

FINAL PLANS

NAME OF CONTRACTOR: \_\_\_\_\_  
 DATE OF LETTING: \_\_\_\_\_  
 DATE WORK BEGAN: \_\_\_\_\_  
 DATE WORK COMPLETED: \_\_\_\_\_  
 DATE WORK ACCEPTED: \_\_\_\_\_

SHEET 1 TITLE SHEET  
 SHEET 2 INDEX OF SHEETS  
 REFERENCE SHEET 2 FOR FULL INDEX OF SHEETS

STATE OF TEXAS  
 DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED  
 STATE HIGHWAY IMPROVEMENT  
 FEDERAL AID PROJECT F2023(972)

BU 287P

LIMITS: WJ BOAZ ROAD TO BAILEY BOSWELL ROAD  
 NET LENGTH OF PROJECT = 3,706 FT = 0.702 MI  
 FOR THE CONSTRUCTION OF LANDSCAPE AND SCENIC ENHANCEMENT WORK  
 CONSISTING OF: HARDSCAPE, IRRIGATION, AND PLANTING

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
287P	F 2023(972)		BU 287P
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	TARRANT	1
CONTROL	SECTION	JOB	
0013	10	091	

ROADWAY SPEED LIMIT: 50 MPH

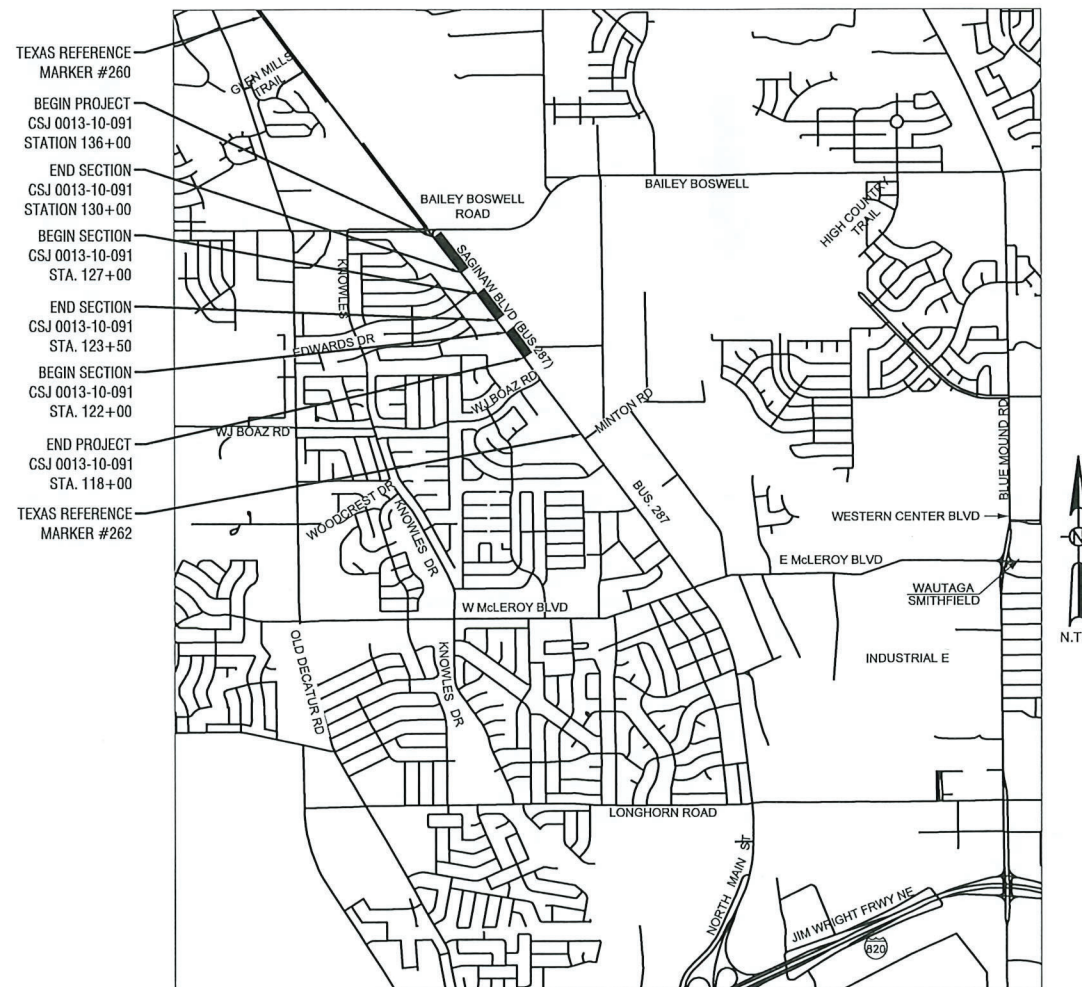
NOTE:

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

SUBMITTED FOR LETTING: 06/26/23  
*Laura Presley*  
 PROJECT MANAGER  
 KIMLEY-HORN AND ASSOCIATES, INC.

CONCURRENCE: 6/26/23  
*John Boone*  
 CITY MANAGER  
 CITY OF SAGINAW

CONCURRENCE: 6/26/23  
*Lee Howell*  
 DEPUTY CITY MANAGER  
 CITY OF SAGINAW



TEXAS REFERENCE MARKER #260  
 BEGIN PROJECT CSJ 0013-10-091 STATION 136+00  
 END SECTION CSJ 0013-10-091 STATION 130+00  
 BEGIN SECTION CSJ 0013-10-091 STA. 127+00  
 END SECTION CSJ 0013-10-091 STA. 123+50  
 BEGIN SECTION CSJ 0013-10-091 STA. 122+00  
 END PROJECT CSJ 0013-10-091 STA. 118+00  
 TEXAS REFERENCE MARKER #262



NO EQUATIONS  
 STATION EXCEPTIONS:  
 STA. 130+00 - STA. 127+00  
 STA. 123+50 - STA. 122+00  
 NO RAILROAD CROSSINGS

PLANS PREPARED BY:

**Kimley»Horn**

TEXAS REGISTERED ENGINEERING FIRM # F-928  
 801 CHERRY STREET, UNIT 11, SUITE 1300  
 FORT WORTH, TX 76102  
 P: 817-335-6511



06/22/2023

06/22/2023

06/22/2023

PLOTTED BY: KELEHER, MEGAN  
 PLOT DATE: 6/22/2023 2:33 PM  
 LOCATION: K:\FTW\_LAL\051003158\_SAGINAW GR PHASE II\DWG04 CD\SHEET1\_COVER.DWG  
 LAST SAVED: 6/22/2023 1:35 PM

WORK WAS COMPLETED ACCORDING TO THE PLANS AND CONTRACT.

\_\_\_\_\_, R.L.A.  
 SIGNATURE OF REGISTRANT & DATE

® TEXAS DEPARTMENT OF TRANSPORTATION

SUB FOR: DocuSigned by: 6/27/2023  
*phue*  
 7B89CC87CF28477...  
 AREA ENGINEER  
 RECOMMENDED FOR LETTING: 7/7/2023  
 DocuSigned by: *David M Salazar*  
 DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT  
 APPROVED FOR LETTING: 7/7/2023  
 DocuSigned by: *David M Salazar, P.E.*  
 DISTRICT ENGINEER

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- 8 EXISTING CONDITIONS

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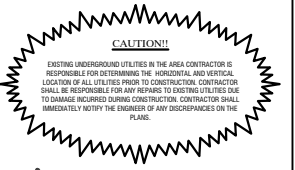
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- 45 SWPPP\*

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



*Antonio D. Jaramilla*  
 P.E. 06/22/2023  
 DATE



*Laura Preley*

**Kimley»Horn**  
 ® Texas Registered Engineering Firm F-928  
 Texas Department of Transportation  
 © 2023

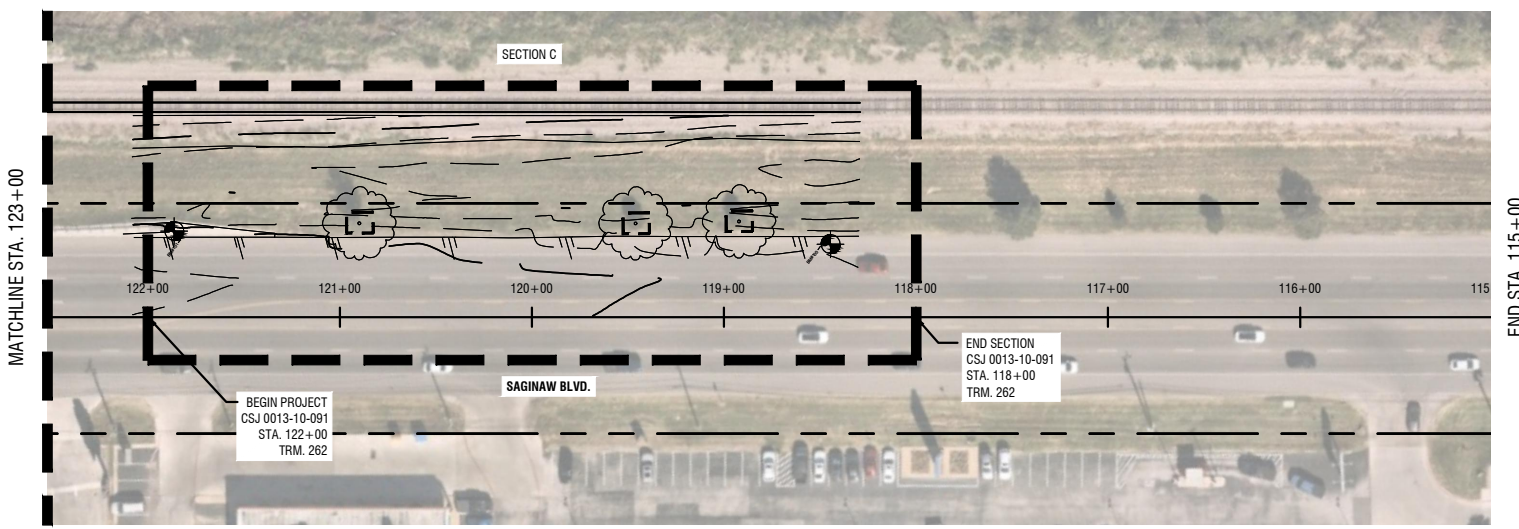
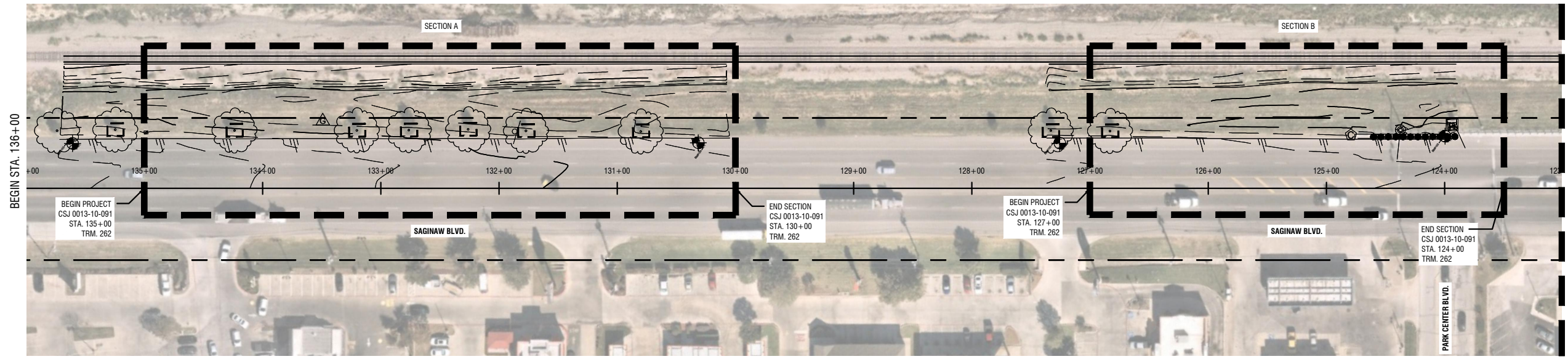
**SAGINAW BOULEVARD LANDSCAPE  
 ENHANCEMENTS  
 GREEN RIBBON PROGRAM**  
 SAGINAW, TEXAS

**INDEX OF SHEETS**

FED.RD.	PROJECT NO.	HIGHWAY NO.
287P	SEE TITLE SHEET	BU 287P
STATE	DISTRICT	COUNTY
TEXAS	FTW	TARRANT
CONTROL	SECTION	JOB
0013	10	091
		SHEET NO.
		2

PLOTTED BY: KELLEHER, MEGAN  
 PLOT DATE: 6/22/2023 2:33 PM  
 LOCATION: K:\FTW\_LAP\06100103158\_SAGINAW GR PHASE I\DWG\04\_CD SHEET\COVER.DWG  
 LAST SAVED: 6/22/2023 1:35 PM





**NOTE:**  
CALL TXDOT TRAFFIC MANAGEMENT CENTER (817-370-3661) FOR TXDOT LOCATES WHEN WORKING NEAR EXISTING TRAFFIC SIGNAL.

**CAUTION!**  
EXISTING UNDERGROUND UTILITIES IN THE AREA CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO EXISTING UTILITIES DUE TO DAMAGE INCURRED DURING CONSTRUCTION. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES ON THE PLAN.

**GRAPHIC SCALE IN FEET**  
0 25 50 100  
IF PLAN SHEET IS 22"x34"  
SCALE IS 1 IN = 50 FT

*Laura Presley*  
  
 06/22/2023

**Kimley»Horn**  
 © Texas Registered Engineering Firm F-928  
  
 © 2023

SAGINAW BOULEVARD LANDSCAPE  
 ENHANCEMENTS  
 GREEN RIBBON PROGRAM  
 SAGINAW, TEXAS

OVERALL LAYOUT PLAN

FED. RD.	PROJECT NO.	HIGHWAY NO.	
287P	SEE TITLE SHEET	BU 287P	
STATE	DISTRICT	COUNTY	
TEXAS	FTW	TARRANT	
CONTROL	SECTION	JOB	
0013	10	091	
			SHEET NO. 3

PLOTTED BY: KELLEHER, MEGAN  
 PLOT DATE: 6/22/2023 2:23 PM  
 LOCATION: K:\FTW\_LAP\06100103158\_SAGINAW GR PHASE II\DWG\04\_CD SHEET\COVER.DWG  
 LAST SAVED: 6/22/2023 1:35 PM

**Control:** 0013-10-091

**County:** Tarrant

**Highway:** BU 287P

Specification Data

**Basis of Estimate**

Item	Description	Rate	Unit
166	Fertilizer (16-8-8)	600 lb./acre**	ton
168	Vegetative Watering	169,400 gal./acre	1,000 gal.

**Special Notes**

Electronic files containing answered pre-letting questions and other project related design information will be placed in the following FTP site periodically.

Check this site for new information. Notices of new postings will not be sent out by the Engineer.

The data located in these files is for non-construction purposes only and can be found at

TxDOT's public FTP site at <https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/>.

Access is read-only.

All files in the FTP site are subject to the License Agreement shown on the FTP site.

To obtain a copy of the project plans free of charge, submit a request from the following site: <http://www.txdot.gov/business/letting-bids/plans-online.html>

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

Area Engineer's Email: [minh.tran@txdot.gov](mailto:minh.tran@txdot.gov)  
Assistant Area Engineer's Email: [Alfredo.Luera@txdot.gov](mailto:Alfredo.Luera@txdot.gov)  
Design Manager's Email: [sam.yacoub@txdot.gov](mailto:sam.yacoub@txdot.gov)

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

For Q&A's on Proposals navigate to <https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors>. Use the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard

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using the controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.

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.

Single lane closures, except as otherwise shown in the plans, will be restricted to off-peak hours as defined in the following table:

Peak Hours		Off-Peak Hours	
6 to 9 AM Monday through Friday	3 to 7 PM Monday through Friday	9 AM to 3 PM and 7 PM to 6 AM Monday through Friday	All day Saturday and Sunday

Work that requires closure of multiple travel lanes in the same direction, except as otherwise shown in the plans, are restricted to night hours between 9 PM and 6 AM.

Existing storm sewers and utilities are shown from the best available information. Verify the location of all underground facilities prior to starting work.

For dimensions of right-of-way not shown on the plans, see right-of-way map on file at the TxDOT District Office.

**Modifications to Lane Closure / Work Restrictions:**

Submit a request in writing for approval by the Engineer a minimum of 10 days in advance of implementing a change to lane closure restrictions.

When deemed necessary, the Engineer will lengthen, shorten, or otherwise modify lane closure restrictions as traffic conditions warrant.

When deemed necessary, the Engineer will modify the list of major events when new events develop, existing events are rescheduled, or when warranted.

Special Events/ Special Situations will be handled on a case-by-case basis. No work restricting lane closures is allowed from 3 PM a day before to 9 AM the day after the Special Event or Special Situation.



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Do not discolor or damage existing curb and curb and gutter during construction operations. In the event of discoloration or damage, clean or repair as directed.

Provide temporary drain openings at all low points or other drainage structures, as required, at the Contractor's expense.

Remove any obstructions to existing drainage due to the contractor's operations, as required, at the Contractor's expense.

#### **Item 2. Instructions to Bidders**

Proposals with a bid of more than **96** working days for the substantial Completion of Milestone 1 will be considered non-responsive.

#### **Item 4 – Scope of Work**

Reimbursement for project overhead will not be considered until project completion has extended beyond the original Contract Time.

#### **Item 5. Control of the Work**

When shop drawings, shop details, erection drawings, working drawings, forming plans, or other drawings are required, prepare and submit drawings on sheets 8-1/2 by 11 inches, 17 by 22 inches, or full size drawings reduced to half scale if completely legible. If, in the opinion of the Engineer, the drawings are not completely legible, prepare and submit on sheets 22 by 34 inches, with a 1-1/2 inch left margin, and 1/2 inch top, right, and bottom margins.

Submit all sheets with a title in the lower right hand corner. The title must include the sheet index data shown on the lower right corner of the project plans, name of the structure or element or stream, sheet numbering for the shop drawings, name of the fabricator and the name of the Contractor.

Standard Operating Procedure for Alternate Precast Proposal Submission” found online at <https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design>. Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

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#### **Item 6. Control of Materials**

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the contractor must submit a notarized original of the TxDOT Construction Material Buy America Certification Form for all items classified as construction materials. This form is not required for materials classified as a manufactured product.

Refer to the Buy America Material Classification Sheet for clarification on material categorization.

The Buy America Material Classification Sheet is located at the below link.

<https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html> for clarification on material categorization.

#### **Item 7. Legal Relations and Responsibilities**

The total area disturbed for this project is **.28** acres. The disturbed area in this project, all project locations in the Contract, and the Contractor project specific locations (PSLs), within 1 mile of the project limits, for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain required authorization from the TCEQ for Contractor PSLs for construction support activities on or off the right of way. When the total area disturbed in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the right of way to the Engineer and to the local government that operates a separate storm sewer system.

When a bridge deck is milled, seal coated and overlaid, remove excess material. Do not just broom to the sides of the bridge, under guardrail, etc. Cover or protect all sealed expansion joints and rails on bridges and all railroad tracks encountered as approved. Clean and repair all of these features if they weren't properly protected at contractor's expense. This work is subsidiary work to applicable bid items.

#### **Prevention of Migratory Bird Nesting**

It is anticipated that migratory birds, a protected group of species, may try to nest on bridges, culverts, vegetation, or gravel substrate, at any time of the year. The preferred nesting season for migratory birds is from February 15 through October 1. When practicable, schedule construction operations outside of the preferred nesting season. Otherwise, avoid nests containing migratory birds and perform no work in the nesting areas until the young birds have fledged.

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The following Holiday/Event lane closure restriction requirements apply to this project:  
No work that restricts or interferes with traffic shall be allowed between 3 PM on the day preceding a Holiday or Event and 9 AM on the day after the Holiday or Event.

<b>Holiday Lane Closure Restrictions</b>	
<b>New Year's Eve and New Year's Day</b> (December 31 through January 1)	3 PM December 30 through 9 AM January 2
<b>Easter Holiday Weekend</b> (Friday through Sunday)	3PM Thursday through 9 AM Monday
<b>Memorial Day Weekend</b> (Friday through Monday)	3 PM Thursday through 9 AM Tuesday
<b>Independence Day</b> (July 3 through July 5)	3 PM July 2 through 9 AM July 6
<b>Labor Day Weekend</b> (Friday through Monday)	3 PM Thursday through 9 AM Tuesday
<b>Thanksgiving Holiday</b> (Wednesday through Sunday)	3 PM Tuesday through 9 AM Monday
<b>Christmas Holiday</b> (December 23 through December 26)	3 PM December 22 through 9 AM December 27

Plan work schedules around the appropriate dates above to ensure productive work is performed without lane closures.

<b>Event Lane Closure Restrictions</b>			
3 PM the day before Event to 9 AM the day after the Event			
NASCAR Races at Texas Motor Speedway (generally 3 events):	NASCAR Nationwide and Sprint Cup Series (Held in late March/early April)	NASCAR Nationwide and Sprint Cup Series (Held in Late October/early November)	Indy Series Racing and NASCAR Truck Series (Held in June)
Within one mile radius of major retail traffic generators i.e. malls (Thanksgiving Day through January 2)			
Fort Worth Stock Show and Rodeo			
Arlington Entertainment District			
Grapevine Festivals (Including but not limited to: Carol of Lights, Black Friday Weekend, Christmas Parade, and weekends during Christmas Capital of Texas)			

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MayFest
Weatherford Peach Festival

**Item 8. Prosecution and Progress**

Working days will be computed and charged in accordance with Section 8.3.1.1, 'Five-Day Workweek.'

Progress schedule to be provided by contractor and in CPM format. Coordinate with managing area office on progress schedule.

**Item 100. Preparing Right of Way**

Measurement for this item will be along the centerline of the project with the limits of measurements as shown on the plans.

**Item 164. Seeding for Erosion Control**

Apply seeding required between December 1 and January 31 using seed types and mixtures as shown in Item 164.2.1, Table 3. If, in the opinion of the Engineer, this does not provide an effective vegetative cover, apply "straw or hay mulch" as specified in Article 164.3.2, "Straw or Hay Mulch Seeding" as soon as possible. After February 1, apply warm season seeding in order to establish a permanent protective vegetative cover.

**Item 166. Fertilizer**

Fertilize all areas of project to be seeded or sodded.

**Item 168. Vegetative Watering**

Furnish and install an approved rain gauge at the project site, as directed. Furnishing and installation of the rain gauge will not be paid for directly, but will be subsidiary to Item 168.



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Apply vegetative watering for an establishment period of thirteen weeks following application of seed or installation of sod, at a rate of 1/2 inch of water depth per week (approximately 13,030 gallons per acre). During the first four weeks after seeding, apply water twice per week, on non-consecutive days, each at half the weekly application rate. For the remainder of the establishment period, apply vegetative watering once per week during the months of January through June or September through December, at the weekly application rate; apply watering twice per week, on non-consecutive days during the months of July and August, each at one-half the weekly application rate.

Average weekly rainfall rates for the District are:

January—0.39"	April—0.86"	July—0.48"	October—0.68"
February—0.46"	May—1.00"	August—0.47"	November—0.46"
March—0.48"	June—0.63"	September—0.74"	December—0.37"

**Item 192. Planting**

No planting shall occur between June 1st and September 15th without written approval from the Engineer.

Perform soil percolation test at least 24 hours prior to planting trees in plant pits. Excavate plant pit and fill entirely with water. Inspect planting pit within 24 hours to verify water has percolated into surrounding soil. In the event the water is present after 24 hours, contact Engineer before continuing tree planting in pits.

Prior to installing any plant material, ensure the irrigation system (if included in project) is pressurized up to the valves.

Begin the 90-day maintenance period only after all live plant material and functional irrigation systems have been installed as shown on plans. It is understood that the contractor will provide 3” of bark mulch for the 30-gallon plant material subsidiary to item 192 6024. All other bark mulch areas are paid for under pay item 192 6012.

Per special provision 192.001 plant material requiring replacement will be at the cost of the contractor.

**Item 193. Landscape Establishment**

The Contractor shall maintain the project area and be responsible for the adequate irrigation of the trees and planting beds during the 12-month establishment period.

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Begin the additional establishment period covered under this item only after all maintenance activities have been completed under items 170 and 192 and after all plant material and irrigation systems have been installed as shown on plans. The Engineer may authorize in writing beginning the 12-month establishment period at individual locations provided the installations are complete at those locations.

Replace dead or dying plant material within 10 days of notification by the Engineer unless otherwise indicated in the notification. Plant material replacement will be subsidiary to this item unless determined otherwise by the Engineer.

Contractor will continue to pay for water used through the irrigation meter during the maintenance period under this item. Transfer the meter to the City at the end of the project.

**Item 432. Riprap**

Provide weep holes as directed.

The quantities for riprap at the location indicated may be varied to the extent necessary to ensure proper functioning for the purpose intended.

All concrete riprap will be 5" (.42') in thickness, unless otherwise shown on the plans, and must be reinforced.

An 8 inch (.67 ft.) by 18 inch (1.5 ft.) toe wall is required at the exposed edges of all concrete riprap, unless otherwise directed.

Provide a toe wall at all exposed edges of all protection stone riprap, unless otherwise directed.

**Item 502. Barricades, Signs, and Traffic Handling**

The contractor force account ‘safety contingency’ that has been established for this project is intended to be utilized for work zone enhancements to improve the effectiveness of the traffic control plan that could typically 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.

Permanent signs may be installed when construction in an area is complete and they will not conflict with the traffic control plan for the remainder of the job.

Existing signs are to remain as long as they do not interfere with construction and they do not conflict with the traffic control plan.

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Any sign not detailed in the plans but called for in the layout will be as shown in the current "Standard Highway Sign Designs for Texas".

When traffic is obstructed, arrange warning devices in accordance with the latest edition of the "Texas Manual on Uniform Traffic Control Devices".

Cover or remove any work zone signs when work or condition referenced is not occurring.

Do not place barricades, signs, or any other traffic control devices where they interfere with sight distance at driveways or side streets. Provide access to all driveways during all phases of construction unless otherwise noted in the plans or as directed.

**Item 506. Temporary Erosion, Sedimentation, and Environmental Controls**

Remove accumulated sediment or replace SW3P controls when the capacity has been reduced by 50% or when the depth of sediment at the control structure exceeds one foot.





CONTROLLING PROJECT ID 0013-10-091

DISTRICT Fort Worth  
HIGHWAY BU 287P

COUNTY Tarrant

# Estimate & Quantity Sheet

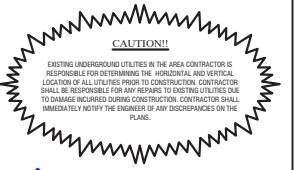
CONTROL SECTION JOB				0013-10-091		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00194743			
COUNTY				Tarrant			
HIGHWAY				BU 287P			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	100-6002	PREPARING ROW	STA	10.000		10.000	
	105-6014	REMOVING STAB BASE & ASPH PAV (7"-12")	SY	76.000		76.000	
	164-6008	BROADCAST SEED (PERM) (URBAN) (CLAY)	AC	0.250		0.250	
	166-6001	FERTILIZER	AC	0.250		0.250	
	168-6001	VEGETATIVE WATERING	MG	8.700		8.700	
	170-6001	IRRIGATION SYSTEM	LS	1.000		1.000	
	192-6003	PLANT MATERIAL (3-GAL)	EA	1,631.000		1,631.000	
	192-6015	LANDSCAPE EDGE	LF	822.000		822.000	
	192-6016	PLANT BED PREPARATION	SY	968.000		968.000	
	193-6001	PLANT MAINTENANCE	MO	12.000		12.000	
	193-6007	IRRIGATION SYSTEM OPER AND MAINT	MO	12.000		12.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY	23.000		23.000	
	432-6041	RIPRAP (SPECIAL)	CY	103.000		103.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	5		5	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	1,107.000		1,107.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	1,107.000		1,107.000	
	1004-6001	TREE PROTECTION	EA	12.000		12.000	
	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	

**BASE BID MATERIAL QUANTITIES**

SECTION #	STATION #	ITEM 100 6002	ITEM 105-6014	ITEM 164 6008	ITEM 166 6001	ITEM 168 6001	ITEM 170 6001	ITEM 192 6003	ITEM 192 6003	ITEM 192 6003	ITEM 192 6003	ITEM 192 6003	ITEM 192 6003	ITEM 192 6003	ITEM 192 6003
		PREPARING ROW	REMOVING STAB BASE & ASPH PAV (7"-12")	BROADCAST SEED (PERM) (RURAL) (CLAY)	FERTILIZER	VEGETATIVE WATERING	IRRIGATION SYSTEM	PLANT MATERIAL (3 - GAL) (SHRUB) (KALEIDOSCOPE GLOSSY ABELIA)	PLANT MATERIAL (3 - GAL) (SHRUB) (DWARF YAUPON HOLLY)	PLANT MATERIAL (3 - GAL) (SHRUB) (DWARF FIREPOWER NANDINA)	PLANT MATERIAL (3 - GAL) (SHRUB) (LEMON LIME NANDINA)	PLANT MATERIAL (3 - GAL) (SHRUB) (COLOR GUARD YUCCA)	PLANT MATERIAL (3 - GAL) (SHRUB) (DWARF FOUNTAIN GRASS)	PLANT MATERIAL (3 - GAL) (SHRUB) (PINK MUHLY)	PLANT MATERIAL (3 - GAL) (SHRUB) (MEXICAN FEATHER GRASS)
		(STA)	(SY)	(AC)	(AC)	(MG)	(LS)	(EA)	(EA)	(EA)	(EA)	(EA)	(EA)	(EA)	(EA)
A	BEGIN STA. 135+00 TO END STA. 130+00	5	40.5	0.125	0.125	4.35		191	46	0	126	145	76	0	381
B	BEGIN STA. 127+00 TO END STA. 124+00	2.5	16.5	0.0625	0.0625	2.175		0	56	38	0	74	76	84	0
C	BEGIN STA. 122+00 TO END STA. 118+00	2.5	19	0.0625	0.0625	2.175		69	30	72	41	76	0	0	50
	<b>TOTALS</b>	10	76	0.25	0.25	8.7	1	260	132	110	167	295	152	84	431

**BASE BID MATERIAL QUANTITIES**

SECTION #	STATION #	ITEM 192 6015	ITEM 192 6016	ITEM 193 6001	ITEM 193 6007	ITEM 432 6041	ITEM 432 6041	ITEM 502 6001	ITEM 506 6040	ITEM 506 6043	ITEM 500 6001	ITEM 432 6001	ITEM 1004 6001
		LANDSCAPE EDGE	BED PREP TYPE 2	PLANT MAINTENANCE	IRRIGATION SYSTEM OPERATION & MAINTENANCE	RIPRAP (SPECIAL) (RIVER ROCK) (3") (COLORADO)	RIPRAP (SPECIAL) (RIVER ROCK) (3") (CHEYENNE)	BARRICADES SIGNS & TRAFFIC HANDLING	INSTALL BIO LOGS EROSION CONTROL	REMOVE BIO LOGS EROSION CONTROL	MOBILIZATION	RIP RAP (CONC) (4 IN)	TREE PROTECTION
		(LF)	(SY)	(MO)	(MO)	(CY)	(CY)	(MO)	(LF)	(LF)	(LS)	(CY)	(EA)
A	BEGIN STA. 135+00 TO END STA. 130+00	443	520			27	26		540	540		12	7
B	BEGIN STA. 127+00 TO END STA. 124+00	189	220			12	11		260	260		5	2
C	BEGIN STA. 122+00 TO END STA. 118+00	190	228			12	15		307	307		6	3
	<b>TOTALS</b>	822	968	12	12	51	52	5	1,107	1,107	1	23	12



**Kimley»Horn**  
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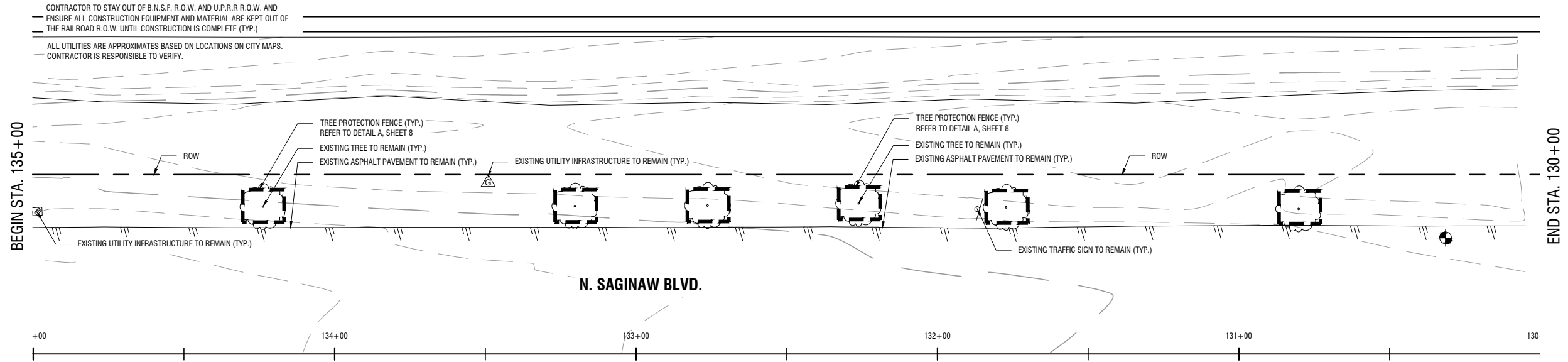


SAGINAW BOULEVARD LANDSCAPE ENHANCEMENTS  
 GREEN RIBBON PROGRAM  
 SAGINAW, TEXAS  
 PROPOSED PROJECT QUANTITIES

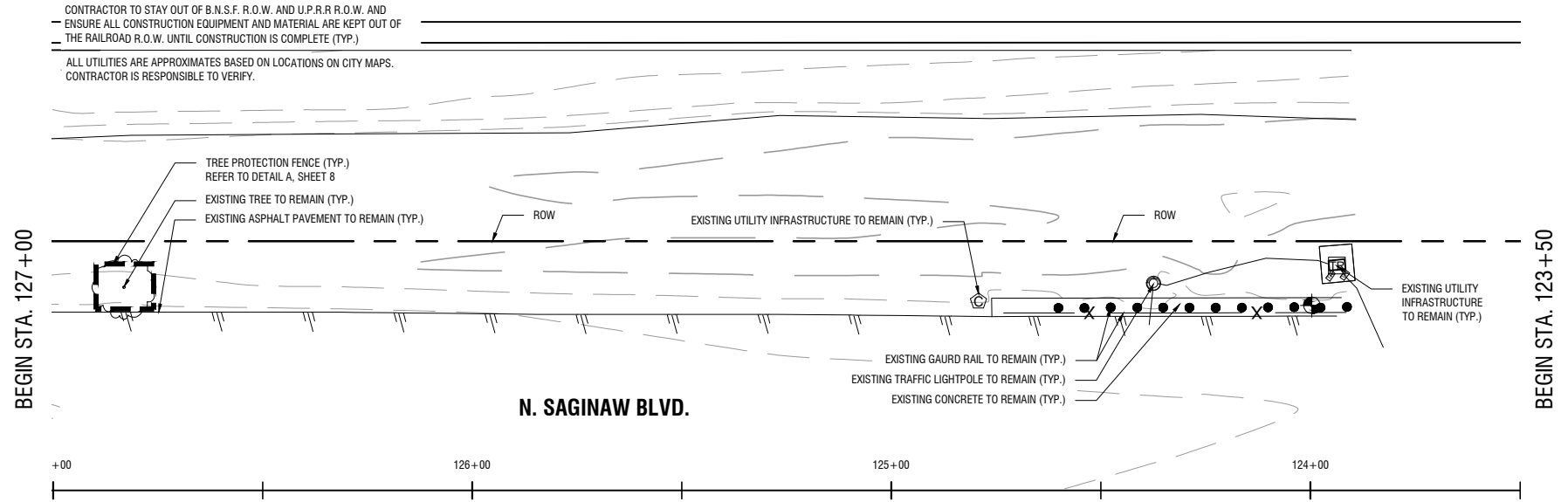
FED.RD.	PROJECT NO.	HIGHWAY NO.
287P	SEE TITLE SHEET	BU 287P
STATE	DISTRICT	COUNTY
TEXAS	FTW	TARRANT
CONTROL	SECTION	JOB
0013	10	091
		SHEET NO.
		6

PLOTTED BY: KELLEHER, MEGAN  
 PLOT DATE: 7/26/2023 7:03 PM  
 LOCATION: K:\FTW\_LAP\08100103188\_SAGINAW GR PHASE II\DWG\04\_CD-SHEET2-QUANTITIES.DWG  
 LAST SAVED: 7/26/2023 5:24 PM





1 SECTION A - BEGIN STA. 135+00 TO END STA. 130+00  
PLAN



2 SECTION B - BEGIN STA. 127+00 TO END STA. 123+50  
PLAN

**LEGEND**

	EXISTING CONTOUR
	EXISTING ASPHALT ROADWAY
	EXISTING SIGN TO REMAIN
	EXISTING TREE TO REMAIN
	TREE PROTECTION FENCE REF. DETAIL A, SHEET 6

NOTE:  
 1. ALL EXISTING ROADWAY PAVING TO REMAIN.  
 2. ALL EXISTING SIGNS TO REMAIN.  
 3. ALL UTILITIES ARE APPROXIMATES BASED ON LOCATION OF CITY MAPS AND VISIBLE EVIDENCE OF UTILITIES ABOVE GROUND. CONTRACTOR IS RESPONSIBLE TO VERIFY LOCATIONS.

