DESIGN	FED.RD. DIV.NO.	STATE PROJECT NO.		HIGHWAY NO.
QA	6	C 1975 -2 -13		FM1895
GRAPHICS QA	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK QA	TEXAS	DALLAS	KAUFMAN	1
CHECK QA	CONTROL	SECTION	JOB	
	1975	02	013	

FINAL PLANS

NAME OF CONTRACTOR: _____

DATE OF LETTING: _____

DATE WORK BEGAN: _____

DATE WORK COMPLETED: _____

DATE WORK ACCEPTED: _____

SUMMARY OF CHANGE ORDERS:

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

STATE PROJECT
C 1975 -2 -13

FM 1895

KAUFMAN COUNTY

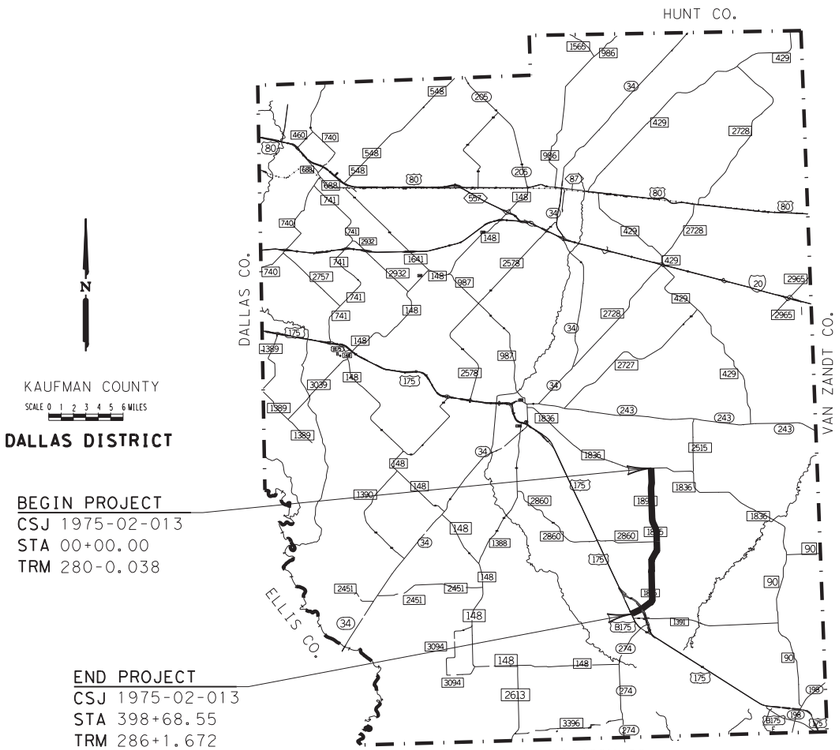
CSJ: 1975-02-013

LIMITS: FROM FM 1836 TO BUS US 175 IN KEMP

TOTAL LENGTH OF PROJECT =			
ROADWAY	= 39,805.19 FT.	= 7.538 MI.
BRIDGE	= 63.36 FT.	= 0.012 MI.
TOTAL	= 39,868.55 FT.	= 7.550 MI.

FOR THE CONSTRUCTION OF: REHABILITATION OF EXISTING ROADWAY

CONSISTING OF: RESTORE EXISTING PAVEMENT AND ADD SHOULDERS



EQUATIONS: NONE
EXCEPTIONS: NONE
RAILROAD CROSSINGS: NONE

FM 1895: BUS US 175 TO FM 2860
DESIGN SPEED = 40 MPH (2R)
ADT = 900 (2022)
ADT = 1200 (2042)

FM 1895: FM 2860 TO FM 1836
DESIGN SPEED = 40 MPH (2R)
ADT = 350 (2022)
ADT = 500 (2042)

FUNCTIONAL CLASSIFCIATION: RURAL MINOR COLLECTOR

NOTE:

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

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING: 7/27/2022
DocuSigned by: Falon Penfroc
BF3C6897A5A0461...
, P.E.
ER

RECOMMENDED 7/27/2022
DocuSigned by:
CD610F6E0D584EF...
, P.E.
TRANSPORTATION PLANNING & DEVELOPMENT

RECOMMENDED 7/27/2022
DocuSigned by: Lane Selman
29F92BAFC501498...
, P.E.
NEER

APPROVED FOR LETTING: 7/27/2022
DocuSigned by:
E2527653E8DE475...
, P.E.
IGINEER

WORK WAS COMPLETED ACCORDING TO THE PLANS AND CONTRACT.

_____, P.E.
Signature of Registrant & Date

DATE:

POL

I. GENERAL

	1	TITLE SHEET
	2	INDEX OF SHEETS
	3	PROJECT LAYOUT
	4-7	TYPICAL SECTIONS
	8, 8A-8F	GENERAL NOTES
	9, 9A-9C	ESTIMATE & QUANTITY
	10-14	QUANTITY SUMMARY
	15-16	DRIVEWAY SUMMARY
	17-23	SOSS

II. TRAFFIC CONTROL PLAN

	24	TRAFFIC CONTROL PLAN PHASE NARRATIVE
	25	TRAFFIC CONTROL PLAN TYPICAL SECTIONS
	26	TRAFFIC CONTROL PLAN CULVERT EXTENSION
	27	TRAFFIC CONTROL PLAN CULVERT REPLACEMENT
	28	TRAFFIC CONTROL PLAN FM 1895 AT US 175
*	29-40	BC(1)-21 THRU BC(12)-21
*	41	WZ(STPM)-13
*	42	WZ(TD)-17
*	43	WZ(UL)-13
*	44	WZ(RS)-22
*	45	TCP(1-1)-18
*	46	TCP(1-2)-18
*	47	TCP(1-3)-18
*	48	TCP(1-6)-18
*	49	TCP(2-1)-18
*	50	TCP(2-2)-18
*	51	TCP(2-3)-18
*	52	TCP(2-6)-18
*	53	TCP(3-1)-13
*	54	TCP(3-3)-14
*	55	TCP(3-4)-13
*	56	TCP(7-1)-13

III. ROADWAY DETAILS

	57-71	CORE BORING DATA
	72-76	ALIGNMENT DATA
	77-95	PLAN LAYOUT
	96	ROADWAY DETAILS
	97	DRIVEWAY INTERSECTION DETAILS
*	98	GF(31)-19
*	99	GF(31)MS-19
*	100	SGT(10S)31-16
*	101	SGT(11S)31-18
*	102	SGT(12S)31-18
*	103	SGT(15)31-20
*	104	CCCG-22
*	105	TREATMENT FOR VARIOUS EDGE CONDITIONS
**	106	LJD(1-1)-07 (DAL)
*	107-110	MB(1)-21 THRU MB(4)-21
*	111	TE(HMAC)-11
*	112	WF(2)-10

IV. RETAINING WALL DETAILS

NONE

V. DRAINAGE DETAILS

	113	DRAINAGE AREA MAP
	114	HYDRAULIC COMPUTATION
	115-126	CULVERT LAYOUT
	127-136	TEMPORARY SPECIAL SHORING
	137	MISCELLANEOUS CONNECTION DETAILS
	138	BCS
	139-141	SETB-SW-0
*	142	MC-MD
*	143-144	MC-5-20
*	145-146	MC-6-16
*	147	ECD
*	148	SCC-MD
*	149-150	SCC-3&4
*	151-152	SCC-5&6
*	153	SCP-4
*	154	SCP-5
*	155	SCP-6
*	156	PW
*	157	CH-PW-0
*	158	CH-PW-S
*	159-160	SET-P-CD
*	161	PSET-RC
*	162	PSET-RP
*	163	PSET-RR
*	164	PSET-SC
*	165	PSET-SP
*	166	CRR
*	167-168	SRR

VI. UTILITIES

NONE

VII. BRIDGE

	169	WALNUT CREEK DRAINAGE AREA MAP
	170	UNNAMED TRIBUTARY DRAINAGE AREA MAP
	171-174	WALNUT CREEK HYDRAULIC COMPUTATION
	175-178	UNNAMED TRIBUTARY HYRDRAULIC DATA
	179-180	EXISTING & PROPOSED TYPICAL SECTION
	181-182	TCP TYPICAL SECTION
	183	BRIDGE CLASS CULVERT #1
	184	BRIDGE CLASS CULVERT #1 TEMP SPL SHORING
	185	BRIDGE CLASS CULVERT #2
	186	BRIDGE CLASS CULVERT #2 TEMP SPL SHORING

VIII. TRAFFIC DETAILS

	187-205	SIGNING AND PAVEMENT MARKINGS
	206-207	GUIDE SIGN DETAILS
*	208-210	TSR(3)-13 THRU TSR(5)-13
*	211-216	D&OM(1)-20 THRU D&OM(5)-20, D&OM(VIA)-20
*	217-219	PM(1)-20 THRU PM(3)-20
**	220	TWO-LANE HIGHWAY CURVE SIGNING & MARKINGS
*	221	SMD(GEN)-08
**	222	SMD(SLIP-1)-08(DAL)
*	223	SMD(SLIP-2)-08
*	224	SMD(SLIP-3)-08
*	225-227	RS(2)-13 THRU RS(4)-13

IX. ENVIRONMENTAL ISSUES

	228	STORMWATER POLLUTION PREVENTION PLAN (SW3P)
	229	ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
	230-248	SWPPP LAYOUT
*	249-251	EC(1)-16 THRU EC(3)-16
*	252-254	EC(9)-16
**	255	VEGETATIVE ESTABLISHMENT SHEET (DAL)
**	256	SW3P SIGN SHEET (DAL)

X. MISCELLANEOUS ITEMS

NONE

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

* STATEWIDE STANDARDS
** DALLAS DISTRICT STANDARDS

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

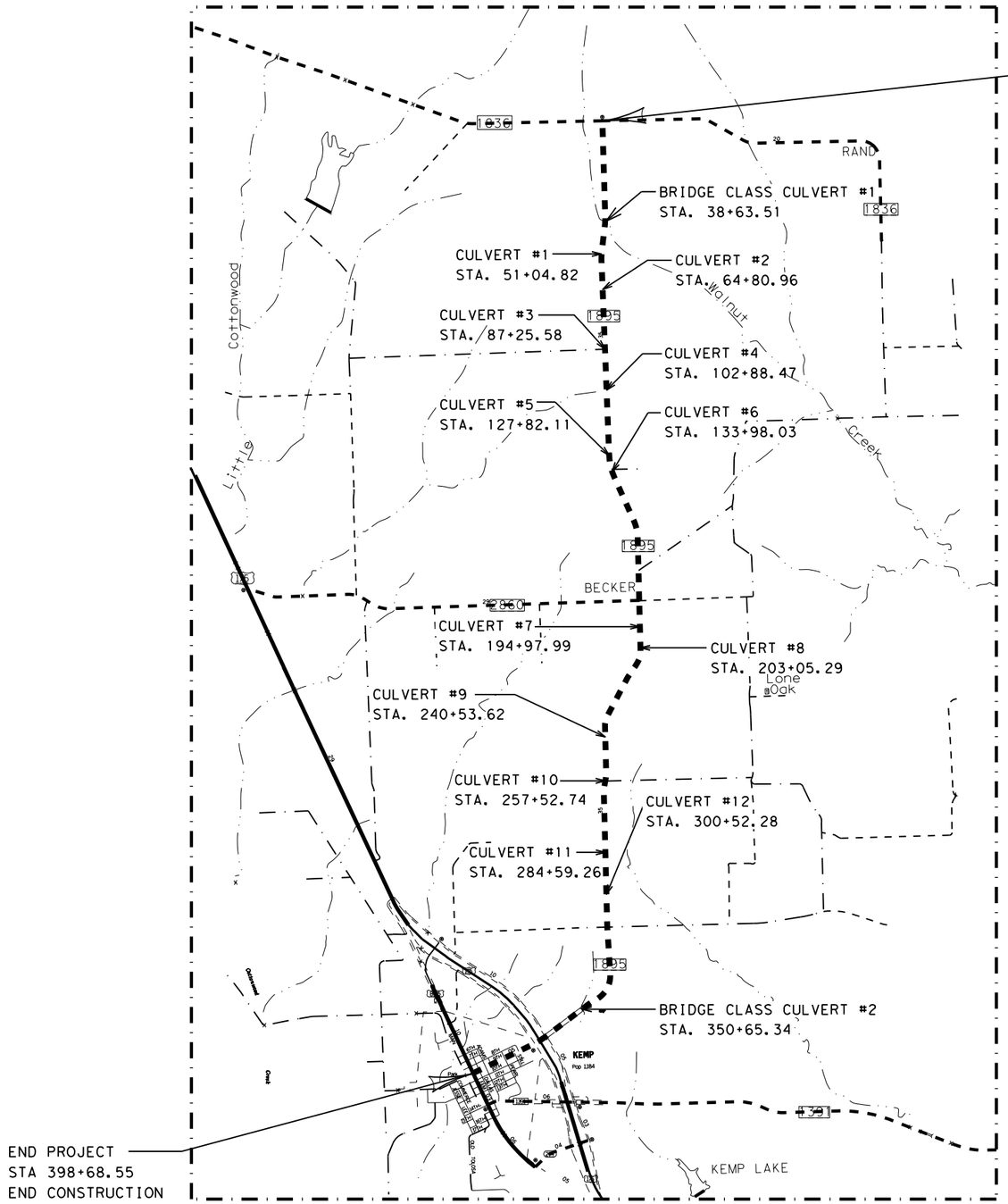
Falon Renfroe, P.E. 7/29/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
INDEX OF SHEETS

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	2
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	



NOTE:

PLACE ADVANCE WARNING SIGNS IN ACCORDANCE WITH BC, TCP, WZ STANDARDS AND MUTCD, AND AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

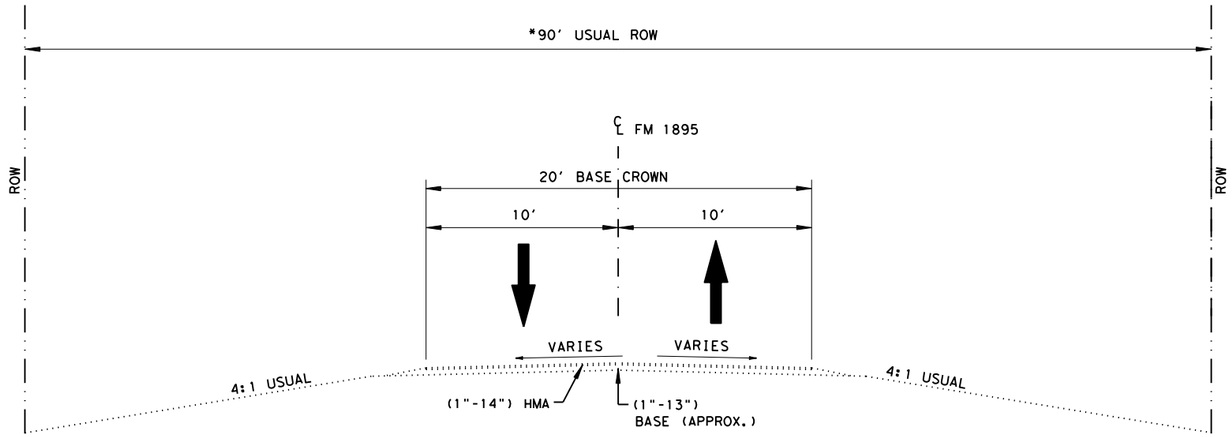
Texas Department of Transportation

FM 1895
PROJECT LAYOUT

SCALE: NTS SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	3
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

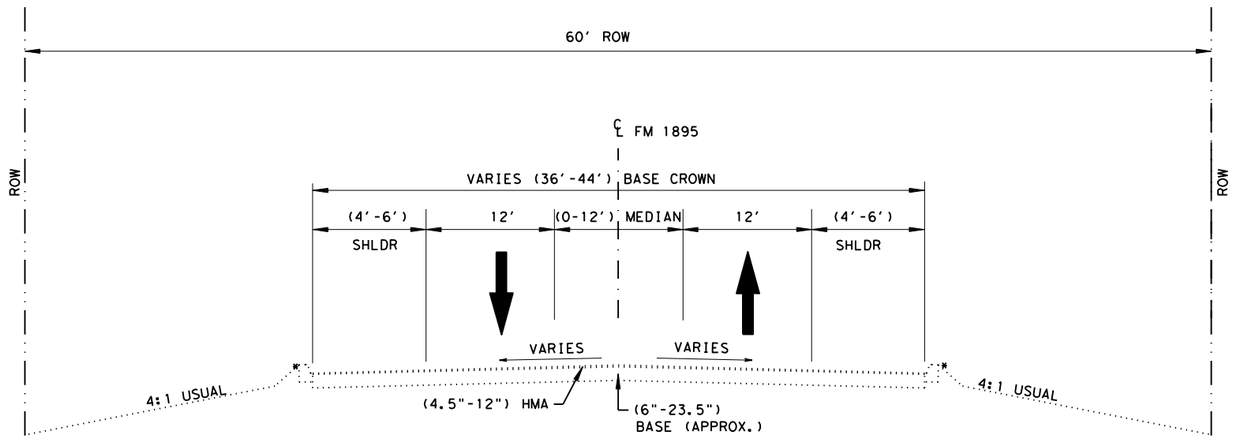
DATE: 7/27/2022 9:04:35 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\1. General\3. Project Layout.dgn



EXISITNG TYPICAL SECTION

STA. 0+11.31 TO STA 366+87.21

*EXISTING ROW VARIES (90' - 221')
STA 22+96.21 - 54+83.93



EXISITNG TYPICAL SECTION

STA. 366+87.21 TO STA 398+37.07

(MEDIAN)

STA. 367+43.61 TO STA 371+71.21

CURB LOCATION

*STA. 372+65.87 TO STA 398+37.07

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

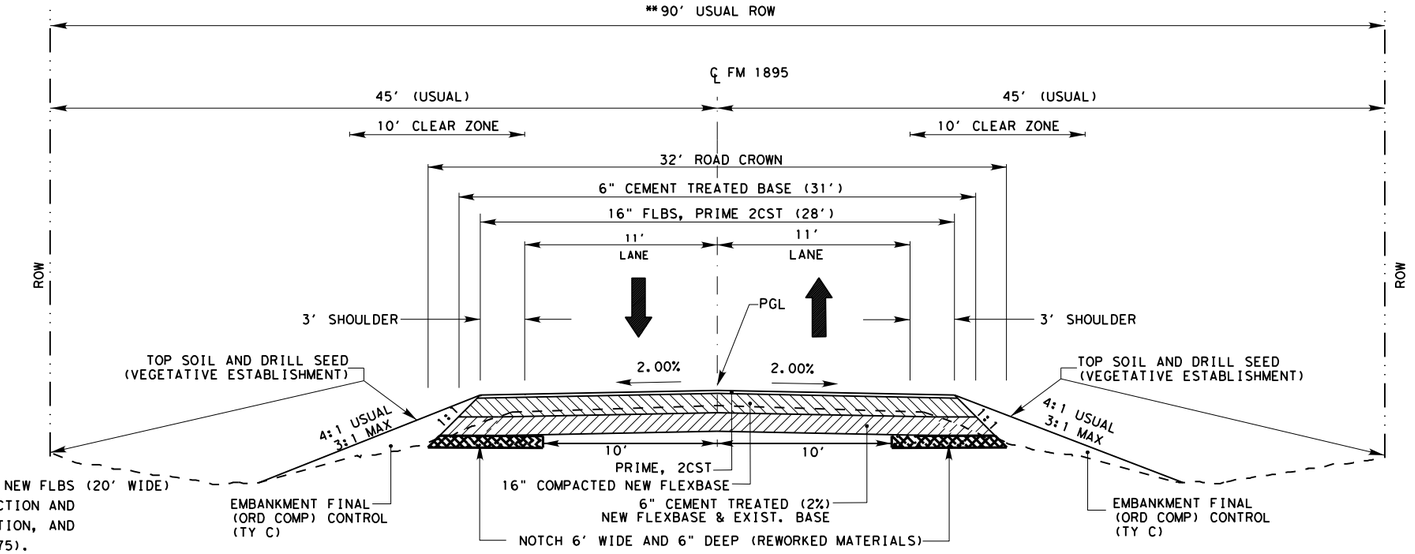
Texas Department of Transportation

FM 1895
TYPICAL SECTIONS

SCALE: NTS SHEET 1 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	4
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 9:09:18 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\1. General\4. Typical Sections.dgn



12" REMOVAL

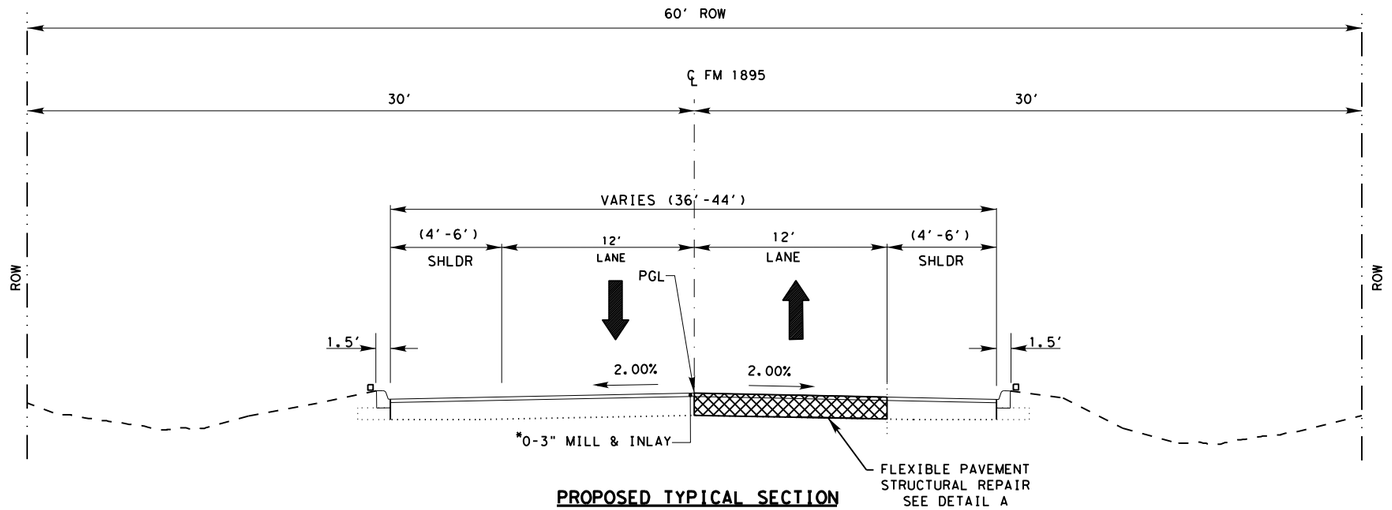
1. REWORK 12" OF EXISTING MATERIAL WITH 1" NEW FLBS (20' WIDE) ITEM 251), AND SPREAD OUT OVER TO 31' SECTION AND FILL 6'X 6" NOTCHES ON EACH SIDE OF SECTION, AND MIX 6" WITH 2% CEMENT (31' WIDE)(ITEM 275).
2. PLACE 16" OF NEW FLEXIBLE BASE MATERIAL (TY D GR 1 OR 2) (ITEM 247)
3. APPLY PRIME AND TWO COURSE SURFACE TREATMENT (ITEM 316)
4. PGL WILL BE 10" HIGHER THAN EXISTING

* 9" REMOVAL

1. REMOVE 9" OF EXISTING MATERIALS (ITEM 105)
2. ADD 10" OF NEW FLBS (20' WIDE) AND REWORK 13" ITEM 251), AND SPREAD OUT OVER TO 31' SECTION AND FILL 6'X 6" NOTCHES ON EACH SIDE OF SECTION, AND MIX 6" WITH 2% CEMENT (31' WIDE)(ITEM 275).
3. PLACE 16" OF NEW FLEXIBLE BASE MATERIAL (TY D GR 1 OR 2) (ITEM 247)
4. APPLY PRIME AND TWO COURSE SURFACE TREATMENT (ITEM 316)
5. PGL WILL BE 10" HIGHER THAN EXISTING

PROPOSED TYPICAL SECTION

STA 2+61.31 TO STA 31+13.00
STA 46+13.00 TO STA 107+15.00
*STA 107+15.00 TO STA 158+65.00
STA 158+65.00 TO STA 203+56.00
STA 211+56.00 TO STA 231+42.00
STA 238+49.00 TO STA 253+20.00
STA 257+25.00 TO STA 265+40.00
*STA 265+40.00 TO STA 326+98.00
STA 326+98.00 TO STA 331+34.00
STA 343+57.00 TO STA 364+67.00
**EXISTING ROW VARIES (90' - 221')
STA 22+96.21 - 54+83.93



PROPOSED TYPICAL SECTION

STA 367+43.61 TO STA 371+71.21 (MEDIAN)
STA 372+28.12 TO STA 398+37.07 (CURB)

MEDIAN

STA 367+43.61 TO STA 371+71.21

CURB

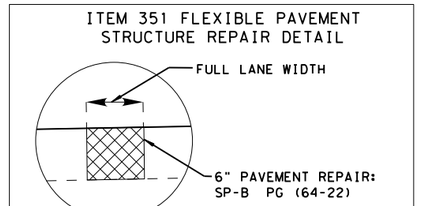
□STA. 372+65.87 TO STA 398+37.07

1. MILL & REMOVE 0"-3" OF EXISTING ASPHALT (ITEM 354)
2. REPAIR PAVEMENT AREAS WILL BE LOCATED BY THE ENGINEER WHERE IS NEEDED. (ITEM 351)
3. APPLY TACK COAT (ITEM 3077)
4. PLACE 2" SP-C SAC-B PG64-22 (ITEM 3077)
5. PGL WILL MATCH EXISTING

NOTE:
*AVERAGE MILLING IS 2", SOME AREAS MAY NEED UP TO 3".

NOTE:
1. NEW FLEXBASE - TY D GR 1-2
2. SUPERELEVATION & PAVEMENT TRANSITION ARE SHOWN IN PLANS
3. SIDE SLOPES AT CULVERT WILL BE AS SHOWN IN CULVERT PLAN & PROFILE.
4. PROPOSED FRONT SLOPE WILL MEET AT OR BEFORE DITCHLINE EXCEPT CROSS CULVERT AREA.
5. LIMITS OF EXIST PAVEMENT & BASE DEPTHS WERE ESTIMATED BY INTERPOLATING BETWEEN CORE DATA LOCATIONS. CONTRACTOR SHALL FIELD VERIFY TO ENSURE MAX 50% RAP FOR REWORKED BASE.
6. CONTRACTOR TO VERIFY IF BASE & SUBGRADE MATERIAL IS STABLE FOR MOVEMENT OF CONSTRUCTION EQUIPMENT. ANY NECESSARY STABILIZATION OF MATERIAL SHALL BE RESPONSIBILITY OF THE CONTRACTOR.
7. MINIMIZE VEGETATION AND SOIL DISTURBANCE TO EXTENT PRACTICABLE (WHILE STILL ACCOMPLISHING REQUIRED CONSTRUCTION). RE-VEGETATE DISTURBED SPOILS.

DETAIL A



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/29/2022
Signature of Registrant & Date

Texas Department of Transportation

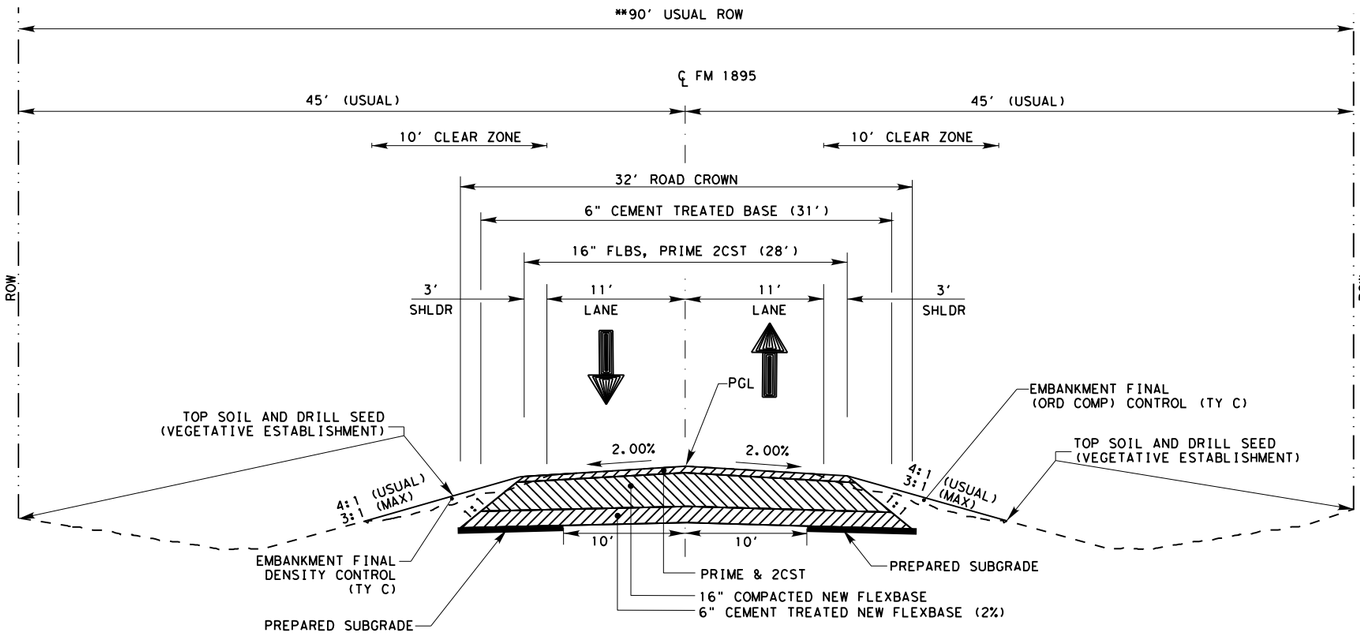
FM 1895
TYPICAL SECTIONS

SCALE: NTS SHEET 2 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	5
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/29/2022 8:43:32 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\19750201 3\4 - Design\Plan Set\1. General\4. Typical Sections.dgn

1. REMOVE 12"-22" OF EXISTING MATERIAL (ITEM 105)
2. PLACE 6" NEW FLEXIBLE BASE MATERIAL (ITEM 247) OVER 31' SECTION AND MIX WITH 2% CEMENT (ITEM 275).
3. PLACE 16" NEW FLEXIBLE BASE (TY D GR 1 OR 2) (ITEM 247).
4. APPLY PRIME AND TWO COURSE SURFACE TREATMENT. (ITEM 316)
5. PGL WILL BE 0-10" HIGHER THAN EXISTING.

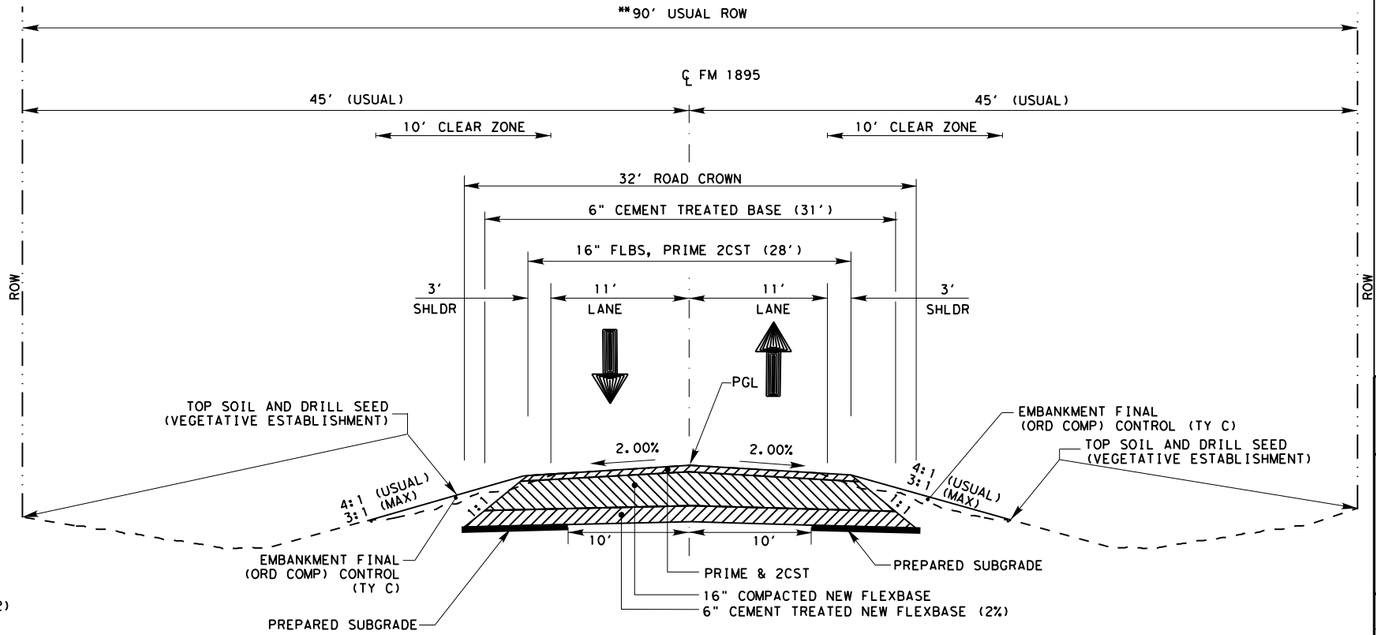


PROPOSED TYPICAL SECTION (TRANSITION SECTIONS)

STA 0+11.31 TO STA 2+61.31
STA 31+13.00 TO STA 33+63.00
STA 43+63.00 TO STA 46+13.00
STA 364+67.00 TO STA 366+87.21
**EXISTING ROW VARIES (90' - 221')
STA 22+96.21 - 54+83.93

NOTE:
1. NEW FLEXBASE - TY D GR 1-2
2. SUPERELEVATION & PAVEMENT TRANSITION ARE SHOWN IN PLANS
3. SIDE SLOPES AT CULVERT WILL BE AS SHOWN IN CULVERT PLAN & PROFILE.
4. PROPOSED FRONT SLOPE WILL MEET AT OR BEFORE DITCHLINE EXCEPT CROSS CULVERT AREA.
5. LIMITS OF EXIST PAVEMENT & BASE DEPTHS WERE ESTIMATED BY INTERPOLATING BETWEEN CORE DATA LOCATIONS. CONTRACTOR SHALL FIELD VERIFY TO ENSURE MAX 50% RAP FOR REWORKED BASE.
6. CONTRACTOR TO VERIFY IF BASE & SUBGRADE MATERIAL IS STABLE FOR MOVEMENT OF CONSTRUCTION EQUIPMENT. ANY NECESSARY STABILIZATION OF MATERIAL SHALL BE RESPONSIBILITY OF THE CONTRACTOR.
7. MINIMIZE VEGETATION AND SOIL DISTURBANCE TO EXTENT PRACTICABLE (WHILE STILL ACCOMPLISHING REQUIRED CONSTRUCTION). RE-VEGETATE DISTURBED SPOILS.

1. REMOVE 22" OF EX MATERIALS (ITEM 105)
2. ADD 6" OF NEW FLBS OVER 31' (ITEM 247) AND MIX WITH 2% CEMENT (ITEM 275).
3. PLACE 16" OF NEW FLEXIBLE BASE MATERIAL (TY D GR 1 OR 2) (ITEM 247)
4. APPLY PRIME AND TWO COURSE SURFACE TREATMENT (ITEM 316)
5. PGL WILL MATCH WITH EXISTING



PROPOSED TYPICAL SECTION (100-YR FLOOD PLAIN & OVERTOPPING)

STA 33+63.00 TO STA 43+63.00
**EXISTING ROW VARIES (90' - 221')
STA 22+96.21 - 54+83.93

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

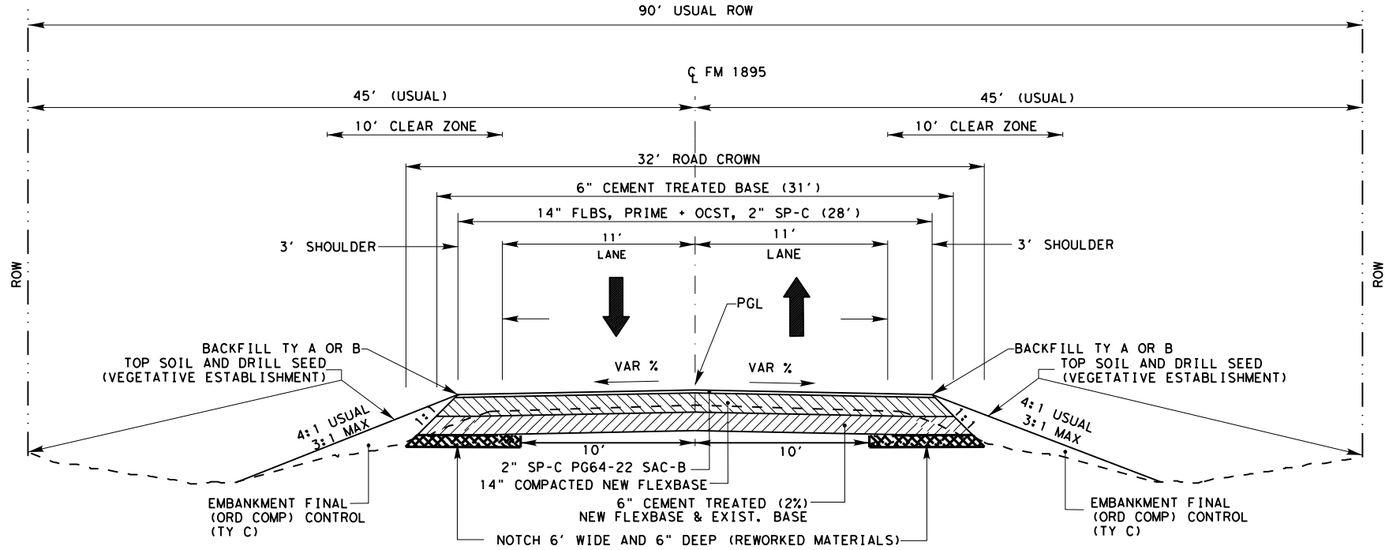
Texas Department of Transportation

FM 1895
TYPICAL SECTIONS

SCALE: NTS SHEET 3 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	6
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 9:11:11 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\1. General\4. Typical Sections.dgn



NOTE:
1. NEW FLEXBASE - TY D GR 1-2
2. SUPERELEVATION & PAVEMENT TRANSITION ARE SHOWN IN PLANS
3. SIDE SLOPES AT CULVERT WILL BE AS SHOWN IN CULVERT PLAN & PROFILE.
4. PROPOSED FRONT SLOPE WILL MEET AT OR BEFORE DITCHLINE EXCEPT CROSS CULVERT AREA.
5. LIMITS OF EXIST PAVEMENT & BASE DEPTHS WERE ESTIMATED BY INTERPOLATING BETWEEN CORE DATA LOCATIONS. CONTRACTOR SHALL FIELD VERIFY TO ENSURE MAX 50% RAP FOR REWORKED BASE.
6. CONTRACTOR TO VERIFY IF BASE & SUBGRADE MATERIAL IS STABLE FOR MOVEMENT OF CONSTRUCTION EQUIPMENT. ANY NECESSARY STABILIZATION OF MATERIAL SHALL BE RESPONSIBILITY OF THE CONTRACTOR.
7. MINIMIZE VEGEETATION AND SOIL DISTURBANCE TO EXTENT PRACTICABLE (WHILE STILL ACCOMPLISHING REQUIRED CONSTRUCTION). RE-VEGETATE DISTURBED SPOILS.

1. REWORK 12" OF EX MATERIALS WITH 1" NEW FLBS (20' WIDE) ITEM 251),AND SPREAD OUT OVER TO 31' SECTION AND FILL 6'X 6" NOTCHES ON EACH SIDE OF SECTION, AND MIX 6" WITH 2% CEMENT (31' WIDE)(ITEM 275).
2. PLACE 14" OF NEW FLEXIBLE BASE MATERIAL (TY D GR 1 OR 2) (ITEM 247)
3. APPLY PRIME & OCST (ITEM 316)
4. PLACE 2" SP-C SAC-B PG64-22 (ITEM 3077)
5. PGL WILL BE 10" HIGHER THAN EXISTING

PROPOSED TYPICAL SECTION (SUPER-ELEVATED CURVE LOCATION)

STA 203+56.00 TO STA 211+56.00
STA 231+42.00 TO STA 238+49.00
STA 253+20.00 TO STA 257+25.00
STA 331+34.00 TO STA 343+57.00

FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
TYPICAL SECTIONS (PROPOSED)

SCALE: NTS SHEET 4 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	
CHECK	CONTROL	SECTION	JOB	7
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 9:11:37 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\1. General\4. Typical Sections.dgn

SPECIFICATION DATA

Table 1: Soil Constants Requirements				
Item	Description	Plasticity Index		Note
		Max	Min	
132	EMBANKMENT (FINAL)(ORD COMP) (TY C)	40	8	1

Note 1: Material excavated from the project must meet the PI requirements when used in the top 10 feet of embankment that supports the pavement structure or other locations shown in the plans. Do not use shale and obtain approval to incorporate shaley clay produced by the construction project.

Table 2: Basis of Estimate for Permanent Construction					
Item	Description	Thickness	Rate		Quantity
164	Drill Seed (Perm) (R) (C)	N/A	See Specifications		267,782 SY
166 *	Fertilizer (12-6-6)	N/A	500	Lbs./Ac	13.83 Ton
168	Vegetative Watering (Warm)**	N/A	12	MG/Ac/Day	39,836 MG
314	Emuls Asph	N/A	0.20	Gal/SY	22,828 Gal
3077	SP MIXES	See Plans	110	Lbs./SY/In	2,452 Ton
3077	Tack Coat (Undiluted Application Rate)	New HMA	0.06	Gal/SY	1965 Gal
		Milled HMA	0.11		
*For contractor's information only **Use Summer rate for calculation, adjust for actual field conditions/temperatures as necessary. See Vegetation Establishment Plan Sheet for estimated daily rates. ***Portland Concrete Cement					
Note: (1) Base material weight based on 1.75 Ton/CY (dry- compacted) (2) Asphalt weight based on 110 Lbs./SY/In (3) Subgrade weight based on 1.75 Ton/CY (dry-compacted) (4) Item 314 Residual Asphalt 0.20 Gal/SY					

CSJ: 1975-02-013 Sheet 8

County: KAUFMAN

Highway: FM 1895

Table 3: Basis of Estimate for Temporary Erosion Control Items				
Item	Description	Rate		Quantity
164	Drill Seeding (Temp) (Warm or Cool)	See Specifications		178,524 SY
166*	Fertilizer (12-6-6)	500	Lb/Ac	9.22 Ton
168	Vegetative Watering (Warm)**	12	MG/Ac/Day	26,562 MG
*For Contractor's Information Only. **Use Summer rate for calculation, adjust for Actual Field Conditions/Temperatures as Necessary. See Vegetation Establishment Sheet for estimated daily rates.				

GENERAL

The construction, operation and maintenance of the proposed project will be consistent with the state implementation plan as prepared by the Texas Commission on Environmental Quality.

The disturbed area for this project, as shown on the plans is 55.86 acres. However, the Total Disturbed Area (TDA) will establish the required authorization for storm water discharges. The TDA of this project will be determined by the sum of the disturbed area in all project locations in the contract, and all disturbed area on all Project-Specific Locations (PSL) located in the project limits and/or within 1 mile of the project limits. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction site as shown on the plans, according to the TDA of the project. The contractor will obtain any required authorization from the TCEQ for the discharge of storm water from any PSL for construction support activities on or off of the project row according to the TDA of the project. When the TDA for the project exceeds 1 acre, provide a copy of the appropriate application of permit (NOI, or Construction Site Notice) to the engineer, for any PSL located in the project limits or within 1 mile of the project limits. Follow the directives and adhere to all requirements set forth in the TCEQ, Texas Pollution Discharge Elimination System, Construction General Permit (TPDES, CGP).

This project required permits with environmental resources agencies, as outlined in the plan set Environmental Permits, Issues and Commitments (EPIC) Sheet. There is a high probability that an environmentally sensitive area could be encountered on the contractor designated Project-Specific Locations (PSL) for this project (haul roads, equipment staging areas, borrow pits, disposal sites, field offices, storage areas, parking areas, etc.). Item 7.6 "Project-Specific Locations", provides a listing of regulatory agencies that may need to be contacted regarding this project.

Install traffic marking signs prior to sealcoat application and remove within three days after placement of traffic markings.

Leave all right of way areas undisturbed until actual construction is to be performed in said areas.

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

Lane Selman, P.E. Lane.Selman@txdot.gov
Nicholas Wadlington, P.E. Nicholas.Wadlington@txdot.gov

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

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

Paper copies of cross-sections may be produced by using the provided .pdf file located on the above FTP Website at the bidders' expense and at copying companies. This data is for non-construction purposes only and it is the responsibility of the prospective bidder to validate the enclosed data with appropriate plans, specifications and estimate for the project(s).

Item 5:
Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way on this project. For signal, illumination, surveillance, and communications & control maintained by TxDOT, call the TxDOT Traffic Signal Office (214-320-6682) for locates a minimum of 48 hours in advance of excavation. For irrigation systems, call TxDOT Landscape Office (214-320-6205) for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages when utilities are damaged due to Contractor's negligence including, but not limited to, repair or replacement at the Contractor's expense.

For the project to be deemed complete, permanently stabilize all unpaved disturbed areas of the project with a vegetative cover at a minimum of 70% density for the control of erosion.

Place construction stakes/station markings at intervals of no more than 100 feet or as directed by the Engineer. Place stakes and markings so as not to interfere with normal construction operations.

Item 7:
Repair or replace any structures and utilities that might have been damaged by negligence or a failure to have utility locates performed.

Holiday restrictions – the engineer may decide that no lane closures or construction operations shall be allowed during the restricted periods listed in the following holiday schedule. TxDOT has the right to lengthen, shorten, or otherwise modify these restricted periods as actual, or expected, traffic conditions may warrant. Working days will not be charged for these restricted periods. No

CSJ: 1975-02-013 **Sheet** 8A

County: KAUFMAN

Highway: FM 1895

additional compensation will be allowed for these closures (i.e., overhead, delays, stand-by, barricades or any other associated cost impacts).

- New Year's Eve and Day (5am on December 31 thru 10:00 pm January 1)
- Easter Holiday weekend (5am on Friday thru 10:00 pm Sunday)
- Memorial Day weekend (5am on Friday thru 10:00pm Monday)
- Independence Day (5am on July 3 thru 10:00 pm on July 5)
- Labor Day weekend (5am on Friday thru 10:00 pm Monday)
- Thanksgiving Holiday (5am on Wednesday thru 10:00 pm Sunday)
- Christmas Holiday (5am on December 23 thru 10:00 pm December 26)

No significant traffic generator events identified.

Item 8:
This Project will be a Standard Workweek.

Meet weekly with the engineer to notify him or her of planned work for the upcoming week.

Provide the engineer with a daily work schedule of planned work.

Critical Path Method (CPM) schedule in P6 format will be required for this project. Submit baseline schedule and obtain approval prior to beginning construction. The Estimate will be held if monthly schedule update is not submitted.

Item 100:
Remove the existing roadway small signs, delineators and object markers as shown on the plans, or as directed, during construction within the right of way. Small sign, delineator and object marker removals are subsidiary to this Item.

Neatly trim trees, overhanging branches and all underbrush at the ROW line to produce 18' vertical clear area within the limits of ROW. Do not disturb any vegetation beyond the TXDOT ROW or its authorized elements.

The limits of preparing right of way will be measured from Sta. 0+11.31 to Sta. 398+37.07 along the centerline of construction.

Item 104:
In those areas where the pavement is not to be overlaid, provide a smooth surface after the curb removal. Planing or grinding is considered an acceptable method at these locations. Measurement and payment is in accordance with this item.

Sawing of concrete is not paid for directly but is considered subsidiary to this item.

Items 105, 251, and 354:
Saw existing asphalt along neat lines where portions are to be left in place temporarily or permanently. Sawing is not paid for directly but is subsidiary to this item.

Take possession of recycled asphalt pavement from the project and recycle the material.

Properly dispose of unsalvageable material at your own expense.

Items 110 and 132:
Scarify and loosen the excavated areas, unpaved surface areas, except rock, to a depth of at least 8 inches and compact in accordance with the specifications.

Excavation and embankment for driveways, sleeper slabs, alleys and intersections will not be paid for directly, but will be considered subsidiary to these items.
Excavated material from the project site has not been determined to be suitable for embankment. The bidder assumes all risk for the use of excavated materials for embankment and is expected to meet all material requirements for embankment regardless of the source.

Perform Tex-106-E (Plasticity Index) by an approved laboratory on excavated soils from sources outside right of way when used in roadway embankment. Provide the test results at no expense to the department. The engineer will sample and test soils produced by the construction project for specification requirements or material sources specified in the plans.

Earth embankment Type C, is mainly composed of material other than shale. Furnish material that is free from vegetation or other objectionable material and that conforms to the requirements of Table 1 (Sheet A). If necessary, treat material with lime slurry in accordance with Item 260, “Lime Treatment (Road-Mixed)” in order to meet these requirements. Use Tex-121-E, figure 1, page 4 to calculate the amount of lime required. When lime treated subgrade is specified, 3000 PPM is the maximum allowed sulfate content in the top 3 feet when material comes from borrow source. Follow recommendations of 260.4.4 for mixing and mellowing. The engineer will test material placed or excavated to a depth of one foot below and laterally to one foot outside the proposed treatment limit. Lime treatment of this material will not be paid for directly, but will be considered subsidiary to this item.

Do not use shaley clays in embankment unless approved in writing.

Item 134:
Start backfilling pavement edges as soon as possible after the surface course is started.

Backfill and compact the pavement edges to produce a smooth surface adjacent to the pavement with no vertical edges.

Use Type “A” or “B” material to backfill pavement edges as shown in plans. Type “A” or “B” material shall consist of suitable material that when compacted will support the pavement edge. Rap is considered suitable Type “A” or “B” material.

Blade the existing vegetation into a neat wind-row prior to overlay. After placing Ty A or Ty B backfill and placing seeding, the material from the wind-row shall be replaced on the completed slopes. Emulsion shall be placed at a 50/50 solution of water to emulsion over disturbed area. Emulsion rate=0.15 Gal/SY residual. This work, materials and equipment shall be subsidiary to Item 134.

CSJ: 1975-02-013 **Sheet** 8B

County: KAUFMAN

Highway: FM 1895

Item 152:
Use road grader work to windrow sod/topsoil (6” depth), construct slopes, prepare driveways for HMAC, grade ditches as necessary to establish drainage and redistribute sod/topsoil on finished slopes.

Redistributed sod/topsoil shall be free of rock, rap, base material and other objectionable materials.

Cut ditches to proposed grade in the immediate vicinity of cross drain structures prior to placing Storm Water BMP devices at the early stages of the project.

If excess material is generated under this item, it may be utilized to construct slopes, or wasted as approved.

Item 160:
Sequence construction operations to salvage topsoil from one location and spread on areas ready to receive topsoil. Keep stockpiling of topsoil to a minimum.

Use fertile clay or loam from the project site not more than six inches below natural grade as topsoil.

Item 161:
Provide tickets representing quantity of compost delivered to site.

Item 247:
Construct uniform layer thickness of 12 inches, or less with the required density and moisture content. Minimum PI is equal to three (3) for all grades.

Flexible Base shall not contain more than 1% by weight of clay balls.

Roadway delivery flexbase measured by the Ton shall be used as additional base material to construct superelevation sections to rates shown in the plans. Processing of this material will not be paid for directly, but will be considered subsidiary to the various bid items.
Place blue top hubs for alignment and elevations of new base at centerline and edge of pavement.

Measure roadway profile smoothness with a high speed or lightweight inertial profiler that is certified by the Texas Transportation Institute. Acceptance for locations constructed under traffic will be based on no 0.10-mile section having an average IRI value greater than 125 inches per mile. Acceptance for locations not constructed under traffic will be based on no 0.10 mile section having an average IRI value greater than 95 inches per mile and no individual wheel path spike greater than 105. Following corrections, re-profile the roadway to verify that corrective actions were successful.

Item 301:
Provide liquid antistripping agents unless otherwise directed. Add the minimum dosage determined by the manufacturer or higher dosage determined by design requirement and try subsequent trials at 0.25% increments.

Item 314:
Apply MS-2 or SS-1 as a prime, dilute the asphalt with base finish water, distribute in successive applications, and work into the top 1/4" of flex base. Residual asphalt 0.20 Gal/SY.

Item 316:

	AC20-5TR, AC20-XP AC15-P	CRS-2P	RC-250
JANUARY			REQUIRES INTERMEDIATE COURSE TO BE PLACED
FEBRUARY			
MARCH		REFER TO STANDARD SPECIFICATIONS ITEM 316 FOR TEMPERATURE REQUIREMENTS	
APRIL			
MAY	REFER TO STANDARD SPECIFICATIONS ITEM 316 FOR TEMPERATURE REQUIREMENTS		
JUNE			
JULY			
AUGUST			
SEPTEMBER		REFER TO STANDARD SPECIFICATIONS ITEM 316 FOR TEMPERATURE REQUIREMENTS	
OCTOBER			
NOVEMBER			REQUIRES INTERMEDIATE COURSE TO BE PLACED
DECEMBER			

RC-250 is only allowed as a first course in accordance with table above.

Utilize an asphalt distributor capable of providing a transversely varied asphalt rate. The Engineer will select the pavements where the transversely varied asphalt rate is required.
When a transversely varied rate is required, the asphalt rate outside of the wheel paths will be between 22 and 32% higher than the asphalt rate applied in the wheel paths. Provide calibration documents to the Engineer that include a description of the spray bar(s) and nozzles that will be used and the percentage difference in asphalt rate achieved by each tested spray bar and nozzle arrangement. The nozzles proposed for use shall be clearly stamped or marked from the factory identifying the manufacturer.

CSJ: 1975-02-013 Sheet 8C

County: KAUFMAN

Highway: FM 1895

First Course				
ITEM	APPLICATION			
	Emul. Asphalt Treatment	1st Course		
*Asphalt Type	MS-2 or SS-1	CRS-2P	AC20-5TR, AC20-XP, AC15-P	RC-250 #
*Asph. Rate (Gal/SY)	0.20	0.50	0.42	0.28
Aggregate Type		B or L	B or L	B or L
Aggregate Grade		3	3	5
Aggr. Rate (CY/SY)		1:105	1:105	1:125
Min. Cure Time	24 hrs	14 days (Emulsion)		

When RC-250 is used as the 1st course, an intermediate course will be required and will be placed as soon as temperature allows which will be before 2nd Course is placed.

Intermediate Seal	
ITEM	APPLICATION
	Intermediate Course
*Asphalt Type	CRS-2P
*Asph. Rate (Gal/SY)	0.44
Aggregate Type	B or L
Aggregate Grade	4
Aggr. Rate (CY/SY)	1:120

Second Course	
ITEM	APPLICATION
	2nd Course
*Asphalt Type	AC20-5TR, AC20-XP, AC15-P
*Asph. Rate (Gal/SY)	0.36
Aggregate Type	PB or PL
Aggregate Grade	4
Aggr. Rate (CY/SY)	1:120

* The information above is intended to provide general guidance and as a basis of estimate. Based on the season and weather conditions at the time, the engineer will determine the asphalt type and rates to be used at the time of application.

In addition to the temperature requirements of this Item, AC Asphalts used in Surface Treatments and Sealcoats must be placed between May 15 and August 31. Emulsions may be substituted for AC Asphalts outside this timeframe only with the approval of the Engineer.

Item 320:
Use a self-propelled wheel mounted MTV capable of receiving mix from the haul trucks, separate from the paver. It shall have a minimum storage capacity of approximately 25 tons. It shall be equipped with a pivoting discharge conveyor and shall completely and thoroughly remix the material prior to placement. The effectiveness of the MTV's remixing ability is subject to the approval of the Engineer. In addition, the paver shall have a surge storage insert with a minimum capacity of 20 tons.

The use of windrow pick-up equipment is allowed except on the first course of roadway material placed over the subgrade.

Item 354:
Remove the loose material from the roadway before opening to traffic.

Take possession of recycled asphalt pavement from the project and recycle the material.

Properly dispose of unsalvageable material at your own expense.

Slope longitudinal faces greater than 1 ¼" to a minimum of 1:1 slope at the end of the work period if traffic is able to traverse the joint. Slope transverse tapers to a minimum of 36:1 at the end of the workday. Remove the taper prior to continuing the milling.

For open shoulder sections, plane the asphalt so the flow of water is not impeded at the shoulder edge or across the surface. Added planing up to three feet in width outside the lines and grades of the plans, necessary to provide proper drainage, will be subsidiary to the bid item.

Patch pavement cut to excessive depth by equipment failure with an approved epoxy material. Re-plane patched area to an acceptable approved ride quality. Payment for these corrections is subsidiary to this item.

Item 400:
Structural Excavation is not paid for directly but is considered subsidiary to pertinent Items.

Item 421:
Furnish mix designs to the Engineer in a format compatible to the latest version of the Department's Construction Management System (Site Manager). Mix Design templates will be provided by the Engineer.

Supply the Engineer with a list of certified personnel and copies of their current ACI certificates before beginning production and when personnel changes are made. Supply hard copies of calibration reports for testing equipment when required by the Engineer.

Item 464:
The concrete collars and the connections of pipes to existing or proposed concrete boxes or pipe will not be paid for directly but will be considered subsidiary to the various bid items.

Item 500:
Material On Hand (MOH) will not be used in calculating partial payments for Mobilization.

CSJ: 1975-02-013 **Sheet** 8D

County: KAUFMAN

Highway: FM 1895

Item 502:
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.

Access will be provided to all business and residences at all times. Where turning radii are limited during phased construction at intersections, provide all weather surfaces such as RAP or base in turning movements to accommodate and to protect the traffic from edge drop-offs. Materials, labor, maintenance and removal for these temporary accesses and radii will not be paid for directly but will be considered subsidiary to the various bid items.

Provide written proposed lane closure information by 1:00 pm on the business day prior to the proposed closures. Do not close lanes when this requirement is not met.

When excavation is required next to a pavement lane carrying traffic and the widening is not completed by the end of the work day, backfill against the edge of the pavement with at least a 3:1 slope using an acceptable material to support vehicular traffic. Carefully remove and dispose of this material when work resumes. Backfilling pavement edges, and the materials required for the work will be subsidiary to this item.

Place barricades and signs in locations that do not obstruct the sight distance of drivers entering the highway from driveways or side streets.

Do not commence work on the road before sunrise. Do not operate or park any equipment/machinery closer than 30 feet from the traveled roadway after sunset unless authorized by the engineer.

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

Limit lane closures along FM 1895 to the hours between 9:00 am and 3:30 pm. Work in other areas of the project is not restricted to this time frame.

Item 506:
Take all practicable precautions to prevent debris from being discharged into the Waters of Texas or a designated wetland. Install Best Management Practices before demolition begins and maintain them during the demolition. Remove any debris or construction material that escapes containment devices and are discharged into the restricted areas, before the next rain event or within 24 hours of the discharge.

If temporary construction stream crossings are allowed under a Nationwide Permit, submit in writing for approval the type and location of each temporary stream crossing. Use temporary bridges, timber mats, or other structurally sound and non-eroding material for temporary stream crossings. A temporary culvert crossing will consist of storm sewer pipes and 4- to 8-inch nominal

size rock. Temporary stream crossings must not cause more than minimal changes to the hydraulic flow characteristics of the stream, increase flooding, or cause more than minimal degradation of water quality. Remove the temporary stream crossings in their entirety and return the affected areas to their pre-existing elevation. All work and materials use for temporary construction stream crossings will not be paid for directly but are subsidiary to pertinent Items.

Provide SW3P Signs. Obtain from the Engineer a copy of the project's completed TPDES Storm Water Program Construction Site Notice and Contractor Site Notice. Laminate the sheets and bond with adhesive to 36" X 36" plywood sign blanks. Ensure the sheets remain dry. Apply Type C Blue reflective sheeting as the background and add the text "SW3P" in 5" white lettering, centered at the top. Attach the signs to approved temporary mounts and locate at each of the project limits just inside the right of way line at a readable height or as directed by the Engineer. If the sign cannot be placed outside the clear zone, it must adhere to the TMUTCD. SW3P signs, maintenance, and reposting (for replacement or as needed to ensure readability) will be subsidiary to Item 502.

Concrete Washouts are required per the CGP. The Concrete Washout Area(s) structural controls must consist of temporary berms, temporary shallow pits, and/or temporary storage tanks to prevent contaminated runoff and must be lined as to prevent contamination of underlying soil. Ensure pits properly maintained including removal of concrete as not to allow over flow. The location(s) of washout area will be approved by the Engineer. When washout pits are no longer needed, they will be removed and area will be restored to original condition. This work, materials and labor will not be measured or paid for directly but will be subsidiary to Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls."

Item 529:
Provide grooved joints at 10-foot intervals and ¾ inch expansion joint material for doweled curb at the same locations as on the existing pavement.
For Curb and Gutter sections, provide grooved joints at 10-foot intervals and ¾ inch expansion joint material at a maximum of 50-foot centers and at all radius points and inlets.

Curb and Gutter transitions will be paid for by the foot at the unit price for the corresponding curb or curb and gutter section.

Saw joints at the same location as on the existing pavement.

Item 530:
Provide Class "HES" concrete for concrete intersections and driveways listed or shown on the plans.

Item 540:
Furnish one type of post throughout the project except as specifically noted in the plans.

Item 585:
Use Surface Test Type A on all intersections and driveways.

Use Surface Test Type B pay adjustment schedule 3 on the travel lanes.

CSJ: 1975-02-013 **Sheet** 8E

County: KAUFMAN

Highway: FM 1895

Items 644:
Prior to taking elevations to determine lengths for fabrication of sign posts and/or sign support towers, obtain verification of all proposed locations.

All sign mounts shall have a clamp base system for all small roadside sign assemblies.

Provide two (2) sets of shop drawings for signs. The shop drawings shall conform to the details shown on the plans. The shop drawings shall show the details of the panels, wind beams, stiffeners, joint backing plates, splices, fasteners, brackets, and signs support connections. The shop drawings shall show letter types and sizes, interline spacing and message arrangements.

Affix a sign identification decal to the back of all signs in accordance with Item 643.

Item 666:
Place pavement markings according to the "Texas Manual on Uniform Traffic Control Devices" and the applicable plan sheets.

No contract stripe will be placed unless the striping inspector is present and at least 24 hours advance notice has been given by the Contractor.

Lay out pilot lines for approval to all final pavement marking applications.

Use equipment with footage counters capable of measuring the linear footage placed. Calibrate counters prior to the beginning of striping operations.

Use a double-drop bead system with an application rate of 7.0 lbs/gal Type II and 7.0 lbs/gal Type III beads. Apply the Type II beads before applying Type III beads. Use a gravity flow applicator to funnel beads onto the stripe. Reduce truck speed enough that the beads drop onto the stripe and do not roll in the paint film.

Apply all stripes in one coat.

A portable retro reflectometer may be used in accordance to the specifications for this project if total quantity of striping is less than 200,000 linear foot.

Due to problems in traffic handling, do not place a dash center stripe and edge line at the same time.

Item 662 and 672:
Black adhesive will be used on asphalt pavements and white adhesive will be used on concrete pavements.

Item 730:
At the discretion of the Engineer, mow non-paved areas within the project prior to placement of permanent vegetation. Mow up to (3) cycles per growing season.

Item 3077:
Use aggregate that meets the Surface Aggregate Classification (SAC) requirement of Class B.

Provide PG binder 64-22 in Type SP-C mixture.

Item 6185:

TCP 1 Series	Scenario		Required TMA/TA	
(1-1)-18 / (1-2)-18			1	
(1-3)-18	A	B	1	2
(1-6)-18			1	

TCP 2 Series	Scenario		Required TMA/TA	
(2-1)-18 / (2-2)-18 / (2-6)-18	All		1	
(2-3)-18	A	B	1	2

TCP 3 Series	Scenario			Required TMA/TA
(3-1)-13	All			2
(3-3)-14	A	B	D	2
	C			3
(3-4)-13	All			1, unless working inside a twltl, then 2.

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

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1975-02-013 **DISTRICT** Dallas **COUNTY** Kaufman
HIGHWAY FM 1895

			CONTROL SECTION JOB		**1975-02-013**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00064125**		
			COUNTY		**Kaufman**		
			HIGHWAY		**FM 1895**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	397.130		397.130	
	104-6009	REMOVING CONC (RIPRAP)	SY	45.500		45.500	
	104-6017	REMOVING CONC (DRIVEWAYS)	SY	730.000		730.000	
	104-6022	REMOVING CONC (CURB AND GUTTER)	LF	500.000		500.000	
	105-6011	REMOVING STAB BASE AND ASPH PAV (2"-6")	SY	7,272.000		7,272.000	
	105-6013	REMOVING STAB BASE & ASPH PAV (9")	SY	25,130.000		25,130.000	
	105-6073	REMOV STAB BASE AND ASPH PAV (22")	SY	2,223.000		2,223.000	
	105-6164	REMOVE STAB BASE & ASPH PAV (12"-22")	SY	2,157.000		2,157.000	
	112-6001	SUBGRADE WIDENING (ORD COMP)	STA	366.760		366.760	
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	16,833.500		16,833.500	
	134-6004	BACKFILL (TY A OR B)	STA	397.130		397.130	
	152-6001	ROAD GRADER WORK (ORD COMP)	STA	371.040		371.040	
	161-6017	COMPOST MANUF TOPSOIL (4")	SY	267,782.000		267,782.000	
	164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	267,782.000		267,782.000	
	164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	178,524.000		178,524.000	
	168-6001	VEGETATIVE WATERING	MG	66,398.000		66,398.000	
	247-6073	FL BS (CMP IN PLC)(TY D GR 1-2) (6")	SY	6,789.000		6,789.000	
	247-6133	FL BS (RDWY DEL) (TY D GR 1-2)	TON	14,752.000		14,752.000	
	247-6254	FL BS (CMP IN PLC)(TY-D GR-1-2)(14")	SY	9,754.000		9,754.000	
	247-6477	FL BS (CMP IN PLC)(TY D GR 1-2)(16")	SY	104,355.000		104,355.000	
	251-6336	REWORK BS MATL(TY C)(13")(ORD COMP)	SY	77,129.000		77,129.000	
	275-6001	CEMENT	TON	749.000		749.000	
	275-6003	CEMENT TREAT (NEW BASE) (6")	SY	6,789.000		6,789.000	
	275-6004	CEMENT TREAT (MX EXST MTL & NW BS) (6")	SY	119,546.000		119,546.000	
	314-6021	EMULS ASPH (PRIME)(MS-2 OR SS-1)	GAL	22,828.000		22,828.000	
	316-6024	ASPH (CRS-2P)	GAL	69,240.000		69,240.000	
	316-6029	ASPH (RC-250)	GAL	10,660.000		10,660.000	
	316-6403	AGGR (TY-B GR-5 OR TY-L GR-5)	CY	315.000		315.000	
	316-6419	ASPH (AC-15P, AC-20-5TR OR AC-20XP)	GAL	53,553.000		53,553.000	
	316-6434	AGGR (TY-PB GR-4 OR TY-PL GR-4 (SAC-B)	CY	877.000		877.000	
	316-6435	AGGR (TY-B GR-4 OR TY-L GR-4 SAC-B)	CY	960.000		960.000	
	316-6440	AGGR (TY-B GR-3 OR TY-L GR-3)(SAC-B)	CY	732.000		732.000	
	351-6002	FLEXIBLE PAVEMENT STRUCTURE REPAIR(6")	SY	637.000		637.000	
	354-6003	PLAN & TEXT ASPH CONC PAV(0" TO 3")	SY	12,527.000		12,527.000	
	400-6006	CUT & RESTORING PAV	SY	25.000		25.000	
	403-6001	TEMPORARY SPL SHORING	SF	5,781.000		5,781.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY	30.540		30.540	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1975-02-013 **DISTRICT** Dallas **COUNTY** Kaufman
HIGHWAY FM 1895

			CONTROL SECTION JOB		**1975-02-013**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00064125**		
			COUNTY		**Kaufman**		
			HIGHWAY		**FM 1895**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	432-6026	RIPRAP (STONE COMMON)(DRY)(18 IN)	CY	1,277.240		1,277.240	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	97.000		97.000	
	462-6048	CONC BOX CULV (4 FT X 3 FT)(EXTEND)	LF	22.000		22.000	
	462-6051	CONC BOX CULV (5 FT X 3 FT)(EXTEND)	LF	82.000		82.000	
	462-6054	CONC BOX CULV (6 FT X 3 FT)(EXTEND)	LF	18.000		18.000	
	462-6056	CONC BOX CULV (6 FT X 5 FT)(EXTEND)	LF	27.000		27.000	
	464-6003	RC PIPE (CL III)(18 IN)	LF	2,458.000		2,458.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF	1,018.000		1,018.000	
	464-6007	RC PIPE (CL III)(30 IN)	LF	44.000		44.000	
	464-6018	RC PIPE (CL IV)(24 IN)	LF	52.000		52.000	
	464-6019	RC PIPE (CL IV)(30 IN)	LF	20.000		20.000	
	464-6020	RC PIPE (CL IV)(36 IN)	LF	72.000		72.000	
	464-6021	RC PIPE (CL IV)(42 IN)	LF	34.000		34.000	
	464-6022	RC PIPE (CL IV)(48 IN)	LF	14.000		14.000	
	466-6099	HEADWALL (CH - PW - 0) (DIA= 30 IN)	EA	2.000		2.000	
	466-6103	HEADWALL (CH - PW - 0) (DIA= 48 IN)	EA	2.000		2.000	
	466-6134	HEADWALL (CH - PW - S) (DIA= 36 IN)	EA	2.000		2.000	
	466-6135	HEADWALL (CH - PW - S) (DIA= 42 IN)	EA	4.000		4.000	
	466-6172	WINGWALL (PW - 1) (HW=11 FT)	EA	1.000		1.000	
	466-6180	WINGWALL (PW - 1) (HW=5 FT)	EA	8.000		8.000	
	466-6181	WINGWALL (PW - 1) (HW=6 FT)	EA	1.000		1.000	
	466-6182	WINGWALL (PW - 1) (HW=7 FT)	EA	1.000		1.000	
	466-6183	WINGWALL (PW - 1) (HW=8 FT)	EA	1.000		1.000	
	466-6184	WINGWALL (PW - 1) (HW=9 FT)	EA	1.000		1.000	
	466-6211	WINGWALL (SW - 0) (HW=8 FT)	EA	1.000		1.000	
	467-6363	SET (TY II) (18 IN) (RCP) (6: 1) (P)	EA	132.000		132.000	
	467-6388	SET (TY II) (24 IN) (RCP) (3: 1) (C)	EA	3.000		3.000	
	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	52.000		52.000	
	467-6423	SET (TY II) (30 IN) (RCP) (6: 1) (P)	EA	2.000		2.000	
	479-6001	ADJUSTING MANHOLES	EA	3.000		3.000	
	480-6001	CLEAN EXIST CULVERTS	EA	13.000		13.000	
	496-6004	REMOV STR (SET)	EA	108.000		108.000	
	496-6005	REMOV STR (WINGWALL)	EA	6.000		6.000	
	496-6006	REMOV STR (HEADWALL)	EA	15.000		15.000	
	496-6007	REMOV STR (PIPE)	LF	2,345.000		2,345.000	
	496-6016	REMOV STR (PIPE)	EA	1.000		1.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1975-02-013 **DISTRICT** Dallas **COUNTY** Kaufman
HIGHWAY FM 1895

							TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB		**1975-02-013**			
			PROJECT ID		**A00064125**			
			COUNTY		**Kaufman**			
			HIGHWAY		**FM 1895**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL		
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	11.000		11.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)		LF	675.000		675.000	
	506-6003	ROCK FILTER DAMS (INSTALL) (TY 3)		LF	180.000		180.000	
	506-6011	ROCK FILTER DAMS (REMOVE)		LF	855.000		855.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)		SY	112.000		112.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)		SY	112.000		112.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)		LF	20,516.000		20,516.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)		LF	20,516.000		20,516.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")		LF	3,325.000		3,325.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)		LF	3,325.000		3,325.000	
	529-6008	CONC CURB & GUTTER (TY II)		LF	500.000		500.000	
	530-6005	DRIVEWAYS (ACP)		SY	1,604.000		1,604.000	
	530-6016	DRIVEWAYS (BASE)		SY	5,530.000		5,530.000	
	530-6017	DRIVEWAYS (CONC) (HES)		SY	745.000		745.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)		LF	934.000		934.000	
	540-6020	MTL W - BEAM GD FEN (LOW FILL CULVERT)		LF	66.000		66.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)		EA	8.000		8.000	
	552-6003	WIRE FENCE (TY C)		LF	25.000		25.000	
	560-6011	MAILBOX INSTALL-S (TWW-POST) TY 4		EA	56.000		56.000	
	560-6012	MAILBOX INSTALL-D (TWW-POST) TY 4		EA	4.000		4.000	
	560-6013	MAILBOX INSTALL-M (TWW-POST) TY 4		EA	1.000		1.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)		EA	111.000		111.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)		EA	14.000		14.000	
	644-6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)		EA	6.000		6.000	
	644-6033	IN SM RD SN SUP&AM TYS80(1)SA(U)		EA	4.000		4.000	
	644-6036	IN SM RD SN SUP&AM TYS80(1)SA(U-BM)		EA	4.000		4.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG		EA	2.000		2.000	
	658-6100	INSTL OM ASSM (OM-2Z)(WFLX)GND(BI)		EA	42.000		42.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2		EA	7,966.000		7,966.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)		LF	253.500		253.500	
	666-6170	REFL PAV MRK TY II (W) 4" (SLD)		LF	71,596.000		71,596.000	
	666-6174	REFL PAV MRK TY II (W) 6" (SLD)		LF	9,743.000		9,743.000	
	666-6205	REFL PAV MRK TY II (Y) 4" (BRK)		LF	3,675.000		3,675.000	
	666-6207	REFL PAV MRK TY II (Y) 4" (SLD)		LF	60,496.000		60,496.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)		LF	4,742.000		4,742.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)		LF	6,867.000		6,867.000	
	666-6342	REF PROF PAV MRK TY I(W)4"(SLD)(100MIL)		LF	62,112.000		62,112.000	

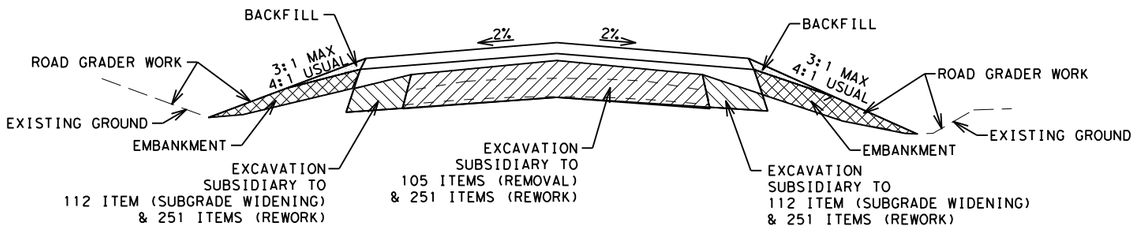
Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1975-02-013 **DISTRICT** Dallas **COUNTY** Kaufman
HIGHWAY FM 1895

			CONTROL SECTION JOB		**1975-02-013**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00064125**		
			COUNTY		**Kaufman**		
			HIGHWAY		**FM 1895**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	10,752.000		10,752.000	
	666-6344	REF PROF PAV MRK TY I(Y)4"(BRK)(100MIL)	LF	3,675.000		3,675.000	
	666-6345	REF PROF PAV MRK TY I(Y)4"(SLD)(100MIL)	LF	46,762.000		46,762.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	923.000		923.000	
	730-6107	FULL - WIDTH MOWING	CYC	3.000		3.000	
	3077-6013	SP MIXESSP-CSAC-B PG64-22	TON	2,452.000		2,452.000	
	3077-6075	TACK COAT	GAL	1,965.000		1,965.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY	177.000		177.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	30.000		30.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

SUMMARY OF ROADWAY ITEMS

LOCATION		LENGTH	EXISTING WIDTH	CEMENT TREATED WIDTH	FLEXBASE WIDTH	SURFACE WIDTH	100 6002 PREPARING ROW	104 6009 REMOVING CONC (RIPRAP)	104 6022 REMOVING CONC (CURB AND GUTTER) **	105 6013 REMOVING STAB BASE & ASPH PAV (9")	105 6164 REMOVE STAB BASE & ASPH PAV (12"-22")	105 6073 REMOV STAB BASE AND ASPH PAV (22")	112 6001 SUBGRADE WIDENING (ORD COMP)	132 6005 EMBANKMENT (FINAL) (ORD COMP) (TY C)	134 6004 BACKFILL (TY A OR B)	152 6001 ROAD GRADER WORK (ORD COMP)	247 6073 FL BS (CMP IN PLC) (TY D GR 1-2) (6")	247 6133 FL BS (RDWY DEL) (TY D GR 1-2)
STA	STA	LF	LF	LF	LF	LF	STA	SY	LF	SY	SY	SY	STA	CY	STA	STA	SY	TON
CSJ: 1975-02-013																		
0+11.31	2+61.31	250.00	20	31	28	28	2.50				556		2.50	19.00	2.50	2.50	862	
2+61.31	31+13.00	2851.69	20	31	28	28	28.52						28.52	1208.60	28.52	28.52		309
31+13.00	33+63.00	250.00	20	31	28	28	2.50				556		2.50	77.70	2.5	2.5	862	
33+63.00	43+63.00	1000.00	20	31	28	28	10.00					2223	10.00	284.20	10	10	3445	
43+63.00	46+13.00	250.00	20	31	28	28	2.50				556		2.50	15.70	2.5	2.5	862	
46+13.00	107+15.00	6102.00	20	31	28	28	61.02	38					61.02	2632.60	61.02	61.02		660
107+15.00	158+65.00	5150.00	20	31	28	28	51.50			11445			51.50	2977.80	51.5	51.5		5564
158+65.00	203+56.00	4491.00	20	31	28	28	44.91						44.91	2198.50	44.91	44.91		486
203+56.00	211+56.00	800.00	20	31	28	28	8.00						8.00	402.90	8	8		87
211+56.00	231+42.00	1986.00	20	31	28	28	19.86						19.86	925.60	19.86	19.86		215
231+42.00	238+49.00	707.00	20	31	28	28	7.07						7.07	65.10	7.07	7.07		77
238+49.00	253+20.00	1471.00	20	31	28	28	14.71						14.71	903.60	14.71	14.71		159
253+20.00	257+25.00	405.00	20	31	28	28	4.05						4.05	173.30	4.05	4.05		44
257+25.00	265+40.00	815.00	20	31	28	28	8.15						8.15	322.20	8.15	8.15		89
265+40.00	326+98.00	6158.00	20	31	28	28	61.58			13685			61.58	2819.20	61.58	61.58		6653
326+98.00	331+34.00	436.00	20	31	28	28	4.36						4.36	213.50	4.36	4.36		48
331+34.00	343+57.00	1223.00	20	31	28	28	12.23						12.23	455.40	12.23	12.23		133
343+57.00	364+67.00	2110.00	20	31	28	28	21.10						21.10	1104.40	21.1	21.1		228
364+67.00	366+87.00	220.00	20	31	28	28	2.20				489		2.20	34.20	2.2	2.2	758	
367+43.61	371+71.21	427.60	44			44	4.28								4.28	4.28		
372+28.12	398+37.07	2608.95	36			36	26.09		500						26.09			
CSJ: 1975-02-013							397.13	38	500	25130	2157	2223	366.76	16833.50	397.13	371.04	6789	14752
PROJECT TOTALS							397.13	38	500	25130	2157	2223	366.76	16833.50	397.13	371.04	6789	14752



TYPICAL EARTHWORK SECTION
NTS

NOTES:

**LOCATION WILL BE DETERMINED IN THE FIELD BY THE ENGINEER.

FM 1895
QUANTITY SUMMARY

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	10
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 8/9/2022 7:50:31 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\1. General\7. Summary Sheets.dgn

DATE: 7/29/2022 7:56:55 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\1. General\7. Summary Sheets.dgn

SUMMARY OF ROADWAY ITEMS

LOCATION		LENGTH	EXISTING WIDTH	CEMENT TREATED WIDTH	FLEXBASE WIDTH	SURFACE WIDTH	247 6254 FL BS (CMP IN PLC) (TY-D GR-1-2) (14")	247 6477 FL BS (CMP IN PLC) (TY D GR 1-2) (16")	251 6336 REWORK BS MATL (TY C) (13") (ORD COMP)	275 6001 CEMENT	275 6003 CEMENT TREAT (NEW BASE) (6")	275 6004 CEMENT TREAT (MX EXST MTL & NW BS) (6"	314 6021 EMULS ASPH (PRIME) (MS-2 OR SS-1)	316 6024 ASPH (CRS-2P) (1)	316 6024 ASPH (CRS-2P) (2)	316 6029 ASPH (RC-250) (1)	316 6403 AGGR (TY-B GR-5 OR TY-L GR-5) (1)	316 6419 ASPH (AC-15P, AC-20-5TR OR AC-20XP) (1)	316 6419 ASPH (AC-15P, AC-20-5TR OR AC-20XP) (3)
STA	STA	LF	LF	LF	LF	LF	SY	SY	SY	TON	SY	SY	GAL	GAL	GAL	CY	CY	GAL	GAL
CSJ: 1975-02-013																			
0+11.31	2+61.31	250.00	20	31	28	28		778		6	862		156	130.00	343	73	3	109	280
2+61.31	31+13.00	2851.69	20	31	28	28		8872	6338	58		9823	1775	1479.00	3904	829	24	1243	3194
31+13.00	33+63.00	250.00	20	31	28	28		778		6	862		156	130.00	343	73	3	109	280
33+63.00	43+63.00	1000.00	20	31	28	28		3112		21	3445		623	519.00	1369	291	9	436	1120
43+63.00	46+13.00	250.00	20	31	28	28		778		6	862		156	130.00	343	73	3	109	280
46+13.00	107+15.00	6102.00	20	31	28	28		18984	13560	123		21018	3797	3164.00	8353	1772	51	2658	6835
107+15.00	158+65.00	5150.00	20	31	28	28		16023	11445	104		17739	3205	2671.00	7050	1496	43	2244	5768
158+65.00	203+56.00	4491.00	20	31	28	28		13972	9980	91		15469	2795	2329.00	6148	1305	38	1957	5030
203+56.00	211+56.00	800.00	20	31	28	28	2489		1778	17		2756	498	415.00	1096	233	7	349	
211+56.00	231+42.00	1986.00	20	31	28	28		6179	4414	40		6841	1236	1030.00	2719	577	17	866	2225
231+42.00	238+49.00	707.00	20	31	28	28	2200		1572	15		2436	440	367.00	968	206	6	308	
238+49.00	253+20.00	1471.00	20	31	28	28		4577	3269	30		5067	916	763.00	2014	428	13	641	1648
253+20.00	257+25.00	405.00	20	31	28	28	1260		900	9		1395	252	210.00	555	118	4	177	
257+25.00	265+40.00	815.00	20	31	28	28		2536	1812	17		2808	508	423.00	1116	237	7	355	913
265+40.00	326+98.00	6158.00	20	31	28	28		19159	13685	124		21211	3832	3194.00	8430	1789	52	2683	6897
326+98.00	331+34.00	436.00	20	31	28	28		1357	969	9		1502	272	227.00	597	127	4	190	489
331+34.00	343+57.00	1223.00	20	31	28	28	3805		2718	25		4213	761	635.00	1675	356	11	533	
343+57.00	364+67.00	2110.00	20	31	28	28		6565	4689	43		7268	1313	1095.00	2889	613	18	920	2364
364+67.00	366+87.00	220.00	20	31	28	28		685		5	758		137	115.00	302	64	2	96	247
367+43.61	371+71.21	427.60	44			44													
372+28.12	398+37.07	2608.95	36			36													
CSJ: 1975-02-013							9754	104355	77129	749	6789	119546	22828	19026	50214	10660	315	15983	37570
PROJECT TOTALS							9754	104355	77129	749	6789	119546	22828	69240		10660	315	53553	

SUMMARY OF ROADWAY ITEMS

LOCATION		LENGTH	EXISTING WIDTH	CEMENT TREATED WIDTH	FLEXBASE WIDTH	SURFACE WIDTH	316 6434 AGGR (TY-PB GR-4 OR TY-PL GR-4 (SAC-B) (3)	316 6435 AGGR (TY-B GR-4 OR TY-L GR-4 SAC-B) (2)	316 6440 AGGR (TY-B GR-3 OR TY-L GR-3) (SAC-B) (1)	351 6002 FLEXIBLE PAVEMENT STRUCTURE REPAIR (6")	354 6003 PLAN & TEXT ASPH CONC PAV (0" TO 3")	432 6001 RIPRAP (CONC) (4 IN)	479 6001 ADJUSTING MANHOLES	529 6008 CONC CURB & GUTTER (TY II) **	552 6003 WIRE FENCE (TY C)	3077 6013 SP MIXES SP-C SAC-B PG64-22	3077 6075 TACK COAT
STA	STA	LF	LF	LF	LF	LF	CY	CY	CY	SY	SY	CY	EA	LF	LF	TON	GAL
CSJ: 1975-02-013																	
0+11.31	2+61.31	250.00	20	31	28	28	7	7	5								
2+61.31	31+13.00	2851.69	20	31	28	28	74	74	57								
31+13.00	33+63.00	250.00	20	31	28	28	7	7	5								
33+63.00	43+63.00	1000.00	20	31	28	28	26	26	20								
43+63.00	46+13.00	250.00	20	31	28	28	7	7	5								
46+13.00	107+15.00	6102.00	20	31	28	28	159	159	121			7					
107+15.00	158+65.00	5150.00	20	31	28	28	134	134	102						25.00		
158+65.00	203+56.00	4491.00	20	31	28	28	117	117	89								
203+56.00	211+56.00	800.00	20	31	28	28		21	16							274	150
211+56.00	231+42.00	1986.00	20	31	28	28	52	52	40								
231+42.00	238+49.00	707.00	20	31	28	28		19	14							242	132
238+49.00	253+20.00	1471.00	20	31	28	28	39	39	30								
253+20.00	257+25.00	405.00	20	31	28	28		11	8							139	76
257+25.00	265+40.00	815.00	20	31	28	28	22	22	17								
265+40.00	326+98.00	6158.00	20	31	28	28	160	160	122								
326+98.00	331+34.00	436.00	20	31	28	28	12	12	9								
331+34.00	343+57.00	1223.00	20	31	28	28		32	25							419	229
343+57.00	364+67.00	2110.00	20	31	28	28	55	55	42								
364+67.00	366+87.00	220.00	20	31	28	28	6	6	5								
*367+43.61	371+71.21	427.60	44			44				110	2091					230	230
*372+28.12	398+37.07	2608.95	36			36				527	10436		3	500		1148	1148
CSJ: 1975-02-013							877	960	732	637	12527	7	3	500	25	2452	1965
PROJECT TOTALS							877	960	732	637	12527	7	3	500	25	2452	1965

NOTES:

*AVERAGE MILLING IS 2", SOME AREAS MAY NEED UP TO 3".

**LOCATION WILL BE DETERMINED IN THE FIELD BY THE ENGINEER.

(1) FIRST COURSE

(2) INTERMEDIATE COURSE

(3) SECOND COURSE

FM 1895
QUANTITY SUMMARY

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	11
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

SUMMARY OF DRIVEWAY ITEMS

LOCATION	104 6017 REMOVING CONC (DRIVEWAYS) SY	105 6011 REMOVING STAB BASE AND ASPH PAV (2"-6") SY	464 6003 RC PIPE (CL III)(18 IN) LF	464 6005 RC PIPE (CL III)(24 IN) LF	464 6007 RC PIPE (CL III)(30 IN) LF	467 6363 SET (TY II) (18 IN) (RCP (6:1) (P) EA	467 6395 SET (TY II) (24 IN) (RCP (6:1) (P) EA	467 6423 SET (TY II) (30 IN) (RCP (6:1) (P) EA	496 6004 REMOV STR (SET) EA	496 6006 REMOV STR (HEADWALL) EA	496 6007 REMOV STR (PIPE) LF	530 6005 DRIVEWAYS (ACP) SY	530 6016 DRIVEWAYS (BASE) SY	530 6017 DRIVEWAYS (CONC) (HES) SY
CSJ:1975-02-013														
0+11.31 TO 366+87.21	730	7272	2458	1018	44	132	52	2	100	2	2345	1604	5530	745
CSJ: 1975-02-013 TOTALS	730	7272	2458	1018	44	132	52	2	100	2	2345	1604	5530	745
PROJECT TOTALS	730	7272	2458	1018	44	132	52	2	100	2	2345	1604	5530	745

SUMMARY OF MBGF ITEMS

LOCATION	432 6045 RIPRAP (MOW STRIP)(4 IN) CY	540 6001 MTL W-BEAM GD FEN (TIM POST) LF	540 6020 MTL W - BEAM GD FEN (LOW FILL CULVERT) LF	544 6001 GUARDRAIL END TREATMENT (INSTALL) EA
CSJ:1975-02-013				
37+65.25 TO 40+90.25 LT	26	325		2
36+89.50 TO 39+39.50 RT	22	250		2
349+96.50 TO 354+46.50 LT	27	217	33	2
349+60.20 TO 351+35.20 RT	22	142	33	2
CSJ: 1975-02-013 TOTALS	97	934	66	8
PROJECT TOTALS	97	934	66	8

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	662 6111 WK ZN PAV MRK SHT TERM (TAB)TY Y-2 EA	6001 6002 PORTABLE CHANGEABLE MESSAGE SIGN EA	6185 6002 TMA (STATIONARY) DAY	6185 6005 TMA (MOBILE OPERATION) DAY
CSJ: 1975-02-013				
STA 0+00 TO 39837.07	7966	2	177	30
CSJ: 1975-02-013 TOTALS	7966	2	177	30
PROJECT TOTALS	**7966**	**2**	**177**	**30**

SUMMARY OF MAILBOX ITEMS

LOCATION	560 6011 MAILBOX INSTALL-S (TWW-POST) TY 4 EA	560 6012 MAILBOX INSTALL-D (TWW-POST) TY 4 EA	560 6013 MAILBOX INSTALL-M (TWW-POST) TY 4 EA
CSJ:1975-02-013			
SHEET 1 OF 19			
SHEET 2 OF 19			
SHEET 3 OF 19			
SHEET 4 OF 19	2		
SHEET 5 OF 19	1		1
SHEET 6 OF 19			
SHEET 7 OF 19	3	1	
SHEET 8 OF 19	2		
SHEET 9 OF 19	6		
SHEET 10 OF 19	6	1	
SHEET 11 OF 19	5		
SHEET 12 OF 19	4		
SHEET 13 OF 19	10		
SHEET 14 OF 19	5	1	
SHEET 15 OF 19	6		
SHEET 16 OF 19	2		
SHEET 17 OF 19	4	1	
SHEET 18 OF 19			
SHEET 19 OF 19			
CSJ: 1975-02-013 TOTALS	56	4	1
PROJECT TOTALS	56	4	1

FM 1895
QUANTITY SUMMARY

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	12
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

SUMMARY OF DRAINAGE ITEMS

LOCATION	400 6006 CUT & RESTORING PAV	403 6001 TEMPORARY SPL SHORING	432 6026 RIPRAP (STONE COMMON) (DRY) (18 IN)	462 6048 CONC BOX CULV (4 FT X 3 FT) (EXTEND)	462 6051 CONC BOX CULV (5 FT X 3 FT) (EXTEND)	462 6054 CONC BOX CULV (6 FT X 3 FT) (EXTEND)	462 6056 CONC BOX CULV (6 FT X 5 FT) (EXTEND)	464 6018 RC PIPE (CL IV) (24 IN)	464 6019 RC PIPE (CL IV) (30 IN)	464 6020 RC PIPE (CL IV) (36 IN)	464 6021 RC PIPE (CL IV) (42 IN)	464 6022 RC PIPE (CL IV) (48 IN)	466 6099 HEADWALL (CH - PW - 0) (DIA= 30 IN)
	SY	SF	CY	LF	LF	LF	LF	LF	LF	LF	LF	LF	EA
CSJ: 1975-02-013													
CULVERT =1 STA 51+04.82		175	43.5								18		
CULVERT =2 STA 64+80.96		376	72.86								16		
CULVERT =3 STA 87+25.58	25		8.33					48					
CULVERT =4 STA 102+88.47		84	26.12						20				2
CULVERT =5 STA 127+82.11		353	70.39							72			
CULVERT =6 STA 133+98.03		639	30.00				11						
CULVERT =7 STA 194+97.99		301	62.11		32								
CULVERT =8 STA 203+05.29		294	102.55									14	
CULVERT =9 STA 240+53.62		448	112		18								
CULVERT =10 STA 257+52.74								4					
CULVERT =11 STA 284+59.26		376	91.81			18							
CULVERT =12 STA 300+52.28		360	39.08	22									
CSJ: 1975-02-013 TOTALS	25	3406	658.75	22	50	18	11	52	20	72	34	14	2
PROJECT TOTALS	**25**	**3406**	**658.75**	**22**	**50**	**18**	**11**	**52**	**20**	**72**	**34**	**14**	**2**

SUMMARY OF BRIDGE = 1 ITEMS NBI: 181300197502001

LOCATION	104 6009 REMOVING CONC (RIPRAP)	403 6001 TEMPORARY SPL SHORING	432 6001 RIPRAP (CONC) (4 IN)	432 6026 RIPRAP (STONE COMMON) (DRY) (18 IN)	462 6056 CONC BOX CULV (6 FT X 5 FT) (EXTEND)	466 6172 WINGWALL (PW - 1) (HW=11 FT)	466 6184 WINGWALL (PW - 1) (HW=9 FT)	480 6001 CLEAN EXIST CULVERTS	496 6005 REMOV STR (WINGWALL)	658 6100 INSTL OM ASSM (OM-2Z) (WFL X) GND (BI)
	SY	SF	CY	CY	LF	EA	EA	EA	EA	EA
CSJ: 1975-02-013										
BRIDGE CLASS CULVERT = 1 STA 38+63.51	7.5	1785	17.7	294.16	16	1	1	1	2	4
CSJ:1975-02-013 TOTALS	7.5	1785	17.7	294.16	16	1	1	1	2	4
PROJECT TOTALS	**7.5**	**1785**	**17.7**	**294.16**	**16**	**1**	**1**	**1**	**2**	**4**

SUMMARY OF DRAINAGE ITEMS

LOCATION	466 6103 HEADWALL (CH - PW - 0) (DIA= 48 IN)	466 6134 HEADWALL (CH - PW - S) (DIA= 36 IN)	466 6135 HEADWALL (CH - PW - S) (DIA= 42 IN)	466 6180 WINGWALL (PW - 1) (HW=5 FT)	466 6183 WINGWALL (PW - 1) (HW=8 FT)	466 6211 WINGWALL (SW - 0) (HW=8 FT)	467 6388 SET (TY II) (24 IN) (RCP (3: 1) (C)	480 6001 CLEAN EXIST CULVERTS	496 6004 REMOV STR (SET)	496 6005 REMOV STR (WINGWALL)	496 6006 REMOV STR (HEADWALL)	496 6016 REMOV STR (PIPE)	658 6100 INSTL OM ASSM (OM-2Z) (WFL X) GND (BI)
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
CSJ: 1975-02-013													
CULVERT =1 STA 51+04.82			2					1			2		2
CULVERT =2 STA 64+80.96			2					1			2		2
CULVERT =3 STA 87+25.58							2				2	1	2
CULVERT =4 STA 102+88.47								1			2		2
CULVERT =5 STA 127+82.11		2						1			2		4
CULVERT =6 STA 133+98.03					1	1		1	2				2
CULVERT =7 STA 194+97.99				2				1		2			4
CULVERT =8 STA 203+05.29	2							1			2		4
CULVERT =9 STA 240+53.62				2				1	2				4
CULVERT =10 STA 257+52.74							1	1			1		2
CULVERT =11 STA 284+59.26				2				1	2				4
CULVERT =12 STA 300+52.28				2				1	2				2
CSJ: 1975-02-013 TOTALS	2	2	4	8	1	1	3	11	8	2	13	1	34
PROJECT TOTALS	**2**	**2**	**4**	**8**	**1**	**1**	**3**	**11**	**8**	**2**	**13**	**1**	**34**

SUMMAR OF BRIDGE = 2 ITEMS NBI: 181300197502002

LOCATION	403 6001 TEMPORARY SPL SHORING	432 6001 RIPRAP (CONC) (4 IN)	432 6026 RIPRAP (STONE COMMON) (DRY) (18 IN)	462 6051 CONC BOX CULV (5 FT X 3 FT) (EXTEND)	466 6181 WINGWALL (PW - 1) (HW=6 FT)	466 6182 WINGWALL (PW - 1) (HW=7 FT)	480 6001 CLEAN EXIST CULVERTS	496 6005 REMOV STR (WINGWALL)	658 6100 INSTL OM ASSM (OM-2Z) (WFL X) GND (BI)
	SF	CY	CY	LF	EA	EA	EA	EA	EA
CSJ: 1975-02-013									
BRIDGE CLASS CULVERT = 2 STA 350+65.34	590	5.84	324.33	32	1	1	1	2	4
CSJ:1975-02-013 TOTALS	590	5.84	324.33	32	1	1	1	2	4
PROJECT TOTALS	**590**	**5.84**	**324.33**	**32**	**1**	**1**	**1**	**2**	**4**

SUMMARY OF SIGNING ITEMS

LOCATION	644 6001 IN SM RD SN SUP&AM TY10BWG(1)SA(P)	644 6004 IN SM RD SN SUP&AM TY10BWG(1)SA(T)	644 6007 IN SM RD SN SUP&AM TY10BWG(1)SA(U)	644 6033 IN SM RD SN SUP&AM TYS80(1)SA(U)	644 6036 IN SM RD SN SUP&AM TYS80(1)SA(U-BM)	644 6068 RELOCATE SM RD SN SUP&AM TY 10BWG
	EA	EA	EA	EA	EA	EA
CSJ:1975-02-013						
SHEET 1 OF 19	7		1	3	2	
SHEET 2 OF 19						
SHEET 3 OF 19						
SHEET 4 OF 19						
SHEET 5 OF 19	2					
SHEET 6 OF 19	5					
SHEET 7 OF 19	6					
SHEET 8 OF 19	9	1				
SHEET 9 OF 19	12	1	3		1	
SHEET 10 OF 19	10	1				
SHEET 11 OF 19	5					
SHEET 12 OF 19	9					
SHEET 13 OF 19	2					
SHEET 14 OF 19						
SHEET 15 OF 19	4		1			1
SHEET 16 OF 19	11	1				
SHEET 17 OF 19	10	7	1	1		1
SHEET 18 OF 19	13	3			1	
SHEET 19 OF 19	6					
CSJ: 1975-02-013 TOTALS	111	14	6	4	4	2
PROJECT TOTALS	111	14	6	4	4	2

FM 1895
QUANTITY SUMMARY

SCALE: NTS SHEET 4 OF 5

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	13
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	161 6017 COMPOST MANUF TOPSOIL (4") SY	164 6035 DRILL SEEDING (PERM) (RURAL) (CLAY) SY	164 6051 DRILL SEED (TEMP) (WARM OR COOL) SY	168 6001 VEGETATIVE WATERING MG	506 6002 ROCK FILTER DAMS (INSTALL) (TY 2) LF	506 6003 ROCK FILTER DAMS (INSTALL) (TY 3) LF	506 6011 ROCK FILTER DAMS (REMOVE) LF	506 6020 CONSTRUCTION EXITS (INSTALL) (TY 1) SY	506 6024 CONSTRUCTION EXITS (REMOVE) SY	506 6038 TEMP SEDMT CONT FENCE (INSTALL) LF	506 6039 TEMP SEDMT CONT FENCE (REMOVE) LF	506 6041 BIODEG EROSN CONT LOGS (INSTL) (12" LF	506 6043 BIODEG EROSN CONT LOGS (REMOVE) LF	730 6107 FULL - WIDTH MOWING * CYC
CSJ: 1975-02-013														
SHEET 1 OF 19	14639	14639	9760	3630						1481	1481	120	120	
SHEET 2 OF 19	20750	20750	13834	5145	30	60	90			1685	1685	90	90	
SHEET 3 OF 19	23957	23957	15972	5940	135		135			1665	1665	180	180	
SHEET 4 OF 19	15156	15156	10104	3758	60		60			1654	1654	150	150	
SHEET 5 OF 19	15156	15156	10104	3758	75		75			1785	1785	165	165	
SHEET 6 OF 19	15156	15156	10104	3758		60	60			1510	1510	195	195	
SHEET 7 OF 19	15156	15156	10104	3758	45		45			660	660	210	210	
SHEET 8 OF 19	15156	15156	10104	3758						745	745	255	255	
SHEET 9 OF 19	15156	15156	10104	3758	60		60			2199	2199	225	225	
SHEET 10 OF 19	15156	15156	10104	3758	60		60			1065	1065	240	240	3
SHEET 11 OF 19	15156	15156	10104	3758	60		60			595	595	19	19	
SHEET 12 OF 19	15156	15156	10104	3758	30		30			840	840	270	270	
SHEET 13 OF 19	15156	15156	10104	3758	60		60			1130	1130	240	240	
SHEET 14 OF 19	15156	15156	10104	3758	60		60			795	795	210	210	
SHEET 15 OF 19	15156	15156	10104	3758						345	345	195	195	
SHEET 16 OF 19	15156	15156	10104	3758		30	30			450	450	195	195	
SHEET 17 OF 19	11408	11408	7606	2829		30	30	112	112	935	935	150	150	
SHEET 18 OF 19												45	45	
SHEET 19 OF 19												15	15	
**ADDITIONAL 5%										977	977	156	156	
CSJ: 1975-02-013 TOTALS	267782	267782	178524	66398	675	180	855	112	112	20516	20516	3325	3325	3
PROJECT TOTALS	267782	267782	178524	66398	675	180	855	112	112	20516	20516	3325	3325	3

SUMMARY OF PAVEMENT MARKING ITEMS

LOCATION	666 6048 REFL PAV MRK TY I (W)24" (SLD) (100MIL) LF	666 6170 REFL PAV MRK TY II (W) 4" (SLD) LF	666 6174 REFL PAV MRK TY II (W) 6" (SLD) LF	666 6205 REFL PAV MRK TY II (Y) 4" (BRK) LF	666 6207 REFL PAV MRK TY II (Y) 4" (SLD) LF	666 6303 RE PM W/RET REQ TY I (W)4" (SLD) (100MIL) LF	666 6315 RE PM W/RET REQ TY I (Y)4" (SLD) (100MIL) LF	666 6342 REF PROF PAV MRK TY I (W)4" (SLD) (100MIL) LF	666 6343 REF PROF PAV MRK TY I (W)6" (SLD) (100MIL) LF	666 6344 REF PROF PAV MRK TY I (Y)4" (BRK) (100MIL) LF	666 6345 REF PROF PAV MRK TY I (Y)4" (SLD) (100MIL) LF	672 6009 REFL PAV MRKR TY II-A-A EA
CSJ: 1975-02-013												
SHEET 1 OF 19	24	4288		436	660			4288		436	660	31
SHEET 2 OF 19		4400		550				4400		550		28
SHEET 3 OF 19		3618	782	244	3029			3618	782	244	3029	51
SHEET 4 OF 19		4400			4400			4400			4400	55
SHEET 5 OF 19	10	4369			4337			4369			4337	55
SHEET 6 OF 19	11	3955	425		4316			3955	425		4316	54
SHEET 7 OF 19		3391			4400			3391	1009		4400	55
SHEET 8 OF 19		2875	1525	340	2016			2875	1525	340	2016	43
SHEET 9 OF 19	73	4073		550				4073		550		28
SHEET 10 OF 19		2539	1861	119	3550			2539	1861	119	3550	51
SHEET 11 OF 19		3181	1219		4400			3181	1219		4400	55
SHEET 12 OF 19	10	2953	1395		4295			2953	1395		4295	54
SHEET 13 OF 19		4363	37	544	230			4363	37	544	230	31
SHEET 14 OF 19		4400		287	3080			4400		287	3080	53
SHEET 15 OF 19	19	4243		550	788			4243		550	788	38
SHEET 16 OF 19		1901	2499	55	4180			1901	2499	55	4180	55
SHEET 17 OF 19	73	5199			6639	1018	1779	3163			3081	122
SHEET 18 OF 19	21.5	6378			8800	3189	4400					55
SHEET 19 OF 19	12	1070			1376	535	688					9
CSJ: 1975-02-013 TOTALS	253.5	71596	9743	3675	60496	4742	6867	62112	10752	3675	46762	923
PROJECT TOTALS	253.5	71596	9743	3675	60496	4742	6867	62112	10752	3675	46762	923

NOTES:

*APPROXIMATELY 55.3 ACRES PER FULL WIDTH MOWING CYCLE FOR CONTRACTOR'S INFORMATION.

**QUANTITIES HAVE BEEN INCREASED BY 5% TO ACCOUNT FOR REPLACEMENTS NEEDED DUE TO NORMAL WEAR OR DIFFERING SITE CONDITONS.

Texas Department of Transportation

FM 1895
QUANTITY SUMMARY

SCALE: NTS

SHEET 5 OF 5

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	14
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

SUMMARY OF DRIVEWAY AND INTERSECTIONS SHEET 1

DW #	STATION (LT/RT)	EXISTING DESCRIPTION	PROPOSED LENGTH	PROPOSED WIDTH	PROPOSED RADIUS (R1)	PROPOSED RADIUS (R2)	*104 6017 Removing Conc (Driveways)	*105 6011 REMOVING STAB BASE & ASPH PAV (2"-6")	*464 6003 RC PIPE (CL III) (18 IN)	*464 6005 RC PIPE (CL III) (24 IN)	*464 6007 RC PIPE (CL III) (30 IN)	*467 6363 SET (TY II) (18I N)(RCP) (6:1)(P)	*467 6395 SET(TY II) (24IN) (RCP) (6:1)(P)	*467 6423 SET(TY II) (30 IN)(RCP) (6:1)(P)	*496 6004 REMOV STR (SET)	*496 6006 REMOVE HEADWALLS	*496 6007 REMOVE PIPE	*530 6005 DRIVEWAY (ACP)	*530 6016 DRIVEWAY (BASE)	*530 6017 DRIVEWAY (CONC) (HES)
			LF	LF	LF	LF	SY	SY	LF	LF	LF	EA	EA	EA	EA	EA	LF	SY	SY	SY
DW-1	18+51.64 LT	GRASS	32	14	15	15		64		28			2						22	
DW-2	28+43.88 RT	GRASS	31	20	15	15		74	32			2			2		25		81	
DW-3	45+39.79 LT	GRASS	34.5	42	27	27		188	64			2					53		197	
DW-4	50+82.25 RT	GRASS	32	15	15	15		77							2				64	
DW-5	51+82.04 RT	GRAVEL	32	13	30	30		102	44			2			2		27		90	
DW-6	75+11.29 LT	GRAVEL	32	10	15	15		39	28			2					17		46	
DW-7	77+17.55 LT	GRAVEL	31	9	30	20		61											64	
DW-8	77+59.44 RT	GRAVEL	31	14	45	35		113											114	
DW-9	78+84.55 RT	GRAVEL	31	12	25	15		73	32			2					20		62	
DW-10	87+52.86 RT (CR 149)	ASPHALT	31	20	25	25		107										99		
DW-11	95+83.87 RT	GRAVEL	31	11	20	15		43											53	
DW-12	95+89.04 LT	GRAVEL	31	11	15	15		46											49	
DW-13	96+74.83 LT	GRASS	31	19	15	15		93	32			2							76	
DW-14	106+57.22 LT	GRAVEL	30	18	15	15		94		32			2		2		32		71	
DW-15	106+97.15 RT	GRAVEL	32	10	20	20		40	36			2			2		24		55	
DW-16	111+57.96 RT	GRAVEL	32	12	20	15		60	24			2							58	
DW-17	114+56.41 LT (CR 115)	ASPHALT	29	18	15	15		63										70		
DW-18	124+12.02 RT	GRASS	32	16	15	15		93	36			2			2		22		69	
DW-19	127+08.54 RT	GRAVEL	32	12	20	18		56		64			4				63		61	
DW-20	133+64.77 LT	GRAVEL	31	20	25	25		98											93	
DW-21	136+32.54 RT	GRAVEL	32	13	15	15		61		44			2		2		32		57	
DW-22	148+18.70 RT	GRAVEL	30	13	15	15		51	32			2			2		20		54	
DW-23	151+17.66 RT	GRAVEL	30	16	15	20		87	40			2			2		27		69	
DW-24	156+95.84 RT	GRAVEL	32	11	15	15		39	32			2					21		50	
DW-25	157+41.61 LT (4035A)	ASPHALT	30	11	15	15		37										40		
DW-26	158+42.61 RT	GRASS	32	12	15	15		9	32			2					21		54	
DW-27	160+48.59 RT	GRAVEL	31.5	13	20	15		61	44			2			2		44		61	
DW-28	161+57.13 RT	GRAVEL	31	10	15	15		46	32			2					17		45	
DW-29	164+50.67 RT	GRAVEL	31	10	15	15		42	36			2			2		23		45	
DW-30	166+67.61 RT	GRAVEL	31	9	15	15		43	36			2			2		23		42	
DW-31	170+68.64 RT	GRAVEL	31	10	15	15		47	32			2					20		45	
DW-32	173+85.43 LT	GRAVEL	32	8	15	15		40	32			2					20		39	
DW-33	175+54.58 LT	GRAVEL	32	11	15	15		46	40			2			2		26		50	
DW-34	178+70.55 RT	GRAVEL	30	9	15	15		38	32			2					21		43	
DW-35	180+10.58 RT	GRASS	31	12	15	15		60	36			2			2		23		52	
DW-36	180+74.50 RT	ASPHALT	31	13	15	20		67	40			2			2		27		60	
DW-37A	181+87.58 LT (CR 4035)	ASPHALT	32	35	21	95		280							2			244		
DW-37B	182+67.68 LT	NONE	18	14	15	15												43		
DW-38	183+68.05 LT	GRAVEL	32	10	15	15		50											48	
DW-39	184+28.58 LT	GRAVEL	32	9	15	15		45											43	
DW-40	185+31.13 RT (FM 2860)	ASPHALT	20	58.5	90	53		206										186		
DW-41	185+39.35 LT (CR 4035)	ASPHALT	32	21	23	48		143										123		
DW-42	188+92.48 RT	GRAVEL	31	18	15	20		80		88			4		4		66		76	
DW-43	193+59.96 LT	ASPHALT	32	11	15	15		49	36			2			2		23	53		
DW-44	194+45.91 RT	CONCRETE	30	13	20	27	80			64			4		4		40			71
DW-45	199+50.93 LT	GRAVEL	32	12	15	15		48		48			2		2		34		54	
DW-46	199+89.41 RT	GRAVEL	30	10	15	15		40	44			2			2		32		45	
DW-47	202+33.00 LT	GRAVEL	33	20	15	15		88		48			2		2		36		84	
DW-48	203+63.27 LT	GRAVEL	33	11	15	15		50		32			2		2		29		52	
DW-49	205+29.05 RT	GRAVEL	31	15	18	22		71	40			2			2		35		70	
DW-50	207+91.53 LT	GRAVEL	29	10	15	15		52		32			2				20		45	
DW-51	213+22.57 LT	GRAVEL	32.5	13	15	15		63	44			2			2		32		58	
DW-52	216+70.50 LT	GRAVEL	31	15	15	15		66	36			2			2		22		63	
DW-53	217+16.82 RT	GRAVEL	31	11	15	25		77	36			2					22		58	
DW-54	223+17.28 RT	GRAVEL	29	9	15	15		40	32			2					20		40	
DW-55	226+06.95 LT	GRAVEL	33	13	15	30		76	42			2					31		68	
DW-56	228+07.83 RT	GRAVEL	29	14	15	15		53	32			2			2		20		56	
DW-57	230+67.68 RT	GRASS	29	15	15	15		61	36			2			2		23		60	
DRIVEWAY AND INTERSECTION SHEET TOTAL NO.1							80	3996	1202	480	0	66	26	0	60	0	1155	858	3050	71

NOTES

* FOR CONTRACTORS INFO ONLY
  SEE DRIVEWAY X-SECTIONS FOR CONSTRUCTION

FM 1895
DRIVEWAY SUMMARY

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	15
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 8/1/2022 3:00:32 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\1. General\8. DRIVEWAY SUMMARY SHEET.dgn

SUMMARY OF DRIVEWAY AND INTERSECTIONS SHEET 2

DW#	STATION (LT/RT)	EXISTING DESCRIPTION	PROPOSED LENGTH	PROPOSED WIDTH	PROPOSED RADIUS (R1)	PROPOSED RADIUS (R2)	*104 6017 Removing Conc (Driveways)	*105 6011 REMOVING STAB BASE & ASPH PAV (2"-6")	*464 6003 RC PIPE (CL III) (18 IN)	*464 6005 RC PIPE (CL III) (24 IN)	*464 6007 RC PIPE (CL III) (30 IN)	*467 6363 SET (TY II) (18IN)(RCP) (6:1)(P)	*467 6395 SET(TY II) (24IN) (RCP) (6:1)(P)	*467 6423 SET(TY II) (30 IN)(RCP) (6:1)(P)	*496 6004 REMOV STR (SET)	*496 6006 REMOVE HEADWALL	*496 6007 REMOVE PIPE	*530 6005 DRIVEWAY (ACP)	*530 6016 DRIVEWAY (BASE)	*530 6017 DRIVEWAY (CONC) (HES)
			LF	LF	LF	LF	SY	SY	LF	LF	LF	EA	EA	EA	EA	EA	LF	SY	SY	SY
DW-58	233+42.79 RT	GRAVEL	30	12	20	15		53		36			2				24		56	
DW-59	237+54.84 RT	GRAVEL	30	11	15	15		44		38			2		2		26		57	
DW-60	244+20.59 RT	CONCRETE	29	12	15	15	46		32			2					20			50
DW-61	246+16.07 RT	CONCRETE	29	12	15	15	52			32			2				20			50
DW-62	248+42.59 RT	GRASS	29	13	15	15		64											55	
DW-63	249+49.78 RT	GRASS	30	15	15	15		74											61	
DW-64	253+79.40 RT	GRAVEL	31	14	15	15		57		32			2				21		60	
DW-65	257+66.31 LT (CR 4029)	ASPHALT	29.5	21	26	69		121										129		
DW-66	258+25.12 RT	ASPHALT	32	14	35	21		98										90		
DW-67	263+78.13 RT	GRAVEL	32	11	15	15		53	40			2			2		27		50	
DW-68	265+56.74 RT	GRASS	32	11	15	15		55	28			2					17		50	
DW-69	266+83.92 RT	GRAVEL	32	12	15	20		55	36			2					24		58	
DW-70	268+05.00 RT	GRAVEL	31.5	8	20	20		29	32			2			2		18		48	
DW-71	270+53.07 RT	ASPHALT	31.5	12	15	15		54	36			2			2		24	53		
DW-72	274+07.35 RT	GRAVEL	31.5	11	15	15		50	36			2					25		50	
DW-73	275+22.73 LT	GRAVEL	30.5	12	15	15		54	36			2			2		24		52	
DW-74	275+77.93 RT	GRAVEL	31.5	16	15	15		70	36			2			2		22		67	
DW-75	280+17.15 RT	GRAVEL	31.5	10	15	15		43		32			2				21		46	
DW-76	280+84.28 RT	GRASS	31.5	17	15	15		87		36			2				24		71	
DW-77	281+63.55 RT	GRAVEL	31.5	34	20	30		167		72			2		2		58		149	
DW-78	282+87.54 LT	CONCRETE	30	31	15	15	124			48			2		2	2	36			115
DW-79	285+64.86 RT	ASPHALT	32	20	20	15		93		40			2		2		27	86		
DW-80	286+29.21 LT	GRAVEL	30	19	41	53		148		56			2				43		124	
DW-81	288+73.58 RT	GRAVEL	32	18	15	22		82	42			2			2		30		81	
DW-82	289+30.40 LT	GRAVEL	30	11	15	15		51	36			2					24		48	
DW-83	289+47.86 RT	GRASS	32	18	15	18		81	44			2			2		22		75	
DW-84	292+62.85 RT	GRASS	32	9	15	15		11	28			2					14		43	
DW-85	294+62.10 RT	GRAVEL	32	11	15	15		49											50	
DW-86	295+61.62 RT	CONCRETE	32	18	15	15	73			36			2				22			75
DW-87	298+41.19 LT	GRASS	30	10	15	15		55		32			2		2		18		44	
DW-88	299+13.90 RT	GRAVEL	32	13	15	20		67	36			2					24		61	
DW-89	304+10.13 RT	GRAVEL	28	12	15	15		95	68			2			2		56		91	
DW-90	304+19.27 LT	GRASS	30	16	15	15		71	32			2					20		64	
DW-91	305+00.88 RT	CONCRETE	32	20	15	15	85		44			2					29			83
DW-92	305+93.30 RT	GRAVEL	33	10	15	15		42	36			2			2		22		48	
DW-93	306+64.93 RT	GRAVEL	33.5	11	15	15		51	36			2			2		23		52	
DW-94	308+26.40 RT	GRAVEL	33.5	11	15	15		52	52			2			2		39		52	
DW-95	309+80.16 RT	GRAVEL	32	11	15	15		45	36			2			2		22		51	
DW-96	313+70.95 LT (CR 4017)	ASPHALT	32	23	26	40		147										136		
DW-97	313+71.08 RT (PLAIN VIEW DR.)	ASPHALT	29	18	37	42		102										93		
DW-98	313+91.61 RT	CONCRETE	28	11	55	15	33													43
DW-99	315+35.42 RT	GRASS	29	14	15	15		68	36			2					23		56	
DW-100	316+48.88 LT	GRAVEL	32	11	15	15		43	36			2					24		51	
DW-101	317+67.02 RT	GRAVEL	29	11	15	15		52	24			2							47	
DW-102	320+70.68 LT	GRAVEL	31.5	12	15	22		68		48			2				35		59	
DW-103	327+83.61 RT	GRAVEL	31	19	20	15		78	48			2			2		36		80	
DW-104	330+66.39 LT	GRAVEL	31	9	15	15		21	36			2			2		22		42	
DW-105	341+86.46 RT	GRASS	30.5	14	15	15		68	32			2					20		59	
DW-106	342+75.10 LT	ASPHALT	31.5	14	15	15		55	28			2						61		
DW-107	343+78.11 RT	CONCRETE	31	12	15	15	47		36			2					24			53
DW-108	348+02.03 LT	GRAVEL	31	11	15	15		48	28			2							54	
DW-109	349+09.73 RT	GRAVEL	31	11	15	15		46			44			2			30		45	
DW-110	359+14.30 LT	GRAVEL	30.5	9	15	15		25	40			2					25		42	
DW-111	360+68.07 LT	GRAVEL	29	11	15	20		50											51	
DW-112	361+35.01 RT	GRAVEL	32.5	17	15	25		87											80	
DW-113	363+46.60 RT	ASPHALT	34	19	15	72		97	42			2					30	98		
DW-114	364+20.94 RT	ASPHALT	35	50	15	15	190		68			2			2		55			205
DRIVEWAY AND INTERSECTION SHEET TOTAL NO.2							**650**	**3276**	**1256**	**538**	**44**	**66**	**26**	**2**	**40**	**2**	**1190**	**746**	**2480**	**674**
DRIVEWAY AND INTERSECTION SHEET TOTAL NO.1							**80**	**3996**	**1202**	**480**	**0**	**66**	**26**	**0**	**60**	**0**	**1155**	**858**	**3050**	**71**
PROJECT TOTAL							**730**	**7272**	**2458**	**1018**	**44**	**132**	**52**	**2**	**100**	**2**	**2345**	**1604**	**5530**	**745**

NOTES

* FOR CONTRACTORS INFO ONLY
  SEE DRIVEWAY X-SECTIONS FOR CONSTRUCTION

Texas Department of Transportation

FM 1895
DRIVEWAY SUMMARY

SCALE: NTS

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	16
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
1	1	M3-3	SOUTH <AUXILIARY SIGN>	24 x 12	X		S80	1	SA	U		
		M3-4	WEST <AUXILIARY SIGN>	24 x 12	X							
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		M6-1L	<ARROW - HORIZ. LEFT> <AUXILIARY SIGN>	21 x 15	X							
		M6-3	<ARROW - VERTICAL STRGHT> <AUX. SIGN>	21 x 15	X							
	2	M3-4	WEST <AUXILIARY SIGN>	24 x 12	X		S80	1	SA	U		
		M3-2	EAST <AUXILIARY SIGN>	24 x 12	X							
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		M6-1L	<ARROW - HORIZ. LEFT> <AUXILIARY SIGN>	21 x 15	X							
		M6-1R	<ARROW - HORIZ. RIGHT> <AUXILIARY SIGN>	21 x 15	X							
	3	W1-7T	<BI-DIRECTIONAL LRG ARRW w/ CHEVRONS>	96 x 36	X		S80	1	SA	U	BM	
	4	M3-2	EAST <AUXILIARY SIGN>	24 x 12	X		S80	1	SA	U		
		M3-3	SOUTH <AUXILIARY SIGN>	24 x 12	X							
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		M6-3	<ARROW - VERTICAL STRGHT> <AUX. SIGN>	21 x 15	X							
		M6-1R	<ARROW - HORIZ. RIGHT> <AUXILIARY SIGN>	21 x 15	X							
	5	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	6	M3-3	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		D10-7AT	<3 DIGIT VERTICAL NUMBER>	3 x 10	X							
		D10-7AT	<3 DIGIT VERTICAL NUMBER>	3 x 10	X							
	7	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	8	D1-2	(DESTINATION - 2 LINE)	96 x 30	X		S80	1	SA	U	BM	
	9	W3-1	SYMBOL - STOP AHEAD	36 x 36	X		10BWG	1	SA	P		
	10	D2-2	(DESTINATIONS) (DISTANCES) <2 LINES>	66 x 30	X		10BWG	1	SA	U		
	11	R12-1T	WEIGHT LIMIT/GROSS (WEIGHT) LBS	24 x 36	X		10BWG		SA	P		
	12	M2-1	#REFR	21 x 15	X		10BWG		SA	P		
		M1-6F	JCT <AUXILIARY SIGN>	24 x 24								
	13	W2-4	SYMBOL - TEE INTERSECTION AHEAD	36 x 36	X		10BWG		SA	P		
5	1	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	2	M3-1	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		D10-7AT	<3 DIGIT VERTICAL NUMBER>	3 x 10	X							
		D10-7AT	<3 DIGIT VERTICAL NUMBER>	3 x 10	X							
6	1	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

DATE: 2022/07/19
FILE: DOCUMENT NAME

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS 1 of 7

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
4-16	DIST	COUNTY		SHEET NO.
8-16	DAL	KAUFMAN		17

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
	2	W1-2L	SYMBOL - HORIZ CURVE LEFT	36 x 36	X		10BWG	1	SA	P		
		W13-1P	(SPEED) MPH <ADVISORY SPEED PLAQUE>	18 x 18	X							
	3	W1-8L	<CHEVRON LEFT>	24 x 30	X		10BWG	1	SA	P		
		W1-8R	<CHEVRON RIGHT>	24 x 30	X							
	4	W1-8L	<CHEVRON LEFT>	24 x 30	X		10BWG	1	SA	P		
		W1-8R	<CHEVRON RIGHT>	24 x 30	X							
	5	W1-8L	<CHEVRON LEFT>	24 x 30	X		10BWG	1	SA	P		
		W1-8R	<CHEVRON RIGHT>	24 x 30	X							
7	1	W1-8L	<CHEVRON LEFT>	24 x 30	X		10BWG	1	SA	P		
		W1-8R	<CHEVRON RIGHT>	24 x 30	X							
	2	W1-2R	SYMBOL - HORIZ CURVE RIGHT	36 x 36	X		10BWG	1	SA	P		
		W13-1P	(SPEED) MPH <ADVISORY SPEED PLAQUE>	18 x 18	X							
	3	W1-2R	SYMBOL - HORIZ CURVE RIGHT	36 x 36	X		10BWG	1	SA	P		
		W13-1P	(SPEED) MPH <ADVISORY SPEED PLAQUE>	18 x 18	X							
	4	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	5	W1-8L	<CHEVRON LEFT>	24 x 30	X		10BWG	1	SA	P		
		W1-8R	<CHEVRON RIGHT>	24 x 30	X							
	6	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
8	1	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	2	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	3	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	4	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	5	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	6	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	7	W1-2L	SYMBOL - HORIZ CURVE LEFT	36 x 36	X		10BWG	1	SA	P		
		W13-1P	(SPEED) MPH <ADVISORY SPEED PLAQUE>	18 x 18	X							
	8	W2-1AT	HIGHWAY INTERSECTION AHEAD	48 x 48	X		10BWG	1	SA	T		
	9	M2-1	JCT <AUXILIARY SIGN>	21 x 15	X		10BWG	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24								
	10	W3-1	SYMBOL - STOP AHEAD	36 x 36	X		10BWG	1	SA	P		
9	1	D2-2	(DESTINATIONS) (DISTANCES) <2 LINES>	90 x 30	X		S80	1	SA	U	BM	
	2	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS 2 of 7

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		1975	02	013	FM 1895
4-16		DIST	COUNTY		SHEET NO.
8-16		DAL	KAUFMAN		18

18

DATE: 2022/07/19
FILE: DOCUMENT NAME

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
	3	M3-1	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
	4	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	5	M3-4	WEST <AUXILIARY SIGN>	24 x 12	X		S80	1	SA	U		
		M3-1	NORTH <AUXILIARY SIGN>	24 x 12	X							
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		M6-1L	M6-1L<ARROW - HORIZ. LEFT> <AUXILIARY SIGN>	21 x 15	X							
		M6-3	<ARROW - VERTICAL STRGHT> <AUX. SIGN>	21 x 15	X							
	6	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	7	M3-1	NORTH <AUXILIARY SIGN>	24 x 12	X		S80	1	SA	U		
		M3-3	SOUTH <AUXILIARY SIGN>	24 x 12	X							
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		M6-1L	M6-1L<ARROW - HORIZ. LEFT> <AUXILIARY SIGN>	21 x 15	X							
		M6-LR	M6-1L<ARROW - HORIZ. RIGHTT> <AUXILIARY SIGN>	21 x 15	X							
	8	M3-4	WEST <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
	9	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	10	M3-3	SOUTH <AUXILIARY SIGN>	24 x 12	X		S80	1	SA	U		
		M3-4	WEST <AUXILIARY SIGN>	24 x 12	X							
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		M6-3	<ARROW - VERTICAL STRGHT> <AUX. SIGN>	21 x 15	X							
		M6-3R	M6-1L<ARROW - HORIZ. RIGHT> <AUXILIARY SIGN>	21 x 15	X							
	11	M3-3	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
	12	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	13	W3-1	SYMBOL - STOP AHEAD	36 x 36	X		10BWG	1	SA	P		
	14	D2-1	(DESTINATION) (DISTANCE) <1 LINE>	54 x 18	X		10BWG	1	SA	T		
	15	R12-1T	WEIGHT LIMIT/GROSS (WEIGHT) LBS	24 x 36	X		10BWG	1	SA	P		
	16	R12-1T	WEIGHT LIMIT/GROSS (WEIGHT) LBS	24 x 36	X		10BWG	1	SA	P		
	17	R12-1T	WEIGHT LIMIT/GROSS (WEIGHT) LBS	24 x 36	X		10BWG	1	SA	P		
10	1	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	2	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	3	W1-2R	SYMBOL - HORIZ CURVE RIGHT	36 x 36	X		10BWG	1	SA	P		
		W13-1P	(SPEED) MPH <ADVISORY SPEED PLAQUE>	18 x 18	X							
	4	M2-1	JCT <AUXILIARY SIGN>	21 x 15	X		10BWG	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							

DATE: 2022/07/19
FILE: DOCUMENT NAME

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS 3 of 7

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		1975	02	013	FM 1895
4-16		DIST	COUNTY		SHEET NO.
8-16		DAL	KAUFMAN		19

18

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
	5	W1-8R	<CHEVRON RIGHT>	18 x 24	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	18 x 24	X							
	6	W2-1AT	HIGHWAY INTERSECTION AHEAD	48 x 48	X		10BWG	1	SA	T		
	7	W1-8R	<CHEVRON RIGHT>	18 x 24	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	18 x 24	X							
	8	W1-8R	<CHEVRON RIGHT>	18 x 24	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	18 x 24	X							
	9	M3-3	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		D10-7AT	<3 DIGIT VERTICAL NUMBER>	3 x 10	X							
		D10-7AT	<3 DIGIT VERTICAL NUMBER>	3 x 10	X							
	10	W1-8R	<CHEVRON RIGHT>	18 x 24	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	18 x 24	X							
	11	W1-2L	SYMBOL - HORIZ CURVE LEFT	36 x 36	X		10BWG	1	SA	P		
		W13-1P	(SPEED) MPH <ADVISORY SPEED PLAQUE>	18 x 18	X							
11	1	W1-2L	SYMBOL - HORIZ CURVE LEFT	36 x 36	X		10BWG	1	SA	P		
		W13-1P	(SPEED) MPH <ADVISORY SPEED PLAQUE>	18 x 18	X							
	2	W1-8L	<CHEVRON LEFT>	24 x 30	X		10BWG	1	SA	P		
		W1-8R	<CHEVRON RIGHT>	24 x 30	X							
	3	W1-8L	<CHEVRON LEFT>	24 x 30	X		10BWG	1	SA	P		
		W1-8R	<CHEVRON RIGHT>	24 x 30	X							
	4	W1-8L	<CHEVRON LEFT>	24 x 30	X		10BWG	1	SA	P		
		W1-8R	<CHEVRON RIGHT>	24 x 30	X							
	5	W1-8L	<CHEVRON LEFT>	24 x 30	X		10BWG	1	SA	P		
		W1-8R	<CHEVRON RIGHT>	24 x 30	X							
12	1	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	2	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	3	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	4	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	5	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	6	W1-8L	<CHEVRON LEFT>	24 x 30	X		10BWG	1	SA	P		
		W1-8R	<CHEVRON RIGHT>	24 x 30	X							
	7	W1-8L	<CHEVRON LEFT>	24 x 30	X		10BWG	1	SA	P		
		W1-8R	<CHEVRON RIGHT>	24 x 30	X							
	8	W1-8L	<CHEVRON LEFT>	24 x 30	X		10BWG	1	SA	P		
		W1-8R	<CHEVRON RIGHT>	24 x 30	X							
	9	W1-4R	SYMBOL - REVERSE CURVE RIGHT	36 x 36	X		10BWG	1	SA	P		
		W13-1P	(SPEED) MPH <ADVISORY SPEED PLAQUE>	18 x 18	X							

DATE: 2022/07/19
FILE: DOCUMENT NAME

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS 4 of 7

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		1975	02	013	FM 1895
4-16		DIST	COUNTY		SHEET NO.
8-16		DAL	KAUFMAN		20

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
13	1	W1-8L	<CHEVRON LEFT>	24 x 30	X		10BWG	1	SA	P		
		W1-8R	<CHEVRON RIGHT>	24 x 30	X							
	2	W1-4R	SYMBOL - REVERSE CURVE RIGHT	36 x 36	X		10BWG	1	SA	P		
		W13-1P	(SPEED) MPH <ADVISORY SPEED PLAQUE>	18 x 18	X							
15	1	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	2	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	3	I-2AT	(CITY NAME) CITY LIMIT	48 x 36	X		10BWG	1	SA	U		
	4	W1-2R	SYMBOL - HORIZ CURVE RIGHT	36 x 36	X		10BWG	1	SA	P		
		W13-1P	(SPEED) MPH <ADVISORY SPEED PLAQUE>	18 x 18	X							
	5	M3-1	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		D10-7AT	<3 DIGIT VERTICAL NUMBER>	3 x 10	X							
		D10-7AT	<3 DIGIT VERTICAL NUMBER>	3 x 10	X							
16	1	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	2	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	3	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	4	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	5	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	6	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	7	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	8	W1-2L	SYMBOL - HORIZ CURVE LEFT	36 x 36	X		10BWG	1	SA	P		
		W13-1P	(SPEED) MPH <ADVISORY SPEED PLAQUE>	18 x 18	X							
	9	W2-1ATL	HIGHWAY INTERSECTION AHEAD	48 x 48	X		10BWG	1	SA	T		
	10	M2-1	JCT <AUXILIARY SIGN>	21 x 15	X		10BWG	1	SA	P		
		M1-4(3 DGT)	<US HIGHWAY ROUTE SHIELD> (ROUTE #)	30 x 24	X							
	11	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							
	12	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS 5 of 7

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
4-16	DIST	COUNTY		SHEET NO.
8-16	DAL	KAUFMAN		21

18

DATE: 2022/07/19
FILE: DOCUMENT NAME

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
17	1	W3-1	SYMBOL - STOP AHEAD	36 x 36	X		10BWG	1	SA	P		
	2	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	3	D1-3	(DISTINATION - 3 LINE)	66 x 42	X		S80	1	SA	U		
	4	M3-1	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
	5	R12-1T	WEIGHT LIMIT/GROSS (WEIGHT) LBS	24 x 36	X		10BWG	1	SA	P		
	6	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
	7	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	8	R1-1	STOP	36 x 36	X		10BWG	1	SA	T		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	9	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
	10	D1-1	(DESTINATION - 1 LINE)	84 x 18	X		10BWG	1	SA	T		
	11	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
	12	D1-2	(DESTINATION - 2 LINE)	72 x 30	X		10BWG	1	SA	U		
	13	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	14	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
	15	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	16	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	17	R1-1	#REF℄	36 x 36	X		10BWG	1	SA	P		
		W4-4P	STOP	24 x 12	X							
	18	R12-1T	WEIGHT LIMIT/GROSS (WEIGHT) LBS	24 x 36	X		10BWG	1	SA	P		
	19	D2-1	(DESTINATION) (DISTANCE) <1 LINE>	66 X 18	X		10BWG	1	SA	T		
18	1	M3-3	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
	2	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	3	W2-1AT	HIGHWAY INTERSECTION AHEAD	48 x 48	X		10BWG	1	SA	T		
			HIGHWAY INTERSECTION AHEAD									
	4	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	5	D1-2	(DESTINATION - 2 LINE)	78 x 30	X		S80	1	SA	U	BM	
	6	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

DATE: 2022/07/19
FILE: DOCUMENT NAME

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS 6 of 7

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
4-16	DIST	COUNTY		SHEET NO.
8-16	DAL	KAUFMAN		22

18

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"	BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	TY N TY S
	7	W3-1	SYMBOL - STOP AHEAD	36 x 36	X		10BWG	1	SA	P		
	8	M2-1	JCT <AUXILIARY SIGN>	21 x 15	X		10BWG	1	SA	P		
		M4-3	BUSINESS <AUXILIARY SIGN>	24 x 12	X							
		M1-4(3 dgt)	<US HIGHWAY ROUTE SHIELD> (ROUTE #)	30 x 24	X							
	9	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	10	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	11	W3-1	SYMBOL - STOP AHEAD	36 x 36	X		10BWG	1	SA	P		
	12	M2-1	JCT <AUXILIARY SIGN>	21 x 15	X		10BWG	1	SA	P		
		M1-4(3 dgt)	<US HIGHWAY ROUTE SHIELD> (ROUTE #)	30 x 24	X							
	13	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	14	W2-1AT	HIGHWAY INTERSECTION AHEAD	48 x 48	X		10BWG	1	SA	T		
	15	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	16	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	17	D2-1	(DESTINATION) (DISTANCE) <1 LINE>	54 x 18	X		10BWG	1	SA	T		
19	1	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	2	M3-1	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
	3	M4-3	BUSINESS <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-4(3 dgt)	<US HIGHWAY ROUTE SHIELD> (ROUTE #)	30 x 24	X							
		M6-4	<ARROW - DUAL LEFT & RIGHT> <AUX. SIGN>	21 x 15	X							
	4	R12-1T	WEIGHT LIMIT/GROSS (WEIGHT) LBS	24 x 36	X		10BWG	1	SA	P		
	5	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							
	6	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	X							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS 7 of 7

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		1975	02	013	FM 1895
4-16		DIST	COUNTY		SHEET NO.
8-16		DAL	KAUFMAN		23

DATE: 2022/07/19
FILE: DOCUMENT NAME

SUGGESTED SEQUENCE OF WORK

PHASE I

1. INSTALL PROJECT SIGNS & ADVANCE WARNING SIGNS AS SPECIFIED IN BC STANDARDS, TCP STANDARDS, OR AS DIRECTED BY ENGINEER.
2. PLACE SW3P DEVICES AS PER STANDARD AND AS DIRECTED BY THE ENGINEER.
3. SET CHANNELIZATION DEVICES AND CONSTRUCT CULVERT EXTENSIONS. DURING CONSTRUCTION, ALWAYS PROVIDE POSITIVE DRAINAGE. "SEE CULVERT DETAIL SHEET FOR MORE INFORMATION."
4. CONSTRUCT UP-STREAM OR DOWN-STREAM SIDE AT A TIME WITHOUT INTERRUPTION OF TRAFFIC FLOW.

PHASE II

1. DELINEATE PAVEMENT EDGE AND CENTERLINE WITH VERTICAL PANELS. SALVAGE EXISTING TOPSOIL FROM WORK AREA.
2. REMIX EXISTING BASE WITH NEW FLBS, SPREAD OUT OVER 31' SECTION AND NOTCHES.
3. REWORK EACH SEGMENT FULL WIDTH EACH DAY TO WHERE NO GRADE DIFFERENCE IS PRESENT AT CENTERLINE.
4. CEMENT TREAT SUBGRADE MATERIAL IN HALF WIDTHS.
5. PLACE NEW BASE SECTION IN HALF WIDTHS. SEQUENCE OPERATIONS TO CONSTRUCT FULL WIDTH BASE SECTION WHERE NO GRADE DIFFERENCE IS PRESENT AT COMPLETION OF DAILY OPERATIONS.
6. APPLY PRIME, (ONE/TWO) COURSE SURFACE TREATMENT, 2" SP-C PER PLANS AND TEMPORARY PAVEMENT MARKINGS.
7. FILL SIDE SLOPE AND BACKFILL EDGES AS SHOWN IN TYPICAL SECTION OR AS DIRECTED BY THE ENGINEER.
8. CONSTRUCT DRIVEWAYS AND DRIVEWAY CULVERTS.

PHASE III

1. FOLLOW TCP @ US 175 FOR BEGINNING OF MILL AND INLAY.
2. REPAIR PAVEMENT AREAS AS NEEDED.
3. MILL AND OVERLAY 2" SP-C SAC-B PG64-22.
4. REMOVE AND REPLACE CURB AND GUTTER AT VARIOUS LOCATIONS AS DIRECTED BY THE ENGINEER.
5. MAINTAIN OPEN TRAFFIC FLOW WHILE IN CONSTRUCTION OPERATIONS, USE TCP 2-2 & 3-1 IN ACCORDANCE WITH FLAGGERS AND ANY OTHER TCP'S AS NEEDED.

PHASE IV

1. INSTALL NEW SIGNS.
2. PLACE PERMANENT PAVEMENT MARKINGS.
3. RE-VEGETATE DISTURBED SOILS IN COMPLETED PROJECT AREA AS SOON AS PRACTICABLE OR AS DIRECTED BY THE ENGINEER.
4. PERFORM FINAL CLEANUP AS DIRECTED BY ENGINEER.

TCP GENERAL NOTES

THE CONTRACTOR MAY SUGGEST AN ALTERNATE SEQUENCE OF WORK TO THE CONSTRUCTION ENGINEER OF THE TRAFFIC CONTROL PLAN FOR APPROVAL. IF THE ALTERNATE TCP IS ACCEPTED, THE CONTRACTOR WILL BE RESPONSIBLE FOR DEVELOPING DETAILED PLANS TO BE SEALED BY A LICENSED PROFESSIONAL ENGINEER FOR INCLUSION WITH THE CHANGE ORDER. THE CONTRACTOR CANNOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON REVISED PHASE/STAGE UNTIL WRITTEN APPROVAL OF THE ENGINEER IS OBTAINED.

OVERNIGHT LANE CLOSURES WILL NOT BE PERMITTED.

LIMIT THE LENGTH OF DAILY WORK TO THAT AREA OF OPERATION THAT CAN BE COMPLETED IN ONE WORK DAY IN ORDER TO ALLOW FOR TWO-WAY TRAFFIC AT NIGHT. SUCH AREAS MUST NOT EXCEED ONE (1) MILE, UNLESS APPROVED BY THE ENGINEER. WITHIN THE 1 MILE SECTION, ONLY CLOSE OFF THE AREA WHERE ACTUAL WORK IS BEING PERFORMED. COMPLETE ONE (1) MILE SECTION TO ONE COURSE TREATMENT BEFORE PROCEEDING TO THE NEXT SECTION UNLESS APPROVED BY THE ENGINEER.

INTERMITTENT ONE-WAY TRAFFIC CONTROL (LANE CLOSURES) WILL BE IN ACCORDANCE WITH TCP & WZ STANDARD AND AS DIRECTED BY THE ENGINEER.

THE CONTRACTOR WILL PROVIDE WRITTEN NOTICE TO THE ENGINEER BEFORE 1:00 PM ON THE BUSINESS DAY PRECEDING PROPOSED LANE CLOSURES. LANE CLOSURES WILL NOT BE PERMITTED WITHOUT THIS NOTIFICATION.

PAVEMENT EDGE DROP-OFFS WILL NOT BE ALLOWED TO REMAIN OVER NIGHT. AT THE END OF EACH WORKDAY ALL PAVEMENT EDGE DROP-OFFS SHALL BE BACK FILLED BY A SUITABLE MATERIAL TO FORM A STABLE 3:1 SLOPE OR FLATTER.

COMPLY WITH TCP (7-1)-13, WHICH INCLUDES PROVISIONS FOR CERTAIN SIGNS TO BE INSTALLED AND TO REMAIN UNTIL PERMANENT PAVEMENT MARKINGS ARE IN PLACE. THESE SIGNS ARE IN ADDITION TO SIGNS THAT MAY BE REQUIRED BY THE VARIOUS TCP AND BC STANDARDS.

THE CONTRACTOR SHALL COVER OR REMOVE ANY CONFLICTING SIGNS OR PAVEMENT MARKINGS DURING CONSTRUCTION AS DIRECTED BY ENGINEER AND THIS WORK SHALL BE SUBSIDIARY TO ITEM 502.LOCATION OF CONSTRUCTION EXIT WILL BE DETERMINED IN THE FIELD BY THE ENGINEER.

THE CONTRACTOR WILL PROVIDE AND MAINTAIN SKILLED FLAGGERS EQUIPPED WITH TWO-WAY RADIOS TO HANDLE TRAFFIC THROUGH THE WORK AREAS FOR THE SAFETY AND CONVENIENCE OF THE TRAVELING PUBLIC AND CONTRACTOR PERSONNEL.

PAY ATTENTION FOR OVERHEAD UTILITIES.

MAINTAIN DRIVEWAY AND SIDE STREET ACCESS AT ALL TIMES WITH AN ALL WEATHER SURFACE CONSISTING OF RAP OR BASE.

TEMPORARY SW3P EROSION CONTROL MEASURES SHALL ONLY BE PLACED IN AREAS WHERE SOIL DISTURBANCE IS EXPECTED TO OCCUR WITHIN TWO WEEKS. TEMPORARY SW3P EROSION CONTROL MEASURES SHALL BE REMOVED IN EACH AREA WITHIN TWO WEEKS OF VEGETATION ESTABLISHMENT OR AS DIRECTED BY THE ENGINEER.

MINIMIZE THE USE OF EQUIPMENT IN THE STREAMS AND RIPARIAN AREAS DURING CONSTRUCTION. WHEN POSSIBLE, EQUIPMENT ACCESS SHOULD BE REMOVED FROM BANKS OR BRIDGE DECKS. WHEN TEMPORARY STREAM CROSSINGS ARE UNAVOIDABLE, REMOVE STREAM CROSSINGS ONCE THEY ARE NO LONGER NEEDED, AND STABILIZE BANKS AND SOILS AROUND THE CROSSING.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

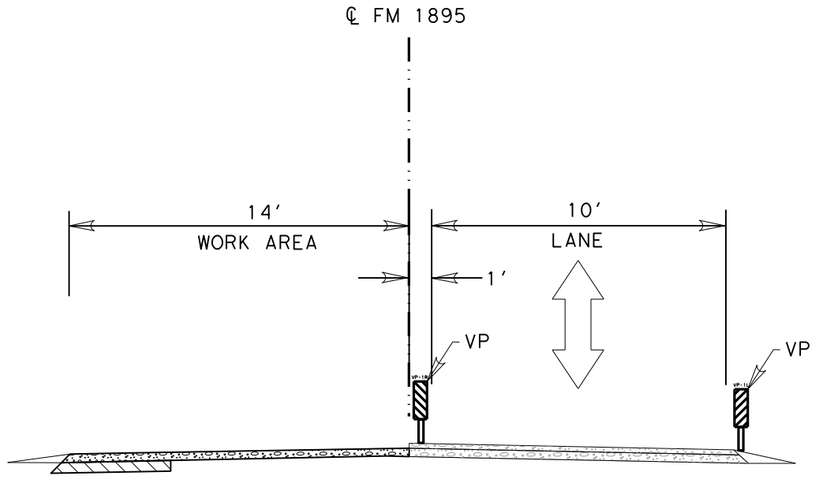
Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

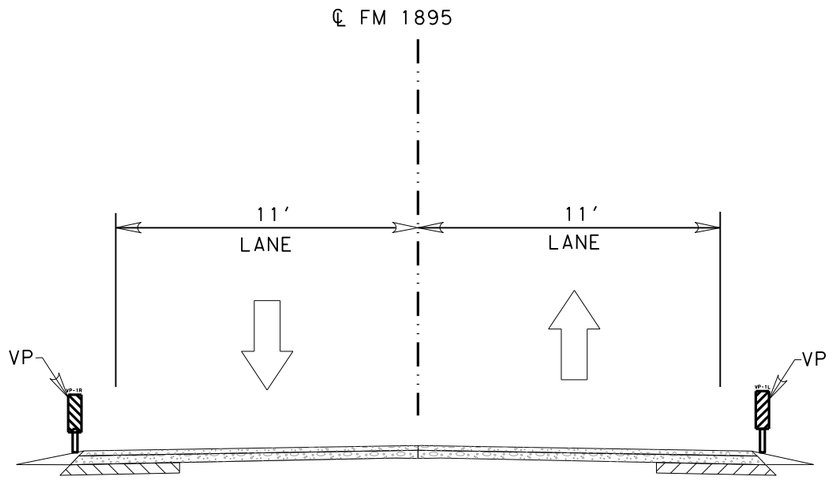
FM 1895
TRAFFIC CONTROL PLAN
PHASE NARRATIVE

SCALE: NTS SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS: FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK: JR	TEXAS	DAL	KAUFMAN	24
CHECK: VD	CONTROL	SECTION	JOB	
	1975	02	013	



PHASE II
CONSTRUCTION OPERATION PRESENT
* STA 0+11.31 TO STA 366+87.21



PHASE II
CONSTRUCTION OPERATION NOT PRESENT
STA 0+11.31 TO STA 366+87.21

NOTES:
CENTERLINE CHANNELIZATION DEVICES MAY BE OMITTED WHEN A PILOT CAR IS LEADING TRAFFIC IN ACCORDING WITH TCP(2-2)-18. AT ANY REMOVAL OF EXISTING PAVEMENT AREA, CONTRACTOR SHALL SEQUENCE OPERATIONS TO PLACE FIRST LIFT OF NEW FLEXBASE THE SAME DAY AS REMOVAL. CONTRACTORS RESPONIBILITY TO DETERMINE IF THE EXISTING SUBGRADE IS SUITABLE FOR DIRECT TRAFFIC.

*OPERATION WILL REFLECT ON OPPOSITE TRAVEL LANE OF CONSTRUCTION.

FOR OVERLAY SECTION SEE SEQUENCE OF WORK IN THE TCP NARRATIVE.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

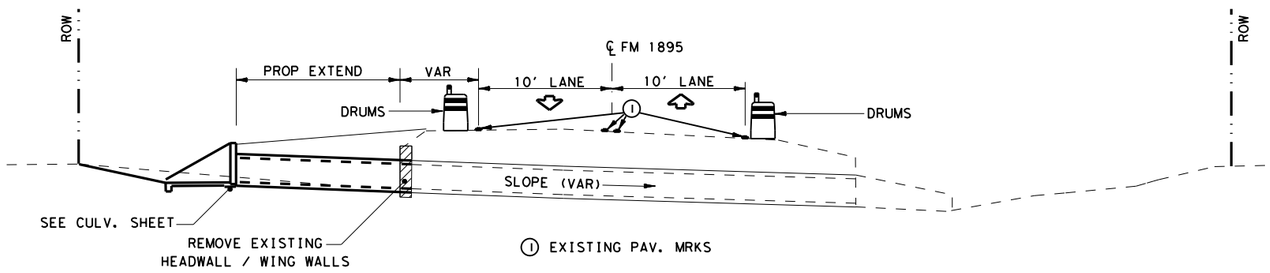
Texas Department of Transportation

FM 1895
TRAFFIC CONTROL PLAN
TYPICAL SECTION

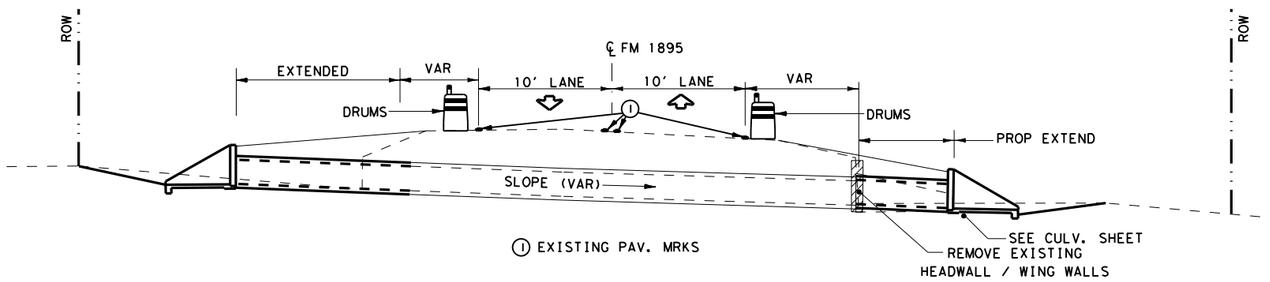
SCALE: NTS SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	25
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

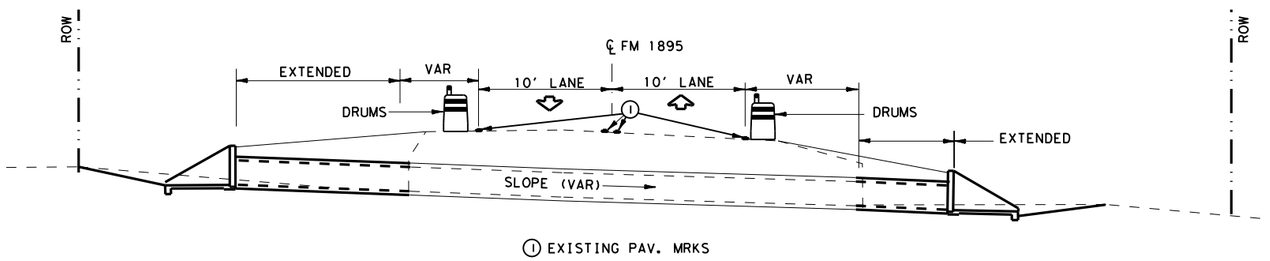
DATE: 7/27/2022 8:29:00 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\2. TCP\2. TCP TYP SECTION.dgn



TYPICAL TCP FOR CULVERT EXTENSION
STEP-1



TYPICAL TCP FOR CULVERT EXTENSION
STEP-2



TYPICAL TCP FOR CULVERT EXTENSION
STEP-3

NOTE: SEE "BC & TCP STANDARDS, AND SEQUENCE OF WORK IN THE TCP NARRATIVE SHEET FOR DETAILS".

NOTES:

1. INSTALL ADVANCE WARNING SIGNS FOLLOWING BC & TCP STANDARDS AS STATED IN PHASE NARRATIVE.
2. IF LANE CLOSING IS NEEDED, WITH THE ENGINEER'S APPROVAL, USE FLAGGERS & PILOT VEHICLE TO HANDLE TRAFFIC FLOW .
3. COMPLETE EACH CULVERT REPLACEMENT WORK W/O INTERRUPTION.
4. IF NEEDED, PROVIDE TEMP DETOUR WITH THE ENGINEER'S APPROVAL.
5. PROVIDE / MAINTAIN SMOOTH SURFACE & PVMT MARKS AS NEEDED AFTER CULVERT EXTENSION/REPLACEMENT.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
TRAFFIC CONTROL PLAN
CULVERT EXTENSION

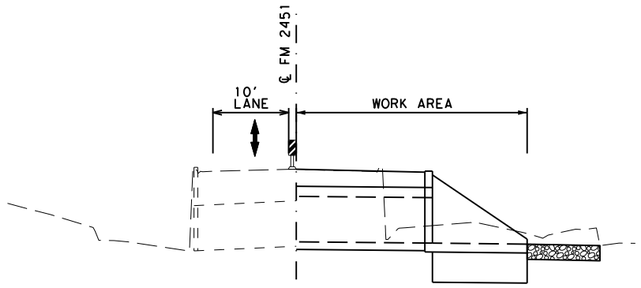
SCALE: NTS — SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	26
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

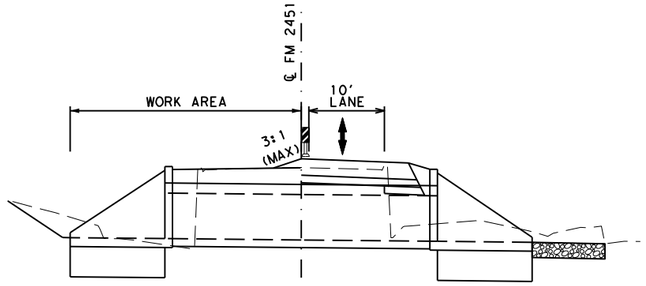
DATE: 7/27/2022 8:31:24 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\2. TCP\3. TCP CULV EXTEN.dgn

NOTES:
1. TWO-WAY TRAFFIC SHALL BE ESTABLISHED AT THE END OF EACH WORK DAY.
2. PROVIDE & MAINTAIN SMOOTH SURFACE & PAVEMENT MARKINGS AS NEEDED AFTER THE COMPLETION OF THE CULVERT EXTENSIONS.
3. SEE CULVERT LAYOUTS FOR ADDITION DETAIL.
4. CONSTRUCT 3:1 SAFETY SLOPE AT THE END OF DAILY OPPERATIONS UNTIL BOTH SIDES OF THE ROADWAY ARE THE SAME ELEVATION.

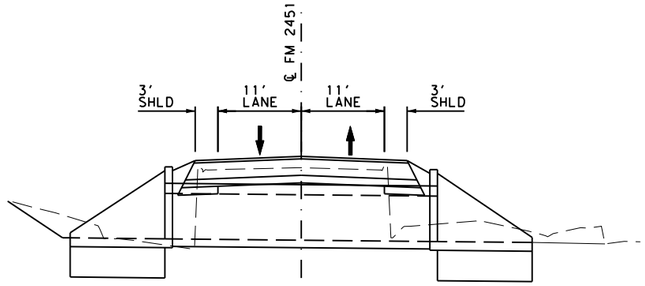
VERTICAL PANEL



CULVERT #2
STEP 1



CULVERT #2
STEP 2



CULVERT #2
STEP 3

STATE OF TEXAS
FALON J. REMFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Remfroe, P.E. 7/28/2022
Signature of Registrant & Date

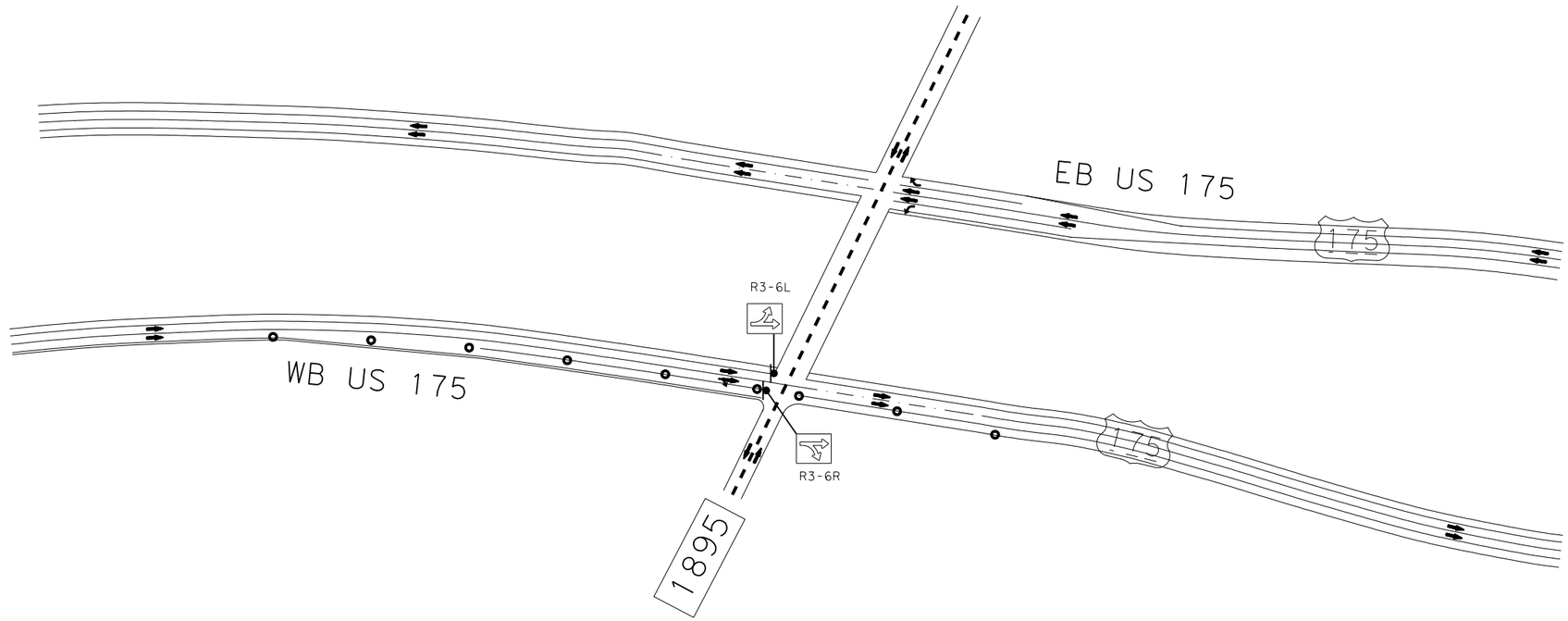
Texas Department of Transportation

FM 1895
TRAFFIC CONTROL PLAN
CULVERT REPLACEMENT

SCALE: NTS SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK FR	TEXAS	DAL	KAUFMAN	27
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	

DATE: 7/27/2022 8:49:46 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\2. TCP\4. E03_CULVERT REPLACEMENT TYPICALS.dgn



LEGEND

- TYPE III BARRICADE DRUM
- TRAVEL LANE
- SIGN POST

NOTES

1. OVERNIGHT LANE CLOSURES WILL NOT BE PERMITTED.
2. PLACE IN ACCORDANCE WITH BC, TCP, WZ STANDARDS AND MUTCD, AND AS DIRECTED BY THE ENGINEER.
3. AT THE END OF EACH WORK DAY, PAVEMENT EDGE DROP-OFFS SHALL BE BACKFILLED WITH SUITABLE MATERIAL TO FORM 3:1 SLOPE.
4. PLACE ADVANCE WARNING SIGNS IN ACCORDANCE WITH BC,TCP, WZ STANDARDS AND MUTCD, AND AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
TRAFFIC CONTROL PLAN
FM 1895 AT US 175

SCALE: NTS SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	28
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 8:55:11 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\2. TCP\5. TCP US175 at FM1895.dgn

DATE: 7/27/2022 9:39:44 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Master Design Files\Standards\TxDOT\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

SHEET 1 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

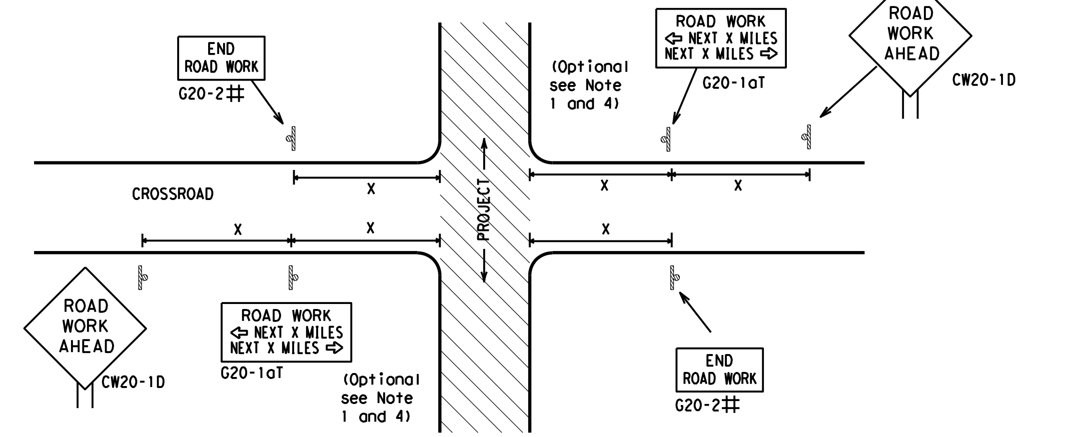
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		29

DATE: 7/27/2022 9:40:27 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOTS\Documents\18 - DAL\Design Projects\1975020134 - Design\Master Design Files\Standards\Traffic\bc-21.dgn

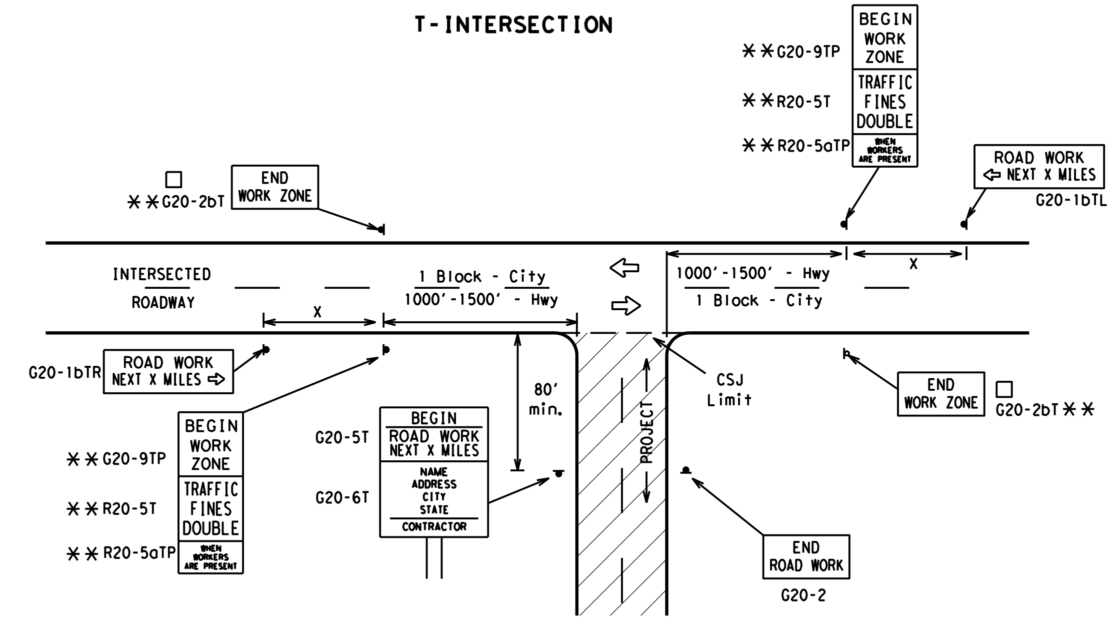
TYPICAL LOCATION OF CROSSROAD SIGNS



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.

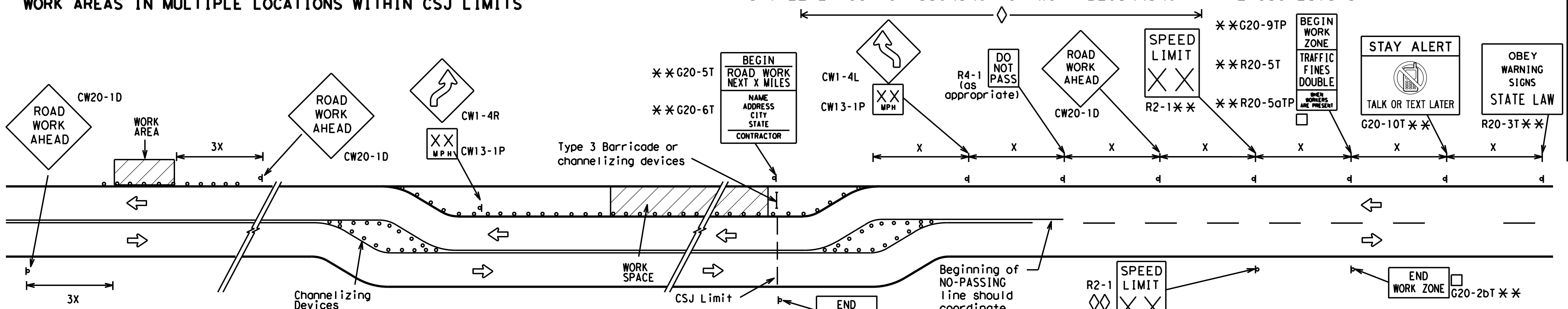
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

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.

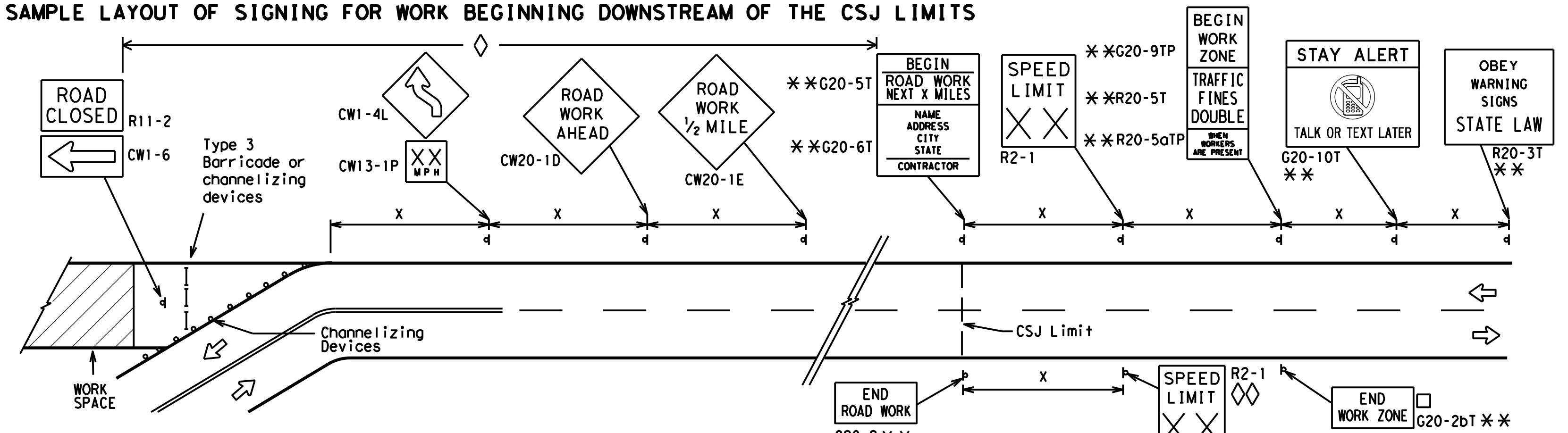
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

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



LEGEND

Symbol	Description
⊢—⊣	Type 3 Barricade
○ ○ ○	Channelizing Devices
⊥	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

NOTES

The Contractor shall determine the appropriate distance to be placed on the 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.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

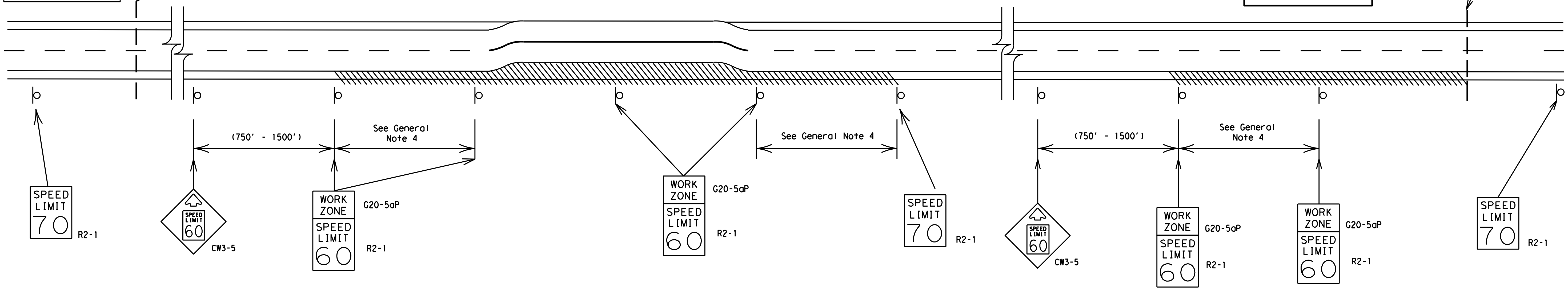
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
9-07 8-14	DIST		COUNTY	SHEET NO.
7-13 5-21	DAL		KAUFMAN	30

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.

DATE: 7/27/2022 9:43:57 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\9 - Design\Master Design Files\Standards\TTOFF\bc-21.dgn

SHEET 3 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

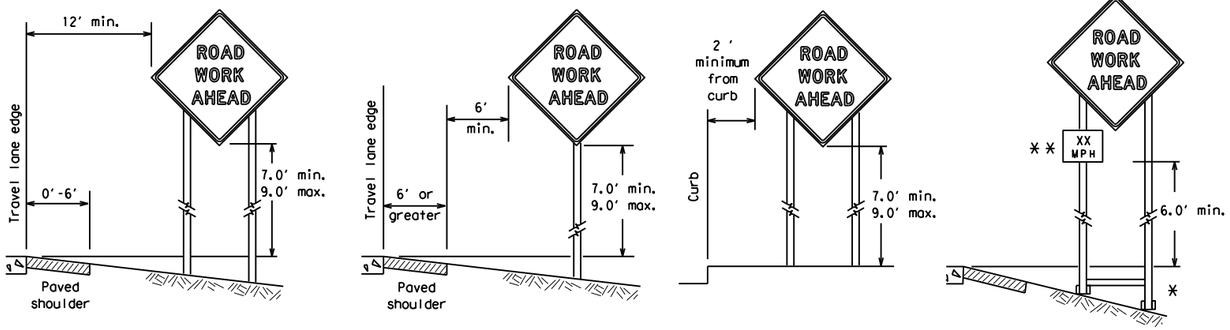
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	1975	02	013	FM 1895
	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	31

DATE: 7/27/2022 9:44:26 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOTS\Documents\18 - DAL\Design Projects\197502013X4 - DesignMaster Design Files\Standards\Traffic\bc-21.dgn

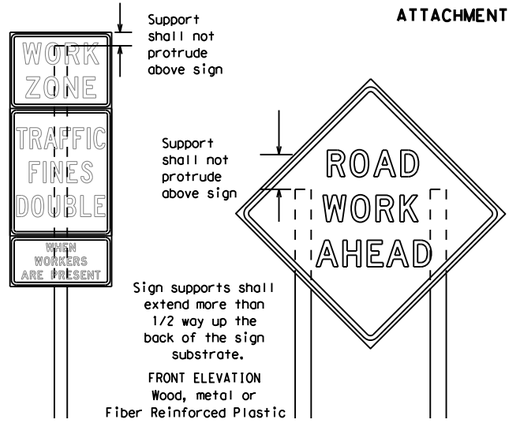
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

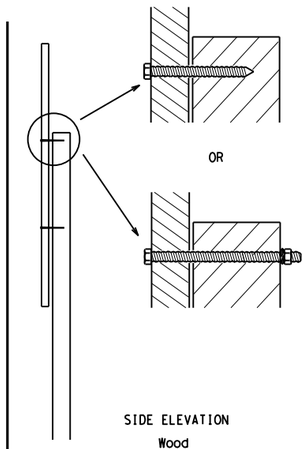


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





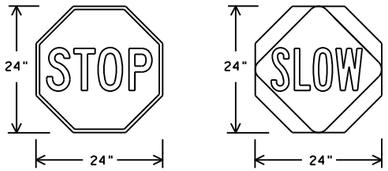
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

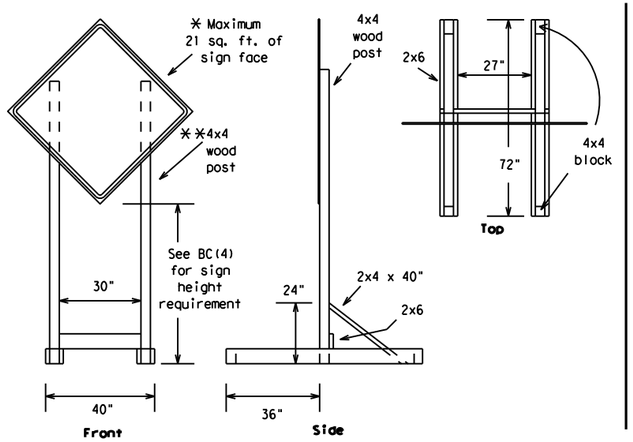
Texas Department of Transportation | Traffic Safety Division Standard

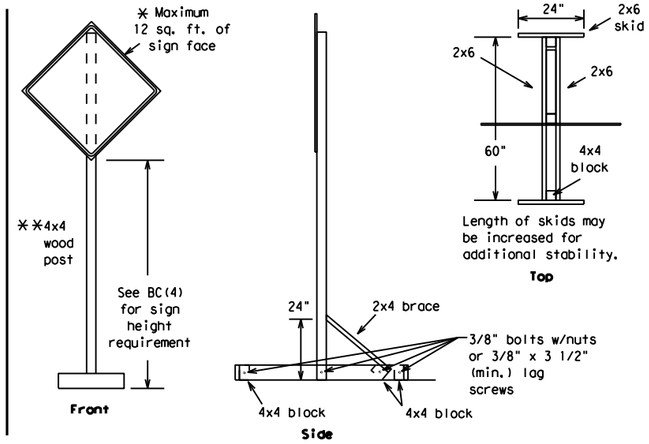
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	KAUFMAN		32

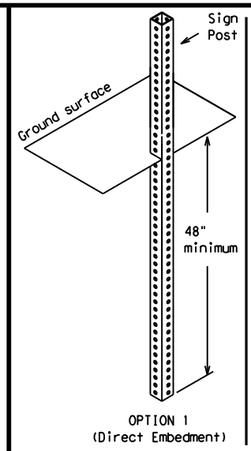
DATE: 7/27/2022 9:45:11 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Master Design Files\Standards\Traffic\bc-21.dgn

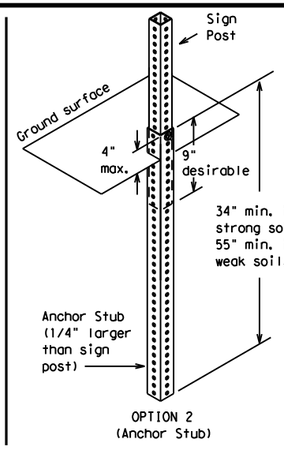


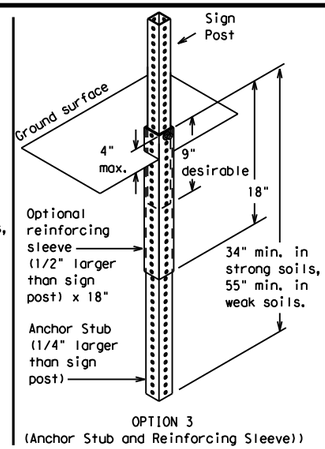


SKID MOUNTED WOOD SIGN SUPPORTS

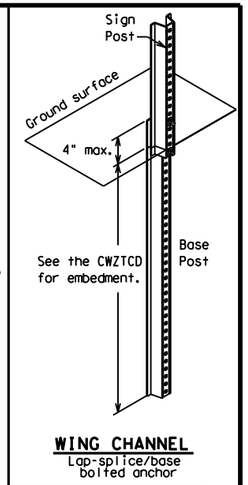
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







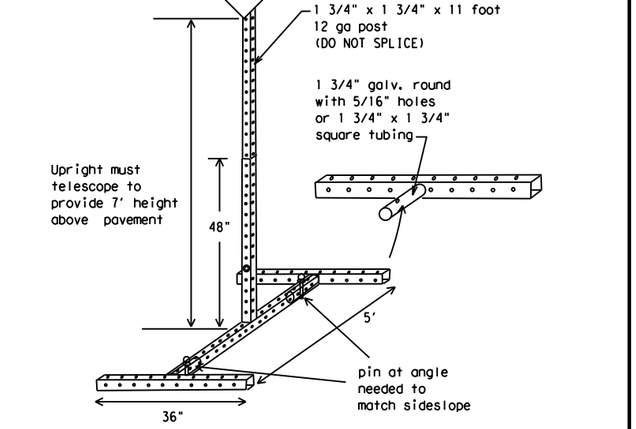
PERFORATED SQUARE METAL TUBING

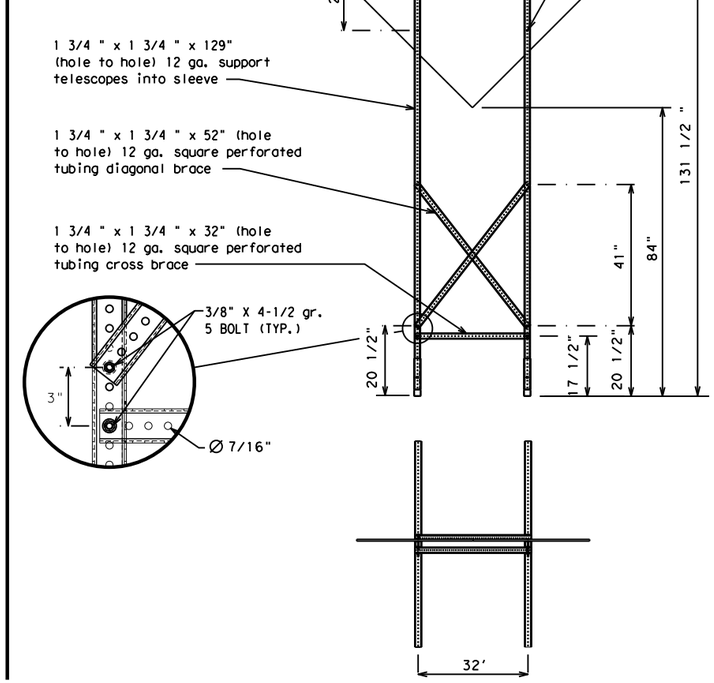


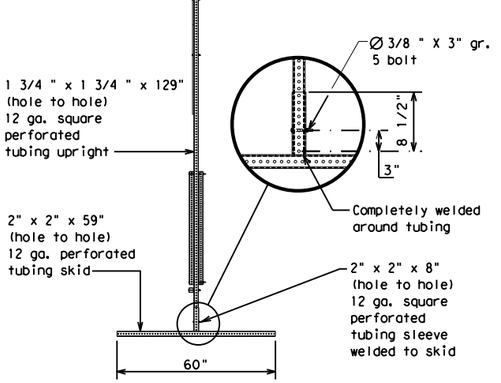
WING CHANNEL
Lap-splice/base bolted anchor

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.

SHEET 5 OF 12

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	1975	02	013	FM 1895
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	KAUFMAN		33

DATE: 7/27/2022 9:45:37 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Master Design Files\Standards\Traffic\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

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

* 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)

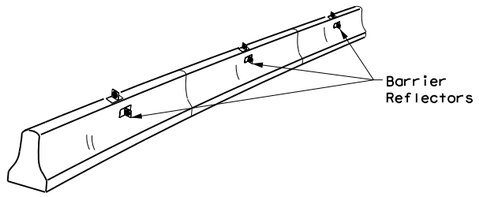
BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	KAUFMAN		34

100

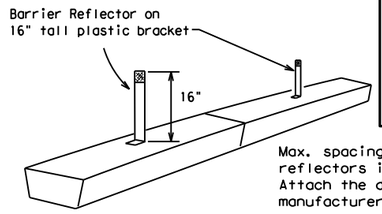
DATE: 7/27/2022 9:45:59 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Master Design Files\Standards\Traffic\bc-21.dgn

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.

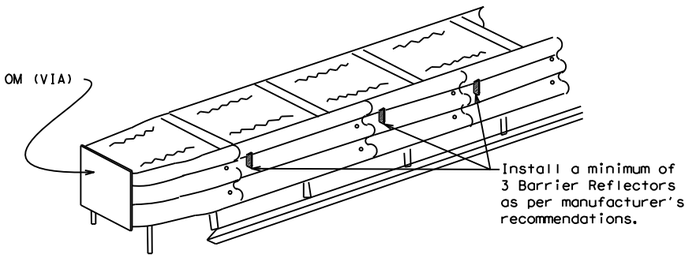


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

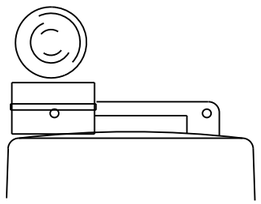


DELINEATION OF END TREATMENTS

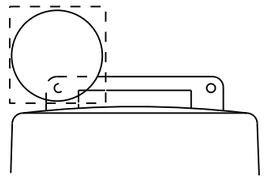
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

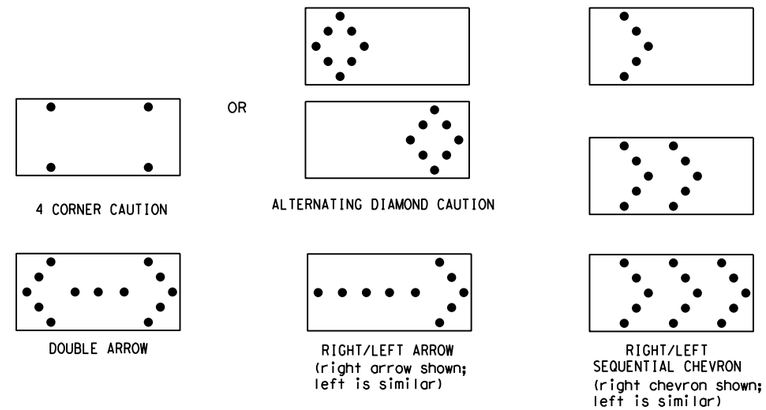
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	KAUFMAN		35

101

DATE: 7/27/2022 9:46:14 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\19750201304 - Design\Master Design Files\Standards\Traffic\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:

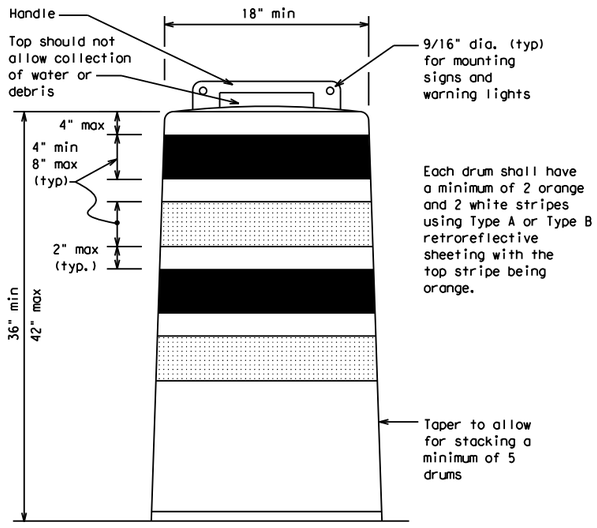
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

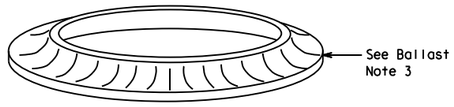
RETROREFLECTIVE SHEETING

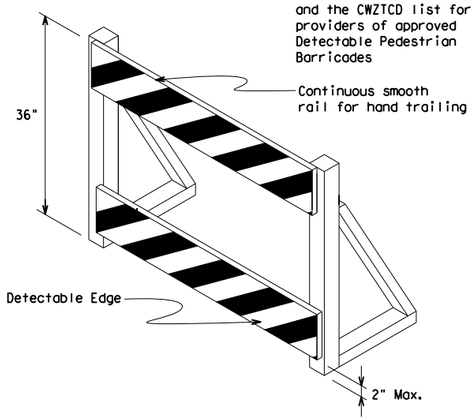
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

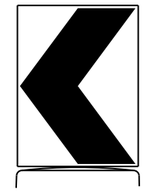




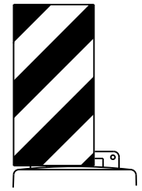


DETECTABLE PEDESTRIAN BARRICADES

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

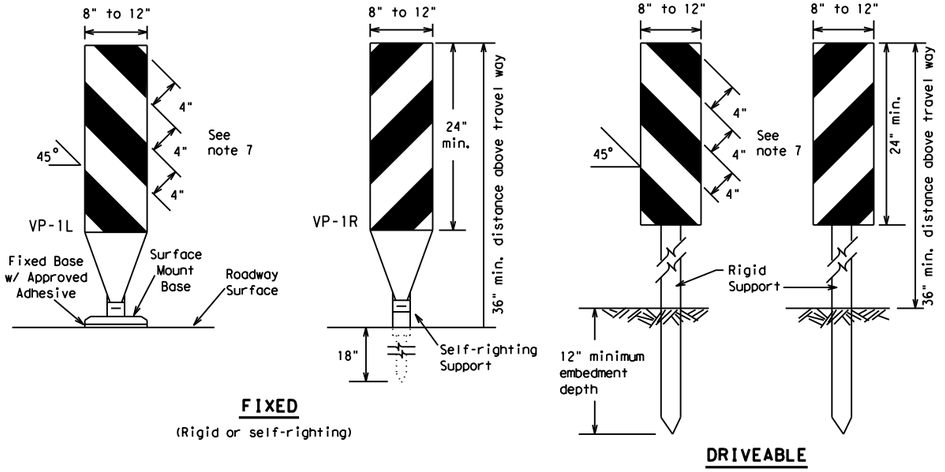
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	DAL	KAUFMAN		36
7-13				

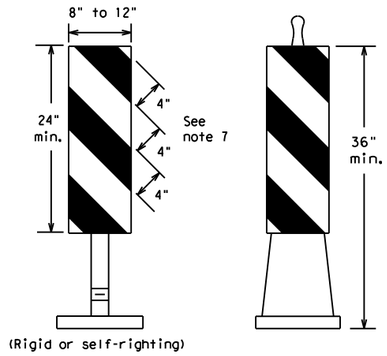
102

DATE: 7/27/2022 9:46:31 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\19750201\3\4 - Design\Master Design Files\Standards\Traffic\bc-21.dgn



FIXED
(Rigid or self-righting)

DRIVEABLE

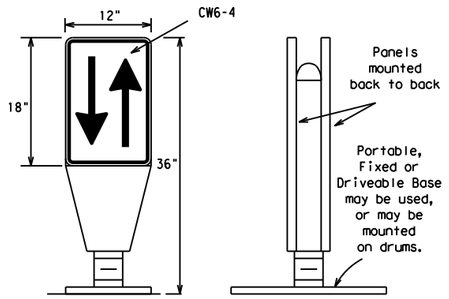


(Rigid or self-righting)

PORTABLE

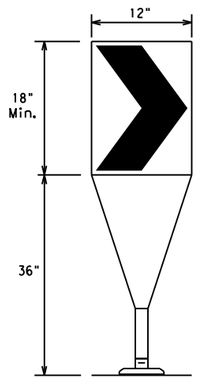
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



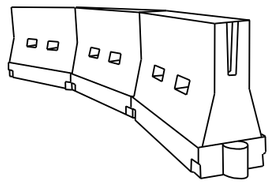
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

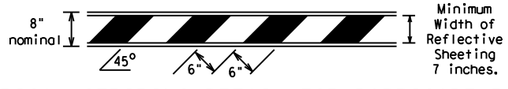
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	KAUFMAN		37

DATE: 7/27/2022 9:46:46 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Master Design Files\Standards\Traffic\bc-21.dgn

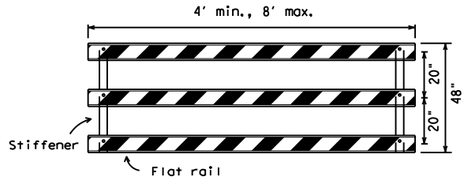
TYPE 3 BARRICADES

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.



