INDEX OF SHEETS

SEE SHEET NO. 2

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT BR 2021(703)

OAKES ST.
TOM GREEN

NET LENGTH OF PROJECT
ROADWAY = 161.5 FT = 0.031 MI
BRIDGE = 469.0 FT = 0.089 MI
TOTAL = 630.5 FT = 0.120 MI

LIMITS: AT OAKES STREET OVER CONCHO RIVER

FOR THE CONSTRUCTION OF BRIDGE REHABILITATION

FUNCTIONAL CLASS = MAJOR COLLECTOR
TERRAIN = LEVEL
CURRENT ADT (2018) = 5507
FUTURE ADT (2040) = 7710

FEDERAL-AID PROJECT NUMBER			
BR 2021(703)			
CONT	SECT	JOB	HIGHWAY
0907	00	226	OAKES ST.
DIST	COUNTY		SHEET NO.
SJT	TOM GREEN		1

FINAL PLANS

Letting Date: _____

Name of Contractor: _____

Date Work Began: _____

Date Work Completed: _____

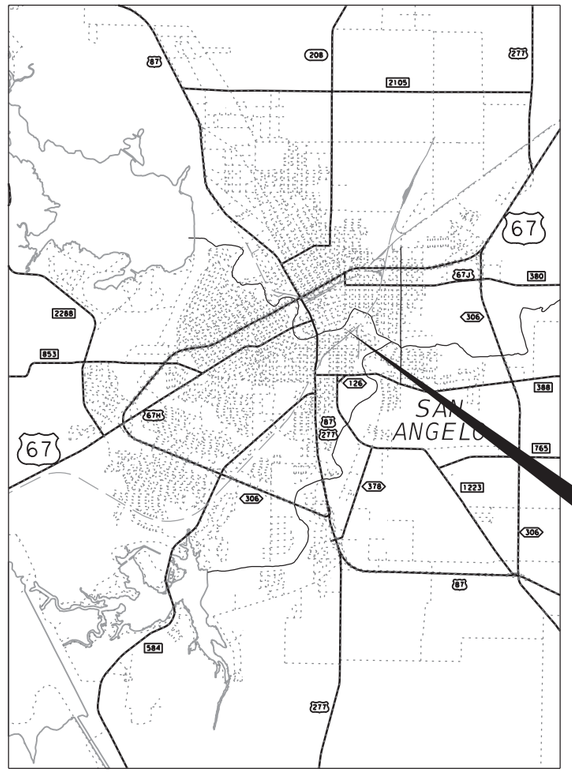
Date Work Accepted: _____

Final Contract Cost: _____

Project was built according to the Plans & Specifications. These final plans reflect the work done and the quantities shown thereon and on the Final Estimate are Final Quantities.

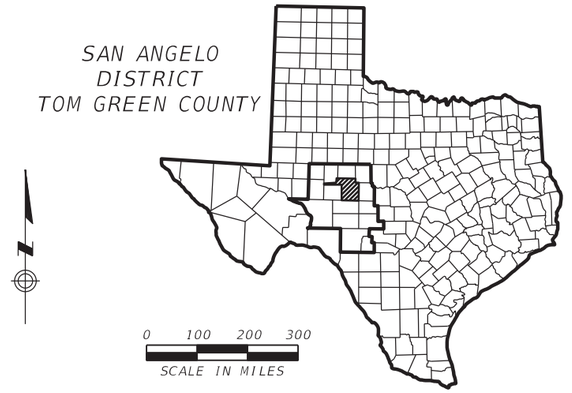
Area Engineer Date

Summary of Change Orders:



PROJECT BR 2021(703)

C-S-J 0907-00-226
MILE POINT 1.941
LATITUDE 31.4586728°
LONGITUDE -100.43285869°



EXCEPTIONS
NONE

EQUATIONS
NONE

RAILROAD CROSSINGS
NONE

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 CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, JULY 5, 2022).

2022
Texas Department of Transportation

SUBMITTED FOR LETTING: 9/28/2022

DocuSigned by:
Nicholas Greenly
DDF89C6522AF49E...
District Design Engineer

RECOMMENDED FOR LETTING: 9/28/2022

DocuSigned by:
John L. Dewitt, P.E.
826185212F51427...
District Director of TP&D

APPROVED FOR LETTING: 9/28/2022

DocuSigned by:
BC10B17FA709437...
District Engineer

DATE: 9/28/2022 8:57:36 AM
FILE: pw:\\txdot.projectwiseonline.com:TxDOT2\Documents\07 - SJT\Design Projects\090700226\4 - Design\Plan Set\1. General\TITLE SHEET.dgn

No.	Title
	GENERAL
1	TITLE SHEET
2	INDEX OF SHEETS
3	GENERAL NOTES
4	ESTIMATE & QUANTITY
5	QUANTITY SUMMARY
6	LOCATION MAP
7	PROJECT LAYOUT
	TRAFFIC CONTROL PLAN
8	TRAFFIC CONTROL PLAN GENERAL REQUIREMENTS
9	DETOUR LAYOUT
	TRAFFIC CONTROL PLAN STANDARDS
#10-21	BC (1)-21 THRU BC (12)-21
	ROADWAY AND BRIDGE DETAILS
22	NORTH APPROACH DETAILS
23	SOUTH APPROACH DETAILS
24	BRIDGE LAYOUT
25	SUMMARY OF REPAIRS
26-27	BEAM END REPAIR DETAILS
28	BEAM SPALL REPAIR DETAILS
29	DECK SOFFIT & DIAPHRAGM REPAIR DETAIL
30	CONCRETE REPAIR DETAILS
31	NON-STRUCTURAL CURB REPAIR DETAILS
32	CLEANING AND SEALING EXISTING BRIDGE JOINTS
33	FOOTING UNDERMINING & EMBANKMENT FILL DETAILS
34	SIDEWALK DETAILS
	ROADWAY AND BRIDGE STANDARDS
#35-36	CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
#37	TRANS-20
	TRAFFIC STANDARDS
#38	PM (1)-20
#39	PM (2)-20
	ENVIRONMENTAL DETAILS
40	ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
41	SW3P INDEX
42	SW3P LAYOUT
	ENVIRONMENTAL STANDARDS
#43	EC(1)-16
#44	EC(9)-16 (1 OF 3)
#45	EC(9)-16 (2 OF 3)
#46	EC(9)-16 (3 OF 3)

DATE: 9/28/2022 8:20:59 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\0907002\4 - Design\Plan Set\1. General\INDEX OF SHEETS.dgn

STATE OF TEXAS
NICHOLAS J. GREENLY
131239
LICENSED
PROFESSIONAL ENGINEER

Nick Greenly P.E. 09/30/2022

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE BY A # HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

Texas Department of Transportation

San Angelo District

INDEX OF SHEETS

SHEET 1 OF 1 NOT TO SCALE

SHEET ISSUED OR LAST REVISED

CONT	SECT	JOB	HIGHWAY
0907	00	226	OAKES ST.
DIST.	COUNTY		SHEET NO.
SJT	TOM GREEN		2

GENERAL NOTES

The following Standard Sheets have been modified: None

Locate the project bulletin board at an approved location within the project limits such as at a field office, staging area, or stockpile, and make accessible to the public at all times. Do not remove the bulletin board from the project until approved. If a construction site notice is required for the project, post a copy at each geographically separated work location.

In those instances where fixed features require, vary the governing slopes indicated in these plans from within the limits to the extent determined.

If Contractor elects to establish a pit within 200 ft. of a public road, construct a barrier or other device in accordance with Natural Resources Code, Chapter 133, and Section 133.041.

Do not use salt water with solids in excess of 10,000 parts per million, as determined by evaporation.

Contractor questions on this project are to be addressed by the following individual:

Nicholas Greenly, P.E.; email SJT_PreliminaryReview@txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individual.

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address: https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

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

Item 5, "Control of the Work"

State Highway right of way markers destroyed by the Contractor shall be replaced by a Texas Registered Professional Land Surveyor (RPLS) at no cost to the State. Provide written documentation from the RPLS attesting to the replacement of the right of way markers.

Make suitable advance notification to affected non-participating municipalities regarding Class B underground facilities, call the Department's San Angelo District Traffic Office at telephone number (325) 947-9208 to have the Department's existing traffic signal and illumination utilities located, and call the Department's San Angelo District Maintenance Office at telephone number (325) 947-9322 to have the Department's existing irrigation utilities located.

County: TOM GREEN **Sheet: 3**

Highway: OAKES STREET **Control:** 0907-00-226

A copy of the 3D model or cross-sections and earthwork data may be obtained by qualified bidders by sending a request to the following email address: SJT_PreliminaryReview@txdot.gov. Data as provided is for non-construction purposes only and it is the responsibility of the prospective bidder to validate this information with the appropriate plans and Specifications.

Item 6, "Control of Materials"

When allowed, materials and equipment stored in the right of way shall have barricades and appropriate erosion control measures approved by the Engineer.

Access the work area from the right of way.

Item 7, "Legal Relations and Responsibilities"

No significant traffic generator events have been identified.

Item 8, "Prosecution and Progress"

Submit the sequence of work and estimated progress schedule on paper or as a Portable Document Format (PDF) electronic file compatible with Adobe Systems Incorporated "Acrobat Reader XI".

A 90-day delay start provision is included in the contract to allow time to procure construction materials including Portland cement concrete, and flexible base.

Item 9, "Measurement and Payment"

The progress payment period shall end two working days before the last working day of the month. Deliver invoices to be paid as material on hand on or before the end of the progress payment period.

Item 247, "Flexible Base"

Stockpile flexible base produced for this project separately from any other stockpiled material and label stockpile with project number, material type, and grade.

Provide 24 hours written notice of intent to begin crushing operations. Materials produced prior to this notice will not be accepted.

Furnish Grade 4 material that meets the requirements of the following table:

Master gradation sieve size (% retained)					Soil Constants		Wet Ball Mill Max
1 3/4"	7/8"	3/8"	No. 4	No. 40	L.L. Max	P.I. Max	
0-10	10-35	30-65	45-75	65-90	40	10	40

Minimum compressive strength required is 35 psi at 0 psi lateral pressure as tested in accordance with Tex-117-E.

The maximum increase in material passing the number 40 sieve resulting from the wet ball mill test is 20% as tested in accordance with Tex-116-E.

Compact using ordinary compaction.

Item 360, "Concrete Pavement"

A metal-tine texture finish is not required.

Item 421, "Hydraulic Cement Concrete"

Provide sulfate-resistant concrete (containing Type II cement) for all concrete identified as structural concrete in Table 8, except for the following: bridge railing, approach slabs, concrete traffic barrier, prestressed concrete panels, Class H concrete, and Class S concrete.

Entrained air is required in all slip formed concrete, but is not required for other structural concrete. Adjust the dosage of air entraining agent for low air content as directed by the Engineer. If entrained air is provided where not required, only the upper limits of the applicable Special Provision will be enforced.

Provide only the following items listed in 421.3.3, "Testing Equipment": test molds and wheelbarrow.

Item 429, "Concrete Structure Repair"

Maintain a complete paper copy of the TxDOT Concrete Repair Manual at each active location which requires work performed under this Item. This document is available as a free download from: http://onlinemanuals.txdot.gov/txdotmanuals/crm/crm.pdf.

Obtain approval of both damaged concrete removal and concrete surface preparation before placing repair materials.

Item 502, "Barricades, Signs and Traffic Handling"

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

Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls"

The project is exempt from the Texas Pollutant Discharge Elimination System (TPDES) General Permit (TXR150000). Exempt projects are those that disturb less than one acre or routine maintenance activities that maintain the original line and grade, hydraulic capacity, or original purposes of the site.

County: TOM GREEN **Sheet: 3A**

Highway: OAKES STREET **Control:** 0907-00-226

Item 666, "Retroreflectorized Pavement Markings"

Place glass beads for pavement markings in accordance with the following table:

Marking Types	Glass Bead (Double Drop) Types	Glass Bead Rates	
		Surface Treatment	Asphalt Concrete Pavement, Microsurfacing, Concrete Pavement
TY I markings	Type II	12 LB per 100 SF	6 LB per 100 SF
	Type III	12 LB per 100 SF	6 LB per 100 SF
TY II markings	Type II	12 LB per GAL	6 LB per GAL
	Type III	12 LB per GAL	6 LB per GAL

Apply TY II marking material at a rate of 25 gallons per mile.

The striper speed shall not exceed 5 MPH during application. Convert to gravity-flow beaders (if not in use) to obtain optimum bead application, when directed.

Clean striper tanks before use if there is a build-up of dry paint, as directed. Flush lines and guns before use.

Reference existing markings before performing work that disturbs the markings, so that the markings can be re-established.

Provide a double-drop of Type II and Type III glass beads.

For the purposes of this project, existing no-passing zone markings were not evaluated for adherence to current standards, but were re-established in their existing locations.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0907-00-226 **DISTRICT** San Angelo **COUNTY** Tom Green
HIGHWAY OAKES

							TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB		**0907-00-226**			
			PROJECT ID		**A00139801**			
			COUNTY		**Tom Green**			
			HIGHWAY		**OAKES**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL		
	104-6001	REMOVING CONC (PAV)		SY	171.000		171.000	
	104-6015	REMOVING CONC (SIDEWALKS)		SY	53.000		53.000	
	104-6021	REMOVING CONC (CURB)		LF	29.000		29.000	
	110-6001	EXCAVATION (ROADWAY)		CY	170.000		170.000	
	247-6061	FL BS (CMP IN PLC)(TYA GR1-2) (6")		SY	880.000		880.000	
	360-6001	CONC PVMT (CONT REINF - CRCP) (7")		SY	932.000		932.000	
	401-6001	FLOWABLE BACKFILL		CY	100.000		100.000	
	429-6002	CONC STR REPAIR (EPOXY MORTAR)		SF	1,000.000		1,000.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)		SF	1,000.000		1,000.000	
	429-6009	CONC STR REPAIR (STANDARD)		SF	8.000		8.000	
	438-6001	CLEANING AND SEALING EXISTING JOINTS		LF	1,000.000		1,000.000	
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)		LF	144.000		144.000	
	439-6013	MULTI-LAYER POLYMER OVERLAY		SY	1,780.000		1,780.000	
	446-6028	SPOT CLEAN & PAINT EXT STR(SPL PRT SYS)		LS	1.000		1.000	
	483-6013	SHOT BLASTING		SY	1,780.000		1,780.000	
	500-6001	MOBILIZATION		LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	9.000		9.000	
	506-6035	SANDBAGS FOR EROSION CONTROL		EA	15.000		15.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)		LF	430.000		430.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)		LF	430.000		430.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")		LF	440.000		440.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)		LF	440.000		440.000	
	529-6036	CONCRETE CURB (SPECIAL)		LF	29.000		29.000	
	531-6001	CONC SIDEWALKS (4")		SY	53.000		53.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)		LF	1,260.000		1,260.000	
	672-6009	REFL PAV MRKR TY II-A-A		EA	16.000		16.000	
	784-6192	REPAIR STEEL (CORROSION MITIGATION)		EA	24.000		24.000	
	786-6001	CARBON FIBER REINF POLYMER PROTECTION		SF	350.000		350.000	
	3077-6022	SP MIXESSP-CSAC-A PG70-22		TON	43.000		43.000	
	4119-6001	ULTRA-HIGH PERFORMANCE CONCRETE (UPHC)		CY	4.200		4.200	
	7184-6013	CUT AND REPLACE CONCRETE CURB		LF	45.000		45.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)		LS	1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)		LS	1.000		1.000	

0104 6001	0104 6015	0104 6021	0110 6001	0247 6061	0360 6001	0401 6001	0429 6002	0429 6007	0429 6009	0438 6001	0438 6004	0439 6013	0446 6028	0483 6013	0500 6001
REMOVING CONC (PAV)	REMOVING CONC (SIDEWALKS)	REMOVING CONC (CURB)	EXCAVATION (ROADWAY)	FL BS (CMP IN PLC)(TY A GR 1-2) (6")	CONC PVMT (CONT REINF - CRCP) (7")	FLOWABLE BACKFILL	CONC STR REPAIR (EPOXY MORTAR)	CONC STR REPAIR (VERTICAL & OVERHEAD)	CONC STR REPAIR (STANDARD)	CLEANING AND SEALING EXISTING JOINTS	CLEANING AND SEALING EXIST JOINTS(CL7)	MULTI-LAYER POLYMER OVERLAY	SPOT CLEAN & PAINT EXT STR(SPL PRT SYS)	SHOT BLASTING	MOBILIZATION
SY	SY	LF	CY	SY	SY	CY	SF	SF	SF	LF	LF	SY	LS	SY	LS
171	53	29	170	880	932	100	1,000	1,000	8	1,000	144	1,780	1	1,780	1

0502 6001	0506 6035	0506 6038	0506 6039	0506 6041	0506 6043	0529 6036	0531 6001	0666 6315	0672 6009	0784 6192	0786 6001	3077 6022	4119 6001	7184 6013
BARRICADES, SIGNS AND TRAFFIC HANDLING	SANDBAGS FOR EROSION CONTROL	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)	CONCRETE CURB (SPECIAL)	CONC SIDEWALKS (4")	RE PM W/RET REQ TY I (Y)4"(SLD)(100 MIL)	REFL PAV MRKR TY II-A-A	REPAIR STEEL (CORROSION MITIGATION)	CARBON FIBER REINF POLYMER PROTECTION	SP MIXES SP-C SAC-A PG70-22	ULTRA-HIGH PERFORMANCE CONCRETE (UPHC)	CUT AND REPLACE CONCRETE CURB
MO	EA	LF	LF	LF	LF	LF	SY	LF	EA	EA	SF	TON	CY	LF
9	15	430	430	440	440	29	53	1260	16	24	350	43	4.2	45

DATE: 8/30/2022 11:59:46 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\0907002 26\4 - Design\Plan Set\1. General\QUANTITY SUMMARY (1 OF 4).dgn

Texas Department of Transportation

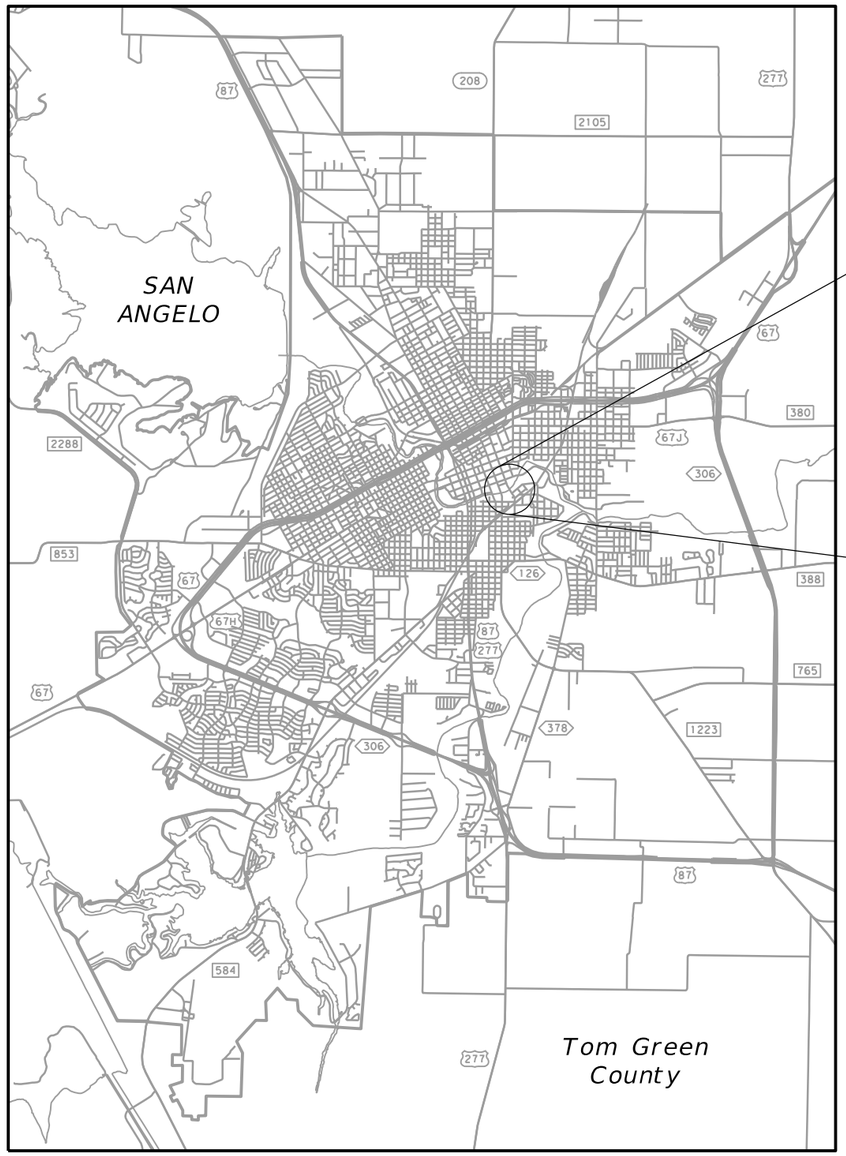
San Angelo District

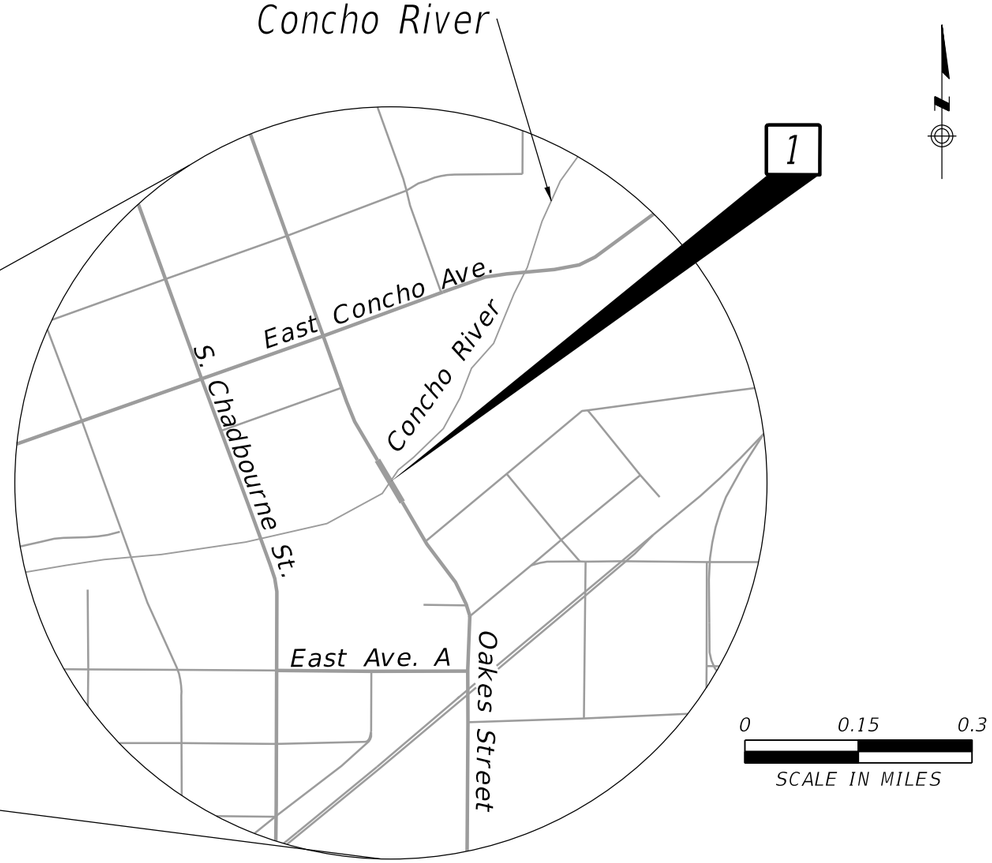
QUANTITY SUMMARY

NOT TO SCALE

SHEET ISSUED OR LAST REVISED

CONT	SECT	JOB	HIGHWAY
0907	00	226	OAKES ST.
DIST.	COUNTY		SHEET NO.
SJT	TOM GREEN		5





SITE No.	BRIDGE NUMBER	BRIDGE NAME	COUNTY	LATITUDE	LONGITUDE (-)
1	07-226-0-B023-10-002	OAKES OVER CONCHO RIVER	TOM GREEN	31°27'31.22"N	100°25'58.29"W

Texas Department of Transportation

San Angelo District

LOCATION MAP

SHEET 1 OF 1 SCALE VARIES

SHEET ISSUED OR LAST REVISED

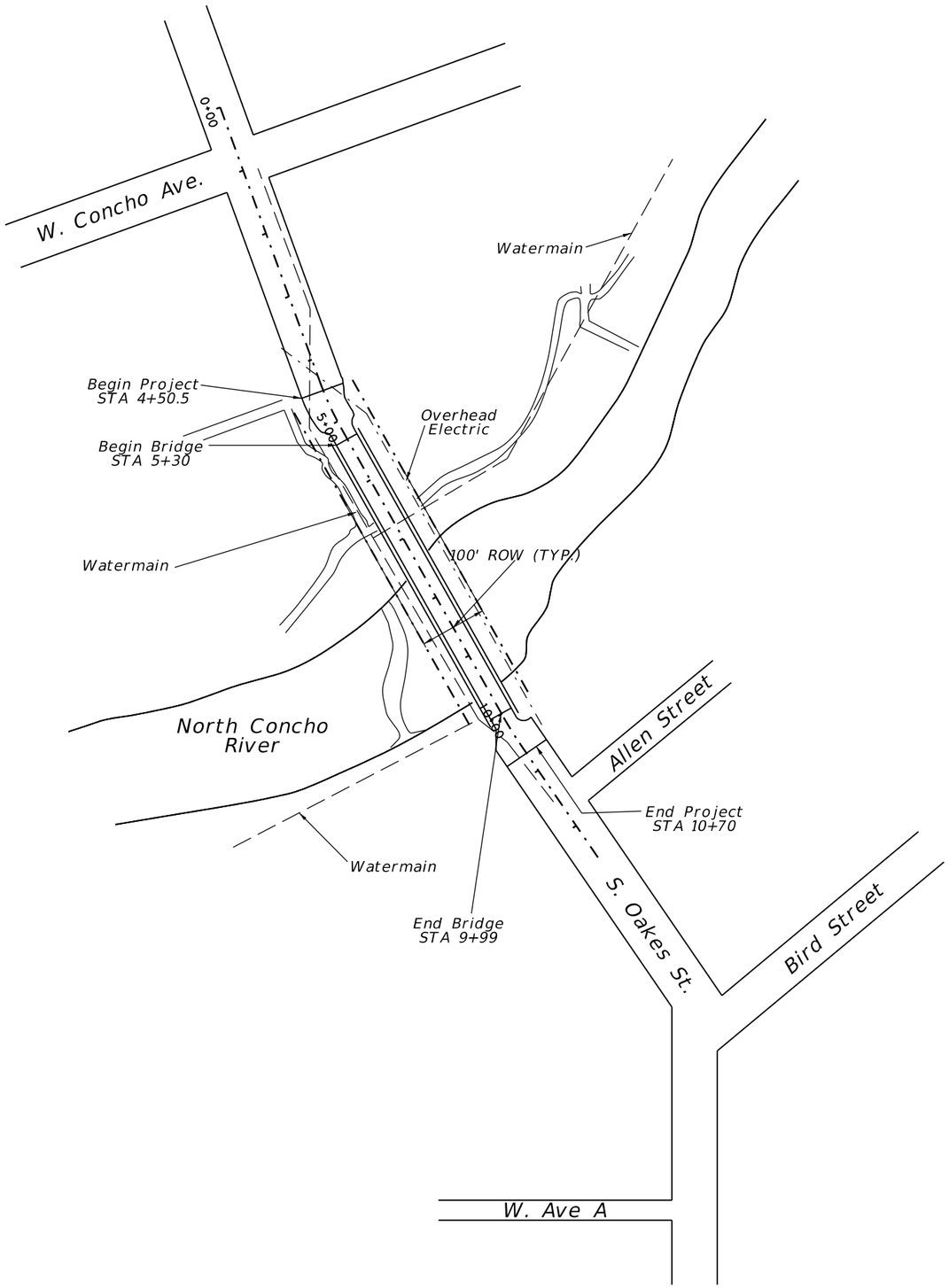
CONT	SECT	JOB	HIGHWAY
0907	00	226	OAKES ST.

DIST	COUNTY	SHEET NO.
SJT	TOM GREEN	6

DATE: 8/30/2022 11:59:49 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\090700226\4 - Design\Plan Set\1. General\LOCATION MAP (1 OF 4).dgn

General Note

1. Atmos gas line present on eastern portion of bridge between outer girder and fascia.



0 100 200
SCALE IN FEET

Texas Department of Transportation

San Angelo District

PROJECT LAYOUT

SCALE 1"=200'

SHEET ISSUED OR LAST REVISED

CONT	SECT	JOB	HIGHWAY
0907	00	226	OAKES ST.
DIST	COUNTY		SHEET NO.
SJT	TOM GREEN		7

DATE: 8/30/2022 11:59:56 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\0907000226\4 - Design\Plan Set\1. General\PROJECT LAYOUT

GENERAL NOTES

1. When a contractor force account "Safety Contingency" has been established for the project, it is for work zone enhancements that were unforeseen in the project planning and design stage, but would improve the effectiveness of the traffic control plan. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if doing so does not slow implementation of work zone enhancements.
2. Shadow, lead, trail, and ramp control vehicles shown on the plans are required.
3. Use high level warning flags on advance warning signs during daytime operations.
4. Provide flaggers at such times and locations as directed to ensure the safe passage of traffic through construction areas. When flaggers are used to control traffic, furnish and install signs CW20-7 "FLAGGER SYMBOL", CW20-7aD "FLAGGER AHEAD", and CW3-4 "BE PREPARED TO STOP". Flaggers shall use 24 in. STOP/SLOW paddles.
5. Temporarily relocate existing mailbox assemblies on portable mailbox stands as shown on the plans, or as directed. Use materials conforming to the Compliant Work Zone Traffic Control Device List (CWZTCDL).
6. Prior to each work day, make provisions to exclude vehicles from parking within work areas.
7. Temporarily relocate existing permanent sign assemblies to temporary supports as shown on the plans, or as directed.
8. Omit advance warning signs and furnish and install reduced size signs CW20-1 "ROAD WORK AHEAD" mounted back to back with reduced size signs G20-2 "END ROAD WORK" signs at intersecting city streets and county roads.
9. Furnish and install signs CW20-1D "ROAD WORK AHEAD", G20-1aT "ROAD WORK ←NEXT X MILES, NEXT X MILES→", and G20-2 "END ROAD WORK" at intersecting state highways.
10. Sign and buffer spacing may be altered to fit field conditions, as directed.
11. In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have employee(s) available to respond on the project for emergencies and for taking corrective measures within 30 minutes.
12. Cones may be used as the typical channelizing device for freeway surfacing projects.
13. 28 in. tall cones will be allowed only for short duration or short term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate term stationary work areas should use drums, vertical panels, or 42 in. tall two-piece cones.
14. All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
15. The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
16. Warning signs for long term stationary work should be mounted at 7 ft. to the bottom of the sign.
17. For long term stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
18. All motor vehicle equipment having an obstructed view to the rear shall have a reverse signal alarm audible above the surrounding noise level.
19. Traffic control devices denoted with the triangle symbol on the plans may be omitted.
20. When sheet WZ(RS) is included in the plans, furnish and install temporary rumble strips for daytime lane closures. Do not use temporary rumble strips on freeways or expressways.
21. When sheet WZ(BRK) is included in the plans, furnish and install signs CW21-1T "GIVE US A BRAKE".
22. Flags attached to signs shown in the plans are required.
23. Signs END ROAD WORK (G20-2) may be omitted when conflicting with G20-2 signs already in place on the project.
24. The Engineer will determine advisory speeds to be shown on plaques CW13-1P.
25. Temporary work zone devices (including portable barriers) manufactured after December 31, 2019 must have been successfully tested to the 2016 edition of Manual for Assessing Safety Hardware (MASH). Such devices manufactured on or before this date, and successfully tested to either National Cooperative Highway Research Program (NCHRP) Report 350 or the 2009 edition of MASH, may continue to be used.