NOTE:  
CALL TXDOT TRAFFIC MANAGEMENT CENTER (817-370-3661) FOR TXDOT LOCATES WHEN WORKING NEAR EXISTING TRAFFIC SIGNAL.

CAUTION!  
EXISTING UNDERGROUND UTILITIES IN THE AREA CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO EXISTING UTILITIES DUE TO DAMAGE INCURRED DURING CONSTRUCTION. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES ON THE PLANS.

GRAPHIC SCALE IN FEET  
0 10 20 40  
IF PLAN SHEET IS 22"x34" SCALE IS 1 IN = 20 FT

*Laura Presley*  
 REGISTERED LANDSCAPE ARCHITECT  
 LAURA K. PRESELEY  
 3599  
 STATE OF TEXAS  
 06/22/2023

**Kimley»Horn**  
 Texas Registered Engineering Firm F-928  
 Texas Department of Transportation  
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SAGINAW BOULEVARD LANDSCAPE ENHANCEMENTS  
 GREEN RIBBON PROGRAM  
 SAGINAW, TEXAS  
 EXISTING CONDITIONS

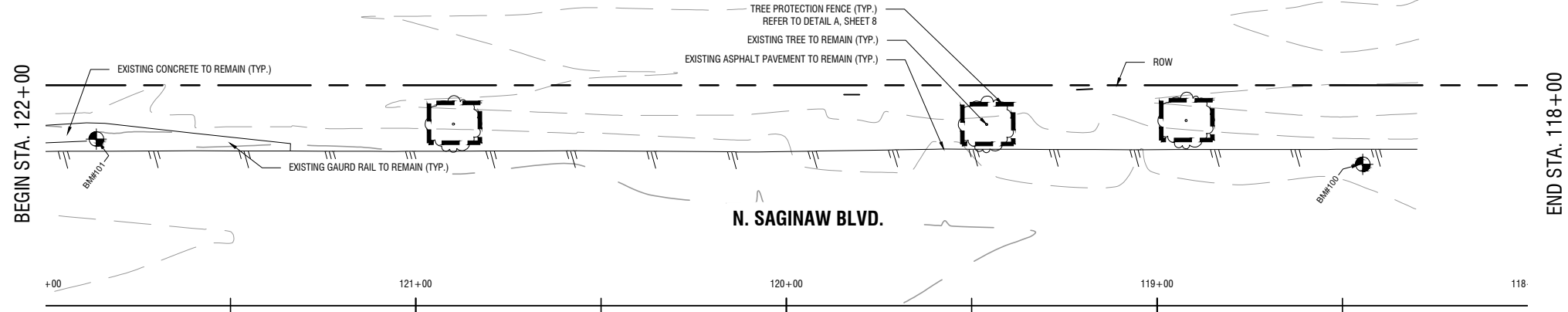
BEGIN STA. 135+00 TO END STA. 130+00  
 BEGIN STA. 127+00 TO END STA. 123+50

FED.RD.	PROJECT NO.	HIGHWAY NO.
287P	SEE TITLE SHEET	BU 287P
STATE	DISTRICT	COUNTY
TEXAS	FTW	TARRANT
CONTROL	SECTION	JOB
0013	10	091
SHEET NO.		
7		

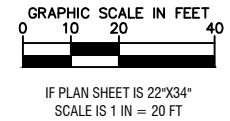
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 LOCATION: K:\FTW\_LAP\06100103188\_SAGINAW GR PHASE I\DWG\04\_CD SHEETS-EXISTING CONDITIONS.DWG  
 LAST SAVED: 6/22/2023 7:47 AM

CONTRACTOR TO STAY OUT OF B.N.S.F. R.O.W. AND U.P.R.R. R.O.W. AND  
 ENSURE ALL CONSTRUCTION EQUIPMENT AND MATERIAL ARE KEPT OUT OF  
 THE RAILROAD R.O.W. UNTIL CONSTRUCTION IS COMPLETE (TYP.)

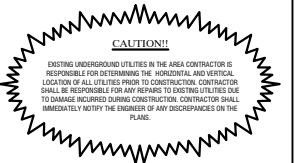
ALL UTILITIES ARE APPROXIMATES BASED ON LOCATIONS ON CITY MAPS.  
 CONTRACTOR IS RESPONSIBLE TO VERIFY.



3 SECTION C - BEGIN STA. 122+00 TO END STA. 118+00  
 PLAN



NOTE:  
 CALL TXDOT TRAFFIC MANAGEMENT CENTER  
 (817-370-3661) FOR TXDOT LOCATES WHEN  
 WORKING NEAR EXISTING TRAFFIC SIGNAL.



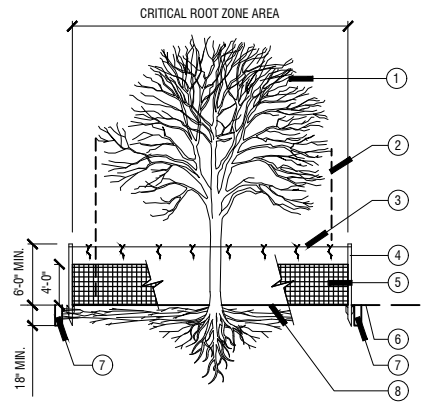
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SAGINAW BOULEVARD LANDSCAPE  
 ENHANCEMENTS  
 GREEN RIBBON PROGRAM  
 SAGINAW, TEXAS

EXISTING CONDITIONS  
 BEGIN STA. 122+00 TO  
 END STA. 118+00

FED.RD.	PROJECT NO.	HIGHWAY NO.
287P	SEE TITLE SHEET	BU 287P
STATE	DISTRICT	COUNTY
TEXAS	FTW	TARRANT
CONTROL	SECTION	JOB
0013	10	091
SHEET NO.		
8		

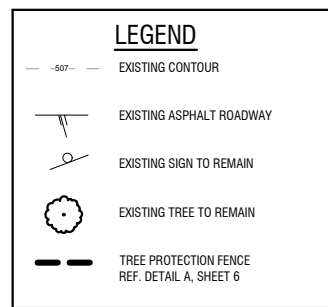


A STANDARD TREE PROTECTION FENCE  
 N.T.S.

- 1 EXISTING TREE(S) TO REMAIN.
- 2 DRIPLINE OF EXISTING TREE (TYP)
- 3 CONTINUOUS NYLON TIE STRING TIED TO STAKE TOPS W/ 2' TUNDRA WEIGHT ORANGE STREAMERS @ 3' O.C.
- 4 6\"/>

GUIDELINES FOR TREE PROTECTION

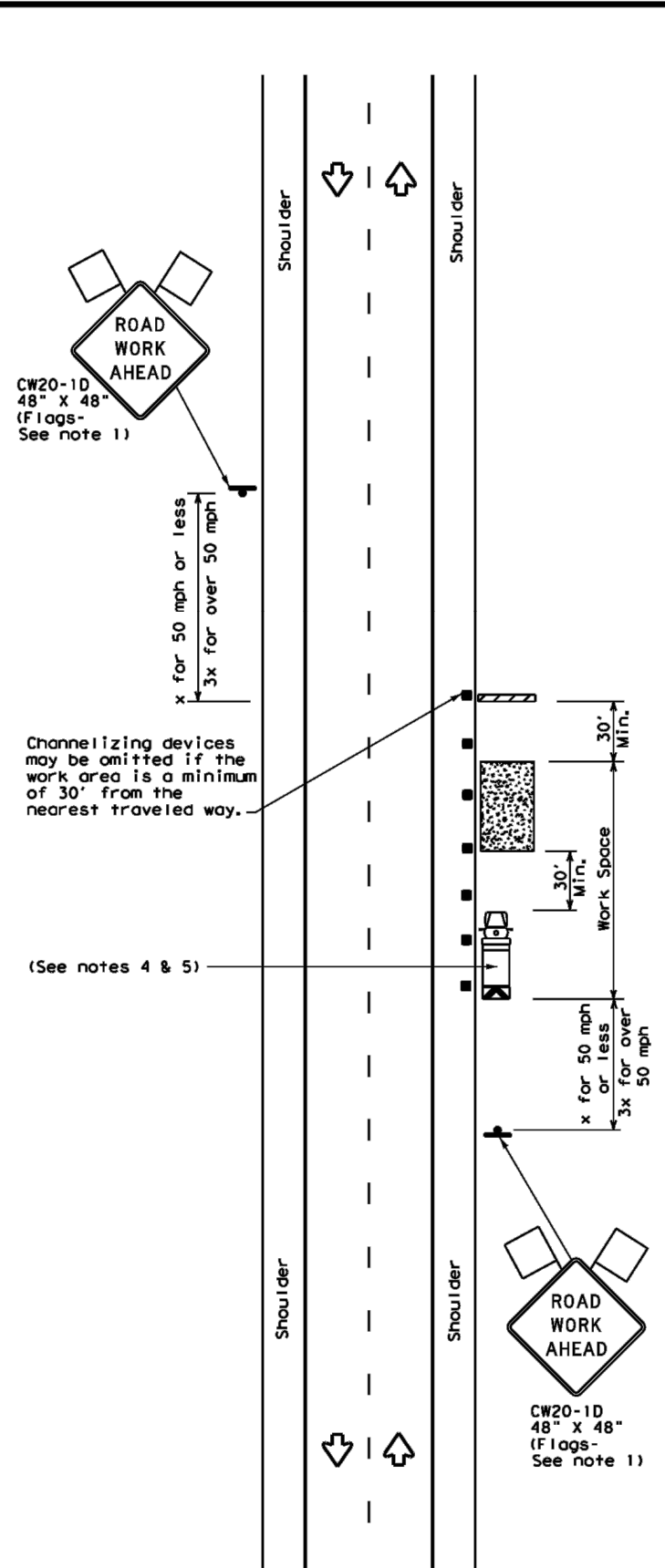
1. THE CONTRACTOR SHALL ERECT A FENCE AROUND EACH PRESERVED TREE OR GROUP OF PRESERVED TREES TO PREVENT THE PLACEMENT OF DEBRIS OR FILL WITHIN THE DRIP LINE OF ANY PRESERVED TREE. THE CONTRACTOR SHALL ERECT THE TREE PROTECTION FENCING PRIOR TO COMMENCING ANY CONSTRUCTION ACTIVITY. REFERENCE TREE PROTECTION DETAIL, THIS SHEET.
2. TREE PROTECTION FENCING MUST REMAIN IN PLACE THROUGHOUT CONSTRUCTION, EXCEPT FOR TEMPORARY REMOVAL TO PERFORM REQUIRED WORK WITHIN TREE PROTECTION AREA. PRE-APPROVED WORK WITHIN TREE PROTECTION AREA AND/OR CRITICAL ROOT ZONE MUST BE DONE BY HAND WHENEVER POSSIBLE. NO HEAVY EQUIPMENT OR MATERIALS STORAGE WITHIN TREE PROTECTION AREA.
3. WHEN CONSTRUCTION IS UNDER THE DRIP LINE OF A PRESERVED TREE, PROFESSIONAL ROOT PRUNING BY AN ISA CERTIFIED ARBORIST OR EQUIVALENT MUST BE COMPLETED PRIOR TO ANY SOIL DISTURBANCE.
4. DURING THE CONSTRUCTION STAGE OF DEVELOPMENT, THE CONTRACTOR SHALL PROHIBIT CLEANING OF EQUIPMENT OR MATERIALS UNDER THE CANOPY OF ANY TREE OR GROUP OF TREES TO REMAIN. NOR SHALL THE CONTRACTOR ALLOW THE DISPOSAL OF ANY WASTE MATERIAL SUCH AS, BUT NOT LIMITED TO, PAINT, OIL, SOLVENTS, ASPHALT, CONCRETE, MORTAR, ETC., UNDER THE CANOPY OF ANY TREE TO REMAIN.
5. NO ATTACHMENTS OR WIRES OF ANY KIND, OTHER THAN THOSE OF A PROTECTIVE NATURE, SHOULD BE ATTACHED TO ANY TREE.



NOTE:  
 1. ALL EXISTING ROADWAY PAVING TO REMAIN.  
 2. ALL EXISTING SIGNS TO REMAIN.  
 3. ALL UTILITIES ARE APPROXIMATES BASED ON LOCATION OF CITY MAPS AND VISIBLE EVIDENCE OF UTILITIES ABOVE GROUND. CONTRACTOR IS RESPONSIBLE TO VERIFY LOCATIONS.

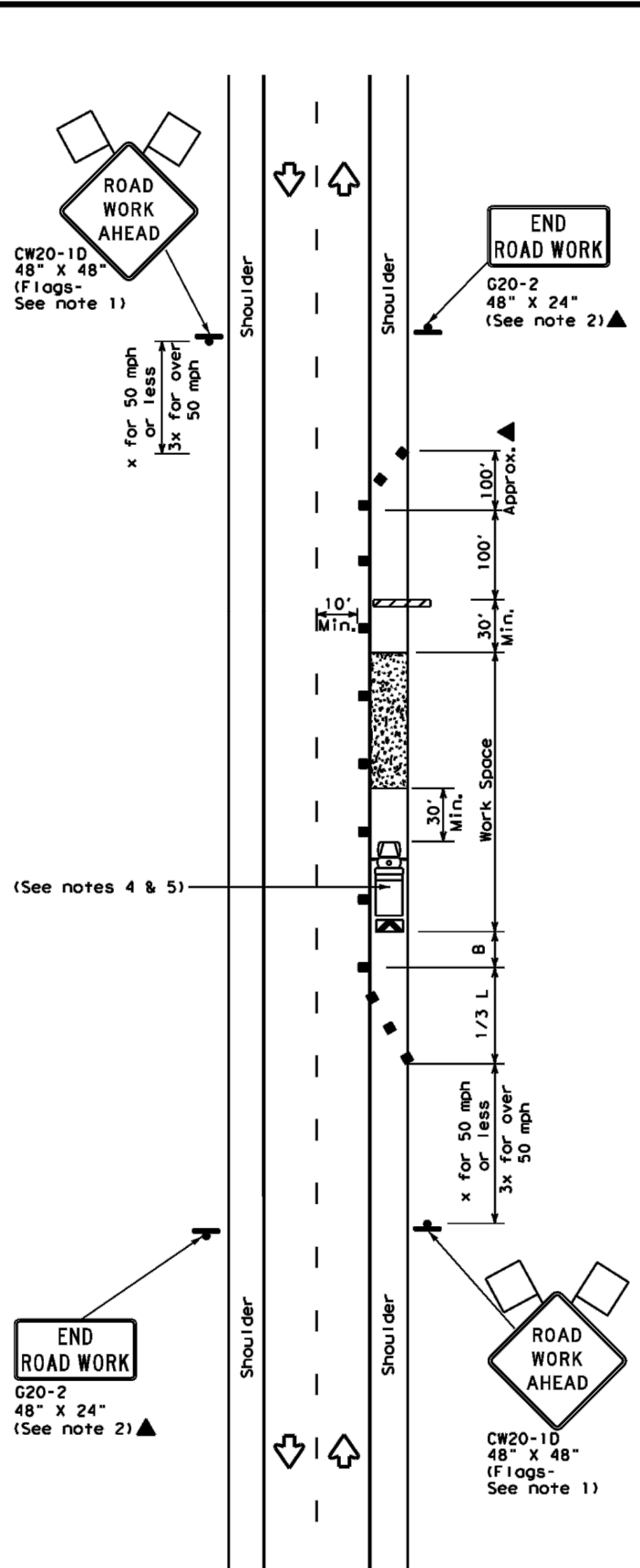
PLOTTED BY: KELLEHER, MEGAN  
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 LAST SAVED: 6/22/2023 7:47 AM

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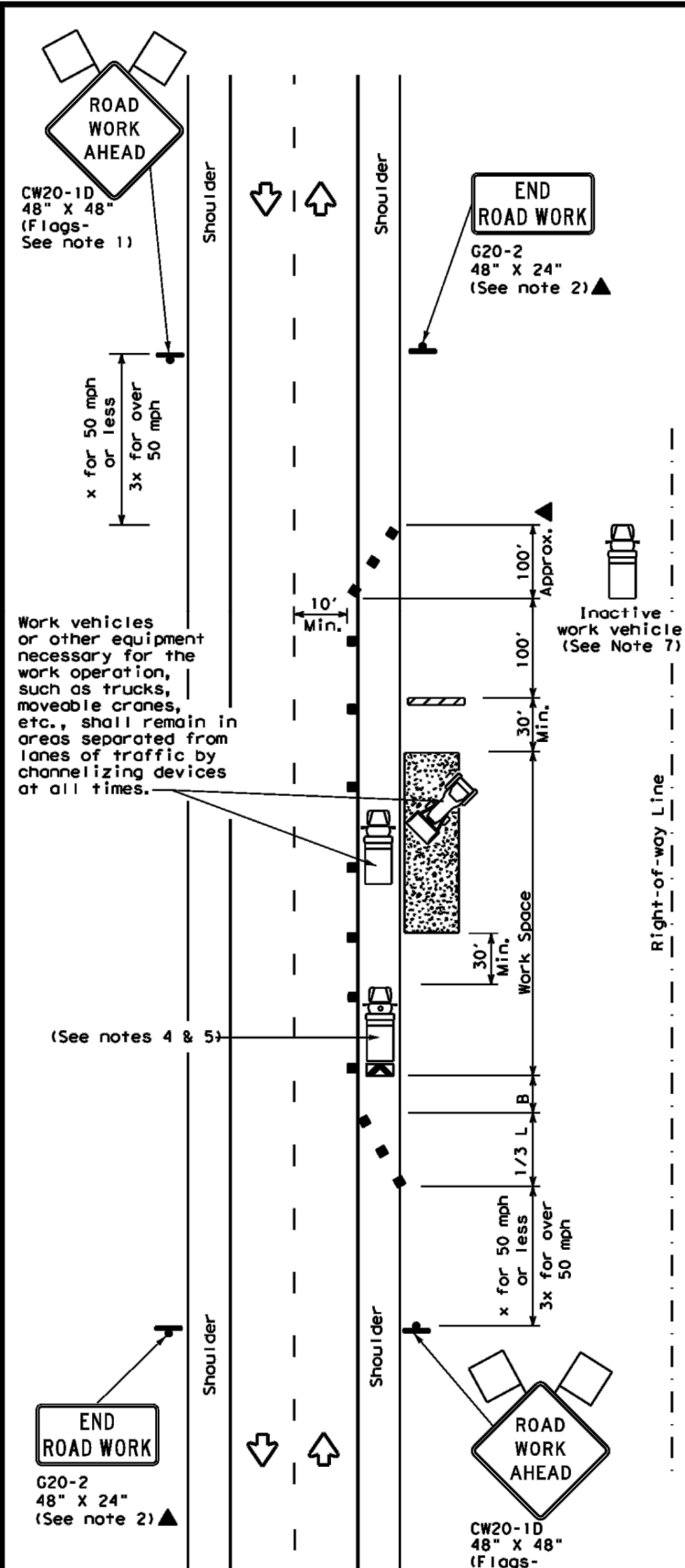
TCP (2-1a)

**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		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
	✓	✓	✓	✓

**GENERAL NOTES**

- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
- Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
- Shadow Vehicle with TMA and high intensity rotating, flashing, 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.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
- Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
- CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.



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

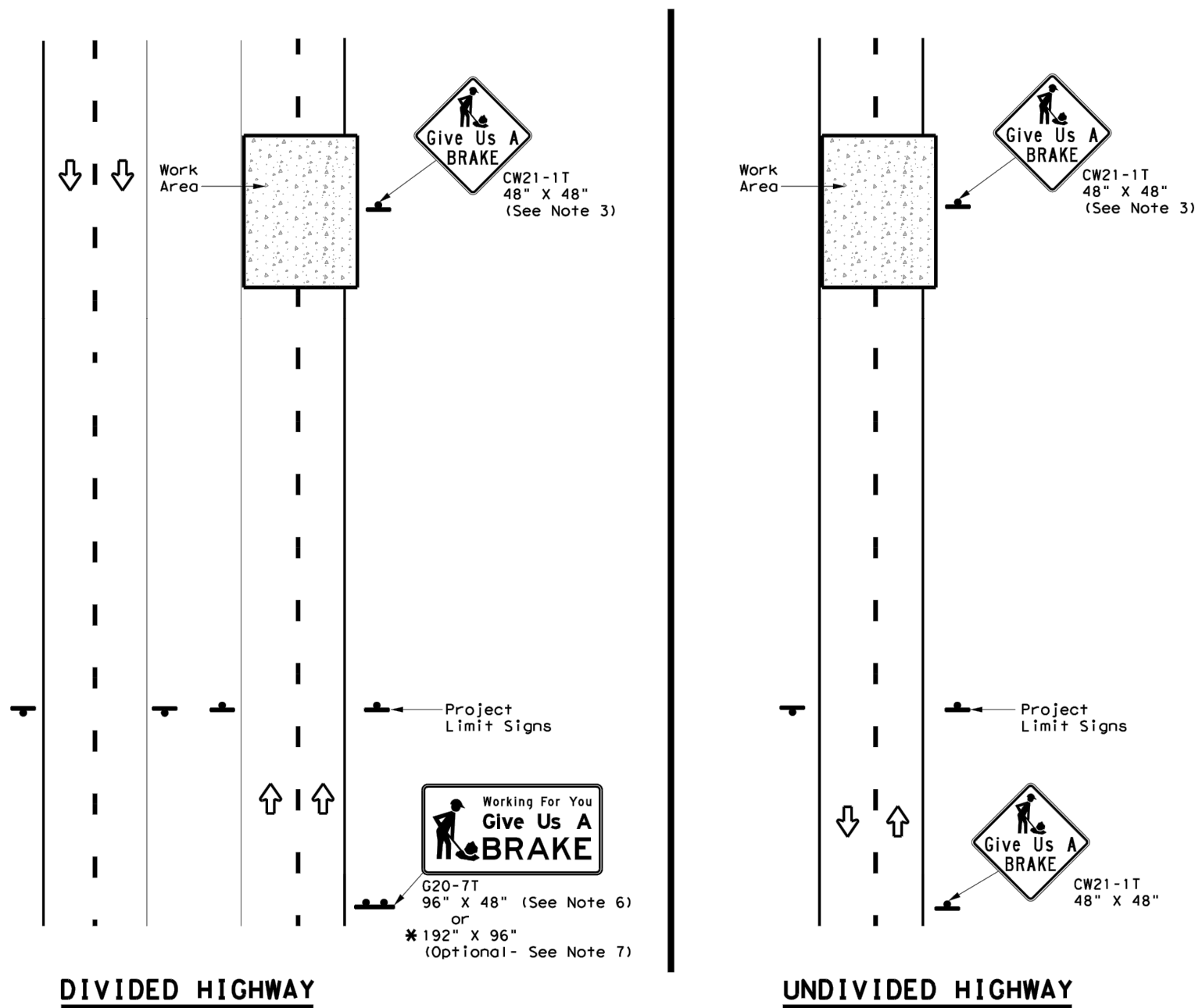
**TCP (2-1) - 18**

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0013	10	091	BUS 287
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 2-12	FTW	TARRANT	9	
1-97 2-18				

DATE:  
FILE:

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DATE:  
FILE:



SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

\* When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL		DRILLED SHAFT
						Size	(LF)	
							① ②	24" DIA. (LF)
Orange	G20-7T		96" X 48"	Type B <sub>FL</sub> or C <sub>FL</sub>	32	▲	▲ ▲	▲
Orange	G20-7T		192" X 96"	Type B <sub>FL</sub> or C <sub>FL</sub>	128	W8x18	16 17	12

▲ See Note 6 Below

LEGEND

	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS

PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B <sub>FL</sub> OR TYPE C <sub>FL</sub>
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

GENERAL NOTES

- See BC and SMD sheets for additional sign support details.
- Sign locations shall be approved by the Engineer.
- For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
- Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
- Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
- The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
- The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:  
 Item 636 - Aluminum Signs  
 Item 647 - Large Roadside Sign Supports and Assemblies.  
 Item 416 - Drilled Shaft Foundations
- 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.



WORK ZONE  
"GIVE US A BRAKE"  
SIGNS

WZ (BRK) - 13

FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0013	10	091	BUS 287
6-96 5-98 7-13	DIST	COUNTY	SHEET NO.	
8-96 3-03	FTW	TARRANT	10	



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DATE:  
 FILE:

**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).

<p><b>THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT</b>  <a href="http://www.txdot.gov">http://www.txdot.gov</a></p>
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



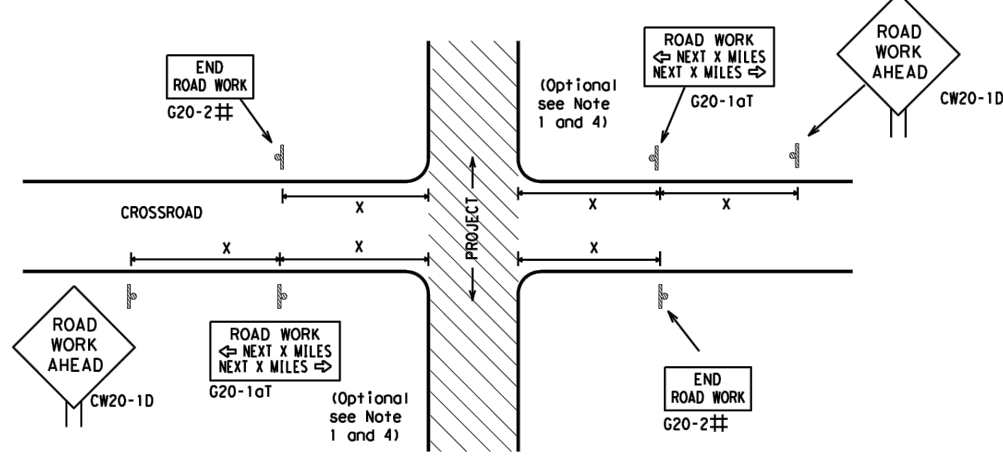
**BARRICADE AND CONSTRUCTION  
 GENERAL NOTES  
 AND REQUIREMENTS**

**BC (1) - 21**

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
	0013	10	091	BUS 287
<b>4-03</b> 7-13	REVISIONS			
<b>9-07</b> 8-14	DIST	COUNTY	SHEET NO.	
<b>5-10</b> 5-21	FTW	TARRANT	11	

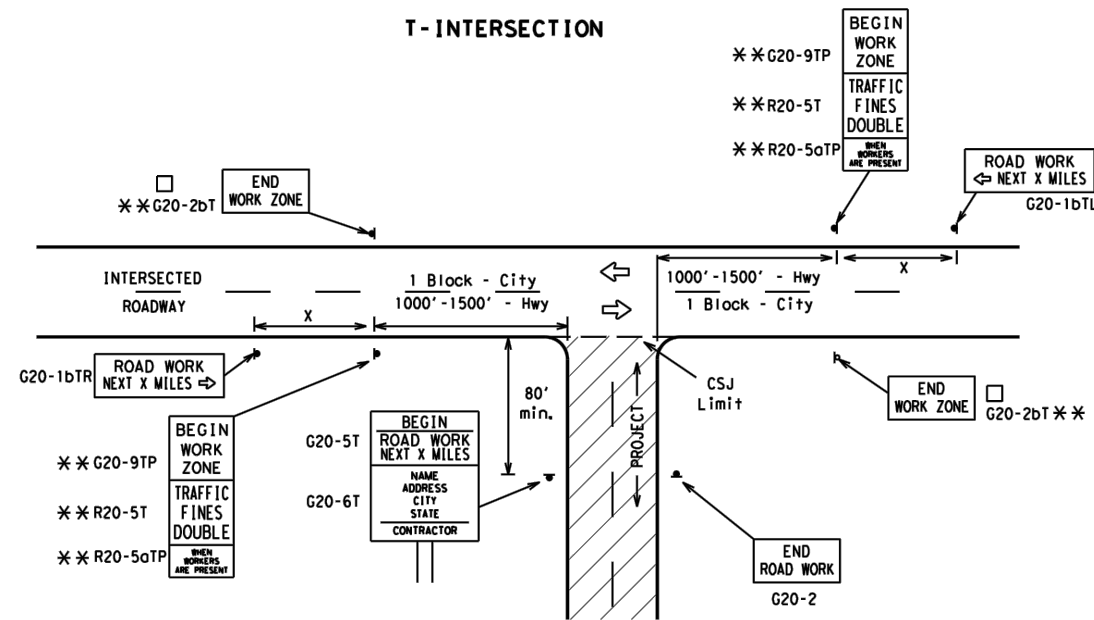
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**TYPICAL LOCATION OF CROSSROAD SIGNS**



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

**T-INTERSECTION**



**CSJ LIMITS AT T-INTERSECTION**

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

**TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING<sup>1,5,6</sup>**

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

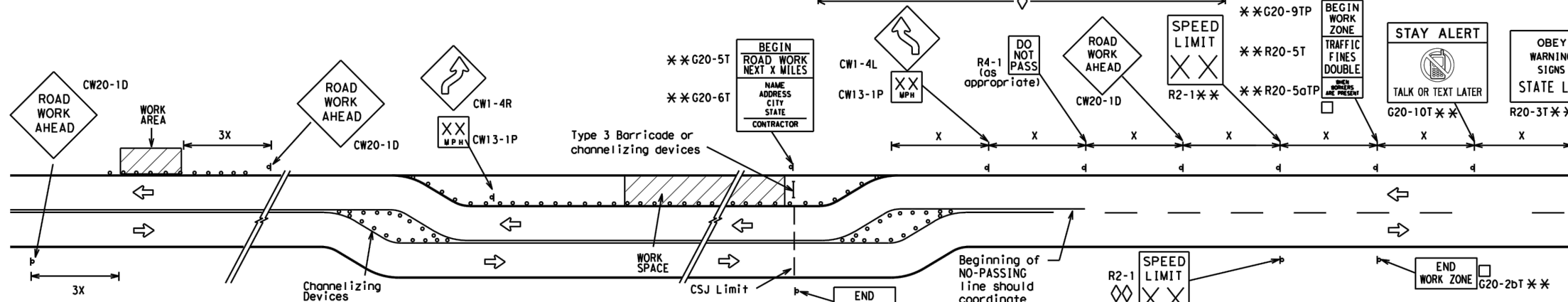
\* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

**GENERAL NOTES**

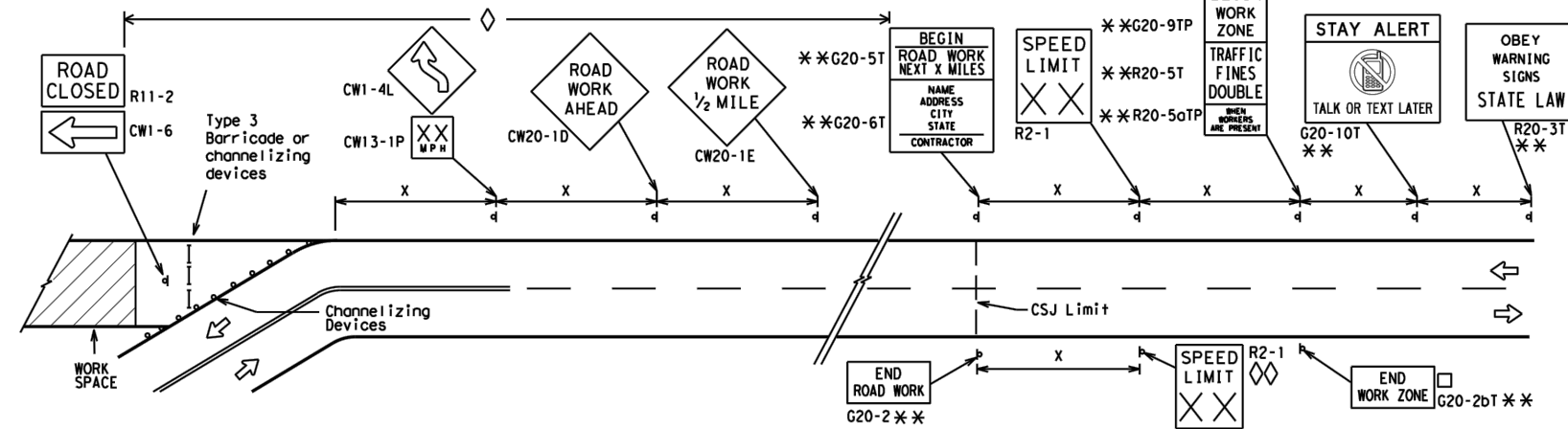
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be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

**WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS**

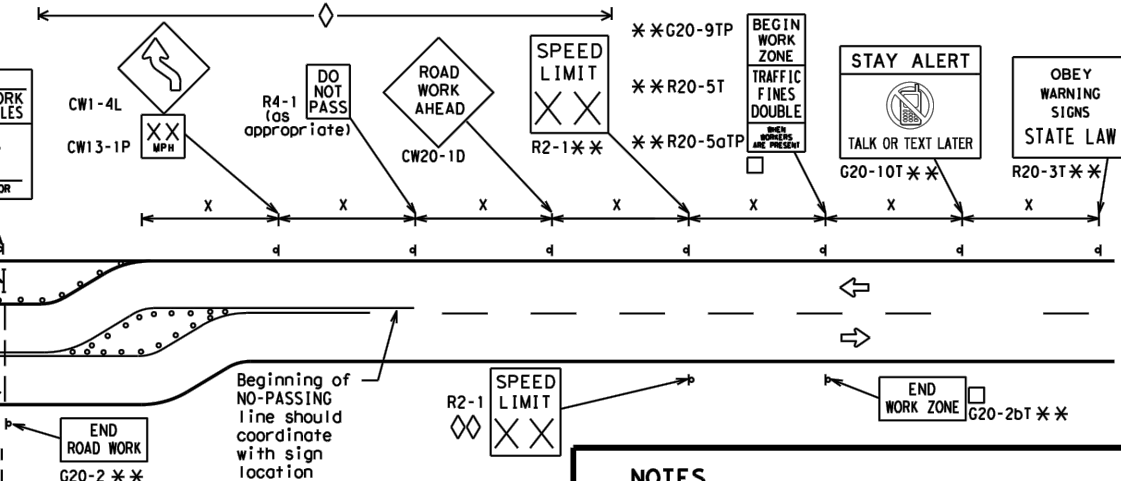


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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



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



**NOTES**

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "x" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
  - CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.
  - Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
  - Contractor will install a regulatory speed limit sign at the end of the work zone.