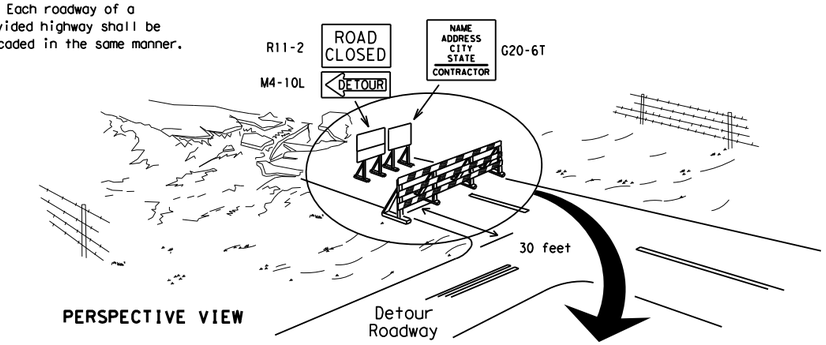
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

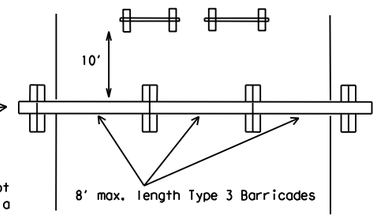
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

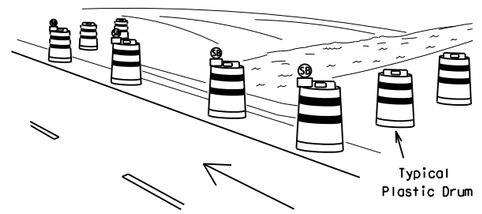
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

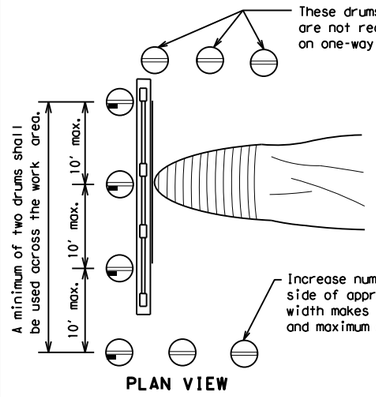
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

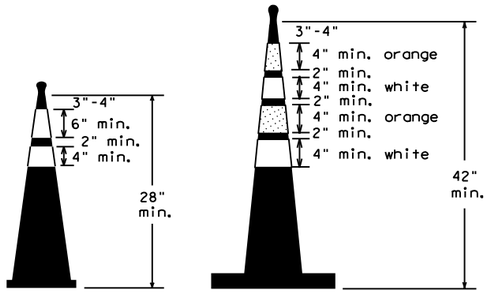
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

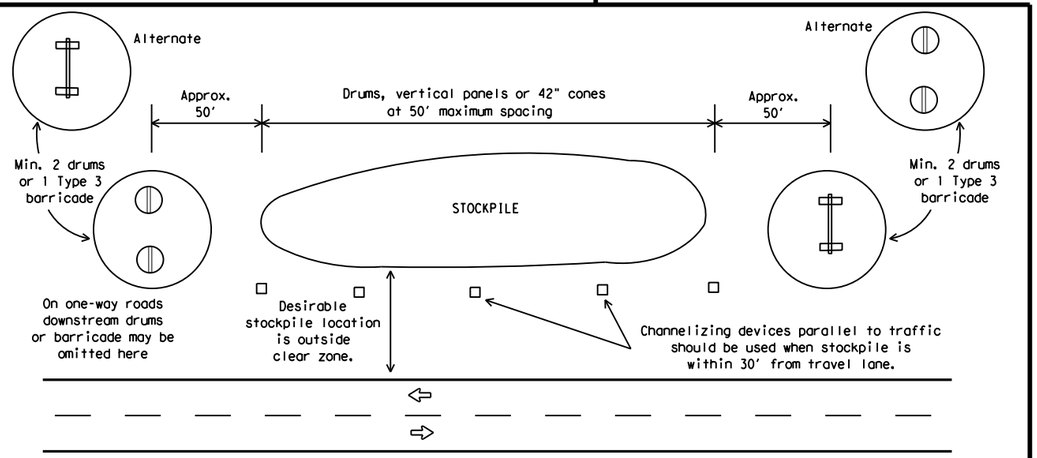
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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	1975	02	013	FM 1895
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	KAUFMAN		38

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.

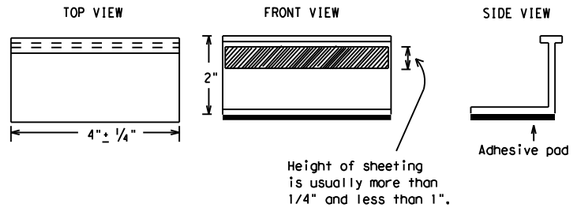
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

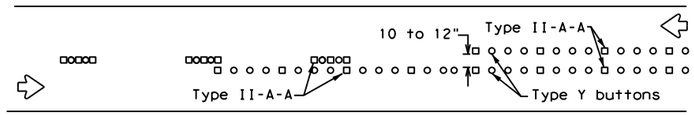
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	DAL	KAUFMAN		39
11-02 8-14				

105

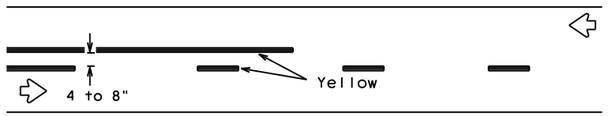
DATE: 7/27/2022 9:47:19 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013X4 - DesignMaster Design Files\Standards\Traffic\bc-21.dgn

PAVEMENT MARKING PATTERNS

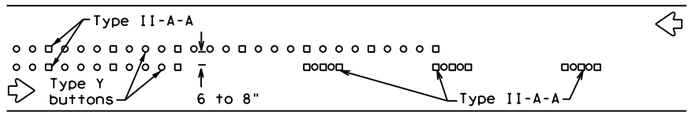
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



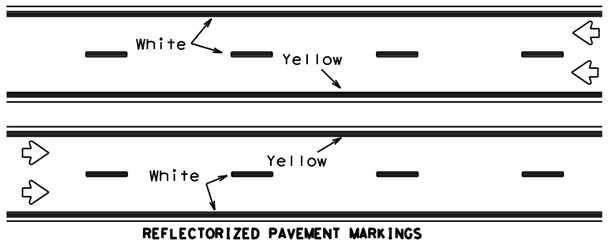
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



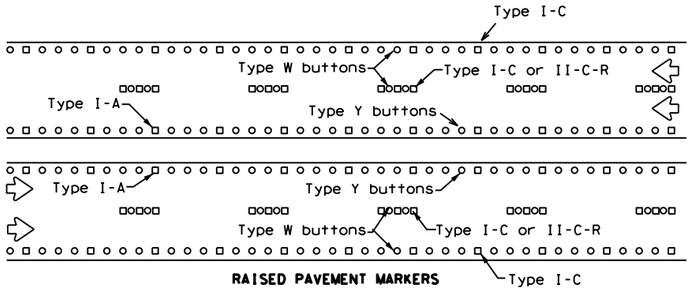
RAISED PAVEMENT MARKERS - PATTERN B

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



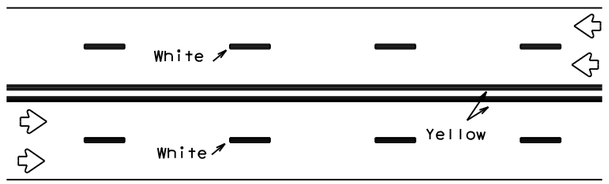
REFLECTORIZED PAVEMENT MARKINGS



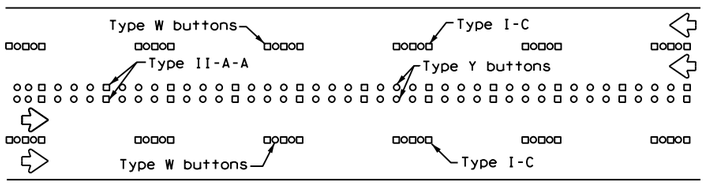
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



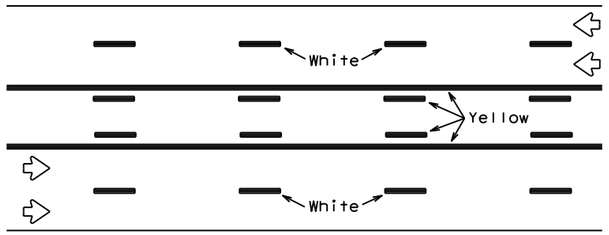
REFLECTORIZED PAVEMENT MARKINGS



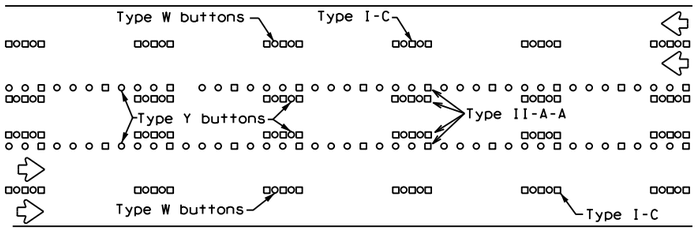
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

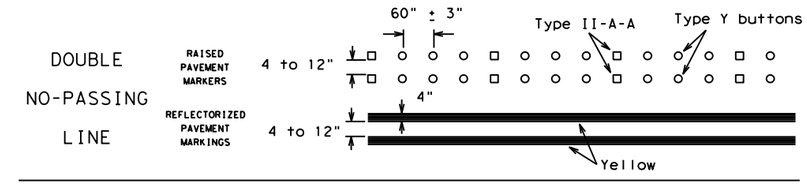
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

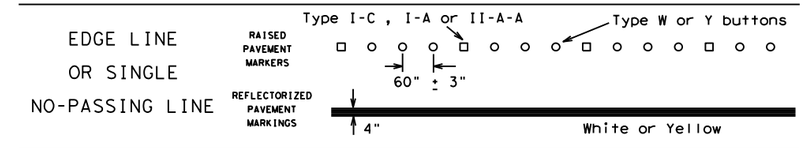
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

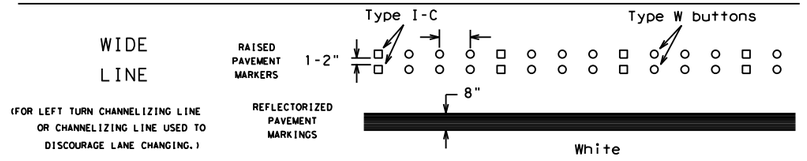


EDGE LINE OR SINGLE NO-PASSING LINE



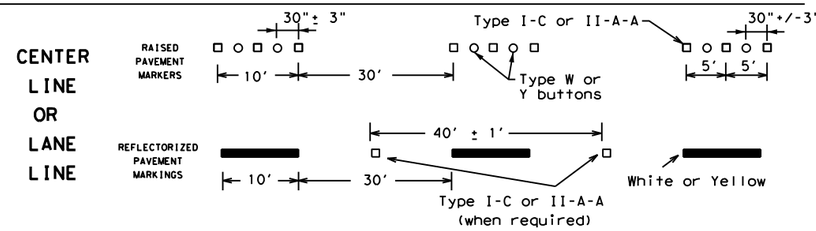
WIDE LINE

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

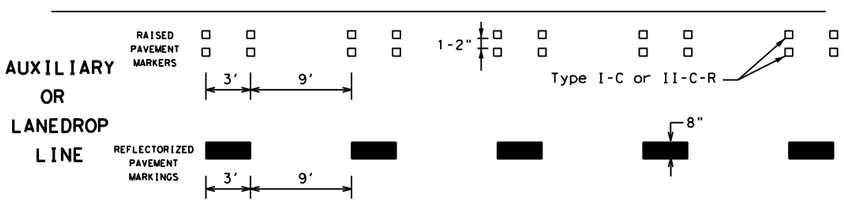


BROKEN LINES

CENTER LINE OR LANE LINE

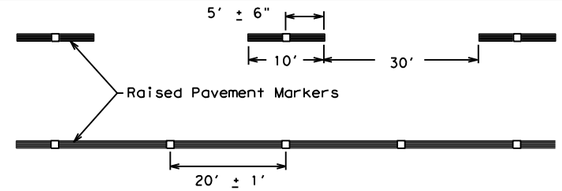


AUXILIARY OR LANEDROP LINE



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

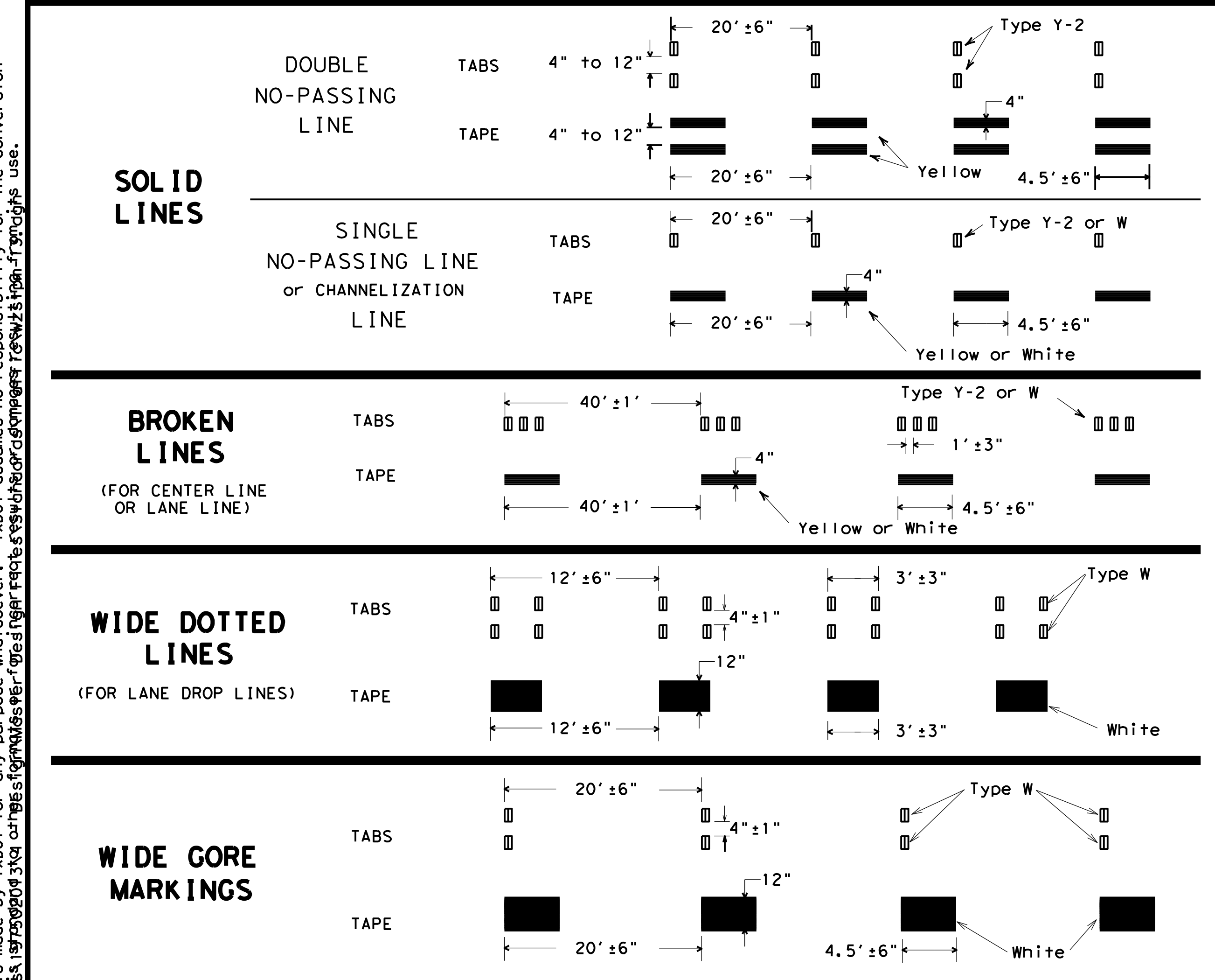
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

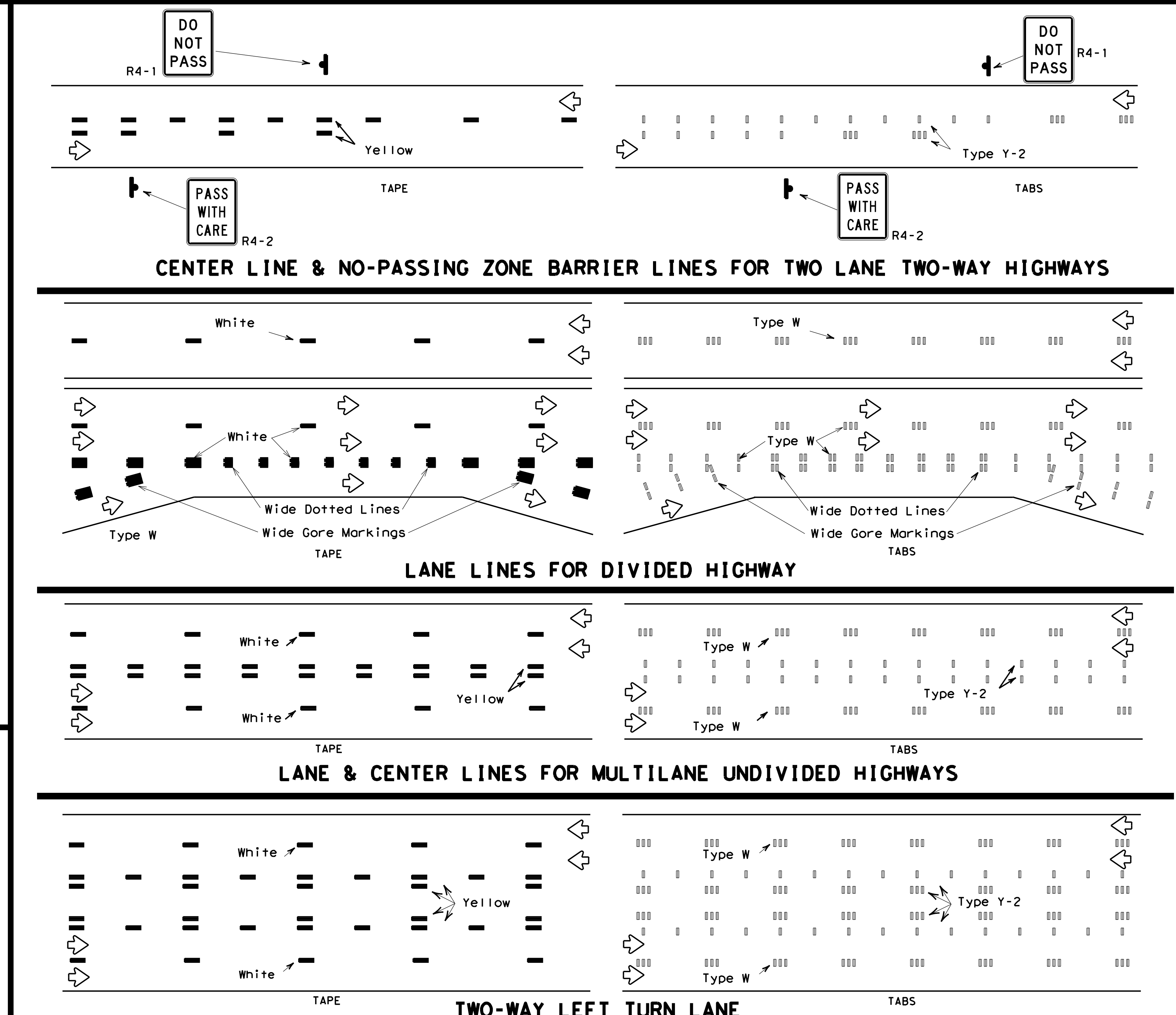
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		40

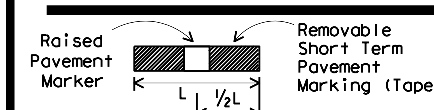
DATE: 7/27/2022 10:00:55 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\...

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS





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

NOTES:

1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
6. For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
7. For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
8. For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

PREFABRICATED PAVEMENT MARKINGS

1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Costruction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

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

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

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

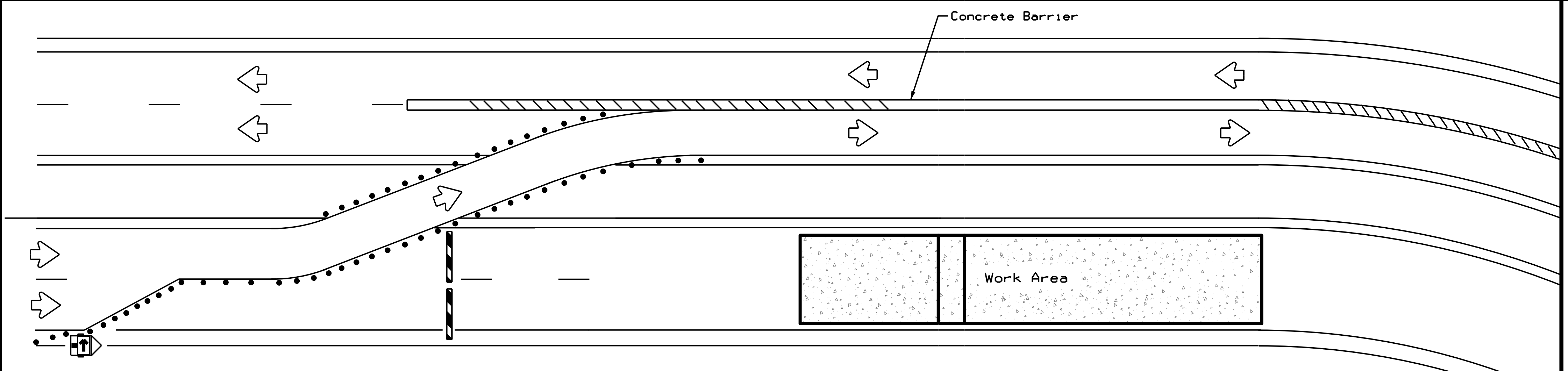
Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

FILE: wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 3-03 7-13	1975	02	013	FM 1895
	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	41



NOTES:

1. Length of Safety Glare screen will be specified elsewhere in the plans.

2. The cumulative nominal length of the modular safety glare screen units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one safety glare screen unit.

3. Screen Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one glare screen panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.

4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."

5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

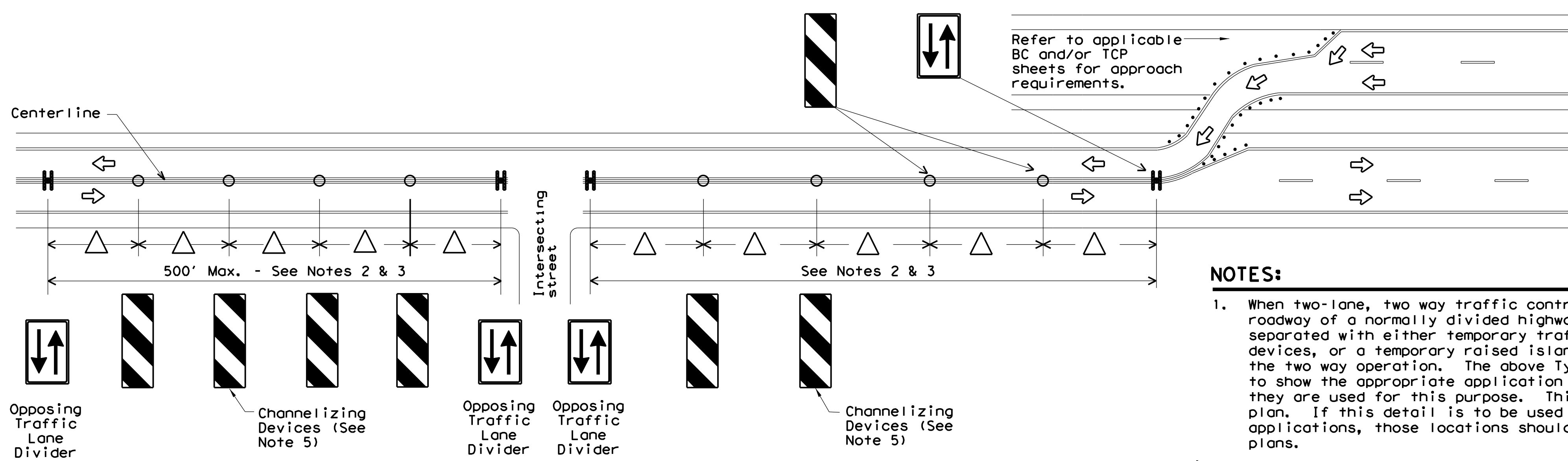
BARRIER DELINEATION WITH MODULAR GLARE SCREENS

LEGEND	
	Type 3 Barricade
• • •	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	Sign
\ \ \ \	Safety glare screen

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

Only pre-qualified products shall be used. A copy of the Compliant Work Zone Traffic Control Devices List" CWZTCD)describes pre-qualified products and their sources and may be found at the following web address:

http://www.txdot.gov/business/resources/producer-list.html



VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.

△2. Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100'.

3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.

4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.

5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

DATE: 7/27/2022 10:02:56 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\1975020013\...

Texas Department of Transportation

Traffic Operations Division Standard

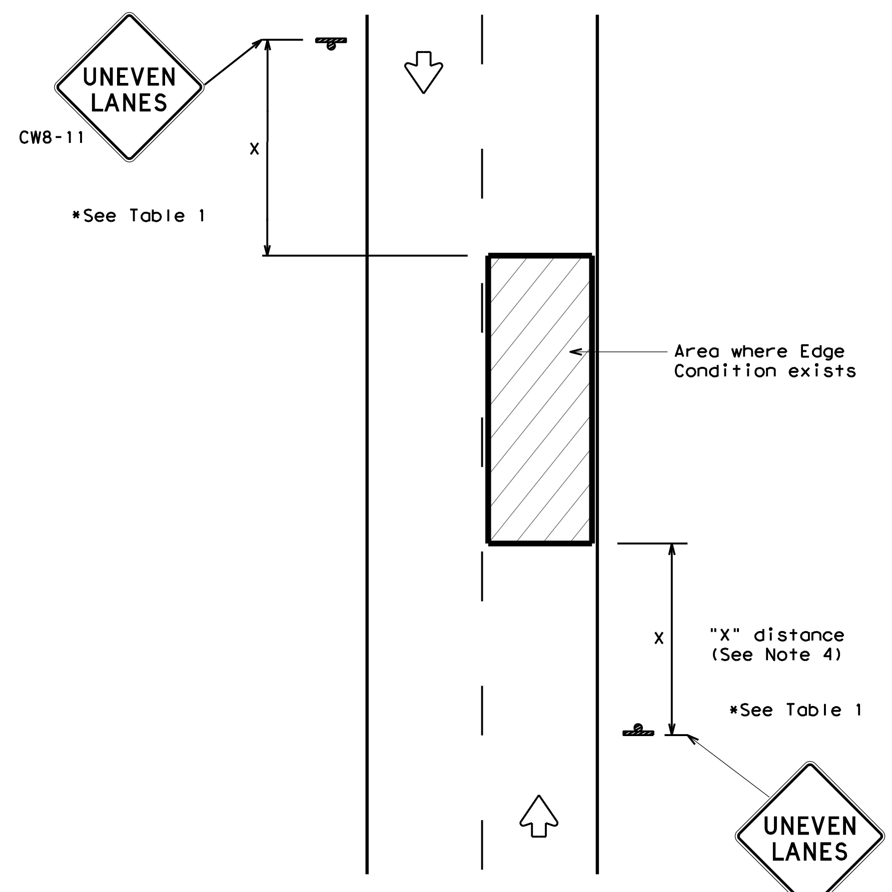
TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-17

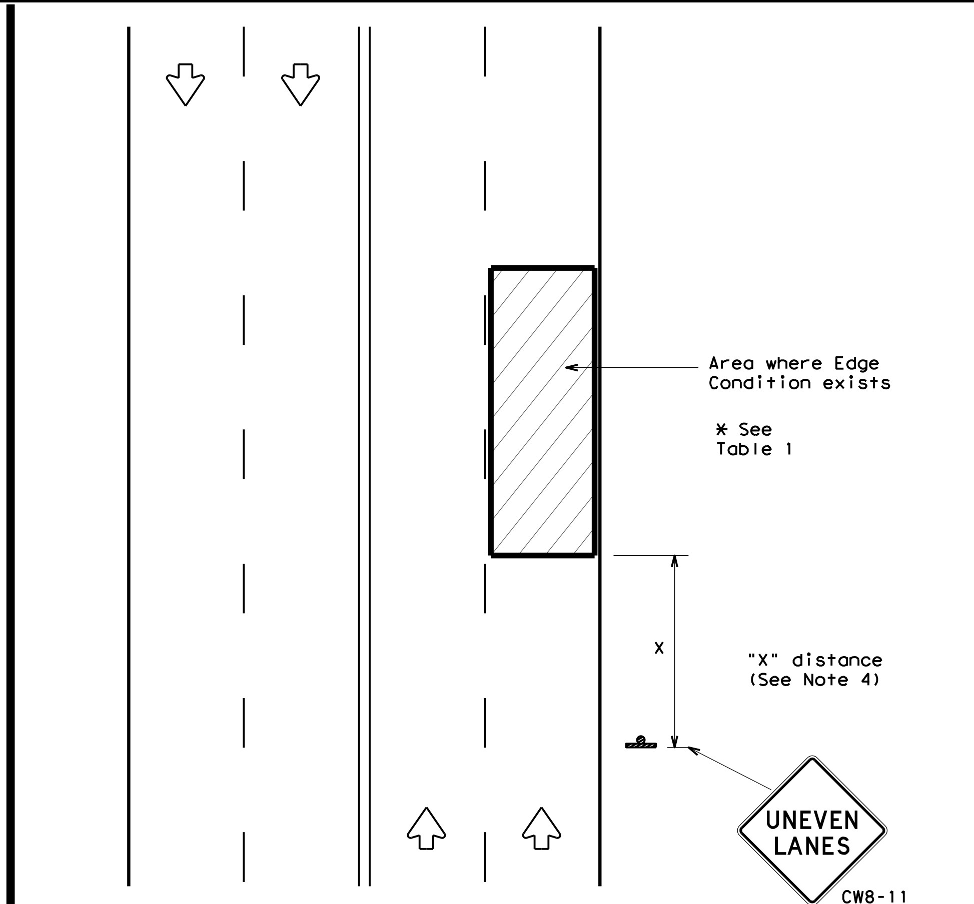
FILE: wztd-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 2-17 3-03 7-13	1975	02	013	FM 1895
	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	42

110

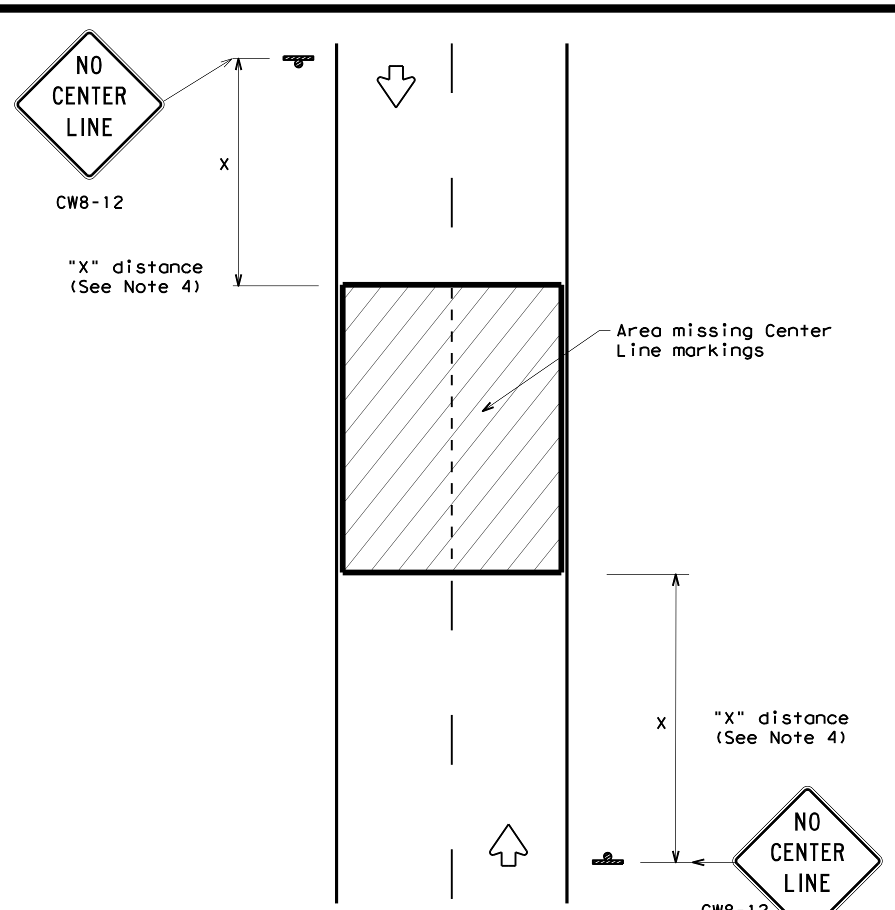
DATE: 7/27/2022 10:05:00 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\...



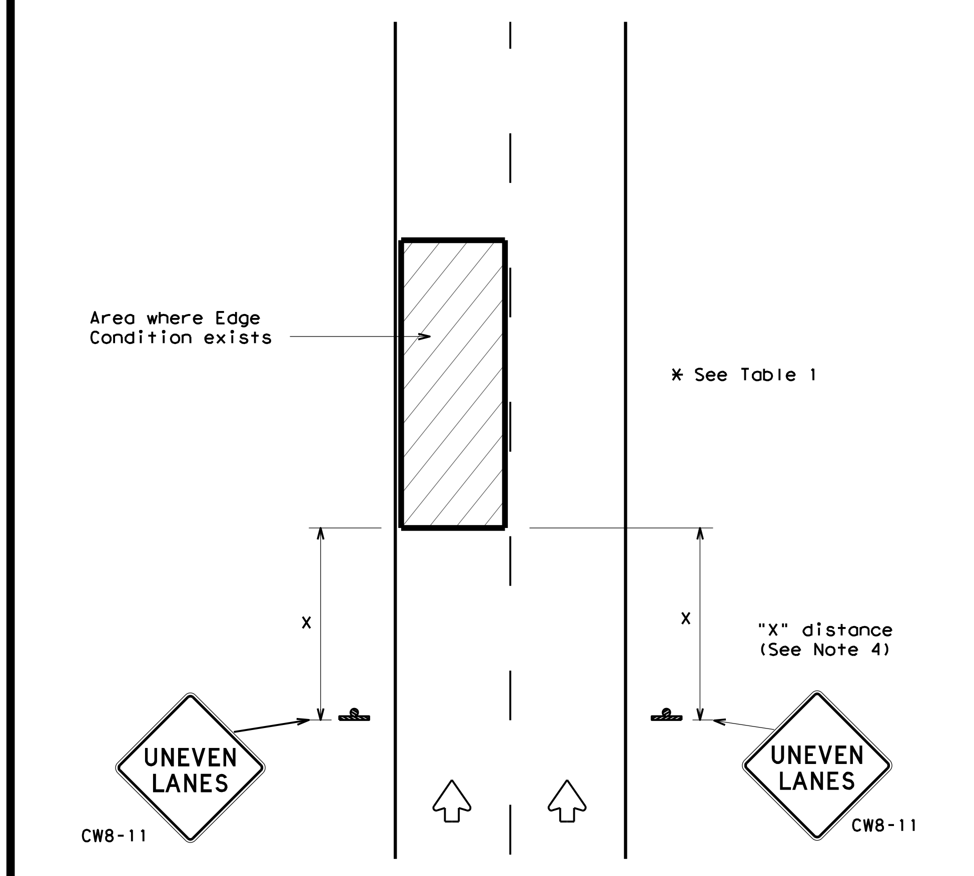
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

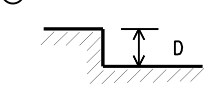
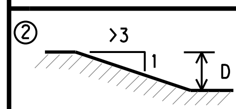
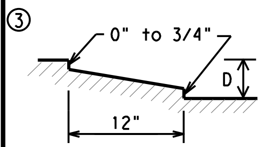
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1

Edge Condition	Edge Height (D)	* Warning Devices
① 	Less than or equal to: 1¼" (maximum-planing) 1½" (typical-overlay)	Sign: CW8-11
	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
② 	Less than or equal to 3"	Sign: CW8-11
③  Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

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

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

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

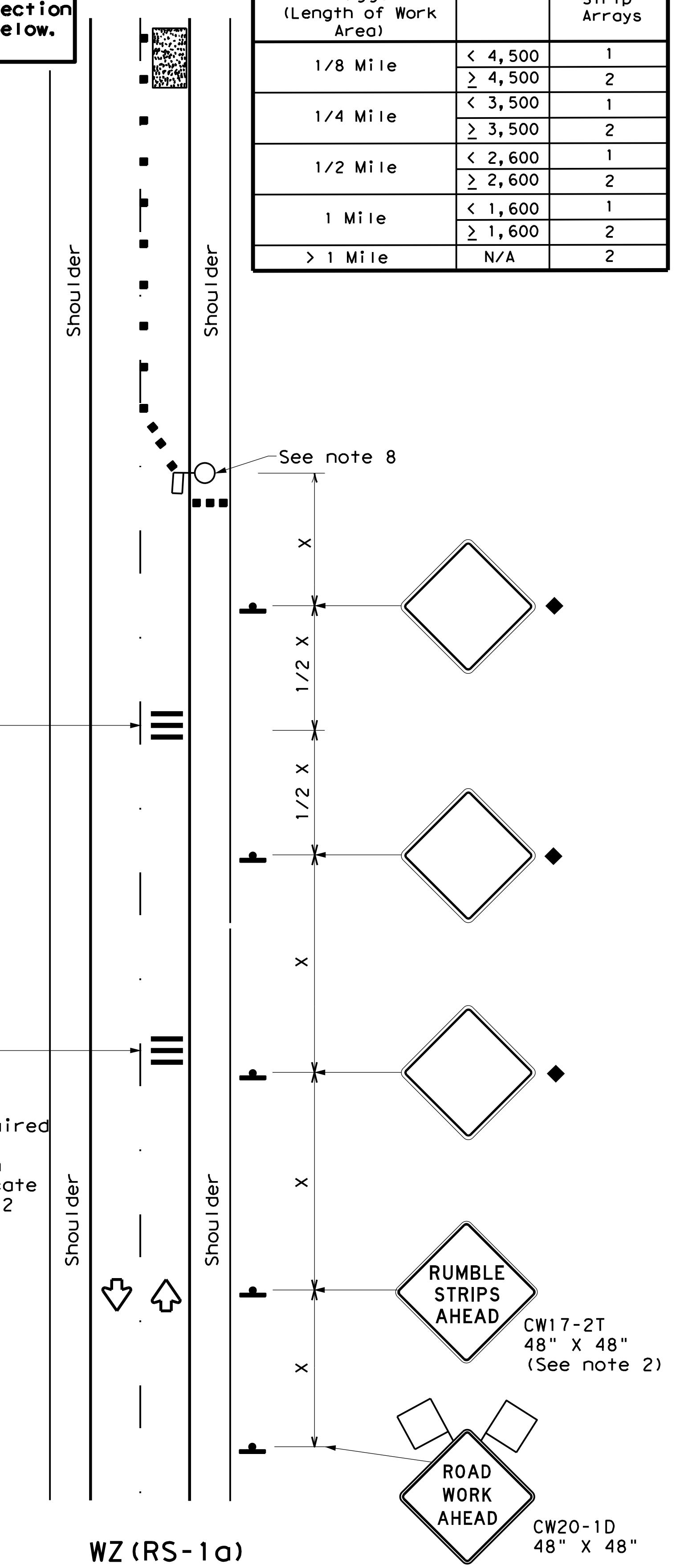
WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT 1975	SECT 02	JOB 013	HIGHWAY FM 1895
REVISIONS 8-95 2-98 7-13 1-97 3-03	DIST DAL	COUNTY KAUFMAN		SHEET NO. 43

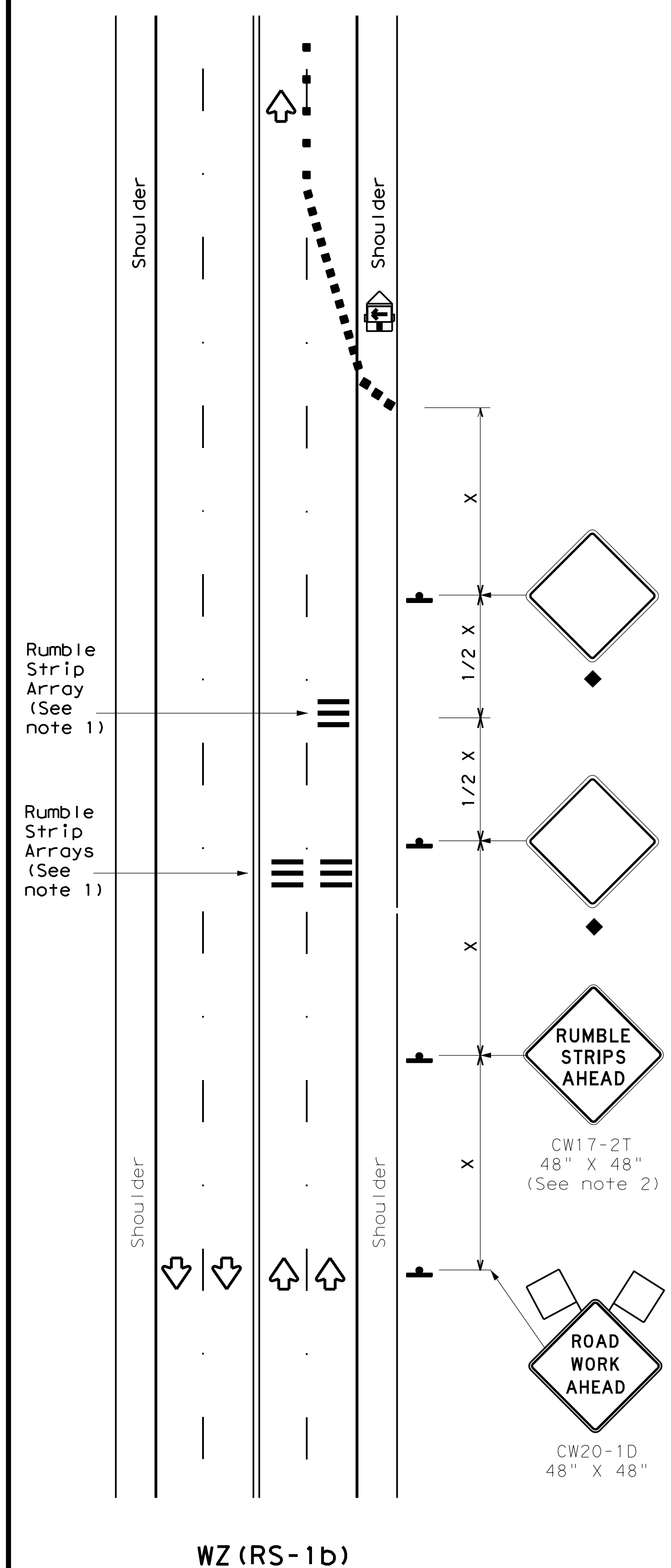
112

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

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



RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

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

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

* Conventional Roads Only

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

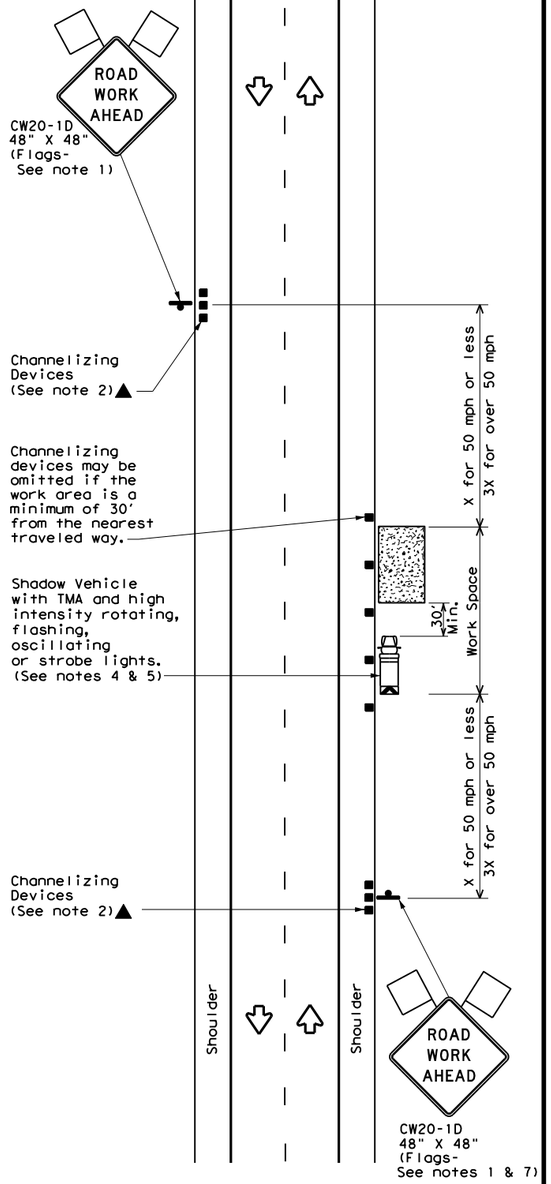
WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-14 1-22 4-16	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		44

117

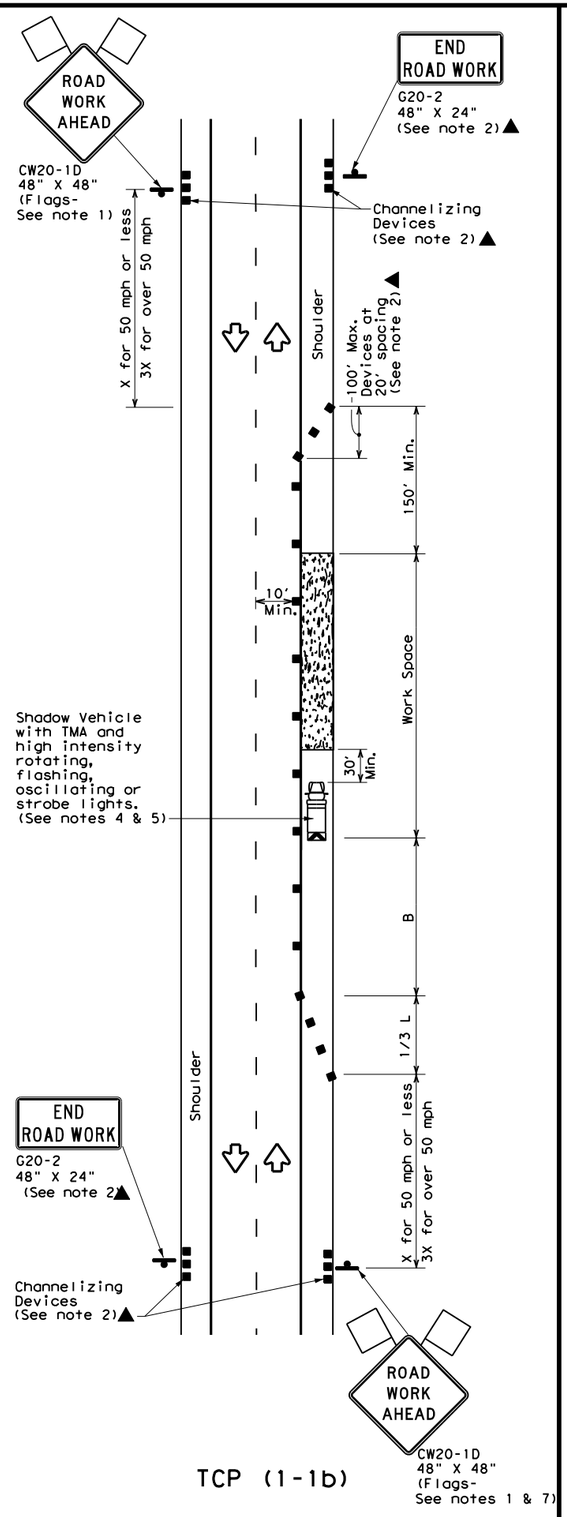
DATE: 7/27/2022 10:06:20 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOTS\Documents\18 - DAL\Design Projects\...

DATE: 7/27/2022 10:13:24 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\tcp1-1-18.dgn



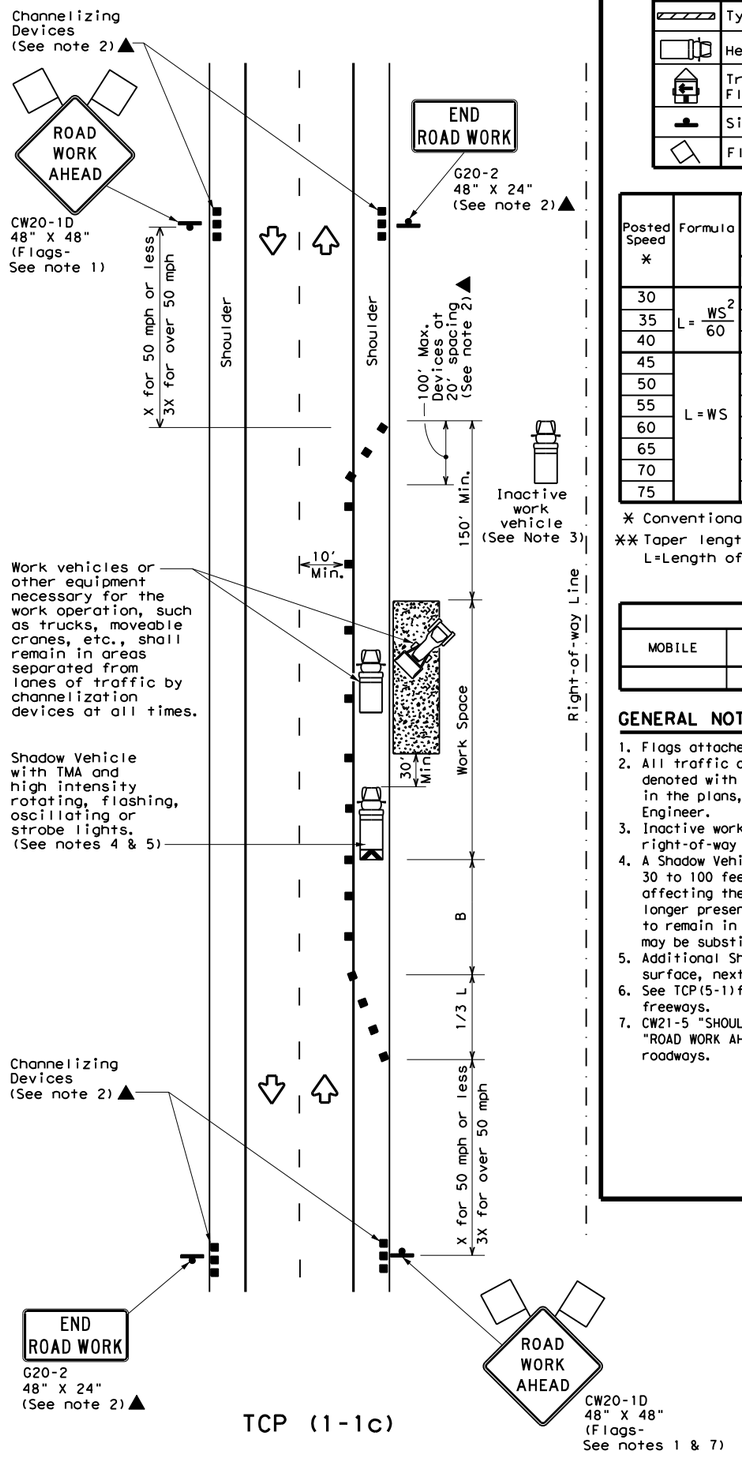
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
6. See TCP(5-1)for shoulder work on divided highways, expressways and freeways.
7. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

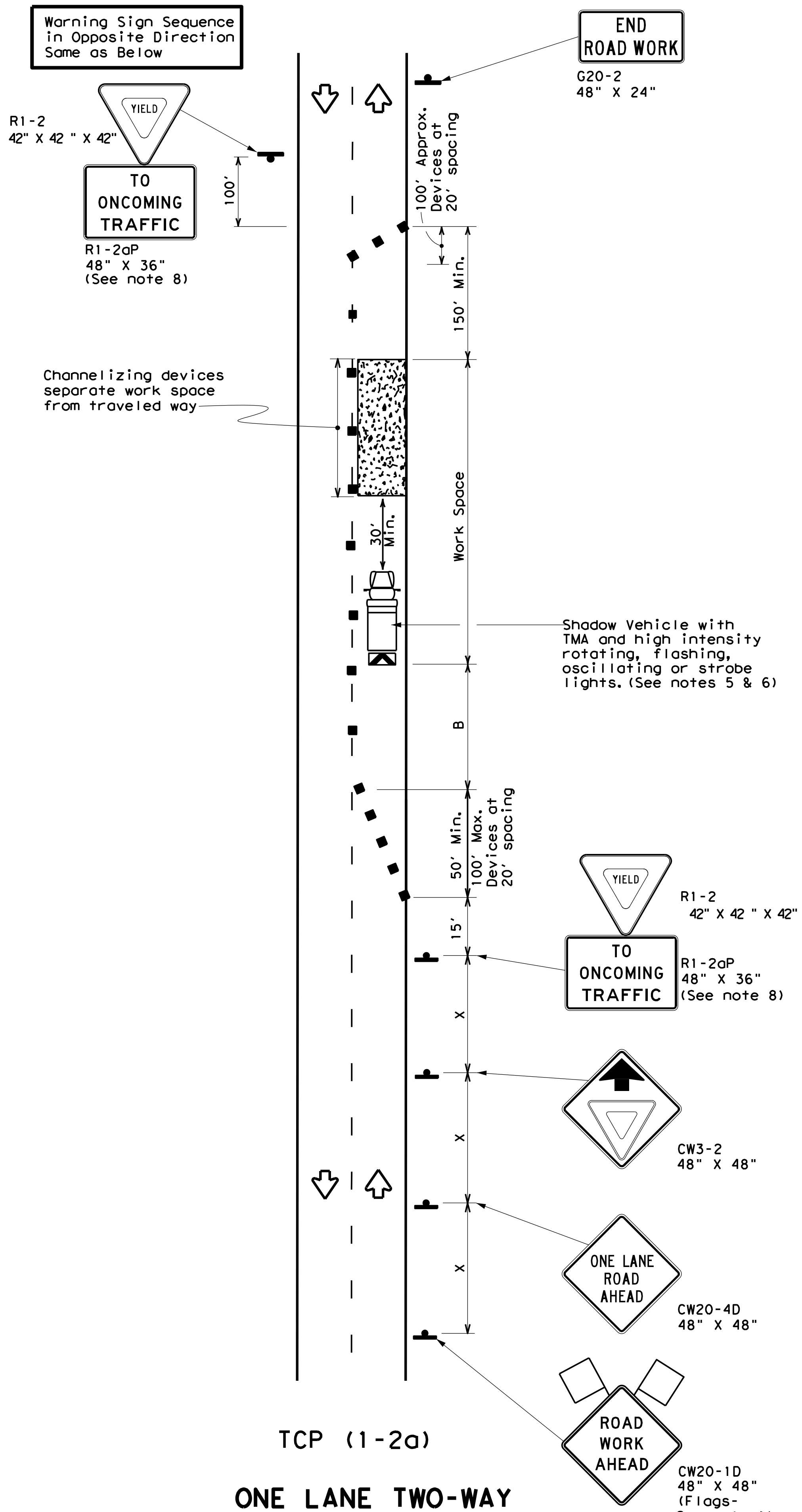
Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

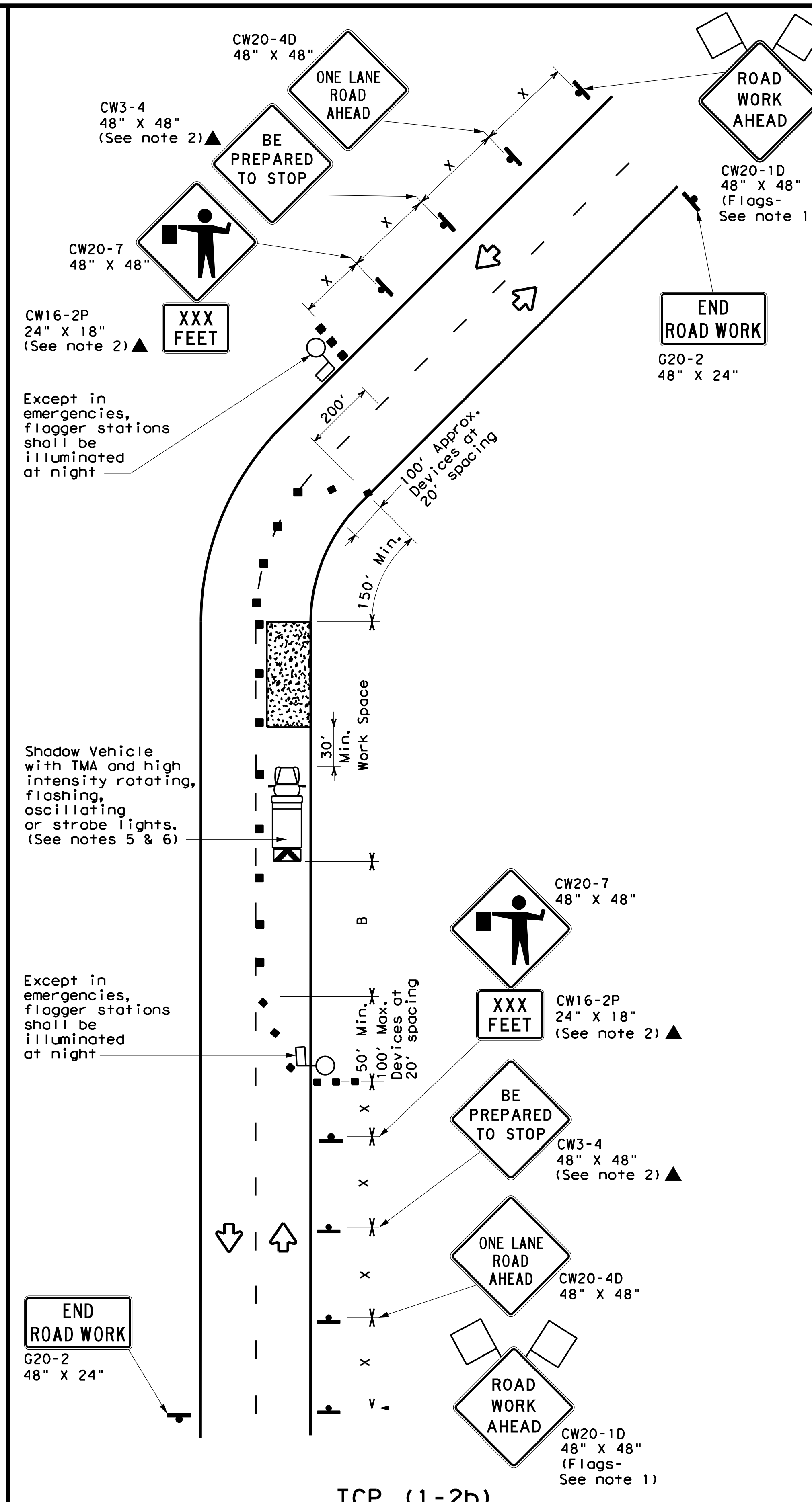
FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 / 8-95 2-12 / 1-97 2-18	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		45

151



ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



ONE LANE TWO-WAY CONTROL WITH FLAGGERS

LEGEND

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only

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

TYPICAL USAGE

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
8. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation | Traffic Operations Division Standard

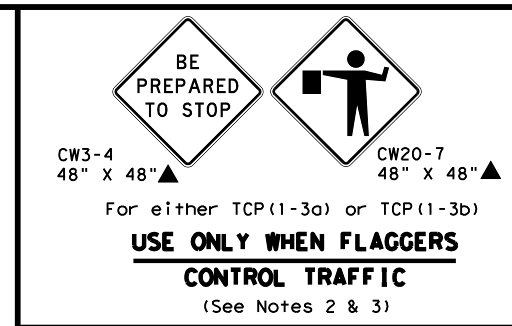
TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

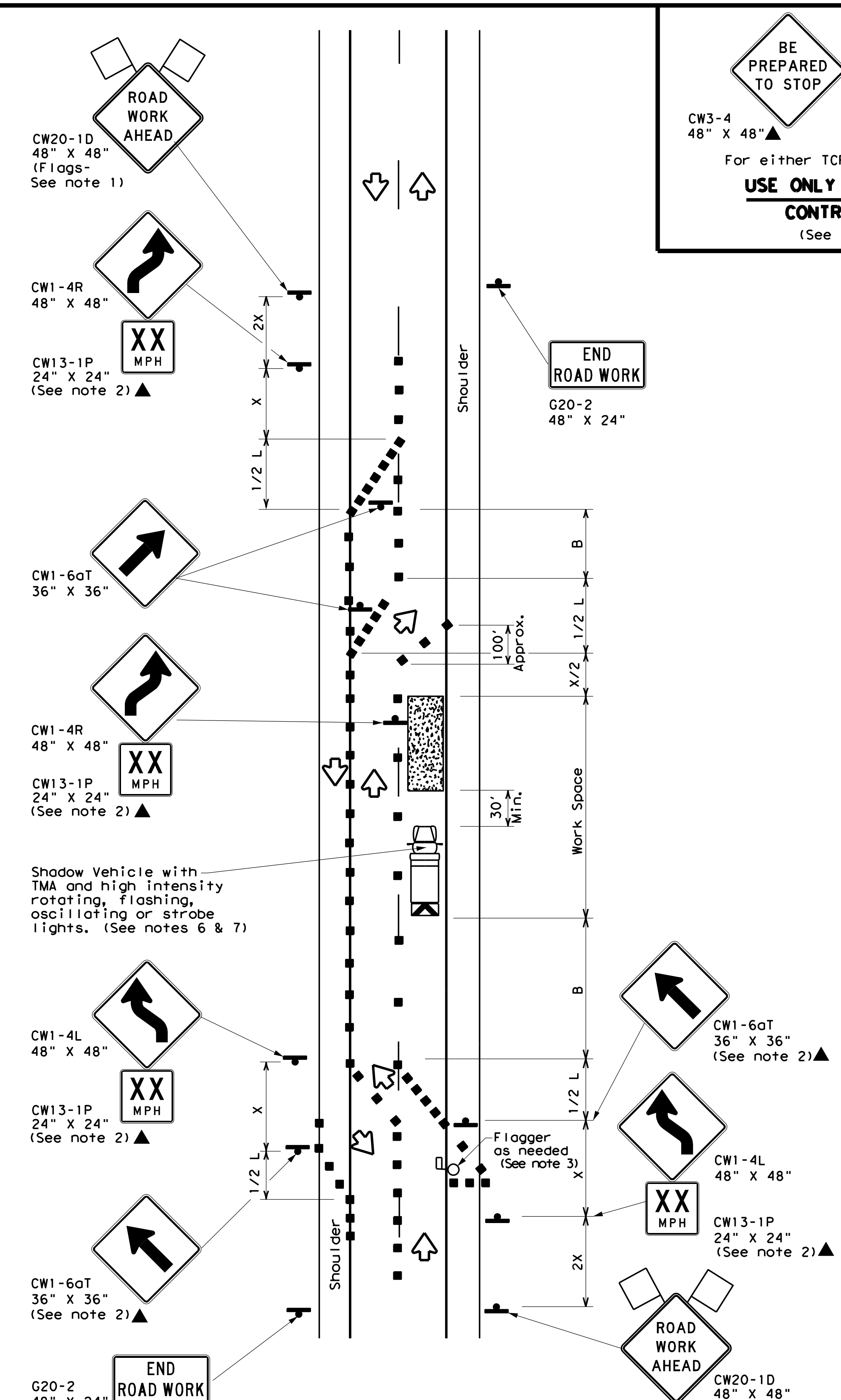
TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	1975	02	013	FM 1895
	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	46

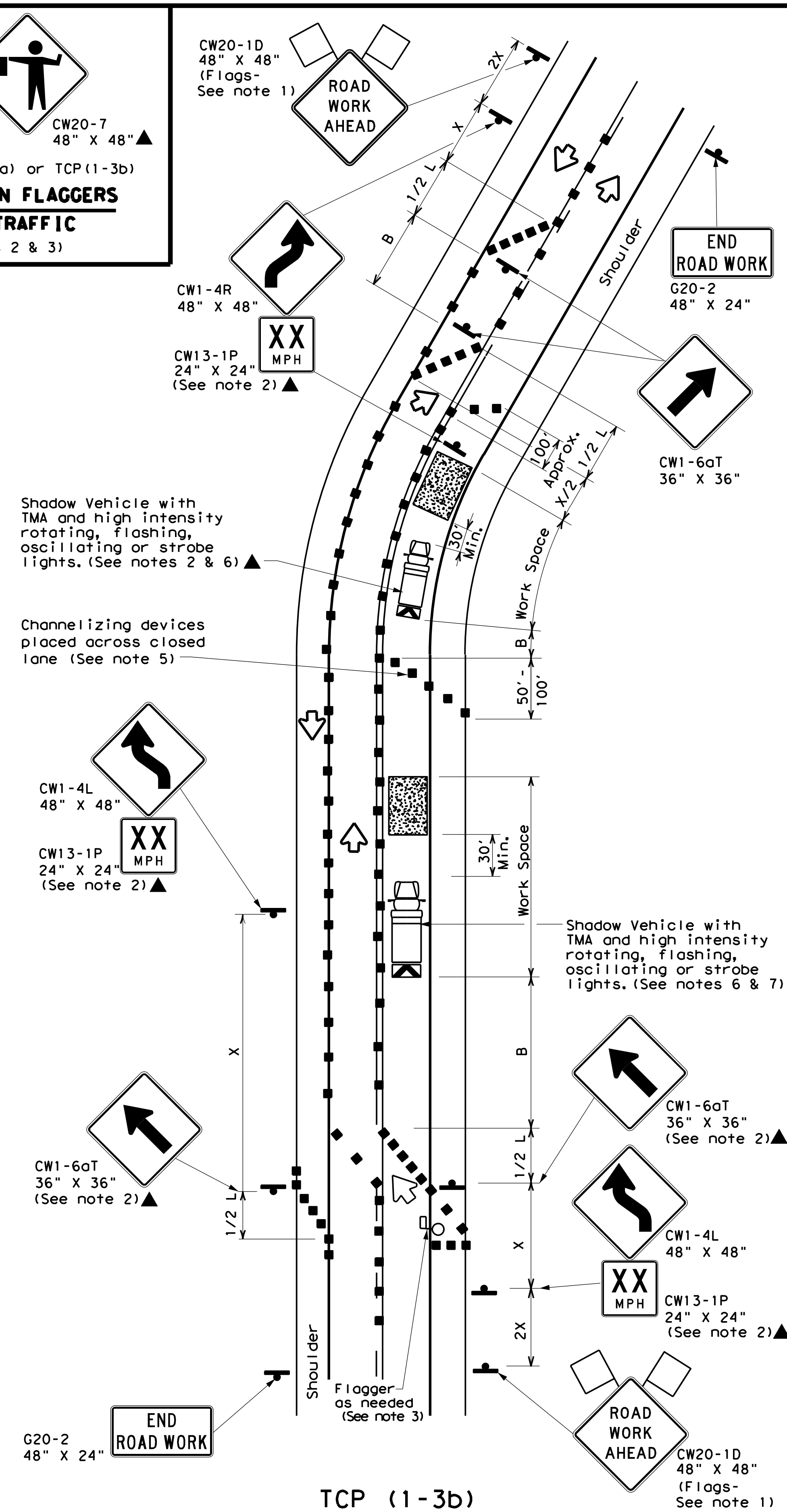
152

DATE: 7/27/2022 10:14:54 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOTS\Documents\18 - DAL\Design Projects\...





TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS
ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (1-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS
ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
8. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

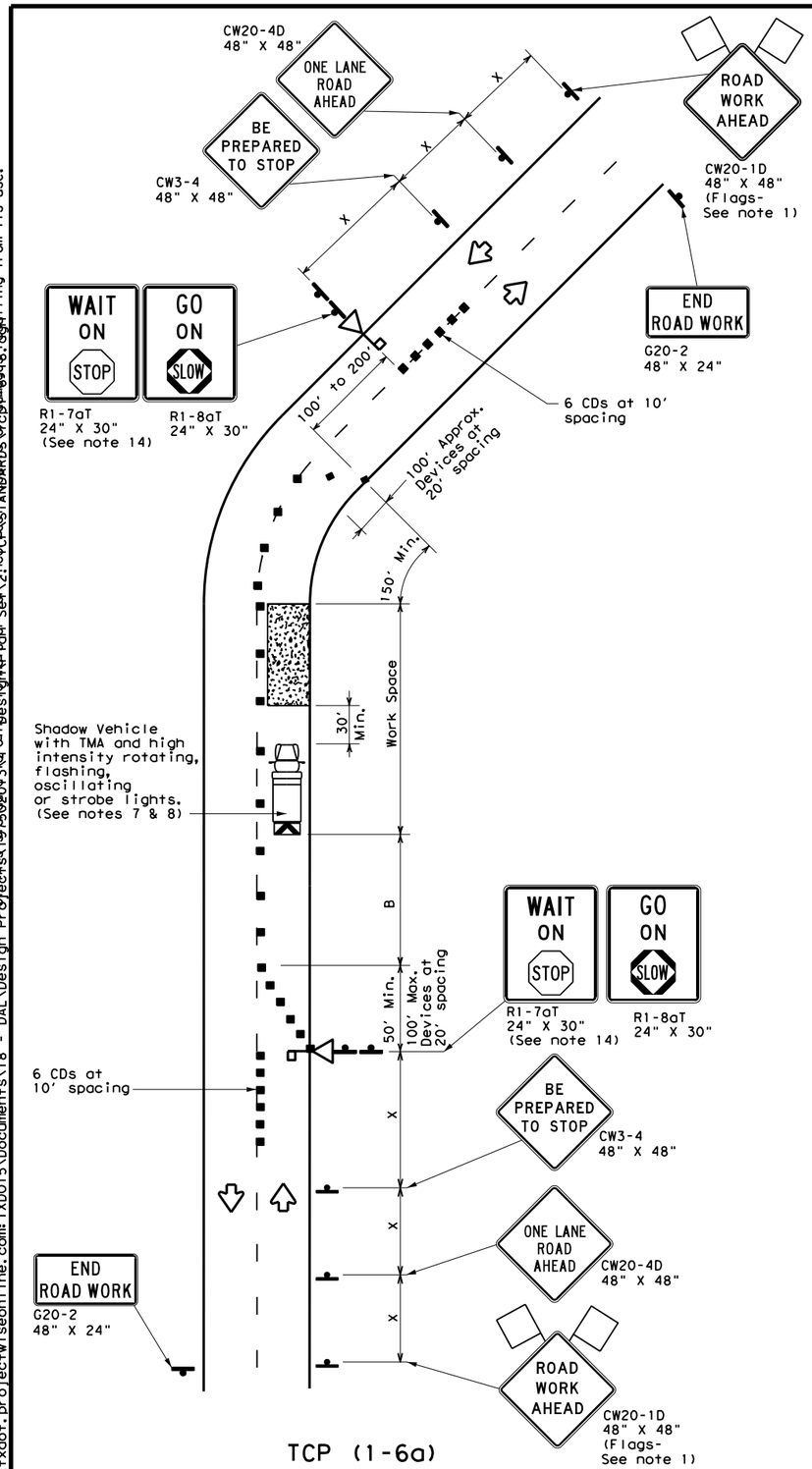
Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

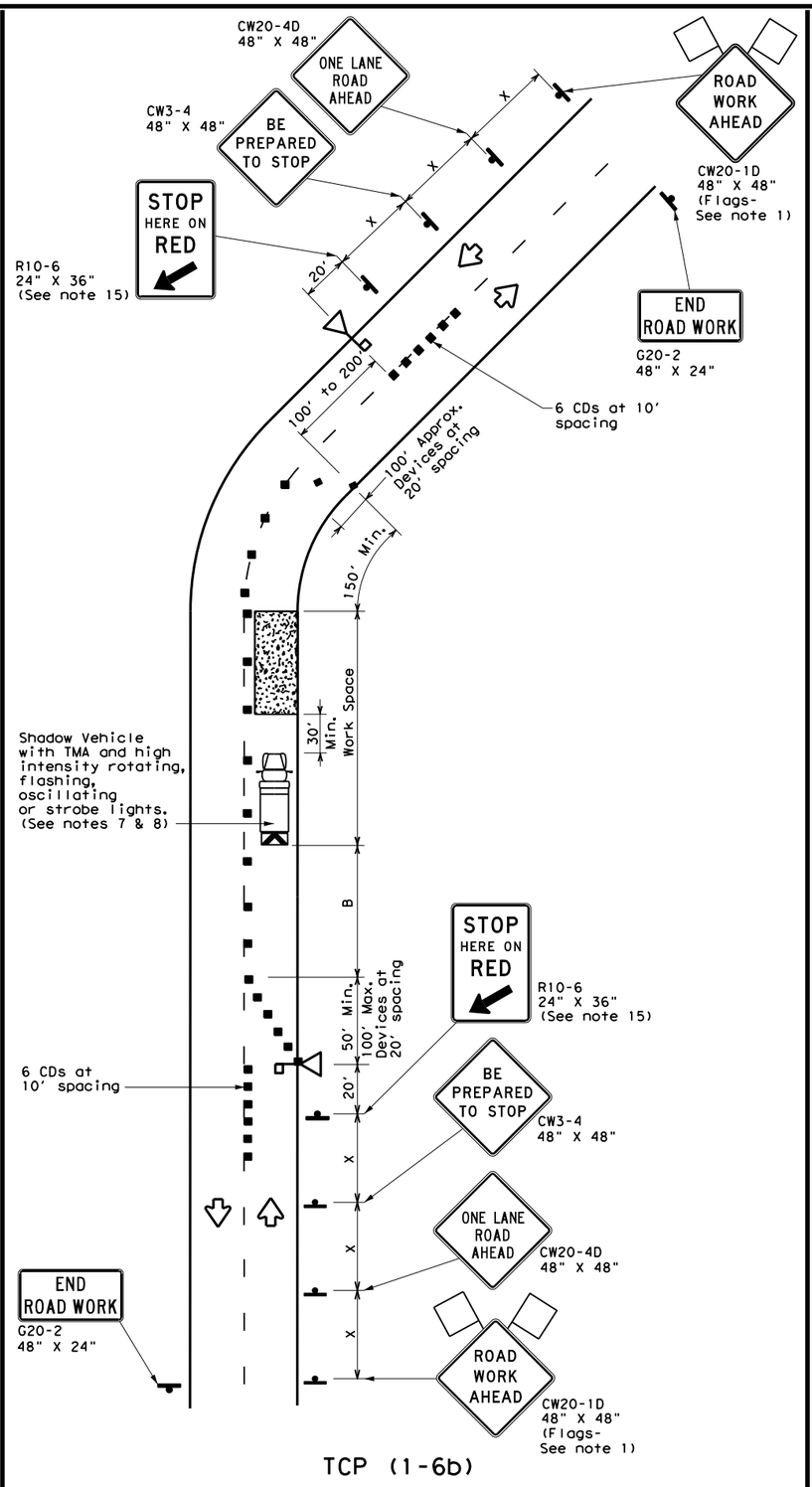
FILE: tcp1-3-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT 1975	SECT 02	JOB 013	HIGHWAY FM 1895
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	DIST DAL		COUNTY KAUFMAN	SHEET NO. 47

DATE: 7/27/2022 10:32:22 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\tcp1-6-18.dgn



TCP (1-6a)

ONE LANE TWO-WAY CONTROL WITH STOP/SLOW AFADs



TCP (1-6b)

ONE LANE TWO-WAY CONTROL WITH RED/YELLOW LENS AFADs

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. AFADs shall only be used in situations where there is one lane of approaching traffic in the direction to be controlled.
3. Adequate stopping sight distance must be provided to each AFAD location for approaching traffic. (See table above).
4. Each AFAD shall be operated by a qualified/certified flagger. Flaggers operating AFADs shall not leave them unattended while they are in use.
5. One flagger may operate two AFADs only when the flagger has an unobstructed view of both AFADs and of the approaching traffic in both directions.
6. When pilot cars are used, a flagger controlling traffic shall be located on each approach. AFADs shall not be operated by the pilot car operator.
7. All AFADs shall be equipped with gate arms with an orange or fluorescent red-orange flag attached to the end of the gate arm. The flag shall be a minimum of 16" square.
8. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
9. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
10. Flaggers should use two-way radios or other methods of communication to control traffic.
11. Length of work space should be based on the ability of flaggers to communicate.
12. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the AFAD.
13. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
14. The R1-7aT "WAIT ON STOP" sign and the R1-8aT "GO ON SLOW" sign shall be installed at the AFAD location on separate supports or they may be fabricated as one 48" x 30" sign. They shall not obscure the face of the STOP/SLOW AFAD.
15. The R10-6 "STOP HERE ON RED" arrow sign shall be offset so as not to obscure the lenses of the AFAD.

Texas Department of Transportation

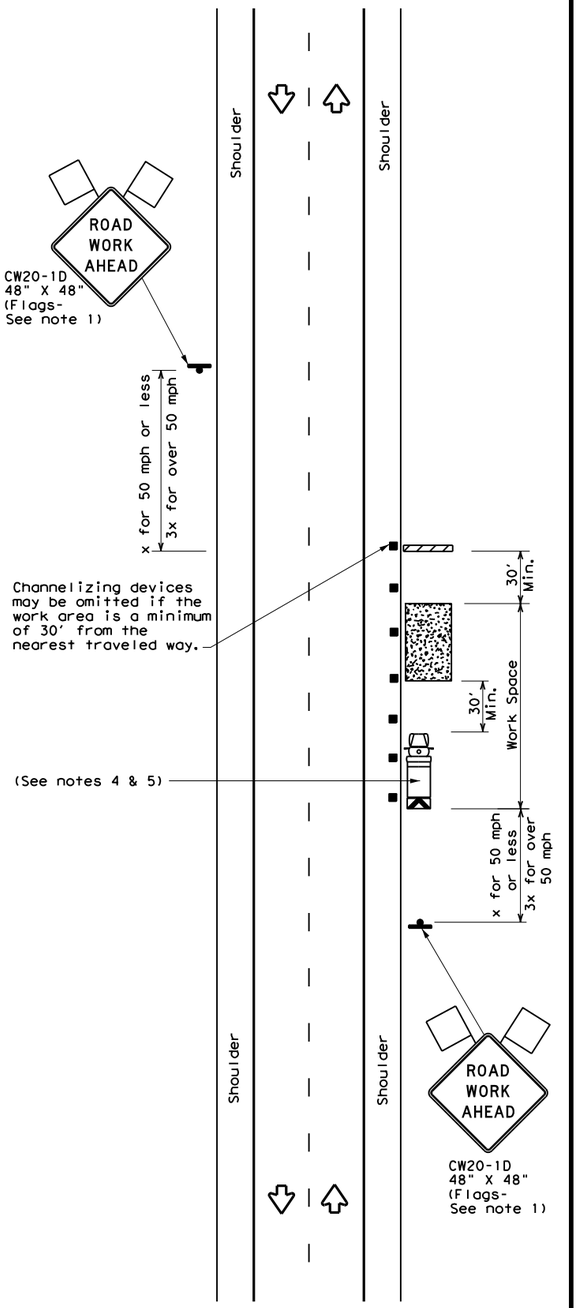
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN AUTOMATED FLAGGER ASSISTANCE DEVICES (AFADS)

TCP(1-6)-18

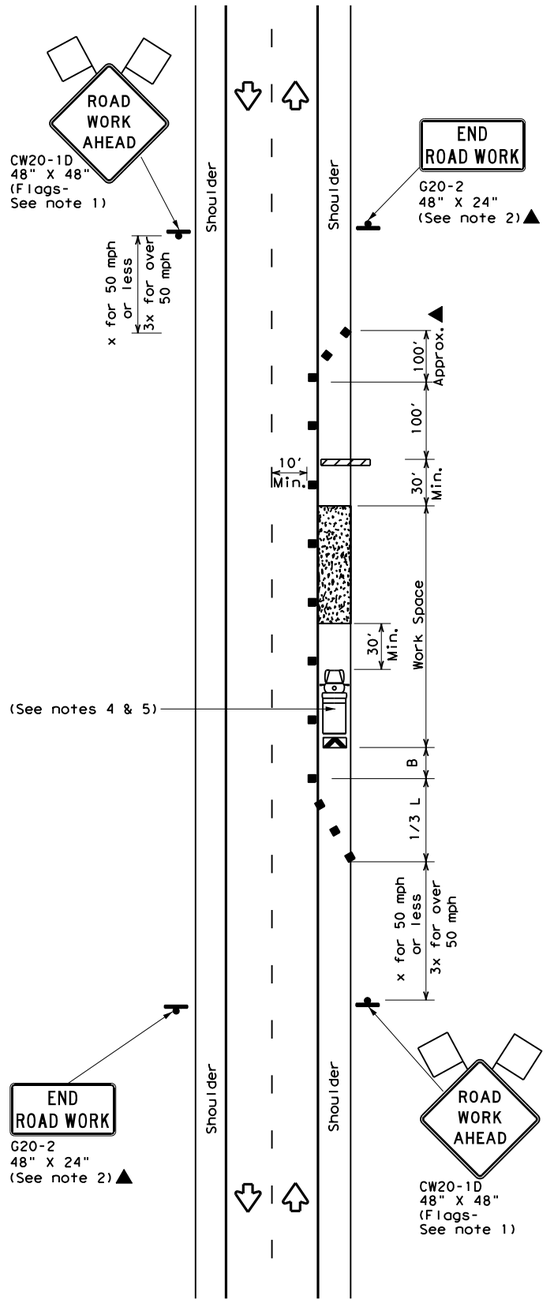
FILE: tcp1-6-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		48

DATE: 7/27/2022 10:19:23 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\tcp2-1-18.dgn



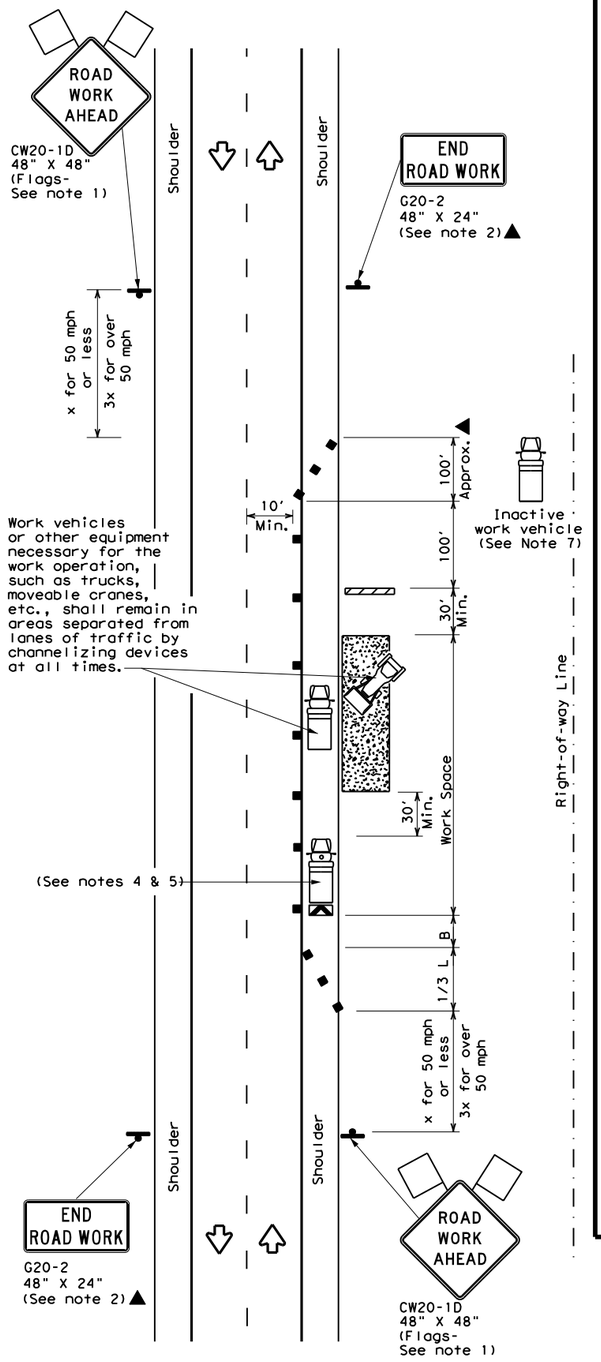
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
3. Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
8. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

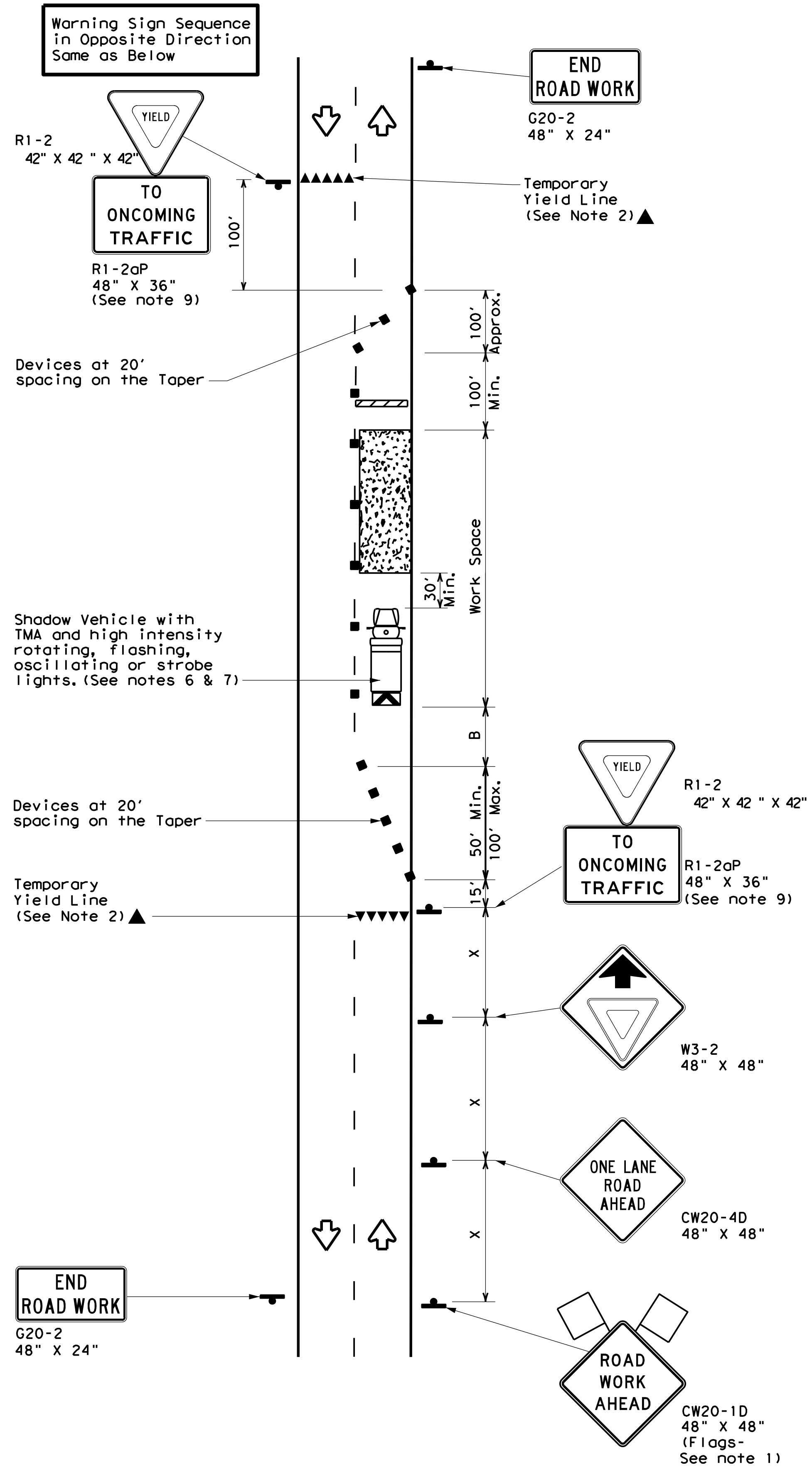
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	DAL	KAUFMAN		49
1-97 2-18				

DATE: 7/27/2022 10:20:41 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\



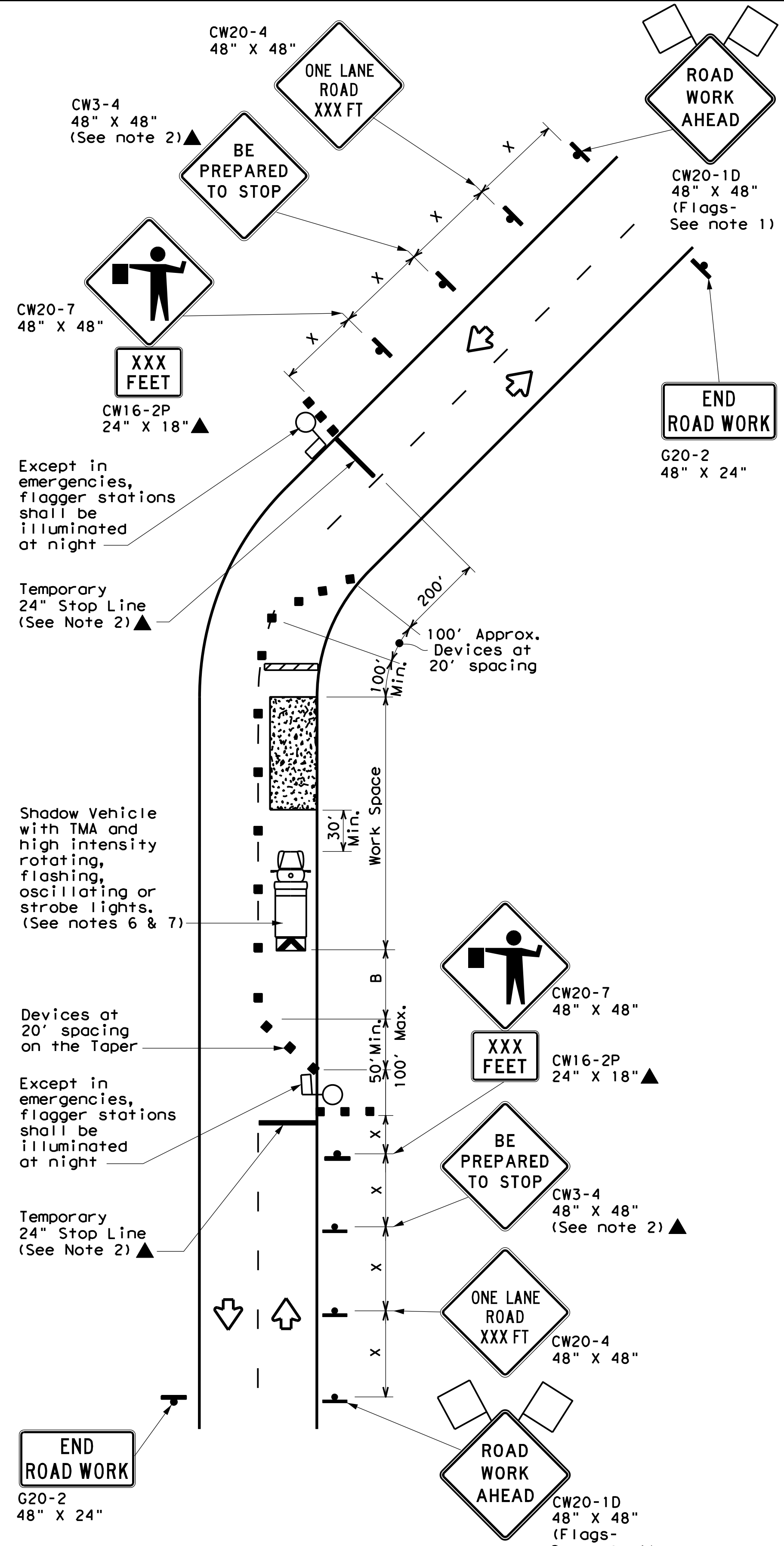
TCP (2-2a)

2-LANE ROADWAY WITHOUT PAVED SHOULDERS

ONE LANE TWO-WAY

CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See Note 9)



TCP (2-2b)

2-LANE ROADWAY WITHOUT PAVED SHOULDERS

ONE LANE TWO-WAY

CONTROL WITH FLAGGERS

LEGEND

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

TCP (2-2b)

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

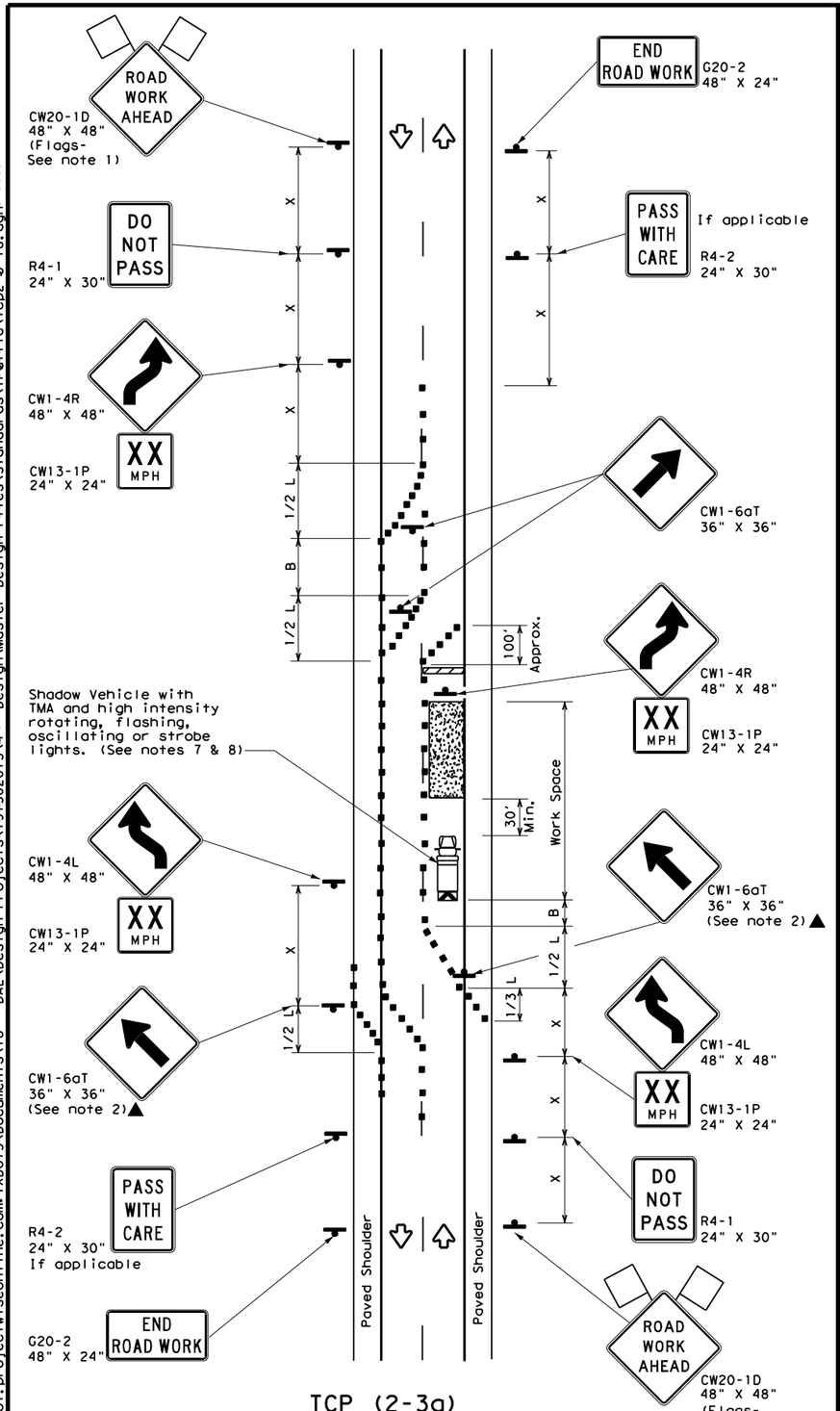
Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-18

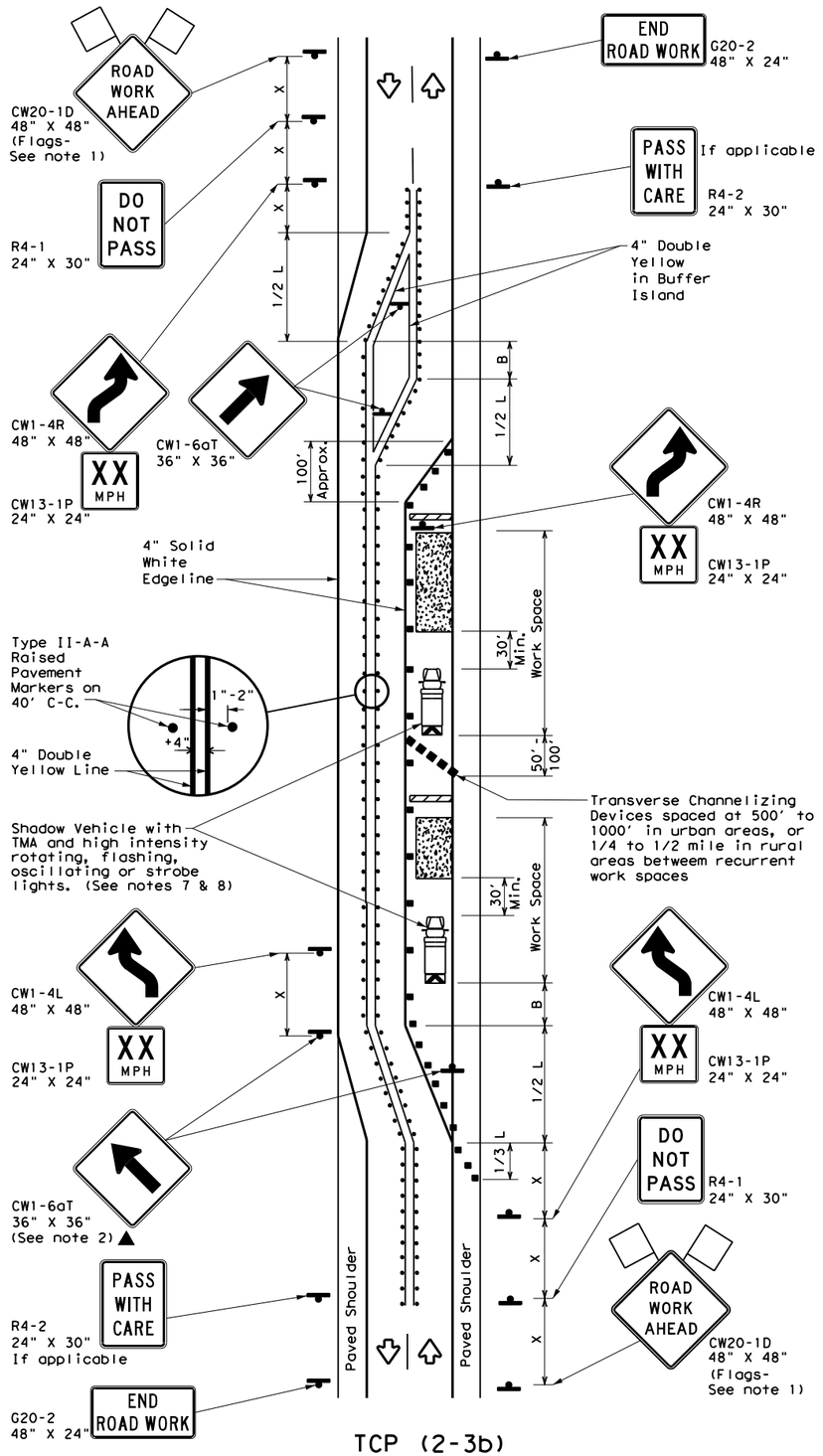
FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	1975	02	013	FM 1895
	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	50

DATE: 7/27/2022 10:22:34 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Profiles\tcp(2-3)-18.dgn



TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND

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

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

* Conventional Roads Only

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
				TCP(2-3b)ONLY
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

9. Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

Texas Department of Transportation

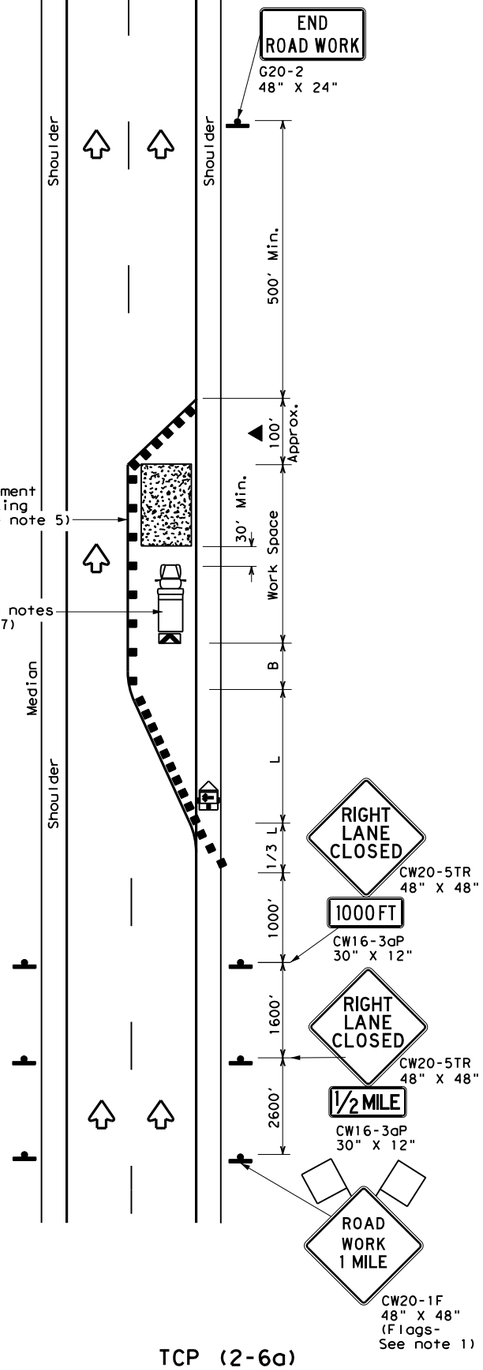
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

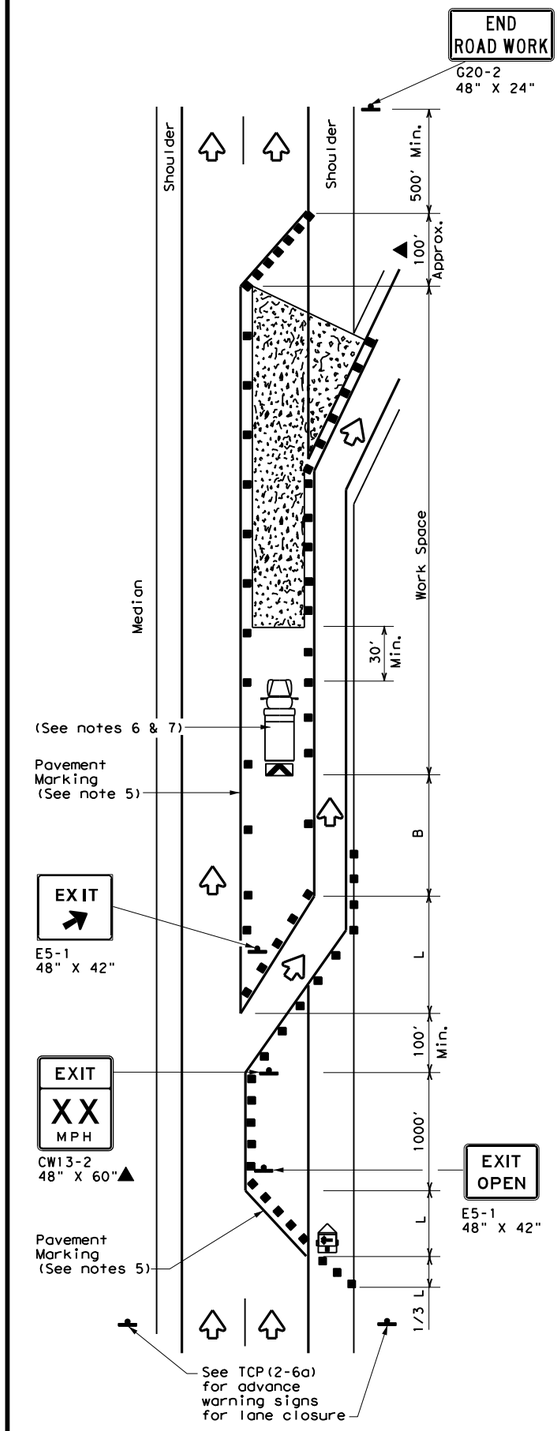
FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	DAL	KAUFMAN		51
4-98 2-18				

DATE: 7/27/2022 10:24:00 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\Standards\tcp2-6-18.dgn



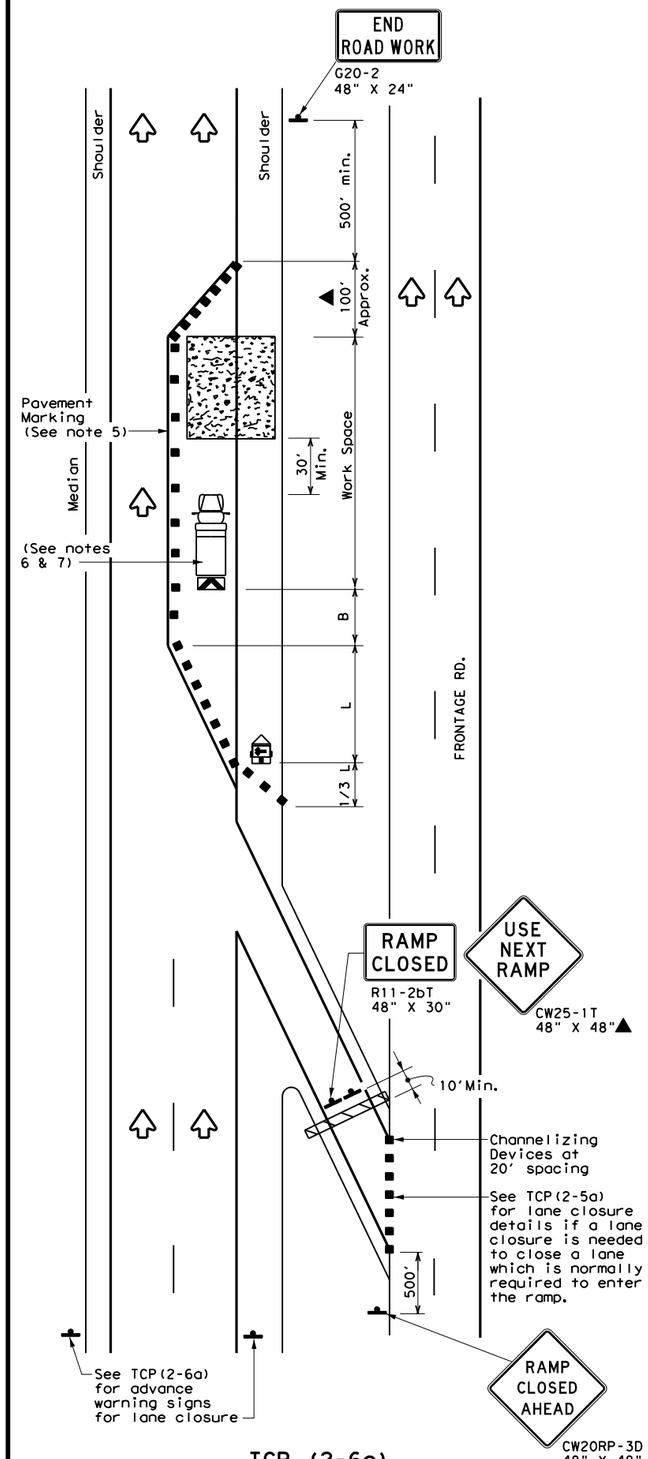
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

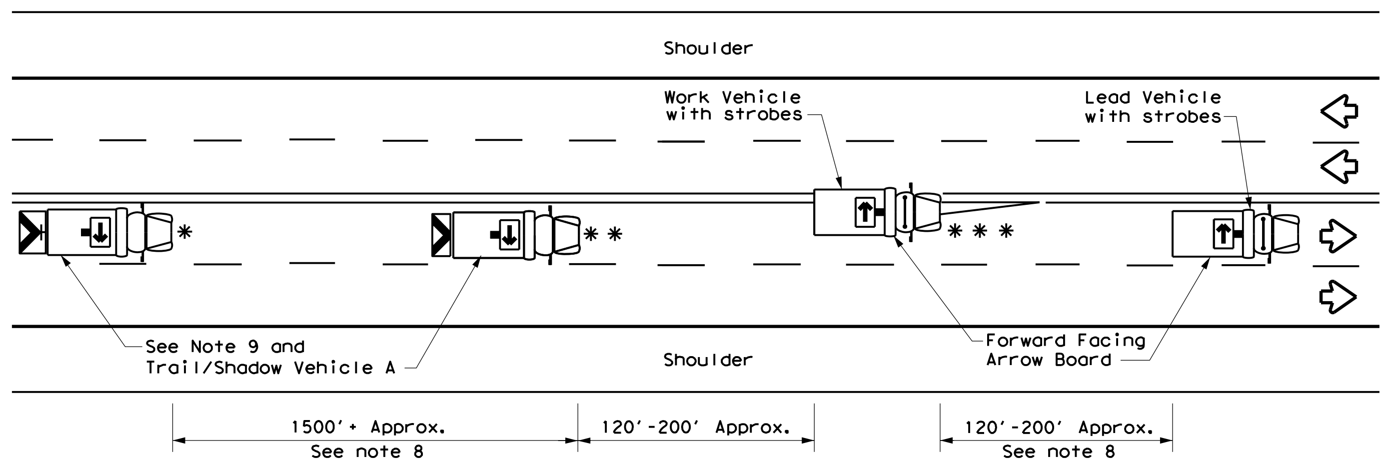
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

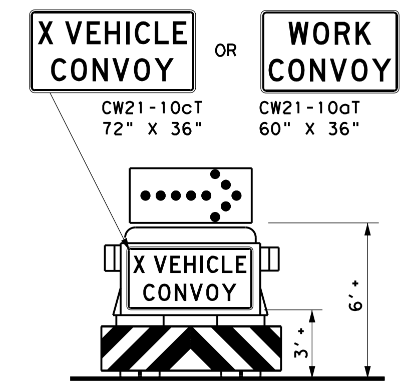
TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		52



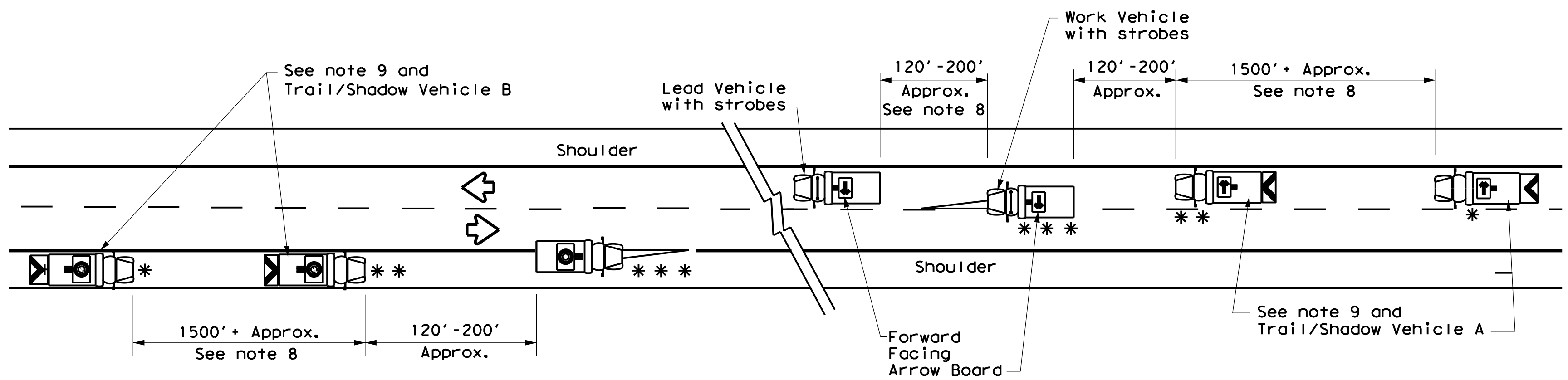
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

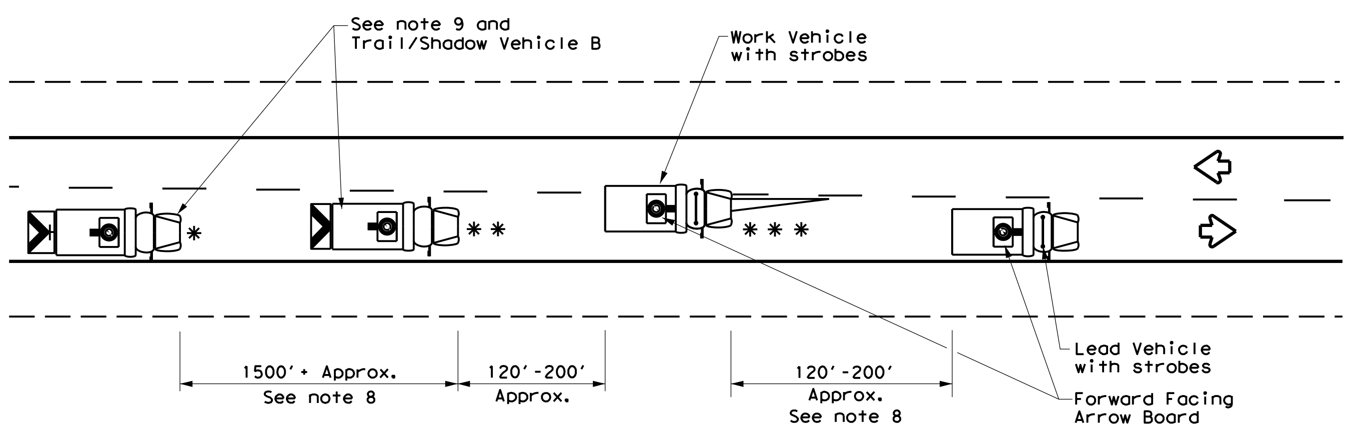


WORK ON SHOULDER

WORK ON TRAVEL LANE

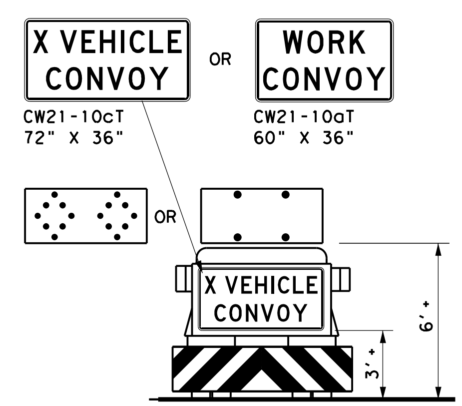
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in CAUTION display

LEGEND

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

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

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.

2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.

3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and TRAIL VEHICLE are required.

4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.

5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.

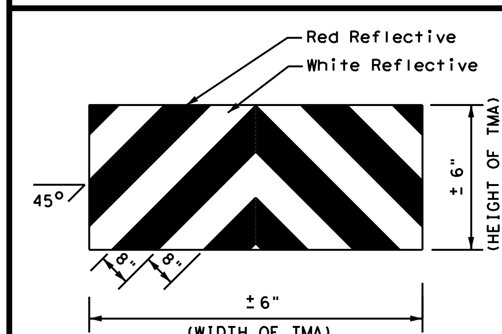
6. Each vehicle shall have two-way radio communication capability.

7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.

8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.

9. "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY"(CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.

10. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

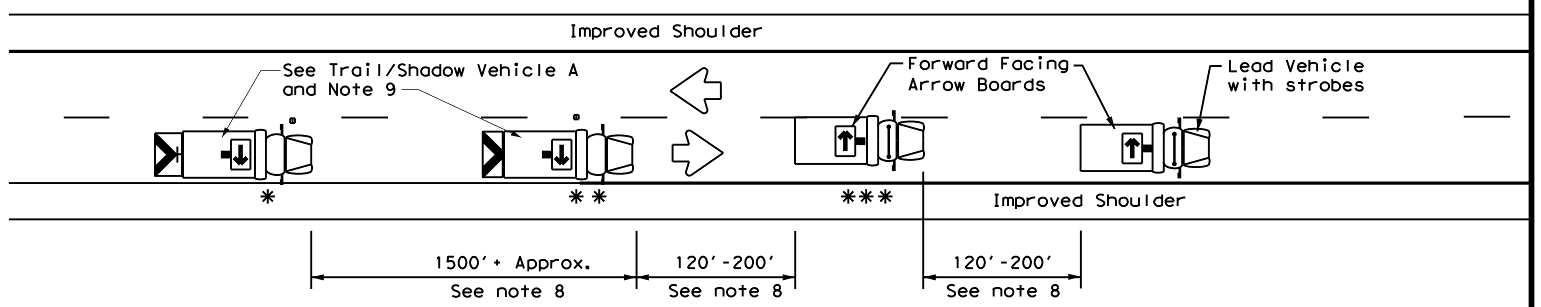
TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT 1975	SECT 02	JOB 013	HIGHWAY FM 1895
REVISIONS 2-94 4-98 8-95 7-13 1-97	DIST DAL		COUNTY KAUFMAN	SHEET NO. 53

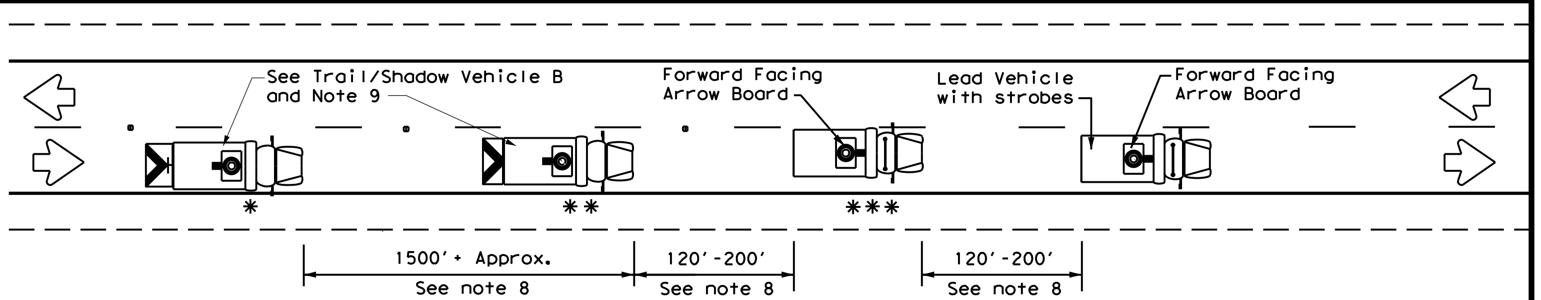
175

DATE: 7/27/2022 10:25:58 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\...



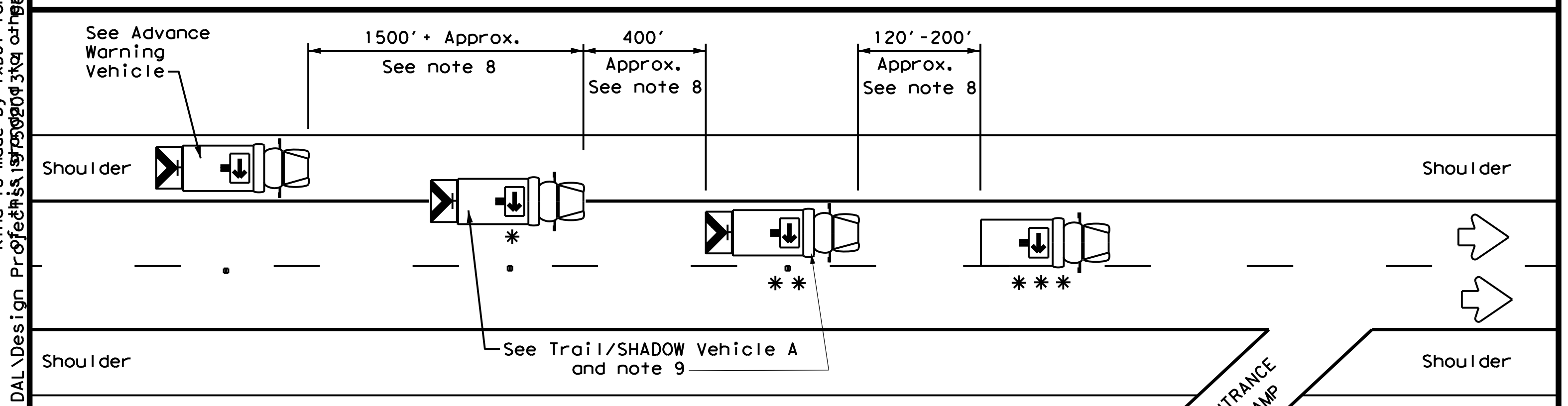
TCP (3-3a)

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



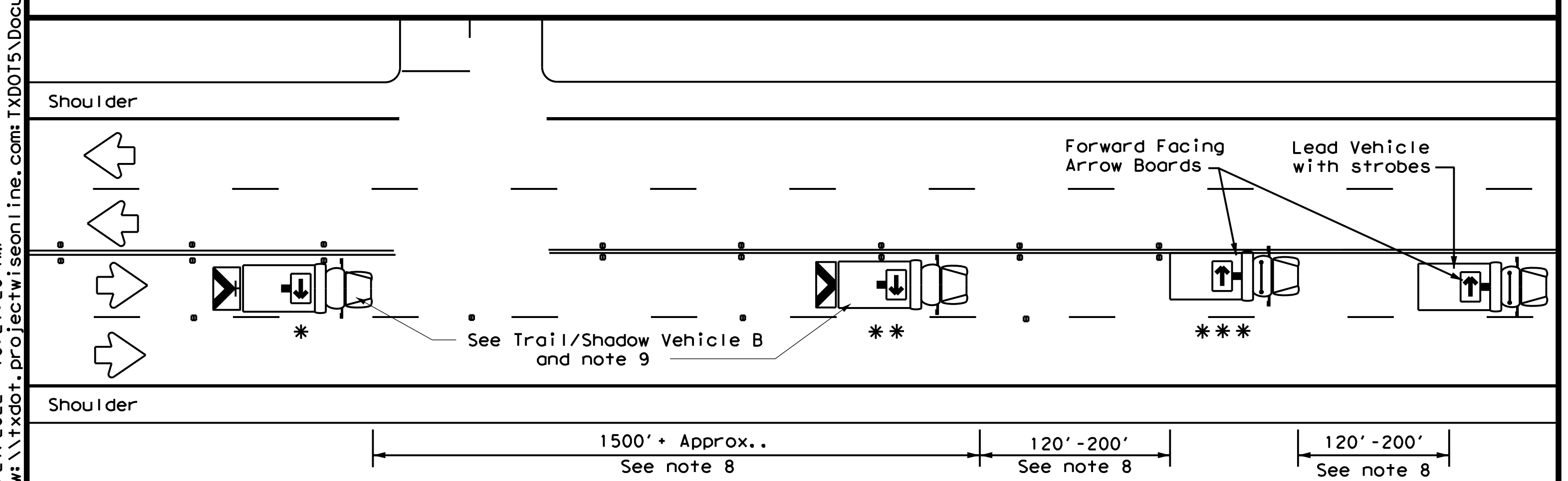
TCP (3-3b)

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



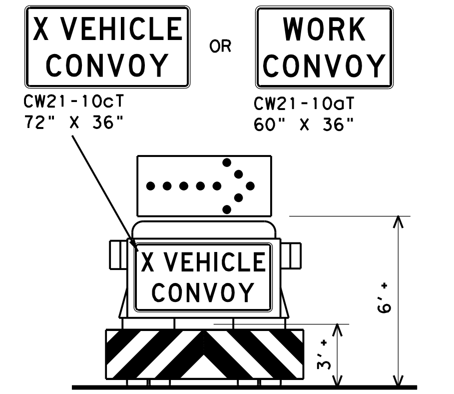
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



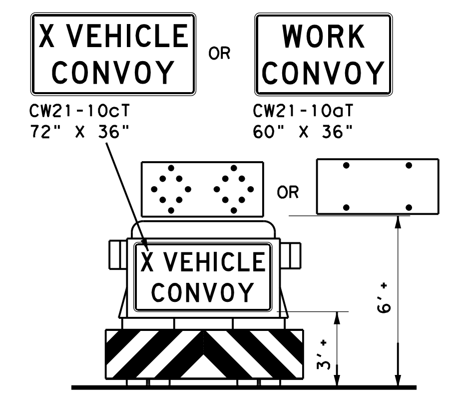
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



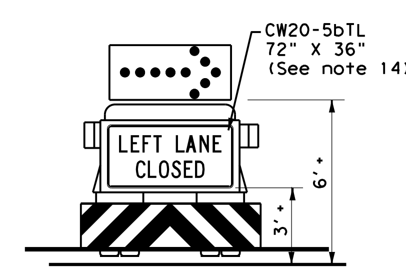
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

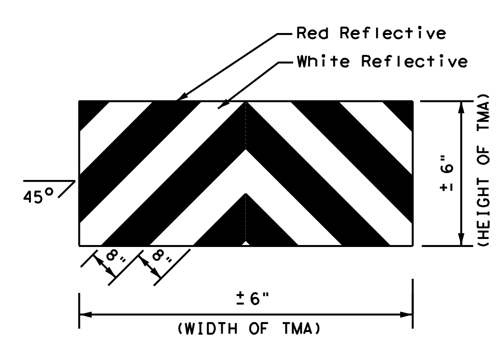


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

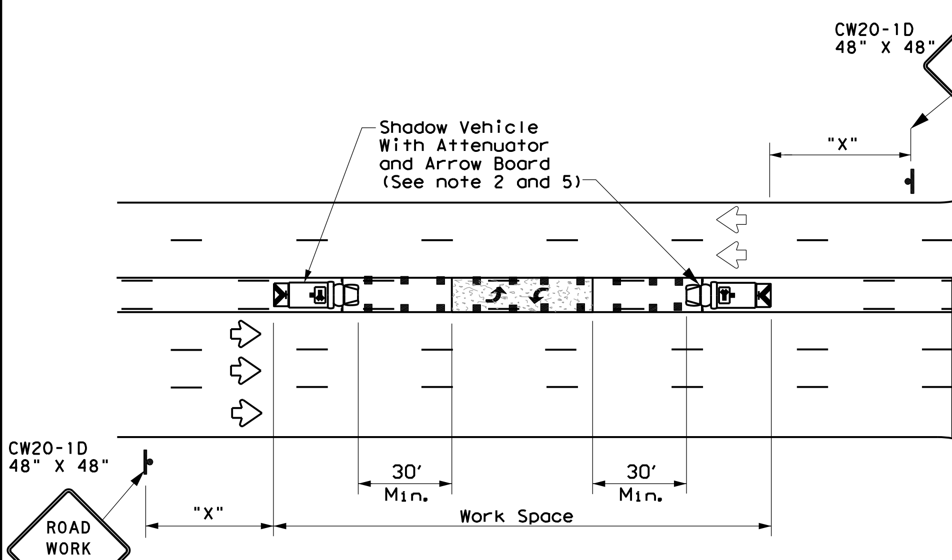
1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer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

Texas Department of Transportation — Traffic Operations Division Standard

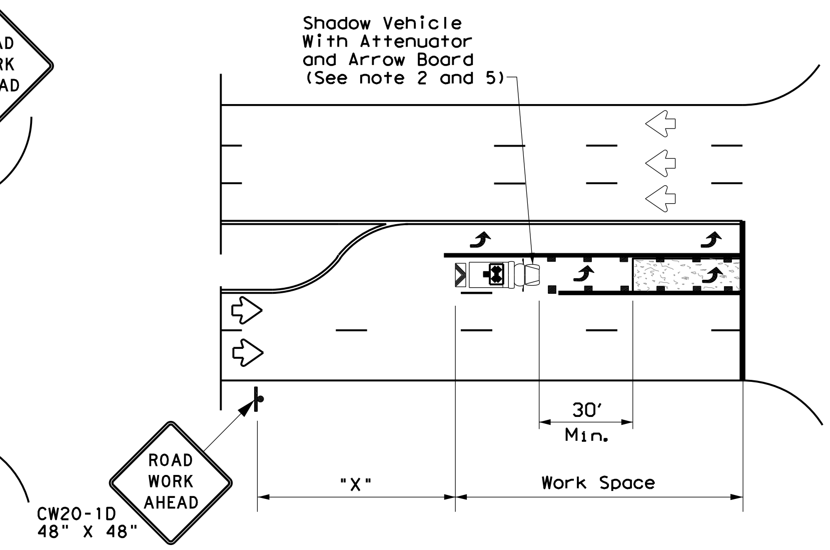
TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL
TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS: 2-94 4-98; 8-95 7-13; 1-97 7-14	1975	02	013	FM 1895
	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	54

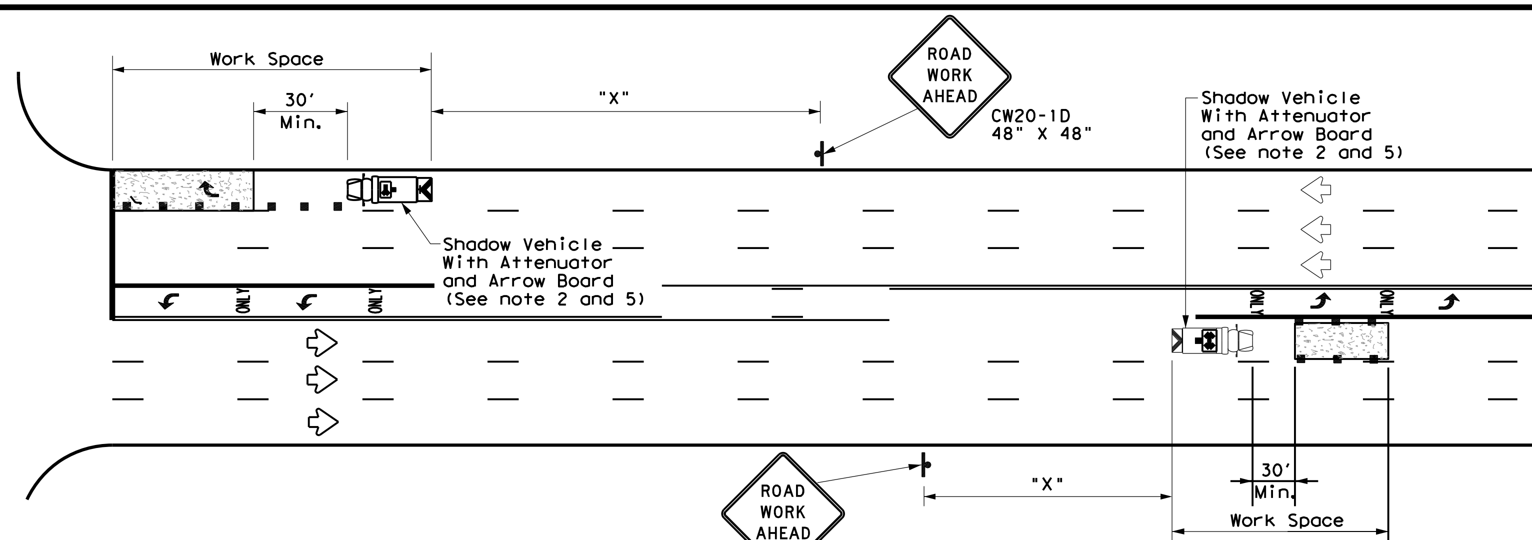
DATE: 7/27/2022 10:27:20 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013 ...



TYPICAL TRAFFIC CONTROL FOR
CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS

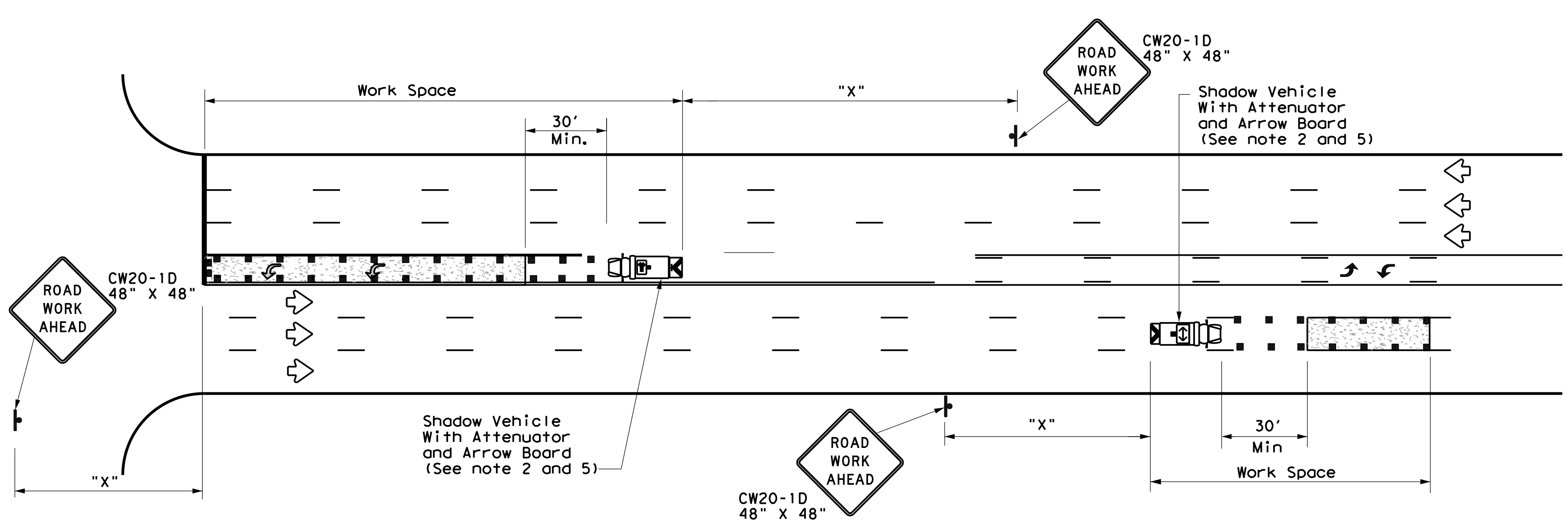


TYPICAL TRAFFIC CONTROL FOR
OUTSIDE DUAL LEFT TURN LANE SYMBOL MARKINGS



TYPICAL TRAFFIC CONTROL FOR
OUTSIDE LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
INSIDE LANE MARKINGS



TYPICAL TRAFFIC CONTROL FOR
LEFT TURN LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
CENTER LANE MARKINGS

LEGEND

*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow	■ ■ ■	Channelizing Devices

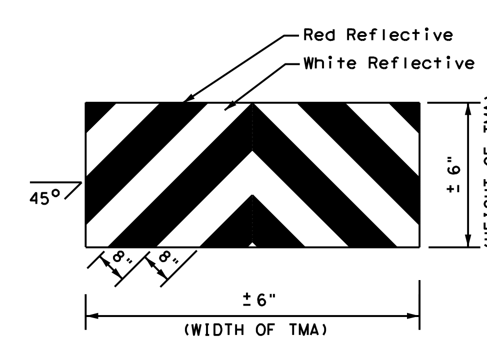
Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'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

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

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

GENERAL NOTES

1. This traffic control plan is for use on conventional roads posted at 45 mph or less and is intended for mobile operations that move continuously or intermittently (stopping up to approximately 15 minutes) such as short-line striping and in-lane rumble strips. When activities are anticipated to take longer amounts of time or traffic conditions warrant, a short duration or short-term stationary traffic control plan should be used.
2. A Truck Mounted Attenuator shall be used on Shadow Vehicle. Striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of departmental material specification DMS-8300, Type A.
3. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
4. The use of yellow rotating beacons or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the drivers side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
5. Flashing arrow board shall be used on Shadow Vehicle. Flashing arrow board shall be Type B or Type C as per BC Standards. The arrow board operation shall be controlled from inside the truck.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

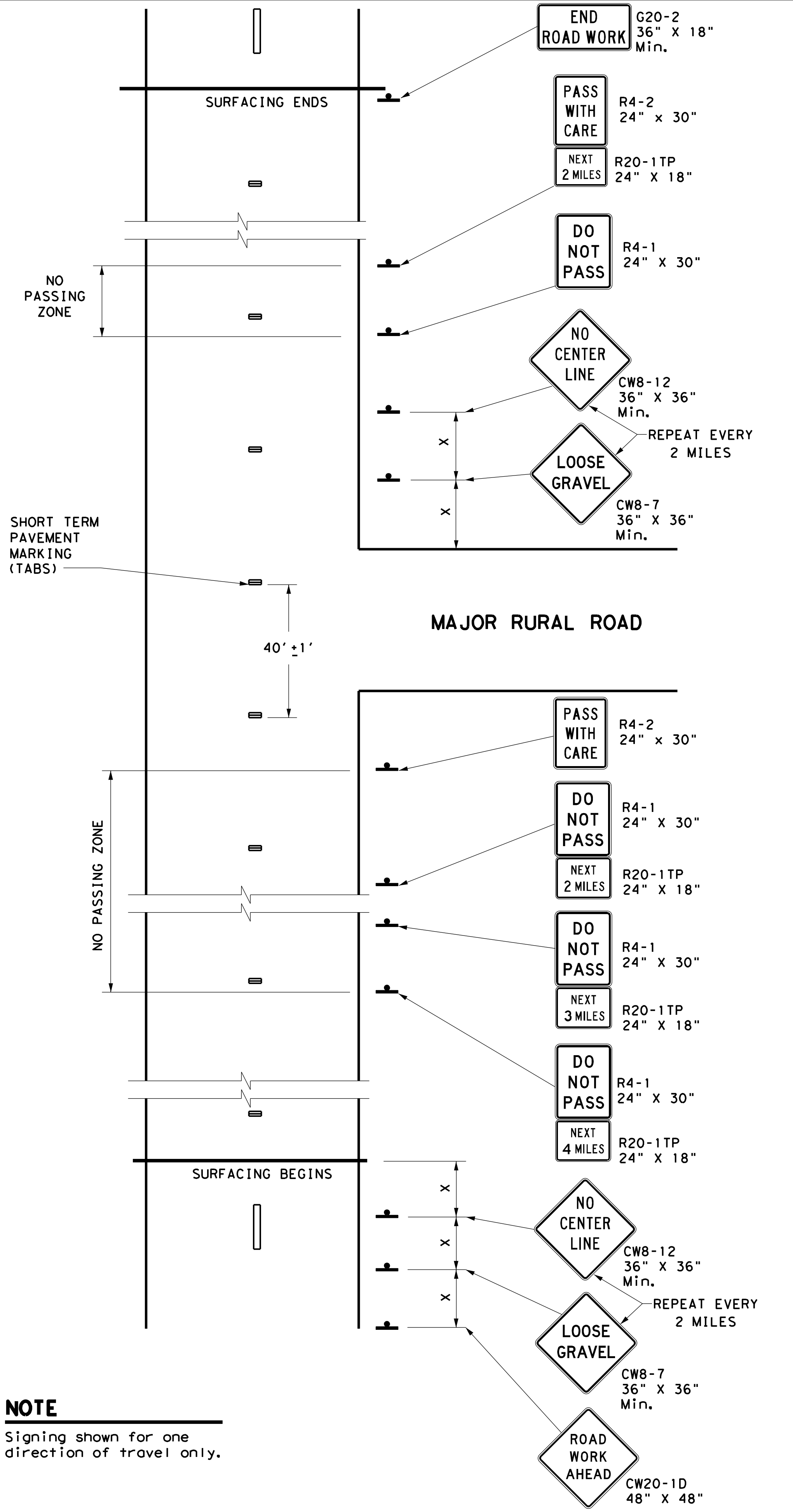
TRAFFIC CONTROL PLAN MOBILE OPERATIONS FOR ISOLATED WORK AREAS UNDIVIDED HIGHWAYS

TCP(3-4)-13

FILE: tcp3-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT July, 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		55

178

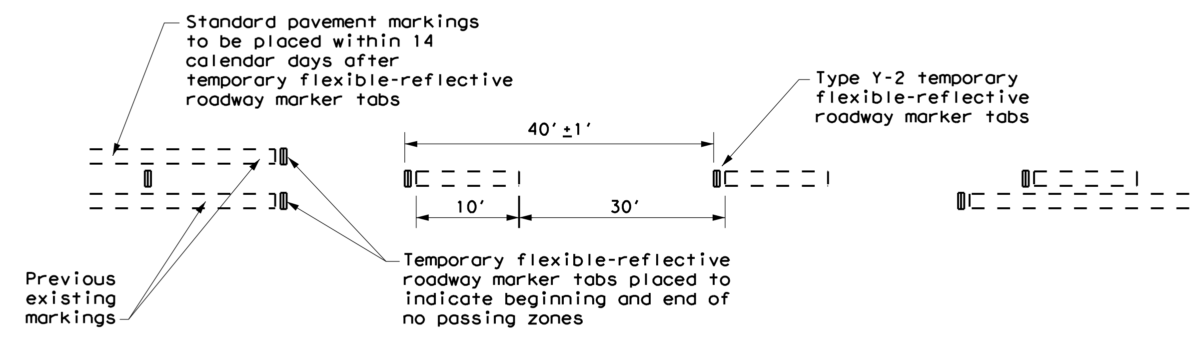
DATE: 7/27/2022 10:28:32 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\1975021013...



NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

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

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

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

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

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

"NO CENTER LINE" SIGN (CW8-12)

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

B. At the time construction activity obliterates the existing center line markings(low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.

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

"LOOSE GRAVEL" SIGN (CW8-7)

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

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

PAVEMENT MARKINGS

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

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

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

COORDINATION OF SIGN LOCATIONS

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

B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T)sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

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

* Conventional Roads Only

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

GENERAL NOTES

1. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.

2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.

3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.

4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".

5. Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

FILE: tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
4-92 4-98 1-97 7-13	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	56

210

DATE: 7/27/2022 10:29:34 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\...

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
CORE BORING DATA

SCALE: NTS SHEET 1 OF 15

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	57
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
CORE BORING DATA

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	58
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
CORE BORING DATA

SCALE: NTS SHEET 3 OF 15

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	59
CHECK VD	CONTROL 1975	SECTION 02	JOB 013	

FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

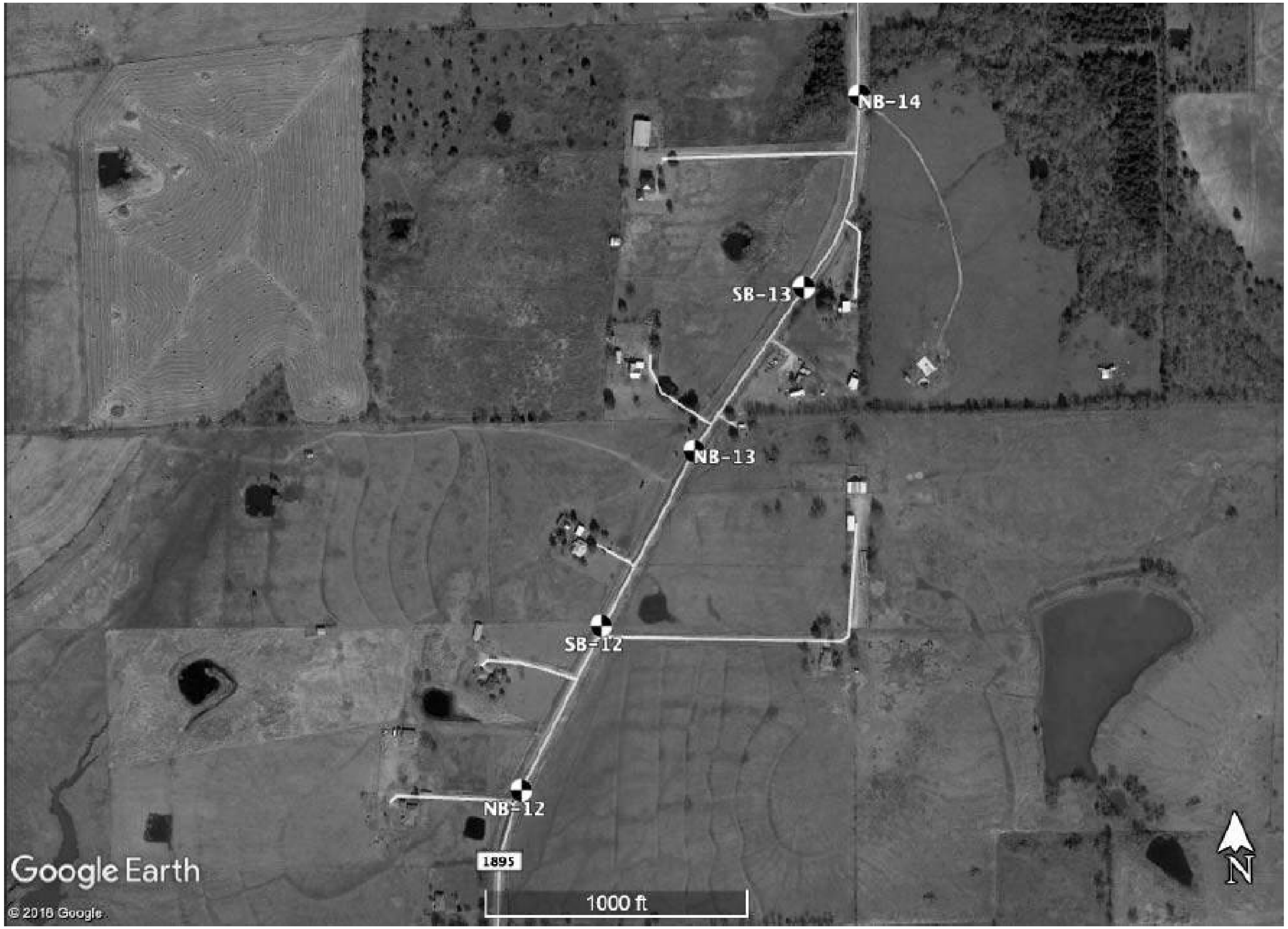
Texas Department of Transportation
© 2022

FM 1895
CORE BORING DATA

SCALE: NTS SHEET 4 OF 15

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	60
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/27/2022 11:13:42 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Master Design Files\Plan Set\Core Boring Data Sheets.dgn



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

FM 1895
CORE BORING DATA

SCALE: NTS SHEET 5 OF 15

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	61
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 11:14:16 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\1975020134 - Design\Master Design Files\Plan Set\Core Boring Data Sheets.dgn

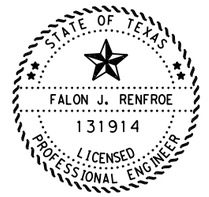
Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

FM 1895
CORE BORING DATA

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	62
CHECK VD	CONTROL 1975	SECTION 02	JOB 013	

DATE: 7/27/2022 11:15:20 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Master Design Files\Plan Set\Core Boring Data Sheets.dgn



Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

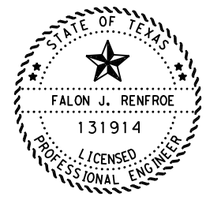
FM 1895
CORE BORING DATA

SCALE: NTS

SHEET 7 OF 15

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	63
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/27/2022 11:15:41 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Master Design Files\Plan Set\Core Boring Data Sheets.dgn



Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
CORE BORING DATA

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	64
CHECK VD	CONTROL 1975	SECTION 02	JOB 013	

DATE: 7/27/2022 11:15:59 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - DesignMaster Design Files\Plan Set\Core Boring Data Sheets.dgn

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
CORE BORING DATA

SCALE: NTS SHEET 9 OF 15

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	65
CHECK VD	CONTROL 1975	SECTION 02	JOB 013	

DATE: 7/27/2022 11:16:37 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\19750201\3\4 - Design\Master Design Files\Plan Set\Core Boring Data Sheets.dgn

DATE: 7/27/2022 11:17:12 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\19750201\3\4 - Design\Master Design Files\Plan Set\Core Boring Data Sheets.dgn

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
CORE BORING DATA

SCALE: NTS SHEET 10 OF 15

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	
CHECK	CONTROL	SECTION	JOB	66
JR				
CHECK	1975	02	013	
VD				

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
CORE BORING DATA

SCALE: NTS

SHEET 11 OF 15

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	67
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 11:18:00 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Master Design Files\Plan Set\Core Boring Data Sheets.dgn

Boring#	Pavement Summary		Subgrade Lab Tests					
	Total Pavement Thickness (in)	Pavement Description	Sample Depth (ft)	Moisture Content (%)	Liquid Limit	Plastic Limit	PI	Sulfate Content (ppm)
NB-1	13	5 inches of Asphalt over 8 inches of Base	1.5	13.2	49	19	30	153
NB-2	18	12 inches of Asphalt over 6 inches of Base	2.5	33.2	36	11	25	153
NB-3	28	4.5 inches of Asphalt over 23.5 inches of Base	3.0	30.1	35	13	17	120
NB-4	14	5 inches of Asphalt over 9 inches of Base	1.5	25.4	54	19	35	<100
NB-5	14	10 inches of Asphalt over 4 inches of Base	1.5	39.1	64	24	40	140
NB-6	13	8 inches of Asphalt over 5 inches of Base	2.0	30.8	74	24	50	<100
NB-7	22	11 inches of Asphalt over 11 inches of Base	2.0	28.4	56	18	38	333
NB-8	15	13 inches of Asphalt over 2 inches of Base	1.5	24.6	48	18	30	553
NB-9	13	12 inches of Asphalt over 1 inch of Base	1.5	28.3	72	15	57	840
NB-10	13	2 inches of Asphalt over 9 inches of Base	1.5	27.7	45	17	28	<100
NB-11	10	2 inches of Asphalt over 8 inches of Base	1.5	26.1	49	13	36	380
NB-12	11	3 inches of Asphalt over 8 inches of Base	2.5	19.7	74	18	56	<100
NB-13	11	2 inches of Asphalt over 9 inches of Base	1.5	27.8	44	18	26	<100
NB-14	16	5 inches of Asphalt over 11 inches of Base	2.5	23.2	43	19	24	<100
NB-15	11	2 inches of Asphalt over 9 inches of Base	2.0	23.6	42	23	19	500
NB-16	14	4.5 inches of Asphalt over 9.5 inches of Base	2.5	23.4	55	18	37	<100
NB-17	15	10 inches of Asphalt over 5 inches of Base	2.5	33.7	72	25	47	280
NB-18	14	3 inches of Asphalt over 11 inches of Base	2.0	25.7	61	21	40	<100
NB-19	16	9 inches of Asphalt over 7 inches of Base	1.5	22.5	52	17	35	440
NB-20	15	12 inches of Asphalt over 3 inches of Base	2.0	28.7	66	19	47	<100
NB-21	13	3.5 inches of Asphalt over 9.5 inches of Base	1.5	25.3	58	20	38	<100
NB-22	12	4 inches of Asphalt over 8 inches of Base	1.25	36.4	77	21	56	147

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

FM 1895
CORE BORING DATA

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	68
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

Boring#	Pavement Summary		Subgrade Lab Tests					
	Total Pavement Thickness (in)	Pavement Description	Sample Depth (ft)	Moisture Content (%)	Liquid Limit	Plastic Limit	PI	Sulfate Content (ppm)
NB-23	10	3 inches of Asphalt over 7 inches of Base	2.0	32.0	79	30	49	100
NB-24	12	5 inches of Asphalt over 7 inches of Base	1.5	30.1	79	25	54	233
NB-25	12	5 inches of Asphalt over 7 inches of Base	1.5	35.6	77	30	47	433
NB-26	16	3 inches of Asphalt over 13 inches of Base	1.75	21.8	52	19	33	<100
NB-27	12	6 inches of Asphalt over 6 inches of Base	1.25	27.3	65	24	41	567
NB-28	13	5 inches of Asphalt over 8 inches of Base	2.0	27.6	78	19	59	660

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
CORE BORING DATA

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	69
CHECK VD	CONTROL 1975	SECTION 02	JOB 013	

DATE: 7/27/2022 11:18:48 AM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - DesignMaster Design Files\Plan Set\Core Boring Data Sheets.dgn

Boring#	Pavement Summary		Subgrade Lab Tests					
	Total Pavement Thickness (in)	Pavement Description	Sample Depth (ft)	Moisture Content (%)	Liquid Limit	Plastic Limit	PI	Sulfate Content (ppm)
SB-1	17	8 inches of Asphalt over 9 inches of Base	2.5	23.4	55	20	35	400
SB-2	21	10 inches of Asphalt over 11 inches of Base	2.0	21.0	42	15	27	833
SB-3	15	6 inches of Asphalt over 9 inches of Base	1.5	24.5	60	21	39	333
SB-4	15	12 inches of Asphalt over 3 inches of Base	2.5	37.5	66	22	44	<100
SB-5	18	9 inches of Asphalt over 9 inches of Base	1.75	31.7	51	16	35	1533
SB-6	14	13 inches of Asphalt over 1 inch of Base	1.5	16.3	50	24	26	133
SB-7	17	11 inches of Asphalt over 6 inches of Base	2.0	31.5	55	18	37	366
SB-8	14	11 inches of Asphalt over 3 inches of Base	2.5	27.5	76	24	52	<100
SB-9	13	12 inches of Asphalt over 1 inch of Base	1.5	21.2	51	14	37	200
SB-10	12	1 inch of Asphalt over 11 inches of Base	1.5	17.8	40	17	23	<100
SB-11	14	1 inch of Asphalt over 13 inches of Base	1.5	27.0	35	17	18	240
SB-12	14	5 inches of Asphalt over 9 inches of Base	1.5	24.0	31	18	13	160
SB-13	14	14 inches of Asphalt	2.5	35.5	48	20	28	393
SB-14	15	6 inches of Asphalt over 9 inches of Base	2.0	26.3	37	13	24	<100
SB-15	12	4 inches of Asphalt over 8 inches of Base	1.25	21.4	44	19	25	<100
SB-16	10	7 inches of Asphalt over 3 inches of Base	1.25	27.3	56	19	37	<100
SB-17	11	4 inches of Asphalt over 7 inches of Base	1.25	27.1	72	22	50	<100
SB-18	14	5.5 inches of Asphalt over 8.5 inches of Base	2.0	28.9	59	20	39	240
SB-19	14	5.5 inches of Asphalt over 8.5 inches of Base	2.5	24.1	54	18	36	<100
SB-20	12	8 inches of Asphalt over 4 inches of Base	1.25	29.6	53	21	32	<100
SB-21	13	3 inches of Asphalt over 10 inches of Base	1.5	30.6	58	22	36	113
SB-22	14	5 inches of Asphalt over 9 inches of Base	1.5	28.1	70	27	43	<100

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
CORE BORING DATA

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	
CHECK	CONTROL	SECTION	JOB	70
JR				
CHECK	1975	02	013	
VD				

Boring#	Pavement Summary		Subgrade Lab Tests					
	Total Pavement Thickness (in)	Pavement Description	Sample Depth (ft)	Moisture Content (%)	Liquid Limit	Plastic Limit	PI	Sulfate Content (ppm)
SB-23	14	14 inches of Asphalt	2.25	37.7	87	28	59	<100
SB-24	10	4 inches of Asphalt over 6 inches of Base	1.5	26.1	72	25	47	147
SB-25	15	7 inches of Asphalt over 8 inches of Base	3.0	25.1	57	20	37	134
SB-26	12	5 inches of Asphalt over 7 inches of Base	2.0	28.8	52	21	31	<100
SB-27	12	7 inches of Asphalt over 5 inches of Base	1.5	32.2	80	16	64	<100

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
CORE BORING DATA

SCALE: NTS SHEET 15 OF 15

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	71
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/27/2022 11:19:32 AM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - DesignMaster Design Files\Plan Set\Core Boring Data Sheets.dgn

DATE: 7/27/2022 11:42:04 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\00A. Alignment Data.dgn

* 1 Describe Chain FM19852

Chain FM19852 contains:
FM198521 FM198523 CUR FM19852_5 CUR FM19852_8 FM1985211 FM1985213 FM1985215 FM-1985217 FM1985219 CUR FM19852_21 FM1985224 CUR FM19852_26 FM1985229 CUR FM19852-_31 CUR FM19852_34 FM1985237 CUR FM19852_39 FM1985242 FM1985244 CUR FM19852_46 - CUR FM19852_49 FM1985252 FM1985254 FM1985256 FM1985258 FM1985260 FM1985262 FM19-85264 FM1985266 FM1985268 CUR FM19852_70 FM1985273 CUR FM19852_75 FM1985278 CUR-FM19852_80 FM1985283 FM1985284

Beginning chain FM19852 description
Feature: Road_Centerline

Point FM198521 N 6,888,666.2568 E 2,674,283.9065 Sta 0+00.00

Course from FM198521 to FM198523 S 1° 08′ 41.88" E Dist 2,166.9397

Point FM198523 N 6,886,499.7498 E 2,674,327.2065 Sta 21+66.94

Course from FM198523 to PC FM19852_5 S 1° 13′ 29.22" E Dist 1,463.7168

Curve Data

Curve FM19852_5
P.I. Station 38+29.80 N 6,884,837.2710 E 2,674,362.7499
Delta = 8° 17′ 01.37" (RT)
Degree = 2° 05′ 00.54"
Tangent = 199.1419
Length = 397.5897
Radius = 2,750.0000
External = 7.2010
Long Chord = 397.2436
Mid. Ord. = 7.1822
P.C. Station 36+30.66 N 6,885,036.3674 E 2,674,358.4933
P.T. Station 40+28.25 N 6,884,639.6386 E 2,674,338.2773
C.C. N 6,884,977.5865 E 2,671,609.1216
Back = S 1° 13′ 29.22" E
Ahead = S 7° 03′ 32.15" W
Chord Bear = S 2° 55′ 01.46" W

Course from PT FM19852_5 to PC FM19852_8 S 7° 03′ 32.15" W Dist 1,121.8350

Curve Data

Curve FM19852_8
P.I. Station 53+45.84 N 6,883,332.0312 E 2,674,176.3580
Delta = 8° 36′ 41.73" (LT)
Degree = 2° 12′ 13.26"
Tangent = 195.7594
Length = 390.7816
Radius = 2,600.0000
External = 7.3592
Long Chord = 390.4139
Mid. Ord. = 7.3384
P.C. Station 51+50.08 N 6,883,526.3068 E 2,674,200.4149
P.T. Station 55+40.86 N 6,883,136.3436 E 2,674,181.6622
C.C. N 6,883,206.7925 E 2,676,780.7076
Back = S 7° 03′ 32.15" W
Ahead = S 1° 33′ 09.58" E
Chord Bear = S 2° 45′ 11.28" W

Course from PT FM19852_8 to FM1985211 S 1° 46′ 10.31" E Dist 830.5809

Point FM1985211 N 6,882,306.1588 E 2,674,207.3099 Sta 63+71.44

Course from FM1985211 to FM1985213 S 1° 19′ 21.32" E Dist 869.6498

Point FM1985213 N 6,881,436.7407 E 2,674,227.3827 Sta 72+41.09

Course from FM1985213 to FM1985215 S 1° 40′ 35.27" E Dist 920.7832

Point FM1985215 N 6,880,516.3516 E 2,674,254.3208 Sta 81+61.88

Course from FM1985215 to FM1985217 S 1° 31′ 19.10" E Dist 735.6946

Point FM1985217 N 6,879,780.9165 E 2,674,273.8611 Sta 88+97.57

Course from FM1985217 to FM1985219 S 1° 37′ 37.62" E Dist 2,902.4286

Point FM1985219 N 6,876,879.6582 E 2,674,356.2748 Sta 118+00.00

Course from FM1985219 to PC FM19852_21 S 1° 32′ 13.99" E Dist 1,112.8548

Curve Data

Curve FM19852_21
P.I. Station 132+75.72 N 6,875,404.4664 E 2,674,395.8631
Delta = 22° 11′ 41.21" (LT)
Degree = 3° 05′ 49.45"
Tangent = 362.8681
Length = 716.6382
Radius = 1,850.0000
External = 35.2515
Long Chord = 712.1659
Mid. Ord. = 34.5924
P.C. Station 129+12.85 N 6,875,767.2039 E 2,674,386.1286
P.T. Station 136+29.49 N 6,875,072.2832 E 2,674,541.9026
C.C. N 6,875,816.8327 E 2,676,235.4628
Back = S 1° 32′ 13.99" E
Ahead = S 23° 43′ 55.21" E
Chord Bear = S 12° 38′ 04.60" E

Course from PT FM19852_21 to FM1985224 S 23° 43′ 55.21" E Dist 836.0244

Point FM1985224 N 6,874,306.9548 E 2,674,878.3683 Sta 144+65.52

Course from FM1985224 to PC FM19852_26 S 24° 00′ 52.21" E Dist 980.0301

Curve Data

Curve FM19852_26
P.I. Station 158+32.09 N 6,873,058.6723 E 2,675,434.5182
Delta = 23° 36′ 11.56" (RT)
Degree = 3° 05′ 49.45"
Tangent = 386.5392
Length = 762.1144
Radius = 1,850.0000
External = 39.9504
Long Chord = 756.7369
Mid. Ord. = 39.1059
P.C. Station 154+45.55 N 6,873,411.7536 E 2,675,277.2091
P.T. Station 162+07.66 N 6,872,672.1430 E 2,675,437.2929
C.C. N 6,872,658.8630 E 2,673,587.3406
Back = S 24° 00′ 52.21" E
Ahead = S 0° 24′ 40.66" E
Chord Bear = S 12° 12′ 46.44" E

Course from PT FM19852_26 to FM1985229 S 0° 24′ 40.66" E Dist 2,992.6403

Point FM1985229 N 6,869,679.5798 E 2,675,458.7752 Sta 192+00.30

Course from FM1985229 to PC FM19852_31 S 0° 22′ 16.80" E Dist 1,263.6244

Curve Data

Curve FM19852_31
P.I. Station 207+51.96 N 6,868,127.9524 E 2,675,468.8314
Delta = 36° 03′ 23.06" (RT)
Degree = 6° 28′ 26.76"
Tangent = 288.0356
Length = 556.9332
Radius = 885.0000
External = 45.6930
Long Chord = 547.7886
Mid. Ord. = 43.4497
P.C. Station 204+63.93 N 6,868,415.9820 E 2,675,466.9646
P.T. Station 210+20.86 N 6,867,893.9997 E 2,675,300.8117
C.C. N 6,868,410.2464 E 2,674,581.9832
Back = S 0° 22′ 16.80" E
Ahead = S 35° 41′ 06.26" W
Chord Bear = S 17° 39′ 24.73" W

Course from PT FM19852_31 to PC FM19852_34 S 35° 41′ 06.26" W Dist 531.0107

Curve Data

Curve FM19852_34
P.I. Station 218+06.92 N 6,867,255.5321 E 2,674,842.2784
Delta = 8° 27′ 22.08" (LT)
Degree = 1° 39′ 38.69"
Tangent = 255.0513
Length = 509.1764
Radius = 3,450.0000
External = 9.4149
Long Chord = 508.7144
Mid. Ord. = 9.3892
P.C. Station 215+51.87 N 6,867,462.6939 E 2,674,991.0574
P.T. Station 220+61.05 N 6,867,028.7442 E 2,674,725.5804
C.C. N 6,865,450.2067 E 2,677,793.2699
Back = S 35° 41′ 06.26" W
Ahead = S 27° 13′ 44.19" W
Chord Bear = S 31° 27′ 25.22" W

Course from PT FM19852_34 to FM1985237 S 27° 13′ 44.19" W Dist 338.3648

Point FM1985237 N 6,866,727.8752 E 2,674,570.7625 Sta 223+99.41

Course from FM1985237 to PC FM19852_39 S 27° 03′ 04.83" W Dist 846.2053

Curve Data

Curve FM19852_39
P.I. Station 234+86.87 N 6,865,759.3816 E 2,674,076.1967
Delta = 27° 47′ 47.75" (LT)
Degree = 5° 52′ 35.36"
Tangent = 241.2574
Length = 473.0136
Radius = 975.0000
External = 29.4054
Long Chord = 468.3885
Mid. Ord. = 28.5445
P.C. Station 232+45.62 N 6,865,974.2453 E 2,674,185.9179
P.T. Station 237+18.63 N 6,865,518.1446 E 2,674,079.3347
C.C. N 6,865,530.8262 E 2,675,054.2523
Back = S 27° 03′ 04.83" W
Ahead = S 0° 44′ 42.92" E
Chord Bear = S 13° 09′ 10.95" W

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

NOTE:

PROFILE INCLUDED FOR DESIGN CHECK ONLY.
PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTION.

FM 1895
ALIGNMENT DATA

SCALE: NTS SHEET 1 OF 5

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	72
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

Course from PT FM19852_39 to FM1985242 S 0° 44′ 42.92" E Dist 245.7402

Point FM1985242 N 6,865,272.4252 E 2,674,082.5310 Sta 239+64.37

Course from FM1985242 to FM1985244 S 1° 06′ 17.08" E Dist 271.0542

Point FM1985244 N 6,865,001.4214 E 2,674,087.7570 Sta 242+35.42

Course from FM1985244 to PC FM19852_46 S 1° 13′ 29.69" E Dist 1,169.8382

Curve Data

Curve FM19852_46

P.I. Station	255+80.15	N	6,863,657.0078	E	2,674,116.5033
Delta =	11° 17′ 07.62" (RT)				
Degree =	3° 14′ 13.38"				
Tangent =	174.8827				
Length =	348.6339				
Radius =	1,770.0000				
External =	8.6186				
Long Chord =	348.0706				
Mid. Ord. =	8.5768				
P.C. Station	254+05.26	N	6,863,831.8506	E	2,674,112.7648
P.T. Station	257+53.90	N	6,863,484.8142	E	2,674,085.9533
C.C.		N	6,863,794.0130	E	2,672,343.1693

Back = S 1° 13′ 29.69" E

Ahead = S 10° 03′ 37.93" W

Chord Bear = S 4° 25′ 04.12" W

Course from PT FM19852_46 to PC FM19852_49 S 10° 03′ 37.93" W Dist 212.9717

Curve Data

Curve FM19852_49

P.I. Station	261+55.72	N	6,863,089.1711	E	2,674,015.7597
Delta =	10° 57′ 05.80" (LT)				
Degree =	2° 54′ 30.29"				
Tangent =	189.2499				
Length =	376.5491				
Radius =	1,970.0000				
External =	9.0311				
Long Chord =	375.9762				
Mid. Ord. =	8.9899				
P.C. Station	259+66.87	N	6,863,275.1171	E	2,674,048.7496
P.T. Station	263+43.42	N	6,862,900.3440	E	2,674,018.6966
C.C.		N	6,862,930.9806	E	2,675,988.4583

Back = S 10° 03′ 37.93" W

Ahead = S 0° 53′ 27.87" E

Chord Bear = S 4° 35′ 05.03" W

Course from PT FM19852_49 to FM1985252 S 0° 53′ 27.87" E Dist 556.0397

Point FM1985252 N 6,862,344.3715 E 2,674,027.3438 Sta 268+99.46

Course from FM1985252 to FM1985254 S 1° 00′ 12.94" E Dist 651.8974

Point FM1985254 N 6,861,692.5741 E 2,674,038.7619 Sta 275+51.35

Course from FM1985254 to FM1985256 S 1° 01′ 04.05" E Dist 1,996.3242

Point FM1985256 N 6,859,696.5649 E 2,674,074.2224 Sta 295+47.68

Course from FM1985256 to FM1985258 S 0° 58′ 51.68" E Dist 787.8556

Point FM1985258 N 6,858,908.8247 E 2,674,087.7114 Sta 303+35.53

Course from FM1985258 to FM1985260 S 1° 09′ 20.84" E Dist 213.7886

Point FM1985260 N 6,858,695.0796 E 2,674,092.0238 Sta 305+49.32

Course from FM1985260 to FM1985262 S 1° 39′ 50.57" E Dist 275.9358

Point FM1985262 N 6,858,419.2602 E 2,674,100.0367 Sta 308+25.26

Course from FM1985262 to FM1985264 S 2° 00′ 31.31" E Dist 510.8911

Point FM1985264 N 6,857,908.6830 E 2,674,117.9440 Sta 313+36.15

Course from FM1985264 to FM1985266 S 2° 08′ 46.02" E Dist 92.0322

Point FM1985266 N 6,857,816.7153 E 2,674,121.3904 Sta 314+28.18

Course from FM1985266 to FM1985268 S 2° 35′ 20.71" E Dist 1,263.4101

Point FM1985268 N 6,856,554.5949 E 2,674,178.4621 Sta 326+91.59

Course from FM1985268 to PC FM19852_70 S 2° 27′ 46.76" E Dist 547.1116

Curve Data

Curve FM19852_70

P.I. Station	337+80.89	N	6,855,466.3080	E	2,674,225.2734
Delta =	59° 47′ 37.85" (RT)				
Degree =	6° 04′ 33.26"				
Tangent =	542.1817				
Length =	984.1143				
Radius =	943.0000				
External =	144.7546				
Long Chord =	940.0601				
Mid. Ord. =	125.4911				
P.C. Station	332+38.70	N	6,856,007.9888	E	2,674,201.9737
P.T. Station	342+22.82	N	6,855,173.6454	E	2,673,768.8640
C.C.		N	6,855,967.4643	E	2,673,259.8448

Back = S 2° 27′ 46.76" E

Ahead = S 57° 19′ 51.09" W

Chord Bear = S 27° 26′ 02.17" W

Course from PT FM19852_70 to FM1985273 S 57° 19′ 51.09" W Dist 253.4485

Point FM1985273 N 6,855,036.8372 E 2,673,555.5106 Sta 344+76.27

Course from FM1985273 to PC FM19852_75 S 57° 39′ 18.13" W Dist 355.3904

Curve Data

Curve FM19852_75

P.I. Station	349+64.19	N	6,854,775.7903	E	2,673,143.2919
Delta =	3° 59′ 42.07" (LT)				
Degree =	1° 30′ 28.02"				
Tangent =	132.5336				
Length =	264.9598				
Radius =	3,800.0000				
External =	2.3105				
Long Chord =	264.9061				
Mid. Ord. =	2.3091				
P.C. Station	348+31.66	N	6,854,846.6978	E	2,673,255.2619
P.T. Station	350+96.62	N	6,854,697.2541	E	2,673,036.5341
C.C.		N	6,851,636.2974	E	2,675,288.3209

Back = S 57° 39′ 18.13" W

Ahead = S 53° 39′ 36.06" W

Chord Bear = S 55° 39′ 27.09" W

Course from PT FM19852_75 to FM1985278 S 53° 39′ 36.06" W Dist 674.9506

Point FM1985278 N 6,854,297.2950 E 2,672,492.8513 Sta 357+71.57

Course from FM1985278 to PC FM19852_80 S 53° 20′ 03.53" W Dist 869.7918

Curve Data

Curve FM19852_80

P.I. Station	370+44.43	N	6,853,537.2106	E	2,671,471.8443
Delta =	12° 06′ 34.71" (RT)				
Degree =	1° 30′ 28.02"				
Tangent =	403.0725				
Length =	803.1419				
Radius =	3,800.0000				
External =	21.3175				
Long Chord =	801.6479				
Mid. Ord. =	21.1986				
P.C. Station	366+41.36	N	6,853,777.9033	E	2,671,795.1623
P.T. Station	374+44.50	N	6,853,369.7004	E	2,671,105.2276
C.C.		N	6,856,826.0102	E	2,669,526.0117

Back = S 53° 20′ 03.53" W

Ahead = S 65° 26′ 38.24" W

Chord Bear = S 59° 23′ 20.88" W

Course from PT FM19852_80 to FM1985283 S 65° 26′ 38.24" W Dist 939.3603

Point FM1985283 N 6,852,979.3182 E 2,670,250.8276 Sta 383+83.86

Course from FM1985283 to FM1985284 S 65° 27′ 57.16" W Dist 1,484.6894

Point FM1985284 N 6,852,362.8230 E 2,668,900.1847 Sta 398+68.55

****

Ending chain FM19852 description

LEGEND

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

NOTE:

PROFILE INCLUDED FOR DESIGN CHECK ONLY.
PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTION.

Texas Department of Transportation

FM 1895
ALIGNMENT DATA

SCALE: NTS SHEET 2 OF 5

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	73
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 11:42:31 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\00A. Alignment Data.dgn

DATE: 7/27/2022 11:42:57 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\00A. Alignment Data.dgn

* 1 Print Profile PROPPROFILE1

Beginning profile PROPPROFILE1 description:

		STATION	ELEV	GRADE	TOTAL L	BACK L	AHEAD L	
VPI	1	0+00.00	447.5199					
VPC		0+16.09	447.2219	-1.8521	K = 4.5			
VPI	2	0+21.11	447.1289		10.0484	5.0242	5.0242	
Low Point		0+24.42	447.1447					
VPT		0+26.13	447.1480	0.3803				
VPC		0+90.07	447.3911	0.3803	K = 60.2	SSD = 646.2		
High Point		1+12.96	447.4346					
VPI	3	1+45.00	447.6000		109.8605	54.9303	54.9303	
VPT		1+99.93	446.8065	-1.4445				
VPC		5+29.75	442.0422	-1.4445	K = 575.4			
VPI	4	5+78.66	441.3356		97.8257	48.9129	48.9129	
VPT		6+27.57	440.7122	-1.2745				
VPC		11+16.01	434.4870	-1.2745	K = 914.1			
VPI	5	11+91.01	433.5311		150.0000	75.0000	75.0000	
VPT		12+66.01	432.6983	-1.1104				
VPC		14+64.74	430.4915	-1.1104	K = 162.8			
VPI	6	15+00.00	430.1000		70.5146	35.2573	35.2573	
VPT		15+35.26	429.8612	-0.6773				
VPC		18+37.99	427.8107	-0.6773	K = 1483.7			
VPI	7	20+39.61	426.4451		403.2447	201.6223	201.6223	
VPT		22+41.23	425.6274	-0.4055				
VPC		26+98.68	423.7723	-0.4055	K = 1545.0	SSD = 49646.6		
VPI	8	27+15.48	423.7042		33.5901	16.7950	16.7950	
VPT		27+32.28	423.6324	-0.4273				
VPC		33+27.48	421.0892	-0.4273	K = 1566.1	SSD = 14473.7		
VPI	9	33+86.09	420.8388		117.2287	58.6144	58.6144	
VPT		34+44.70	420.5445	-0.5021				
VPC		36+82.78	419.3490	-0.5021	K = 127.0	SSD = 1878.8		
VPI	10	37+20.00	419.1621		74.4304	37.2152	37.2152	
VPT		37+57.22	418.7572	-1.0881				
VPC		38+18.24	418.0932	-1.0881	K = 226.8			
VPI	11	39+50.76	416.6513		265.0339	132.5170	132.5170	
Low Point		40+65.06	416.7504					
VPT		40+83.28	416.7577	0.0803				
VPC		44+91.70	417.0857	0.0803	K = 808.5			
VPI	12	46+34.00	417.2000		284.6047	142.3023	142.3023	
VPT		47+76.30	417.8152	0.4323				
VPC		48+02.65	417.9291	0.4323	K = 86.5			
VPI	13	49+00.00	418.3500		194.6909	97.3454	97.3454	
VPT		49+97.35	420.9618	2.6831				
VPC		55+36.73	435.4340	2.6831	K = 71.9	SSD = 404.9		
VPI	14	56+92.42	439.6112		311.3724	155.6862	155.6862	
High Point		57+29.71	438.0229					
VPT		58+48.11	437.0484	-1.6461				
VPC		58+90.30	436.3538	-1.6461	K = 291.2			
VPI	15	59+40.30	435.5308		100.0000	50.0000	50.0000	
VPT		59+90.30	434.8794	-1.3027				
VPC		60+98.26	433.4730	-1.3027	K = 178.6			
Low Point		63+30.99	431.9571					
VPI	16	64+80.00	428.5000		763.4824	381.7412	381.7412	
VPT		68+61.74	439.8414	2.9710				
VPC		74+29.87	456.7204	2.9710	K = 96.2	SSD = 455.7		
VPI	17	76+66.86	463.7612		473.9755	236.9877	236.9877	
High Point		77+15.74	460.9670					
VPT		79+03.85	459.1284	-1.9549				
VPC		80+10.65	457.0404	-1.9549	K = 130.8			
VPI	18	81+48.65	454.3427		275.9944	137.9972	137.9972	
Low Point		82+66.44	454.5402					
VPT		82+86.65	454.5558	0.1544				
VPC		87+02.15	455.1974	0.1544	K = 95.0			
VPI	19	88+50.90	455.4271		297.5050	148.7525	148.7525	
VPT		89+99.65	460.3137	3.2850				
VPC		92+26.48	467.7649	3.2850	K = 85.0	SSD = 428.2		
VPI	20	94+80.00	476.0933		507.0491	253.5246	253.5246	
High Point		95+05.58	472.3492					
VPT		97+33.52	469.2913	-2.6830				
VPC		101+55.57	457.9681	-2.6830	K = 64.2			
VPI	21	102+55.90	455.2762		200.6680	100.3340	100.3340	
Low Point		103+27.76	455.6581					
VPT		103+56.23	455.7213	0.4436				
VPC		106+26.90	456.9220	0.4436	K = 1290.3			
VPI	22	106+86.82	457.1878		119.8310	59.9155	59.9155	
VPT		107+46.74	457.5093	0.5365				
VPC		109+32.47	458.5057	0.5365	K = 169.2	SSD = 614.5		
High Point		110+23.25	458.7492					
VPI	23	111+83.80	459.8541		502.6516	251.3258	251.3258	
VPT		114+35.13	453.7360	-2.4343				
VPC		118+82.99	442.8335	-2.4343	K = 358.0			
VPI	24	123+71.01	430.9535		976.0412	488.0206	488.0206	
Low Point		127+54.58	432.2249					
VPT		128+59.03	432.3772	0.2917				
VPC		131+95.88	433.3599	0.2917	K = 857.9	SSD = 2618.7		
VPI	25	133+86.49	433.9160		381.2266	190.6133	190.6133	
High Point		134+46.15	433.7250					
VPT		135+77.10	433.6250	-0.1527				
VPC		135+90.41	433.6047	-0.1527	K = 216.8			
Low Point		136+23.50	433.5795					
VPI	26	136+90.41	433.4521		200.0000	100.0000	100.0000	
VPT		137+90.41	434.2221	0.7700				
VPC		141+05.95	436.6520	0.7700	K = 180.5			
VPI	27	143+01.52	438.1579		391.1317	195.5658	195.5658	
VPT		144+97.09	443.9012	2.9368				
VPC		147+70.00	451.9160	2.9368	K = 71.9	SSD = 408.5		
VPI	28	149+20.00	456.3211		300.0000	150.0000	150.0000	
High Point		149+81.08	455.0154					
VPT		150+70.00	454.4653	-1.2372				
VPC		158+03.29	445.3931	-1.2372	K = 155.1	SSD = 1401.2		
VPI	29	158+65.79	444.6199		125.0000	62.5000	62.5000	
VPT		159+28.29	443.3429	-2.0432				

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

NOTE:

PROFILE INCLUDED FOR DESIGN CHECK ONLY.
PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTION.

Texas Department of Transportation

FM 1895
ALIGNMENT DATA

SCALE: NTS SHEET 3 OF 5

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	74
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

VPC		159+52.39	442.8506	-2.0432	K = 106.7			
VPI	30	160+07.22	441.7302		109.6691	54.8346	54.8346	
VPT		160+62.05	441.1737	-1.0149				
VPC		163+62.35	438.1258	-1.0149	K = 903.9			
VPI	31	164+42.84	437.3089		160.9740	80.4870	80.4870	
VPT		165+23.33	436.6354	-0.8368				
VPC		170+55.51	432.1818	-0.8368	K = 1530.1			
VPI	32	171+89.60	431.0597		268.1780	134.0890	134.0890	
VPT		173+23.69	430.1726	-0.6616				
VPC		173+58.08	429.9451	-0.6616	K = 203.6 SSD = 2785.5			
VPI	33	173+98.08	429.6805		80.0000	40.0000	40.0000	
VPT		174+38.08	429.2586	-1.0546				
VPC		180+50.79	422.7971	-1.0546	K = 564.5 SSD = 6063.9			
VPI	34	181+01.44	422.2630		101.2927	50.6463	50.6463	
VPT		181+52.09	421.6380	-1.2340				
VPC		182+62.55	420.2749	-1.2340	K = 223.1			
VPI	35	183+05.59	419.7438		86.0860	43.0430	43.0430	
VPT		183+48.63	419.3787	-0.8482				
VPC		188+13.60	415.4348	-0.8482	K = 452.5			
VPI	36	191+48.31	412.5957		669.4262	334.7131	334.7131	
Low Point		191+97.41	413.8070					
VPT		194+83.02	414.7084	0.6312				
VPI	37	195+29.00	414.9985	0.6312				
VPC		197+82.18	416.1005	0.4352	K = 247.0 SSD = 1184.6			
High Point		198+89.68	416.3344					
VPI	38	199+08.04	416.6482		251.7172	125.8586	125.8586	
VPT		200+33.90	415.9134	-0.5839				
VPC		202+29.81	414.7695	-0.5839	K = 98.6			
Low Point		202+87.38	414.6014					
VPI	39	204+00.11	413.7751		340.5909	170.2954	170.2954	
VPT		205+70.41	418.6642	2.8709				
VPC		207+57.68	424.0408	2.8709	K = 44.0 SSD = 612.8			
VPI	40	207+99.24	425.2339		83.1127	41.5564	41.5564	
VPT		208+40.80	425.6420	0.9820				
VPC		209+79.87	427.0077	0.9820	K = 151.0 SSD = 1236.5			
VPI	41	210+49.69	427.6933		139.6484	69.8242	69.8242	
VPT		211+19.51	427.7333	0.0572				
VPC		211+31.91	427.7404	0.0572	K = 64.0			
VPI	42	211+76.76	427.7660		89.7046	44.8523	44.8523	
VPT		212+21.61	428.4203	1.4588				
VPC		216+14.30	434.1490	1.4588	K = 171.9 SSD = 636.9			
VPI	43	218+39.63	437.4361		450.6564	225.3282	225.3282	
High Point		218+65.08	435.9782					
VPT		220+64.96	434.8162	-1.1627				
VPC		228+61.36	425.5565	-1.1627	K = 637.5			
VPI	44	229+89.10	424.0713		255.4872	127.7436	127.7436	
VPT		231+16.84	423.0980	-0.7619				
VPI	45	233+13.85	421.5969	-0.7619				
VPC		235+04.71	419.7538	-0.9657	K = 181.0			
VPI	46	235+43.84	419.3760		78.2602	39.1301	39.1301	
VPT		235+82.97	419.1673	-0.5333				
VPC		238+59.48	417.6926	-0.5333	K = 561.8			
Low Point		241+59.11	416.8936					
VPI	47	241+68.51	416.0445		618.0606	309.0303	309.0303	
VPT		244+77.54	417.7960	0.5668				
VPC		246+77.16	418.9274	0.5668	K = 262.6 SSD = 990.7			
High Point		248+26.00	419.3492					
VPI	48	248+50.49	419.9098		346.6610	173.3305	173.3305	
VPT		250+23.82	418.6042	-0.7533				
VPI	49	258+03.17	412.7337	-0.7533				
VPC		261+71.99	413.7253	0.2689	K = 247.0 SSD = 2904.0			
VPI	50	262+18.63	413.8507		93.2713	46.6357	46.6357	
High Point		262+38.40	413.8146					
VPT		262+65.27	413.8000	-0.1088				
VPC		268+24.63	413.1916	-0.1088	K = 980.6 SSD = 1810.0			
VPI	51	271+91.15	412.7930		733.0409	366.5204	366.5204	
VPT		275+57.67	409.6546	-0.8563				
VPC		281+66.41	404.4422	-0.8563	K = 317.7			
Low Point		284+38.43	403.2776					
VPI	52	285+20.00	401.4146		707.1799	353.5899	353.5899	
VPT		288+73.59	406.2580	1.3698				
VPC		290+20.82	408.2748	1.3698	K = 252.9 SSD = 738.7			
High Point		293+67.23	410.6473					
VPI	53	294+04.00	413.5236		766.3592	383.1796	383.1796	
VPT		297+87.18	407.1605	-1.6606				
VPC		298+72.97	405.7359	-1.6606	K = 97.5			
Low Point		300+34.89	404.3915					
VPI	54	300+82.00	402.2647		418.0656	209.0328	209.0328	
VPT		302+91.03	407.7559	2.6270				
VPI	55	304+80.00	412.7201	2.6270				
VPC		313+15.06	412.4079	-0.0374	K = 115.0			
Low Point		313+19.36	412.4071					
VPI	56	313+42.26	412.3978		54.4011	27.2006	27.2006	
VPT		313+69.46	412.5163	0.4357				
VPC		313+71.53	412.5253	0.4357	K = 130.5 SSD = 1457.8			
VPI	57	314+21.53	412.7431		100.0000	50.0000	50.0000	
High Point		314+28.37	412.6491					
VPT		314+71.53	412.5777	-0.3308				
VPI	58	317+04.58	411.8069	-0.3308				
VPC		318+24.09	411.4116	-0.3308	K = 582.8 SSD = 2086.1			
VPI	59	319+87.64	410.8706		327.1036	163.5518	163.5518	
VPT		321+51.19	409.4117	-0.8920				
VPC		324+42.28	406.8152	-0.8920	K = 1487.3 SSD = 10773.6			
VPI	60	325+17.28	406.1462		150.0000	75.0000	75.0000	
VPT		325+92.28	405.4016	-0.9929				
VPC		332+51.34	398.8581	-0.9929	K = 662.9			
VPI	61	334+69.23	396.6948		435.7844	217.8922	217.8922	
VPT		336+87.12	395.9638	-0.3355				
VPC		338+91.69	395.2776	-0.3355	K = 136.0			
VPI	62	339+30.42	395.1477		77.4623	38.7311	38.7311	
Low Point		339+37.31	395.2011					
VPT		339+69.15	395.2383	0.2341				

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

NOTE:

PROFILE INCLUDED FOR DESIGN CHECK ONLY.
PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTION.

Texas Department of Transportation

FM 1895
ALIGNMENT DATA

SCALE: NTS SHEET 4 OF 5

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	75
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 11:43:19 AM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\00A. Alignment Data.dgn

```
VPI     63    342+52.00   395.9005     0.2341


VPC           346+93.08   390.6484    -1.1907  K =  420.6  SSD = 4588.5

VPI     64    347+43.08   390.0530             100.0000   50.0000   50.0000

VPT           347+93.08   389.3388    -1.4285


VPC           349+14.62   387.6025    -1.4285  K =  344.0

VPI     65    352+84.08   382.3249             738.9147  369.4573  369.4573

Low Point     354+06.04   384.0926

VPT           356+53.54   384.9830     0.7195


VPC           358+90.78   386.6899     0.7195  K =  204.1  SSD = 796.7

High Point    360+37.65   387.2182

VPI     66    360+68.79   387.9706             356.0188  178.0094  178.0094

VPT           362+46.80   386.1467    -1.0246


VPC           366+02.39   382.5034    -1.0246  K =  19.0  SSD = 765.2

VPI     67    366+16.00   382.3640              27.2211   13.6106   13.6106

VPT           366+29.61   382.0291    -2.4601


VPC           366+56.86   381.3589    -2.4601  K =  3.9

VPI     68    366+62.00   381.2323              10.2875    5.1438    5.1438

Low Point     366+66.54   381.2398

VPT           366+67.14   381.2402     0.1540


VPI     69    366+87.20   381.2711     0.1540


--------------------------------------------------------------------------------

Ending profile PROPPROFILE1 description
```


Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

NOTE:

PROFILE INCLUDED FOR DESIGN CHECK ONLY.
PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTION.