TRUCK MOUNTED ATTENUATOR REQUIREMENTS

Provide the number of vehicles with truck mounted attenuators listed in the table below. The Contractor shall determine if multiple operations will occur at the same time, to determine the total number of truck mounted attenuators needed for the project.

WZ(BTS-1)	0	TCP(2-3)	0	TCP(6-1)	0
TCP(1-1)	0	TCP(2-4)	0	TCP(6-2)	0
TCP(1-2)	0	TCP(2-5)	0	TCP(6-3)	0
TCP(1-3)	0	TCP(2-6)	0	TCP(6-4)	0
TCP(1-4)	0	TCP(3-1)	0	TCP(6-5)	0
TCP(1-5)	0	TCP(3-2)	0	TCP(6-6)	0
TCP(1-6)	0	TCP(3-3)	0	TCP(6-7)	0
TCP(2-1)	0	TCP(3-4)	0	TCP(6-8)	0
TCP(2-2)	0	TCP(5-1)	0	TCP(6-9)	0
TRAFFIC CONTROL PLAN PILOT VEHICLE OPERATION					0
TRAFFIC CONTROL PLAN TWO LANE CLOSURES ON FOUR LANE UNDIVIDED HIGHWAYS					0
TRAFFIC CONTROL PLAN LANE CLOSURES WITH BARRIER					0
TRAFFIC CONTROL PLAN SHOULDER CLOSURES WITH BARRIER					0
TRAFFIC CONTROL PLAN WORK SPACE NEAR SHOULDER					0
TRAFFIC CONTROL PLAN CROSSOVER CLOSURE					0
TRAFFIC CONTROL PLAN TURNAROUND CLOSURE					0
TRAFFIC CONTROL PLAN LANE CLOSURES WITH TRAFFIC SIGNAL AND BARRIER					0
TRAFFIC CONTROL PLAN LANE CLOSURES WITH TRAFFIC SIGNAL					0
TRAFFIC CONTROL PLAN FREEWAY CLOSURE					0

PORTABLE CHANGEABLE MESSAGE SIGN REQUIREMENTS

Provide the portable changeable message signs listed in the table below. The Contractor shall determine if multiple operations will occur at the same time, to determine the total number of portable changeable message signs needed for the project.

TCP(6-1)	0	TCP(6-4)	0	TCP(6-8)	0
TCP(6-2)	0	TCP(6-6)	0	TCP(6-9)	0
TCP(6-3)	0	TCP(6-7)	0		
TRAFFIC CONTROL PLAN LANE CLOSURES WITH BARRIER					0
TRAFFIC CONTROL PLAN SHOULDER CLOSURES WITH BARRIER					0
TRAFFIC CONTROL PLAN LANE CLOSURES WITH TRAFFIC SIGNAL AND BARRIER					0
TRAFFIC CONTROL PLAN LANE CLOSURES WITH TRAFFIC SIGNAL					0
TRAFFIC CONTROL PLAN FREEWAY CLOSURE					0

TYPICAL USAGE

MOBILE
Work that moves continuously or intermittently (stopping for up to approximately 15 minutes).

SHORT DURATION
Work that occupies a location up to 1 hour.

SHORT TERM STATIONARY
Daytime work that occupies a location for more than 1 hour in a single daylight period.

INTERMEDIATE TERM STATIONARY
Work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.

LONG TERM STATIONARY
Work that occupies a location more than 3 days.

STATE OF TEXAS
NICHOLAS J. GREENLY
131239
LICENSED PROFESSIONAL ENGINEER

Nick Greenly P.E.

09/02/2022

Texas Department of Transportation | San Angelo District

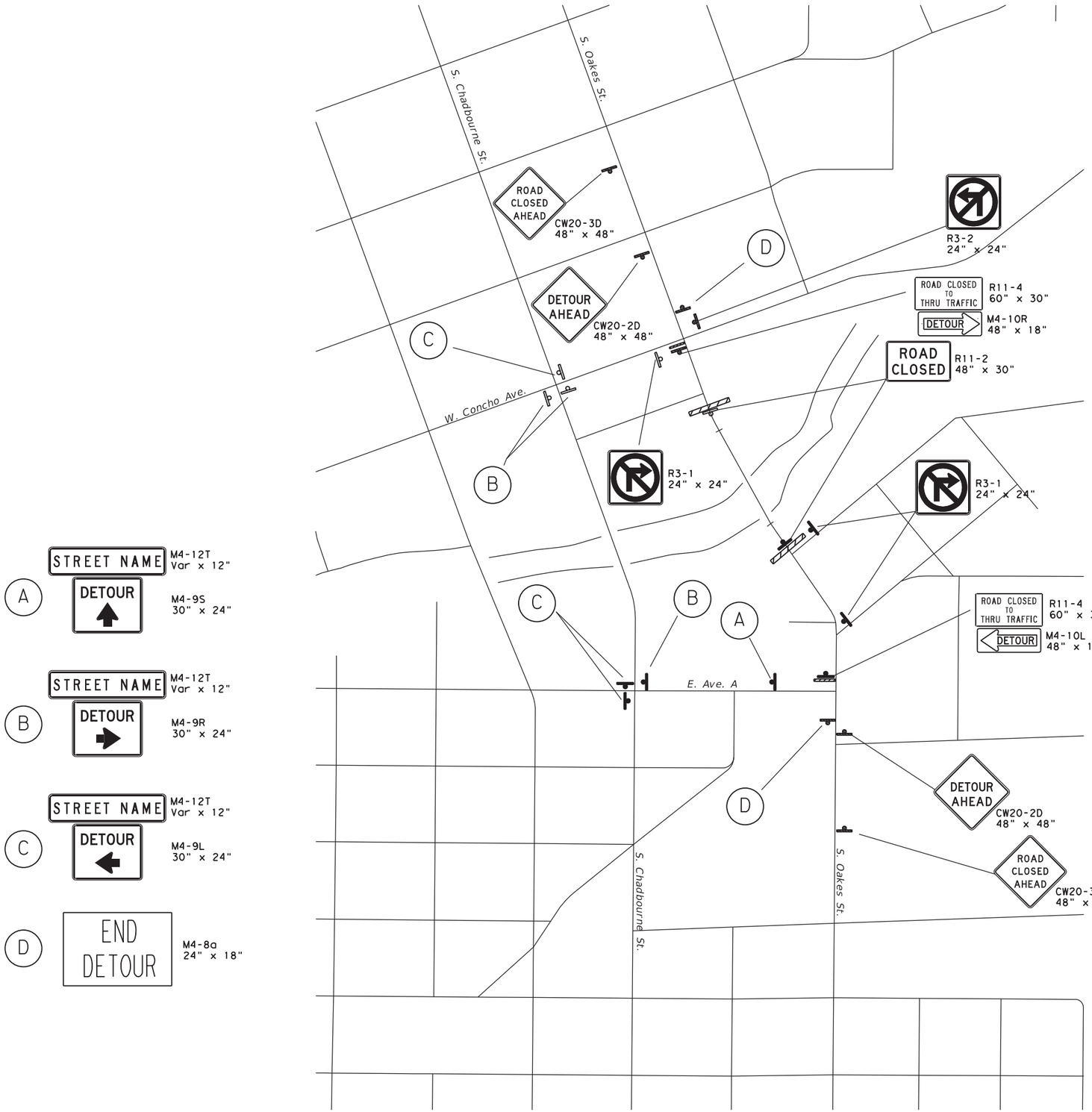
TRAFFIC CONTROL PLAN GENERAL REQUIREMENTS

SHEET 1 OF 1 — NOT TO SCALE

CONT	SECT	JOB	HIGHWAY
0907	00	226	OAKES ST.
DIST	COUNTY		SHEET NO.
SJT	TOM GREEN		8

SHEET ISSUED OR LAST REVISED: 11-19

DATE: 8/30/2022 12:00:00 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\0907002261\4 - Design\Plan Set\2. TCP\TRAFFIC CONTROL PLAN GENERAL REQUIREMENTS.dgn



A — STREET NAME (M4-12T Var x 12") / DETOUR (M4-9S 30" x 24")

B — STREET NAME (M4-12T Var x 12") / DETOUR (M4-9R 30" x 24")

C — STREET NAME (M4-12T Var x 12") / DETOUR (M4-9L 30" x 24")

D — END DETOUR (M4-8a 24" x 18")

Detour Sequence Narrative

1. Southbound traffic on S. Oakes street will be detoured onto W. Concho Ave, then S. Chadbourne St., and finally on E. Ave. A before returning to Oakes.

2. Northbound traffic on S. Oakes street will be detoured onto E. Ave. A Ave, then S. Chadbourne St., and finally on W. Concho Ave before returning to Oakes.

Note: All streets supporting detour traffic must remain two way

0 100 200 300 400 500
SCALE IN FEET

LEGEND	
	Type 3 Barricade
	Sign

STATE OF TEXAS
NICHOLAS J. GREENLY
131239
LICENSED
PROFESSIONAL ENGINEER

Nick Greenly P.E.

09/02/2022

Texas Department of Transportation — San Angelo District

DETOUR LAYOUT

SCALE 1"=500'

SHEET ISSUED OR LAST REVISED

CONT	SECT	JOB	HIGHWAY
0907	00	226	OAKES ST.
DIST	COUNTY		SHEET NO.
SJT	TOM GREEN		9

DATE: 8/30/2022 12:00:09 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\090700226\4 - Design\Plan Set\2. TCP\bc-21.dgn

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

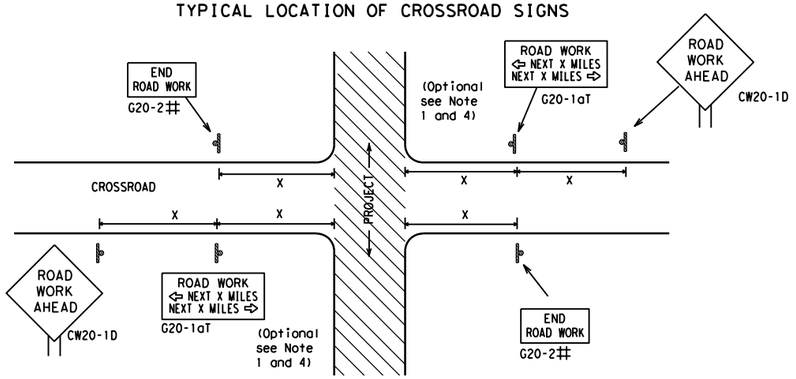
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	OAKES ST.
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	SJT	TOM GREEN		10
5-10 5-21				

DATE: 8/30/2022 12:00:09 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\090700226\4 - Design\Plan Set\2. TCP\bc-21.dgn

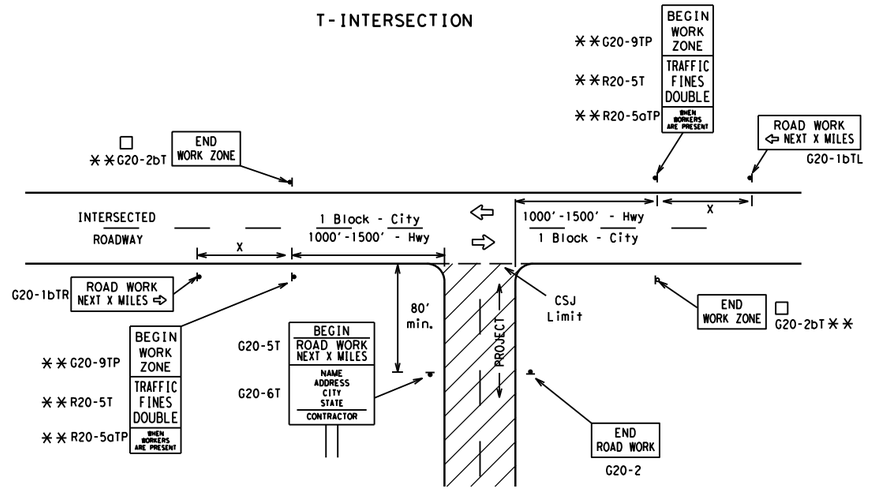
TYPICAL LOCATION OF CROSSROAD SIGNS



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.

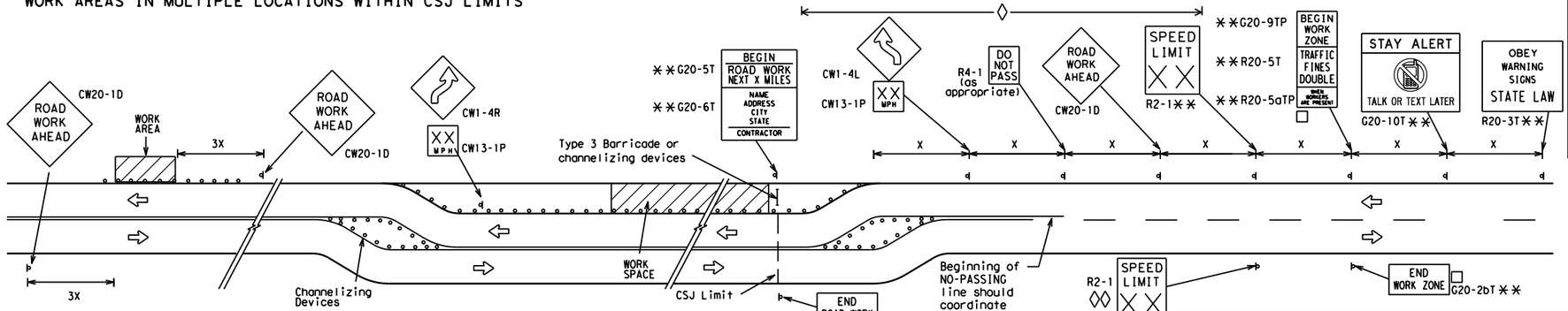
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

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.

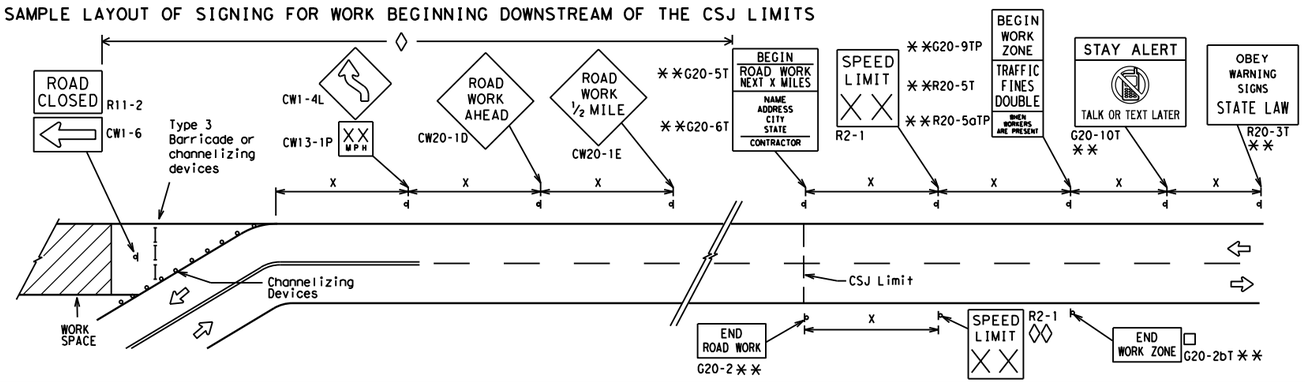
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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

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



NOTES

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

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

** 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.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	OAKES ST.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SJT	TOM GREEN		11

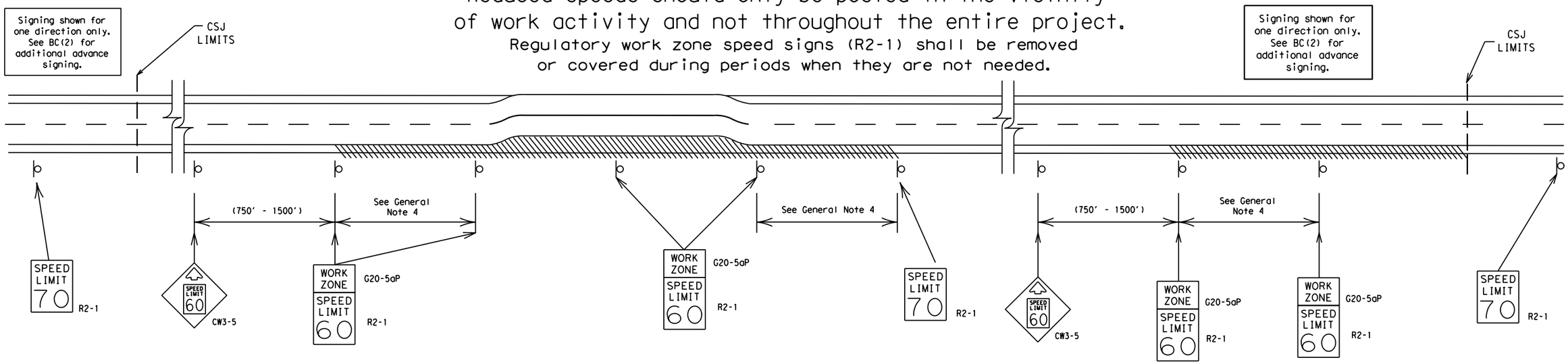
DATE: 8/30/2022 12:00:10 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\0907002269\Design\TCP\bc-21.dgn

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.

Texas Department of Transportation

Traffic Safety Division Standard

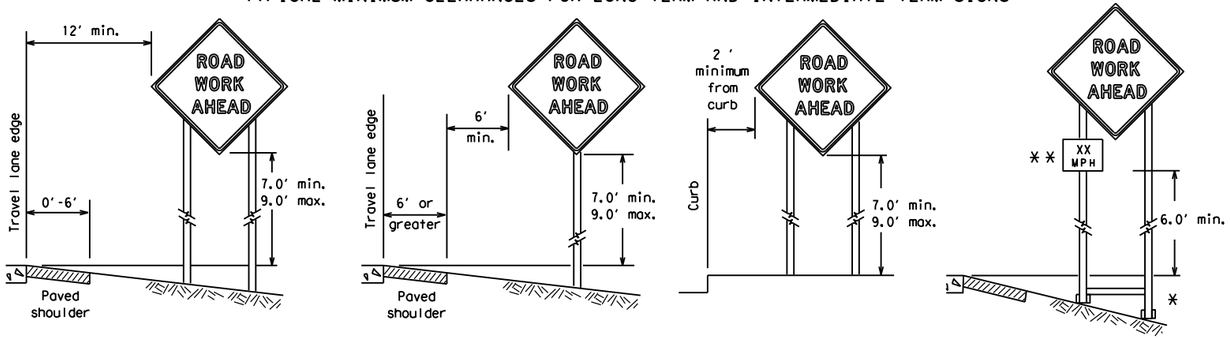
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	OAKES ST.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SJT	TOM GREEN		12

DATE: 8/30/2022 12:00:10 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\090700226\4 - Design\Plan Set\2. TCP\bc-21.dgn

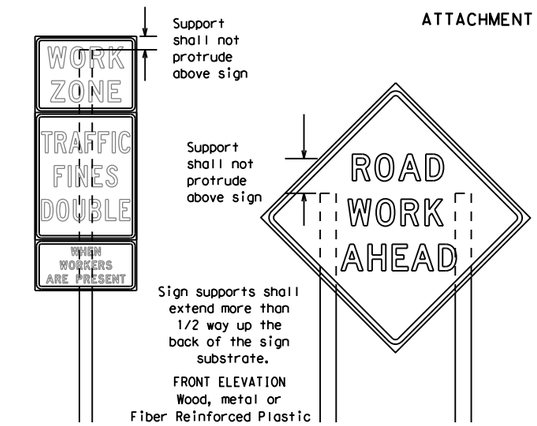
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

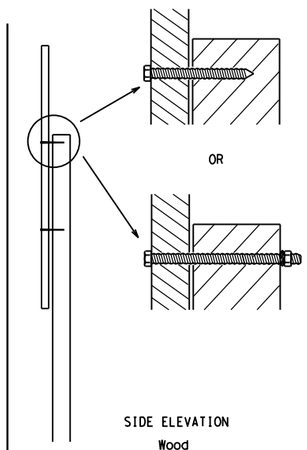


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





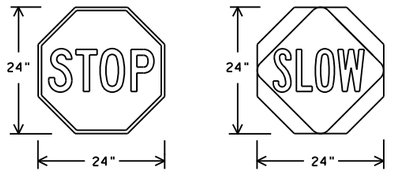
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

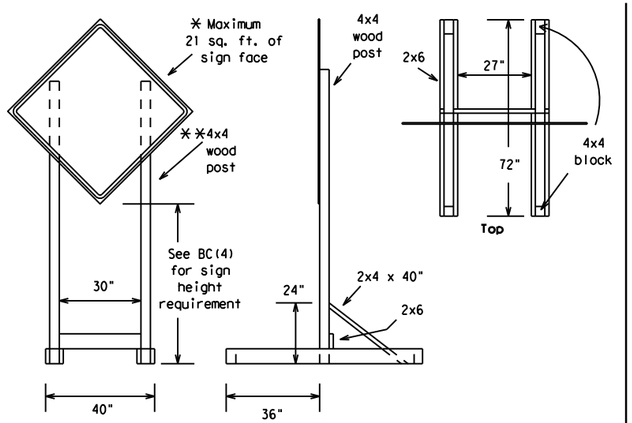
Texas Department of Transportation | Traffic Safety Division Standard

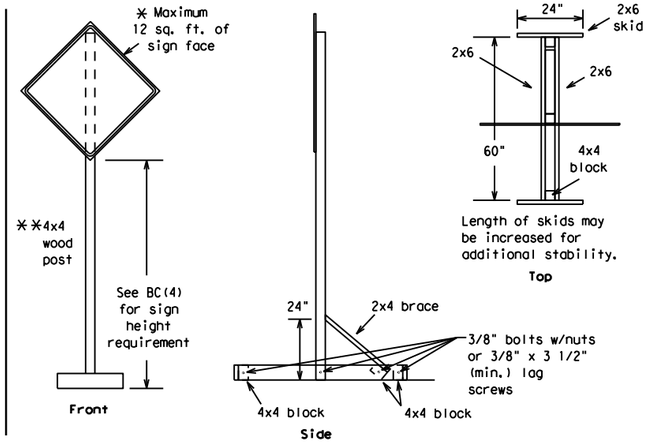
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	OAKES ST.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SJT	TOM GREEN		13

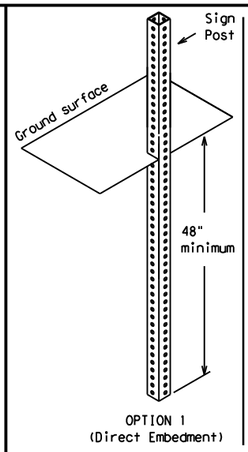
DATE: 8/30/2022 12:00:11 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\09070022644 - Design\Plan Set\2. TCP\bc-21.dgn

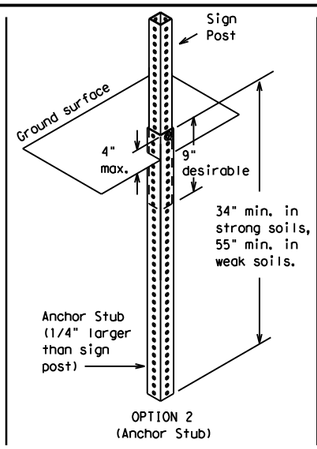


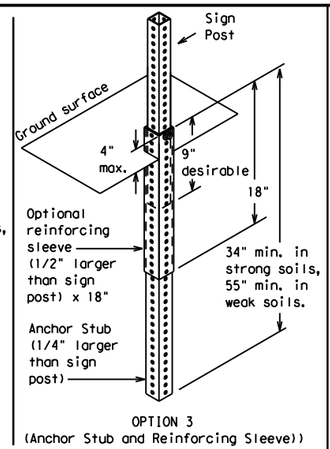


SKID MOUNTED WOOD SIGN SUPPORTS

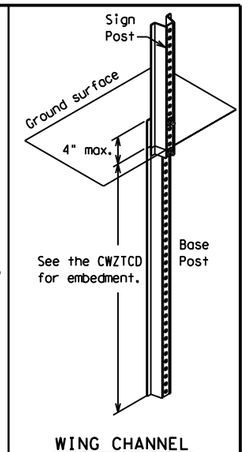
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







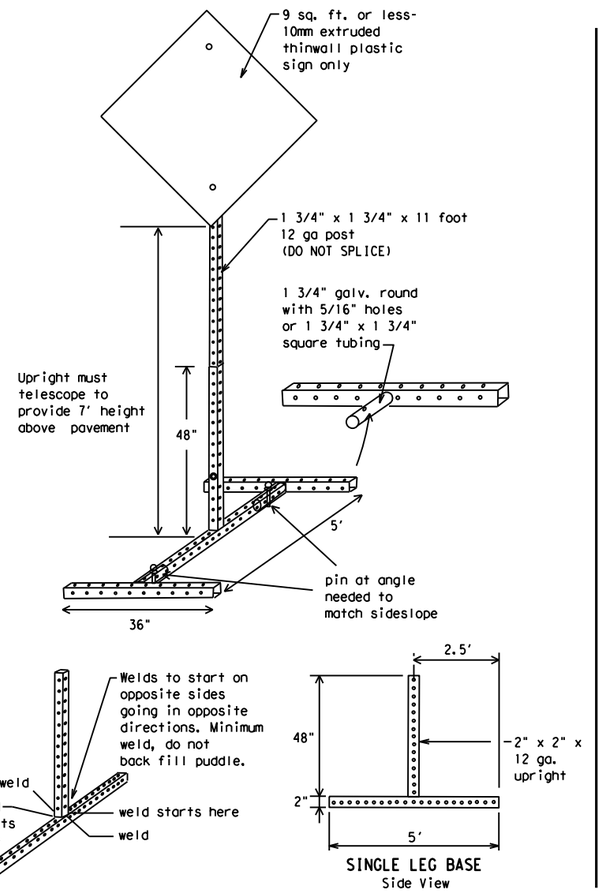
PERFORATED SQUARE METAL TUBING

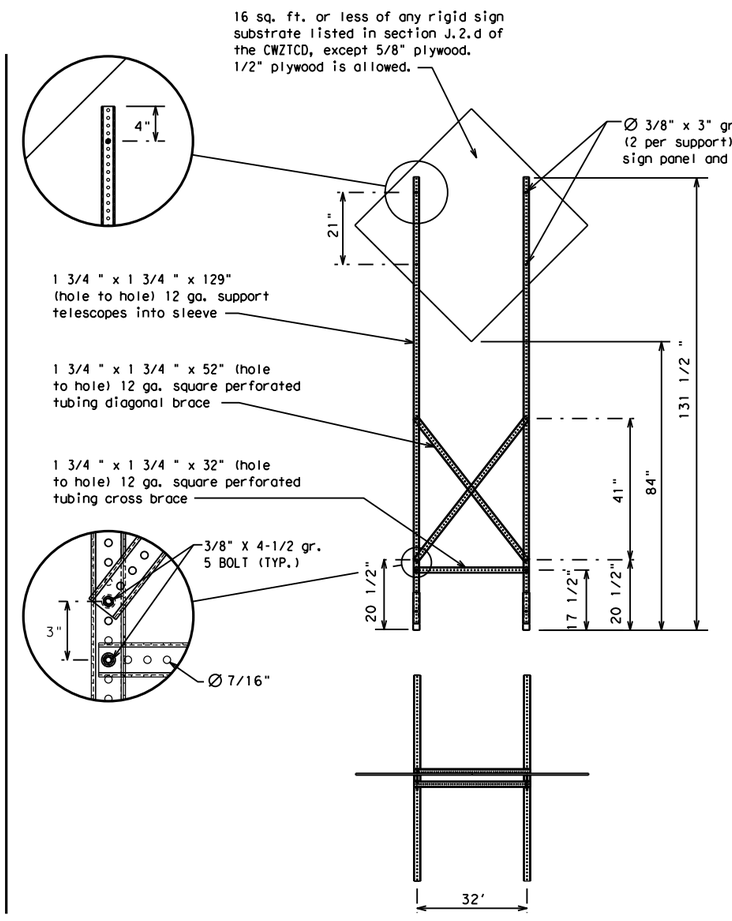


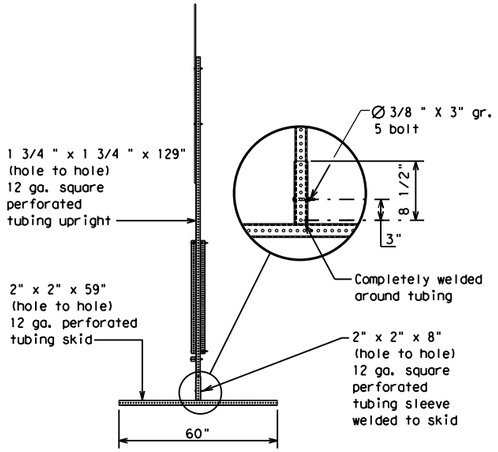
WING CHANNEL
Lap-splice/base bolted anchor

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.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	OAKES ST.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SJT	TOM GREEN		14

DATE: 8/30/2022 12:00:12 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\090700226\4 - Design\Plan Set\2. TCP\bc-21.dgn

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

WORD OR PHRASE	ABBREVIATION
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		Other Condition List	
FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *
XXXXXXXX BLVD CLOSED			

* 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		Location List	Warning List	** Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

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

** 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.

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

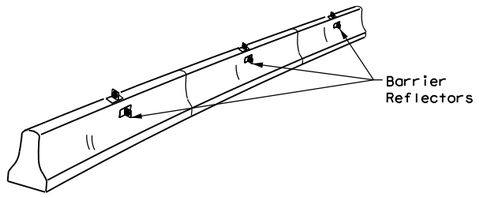
BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	OAKES ST.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SJT	TOM GREEN		15

100

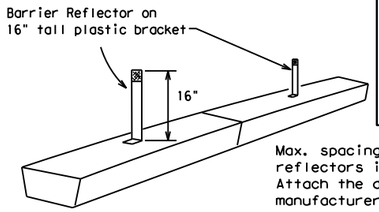
DATE: 8/30/2022 12:00:16 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\0907002\4 - Design\Plan Set\2. TCP\bc-21.dgn

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.

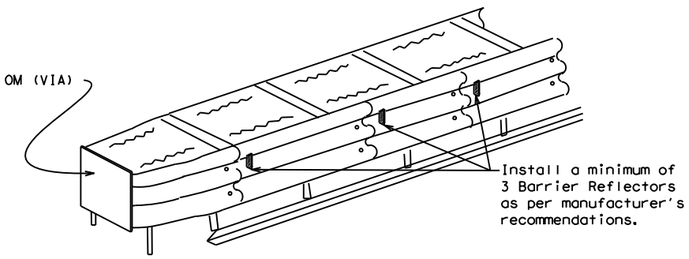


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

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.