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

SHEET 2 OF 12



**BARRICADE AND CONSTRUCTION PROJECT LIMIT**

**BC(2)-21**

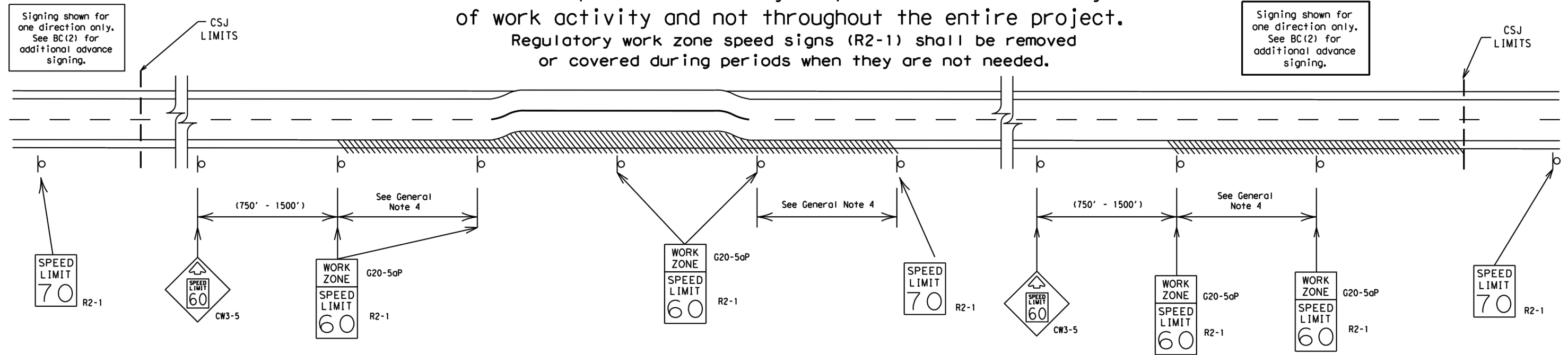
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# TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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



## GUIDANCE FOR USE:

### LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present.

Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

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

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

### SHORT TERM WORK ZONE SPEED LIMITS

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

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:
 

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

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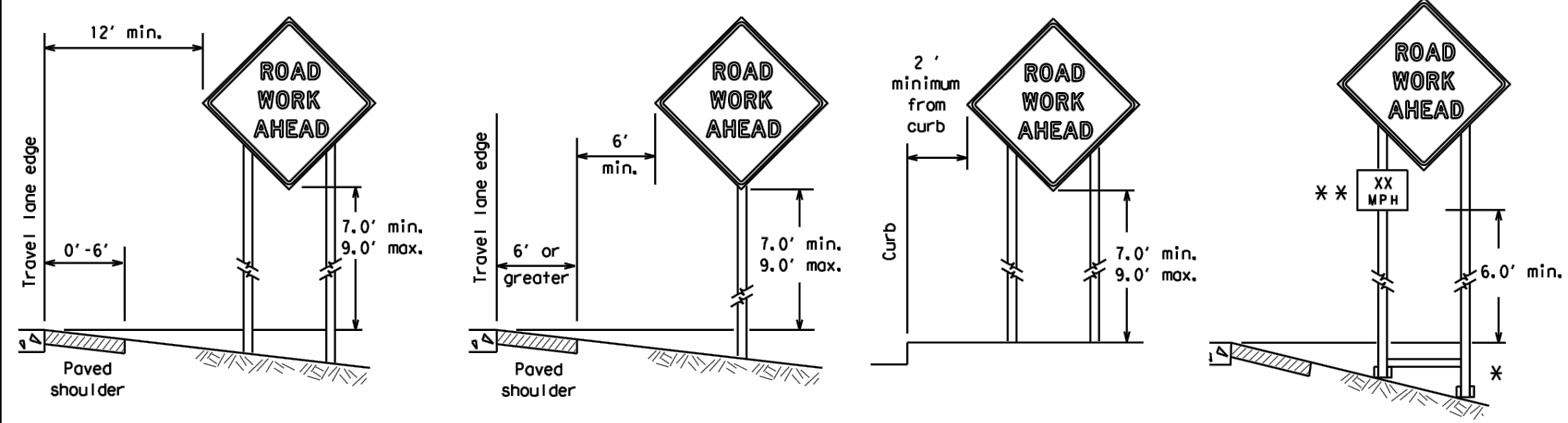
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SHEET 3 OF 12

		<b>Traffic Safety Division Standard</b>	
<h2>BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT</h2>			
<h3>BC (3) - 21</h3>			
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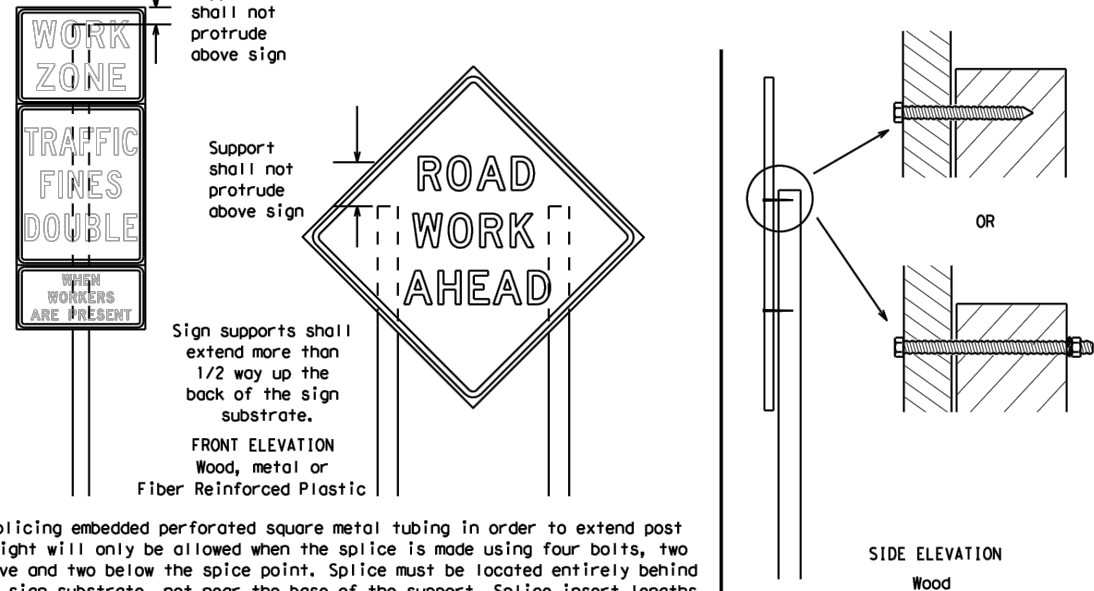
**TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS**



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

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

**ATTACHMENT FOR SIGN SUPPORTS**



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 splice 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.

**GENERAL NOTES FOR WORK ZONE SIGNS**

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
- 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.
- 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.
- 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.
- 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.
- 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)**

- 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.
  - Long-term stationary - work that occupies a location more than 3 days.
  - Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
  - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
  - Short, duration - work that occupies a location up to 1 hour.
  - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

**SIGN MOUNTING HEIGHT**

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

**SIZE OF SIGNS**

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

**SIGN SUBSTRATES**

- The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- 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**

- 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).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
- Orange sheeting, meeting the requirements of DMS-8300 Type B<sub>FL</sub> or Type C<sub>FL</sub>, shall be used for rigid signs with orange backgrounds.

**SIGN LETTERS**

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

**REMOVING OR COVERING**

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- 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.
- Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
- When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
- Burlap shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

**SIGN SUPPORT WEIGHTS**

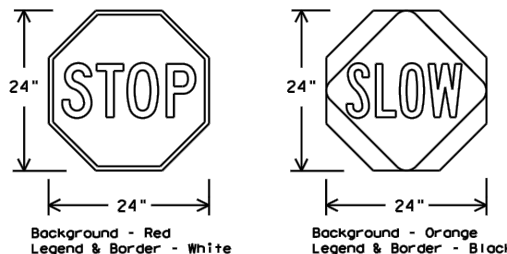
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- 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.
- 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.
- 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.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

**FLAGS ON SIGNS**

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

**STOP/SLOW PADDLES**

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



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B <sub>FL</sub> OR C <sub>FL</sub> 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**

- 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.
- 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.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- 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.
- 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.
- 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.

Texas Department of Transportation  
Traffic Safety Division Standard

**BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES**

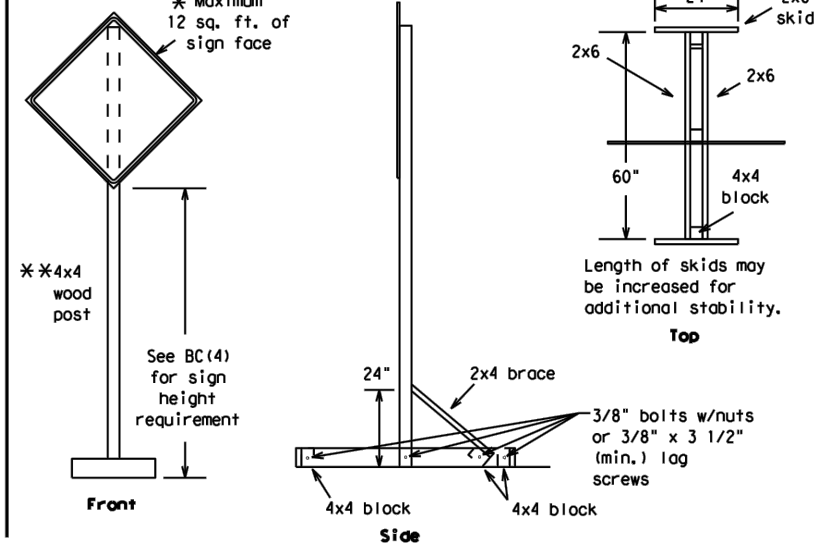
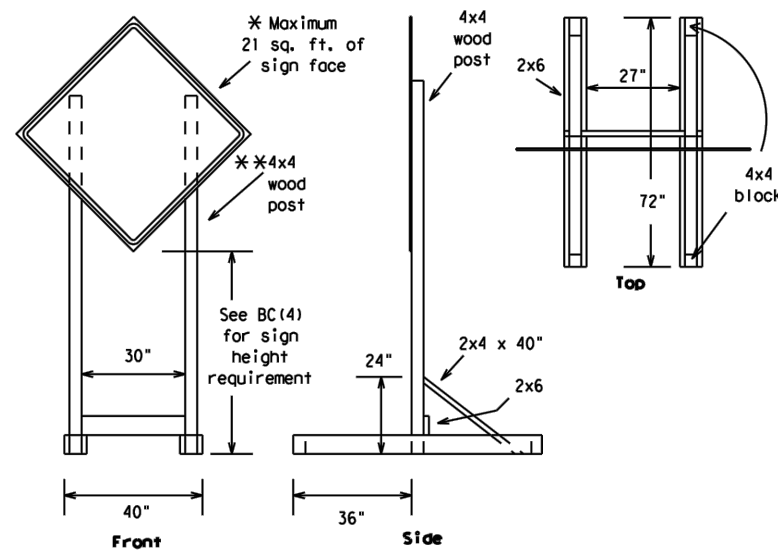
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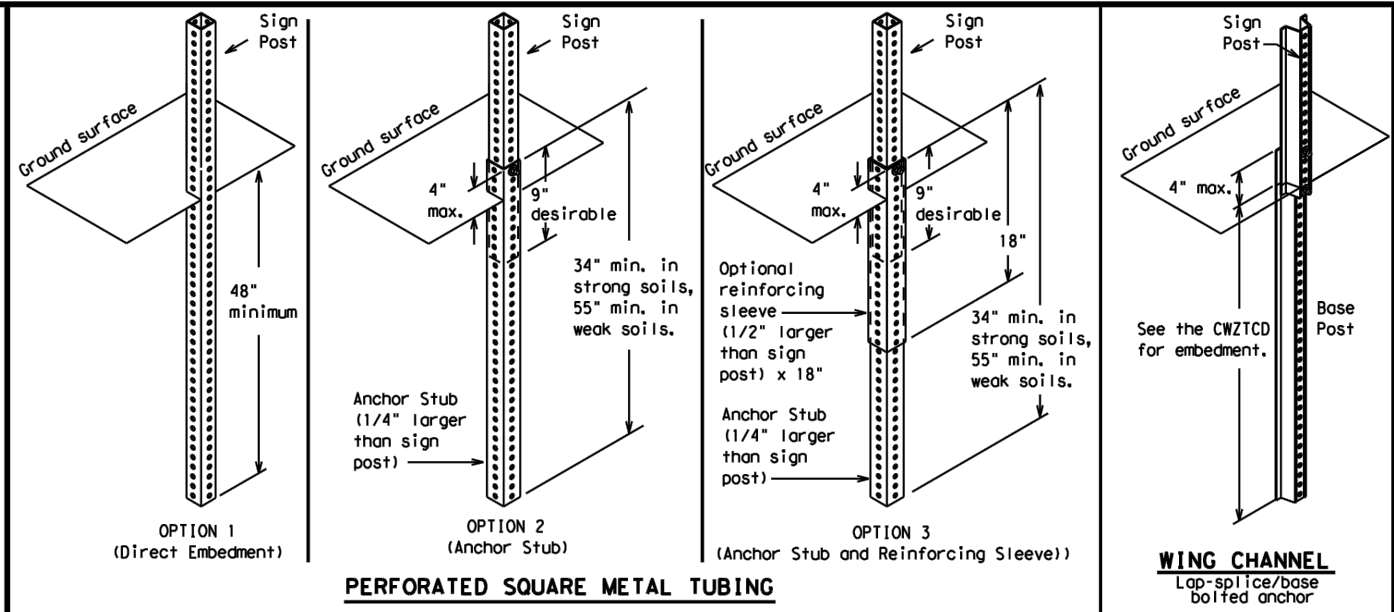


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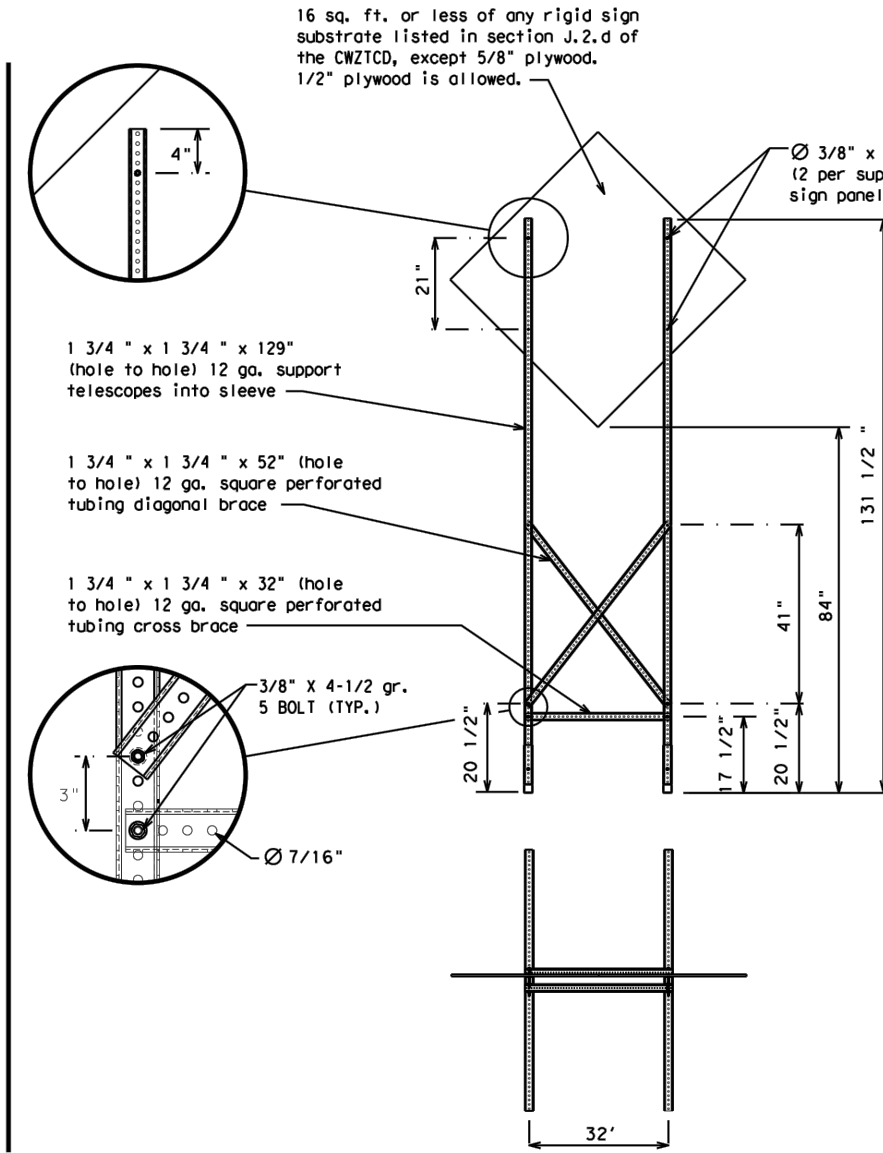
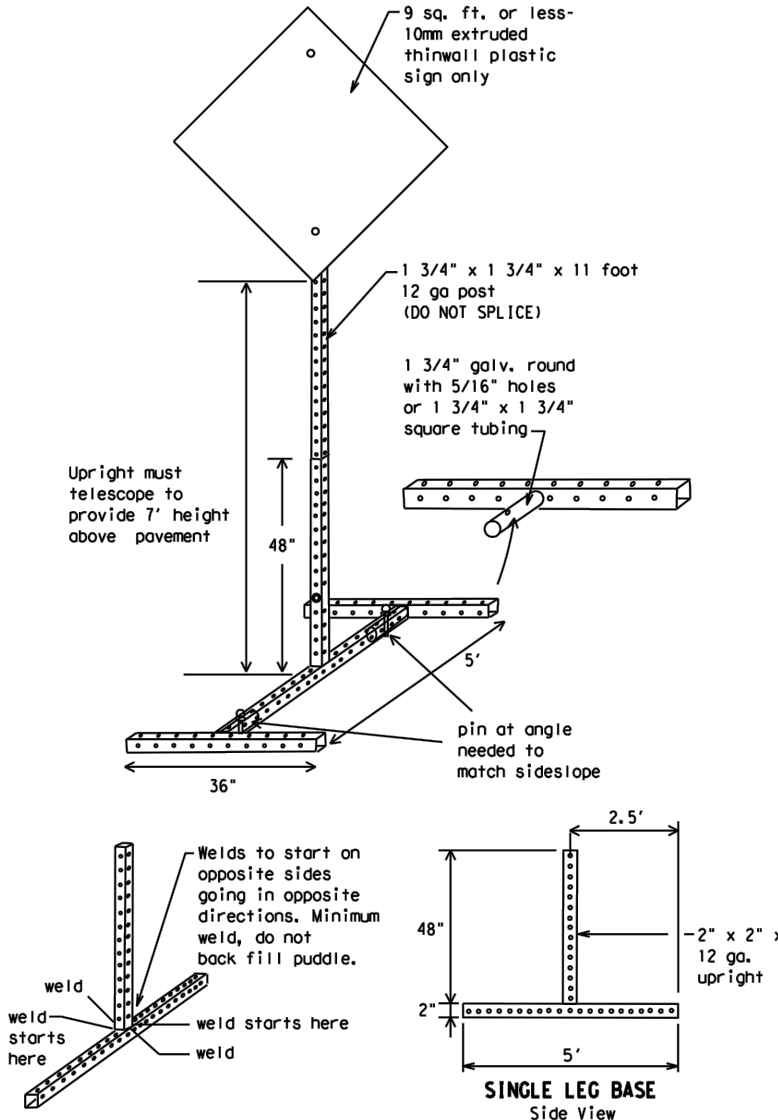
### SKID MOUNTED WOOD SIGN SUPPORTS

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



### GROUND MOUNTED SIGN SUPPORTS

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



### SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

\* 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

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

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

SHEET 5 OF 12



## BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 21

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

# RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

## PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

## Phase 1: Condition Lists

### Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE
ROAD CLOSED AT SH XXX
ROAD CLSD AT FM XXXX
RIGHT X LANES CLOSED
CENTER LANE CLOSED
NIGHT LANE CLOSURES
VARIOUS LANES CLOSED
EXIT CLOSED
MALL DRIVEWAY CLOSED
XXXXXXXX BLVD CLOSED

### Other Condition List

FRONTAGE ROAD CLOSED
SHOULDER CLOSED XXX FT
RIGHT LN CLOSED XXX FT
RIGHT X LANES OPEN
DAYTIME LANE CLOSURES
I-XX SOUTH EXIT CLOSED
EXIT XXX CLOSED X MILE
RIGHT LN TO BE CLOSED
X LANES CLOSED TUE - FRI

\* 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
DETOUR NEXT X EXITS
USE EXIT XXX
STAY ON US XXX SOUTH
TRUCKS USE US XXX N
WATCH FOR TRUCKS
EXPECT DELAYS
REDUCE SPEED XXX FT
USE OTHER ROUTES
STAY IN LANE

### Location List

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

### Warning List

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

### \*\* Advance Notice List

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

\*\* See Application Guidelines Note 6.

## APPLICATION GUIDELINES

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

## WORDING ALTERNATIVES

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

PCMS 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

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

SHEET 6 OF 12



## BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

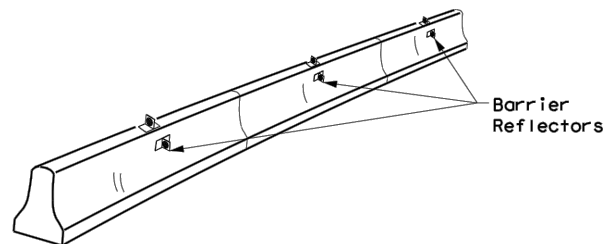
BC (6) - 21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0013	10	091	BUS 287
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	FTW	TARRANT	16	

DATE: FILE:

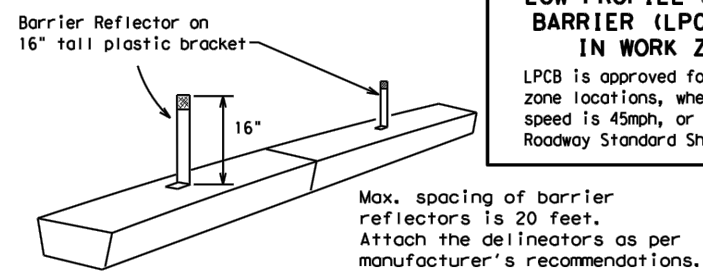
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors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



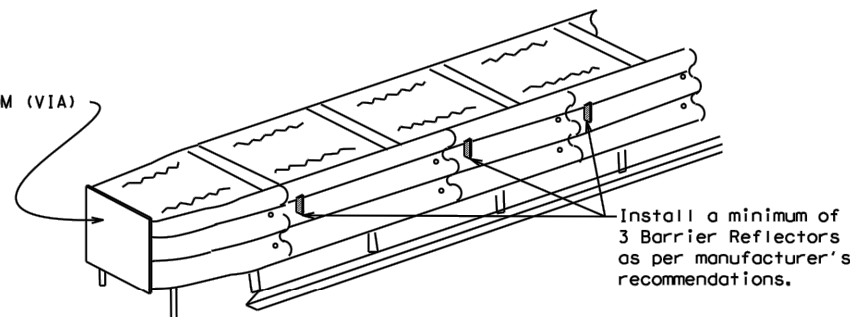
**CONCRETE TRAFFIC BARRIER (CTB)**

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



**LOW PROFILE CONCRETE BARRIER (LPCB) 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 appropriate 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**

**WARNING LIGHTS**

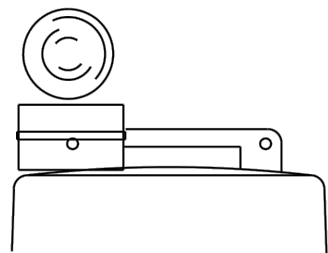
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet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

**WARNING LIGHTS MOUNTED ON PLASTIC DRUMS**

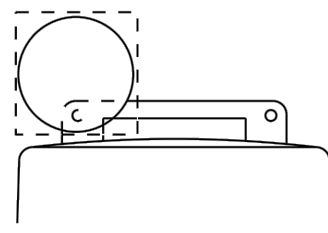
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing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

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

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



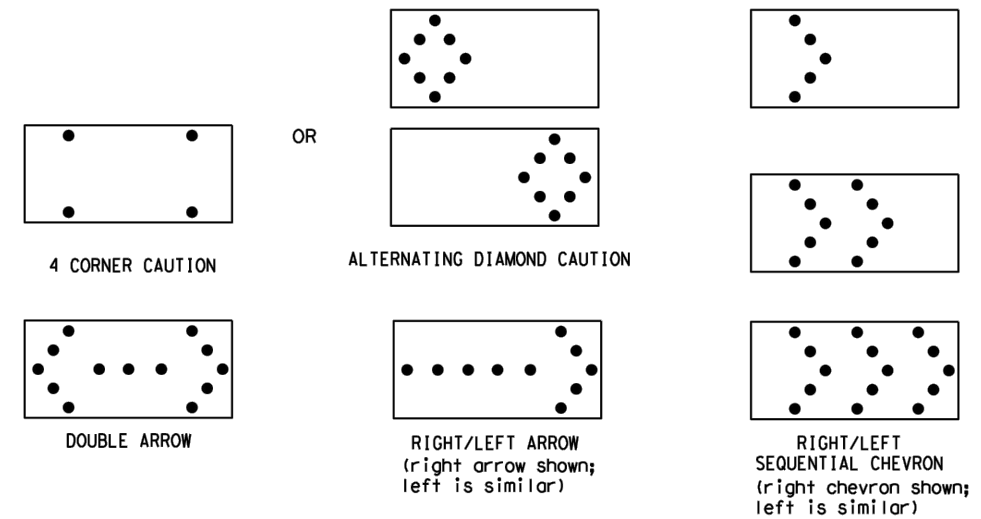
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



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

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

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



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

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

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

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

**FLASHING ARROW BOARDS**

SHEET 7 OF 12

**TRUCK-MOUNTED ATTENUATORS**

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

Texas Department of Transportation  
Traffic Safety Division Standard

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

**BC (7) -21**

FILE: bc-21.dgn	DWG: TxDOT	CK: TxDOT	DWG: TxDOT	CK: TxDOT
© TxDOT November 2002		CONT: 0013	SECT: 10	JOB: 091
REVISIONS		HIGHWAY: BUS 287		
9-07	8-14	DIST: 7-13	COUNTY: TARRANT	SHEET NO.: 17
7-13	5-21	FTW		

DATE: FILE:

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**GENERAL NOTES**

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

**GENERAL DESIGN REQUIREMENTS**

Pre-qualified plastic drums shall meet the following requirements:

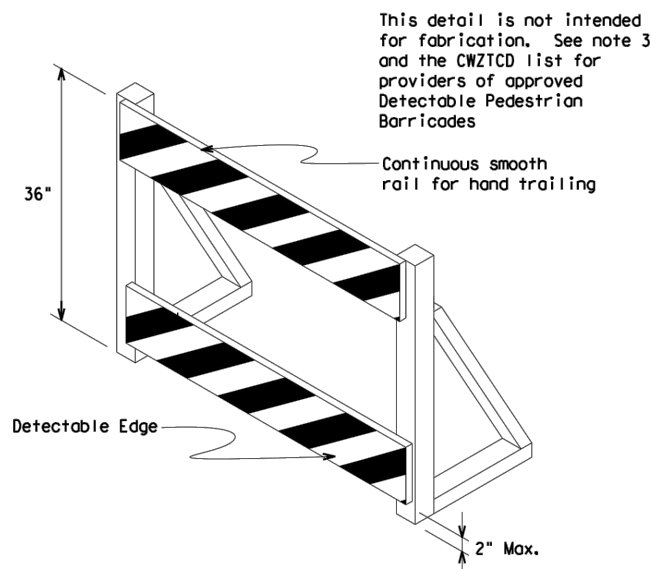
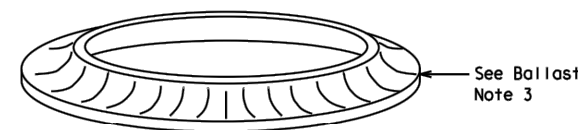
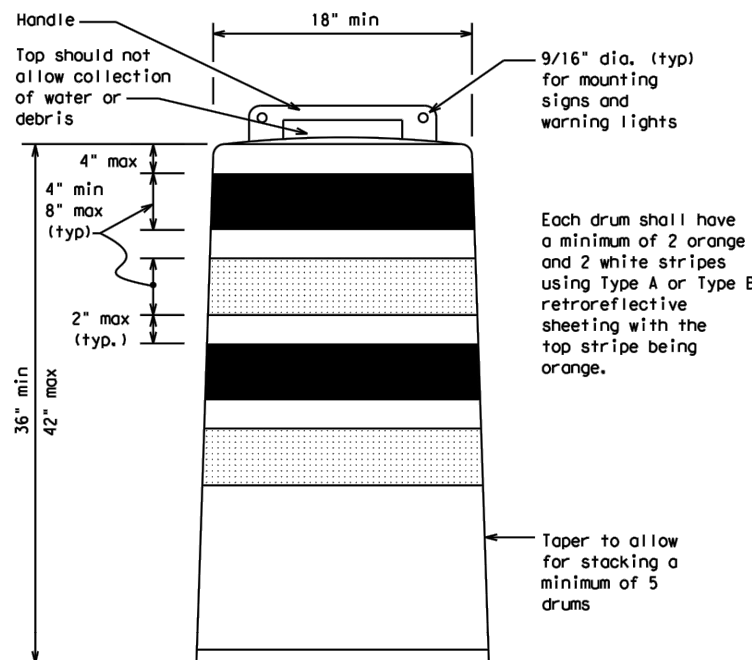
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

**RETROREFLECTIVE SHEETING**

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

**BALLAST**

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

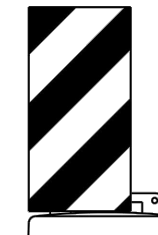


**DETECTABLE PEDESTRIAN BARRICADES**

- 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.
- 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.
- 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.
- 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.
- Warning lights shall not be attached to detectable pedestrian barricades.
- 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**

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

SHEET 8 OF 12



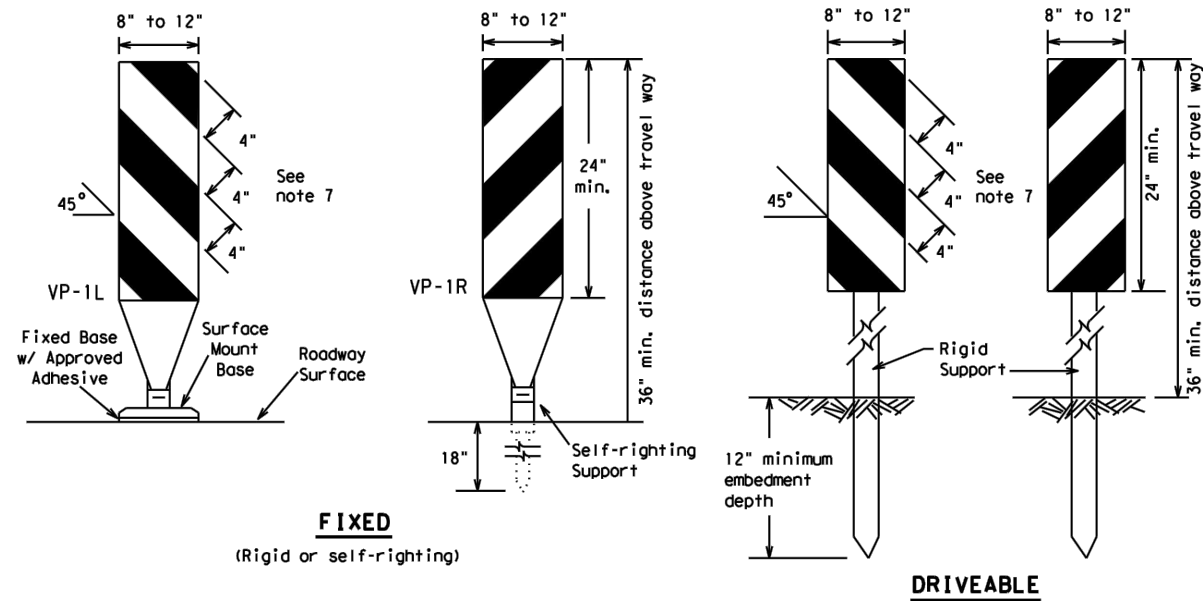
**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (8) - 21**

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4-03	8-14	DIST	COUNTY	SHEET NO.					
9-07	5-21	FTW	TARRANT	18					
7-13									

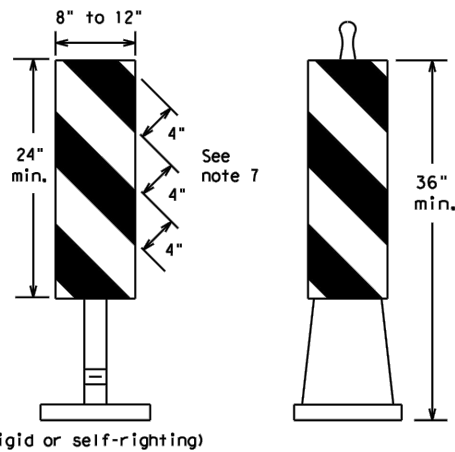
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**FIXED**  
(Rigid or self-righting)

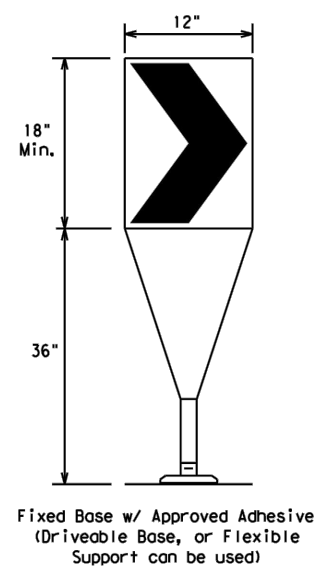
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**PORTABLE**

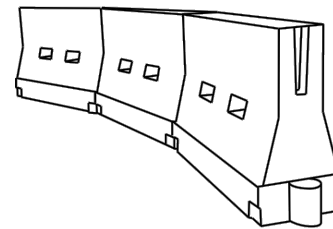
**VERTICAL PANELS (VPs)**

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



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

**CHEVRONS**



**LONGITUDINAL CHANNELIZING DEVICES (LCD)**

- LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- LCDs used as barricades 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**

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

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

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

**GENERAL NOTES**

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

Posted Speed	Formula	Minimum Desirable Taper Lengths			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = WS <sup>2</sup> / 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'

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

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

SHEET 9 OF 12



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (9) - 21**

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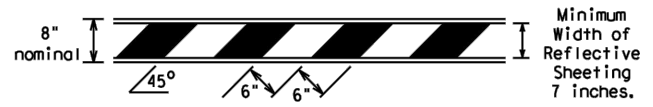


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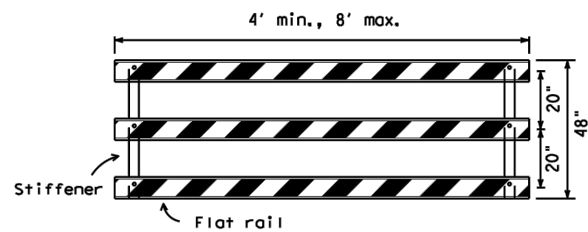
**TYPE 3 BARRICADES**

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

Barricades shall NOT be used as a sign support.