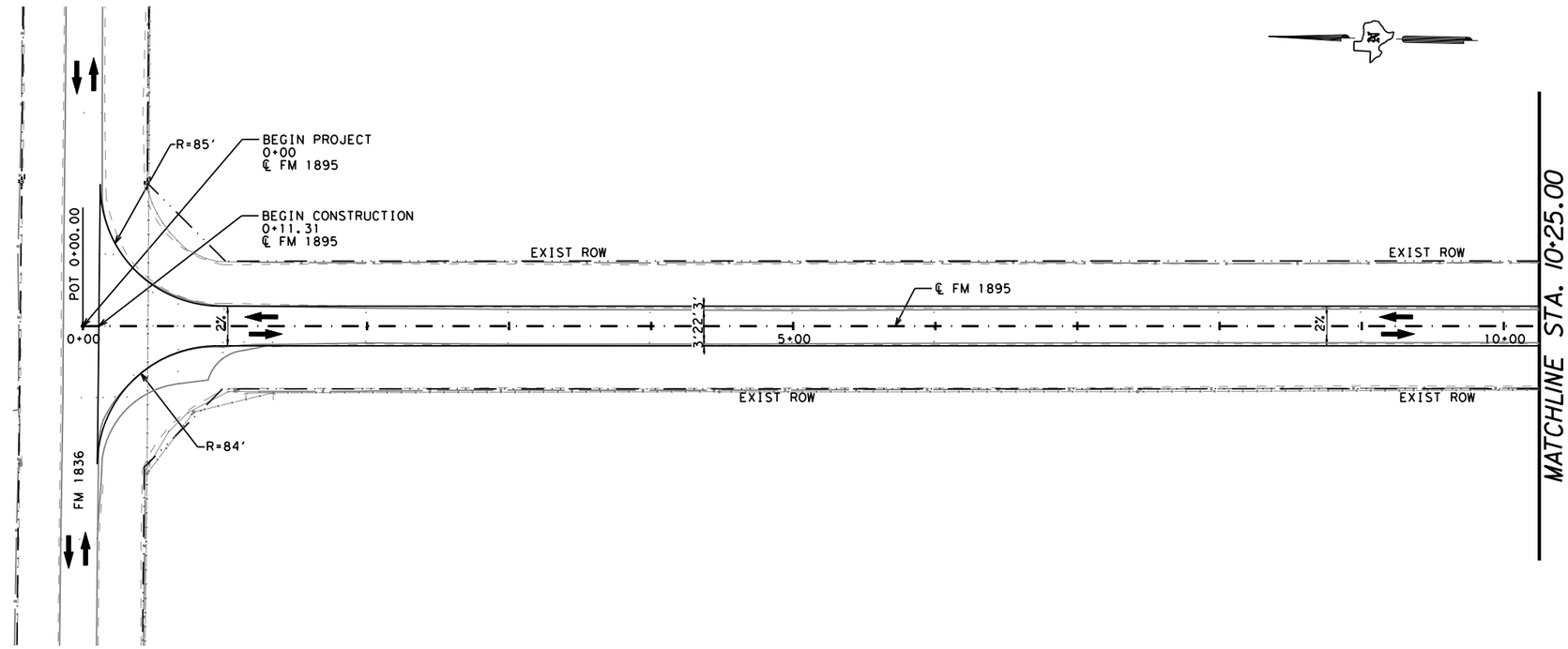
Texas Department of Transportation

FM 1895
ALIGNMENT DATA

SCALE: NTS SHEET 5 OF 5

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	76
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 11:43:39 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\00A. Alignment Data.dgn



SCALE (FEET)
0 25 50 100

LEGEND:

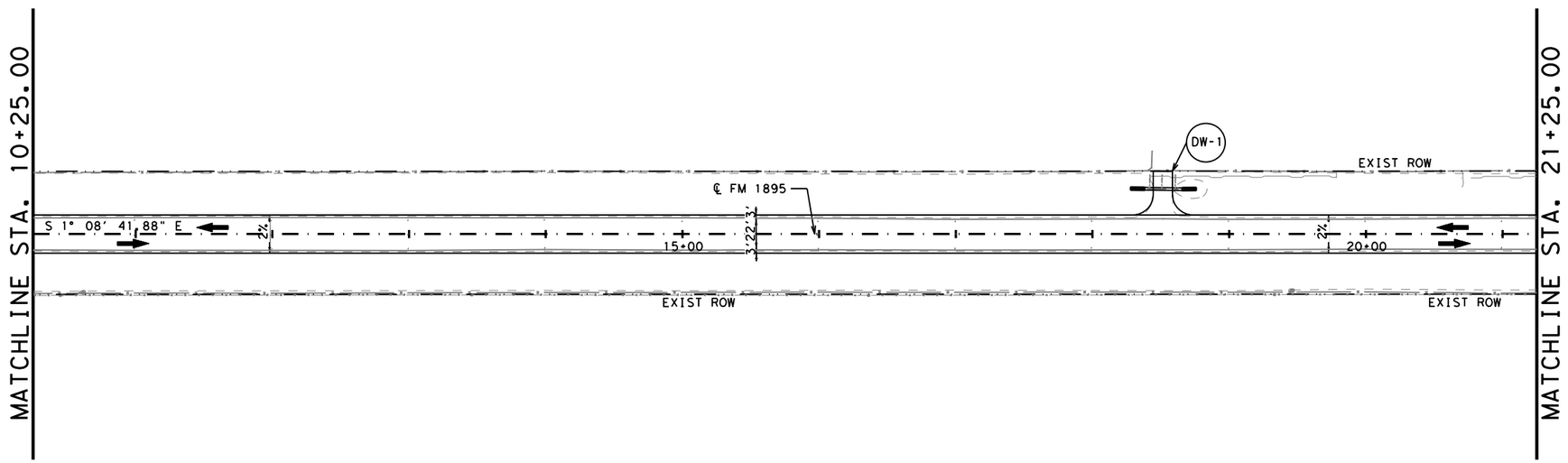
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

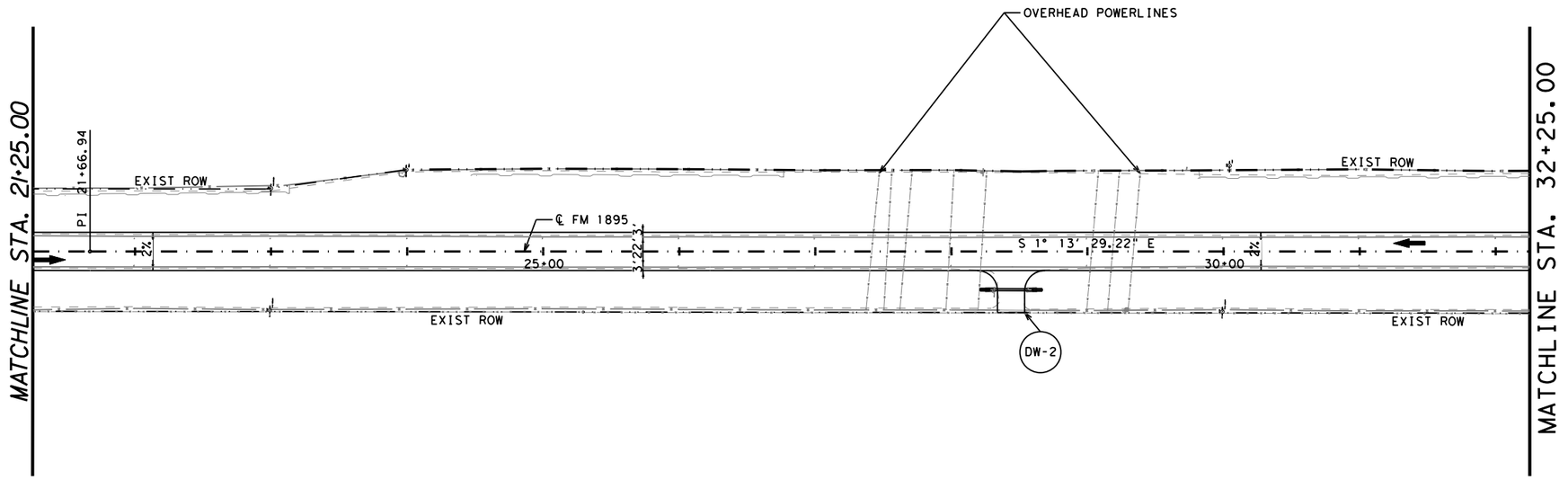
Texas Department of Transportation
© 2022

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 1 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	77
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 11:48:38 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\01 PLAN LAYOUT.dgn



SCALE (FEET)

0 25 50 100

LEGEND:

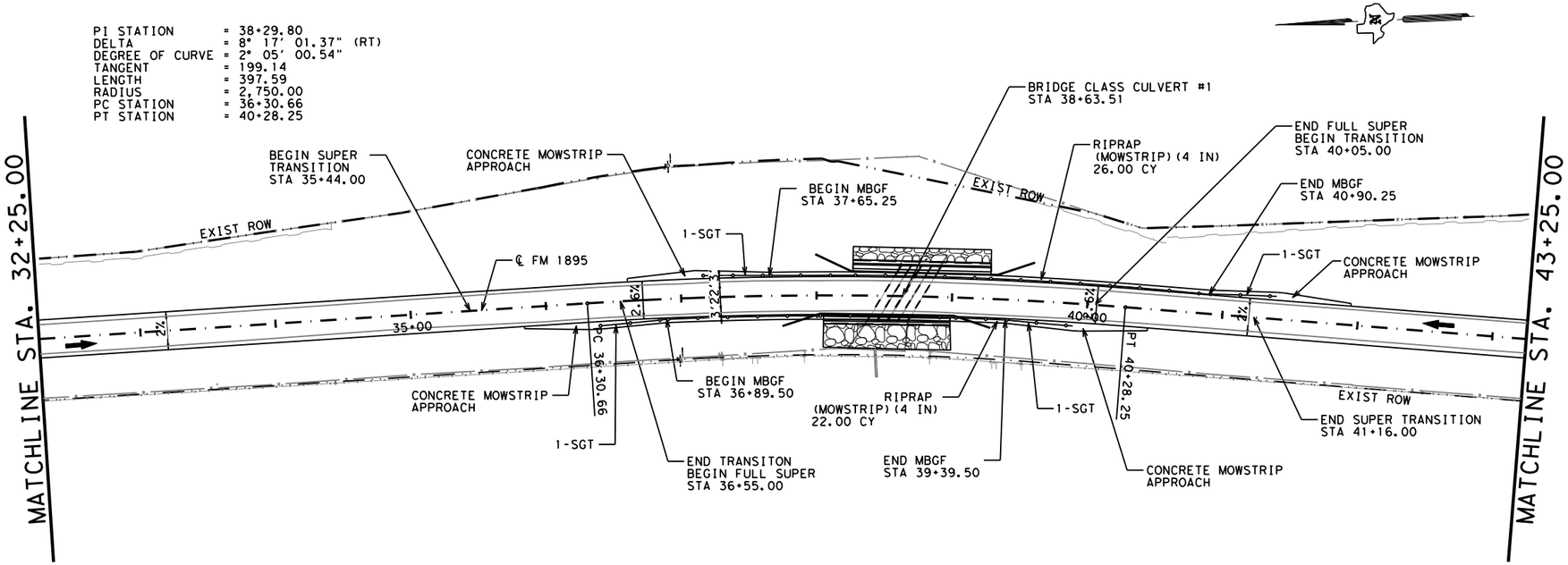
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

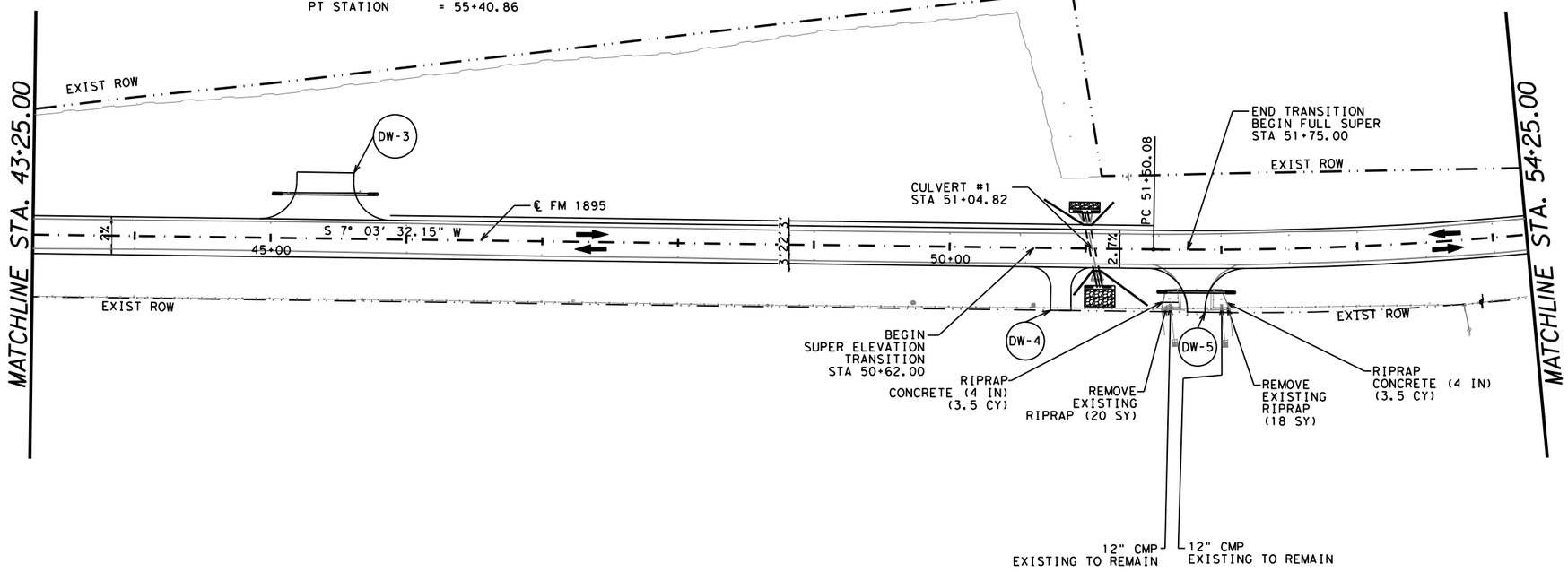
FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 2 OF 19

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	78
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 11:50:05 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\02 PLAN LAYOUT.dgn

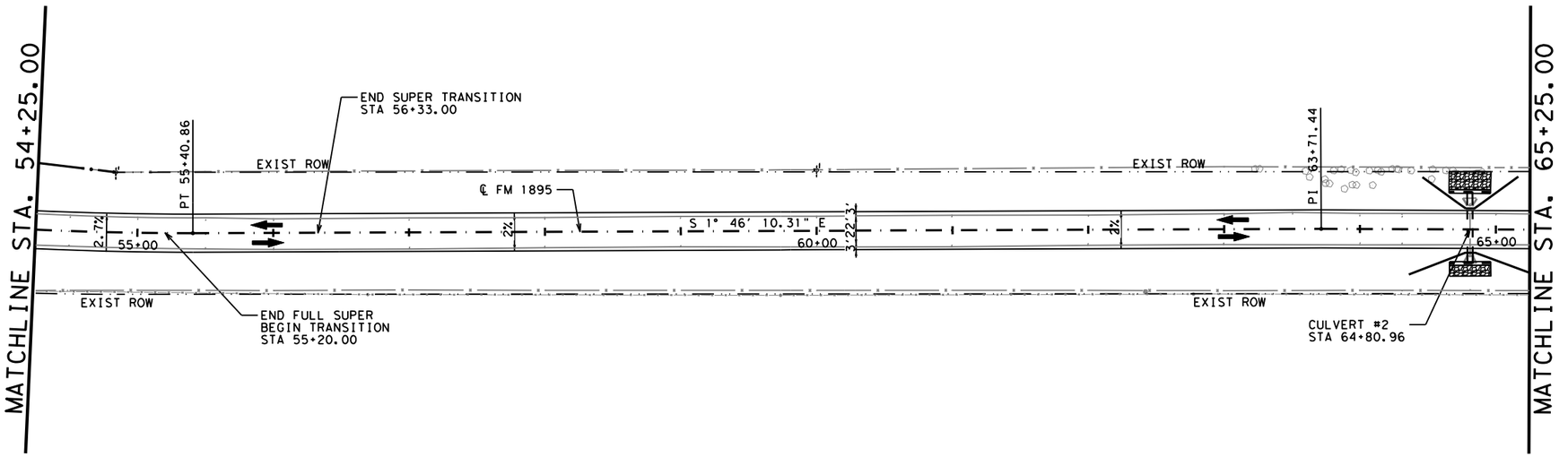
PI STATION = 53+45.84
DELTA = 8° 36' 41.73" (LT)
DEGREE OF CURVE = 2° 12' 13.26"
TANGENT = 195.76
LENGTH = 390.78
RADIUS = 2,600.00
PC STATION = 51+50.08
PT STATION = 55+40.86



SCALE (FEET)
0 25 50 100

LEGEND:
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE:
1. PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.
2. SEE DRIVEWAY DETAILS FOR RADIUS.
3. RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE
4. DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.
5. NEATLY SAWCUT EXISTING RIPRAP. EXISTING PIPE FROM ADJACENT PROPERTY AND UTILITY TO REMAIN IN PLACE.
6. DOWEL PROPOSED RIPRAP INTO EXISTING.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

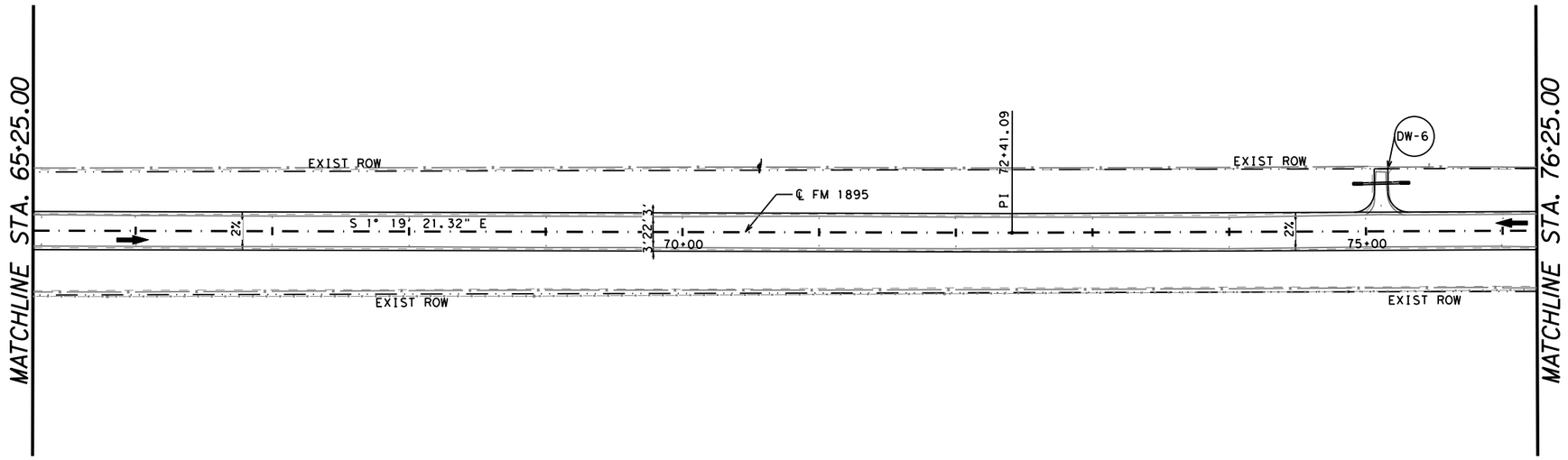
Texas Department of Transportation
© 2022

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 3 OF 19

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS: FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK: JR	TEXAS	DAL	KAUFMAN	79
CHECK: VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/27/2022 12:36:41 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\03 PLAN LAYOUT.dgn



SCALE (FEET)
0 25 50 100

LEGEND:

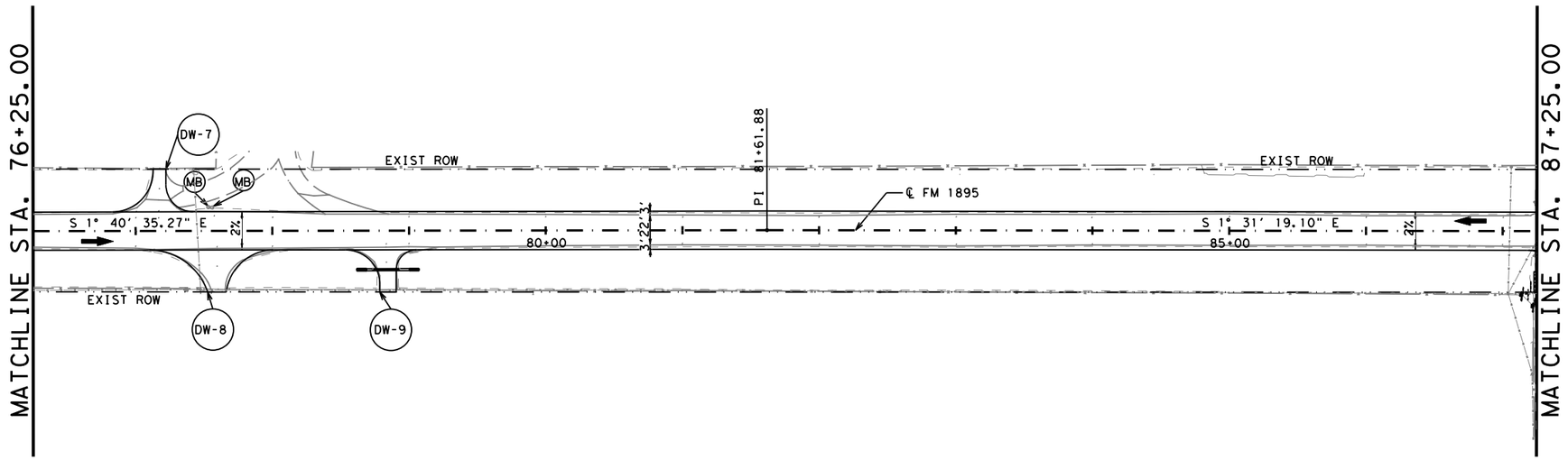
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/29/2022
Signature of Registrant & Date

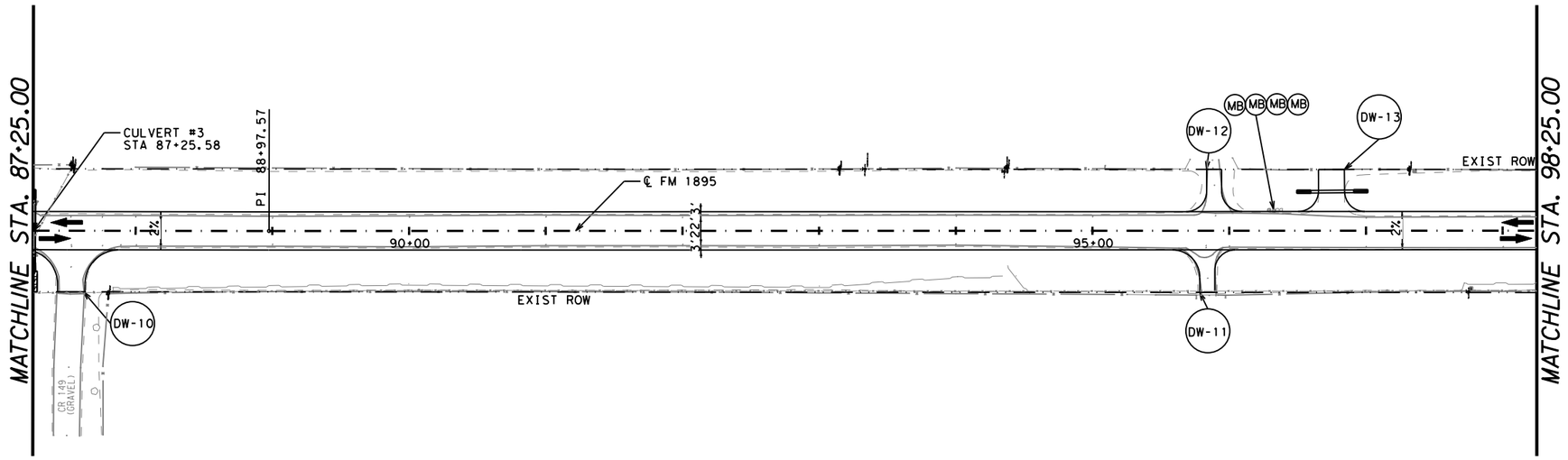
Texas Department of Transportation
© 2022

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 4 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	80
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/29/2022 8:51:31 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\04 PLAN LAYOUT.dgn



SCALE (FEET)
0 25 50 100

LEGEND:

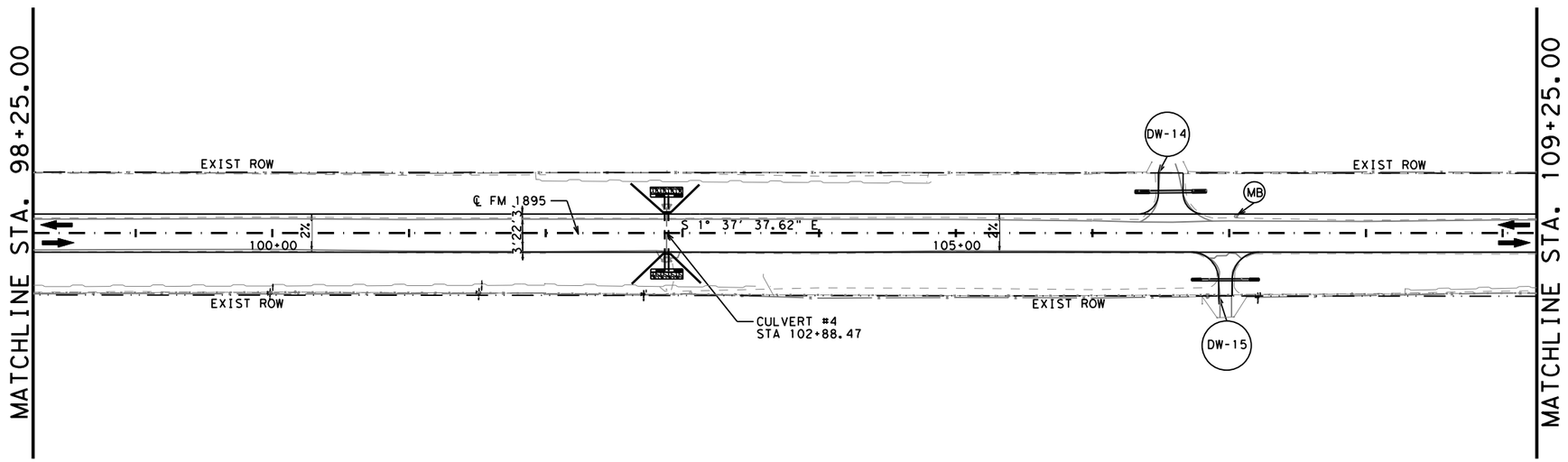
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

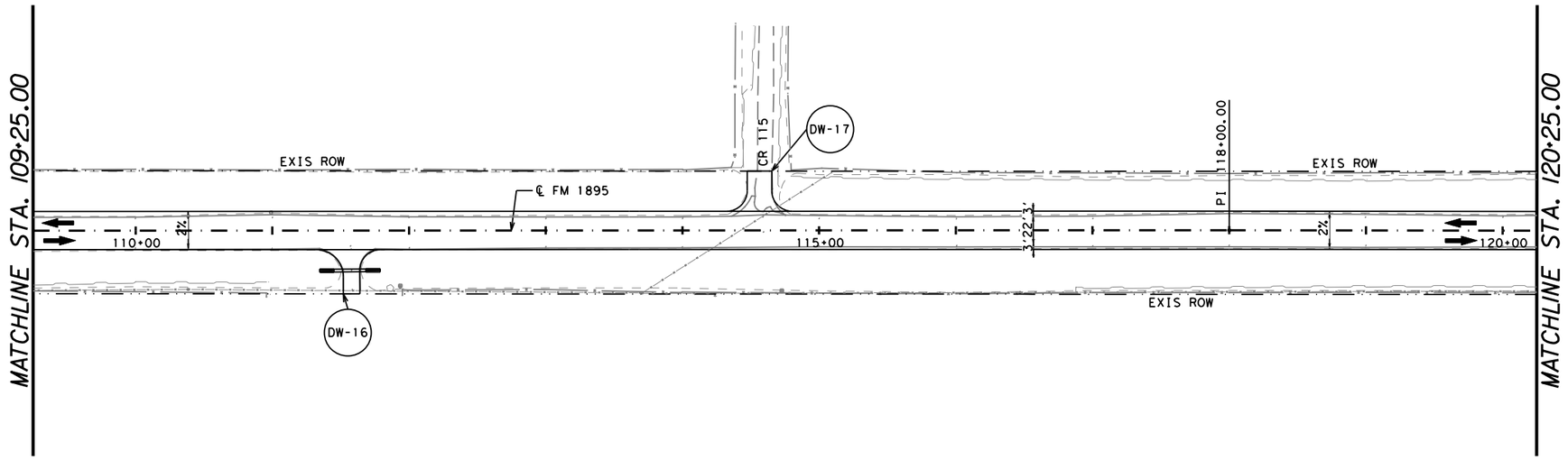
Texas Department of Transportation

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 5 OF 19

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	81
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 1:27:56 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\05 PLAN LAYOUT.dgn



SCALE (FEET)
0 25 50 100

LEGEND:

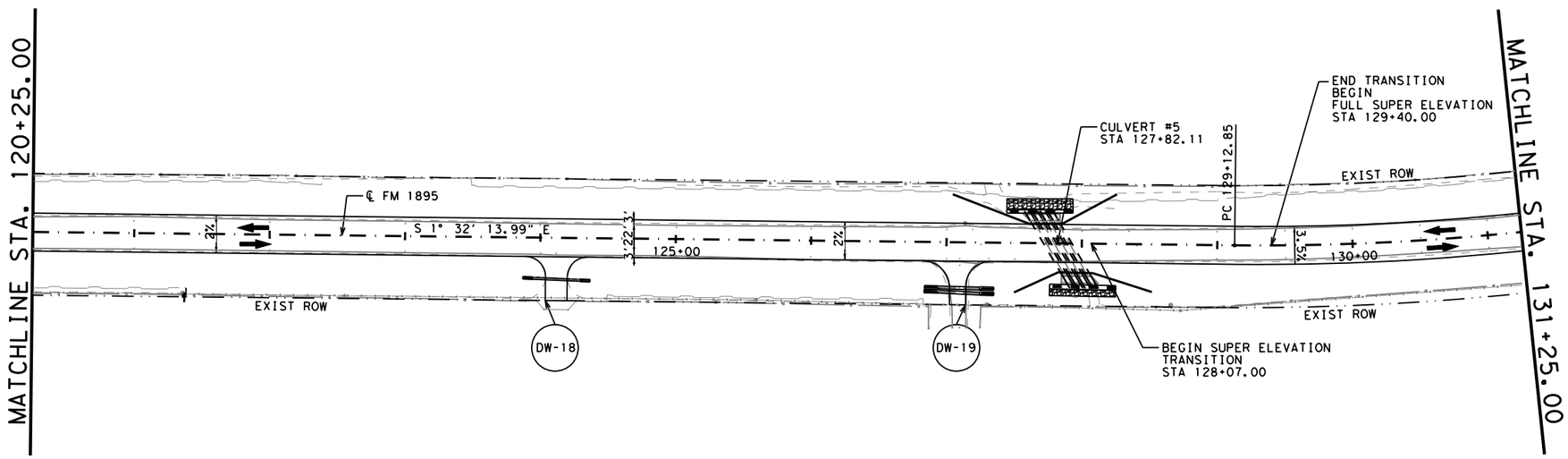
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

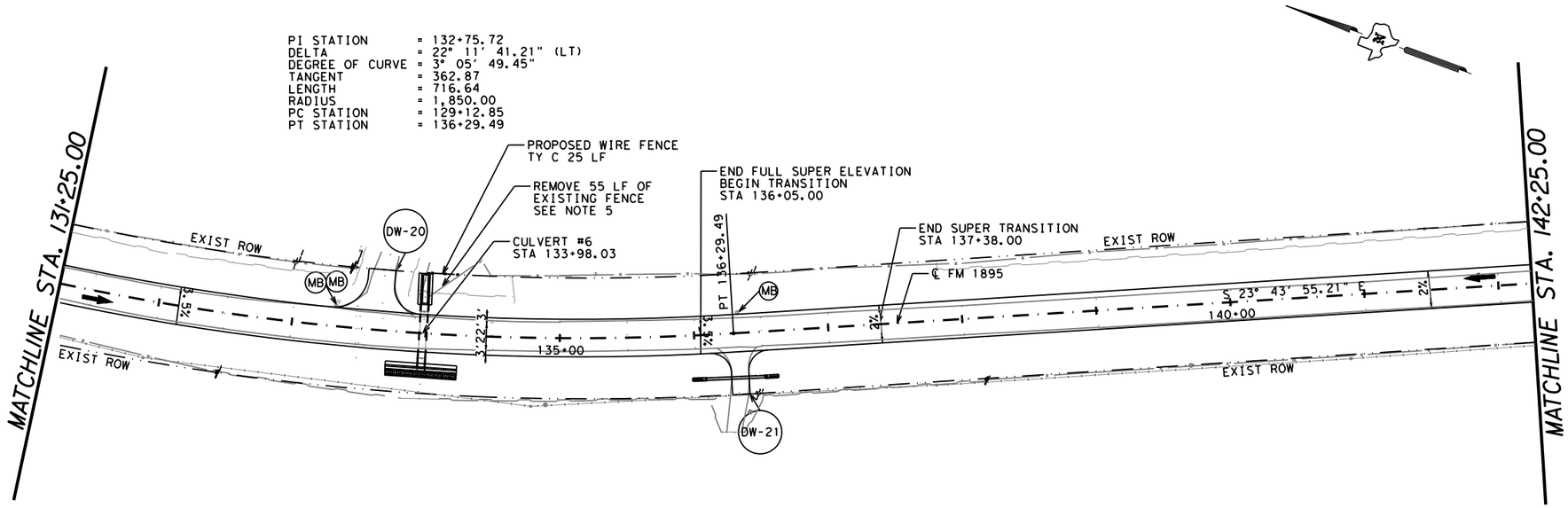
Texas Department of Transportation

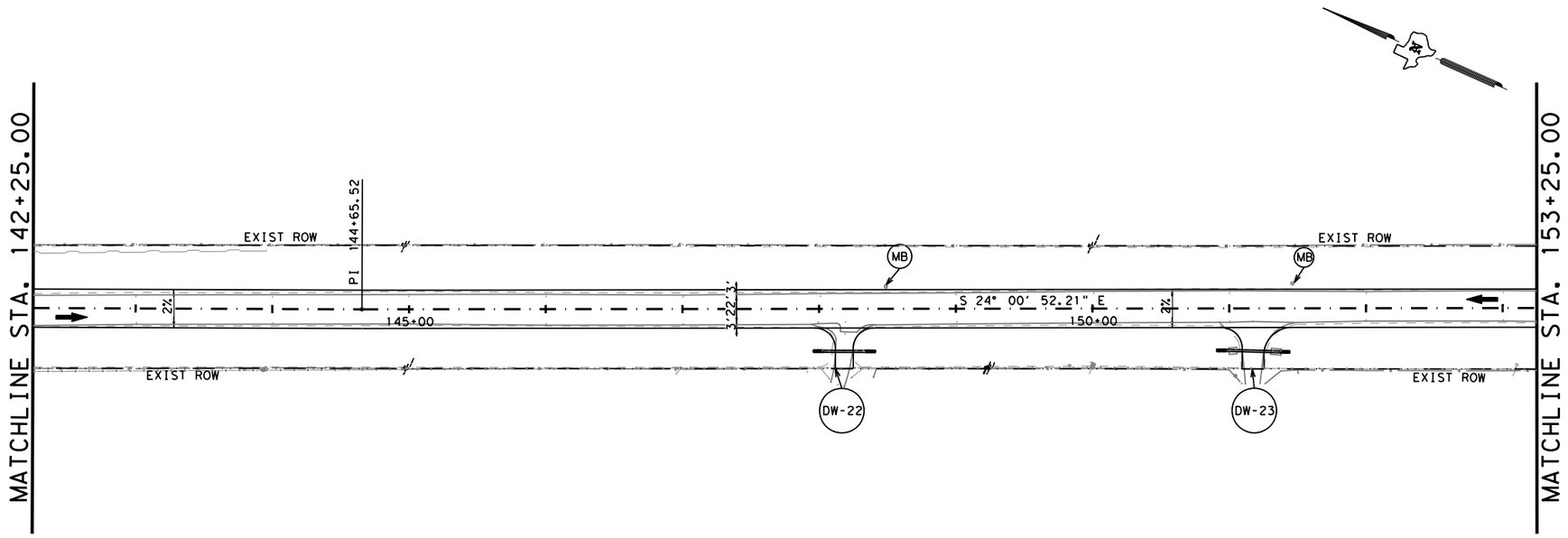
FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 6 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	82
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 12:40:25 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\06 PLAN LAYOUT.dgn





SCALE (FEET)
0 25 50 100

LEGEND:

- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
1. PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

2. SEE DRIVEWAY DETAILS FOR RADIUS.

3. RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE.

4. DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.

5. FENCE REMOVAL IS SUBSIDIARY TO ITEM 100.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

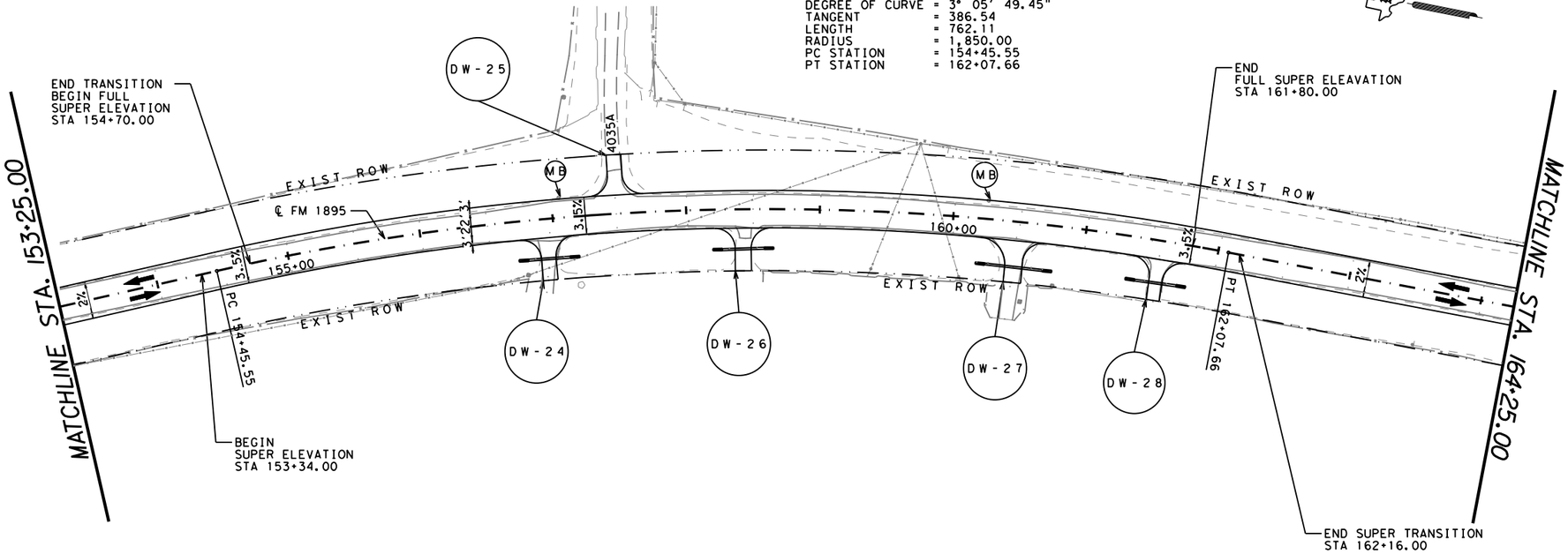
FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 7 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	83
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 12:41:35 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\07 PLAN LAYOUT.dgn

PI STATION = 158+32.09
DELTA = 23° 36' 11.56" (RT)
DEGREE OF CURVE = 3° 05' 49.45"
TANGENT = 386.54
LENGTH = 762.11
RADIUS = 1,850.00
PC STATION = 154+45.55
PT STATION = 162+07.66



SCALE (FEET)
0 25 50 100

LEGEND:

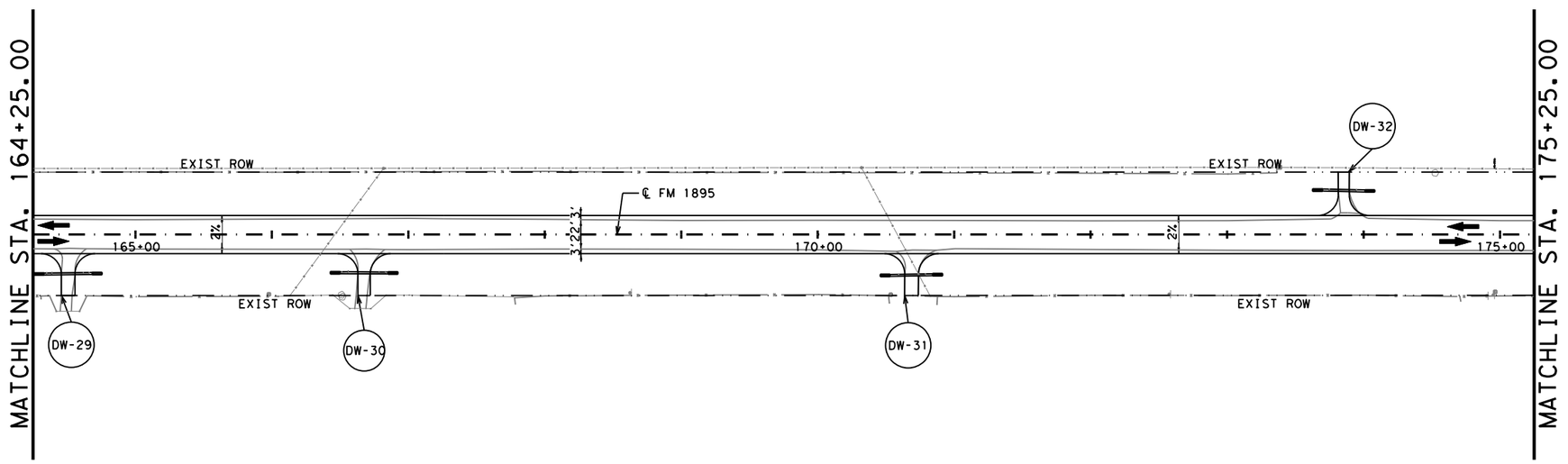
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

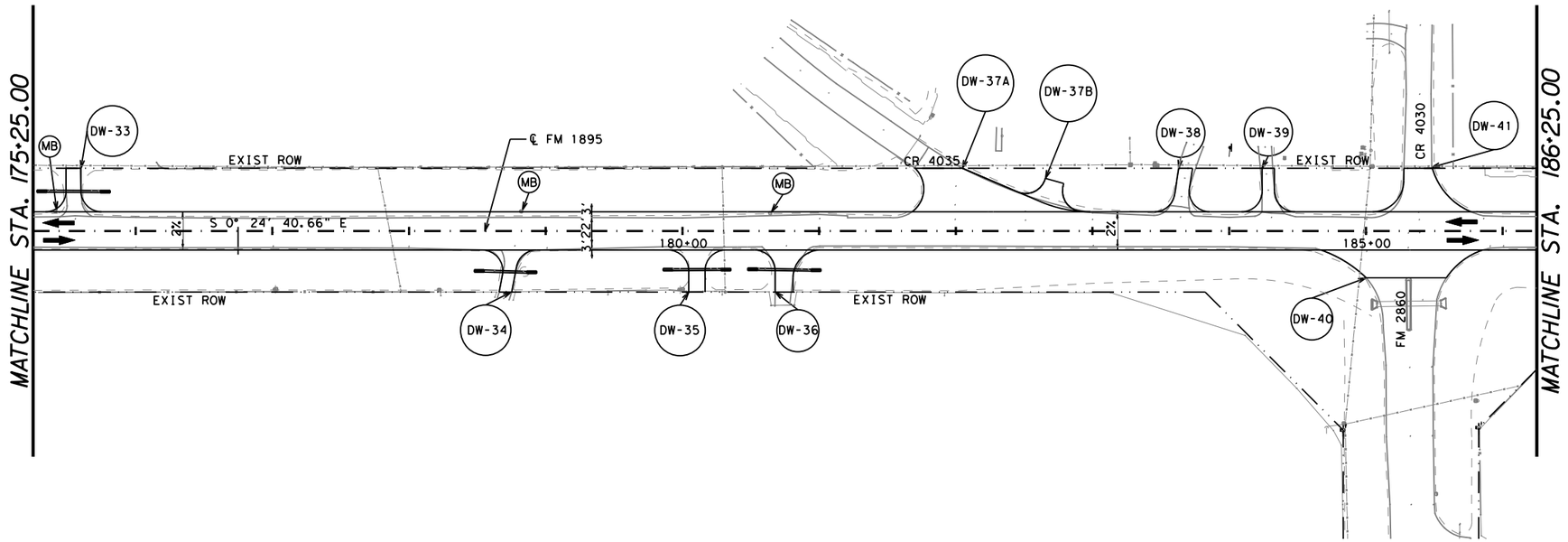
Texas Department of Transportation
© 2022

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 8 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	84
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 12:42:54 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\08 PLAN LAYOUT.dgn



SCALE (FEET)
0 25 50 100

LEGEND:

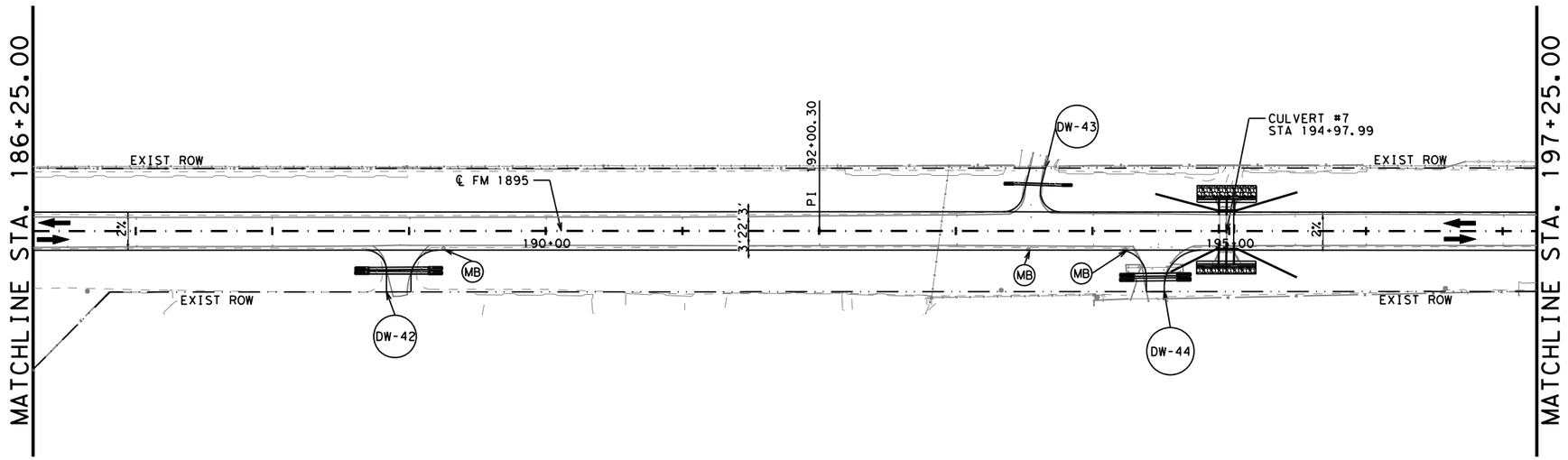
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

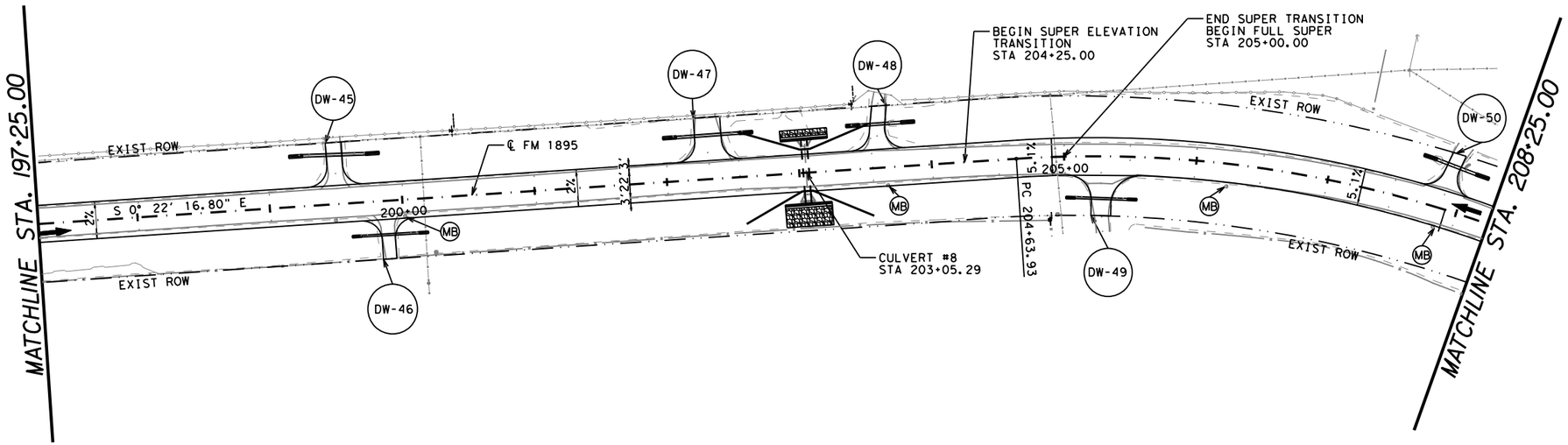
Texas Department of Transportation
© 2022

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 9 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	85
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 12:44:41 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\09 PLAN LAYOUT.dgn



SCALE (FEET)
0 25 50 100

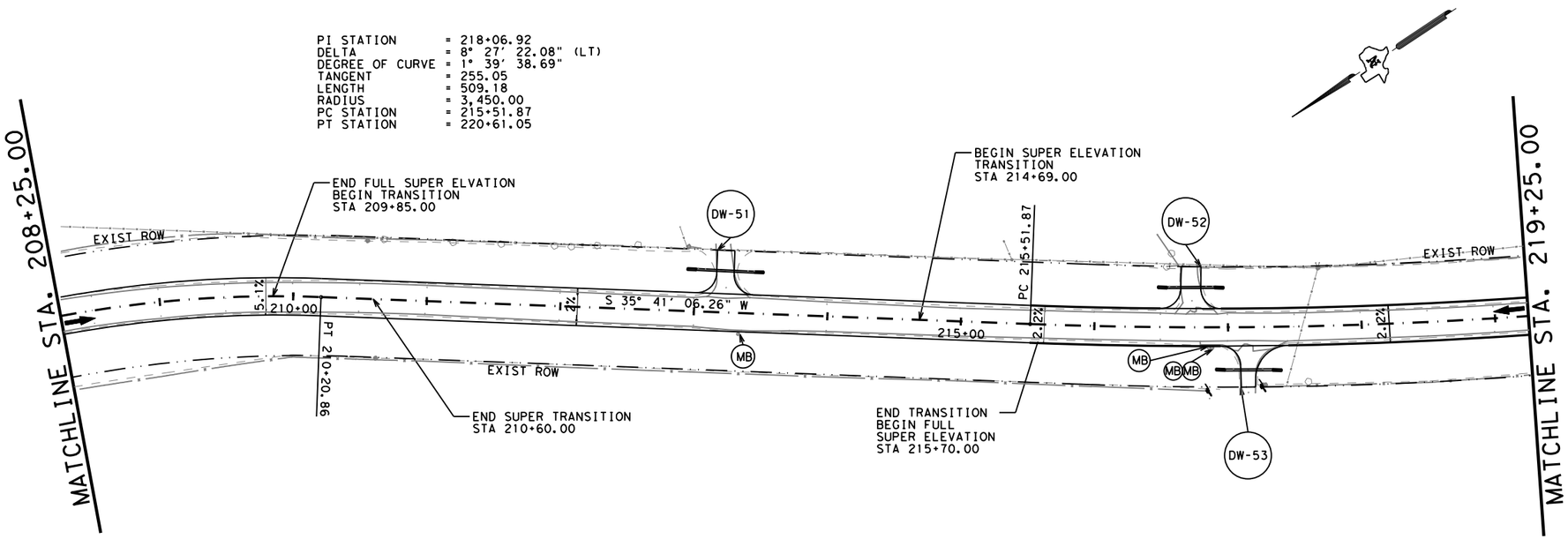
LEGEND:
- TRAVEL LANE & DIRECTION
- MB MAILBOXES
- DW DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

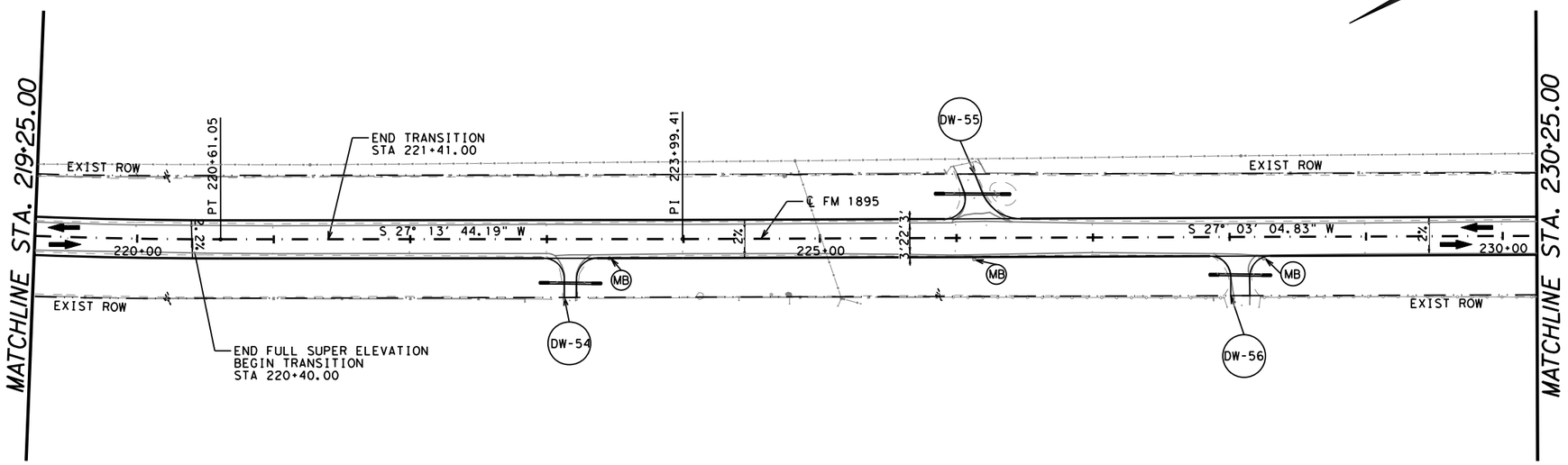
Texas Department of Transportation

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 10 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	86
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 12:46:31 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\10 PLAN LAYOUT.dgn



SCALE (FEET)
0 25 50 100

LEGEND:

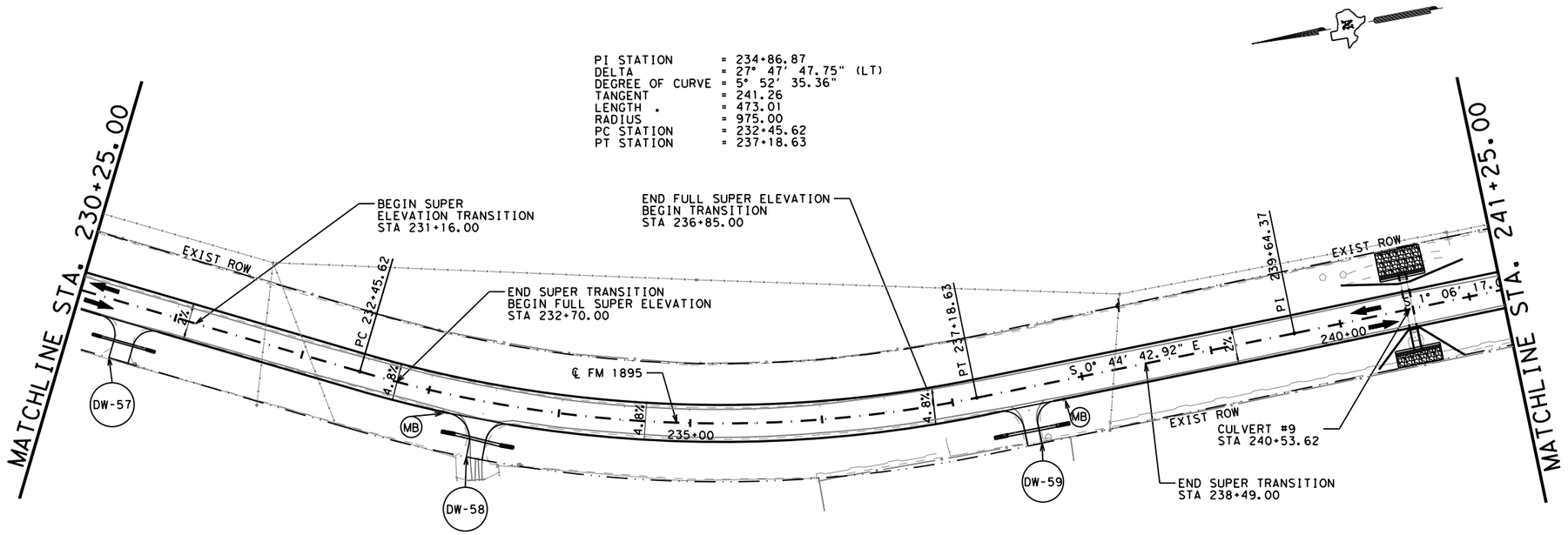
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY.
PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

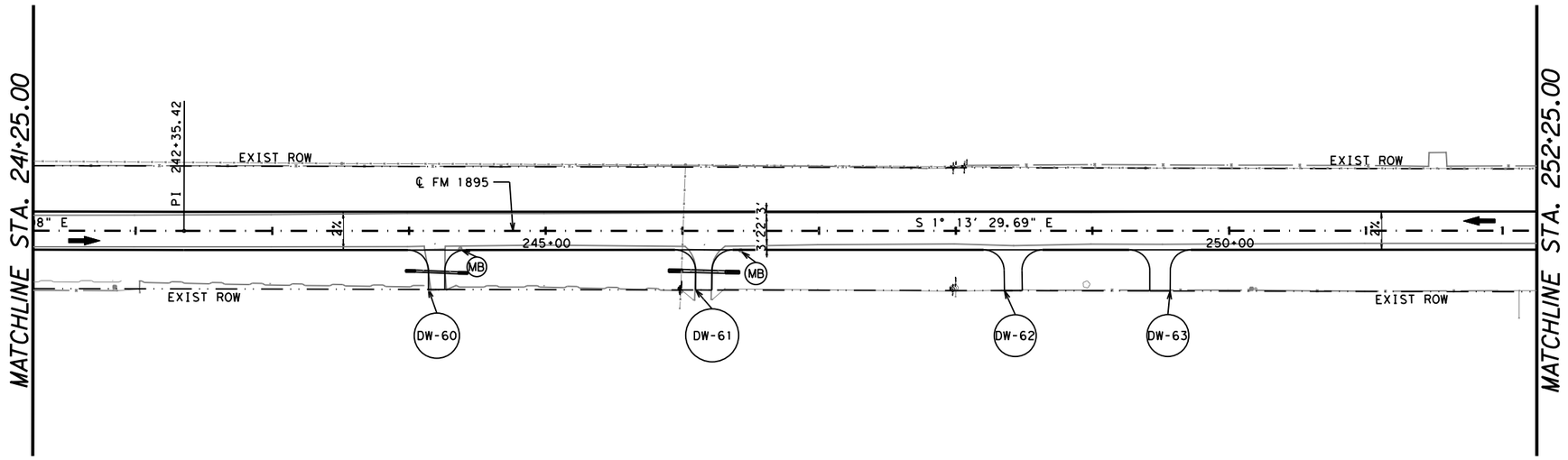
Texas Department of Transportation
© 2022

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 11 OF 19

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	87
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 12:54:46 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\11 PLAN LAYOUT.dgn



SCALE (FEET)

0 25 50 100

LEGEND:

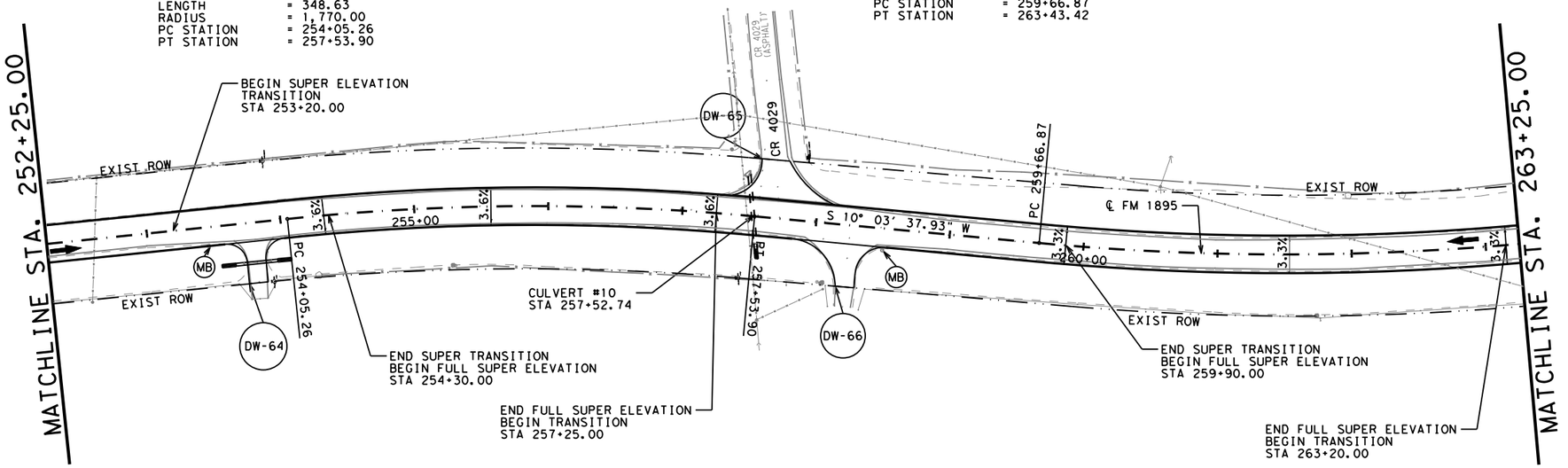
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

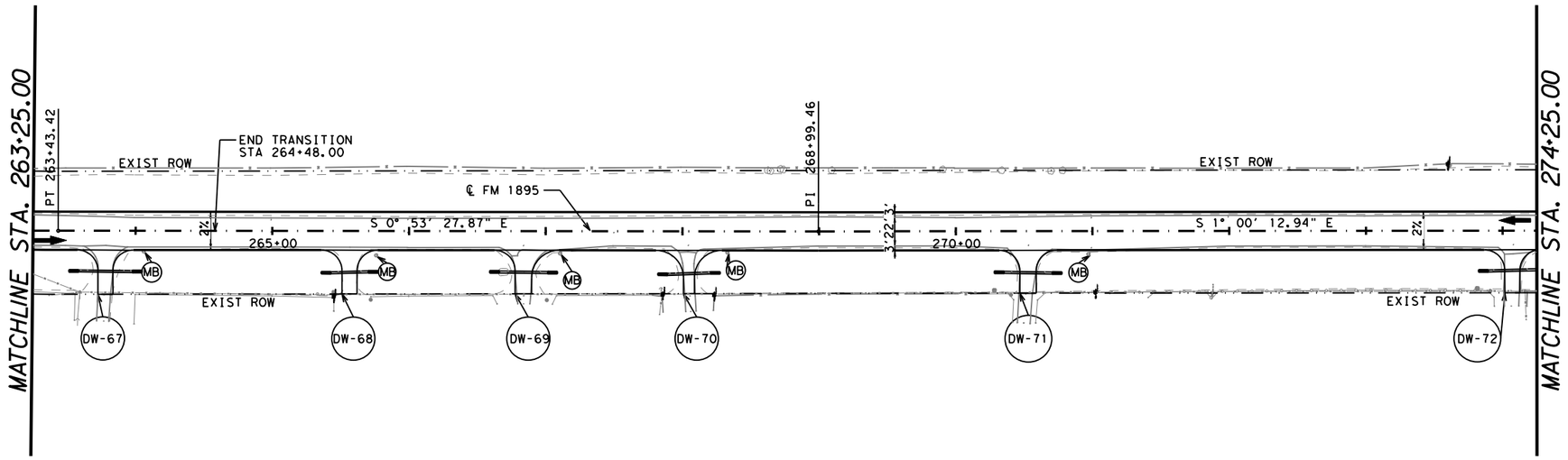
Texas Department of Transportation
© 2022

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 12 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	88
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 1:29:04 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\12 PLAN LAYOUT.dgn



SCALE (FEET)
0 25 50 100

LEGEND:

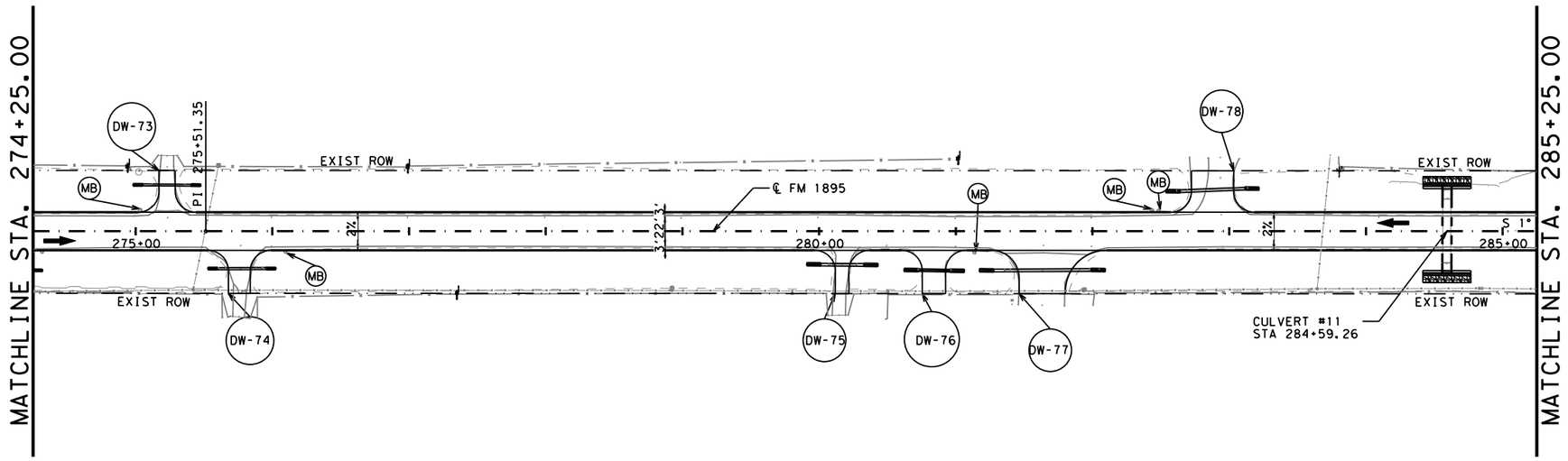
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

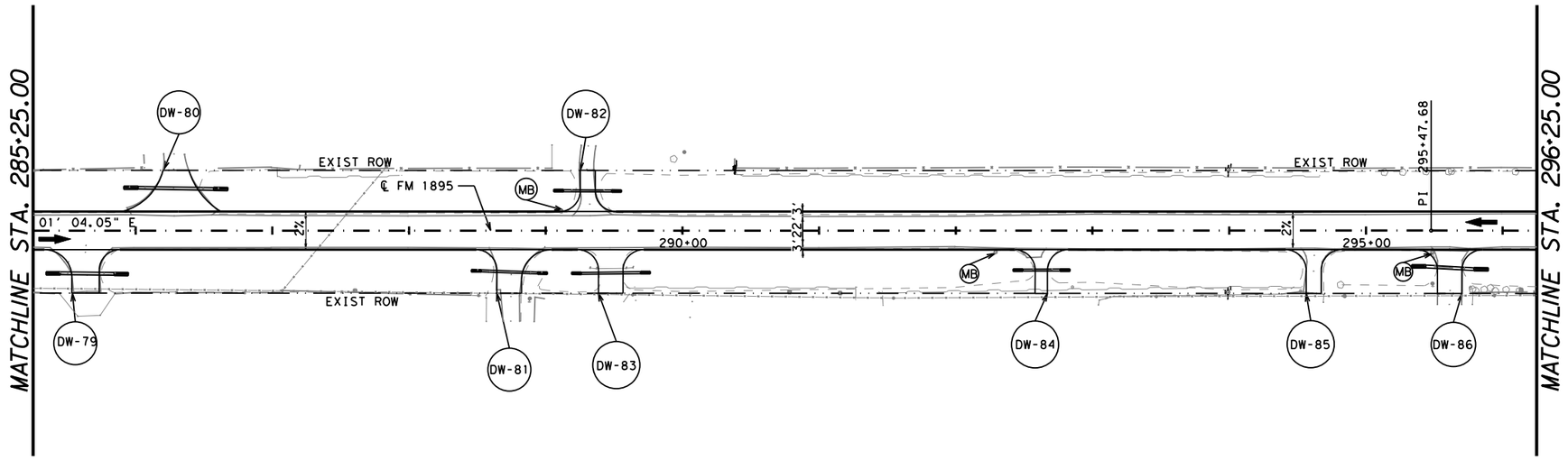
Texas Department of Transportation
© 2022

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 13 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	89
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 12:56:47 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\13 PLAN LAYOUT.dgn



SCALE (FEET)

0 25 50 100

LEGEND:

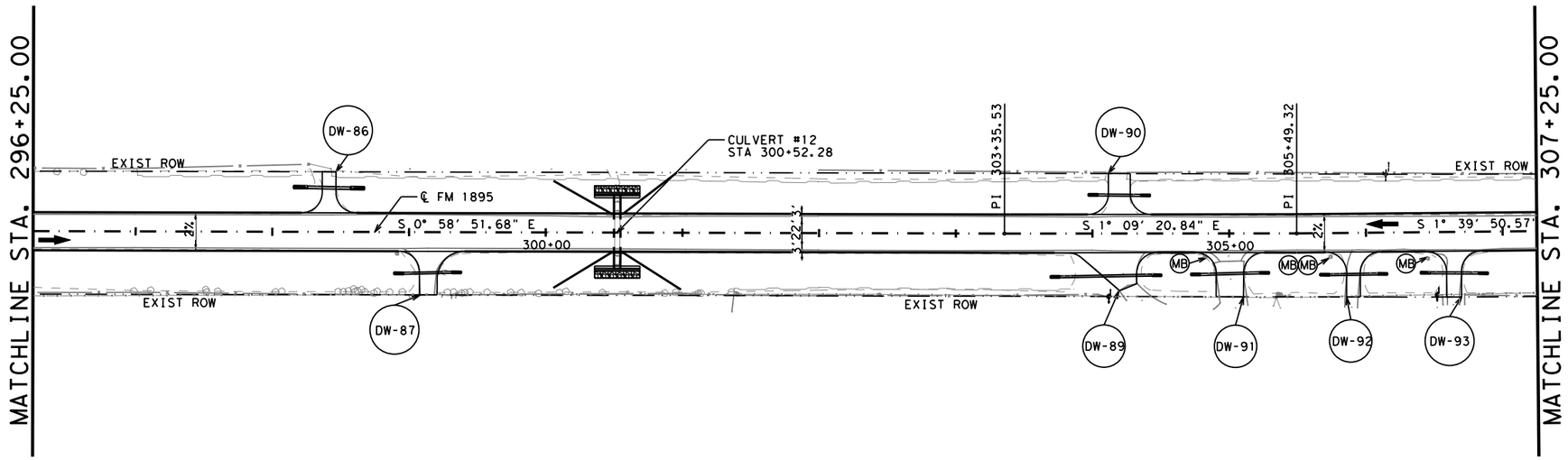
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

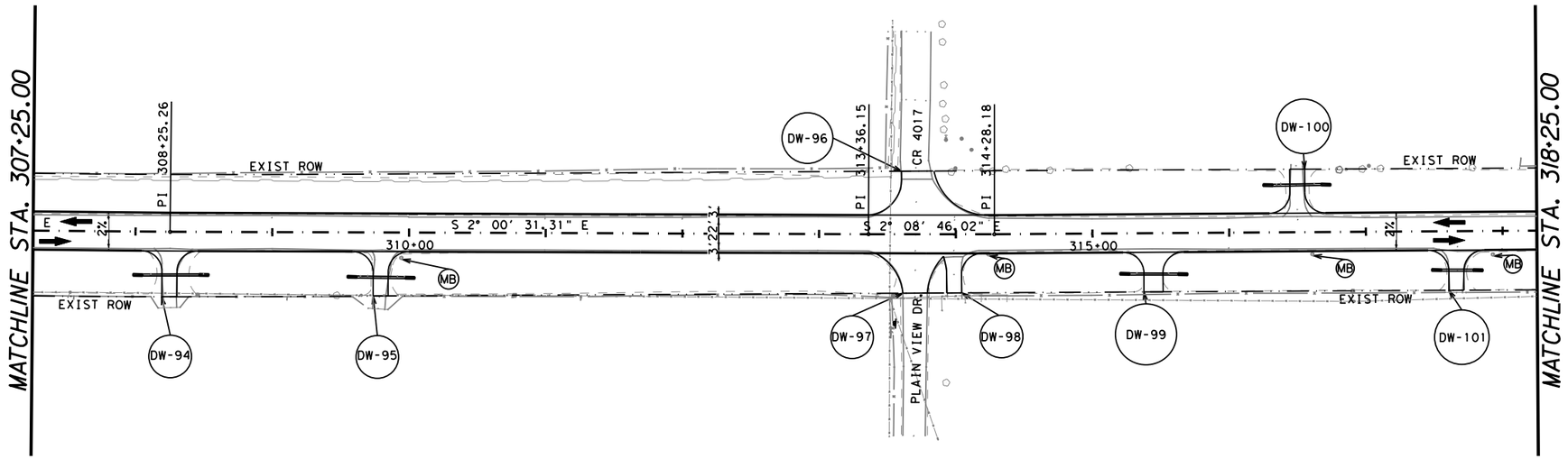
Texas Department of Transportation
© 2022

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 14 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	90
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 12:58:19 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\14 PLAN LAYOUT.dgn



SCALE (FEET)
0 25 50 100

LEGEND:

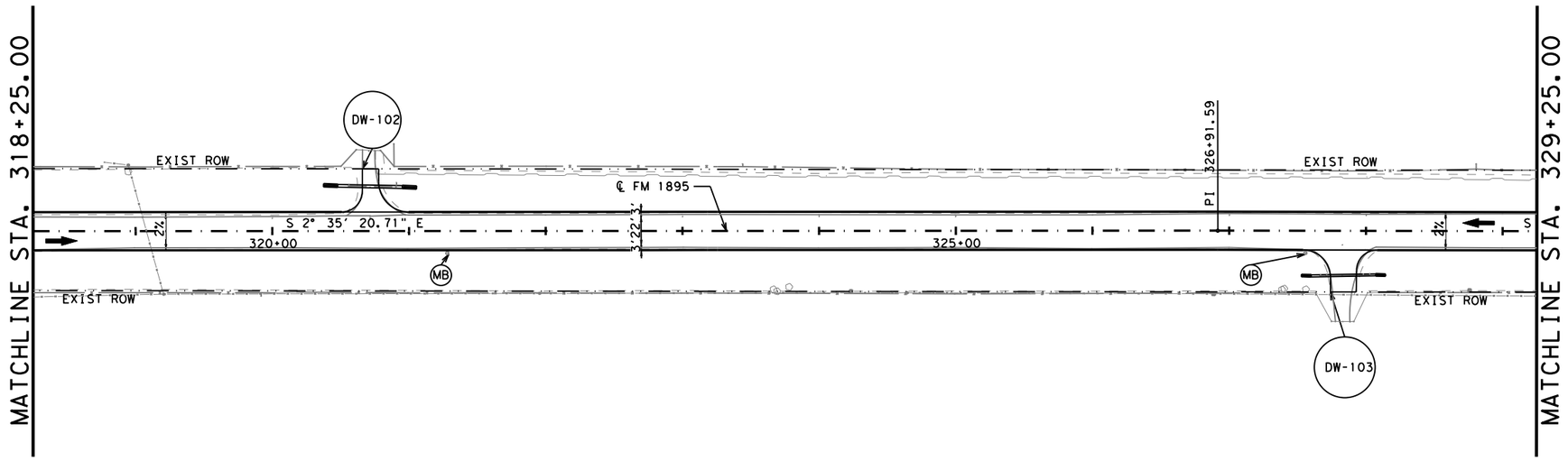
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

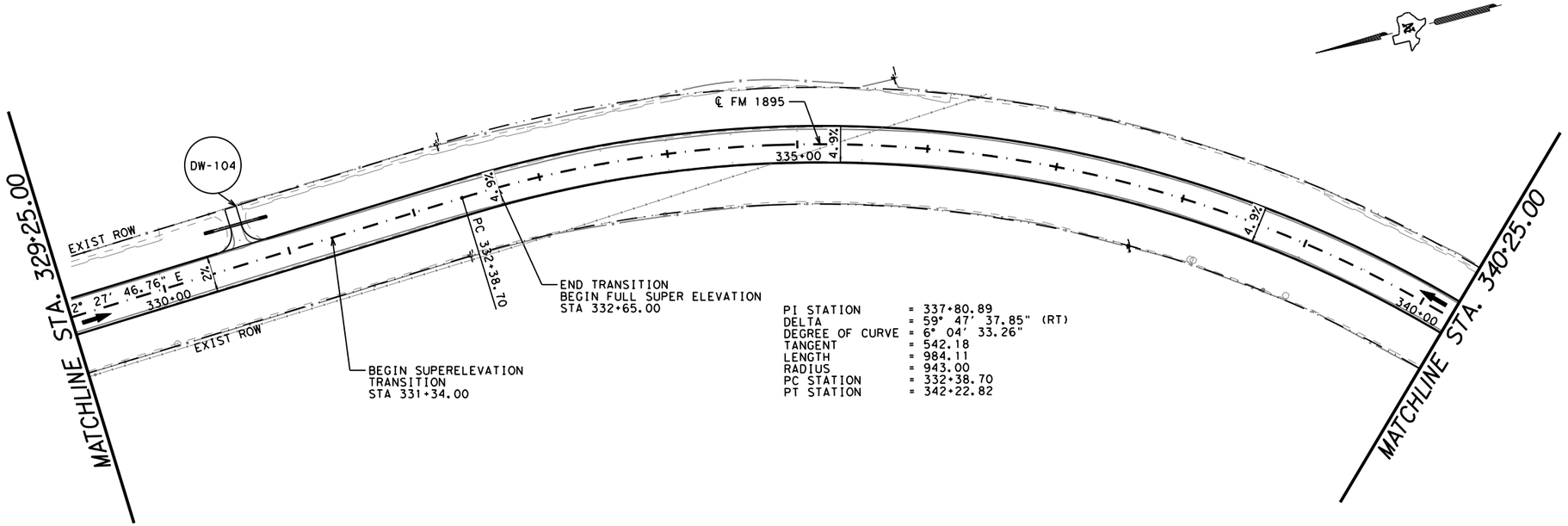
Texas Department of Transportation
© 2022

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 15 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	91
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 12:59:12 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\15 PLAN LAYOUT.dgn



PI STATION = 337+80.89
DELTA = 59° 47' 37.85" (RT)
DEGREE OF CURVE = 6° 04' 33.26"
TANGENT = 542.18
LENGTH = 984.11
RADIUS = 943.00
PC STATION = 332+38.70
PT STATION = 342+22.82

SCALE (FEET)
0 25 50 100

LEGEND:

- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

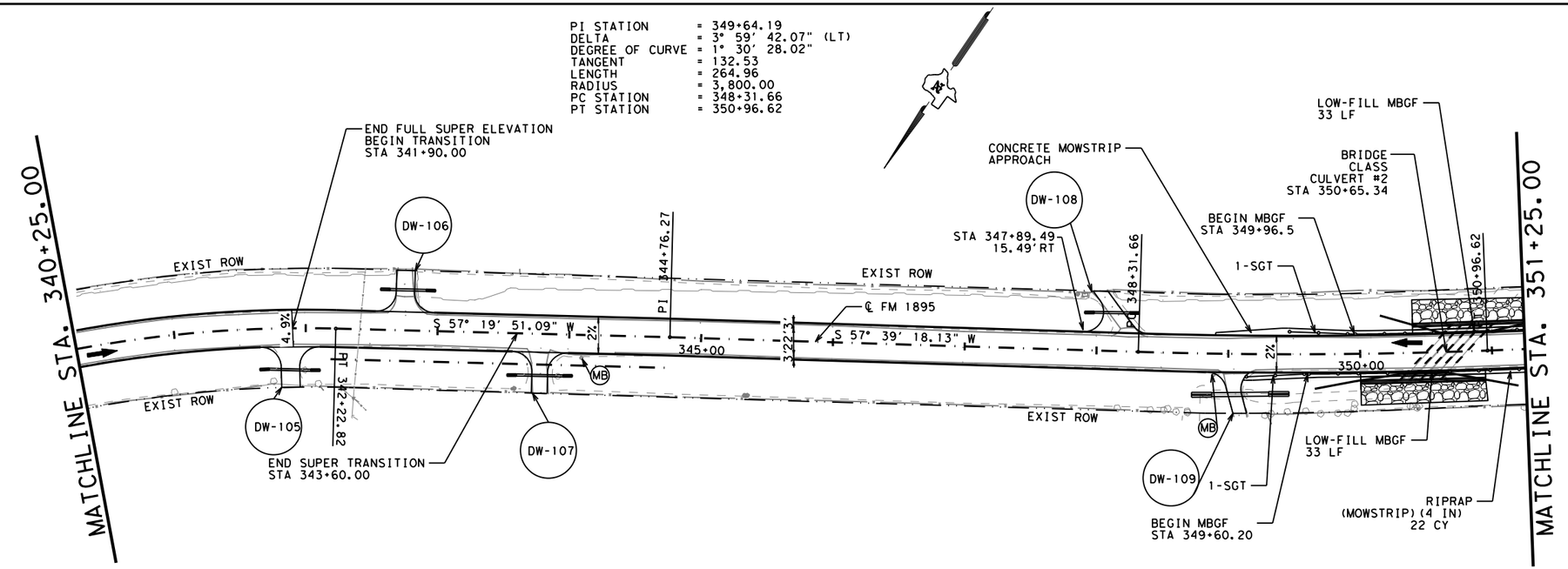
NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY.
PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.

PI STATION = 349+64.19
DELTA = 3° 59' 42.07" (LT)
DEGREE OF CURVE = 1° 30' 28.02"
TANGENT = 132.53
LENGTH = 264.96
RADIUS = 3,800.00
PC STATION = 348+31.66
PT STATION = 350+96.62



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

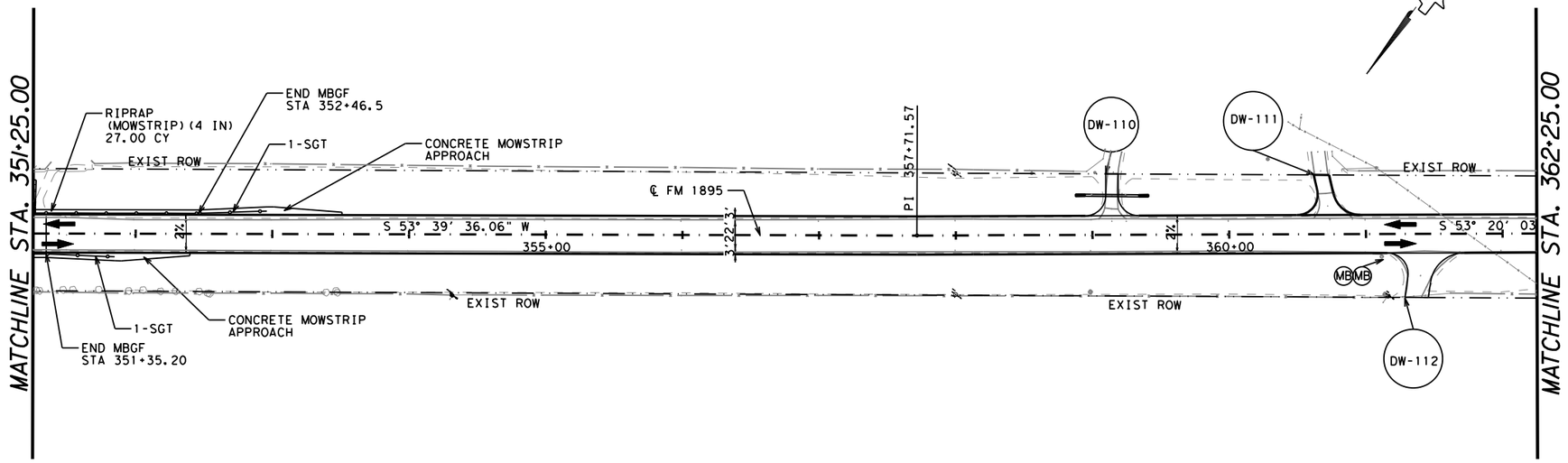
Texas Department of Transportation

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 16 OF 19

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	92
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 1:01:05 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\16 PLAN LAYOUT.dgn



SCALE (FEET)
0 25 50 100

LEGEND:

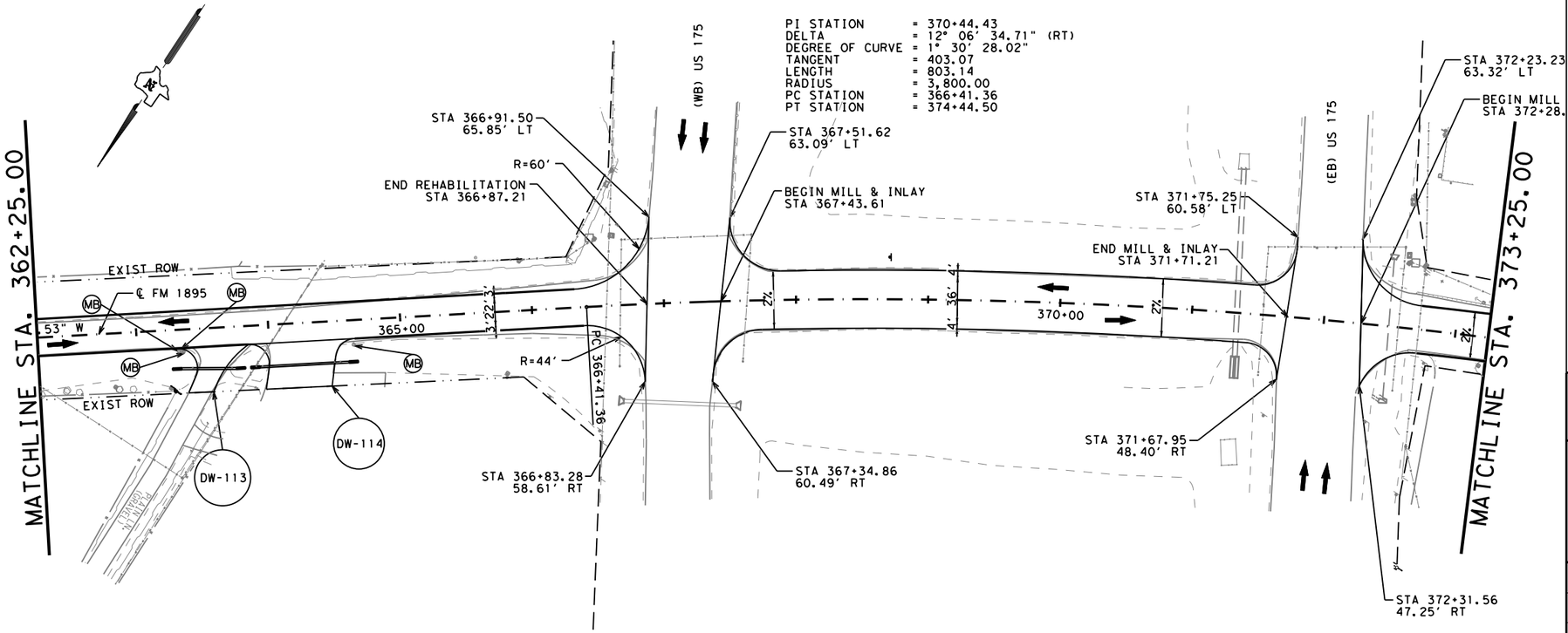
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

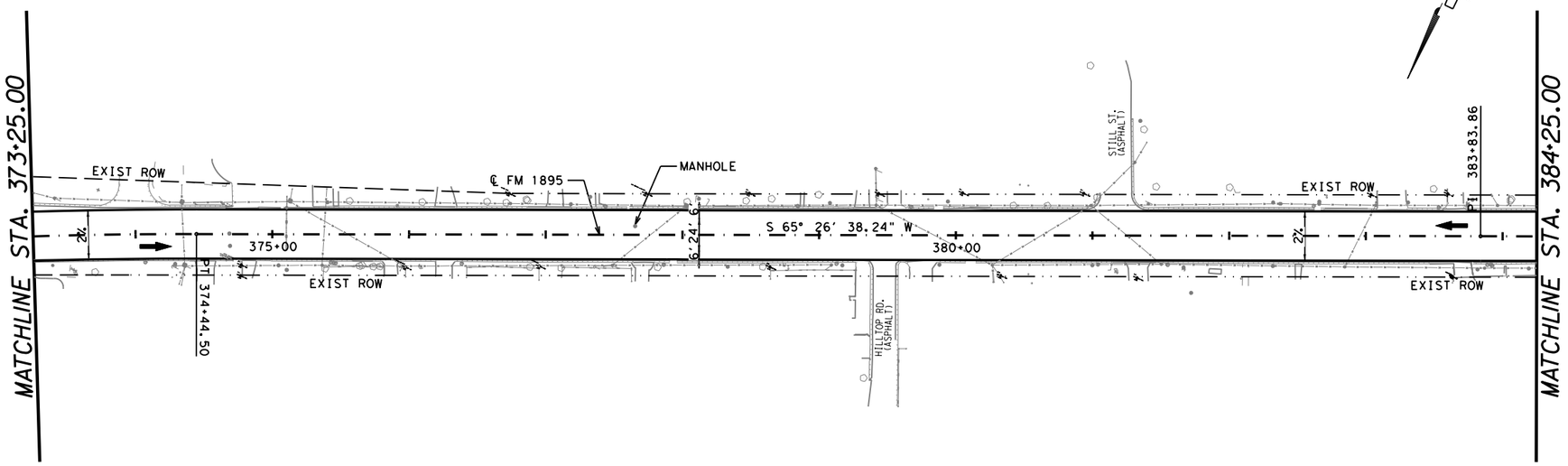
Texas Department of Transportation
© 2022

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 17 OF 19

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	93
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 1:02:12 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\17 PLAN LAYOUT.dgn



SCALE (FEET)
0 25 50 100

LEGEND:

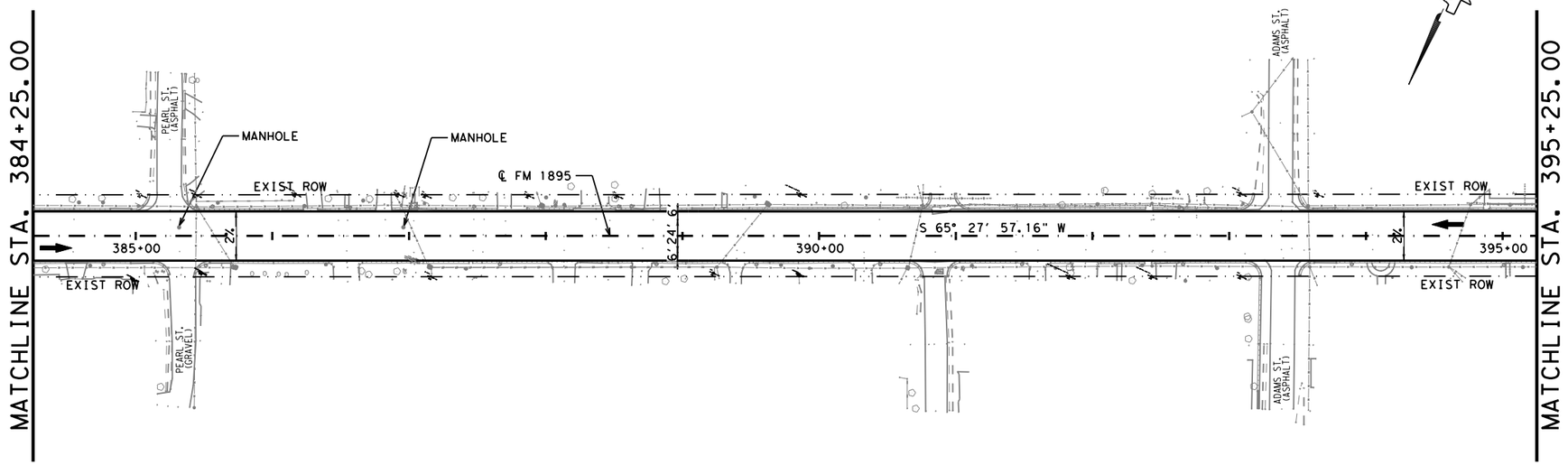
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

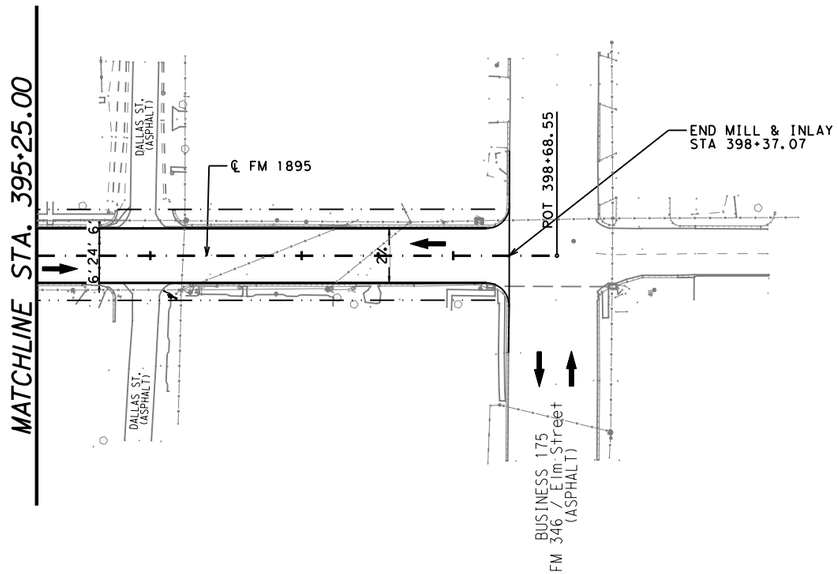
Texas Department of Transportation

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 18 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	94
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 1:03:23 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\18 PLAN LAYOUT.dgn



SCALE (FEET)

0 25 50 100

LEGEND:

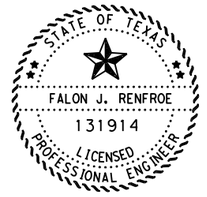
- TRAVEL LANE & DIRECTION
- (MB) MAILBOXES
- (DW) DRIVEWAY
- TEMPORARY SPECIAL SHORING

NOTE
PROFILE INCLUDED FOR DESIGN CHECK ONLY. PROPOSED GRADE LINE IS CONTROLLED BY THE TYPICAL SECTIONS.

SEE DRIVEWAY DETAILS FOR RADIUS.

RIPRAP SHALL MAINTAIN POSITIVE DRAINAGE

DITCH GRADING WILL BE PAID UNDER ITEM 152. DITCH GRADING SHOULD BE GRADED TO DRAIN, CONTINOUS TO THE NEAREST STRUCTURE AS SHOWN IN THE PLANS.



Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

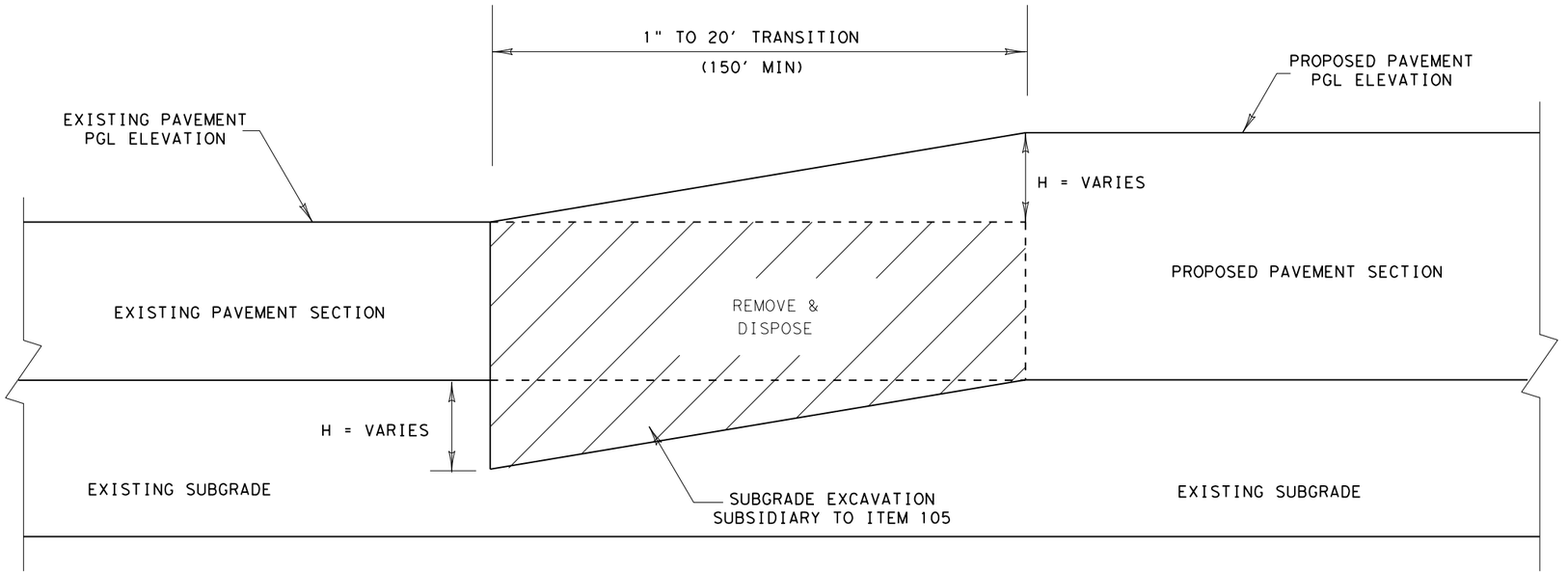
Texas Department of Transportation

FM 1895
PLAN LAYOUT

SCALE: 1"=100' SHEET 19 OF 19

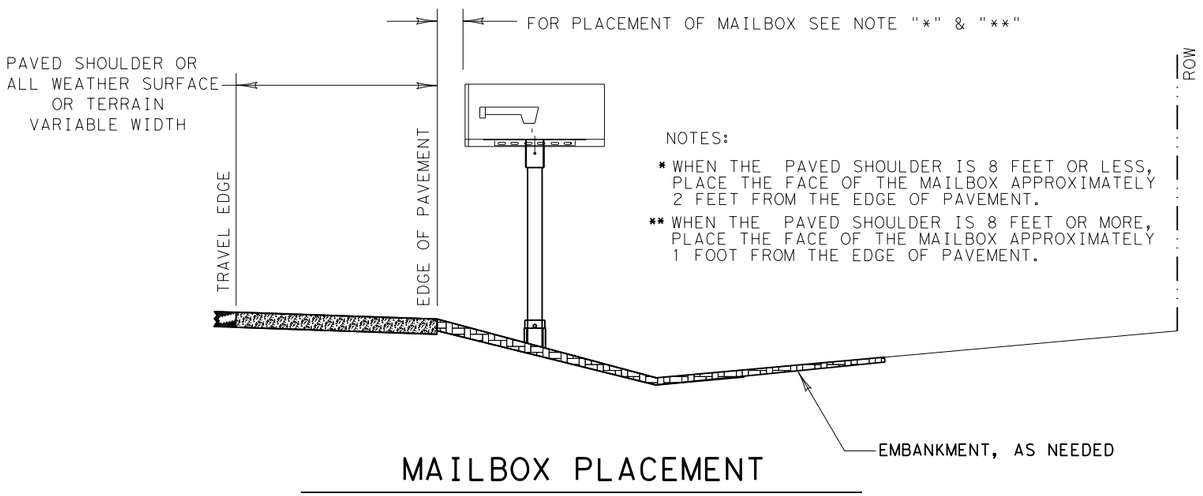
DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	95
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 1:04:27 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\19 PLAN LAYOUT.dgn



NOTE:
1. PROPOSED PAVEMENT TRANSITIONS ARE SHOWN IN PROP TYPICAL SECTIONS.
2. PGL CHANGE / H IS SHOWN IN PROP TYPICAL SECTIONS.

PAVEMENT TRANSITION DETAIL



MAILBOX PLACEMENT

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

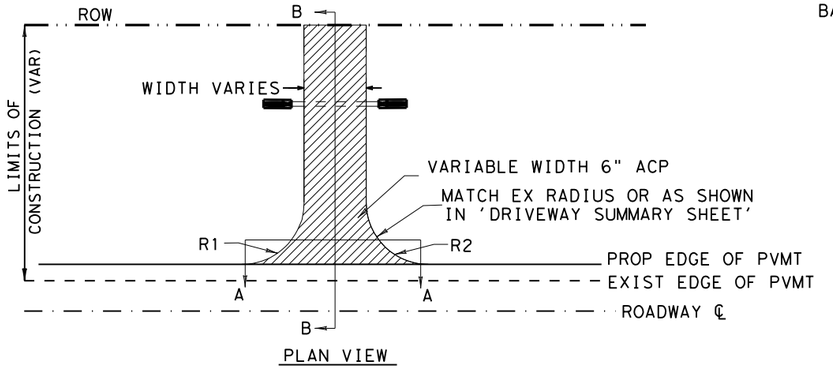
Texas Department of Transportation

FM 1895
ROADWAY DETAILS

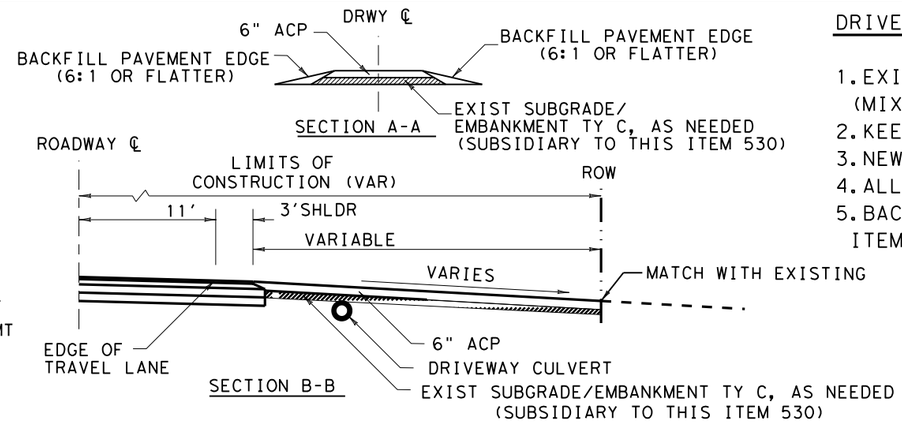
SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	96
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 1:51:22 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\20. RDWY MISC DETAIL.dgn



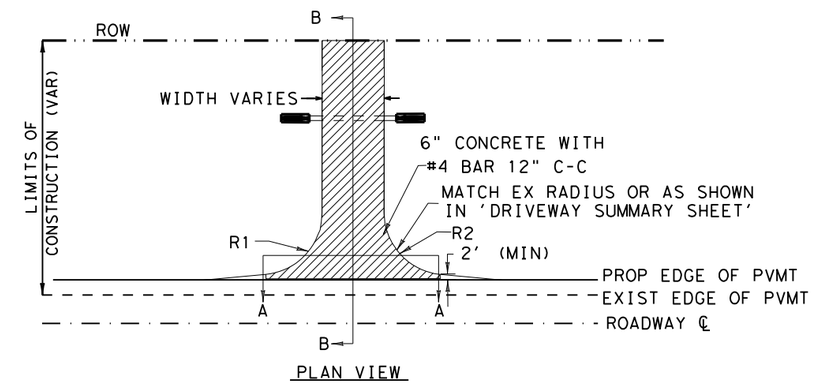
PLAN VIEW



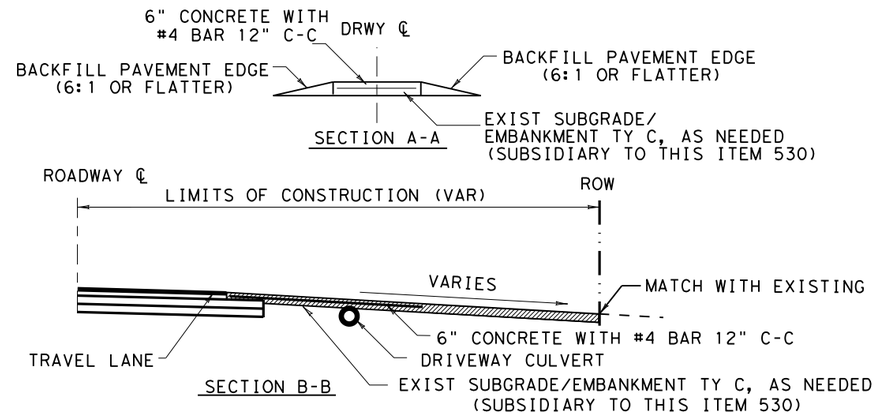
DRIVEWAY/INTERSECTION NOTES:

1. EXIST CONC DRIVEWAY - USE 6" HES CONCRETE (MIX DESIGN SHALL BE APPROVED BY ENGINEER).
2. KEEP MINIMUM FILL 6" ON DRIVEWAY CULVERT.
3. NEW ACP SHALL BE SP-C SAC-B PG 64-22
4. ALL NEW FLEX BASE SHALL BE TY D GR 1-2
5. BACKFILL MATERIAL SHALL MEET REQUIRMENT ITEM 134 AND IT IS SUBSIDIARY TO ITEM 530.

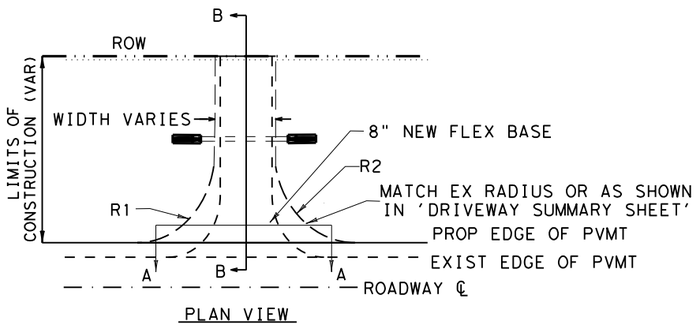
TYPICAL DRIVEWAY/INTERSECTION ASPHALT



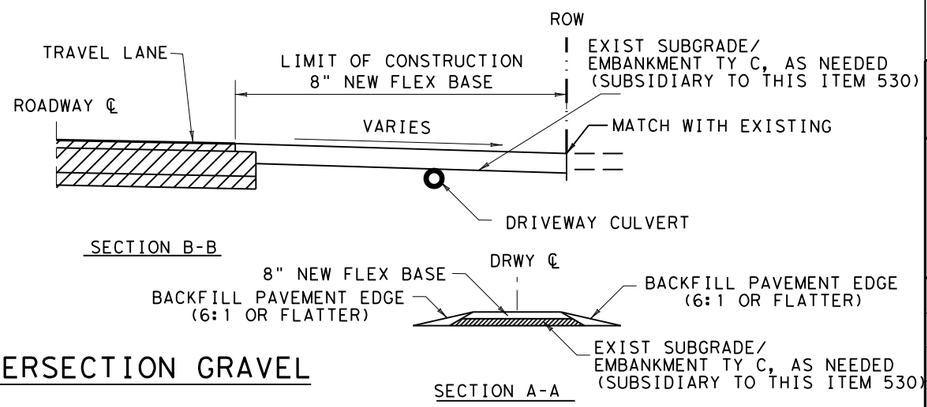
PLAN VIEW



TYPICAL DRIVEWAY/INTERSECTION CONCRETE



PLAN VIEW



TYPICAL DRIVEWAY/INTERSECTION GRAVEL

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

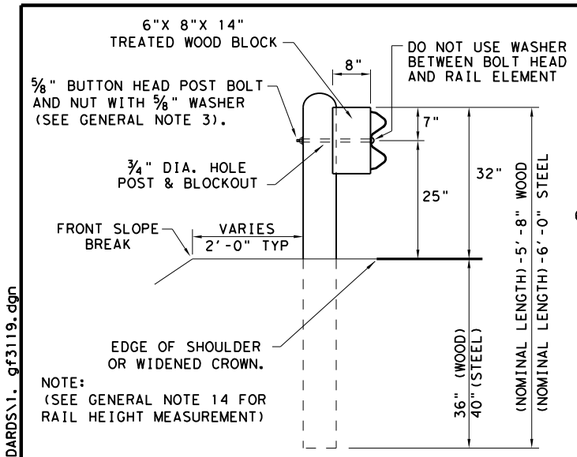
FM 1895 DRIVEWAY INTERSECTION DETAILS

SCALE: NTS

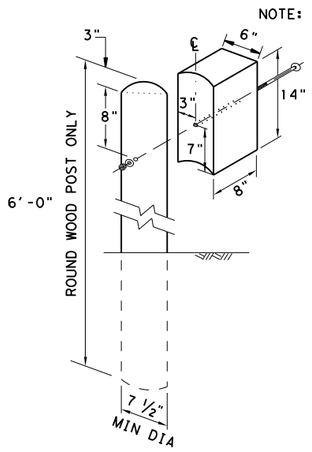
DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	97
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 1:57:55 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\DRIVEWAY INTERSECTION DETAIL.dgn

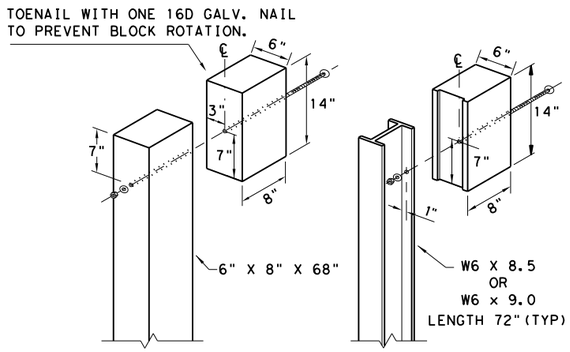
DATE: 7/27/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\19750213\4 - Design\Plan Set\3. Roadway\STANDARDS\1. gf3119.dgn



TYPICAL POST PLACEMENT



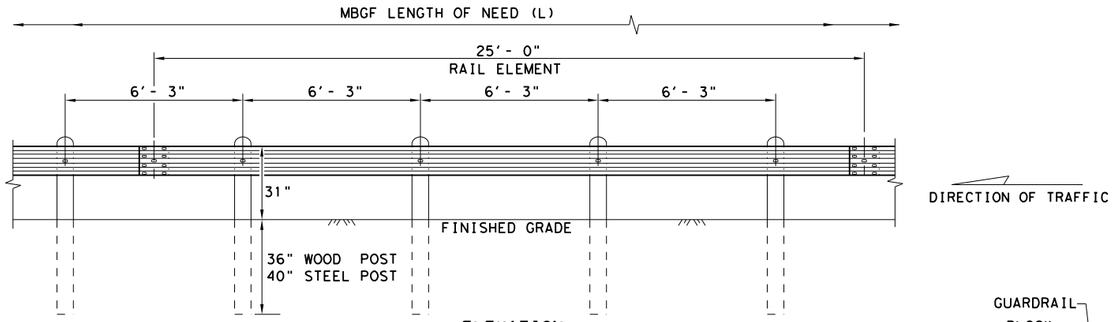
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST

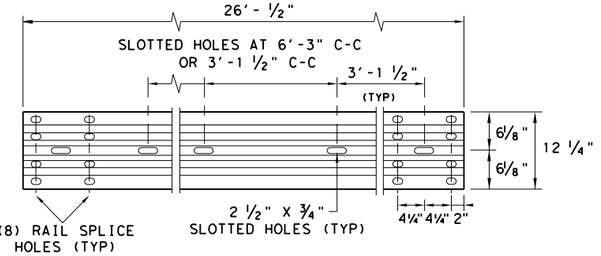
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



ELEVATION
MID-SPAN RAIL SPLICE

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



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

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

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

SPLICE BOLT LENGTH → VARIES

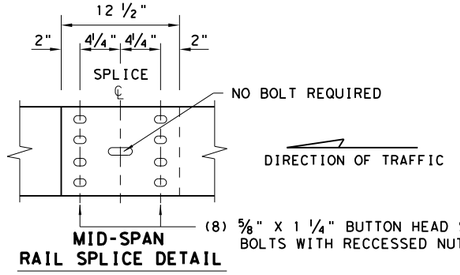
FBB01 = 1 ¼"
FBB02 = 2"

⅝"

POST & BLOCK LENGTH
FBB03 = 10"
FBB04 = 18"

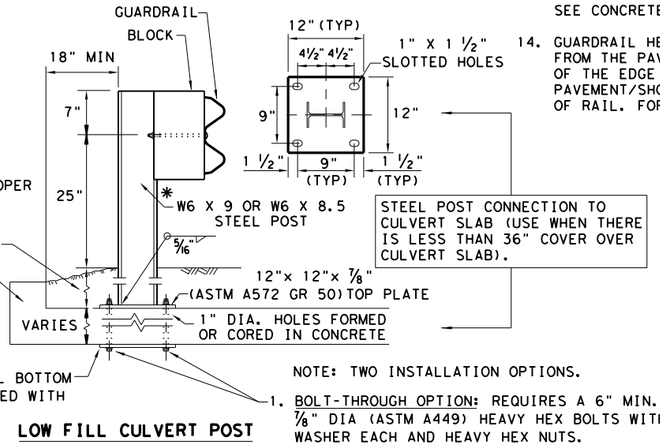
BUTTON HEAD BOLT

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



MID-SPAN RAIL SPLICE DETAIL

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



12" X 12" X ¼" (ASTM A36) STEEL BOTTOM PLATE WITH 1" DIA. HOLES REQUIRED WITH BOLT-THROUGH INSTALLATION.

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

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

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

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

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

GENERAL NOTES

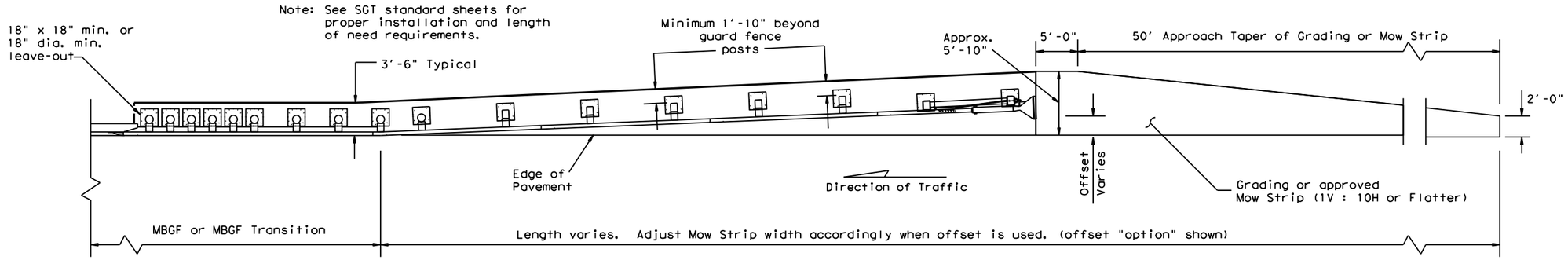
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS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

Texas Department of Transportation — Design Division Standard

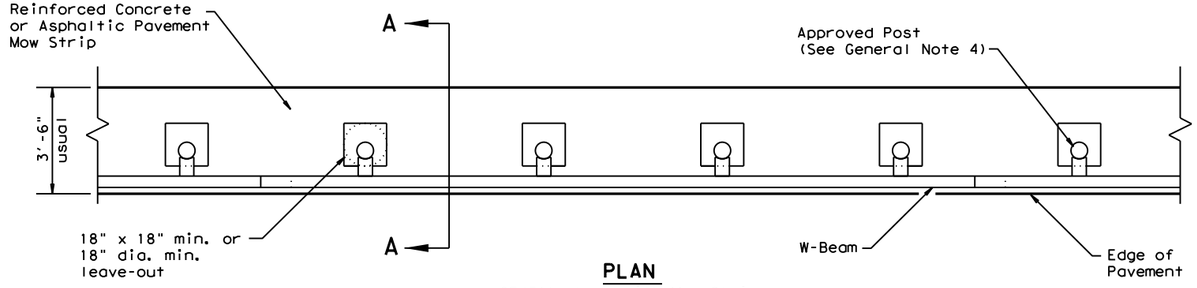
METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		98

DATE: 7/27/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\STANDARDS\2. gf31ms19.dgn

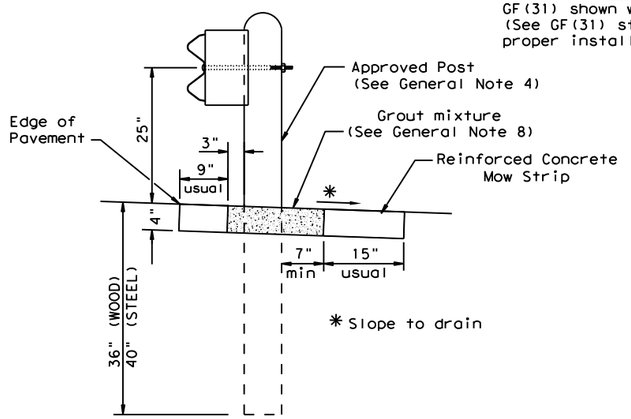


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



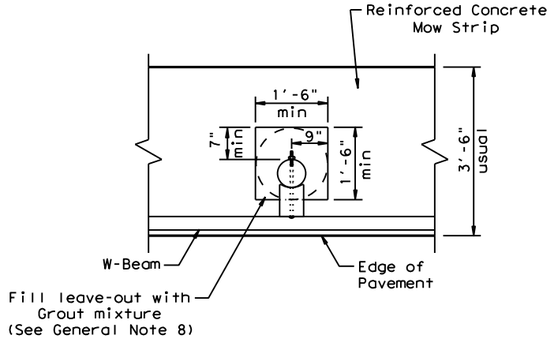
PLAN

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



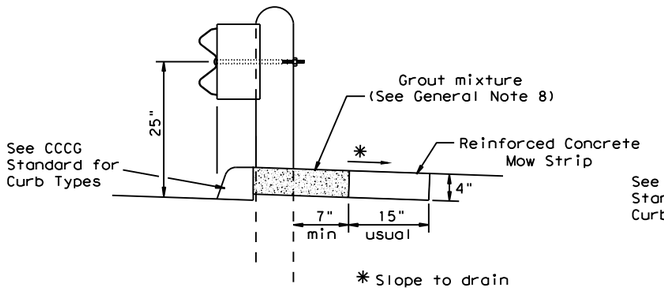
SECTION A-A

Typical



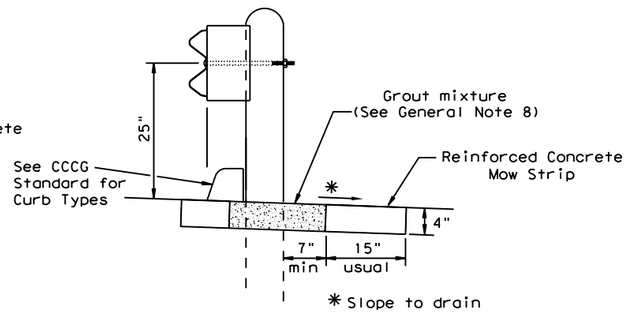
MOW STRIP DETAIL

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



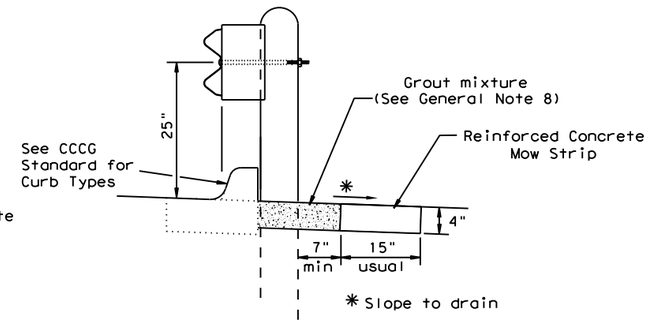
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

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

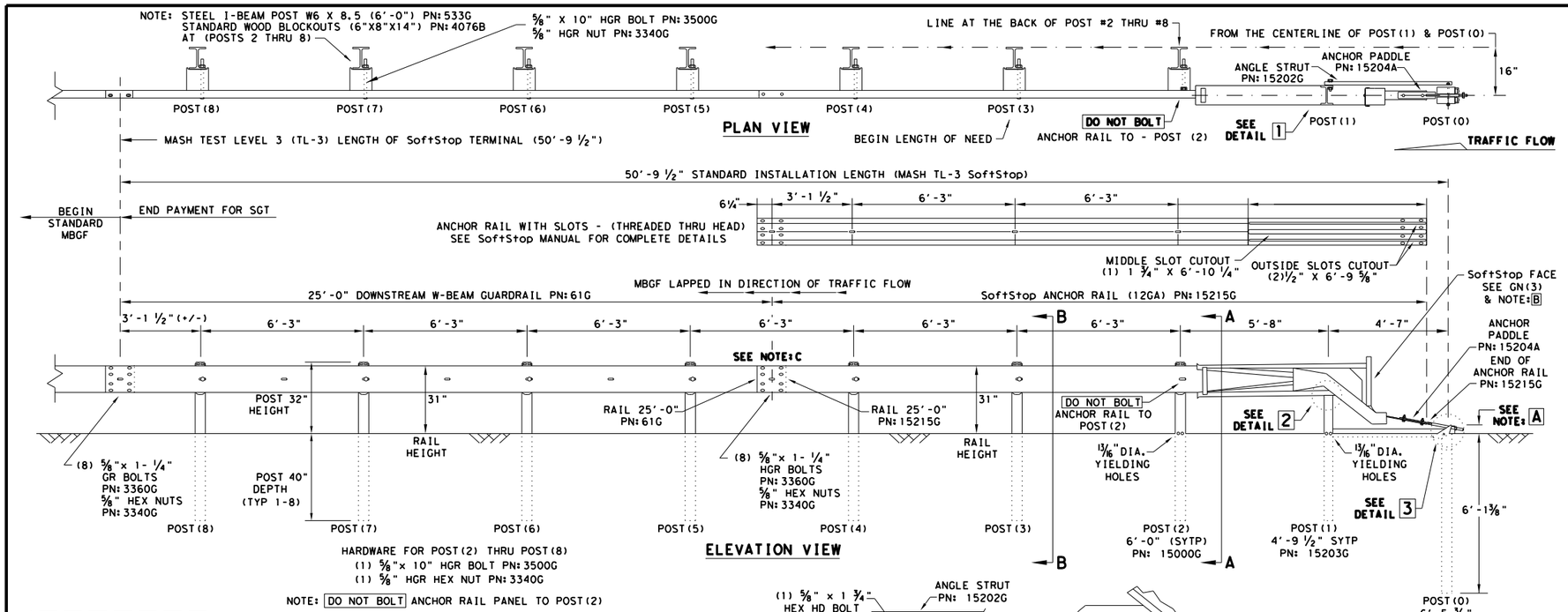
Texas Department of Transportation

Design Division Standard

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

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		99



GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Design Division Standard

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

FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP	
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1975	02	013	FM 1895	
	DIST	COUNTY		SHEET NO.	
	DALLAS	KAUFMAN		100	

DATE:
FILE:

DATE: 7/27/2022
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Profiles\SGT11S3118.dgn

(SEE GN NOTE 15)
STANDARD 31" MBGF

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

FIELD-SIDE
(RAIL 3)

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

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

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

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

RAIL 4 | RAIL 3 | RAIL 2 | RAIL 1

ITEM (10)
CABLE ASSEMBLY

ITEM (2)
GROUNDSTRUT

NO BLOCKOUT
AT (POST 1)

CABLES

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

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

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

PLAN VIEW

INSTALL GUARD FENCE RECESSED
HEX NUTS ON TRAFFIC-SIDE

MBGF
RAIL 2

MBGF
RAIL 1

DETAIL (C)

TRAFFIC FLOW

END PAYMENT (SGT) BY EACH

DO NOT BOLT
RAIL TO POST 6

BEGIN LENGTH OF NEED

INSTALLATION LENGTH 55'- ½"

49'-8 ⅝"

6'-3" | 6'-3" | 6'-3" | 6'- ¾" | 6'-3" | 6'-3" | 6'-3" | 37 ½" | 5'-3 ⅜"

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

RAIL
HEIGHT
31"

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

ARROWS

DETAIL (D)

RAIL
HEIGHT
31"

HEAD
HEIGHT

DETAIL (B)

32-¼"

68-⅛"

FINISHED
GRADE

CABLES

FINISHED
GRADE

ITEM (10)
CABLE
ASSEMBLY

ITEM (2)
GROUNDSTRUT

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

ITEM (4)
I-BEAM
W6 X 9

NO BLOCKOUT
AT (POST 1)

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

ELEVATION VIEW

**SOIL
ANCHOR POST**
ITEM (1)

A

A

TSS PANEL
GALVANIZED
ITEM (5)

RSS PLATE
GALVANIZED
ITEM (8)

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

TSS PANEL AND RSS PLATE

DETAIL (D)

HEAD
HEIGHT
32-¼"

TOP OF POST

31-⅞"

FINISHED
GRADE

40-⅛"

68-⅛"
ANCHOR POST
DEPTH

ITEM (1)
ANCHOR

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

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

SECTION VIEW A-A

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

7 ⅝"

2 ⅛"

UPPER CABLE
(BACK SIDE)

LOWER CABLE
(TRAFFIC SIDE)

DETAIL (B)

CABLE
FRICTION PLATE
HEAD UNIT
ITEM (9)

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

ITEM (24)

ITEM (21)

ITEM (20)
8X

ITEM (17)
8X

ITEM (23)
6X
3 SCREWS
EACH SIDE

(RAIL 1)

ITEM (22)
BRACKET
SHIPPED FLAT

ITEM (3)

ITEM (16)
4X

* ITEM (25)
HIGH INTENSITY
REFLECTIVE SHEETING

NOTE: DELINEATION MARKER IN
ACCORDANCE WITH TEXAS MUTCD.

SPLICE FOR IMPACT-HEAD
TO GUARD FENCE (RAIL1)

DETAIL (A)

APPROX 5'-10"

5'-0"

50' APPROACH GRADING

STANDARD
MBGF

2'-0"

EDGE OF PAVEMENT

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

2'-0" MAX.
RAIL OFFSET

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

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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

GENERAL NOTES

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

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

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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

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

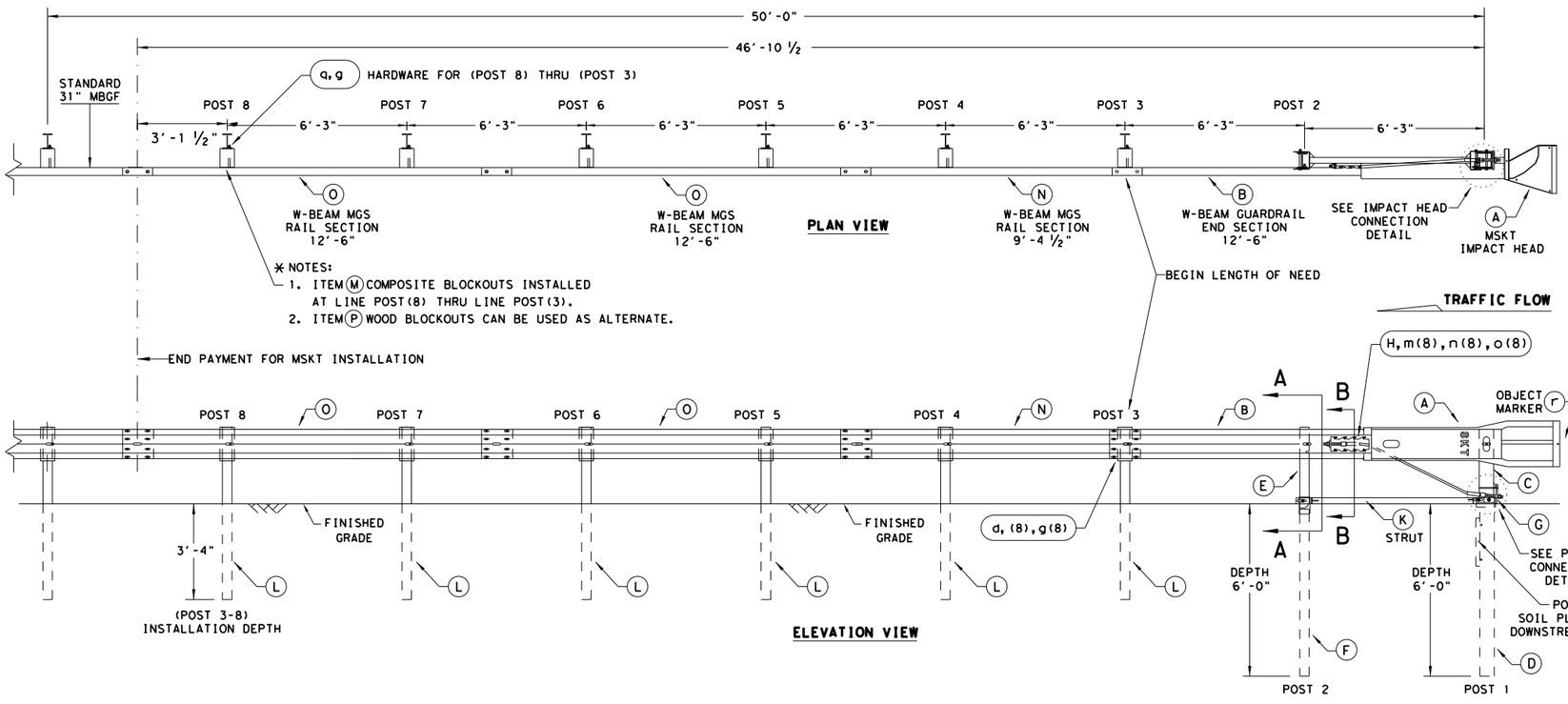
Texas Department of Transportation

Design Division Standard

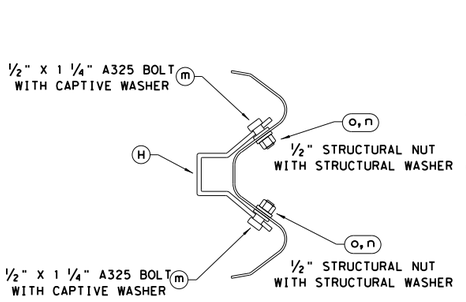
MAX-TENSION END TERMINAL
MASH - TL-3
SGT(11S)31-18

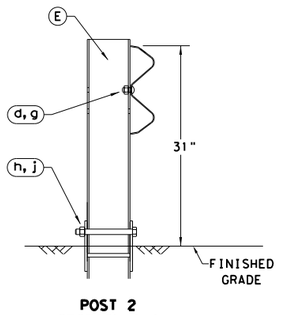
FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		101

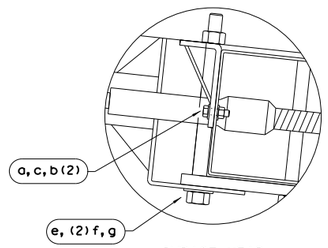
DATE: 7/27/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\STANDARDS\5. sgt12s3118.dgn

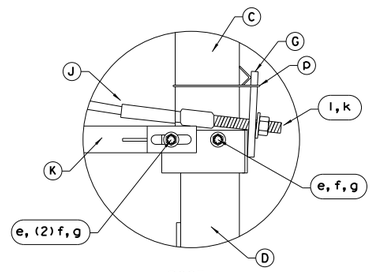


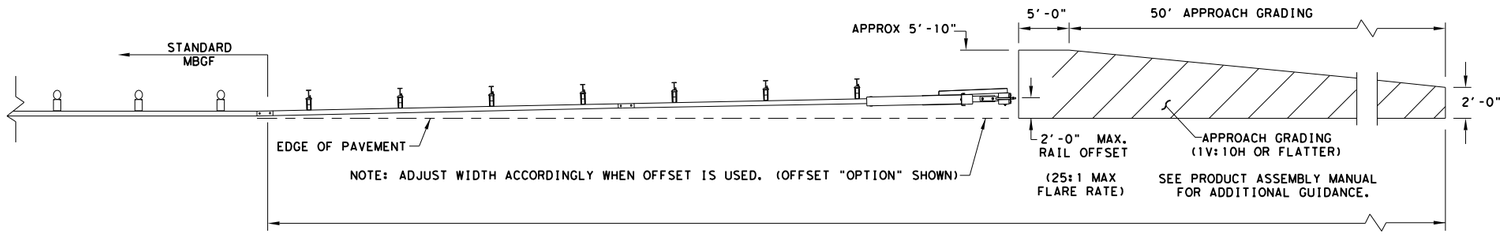
NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.











APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

GENERAL NOTES

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

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

SEE NOTES: *

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

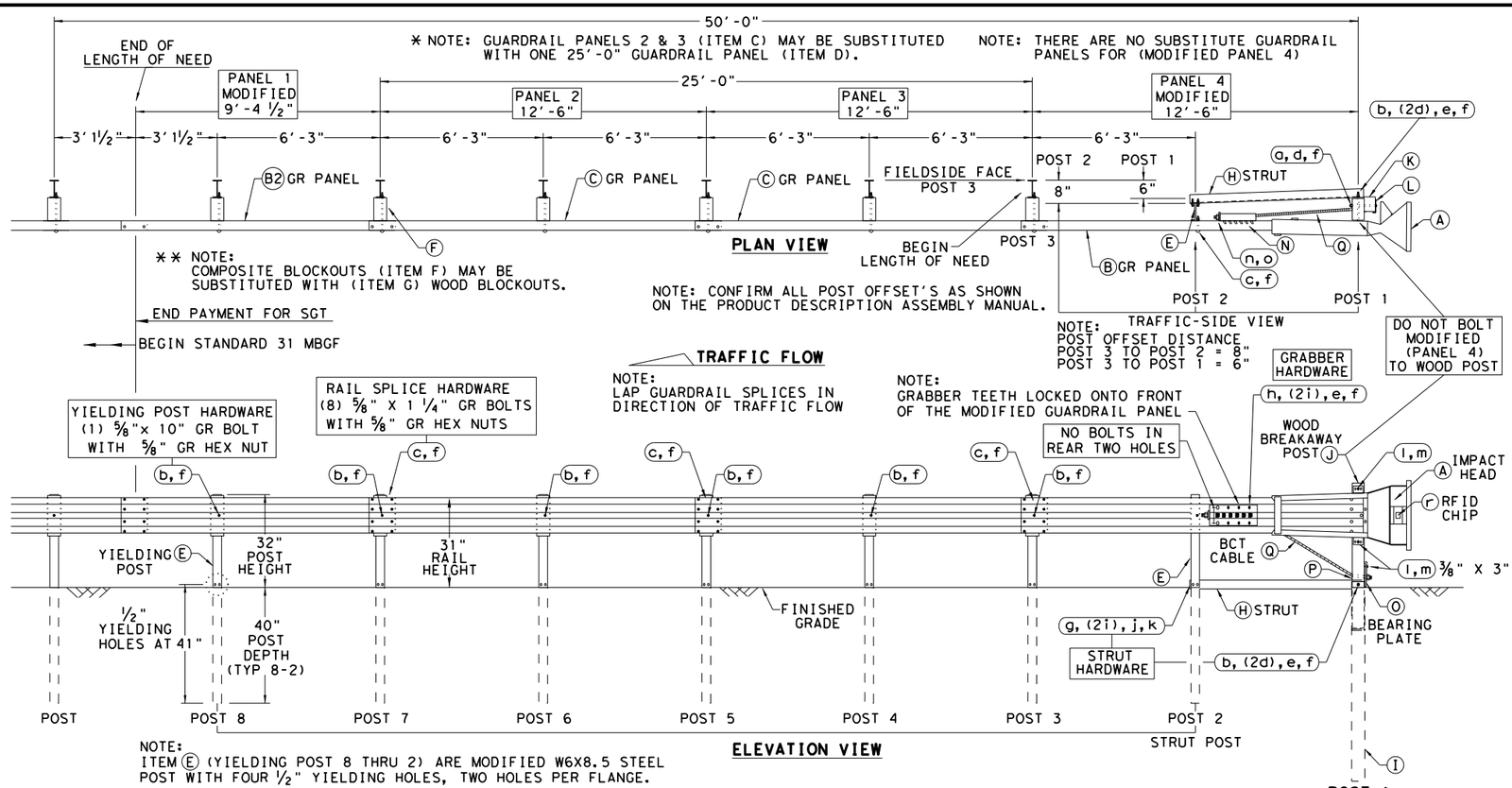
Texas Department of Transportation

Design Division Standard

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

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1975	02	013	FM 1895	
	DIST	COUNTY		SHEET NO.	
	DAL	KAUFMAN		102	

DATE: 7/27/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\1975020134 - Design\Plan Set\3. Roadway\STANDARDS\6. sgt153120.dgn

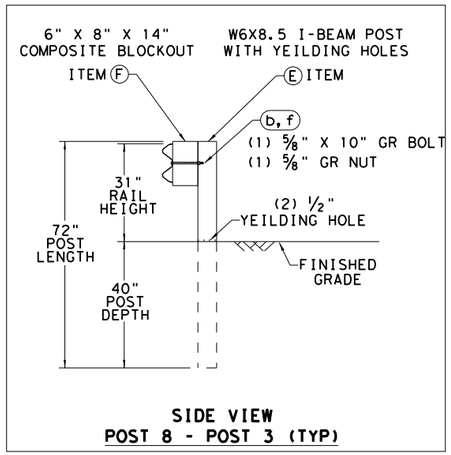


GENERAL NOTES

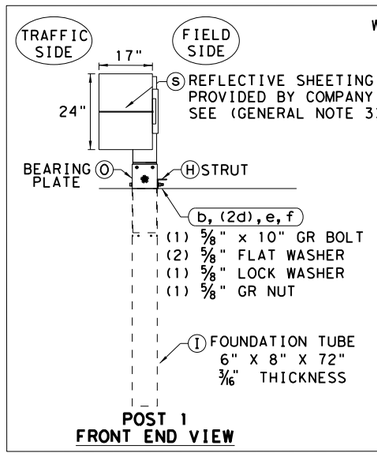
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL.
3. MANUFACTURER WILL APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" TO THE FACE PLATE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. THE OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. THE NOMINAL HEIGHT OF THE GUARDRAIL BEAM IS 31 INCHES WITH A TOLERANCE OF +/- ONE INCH.
5. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
6. (POST 2 THROUGH POST 8) ARE MODIFIED STEEL-YIELDING POSTS WITH YIELDING HOLES AT GROUND LEVEL. THERE ARE NO SUBSTITUTE POSTS.
7. POSTS SHALL NOT BE SET IN CONCRETE.
8. IF SOLID ROCK IS ENCOUNTERED FOR ANY OF THE POSTS IN THE SYSTEM, CONTACT THE MANUFACTURER FOR SPECIFIC INSTALLATION GUIDANCE.
9. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
10. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS DMS-7210 REQUIREMENTS MAY BE SUBSTITUTED FOR AN APPROVED WOOD BLOCKOUT. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
11. THE ENTIRE SYSTEM MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY CURVE. HOWEVER, THE SYSTEM CAN BE OFFSET BY TWO FEET AS SHOWN ON THE APPROACH GRADING DETAIL TO HELP OFF-SET THE IMPACT HEAD FROM SHOULDER OF THE ROAD.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D *	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CBO8
G **	6	WOOD BLOCKOUT 6" X 8" X 14"	WBO8
H	1	STRUT 3" X 3" X 80" x 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" x 3/16"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
		SMALL HARDWARE	
a	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563DH HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M

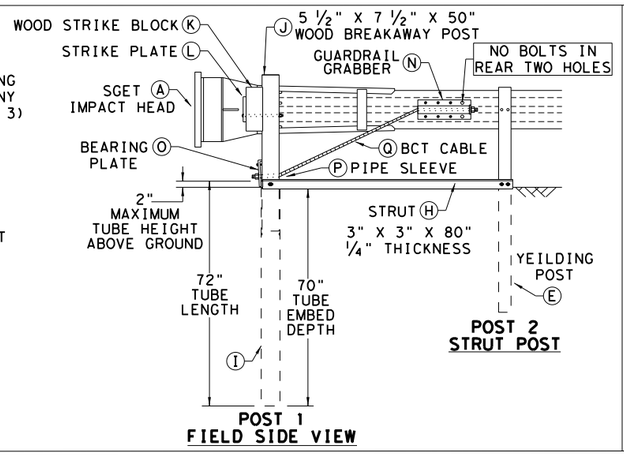
* ALTERNATIVE ITEMS
** NOTE: SEE PLAN VIEW



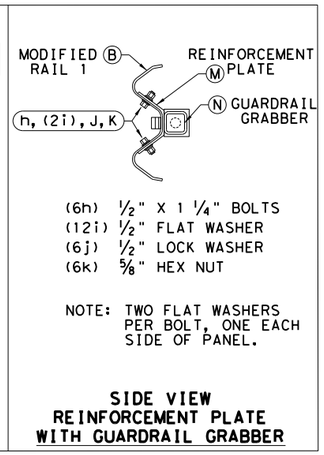
SIDE VIEW
POST 8 - POST 3 (TYP)



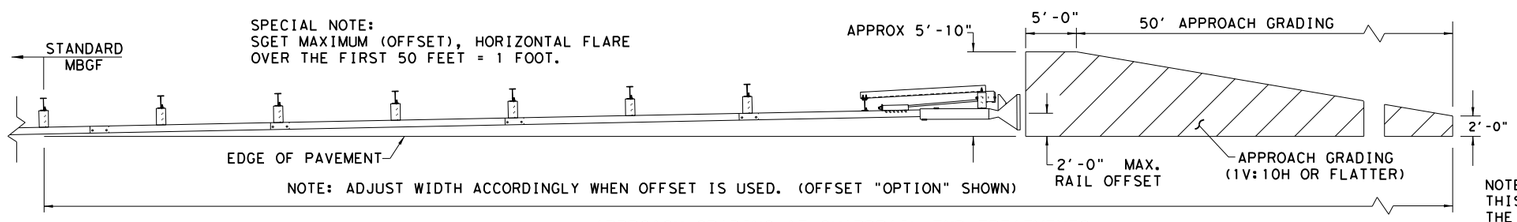
POST 1
FRONT END VIEW



POST 1
FIELD SIDE VIEW



SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



APPROACH GRADING AT GUARDRAIL END TREATMENTS

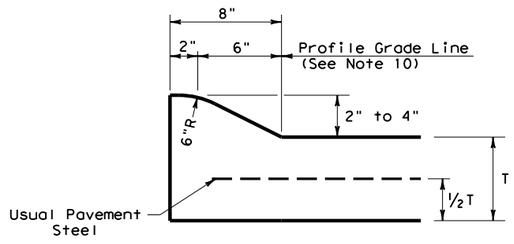
NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

Texas Department of Transportation — Design Division Standard

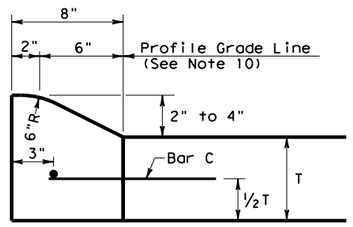
SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT(15)31-20

FILE: sgt153120.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP	
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1975	02	013	FM 1895	
	DIST	COUNTY		SHEET NO.	
	DAL	KAUFMAN		103	

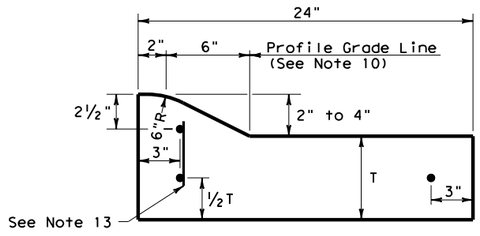
DATE: 7/27/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\STANDARDS\cccg22.dgn



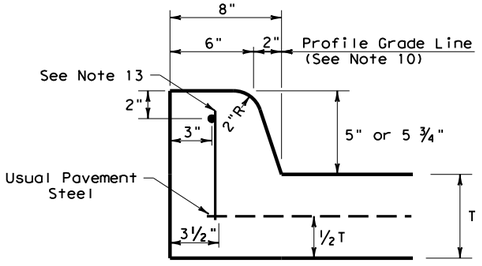
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



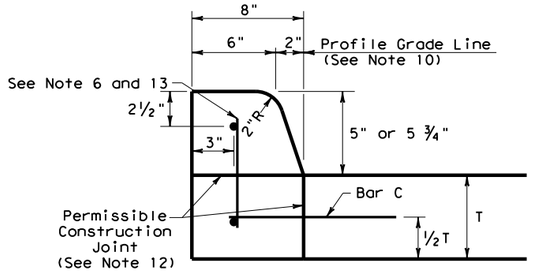
TYPE I CURB
2" - 4" HEIGHT



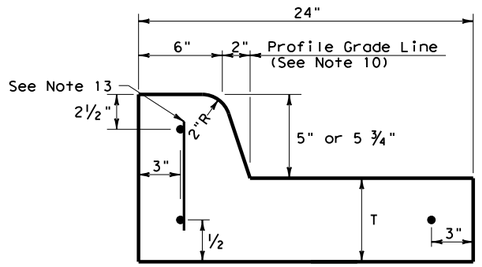
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



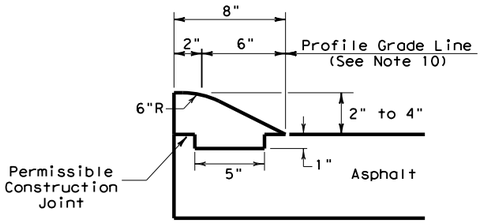
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



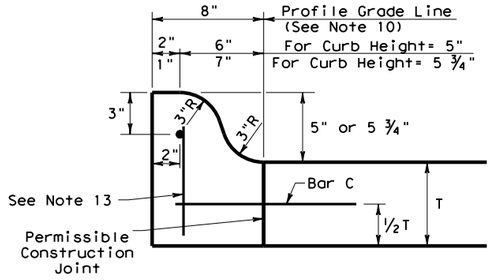
TYPE II CURB
5" - 5 ¾" HEIGHT



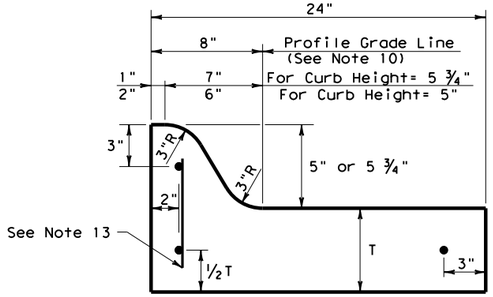
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



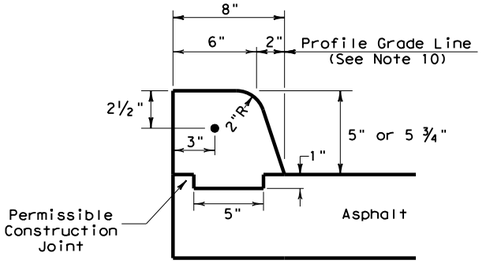
TYPE III CURB (KEYED)
2" - 4" HEIGHT



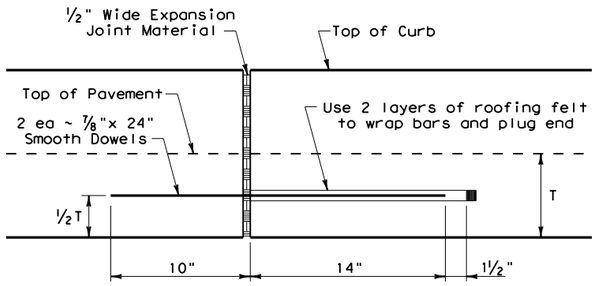
TYPE IIa CURB
5" - 5 ¾" HEIGHT



TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT

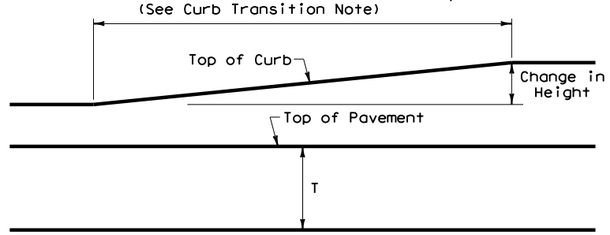


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

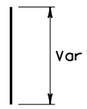
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



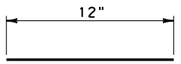
CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B placement as needed (typically at four ft. C-C) to support curb reinforcing steel during concrete placement.



BAR B



BAR C

Texas Department of Transportation

Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

CCCG-22

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: CS	CK: KM
© TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		104

DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

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

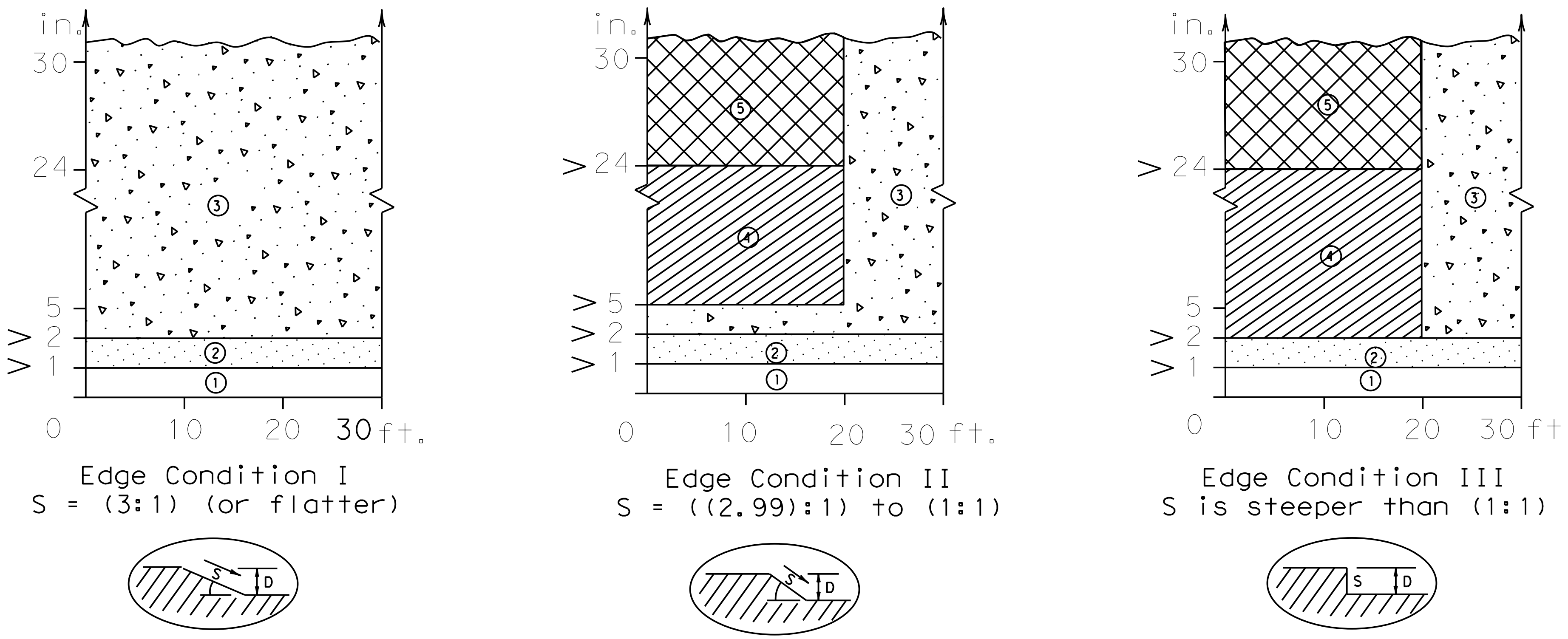
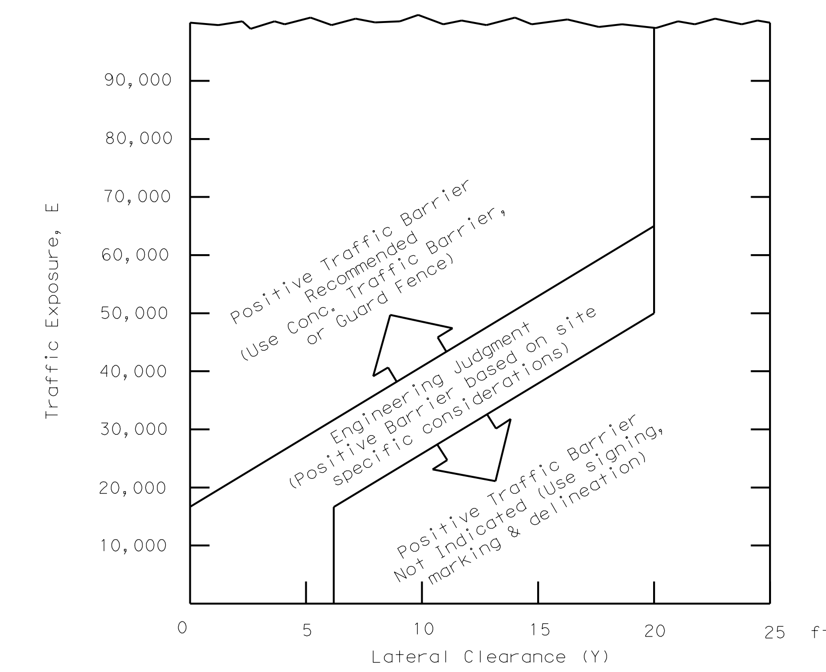
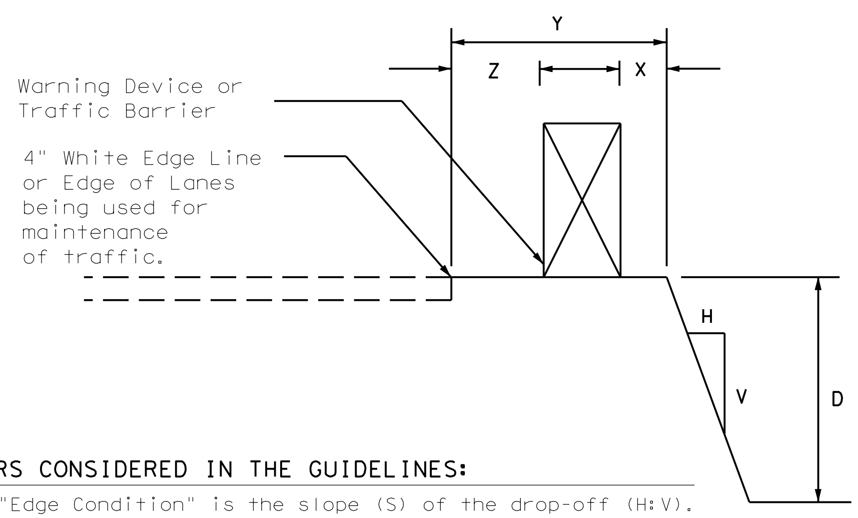


FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▩)



1. E = ADT x T
   Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.
2. Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.
3. An approved end treatment should be provided for any positive barrier end located within the clear zone.



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

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

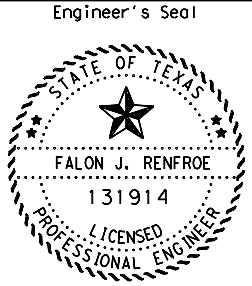
FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".
2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.
3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.
4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.
5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Edge Condition Notes:

1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.
2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.
3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.
4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

Engineer's Seal



7/28/2022

Date

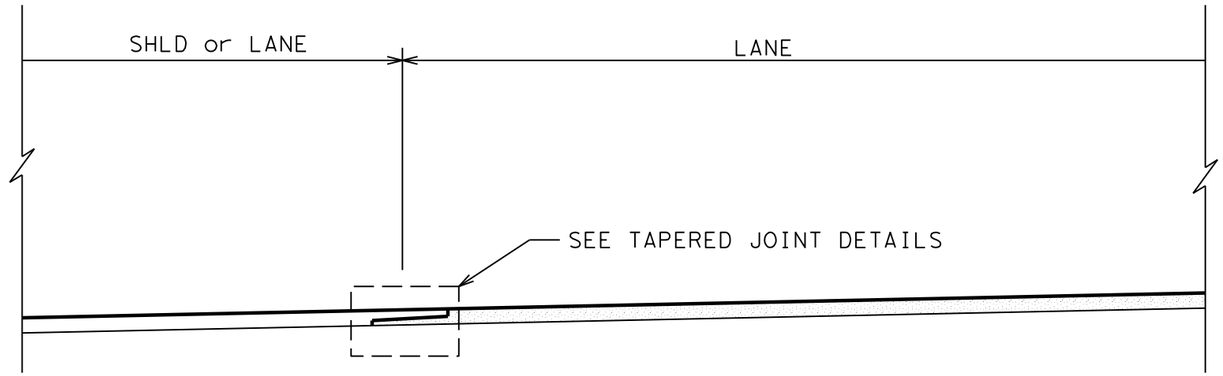
Falon Renfroe, P.E.

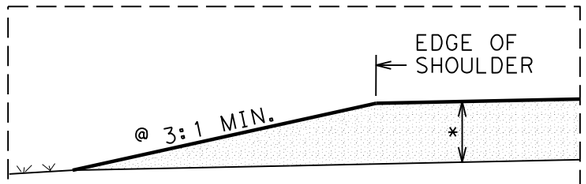
Texas Department of Transportation

Traffic Safety Division Standard

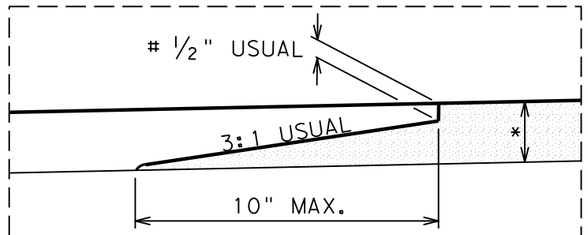
TREATMENT FOR VARIOUS EDGE CONDITIONS

FILE: edgecon.dgn	DN:	CK:	DW:	CK:
© TxDOT August 2000	CONT	SECT	JOB	HIGHWAY
REVISIONS 03-01 08-01 9-21	1975	02	013	FM 1895
	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	105

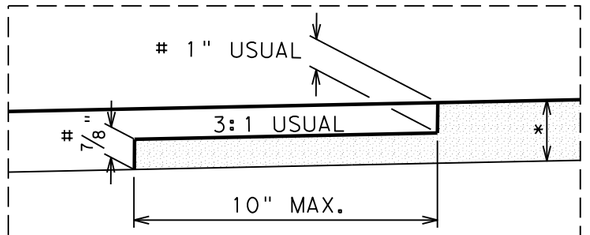




TAPERED OUTSIDE EDGE DETAIL



TAPERED JOINT DETAIL 1.5" TO 4" LIFTS



TAPERED JOINT DETAIL OVER 4" LIFTS

@ IF BACKFILLED SLOPE IS LESS THAN 3:1, COVER WEDGE WITH APPROVED BACKFILL.

* SEE TYPICAL SECTION FOR DEPTH AND TYPE OF HMA.
# NOTCH DEPTH SHALL NOT BE LESS THAN NOMINAL AGGREGATE SIZE.

NOTES:

1. THE ABOVE DETAILS SHALL BE CONSTRUCTED BY TAPERING THE BITUMINOUS MAT. THE TAPERED PORTION SHALL EXTEND BEYOND THE NORMAL LANE WIDTH AND BE LAID MONOLITHICALLY WITH ADJOINING MAT. THE TAPERED PORTION OF THE MAT SHALL BE CONSTRUCTED BY THE USE OF AN APPROVED STRIKE-OFF DEVICE THAT WILL PROVIDE A UNIFORM SLOPE AND WILL NOT RESTRICT THE MAIN SCREED. CLEAN WEDGE PRIOR TO PLACEMENT OF TACK COAT. TACK COAT SHALL BE APPLIED UNIFORMLY TO THE IN-PLACE TAPER WITH A DISTRIBUTOR BEFORE THE ADJACENT MAT IS PLACED. FINAL DENSITY REQUIREMENTS FOR THE ENTIRE PAVEMENT, INCLUDING THE TAPER AREA, WILL REMAIN UNCHANGED. COMPACTION OF THE INITIAL TAPER SECTION WILL BE REQUIRED AS NEAR TO FINAL DENSITY AS POSSIBLE. ROLL ADJACENT MAT FROM HOT SIDE TO COLD.

2. THE TYPE OF DEVICE TO PRODUCE ABOVE REFERENCED DETAILS SHALL PROVIDE INITIAL COMPACTION EQUIVALENT TO LAYDOWN MACHINE, WITH FINAL DENSITY ADHERING TO NOTE 1, AND BE APPROVED BY THE ENGINEER.

3. HOT MIX MATERIAL AND PLACEMENT SHALL BE PAID FOR UNDER THE PERTINENT ITEM. ANY ADDITIONAL SURFACE PREPARATION, TACK COAT, TACK COAT PLACEMENT, EQUIPMENT, LABOR, TOOLS AND INCIDENTALS TO PRODUCE TAPERED EDGE AND JOINTS AS DESCRIBED ABOVE SHALL BE CONSIDERED SUBSIDIARY TO THE HOT MIX ITEM.

4. THE TAPERED JOINT DETAIL IS NOT INTENDED FOR USE ON 2 WAY 2 LANE ROADBED CENTERLINE WITH LESS THAN 22' OVERALL WIDTH.

5. FULL PAVING OF ALL LANES AND SHOULDRS BY THE END OF EACH DAY PRODUCTION WILL NOT REQUIRE A TAPERED JOINT.

REVISED ON 9/10/08

Texas Department of Transportation

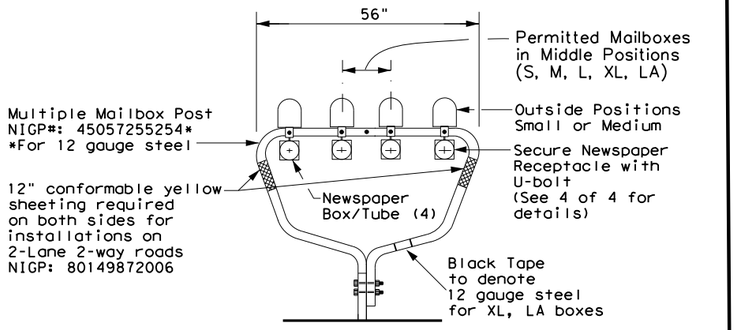
HOT MIX EDGE AND LONGITUDINAL JOINT DETAILS DALLAS DISTRICT STANDARD

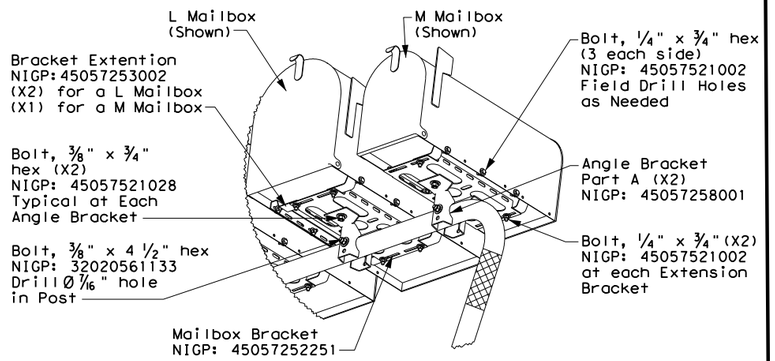
LJD(1-1)-07

FED. RD. DIV. NO.	PROJECT NUMBER		SHEET NUMBER
18	(SEE TITLE SHEET)		106
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	DALLAS	
CONTROL	SECTION	SECTION	HIGHWAY NUMBER
1975	02	013	FM 1895

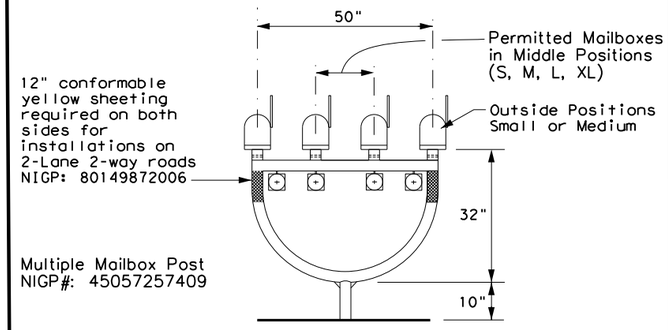
DATE:
FILE:

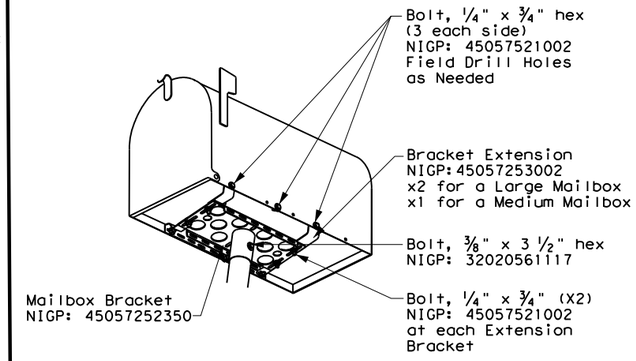
TYPE 1 - MULTIPLE





TYPE 4 - MULTIPLE





MAILBOX SIZES

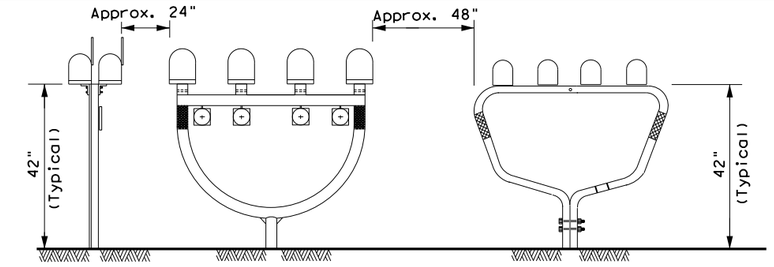
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX **
	LENGTH	WIDTH	HEIGHT	WEIGHT
SMALL	19 1/2"	6"	7"	6 LBS
MEDIUM	22 1/2" *	8" *	11 1/2" *	8 LBS
LARGE	23 1/2"	11 1/2"	13 1/2"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 1/2"	15"	23 LBS

* See Note 1.
** Excluding Molded Plastic on 4 X 4 Post

GENERAL NOTES:

1. Dimensions shown (length, width, and height) are typical, not maximums. However, anytime a medium size mailbox is mounted on a single/double mount or on the outside position on a multi mount, the dimensions shown are maximums.
2. Mailboxes shall be made of light weight sheet metal or light weight plastic. Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.

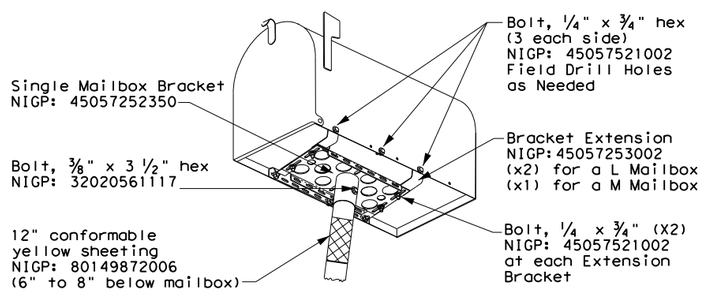
TYPICAL INSTALLATION MEASUREMENTS

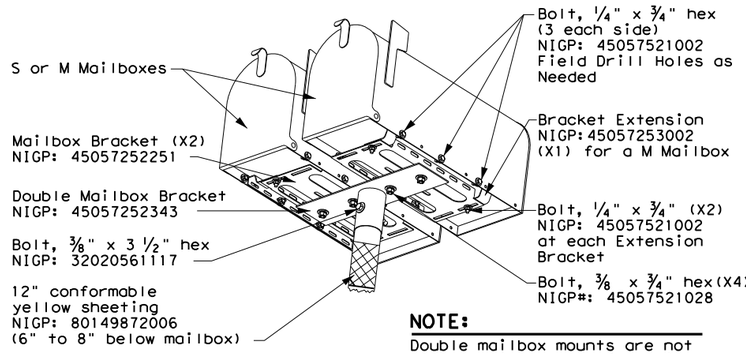


NOTE:

Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Design Standard sheets PED-Pedestrian Facilities Curb Ramps.

TYPE 2 and 4 - SINGLE/DOUBLE

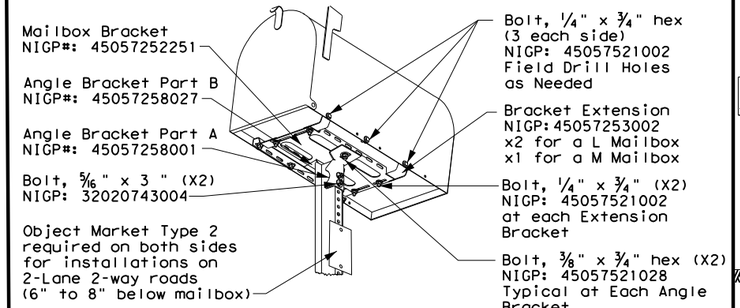


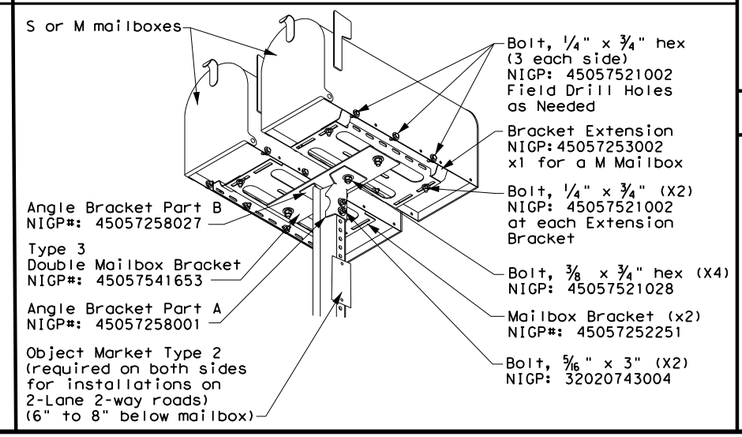


NOTE:

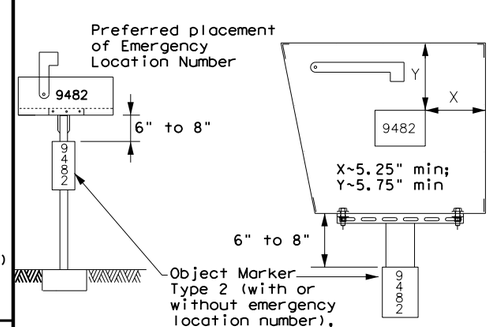
Double mailbox mounts are not allowed with a type 4 multiple mailbox installation

TYPE 3 - SINGLE/DOUBLE





PLACEMENT OF EMERGENCY LOCATION NUMBER

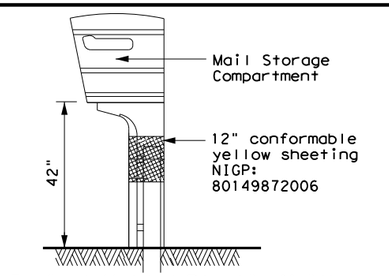


NOTES:

1. Location numbers are provided by homeowner. Minimum size 1" height.
2. Location number is typically placed on the mailbox in a contrasting color.
3. Black numbers may be placed on the Type 2 object marker if the numbers cannot be placed on the mailbox.
4. Alternatively, a green or blue plate with white numbers attached may be mounted below the object marker. Other contrasting color configuration, as approved, may be used.
5. See 3 of 4 for Foundation details.
6. See 4 of 4 for Hardware details.

SHEET 1 OF 4

TYPE 5



Typical Molded Plastic Mailbox

Texas Department of Transportation

Maintenance Division Standard

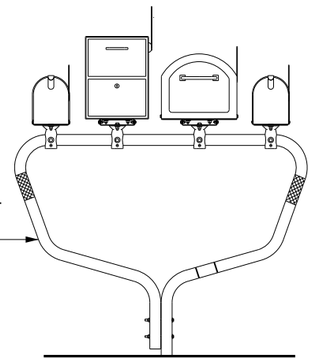
MAILBOX MOUNTING AND ASSEMBLY

MB(1)-21

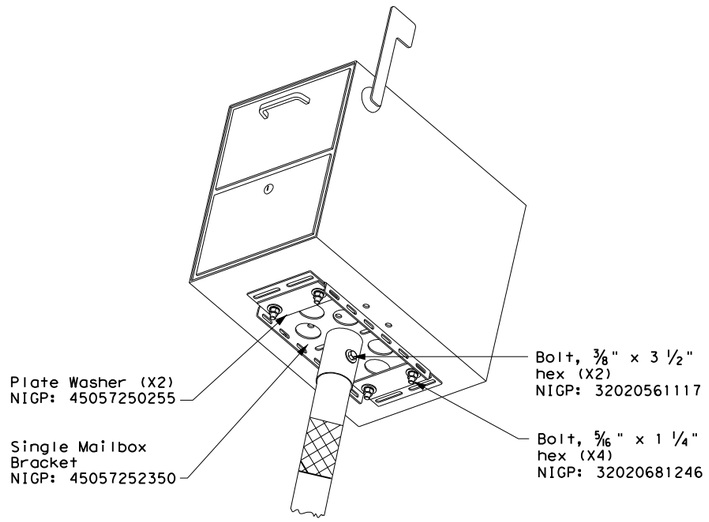
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		107

DATE:
FILE:

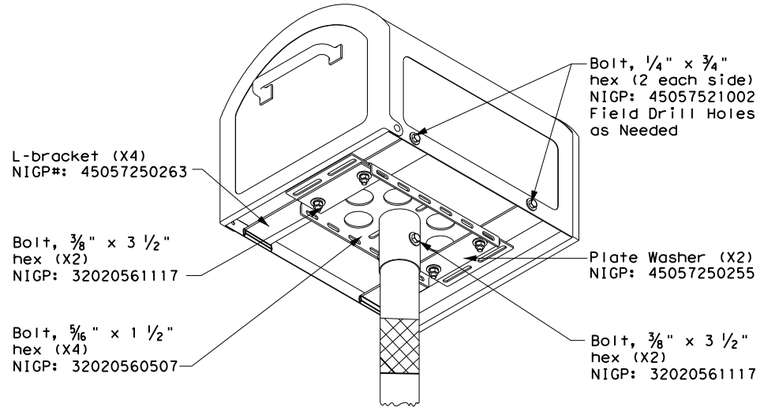
TYPE 1- MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX

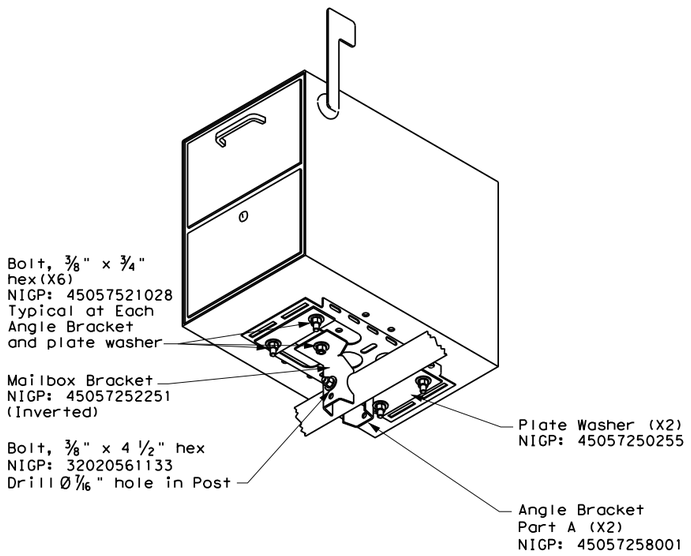


TYPE 2/4 - SINGLE XL MAILBOX

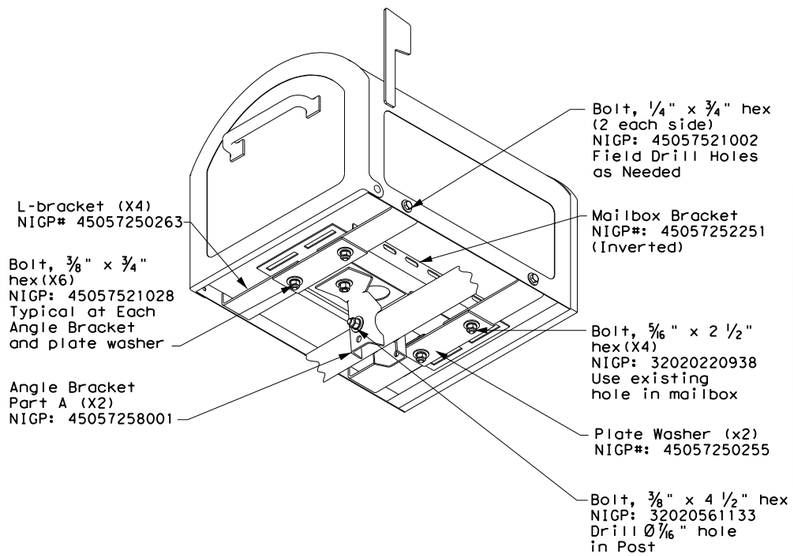


NOTE:
Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

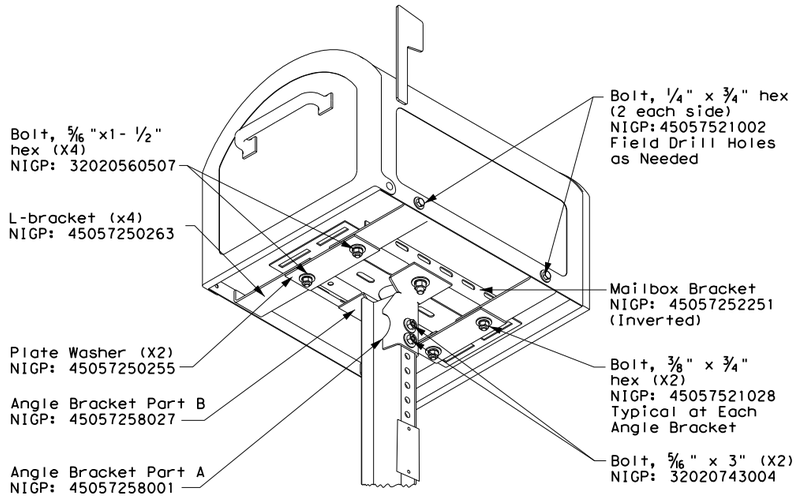
TYPE 1 MULTI – LOCKABLE ARCHITECTURAL (LA)



TYPE 1 MULTI – XL MAILBOX



TYPE 3 - XL MAILBOX MOUNTING



Texas Department of Transportation

Maintenance Division Standard

XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY

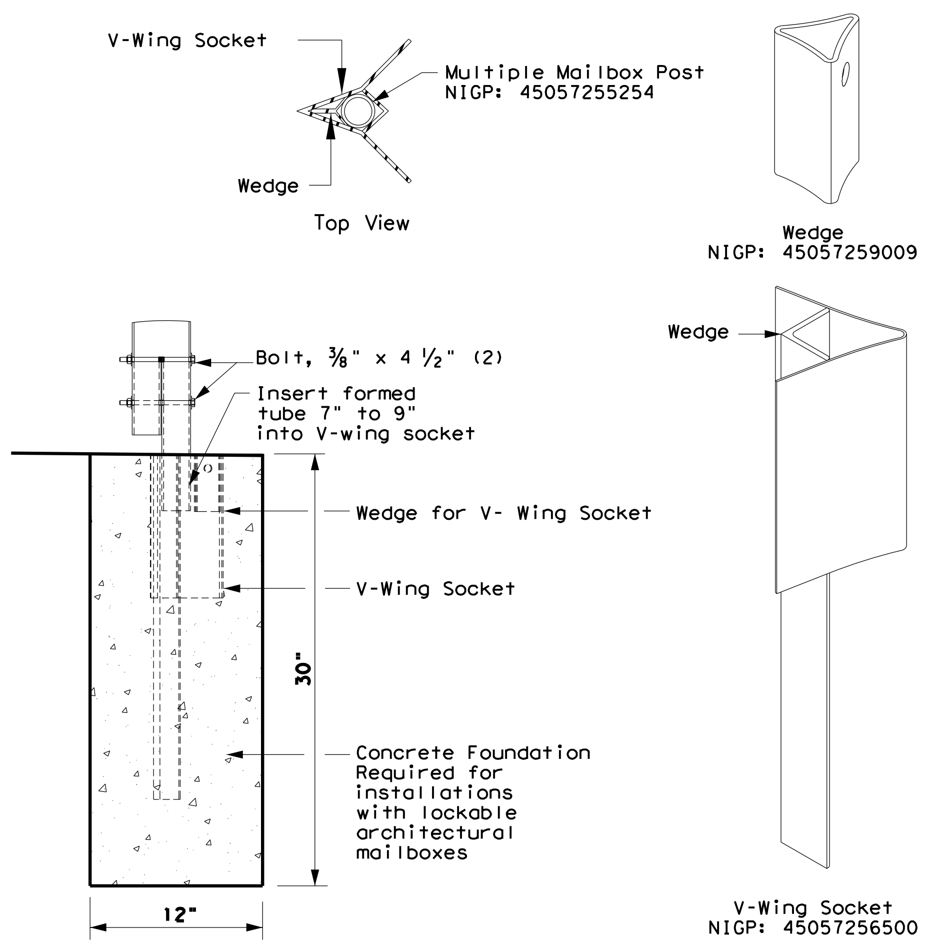
MB(2)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		108

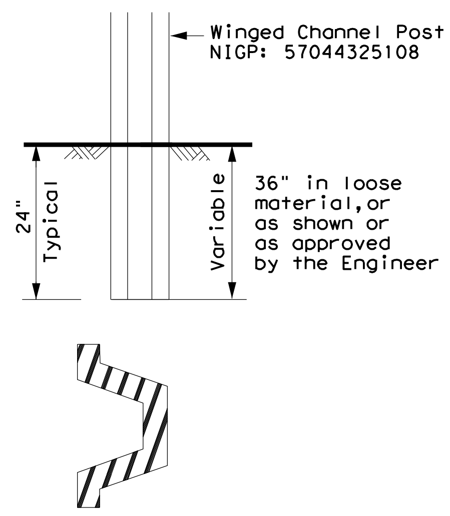
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/27/2022 2:31:08 PM

TYPE 1 - SUPPORT/FOUNDATION
Thin Wall Tube w/ V-LOC Anchorage



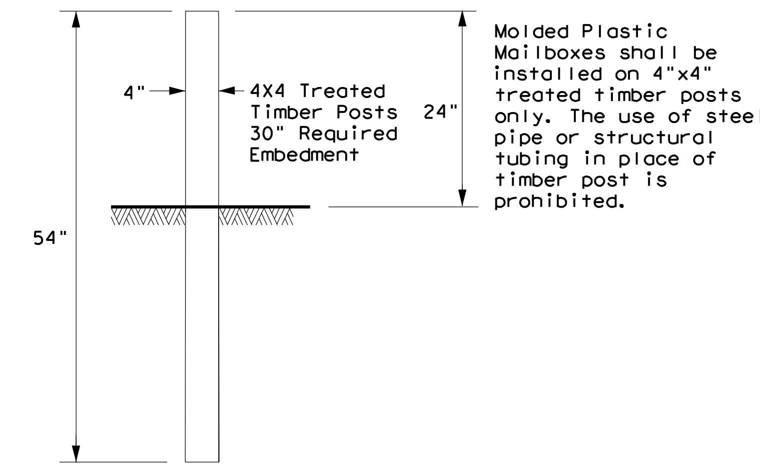
TYPE 3 - SUPPORT/FOUNDATION



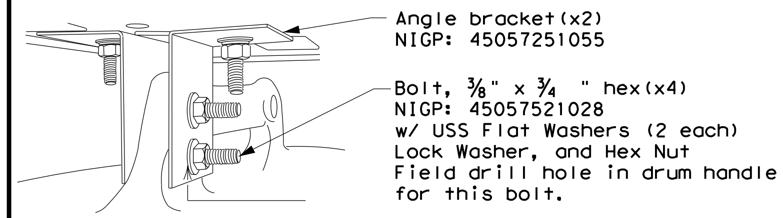
NOTES:

1. Attach Object Marker (OM) facing direction of traffic.
2. OM will also be required on opposite side if installed on a 2-Lane, 2-Way roadway.

TYPE 5 - SUPPORT/FOUNDATION



TYPE 6 - TEMPORARY MAILBOX SUPPORT



Plastic Drum NIGP: 55093383655
Rubber Collar NIGP: 55093387102

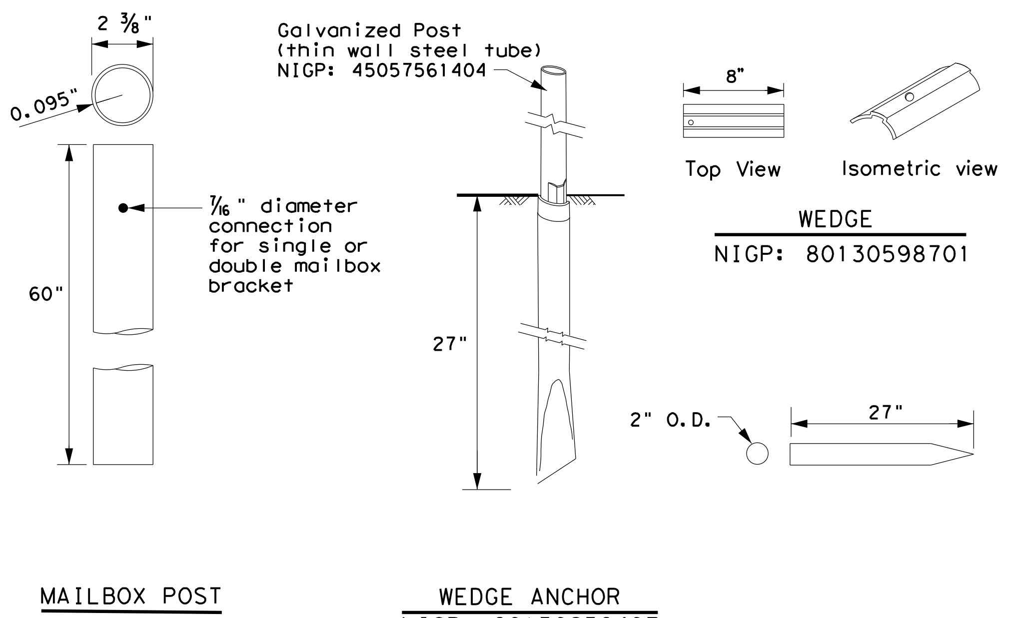
NOTES:

1. Place on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
2. Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

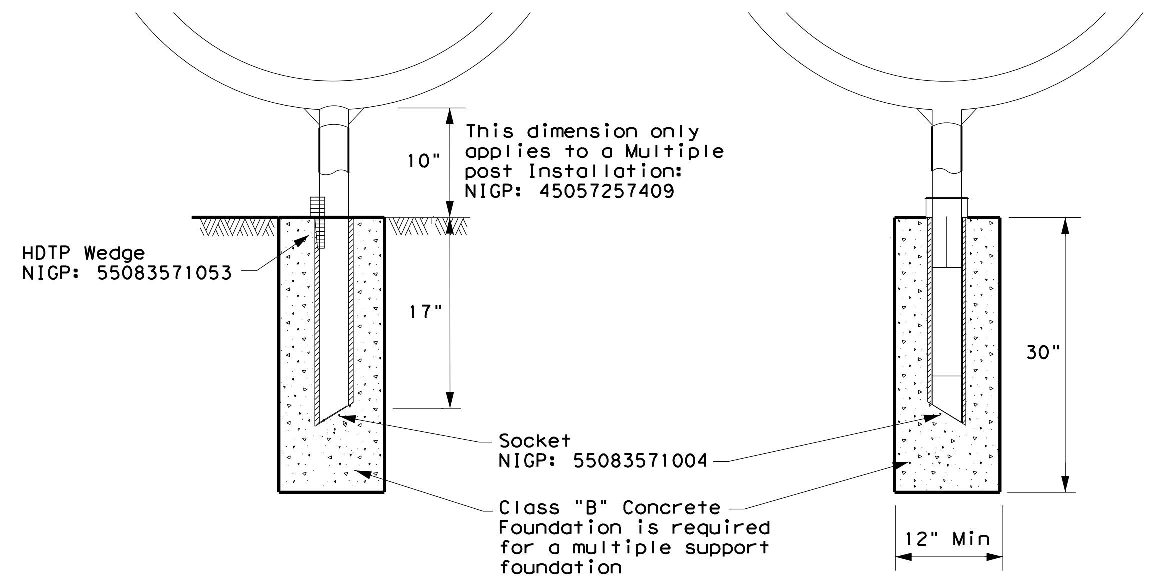
GENERAL NOTES:

1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition, only on Type 1, Type 2, and Type 4

TYPE 2 - SUPPORT/FOUNDATION
Thin Wall Steel Tube w/Wedge Anchor System



TYPE 4 - SUPPORT/FOUNDATION
Whitecoated steel post NIGP: 45057561107
Multiple post NIGP: 45057257409
Recycled Rubber post (RR) NIGP: 45057561057



SHEET 3 OF 4

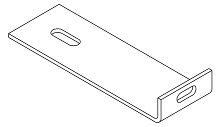
Texas Department of Transportation | Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

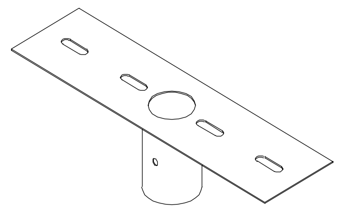
MB(3)-21

FILE: MB-21.dgn	DN:	CK:	DW:	CK:
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015	1975	02	013	FM 1895
6/2005 1/2011	DIST		COUNTY	SHEET NO.
11/2006 7/2014	DAL		KAUFMAN	109

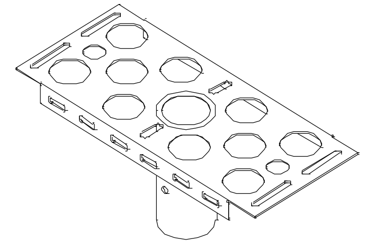
TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4			TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple	Single	Single
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: SS, SM, MM	S, M, L, XL, or LA	SS, SM, or MM	Outside Position: S or M Inside Position: S, M, L, or XL	Molded Plastic	S, or M
Mailbox Post NIGP #	45057255254 (Galvanized Multiple)	45057561404 (Thin Walled Gavanize)	57044325108 (Wing Channel Post)	45057561107 (Thin walled white powder coated) 45057561057 (Recycled Rubber Post: S or M only)	45057561107 (Thin Walled White Powder Coated)	45057257409 (White Powder Coated Multiple)	4x4 Timber	Construction Barrel
Post and Mailbox Hardware NIGP #	45057259009 (Wedge) 45057256500 (V-Wing Socket) 45057253002 (Bracket Extension) 45057252251 (Mailbox Bracket) 45057258001 (Part A Angle Bracket x2) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	80130598701 (Wedge) 80130238407 (Wedge Anchor) 45057253002 (Bracket Extension) 45057252343 (Double MB Bracket) 45057252350 (S. Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket forXL x4)	45057541653 (Type 3 Double Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057253002 (Bracket Extension) 45057258001 (Part A Angle Bracket) 45057258027 (Part B Angle Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057252350 (Single Mailbox Bracket) 45057253002 (Bracket Extension) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252343 (Double Mount Bracket) 45057252251 (Mailbox Bracket x2)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252350 (Single Mount Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	None	45057251055 Angle Bracket (x2)
Foundation Used	Class B Concrete (Required for LA Mailboxes)	Class B Concrete (Required for LA Mailboxes)	None	Class B Concrete (not used with recycled rubber post, required for LA Mailboxes)	Class B Concrete (not required)	Class B Concrete	None	None



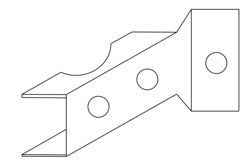
NIGP: 45057250263
L-Bracket x4 for XL sized mailboxes



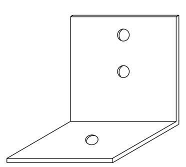
NIGP: 45057252343
Double Mailbox Bracket
For Type 2 and Type 4 double mount



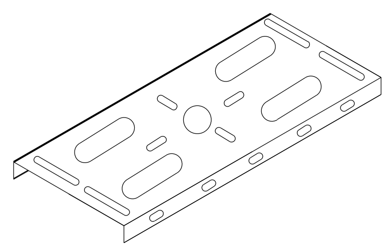
NIGP: 45057252350
Single Mailbox Bracket
For Type 2 single and for Type 4 single and multi mount



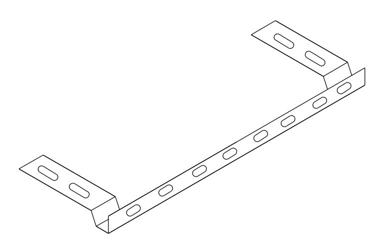
NIGP: 45057258001
Part "A" Angle Bracket
For Type 1 multi (2 per mailbox) and Type 3 single and double



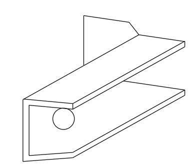
NIGP: 45057251055
Type 6 Angle Bracket
(2 per mailbox)



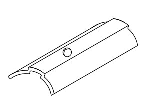
NIGP: 45057252251
Mailbox Bracket
For Type 1 multi and any double mount (use 2)



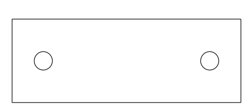
NIGP: 45057253002
Bracket Extension
Use 1 for a medium Mailbox
Use 2 for a Large Mailbox



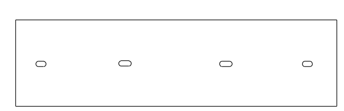
NIGP: 45057258027
Part "B" Angle Bracket
For Type 3 single and double



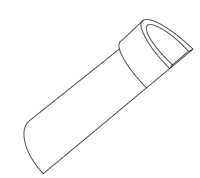
NIGP: 80130598701
Wedge for Type 2



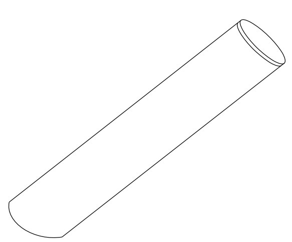
NIGP: 45057250255
Plate Washer for Architecural and XL Mailboxes



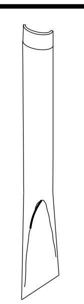
NIGP: 45057541653
Type 3 double mailbox bracket



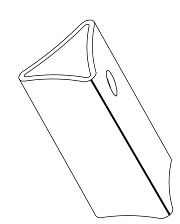
NIGP: 55083571053
Type 4 Mailbox Wedge



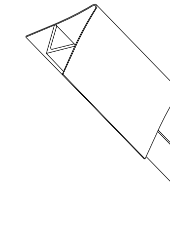
NIGP: 55083571004
Type 4 Mailbox Socket



NIGP: 80130238407
Type 2 Wedge Anchor



NIGP: 45057259009
Wedge for Type 1 V-wing Socket



NIGP: 45057256500
V-wing Socket for Type 1 Foundation

NIGP #	OBJECT MARKERS AND CONFORMABLE SHEETING
55008311759	Type 2 OM 4"x4" (3 Needed) for Type 3 Wing Channel Post
55008312906	Type 2 OM 6"x12" (1 needed) for Type 3 Wing Channel Post
80149872006	12" Conformable Reflective Yellow Sheeting for Flexible Posts

NOTES:

1. Type 2 object marker in accordance with Traffic Engineering Standard Delineators & Object Markers.
2. A light weight receptacle for newspaper delivery can be attached to mailbox posts if the receptacle does not touch the mailbox, present a hazard to traffic or delivery of the mail, extend beyond the front of the mailbox, or display advertising, except the publication title.

