECT. DOCUMENT ANY DETERMINATION(S) THAT PROJECT ACTIVITIES DO NOT AFFECT A USACE PERMIT AREA. MAINTAIN COPIES OF DETERMINATION(S) FOR REVIEW BY THE DEPARTMENT OR ANY REGULATORY AGENCY.

DOCUMENT AND COORDINATE WITH THE USACE, IF REQUIRED, PRIOR TO ANY EXCAVATION HAULED FROM OR EMBANKMENT HAULED INTO A USACE PERMIT AREA BY EITHER (1) OR (2) BELOW.

**1. RESTRICTED USE OF MATERIALS FOR THE PREVIOUSLY EVALUATED PERMIT AREAS.**

DOCUMENT BOTH THE PROJECT SPECIFIC LOCATION (PSL) AND AUTHORIZATION. MAINTAIN COPIES FOR REVIEW BY THE DEPARTMENT OR ANY REGULATORY AGENCY.

WHEN AN AREA WITHIN THE PROJECT LIMITS HAS BEEN EVALUATED BY THE USACE AS PART OF THE PERMIT PROCESS FOR THIS PROJECT:

- SUITABLE EXCAVATION OF REQUIRED MATERIAL IN THE AREAS SHOWN ON THE PLANS AND CROSS SECTIONS AS SPECIFIED IN ITEM 110 IS USED FOR PERMANENT OR TEMPORARY FILL (ITEM 132, EMBANKMENT) WITHIN A USACE PERMIT AREA;

- SUITABLE EMBANKMENT (ITEM 132) FROM WITHIN THE USACE PERMIT AREA IS USED AS FILL WITHIN A USACE EVALUATED AREA; AND,

- UNSUITABLE EXCAVATION OR EXCESS EXCAVATION [“WASTE”] (ITEM 110) THAT IS DISPOSED OF AT A LOCATION APPROVED BY THE ENGINEER WITHIN A USACE EVALUATED AREA.

**2. CONTRACTOR MATERIALS FROM AREAS OTHER THAN PREVIOUSLY EVALUATED AREAS.**

PROVIDE THE DEPARTMENT WITH A COPY OF ALL USACE COORDINATION OR APPROVAL(S) PRIOR TO INITIATING ANY ACTIVITIES FOR AN AREA WITHIN THE PROJECT LIMITS THAT HAS NOT BEEN EVALUATED BY THE USACE OR FOR ANY OFF RIGHT OF WAY LOCATIONS USED FOR THE FOLLOWING, BUT NOT LIMITED TO, HAUL ROADS, EQUIPMENT STAGING AREAS, BORROW AND DISPOSAL SITES:

- ITEM 132, EMBANKMENT, USED FOR TEMPORARY OR PERMANENT FILL WITHIN A USACE PERMIT AREA; AND,

- UNSUITABLE EXCAVATION OR EXCESS EXCAVATION [“WASTE”] (ITEM 110, EXCAVATION) THAT IS DISPOSED OF OUTSIDE A USACE EVALUATED AREA.

**THE TOTAL DISTURBED AREA FOR THIS PROJECT IS 42.94 ACRES**

THE DISTURBED AREA IN THIS PROJECT, ALL PROJECT LOCATIONS IN THE CONTRACT, AND THE CONTRACTOR’S PROJECT SPECIFIC LOCATIONS (PSLS), WITHIN ONE (1) MILE OF THE PROJECT LIMITS, FOR THE CONTRACT WILL FURTHER ESTABLISH THE AUTHORIZATION REQUIREMENTS FOR STORM WATER DISCHARGES. THE DEPARTMENT WILL OBTAIN AN AUTHORIZATION TO DISCHARGE STORM WATER FROM THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) FOR THE CONSTRUCTION ACTIVITIES SHOWN ON THE PLANS. THE CONTRACTOR IS TO OBTAIN REQUIRED AUTHORIZATION FROM THE TCEQ FOR CONTRACTOR PSLS FOR CONSTRUCTION SUPPORT ACTIVITIES ON OR OFF THE ROW. WHEN THE TOTAL AREA DISTURBED IN THE CONTRACT AND PSLS WITHIN ONE (1) MILE OF THE PROJECT LIMITS EXCEEDS FIVE (5) ACRES, PROVIDE A COPY OF THE CONTRACTOR’S NOI FOR PSLS ON THE ROW TO THE ENGINEER AND TO THE LOCAL GOVERNMENT THAT OPERATES A SEPARATE STORM SEWER SYSTEM.

**“NO SIGNIFICANT TRAFFIC GENERATOR EVENTS IDENTIFIED”**

**ITEM 8 – PROSECUTION AND PROGRESS**

WORKING DAYS WILL BE CHARGED IN ACCORDANCE WITH ARTICLE 8.3.1.4, STANDARD WORKWEEK.



**CSJ: 0132-01-055**

**COUNTY: DICKENS**

**HIGHWAY: US-82**

PROVIDE A MINIMUM OF 2 WORKING DAYS ADVANCED NOTICE TO THE ENGINEER FOR REQUESTS TO PERFORM WORK ON SATURDAYS. NO WORK ON SUNDAYS OR NATIONAL HOLIDAYS WILL BE ALLOWED.

SUBMIT WRITTEN REQUESTS TO THE ENGINEER FOR CONSIDERATION OF TEMPORARY SUSPENSION OF WORK AND/OR WORKING DAY CHARGES DUE TO CONDITIONS NOT UNDER THE CONTROL OF THE CONTRACTOR. SUCH REQUESTS WILL BE EVALUATED BY THE ENGINEER ON A CASE-BY-CASE BASIS AND A WRITTEN RESPONSE WILL BE PROVIDED TO THE CONTRACTOR.

COORDINATE WITH THE ENGINEER TO DETERMINE THE APPROPRIATE PROJECT SCHEDULE TYPE IN ACCORDANCE WITH ARTICLE 5.5 PRIOR TO SUBMISSION OF THE BASELINE SCHEDULE.

**ITEM 134 - BACKFILL PAVEMENT EDGES**

WINDROW APPROXIMATELY 4” OF EXISTING TOPSOIL PRIOR TO BEGINNING OPERATIONS. UPON COMPLETION OF OPERATIONS, RETURN THE WINDROWED MATERIAL TO THE SLOPES AND DITCHES AS A PERMANENT EROSION CONTROL MEASURE. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.

SHOULDER UP PAVEMENT EDGES AT THE END OF EACH WORKING DAY TO ENSURE SLOPES OF 4:1 OR FLATTER OFF OF THE EDGE OF PAVEMENT. PAYMENT FOR BACKFILL OF PAVEMENT EDGES WILL ONLY BE MADE ONCE FOR THE FINAL ROADWAY SECTION.

APPLY EMULSIFIED ASPHALT TO THE BACKFILLED MATERIAL AFTER IT HAS BEEN ROLLED AND SEEDED.

**ITEM 164 – SEEDING FOR EROSION CONTROL**

ALL SEEDED AREAS OF THE PROJECT SHALL BE FERTILIZED WITH 60 POUNDS OF NITROGEN PER ACRE. FERTILIZER WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO PERTINENT BID ITEMS.

**ITEM 300 – ASPHALTS, OILS AND EMULSIONS**

PROVIDE DOCUMENTATION THAT INCLUDES THE CURRENT LAB NUMBER SHOWING THAT THE OIL SAMPLE HAS BEEN PRE-TESTED AND APPROVED FOR THE MONTH OF APPLICATION. THIS DOCUMENTATION MUST BE PROVIDED AND VERIFIED BY THE ENGINEER PRIOR TO APPLICATION OF THE MATERIAL.

DO NOT DILUTE EMULSIFIED ASPHALT WITH ADDITIONAL WATER UNDER ANY CIRCUMSTANCES. PROVIDE EMULSIONS MEETING THE REQUIREMENTS UNDER ITEM 300.

**ITEM 351 – FLEXIBLE PAVEMENT REPAIR**

PROVIDE D-GR HMA TY D WITH PG 70-28 BINDER WITH SUPPORTING NOTES LISTED IN THE PLAN SET’S ITEM 3076 GENERAL NOTES. PERFORM FLEXIBLE PAVEMENT REPAIRS IN ACCORDANCE WITH ITEM 3076 AND APPLICABLE SUPPORTING NOTES.

**CSJ: 0132-01-055**

**COUNTY: DICKENS**

**HIGHWAY: US-82**

USE OF A MOTOR GRADER FOR PAVING OPERATIONS WILL NOT BE ALLOWED UNLESS AUTHORIZED BY THE ENGINEER.

PERFORM ALL REPAIRS DURING A SINGLE DAYTIME OPERATION ONLY. DO NOT EXTEND OPERATIONS OVERNIGHT.

**ITEM 354 – PLANING AND TEXTURING PAVEMENT**

PLANED ASPHALTIC MATERIAL WILL BECOME PROPERTY OF THE CONTRACTOR.

**ITEM 432 – RIPRAP MOW STRIP**

WHERE RIPRAP MOW STRIP ADJOINS THE PAVEMENT, EDGE OF PAVEMENT SHALL BE SAWCUT PRIOR TO PLACEMENT OF RIPRAP TO PROVIDE A CLEAN JOINT. THIS WORK WILL BE SUBSIDIARY TO THIS ITEM AND WILL BE PERFORMED AT THE DIRECTION OF THE ENGINEER.

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

THE CONTRACTOR'S RESPONSIBLE PERSON FOR TCP COMPLIANCE SHALL BE AVAILABLE BY PHONE AND SHALL HAVE A RESPONSE TIME WITHIN 45 MINUTES.

WORK WILL NOT BE ALLOWED ON BOTH SIDES OF THE ROAD AT THE SAME TIME UNLESS OTHERWISE APPROVED BY THE ENGINEER.

ALL EQUIPMENT AND MATERIALS SHALL BE STORED OUTSIDE THE ROADWAY CLEAR ZONE.

EQUIP ALL WORK VEHICLES WITHIN 30 FEET OF THE TRAVELED WAY WITH A FUNCTIONING AMBER STROBE LIGHT OR ROTATING BEACON VISIBLE FROM ALL DIRECTIONS.

THE CONTRACTOR SHALL TAKE ACTION AT THE TIME OF RECEIPT OF THE BARRICADE INSPECTION IN ACORDANCE WITH THE DEFICICIENCY PRIORITY. MAKE CORRECTIONS WITHIN 1 CALENDAR DAY FOR A PRIORITY 1 DEFICIENCY, OR WITHIN 7 CALENDAR DAYS FOR A PRIORITY 2 DEFICIENCY. THE ENGINEER MAY REQUIRE THE TEMPORARY SUSPENSION OF WORK WITHOUT SUSPENSION OF TIME CHARGES FOR FAILURE TO MAKE CORRECTIONS WITHIN THE APPROPRIATE TIME FRAMES.

THE CONTRACTOR FORCE ACCOUNT "SAFETY CONTINGENCY" THAT HAS BEEN ESTABLISHED FOR THIS PROJECT IS INTENDED TO BE UTILIZED FOR WORK ZONE ENHANCEMENTS AND TO IMPROVE THE EFFECTIVENESS OF THE TRAFFIC CONTROL PLAN. THESE ENHANCEMENTS WILL BE MUTUALLY AGREED UPON BY THE ENGINEER AND THE CONTRACTOR'S RESPONSIBLE PERSON IN WRITING. THE ENGINEER MAY CHOOSE TO USE EXISTING BID ITEMS IF IT DOES NOT SLOW THE IMPLEMENTATION OR ENHANCEMENT.

THE USE OF A PILOT CAR WILL BE REQUIRED FOR ONE-LANE, TWO-WAY TRAFFIC CONTROL. ONE-LANE, TWO-WAY TRAFFIC CONTROL WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 502.

PROVIDE FLAGS AND A CW8-15P "MOTORCYCLE WARNING" PLAQUE ON ALL CW20-ID "ROAD WORK AHEAD" SIGNS.



**CSJ: 0132-01-055**

**COUNTY: DICKENS**

**HIGHWAY: US-82**

A 65-MPH REGULATORY WORK ZONE SPEED REDUCTION WILL BE REQUIRED FOR THIS PROJECT. SIGNS FOR SPEED REDUCTION SHALL BE PLACED PRIOR TO CONSTRUCTION AND WILL BE CONSIDERED SUBSIDIARY TO THE UNIT BID PRICE FOR THIS ITEM. AT THE DIRECTION OF THE ENGINEER, COVER OR REMOVE TEMPORARY SPEED LIMIT SIGNS ONCE APPLICABLE WORK IS COMPLETE.

**ITEM 506 – TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS**

THE ENGINEER MAY REQUIRE THE TEMPORARY SUSPENSION OF WORK WITHOUT SUSPENSION OF TIME CHARGES FOR FAILURE TO MAKE CORRECTIONS TO DEFICIENCIES NOTED ON FORM 2118 WITHIN THE APPROPRIATE TIME FRAMES.

**ITEM 533 – MILLED RUMBLE STRIPS**

THE MILLED RUMBLE STRIPS SHOULD BE PLACED ON SHOULDERS ACCORDING TO RS(1)-23 STANDARDS AND THE SHOULDER WIDTHS AS SHOWN BELOW:

- SHOULDER WIDTH OF 2 FEET OR LESS - THE RUMBLE STRIP WILL BEGIN ON THE EDGE LINE AS SHOWN IN THE STANDARDS.
- SHOULDER WIDTH GREATER THAN 2 FEET BUT LESS THAN 6 FEET - THE RUMBLE STRIP WILL BE CENTERED ON THE SHOULDER.
- SHOULDER WIDTH GREATER THAN 6 FEET - THE RUMBLE STRIP WILL BEGIN 2 FEET FROM THE EDGE LINE
- OR AS DIRECTED BY THE ENGINEER

THE CONTRACTOR IS RESPONSIBLE FOR RE-ESTABLISHING LOCATION AND ALIGNMENT FOR MILLED RUMBLE STRIPS MATCHING PAVEMENT MARKING ALIGNMENT PRIOR TO PLACEMENT OF PERMANENT PAVEMENT MARKINGS. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.

**ITEMS 542 & 544 – REMOVING METAL BEAM GUARD FENCE & GUARDRAIL END TREATMENTS**
SALVAGED MBGF AND GUARDRAIL END TREATMENTS WILL BECOME THE PROPERTY OF THE CONTRACTOR UPON REMOVAL FROM SERVICE.

**ITEM 585 – RIDE QUALITY FOR PAVEMENT SURFACES**

USE SURFACE TEST TYPE "B" FOR FINISHED RIDING SURFACES OF NEWLY CONSTRUCTED TRAVEL LANES.

USE PAY ADJUSTMENT SCHEDULE 2.

**ITEM 666 - REFLECTORIZED PAVEMENT MARKINGS**

THE CONTRACTOR SHALL PLACE GUIDE MARKS TO ESTABLISH THE LOCATION OF THE PROPOSED PAVEMENT MARKINGS. THE CONTRACTOR MAY USE YELLOW TABS SPACED AT 40' ON CENTER OR OTHER METHODS NOT NOTED IN THE PLANS. ALTERNATE METHODS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO STRIPING. ANY ALTERNATE GUIDE MARKINGS PLACED WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.

**ITEM 672 – RAISED PAVEMENT MARKERS**

REMOVE EXISTING RAISED PAVEMENT MARKINGS AS THE WORK PROGRESSES, OR AS DIRECTED BY THE ENGINEER. REMOVAL SHALL TAKE PLACE IN CONCURRENCE WITH THE PROPOSED TCP PHASING UNLESS OTHERWISE DIRECTED. REMOVAL OF EXISTING RPMS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.

**ITEM 677 – ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS**

IN ACCORDANCE WITH THE TEXAS MUTCD, BLACK PAVEMENT MARKINGS WILL NOT BE ACCEPTED AS A SUBSTITUTE FOR REMOVAL OF EXISTING PAVEMENT MARKINGS.

**ITEM 3076 – DENSE GRADED HOT-MIX ASPHALT**

ANY REPAIRS MADE TO NEW HOTMIX WILL BE PERFORMED FULL LANE WIDTH OR FULL SHOULDER WIDTH AT THE CONTRACTOR'S EXPENSE.

PROVIDE AGGREGATE MEETING A SURFACE AGGREGATE CLASSIFICATION OF SAC-A.

MINIMUM CRUSHED FACE COUNT FOR COURSE GRAVEL AGGREGATE IS 95%.

MINERAL FILLER OTHER THAN DRIED STONE DUST MUST BE APPROVED.

LIME OR LIQUID ANTISTRIPPING AGENT WILL BE REQUIRED.

DESIGN THE MIXTURE USING A SUPERPAVE GYRATORY COMPACTOR (SGC) AT 50 GYRATIONS.

TARGET LAB MOLDED DENSITY IS 97.0%.

MINIMUM ASPHALT CONTENT WILL BE 5%.

TEX-530-C BOIL TEST WILL BE WAIVED.

TWO (2) VERIFICATION TESTS PER DESIGN WILL BE PERFORMED BY THE CHILDRESS DISTRICT LABORATORY. ANY ADDITIONAL DESIGN VERIFICATION TESTING WILL BE PAID FOR BY THE CONTRACTOR AT $5,000 EACH.

THE MAXIMUM CONTENT OF RECYCLED MATERIALS FOR ALL HOT MIX ASPHALT CONRETE SHALL BE 10%.

RAS WILL NOT BE ALLOWED.



**CSJ: 0132-01-055**

**COUNTY: DICKENS**

**HIGHWAY: US-82**

A MATERIAL TRANSFER VEHICLE (MTV) WITH REMIXING CAPABILITIES WILL BE REQUIRED.

CONTRACTOR SHALL NOT UNLOAD NEW HOT MIX ONTO THE FINAL RIDING SURFACE OF ANY PAVEMENT.

A TAPERED LONGITUDINAL JOINT WILL BE REQUIRED UNLESS OTHERWISE APPROVED BY THE ENGINEER.

PRODUCTION SAMPLING: THE SAMPLER SHALL SPLIT EACH SAMPLE INTO THREE (3) EQUAL PORTIONS IN ACCORDANCE WITH TEX-200-F AND LABEL THESE PORTIONS AS "CONTRACTOR", "ENGINEER", AND "REFEREE". CONTRACTOR SHALL DELIVER THE ENGINEER AND REFEREE SAMPLES TO THE CHILDRESS DISTRICT LABORATORY FOR TESTING.

**ITEM 3076 – TACK COAT**

TRACKING RESISTANT ASPHALT INTERLAYER (TRAIL) APPROVED MATERIALS SHALL BE USED FOR TACK COAT.

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

THERE WILL BE NO ADDITIONAL SHADOW VEHICLES OR TMA REQUIRED IN ADDITION TO THE SHADOW VEHICLES WITH TRUCK MOUNTED ATTENUATOR (TMA) THAT ARE SPECIFIED AS BEING REQUIRED ON THE TRAFFIC CONTROL PLAN STANDARDS FOR THIS PROJECT.

REFERENCE THE TABLE BELOW FOR TMA REQUIRED PER TCP STANDARD OPERATION. THE CONTRACTOR WILL BE RESPONSIBLE FOR DETERMINING IF ONE OR MORE OF THESE OPERATIONS WILL BE ONGOING AT THE SAME TIME TO DETERMINE THE TOTAL NUMBER OF TMA'S NEEDED FOR THE PROJECT.

**BASIS OF ESTIMATE FOR TMAs**

| PHASE | STANDARD | REQUIRED | ADDITIONAL | TOTAL |
|---|---|---|---|---|
| TMA (MOBILE) | | | | |
| STRIPING | TCP (3-2)-13 | 2 | 0 | 2 |
| RPM | TCP (3-3)-14 | 2 | 0 | 2 |
| TMA (STATIONARY) | | | | |
| ACP PLACE | TCP (1-5)-18 | 1 | 0 | 1 |

# Estimate & Quantity Sheet

**CONTROLLING PROJECT ID** 0132-01-055 **DISTRICT** Childress **COUNTY** Dickens
**HIGHWAY** US 82

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | **CONTROL SECTION JOB** | | **0132-01-055** | | **0132-02-037** | | TOTAL EST. | TOTAL FINAL |
| | | | **PROJECT ID** | | **A00137686** | | **A00137687** | | | |
| | | | **COUNTY** | | **Dickens** | | **Dickens** | | | |
| | | | **HIGHWAY** | | **US 82** | | **US 82** | | | |
| **ALT** | **BID CODE** | **DESCRIPTION** | | **UNIT** | EST. | FINAL | EST. | FINAL | | |
| | 132-6003 | EMBANKMENT (FINAL)(ORD COMP)(TY B) | | CY | 104.000 | | 18.000 | | 122.000 | |
| | 134-6001 | BACKFILL (TY A) | | STA | 435.000 | | 500.000 | | 935.000 | |
| | 164-6034 | DRILL SEEDING (PERM) (RURAL) (SANDY) | | AC | 20.000 | | 23.000 | | 43.000 | |
| | 168-6001 | VEGETATIVE WATERING | | MG | 780.000 | | 897.000 | | 1,677.000 | |
| | 314-6013 | EMULS ASPH (EROSN CONT)(CSS-1H) | | GAL | 19,185.000 | | 22,083.000 | | 41,268.000 | |
| | 351-6019 | FLEXIBLE PAVEMENT STRUCTURE REPAIR(3") | | SY | 500.000 | | 500.000 | | 1,000.000 | |
| | 354-6021 | PLANE ASPH CONC PAV(0" TO 2") | | SY | 4,223.000 | | 4,223.000 | | 8,446.000 | |
| | 432-6045 | RIPRAP (MOW STRIP)(4 IN) | | CY | 208.000 | | 36.000 | | 244.000 | |
| | 500-6001 | MOBILIZATION | | LS | 1.000 | | | | 1.000 | |
| | 502-6001 | BARRICADES, SIGNS AND TRAFFIC HANDLING | | MO | 6.000 | | | | 6.000 | |
| | 506-6042 | BIODEG EROSN CONT LOGS (INSTL) (18") | | LF | 660.000 | | 940.000 | | 1,600.000 | |
| | 533-6001 | RUMBLE STRIPS (SHOULDER) | | LF | 84,828.000 | | 98,397.000 | | 183,225.000 | |
| | 540-6002 | MTL W-BEAM GD FEN (STEEL POST) | | LF | 3,625.000 | | 450.000 | | 4,075.000 | |
| | 540-6006 | MTL BEAM GD FEN TRANS (THRIE-BEAM) | | EA | 4.000 | | 2.000 | | 6.000 | |
| | 540-6016 | DOWNSTREAM ANCHOR TERMINAL SECTION | | EA | 7.000 | | 2.000 | | 9.000 | |
| | 540-6018 | MTL BM GD FEN TRANS (NON - SYM) | | EA | 4.000 | | 2.000 | | 6.000 | |
| | 540-6037 | MTL BM GD FEN TRANS (ANCHOR PLATE) | | EA | 4.000 | | 2.000 | | 6.000 | |
| | 542-6001 | REMOVE METAL BEAM GUARD FENCE | | LF | 3,825.000 | | 550.000 | | 4,375.000 | |
| | 542-6002 | REMOVE TERMINAL ANCHOR SECTION | | EA | 7.000 | | 2.000 | | 9.000 | |
| | 542-6004 | RM MTL BM GD FENCE TRANS (THRIE-BEAM) | | EA | 4.000 | | 2.000 | | 6.000 | |
| | 544-6001 | GUARDRAIL END TREATMENT (INSTALL) | | EA | 7.000 | | 2.000 | | 9.000 | |
| | 544-6003 | GUARDRAIL END TREATMENT (REMOVE) | | EA | 7.000 | | 2.000 | | 9.000 | |
| | 658-6061 | INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2 | | EA | 42.000 | | 6.000 | | 48.000 | |
| | 658-6064 | INSTL DEL ASSM (D-SY)SZ 1(BRF)GF2 | | EA | 12.000 | | 6.000 | | 18.000 | |
| | 662-6109 | WK ZN PAV MRK SHT TERM (TAB)TY W | | EA | 3,387.000 | | 3,755.000 | | 7,142.000 | |
| | 666-6018 | REFL PAV MRK TY I (W)6"(DOT)(100MIL) | | LF | 164.000 | | | | 164.000 | |
| | 666-6042 | REFL PAV MRK TY I (W)12"(SLD)(100MIL) | | LF | 210.000 | | 10.000 | | 220.000 | |
| | 666-6081 | REFL PAV MRK TY I(W)(ENTR GORE)(100MIL) | | EA | 1.000 | | | | 1.000 | |
| | 666-6084 | REFL PAV MRK TY I(W)(EXIT GORE)(100MIL) | | EA | 1.000 | | | | 1.000 | |
| | 666-6102 | REF PAV MRK TY I(W)36"(YLD TRI)(100MIL) | | EA | 232.000 | | 224.000 | | 456.000 | |
| | 666-6306 | RE PM W/RET REQ TY I (W)6"(BRK)(100MIL) | | LF | 10,860.000 | | 12,520.000 | | 23,380.000 | |
| | 666-6309 | RE PM W/RET REQ TY I (W)6"(SLD)(100MIL) | | LF | 43,453.000 | | 50,071.000 | | 93,524.000 | |
| | 666-6321 | RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) | | LF | 45,425.000 | | 51,811.000 | | 97,236.000 | |
| | 672-6010 | REFL PAV MRKR TY II-C-R | | EA | 605.000 | | 626.000 | | 1,231.000 | |
| | 677-6001 | ELIM EXT PAV MRK & MRKS (4") | | LF | 80.000 | | 100.000 | | 180.000 | |
| | 3076-6045 | D-GR HMA TY-D SAC-A PG70-28 | | TON | 22,035.000 | | 25,082.000 | | 47,117.000 | |
| | 3076-6047 | D-GR HMA TY-D PG70-28 (LEVEL-UP) | | TON | 3,357.000 | | 3,864.000 | | 7,221.000 | |

# Estimate & Quantity Sheet

**CONTROLLING PROJECT ID** 0132-01-055 **DISTRICT** Childress **COUNTY** Dickens
**HIGHWAY** US 82

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | **CONTROL SECTION JOB** | **0132-01-055** | | **0132-02-037** | | TOTAL EST. | TOTAL FINAL |
| | | | **PROJECT ID** | **A00137686** | | **A00137687** | | | |
| | | | **COUNTY** | **Dickens** | | **Dickens** | | | |
| | | | **HIGHWAY** | **US 82** | | **US 82** | | | |
| **ALT** | **BID CODE** | **DESCRIPTION** | **UNIT** | EST. | FINAL | EST. | FINAL | | |
| | 3076-6066 | TACK COAT | GAL | 19,053.000 | | 21,671.000 | | 40,724.000 | |
| | 6185-6002 | TMA (STATIONARY) | DAY | 93.000 | | | | 93.000 | |
| | 6185-6005 | TMA (MOBILE OPERATION) | DAY | 6.000 | | | | 6.000 | |
| | 08 | CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING) | LS | 1.000 | | | | 1.000 | |
| | | CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING) | LS | 1.000 | | | | 1.000 | |

## ROADWAY SUMMARY

| LOCATION | TYPICAL SECTION NUMBER | | LENGTH | 134 | 351 | 354 | 533 | 3076* | 3076 | 3076 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 6001 | 6019 | 6021 | 6001 | 6045 | 6047 | 6066 |
| | | | | BACKFILL (TY A) | FLEXIBLE PAVEMENT STRUCTURE REPAIR (3") | PLANE ASPH CONC PAV (0" TO 2") | RUMBLE STRIPS (SHOULDER) | D-GR HMA TY-D SAC-A PG 70-28 220 LBS/SY | D-GR HMA TY-D PG 70-28 (LEVEL-UP) 140 LBS/SY | TACK COAT (0.10 GAL/SY) |
| | | | LF | STA | SY | SY | LF | TON | TON | GAL |
| STA. 767+12.00 TO STA. 860+87.00 | 1 | | 9,375.00 | 94 | ~ | ~ | 18,510 | 4,609 | 729 | 3,980 |
| STA. 860+87.00 TO STA. 863+87.00 | TRANS | 1 TO 2 | 300.00 | 3 | ~ | ~ | 520 | 165 | 23 | 143 |
| STA. 863+87.00 TO STA. 865+87.00 | 2 | | 200.00 | 2 | ~ | ~ | 400 | 126 | 16 | 110 |
| STA. 865+87.00 TO STA. 867+42.00 | 3 | | 155.00 | 2 | ~ | ~ | 155 | 107 | 12 | 94 |
| STA. 867+42.00 TO STA. 882+43.00 | 1 | | 1,501.00 | 15 | ~ | ~ | 3,002 | 735 | 117 | 634 |
| STA. 882+43.00 TO STA. 883+59.00 | 4 | | 116.00 | 1 | ~ | ~ | 116 | 83 | 9 | 72 |
| STA. 883+59.00 TO STA. 887+09.00 | TRANS | 4 TO 1 | 350.00 | 4 | ~ | ~ | 700 | 194 | 27 | 168 |
| STA. 887+09.00 TO STA. 1201+65.00 | 1 | | 31,456.00 | 315 | 500 | ~ | 61,425 | 15,322 | 2,424 | 13,221 |
| PLANING DETAILS | | | ~ | ~ | ~ | 4,223 | ~ | ~ | ~ | ~ |
| INTERSECTION AND DRIVEWAY DETAILS | | | ~ | ~ | ~ | ~ | ~ | 67 | ~ | 61 |
| CROSSOVER DETAILS | | | ~ | ~ | ~ | ~ | ~ | 627 | ~ | 570 |
| CSJ: 0132-01-055 TOTALS | | | 43,453.00 | 435 | 500 | 4,223 | 84,828 | 22,035 | 3,357 | 19,053 |
| STA. 1201+65.00 TO STA. 1702+36.00 | 1 | | 50,071 | 500 | 500 | ~ | 98,397 | 24,422 | 3,864 | 21,071 |
| PLANING DETAILS | | | ~ | ~ | ~ | 4,223 | ~ | ~ | ~ | ~ |
| INTERSECTION AND DRIVEWAY DETAILS | | | ~ | ~ | ~ | ~ | ~ | 61 | ~ | 55 |
| CROSSOVER DETAILS | | | ~ | ~ | ~ | ~ | ~ | 599 | ~ | 545 |
| CSJ: 0132-02-037 TOTALS | | | 50,071 | 500 | 500 | 4,223 | 98,397 | 25,082 | 3,864 | 21,671 |
| PROJECT TOTALS | | | 93,524 | 935 | 1,000 | 8,446 | 183,225 | 47,117 | 7,221 | 40,724 |

*NOTE: 4' SHOULDER LEVEL-UP QUANTITY IS INCLUDED IN ITEM 3076-6045.

## PAVEMENT MARKING SUMMARY

| LOCATION | 666 | 666 | 666 | 666 | 666 | 666 | 666 | 666 | 672 | 677 |
|---|---|---|---|---|---|---|---|---|---|---|
| | 6018 | 6042 | 6081 | 6084 | 6102 | 6306 | 6309 | 6321 | 6010 | 6001 |
| | REFL PAV MRK TY I (W)6"(DOT)X100MIL) | REFL PAV MRK TY I (W)12"(SLD)X100MIL) | REFL PAV MRK TY I (WX)ENTR GOREX 100MIL) | REFL PAV MRK TY I (WX)EXIT GOREX 100MIL) | REFL PAV MRK TY I (W)36"(YLD TRIX 100MIL) | RE PM W/RET REQ TY I (W)6"(BRK)X100MIL) | RE PM W/RET REQ TY I (W)6"(SLD)X100MIL) | RE PM W/RET REQ TY I (Y)6"(SLD)X100MIL) | REFL PAV MRKR TY II-C-R | ELIM EXT PAVE MRK & MRKS (4") |
| | LF | LF | EA | EA | EA | LF | LF | LF | EA | LF |
| STA. 767+12.00 TO STA. 1201+65.00 | 164 | 210 | 1 | 1 | 232 | 10,860 | 43,453 | 45,425 | 605 | 80 |
| CSJ: 0132-01-055 TOTALS | 164 | 210 | 1 | 1 | 232 | 10,860 | 43,453 | 45,425 | 605 | 80 |
| STA. 1201+65.00 TO STA. 1702+36.00 | ~ | 10 | ~ | ~ | 224 | 12,520 | 50,071 | 51,811 | 626 | 100 |
| CSJ: 0132-02-037 TOTALS | ~ | 10 | ~ | ~ | 224 | 12,520 | 50,071 | 51,811 | 626 | 100 |
| PROJECT TOTALS | 164 | 220 | 1 | 1 | 456 | 23,380 | 93,524 | 97,236 | 1,231 | 180 |

QUANTITY SUMMARY


Texas Department of Transportation



| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055.ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 9 |

DN:

DATE: $DATE$ $TIME$
FILE: $FILE$

## MBGF SUMMARY

| LOCATION | 132 | 432 | 540 | 540 | 540 | 540 | 540 | 542 | 542 | 542 | 544 | 544 | 658 | 658 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 6003 | 6045 | 6002 | 6006 | 6016 | 6018 | 6037 | 6001 | 6002 | 6004 | 6001 | 6003 | 6061 | 6064 |
| | EMBANKMENT (FINAL) (ORD COMP) (TY B) | RIPRAP (MOW STRIP) (4 IN) | MTL W-BEAM GD FEN (STEEL POST) | MTL BM GD FEN TRANS (THRIE-BEAM) | DOWNSTREAM ANCHOR TERMINAL SECTION | MTL BEAM GD FEN TRANS (NON-SYM) | MTL BM GD FEN TRANS (ANCHOR PLATE) | REMOVE METAL BEAM GUARD FENCE | REMOVE TERMINAL ANCHOR SECTION | RM MTL BM GD FENCE TRANS (THRIE-BEAM) | GUARDRAIL END TREATMENT (INSTALL) | GUARDRAIL END TREATMENT (REMOVE) | INSTL DEL ASSM (D-SW) SZ 1(BRF) GF2 | INSTL DEL ASSM (D-SY) SZ 1(BRF) GF2 |
| | CY | CY | LF | EA | EA | EA | EA | LF | EA | EA | EA | EA | | |
| | LT / RT | LT / RT | LT / RT | LT / RT | LT / RT | LT / RT | LT / RT | LT / RT | LT / RT | RT / LT | LT / RT | LT / RT | EA | EA |
| STA. 773+10.00 TO STA. 790+10.00 | 38 / ~ | 76 / ~ | 1625 / ~ | ~ | 1 / ~ | ~ | ~ | 1625 / ~ | 1 / ~ | ~ | 1 / ~ | 1 / ~ | 17 | ~ |
| STA. 812+82.00 TO STA. 816+82.00 | 10 / ~ | 20 / ~ | 325 / ~ | ~ | 1 / ~ | ~ | ~ | 325 / ~ | 1 / ~ | ~ | 1 / ~ | 1 / ~ | 4 | ~ |
| STA. 823+50.00 TO STA. 832+00.00 | 20 / ~ | 40 / ~ | 775 / ~ | ~ | 1 / ~ | ~ | ~ | 775 / ~ | 1 / ~ | ~ | 1 / ~ | 1 / ~ | 9 | ~ |
| BRIDGE AT STA. 1111+25.00 (DOWNSTREAM) | 2 / 2 | 4 / 4 | 50 / 50 | ~ | 1 / 1 | 1 / 1 | 1 / 1 | 50 / 200 | 1 / 1 | ~ | ~ | ~ | 2 | 2 |
| BRIDGE AT STA. 1111+25.00 (UPSTREAM) | 7 / 7 | 14 / 14 | 175 / 175 | 1 / 1 | ~ | ~ | ~ | 150 / 150 | ~ | 1 / 1 | 1 / 1 | 1 / 1 | 4 | 4 |
| BRIDGE AT STA. 1162+76.00 (DOWNSTREAM) | 2 / 2 | 4 / 4 | 50 / 50 | ~ | 1 / 1 | 1 / 1 | 1 / 1 | 50 / 200 | 1 / 1 | ~ | ~ | ~ | 2 | 2 |
| BRIDGE AT STA. 1162+76.00 (UPSTREAM) | 7 / 7 | 14 / 14 | 175 / 175 | 1 / 1 | ~ | ~ | ~ | 150 / 150 | ~ | 1 / 1 | 1 / 1 | 1 / 1 | 4 | 4 |
| CSJ: 0132-01-055 TOTALS | 104 | 208 | 3,625 | 4 | 7 | 4 | 4 | 3,825 | 7 | 4 | 7 | 7 | 42 | 12 |
| BRIDGE AT STA. 1648+32.00 (DOWNSTREAM) | 2 / 2 | 4 / 4 | 50 / 50 | ~ | 1 / 1 | 1 / 1 | 1 / 1 | 50 / 200 | 1 / 1 | ~ | ~ | ~ | 2 | 2 |
| BRIDGE AT STA. 1648+32.00 (UPSTREAM) | 7 / 7 | 14 / 14 | 175 / 175 | 1 / 1 | ~ | ~ | ~ | 150 / 150 | ~ | 1 / 1 | 1 / 1 | 1 / 1 | 4 | 4 |
| CSJ: 0132-02-037 TOTALS | 18 | 36 | 450 | 2 | 2 | 2 | 2 | 550 | 2 | 2 | 2 | 2 | 6 | 6 |
| PROJECT TOTALS | 122 | 244 | 4,075 | 6 | 9 | 6 | 6 | 4,375 | 9 | 6 | 9 | 9 | 48 | 18 |

## WORK ZONE SUMMARY

| LOCATION | 662 | 6185 | 6185 |
|---|---|---|---|
| | 6109 | 6002 | 6005 |
| | WK ZN PAV MRK SHT TERM (TAB) TY W | TMA (STATIONARY) | TMA (MOBILE OPERATION) |
| | EA | DAY | DAY |
| STA. 767+12.00 TO STA. 1201+65.00 | 3,387 | 93 | 6 |
| CSJ: 0132-01-055 TOTALS | 3,387 | 93 | 6 |
| STA. 1201+65.00 TO STA. 1702+36.00 | 3,755 | ~ | ~ |
| CSJ: 0132-02-037 TOTALS | 3,755 | ~ | ~ |
| PROJECT TOTALS | 7,142 | 93 | 6 |

## EROSION CONTROL SUMMARY

| LOCATION | 164 | 168 | 314 | 506 |
|---|---|---|---|---|
| | 6034 | 6001 | 6013 | 6042 |
| | DRILL SEEDING (PERM) (RURAL) (SANDY) | VEGETATIVE WATERING | EMULS ASHP (EROSN CONT) (CSS-1H) (0.20 GAL/SY) | BIODEG EROSN CONT LOGS (INSTL) |
| | AC | MG | GAL | LF |
| STA. 767+12.00 TO STA. 1201+65.00 | 20 | 780 | 19,185 | 660 |
| CSJ: 0132-01-055 TOTALS | 20 | 780 | 19,185 | 660 |
| STA. 1201+65.00 TO STA. 1702+36.00 | 23 | 897 | 22,083 | 940 |
| CSJ: 0132-02-037 TOTALS | 23 | 897 | 22,083 | 940 |
| PROJECT TOTALS | 43 | 1,677 | 41,268 | 1,600 |

DN:

DATE: $DATE$ $TIME$
FILE: $FILE$

# QUANTITY SUMMARY


Texas Department of Transportation



| CONT | SECT | JOB | HIGHWAY |
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## BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

## WORKER SAFETY NOTES:

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

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

## COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

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



Texas Department of Transportation

Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

# BC(1)-21

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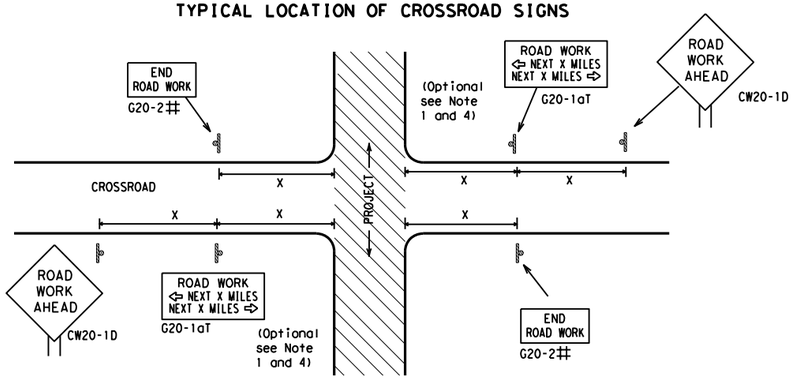
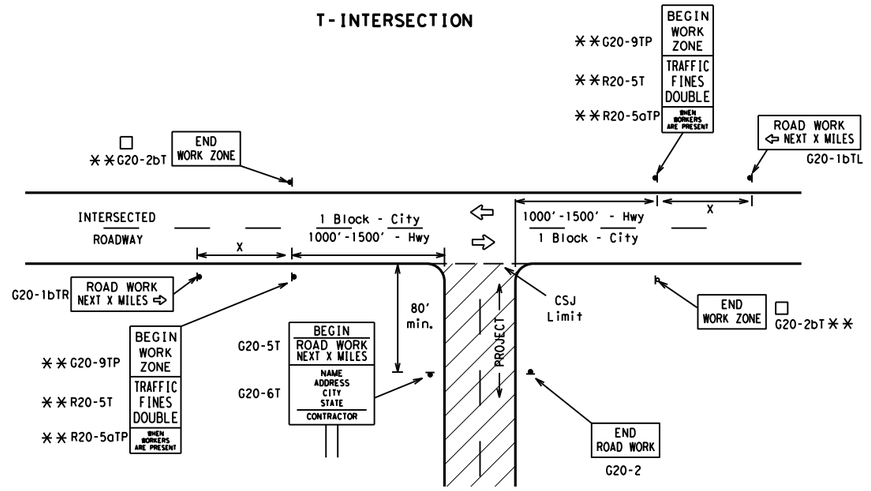
## TYPICAL LOCATION OF CROSSROAD SIGNS




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

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

## T-INTERSECTION




## CSJ LIMITS AT T-INTERSECTION

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

## TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

### SIZE

| Sign Number or Series | Conventional Road | Expressway/ Freeway |
|---|---|---|
| CW20[4] CW21 CW22 CW23 CW25 | 48" x 48" | 48" x 48" |
| CW1, CW2, CW7, CW8, CW9, CW11, CW14 | 36" x 36" | 48" x 48" |
| CW3, CW4, CW5, CW6, CW8-3, CW10, CW12 | 48" x 48" | 48" x 48" |

### SPACING

| Posted Speed | Sign △ Spacing "X" |
|---|---|
| MPH | Feet (Apprx.) |
| 30 | 120 |
| 35 | 160 |
| 40 | 240 |
| 45 | 320 |
| 50 | 400 |
| 55 | 500[2] |
| 60 | 600[2] |
| 65 | 700[2] |
| 70 | 800[2] |
| 75 | 900[2] |
| 80 | 1000[2] |
| * | *[3] |

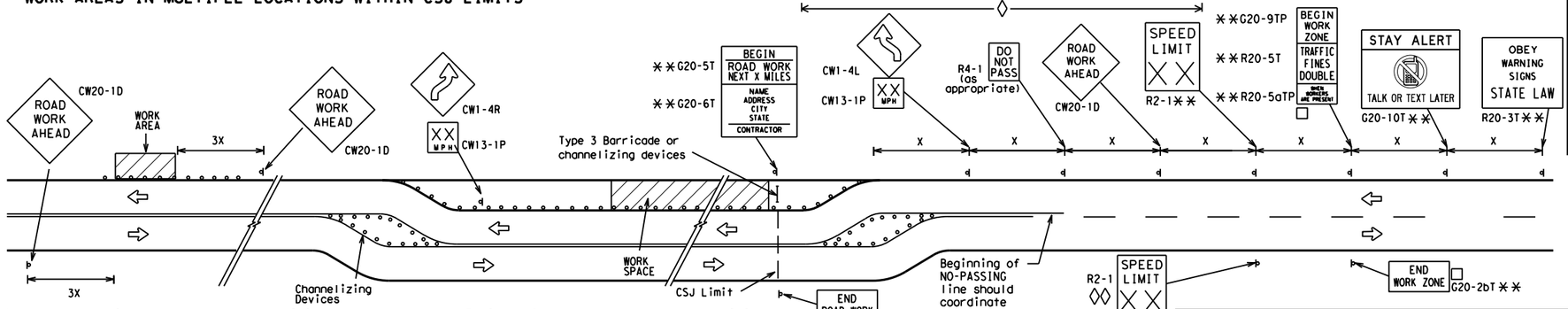
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

## GENERAL NOTES

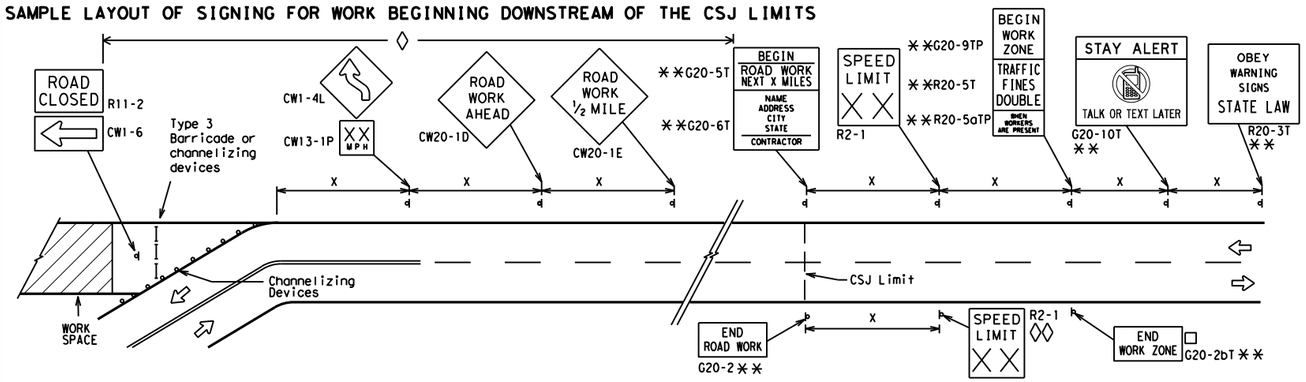
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

## WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS




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

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




## SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS




## NOTES

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

□ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

** CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◊ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

◊◊ Contractor will install a regulatory speed limit sign at the end of the work zone.

## LEGEND

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



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# BARRICADE AND CONSTRUCTION PROJECT LIMIT

## BC(2)-21

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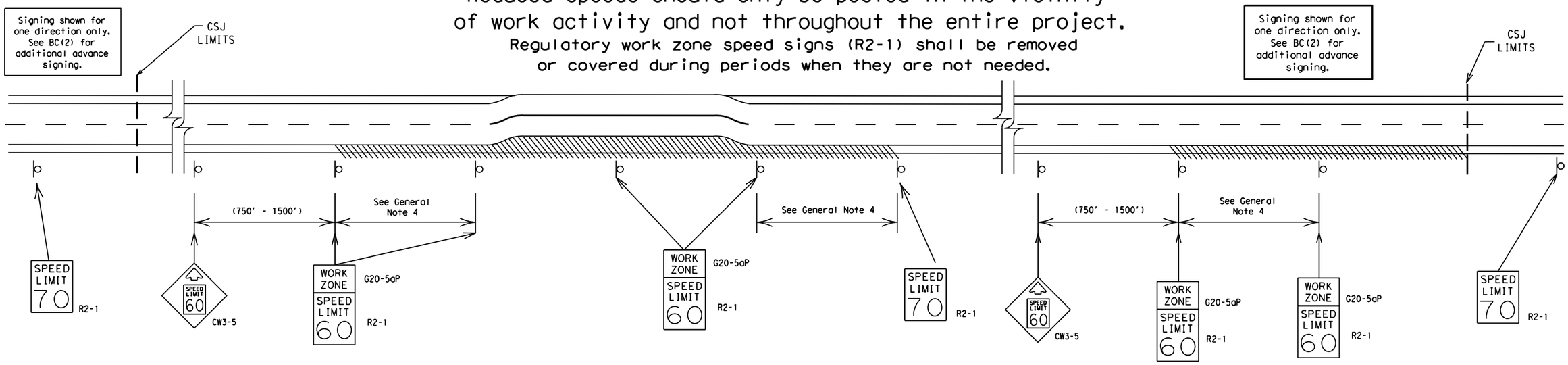
# TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.




## GUIDANCE FOR USE:

### LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

### SHORT TERM WORK ZONE SPEED LIMITS

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

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

### GENERAL NOTES

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



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# BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

## BC(3)-21

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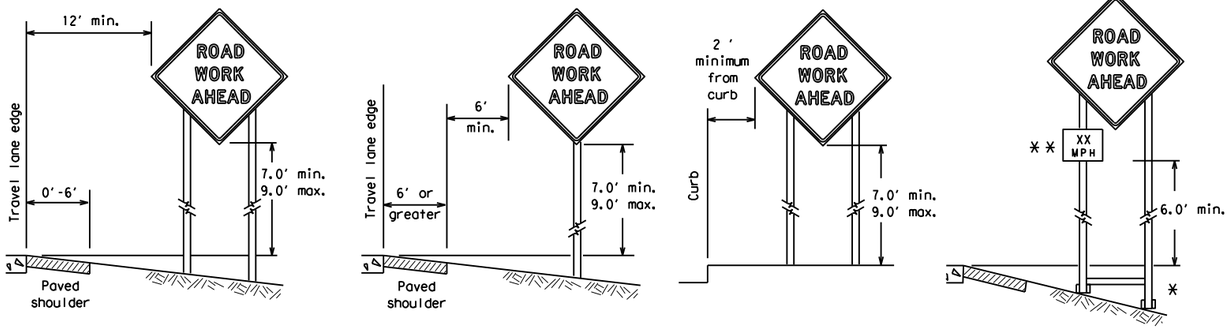
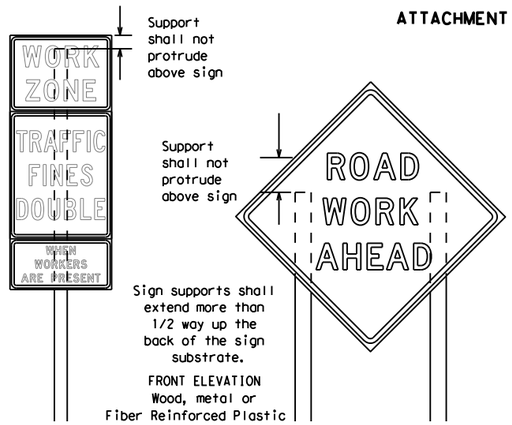
## TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

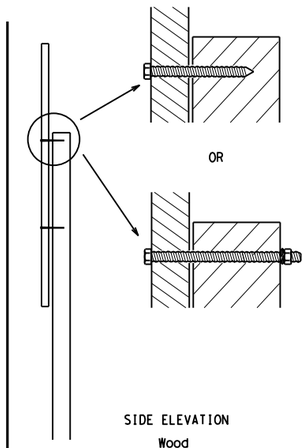



* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

## ATTACHMENT FOR SIGN SUPPORTS



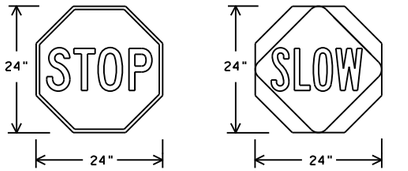

Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

**Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.**

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

## STOP/SLOW PADDLES

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




| SHEETING REQUIREMENTS (WHEN USED AT NIGHT) | | |
|---|---|---|
| USAGE | COLOR | SIGN FACE MATERIAL |
| BACKGROUND | RED | TYPE B OR C SHEETING |
| BACKGROUND | ORANGE | TYPE $B_{FL}$ OR $C_{FL}$ SHEETING |
| LEGEND & BORDER | WHITE | TYPE B OR C SHEETING |
| LEGEND & BORDER | BLACK | ACRYLIC NON-REFLECTIVE FILM |

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

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

## GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. 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.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets. The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. 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.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

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

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

## SIGN MOUNTING HEIGHT

1. 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.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. 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.
5. 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

1. 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

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

## REFLECTIVE SHEETING

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

## SIGN LETTERS

1. 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

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. 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.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

## SIGN SUPPORT WEIGHTS

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

## FLAGS ON SIGNS

1. 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.



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# BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

# BC(4)-21

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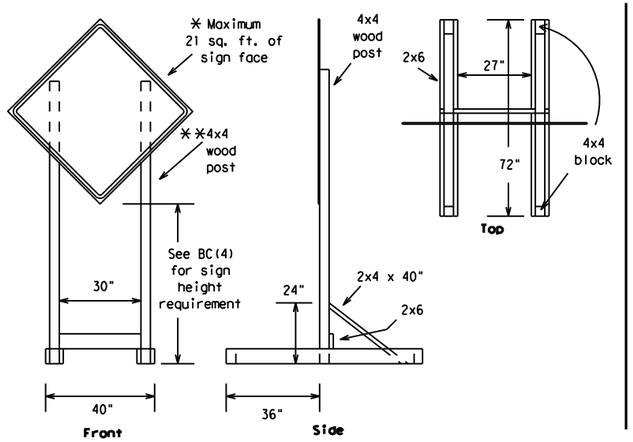
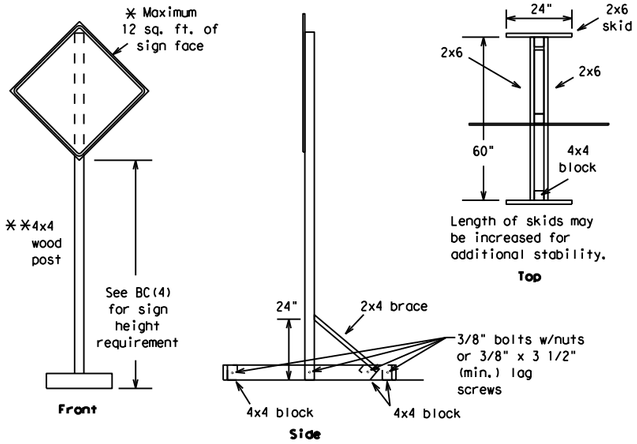
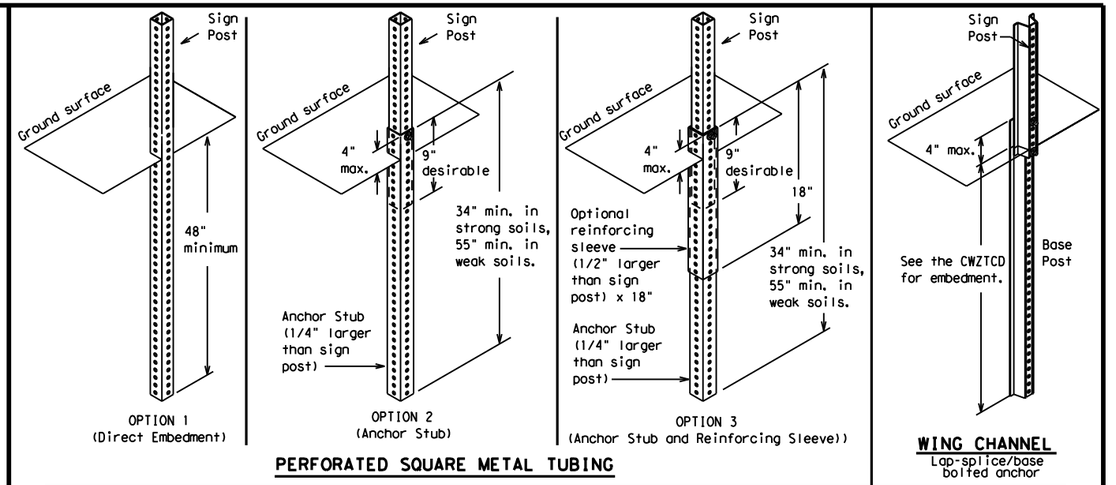


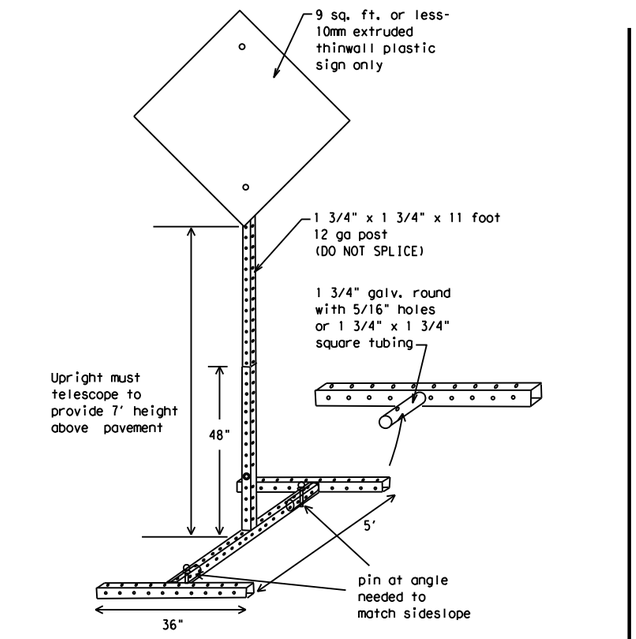

# SKID MOUNTED WOOD SIGN SUPPORTS

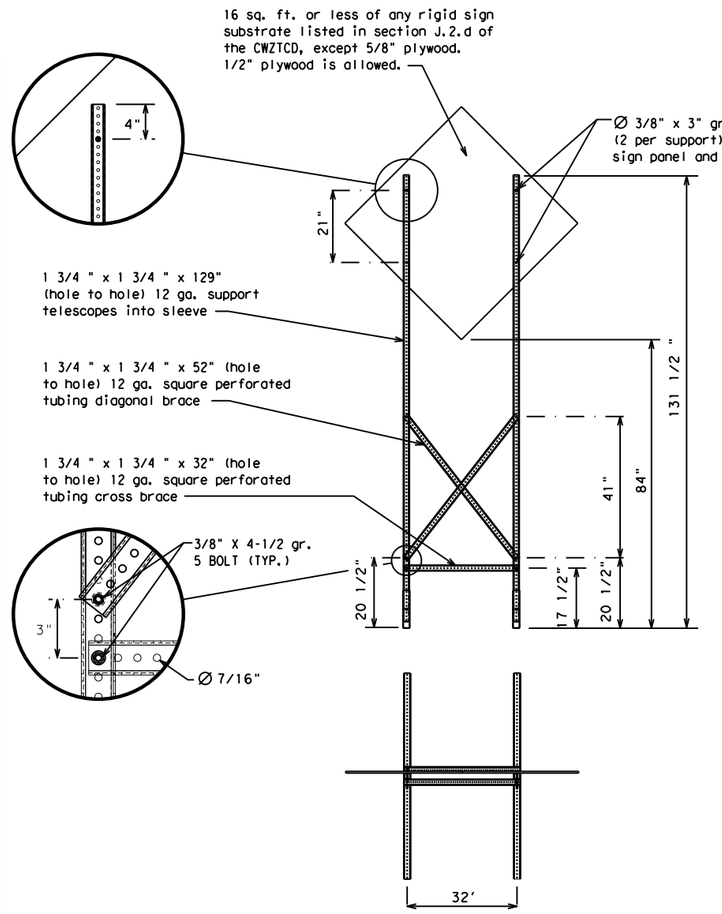
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

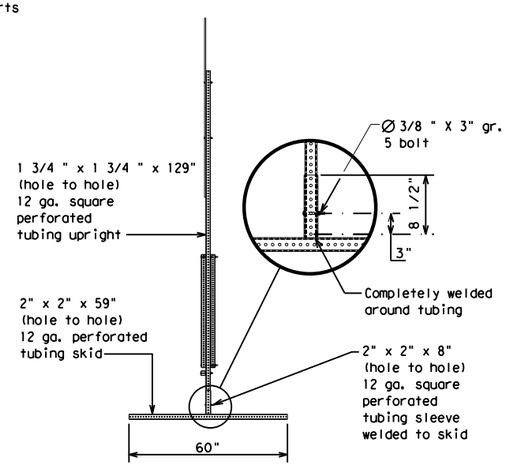



# GROUND MOUNTED SIGN SUPPORTS

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




# SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

## WEDGE ANCHORS

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

## OTHER DESIGNS

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

## GENERAL NOTES

1. 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.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

* See BC(4) for definition of "Work Duration."

** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

☐ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

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# BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

## BC(5)-21

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

## PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

# RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

## Phase 1: Condition Lists

### Road/Lane/Ramp Closure List

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

### Other Condition List

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

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

## Phase 2: Possible Component Lists

### Action to Take/Effect on Travel List

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

### Location List

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

### Warning List

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

### ** Advance Notice List

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

** See Application Guidelines Note 6.

### APPLICATION GUIDELINES

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

### WORDING ALTERNATIVES

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

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

### FULL MATRIX PCMS SIGNS

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

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Texas Department of Transportation

Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

# BC(6)-21

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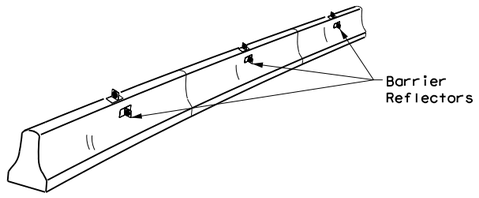
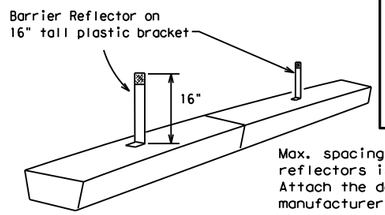
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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




## CONCRETE TRAFFIC BARRIER (CTB)

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

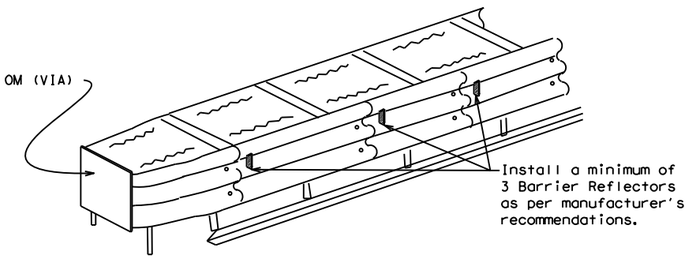



Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

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

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

## LOW PROFILE CONCRETE BARRIER (LPCB)

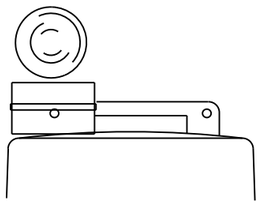



## DELINEATION OF END TREATMENTS

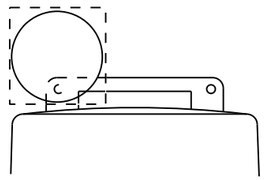
**END TREATMENTS FOR CTB'S USED IN WORK ZONES**

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

# BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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

## WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type $B_{FL}$ or $C_{FL}$ Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. 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.
7. 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.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

## WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

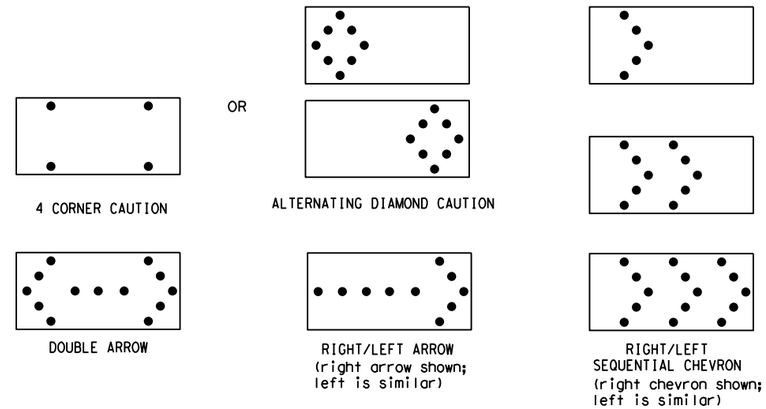
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. 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.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. 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

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. 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.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

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

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. 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.
4. The Flashing Arrow Board should be able to display the following symbols:




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

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

**ATTENTION**

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

# FLASHING ARROW BOARDS



## TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

# BC(7)-21

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| 9-07 8-14 | DIST | COUNTY | | SHEET NO. |
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## 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 but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
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:

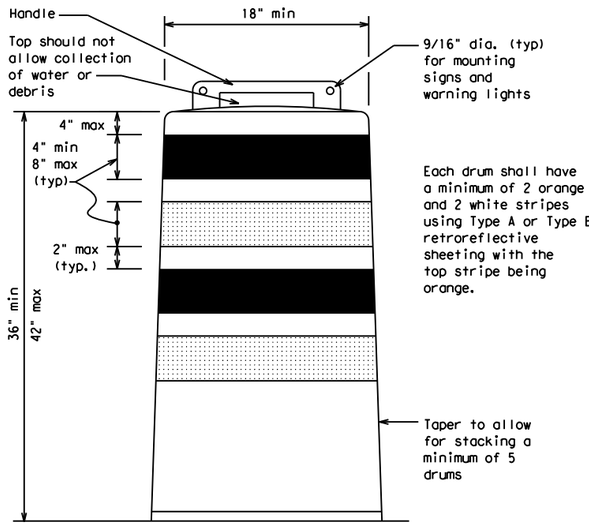
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

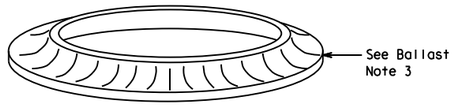
## RETROREFLECTIVE SHEETING

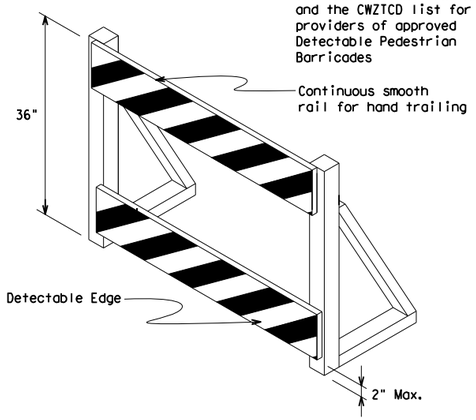
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

## BALLAST

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 sandbags will be allowed, however height of sandbags above pavement surface may 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 sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
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 not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.



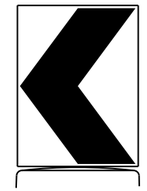



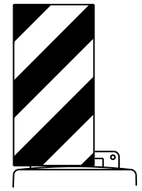

This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades

## DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

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

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type $B_{FL}$ or Type $C_{FL}$ Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
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 (nominal) 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 on every third drum. A minimum of three (3) should be used at 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.



Texas Department of Transportation

Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

# BC(8)-21

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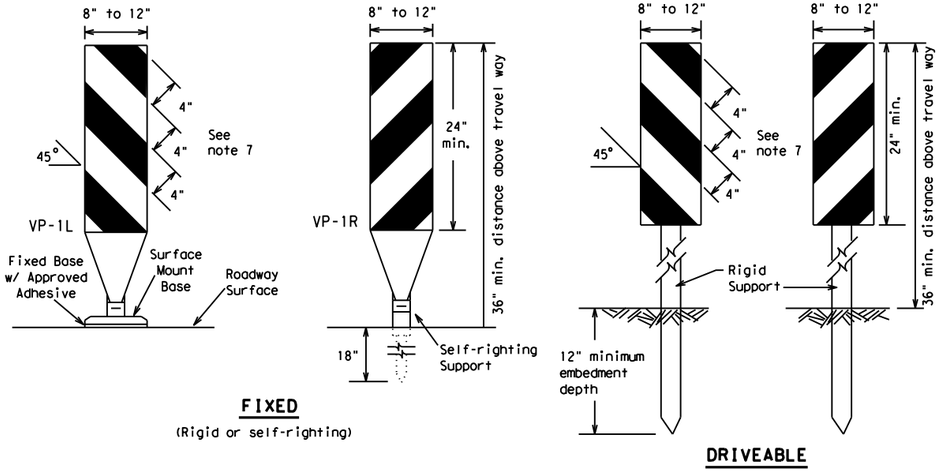
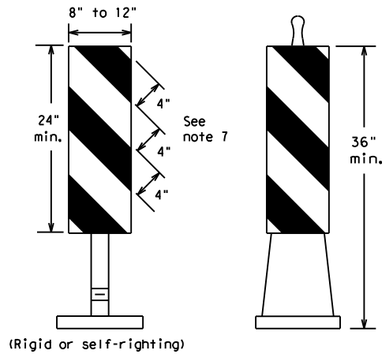



**FIXED**
(Rigid or self-righting)

**DRIVEABLE**

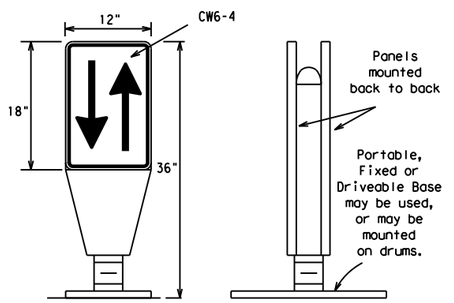



(Rigid or self-righting)

**PORTABLE**

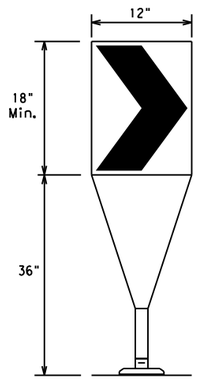
## VERTICAL PANELS (VPs)

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




## OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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



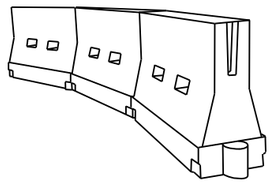

Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. 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.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type $B_{FL}$ or Type $C_{FL}$ conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

## CHEVRONS

## GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. 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.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



## LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. 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.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

## WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

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

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

# BC(9)-21

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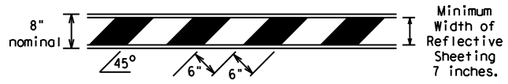
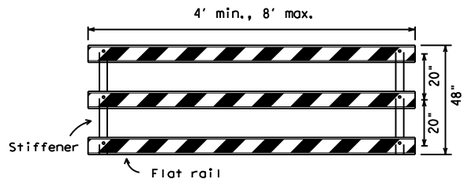
## TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



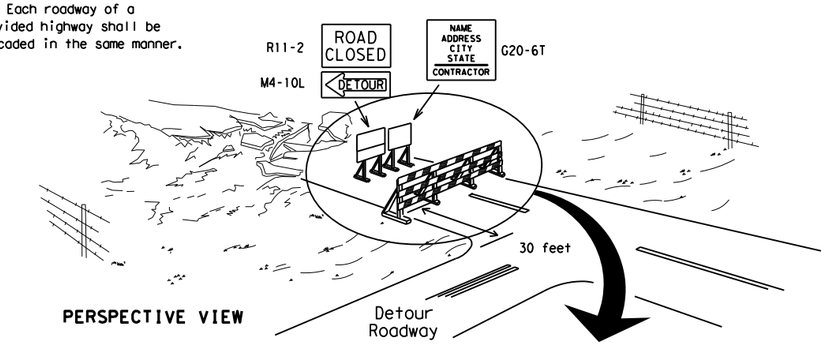

### TYPICAL STRIPING DETAIL FOR BARRICADE RAIL




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

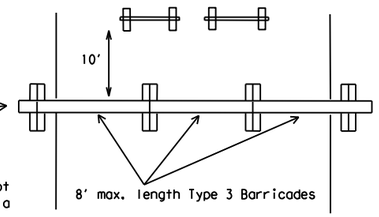
### TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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




PERSPECTIVE VIEW

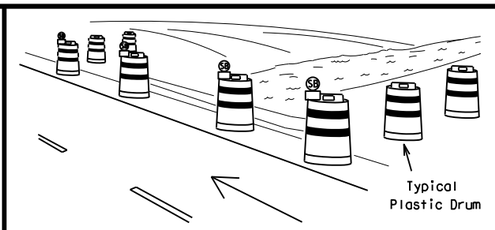
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.




PLAN VIEW

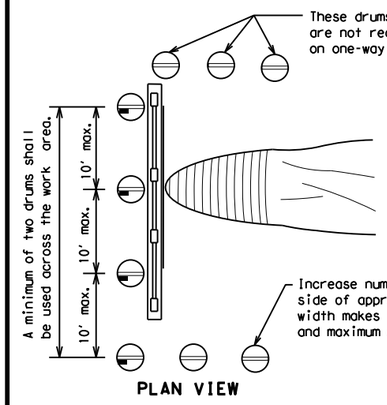
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

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




PERSPECTIVE VIEW

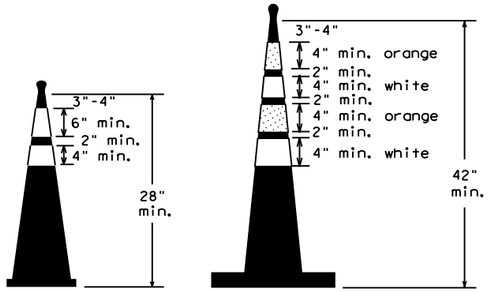
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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




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

PLAN VIEW

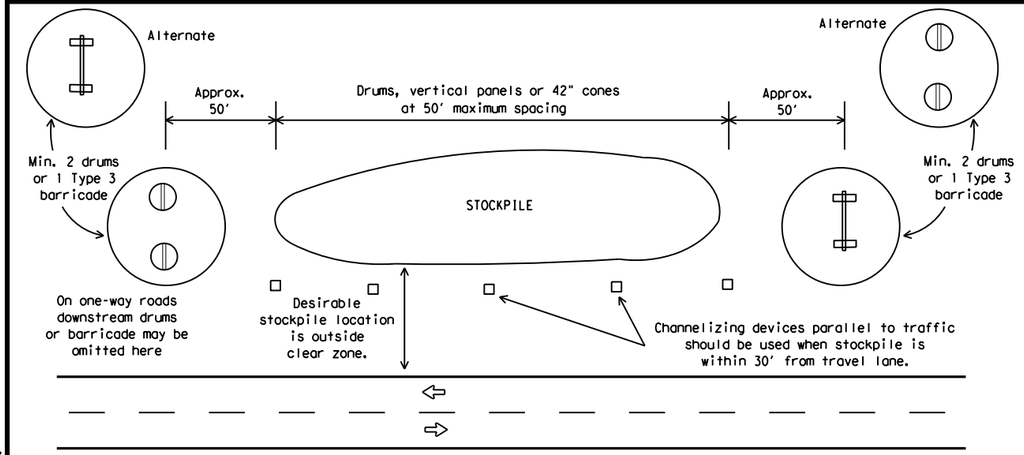
### CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS




28" Cones shall have a minimum weight of 9 1/2 lbs.

42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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




### TRAFFIC CONTROL FOR MATERIAL STOCKPILES

DATE:
FILE:

SHEET 10 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

## BC(10)-21

| FILE: bc-21.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| © TxDOT November 2002 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 9-07 8-14 7-13 5-21 | 0132 | 01 | 055.ETC. | US 82 |
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| | CHS | DICKENS | | 20 |

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DATE:
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# WORK ZONE PAVEMENT MARKINGS

## GENERAL

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

## RAISED PAVEMENT MARKERS

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

## PREFABRICATED PAVEMENT MARKINGS

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

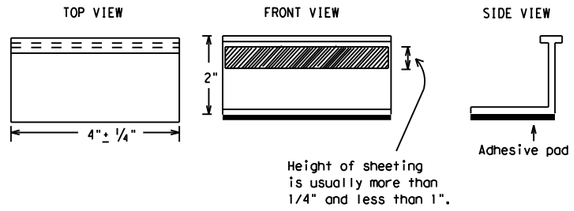
## MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

## REMOVAL OF PAVEMENT MARKINGS

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

# Temporary Flexible-Reflective Roadway Marker Tabs




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

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

## RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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



Texas Department of Transportation

Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

# BC(11)-21

| FILE: bc-21.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
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| 2-98 9-07 5-21 | DIST | COUNTY | | SHEET NO. |
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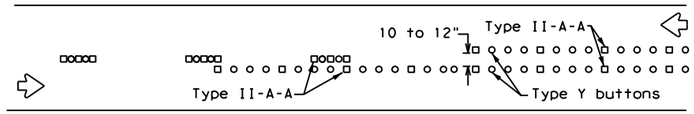
| 11-02 8-14 | | | | |

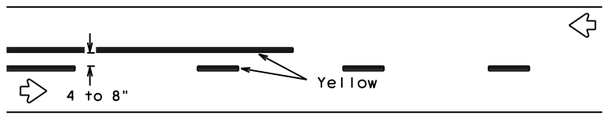
DATE:
FILE:

# PAVEMENT MARKING PATTERNS

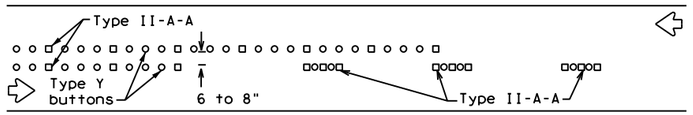

REFLECTORIZED PAVEMENT MARKINGS - PATTERN A




RAISED PAVEMENT MARKERS - PATTERN A



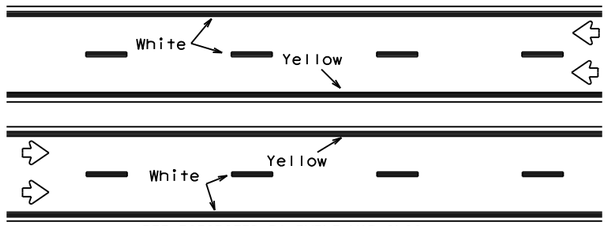

REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



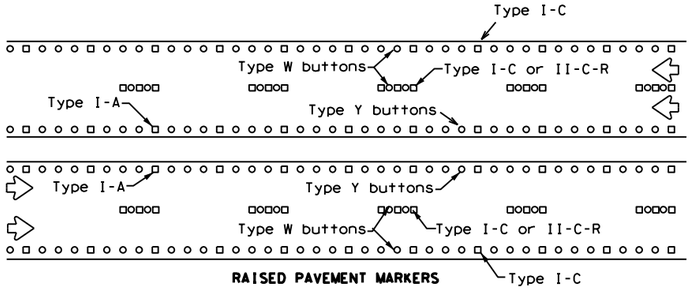

RAISED PAVEMENT MARKERS - PATTERN B

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

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



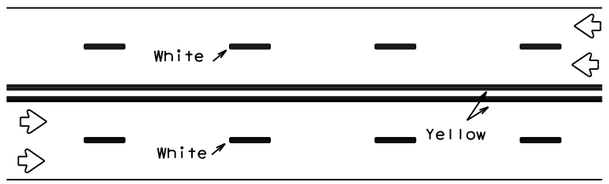

REFLECTORIZED PAVEMENT MARKINGS



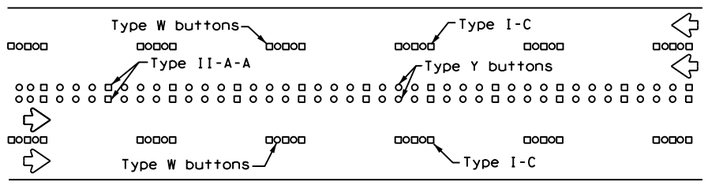

RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

## EDGE & LANE LINES FOR DIVIDED HIGHWAY



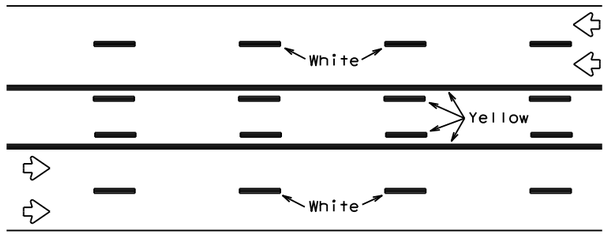

REFLECTORIZED PAVEMENT MARKINGS



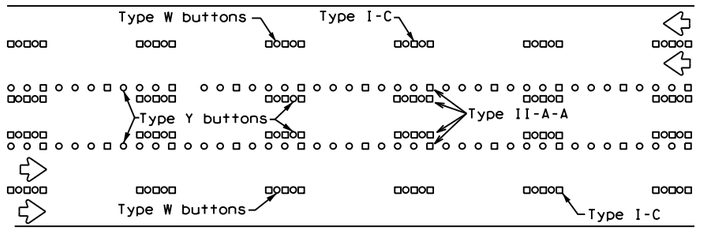

RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

## LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS




REFLECTORIZED PAVEMENT MARKINGS




RAISED PAVEMENT MARKERS

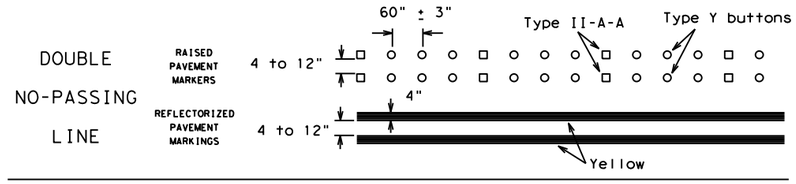
Prefabricated markings may be substituted for reflectorized pavement markings.

## TWO-WAY LEFT TURN LANE

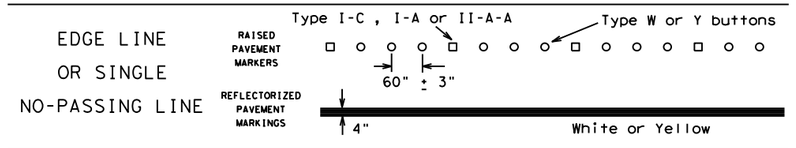
# STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

## SOLID LINES

DOUBLE NO-PASSING LINE

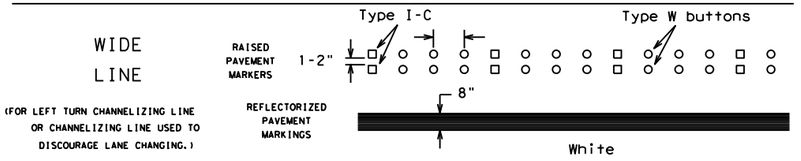



EDGE LINE OR SINGLE NO-PASSING LINE



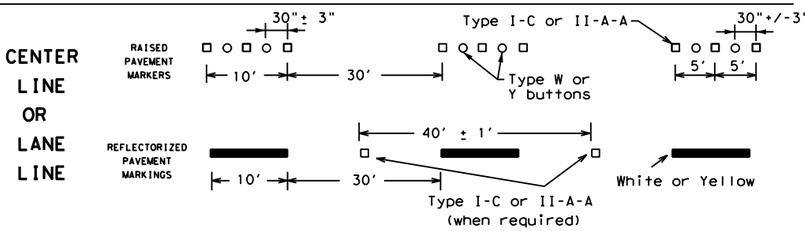

WIDE LINE

(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)

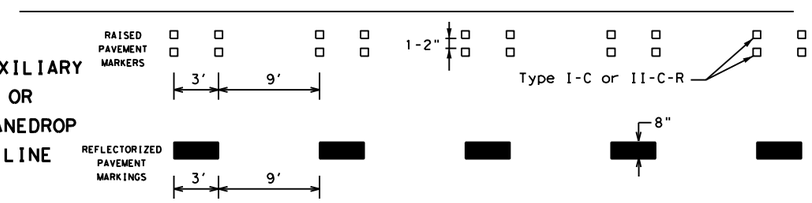



## BROKEN LINES

CENTER LINE OR LANE LINE

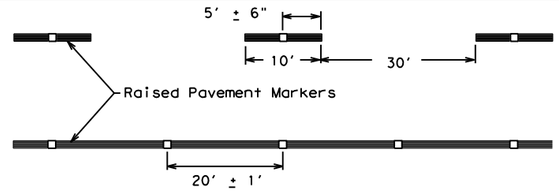



AUXILIARY OR LANEDROP LINE




### REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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




Centerline only - not to be used on edge lines

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."



Texas Department of Transportation

Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

## BC(12)-21

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| 1-97 9-07 5-21 | DIST | COUNTY | | SHEET NO. |
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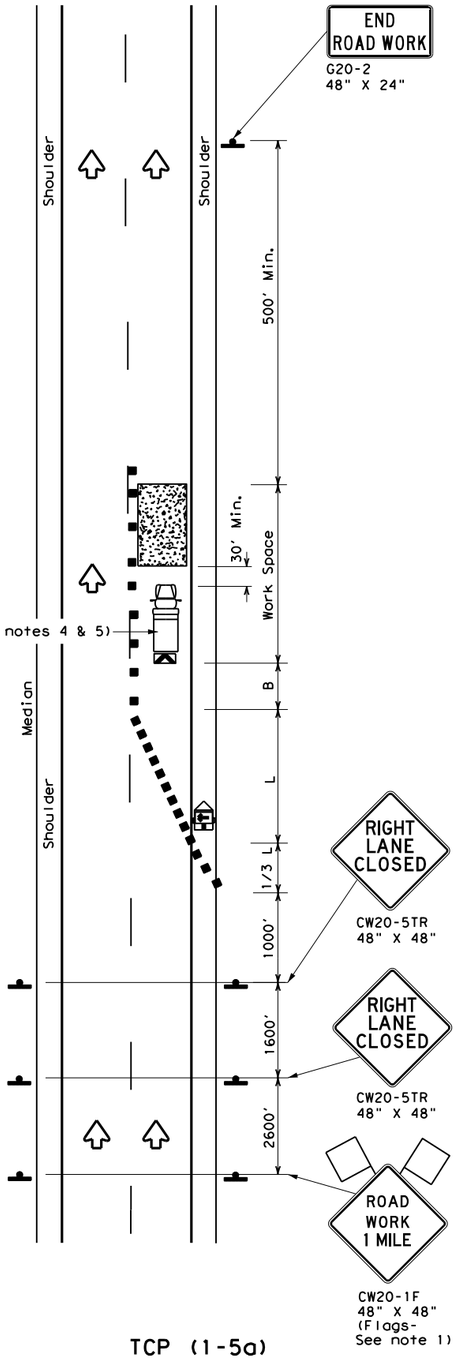
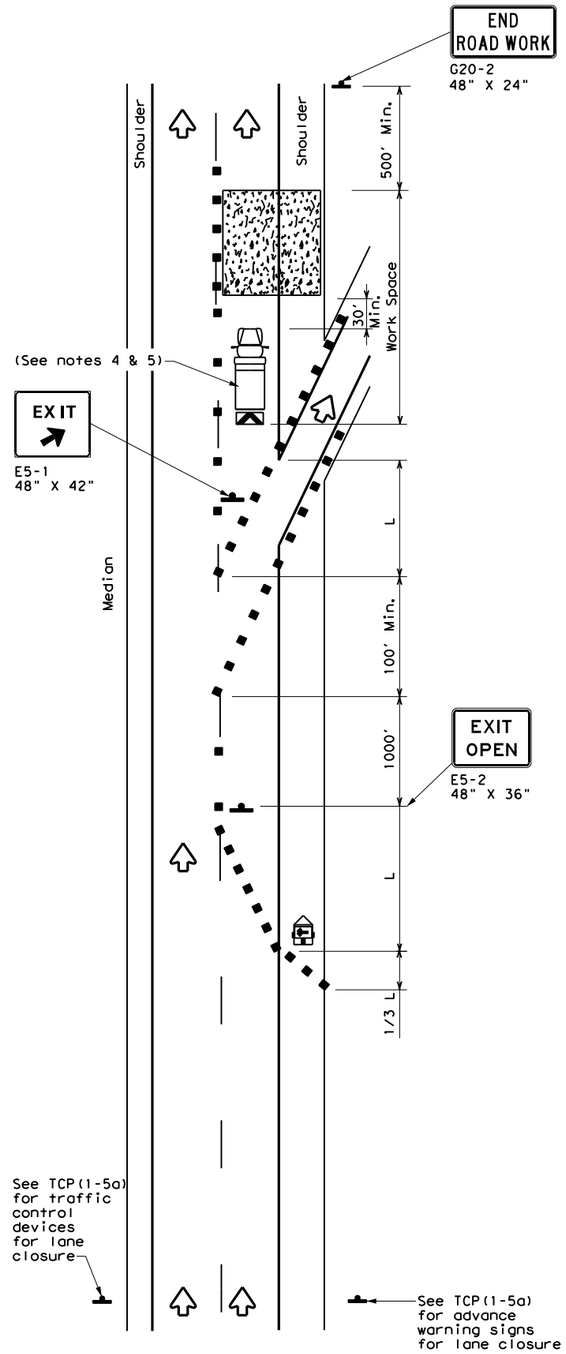


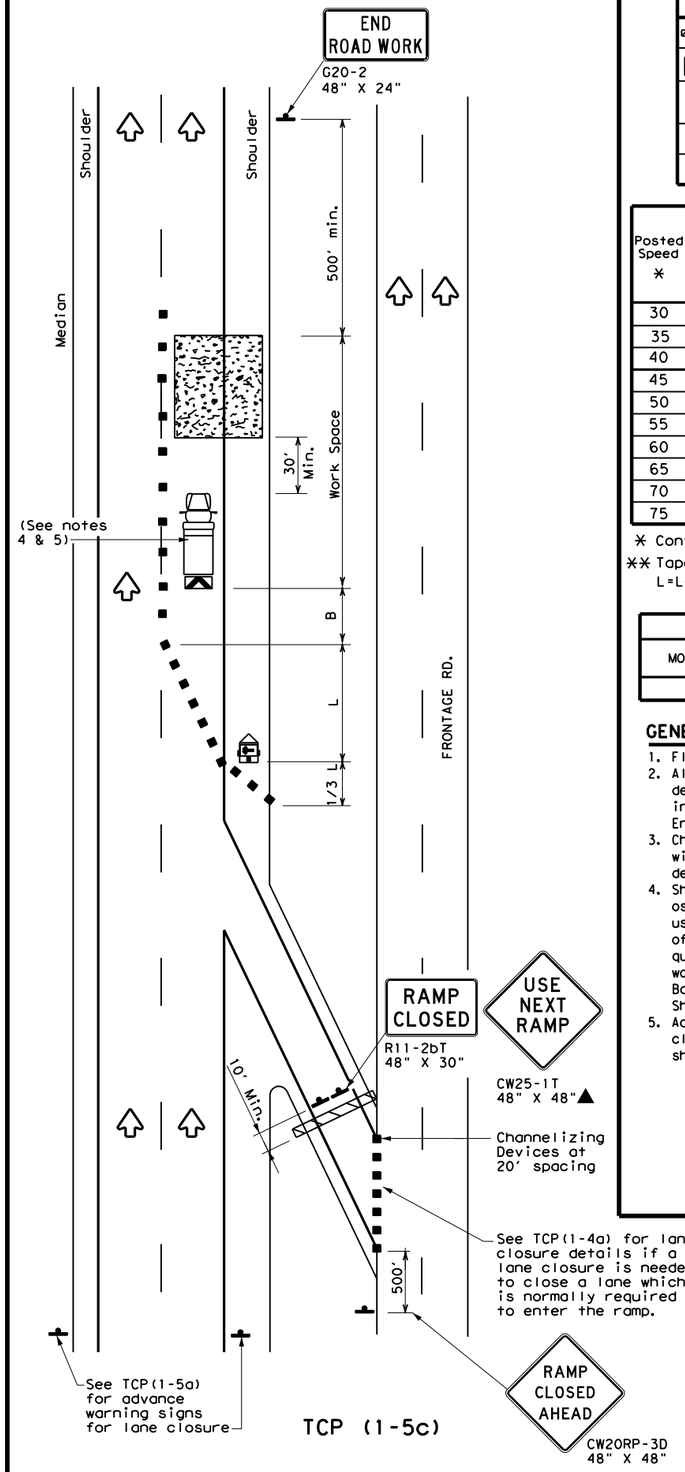

TCP (1-5a)

## ONE LANE CLOSURE




TCP (1-5b)

## LANE CLOSURE NEAR EXIT RAMPS




TCP (1-5c)

## LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

## GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

# TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

# TCP(1-5)-18

| FILE: tcp1-5-18.dgn | DN: | CK: | DW: | CK: |
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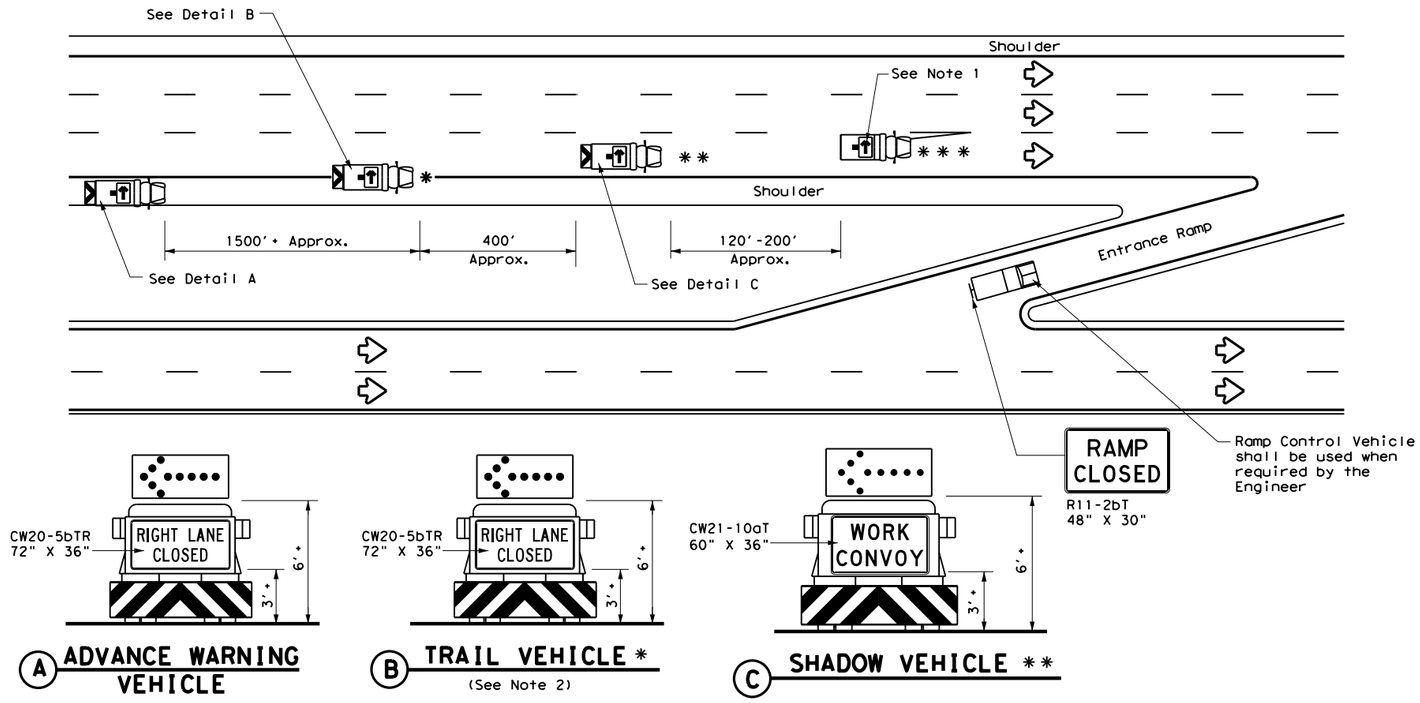
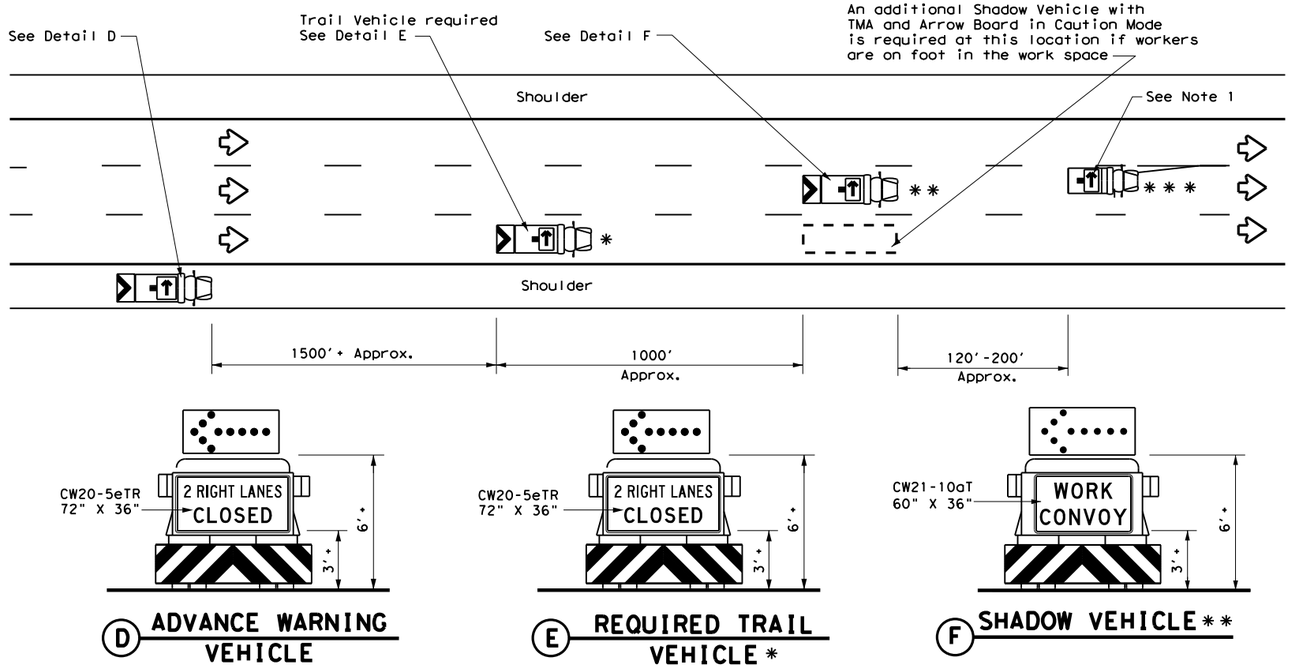



## RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



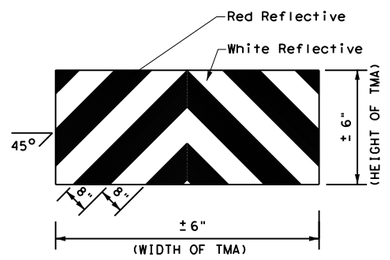

## INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

## GENERAL NOTES

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




STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

# TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

# TCP(3-2)-13

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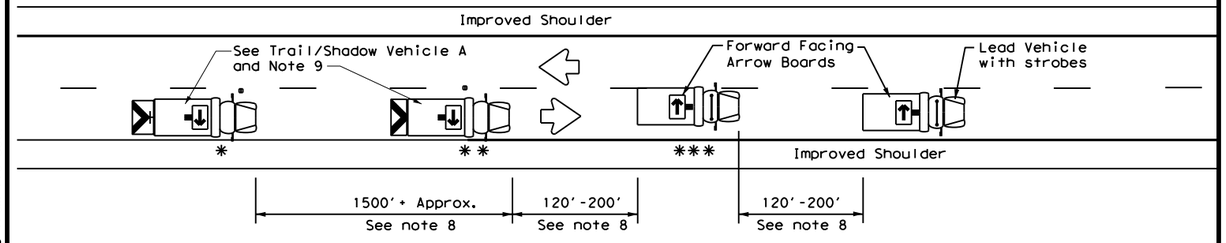
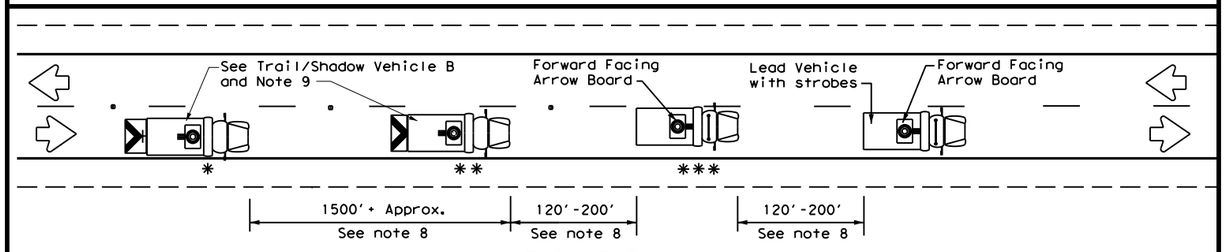
| 1-97 | | | | |

176



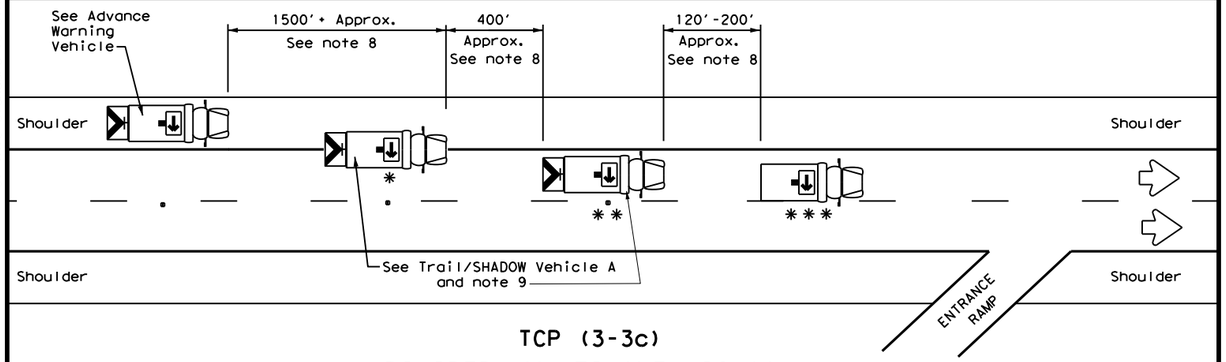

TCP (3-3a)

## TWO LANE HIGHWAY WITH PAVED SHOULDERS (WORK ON TRAVEL LANE)



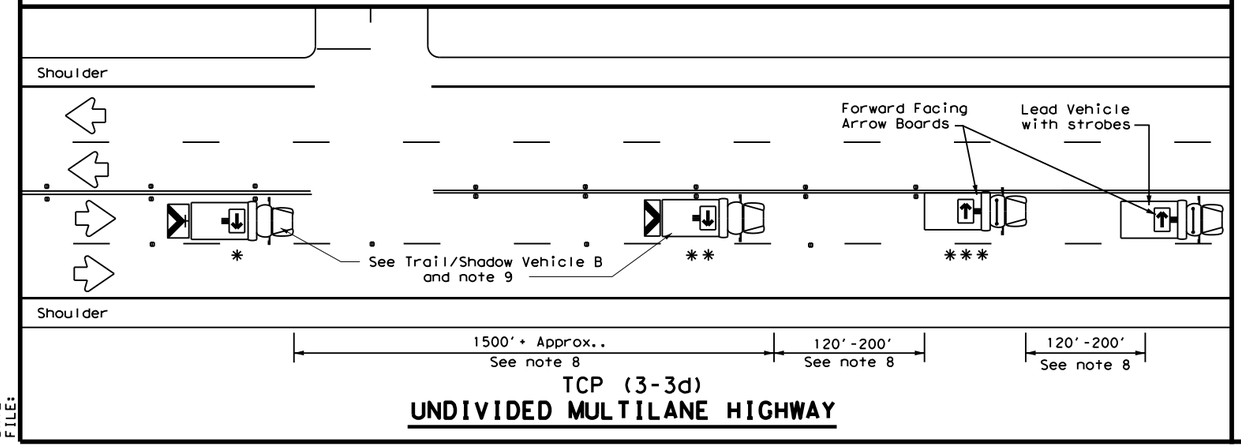

TCP (3-3b)

## TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS (WORK ON TRAVEL LANE)




TCP (3-3c)

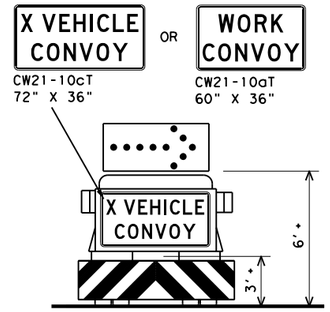
## DIVIDED MULTILANE HIGHWAY




TCP (3-3d)

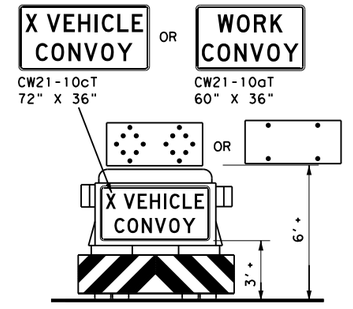
## UNDIVIDED MULTILANE HIGHWAY

DATE:
FILE:



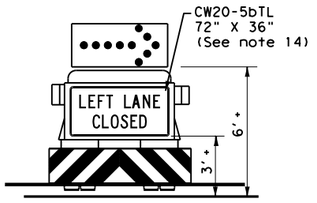

## TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

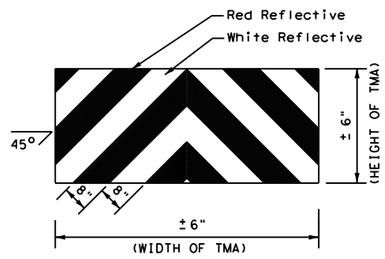



## TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode




## ADVANCE WARNING VEHICLE




## STRIPING FOR TMA

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

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

## GENERAL NOTES

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

Texas Department of Transportation

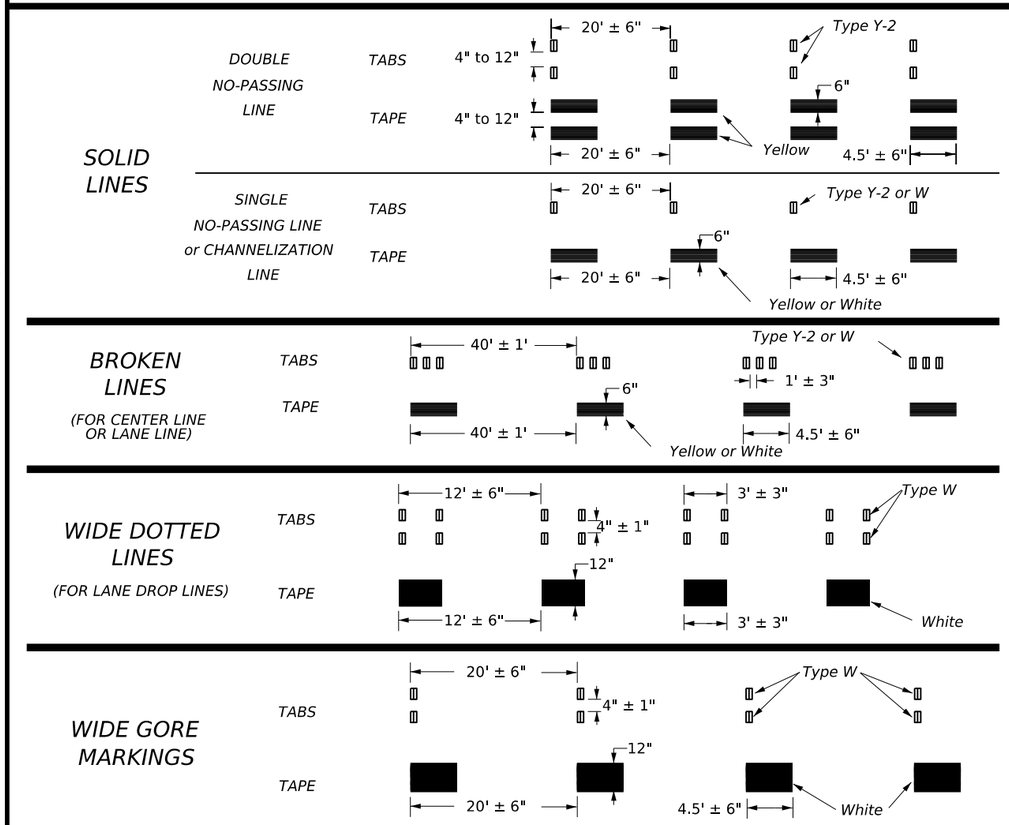
Traffic Operations Division Standard

# TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

# TCP(3-3)-14

| FILE: tcp3-3.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT September 1987 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055.ETC. | US 82 |
| 2-94 4-98 | DIST | COUNTY | | SHEET NO. |
| 8-95 7-13 | CHS | DICKENS | | 25 |
| 1-97 7-14 | | | | |

# WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS




**NOTES:**

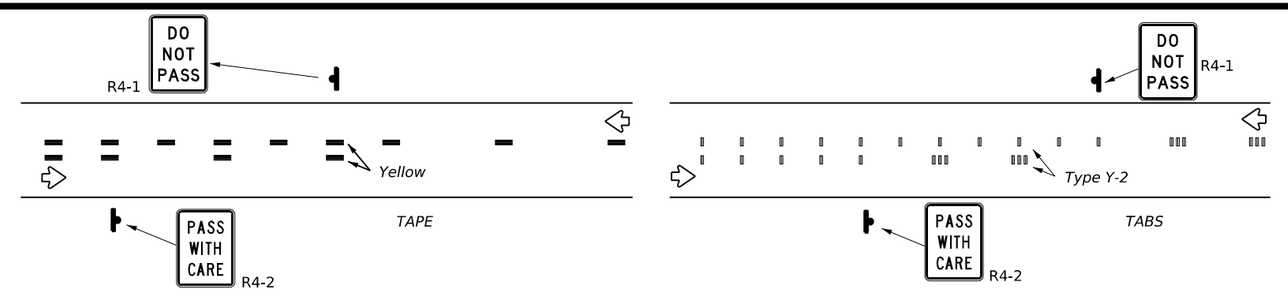
1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical 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.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway 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.
6. 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.
7. 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).
8. For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

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

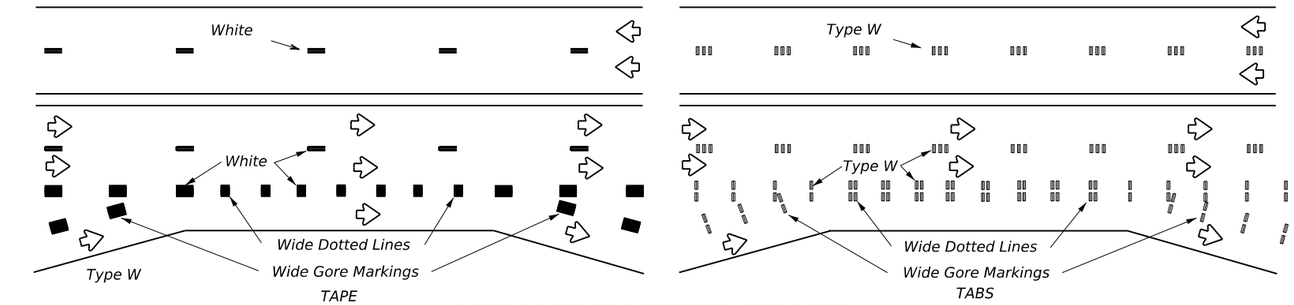
1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
2. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
3. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
4. 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.

DATE:
FILE:

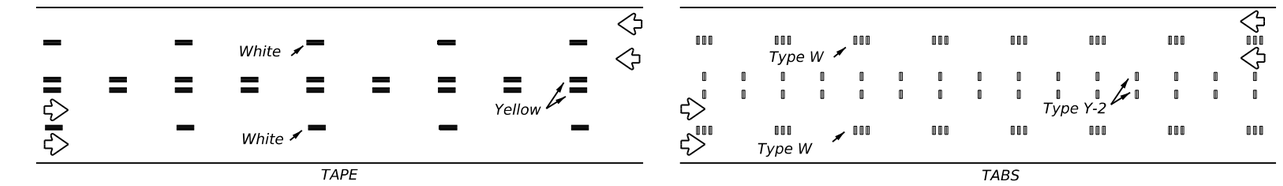
# WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



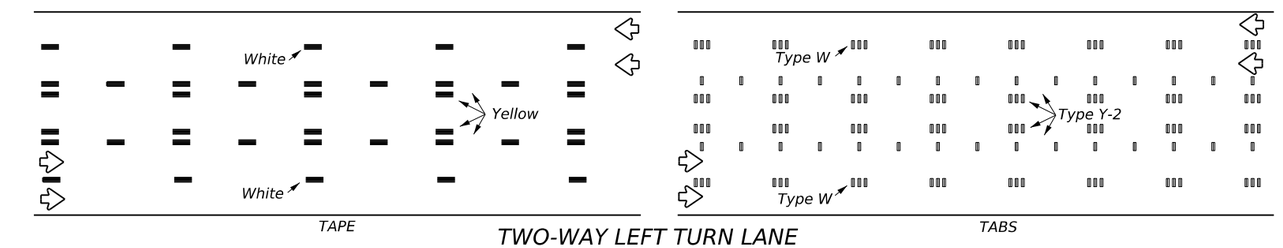

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



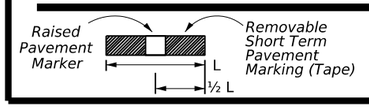

LANE LINES FOR DIVIDED HIGHWAY




LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS




TWO-WAY LEFT TURN LANE




*If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.*

**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 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Costruction-Grade Prefabricated Pavement Markings."

**RAISED PAVEMENT MARKERS**

1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

**DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)**

1. DMSs 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

Texas Department of Transportation

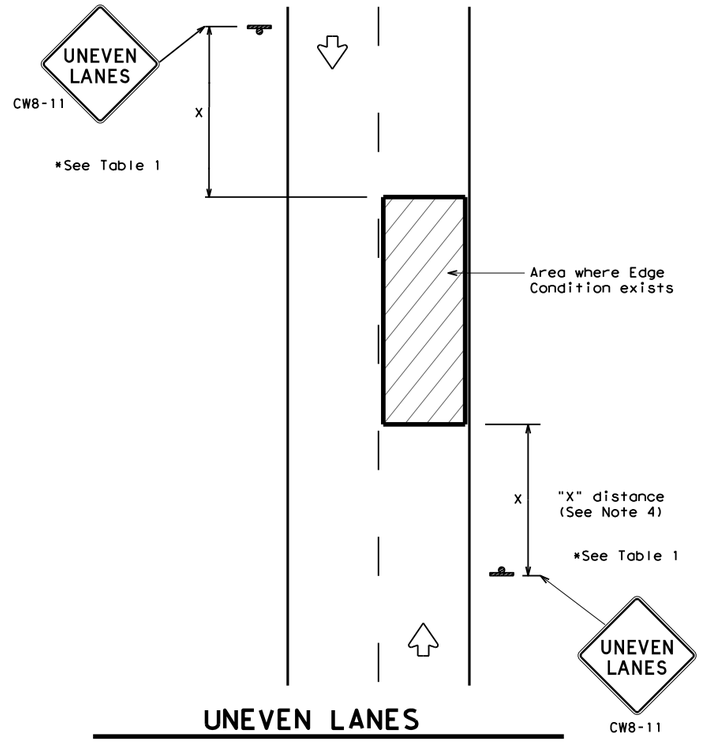
**Traffic Safety Division Standard**

# WORK ZONE SHORT TERM PAVEMENT MARKINGS

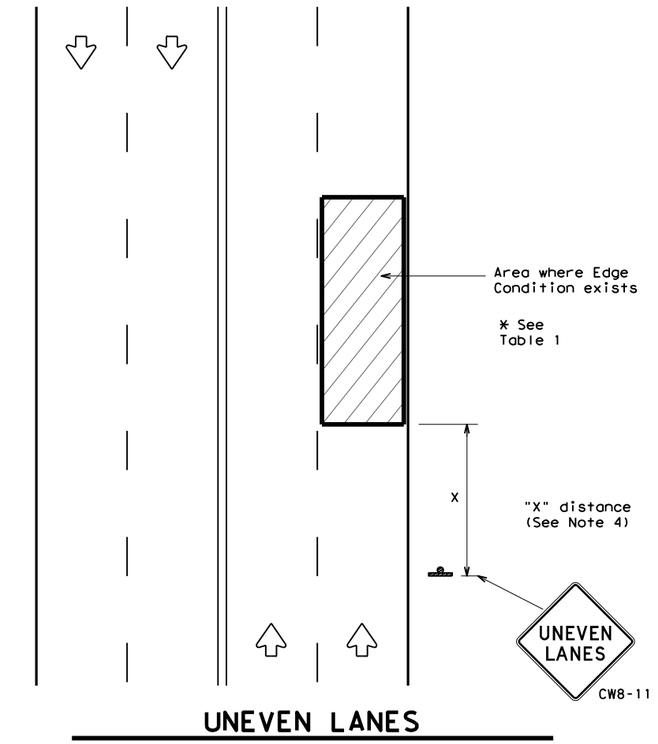
## WZ(STPM)-23

| FILE: wzstpm-23.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| ©TxDOT February 2023 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055. ETC. | US 82 |
| 4-92 7-13<br>1-97 2-23<br>3-03 | DIST | COUNTY | | SHEET NO. |
| | CHS | DICKENS | | 26 |

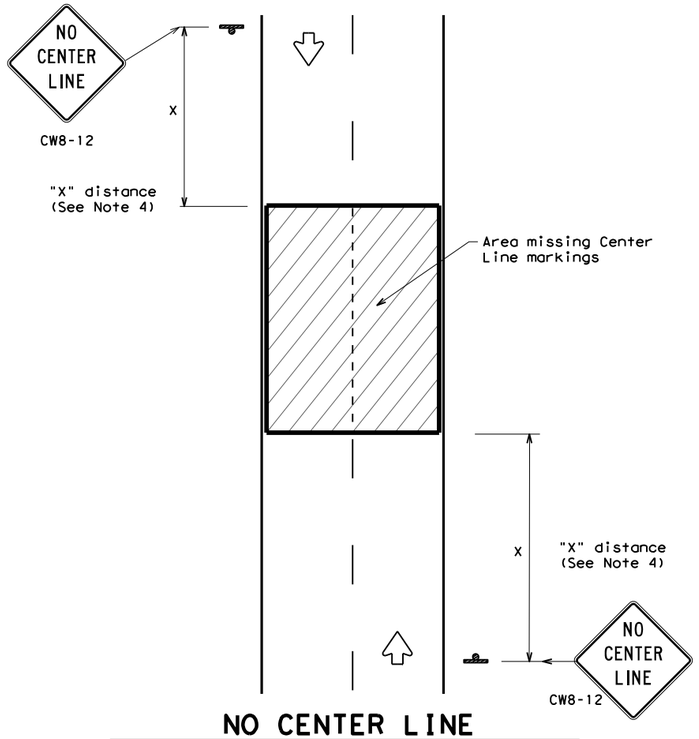
DATE:
FILE:



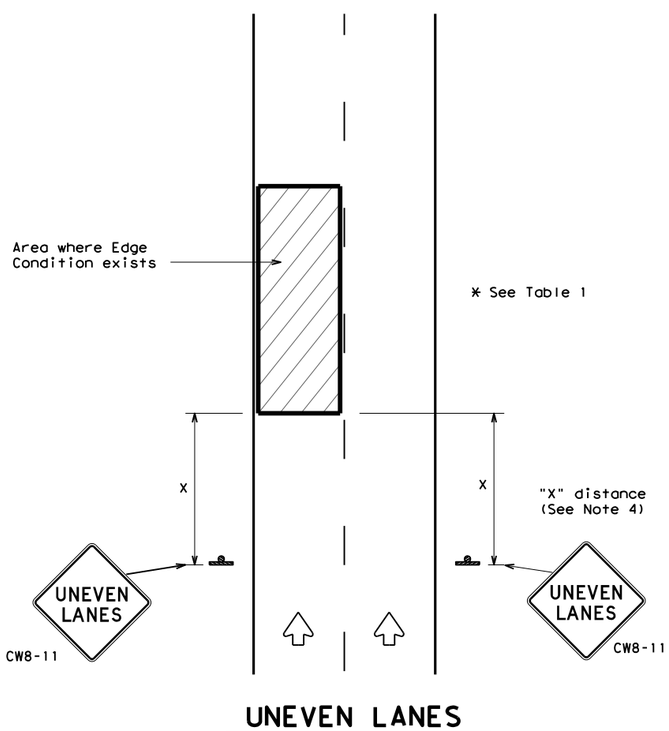

## UNEVEN LANES
## TWO LANE CONVENTIONAL ROAD




## UNEVEN LANES
## FOUR LANE CONVENTIONAL ROAD




## NO CENTER LINE
## TWO LANE CONVENTIONAL ROAD




## UNEVEN LANES
## DIVIDED ROADWAY

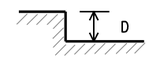
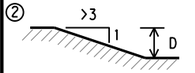
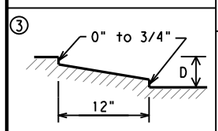
| DEPARTMENTAL MATERIAL SPECIFICATIONS | |
|---|---|
| PERMANENT PREFABRICATED PAVEMENT MARKINGS | DMS-8240 |
| TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS | DMS-8241 |
| SIGN FACE MATERIALS | DMS-8300 |

| COLOR | USAGE | SHEETING MATERIAL |
|---|---|---|
| ORANGE | BACKGROUND | TYPE $B_{FL}$ OR TYPE $C_{FL}$ SHEETING |
| BLACK | LEGEND & BORDERS | ACRYLIC NON-REFLECTIVE SHEETING |

## GENERAL NOTES

1. 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.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. 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."
6. 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.
7. Short term markings shall not be used to simulate edge lines.
8. 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: 1¼" (maximum-planing) 1½" (typical-overlay) | Sign: CW8-11 |
| | 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. | |
| ②   | Less than or equal to 3" | Sign: CW8-11 |
| ③   Notched Wedge Joint | Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3". | |

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

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

Texas Department of Transportation

*Traffic Operations Division Standard*

# SIGNING FOR UNEVEN LANES

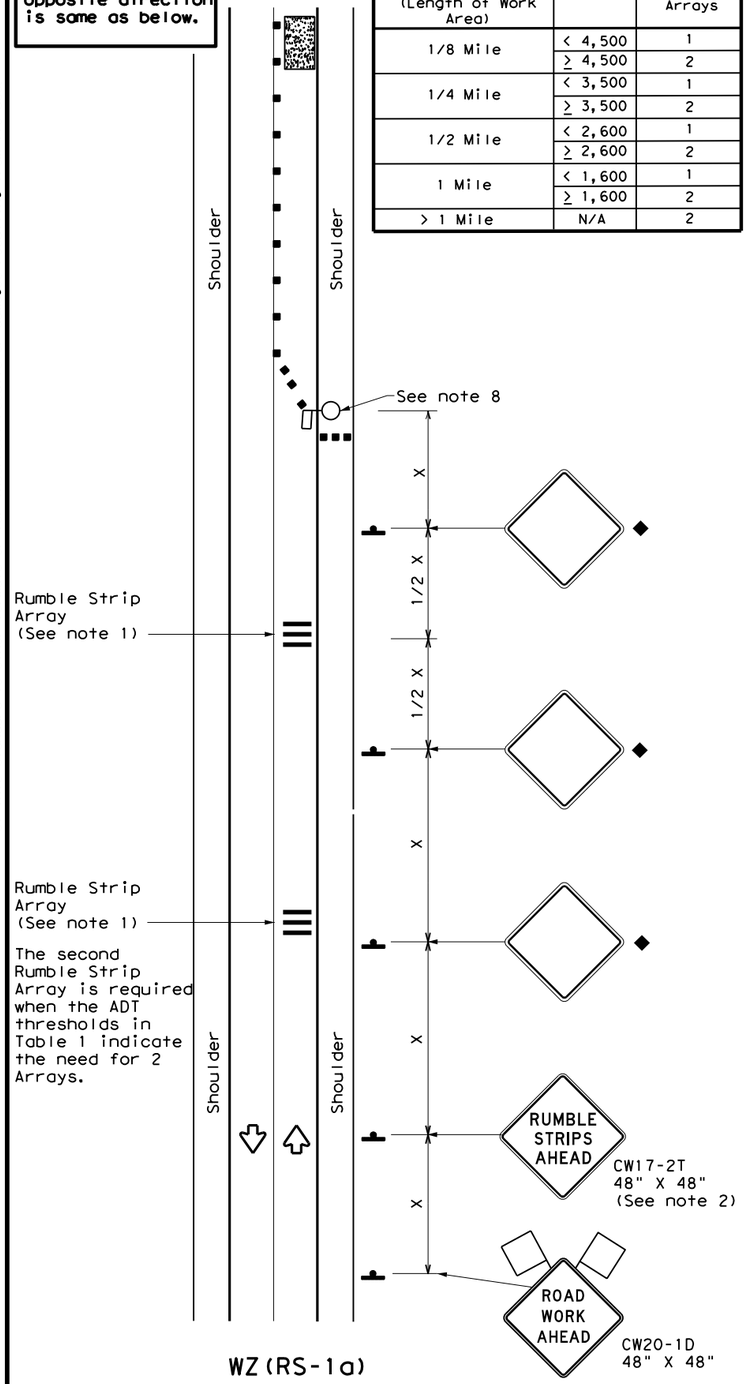
# WZ(UL)-13

| FILE: wzul-13.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT April 1992 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055, ETC. | US 82 |
| 8-95 2-98 7-13 | DIST | COUNTY | | SHEET NO. |
| 1-97 3-03 | CHS | DICKENS | | 27 |

DATE:
FILE:

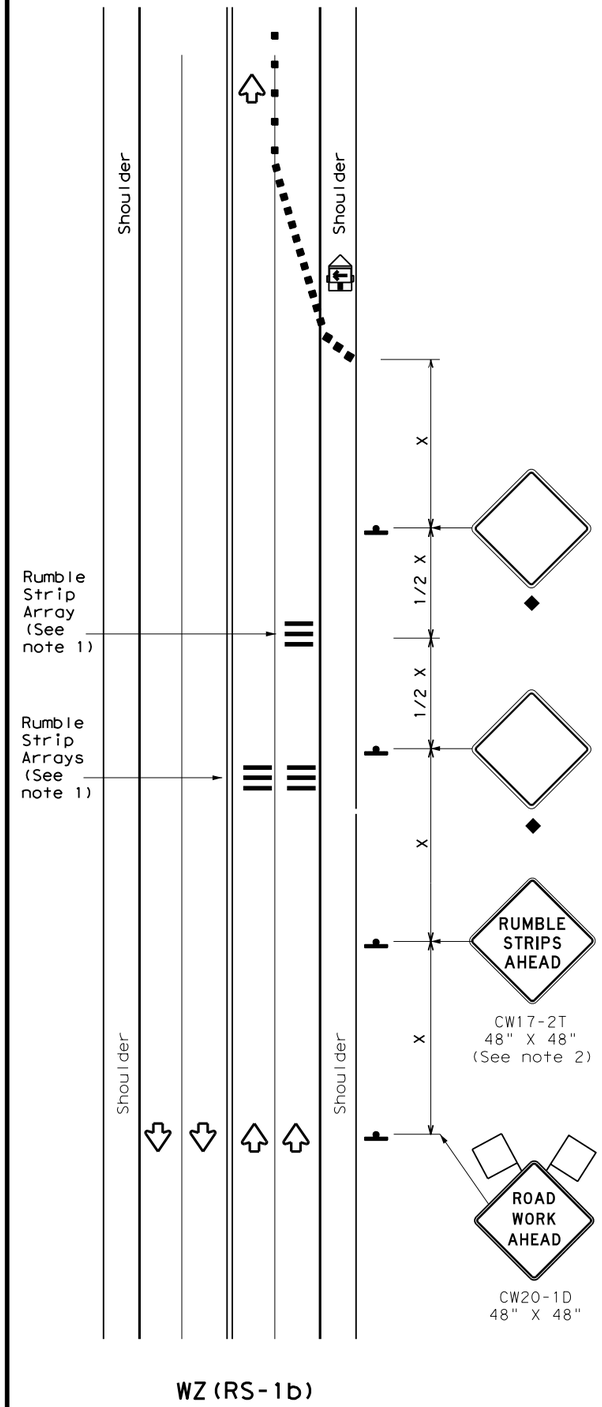
**Warning sign and rumble strip sequence in opposite direction is same as below.**

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




WZ(RS-1a)

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




WZ(RS-1b)

## RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

## GENERAL NOTES

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

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

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

* Conventional Roads Only

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

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

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

* For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.

| TABLE 2 | |
|---|---|
| Speed | Approximate distance between strips in an array |
| ≤ 40 MPH | 10' |
| > 40 MPH & ≤ 55 MPH | 15' |
| = 60 MPH | 20' |
| ≥ 65 MPH | * 35' + |

Texas Department of Transportation

Traffic Safety Division Standard

# TEMPORARY RUMBLE STRIPS

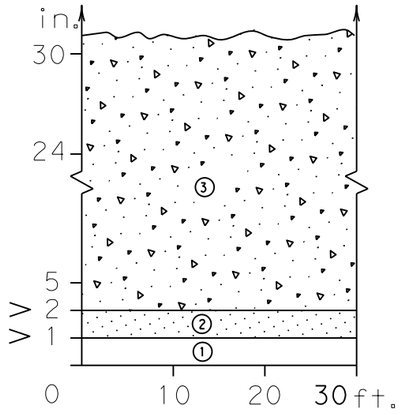
## WZ(RS)-22

| FILE: wzrs22.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT November 2012 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 2-14 1-22 4-16 | 0132 | 01 | 055, ETC. | US 82 |
| | DIST | COUNTY | | SHEET NO. |
| | CHS | DICKENS | | 28 |

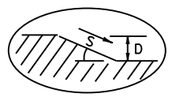
DATE:
FILE:

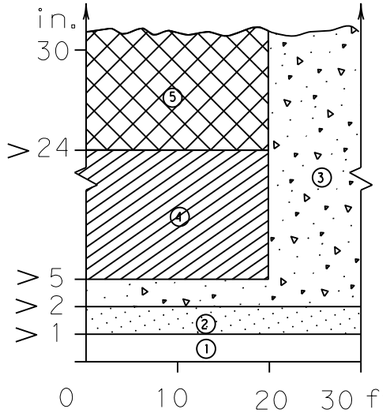
# DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet

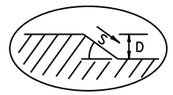


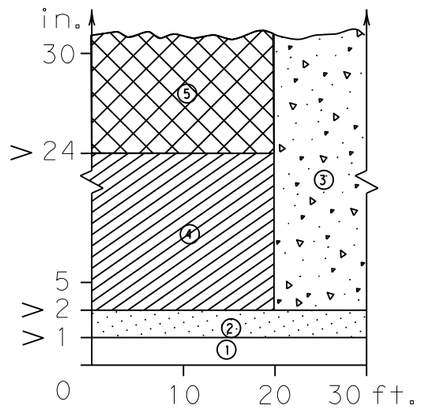

Edge Condition I
S = (3:1) (or flatter)



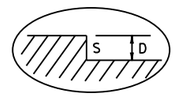



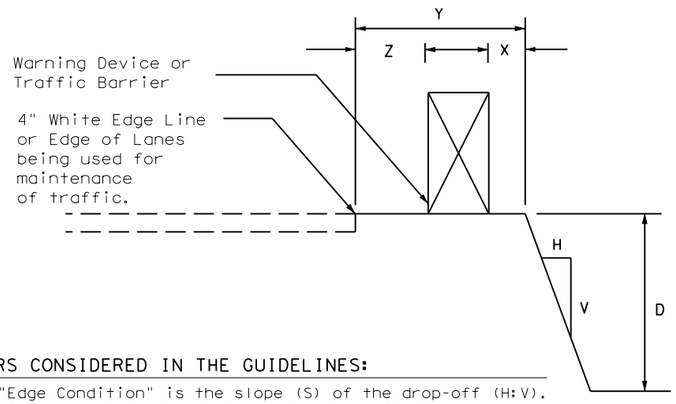

Edge Condition II
S = ((2.99):1) to (1:1)




Edge Condition III
S is steeper than (1:1)




## FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job 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.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. 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.

5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

| Zone | Treatment Types Guidelines: |
|---|---|
| ① | No treatment |
| ② | CW 8-11 "Uneven Lanes" signs. |
| ③ | CW 8-9a Shoulder Drop-Off" or CW 8-11 signs plus vertical panels. |
| ④ | CW8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge slope to that of the profered Edge Condition I. |
| ⑤ | Check indications (Figure-1) for possitive barrier. Where positive barrier is not indicated, the treatment shown above for Zone-4 may be used after consideration of other applicable factors. |

## Edge Condition Notes:

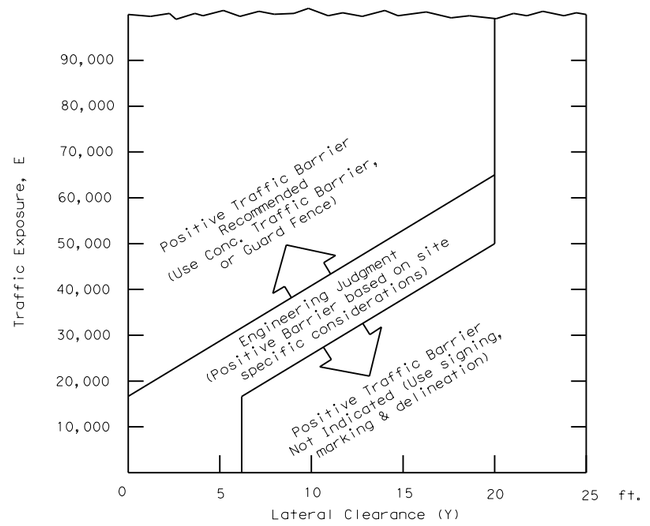
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

## FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 ( ▨ )




1. E = ADT x T
Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.

2. 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.

3. An approved end treatment should be provided for any positive barrier end located within the clear zone.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane 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 a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

Engineer's Seal

STATE OF TEXAS
CHARLES B. STEED
88647
LICENSED
PROFESSIONAL ENGINEER

Charles B. Steed, P.E.

Date 08/24/2023

Texas Department of Transportation

Traffic Safety Division Standard

# TREATMENT FOR VARIOUS EDGE CONDITIONS

| FILE: edgecon.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| ©TxDOT August 2000 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055.ETC | US 82 |
| 03-01<br>08-01<br>9-21 | DIST | COUNTY | | SHEET NO. |
| | CHS | DICKENS | | 29 |

DN=

## HORIZONTAL CURVE DATA

| NO. | PC | PI | PT | RADIUS | DELTA | LENGTH | TANGENT | SUPERELEVATION RATE, E MAX (%) | DESIGN SPEED (MPH) |
|---|---|---|---|---|---|---|---|---|---|
| C1 | 767+12.00 | 772+55.07 | 777+79.36 | 2347.41 | 26°03'08.169" | 1067.36 | 543.07 | 6 | 70 |
| C2 | 786+33.84 | 793+69.17 | 800+96.50 | 5731.97 | 14°37'13.834" | 1462.66 | 735.33 | 6 | 80 |
| C3 | 879+77.20 | 882+34.92 | 884+92.31 | 5742.66 | 05°08'21.739" | 515.11 | 257.73 | 6 | 80 |
| C4 | 1099+71.02 | 1103+13.83 | 1106+53.40 | 2864.93 | 13°38'48.456" | 682.37 | 342.81 | 6 | 75 |
| C5 | 1170+69.76 | 1176+19.95 | 1181+66.78 | 5729.65 | 10°58'12.390" | 1097.03 | 550.19 | 6 | 80 |
| C6 | 1500+74.55 | 1503+79.42 | 1506+83.71 | 5729.58 | 06°05'29.696" | 609.16 | 304.87 | 6 | 80 |
| C7 | 1583+13.41 | 1592+76.19 | 1601+71.02 | 2864.79 | 37°09'08.415" | 1857.62 | 962.78 | 6 | 75 |
| C8 | 1622+12.20 | 1624+42.02 | 1626+70.85 | 2864.93 | 09°10'21.292" | 458.65 | 229.82 | 6 | 75 |
| C9 | 1633+68.34 | 1636+72.45 | 1639+74.29 | 2864.79 | 12°07'08.436" | 605.95 | 304.11 | 6 | 75 |
| C10 | 1659+15.39 | 1665+37.56 | 1671+54.87 | 5729.58 | 12°23'41.094" | 1239.48 | 622.17 | 6 | 80 |

CONTROLLING HORIZONTAL CURVE DESIGN SPEED RURAL = 70 MPH

## CONTROLLING VERTICAL CURVE DATA

| PI | ELEVATION | LENGTH (FT) | GRADE DIFFERENCE | G1 (%) | G2 (%) | K | CURVE TYPE | DESIGN SPEED (MPH) |
|---|---|---|---|---|---|---|---|---|
| 1607+43.63 | 1982.93 | 290 | 5.9 | -3.4 | 2.4 | 49.15 | SAG | 35 |

CONTROLLING VERTICAL CURVE DESIGN SPEED = 35 MPH

STATE OF TEXAS
CHARLES B. STEED
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PROFESSIONAL ENGINEER
Charles B. Steed, P.E.

08/24/2023

# CURVE DATA


Texas Department of Transportation

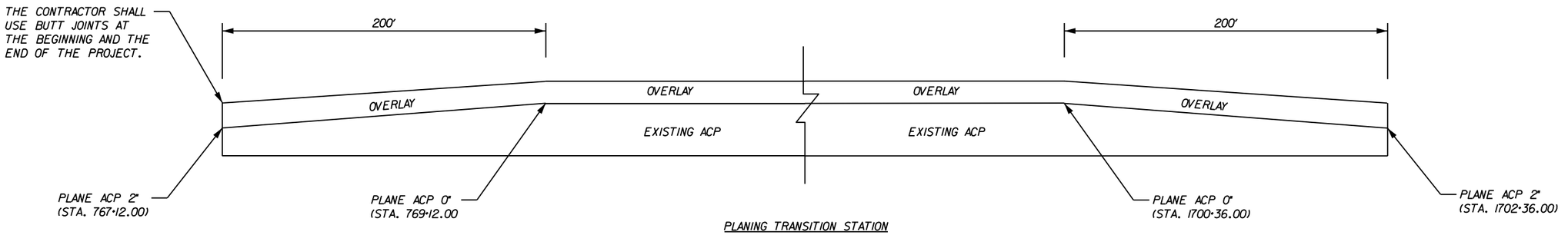
SHEET 1 OF 1

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055.ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 30 |

DATE: $DATE$ $TIME$
FILE: $FILE$

DN:

## PLANING DETAIL




PLANING TRANSITION STATION

CSJ: 0132-01-055 (WBL)

STA. 767+12.00 TO STA. 769+12.00 = 200.00 FT.

CSJ: 0132-02-037 (WBL)

STA. 1700+36.00 TO STA. 1702+36.00 = 200.00 FT.

NOTE: PLANING SHALL BE PERFORMED ONLY ON THE DAY OF OVERLAY PLACEMENT.

STATE OF TEXAS
CHARLES B. STEED
88647
LICENSED
PROFESSIONAL ENGINEER

Charles B. Steed, P.E.

08/24/2023

# PLANING DETAILS

(NO SCALE)


Texas Department of Transportation

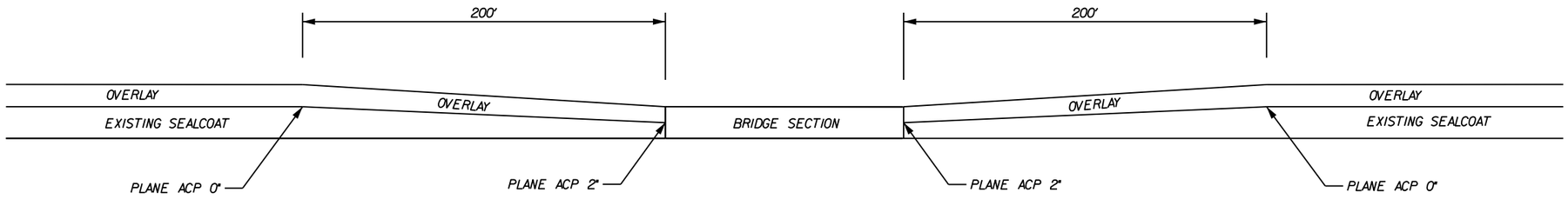
SHEET 1 OF 2

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055.ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 31 |

DATE: $DATE$ $TIME$
FILE: $FILE$

DN:

## PLANING DETAIL




## PLANING DETAIL AT BRIDGES

CSJ: 0132-01-055 (WBL)
STA. 1108+58.00 TO STA. 1110+58.00 • 200.00 FT.
STA. 1111+93.00 TO STA. 1113+93.00 • 200.00 FT.
STA. 1160+00.00 TO STA. 1162+00.00 • 200.00 FT.
STA. 1163+52.00 TO STA. 1165+52.00 • 200.00 FT.

CSJ: 0132-02-037 (WBL)
STA. 1517+53.00 TO STA. 1519+53.00 • 200.00 FT.
STA. 1521+73.00 TO STA. 1523+73.00 • 200.00 FT.
STA. 1645+49.00 TO STA. 1647+49.00 • 200.00 FT.
STA. 1649+14.00 TO STA. 1651+14.00 • 200.00 FT.

NOTE: PLANING SHALL BE PERFORMED ONLY ON THE DAY OF OVERLAY PLACEMENT.

STATE OF TEXAS
CHARLES B. STEED
88647
LICENSED
PROFESSIONAL ENGINEER
Charles B. Steed, P.E.

08/24/2023

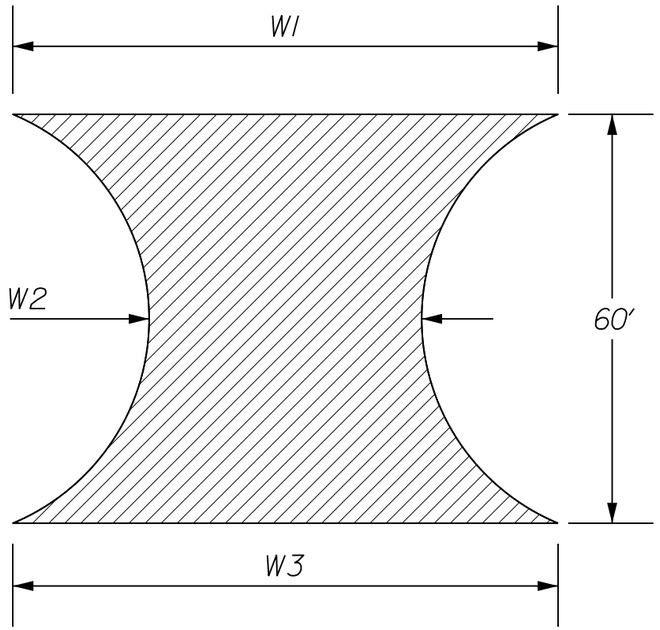
DATE: $DATE$ $TIME$
FILE: $FILE$

# PLANING DETAILS

(NO SCALE)


Texas Department of Transportation
SHEET 2 OF 2

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055.ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 32 |




TYPICAL CROSSOVER DETAIL

| STATION | W1 | W2 | W3 | AREA | 3076-6045 | 666-6102 | 666-6321 |
|---|---|---|---|---|---|---|---|
| | | | | | D-GR HMA TY-D SAC-A PG70-28 220 LBS/SY | REFL PAV MRK TY I (W)36" (YLD TRI)(100MIL) | RE PM W/RET REQ TY I (Y)6" (SLD)(100MIL) |
| | FT | FT | FT | SY | TONS | EA | LF |
| 792+41.00 | 70 | 25 | 70 | 246 | 27 | 10 | 116 |
| 794+53.00 | 70 | 25 | 70 | 246 | 27 | 10 | 116 |
| 849+24.00 | 90 | 40 | 90 | 349 | 38 | 14 | 116 |
| 862+25.00 | 90 | 40 | 90 | 349 | 38 | 14 | 116 |
| 892+58.00 | 90 | 40 | 90 | 349 | 38 | 14 | 116 |
| 931+58.00 | 90 | 40 | 90 | 349 | 38 | 14 | 116 |
| 952+19.00 | 85 | 40 | 60 | 327 | 36 | 14 | 116 |
| 959+73.00 | 80 | 40 | 90 | 345 | 38 | 14 | 116 |
| 979+88.00 | 80 | 40 | 80 | 341 | 38 | 14 | 116 |
| 1005+65.00 | 95 | 40 | 85 | 349 | 38 | 14 | 116 |
| 1041+31.00 | 80 | 40 | 80 | 341 | 38 | 14 | 116 |
| 1060+91.00 | 85 | 40 | 85 | 346 | 38 | 14 | 116 |
| 1082+55.00 | 90 | 40 | 80 | 345 | 38 | 14 | 116 |
| 1116+95.00 | 85 | 40 | 85 | 346 | 38 | 14 | 116 |
| 1172+10.00 | 90 | 50 | 90 | 407 | 45 | 18 | 116 |
| 1180+92.00 | 80 | 35 | 80 | 312 | 34 | 12 | 116 |
| 1200+78.00 | 100 | 40 | 80 | 347 | 38 | 14 | 116 |
| CSJ: 0132-01-055 TOTALS | | | | 5,695 | 627 | 232 | 1,972 |
| 1210+69.00 | 80 | 40 | 80 | 341 | 38 | 14 | 116 |
| 1217+66.00 | 100 | 40 | 100 | 353 | 39 | 14 | 116 |
| 1247+84.00 | 95 | 50 | 100 | 414 | 46 | 18 | 116 |
| 1275+20.00 | 80 | 40 | 75 | 338 | 37 | 14 | 116 |
| 1292+15.00 | 90 | 40 | 95 | 351 | 39 | 14 | 116 |
| 1304+15.00 | 80 | 40 | 95 | 346 | 38 | 14 | 116 |
| 1317+16.00 | 95 | 50 | 95 | 412 | 45 | 18 | 116 |
| 1358+59.00 | 80 | 40 | 80 | 341 | 38 | 14 | 116 |
| 1401+46.00 | 90 | 40 | 80 | 345 | 38 | 14 | 116 |
| 1474+86.00 | 85 | 40 | 85 | 346 | 38 | 14 | 116 |
| 1536+63.00 | 110 | 45 | 100 | 385 | 42 | 16 | 116 |
| 1595+29.00 | 90 | 40 | 90 | 349 | 38 | 14 | 116 |
| 1656+23.00 | 100 | 50 | 100 | 416 | 46 | 18 | 116 |
| 1672+67.00 | 100 | 40 | 100 | 353 | 39 | 14 | 116 |
| 1700+09.00 | 100 | 40 | 95 | 352 | 39 | 14 | 116 |
| CSJ: 0132-02-037 TOTALS | | | | 5,441 | 599 | 224 | 1,740 |
| PROJECT TOTALS | | | | 11,136 | 1,226 | 456 | 3,712 |

NOTES:

REFER TO PM(I)-22 FOR PLACEMENT OF STRIPING AND YIELD LINES AT CROSSOVERS.

PAVING OF CROSSOVERS WILL BE PERFORMED AFTER OVERLAY OF THE ROADWAY.

STATE OF TEXAS
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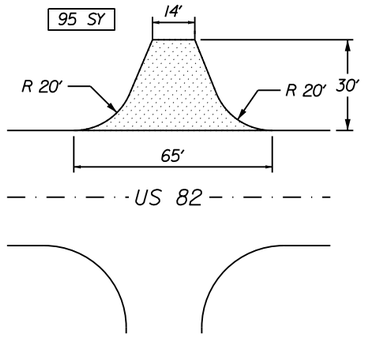
08/24/2023

# CROSSOVER DETAILS


Texas Department of Transportation
SHEET 1 OF 1

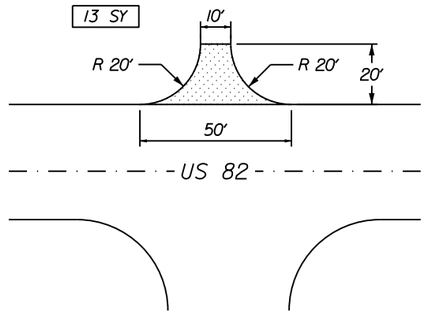
| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055,ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 33 |

DATE: $DATE$ $TIME$
FILE: $FILE$




PRIVATE DRIVEWAY

STA. 792+43.00




PRIVATE DRIVEWAY

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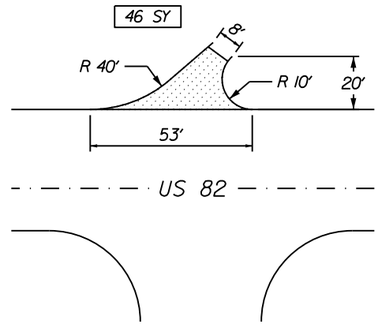
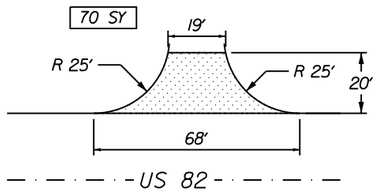


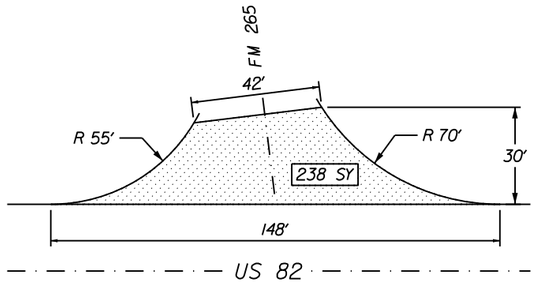

PRIVATE DRIVEWAY

STA. 862+16.00



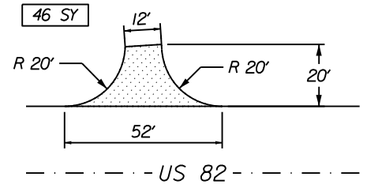

PRIVATE DRIVEWAY

STA. 892+67.00



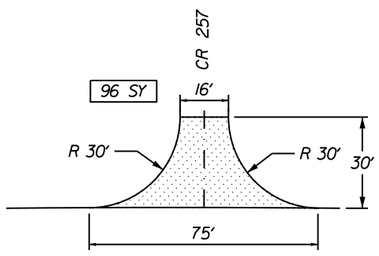

INTERSECTION

STA. 952+19.00




PRIVATE DRIVEWAY

STA. 1005+49.00




INTERSECTION

STA. 1172+20.00

| DESCRIPTION | STATION | AREA | 3076-6045 | 666-6042 |
|---|---|---|---|---|
| | | | D-GR HMA TY-D SAC-A PG70-28 220 LBS/SY | REFL PAV MRK TY I (W)12"(SLD)(100MIL) |
| | | SY | TON | LF |
| PRIVATE DRIVE | 792+43.00 | 95 | 11 | ~ |
| PRIVATE DRIVE | 849+18.00 | 13 | 2 | ~ |
| PRIVATE DRIVE | 862+16.00 | 46 | 5 | ~ |
| PRIVATE DRIVE | 892+67.00 | 70 | 8 | ~ |
| INTERSECTION - FM 265 | 952+19.00 | 238 | 26 | 10 |
| PRIVATE DRIVE | 1005+49.00 | 46 | 5 | ~ |
| INTERSECTION - CR 257 | 1172+20.00 | 96 | 11 | ~ |
| CSJ: 0132-01-055 TOTALS | | 604 | 67 | 10 |

STATE OF TEXAS
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88647
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PROFESSIONAL ENGINEER

Charles B. Steed, P.E.

08/24/2023

# INTERSECTION AND DRIVEWAY DETAILS

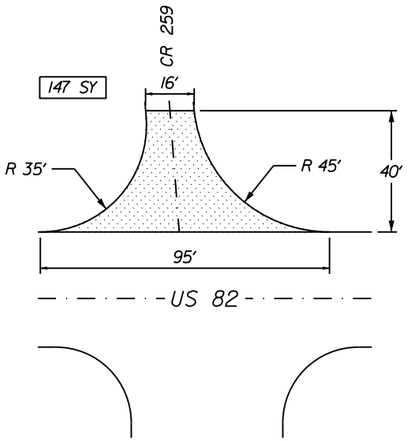


Texas Department of Transportation

SHEET 1 OF 2

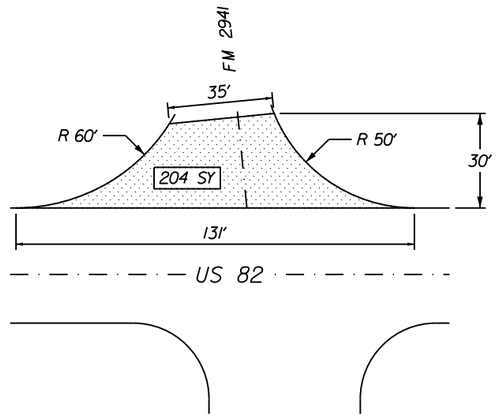
| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055.ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 34 |

DATE: $DATE$ $TIME$
FILE: $FILE$



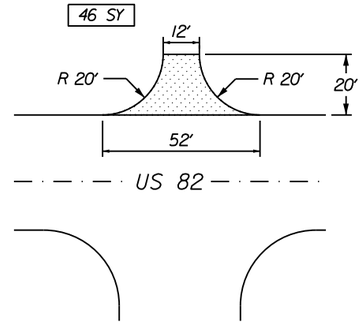

INTERSECTION

STA. 1247+80.00



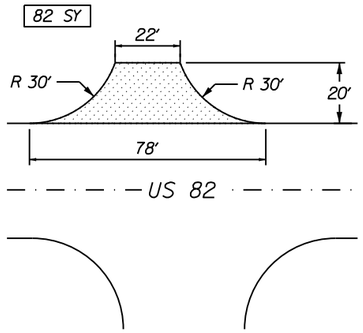

INTERSECTION

STA. 1317+00.00



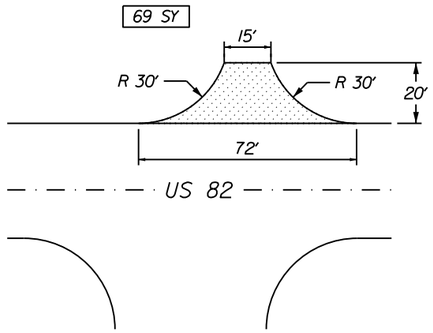

PRIVATE DRIVEWAY

STA. 1401+44.00




PRIVATE DRIVEWAY

STA. 1536+54.00




PRIVATE DRIVEWAY

1656+33.00

| DESCRIPTION | STATION | AREA | 3076-6045 D-GR HMA TY-D SAC-A PG70-28 220 LBS/SY | 666-6042 REFL PAV MRK TY I (W)12"(SLD)(100MIL) |
|---|---|---|---|---|
| | | SY | TON | LF |
| INTERSECTION - CR 259 | 1247+80.00 | 147 | 16 | ~ |
| INTERSECTION - FM 2941 | 1317+00.00 | 204 | 23 | 10 |
| PRIVATE DRIVE | 1401+44.00 | 46 | 5 | ~ |
| PRIVATE DRIVE | 1536+54.00 | 82 | 9 | ~ |
| PRIVATE DRIVE | 1656+33.00 | 69 | 8 | ~ |
| CSJ: 0132-02-037 TOTALS | | 548 | 61 | 10 |

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PROFESSIONAL ENGINEER

Charles B. Steed, P.E.

08/24/2023

# INTERSECTION AND DRIVEWAY DETAILS



Texas Department of Transportation

SHEET 2 OF 2

| CONT | SECT | JOB | HIGHWAY |
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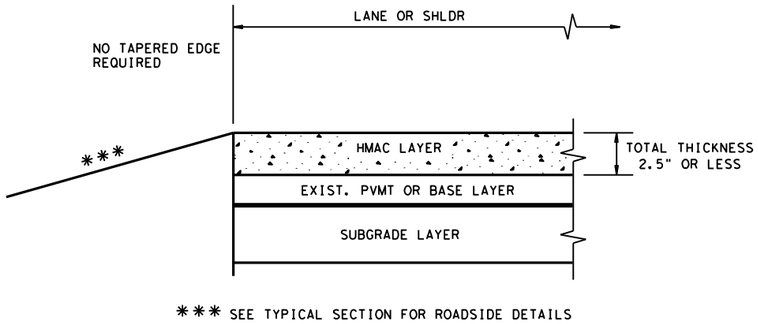
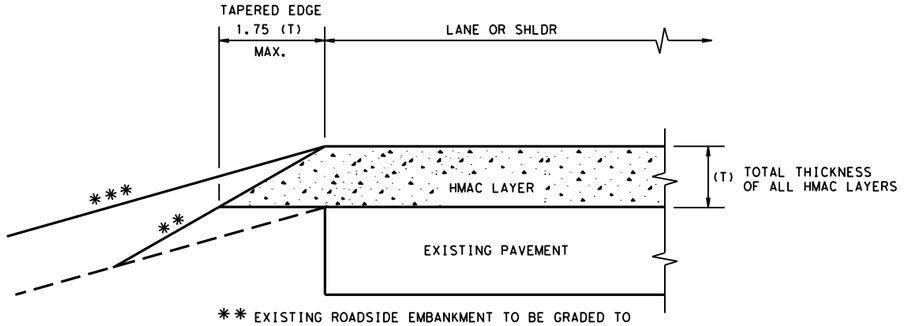



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

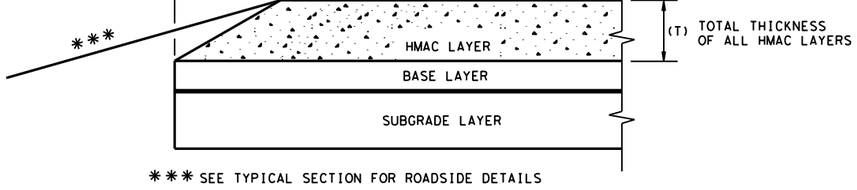
## CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY WITH THICKNESS OF 2.5" OR LESS




** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

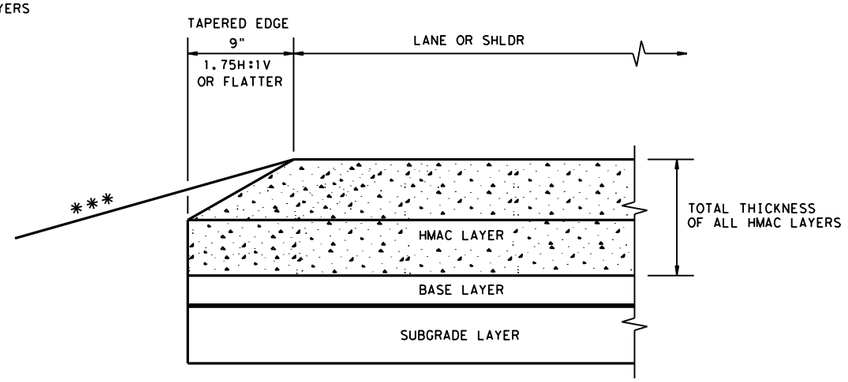
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

## CONDITION - 2
OVERLAY OF EXISTING PAVEMENT HMAC THICKNESS 2.5" TO 5"




*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

## CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 2.5" TO 5"




*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

## CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 5" OR GREATER

(NOT TO SCALE)

## GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

Texas Department of Transportation

Design Division Standard

# TAPERED EDGE DETAILS HMAC PAVEMENT

## TE(HMAC)-11

| FILE: tehmac11.dgn | DN: TxDOT | CK: RL | DW: KB | CK: |
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| © TxDOT January 2011 | CONT | SECT | JOB | HIGHWAY |
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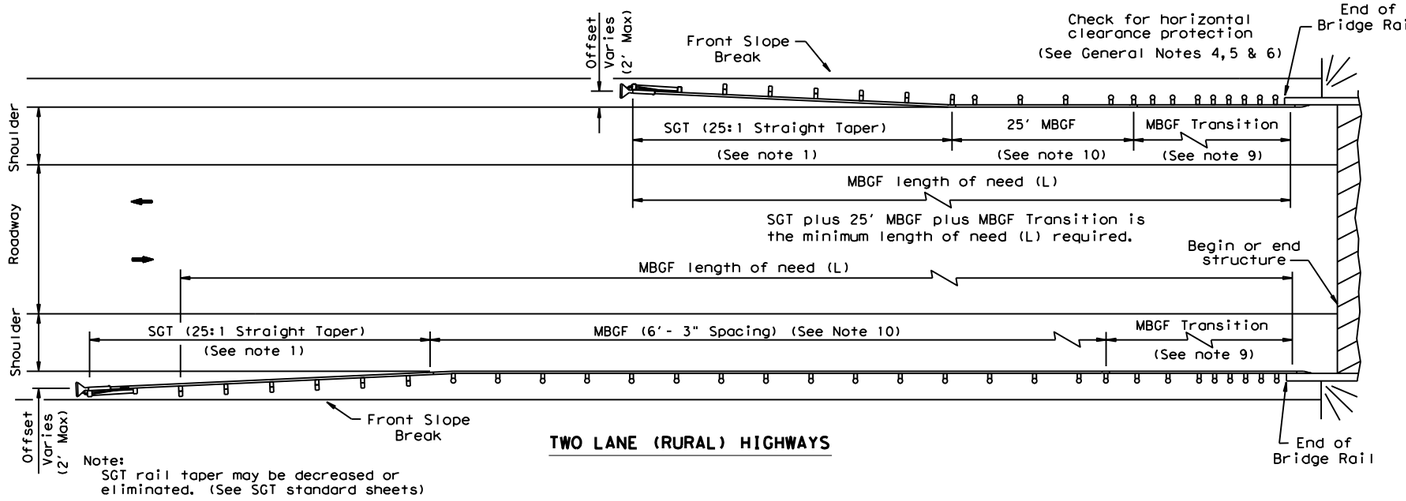
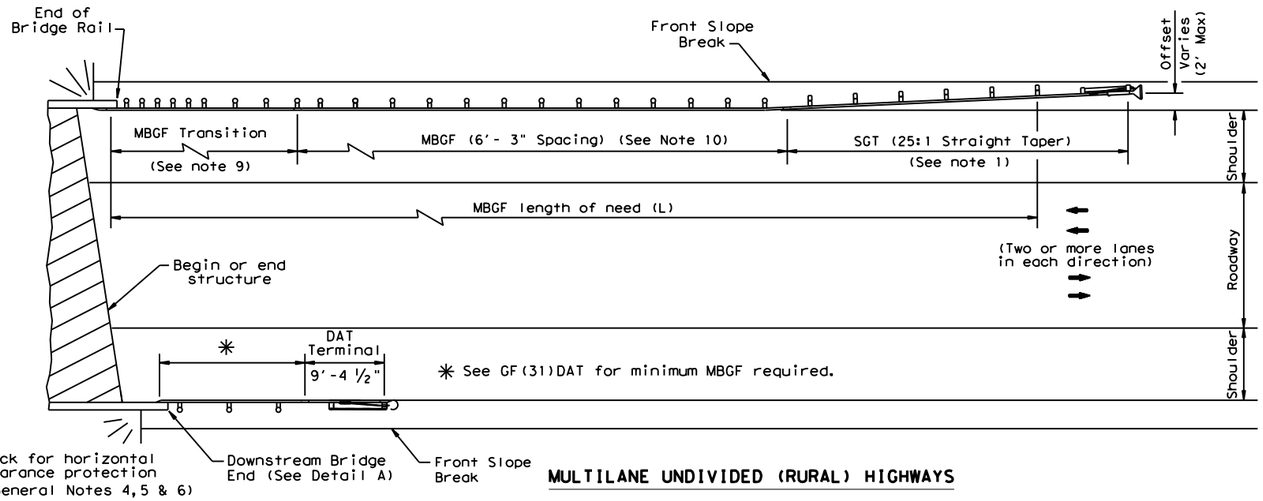
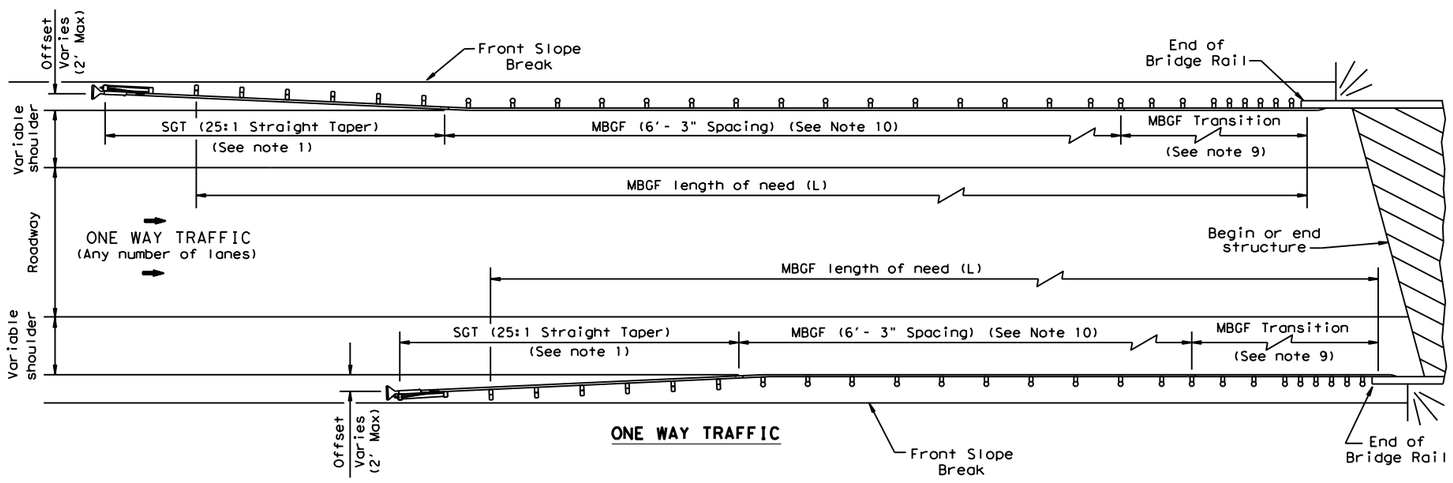



**TWO LANE (RURAL) HIGHWAYS**

Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)



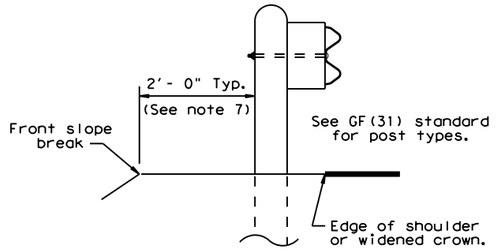

**MULTILANE UNDIVIDED (RURAL) HIGHWAYS**




**ONE WAY TRAFFIC**

## GENERAL NOTES

1. For more detail: See GF(31), SGT( )31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'- 0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. <u>For restrictive bridge widths:</u> The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft. "maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.




**TYPICAL CROSS SECTION AT MBGF**




Note:
All rail elements shall be lapped in the direction of adjacent traffic.

**DETAIL A**

Showing Downstream Rail Attachment

Texas Department of Transportation

Design Division Standard

# BRIDGE END DETAILS

## (METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

# BED-14

| FILE: bed14.dgn | DN: TxDOT | CK: AM | DW: BD/VP | CK: CGL |
|---|---|---|---|---|
| © TxDOT: December 2011 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055,ETC. | US 82 |
| REVISED APRIL 2014 SEE (MEMO 0414) | DIST | COUNTY | | SHEET NO. |
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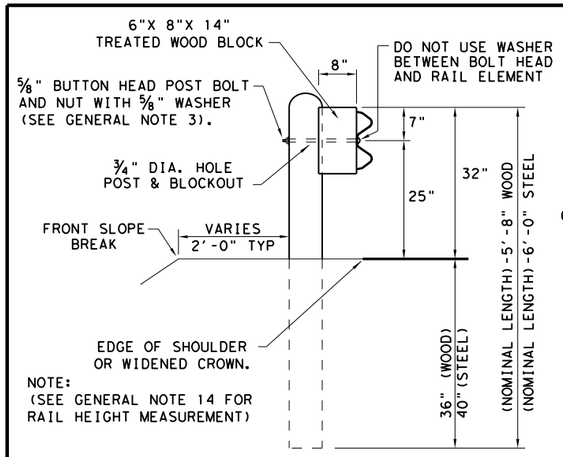
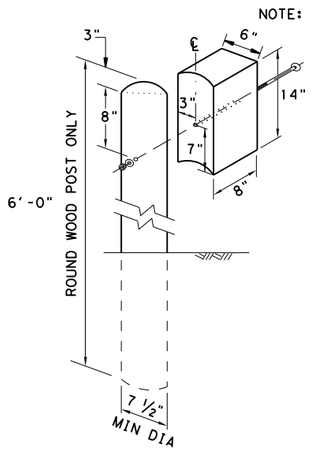
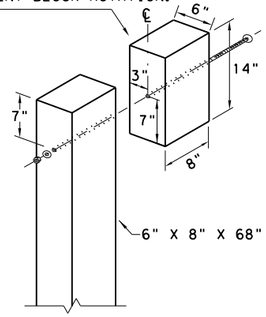



**TYPICAL POST PLACEMENT**

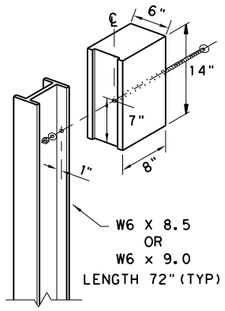



**WOOD BLOCK TO ROUND WOOD POST**

NOTE: TOENAIL WITH ONE 16D GALV. NAIL TO PREVENT BLOCK ROTATION.

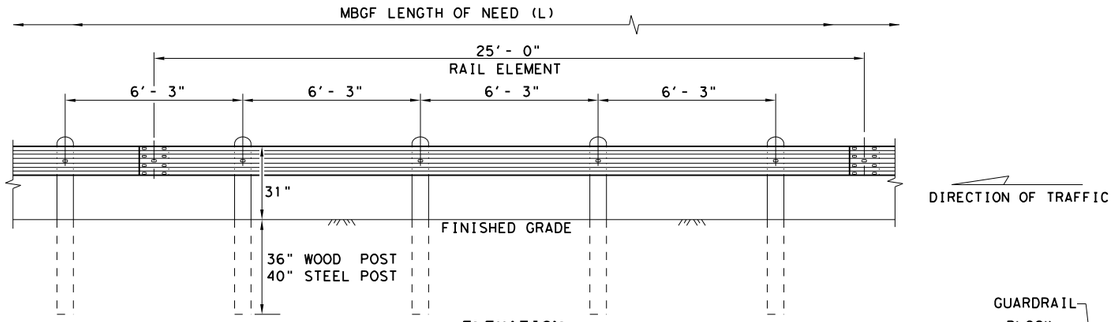



**WOOD BLOCK TO RECTANGULAR WOOD POST**



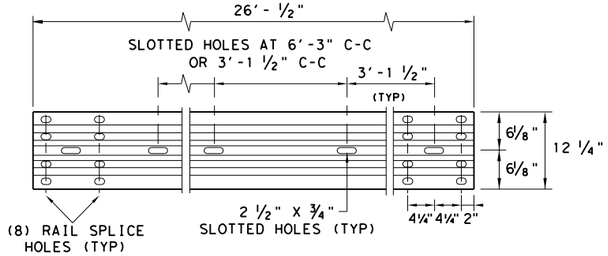

**ROUTED WOOD BLOCK TO I-BEAM STEEL POST**

NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.




**ELEVATION**
**MID-SPAN RAIL SPLICE**

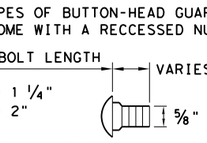
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)




**ELEVATION 25'- 0" (NOM.) W-BEAM SECTION**

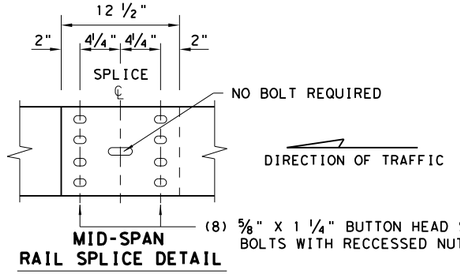
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECCESSED NUT.



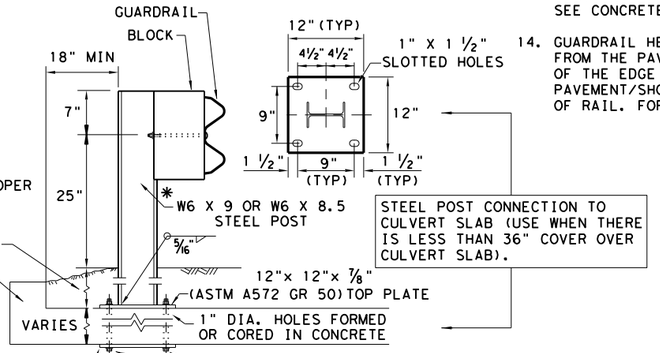

**BUTTON HEAD BOLT**

NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.




**MID-SPAN RAIL SPLICE DETAIL**

NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.




**LOW FILL CULVERT POST**

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS ¼" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

NOTE: TRANSISTIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS.
SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

## GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

Texas Department of Transportation

Design Division Standard

# METAL BEAM GUARD FENCE
# TL-3 MASH COMPLIANT
# GF(31)-19

| FILE: gf3119.dgn | DN: TxDOT | CK: KM | DW: VP | CK: CGL/AG |
|---|---|---|---|---|
| ©TxDOT: NOVEMBER 2019 | CONT | SECT | JOB | HIGHWAY |
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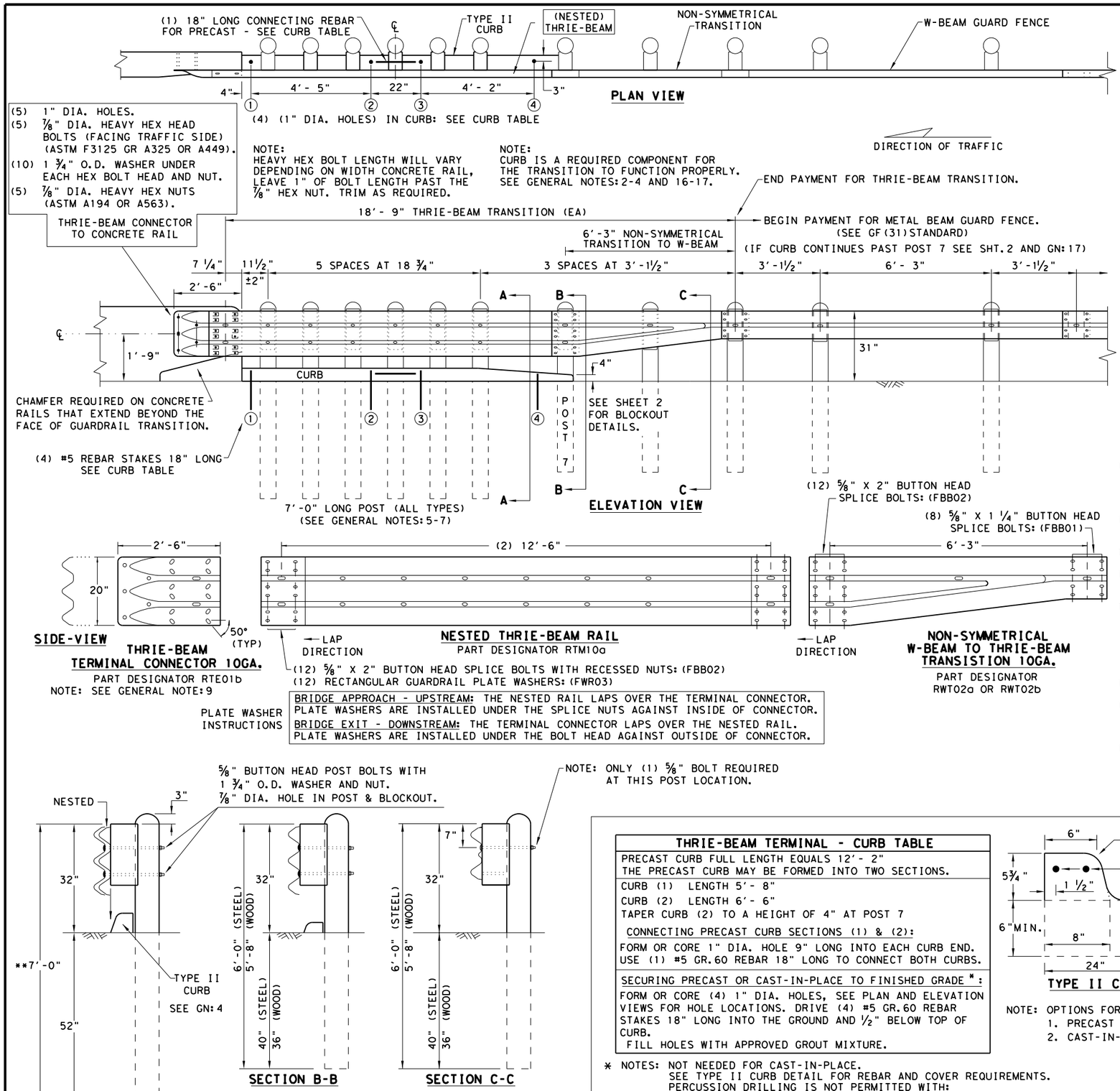



## GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- ¾" HEIGHT); SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE: 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 ½" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST ⅝" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TXDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED)(TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED)(STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

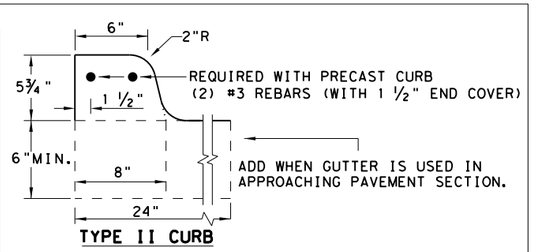
### THRIE-BEAM TERMINAL - CURB TABLE

PRECAST CURB FULL LENGTH EQUALS 12'- 2"
THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.

CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7

CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END.
USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.

SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND ½" BELOW TOP OF CURB.
FILL HOLES WITH APPROVED GROUT MIXTURE.




TYPE II CURB

NOTE: OPTIONS FOR TYPE II CURB:
1. PRECAST
2. CAST-IN-PLACE

* NOTES: NOT NEEDED FOR CAST-IN-PLACE.
SEE TYPE II CURB DETAIL FOR REBAR AND COVER REQUIREMENTS.
PERCUSSION DRILLING IS NOT PERMITTED WITH:
TYPE II CURB, BRIDGE RAIL OR CONCRETE TRAFFIC RAIL.

TYPE II CURB DETAILS

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

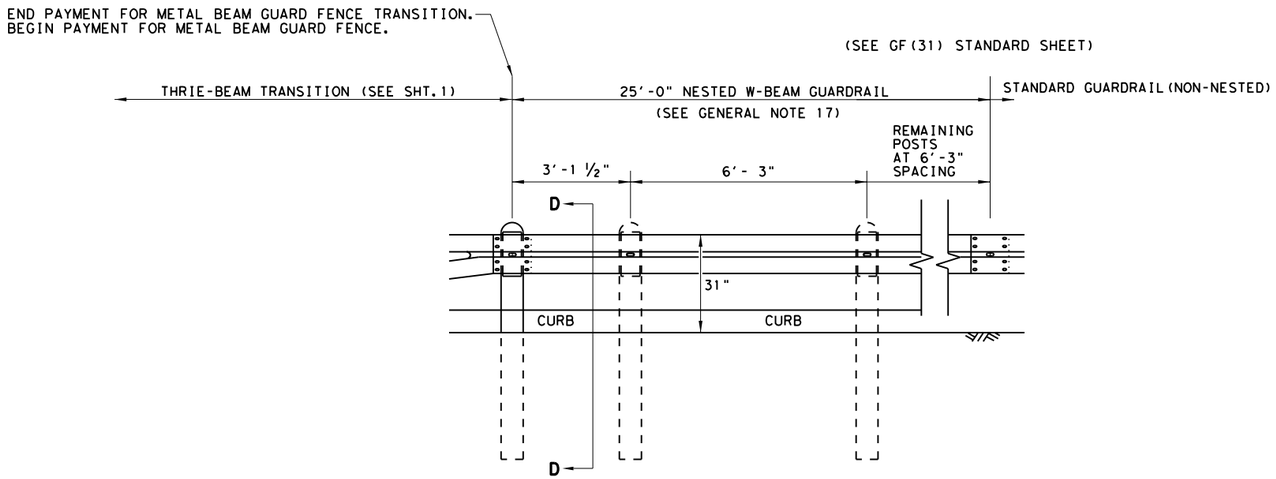
# METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

# GF(31)TR TL3-20

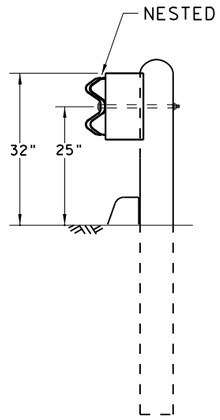
| FILE: gf31trtl320.dgn | DN: TxDOT | CK: KM | DW: VP | CK: CGL/AG |
|---|---|---|---|---|
| ©TxDOT: NOVEMBER 2020 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055.ETC. | US 82 |
| | DIST | COUNTY | | SHEET NO. |
| | CHS | DICKENS | | 39 |

DATE:
FILE:

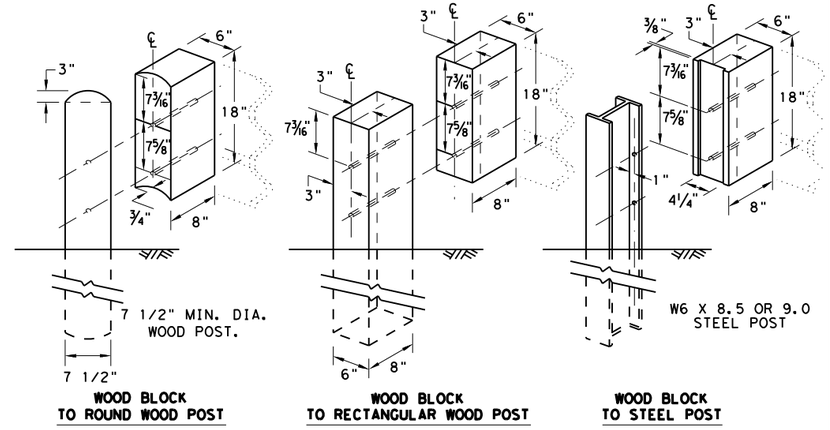
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)




ELEVATION VIEW




SECTION D-D




THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

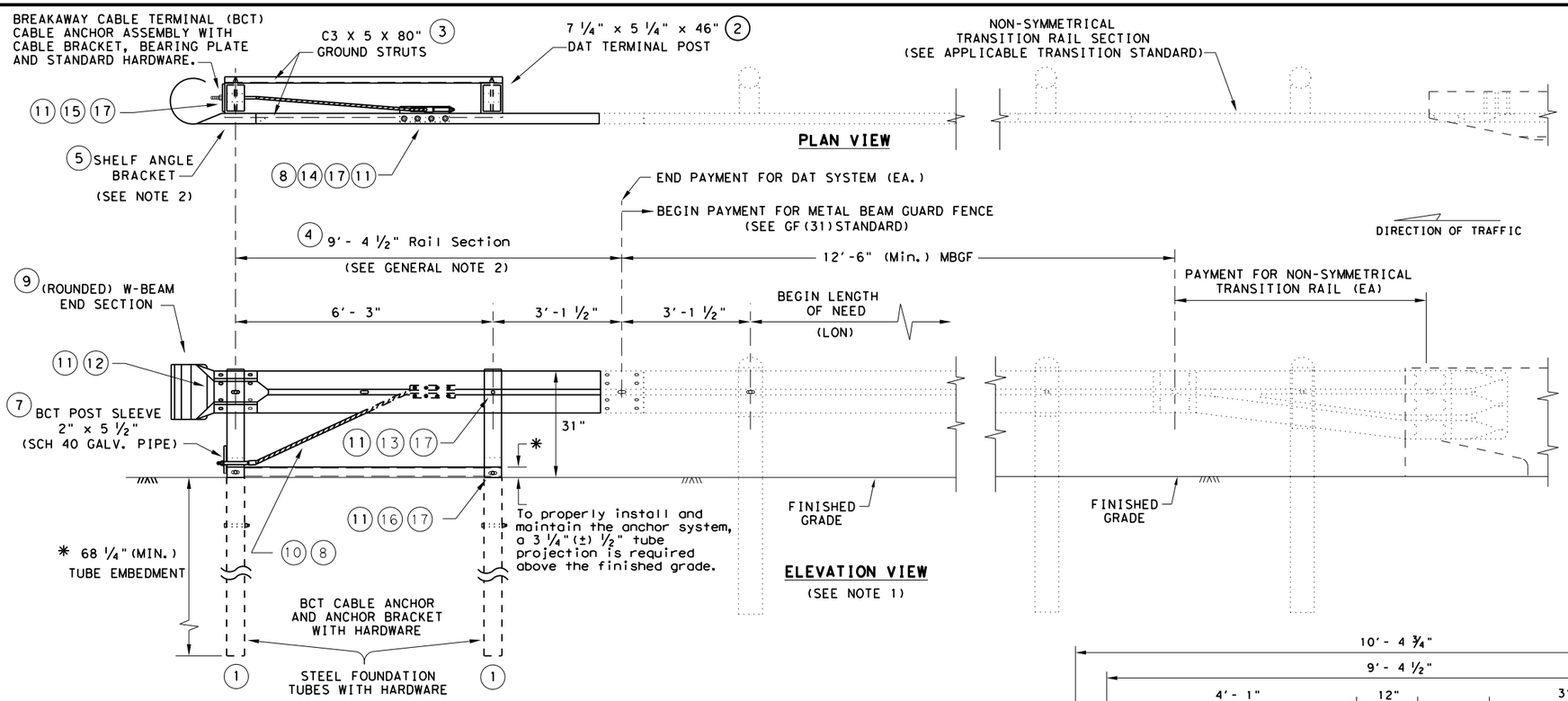
Texas Department of Transportation | Design Division Standard

# METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

## GF(31)TR TL3-20

| | | | | | |
|---|---|---|---|---|---|
| FILE: gf31tr1320.dgn | DN: TxDOT | CK: KM | DW: KM | CK: CGL/AG | |
| ©TxDOT: NOVEMBER 2020 | CONT | SECT | JOB | HIGHWAY | |
| REVISIONS | 0132 | 01 | 055.ETC. | US 82 | |
| | DIST | COUNTY | | SHEET NO. | |
| | CHS | DICKENS | | 40 | |

DATE:
FILE:




## DOWNSTREAM ANCHOR TERMINAL (DAT)

NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

## GENERAL NOTES

1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 3/4" ABOVE THE FINISHED GRADE.
4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
5. REFER TO GF(31) SHEET FOR TERMINAL CONNECTION DETAILS.

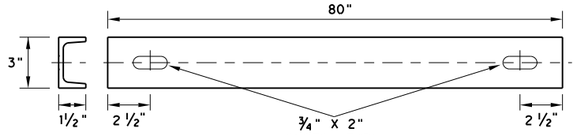
## MOW STRIP INSTALLATION

IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

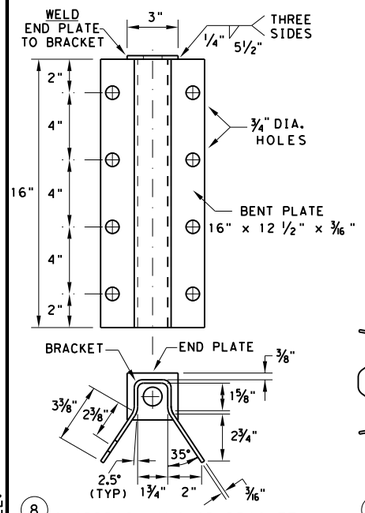
| # | (DAT) PARTS LIST | QTY |
|---|---|---|
| (1) | STEEL FOUNDATION TUBE | 2 |
| (2) | DAT TERMINAL POST | 2 |
| (3) | CHANNEL STRUT | 2 |
| (4) | TERMINAL RAIL ELEMENT | 1 |
| (5) | SHELF ANGLE BRACKET | 1 |
| (6) | BCT BEARING PLATE | 1 |
| (7) | BCT POST SLEEVE | 1 |
| (8) | GUARDRAIL ANCHOR BRACKET | 1 |
| (9) | (ROUNDED) W-BEAM END SECTION | 1 |
| (10) | BCT CABLE ANCHOR | 1 |
| (11) | RECESSED NUT, GUARDRAIL | 20 |
| (12) | 1 1/4" BUTTON HEAD BOLT | 4 |
| (13) | 10" BUTTON HEAD BOLT | 2 |
| (14) | 5/8" X 2" HEX HEAD BOLT | 8 |
| (15) | 5/8" X 8" HEX HEAD BOLT | 4 |
| (16) | 5/8" X 10" HEX HEAD BOLT | 2 |
| (17) | 5/8" FLAT WASHER | 18 |



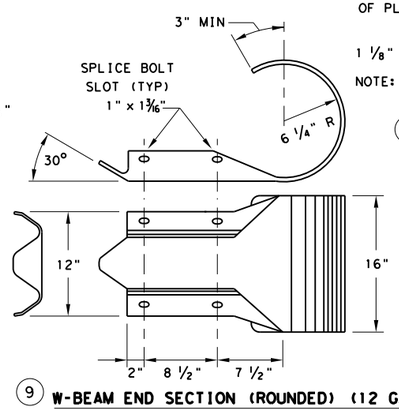

(4) TERMINAL RAIL ELEMENT FOR DAT



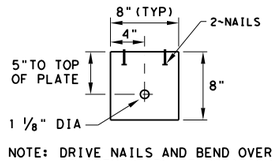

(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36




(8) GUARDRAIL ANCHOR BRACKET

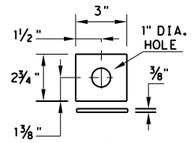



(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

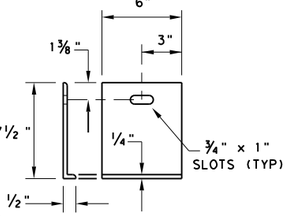



NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

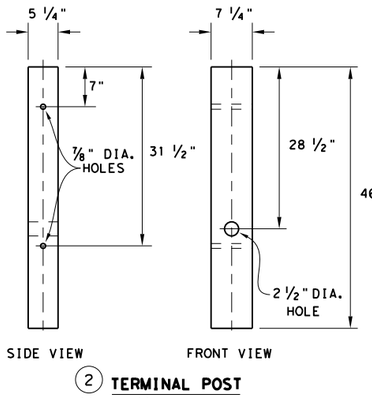
(6) BEARING PLATE
8"x 8"x 5/8" ℄



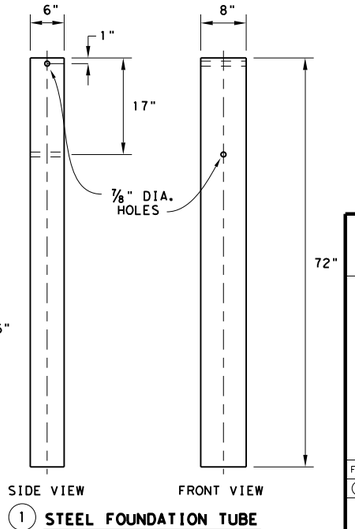

END PLATE




(5) SHELF ANGLE BRACKET




(2) TERMINAL POST
7 1/4"x 5 1/4"x 46" WOOD POST




(1) STEEL FOUNDATION TUBE
6"x 8"x 1/8" x 72" STEEL TUBE

Texas Department of Transportation — Design Division Standard

# METAL BEAM GUARD FENCE (DOWNSTREAM ANCHOR TERMINAL) TL-3 MASH COMPLIANT

# GF(31)DAT-19

| FILE: gf31dat19.dgn | DN: TxDOT | CK: KM | DW: VP | CK: CGL/AG |
|---|---|---|---|---|
| ©TxDOT: NOVEMBER 2019 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055,ETC. | US 82 |
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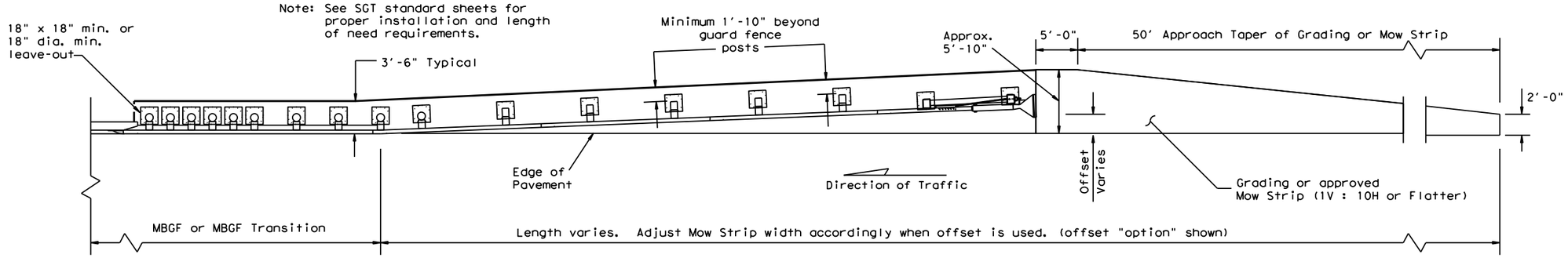
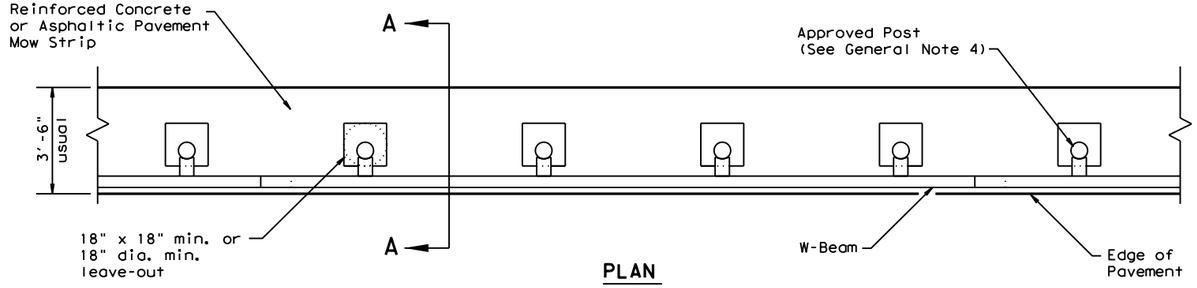
DATE:
FILE:

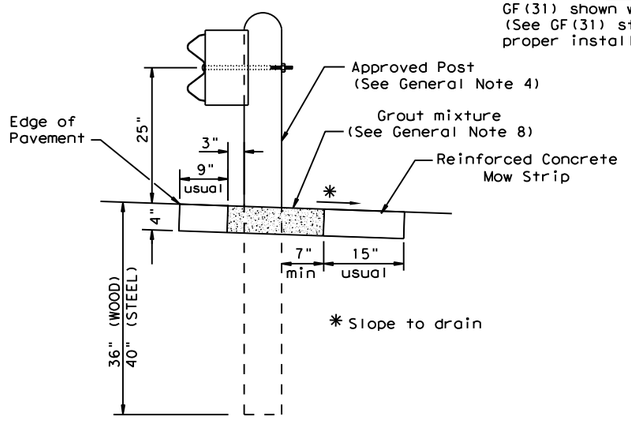



## GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



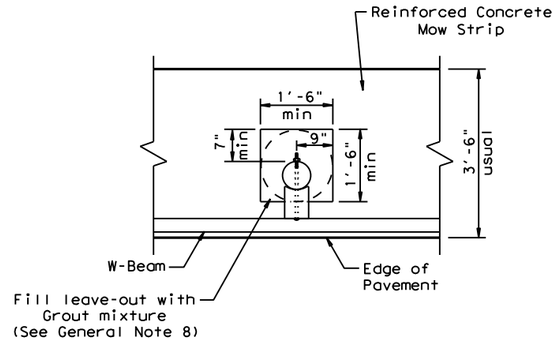

### PLAN

GF(31) shown with Mow Strip
(See GF(31) standard sheet for proper installation)



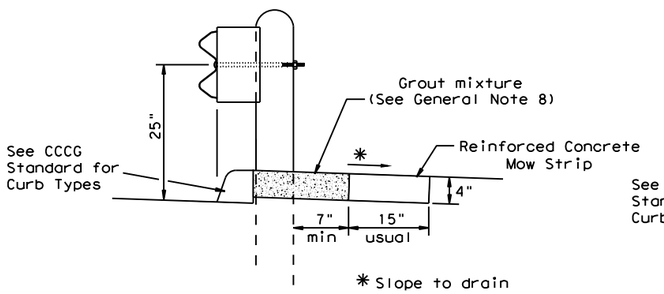

### SECTION A-A

Typical



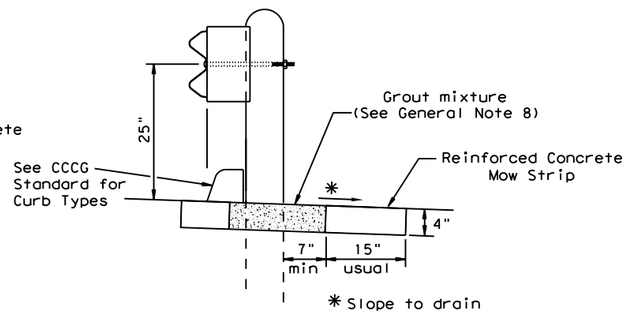

### MOW STRIP DETAIL

Reinforced Concrete Mow Strip
with 18" x 18" Square or
18" Dia. minimum leave-out.



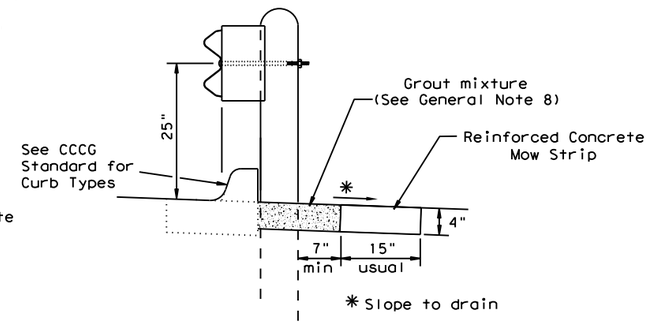

### CURB OPTION (1)

This option will increase the post embedment throughout the system.




### CURB OPTION (2)

Curb shown on top of mow strip




### CURB OPTION (3)

Note: Site Condition(s)

Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.

Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

## GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.

Texas Department of Transportation

Design Division Standard

# METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT

# GF(31)MS-19

| FILE: gf31ms19.dgn | DN: TxDOT | CK: KM | DW: VP | CK: CGL/AG |
|---|---|---|---|---|
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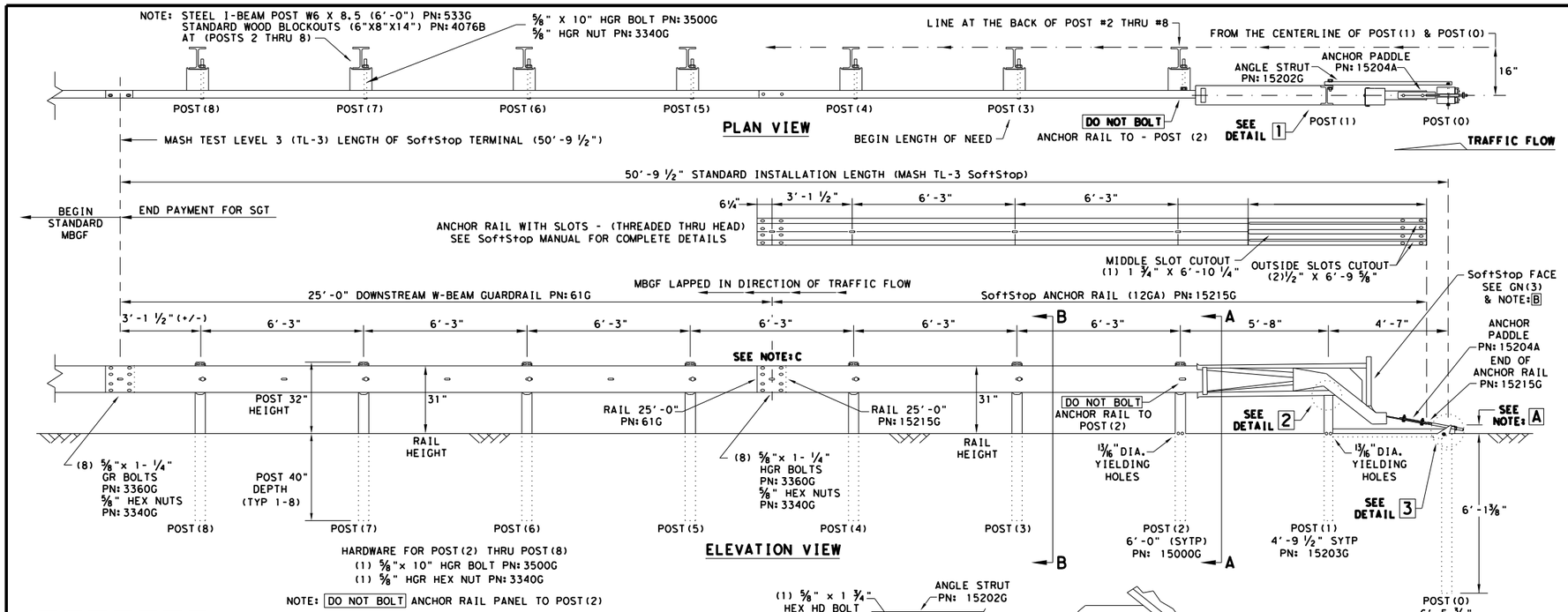



## GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY AT 1(888)323-6374. 2525 N. STEMMONS FREEWAY, DALLAS, TX 75207
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; SoftStop END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL. PN: 620237B
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
7. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL AND REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
8. POSTS SHALL NOT BE SET IN CONCRETE.
9. IT IS ACCEPTABLE TO INSTALL THE SoftStop IMPACT HEAD PARALLEL TO THE GRADE LINE OR WITH AN UPWARD TILT.
10. DO NOT ATTACH THE SoftStop SYSTEM DIRECTLY TO A RIGID BARRIER.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE SoftStop SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.

| | |
|---|---|
| NOTE:A | THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-¾" MIN. TO 4" MAX. ABOVE FINISHED GRADE. |
| NOTE:B | PART PN: 5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)<br>PART PN: 5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING) |
| NOTE:C | W-BEAM SPLICE LOCATED BETWEEN LINE POST(4) AND LINE POST(5)<br>GUARDRAIL PANEL 25'-0" PN: 61G<br>ANCHOR RAIL 25'-0" PN: 15215G<br>LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW. |

| PART | QTY | MAIN SYSTEM COMPONENTS |
|---|---|---|
| 620237B | 1 | PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.) |
| 15208A | 1 | SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH) |
| 15215G | 1 | SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS |
| 61G | 1 | SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0") |
| 15205A | 1 | POST #0 - ANCHOR POST (6'- 5 ⅜") |
| 15203G | 1 | POST #1 - (SYTP) (4'- 9 ½") |
| 15000G | 1 | POST #2 - (SYTP) (6'- 0") |
| 533G | 6 | POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0") |
| 4076B | 7 | BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14") |
| 6777B | 7 | BLOCKOUT - COMPOSITE (4" x 7 ½" x 14") |
| 15204A | 1 | ANCHOR PADDLE |
| 15207G | 1 | ANCHOR KEEPER PLATE (24 GA) |
| 15206G | 1 | ANCHOR PLATE WASHER ( ½" THICK ) |
| 15201G | 2 | ANCHOR POST ANGLE (10" LONG) |
| 15202G | 1 | ANGLE STRUT |
| | | **HARDWARE** |
| 4902G | 1 | 1" ROUND WASHER F436 |
| 3908G | 1 | 1" HEAVY HEX NUT A563 GR.DH |
| 3717G | 2 | ¾" x 2 ½" HEX BOLT A325 |
| 3701G | 4 | ¾" ROUND WASHER F436 |
| 3704G | 2 | ¾" HEAVY HEX NUT A563 GR.DH |
| 3360G | 16 | ⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HGR |
| 3340G | 25 | ⅝" W-BEAM RAIL SPLICE NUTS HGR |
| 3500G | 7 | ⅝" x 10" HGR POST BOLT A307 |
| 3391G | 1 | ⅝" x 1 ¾" HEX HD BOLT A325 |
| 4489G | 1 | ⅝" x 9" HEX HD BOLT A325 |
| 4372G | 4 | ⅝" WASHER F436 |
| 105285G | 2 | ⅝" x 2 ½" HEX HD BOLT GR-5 |
| 105286G | 1 | ⅝" x 1 ½" HEX HD BOLT GR-5 |
| 3240G | 6 | ⅝" ROUND WASHER (WIDE) |
| 3245G | 3 | ⅝" HEX NUT A563 GR.DH |
| 5852B | 1 | HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE:B |

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SoftStop END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

# TRINITY HIGHWAY
# SOFTSTOP END TERMINAL
# MASH - TL-3
# SGT(10S)31-16

| FILE: sgt10s3116 | DN: TxDOT | CK: KM | DW: VP | CK: MB/VP |
|---|---|---|---|---|
| ©TxDOT: JULY 2016 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055,ETC. | US 82 |
| | DIST | COUNTY | | SHEET NO. |
| | CHS | DICKENS | | 43 |

DATE:
FILE:

DATE:
FILE:

(SEE GN NOTE 15)
STANDARD 31" MBGF

ITEM (6)
INNER SIDE SLIDER
(ISS) PANEL FOR RAIL 3

FIELD-SIDE
(RAIL 3)

NOTE:
RECESSED HEX NUTS FACING
TRAFFIC-SIDE **SEE DETAIL (C)**

REFERENCE LINE USED TO INSTALL
LINE POST(9) THRU POST(2)

POST 1 OFFSET DISTANCE MEASURED
7-⅝" FROM REFERENCE LINE

POST 9 | POST 8 | POST 7 | POST 6 | POST 5 | POST 4 | POST 3 | POST 2

RAIL 4 | RAIL 3 | RAIL 2 | RAIL 1

ITEM (10)
CABLE ASSEMBLY

ITEM (2)
GROUNDSTRUT

NO BLOCKOUT
AT (POST 1)

CABLES

ITEM (5)
TRAFFIC SIDE SLIDER
(TSS) PANEL FOR RAIL 2

NOTE: SECURE THE (TSS) PANEL TO OUTSIDE
OF RAIL 2 WITH THE PANEL ARROWS
POINTING TOWARDS THE HEAD.

NOTES:
1. ITEM (12) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST(9) THRU LINE POST(2).
2. DO NOT INSTALL A BLOCKOUT AT LINE POST(1).

**PLAN VIEW**

MBGF
RAIL 2

INSTALL GUARD FENCE RECESSED
HEX NUTS ON TRAFFIC-SIDE

MBGF
RAIL 1

**DETAIL (C)**

TRAFFIC FLOW

ITEM (25)
MAX-TENSION HEAD
**SEE DETAIL (A)**

END PAYMENT (SGT) BY EACH

DO NOT BOLT
RAIL TO POST 6

BEGIN LENGTH OF NEED

INSTALLATION LENGTH 55'- ½"

49'-8 9/16"

6'-3" | 6'-3" | 6'-3" | 6'- ¾" | 6'-3" | 6'-3" | 6'-3" | 37 ½" | 5'-3 11/16"

RAIL
HEIGHT
31"

ARROWS

RAIL
HEIGHT
31"

HEAD
HEIGHT

**DETAIL (B)**

32-¼"

ITEM (13) RAIL 4 | ITEM (13) RAIL 3 | ITEM (13) RAIL 2 | ITEM (13) RAIL 1

**DETAIL (D)**

FINISHED
GRADE

CABLES

FINISHED
GRADE

ITEM (10)
CABLE
ASSEMBLY

ITEM (2)
GROUNDSTRUT

68-⅛"

POST 9 | POST 8 | POST 7 | POST 6 | POST 5 | POST 4 | POST 3 | POST 2 | POST 1

ITEM (4)
I-BEAM
W6 X 9

NO BLOCKOUT
AT (POST 1)

(8) X-LITE LINE POST - ITEM (11)

**ELEVATION VIEW**

**SOIL
ANCHOR POST**
ITEM (1)

A

A

TSS PANEL
GALVANIZED
ITEM (5)

RSS PLATE
GALVANIZED
ITEM (8)

INSTALL THE TSS AND RSS
WITH THE ARROWS POINTING
TOWARDS THE MAX-HEAD

TSS PANEL AND RSS PLATE
**DETAIL (D)**

HEAD
HEIGHT
32-¼"

TOP OF POST

31-⅞"

FINISHED
GRADE

40-⅛"

68-⅛"
ANCHOR POST
DEPTH

ITEM (1)
ANCHOR

ITEM (11)
LINE POSTS
2 THRU 9
(NOTE: ITEM (4) POST 1 (NOT SHOWN),
TO BE INSTALLED AT SAME DEPTH
AS LINE POSTS.)

**SOIL ANCHOR, POST 1
& LINE POST 2 THRU 9**

**SECTION VIEW A-A**

NOTE:
USE THE MASH APPROVED
X-TENSION CABLE ASSEMBLY.

7 5/16"

2 ⅛"

UPPER CABLE
(BACK SIDE)

LOWER CABLE
(TRAFFIC SIDE)

**DETAIL (B)**

CABLE
FRICTION PLATE
HEAD UNIT
ITEM (9)

NOTE:
INSTALL ⅝" RECESSED HEX
NUTS ON TRAFFIC SIDE.

ITEM (24)
ITEM (21)

ITEM (20)
8X

ITEM (17)
8X

ITEM (23)
6X
3 SCREWS
EACH SIDE

(RAIL 1)

ITEM (22)
BRACKET
SHIPPED FLAT

ITEM (3)

ITEM (16)
4X

* ITEM (25)
HIGH INTENSITY
REFLECTIVE SHEETING

NOTE: DELINEATION MARKER IN
ACCORDANCE WITH TEXAS MUTCD.

SPLICE FOR IMPACT-HEAD
TO GUARD FENCE (RAIL1)

**DETAIL (A)**

## GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
2. FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE; MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURE'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. ALL STEEL COMPONENTS ARE GALVANIZED PER ASTM A123 OR EQUIVALENT UNLESS OTHERWISE STATED.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POST WITH COMPOSITE BLOCKOUTS.
7. COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST(MPL)FOR CERTIFIED PRODUCERS.
8. REFER TO INSTALLATION MANUAL FOR SPECIFIC PANEL LAPPING GUIDANCE.
9. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL FOR INSTALLATION GUIDANCE.
10. POSTS SHALL NOT BE SET IN CONCRETE.
11. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POST TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST.
12. MAX-TENSION SYSTEM SHALL NEVER BE INSTALLED WITHIN A CURVED SECTION OF GUARDRAIL.
13. IF A DELINEATION MARKER IS REQUIRED, MARKER SHALL BE IN ACCORDANCE WITH TEXAS MUTCD.
14. THE SYSTEM IS SHOWN WITH 12'-6" MBGF PANELS, 25'-0" MBGF PANELS ARE ALSO ALLOWED.
15. A MINIMUM OF 12'-6" OF 12GA. MBGF IS REQUIRED IMMEDIATELY DOWNSTREAM OF THE MAX-TENSION SYSTEM.

| ITEM # | PART NUMBER | DESCRIPTION | QTY |
|---|---|---|---|
| 1 | BSI-1610060-00 | SOIL ANCHOR - GALVANIZED | 1 |
| 2 | BSI-1610061-00 | GROUND STRUT - GALVANIZED | 1 |
| 3 | BSI-1610062-00 | MAX-TENSION IMPACT HEAD | 1 |
| 4 | BSI-1610063-00 | W6x9 I-BEAM POST 6FT.-GALVANIZED | 1 |
| 5 | BSI-1610064-00 | TSS PANEL - TRAFFIC SIDE SLIDER | 1 |
| 6 | BSI-1610065-00 | ISS PANEL - INNER SIDE SLIDER | 1 |
| 7 | BSI-1610066-00 | TOOTH - GEOMET | 1 |
| 8 | BSI-1610067-00 | RSS PLATE - REAR SIDE SLIDER | 1 |
| 9 | B061058 | CABLE FRICTION PLATE - HEAD UNIT | 1 |
| 10 | BSI-1610069-00 | CABLE ASSEMBLY - MASH X-TENSION | 2 |
| 11 | BSI-1012078-00 | X-LITE LINE POST-GALVANIZED | 8 |
| 12 | B090534 | 8" W-BEAM COMPOSITE-BLOCKOUT XT110 | 8 |
| 13 | BSI-4004386 | 12'-6" W-BEAM GUARD FENCE PANELS 12GA. | 4 |
| 14 | BSI-1102027-00 | X-LITE SQUARE WASHER | 1 |
| 15 | BSI-2001886 | ⅝" X 7" THREAD BOLT HH (GR.5)GEOMET | 1 |
| 16 | BSI-2001885 | ¾" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET | 4 |
| 17 | 4001115 | ⅝" X 1 ¼" GUARD FENCE BOLTS (GR.2)MGAL | 48 |
| 18 | 2001840 | ⅝" X 10" GUARD FENCE BOLTS MGAL | 8 |
| 19 | 2001636 | ⅝" WASHER F436 STRUCTURAL MGAL | 2 |
| 20 | 4001116 | ⅝" RECESSED GUARD FENCE NUT (GR.2)MGAL | 59 |
| 21 | BSI-2001888 | ⅝" X 2" ALL THREAD BOLT (GR.5)GEOMET | 1 |
| 22 | BSI-1701063-00 | DELINEATION MOUNTING (BRACKET) | 1 |
| 23 | BSI-2001887 | ¼" X ¾" SCREW SD HH 410SS | 7 |
| 24 | 4002051 | GUARDRAIL WASHER RECT AASHTO FWR03 | 1 |
| * 25 | SEE NOTE BELOW | HIGH INTENSITY REFLECTIVE SHEETING | 1 |
| ** 26 | 4002337 | 8" W-BEAM TIMBER-BLOCKOUT, PDB01B | 8 |
| ** 27 | BSI-4004431 | 25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA. | 2 |
| 28 | MANMAX Rev-(D) | MAX-TENSION INSTALLATION INSTRUCTIONS | 1 |

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

** ALTERNATIVE ITEMS NOT SHOWN.
ITEM(26) 8" WOOD-BLOCKOUTS
ITEM(27) 25'GUARD FENCE PANELS

APPROX 5'-10"

5'-0"

50' APPROACH GRADING

STANDARD
MBGF

2'-0"

EDGE OF PAVEMENT

NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

2'-0" MAX.
RAIL OFFSET

APPROACH GRADING
(1V:10H OR FLATTER)
SEE PRODUCT ASSEMBLY MANUAL
FOR ADDITIONAL GUIDANCE.

NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT
USED FOR ALL TANGENT TYPE END TREATMENTS.

**APPROACH GRADING AT GUARDRAIL END TREATMENTS**

TRAFFIC FLOW

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE MAX-TENSION END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

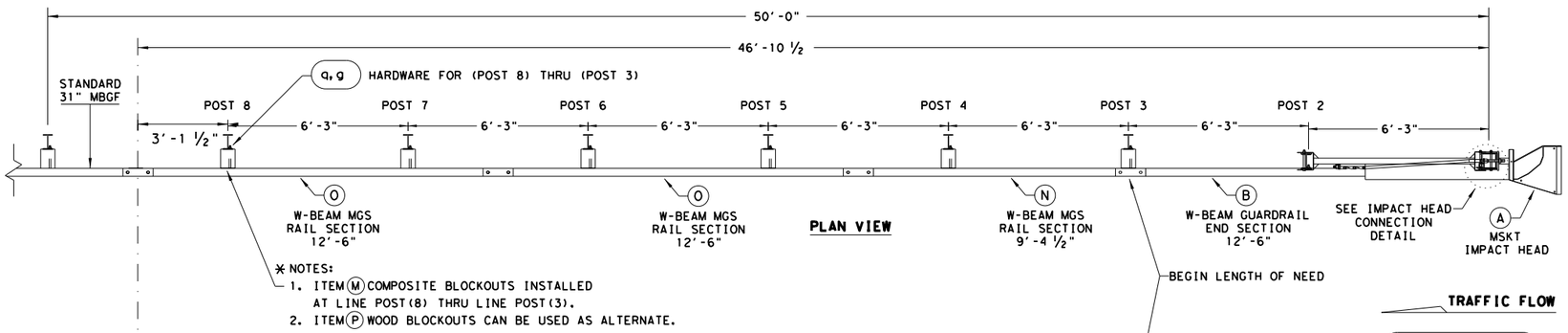
Texas Department of Transportation

*Design Division Standard*

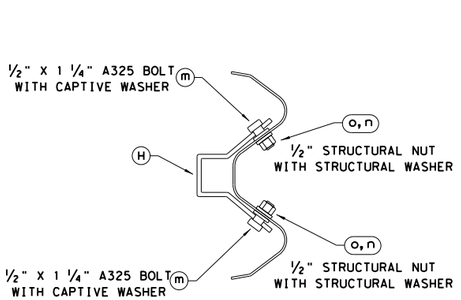
# MAX-TENSION END TERMINAL
# MASH - TL-3
# SGT(11S)31-18

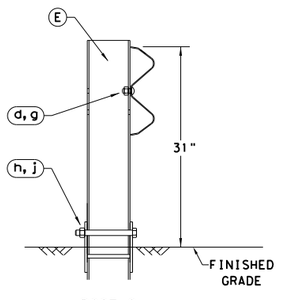
| FILE: sgt11s3118.dgn | DN: TxDOT | CK: KM | DW: TxDOT | CK: CL |
|---|---|---|---|---|
| © TxDOT: FEBRUARY 2018 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055.ETC. | US 82 |
| | DIST | COUNTY | | SHEET NO. |
| | CHS | DICKENS | | 44 |

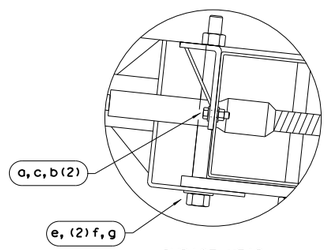
DATE:
FILE:

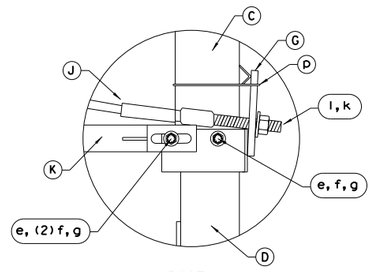


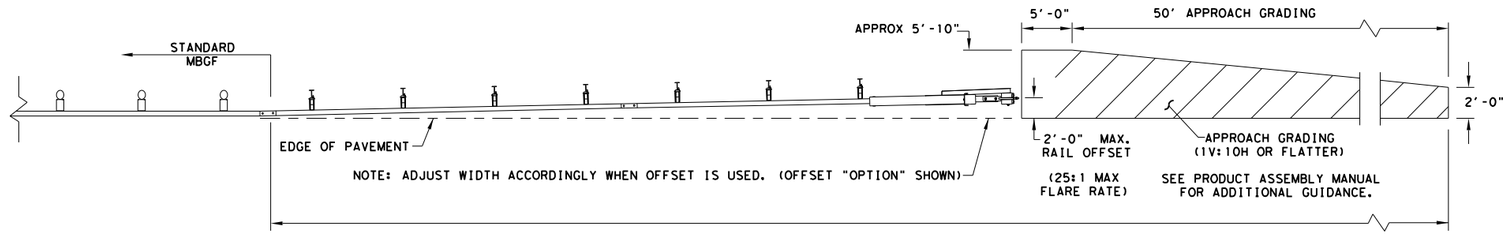

NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.




APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MSKT END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

## GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION~062717).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
7. A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
8. IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
13. THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
14. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

SEE NOTES: *

ALTERNATIVE ITEMS NOT SHOWN. **
* ITEM(P) 8" WOOD-BLOCKOUT
** ITEM(Q) 25'GUARD FENCE PANEL

| ITEM | QTY | MAIN SYSTEM COMPONENTS | ITEM NUMBERS |
|---|---|---|---|
| A | 1 | MSKT IMPACT HEAD | MS3000 |
| B | 1 | W-BEAM GUARDRAIL END SECTION, 12 Ga. | SF1303 |
| C | 1 | POST 1 - TOP (6" X 6" X ⅛" TUBE) | MTPHP1A |
| D | 1 | POST 1 - BOTTOM (6' W6X15) | MTPHP1B |
| E | 1 | POST 2 - ASSEMBLY TOP | UHP2A |
| F | 1 | POST 2 - ASSEMBLY BOTTOM (6' W6X9) | HP2B |
| G | 1 | BEARING PLATE | E750 |
| H | 1 | CABLE ANCHOR BOX | S760 |
| J | 1 | BCT CABLE ANCHOR ASSEMBLY | E770 |
| K | 1 | GROUND STRUT | MS785 |
| L | 6 | W6x9 OR W6x8.5 STEEL POST | P621 |
| M | 6 | COMPOSITE BLOCKOUTS | CBSP-14 |
| N | 1 | W-BEAM MGS RAIL SECTION (9'-4 ½") | G12025 |
| O | 2 | W-BEAM MGS RAIL SECTION (12'-6") | G1203A |
| P | 6 | WOOD BLOCKOUT 6" X 8" X 14" | P675 |
| Q | 1 | W-BEAM MGS RAIL SECTION (25'-0") | G1209 |
| | | **SMALL HARDWARE** | |
| a | 2 | ⅝" x 1" HEX BOLT (GRD 5) | B5160104A |
| b | 4 | ⅝" WASHER | W0516 |
| c | 2 | ⅝" HEX NUT | N0516 |
| d | 25 | ⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2) | B580122 |
| e | 2 | ⅝" Dia. x 9" HEX BOLT (GRD A449) | B580904A |
| f | 3 | ⅝" WASHER | W050 |
| g | 33 | ⅝" Dia. H.G.R NUT | N050 |
| h | 1 | ¾" Dia. x 8 ½" HEX BOLT (GRD A449) | B340854A |
| j | 1 | ¾" Dia. HEX NUT | N030 |
| k | 2 | 1 ANCHOR CABLE HEX NUT | N100 |
| l | 2 | 1 ANCHOR CABLE WASHER | W100 |
| m | 8 | ½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER | SB12A |
| n | 8 | ½" STRUCTURAL NUTS | N012A |
| o | 8 | 1 1/16" O.D. x ⅜" I.D. STRUCTURAL WASHERS | W012A |
| p | 1 | BEARING PLATE RETAINER TIE | CT-100ST |
| q | 6 | ⅝" x 10" H.G.R. BOLT | B581002 |
| r | 1 | OBJECT MARKER 18" X 18" | E3151 |

Texas Department of Transportation

Design Division Standard

# SINGLE GUARDRAIL TERMINAL
# MSKT-MASH-TL-3
# SGT(12S)31-18

| FILE: sgt12s3118.dgn | DN: TxDOT | CK: KM | DW: VP | CK: CL |
|---|---|---|---|---|
| © TxDOT: APRIL 2018 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055,ETC. | US 82 |
| | DIST | COUNTY | | SHEET NO. |
| | CHS | DICKENS | | 45 |

DATE:
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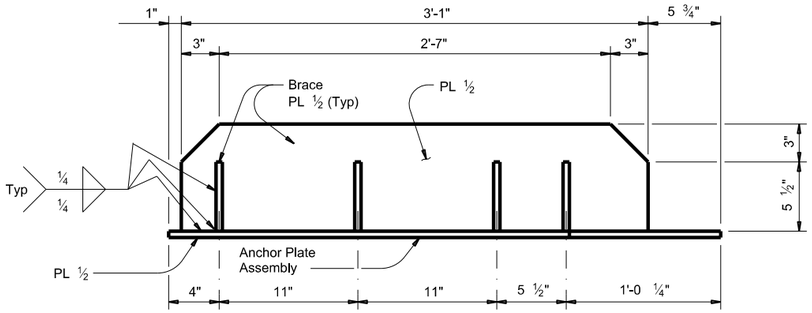
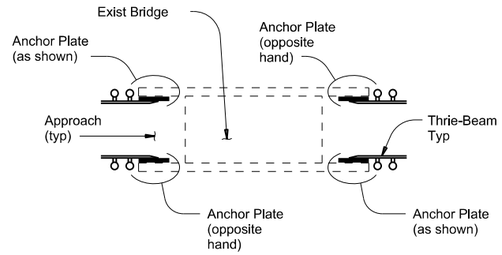
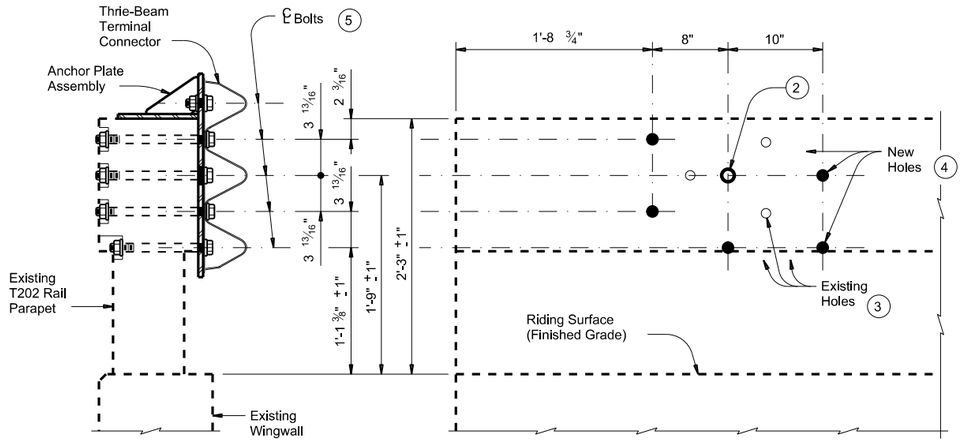



PLAN



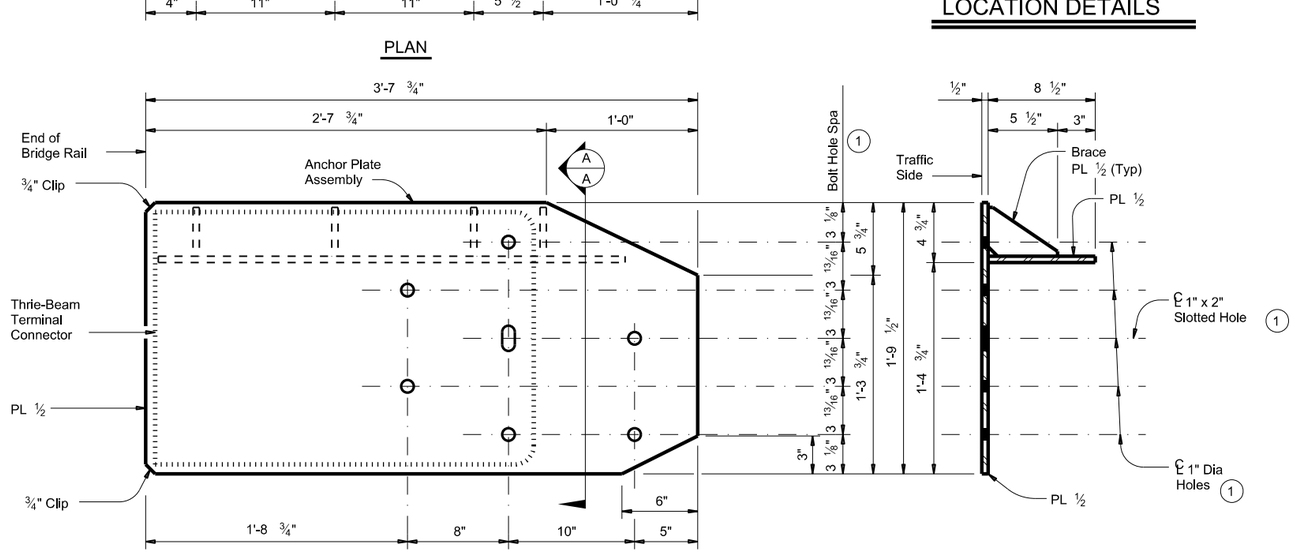

## LOCATION DETAILS




SECTION
Showing completed installation

ROADSIDE ELEVATION
Anchor Plate assembly and Thrie-Beam Terminal Connector not shown for clarity

## DETAILS OF BOLTS AND HOLES (1)

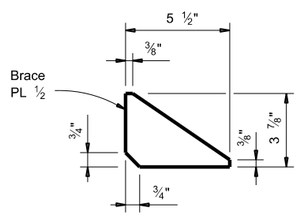



ROADSIDE ELEVATION

SECTION A-A

## ANCHOR PLATE DETAILS

Anchor Plate shown is detailed for one end of one side of rail only.
For other side, Anchor Plate must be built opposite hand.




## BRACE PLATE DETAILS

### CONSTRUCTION NOTES:

Field verify dimensions before commencing work and ordering materials.

Plugging of newly exposed existing bolt holes is not necessary except as stated here in or otherwise indicated on the plans. This work is considered subsidiary to the pertinent bid items.

Attach the MBGF Transition to the existing parapet using the Anchor Plate assembly and the Thrie-Beam Terminal Connection. Splice the Thrie-Beam Terminal Connection to the Thrie-Beam with the normal 12 connection bolts. Refer to Metal Beam Guard Fence Transition and Metal Beam Guard Fence detail sheets for additional details and information not shown herein.

### MATERIAL NOTES:

Fabricate Anchor Plate assembly with steel conforming to either ASTM A36 or A572 Gr 50. Anchor Plate assembly must be free of burrs, sharp edges and weld splatter. Grind edges and corners to a 1/16" flat or radius. Hot-dip galvanize Anchor Plate assembly in accordance with Item 445, "Galvanizing". Anchor bolts, nuts, and washers must conform to Item 449, "Anchor Bolts".

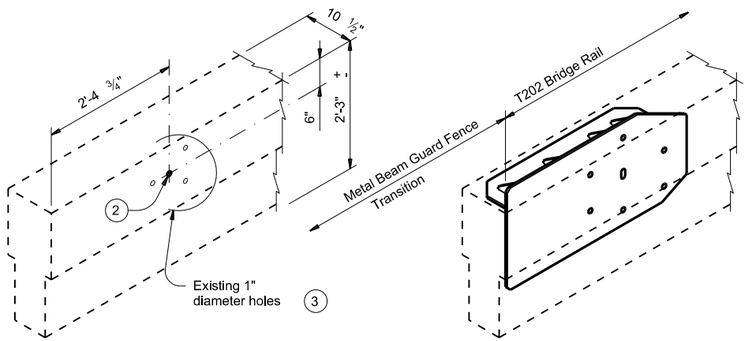
### GENERAL NOTES:

These details are for retrofitting existing rails only, not new construction, with a Thrie-Beam Terminal Connection.

Shop drawings are not required for this installation.

Payment for materials, fabrication, and installation of this assembly are to be included in unit price bid in accordance with Item 540 "Mtl Bm Gd Fen Trans (Anchor Plate)".

Estimated weight of a single Anchor Plate assembly, including bolts, nuts, and washers, but not including the Thrie-Beam Terminal Connector = 190 Lbs.




EXISTING PARAPET
Shown after removal of existing MBGF Transition connector and prior to coring new bolt holes

ANCHOR PLATE PLACEMENT

## INSTALLATION DETAILS

(1) The Contractor must verify that locations of bolt holes match those in the Thrie-Beam Terminal Connector to be installed in that location prior to fabrication of the Anchor Plate assembly and prior to coring bolt holes in the existing T202 parapet.

(2) If the existing holes are aligned as expected, use the indicated existing 1" diameter hole in the installation of the Anchor Plate assembly and the Thrie-Beam Terminal Connector.

(3) If the existing holes are not aligned as expected, holes that cannot be utilized in the installation and are within 3" of a new bolt hole must be filled with epoxy grout prior to coring new holes.

(4) Drill new 1" diameter holes, each with a 2 ½" diameter x 1" deep recess, through existing railing parapet. Recesses are only required when pedestrian sidewalks are adjacent to back of rail unless directed otherwise by the Engineer. Holes should be perpendicular to the roadside face of the parapet. Drill holes and recesses with coring type equipment. Percussion drilling is not allowed. Patch spalls, when directed by the Engineer, in accordance with Item 429, "Concrete Structure Repair", at the contractor's expense.

(5) 7 ~ 7/8" diameter ASTM F3125 Gr A325 Hex Head Anchor Bolts each with 2 ~ 1 ¾" O.D. washers. Place washer under each head and nut. Provide bolts of sufficient length to extend a minimum of ½" beyond nut. Cut excess bolt length and paint cut surface with zinc-rich paint if directed by the Engineer.

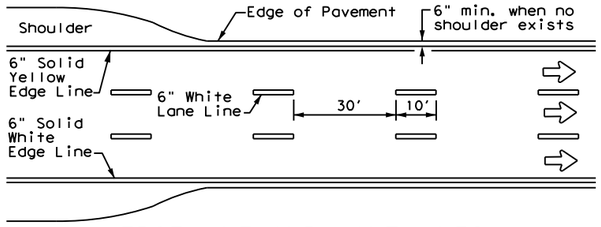
Texas Department of Transportation

Bridge Division Standard

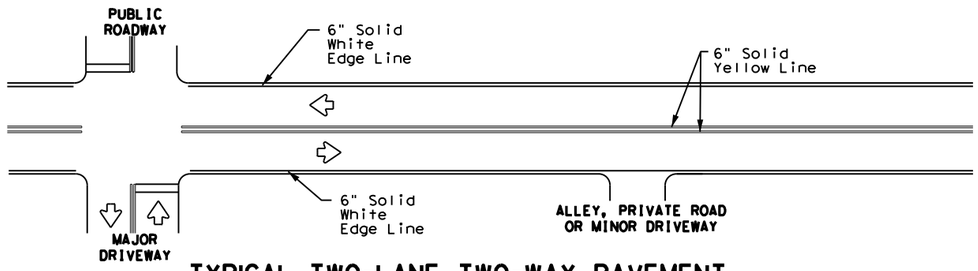
# T202 TRANSITION RETROFIT GUIDE MOD

# T202TR MOD

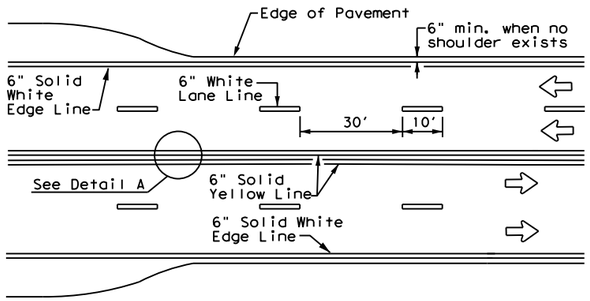
| FILE: tlstd026-19.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT September 2019 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055, ETC. | US 82 |
| | DIST | COUNTY | | SHEET NO. |
| | CHS | DICKENS | | 46 |

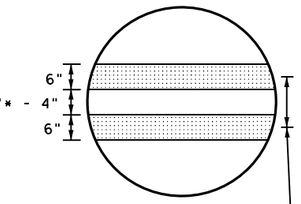



## EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS




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

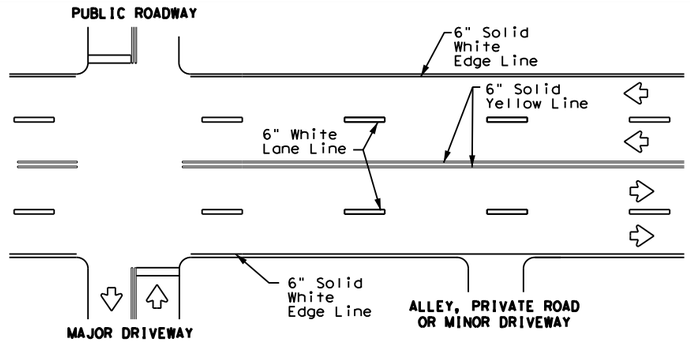


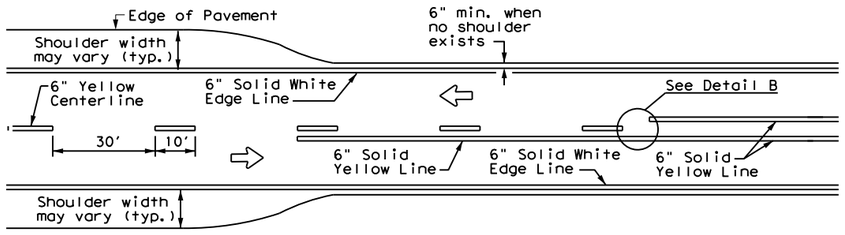

## CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

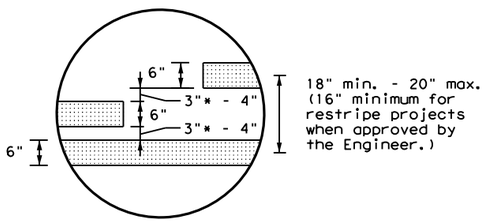
** 8" minimum for restripe projects when approved by the Engineer.



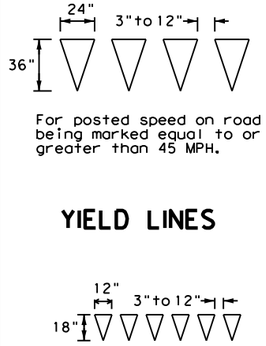

## TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

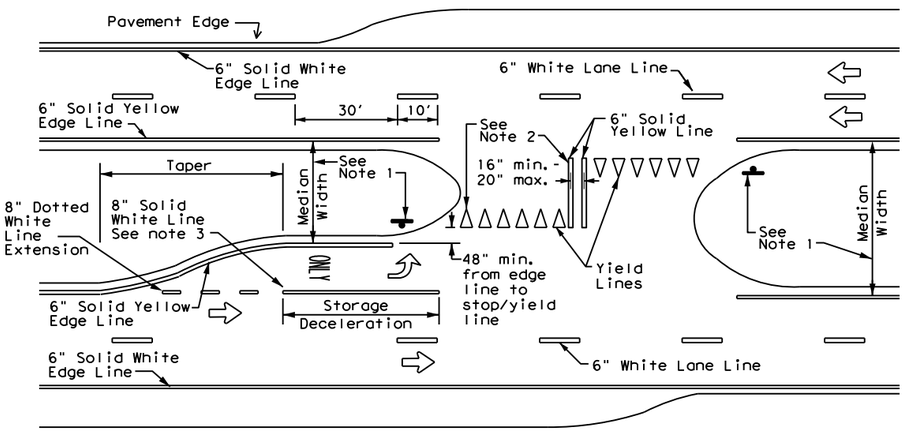



## TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS




* 2" minimum for restripe projects when approved by the Engineer.




## FOUR LANE DIVIDED ROADWAY CROSSOVERS

### NOTES

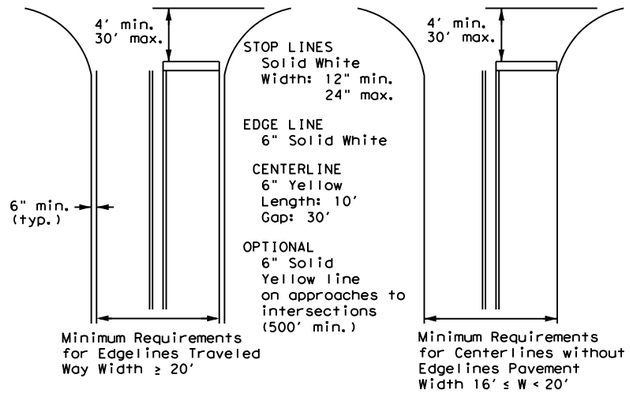
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling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

### GENERAL NOTES

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

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

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




NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

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

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

# TYPICAL STANDARD PAVEMENT MARKINGS

# PM(1)-22

| FILE: pm1-22.dgn | DN: | CK: | DW: | CK: |
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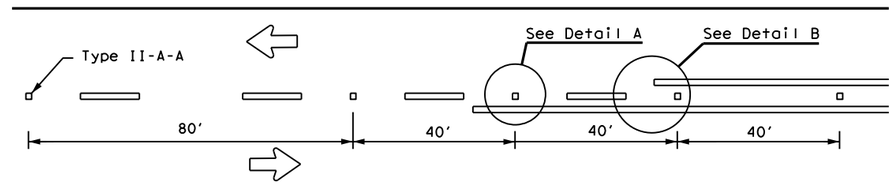
| REVISIONS 11-78 8-00 6-20 | 0132 | 01 | 055. ETC. | US 82 |
| 8-95 3-03 12-22 | DIST | COUNTY | | SHEET NO. |
| 5-00 2-12 | CHS | DICKENS | | 47 |

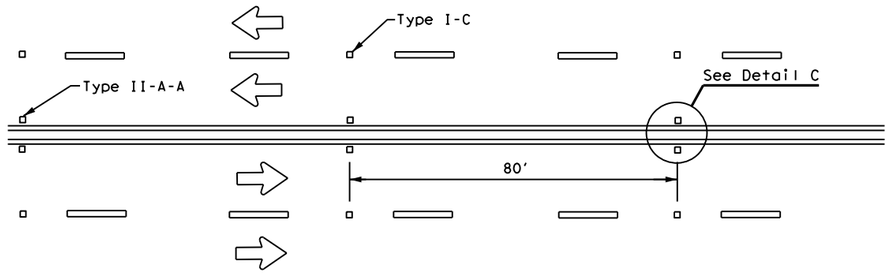
22A

DATE:
FILE:

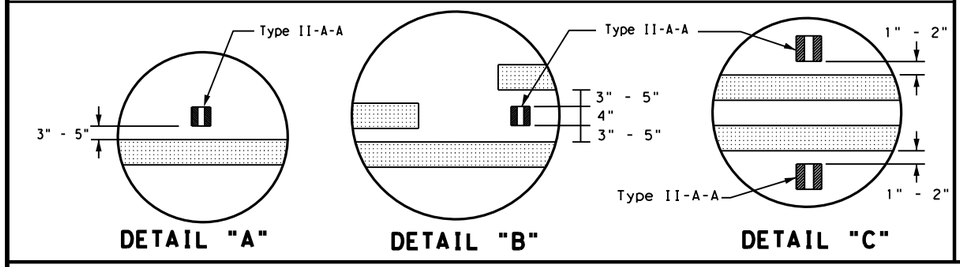
# REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

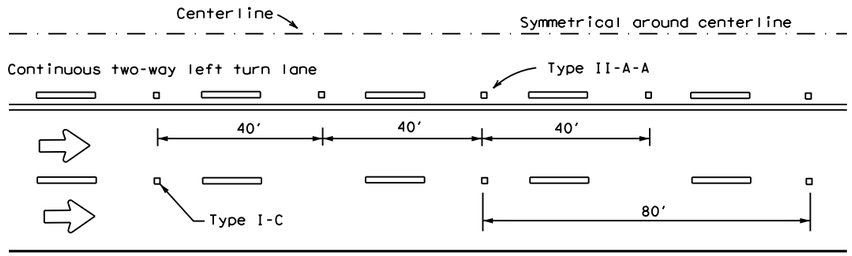



## CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

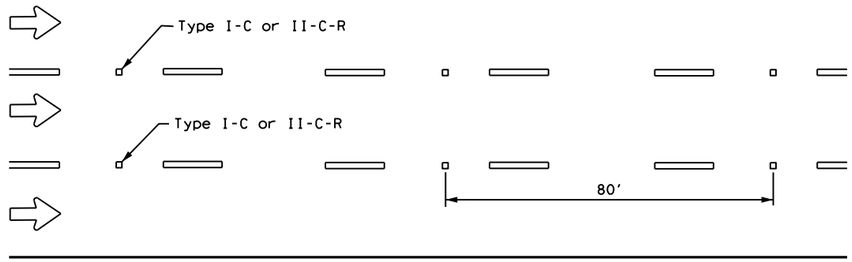



## CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



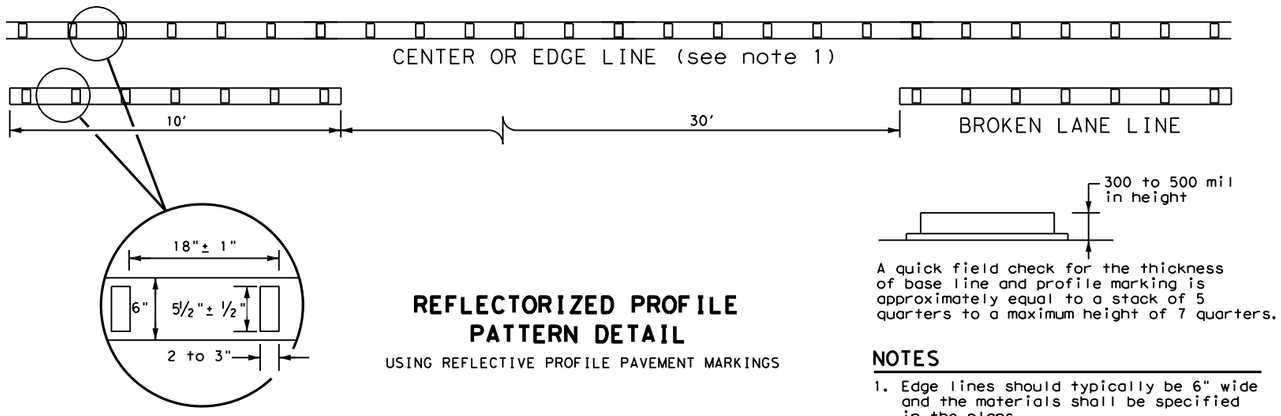

## CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE




## LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

See Note 3.




## REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

### NOTES

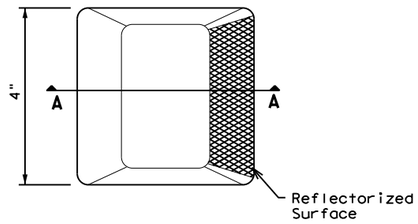
1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

### GENERAL NOTES

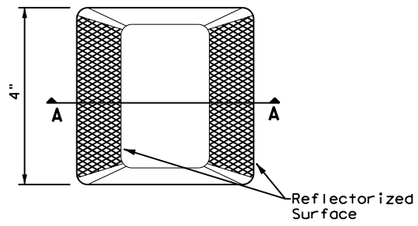
1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

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

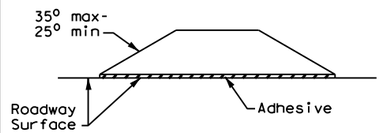
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.




Type I (Top View)




Type II (Top View)




SECTION A

## RAISED PAVEMENT MARKERS

Texas Department of Transportation

Traffic Safety Division Standard

# POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

| FILE: pm2-22.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| ©TxDOT December 2022 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12 | 0132 | 01 | 055, ETC. | US 82 |
| | DIST | COUNTY | | SHEET NO. |
| | CHS | DICKENS | | 48 |

22B

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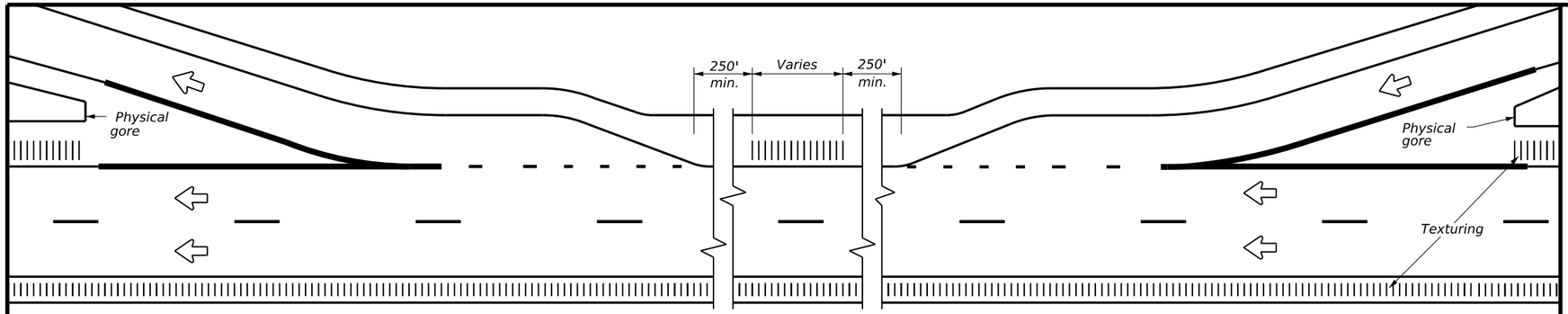
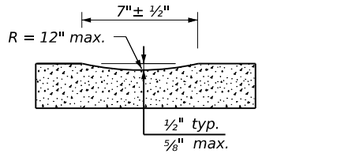
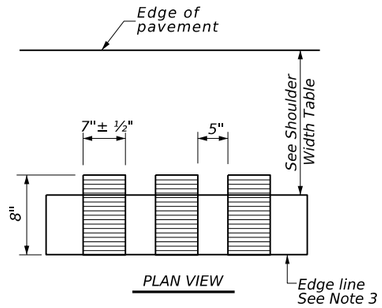


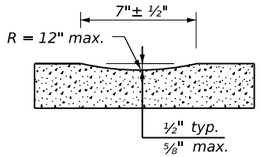

TYPICAL RUMBLE STRIP PLACEMENT AT EXIT AND ENTRANCE RAMPS



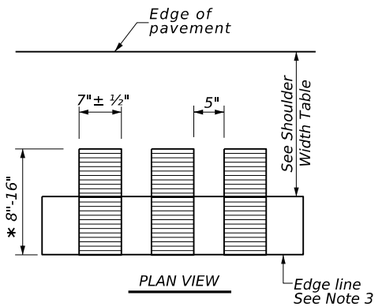

PROFILE VIEW
OPTION 1




CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

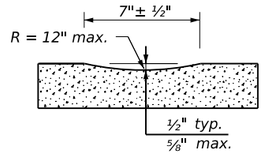



PROFILE VIEW
OPTION 2

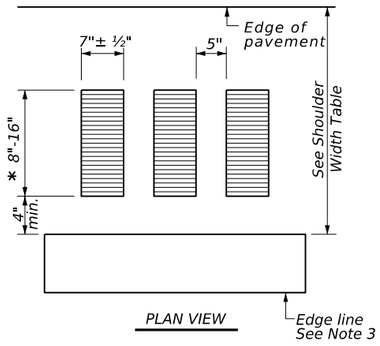



* This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

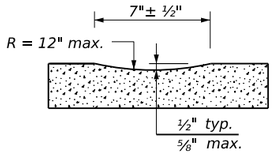



PROFILE VIEW
OPTION 3

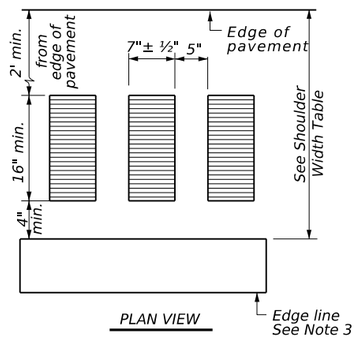



* This distance may vary based on width of shoulder

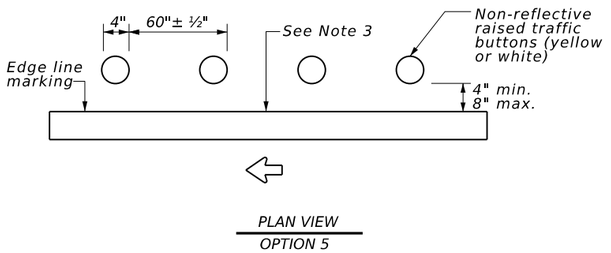
CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)




PROFILE VIEW
OPTION 4

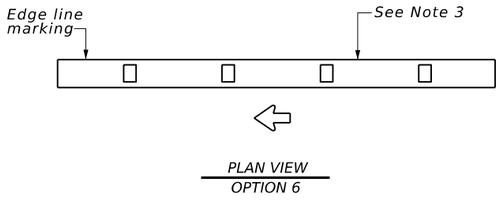



CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)




PLAN VIEW
OPTION 5

RAISED EDGE LINE
(Rumble Strips)




PLAN VIEW
OPTION 6

PROFILE EDGE LINE MARKINGS
(Rumble Strips)

## GENERAL NOTES

1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use standard sheets PM(2) and FPM(1) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the Shoulder Width Table below for determining what options may be used for edge line rumble strips.
5. Breaks in edge line rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections, or driveways with high usage of large trucks when installed on conventional highways.
6. Rumble strips shall not be placed across exit or entrance ramps, acceleration or deceleration lanes, crossovers, gore areas, or intersections with other roadways.
7. Consideration should be given to noise levels when edge line rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Consideration shall be given to bicyclists. See RS(6).

## WHEN INSTALLING MILLED DEPRESSION EDGE LINE RUMBLE STRIPS:

9. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
10. Pavement markings can be applied over milled shoulder rumble strips to create an edge line rumble stripe.

## WHEN INSTALLING RAISED OR PROFILE EDGE LINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edge line when used as a rumble strip. The color of the button should match the color of the adjacent edge line marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. The minimum distance between the edge line and the buttons should be used if the shoulder is less than 8 feet in width.
15. Raised profile thermoplastic markings used as edge lines may substitute for buttons.

## SHOULDER WIDTH TABLE

| EQUAL TO OR LESS THAN 2 FEET | GREATER THAN 2 FEET LESS THAN 4 FEET | EQUAL TO OR GREATER THAN 4 FEET |
|---|---|---|
| Option 1, 5, or 6 | Option 1, 2, 3, 5, or 6 | Option 2, 4, 5, or 6 |

Texas Department of Transportation

Traffic Safety Division Standard

# EDGE LINE RUMBLE STRIPS ON FREEWAYS AND DIVIDED HIGHWAYS RS(1)-23

| FILE: rs(1)-23.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT January 2023 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055, ETC. | US 82 |
| 4-06 1-23 | DIST | COUNTY | | SHEET NO. |
| 2-10 | CHS | DICKENS | | 49 |
| 10-13 | | | | |

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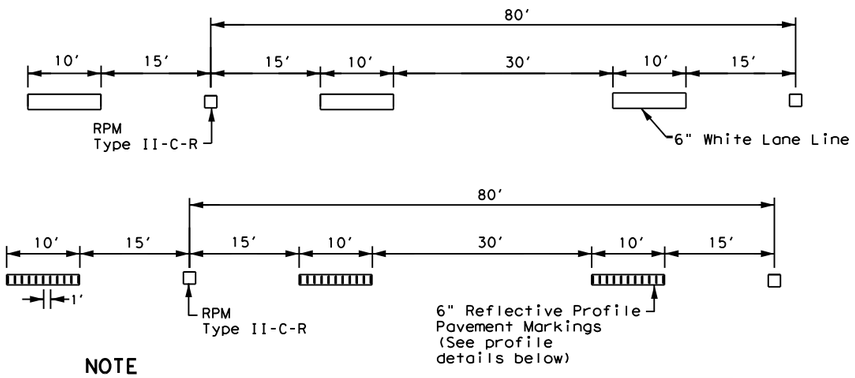
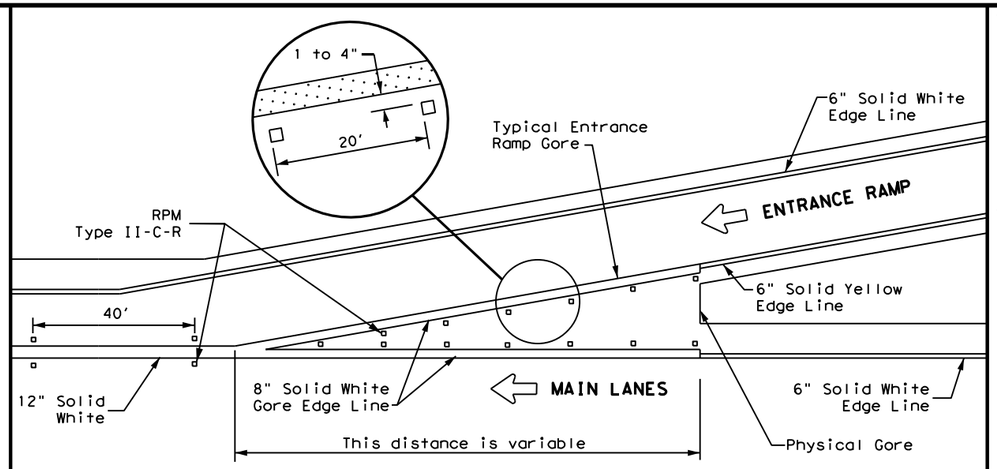



**NOTE**

Reflectorized raised pavement markers Type II-C-R shall be spaced on 80'centers with the clear face toward normal traffic and the red face toward wrong way traffic. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.

## TRAFFIC LANE LINES PAVEMENT MARKING




## TYPICAL ENTRANCE RAMP GORE MARKING

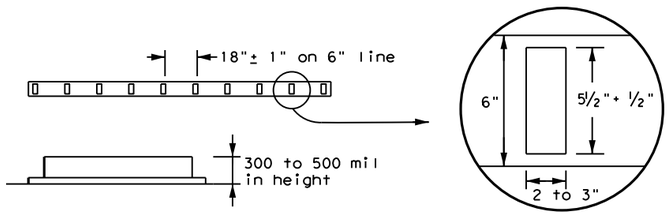
| MATERIAL SPECIFICATIONS | |
|---|---|
| PAVEMENT MARKERS (REFLECTORIZED) | DMS-4200 |
| EPOXY AND ADHESIVES | DMS-6100 |
| BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS | DMS-6130 |
| TRAFFIC PAINT | DMS-8200 |
| HOT APPLIED THERMOPLASTIC | DMS-8220 |
| PERMANENT PREFABRICATED PAVEMENT MARKINGS | DMS-8240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

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

| LEGEND | |
|---|---|
| ⇦ | Traffic flow |
| ↱ | Pavement marking arrows (white) |
| ▫ | Reflectorized Raised Markers (RPM) Type II-C-R |

**GENERAL NOTE**

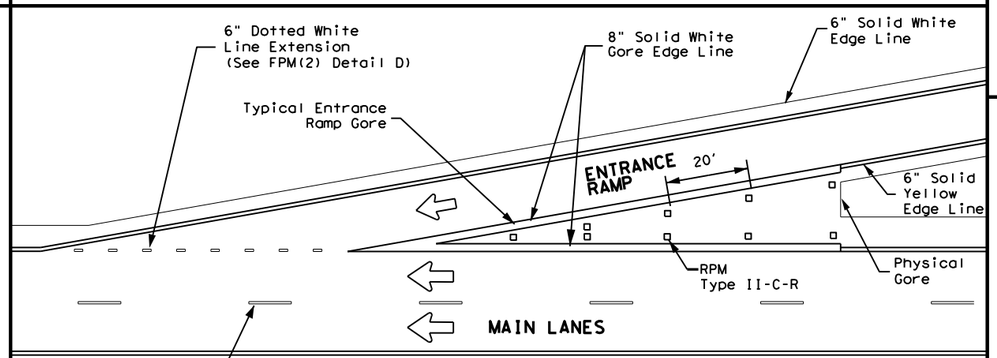
On concrete pavements the raised pavement markers shall be placed to one side of the longitudinal joints.




**NOTE**

Edge lines should typically be 6" wide and the materials shall be as specified in the plans. See details above if reflective profile pavement markings are to be used.

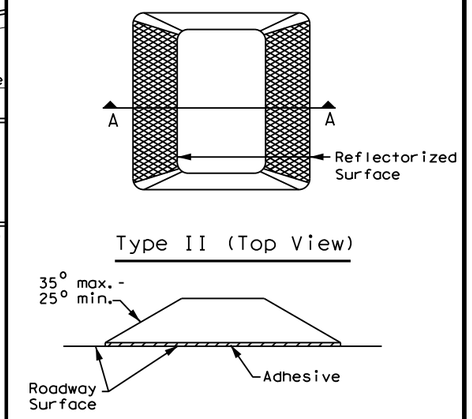
## EDGE LINE PAVEMENT MARKINGS




**NOTE**

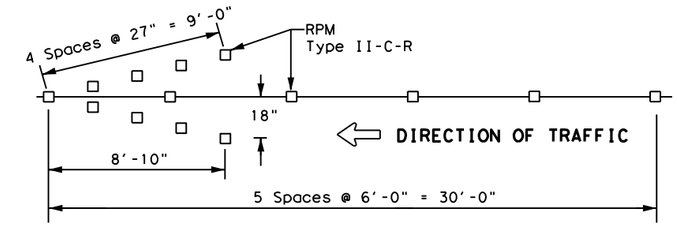
See the Roadway Design Manual Chapter 3 to determine if a tapered acceleration lane may be used.

## TAPERED ACCELERATION LANE




SECTION A

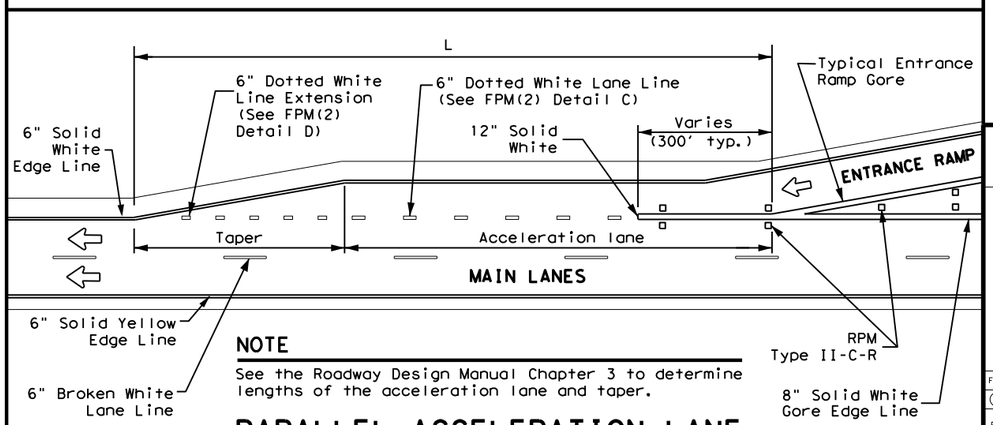
## REFLECTORIZED RAISED PAVEMENT MARKER (RPM)




**NOTES**

1. Reflectorized raised pavement markers Type-II-C-R in the wrong way arrow shall have the clear face toward normal traffic and the red face toward the wrong way traffic.
2. Red reflectorized wrong way arrows, not to exceed two, may be placed on exit ramps. Locations of the arrows shall be as shown in the plans or as directed by the engineer.

## WRONG WAY ARROW




**NOTE**

See the Roadway Design Manual Chapter 3 to determine lengths of the acceleration lane and taper.

## PARALLEL ACCELERATION LANE

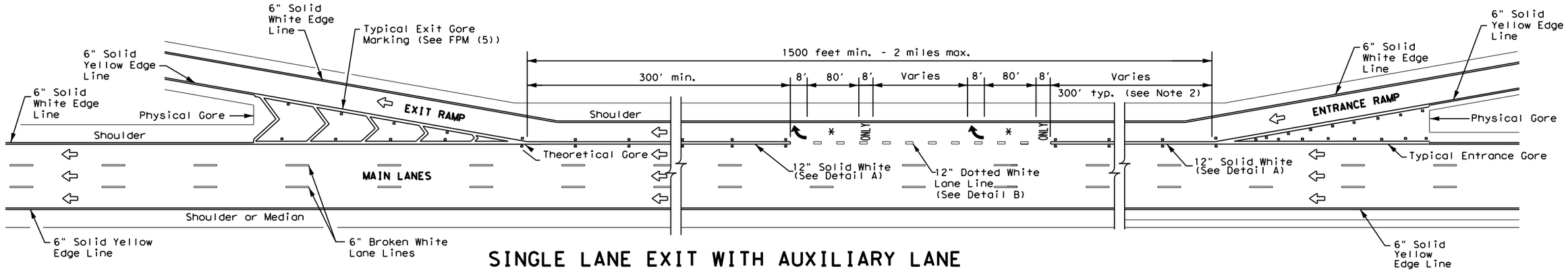
*Texas Department of Transportation* — *Traffic Safety Division Standard*

# TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS WITH RAISED PAVEMENT MARKERS

# FPM(1)-22

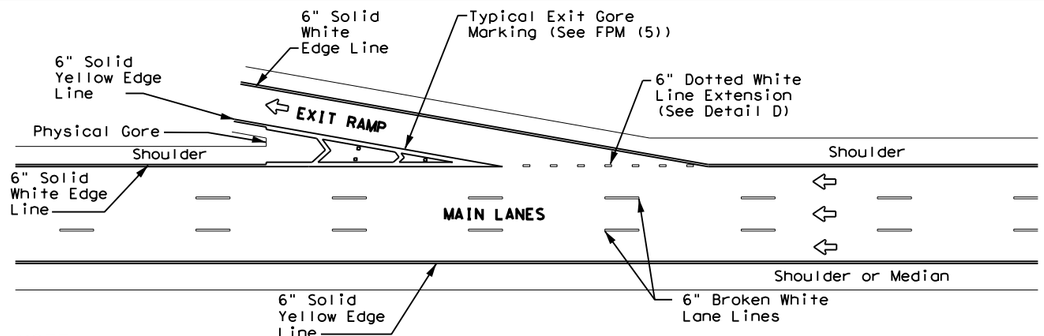
| FILE: fpm(1)-22.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| © TxDOT October 2022 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055, ETC. | US 82 |
| 5-74 8-00 2-12 | DIST | COUNTY | | SHEET NO. |
| 4-92 2-08 10-22 | CHS | DICKENS | | 50 |
| 5-00 2-10 | | | | |

23A




## SINGLE LANE EXIT WITH AUXILIARY LANE

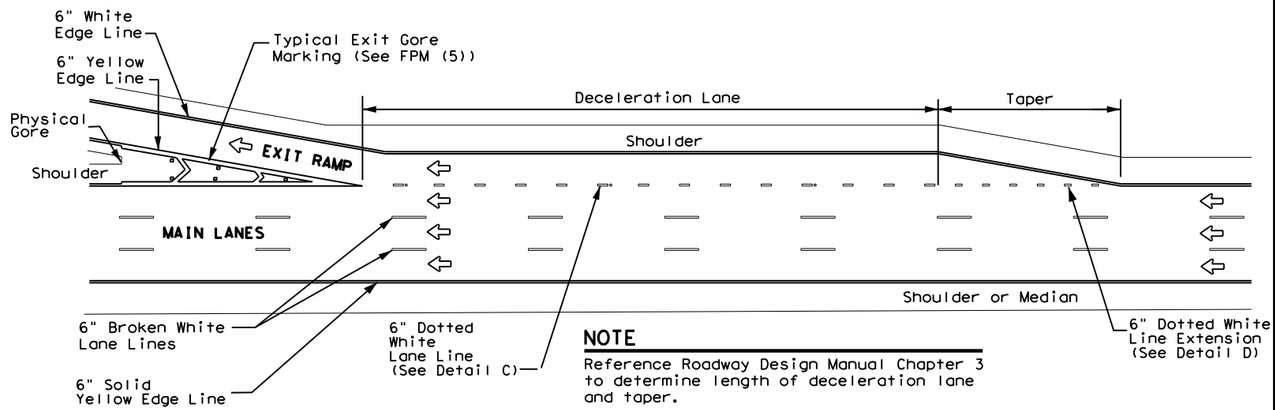
(See Note 2)




**NOTE**

Reference Roadway Design Manual Chapter 3 to determine if tapered deceleration lane may be used.