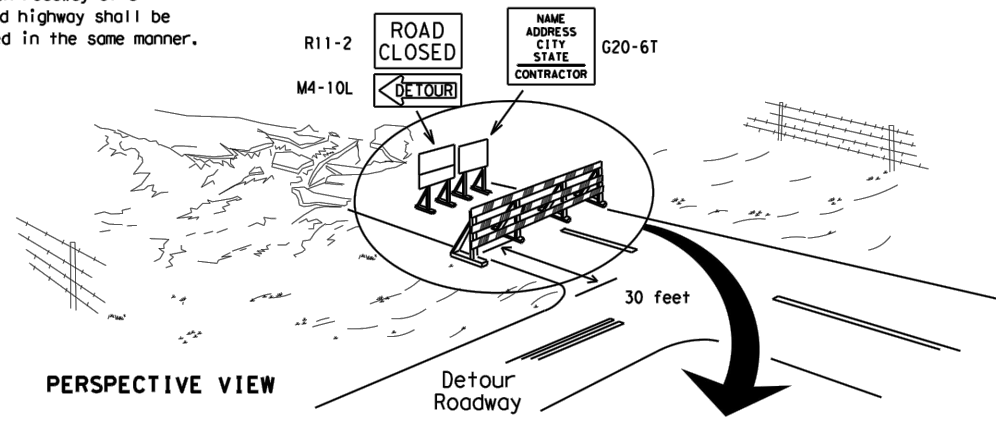
**TYPICAL STRIPING DETAIL FOR BARRICADE RAIL**



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

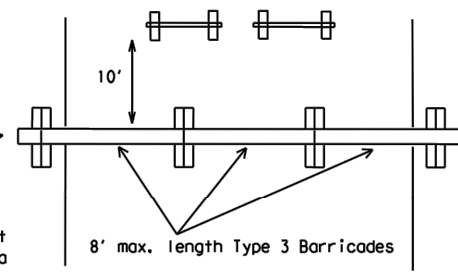
**TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES**

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



PERSPECTIVE VIEW

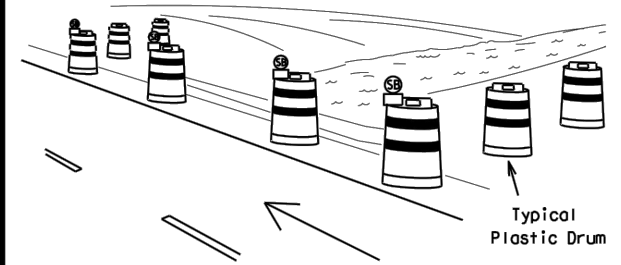
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



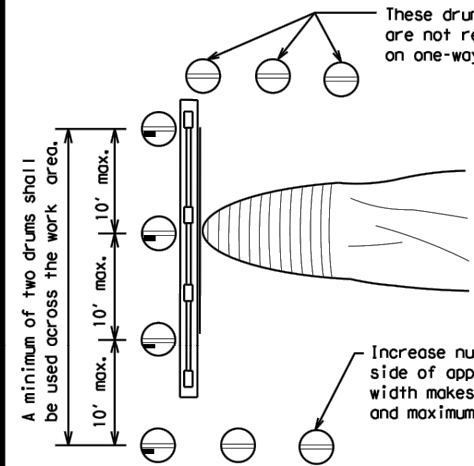
PLAN VIEW

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

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



PERSPECTIVE VIEW

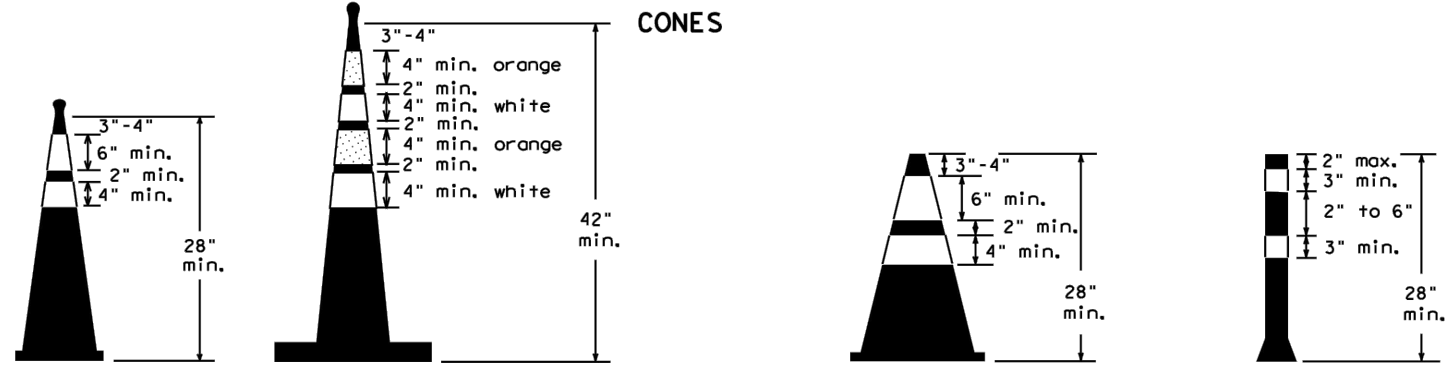


PLAN VIEW

1. Where positive redirection 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
	Steady burn warning light or yellow warning reflector

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



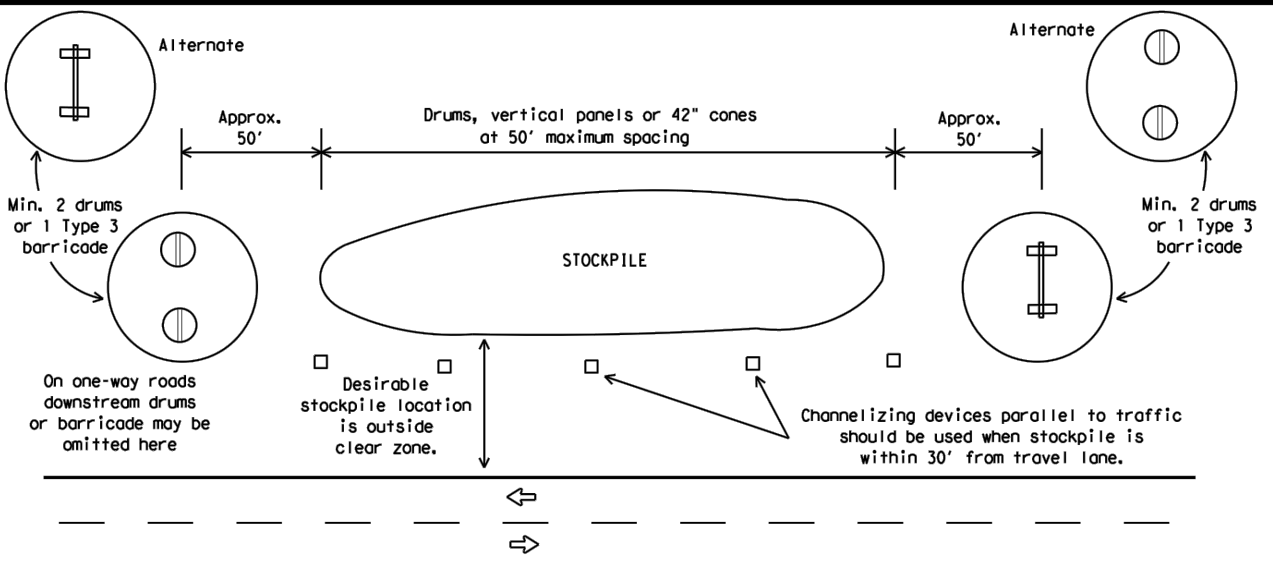
Two-Piece cones

One-Piece cones

Tubular Marker

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

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



**TRAFFIC CONTROL FOR MATERIAL STOCKPILES**



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (10) - 21**

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## WORK ZONE PAVEMENT MARKINGS

### GENERAL

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

### RAISED PAVEMENT MARKERS

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

### PREFABRICATED PAVEMENT MARKINGS

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

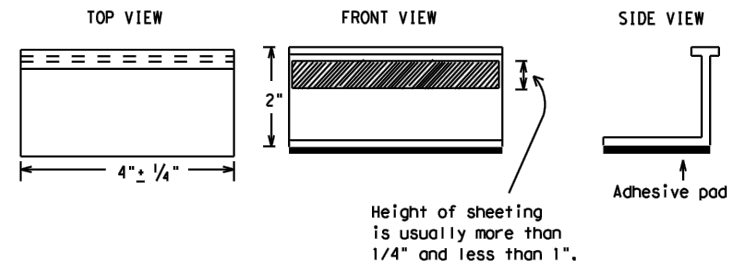
### MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

### REMOVAL OF PAVEMENT MARKINGS

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

## Temporary Flexible-Reflective Roadway Marker Tabs



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

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

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

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

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

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

SHEET 11 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

**BC(11)-21**

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11-02 8-14				

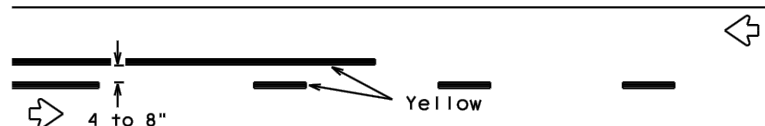
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## PAVEMENT MARKING PATTERNS

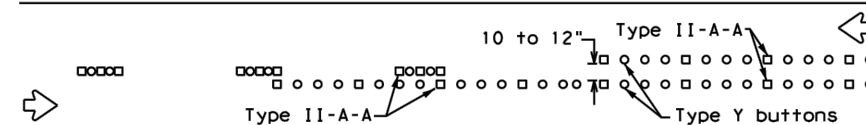


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

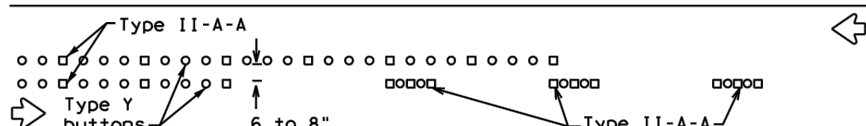


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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.

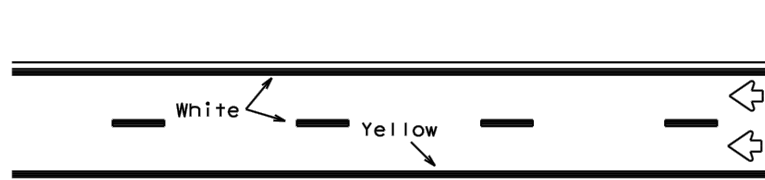


RAISED PAVEMENT MARKERS - PATTERN A



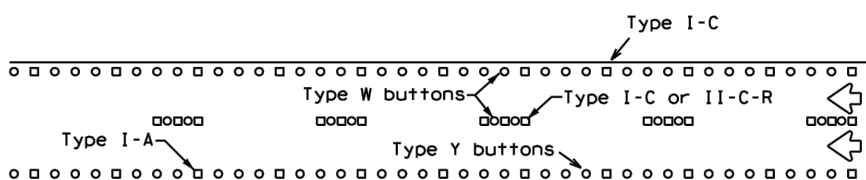
RAISED PAVEMENT MARKERS - PATTERN B

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



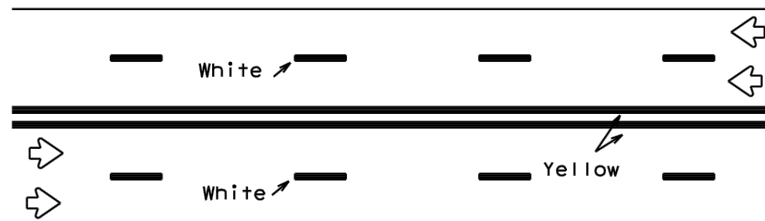
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



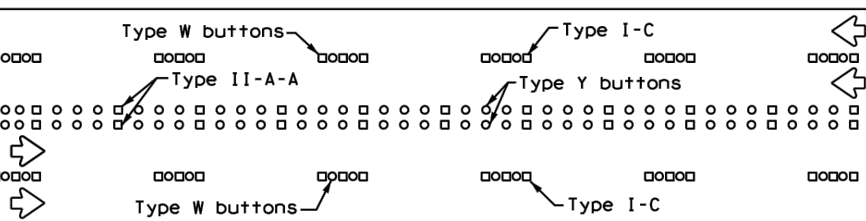
RAISED PAVEMENT MARKERS

## EDGE & LANE LINES FOR DIVIDED HIGHWAY



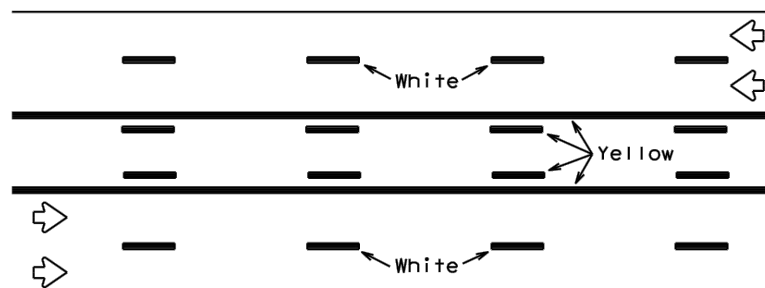
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



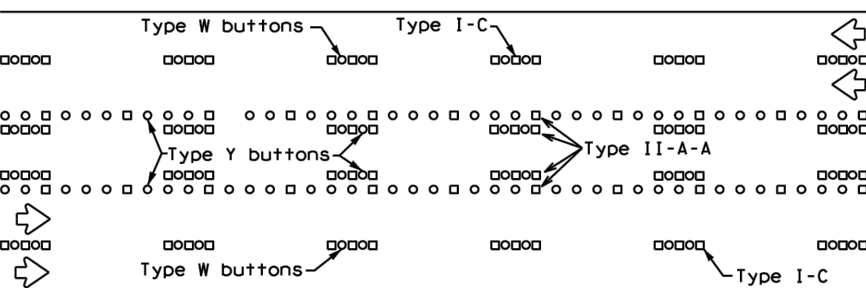
RAISED PAVEMENT MARKERS

## LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

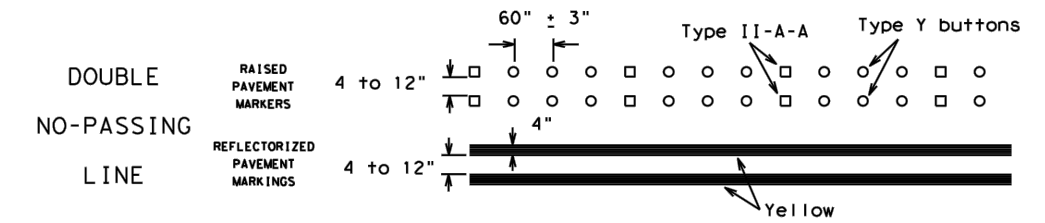
Prefabricated markings may be substituted for reflectORIZED pavement markings.



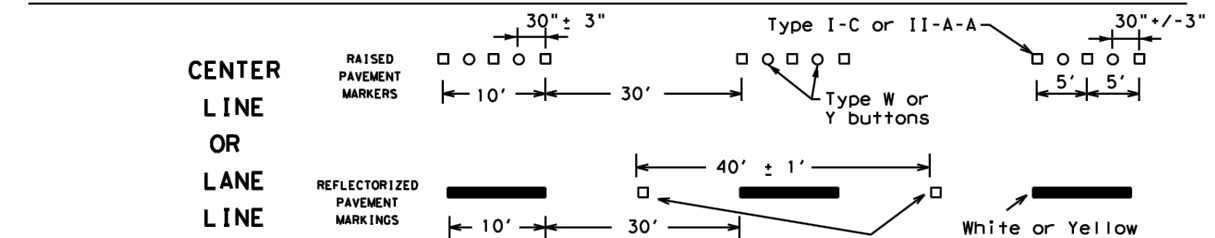
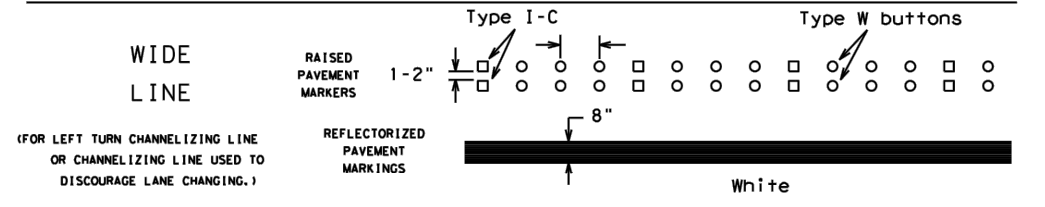
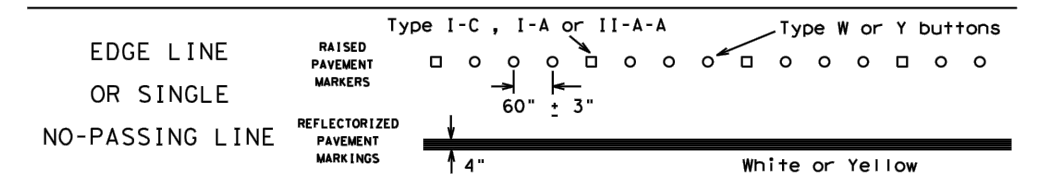
RAISED PAVEMENT MARKERS

## TWO-WAY LEFT TURN LANE

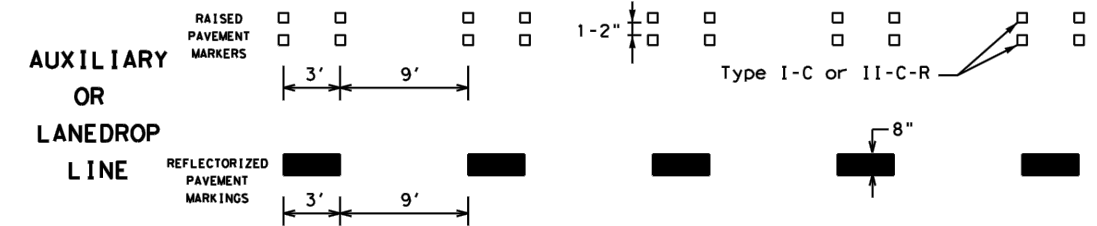
## STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



### SOLID LINES

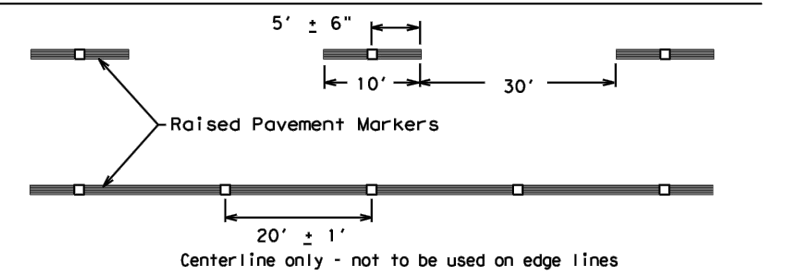


### BROKEN LINES



### 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.



SHEET 12 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC (12) - 21

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."

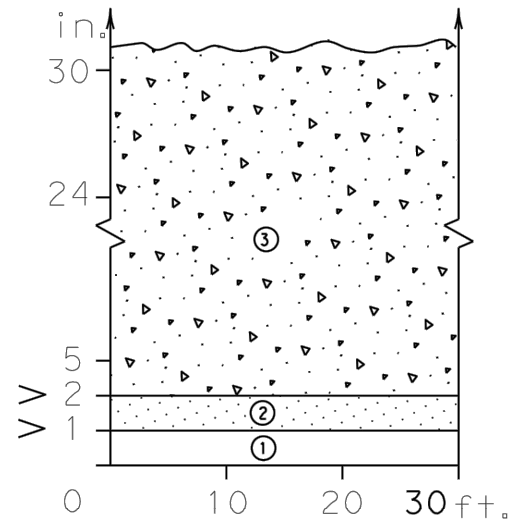
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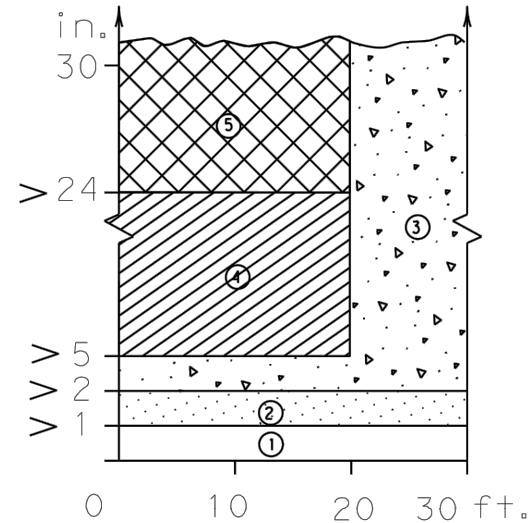
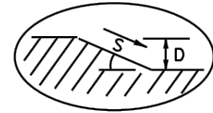
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FILE:

## DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

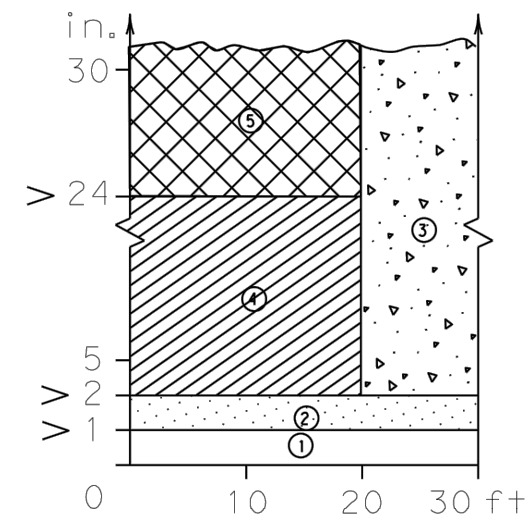
Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet



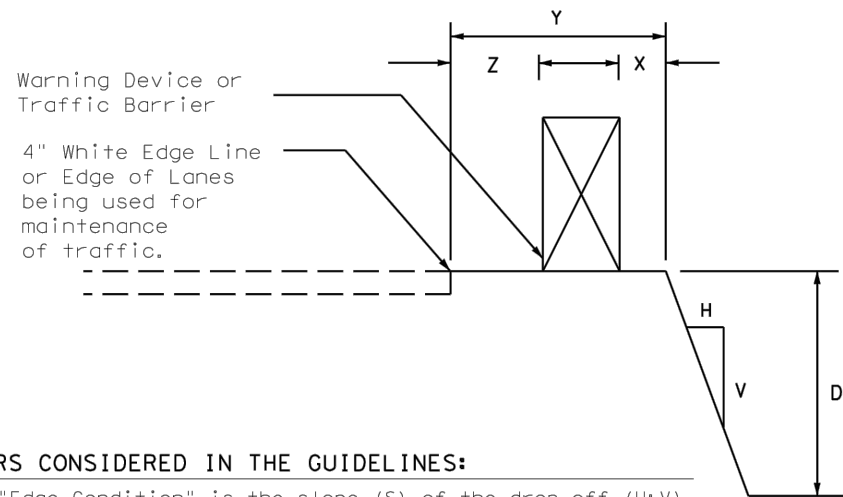
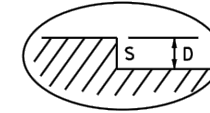
**Edge Condition I**  
S = (3:1) (or flatter)



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



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

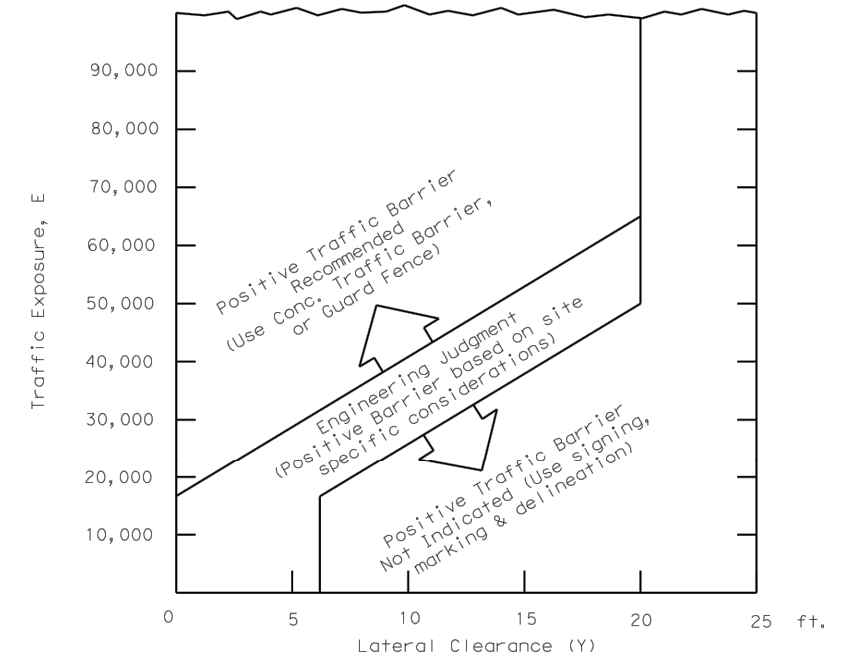


Zone	Treatment Types Guidelines:
①	No treatment
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge slope to that of the profered Edge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

### Edge Condition Notes:

- 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.
- 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" exceeds 24 inches, the possibility for rollover is greater in most vehicles.
- 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.
- Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

## FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 ( [Cross-hatched] )



- $E = ADT \times T$   
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.
- Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.
- An approved end treatment should be provided for any positive barrier end located within the clear zone.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

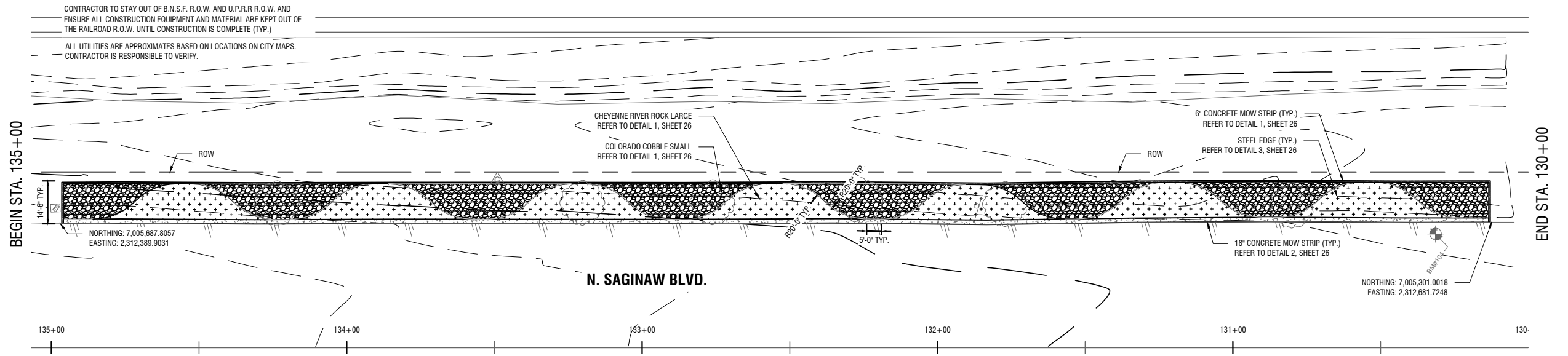
### FACTORS CONSIDERED IN THE GUIDELINES:

- The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height" is the depth of the drop-off "D".
- Distance "X" is to be the maximum practical under 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.
- 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.
- 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.
- 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.

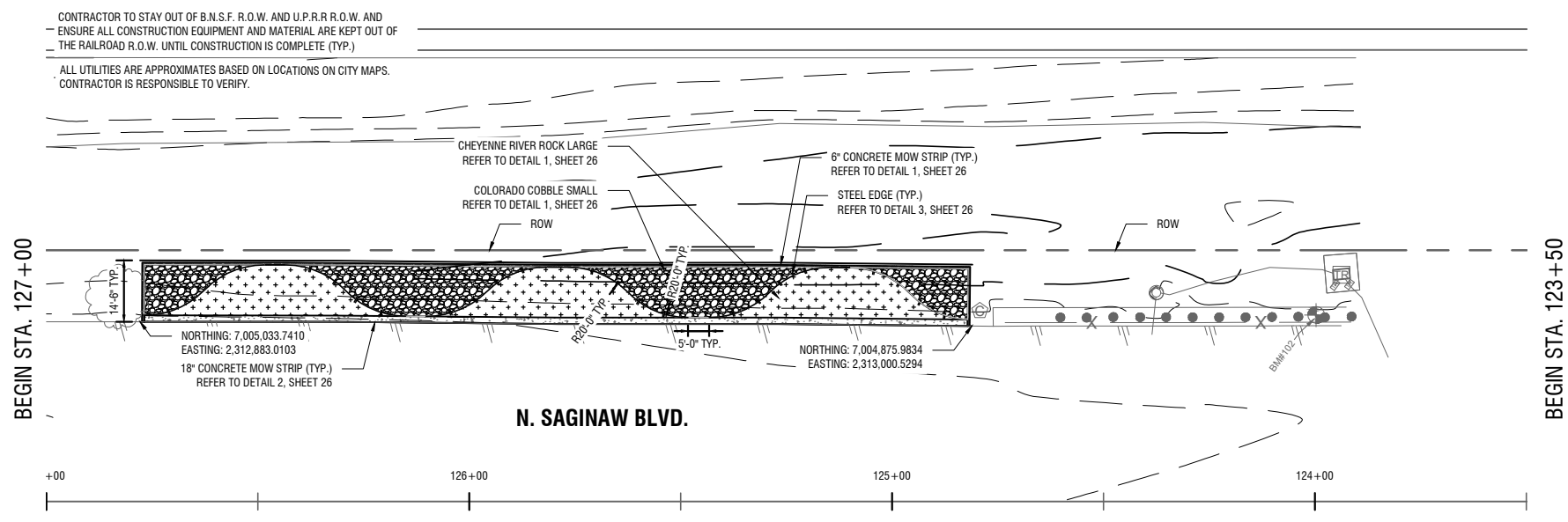
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DATE:  
FILE:

Engineer's Seal		Texas Department of Transportation		Traffic Safety Division Standard	
 06/22/2023 [Signature]		<h2 style="margin: 0;">TREATMENT FOR VARIOUS EDGE CONDITIONS</h2>			
FILE: edgecon.dgn	DN: 0013	CK: 10	DW: 091	CK: 23	
© TxDOT August 2000		CON: 0013	SECT: 10	JOB: 091	HIGHWAY: BUS 287
REVISIONS		DIST: FTW	COUNTY: TARRANT	SHEET NO. 23	



1 SECTION A - BEGIN STA. 135+00 TO END STA. 130+00  
PLAN



2 SECTION B - BEGIN STA. 127+00 TO END STA. 123+50  
PLAN

NOTE:  
CALL TXDOT TRAFFIC MANAGEMENT CENTER (817-370-3661) FOR TXDOT LOCATES WHEN WORKING NEAR EXISTING TRAFFIC SIGNAL.

CAUTION!  
EXISTING UNDERGROUND UTILITIES IN THE AREA CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO EXISTING UTILITIES DUE TO DAMAGE INCURRED DURING CONSTRUCTION. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES ON THE PLAN.

GRAPHIC SCALE IN FEET  
0 10 20 40  
IF PLAN SHEET IS 22"x34"  
SCALE IS 1 IN = 20 FT



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SAGINAW BOULEVARD LANDSCAPE ENHANCEMENTS  
GREEN RIBBON PROGRAM  
SAGINAW, TEXAS

HARDSCAPE PLAN

BEGIN STA. 135+00 TO END STA. 130+00  
BEGIN STA. 127+00 TO END STA. 123+50

**LEGEND**

	18" MOW STRIP SEE DET. 2, SHEET 26
	12" MOW STRIP SEE DET. 1, SHEET 26
	CHEYENNE RIVER ROCK LARGE MANUFACTURER: WHIZ-Q STONE PRODUCT CODE: 50174TON PHONE: 817-429-0822 SEE DET. 1, SHEET 26
	COLORADO COBBLE SMALL MANUFACTURER: WHIZ-Q STONE PRODUCT CODE: 35229 PHONE: 817-429-0822 SEE DET. 1, SHEET 26

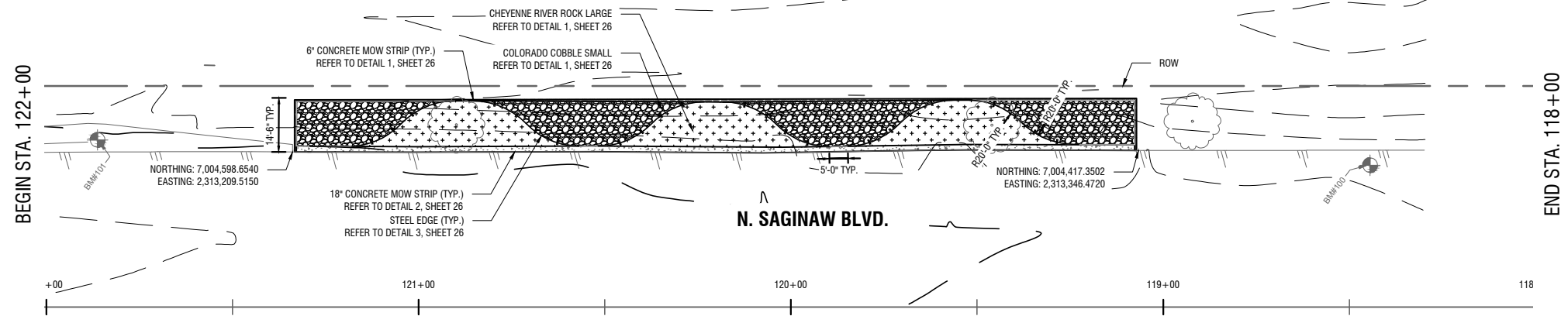
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287P	SEE TITLE SHEET	BU 287P	
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	TARRANT	
CONTROL	SECTION	JOB	24
0013	10	091	

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CONTRACTOR TO STAY OUT OF B.N.S.F. R.O.W. AND U.P.R.R. R.O.W. AND  
 ENSURE ALL CONSTRUCTION EQUIPMENT AND MATERIAL ARE KEPT OUT OF  
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ALL UTILITIES ARE APPROXIMATES BASED ON LOCATIONS ON CITY MAPS.  
 CONTRACTOR IS RESPONSIBLE TO VERIFY.