BID CODES FOR CONTRACTS

MB-(X) ASSM TY (XXX) (X)

Type of Mailbox
- S = Single
- D = Double
- M = Multiple
- MP = Molded Plastic

Type of Post
- WC = Winged Channel Post
- RR = Recycled Rubber
- TWW = Thin Walled White Tubing
- TWG = Thin Walled Galvanized Tubing
- TIM = Timber

Type of Foundation
- Ty 1 = V-Loc
- Ty 2 = Wedge Anchor Steel System
- Ty 3 = Winged Channel post
- Ty 4 = Wedge Anchor Plastic System
- Ty 5 = 4 X 4 Post

SHEET 4 OF 4

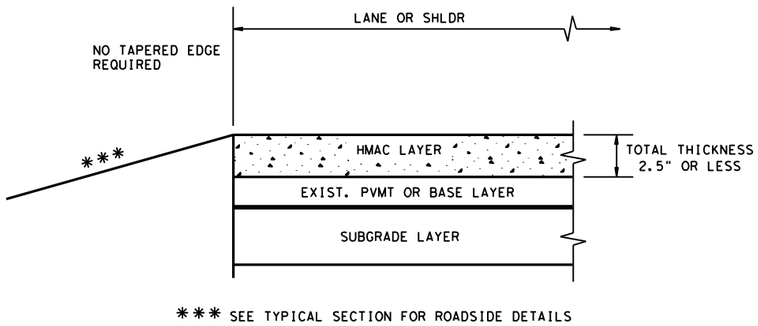
Texas Department of Transportation — Maintenance Division Standard

NIGP PARTS LIST AND COMPATIBILITY

MB(4)-21

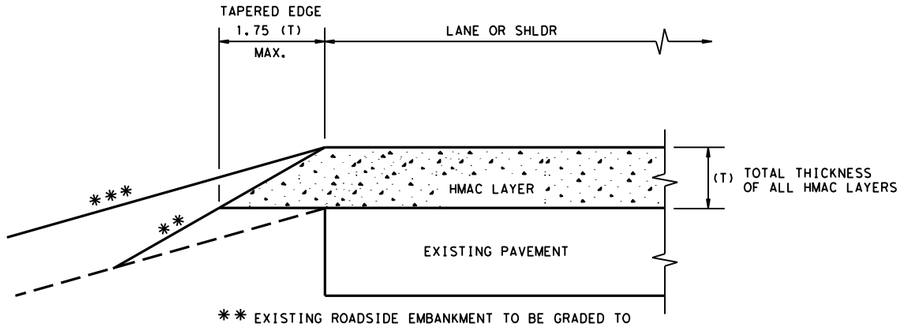
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT 1975	SECT 02	JOB 013	HIGHWAY FM 1895
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	DIST DAL		COUNTY KAUFMAN	SHEET NO. 110

DATE: 7/27/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\STANDARDS\tehmac11.dgn



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

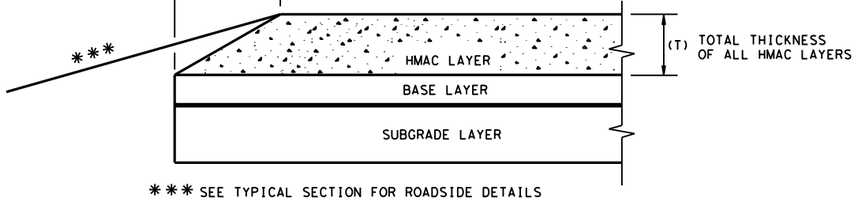
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY WITH THICKNESS OF 2.5" OR LESS



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

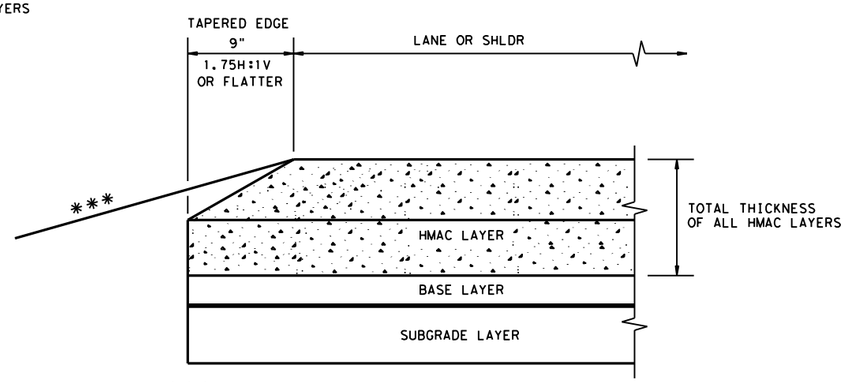
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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

(NOT TO SCALE)

GENERAL NOTES

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

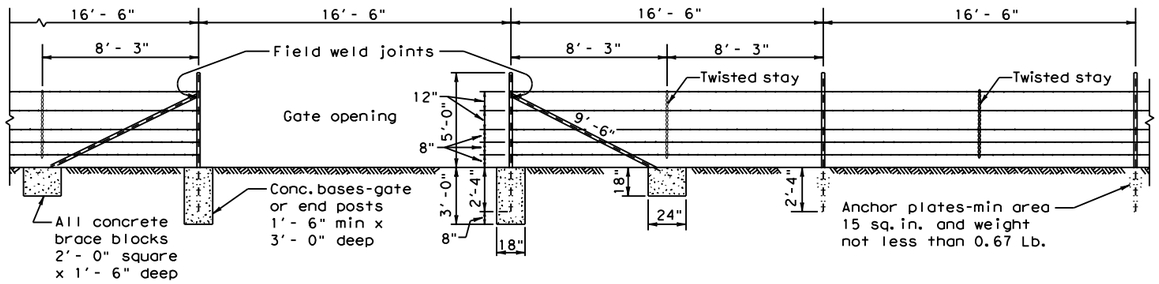
Texas Department of Transportation | Design Division Standard

TAPERED EDGE DETAILS
HMAC PAVEMENT

TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:
© TxDOT January 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		111

DATE: 7/27/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\3. Roadway\STANDARDS\wf210.dgn

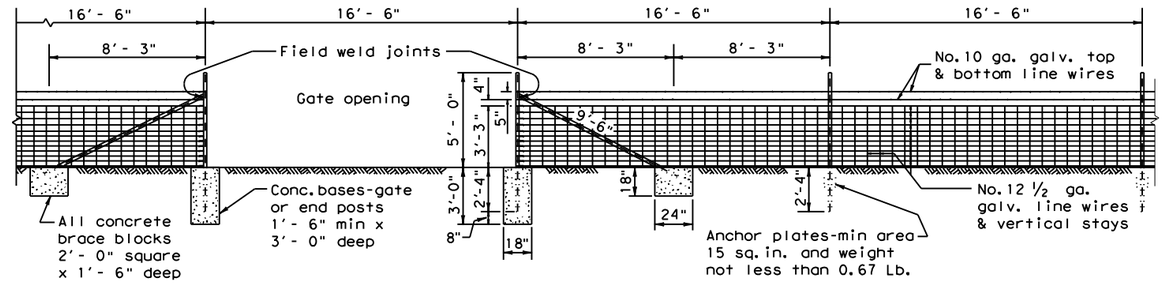


SECTION GALVANIZED BARBED WIRE FENCE WITH METAL POSTS

BRACING DETAIL USED AT ENDS AND GATES

TYPE "C" FENCE

(See General Note 8)



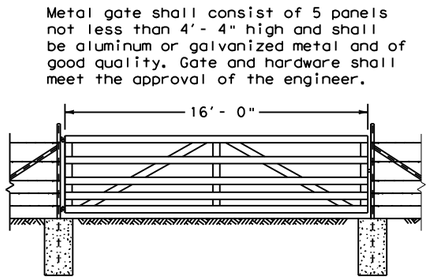
SECTION GALVANIZED WOVEN WIRE FENCE WITH METAL POSTS

BRACING DETAIL USED AT ENDS AND GATES

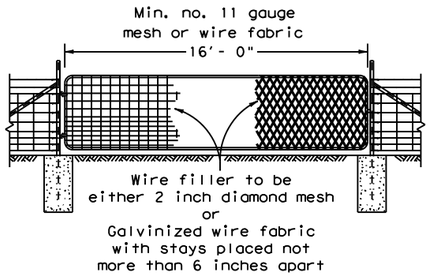
TYPE "D" FENCE

(See General Note 8)

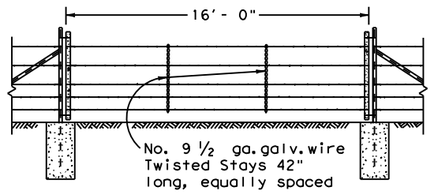
Note:
For Steel pipe and T-Post requirements. (See General Notes 6 & 7)



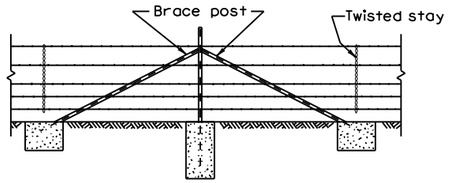
DETAIL TYPE 1 GATE



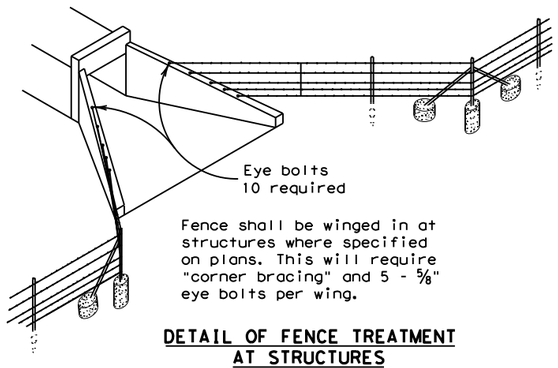
DETAIL TYPE 2 GATE



DETAIL TYPE 3 GATE

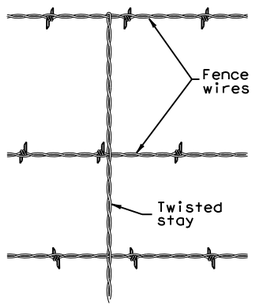


CORNER OR PULL POST ASSEMBLY

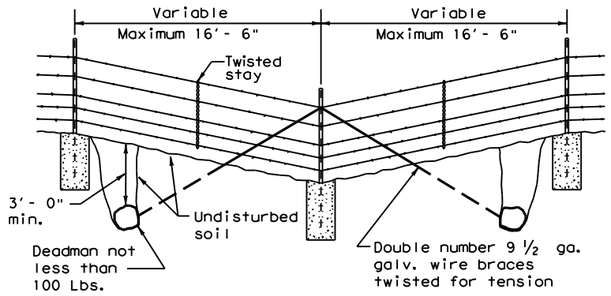


Fence shall be winged in at structures where specified on plans. This will require "corner bracing" and 5 - ⅝" eye bolts per wing.

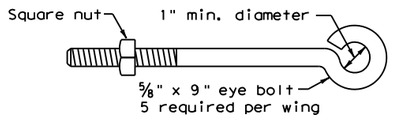
DETAIL OF FENCE TREATMENT AT STRUCTURES



DETAIL OF STAY
(Barbed Wire Fence)



DETAIL OF FENCE SAG



DETAIL OF EYE BOLT

GENERAL NOTES

1. Any high point which interferes with the placing of wire mesh shall be excavated to provide a 2 inch clearance.
2. Latches for Type 1 and Type 2 gates shall be good commercial quality and design latch of the spring, fork or chain type. All latches shall be suitable to the gate and shall be approved by the Engineer.
3. Hinges for Type 2 gates shall be a commercial design approved by the Engineer suitable for post and gate.
4. Concrete shall be of the design and consistency approved by the Engineer and shall contain not less than 4 sacks of cement per cubic yard. Concrete footings are to be crowned at the top to shed water.
5. Steel anchor plates shall be of a design and thickness sufficient to prevent turning of the post in firm soil.
6. Steel pipe end posts, corner and pull posts shall be a minimum of 2" Std. pipe (2.375" O.D., 0.154" wall thickness) with a 1¼" Std. pipe brace (1.660" O.D., 0.140" wall thickness), with a 2"x2"x1/4" angle, or other as approved by the Engineer. Fasteners for securing barbed wire or woven wire fence to metal posts shall be a minimum of 11 gauge galvanized steel wire. Tubular posts shall be fitted with water malleable iron caps.
7. If Steel pipe is used for posts and braces, use standard pipe in accordance with ASTM A 53, Class B or A 501. For T-Posts use steel that meets ASTM A 702. Metal line posts shall be not less than 6'-6" in length and shall weigh not less than (1.33 lbs./lin.ft.). These Items shall be in accordance with Item 552, "Wire Fence."
8. Barbed Wire shall be in accordance with ASTM A 121, Class 1 Design designation 12-2-4-1 4R or 12-2-5-1 4R, or as approved by the Engineer.

   Woven Wire Fence (Type D) shall be in accordance with ASTM A 116, Class 1 No. 12-1/2 Grade 60 (See Table 1 ASTM A 116) to the height and design shown on the plans, or as approved by the Engineer.
9. The location of gates and corner posts will be as indicated elsewhere in these plans.

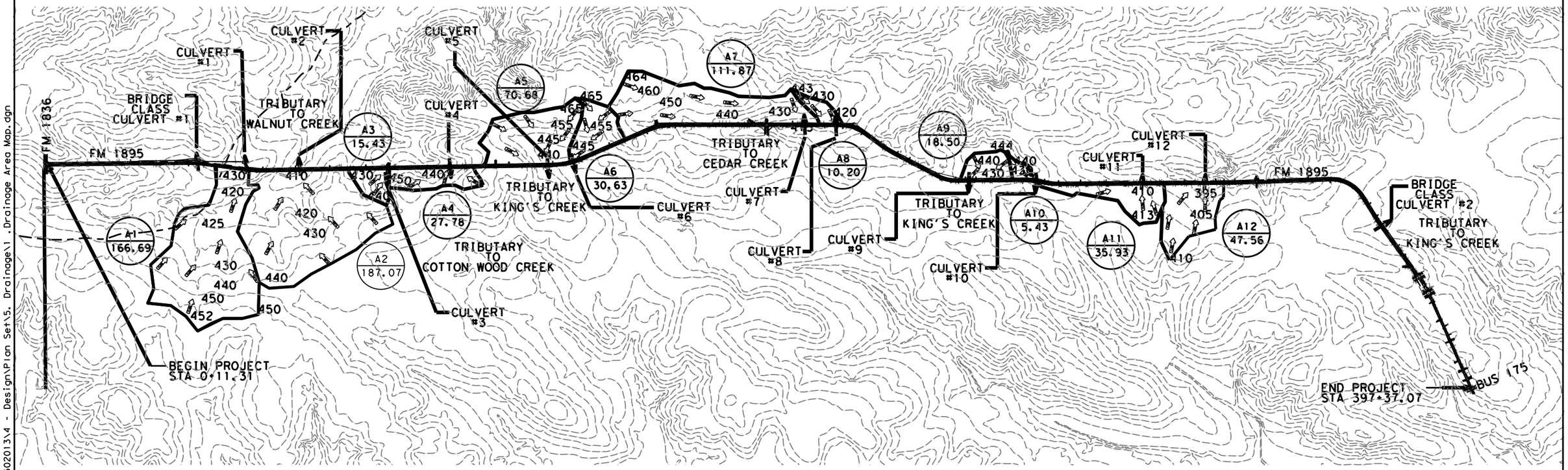
Texas Department of Transportation

Design Division Standard

BARBED WIRE AND WOVEN WIRE FENCE (STEEL POSTS)

WF(2)-10

FILE: wf210.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
© TxDOT 1996	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		112



LEGEND

FLOW

DA ID / ACRES

NOTES:
1. TXDOT'S HYDRAULIC DESIGN MANUAL (SEPT 2019) USED AS REFERENCE.
2. CALCULATIONS ARE BASED ON THE RATIONAL METHOD FOR DRAINAGE AREAS AND NRCS METHOD FOR TIME OF CONCENTRATION.
3. TERRAIN DATA SOURCE IS USDA/NRCS 2018.

Coeff.	10-YR	25-YR	100-YR
e	0.7875	0.7796	0.773
b (in.)	75	84.76	105.58
d (min)	9.02	8.71	8.67

Select County: **KAUFMAN**

Select Area Type: **Rural**

DESCRIPTION	STATION	DA I.D.	Cr	Ci	Cv	Cs	C	A (acres)	T_c (min)	10-YEAR I_{10} (in/hr)	10-YEAR Q_{10} (cfs)	25-YEAR I_{25} (in/hr)	25-YEAR Q_{25} (cfs)	100-YEAR I_{100} (in/hr)	100-YEAR Q_{100} (cfs)
(1) 1 - 42" x 38.97' RCP 57.84' (PROP)	51+04.82	A1	0.11	0.07	0.07	0.08	0.33	166.78	61.0	2.64	**145.41**	3.10	**170.54**	3.97	**218.56**
(2) 1 - 42" x 37.24' RCP 57.24' (PROP)	64+80.96	A2	0.11	0.07	0.07	0.08	0.33	194.12	59.0	2.70	**173.16**	3.17	**203.05**	4.06	**260.18**
(3) 1 - 24" x 35.43' RCP 48.00' (PROP)	87+25.58	A3	0.11	0.07	0.07	0.08	0.33	15.43	12.0	6.82	**34.70**	7.98	**40.64**	10.16	**51.73**
(4) 1 - 30" x 35.64' RCP 55.64 ' (PROP)	102+88.47	A4	0.11	0.07	0.07	0.08	0.33	27.78	18.0	5.59	**51.27**	6.55	**60.01**	8.34	**76.47**
(5) 4 - 36" x 47.96' RCP 63.96' (PROP)	127+82.11	A5	0.11	0.07	0.07	0.08	0.33	70.68	10.0	7.37	**171,99**	8.64	**201,51**	10.99	**256,33**
(6) 1 - 5' x 6' x 35.16' SBC 47.16' (PROP)	133+98.03	A6	0.11	0.07	0.07	0.08	0.33	30.63	16.0	5.94	**60,06**	6.96	**70,30**	8.86	**89,56**
(7) 2 - 5' x 3' x 33' MBC 57' (PROP)	194+97.99	A7	0.11	0.07	0.07	0.08	0.33	111.87	49.0	3.06	**113,10**	3.59	**132,54**	4.60	**169,67**
(8) 1 - 48" x 36.77' RCP 58.77' (PROP)	203+05.29	A8	0.11	0.07	0.07	0.08	0.33	10.20	11.0	7.08	**23,84**	8.30	**27,92**	10.56	**35,53**
(9) 1 - 5' x 3' x 41.11' SBC 59.11 (PROP)	240+53.62	A9	0.11	0.07	0.07	0.08	0.33	18.50	10.0	7.37	**45,02**	8.64	**52,74**	10.99	**67,09**
(10) 1 - 24" x 51.29' RCP 55.29' (PROP)	257+52.74	A10	0.11	0.07	0.07	0.08	0.33	5.67	10.0	7.37	**13,80**	8.64	**16,17**	10.99	**20,56**
(11) 1 - 6' x 3' x 47.10' SBC 65.10' (PROP)	284+59.26	A11	0.11	0.07	0.07	0.08	0.33	35.93	16.0	5.94	**70,45**	6.96	**82,47**	8.86	**105,05**
(12) 1- 4' x 3' x 33.17' SBC 55.17' (PROP)	300+52.58	A12	0.11	0.07	0.07	0.08	0.33	47.56	38.0	3.62	**56,74**	4.23	**66,45**	5.41	**84,95**

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
DRAINAGE AREA MAP

SCALE: NTS SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	113
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 2:38:27 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\19750201\4 - Design\Plan Set\5. Drainage\1 .Drainage Area Map.dgn

CULVERT INPUT DATA (HY-8, v7.6)

CULVERT NO.	STATION	ROADWAY	DESCRIPTION	DRAINAGE AREA	ALLOWABLE HEADWATER (FT)	Q 10 YEAR DESIGN							Q 100 YEAR DESIGN							COMMENTS
						FLOW "Q" (CFS)	HW ELEV (FT)	HW DEPTH (FT)	TW ELEV (FT)	TW DEPTH (FT)	OUTLET VELOCITY (CFS)	TW VELOCITY (FT/S)	FLOW "Q" (CFS)	HW ELEV (FT)	HW DEPTH (FT)	TW ELEV (FT)	TW DEPTH (FT)	OUTLET VELOCITY (CFS)	TW VELOCITY (FT/S)	
1	51+04.82	FM 1895	EXIST 1-42" X 39.84' RCP	A1	420.58	145.41	424.08	7.08	419.14	2.15	11.94	4.97	218.56	424.18	7.19	419.57	2.58	11.73	5.52	
			PROP 1-42" X 57.84' RCP				424.08	7.00	419.23	2.15	11.92	4.97		424.18	7.10	419.66	2.58	11.65	5.52	
2	64+80.96	FM 1895	EXIST 1-42" X 37.24' RCP	A2	429.33	173.16	433.12	7.41	428.03	2.33	12.91	5.20	260.18	433.22	7.52	428.49	2.79	12.97	5.77	
			PROP 1-42" X 57.24' RCP				433.12	7.34	428.11	2.33	13.07	5.20		433.23	7.45	428.57	2.79	12.97	5.77	
3	87+25.58	FM 1895	EXIST 1-24" X 35.43' RCP	A3	452.19	34.70	455.47	5.29	451.27	1.09	10.23	3.40	51.73	455.52	5.34	451.50	1.32	10.29	3.79	
			PROP 1-24" X 48.00' RCP				455.47	5.29	451.28	1.09	10.23	3.40		455.52	5.33	451.51	1.32	10.28	3.79	
4	102+88.47	FM 1895	EXIST 1-30" X 35.64' RCP	A4	452.13	51.27	455.47	5.99	450.80	1.32	10.81	3.78	76.47	456.16	6.68	451.08	1.60	11.50	4.21	
			PROP 1-30" X 55.64' RCP				455.61	5.98	450.95	1.32	10.81	3.78		456.16	6.53	451.23	1.60	11.36	4.21	
5	127+82.11	FM 1895	EXIST 4-36" X 47.96' RCP	A5	429.44	171.99	429.47	3.44	428.35	2.32	6.08	5.19	256.33	431.22	5.19	428.80	2.77	9.07	5.75	
			PROP 4-36" X 65.96' RCP				429.81	3.44	428.69	2.32	6.08	5.19		431.56	5.19	429.14	2.77	9.07	5.75	
6	133+98.03	FM 1895	EXIST 1-5' X 6' X 35.16' SBC	A6	429.92	60.06	426.74	2.83	425.33	1.42	7.29	3.95	89.56	427.61	3.66	425.63	1.72	8.32	4.38	
			PROP 1-5' X 6' X 47.16' SBC				426.75	2.83	425.34	1.42	7.29	3.95		427.62	3.66	425.64	1.72	8.32	4.38	
7	194+97.99	FM 1895	EXIST 2- 5' 3' X 33' MBC	A7	411.08	113.10	410.71	2.67	409.91	1.92	5.29	4.66	169.67	411.57	3.58	410.30	2.31	6.72	5.17	
			PROP 2- 5' X 3' X 57' MBC				410.77	2.67	409.97	1.92	5.03	4.66		411.63	3.58	410.36	2.31	6.44	5.17	
8	203+05.29	FM 1895	EXIST 1-48" X 36.77' RCP	A8	412.33	23.84	410.16	1.98	409.08	0.90	8.01	3.07	35.53	410.72	2.54	409.28	1.10	8.76	3.43	
			PROP 1-48" x 58.77' RCP				410.26	1.98	409.18	0.90	8.29	3.07		410.82	2.54	409.38	1.10	9.07	3.43	
9	240+53.62	FM 1895	EXIST 1-5' X 3' X 41.11' SBC	A9	410.78	45.02	410.10	2.31	408.94	1.24	6.62	3.65	67.09	411.17	2.99	409.20	1.50	9.92	4.06	
			PROP 1-5' X 3 X 59.11' SBC				410.08	2.30	409.02	1.24	7.37	3.65		410.79	3.01	409.28	1.50	8.29	4.06	
10	257+52.74	FM 1895	EXIST 1-24" X 51.29' RCP	A10	410.29	13.80	410.51	2.12	408.97	0.68	6.20	2.63	20.56	411.36	3.03	409.13	0.84	7.52	2.95	
			PROP 1-24" X 55.29' RCP				410.51	2.12	408.97	0.68	6.20	2.63		411.39	3.03	409.13	0.84	7.52	2.95	
11	284+59.26	FM 1895	EXIST 1-6' X 3' X 47.10' SBC	A11	396.05	70.45	395.77	2.74	394.57	1.54	7.67	4.12	105.05	396.70	3.67	394.88	1.85	8.64	4.57	
			PROP 1-6' X 3' X 65.10' SBC				395.79	2.74	394.59	1.54	6.65	4.12		396.72	3.67	394.90	1.85	8.44	4.57	
12	300+52.28	FM 1895	EXIST 1-4' X 3' 33.17' SBC	A12	400.58	56.74	400.67	3.13	398.93	1.39	7.79	3.89	84.95	401.89	4.35	399.22	1.68	8.84	4.32	
			PROP 1-4' X 3' X 55.17' SBC				400.71	3.13	398.97	1.39	7.97	3.89		401.93	4.35	399.26	1.68	8.81	4.32	

CULVERT INPUT DATA (HY-8, v7.6)

CULVERT NO.	STATION	ROADWAY	DESCRIPTION	DRAINAGE AREA	INLET STATION (FT)	INLET ELEV (FT)	UPPER-BREAK STATION (FT)	UPPER-BREAK STATION (FT)	UPPER-BREAK STATION (FT)	LOWER-BREAK STATION (FT)	OUTLET STATION (FT)	OUTLET ELEV (FT)	TAILWATER DATA
1	51+04.82	FM 1895	EXIST 1-42" X 39.84' RCP	A1	0	416.99					39.84	416.61	TRAPZCH,BOT WIDTH=5, SS= 4&5 :1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 416.99
			PROP 1-42" X 57.84' RCP		0	417.08					57.84	416.54	TRAPZCH,BOT WIDTH=5, SS= 4.5&5 :1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 417.08
2	64+80.96	FM 1895	EXIST 1-42" X 37.24' RCP	A2	0	425.07					37.24	425.19	TRAPZCH,BOT WIDTH=5, SS= 4&5 :1, CH S=0.0067FT/FT, "N"= 0.012, CH INVERT EL = 425.70
			PROP 1-42" X 57.24' RCP		0	425.83					57.24	425.06	TRAPZCH,BOT WIDTH=5, SS= 3.5&5.5 :1, CH S=0.0067FT/FT, "N"= 0.012, CH INVERT EL = 425.83
3	87+25.58	FM 1895	EXIST 1-24" X 35.43' RCP	A3	0	450.18					35.43	450.09	TRAPZCH,BOT WIDTH=5, SS= 5:1, CH S=0.0133FT/FT, "N"= 0.012, CH INVERT EL = 450.18
			PROP 1-24" X 49.43' RCP		0	450.19					49.43	450.07	TRAPZCH,BOT WIDTH=5, SS= 3.5&4 :1, CH S=0.0133FT/FT, "N"= 0.012, CH INVERT EL = 450.19
4	102+88.47	FM 1895	EXIST 1-30" X 35.64' RCP	A4	0	449.48					35.64	449.25	TRAPZCH,BOT WIDTH=5, SS= 4&5:1, CH S=0.0200FT/FT, "N"= 0.012, CH INVERT EL = 449.48
			PROP 1-30" X 55.64' RCP		0	449.63					55.64	449.1	TRAPZCH,BOT WIDTH=5, SS= 3.5&4:1, CH S=0.0200FT/FT, "N"= 0.012, CH INVERT EL = 449.63
5	127+82.11	FM 1895	EXIST 4-36" X 47.96' RCP	A5	0	426.03					47.96	424.04	TRAPZCH,BOT WIDTH=5, SS= 3.5&5:1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 426.03
			PROP 4-36" X 65.96' RCP		0	426.37					65.96	423.63	TRAPZCH,BOT WIDTH=5, SS= 3.5&5 :1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 426.44
6	133+98.03	FM 1895	EXIST 1-5' X 6' X 35.16' SBC	A6	0	423.91					35.16	423.84	TRAPZCH,BOT WIDTH=5, SS= 3:1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 423.91
			PROP 1-5' X 6' X 47.16' SBC		0	423.92					47.16	423.83	TRAPZCH,BOT WIDTH=5, SS= 3 :1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 423.92
7	194+97.99	FM 1895	EXIST 2- 5' 3' X 33' MBC	A7	0	407.99					33	407.77	TRAPZCH,BOT WIDTH=5, SS= 4&5:1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 407.99
			PROP 2- 5' X 3' X 57' MBC		0	408.08					57	407.71	TRAPZCH,BOT WIDTH=5, SS= 7&9:1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 408.08
8	203+05.29	FM 1895	EXIST 1-48" X 36.77' RCP	A8	0	408.18					36.77	407.73	TRAPZCH,BOT WIDTH=5, SS= 5 :1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 408.18
			PROP 1-48" x 58.77' RCP		0	408.33					58.77	407.61	TRAPZCH,BOT WIDTH=5, SS= 7&9 :1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 408.33
9	240+53.62	FM 1895	EXIST 1-5' X 3' X 41.11' SBC	A9	0	407.7					41.11	407.8	TRAPZCH,BOT WIDTH=5, SS= 2&4:1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 407.70
			PROP 1-5' X 3 X 59.11' SBC		0	407.78					59.11	407.5	TRAPZCH,BOT WIDTH=5, SS= 3&3.3:1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 407.78
10	257+52.74	FM 1895	EXIST 1-24" X 51.29' RCP	A10	0	408.29					51.29	408.19	TRAPZCH,BOT WIDTH=5, SS= 4&9 :1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 408.29
			PROP 1-24" X 55.29' RCP		0	405.29					55.29	408.19	TRAPZCH,BOT WIDTH=5, SS= 3&4.5 :1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 408.29
11	284+59.26	FM 1895	EXIST 1-6' X 3' X 47.10' SBC	A11	0	393.03					47.1	392.85	TRAPZCH,BOT WIDTH=5, SS= 2.5 :1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 393.03
			PROP 1-6' X 3' X 65.10' SBC		0	393.05					65.1	392.85	TRAPZCH,BOT WIDTH=5, SS= 3 :1, CH S=0.000FT/FT, "N"= 0.012, CH INVERT EL = 393.05
12	300+52.28	FM 1895	EXIST 1-4' X 3' 33.17' SBC	A12	0	397.54					60	397.4	TRAPZCH,BOT WIDTH=5, SS= 2.5 :1, CH S=0.020FT/FT, "N"= 0.012, CH INVERT EL = 397.54
			PROP 1-4' X 3' X 55.17' SBC		0	397.58					60	397.35	TRAPZCH,BOT WIDTH=5, SS= 5.5 :1, CH S=0.020FT/FT, "N"= 0.012, CH INVERT EL = 397.58

REFERENCE

TXDOT'S HYDRAULIC DESIGN MANUAL (SEPTEMBER 2019)

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

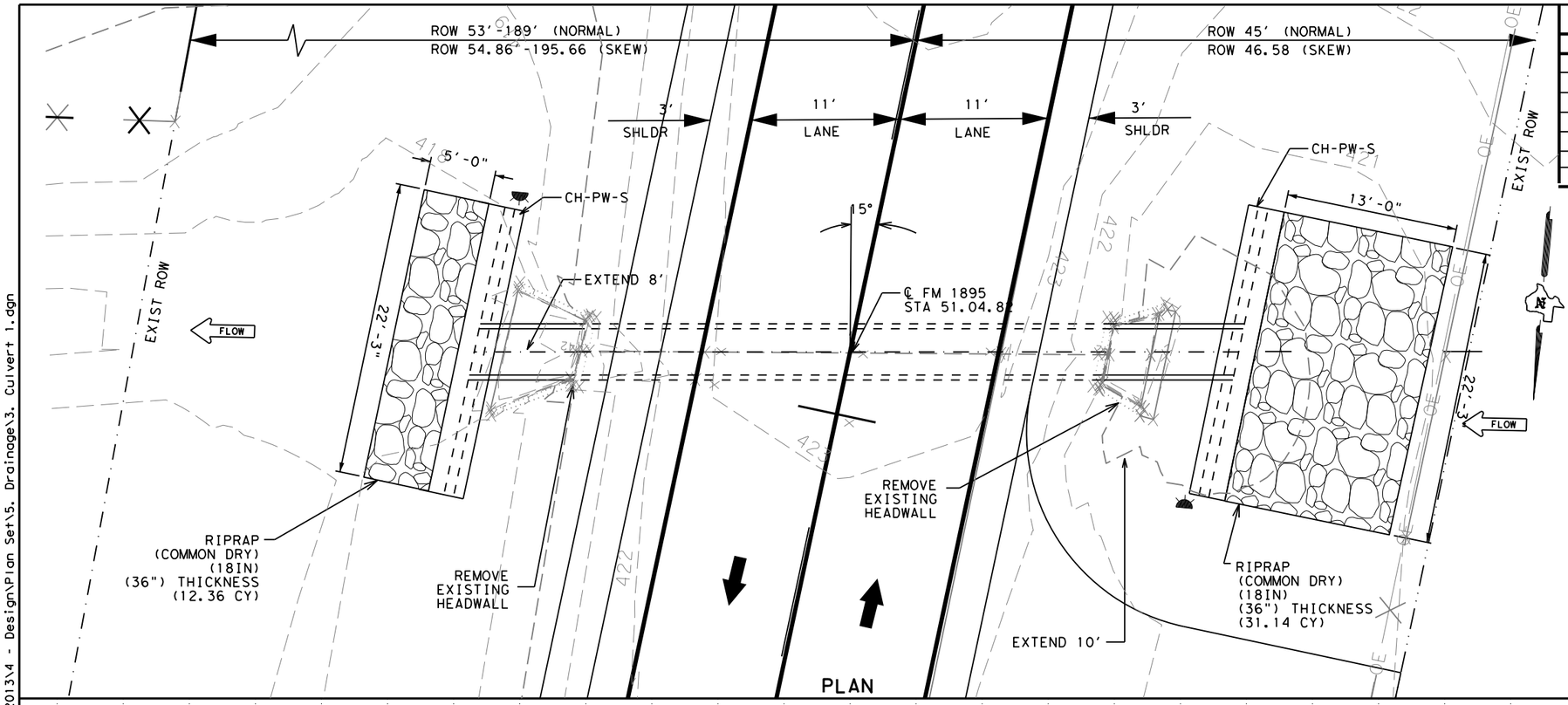
Texas Department of Transportation
© 2022

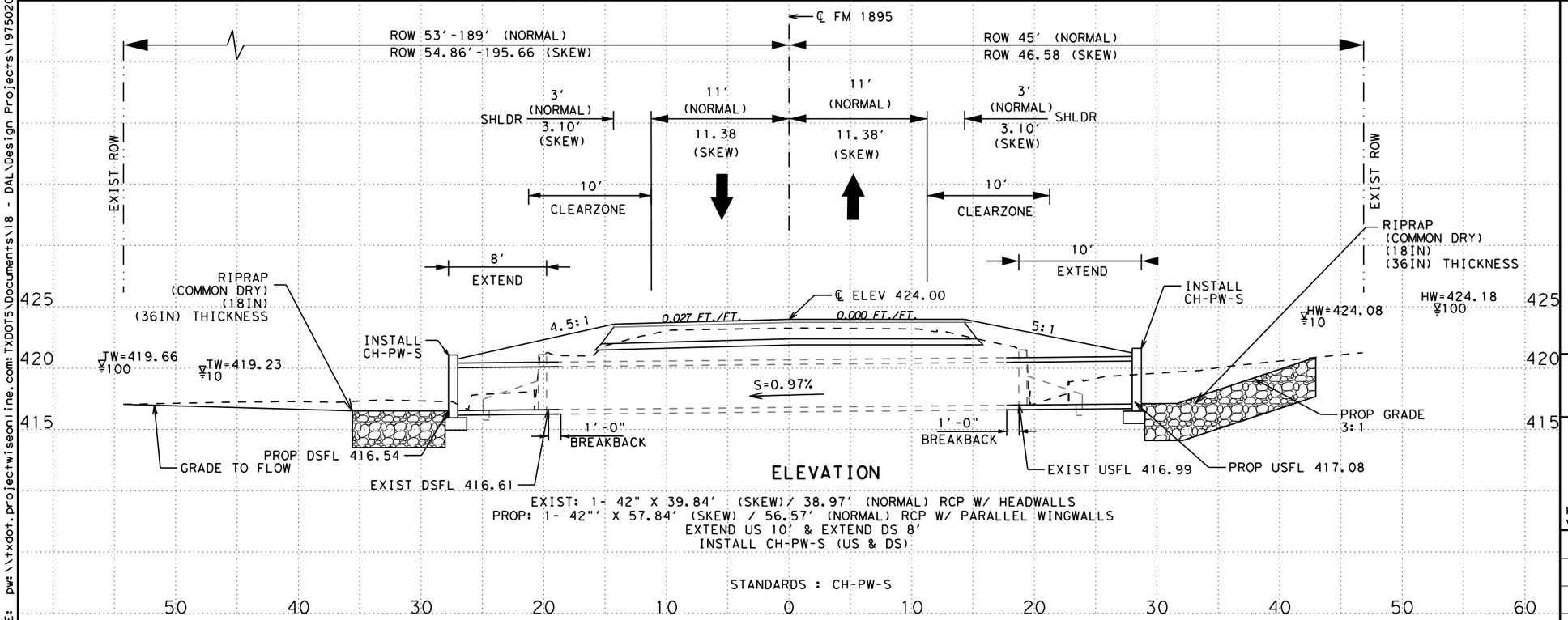
FM 1895
HYDRAULIC COMPUTATION

SCALE: NTS SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	114
CHECK VD	CONTROL 1975	SECTION 02	JOB 013	

DATE: 7/27/2022 2:39:48 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\2. Hydraulic Computation Sheet.dgn





EXIST: 1- 42" X 39.84' (SKEW)/ 38.97' (NORMAL) RCP W/ HEADWALLS
PROP: 1- 42"' X 57.84' (SKEW) / 56.57' (NORMAL) RCP W/ PARALLEL WINGWALLS
EXTEND US 10' & EXTEND DS 8'
INSTALL CH-PW-S (US & DS)

STANDARDS : CH-PW-S

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUA.
0403-6001	TEMP SPL SHORING	SF	175
0432-6026	RIPRAP (STONE PROTECTION) (18IN)	CY	43.50
0464-6021	RCP (CL IV) (42 IN)	LF	18
0466-6135	HEADWALL (CH-PW-S) (DIA=42IN)	EA	2
0480-6001	CLEAN EXIST CULVS	EA	1
0496-6006	REMOV STR (HEADWALL)	EA	2
0658-6100	INSTL OM ASSM (OM-2Z)(WFLX)GND BI	EA	2

LEGEND

DELINEATOR
FLOW DIRECTION
PROPOSED PAVEMENT

SCALE (FEET):
0 2 5 10

HYDRAULIC DATA

Q_{10} = 145.41	Q_{100} = 218.56
V_{10} = 11.92	V_{100} = 11.65
HW_{10} = 424.08	HW_{100} = 424.18
TW_{10} = 419.23	TW_{100} = 419.66

NOTE:
1. BREAKBACK ON EXISTING STRUCTURE UP TO 1' WITH ENGINEER'S APPROVAL. THE REMOVAL IS SUBSIDIARY TO ITEM 496 & THE REPLACEMENT IS SUBSIDIARY TO ITEM 464.
2. PROPOSED EXTENSION WILL MATCH EXISTING SLOPE. UNLESS OTHERWISE DIRECTED BY THE ENGINEER OR SHOWN IN PLANS.
3. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CULVERT RELATED TO CONSTRUCTION OPERATIONS.
4. SEE MISC CONNECTION DETAILS FOR FURTHER INFORMATION.
5. SEE TEMPORARY SPECIAL SHORING SHEETS FOR FURTHER INFORMATION.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

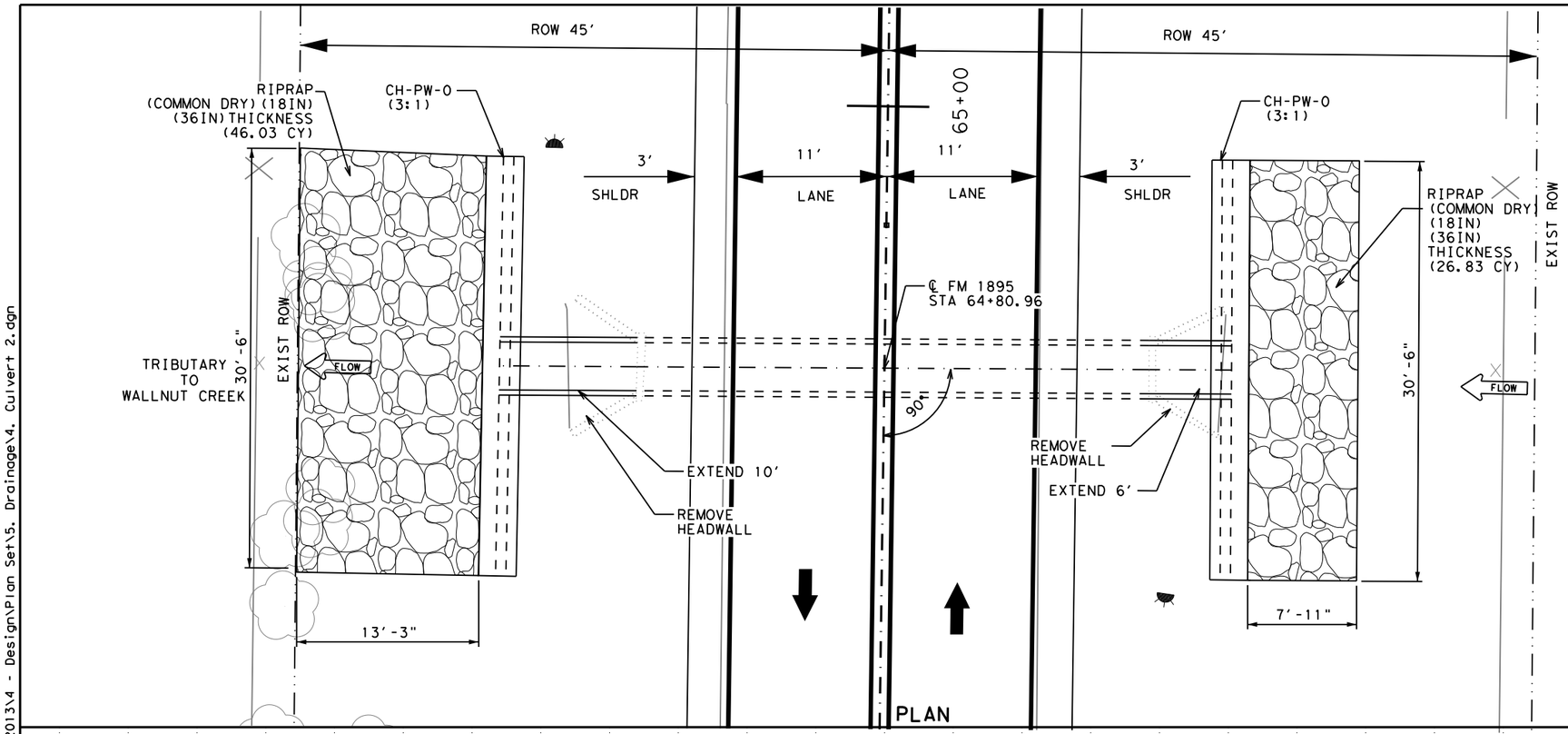
Texas Department of Transportation

FM 1895
CULVERT LAYOUT #1
STA 51+04.82

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'
SHEET 1 OF 12

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	115
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/28/2022 12:37:52 PM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\3. Culvert 1.dgn



ELEVATION

EXIST: 1- 42" X 37.24' RCP W/ HEADWALLS
PROP: 1- 42" X 53.24' RCP W/ PARALLEL WINGWALLS
EXTEND US 6' & EXTEND DS 10'
INSTALL CH-PW-0 (US & DS)

STANDARDS : CH-PW-0

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUA.
0403-6001	TEMP SPL SHORING	SF	376
0432-6026	RIPRAP (STONE COMMON) (DRY) (18IN)	CY	72.86
0464-6021	RC PIPE (CL IV) (42 IN)	LF	16
0466-6135	HEADWALL (CH-PW-0) (DIA=42IN)	EA	2
0480-6001	CLEAN EXIST CULVERTS	EA	1
0496-6006	REMOV STR (HEADWALL)	EA	2
0658-6100	INSTL OM ASSM (OM-2Z) (WFLX) GND BI	EA	2

LEGEND

DELINEATOR
FLOW DIRECTION
PROPOSED PAVEMENT

SCALE (FEET): 0 2 5 10

HYDRAULIC DATA

Q_{10} = 173.16	Q_{100} = 260.18
V_{10} = 13.07	V_{100} = 12.97
HW_{10} = 433.12	HW_{100} = 433.23
TW_{10} = 428.11	TW_{100} = 428.57

NOTE:
1. BREAKBACK ON EXISTING STRUCTURE UP TO 1' WITH ENGINEER'S APPROVAL. THE REMOBAL IS SUBSIDIARY TO ITEM 496 & THE REPLACEMENT IS SUBSIDIARY TO ITEM 464.
2. PROPOSED EXTENSION WILL MATCH EXISTING SLOPE. UNLESS OTHERWISE DIRECTED BY THE ENGINEER OR SHOWN IN PLANS.
3. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CULVERT RELATED TO CONSTRUCTION OPERATIONS.
4. SEE MISC CONNECTION DETAILS FOR FURTHER INFORMATION.
5. SEE TEMPORARY SPECIAL SHORING SHEETS FOR FURTHER INFORMATION.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

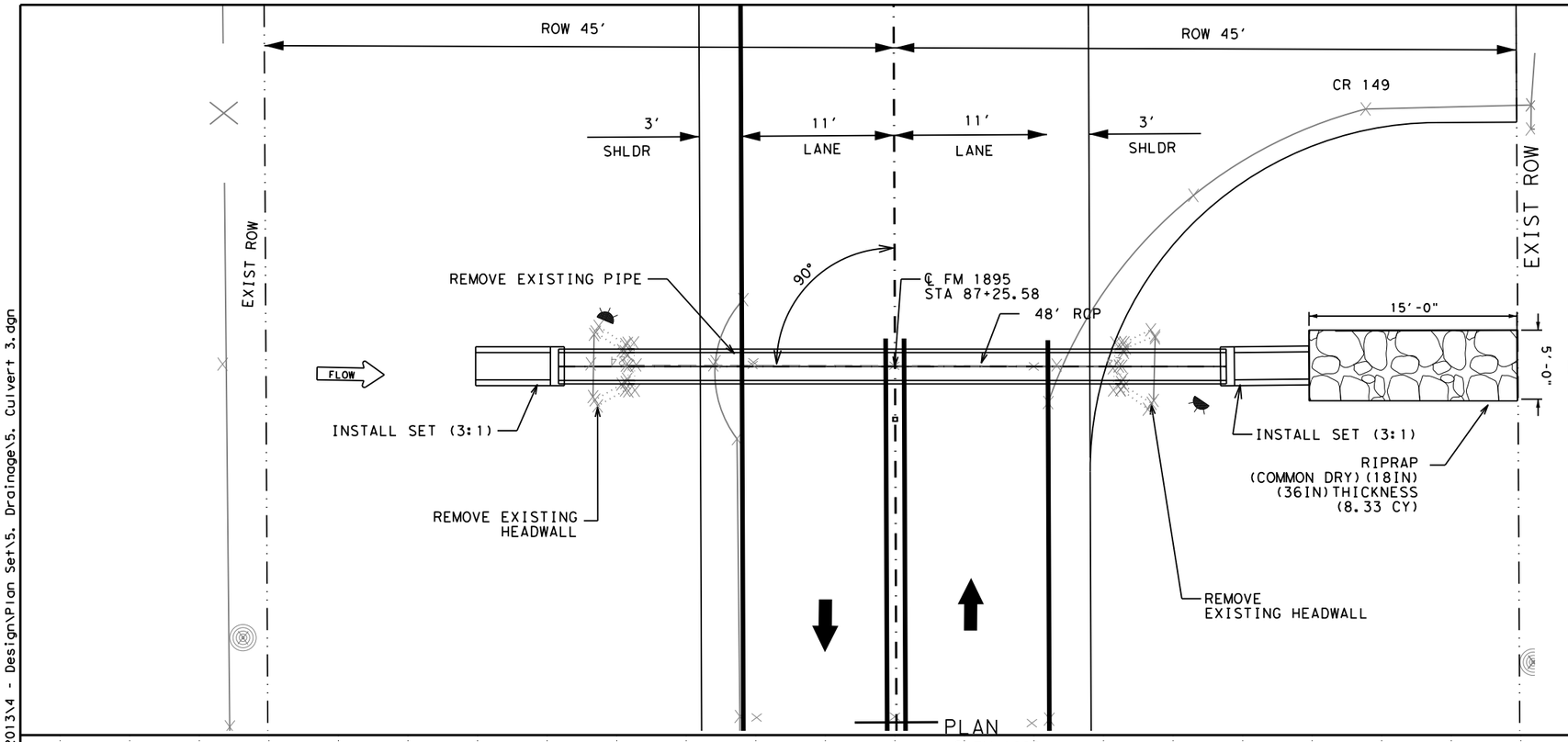
Texas Department of Transportation

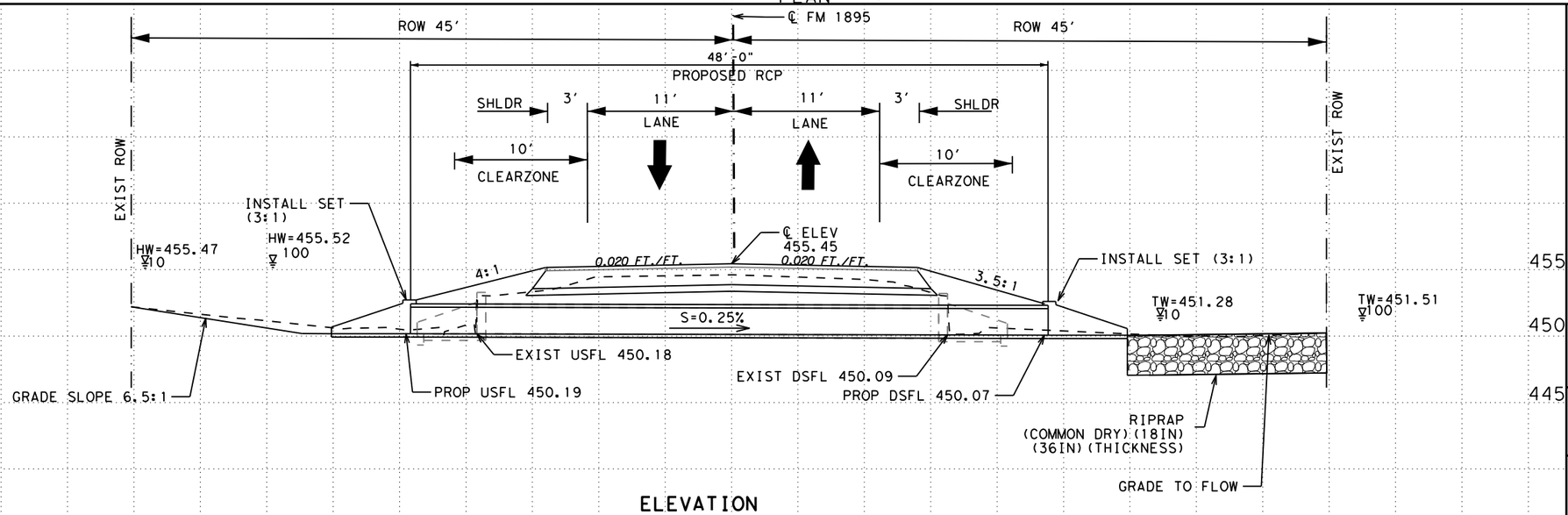
FM 1895
CULVERT LAYOUT #2
STA 64+80.96

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	116
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/28/2022 12:45:18 PM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\4. Culvert 2.dgn





ELEVATION

EXIST: 1- 24" X 35.43' RCP W/ HEADWALLS (REMOVE)
PROP: 1- 24"' X 48.00' RCP W/ SET
INSTALL SET (US & DS)

STANDARDS : PSET-SC, SETP-CD, PSET-SP, PSET-RP, PSET-RR

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUA.
0400-6006	CUT & RESTORE PAV	SY	25
0432-6026	RIPRAP (STONE COMMON) (DRY) (18IN)	CY	8.33
0464-6018	RC PIPE (CL IV) (24 IN)	LF	48
0467-6388	SET (TY II) (24IN) (RCP) (3:1) (C)	EA	2
0496-6006	REMOV STR (HEADWALL)	EA	2
0496-6016	REMOV STR (PIPE)	EA	1
0658-6100	INSTL OM ASSM (OM-2Z)(WFLX)GND BI	EA	2

LEGEND

DELINEATOR
FLOW DIRECTION
PROPOSED PAVEMENT

SCALE (FEET):
0 2 5 10

HYDRAULIC DATA

Q_{10} = 34.70	Q_{100} = 51.73
V_{10} = 10.23	V_{100} = 10.28
HW_{10} = 455.47	HW_{100} = 455.52
TW_{10} = 451.28	TW_{100} = 451.51

NOTE:
1. FOR ITEM 400, CUT & RESTORE, USE 2" SP-B PG 64-22 & 8" NEW FL BS TY D GR 1-2 OVER COMPACTED EXISTING MATERIAL.
2. PROPOSED EXTENSION WILL MATCH EXISTING SLOPE. UNLESS OTHERWISE DIRECTED BY THE ENGINEER OR SHOWN IN PLANS.
3. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CULVERT RELATED TO CONSTRUCTION OPERATIONS.
4. SEE MISC CONNECTION DETAILS FOR FURTHER INFORMATION.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

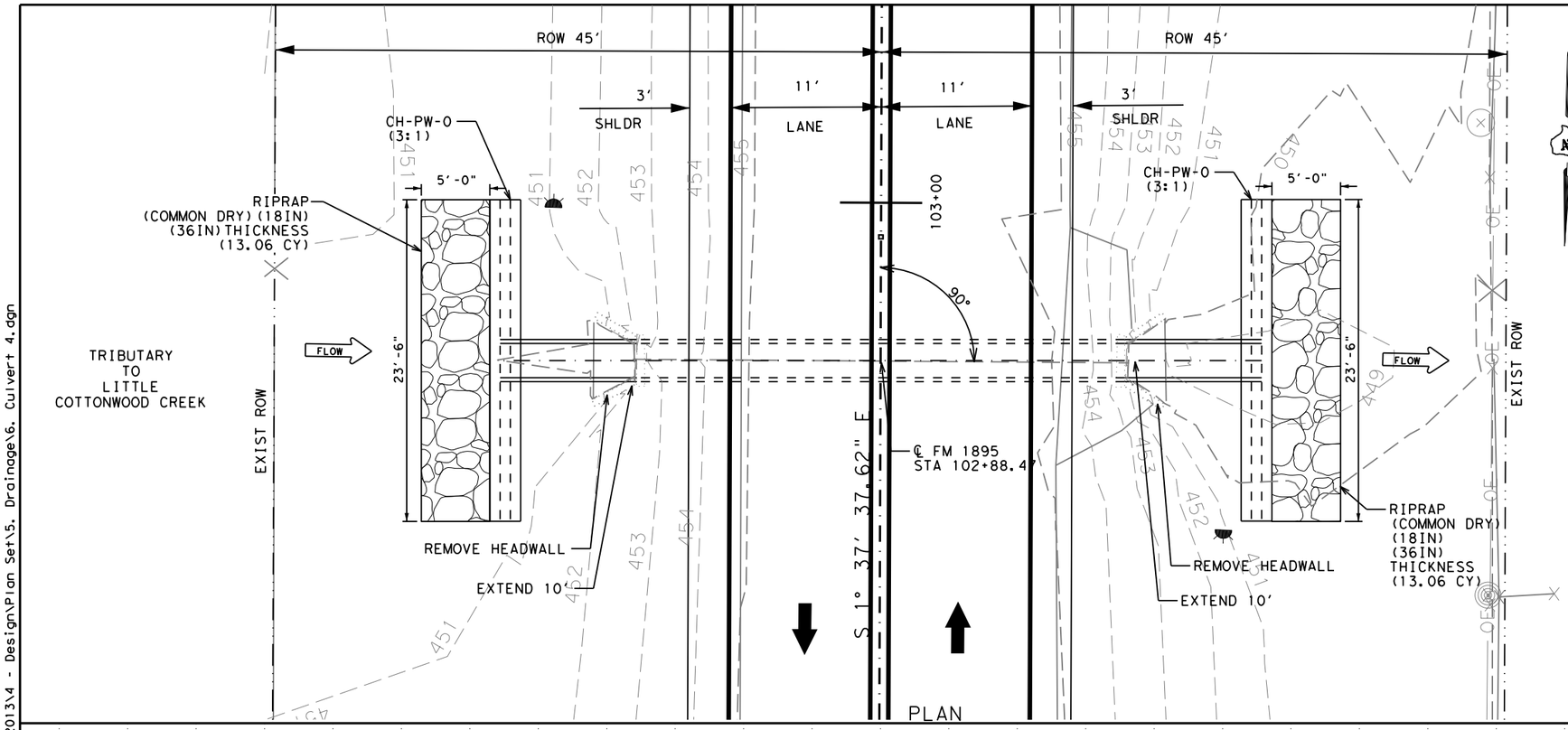
Texas Department of Transportation

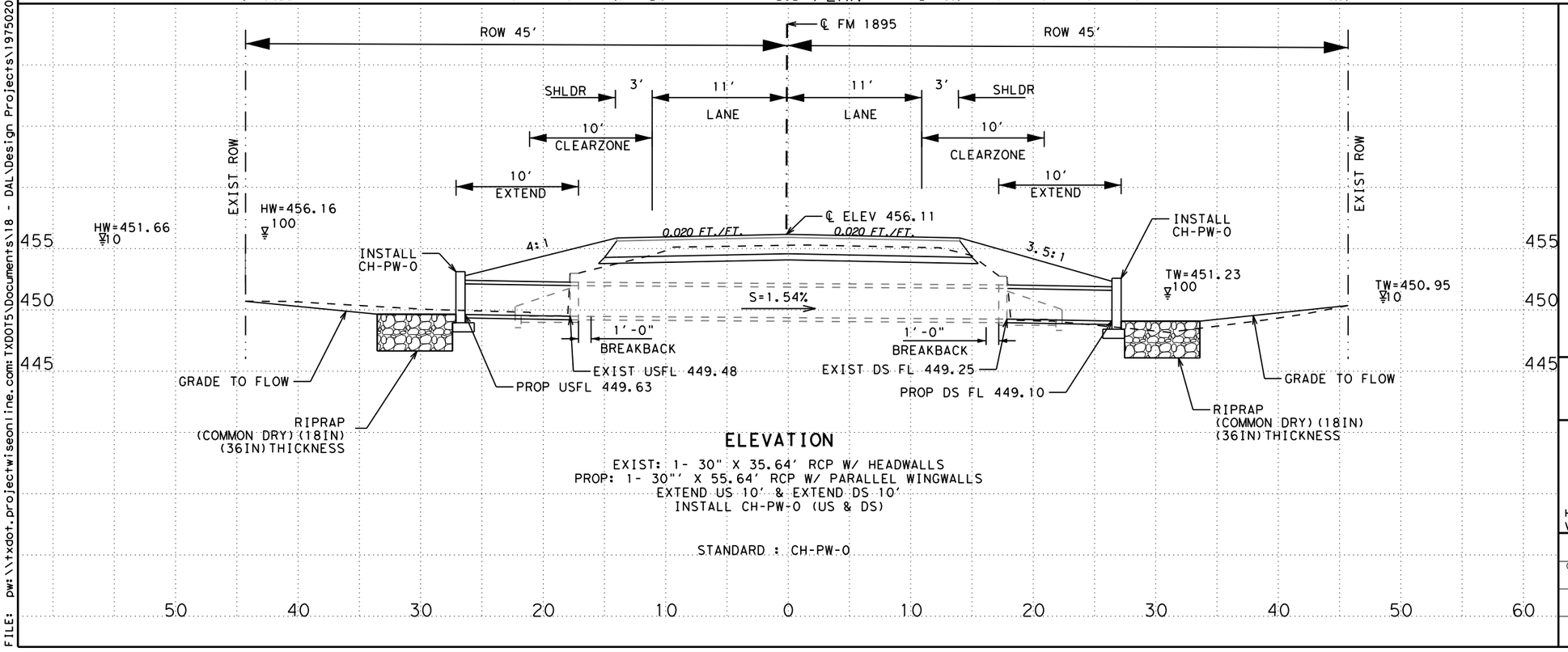
FM 1895
CULVERT LAYOUT #3
STA 87+25.58

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	117
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/28/2022 7:40:09 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\5. Culvert 3.dgn





ELEVATION

EXIST: 1- 30" X 35.64' RCP W/ HEADWALLS
PROP: 1- 30"' X 55.64' RCP W/ PARALLEL WINGWALLS
EXTEND US 10' & EXTEND DS 10'
INSTALL CH-PW-0 (US & DS)

STANDARD : CH-PW-0

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUA.
0403-6001	TEMP SPL SHORING	SF	84
0432-6026	RIPRAP (STONE COMMON) (DRY) (18IN)	CY	26.12
0464-6019	RC PIPE (CL IV) (30 IN)	LF	20
0466-6099	HEADWALL (CH-PW-0) (DIA=30IN)	EA	2
0480-6001	CLEAN EXIST CULVERTS	EA	1
0496-6006	REMOV STR (HEADWALL)	EA	2
0658-6100	INSTL OM ASSM (OM-2Z) (WFLX) GND BI	EA	2

LEGEND

DELINEATOR
FLOW DIRECTION
PROPOSED PAVEMENT
SCALE (FEET):
0 2 5 10

HYDRAULIC DATA

Q_{10} = 51.27 Q_{100} = 76.47
V_{10} = 10.81 V_{100} = 11.36
HW_{10} = 455.61 HW_{100} = 456.16
TW_{10} = 450.95 TW_{100} = 451.23

NOTE:
1. BREAKBACK ON EXISTING STRUCTURE UP TO 1' WITH ENGINEER'S APPROVAL. THE REMOVAL IS SUBSIDIARY TO ITEM 496 & THE REPLACEMENT IS SUBSIDIARY TO ITEM 464.
2. PROPOSED EXTENSION WILL MATCH EXISTING SLOPE. UNLESS OTHERWISE DIRECTED BY THE ENGINEER OR SHOWN IN PLANS.
3. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CULVERT RELATED TO CONSTRUCTION OPERATIONS.
4. SEE MISC CONNECTION DETAILS FOR FURTHER INFORMATION.
5. SEE TEMPORARY SPECIAL SHORING SHEETS FOR FURTHER INFORMATION.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

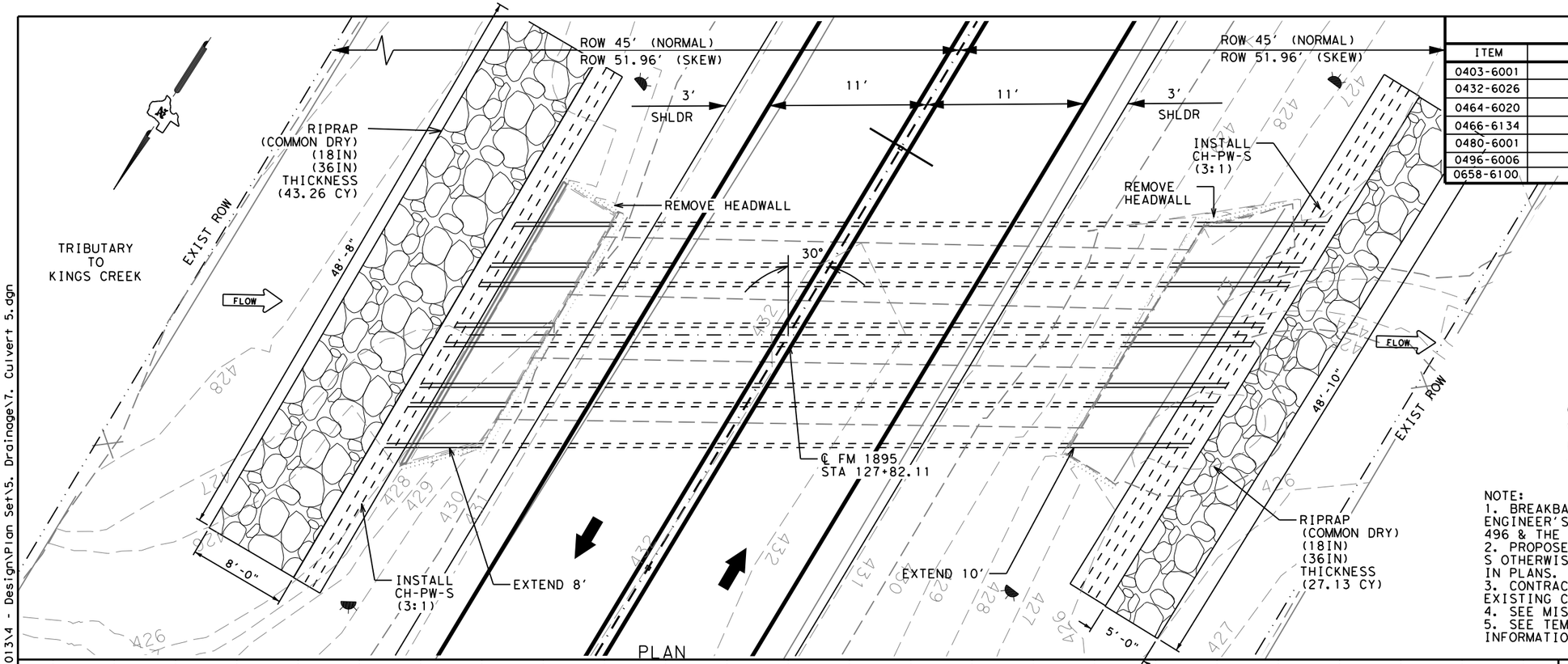
Texas Department of Transportation

FM 1895
CULVERT LAYOUT #4
STA 102+88.47

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'
SHEET 4 OF 12

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	118
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/28/2022 12:53:22 PM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\6. Culvert 4.dgn



ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QUA.
0403-6001	TEMP SPL SHORING	SF	353
0432-6026	RIPRAP (STONE COMMON) (DRY) (18IN)	CY	70.39
0464-6020	RC PIPE (CL IV) (36 IN)	LF	72
0466-6134	HEADWALL (CH-PW-S) (DIA=36IN)	EA	2
0480-6001	CLEAN EXIST CULVERTS	EA	1
0496-6006	REMOV STR (HEADWALL)	EA	2
0658-6100	INSTL OM ASSM (OM-2Z) (WFLX) GND BI	EA	4

LEGEND

DELINEATOR

FLOW DIRECTION

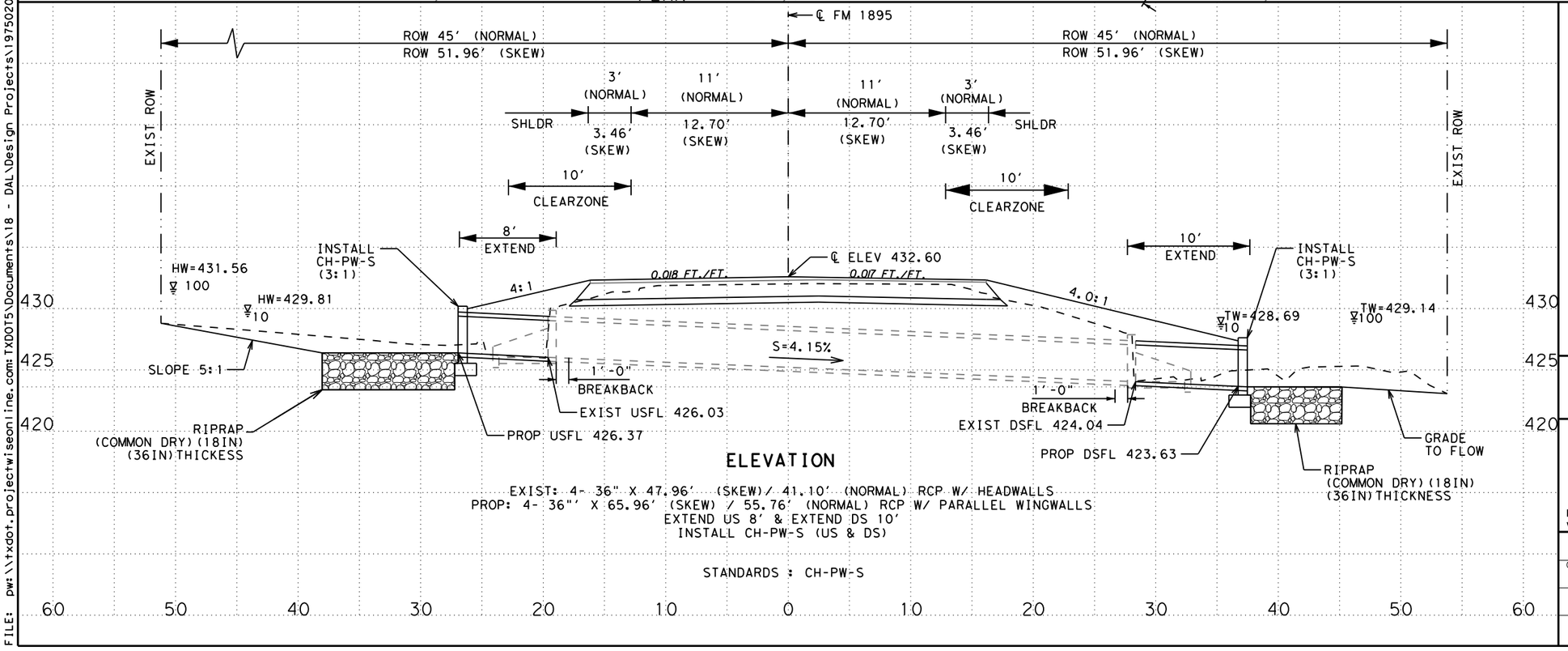
PROPOSED PAVEMENT

SCALE (FEET): 0 2 5 10

HYDRAULIC DATA

Q_{10} = 171.99	Q_{100} = 256.33
V_{10} = 6.08	V_{100} = 9.07
HW_{10} = 429.81	HW_{100} = 431.56
TW_{10} = 428.69	TW_{100} = 429.14

NOTE:
1. BREAKBACK ON EXISTING STRUCTURE UP TO 1' WITH ENGINEER'S APPROVAL. THE REMOVAL IS SUBSIDIARY TO ITEM 496 & THE REPLACEMENT IS SUBSIDIARY TO ITEM 464.
2. PROPOSED EXTENSION WILL MATCH EXISTING SLOPE. UNLESS OTHERWISE DIRECTED BY THE ENGINEER OR SHOWN IN PLANS.
3. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CULVERT RELATED TO CONSTRUCTION OPERATIONS.
4. SEE MISC CONNECTION DETAILS FOR FURTHER INFORMATION.
5. SEE TEMPORARY SPECIAL SHORING SHEETS FOR FURTHER INFORMATION.



ELEVATION

EXIST: 4- 36" X 47.96' (SKEW) / 41.10' (NORMAL) RCP W/ HEADWALLS
PROP: 4- 36"' X 65.96' (SKEW) / 55.76' (NORMAL) RCP W/ PARALLEL WINGWALLS
EXTEND US 8' & EXTEND DS 10'
INSTALL CH-PW-S (US & DS)

STANDARDS : CH-PW-S

FALON J. RENFROE 131914 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

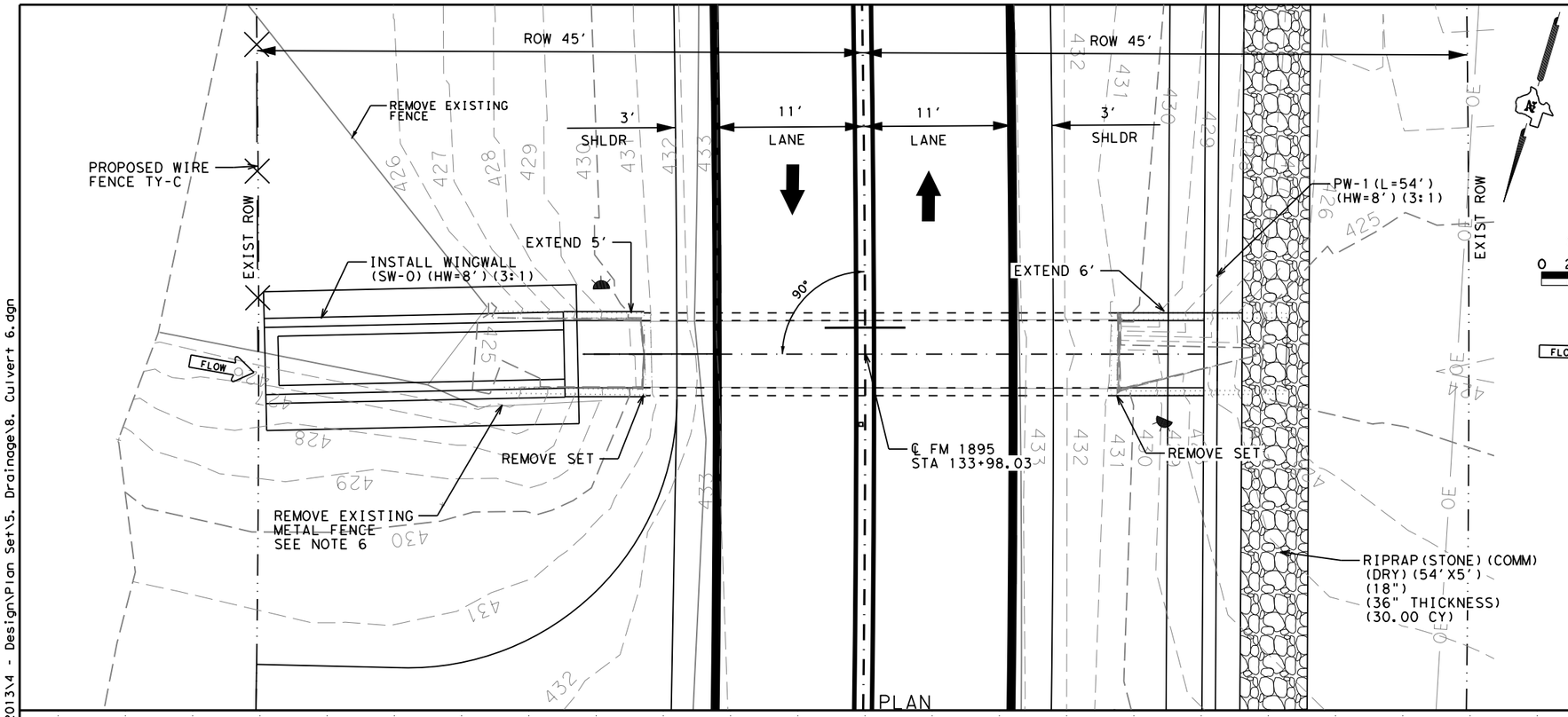
Texas Department of Transportation
© 2022

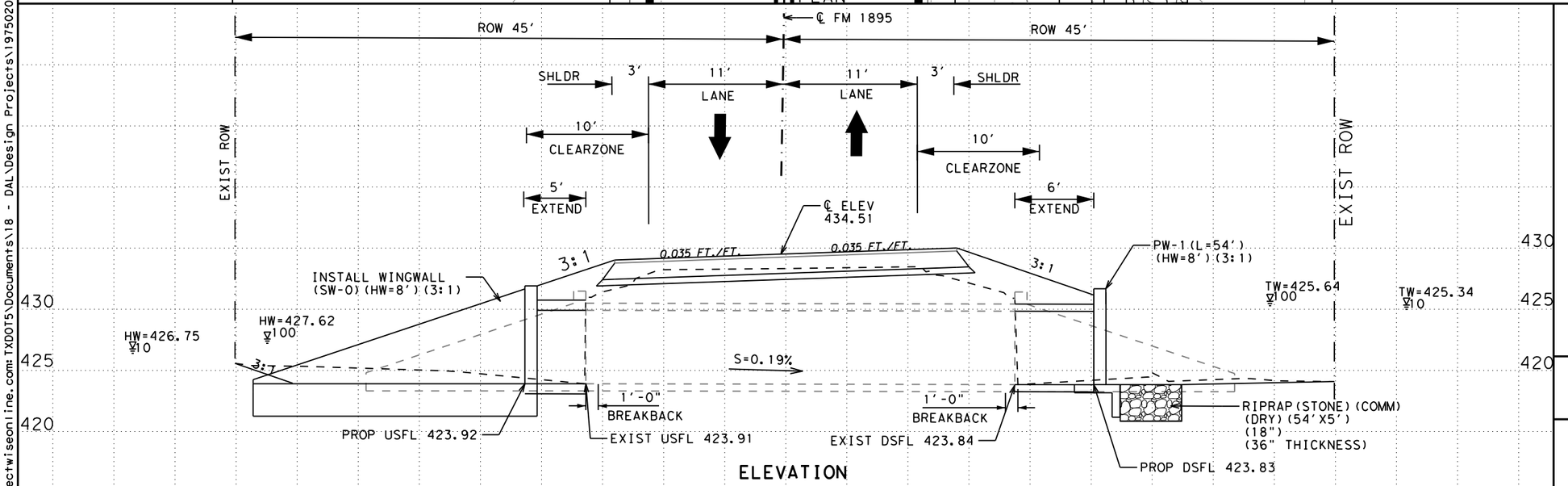
FM 1895
CULVERT LAYOUT #5
STA 127+82.11

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'
SHEET 5 OF 12

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	119
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/28/2022 8:17:46 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\1975020\4 - Design\Plan Set\5. Drainage\7. Culvert 5.dgn





EXIST: 1- 5' X 6'X 35.16' BOX CULVERT W/ S.E.T
PROP: 1- 5' X 6' X 46.16' BOX CULVERT W/ SW-0 (LT) & PW (RT)
EXTEND US 5' & EXTEND DS 6'
INSTALL SW-0 (LT) & PW (RT)

STANDARDS : SCC 5&6, SETB-SW-0, PW

50 40 30 20 10 0 10 20 30 40 50 60

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUA.
0403-6001	TEMP SPL SHORING	SF	639
0432-6026	RIPRAP (STONE COMMON) (DRY) (18IN)	CY	30.00
0462-6056	CONC BOX CULV (6FTX5FT) EXTEND	LF	11
0466-6183	WINGWALL (PW-1) (HW=8FT)	EA	1
0466-6211	WINGWALL (SW-0) (HW=8FT)	EA	1
0480-6001	CLEAN EXIST CULVERTS	EA	1
0496-6004	REMOV STR (SET)	EA	2
0658-6100	INSTL OM ASSM (OM-2Z) (WFLX) GND BI	EA	2

SCALE (FEET): 0 2 5 10

LEGEND

DELINEATOR
FLOW DIRECTION
PROPOSED PAVEMENT

HYDRAULIC DATA

Q_{10} = 60.06	Q_{100} = 89.56
V_{10} = 7.29	V_{100} = 8.32
HW_{10} = 426.75	HW_{100} = 427.62
TW_{10} = 425.34	TW_{100} = 425.64

NOTE:
1. BREAKBACK ON EXISTING STRUCTURE UP TO 1' WITH ENGINEER'S APPROVAL. THE REMOVAL IS SUBSIDIARY TO ITEM 496 & THE REPLACEMENT IS SUBSIDIARY TO ITEM 462.
2. PROPOSED EXTENSION WILL MATCH EXISTING SLOPE. UNLESS OTHERWISE DIRECTED BY THE ENGINEER OR SHOWN IN PLANS.
3. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CULVERT RELATED TO CONSTRUCTION OPERATIONS.
4. SEE MISC CONNECTION DETAILS FOR FURTHER INFORMATION.
5. SEE TEMPORARY SPECIAL SHORING SHEETS FOR FURTHER INFORMATION.
6. REMOVAL OF METAL FENCE SUBSIDIARY TO ITEM 496.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

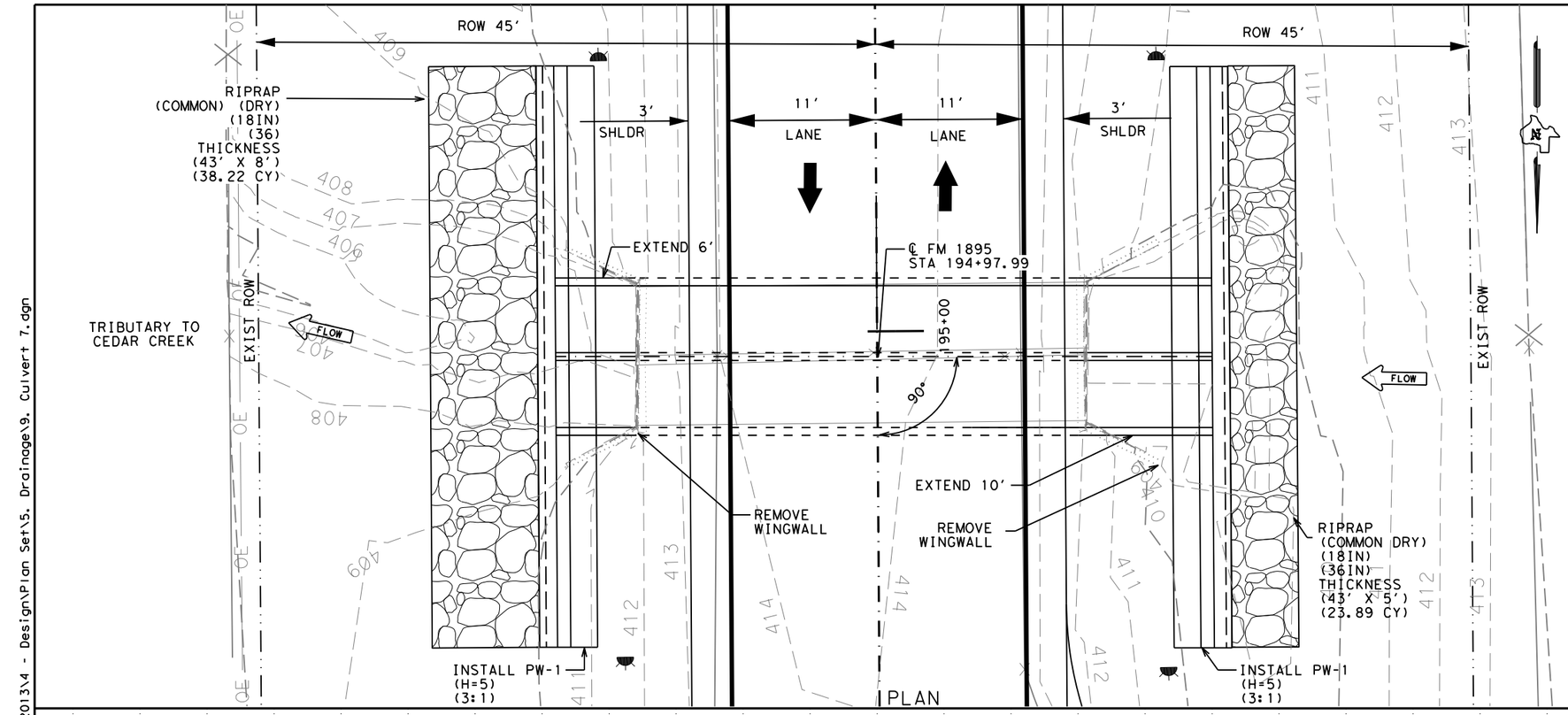
Texas Department of Transportation

FM 1895
CULVERT LAYOUT #6
STA 133+98.03

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'
SHEET 6 OF 12

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	120
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/28/2022 1:02:46 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\8. Culvert 6.dgn



ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUA.
0403-6001	TEMP SPL SHORING	SF	301
0432-6026	RIPRAP (STONE COMMON) (DRY) (18IN)	CY	62.11
0462-6051	CONC BOX CUL (5FT X 3FT) (EXTEND	LF	32
0466-6180	WINGWALL (PW-1) (HW=5FT)	EA	2
0480-6001	CLEAN EXIST CULVERTS	EA	1
0496-6005	REMOV STR (WINGWALL)	EA	2
0658-6100	INSTL OM ASSM (OM-2Z)(WFLX)GND BI	EA	4

LEGEND

DELINEATOR

FLOW DIRECTION

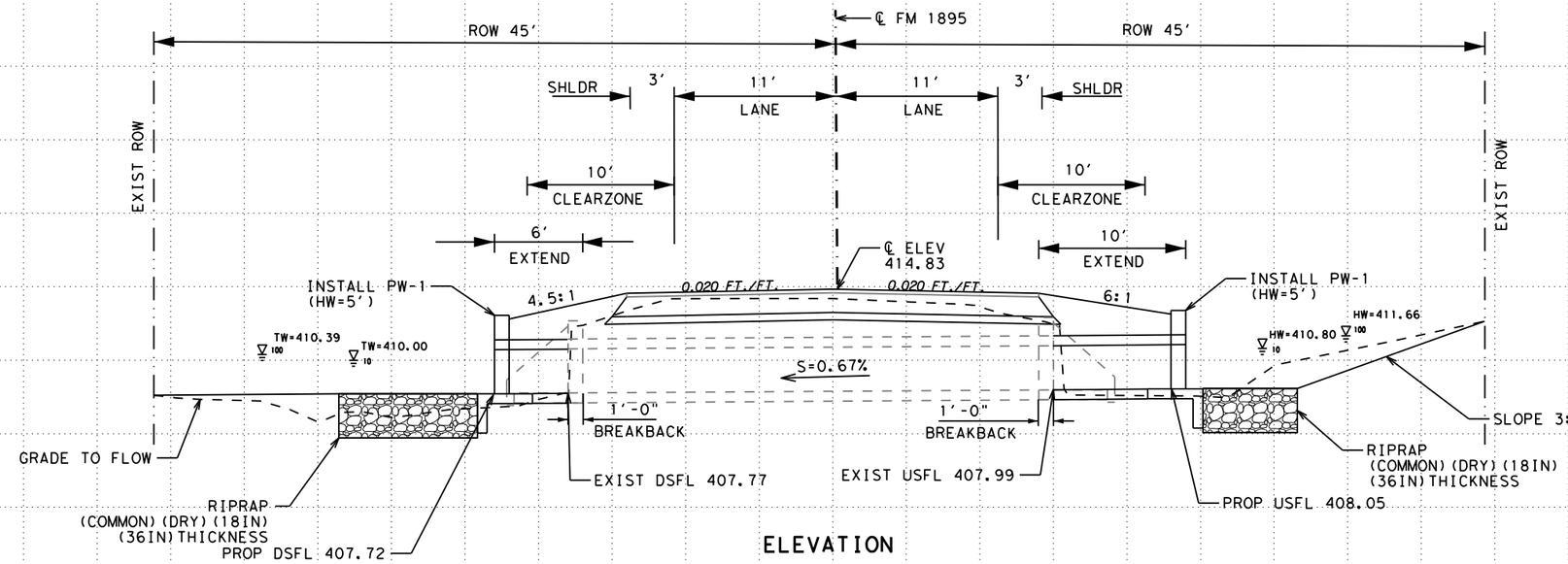
PROPOSED PAVEMENT

SCALE (FEET)
0 2 5 10

HYDRAULIC DATA

Q_{10} = 113.10 Q_{100} = 169.67
V_{10} = 4.95 V_{100} = 6.34
HW_{10} = 410.80 HW_{100} = 411.66
TW_{10} = 410.00 TW_{100} = 410.39

NOTE:
1. BREAKBACK ON EXISTING STRUCTURE UP TO 1' WITH ENGINEER'S APPROVAL. THE REMOVAL IS SUBSIDIARY TO ITEM 496 & THE REPLACEMENT IS SUBSIDIARY TO ITEM 462.
2. PROPOSED EXTENSION WILL MATCH EXISTING SLOPE. UNLESS OTHERWISE DIRECTED BY THE ENGINEER OR SHOWN IN PLANS.
3. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CULVERT RELATED TO CONSTRUCTION OPERATIONS.
4. SEE MISC CONNECTION DETAILS FOR FURTHER INFORMATION.
5. SEE TEMPORARY SPECIAL SHORING SHEETS FOR FURTHER INFORMATION.



ELEVATION

EXIST: 2- 5' X 3' X 33' BOX CULVERT W/ WINGWALLS
PROP: 2- 5' X 3' X 49' BOX CULVERT W/ PARALLEL WINGWALLS
EXTEND US 10' & EXTEND DS 6'
INSTALL PW-1 (US & DS)

STANDARDS : MC-5-20, PW ,MC-MD

FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

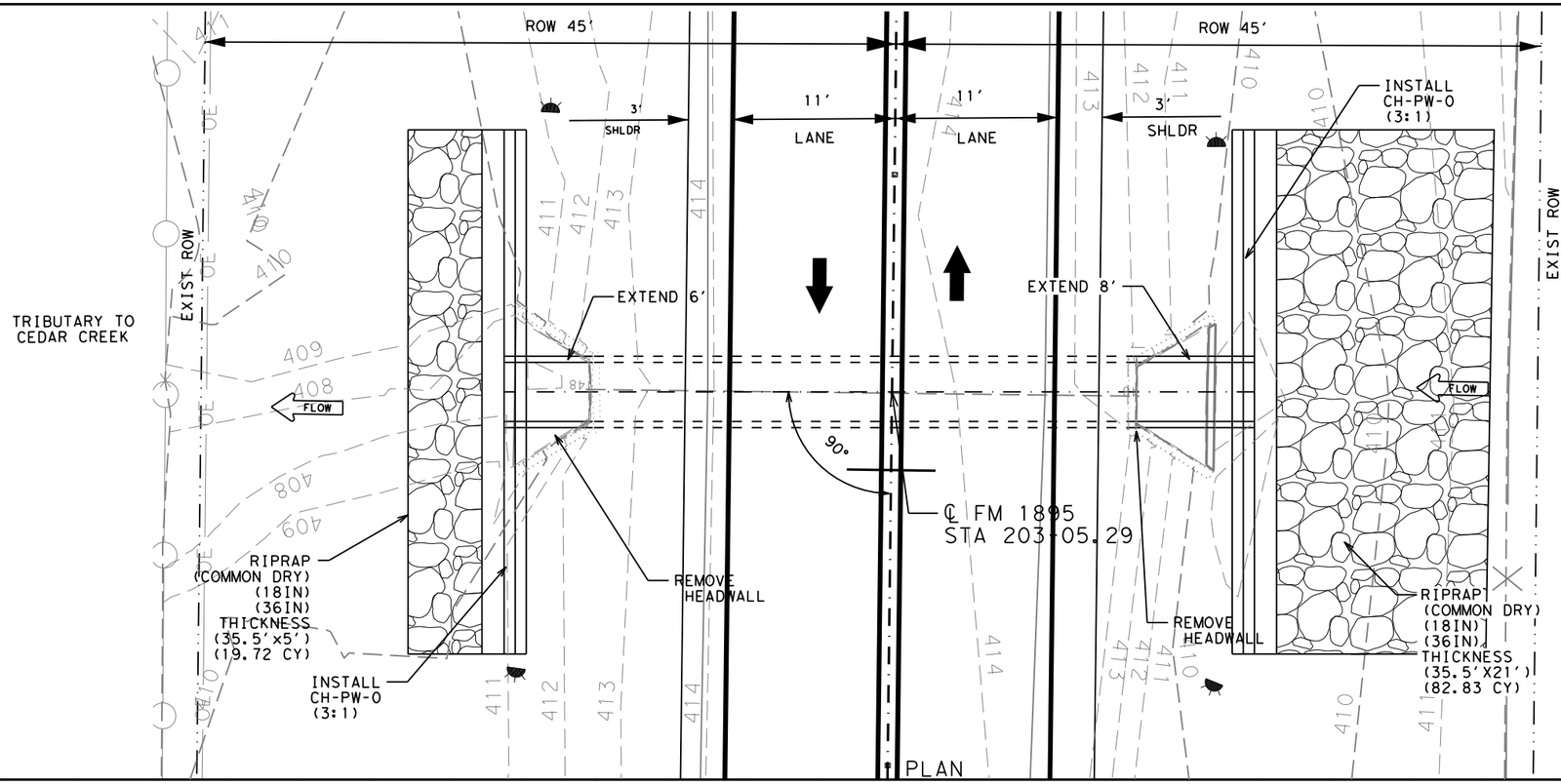
Texas Department of Transportation

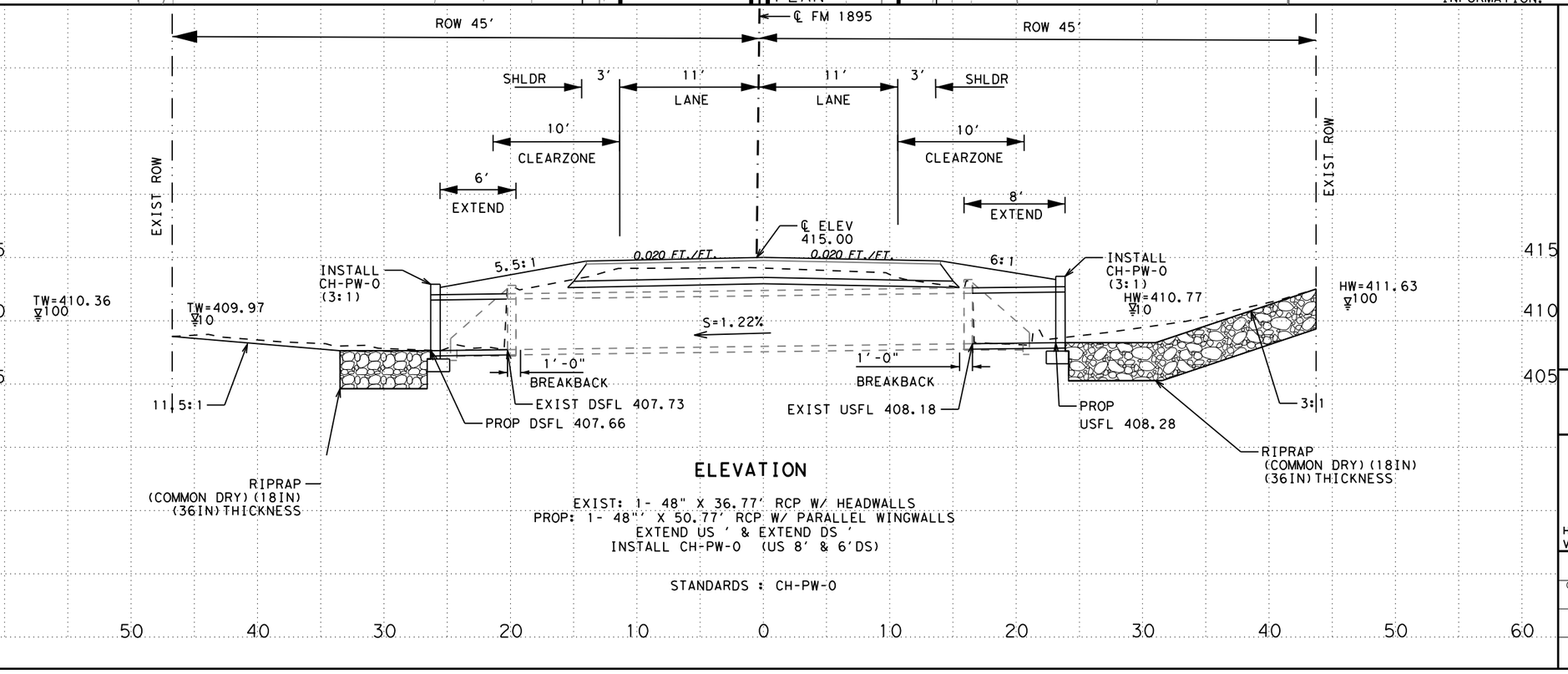
FM 1895
CULVERT LAYOUT #7
STA 194+97.99

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'
SHEET 7 OF 12

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	121
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/28/2022 9:07:16 AM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\9. Culvert 7.dgn





ELEVATION

EXIST: 1- 48" X 36.77' RCP W/ HEADWALLS
PROP: 1- 48"' X 50.77' RCP W/ PARALLEL WINGWALLS
EXTEND US ' & EXTEND DS '
INSTALL CH-PW-0 (US 8' & 6'DS)

STANDARDS : CH-PW-0

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUA.
0403-6001	TEMP SPL SHORING	SF	294
0432-6026	RIPRAP (STONE COMMON) (DRY) (18IN)	CY	102.55
0464-6022	RC PIPE (CL IV) (48 IN)	LF	14
0466-6103	HEADWALL (CH-PW-S) (DIA=48IN)	EA	2
0480-6001	CLEAN EXIST CULVERTS	EA	1
0496-6006	REMOV STR (HEADWALL)	EA	2
0658-6100	INSTL OM ASSM (OM-2Z)(WFLX)GND BI	EA	4

LEGEND

DELINEATOR
FLOW DIRECTION
PROPOSED PAVEMENT

SCALE (FEET):
0 2 5 10

HYDRAULIC DATA

Q_{10} = 23.84 Q_{100} = 35.53
V_{10} = 8.02 V_{100} = 9.21
HW_{10} = 410.77 HW_{100} = 411.63
TW_{10} = 409.97 TW_{100} = 410.36

NOTE:
1. BREAKBACK ON EXISTING STRUCTURE UP TO 1' WITH ENGINEER'S APPROVAL.THE REMOVAL IS SUBSIDIARY TO ITEM 496 & THE REPLACEMENT IS SUBSIDIARY TO ITEM 464.
2. PROPOSED EXTENSION WILL MATCH EXISTING SLOPE. UNLES S OTHERWISE DIRECTED BY THE ENGINEER OR SHOWN IN PLANS.
3. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CULVERT RELATED TO CONSTRUCTION OPERATIONS.
4. SEE MISC CONNECTION DETAILS FOR FURTHER INFORMATION.
5. SEE TEMPORARY SPECIAL SHORING SHEETS FOR FURTHER INFORMATION.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

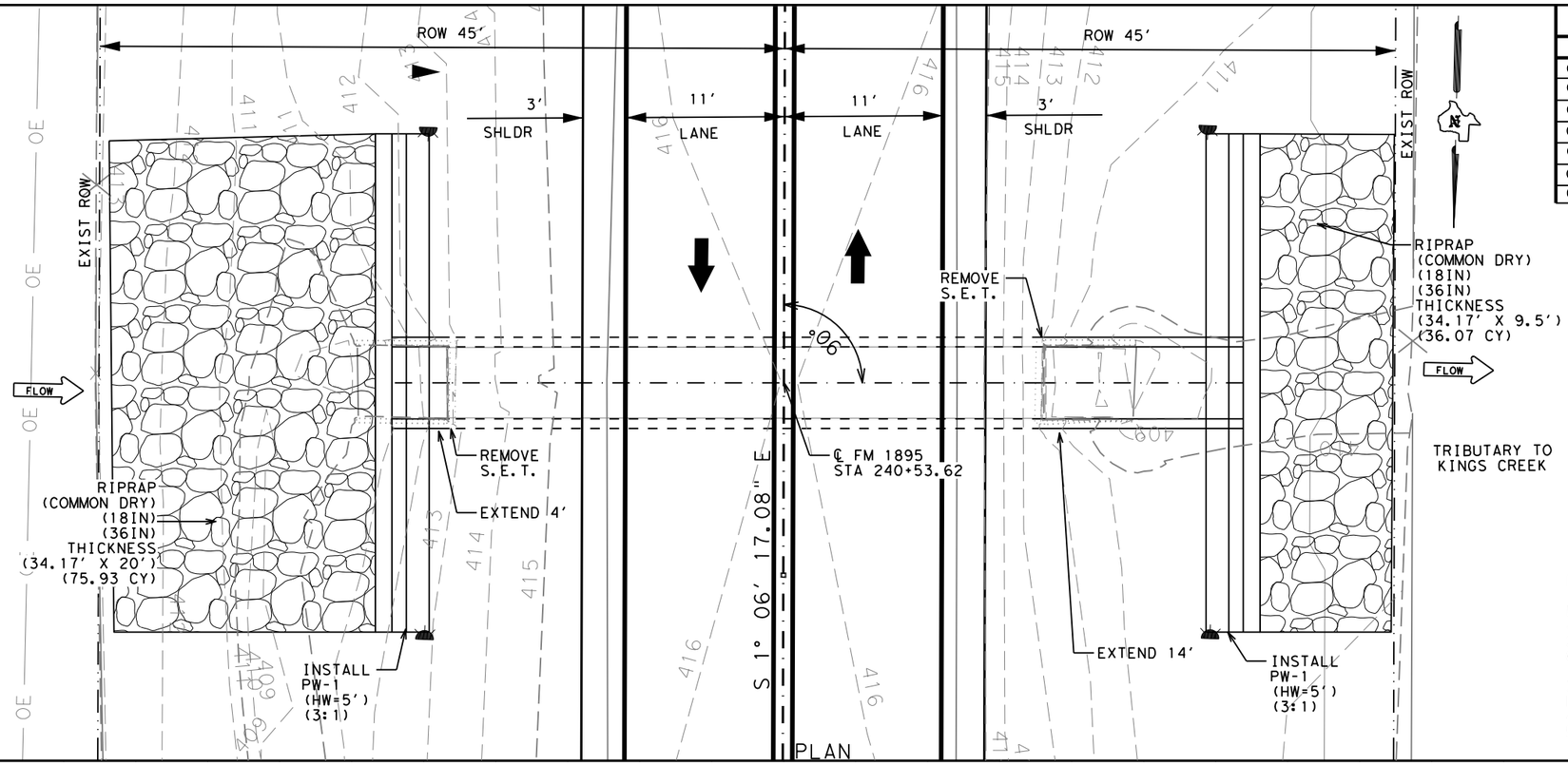
Texas Department of Transportation

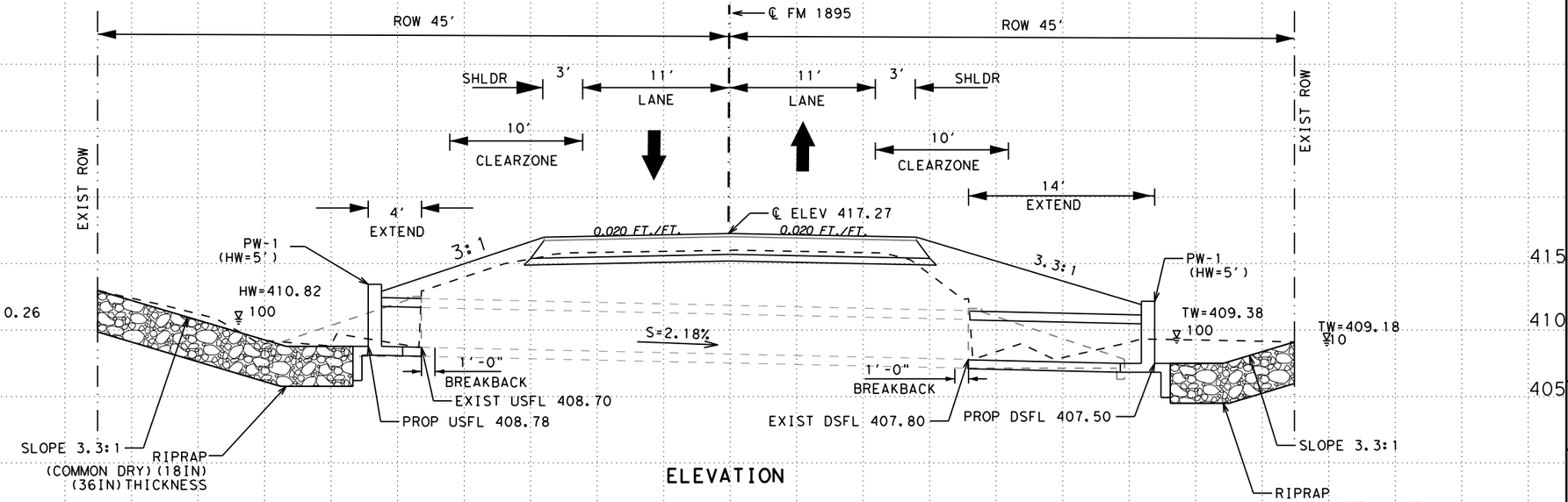
FM 1895
CULVERT LAYOUT #8
STA 203+05.29

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	122
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/28/2022 9:13:41 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\10. Culvert 8.dgn





ELEVATION

EXIST: 1- 5' X 3' X 41.11' BOX CULVERT W/ S.E.T.
PROP: 1- 5' X 3' X 59.11' BOX CULVERT W/ PARALLEL WINGWALL
EXTEND US 4' & EXTEND DS 14'
INSTALL PW-1 (US & DS)

STANDARDS : SCC-5&6, PW, SCP-5

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUA.
0403-6001	TEMP SPL SHORING	SF	448
0432-6026	RIPRAP (STONE COMMON) (DRY) (18IN)	CY	112.00
0462-6051	CONC BOX CULV (5FTX3FT) EXTEND	LF	18
0466-6180	WINGWALL (PW-1) (HW=5FT)	EA	2
0480-6001	CLEAN EXIST CULVERTS	EA	1
0496-6004	REMOV STR (SET)	EA	2
0658-6100	INSTL OM ASSM (OM-2Z)(WFLX)GND BI	EA	4

LEGEND

DELINEATOR
FLOW DIRECTION
PROPOSED PAVEMENT
SCALE (FEET): 0 2 5 10

HYDRAULIC DATA

Q_{10} = 45.02 Q_{100} = 67.09
V_{10} = 7.37 V_{100} = 8.29
HW_{10} = 410.26 HW_{100} = 410.82
TW_{10} = 409.18 TW_{100} = 409.38

NOTE:
1. BREAKBACK ON EXISTING STRUCTURE UP TO 1' WITH ENGINEER'S APPROVAL. THE REMOVAL IS SUBSIDIARY TO ITEM 496 & THE REPLACEMENT IS SUBSIDIARY TO ITEM 462.
2. PROPOSED EXTENSION WILL MATCH EXISTING SLOPE. UNLESS OTHERWISE DIRECTED BY THE ENGINEER OR SHOWN IN PLANS.
3. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CULVERT RELATED TO CONSTRUCTION OPERATIONS.
4. SEE MISC CONNECTION DETAILS FOR FURTHER INFORMATION.
5. SEE TEMPORARY SPECIAL SHORING SHEETS FOR FURTHER INFORMATION.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

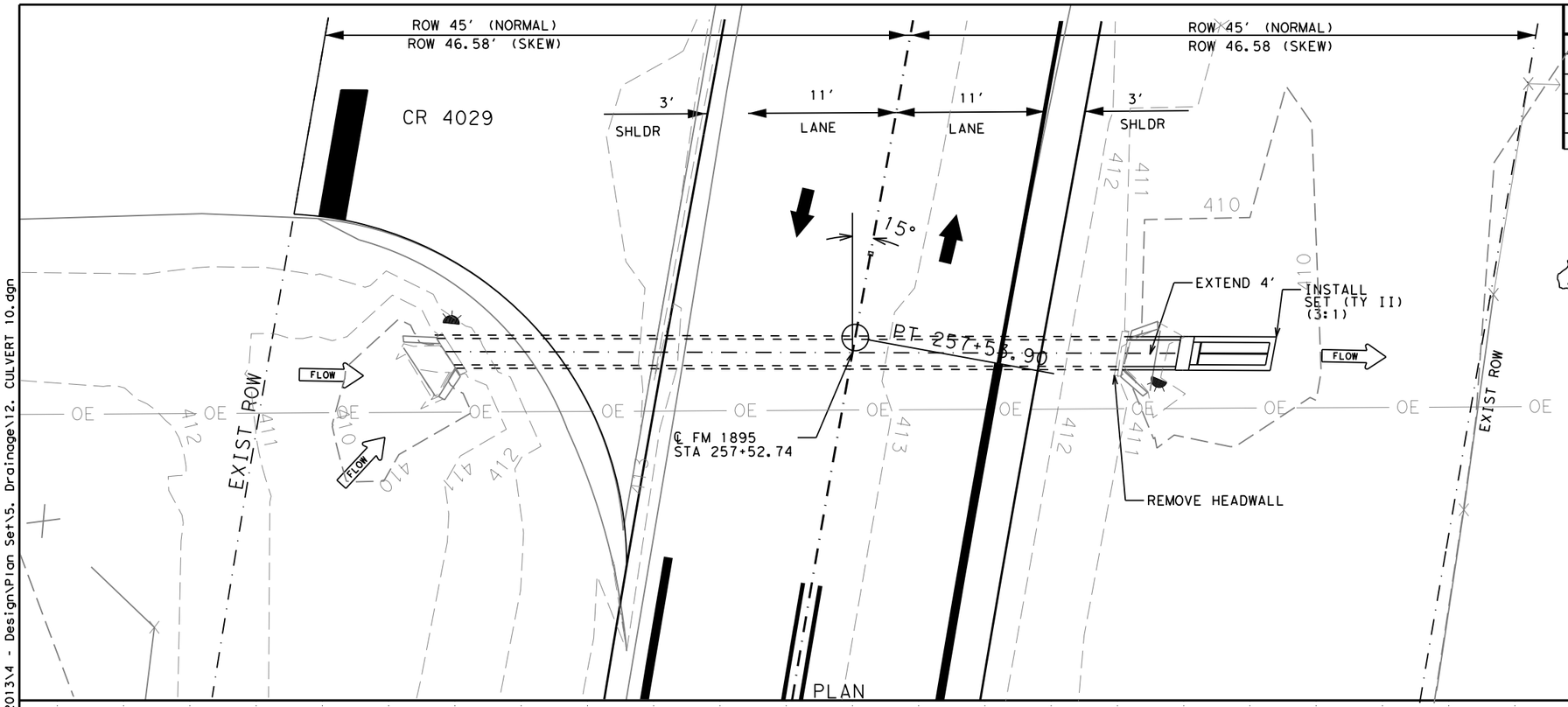
Texas Department of Transportation

FM 1895
CULVERT LAYOUT #9
STA 240+53.62

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'
SHEET 9 OF 12

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	123
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/28/2022 9:21:12 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\11. Culvert 9 .dgn



ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUA.
0464-6018	RC PIPE (CL IV) (24 IN)	LF	4
0467-6388	SET (TY II) (24IN) (RCP) (3:1) C	EA	1
0480-6001	CLEAN EXIST CULVERTS	EA	1
0496-6006	REMOV STR (HEADWALL)	EA	1
0658-6100	INSTL OM ASSM (OM-2Z)(WFLX)GND BI	EA	2

LEGEND

DELINEATOR

FLOW DIRECTION

PROPOSED PAVEMENT

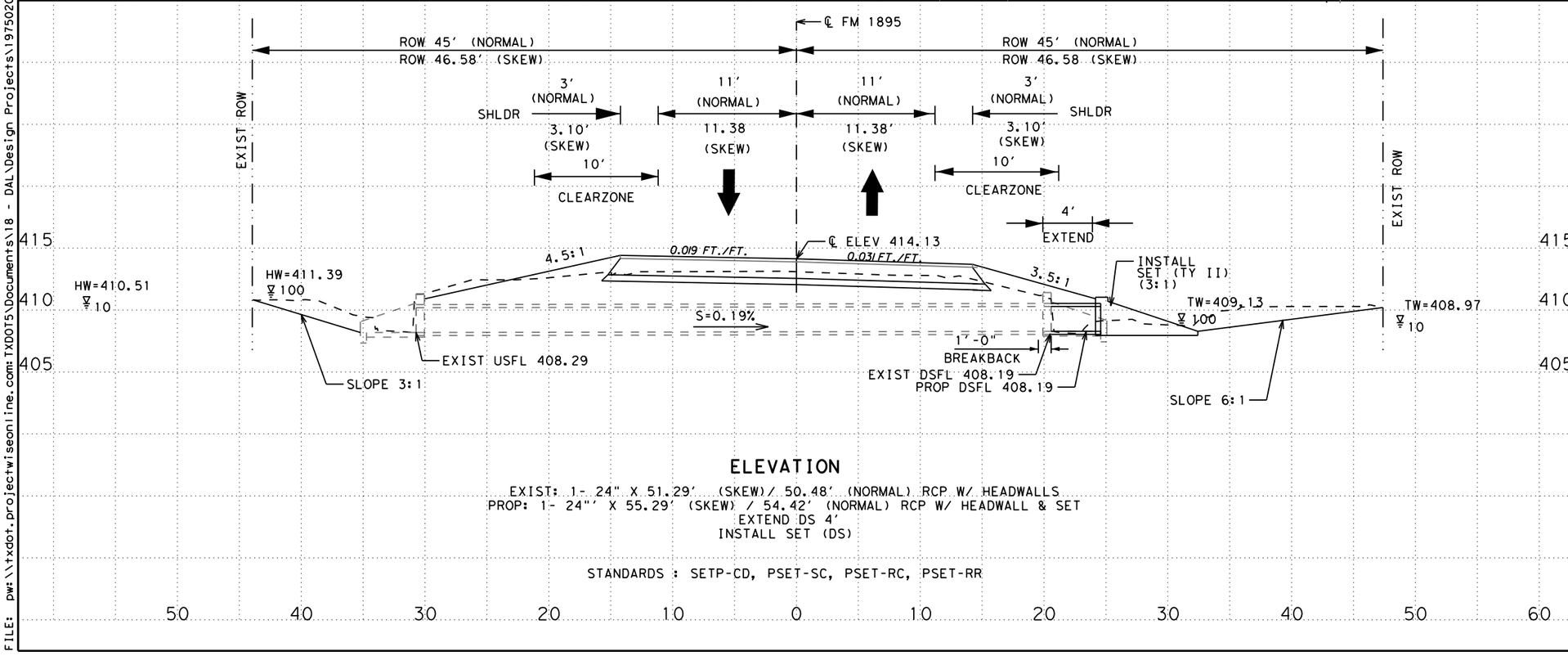
SCALE (FEET):

0 2 5 10

HYDRAULIC DATA

Q_{10} = 13.80 Q_{100} = 20.56
V_{10} = 6.20 V_{100} = 7.52
HW_{10} = 410.51 HW_{100} = 411.39
TW_{10} = 408.97 TW_{100} = 409.13

NOTE:
1. BREAKBACK ON EXISTING STRUCTURE UP TO 1' WITH ENGINEER'S APPROVAL. THE REMOVAL IS SUBSIDIARY TO ITEM 496 & THE REPLACEMENT IS SUBSIDIARY TO ITEM 464.
2. PROPOSED EXTENSION WILL MATCH EXISTING SLOPE. UNLES S OTHERWISE DIRECTED BY THE ENGINEER OR SHOWN IN PLANS.
3. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CULVERT RELATED TO CONSTRUCTION OPERATIONS.
4. SEE MISC CONNECTION DETAILS FOR FURTHER INFORMATION.



ELEVATION

EXIST: 1- 24" X 51.29' (SKEW)/ 50.48' (NORMAL) RCP W/ HEADWALLS
PROP: 1- 24"' X 55.29' (SKEW) / 54.42' (NORMAL) RCP W/ HEADWALL & SET
EXTEND DS 4'
INSTALL SET (DS)

STANDARDS : SETP-CD, PSET-SC, PSET-RC, PSET-RR

FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

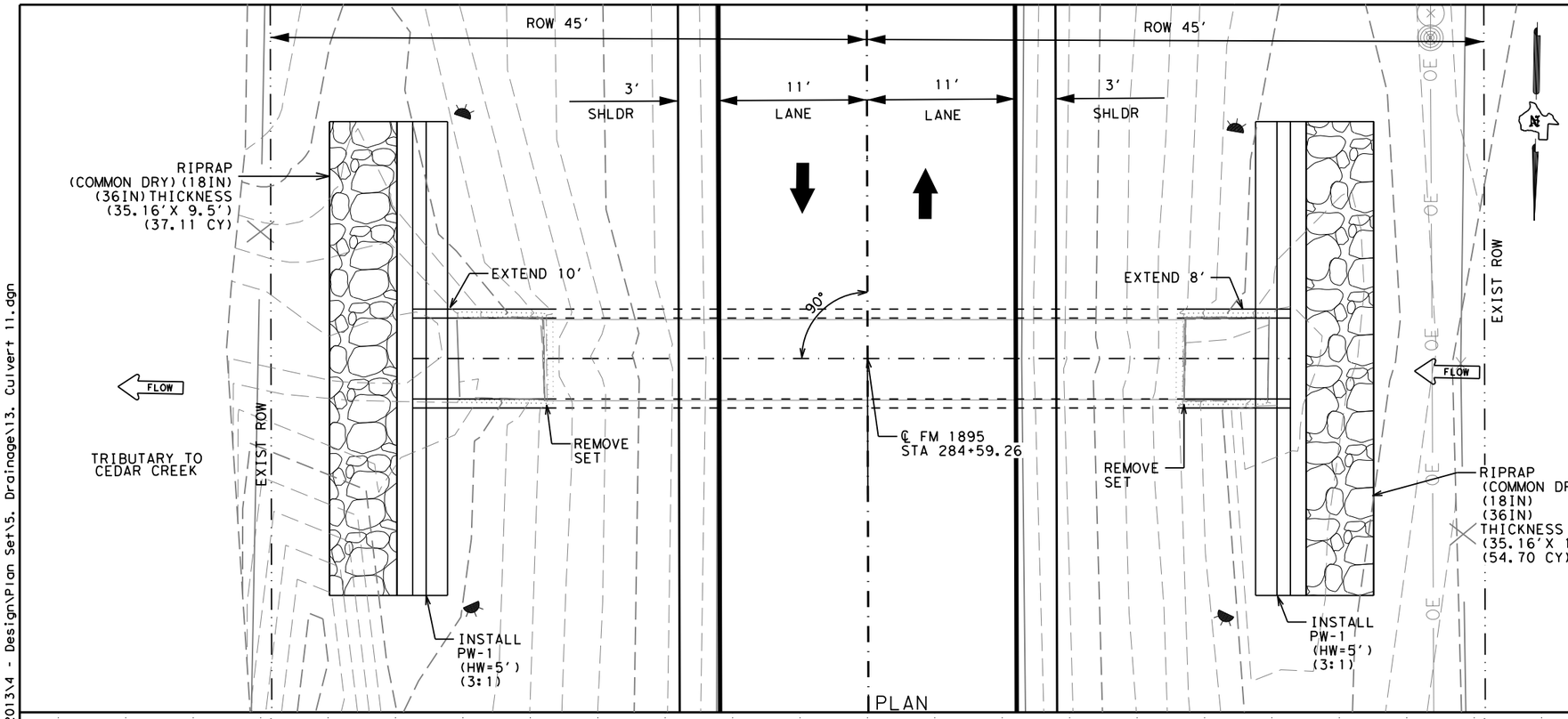
Texas Department of Transportation

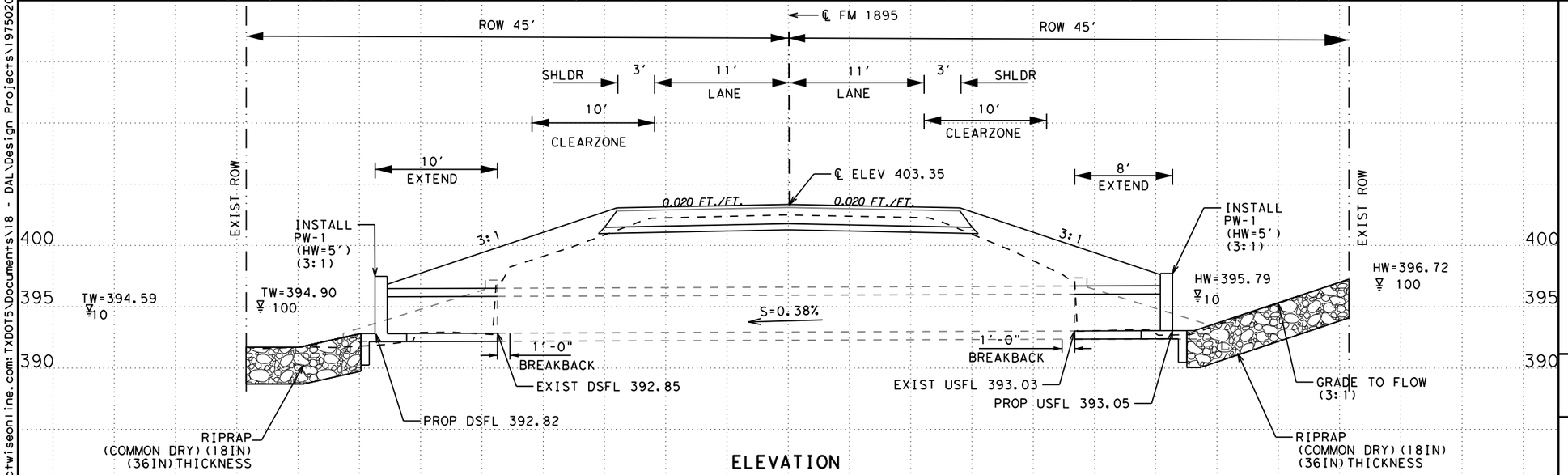
FM 1895
CULVERT LAYOUT #10
STA 257+52.74

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'
SHEET 10 OF 12

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	124
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/28/2022 9:26:31 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\12. CULVERT 10.dgn





ELEVATION

EXIST: 1- 6' X 3' X 47.10' BOX CULVERT W/ S.E.T.
PROP: 1- 6' X 3' X 65.10' BOX CULVERT W/ PARALLEL WINGWALL
EXTEND US 8' & EXTEND DS 10'
INSTALL PW-1 (US & DS)

STANDARDS : SCC-5&6, PW, SCP-6

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUA.
0403-6001	TEMP SPL SHORING	SF	376
0432-6026	RIPRAP (STONE COMMON) (DRY) (18IN)	CY	91.81
0462-6054	CONC BOX CULV (6FTX3FT) EXTEND	LF	18
0466-6180	WINGWALL (PW-1) (HW=5FT)	EA	2
0480-6001	CLEAN EXIST CULVERTS	EA	1
0496-6004	REMOV STR (SET)	EA	2
0658-6100	INSTL OM ASSM (OM-2Z) (WFLX) GND BI	EA	4

LEGEND

DELINEATOR
FLOW DIRECTION
PROPOSED PAVEMENT

SCALE (FEET):
0 2 5 10

HYDRAULIC DATA

Q_{10} = 70.45	Q_{100} = 105.05
V_{10} = 6.65	V_{100} = 8.44
HW_{10} = 395.79	HW_{100} = 396.72
TW_{10} = 394.59	TW_{100} = 394.90

NOTE:
1. BREAKBACK ON EXISTING STRUCTURE UP TO 1' WITH ENGINEER'S APPROVAL. THE REMOVAL IS SUBSIDIARY TO ITEM 496 & THE REPLACEMENT IS SUBSIDIARY TO ITEM 462.
2. PROPOSED EXTENSION WILL MATCH EXISTING SLOPE. UNLESS OTHERWISE DIRECTED BY THE ENGINEER OR SHOWN IN PLANS.
3. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CULVERT RELATED TO CONSTRUCTION OPERATIONS.
4. SEE MISC CONNECTION DETAILS FOR FURTHER INFORMATION.
5. SEE TEMPORARY SPECIAL SHORING SHEETS FOR FURTHER INFORMATION.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

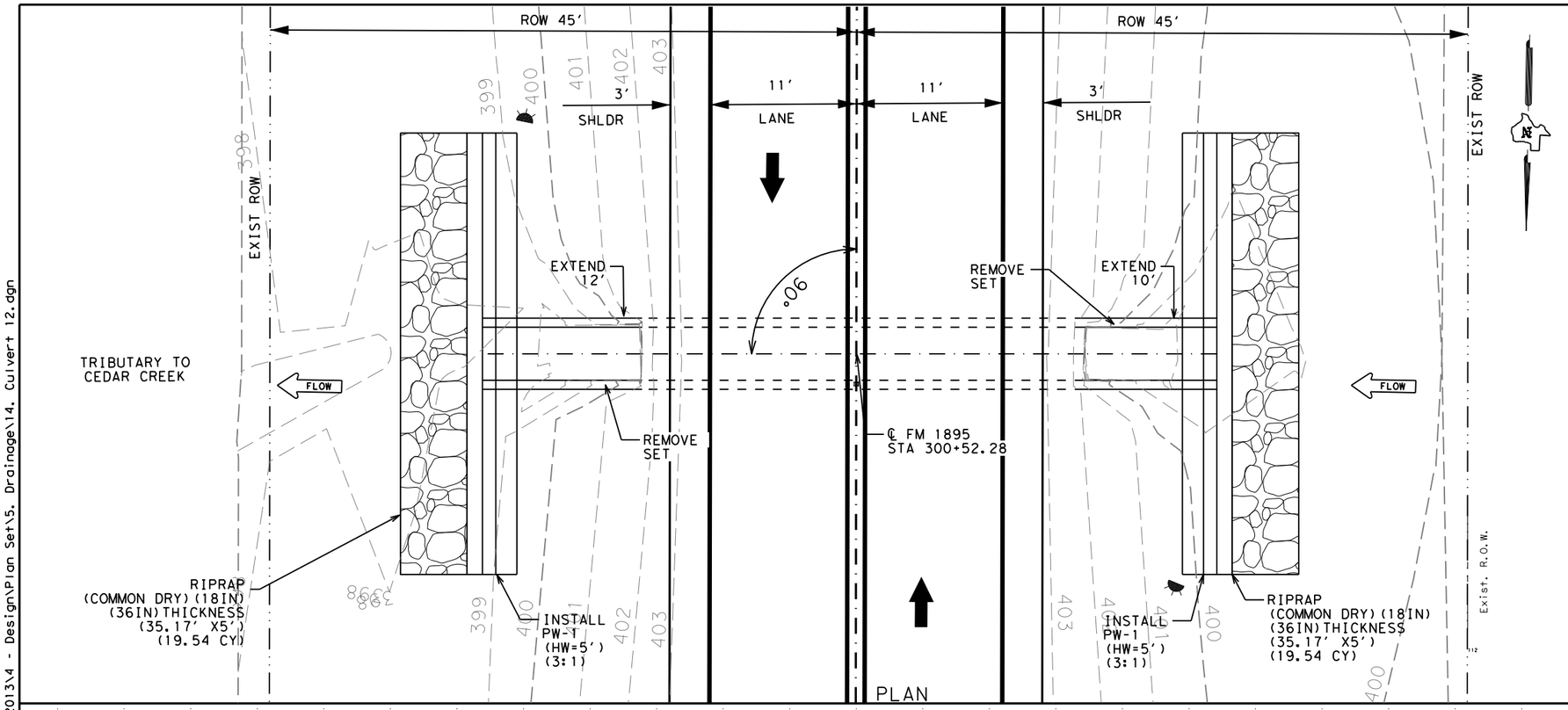
Texas Department of Transportation

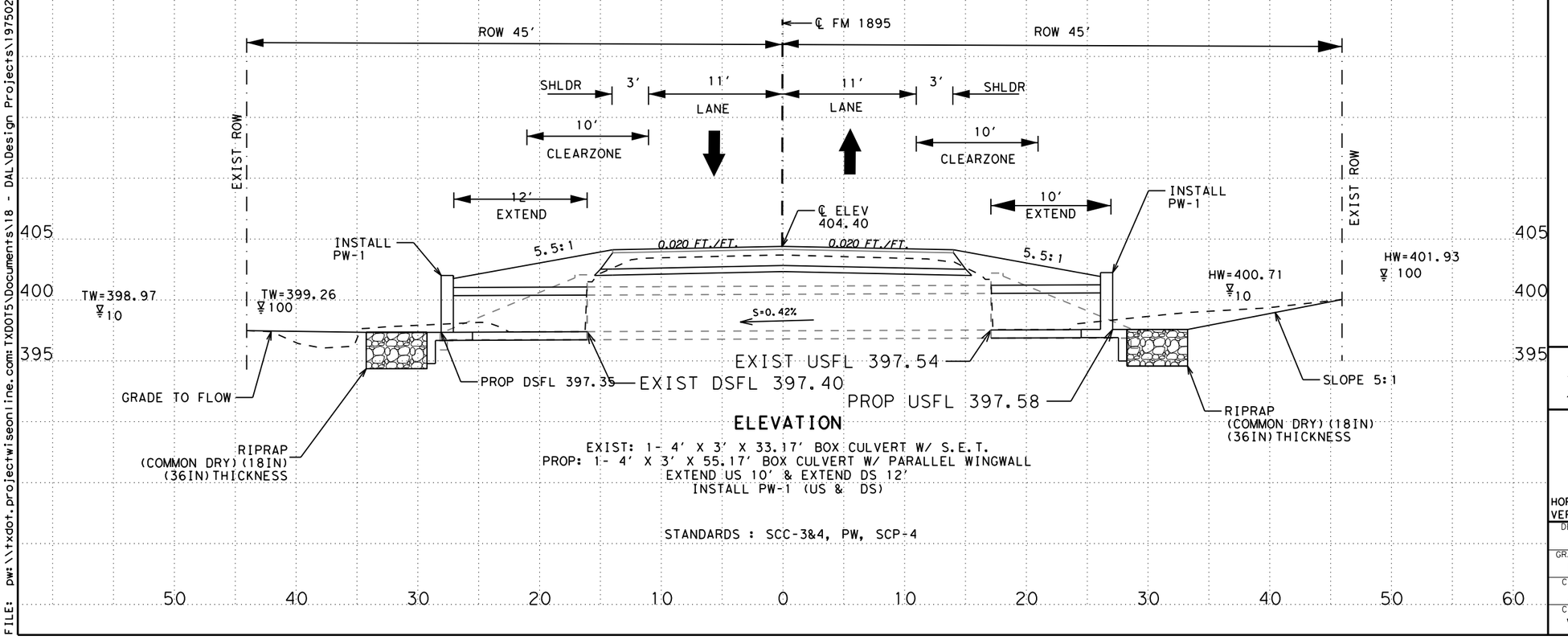
FM 1895
CULVERT LAYOUT #11
STA 284+59.26

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'
SHEET 11 OF 12

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	125
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/28/2022 9:57:28 AM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\13. Culvert 11.dgn





ELEVATION

EXIST: 1- 4' X 3' X 33.17' BOX CULVERT W/ S.E.T.
PROP: 1- 4' X 3' X 55.17' BOX CULVERT W/ PARALLEL WINGWALL
EXTEND US 10' & EXTEND DS 12'
INSTALL PW-1 (US & DS)

STANDARDS : SCC-3&4, PW, SCP-4

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUA.
0403-6001	TEMP SPL SHORING	SF	360
0432-6026	RIPRAP (STONE COMMON) (DRY) (18IN)	CY	39.08
0462-6048	CONC BOX CULV (4FTX3FT) EXTEND	LF	22
0466-6180	WINGWALL (PW-1) (HW=5FT)	EA	2
0480-6001	CLEAN EXIST CULVS	EA	1
0496-6004	REMOV STR (SET)	EA	2
0658-6100	INSTL OM ASSM (OM-2Z) (WFLX) GND BI	EA	2

LEGEND

DELINEATOR
FLOW DIRECTION
PROPOSED PAVEMENT

SCALE (FEET):
0 2 5 10

HYDRAULIC DATA

Q_{10} = 56.74 Q_{100} = 84.95
V_{10} = 7.97 V_{100} = 8.81
HW_{10} = 400.71 HW_{100} = 401.93
TW_{10} = 398.97 TW_{100} = 399.26

NOTE:
1. BREAKBACK ON EXISTING STRUCTURE UP TO 1' WITH ENGINEER'S APPROVAL. THE REMOBAL IS SUBSIDIARY TO ITEM 496 & THE REPLACEMENT IS SUBSIDIARY TO ITEM 464.
2. PROPOSED EXTENSION WILL MATCH EXISTING SLOPE. UNLESS OTHERWISE DIRECTED BY THE ENGINEER OR SHOWN IN PLANS.
3. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CULVERT RELATED TO CONSTRUCTION OPERATIONS.
4. SEE MISC CONNECTION DETAILS FOR FURTHER INFORMATION.
5. SEE TEMPORARY SPECIAL SHORING SHEETS FOR FURTHER INFORMATION.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

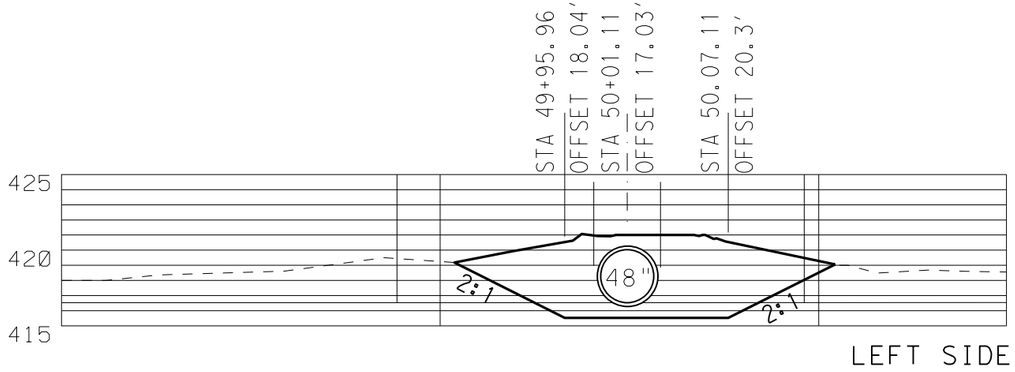
FM 1895
CULVERT LAYOUT #12
STA 300+52.28

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=10'
SHEET 12 OF 12

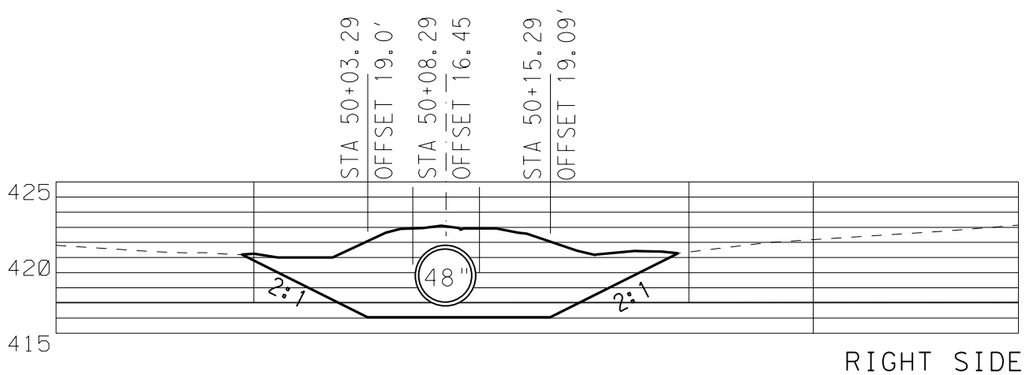
DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	126
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/28/2022 10:01:44 AM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\14. Culvert 12.dgn

CULVERT #1
STA 51+04.82



LEFT SIDE



RIGHT SIDE

ELEVATION

FM 1895
CULVERT #1

QUANTITY:
+94
+105
-24
=175 SF

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
TEMPORARY SPECIAL SHORING

SCALE: NTS

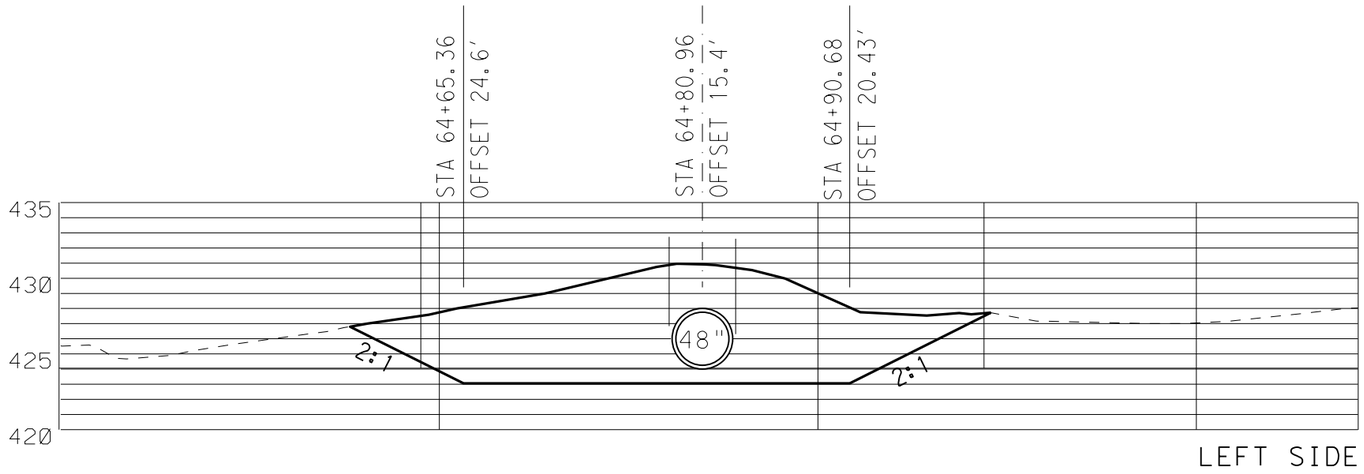
SHEET 1 OF 10

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
JR	6	(SEE TITLE SHEET)		FM1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JR	TEXAS	DALLAS	KAUFMAN	127
CHECK	CONTROL	SECTION	JOB	
QA	1975	02	013	
CHECK				
JR				

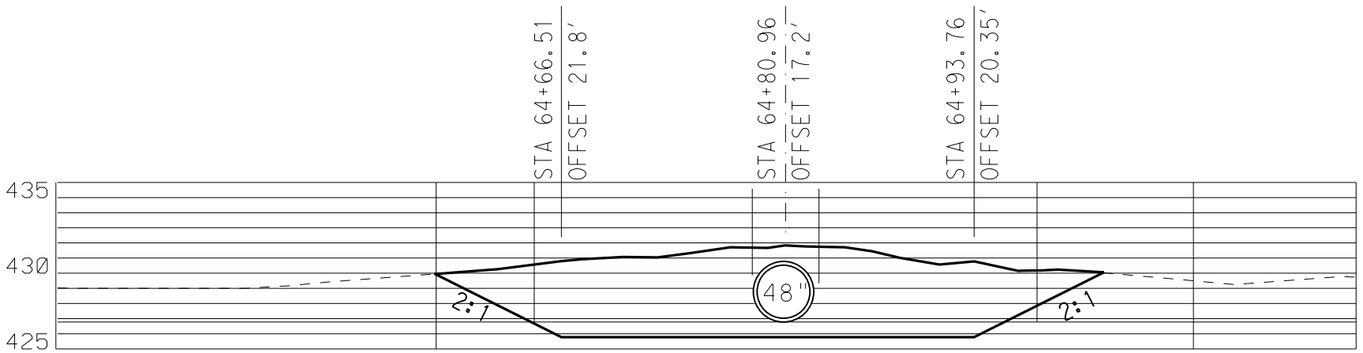
DATE: 7/28/2022 1:45:42 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\15. CULVERT 1 TEMP SPL SHORING.dgn

CULVERT #2
STA 64+80.96

QUANTITY:
+209
+191
-24
=376 SF



LEFT SIDE



RIGHT SIDE

ELEVATION

FM 1895
CULVERT #2

FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
TEMPORARY SPECIAL SHORING

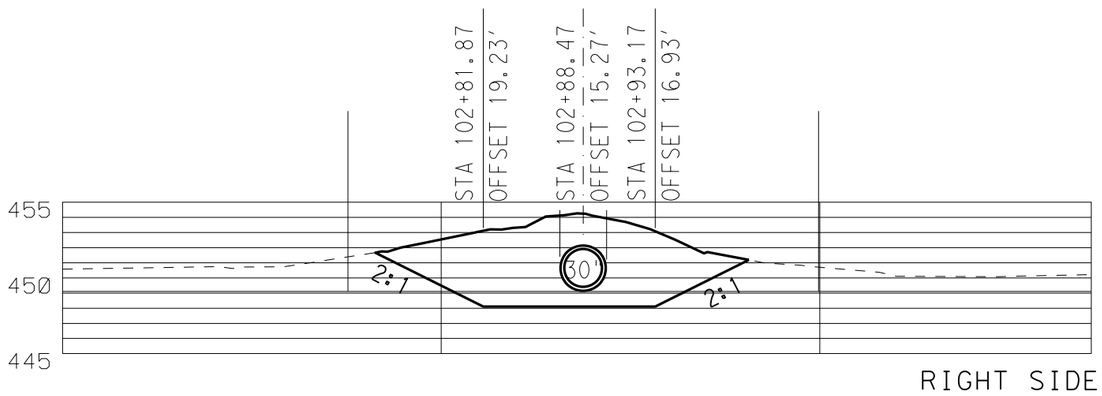
SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
JR	6	(SEE TITLE SHEET)		FM1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JR	TEXAS	DALLAS	KAUFMAN	128
CHECK	CONTROL	SECTION	JOB	
QA	1975	02	013	
CHECK				
JR				

DATE: 7/28/2022 1:47:45 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\16. CULVERT 2 TEMP SPL SHORING.dgn

CULVERT #4
STA 102+88.47

QUANTITY:
+0
+96
-12
=84 SF



RIGHT SIDE

ELEVATION

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
TEMPORARY SPECIAL SHORING

SCALE: NTS

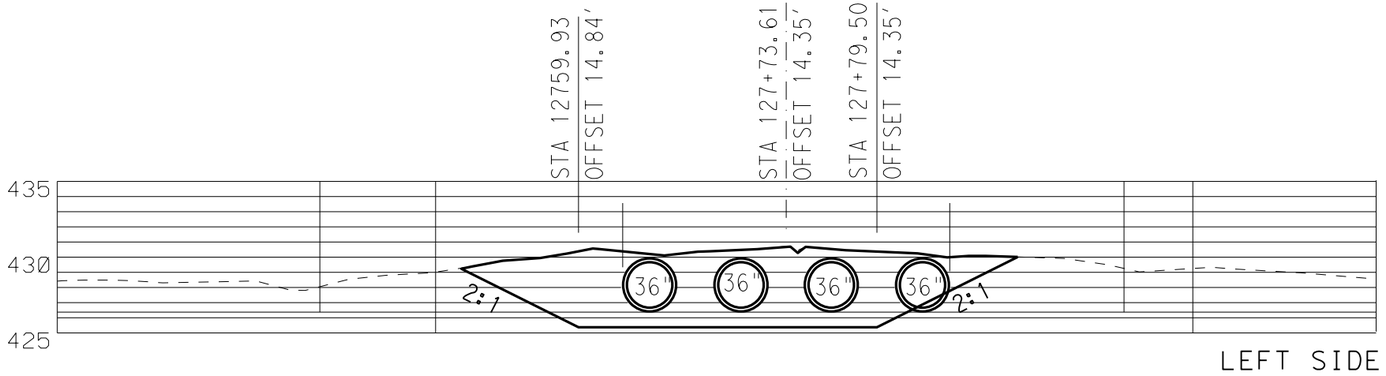
SHEET 3 OF 10

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
JR	6	(SEE TITLE SHEET)		FM1895
GRAPHICS JR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK QA	TEXAS	DALLAS	KAUFMAN	129
CHECK JR	CONTROL	SECTION	JOB	
	1975	02	013	

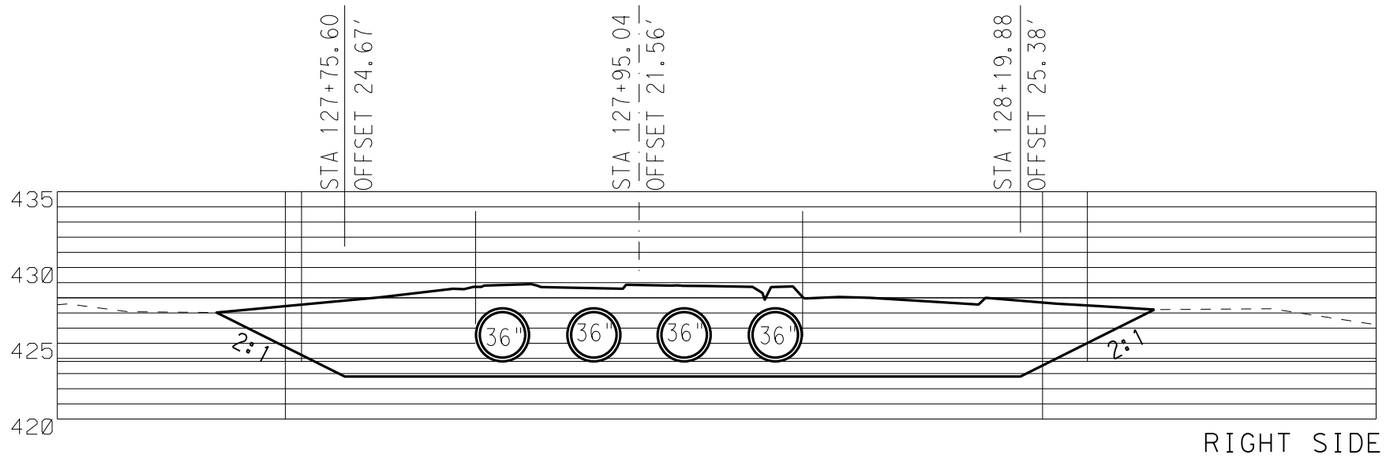
DATE: 7/28/2022 1:47:08 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\17. CULVERT 4 TEMP SPL SHORING.dgn

CULVERT #5
STA 127+82.11

QUANTITY:
+142
+291
-80
=353 SF



LEFT SIDE



RIGHT SIDE

ELEVATION

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
TEMPORARY SPECIAL SHORING

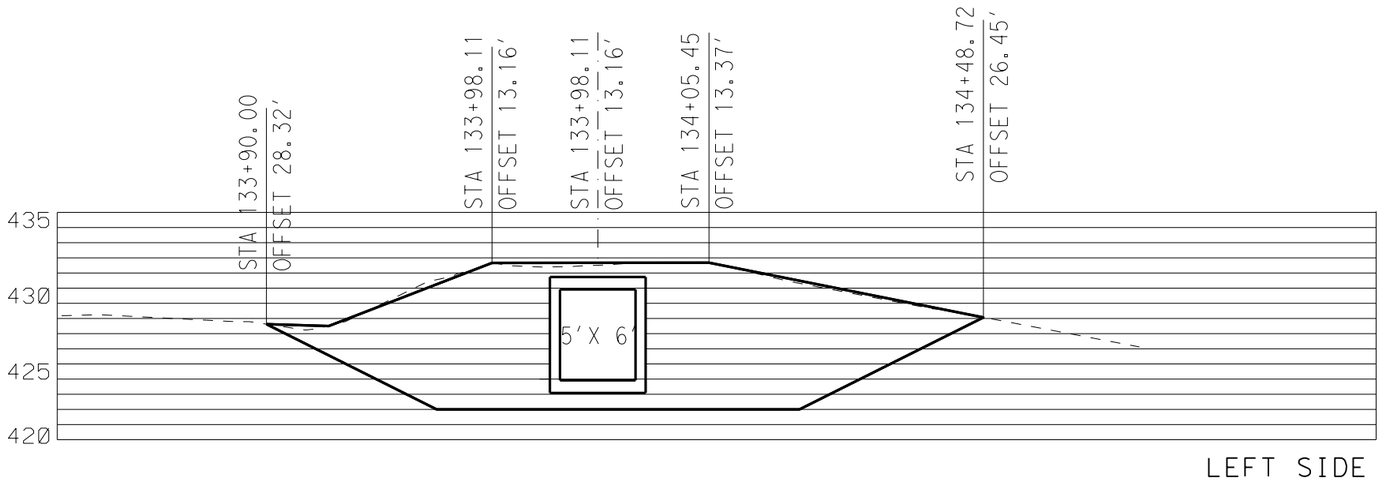
SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
JR	6	(SEE TITLE SHEET)		FM1895
GRAPHICS JR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK QA	TEXAS	DALLAS	KAUFMAN	130
CHECK JR	CONTROL	SECTION	JOB	
	1975	02	013	

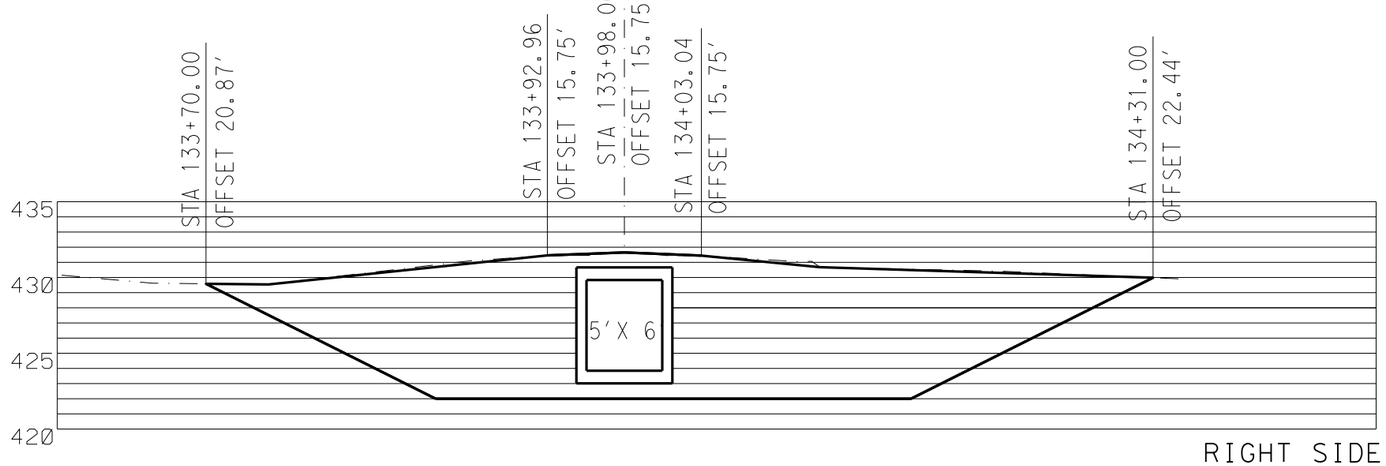
DATE: 7/28/2022 1:50:01 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\18. CULVERT 5 TEMP SPL SHORING.dgn

CULVERT #6
STA 133+98.03

QUANTITY:
+269
+370
=639 SF



LEFT SIDE



RIGHT SIDE

ELEVATION

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
TEMPORARY SPECIAL SHORING

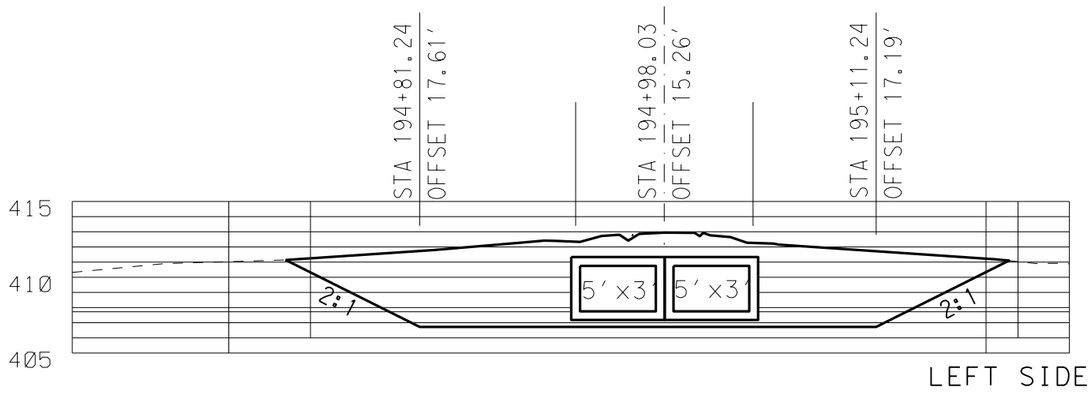
SCALE: NTS

SHEET 5 OF 10

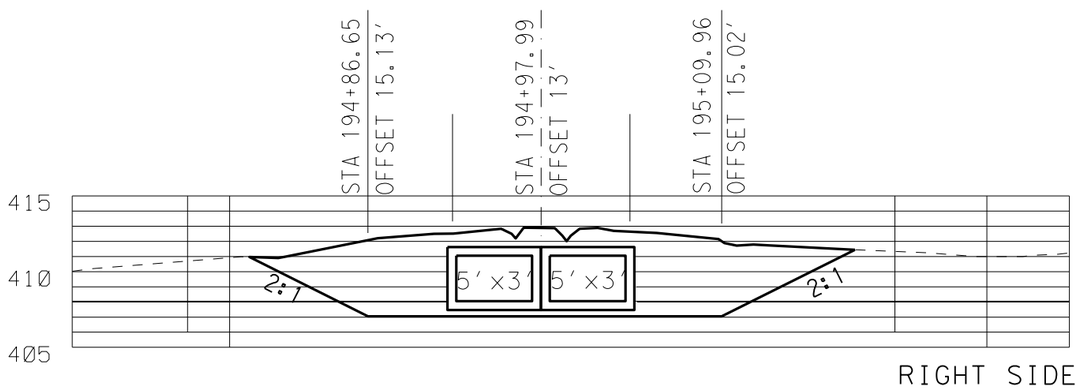
DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
JR	6	(SEE TITLE SHEET)		FM1895
GRAPHICS JR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK QA	TEXAS	DALLAS	KAUFMAN	131
CHECK JR	CONTROL	SECTION	JOB	
	1975	02	013	

CULVERT #7
STA 194+97.99

QUANTITY:
+213
+168
-80
=301 SF



LEFT SIDE



RIGHT SIDE

ELEVATION

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
TEMPORARY SPECIAL SHORING

SCALE: NTS

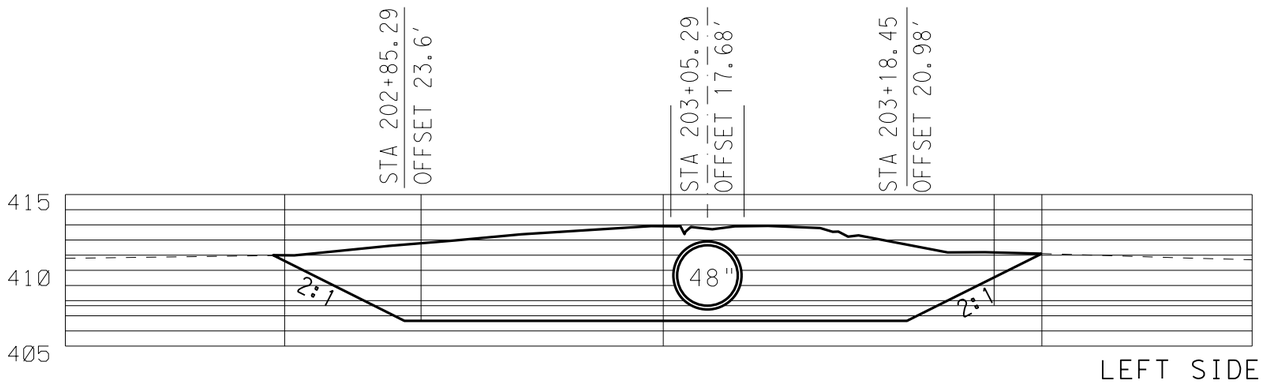
SHEET 6 OF 10

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
JR	6	(SEE TITLE SHEET)		FM1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JR	TEXAS	DALLAS	KAUFMAN	132
CHECK	CONTROL	SECTION	JOB	
QA	1975	02	013	
CHECK				
JR				

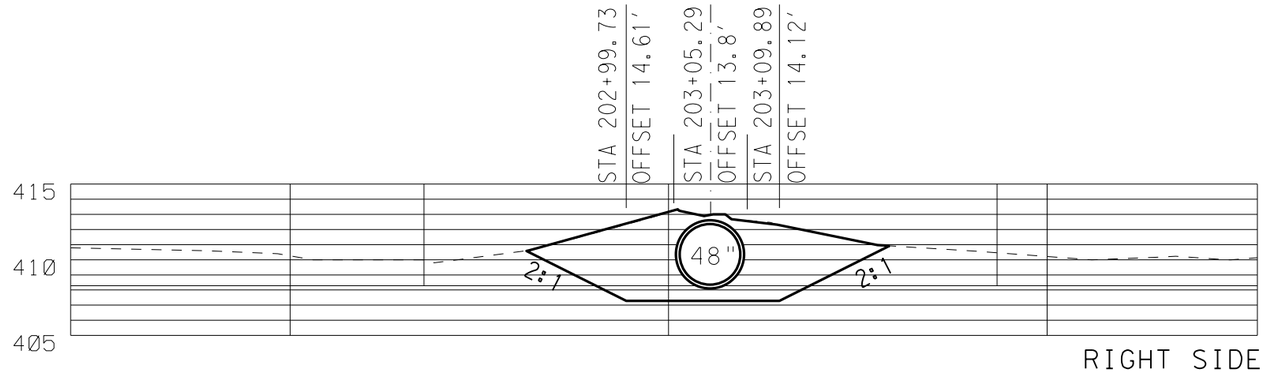
DATE: 7/28/2022 2:59:17 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\19. CULVERT 7 TEMP SPL SHORING.dgn

CULVERT #8
STA 203+05.29

QUANTITY:
+236
+90
-32
=294 SF



LEFT SIDE



RIGHT SIDE

ELEVATION

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

FM 1895
TEMPORARY SPECIAL SHORING

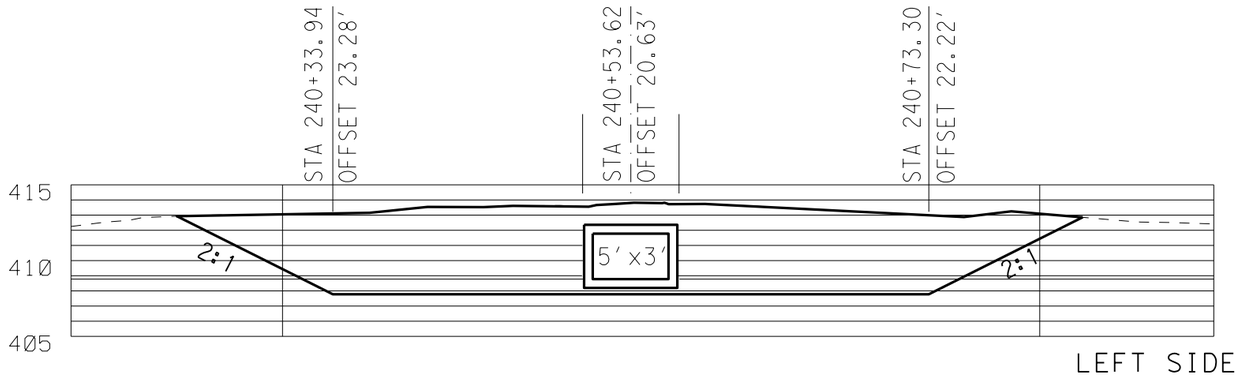
SCALE: NTS

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JR	6	(SEE TITLE SHEET)		FM1895
GRAPHICS: JR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK: QA	TEXAS	DALLAS	KAUFMAN	133
CHECK: JR	CONTROL	SECTION	JOB	
	1975	02	013	

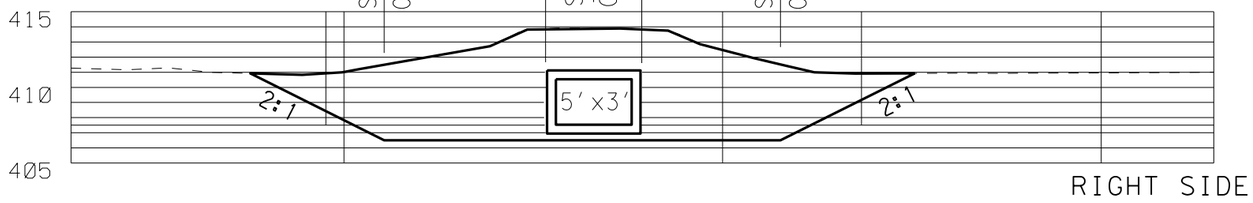
DATE: 7/28/2022 2:32:11 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\20. CULVERT 8 TEMP SPL SHORING.dgn

CULVERT #9
STA 240+53.62

QUANTITY:
+279
+209
-40
=448 SF



LEFT SIDE



RIGHT SIDE

ELEVATION

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
TEMPORARY SPECIAL SHORING

SCALE: NTS

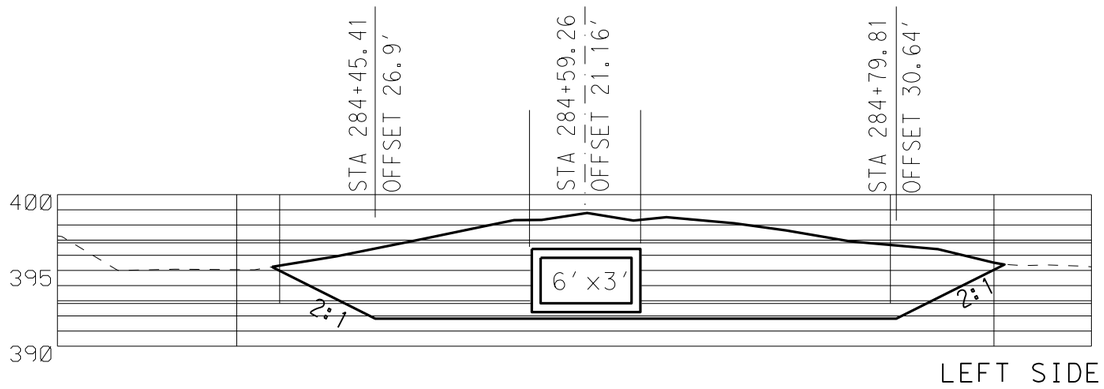
SHEET 8 OF 10

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
JR	6	(SEE TITLE SHEET)		FM1895
GRAPHICS JR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK QA	TEXAS	DALLAS	KAUFMAN	134
CHECK JR	CONTROL	SECTION	JOB	
	1975	02	013	

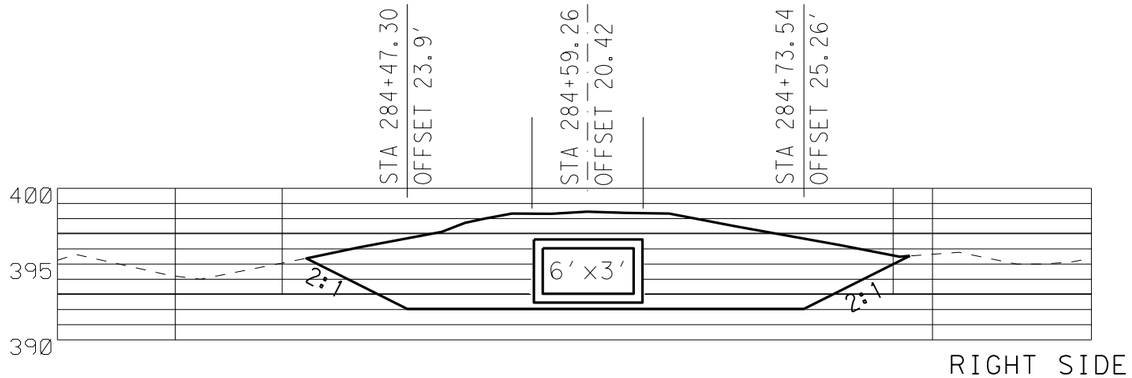
DATE: 7/28/2022 2:54:34 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\21. CULVERT 9 TEMP SPL SHORING.dgn

CULVERT #11
STA 284+59.26

QUANTITY:
+240
+183
-47
=376 SF



LEFT SIDE



RIGHT SIDE

ELEVATION

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

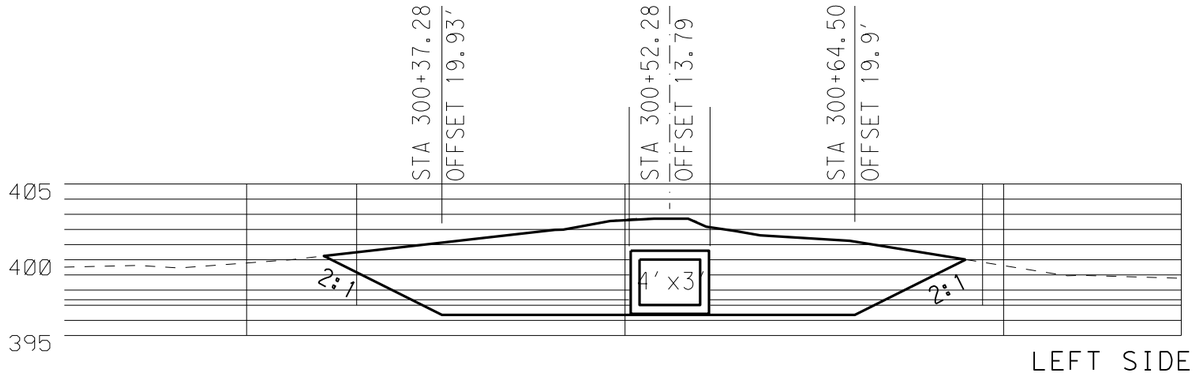
FM 1895
TEMPORARY SPECIAL SHORING

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
JR	6	(SEE TITLE SHEET)		FM1895
GRAPHICS JR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK QA	TEXAS	DALLAS	KAUFMAN	135
CHECK JR	CONTROL	SECTION	JOB	
	1975	02	013	

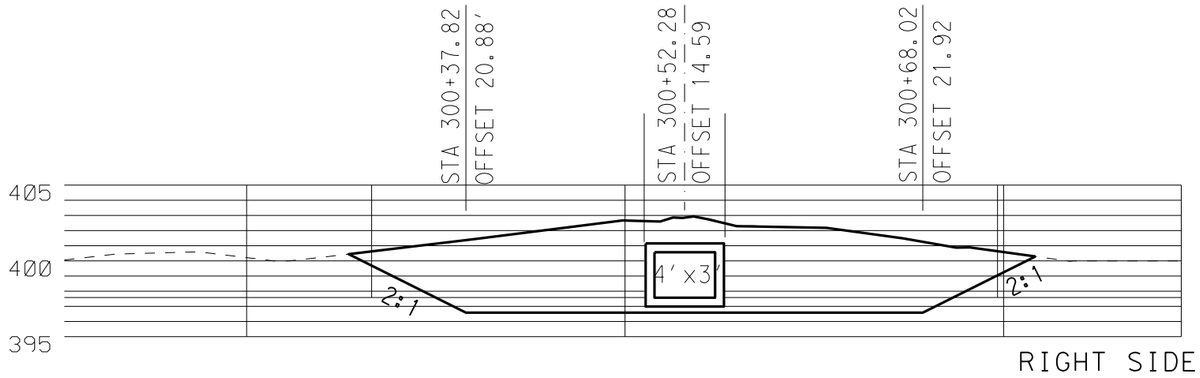
DATE: 7/28/2022 2:51:47 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\22. CULVERT 11 TEMP SPL SHORING.dgn

CULVERT #12
STA 300+52.28



LEFT SIDE

QUANTITY:
+188
+205
-33
=360 SF



RIGHT SIDE

ELEVATION

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
TEMPORARY SPECIAL SHORING

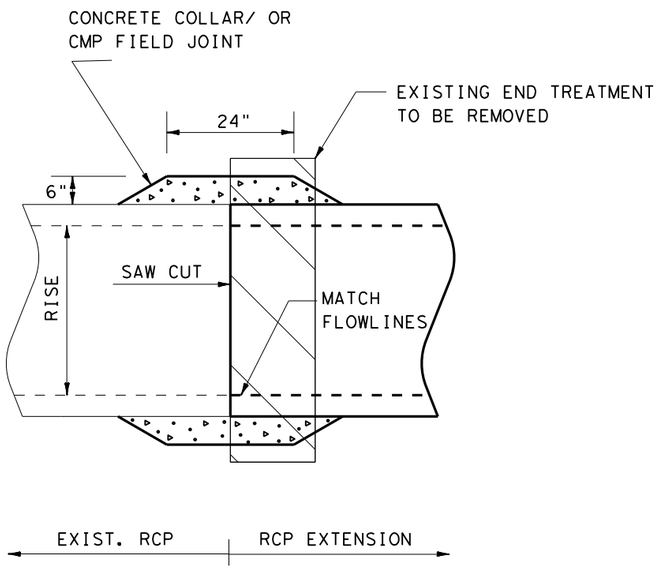
SCALE: NTS

SHEET 10 OF 10

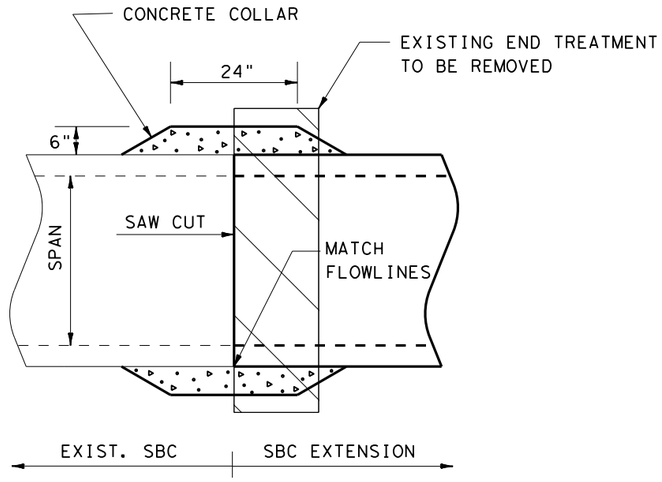
DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
JR	6	(SEE TITLE SHEET)		FM1895
GRAPHICS JR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK QA	TEXAS	DALLAS	KAUFMAN	136
CHECK JR	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/28/2022 2:52:50 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\23. CULVERT 12 TEMP SPL SHORING.dgn

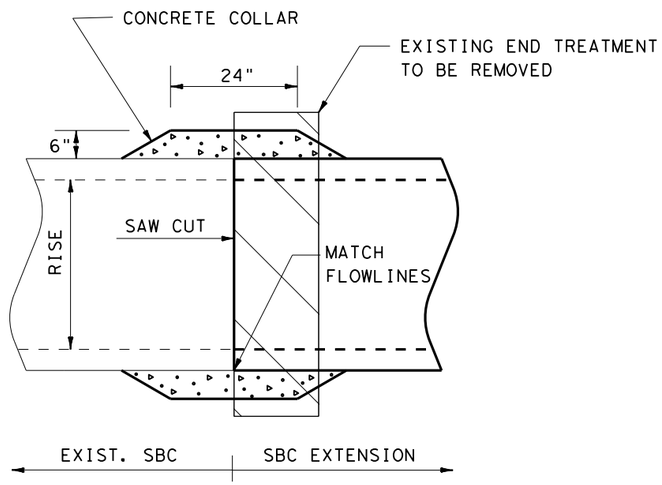
RCP CONNECTION DETAIL



SBC CONNECTION DETAIL



PLAN



ELEVATION

1. IN LIEU OF CONCRETE COLLAR FOR RCP CONNECTIONS, THE CONTRACTOR HAS THE OPTION TO REMOVE THE EXISTING RCP BACK TO FIRST JOINT AND REPLACE WITH THE NEW PIPE AT CONTRACTOR'S OWN EXPENSE.
2. CONCRETE COLLAR WILL BE SUBSIDIARY TO ITEM 462 OR ITEM 464.
3. CL C CONCRETE SHALL BE USED FOR COLLAR.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
MISCELLANEOUS
CONNECTION DETAILS

SCALE: N/A SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	137
CHECK	CONTROL	SECTION	JOB	
FR	1975	02	013	
CHECK				
JR				

DATE: 7/28/2022 10:16:58 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\5. Drainage\24. MISC PIPE CONNECTION DETAILS1.dgn

BOX CULVERT SUPPLEMENT SHEET ~ WINGS AND END TREATMENTS

Revision: 2/3/2020, Bridge Division

Culvert Station and/or Creek Name	Description of Box Culert No.Spans ~ Span X Height	Max Fill Height (ft)	Applicable Box Culvert Standard	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope (SL:1)	T Culvert Top Slab Thick's (in)	U Culvert Wall Thick's (in)	C Estimate Curb Height (ft)	Hw Height of Wing (ft)	A Curb to End of Wingwall (ft)	B Offset of End of Wingwall (ft)	Lw Length of Longest Wingwall (ft)	Ltw Culvert Toewall Length (ft)	Atw Anchor Toewall Length (ft)	Riprap Apron (C.Y.)	Class "C" Conc. (Curb) (CY)	Class "C" Conc. (Wing.) (CY)	Total Wingwall Area (SF)
BRIDGE CULVERT #1 STA 38+63.51 (Lt)	4 ~ 6' X 5'	2'	MC-6-16	PW-1	30	3:1	9"	7"	4.604	10.354	N/A	N/A	35.868	31.081	N/A	0.0	5.3	47.9	743
BRIDGE CULVERT #1 STA 38+63.51 (Rt)	4 ~ 6' X 5'	2'	MC-6-16	PW-1	30	3:1	9"	7"	3.250	9.000	N/A	N/A	31.177	31.081	N/A	0.0	3.8	38.8	561
CULVERT #6 STA 133+98.03 (Lt)	1 ~ 5' X 6'	2'	Non-Stndrd	SETB-SW-0	0	3:1	10"	8"	1.167	7.750	N/A	N/A	22.250	6.333	5.000	0.0	0.3	11.2	N/A
CULVERT #6 STA 133+98.03 (Rt)	1 ~ 5' X 6'	2'	Non-Stndrd	PW-1	0	3:1	10"	8"	1.000	7.833	N/A	N/A	23.500	6.333	N/A	0.0	0.2	23.2	368
CULVERT #7 STA 194+97.99 (Both)	2 ~ 5' X 3'	1'	MC-5-20	PW-1	0	3:1	8"	7"	1.604	5.271	N/A	N/A	15.813	11.750	N/A	0.0	1.4	22.8	334
CULVERT # 9 STA 240+53.62 (Both)	1 ~ 5' X 3'	3.5'	SCC-5&6	PW-1	0	3:1	8"	7"	1.000	4.667	N/A	N/A	14.000	6.167	N/A	0.0	0.4	18.6	262
CULVERT # 11 STA 284+59.26 (Both)	1 ~ 6' X 3'	4.5'	SCC-5&6	PW-1	0	3:1	8"	7"	1.000	4.667	N/A	N/A	14.000	7.167	N/A	0.0	0.6	18.8	262
CULVERT #12 STA 300+52.28 (Both)	1 ~ 4' X 3'	3.5'	SCC-3&4	PW-1	0	3:1	8"	7"	1.000	4.667	N/A	N/A	14.000	5.167	N/A	0.0	0.4	18.4	262
BRIDGE CULVERT #2 STA 350+65.34 (Lt)	4 ~ 5' X 3'	1'	MC-5-20	PW-1	45	3:1	8"	7"	2.667	6.333	N/A	N/A	26.870	32.409	N/A	0.0	3.2	23.2	340
BRIDGE CULVERT #2 STA 350+65.34 (Rt)	4 ~ 5' X 3'	1'	MC-5-20	PW-1	45	3:1	8"	7"	3.667	7.333	N/A	N/A	31.113	32.409	N/A	0.0	4.4	31.1	456

DATE:
FILE:

NOTES:
Skew = 0° on SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standard sheets;
30° maximum for safety end treatment

SL:1 = Horizontal : 1 Vertical
· Side slope at culvert for flared or straight wingwalls.
· Channel slope for parallel wingwalls.
· Slope must be 3:1 or flatter for safety end treatments.

T = Box culvert top slab thickness. Dimension can be found on the applicable box culvert standard sheet.

U = Box culvert wall thickness. Dimension can be found on the applicable box culvert standard sheet.

C = Curb height

See applicable wing or end treatment standard sheets for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.

Hw = Height of wingwall

A = Distance from face of curb to end of wingwall (not applicable to parallel or straight wingwalls)

B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.

Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)
Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

1. Round the wall heights shown to the nearest foot for bidding purposes.
2. Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class S concrete is required for the top slab of the culvert, also provide Class S concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.
3. Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.
4. Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

*NOTE:
CULVERT WAS DESIGNED AS A 6' X 5'
BUT ACTUALLY IS A 5' X 6'. CONTRACTOR
WILL NEED TO FLIP IN THE FIELD
TO INSTALL.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation

Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

FILE: bcsstde1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DALLAS	KAUFMAN		138

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for One Structure End)

Maximum Wingwall Height Hw (9)	W	X	Y	Z	Variable Reinforcing Bars J1 Size	Bars J1 Spa	Bars J2 Size	Bars J2 Spa	Estimated Quantities per ft of wing length (Two~Wings) (3) Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'- 5"	1'- 0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'- 5"	1'- 0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'- 5"	1'- 0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'- 5"	1'- 0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'- 2"	1'- 6"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'- 2"	1'- 6"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'- 2"	1'- 6"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'- 2"	1'- 6"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'- 8"	1'- 9"	1'- 3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'- 2"	2'- 0"	1'- 6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'- 8"	2'- 3"	1'- 9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'- 2"	2'- 6"	2'- 0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'- 8"	2'- 9"	2'- 3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'- 2"	3'- 0"	2'- 6"	9"	#7	6"	#5	6"	162.29	0.721

TABLE OF WINGWALL REINFORCING (Two~Wings)

Bar	Size	No.		Spa
D	#5	~	1'-0"	
E	#4	~	1'-0"	
F	#4	~	1'-0"	
G	#6	4	~	
M	#4	4	~	
P	#4	~	1'-0"	
R	#5	6	~	
V	#4	~	1'-0"	

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.		Spa
L	#4	~	1'-0"	
Q	#4	1	~	
Reinf (Lb/Ft)				2.45
Conc (CY/Ft)				0.037

TABLE OF ESTIMATED ANCHOR TOEWALL QUANTITIES

Bar	Size	No.		Spa
K	#4	~	1'-0"	
N	#5	6	~	
OL	#4	6	~	
Reinf (Lb/Ft)				9.82
Conc (CY/Ft)				0.074

(1) Extend Bars P 3'-0" Min into bottom slab of box culvert.

(2) Adjust to fit as necessary to maintain 1 1#2" clear cover and 4" Min between bars.

(3) Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings multiply the tabulated values by Lw.

(4) Recommended values of slope are: 3:1, 4:1, and 6:1. Provide 3:1 or flatter slope.

(5) When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, extend construction joints or grooved joints, oriented in the direction of flow, across the full distance of the riprap, at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B is not required.

(6) At Contractor's option, end the culvert toewall flush with wingwall toewall. Adjust reinforcing as needed.

(7) 3" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to Extended Curb Details (ECD) standard sheet.

(8) For vehicle safety, reduce curbs height, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.

(9) See Table of Maximum Wing Heights for various slopes. Height is limited based on a 33'-6" maximum safety pipe runner length.

TABLE OF MAXIMUM WING HEIGHTS (9)

Side Slope	Hw Max
3:1	11'- 5"
4:1	8'-10"
6:1	6'- 1"

WING DIMENSION CALCULATIONS:

Hw = H + T + C - 0.250' (9)

Lw = (Hw - 0.333') (SL)

For cast-in-place culverts:

Ltw = (N) (S) + (N + 1) (U)

For precast culverts:

Ltw = (N) (2U + S) + (N - 1) (0.500')

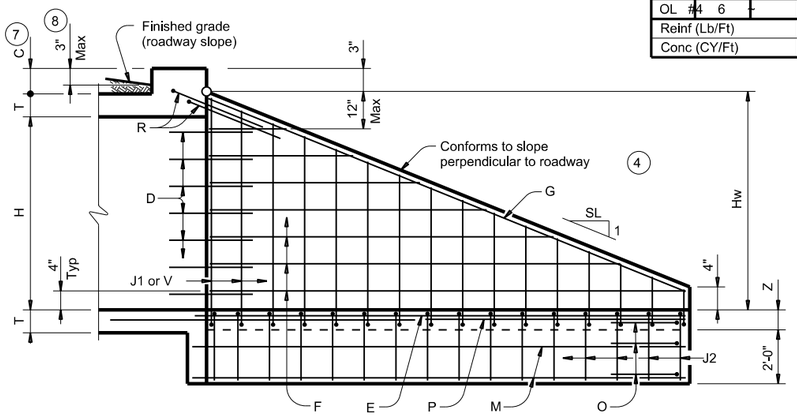
Lc = (Ltw) - (2U)

Atw = Lc

Total Wingwall Area (two wings ~ SF) = (Hw + 0.333') (Lw)

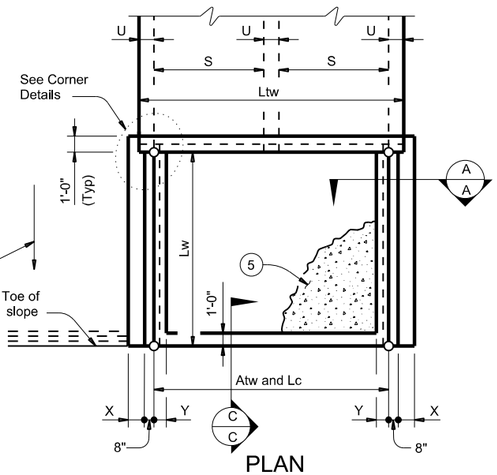
Hw = Height of wingwall (feet)
SL:1 = Side slope ratio (horizontal : 1 vertical)
Lw = Length of wingwall (feet)
Ltw = Culvert toewall length (feet)
Lc = Culvert curb between wings (feet)
Atw = Anchor toewall length (feet)
N = Number of culvert spans

See applicable box culvert standard for H, S, T, and U values. See Table of Maximum Wall Heights for limits on Hw.



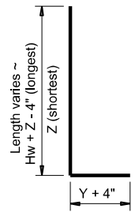
INSIDE ELEVATION OF WINGWALL

(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)

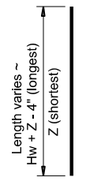


PLAN

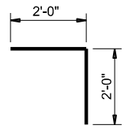
(Showing dimensions.)



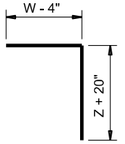
BARS J1



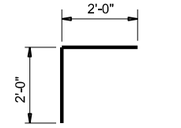
BARS V



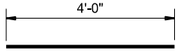
BARS L and OL



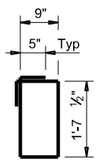
BARS J2



BARS R



BARS D



BARS K
(Length = 5'-6")

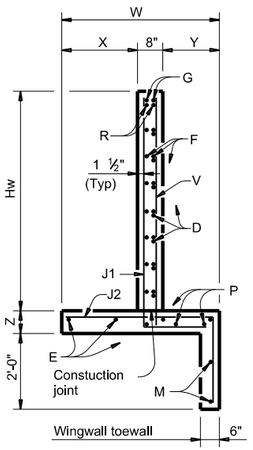
MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.
Provide Class "C" concrete (f'c = 3,600 psi).
Adjust reinforcing as necessary to provide a minimum clear cover of 1 ½".
Provide pipe runners and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
Provide ASTM A307 bolts and nuts.
Provide ASTM A36 steel plates.
Galvanize all steel components, except reinforcing unless required elsewhere in the plans, after fabrication.
Repair galvanizing damaged during transport or construction in accordance with the Item 445, "Galvanizing".
For optional adhesive anchors, install epoxy adhesive anchorages in accordance with the manufacturer's instructions including hole size, drilling equipment and method, hole cleaning equipment and method, mixing and dispensing adhesive, and anchor insertion. Do not alter the manufacturer's mixing nozzle or dispenser. Provide anchorage rods that are clean and free of grease, oil, or any other foreign material. Demonstrate hole cleaning method to the Engineer for approval and continue the approved process for all anchorage locations. Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

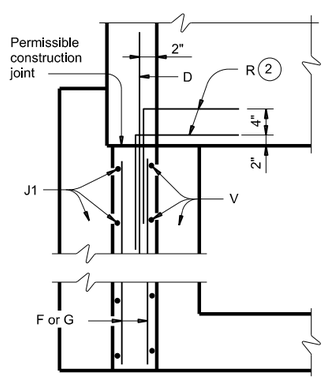
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.
Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
All bolts, nuts, washers, brackets, angles, and pipe runners are considered parts of the safety end treatment for payment.
The quantities for pipe runners, reinforcing steel, and concrete, resulting from the formulas given herein are for Contractor's information only.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.

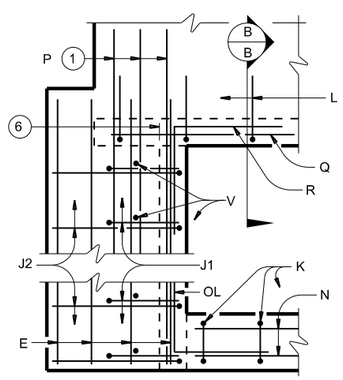
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing dimensions are out-to-out of bars.



SECTION A-A



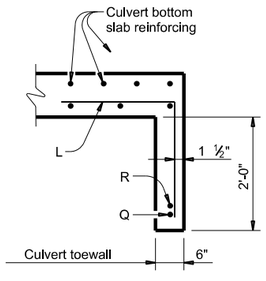
WINGWALL



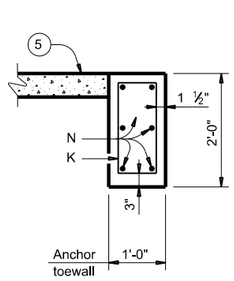
FOOTING AND TOEWALL

CORNER DETAILS

(Culvert and culvert toewall reinforcing not shown for clarity.)