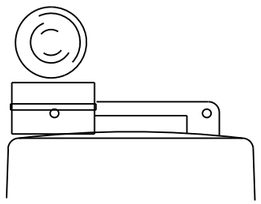


DELINEATION OF END TREATMENTS

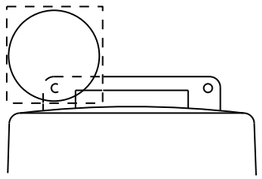
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

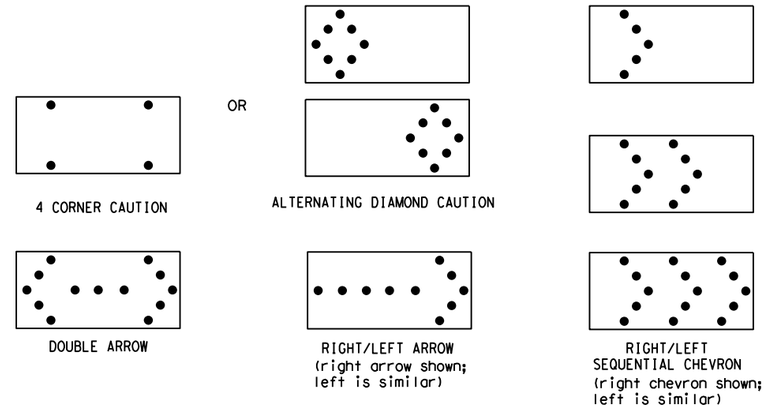
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	OAKES ST.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SJT	TOM GREEN		16

101

DATE: 8/30/2022 12:00:19 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\090700226\4 - Design\Plan Set\2. TCP\bc-21.dgn

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:

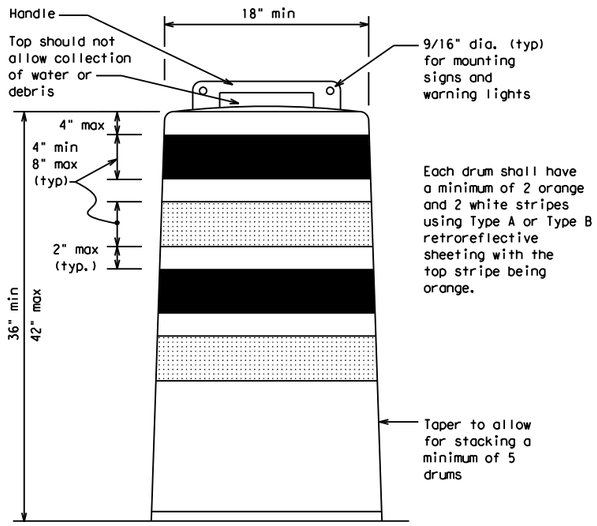
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents 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.

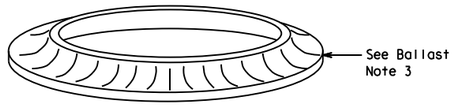
RETROREFLECTIVE SHEETING

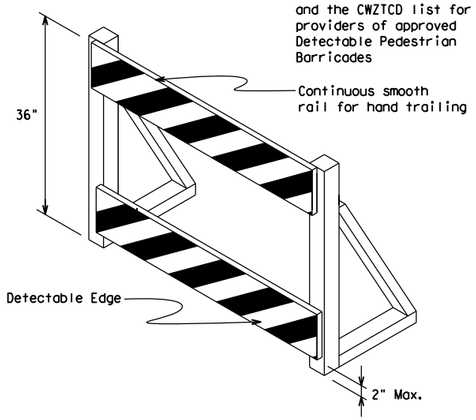
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall 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.

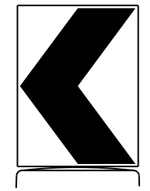




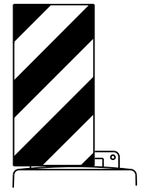


DETECTABLE PEDESTRIAN BARRICADES

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

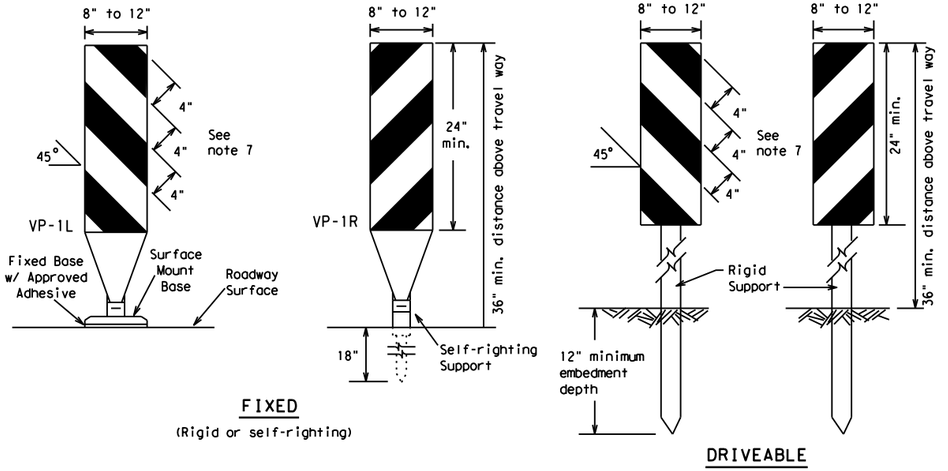
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	OAKES ST.
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	SJT	TOM GREEN		17
7-13				

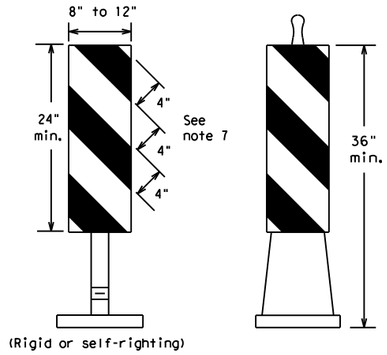
102

DATE: 8/30/2022 12:00:22 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\0907002264 - Design\Plan Set\2. TCP\bc-21.dgn



FIXED
(Rigid or self-righting)

DRIVEABLE

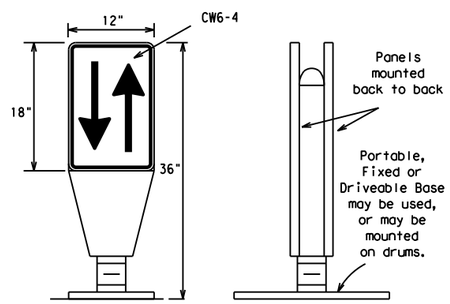


(Rigid or self-righting)

PORTABLE

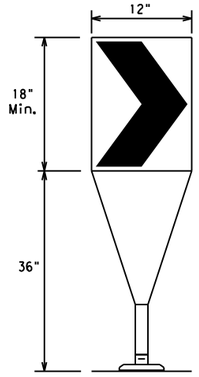
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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.

VERTICAL PANELS (VPs)



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.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



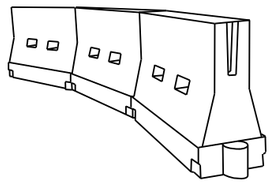
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

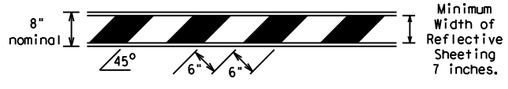
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	OAKES ST.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SJT	TOM GREEN		18

DATE: 8/30/2022 12:00:26 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\090700226\4 - Design\Plan Set\2. TCP\bc-21.dgn

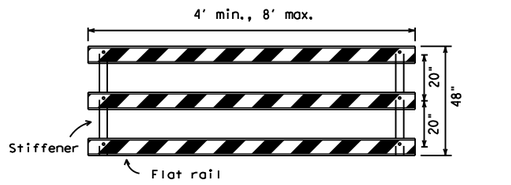
TYPE 3 BARRICADES

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.



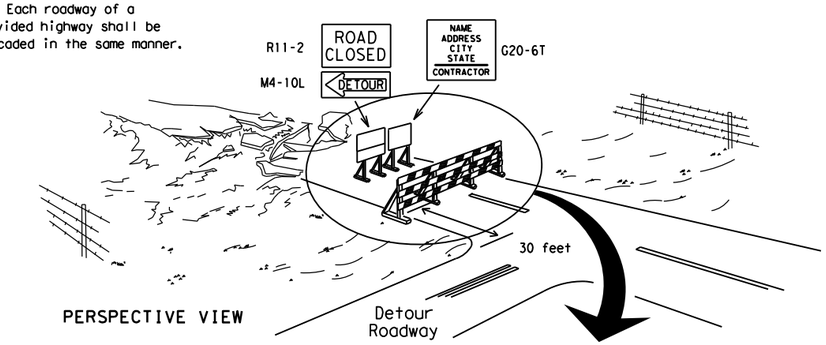
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

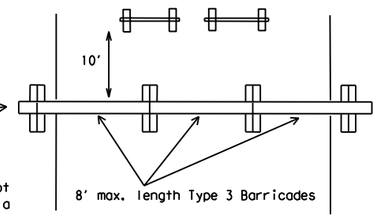
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

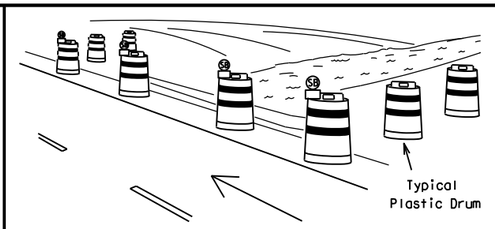
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

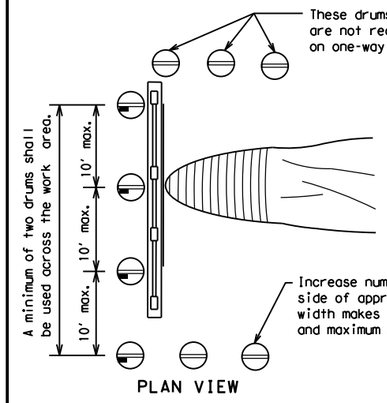
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

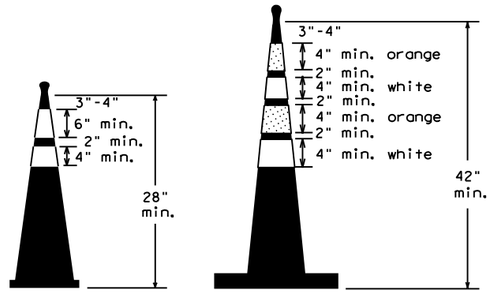
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder 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.



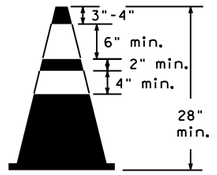
PLAN VIEW

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

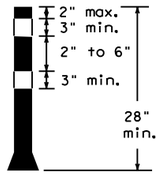
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

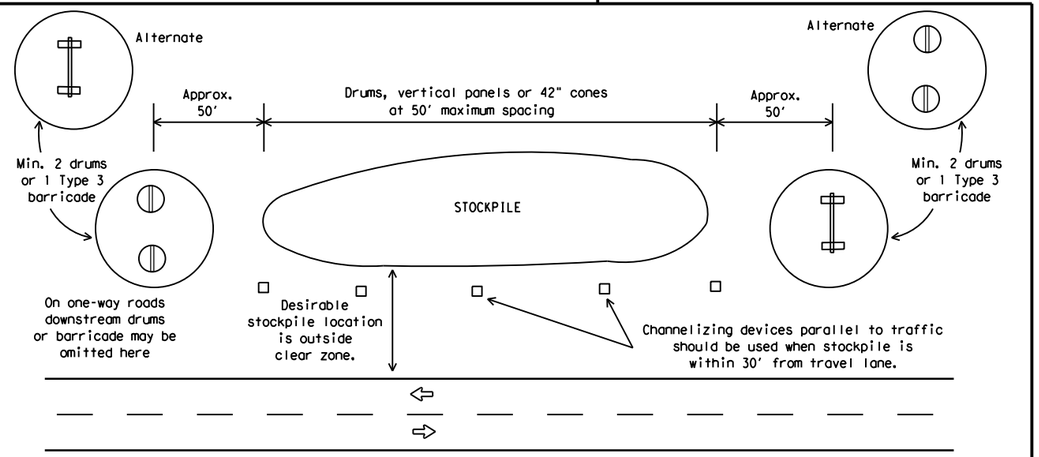


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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	0907	00	226	OAKES ST.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SJT	TOM GREEN		19

104

DATE: 8/30/2022 12:00:29 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\0907002264 - Design\Plan Set\2. TCP\bc-21.dgn

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.

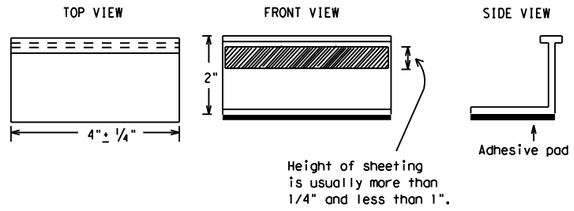
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

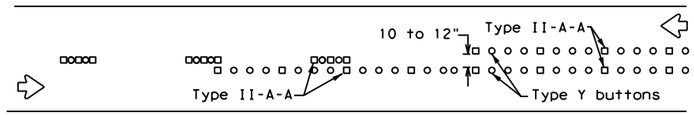
BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	OAKES ST.
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	SJT	TOM GREEN		20
11-02 8-14				

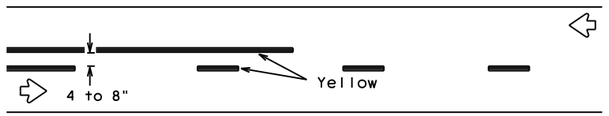
DATE: 8/30/2022 12:00:33 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\090700226\4 - Design\Plan Set\2. TCP\bc-21.dgn

PAVEMENT MARKING PATTERNS

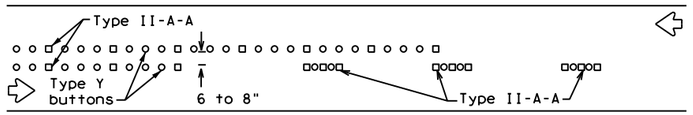
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



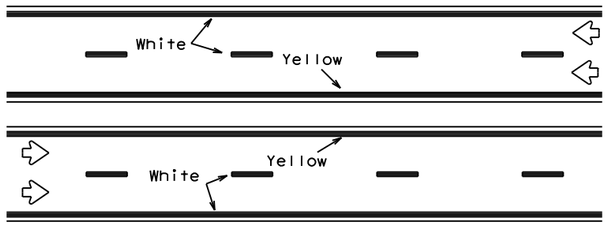
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



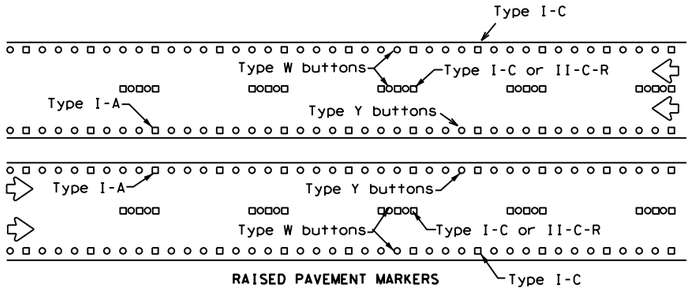
RAISED PAVEMENT MARKERS - PATTERN B

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



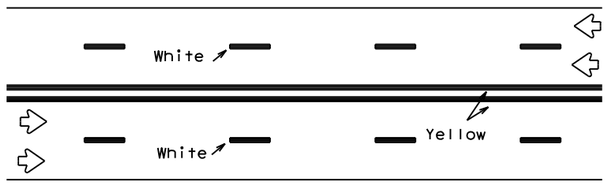
REFLECTORIZED PAVEMENT MARKINGS



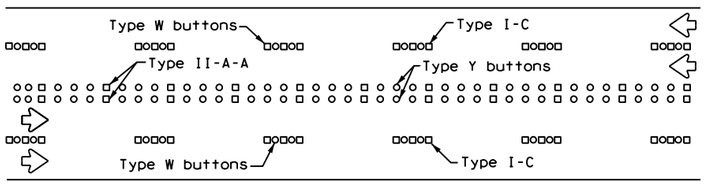
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



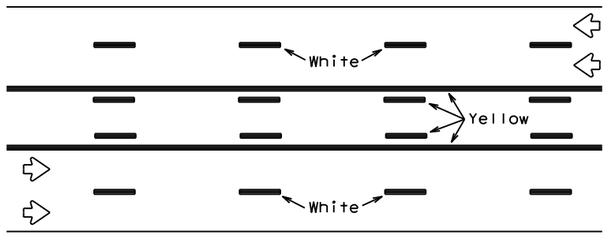
REFLECTORIZED PAVEMENT MARKINGS



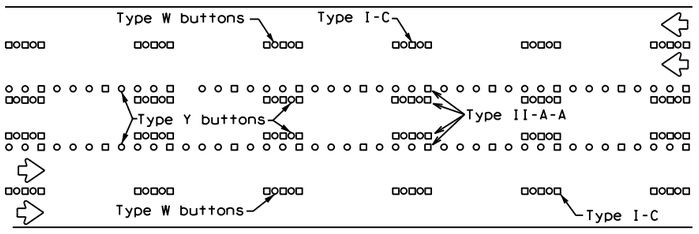
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

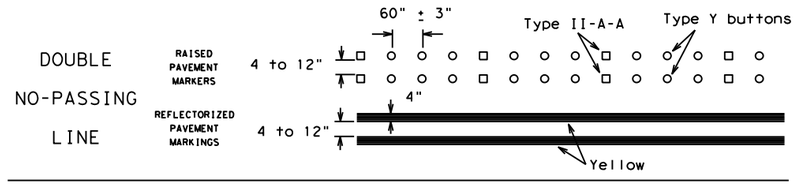
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

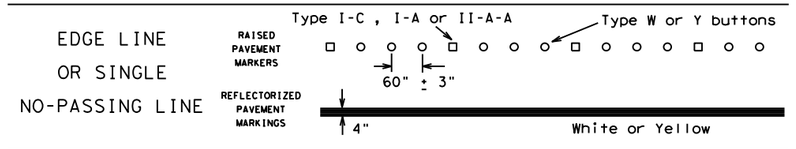
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

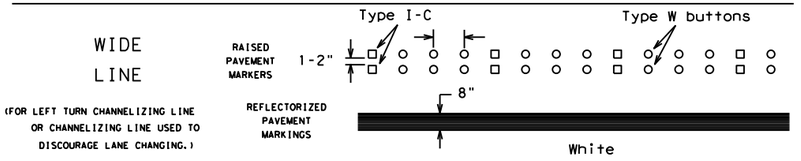


EDGE LINE OR SINGLE NO-PASSING LINE



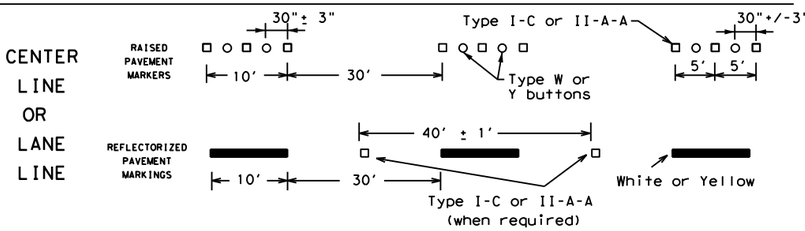
WIDE LINE

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

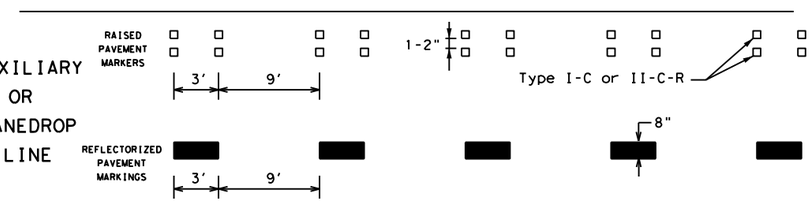


BROKEN LINES

CENTER LINE OR LANE LINE

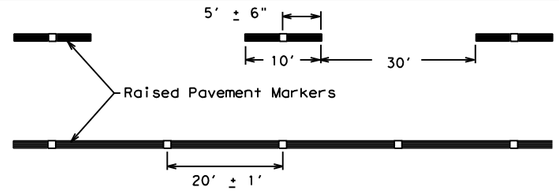


AUXILIARY OR LANEDROP LINE



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."

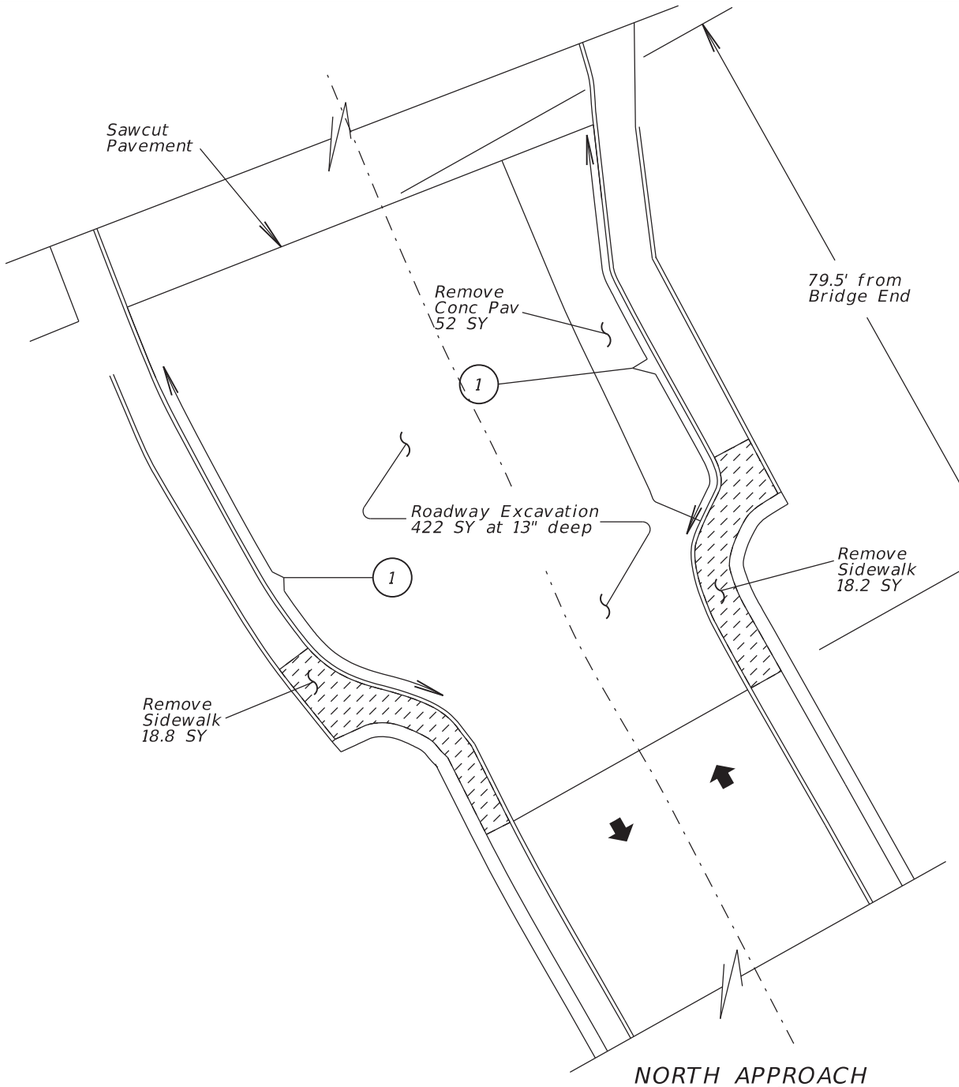
Texas Department of Transportation

Traffic Safety Division Standard

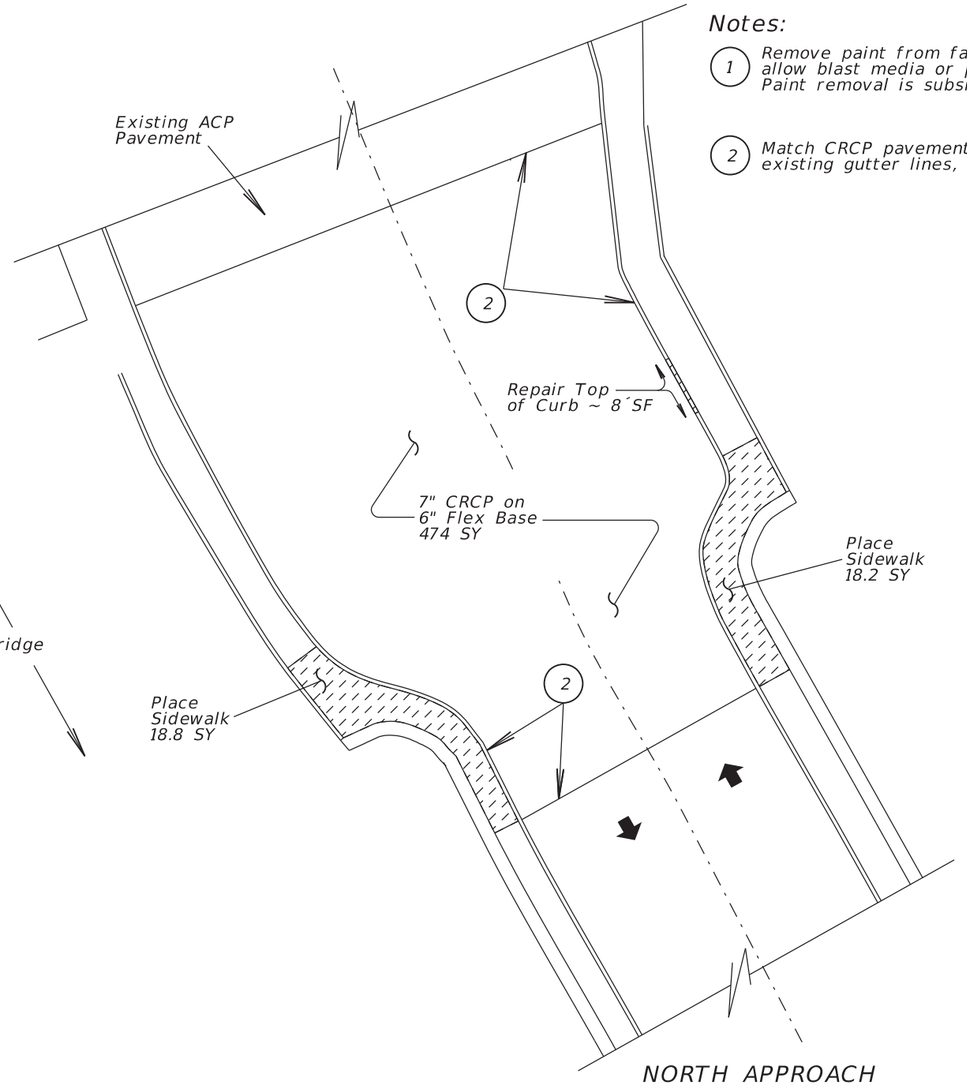
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21	0907	00	226	OAKES ST.
2-98 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	SJT	TOM GREEN		21



NORTH APPROACH
Removal Items



NORTH APPROACH
Install Items

Notes:

1. Remove paint from face and top of curb. Do not allow blast media or paint to enter drainage pipes. Paint removal is subsidiary to other pay items.
2. Match CRCP pavement elevations with existing pavement, existing gutter lines, and bridge deck elevations.

0 10 20
SCALE IN FEET

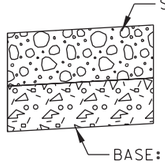
STATE OF TEXAS
NICHOLAS J. GREENLY
131239
LICENSED
PROFESSIONAL ENGINEER

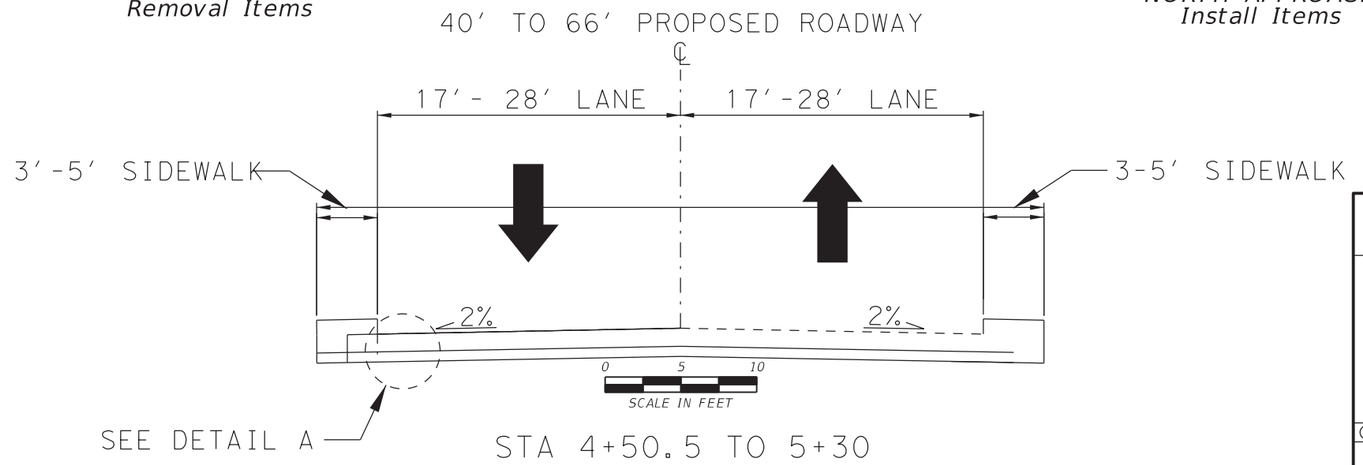
Nick Greenly P.E.