3 SECTION C - BEGIN STA. 122+00 TO END STA. 118+00  
 PLAN



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 0 10 20 40  
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06/22/2023

**Kimley»Horn**  
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SAGINAW BOULEVARD LANDSCAPE  
 ENHANCEMENTS  
 GREEN RIBBON PROGRAM  
 SAGINAW, TEXAS

HARDSCAPE PLAN  
 BEGIN STA. 122+00 TO  
 END STA. 118+00

**LEGEND**

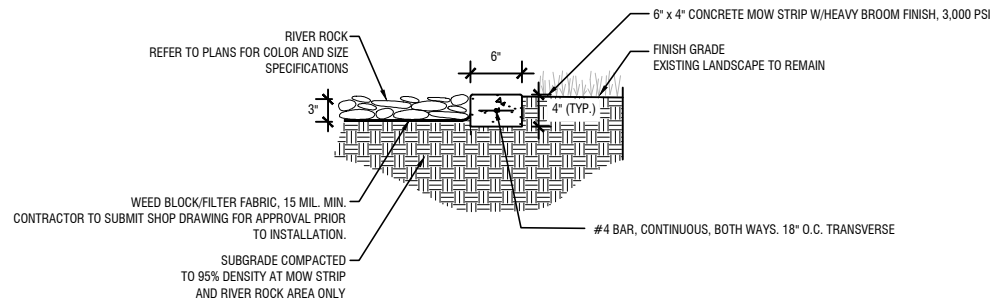
	18" MOW STRIP SEE DET. 2, SHEET 26
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	COLORADO COBBLE SMALL MANUFACTURER: WHIZ-Q STONE PRODUCT CODE: 35229 PHONE: 817-429-0822 SEE DET. 1, SHEET 26

FED.RD.	PROJECT NO.	HIGHWAY NO.	
287P	SEE TITLE SHEET	BU 287P	
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	TARRANT	
CONTROL	SECTION	JOB	25
0013	10	091	

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 LOCATION: K:\FTW\_LAP\06100103158\_SAGINAW GR PHASE I\DWG\04\_CD SHEETS\5\_HARDSCAPE.DWG  
 LAST SAVED: 6/8/2023 6:34 PM

**MATERIAL NOTES:**  
 MAKE: WHIZ-O STONE\*  
 STYLE: REFERENCE PLAN  
 \*OR APPROVED EQUAL  
 DEPTH OF RIVER ROCK VARIES FOR THE CHEYENNE RIVER ROCK ONLY. RIVER ROCK SHOULD MAINTAIN DEPTH 1" BELOW EXISTING CURB, STEEL EDGE, AND CONCRETE MOW STRIP.

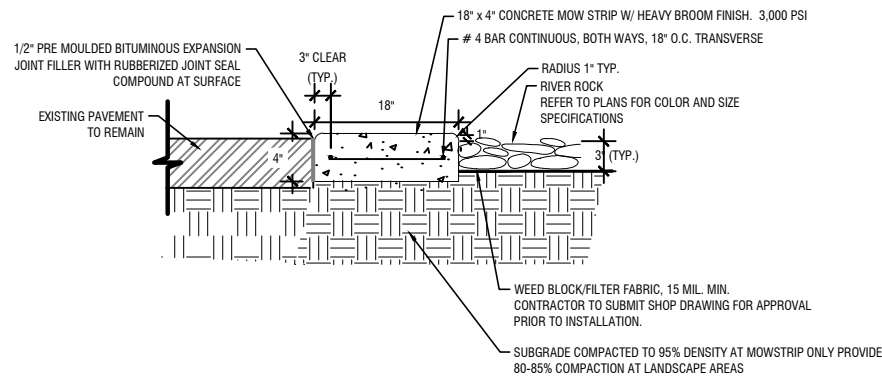
**NOTES:**  
 1. CONTRACTOR TO SUBMIT RIVER ROCK SAMPLES FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.  
 2. CONTRACTOR TO REPAIR/REPLACE EXISTING LANDSCAPE TO ITS PREVIOUS CONDITION IF DISTURBED DURING CONSTRUCTION. FINAL APPROVAL BY CITY OR LANDSCAPE ARCHITECT.  
 3. PROVIDE 1 1/2" DEEP SAWCUTS TO MOW STRIP AT 6' O.C.  
 4. PROVIDE EXPANSION JOINT TO ADJACENT PAVEMENT AND/OR CURB.



**1 6" CONCRETE MOW STRIP AND RIVER ROCK**

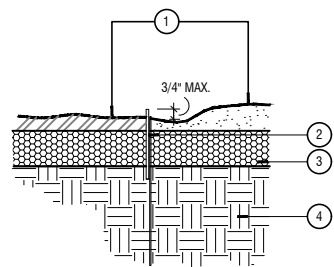
SECTION NTS

**NOTES:**  
 1. PROVIDE 1 1/2" DEEP SAWCUTS TO MOW STRIP AT 6' O.C.  
 2. PROVIDE EXPANSION JOINT TO ADJACENT PAVEMENT AND/OR CURB.  
 3. CONTRACTOR TO REPAIR/REPLACE EXISTING LANDSCAPE TO ITS PREVIOUS CONDITION IF DISTURBED DURING CONSTRUCTION. FINAL APPROVAL BY CITY OR LANDSCAPE ARCHITECT.  
 4. CONTRACTOR TO SAW CUT AND REMOVE 9" WIDE SEGMENT OF EXISTING ASPHALT PAVEMENT AND SUBBASE TO PROVIDE STRAIGHT EDGE FOR MOW STRIP FORMS (ITEM 105-6014).



**2 18" CONCRETE MOW STRIP**

SECTION NTS



1. RIVER ROCK AND DECOMPOSED GRANITE LAYERS. REFER TO DETAILS AND/OR SPECIFICATIONS.
2. STEEL EDGE: 3/16" SIZE; COLOR TO BE BLACK
3. BED SOIL: 12" MINIMUM DEPTH. REF. NOTES AND/OR SPECS FOR MIX. & DEPTH.
4. NATIVE SOIL.

**3 STEEL EDGING**

SECTION NTS

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06/22/2023

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 ENHANCEMENTS  
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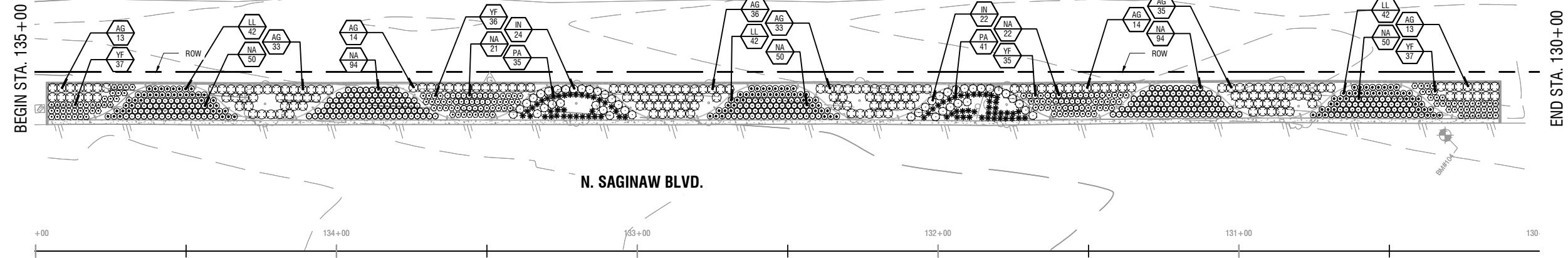
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STATE	DISTRICT	COUNTY
TEXAS	FTW	TARRANT
CONTROL	SECTION	JOB
0013	10	091
		SHEET NO.
		26

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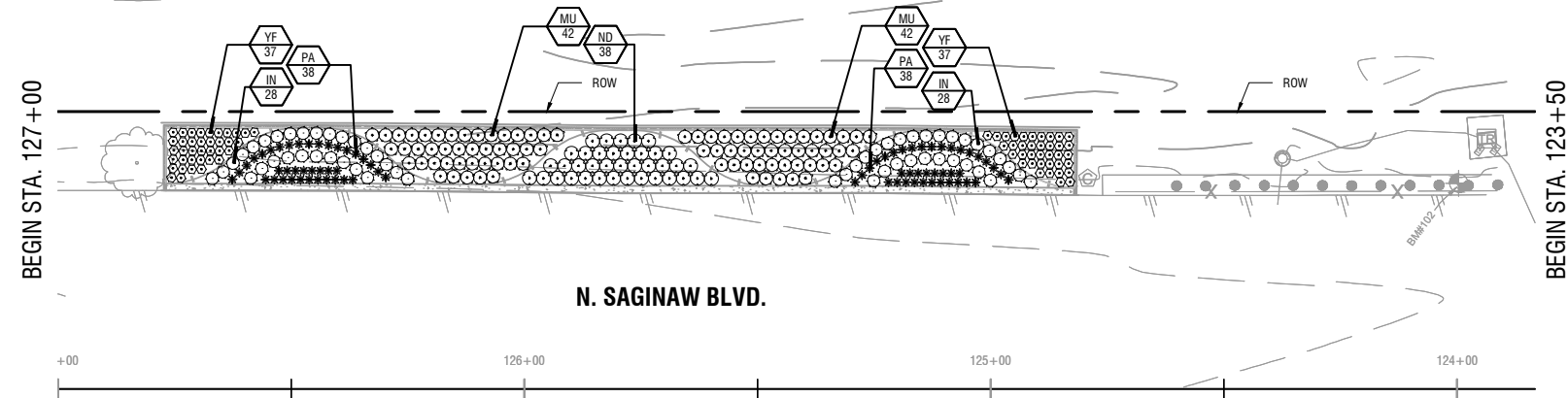
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 LAST SAVED: 6/22/2023 2:20 PM

CONTRACTOR TO SEED TO LIMITS OF DISTURBANCE.  
 CONTRACTOR TO STAY OUT OF B.N.S.F. R.O.W. AND U.P.R.R. R.O.W. AND  
 ENSURE ALL CONSTRUCTION EQUIPMENT AND MATERIAL ARE KEPT OUT OF  
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1 SECTION A - BEGIN STA. 135+00 TO END STA. 130+00  
 PLAN

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 IF PLAN SHEET IS 22"x34"  
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 ENHANCEMENTS  
 GREEN RIBBON PROGRAM  
 SAGINAW, TEXAS

PLANTING PLAN

BEGIN STA. 135+00 TO END STA. 130+00  
 BEGIN STA. 127+00 TO END STA. 123+50

PLANT SCHEDULE

SHRUBS	CODE	QTY	BOTANICAL / COMMON NAME	SIZE	CONT	SPACING	REMARKS
	AG	260	ABELIA X GRANDIFLORA 'KALEIDOSCOPE' / KALEIDOSCOPE GLOSSY ABELIA	18" H X 18" W	3 GAL. MIN.	36" O.C.	FULL & MATCHING
	IN	132	ILEX VOMITORIA 'NANA' / DWARF YAUPON HOLLY	18" H X 18" W	3 GAL. MIN.	36" O.C.	FULL & MATCHING
	ND	110	NANDINA DOMESTICA 'FIREPOWER' / DWARF FIREPOWER NANDINA	12" H X 12" W	3 GAL. MIN.	36" O.C.	FULL & MATCHING
	LL	167	NANDINA DOMESTICA 'LEMON LIME' / LEMON LIME HEAVENLY BAMBOO	12" H X 12" W	3 GAL. MIN.	24" O.C.	FULL & MATCHING
	YF	295	YUCCA FILAMENTOSA 'COLOR GUARD' / ADAM'S NEEDLE	12" H X 12" W	3 GAL. MIN.	24" O.C.	FULL & MATCHING
GRASSES	CODE	QTY	BOTANICAL / COMMON NAME	SIZE	CONT	SPACING	REMARKS
	MU	84	MUHLENBERGIA CAPILLARIS / PINK MUHLY	18" H X 18" W	3 GAL. MIN.	36" O.C.	FULL & MATCHING
	NA	431	NASSELLA TENUISSIMA / MEXICAN FEATHER GRASS	12" H X 12" W	3 GAL. MIN.	24" O.C.	FULL & MATCHING
	PA	152	PENNISSETUM ALOPECUROIDES 'HAMELN' / DWARF FOUNTAIN GRASS	12" H X 12" W	3 GAL. MIN.	24" O.C.	FULL & MATCHING

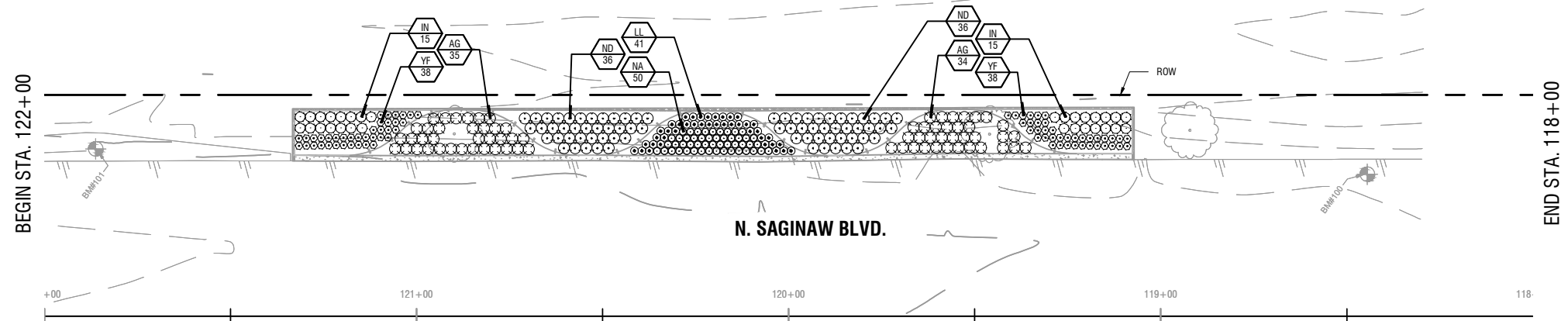
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287P	SEE TITLE SHEET	BU 287P
STATE	DISTRICT	COUNTY
TEXAS	FTW	TARRANT
CONTROL	SECTION	JOB
0013	10	091
		SHEET NO.
		27

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3 SECTION C - BEGIN STA. 122+00 TO END STA. 118+00  
 PLAN



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 ENHANCEMENTS  
 GREEN RIBBON PROGRAM  
 SAGINAW, TEXAS

PLANTING PLAN  
 BEGIN STA. 122+00 TO  
 END STA. 118+00

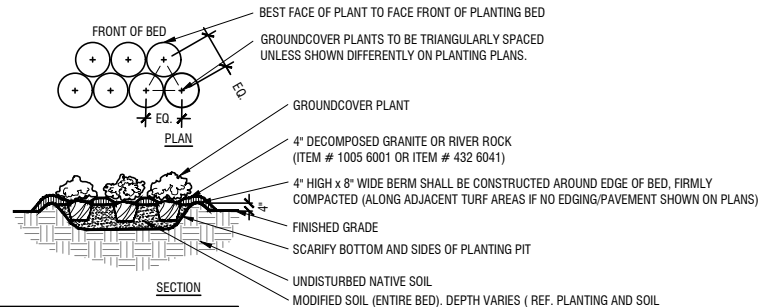
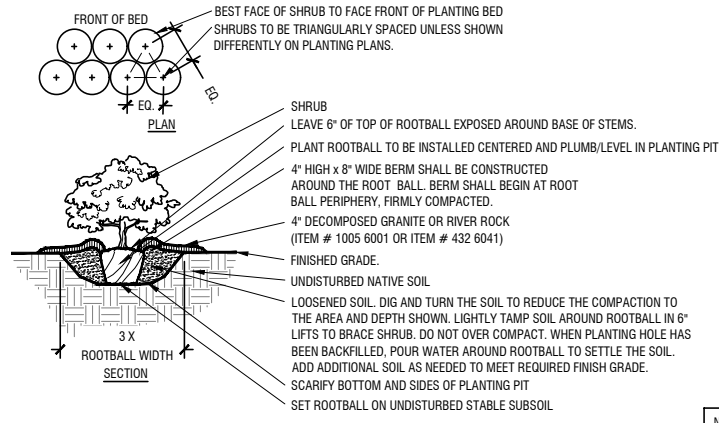
PLANT SCHEDULE

SHRUBS	CODE	QTY	BOTANICAL / COMMON NAME	SIZE	CONT	SPACING	REMARKS
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FED.RD.	PROJECT NO.	HIGHWAY NO.
287P	SEE TITLE SHEET	BU 287P
STATE	DISTRICT	COUNTY
TEXAS	FTW	TARRANT
CONTROL	SECTION	JOB
0013	10	091
		SHEET NO.
		28





**NOTES:**  
 1. REF. PLANTING SPECIFICATIONS FOR ADDITIONAL INFORMATION.  
 2. WHEN SHRUBS MASSED TOGETHER WITH GROUNDCOVER BEDS, ALL SOIL IN BED TO BE AMENDED. (REF. SOIL MANAGEMENT PLANS AND SPECIFICATIONS)  
 3. WHEN SHRUBS ARE USED IN MASSES, PRUNE ALL SHRUBS TO ACHIEVE UNIFORM MASS/HEIGHT.  
 4. REF. TO PLANT SCHEDULE AND PLANTING PLANS FOR SPACING/LAYOUT.

**NOTES:**  
 1. REF. PLANTING SPECIFICATIONS FOR ADDITIONAL INFORMATION.  
 2. REF. PLANT SCHEDULE AND PLANTING PLANS FOR SPACING/LAYOUT.

**1 SHRUB / GROUNDCOVER PLANTING**  
 SECTION NTS

**LANDSCAPE NOTES**

**INSPECTIONS:**

- NO EXCAVATION SHALL OCCUR IN ROW BEFORE INSPECTION BY TXDOT & CITY PERSONNEL.
- THE CONTRACTOR SHALL MARK ALL WATER LINES, SEWER LINES, & TREE LOCATIONS PRIOR TO CALLING FOR ROW INSPECTION.
- SCREENING WALLS, WATER METERS, CLEANOUTS AND OTHER APPURTENANCES, SHALL BE ACCESSIBLE, ADJUSTED TO GRADE, CLEARLY MARKED WITH FLAGGING FOR FIELD VERIFICATION BY THE PUBLIC WORKS DEPARTMENT, AND COMPLIANT WITH CITY OF SAGINAW'S PUBLIC WORKS DEPARTMENT STANDARDS PRIOR TO CALLING FOR A FINAL INSPECTION.
- PRIOR TO CALLING FOR A LANDSCAPE INSPECTION, CONTRACTOR SHALL MARK ALL MANHOLES, VALVES, WATER METERS, CLEANOUTS AND OTHER UTILITY APPURTENANCES.

**NURSERY AND LANDSCAPE STANDARDS:**

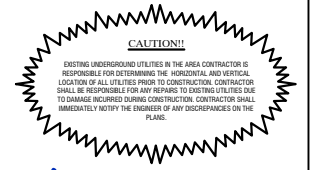
- UNLESS OTHERWISE SPECIFIED, TREES SHALL BE PLANTED (6") MINIMUM FROM CURBS, SIDEWALKS, UTILITY LINES, SCREENING WALLS AND/OR OTHER STRUCTURES. THE CITY WILL BE INVOLVED IN FINAL APPROVAL FOR ALL TREE PLACEMENTS.
- NO PLANT MATERIAL SHALL BE ALLOWED TO ENCRUCH ON RIGHT-OF-WAY, SIDEWALKS OR EASEMENTS TO THE EXTENT THAT VISION OR ROUTE OF TRAVEL FOR VEHICULAR, PEDESTRIAN, OR BICYCLE TRAFFIC IS IMPEDED.
- THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1-2004) SPECIFICATIONS SHALL GOVERN PLANT QUALIFICATIONS, GRADES AND STANDARDS.
- ALL PLANTING BED BACKFILL AREAS TO BE PREPARED WITH 'READY TO PLANT BEDDING MIX' BY SOIL BUILDING SOLUTIONS (OR APPROVED EQUAL). INSTALL TO DEPTHS PER PLANING DETAILS. PLANTING BED PIT SOIL TO BE A MIXTURE OF 50% COMPOST WITH 50% SCREENED AND WEED FREE NATIVE SOIL AND SCREENED SHARP SAND. 98.5% OF THE PLANTING BED PIT SOIL PARTICLES WILL PASS THROUGH A 1/2" SCREEN AND 98% OR MORE SHALL PASS THROUGH A 3/4" SCREEN. SOIL SHALL BE FREE OF STONES, ROOTS, AND CLODS AND ANY OTHER FOREIGN MATERIAL THAT IS NOT BENEFICIAL FOR PLANT GROWTH.
- NO PLANTING AREAS SHALL EXCEED 3:1 SLOPE (3' HORIZONTAL TO 1' VERTICAL). EARTHEN BERMS SHALL NOT INCLUDE CONSTRUCTION DEBRIS. CONTRACTOR SHALL CORRECT EROSION OR DAMAGE TO THE SMOOTH FINISH GRADE OF THE BERM PRIOR TO ACCEPTANCE.
- ALL PLANT BEDS SHALL BE TOP-DRESSED WITH A MINIMUM OF 3 INCHES OF DECOMPOSED GRANITE MULCH.
- GROUND COVERS MUST PROVIDE COMPLETE COVERAGE WITHIN TWO (2) YEARS OF PLANTING.

**MAINTENANCE STANDARDS:**

- ALL PLANT MATERIAL SHALL BE MAINTAINED IN A HEALTHY AND GROWING CONDITION AS IS APPROPRIATE FOR THE SEASON OF THE YEAR. PLANT MATERIAL THAT IS DAMAGED, DESTROYED, OR REMOVED SHALL BE REPLACED WITH PLANT MATERIAL OF SIMILAR SIZE AND VARIETY WITHIN 30 DAYS, UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY OF SAGINAW.
- THE OWNER, TENANT, AND/OR THEIR AGENTS SHALL BE RESPONSIBLE FOR THE MAINTENANCE, ESTABLISHMENT, AND PERMANENCE OF PLANT MATERIAL. ALL LANDSCAPING SHALL BE MAINTAINED IN ACCORDANCE WITH DESIGN INTENT. THIS SHALL INCLUDE, BUT NOT LIMITED TO, MOWING, EDGING, PRUNING, FERTILIZING, WATERING, AND OTHER ACTIVITIES NECESSARY FOR THE MAINTENANCE OF LANDSCAPED AREAS.
- LANDSCAPE AND OPEN AREAS SHALL BE FREE OF TRASH, LITTER AND WEEDS.

**GENERAL NOTES:**

- CONTRACTOR WILL BE RESPONSIBLE FOR REFERENCING ITEM 192 OF THE TEXAS STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES 2014 FOR SPECIFICATIONS DIMENSIONS, VOLUMES AND MEASUREMENTS THAT HAVE BEEN MODIFIED OR NOT SHOWN.
- ALL PLANTS WILL BE NURSERY-GROWN IN CONTAINERS UNLESS OTHERWISE SHOWN ON PLANS.
- REJECTION OF PLANTS WILL BE IN ACCORDANCE WITH ITEM 192.2.2.
- THE CONTRACTOR WILL BE RESPONSIBLE FOR THE SAFE TRANSPORTATION OF PLANTS TO THE PROJECT SITE AND THEIR CONDITION UPON ARRIVAL.
- PLANT MATERIALS WILL NOT BE STORED ON HARD SURFACE OR LEFT EXPOSED TO THE SUN.
- PROTECT THE ROOT BALLS AND WATER REGULARLY UNTIL PLANTING.
- IF PLANTS ARE LEFT IN STORAGE OVER THE WEEKEND OR HOLIDAY, A MEANS OF PERIODICALLY WATERING AND INSPECTION CONTAINER MOISTURE WILL BE PROVIDED.
- ALL PLANTS WILL BE HARDY, SYMMETRICAL, TIGHT KNIT, AND SO TRAINED OR FAVORED IN DEVELOPMENT AND APPEARANCE AS TO BE SUPERIOR IN FORM, NUMBER OF BRANCHES, AND COMPACTNESS. PLANTS WILL BE SOUND, HEALTHY AND VIGOROUS, WELL BRANCHED, DENSELY FOLIATED WHEN IN LEAF, AND WILL HAVE HEALTHY, WELL DEVELOPED ROOT SYSTEMS.
- ALL AGGREGATE AND RIVER ROCK BEDS SHALL BE 18" MIN. DISTANCE FROM FACE OF PAVEMENT.

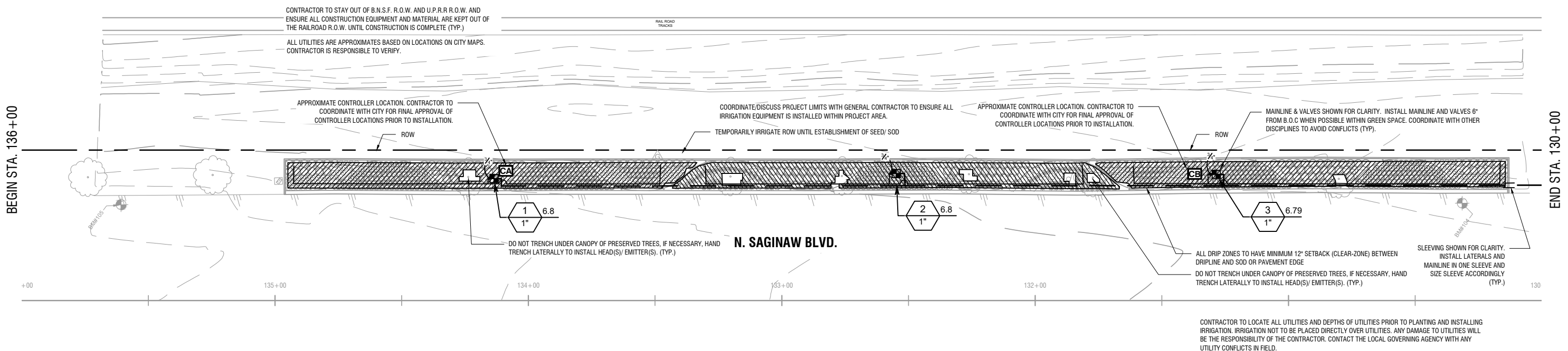


**Kimley»Horn**  
 Texas Registered Engineering Firm F-928  
 Texas Department of Transportation  
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SAGINAW BOULEVARD LANDSCAPE  
 ENHANCEMENTS  
 GREEN RIBBON PROGRAM  
 SAGINAW, TEXAS  
 PLANTING DETAILS

FED.RD.	PROJECT NO.	HIGHWAY NO.
287P	SEE TITLE SHEET	BU 287P
STATE	DISTRICT	COUNTY
TEXAS	FTW	TARRANT
CONTROL	SECTION	JOB
0013	10	091
SHEET NO. 29		

PLOTTED BY: KELLEHER, MEGAN  
 PLOT DATE: 6/22/2023 2:25 PM  
 LOCATION: K:\FTW\_LAP\06100103188\_SAGINAW GR PHASE II\DWG\04\_CD SHEET\9\_PLANTING DETAILS.DWG  
 LAST SAVED: 6/8/2023 8:45 PM



1 SECTION A - BEGIN STA. 136+00 TO END STA. 130+00  
PLAN

**GENERAL IRRIGATION NOTES**

- IRRIGATION CONTRACTOR SHALL TEST EXISTING STATIC PRESSURE ON SITE PRIOR TO CONSTRUCTION. SHOULD EXISTING SITE PRESSURE BE BELOW 65 PSI, CONTRACTOR SHALL CONTACT THE IRRIGATION DESIGNER PRIOR TO COMMENCEMENT OF CONSTRUCTION.
- COORDINATE IRRIGATION INSTALLATION WITH PLANTING PLAN AND SITE CONDITIONS TO PROVIDE COMPLETE 100% COVERAGE WITH MINIMUM OVERSPRAY. THE IRRIGATION CONTRACTOR SHALL MAKE MINOR ADJUSTMENTS TO ENSURE PROPER COVERAGE AT NO ADDITIONAL COST TO THE OWNER.
- ALL CONSTRUCTION SHALL CONFORM TO CITY, COUNTY, STATE, AND FEDERAL REQUIREMENTS. IT SHALL BE THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO ENSURE THAT ALL IRRIGATION EQUIPMENT MEETS GOVERNMENT REGULATIONS. CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS OR APPROVALS PRIOR TO COMMENCEMENT OF OPERATIONS ON-SITE. COPIES OF THE PERMITS SHALL BE SENT TO THE OWNER/GENERAL CONTRACTOR.
- LATERAL PIPE SHALL BE INSTALLED AT A MINIMUM DEPTH OF 12 INCHES. MAINLINE PIPE AND WIRES SHALL BE INSTALLED AT A MINIMUM DEPTH OF 18 INCHES.
- ELECTRICAL POWER SHALL BE PROVIDED WITHIN 5 FEET OF CONTROLLER LOCATION BY GENERAL CONTRACTOR. LICENSED IRRIGATION CONTRACTOR TO PROVIDE FINAL HARD WIRE TO CONTROLLER.
- 24 VOLT VALVE WIRE SHALL BE A MINIMUM OF 14 GAUGE, U.L. APPROVED FOR DIRECT BURIAL, SINGLE CONDUCTOR "IRRIGATION WIRE". CONTRACTOR TO CONFIRM WIRE SIZE PRIOR TO INSTALLATION. WIRE SPLICES SHALL BE ENCASED IN A WATERPROOF WIRE CONNECTOR UL APPROVED AND FILLED WITH SILICONE.
- IRRIGATION VALVES AND VALVE BOXES SHALL BE LOCATED IN LANDSCAPE BEDS OR GROUND COVER AREAS WHENEVER POSSIBLE. ALL REMOTE VALVE BOXES SHALL BE SET FLUSH WITH FINISHED GRADE AND CONTAIN ONE CUBIC FOOT OF CLEAN GRAVEL BENEATH VALVE. LABEL REMOTE BOXES WITH ONE-INCH ALPHA NUMERIC NOTATION CORRESPONDING TO THE APPLICABLE ALPHA CONTROLLER AND NUMERIC STATION. USE 1" ROUND VALVE BOXES FOR ELECTRIC VALVES AND QUICK COUPLING VALVES. USE 15" X 9.5" RECTANGULAR BOX FOR DRIP VALVES UNLESS NOTED OTHERWISE. DOUBLE CHECK ASSEMBLY SHALL BE BOXED ACCORDING TO LOCAL CODES.
- USE PVC SWING JOINT ASSEMBLIES TO CONNECT ALL SPRAY AND ROTOR HEADS.
- CONTRACTOR IS TO CONTACT APPROPRIATE AUTHORITIES AND LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, EQUIPMENT QUANTITIES, AND UTILITY LOCATIONS PRIOR TO BEGINNING WORK.
- SLEEVES SHALL BE INSTALLED BY GENERAL CONTRACTOR UNLESS OTHERWISE NOTED. SLEEVE MATERIAL SHALL BE PVC, SCHD. 40. CONTRACTOR SHALL EXTEND SLEEVES 18 INCHES BEYOND EDGE OF ALL PAVEMENT. ELECTRICAL WIRES FOR IRRIGATION VALVES AND IRRIGATION LINES ARE TO BE PLACED IN SEPARATE SLEEVES. SEE SLEEVING DETAIL. ALL PRESSURE MAINLINES UNDER ASPHALT PAVEMENT SHALL BE PLACED WITHIN SLEEVES AS NOTED.
- DRIP LINE SHALL BE PLACED A MINIMUM OF 2" UNDER MULCH.
- LICENSED IRRIGATION CONTRACTOR SHALL ADJUST SPRAY NOZZLES FOR "HEAD-TO-HEAD" COVERAGE AND ADJUST FOR MINIMUM OVERSPRAY ONTO PAVEMENT. NO OVERSPRAY IS PERMITTED ONTO STREETS OR SIDEWALKS.
- IRRIGATION CONTRACTOR SHALL SUPPLY AND CONSTRUCT IRRIGATION SYSTEM WITH ALL MATERIALS AND PER MANUFACTURER SPECIFICATIONS SHOWN ON THIS PLAN. IF CONTRACTOR PREFERENCES MATERIALS THAT DIFFER FROM THE THIS PLAN, THEY SHALL BE APPROVED BY THE IRRIGATION DESIGNER PRIOR TO CONSTRUCTION.
- VERIFY CONTROLLER AND RAIN SENSOR LOCATION AND MAINLINE POINT OF CONNECTION AT PROJECT SITE WITH OWNER.
- EXISTING TREES TO REMAIN ARE TO BE PROTECTED FROM DAMAGE. DO NOT TRENCH OR EXCAVATE WITHIN THE CRITICAL ROOT ZONE OF ANY TREE.
- IRRIGATION LATERAL LINES, MAIN LINES AND EQUIPMENT MAY BE SHOWN OUTSIDE PROPERTY LINES ON THIS PLAN. ALL IRRIGATION LINES AND EQUIPMENT ARE TO BE WITHIN AND INSTALLED WITHIN THE LIMITS OF THE PROPERTY LINE.
- SUPPLY LINE AND METER TO BE PROVIDED BY GENERAL CONTRACTOR. BACKFLOW PREVENTER TO BE PROVIDED BY IRRIGATION CONTRACTOR. IRRIGATION CONTRACTOR'S POINT OF CONNECTION TO BEGIN AFTER THE IRRIGATION WATER METER.
- IRRIGATION CONTRACTOR SHALL REVIEW WINTERIZATION PROCEDURES FOR IRRIGATION SYSTEM WITH OWNERS REPRESENTATIVE.
- ALL PLANT MATERIAL IN TREE HOLDING AREAS SHALL BE MANUALLY WATERED/IRRIGATED TO KEEP MOIST UNTIL PLANTED.
- MAINLINE, VALVES, AND WIRING ARE SHOWN ON DRAWINGS FOR CLARITY. SHOULD BE LOCATED IN ACCESSIBLE GREEN SPACE. CONTRACTOR TO COORDINATE WITH ALL DISCIPLINES TO AVOID CONFLICTS WITH UTILITIES/ STRUCTURES, ETC.
- INSTALLATION OF WORK SHALL BE COORDINATED WITH OTHER CONTRACTORS IN SUCH A MANNER AS TO ALLOW FOR A SPEEDY AND ORDERLY COMPLETION OF ALL WORK ON THE SITE.
- SET SPRAY HEADS 4" FROM BACK OF CURB OR 24" IF PAVEMENT HAS NO CURB.
- CONTRACTOR SHALL PROVIDE "AS-BUILT" DRAWINGS OF THE FINAL INSTALLATION TO OWNER AT SUBSTANTIAL COMPLETION BEFORE RECEIVING FINAL PAYMENT. "AS-BUILT" DRAWINGS TO BE COLOR CODED BY ZONE ON 8.5" X 11", LAMINATED, AND PLACED IN CONTROLLER.
- ALL DRIP ZONES SHALL BE INSTALLED WITH A SELF-FLUSHING DISC FILTER, OR APPROVED EQUAL.
- INSTALL ALL IRRIGATION COMPONENTS AS PER MANUFACTURERS REQUIREMENTS.
- IRRIGATION HEADS AND COMPONENTS SHALL BE LOCATED A MINIMUM OF 24" FROM ALL BUILDINGS TO AVOID ADVERSE PERFORMANCE OF FOUNDATIONS AND SLABS.
- NO LATERALS LESS THAN 3/4" DIAMETER.