SECTION B-B (5)



SECTION C-C

SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

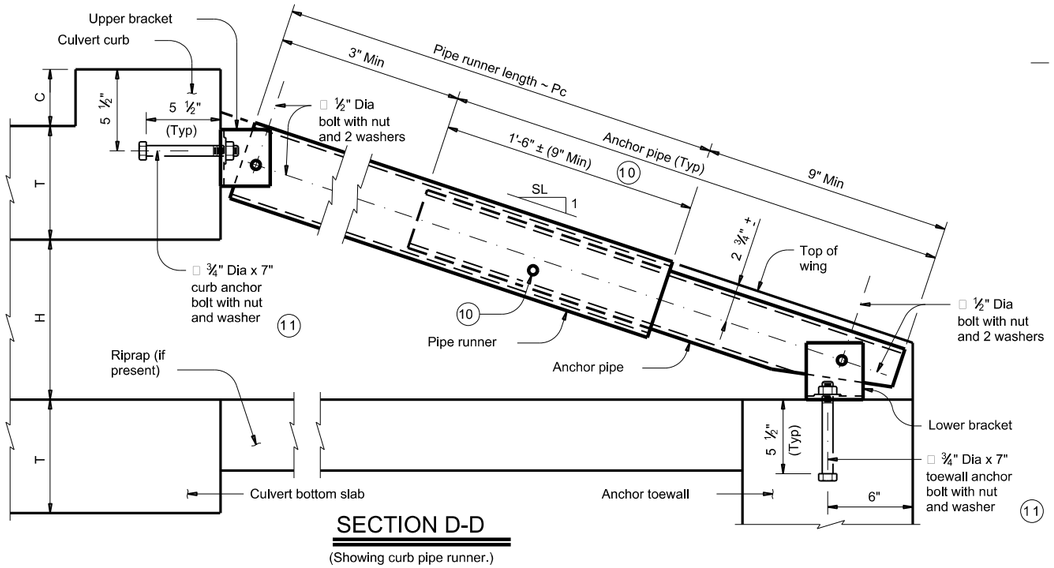
SAFETY END TREATMENT WITH STRAIGHT WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-SW-O

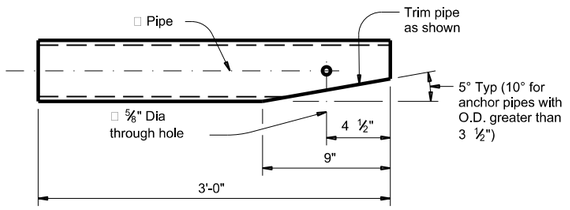
FILE:	setbs0se-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT	February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS		1975	02	013	FM 1895
		DIST	COUNTY		SHEET NO.
		DAL	KAUFMAN		139

DATE: 7/28/2022 11:00:08 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\setbs0se-20.dgn

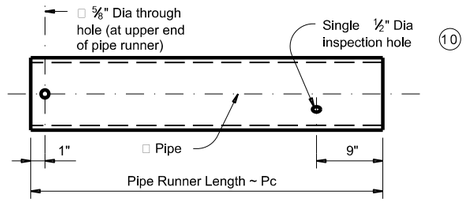


SECTION D-D

(Showing curb pipe runner.)



ANCHOR PIPE DETAILS



PIPE RUNNER DETAILS

MAXIMUM PIPE RUNNER LENGTHS AND REQUIRED PIPE RUNNER AND ANCHOR PIPE SIZES						
Maximum Pipe Runner Length (Pc)	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
9'-4"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'-0"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
33'-6"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"

(10) After installation of pipe runner, use the ½" inspection hole to ensure that the lap of the anchor pipe with the pipe runner is adequate.

(11) At Contractor's option, an adhesive anchor may be used. Provide ¾" Dia adhesive anchors that meet the requirements of ASTM A307. Gr A fully threaded rods. Embed threaded rods into curb, wingwalls, and toewall using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 5 ½". Provide anchor adhesive able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use.

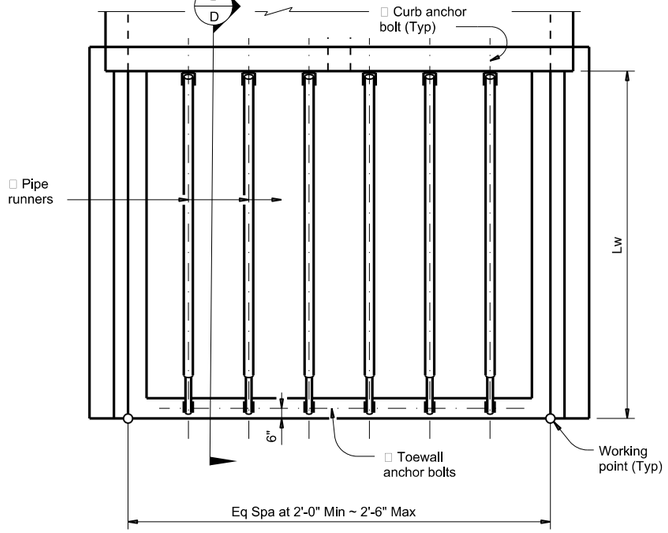
PIPE RUNNER DIMENSION CALCULATIONS:

Pc = (Lw) (K) - (1.688)

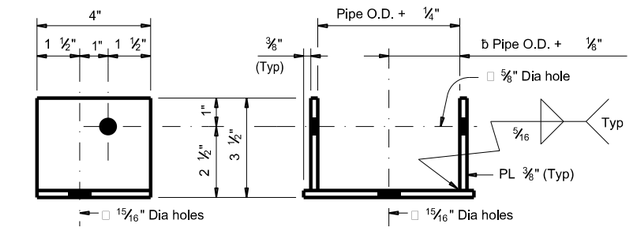
Pc = Pipe runner length (feet)

K = Constant values for use in formulas

Slope SL:1	K
3:1	~ 1.054
4:1	~ 1.031
6:1	~ 1.014



PIPE RUNNER PLAN



SIDE VIEW ELEVATION

Note: Upper and lower brackets match the required pipe diameters as shown in the table.

UPPER AND LOWER BRACKET DETAILS

SHEET 2 OF 3

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT WITH STRAIGHT WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-SW-O

FILE: setbs0se-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		140

DATE: 7/28/2022 11:00:36 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\setbs0se-20.dgn

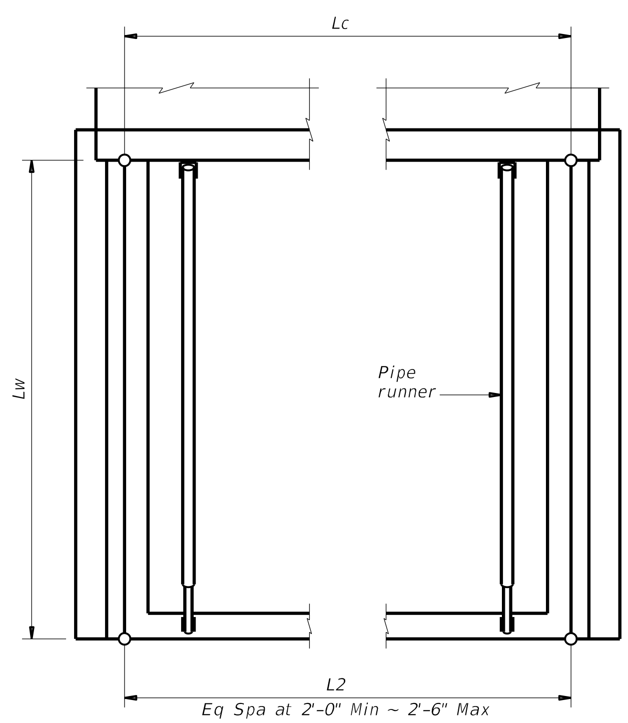
SUMMARY OF SAFETY END TREATMENT PIPE RUNNER INFORMATION FOR SETB-SW-0, SETB-FW-0 AND SETB-FW-S SHEETS

Revision: 2/3/2020, Bridge Division

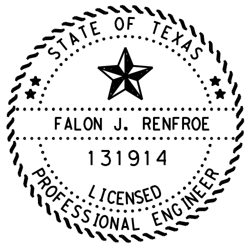
L1 Not required for SETB-SW-0 D1 Not required for SETB-SW-0

Culvert Station and/or Creek Name	Applicable Wing or End Treatment Standard	Lc	L1	L2			D1	L3			W1	L4			L5	Curb Pipe Runner (Pc)		Longest Wing Pipe Runner (Pw)	Short Pw	non-sliding pipe	Curb, wing &/or Non-Sliding Pipe		3'-0" Anchor Pipe	
				No. Spa	L2 Spa	O'all Lgth		No. Spa	L3 Spa	O'all Lgth		No. Spa	L4 Spa	O'all Lgth		No.	Lgth				Size	Total Lgth	Anchor Pipe Size	Total Lgth
CULVERT # 6 STA 133+98.03 (LT)	SETB-SW-0	5.000	N/A	2	2.500	5.000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	21.771	N/A	N/A	N/A	5"	21.771	4"	3.000

(12) Quantities shown are for one structure end if Lt or Rt. Quantities shown are for two structure ends if Both.



PIPE RUNNER LAYOUT



Falon Renfroe, P.E. 8/3/2022
Signature of Registrant & Date

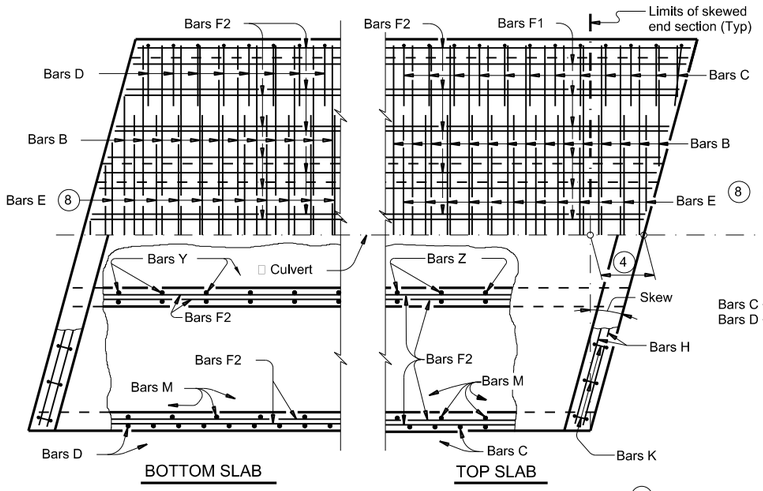
Texas Department of Transportation
Bridge Division Standard

SAFETY END TREATMENT WITH STRAIGHT WINGS

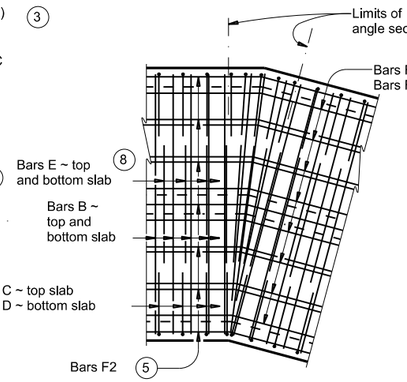
FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-SW-0

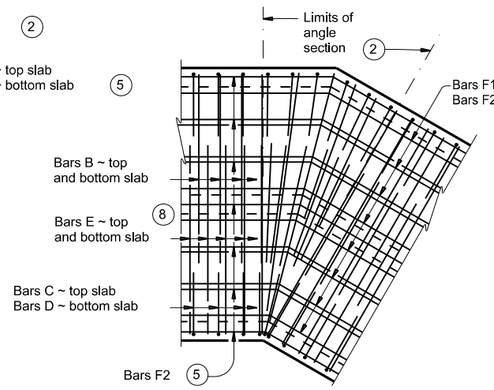
FILE: setbs0se-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		141



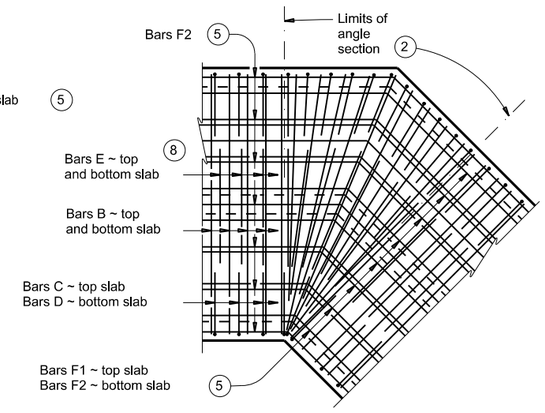
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° (7)



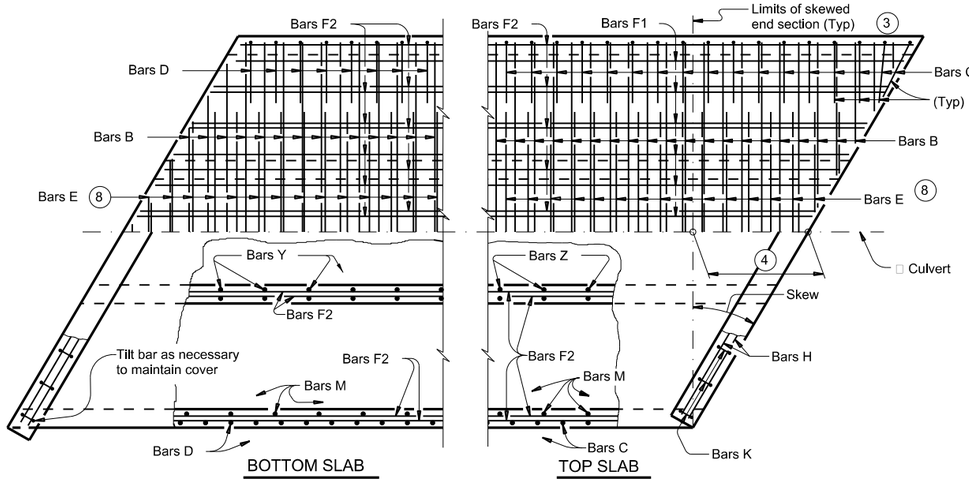
PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



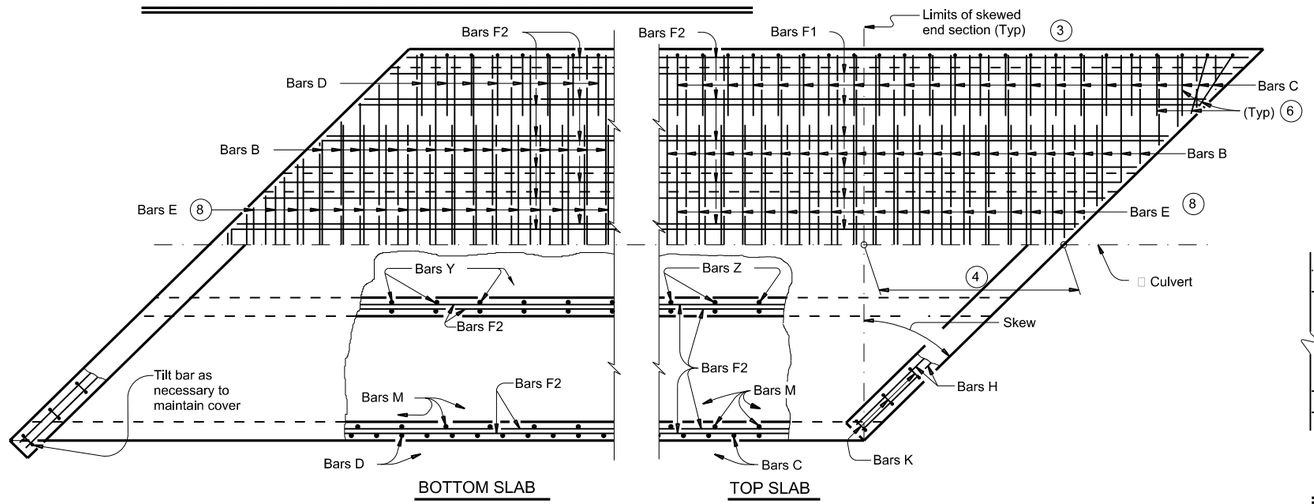
PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°



PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



PLAN OF SKEWED ENDS ~ OVER 30° TO 45°

(1) For skewed box culverts with less than 2'-0" of fill, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension.

For non-skewed box culverts with less than 2'-0" of fill and for skewed or non-skewed culverts with a fill depth of 2'-0" or greater, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension. Alternatively, if the box is non-skewed, embed #6 anchor bars with a Type III, Class C, D, E, or F anchor adhesive into the existing walls, top and bottom slab at 1'-6" center-to-center spacing. Minimum embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 26.4 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing." Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

Break back wings and apron as necessary to install the extension. Clean and extend the exposed wingwall and apron reinforcing into the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, form horizontal and vertical transitions as directed by the Engineer. Match bottom slabs to maintain an uninterrupted flow line. Field bend existing and new reinforcing into transitions and maintain specified cover requirements. For top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface, adjust the "H" dimension to provide a smooth riding surface.

(2) When the spacing between Bars B or Bars E becomes less than half of the normal spacing, cut bars to avoid conflict.

(3) The length of Bars B and Bars E will vary in the skewed end sections.

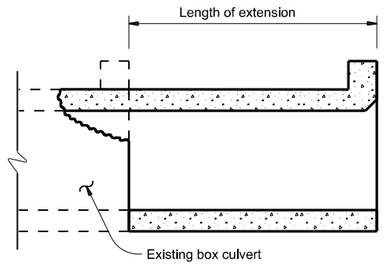
(4) [One half of overall width] x [tangent of the skew angle]

(5) Place Bars F1 and F2 continuously through the angle section. Bend Bars F1 and F2 to remain parallel to the walls of the box culvert.

(6) When necessary to avoid conflict in acute corners, shorten the slab extension leg of Bars C and Bars D to a minimum of 1'-6" for skews of 30° thru 45°.

(7) At the Contractor's option, for skews of 15° or less, place Bars B, C, D, and E parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B and Bars E shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets to accommodate the skew.

(8) Extend Bars E as shown on the MC standard sheet for direct traffic culverts.



LENGTHENING DETAIL (1)

CONSTRUCTION NOTES:

Do not use permanent forms.
When required, lap Bars H 1'-8" for uncoated or galvanized bars.
Provide a minimum of 1 ½" clear cover.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel, if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) with these exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to Multiple Box Culverts Cast-in-Place (MC) standard sheets for details of straight sections of culvert.
For skewed sections and angle sections, refer to Multiple Box Culverts Cast-in-Place (MC) standard sheets for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown.
For skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume, and reinforcing steel weight by dividing the values shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets by the cosine of the skew angle.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

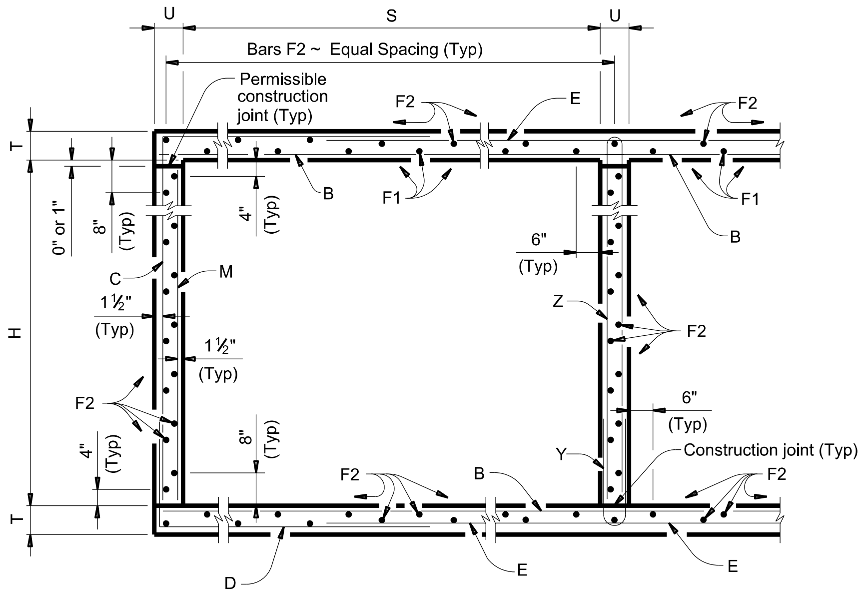
Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

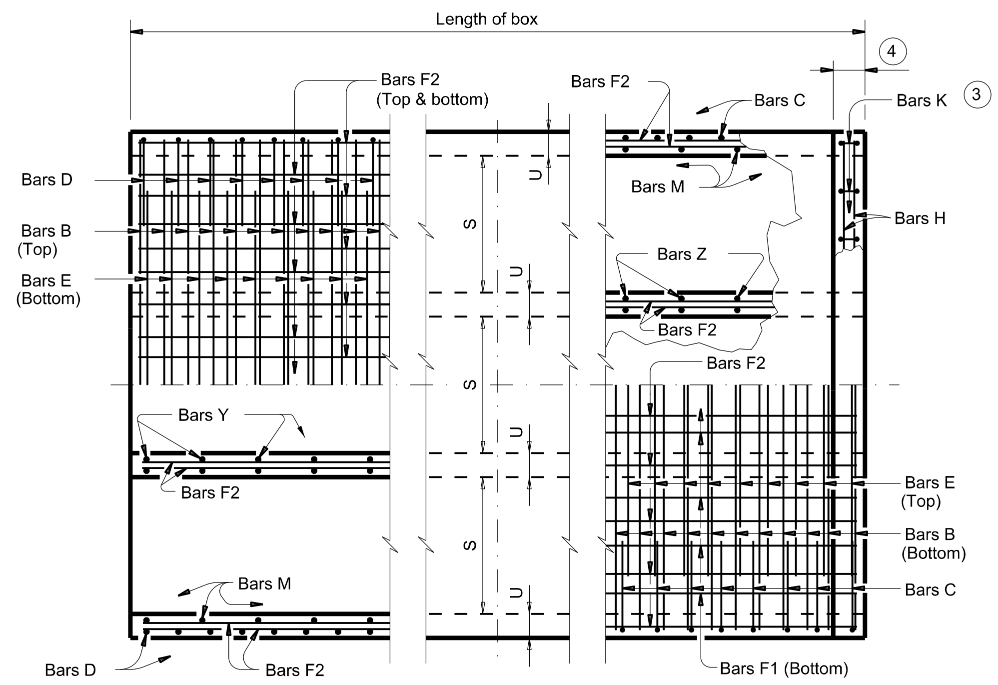
MC-MD

FILE: mc-mdste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		142

DATE: 7/28/2022 11:07:18 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\1. mc-mdste-20.dgn



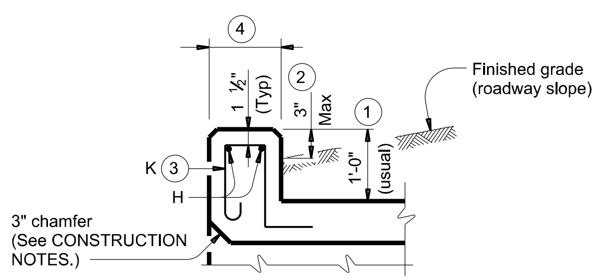
TYPICAL SECTION



BOTTOM SLAB

TOP SLAB

PART PLANS



SECTION THRU CURB

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
2. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:
Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

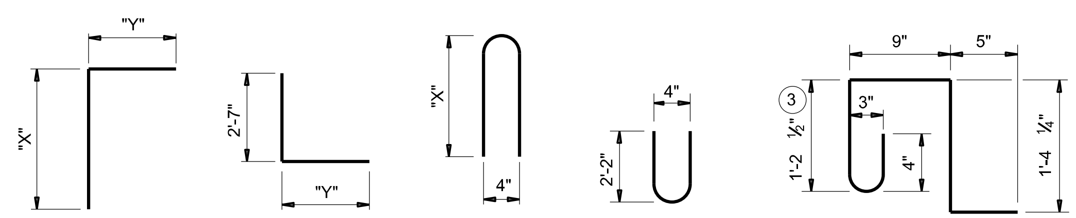
Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Multiple Box Culverts Cast-In-Place Miscellaneous Detail (MC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

TABLE OF BAR DIMENSIONS

H	"X"	"Y"
2'-0"	2'-6 ½"	3'-8 ½"
3'-0"	3'-6 ½"	3'-8 ½"
4'-0"	4'-6 ½"	3'-8 ½"
5'-0"	5'-6 ½"	3'-8 ½"



BARS C　BARS D　BARS Z　BARS Y　BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

HL93 LOADING　SHEET 1 OF 2

Texas Department of Transportation　Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE
5'-0" SPAN
0' TO 20' FILL

MC-5-20

FILE: mc520ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	143

DATE: 7/28/2022 11:11:45 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\...\STANDARDS\2. mc520ste-20.dgn

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

DATE: 7/28/2022 11:12:24 AM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\2. mc520ste-20.dgn

NUMBER OF SPANS	SECTION DIMENSIONS				BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																																		QUANTITIES					
					Bars B					Bars C & D							Bars E					Bars F1 ~ #4				Bars F2 ~ #4				Bars M ~ #4				Bars Y & Z ~ #4								Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Bars C Length	Bars C Wt	Bars D Length	Bars D Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Bars Y Length	Bars Y Wt	Bars Z Length	Bars Z Wt	Length	Wt	No.	Wt	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)
2	5' - 0"	2' - 0"	8"	7"	108	#5	9"	11' - 6"	1,295	108	#5	9"	6' - 3"	704	6' - 4"	713	108	#5	9"	8' - 8"	976	8	18"	39' - 9"	212	38	18"	39' - 9"	1,009	108	9"	2' - 0"	144	54	9"	4' - 7"	165	5' - 3"	189	11' - 6"	31	26	72	0.710	135.2	0.9	103	29.3	5,510
3	5' - 0"	2' - 0"	8"	7"	108	#5	9"	17' - 1"	1,924	108	#5	9"	6' - 3"	704	6' - 4"	713	108	#5	9"	14' - 3"	1,605	12	18"	39' - 9"	319	54	18"	39' - 9"	1,434	108	9"	2' - 0"	144	108	9"	4' - 7"	331	5' - 3"	379	17' - 1"	46	38	106	1.029	188.8	1.3	152	42.4	7,705
4	5' - 0"	2' - 0"	8"	7"	108	#5	9"	22' - 8"	2,553	108	#5	9"	6' - 3"	704	6' - 4"	713	108	#5	9"	19' - 10"	2,234	16	18"	39' - 9"	425	70	18"	39' - 9"	1,859	108	9"	2' - 0"	144	162	9"	4' - 7"	496	5' - 3"	568	22' - 8"	61	48	134	1.348	242.4	1.7	195	55.6	9,891
5	5' - 0"	2' - 0"	8"	7"	108	#5	9"	28' - 3"	3,182	108	#5	9"	6' - 3"	704	6' - 4"	713	108	#5	9"	25' - 5"	2,863	20	18"	39' - 9"	531	86	18"	39' - 9"	2,284	108	9"	2' - 0"	144	216	9"	4' - 7"	661	5' - 3"	758	28' - 3"	75	60	167	1.667	296.0	2.1	242	68.8	12,082
6	5' - 0"	2' - 0"	8"	7"	108	#5	9"	33' - 10"	3,811	108	#5	9"	6' - 3"	704	6' - 4"	713	108	#5	9"	31' - 0"	3,492	24	18"	39' - 9"	637	102	18"	39' - 9"	2,708	108	9"	2' - 0"	144	270	9"	4' - 7"	827	5' - 3"	947	33' - 10"	90	70	195	1.986	349.6	2.5	285	82.0	14,268
2	5' - 0"	3' - 0"	8"	7"	108	#6	9"	11' - 6"	1,865	108	#5	9"	7' - 3"	817	6' - 4"	713	108	#5	9"	8' - 8"	976	8	18"	39' - 9"	212	44	18"	39' - 9"	1,168	108	9"	3' - 0"	216	54	9"	4' - 7"	165	7' - 3"	262	11' - 6"	31	26	72	0.775	159.9	0.9	103	31.9	6,497
3	5' - 0"	3' - 0"	8"	7"	108	#6	9"	17' - 1"	2,771	108	#5	9"	7' - 3"	817	6' - 4"	713	108	#5	9"	14' - 3"	1,605	12	18"	39' - 9"	319	62	18"	39' - 9"	1,646	108	9"	3' - 0"	216	108	9"	4' - 7"	331	7' - 3"	523	17' - 1"	46	38	106	1.115	223.5	1.3	152	45.9	9,093
4	5' - 0"	3' - 0"	8"	7"	108	#6	9"	22' - 8"	3,677	108	#5	9"	7' - 3"	817	6' - 4"	713	108	#5	9"	19' - 10"	2,234	16	18"	39' - 9"	425	80	18"	39' - 9"	2,124	108	9"	3' - 0"	216	162	9"	4' - 7"	496	7' - 3"	785	22' - 8"	61	48	134	1.456	287.2	1.7	195	59.9	11,682
5	5' - 0"	3' - 0"	8"	7"	108	#6	9"	28' - 3"	4,583	108	#5	9"	7' - 3"	817	6' - 4"	713	108	#5	9"	25' - 5"	2,863	20	18"	39' - 9"	531	98	18"	39' - 9"	2,602	108	9"	3' - 0"	216	216	9"	4' - 7"	661	7' - 3"	1,046	28' - 3"	75	60	167	1.796	350.8	2.1	242	73.9	14,274
6	5' - 0"	3' - 0"	8"	7"	108	#6	9"	33' - 10"	5,488	108	#5	9"	7' - 3"	817	6' - 4"	713	108	#5	9"	31' - 0"	3,492	24	18"	39' - 9"	637	116	18"	39' - 9"	3,080	108	9"	3' - 0"	216	270	9"	4' - 7"	827	7' - 3"	1,308	33' - 10"	90	70	195	2.137	414.5	2.5	285	88.0	16,863
2	5' - 0"	4' - 0"	8"	7"	108	#6	9"	11' - 6"	1,865	108	#5	9"	8' - 3"	929	6' - 4"	713	108	#5	9"	8' - 8"	976	8	18"	39' - 9"	212	44	18"	39' - 9"	1,168	108	9"	4' - 0"	289	54	9"	4' - 7"	165	9' - 3"	334	11' - 6"	31	26	72	0.840	166.3	0.9	103	34.5	6,754
3	5' - 0"	4' - 0"	8"	7"	108	#6	9"	17' - 1"	2,771	108	#5	9"	8' - 3"	929	6' - 4"	713	108	#5	9"	14' - 3"	1,605	12	18"	39' - 9"	319	62	18"	39' - 9"	1,646	108	9"	4' - 0"	289	108	9"	4' - 7"	331	9' - 3"	667	17' - 1"	46	38	106	1.202	231.8	1.3	152	49.4	9,422
4	5' - 0"	4' - 0"	8"	7"	108	#6	9"	22' - 8"	3,677	108	#5	9"	8' - 3"	929	6' - 4"	713	108	#5	9"	19' - 10"	2,234	16	18"	39' - 9"	425	80	18"	39' - 9"	2,124	108	9"	4' - 0"	289	162	9"	4' - 7"	496	9' - 3"	1,001	22' - 8"	61	48	134	1.564	297.2	1.7	195	64.3	12,083
5	5' - 0"	4' - 0"	8"	7"	108	#6	9"	28' - 3"	4,583	108	#5	9"	8' - 3"	929	6' - 4"	713	108	#5	9"	25' - 5"	2,863	20	18"	39' - 9"	531	98	18"	39' - 9"	2,602	108	9"	4' - 0"	289	216	9"	4' - 7"	661	9' - 3"	1,335	28' - 3"	75	60	167	1.926	362.7	2.1	242	79.1	14,748
6	5' - 0"	4' - 0"	8"	7"	108	#6	9"	33' - 10"	5,488	108	#5	9"	8' - 3"	929	6' - 4"	713	108	#5	9"	31' - 0"	3,492	24	18"	39' - 9"	637	116	18"	39' - 9"	3,080	108	9"	4' - 0"	289	270	9"	4' - 7"	827	9' - 3"	1,668	33' - 10"	90	70	195	2.288	428.1	2.5	285	94.0	17,408
2	5' - 0"	5' - 0"	8"	7"	108	#6	9"	11' - 6"	1,865	108	#5	9"	9' - 3"	1,042	6' - 4"	713	108	#5	9"	8' - 8"	976	8	18"	39' - 9"	212	50	18"	39' - 9"	1,328	108	9"	5' - 0"	361	54	9"	4' - 7"	165	11' - 3"	406	11' - 6"	31	26	72	0.904	176.7	0.9	103	37.0	7,171
3	5' - 0"	5' - 0"	8"	7"	108	#6	9"	17' - 1"	2,771	108	#5	9"	9' - 3"	1,042	6' - 4"	713	108	#5	9"	14' - 3"	1,605	12	18"	39' - 9"	319	70	18"	39' - 9"	1,859	108	9"	5' - 0"	361	108	9"	4' - 7"	331	11' - 3"	812	17' - 1"	46	38	106	1.288	245.3	1.3	152	52.8	9,965
4	5' - 0"	5' - 0"	8"	7"	108	#6	9"	22' - 8"	3,677	108	#5	9"	9' - 3"	1,042	6' - 4"	713	108	#5	9"	19' - 10"	2,234	16	18"	39' - 9"	425	90	18"	39' - 9"	2,390	108	9"	5' - 0"	361	162	9"	4' - 7"	496	11' - 3"	1,217	22' - 8"	61	48	134	1.672	313.9	1.7	195	68.6	12,750
5	5' - 0"	5' - 0"	8"	7"	108	#6	9"	28' - 3"	4,583	108	#5	9"	9' - 3"	1,042	6' - 4"	713	108	#5	9"	25' - 5"	2,863	20	18"	39' - 9"	531	110	18"	39' - 9"	2,921	108	9"	5' - 0"	361	216	9"	4' - 7"	661	11' - 3"	1,623	28' - 3"	75	60	167	2.056	382.5	2.1	242	84.3	15,540
6	5' - 0"	5' - 0"	8"	7"	108	#6	9"	33' - 10"	5,488	108	#5	9"	9' - 3"	1,042	6' - 4"	713	108	#5	9"	31' - 0"	3,492	24	18"	39' - 9"	637	130	18"	39' - 9"	3,452	108	9"	5' - 0"	361	270	9"	4' - 7"	827	11' - 3"	2,029	33' - 10"	90	70	195	2.439	451.0	2.5	285	100.1	18,326

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE

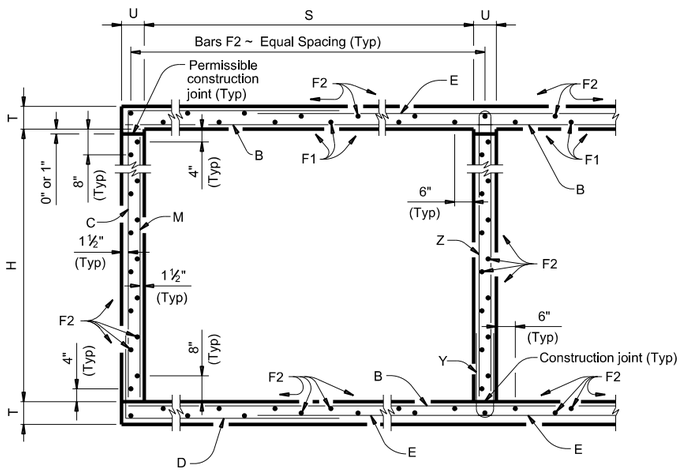
5'-0" SPAN

0' TO 20' FILL

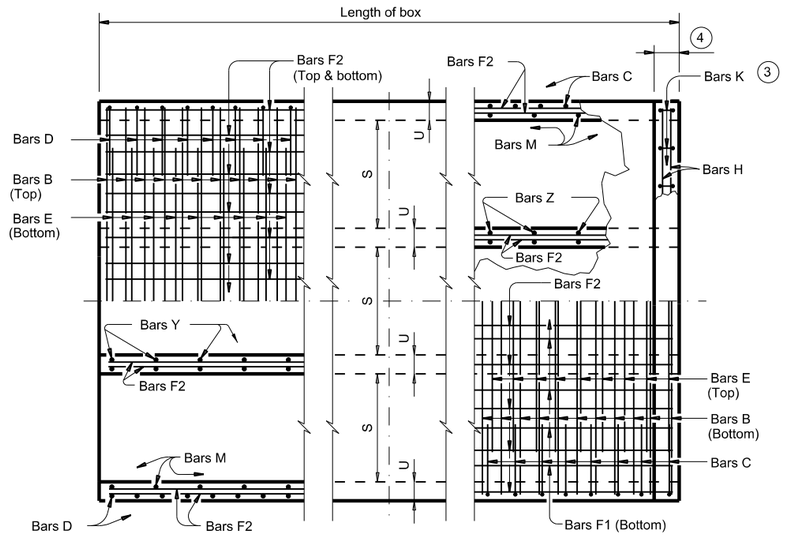
MC-5-20

FILE: mc520ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		144

DATE: 7/28/2022 11:16:04 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\3. mc616ste-20.dgn



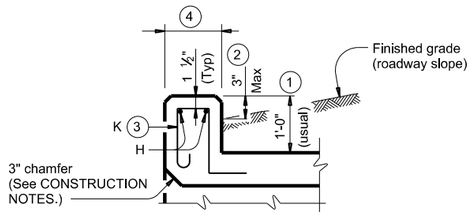
TYPICAL SECTION



BOTTOM SLAB

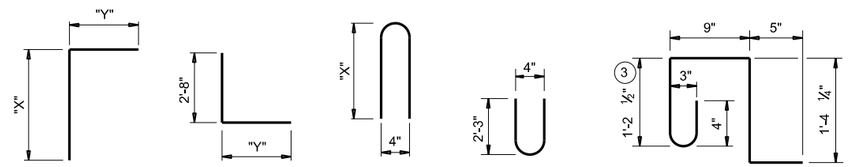
TOP SLAB

PART PLANS



SECTION THRU CURB

TABLE OF BAR DIMENSIONS		
H	"X"	"Y"
2'-0"	2'-7 ½"	4'-1"
3'-0"	3'-7 ½"	4'-1"
4'-0"	4'-7 ½"	4'-1"
5'-0"	5'-7 ½"	4'-1"
6'-0"	6'-7 ½"	4'-1"



1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   · For structures without bridge rail, construct curbs no more than 3" above finished grade.
   · For structures with bridge rail, construct curbs flush with finished grade.
   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
· culverts with overlay,
· culverts with 1-to-2 course surface treatment, or
· culverts with the top slab as the final riding surface.
Provide bar laps, where required, as follows:
· Uncoated or galvanized ~ #4 = 1'-8" Min
· Uncoated or galvanized ~ #5 = 2'-1" Min
· Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Multiple Box Culverts Cast-In-Place Miscellaneous Detail (MC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE

6'-0" SPAN
0' TO 16' FILL

MC-6-16

FILE: mc616ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		145

DATE: 7/28/2022 11:16:20 AM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\3. mc616ste-20.dgn

BILLS OF REINFORCING STEEL (For Box Length = 40 feet)

NUMBER OF SPANS	SECTION DIMENSIONS				Bars B					Bars C & D							Bars E					Bars F1 ~ #4				Bars F2 ~ #4				Bars M ~ #4				Bars Y & Z ~ #4								Bars H 4 ~ #4		Bars K		QUANTITIES					
													Bars C		Bars D																						Bars Y		Bars Z										Per Foot of Barrel		Curb		Total	
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Length	Wt	Length	Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	Length	Wt	Length	Wt	Length	Wt	No.	Wt	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)
2	6' - 0"	2' - 0"	9"	7"	108	#6	9"	13' - 6"	2,190	108	#5	9"	6' - 8"	751	6' - 9"	760	108	#6	9"	10' - 2"	1,649	10	18"	39' - 9"	266	44	18"	39' - 9"	1,168	108	9"	2' - 0"	144	54	9"	4' - 9"	171	5' - 5"	195	13' - 6"	36	30	84	0.894	182.4	1.0	120	36.8	7,414
3	6' - 0"	2' - 0"	9"	7"	108	#6	9"	20' - 1"	3,258	108	#5	9"	6' - 8"	751	6' - 9"	760	108	#6	9"	16' - 9"	2,717	15	18"	39' - 9"	398	63	18"	39' - 9"	1,673	108	9"	2' - 0"	144	108	9"	4' - 9"	343	5' - 5"	391	20' - 1"	54	44	122	1.302	260.9	1.5	176	53.6	10,611
4	6' - 0"	2' - 0"	9"	7"	108	#6	9"	26' - 8"	4,326	108	#5	9"	6' - 8"	751	6' - 9"	760	108	#6	9"	23' - 4"	3,785	20	18"	39' - 9"	531	82	18"	39' - 9"	2,177	108	9"	2' - 0"	144	162	9"	4' - 9"	514	5' - 5"	586	26' - 8"	71	56	156	1.711	339.4	2.0	227	70.4	13,801
5	6' - 0"	2' - 0"	9"	7"	108	#6	9"	33' - 3"	5,394	108	#5	9"	6' - 8"	751	6' - 9"	760	108	#6	9"	29' - 11"	4,853	25	18"	39' - 9"	664	101	18"	39' - 9"	2,682	108	9"	2' - 0"	144	216	9"	4' - 9"	685	5' - 5"	782	33' - 3"	89	70	195	2.120	417.9	2.5	284	87.3	16,999
6	6' - 0"	2' - 0"	9"	7"	108	#6	9"	39' - 10"	6,462	108	#5	9"	6' - 8"	751	6' - 9"	760	108	#6	9"	36' - 6"	5,921	30	18"	39' - 9"	797	120	18"	39' - 9"	3,186	108	9"	2' - 0"	144	270	9"	4' - 9"	857	5' - 5"	977	39' - 10"	106	82	228	2.529	496.4	3.0	334	104.1	20,189
2	6' - 0"	3' - 0"	9"	7"	108	#6	9"	13' - 6"	2,190	108	#5	9"	7' - 8"	864	6' - 9"	760	108	#6	9"	10' - 2"	1,649	10	18"	39' - 9"	266	50	18"	39' - 9"	1,328	108	9"	3' - 0"	216	54	9"	4' - 9"	171	7' - 5"	268	13' - 6"	36	30	84	0.958	192.8	1.0	120	39.3	7,832
3	6' - 0"	3' - 0"	9"	7"	108	#6	9"	20' - 1"	3,258	108	#5	9"	7' - 8"	864	6' - 9"	760	108	#6	9"	16' - 9"	2,717	15	18"	39' - 9"	398	71	18"	39' - 9"	1,885	108	9"	3' - 0"	216	108	9"	4' - 9"	343	7' - 5"	535	20' - 1"	54	44	122	1.389	274.4	1.5	176	57.1	11,152
4	6' - 0"	3' - 0"	9"	7"	108	#6	9"	26' - 8"	4,326	108	#5	9"	7' - 8"	864	6' - 9"	760	108	#6	9"	23' - 4"	3,785	20	18"	39' - 9"	531	92	18"	39' - 9"	2,443	108	9"	3' - 0"	216	162	9"	4' - 9"	514	7' - 5"	803	26' - 8"	71	56	156	1.819	356.1	2.0	227	74.7	14,469
5	6' - 0"	3' - 0"	9"	7"	108	#6	9"	33' - 3"	5,394	108	#5	9"	7' - 8"	864	6' - 9"	760	108	#6	9"	29' - 11"	4,853	25	18"	39' - 9"	664	113	18"	39' - 9"	3,000	108	9"	3' - 0"	216	216	9"	4' - 9"	685	7' - 5"	1,070	33' - 3"	89	70	195	2.250	437.7	2.5	284	92.5	17,790
6	6' - 0"	3' - 0"	9"	7"	108	#6	9"	39' - 10"	6,462	108	#5	9"	7' - 8"	864	6' - 9"	760	108	#6	9"	36' - 6"	5,921	30	18"	39' - 9"	797	134	18"	39' - 9"	3,558	108	9"	3' - 0"	216	270	9"	4' - 9"	857	7' - 5"	1,338	39' - 10"	106	82	228	2.681	519.3	3.0	334	110.2	21,107
2	6' - 0"	4' - 0"	9"	7"	108	#6	9"	13' - 6"	2,190	108	#5	9"	8' - 8"	976	6' - 9"	760	108	#6	9"	10' - 2"	1,649	10	18"	39' - 9"	266	50	18"	39' - 9"	1,328	108	9"	4' - 0"	289	54	9"	4' - 9"	171	9' - 5"	340	13' - 6"	36	30	84	1.023	199.2	1.0	120	41.9	8,089
3	6' - 0"	4' - 0"	9"	7"	108	#6	9"	20' - 1"	3,258	108	#5	9"	8' - 8"	976	6' - 9"	760	108	#6	9"	16' - 9"	2,717	15	18"	39' - 9"	398	71	18"	39' - 9"	1,885	108	9"	4' - 0"	289	108	9"	4' - 9"	343	9' - 5"	679	20' - 1"	54	44	122	1.475	282.6	1.5	176	60.5	11,481
4	6' - 0"	4' - 0"	9"	7"	108	#6	9"	26' - 8"	4,326	108	#5	9"	8' - 8"	976	6' - 9"	760	108	#6	9"	23' - 4"	3,785	20	18"	39' - 9"	531	92	18"	39' - 9"	2,443	108	9"	4' - 0"	289	162	9"	4' - 9"	514	9' - 5"	1,019	26' - 8"	71	56	156	1.927	366.1	2.0	227	79.1	14,870
5	6' - 0"	4' - 0"	9"	7"	108	#6	9"	33' - 3"	5,394	108	#5	9"	8' - 8"	976	6' - 9"	760	108	#6	9"	29' - 11"	4,853	25	18"	39' - 9"	664	113	18"	39' - 9"	3,000	108	9"	4' - 0"	289	216	9"	4' - 9"	685	9' - 5"	1,359	33' - 3"	89	70	195	2.380	449.5	2.5	284	97.7	18,264
6	6' - 0"	4' - 0"	9"	7"	108	#6	9"	39' - 10"	6,462	108	#5	9"	8' - 8"	976	6' - 9"	760	108	#6	9"	36' - 6"	5,921	30	18"	39' - 9"	797	134	18"	39' - 9"	3,558	108	9"	4' - 0"	289	270	9"	4' - 9"	857	9' - 5"	1,698	39' - 10"	106	82	228	2.832	533.0	3.0	334	116.2	21,652
2	6' - 0"	5' - 0"	9"	7"	108	#6	9"	13' - 6"	2,190	108	#5	9"	9' - 8"	1,089	6' - 9"	760	108	#6	9"	10' - 2"	1,649	10	18"	39' - 9"	266	56	18"	39' - 9"	1,487	108	9"	5' - 0"	361	54	9"	4' - 9"	171	11' - 5"	412	13' - 6"	36	30	84	1.088	209.6	1.0	120	44.5	8,505
3	6' - 0"	5' - 0"	9"	7"	108	#6	9"	20' - 1"	3,258	108	#5	9"	9' - 8"	1,089	6' - 9"	760	108	#6	9"	16' - 9"	2,717	15	18"	39' - 9"	398	79	18"	39' - 9"	2,098	108	9"	5' - 0"	361	108	9"	4' - 9"	343	11' - 5"	824	20' - 1"	54	44	122	1.562	296.2	1.5	176	64.0	12,024
4	6' - 0"	5' - 0"	9"	7"	108	#6	9"	26' - 8"	4,326	108	#5	9"	9' - 8"	1,089	6' - 9"	760	108	#6	9"	23' - 4"	3,785	20	18"	39' - 9"	531	102	18"	39' - 9"	2,708	108	9"	5' - 0"	361	162	9"	4' - 9"	514	11' - 5"	1,235	26' - 8"	71	56	156	2.035	382.7	2.0	227	83.4	15,536
5	6' - 0"	5' - 0"	9"	7"	108	#6	9"	33' - 3"	5,394	108	#5	9"	9' - 8"	1,089	6' - 9"	760	108	#6	9"	29' - 11"	4,853	25	18"	39' - 9"	664	125	18"	39' - 9"	3,319	108	9"	5' - 0"	361	216	9"	4' - 9"	685	11' - 5"	1,647	33' - 3"	89	70	195	2.509	469.3	2.5	284	102.8	19,056
6	6' - 0"	5' - 0"	9"	7"	108	#6	9"	39' - 10"	6,462	108	#5	9"	9' - 8"	1,089	6' - 9"	760	108	#6	9"	36' - 6"	5,921	30	18"	39' - 9"	797	148	18"	39' - 9"	3,930	108	9"	5' - 0"	361	270	9"	4' - 9"	857	11' - 5"	2,059	39' - 10"	106	82	228	2.983	555.9	3.0	334	122.3	22,570
2	6' - 0"	6' - 0"	9"	7"	108	#6	9"	13' - 6"	2,190	108	#5	9"	10' - 8"	1,202	6' - 9"	760	108	#6	9"	10' - 2"	1,649	10	18"	39' - 9"	266	62	18"	39' - 9"	1,646	108	9"	6' - 0"	433	54	9"	4' - 9"	171	13' - 5"	484	13' - 6"	36	30	84	1.153	220.0	1.0	120	47.1	8,921
3	6' - 0"	6' - 0"	9"	7"	108	#6	9"	20' - 1"	3,258	108	#5	9"	10' - 8"	1,202	6' - 9"	760	108	#6	9"	16' - 9"	2,717	15	18"	39' - 9"	398	87	18"	39' - 9"	2,310	108	9"	6' - 0"	433	108	9"	4' - 9"	343	13' - 5"	968	20' - 1"	54	44	122	1.648	309.7	1.5	176	67.4	12,565
4	6' - 0"	6' - 0"	9"	7"	108	#6	9"	26' - 8"	4,326	108	#5	9"	10' - 8"	1,202	6' - 9"	760	108	#6	9"	23' - 4"	3,785	20	18"	39' - 9"	531	112	18"	39' - 9"	2,974	108	9"	6' - 0"	433	162	9"	4' - 9"	514	13' - 5"	1,452	26' - 8"	71	56	156	2.144	399.4	2.0	227	87.7	16,204
5	6' - 0"	6' - 0"	9"	7"	108	#6	9"	33' - 3"	5,394	108	#5	9"	10' - 8"	1,202	6' - 9"	760	108	#6	9"	29' - 11"	4,853	25	18"	39' - 9"	664	137	18"	39' - 9"	3,638	108	9"	6' - 0"	433	216	9"	4' - 9"	685	13' - 5"	1,936	33' - 3"	89	70	195	2.639	489.1	2.5	284	108.0	19,849
6	6' - 0"	6' - 0"	9"	7"	108	#6	9"	39' - 10"	6,462	108	#5	9"	10' - 8"	1,202	6' - 9"	760	108	#6	9"	36' - 6"	5,921	30	18"	39' - 9"	797	162	18"	39' - 9"	4,302	108	9"	6' - 0"	433	270	9"	4' - 9"	857	13' - 5"	2,420	39' - 10"	106	82	228	3.134	578.9	3.0	334	128.3	23,488

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

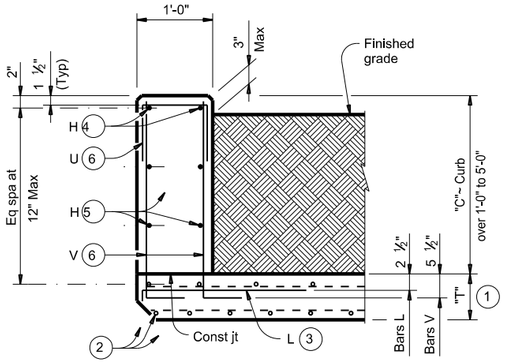
MULTIPLE BOX CULVERTS CAST-IN-PLACE

6'-0" SPAN

0' TO 16' FILL

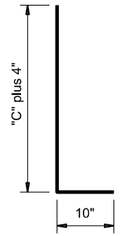
MC-6-16

FILE: mc616ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		146

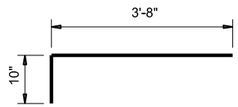


TYPICAL SECTION

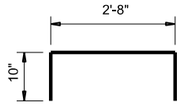
Used for curbs over 1'-0" to 5'-0"



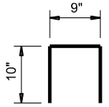
BARS V (#5) (6)
Spaced at 12" Max



BARS L (#5) (3)
Spaced at 12" Max



OPTIONAL BARS L (#5) (3) (7)
Spaced at 12" Max



BARS U (#4) (6)
Spaced at 12" Max

1. "T" is equal to the culvert top slab thickness. For precast boxes with slabs less than 8" thick, see SCP-MD standard for additional details.
2. Adjust normal culvert slab bars as necessary to clear obstructions.
3. Place bars L as shown. Tilt hook as necessary to maintain cover.
4. Place normal culvert curb bars H(#4) as shown. Adjust as necessary to clear obstructions.
5. Additional bars H(#4) as required to maintain 12" Max spacing.
6. Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.
7. Optional bars L are to be used only for precast box culverts with 3'-0" closure pour.
8. Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES (8)

Curb Height "C"	Conc (CY/LF)	Reinf Steel (Lb/LF)
1'-0"	0.037	10.4
1'-6"	0.056	14.5
2'-0"	0.074	15.6
2'-6"	0.093	18.0
3'-0"	0.111	19.0
3'-6"	0.130	21.3
4'-0"	0.148	22.4
4'-6"	0.167	24.8
5'-0"	0.185	25.9

CONSTRUCTION NOTES:

Adjust reinforcing steel as necessary to provide 1 ¼" cover.

For vehicle safety, top of the curb must not project more than 3" above the finished grade.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide galvanized reinforcing steel if required elsewhere in the plans.

Provide Class "C" concrete (f'c = 3,600 psi) minimum for curbs.

Provide bar laps, where required, as follows:

· Uncoated or galvanized ~ #4 = 1'-8" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

These extended curb details have sufficient strength to allow for future retrofit of Type T631 or T631LS railing. These details are suitable for use with PR11, PR22 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T631 or T631LS railing, use the T631-CM standard.

This Curb is considered as part of the Box Culvert for payment.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation

Bridge Division Standard

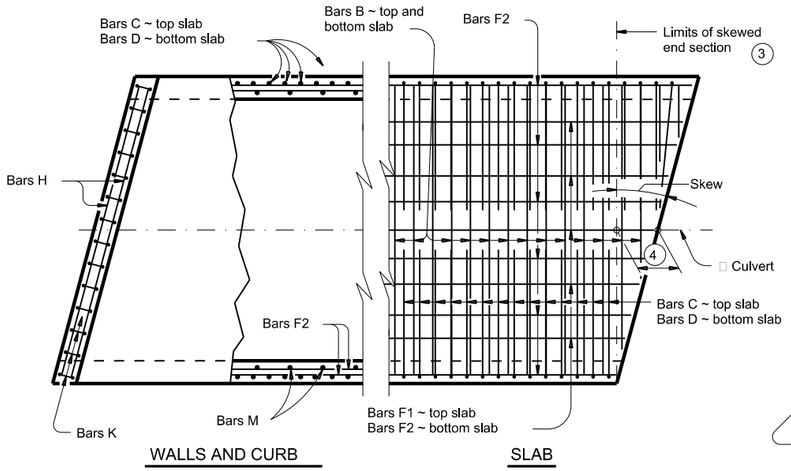
EXTENDED CURB DETAILS

FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 5'-0" TALL

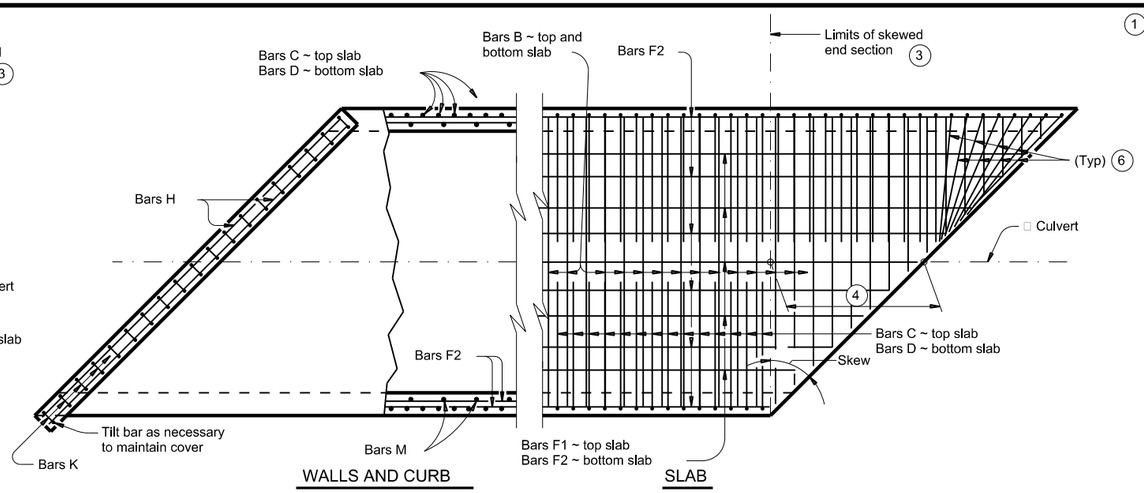
ECD

FILE: ecdstde1-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		147

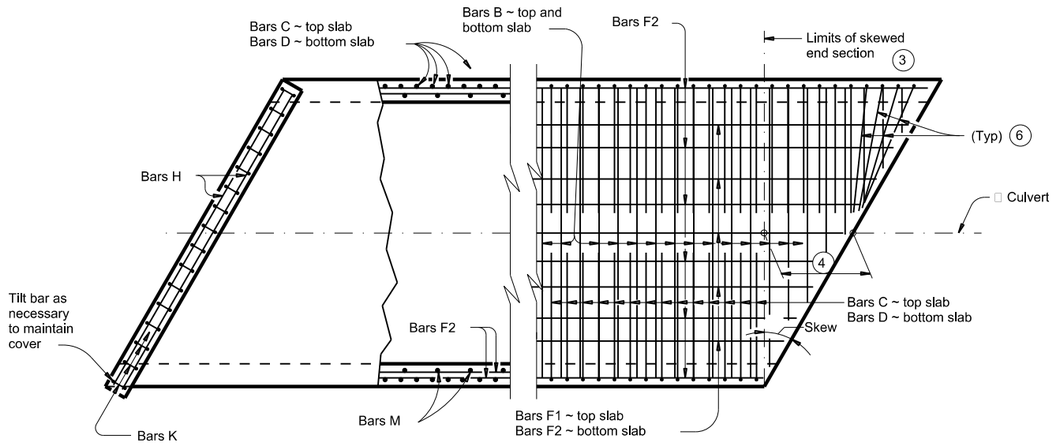
DATE: 7/28/2022 11:20:47 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\4. ecdstde1-20.dgn



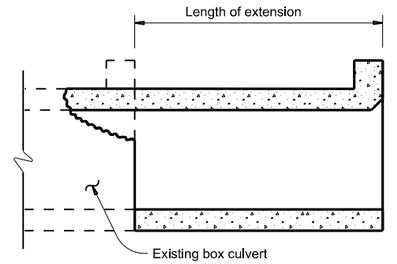
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° (7)



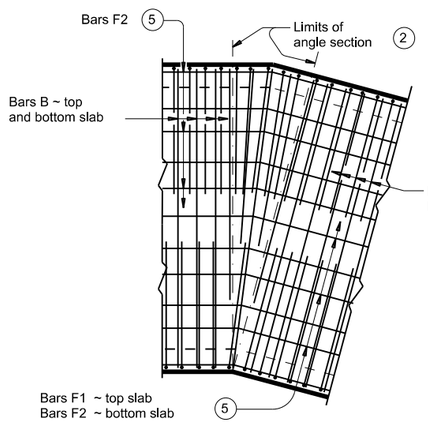
PLAN OF SKEWED ENDS ~ OVER 30° TO 45°



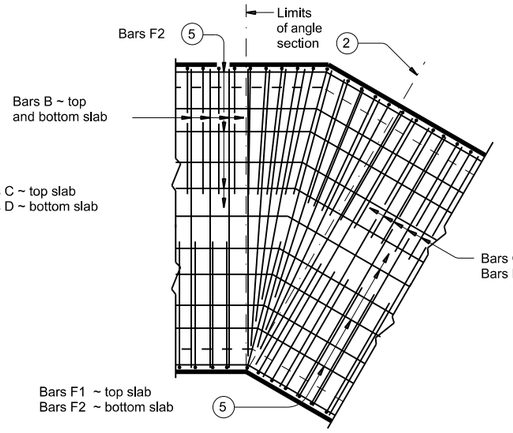
PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



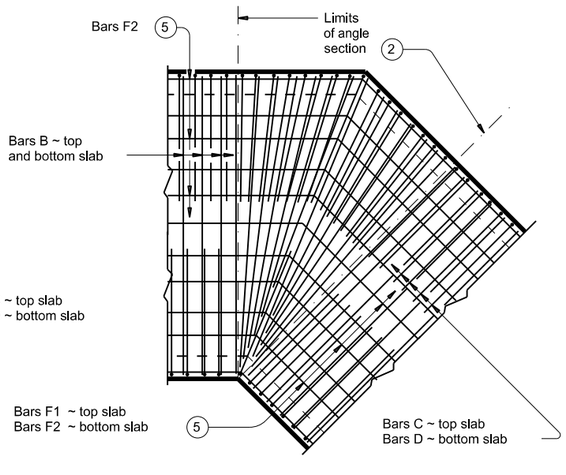
LENGTHENING DETAIL (1)



PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°

(1) For skewed box culverts with less than 2'-0" of fill, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension.

For non-skewed box culverts with less than 2'-0" of fill and for skewed or non-skewed culverts with a fill depth of 2'-0" or greater, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension. Alternatively, if the box is non-skewed, embed #6 anchor bars with a Type III, C, D , E, or F anchor adhesive into the existing walls, top and bottom slab at 1'-6" center-to-center spacing. Minimum embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 26.4 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing." Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

Break back wings and apron as necessary to install the extension. Clean and extend the exposed wingwall and apron reinforcing into the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, form horizontal and vertical transitions as directed by the Engineer. Match bottom slabs to maintain an uninterrupted flow line. Field bend existing and new reinforcing into transitions and maintain specified cover requirements. For top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface, adjust the "H" dimension to provide a smooth riding surface.

(2) When the spacing between Bars B becomes less than half of the normal spacing, cut bars to avoid conflict.

(3) The length of Bars B vary in the skewed end sections.

(4) [One half of overall width] x [tangent of the skew angle]

(5) Place Bars F1 and F2 continuously through the angle section. Bend Bars F1 and F2 to remain parallel to the walls of the box culvert.

(6) When necessary to avoid conflict in acute corners, shorten the slab extension leg of Bars C and Bars D to a minimum of 1'-6" for skews of 30° thru 45°.

(7) At the Contractor's option, for skews of 15° or less, place Bars B, C, and D parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B shown on the Single Box Culverts Cast-In-Place (SCC) standards sheets to accommodate the skew.

CONSTRUCTION NOTES:

Do not use permanent forms.
When required, lap Bars H 1'-8" for uncoated or galvanized bars.
Provide a minimum of 1 ½" clear cover.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel, if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) with these exceptions:
provide Class S concrete (f'c = 4,000 psi) for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Refer to Single Box Culverts Cast-in-Place (SCC) standard sheets for details of straight sections of culvert.

For skewed sections and angle sections, refer to Single Box Culverts Cast-in-Place (SCC) standard sheets for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown.

For skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume, and reinforcing steel weight by dividing the values shown on the culvert Single Box Culverts Cast-In-Place (SCC) standard sheets by the cosine of the skew angle.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

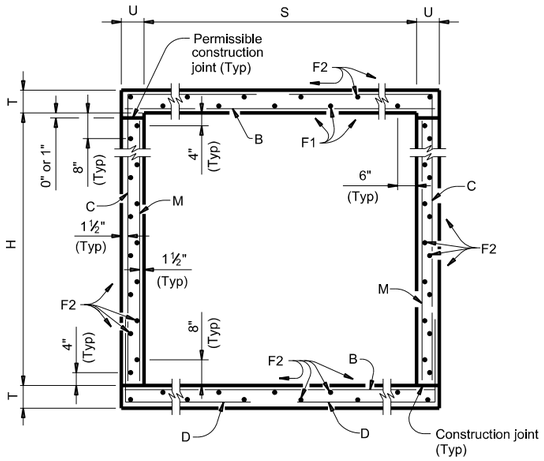
SINGLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

SCC-MD

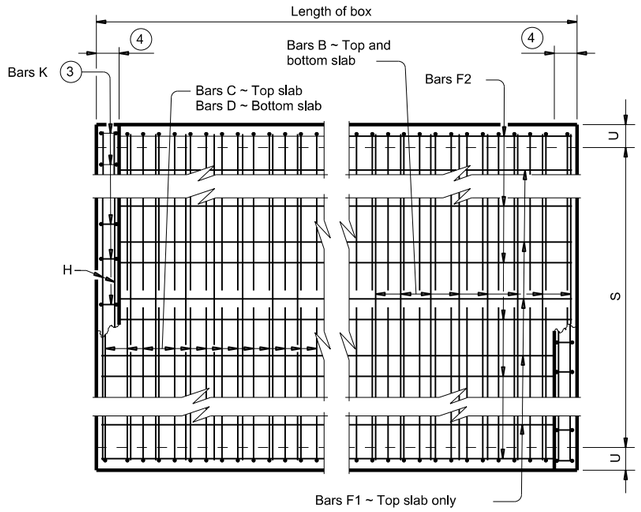
FILE: sccmdste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		148

DATE: 7/28/2022 11:22:48 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\2020 Revisions\STANDARDS\5. sccmdste-20.dgn

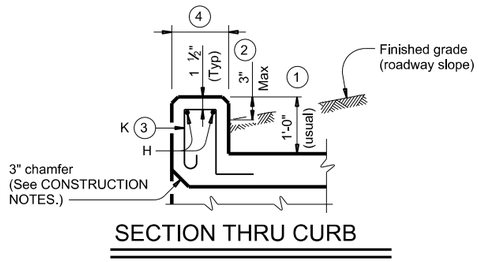
DATE: 7/28/2022 11:25:27 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\6. scc34ste-21.dgn



TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   · For structures without bridge rail, construct curbs no more than 3" above finished grade.
   · For structures with bridge rail, construct curbs flush with finished grade.
   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR.
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

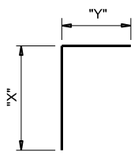
MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
· culverts with overlay,
· culverts with 1-to-2 course surface treatment, or
· culverts with the top slab as the final riding surface.
Provide bar laps, where required, as follows:
· Uncoated or galvanized ~ #4 = 1'-8" Min
· Uncoated or galvanized ~ #5 = 2'-1" Min

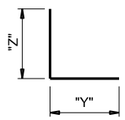
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

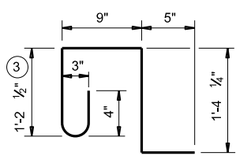
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



BARS C



BARS D



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-3 & 4

FILE: scc34ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		149

SECTION DIMENSIONS				⑤ FILL HEIGHT	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																											QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
3' - 0"	2' - 0"	8"	7"	30'	108	#5	9"	3' - 11"	441	108	#4	9"	5' - 4"	385	2' - 6"	2' - 10"	108	#4	9"	5' - 1"	367	2' - 10"	2' - 3"	108	9"	2' - 0"	144	3	39' - 9"	80	19	39' - 9"	505	3' - 11"	10	10	28	0.292	48.1	0.3	38	12.0	1,960
3' - 0"	3' - 0"	8"	7"	30'	108	#5	9"	3' - 11"	441	108	#4	9"	6' - 4"	457	3' - 6"	2' - 10"	108	#4	9"	5' - 1"	367	2' - 10"	2' - 3"	108	9"	3' - 0"	216	3	39' - 9"	80	23	39' - 9"	611	3' - 11"	10	10	28	0.335	54.3	0.3	38	13.7	2,210
4' - 0"	2' - 0"	8"	7"	30'	108	#5	9"	4' - 11"	554	162	#4	6"	5' - 8"	613	2' - 6"	3' - 2"	162	#4	6"	5' - 5"	586	3' - 2"	2' - 3"	108	9"	2' - 0"	144	3	39' - 9"	80	21	39' - 9"	558	4' - 11"	13	12	33	0.342	63.4	0.4	46	14.1	2,581
4' - 0"	3' - 0"	8"	7"	30'	108	#5	9"	4' - 11"	554	162	#4	6"	6' - 8"	721	3' - 6"	3' - 2"	162	#4	6"	5' - 5"	586	3' - 2"	2' - 3"	108	9"	3' - 0"	216	3	39' - 9"	80	25	39' - 9"	664	4' - 11"	13	12	33	0.385	70.5	0.4	46	15.8	2,867
4' - 0"	4' - 0"	8"	7"	30'	108	#5	9"	4' - 11"	554	162	#4	6"	7' - 8"	830	4' - 6"	3' - 2"	162	#4	6"	5' - 5"	586	3' - 2"	2' - 3"	108	9"	4' - 0"	289	3	39' - 9"	80	25	39' - 9"	664	4' - 11"	13	12	33	0.428	75.1	0.4	46	17.5	3,049

⑤ For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE

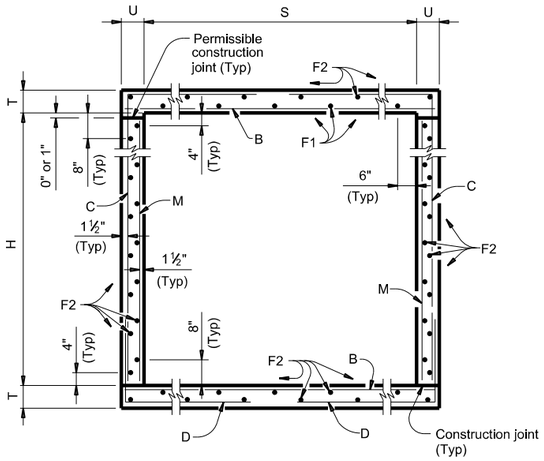
0' TO 30' FILL

SCC-3 & 4

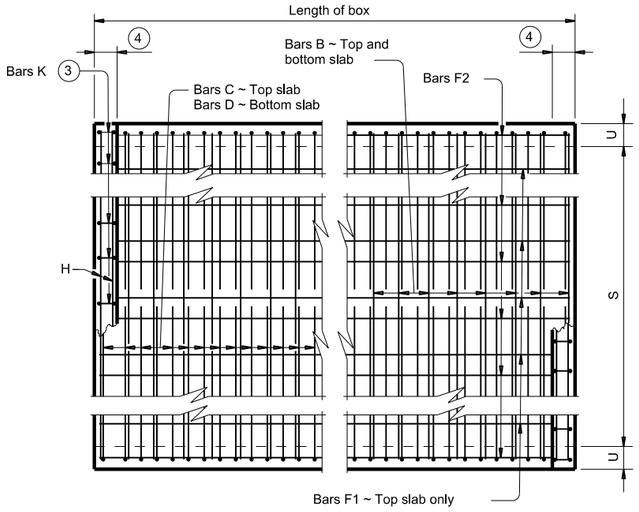
FILE: scc34ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		150

DATE: 7/28/2022 11:25:53 AM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\6. scc34ste-21.dgn

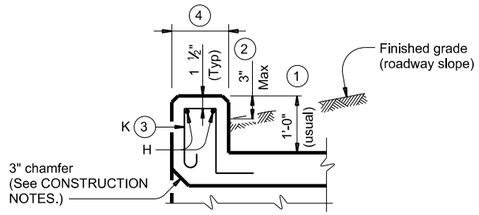
DATE: 7/28/2022 11:28:01 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\7. scc56ste-21.dgn



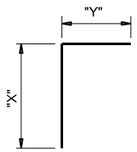
TYPICAL SECTION



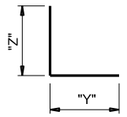
PLAN OF REINF STEEL



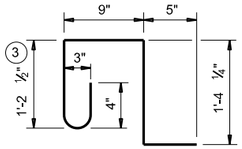
SECTION THRU CURB



BARS C



BARS D



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

1 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2 For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3 For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR.
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-5 & 6

FILE: scc56ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		151

SECTION DIMENSIONS				⑤ FILL HEIGHT	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																												QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
5' - 0"	2' - 0"	8"	7"	26'	108	#6	9"	5' - 11"	960	108	#5	9"	6' - 3"	704	2' - 6"	3' - 9"	108	#5	9"	6' - 5"	723	3' - 9"	2' - 8"	108	9"	2' - 0"	144	4	39' - 9"	106	22	39' - 9"	584	5' - 11"	16	14	39	0.391	80.5	0.5	55	16.1	3,276
5' - 0"	2' - 0"	9"	7"	30'	108	#6	9"	5' - 11"	960	108	#5	9"	6' - 4"	713	2' - 7"	3' - 9"	108	#5	9"	6' - 6"	732	3' - 9"	2' - 9"	108	9"	2' - 0"	144	4	39' - 9"	106	22	39' - 9"	584	5' - 11"	16	14	39	0.429	81.0	0.5	55	17.6	3,294
5' - 0"	3' - 0"	8"	7"	26'	108	#6	9"	5' - 11"	960	108	#5	9"	7' - 3"	817	3' - 6"	3' - 9"	108	#5	9"	6' - 5"	723	3' - 9"	2' - 8"	108	9"	3' - 0"	216	4	39' - 9"	106	26	39' - 9"	690	5' - 11"	16	14	39	0.434	87.8	0.5	55	17.8	3,567
5' - 0"	3' - 0"	9"	7"	30'	108	#6	9"	5' - 11"	960	108	#5	9"	7' - 4"	826	3' - 7"	3' - 9"	108	#5	9"	6' - 6"	732	3' - 9"	2' - 9"	108	9"	3' - 0"	216	4	39' - 9"	106	26	39' - 9"	690	5' - 11"	16	14	39	0.472	88.3	0.5	55	19.3	3,585
5' - 0"	4' - 0"	8"	7"	26'	108	#6	9"	5' - 11"	960	108	#5	9"	8' - 3"	929	4' - 6"	3' - 9"	108	#5	9"	6' - 5"	723	3' - 9"	2' - 8"	108	9"	4' - 0"	289	4	39' - 9"	106	26	39' - 9"	690	5' - 11"	16	14	39	0.477	92.4	0.5	55	19.5	3,752
5' - 0"	4' - 0"	9"	7"	30'	108	#6	9"	5' - 11"	960	108	#5	9"	8' - 4"	939	4' - 7"	3' - 9"	108	#5	9"	6' - 6"	732	3' - 9"	2' - 9"	108	9"	4' - 0"	289	4	39' - 9"	106	26	39' - 9"	690	5' - 11"	16	14	39	0.515	92.9	0.5	55	21.1	3,771
5' - 0"	5' - 0"	8"	7"	26'	108	#6	9"	5' - 11"	960	108	#5	9"	9' - 3"	1,042	5' - 6"	3' - 9"	108	#5	9"	6' - 5"	723	3' - 9"	2' - 8"	108	9"	5' - 0"	361	4	39' - 9"	106	30	39' - 9"	797	5' - 11"	16	14	39	0.521	99.7	0.5	55	21.3	4,044
5' - 0"	5' - 0"	9"	7"	30'	108	#6	9"	5' - 11"	960	108	#5	9"	9' - 4"	1,051	5' - 7"	3' - 9"	108	#5	9"	6' - 6"	732	3' - 9"	2' - 9"	108	9"	5' - 0"	361	4	39' - 9"	106	30	39' - 9"	797	5' - 11"	16	14	39	0.559	100.2	0.5	55	22.8	4,062
6' - 0"	2' - 0"	8"	7"	20'	108	#6	9"	6' - 11"	1,122	108	#5	9"	6' - 7"	742	2' - 6"	4' - 1"	108	#5	9"	6' - 9"	760	4' - 1"	2' - 8"	108	9"	2' - 0"	144	5	39' - 9"	133	25	39' - 9"	664	6' - 11"	18	16	45	0.440	89.1	0.5	63	18.1	3,628
6' - 0"	2' - 0"	9"	7"	26'	108	#6	9"	6' - 11"	1,122	162	#5	6"	6' - 8"	1,126	2' - 7"	4' - 1"	162	#5	6"	6' - 10"	1,155	4' - 1"	2' - 9"	108	9"	2' - 0"	144	5	39' - 9"	133	25	39' - 9"	664	6' - 11"	18	16	45	0.485	108.6	0.5	63	19.9	4,407
6' - 0"	2' - 0"	10"	8"	30'	108	#6	9"	7' - 1"	1,149	162	#5	6"	6' - 10"	1,155	2' - 8"	4' - 2"	162	#5	6"	7' - 0"	1,183	4' - 2"	2' - 10"	82	12"	2' - 0"	110	5	39' - 9"	133	25	39' - 9"	664	7' - 1"	19	18	50	0.551	109.9	0.5	69	22.6	4,463
6' - 0"	3' - 0"	8"	7"	20'	108	#6	9"	6' - 11"	1,122	108	#5	9"	7' - 7"	854	3' - 6"	4' - 1"	108	#5	9"	6' - 9"	760	4' - 1"	2' - 8"	108	9"	3' - 0"	216	5	39' - 9"	133	29	39' - 9"	770	6' - 11"	18	16	45	0.484	96.4	0.5	63	19.9	3,918
6' - 0"	3' - 0"	9"	7"	26'	108	#6	9"	6' - 11"	1,122	162	#5	6"	7' - 8"	1,295	3' - 7"	4' - 1"	162	#5	6"	6' - 10"	1,155	4' - 1"	2' - 9"	108	9"	3' - 0"	216	5	39' - 9"	133	29	39' - 9"	770	6' - 11"	18	16	45	0.528	117.3	0.5	63	21.6	4,754
6' - 0"	3' - 0"	10"	8"	30'	108	#6	9"	7' - 1"	1,149	162	#5	6"	7' - 10"	1,324	3' - 8"	4' - 2"	162	#5	6"	7' - 0"	1,183	4' - 2"	2' - 10"	82	12"	3' - 0"	164	5	39' - 9"	133	29	39' - 9"	770	7' - 1"	19	18	50	0.601	118.1	0.5	69	24.6	4,792
6' - 0"	4' - 0"	8"	7"	20'	108	#6	9"	6' - 11"	1,122	108	#5	9"	8' - 7"	967	4' - 6"	4' - 1"	108	#5	9"	6' - 9"	760	4' - 1"	2' - 8"	108	9"	4' - 0"	289	5	39' - 9"	133	29	39' - 9"	770	6' - 11"	18	16	45	0.527	101.0	0.5	63	21.6	4,104
6' - 0"	4' - 0"	9"	7"	26'	108	#6	9"	6' - 11"	1,122	162	#5	6"	8' - 8"	1,464	4' - 7"	4' - 1"	162	#5	6"	6' - 10"	1,155	4' - 1"	2' - 9"	108	9"	4' - 0"	289	5	39' - 9"	133	29	39' - 9"	770	6' - 11"	18	16	45	0.571	123.3	0.5	63	23.4	4,996
6' - 0"	4' - 0"	10"	8"	30'	108	#6	9"	7' - 1"	1,149	162	#5	6"	8' - 10"	1,493	4' - 8"	4' - 2"	162	#5	6"	7' - 0"	1,183	4' - 2"	2' - 10"	82	12"	4' - 0"	219	5	39' - 9"	133	29	39' - 9"	770	7' - 1"	19	18	50	0.650	123.7	0.5	69	26.5	5,016
6' - 0"	5' - 0"	8"	7"	20'	108	#6	9"	6' - 11"	1,122	108	#5	9"	9' - 7"	1,080	5' - 6"	4' - 1"	108	#5	9"	6' - 9"	760	4' - 1"	2' - 8"	108	9"	5' - 0"	361	5	39' - 9"	133	33	39' - 9"	876	6' - 11"	18	16	45	0.570	108.3	0.5	63	23.3	4,395
6' - 0"	5' - 0"	9"	7"	26'	108	#6	9"	6' - 11"	1,122	162	#5	6"	9' - 8"	1,633	5' - 7"	4' - 1"	162	#5	6"	6' - 10"	1,155	4' - 1"	2' - 9"	108	9"	5' - 0"	361	5	39' - 9"	133	33	39' - 9"	876	6' - 11"	18	16	45	0.614	132.0	0.5	63	25.1	5,343
6' - 0"	5' - 0"	10"	8"	30'	108	#6	9"	7' - 1"	1,149	162	#5	6"	9' - 10"	1,661	5' - 8"	4' - 2"	162	#5	6"	7' - 0"	1,183	4' - 2"	2' - 10"	82	12"	5' - 0"	274	5	39' - 9"	133	33	39' - 9"	876	7' - 1"	19	18	50	0.700	131.9	0.5	69	28.5	5,345
6' - 0"	6' - 0"	8"	7"	20'	108	#6	9"	6' - 11"	1,122	108	#5	9"	10' - 7"	1,192	6' - 6"	4' - 1"	108	#5	9"	6' - 9"	760	4' - 1"	2' - 8"	108	9"	6' - 0"	433	5	39' - 9"	133	37	39' - 9"	982	6' - 11"	18	16	45	0.613	115.6	0.5	63	25.0	4,685
6' - 0"	6' - 0"	9"	7"	26'	108	#6	9"	6' - 11"	1,122	162	#5	6"	10' - 8"	1,802	6' - 7"	4' - 1"	162	#5	6"	6' - 10"	1,155	4' - 1"	2' - 9"	108	9"	6' - 0"	433	5	39' - 9"	133	37	39' - 9"	982	6' - 11"	18	16	45	0.657	140.7	0.5	63	26.8	5,690
6' - 0"	6' - 0"	10"	8"	30'	108	#6	9"	7' - 1"	1,149	162	#5	6"	10' - 10"	1,830	6' - 8"	4' - 2"	162	#5	6"	7' - 0"	1,183	4' - 2"	2' - 10"	82	12"	6' - 0"	329	5	39' - 9"	133	37	39' - 9"	982	7' - 1"	19	18	50	0.749	140.2	0.5	69	30.5	5,675

⑤ For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

DATE: 7/28/2022 11:28:17 AM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\7. scc56ste-21.dgn

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

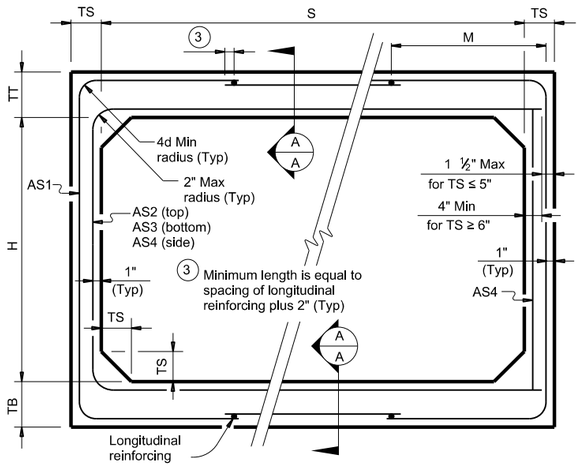
SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-5 & 6

FILE: scc56ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		152

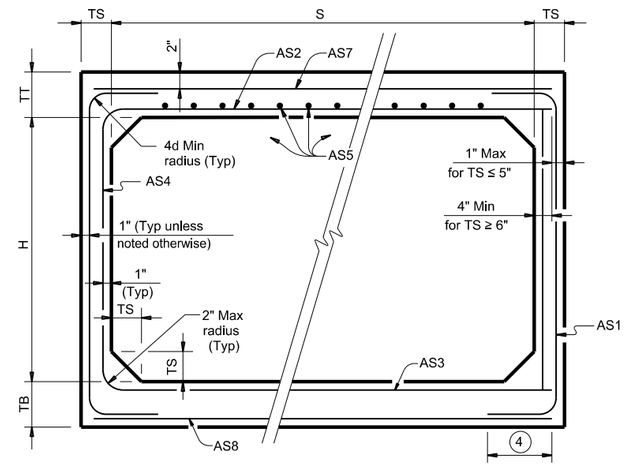
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
4	2	7.5	6	5	< 2	-	0.18	0.27	0.15	0.12	0.18	0.18	0.14	4.5
4	2	5	5	5	2 < 3	38	0.18	0.19	0.17	0.12	-	-	-	3.6
4	2	5	5	5	3 - 5	38	0.13	0.13	0.13	0.12	-	-	-	3.6
4	2	5	5	5	10	38	0.12	0.12	0.12	0.12	-	-	-	3.6
4	2	5	5	5	15	38	0.14	0.16	0.16	0.12	-	-	-	3.6
4	2	5	5	5	20	38	0.18	0.20	0.21	0.12	-	-	-	3.6
4	2	5	5	5	25	38	0.23	0.25	0.25	0.12	-	-	-	3.6
4	2	5	5	5	30	38	0.28	0.30	0.30	0.12	-	-	-	3.6
4	3	7.5	6	5	< 2	-	0.18	0.31	0.18	0.12	0.18	0.18	0.14	5.0
4	3	5	5	5	2 < 3	38	0.15	0.23	0.20	0.12	-	-	-	4.1
4	3	5	5	5	3 - 5	38	0.12	0.16	0.16	0.12	-	-	-	4.1
4	3	5	5	5	10	38	0.12	0.14	0.14	0.12	-	-	-	4.1
4	3	5	5	5	15	38	0.12	0.18	0.18	0.12	-	-	-	4.1
4	3	5	5	5	20	38	0.14	0.23	0.24	0.12	-	-	-	4.1
4	3	5	5	5	25	38	0.17	0.29	0.29	0.12	-	-	-	4.1
4	3	5	5	5	30	38	0.21	0.35	0.35	0.12	-	-	-	4.1
4	4	7.5	6	5	< 2	-	0.18	0.33	0.20	0.12	0.18	0.18	0.14	5.5
4	4	5	5	5	2 < 3	38	0.12	0.26	0.23	0.12	-	-	-	4.6
4	4	5	5	5	3 - 5	38	0.12	0.18	0.18	0.12	-	-	-	4.6
4	4	5	5	5	10	38	0.12	0.15	0.15	0.12	-	-	-	4.6
4	4	5	5	5	15	38	0.12	0.19	0.20	0.12	-	-	-	4.6
4	4	5	5	5	20	38	0.12	0.25	0.25	0.12	-	-	-	4.6
4	4	5	5	5	25	38	0.14	0.31	0.31	0.12	-	-	-	4.6
4	4	5	5	5	30	38	0.17	0.37	0.37	0.12	-	-	-	4.6



CORNER OPTION "A" CORNER OPTION "B"

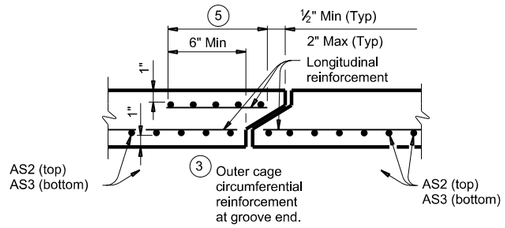
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f'c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

4'-0" SPAN

SCP-4

FILE: scp04sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		153

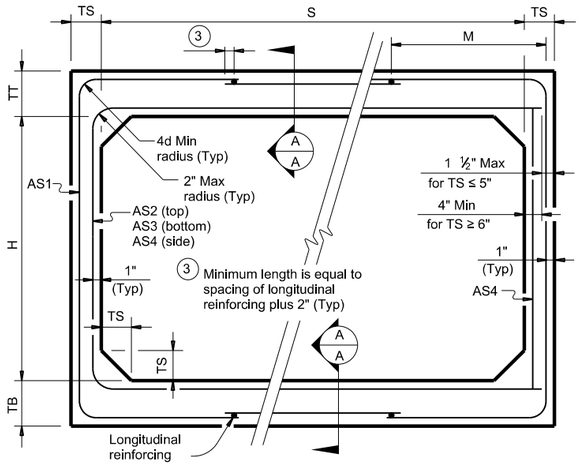
DATE: 7/29/2022 12:40:05 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\8. scp04sts-20.dgn

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
5	2	8	7	6	< 2	-	0.19	0.27	0.18	0.14	0.19	0.19	0.17	6.0
5	2	6	6	6	2 < 3	44	0.22	0.20	0.16	0.14	-	-	-	5.1
5	2	6	6	6	3 - 5	44	0.16	0.14	0.14	0.14	-	-	-	5.1
5	2	6	6	6	10	36	0.15	0.14	0.14	0.14	-	-	-	5.1
5	2	6	6	6	15	36	0.20	0.18	0.18	0.14	-	-	-	5.1
5	2	6	6	6	20	36	0.26	0.23	0.24	0.14	-	-	-	5.1
5	2	6	6	6	25	36	0.33	0.29	0.29	0.14	-	-	-	5.1
5	2	6	6	6	30	36	0.39	0.34	0.35	0.14	-	-	-	5.1
5	3	8	7	6	< 2	-	0.19	0.31	0.21	0.14	0.19	0.19	0.17	6.6
5	3	6	6	6	2 < 3	45	0.18	0.24	0.19	0.14	-	-	-	5.7
5	3	6	6	6	3 - 5	36	0.14	0.17	0.16	0.14	-	-	-	5.7
5	3	6	6	6	10	36	0.14	0.16	0.17	0.14	-	-	-	5.7
5	3	6	6	6	15	35	0.16	0.21	0.22	0.14	-	-	-	5.7
5	3	6	6	6	20	35	0.21	0.27	0.28	0.14	-	-	-	5.7
5	3	6	6	6	25	35	0.26	0.34	0.34	0.14	-	-	-	5.7
5	3	6	6	6	30	35	0.31	0.41	0.41	0.14	-	-	-	5.7
5	4	8	7	6	< 2	-	0.19	0.33	0.24	0.14	0.19	0.19	0.17	7.2
5	4	6	6	6	2 < 3	45	0.16	0.27	0.22	0.14	-	-	-	6.3
5	4	6	6	6	3 - 5	45	0.14	0.19	0.18	0.14	-	-	-	6.3
5	4	6	6	6	10	36	0.14	0.18	0.18	0.14	-	-	-	6.3
5	4	6	6	6	15	35	0.14	0.23	0.24	0.14	-	-	-	6.3
5	4	6	6	6	20	35	0.17	0.30	0.31	0.14	-	-	-	6.3
5	4	6	6	6	25	35	0.21	0.37	0.38	0.14	-	-	-	6.3
5	4	6	6	6	30	35	0.25	0.44	0.45	0.14	-	-	-	6.3
5	5	8	7	6	< 2	-	0.19	0.35	0.26	0.14	0.19	0.19	0.17	7.8
5	5	6	6	6	2 < 3	45	0.14	0.29	0.24	0.14	-	-	-	6.9
5	5	6	6	6	3 - 5	45	0.14	0.21	0.20	0.14	-	-	-	6.9
5	5	6	6	6	10	45	0.14	0.19	0.20	0.14	-	-	-	6.9
5	5	6	6	6	15	36	0.14	0.24	0.25	0.14	-	-	-	6.9
5	5	6	6	6	20	35	0.15	0.31	0.32	0.14	-	-	-	6.9
5	5	6	6	6	25	35	0.18	0.38	0.39	0.14	-	-	-	6.9
5	5	6	6	6	30	35	0.21	0.46	0.47	0.14	-	-	-	6.9

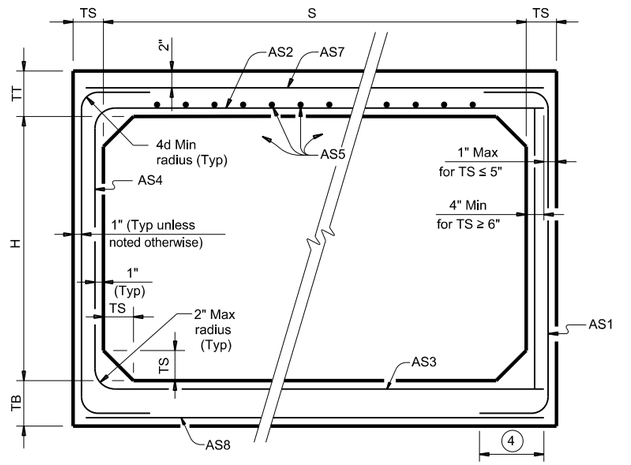
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

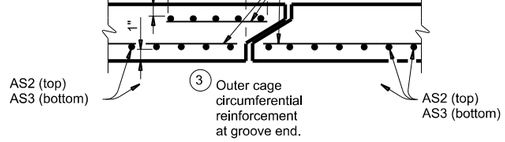
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete ($f'c$ = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

5'-0" SPAN

SCP-5

FILE: scp05sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		154

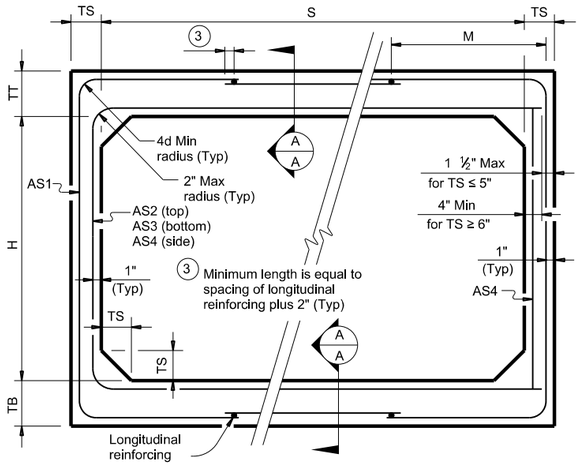
DATE: 7/28/2022 11:39:41 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\9. scp05sts-20.dgn

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
6	2	8	7	7	< 2	-	0.23	0.27	0.19	0.17	0.19	0.19	0.17	7.2
6	2	7	7	7	2 < 3	43	0.25	0.21	0.17	0.17	-	-	-	6.8
6	2	7	7	7	3 - 5	43	0.20	0.17	0.17	0.17	-	-	-	6.8
6	2	7	7	7	10	39	0.20	0.17	0.17	0.17	-	-	-	6.8
6	2	7	7	7	15	39	0.26	0.20	0.20	0.17	-	-	-	6.8
6	2	7	7	7	20	39	0.34	0.26	0.26	0.17	-	-	-	6.8
6	2	7	7	7	25	39	0.43	0.32	0.32	0.17	-	-	-	6.8
6	2	7	7	7	30	39	0.52	0.38	0.39	0.17	-	-	-	6.8
6	3	8	7	7	< 2	-	0.20	0.31	0.22	0.17	0.19	0.19	0.17	7.9
6	3	7	7	7	2 < 3	43	0.21	0.24	0.19	0.17	-	-	-	7.5
6	3	7	7	7	3 - 5	39	0.17	0.18	0.17	0.17	-	-	-	7.5
6	3	7	7	7	10	39	0.17	0.18	0.19	0.17	-	-	-	7.5
6	3	7	7	7	15	38	0.22	0.24	0.24	0.17	-	-	-	7.5
6	3	7	7	7	20	38	0.28	0.31	0.31	0.17	-	-	-	7.5
6	3	7	7	7	25	38	0.35	0.38	0.39	0.17	-	-	-	7.5
6	3	7	7	7	30	38	0.42	0.46	0.46	0.17	-	-	-	7.5
6	4	8	7	7	< 2	-	0.19	0.34	0.25	0.17	0.19	0.19	0.17	8.6
6	4	7	7	7	2 < 3	43	0.19	0.27	0.21	0.17	-	-	-	8.2
6	4	7	7	7	3 - 5	39	0.17	0.21	0.19	0.17	-	-	-	8.2
6	4	7	7	7	10	39	0.17	0.20	0.21	0.17	-	-	-	8.2
6	4	7	7	7	15	38	0.18	0.27	0.27	0.17	-	-	-	8.2
6	4	7	7	7	20	38	0.24	0.34	0.35	0.17	-	-	-	8.2
6	4	7	7	7	25	38	0.29	0.43	0.42	0.17	-	-	-	8.2
6	4	7	7	7	30	38	0.35	0.51	0.52	0.17	-	-	-	8.2
6	5	8	7	7	< 2	-	0.19	0.37	0.28	0.17	0.19	0.19	0.17	9.3
6	5	7	7	7	2 < 3	43	0.17	0.30	0.24	0.17	-	-	-	8.9
6	5	7	7	7	3 - 5	43	0.17	0.23	0.21	0.17	-	-	-	8.9
6	5	7	7	7	10	39	0.17	0.22	0.23	0.17	-	-	-	8.9
6	5	7	7	7	15	38	0.17	0.28	0.29	0.17	-	-	-	8.9
6	5	7	7	7	20	38	0.20	0.37	0.38	0.17	-	-	-	8.9
6	5	7	7	7	25	38	0.25	0.45	0.46	0.17	-	-	-	8.9
6	5	7	7	7	30	38	0.30	0.54	0.55	0.17	-	-	-	8.9
6	6	8	7	7	< 2	-	0.19	0.38	0.30	0.17	0.19	0.19	0.17	10
6	6	7	7	7	2 < 3	52	0.17	0.32	0.26	0.17	-	-	-	9.6
6	6	7	7	7	3 - 5	52	0.17	0.24	0.22	0.17	-	-	-	9.6
6	6	7	7	7	10	43	0.17	0.23	0.24	0.17	-	-	-	9.6
6	6	7	7	7	15	39	0.17	0.29	0.31	0.17	-	-	-	9.6
6	6	7	7	7	20	39	0.18	0.38	0.39	0.17	-	-	-	9.6
6	6	7	7	7	25	38	0.23	0.46	0.48	0.17	-	-	-	9.6
6	6	7	7	7	30	38	0.27	0.55	0.57	0.17	-	-	-	9.6

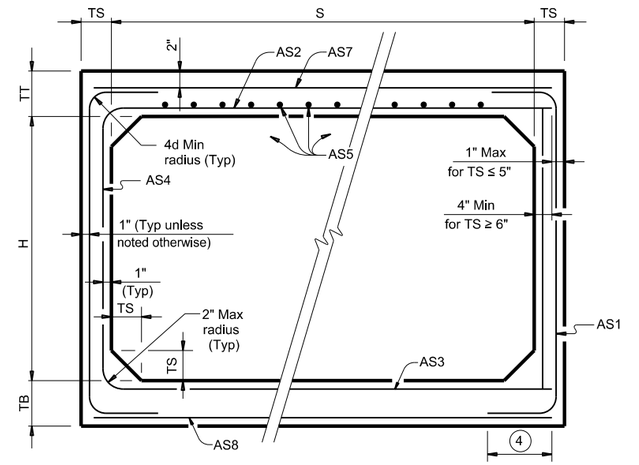
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

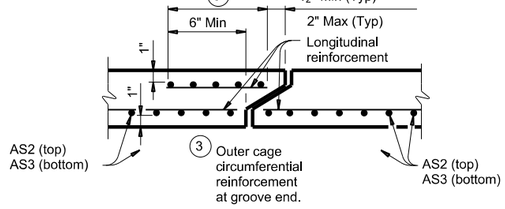
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f'c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

6'-0" SPAN

SCP-6

FILE: scp06sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		155

DATE: 7/28/2022 11:43:00 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\10. scp06sts-20.dgn

DATE: 7/28/2022 11:45:49 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\11. pwstde01-20.dgn

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

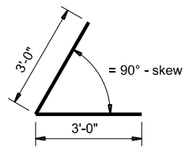
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) ④		Estimated Quantities per ft of Toewall (1~toewall)	
Maximum Wingwall Height Hw	W	X	Y	Z	Bars J1		Bars J2					
					Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING
(2~wings)

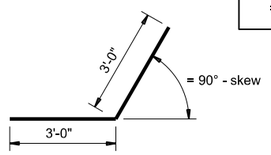
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

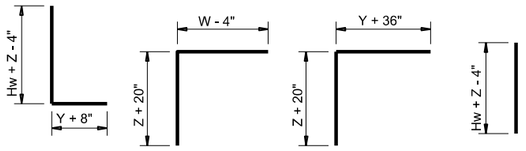
Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



BARS D1



BARS D2



BARS J1 BARS J2 BARS J3 BARS V

WING DIMENSION FORMULAS:

(All values are in feet.)

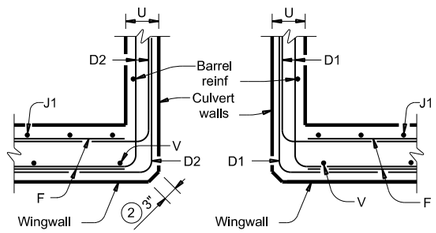
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW-1
= (Hw - 1') (SL) ÷ cosine (θ) for Type PW-2 and Hw 4' ≤
= (Hw - 0.5') (SL) ÷ cosine (θ) for Type PW-2 and Hw 4' <

For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine (θ)

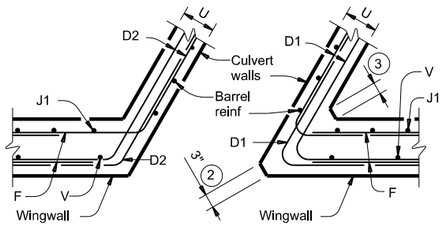
For precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) - 6 SF for Type PW-2 and Hw 4' ≤
= (2)(Hw)(Lw) - 1.5 SF for Type PW-2 and Hw 4' <

Hw = Height of wingwall
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
SL:1 = Channel slope ratio. (horizontal: 1 vertical, usual value is 2:1)
θ = Culvert skew

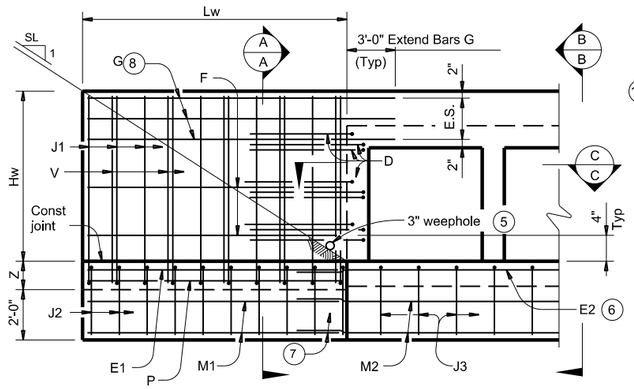
See applicable box culvert standard sheet for S, H, T, and U values.



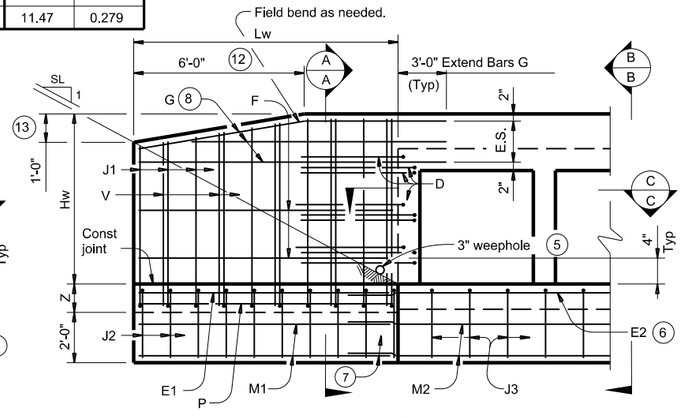
SECTION C-C - PW-1



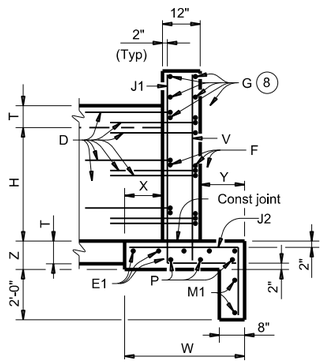
SECTION C-C - PW-2



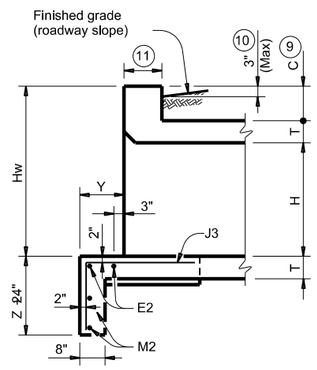
PARTIAL ELEVATION - PW-1



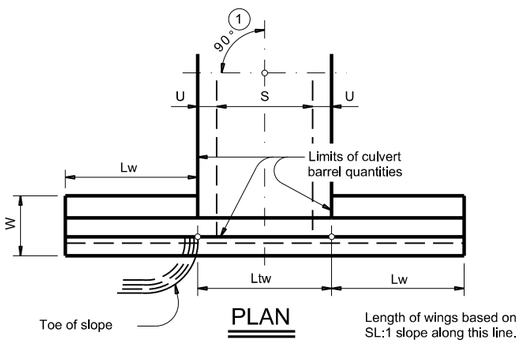
PARTIAL ELEVATION - PW-2



SECTION A-A
(Showing wing reinforcement.)



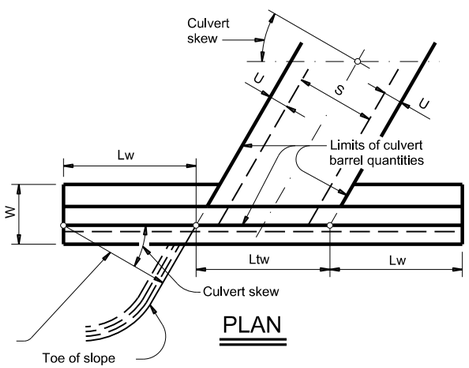
SECTION B-B
(Showing wing reinforcement.)



PLAN

Length of wings based on SL:1 slope along this line.

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

1. Skew = 0°
2. At discharge end, chamfer may be ¾" minimum.
3. For 15° skew ~ 1"
   For 30° skew ~ 2"
   For 45° skew ~ 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
9. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, construct curbs no more than 3" above finished grade.
    - For structures with bridge rail, construct curbs flush with finished grade.

    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
11. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elswhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.

DESIGNER NOTES:
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforing steel if required elsewhere in the plans.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing dimensions are out-to-out of bars.

Texas Department of Transportation
Bridge Division Standard

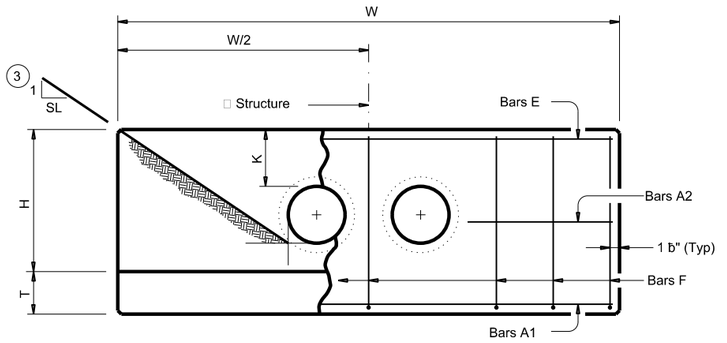
CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS TYPES PW-1 AND PW-2

PW

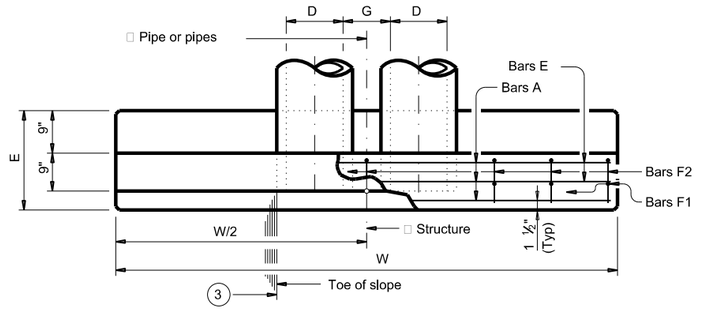
FILE: pwstde01-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		156

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

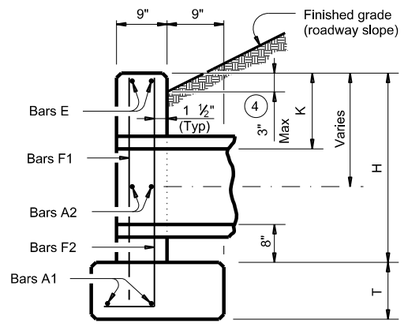
Slope	Dia of Pipe (D)	Values for One Pipe W	Values for One Pipe Reinf (Lbs) (1)	Values for One Pipe Conc (CY) (2)	Values To Be Added for Each Addt'l Pipe W	Values To Be Added for Each Addt'l Pipe Reinf (Lbs) (1)	Values To Be Added for Each Addt'l Pipe Conc (CY) (2)
2:1	12"	9' - 0"	122	1.1	1' - 9"	15	0.2
	15"	10' - 3"	136	1.3	2' - 2"	16	0.2
	18"	11' - 6"	163	1.5	2' - 8"	19	0.3
	21"	12' - 9"	200	1.8	3' - 1"	31	0.4
	24"	14' - 0"	217	2.1	3' - 7"	34	0.4
	27"	15' - 3"	254	2.4	3' - 11"	37	0.5
	30"	16' - 6"	272	2.7	4' - 4"	40	0.6
	33"	17' - 9"	314	3.1	4' - 8"	43	0.6
	36"	19' - 0"	371	3.9	5' - 1"	46	0.8
	42"	21' - 6"	442	4.9	5' - 10"	52	1.0
	48"	25' - 0"	569	6.4	6' - 7"	59	1.3
	54"	27' - 6"	701	7.5	7' - 6"	82	1.6
	60"	30' - 0"	794	8.8	8' - 3"	90	1.8
	66"	32' - 6"	894	10.2	8' - 9"	96	2.0
	72"	35' - 0"	1,055	11.7	9' - 4"	103	2.3
3:1	12"	13' - 0"	175	1.6	1' - 9"	14	0.2
	15"	14' - 9"	193	1.9	2' - 2"	17	0.2
	18"	16' - 6"	228	2.2	2' - 8"	19	0.3
	21"	18' - 3"	299	2.6	3' - 1"	31	0.4
	24"	20' - 0"	323	3.0	3' - 7"	33	0.4
	27"	21' - 9"	371	3.5	3' - 11"	37	0.5
	30"	23' - 6"	415	4.0	4' - 4"	40	0.5
	33"	25' - 3"	469	4.6	4' - 8"	43	0.6
	36"	27' - 0"	556	5.7	5' - 1"	46	0.8
	42"	30' - 6"	675	7.1	5' - 10"	52	1.0
	48"	35' - 6"	837	9.2	6' - 7"	59	1.3
	54"	39' - 0"	1,015	11.0	7' - 6"	84	1.6
	60"	42' - 6"	1,171	12.9	8' - 3"	91	1.8
	66"	46' - 0"	1,298	14.9	8' - 9"	98	2.0
	72"	49' - 6"	1,561	17.1	9' - 4"	103	2.3
4:1	12"	17' - 0"	229	2.0	1' - 9"	15	0.2
	15"	19' - 3"	266	2.4	2' - 2"	17	0.2
	18"	21' - 6"	308	2.9	2' - 8"	19	0.3
	21"	23' - 9"	382	3.5	3' - 1"	31	0.3
	24"	26' - 0"	430	3.9	3' - 7"	34	0.4
	27"	28' - 3"	486	4.7	3' - 11"	37	0.5
	30"	30' - 6"	539	5.2	4' - 4"	40	0.6
	33"	32' - 9"	603	6.0	4' - 8"	42	0.6
	36"	35' - 0"	738	7.5	5' - 1"	47	0.8
	42"	39' - 6"	881	9.3	5' - 10"	52	1.0
	48"	46' - 0"	1,102	12.1	6' - 7"	61	1.3
	54"	50' - 6"	1,364	14.4	7' - 6"	84	1.6
	60"	55' - 0"	1,547	16.9	8' - 3"	91	1.8
	66"	59' - 6"	1,741	19.5	8' - 9"	98	2.0
	72"	64' - 0"	2,077	22.4	9' - 4"	102	2.3
6:1	12"	25' - 0"	336	3.0	1' - 9"	14	0.2
	15"	28' - 3"	384	3.6	2' - 2"	17	0.2
	18"	31' - 6"	452	4.2	2' - 8"	19	0.3
	21"	34' - 9"	581	5.1	3' - 1"	31	0.4
	24"	38' - 0"	644	5.8	3' - 7"	34	0.4
	27"	41' - 3"	737	6.9	3' - 11"	37	0.5
	30"	44' - 6"	807	7.7	4' - 4"	39	0.6
	33"	47' - 9"	912	8.9	4' - 8"	44	0.6
	36"	51' - 0"	1,108	11.0	5' - 1"	48	0.8
	42"	57' - 6"	1,318	13.7	5' - 10"	54	1.0
	48"	67' - 0"	1,682	17.9	6' - 7"	59	1.3
	54"	73' - 6"	2,072	21.3	7' - 6"	83	1.6
	60"	80' - 0"	2,351	24.9	8' - 3"	89	1.8
	66"	86' - 6"	2,643	28.9	8' - 9"	96	2.0
	72"	93' - 0"	3,121	33.1	9' - 4"	101	2.3



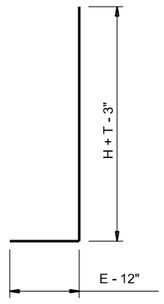
ELEVATION



PLAN OF NON-SKEWED PIPES



SECTION AT CENTER OF PIPE



BARS F2

1. Total quantities include one 3'-1" lap for bars over 60' in length.
2. Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.
3. Indicated slope is perpendicular to centerline pipe or pipes.
4. For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
5. Dimensions shown are usual and maximum.
6. Quantities shown are for one structure end only (one headwall).

TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (5)	H	T	E
12"	0' - 9"	1' - 0"	2' - 8"	0' - 9"	1' - 9"
15"	0' - 11"	1' - 0"	2' - 11"	0' - 9"	1' - 9"
18"	1' - 2"	1' - 0"	3' - 2"	0' - 9"	1' - 9"
21"	1' - 4"	1' - 0"	3' - 5"	0' - 9"	2' - 0"
24"	1' - 7"	1' - 0"	3' - 8"	0' - 9"	2' - 0"
27"	1' - 8"	1' - 0"	3' - 11"	0' - 9"	2' - 3"
30"	1' - 10"	1' - 0"	4' - 2"	0' - 9"	2' - 3"
33"	1' - 11"	1' - 0"	4' - 5"	0' - 9"	2' - 6"
36"	2' - 1"	1' - 0"	4' - 8"	1' - 0"	2' - 6"
42"	2' - 4"	1' - 0"	5' - 2"	1' - 0"	2' - 9"
48"	2' - 7"	1' - 3"	5' - 11"	1' - 0"	3' - 0"
54"	3' - 0"	1' - 3"	6' - 5"	1' - 0"	3' - 3"
60"	3' - 3"	1' - 3"	6' - 11"	1' - 0"	3' - 6"
66"	3' - 3"	1' - 3"	7' - 5"	1' - 0"	3' - 9"
72"	3' - 4"	1' - 3"	7' - 11"	1' - 0"	4' - 0"

TABLE OF REINFORCING STEEL (6)

Bar	Size	Spa	No.
A1	#5	~	2
A2	#5	1' - 6"	~
E	#5	~	2
F	#5	1' - 0"	~

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing dimensions are out-to-out of bars.

Texas Department of Transportation — Bridge Division Standard

CONCRETE HEADWALLS WITH PARALLEL WINGS FOR NON-SKEWED PIPE CULVERTS

CH-PW-0

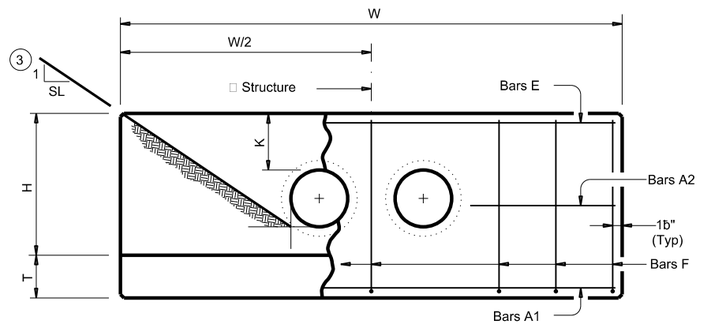
FILE: chpw0ste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		157

DATE: 7/28/2022 11:48:47 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\12. chpw0ste-20.dgn

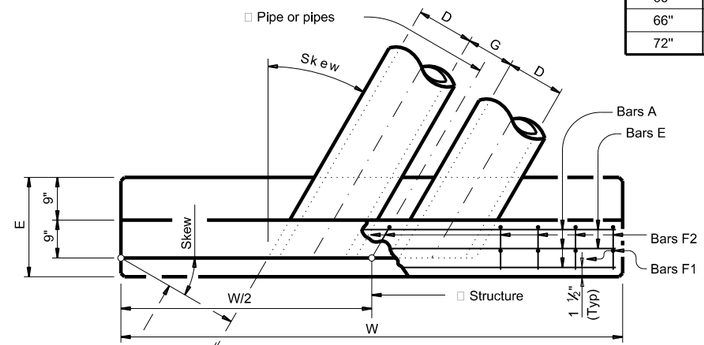
DATE: 7/28/2022 11:50:43 AM
pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\13. chpwsste-20.dgn

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

Slope	Dia of Pipe (D)	15° Skew						30° Skew						45° Skew					
		Values for One Pipe			Values To Be Added for Each Addt'l Pipe			Values for One Pipe			Values To Be Added for Each Addt'l Pipe			Values for One Pipe			Values To Be Added for Each Addt'l Pipe		
		W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)
2:1	12"	9' - 4"	124	1.1	1' - 9 ¾"	15	0.2	10' - 5"	130	1.2	2' - 0"	16	0.2	12' - 9"	159	1.5	2' - 5 ¾"	17	0.2
	15"	10' - 7"	136	1.3	2' - 3"	17	0.2	11' - 10"	159	1.5	2' - 6"	18	0.2	14' - 6"	191	1.8	3' - 0 ¾"	20	0.3
	18"	11' - 11"	165	1.5	2' - 9"	19	0.3	13' - 3"	174	1.7	3' - 1"	29	0.3	16' - 3"	207	2.1	3' - 9 ¼"	33	0.4
	21"	13' - 2"	203	1.9	3' - 2 ¼"	31	0.4	14' - 9"	233	2.1	3' - 6 ¾"	33	0.4	18' - 0"	276	2.6	4' - 4 ¼"	36	0.5
	24"	14' - 6"	240	2.1	3' - 8 ¼"	34	0.4	16' - 2"	251	2.4	4' - 1 ¾"	36	0.5	19' - 10"	318	2.9	5' - 0 ¾"	39	0.6
	27"	15' - 9"	258	2.5	4' - 0 ¾"	38	0.5	17' - 7"	292	2.8	4' - 6 ¼"	39	0.6	21' - 7"	342	3.4	5' - 6 ¼"	44	0.7
	30"	17' - 1"	297	2.8	4' - 5 ¾"	40	0.6	19' - 1"	311	3.1	5' - 0"	42	0.6	23' - 4"	388	3.8	6' - 1 ¾"	47	0.8
	33"	18' - 5"	320	3.3	4' - 9 ¾"	43	0.6	20' - 6"	358	3.6	5' - 4 ¾"	46	0.7	25' - 1"	439	4.4	6' - 7 ¼"	51	0.9
	36"	19' - 8"	401	4.0	5' - 3"	47	0.9	21' - 11"	422	4.5	5' - 10 ¾"	50	0.9	26' - 10"	517	5.5	7' - 2 ¼"	55	1.2
	42"	22' - 3"	476	5.0	6' - 0 ¾"	53	1.1	24' - 10"	528	5.6	6' - 8 ¾"	56	1.2	30' - 5"	634	6.9	8' - 3"	76	1.4
	48"	25' - 11"	577	6.6	6' - 9 ¾"	60	1.3	28' - 10"	637	7.3	7' - 7 ¼"	79	1.5	35' - 4"	791	9.0	9' - 3 ¾"	88	1.8
	54"	28' - 6"	711	7.8	7' - 9"	83	1.6	31' - 9"	781	8.7	8' - 8"	81	1.8	38' - 11"	958	10.7	10' - 7 ¼"	97	2.2
	60"	31' - 1"	805	9.2	8' - 6 ¼"	91	1.9	34' - 8"	881	10.2	9' - 6 ¼"	97	2.1	42' - 5"	1,113	12.5	11' - 8"	124	2.6
	66"	33' - 8"	907	10.6	9' - 0 ¾"	98	2.1	37' - 6"	1,028	11.8	10' - 1 ¼"	102	2.4	46' - 0"	1,235	14.5	12' - 4 ¼"	132	2.9
	72"	36' - 3"	1,071	12.1	9' - 8"	105	2.4	40' - 5"	1,207	13.5	10' - 9 ¼"	110	2.6	49' - 6"	1,446	16.6	13' - 2 ¼"	141	3.2
3:1	12"	13' - 6"	178	1.6	1' - 9 ¾"	15	0.2	15' - 0"	189	1.8	2' - 0"	15	0.2	18' - 5"	237	2.2	2' - 5 ¾"	17	0.2
	15"	15' - 3"	212	1.9	2' - 3"	17	0.2	17' - 0"	223	2.1	2' - 6"	17	0.3	20' - 10"	276	2.6	3' - 0 ¾"	20	0.3
	18"	17' - 1"	231	2.3	2' - 9"	19	0.3	19' - 1"	259	2.5	3' - 1"	29	0.3	23' - 4"	318	3.1	3' - 9 ¼"	32	0.4
	21"	18' - 11"	306	2.7	3' - 2 ¼"	31	0.4	21' - 1"	339	3.0	3' - 6 ¾"	33	0.4	25' - 10"	413	3.7	4' - 4 ¼"	36	0.5
	24"	20' - 8"	345	3.1	3' - 8 ¾"	35	0.4	23' - 1"	384	3.5	4' - 1 ¾"	36	0.5	28' - 3"	462	4.2	5' - 0 ¾"	40	0.6
	27"	22' - 6"	376	3.7	4' - 0 ¾"	38	0.5	25' - 1"	438	4.1	4' - 6 ¼"	39	0.6	30' - 9"	522	5.0	5' - 6 ¼"	44	0.7
	30"	24' - 4"	422	4.1	4' - 5 ¾"	40	0.6	27' - 2"	466	4.6	5' - 0"	42	0.6	33' - 3"	578	5.6	6' - 1 ¾"	47	0.8
	33"	26' - 2"	476	4.8	4' - 10"	43	0.6	29' - 2"	522	5.3	5' - 4 ¾"	46	0.7	35' - 9"	644	6.5	6' - 7 ¼"	51	0.9
	36"	27' - 11"	590	5.9	5' - 3"	47	0.8	31' - 2"	645	6.6	5' - 10 ¾"	50	0.9	38' - 2"	787	8.0	7' - 2 ¼"	56	1.2
	42"	31' - 7"	684	7.3	6' - 0 ¼"	53	1.1	35' - 3"	776	8.2	6' - 8 ¾"	56	1.2	43' - 2"	933	10.0	8' - 3"	79	1.4
	48"	36' - 9"	880	9.6	6' - 9 ¾"	61	1.3	41' - 0"	953	10.7	7' - 7 ¼"	81	1.5	50' - 2"	1,166	13.1	9' - 3 ¾"	88	1.8
	54"	40' - 5"	1,065	11.4	7' - 9"	85	1.6	45' - 0"	1,185	12.7	8' - 8"	89	1.8	55' - 2"	1,435	15.5	10' - 7 ¼"	97	2.2
	60"	44' - 0"	1,224	13.3	8' - 6 ¼"	93	1.9	49' - 1"	1,356	14.8	9' - 6 ¼"	96	2.1	60' - 1"	1,635	18.2	11' - 8"	124	2.6
	66"	47' - 7"	1,357	15.4	9' - 1"	98	2.1	53' - 1"	1,497	17.2	10' - 1 ¼"	103	2.3	65' - 1"	1,892	21.1	12' - 4 ¼"	130	2.9
	72"	51' - 3"	1,624	17.7	9' - 8"	105	2.3	57' - 2"	1,787	19.7	10' - 9 ¼"	109	2.6	70' - 0"	2,218	24.1	13' - 2 ¼"	139	3.2
4:1	12"	17' - 7"	232	2.1	1' - 9 ¾"	15	0.2	19' - 8"	259	2.4	2' - 0"	16	0.2	24' - 0"	314	2.9	2' - 5 ¾"	18	0.2
	15"	19' - 11"	272	2.5	2' - 3"	17	0.2	22' - 3"	301	2.8	2' - 6"	18	0.3	27' - 3"	361	3.5	3' - 0 ¾"	21	0.3
	18"	22' - 3"	313	3.0	2' - 9"	19	0.3	24' - 10"	344	3.3	3' - 1"	29	0.3	30' - 5"	427	4.0	3' - 9 ¼"	32	0.4
	21"	24' - 7"	407	3.6	3' - 2 ¼"	31	0.4	27' - 5"	446	4.0	3' - 6 ¾"	33	0.4	33' - 7"	549	4.9	4' - 4 ¼"	36	0.5
	24"	26' - 11"	455	4.1	3' - 8 ¾"	35	0.4	30' - 0"	499	4.5	4' - 1 ¾"	36	0.5	36' - 9"	609	5.6	5' - 0 ¾"	40	0.6
	27"	29' - 3"	514	4.8	4' - 0 ¾"	38	0.5	32' - 7"	562	5.4	4' - 6 ¼"	40	0.6	39' - 11"	703	6.6	5' - 6 ¼"	43	0.7
	30"	31' - 7"	568	5.4	4' - 5 ¾"	40	0.6	35' - 3"	620	6.0	5' - 0"	42	0.6	43' - 2"	768	7.4	6' - 1 ¾"	49	0.8
	33"	33' - 11"	634	6.2	4' - 10"	43	0.7	37' - 10"	710	7.0	5' - 4 ¾"	46	0.7	46' - 4"	848	8.5	6' - 7 ¼"	52	0.9
	36"	36' - 3"	776	7.7	5' - 3"	48	0.9	40' - 5"	868	8.6	5' - 10 ¾"	49	0.9	49' - 6"	1,058	10.6	7' - 2 ¼"	56	1.1
	42"	40' - 11"	921	9.6	6' - 0 ¼"	53	1.0	45' - 7"	1,022	10.7	6' - 8 ¾"	57	1.2	55' - 10"	1,262	13.1	8' - 3"	78	1.4
	48"	47' - 7"	1,152	12.6	6' - 10"	61	1.3	53' - 1"	1,268	14.0	7' - 7 ¼"	80	1.5	65' - 1"	1,587	17.2	9' - 3 ¾"	86	1.8
	54"	52' - 3"	1,416	14.9	7' - 9 ¼"	86	1.6	58' - 4"	1,589	16.6	8' - 8"	89	1.8	71' - 5"	1,924	20.4	10' - 7 ¼"	95	2.2
	60"	56' - 11"	1,606	17.5	8' - 6 ¾"	92	1.9	63' - 6"	1,806	19.5	9' - 6 ¼"	95	2.1	77' - 9"	2,192	23.9	11' - 8"	122	2.6
	66"	61' - 7"	1,819	20.2	9' - 0 ¾"	97	2.1	68' - 8"	2,019	22.5	10' - 1 ¼"	101	2.4	84' - 2"	2,472	27.6	12' - 4 ¼"	131	2.9
	72"	66' - 3"	2,150	23.2	9' - 8"	104	2.4	73' - 11"	2,379	25.9	10' - 9 ¼"	108	2.6	90' - 6"	2,937	31.7	13' - 2 ¼"	138	3.2
6:1	12"	25' - 11"	342	3.1	1' - 9 ¾"	15	0.2	28' - 10"	374	3.5	2' - 0"	16	0.2	35' - 4"	456	4.3	2' - 5 ¾"	17	0.2
	15"	29' - 3"	390	3.7	2' - 3"	17	0.2	32' - 7"	442	4.2	2' - 6"	18	0.2	39' - 11"	549	5.1	3' - 0 ¾"	20	0.3
	18"	32' - 7"	459	4.4	2' - 9"	20	0.3	36' - 4"	515	4.9	3' - 1"	29	0.3	44' - 7"	629	6.0	3' - 9 ¼"	33	0.4
	21"	36' - 0"	608	5.3	3' - 2 ¼"	31	0.4	40' - 2"	660	5.9	3' - 6 ¾"	33	0.4	49' - 2"	823	7.2	4' - 4 ¼"	38	0.5
	24"	39' - 4"	672	6.0	3' - 8 ¾"	35	0.4	43' - 11"	748	6.7	4' - 1 ¾"	36	0.5	53' - 9"	920	8.2	5' - 0 ¾"	42	0.6
	27"	42' - 8"	770	7.1	4' - 0 ¾"	38	0.5	47' - 8"	852	8.0	4' - 6 ¼"	41	0.5	58' - 4"	1,039	9.7	5' - 6 ¼"	45	0.7
	30"	46' - 1"	839	8.0	4' - 5 ¾"	40	0.6	51' - 5"	949	8.9	5' - 0"	44	0.6	62' - 11"	1,162	10.9	6' - 1 ¾"	48	0.8
	33"	49' - 5"	947	9.2	4' - 10"	45	0.7	55' - 2"	1,040	10.3	5' - 4 ¾"	48	0.7	67' - 6"	1,292	12.6	6' - 7 ¼"	50	0.9
	36"	52' - 10"	1,151	11.4	5' - 3"	49	0.8	58' - 11"	1,287	12.7	5' - 10 ¾"	51	1.0	72' - 1"	1,583	15.6	7' - 2 ¼"	55	1.1
	42"	59' - 6"	1,365	14.2	6' - 0 ¼"	55	1.0	66' - 5"	1,530	15.8	6' - 8 ¾"	57	1.2	81' - 4"	1,875	19.4	8' - 3"	76	1.4
	48"	69' - 4"	1,737	18.5	6' - 10"	59	1.3	77' - 4"	1,942	20.7	7' - 7 ¼"	79	1.5	94' - 9"	2,368	25.3	9' - 3 ¾"	86	1.8
	54"	76' - 1"	2,138	22.0	7' - 9 ¼"	83	1.6	84' - 10"	2,378	24.6	8' - 8"	87	1.8	103' - 11"	2,912	30.1	10' - 7 ¼"	95	2.2
	60"	82' - 10"	2,426	25.8	8' - 6 ¾"	90	1.9	92' - 5"	2,681	28.8	9' - 6 ¼"	94	2.1	113' - 2"	3,294	35.3	11' - 8"	122	2.6
	66"	89' - 7"	2,730	29.9	9' - 0 ¾"	96	2.1	99' - 11"	3,038	33.3	10' - 1 ¼"	101	2.4	122' - 4"	3,697	40.8	12' - 4 ¼"	130	2.9
	72"	96' - 3"	3,218	34.2	9' - 8"	102	2.4	107' - 5"	3,580	38.2	10' - 9 ¼"	108	2.6	131' - 6"	4,372	46.8	13' - 2 ¼"	139	3.2



ELEVATION

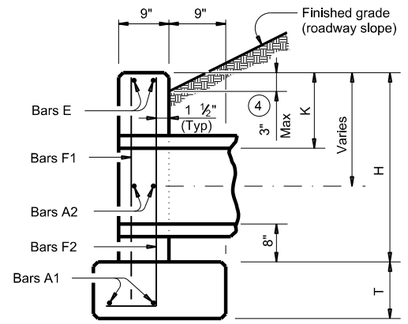


Lengths of wings based on SL:1 slope along this line.

3 Toe of slope

PLAN OF SKEWED PIPES

Showing 30° skew.



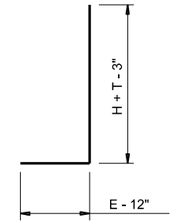
SECTION AT CENTER OF PIPE

TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (5)	H	T	E
12"	0' - 9"	1' - 0"	2' - 8"	0' - 9"	1' - 9"
15"	0' - 11"	1' - 0"	2' - 11"	0' - 9"	1' - 9"
18"	1' - 2"	1' - 0"	3' - 2"	0' - 9"	1' - 9"
21"	1' - 4"	1' - 0"	3' - 5"	0' - 9"	2' - 0"
24"	1' - 7"	1' - 0"	3' - 8"	0' - 9"	2' - 0"
27"	1' - 8"	1' - 0"	3' - 11"	0' - 9"	2' - 3"
30"	1' - 10"	1' - 0"	4' - 2"	0' - 9"	2' - 3"
33"	1' - 11"	1' - 0"	4' - 5"	0' - 9"	2' - 6"
36"	2' - 1"	1' - 0"	4' - 8"	1' - 0"	2' - 6"
42"	2' - 4"	1' - 0"	5' - 2"	1' - 0"	2' - 9"
48"	2' - 7"	1' - 3"	5' - 11"	1' - 0"	3' - 0"
54"	3' - 0"	1' - 3"	6' - 5"	1' - 0"	3' - 3"
60"	3' - 3"	1' - 3"	6' - 11"	1' - 0"	3' - 6"
66"	3' - 3"	1' - 3"	7' - 5"	1' - 0"	3' - 9"
72"	3' - 4"	1' - 3"	7' - 11"	1' - 0"	4' - 0"

TABLE OF REINFORCING STEEL (6)

Bar	Size	Spa	No.
A1	#5	~	2
A2	#5	1' - 6"	~
E	#5	~	2
F	#5	1' - 0"	~



BARS F2

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing dimensions are out-to-out of bars.

(1) Total quantites include one 3'-1" lap for bars over 60' in length.

(2) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(3) Indicated slope is perpendicular to centerline pipe or pipes.

(4) For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(5) Dimensions shown are usual and maximum.

(6) Quantities shown are for one structure end only (one headwall).

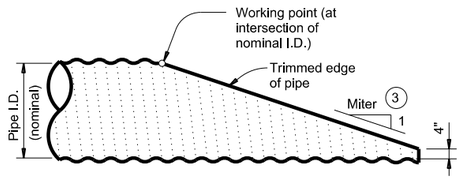
Texas Department of Transportation

Bridge Division Standard

CONCRETE HEADWALLS
WITH PARALLEL WINGS FOR SKEWED PIPE CULVERTS

CH-PW-S

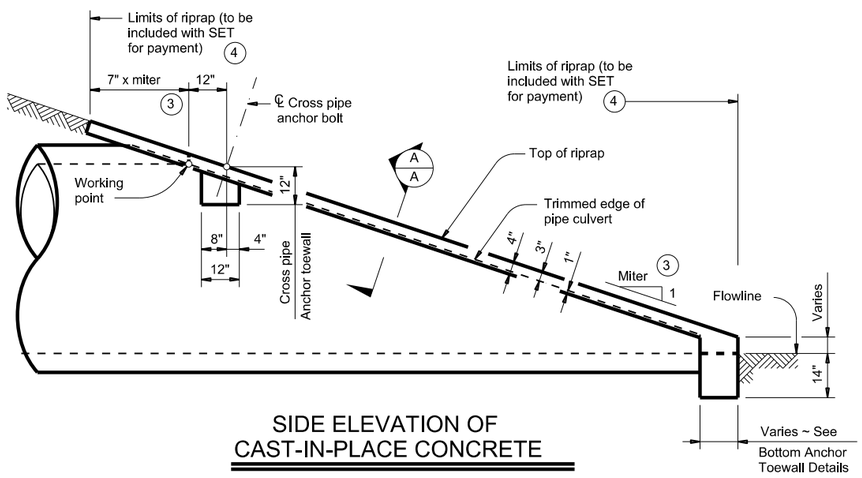
FILE: chpwsste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		158



NOTE: All pipe runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

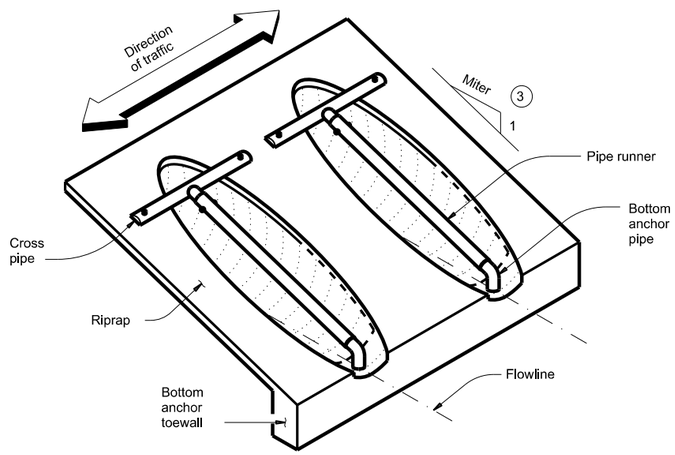
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert. Details of reinforced concrete pipe (RCP) culvert are similar.)



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details of corrugated metal pipe (CMP) culvert are similar. Pipe runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS (1) (2)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' - 7"	3' - 5"	N/A	N/A	N/A	5' - 10"	N/A	N/A	N/A	8' - 1"	N/A	N/A	N/A	12' - 9"
27"	1' - 8"	3' - 8"	N/A	N/A	5' - 5"	6' - 11"	N/A	N/A	7' - 7"	9' - 7"	N/A	N/A	11' - 11"	14' - 11"
30"	1' - 10"	3' - 11"	N/A	N/A	6' - 4"	8' - 0"	N/A	N/A	8' - 9"	11' - 0"	N/A	N/A	13' - 8"	17' - 0"
33"	1' - 11"	4' - 2"	6' - 2"	6' - 5"	7' - 3"	9' - 1"	8' - 6"	8' - 10"	10' - 0"	12' - 5"	13' - 3"	13' - 9"	15' - 5"	19' - 2"
36"	2' - 1"	4' - 5"	6' - 11"	7' - 3"	8' - 2"	10' - 2"	9' - 6"	9' - 11"	11' - 2"	13' - 10"	14' - 9"	15' - 3"	17' - 2"	21' - 3"
42"	2' - 4"	4' - 11"	8' - 6"	8' - 10"	9' - 11"	12' - 4"	11' - 7"	12' - 0"	13' - 6"	16' - 8"	17' - 9"	18' - 5"	20' - 8"	25' - 7"
48"	2' - 7"	5' - 5"	10' - 1"	10' - 5"	11' - 9"	N/A	13' - 7"	14' - 2"	15' - 10"	N/A	20' - 9"	21' - 6"	24' - 2"	N/A
54"	3' - 0"	5' - 11"	11' - 8"	12' - 1"	N/A	N/A	15' - 8"	16' - 3"	N/A	N/A	23' - 10"	24' - 8"	N/A	N/A
60"	3' - 3"	6' - 5"	13' - 3"	N/A	N/A	N/A	17' - 9"	N/A	N/A	N/A	26' - 10"	N/A	N/A	N/A

TYPICAL PIPE CULVERT MITERS (3)

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS (1)

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10' - 0"
4" STD	4.500"	4.026"	19' - 8"
5" STD	5.563"	5.047"	34' - 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

(1) Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.

(2) This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT Roadway Design Manual.

(3) Miter = slope of mitered end of pipe culvert.

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(5) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

Texas Department of Transportation

Bridge Division Standard

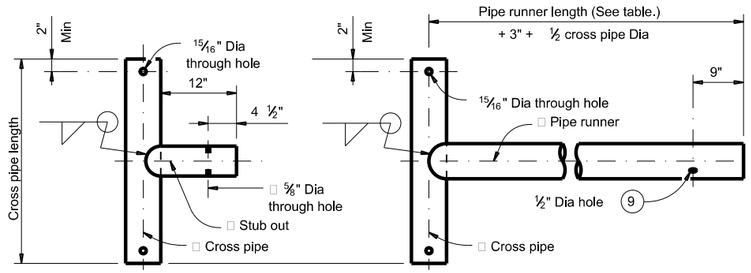
SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

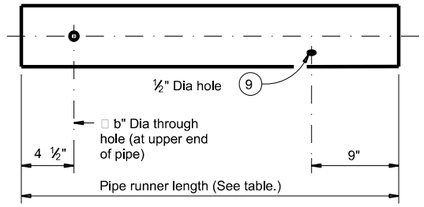
FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		159

DATE: 7/28/2022 11:53:10 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\13A. setpcdse-20.dgn



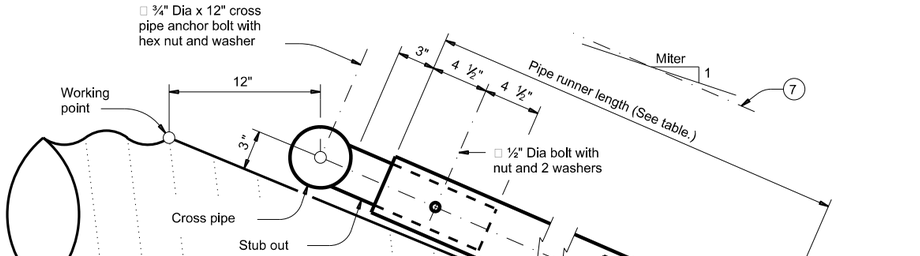
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



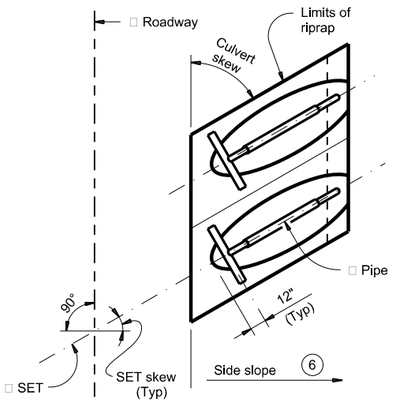
NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

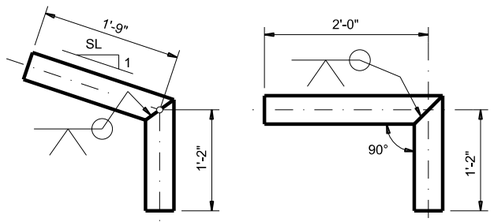


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity)

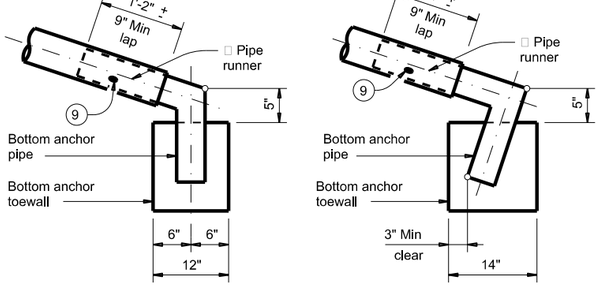


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

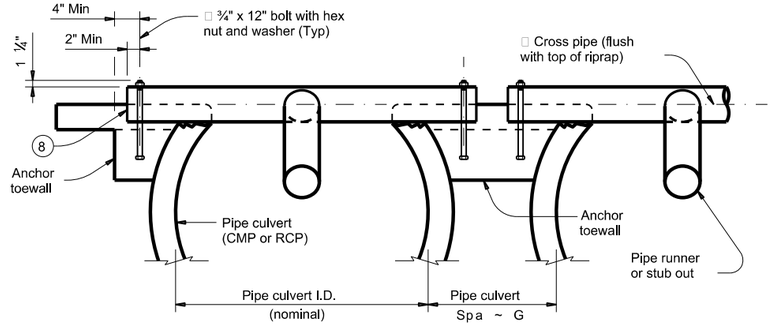
BOTTOM ANCHOR PIPE DETAILS (10)



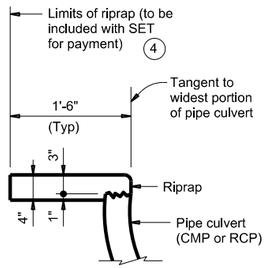
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)



SHOWING CROSS PIPE AND ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SECTION A-A

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Recommended values of side slope are 3:1, 4:1, and 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

(7) Note that actual slope of pipe runner may vary slightly from side slope of riprap and trimmed culvert pipe edge.

(8) Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, inspect the 1/2" hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide pipe runners, cross pipes, and anchor pipes conforming to the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

Payment for riprap and toewall is included in the price bid for each safety end treatment.

Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

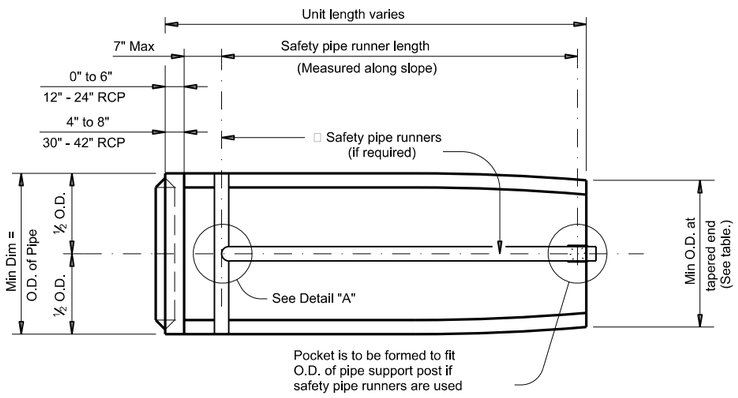
FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		160

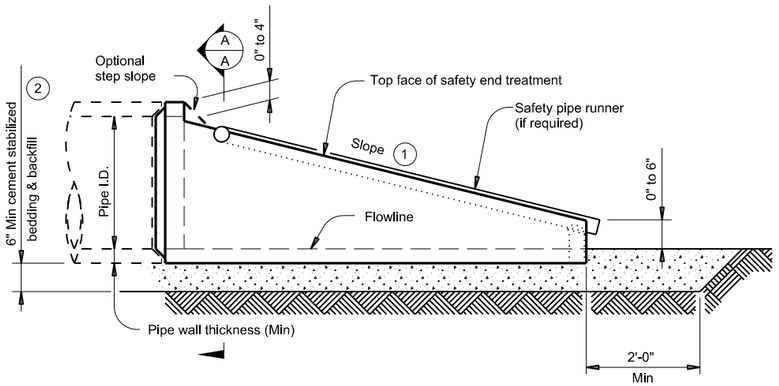
DATE: 7/28/2022 11:53:24 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\13A. setpcdse-20.dgn

DATE: 7/28/2022 12:34:13 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\14. psetrcss-20.dgn



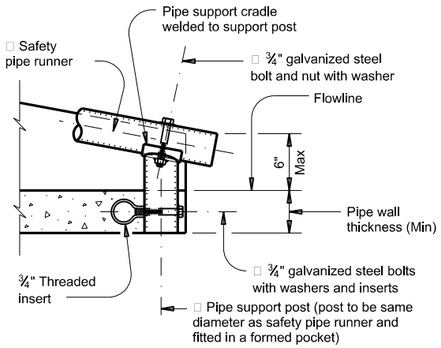
PLAN VIEW

(Showing spigot end connection.)



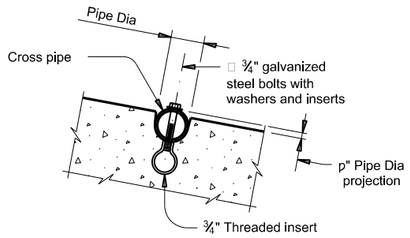
LONGITUDINAL ELEVATION

(Showing spigot end connection.)



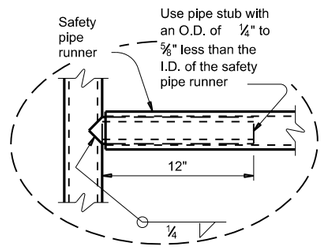
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

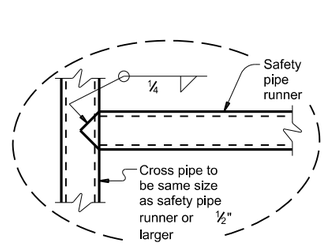


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

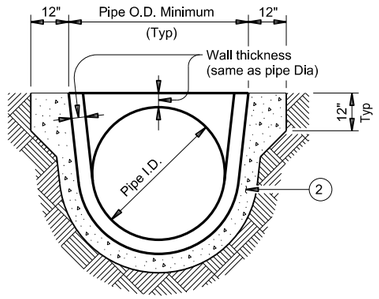


OPTION A

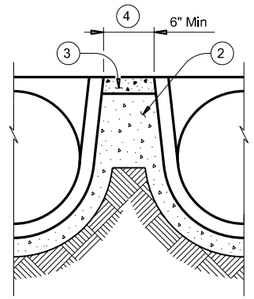


OPTION B

DETAIL A



SECTION A-A



MULTIPLE PIPE INSTALLATION

MAX SAFETY PIPE RUNNER LENGTHS AND REQUIRED SAFETY PIPE RUNNER SIZES

Max Safety Pipe Runner Length	Required Pipe Runner Size		
	Pipe Size	Pipe O.D.	Pipe I.D.
11' - 2"	3" STD	3.500"	3.068"
15' - 6"	3 ½" STD	4.000"	3.548"
20' - 10"	4" STD	4.500"	4.026"
35' - 4"	5" STD	5.563"	5.047"

1. Slope as shown elsewhere in the plans. Slope of 3:1 or flatter is required for vehicle safety.
2. Provide cement stabilized bedding and backfill in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.
3. Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap be considered subsidiary to the Item "Safety End Treatment".
4. Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	Min Wall Thickness	Min O.D.	Min O.D. at Tapered End	Min Reinf Requirements (sq. in. / ft. of pipe)	Slope	Minimum Length of Unit	Single Pipe		Multiple Pipe	
							Skew	Pipe Runners Required	Skew	Pipe Runners Required
12"	2"	16"	16"	0.07 Circ.	3:1	2' - 0"	≤ 45°	No	≤ 45°	No
					4:1	2' - 8"				
					6:1	4' - 0"				
15"	2 ¼"	19 ½"	19"	0.07 Circ.	3:1	2' - 10"	≤ 45°	No	≤ 45°	No
					4:1	3' - 9"				
					6:1	5' - 8"				
18"	2 ½"	23"	21 ½"	0.07 Circ.	3:1	3' - 8"	≤ 45°	No	≤ 45°	No
					4:1	4' - 10"				
					6:1	7' - 3"				
24"	3"	30"	27"	0.07 Circ.	3:1	5' - 3"	≤ 45°	No	≤ 30°	No
					4:1	7' - 0"			> 30°	Yes
					6:1	10' - 6"				
30"	3 ½"	37"	31"	0.18 Circ.	3:1	6' - 3"	≤ 15°	No	≤ 15°	No
					4:1	8' - 2"	> 15°	Yes	> 15°	Yes
					6:1	12' - 1"				
36"	4"	44"	36"	0.19 Ellip.	3:1	7' - 10"	= 0°	No	≥ 0 °	Yes
					4:1	10' - 4"	> 0°	Yes		
					6:1	15' - 4"				
42"	4 ½"	51"	41 ½"	0.23 Ellip.	3:1	9' - 6"	≥ 0 °	Yes	≥ 0 °	Yes
					4:1	12' - 6"				
					6:1	18' - 7"				

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide safety pipe runners, cross pipes, pipe support posts, and pipe stubs meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (CRP) may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

Manufacture precast concrete end sections in accordance with Item 464, "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.

Provide precast concrete end sections with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for grout, mortar, cold applied asphalt joint compound or pre-formed plastic gasket material.

Methods of lifting shall be provided by the manufacturer for ease of loading, unloading, and installation.

Pipe runners are designed for a traversing load of 1,800 Lbs at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Texas Department of Transportation

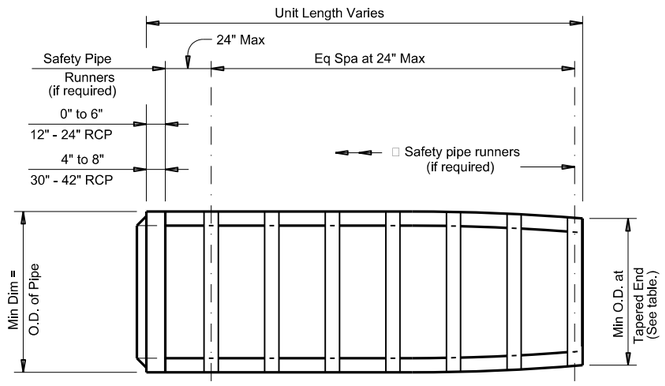
Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

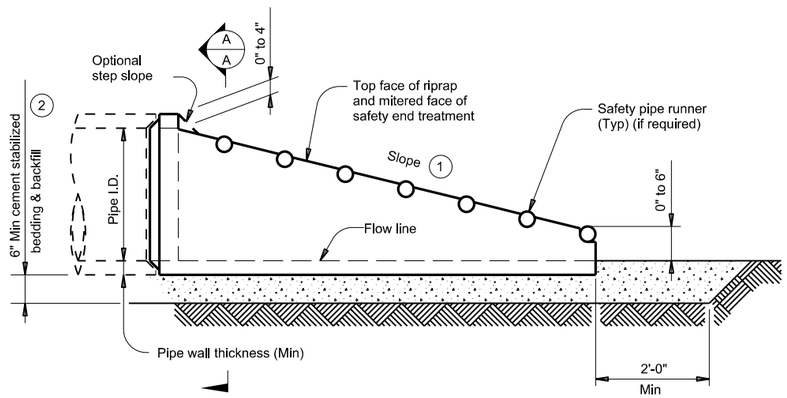
PSET-RC

FILE: psetrcss-20.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		161



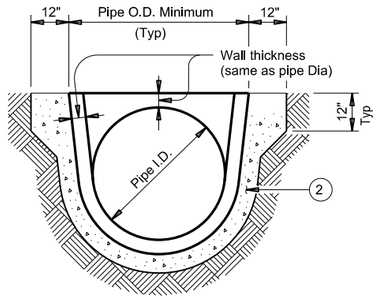
PLAN VIEW - 12" THRU 24"

(Showing spigot end connection.)

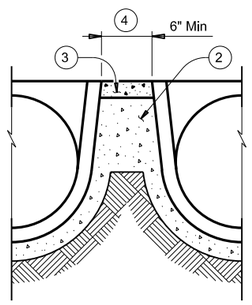


LONGITUDINAL ELEVATION - 12" THRU 24"

(Showing spigot end connection.)



SECTION A-A



MULTIPLE PIPE INSTALLATION

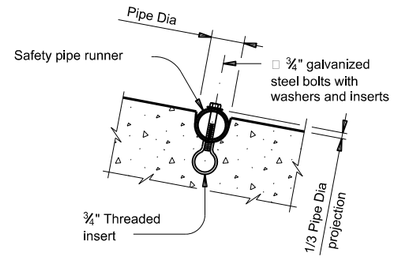
(1) Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.

Provide cement stabilized bedding and backfill in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

(3) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".

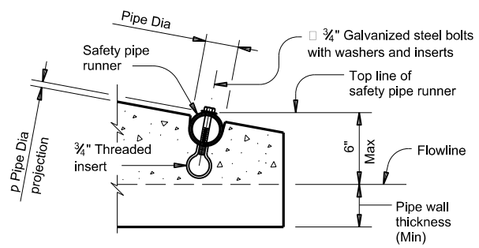
(4) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

(5) Safety pipe runners are required for multiple pipe culverts with more than two pipes.

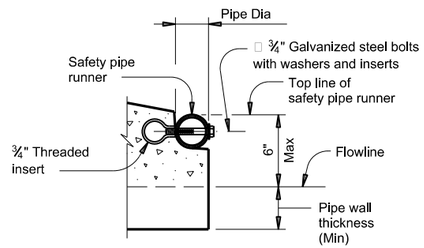


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



OPTION A



OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	Min Wall Thickness	Min O.D.	Min O.D. at Tapered End	Min Reinf Requirements (sq. in. per ft. of Pipe)	Max Slope	Min Length of Unit	Pipe Runner Requirements		Required Pipe Runner Sizes		
							Single Pipe	Multiple Pipe	Nominal Dia	O.D.	I.D.
12"	2"	16"	16"	0.07 Circ.	6:1	4' - 0"	No	(5)	3" STD	3.500"	3.068"
15"	2 ¼"	19 ½"	19"	0.07 Circ.	6:1	5' - 8"	No	(5)	3" STD	3.500"	3.068"
18"	2 ½"	23"	21 ½"	0.07 Circ.	6:1	7' - 3"	No	(5)	3" STD	3.500"	3.068"
24"	3"	30"	27"	0.07 Circ.	6:1	10' - 6"	No	(5)	3" STD	3.500"	3.068"
30"	3 ½"	37"	31"	0.18 Circ.	6:1	12' - 1"	No	Yes	4" STD	4.500"	4.026"
36"	4"	44"	36"	0.19 Ellip.	6:1	15' - 4"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 ½"	51"	41 ½"	0.23 Ellip.	6:1	18' - 7"	Yes	Yes	4" STD	4.500"	4.026"

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Galvanize steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP) may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

Manufacture precast concrete end sections in accordance with Item 464, "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.

Provide precast concrete end sections with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for grout, mortar, cold applied asphalt joint compound or pre-formed plastic gasket material.

Methods of lifting shall be provided by the manufacturer for ease of loading, unloading and installation.

Pipe runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

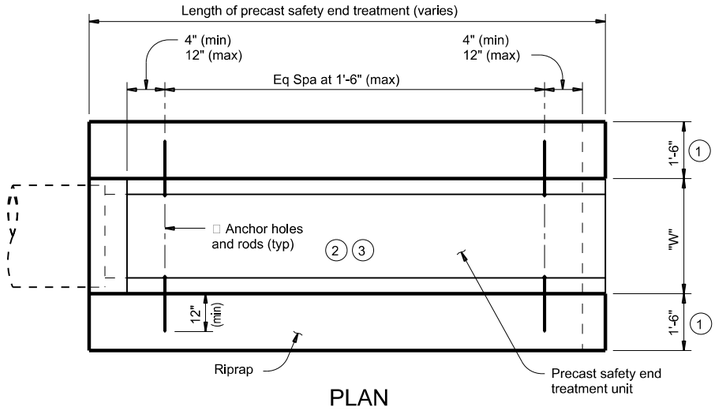
TYPE II ~ PARALLEL DRAINAGE

PSET-RP

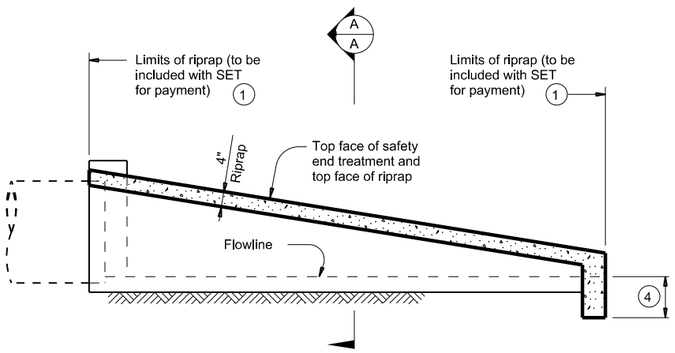
FILE: psetrpss-20.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		162

DATE: 7/28/2022 12:35:53 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\15. psetrpss-20.dgn

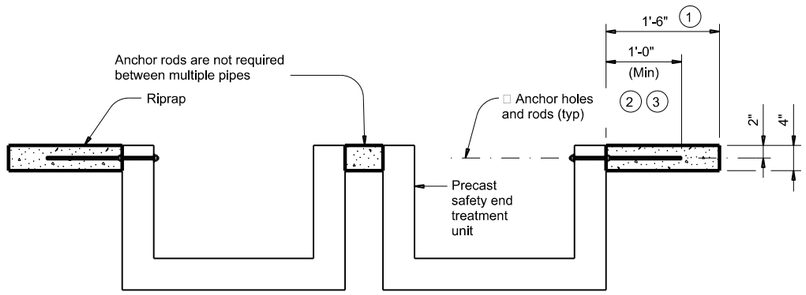
DATE: 7/28/2022 12:37:33 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\16. psetrrse-20.dgn



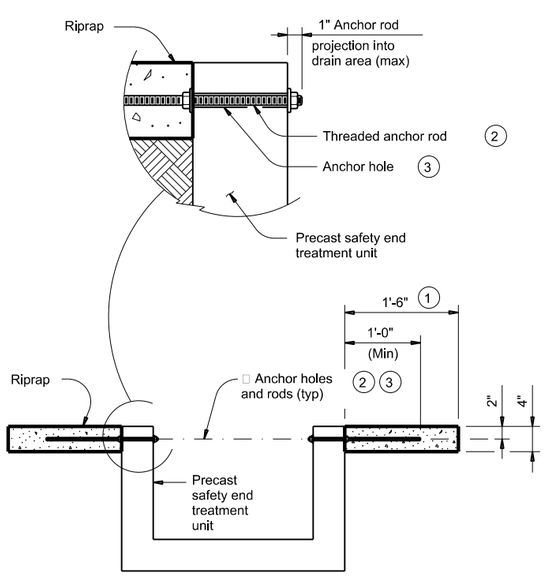
PLAN



LONGITUDINAL ELEVATION



MULTIPLE PIPE INSTALLATION



SINGLE PIPE INSTALLATION

SECTION A-A

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY)

5

Nominal Culvert (Pipe) I.D.	PSET-SC and PSET-SP Standards				PSET-RC and PSET-RP Standards			
	Unit Width "W"	Side Slope			Unit Width "W"	Side Slope		
		3:1	4:1	6:1		3:1	4:1	6:1
12"	23.0"	0.1	0.2	0.2	16.0"	0.1	0.1	0.2
15"	26.5"	0.2	0.2	0.3	19.5"	0.1	0.2	0.2
18"	30.0"	0.2	0.2	0.3	23.0"	0.2	0.2	0.3
24"	37.0"	0.3	0.3	0.5	30.0"	0.2	0.3	0.4
30"	44.5"	0.3	0.4	0.6	37.0"	0.3	0.3	0.5
36"	51.5"	0.4	0.5	0.7	44.0"	0.3	0.4	0.6
42"	58.5"	0.5	0.6	0.8	51.0"	0.4	0.5	0.7

(1) Riprap placed beyond the limits shown will be paid as concrete riprap in accordance with Item 432, "Riprap". When riprap is cast integrally with the precast safety end treatment, this dimension is 1'-0" minimum.

(2) 1#2" Dia ASTM A307 Gr A threaded anchor rod with 2 nuts and 2 washers. Galvanize all components in accordance with Item 445, "Galvanizing". Repair galvanizing that is damaged during transport or construction in accordance with the specifications.

(3) 3#4" through holes in walls of safety end treatment for riprap anchor rods may be drilled with rotary (coring or masonry) type drilling equipment or may be formed. Do not use percussive (star) type drilling equipment. If holes are drilled, patch spalls in the inside face of the wall exceeding 1#2" from the holes.

(4) Provide riprap toe wall when dimension is shown elsewhere in the plans or when field conditions require a toe wall.

(5) Quantities shown are for one end of one reinforced concrete pipe culvert. For multiple pipe culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only. Quantities are based on the minimum unit lengths shown on the Precast Saftey End Treatment (SET) standard sheets.

MATERIAL NOTES:

Provide Class "B" riprap in accordance with Item 432, "Riprap".
Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise. The anchor rods shown are always required.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".
Refer to PSET-SC or PSET-SP standard sheets for details of square safety end treatments not shown. Refer to PSET-RC or PSET-RP standard sheets for details of round safety end treatments not shown.
For precast units with integrally cast riprap, substitute reinforcing steel in the amount on 0.26 in./ft. minimum for the threaded anchor rods shown. When requested, submit sealed engineering drawings for approval prior to construction. Shop drawings will not be required. Note that a proprietary precast unit with integral riprap is available from L&R Precast Concrete Works, Inc. (956) 583-6293 or www.lrprecast.com.
Payment for riprap and toewalls is included in the price bid for each safety end treatment.

These riprap details are only applicable when notes that require placement of riprap with precast safety end treatments are shown elsewhere in the plans.

Precast units with integrally cast riprap are permitted unless noted otherwise on the plans.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT
TYPE II
RIPRAP DETAILS

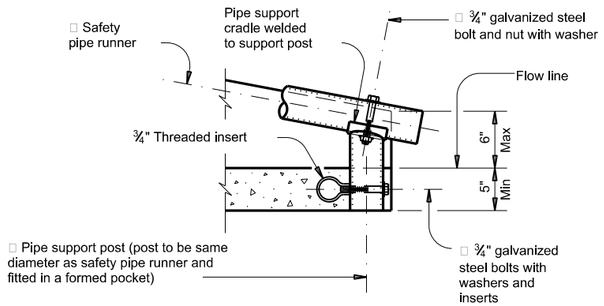
PSET-RR

FILE: psetrrse-20.dgn	DN: GAF	CK: TxDOT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		163

DATE: 7/28/2022 12:39:12 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\17. psetscss-20.dgn

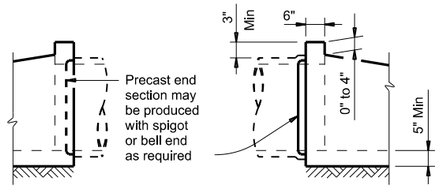
REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness (8)	"D" (1)	Slope	Min Length of Unit	Single Pipe Skew	Single Pipe Pipe Runners Required	Multiple Pipes Skew	Multiple Pipes Pipe Runners Required
12"	2"	1.15"	17.00"	3:1	2' - 11"	≤ 45°	No	≤ 45°	No
				4:1	3' - 6"				
				6:1	4' - 9"				
15"	2 ¼"	1.30"	20.50"	3:1	3' - 8"	≤ 45°	No	≤ 45°	No
				4:1	4' - 7"				
				6:1	6' - 5"				
18"	2 ½"	1.60"	24.00"	3:1	4' - 6"	≤ 45°	No	≤ 45°	No
				4:1	5' - 8"				
				6:1	8' - 0"				
24"	3"	1.95"	31.00"	3:1	6' - 2"	≤ 45°	No	= 30°	No
				4:1	7' - 10"			> 30°	Yes
				6:1	11' - 3"				
30"	3 ½"	2.65"	38.50"	3:1	7' - 10"	= 15°	No	= 15°	No
				4:1	10' - 1"	> 15°	Yes	> 15°	Yes
				6:1	14' - 8"				
36"	4"	2.75"	45.50"	3:1	9' - 5"	= 0°	No	≥ 0°	Yes
				4:1	12' - 3"	> 0°	Yes		
				6:1	17' - 11"				
42"	4 ½"	N/A	52.50"	3:1	11' - 1"	≥ 0°	Yes	≥ 0°	Yes
				4:1	14' - 5"				
				6:1	21' - 2"				



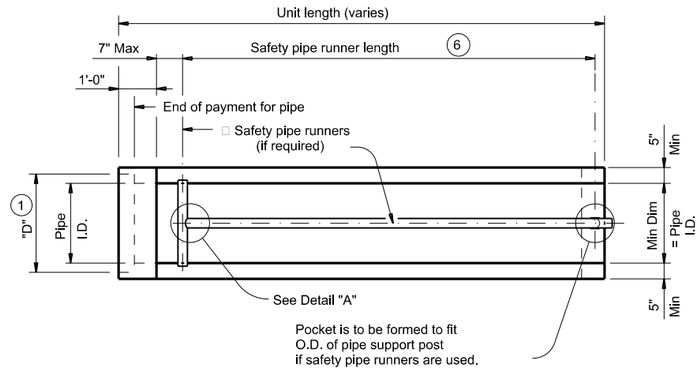
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)



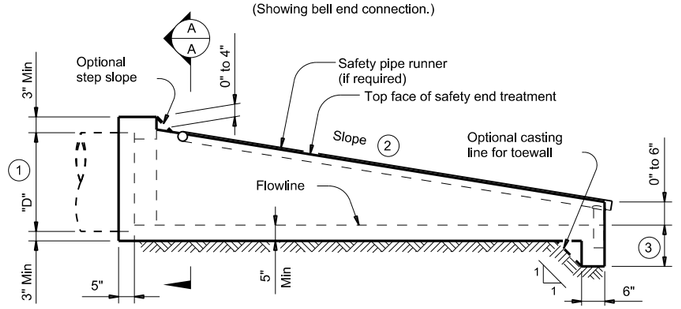
OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment)



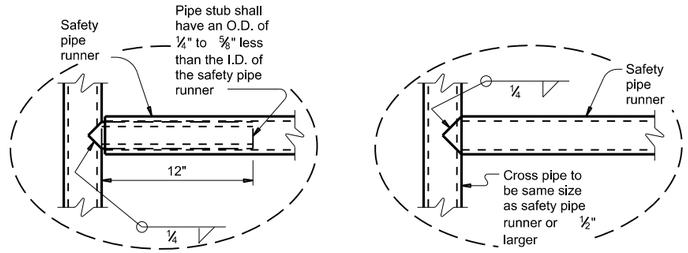
PLAN

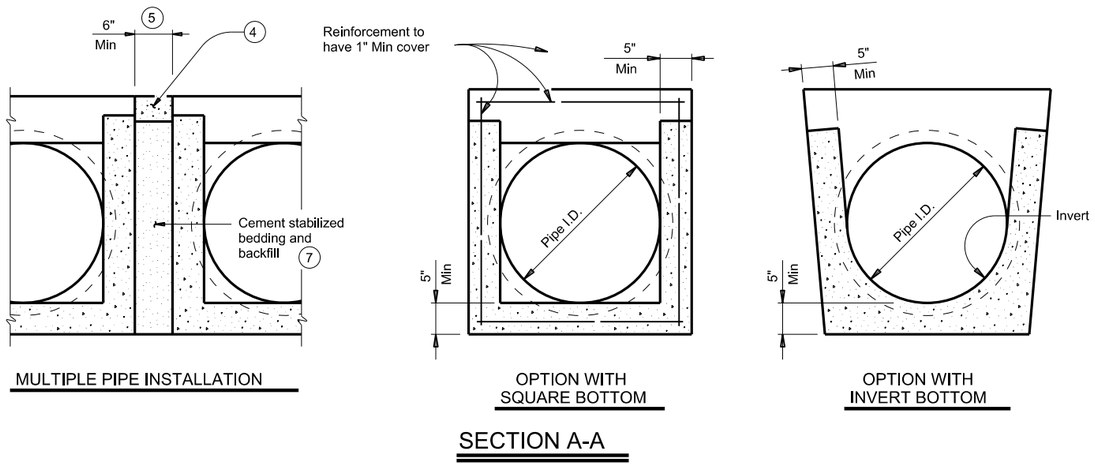
(Showing bell end connection.)

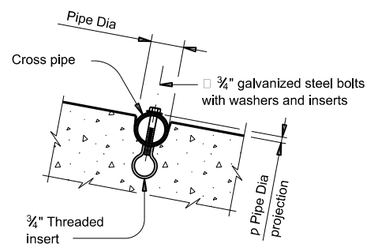


LONGITUDINAL ELEVATION

(Showing bell end connection.)







INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

SAFETY PIPE RUNNER DIMENSIONS

Max Safety Pipe Runner Length	Required Pipe Runner Size: Pipe Size	Pipe O.D.	Pipe I.D.
11' - 2"	3" STD	3.500"	3.068"
15' - 6"	3 ½" STD	4.000"	3.548"
20' - 10"	4" STD	4.500"	4.026"
35' - 4"	5" STD	5.563"	5.047"

(1) Dimension "D" is based on reinforced concrete pipe (RCP) meeting the requirements of ASTM C-76, Class III, (RCP Wall "B" thickness). Adjust "D" for any other wall thickness used. For thermoplastic pipe (TP) take into account the annular space requirements for grouted connections.

(2) Slope as shown elsewhere in plans. Slope of 3:1 or flatter is required for vehicle safety.

(3) Toewall to be used only when dimension is shown elsewhere in the plans.

(4) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".

(5) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

(6) Measured along slope.

(7) Provide cement stabilized bedding and backfill in accordance with the Item 400, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

(8) Thermoplastic pipe wall thickness may vary. Adjust accordingly. Thermoplastic pipe requires the safety end treatments to have a bell end for grouted connections.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Manufacture this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" - D12 x D12 or 5"x5" - D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor, the next larger size of safety end treatment may be furnished as long as the "D" dimension cast is that of the required size of pipe.

Pipe runners are designed for a traversing load of 1,800 Lbs at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Provide safety pipe runners, cross pipes, pipe support posts, and pipe stubs meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464 "Reinforced Concrete Pipe". Connect TP by grouting. See PBGC standard for grouted connections with TP and precast safety end treatment.

Texas Department of Transportation

Bridge Division Standard

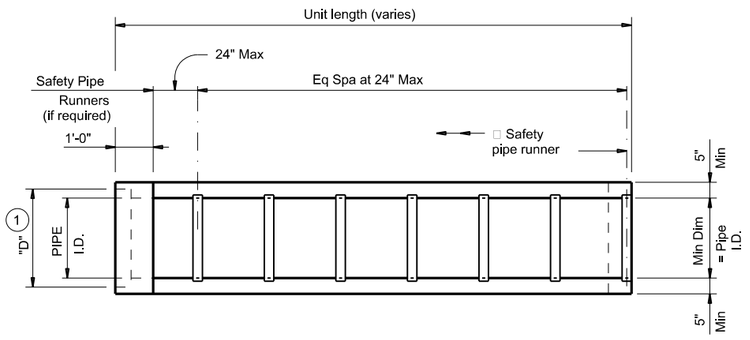
PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

PSET-SC

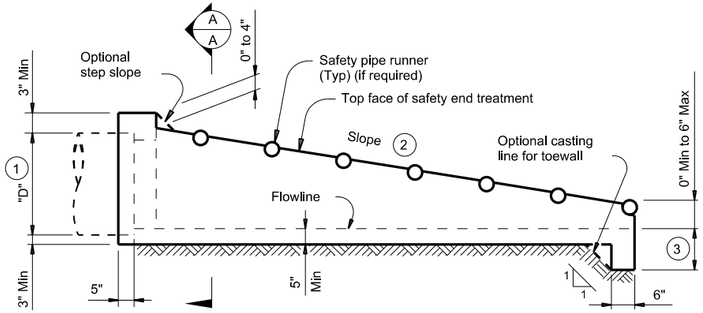
FILE: psetscss-20.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		164

DATE: 7/28/2022 12:40:59 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\18. pset spss-20.dgn



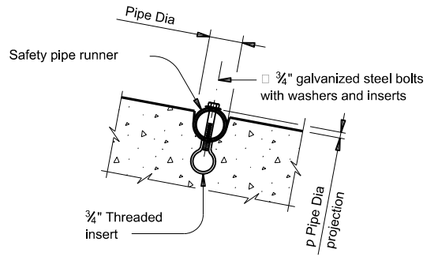
PLAN

(Showing bell end connection.)



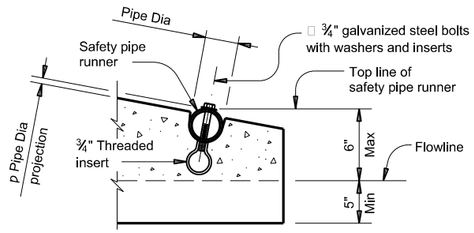
LONGITUDINAL ELEVATION

(Showing bell end connection.)

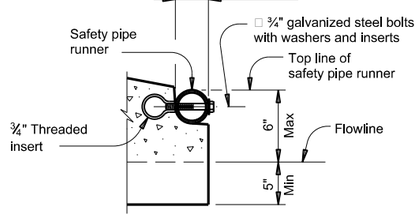


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



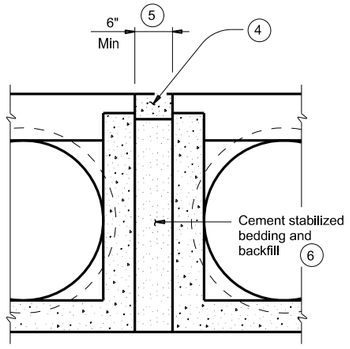
OPTION A



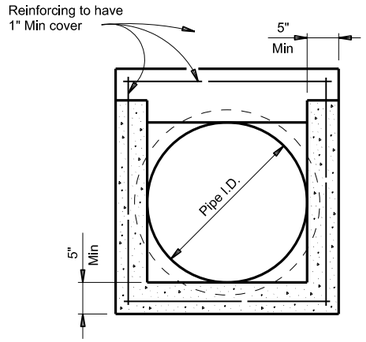
OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

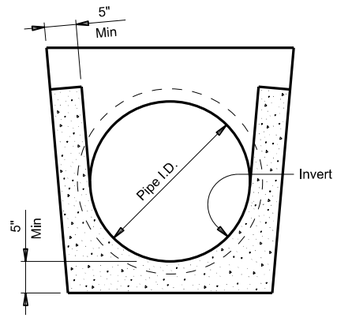
(If required)



MULTIPLE PIPE INSTALLATION

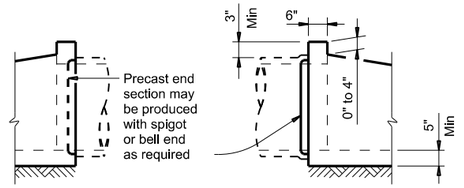


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment.)

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness (7)	"D" (1)	Slope	Min Length	Pipe Runners Required		Required Pipe Runner Size		
						Single Pipe	Multiple Pipe	Nominal Dia.	O.D.	I.D.
12"	2"	1.15"	17.00"	6:1	4' - 9"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
15"	2 ¼"	1.30"	20.50"	6:1	6' - 5"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
18"	2 ½"	1.60"	24.00"	6:1	8' - 0"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
24"	3"	1.95"	31.00"	6:1	11' - 3"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
30"	3 ½"	2.65"	38.50"	6:1	14' - 8"	No	Yes	4" STD	4.500"	4.026"
36"	4"	2.75"	45.50"	6:1	17' - 11"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 ½"	N/A	52.50"	6:1	21' - 2"	Yes	Yes	4" STD	4.500"	4.026"

(1) Dimension "D" is based on reinforced concrete pipe (RCP) meeting the requirements of ASTM C-76, Class III, (RCP Wall "B" thickness). Adjust "D" for any other wall thickness used. For thermoplastic pipe (TP) take into account the annular space requirements for grouted connections.

(2) Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.

(3) Toewall to be used only when dimension is shown elsewhere in the plans.

(4) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".

(5) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

(6) Provide cement stabilized bedding and backfill in accordance with the Item 400, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

(7) Thermoplastic pipe wall thickness may vary. Adjust accordingly. Thermoplastic pipe requires the safety end treatments to have a bell end for grouted connections.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Manufacture this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" - D12 x D12 or 5"x5" - D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor the next larger size of safety end treatment may be furnished; as long as the "D" dimension cast is that of the required size of pipe.

Pipe runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464, "Reinforced Concrete Pipe". Connect TP by grouting. See PBGC standard for grouted connections with TP and precast safety end treatment.

Texas Department of Transportation

Bridge Division Standard

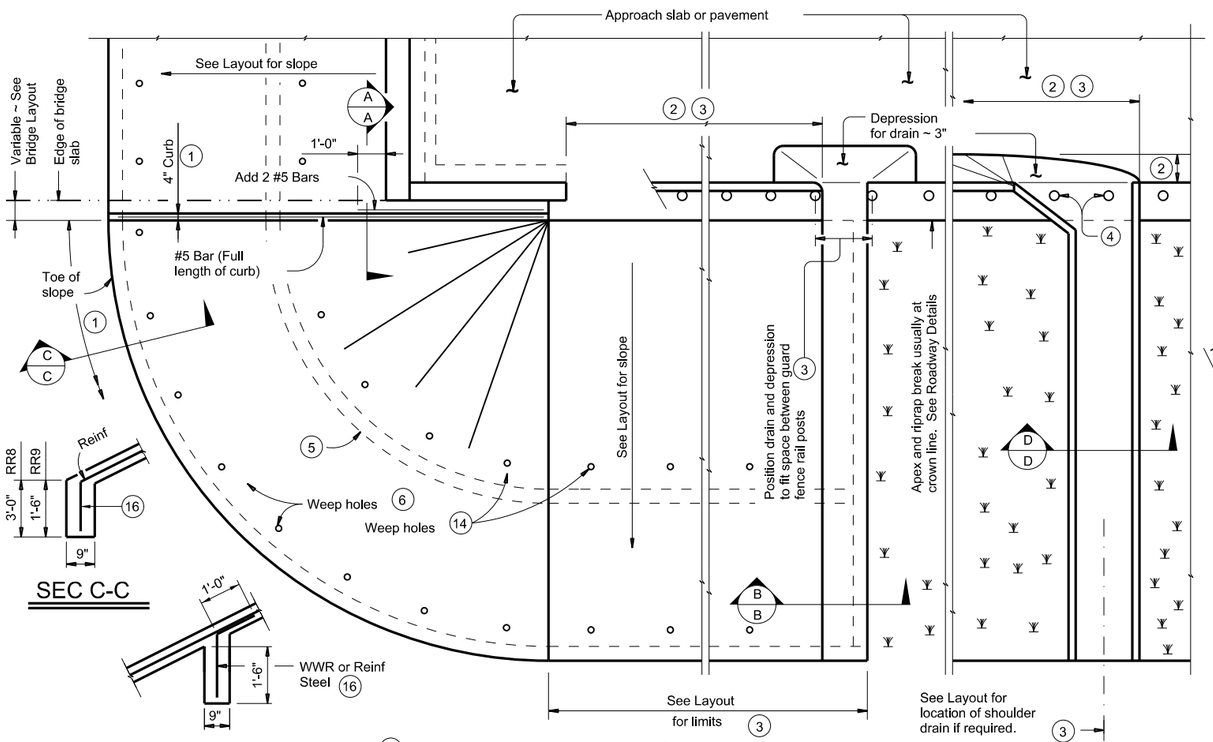
PRECAST SAFETY END TREATMENT

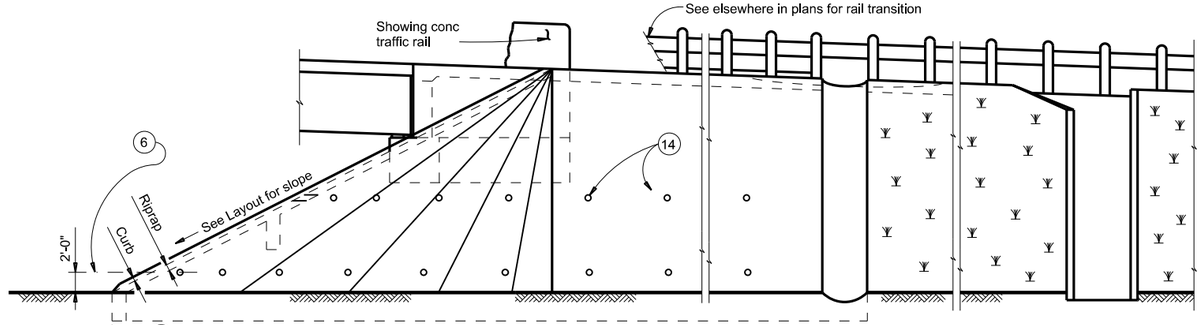
TYPE II ~ PARALLEL DRAINAGE

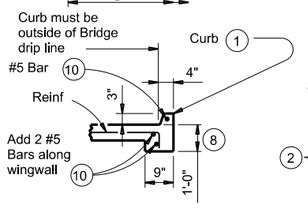
PSET-SP

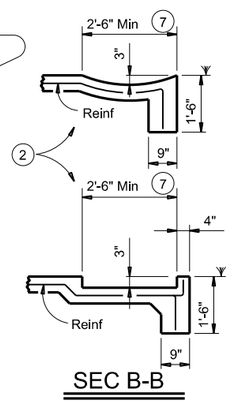
FILE: psetspss-20.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		165

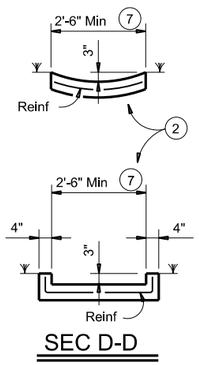
DATE: 7/28/2022 12:43:59 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\19. crrstde1-19.dgn

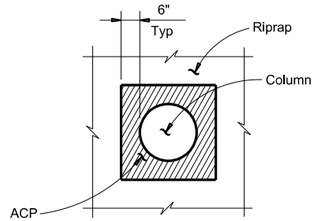






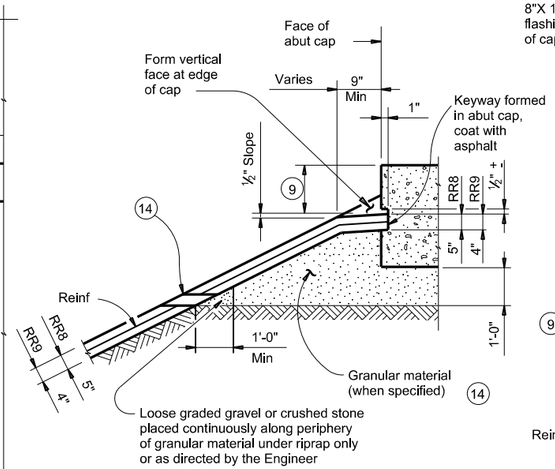




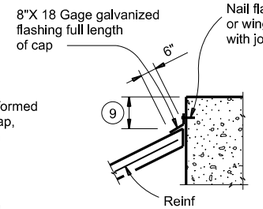


RIPRAP DETAIL AT COLUMNS

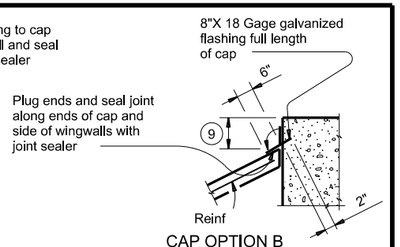
(As directed by the Engineer)



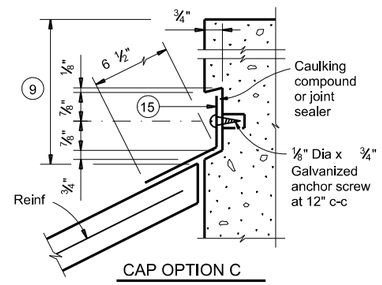
SHOWING KEYWAY OPTION



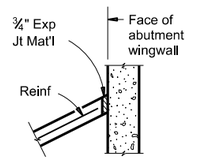
CAP OPTION A



CAP OPTION B

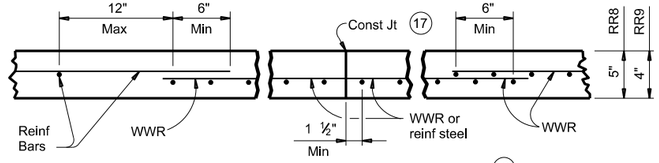


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic fiber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage Galv Sheet Metal
16. Provide WWR or #3 bars, with 1'-0" extension into slope.
17. WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

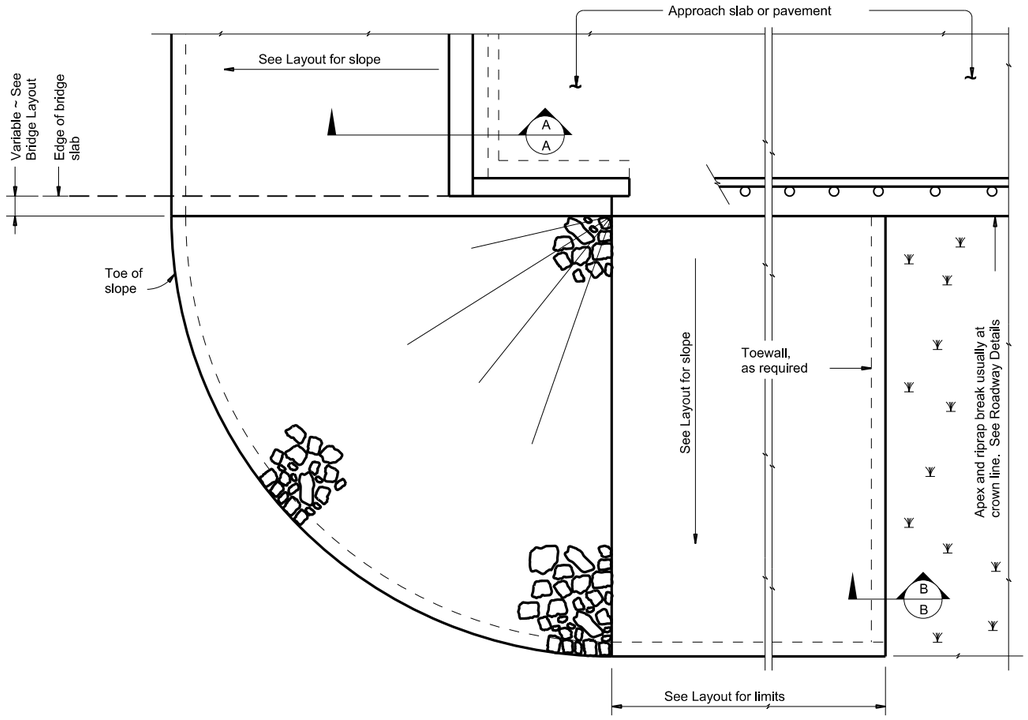
Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

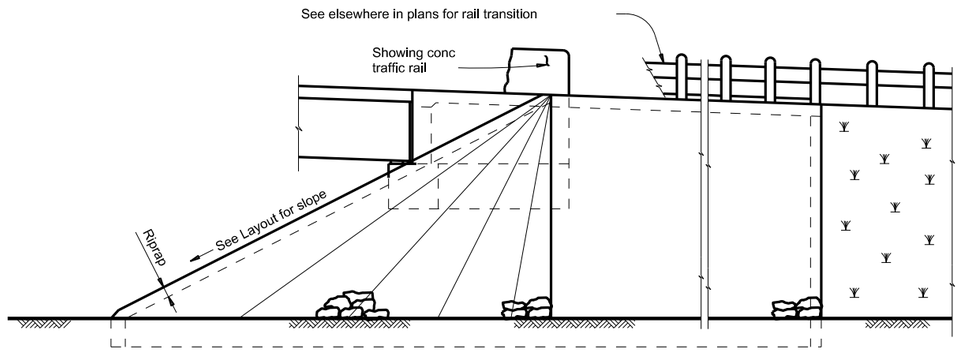
CRR

FILE: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		166

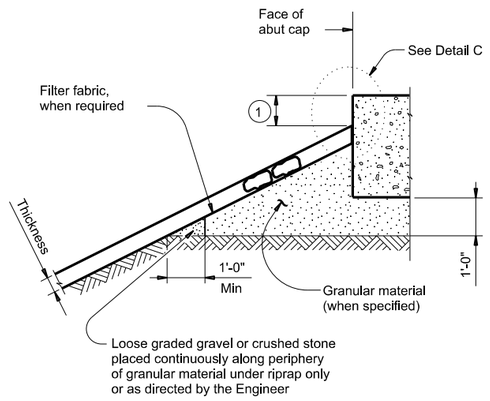
DATE: 7/28/2022 12:45:46 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\20. srrstde1-19.dgn



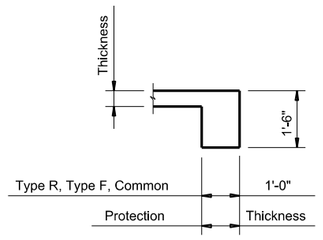
PLAN



ELEVATION

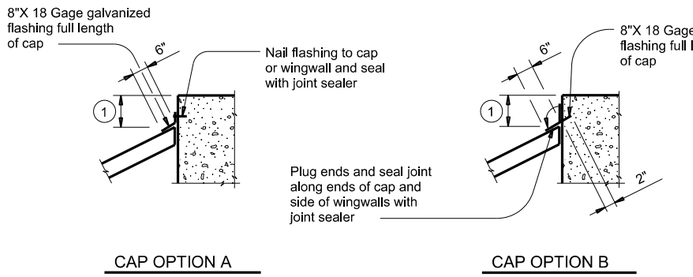


SECTION A-A AT CAP



SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A

CAP OPTION B

DETAIL C

(1) Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

GENERAL NOTES:
Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
See elsewhere in plans for locations and details of shoulder drains.