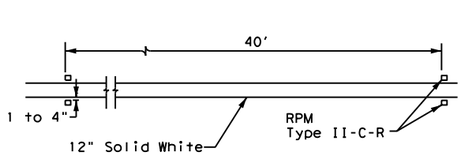
## TAPERED DECELERATION LANE



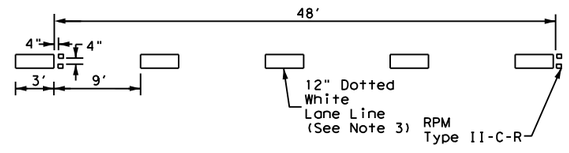

**NOTE**

Reference Roadway Design Manual Chapter 3 to determine length of deceleration lane and taper.

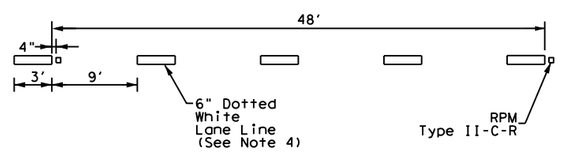
## PARALLEL DECELERATION LANE



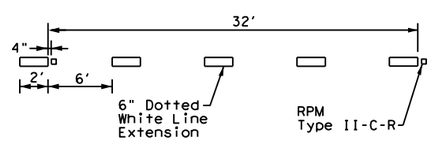

## DETAIL A




## DETAIL B




## DETAIL C




## DETAIL D

### GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") dotted lane line (see Detail B) is used to separate a through lane that continues beyond the interchange from an adjacent mandatory exit lane.
4. Normal (6") dotted lane line (see Detail C) is used at parallel acceleration and deceleration lanes.
5. See FPM(1) for traffic lane line pavement marking details.

| LEGEND | |
|---|---|
| ⇦ | Traffic flow |
| ↱ | Pavement marking arrows (white) |
| ▫ | Reflectorized Raised Markers (RPM) Type II-C-R |
| ✳ | Arrow markings are optional, however "ONLY" is required if arrow is used |

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

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

Texas Department of Transportation

Traffic Safety Division Standard

# TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS ENTRANCE AND EXIT RAMPS

# FPM(2)-22

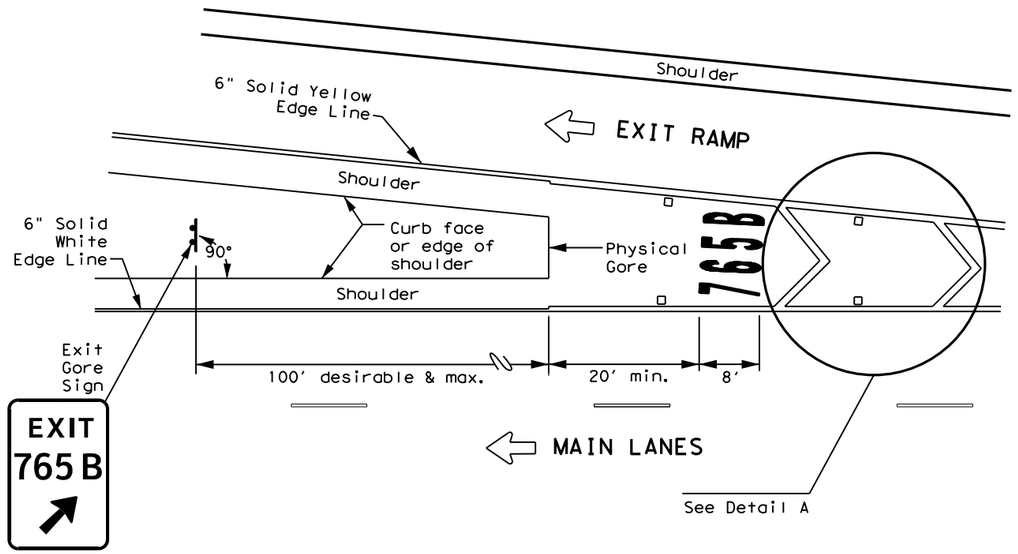
| FILE: fpm(2)-22.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| © TxDOT October 2022 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 2-77 5-00 2-12 4-92 8-00 10-22 8-95 2-10 | 0132 | 01 | 055, ETC. | US 82 |
| | DIST | COUNTY | | SHEET NO. |
| | CHS | DICKENS | | 51 |

23B

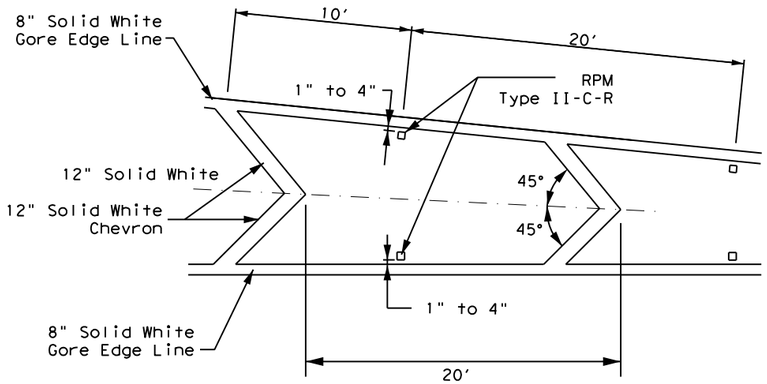
DATE:
FILE:

## EXIT NUMBER PAVEMENT MARKING NOTES

1. Minimum 8 foot white exit number pavement markings should be used, unless otherwise noted.
2. Spacing between letters and numbers should be approximately 4 inches.
3. Pavement markings are to be located as specified elsewhere in the plans.
4. Numbers and Letters details can be found in the Standard Highway Design for Texas (SHSD) Section 12 at http://www.txdot.gov




## MARKINGS WITH EXIT NUMBER




## NOTES

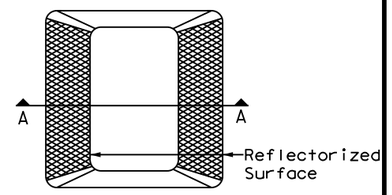
1. Raised pavement markers shall be centered between each chevron or neutral area line.
2. For more information, see Reflectorized Raised Pavement Marker Detail.

## DETAIL A

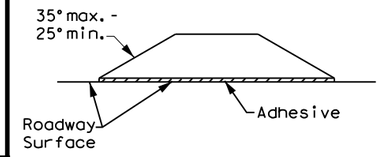
| MATERIAL SPECIFICATIONS | |
|---|---|
| PAVEMENT MARKERS (REFLECTORIZED) | DMS-4200 |
| EPOXY AND ADHESIVES | DMS-6100 |
| BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS | DMS-6130 |
| TRAFFIC PAINT | DMS-8200 |
| HOT APPLIED THERMOPLASTIC | DMS-8220 |
| PERMANENT PREFABRICATED PAVEMENT MARKINGS | DMS-8240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

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

| LEGEND | |
|---|---|
| ⇦ | Traffic flow |
| ▫ | Reflectorized Raised Markers (RPM) Type II-C-R |

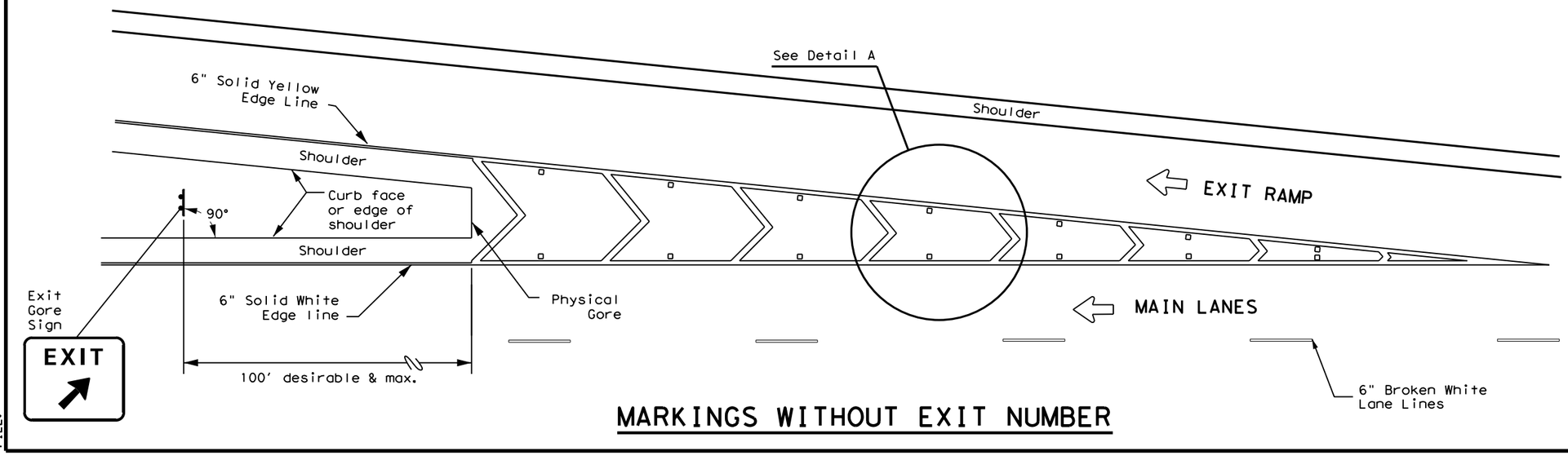



Type II (Top View)




SECTION A

## REFLECTORIZED RAISED PAVEMENT MARKER (RPM)




## MARKINGS WITHOUT EXIT NUMBER

Texas Department of Transportation

Traffic Safety Division Standard

# EXIT GORE PAVEMENT MARKINGS

# FPM(5)-22

| FILE: fpm(5)-22.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| ©TxDOT October 2022 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 9-19 10-22 | 0132 | 01 | 055, ETC. | US 82 |
| | DIST | COUNTY | | SHEET NO. |
| | CHS | DICKENS | | 52 |

23E

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FILE:

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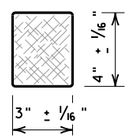
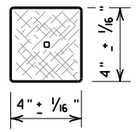
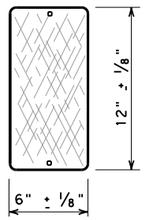
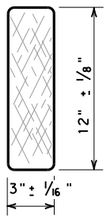
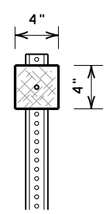
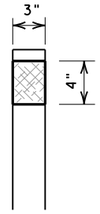
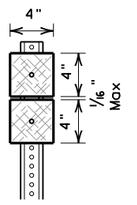
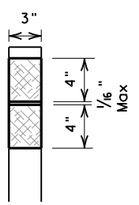
DATE:
FILE:

## REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

| | SIZE 1 | SIZE 2 | SIZE 3 | SIZE 4 |
|---|---|---|---|---|
| DEVICE |   |   |   |   |
| SHEETING | Yellow, White or Red Type B or C reflective sheeting | | | |
| NOTE | 1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx).<br>2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes. | | | |

## DELINEATORS

| | SINGLE | | DOUBLE | |
|---|---|---|---|---|
| DEVICE |   |   |   |   |
| | 1-Size 2 reflector unit | 1-Size 1 reflector unit | 2-Size 2 reflector units | 2-Size 1 reflector units |
| SHEETING | Yellow, White or Red Type B or C Reflective Sheeting | | | |
| POST TYPE | WC | YFLX, WFLX | WC | YFLX, WFLX |
| MOUNT TYPE | GND | GND, SRF | GND | GND, SRF |

## D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

**NUMBER OF REFLECTORS**
S = Single
D = Double

**COLOR OF REFLECTORS**
W = White
Y = Yellow
R = Red

**REFLECTOR UNIT SIZE**
1 or 2

**TYPE OF POST OR DELINEATOR**
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

**TYPE OF MOUNT**
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

**DIRECTION**
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

**TYPE OF OBJECT MARKER**
1, 2, 3, or 4

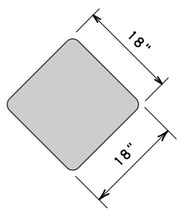
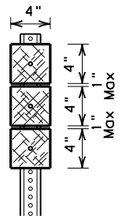
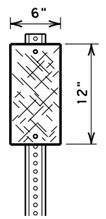
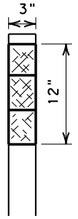
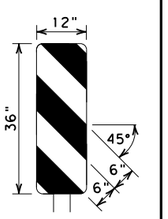
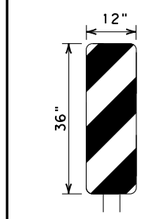
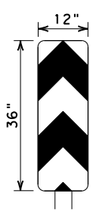
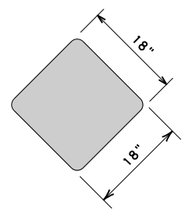
**NUMBER OF REFLECTORS OR DIRECTION**
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

**TYPE OF POST**
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

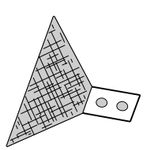
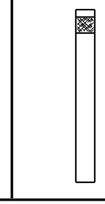
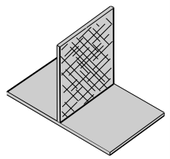
**TYPE OF MOUNT**
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

**DIRECTION**
If Required
BI = Bi-Directional

## OBJECT MARKERS

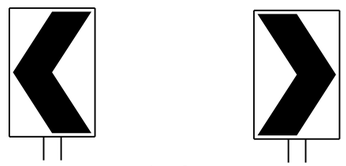
| | Type 1 (OM-1) | Type 2 (OM-2) | | | Type 3 (OM-3) | | | Type 4 (OM-4) |
|---|---|---|---|---|---|---|---|---|
| | OM-1 | OM-2X | OM-2Y | OM-2Z | OM-3L | OM-3R | OM-3C | OM-4 |
| DEVICE |   |   |   |   |   |   |   |   |
| | | 3-Size 2 reflector units | 1-Size 3 reflector unit | 3-Size 1 reflector units or 1-Size 4 reflector unit | | | | |
| SHEETING | Yellow-Type $B_{FL}$ or $C_{FL}$ Sheeting | Yellow - Type B or C Sheeting | | | Alternating acrylic black and retroflective yellow - Type $B_{FL}$ or $C_{FL}$ Sheeting | | | Red -Type $B_{FL}$ or $C_{FL}$ Sheeting |
| POST TYPE | TWT | WC | WC | WFLX | TWT | | | TWT |
| MOUNT TYPE | WAS, WAP | GND | GND | GND, SRF | WAS, WAP | | | WAS, WAP |

## BARRIER REFLECTORS (BRF)

| | GF1 | GF2 | CTB |
|---|---|---|---|
| DEVICE |  |  |  |
| NOTE | 1. Barrier reflectors shall meet the requirements of DMS 8600.<br>2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov. | | |
| SHEETING | Yellow, White, Red | | |
| NOTE | 1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches. | | |

## CHEVRONS

DEVICE



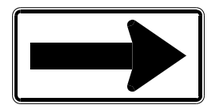
W1-8

| SIZE (W x L) | 18"x 24" (Conventional) | 24"x 30" (Conventional Oversize) | 30"x 36" (Expressway) | 36" x 48" (Freeway) |
|---|---|---|---|---|
| MOUNTING HEIGHT | 4'-0" or 7'-0" | | 7'-0" Only | |

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

## ONE DIRECTION LARGE ARROW

DEVICE



W1-6

| SIZE (W x L) | 48" x 24" (Conventional) | 60" x 30" (Expressway & Freeway) |
|---|---|---|
| MOUNTING HEIGHT | 7'-0" | |

## DEPARTMENTAL MATERIAL SPECIFICATIONS

| | |
|---|---|
| FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES) | DMS-4400 |
| SIGN FACE MATERIALS | DMS-8300 |
| DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS | DMS-8600 |

## NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

# DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

# D & OM(1)-20

| FILE: dom1-20.dgn | DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|---|
| ©TxDOT August 2004 | CONT | SECT | JOB | HIGHWAY |
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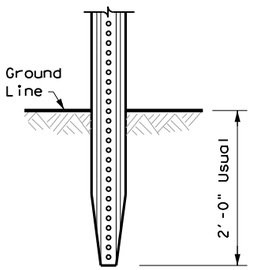
| 10-09 3-15 | DIST | COUNTY | | SHEET NO. |
| 4-10 7-20 | CHS | DICKENS | | 53 |

20A

# POST TYPE AND SUPPORT FOUNDATION DETAILS

## WING CHANNEL (WC)

### GND

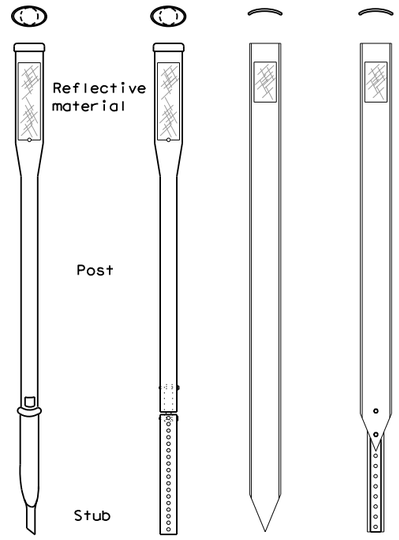



**NOTES**

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

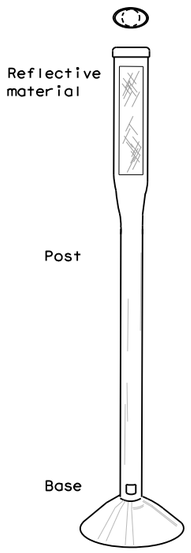
## FLEXIBLE POSTS (YFLX, WFLX)

### GND




EMBEDDED

### SRF



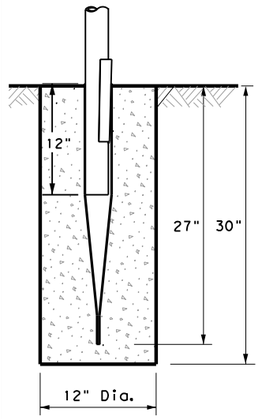

SURFACE MOUNT

**NOTES**

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

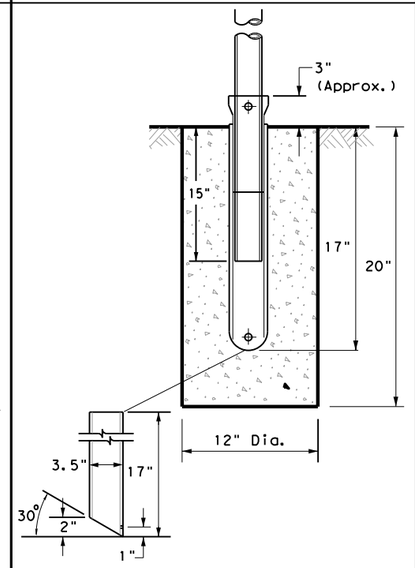
## WEDGE ANCHOR SYSTEMS

### WAS




STEEL

### WAP




PLASTIC

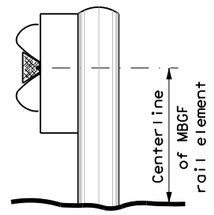
**NOTE**

1. Install per manufacturer's recommendations.

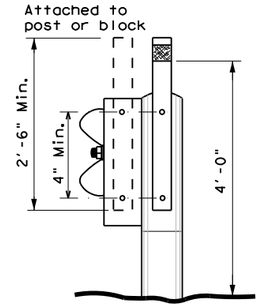
# TYPE OF BARRIER MOUNTS

## GUARD FENCE ATTACHMENT

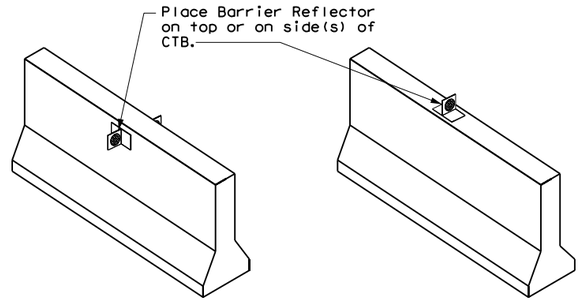
### GF1




### GF2



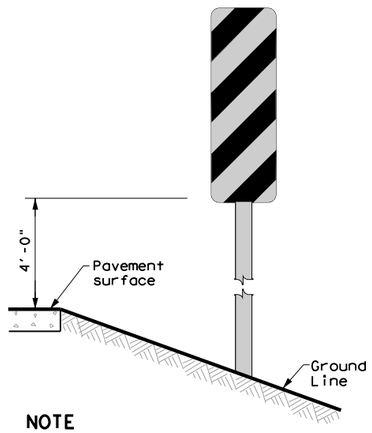

## CONCRETE TRAFFIC BARRIER (CTB)




**GENERAL NOTES**

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

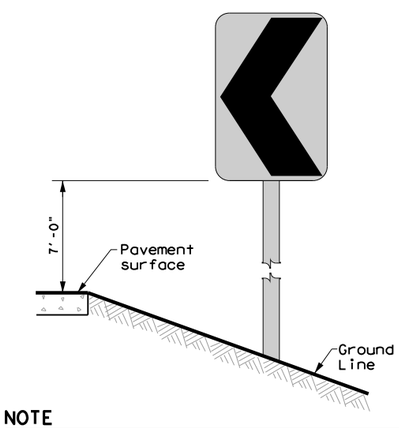
## TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS




**NOTE**

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

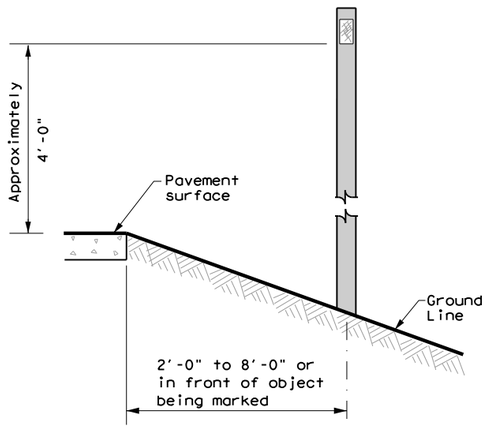
## CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN




**NOTE**

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

## DELINEATORS AND TYPE 2 OBJECT MARKERS




See general notes 1, 2 and 3.

Texas Department of Transportation — Traffic Safety Division Standard

# DELINEATOR & OBJECT MARKER INSTALLATION

# D & OM(2)-20

| FILE: dom2-20.dgn | DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|---|
| © TxDOT August 2004 | CONT | SECT | JOB | HIGHWAY |
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| 10-09 3-15 | DIST | COUNTY | | SHEET NO. |
| 4-10 7-20 | CHS | DICKENS | | 54 |

20B

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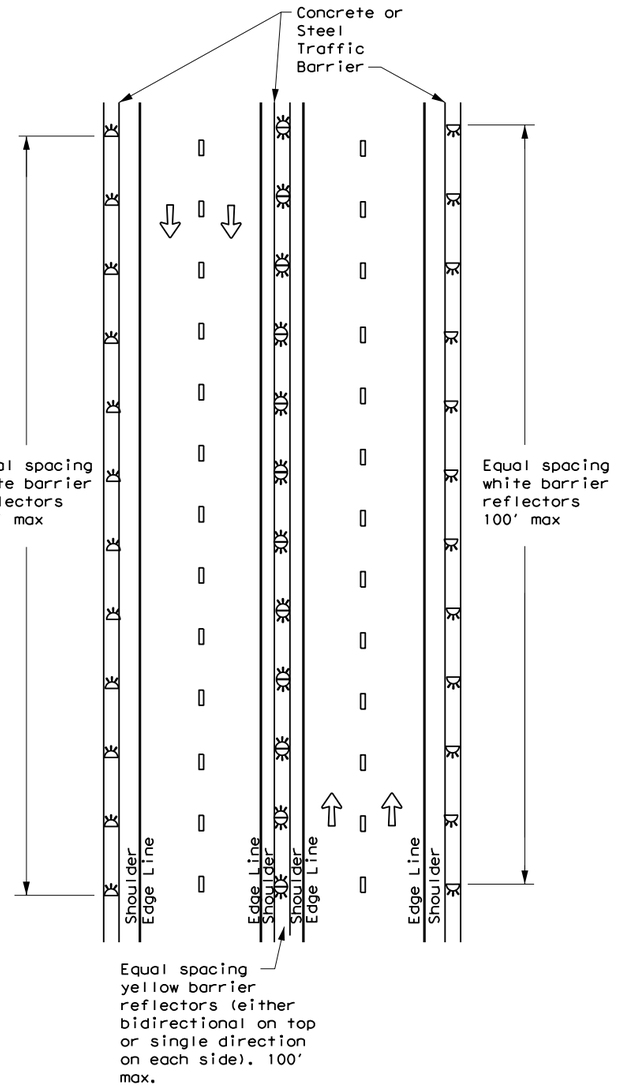
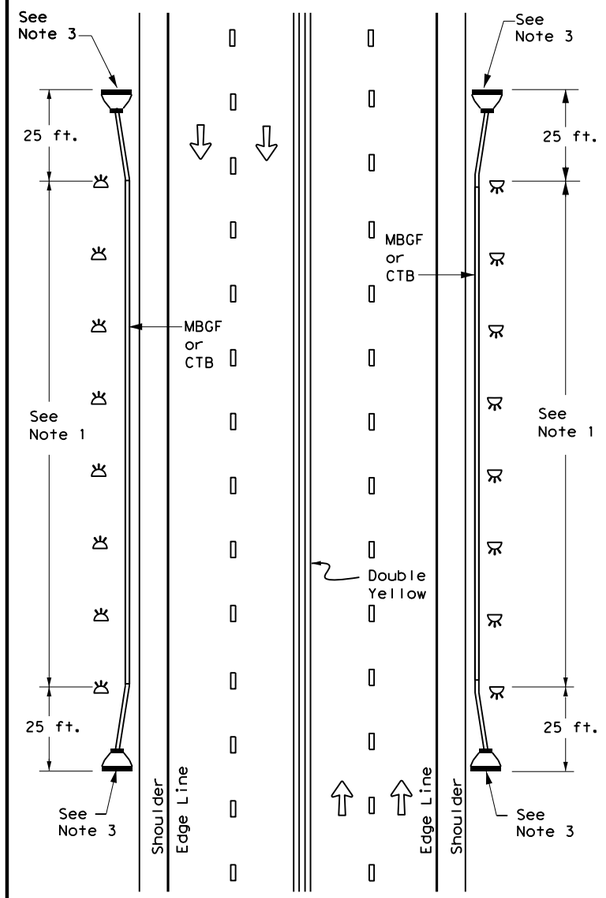
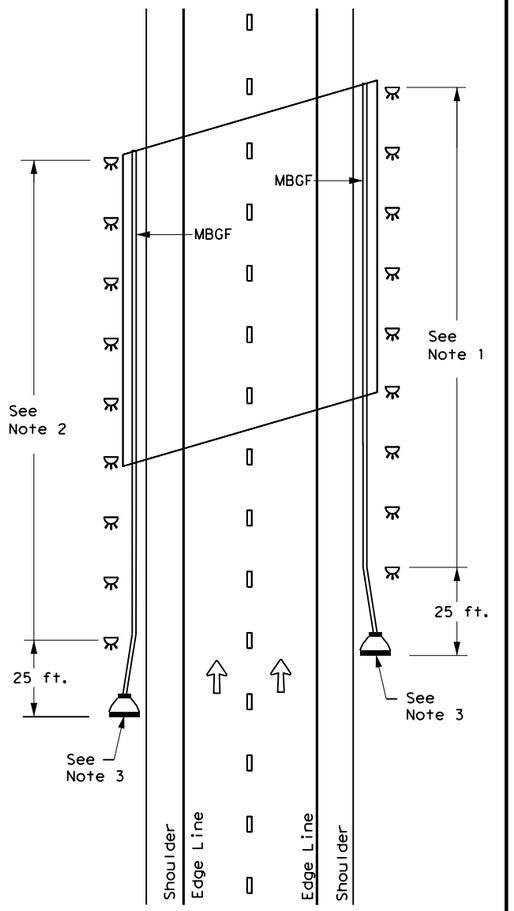
## CONTINUOUS CONCRETE OR STEEL BARRIER



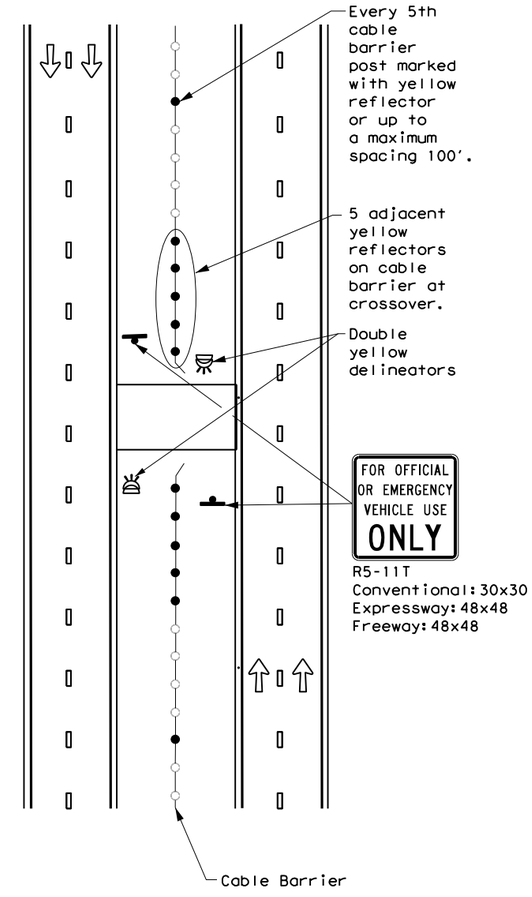

## MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)




## DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)




## EMERGENCY CROSSOVER




## NOTES

1. Equal spacing (100' max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100' max.)
2. Equal spacing (100' max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3)in front of the terminal end.

## LEGEND

| | |
|---|---|
| | Bidirectional Delineator |
| | Delineator |
| | OM-3 |
| | OM-2 |
| | Terminal End |
| | Traffic Flow |

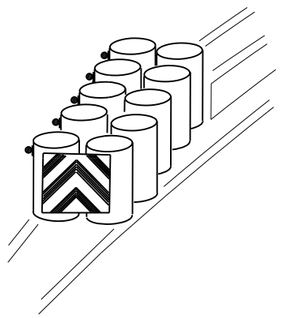
Texas Department of Transportation

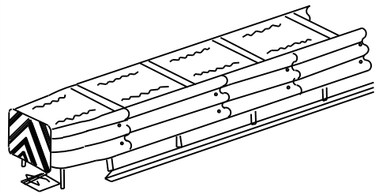
Traffic Safety Division Standard

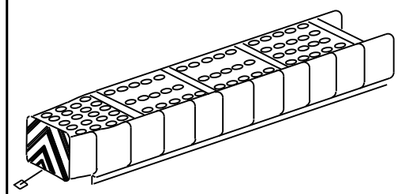
# DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

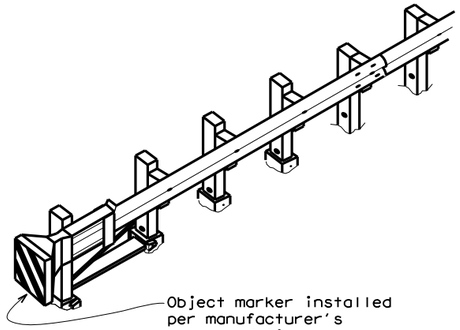
# D & OM(6)-20

| FILE: dom6-20.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT August 2015 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055.ETC. | US 82 |
| 7-20 | DIST | COUNTY | | SHEET NO. |
| | CHS | DICKENS | | 55 |

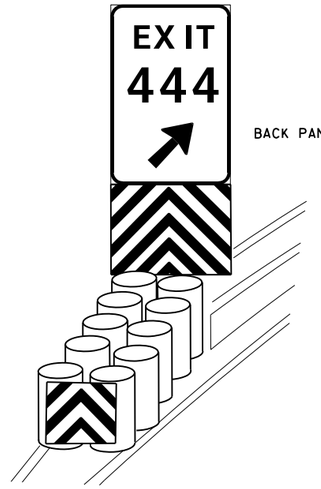




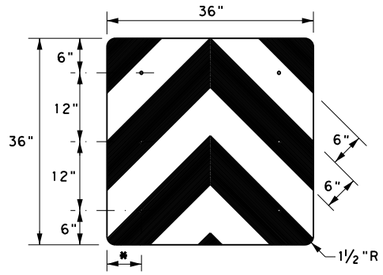


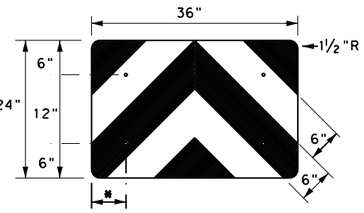


Object marker installed per manufacturer's recommendations.

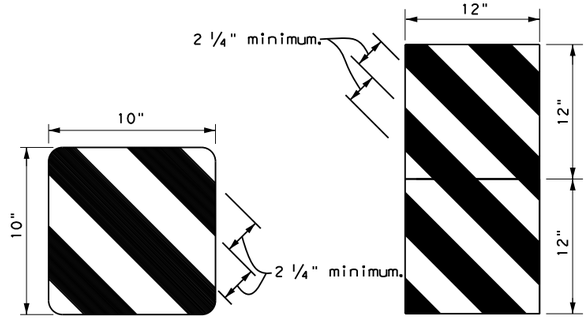



BACK PANEL (OPTIONAL)

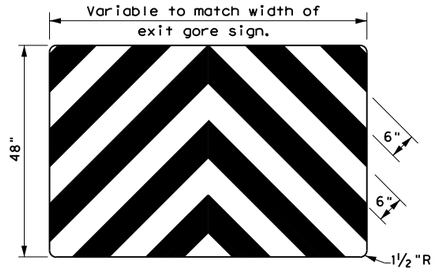


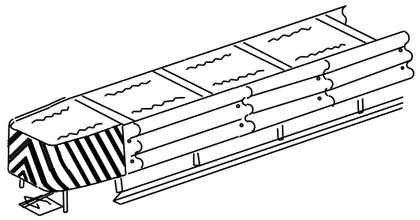



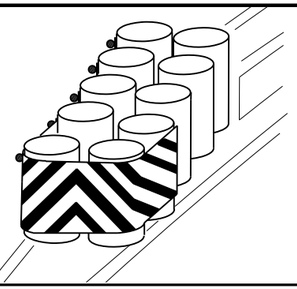

* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

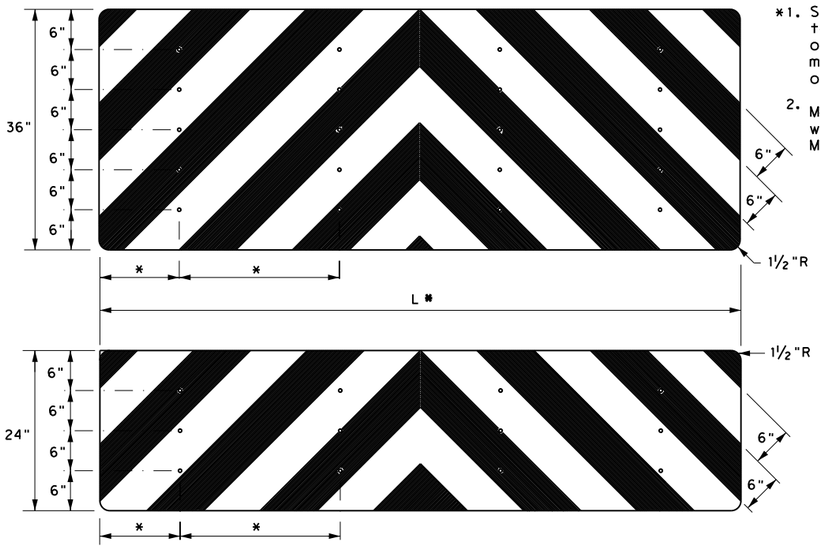



OBJECT MARKERS SMALLER THAN 3 FT$^2$








## NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

## NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

Traffic Safety Division Standard

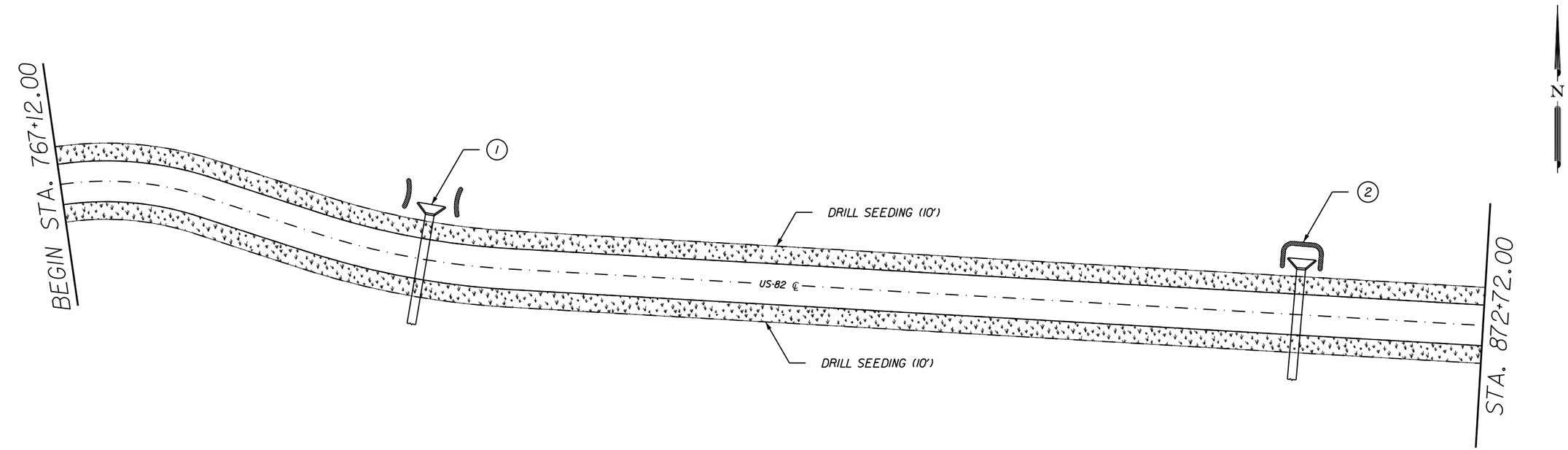
# DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

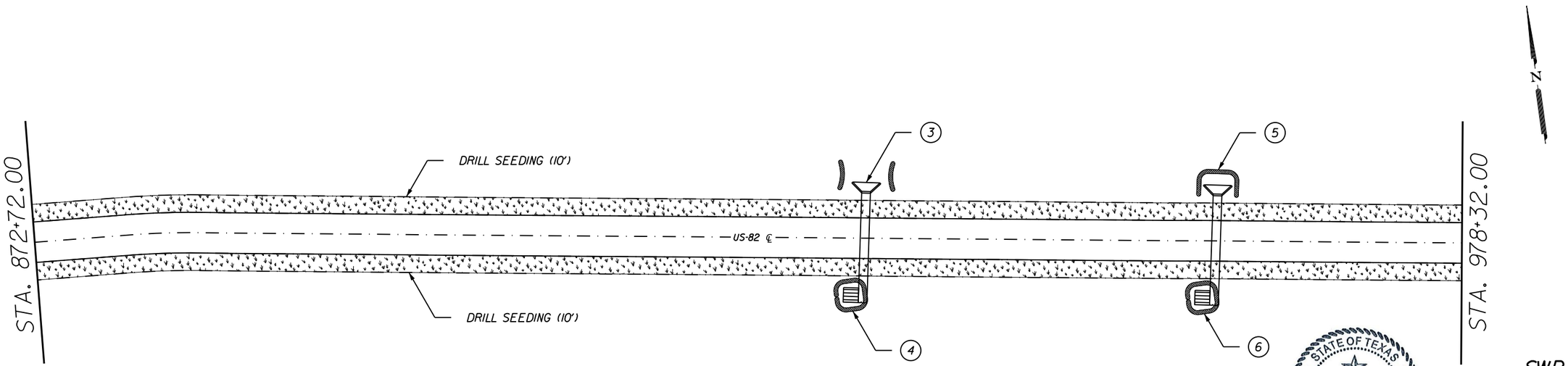
# D & OM(VIA)-20

| FILE: domvia20.dgn | DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|---|
| © TxDOT December 1989 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055, ETC. | US 82 |
| 4-92 8-04 | DIST | COUNTY | | SHEET NO. |
| 8-95 3-15 | CHS | DICKENS | | 56 |
| 4-98 7-20 | | | | |

20G

DATE:
FILE:




DATE: $DATE$ $TIME$
FILE: $FILE$

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CHARLES B. STEED
88647
LICENSED
PROFESSIONAL ENGINEER

Charles B. Steed, P.E.

08/24/2023

# SWP3 LAYOUT

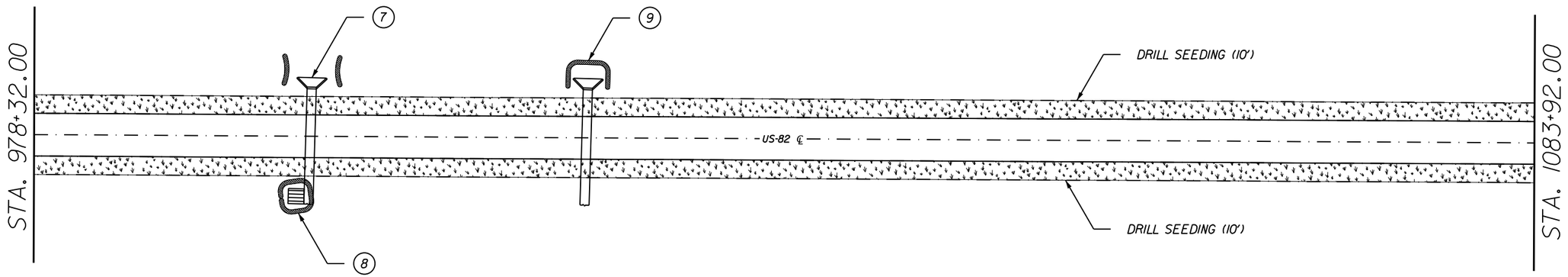
(NO SCALE)

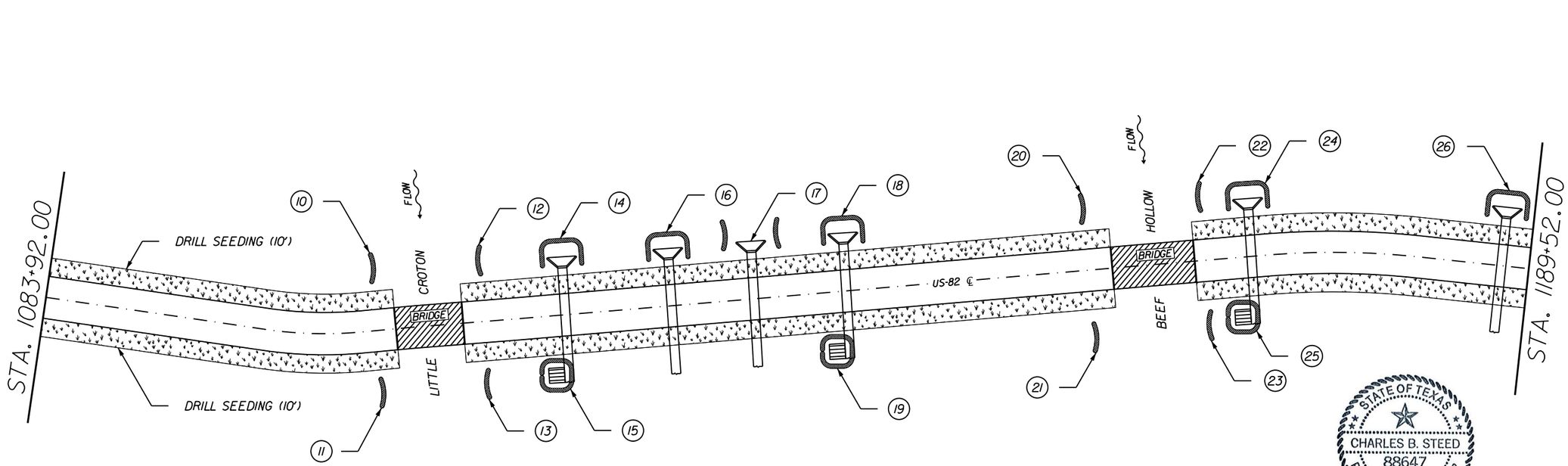


Texas Department of Transportation

SHEET 1 OF 5

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055.ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 57 |

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# SWP3 LAYOUT

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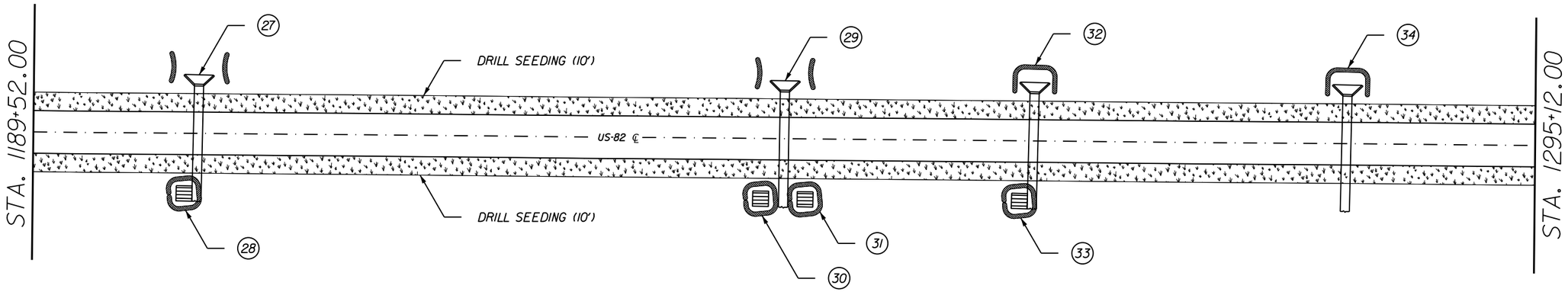
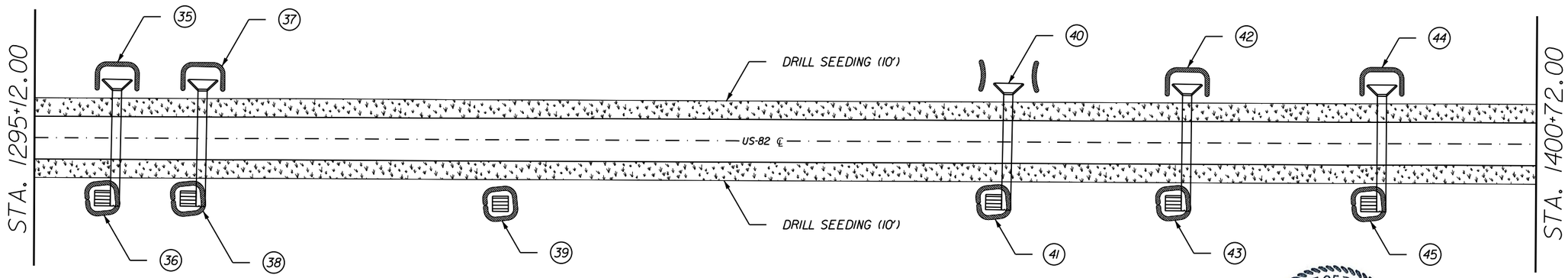
Texas Department of Transportation

SHEET 2 OF 5

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055.ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 58 |

DATE: $DATE$ $TIME$
FILE: $FILE$

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# SWP3 LAYOUT

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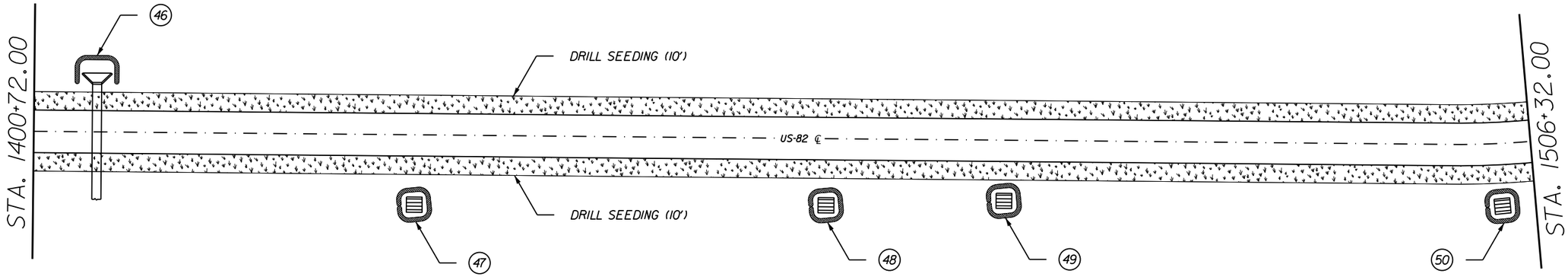
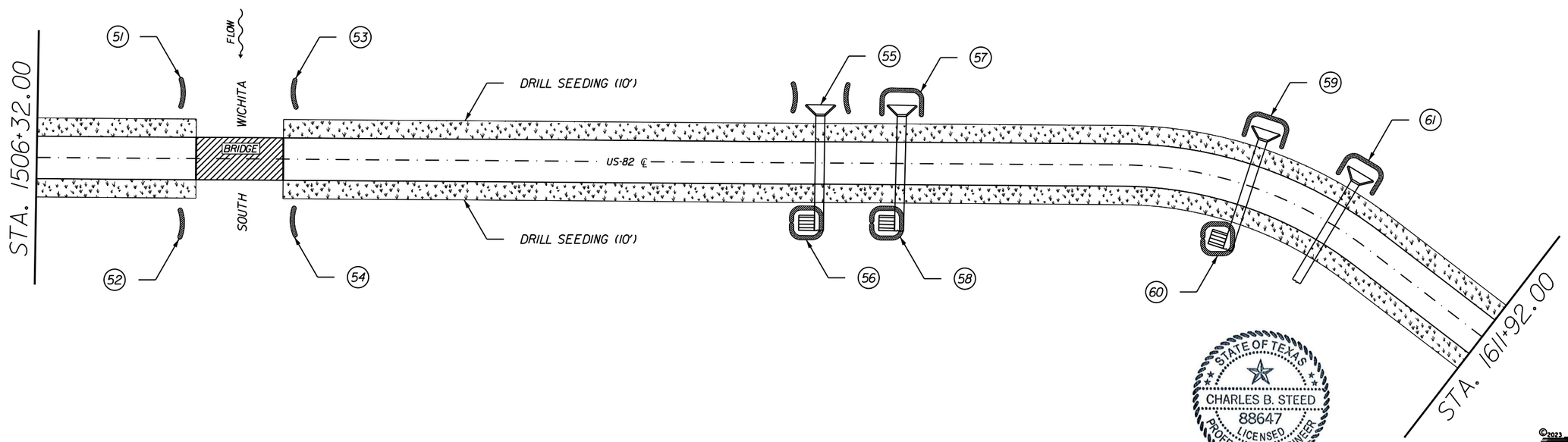
Texas Department of Transportation

SHEET 3 OF 5

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055.ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 59 |

DATE: $DATE$ $TIME$
FILE: $FILE$

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# SWP3 LAYOUT

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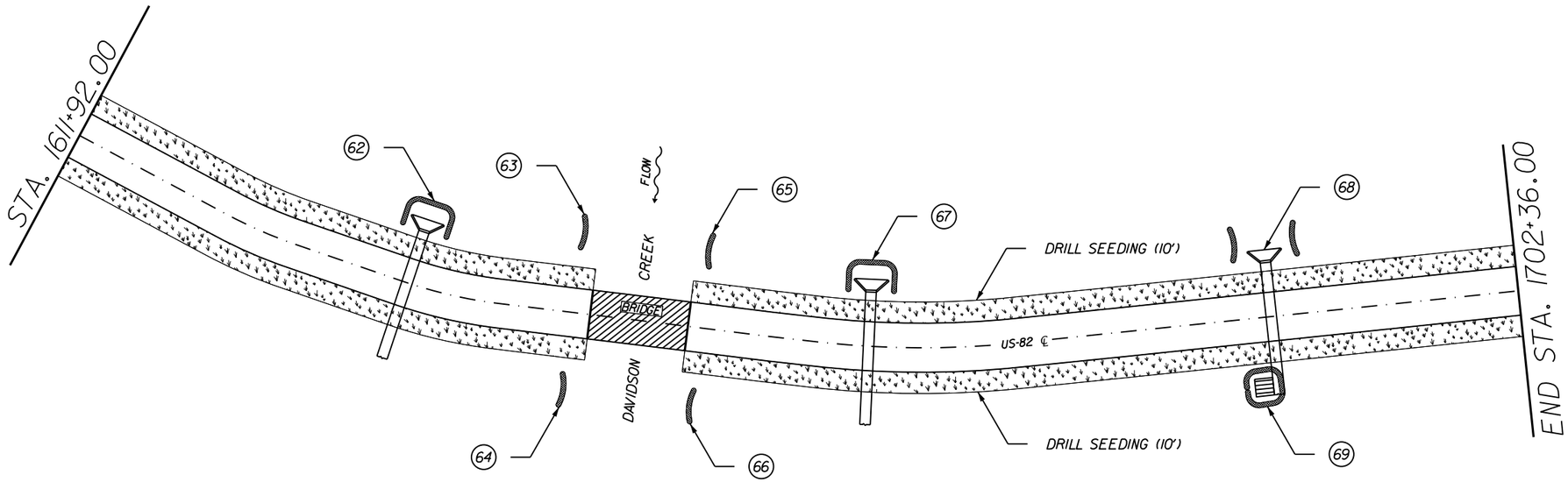
Texas Department of Transportation

SHEET 4 OF 5

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055.ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 60 |

DATE: $DATE$ $TIME$
FILE: $FILE$

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08/24/2023

# SWP3 LAYOUT

(NO SCALE)

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SHEET 5 OF 5

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055.ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 61 |

DATE: $DATE$ $TIME$
FILE: $FILE$

## SUMMARY OF EROSION LOGS

| LOCATION NO. | STRUCTURE | STATION | OFFSET FROM US-82 (WB) CL (FT) | EROSION LOG TOTAL (FT) | INSTALL DATE | REMOVAL DATE |
|---|---|---|---|---|---|---|
| 1 | CULVERT | 794+58 | 44L | 40 | | |
| 2 | CULVERT | 859+15 | 36L | 20 | | |
| 3 | CULVERT | 934+16 | 42L | 40 | | |
| 4 | DROP INLET | 934+16 | 42R | 20 | | |
| 5 | CULVERT | 960+18 | 45L | 20 | | |
| 6 | DROP INLET | 960+18 | 45R | 20 | | |
| 7 | CULVERT | 997+78 | 49L | 40 | | |
| 8 | DROP INLET | 997+78 | 43R | 20 | | |
| 9 | CULVERT | 1017+22 | 47L | 20 | | |
| 10 | L.C. BRIDGE | 1110+26 | 56L | 20 | | |
| 11 | L.C. BRIDGE | 1110+26 | 42R | 20 | | |
| 12 | L.C. BRIDGE | 1112+00 | 45L | 20 | | |
| 13 | L.C. BRIDGE | 1112+00 | 45R | 20 | | |
| 14 | CULVERT | 1115+40 | 48L | 20 | | |
| 15 | DROP INLET | 1115+40 | 48R | 20 | | |
| 16 | CULVERT | 1123+20 | 54L | 20 | | |
| 17 | CULVERT | 1131+18 | 46L | 40 | | |
| 18 | CULVERT | 1141+16 | 48L | 20 | | |
| 19 | DROP INLET | 1141+16 | 44R | 20 | | |
| 20 | B.H. BRIDGE | 1161+78 | 80L | 20 | | |
| 21 | B.H. BRIDGE | 1161+78 | 51R | 20 | | |
| 22 | B.H. BRIDGE | 1163+62 | 80L | 20 | | |
| 23 | B.H. BRIDGE | 1163+62 | 47R | 20 | | |
| 24 | CULVERT | 1168+61 | 52L | 20 | | |
| 25 | DROP INLET | 1168+61 | 51R | 20 | | |
| 26 | CULVERT | 1188+82 | 48L | 20 | | |
| 27 | CULVERT | 1201+16 | 48L | 40 | | |
| 28 | DROP INLET | 1201+16 | 46R | 20 | | |
| CSJ: 0132-01-055 TOTAL | | | | 660 | | |

NOTE: EROSION LOGS SHALL BE INSTALLED AS SHOWN ON EC(9)-16.

## SUMMARY OF EROSION LOGS (CONT.)

| LOCATION NO. | STRUCTURE | STATION | OFFSET FROM US-82 (WB) CL (FT) | EROSION LOG TOTAL (FT) | INSTALL DATE | REMOVAL DATE |
|---|---|---|---|---|---|---|
| 29 | DROP INLET | 1242+14 | 45R | 20 | | |
| 30 | CULVERT | 1242+32 | 53L | 40 | | |
| 31 | DROP INLET | 1242+50 | 45R | 20 | | |
| 32 | CULVERT | 1259+86 | 50L | 40 | | |
| 33 | DROP INLET | 1259+86 | 46R | 20 | | |
| 34 | CULVERT | 1281+85 | 48L | 20 | | |
| 35 | CULVERT | 1300+80 | 48L | 20 | | |
| 36 | DROP INLET | 1300+80 | 46R | 20 | | |
| 37 | CULVERT | 1306+80 | 48L | 20 | | |
| 38 | DROP INLET | 1306+80 | 46R | 20 | | |
| 39 | DROP INLET | 1328+83 | 46R | 20 | | |
| 40 | CULVERT | 1363+56 | 48L | 40 | | |
| 41 | DROP INLET | 1363+56 | 46R | 20 | | |
| 42 | CULVERT | 1376+09 | 47L | 20 | | |
| 43 | DROP INLET | 1376+09 | 44R | 20 | | |
| 44 | CULVERT | 1389+78 | 50L | 20 | | |
| 45 | DROP INLET | 1389+78 | 48R | 20 | | |
| 46 | CULVERT | 1405+16 | 48L | 20 | | |
| 47 | DROP INLET | 1427+82 | 42R | 20 | | |
| 48 | DROP INLET | 1456+86 | 38R | 20 | | |
| 49 | DROP INLET | 1468+82 | 44R | 20 | | |
| 50 | DROP INLET | 1504+37 | 42R | 20 | | |
| 51 | S.W. BRIDGE | 1519+15 | 60L | 20 | | |
| 52 | S.W. BRIDGE | 1519+15 | 42R | 20 | | |
| 53 | S.W. BRIDGE | 1521+74 | 70L | 20 | | |
| 54 | S.W. BRIDGE | 1521+74 | 50R | 20 | | |
| 55 | CULVERT | 1561+67 | 48L | 40 | | |
| 56 | DROP INLET | 1561+67 | 48R | 20 | | |
| 57 | CULVERT | 1567+15 | 48L | 20 | | |
| 58 | DROP INLET | 1567+38 | 42R | 20 | | |
| 59 | CULVERT | 1592+12 | 85L | 40 | | |
| 60 | DROP INLET | 1592+12 | 46R | 20 | | |
| 61 | CULVERT | 1598+55 | 56L | 20 | | |
| 62 | CULVERT | 1633+96 | 48L | 20 | | |
| 63 | D.C. BRIDGE | 1647+16 | 46L | 20 | | |
| 64 | D.C. BRIDGE | 1647+16 | 52R | 20 | | |
| 65 | D.C. BRIDGE | 1649+55 | 77L | 20 | | |
| 66 | D.C. BRIDGE | 1649+55 | 51R | 20 | | |
| 67 | CULVERT | 1662+43 | 52L | 20 | | |
| 68 | CULVERT | 1687+10 | 48L | 40 | | |
| 69 | DROP INLET | 1687+10 | 42R | 20 | | |
| CSJ: 0132-02-037 TOTAL | | | | 940 | | |
| PROJECT TOTAL | | | | 1600 | | |

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08/24/2023

SWP3
SUMMARY

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SHEET 1 OF 1

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0132 | 01 | 055,ETC. | US 82 |
| DIST | COUNTY | | SHEET NO. |
| CHS | DICKENS | | 62 |

DN: $TIME$
DATE: $DATE$
FILE: $FILE$

## STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept in the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

### 1.0 SITE/PROJECT DESCRIPTION

**1.1 PROJECT CONTROL SECTION JOB (CSJ):**
0132-01-055, 0132-02-037

**1.2 PROJECT LIMITS:**
From: 1,186 FT. EAST OF DICKENS ECL

To: KING COUNTY LINE

**1.3 PROJECT COORDINATES:**
BEGIN: (Lat) 33.626280 (N) ,(Long) 100.821318 (W)

END: (Lat) 33.602271 (N) ,(Long) 100.517988 (W)

**1.4 TOTAL PROJECT AREA (Acres):** 124.76

**1.5 TOTAL AREA TO BE DISTURBED (Acres):** 42.94

**1.6 NATURE OF CONSTRUCTION ACTIVITY:**
CONSTRUCTION OF ACP OVERLAY CONSISTING OF ACP, STRIPING, AND METAL-BEAM GUARD FENCE.

**1.7 MAJOR SOIL TYPES:**

| Soil Type | Description |
|---|---|
| Woodward-Deepwood-Quinlan complex 2 to 12% slopes | Well drained, and medium rate of runoff. |
| Deepwood-Quinlan-Cottonwood Complex 5 to 50% slopes | Well drained and medium rate of runoff. |
| Olton Clay Loam 0 to 3% slopes | 100% clay, well drained, low rate of runoff. |
| Miles Fine Sandy Loam 1 to 5% slopes | 85% miles, well drained, and low rate of runoff. |
| | |
| | |
| | |

**1.8 PROJECT SPECIFIC LOCATIONS (PSLs):**
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☐ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☒ No PSLs planned for construction

| Type | Sheet #s |
|---|---|
| | |
| | |
| | |
| | |
| | |

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

**1.9 CONSTRUCTION ACTIVITIES:**
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

☒ Mobilization
☒ Install sediment and erosion controls
☒ Blade existing topsoil into windrows, prep ROW, clear and grub
☐ Remove existing pavement
☒ Grading operations, excavation, and embankment
☐ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☒ Remove existing metal beam guard fence (MBGF), bridge rail
☒ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☒ Install mow strip, MBGF, bridge rail
☐ Place flex base
☐ Rework slopes, grade ditches
☐ Blade windrowed material back across slopes
☒ Revegetation of unpaved areas
☒ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

**1.10 POTENTIAL POLLUTANTS AND SOURCES:**

☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☒ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☒ Solvents, paints, adhesives, etc. from various construction activities
☐ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☐ Contaminated water from excavation or dewatering pump-out water
☒ Sanitary waste from onsite restroom facilities
☒ Trash from various construction activities/receptacles
☐ Long-term stockpiles of material and waste
☐ Other: _____
☐ Other: _____
☐ Other: _____

**1.11 RECEIVING WATERS:**
Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

| Tributaries | Classified Waterbody |
|---|---|
| Little Croton Creek | Croton Creek (1238A); Brazos River Basin |
| None | S. Fork Wichita River (0226); Red River Basin |
| No TMDLs or I-Plans were identified. | |
| | |
| | |
| | |

* Add (*) for impaired waterbodies with pollutant in ().

**1.12 ROLES AND RESPONSIBILITIES: TxDOT**

☒ Development of plans and specifications
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☐ Submit NOI/CSN to local MS4
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

**1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR**

☒ Day To Day Operational Control
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☐ Submit NOI/CSN to local MS4
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

**1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:**

| MS4 Entity |
|---|
| No MS4s recieve stormwater discharge from the site. |
| |
| |
| |
| |

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11/02/2023

## STORMWATER POLLUTION PREVENTION PLAN (SWP3)



Texas Department of Transportation



| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| | C 132-1-55 | | 63 |
| STATE | STATE DIST. | COUNTY | |
| TEXAS | CHS | DICKENS | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0132 | 01 | 055,ETC. | US 82 |

## STORMWATER POLLUTION PREVENTION PLAN (SWP3):

### 2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

### 2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

**T / P**

- ☒ ☒ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- ☐ ☒ Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

### 2.2 SEDIMENT CONTROL BMPs:

**T / P**

- ☒ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- ☐ ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

**T / P**

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - ☐ Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☒ Required (>10 acres), but not feasible due to:
    - ☒ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

### 2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

| Type | Stationing | |
|---|---|---|
| | From | To |
| No permanent controls are planned. | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

### 2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☒ Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☒ Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

### 2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☐ Concrete and Materials Waste Management
- ☒ Debris and Trash Management
- ☒ Dust Control
- ☒ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

### 2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

| Type | Stationing | |
|---|---|---|
| | From | To |
| No surface waters present. Vegetated buffer zones are not planned. | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

### 2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- ☒ Fire hydrant flushings
- ☒ Irrigation drainage
- ☒ Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- ☒ Potable water sources
- ☒ Springs
- ☒ Uncontaminated groundwater
- ☒ Water used to wash vehicles or control dust
- ☒ Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

### 2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3 .

### 2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

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11/02/2023

**STORMWATER POLLUTION PREVENTION PLAN (SWP3)**



Sheet 2 of 2

*Texas Department of Transportation*

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| | C 132-1-55 | | 64 |
| STATE | STATE DIST. | COUNTY | |
| TEXAS | CHS | DICKENS | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0132 | 01 | 055,ETC. | US 82 |

DATE:
FILE:

## 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 disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

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.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

| Erosion | Sedimentation | Post-Construction TSS |
|---|---|---|
| ☒ Temporary Vegetation | ☐ Silt Fence | ☐ Vegetative Filter Strips |
| ☐ Blankets/Matting | ☐ Rock Berm | ☐ Retention/Irrigation Systems |
| ☐ Mulch | ☐ Triangular Filter Dike | ☐ Extended Detention Basin |
| ☐ Sodding | ☐ Sand Bag Berm | ☐ Constructed Wetlands |
| ☐ Interceptor Swale | ☐ Straw Bale Dike | ☐ Wet Basin |
| ☐ Diversion Dike | ☐ Brush Berms | ☐ Erosion Control Compost |
| ☐ Erosion Control Compost | ☐ Erosion Control Compost | ☐ Mulch Filter Berm and Socks |
| ☐ Mulch Filter Berm and Socks | ☐ Mulch Filter Berm and Socks | ☐ Compost Filter Berm and Socks |
| ☐ Compost Filter Berm and Socks | ☐ Compost Filter Berm and Socks | ☒ Vegetation Lined Ditches |
| | ☐ Stone Outlet Sediment Traps | ☐ Sand Filter Systems |
| | ☐ Sediment Basins | ☐ Grassy Swales |

## III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease 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. Minimize impacts to existing vegetation in the project area; impacted vegetation should be replaced with in-kind native vegetation. Trim trees instead of removal (when possible). Re-vegetation proposed for the project would be in compliance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscapes.
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. Migratory Birds - Do not disturb, destroy, or remove active nests including nesting birds during the nesting season. Avoid impacts to birds, their eggs, and their young. Avoid the removal of unoccupied, inactive nests, as practical.
2. Eastern Spotted Skunk - Avoid harming species if encountered and avoid unnecessary impacts to dens.
3. Texas Horned Lizard - Potential occurrence in the project area. If the Texas Horned Lizard is found in the project area; avoid harming the species and allow the species to safely leave the project area. This should include avoiding harvester ant mounds in the selection of project specific locations (PSLs). avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter where feasible.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

### LIST OF ABBREVIATIONS

| | | | |
|---|---|---|---|
| BMP: | Best Management Practice | SPCC: | Spill Prevention Control and Countermeasure |
| CGP: | Construction General Permit | SW3P: | Storm Water Pollution Prevention Plan |
| DSHS: | Texas Department of State Health Services | PCN: | Pre-Construction Notification |
| FHWA: | Federal Highway Administration | PSL: | Project Specific Location |
| MOA: | Memorandum of Agreement | TCEQ: | Texas Commission on Environmental Quality |
| MOU: | Memorandum of Understanding | TPDES: | Texas Pollutant Discharge Elimination System |
| MS4: | Municipal Separate Stormwater Sewer System | TPWD: | Texas Parks and Wildlife Department |
| MBTA: | Migratory Bird Treaty Act | TxDOT: | Texas Department of Transportation |
| NOT: | Notice of Termination | T&E: | Threatened and Endangered Species |
| NWP: | Nationwide Permit | USACE: | U.S. Army Corps of Engineers |
| NOI: | Notice of Intent | USFWS: | U.S. Fish and Wildlife Service |

## VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):
Comply with 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 products which may be hazardous. Maintain product labelling 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:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (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.

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08/24/2023

Texas Department of Transportation

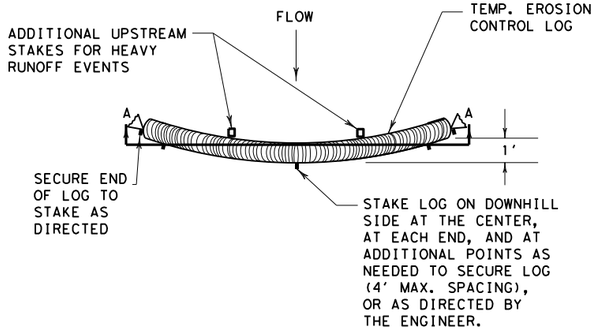
Design Division Standard

# ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

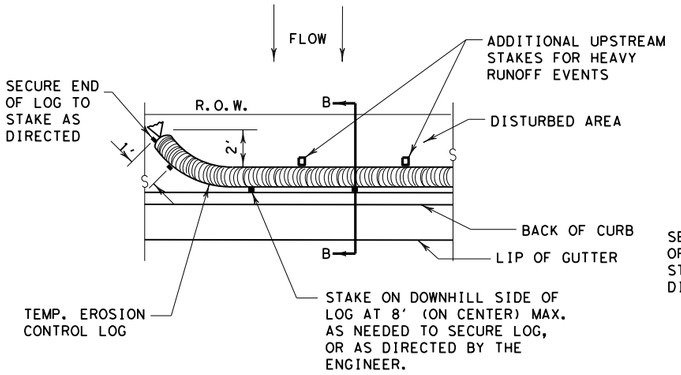
# EPIC

| | | | | | |
|---|---|---|---|---|---|
| FILE: epic.dgn | DN: TxDOT | CK: RG | DW: VP | CK: AR | |
| ©TxDOT: February 2015 | CONT | SECT | JOB | HIGHWAY | |
| REVISIONS | 0132 | 01 | 055.ETC. | US 82 | |
| 12-12-2011 (DS) | DIST | COUNTY | | SHEET NO. | |
| 05-07-14 ADDED NOTE SECTION IV. | CHS | DICKENS | | 65 | |
| 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES. | | | | | |

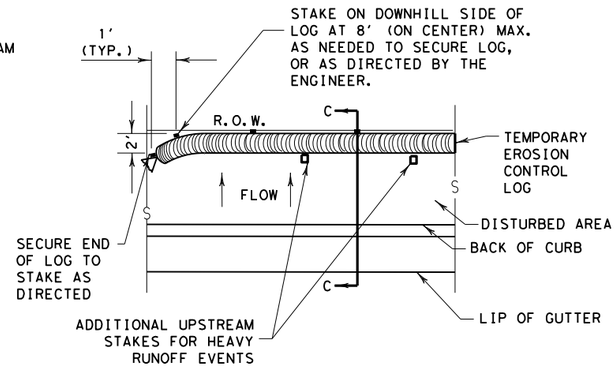
DATE:
FILE:



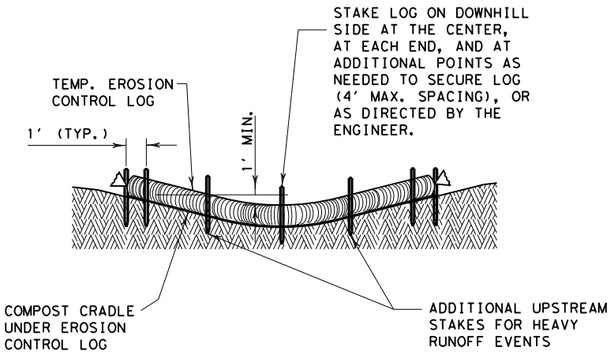

PLAN VIEW




PLAN VIEW



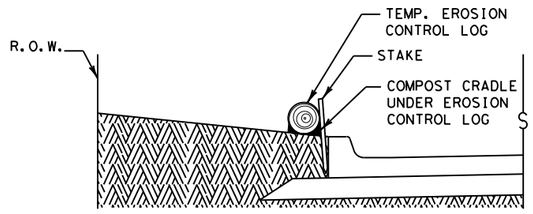

PLAN VIEW




SECTION A-A

EROSION CONTROL LOG DAM

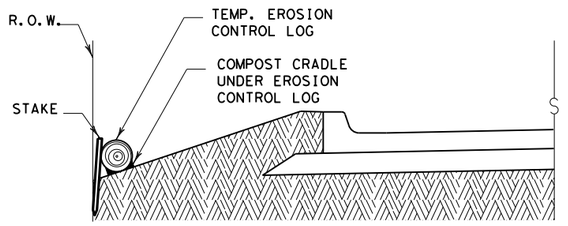
CL-D




SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

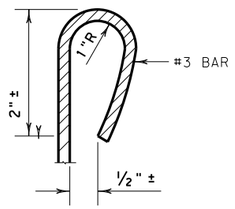
CL-BOC




SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW




REBAR STAKE DETAIL

## GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

## LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

## SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

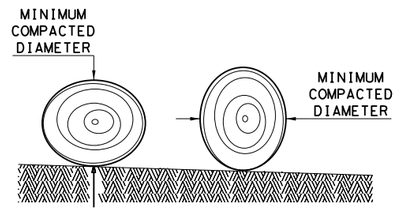
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.




DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS



Texas Department of Transportation

Design Division Standard

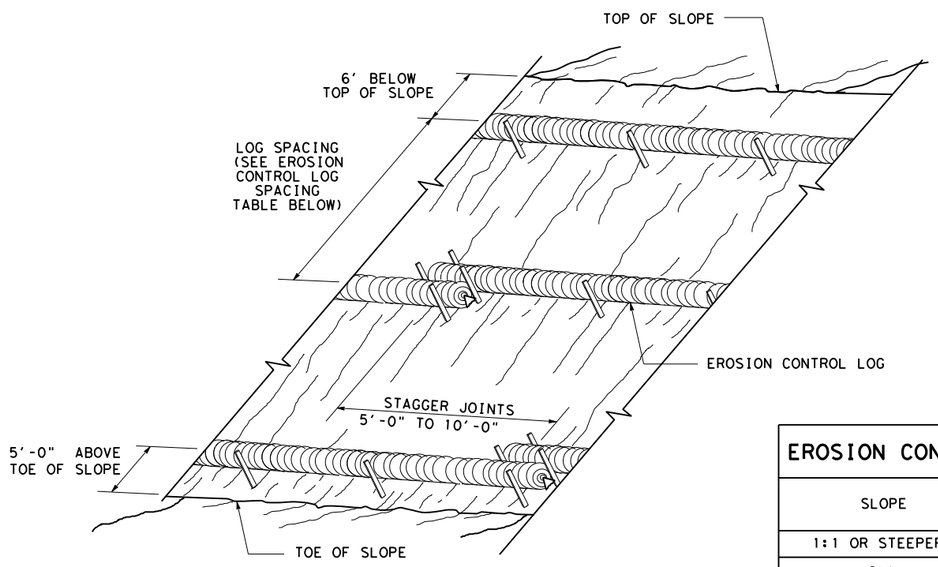
# TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

## EROSION CONTROL LOG

## EC(9)-16

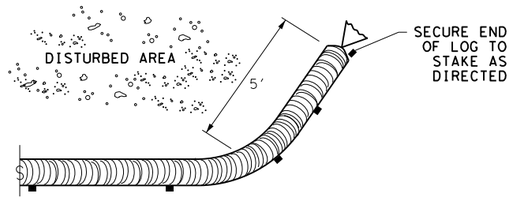
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| FILE: ec916 | DN: TxDOT | | CK: KM | | DW: LS/PT | | CK: LS |
| © TxDOT: JULY 2016 | CONT | SECT | JOB | | HIGHWAY | | |
| REVISIONS | 0132 | 01 | 055, ETC. | | US 82 | | |
| | DIST | COUNTY | | | SHEET NO. | | |
| | CHS | DICKENS | | | 66 | | |

DATE:
FILE:




## EROSION CONTROL LOGS ON SLOPES
## STAKE AND TRENCHING ANCHORING

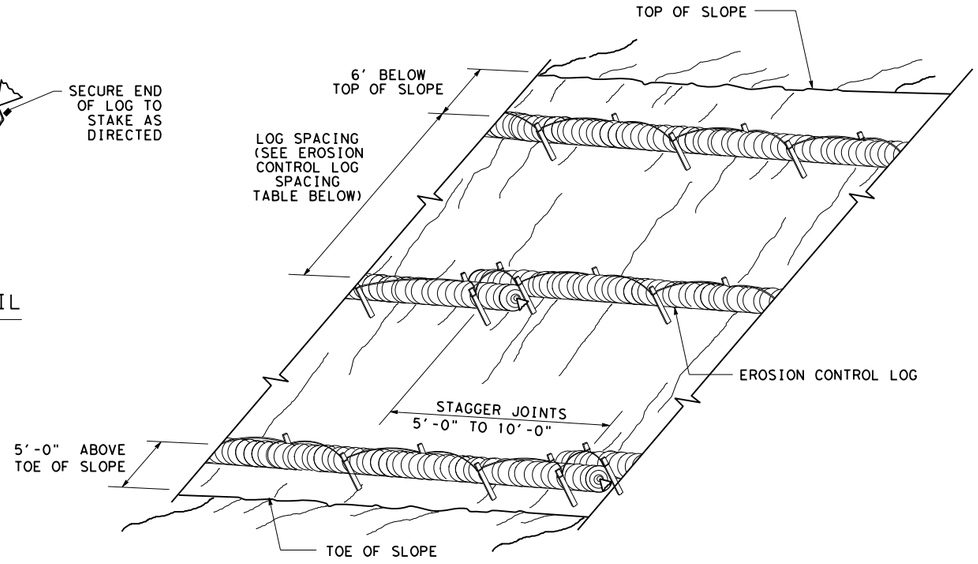
CL-SST




END SECTION RAP DETAIL

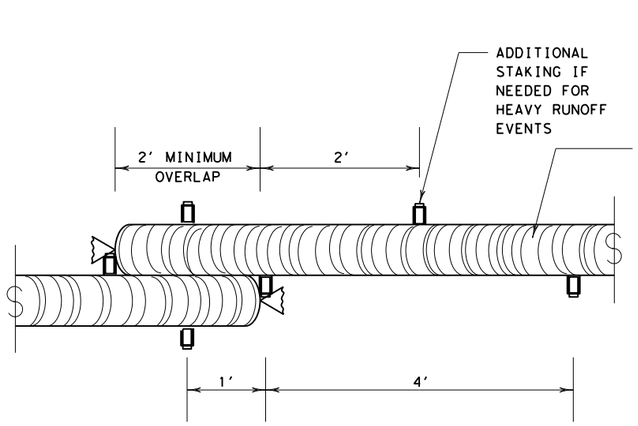
| EROSION CONTROL LOG SPACING TABLE | | | | |
|---|---|---|---|---|
| SLOPE | LOG DIAMETER | | | |
| | 6" | 8" | 12" | 18" |
| 1:1 OR STEEPER | 5' | 10' | 15' | 20' |
| 2:1 | 10' | 20' | 30' | 40' |
| 3:1 | 15' | 30' | 45' | 60' |
| 4:1 OR FLATTER | 20' | 40' | 60' | 80' |

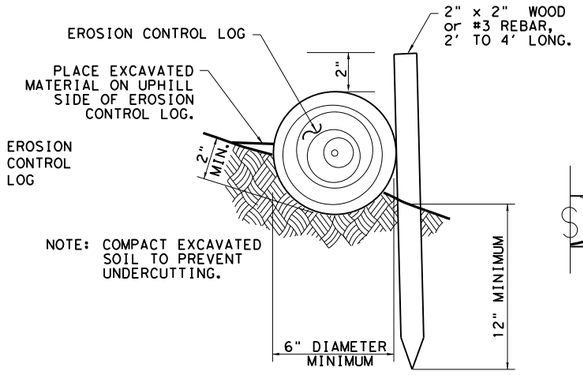
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART




## EROSION CONTROL LOGS ON SLOPES
## STAKE AND LASHING ANCHORING

CL-SSL

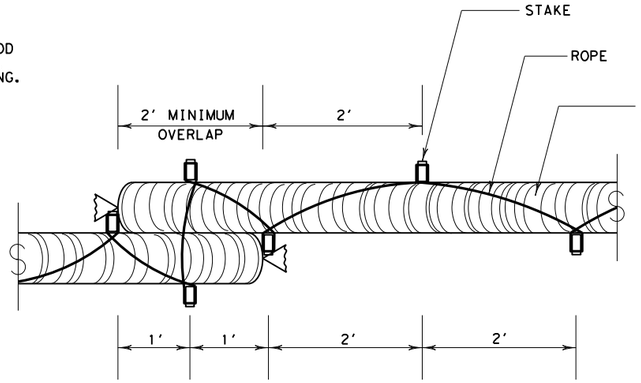


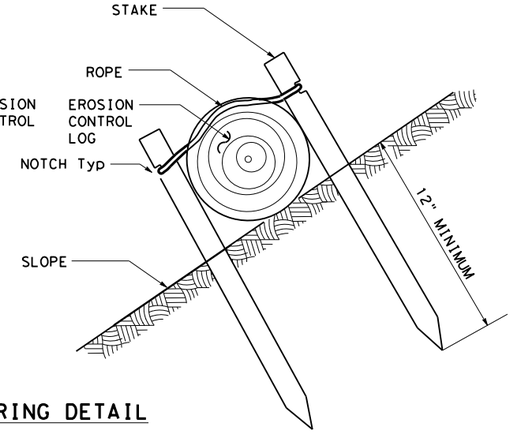




## STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

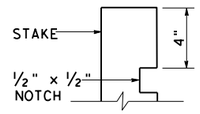
| TRENCH DEPTH TABLE | |
|---|---|
| LOG DIAMETER | DEPTH |
| 6" | 2" |
| 8" | 3" |
| 12" | 4" |
| 18" | 5" |




## STAKE AND LASHING ANCHORING DETAIL

CL-SSL




## STAKE NOTCH DETAIL

SHEET 2 OF 3

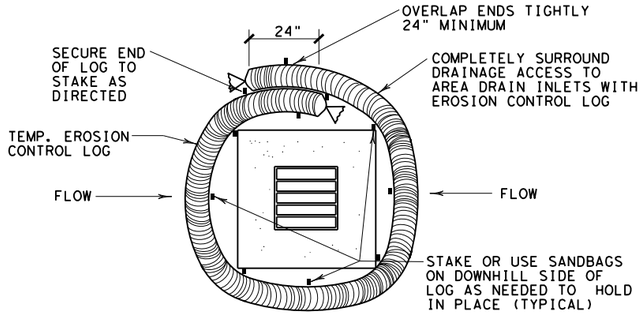
Texas Department of Transportation

Design Division Standard

# TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
## EROSION CONTROL LOG
## EC(9)-16

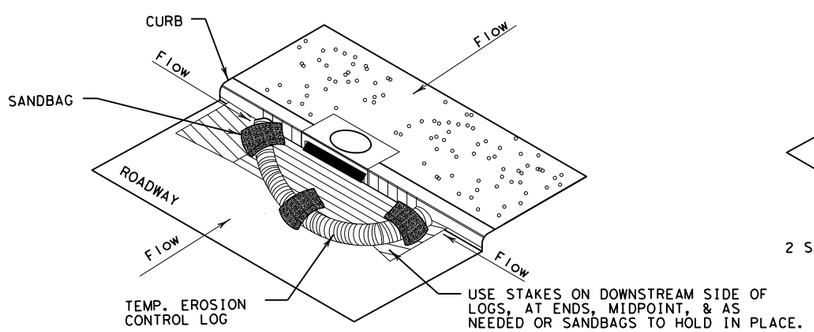
| FILE: ec116 | DN: TxDOT | CK: KM | DW: LS/PT | CK: LS |
|---|---|---|---|---|
| © TxDOT: JULY 2016 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0132 | 01 | 055, ETC. | US 82 |
| | DIST | COUNTY | | SHEET NO. |
| | CHS | DICKENS | | 67 |

DATE:
FILE:



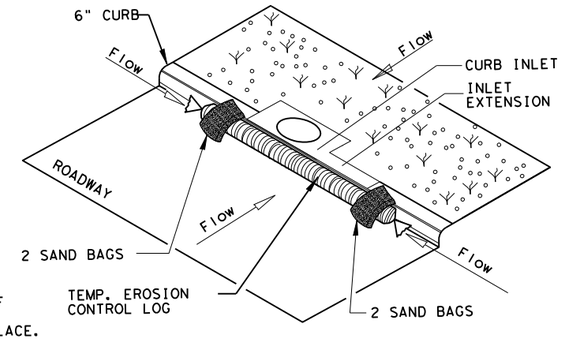

## EROSION CONTROL LOG AT DROP INLET

CL-DI




## EROSION CONTROL LOG AT CURB INLET

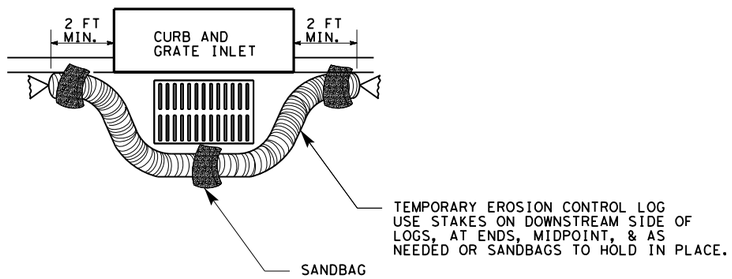
CL-CI




## EROSION CONTROL LOG AT CURB INLET

CL-CI

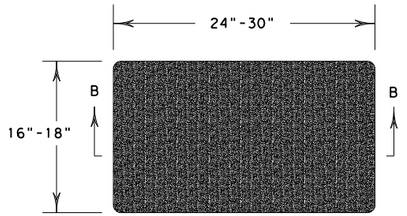
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.




## EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI


SECTION B-B




SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

# TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

## EROSION CONTROL LOG

## EC(9)-16

| | | | | | | |
|---|---|---|---|---|---|---|
| FILE: ec916 | DN: TxDOT | | CK: KM | DW: LS/PT | | CK: LS |
| © TxDOT: JULY 2016 | CONT | SECT | JOB | | HIGHWAY | |
| REVISIONS | 0132 | 01 | 055, ETC. | | US 82 | |
| | DIST | COUNTY | | | | SHEET NO. |
| | CHS | DICKENS | | | | 68 |