THIS IRRIGATION PLAN IS DESIGNED TO THE FOLLOWING STATS: 65 PSI AND 37.5 GPM. IF WATER PRESSURE DOES NOT MEET DESIGN SPECIFICATIONS A BOOSTER PUMP WILL BE REQUIRED AT COST OF CONTRACTOR. CONTACT LANDSCAPE ARCHITECT PRIOR TO INSTALLATION IF SYSTEM HAS +/- 5 PSI THAN DESIGN PRESSURE.

ABOVE QUANTITIES PROVIDED FOR CONVENIENCE ONLY. CONTRACTOR TO CONFIRM ALL QUANTITIES PRIOR TO BIDDING.

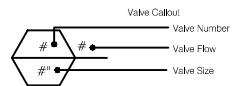
REFERENCE MAXIMUM LATERAL DRIPLINE CHART TO DETERMINE MINIMUM NUMBER OF POINTS OF CONNECTION PER DRIP LINE ZONE.

WHERE LAYOUT FLEXIBILITY EXISTS CENTER FEED LAYOUTS MUST BE USED. THIS ALLOWS FOR EVEN FLOW OF WATER THROUGH THE ZONE.

RAINBIRD DRIP SYSTEM OPERATION INDICATOR TO BE PLACED IN ALL DRIP AREAS AT THE FURTHEST POINT OF EACH DRIP RUN.

**IRRIGATION SCHEDULE**

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY
	Rain Bird XCZ-100-LC Wide Flow Drip Control Kit, for Light Commercial Uses. 1in. PEB Valve, with 1in. Pressure Regulating 40psi Basket Filter. 0.3-20 GPM.	5
	Area to Receive Dripline Rain Bird XFS-CV-PS-6-18 XFS-CV 0.6 GPH Landscape Dripline w/ Purple Stripe.	5,800 l.f.
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY
	Rain Bird TBOS-BT2 2 station Bluetooth battery operated controller with Infrared Port, Master Valve and Sensor Output. Install with (TBOSPSOL) 9V. DC Potted Latching Solenoid. Use (TBOSADAPP or TBOSADAPB) Adapters for Non-Rain Bird Plastic/Brass valves. Compatible w/ Legacy Hand-held Transmitter or Rain Bird Mobile App.	1
	Rain Bird TBOS-BT2 2 station Bluetooth battery operated controller with Infrared Port, Master Valve and Sensor Output. Install with (TBOSPSOL) 9V. DC Potted Latching Solenoid. Use (TBOSADAPP or TBOSADAPB) Adapters for Non-Rain Bird Plastic/Brass valves. Compatible w/ Legacy Hand-held Transmitter or Rain Bird Mobile App.	1
	Rain Bird TBOS-BT2 2 station Bluetooth battery operated controller with Infrared Port, Master Valve and Sensor Output. Install with (TBOSPSOL) 9V. DC Potted Latching Solenoid. Use (TBOSADAPP or TBOSADAPB) Adapters for Non-Rain Bird Plastic/Brass valves. Compatible w/ Legacy Hand-held Transmitter or Rain Bird Mobile App.	1
	Irrigation Lateral Line: PVC Class 200 SDR 21	941.0 l.f.
	Irrigation Mainline: PVC Class 200 SDR 21	1,624 l.f.
	Pipe Sleeve: PVC Schedule 40 Typical pipe sleeve for irrigation pipe. Pipe sleeve shall allow for irrigation piping and their related couplings to easily slide through sleeving material. Extend sleeves 18 inches beyond edges of paving or construction.	20.8 l.f.



**NOTE:**  
CALL TXDOT TRAFFIC MANAGEMENT CENTER (817-370-3661) FOR TXDOT LOCATES WHEN WORKING NEAR EXISTING TRAFFIC SIGNAL.

**CAUTION!**  
EXISTING UNDERGROUND UTILITIES IN THE AREA CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO EXISTING UTILITIES DUE TO DAMAGE INCURRED DURING CONSTRUCTION. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES ON THE PLAN.

GRAPHIC SCALE IN FEET  
0 10 20 40  
IF PLAN SHEET IS 22"X34"  
SCALE IS 1 IN = 20 FT

**Kimley Horn**  
Texas Registered Engineering Firm F-928  
Texas Department of Transportation ©2023

**SAGINAW BOULEVARD LANDSCAPE ENHANCEMENTS GREEN RIBBON PROGRAM**  
SAGINAW, TEXAS

**IRRIGATION PLAN**  
BEGIN STA. 136+00 TO END STA. 130+00

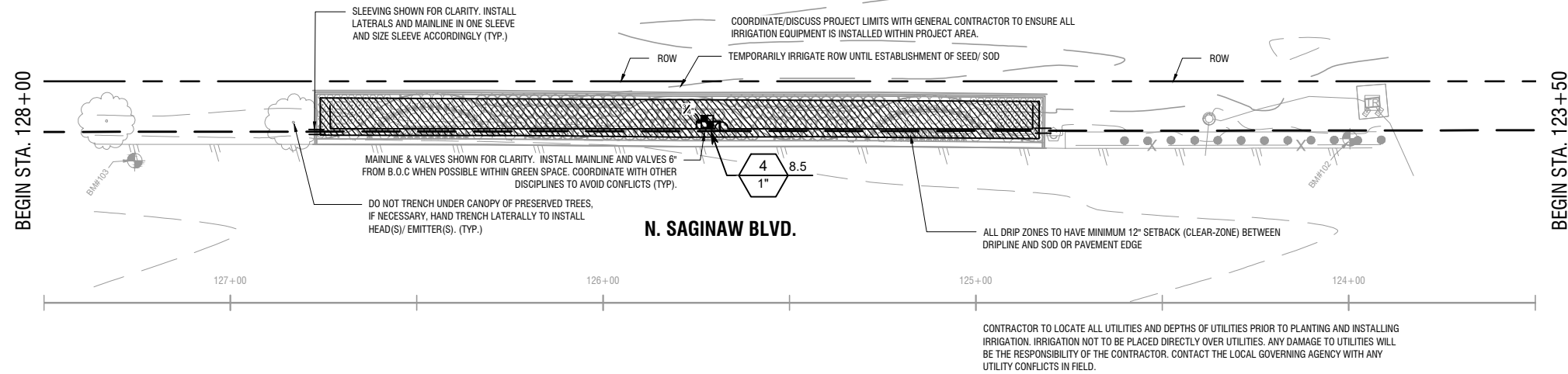
FED.RD.	PROJECT NO.	HIGHWAY NO.
287P	SEE TITLE SHEET	BU 287P
STATE	DISTRICT	COUNTY
TEXAS	FTW	TARRANT
CONTROL	SECTION	JOB
0013	10	091

SHEET NO. 30

PLOTTED BY: KELEHER, MEGAN  
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 LAST SAVED: 6/21/2023 7:26 PM

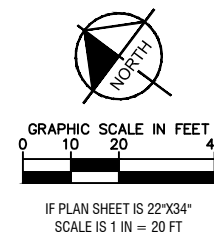
CONTRACTOR TO STAY OUT OF B.N.S.F. R.O.W. AND U.P.R.R. R.O.W. AND ENSURE ALL CONSTRUCTION EQUIPMENT AND MATERIAL ARE KEPT OUT OF THE RAILROAD R.O.W. UNTIL CONSTRUCTION IS COMPLETE (TYP.)

ALL UTILITIES ARE APPROXIMATES BASED ON LOCATIONS ON CITY MAPS. CONTRACTOR IS RESPONSIBLE TO VERIFY.

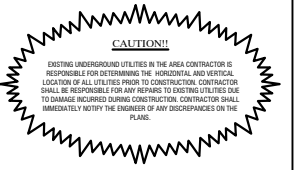


CONTRACTOR TO LOCATE ALL UTILITIES AND DEPTHS OF UTILITIES PRIOR TO PLANTING AND INSTALLING IRRIGATION. IRRIGATION NOT TO BE PLACED DIRECTLY OVER UTILITIES. ANY DAMAGE TO UTILITIES WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. CONTACT THE LOCAL GOVERNING AGENCY WITH ANY UTILITY CONFLICTS IN FIELD.

2 SECTION B - BEGIN STA. 128+00 TO END STA. 123+50  
PLAN

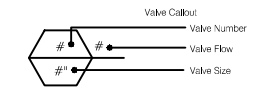


NOTE:  
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IRRIGATION SCHEDULE

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY
	Rain Bird XZ-100-LC Wide Flow Drip Control Kit, for Light Commercial Uses. 1in. PEB Valve, with 1in. Pressure Regulating 40psi Basket Filter. 0.3-20 GPM.	5
	Area to Receive Dripline Rain Bird XFS-CV-PS-6-18 XFS-CV 0.6 GPH Landscape Dripline w/ Purple Stripe.	5,800 l.f.
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY
	Rain Bird TBOS-BT2 2 station Bluetooth battery operated controller with Infrared Port, Master Valve and Sensor Output. Install with (TBOSPSOL) 9V. DC Potted Latching Solenoid. Use (TBOSADAPP or TBOSADAPB) Adapters for Non-Rain Bird Plastic/Brass valves. Compatible w/ Legacy Hand-held Transmitter or Rain Bird Mobile App.	1
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	Irrigation Lateral Line: PVC Class 200 SDR 21	941.0 l.f.
	Irrigation Mainline: PVC Class 200 SDR 21	1,624 l.f.
	Pipe Sleeve: PVC Schedule 40 Typical pipe sleeve for irrigation pipe. Pipe sleeve shall allow for irrigation piping and their related couplings to easily slide through sleeving material. Extend sleeves 18 inches beyond edges of paving or construction.	20.8 l.f.



ABOVE QUANTITIES PROVIDED FOR CONVENIENCE ONLY. CONTRACTOR TO CONFIRM ALL QUANTITIES PRIOR TO BIDDING.  
REFERENCE MAXIMUM LATERAL DRIPLINE CHART TO DETERMINE MINIMUM NUMBER OF POINTS OF CONNECTION PER DRIPLINE ZONE.  
WHERE LAYOUT FLEXIBILITY EXISTS CENTER FEED LAYOUTS MUST BE USED. THIS ALLOWS FOR EVEN FLOW OF WATER THROUGH THE ZONE.  
RAINBIRD DRIP SYSTEM OPERATION INDICATOR TO BE PLACED IN ALL DRIPLINE AREAS AT THE FURTHEST POINT OF EACH DRIPLINE RUN.

PLOTTED BY: KELLEHER, MEGAN  
 PLOT DATE: 6/22/2023 2:26 PM  
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 LAST SAVED: 6/21/2023 7:26 PM

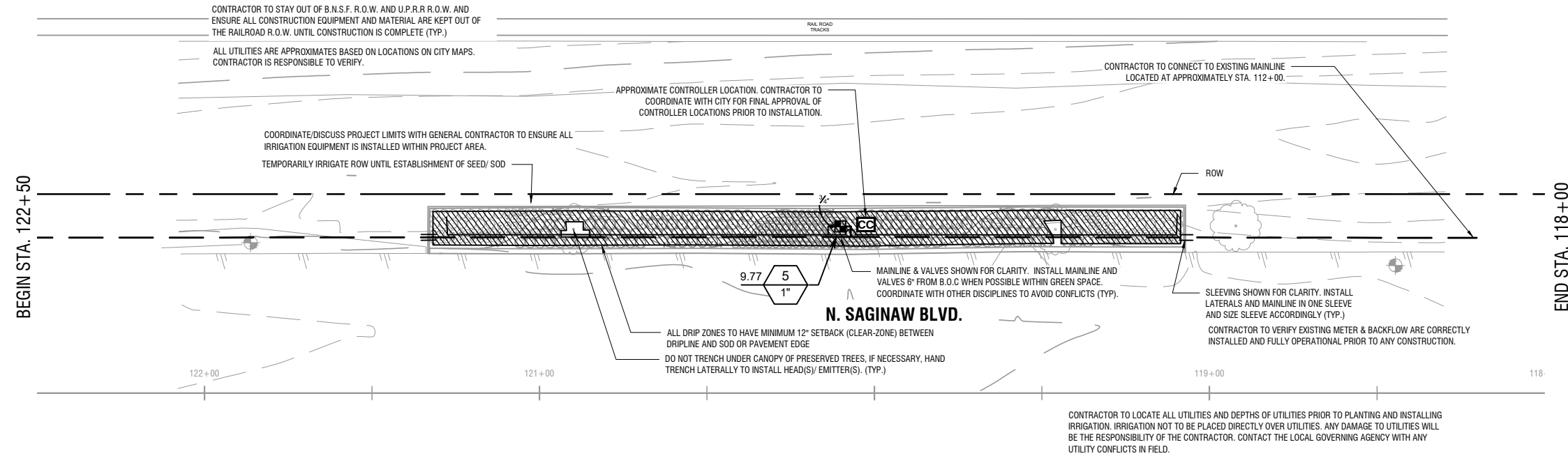
**Kimley»Horn**  
 Texas Registered Engineering Firm F-928  
 Texas Department of Transportation  
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**SAGINAW BOULEVARD LANDSCAPE ENHANCEMENTS GREEN RIBBON PROGRAM**  
 SAGINAW, TEXAS

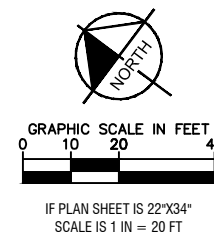
**IRRIGATION PLAN**  
 BEGIN STA. 128+00 TO END STA. 123+50

FED. RD.	PROJECT NO.	HIGHWAY NO.
287P	SEE TITLE SHEET	BU 287P
STATE	DISTRICT	COUNTY
TEXAS	FTW	TARRANT
CONTROL	SECTION	JOB
0013	10	091

SHEET NO. 31



3 SECTION C - BEGIN STA. 122+50 TO END STA. 118+00  
PLAN

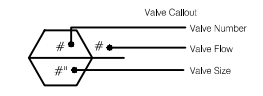


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IRRIGATION SCHEDULE

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RAINBIRD DRIP SYSTEM OPERATION INDICATOR TO BE PLACED IN ALL DRIP AREAS AT THE  
FURTHEST POINT OF EACH DRIP RUN.

PLOTTED BY: KELLEHER, MEGAN  
 PLOT DATE: 6/22/2023 2:26 PM  
 LOCATION: K:\FTW\_LAP\06100103158\_SAGINAW GR PHASE I\DWG\04\_CD\SHEET9\_IRRIGATION.DWG  
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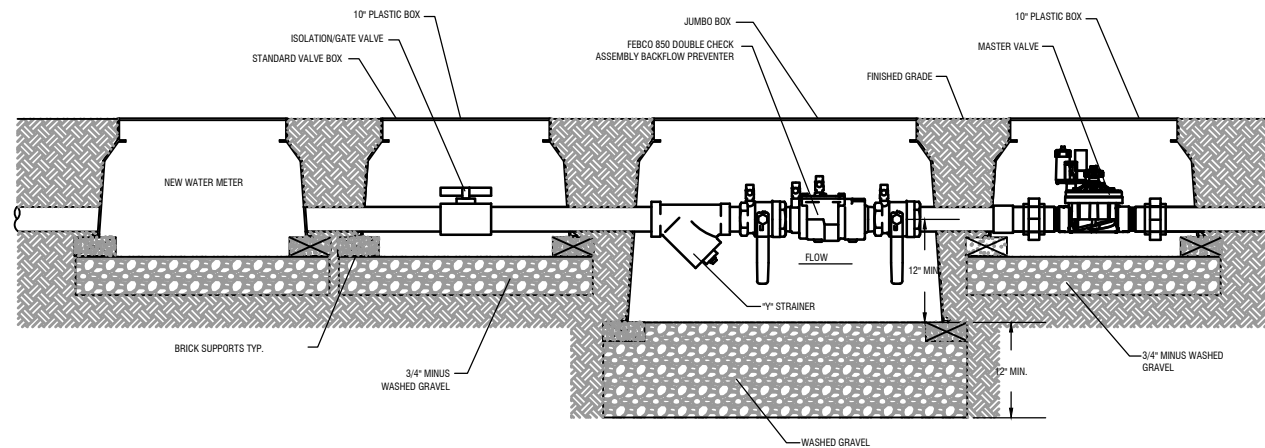
**SAGINAW BOULEVARD LANDSCAPE  
ENHANCEMENTS  
GREEN RIBBON PROGRAM**  
SAGINAW, TEXAS

**IRRIGATION PLAN**  
BEGIN STA. 122+50 TO  
END STA. 118+00

FED. RD.	PROJECT NO.	HIGHWAY NO.
287P	SEE TITLE SHEET	BU 287P
STATE	DISTRICT	COUNTY
TEXAS	FTW	TARRANT
CONTROL	SECTION	JOB
0013	10	091

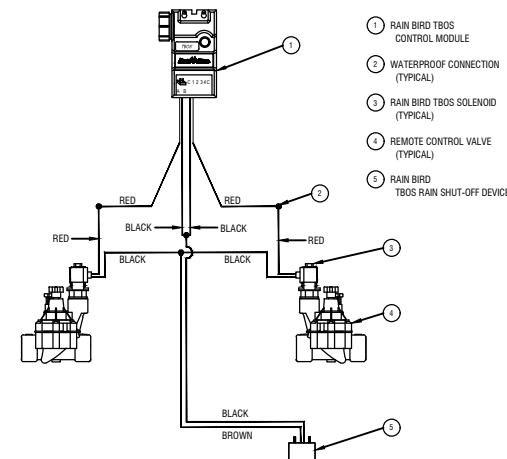
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DOUBLE CHECK ASSEMBLY BACKFLOW PREVENTER

N.T.S.



TBOS WIRING DIAGRAM

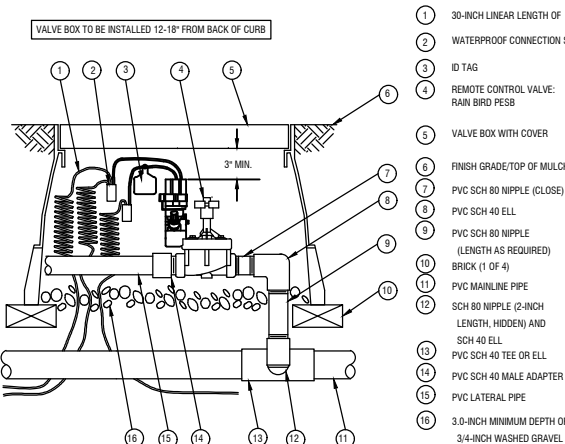
N.T.S.

XFS SUB-SURFACE DRIPLINE BURIAL

- 1 EASY FIT COMPRESSION TEE: RAIN BIRD MDC/TEE
- 2 SUB-SURFACE DRIPLINE: RAIN BIRD XF SERIES DRIPLINE POTABLE: XFS DRIPLINE
- 3 INLINE DRIP EMITTER
- 4 TIE DOWN STAKE: RAIN BIRD TDS-050 WITH BEND (TYPICAL)
- 5 TURF/FINISH GRADE OR SHRUB BED WITH MULCH
- 6 ALL IRRIGATION TO BE INSTALLED ABOVE WEED/FILTER FABRIC.

NOTES:  
1. PLACE TIE DOWN STAKES EVERY THREE FEET IN SAND, FOUR FEET IN LOAM, AND FIVE FEET IN CLAY.  
2. AT FITTINGS WHERE THERE IS A CHANGE OF DIRECTION SUCH AS TEES OR ELBOWS, USE TIE-DOWN STAKES ON EACH LEG OF THE CHANGE OF DIRECTION.  
3. INSERTION FLOW AND TRENCHED INSTALLATIONS DO NOT REQUIRE TIE DOWN STAKES.  
4. ALL IRRIGATION TO BE INSTALLED ABOVE WEED/FILTER FABRIC.

N.T.S.



PESB SERIES VALVE

- 1 30-INCH LINEAR LENGTH OF WIRE, COILED
- 2 WATERPROOF CONNECTION SPLICE-1 (1 OF 2)
- 3 ID TAG
- 4 REMOTE CONTROL VALVE: RAIN BIRD PESB
- 5 VALVE BOX WITH COVER
- 6 FINISH GRADE/TOP OF MULCH
- 7 PVC SCH 80 NIPPLE (CLOSE)
- 8 PVC SCH 40 ELL
- 9 PVC SCH 80 NIPPLE (LENGTH AS REQUIRED)
- 10 BRICK (1 OF 4)
- 11 PVC MAINLINE PIPE
- 12 SCH 80 NIPPLE (2-INCH LENGTH, HIDDEN) AND SCH 40 ELL
- 13 PVC SCH 40 TEE OR ELL
- 14 PVC SCH 40 MALE ADAPTER
- 15 PVC LATERAL PIPE
- 16 3.0-INCH MINIMUM DEPTH OF 3/4-INCH WASHED GRAVEL

N.T.S.

SLEEVE SCHEDULE

PVC PIPE SIZE	SOLVENT WELD SCH. 40 FITTINGS	BELL AND GASKET FITTINGS	SOCKETED PIPE
1/2"	2"	--	2"
3/4"	2"	--	2"
1"	2 1/2"	--	2 1/2"
1 1/4"	3"	--	3"
1 1/2"	3"	3"	3"
2"	4"	4"	4"
2 1/2"	6"	6"	6"
3"	6"	6"	6"
4"	6"	6"	4"

N.T.S.

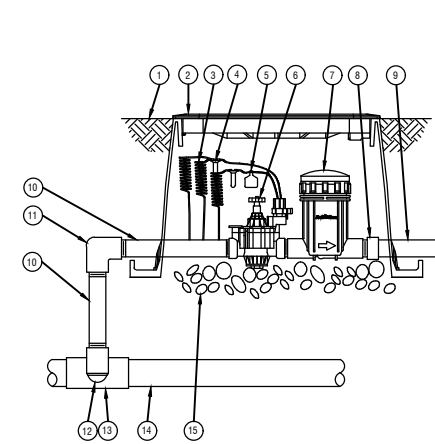
AIR/VACUUM RELIEF



(PLUMBED TO POLY)

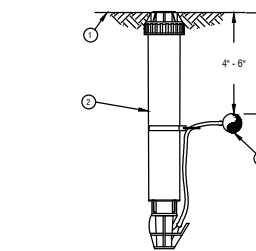
N.T.S.

RAIN BIRD XCZ-100-PRB-LC DRIP CONTROL KIT



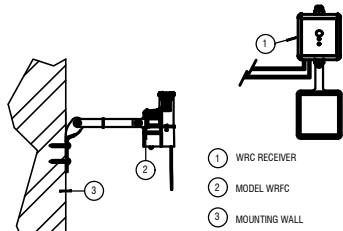
N.T.S.

RAINBIRD XFS SUB-SURFACE DRIPLINE OPERATION INDICATOR



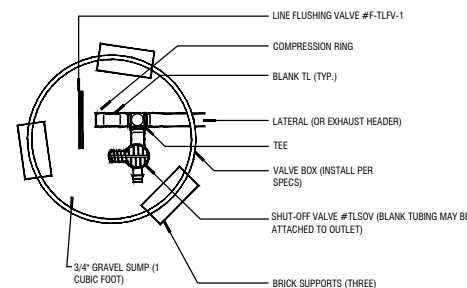
- 1 FINISH GRADE/TURF
- 2 OPERATION INDICATOR RAIN BIRD MODEL: OPERIND
- 3 SUB-SURFACE DRIPLINE: RAIN BIRD XF SERIES DRIPLINE POTABLE: XFS DRIPLINE

N.T.S.



RAIN SENSOR

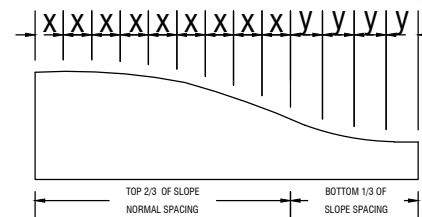
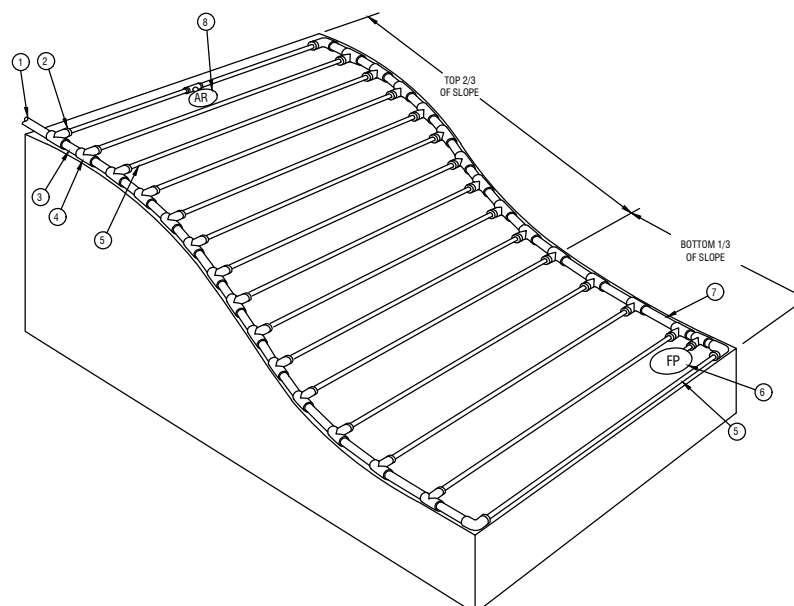
N.T.S.



LINE FLUSHING VALVE

W/ SHUT-OFF VALVE

N.T.S.

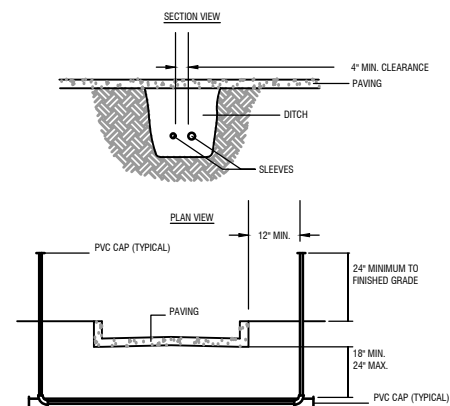


XFS SUB-SURFACE DRIPLINE SLOPED LAYOUT

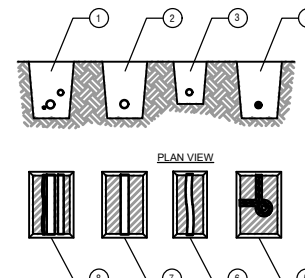
Inlet Pressure psi	12" Spacing		18" Spacing		24" Spacing	
	Nominal Flow (gph)	Nominal Flow (gph)	Nominal Flow (gph)	Nominal Flow (gph)	Nominal Flow (gph)	Nominal Flow (gph)
15	273	155	314	250	424	322
20	318	169	353	294	508	368
30	360	230	413	350	596	414
40	395	255	465	402	652	474
50	417	285	528	420	720	488
60	460	290	596	455	780	514

N.T.S.

PIPE AND WIRE TRENCHING



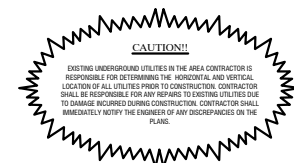
SLEEVE DETAIL



1. ALL IRRIGATION SLEEVES TO BE SCHEDULE 40 PVC.
2. ALL JOINTS TO BE SOLVENT WELDED AND WATERTIGHT.
3. WHERE THERE IS MORE THAN ONE SLEEVE, EXTEND THE SMALLER SLEEVE TO 24-INCHES MINIMUM ABOVE FINISHED GRADE.
4. MECHANICALLY TAMP TO 95% PROCTOR.

PIPE AND WIRE TRENCHING

N.T.S.



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SAGINAW BOULEVARD LANDSCAPE  
ENHANCEMENTS  
GREEN RIBBON PROGRAM  
SAGINAW, TEXAS

IRRIGATION DETAILS

FED.RD.	PROJECT NO.	HIGHWAY NO.	
287P	SEE TITLE SHEET	BU 287P	
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	TARRANT	33
CONTROL	SECTION	JOB	
0013	10	091	

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**GENERAL IRRIGATION NOTES:**

- CONTRACTOR SHALL BE RESPONSIBLE FOR REFERENCING ITEM 170 OF THE TEXAS STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES 2004 FOR SPECIFICATIONS, DIMENSIONS, VOLUMES AND MEASUREMENTS THAT HAVE BEEN MODIFIED OR NOT SHOWN.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS, LICENSES, TESTS, AND/OR APPROVALS, PAYING ANY FEES (INCLUDING IMPACT FEES) AND DEPOSITS AND INSTALLING OR ARRANGING FOR ALL WATER METERS AND TAPS FOR INSTALLATION AND OPERATION AS APPLICABLE. DEPOSITS WILL NOT BE REFUNDED. WATER METERS SHALL BE PLACED IN NAME OF THE CONTRACTOR, AS PROVIDED BY ENGINEER. THE CONTRACTOR WILL PAY FOR MONTHLY WATER CHARGES DURING THE PROJECT. WATER METERS SHALL REMAIN OPERATIONAL AND TURNED ON THROUGH ALL PHASES OF THE CONTRACT TO ENSURE PLANTS RECEIVE REQUIRED WATERING. TRANSFER METER TO CITY OF SAGINAW AT THE END OF PROJECT.
- THE CONTRACTOR IS RESPONSIBLE FOR EXTENDING A 1" CONDUIT WITH 2-#12 INSULATED CONDUCTORS AND 1-#8 BARE CONDUCTOR FROM EXISTING ELECTRICAL SERVICE TO THE CONTROLLER LOCATION.
- BACKFLOW PREVENTERS SHALL BE PLACED IN THE NAME OF THE CITY OF SAGINAW PROVIDED BY ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CHARGES, FEES, TESTS, AND COORDINATION FOR ANY BACKFLOW PREVENTER TESTING, AT INSTALLATION OR ANNUAL INSPECTION, REQUIRED BY LOCAL ENTITY THROUGH ALL PHASES OF THE CONTRACT.
- THE DRAWINGS ARE DIAGRAMMATIC OF THE WORK TO BE PERFORMED. CHANGES MAY BE REQUIRED DUE TO VARYING CONDITIONS OR AS DIRECTED BY THE ENGINEER.
- CONTRACTOR SHALL VERIFY LOCATION OF ANY UNDERGROUND UTILITIES WITH APPROPRIATE AGENCIES. UNDERGROUND UTILITIES (IF SHOWN) ON THE PLANS ARE APPROXIMATE.
- SEE IRRIGATION DETAILS AND MATERIALS CHART FOR MATERIALS SPECIFICATIONS, SIZES, AND REQUIREMENTS.
- CONTRACTOR SHALL COORDINATE IRRIGATION INSTALLATION WITH LANDSCAPE PLAN AND SITE CONDITIONS TO PROVIDE COMPLETE COVERAGE WITH MINIMUM OVERSPRAY. THE IRRIGATION CONTRACTOR SHALL MAKE MINOR ADJUSTMENTS TO ENSURE PROPER COVERAGE AT NO ADDITIONAL COST TO THE OWNER.
- CONTRACTOR SHALL REQUEST CABLE LOCATES FROM TXDOT FTW DISTRICT SIGN SHOP (817-370-3661) PRIOR TO BEGINNING WORK OUTSIDE OF THE MEDIANS.

**CONSTRUCTION METHODS:**

- THE CONTRACTOR SHALL INVESTIGATE THE SITE CONDITIONS AFFECTING THE WORK AND SHALL FURNISH OFFSETS, FITTINGS, AND SLEEVES AS MAY BE REQUIRED TO MEET SITE CONDITIONS.
- ALL IRRIGATION VALVES, MAINLINES, LATERALS, BORINGS, ETC. SHALL BE LOCATED FOR APPROVAL BY THE ENGINEER PRIOR TO INSTALLATION.
- DEVIATIONS IN THE PIPING AS SHOWN ON THE PLANS SHALL BE PERMITTED WITH APPROVAL, IN WRITING, FROM THE ENGINEERING.
- CARE SHALL BE EXERCISED WHEN EXCAVATING NEAR TREES. NO MECHANICAL TRENCHING SHALL BE PERMITTED BELOW THE CANOPY OF EXISTING TREES. CONTRACTOR SHALL ADJUST TRENCH PATH AND/OR EXCAVATE BY HAND TO AVOID DAMAGE TO EXISTING TREE ROOT SYSTEM.
- CONTRACTOR SHALL COORDINATE AND VERIFY LOCATION OF SIGNAL WIRING, TRAFFIC LOOP DETECTOR WIRING, AND CTMS WIRING PRIOR TO BEGINNING ANY WORK. DAMAGE TO SIGNAL WIRING, LOOP DETECTOR WIRING, CTMS WIRING ANY UTILITIES NOT LISTED, AND STRUCTURES SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE. CONTACT TXDOT SIGNAL SECTION @ 214-320-6683 FOR "TXDOT LOCATES".
- ANY UNDERGROUND UTILITIES, HIGH MAST WIRING, AND CTMS WIRING SHOWN ON PLANS ARE APPROXIMATE LOCATIONS ONLY AND SHALL NOT RELIEVE CONTRACTOR'S RESPONSIBILITY OF COORDINATING WITH APPROPRIATE AUTHORITIES TO LOCATE UNDERGROUND UTILITIES, WIRING AND ANY STRUCTURE.
- DIG TRENCHES STRAIGHT AND SUPPORT PIPE CONTINUOUSLY ON BOTTOM OF TRENCH INSTALL PIPE TO AN EVEN GRADE. TRENCH BOTTOM SHALL BE CLEAN AND SMOOTH WITH ALL ORGANIC DEBRIS AND SHARP OBJECTS REMOVED. PIPE SHALL BE SNAKED IN TRENCH, TO ALLOW FOR EXPANSION AND CONTRACTION. FOR PUBLIC SAFETY, PLASTIC CONSTRUCTION FENCING, MINIMUM 4 FEET HIGH, SHALL BE USED AROUND OPEN EXCAVATIONS.
- BORING AND SLEEVE REQUIREMENTS. BORING AND SLEEVE LOCATIONS SHALL BE STAKED FOR ENGINEER'S APPROVAL. BORING DEPTH SHALL BE AT 24" BELOW PAVEMENT. ALL BORINGS AND SLEEVES SHALL BE CONTINUOUS AND SHALL EXTEND THE FULL WIDTH OF THE PAVEMENT AND 5 FEET ON EACH SIDE THEREOF. BORING AND SLEEVES SHALL BE MEASURED AND PAID FOR IN ACCORDANCE WITH ITEM 618. ADDITIONAL PAYMENTS FOR DISTANCES GREATER THAN 5 FEET BEYOND PAVEMENT WILL NOT BE MADE EXCEPT AS ALREADY SHOWN ON PLANS. BORE ENCASEMENT PIPE MUST BE INSTALLED SAME DAY AS BORING.
- PVC CASING(S) FOR BORES AND SLEEVES SHALL CONSIST OF SCH 80 SMOOTH WALL PIPE WITH WELDED JOINTS AND SEAMS, AND SHALL BE CONTINUOUS. THE SIZE OF BORE SHALL NOT EXCEED THE DIAMETER OF CASING(S) REQUIRED BY THE PLANS BY MORE THAN 1 INCH.
- PIPE SHALL NOT BE INSTALLED WHEN AIR TEMPERATURE IS BELOW 40 DEGREES FAHRENHEIT. PLASTIC PIPE SHALL BE CUT IN A MANNER THAT WILL INSURE A SQUARE CUT. BURRS AT CUT ENDS SHALL BE REMOVED PRIOR TO INSTALLATION SO THAT A SMOOTH UNOBSTRUCTED FLOW WILL BE OBTAINED.
- ALL WATER LINES, VALVES, AND SPRINKLER BODIES SHALL BE THOROUGHLY FLUSHED BEFORE INSTALLING DRIPLINE OR SPRINKLER NOZZLES.
- CONTROL WIRE AND WIRE CONNECTIONS SHALL BE AS DESCRIBED ON IRRIGATION MATERIALS SPECIFICATIONS CHART. ALL WIRE CONNECTIONS AND SPLICES SHALL BE MADE IN GROUND BOXES.
- COMPACTION OF THE PIPE TRENCHES MUST BE SUFFICIENT TO LIMIT SHORT TERM SETTING OF THE BACKFILL TO NO MORE THAN 1 INCH. THE CONTRACTOR SHALL CORRECT SETTING GREATER THAN THIS WITHOUT ADDITIONAL COMPENSATION.
- ALL SPRAY HEADS AND ROTOR HEADS SHALL BE INSTALLED NO CLOSER THAN 6" FROM BACK OF CURB.
- ALL CONTROL VALVES SHALL HAVE A BALL VALVE INSTALLED ON THE UPSTREAM SIDE OF INLET. ALL CONTROL VALVES AND BALL VALVES SHALL BE LOCATED IN A JUMBO BOX PER SPECIFICATIONS.
- CONTRACTOR SHALL INSTALL SEPARATE COMMON WIRE FOR EVERY 6 VALVES FOR THE CONTROLLER.