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		167

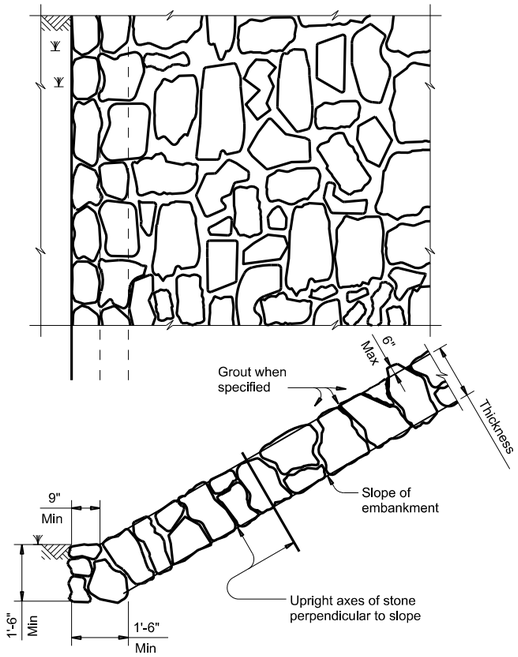


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

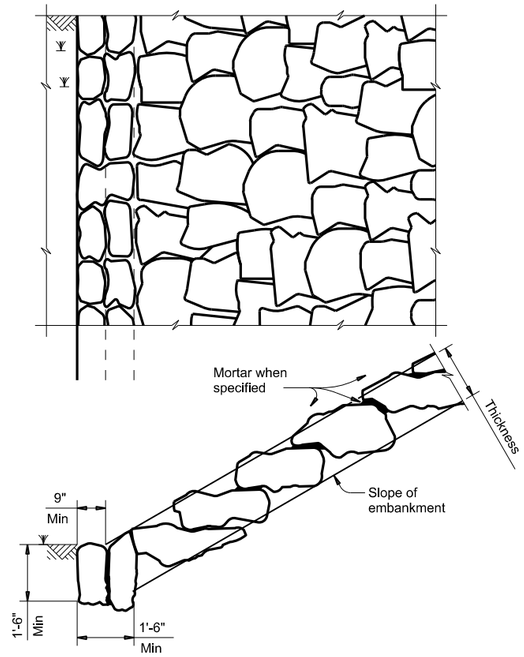


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

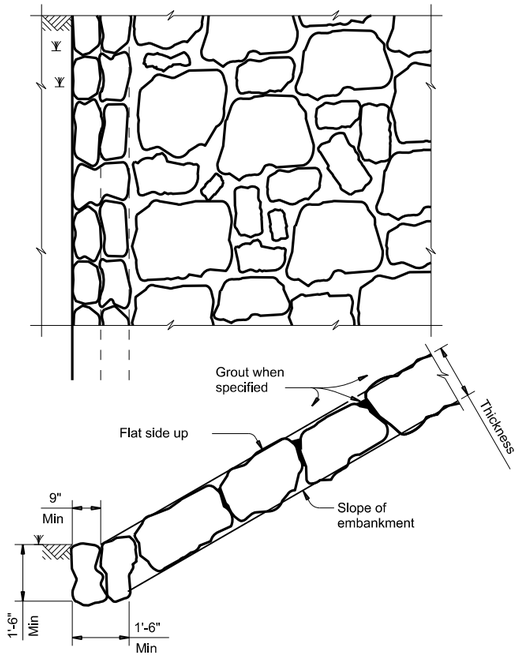


FIGURE 3 ~ TYPE F STONE RIPRAP

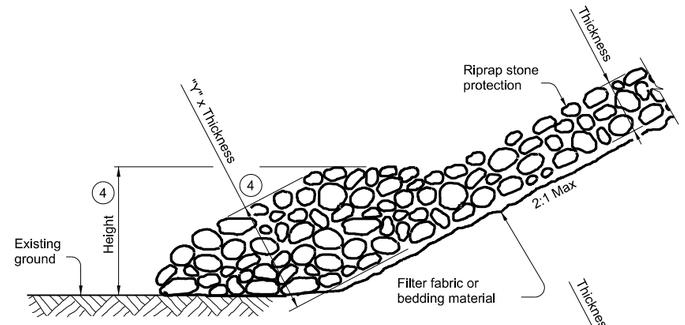
grouted

(2) Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

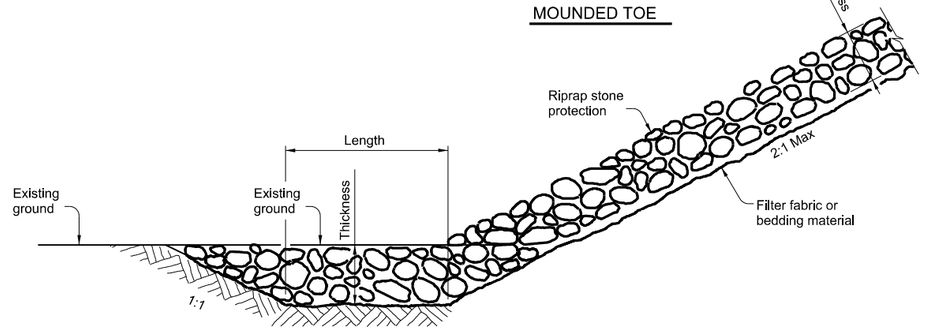
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(4) "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.

(5) List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.

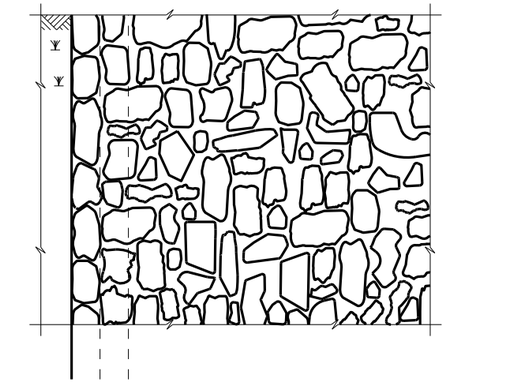


MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)



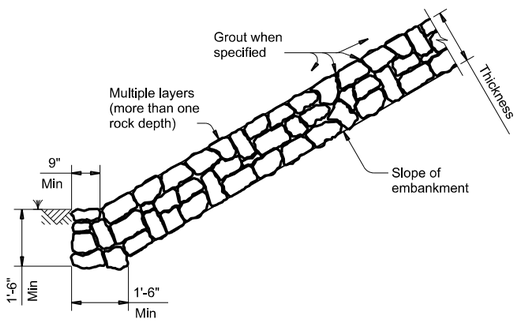
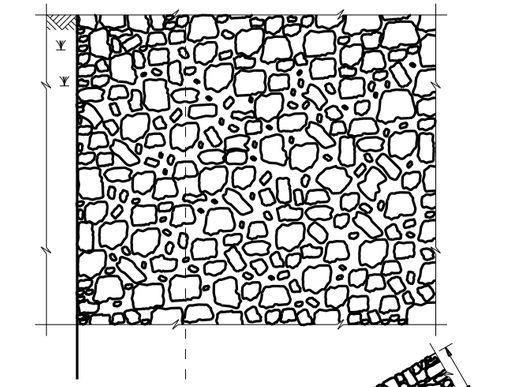


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted



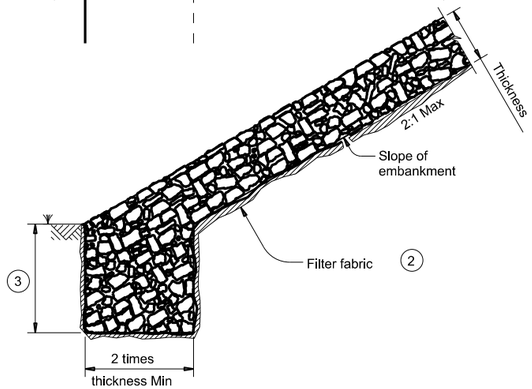


FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

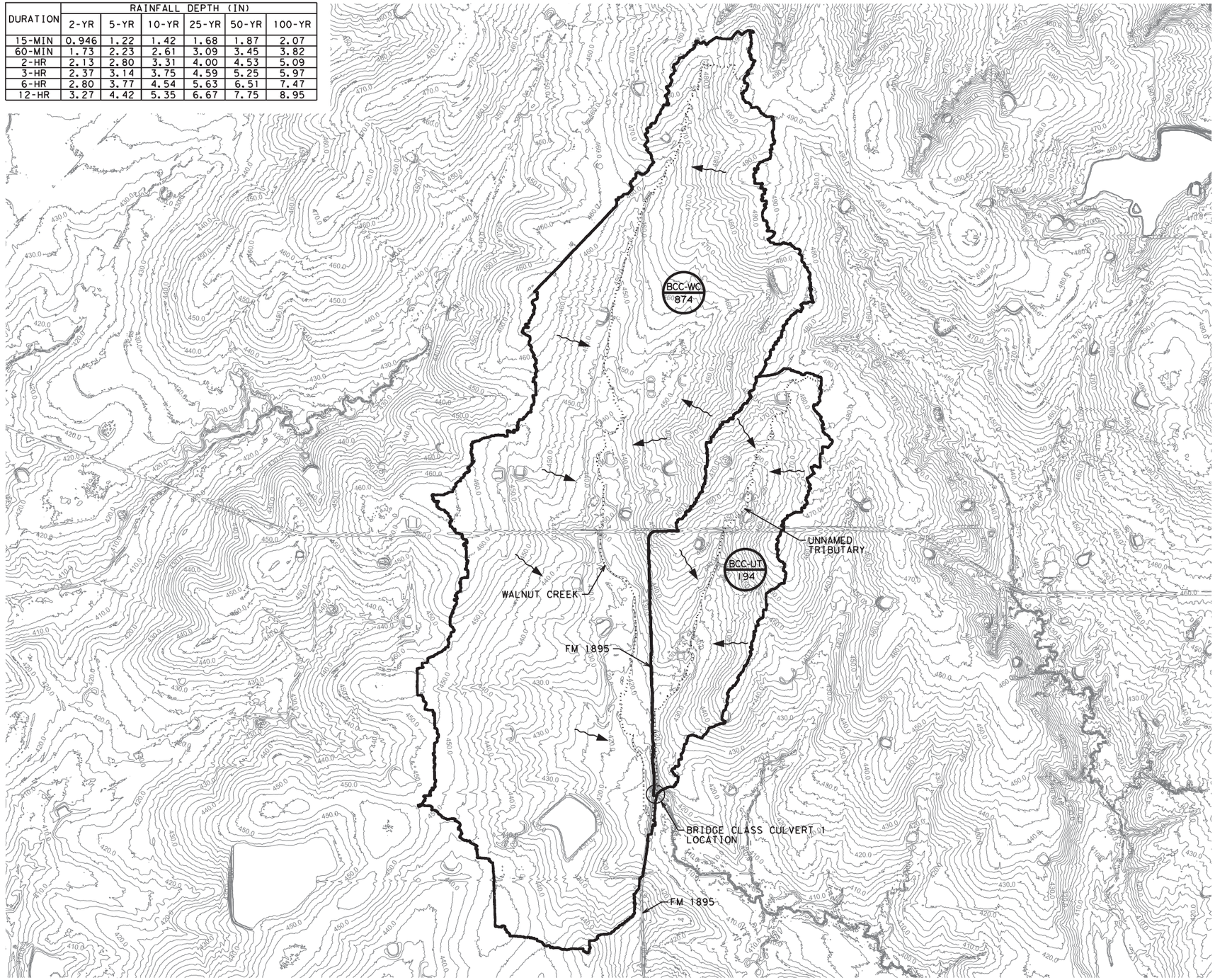
FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		168

DATE: 7/28/2022 12:46:24 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\STANDARDS\20. srrstde1-19.dgn

HYDROLOGY MODEL INPUT DATA FOR WALNUT CREEK						
DA ID	STREAM NAME	ROADWAY	AREA (SQ. MI)	CURVE NUMBER	TIME OF CONCENTRATION (MIN)	LAG TIME (MIN)
BCC-WC	WALNUT CREEK	FM 1895	1.37	81	120	84
BCC-UT	UNNAMED TRIBUTARY	FM 1895	0.30	79	73	51

RUNOFF COMPUTATIONS FOR WALNUT CREEK - NRCS UNIT HYDROGRAPH METHOD IN HEC-HMS								
DA ID	STREAM NAME	ROADWAY	PEAK DISCHARGE (CFS)					
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
BCC-WC	WALNUT CREEK	FM 1895	444.1	711.3	928.1	1228.7	1467.2	1722.3
BCC-UT	UNNAMED TRIBUTARY	FM 1895	121.8	199.9	263.3	349.7	416.7	487.4
BCC-WC & BCC-UT	WALNUT CREEK	FM 1895	536.0	866.0	1134.6	1507.0	1799.5	2112.3

DURATION	RAINFALL DEPTH (IN)					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
15-MIN	0.946	1.22	1.42	1.68	1.87	2.07
60-MIN	1.73	2.23	2.61	3.09	3.45	3.82
2-HR	2.13	2.80	3.31	4.00	4.53	5.09
3-HR	2.37	3.14	3.75	4.59	5.25	5.97
6-HR	2.80	3.77	4.54	5.63	6.51	7.47
12-HR	3.27	4.42	5.35	6.67	7.75	8.95



LEGEND

BOUNDARY AREA

XXXX / XXXX — DRAINAGE AREA ID. / ACRES

FLOW DIRECTION

800′ 0 800′ 1600′

SCALE 1"=1600′

NOTES:

1) RUNOFF COMPUTATIONS PERFORMED WITH HEC-HMS 4.8 VERIFIED BY OMEGA EM REGRESSION EQUATION ANALYSIS.
2) ARC-GIS WAS USED TO CALCULATED THE WEIGHTED CURVE NUMBER AND THE TIME OF CONCENTRATION LONGEST FLOW PATH.
3) THE RAINFALL DEPTHS IN INCHES FOR 15-MIN, 1-HR, 2-HR, 3-HR, 6-HR, AND 12-HR WERE DOWNLOADED FROM THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION'S(NOAA'S) NATIONAL WEATHER SERVICE HYDROMETEOROLOGICAL DESIGN STUDIES CENTER PRECIPITATION FREQUENCY DATA SERVER (PFDS) NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES FOR TEXAS.
4) STORMS WERE MODELED USING A FREQUENCY STORM DISTRIBUTION UP TO A 12-HOUR DURATION.
5) RUNOFF VOLUME WAS COMPUTED USING THE SCS CURVE NUMBER LOSS MODEL WITH CLIMATIC ADJUSTMENT.
6) TIME OF CONCENTRATION(TC) WAS COMPUTED USING THE KERBY-KERPICH METHOD. LAG TIME = 0.7*TC.
7) THE SCS UNIT HYDROGRAPH METHOD WAS USED TO DEVELOP DISCHARGE HYDROGRAPH.
8) SOURCE OF TOPOGRAPHY DATA: TNRIS 2011 LIDAR.

HYDRAULIC DATA

Q25 = 1228.7 cfs V25 = 10.24 fps EL25 = 416.29′
Q100= 1722.3 cfs V100= 11.28 fps EL100= 416.78′

STATE OF TEXAS
DANIEL DIAZ, JR.
124907
LICENSED
PROFESSIONAL ENGINEER

3/25/2022
,P.E.
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
WALNUT CREEK
DRAINAGE AREA MAP

SCALE: 1"= 1600′ SHEET 1 OF 1

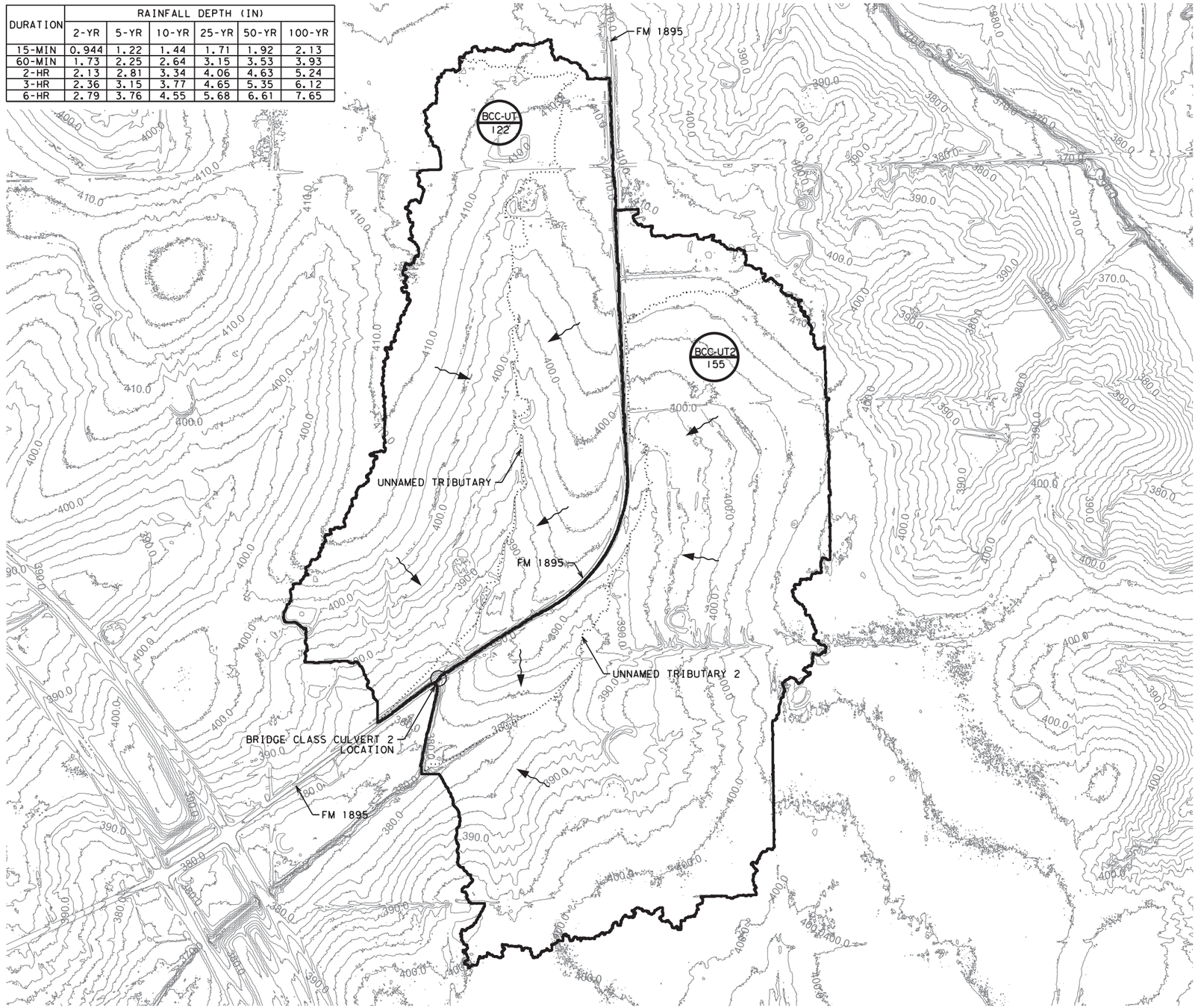
DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
DD	6	(SEE TITLE SHEET)		FM 1895
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS DD	TEXAS	DALLAS	KAUFMAN	169
CHECK	CONTROL	SECTION	JOB	
	1975	02	013	

2/21/2022
D:\Documents\VH&H*Section\VH&H*AreaOffice\1975-02-013\Plan Set\V5. Drainage\Drainage\013*DA*WC.dgn

HYDROLOGY MODEL INPUT DATA FOR UNNAMED TRIBUTARY						
DA ID	STREAM NAME	ROADWAY	AREA (SQ. MI)	CURVE NUMBER	TIME OF CONCENTRATION (MIN)	LAG TIME (MIN)
BCC-UT	UNNAMED TRIBUTARY	FM 1895	0.19	79	83	50
BCC-UT2	UNNAMED TRIBUTARY 2	FM 1895	0.24	78	59	35

RUNOFF COMPUTATIONS FOR UNNAMED TRIBUTARY - NRCS UNIT HYDROGRAPH METHOD IN HEC-HMS							
DA ID	STREAM NAME	ROADWAY	PEAK DISCHARGE (CFS)				
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
BCC-UT	UNNAMED TRIBUTARY	FM 1895	66.1	112.9	152.4	208.1	252.5	300.3
BCC-UT2	UNNAMED TRIBUTARY 2	FM 1895	98.1	169.5	229.6	313.6	380.0	450.9
BCC-UT & BCC-UT2	UNNAMED TRIBUTARY	FM 1895	154.9	263.0	353.7	486.9	593.3	707.9

DURATION	RAINFALL DEPTH (IN)					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
15-MIN	0.944	1.22	1.44	1.71	1.92	2.13
60-MIN	1.73	2.25	2.64	3.15	3.53	3.93
2-HR	2.13	2.81	3.34	4.06	4.63	5.24
3-HR	2.36	3.15	3.77	4.65	5.35	6.12
6-HR	2.79	3.76	4.55	5.68	6.61	7.65



LEGEND

- BOUNDARY AREA
- XXXX / XXXX — DRAINAGE AREA ID. / ACRES
- FLOW DIRECTION

N

350′ 0 350′ 700′

SCALE 1"=700′

NOTES:

1) RUNOFF COMPUTATIONS PERFORMED WITH HEC-HMS 4.8 VERIFIED BY RATIONAL METHOD.
2) ARC-GIS WAS USED TO CALCULATED THE WEIGHTED CURVE NUMBER AND THE TIME OF CONCENTRATION LONGEST FLOW PATH.
3) THE RAINFALL DEPTHS IN INCHES FOR 15-MIN, 1-HR, 2-HR, 3-HR, AND 6-HR WERE DOWNLOADED FROM THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION'S(NOAA'S) NATIONAL WEATHER SERVICE HYDROMETEOROLOGICAL DESIGN STUDIES CENTER PRECIPITATION FREQUENCY DATA SERVER (PFDS) NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES FOR TEXAS.
4) STORMS WERE MODELED USING A FREQUENCY STORM DISTRIBUTION UP TO A 6-HOUR DURATION.
5) RUNOFF VOLUME WAS COMPUTED USING THE SCS CURVE NUMBER LOSS MODEL WITH CLIMATIC ADJUSTMENT.
6) TIME OF CONCENTRATION(TC) WAS COMPUTED USING THE NRCS METHOD. LAG TIME = 0.6*TC.
7) THE SCS UNIT HYDROGRAPH METHOD WAS USED TO DEVELOP DISCHARGE HYDROGRAPH.
8) SOURCE OF TOPOGRAPHY DATA: NCTCOG 2015 LIDAR.

HYDRAULIC DATA

Q25 = 208.1 cfs V25 = 7.93 fps EL25 = 382.79′
Q100= 300.3 cfs V100= 8.82 fps EL100= 383.52′

STATE OF TEXAS
DANIEL DIAZ, JR.
124907
LICENSED
PROFESSIONAL ENGINEER

3/25/2022

Signature of Registrant & Date ,P.E.

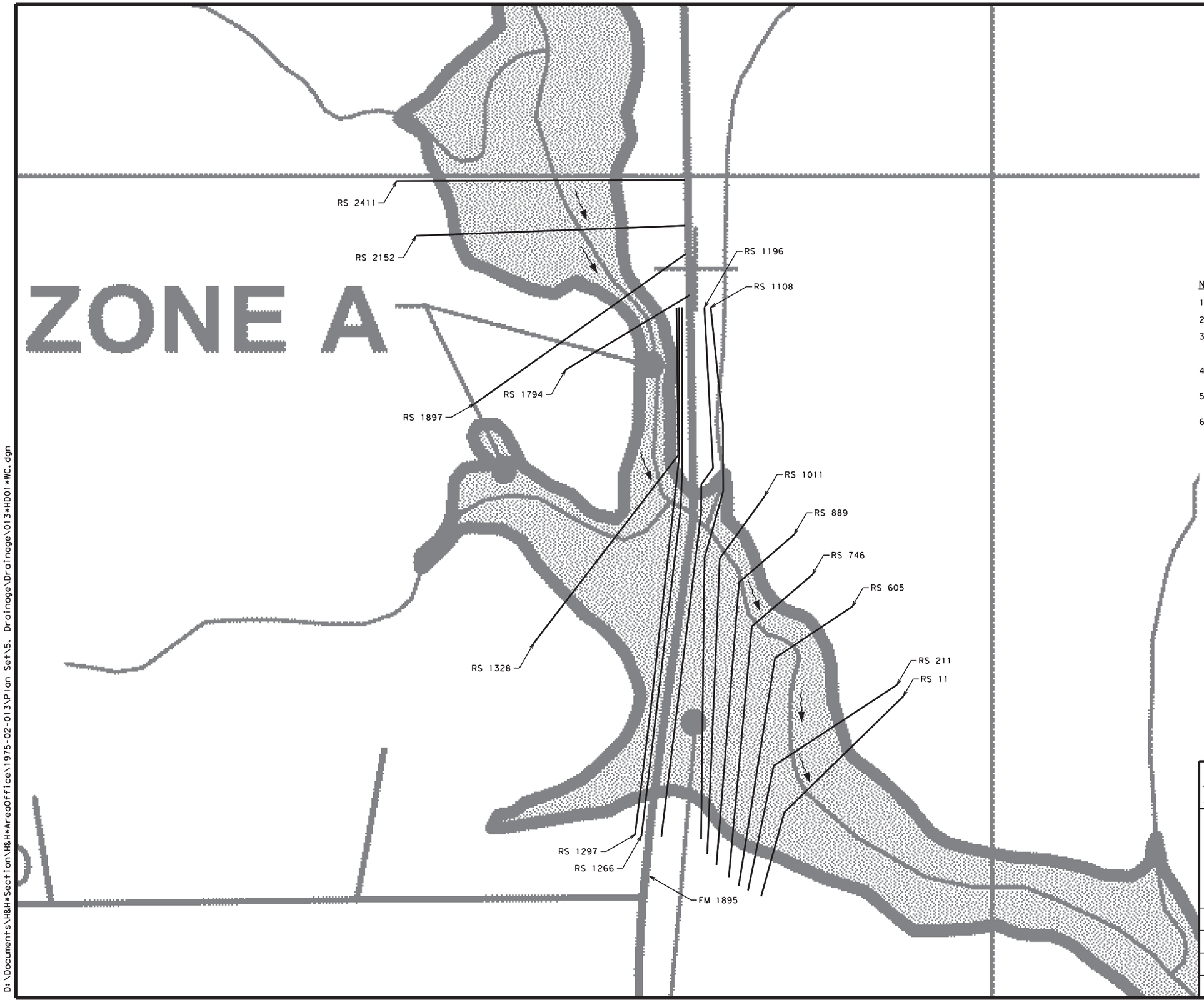
Texas Department of Transportation

FM 1895
UNNAMED TRIBUTARY
DRAINAGE AREA MAP

SCALE: 1"= 700′ SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
DD	6	(SEE TITLE SHEET)		FM 1895
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS DD	TEXAS	DALLAS	KAUFMAN	170
CHECK	CONTROL	SECTION	JOB	
	1975	02	013	

3/25/2022
D:\Documents\H&H*Section\H&H*AreaOffice\1975-02-013\Plan Set\V5. Drainage\Drainage\013*DA*UT.dgn



150′ 0 150′ 300′

SCALE 1"=300′

NOTES:

1) HEC-RAS 5.0.7 USED FOR THE ANALYSIS.
2) ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.
3) THE STARTING WATER SURFACE ELEVATION AT RS 11 WAS BASED ON NORMAL DEPTH CALCULATIONS AND A BED SLOPE OF 0.005 FT/FT.
4) SITE IS DESIGNATED AS FEMA ZONE A AS SHOWN ON PANEL 48257C0350D EFFECTIVE JULY 3, 2012.
5) SOURCE OF TOPOGRAPHY DATA: TNRIS 2011 LIDAR AND PROJECT TOPOGRAPHIC SURVEY.
6) A COPY OF THE DRAINGE AREA MAP, HYDRAULIC DATA SHEETS, AND THE HYDRAULIC MODELS WERE PROVIDED TO THE LOCAL FLOODPLAIN ADMINISTRATOR ON MARCH 2022.

HYDRAULIC DATA

Q25 = 1228.7 cfs V25 = 10.24 fps EL25 = 416.29′
Q100= 1722.3 cfs V100= 11.28 fps EL100= 416.78′

STATE OF TEXAS
DANIEL DIAZ, JR.
124907
LICENSED
PROFESSIONAL ENGINEER

3/25/2022
,P.E.
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
WALNUT CREEK
HYDRAULIC DATA

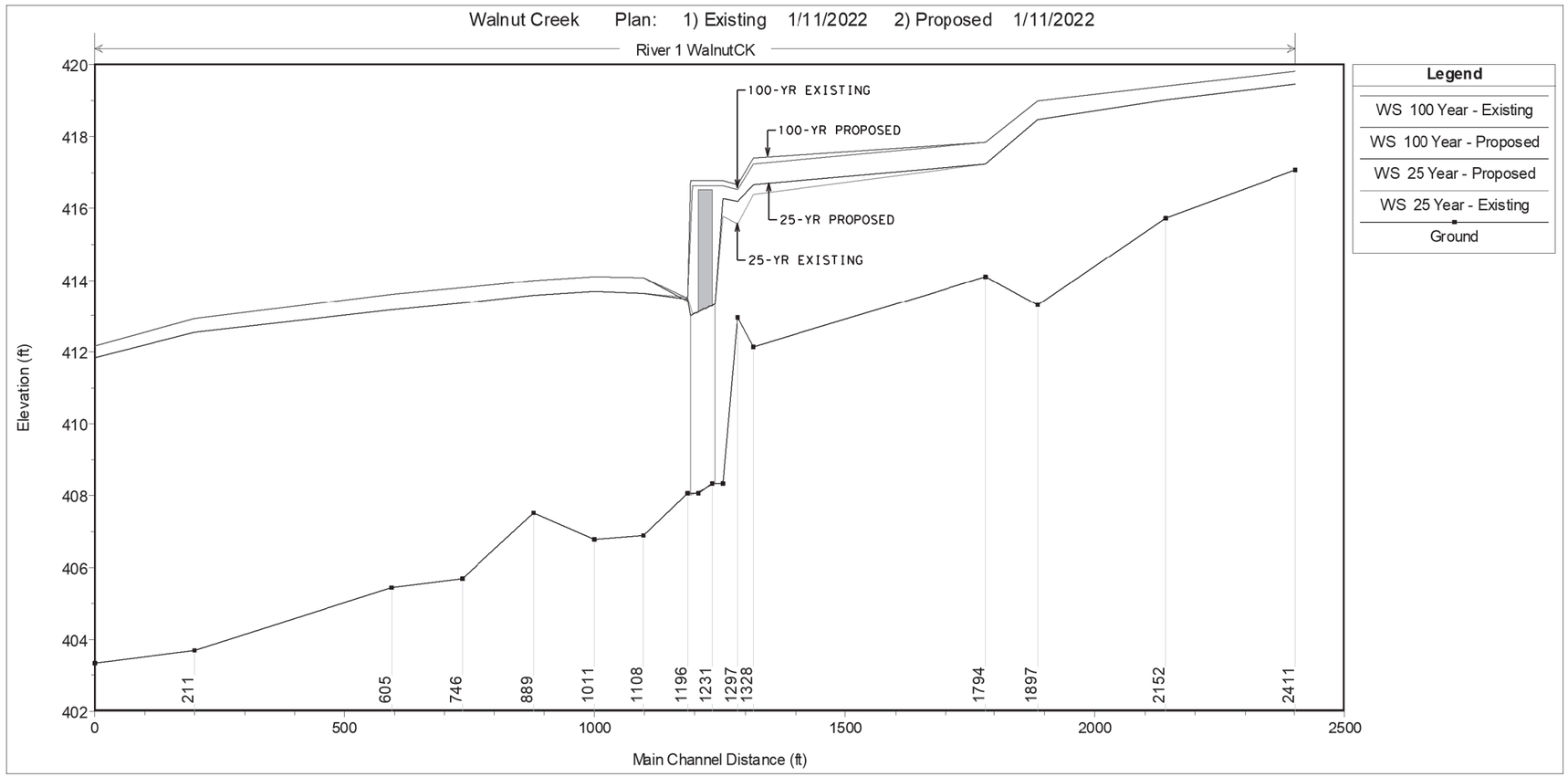
SCALE: 1"= 300′ SHEET 1 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
DD	6	(SEE TITLE SHEET)		FM 1895
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS DD	TEXAS	DALLAS	KAUFMAN	171
CHECK	CONTROL	SECTION	JOB	
	1975	02	013	

2/21/2022
D:\Documents\H&H*Section\H&H*AreaOffice\1975-02-013\Plan Set\V5. Drainage\Drainage\013*HD01*WC.dgn

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
WalnutCK	2411	25 Year	Existing	1228.70	417.08	419.44	418.65	419.50	0.001232	2.61	676.64	553.56	0.34
WalnutCK	2411	25 Year	Proposed	1228.70	417.08	419.44	418.65	419.50	0.001232	2.61	676.64	553.56	0.34
WalnutCK	2411	100 Year	Existing	1722.30	417.08	419.81	418.91	419.87	0.00106	2.74	881.99	571.16	0.32
WalnutCK	2411	100 Year	Proposed	1722.30	417.08	419.81	418.91	419.87	0.00106	2.74	881.99	571.16	0.32
WalnutCK	2152	25 Year	Existing	1228.70	415.74	419.02	418.41	419.13	0.001672	3.86	541.14	430.28	0.42
WalnutCK	2152	25 Year	Proposed	1228.70	415.74	419.02	418.41	419.13	0.001672	3.86	541.14	430.28	0.42
WalnutCK	2152	100 Year	Existing	1722.30	415.74	419.41	418.60	419.53	0.001623	4.17	732.37	521.13	0.42
WalnutCK	2152	100 Year	Proposed	1722.30	415.74	419.41	418.60	419.53	0.001623	4.17	732.37	521.13	0.42
WalnutCK	1897	25 Year	Existing	1228.70	413.32	418.46	417.53	418.64	0.002105	5.11	461.16	430.82	0.48
WalnutCK	1897	25 Year	Proposed	1228.70	413.32	418.46	417.53	418.64	0.002105	5.11	461.16	430.82	0.48
WalnutCK	1897	100 Year	Existing	1722.30	413.32	419.00	418.07	419.13	0.001499	4.74	775.70	711.76	0.42
WalnutCK	1897	100 Year	Proposed	1722.30	413.32	419.00	418.07	419.13	0.001499	4.74	775.70	711.76	0.42
WalnutCK	1794	25 Year	Existing	1228.70	414.09	417.25	417.25	418.16	0.010406	9.48	185.68	120.96	1.04
WalnutCK	1794	25 Year	Proposed	1228.70	414.09	417.25	417.25	418.16	0.010406	9.48	185.68	120.96	1.04
WalnutCK	1794	100 Year	Existing	1722.30	414.09	417.84	417.84	418.74	0.008687	9.93	278.09	250.93	0.98
WalnutCK	1794	100 Year	Proposed	1722.30	414.09	417.84	417.84	418.74	0.008687	9.93	278.09	250.93	0.98
WalnutCK	1328	25 Year	Existing	1228.70	412.12	416.38	415.50	416.43	0.000704	2.84	744.53	973.96	0.28
WalnutCK	1328	25 Year	Proposed	1228.70	412.12	416.67	415.50	416.70	0.000696	2.08	892.90	1031.41	0.26
WalnutCK	1328	100 Year	Existing	1722.30	412.12	417.24	415.71	417.26	0.000374	1.80	1515.74	1136.96	0.20
WalnutCK	1328	100 Year	Proposed	1722.30	412.12	417.41	415.71	417.43	0.000266	1.58	1711.22	1152.85	0.17
WalnutCK	1297	25 Year	Existing	1228.70	412.94	415.57	415.40	416.30	0.007824	6.98	181.68	1172.12	0.87
WalnutCK	1297	25 Year	Proposed	1228.70	412.94	416.20	415.40	416.61	0.003105	5.26	240.46	1314.76	0.57
WalnutCK	1297	100 Year	Existing	1722.30	412.94	416.54	415.84	417.17	0.004032	6.50	272.54	1417.11	0.66
WalnutCK	1297	100 Year	Proposed	1722.30	412.94	416.66	415.84	417.34	0.004304	6.67	320.44	1434.18	0.69
WalnutCK	1266	25 Year	Existing	1228.70	408.35	415.80	411.74	416.00	0.000448	3.59	342.53	1105.69	0.25
WalnutCK	1266	25 Year	Proposed	1228.70	408.35	416.29	411.74	416.47	0.000352	3.34	368.20	1268.81	0.22
WalnutCK	1266	100 Year	Existing	1722.30	408.35	416.65	412.44	416.95	0.001025	4.46	405.70	1308.40	0.36
WalnutCK	1266	100 Year	Proposed	1722.30	408.35	416.78	412.44	417.04	0.000874	4.19	576.82	1327.64	0.33
WalnutCK	1231			Culvert									

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	ft/ft)	(ft/s)	(sq ft)	(ft)	
WalnutCK	1196	25 Year	Existing	1228.70	408.06	413.52	412.16	414.42	0.003323	7.61	161.5	661.65	0.63
WalnutCK	1196	25 Year	Proposed	1228.70	408.06	413.48	412.10	414.45	0.00315	7.91	155.34	657.76	0.62
WalnutCK	1196	100 Year	Existing	1722.30	408.06	413.50	413.14	415.28	0.006612	10.70	160.89	659.98	0.88
WalnutCK	1196	100 Year	Proposed	1722.30	408.06	413.41	413.02	415.37	0.006483	11.24	153.19	649.78	0.89
WalnutCK	1108	25 Year	Existing	1507.00	406.90	413.65	411.93	413.93	0.001504	4.46	500.09	756.27	0.41
WalnutCK	1108	25 Year	Proposed	1507.00	406.90	413.65	411.93	413.93	0.001504	4.46	500.09	756.27	0.41
WalnutCK	1108	100 Year	Existing	2112.30	406.90	414.07	412.80	414.30	0.001296	4.46	860.87	896.79	0.39
WalnutCK	1108	100 Year	Proposed	2112.30	406.90	414.07	412.80	414.30	0.001296	4.46	860.87	896.79	0.39
WalnutCK	1011	25 Year	Existing	1507.00	406.77	413.69	413.10	413.76	0.00082	2.81	953.37	864.21	0.29
WalnutCK	1011	25 Year	Proposed	1507.00	406.77	413.69	413.10	413.76	0.00082	2.81	953.37	864.21	0.29
WalnutCK	1011	100 Year	Existing	2112.30	406.77	414.11	413.30	414.16	0.000674	2.65	1330.03	952.74	0.27
WalnutCK	1011	100 Year	Proposed	2112.30	406.77	414.11	413.30	414.16	0.000674	2.65	1330.03	952.74	0.27
WalnutCK	889	25 Year	Existing	1507.00	407.51	413.58	412.70	413.62	0.001457	2.37	1105.01	782.22	0.24
WalnutCK	889	25 Year	Proposed	1507.00	407.51	413.58	412.70	413.62	0.001457	2.37	1105.01	782.22	0.24
WalnutCK	889	100 Year	Existing	2112.30	407.51	414.00	412.88	414.05	0.001381	2.46	1453.37	861.53	0.23
WalnutCK	889	100 Year	Proposed	2112.30	407.51	414.00	412.88	414.05	0.001381	2.46	1453.37	861.53	0.23
WalnutCK	746	25 Year	Existing	1507.00	405.69	413.37	412.43	413.42	0.001378	2.48	1086.84	689.10	0.23
WalnutCK	746	25 Year	Proposed	1507.00	405.69	413.37	412.43	413.42	0.001378	2.48	1086.84	689.10	0.23
WalnutCK	746	100 Year	Existing	2112.30	405.69	413.80	412.63	413.85	0.001355	2.65	1394.13	737.39	0.23
WalnutCK	746	100 Year	Proposed	2112.30	405.69	413.80	412.63	413.85	0.001355	2.65	1394.13	737.39	0.23
WalnutCK	605	25 Year	Existing	1507.00	405.43	413.18	412.20	413.23	0.001246	2.63	1093.49	680.58	0.22
WalnutCK	605	25 Year	Proposed	1507.00	405.43	413.18	412.20	413.23	0.001246	2.63	1093.49	680.58	0.22
WalnutCK	605	100 Year	Existing	2112.30	405.43	413.61	412.37	413.66	0.001314	2.87	1394.09	732.95	0.23
WalnutCK	605	100 Year	Proposed	2112.30	405.43	413.61	412.37	413.66	0.001314	2.87	1394.09	732.95	0.23
WalnutCK	211	25 Year	Existing	1507.00	403.70	412.54	411.73	412.64	0.001929	3.41	856.44	593.20	0.28
WalnutCK	211	25 Year	Proposed	1507.00	403.70	412.54	411.73	412.64	0.001929	3.41	856.44	593.20	0.28
WalnutCK	211	100 Year	Existing	2112.30	403.70	412.92	411.90	413.02	0.0021	3.75	1088.26	636.06	0.30
WalnutCK	211	100 Year	Proposed	2112.30	403.70	412.92	411.90	413.02	0.0021	3.75	1088.26	636.06	0.30
WalnutCK	11	25 Year	Existing	1507.00	403.33	411.82	411.45	412.04	0.005006	4.80	577.35	518.63	0.44
WalnutCK	11	25 Year	Proposed	1507.00	403.33	411.82	411.45	412.04	0.005006	4.80	577.35	518.63	0.44
WalnutCK	11	100 Year	Existing	2112.30	403.33	412.17	411.70	412.40	0.005001	5.10	769.82	562.21	0.45
WalnutCK	11	100 Year	Proposed	2112.30	403.33	412.17	411.70	412.40	0.005001	5.10	769.82	562.21	0.45



NOTES:

1) HEC-RAS 5.0.7 USED FOR THE ANALYSIS.

2) ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.

3) THE STARTING WATER SURFACE ELEVATION AT RS 11 WAS BASED ON NORMAL DEPTH CALCULATIONS AND A BED SLOPE OF 0.005 FT/FT.

4) SITE IS DESIGNATED AS FEMA ZONE A AS SHOWN ON PANEL 48257C0350D EFFECTIVE JULY 3, 2012.

5) SOURCE OF TOPOGRAPHY DATA: TNRIS 2011 LIDAR AND PROJECT TOPOGRAPHIC SURVEY.

6) A COPY OF THE DRAINGE AREA MAP, HYDRAULIC DATA SHEETS, AND THE HYDRAULIC MODELS WERE PROVIDED TO THE LOCAL FLOODPLAIN ADMINISTRATOR ON MARCH 2022.

HYDRAULIC DATA

Q25 = 1228.7 cfs V25 = 10.24 fps EL25 = 416.29'
Q100= 1722.3 cfs V100= 11.28 fps EL100= 416.78'

STATE OF TEXAS
DANIEL DIAZ, JR.
124907
LICENSED
PROFESSIONAL ENGINEER

3/25/2022
,P.E.
Signature of Registrant & Date

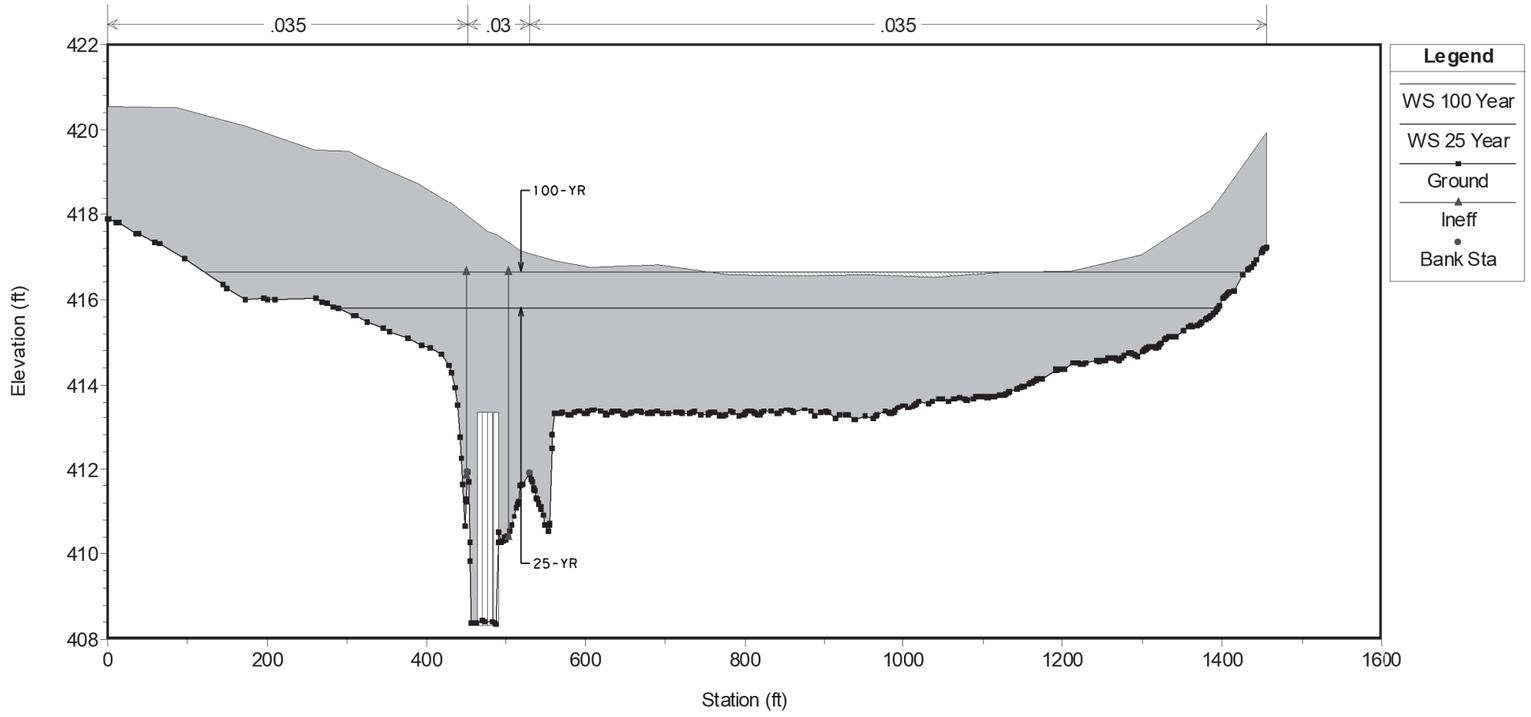
Texas Department of Transportation
© 2022

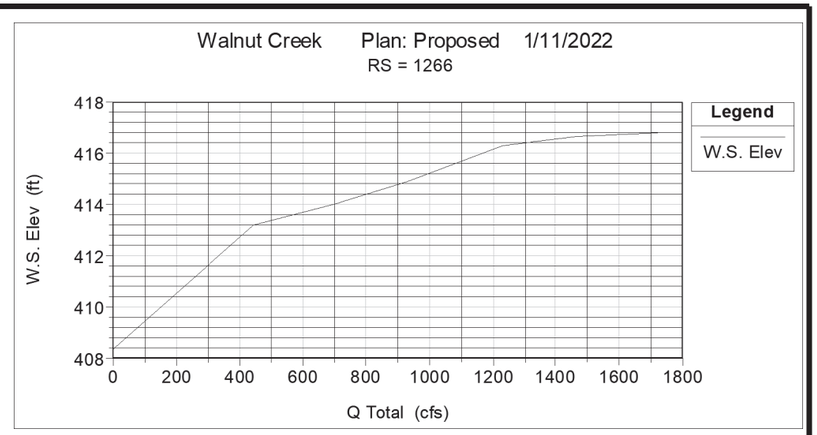
FM 1895
WALNUT CREEK
HYDRAULIC DATA

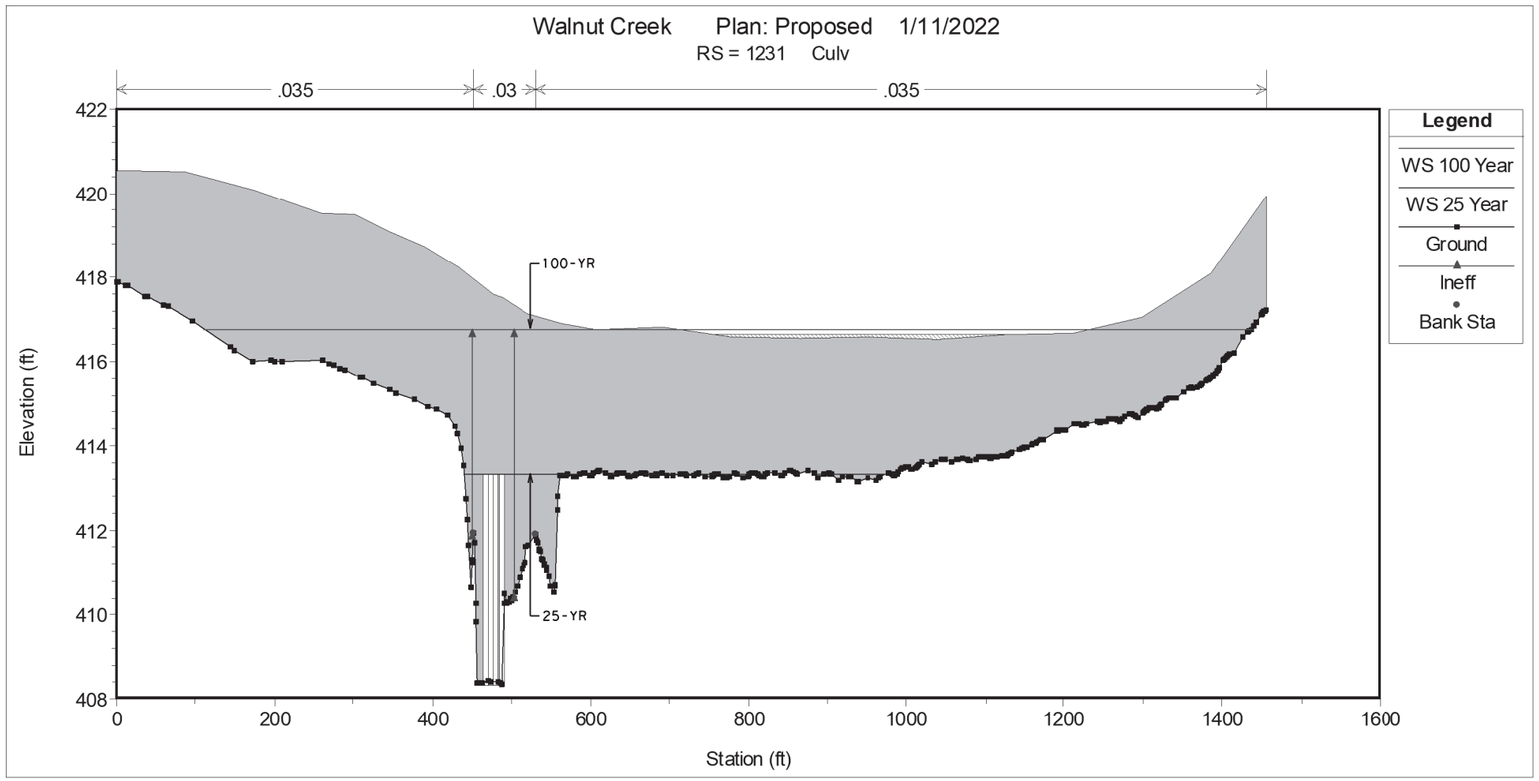
SHEET 2 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
DD	6	(SEE TITLE SHEET)		FM 1895
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS DD	TEXAS	DALLAS	KAUFMAN	172
CHECK	CONTROL	SECTION	JOB	
	1975	02	013	

2/21/2022
D:\Documents\H&H*Section\H&H*AreaOffice\1975-02-013\Plan Set\5. Drainage\Drainage\013*HD02*WC.dgn







NOTES:

1) HEC-RAS 5.0.7 USED FOR THE ANALYSIS.
2) ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.
3) THE STARTING WATER SURFACE ELEVATION AT RS 11 WAS BASED ON NORMAL DEPTH CALCULATIONS AND A BED SLOPE OF 0.005 FT/FT.
4) SITE IS DESIGNATED AS FEMA ZONE A AS SHOWN ON PANEL 48257C0350D EFFECTIVE JULY 3, 2012.
5) SOURCE OF TOPOGRAPHY DATA: TNRIS 2011 LIDAR AND PROJECT TOPOGRAPHIC SURVEY.
6) A COPY OF THE DRAINGE AREA MAP, HYDRAULIC DATA SHEETS, AND THE HYDRAULIC MODELS WERE PROVIDED TO THE LOCAL FLOODPLAIN ADMINISTRATOR ON MARCH 2022.

HYDRAULIC DATA

Q25 = 1228.7 cfs V25 = 10.24 fps EL25 = 416.29'
Q100= 1722.3 cfs V100= 11.28 fps EL100= 416.78'

STATE OF TEXAS
DANIEL DIAZ, JR.
124907
LICENSED
PROFESSIONAL ENGINEER

3/25/2022
,P.E.
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
WALNUT CREEK
HYDRAULIC DATA

SHEET 3 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
DD	6	(SEE TITLE SHEET)		FM 1895
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS DD	TEXAS	DALLAS	KAUFMAN	173
CHECK	CONTROL	SECTION	JOB	
	1975	02	013	

2/21/2022
D:\Documents\VH&H*Section\H&H*AreaOffice\1975-02-013\Plan Set\5. Drainage\Drainage\013*HD03*WC.dgn

River: River 1 Profile: 25 Year Culv Group: Culvert #1
Reach WalnutCK RS: 1231 Plan: Existing

Plan: Existing River 1 WalnutCK RS: 1231 Culv Group: Culvert #1 Profile: 25 Year

Q Culv Group (cfs)	1228.70	Culv Full Len (ft)	45.00
# Barrels	4	Culv Vel US (ft/s)	10.24
Q Barrel (cfs)	307.18	Culv Vel DS (ft/s)	10.24
E.G. US. (ft)	416.00	Culv Inv El Up (ft)	408.33
W.S. US. (ft)	415.80	Culv Inv El Dn (ft)	408.05
E.G. DS (ft)	414.42	Culv Frctn Ls (ft)	0.20
W.S. DS (ft)	413.52	Culv Exit Loss (ft)	0.73
Delta EG (ft)	1.59	Culv Entr Loss (ft)	0.65
Delta WS (ft)	2.28	Q Weir (cfs)	
E.G. IC (ft)	416.25	Weir Sta Lft (ft)	
E.G. OC (ft)	416.00	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	413.33	Weir Max Depth (ft)	
Culv WS Outlet (ft)	413.05	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	3.74	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.33	Min El Weir Flow (ft)	416.64

River: River 1 Profile: 100 Year Culv Group: Culvert #1
Reach WalnutCK RS: 1231 Plan: Existing

Plan: Existing River 1 WalnutCK RS: 1231 Culv Group: Culvert #1 Profile: 100 Year

Q Culv Group (cfs)	1447.89	Culv Full Len (ft)	45.00
# Barrels	4	Culv Vel US (ft/s)	12.07
Q Barrel (cfs)	361.97	Culv Vel DS (ft/s)	12.07
E.G. US. (ft)	416.95	Culv Inv El Up (ft)	408.33
W.S. US. (ft)	416.65	Culv Inv El Dn (ft)	408.05
E.G. DS (ft)	415.28	Culv Frctn Ls (ft)	0.28
W.S. DS (ft)	413.50	Culv Exit Loss (ft)	0.48
Delta EG (ft)	1.67	Culv Entr Loss (ft)	0.90
Delta WS (ft)	3.15	Q Weir (cfs)	274.41
E.G. IC (ft)	417.03	Weir Sta Lft (ft)	550.84
E.G. OC (ft)	416.95	Weir Sta Rgt (ft)	1278.95
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	413.33	Weir Max Depth (ft)	0.33
Culv WS Outlet (ft)	413.05	Weir Avg Depth (ft)	0.27
Culv Nml Depth (ft)	4.24	Weir Flow Area (sq ft)	195.87
Culv Crt Depth (ft)	4.84	Min El Weir Flow (ft)	416.64

NOTES:

1) HEC-RAS 5.0.7 USED FOR THE ANALYSIS.
2) ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.
3) THE STARTING WATER SURFACE ELEVATION AT RS 11 WAS BASED ON NORMAL DEPTH CALCULATIONS AND A BED SLOPE OF 0.005 FT/FT.
4) SITE IS DESIGNATED AS FEMA ZONE A AS SHOWN ON PANEL 48257C0350D EFFECTIVE JULY 3, 2012.
5) SOURCE OF TOPOGRAPHY DATA: TNRIS 2011 LIDAR AND PROJECT TOPOGRAPHIC SURVEY.
6) A COPY OF THE DRAINGE AREA MAP, HYDRAULIC DATA SHEETS, AND THE HYDRAULIC MODELS WERE PROVIDED TO THE LOCAL FLOODPLAIN ADMINISTRATOR ON MARCH 2022.

HYDRAULIC DATA

Q25 = 1228.7 cfs V25 = 10.24 fps EL25 = 416.29'
Q100= 1722.3 cfs V100= 11.28 fps EL100= 416.78'

River: River 1 Profile: 25 Year Culv Group: Culvert #1
Reach WalnutCK RS: 1231 Plan: Proposed

Plan: Proposed River 1 WalnutCK RS: 1231 Culv Group: Culvert #1 Profile: 25 Year

Q Culv Group (cfs)	1228.70	Culv Full Len (ft)	49.00
# Barrels	4	Culv Vel US (ft/s)	10.24
Q Barrel (cfs)	307.18	Culv Vel DS (ft/s)	10.24
E.G. US. (ft)	416.47	Culv Inv El Up (ft)	408.33
W.S. US. (ft)	416.29	Culv Inv El Dn (ft)	408.02
E.G. DS (ft)	414.45	Culv Frctn Ls (ft)	0.22
W.S. DS (ft)	413.48	Culv Exit Loss (ft)	0.66
Delta EG (ft)	2.02	Culv Entr Loss (ft)	1.14
Delta WS (ft)	2.82	Q Weir (cfs)	
E.G. IC (ft)	416.21	Weir Sta Lft (ft)	
E.G. OC (ft)	416.47	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	413.33	Weir Max Depth (ft)	
Culv WS Outlet (ft)	413.02	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.33	Min El Weir Flow (ft)	416.64

River: River 1 Profile: 100 Year Culv Group: Culvert #1
Reach WalnutCK RS: 1231 Plan: Proposed

Plan: Proposed River 1 WalnutCK RS: 1231 Culv Group: Culvert #1 Profile: 100 Year

Q Culv Group (cfs)	1353.26	Culv Full Len (ft)	49.00
# Barrels	4	Culv Vel US (ft/s)	11.28
Q Barrel (cfs)	338.31	Culv Vel DS (ft/s)	11.28
E.G. US. (ft)	417.04	Culv Inv El Up (ft)	408.33
W.S. US. (ft)	416.78	Culv Inv El Dn (ft)	408.02
E.G. DS (ft)	415.37	Culv Frctn Ls (ft)	0.27
W.S. DS (ft)	413.41	Culv Exit Loss (ft)	0.01
Delta EG (ft)	1.66	Culv Entr Loss (ft)	1.38
Delta WS (ft)	3.37	Q Weir (cfs)	369.04
E.G. IC (ft)	417.04	Weir Sta Lft (ft)	539.15
E.G. OC (ft)	417.04	Weir Sta Rgt (ft)	1293.47
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	413.33	Weir Max Depth (ft)	0.40
Culv WS Outlet (ft)	413.02	Weir Avg Depth (ft)	0.32
Culv Nml Depth (ft)	4.00	Weir Flow Area (sq ft)	241.88
Culv Crt Depth (ft)	4.62	Min El Weir Flow (ft)	416.64

STATE OF TEXAS
DANIEL DIAZ, JR.
124907
LICENSED
PROFESSIONAL ENGINEER

3/25/2022
,P.E.
Signature of Registrant & Date

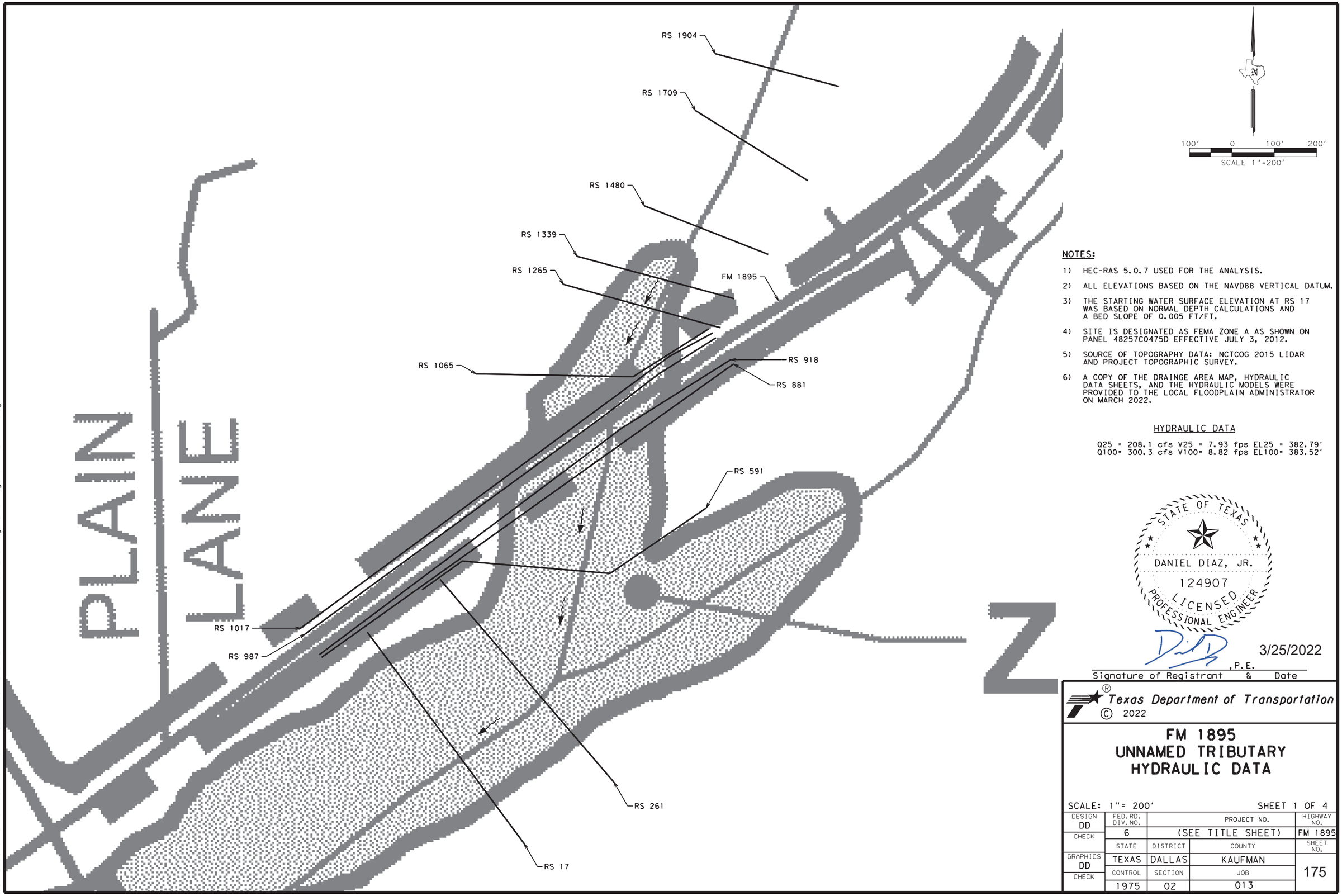
Texas Department of Transportation
© 2022

FM 1895
WALNUT CREEK
HYDRAULIC DATA

SHEET 4 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
DD	6	(SEE TITLE SHEET)		FM 1895
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS DD	TEXAS	DALLAS	KAUFMAN	174
CHECK	CONTROL	SECTION	JOB	
	1975	02	013	

2/21/2022
D:\Documents\H&H*Section\H&H*AreaOffice\1975-02-013\Plan Set\5. Drainage\Drainage\013*HD04*WC.dgn



NOTES:

1) HEC-RAS 5.0.7 USED FOR THE ANALYSIS.
2) ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.
3) THE STARTING WATER SURFACE ELEVATION AT RS 17 WAS BASED ON NORMAL DEPTH CALCULATIONS AND A BED SLOPE OF 0.005 FT/FT.
4) SITE IS DESIGNATED AS FEMA ZONE A AS SHOWN ON PANEL 48257C0475D EFFECTIVE JULY 3, 2012.
5) SOURCE OF TOPOGRAPHY DATA: NCTCOG 2015 LIDAR AND PROJECT TOPOGRAPHIC SURVEY.
6) A COPY OF THE DRAINGE AREA MAP, HYDRAULIC DATA SHEETS, AND THE HYDRAULIC MODELS WERE PROVIDED TO THE LOCAL FLOODPLAIN ADMINISTRATOR ON MARCH 2022.

HYDRAULIC DATA

Q25 = 208.1 cfs V25 = 7.93 fps EL25 = 382.79′
Q100= 300.3 cfs V100= 8.82 fps EL100= 383.52′

STATE OF TEXAS
DANIEL DIAZ, JR.
124907
LICENSED
PROFESSIONAL ENGINEER

3/25/2022

,P.E.
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
UNNAMED TRIBUTARY
HYDRAULIC DATA

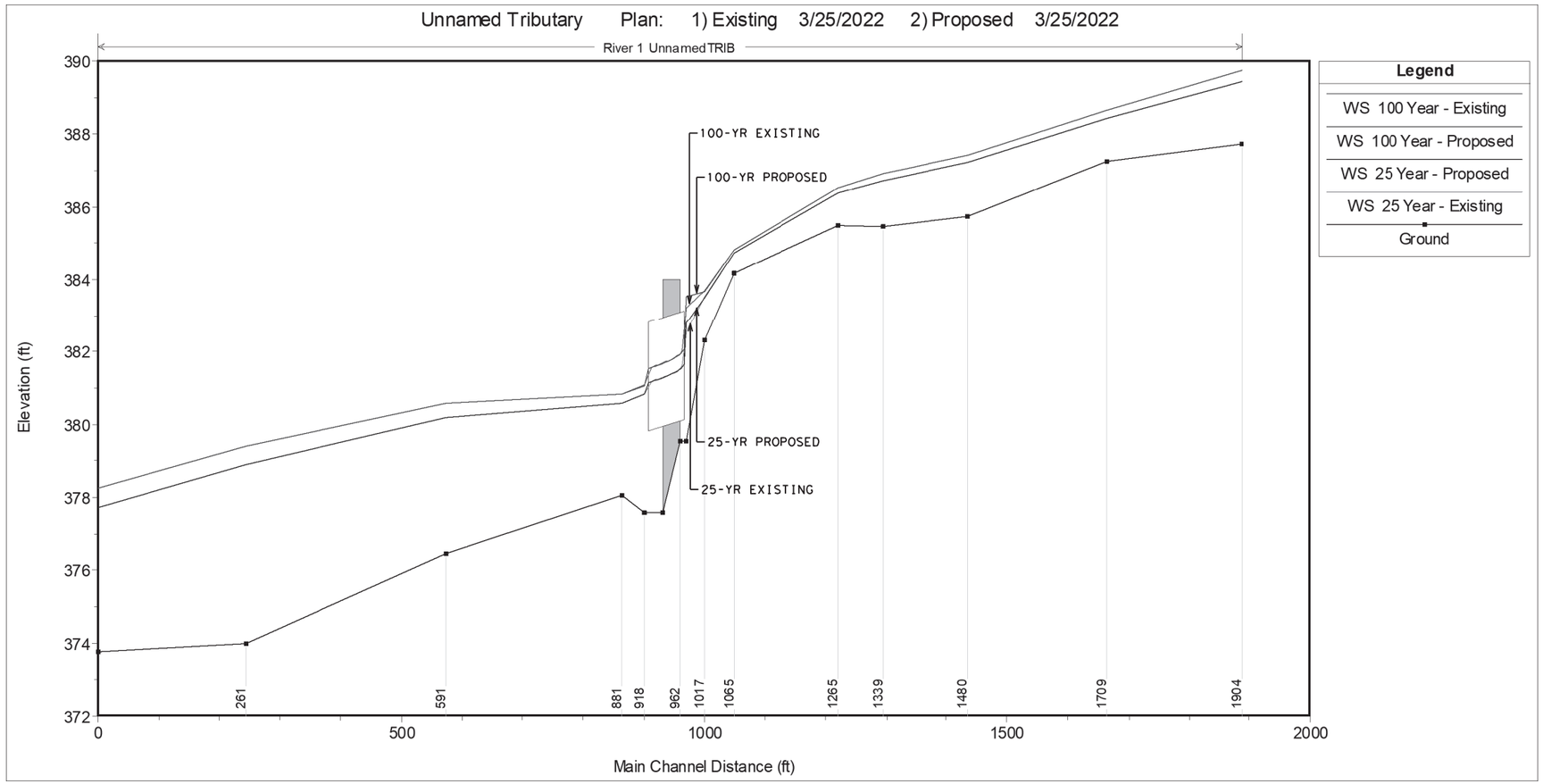
SCALE: 1"= 200′ SHEET 1 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
DD	6	(SEE TITLE SHEET)		FM 1895
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS DD	TEXAS	DALLAS	KAUFMAN	175
CHECK	CONTROL	SECTION	JOB	
	1975	02	013	

3/25/2022
D:\Documents\H&H*Section\H&H*AreaOffice\1975-02-013\Plan Set\S. Drainage\Drainage\013*HD01*UT.dgn

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
UnnamedTRIB	1904	25 Year	Existing	208.10	387.72	389.43	389.41	389.90	0.012875	5.49	37.88	39.01	0.98
UnnamedTRIB	1904	25 Year	Proposed	208.10	387.72	389.43	389.41	389.90	0.012875	5.49	37.88	39.01	0.98
UnnamedTRIB	1904	100 Year	Existing	300.30	387.72	389.74	389.74	390.27	0.010777	5.85	53.41	60.53	0.93
UnnamedTRIB	1904	100 Year	Proposed	300.30	387.72	389.74	389.74	390.27	0.010777	5.85	53.41	60.53	0.93
UnnamedTRIB	1709	25 Year	Existing	208.10	387.25	388.42	388.06	388.53	0.003164	2.69	83.63	122.80	0.49
UnnamedTRIB	1709	25 Year	Proposed	208.10	387.25	388.42	388.06	388.53	0.003164	2.69	83.63	122.80	0.49
UnnamedTRIB	1709	100 Year	Existing	300.30	387.25	388.66	388.26	388.78	0.002873	2.97	117.29	163.43	0.48
UnnamedTRIB	1709	100 Year	Proposed	300.30	387.25	388.66	388.26	388.78	0.002873	2.97	117.29	163.42	0.48
UnnamedTRIB	1480	25 Year	Existing	208.10	385.74	387.22	387.04	387.46	0.007458	3.92	53.41	74.27	0.73
UnnamedTRIB	1480	25 Year	Proposed	208.10	385.74	387.22	387.04	387.46	0.007458	3.92	53.41	74.27	0.73
UnnamedTRIB	1480	100 Year	Existing	300.30	385.74	387.41	387.28	387.73	0.008098	4.56	69.15	88.80	0.79
UnnamedTRIB	1480	100 Year	Proposed	300.30	385.74	387.41	387.28	387.73	0.008096	4.56	69.16	88.81	0.79
UnnamedTRIB	1339	25 Year	Existing	208.10	385.47	386.72	386.34	385.80	0.002795	2.30	91.16	113.86	0.45
UnnamedTRIB	1339	25 Year	Proposed	208.10	385.47	386.72	386.34	385.80	0.002795	2.30	91.16	113.86	0.45
UnnamedTRIB	1339	100 Year	Existing	300.30	385.47	386.92	386.49	387.03	0.002889	2.66	115.72	143.90	0.47
UnnamedTRIB	1339	100 Year	Proposed	300.30	385.47	386.92	386.49	387.03	0.00289	2.66	115.70	143.89	0.47
UnnamedTRIB	1265	25 Year	Existing	208.10	385.49	386.39	386.18	385.52	0.005479	2.88	72.18	103.42	0.61
UnnamedTRIB	1265	25 Year	Proposed	208.10	385.49	386.39	386.18	385.52	0.00549	2.89	72.13	103.41	0.61
UnnamedTRIB	1265	100 Year	Existing	300.30	385.49	386.53	386.32	385.72	0.006202	3.43	87.48	105.87	0.67
UnnamedTRIB	1265	100 Year	Proposed	300.30	385.49	386.53	386.32	385.72	0.00626	3.44	87.22	105.83	0.67
UnnamedTRIB	1065	25 Year	Existing	208.10	384.16	384.72	384.72	384.86	0.021711	3.72	69.69	226.26	1.09
UnnamedTRIB	1065	25 Year	Proposed	208.10	384.16	384.72	384.72	384.86	0.021787	3.73	69.61	226.25	1.09
UnnamedTRIB	1065	100 Year	Existing	300.30	384.16	384.81	384.81	384.99	0.019676	4.10	90.19	229.88	1.07
UnnamedTRIB	1065	100 Year	Proposed	300.30	384.16	384.81	384.81	384.99	0.019261	4.08	90.79	229.95	1.06
UnnamedTRIB	1017	25 Year	Existing	208.10	382.33	383.51	383.51	383.82	0.011536	5.16	52.20	701.49	0.93
UnnamedTRIB	1017	25 Year	Proposed	208.10	382.33	383.50	383.50	383.82	0.013973	4.80	48.01	700.50	0.98
UnnamedTRIB	1017	100 Year	Existing	300.30	382.33	383.70	383.70	384.07	0.011256	5.74	67.72	736.82	0.95
UnnamedTRIB	1017	100 Year	Proposed	300.30	382.33	383.67	383.67	384.07	0.014147	5.38	61.30	725.86	1.01

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
UnnamedTRIB	987	25 Year	Existing	208.10	379.54	382.54	381.23	382.66	0.000997	2.80	74.20	586.92	0.32
UnnamedTRIB	987	25 Year	Proposed	208.10	379.54	382.79	381.24	382.91	0.000836	2.81	73.99	615.12	0.30
UnnamedTRIB	987	100 Year	Existing	300.30	379.54	383.21	381.54	383.37	0.000922	3.17	94.68	663.94	0.32
UnnamedTRIB	987	100 Year	Proposed	300.30	379.54	383.52	381.58	383.68	0.000801	3.22	93.38	687.87	0.30
UnnamedTRIB	962			Culvert									
UnnamedTRIB	918	25 Year	Existing	208.10	377.59	380.83	380.83	381.13	0.006073	4.57	58.91	147.74	0.70
UnnamedTRIB	918	25 Year	Proposed	208.10	377.59	380.82	380.82	381.14	0.005895	4.67	57.11	140.45	0.69
UnnamedTRIB	918	100 Year	Existing	300.30	377.59	381.09	381.09	381.33	0.004874	4.50	106.47	224.70	0.64
UnnamedTRIB	918	100 Year	Proposed	300.30	377.59	381.07	381.07	381.34	0.004956	4.72	101.98	220.50	0.65
UnnamedTRIB	881	25 Year	Existing	208.10	378.06	380.58	379.84	380.64	0.001118	2.36	162.45	327.18	0.32
UnnamedTRIB	881	25 Year	Proposed	208.10	378.06	380.58	379.84	380.64	0.001118	2.36	162.45	327.18	0.32
UnnamedTRIB	881	100 Year	Existing	300.30	378.06	380.82	380.43	380.86	0.00093	2.27	250.59	408.97	0.29
UnnamedTRIB	881	100 Year	Proposed	300.30	378.06	380.82	380.43	380.86	0.00093	2.27	250.59	408.97	0.29
UnnamedTRIB	591	25 Year	Existing	208.10	376.47	380.19	378.96	380.28	0.001406	2.72	130.08	257.85	0.35
UnnamedTRIB	591	25 Year	Proposed	208.10	376.47	380.19	378.96	380.28	0.001406	2.72	130.08	257.85	0.35
UnnamedTRIB	591	100 Year	Existing	300.30	376.47	380.57	380.07	380.61	0.000884	2.12	243.57	347.59	0.28
UnnamedTRIB	591	100 Year	Proposed	300.30	376.47	380.57	380.07	380.61	0.000884	2.12	243.57	347.59	0.28
UnnamedTRIB	261	25 Year	Existing	486.90	373.98	378.89	377.78	379.35	0.003891	5.44	93.32	77.88	0.61
UnnamedTRIB	261	25 Year	Proposed	486.90	373.98	378.89	377.78	379.35	0.003891	5.44	93.32	77.87	0.61
UnnamedTRIB	261	100 Year	Existing	707.90	373.98	379.40	378.54	379.87	0.003648	5.80	169.04	207.38	0.61
UnnamedTRIB	261	100 Year	Proposed	707.90	373.98	379.40	378.54	379.87	0.003648	5.80	169.04	207.38	0.61
UnnamedTRIB	17	25 Year	Existing	486.90	373.77	377.72	376.92	378.27	0.005	5.94	81.93	35.57	0.69
UnnamedTRIB	17	25 Year	Proposed	486.90	373.77	377.72	376.92	378.27	0.005	5.94	81.93	35.57	0.69
UnnamedTRIB	17	100 Year	Existing	707.90	373.77	378.26	377.73	378.82	0.005002	6.25	150.65	213.22	0.70
UnnamedTRIB	17	100 Year	Proposed	707.90	373.77	378.26	377.73	378.82	0.005002	6.25	150.65	213.22	0.70



NOTES:

1) HEC-RAS 5.0.7 USED FOR THE ANALYSIS.

2) ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.

3) THE STARTING WATER SURFACE ELEVATION AT RS 17 WAS BASED ON NORMAL DEPTH CALCULATIONS AND A BED SLOPE OF 0.005 FT/FT.

4) SITE IS DESIGNATED AS FEMA ZONE A AS SHOWN ON PANEL 48257C0475D EFFECTIVE JULY 3, 2012.

5) SOURCE OF TOPOGRAPHY DATA: NCTCOG 2015 LIDAR AND PROJECT TOPOGRAPHIC SURVEY.

6) A COPY OF THE DRAINGE AREA MAP, HYDRAULIC DATA SHEETS, AND THE HYDRAULIC MODELS WERE PROVIDED TO THE LOCAL FLOODPLAIN ADMINISTRATOR ON MARCH 2022.

HYDRAULIC DATA

Q25 = 208.1 cfs V25 = 7.93 fps EL25 = 382.79'
Q100= 300.3 cfs V100= 8.82 fps EL100= 383.52'

STATE OF TEXAS
DANIEL DIAZ, JR.
124907
LICENSED
PROFESSIONAL ENGINEER

3/25/2022

,P.E.
Signature of Registrant & Date

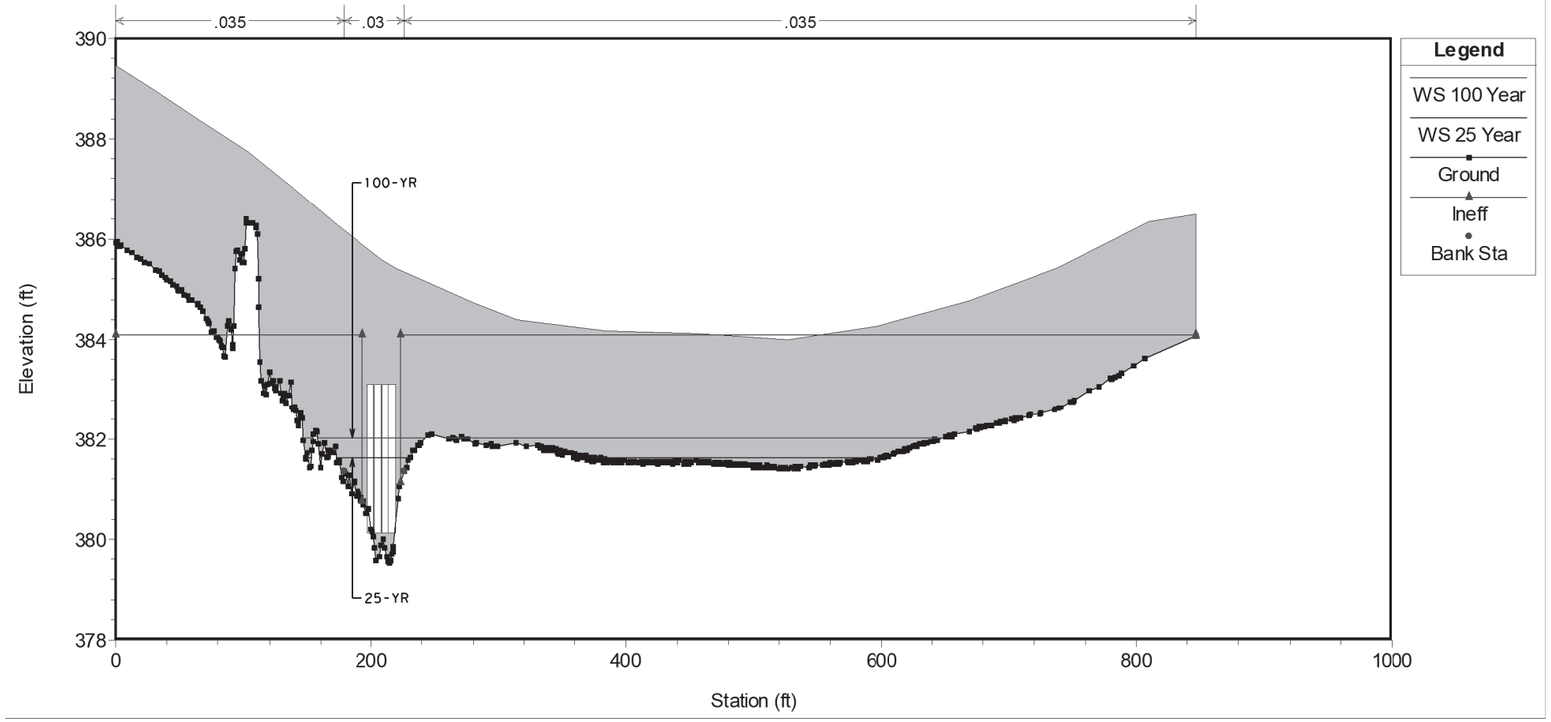
Texas Department of Transportation

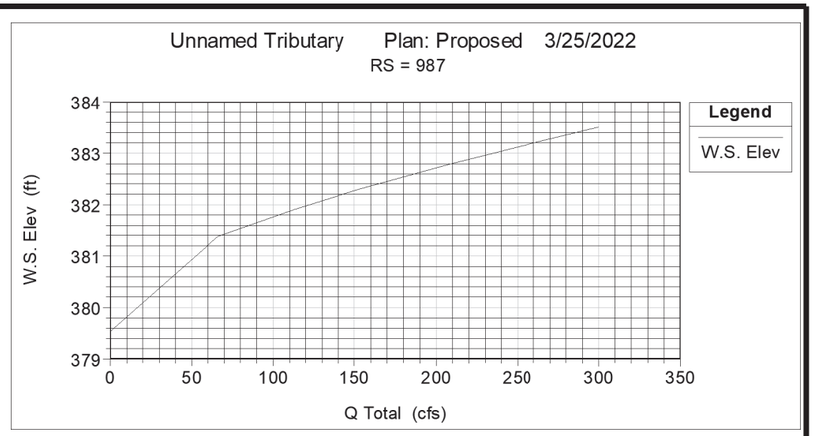
FM 1895
UNNAMED TRIBUTARY
HYDRAULIC DATA

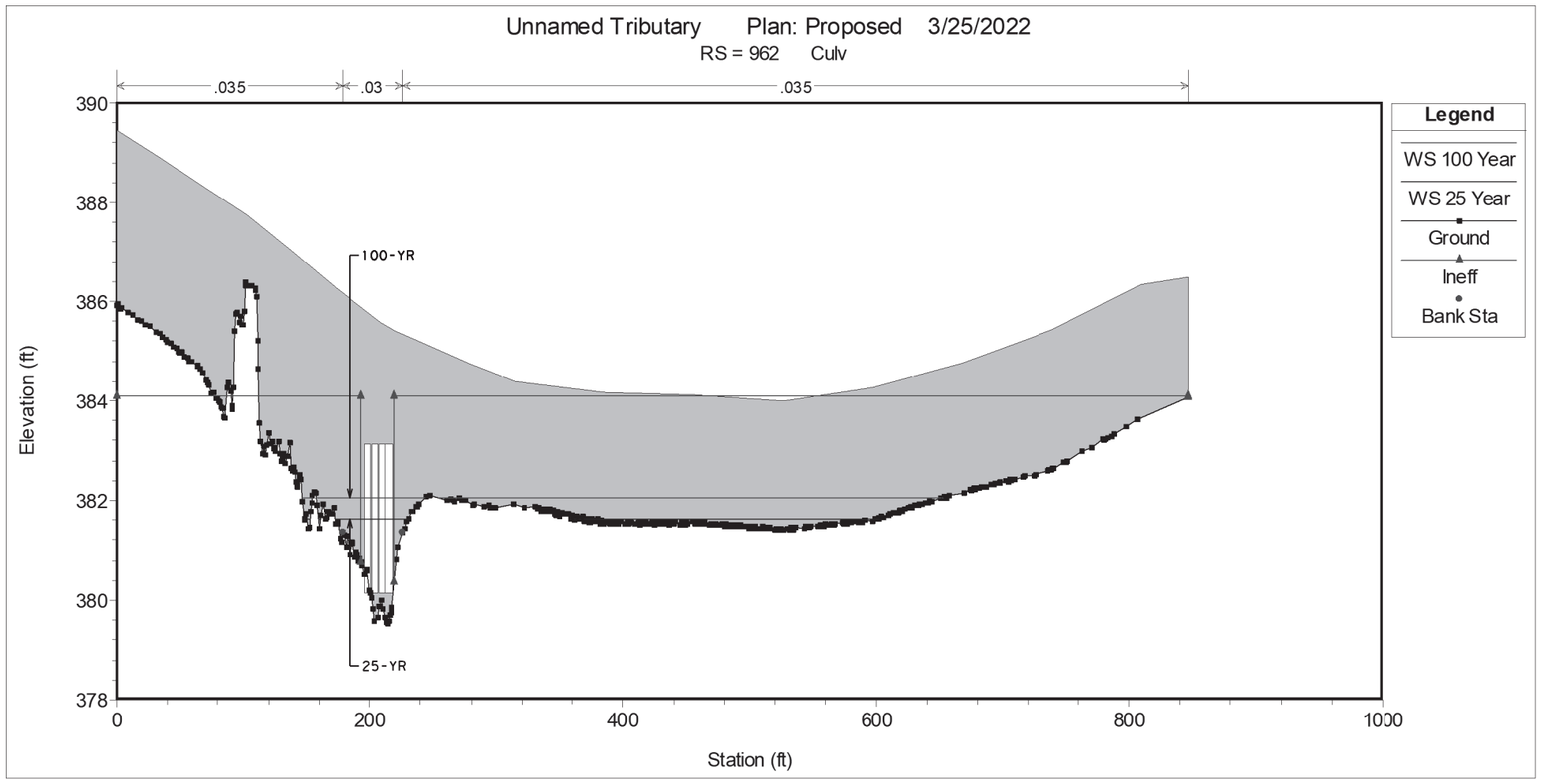
SHEET 2 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
DD	6	(SEE TITLE SHEET)		FM 1895
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS DD	TEXAS	DALLAS	KAUFMAN	176
CHECK	CONTROL	SECTION	JOB	
	1975	02	013	

3/25/2022
D:\Documents\H&H*Section\H&H*AreaOffice\1975-02-013\Plan Set\5. Drainage\Drainage\013*HD02*UT.dgn







NOTES:

1) HEC-RAS 5.0.7 USED FOR THE ANALYSIS.
2) ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.
3) THE STARTING WATER SURFACE ELEVATION AT RS 17 WAS BASED ON NORMAL DEPTH CALCULATIONS AND A BED SLOPE OF 0.005 FT/FT.
4) SITE IS DESIGNATED AS FEMA ZONE A AS SHOWN ON PANEL 48257C0475D EFFECTIVE JULY 3, 2012.
5) SOURCE OF TOPOGRAPHY DATA: NCTCOG 2015 LIDAR AND PROJECT TOPOGRAPHIC SURVEY.
6) A COPY OF THE DRAINGE AREA MAP, HYDRAULIC DATA SHEETS, AND THE HYDRAULIC MODELS WERE PROVIDED TO THE LOCAL FLOODPLAIN ADMINISTRATOR ON MARCH 2022.

HYDRAULIC DATA

Q25 = 208.1 cfs V25 = 7.93 fps EL25 = 382.79'
Q100= 300.3 cfs V100= 8.82 fps EL100= 383.52'

STATE OF TEXAS
DANIEL DIAZ, JR.
124907
LICENSED
PROFESSIONAL ENGINEER

3/25/2022
,P.E.
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
UNNAMED TRIBUTARY
HYDRAULIC DATA

SHEET 3 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
DD	6	(SEE TITLE SHEET)		FM 1895
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS DD	TEXAS	DALLAS	KAUFMAN	177
CHECK	CONTROL	SECTION	JOB	
	1975	02	013	

3/25/2022
D:\Documents\VH&H*Section\H&H*AreaOffice\1975-02-013\Plan Set\5. Drainage\Drainage\013*HD03*UT.dgn

River: River 1 Profile: 25 Year Culv Group: Culvert #1

Reach UnnamedTRIB RS: 962 Plan: Existing

Plan: Existing River 1 UnnamedTRIB RS: 962 Culv Group: Culvert #1 Profile: 25 Year

Q Culv Group (cfs)	208.10	Culv Full Len (ft)	
# Barrels	4	Culv Vel US (ft/s)	6.94
Q Barrel (cfs)	52.03	Culv Vel DS (ft/s)	7.92
E.G. US. (ft)	382.67	Culv Inv El Up (ft)	380.12
W.S. US. (ft)	382.54	Culv Inv El Dn (ft)	379.85
E.G. DS (ft)	381.13	Culv Frctn Ls (ft)	0.23
W.S. DS (ft)	380.83	Culv Exit Loss (ft)	1.01
Delta EG (ft)	1.54	Culv Entr Loss (ft)	0.30
Delta WS (ft)	1.71	Q Weir (cfs)	
E.G. IC (ft)	382.52	Weir Sta Lft (ft)	
E.G. OC (ft)	382.67	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	381.62	Weir Max Depth (ft)	
Culv WS Outlet (ft)	381.16	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.28	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.50	Min El Weir Flow (ft)	384.11

River: River 1 Profile: 100 Year Culv Group: Culvert #1

Reach UnnamedTRIB RS: 962 Plan: Existing

Plan: Existing River 1 UnnamedTRIB RS: 962 Culv Group: Culvert #1 Profile: 100 Year

Q Culv Group (cfs)	300.30	Culv Full Len (ft)	
# Barrels	4	Culv Vel US (ft/s)	7.85
Q Barrel (cfs)	75.08	Culv Vel DS (ft/s)	8.80
E.G. US. (ft)	383.37	Culv Inv El Up (ft)	380.12
W.S. US. (ft)	383.21	Culv Inv El Dn (ft)	379.85
E.G. DS (ft)	381.33	Culv Frctn Ls (ft)	0.23
W.S. DS (ft)	381.09	Culv Exit Loss (ft)	1.43
Delta EG (ft)	2.04	Culv Entr Loss (ft)	0.38
Delta WS (ft)	2.13	Q Weir (cfs)	
E.G. IC (ft)	383.21	Weir Sta Lft (ft)	
E.G. OC (ft)	383.37	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	382.03	Weir Max Depth (ft)	
Culv WS Outlet (ft)	381.56	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.66	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.91	Min El Weir Flow (ft)	384.11

River: River 1 Profile: 25 Year Culv Group: Culvert #1

Reach UnnamedTRIB RS: 962 Plan: Proposed

Plan: Proposed River 1 UnnamedTRIB RS: 962 Culv Group: Culvert #1 Profile: 25 Year

Q Culv Group (cfs)	208.10	Culv Full Len (ft)	
# Barrels	4	Culv Vel US (ft/s)	6.94
Q Barrel (cfs)	52.03	Culv Vel DS (ft/s)	7.93
E.G. US. (ft)	382.91	Culv Inv El Up (ft)	380.14
W.S. US. (ft)	382.79	Culv Inv El Dn (ft)	379.83
E.G. DS (ft)	381.14	Culv Frctn Ls (ft)	0.27
W.S. DS (ft)	380.82	Culv Exit Loss (ft)	0.98
Delta EG (ft)	1.78	Culv Entr Loss (ft)	0.52
Delta WS (ft)	1.97	Q Weir (cfs)	
E.G. IC (ft)	382.60	Weir Sta Lft (ft)	
E.G. OC (ft)	382.91	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	381.64	Weir Max Depth (ft)	
Culv WS Outlet (ft)	381.14	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.28	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.50	Min El Weir Flow (ft)	384.11

River: River 1 Profile: 100 Year Culv Group: Culvert #1

Reach UnnamedTRIB RS: 962 Plan: Proposed

Plan: Proposed River 1 UnnamedTRIB RS: 962 Culv Group: Culvert #1 Profile: 100 Year

Q Culv Group (cfs)	300.30	Culv Full Len (ft)	
# Barrels	4	Culv Vel US (ft/s)	7.85
Q Barrel (cfs)	75.08	Culv Vel DS (ft/s)	8.82
E.G. US. (ft)	383.58	Culv Inv El Up (ft)	380.14
W.S. US. (ft)	383.52	Culv Inv El Dn (ft)	379.83
E.G. DS (ft)	381.34	Culv Frctn Ls (ft)	0.27
W.S. DS (ft)	381.07	Culv Exit Loss (ft)	1.40
Delta EG (ft)	2.34	Culv Entr Loss (ft)	0.67
Delta WS (ft)	2.45	Q Weir (cfs)	
E.G. IC (ft)	383.28	Weir Sta Lft (ft)	
E.G. OC (ft)	383.58	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	382.05	Weir Max Depth (ft)	
Culv WS Outlet (ft)	381.53	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.66	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.91	Min El Weir Flow (ft)	384.11

NOTES:

1) HEC-RAS 5.0.7 USED FOR THE ANALYSIS.
2) ALL ELEVATIONS BASED ON THE NAVD88 VERTICAL DATUM.
3) THE STARTING WATER SURFACE ELEVATION AT RS 17 WAS BASED ON NORMAL DEPTH CALCULATIONS AND A BED SLOPE OF 0.005 FT/FT.
4) SITE IS DESIGNATED AS FEMA ZONE A AS SHOWN ON PANEL 48257C0475D EFFECTIVE JULY 3, 2012.
5) SOURCE OF TOPOGRAPHY DATA: NCTCOG 2015 LIDAR AND PROJECT TOPOGRAPHIC SURVEY.
6) A COPY OF THE DRAINGE AREA MAP, HYDRAULIC DATA SHEETS, AND THE HYDRAULIC MODELS WERE PROVIDED TO THE LOCAL FLOODPLAIN ADMINISTRATOR ON MARCH 2022.

HYDRAULIC DATA

Q25 = 208.1 cfs V25 = 7.93 fps EL25 = 382.79'
Q100= 300.3 cfs V100= 8.82 fps EL100= 383.52'

STATE OF TEXAS
DANIEL DIAZ, JR.
124907
LICENSED
PROFESSIONAL ENGINEER

3/25/2022

,P.E.

Signature of Registrant & Date

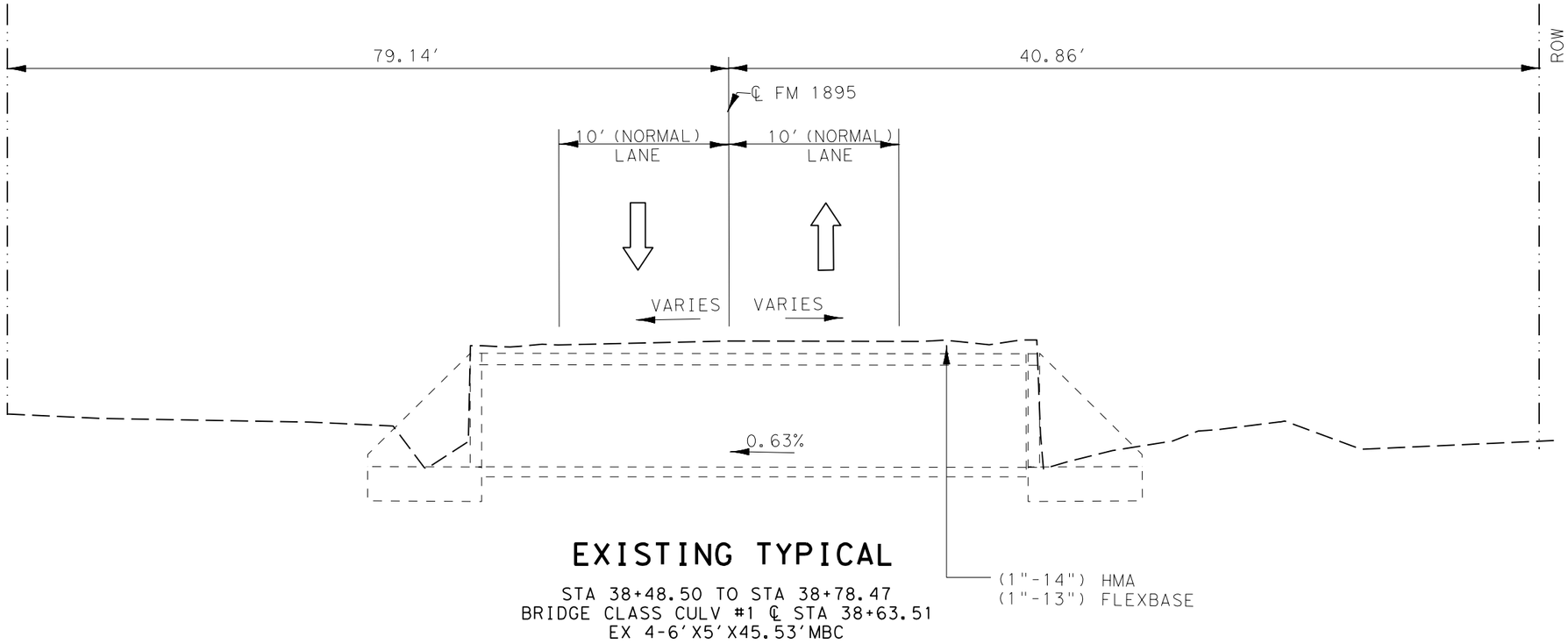
Texas Department of Transportation

FM 1895
UNNAMED TRIBUTARY
HYDRAULIC DATA

SHEET 4 OF 4

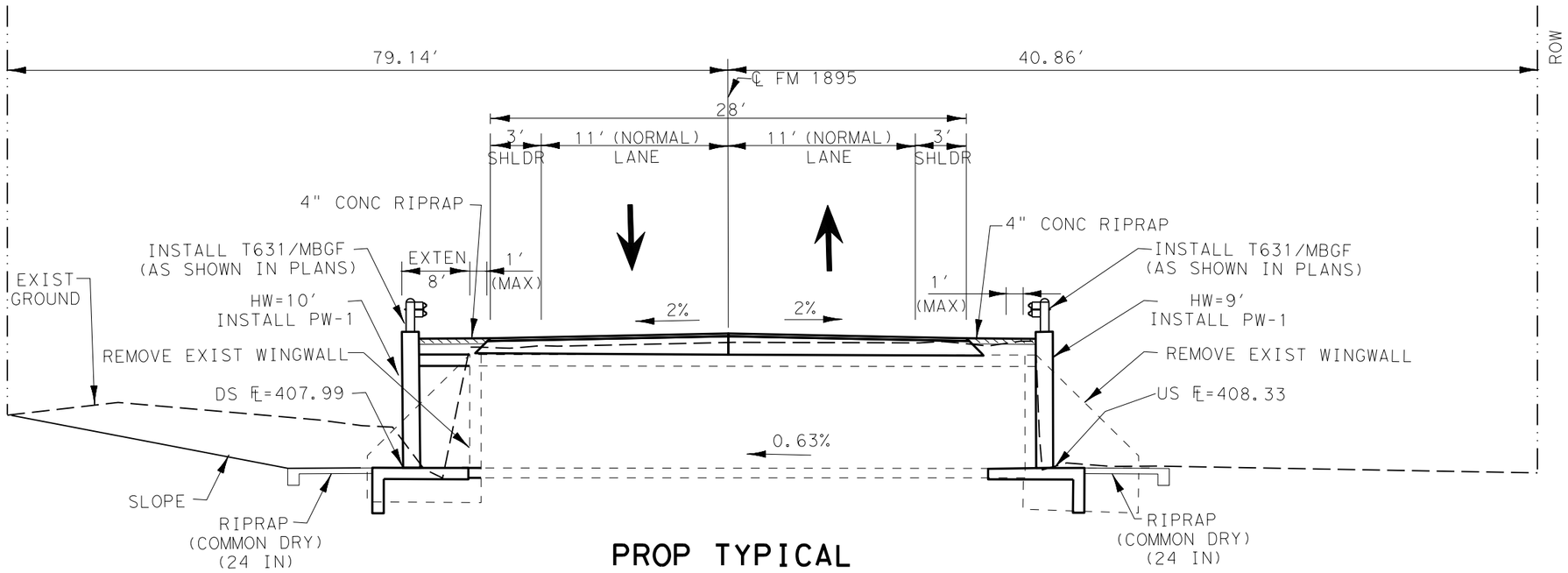
DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
DD	6	(SEE TITLE SHEET)		FM 1895
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS DD	TEXAS	DALLAS	KAUFMAN	178
CHECK	CONTROL	SECTION	JOB	
	1975	02	013	

3/25/2022
D:\Documents\H&H*Section\H&H*AreaOffice\1975-02-013\Plan Set\5. Drainage\Drainage\013*HD04*UT.dgn



EXISTING TYPICAL

STA 38+48.50 TO STA 38+78.47
BRIDGE CLASS CULV #1 ℄ STA 38+63.51
EX 4-6'X5'X45.53'MBC



PROP TYPICAL

STA 38+48.50 TO STA 38+78.47
BRIDGE CLASS CULV #1 ℄ STA 38+63.51
PROP 4-6'X5'X 53.53' 'MBC W/ PW-1 (US & DS)

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

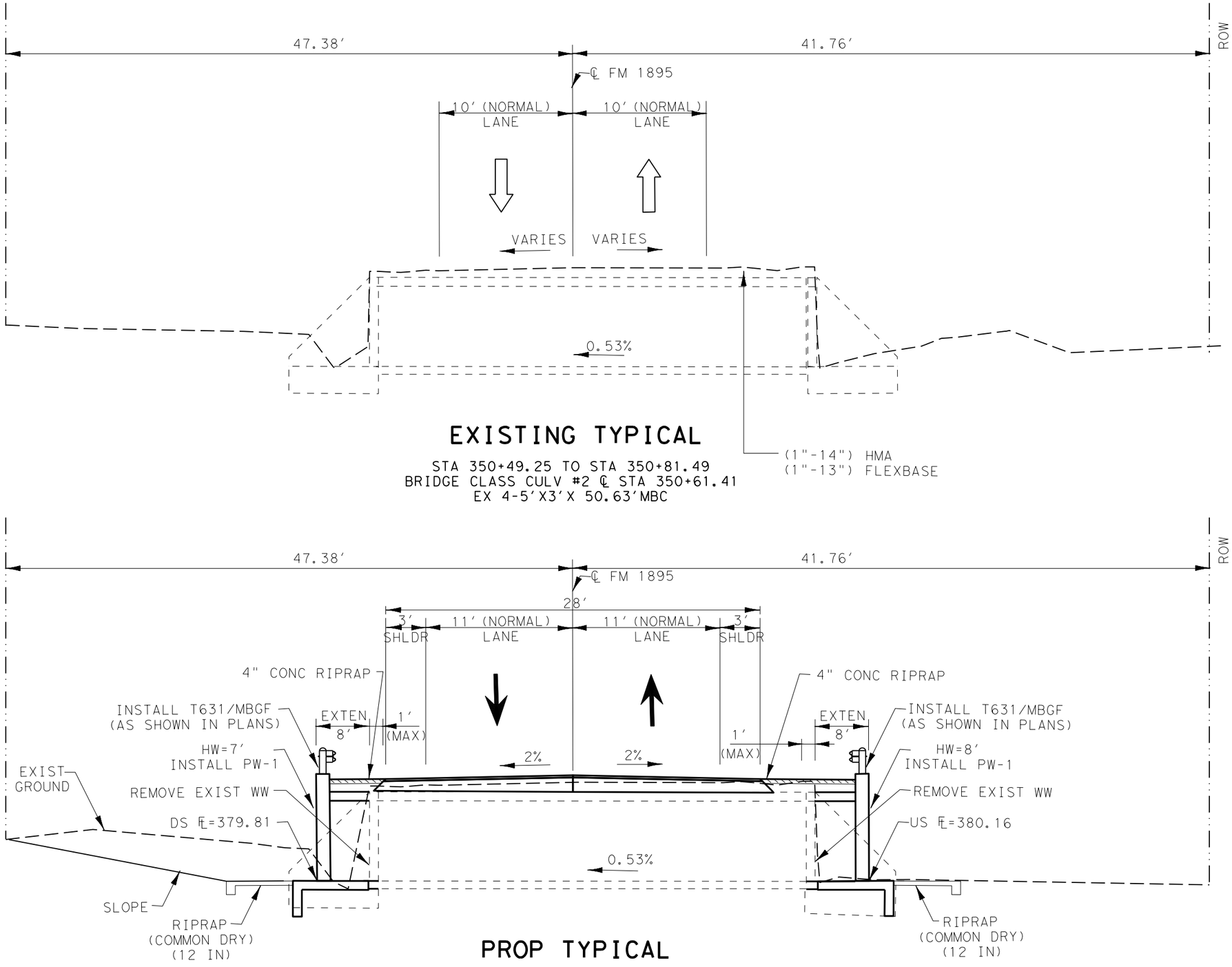
Texas Department of Transportation

FM 1895
EXISTING & PROPOSED
TYPICAL SECTION
(BRIDGE CLASS CULVERT #1)

SCALE: NTS SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	179
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/28/2022 1:41:42 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\7. Bridge\2. BRIDGE CULVERT 1 EXIST AND PROP TYPICAL SECTION FOR BRI



EXISTING TYPICAL

STA 350+49.25 TO STA 350+81.49
BRIDGE CLASS CULV #2 ℄ STA 350+61.41
EX 4-5'X3'X 50.63'MBC

PROP TYPICAL

STA 350+49.25 TO STA 350+81.49
BRIDGE CLASS CULV #2 ℄ STA 350+65.34
PROP 4-5'X3'X 66.63' 'MBC W/ PW-1 (US & DS)

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe , P.E. 7/28/2022
Signature of Registrant & Date

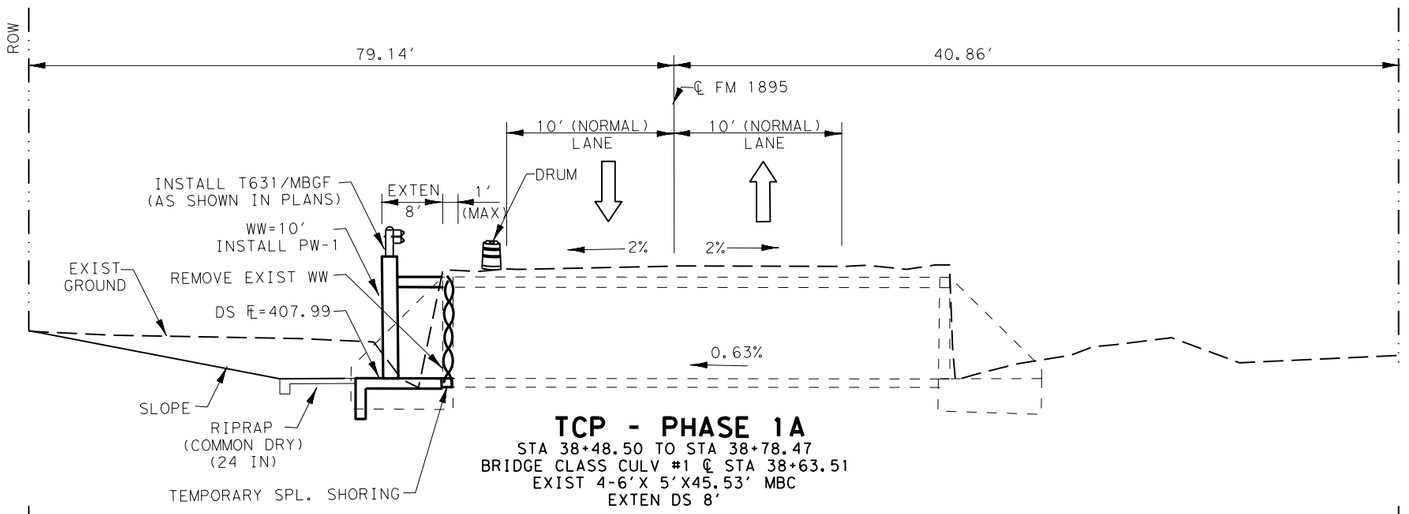
Texas Department of Transportation

FM 1895
EXISTING & PROPOSED
TYPICAL SECTION
(BRIDGE CLASS CULVERT #2)

SCALE: NTS — SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	180
CHECK VD	CONTROL 1975	SECTION 02	JOB 013	

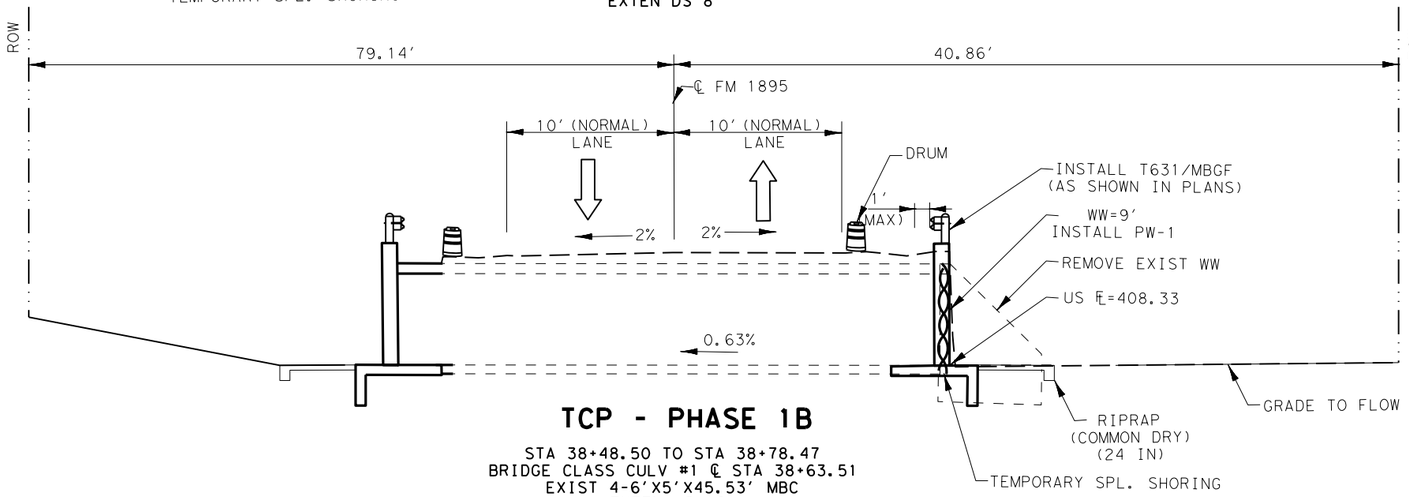
DATE: 7/28/2022 1:38:52 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\7. Bridge\3. BRIDGE CULVERT 2 EXIST AND PROP TYPICAL SECTION FOR BRI



TCP - PHASE 1A

STA 38+48.50 TO STA 38+78.47
BRIDGE CLASS CULV #1 ℄ STA 38+63.51
EXIST 4-6'X 5'X45.53' MBC
EXTEN DS 8'

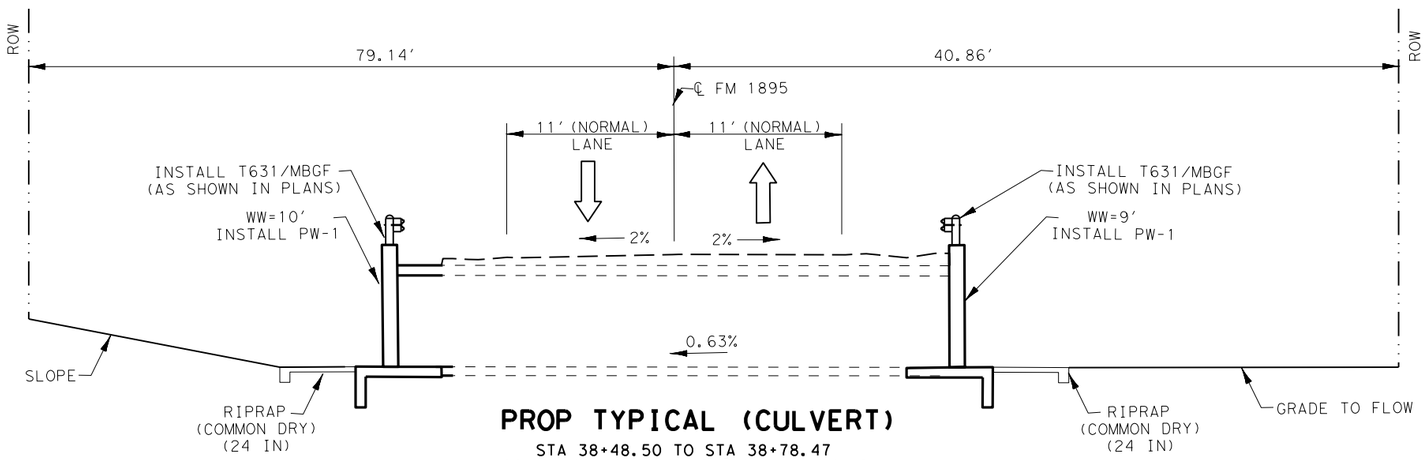
PHASE 1A:
1. SETUP TRAFFIC CONTROL PLAN FOLLOWNG TCP AND BC STANDARDS.
2. EXTEND 8' IN DOWNSTREAM.
3. INSTALL RAC T631 RAIL
4. REGRADE DOWNSTREAM CREEK TO FLOW.



TCP - PHASE 1B

STA 38+48.50 TO STA 38+78.47
BRIDGE CLASS CULV #1 ℄ STA 38+63.51
EXIST 4-6'X5'X45.53' MBC
EXTEN US 10'

PHASE 1B:
1. SETUP TRAFFIC CONTROL PLAN FOLLOWNG TCP AND BC STANDARDS.
2. REMOVE WINGWALL/REPLACE WITH PARALLEL WINGWALL.
3. INSTALL RAC T631 RAIL
4. REGRADE UPSTREAM CREEK TO FLOW.



PROP TYPICAL (CULVERT)

STA 38+48.50 TO STA 38+78.47
BRIDGE CLASS CULV #1 ℄ STA 38+63.51
PROP 4-6'X 5'X53.53' MBC W/ PW-1 (US & DS)

FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

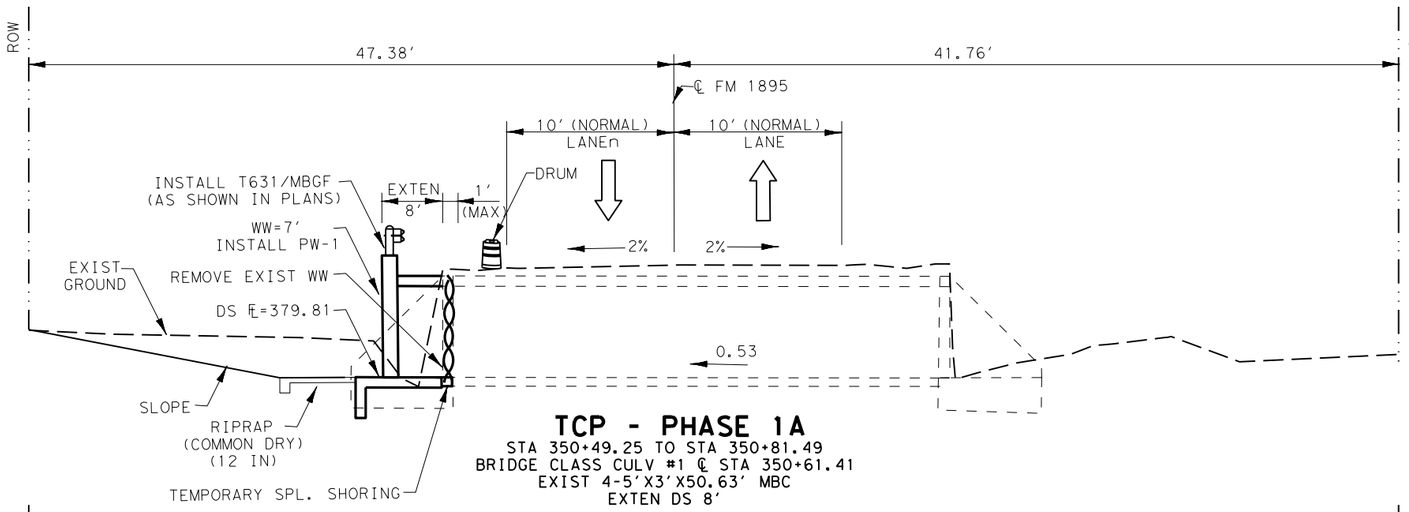
Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

FM 1895
TCP TYPICAL SECTION (BRIDGE CLASS CULVERT #1)

SCALE: NTS SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	181
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

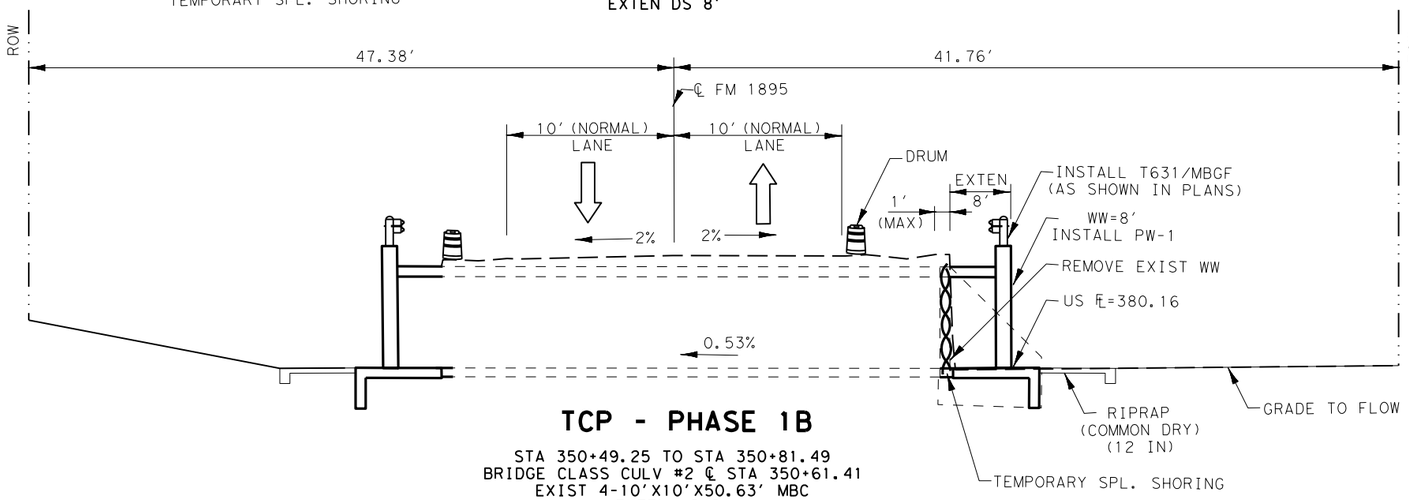
DATE: 7/28/2022 2:36:03 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\7. Bridge\4. BRIDGE CULVERT 1 TCP TYPICAL SECTION FOR BRIDGE.dgn



TCP - PHASE 1A

STA 350+49.25 TO STA 350+81.49
BRIDGE CLASS CULV #1 ℄ STA 350+61.41
EXIST 4-5'X3'X50.63' MBC
EXTEN DS 8'

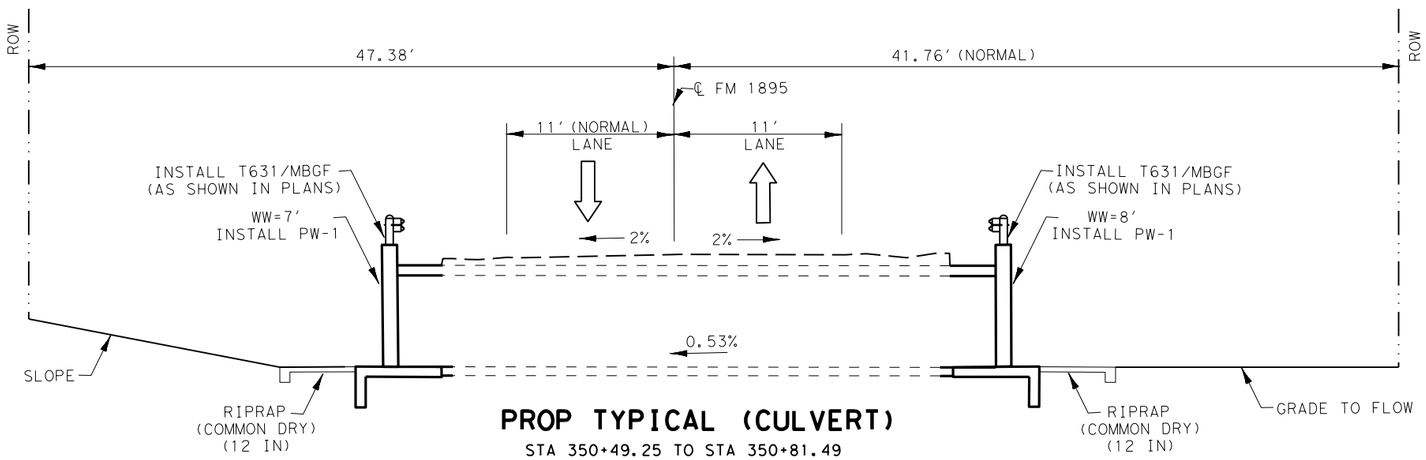
PHASE 1A:
1. SETUP TRAFFIC CONTROL PLAN FOLLOWNG TCP AND BC STANDARDS.
2. EXTEND 8' IN DOWNSTREAM.
3. INSTALL RAC T631 RAIL
4. REGRADE DOWNSTREAM CREEK TO FLOW.



TCP - PHASE 1B

STA 350+49.25 TO STA 350+81.49
BRIDGE CLASS CULV #2 ℄ STA 350+61.41
EXIST 4-10'X10'X50.63' MBC
EXTEN US 8'

PHASE 1B:
1. SETUP TRAFFIC CONTROL PLAN FOLLOWNG TCP AND BC STANDARDS.
2. EXTEND 8' IN UPSTREAM.
3. INSTALL RAC T631 RAIL
4. REGRADE UPSTREAM TO FLOW.



PROP TYPICAL (CULVERT)

STA 350+49.25 TO STA 350+81.49
BRIDGE CLASS CULV #2 ℄ STA 350+61.41
PROP 4-5'X 3'X66.63' MBC W/ PW-1 (US & DS)

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

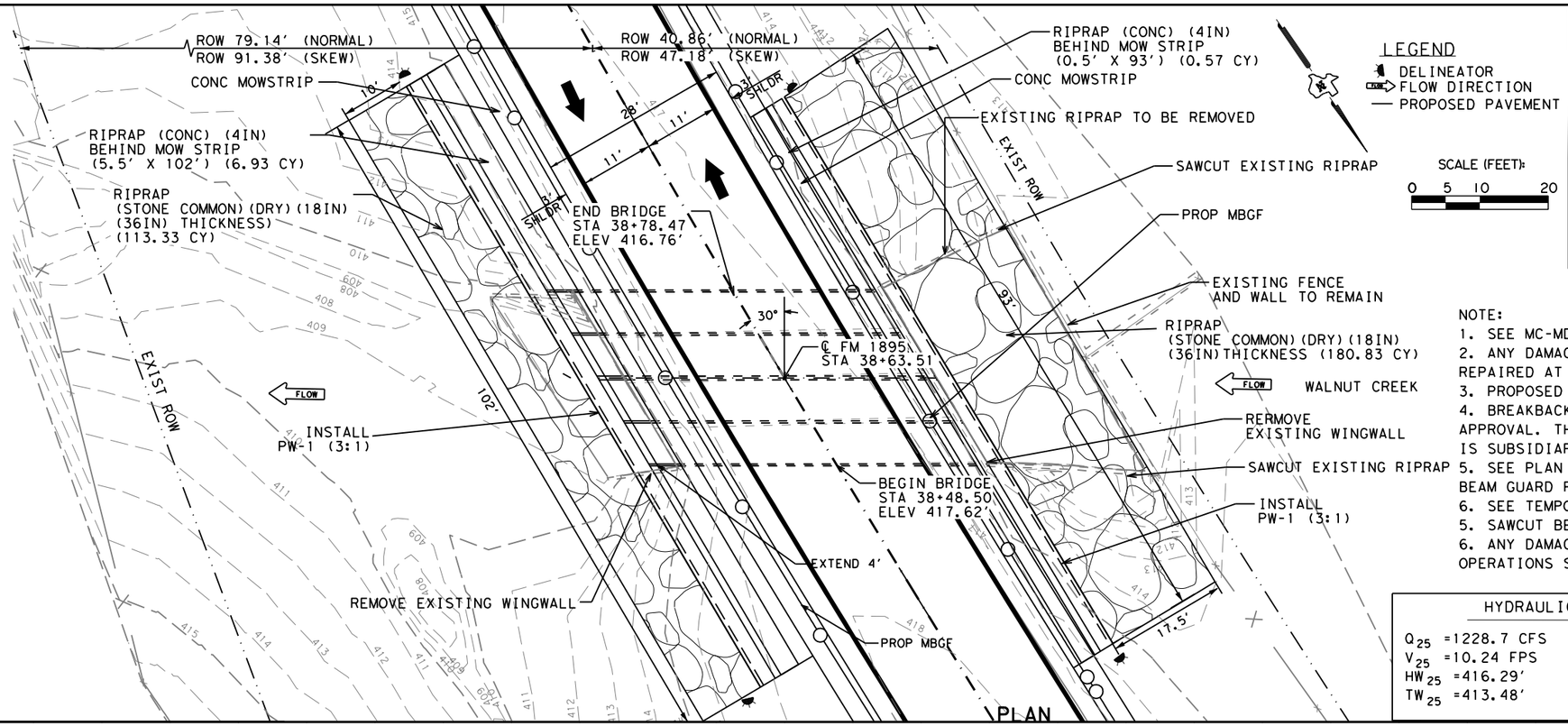
Texas Department of Transportation

FM 1895
TCP TYPICAL SECTION (BRIDGE CLASS CULVERT #2)

SCALE: NTS — SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	182
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/28/2022 2:16:37 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\7. Bridge\5. BRIDGE CULVERT 2 TCP TYPICAL SECTION FOR BRIDGE.dgn



LEGEND

- DELINEATOR
- FLOW DIRECTION
- PROPOSED PAVEMENT

SCALE (FEET): 0 5 10 20

ESTIMATED QUANTITIES

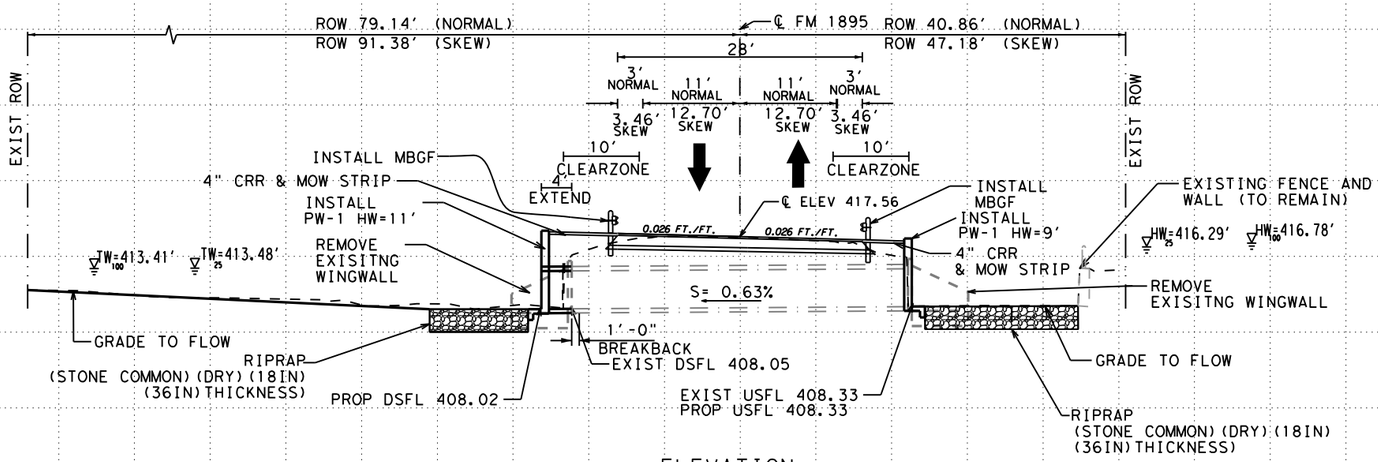
ITEM	DESCRIPTION	UNIT	QUA.
0104-6009	REMOVING (CONC) RIPRAP	CY	7.50
0403-6001	TEMP SPL SHORING	SF	1785
0432-6001	RIPRAP (CONC) (4IN)	CY	17.70
0432-6026	RIPRAP (STONE COMMON) (DRY) (18 IN)	CY	294.16
0462-6056	CONC BOX CULV (6FT X 5FT) EXTEND	LF	16
0466-6172	WINGWALL (PW-1) (HW=11FT)	EA	1
0466-6184	WINGWALL (PW-1) (HW=9FT)	EA	1
0480-6001	CLEAN EXIST CULVERTS	EA	1
0496-6005	REMOV STR (WINGWALL)	EA	2
0658-6100	INSTL OM ASSM (OM-2Z) (WFLX) GND	EA	4

NOTE:
1. SEE MC-MD STD FOR CULVERT EXTENSION DETAIL.
2. ANY DAMAGE OF CULVERTS DUE TO CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
3. PROPOSED EXTENSION WILL MATCH WITH EXISTING SLOPE.
4. BREAKBACK ON EXISTING STRUCTURE UP TO 1' WITH ENGINEER'S APPROVAL. THE REMOVAL IS SUBSIDIARY TO ITEM 496 & THE REPLACEMENT IS SUBSIDIARY TO ITEM 462.
5. SEE PLAN LAYOUT SHEETS FOR MORE INFORMATION REGARDING METAL BEAM GUARD FENCE (MBGF).
6. SEE TEMPORARY SPECIAL SHORING SHEETS FOR FURTHER INFORMATION.
5. SAWCUT BETWEEN EXISTING RIPRAP IS SUBSIDIARY TO ITEM 104.
6. ANY DAMAGE TO THE EXISTING WALL & FENCE DUE TO CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

HYDRAULIC DATA

Q_{25} = 1228.7 CFS	Q_{100} = 1722.3 CFS
V_{25} = 10.24 FPS	V_{100} = 11.28 FPS
HW_{25} = 416.29'	HW_{100} = 416.78'
TW_{25} = 413.48'	TW_{100} = 413.41'

DESIGN SPEED : 40 MPH (2R)
FUNCTIONAL CLASSIFICATION : RURAL MINOR COLLECTOR
ADT = 900 (2022)
ADT = 1200 (2042)
NBI: 18-130-0-1975-02-001



ELEVATION

EXIST 4 - 6' X 5' X 45.53' (SKEW) MBC W/ WINGWALLS
39.11' (NORMAL)
PROP 4 - 6' X 5' X 49.53' (SKEW) MBC W/ PARALLEL WINGWALLS
42.56' (NORMAL)
EXTEND DS 4'
INSTALL PW-1 (US & DS)

STANDARDS : MC-MD, PW, SRR, T631-CM, MC 6-16, SCP-6, CRR

FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Falon Renfroe, P.E. 8/3/2022
Signature of Registrant & Date

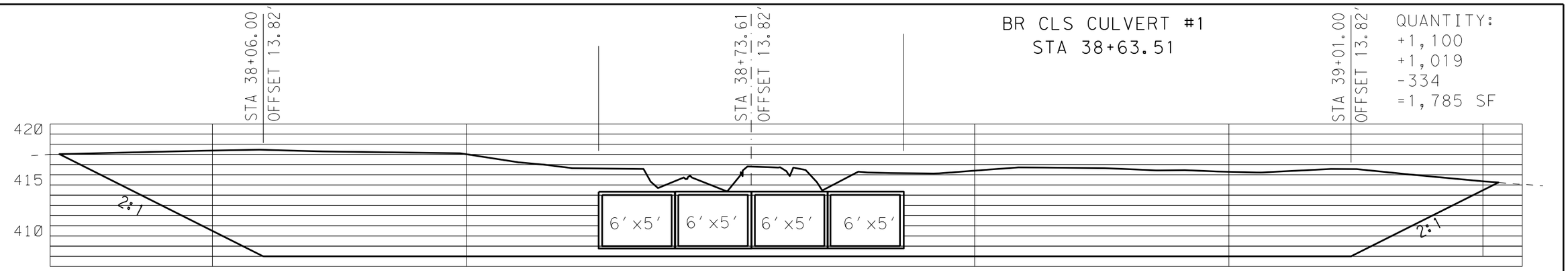
Texas Department of Transportation

FM 1895
BRIDGE CLASS CULVERT #1
STA 38+63.51

HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=20'
SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	183
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 8/3/2022 1:54:13 PM
FILE: dwr:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\7. Bridge\6. Bridge 1.dgn



ELEVATION

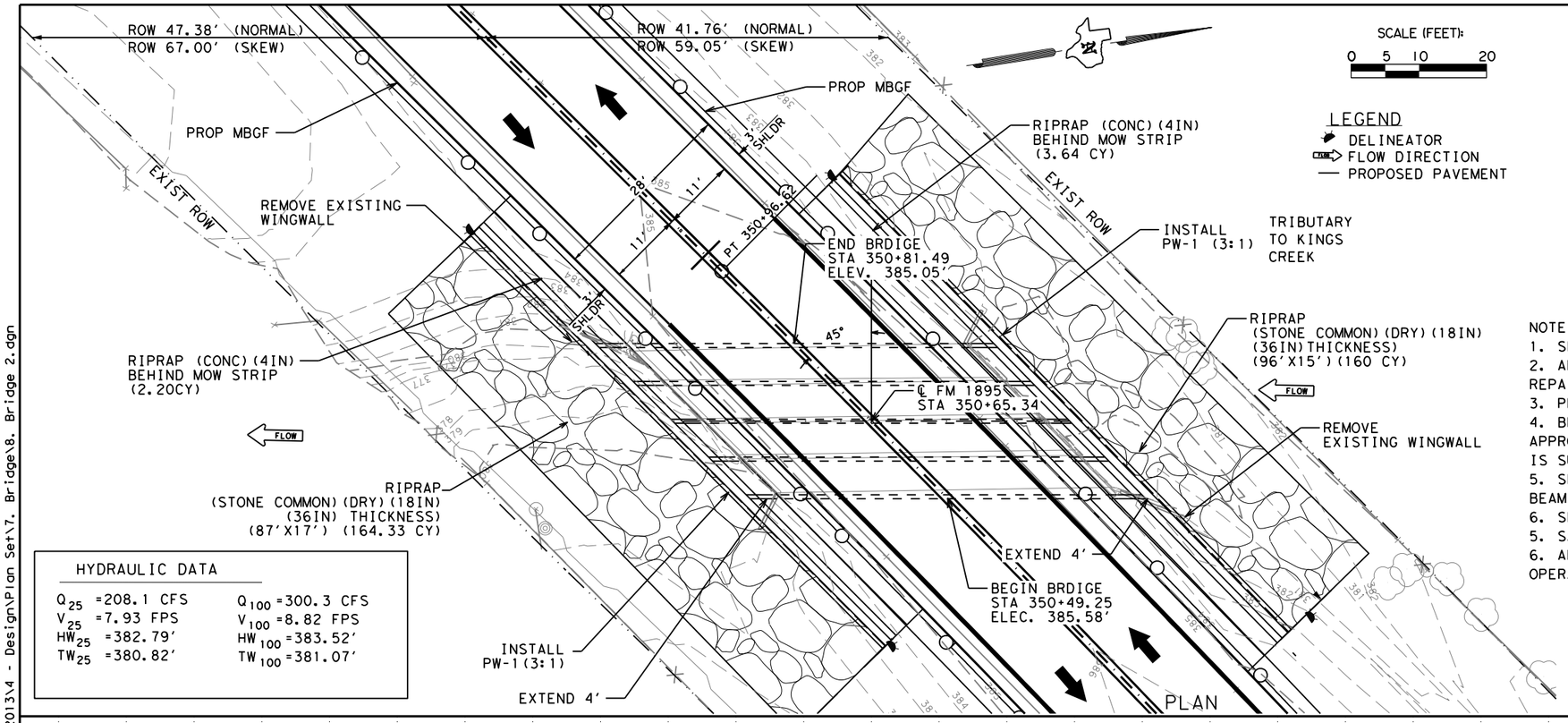
Falon Renfroe, P.E. 7/21/2022
Signature of Registrant & Date

FM 1895
BRIDGE CLASS CULVERT #1
TEMP SPL SHORING
STA 38+63.51

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
JR	6	(SEE TITLE SHEET)		FM1895
GRAPHICS JR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK QA	TEXAS	DALLAS	KAUFMAN	184
CHECK JR	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/19/2022 5:58:19 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\7. Bridge\7. BRDGE #1 TEMP SPL SHORING.dgn



ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUA.
0403-6001	TEMP SPL SHORING	SF	590
0432-6001	RIPRAP (CONC) (4IN)	CY	5.84
0432-6026	RIPRAP (STONE COMMON) (DRY) (18 IN)	CY	324.33
0462-6051	CONC BOX CULV (5FT X 3FT) EXTEND	LF	32
0466-6181	WINGWALL (PW-1) (HW=6FT)	EA	1
0466-6182	WINGWALL (PW-1) (HW=7FT)	EA	1
0480-6001	CLEAN EXIST CULVERTS	EA	1
0496-6005	REMOV STR (WINGWALL)	EA	2
0658-6100	INSTL OM ASSM (OM-2Z) (WFLX) GND BI	EA	4

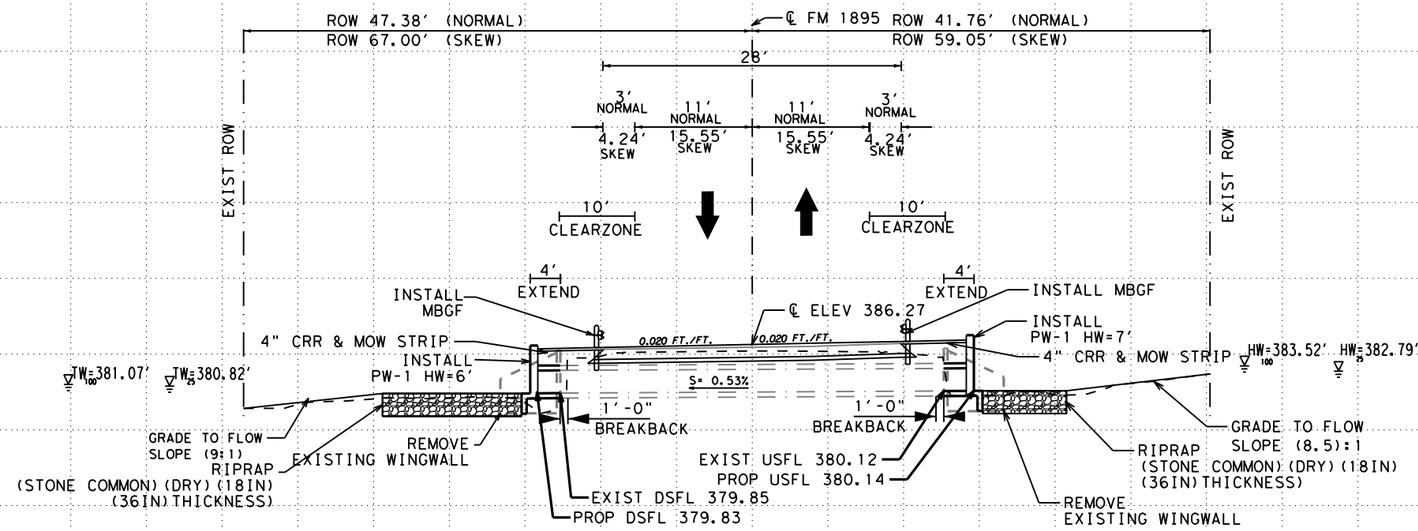
HYDRAULIC DATA

Q_{25}	=208.1 CFS	Q_{100}	=300.3 CFS
V_{25}	=7.93 FPS	V_{100}	=8.82 FPS
HW_{25}	=382.79'	HW_{100}	=383.52'
TW_{25}	=380.82'	TW_{100}	=381.07'

NOTE:
1. SEE MC-MD STD FOR CULVERT EXTENSION DETAIL.
2. ANY DAMAGE OF CULVERTS DUE TO CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
3. PROPOSED EXTENSION WILL MATCH WITH EXISTING SLOPE.
4. BREAKBACK ON EXISTING STRUCTURE UP TO 1' WITH ENGINEER'S APPROVAL. THE REMOVAL IS SUBSIDIARY TO ITEM 496 & THE REPLACEMENT IS SUBSIDIARY TO ITEM 462.
5. SEE PLAN LAYOUT SHEETS FOR MORE INFORMATION REGARDING METAL BEAM GUARD FENCE (MBGF).
6. SEE TEMPORARY SPECIAL SHORING SHEETS FOR FURTHER INFORMATION.
5. SAWCUT BETWEEN EXISTING RIPRAP IS SUBSIDIARY TO ITEM 104.
6. ANY DAMAGE TO THE EXISITNG WALL & FENCE DUE TO CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

DESIGN SPEED : 40 MPH (2R)
FUNCTIONAL CLASSIFICATION : RURAL MINOR COLLECTOR
ADT = 900 (2022)
ADT = 1200 (2042)

NBI: 18-130-0-1975-02-002



ELEVATION

EXIST 4 - 5' X 3' X 50.63' (SKEW) MBC W/ WINGWALLS
35.96' (NORMAL)
PROP 4 - 5' X 3' X 58.63' (SKEW) MBC W/ PARALLEL WINGWALLS
41.64' (NORMAL)
EXTEND US 4' & EXTEND DS 4'
INSTALL PW-1 (US & DS)

STANDARDS : MC-MD, PW, SRR, MC 5-20, SCP-5, CRR

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
BRIDGE CLASS CULVERT #2
STA 350+65.34

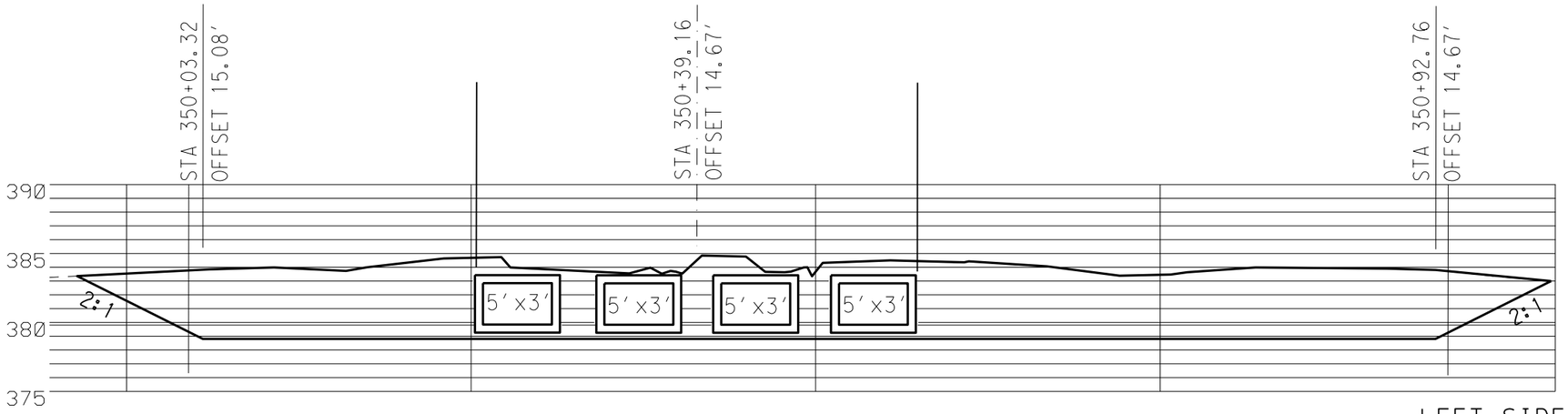
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=20'
SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	185
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

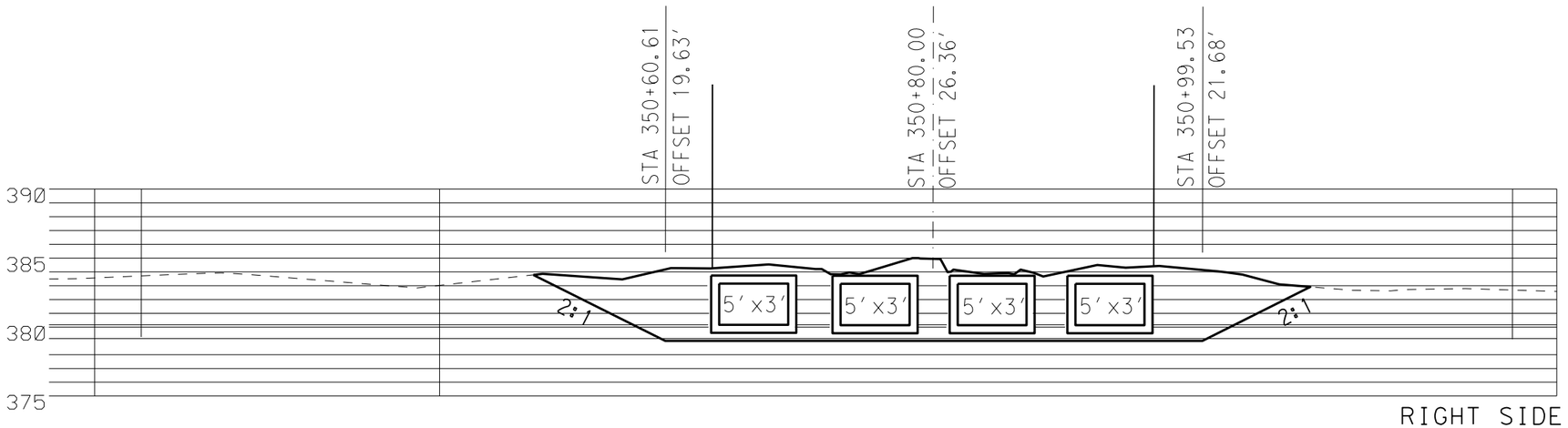
DATE: 7/28/2022 2:55:03 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\7. Bridge\8. Bridge 2.dgn

BR CLS CULVERT #2
STA 350+65.34

QUANTITY:
+506
+244
-160
=590 SF



LEFT SIDE



RIGHT SIDE

ELEVATION

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/21/2022
Signature of Registrant & Date

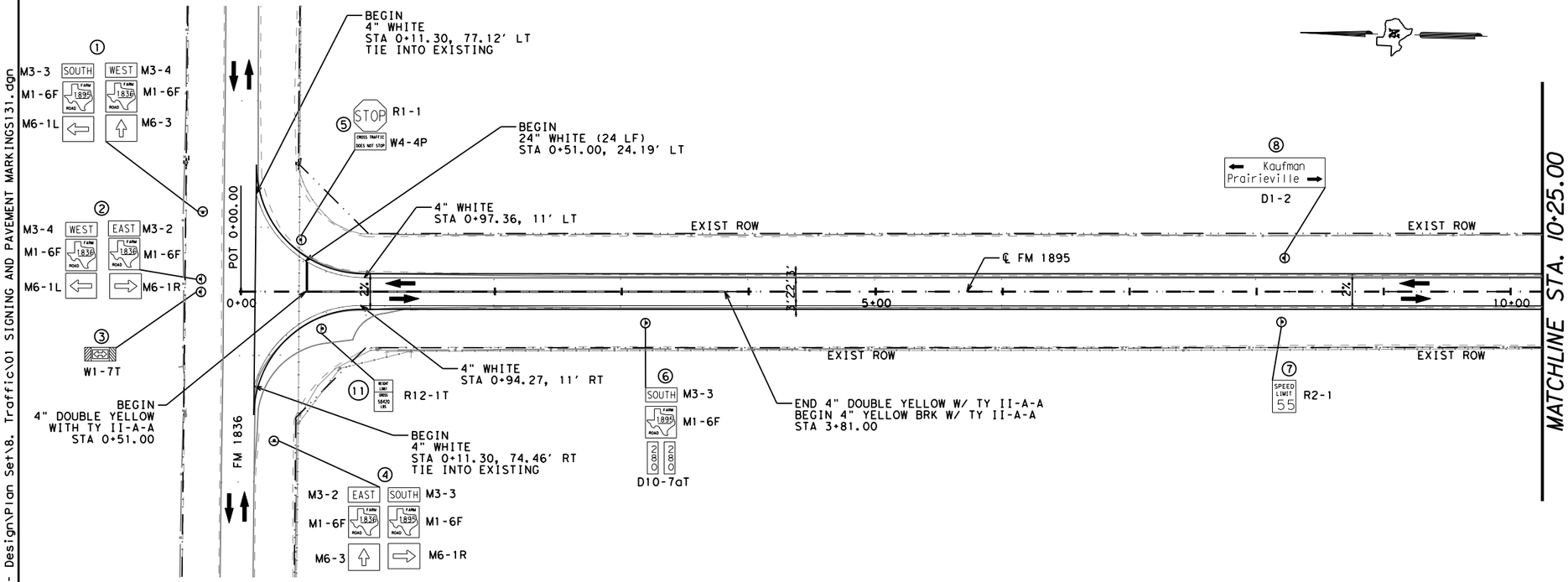
Texas Department of Transportation

FM 1895
BRIDGE CLASS CULVERT #2
TEMP SPL SHORING

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
JR	6	(SEE TITLE SHEET)		FM1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JR	TEXAS	DALLAS	KAUFMAN	186
CHECK	CONTROL	SECTION	JOB	
QA	1975	02	013	
CHECK				
JR				

DATE: 7/19/2022 6:01:13 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\7. Bridge\9. BRIDGE #2 TEMP SPL SHORING.dgn



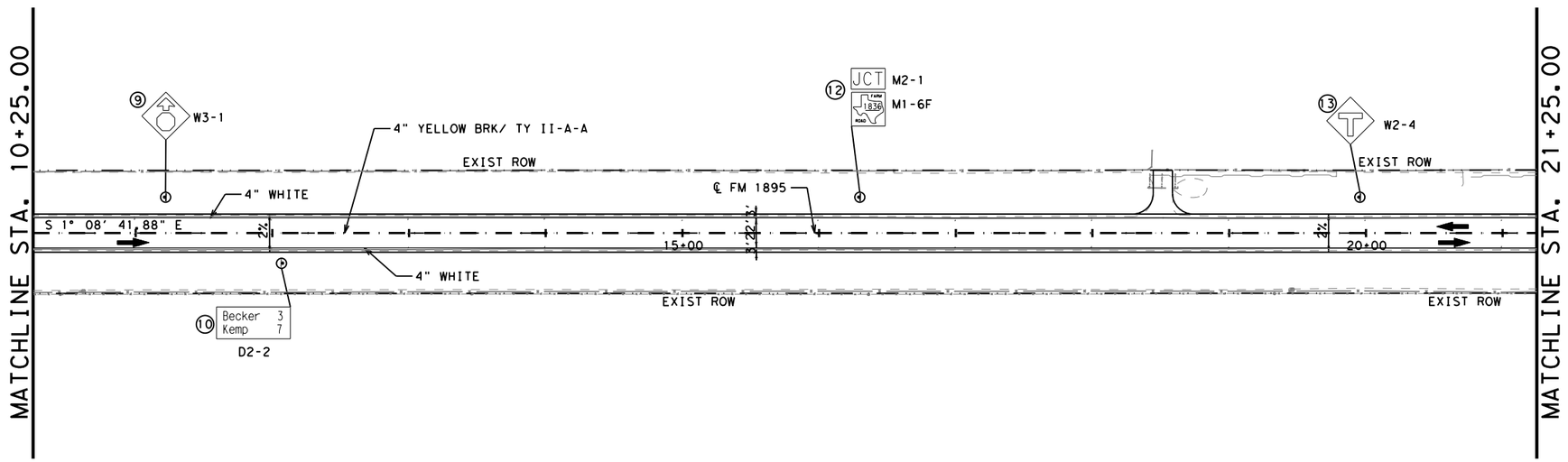
SCALE (FEET)

0 25 50 100

LEGEND:

- SIGN POST
- (#) NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION
AS END CURVE WHEN STRIPING EXISTING SECTIONS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

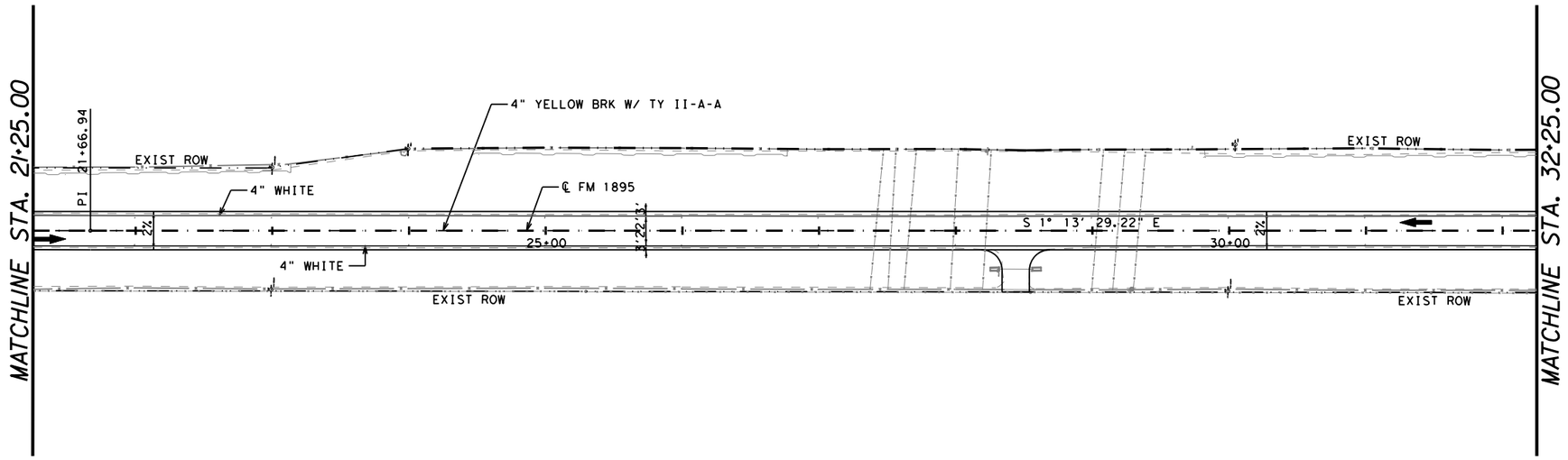
Texas Department of Transportation
© 2022

FM 1895
PAVEMENT MARKINGS & SINGING LAYOUT

SCALE: 1"=100' SHEET 1 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	187
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 10:10:55 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\01 SIGNING AND PAVEMENT MARKINGS131.dgn



SCALE (FEET)

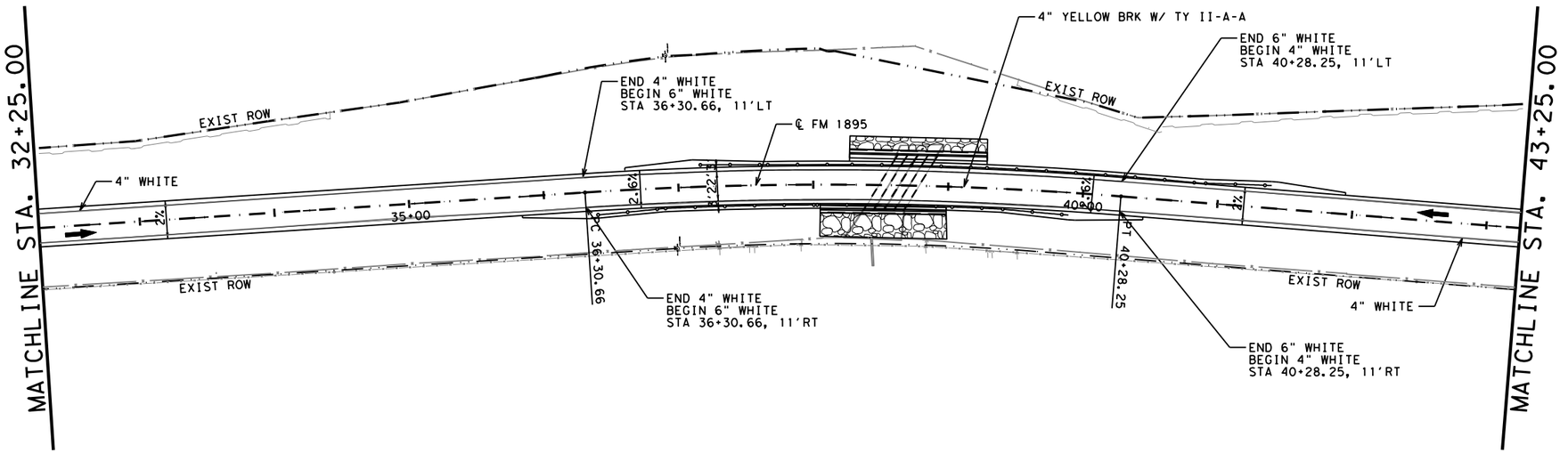
0 25 50 100

LEGEND:

- SIGN POST
- (#) NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION
AS END CURVE WHEN STRIPING EXISTING SECTIONS.

PI STATION = 38+29.80
DELTA = 8° 17' 01.37" (RT)
DEGREE OF CURVE = 2° 05' 00.54"
TANGENT = 199.14
LENGTH = 397.59
RADIUS = 2,750.00
PC STATION = 36+30.66
PT STATION = 40+28.25



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

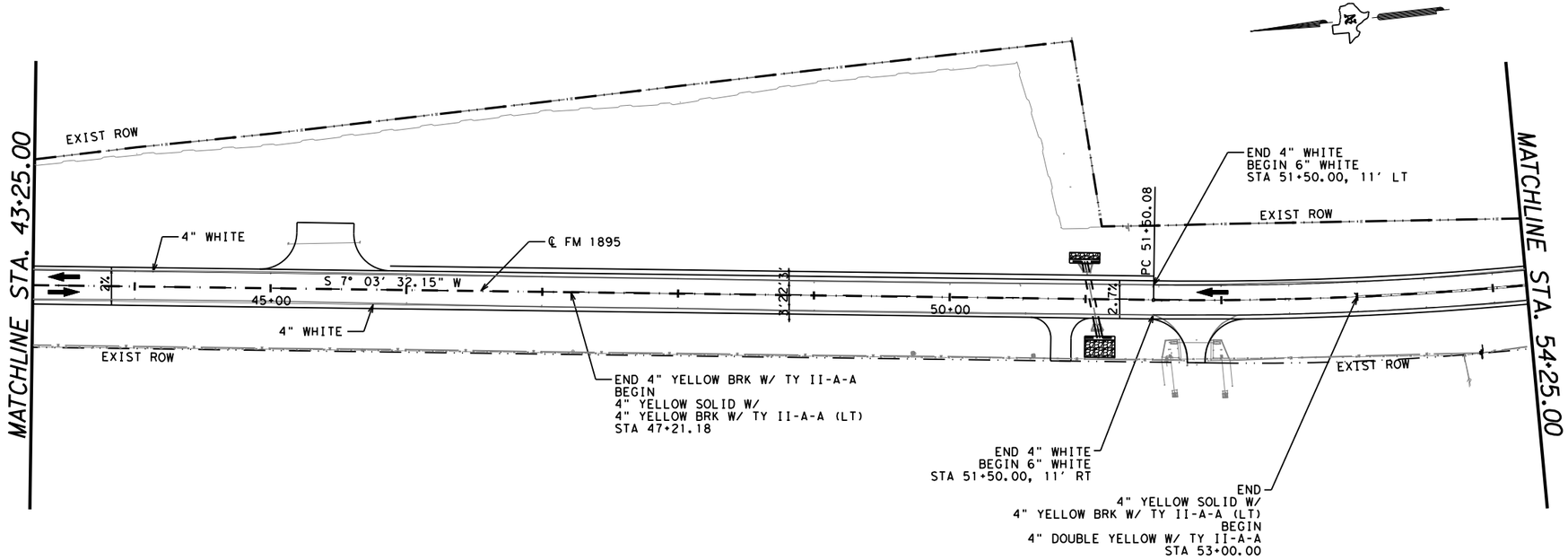
Texas Department of Transportation

FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 2 OF 19

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	188
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 10:12:10 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\02 SIGNING AND PAVEMENT MARKINGS132.dgn

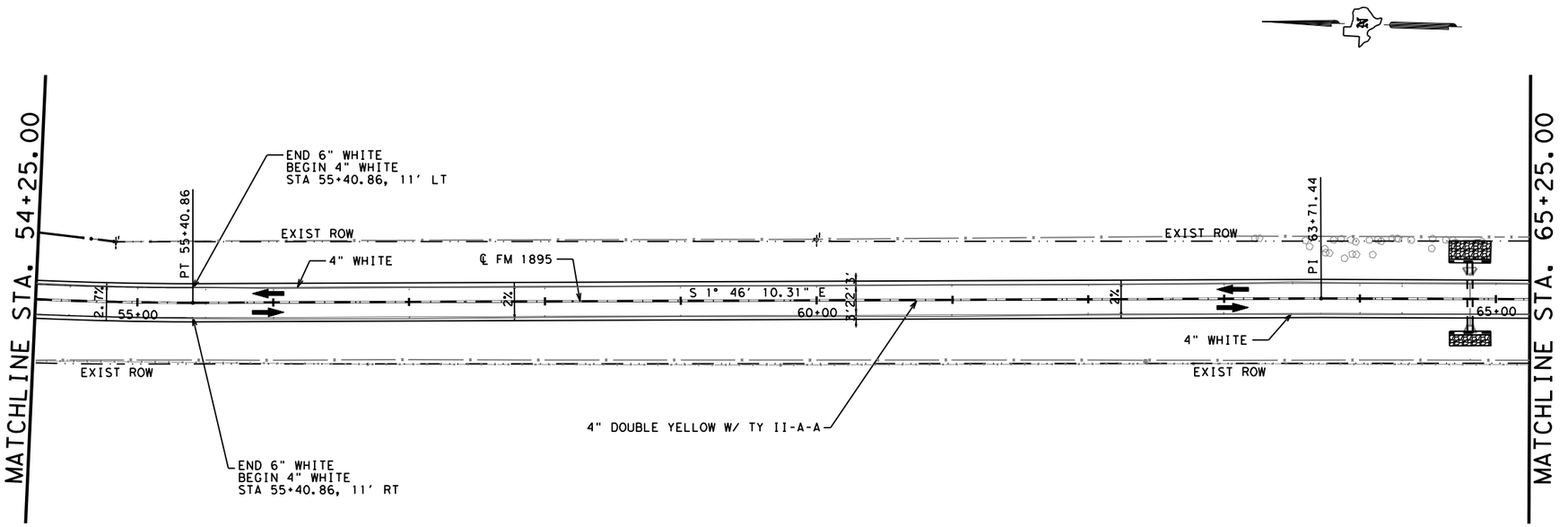


SCALE (FEET)
0 25 50 100

LEGEND:

- SIGN POST
- (#) NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION AS END CURVE WHEN STRIPING EXISTING SECTIONS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe
Signature of Registrant & Date P.E. 7/28/2022

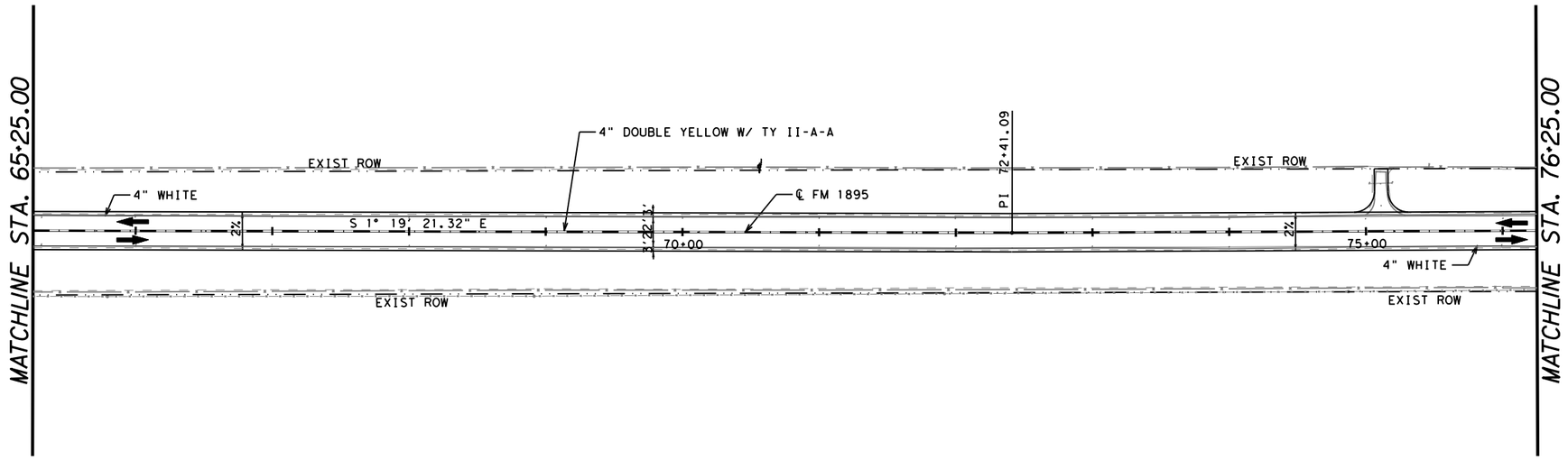
Texas Department of Transportation

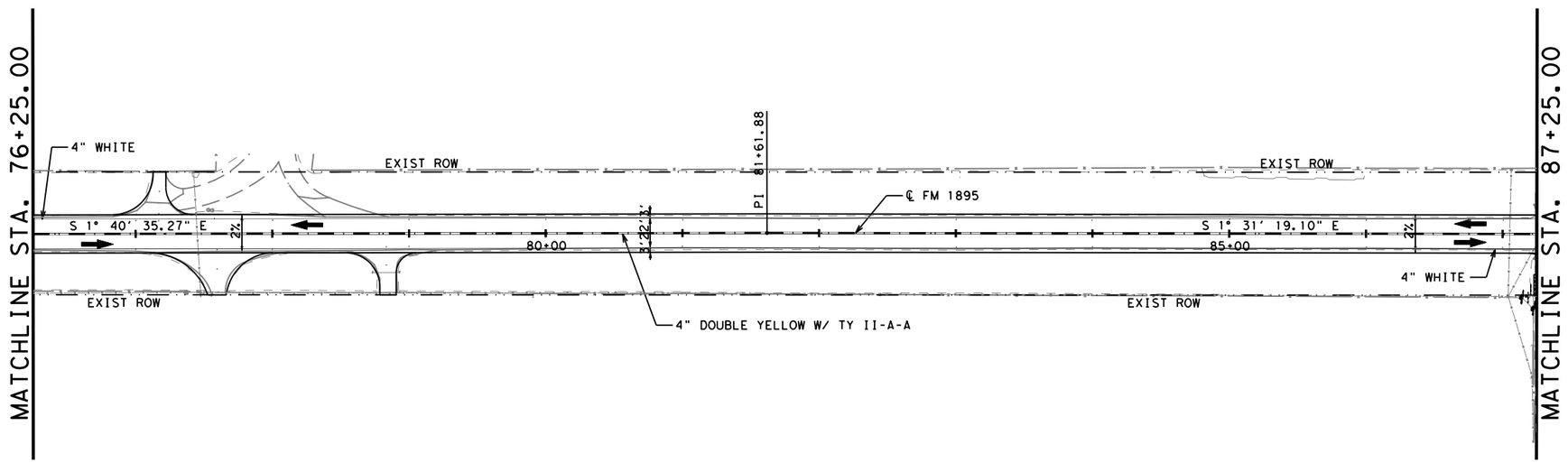
FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: NTS SHEET 3 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	189
CHECK				
VD				

DATE: 7/27/2022 10:14:55 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\03 SIGNING AND PAVEMENT MARKINGS133.dgn





SCALE (FEET)
0 25 50 100

LEGEND:

- SIGN POST
- NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION
AS END CURVE WHEN STRIPING EXISTING SECTIONS.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

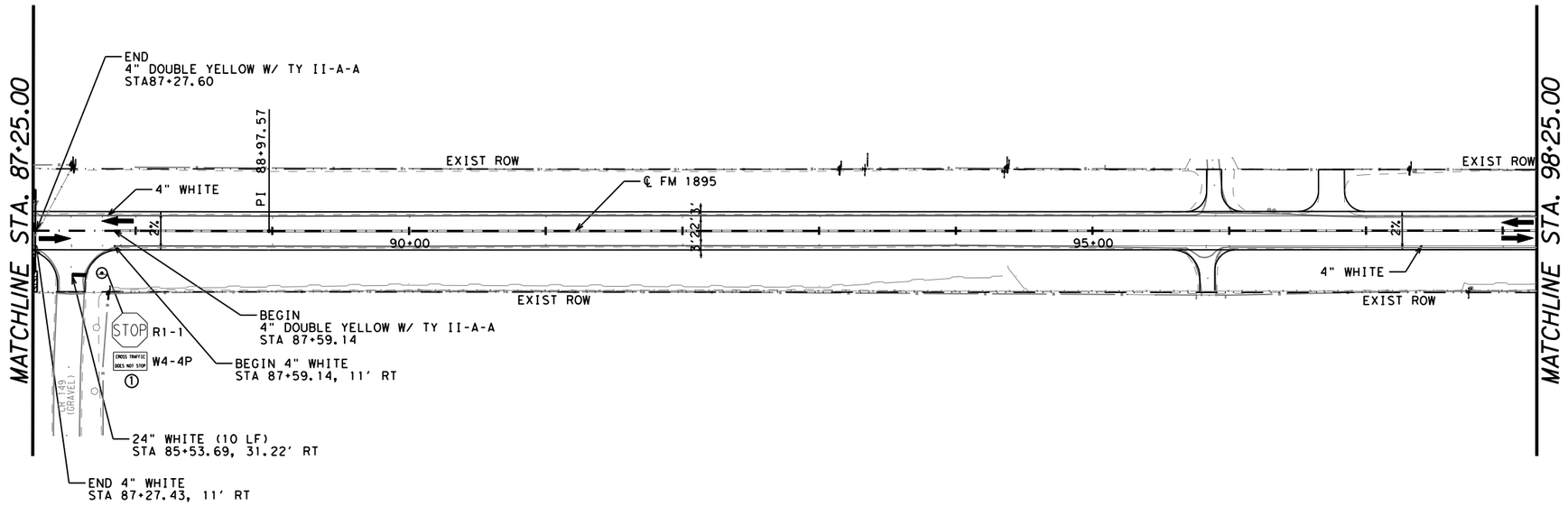
Texas Department of Transportation

FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 4 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	190
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 10:17:25 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\04 SIGNING AND PAVEMENT MARKINGS134.dgn

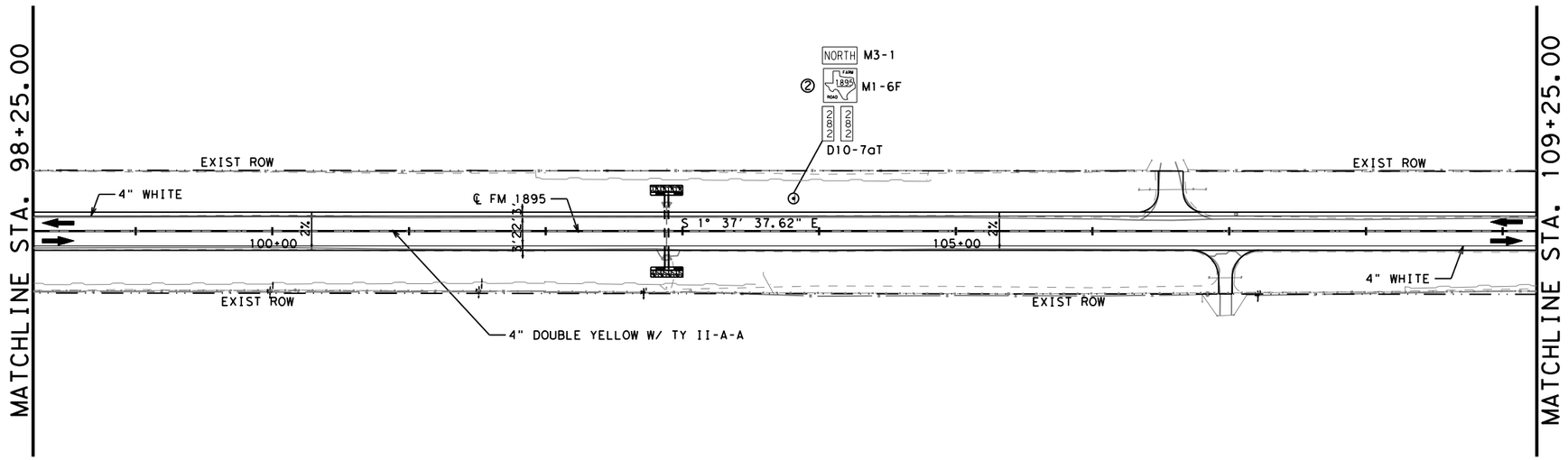


SCALE (FEET)
0 25 50 100

LEGEND:

- SIGN POST
- # NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION
AS END CURVE WHEN STRIPING EXISTING SECTIONS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

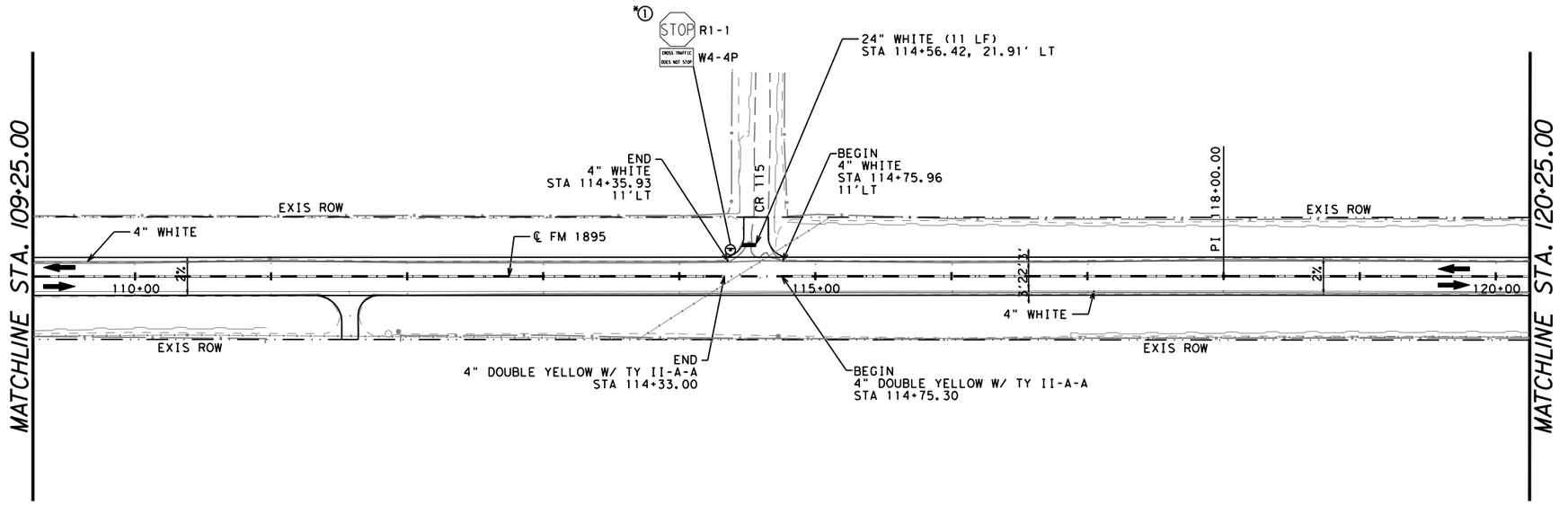
Texas Department of Transportation

FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 5 OF 19

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	191
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 10:21:21 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\05 SIGNING AND PAVEMENT MARKINGS135.dgn



SCALE (FEET)

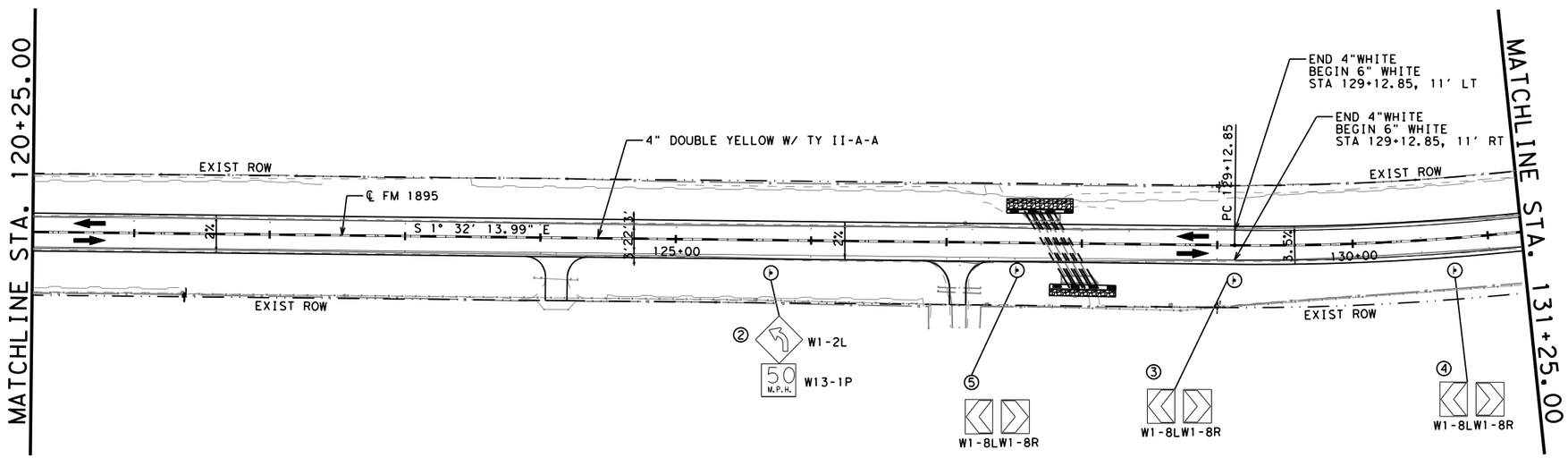
0 25 50 100

LEGEND:

- SIGN POST
- NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION
AS END CURVE WHEN STRIPING EXISTING SECTIONS.