09/02/2022

PROPOSED PAVEMENT STRUCTURE

DETAIL A





STA 4+50.5 TO 5+30

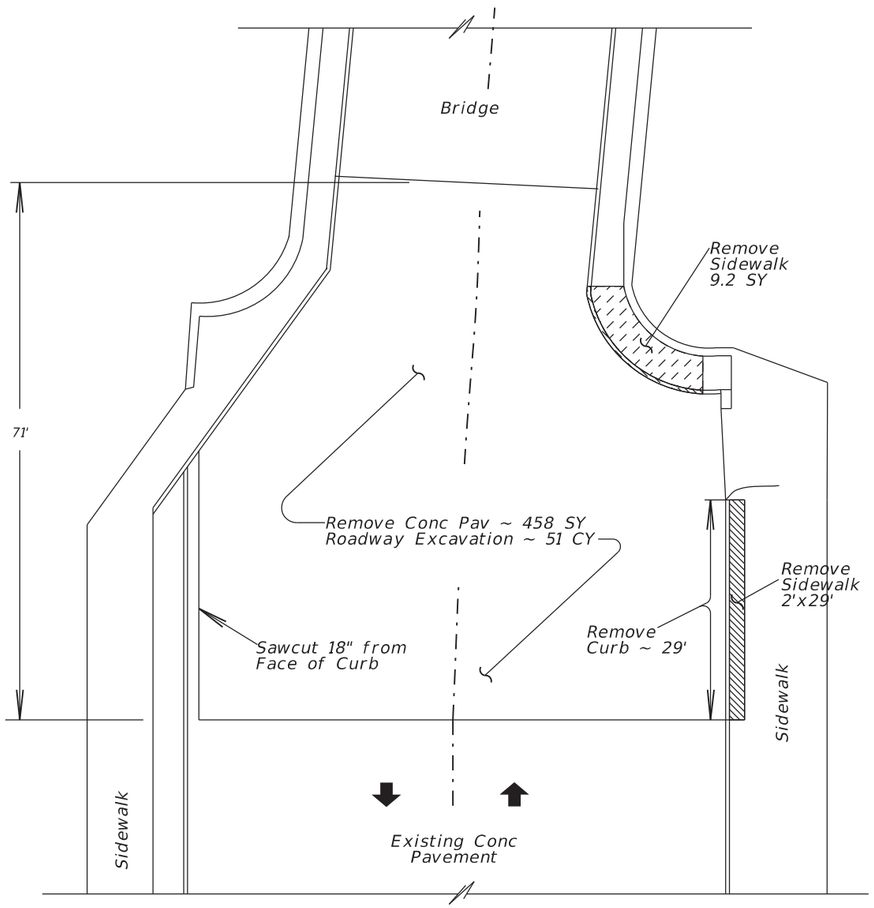
Texas Department of Transportation

San Angelo District

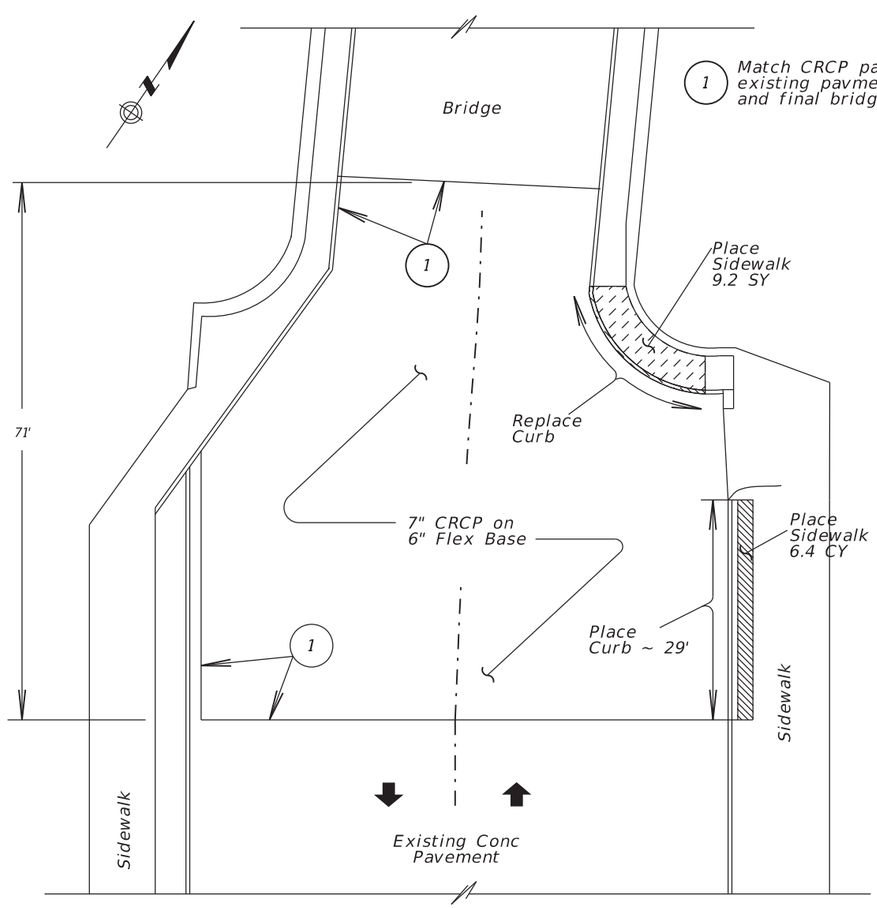
NORTH APPROACH DETAILS

SCALE VARIES

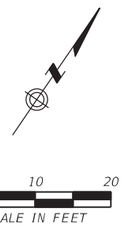
©TxDOT	CONT.	SECT	JOB	HIGHWAY
SHEET ISSUED OR LAST REVISED	0907	00	226	OAKES ST.
	DIST	COUNTY		SHEET NO.
	SJT	TOM GREEN		22

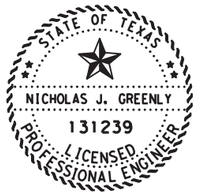


SOUTH APPROACH
Removal Items



SOUTH APPROACH
Install Items



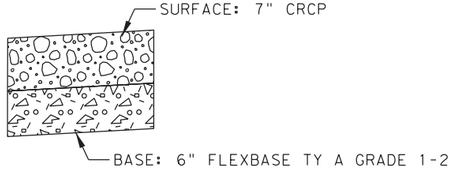


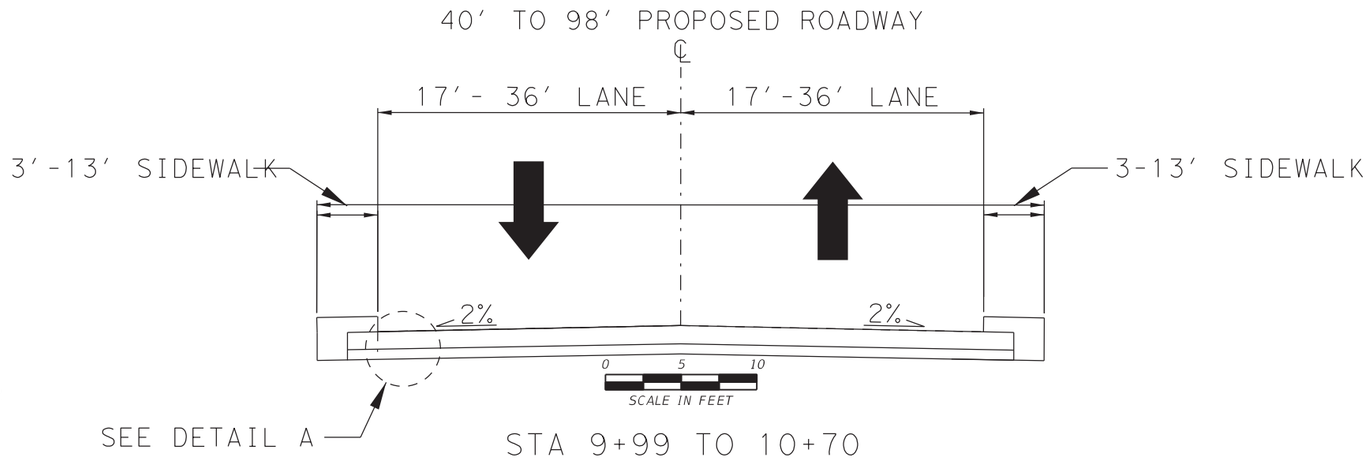
Nick Greenly P.E.

09/02/2022

PROPOSED PAVEMENT STRUCTURE

DETAIL A





STA 9+99 TO 10+70

Texas Department of Transportation

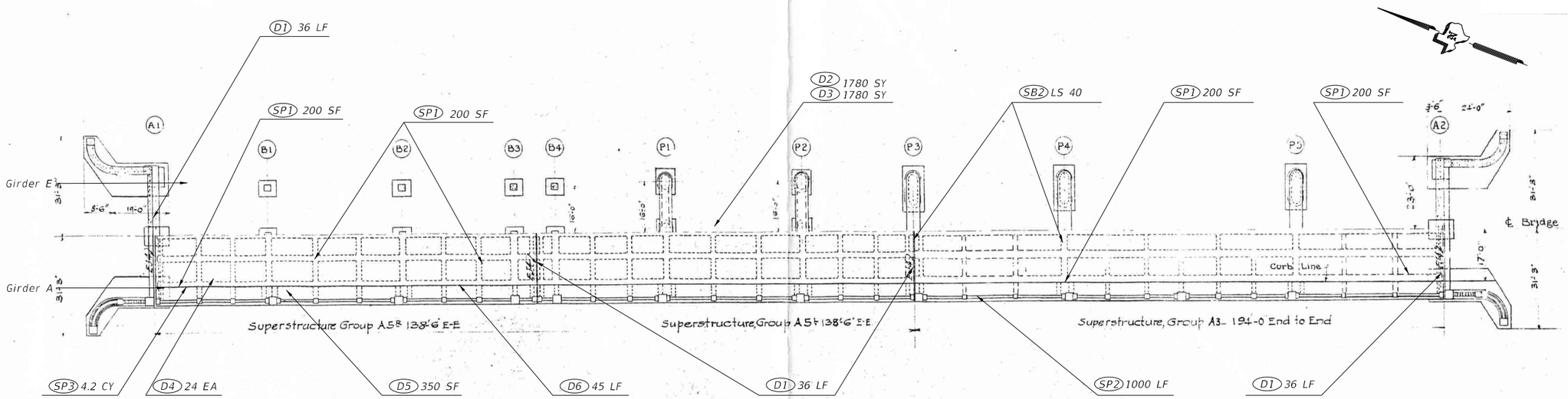
San Angelo District

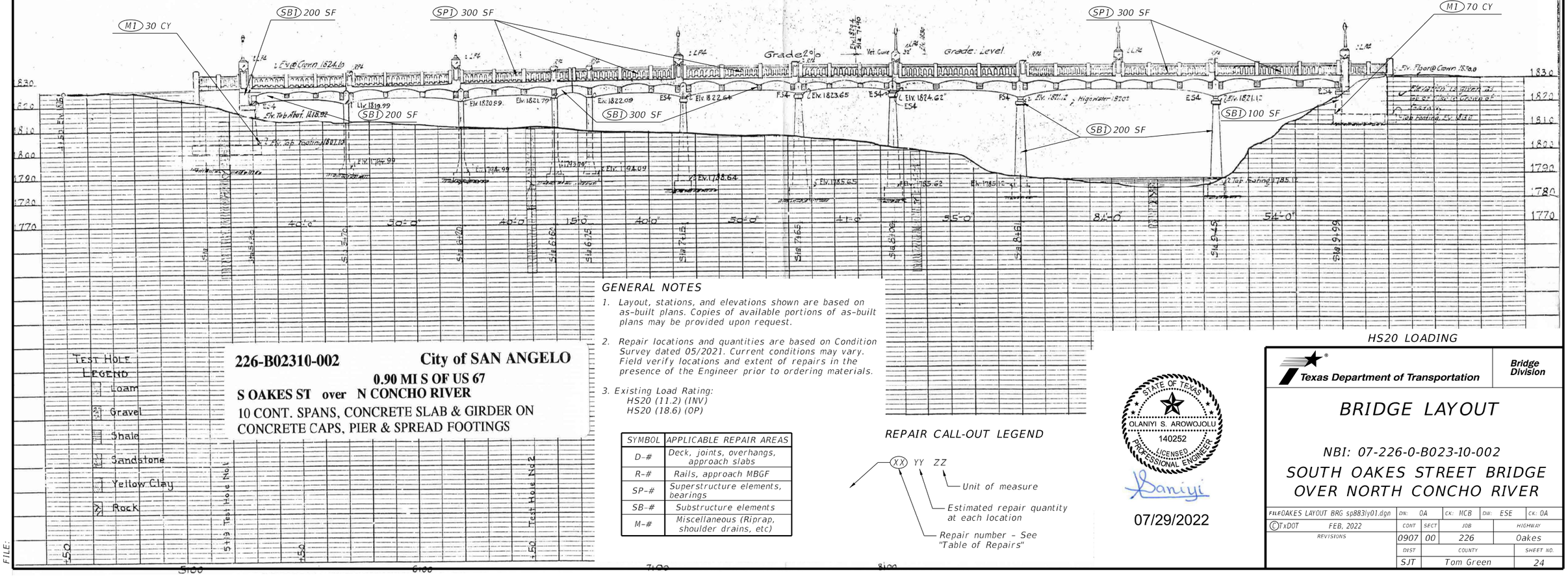
SOUTH APPROACH DETAILS

SCALE VARIES

©TxDOT

CONT	SECT	JOB	HIGHWAY
0907	00	226	OAKES ST.
DIST	COUNTY		SHEET NO.
SJT	TOM GREEN		23





TEST HOLE LEGEND

- Loam
- Gravel
- Shale
- Sandstone
- Yellow Clay
- Rock

226-B02310-002 **City of SAN ANGELO**

0.90 MI S OF US 67

S OAKES ST over N CONCHO RIVER

10 CONT. SPANS, CONCRETE SLAB & GIRDER ON CONCRETE CAPS, PIER & SPREAD FOOTINGS

HS20 LOADING

GENERAL NOTES

1. Layout, stations, and elevations shown are based on as-built plans. Copies of available portions of as-built plans may be provided upon request.
2. Repair locations and quantities are based on Condition Survey dated 05/2021. Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials.
3. Existing Load Rating:
   HS20 (11.2) (INV)
   HS20 (18.6) (OP)

SYMBOL	APPLICABLE REPAIR AREAS
D-#	Deck, joints, overhangs, approach slabs
R-#	Rails, approach MBGF
SP-#	Superstructure elements, bearings
SB-#	Substructure elements
M-#	Miscellaneous (Riprap, shoulder drains, etc)

REPAIR CALL-OUT LEGEND

STATE OF TEXAS
OLANIYI S. AROWOJOLU
140252
LICENSED PROFESSIONAL ENGINEER

07/29/2022

Texas Department of Transportation — Bridge Division

BRIDGE LAYOUT

NBI: 07-226-0-B023-10-002

SOUTH OAKES STREET BRIDGE OVER NORTH CONCHO RIVER

FILE: OAKES LAYOUT BRG sp883ly01.dgn	DN: OA	CK: MCB	DW: ESE	CK: OA
©TxDOT FEB, 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	Oakes
	DIST	COUNTY		SHEET NO.
	SJT	Tom Green		24

DATE:
FILE:

TABLE OF REPAIRS

REPAIR NO.	ITEM	BID ITEM DESCRIPTION	UNIT	QUANTITY	REPAIR DESCRIPTION/LOCATOR	DETAILS/NOTES
M1	0401 6001	FLOWABLE BACKFILL	CY	100	Backfill voids caused by erosion at Abutment 2 Column 1 footing and at various locations	See BRIDGE LAYOUT sheet for locations and refer to FOOTING UNDERMINING and EMBANKMENT FILL REPAIRS sheet for details
SB1	0429 6002	CONC STR REPAIR (EPOXY MORTAR)	SF	1000	Minor spall repairs at various locations on columns, Bent caps, Rails, Abutment caps, and Pier caps	Repair in accordance with TxDOT Concrete Repair Manual, 2021 (Section 3.1). See CONCRETE REPAIR DETAILS sheet
SP1	0429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	1400	Intermediate spall repairs at outside girders (Abutment 1 girders A & E, Pier 3 girder E, Piers 4 & 5, girders A & E, Abutment 2 Girder E), deck soffit (spans 2-7), all Diaphragms (between Abutment 1-Abutment 2)	Repair in accordance with TxDOT Concrete Repair Manual, 2021 (Section 3.2). See DECK SOFFIT AND DIAPHRAGM REPAIR DETAILS sheet
D1	0438 6004	CLEANING AND SEALING EXISTING JOINTS (CL 7)	LF	144	Clean and seal existing joints using a CL 7 joint sealant	See BRIDGE LAYOUT for locations and refer to CLEANING AND SEALING EXISTING BRIDGE JOINTS sheet for details
SP2	0438 6007	CLEANING AND SEALING EXISTING JOINTS (CL 7)	LF	1000	Clean and seal existing joints using CL 7 joint sealant between sidewalks and curbs at various locations to prevent ingress of water through the joints	See BRIDGE LAYOUT for locations
D2	0439 6013	MULTI-LAYER POLYMER OVERLAY	SY	1780	Apply multi-layer polymer overlay to entire deck area	Refer to Multi-Layer Polymer Overlay notes
SB2	0446 6028	SPOT CLEAN & PAINT EXT STR(SPL PRT SYS)	LS	1	Spot clean and paint all steel sliding bearing (40 Nos in total) to enable the bearings to slide along their axes	See BRIDGE LAYOUT sheets for locations and refer to BEAM END REPAIR DETAILS sheets
D3	0483 6013	SHOT BLASTING	SY	1780	Shot blast full deck area to prepare surface prior to Multi-Layer Polymer Overlay	Refer to Multi-Layer Polymer Overlay notes
D4	0784 6192	REPAIR STEEL (CORROSION MITIGATION)	EA	24	Apply HRCSA paint on all hollow square section deck drain scuppers exterior outlets as corrosion mitigation measures.	See BEAM END REPAIR DETAILS sheets
D5	0786 6001	CARBON FIBER REINF POLYMER PROTECTION	SF	350	Apply CFRP Protection to the soffit of the deck, and outside girders after performing intermediate spall repairs	Applies to west sidewalks of span 2 (Bent 1-Bent 2) from SW only and outside girders at various locations. See BEAM SPALL REPAIR DETAILS sheet and DECK SOFFIT & DIAPHRAGM REPAIR DETAILS
SP3	4119 6001	ULTRA-HIGH PERFORMANCE CONCRETE (UHPC)	CY	4.2	Provide UHPC as jacketing to repair outside girders (Abutment 1 girders A & E, Pier 3 girder E, Piers 4 & 5- girders A & E, Abutment 2 Girder E)	See BEAM END REPAIR sheets for details and locations
D6	7184 6013	CUT AND REPLACE CONCRETE CURB	LF	45	Remove and replace damage curbs at various locations	See BRIDGE LAYOUT for locations and refer to NON-STRUCTURAL CURB REPAIR DETAILS sheet

MULTI-LAYER POLYMER OVERLAY NOTES:

1. Shot blast the deck and clean with high pressure air. Remove all oil and other contaminants.

2. Provide a surface profile with less than ¼" deviation. Areas with a deviation greater than ¼" shall be repaired as a Partial-Depth Deck Repair. Deck repairs are paid for as Item 429, "Concrete Structure Repair". Concrete repairs shall be allowed to cure and shot blasted prior to the application of the overlay. Test moisture content in concrete repairs to ensure it is below manufacturer's requirements.

3. Mask existing joints and deck drains.

4. Install Multi-layer Polymer Overlay per Item 439, "Bridge Deck Overlays".

5. Grind the front of all deck drain scuppers down to flush with the finished level of the Multi-layer polymer overlay for the drain to be effective. Payment for the grinding is subsidiary to Item 0439 6013, "Multi-Layer Polymer Overlay."

6. Reapply roadway striping to match the original striping.

7. Seal joints after placement of overlay. See CLEANING AND SEALING EXISTING BRIDGE JOINT'S sheet.

GENERAL NOTES:

The existing structure is a 10-span reinforced concrete bridge constructed in 1930. Damaged locations and quantities are based on May 2021 Bridge Condition Survey. Verify the extent of damage and repairs prior to beginning work. Immediately notify the Engineer of any discrepancies between the plans and the actual conditions. Stations and dimensions are based on existing plans and are provided for reference only. Available portions of existing plans can be provided upon request.

Obtain necessary approval to relocate all utility line around the bents, columns, abutments and under the deck. The contractor must not damage any utility line. Any utility line damaged by the contractor during repair work must be repaired and paid for by the contractor.

HS20 LOADING

STATE OF TEXAS
OLANIYI S. AROWOJOLU
140252
LICENSED
PROFESSIONAL ENGINEER

07/29/2022

Texas Department of Transportation — Bridge Division

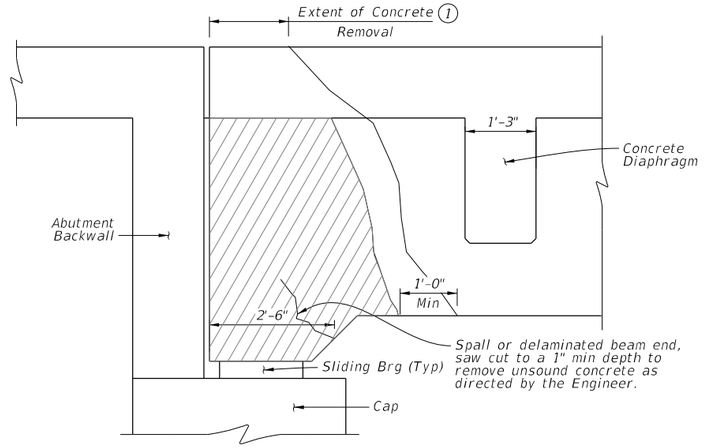
SUMMARY OF REPAIRS

NBI: 07-226-0-B023-10-002

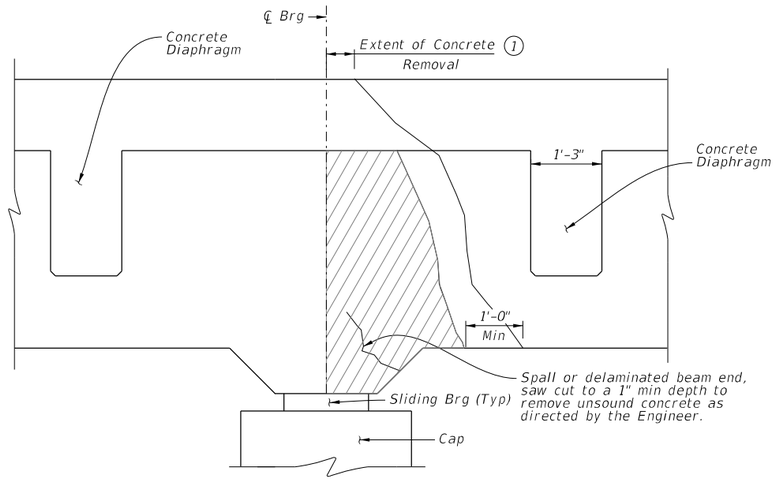
SOUTH OAKES STREET BRIDGE OVER NORTH CONCHO RIVER

FILE: OAKES BRG sp883eq01.dgn	DN: OA	CK: MCB	DW: ESE	CK: OA
©TxDOT FEB. 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	Oakes
	DIST	COUNTY		SHEET NO.
	SJT	Tom Green		25

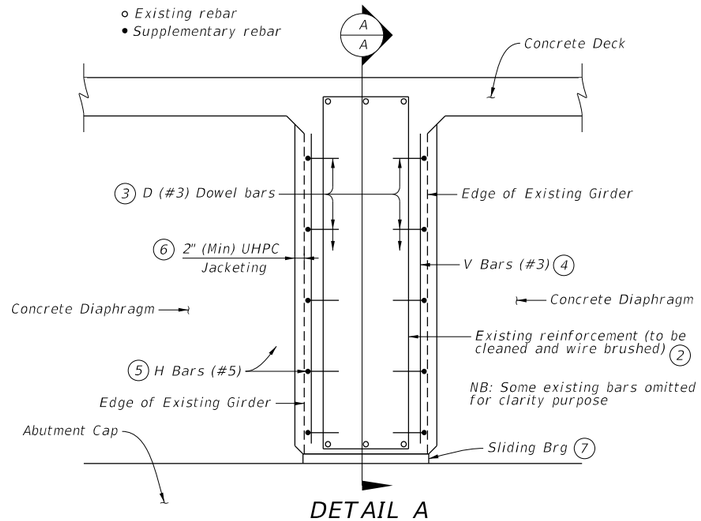
DATE:
FILE:



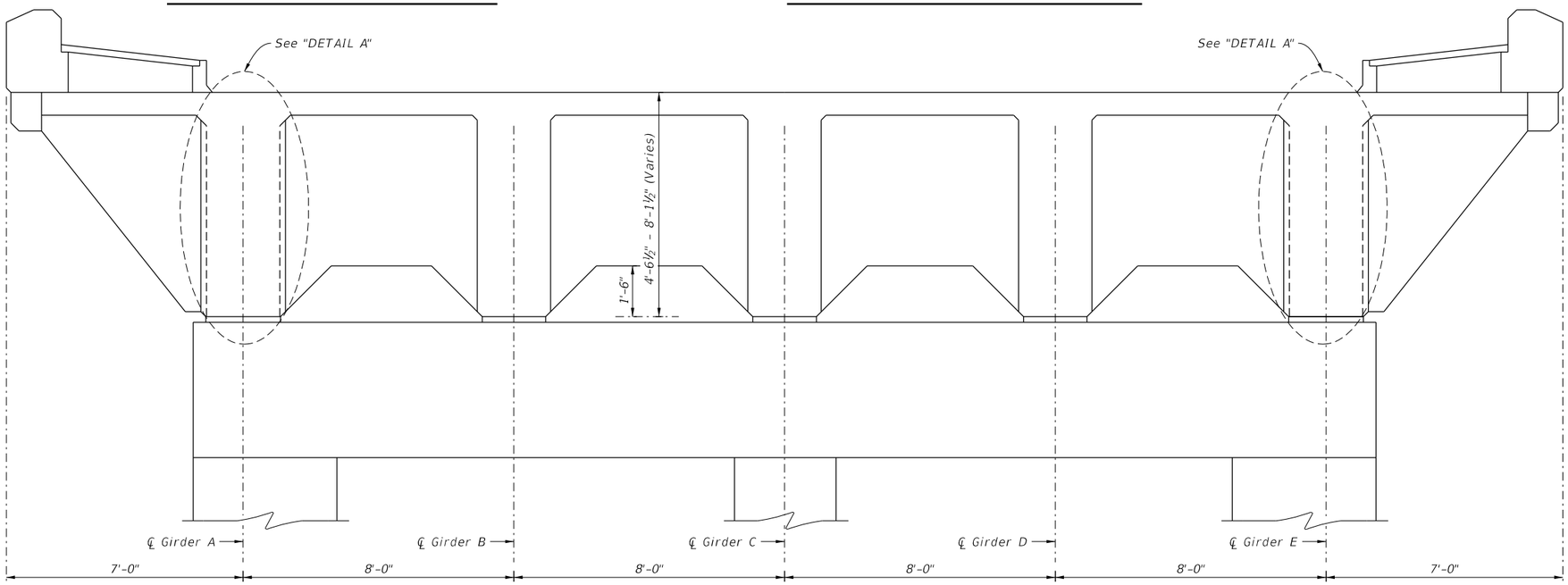
SECTION A-A (AT ABUTMENT 1 & 2, SIMILAR FOR PIER 3)



SECTION A-A (AT PIER 4 & 5)



DETAIL A



PARTIAL TRANSVERSE SECTION - (SEE TABLE OF BEAM REPAIR FOR LOCATION ON SHEET 2 OF 2)

(1) Completely remove delaminated, loose and damaged concrete at the beam end. Saw cut 1" min depth into repair area and up to 1ft (min) beyond the damaged perimeter. The edges of the saw line should be made rough for bonding of UHPC with existing normal concrete.

(2) Clean, wire brush existing reinforcement and reuse. Do not damage nor remove any existing reinforcement in the beam around the repair area. Notify the Engineer of any reinforcing exhibiting damage such as section loss due to corrosion or damage due to concrete removal activities.

(3) Drill and epoxy Bars "D" into existing beam using a Type III Class C, D, E or F epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives." Install per anchor adhesive manufacturer's instructions, including provisions for drill diameter and hole preparation. The dowels must not be spaced more than 5" on centers along the beam depth.

(4) Provide V (#3) bars approximately 2" from the face of the vertical legs of existing stirrups to supplement existing stirrups. Ensure that there is a 1½" clear cover to the new V bars from the outer face of the UHPC jacketing. The V bars must not be spaced more than 5" on centers along the beam length.

(5) Provide H (#5) bars to supplement existing longitudinal and skin reinforcement bars in the beam. The H bars must not be spaced more than 5" on centers along the depth of the beam. All the dowels "D", "V" and "H" bars properly tied and connected to ensure adequate stress transfer from the existing concrete to the new UHPC jacketing system.

(6) Pour UHPC into a 2" min space provided by the formwork as a jacketing system for the beam end. UHPC must be properly and thoroughly dispersed around the repair area, to avoid honeycombing or void between existing beam layer and UHPC layer. See UHPC and formwork notes for details.

(7) Spot clean and paint existing structure (SPL PRT SYS). Pressure wash all bearing on steel units, 5000 psi minimum. Apply high ratio calcium Sulfonate Alkyd (HRCSA) Paint System in accordance with item 446. See sliding Bearing Repair notes.

(8) Quantities shown are for one beam end repair only.

PHOTOS OF TYPICAL BEAM END FRACTURE TO BE REPAIRED WITH UHPC

Repair locations shown on photos and quantities shown are based on Condition Survey dated 05/2021. Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials.

TABLE OF ESTIMATED QUANTITIES (8)

Bar	No.	Size	Length	Weight
D	10	#3	0'-10"	3
H	10	#5	4'-0"	42
V	10	#3	7'-6"	28
Reinforcing Steel			Lb	73
Ultra High Perform. Conc (UHPC)			CY	0.6

STATE OF TEXAS
OLANIYI S. AROWOJOLU
140252
LICENSED PROFESSIONAL ENGINEER

07/29/2022

Texas Department of Transportation | Bridge Division

BEAM END REPAIR DETAILS

NBI: 07-226-0-B023-10-002

SOUTH OAKES STREET BRIDGE OVER NORTH CONCHO RIVER

FILE: OAKES BRG sp883mi08.dgn	DN: OA	CK: MCB	DW: ESE	CK: OA
©TxDOT FEB, 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	Oakes
	DIST	COUNTY		SHEET NO.
	SJT	Tom Green		26

DATE:
FILE:

BEAM END REPAIR NOTES:

1. Identify and mark all repair locations prior to beginning work. Verify areas and quantities with the Engineer. Provide access for the Engineer to inspect and verify repair areas.

2. Prepare a detailed repair procedure for each location and provide photographs for each location in the repair procedure in order to verify locations.

3. Completely remove delaminated, loose, and damaged concrete at beam ends. Square the patch perimeter; saw cut ½" min. Spalled concrete shall be repaired in accordance with the Concrete Repair Manual Chapter 3, Section 3 and detail provided in this sheet.

4. Cracks extending outside of the major spall repair in otherwise sound concrete shall be epoxy injected according to the Concrete Repair Manual Chapter 3, Section 5.5.

5. UHPC shall be used for beam end repairs as provided on this sheet (See UHPC and Formwork Notes).

6. Paint finish repairs to match existing colors as approved by the Engineer.

7. Payment will be according to the Special Specification 4119, "Ultra-High Performance Concrete (UHPC); Item 780, "Concrete Crack Repair"; and Item 495, "Raising Existing Structures".

UHPC NOTES:

1. Submit proposed concrete mix design for approval.

2. Contractor shall work with the UHPC Supplier for the mixing and pouring planning, trial batch and prototype tests, and other planning efforts in accordance with Special Specification 4119, "Ultra-High Performance Concrete (UHPC).

3. The UHPC mix shall contain a minimum of 2 percent (by volume) steel fiber reinforcement. The fibers are recommended to be straight with approximately 0.008 inches in diameter, 0.5 inches in length and a minimum tensile strength of 290 ksi. Other fiber materials that meets the requirements can be used upon approval.

4. Stockpile of materials and mix water should be kept to a temperature between 50 and 60° F on warm days.

5. Ensure surfaces of adjacent elements are pre-wetted to an SSD condition prior to placement of UHPC.

6. Strictly follow the manufacturer's procedures for mixing the UHPC. Monitor UHPC material temperature and mix water to ensure target fluidity.

7. Use specialized equipment recommended by manufacturer for mixing the UHPC.

8. Place UHPC in accordance with manufacturer recommendations. Do not vibrate UHPC. Minor rodding is allowed.

9. Seal UHPC from exposure to external environment prior to initial set. Wet curing is not required.

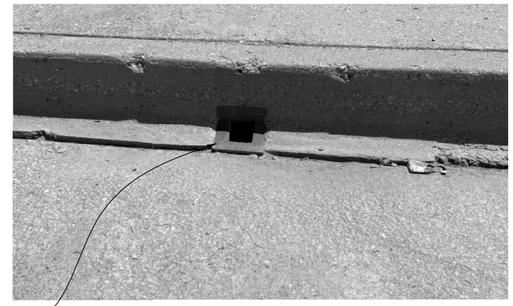
JACKING NOTES:

1. Perform work in accordance with Item 495, "Raising Existing Structures."

2. Provide jacking plans for approval. Jacks may be placed between cap and concrete diaphragm. The plan must show the proposed jacking locations, total jacking height, and the jack capacity calculations.

3. Ensure raising operation does not damage bridge. Cease lifting operations and contact Engineer immediately if jacking causes damage to the deck, beams, diaphragms, or bent caps.

4. Payment for jacking is subsidiary to the UHPC.



(9) PHOTO OF TYPICAL DECK DRAIN

(10) CAST IRON 4 x 6 x 1/2" DECK DRAIN TO BE PAINTED

SLIDING BEARING TO BE CLEANED AND PAINTED (11)

Repair locations shown on photos are based on Condition Survey dated 05/2021. Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials.

SLIDING BEARING TABLE (12)	
LOCATIONS	SLIDING BEARING
A1	All Bearings
P1	
P2	
P3	
P4	
P5	
A2	

BEAM END REPAIR TABLE	
Bent Location	Girders (13)
Abut 1, FWD	Girders A & E
Pier 3, FWD	Girder E
Pier 4 & 5 FWD & BK	Girders A & E
Abut 2, BK	Girder E

RECOMMENDED SEQUENCE OF BEAM END REPAIRS:

1. Perform beam end repair in phases. Close traffic lane above beams before beginning of work. Beam end may be raised or slab area directly above the beam end to be repaired may be broken back. Provide access for pouring UHPC and fixing supplementary V-bars, dowel bars and formwork.

2. If beam raising option is chosen, Jack up each beam end (see Jacking Notes) to the minimum level required to perform the following repair work, but not exceeding ½".

3. Blast clean the sliding bearing plates and remove spalled concrete.

4. Clean and reuse steel if section loss is not severe.

5. Install formwork at beam ends (See formwork notes).

6. Place UHPC concrete as directed (See UHPC Notes).

7. The forms may be stripped, jacks released, and the structure lowered onto the bearings once the UHPC concrete has reached 14 ksi compressive strength.

FORMWORK NOTES:

1. Formwork must match existing non-damaged shape of beam end.

2. Formwork in contact with UHPC must be of a non-absorbing finish.

3. Provided formwork must be properly sealed and pressure tight to withstand the high pressure of freshly mixed UHPC.

SLIDING BEARING NOTES:

Coat sliding bearing with HRCSA containing a minimum of 9.5% active sulfonate with a minimum 9:1 ratio of Total Base Number (TBN) to active sulfonate (minimum of 85 to 9.5% active sulfonate) to all crevices between steel bearing. Apply HRCSA in accordance with manufacturer's recommendations. Work the HRCSA into the crevice to ensure uniform coverage of the steel within the crevice.

GENERAL NOTES:

All photos are based on Bridge Condition Survey conducted in May 2021. Immediately notify the Engineer of any discrepancies between the plans and the actual conditions.

(9) All the deck drains are ineffective. Grind the front of all deck drain scuppers down to flush with the finished level of MLP0 to make them effective. Verify quantities and extent of grinding with Engineer prior to beginning work.

(10) Shot blast and paint all steel drain as corrosion mitigation. Verify quantities and extent of repair with Engineer prior to beginning work.

(11) Spot clean & paint all sliding bearing. Multiple sliding bearings have become frozen with signs of corrosion. Verify quantities and extent of repair with Engineer prior to beginning work. See SLIDING BEARING REPAIR NOTES for details.

(12) See "SLIDING BEARING NOTES" for details.

(13) See "BEAM END REPAIR" for details.

STATE OF TEXAS
OLANIYI S. AROWOJOLU
140252
LICENSED PROFESSIONAL ENGINEER

07/29/2022

Texas Department of Transportation — Bridge Division

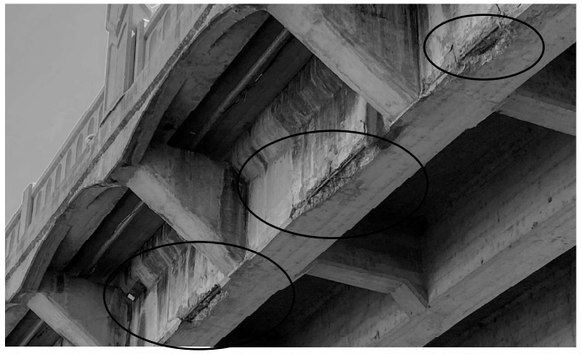
BEAM END REPAIR DETAILS

NBI: 07-226-0-B023-10-002

SOUTH OAKES STREET BRIDGE OVER NORTH CONCHO RIVER

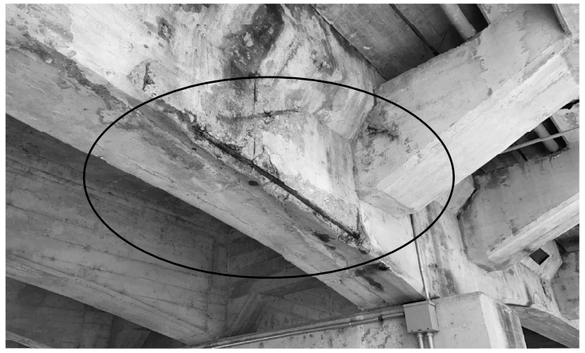
FILE: OAKES BRG sp883mi08.dgn	DN: OA	CK: MCB	DW: ESE	CK: OA
©TxDOT FEB. 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	Oakes
	DIST	COUNTY		SHEET NO.
	SJT	Tom Green		27

DATE:
FILE:

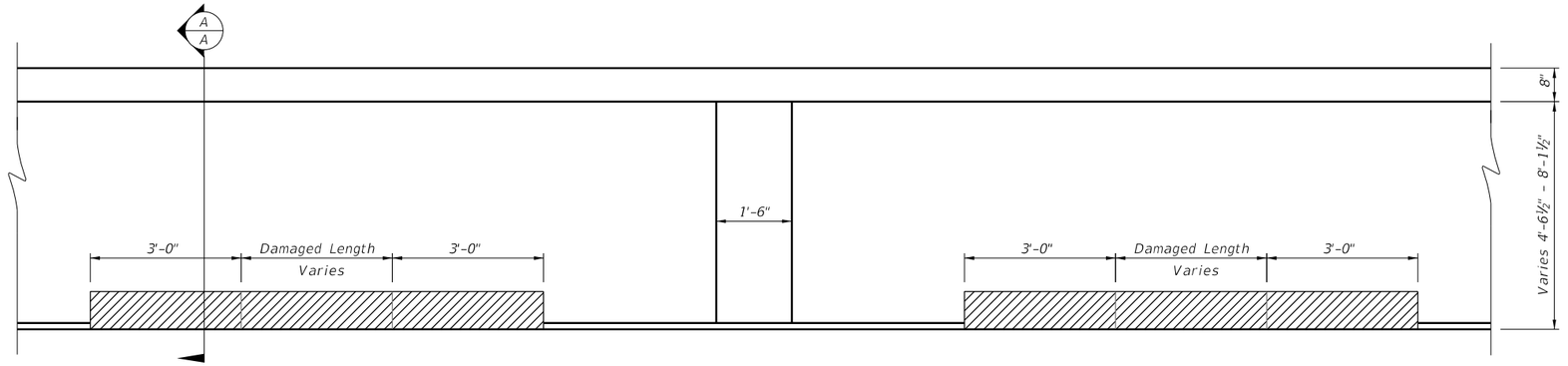


GIRDER E, SPAN 8, EXTENSIVE SPALLING ALONG THE BOTTOM EAST EDGE WITH EXTENSIVE CONCRETE SPALLING AND EXPOSED REINFORCING STEEL

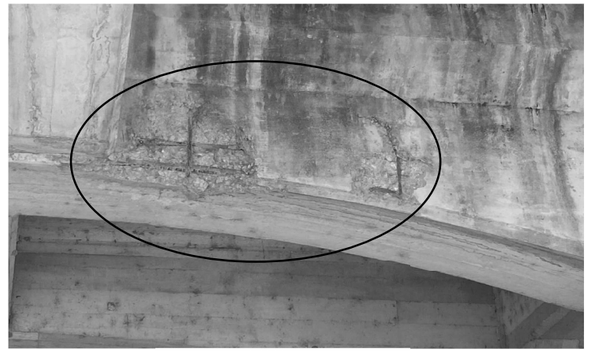
EAST FASCIA, SPALLING ON GIRDER E, CANTILEVER BEAM, AND WEST FASCIA BEAM AT SPAN 3



GIRDER E, BENT 1, LOWER EAST EDGE, EXTENSIVE SPALLING WITH UP TO 100% SECTION LOSS IN EXPOSED SHEAR AND LONGITUDINAL REINFORCING



PARTIAL ELEVATION SHOWING TYPICAL EXTERIOR BEAM SPALLING



GIRDER E, SPAN 5, SPALLING EXPOSING LOGITUDINAL AND SHEAR REINFORCING WITH EVIDENT SECTION LOSS

CONCRETE REPAIR NOTES:

1. Damaged locations and quantities are based on June, 2021 Bridge Condition Survey. Verify extent of damage and repairs prior to proceeding. Immediately notify the Engineer if any discrepancies are noted between the plans and the actual conditions.

2. Perform all repairs in accordance with Section 3.2 of the Concrete Repair Manual. Sound beams to identify areas and limits of delamination. Some delaminations may not be visible. Delineate all areas and provide access to the Engineer for verifications prior to starting repair work.

3. Submit detailed repair procedures, including proposed proprietary materials, for approval prior to commencing work.

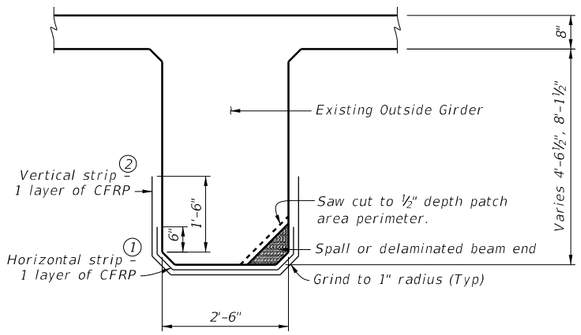
4. For vertical and overhead repair, use Type C material per DMS-4655, "Concrete Repair Materials".

5. Remove any damaged, loose or unsound concrete where indicated on the plans. Use only hand tools or power driven chipping hammers (15 lbs max) to remove concrete behind reinforcing bars. for more information, see TxDOT Concrete Repair Manual, 2021.

6. Bend, but do not remove, damaged steel reinforcement to ensure there will be 1" min concrete cover in the patch area.

7. Obtain a Saturated Surface-Dry (SSD) substrate just prior to patching using a high pressure water blast for a brief period (1 minute minimum) or other approved method. Wet the surface just prior to applying the next lift.

8.) Moist cure the patch material for a minimum of 72 hours using wet mats, water spray, or other method approved by the Engineer.



SECTION A-A

BEAM SPALL REPAIR

① Horizontal Strip- place carbon fiber fabric sheets transversely on beams/girders, with fiber orientation perpendicular to beam/girder centerline. Wrap sheets on bottom and sides of beam/girder to limits shown. Butt joint wraps in the longitudinal direction to achieve full installation length.

② Vertical Strip- place 24" carbon fiber fabric sheets longitudinally on beams/girders, with fiber orientation parallel to beam/girder centerline. Locate sheets on bottom corners of beam beam/girder as shown. Fabric sheets may be overlapped 6" minimum in the longitudinal direction to achieve full installation length.

CONSTRUCTION NOTES:

For unpainted beams/girders, install approved CFRP system and apply the protective top coating with color and texture to match adjacent concrete. Mask adjacent concrete prior to coating. For painted beams/girders, install approved CFRP system and apply the protective top coating prior to painting. Paint concrete and CFRP to produce uniform finish, as specified elsewhere.

GENERAL NOTES:

Provide and apply CFRP system, including protective coating, in accordance with Item 786, "Carbon Fiber Reinforced Polymer (CFRP)". Install CFRP wrap to beams/girders shown on the layout, in the location and to the limits given. Payment for the Bridge Protective Beam Wrap is in accordance with Item 786. Quantity is measured by the square foot of beam/girder surface area covered.

Repair locations shown on photos are based on Condition Survey dated 05/2021. Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials.

STATE OF TEXAS
OLANIYI S. AROWOJOLU
140252
LICENSED PROFESSIONAL ENGINEER

07/29/2022

Texas Department of Transportation — Bridge Division

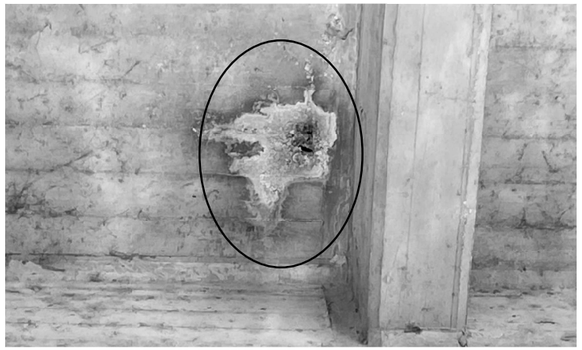
BEAM SPALL REPAIR DETAILS

NBI: 07-226-0-B023-10-002

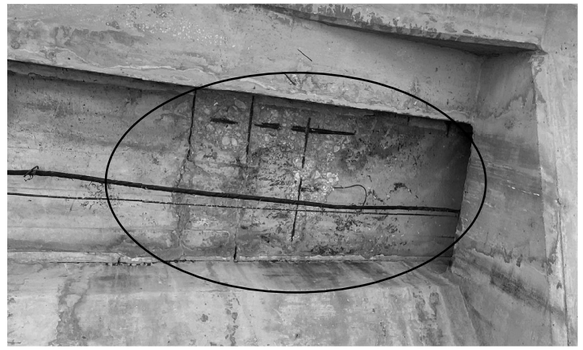
SOUTH OAKES STREET BRIDGE OVER NORTH CONCHO RIVER

FILE: OAKES BRG sp883mi06.dgn	DN: OA	CK: MCB	DW: ESE	CK: OA
©TxDOT FEB, 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	Oakes
	DIST	COUNTY		SHEET NO.
	SJT	Tom Green		28

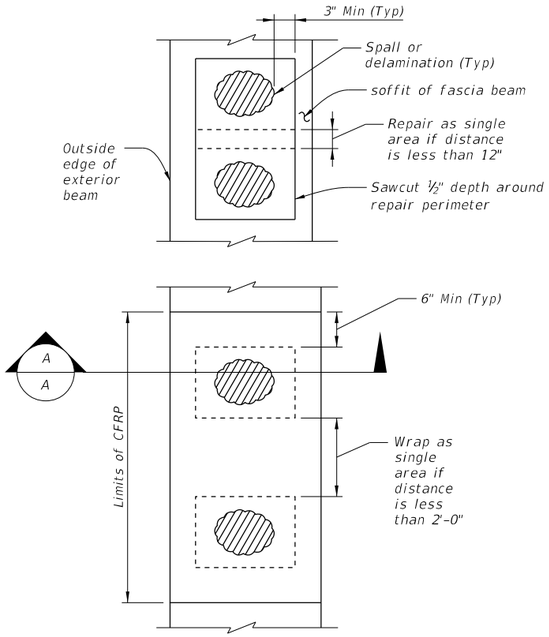
DATE:
FILE:



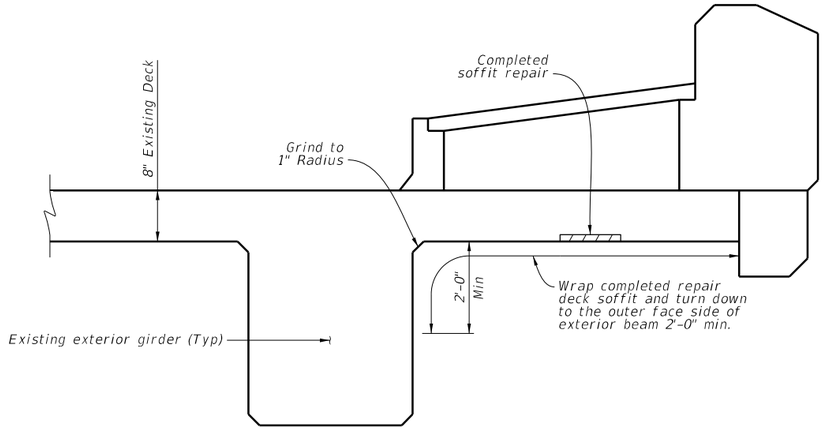
LARGE VOID CAUSED BY SPALLING AT THE UNDERSIDE OF DECK AT SPAN 7 ADJACENT TO GIRDER D AND DIAPHRAGM C



WEST SIDEWALK AND SPAN 2, LARGE SPALL WITH ADVANCED CORROSION OF EXPOSED REINFORCING STEEL



REFLECTED PLAN



SECTION A-A

N.T.S.

DECK SOFFIT SPALL REPAIR

Scale: ¼" = 1'-0", Unless noted otherwise

DIAPHRAGM SPALL REPAIR NOTES:

Identify and mark all repair locations prior to beginning work. Verify areas and quantities with the Engineer. Provide access for the Engineer to inspect and verify repair areas.

Prepare detailed repair procedure in accordance with Chapter 3, Section 2 of the TxDOT Concrete Repair Manual and detail below.

For repairs deeper than 2" with no other mild reinforcing present, install stainless steel pins in existing concrete to anchor repair material.

Trowel apply repair materials to a maximum depth of 6". Form and place material is repair depth exceeds 6".

Repairs are paid for as Item 429, "Concrete Structure Repair".

DECK SOFFIT SPALL REPAIR NOTES:

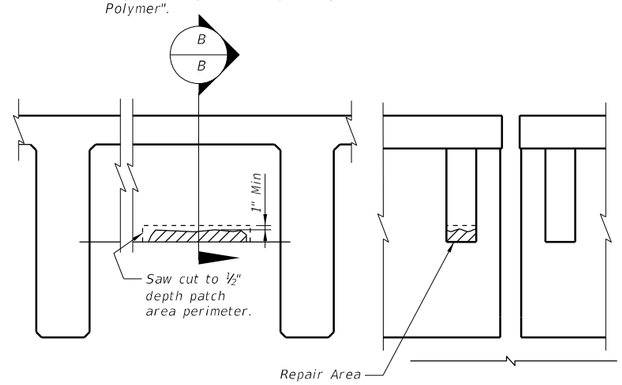
Identify and mark all repair locations prior to beginning work. Verify areas and quantities with Engineer. Provide access for the Engineer to inspect and verify repair areas. Identify repair areas over traffic prior to beginning work.

Obtain necessary approval to relocate all utility line around the bents, columns, abutments and under the deck. The contractor must not damage any utility line. Any utility line damaged by the contractor during repair work must be repaired and paid for by the Contractor.

Prepare detailed repair procedure in accordance with Chapter 3, Section 2 of the TxDOT Concrete Repair Manual and Intermediate Concrete Spall Repair Detail.

For repair areas over traffic, as identified in plans or directed by the Engineer, install one layer of carbon fiber reinforced polymer (CFRP) over repair area per Item 786, "Carbon Fiber Reinforced Polymer", and detail below. CFRP Calculations not required. Paint over CFRP per Item 786, "Carbon Fiber Reinforced Polymer", and match surrounding concrete as approved by Engineer.

Repairs are paid for as Item 429, "Concrete Structure Repair". CFRP, when required, is paid for separately as Item 786, "Carbon Fiber Reinforced Polymer".



ELEVATION SECTION B-B

DIAPHRAGM SPALL REPAIR

Scale: ¼" = 1'-0"

GENERAL NOTES:

Repair locations shown on photos are based on Condition Survey dated 05/2021. Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials.

STATE OF TEXAS
OLANIYI S. AROWOJOLU
140252
LICENSED PROFESSIONAL ENGINEER

07/29/2022

Texas Department of Transportation — Bridge Division

DECK SOFFIT AND DIAPHRAGM REPAIR DETAILS

NBI: 07-226-0-B023-10-002

SOUTH OAKES STREET BRIDGE OVER NORTH CONCHO RIVER

FILE: OAKES BRG sp883mi07.dgn	DN: OA	CK: MCB	DW: ESE	CK: OA
©TxDOT FEB, 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	Oakes
	DIST	COUNTY		SHEET NO.
	SJT	Tom Green		29

DATE:
FILE:

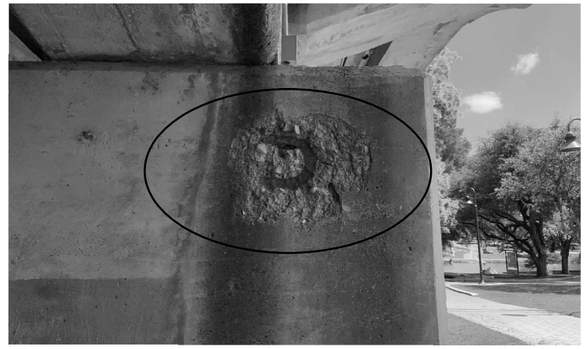
PIER CAP 3, NORTH FACE, GIRDERS A & B

BENT CAP 1, COLUMN 2

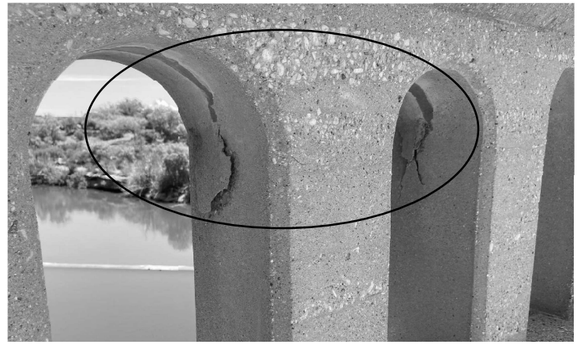
BENT CAP 1, SOUTH FACE

PIER CAP 3, NORTH FACE, GIRDER D

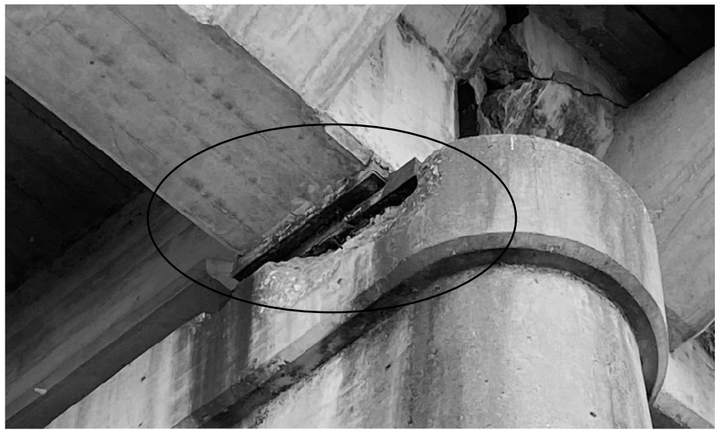
WEST FACE OF BEAM, SPALL AT SPAN 2 WITH SECTION LOSS OF THE EXPOSED IN REINFORCING STEEL



BENT CAP 1, NORTH FACE



RAIL SPALLING



PIER CAP 3, SOUTH FACE, GIRDER E

Spalling to be repaired in accordance with the "Concrete Repair Details" of Section 3.1 of the TxDOT Concrete Repair Manual

CONCRETE REPAIR NOTES:

1. Damaged locations shown on photos and quantities are based on Condition Survey dated 05/2021. Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials. Immediately notify Engineer if any discrepancies are noted between the plans and the actual conditions.

2. Perform all repairs in accordance with Section 3.2 of the Concrete Repair Manual. Sound the concrete to identify areas and limits of delamination. Some delaminations may not be visible. Delineate all areas and provide access to the Engineer for verification prior to starting repair work.

3. Submit detailed repair procedures, including proposed proprietary materials, for approval prior to commencing work.

STATE OF TEXAS
OLANIYI S. AROWOJOLU
140252
LICENSED PROFESSIONAL ENGINEER

07/29/2022

DATE:
FILE:

Texas Department of Transportation

Bridge Division

CONCRETE REPAIR DETAILS

NBI: 07-226-0-B023-10-002

SOUTH OAKES STREET BRIDGE OVER NORTH CONCHO RIVER

FILE: OAKES BRG sp883mi05.dgn	DN: OA	CK: MCB	DW: ESE	CK: OA
©TxDOT FEB, 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	Oakes
	DIST	COUNTY		SHEET NO.
	SJT	Tom Green		30

Areas of curb to be repaired
NB: The exact location of the curb to be repaired varies.

CURB REPLACEMENT NOTES:

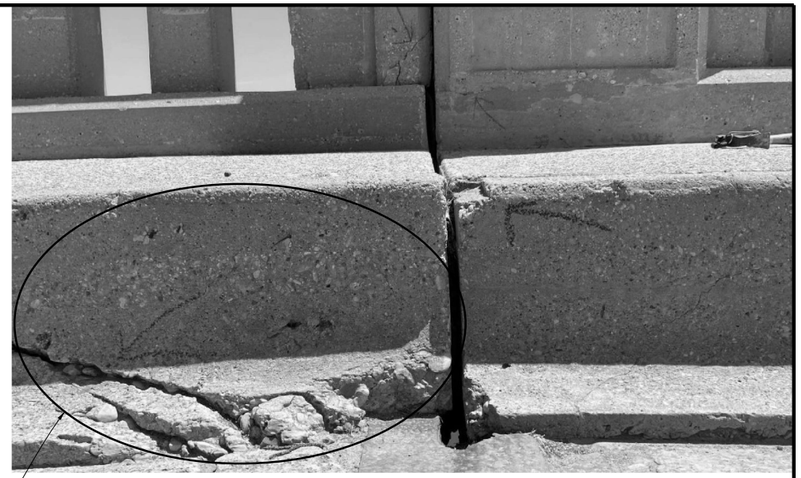
Identify and mark all repair locations prior to beginning work. Verify areas and quantities with the Engineer.

Sawcut the perimeter of the curb ½" deep as shown and remove curb. For missing sections of curb sawcut and remove adjacent intact curb to expose 1'-0" of existing reinforcing. All concrete shall be removed from the existing key in the deck. Take care to minimize damage to the deck.

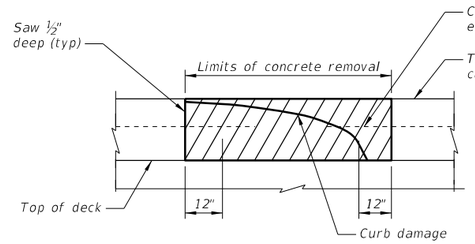
Clean or replace existing dowels. If less than two dowels are present in the repair area add a dowel to match the existing. Extend the existing longitudinal curb rebar into the new curb as shown. If the existing rebar is damaged, drill and epoxy a new bar into the existing deck.

Form and place new concrete to match the shape of the existing curb. Match existing concrete class.

Repairs are paid for as Item 7184, "Cut and Replace Concrete Curb", Curb removal, dowels, dowel placement, and rebar are subsidiary to this item.

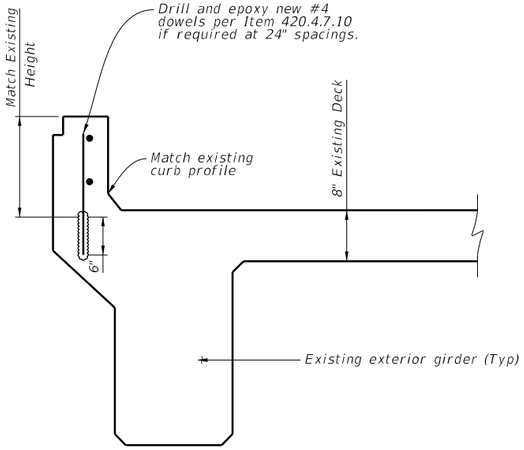


Areas of curbs to be repaired



REMOVAL

RECONSTRUCTION



SECTION A-A

N.T.S.

CURB REPLACEMENT ELEVATION

Scale: ¼" = 1'-0", Unless noted otherwise

GENERAL NOTES:

Damaged locations shown on photos and quantities are based on Condition Survey dated 05/2021. Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials. Immediately notify Engineer if any discrepancies are noted between the plans and the actual conditions.

STATE OF TEXAS
OLANIYI S. AROWOJOLU
140252
LICENSED PROFESSIONAL ENGINEER

07/29/2022

Texas Department of Transportation — Bridge Division

NON-STRUCTURAL CURB REPAIR DETAILS

NBI: 07-226-0-B023-10-002

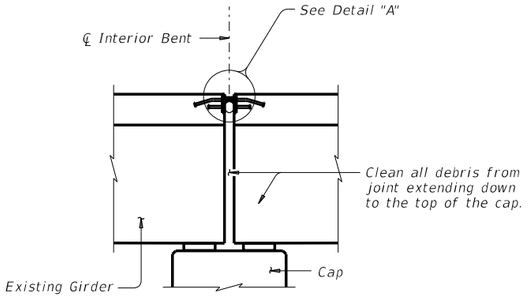
SOUTH OAKES STREET BRIDGE OVER NORTH CONCHO RIVER

FILE: OAKES BRG sp883mi01.dgn	DN: OA	CK: MCB	DW: ESE	CK: OA
©TxDOT FEB. 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	Oakes
	DIST	COUNTY		SHEET NO.
	SJT	Tom Green		31

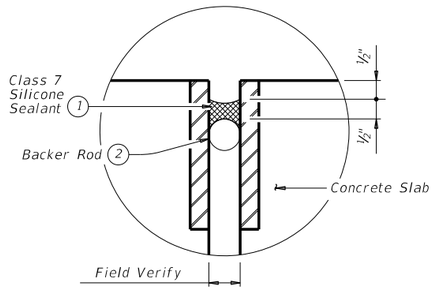
DATE:
FILE:

TABLE OF ESTIMATED QUANTITIES

STRUCTURE NUMBER (FEATURE CROSSED)	JOINT TYPE	ITEM	DESCRIPTION	NUMBER OF JOINTS	QUANTITY (LF)
NBI: 07-226-0-B023-10-002 (North Concho River)	ARMOR JOINT	0438 6004	CLEAN AND SEAL EXISTING ARMOR JOINTS USING CL 7 JOINT SEALANT	4	144



ARMOR JOINT
(used without ACP Overlay)



DETAIL "A"
(Stud anchors not shown for clarity)

PROCEDURE FOR CLEANING AND SEALING EXISTING ARMOR JOINTS

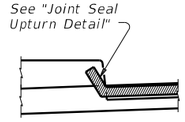
1) Remove existing seal, if present. Clean joint opening of all dirt and other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints."

2) Abrasive blast clean existing steel surface where silicone seal is to be placed.

3) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.

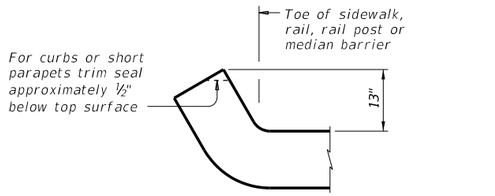
4) Place backer rod into joint opening 1" below the top of concrete. The backer rod must be 25% larger than the joint opening. When sealing joints for slab spans, pan girder spans, or box beam spans, fill void below backer rod with extruded polystyrene foam.

5) Seal the joint opening with a Class 7 Silicone. Recess seal ½" below top of concrete in travel lanes and ⅛" below top of concrete in shoulders.



AT CURB

JOINT SEALANT TERMINATION DETAILS



JOINT SEAL UPTURN DETAIL

(1) Use Class 7 silicone sealant in accordance with DMS-6310, "Joint Sealants and Fillers." Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."

(2) Backer rod must be 25% larger than joint opening and must be compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.

(3) Backer rod must be 25% larger than joint opening and must be compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.

(4) Match existing joint opening or set at a minimum:
- a. 1" at 70°F when the distance between joints is 150 ft or less
- b. 2" at 70°F when the distance between joints is greater than 150 ft.
- c. As directed by the Engineer.

(5) Cleaning and sealing existing header joints does not necessitate replacement of existing header material. If replacement of header material is necessary, as determined by the Engineer, use header material in accordance with DMS-6140, "Polymer Concrete for Bridge Joint Systems." Match the thickness of the header material with the thickness of the overlay as shown in the plans, but not to exceed 4". Place header material flush with roadway surface. Do not cantilever header material over the joint opening. Repair of header material will be paid for in accordance with Item 785-6006, "Bridge Joint Repair (Header)."

(6) Maximum thickness is 4".

GENERAL NOTES

Cleaning existing joint opening (full depth) of all debris, providing and placing backer rod, saw-cutting joint opening, and sealing joint is paid for by Item 438, "Cleaning and Sealing Joints" and measured by the foot of "Cleaning and Sealing of Existing Joints."

Obtain approval for all tools, equipment, materials and techniques proposed for use to prepare the joint.

Provide Class 7 silicone sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in concrete.

Extend sealant up into rail or curb 3 inches on low side or sides of deck. If the Class 7 Sealant cannot be effectively placed in the vertical position, a Class 4 Sealant compatible with the Class 7 sealant is allowed for the extension of the seal into the curb or rail. Prepare surfaces where sealant is to be placed in accordance with manufacturer's specifications.

STATE OF TEXAS
OLANIYI S. AROWOJOLU
140252
LICENSED PROFESSIONAL ENGINEER

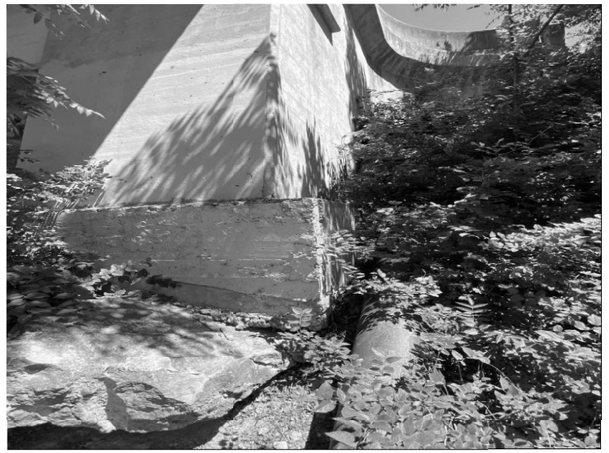
07/29/2022

Texas Department of Transportation — Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS
NBI: 07-226-0-B023-10-002
SOUTH OAKES STREET BRIDGE OVER NORTH CONCHO RIVER

FILE: OAKES BRG sp883mi04.dgn	DN: OA	CK: MCB	DW: ESE	CK: OA
©TxDOT FEB, 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	Oakes
	DIST	COUNTY		SHEET NO.
	SJT	Tom Green		32

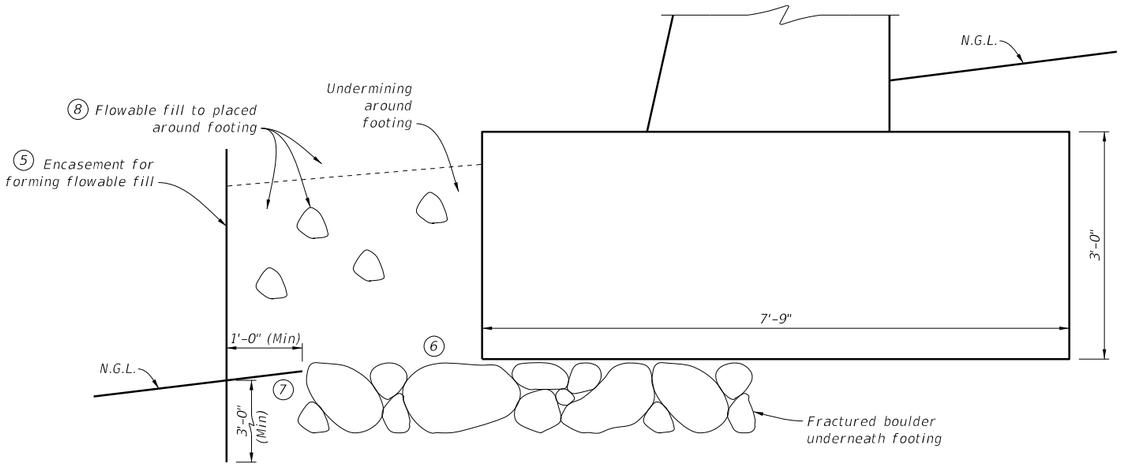
DATE:
FILE:



UNDERMINING AT ABUTMENT 2 COLUMN 1 (1)(2)(3)(4)

UNDERMINING AT THE RETAINING WALL AT ABUTMENT 1 EMBANKMENT (1)(2)(3)(4)

UNDERMINING AT THE ABUTMENT 2 EMBANKMENT (1)(2)(3)(4)



DETAILS FOR PLACING FLOWABLE FILL AT ABUTMENT 2 COLUMN 1 FOOTING

UNDERMINING AT ABUTMENT 2 COLUMN 3 BACKWALL (1)(2)(4)

Damaged locations shown on photos are based on Condition Survey dated 05/2021. Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials. Immediately notify Engineer if any discrepancies are noted between the plans and the actual conditions.

(1) *Undermining at various parts of the abutment footing, embankment retaining wall, etc. The contractor must field verify the extent of the undermining before beginning work.*

(2) *Submit flowable fill design for approval of a thicker consistency to avoid leakage and blowouts. Place flowable fill in a small initial volume of 3 CY max to determine if voids area are being filled and material loss is not occurring. Allow initial placement to setup sufficiently prior to subsequent placements to continue filling voids. Stage placements under concrete footing and abutment in a manner that works from lower elevations upward around abutment, embankment, and retaining wall.*

(3) *Extend and seal every leaks on all drainage pipes causing erosion around the column footing.*

(4) *All photos are from Bridge Condition Survey conducted in May 2021.*

(5) *Create a permanent envelope around the existing footing at perimeter sections showing scour at the sides of the footing.*

(6) *Do not remove boulders wedged under the footing, rather encase them with the concrete apron poured 6" to 2ft thick from the outside edge of the existing footing.*

(7) *At bottom of encasement, fill should be at competent shallow bedrock.*

(8) *Use either flowable fill or Class C concrete.*

GENERAL NOTES:

Current conditions may vary from those shown in photographs. Provide flowable fill conforming to Item 401, "Flowable Backfill". Payment will be for the amount of material placed in the field.

STATE OF TEXAS
OLANIYI S. AROWOJOLU
140252
LICENSED PROFESSIONAL ENGINEER

07/29/2022

Texas Department of Transportation — Bridge Division

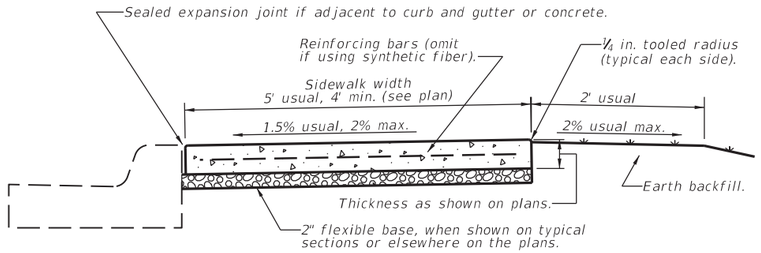
FOOTING UNDERMINING & EMBANKMENT FILL REPAIRS

NBI: 07-226-0-B023-10-002

SOUTH OAKES STREET BRIDGE OVER NORTH CONCHO RIVER

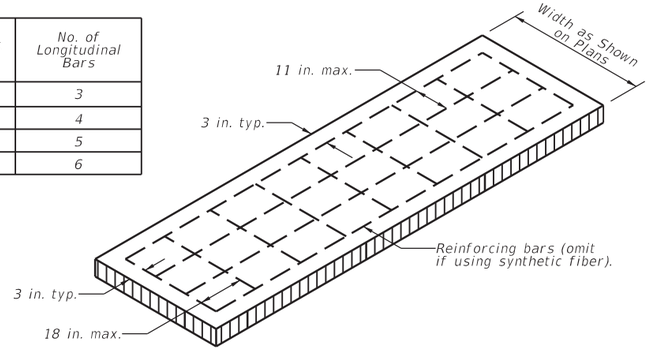
FILE: OAKES BRG sp883mi09.dgn	DN: OA	CK: MCB	DW: ESE	CK: OA
©TxDOT FEB. 2022	CONT.	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	Oakes
	DIST.	COUNTY		SHEET NO.
	SJT	Tom Green		33

DATE:
FILE:

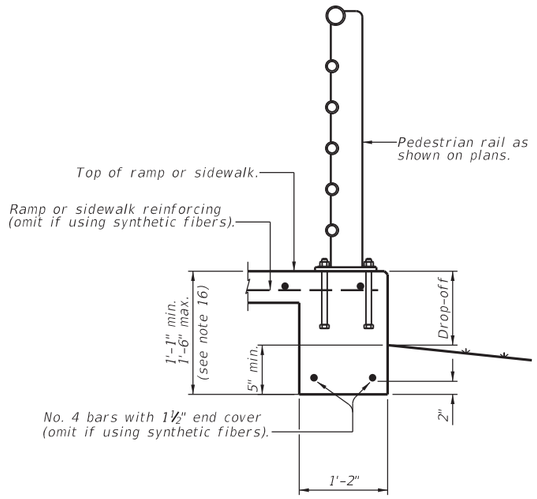


TYPICAL SECTION THROUGH SIDEWALK

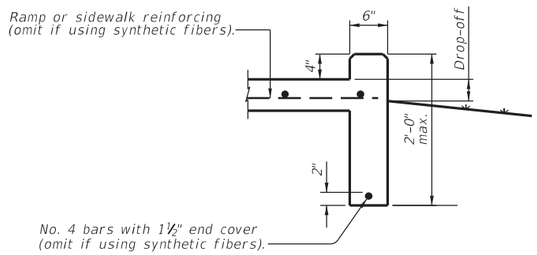
Sidewalk Width	No. of Longitudinal Bars
3 ft.	3
4 ft.	4
5 ft.	5
6 ft.	6



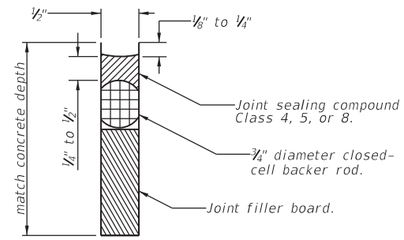
SIDEWALK STEEL REINFORCING



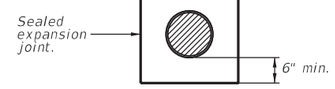
SECTION THRU SIDEWALK WITH PEDESTRIAN RAIL FOOTING



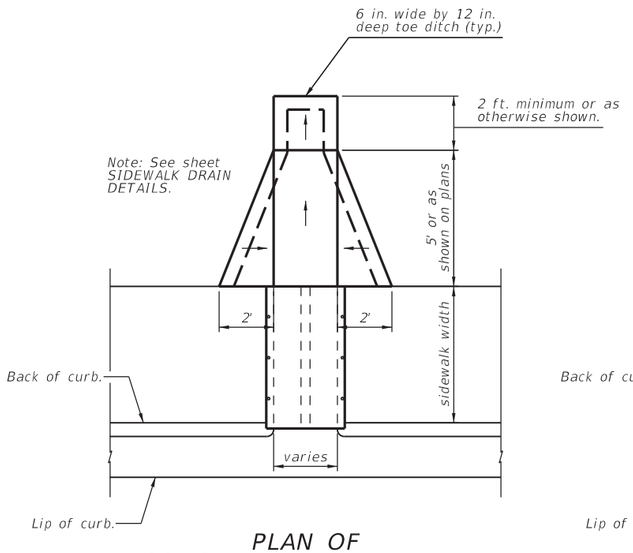
SECTION THRU SIDEWALK WITH EDGE CURB PROTECTION



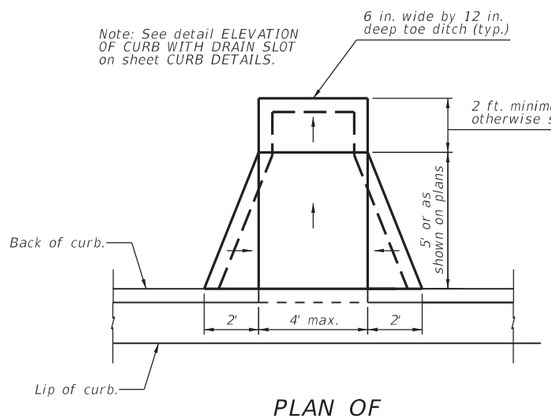
SEALED EXPANSION JOINT



JOINT LAYOUT AT OBSTRUCTION



PLAN OF CONCRETE RIPRAP FLUME ADJACENT TO SIDEWALK DRAIN



PLAN OF CONCRETE RIPRAP FLUME ADJACENT TO CURB

GENERAL NOTES

1. The work performed, materials furnished, equipment, labor, tools, and incidentals for flexible base, sealed expansion joints and earth backfill will not be measured or paid directly, but will be considered as included in payment for Item 531, "Sidewalks."
2. Acceptable joint sealing compounds are listed on the Department's "Joint Sealers" Material/Producer List.
3. Joint filler boards shall conform to the requirements of DMS-6310, "Joint Sealants and Fillers."
4. Reinforcing steel shall conform to the requirements of Item 440, "Reinforcement for Concrete."
5. Where earth backfill is required, place imported topsoil or suitable topsoil from adjacent excavations. Limits and extent of backfill vary. Adjust backfill as directed to avoid obstructions or to remain within right of way limits. Slopes of earth backfill used to patch adjacent to new sidewalk shall be 3:1 or less, unless otherwise directed.
6. Remove and/or relocate any existing irrigation system components, plant material, and other landscaping items that conflict with locations of proposed construction as directed. Unless otherwise identified on the plans, this will not be measured or paid directly, but will be considered as included in payment for Item 531, "Sidewalks."
7. Construct 1/4 in. radius transverse contraction (tooled) joints at intervals equal to the sidewalk width, unless otherwise directed.
8. Construct sealed expansion joints at intervals not to exceed 40 ft. and where new concrete sidewalk abuts curbs, driveways, storm drain inlets, and existing concrete or buildings.
9. Sidewalks crossing driveways shall conform to the driveway details as shown elsewhere in the plans.
10. Flexible base shall conform to the requirements of Item 247, "Flexible Base," Type A, Grade 5 (without minimum strengths or classification). Recycled asphalt pavement (RAP) may be incorporated into the flexible base or may used in place of flexible base.
11. The use of synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber is listed on the Department's "Fibers for Class A and Class B Concrete Applications" Material/Producer List.
12. If used, reinforcing steel shall be No. 3 uncoated deformed bars, placed at the vertical mid-point of the sidewalk thickness. Securely tie reinforcing steel where bars lap, intersect, or cross. Equivalent welded wire reinforcement may be substituted.
13. Where obstructions to remain exist, sidewalk width may be decreased to 3 ft. for a distance not to exceed 200 ft. When approved, sidewalk width may be decreased at obstructions to 32 in. for a distance not to exceed 2 ft. provided that reduced width segments are separated by segments that are 4 ft. long minimum and 3 ft. wide minimum.
14. Concrete for pedestrian rail footing and edge curb protection will be measured and paid for as Item 420.
15. Construct concrete riprap flumes 5 in. thick. Flumes adjacent to curbs are not intended for use in urban areas or within sidewalks. Slope flumes to match surrounding grades.
16. Use details on sheet SIDEWALK RETAINING WALL DETAILS if pedestrian rail footing height exceeds 1'-6".

SIDEWALK EDGE PROTECTION GUIDANCE

HAZARD TYPE	EDGE PROTECTION
drop-off < 1/2" or drop-off beyond 2' from sidewalk edge	none required
drop-off between 1/2" and 10" within 2' from sidewalk edge	edge curb or handrail
drop-off > 10" within 2' from sidewalk edge	handrail
slope > 2:1 within 2' from sidewalk edge and total drop-off > 30"	

PAY ITEMS

0420 6012 CL B CONC (MISC)	CY
0432 6044 RIPRAP (CONC)(FLUME)	CY
0531 6001 CONC SIDEWALKS (4")	SY
0531 6002 CONC SIDEWALKS (5")	SY
0531 6003 CONC SIDEWALKS (6")	SY

STATE OF TEXAS
NICHOLAS J. GREENLY
131239
LICENSED
PROFESSIONAL ENGINEER

Nick Greenly P.E.

09/02/2022

Texas Department of Transportation | San Angelo District

SIDEWALK DETAILS

SHEET 1 OF 1 NOT TO SCALE

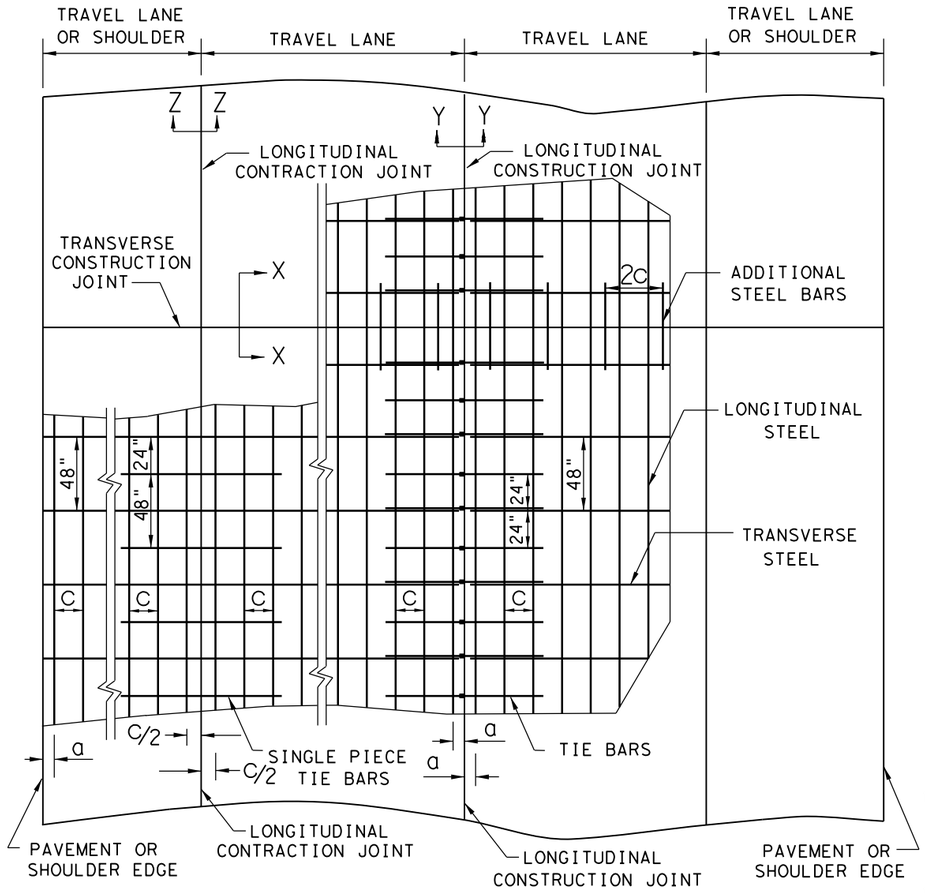
SHEET ISSUED OR LAST REVISED	CONT	SECT	JOB	HIGHWAY
11-19	0907	00	226	OAKES ST.
	DIST	COUNTY		SHEET NO.
	SJT	TOM GREEN		34

DATE: 9/2/2022 11:14:54 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\090700226\4 - Design\Plan Set\8. Traffic\SIDEWALK DETAILS.dgn

DATE: 8/30/2022 12:01:37 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\090700226\4 - Design\Plan Set\3. Roadway\CRCP1-(20).dgn

TABLE NO. 1 LONGITUDINAL STEEL					
SLAB THICKNESS AND BAR SIZE		REGULAR STEEL BARS	FIRST SPACING AT EDGE OR JOINT	ADDITIONAL STEEL BARS AT TRANSVERSE CONSTRUCTION JOINT (SECTION X-X)	
T (IN.)	BAR SIZE	SPACING C (IN.)	SPACING a (IN.)	SPACING 2 X C (IN.)	LENGTH L (IN.)
7.0	#5	6.5	3 TO 4	13	50
7.5	#5	6.0	3 TO 4	12	50
8.0	#6	9.0	3 TO 4	18	50
8.5	#6	8.5	3 TO 4	17	50
9.0	#6	8.0	3 TO 4	16	50
9.5	#6	7.5	3 TO 4	15	50
10.0	#6	7.0	3 TO 4	14	50
10.5	#6	6.75	3 TO 4	13.5	50
11.0	#6	6.5	3 TO 4	13	50
11.5	#6	6.25	3 TO 4	12.5	50
12.0	#6	6.0	3 TO 4	12	50
12.5	#6	5.75	3 TO 4	11.5	50
13.0	#6	5.5	3 TO 4	11	50

TABLE NO. 2 TRANSVERSE STEEL AND TIE BARS						
SLAB THICKNESS (IN.)	TRANSVERSE STEEL		TIE BARS AT LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z)		TIE BARS AT LONGITUDINAL CONSTRUCTION JOINT (SECTION Y-Y)	
	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)
7.0 - 7.5	#5	48	#5	48	#5	24
8.0 - 13.0	#5	48	#6	48	#6	24

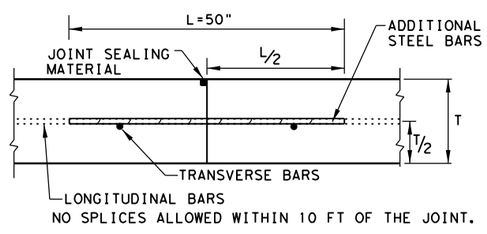


TYPICAL PAVEMENT LAYOUT

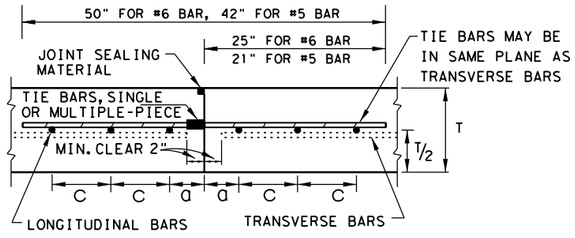
PLAN VIEW (NOT TO SCALE)

GENERAL NOTES

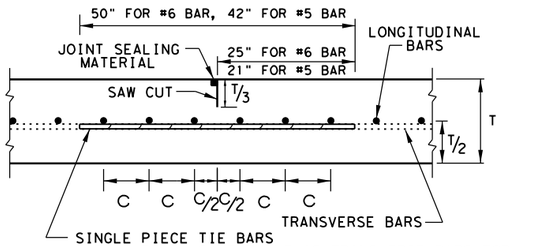
1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT ARE NOT COVERED BY THIS STANDARD.
2. USE COARSE AGGREGATES WITH A RATED COEFFICIENT OF THERMAL EXPANSION (CoTE) OF NOT MORE THAN 5.5 X 10^{-6} IN/IN/ °F AS LISTED IN THE CONCRETE RATED SOURCE QUALITY CATALOG (CRSQC).
3. ALL THE REINFORCING STEEL AND TIE BARS SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A 615 (GRADE 60) OR ASTM A 996 (GRADE 60) OR ABOVE. STEEL BAR SIZES AND SPACINGS SHALL CONFORM TO TABLE NO. 1 AND TABLE NO. 2.
4. STEEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1 IN. HORIZONTALLY AND +/- 0.5 IN. VERTICALLY. CALCULATED AVERAGE BAR SPACING (CONCRETE PLACEMENT WIDTH / NUMBER OF LONGITUDINAL BARS) SHALL CONFORM TO TABLE NO. 1
5. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
6. THE SAW CUT DEPTH FOR THE LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z) SHALL BE ONE THIRD OF THE SLAB THICKNESS (T/3).
7. WHEN TYING CONCRETE GUTTER AT A LONGITUDINAL JOINT, THE TIE BAR LENGTH OR POSITION MAY BE ADJUSTED. PROVIDE 3 IN. OF CONCRETE COVER FROM THE BACK OF GUTTER TO THE END OF TIE BAR.
8. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN.10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
9. OMIT TIE BARS LOCATED WITHIN 18-IN. OF THE TRANSVERSE CONSTRUCTION JOINTS (SECTION X-X). USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL FORMED JOINTS.
10. LONGITUDINAL REINFORCING STEEL SPLICES SHALL BE A MINIMUM OF 25 IN. STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT.
11. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



TRANSVERSE CONSTRUCTION JOINT
SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT
SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT
SECTION Z - Z

SHEET 1 OF 2

Texas Department of Transportation | Design Division Standard

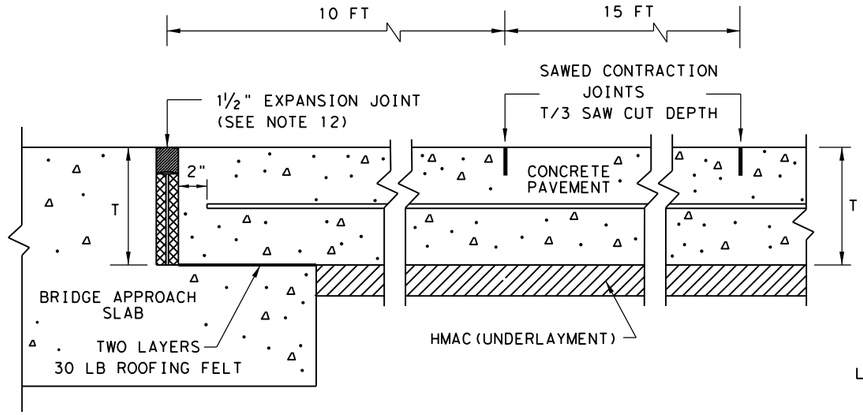
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

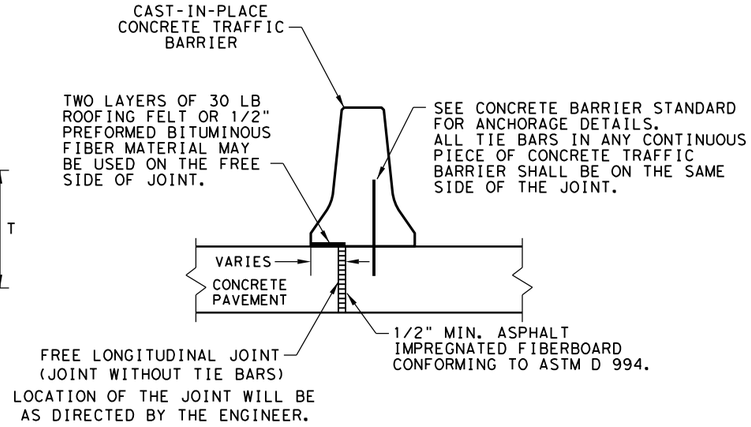
CRCP(1)-20

FILE: crcp120.dgn	DN: TxDOT	CK:KM	DW: AN	CK:VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 10/10/2011 ADD GN #12 04/09/2013 REMOVE 6" AND 6.5" ADD CTE REQUIREMENTS 05/05/2017 CoTE AS RATED 4.3	0907	00	226	OAKES ST.
	DIST	COUNTY		SHEET NO.
	SJT	TOM GREEN		35

DATE: 8/30/2022 12:01:38 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\0907002264 - Design\Plan Set\3. Roadway\CRCP1-(20).dgn



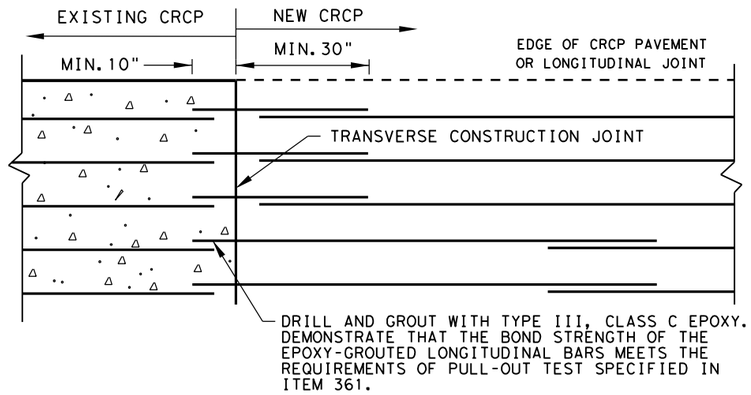
TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH



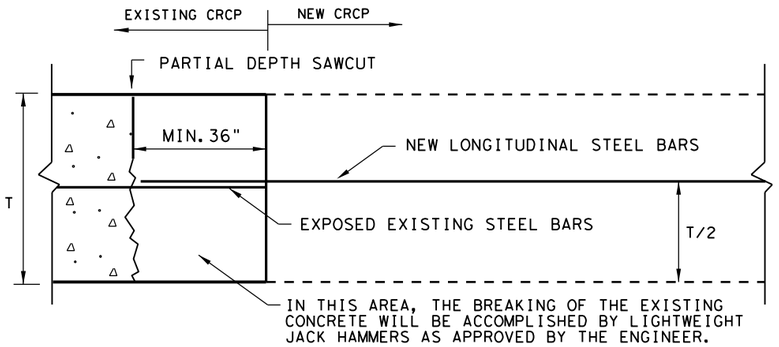
FREE LONGITUDINAL JOINT DETAIL

STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT. ANY OTHER LAP CONFIGURATION MEETING THIS REQUIREMENT WILL BE ALLOWED.

EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)

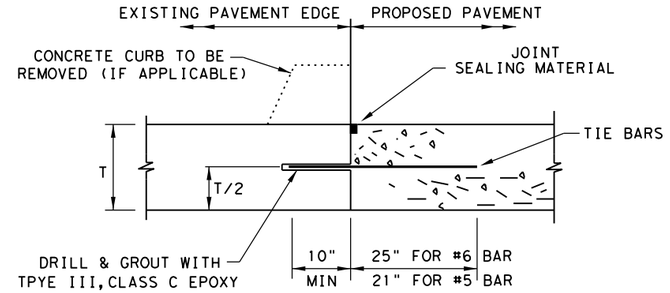


OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)



OPTION B: BREAKBACK AND LAP

TRANSVERSE TIE JOINT DETAIL
EXISTING CRCP TO NEW CRCP



1. BEFORE WIDENING WORK, DEMONSTRATE THAT THE BOND STRENGTH OF THE EPOXY-GROUTED TIE BARS MEETS THE REQUIRMENTS OF PULL-OUT TEST SPECIFIED IN ITEM 361.
2. SPACE TIE BARS AT 24" SPACING. USE #6 TIE BARS FOR 8" AND THICKER SLABS, USE #5 TIE BARS FOR LESS THAN 8" THICK SLABS.

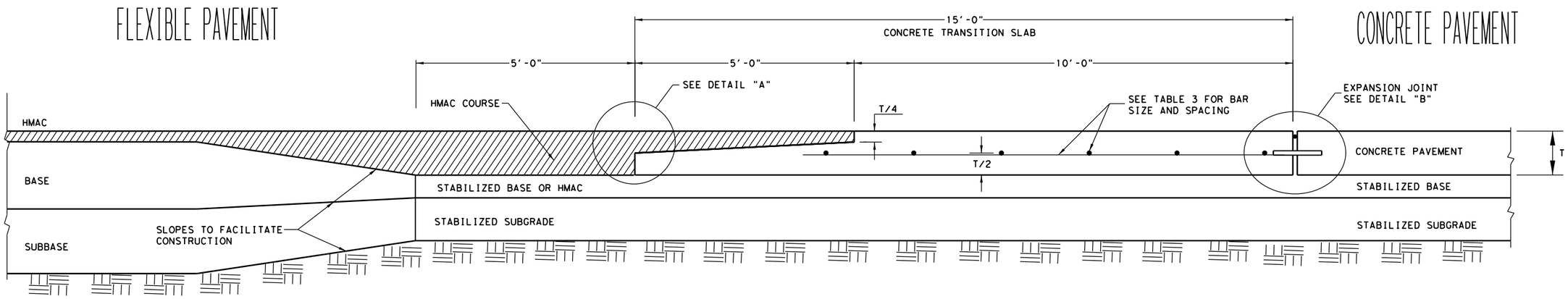
LONGITUDINAL WIDENING JOINT DETAIL

Texas Department of Transportation | Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES
CRCP(1)-20

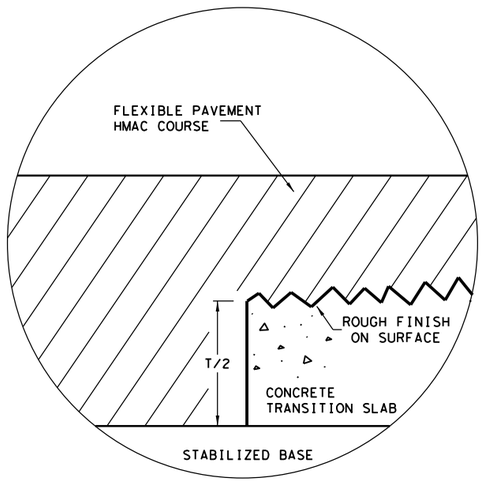
FILE: crcp120.dgn	DN: TxDOT		CK: KM	DW: AN		CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB		HIGHWAY	
REVISIONS 03/16/2020 REMOVED TABLE 1A	0907	00	226		OAKES ST.	
	DIST	COUNTY			SHEET NO.	
	SJT	TOM GREEN			36	

DATE: 8/30/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\090700226\4 - Design\Plan Set\3. Roadway\TRANS-20

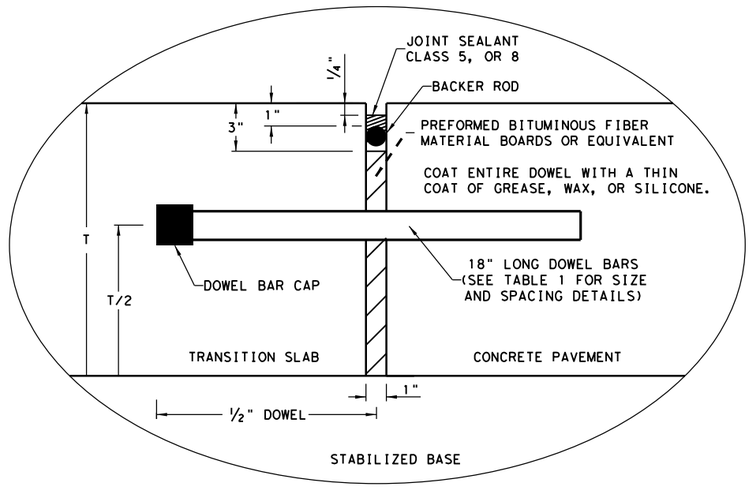


TYPICAL JUNCTION OF CONCRETE PAVEMENT WITH FLEXIBLE PAVEMENT

(NOT TO SCALE)



DETAIL "A"



DETAIL "B"

GENERAL NOTES

1. FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND LOAD TRANSFER DEVICES REFER TO THE GOVERNING SPECIFICATIONS FOR "CONCRETE PAVEMENT" AND "REINFORCING STEEL."
2. DETAILS FOR PAVEMENT WIDTH AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS.
3. MATCH THE LONGITUDINAL JOINTS OF THE CONCRETE TRANSITION SLAB WITH ADJOINING CONCRETE PAVEMENT. PROVIDE EQUIVALENT TIEBARS OR TRANSVERSE BARS AT THESE LONGITUDINAL JOINTS, SEE TABLE NO. 2.
4. REFER TO DMS-6310, "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
5. TRANSITION SLABS WILL BE PAID UNDER ITEM 360, "CONCRETE PAVEMENTS."

TABLE NO. 1 DOWELS (SMOOTH BARS)

SLAB THICKNESS T (IN.)	BAR DIA. AND LENGTH	SPACING (IN.)
7 TO 7.5	1" X 18"	12
8 TO 10	1 1/4" X 18"	12
10 TO 13	1 1/2" X 18"	12

TABLE NO. 2 TIE BARS (DEFORMED BARS)

SLAB THICKNESS T (IN.)	BAR SIZE	SPACING (IN.)
7 TO 7.5	#5	24
8 TO 13	#6	24

TABLE NO. 3 TRANSITION SLAB STEEL (DEFORMED BARS)

SLAB THICKNESS T (IN.)	BAR SIZE	SPACING (IN.) TRANSVERSE DIRECTION	SPACING (IN.) LONGITUDINAL DIRECTION
7 TO 7.5	#5	24	12
8 TO 13	#6	24	12

ADJUST SPACING OF LONGITUDINAL BARS AS NEEDED TO ACCOMDATE DOWEL BAR SPACING.

Texas Department of Transportation — Design Division Standard

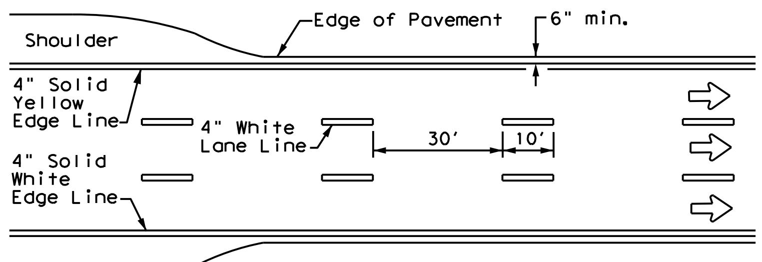
CONCRETE PAVEMENT DETAILS TRANSITION SLAB

T-7 to 13 INCHES

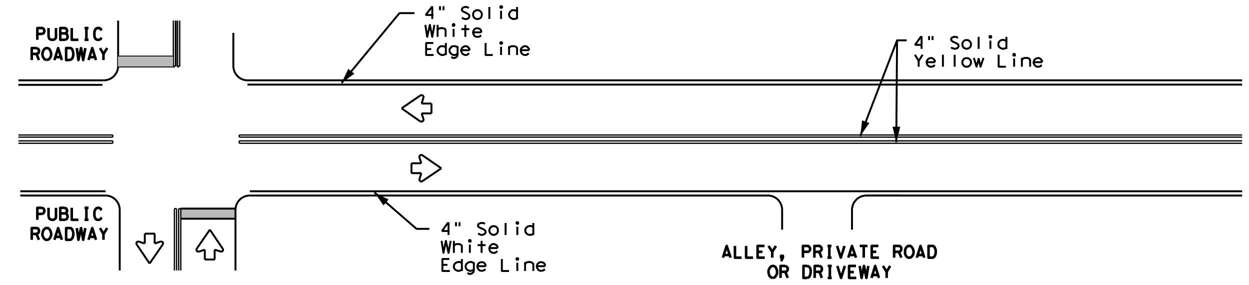
TRANS-20

FILE: transitslab20.dgn	DN: TxDOT	DN: TxDOT	DW: AN	CK: KM
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	OAKES ST.
	DIST	COUNTY		SHEET NO.
	SJT	TOM GREEN		TRANS-20$

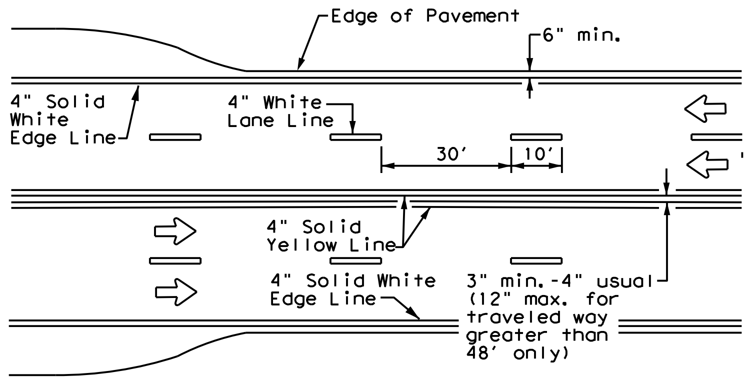
DATE: 8/30/2022 12:01:49 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\0907-00-226\



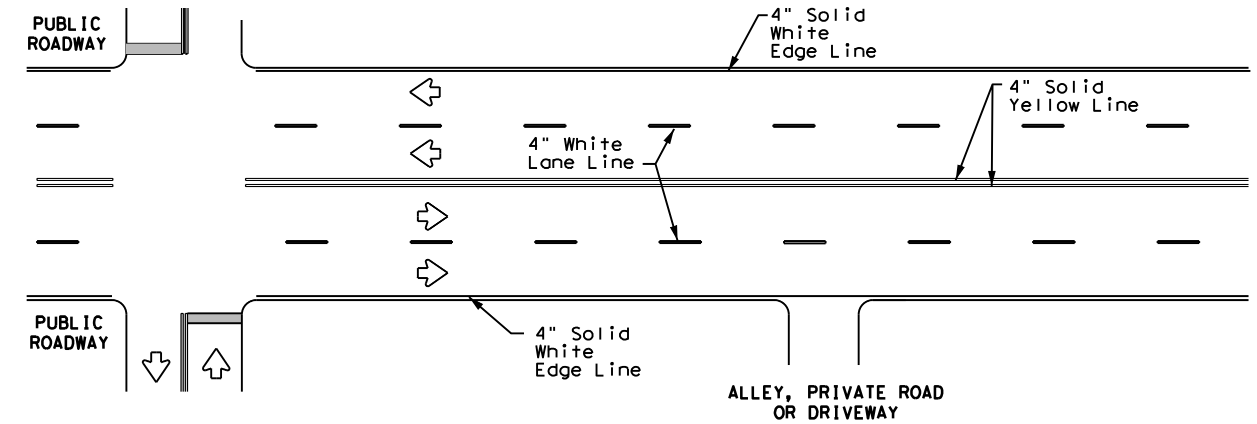
EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



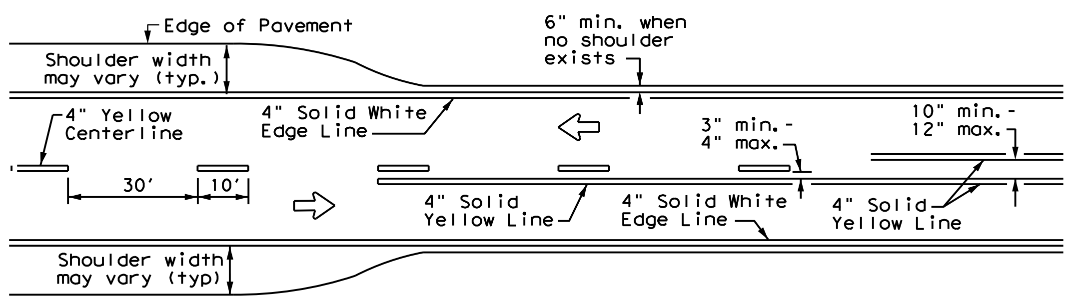
TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS



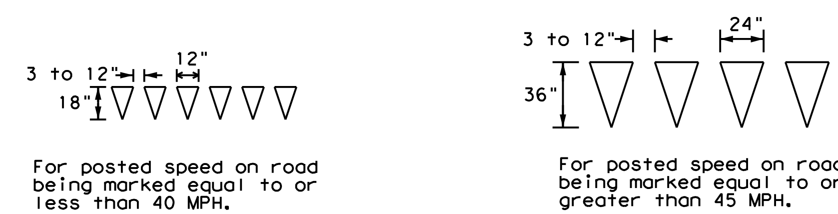
CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



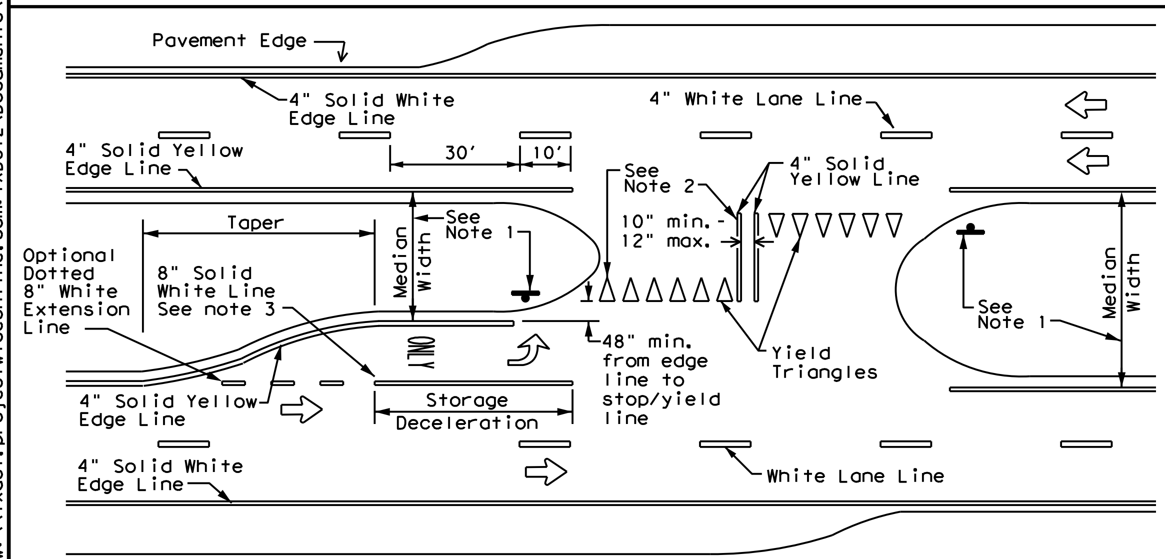
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

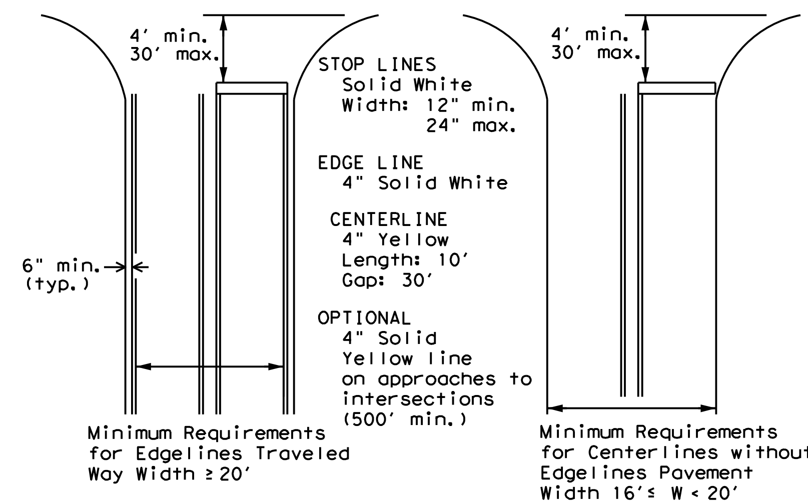
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling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

GENERAL NOTES

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

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

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



GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE
Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

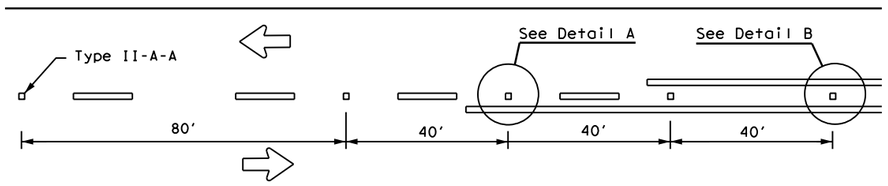
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

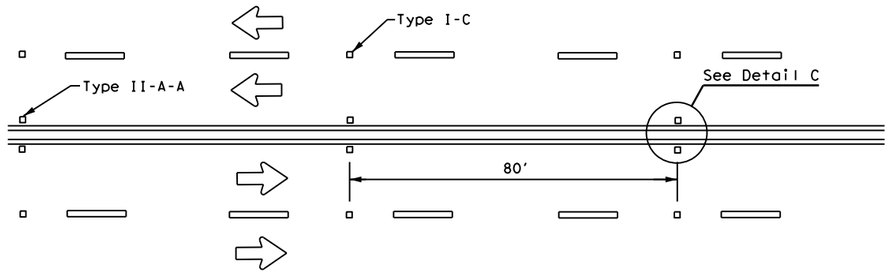
FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
©TxDOT November 1978	CONT 0907	SECT 00	JOB 226	HIGHWAY OAKES ST.
REVISIONS 8-95 3-03 5-00 2-12 8-00 6-20	DIST SJT		COUNTY TOM GREEN	SHEET NO. 38

22A

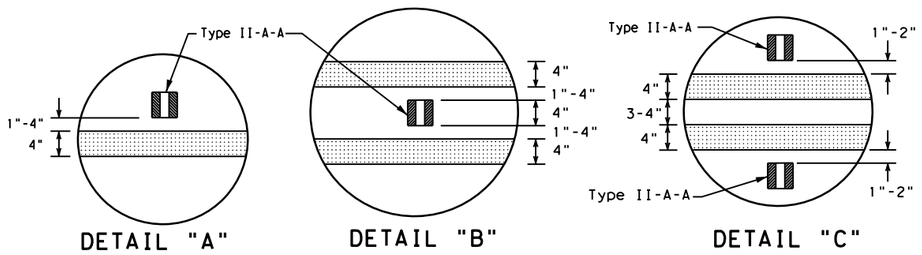
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



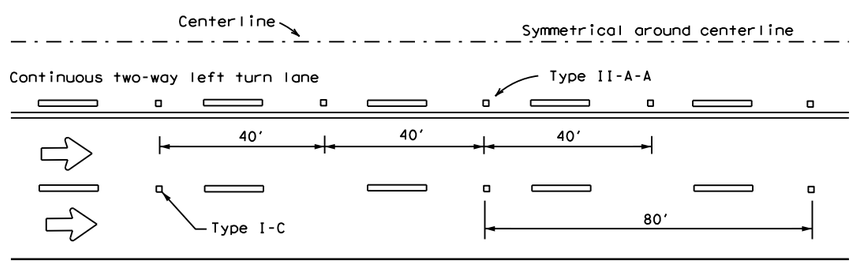
CENTERLINE FOR ALL TWO LANE ROADWAYS



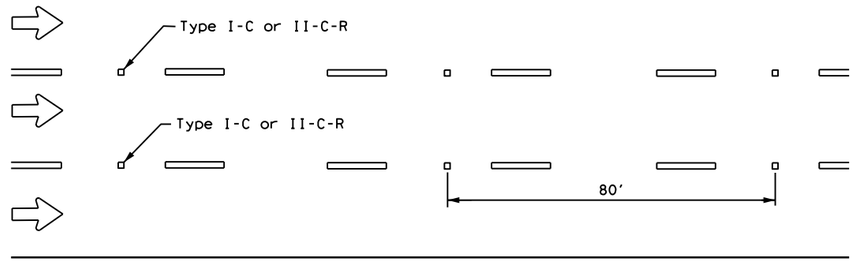
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" DETAIL "B" DETAIL "C"



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

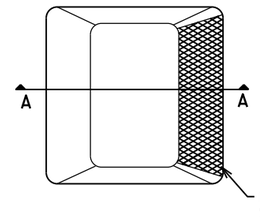


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

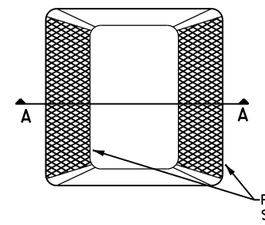
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

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

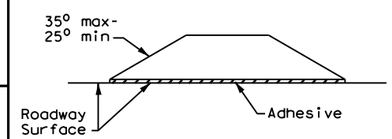
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

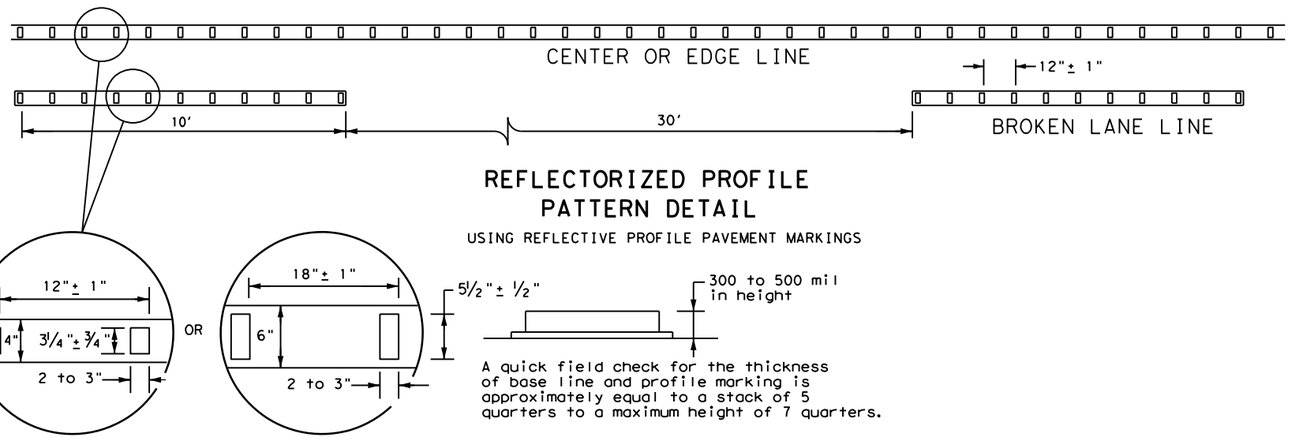


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

NOTE

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 in 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.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10 5-00 2-12 8-00 6-20	0907	00	226	OAKES ST.
	DIST	COUNTY		SHEET NO.
	SJT	TOM GREEN		39

22B

DATE: 8/30/2022 12:01:53 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\pm2-20.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or CGP 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 that may receive discharges from this project. The MS4 Operator may need to be notified prior to construction activities.

1. City of San Angelo

☐ NO ACTION REQUIRED ☑ ACTION REQUIRED

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 CSN with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When 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.

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#

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.

Required Actions: List waters of the U.S. that the permit applies to, the location in project, and check BMP's planned to control erosion, sedimentation and post-construction TSS.

1. North Concho River

BEST MANAGEMENT PRACTICES

EROSION

☐ SEEDING OR SODDING
☐ MULCHING
☐ SOIL RETENTION BLANKETS
☑ BIODEGRADABLE EROSION CONTROL LOGS
☐ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
☐ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
☐ TOPSOIL OR COMPOST
☐ FLEXIBLE CHANNEL LINERS
☐ GROUND COVER

SEDIMENTATION

☐ ROCK FILTER DAMS
☑ TEMPORARY SEDIMENT CONTROL FENCES
☐ TRIANGULAR FILTER DIKES
☐ TOPSOIL OR COMPOST
☑ BIODEGRADABLE EROSION CONTROL LOGS
☐ SEDIMENT BASINS
☐ SAND BAG BERMS
☐ STRAW BALE DIKES
☐ BRUSH BERMS
☐ STORM INLET SEDIMENT TRAPS

POST-CONSTRUCTION TSS

☐ VEGETATIVE FILTER STRIPS
☐ RETENTION/IRRIGATION SYSTEMS
☐ EXTENDED DETENTION BASINS
☐ CONSTRUCTED WETLANDS
☐ WET BASINS
☐ TOPSOIL OR COMPOST
☑ BIODEGRADABLE EROSION CONTROL LOGS
☐ VEGETATION LINED DITCHES
☐ SAND FILTER SYSTEMS
☐ GRASSY SWALES

III. CULTURAL RESOURCES

Refer to the 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 ☑ ACTION REQUIRED

1. Contractor shall not disturb, modify, or remove historical plaques present on bridge.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.

Adhere to specification requirements of Items 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 ☐ ACTION REQUIRED

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

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.

☐ NO ACTION REQUIRED ☑ ACTION REQUIRED

1. The Migratory Bird Treaty Act of 1918 states that it is unlawful to kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, or egg in part or in whole, without a federal permit issued in accordance with the Act's policies and regulations. Migration patterns would not be affected by the proposed project. Remove non-active migratory bird nests from structures where work would be performed from September 1 through the end of February. Prevent migratory birds from building nests from March 1 to August 31. In the event that migratory birds are encountered on-site during project construction, avoid adverse impacts on protected birds, active nests, eggs, and/or young.

ABBREVIATIONS USED

BMP – Best Management Practice
CGP – Construction General Permit
CSN – Construction Site Notice
DSHS – Texas Department of State Health Services
EPA – U.S. Environmental Protection Agency
MS4 – Municipal Separate Stormwater Sewer System
MSDS – Material Safety Data Sheet
NOI – Notice of Intent
NWP – Nationwide Permit
PCN – Pre-Construction Notification
PSL – Project Specific Location
SW3P – Storm Water Pollution Prevention Plan
TCEQ – Texas Commission on Environmental Quality
TPDES – Texas Pollutant Discharge Elimination System
TSS – Total Suspended Solids
USACE – U.S. Army Corps of Engineers

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 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 labeling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the TxDOT 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 ☐ ACTION REQUIRED

1. Hazardous materials testing revealed lead paint on the bearings. This project involves construction work on the bearings. A special provision for item 6.10 Control of Materials has been developed for the work. See SP006-XXX for work in this location.

STATE OF TEXAS
NICHOLAS J. GREENLY
131239
LICENSED PROFESSIONAL ENGINEER

Nick Greenly P.E.
09/08/2022

VII. OTHER ENVIRONMENTAL ISSUES

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

☑ NO ACTION REQUIRED ☐ ACTION REQUIRED

1. N/A

Texas Department of Transportation | San Angelo District

ENVIRONMENTAL PERMITS ISSUES AND COMMITMENTS

SHEET 1 OF 1 NOT TO SCALE

©TxDOT 2022	CONT	SECT	JOB	HIGHWAY
SHEET ISSUED OR LAST REVISED	0907	00	226	OAKES ST.
11-19	DIST	COUNTY		SHEET NO.
	SJT	TOM GREEN		40

DATE: 9/6/2022 2:42:43 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\0907002\6\4 - Design\Plan Set\9. Environmental\ENVIRONMENTAL PERMITS ISSUES AND COMMITMENTS.dgn

SITE DESCRIPTION

The site description is accomplished using various sheets, each revealing separate details. This sheet's purpose is to direct the user to the appropriate location where the information required by the NPDES CGP can be found.

General location map, project limits, and project description: see title sheet of plans.

Intended sequence of major soil disturbing activities:

Total project area (acres): 0.7

Total area to be disturbed (acres): 0.087

Pre- construction weighted runoff coefficient:

Post- construction weighted runoff coefficient:

Existing condition of soil and vegetative cover:

Percent of existing vegetative cover:

Name and segment number of receiving waters: North Concho River

Storm water management: Erosion Control Logs and Temporary Sediment Control Fence

Location of wetland or special aquatic sites on or near the project shall be shown on the site map for the SW3P sheets.

Endangered species information is referenced on EPIC sheet.

Historic preservation effect information is referenced on EPIC sheet.

Drainage patterns, locations where storm water discharges to surface waters, slopes after major grading activities, typical areas of soil disturbance, areas which will not be disturbed, locations of control measures, and locations where stabilization practice will occur are depicted on the erosion control measures plan sheets and the landscape plan sheets.

Sediment must be removed from sediment traps and sedimentation ponds no later than the time that design capacity has been reduced by 50%.

If sediment escapes the site, accumulations must be removed at a frequency to minimize further negative effects, and whenever feasible, prior to the next rain.

Dust will be minimized by watering as necessary.

SW3P REQUIREMENTS

THE SWP3 MUST HAVE A DETAILED SITE MAP INDICATING THE FOLLOWING:

A detailed site map (or maps) indicating the following:

(i) drainage patterns and approximate slopes anticipated after major grading activities; This is usually addressed by adding a copy of the typical sections to the living document.

(ii) areas where soil disturbance will occur;

(iii) locations of all controls and buffers, either planned or in place;

(iv) locations where temporary or permanent stabilization practices are expected to be used;

(v) locations of construction support activities, including off-site activities, that are authorized under the permittee's NOI, including material, waste, borrow, fill, or equipment or chemical storage areas;

(vi) surface waters (including wetlands) either at, adjacent, or in close proximity to the site, and also indicating those that are impaired waters;

(vii) locations where storm water discharges from the site directly to a surface water body or a municipal separate storm sewer system;

(viii) vehicle wash areas; and

(ix) designated points on the site where vehicles will exit onto paved roads (for instance, this applies to construction transition from unstable dirt areas to exterior paved roads).

THE SW3P MUST INCLUDE A DESCRIPTION OF CONSTRUCTION AND WASTE MATERIALS EXPECTED TO BE STORED ON-SITE AND A DESCRIPTION OF CONTROLS TO MINIMIZE POLLUTANTS FROM THESE MATERIALS.

THE SW3P MUST INCLUDE VELOCITY DISSIPATION DEVICES AT DISCHARGE LOCATIONS AND ALONG THE LENGTH OF ANY OUTFALL CHANNEL (I.E. RUNOFF CONVEYANCE) TO PROVIDE A NON-EROSIVE FLOW VELOCITY FROM THE STRUCTURE TO A WATER COURSE, SO THAT THE NATURAL PHYSICAL AND BIOLOGICAL CHARACTERISTICS AND FUNCTIONS ARE MAINTAINED AND PROTECTED.

CONTROLS

(Check all that apply)

INTERIM SOIL STABILIZATION PRACTICES:

- ☐ SEEDING OR SODDING
- ☐ MULCHING
- ☐ SOIL RETENTION BLANKETS
- ☐ TOPSOIL OR COMPOST
- ☐ FLEXIBLE CHANNEL LINERS
- ☐ GROUND COVER

PERMANENT SOIL STABILIZATION PRACTICES:

- ☐ SEEDING OR SODDING
- ☐ MULCHING
- ☐ SOIL RETENTION BLANKETS
- ☐ TOPSOIL OR COMPOST
- ☐ FLEXIBLE CHANNEL LINERS
- ☐ GROUND COVER

INTERIM STRUCTURAL PRACTICES:

- ☑ TEMPORARY SEDIMENT CONTROL FENCE
- ☐ BALED HAY FOR EROSION CONTROL
- ☐ ROCK FILTER DAMS
- ☐ PIPE SLOPE DRAINS
- ☐ CHANNEL LINERS
- ☐ STORM SEWERS
- ☐ STORM INLET SEDIMENT TRAPS
- ☐ STONE OUTLET STRUCTURES
- ☐ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- ☐ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- ☐ PAVED FLUMES
- ☐ CONSTRUCTION EXITS
- ☐ DROP INLET SEDIMENT TRAPS
- ☐ CURB INLET SEDIMENT TRAPS
- ☐ SEDIMENT BASINS
- ☐ CURB AND GUTTER
- ☐ VELOCITY CONTROL DEVICES
- ☑ BIODEGRADABLE EROSION CONTROL LOGS

PERMANENT STRUCTURAL PRACTICES:

- ☑ TEMPORARY SEDIMENT CONTROL FENCE
- ☐ BALED HAY FOR EROSION CONTROL
- ☐ ROCK FILTER DAMS
- ☐ PIPE SLOPE DRAINS
- ☐ CHANNEL LINERS
- ☐ STORM SEWERS
- ☐ STORM INLET SEDIMENT TRAPS
- ☐ STONE OUTLET STRUCTURES
- ☐ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- ☐ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- ☐ PAVED FLUMES
- ☐ CONSTRUCTION EXITS
- ☐ DROP INLET SEDIMENT TRAPS
- ☐ CURB INLET SEDIMENT TRAPS
- ☐ SEDIMENT BASINS
- ☐ CURB AND GUTTER
- ☐ VELOCITY CONTROL DEVICES
- ☑ BIODEGRADABLE EROSION CONTROL LOGS

NARRATIVE (sequence of construction for storm water management activities)
The order of activities will be as follows:

NOTE: Limit the disturbed area such that construction activities will commence in that portion of the site within 14 days. Place stabilization measures in portions of the site no later than 14 days after construction activity has temporarily ceased.

The above indicated practices are proposed to control pollutants in storm water discharges. These practices are based on information contained in TxDOT storm water management guidelines. The schedule of implementation of these practices will be based on the intended sequence of major soil disturbing activities. Stabilization measures shall be initiated no later than 14 days after construction activity in that portion of the site has temporarily or permanently ceased.

Describe construction and waste materials expected to be stored on site and proposed controls to reduce pollutants from these materials (include storage practices, spill prevention and response):
Expected construction waste may include concrete rubble and concrete washout waste. Construction waste shall be removed from the project. Temporary stockpiles for waste material shall be located at an upland location approved by the Engineer. Any rubble waste stockpiled for more than 14 days shall require sedimentation control. This will not be paid for directly, but shall be considered subsidiary to the various bid items. Concrete wash-out waste shall be placed on concrete truck cleanout box and then disposed off project.

Describe pollutant sources from areas other than construction and measures implemented at those sites to minimize pollutant discharges:
Storm sewer system (if present) will be protected with structural controls.

Sedimentation basins are required in drainage areas having disturbance of 10 or more acres.

ABBREVIATIONS USED

BMP - Best Management Practice
CGP - Construction General Permit
EPIC - Environmental Permits, Issues, and Commitments
MSDS - Material Safety Data Sheet
NOI - Notice of Intent
NOT - Notice of Termination
NPDES - National Pollutant Discharge Elimination System
SW3P - Storm Water Pollution Prevention Plan

INFORMATION

MAINTENANCE:
All erosion and sediment control and other protective measures identified in the SW3P must be maintained in effective operating conditions. If site inspections required by this permit identify BMP's that are not operating effectively, maintenance shall be performed before the next anticipated storm event, or as necessary to maintain the continued effectiveness of storm water controls. If maintenance prior to the next anticipated storm event impracticable, maintenance must be scheduled and accomplished as soon as possible.

INSPECTION:
Qualified personnel shall inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, and locations where vehicles enter or exit the site, at intervals as indicated by check mark below:

- ☐ At least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater as recorded on a non-freezing rain gauge to be located at the project site.
- ☑ At least once every 7 calendar days. An inspection must occur regardless of whether or not there has been a rainfall event since the previous inspection.

Disturbed areas that are exposed to precipitation shall be inspected for evidence of, or the potential for pollutants entering the drainage system. Sediment and erosion control measures identified on the SW3P shall be observed to ensure that they are operating correctly. Locations where vehicles enter or exit site shall be inspected for evidence of off-site sediment tracking.
Based on the result of the inspection, the SW3P shall be revised to include additional or modified BMP's designed to correct the observed deficiency.
A report summarizing the scope, date, name and qualifications of Inspector, and major observations relating to the implementation of the SW3P shall be produced and retained as part of the SW3P for three years from date of final stabilization.

WASTE MATERIALS:
All waste materials will be collected and stored in a securely lidded metal dumpster. The dumpster will meet all state and local city solid waste management regulations. All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied as necessary or as required by local regulation, and the trash will be hauled to a local dump. No construction waste material will be buried on-site. This will not be paid directly, but shall be considered subsidiary to the various SW3P items.

SANITARY WASTE:
All sanitary waste will be collected from the portable units as necessary or as required by local regulation, by a licensed sanitary waste management contractor.

HAZARDOUS WASTE:
Hazardous waste includes paints, cleaning solvents, asphalt products, chemical additives for soil stabilization, or concrete curing compounds and additives. All hazardous waste shall be disposed of in accordance with all federal, state, and local regulations.
Provide MSDS sheets prior to beginning work.

REMARKS:
Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, water body or stream bed.
Construction staging areas and vehicle maintenance areas shall be constructed by the Contractor in a manner to minimize the runoff of pollutants.
All waterways shall be cleared as soon as practicable of temporary embankment, temporary bridges, matting, false work, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.

INSPECTOR PAPERWORK CHECKLIST:

- ☑ Contact Form (#)
- ☐ NOI (# and %)
- ☐ NOT (%)
- ☐ Project Diary (%)
- ☐ SW3P Plan (%)
- ☐ Inspection and Maintenance Report (%)
- ☐ SW3P Certification Statement (signed by Area Engineer) (%)
- ☐ NPDES General Permit (Federal Register, dated July 6, 1998) (%)
- ☐ Historic Resources Information - EPIC Sheet (%)
- ☐ Inspector Qualification Form (%)
- ☐ Delegation of Signature Authority (all Inspectors signing reports) (%)
- ☐ Endangered Species and Critical Habitat Information - EPIC Sheet (%)

The symbol (#) indicates that the information should be displayed on the Project Bulletin Board.

The symbol (%) indicates that the information should be a part of the permanent SW3P file maintained at the office managing construction.

Any reportable quantity of Hazardous Material release must be reported to National Response Center at (800) 424-8802.

A copy of the Construction General Permit is a part of the SW3P.

STATE OF TEXAS
NICHOLAS J. GREENLY
131239
LICENSED
PROFESSIONAL ENGINEER

09/02/2022

Nick Greenly P.E.

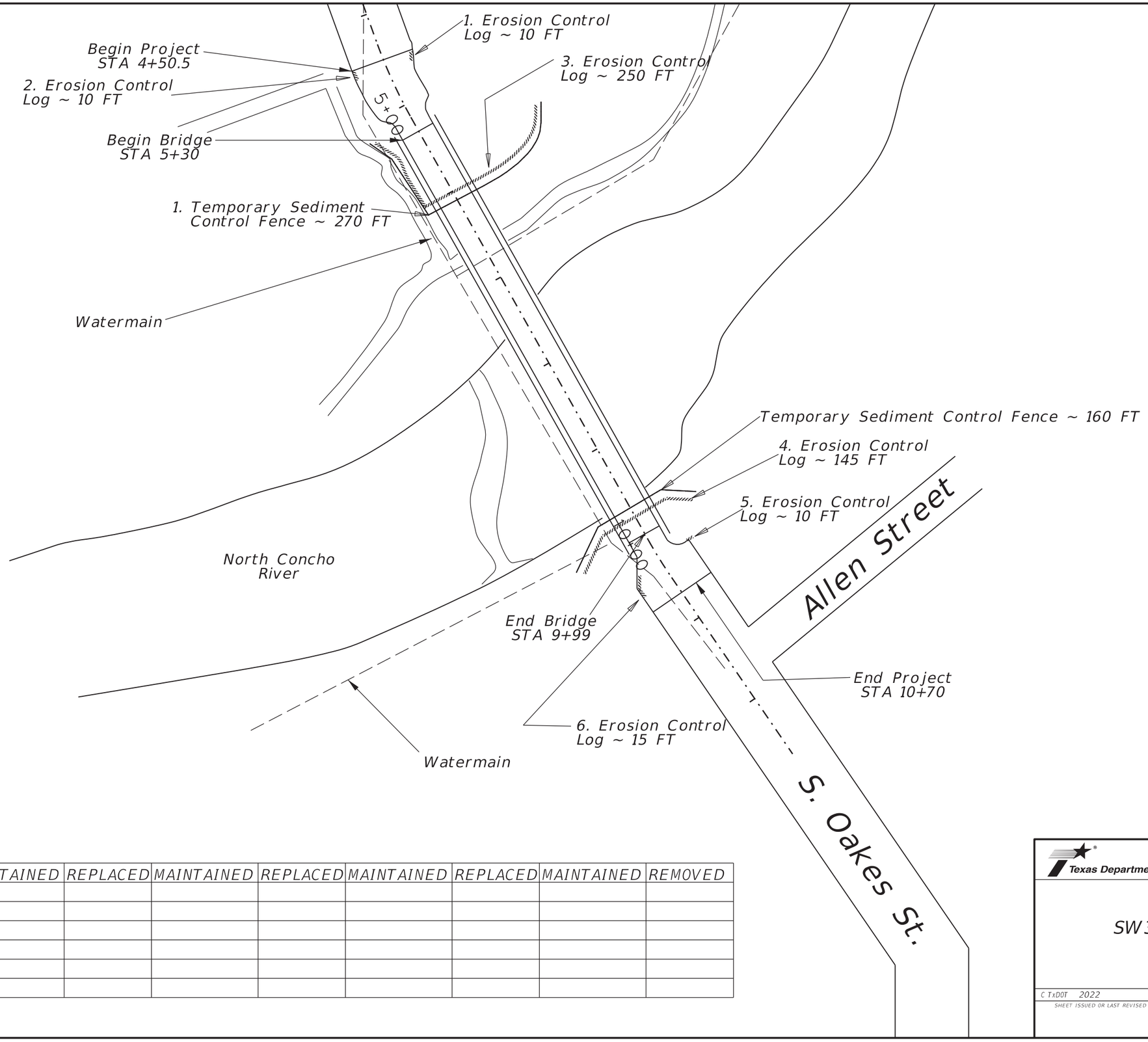
Texas Department of Transportation | San Angelo District

SW3P INDEX

SHEET 1 OF 1 NOT TO SCALE

©TxDOT 2022	CONT	SECT	JOB	HIGHWAY
SHEET ISSUED OR LAST REVISED	0907	00	226	OAKES ST.
11-19	DIST	COUNTY		SHEET NO.
	SJT	TOM GREEN		41

DATE: 8/30/2022 12:02:04 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\090700226\4 - Design\Plan Set\9. Environmental\SW3P INDEX.dgn



ECL #	INSTALLED	MAINTAINED	REPLACED	MAINTAINED	REPLACED	MAINTAINED	REPLACED	MAINTAINED	REMOVED
1									
2									
3									
4									
5									
6									

STATE OF TEXAS
NICHOLAS J. GREENLY
131239
LICENSED
PROFESSIONAL ENGINEER

Nick Greenly P.E.

09/02/2022

Texas Department of Transportation

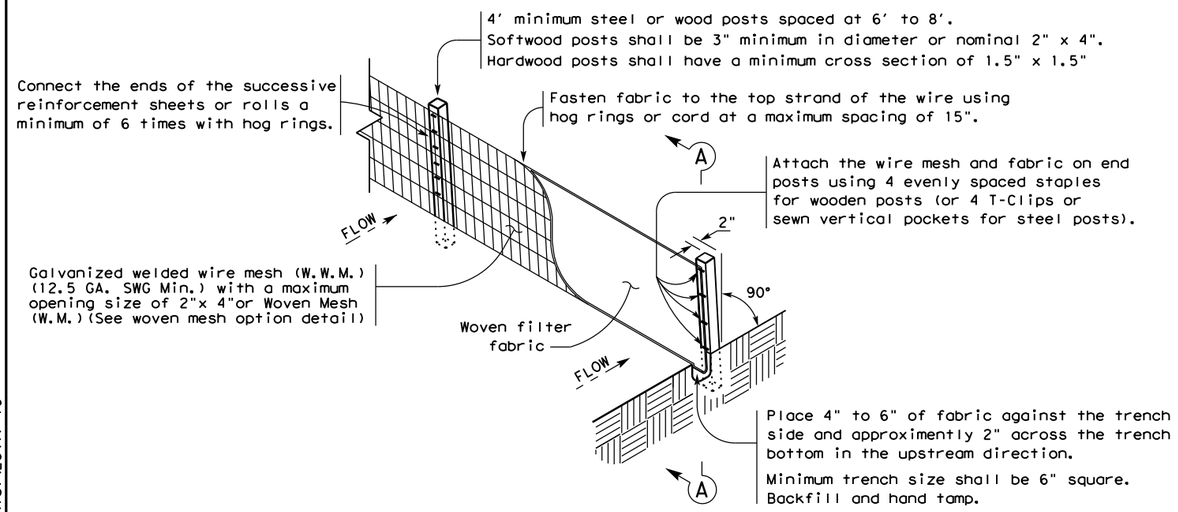
San Angelo District

SW3P LAYOUT

SCALE 1"=100'

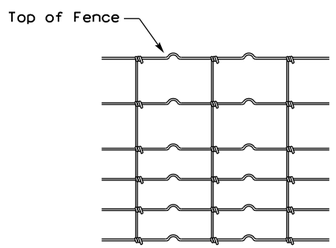
© TxDOT 2022	CONT	SECT	JOB	HIGHWAY
SHEET ISSUED OR LAST REVISED	0907	00	226	OAKES ST.
	DIST	COUNTY		SHEET NO.
	SJT	TOM GREEN		42

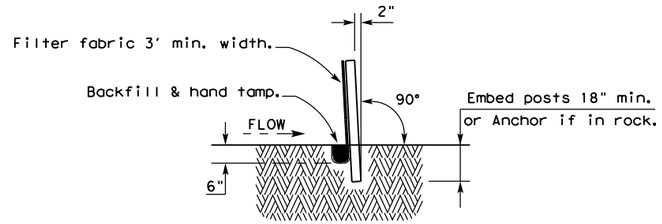
DW: txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\090700226\4 - Design\Plan Set\9. Environmental\EC(1)-16
8/30/2022



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

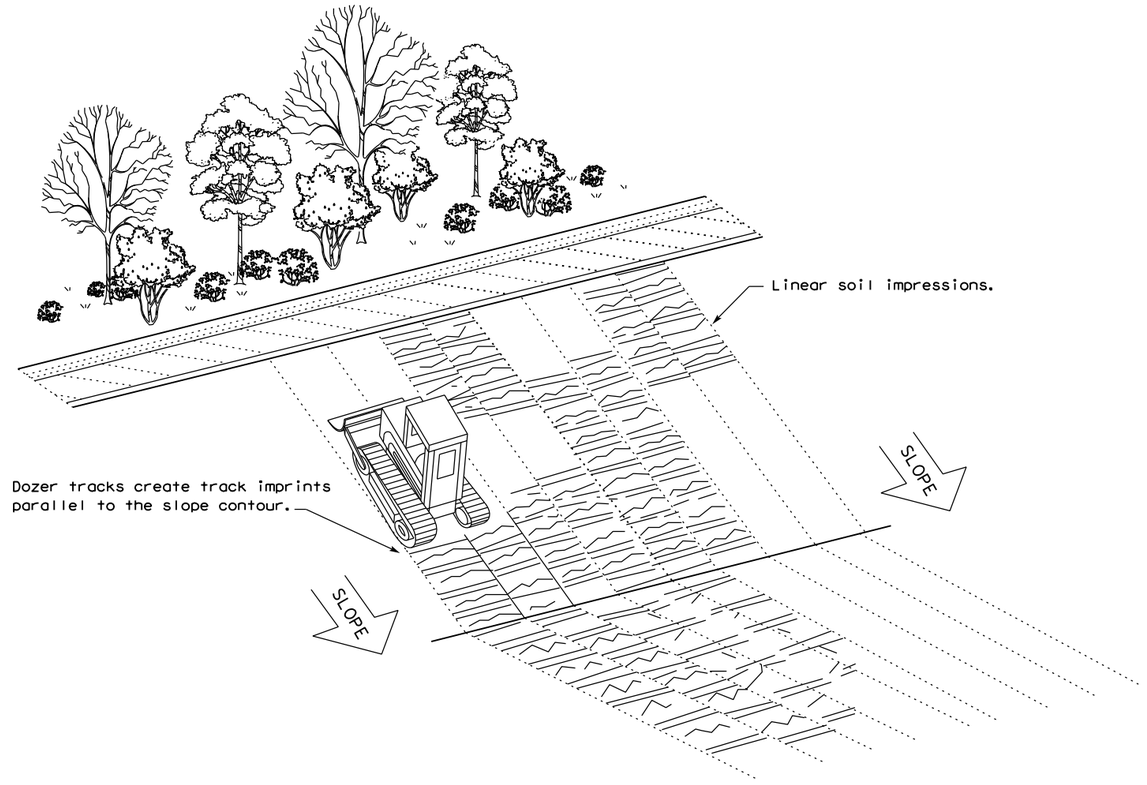
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

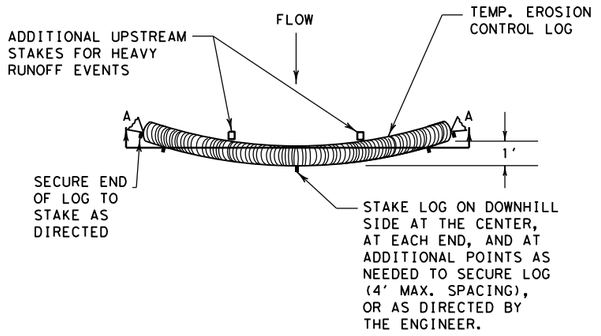
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

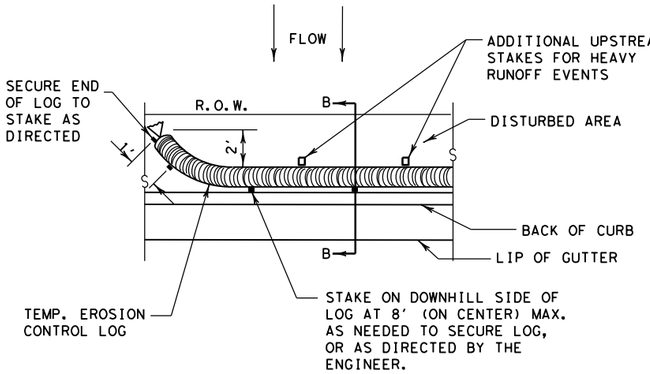
EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0907	00	226		OAKES ST.		
	DIST	COUNTY					SHEET NO.
	SJT	TOM GREEN					43

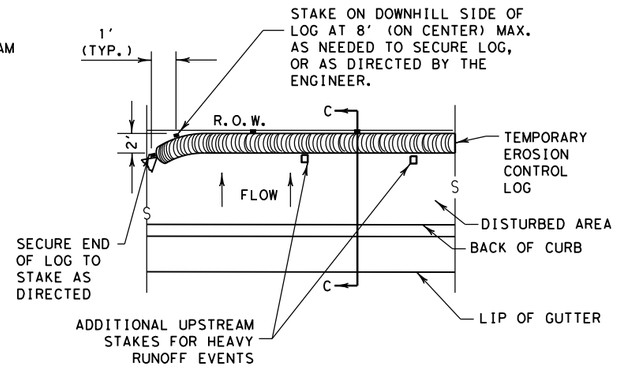
DATE: 8/30/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\0907002261\4 - Design\Plan Set\9. Environmental\ec916.dgn



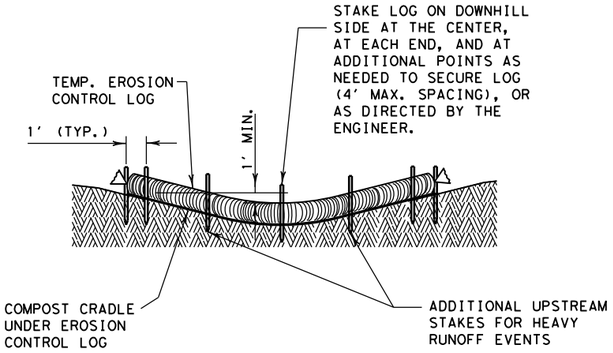
PLAN VIEW



PLAN VIEW



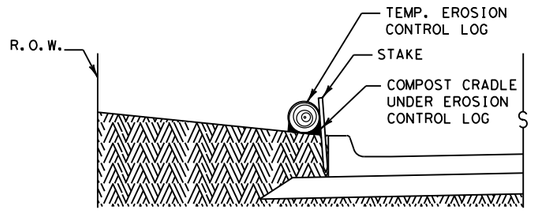
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

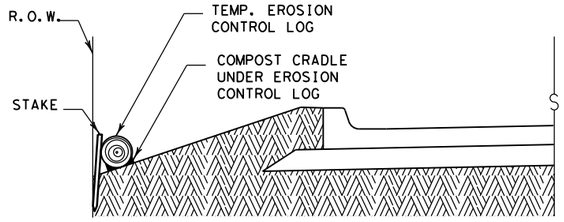
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

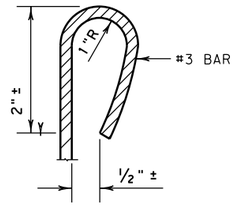
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

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

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.

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.

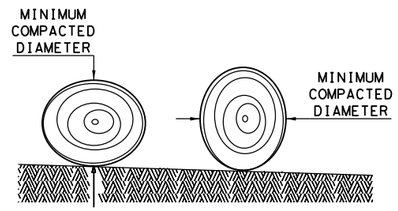
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

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

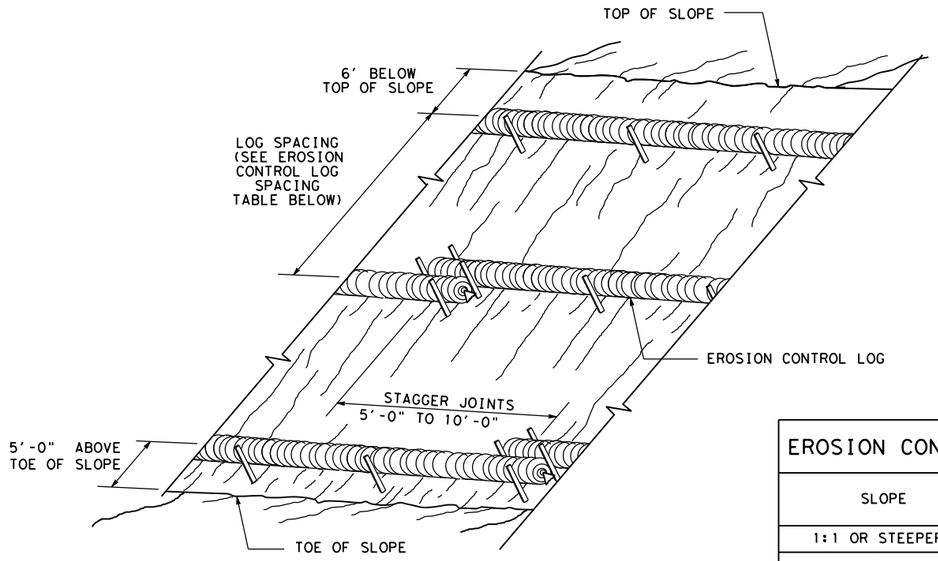
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

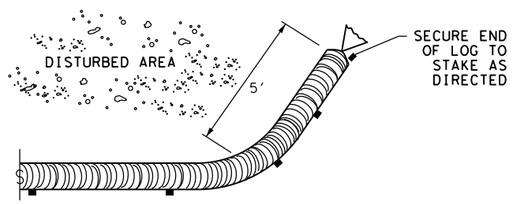
FILE: ec916		DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
© TxDOT: JULY 2016		CONT	SECT	JOB		HIGHWAY	
REVISIONS		0907	00	226		OAKES ST.	
		DIST		COUNTY			SHEET NO.
		SJT		TOM GREEN			44

DATE: 8/30/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\090700226\4 - Design\Plan Set\9. Environmental\ec916.dgn



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

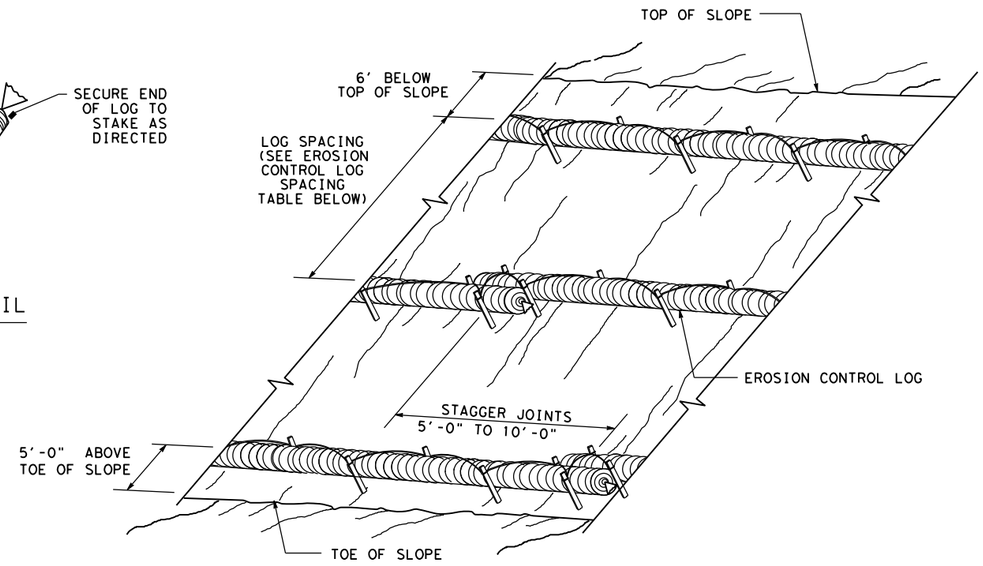
CL-SST



END SECTION RAP DETAIL

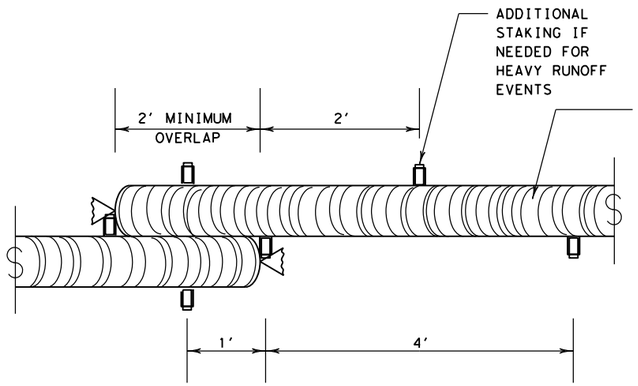
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

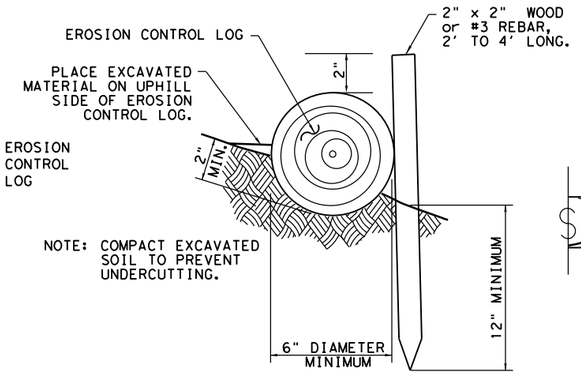
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

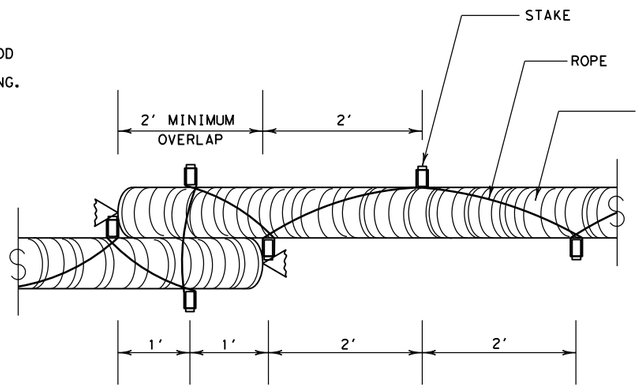


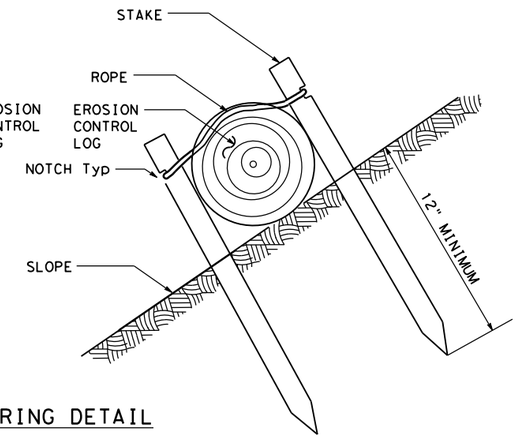


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

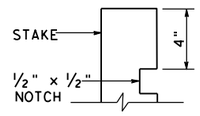
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation | Design Division Standard

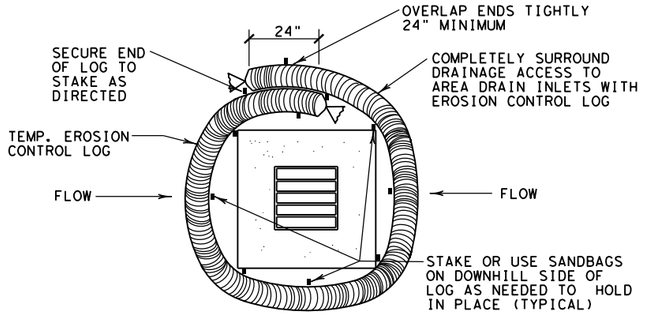
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

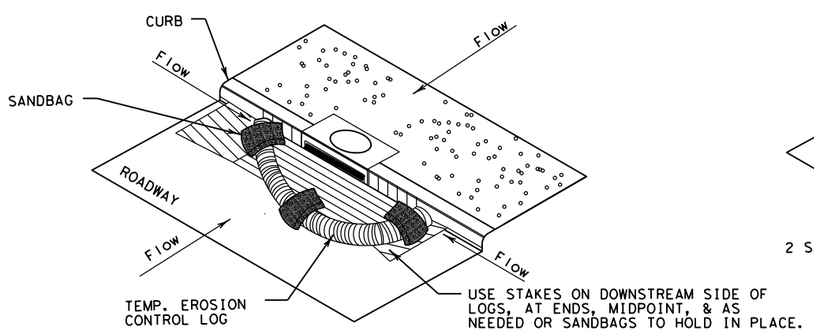
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0907	00	226	OAKES ST.
	DIST	COUNTY		SHEET NO.
	SJT	TOM GREEN		45

DATE: 8/30/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT2\Documents\07 - SJT\Design Projects\0907002264 - Design\Plan Set\9. Environmental\ec916.dgn



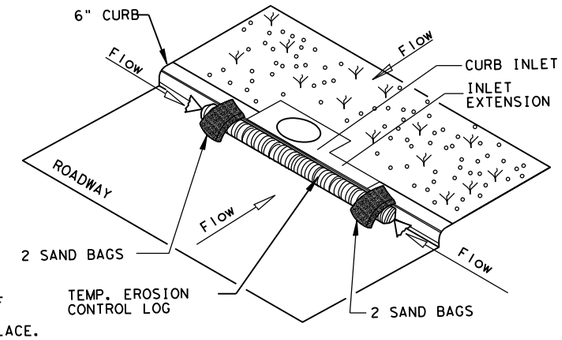
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

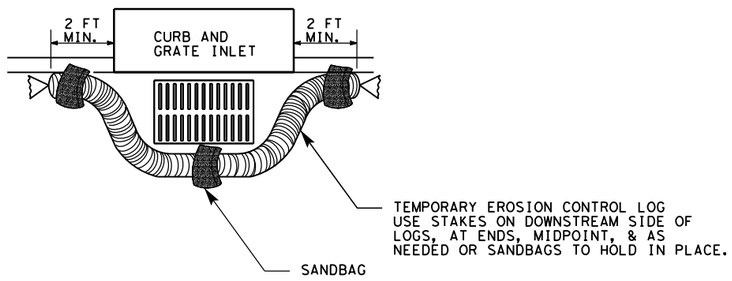
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

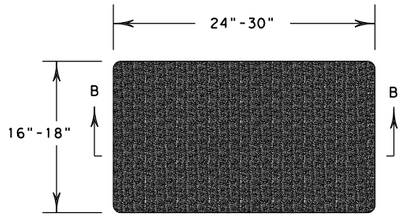
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

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	0907	00	226	OAKES ST.
	DIST	COUNTY		SHEET NO.
	SJT	TOM GREEN		46