**GUARANTEE AND ACCEPTANCE:**


- MAINTENANCE PERIOD. THE IRRIGATION SYSTEM SHALL BE INSPECTED CONCURRENTLY WITH, AND SUBJECT TO THE SAME ESTABLISHMENT/MAINTENANCE REQUIREMENT PERIODS UNDER ITEMS 192 AND 193 (IF USED), DURING THE INSTALLATION, ESTABLISHMENT, AND MAINTENANCE. CONTRACTOR SHALL PERFORM THE FOLLOWING ACTIVITIES AS A MINIMUM AND TO THE SATISFACTION OF THE ENGINEER:
  - INSTALL AND MAINTAIN THE CONTROLLER PROGRAM TO INSURE THE PROPER DISTRIBUTION OF WATER (INCLUDES REPLACEMENT OF ANY BATTERIES)
  - INSPECT, REPAIR, AND/OR REPLACE ANY EQUIPMENT THAT IS FOUND DEFECTIVE OR MAY BE DAMAGED BY OTHER MAINTENANCE.
  - MAKE ANY ADJUSTMENTS THAT MAY BECOME NECESSARY TO ENSURE THE PROPER DELIVERY OF WATER TO THE PLANT MATERIAL.
- AS-BUILT DRAWINGS. UPON COMPLETION OF THE REQUIRED MAINTENANCE PERIOD, THE ENGINEER WILL MAKE AN INSPECTION OF THE PROJECT. THE CONTRACTOR SHALL FURNISH THE ENGINEER A SET OF AS-BUILT DRAWINGS ON REPRODUCIBLE 11X17 FILM BASE SHEETS. THE ENGINEER WILL CHECK BASE SHEETS TO BE SURE THEY ARE A TRUE RECORD OF THE PROJECT CONDITIONS AND WILL DIRECT THE CONTRACTOR TO CORRECT ANY ERRORS THAT ARE FOUND. THE DRAWINGS SHALL SHOW ALL VALVE LOCATIONS BY TRIANGULATION FROM A FIXED OBJECT AND ANY CHANGE TO SPRINKLER HEAD LOCATION FROM A FIXED OBJECT AND ANY CHANGE TO SPRINKLER HEAD LOCATION AND REROUTING OF MAIN AND LATERAL LINES (CHANGES OF THIS NATURE SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.)
- OPERATING AND MAINTENANCE DATA. THE CONTRACTOR SHALL PROVIDE INSTRUCTIONS COVERING FULL OPERATION, CARE AND MAINTENANCE OF THE EQUIPMENT, INCLUDING A SCHEDULE SHOWING LENGTH OF TIME EACH VALVE IS TO BE OPEN TO PROVIDE DETERMINED AMOUNT OF WATER, AND INSTRUCT THE STATE'S DESIGNATED PERSONNEL IN PROPER OPERATING OF THE SYSTEM.
- TEST. TESTING OF THE SYSTEM FOR LEAKAGE SHALL BE IN ACCORDANCE WITH ITEM 170. THE CONTRACTOR SHALL ALSO TEST AND ASSUME THE PROPER ELECTRICAL WORKING ORDER OF THE SYSTEM TO THE SATISFACTION OF THE ENGINEER.

**IRRIGATION MATERIALS SPECIFICATIONS**

DESCRIPTION	* EXAMPLE OR EQUAL	SIZE	APPROXIMATE QUANTITIES FOR INFORMATIONAL PURPOSES ONLY
WATER METER	PER LOCAL CODE	1 INCH	(5) IRRIGATION METERS DESIGNED BASED ON MINIMUM 50 PSI STATIC PRESSURE. NOTIFY LANDSCAPE ARCHITECT PRIOR TO INSTALLING SYSTEM IN THE EVENT STATIC PRESSURE IS LESS THAN 50 PSI.
SPRAY HEADS			
BUBBLERS			
RAINBIRD TBOS-BT2 CONTROLLER		2 STATION	(5) 2 STATION
RAINBIRD WR2-RFS			(5) WIRELESS RAIN/FREEZE SENSOR
GATE VALVE/ISOLATION VALVE/BALL VALVE	SPEARS OR EQUAL	1 INCH	(5) 1 INCH
BACKFLOW PREVENTER	FEBCO 850 (OR PER LOCAL CODE)	1 INCH	(5) 1 INCH
RAINBIRD XCZ-100-LC DRIP CONTROL VALVE KIT		1 INCH	(10) 1 INCH
RAINBIRD XFS-CV-06-18 DRIPLINE			±1.514 LF
RAINBIRD PESB MASTER CONTROL VALVE		1 INCH	(5) 1 INCH
PVC SCHEDULE 80 CONDUIT Pressure rated with slip type solvent welded joints		4 INCH	PAID FOR UNDER ITEM 618, SEE NOTE 16, CONSTRUCTION METHODS AND CONDUIT INSTALLATION DETAILS ON ED (1)-03.
PVC CLASS 200 MAINLINE Pressure rated with twin gasket couplings and fittings of slip type solvent welded joints.		AS INDICATED ON THE PLANS	MEASURE FROM PLAN
PVC CLASS 200 LATERALS AND HEADERS		AS INDICATED ON THE PLANS	MEASURE FROM PLAN
BURIED RISERS			SHALL BE GREEN 6" CUT OFF RISERS
FITTINGS All fittings incorporated into system shall be of the same type, size and class material as the pipe.			AS NEEDED.
CONTROL WIRE All low voltage control wire shall be color coded. Wire sizes shall conform to the controller manufacturer specifications for maximum distances for specific wire sizes. All wire shall be specifically manufactured for direct burial. All wire connections and splices shall be made in ground boxes. The splice shall be completely waterproof and shall be completely encapsulated within a Tom King Black Splice Connector enclosure or approved equal.		12 GA. (FOR LENGTHS BETWEEN 1200-1600 FEET)  14 GA. (FOR LENGTHS BETWEEN 0-1200 FEET)	PROVIDE WIRE COIL EVERY 100 FEET TO ALLOW FOR EXPANSION. ENSURE MAXIMUM WIRE RUN LENGTHS ARE NOT EXCEEDED. INSTALL COMMON WIRE AS NEEDED PER MANUFACTURER SPECIFICATIONS. INSTALL 4 WIRES FROM EACH ARRARD VALVE TO EACH CONTROLLER.
SOLVENT CEMENT Solvent cement shall be the type recommended by the pipe manufacturer.			DO NOT USE BLUE CEMENT. USE A COLORED PRIMER.
VALVE BOXES Boxes for section valves and below-ground backflow preventors, shall be as shown on detail sheet.	DFW Plastics, Inc. DFW65C-14-PKSPSM DFW Plastics, Inc. D1730-18-PKSPSM VALVE BOXES ARE PURPLE BOXES W/ PURPLE BRASS LOCKING ARM LID	BOX SIZE SHALL BE: 17" X 30" X 18" OR 26" X 15" X 14"	QUANTITY AS REQUIRED FOR SECTION VALVES, BELOW GROUND BACKFLOW PREVENTORS AND ANY ACCESSORIES. PROVIDE WEED BARRIER OR FILTER FABRIC AROUND BOXES TO REDUCE SILTATION. TAPE FABRIC IN PLACE AROUND ENTRY POINTS. BOXES SHALL BE PURPLE IN COLOR FOR RECLAIMED WATER.
VALVE BOX RISERS	CONCRETE MASONRY UNIT (CMU) BLOCKS STACKED 2 HIGH AS SHOWN IN DETAILS.	4" X 8" X 16"	QUANTITY AS REQUIRED FOR SECTION VALVES, BELOW GROUND BACKFLOW PREVENTORS, QUICK COUPLING VALVES AND ANY ACCESSORIES
* REFERENCE TO MANUFACTURER'S TRADE NAME OR CATALOG NUMBER IS FOR THE PURPOSE OF IDENTIFICATION ONLY, CONTRACTOR SHALL BE PERMITTED TO FURNISH LIKE MATERIALS OF OTHER MANUFACTURERS PROVIDED THEY ARE OF EQUAL QUALITY AND COMPLY WITH SPECIFICATIONS FOR THIS PROJECT AND ARE APPROVED BY THE ENGINEER.			




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### SAGINAW BOULEVARD LANDSCAPE ENHANCEMENTS GREEN RIBBON PROGRAM

SAGINAW, TEXAS

### IRRIGATION GENERAL NOTES

FED.RD.	PROJECT NO.	HIGHWAY NO.
287P	SEE TITLE SHEET	BU 287P
STATE	DISTRICT	COUNTY
TEXAS	FTW	TARRANT
CONTROL	SECTION	JOB
0013	10	091

SHEET NO.	34
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**GENERAL NOTES FOR ALL ELECTRICAL WORK**

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.
2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.
3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is 1/2 in. or less in diameter.
4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.
5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.
6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

**CONDUIT**

**A. MATERIALS**

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.
2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.
3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.
5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.
6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.
7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.


8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.
9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.
10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

**B. CONSTRUCTION METHODS**

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.
2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.
3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.
4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.
5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."
6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.
7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.
8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.
9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.
10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.
11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.
12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).
13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.
14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

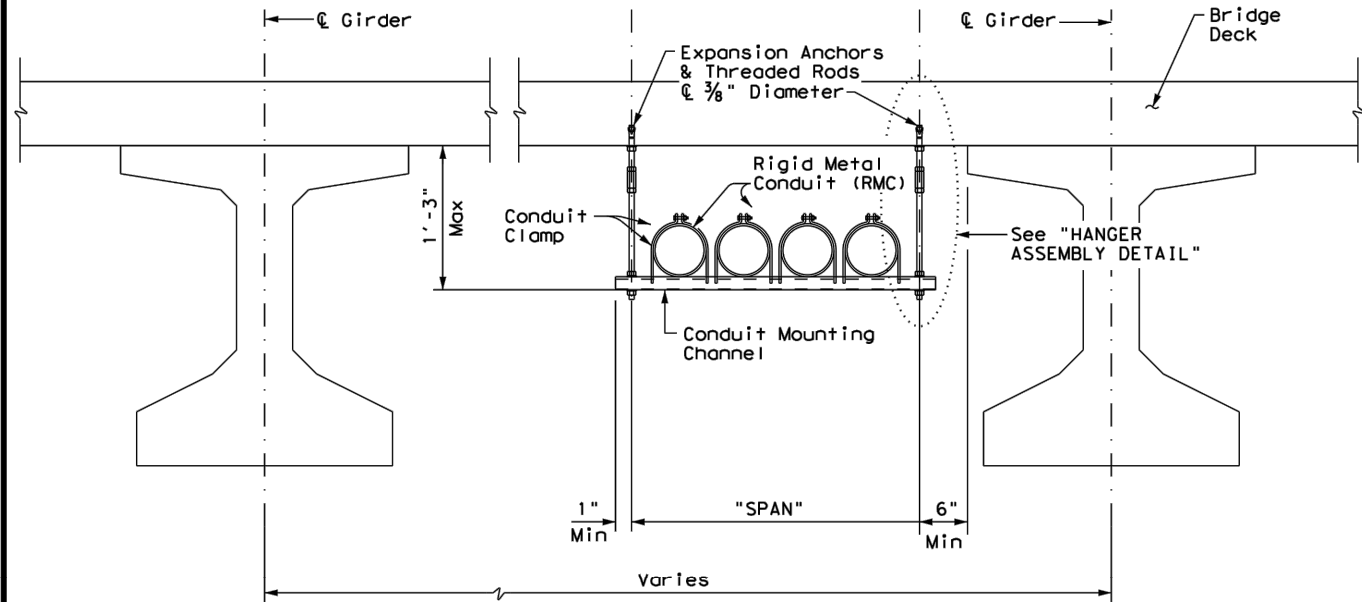
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:  
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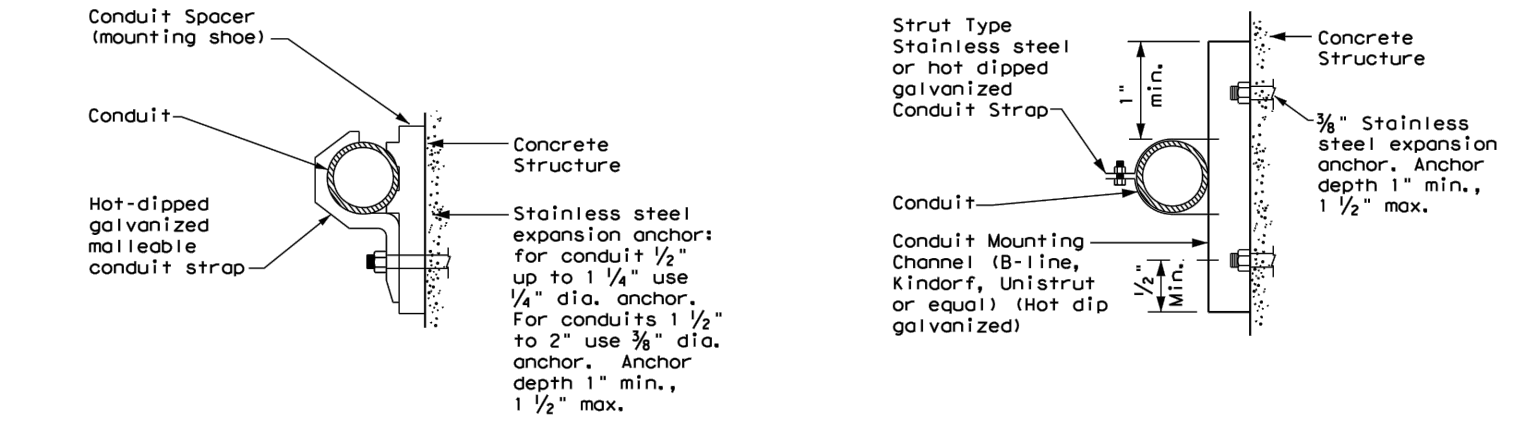
				Traffic Operations Division Standard	
<h2>ELECTRICAL DETAILS CONDUITS &amp; NOTES</h2>					
<h3>ED(1) - 14</h3>					
FILE:	ed1-14.dgn	DN:	CK:	DW:	CK:
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0013	10	089	BUS 287
		DIST	COUNTY		SHEET NO.
		FTW	TARRANT		35



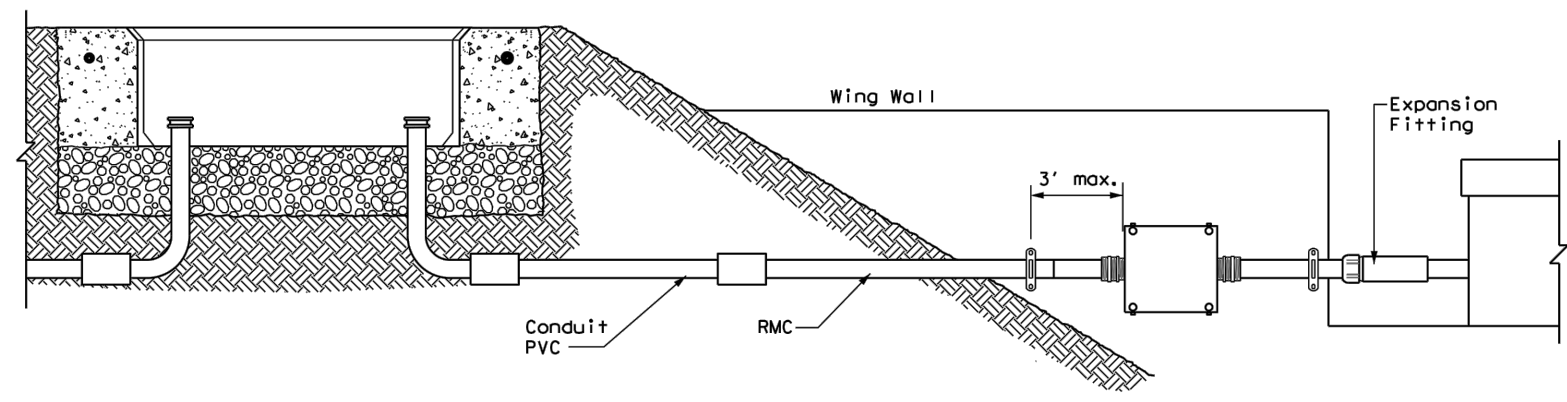
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



CONDUIT HANGING DETAIL



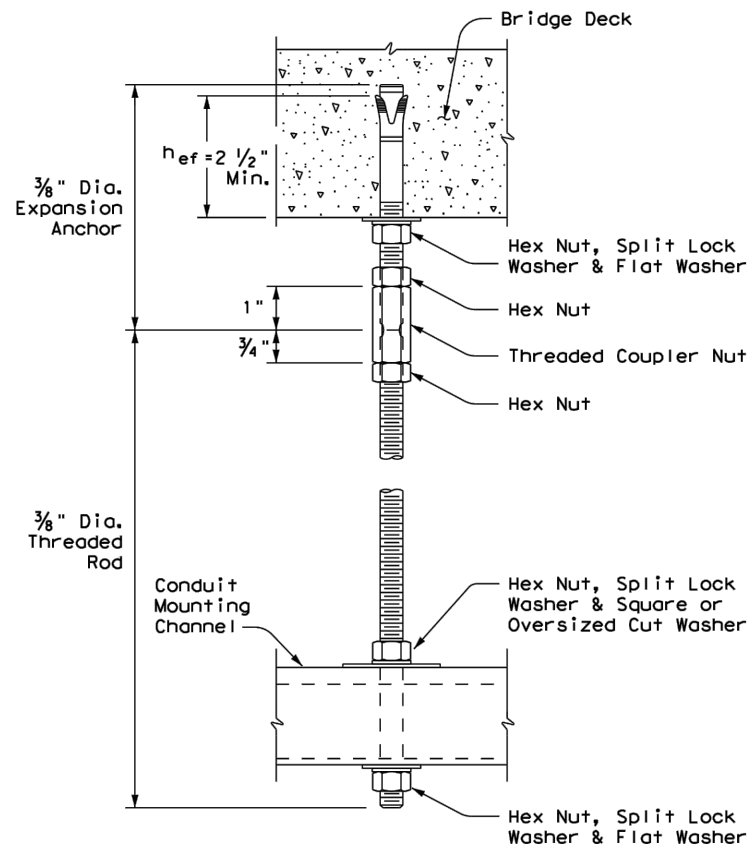
CONDUIT MOUNTING OPTIONS  
Attachment to concrete surfaces  
See ED(1)B.2



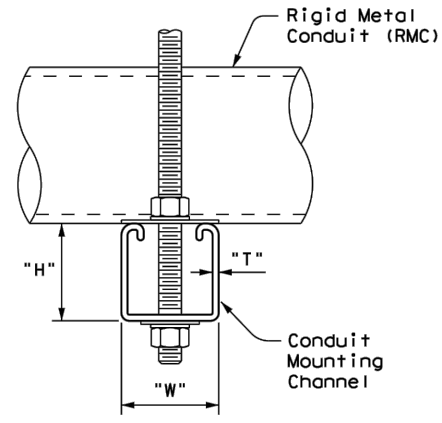
TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

CONDUIT MOUNTING CHANNEL		
"SPAN"	"W" x "H"	"T"
less than 2'	1 5/8" x 1 3/8"	12 Ga.
2'-0" to 2'-6"	1 5/8" x 1 5/8"	12 Ga.
>2'-6" to 3'-0"	1 5/8" x 2 7/16"	12 Ga.

Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.



HANGER ASSEMBLY DETAIL



ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT

EXPANSION ANCHOR NOTES FOR BRIDGE DECK ATTACHMENT

1. Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). The chosen anchor product shall have a designated ICC-ES Evaluation Report number, and its approval status shall be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.
2. Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.
3. Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environment, both the anchor body and expansion wedge shall be stainless steel.
4. Install anchors as shown on the plans and in accordance with the anchor manufacturer's published installation instructions. Arrange a field demonstration test to evaluate the procedures and tools. The test shall be witnessed and approved by the Engineer prior to furnishing anchors on the structure.
5. Prior to hole drilling, use rebar locator to ensure clearing of existing deck strands or reinforcement. Install anchors to ensure a minimum effective embedment depth, (h<sub>ef</sub>), as shown. Increase (h<sub>ef</sub>) as needed to ensure sufficient thread length for proper torqueing and tightening of anchors.
6. Use anchors of minimum 1600 Lbs tensile capacity (minimum of steel, concrete breakout, and concrete pullout strengths as determined by ACI 318 Appendix D) at the required minimum embedment depth (h<sub>ef</sub>). No lateral loads shall be introduced after conduit installation.

		Traffic Operations Division Standard	
<h2>ELECTRICAL DETAILS CONDUIT SUPPORTS</h2>			
<h3>ED(2) - 14</h3>			
FILE: ed2-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT October 2014	CONT: 0013	SECT: 10	JOB: 089
REVISIONS	DIST: FTW	COUNTY: TARRANT	HIGHWAY: BUS 287
			SHEET NO.: 36

DATE: FILE:



# ELECTRICAL CONDUCTORS

## A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS) 11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.
2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.
3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.
4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

## B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

## C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.
4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.
5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

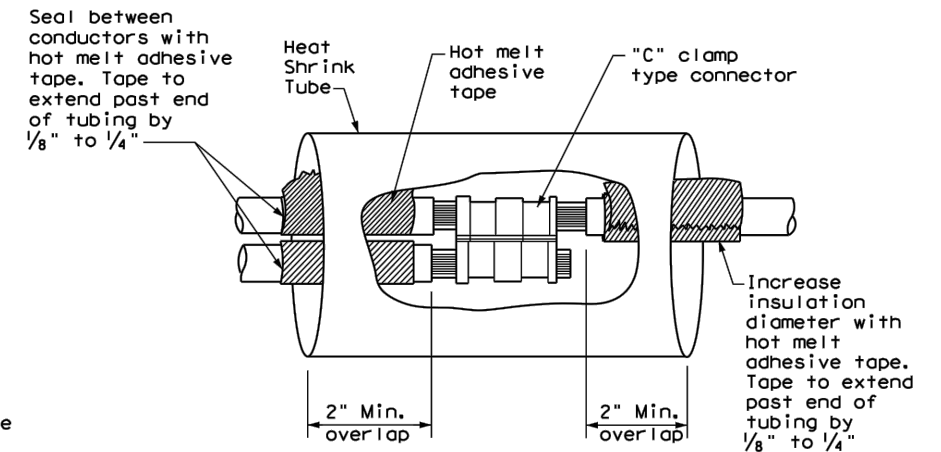
## GROUND RODS & GROUNDING ELECTRODES

### A. MATERIAL INFORMATION

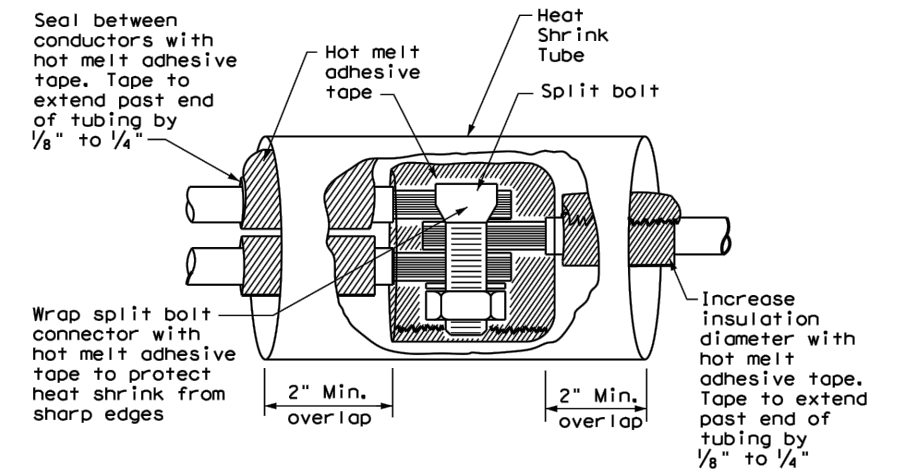
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

### B. CONSTRUCTION METHODS

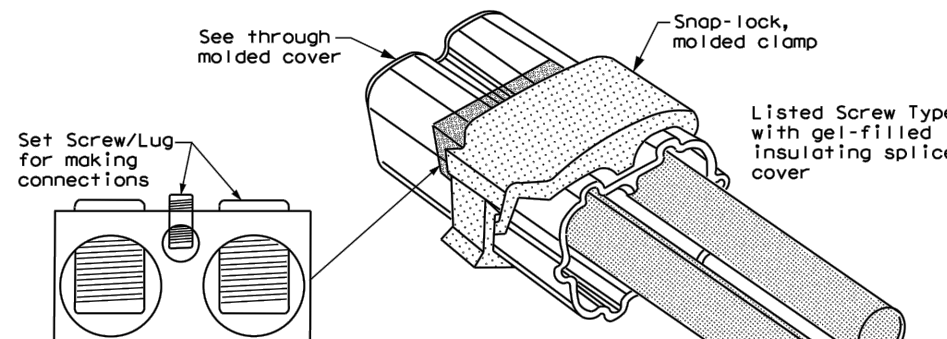
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a timber pole.
3. Install ground rods so the imprinted part number is at the upper end of the rod.
4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



**SPLICE OPTION 1  
Compression Type**



**SPLICE OPTION 2  
Split Bolt Type**



**SPLICE OPTION 3  
Listed Screw Type**

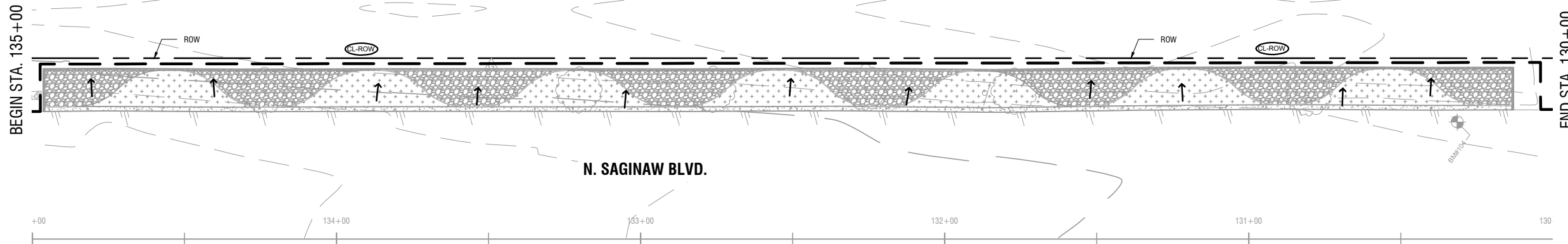
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DATE: FILE:

		<b>Texas Department of Transportation</b>		<b>Traffic Operations Division Standard</b>	
<h1>ELECTRICAL DETAILS CONDUCTORS</h1>					
<h2>ED(3) - 14</h2>					
FILE:	ed3-14.dgn	DN:	TxDOT	CK:	TxDOT
© TxDOT	October 2014	CONT:	0013	SECT:	10
REVISIONS		JOB:	089	HIGHWAY:	BUS 287
		DIST:	COUNTY	SHEET NO.:	
		FTW:	TARRANT		37

CONTRACTOR TO STAY OUT OF B.N.S.F. R.O.W. AND U.P.R.R. R.O.W. AND ENSURE ALL CONSTRUCTION EQUIPMENT AND MATERIAL ARE KEPT OUT OF THE RAILROAD R.O.W. UNTIL CONSTRUCTION IS COMPLETE (TYP.)

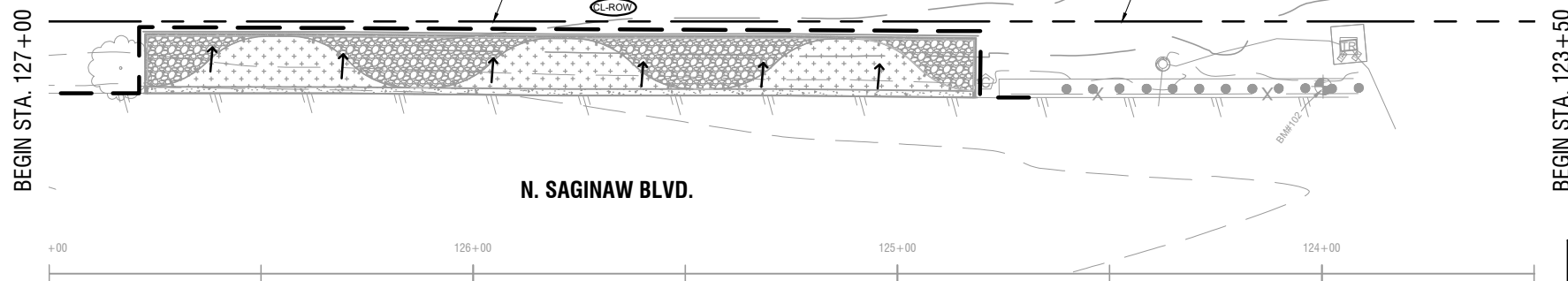
ALL UTILITIES ARE APPROXIMATES BASED ON LOCATIONS ON CITY MAPS. CONTRACTOR IS RESPONSIBLE TO VERIFY.



1 SECTION A - BEGIN STA. 135+00 TO END STA. 130+00  
PLAN

CONTRACTOR TO STAY OUT OF B.N.S.F. R.O.W. AND U.P.R.R. R.O.W. AND ENSURE ALL CONSTRUCTION EQUIPMENT AND MATERIAL ARE KEPT OUT OF THE RAILROAD R.O.W. UNTIL CONSTRUCTION IS COMPLETE (TYP.)

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2 SECTION B - BEGIN STA. 127+00 TO END STA. 123+50  
PLAN

LEGEND	
	SEDIMENT LOG, SEE TXDOT DETAILS
	DRAINAGE FLOW DIRECTION

**NOTE:**  
CALL TXDOT TRAFFIC MANAGEMENT CENTER (817-370-3661) FOR TXDOT LOCATES WHEN WORKING NEAR EXISTING TRAFFIC SIGNAL.

**CAUTION!**  
EXISTING UNDERGROUND UTILITIES IN THE AREA CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES TO EXISTING UTILITIES DUE TO DAMAGE INCURRED DURING CONSTRUCTION. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES ON THE PLANS.

**GRAPHIC SCALE IN FEET**  
0 10 20 40  
IF PLAN SHEET IS 22"x34" SCALE IS 1 IN = 20 FT

06/22/2023

*Thomas B. Jurek*

**Kimley»Horn**  
Texas Registered Engineering Firm F-928  
Texas Department of Transportation  
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SAGINAW BOULEVARD LANDSCAPE ENHANCEMENTS  
GREEN RIBBON PROGRAM  
SAGINAW, TEXAS

EROSION CONTROL PLAN

BEGIN STA. 135+00 TO END STA. 130+00  
BEGIN STA. 127+00 TO END STA. 123+50

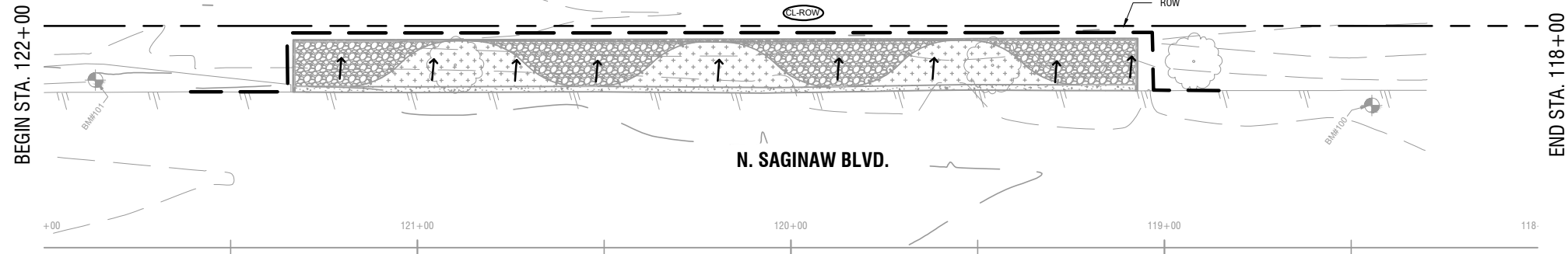
- NOTES:**
- CONTRACTOR TO PROVIDE SEDIMENT LOGS ALONG ENTIRE LENGTH OF PARKWAY AND AT ALL STORM INLETS ALONG THE ROADWAY IN THE PROJECT EXTENTS.
  - ALL WORKMANSHIP SHALL PROCEED IN AN ORDERLY AND WORKMAN LIKE FASHION. IN THE EVENT OF IMMINENT RAINFALL, ALL DUE DILIGENCE TO STABILIZE EXCESS SEDIMENT SHALL BE TAKEN. AFTER EACH RAINFALL EVENT STABILIZATION OF EXISTING SEDIMENT DISCHARGE SHALL BE COMPLETE PRIOR TO COMMENCING ANY FURTHER EARTH DISTURBING ACTIVITIES AS DIRECTED IN THE STORM WATER POLLUTION PREVENTION ACT.
  - CONTRACTOR SHALL INSPECT SAGINAW BLVD. AND ADJACENT STREETS AT LEAST DAILY AND REMOVE ALL SEDIMENT IN SAGINAW BLVD. WITH BROOM AND SHOVEL OR OTHER MEANS NECESSARY.
  - ALL UTILITIES ARE APPROXIMATIONS BASED ON LOCATION ON CITY MAPS. CONTRACTOR IS RESPONSIBLE AND WILL VERIFY.
  - CONTRACTOR TO INSTALL/ DISPLAY CONSTRUCTION SITE NOTICE VISIBLE FROM STREET, LOCATION MAY VARY.
  - BMP'S SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES.
  - CONTRACTOR WILL UTILIZE EXISTING BUS. 287 EAST SHOULDER FOR ENTRY AND EXIT ACCESS TO WORK SITE.
  - THE SEQUENCE OF CONSTRUCTION SHOWN IN THESE PLANS IS A GENERAL OVERVIEW AND IS INTENDED TO CONVEY THE GENERAL CONCEPTS OF THE EROSION CONTROL DESIGN AND SHOULD NOT BE RELIED UPON FOR CONSTRUCTION PURPOSES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETAILED PHASING AND CONSTRUCTION SEQUENCING NECESSARY TO CONSTRUCT THE PROPOSED IMPROVEMENTS INCLUDED IN THESE PLANS. THE CONTRACTOR SHALL NOTIFY ENGINEER IN WRITING IMMEDIATELY, PRIOR TO AND/OR DURING CONSTRUCTION IF ANY ADDITIONAL INFORMATION ON THE CONSTRUCTION SEQUENCE IS NECESSARY. CONTRACTOR IS SOLELY RESPONSIBLE FOR COMPLYING WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION AND ALL OTHER APPLICABLE LAWS.

PLOTTED BY: KLEBER, MEGAN  
 PLOT DATE: 6/22/2023 2:26 PM  
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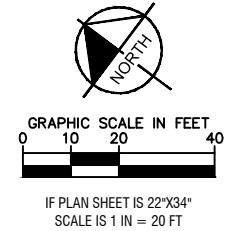
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287P	SEE TITLE SHEET	BU 287P	
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	TARRANT	38
CONTROL	SECTION	JOB	
0013	10	091	

CONTRACTOR TO STAY OUT OF B.N.S.F. R.O.W. AND U.P.R.R. R.O.W. AND  
 ENSURE ALL CONSTRUCTION EQUIPMENT AND MATERIAL ARE KEPT OUT OF  
 THE RAILROAD R.O.W. UNTIL CONSTRUCTION IS COMPLETE (TYP.)

ALL UTILITIES ARE APPROXIMATES BASED ON LOCATIONS ON CITY MAPS.  
 CONTRACTOR IS RESPONSIBLE TO VERIFY.

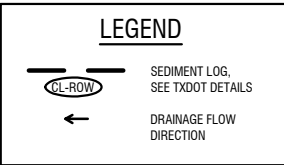


3 SECTION C - BEGIN STA. 122+00 TO END STA. 118+00  
 PLAN



NOTE:  
 CALL TXDOT TRAFFIC MANAGEMENT CENTER  
 (817-370-3661) FOR TXDOT LOCATES WHEN  
 WORKING NEAR EXISTING TRAFFIC SIGNAL.

**CAUTION!**  
 EXISTING UNDERGROUND UTILITIES IN THE AREA CONTRACTOR IS  
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 SHALL BE RESPONSIBLE FOR ANY REPAIRS TO EXISTING UTILITIES DUE  
 TO DAMAGE INCURRED DURING CONSTRUCTION. CONTRACTOR SHALL  
 IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES ON THE  
 PLANS.



- NOTES:**
- CONTRACTOR TO PROVIDE SEDIMENT LOGS ALONG ENTIRE LENGTH OF PARKWAY AND AT ALL STORM INLETS ALONG THE ROADWAY IN THE PROJECT EXTENTS.
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  - CONTRACTOR SHALL INSPECT SAGINAW BLVD. AND ADJACENT STREETS AT LEAST DAILY AND REMOVE ALL SEDIMENT IN SAGINAW BLVD. WITH BROOM AND SHOVEL OR OTHER MEANS NECESSARY.
  - ALL UTILITIES ARE APPROXIMATIONS BASED ON LOCATION ON CITY MAPS. CONTRACTOR IS RESPONSIBLE AND WILL VERIFY.
  - CONTRACTOR TO INSTALL/ DISPLAY CONSTRUCTION SITE NOTICE VISIBLE FROM STREET, LOCATION MAY VARY.
  - BMP'S SHALL NOT BE INSTALLED IN THEIR CONTROL AREA ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES.
  - CONTRACTOR WILL UTILIZE EXISTING BUS. 287 EAST SHOULDER FOR ENTRY AND EXIT ACCESS TO WORK SITE.
  - THE SEQUENCE OF CONSTRUCTION SHOWN IN THESE PLANS IS A GENERAL OVERVIEW AND IS INTENDED TO CONVEY THE GENERAL CONCEPTS OF THE EROSION CONTROL DESIGN AND SHOULD NOT BE RELIED UPON FOR CONSTRUCTION PURPOSES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETAILED PHASING AND CONSTRUCTION SEQUENCING NECESSARY TO CONSTRUCT THE PROPOSED IMPROVEMENTS INCLUDED IN THESE PLANS. THE CONTRACTOR SHALL NOTIFY ENGINEER IN WRITING IMMEDIATELY, PRIOR TO AND/OR DURING CONSTRUCTION IF ANY ADDITIONAL INFORMATION ON THE CONSTRUCTION SEQUENCE IS NECESSARY. CONTRACTOR IS SOLELY RESPONSIBLE FOR COMPLYING WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION AND ALL OTHER APPLICABLE LAWS.

06/22/2023

**Kimley»Horn**  
 Texas Registered Engineering Firm F-928  
 Texas Department of Transportation  
 ©2023

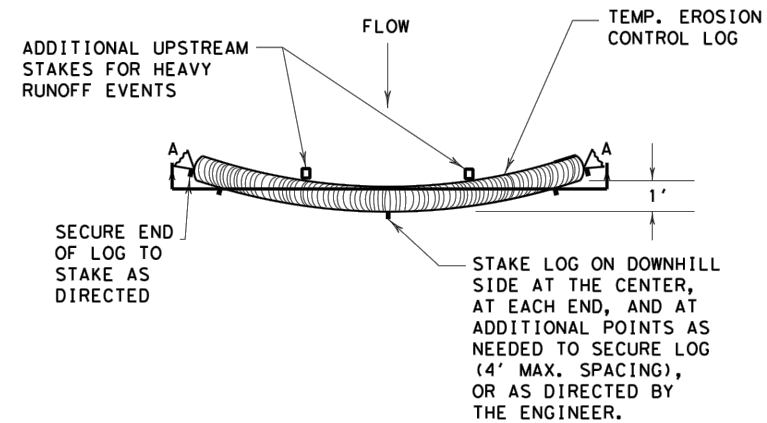
**SAGINAW BOULEVARD LANDSCAPE  
 ENHANCEMENTS  
 GREEN RIBBON PROGRAM**  
 SAGINAW, TEXAS

**EROSION CONTROL PLAN  
 BEGIN STA. 122+00 TO  
 END STA. 118+00**

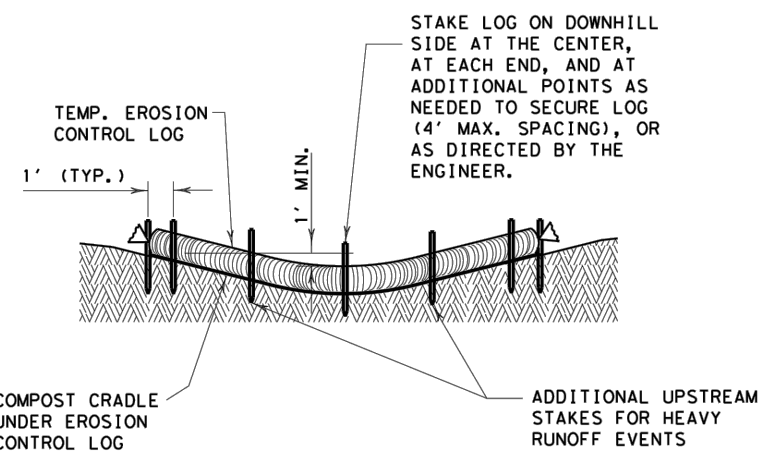
FED.RD.	PROJECT NO.	HIGHWAY NO.
287P	SEE TITLE SHEET	BU 287P
STATE	DISTRICT	COUNTY
TEXAS	FTW	TARRANT
CONTROL	SECTION	JOB
0013	10	091
SHEET NO.		
39		

PLOTTED BY: KELLEHER, MEGAN  
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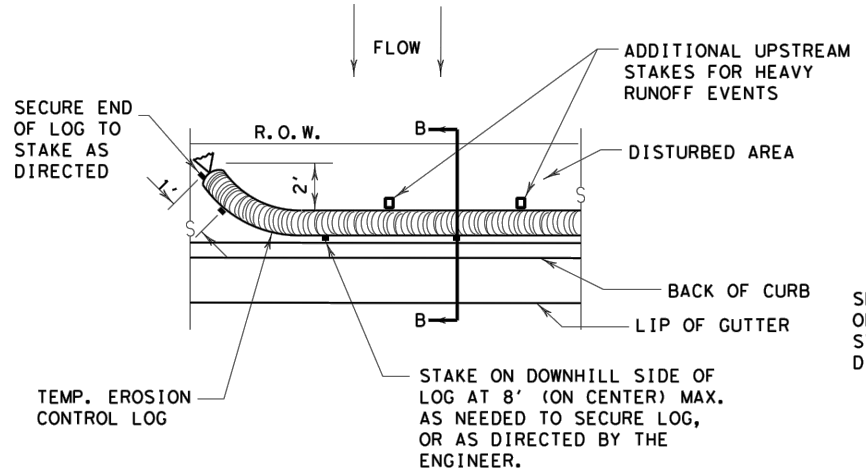
PLAN VIEW



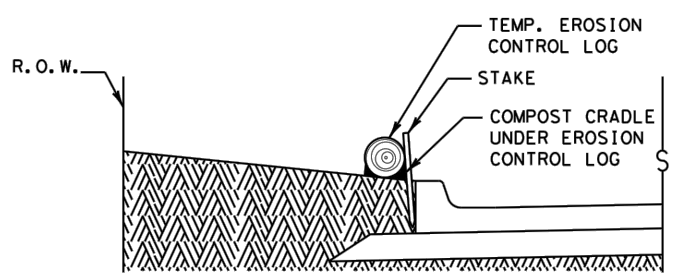
SECTION A-A

EROSION CONTROL LOG DAM

CL-D



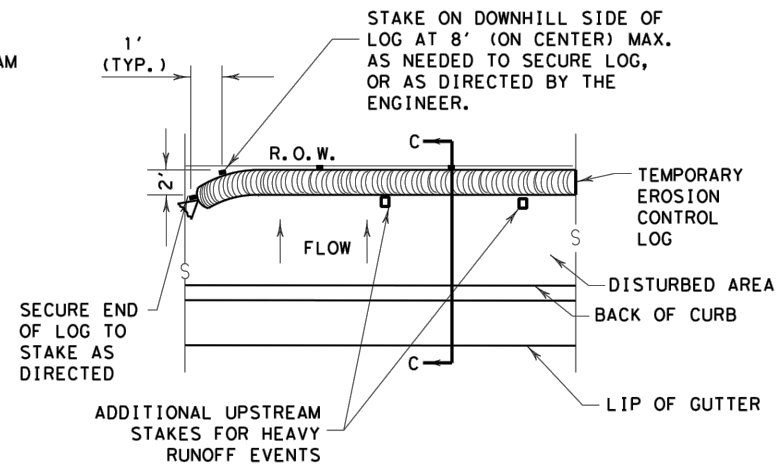
PLAN VIEW



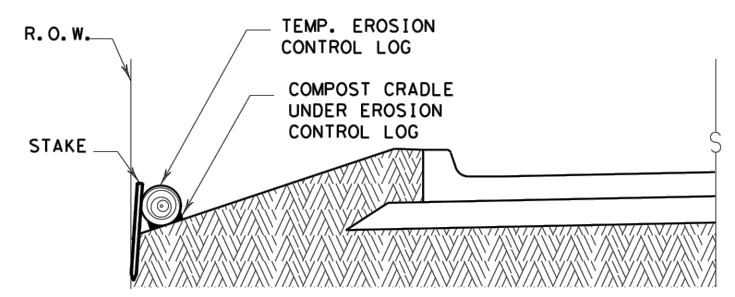
SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



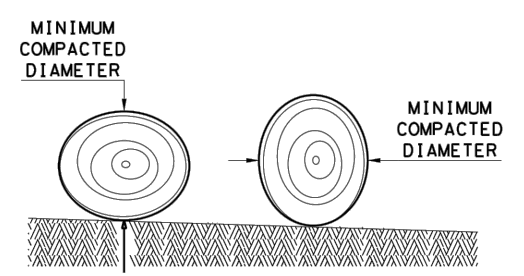
PLAN VIEW



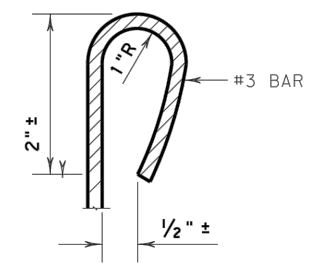
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS



REBAR STAKE DETAIL

**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.

**GENERAL NOTES:**

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

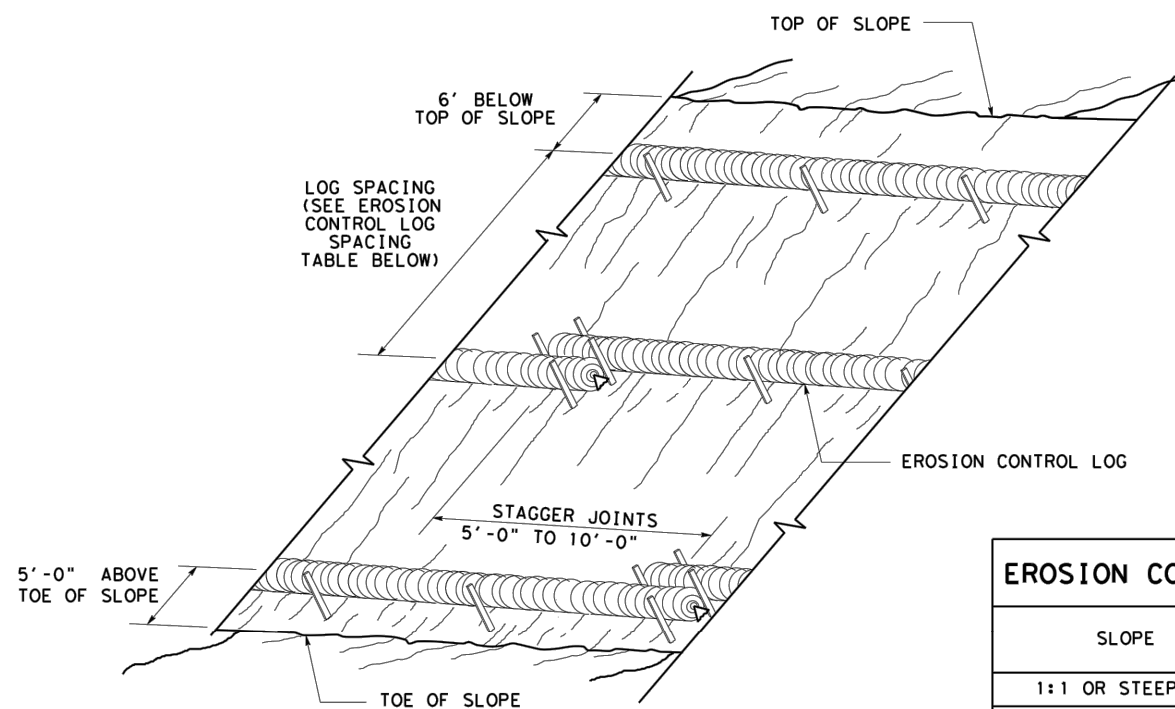
- LEGEND**
- CL-D EROSION CONTROL LOG DAM
  - CL-BOC EROSION CONTROL LOG AT BACK OF CURB
  - CL-ROW EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
  - CL-SST EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
  - CL-SSL EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
  - CL-DI EROSION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

SHEET 1 OF 3

		<b>Design Division Standard</b>	
<b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</b>			
<b>EROSION CONTROL LOG</b>			
<b>EC (9) - 16</b>			
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT
© TxDOT: JULY 2016	CONT	SECT	JOB
REVISIONS	0013	10	091
	DIST	COUNTY	SHEET NO.
	FTW	TARRANT	40

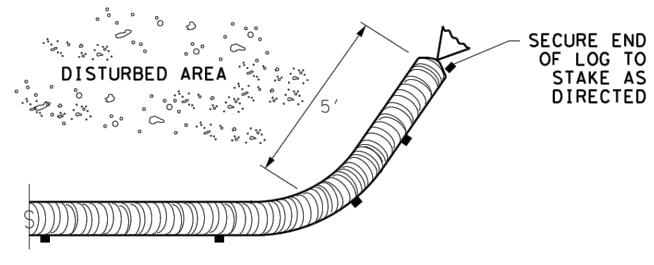
DATE: FILE:

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

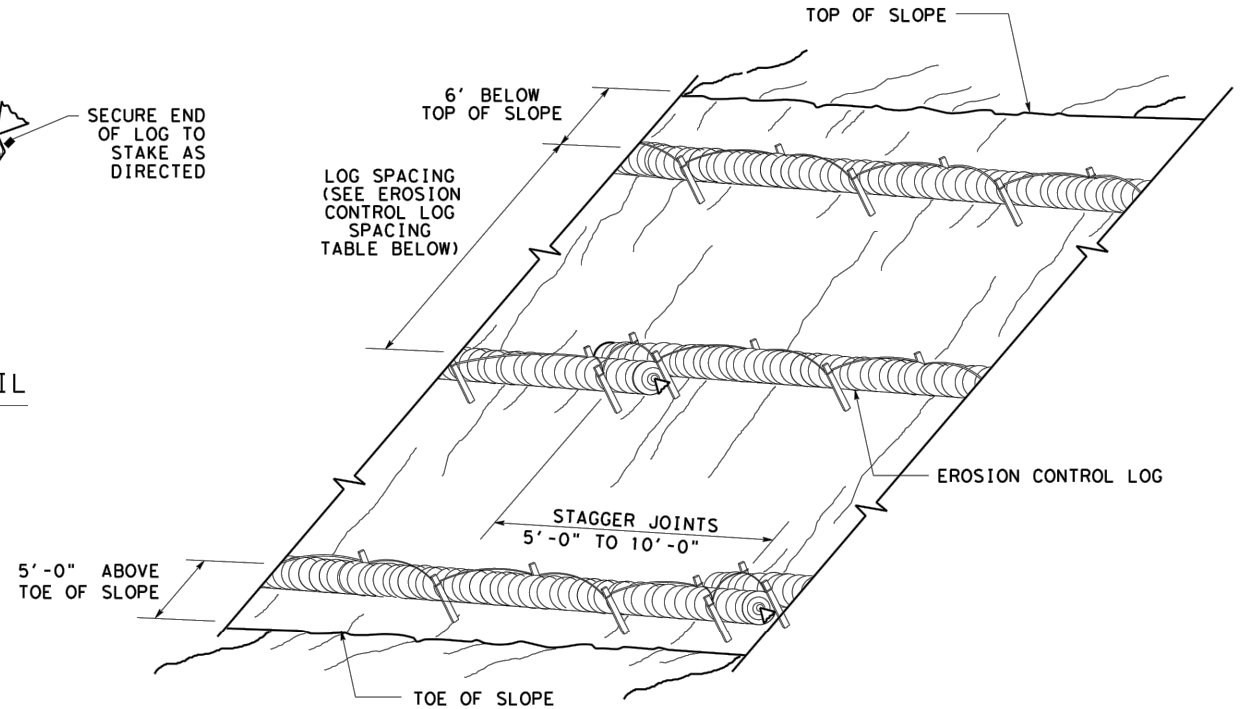
CL-SST



**END SECTION RAP DETAIL**

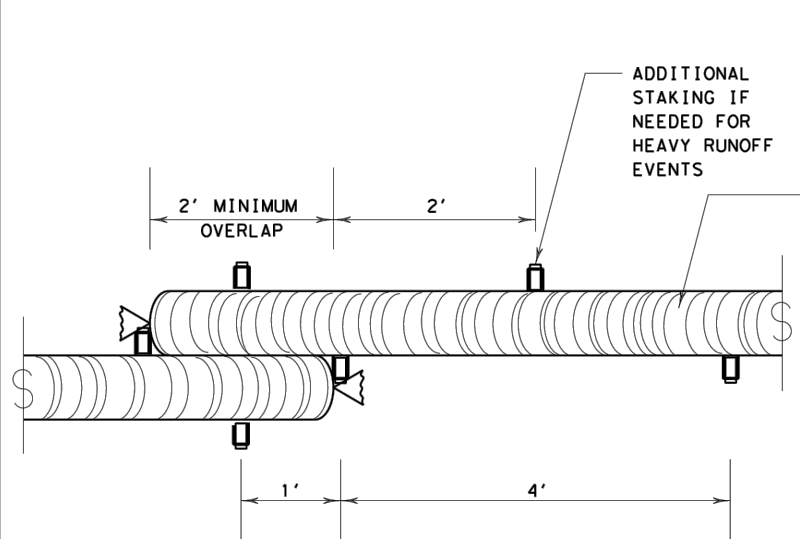
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

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



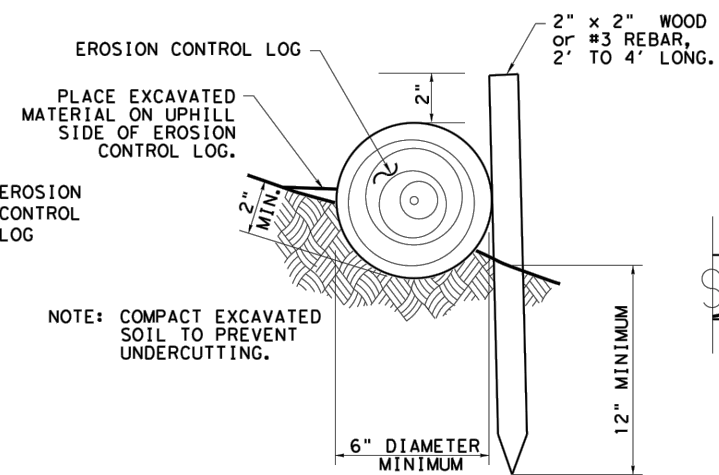
**EROSION CONTROL LOGS ON SLOPES  
STAKE AND LASHING ANCHORING**

CL-SSL



**STAKE AND TRENCHING ANCHORING DETAIL**

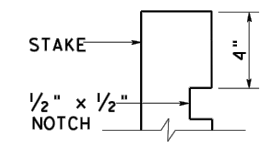
CL-SST



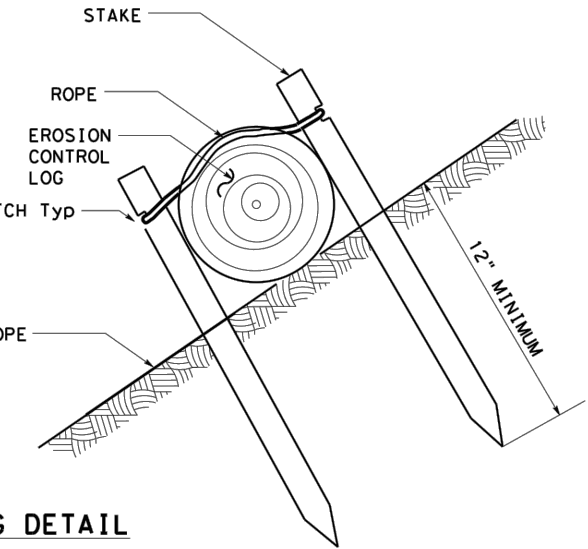
**STAKE AND LASHING ANCHORING DETAIL**

CL-SSL

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



**STAKE NOTCH DETAIL**



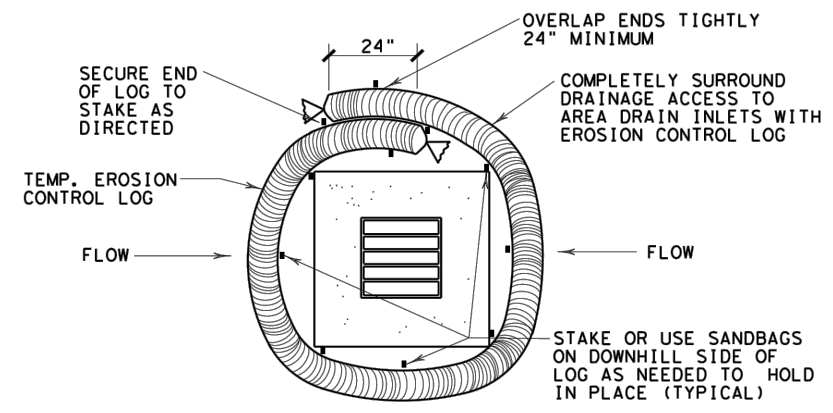
SHEET 2 OF 3

		Design Division Standard	
<b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES EROSION CONTROL LOG EC (9) - 16</b>			
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT
© TxDOT: JULY 2016	CONT: 0013	SECT: 10	JOB: 091
REVISIONS	DIST: FTW	COUNTY: TARRANT	SHEET NO.: 41

DATE:  
FILE:

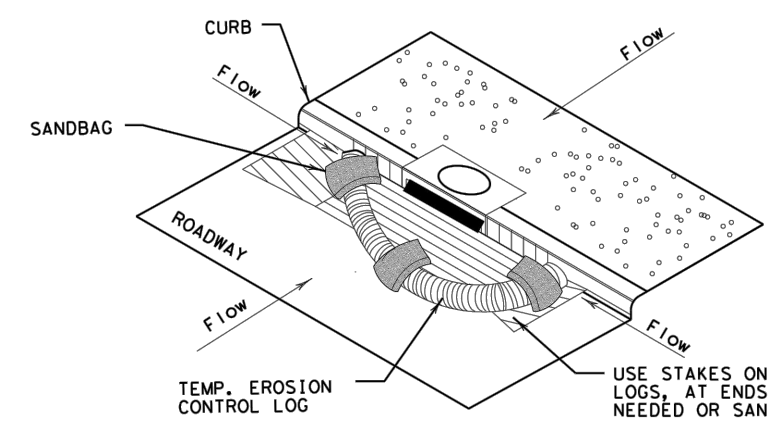


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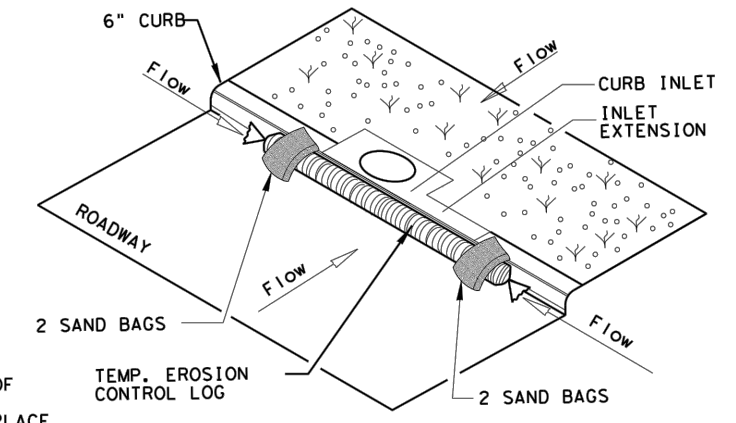
**EROSION CONTROL LOG AT DROP INLET**

CL-DI



**EROSION CONTROL LOG AT CURB INLET**

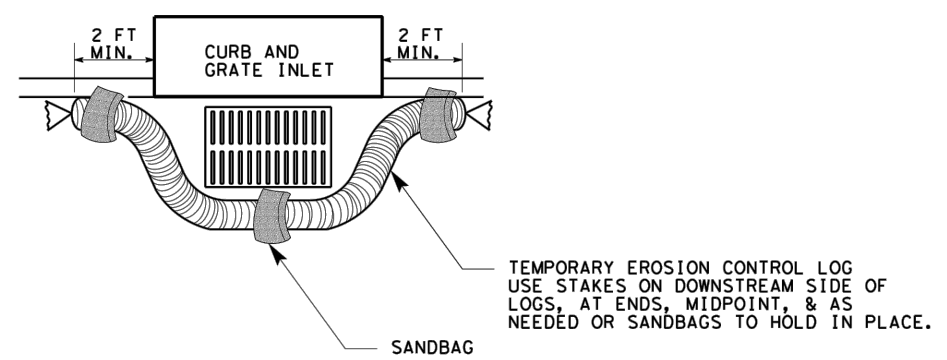
CL-CI



**EROSION CONTROL LOG AT CURB INLET**

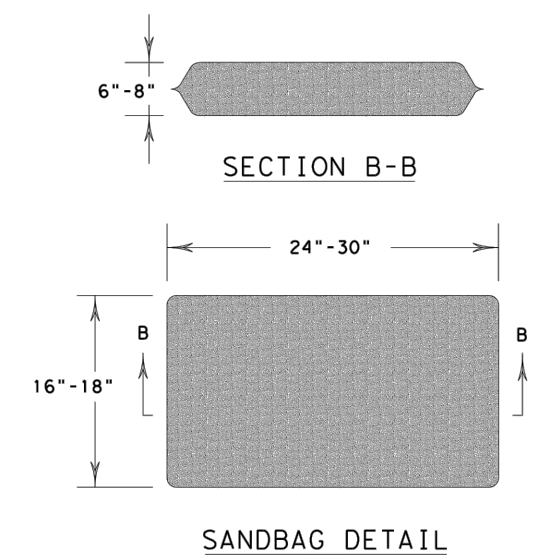
CL-CI

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



SHEET 3 OF 3

		<i>Design Division Standard</i>	
<b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</b> <b>EROSION CONTROL LOG</b> <b>EC (9) - 16</b>			
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT
© TxDOT: JULY 2016	CONT	SECT	JOB
REVISIONS	0013	10	091
	DIST	COUNTY	SHEET NO.
	FTW	TARRANT	42

DATE:  
FILE:

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DATE: FILE:

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

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

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

1. CITY OF SAGINAW MS4

2.  No Action Required  Required Action

Action No.

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

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

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

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

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

Best Management Practices:

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

**III. CULTURAL RESOURCES**

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

No Action Required  Required Action

Action No.

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**IV. VEGETATION RESOURCES**

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

No Action Required  Required Action

Action No.

- Landscaping will be a part of the proposed project activities.
- Landscaping would be a part of the proposed project activities. Re-vegetation of disturbed areas would be in compliance with the Executive Memorandum on Beneficial Landscaping (26Apr94) and the Executive Order on Invasive Species (EO 13112). Regionally native and non-invasive plants would be used to the extent practicable in landscaping and re-vegetation.
- During construction, efforts would be taken to avoid and minimize the disturbance of vegetation and soils. Areas within the existing ROW, but outside the limits of construction, would not be disturbed. Every effort would be made to preserve trees where the would neither compromise safety nor substantially interfere with the proposed projects.

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

No Action Required  Required Action

- Between October 1 and February 15, the contractor would remove all old migratory bird nests from any structure that would be affected by the proposed project, and complete any bridge work/demolition and/or vegetation clearing. In addition, the contractor would be prepared to prevent migratory birds from building nests by utilizing nest prevention methods, such as bird-deterrent netting and bird-repelling sprays and/or gels, between February 15 and October 1. In the event that migratory birds are encountered on-site during project construction, adverse impacts on protected birds, active nests, eggs, and/or young would be avoided.
- No disturbing, destroying, or removing active nests of Bald Eagles, including ground nesting birds, during the nesting season. Avoid the removal of unoccupied, inactive nests as practicable. Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair. No collecting, capturing, relocating, or transporting birds, eggs, young or active nests without a permit. The Eagle Protection Act prohibits the taking or possession of and commerce in eagles, parts, feathers, nests, or eggs with limited exceptions. The definition of take includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. Eagles may not be taken for any purpose unless a permit is issued prior to the taking.
- The contractor and/or TxDOT personnel would be advised of the potential for Whooping Cranes to occur within the project limits. Construction personnel would be advised to avoid adverse impacts to this species and to report any sightings to TxDOT District Environmental staff. Drainage modifications would be limited to the extent practical to accommodate the additional paved surface needed to bring the roadway up to current TxDOT safety standards. The construction personnel would report all sightings to TxDOT Fort Worth District Environmental staff. Reports should include the time, date and location and any available photos.

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

**LIST OF ABBREVIATIONS**

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

**VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES**

General (applies to all projects):

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

Contact the Engineer if any of the following are detected:

- \* Dead or distressed vegetation (not identified as normal)
- \* Trash piles, drums, canister, barrels, etc.
- \* Undesirable smells or odors
- \* Evidence of leaching or seepage of substances

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

Yes  No

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

If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

Yes  No

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

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

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

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

No Action Required  Required Action

Action No.

- 
- 
- 

**VII. OTHER ENVIRONMENTAL ISSUES**

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

No Action Required  Required Action

Action No.

- 
- 
- 

**Design Division Standard**

## ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

# EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
12-12-2011 (DS) REVISIONS	0013	10	091	BUS 287
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY	SHEET NO.	
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	FTW	TARRANT	43	

**STORMWATER POLLUTION PREVENTION PLAN (SWP3):**

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

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

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

**1.0 SITE/PROJECT DESCRIPTION**

**1.1 PROJECT CONTROL SECTION JOB (CSJ):**

0013-10-091

**1.2 PROJECT LIMITS:**

From: WJ BOAZ ROAD

To: BAILEY BOSWELL ROAD

**1.3 PROJECT COORDINATES:**

BEGIN: (Lat) 32°52'49.1"N, (Long) 97°22'51.6"W

END: (Lat) 32°52'22.4"N, (Long) 97°22'28.5"W

**1.4 TOTAL PROJECT AREA (Acres):** 0.53 ACRE

**1.5 TOTAL AREA TO BE DISTURBED (Acres):** 0.30 ACRE

**1.6 NATURE OF CONSTRUCTION ACTIVITY:**

Proposed landscape enhancement of BUS 287 from W Bailey Boswell Road to WJ Boaz Road includes landscape improvements within the east parkway ROW only and permanent irrigation for all landscape improvements.

**1.7 MAJOR SOIL TYPES:**

Soil Type	Description
CLAY	

**1.8 PROJECT SPECIFIC LOCATIONS (PSLs):**

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

- PSLs determined during preconstruction meeting
- PSLs determined during construction
- No PSLs planned for construction

Type	Sheet #s

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

**1.9 CONSTRUCTION ACTIVITIES:**

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

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

Other: \_\_\_\_\_  
 Other: \_\_\_\_\_  
 Other: \_\_\_\_\_

**1.10 POTENTIAL POLLUTANTS AND SOURCES:**

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

**1.11 RECEIVING WATERS:**

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

Tributaries	Classified Waterbody

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

**1.12 ROLES AND RESPONSIBILITIES: TxDOT**

- Development of plans and specifications
- Perform SWP3 inspections
- Maintain SWP3 records and update to reflect daily operations
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_

**1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR**

- Day To Day Operational Control
- Maintain schedule of major construction activities
- Install, maintain and modify BMPs
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_

**STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)**

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
287P	NH XXXX (XXX)		44
STATE	STATE DIST.	COUNTY	
TEXAS			
CONT.	SECT.	JOB	HIGHWAY NO.
0013	10	091	BUS 287