*PLACE BACK CR 115 SIGN BACK ONTO NEW STOP SIGN.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

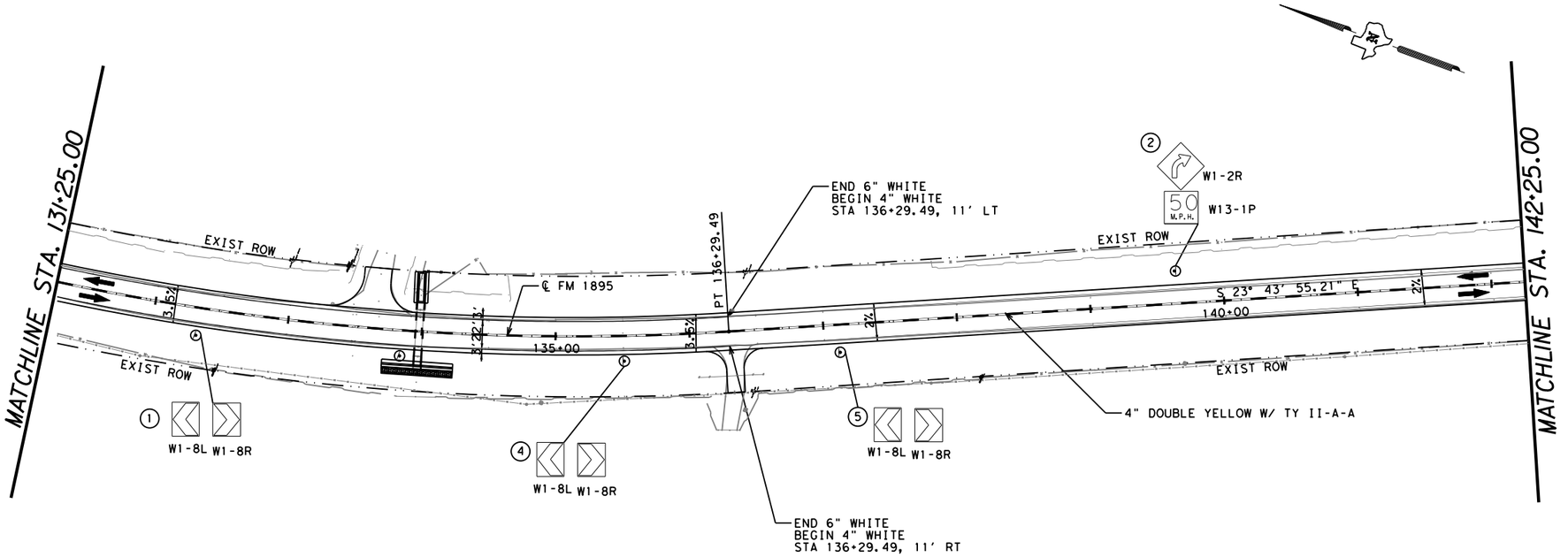
Texas Department of Transportation

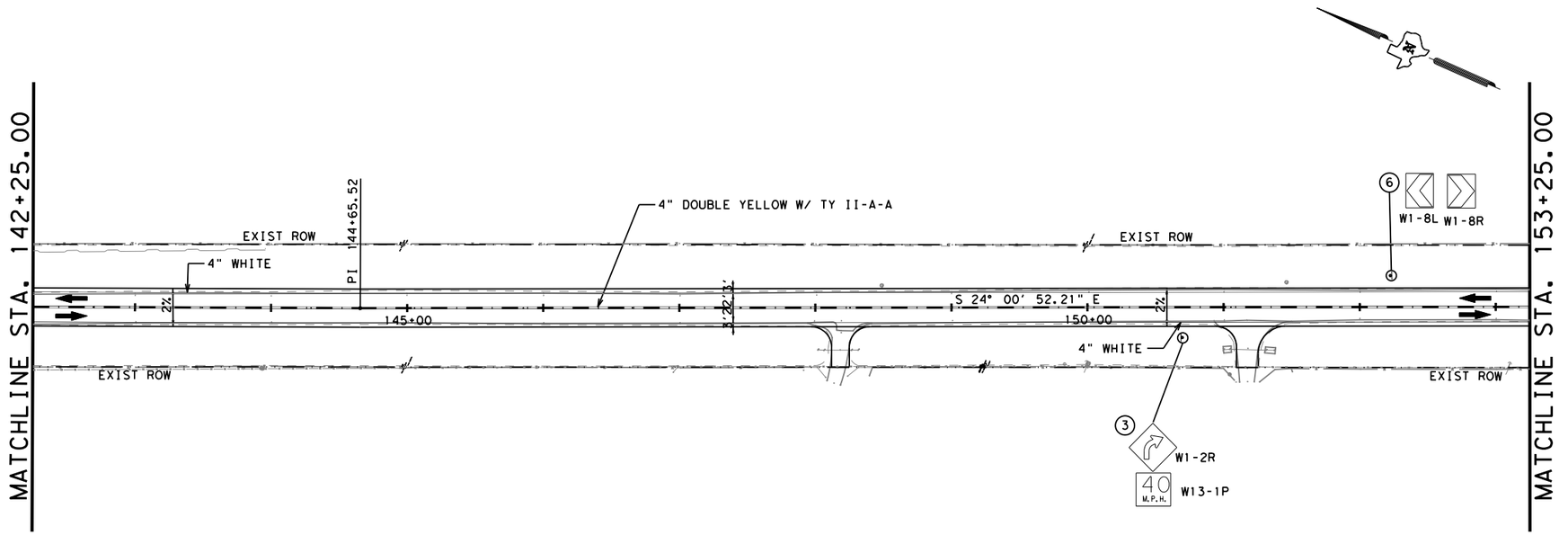
FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 6 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	192
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 10:26:41 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\06 SIGNING AND PAVEMENT MARKINGS136.dgn





SCALE (FEET)

0 25 50 100

LEGEND:

- SIGN POST
- # NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION
AS END CURVE WHEN STRIPING EXISTING SECTIONS.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

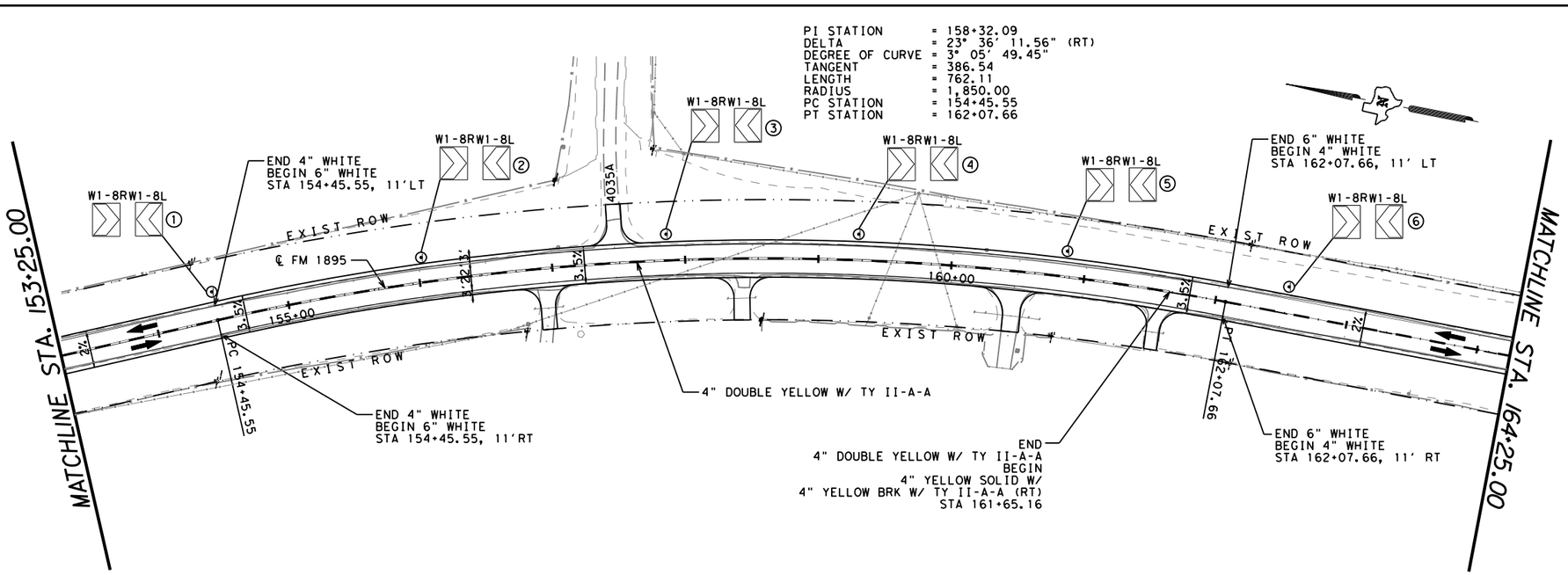
Texas Department of Transportation
© 2022

FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 7 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	193
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 3:28:48 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\07 SIGNING AND PAVEMENT MARKINGS137.dgn

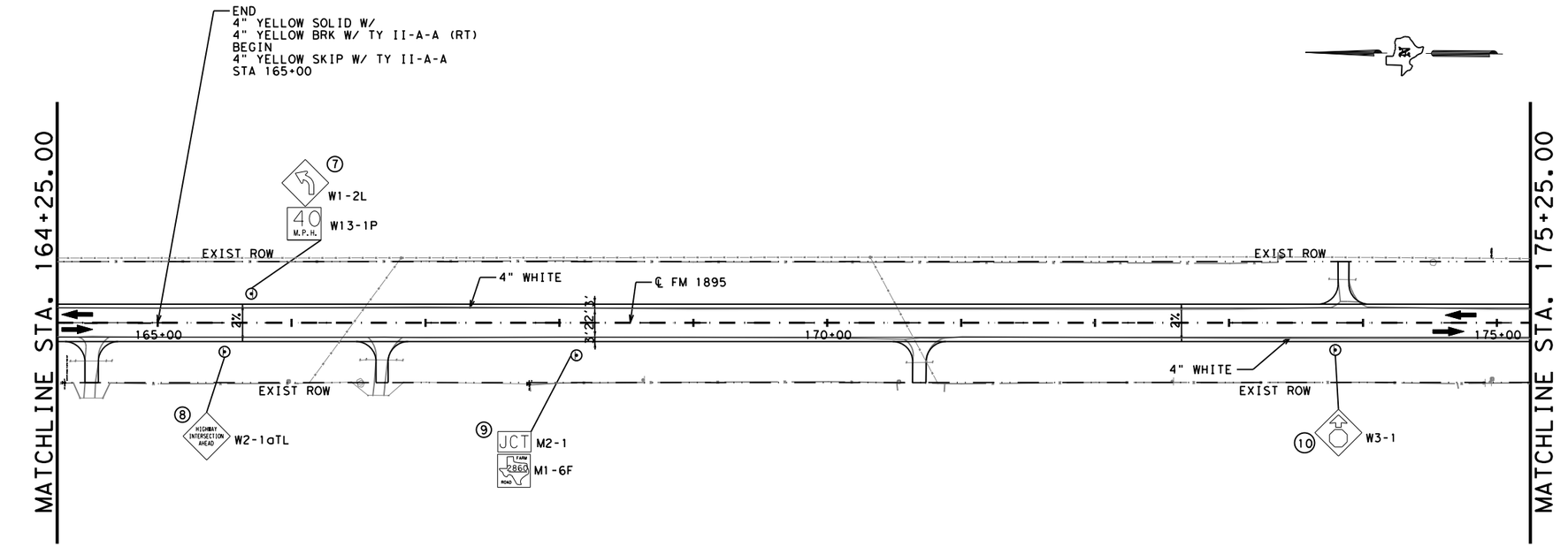


SCALE (FEET)
0 25 50 100

LEGEND:

- SIGN POST
- (#) NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION
AS END CURVE WHEN STRIPING EXISTING SECTIONS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

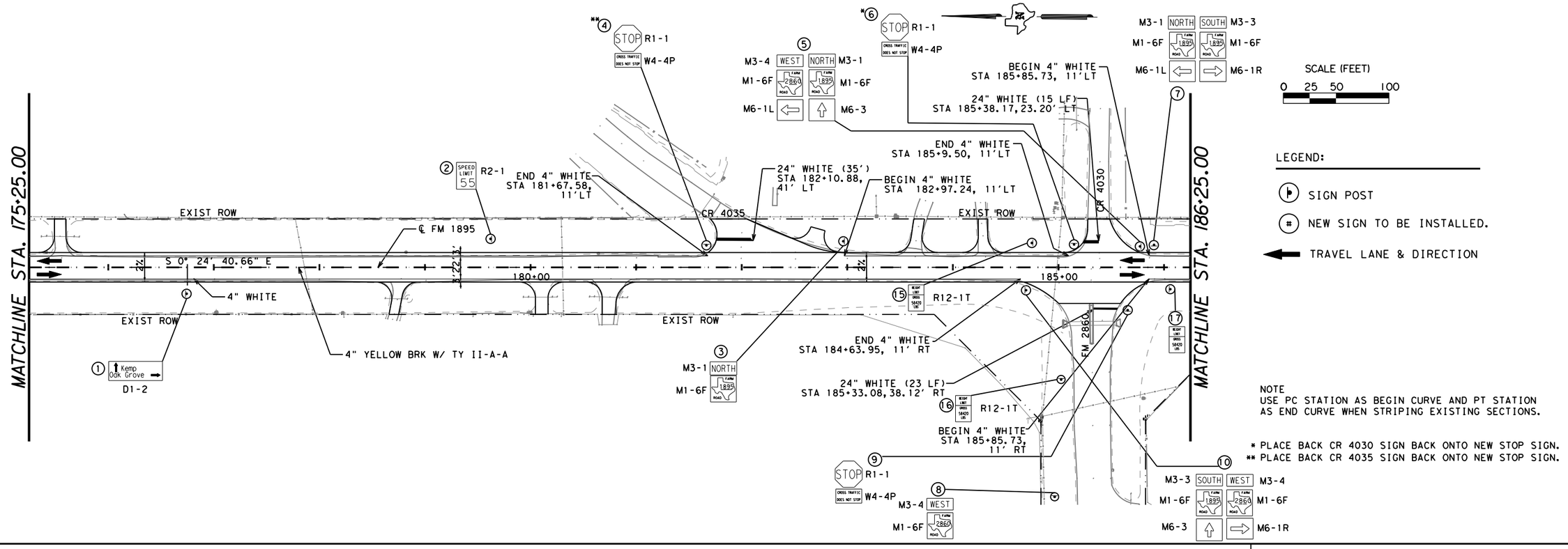
Texas Department of Transportation
© 2022

FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 8 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	194
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 11:53:44 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\08 SIGNING AND PAVEMENT MARKINGS138.dgn



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

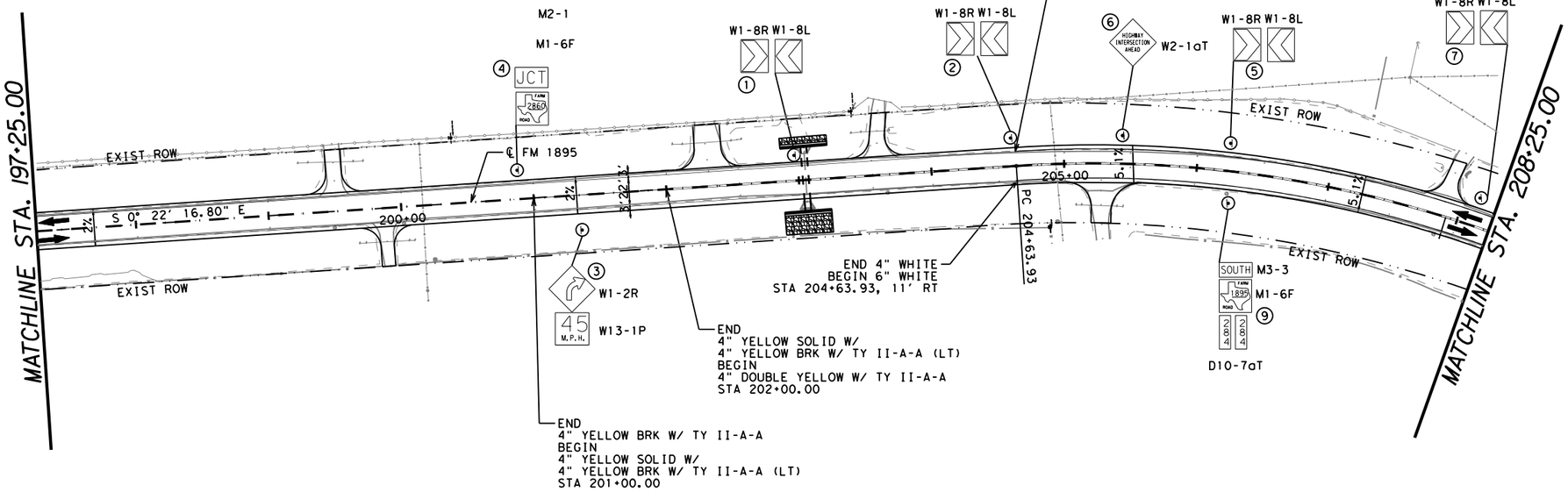
Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

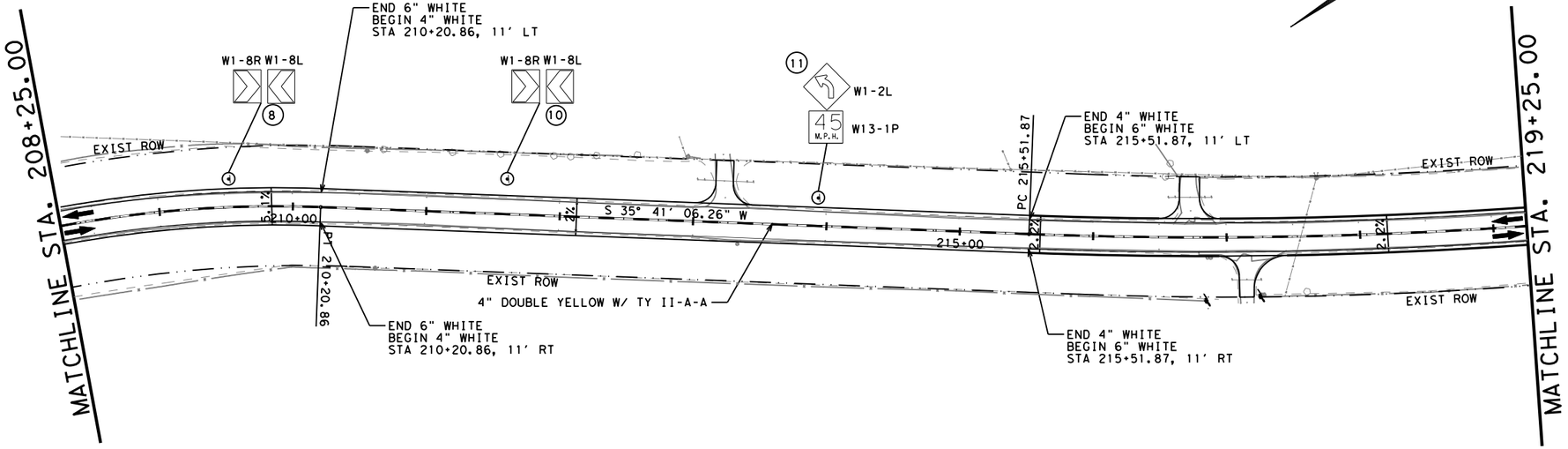
FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 9 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	195
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 12:46:49 PM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\09 SIGNING AND PAVEMENT MARKINGS139.dgn





SCALE (FEET)
0 25 50 100

LEGEND:

- SIGN POST
- # NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION AS END CURVE WHEN STRIPING EXISTING SECTIONS.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

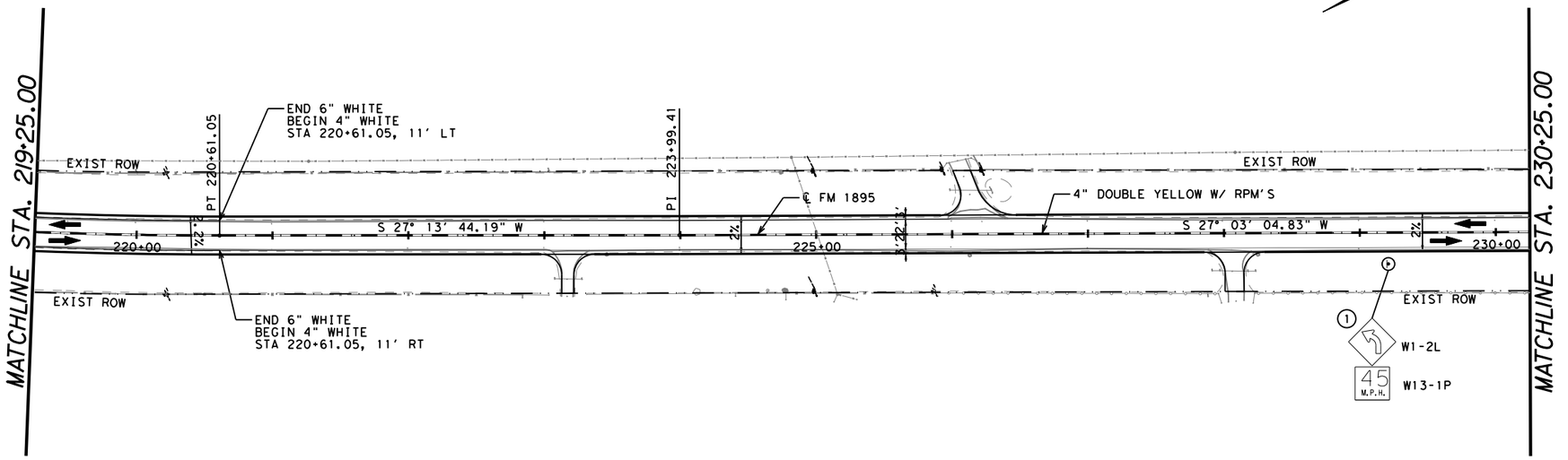
Texas Department of Transportation

FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 10 OF 19

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	196
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 1:13:06 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\10 SIGNING AND PAVEMENT MARKINGS140.dgn



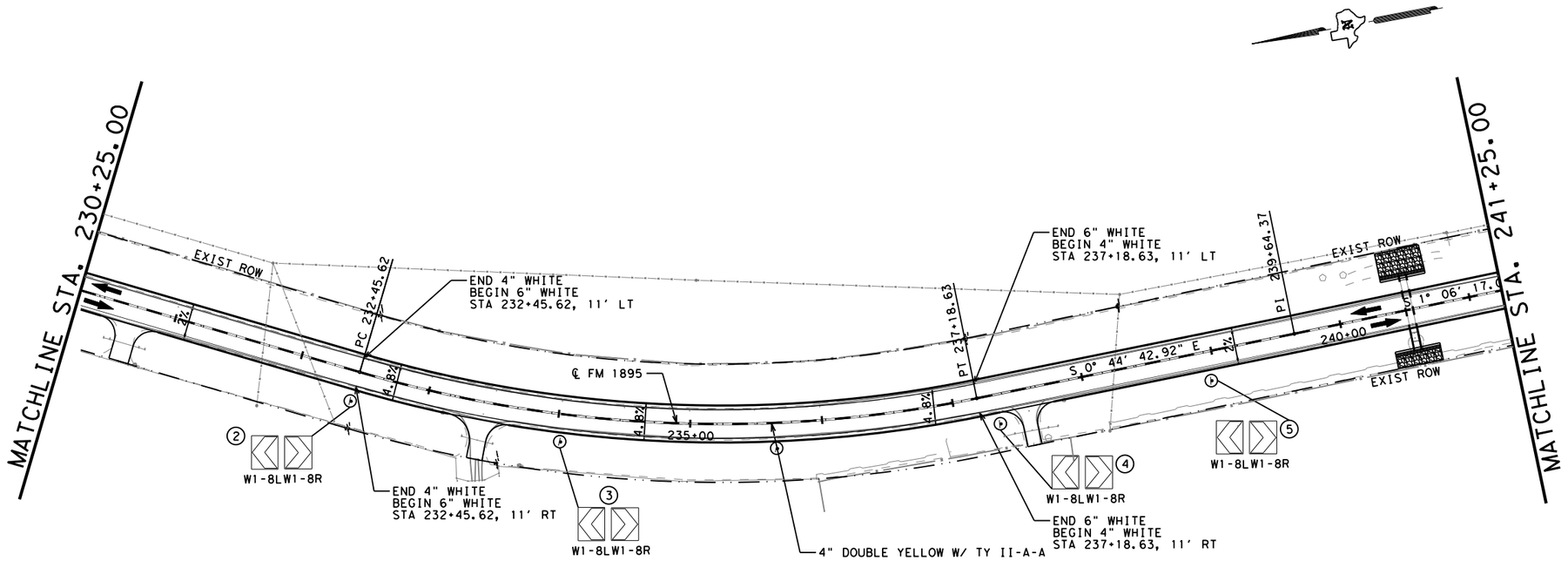
SCALE (FEET)

0 25 50 100

LEGEND:

- SIGN POST
- NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION
AS END CURVE WHEN STRIPING EXISTING SECTIONS.



FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

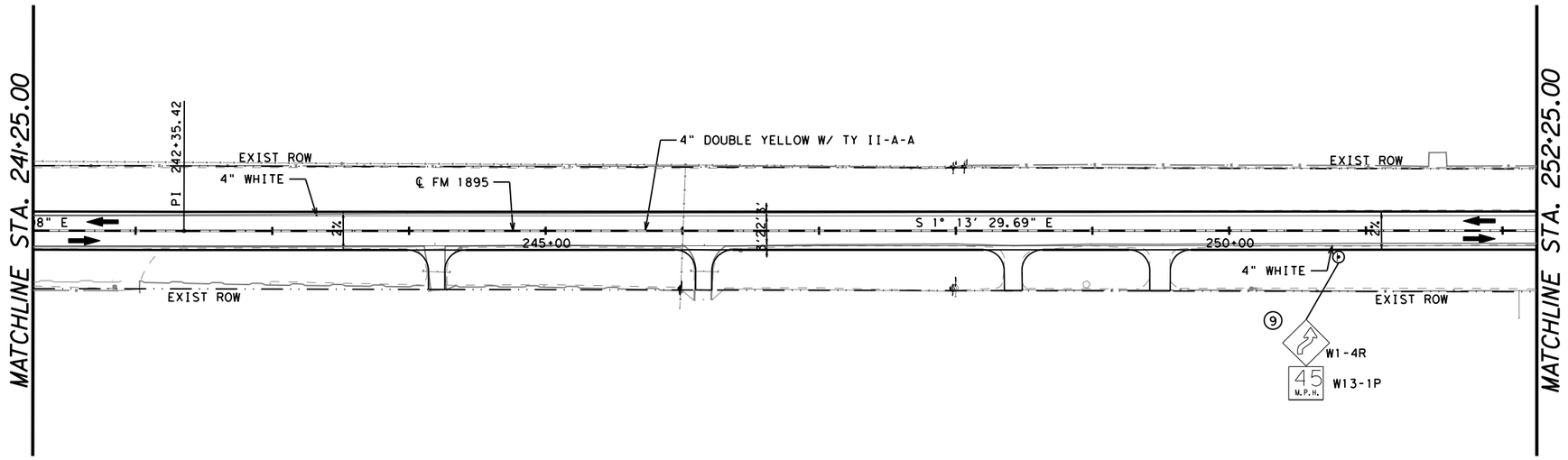
Texas Department of Transportation
© 2022

FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 11 OF 19

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	197
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 1:51:12 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\11 SIGNING AND PAVEMENT MARKINGS141.dgn



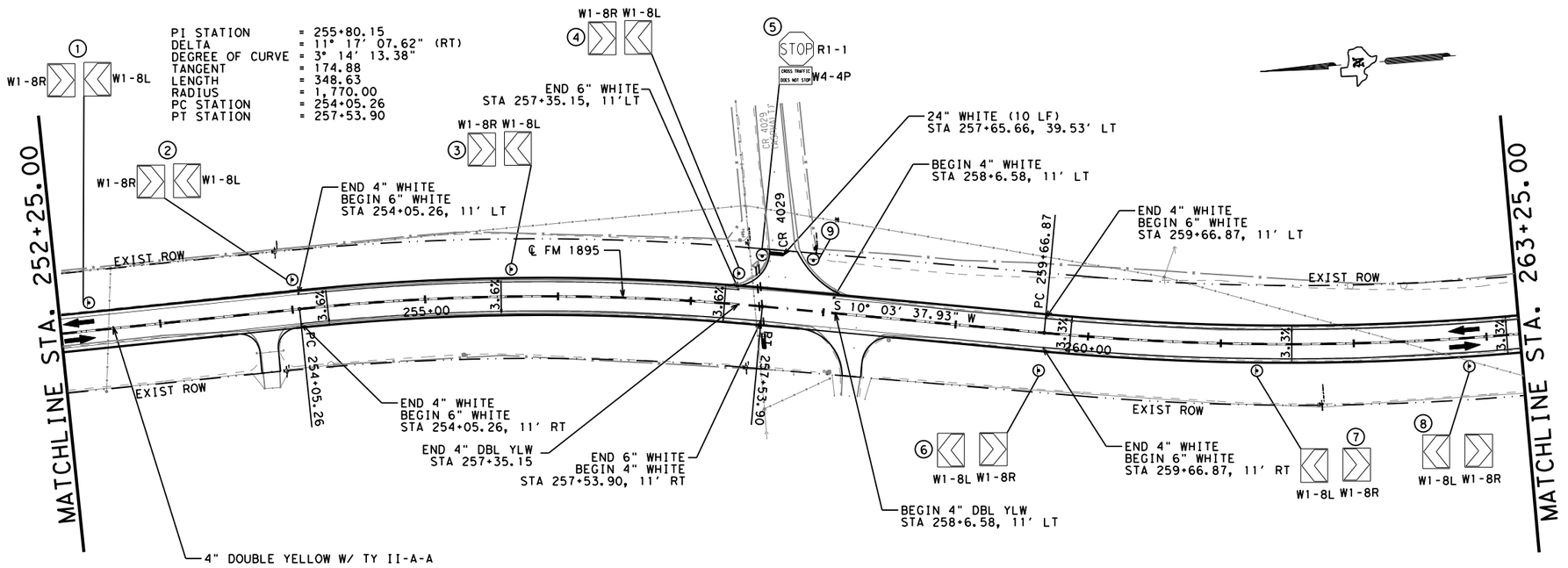
SCALE (FEET)
0 25 50 100

LEGEND:

- SIGN POST
- # NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION AS END CURVE WHEN STRIPING EXISTING SECTIONS.

*CR 4029 SIGN TO REMAIN IN PLACE.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

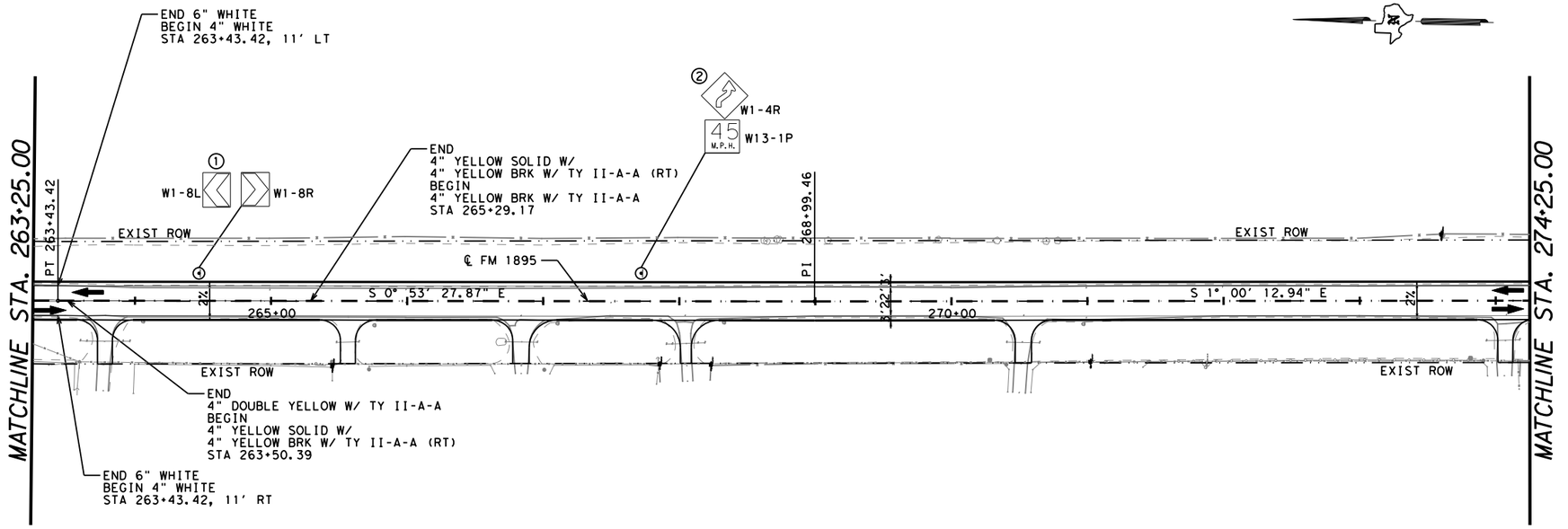
Texas Department of Transportation
© 2022

FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 12 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	198
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 1:58:40 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\12 SIGNING AND PAVEMENT MARKINGS142.dgn



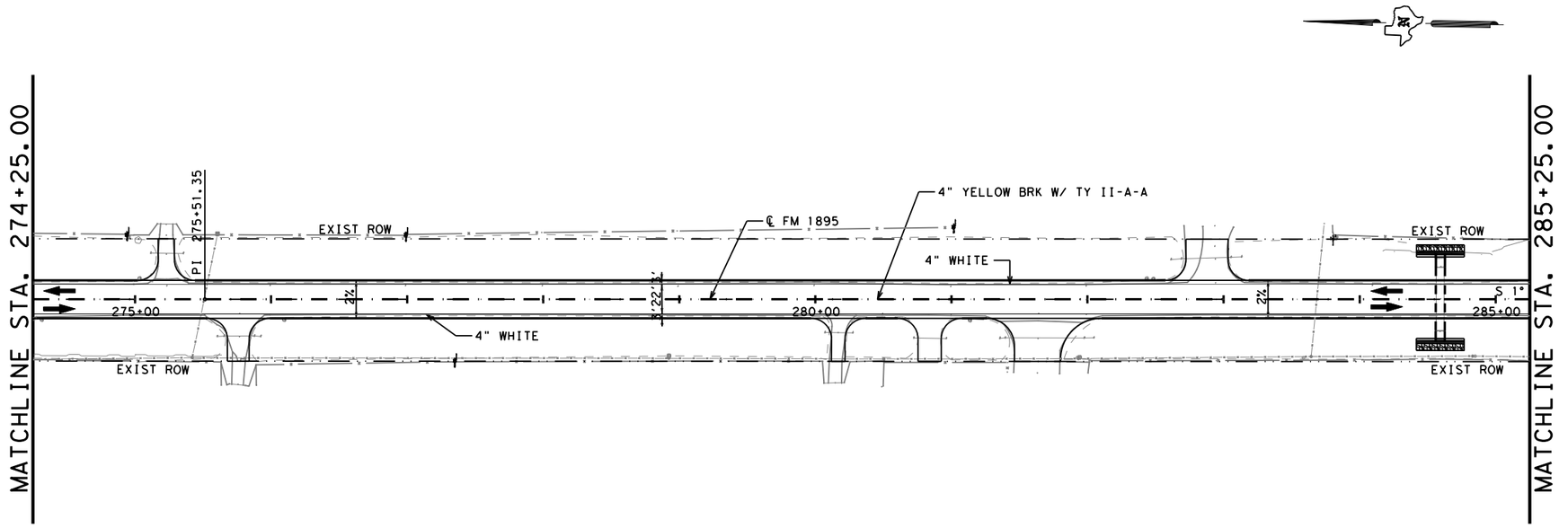
SCALE (FEET)

0 25 50 100

LEGEND:

- SIGN POST
- NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION
AS END CURVE WHEN STRIPING EXISTING SECTIONS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

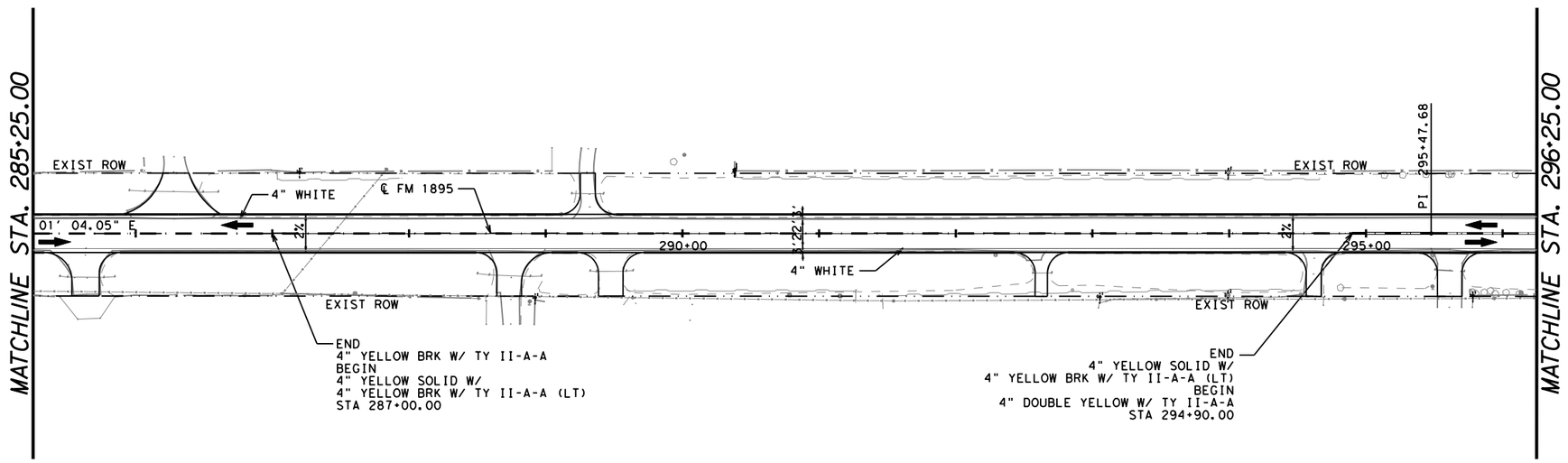
Texas Department of Transportation
© 2022

FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 13 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	199
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 2:06:12 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\13 SIGNING AND PAVEMENT MARKINGS143.dgn

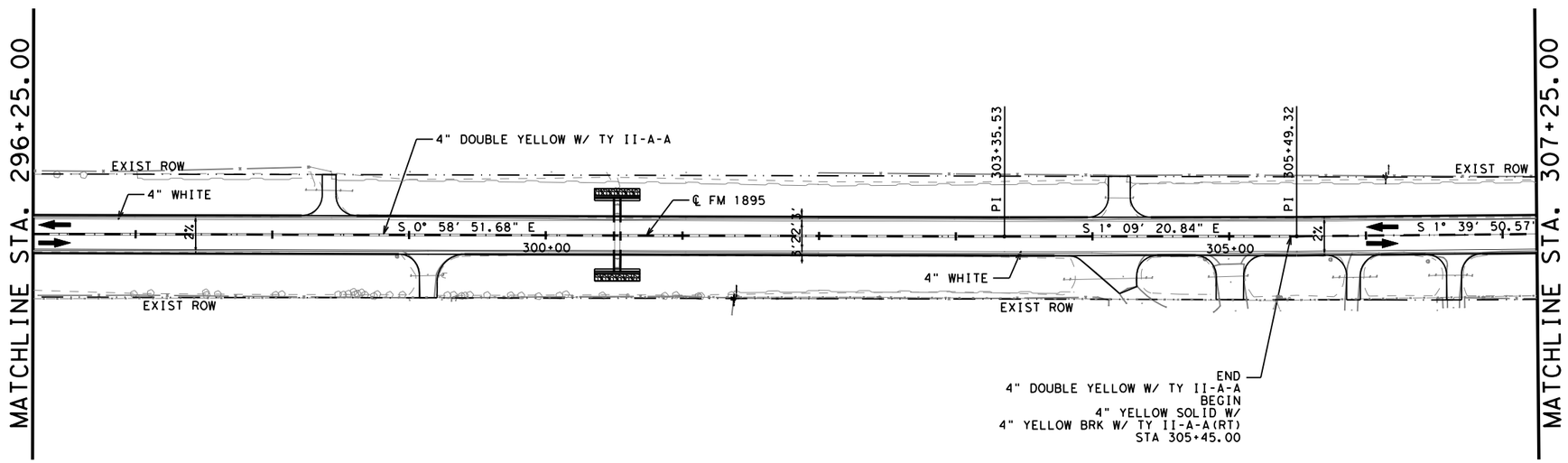


SCALE (FEET)
0 25 50 100

LEGEND:

- SIGN POST
- # NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION
AS END CURVE WHEN STRIPING EXISTING SECTIONS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

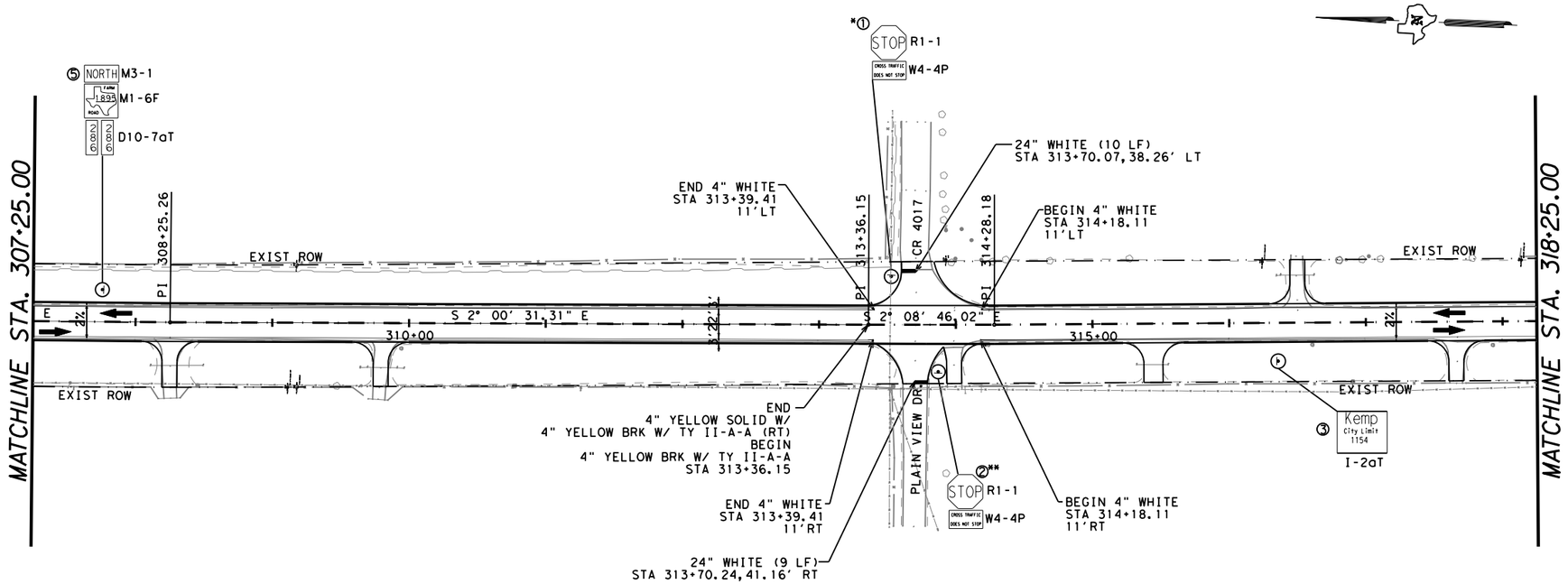
Texas Department of Transportation

FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 14 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	200
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 2:08:03 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\14 SIGNING AND PAVEMENT MARKINGS144.dgn



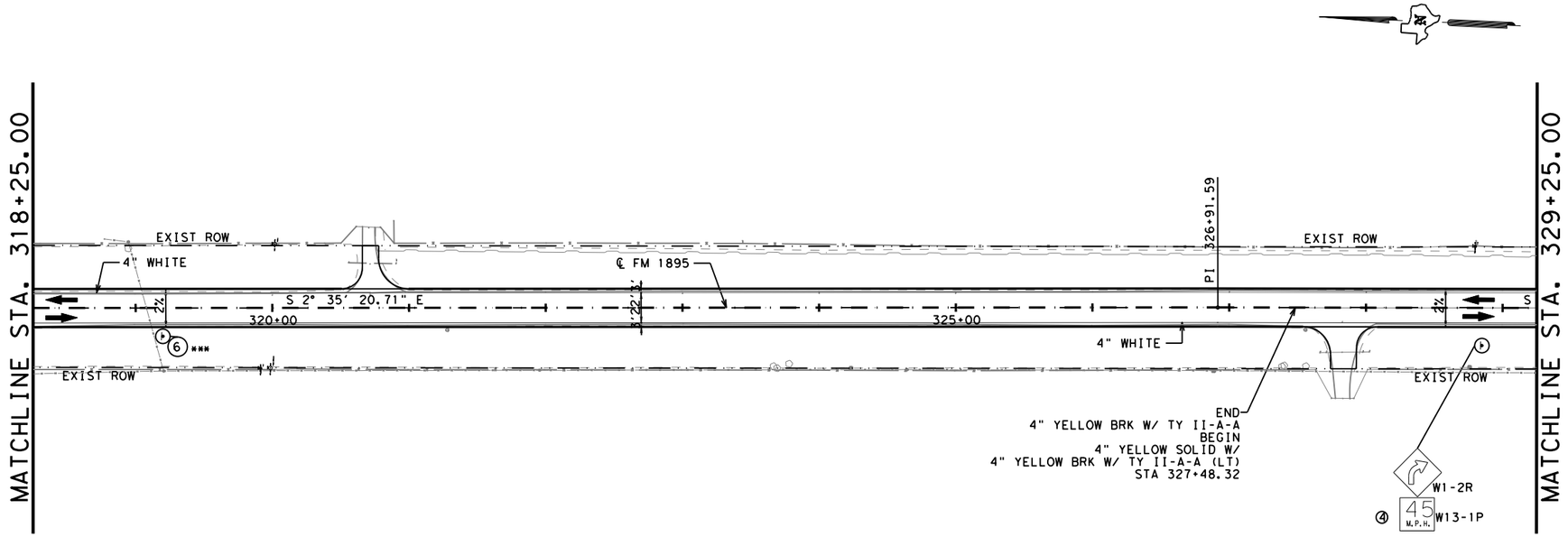
SCALE (FEET)
0 25 50 100

LEGEND:

- SIGN POST
- NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION
AS END CURVE WHEN STRIPING EXISTING SECTIONS.

*PLACE BACK CR 4017 SIGN BACK ONTO NEW STOP SIGN.
**PLACE BACK PLANVIEW SIGN BACK ONTO NEW STOP SIGN.
***RELOCATE CITY ORDINACE SIGN.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

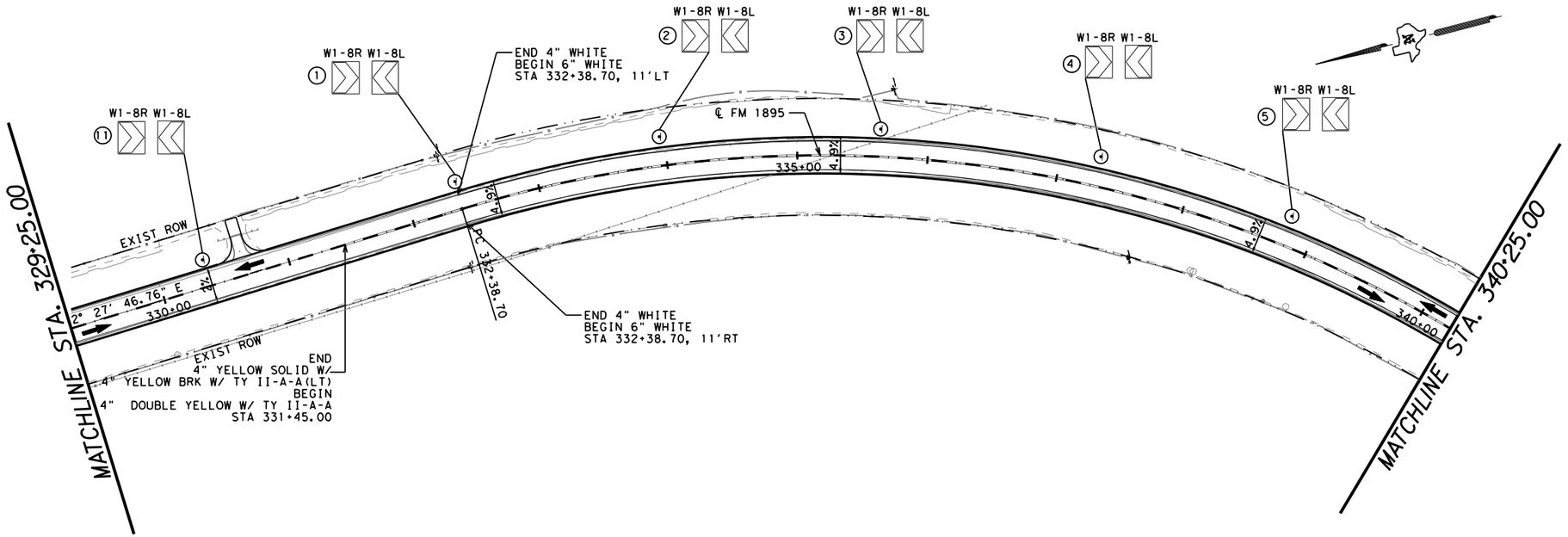
Texas Department of Transportation
© 2022

FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 15 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	201
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 2:17:08 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\15 SIGNING AND PAVEMENT MARKINGS145.dgn

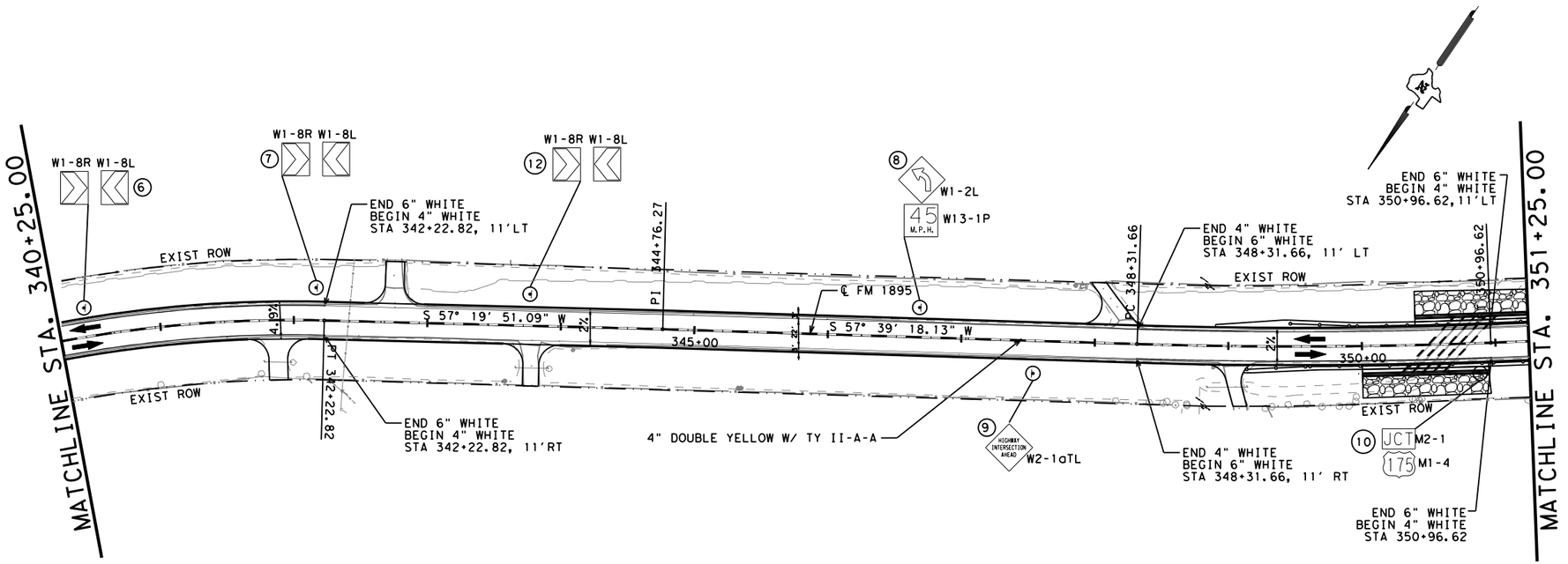


SCALE (FEET)
0 25 50 100

LEGEND:

- SIGN POST
- # NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION
AS END CURVE WHEN STRIPING EXISTING SECTIONS.



STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

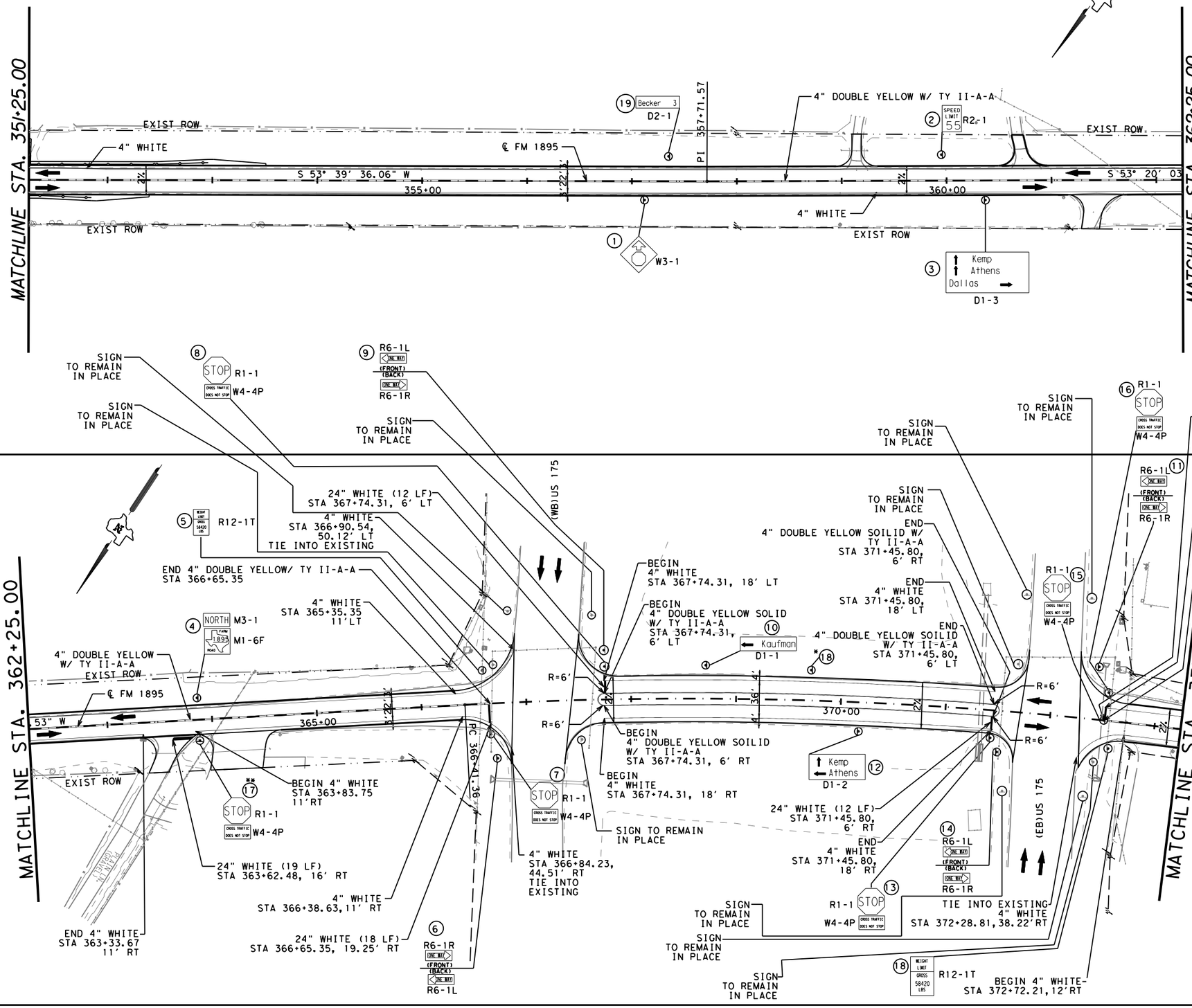
Texas Department of Transportation
© 2022

FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 16 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	202
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 2:19:57 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\16 SIGNING AND PAVEMENT MARKINGS146.dgn



FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

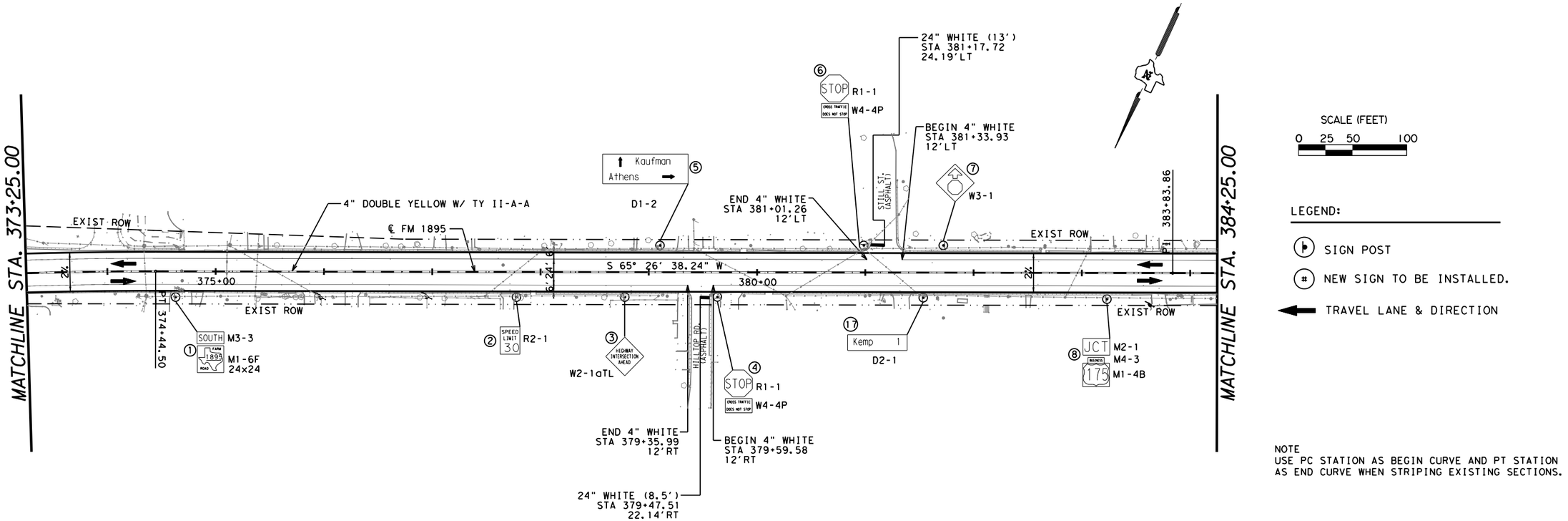
Texas Department of Transportation
© 2022

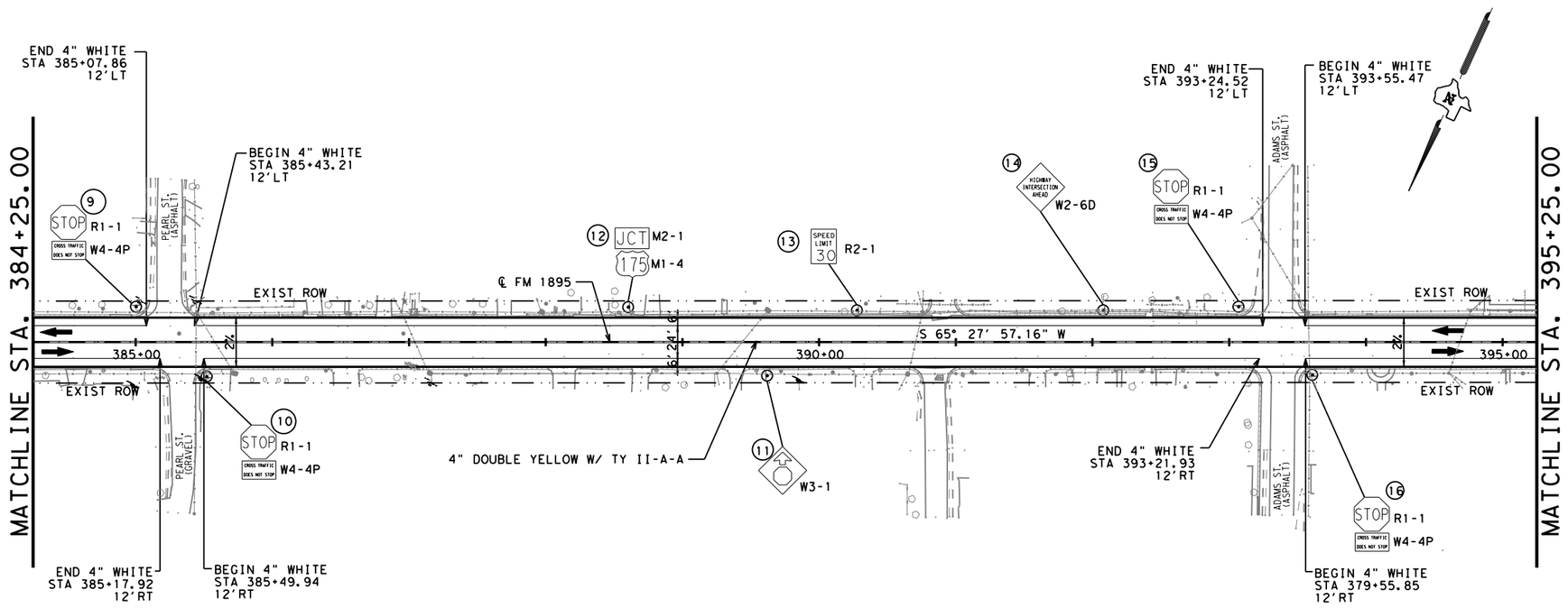
FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 17 OF 19

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	203
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 3:17:24 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\17 SIGNING AND PAVEMENT MARKINGS147.dgn





STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

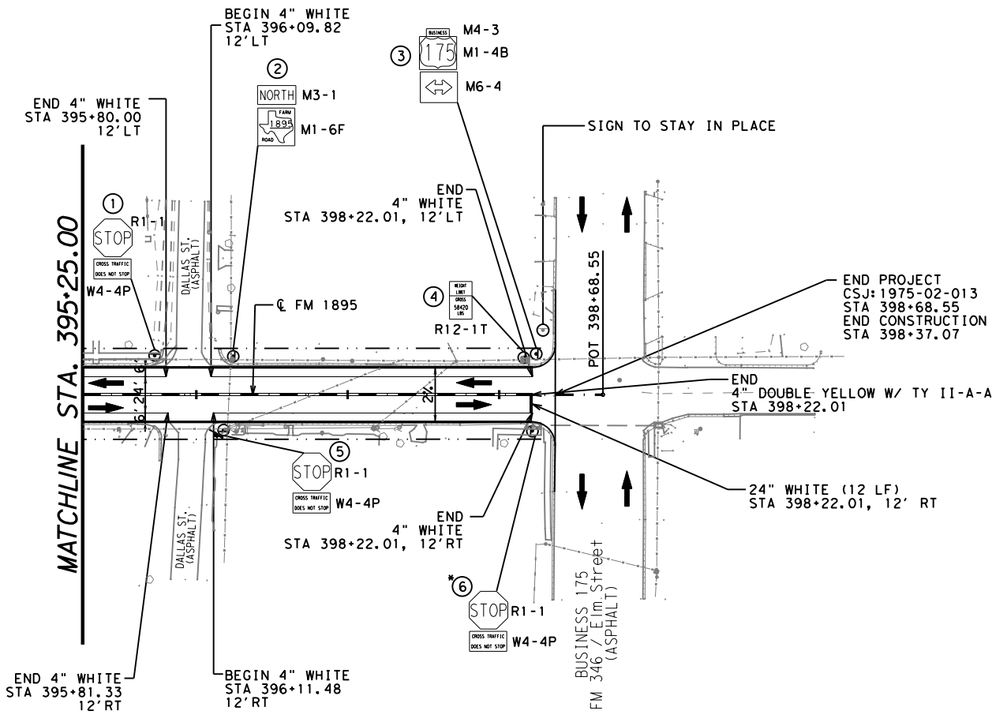
Texas Department of Transportation
© 2022

FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 18 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	204
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 3:19:14 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\19750201\3\4 - Design\Plan Set\8. Traffic\18 SIGNING AND PAVEMENT MARKINGS148.dgn



SCALE (FEET)
0 25 50 100

LEGEND:

- SIGN POST
- NEW SIGN TO BE INSTALLED.
- TRAVEL LANE & DIRECTION

NOTE
USE PC STATION AS BEGIN CURVE AND PT STATION AS END CURVE WHEN STRIPING EXISTING SECTIONS.

ALL EXISTING INTERSECTION HIGHWAY SIGNS TO REMAIN IN PLACE.

*PLACE INTERSECTION STREET SIGNS ONTO NEW STOP SIGN.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/28/2022
Signature of Registrant & Date

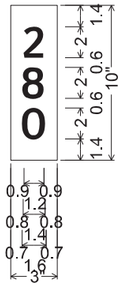
Texas Department of Transportation

FM 1895
PAVEMENT MARKINGS & SIGNING LAYOUT

SCALE: 1"=100' SHEET 19 OF 19

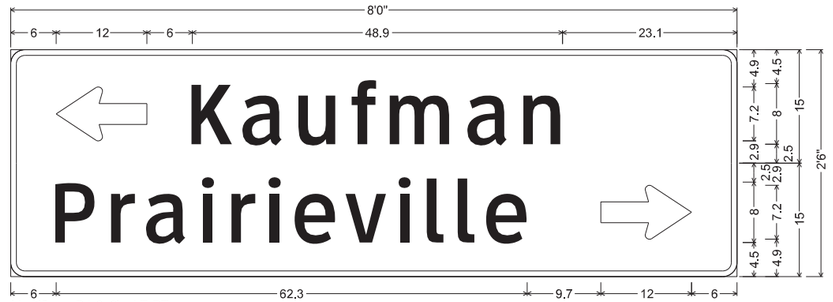
DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	205
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 3:20:58 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\19 SIGNING AND PAVEMENT MARKINGS149.dgn



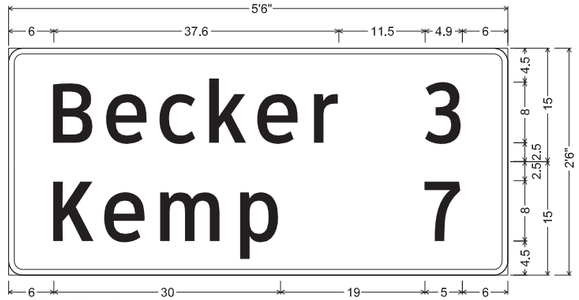
Identifier : D10-7aT 3in;
No border, White on Green;
[2] ClearviewHwy-4-W;
[8] ClearviewHwy-4-W;
[0] ClearviewHwy-4-W;

SHEET 1 SIGN 6



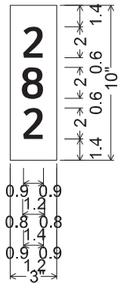
Identifier : D1-2 8in LT-RT;
1.9" Radius, 0.8" Border, White on Green;
Standard Arrow Custom 12.0" X 7.1" 180°; [Kaufman] ClearviewHwy-3-W;
1.9" Radius, 0.8" Border, White on Green;
[Prairieville] ClearviewHwy-3-W; Standard Arrow Custom 12.0" X 7.1" 0°;

SHEET 1 SIGN 8



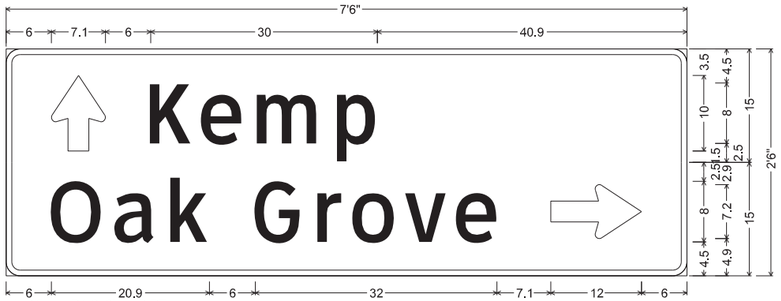
Identifier : D2-2 8in;
1.9" Radius, 0.8" Border, White on Green;
[Becker] ClearviewHwy-3-W; [3] ClearviewHwy-3-W;
1.9" Radius, 0.8" Border, White on Green;
[Kemp] ClearviewHwy-3-W; [7] ClearviewHwy-3-W;

SHEET 1 SIGN 10



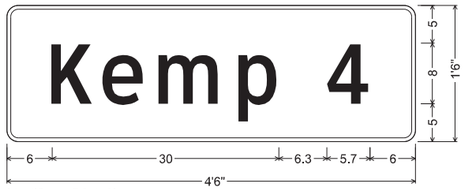
Identifier : D10-7aT 3in;
No border, White on Green;
[2] ClearviewHwy-4-W;
[8] ClearviewHwy-4-W;
[2] ClearviewHwy-4-W;

SHEET 5 SIGN 2



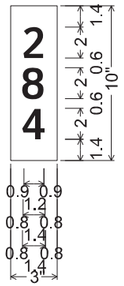
Identifier : D1-2 8in UP-RT;
1.9" Radius, 0.8" Border, White on Green;
Standard Arrow Custom 10.0" X 7.1" 90°; [Kemp] ClearviewHwy-3-W;
1.9" Radius, 0.8" Border, White on Green;
[Oak Grove] ClearviewHwy-3-W; Standard Arrow Custom 12.0" X 7.1" 0°;

SHEET 9 SIGN 1



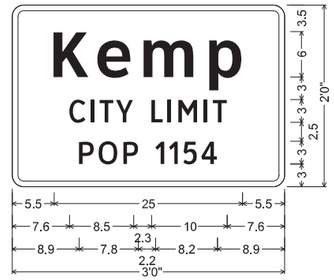
Identifier : D2-1 8in;
1.5" Radius, 0.5" Border, White on Green;
[Kemp] ClearviewHwy-3-W; [4] ClearviewHwy-3-W;

SHEET 9 SIGN 14



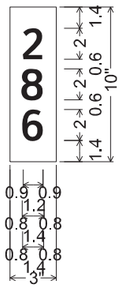
Identifier : D10-7aT 3in;
No border, White on Green;
[2] ClearviewHwy-4-W;
[8] ClearviewHwy-4-W;
[4] ClearviewHwy-4-W;

SHEET 10 SIGN 9



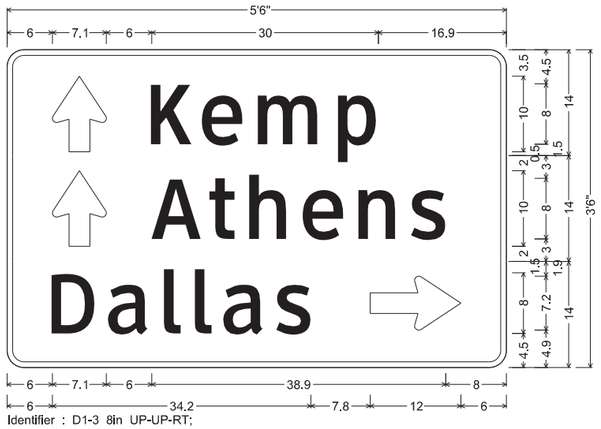
I-2aT 6in;
1.5" Radius, 0.8" Border, White on, Green;
"Kemp", ClearviewHwy-5-W-R;
"CITY LIMIT", ClearviewHwy-3-W;
"POP 1154", ClearviewHwy-3-W;

SHEET 15 SIGN 3



Identifier : D10-7aT 3in;
No border, White on Green;
[2] ClearviewHwy-4-W;
[8] ClearviewHwy-4-W;
[6] ClearviewHwy-4-W;

SHEET 15 SIGN 5



Identifier : D1-3 8in UP-UP-RT;
2.3" Radius, 0.8" Border, White on Green;
Standard Arrow Custom 10.0" X 7.1" 90°; [Kemp] ClearviewHwy-3-W;
2.3" Radius, 0.8" Border, White on Green;
Standard Arrow Custom 10.0" X 7.1" 90°; [Athens] ClearviewHwy-3-W;
2.3" Radius, 0.8" Border, White on Green;
[Dallas] ClearviewHwy-3-W; Standard Arrow Custom 12.0" X 7.1" 0°;

SHEET 17 SIGN 3

STATE OF TEXAS
BRENDA L. SANCHEZ
107705
LICENSED PROFESSIONAL ENGINEER

Brenda L. Sanchez, P.E. 01/28/22
Signature of Registrant & Date

Texas Department of Transportation
©2022

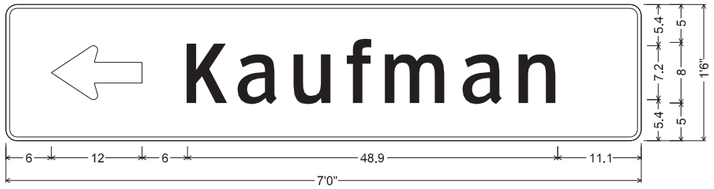
GUIDE SIGN DETAILS

SCALE: NTS SHEET 1 OF 2

DESIGN/CK	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
BLS	6	(SEE TITLE SHEET)		FM1895
CHECK MA	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK BA	TEXAS	DALLAS	KAUFMAN	206
CHECK BB	CONTROL 1975	SECTION 02	JOB 013	

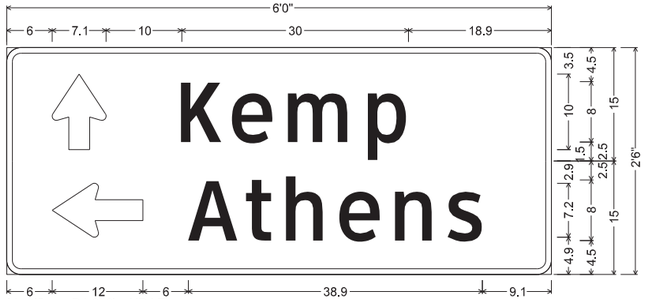
1/28/2022 7:20:44 AM

T:\DALTRAFM\Employees\Brenda\Sign Requests\FM 1895 1975-02-013\FM 1895 1975-02-013.dgn



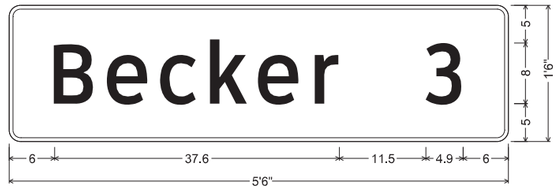
Identifier : D1-1 8in LT;
1.5" Radius, 0.5" Border, White on Green;
Standard Arrow Custom 12.0" X 7.1" 180°; [Kaufman] ClearviewHwy-3-W;

SHEET 17 SIGN 10



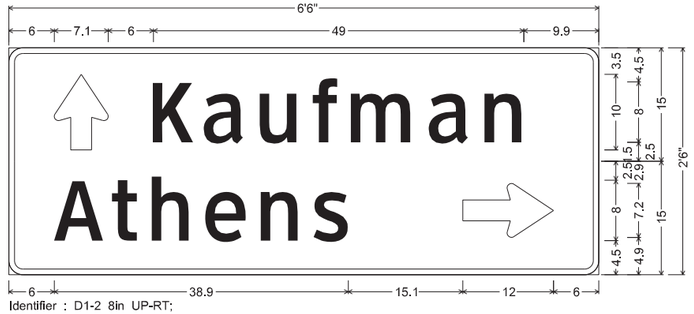
Identifier : D1-2 8in UP-LT;
1.9" Radius, 0.8" Border, White on Green;
Standard Arrow Custom 10.0" X 7.1" 90°; [Kemp] ClearviewHwy-3-W;
1.9" Radius, 0.8" Border, White on Green;
Standard Arrow Custom 12.0" X 7.1" 180°; [Athens] ClearviewHwy-3-W;

SHEET 17 SIGN 12



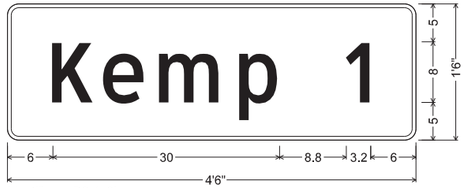
D2-1 8in;
1.5" Radius, 0.5" Border, White on, Green;
"Becker", ClearviewHwy-3-W; "3", ClearviewHwy-3-W;

SHEET 17 SIGN 19



Identifier : D1-2 8in UP-RT;
1.9" Radius, 0.8" Border, White on Green;
Standard Arrow Custom 10.0" X 7.1" 90°; [Kaufman] ClearviewHwy-3-W;
1.9" Radius, 0.8" Border, White on Green;
[Athens] ClearviewHwy-3-W; Standard Arrow Custom 12.0" X 7.1" 0°;

SHEET 18 SIGN 5



Identifier : D2-1 8in;
1.5" Radius, 0.5" Border, White on Green;
[Kemp] ClearviewHwy-3-W; [1] ClearviewHwy-3-W;

SHEET 18 SIGN 17

STATE OF TEXAS
BRENDA L. SANCHEZ
107705
LICENSED PROFESSIONAL ENGINEER

Brenda L. Sanchez, P.E. 01/28/22
Signature of Registrant & Date

Texas Department of Transportation

GUIDE SIGN DETAILS

SCALE: NTS SHEET 2 OF 2

DESIGN/CK	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
BLS	6	(SEE TITLE SHEET)		FM1895
CHECK MA	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK BA	TEXAS	DALLAS	KAUFMAN	207
CHECK BB	CONTROL	SECTION	JOB	
	1975	02	013	

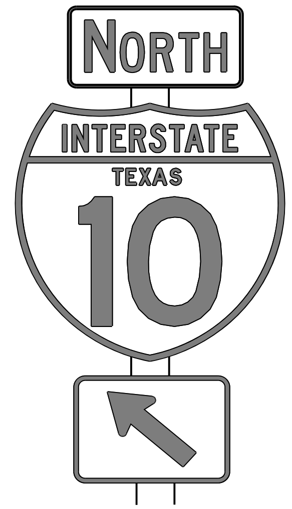
1/28/2022 7:20:45 AM

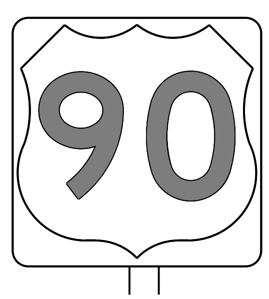
T:\DALTRAFW\Employees\Brenda\Sign Requests\FM 1895 1975-02-013\FM 1895 1975-02-013.dgn

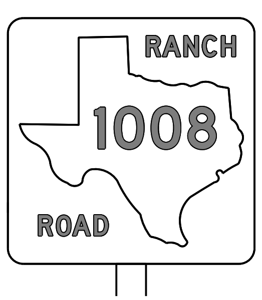
DATE: 7/28/2022 3:09:26 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\1975...

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



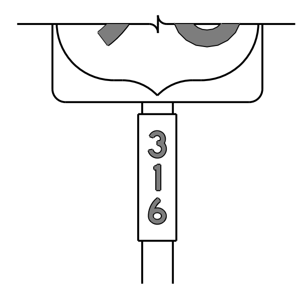


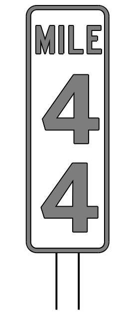


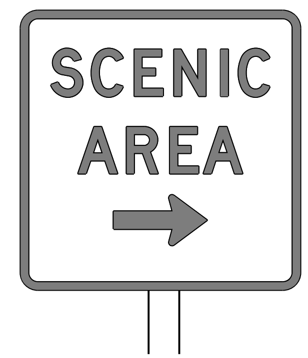
TYPICAL EXAMPLES

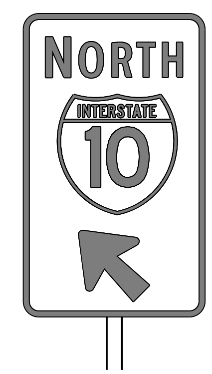
REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

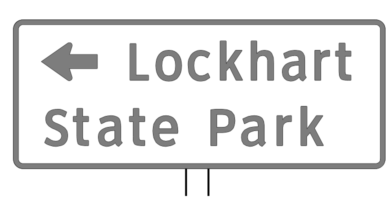
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING

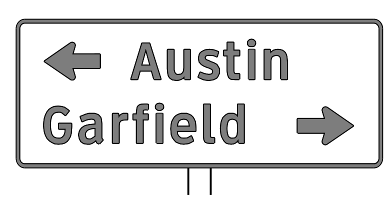












TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.
http://www.txdot.gov/

Texas Department of Transportation
Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(3)-13

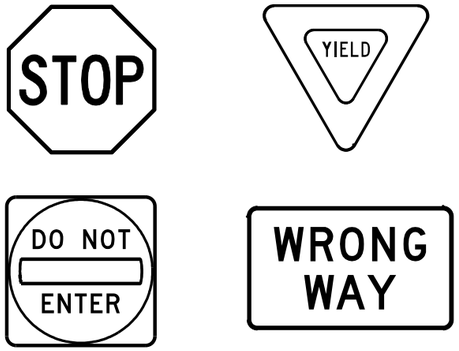
FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
12-03 7-13 9-08	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	208

3

DATE: 7/28/2022 3:11:01 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\tsr4-13.dgn

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

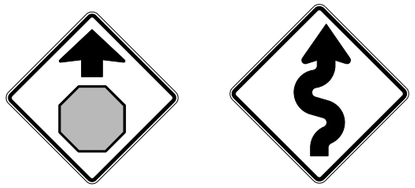
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

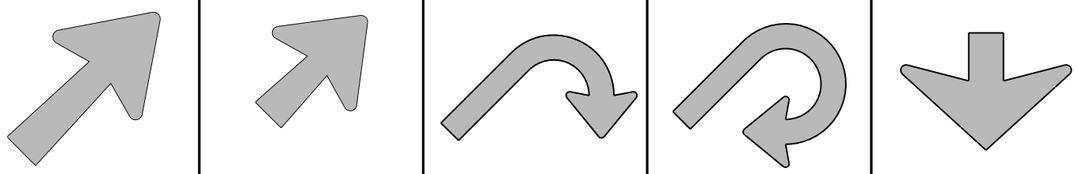
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	DAL	KAUFMAN		209

DATE: 7/28/2022 3:12:44 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\TSR5-13.dgn

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

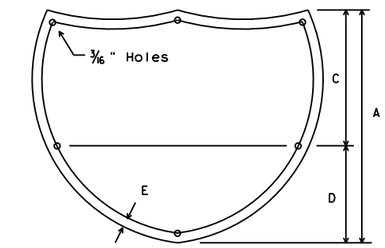
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

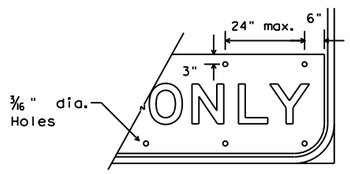
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

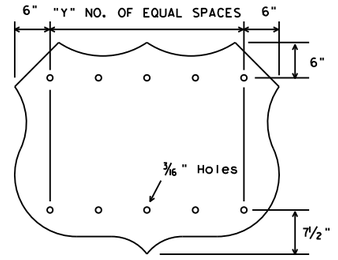


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

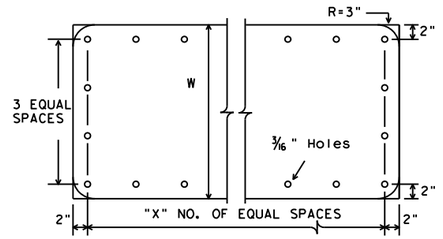


EXIT ONLY PANEL



U.S. ROUTE MARKERS

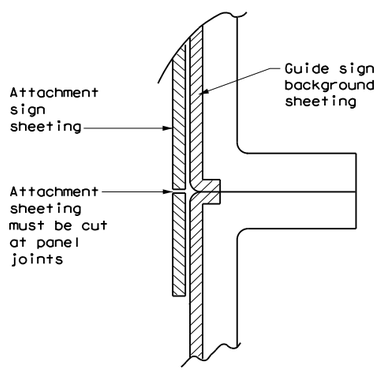
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

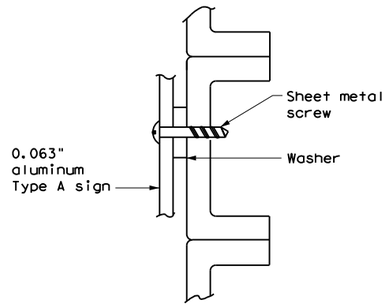
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



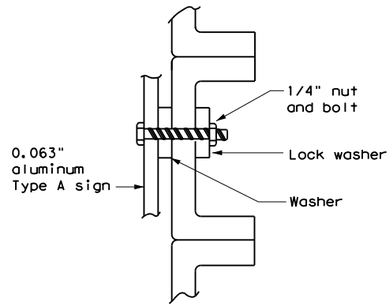
DIRECT APPLIED ATTACHMENT

NOTE:

1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT



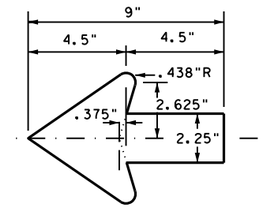
NUT/BOLT ATTACHMENT

NOTE:

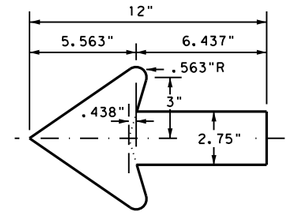
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

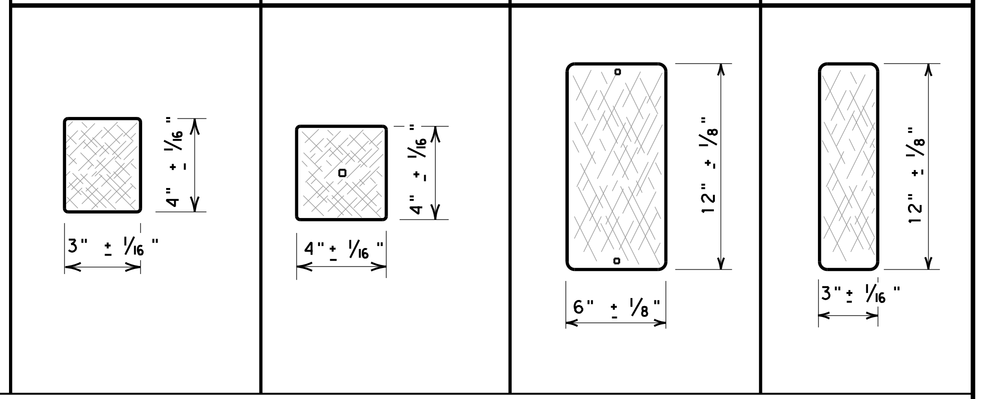
Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

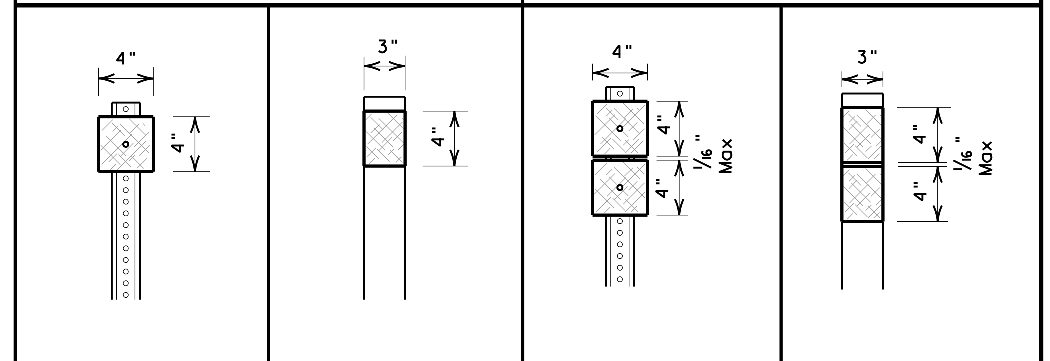
TSR(5)-13

FILE:	tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS		1975	02	013	FM 1895
12-03 7-13		DIST	COUNTY		SHEET NO.
9-08		DAL	KAUFMAN		210

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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

DELINEATORS

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

D & OM DESCRIPTIVE CODES

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

NUMBER OF REFLECTORS
- S = Single
- D = Double

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

REFLECTOR UNIT SIZE
- 1 or 2

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

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

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

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

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

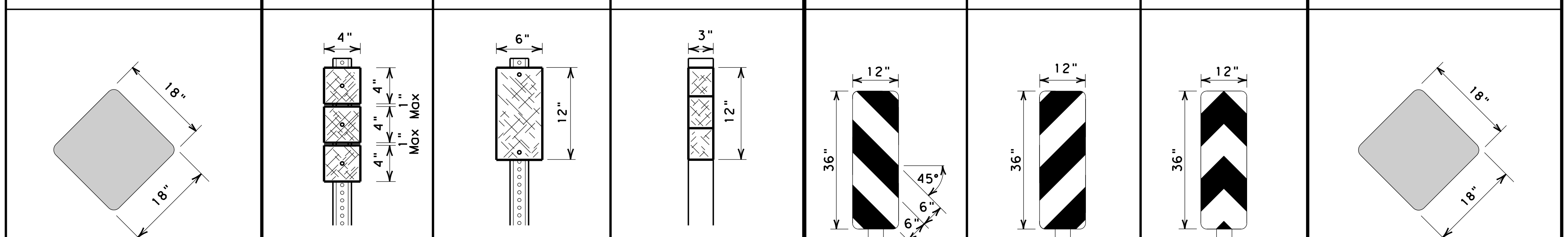
NUMBER OF REFLECTORS OR DIRECTION
- X = 3-Size 2 reflector units (Type 2 only)
- Y = 1-Size 3 reflector unit (Type 2 only)
- Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
- L = Left Side (Type 3 Object Marker only)
- R = Right Side (Type 3 Object Marker only)
- C = Center (Type 3 Object Marker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

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

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

DIRECTION
- If Required
- BI = Bi-Directional

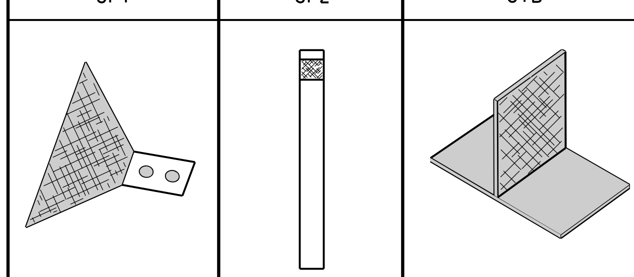
OBJECT MARKERS

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

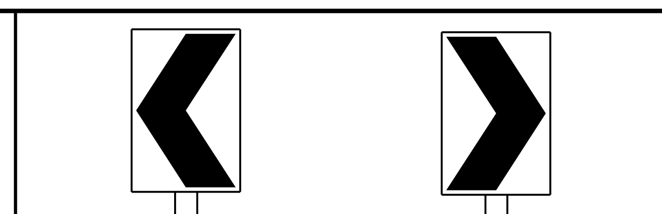
DEPARTMENTAL MATERIAL SPECIFICATIONS

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

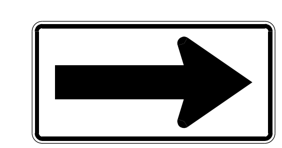
BARRIER REFLECTORS (BRF)

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

CHEVRONS

DEVICE	 W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

ONE DIRECTION LARGE ARROW

DEVICE	 W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE

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

NOTE:

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

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
10-09 3-15	DIST		COUNTY	SHEET NO.
4-10 7-20	DAL		KAUFMAN	211

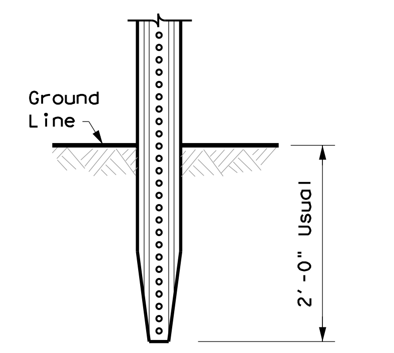
20A

DATE: 7/28/2022 3:14:33 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\...

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

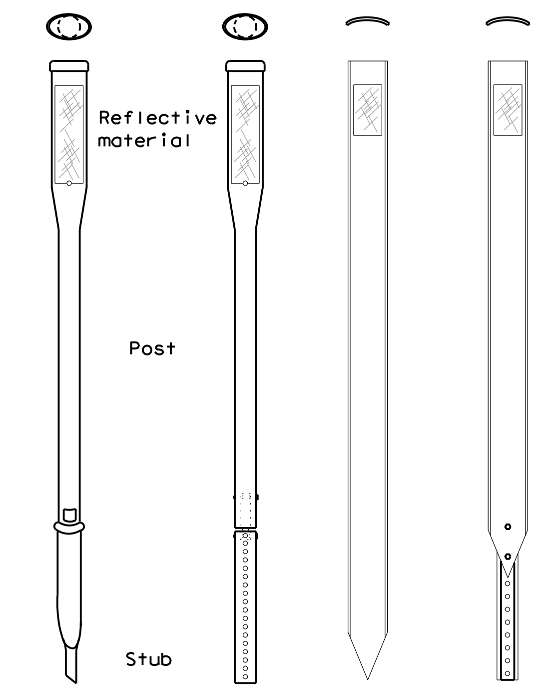


NOTES

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

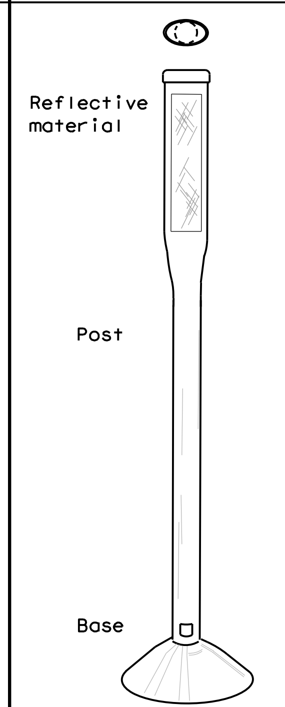
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



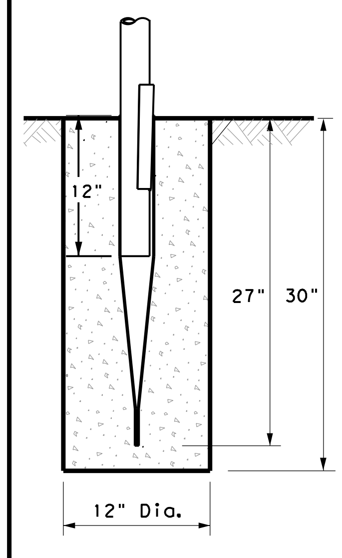
SURFACE MOUNT

NOTES

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

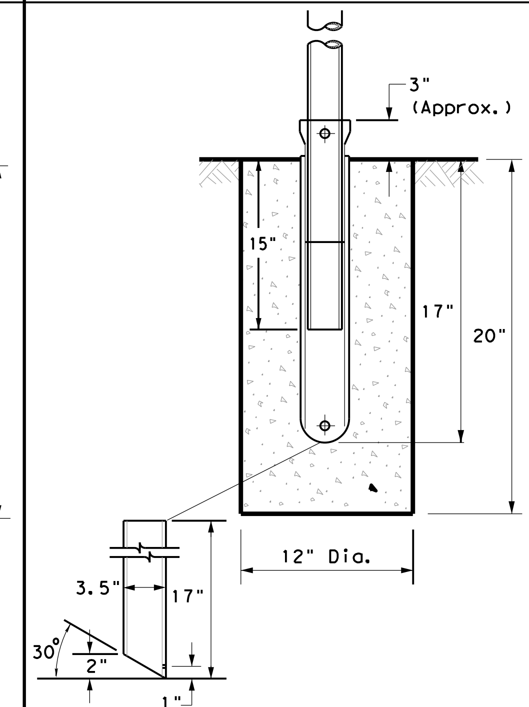
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

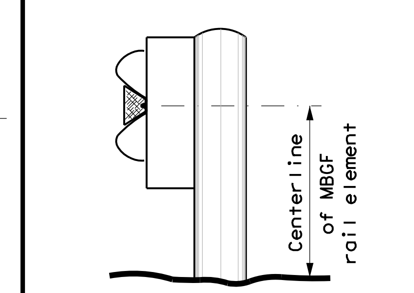
NOTE

1. Install per manufacturer's recommendations.

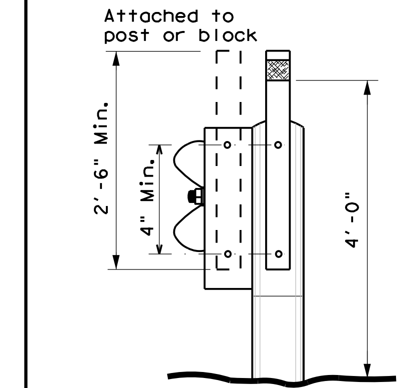
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

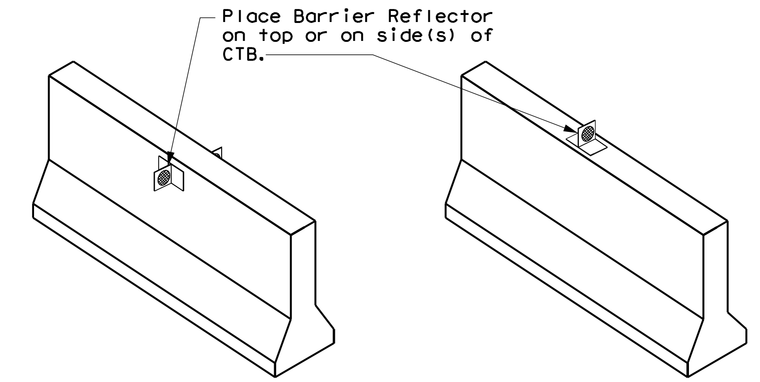
GF1



GF2



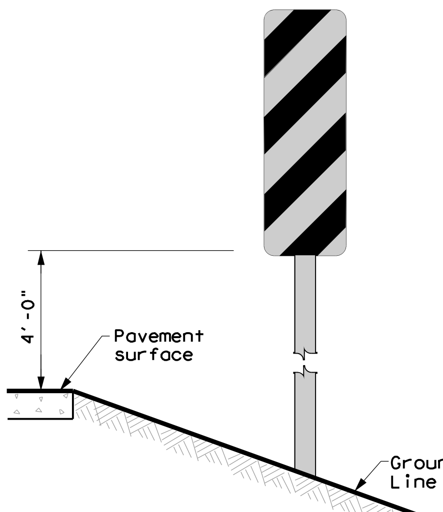
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

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

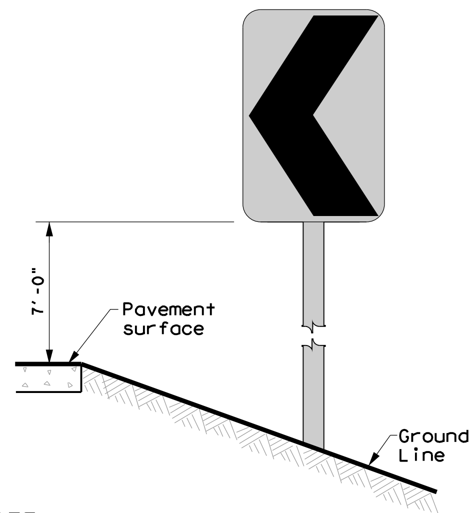
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

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

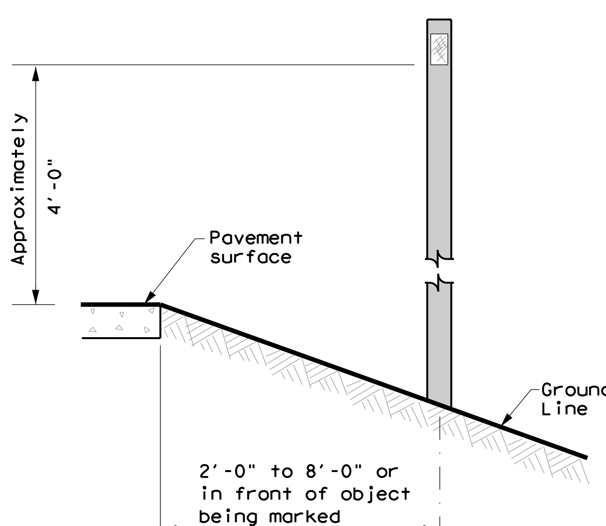
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

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

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT 1975	SECT 02	JOB 013	HIGHWAY FM 1895
REVISIONS 10-09 3-15 4-10 7-20	DIST DAL		COUNTY KAUFMAN	SHEET NO. 212

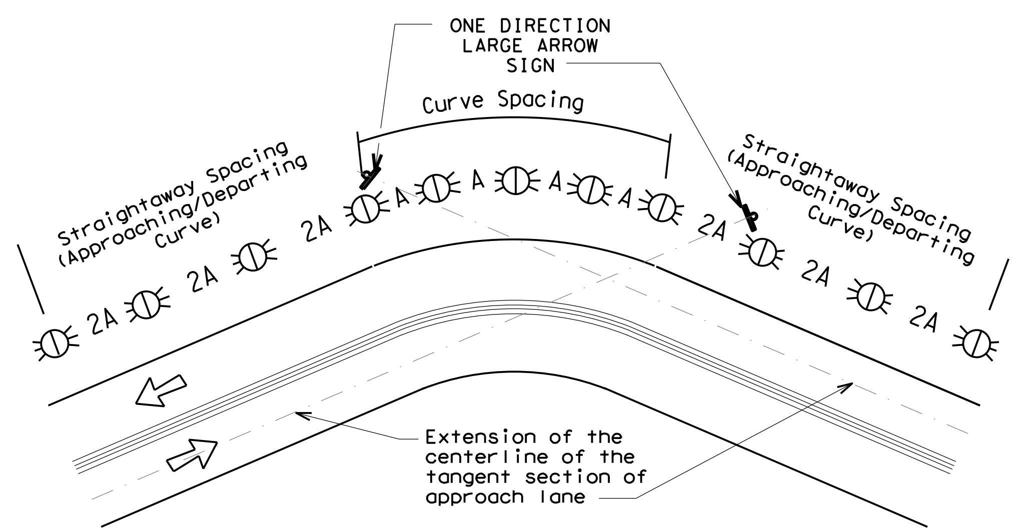
20B

DATE: 7/29/2022 7:31:29 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\...

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

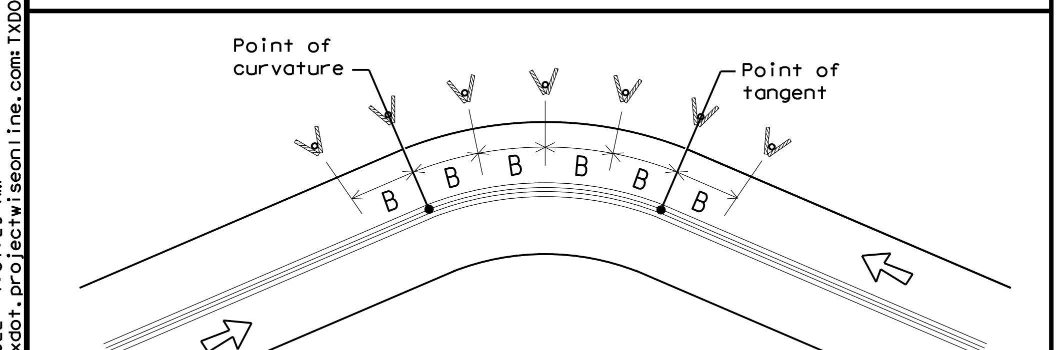
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	—
2	2865	160	320	—
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND

(symbol)	Bi-directional Delineator
(symbol)	Delineator
(symbol)	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

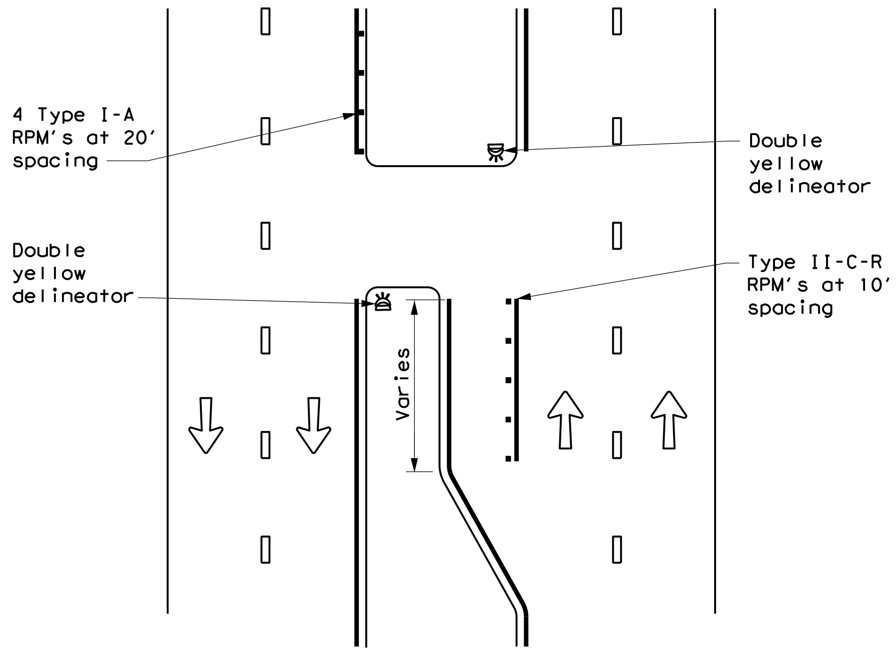
D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
3-15 8-15 8-15 7-20	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	213

20C

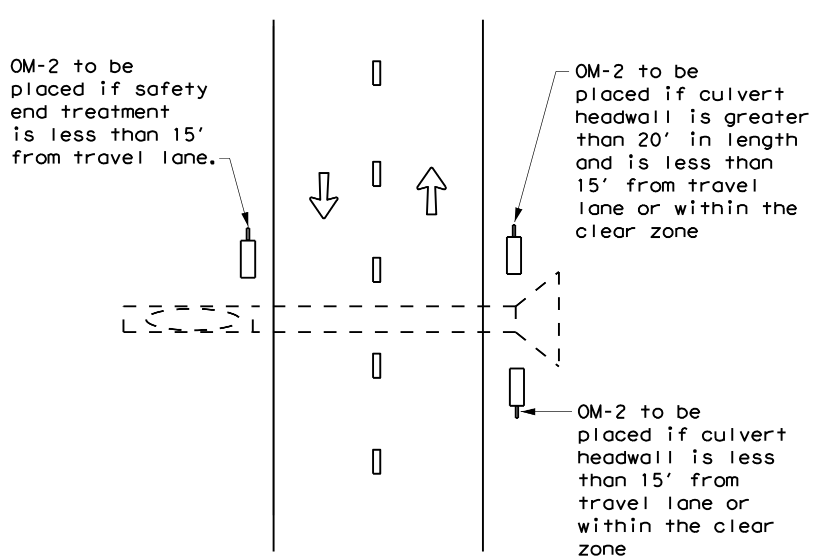
DATE: 7/29/2022 7:38:56 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\...

CROSSOVERS



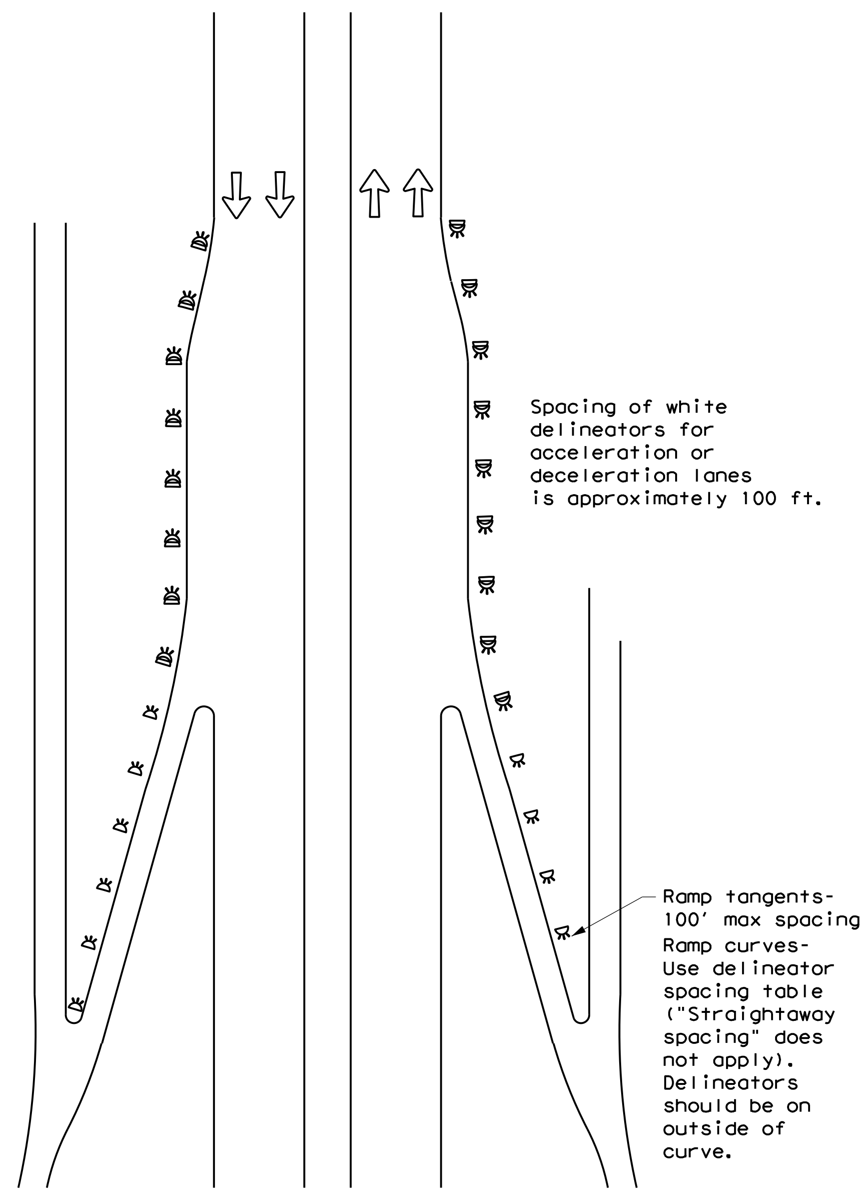
DETAIL 1

FOR CULVERTS WITHOUT MBGF



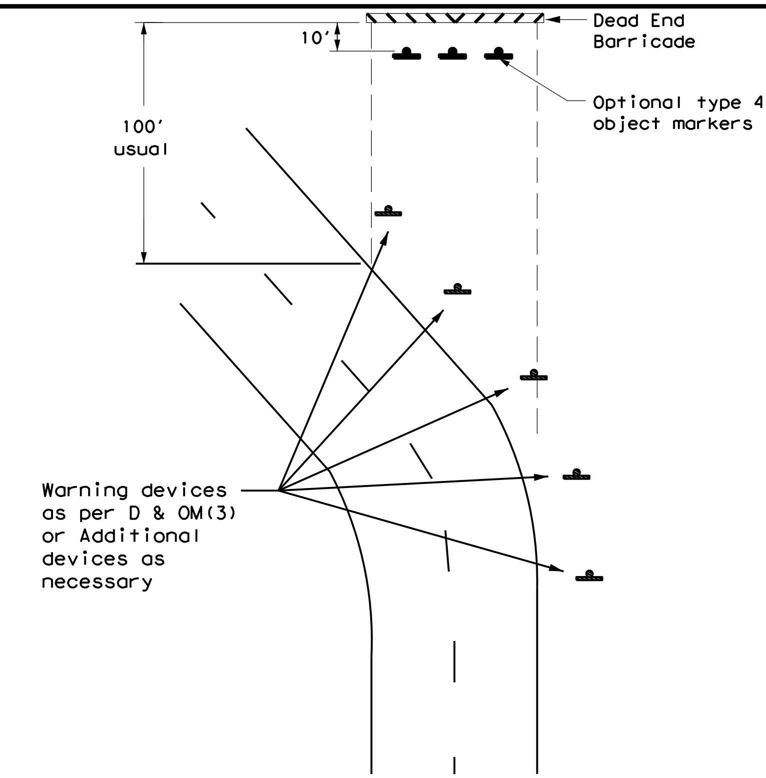
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



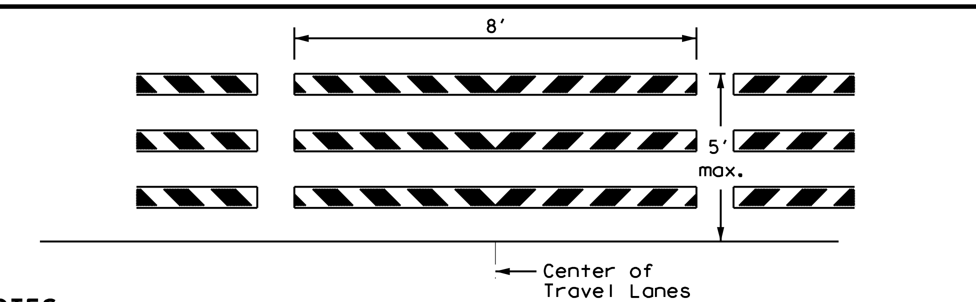
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND

Symbol	Description
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation
Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

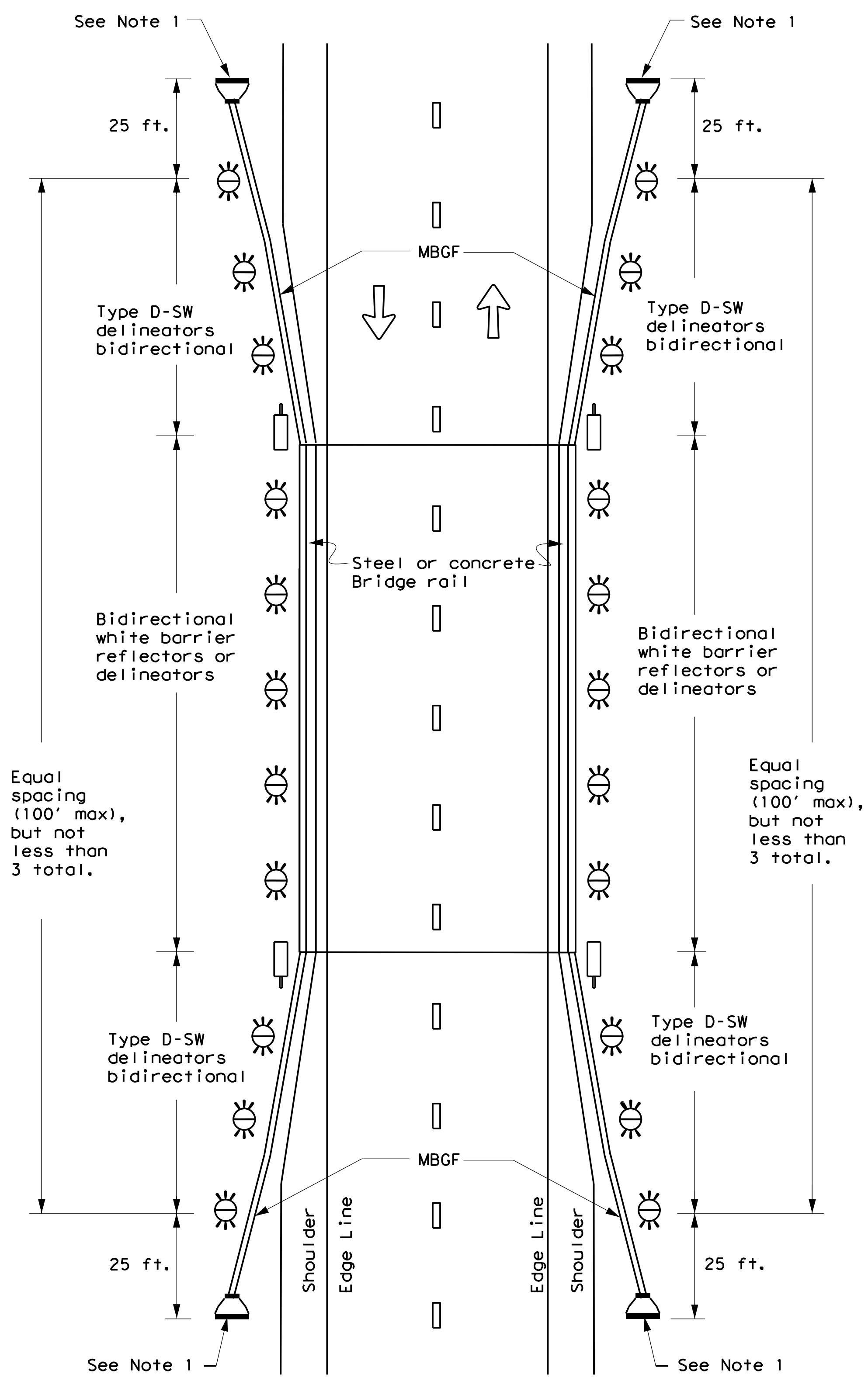
D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 3-15 7-20	1975	02	013	FM 1895
	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	214

20D

DATE: 7/29/2022 8:11:48 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\...

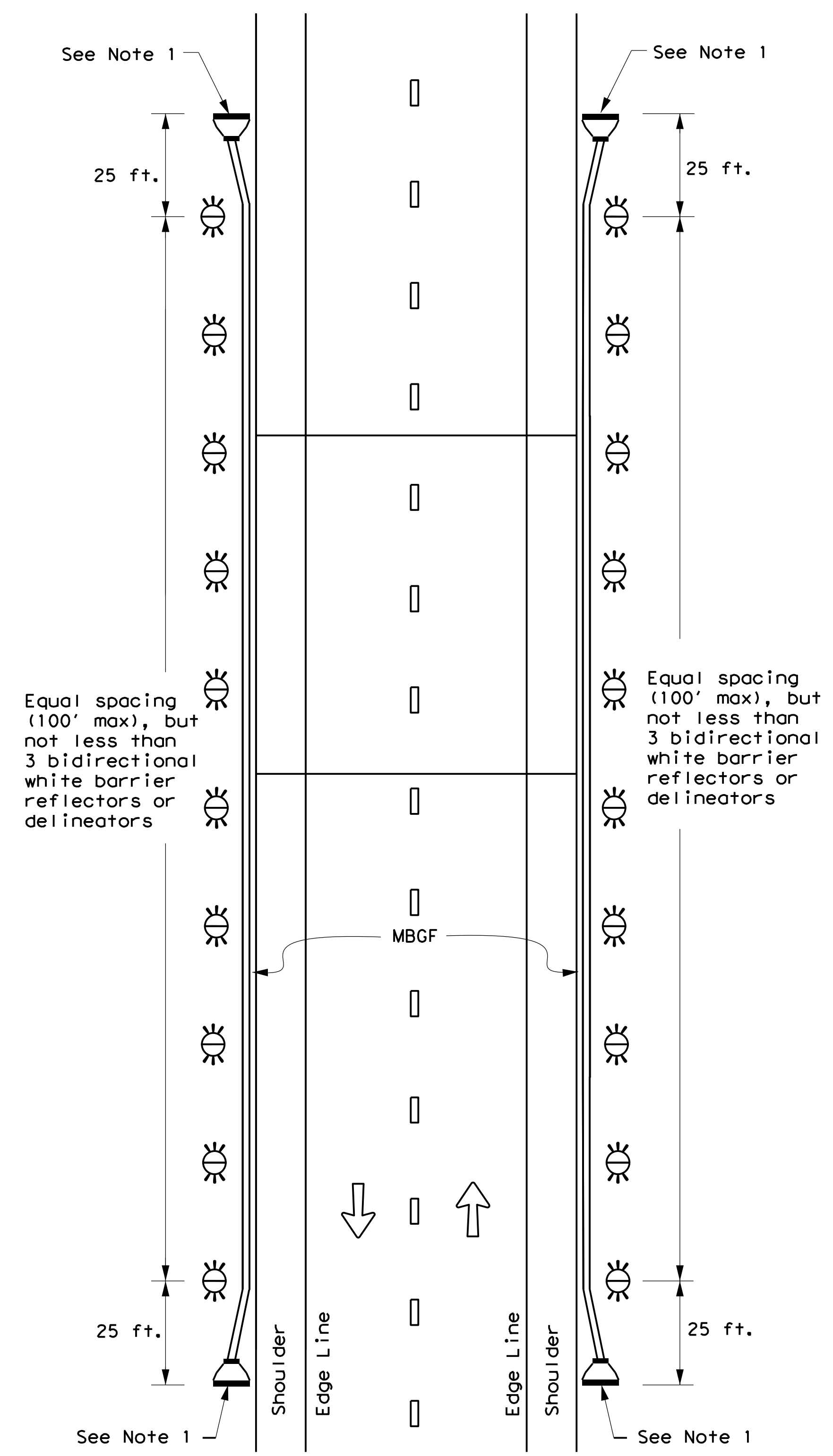
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

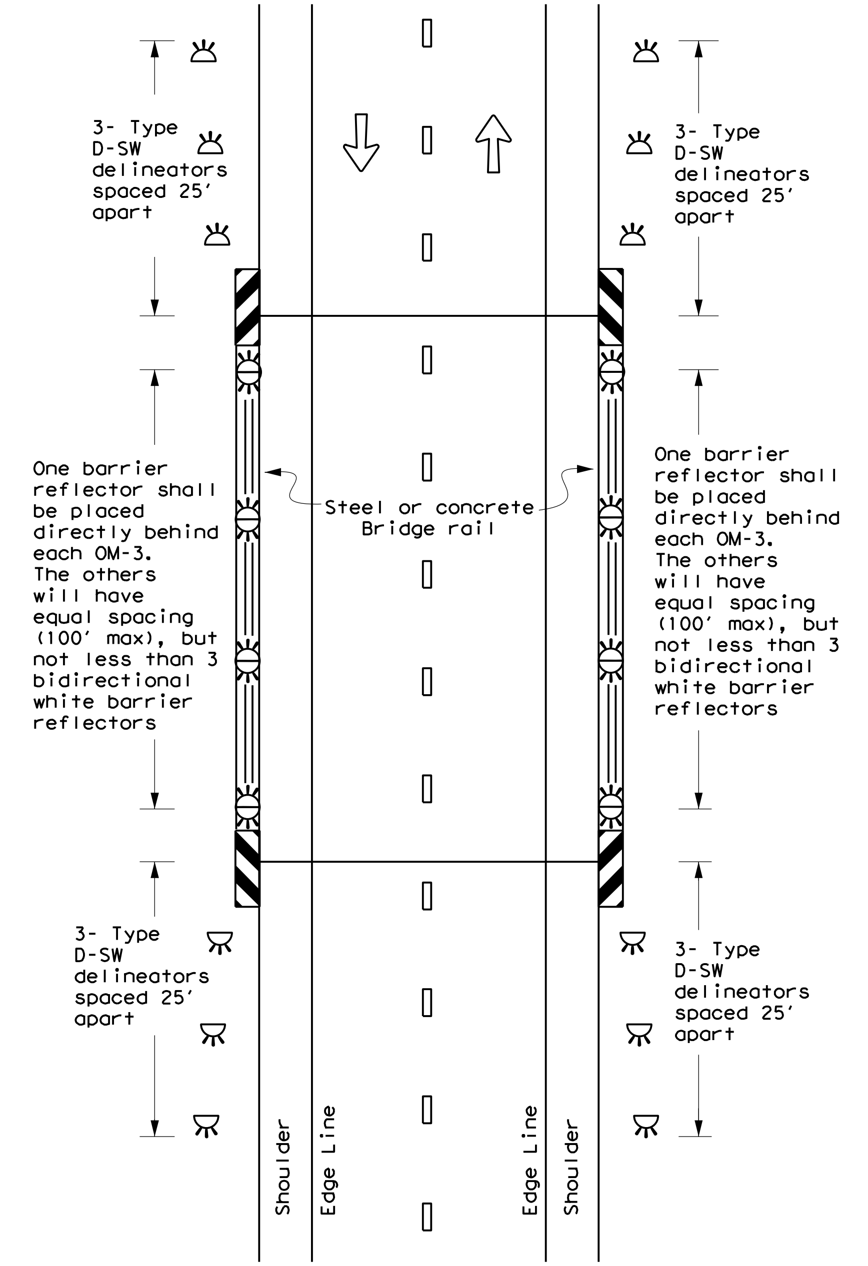
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

Symbol	Description
	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

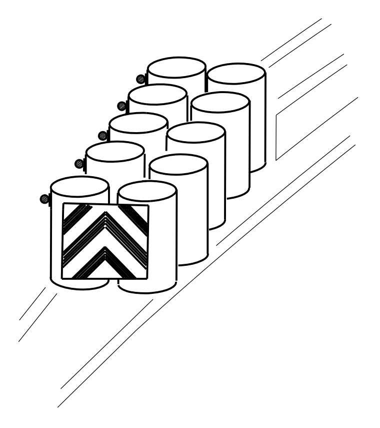
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

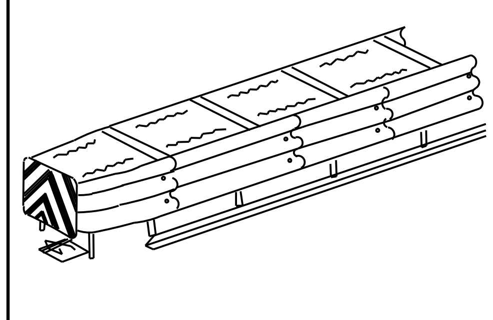
D & OM(5)-20

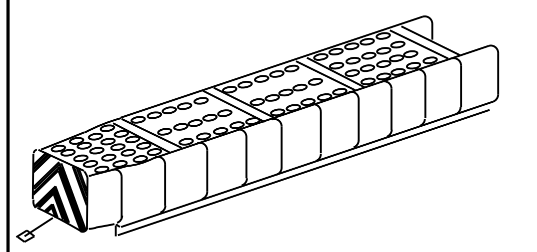
FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
7-20	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	215

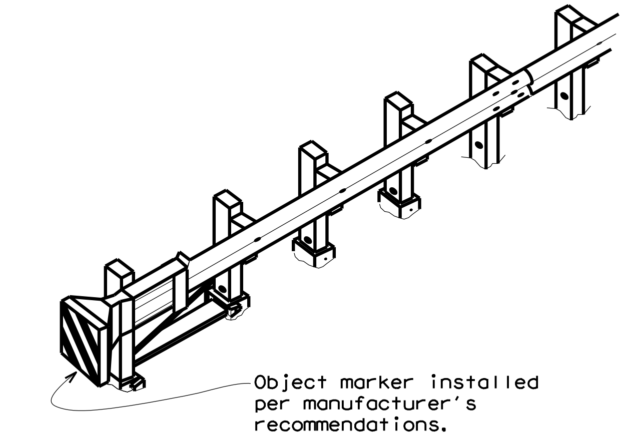
20E

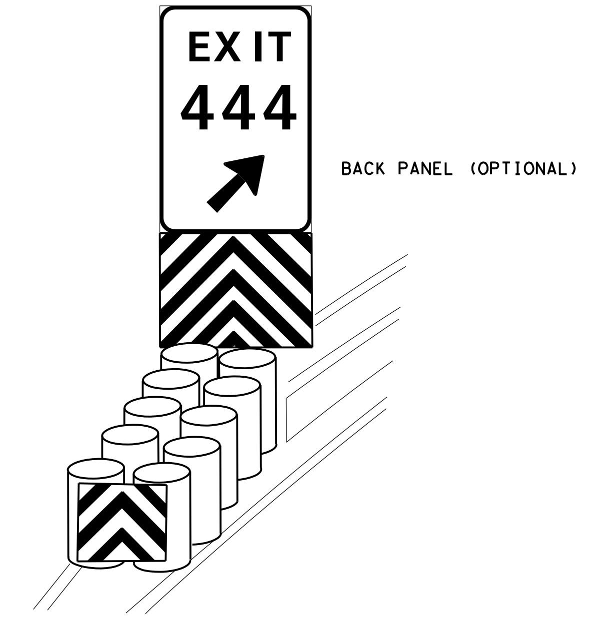
DATE: 7/29/2022 8:01:47 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Pr

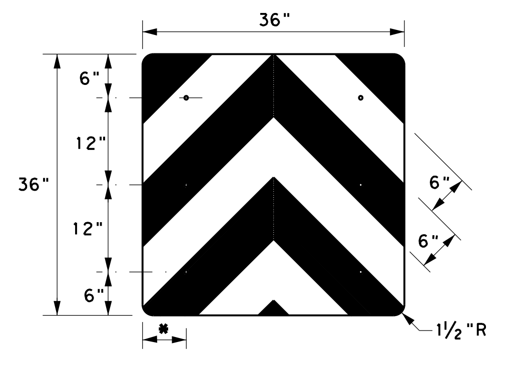


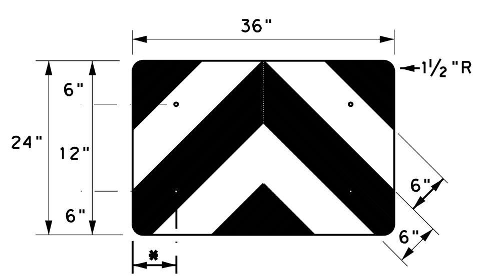




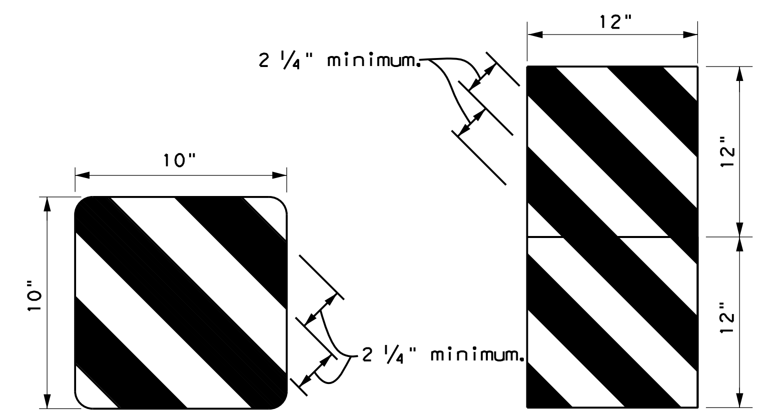




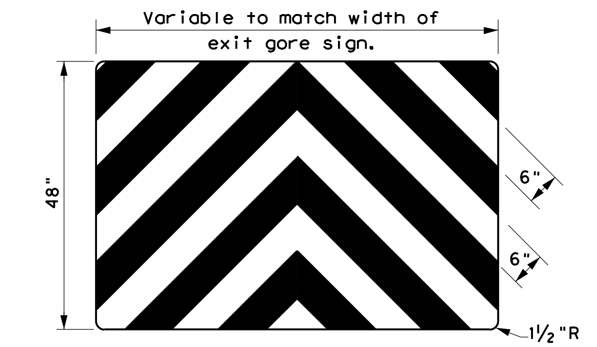


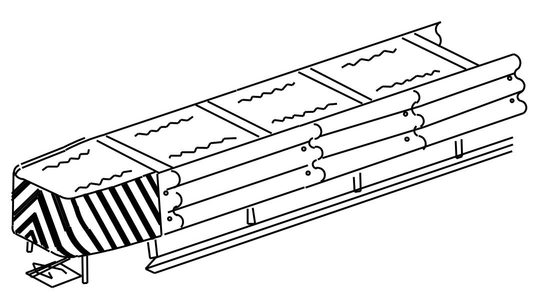


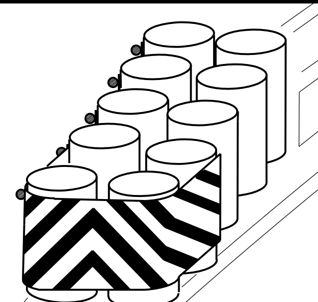
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

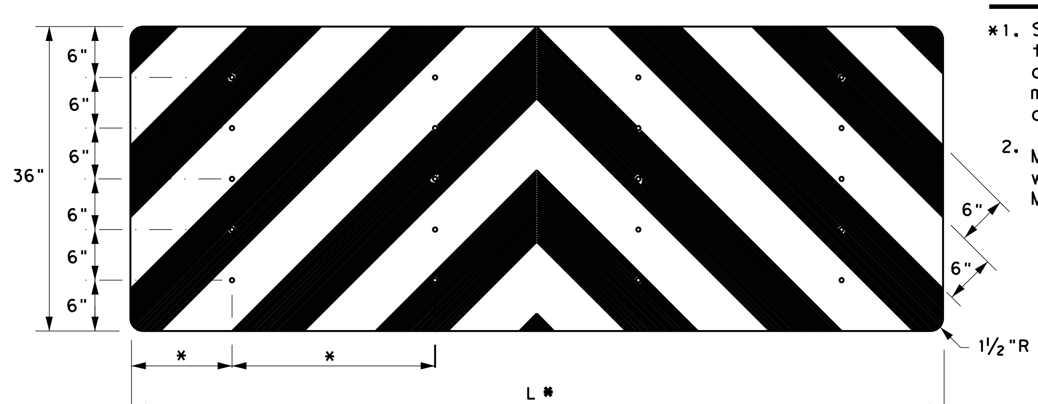


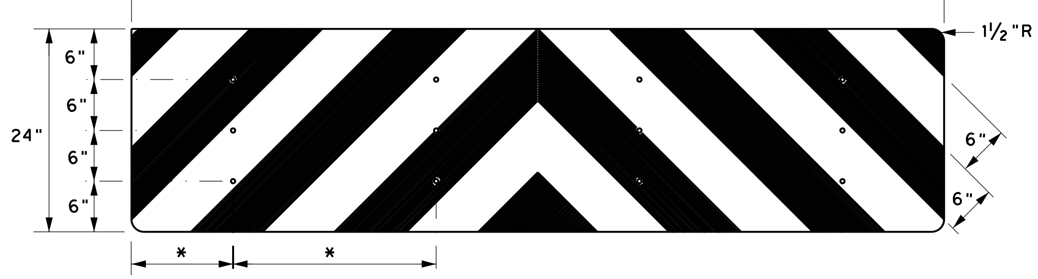
OBJECT MARKERS SMALLER THAN 3 FT^2











NOTES

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

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

NOTES

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

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

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

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

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

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

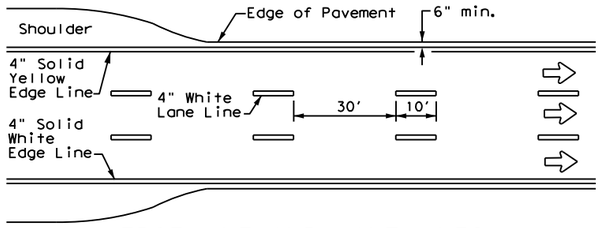
Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

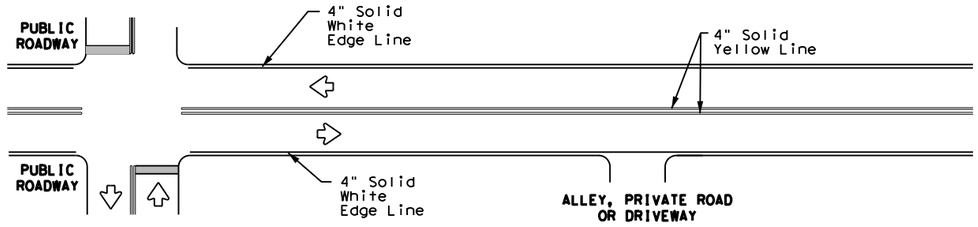
D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
4-92 8-04 8-95 3-15 4-98 7-20	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	216

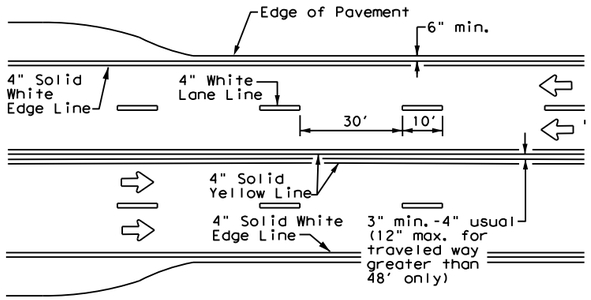
20G



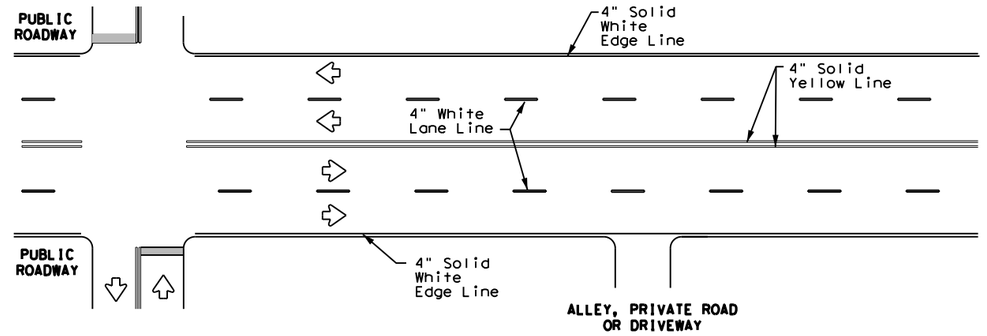
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



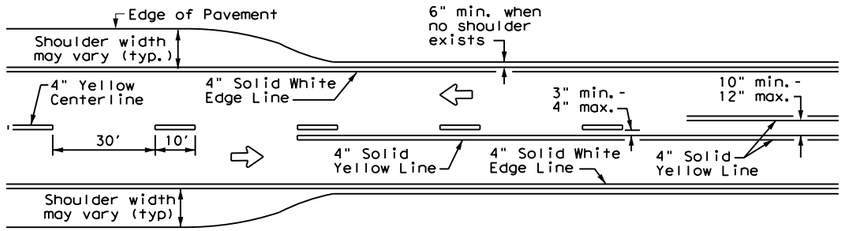
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



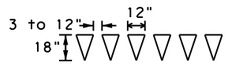
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



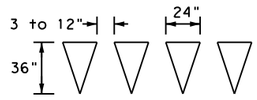
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

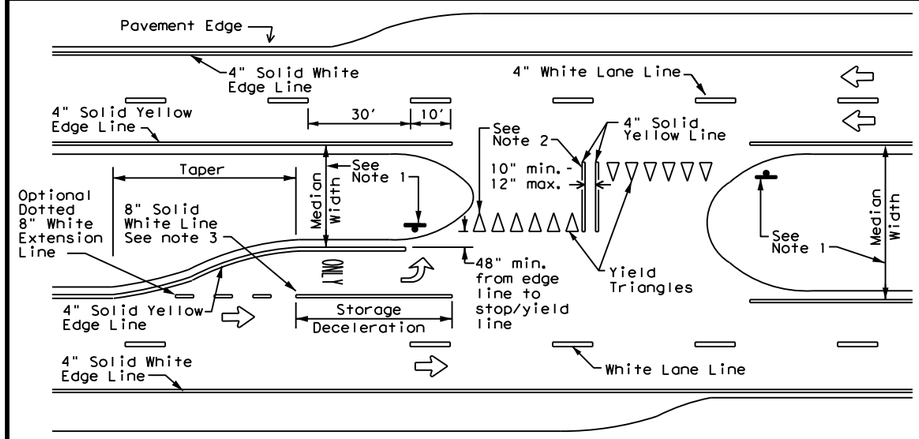


For posted speed on road being marked equal to or less than 40 MPH.



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

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater 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.

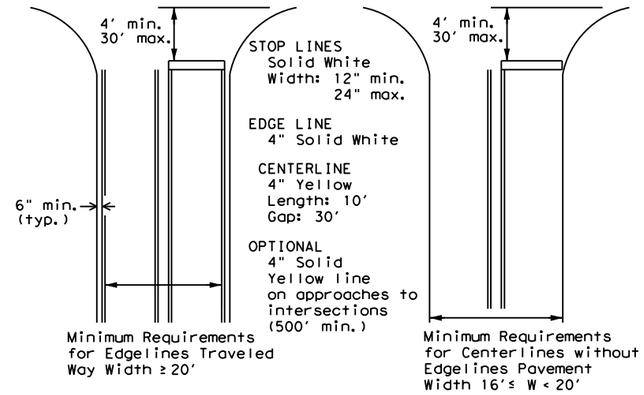
GENERAL NOTES

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

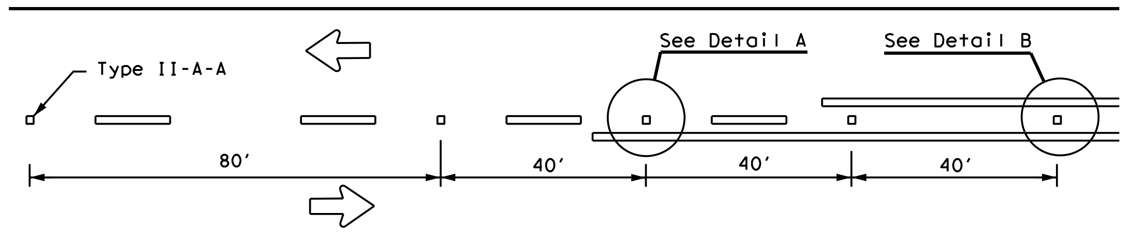
PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	1975	02	013	FM 1895
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	DALLAS	KAUFMAN		217

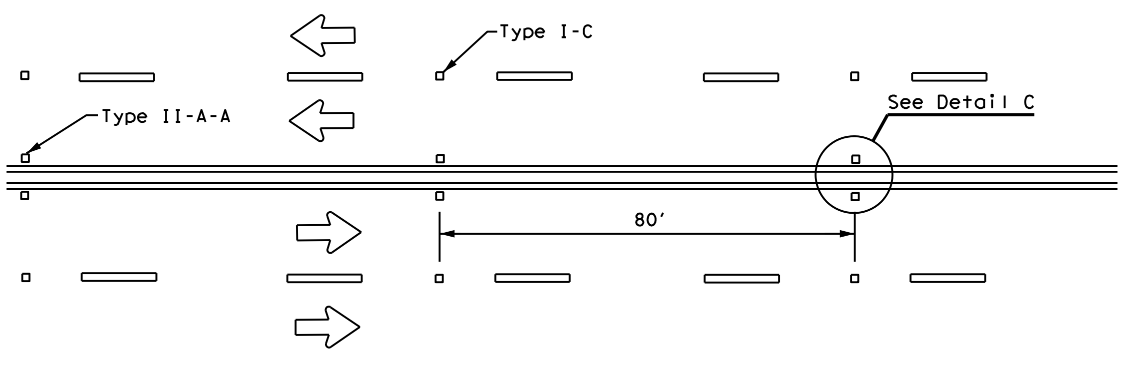
DATE:
FILE:

22A

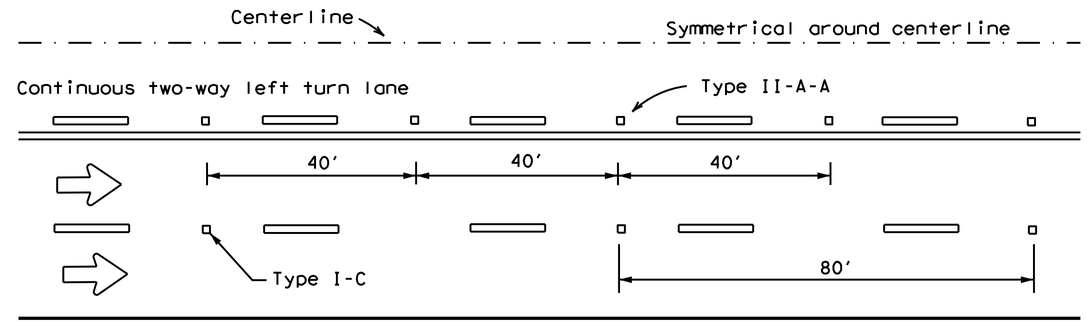
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



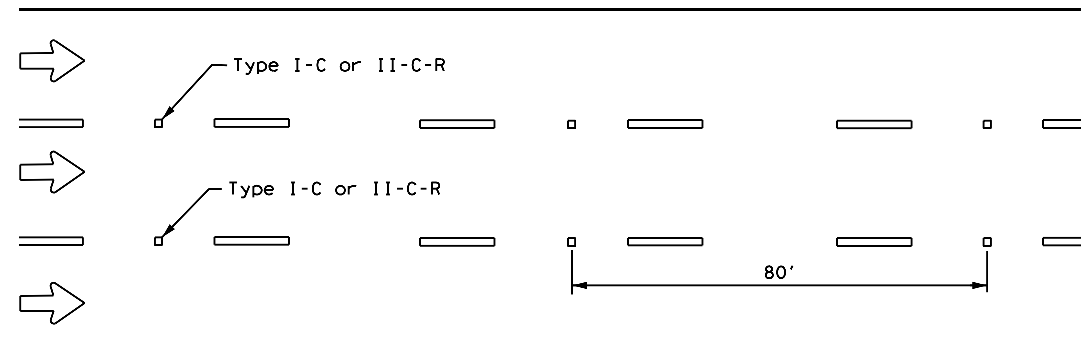
CENTERLINE FOR ALL TWO LANE ROADWAYS



CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS

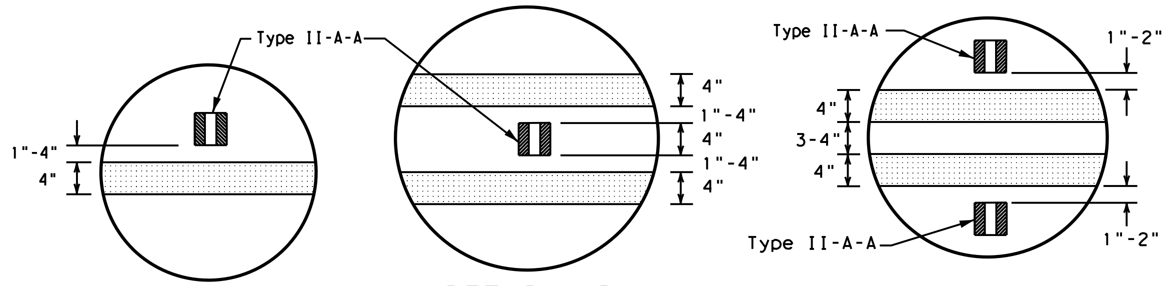


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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

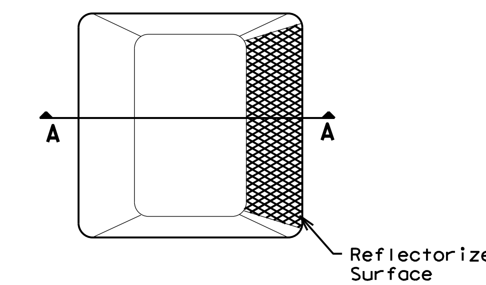
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.



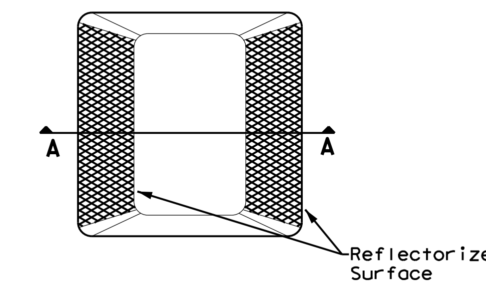
DETAIL "A" DETAIL "B" DETAIL "C"

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

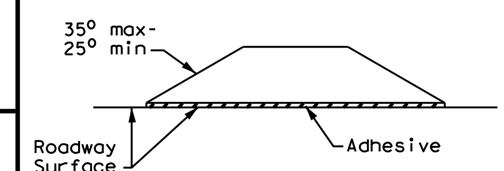
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

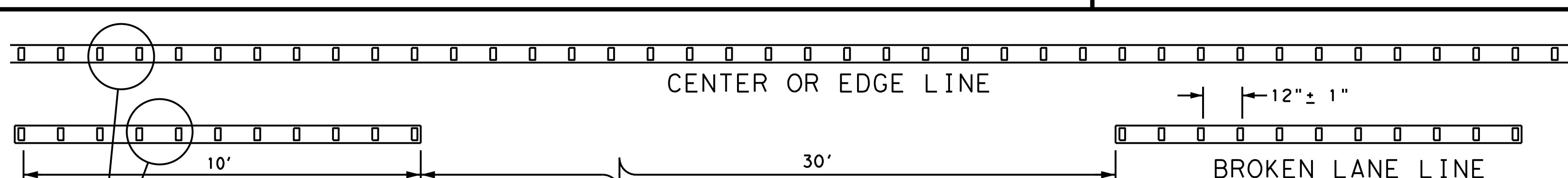


Type II (Top View)



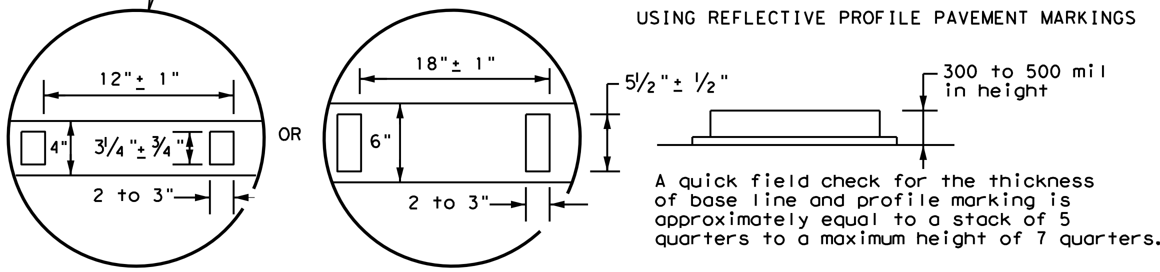
SECTION A

RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS



4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

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.

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

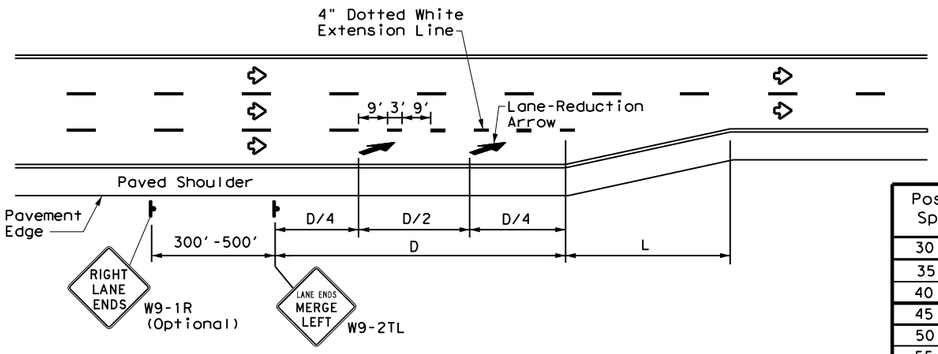
Traffic Safety Division Standard

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	1975	02	013	FM 1895
	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	218

228

DATE: 7/29/2022 8:20:56 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Professional Services\PM3-20.dgn

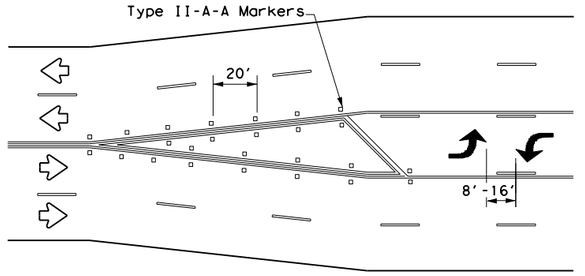


LANE REDUCTION

Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

NOTES

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



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

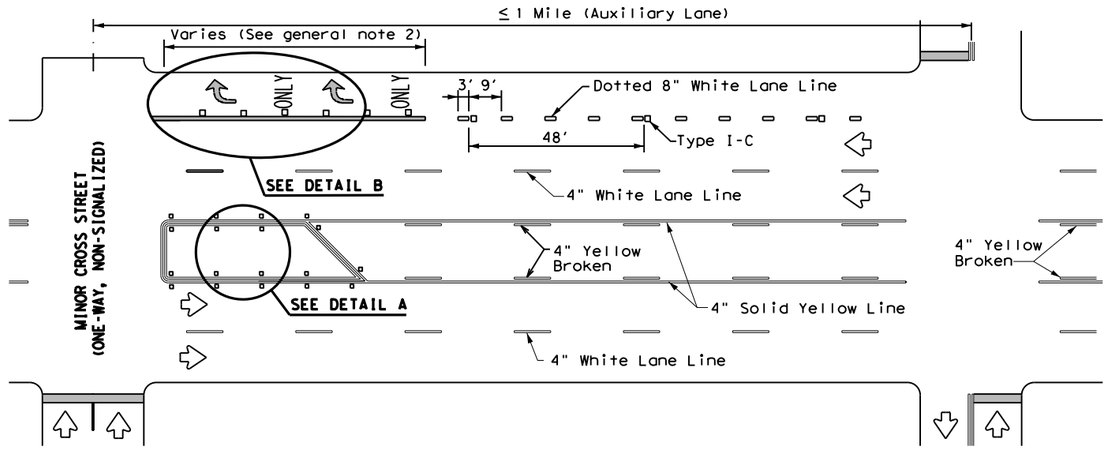
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

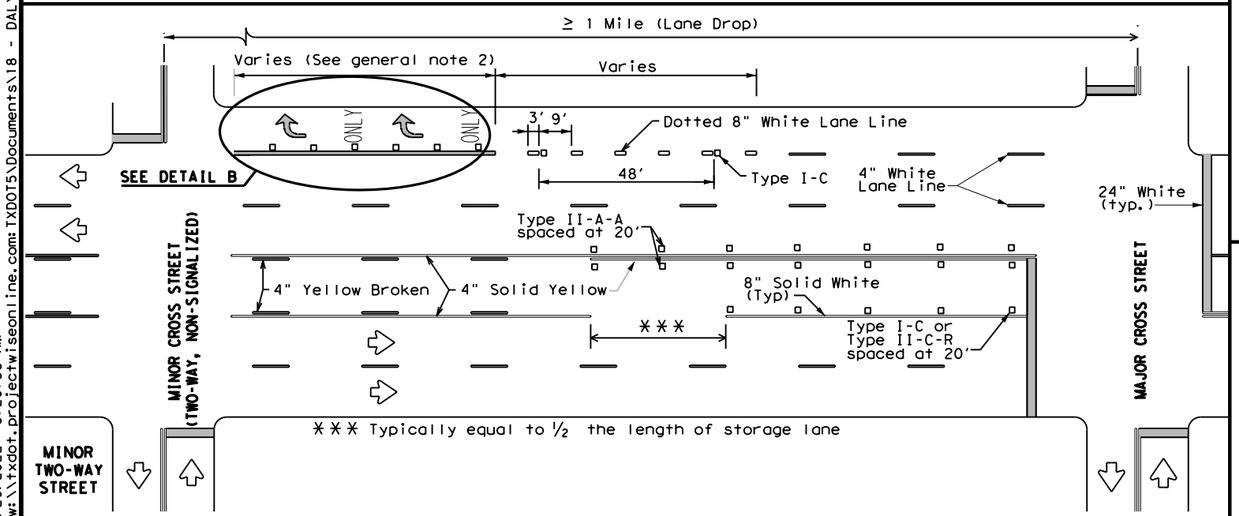
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn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

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

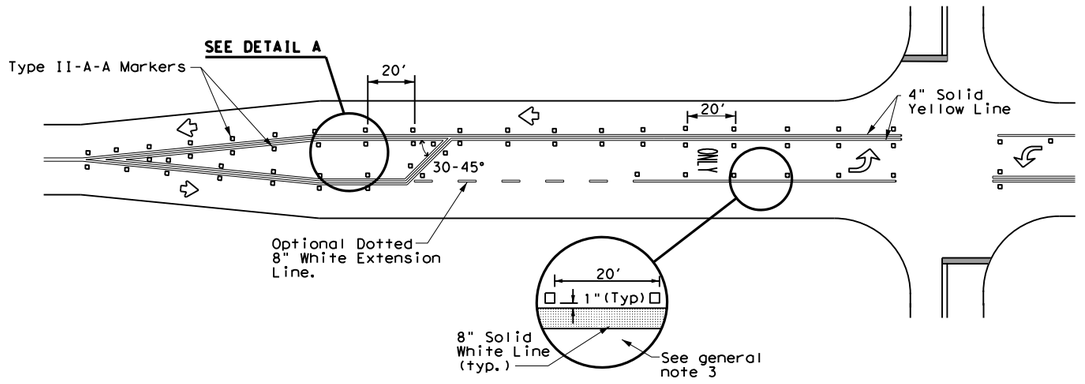
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



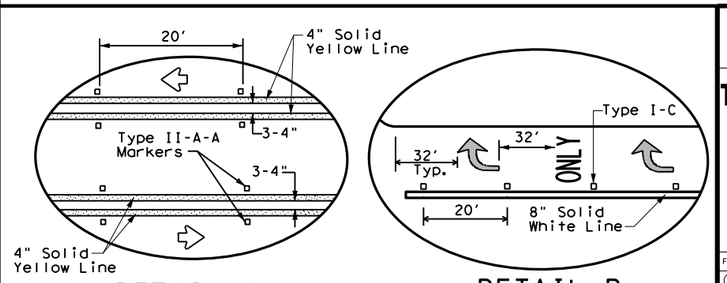
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



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



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



Texas Department of Transportation

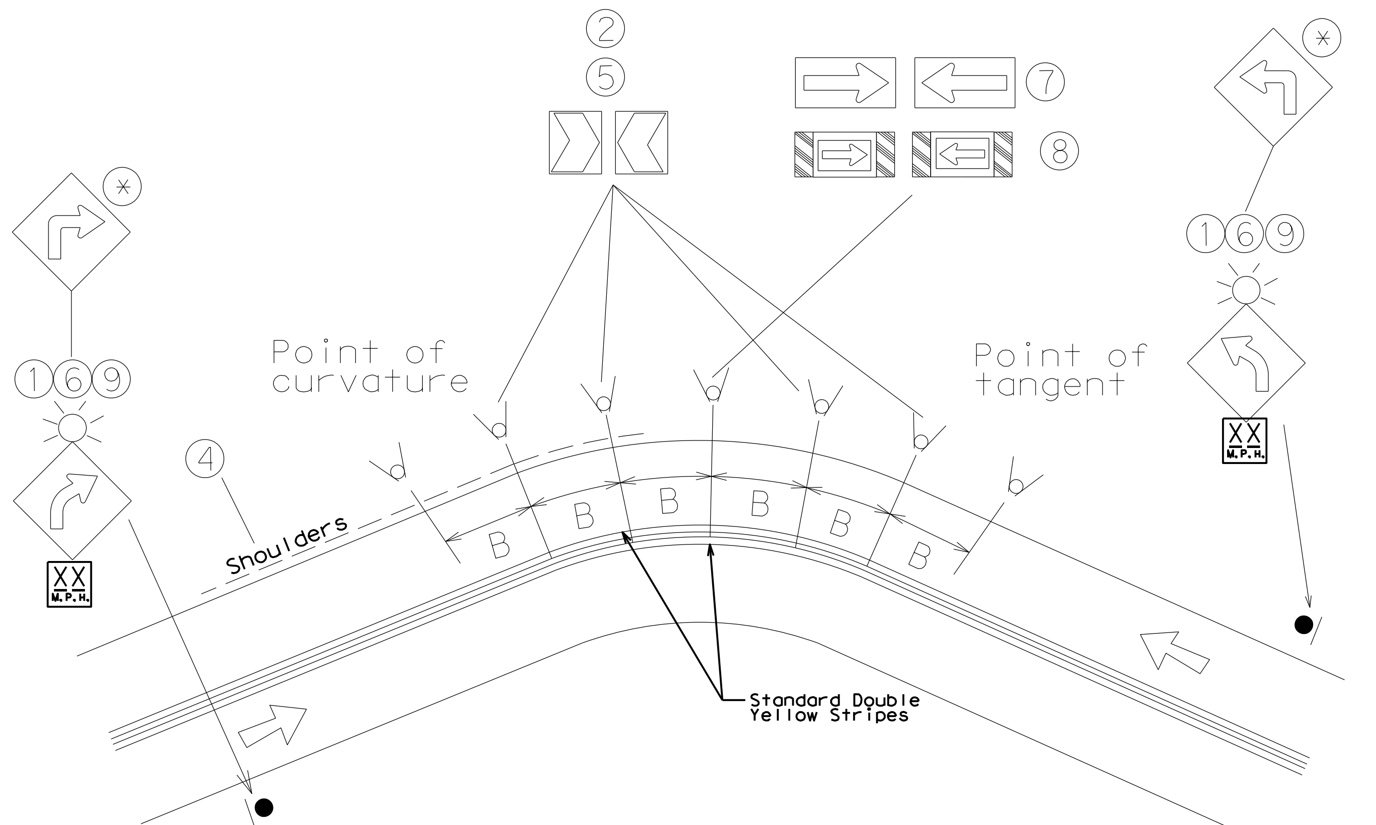
Traffic Safety Division Standard

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

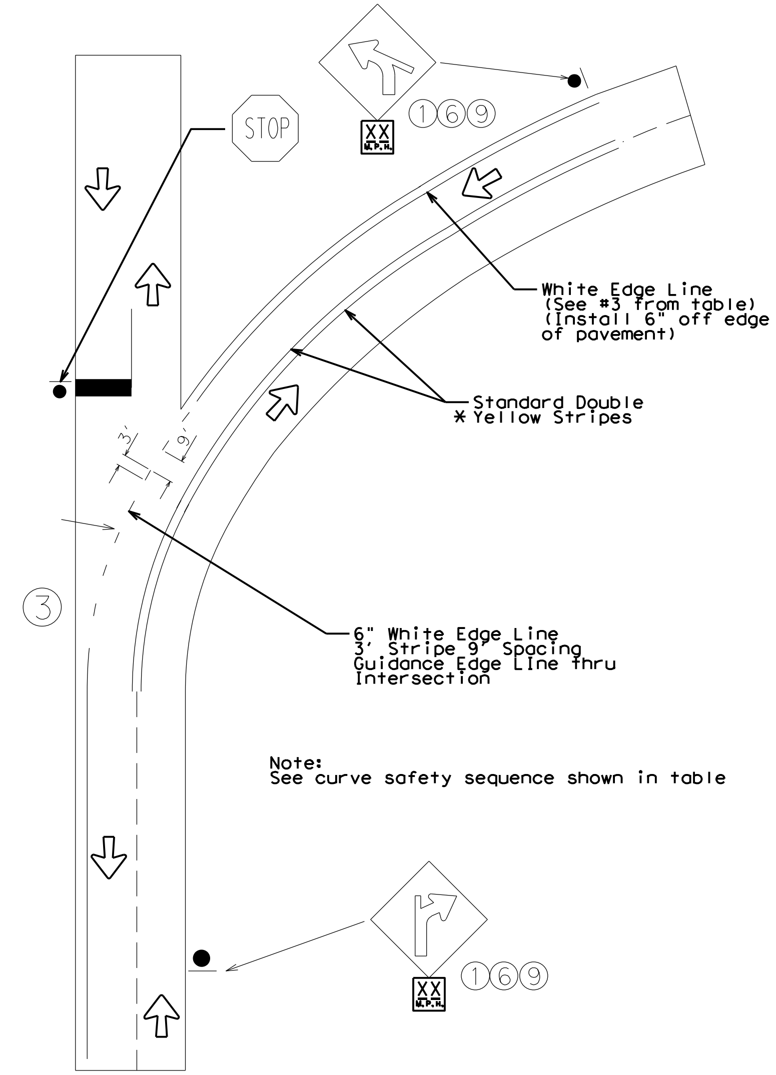
FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
5-00 2-10	DIST	COUNTY		SHEET NO.
8-00 2-12	DAL	KAUFMAN		219
3-03 6-20				

22C

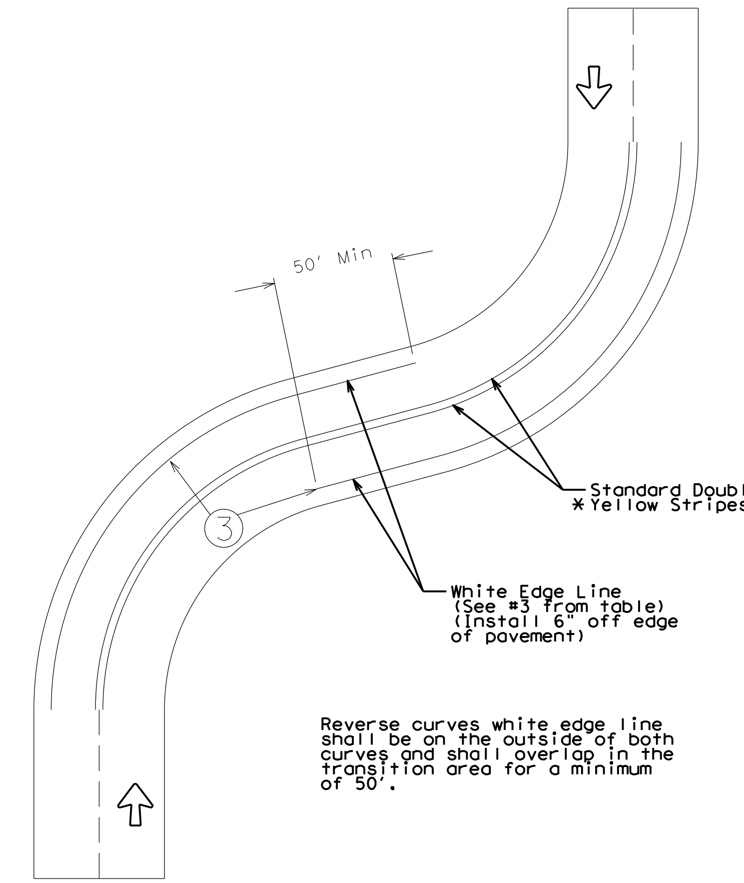
Dallas District Standard for Two-Lane Highway Curve Signing/Markings



Typical Curve Treatment with Intersection



Typical Reverse Curve Edge Line Treatment



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

Curve Safety Sequence

Applicable Minimum Measures

Advisory Speed 55 mph or higher	Advisory Speed 40-50 mph	Advisory speed 35 mph or less		Curve signing, delineation and pavement markings (listed in order from minimum to maximum level of treatment as needed)
+	+	+	1	Advance warning (36" x 36") and advisory mph (18" x 18")
+	+	+	2	Chevron alignment signs if advisory speed is 15 mph or greater than posted speed
	+	+	3	Edge lines
			3a	Pavement width 24' or greater 6" solid white edge line
			3b	Pavement width 20' - 24' 4" solid white edge line
			3c	Pavement width 20' or less no edge line
		Supplemental Measures		
		#	4	Add shoulders and edge line (see #3a)
		#	5	Yellow high intensity flourescent chevron alignment signs - add reflective sheeting to sign support from bottom edge of sign
#	#	#	6	Large advance warning (48" x 48") and advisory mph (30" x 30")
#	#	#	7	Arrow sign (48" x 24")
		#	8	Large arrow sign with diagonals (96" x 36")
		#	9	Add flashers to advance warning signs
#	#	#	10	Surface treatment to improve friction
			**	The W1-1R or L sign shall only be used when the advisory speed is 30 mph or less

+ = required
# = optional

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

Note:
"B" - Chevron Spacing referenced from D&OM(3)-15B

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

OCT-2014 UPDATED NOTES
JAN-2016 NOTE ADDED
SEPT-2016 NOTE ADDED FOR STRIPING IN CURVE
MAR-2017 REMOVED REFERENCE TO DELINEATORS
MAY-2019 MODIFIED SIGN SIZE

Texas Department of Transportation

TWO-LANE HIGHWAY CURVE SIGNING & MARKINGS

DALLAS DISTRICT STANDARD

SCALE: NTS SHEET 1 OF 1

DESIGN/CK	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
BLS	6	(SEE TITLE SHEET)		FM1895
CHECK BLS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK FRC	TEXAS	DALLAS	KAUFMAN	220
CHECK ARO	CONTROL 1975	SECTION 02	JOB 013	

DATE: 7/29/2022 8:25:19 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\STANDARDS\14. smdgen.dgn

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

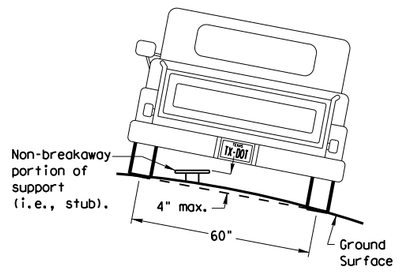
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

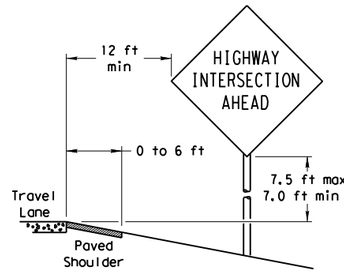
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

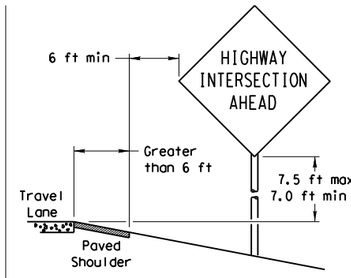
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

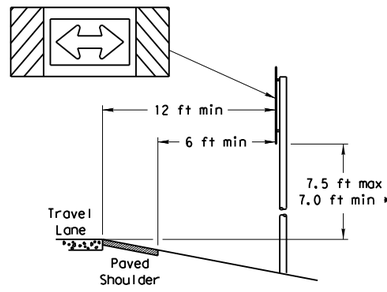
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



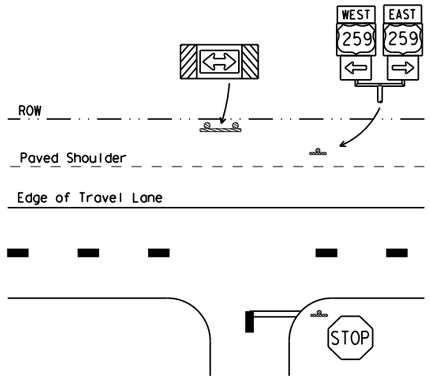
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

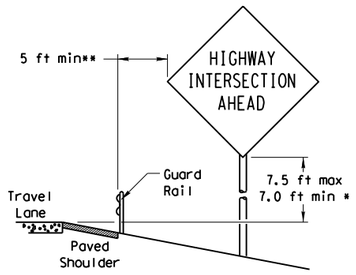
T-INTERSECTION



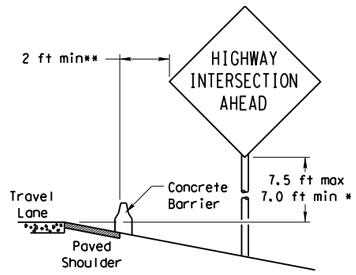
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



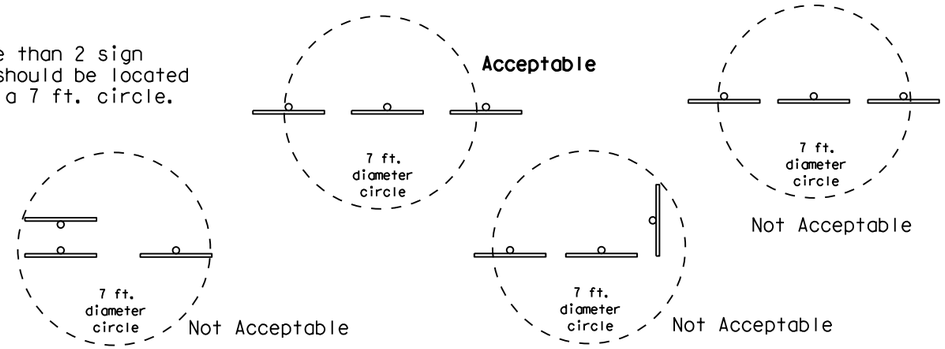
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

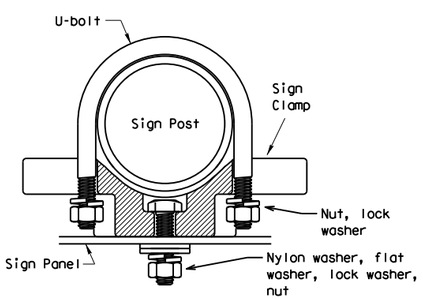
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

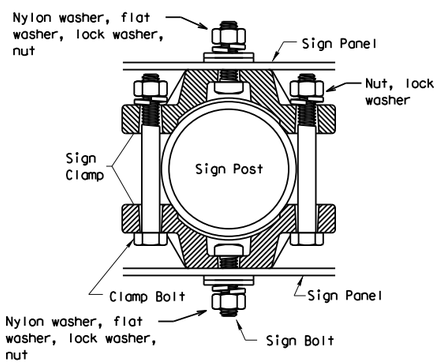


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

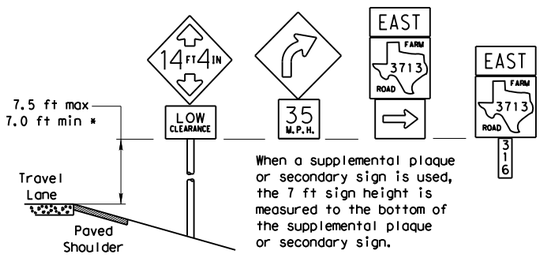
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



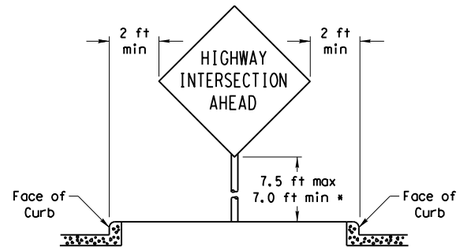
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



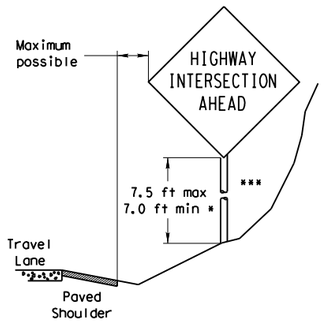
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

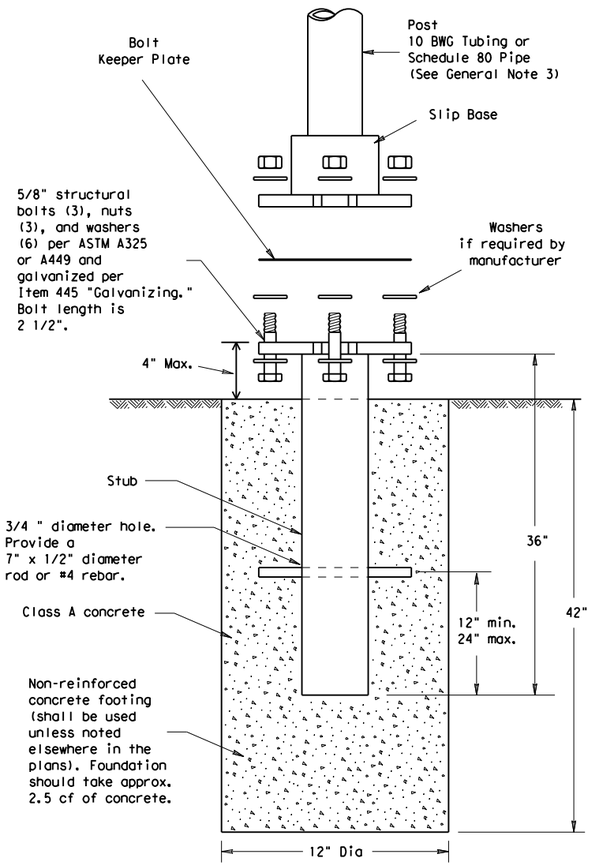
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
1975	02	013	FM 1895

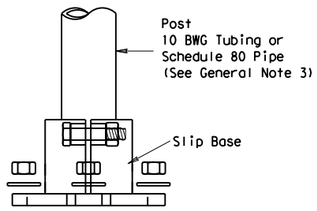
DIST	COUNTY	SHEET NO.
DAL	KAUFMAN	221

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS

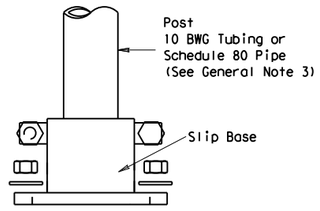


SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

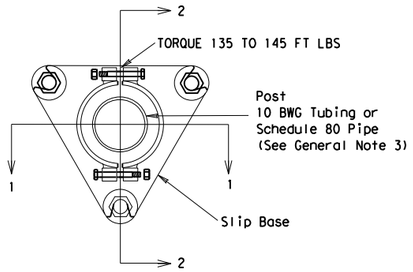
NOTE
The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.



SIDE VIEW 1-1



SIDE VIEW 2-2



TOP VIEW

DETAIL A

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   0.134" nominal wall thickness
   Seamless or electric-resistance welded steel tubing or pipe
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the following:
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   20% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
   Schedule 80 Pipe (2.875" outside diameter)
   0.276" nominal wall thickness
   Steel tubing per ASTM A500 Gr C
   Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
   46,000 PSI minimum yield strength
   62,000 PSI minimum tensile strength
   21% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is:
   http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

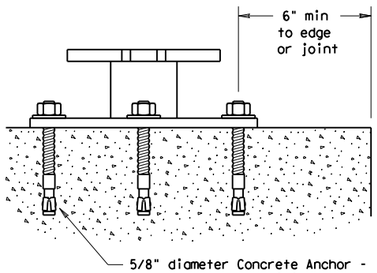
Foundation

1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support

1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

ADDED DETAIL A FOR CLAMP BASE
10-2010

DATE:
FILE:

Texas Department of Transportation
Dallas District Standard

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

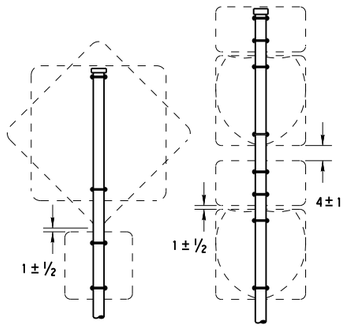
SMD(SLIP-1)-08(DAL)

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

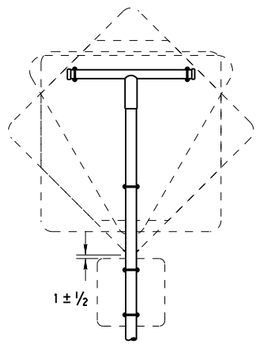
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	1975	02	013	FM 1895
12-10 (DISTRICT) ADDED CLAMP BASE DETAIL FOR SLIP BASE INSTALLATION	DIST	COUNTY		SHEET NO.
	DALLAS	KAUFMAN		222

26B

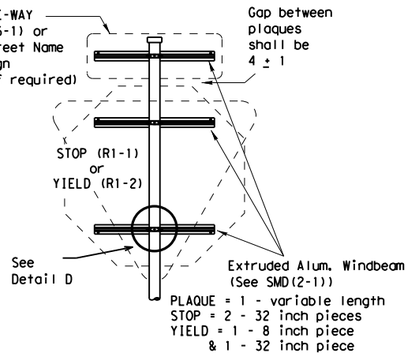
DATE: 7/29/2022 8:29:27 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\8. Traffic\STANDARDS\16. smds2.dgn



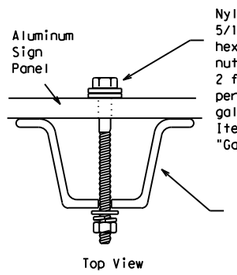
SM RD SGN ASSM TY XXXXX(1)XX(P)



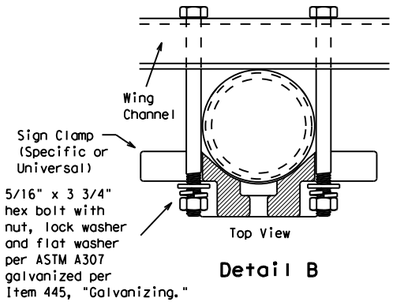
SM RD SGN ASSM TY XXXXX(1)XX(T)



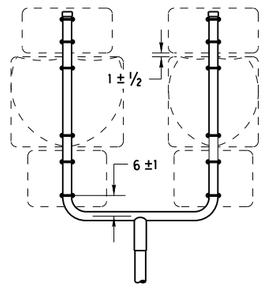
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



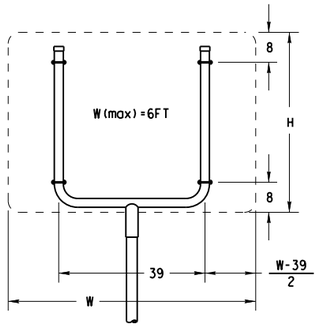
Detail A



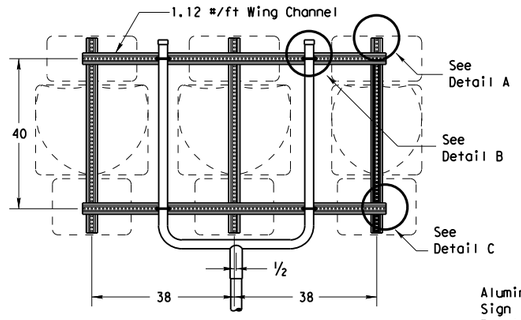
Detail B



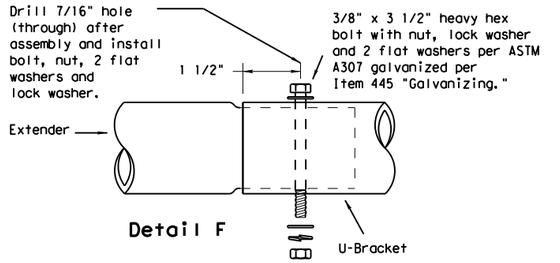
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

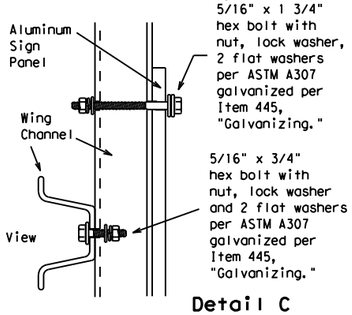


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

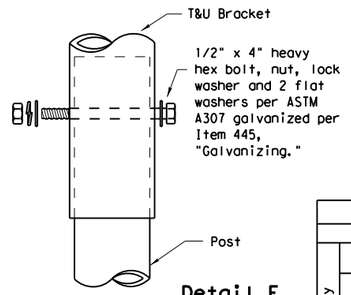


Detail F

Splices shall only be allowed behind the sign substrate.



Detail C



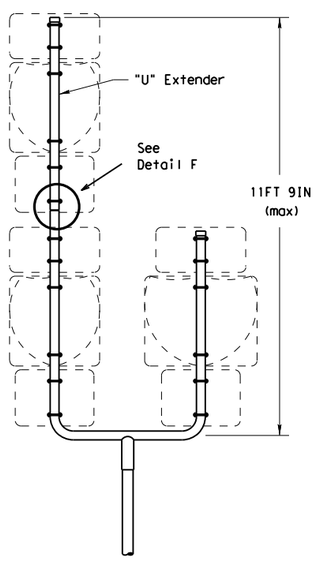
Detail E

GENERAL NOTES:

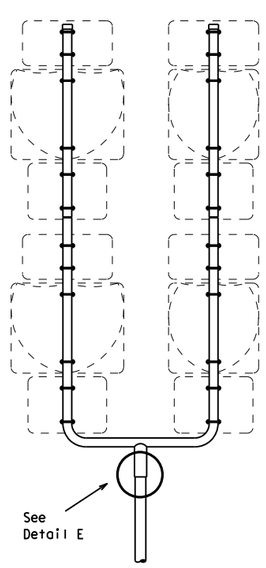
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

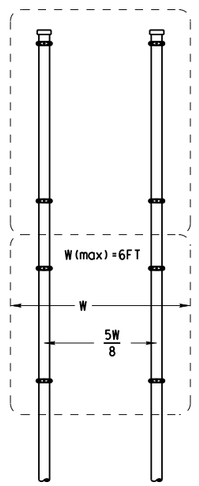
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



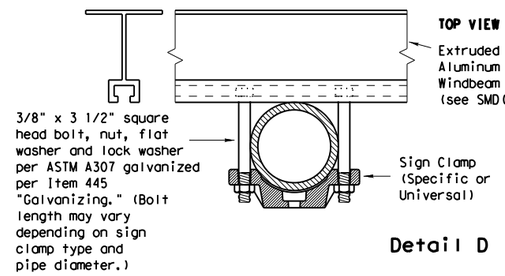
SM RD SGN ASSM TY S80(1)XX(U-1EXT)



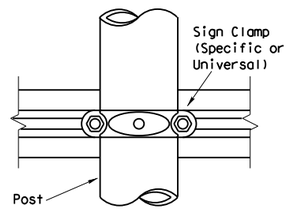
SM RD SGN ASSM TY S80(1)XX(U-2EXT)



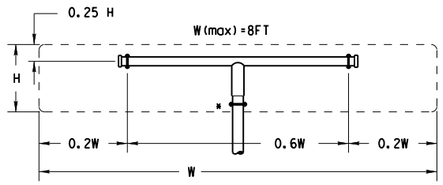
SM RD SGN ASSYM TY XXXXX(2)XX(P)



Detail D



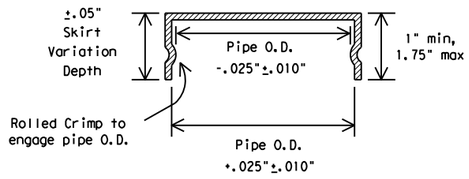
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

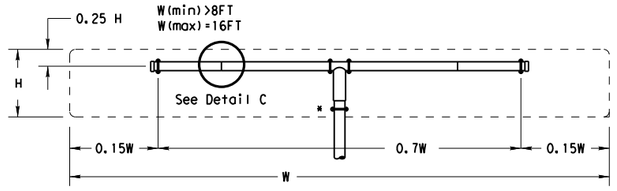
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

9-08 REVISIONS

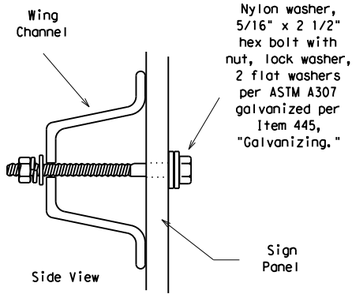
CONT	SECT	JOB	HIGHWAY
1975	02	013	FM 1895

DIST	COUNTY	SHEET NO.
DAL	KAUFMAN	223

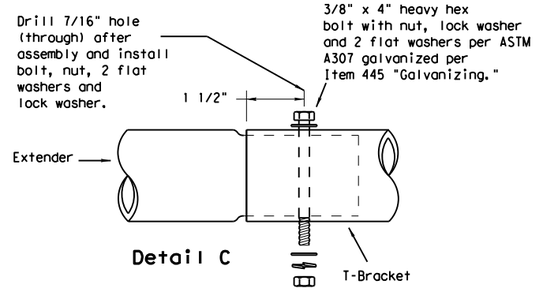
DATE: 7/29/2022 8:31:50 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\19750201X4 - Design\Plan Set\8. Traffic\STANDARDS\17. smds3.dgn



SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



Detail B



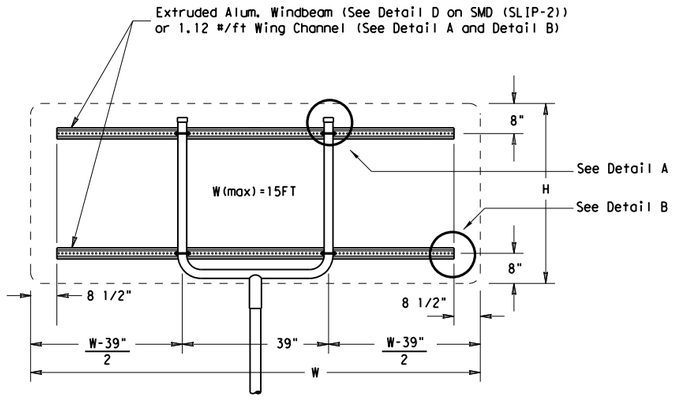
Detail C

Splices shall only be allowed behind the sign substrate.

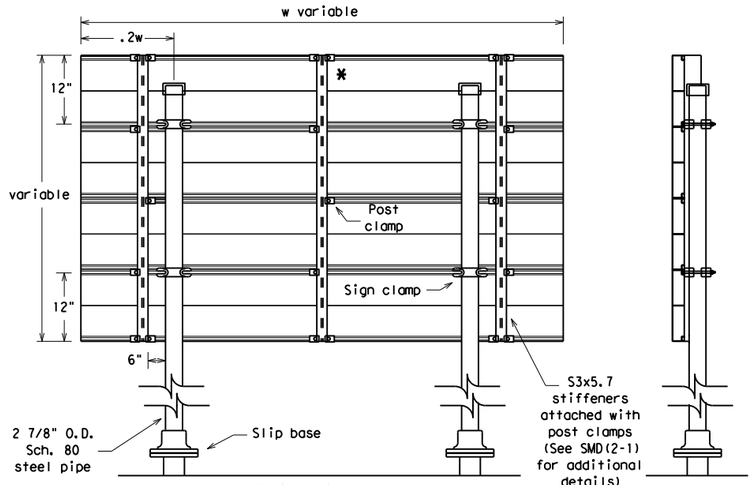
GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. See table above.
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.



SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

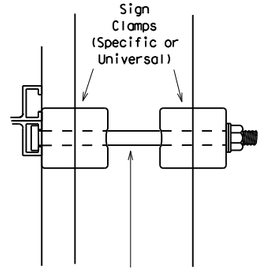


Typical Sign Mount

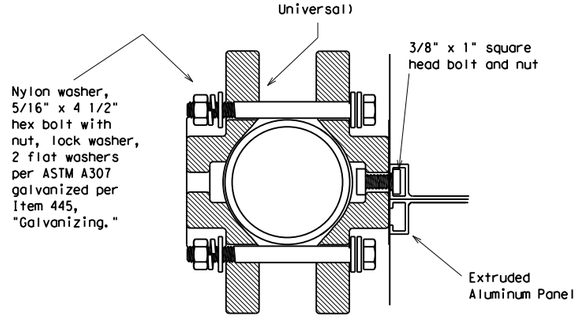
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

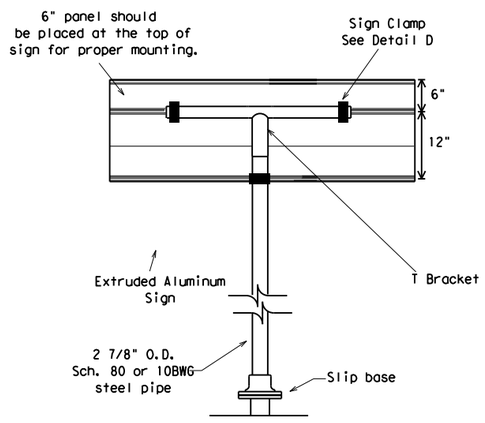
See Detail E
for clamp installation



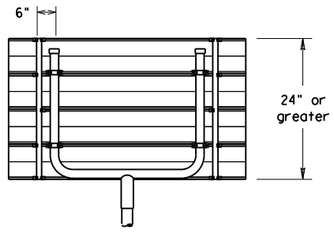
Detail E



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

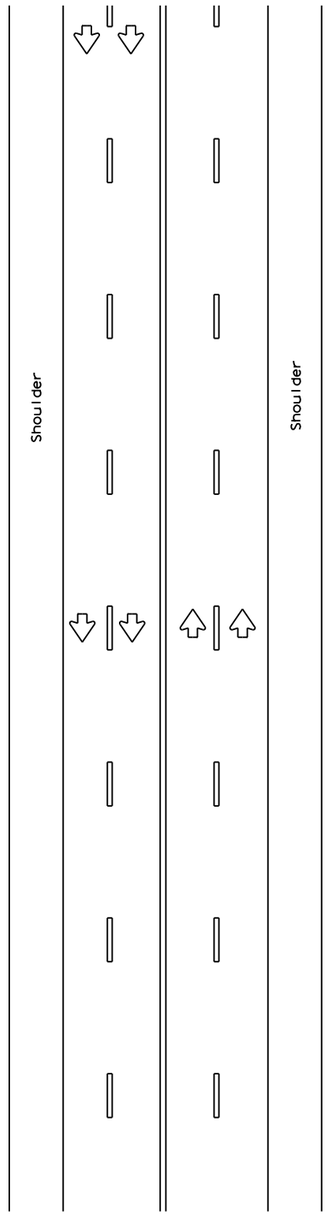
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

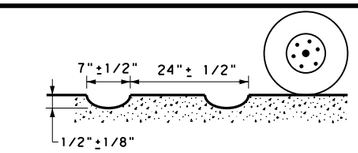
REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		224

DATE: 7/29/2022 8:47:48 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\RS(2)-13.dgn

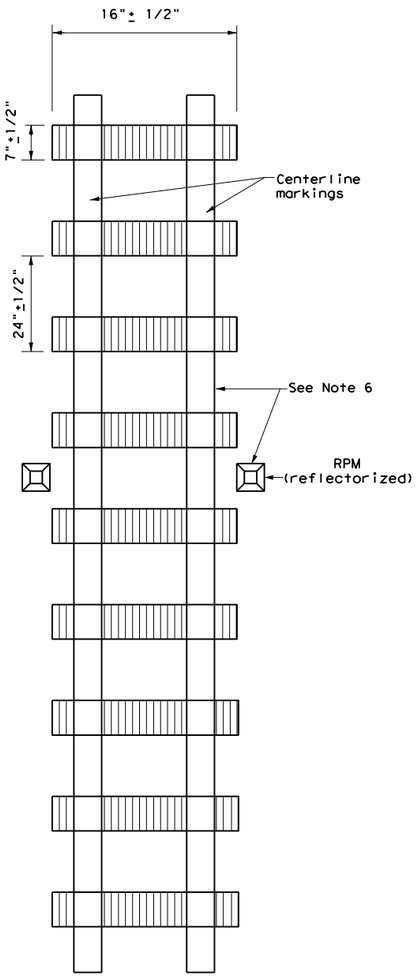
CENTERLINE RUMBLE STRIPS



MULTILANE UNDIVIDED HIGHWAY WITH SHOULDER

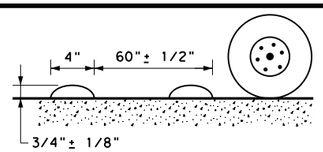


PROFILE VIEW

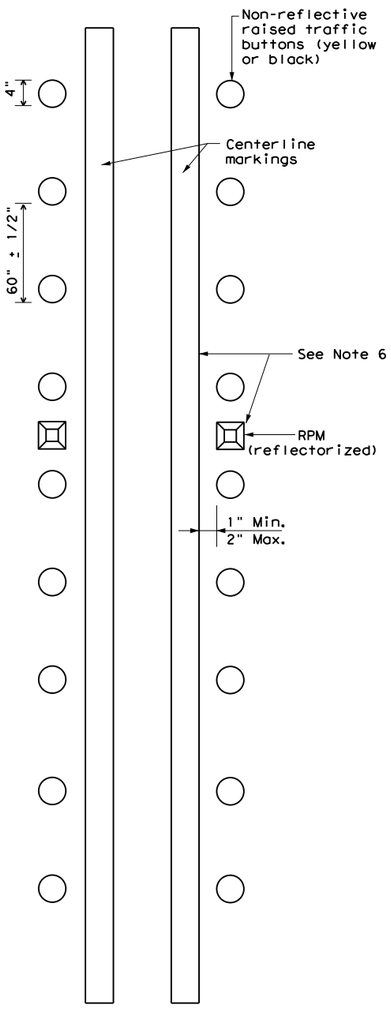


PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS

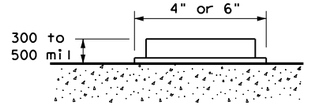


PROFILE VIEW

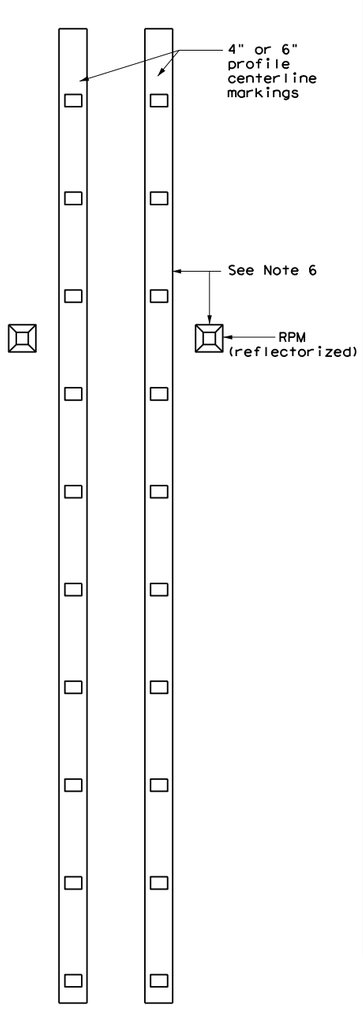


PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS



PROFILE VIEW



PLAN VIEW
OPTION 3

PROFILE CENTERLINE MARKINGS

GENERAL NOTES

1. This standard sheet provides guidelines for installing centerline rumble strips on multilane undivided highways.
2. Centerline and edgeline rumble strips or profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
3. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
4. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
5. Breaks in milled centerline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossing, intersections and driveways with high usage of large trucks.
6. Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings and profile markings.
7. Consideration should be given to noise levels when centerline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inch depth of milled rumble strip may be considered in these areas.
8. Pavement markings must be applied over milled centerline rumble strips for normal centerline spacing. For wider medians, specify in the plans the exact placement of the rumble strips. Place the rumble strips under each centerline marking or centered in the middle of the median.

WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

9. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per manufacturer's recommendations.
10. When using non-reflective raised traffic buttons as a centerline rumble strip, the button shall be placed adjacent to the pavement marking delineating the centerline. The color of the button should be yellow for a continuous no passing roadway. The button will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.

WHEN INSTALLING EDGELINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

11. See standard sheet RS(4).

Texas Department of Transportation®

Traffic Operations Division Standard

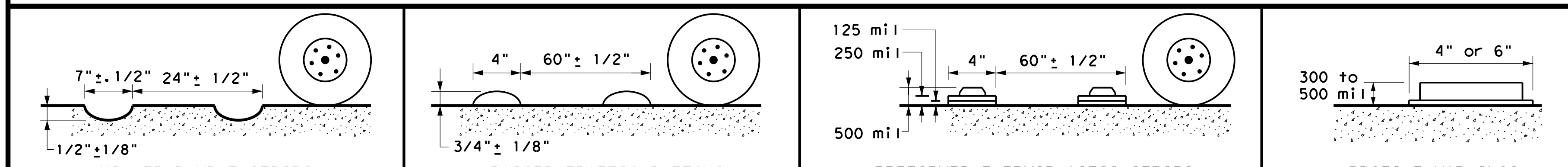
CENTERLINE RUMBLE STRIPS ON MULTILANE UNDIVIDED HIGHWAYS

RS(2)-13

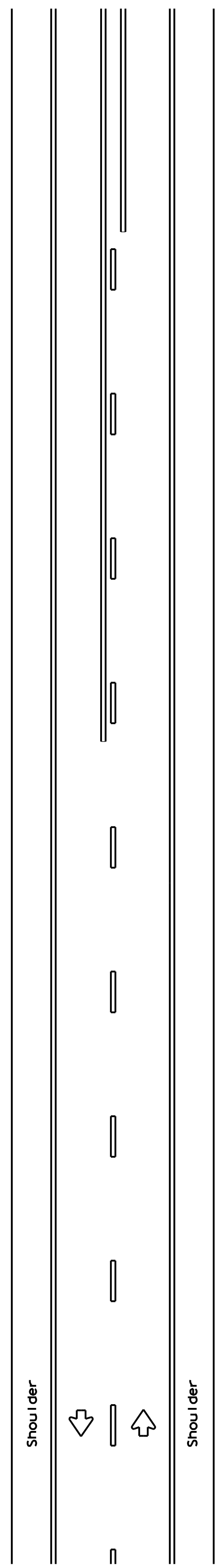
FILE: rs(2)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		225

DATE: 7/29/2022 8:50:01 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\19750201 3\...

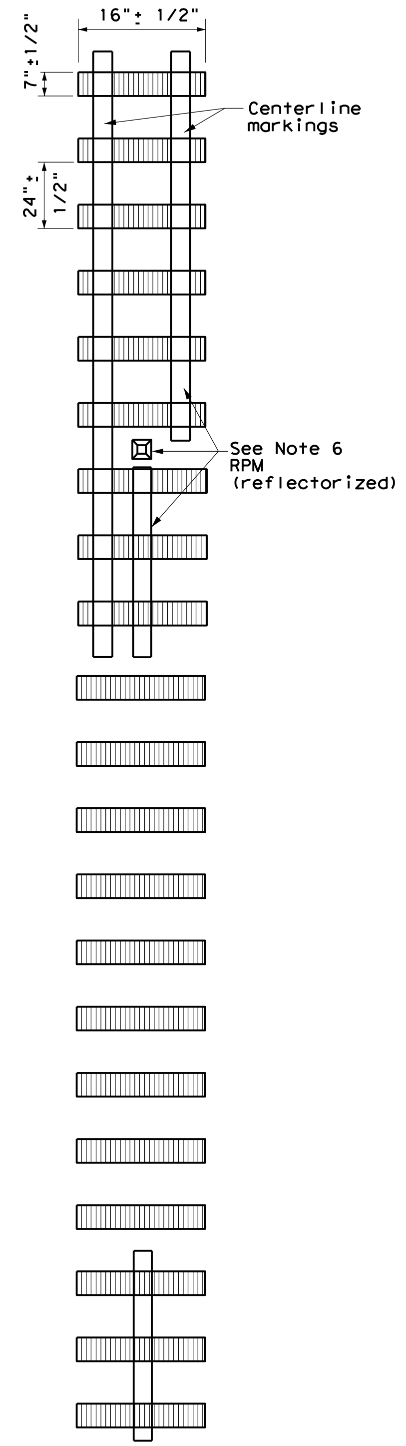
CENTERLINE RUMBLE STRIPS



PROFILE VIEW

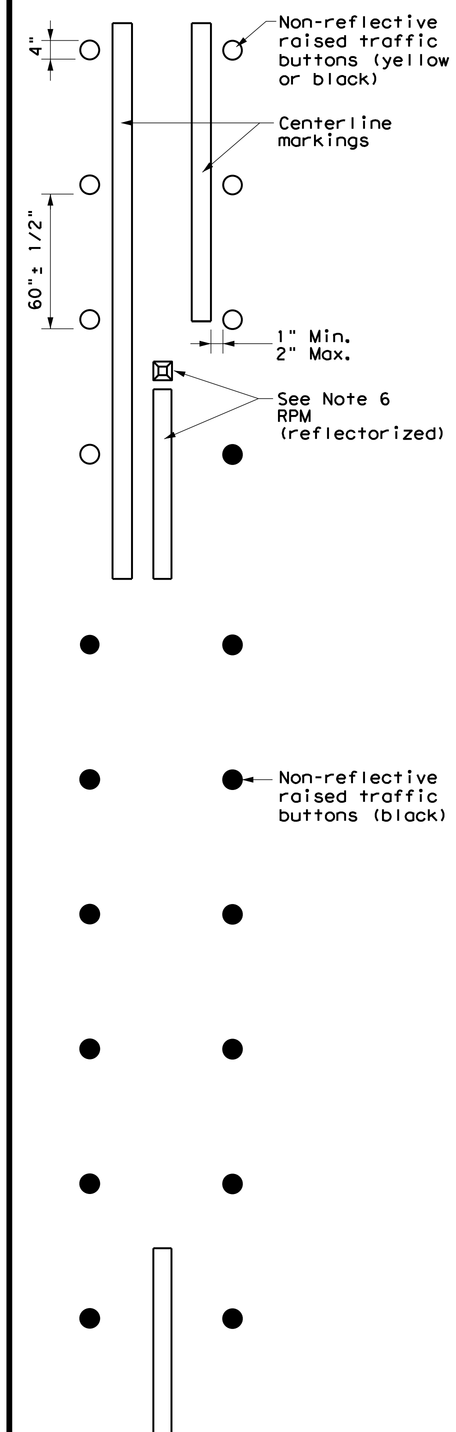


TWO LANE TWO-WAY ROADWAYS



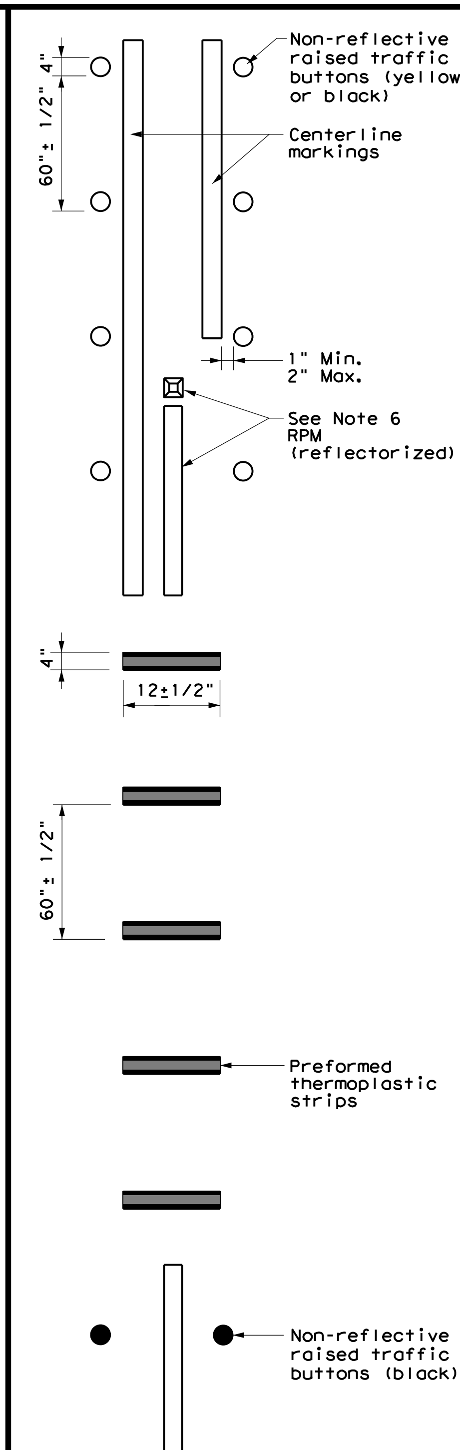
PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS



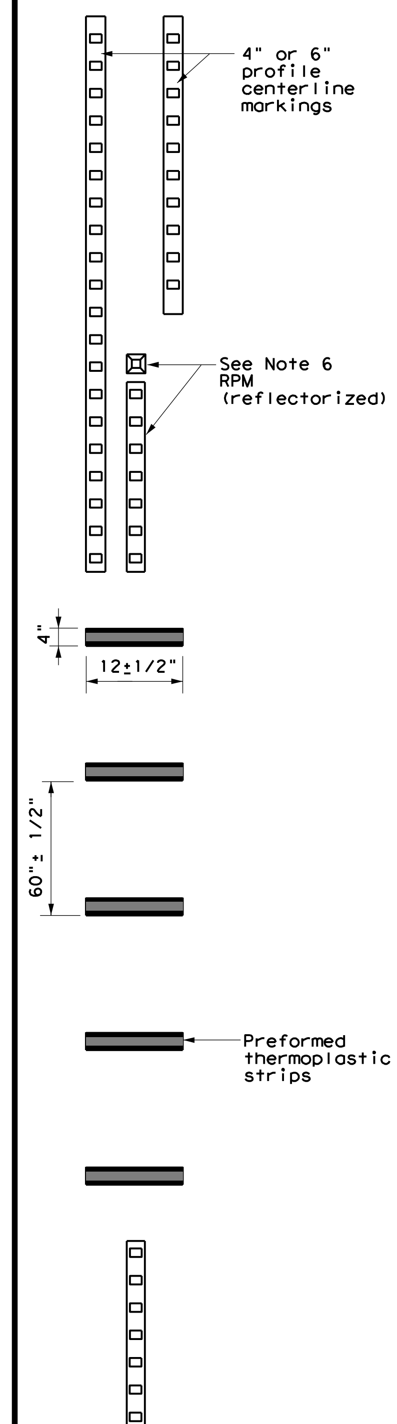
PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS



PLAN VIEW
OPTION 3

RAISED CENTERLINE RUMBLE STRIPS AND PREFORMED THERMOPLASTIC STRIPS



PLAN VIEW
OPTION 4

PROFILE CENTERLINE MARKINGS AND PREFORMED THERMOPLASTIC STRIPS

GENERAL NOTES

1. This standard sheet provides guidelines for installing centerline rumble strips on two-lane highways with or without shoulders.
2. Centerline and edgeline rumble strips or profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
3. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
4. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
5. Breaks in milled centerline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections and driveways with high usage of large trucks.
6. Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, and dimensions pavement markings and profile markings.
7. Consideration should be given to noise levels when centerline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inch depth of milled rumble strip may be considered in these areas.
8. Pavement markings must be applied over milled centerline rumble strips.

WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

9. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per manufacturer's recommendations.
10. When using non-reflective raised traffic buttons as a centerline rumble strip, the button shall be placed adjacent to the pavement marking delineating the centerline. The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
11. The color of the button should be yellow for a continuous no passing roadway. Black buttons should be used in areas where passing is allowed.

WHEN INSTALLING EDGELINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

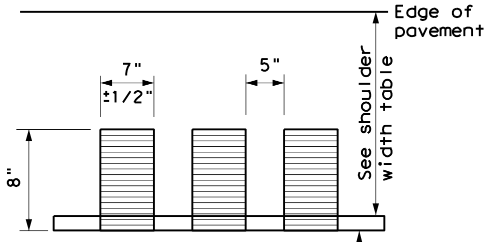
12. See standard sheet RS(4).

Texas Department of Transportation
Traffic Operations Division Standard

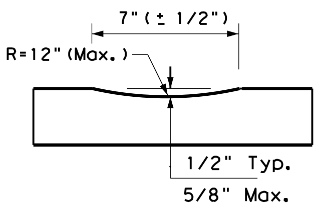
CENTERLINE RUMBLE STRIPS ON TWO LANE TWO-WAY HIGHWAYS

RS(3)-13

FILE: rs(3)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST		COUNTY	SHEET NO.
	DAL		KAUFMAN	226



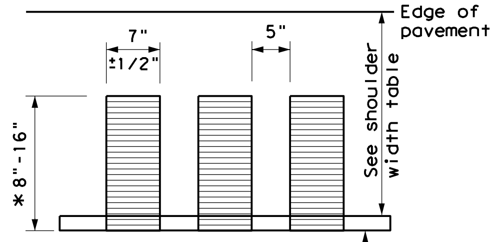
PLAN VIEW



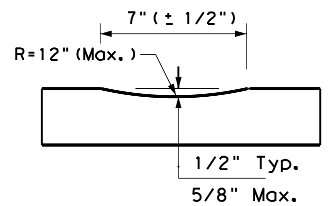
PROFILE VIEW

OPTION 1

CONTINUOUS MILLED DEPRESSIONS (Rumble Stripes)



PLAN VIEW

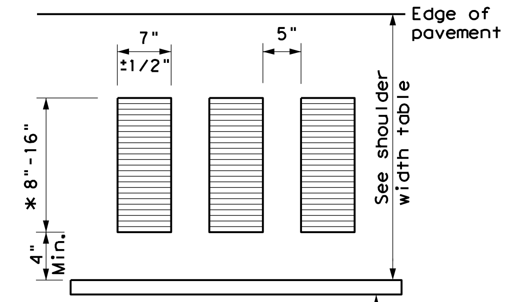


* This distance may vary based on width of shoulder

PROFILE VIEW

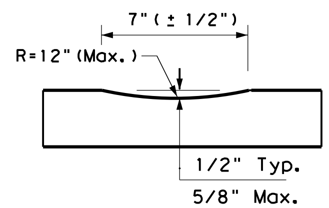
OPTION 2

CONTINUOUS MILLED DEPRESSIONS (Rumble Stripes)



PLAN VIEW

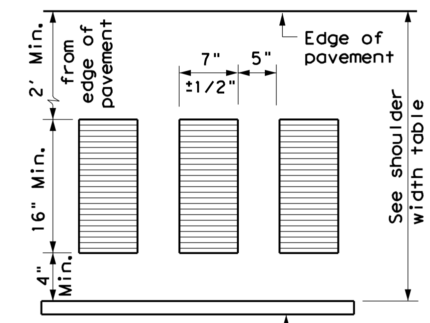
* This distance may vary based on width of shoulder



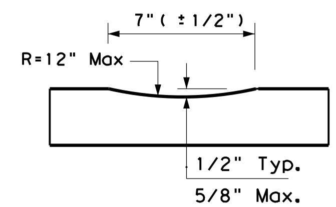
PROFILE VIEW

OPTION 3

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



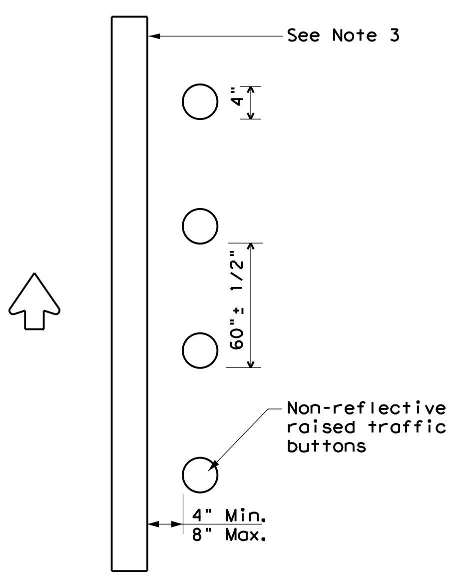
PLAN VIEW



PROFILE VIEW

OPTION 4

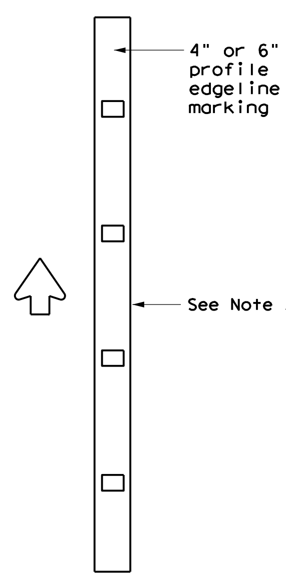
CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



PLAN VIEW

OPTION 5

RAISED EDGELINE RUMBLE STRIPS



PLAN VIEW

OPTION 6

PROFILE EDGELINE MARKINGS

SHOULDER WIDTH TABLE		
EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5 OR 6	Option 1, 2, 3 5 OR 6	Option 2, 4, 5 OR 6

GENERAL NOTES

1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the table below for determining what options may be used for edgeline rumble strips.

WHEN INSTALLING MILLED DEPRESSION EDGELINE RUMBLE STRIPS:

5. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
6. Pavement markings can be applied over milled shoulder rumble strips to create an edgeline rumble stripe.
7. Breaks in edgeline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections and driveways with high usage of large trucks when installed on conventional highways.
8. Rumble strips shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
9. Consideration should be given to noise levels when edgeline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inches depth of milled rumble strip may be considered in these areas.
10. On roadways with high bicycle activity, consideration should be given before the installation of edgeline rumble strips. Things to consider include size of rumble strips, rumble strip material and location of rumble strips on the shoulder. If the designer determines that gaps are needed in the rumble strips due to bicycle use of the road, then follow the requirement shown in FHWA Technical Advisory T5040.39, or latest version. A detail of the spacing shall be included in the plans.

WHEN INSTALLING RAISED OR PROFILE EDGELINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edgeline when used as a rumble strip. The color of the button should match the color of the adjacent edgeline marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. Breaks in edgeline rumble strips using raised traffic buttons shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossing, intersections and driveways with high usage of large trucks when installed on conventional highways.
15. The minimum distance between the edgeline and the buttons should be used if the shoulder is less than 8 feet in width.
16. Raised profile thermoplastic markings used as edgelines may substitute for buttons.

Texas Department of Transportation — Traffic Operations Division Standard

EDGELINE RUMBLE STRIPS ON UNDIVIDED OR TWO LANE HIGHWAYS RS(4)-13

FILE: rs(4)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2013	CONT 1975	SECT 02	JOB 013	HIGHWAY FM 1895
REVISIONS	DIST DAL		COUNTY KAUFMAN	SHEET NO. 227

A. GENERAL SITE DATA

1. PROJECT LIMITS: *FM 1895 FROM BUS US175 IN KEMP TO FM 1836*

Begin Project Coordinates : Latitude (N): 32.5421938 Longitude (W): - 96.2104342

END Project Coordinates : Latitude (N): 32.4430287 Longitude (W): - 96.2296960

2. PROJECT SITE MAPS:

- *Project Location Map: The Title Sheet and Project Layout (Sheet 3)*
- *Drainage Patterns: Drainage Area Maps (Sheets 113, 169, & 170)*
- *Slopes Anticipated After Major Gradings or Areas of Soil Disturbance: Typical Sections (Sheets 4-7)*
- *Location of Erosion and Sediment Controls: SWPPP Layout (Sheets 230-248)*
- *Surface Waters and Discharge Locations: Drainage and Culvert Layouts & Brdige Layouts (Sheets 115-126) & (Sheets 183 & 185)*
- *Project Specific Location(s) (PSL): To be determined by the project Construction Personnel. Location(s) shown on SW3P Site Map (If PSL location(s) is within one mile of project) and information located in project SW3P Binder (Reference item #10 below).*

3. PROJECT DESCRIPTION:

RESTORE EXISTING PAVEMENT AND ADD SHOULDERS

4. MAJOR SOIL DISTURBING ACTIVITIES:

PAVEMENT & SHOULDER WIDENING, CULVERT EXTENSION. VEGETATION CLEARING, EXCAVATION, BACKFILL AND/OR GRADING TOPSOIL PLACEMENT AND SEEDING.

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:

SOIL IS WELL DRAINED. GENTLY SLOPING TO MODERATELY STEEP. CLAYEY AND LOAMY SOILS THAT HAVE MODERATE AND VERY SLOW PERMABILITY. THE GENERAL AREA AROUND THE PROJECT HAS VEGETATION COVER OF MAINTAINED ROW GRASSES AT AN APPROXIMATE DENSITY OF 100%.

6. TOTAL PROJECT AREA: *93.72* Acres

7. TOTAL AREA TO BE DISTURBED: *55.86* Acres (*60 %*)

8. WEIGHTED RUNOFF COEFFICIENT

BEFORE CONSTRUCTION: *0.85*
AFTER CONSTRUCTION: *0.85*

9. NAME OF RECEIVING WATERS:

PROJECT AREA DRAINS TO MULTIPLE PONDS, WALNUT CREEK AND ITS TRIBUTARIES, AND NUMEROUS TRIBUTARIES TO LITTLE COTTONWOOD CREEK, KINGS CREEK (SEGMENT 0818C) AND CEDAR CREEK (SEGMENT 0818B). SEGMENTS 0818B AND 0818C ARE IMPAIRED BY BACTERIA IN WATER (RECREATION USE).

10. PROJECT SW3P Binder:

A. For projects disturbing one to five acres, TxDOT will maintain a SW3P Binder at the project field office (If there is not a project field office, should be kept at the Area Office) which contains the following: Index Sheet, TCEQ Signature Authority, TxDOT's and Contractor's Small Construction Site Notice, SW3P Inspector Qualification Statements, EPIC Sheet, SW3P Sheet, Site Location Maps, Inspection and Maintenance Reports (Form 2118), Construction Stage Gate Checklists(s) (CSGC), Stored Material Lists specifying associated control measures and the Appendix which contains the TPDES Construction General Permit, TxDOT and Contractor MS4 Operator Notification(s) and the Construction PSL Permits per all applicable requirements.

B. For projects disturbing 5 acres or more, TxDOT will follow the actions listed in (10.A.) above with the addition of the following: TxDOT and Contractor Notice Of Intent (N.O.I.) and Fee Payment Form, TxDOT and Contractor Large Construction Site Notice (to be used instead of Small Site Notice), and TPDES Permit Coverage Notice.

C. For projects disturbing less than one acre, actions described in (10.A.) and (10.B.) above are not required. Acreage is calculated by adding Total Area To Be Disturbed Acres on project (See #7 above) and the PSL(s) acreage located within one mile of project.

B. EROSION AND SEDIMENT CONTROLS

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

- T TEMPORARY SEEDING
- ___ MULCHING (Hay or Straw)
- ___ BUFFER ZONES
- ___ PLANTING
- P SEEDING
- ___ SODDING
- P PRESERVATION OF NATURAL RESOURCES
- ___ FLEXIBLE CHANNEL LINER
- ___ RIGID CHANNEL LINER
- ___ SOIL RETENTION BLANKET
- P COMPOST MANUFACTURED TOPSOIL
- T VERTICAL TRACKING
- ___ OTHER: *(Specify Practice)*

2. STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

- T SILT FENCES
- T EROSION CONTROL LOGS
- ___ EROSION CONTROL COMPOST BERMS (Low Velocity)
- T ROCK FILTER DAMS
- ___ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- ___ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- ___ DIVERSION DIKE AND SWALE COMBINATIONS
- ___ PIPE SLOPE DRAINS
- ___ PAVED FLUMES
- T ROCK BEDDING AT CONSTRUCTION EXIT
- ___ TIMBER MATTING AT CONSTRUCTION EXIT
- ___ CHANNEL LINERS
- ___ SEDIMENT TRAPS
- ___ SEDIMENT BASINS
- ___ STORM INLET SEDIMENT TRAP
- ___ STONE OUTLET STRUCTURES
- ___ CURBS AND GUTTERS
- ___ STORM SEWERS
- ___ VELOCITY CONTROL DEVICES
- ___ OTHER: *(Specify Practice)*

NOTE: TOP OF BMP'S SHOULD NOT BE HIGHER THAN ROADWAY ELEVATION AS NOT TO FLOOD ROADWAY UNLESS PRIOR APPROVAL FROM ENGINEER IS OBTAINED.

3. STORM WATER MANAGEMENT:

A. Storm water drainage will be provided by ditches, inlets, and storm water systems which carry drainage within the R.O.W. to the lows within the roadway and project site which drains to natural facilities.

B. Other permanent erosion controls include hydraulic design to limit structure outlet velocities and grading design generally consisting of 4 :1 or flatter slopes with permanent vegetative cover.

C. Sedimentation basins are not feasible on this project due to limited room within TXDOR ROW. Alternate BMP's have been included in the SW3P to provide equivalent sedimentation control.

4. STORM WATER MANAGEMENT ACTIVITIES:

1. *See Construction Progress Schedule for Schedule and Duration of Relevant Soil Disturbance and Stabilization Activities.*
2. *To the extent practicable. Preserve existing vegetation, maintain a vegetative buffer along recieving waters and phase construction activites to minimize exposure of disturbed soils.*
3. *Avoid storing portable sanitary units, concrete washout or chemicals within 50 feet upgradient of a recieving water or drainage conveyance without adequate pollution control.*
4. *The contractor will place barricades and signs and place Sw3p measures where contractor will start working, Install SW3p control devices (BMPs) to protect recieving waters, downslope perimeters, and active roadways prior to soil disturbance and construction activity in their vicinity, per Sw3p site map, as needed and as directed or authorized by the engineer. Do not install BMP's more than two weeks prior to the activitie in thier control area.*
5. *The Contractor will extend the culvert with proper SW3P measures presence.*
6. *Start Widening as shown in plans, one side at a time.*
7. *Place Embankement, Backfill and signs, and regrade ditches, rework, place new flexbase , surface treatment, asphalt and pavement markings*
8. *Place top soil, drill seeding and watering as per standards and as directed by the engineer. [Where work has temporarirly ceased in a disturbed area (I.E. will exceed 14 days before next soil disturbance activity or initiation of final stabilization measures, temporarily stabilize soils per TXR1500000, with vertical tracking, temporay seeding and/or other soil cover, and velocity and downslope perimeter controls, as appropriate and/or as directed by the engineer.] Re-vegetate disturbed soils in completed project areas as soon as practicable or directed by the engineer.*
9. *Final project site clean-up as directed by the engineer. When construction activity is complete, project area is stabilized, and as directed or authorized by the engineer, remove all temporary SW3p controls.*

5. NON-STORM WATER DISCHARGES:

Filter non-storm water discharges, or hold in retention basins, before being allowed to mix with storm water. These discharges consist of, but not limited to, non-polluted ground water, spring water, foundation or footing drain water, water used for dust control or pavement washing and vehicle washwater containing no detergents.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:

Maintain all erosion and sediment controls in good working order. Perform any necessary cleaning/repairs/replacements at the earliest possible date prior to next rain event, but no later than 7 calendar days. Ensure the surrounding ground has dried sufficiently to prevent damage from equipment. "Too Wet" is the only reason for not adhering to timeframes described. When construction activities permanently or temporarily cease and are not expected to resume for 14 or more days on a disturbed portion of the site, stabilization measures must be initiated immediately.

2. INSPECTION:

A TxDOT Inspector will perform a regularly scheduled SW3P Inspection every 7 calendar days. An Inspection and Maintenance Report, signed by the TxDOT Inspector and the Contractor, will be filed for each Inspection. Revise/clean/repair/replace each BMP control device in accordance with the current Field Inspection and Maintenance Report (Form 2118) and Item 1 (Maintenance) above.

3. WASTE MATERIALS:

On a daily basis, or as may be directed, collect all waste materials, trash and debris from the construction site and deposit into a metal dumpster having a secure cover and which meets all state and local city solid waste management requirements. Empty the dumpster as required by regulation, or as may be directed, at a local approved landfill site. Do not bury construction waste on the construction project site.

4. HAZARDOUS WASTE & SPILL REPORTING:

As a minimum, any products in the following categories are considered to be hazardous: Paints, Acids, Solvents, Fuels, Asphalt Products, Chemical Additives for Soil Stabilization, and Concrete Curing Compounds or Additives. When storing hazardous material on the project site, or at a Project Specific Location, take all practicable precaution to prevent and/or contain any spillage of these materials. In the event of a spill, contact the spill coordinator immediately.

5. SANITARY WASTE:

Use a licensed sanitary waste management contractor to collect all sanitary waste from portable units as may be required by local regulation, or as directed.

6. CONSTRUCTION VEHICLE TRACKING:

On a regular basis, or as may be directed, dampen haul roads for dust control and construct construction entrances/exits. Provide for a motorized broom or vacuum type sweeper to be available on a daily basis, or as may be directed, to remove sediment from paved roadways on project, abutting and traversing the project site.

7. MANAGEMENT PRACTICES:

A. Construct disposal areas, stockpiles, haul roads and PSL's in a manner that will minimize and control the amount of sediment that may enter receiving waters. Do not locate disposal areas in any wetland, waterbody or streambed.

B. Locate construction staging areas, vehicle maintenance and PSL's areas in a manner to minimize the runoff of pollutants.

C. When working in or near a wetland, install and maintain operating soil erosion and sediment controls at all times during construction and isolate the work from the wetland.

D. Clear all waterways as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.

E. Procedures and/or practices should be taken to control dust.

F. Sediment to be removed from roadways daily or when work begins after weather events if construction activities have ceased due to weather event.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

727/2022
Falon Renfroe, P.E.
Signature of Registrant & Date

Texas Department of Transportation

DALLAS DISTRICT ENVIRONMENTAL

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

TEMPLATE REVISION DATE: 02/07/18

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
QA	6	SEE TITLE SHEET		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
QA	TEXAS	DALLAS	KAUFMAN	
CHECK	CONTROL	SECTION	JOB	228
JR	1975	02	013	
CHECK				
JR				

FILE NAME
DATE
DESIGNER

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

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

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List adjacent MS 4 Operator(s) that receive discharges from this project. They need to be notified prior to construction activities.
(Note: Leave blank only if no adjacent MS 4 Operator(s) are affected.)

1. County of Kaufman Phase II MS 4 Contact - Kathy Morris
2.

☐ No Action Required ☒ Required Action

Action Number:

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

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas. No equipment is allowed in any sream channel below the ordinary High Water Mark except on approved temporary stream crossings or drill pads.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☐ No Permit Required

☒ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# 3(a)

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

1. Crossing 1 Unnamed Trib. to Walnut Creek Sta. 38+50 Stream Impacts
2. Crossing 2 Unnamed Trib. to Walnut Creek Sta. 64+80 Stream Impacts
3. Crossing 3 Unnamed Trib. to Cedar Creek Sta. 127+82 Stream Impacts
4. Crossing 4 Unnamed Trib. to Cedar Creek Sta. 194+97 Stream Impacts
5. Crossing 5 Unnamed Trib. to Cedar Creek Sta. 203+05 Stream Impacts
6. Crossing 6 Unnamed Trib. to Cedar Creek Sta. 284+59 Stream Impacts
7. Crossing 7 Unnamed Trib. to Cedar Creek Sta. 300+52 Stream Impacts
8. Crossing 8 Unnamed Trib. to Kings Creek Sta. 350+50 Stream Impacts

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

Best Management Practices for applicable 401 General Conditions:
(Note: If CORP Permit not required, do not check boxes.)

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

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action Number:

1.
2.
3.

IV. VEGETATION RESOURCES

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

☒ No Action Required ☐ Required Action

Action Number:

1.
2.
3.

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

☐ No Action Required ☒ Required Action

Action Number:

1. The following species could occur in the project area: Woodhouse's toad, Strecker's chorus frog, southern crawfish frog, long tailed weasel, eastern spotted skunk, western box turtle, and slender glass lizard. Follow the Special Notes on the EPIC sheet and the BMPs listed below to protect the species.

2. Contractor to implement the following BMPs from "Beneficial Management Practices: Avoiding, Minimizing, and Mitigating Impacts of Transportation Projects on State Natural Resources" available at https://ftp.txdot.gov/pub/txdot-info/env/toolkit/300-01-bmp.pdf.
   a. Minimize impacts to wetland habitats including isolated ephemeral pools.
   b. Section 2.6.1 Aquatic Amphibian and Reptile BMP (barrier fencing not required)
   c. Section 2.6.2 Terrestrial Amphibian and Reptile BMP
   d. Section 1.4 Water Quality BMP
   e. Section 1.2 Vegetation BMP

Special Notes:

1. Avoid harming all wildlife species if encountered and allow them to safely leave the project site. Due diligence should be used to avoid killing or harming any wildlife species in the implementation of transportation projects.
2. 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 immediated area, and contact the Engineer immediately.
3. The Migratory Bird 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 within the Act's policies and regulations. The contractor would remove all old migratory bird nests from any structure or trees where work would be done from October 1 to February 15. In addition, the contractor would be prepared to prevent migratory birds from building nest(s) between February 15 to October 1. In the event that migratory birds are encountered on-site during project construction, efforts to avoid adverse impacts on protected birds, active nests, eggs and/or young would be observed.

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):
Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Safety Data Sheets (SDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act. Maintain an adequate supply of on-site spill response materials, as indicated in the SDS. In the event of a spill, take actions to mitigate the spill as indicated in the SDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canisters, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

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

☒ Yes ☐ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☒ No

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

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

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

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

☒ No Action Required ☐ Required Action

Action Number:

1.
2.
3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action Number:

1.

GENERAL NOTE:

Any change orders and/or deviations from the final design must be reported to the Engineer prior to commencement of construction activities, as additional environmental clearance may be required.

LAST REVISION: 1/15/15

 Texas Department of Transportation
Dallas District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 1895
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	Kaufman	
CONTROL	SECTION	JOB	SHEET NO.
1975	02	013	229

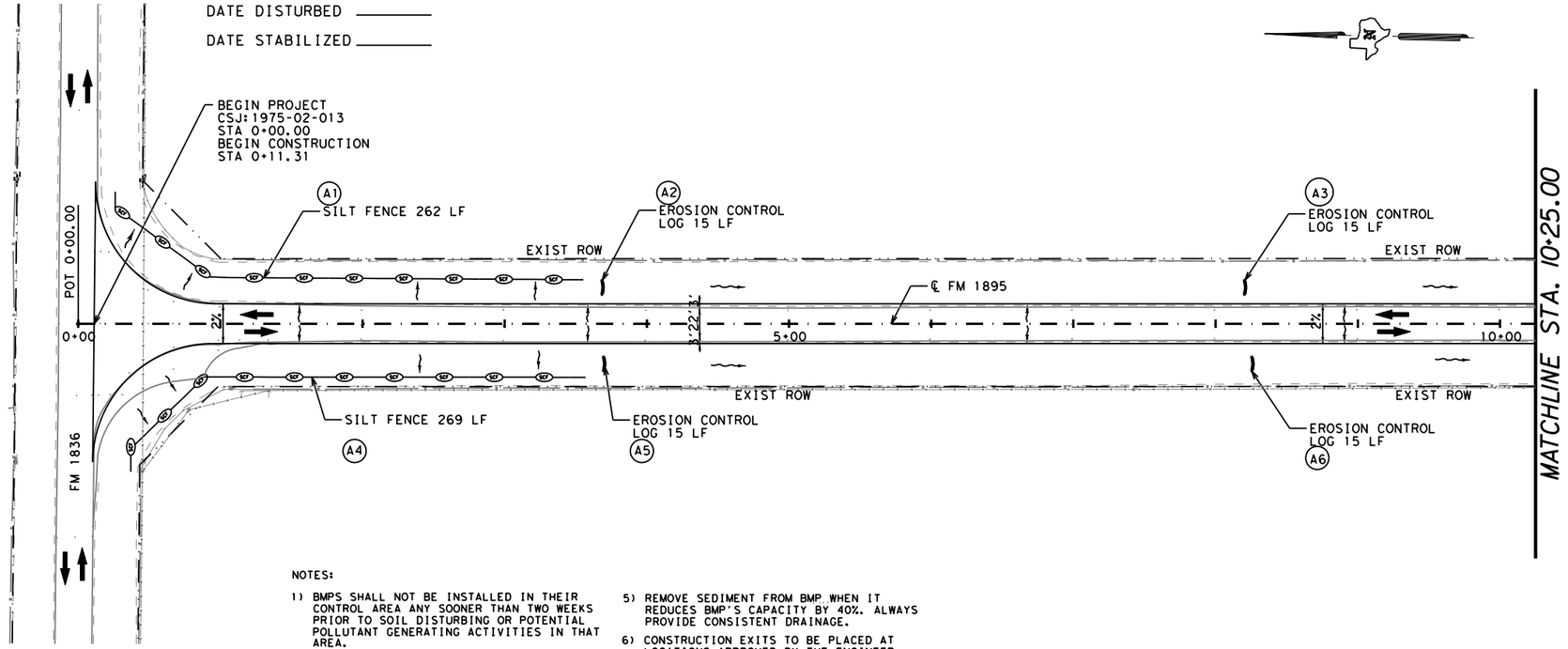
Notes To Designer:
1. *Do not alter Sheet Design or Font style, size or weight - match text attributes.*
2. *If additional space is needed for a numbered section, fence and adjust sections up or down as needed for proportioning and readability but do not relocate from its relative position.*
3. *All areas should be addressed thoroughly and verify the necessary pay items are set up to support actions needed.*

Filled Out: XX/XX/XXXX
Prepared by: Name/Section

DISTURBED AREA [A]

DATE DISTURBED _____

DATE STABILIZED _____



SCALE (FEET)

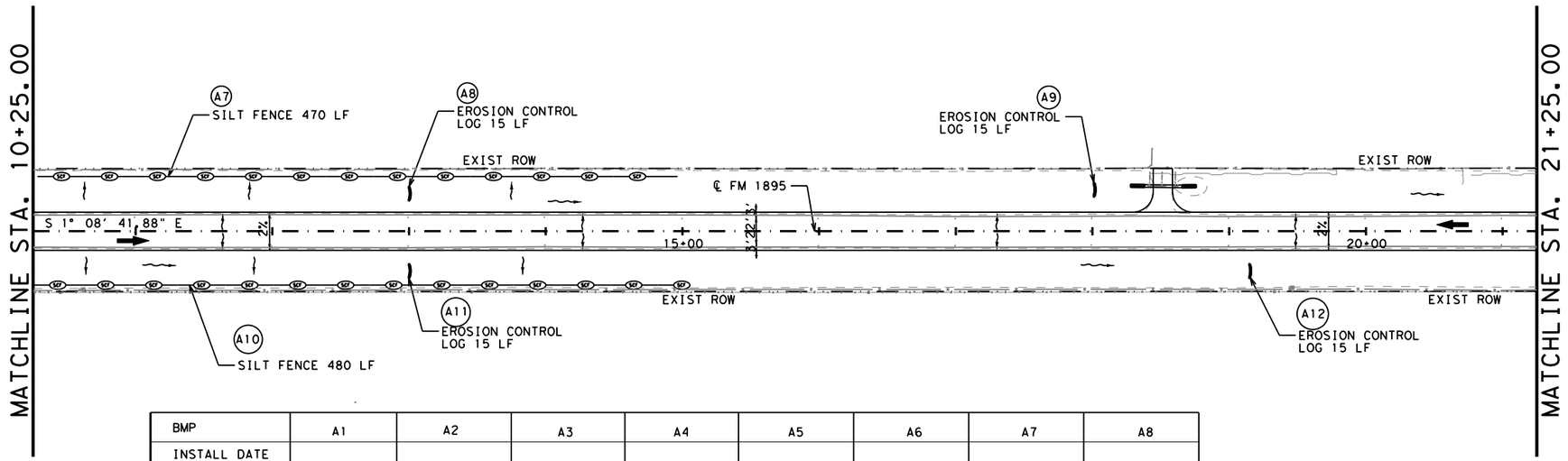
0 25 50 100

LEGEND

- SILT FENCE — SCF
- EROSION CONTROL LOGS
- ROCK FILTER DAM
- DRAINAGE FLOW
- CONSTRUCTION EXIT TY I
- BMP NO. (X)

NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.



BMP	A1	A2	A3	A4	A5	A6	A7	A8
INSTALL DATE								
REMOVE DATE								

BMP	A9	A10	A11	A12
INSTALL DATE				
REMOVE DATE				

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/27/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 1 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	230
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

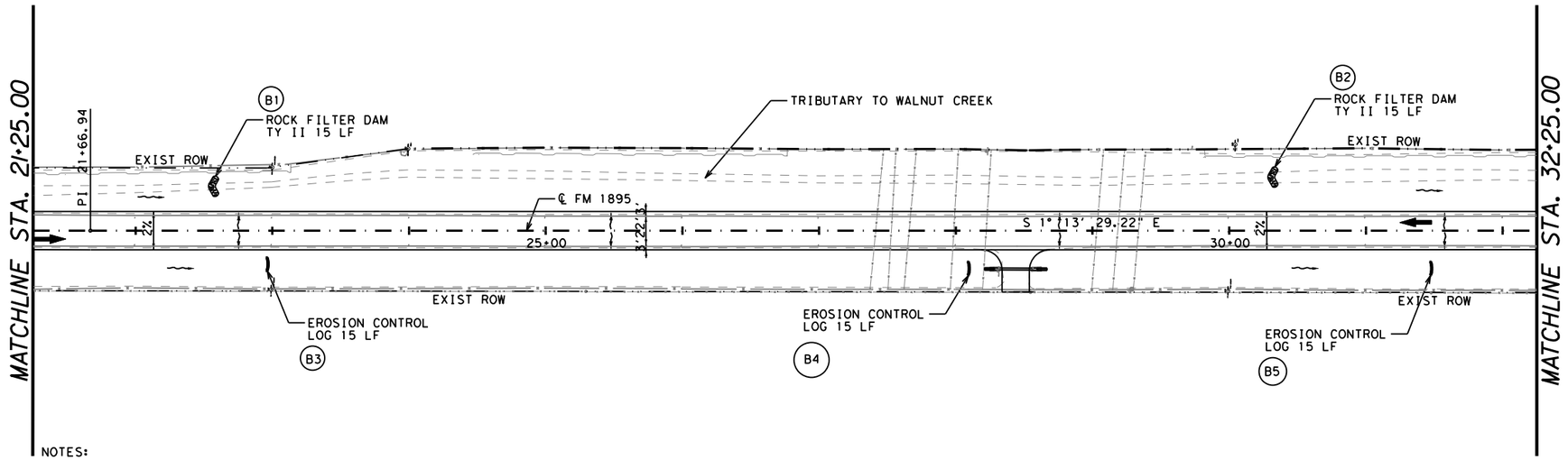
DATE: 7/27/2022 7:15:34 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\01 SWPPP.dgn

DISTURBED AREA [B]

DATE DISTURBED _____

DATE STABILIZED _____

BMP	B21
INSTALL DATE	
REMOVE DATE	



SCALE (FEET)

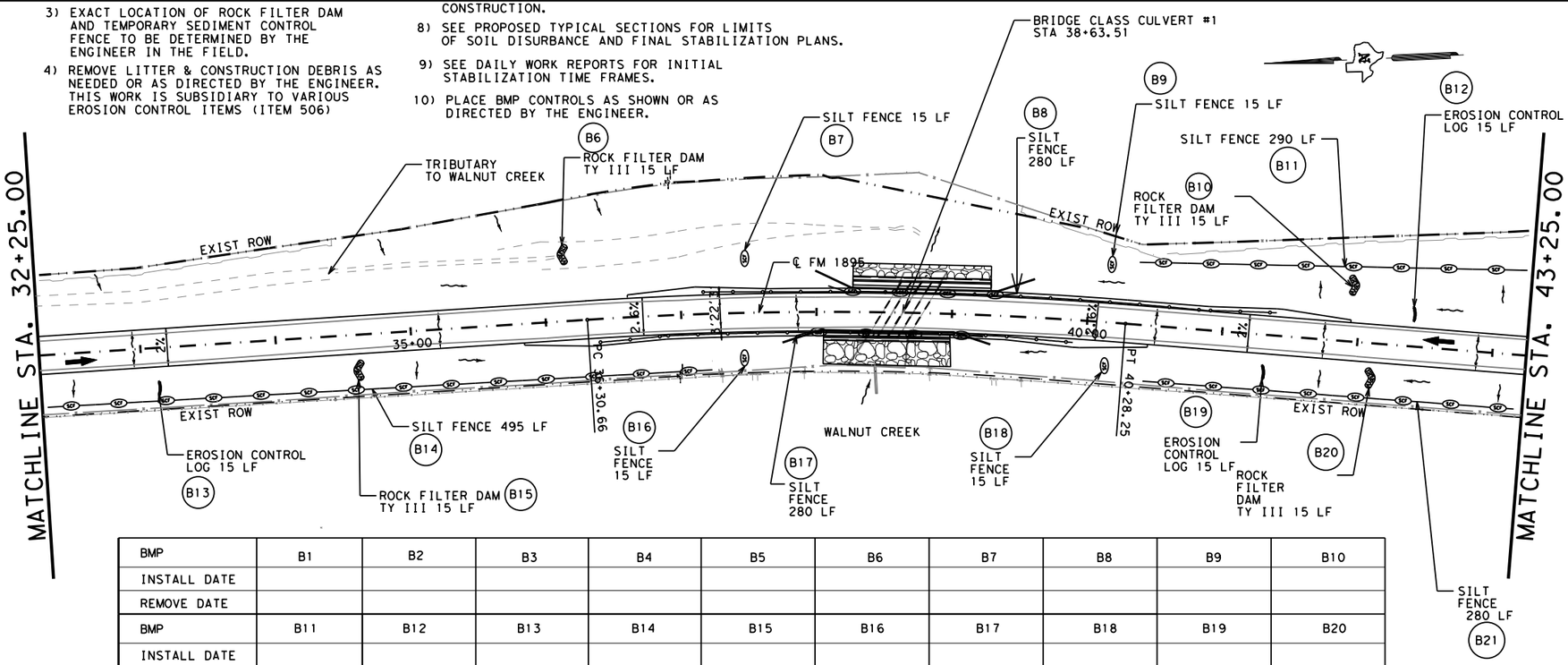
0 25 50 100

LEGEND

- SILT FENCE — SCF
- EROSION CONTROL LOGS
- ROCK FILTER DAM
- DRAINAGE FLOW
- CONSTRUCTION EXIT TY I
- BMP NO. (X)

NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.



BMP	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
INSTALL DATE										
REMOVE DATE										
BMP	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20
INSTALL DATE										
REMOVE DATE										

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/27/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 2 OF 19

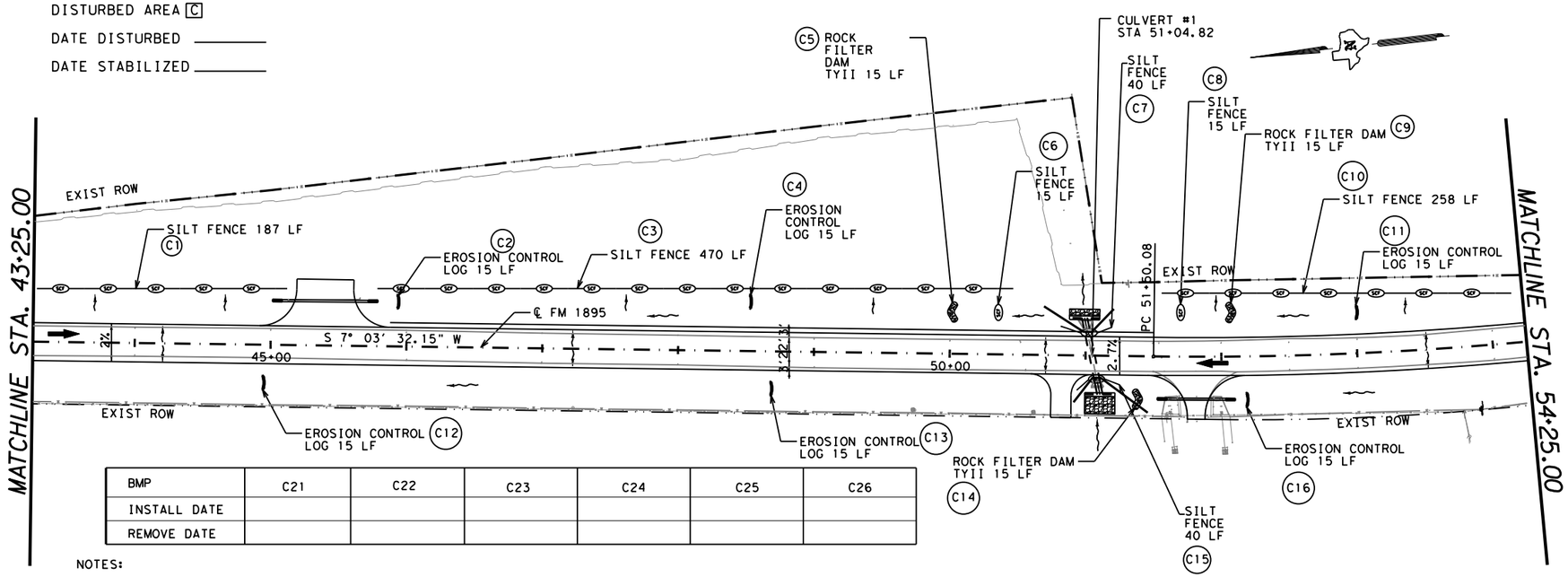
DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	231
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 7:18:16 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\02 SWPPP.dgn

DISTURBED AREA [C]

DATE DISTURBED _____

DATE STABILIZED _____



BMP	C21	C22	C23	C24	C25	C26
INSTALL DATE						
REMOVE DATE						

SCALE (FEET)

0 25 50 100

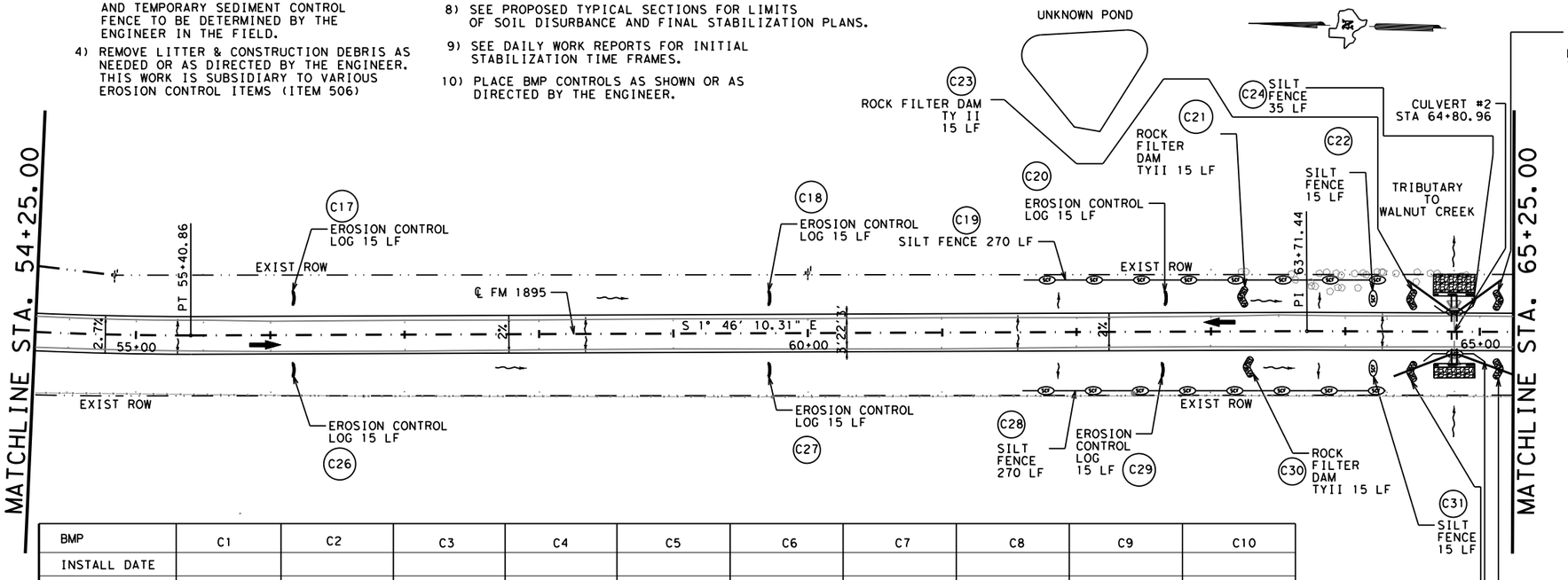
LEGEND

- SILT FENCE — SCF
- EROSION CONTROL LOGS
- ROCK FILTER DAM
- DRAINAGE FLOW
- CONSTRUCTION EXIT TY I
- BMP NO. (X)

NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.

BMP	C27	C28	C29	C30	C31	C32	C33	C34
INSTALL DATE								
REMOVE DATE								



BMP	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
INSTALL DATE										
REMOVE DATE										
BMP	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20
INSTALL DATE										
REMOVE DATE										

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 727/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 3 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	232
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

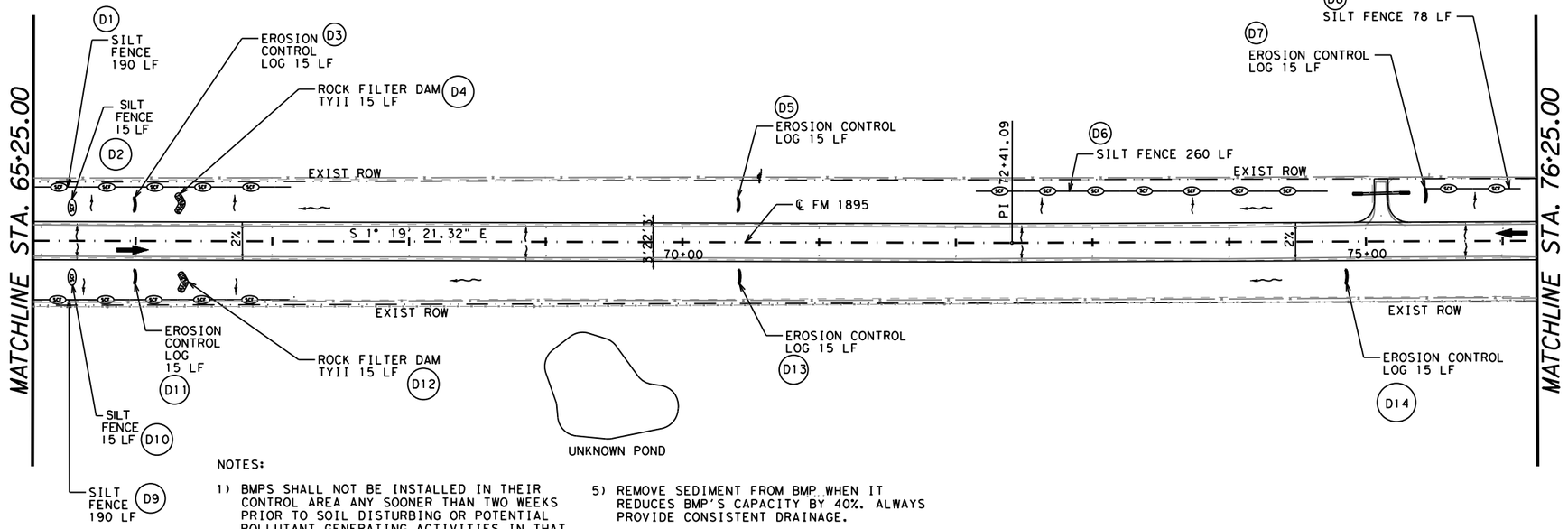
DATE: 7/27/2022 7:42:20 AM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\03 SWPPP.dgn

DISTURBED AREA (D)

DATE DISTURBED _____

DATE STABILIZED _____

BMP	D23	D24	D25	D26	D27	D28
INSTALL DATE						
REMOVE DATE						



SCALE (FEET)

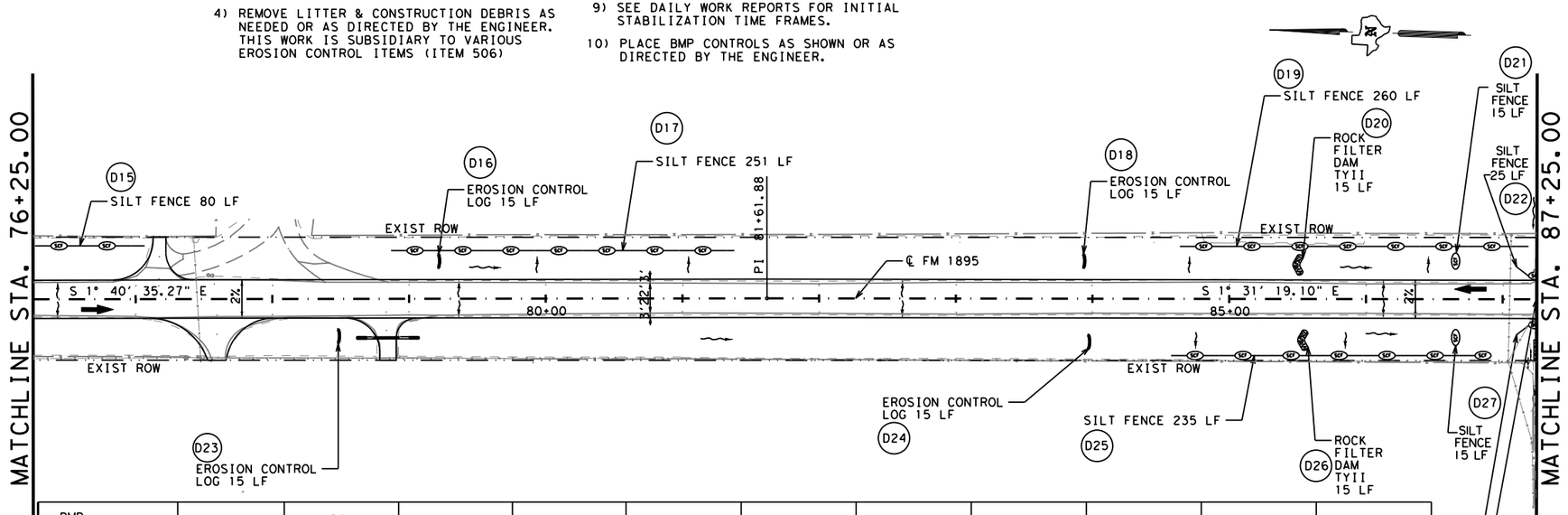
0 25 50 100

LEGEND

- SILT FENCE (SCF)
- EROSION CONTROL LOGS
- ROCK FILTER DAM
- DRAINAGE FLOW
- CONSTRUCTION EXIT TY I
- BMP NO. (X)

NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.



BMP	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11
INSTALL DATE											
REMOVE DATE											

BMP	D12	D13	D14	D15	D16	D17	D18	D19	D20	D21	D22
INSTALL DATE											
REMOVE DATE											

FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Falon Renfroe, P.E. 7/27/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 4 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	233
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/27/2022 8:21:17 AM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\04 SWPPP.dgn

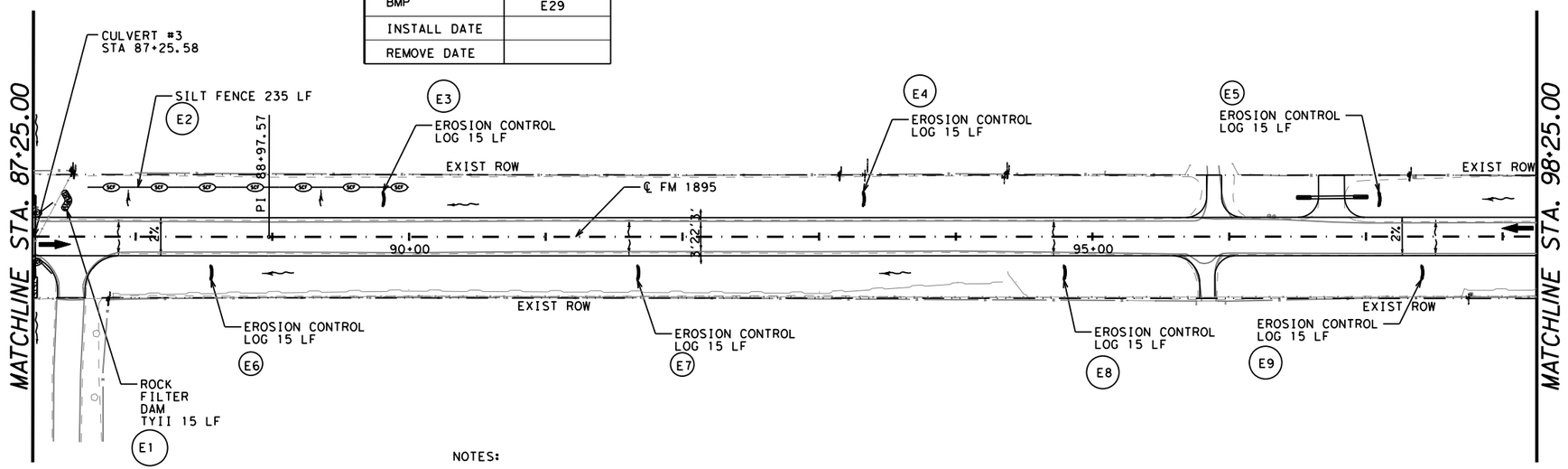
DISTURBED AREA [E]

DATE DISTURBED _____

DATE STABILIZED _____

BMP	E23	E24	E25	E26	E27	E28
INSTALL DATE						
REMOVE DATE						

BMP	E29
INSTALL DATE	
REMOVE DATE	



SCALE (FEET)

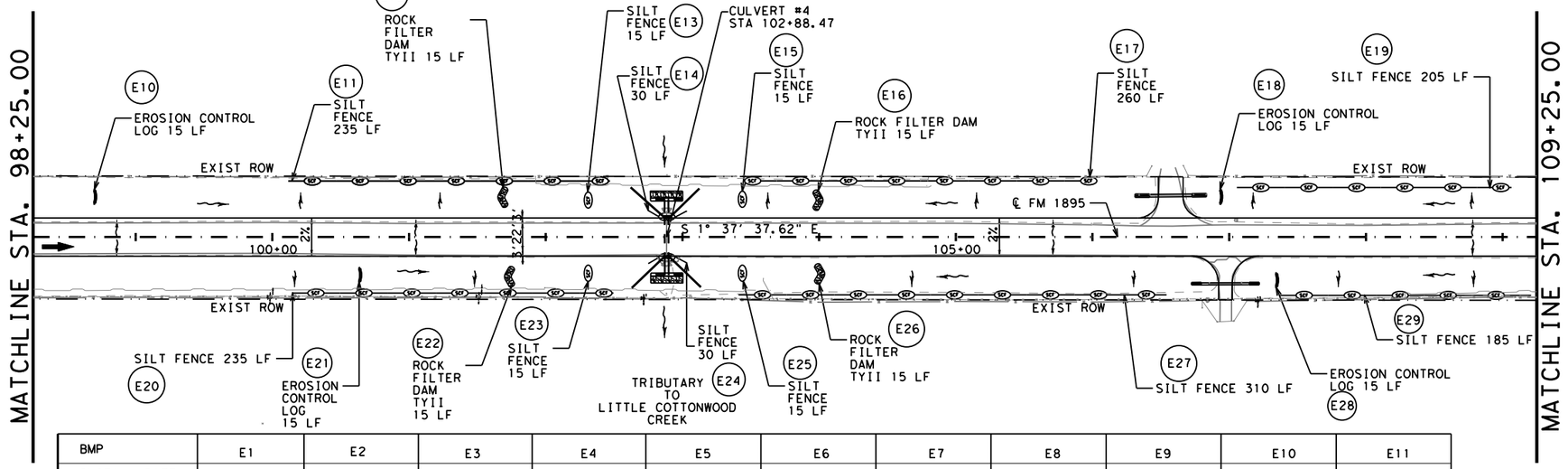
0 25 50 100

LEGEND

- SILT FENCE — SCF
- EROSION CONTROL LOGS
- ROCK FILTER DAM
- DRAINAGE FLOW
- CONSTRUCTION EXIT TY I
- BMP NO. — X

NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.



BMP	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11
INSTALL DATE											
REMOVE DATE											

BMP	E12	E13	E14	E15	E16	E17	E18	E19	E20	E21	E22
INSTALL DATE											
REMOVE DATE											

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED
PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/27/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 5 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	234
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

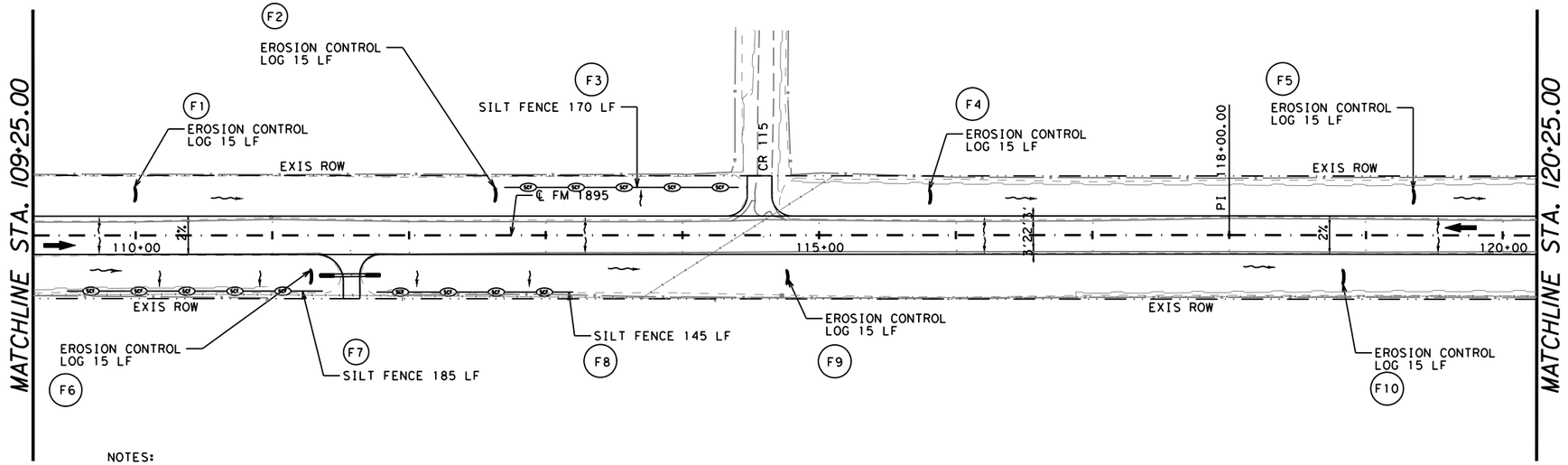
DATE: 7/27/2022 8:24:15 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\05 SWPPP.dgn

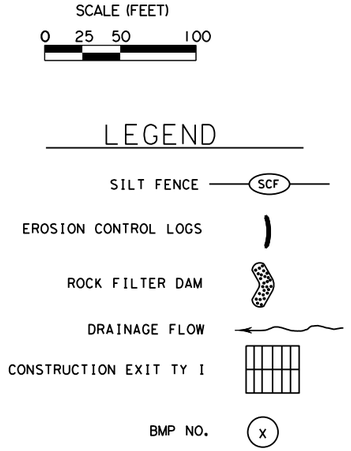
DISTURBED AREA [F]

DATE DISTURBED _____

DATE STABILIZED _____

BMP	F23	F24	F25	F26	F27	F28
INSTALL DATE						
REMOVE DATE						

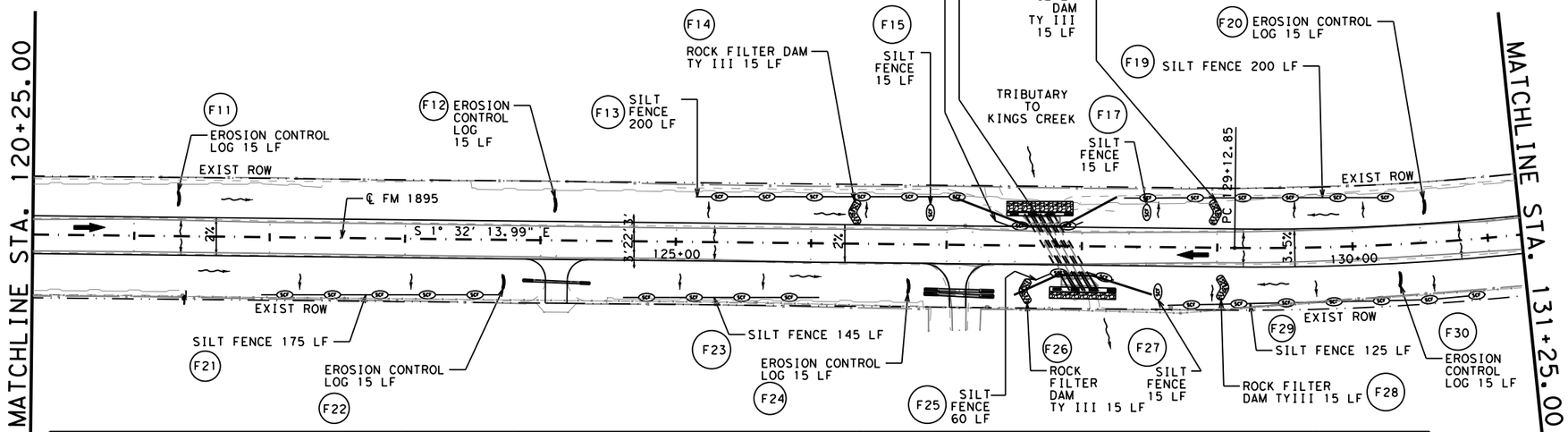




NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.

BMP	F29	F30
INSTALL DATE		
REMOVE DATE		



BMP	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11
INSTALL DATE											
REMOVE DATE											
BMP	F12	F13	F14	F15	F16	F17	F18	F19	F20	F21	F22
INSTALL DATE											
REMOVE DATE											

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 727/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 6 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	235
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

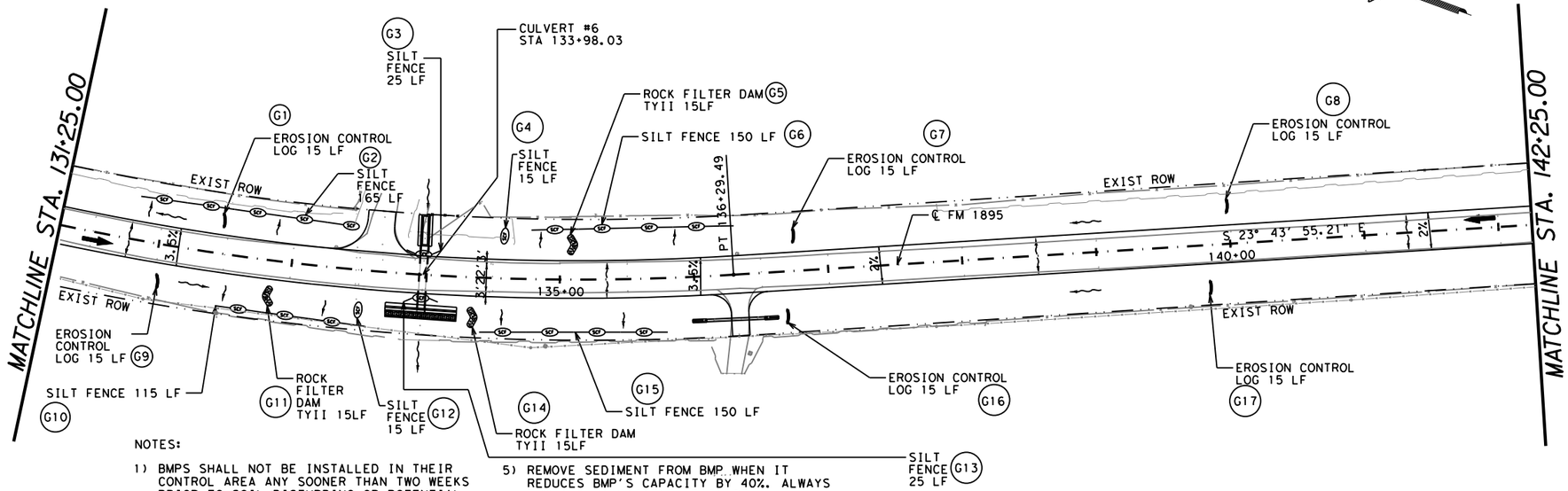
DATE: 7/27/2022 8:25:57 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\19750201314 - Design\Plan Set\9. Environmental\06 SWPPP.dgn

DISTURBED AREA [G]

DATE DISTURBED _____

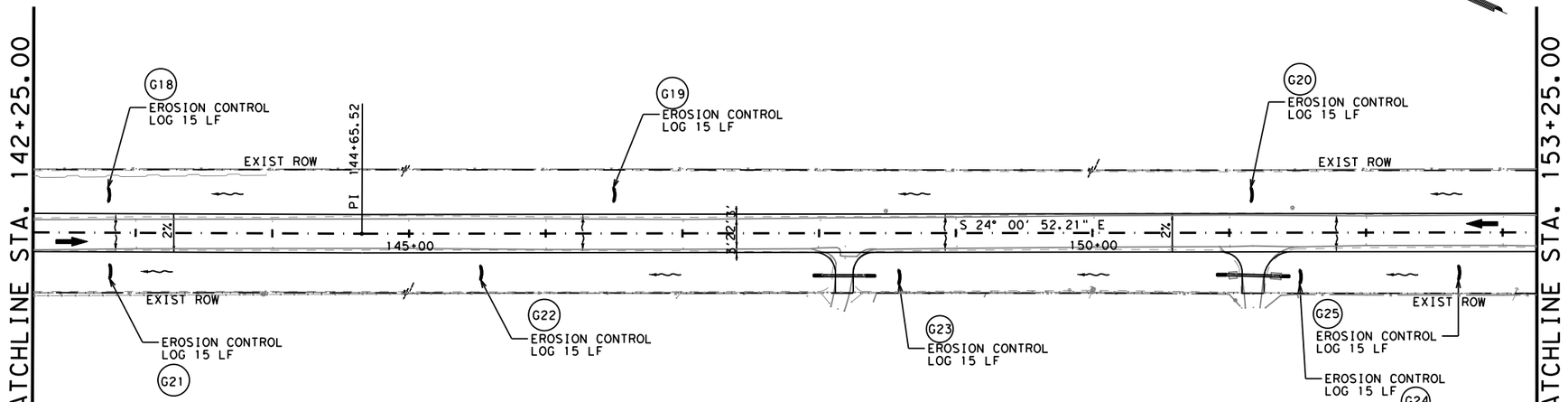
DATE STABILIZED _____

BMP	G23	G24	G25
INSTALL DATE			
REMOVE DATE			



NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.



BMP	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11
INSTALL DATE											
REMOVE DATE											
BMP	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22
INSTALL DATE											
REMOVE DATE											

SCALE (FEET)

0 25 50 100

LEGEND

SILT FENCE — SCF

EROSION CONTROL LOGS

ROCK FILTER DAM

DRAINAGE FLOW

CONSTRUCTION EXIT TY I

BMP NO. X

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe P.E. 7/27/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 7 OF 19

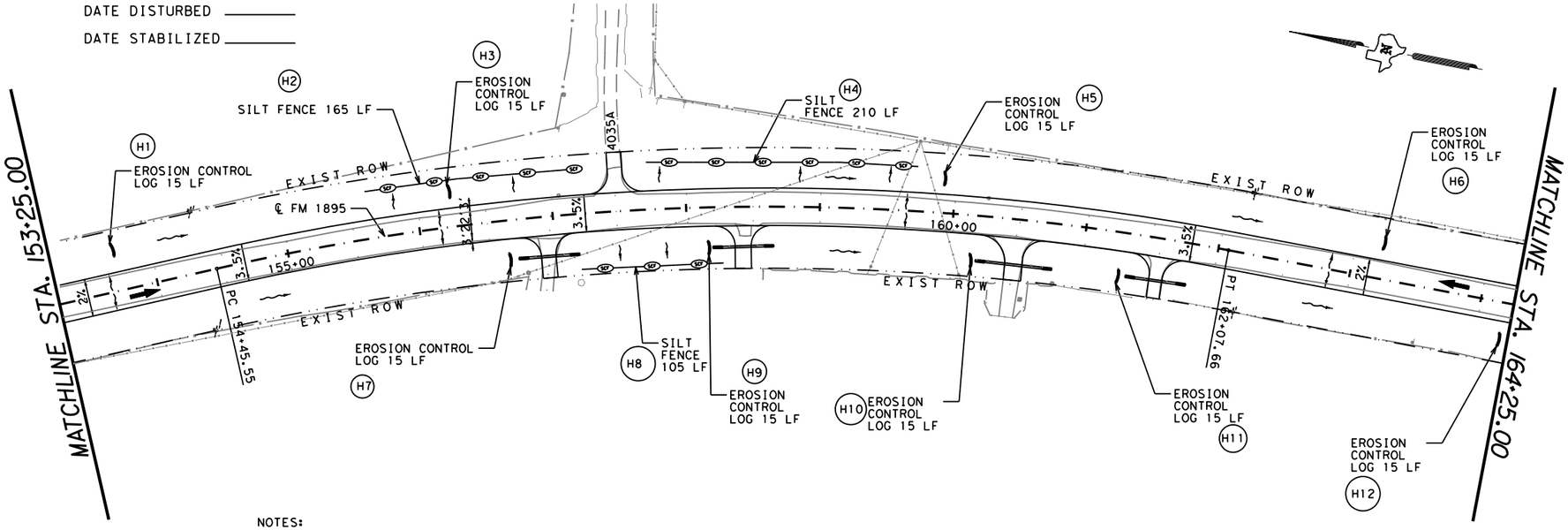
DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	236
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/27/2022 8:26:29 AM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\07 SWPPP.dgn

DISTURBED AREA [H]

DATE DISTURBED _____

DATE STABILIZED _____



SCALE (FEET)

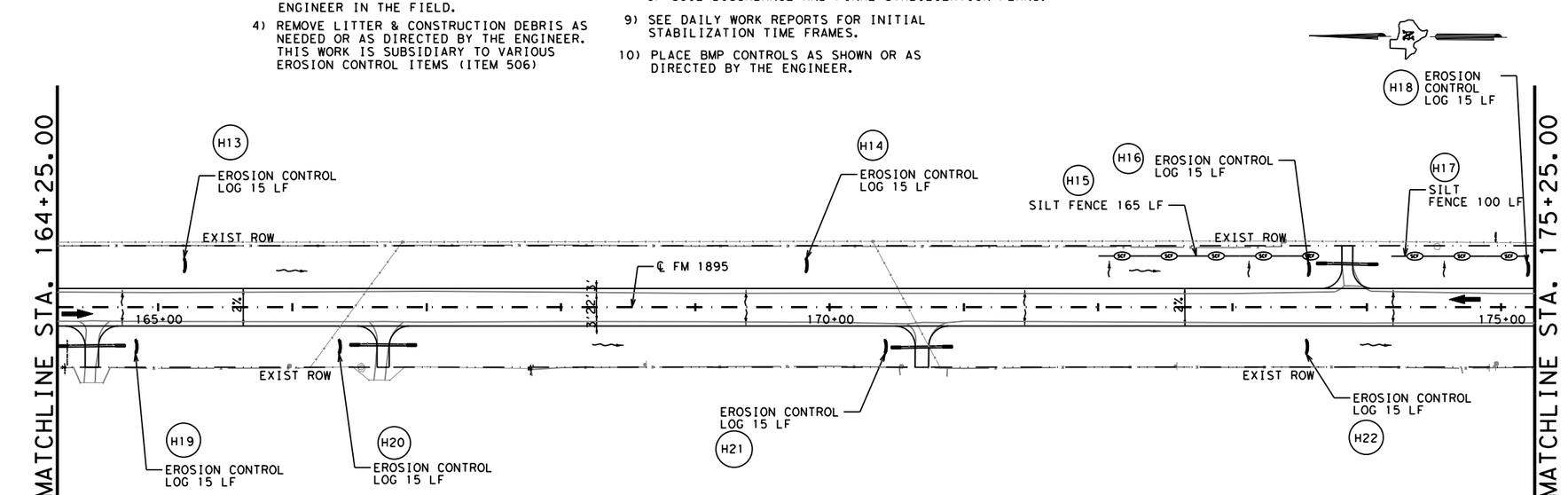
0 25 50 100

LEGEND

- SILT FENCE — SCF
- EROSION CONTROL LOGS
- ROCK FILTER DAM
- DRAINAGE FLOW
- CONSTRUCTION EXIT TY I
- BMP NO. — X

NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.



BMP	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11
INSTALL DATE											
REMOVE DATE											
BMP	H12	H13	H14	H15	H16	H17	H18	H19	H20	H21	H22
INSTALL DATE											
REMOVE DATE											

FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Falon Renfroe, P.E. 7/27/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 8 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	237
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 8:27:33 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\08 SWPPP.dgn

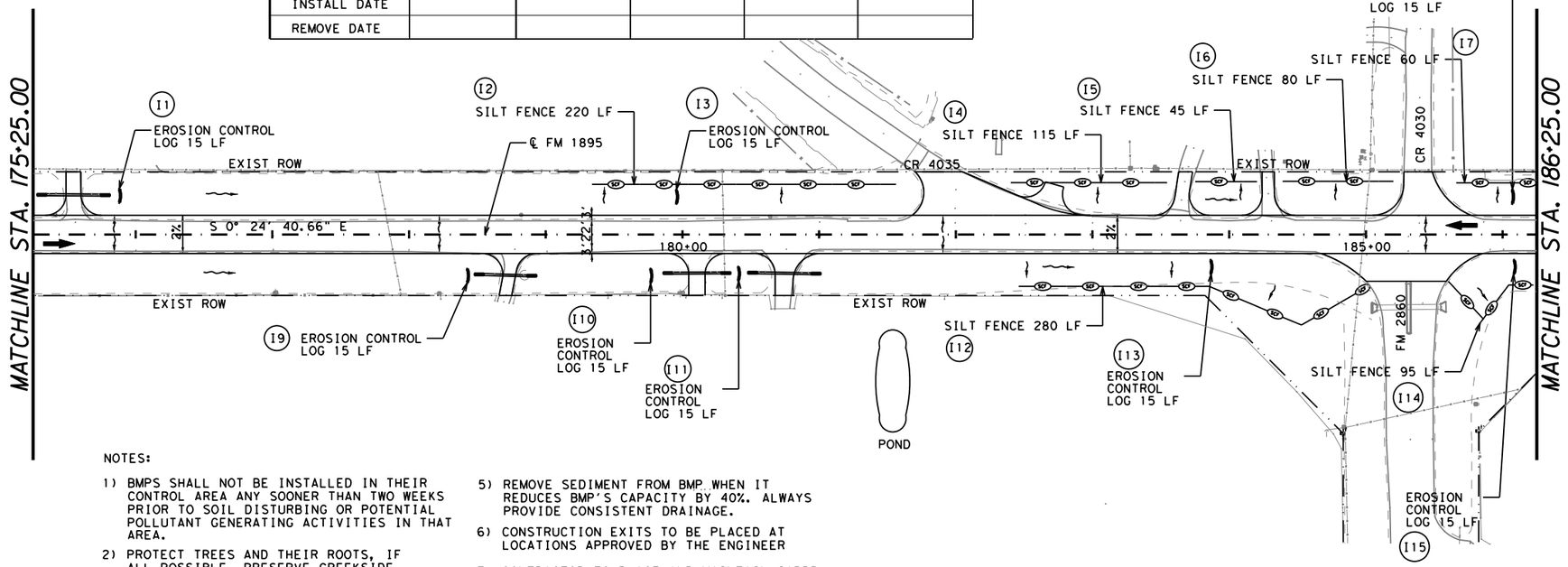
DISTURBED AREA [I]

DATE DISTURBED _____

DATE STABILIZED _____

BMP	I23	I24	I25	I26	I27	I28	I29	I30
INSTALL DATE								
REMOVE DATE								

BMP	I31	I32	I33	I34	I35
INSTALL DATE					
REMOVE DATE					



SCALE (FEET)

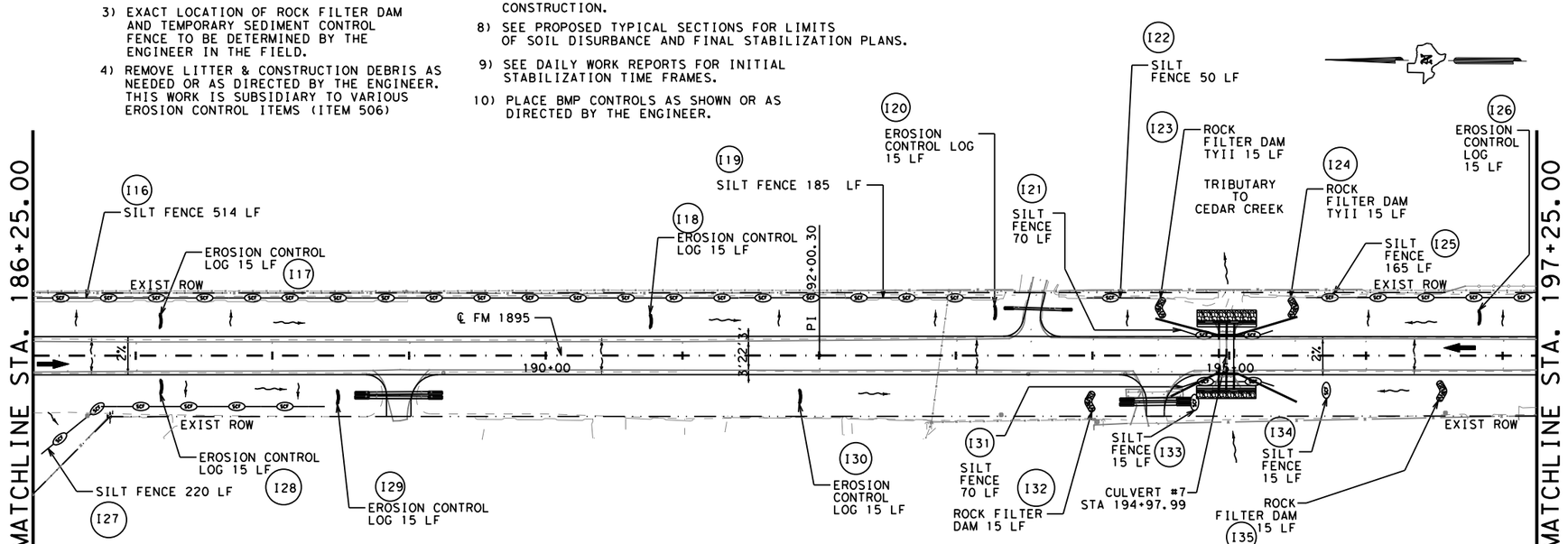
0 25 50 100

LEGEND

- SILT FENCE — SCF
- EROSION CONTROL LOGS
- ROCK FILTER DAM
- DRAINAGE FLOW
- CONSTRUCTION EXIT TY I
- BMP NO. (X)

NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.



BMP	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11
INSTALL DATE											
REMOVE DATE											

BMP	I12	I13	I14	I15	I16	I17	I18	I19	I20	I21	I22
INSTALL DATE											
REMOVE DATE											

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/27/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 9 OF 19

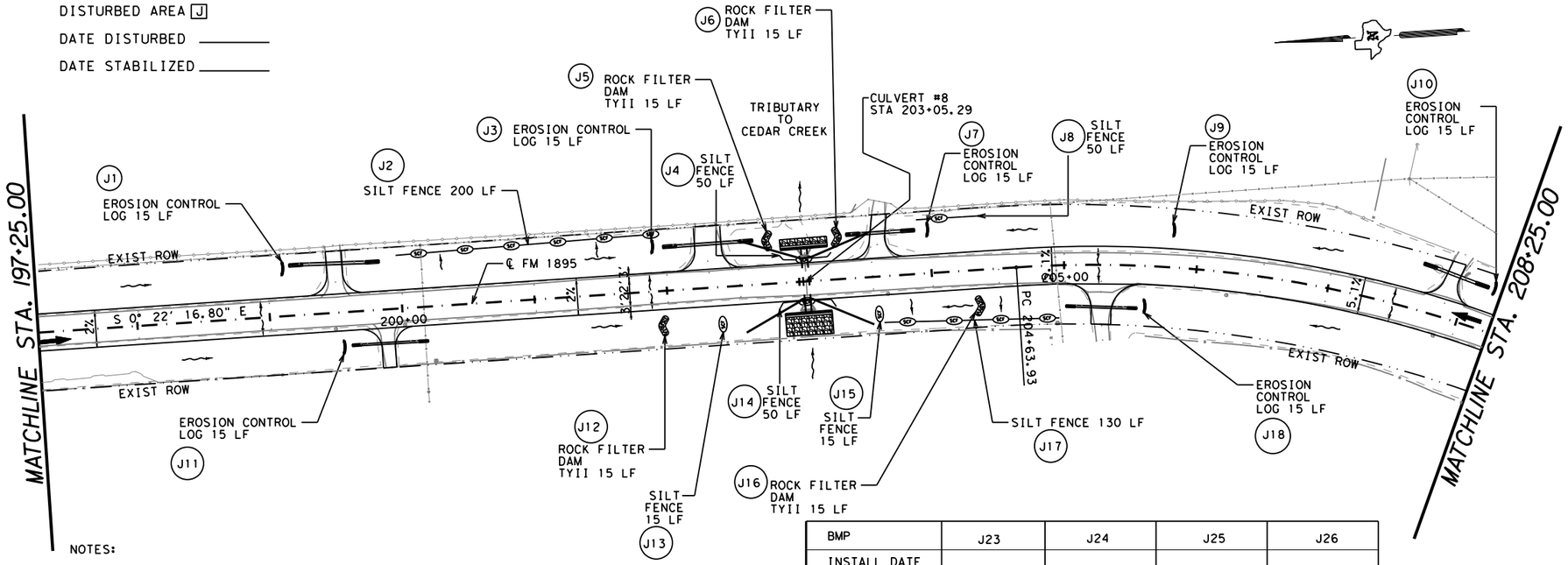
DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	238
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/27/2022 8:33:28 AM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\09 SWPPP.dgn

DISTURBED AREA [J]

DATE DISTURBED _____

DATE STABILIZED _____

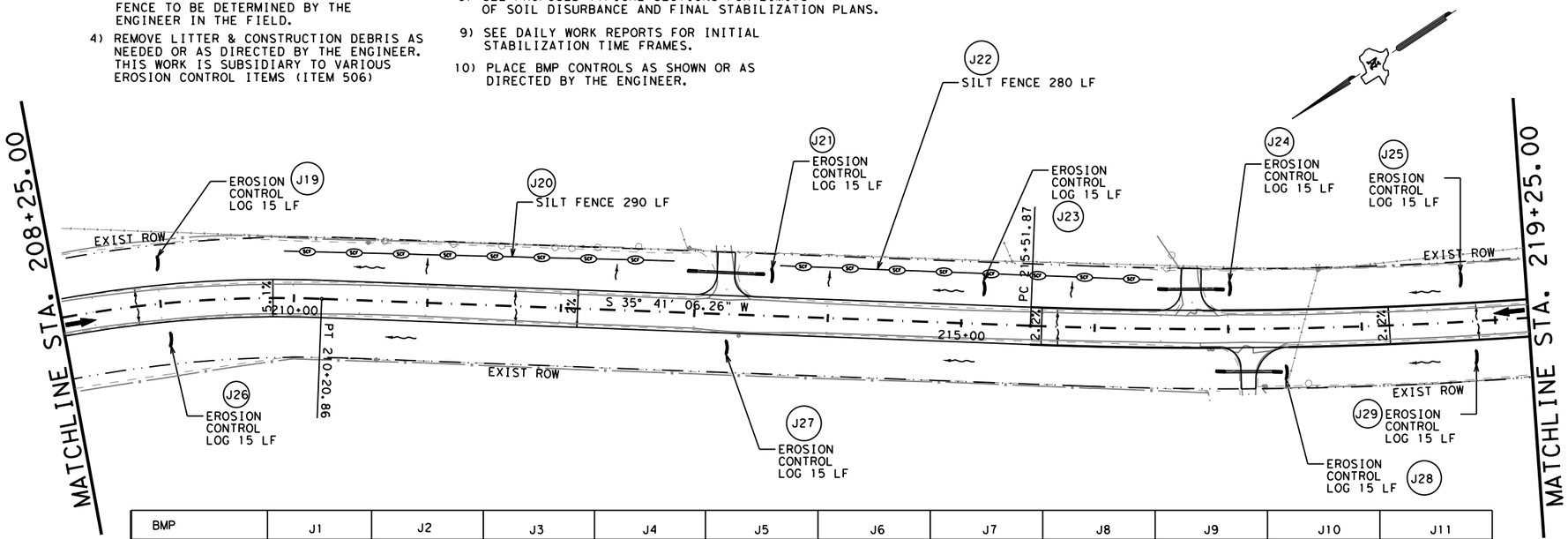


BMP	J23	J24	J25	J26
INSTALL DATE				
REMOVE DATE				

BMP	J27	J28	J29
INSTALL DATE			
REMOVE DATE			

NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.



BMP	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11
INSTALL DATE											
REMOVE DATE											

BMP	J12	J13	J14	J15	J16	J17	J18	J19	J20	J21	J22
INSTALL DATE											
REMOVE DATE											

SCALE (FEET)

0 25 50 100

LEGEND

SILT FENCE — SCF

EROSION CONTROL LOGS

ROCK FILTER DAM

DRAINAGE FLOW

CONSTRUCTION EXIT TY I

BMP NO. X

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/27/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 10 OF 19

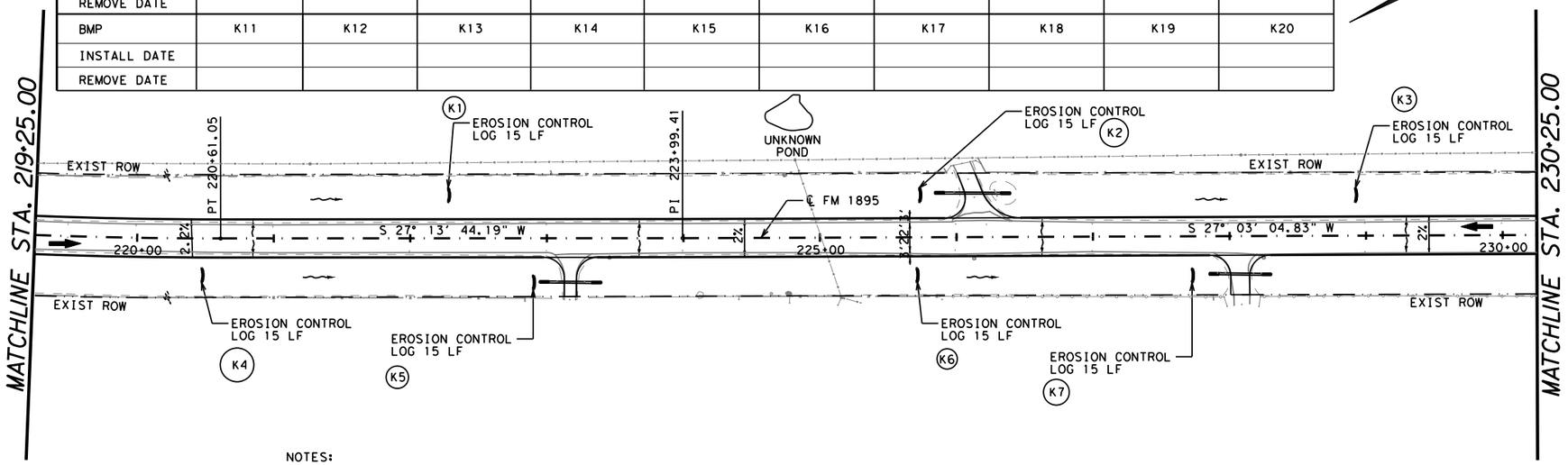
DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	239
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/27/2022 8:39:35 AM
FILE: dw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\19750201 3\4 - Design\Plan Set\9. Environmental\10 SWPPP.dgn

DATE DISTURBED _____

DATE STABILIZED _____

BMP	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10
INSTALL DATE										
REMOVE DATE										
BMP	K11	K12	K13	K14	K15	K16	K17	K18	K19	K20
INSTALL DATE										
REMOVE DATE										



SCALE (FEET)

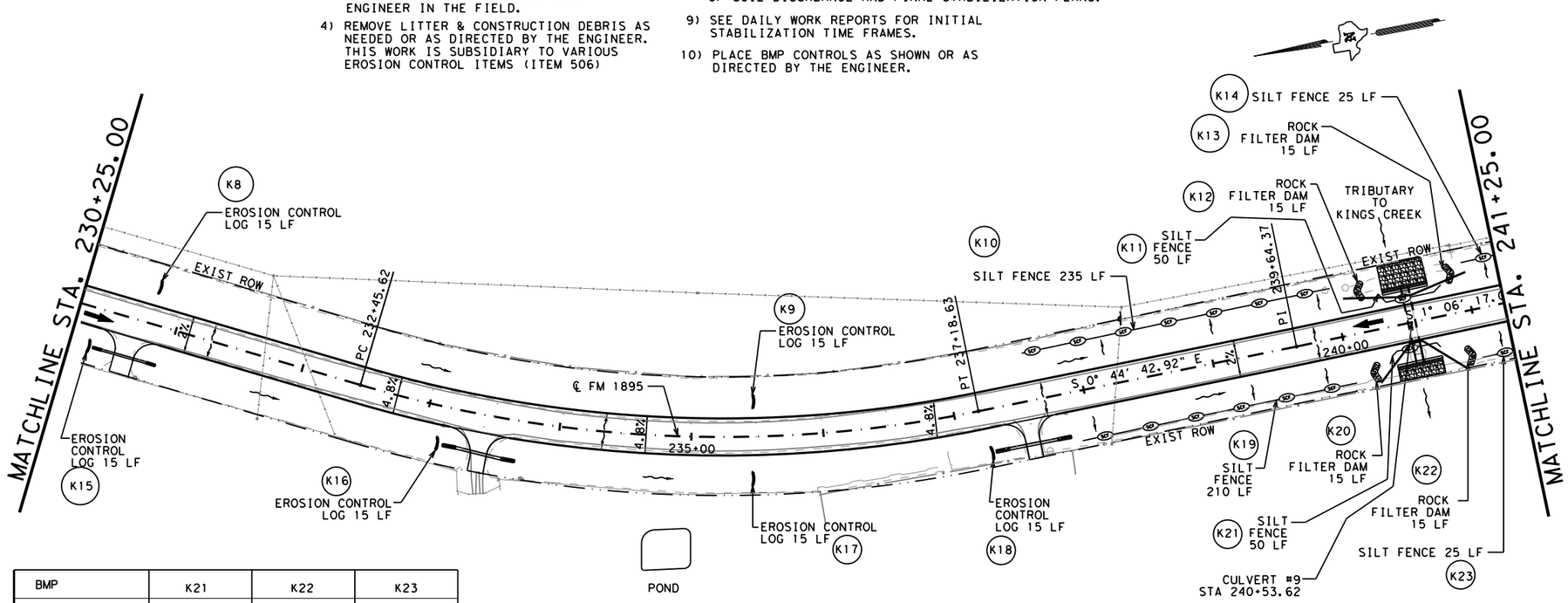
0 25 50 100

LEGEND

- SILT FENCE — SCF
- EROSION CONTROL LOGS
- ROCK FILTER DAM
- DRAINAGE FLOW
- CONSTRUCTION EXIT TY I
- BMP NO. — X

NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.



BMP	K21	K22	K23
INSTALL DATE			
REMOVE DATE			

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/29/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 11 OF 19

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	240
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

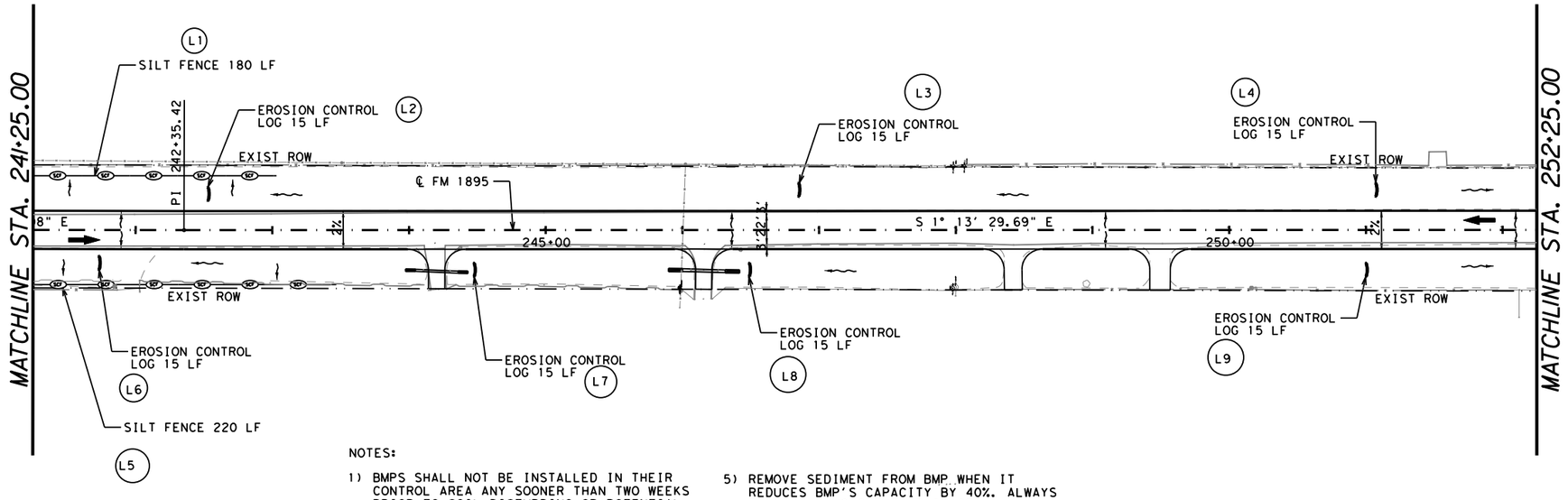
DATE: 7/27/2022 8:43:34 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\11 SWPPP.dgn

DISTURBED AREA [L]

DATE DISTURBED _____

DATE STABILIZED _____

BMP	L23	L24
INSTALL DATE		
REMOVE DATE		



SCALE (FEET)

0 25 50 100

LEGEND

SILT FENCE — SCF

EROSION CONTROL LOGS

ROCK FILTER DAM

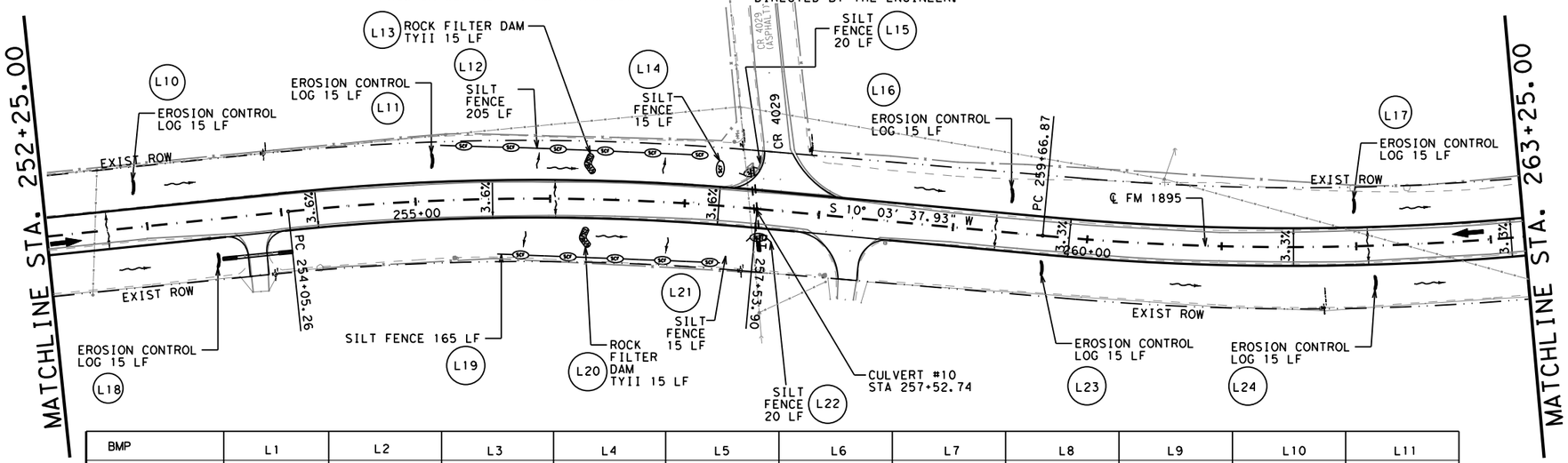
DRAINAGE FLOW

CONSTRUCTION EXIT TY I

BMP NO. X

NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.



BMP	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11
INSTALL DATE											
REMOVE DATE											

BMP	L12	L13	L14	L15	L16	L17	L18	L19	L20	L21	L22
INSTALL DATE											
REMOVE DATE											

FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Falon Renfroe, P.E. 7/27/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 12 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	241
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

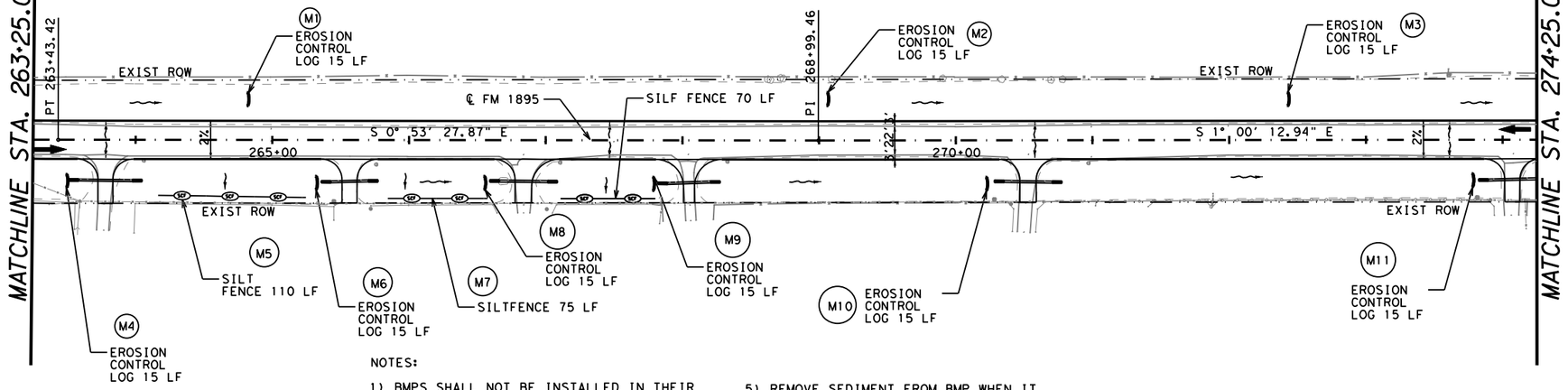
DATE: 7/27/2022 8:44:14 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\19750201\4 - Design\Plan Set\9. Environmental\12 SWPPP.dgn

DISTURBED AREA [M]

DATE DISTURBED _____

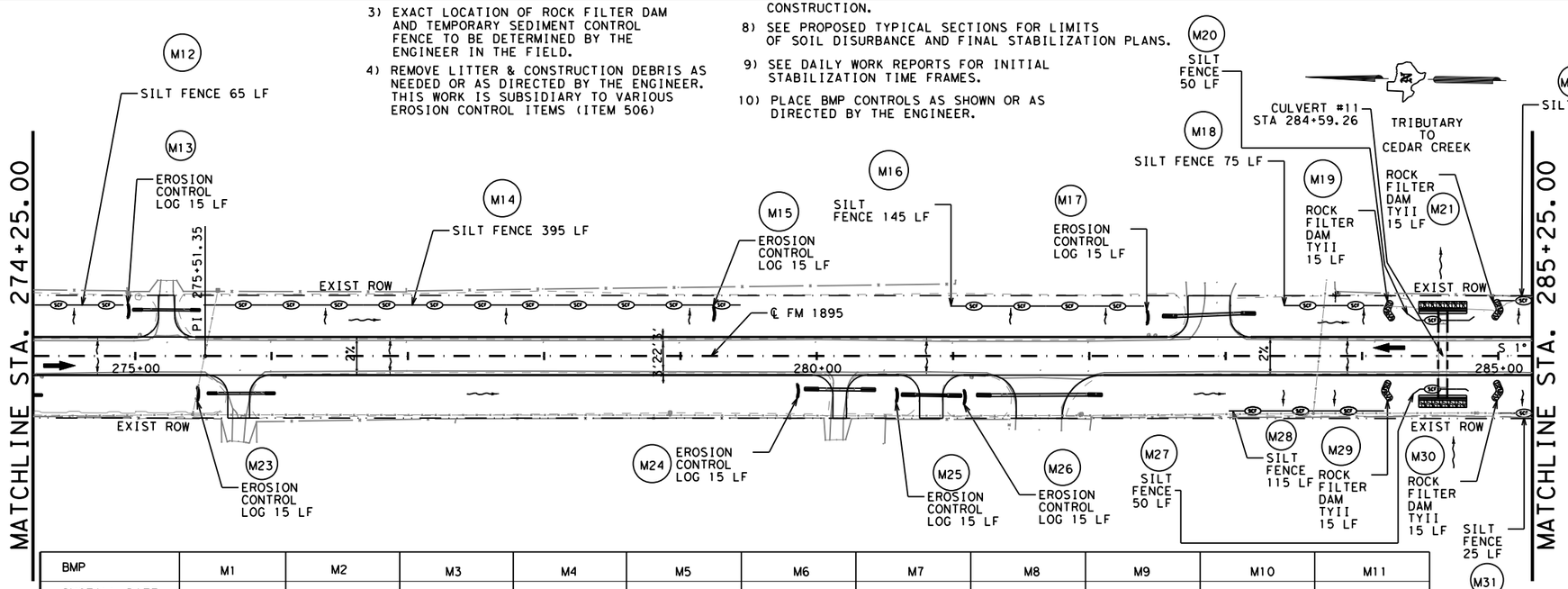
DATE STABILIZED _____

BMP	M23	M24	M25	M26	M27	M28	M29	M30	M31
INSTALL DATE									
REMOVE DATE									



NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.



BMP	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
INSTALL DATE											
REMOVE DATE											

BMP	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22
INSTALL DATE											
REMOVE DATE											

SCALE (FEET)

0 25 50 100

LEGEND

- SILT FENCE — SCF
- EROSION CONTROL LOGS
- ROCK FILTER DAM
- DRAINAGE FLOW
- CONSTRUCTION EXIT TY I
- BMP NO. — X

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/27/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

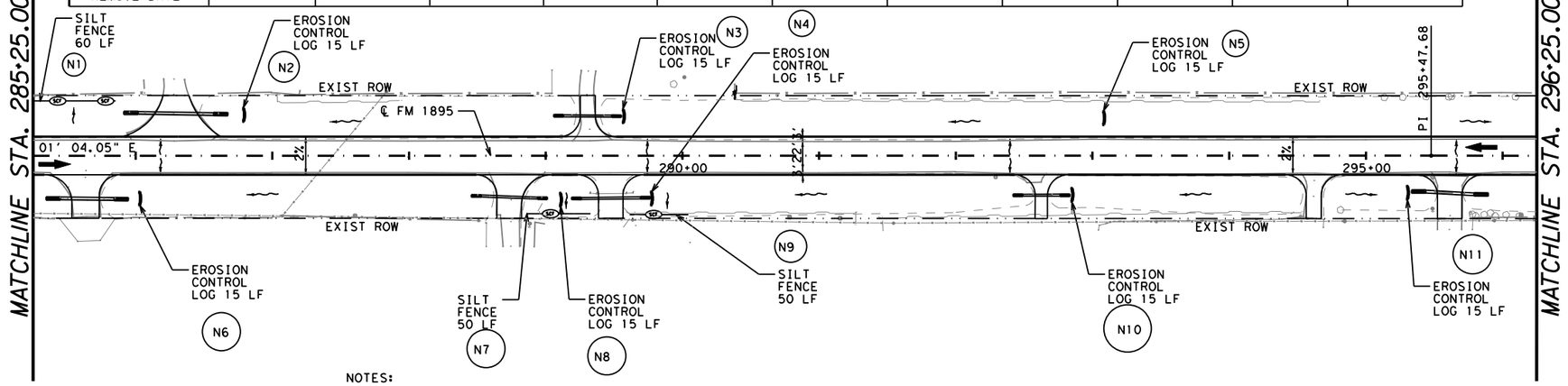
FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 13 OF 19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	242
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

DATE: 7/27/2022 8:45:17 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\13 SWPPP.dgn

BMP	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11
INSTALL DATE											
REMOVE DATE											
BMP	N12	N13	N14	N15	N16	N17	N18	N19	N20	N21	N22
INSTALL DATE											
REMOVE DATE											



SCALE (FEET)
0 25 50 100

LEGEND

- SILT FENCE — SCF
- EROSION CONTROL LOGS
- ROCK FILTER DAM
- DRAINAGE FLOW
- CONSTRUCTION EXIT TY I
- BMP NO. — X

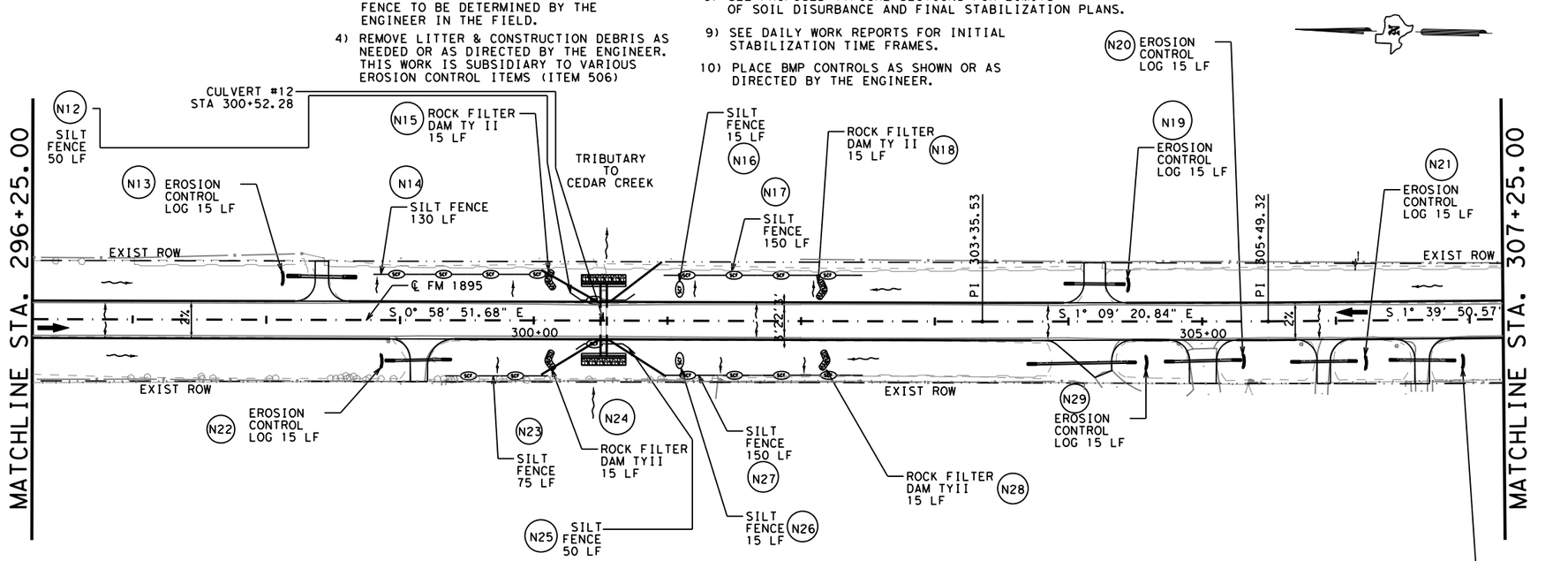
DISTURBED AREA N

DATE DISTURBED _____

DATE STABILIZED _____

NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.



BMP	N23	N24	N25	N26	N27	N28	N29	N30
INSTALL DATE								
REMOVE DATE								

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/27/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 14 OF 19

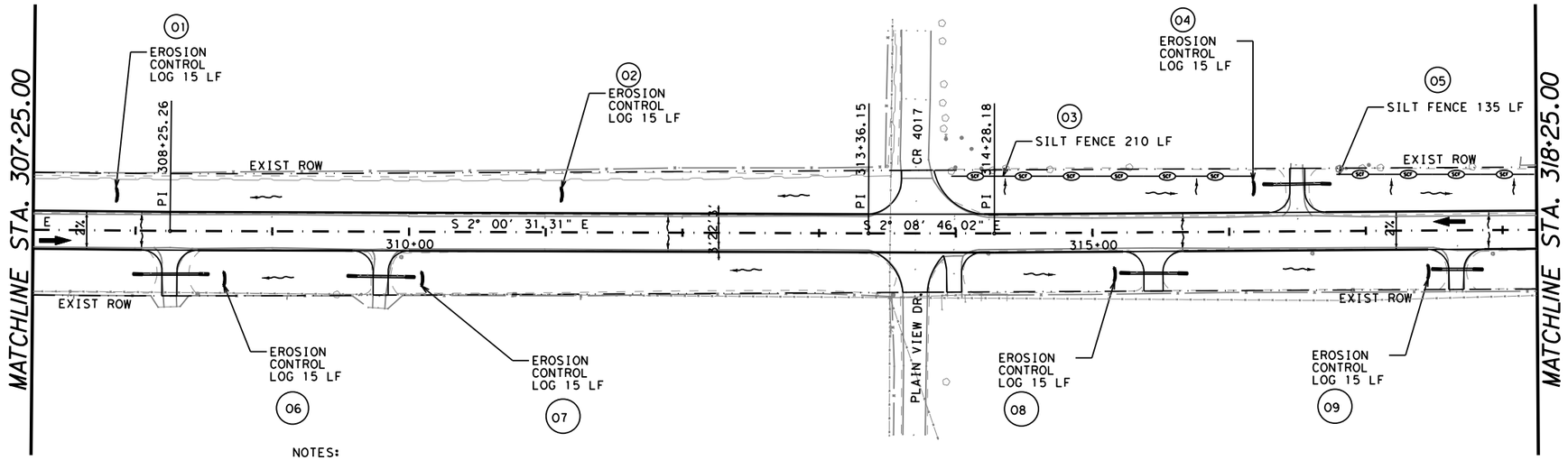
DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	243
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 8:46:08 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\19750201\4 - Design\Plan Set\9. Environmental\14 SWPPP.dgn

DISTURBED AREA [0]

DATE DISTURBED _____

DATE STABILIZED _____



SCALE (FEET)

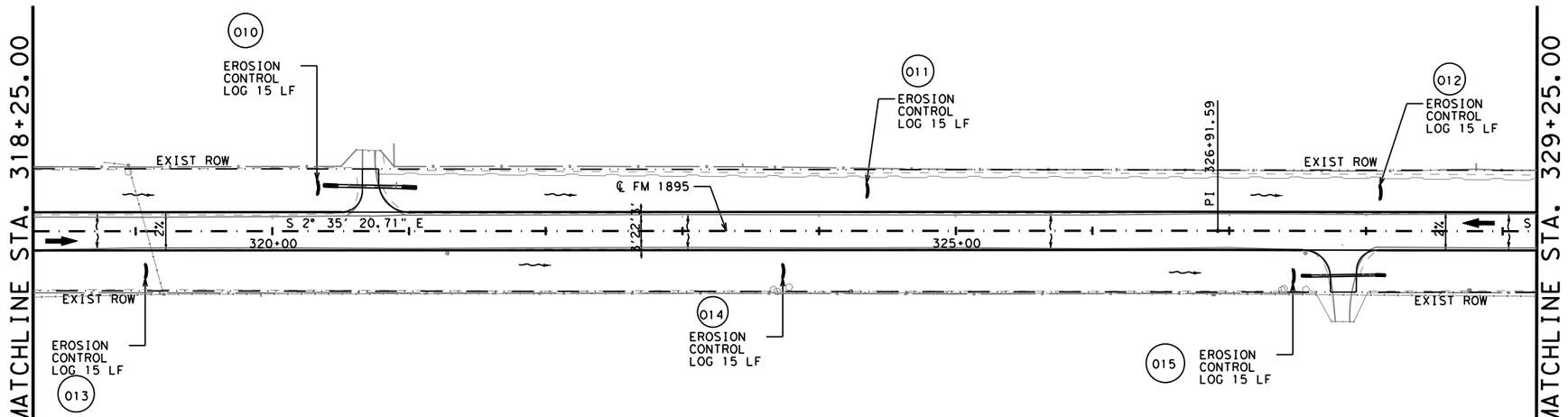
0 25 50 100

LEGEND

- SILT FENCE — SCF
- EROSION CONTROL LOGS
- ROCK FILTER DAM
- DRAINAGE FLOW
- CONSTRUCTION EXIT TY I
- BMP NO. (X)

NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.



BMP	01	02	03	04	05	06	07	08	09	010	011
INSTALL DATE											
REMOVE DATE											

BMP	012	013	014	015
INSTALL DATE				
REMOVE DATE				

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/27/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 15 OF 19

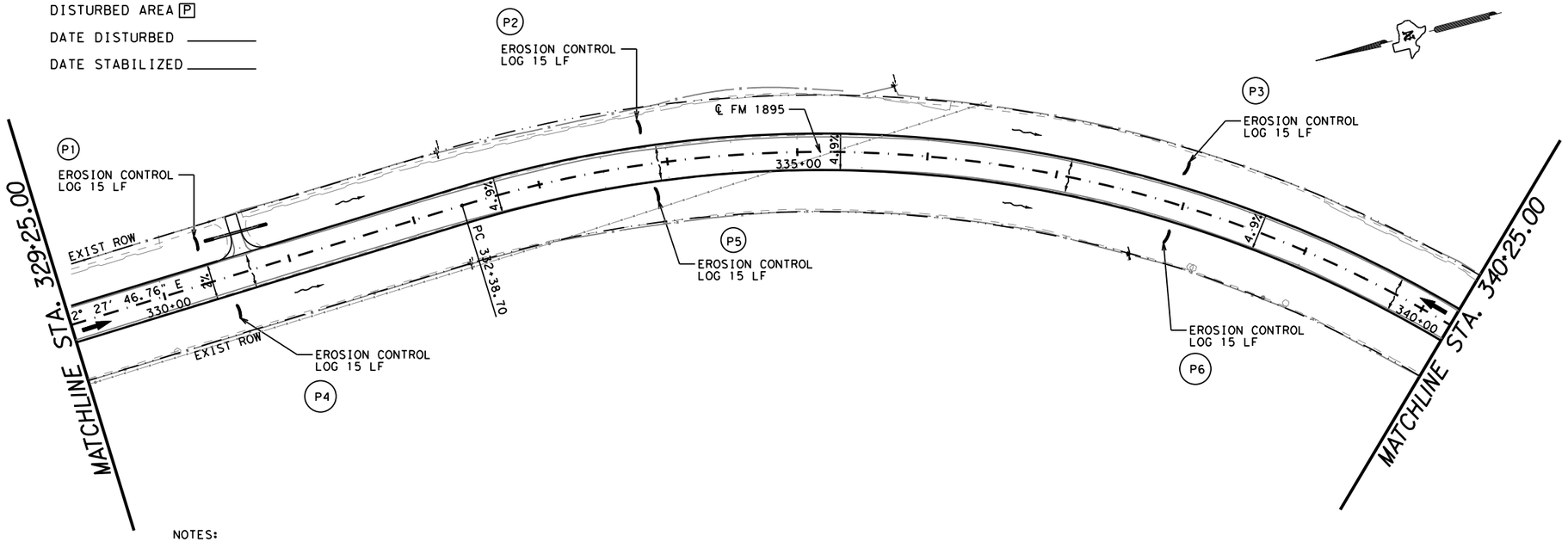
DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	244
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 8:47:50 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\15 SWPPP.dgn

DISTURBED AREA [P]

DATE DISTURBED _____

DATE STABILIZED _____



SCALE (FEET)

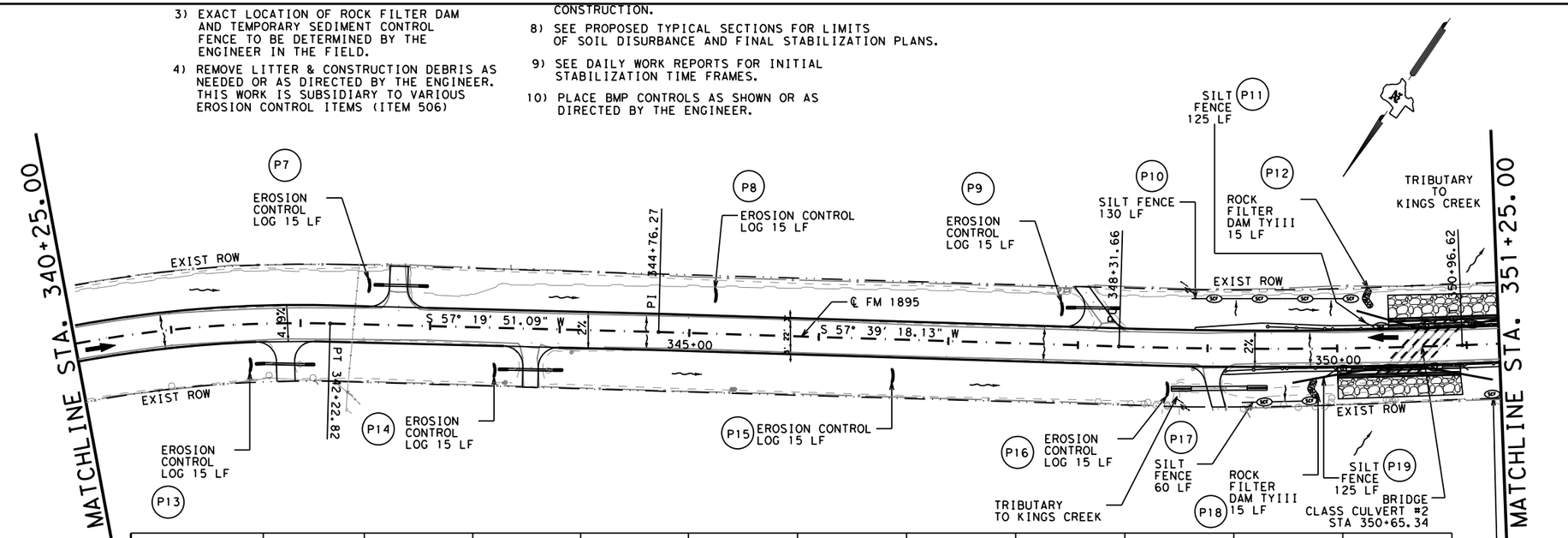
0 25 50 100

LEGEND

- SILT FENCE — SCF
- EROSION CONTROL LOGS
- ROCK FILTER DAM
- DRAINAGE FLOW
- CONSTRUCTION EXIT TY I
- BMP NO. (X)

NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.



BMP	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11
INSTALL DATE											
REMOVE DATE											

BMP	P12	P13	P14	P15	P16	P17	P18	P19	P20
INSTALL DATE									
REMOVE DATE									

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/27/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 16 OF 19

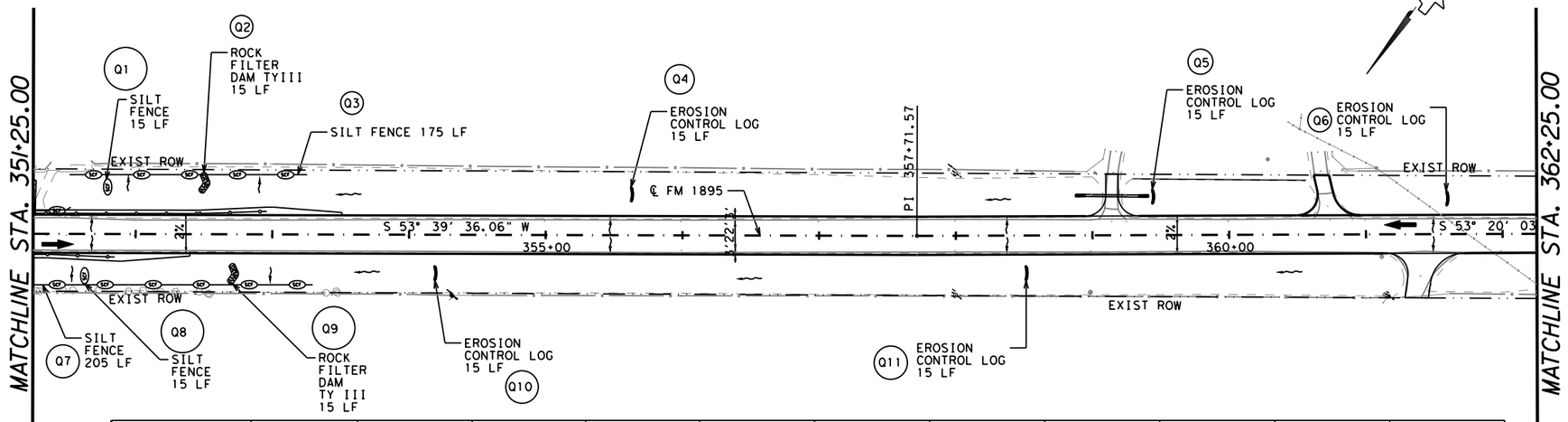
DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	245
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

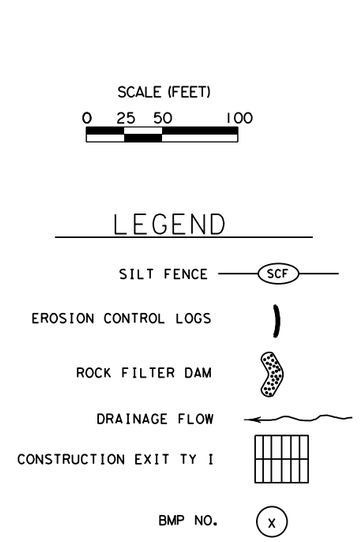
DATE: 7/27/2022 8:48:37 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\16 SWPPP.dgn

DISTURBED AREA Q

DATE DISTURBED _____

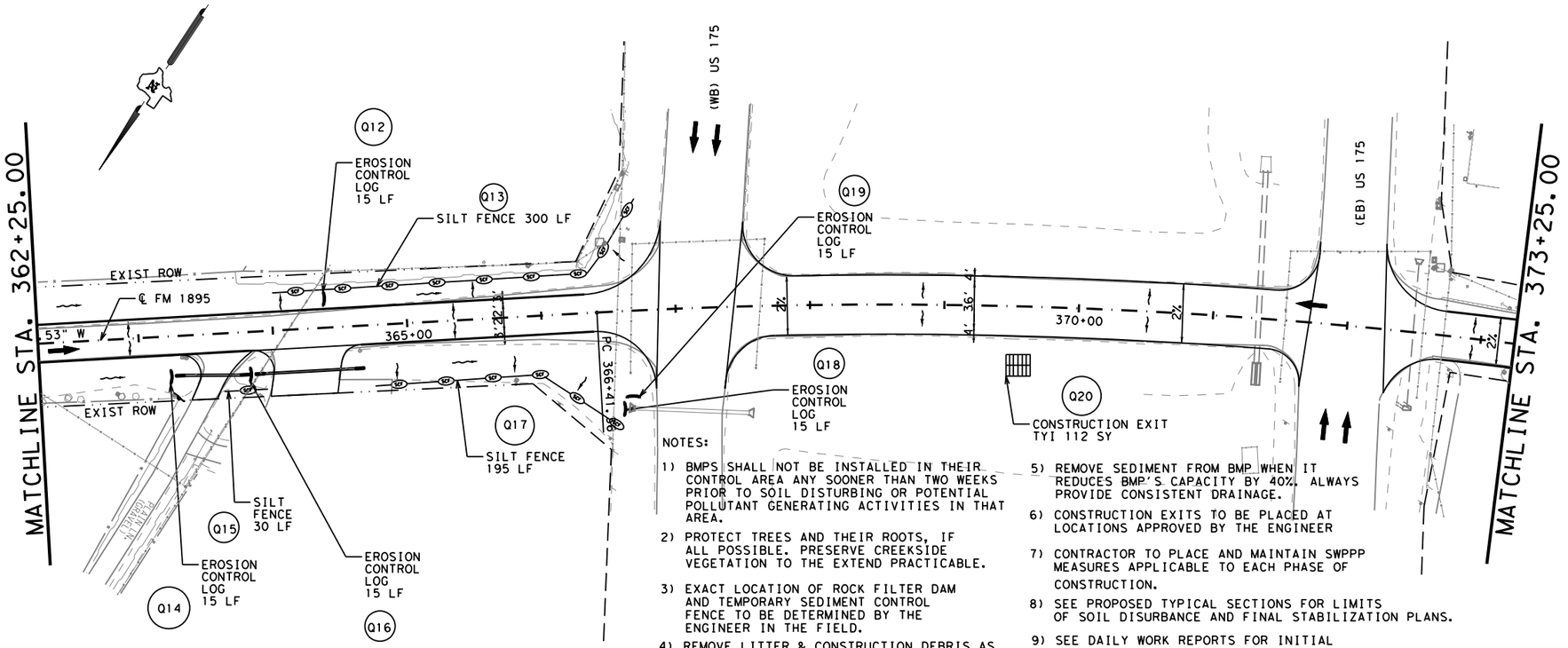
DATE STABILIZED _____





BMP	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
INSTALL DATE											
REMOVE DATE											

BMP	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
INSTALL DATE									
REMOVE DATE									



NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/27/2022
Signature of Registrant & Date

Texas Department of Transportation
© 2022

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 17 OF 19

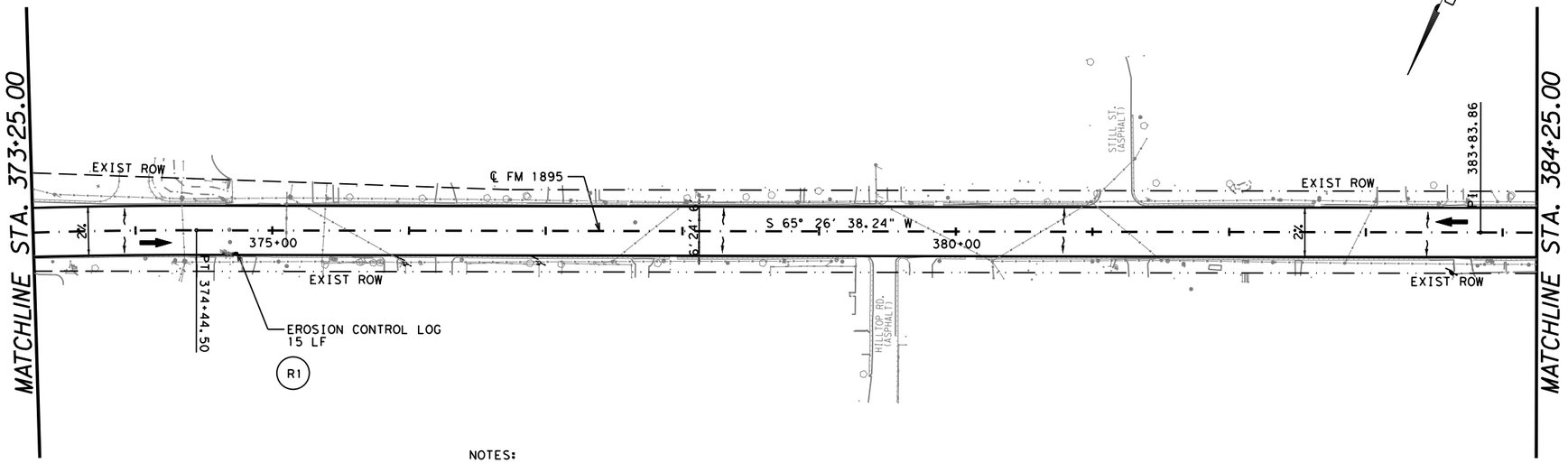
DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	246
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 8:49:13 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\17 SWPPP.dgn

DISTURBED AREA [R]

DATE DISTURBED _____

DATE STABILIZED _____



SCALE (FEET)

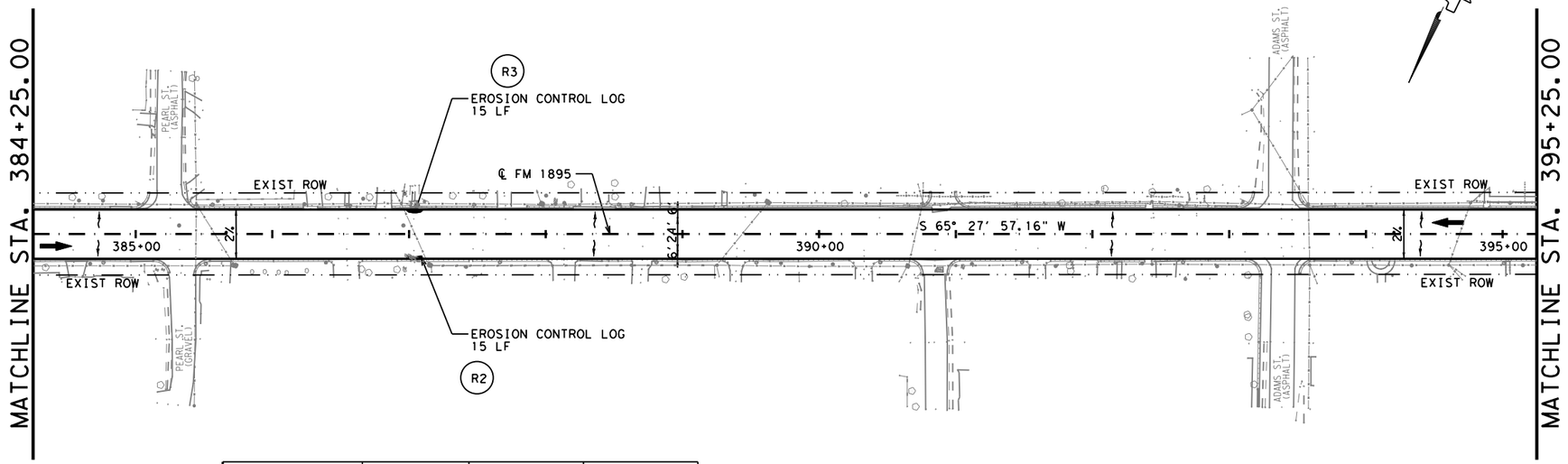
0 25 50 100

LEGEND

- SILT FENCE — SCF
- EROSION CONTROL LOGS
- ROCK FILTER DAM
- DRAINAGE FLOW
- CONSTRUCTION EXIT TY I
- BMP NO. — X

NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.



BMP	R1	R2	R3
INSTALL DATE			
REMOVE DATE			

FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Falon Renfroe, P.E. 7/27/2022
Signature of Registrant & Date

Texas Department of Transportation

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 18 OF 19

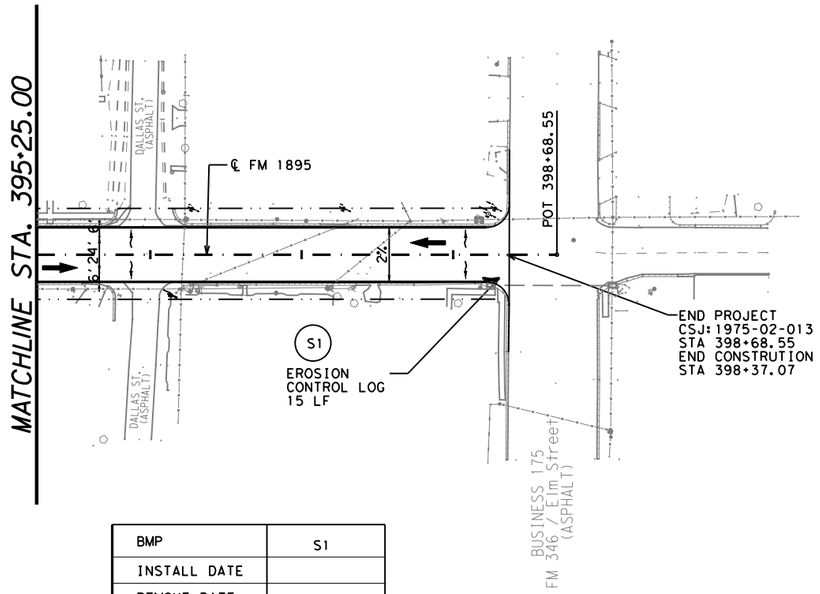
DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
FR	TEXAS	DAL	KAUFMAN	247
CHECK	CONTROL	SECTION	JOB	
JR	1975	02	013	
CHECK				
VD				

DATE: 7/27/2022 8:49:54 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\18 SWPPP.dgn

DISTURBED AREA [S]

DATE DISTURBED _____

DATE STABILIZED _____



BMP	S1
INSTALL DATE	
REMOVE DATE	

NOTES:

1) BMPS SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THAT AREA.
2) PROTECT TREES AND THEIR ROOTS, IF ALL POSSIBLE. PRESERVE CREEKSIDE VEGETATION TO THE EXTEND PRACTICABLE.
3) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.
4) REMOVE LITTER & CONSTRUCTION DEBRIS AS NEEDED OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO VARIOUS EROSION CONTROL ITEMS (ITEM 506)
5) REMOVE SEDIMENT FROM BMP WHEN IT REDUCES BMP'S CAPACITY BY 40%. ALWAYS PROVIDE CONSISTENT DRAINAGE.
6) CONSTRUCTION EXITS TO BE PLACED AT LOCATIONS APPROVED BY THE ENGINEER
7) CONTRACTOR TO PLACE AND MAINTAIN SWPPP MEASURES APPLICABLE TO EACH PHASE OF CONSTRUCTION.
8) SEE PROPOSED TYPICAL SECTIONS FOR LIMITS OF SOIL DISURBANCE AND FINAL STABILIZATION PLANS.
9) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.
10) PLACE BMP CONTROLS AS SHOWN OR AS DIRECTED BY THE ENGINEER.

SCALE (FEET)
0 25 50 100

LEGEND

SILT FENCE — SCF
EROSION CONTROL LOGS
ROCK FILTER DAM
DRAINAGE FLOW
CONSTRUCTION EXIT TY I
BMP NO. X

STATE OF TEXAS
FALON J. RENFROE
131914
LICENSED PROFESSIONAL ENGINEER

Falon Renfroe, P.E. 7/27/2022
Signature of Registrant & Date

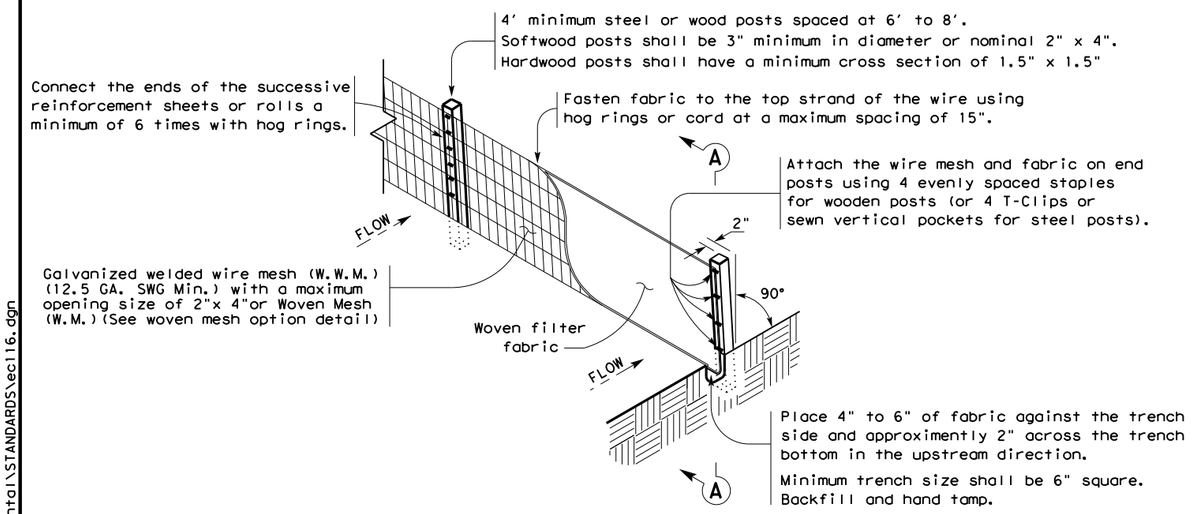
Texas Department of Transportation

FM 1895
SWPPP LAYOUT

SCALE: 1"=100' SHEET 19 OF 19

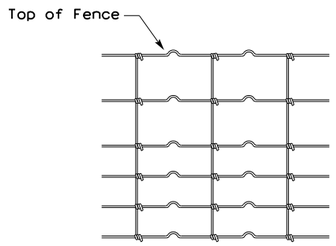
DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
FR	6	(SEE TITLE SHEET)		FM 1895
GRAPHICS FR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JR	TEXAS	DAL	KAUFMAN	248
CHECK VD	CONTROL	SECTION	JOB	
	1975	02	013	

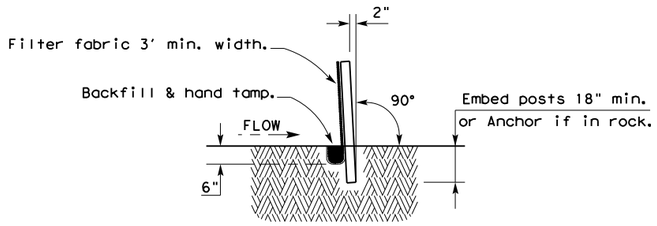
DATE: 7/27/2022 8:51:07 AM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\19 SWPPP.dgn



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.

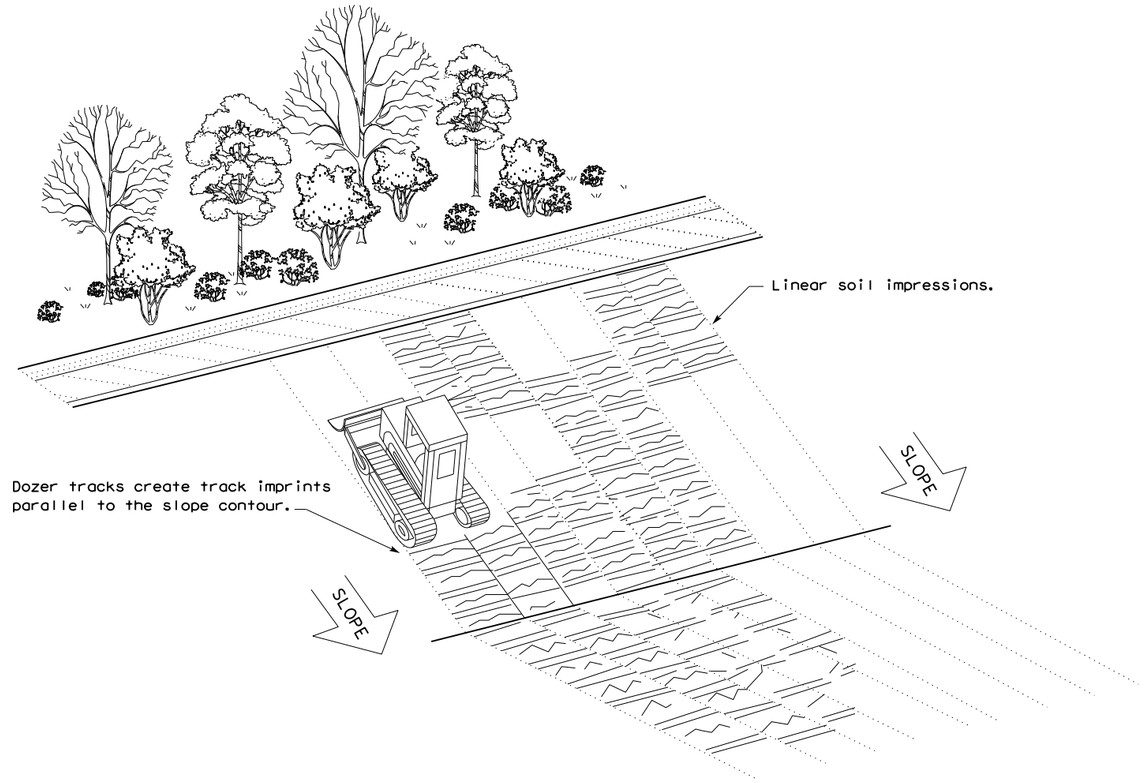
LEGEND

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

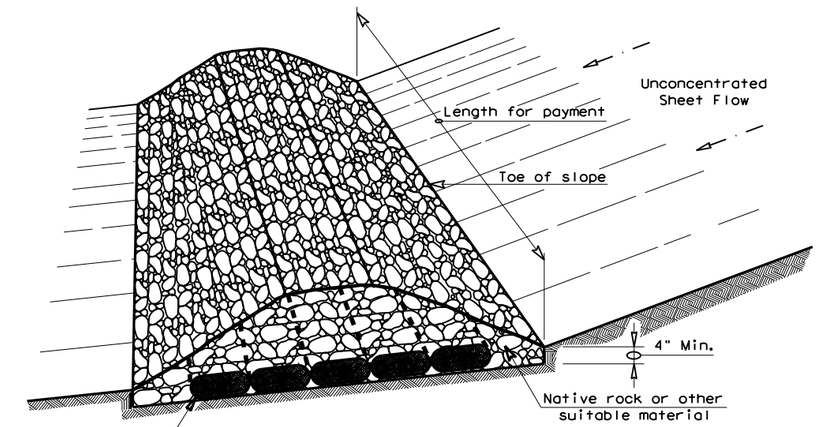
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

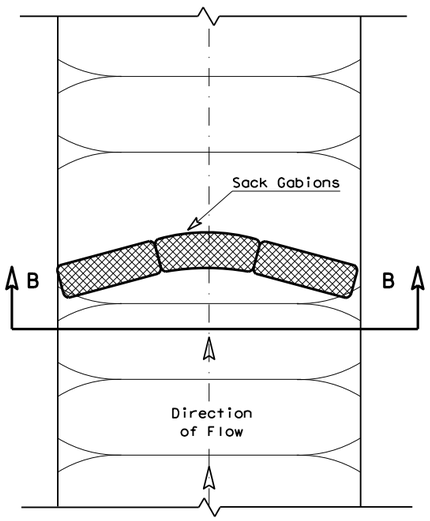
FILE: ec116	DN: TxDOT		CK: KM		DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	1975	02	013		FM 1895	
	DIST	COUNTY			SHEET NO.	
	DAL	KAUFMAN			249	

DATE: 7/26/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\STANDARDS\ec216.dgn

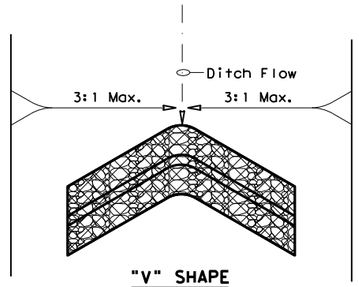


FILTER DAM AT TOE OF SLOPE

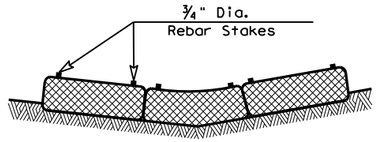
RFD1



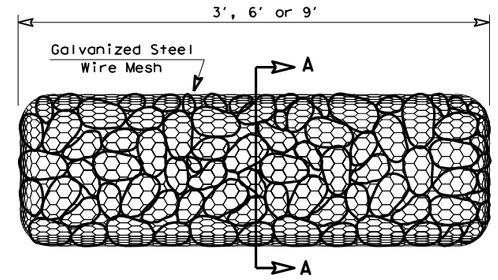
PLAN VIEW



"V" SHAPE PLAN VIEW

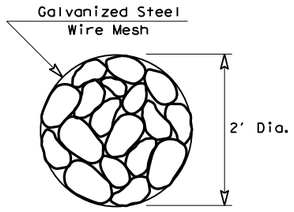


SECTION B-B

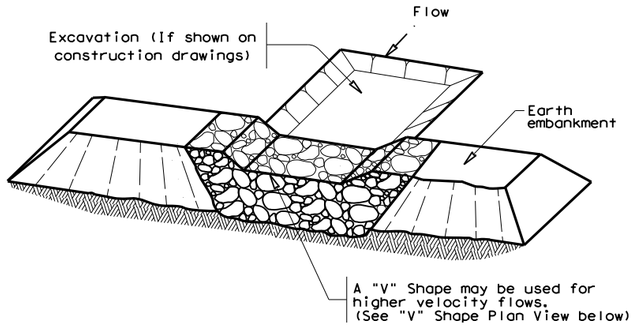


TYPE 4 (SACK GABIONS)

RFD4

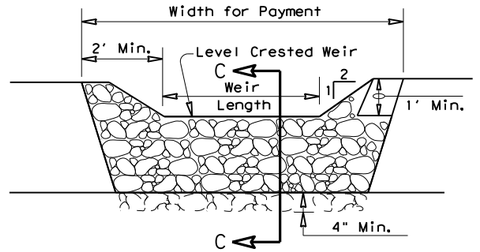


SECTION A-A

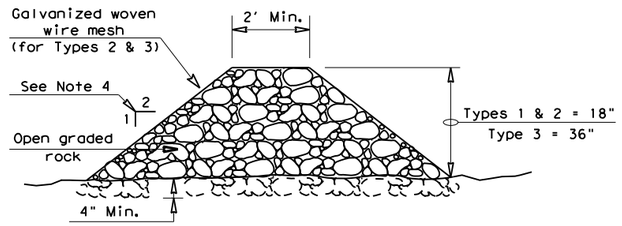


FILTER DAM AT SEDIMENT TRAP

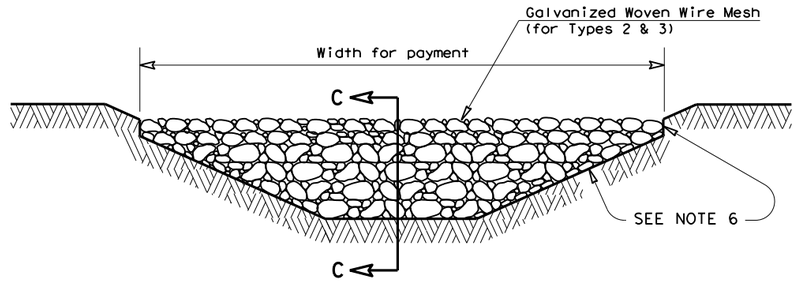
RFD1 — OR — RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation — Design Division Standard

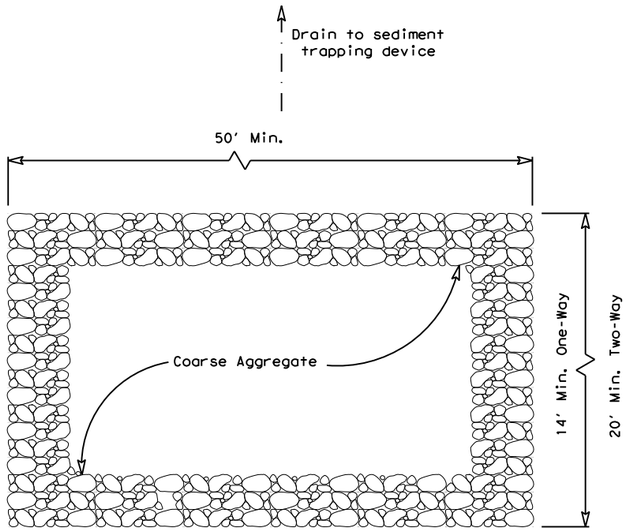
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

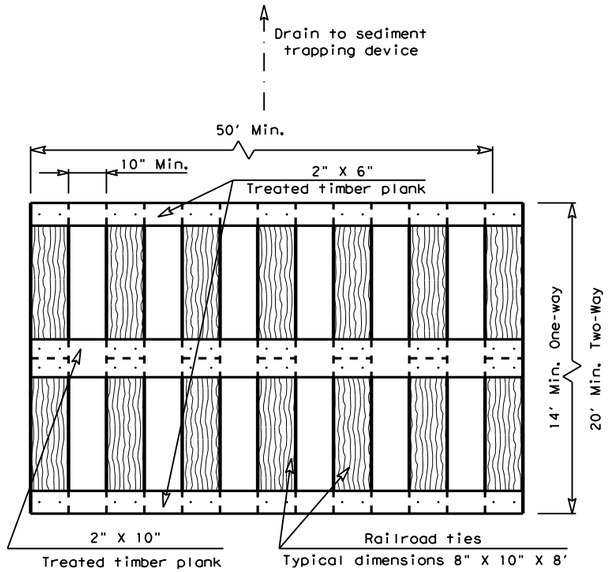
EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		250

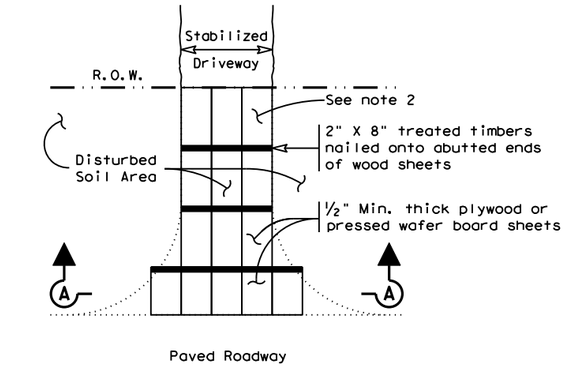
DATE: 7/29/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\19750201\3\4 - Design\Plan Set\9. Environmental\STANDARDS\ec316.dgn



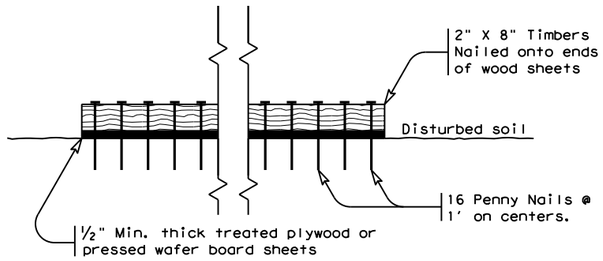
PLAN VIEW



PLAN VIEW



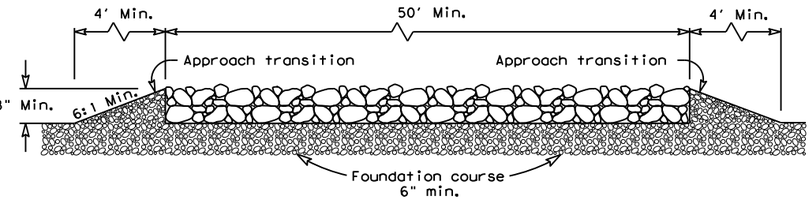
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

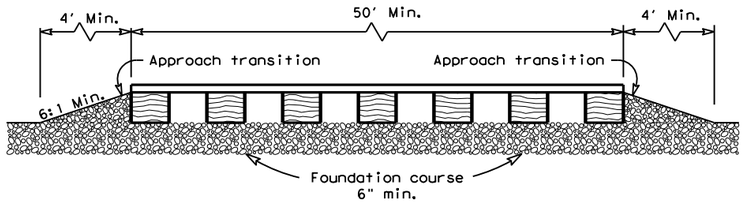
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

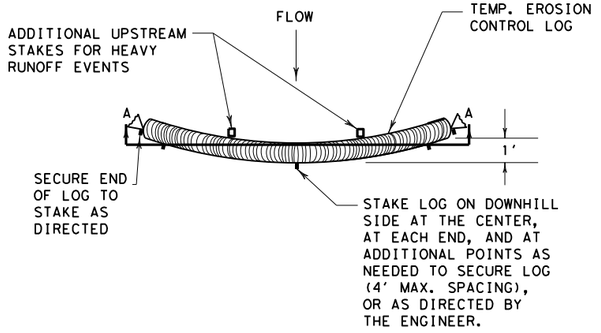
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

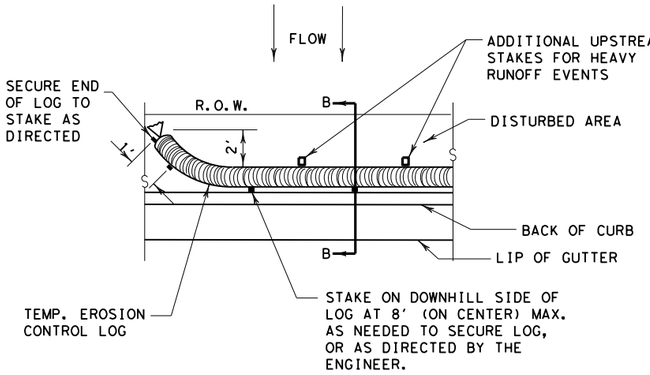
EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		251

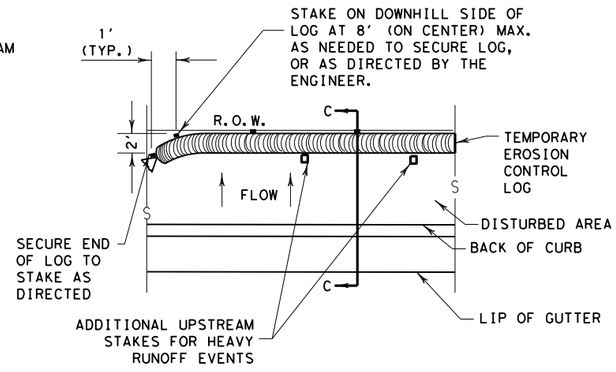
DATE: 7/26/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\STANDARDS\ec916.dgn



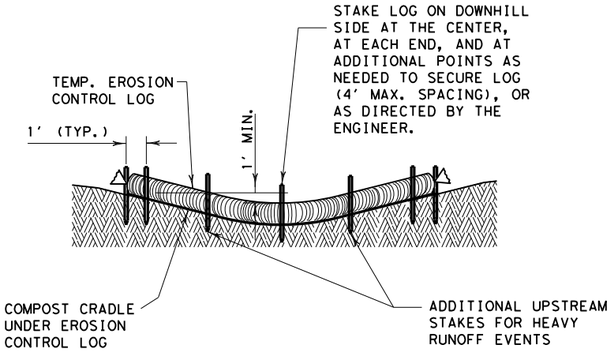
PLAN VIEW



PLAN VIEW



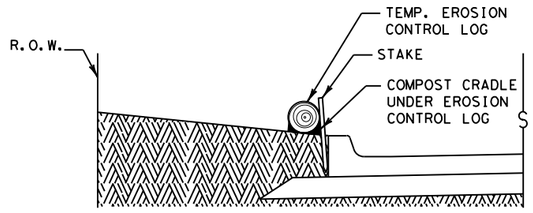
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

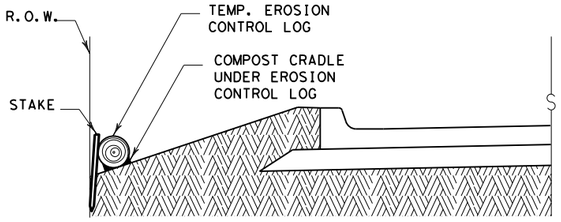
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

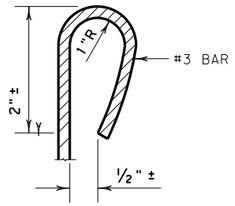
CL-BOC



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.

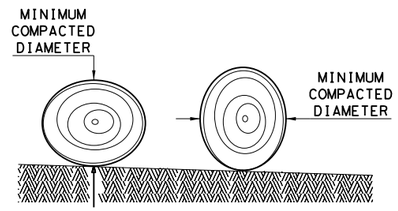
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

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

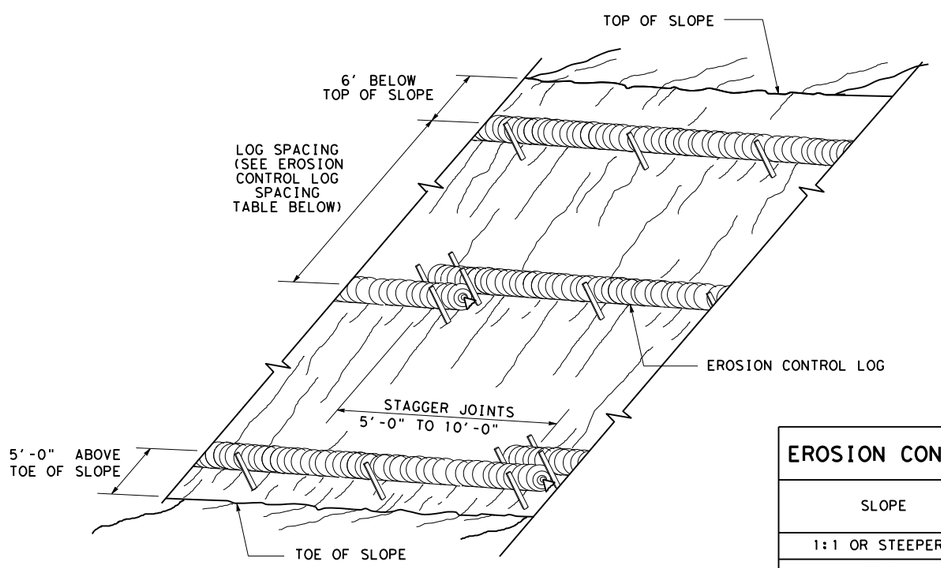
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

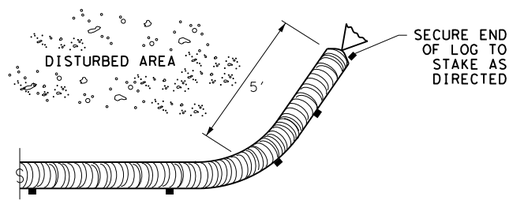
FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	1975	02	013		FM 1895		
	DIST	COUNTY				SHEET NO.	
	DAL	KAUFMAN				252	

DATE: 7/26/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\197502013\4 - Design\Plan Set\9. Environmental\STANDARDS\ec916.dgn



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

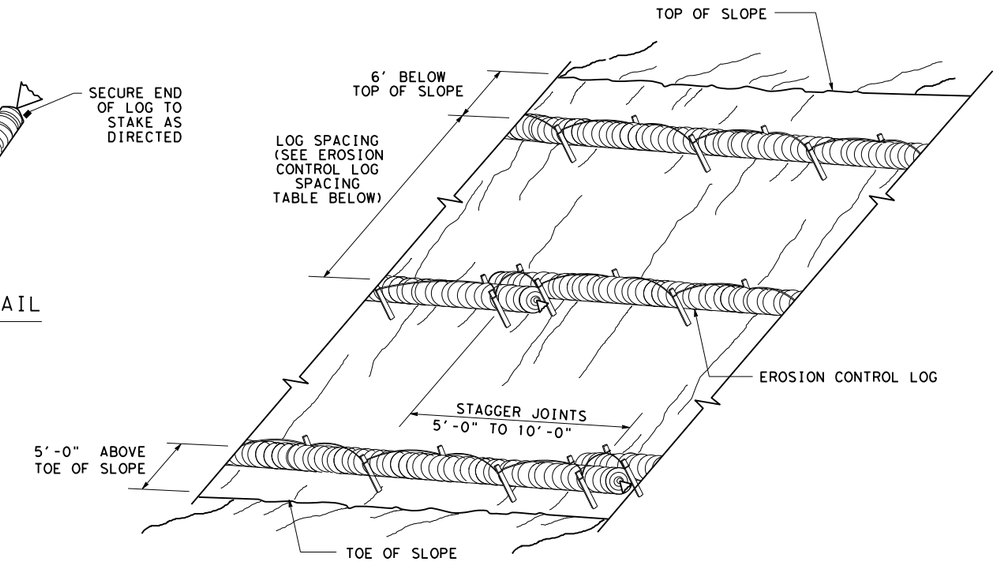
CL-SST



END SECTION RAP DETAIL

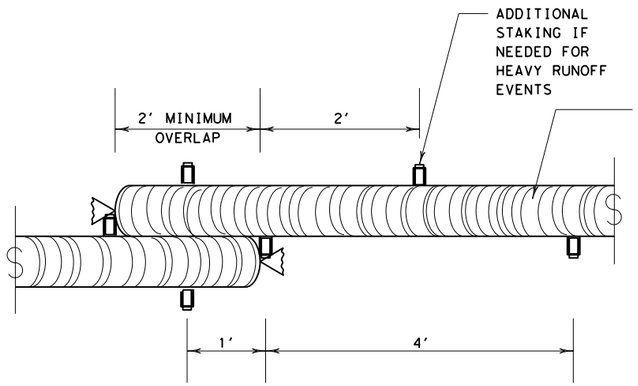
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

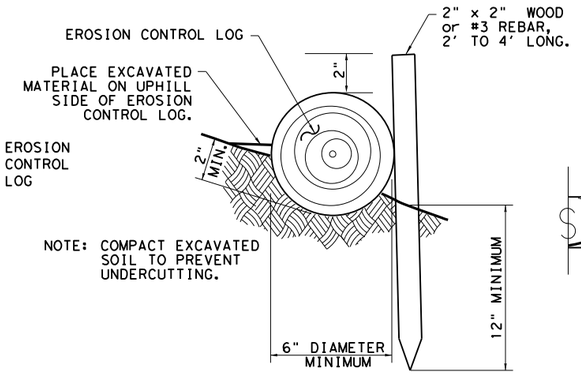
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

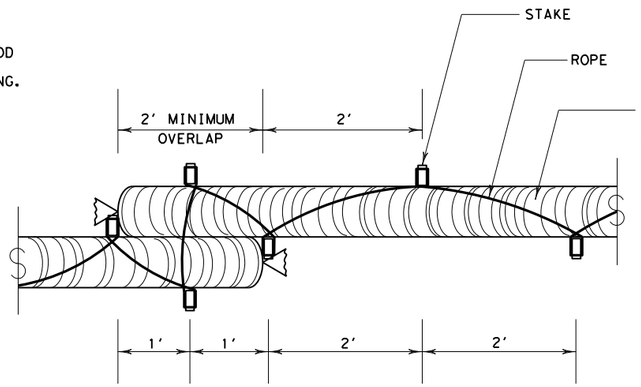


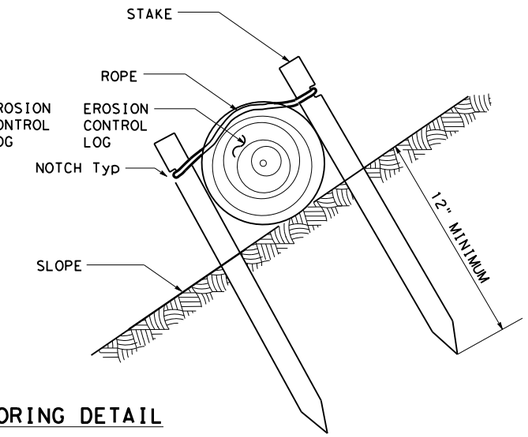


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

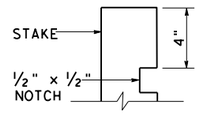
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



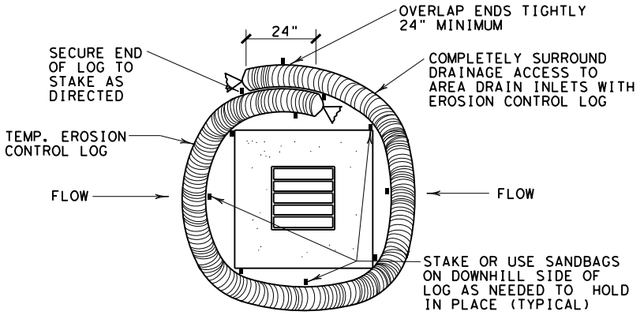
STAKE NOTCH DETAIL

Texas Department of Transportation — Design Division Standard

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

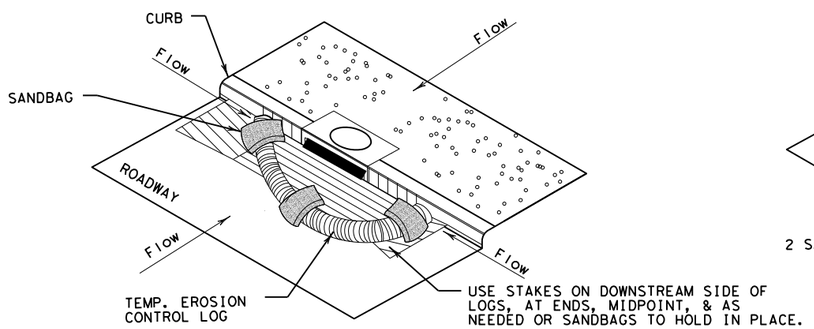
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		253

DATE: 7/26/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\1975020134 - Design\Plan Set\9. Environmental\STANDARDS\ec916.dgn



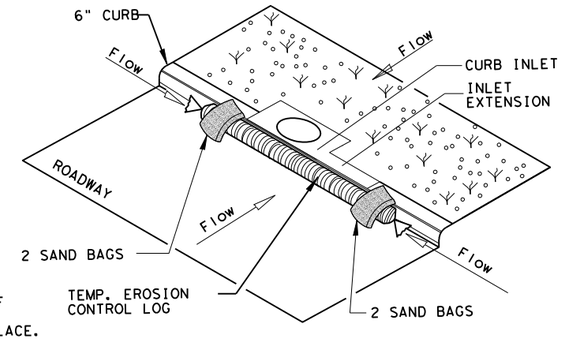
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

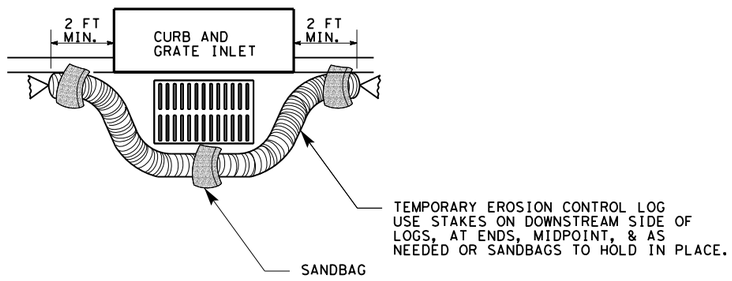
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

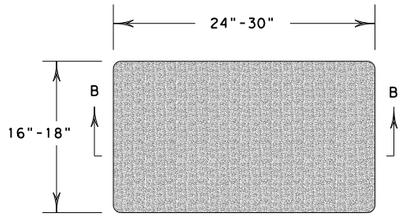
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	1975	02	013	FM 1895
	DIST	COUNTY		SHEET NO.
	DAL	KAUFMAN		254

USER ID

SURFACE PREPARATION ITEM 160* TOPSOIL SY / ITEM 161* COMPOST MANUF. TOPSOIL (BOS) (4") SY

SURFACE PREPARATION

Prepare planting area surface BEFORE placing Topsoil, Compost, Fertilizer, Seed and/or Sod.
Once project area has been completed to final lines, grade and compaction, remove objectionable materials from planting area surface and cultivate existing surface to a depth of 4 inches, unless otherwise specified or directed.

Refer to Items 160 and 161 of TxDOT 2014 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.

TOPSOIL NOTES:
1. When Topsoil is specified under Item 160, use suitable material salvaged from the project ROW in accordance with Item 160 specifications, and/or secure additional good material from approved sources.
2. Topsoil shall include only the top 6 inches of its native surface, and be easily cultivated, fertile, erosion-resistant and free of objectionable materials.
3. Topsoil obtained from sites outside of the ROW must come from approved sources and have a pH between 5.5 and 8.5 su.
4. Place Topsoil on pre-cultivated surface, spread to a uniform loose cover at thickness specified, and shape per plans. Water and roll the finished surface with a light roller or other suitable equipment per Item 160.3; do not over-compact.

COMPOST NOTES:
1. When Compost Manufactured Topsoil (4") is specified under Item 161, use compost meeting all requirements of Item 161.2 and Table 1. Provide quality control (QC) documentation and obtain Engineer approval prior to compost delivery.
2. Contractor shall provide tickets/invoices that document material type, quantity and placement for all compost delivered.
3. Additional topsoil may be required to be imported to achieve the compost/topsoil mix ratio. Topsoil must meet Item 160 specifications.

APPLICATION OF COMPOST MANUFACTURED TOPSOIL (4")

AFTER Surface Preparation, uniformly spread a 1-inch layer of compost on-grade with 3 inches topsoil over pre-cultivated planting area. (25% compost and 75% topsoil = 1" compost and 3" topsoil.)
Then mix compost and topsoil together by cultivating the compost into the topsoil (by till or disk) to a 4-inch (4") depth.
Roll the finished surface with a light corrugated drum; do not over-compact.

FERTILIZER ITEM 166* FERTILIZER AC

SOIL ANALYSIS FOR FERTILIZER APPLICATION RATE

Unless otherwise stated in the plans, Contractor shall perform at least one soil analysis on each project before fertilization, and submit results to Engineer with recommended fertilizer rates based on soil analysis.
Engineer may direct sample location(s). Soil analysis may be waived if both compost and sod are used on entire project.

FERTILIZER NOTES:
1. Refer to Item 166 of TxDOT 2014 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.
2. Apply fertilizer BEFORE seeding, or AFTER placing sod.
3. Use fertilizer containing nitrogen (N), phosphoric acid (P) and potash (K) nutrients, unless otherwise specified. At least 50% of the Nitrogen component shall be a slow-release sulfur-coated urea as described in Item 166.3. Do not apply more than 60 lbs Nitrogen per acre without Engineer concurrence.
4. Deliver fertilizer in bags, clearly labeled to show contents, unless otherwise specified or approved prior to delivery. When non-bagged, loose fertilizer is approved, provide documentation for each load of material delivered, to validate authenticity of the material.
5. Apply fertilizer uniformly, as a dry, granular material, essentially dust-free, and do not mix with water for application as a slurry.
6. When both temporary and permanent seeding are specified for the same area, apply half of the required fertilizer before the temporary seeding operation and the other half before the permanent seeding operation.

SEEDING FOR EROSION CONTROL ITEM 164* DRILL SEEDING AC

RECOMMENDED PLANTING SEASON	PERMANENT RURAL SEED MIX ITEM 164 - DRILL SEEDING (PERM) (RURAL)(CLAY)		PERMANENT URBAN SEED MIX ITEM 164 - DRILL SEEDING (PERM) (URBAN)(CLAY)		TEMPORARY DRILL SEED MIX ITEM 164 - DRILL SEEDING (TEMP) (WARM OR COOL)	
		Pure Live Seed Rate**		Pure Live Seed Rate**		Pure Live Seed Rate**
WARM SEASON Mar.15th, April, May, June, July, August, Sept. 15th	Green Sprangletop (Van Horn)	- 1.0 lbs/AC	Green Sprangletop (Leptochloa dubia)	- 0.3 lbs/AC	Foxtail Millet (Setaria italica)	- 34 lbs/AC
	Sideoats Grama (Haskell)	- 1.0 lbs/AC	Sideoats Grama (El Reno)(Bouteloua curtipendula)	- 3.6 lbs/AC		
	Texas Grama (Atascosa)	- 1.0 lbs/AC	Buffalograss (Texoka)(Buchloe dactyloides)	- 1.6 lbs/AC		
	Hairy Grama (Chaparral)	- 0.4 lbs/AC	Bermudagrass (Cynodon dactylon)	- 2.4 lbs/AC		
	Shortspike Windmillgrass (Welder)	- 0.2 lbs/AC				
	Little Bluestem (OK Select)	- 0.8 lbs/AC				
	Purple Prairie Clover (Cuero)	- 0.6 lbs/AC				
	Engelmann Daisy (Eldorado)	- 0.75lbs/AC				
	Illinois Bundleflower	- 1.3 lbs/AC				
	Awnless Bushsunflower (Plateau)	- 0.2 lbs/AC				
COOL SEASON Sept 16th, Oct, Nov, Dec, Jan, Feb, Mar 14th						Pure Live Seed Rate**
					Tall Fescue (Festuca arundinaceae)	- 4.5 lbs/AC
					Western Wheatgrass (Agropyron smithii)	- 5.6 lbs/AC
					Red Winter Wheat (Triticum aestivum)	- 34 lbs/AC
					Cereal Rye	- 34 lbs/AC

SEEDING NOTES:
1. When seeding is specified under Item 164, refer to TxDOT 2014 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown. Materials and construction shall meet specifications.
2. Conduct seeding upon completion of each applicable construction stage (dependent upon planting season requirements), without compensation for additional move-ins.
3. Place seed AFTER preparing planting area surface. Refer to Surface Preparation detail this sheet, as well as Topsoil Item 160 and Compost Manufactured Topsoil Item 161 when specified. Apply fertilizer per Item 166 BEFORE seeding, per specifications and this sheet, to help drill the fertilizer into the soil.
4. When temporary grasses are well-established and more than 2 inches tall, mow planting area before seeding permanent grasses; mowing for this purpose will be subsidiary. When vegetation is not already well-established, cultivate planting area to a depth as described in Item 164.3, before temporary seeding and before permanent seeding.
5. Seed material must be appropriate to the location, soil type and season. Use the seed mix species and pure live seed rates designated in Tables 1-4 of the TxDOT 2014 Standard Specifications* for Item 164, unless otherwise specified.
6. All seed shall meet labeling, delivery, analysis, and testing requirements described in Item 164.2.1. Deliver seed in labeled, unopened bags or containers to Engineer prior to planting.
7. Uniformly plant seed over the designated planting area, along the contour of slopes, and drill seed to a depth as described in Item 164.3.4.
8. Hydroseeding may be allowed, when specified or Engineer concurs.
9. Implement and continue Vegetative Watering per the schedule, rate and volume specified under Item 168.

TXDOT REFERENCE MATERIALS:

- * "STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES" 2014
- "A GUIDANCE TO ROADSIDE VEGETATION ESTABLISHMENT" 2004
- ONLINE TRAINING COURSE: MNT415 REVEGETATION DURING CONSTRUCTION
- DALLAS DISTRICT "VEGETATION ESTABLISHMENT GUIDELINES"

SODDING FOR EROSION CONTROL ITEM 162* BLOCK SOD (BERMUDA) SY

BLOCK OR ROLL SOD	COMMON NAME	BOTANICAL NAME
	Common Bermuda Grass	Cynodon dactylon

SODDING NOTES:
1. Refer to Item 162 of TxDOT 2014 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.
2. Place sod between the average date of the last freeze in the Spring and 6 weeks before the average date of the first freeze in the Fall, per the Texas Almanac for the project area.
3. Place sod only AFTER soil surface preparation is complete as detailed in this sheet. Dry soil may require pre-watering.
4. Place all sod (blocks or rolls) within 24 hours of delivery to the site, and keep moist from the time it is dug up until it is planted. Sod with dried roots will not be accepted.
5. Place sod with joints alternating on each row to prevent all joints from lining up, and place blocks firmly against adjacent blocks. Roll, tamp and trim sod per Item 162.3.
6. Place fertilizer promptly AFTER sodding operation is complete in each area.
7. Water sod immediately following placement, and continue Vegetative Watering per Item 168.

VEGETATIVE WATERING FOR ESTABLISHING SEED AND SOD ITEM 168* VEGETATIVE WATERING MG

WATERING SCHEDULE

SEASON (Usual Months)	RATE	TIME SCHEDULE	TOTAL WATER ESTIMATE
SPRING & FALL (March, April, May, October)	7,000 gallons/acre per working day	Vegetative watering for seed shall begin on the day after rainfall described below and continue for 60 consecutive working days; vegetative watering for sod shall begin on the day the sod is placed and continue for a minimum of 15 consecutive working days.	420,000 gallons/acre (60 working days)
SUMMER (June, July, August, September)	12,000 gallons/acre per working day		720,000 gallons/acre (60 working days)
WINTER (November through February)	1,000 gallons/acre per working day	Vegetative watering for seed and/or sod shall begin on the day after placement for 15 consecutive working days	15,000 gallons/acre (15 working days)

Notes: Rate and frequency may be adjusted, with the approval of the Engineer, to meet site conditions (especially with sod).
For informational purposes only: 1,000 gallons equals 1 MG

VEGETATIVE WATERING NOTES:
1. Refer to Item 168 of TxDOT 2014 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.
2. Use clean water free of industrial waste and other substances harmful to vegetation growth, per Item 168.2.
3. Use Vegetative Watering to keep the seed bed moist during germination; not to provide initial watering. After drill seeding, postpone watering operations until site receives at least 1/2-inch of natural rainfall in a single day. Delay watering operations for warm season grasses until soil temperature exceeds 70 degrees F.
4. For sod, water immediately.
5. All water distribution equipment shall be furnished and operated to provide water at a uniform and controllable rate. Use a metering device on all watering equipment.
6. Evenly distribute water over entire area designated for seeding and/or sodding, using even spray patterns that do not disturb seed bed and/or dislodge seed from seed bed.
7. Do not water between the hours of 12:00 p.m. and 6:00 p.m. when daytime temperatures exceed 95 degrees F.
8. After initial establishment period, continue intermittent watering of newly established seed or sod at a rate of approximately 1-inch water/week, during summer months until end of contract.
9. If 1/4-inch or more of rainfall occurs on site on any given working day, no vegetative watering will be needed on that working day. (Note: 1/4-inch rain equals 7,000 gallons of water per acre.)
10. Should the Contractor fail to apply the specified amount of water within the time allowed, any seed or sod in poor condition shall be replaced, fertilized, and watered at Contractor's expense.

**Note: The amount of Pure Live Seed (PLS) in one pound of bulk seed is based on three factors: % Purity, % Germination, and % Dormant. Use the following formula to calculate PLS in bulk seed: PLS = % Purity X (% Germination + % Dormant) Ensure that the specified amount of pure live seed is placed.

ROADSIDE MOWING ITEM 730* PROJECT MAINTENANCE AC

MOWING NOTES:
1. During project construction, once seed is established, use mowing to promote permanent grasses by mowing any remaining temporary grasses.
2. Also mow established turf and ROW grasses in designated areas of project limits as specified or directed by Engineer.
3. Remove litter and debris prior to mowing.
4. Do not mow on wet ground when soil rutting can occur.
5. Hand-trim around obstructions and stormwater control devices as needed.
6. Maintain paved surfaces free of tracked soils and clipped vegetation.

SEQUENCE OF WORK:

- CULTIVATE SURFACE SOIL.
- PREPARE / PLACE TOPSOIL, OR
- PREPARE / PLACE COMPOST MANUFACTURED TOPSOIL.
- APPLY FERTILIZER AND THEN PLACE SEEDING, OR
- PLACE SOD AND THEN APPLY FERTILIZER.
- CONDUCT VEGETATIVE WATERING.
- CONDUCT ROADSIDE MOWING, AS DIRECTED.

Texas Department of Transportation

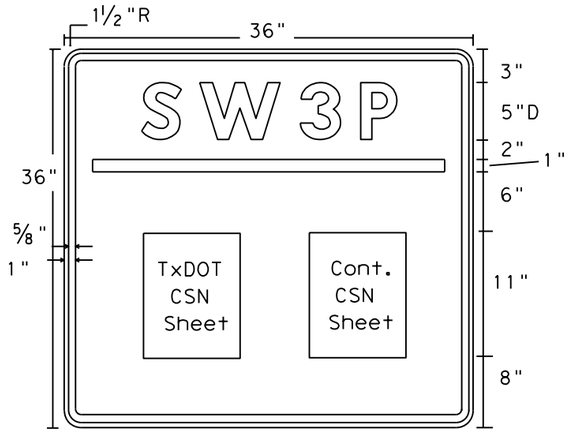
VEGETATION ESTABLISHMENT SHEET

(DALLAS DISTRICT)

TEMPLATE REVISION DATE: 02/21/19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
CPB	6	(See Title Sheet)		FM 1895
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
XXX	TEXAS	DALLAS	KAUFMAN	
CHECK	CONTROL	SECTION	JOB	255
XXX	1975	02	013	
CHECK				
XXX				

DATE



SW3P SIGN

TxDOT & Contractor Construction Site Note (CSN)

Sign Dimensions

36" X 36"

Letters - White
Numbers - White
Border - White
Background - Blue

GENERAL NOTES:

1. The alphabets and lateral spacing between letters and numerals shall conform with the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways", (TMUTCD) latest edition, and the "Compliant Work Zone Traffic Control Devices List". Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.
2. Legend and border may be applied by reverse screening process with transparent colored ink, cut-out white reflective sheeting applied to colored background or combination thereof. Background shall be reflective sheeting Type C.
3. CSN Sheets will be laminated and attached to the sign with an adhesive. Ensure sheets remain dry. (See Figure 1).
4. SW3P Signs should be placed just inside the ROW line at the project limits at a readable height. It may be placed perpendicular or parallel to ROW line. If the sign cannot be placed outside the clear zone, it will be mounted per TMUTCD requirements.
5. Final location of the signs will be as approved by the Engineer.

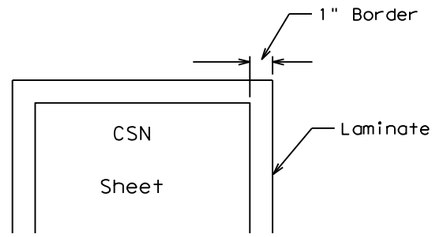
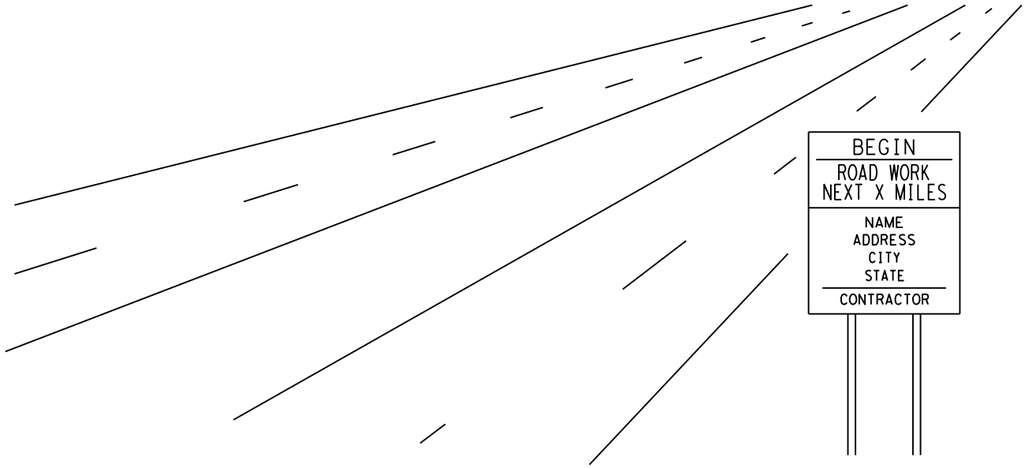
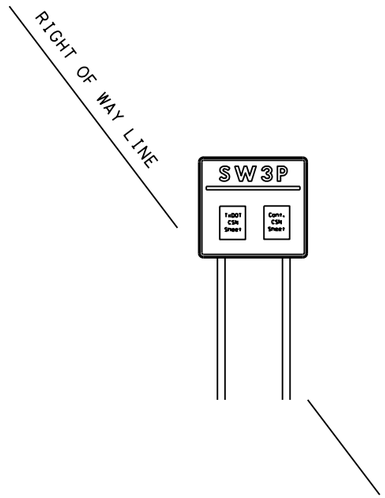


Figure 1





DEPARTMENT MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
FLAT SURFACE REFLECTIVE SHEETING	DMS-8300
VINYL NON-REFLECTIVE DECAL SHEETING	DMS-8320

COLOR	USAGE	REFLECTIVE SHEETING OR OTHER MATERIAL
BLUE	BACKGROUND	TYPE C (FLUORESCENT PRISMATIC)
WHITE	LEGEND & BORDERS	VINYL NON-REFLECTIVE DECAL SHEETING

Texas Department of Transportation
DALLAS DISTRICT STANDARD

SW3P SIGN SHEET

FILE:	DN: TxDOT	CK:	DW:	CK:	
©TxDOT 2016	DISTRICT	PROJECT NO.			SHEET
	18	(SEE TITLE SHEET)			256
REVISION DATE: 10-16-15	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	KAUFMAN		1975	02	013	FM 1895

LEVELS DISPLAYED
PATH: