Change Order #5

Las Milpas Road

Owner: Hidalgo County Precinct #2

To: GO Underground, LLC
217 E. Monroe Ave.
Harlingen Texas 78550-5519

From: B2Z Engineering

Project: Las Milpas Road
Contract: C-22-0094-09-06(ARPA 22-1-122-109)
Limits: McColl Rd (FM 3062) to 10th Street (FM 336)

Subject: Change Order #5 in the amount of $557,423.18 has been approved by Hidalgo County Precinct #2 to make the following changes.

Description: Change Order No. 5 (CO#5) introduces plans and quantities to construct a new 12'W x 8'H x 88' long drainage structure underneath Las Milpas Road. It is designed as an overflow drainage structure to be used as an equalizer during heavy rain events on the west side of the Main Canal. During inclement weather the ditch waters build up, rise, and overflow the bank into farmers' fields. The new structure will serve as an equalizer for the bridge to allow water to cross underneath the road without overflowing the outer banks and spilling over into farmed fields. CO#5 introduces new items, quantities and prices and uses existing items for additional quantities into the contract to provides additional drainage during heavy rain events.

The Las Milpas plans were designed to construct a new bridge and new road extending Las Milpas Road from McColl Road to 10th Street. The new construction includes a bridge over the HCID #2 Main Canal, additional drainage, and traffic signals at both intersections. CO#5 adds a new box structure to equalize the ditch overflow on both sides of the bridge to minimize flooding into the neighboring fields. GDJ prepared the change order plan sheets, and B2Z completed Change Order #5.

CO#5 is a major change order. It adds 88' of a 12' x 8' concrete box structure, excavation, bedding, backfill, 18" concrete pipe, wingwalls, SET's, riprap, guardrail, and driveways. GO Underground provided a cost estimate that was reviewed by Precinct #2, and a revised CPM schedule for the additional time to complete the work. GO Underground requested an additional 100 days of time and 5 months of barricades to complete the drainage structure as part of the Las Milpas plans. The approval and completion of CO#5 is critical to the project because it controls the start of the main bridge work.

The project is currently under construction and expediting the approval of CO #5 is vital to not delay time or extend the project any further.

Change Order #5 does not impact the original environmental assessment, does not impact TDLR elements, does not impact wetlands, does not impact waters of the US, or archeological, historical,

or social issues, such as endangered species or regulated areas within the project. This change order will not cause a disturbance that requires a site notification.

Hidalgo County Precinct 2 reviewed Change Order #5 with B2Z and agrees with the changes in the current contract. CO #5 adds new items/prices and modifies existing items/prices to account for the material escalation increases that occurred during the project.

See the attached TxDOT Change Order Form 2146-L used to introduce Change Order #5, and the new plan sheets: 98a, 98b, 135a and revised plan sheets: 118a, 98c, 98d, 98e, 98f, 98g, 98h, 98i, 98j, 98k and 98l.

Change Order No. 5 is signed by both Hidalgo County Precinct 2 and GO Underground and awaits final execution.

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIME:
Original Contract Price $3,694,806.64	Original Contract Time 160 working Days
Previous Change Orders -$242,984.60	Previous Change Orders 40 Working Days

Contract Price prior to this Change Order $3,451,822.04	Contract Time prior to this Change Order 200 Working Days
Net **increase/decrease** of the Change Order $557,423.18	Net **increase/decrease** of the Change Order 100 Working Days
Contract Price with all approved Change Orders $4,009,245.22	Contract Time with all approved Change Orders 300 Working Days

Form 2146-L
(Rev. 10/11)
Page 1 of 1

CONSTRUCTION CONTRACT CHANGE ORDER NUMBER: 5

1. CONTRACTOR: GO Underground, LLC

2. Change Order Work Limits: Sta. Sta 138+00 to Sta. 141+50

3. Type of Change (on federal-aid non-exempt projects): Major (Major/Minor)

4. Describe the change and the reason for the change order. When necessary, include exceptions to this agreement.

CO#5 adds a new drainage culvert that crosses under the Las Milpas Road for the ditch overflow that impacts farmed fields during heavy rains. It is a 12' x8' single box culvert that includes wingwalls, structl excav, riprap, 18" RCP, SET's & MBGF. CO#5 adds quantity to exiting items and introduces new items and prices. The Las Milpas Rd is currently under construction and a quick approval of CO#5 is required to not delay the project. CO#5 adds 100 days and 5 months of barricades to complete.

CCSJ:	NA
Project:	Las Milpas Road
Highway:	Las Milpas Road
County:	Hidalgo
District:	Pharr
Contract Number:	C22-0094-09-06

5. New or revised plan sheet(s) are attached and numbered: 98a, 98b, 118a, 135a , 98c -98l

Each signatory hereby warrants that each has the authority to execute this Change Order.

By signing this change order, the contractor agrees to waive any and all claims for additional compensation due to any and all other expenses; additional changes for time, overhead and profit; or loss of compensation as a result of this change. Further, the contractor agrees that this agreement is made in accordance with Item 4 and the Contract. Exceptions should be noted in the response for #5 above.

THE CONTRACTOR Date

By George Olivares

Typed/Printed Name George Olivares

Typed/Printed Title President.

The following information must be provided

Time Ext. #: 2 Days added on this C.O.: 100

Amt. added by this change order: $557,423.18

For TxDOT use only:

Days participating: 0

Amount participating: NA

Signature Date

Name/Title

RECOMMENDED FOR EXECUTION:

Name/Title 1/17/2024 Date

Name/Title Date
☐ APPROVED ☐ REQUEST APPROVAL

Name/Title Date

Name/Title Date
☐ APPROVED ☐ REQUEST APPROVAL

Name/Title Date

Name/Title Date
☐ APPROVED ☐ REQUEST APPROVAL

Name/Title Date

Name/Title Date
☐ APPROVED

Engineer's Seal:

STATE OF TEXAS
S. R. MUNOZ
71364
LICENSED
PROFESSIONAL ENGINEER

CONSTRUCTION CONTRACT CHANGE ORDER NUMBER: 5

Estimated Cost:

CCSJ: C22-0094-09-06

Paid by Invoice? (☐ Yes ☒ No)

TABLE A: Force Account Work and Materials Placed into Stock

LABOR	HOURLY RATE	EQUIPMENT	HOURLY RATE

TABLE B: Contract Items

				ORIGINAL + PREVIOUSLY REVISED		NEW		
ITEM	DESCRIPTION	UNIT	UNIT PRICE	QUANTITY	ITEM COST	QUANTITY	ITEM COST	OVERRUN/ UNDERRUN
4006010	STRUCT EXCAV (SPECIAL)	CY	200.00	0.00	0.00	14.00	2,800.00	2,800.00
4326001	RIPRAP (CONC)(4 IN)	CY	686.00	0.00	0.00	165.00	113,190.00	113,190.00
4326045	RIPRAP (MOW STRIP) (4 IN)	CY	700.00	0.00	0.00	18.00	12,600.00	12,600.00
4626042	CONC BOX CULV (12 FT X 8 FT)	LF	3,229.36	0.00	0.00	88.00	284,183.68	284,183.68
4646003	RC PIPE (CL III) (18 IN)	LF	100.00	0.00	0.00	80.00	8,000.00	8,000.00
4666211	WINGWALL (SW - 0) (HW = 8 FT)	EA	25,000.00	0.00	0.00	2.00	50,000.00	50,000.00
4676362	SET (TY II) (18 IN) (RCP) (6: 1) (C)	EA	1,200.00	0.00	0.00	4.00	4,800.00	4,800.00
5306005	DRIVEWAYS (ACP)	SY	80.00	0.00	0.00	234.00	18,720.00	18,720.00
5406001	MTL W-BEAM GD FEN (TIM POST)	LF	85.00	0.00	0.00	247.50	21,037.50	21,037.50
5406046	TL-2 31"N SHORT RADIUS (W/O DA	EA	10,000.00	0.00	0.00	2.00	20,000.00	20,000.00
5446001	GUARDRAIL END TREATMENT (INST	EA	5,000.00	0.00	0.00	2.00	10,000.00	10,000.00
5406016	DOWNSTREAM ANCHOR TERMINAL	EA	3,300.00	0.00	0.00	2.00	6,600.00	6,600.00
5026001	BARRICADES, SIGNS & TRAFFIC HA	MO	2,200.00	10.00	22,000.00	15.00	33,000.00	11,000.00
1326006	EMBKMT FINAL DENS CONT TY C	CY	12.00	16,458.00	197,496.00	15,999.00	191,988.00	- 5,508.00
TOTALS					219,496.00		776,919.18	557,423.18

CONSTRUCTION CONTRACT CHANGE ORDER NUMBER: 5

TABLE B: Contract Items (Continued)

CCSJ: C22-0094-09-06

				ORIGINAL + PREVIOUSLY REVISED		NEW		
ITEM	DESCRIPTION	UNIT	UNIT PRICE	QUANTITY	ITEM COST	QUANTITY	ITEM COST	OVERRUN/ UNDERRUN
The "Totals" from Table B of the previous work sheet:					219,496.00		776,919.18	557,423.18
TOTALS					219,496.00		776,919.18	557,423.18

Las Milpas Road

Drainage Tunnel

CO #5

				Las Milpas Estimate	Unit Price				Las Milpas Estimate	Total Price			Differences	
		UOM	Items	$	GDJ Estimate $	GO Estimate $	TxDOT Med Estimate $		$	GDJ Estimate $	GO Estimate $	TxDOT Med Estimate $		
400-6010	Str Excav	CY	14	$ 60.00		$ 200.00	$ 86.50		$ 840.00	$ 1,050.00	$ 2,800.00	$ 1,211.00	$ 1,589.00	OK
432-6001	Riprap)(4in)	CY	165	$ 555.00		$ 686.00	$ 751.71		$ 91,575.00	$ 74,250.00	$ 113,190.00	$ 124,032.15	$ (10,842.15)	Good Price
432-6045	Riprap)(Mow Strip)(4in)	CY	18	$ 555.00		$ 700.00	$ 693.09		$ 9,990.00	$ 9,688.50	$ 12,600.00	$ 12,475.62	$ 124.38	Good Price
462-6042	Box Culv (12x8)	Lf	88	$ 1,606.00		$ 3,229.36	$ 2,530.00		$ 141,328.00	$ 308,000.00	$ 284,183.68	$ 222,640.00	$ 61,543.68	OK(TxDOTs price is for a 10'x10 vs 12x8)
464-6003	RC Pipe(18")	Lf	80	$ 64.57		$ 100.00	$ 100.00		$ 5,165.60	$ 7,440.00	$ 8,000.00	$ 8,000.00	$ -	Good Price
466-6211	WW(SW-0)(HW=8Ft)	Ea	2	$ 15,750.00		$ 25,000.00	$ 25,000.00		$ 31,500.00	$ 36,000.00	$ 50,000.00	$ 50,000.00	$ -	Good Price
467-6362	SET(II)(18in)(RCP)(6:1)(C)	Ea	4	$ 1,350.00		$ 1,200.00	$ 770.00		$ 5,400.00	$ 4,800.00	$ 4,800.00	$ 3,080.00	$ 1,720.00	OK
530-6005	Driveways(ACP)	Sy	234	-		$ 80.00	$ 65.00			$ 7,488.00	$ 18,720.00	$ 15,210.00	$ 3,510.00	Good Price
540-6001	Mtl W-Bm G F (Tim)	Lf	247.5	-		$ 85.00	$ 26.77			$ 7,672.50	$ 21,037.50	$ 6,625.58	$ 14,411.93	Accepted
540-6046	TL-2 31`"N Sht Radius(W/O Dat)	Ea	2	-		$ 10,000.00	$ 500.00			$ 60,000.00	$ 20,000.00	$ 1,000.00	$ 19,000.00	Accepted
544-6001	GDRL End Traet(Install)	Ea	2	-		$ 5,000.00	$ 3,469.96			$ 10,000.00	$ 10,000.00	$ 6,939.92	$ 3,060.08	OK
540-6016	TAS(DS)	Ea	2	-		$ 3,300.00	$ 1,500.00			$ 6,000.00	$ 6,600.00	$ 3,000.00	$ 3,600.00	OK
502-6001	Barricades, sign and Traffic Handle	Mo	5	2200		$ 2,200.00	$ 1,500.00				$ 11,000.00		$ 11,000.00	OK
132-6006	**Embankment**	**CY**	**-459**	**12**						$ (5,508.00)	$ (5,508.00)	$ (5,508.00)	$ (5,508.00)	OK
										$ 526,881.00	$ 557,423.18	$ 448,706.27	$ 97,716.92	Difference

Red Numbers - Higher Price

Box Culvert Deduction

Embankment	W	H	L	CY
13'x9'x106'	13	9	106	459

HIDALGO COUNTY PCT 2 LAS MILPAS H&B TUNNEL — 9/25/2023

LOCATION: LAS MILPAS ROADWAY TUNNEL CROSSING

HIDALGO COUNTY PRECINCT 2 COMMISSIONER EDDIE CANTU

GRJ Engineering

I. PEDESTRIAN TUNNEL

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	PCT 2 UNIT PRICE	PCT 2 AMOUNT
400 6010	STRUCT EXCAV (SPECIAL)	CY	14.0	$75.00	$1,050.00
432 6001	RIPRAP (CONC)(4 IN)	CY	165.0	$450.00	$74,250.00
432 6045	RIPRAP (MOW STRIP)(4 IN)	CY	18.0	$538.25	$9,688.50
462 6042	CONC BOX CULV (12 FT X 8 FT)	LF	88.0	$3,500.00	$308,000.00
464 6003	RC PIPE (CL III)(18 IN)	LF	80.0	$93.00	$7,440.00
466 6211	WINGWALL (SW - 0) (HW=8 FT)	EA	2.0	$18,000.00	$36,000.00
467 6362	SET (TY II) (18 IN) (RCP) (6: 1) (C)	EA	4.0	$1,200.00	$4,800.00
530 6005	DRIVEWAYS (ACP)	SY	234.0	$32.00	$7,488.00
540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	247.5	$31.00	$7,672.50
540 6046	TL-2 31"N SHORT RADIUS (W/O DAT)	EA	2.0	$30,000.00	$60,000.00
544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2.0	$5,000.00	$10,000.00
540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	2.0	$3,000.00	$6,000.00
		SUBTOTAL PEDESTRIAL TUNNEL			$532,389
	TOTAL CONSTRUCTION COST				$532,389

Estimate does not include barricades(add) or embankment(deduct)

GO UNDERGROUND LLC

I. PEDESTRIAN TUNNEL

ITEM NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT
400 6010	STRUCT EXCAV (SPECIAL)	CY	14.0	$ 200.00	$ 2,800.00
432 6001	RIPRAP (CONC)(4 IN)	CY	165.0	$ 686.00	$ 113,190.00
432 6045	RIPRAP (MOW STRIP)(4 IN)	CY	18.0	$ 700.00	$ 12,600.00
462 6042	CONC BOX CULV (12 FT X 8 FT)	LF	88.0	$ 3,229.36	$ 284,184.00
464 6003	RC PIPE (CL 111)(18 IN)	LF	80.0	$ 100.00	$ 8,000.00
466 6211	WINGWALL (SW - 0) (HW=8 FT)	EA	2.0	$ 25,000.00	$ 50,000.00
467 6362	SET (TY II) (18 IN) (RCP) (6: 1) (C)	EA	4.0	$ 1,200.00	$ 4,800.00
530 6005	DRIVEWAYS (ACP)	SY	234.0	$ 80.00	$ 18,720.00
502 6001	BARRICADES, SIGNS, TRAFFIC HLING	MO	8.0	$ -	$ -
540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	247.5	$ 85.00	$ 21,037.50
540 6046	TL-2 31"N SHORT RADIUS (W/O DAT)	EA	2.0	$ 10,000.00	$ 20,000.00
544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2.0	$ 5,000.00	$ 10,000.00
540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	2.0	$ 3,300.00	$ 6,600.00
				TOTAL	$ 551,931.50

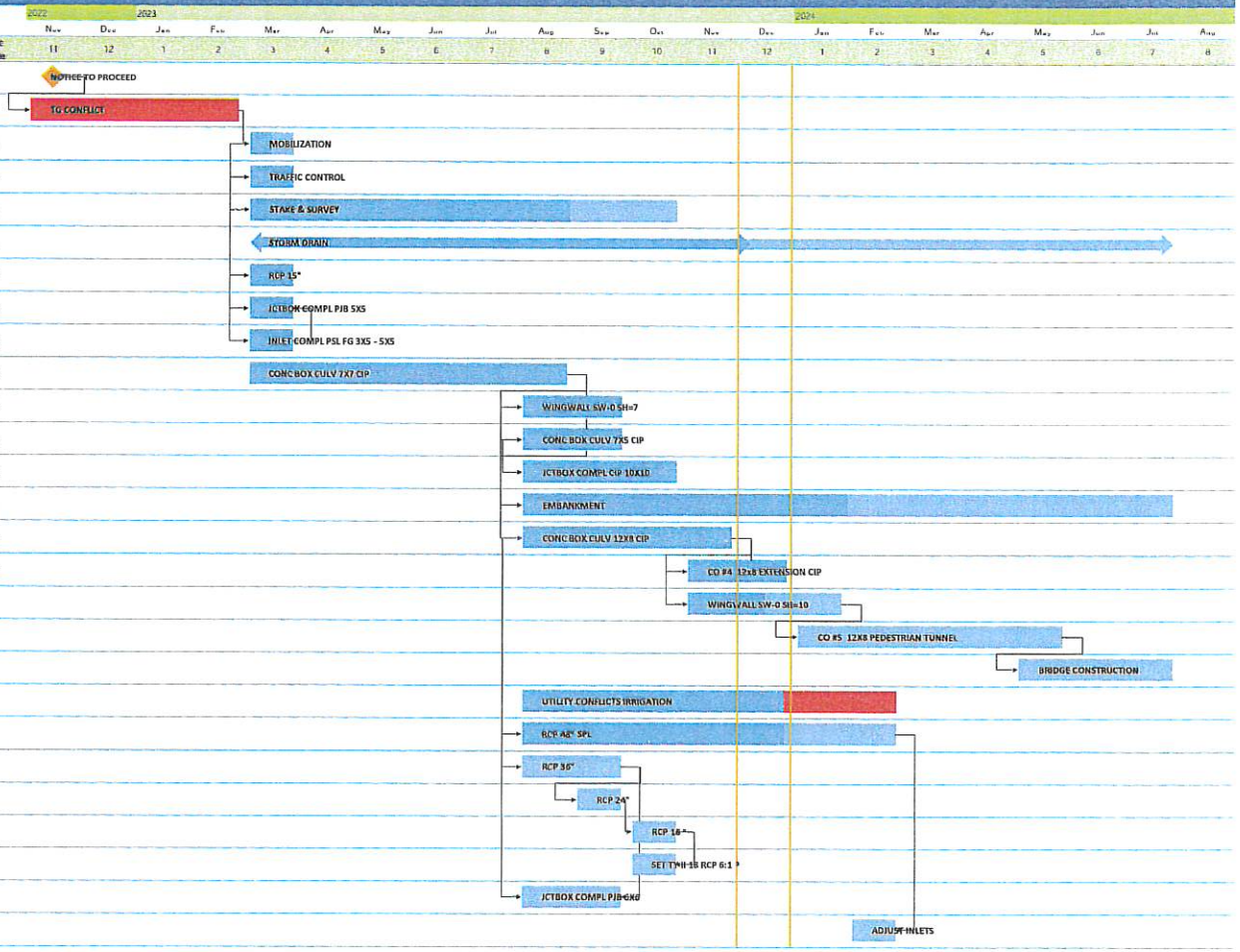
Estimate does not include barricades(add) or embankment(deduct)

LAS MILPAS

Project Lead:

WBS	Task Name	Priority	Resource	Start	Finish	Duration	Percent Complete
1	NOTICE TO PROCEED	NORMAL		Tue 01-Nov-22	Tue 01-Nov-22	1	0%
2	TG CONFLICT	HIGH		Wed 02-Nov-22	Tue 28-Feb-23	85	0%
3	MOBILIZATION	NORMAL		Wed 01-Mar-23	Tue 21-Mar-23	15	50%
4	TRAFFIC CONTROL	NORMAL		Wed 01-Mar-23	Tue 21-Mar-23	15	100%
5	STAKE & SURVEY	NORMAL		Wed 01-Mar-23	Tue 10-Oct-23	160	75%
6	**STORM DRAIN**	NORMAL		**Wed 08-Mar-23**	**Wed 31-Jul-24**	**366**	**54%**
6.1	RCP 15"	NORMAL		Wed 08-Mar-23	Tue 28-Mar-23	15	100%
6.2	JCTBOX COMPL PJB 5X5	NORMAL		Mon 13-Mar-23	Wed 15-Mar-23	3	100%
6.3	INLET COMPL PSL FG 3X5 - 5X5	NORMAL		Wed 08-Mar-23	Fri 10-Mar-23	3	100%
6.4	CONC BOX CULV 7X7 CIP	NORMAL		Wed 15-Mar-23	Tue 15-Aug-23	110	100%
6.5	WINGWALL SW-0 SH=7	NORMAL		Wed 16-Aug-23	Tue 19-Sep-23	25	100%
6.6	CONC BOX CULV 7X5 CIP	NORMAL		Wed 16-Aug-23	Tue 26-Sep-23	30	100%
6.7	JCTBOX COMPL CIP 10X10	NORMAL		Wed 23-Aug-23	Tue 03-Oct-23	30	100%
6.8	EMBANKMENT	NORMAL		Wed 16-Aug-23	Tue 30-Jul-24	250	50%
6.9	CONC BOX CULV 12X8 CIP	HIGH		Mon 21-Aug-23	Tue 21-Nov-23	67	100%
6.10	CO #4 12x8 EXTENSION CIP	NORMAL		Wed 29-Nov-23	Tue 05-Dec-23	5	100%
6.11	WINGWALL SW-0 SH=10	NORMAL		Wed 22-Nov-23	Tue 02-Jan-24	30	50%
6.12	CO #5 12X8 PEDESTRIAN TUNNEL	NORMAL		Wed 03-Jan-24	Tue 21-May-24	100	0%
6.13	BRIDGE CONSTRUCTION	NORMAL		Wed 22-May-24	Wed 31-Jul-24	51	0%
6.14	UTILITY CONFLICTS IRRIGATION	NORMAL		Tue 08-Aug-23	Mon 05-Feb-24	130	70%
6.15	RCP 48" SPL	NORMAL		Mon 21-Aug-23	Fri 16-Feb-24	130	70%
6.16	RCP 36"	NORMAL		Mon 21-Aug-23	Fri 15-Sep-23	20	0%
6.17	RCP 24"	NORMAL		Mon 18-Sep-23	Fri 29-Sep-23	10	0%
6.18	RCP 18 "	NORMAL		Mon 02-Oct-23	Fri 13-Oct-23	10	0%
6.19	SET TY II 18 RCP 6:1 P	NORMAL		Mon 02-Oct-23	Fri 13-Oct-23	10	0%
6.20	JCTBOX COMPL PJB 6X6	NORMAL		Mon 21-Aug-23	Fri 15-Sep-23	20	0%
6.21	ADJUST INLETS	NORMAL		Mon 05-Feb-24	Fri 16-Feb-24	10	0%

Type here to add a new task



B2Z Engineering
Mission, TX 78573

☒ ACCEPTED ☐ AMEND - SEE CHANGES BELOW
☐ ACCEPTED AS NOTED ☐ REJECTED
☐ RETURNED FOR CORRECTION

ACCEPTANCE IS FOR GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS ONLY. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESSES AND TECHNIQUES FOR CONSTRUCTION; COORDINATING ITS WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING ITS WORK IN A SAFE AND SATISFACTORY MANNER

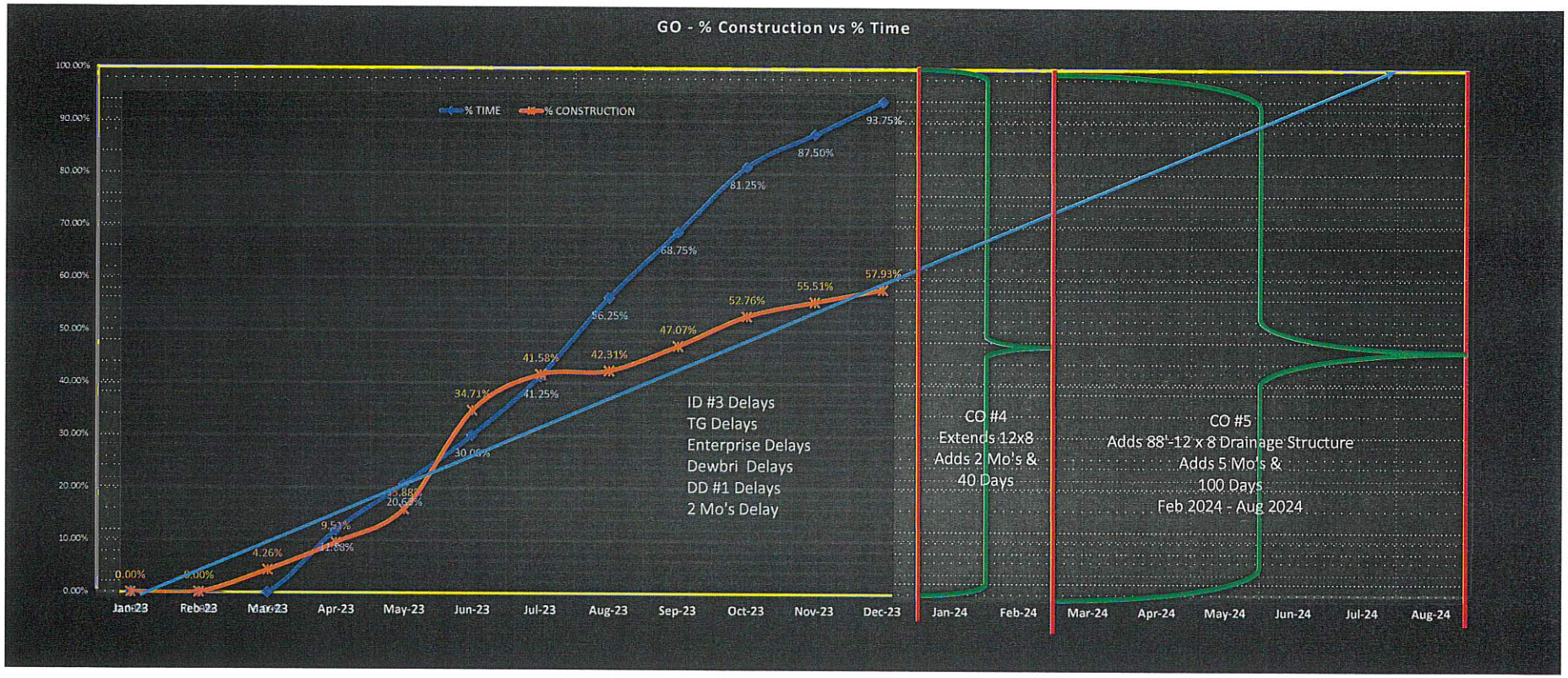
By: _____

Date: 12/13/2023

Las Milpas Road
CPM Schedules

	Original Time Days	Original Time Months
	160	8

No.	Schedule	Submission Date	Time(Days)	Time(Mo)	Accepted/ Not Accepted		Reason	Project Completion Date
1	Baseline	12/4/2022	-	-	Not Accepted	Return w/ corrections	CPM does not follow County requirements	NA
2	Regular	5/31/2023	241	12.05	Accepted	W/ utility delays(TG - 3 Mo's-60D)	CPM does not follow County requirements	12/11/2023
x	x	x	241	12.05	Accepted	W/ utility delays(DeBrie, Enterprise - 1 Mo-20D)	CPM does not follow County requirements	x
x	x	x	241	12.05	Accepted	W/ utility delays(ID#3 - 2 Mo-40D)	CPM does not follow County requirements	x
3	Modified	12/1/2024	366	18.3	Accepted	Include CO #4 & #5 adds time (2 Mo & 5Mo's)	CPM follows County requirements	7/24/2024


GO - % Construction vs % Time
% TIME
% CONSTRUCTION
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Jan-23
Feb-23
Mar-23
Apr-23
May-23
Jun-23
Jul-23
Aug-23
Sep-23
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
0.00%
0.00%
4.26%
9.51%
11.88%
20.63%
30.06%
34.71%
41.25%
41.58%
42.31%
47.07%
52.76%
55.51%
57.93%
56.25%
68.75%
81.25%
87.50%
93.75%
ID #3 Delays
TG Delays
Enterprise Delays
Dewbri Delays
DD #1 Delays
2 Mo's Delay
CO #4
Extends 12x8
Adds 2 Mo's &
40 Days
CO #5
Adds 88'-12 x 8 Drainage Structure
Adds 5 Mo's &
100 Days
Feb 2024 - Aug 2024

Las Milpas Road

Change Orders

		Original Total								Richard Cortez	
	AWARD AMOUNT:	$ 15,498,000.00									
	Description	CO AMOUNT	Additional Time	Additional Mo	Plan Sheets	Responsible EOR	Error	Contractor Appr(GO)	County Appr(B2Z)	Final Approval	
CO #1	Pipe Adjustment(Labor & Equipment)	$ (328,176.60)	0		6c & 74a	R Machescha	No		December 1, 2022		AP
CO #2	12" Hidalgo WL Conflict, , Add Standard Shts (SCC-7)for CIP 7x7 & 7x9 RCB	$ 21,700.00	0		115a, 133a, 133b	Oliver Salgado	No		March 7, 2023		AP
CO #3	Add 12 x 8 CIP Box Culvert Design	NR	0		133c, 133d	Oliver Salgado	No				AP
CP #4	Extend 12x8 CIP 24' to the north(exposed gas line)	$ 63,492.00	40	2	5a, 117a	Oliver Salgado	No				AP
CO #5	Drainage Tunnel	$ 557,423.18	100	5	15 Shts	MDJ	No				
CO #6											
CO #7											
CO #8											
CO #9											
CO #10											
CO #11											
	Sum of all CO's	$ 314,438.58	140	7							

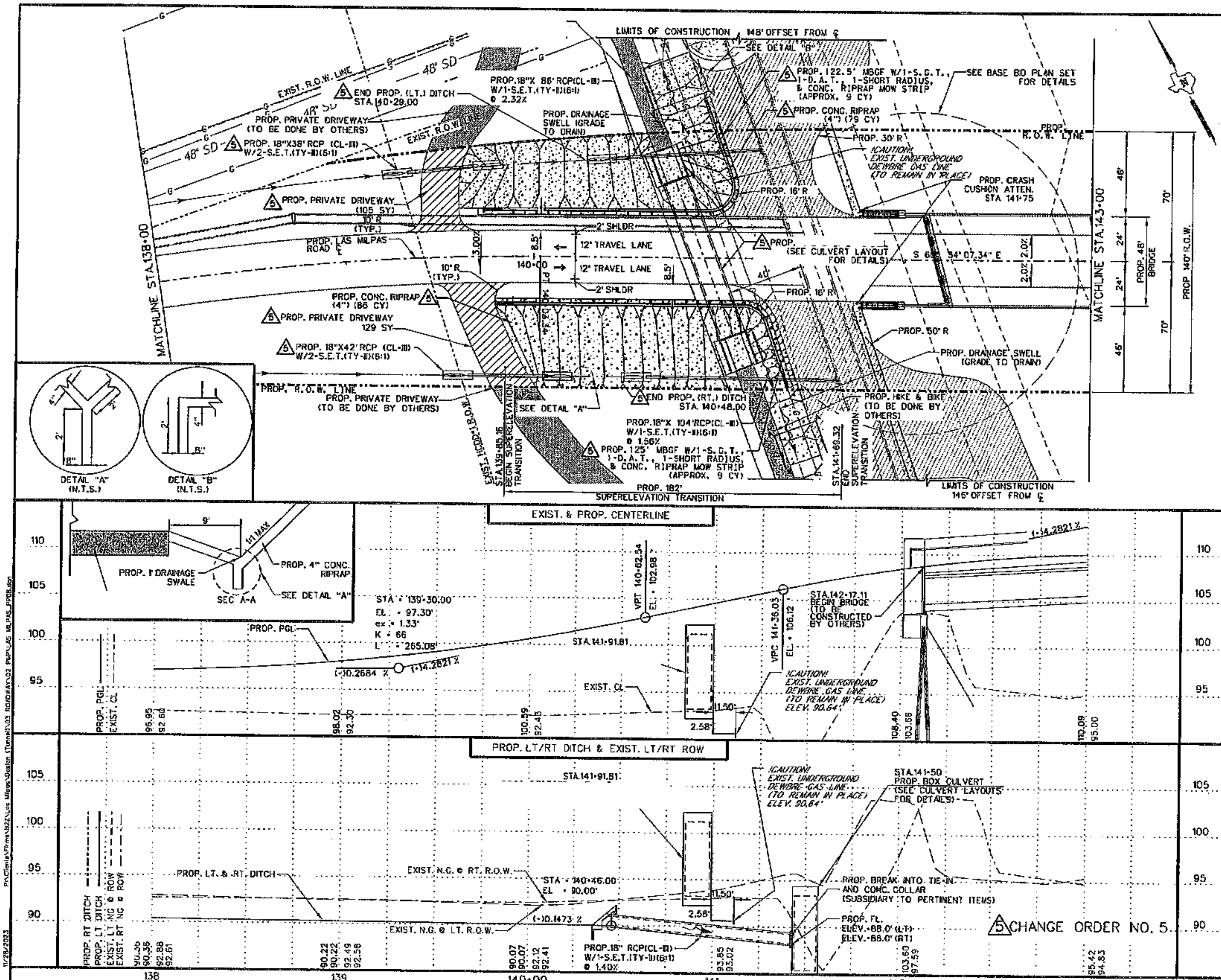
	Start	End	Total	Delays
Original Project Schedule	Mar-23	Dec-23	8 Months	Texas Gas, DeBrie, Lone Star and Enterprise Gas
CO #4	Jan-24	Feb-24	2 Months	DD#1 & Enterprise Gas
CO #5	Feb-24	Dec-24	5 Months	None

Las Milpas Road

Change Orders

		Original Total	Original	Original							
	AWARD AMOUNT:	$ 15,498,000.00	160	8							Richard Cortez
	Description	CO AMOUNT	Additional Time	Additional Mo	Plan Sheets	Responsible EOR	Error	Contractor Appr(GO)	County Appr(B2Z)	Final Approval	
CO #1	Pipe Adjustment(Labor & Equipment)	$ (328,176.60)	0	0	6c & 74a	R Machescha	No		December 1, 2022		AP
CO #2	12" Hidalgo WL Conflict, , Add Standard Shts (SCC-7)for CIP 7x7 & 7x9 RCB	$ 21,700.00	0	0	115a, 133a, 133b	Oliver Salgado	No		March 7, 2023		AP
CO #3	Add 12 x 8 CIP Box Culvert Design	NR	0	0	133c, 133d	Oliver Salgado	No				AP
CP #4	Extend 12x8 CIP 24' to the north(exposed gas line)	$ 63,492.00	40	2	5a, 117a	Oliver Salgado	No				AP
CO #5	Pedestrian Tunnel(Estimated Cost(W/ GO & B2Z))	$ 562,931.18	100	5	15 Shts	RDJ	No				
CO #6											
CO #7											
CO #8											
CO #9											
CO #10											
CO #11											
	Sum of all CO's	$ 319,946.58	140	7							

	Start	End	Total	Delays
Original Project Schedule	Mar-23	Dec-23	8 Months	Texas Gas, DeBrie, Lone Star and Enterprise Gas
CO #4	Jan-24	Feb-24	2 Months	DD#1 & Enterprise Gas
CO #5	Feb-24	Dec-24	5 Months	DD#1 approving lans



ITEM	DESCRIPTION	UNIT	QUANTITY
432	RIPRAP (CONC)(4")	CY	165
432	RIPRAP (MOW STRIP)(4")	CY	18
464	RC PIPE (CL-III)(18IN)	LF	80
467	SET (TY II)(6:1)(18IN)	EA	4
530	DRIVEWAYS (ACP)	SY	234
540	METAL BEAM GUARD FENCE	LF	247.5
540	TL-2 31" SHORT W/O DAT	EA	2
540	INSTALL DAT	EA	2
544	INSTALL GET	EA	2

LEGEND:

- PROPOSED PRIVATE DRIVEWAY OR PUBLIC INTERSECTION (SEE DRIVEWAY TABLE FOR QUANTITIES)
- PROP. CUT AND RESTORE
- PROPOSED PLANING (0-1½")
- EXIST. ROADWAY TO BE REMOVED (ITEM 110)
- TO BE REMOVED UNDER ITEM 496 INCLUDES PAYMENT FOR REMOVAL OF ALL APPURTENANCES
- REMOVAL, RELOCATION AND INSTALLATION OF MAILBOXES ITEM 560
- TO BE REMOVED UNDER ITEM 100 "PREP. ROW"
- PROP. DITCH FLOWLINE/DIRECTION
- OBJECT MARKER OM-2Z(FLX)GND(BI)

NOTE:
SEE HORIZONTAL ALIGNMENT DATA SHEET FOR PROP. CENTERLINE DATA.
SEE SURVEY CONTROL SHEETS FOR BM STATIONS, OFFSETS, ELEVATIONS, ETC.

5 CHANGE ORDER NO. 5

STATE OF TEXAS
CHRISTOPHER R. RODRIGUEZ
107692
LICENSED PROFESSIONAL ENGINEER
11/28/2023

GAL Engineering
Firm No. - 20061

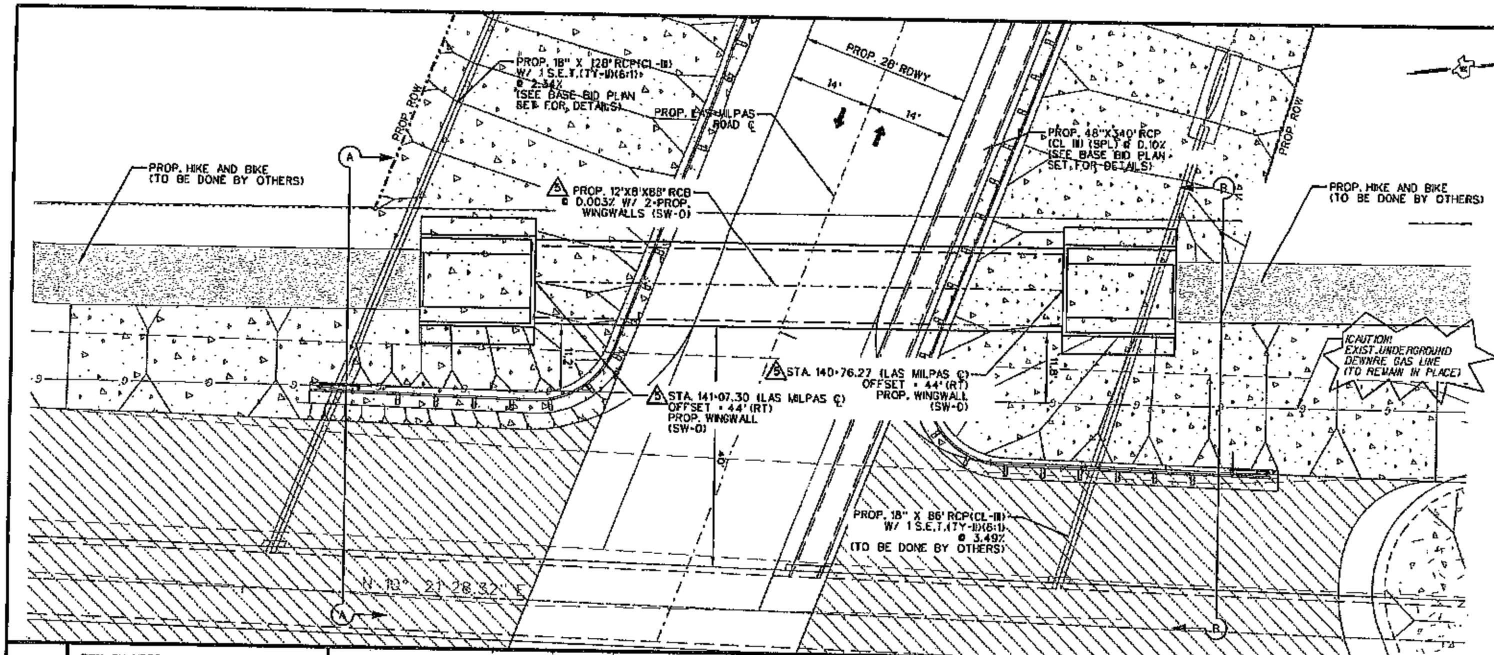
HIDALGO COUNTY PRECINCT 2
COMMISSIONER EDUARDO "EDDIE" CANTU

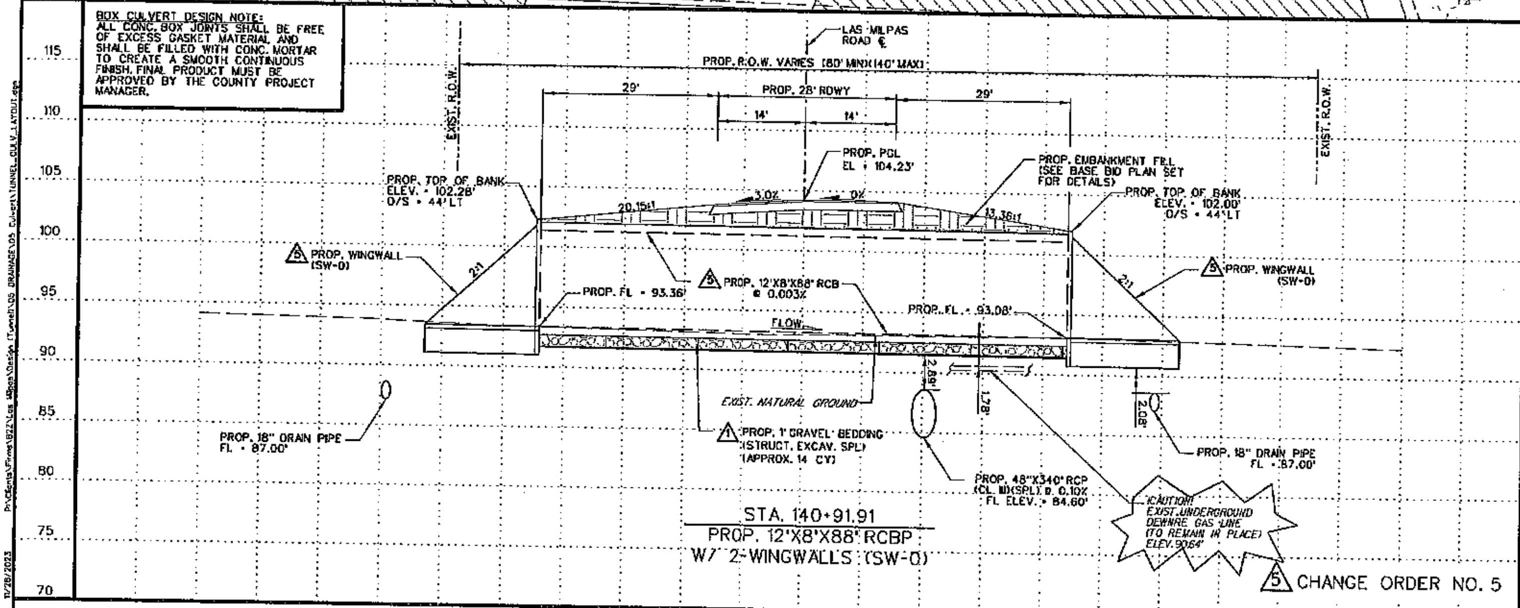
LAS MILPAS ROAD PLAN AND PROFILE STA. 138+00 TO STA. 143+00

SCALE:
HOR: 1"= 50'
VER: 1"= 10'

SHEET 1 OF 4

FED. RD. DIV. NO.	STATE	PROJECT NO.	SHEET NO.
6	TEXAS		98a
STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO. / JOB NO.	HIGHWAY NO.
PHR	HIDALGO	- - -	MILPAS





STA. 140+91.91
PROP. 12'X8'X88' RCBP
W/ 2-WINGWALLS (SW-0)

5 CHANGE ORDER NO. 5

SHEET SUMMARY

ITEM	DESCRIPTION	UNIT	QUANTITY
400	STRUCT. EXCAVATION (SPL)	CY	14
462	CONC. BOX (12' X 8')	LF	88
466	WINGWALL (SW-0) (HW = 8')	EA	2
132	EMBANKMT FINAL DENS CONT TY C	EA	-459

LEGEND:

DIRECTION OF FLOW

SEE P&P SHEETS FOR DETAILS

FOR CONTRACTORS INFOMATION ONLY, NON PAY

5 CHANGE ORDER NO. 5

NOTES:

1. WHEN WORKING OUTSIDE THE ROW, CAUTION SHALL BE TAKEN NOT TO DAMAGE EXISTING FENCES, TREES, ETC. THE CONTRACTOR SHALL NOTIFY PROPERTY OWNERS WHEN WORKING OUTSIDE THE ROW. ANY DAMAGES DONE TO THEIR PROPERTY SHALL BE REPAIRED AT CONTRACTORS EXPENSE.
2. THE CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANIES TO FIELD VERIFY HORIZONTAL AND VERTICAL INFORMATION.
3. SEE ALIGNMENT DATA SHEET FOR PROP. CENTERLINE DATA.
4. CULVERT WAS ANALYZED USING FEDERAL HIGHWAY ADMINISTRATION'S, FHWA, "HY-8" SOFTWARE.

STATE OF TEXAS
CHRISTOPHER R. RODRIGUEZ
107692
LICENSED PROFESSIONAL ENGINEER
11/28/2023

GDJ Engineering
Firm No. - 2006

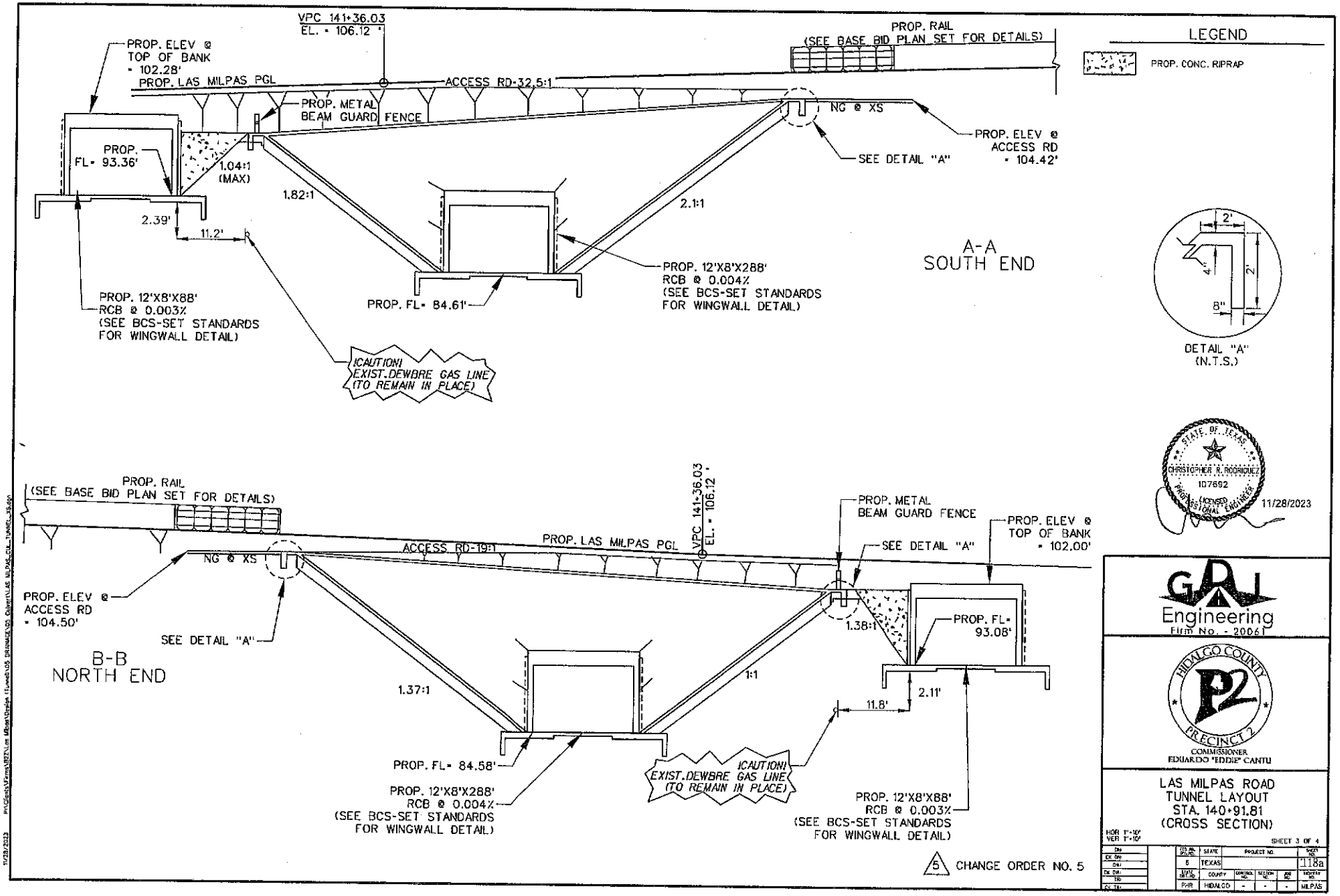
HIDALGO COUNTY
P2
PRECINCT 2
COMMISSIONER
EDUARDO "EDDIE" CANTU

LAS MILPAS
TUNNEL LAYOUT
STA. 140+91.81

SCALE:
HOR: 1" = 20'
VER: 1" = 10'

SHEET 2 OF 4

DRAWING:	FED. RD. DIV. NO.	STATE	PROJECT NO.				HIGHWAY NO.
CKD:	6	TEXAS					98b
ENGINEER:	STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
CKD:	PHR	HIDALGO	-	-	-		MILPAS
REVIEW:							
CKD:							


VPC 141+36.03
EL. = 106.12 '
PROP. ELEV @
TOP OF BANK
= 102.28'
PROP. LAS MILPAS PGL
ACCESS RD-32.5:1
PROP. RAIL
(SEE BASE BID PLAN SET FOR DETAILS)
PROP. METAL
BEAM GUARD FENCE
NG @ XS
PROP. ELEV @
ACCESS RD
= 104.42'
SEE DETAIL "A"
PROP.
FL= 93.36'
1.04:1
(MAX)
1.82:1
2.1:1
2.39'
11.2'
PROP. 12'X8'X88'
RCB @ 0.003%
(SEE BCS-SET STANDARDS
FOR WINGWALL DETAIL)
PROP. FL= 84.61'
PROP. 12'X8'X288'
RCB @ 0.004%
(SEE BCS-SET STANDARDS
FOR WINGWALL DETAIL)
(CAUTION)
EXIST. DEWBRE GAS LINE
(TO REMAIN IN PLACE)
A-A
SOUTH END
LEGEND
PROP. CONC. RIPRAP
2'
4'
2'
8"
DETAIL "A"
(N.T.S.)
PROP. RAIL
(SEE BASE BID PLAN SET FOR DETAILS)
ACCESS RD-19:1
PROP. LAS MILPAS PGL
VPC 141+36.03
EL. = 106.12 '
PROP. METAL
BEAM GUARD FENCE
SEE DETAIL "A"
PROP. ELEV @
TOP OF BANK
= 102.00'
NG @ XS
PROP. ELEV @
ACCESS RD
= 104.50'
SEE DETAIL "A"
B-B
NORTH END
1.38:1
PROP. FL=
93.08'
1.37:1
1:1
11.8'
2.11'
PROP. FL= 84.58'
PROP. 12'X8'X288'
RCB @ 0.004%
(SEE BCS-SET STANDARDS
FOR WINGWALL DETAIL)
(CAUTION)
EXIST. DEWBRE GAS LINE
(TO REMAIN IN PLACE)
PROP. 12'X8'X88'
RCB @ 0.003%
(SEE BCS-SET STANDARDS
FOR WINGWALL DETAIL)
5 CHANGE ORDER NO. 5
STATE OF TEXAS
CHRISTOPHER R. RODRIGUEZ
107692
LICENSED
PROFESSIONAL ENGINEER
11/28/2023
GDJ
Engineering
Firm No. - 20061
HIDALGO COUNTY
P2
PRECINCT 2
COMMISSIONER
EDUARDO "EDDIE" CANTU
LAS MILPAS ROAD
TUNNEL LAYOUT
STA. 140+91.81
(CROSS SECTION)
HOR 1"=10'
VER 1"=10'
SHEET 3 OF 4
DN
CK. DN
DW
CK. DW
TR
CK. TR
FED. RD. PROJ. NO.
STATE
TEXAS
PROJECT NO.
SHEET NO.
118a
STATE DIST. NO.
COUNTY
HIDALGO
CONTROL NO.
SECTION NO.
JOB NO.
HIGHWAY NO.
PHR
MILPAS

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°, 15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" (2) Conc (Curb) (CY)	Class "C" (3) Conc (Wingwall) (CY)	Total Wingwall Area (SF)
STA. 140+91.81 (BOTH)	1-12'X8'	3'	SCP-12	SW-0	0°	2:1	12	12	1	9.750	N/A	N/A	18.833	N/A	N/A	5.0	1.0	22.0	380

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:
FILE:

NOTES:
Skew = 0° on SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standard sheets;
30° maximum for safety end treatment

SL:1 = Horizontal : 1 Vertical
- Side slope at culvert for flared or straight wingwalls.
- Channel slope for parallel wingwalls.
- Slope must be 3:1 or flatter for safety end treatments.

T = Box culvert top slab thickness. Dimension can be found on the applicable box culvert standard sheet.

U = Box culvert wall thickness. Dimension can be found on the applicable box culvert standard sheet.

C = Curb height

See applicable wing or end treatment standard sheets for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.

Hw = Height of wingwall

A = Distance from face of curb to end of wingwall [not applicable to parallel or straight wingwalls]

B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.

Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)
Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

STATE OF TEXAS
CHRISTOPHER R. RODRIGUEZ
107692
PROFESSIONAL ENGINEER
11/28/2023

(1) Round the wall heights shown to the nearest foot for bidding purposes.

(2) Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class S concrete is required for the top slab of the culvert, also provide Class S concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.

(3) Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.

(4) Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

SPECIAL NOTE:

This sheet is a supplement to the box culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the box culvert wingwalls and safety end treatments.

An Excel 2010 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.

Texas Department of Transportation

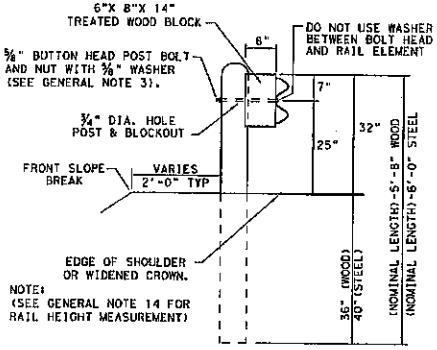
Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

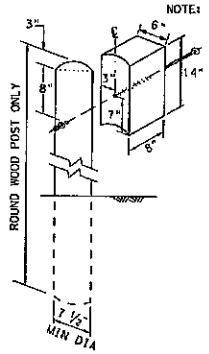
BCS

FILE:	bcssfp1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	February 2020	CONT	SECT	JOB	HIGHWAY
	REVISIONS	-	-	-	MILPAS
		DIST	COUNTY		SHEET NO.
		PHR	HIDALGO		135a

DATE:
FILE:

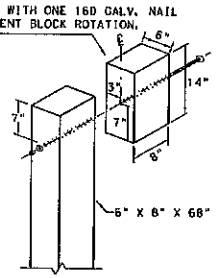


TYPICAL POST PLACEMENT

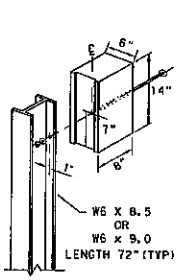


WOOD BLOCK TO ROUND WOOD POST

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

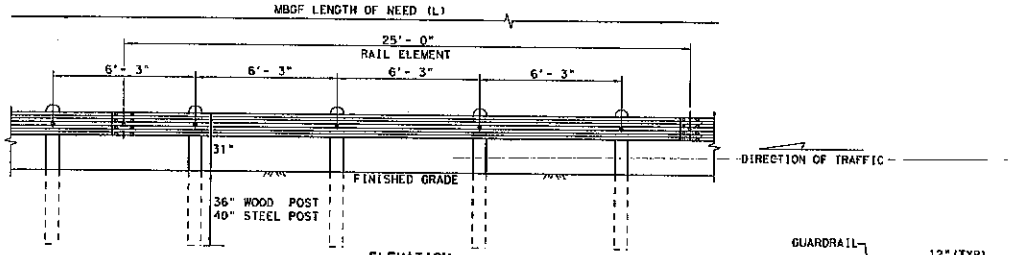


WOOD BLOCK TO RECTANGULAR WOOD POST



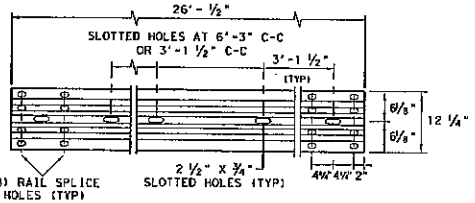
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



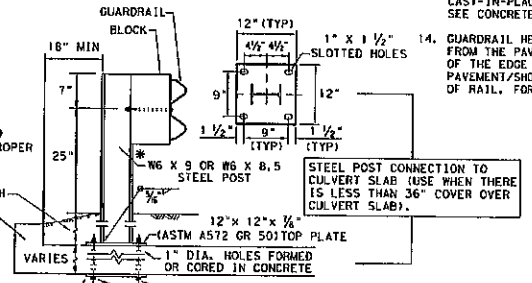
ELEVATION
MID-SPAN RAIL SPLICE

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



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

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



* POST(S) MAY REQUIRE FIELD MODIFICATION TO ENSURE PROPER GUARDRAIL HEIGHT.

12" X 12" X 1/4" (ASTM A36) STEEL BOTTOM PLATE WITH 1" DIA. HOLES REQUIRED WITH BOLT-THROUGH INSTALLATION.

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

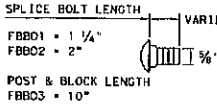
1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS, 1/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 1/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

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

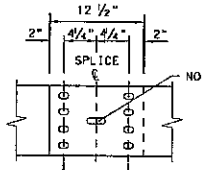
NOTE: TRANSITIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS,
SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

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



BUTTON HEAD BOLT

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



MID-SPAN RAIL SPLICE DETAIL

(8) 5/8" X 1 1/4" BUTTON HEAD SPLICE BOLTS WITH RECCESSED NUTS.

NOTE: GF(31)1 MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.

GENERAL NOTES

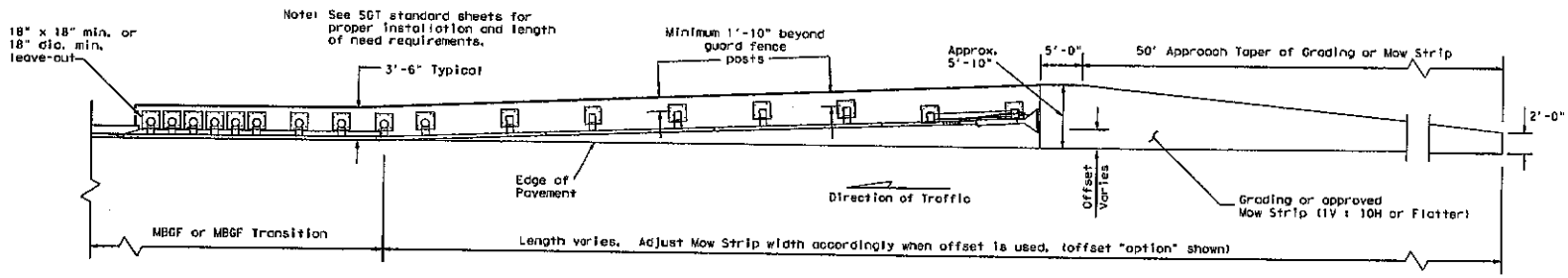
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS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

Texas Department of Transportation — Design Division Standard

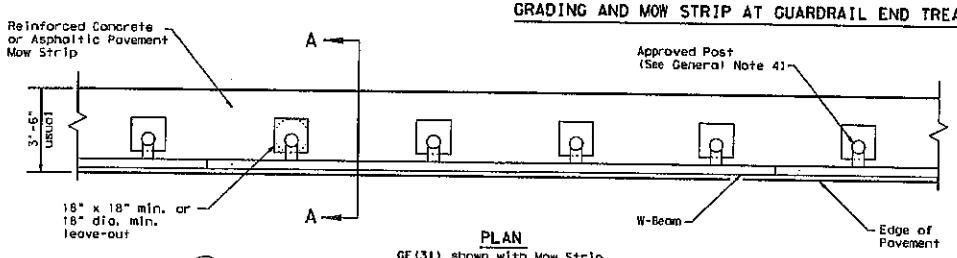
METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: COL/AG
©TxDOT NOVEMBER 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO. 98c

DATE:
FILE:

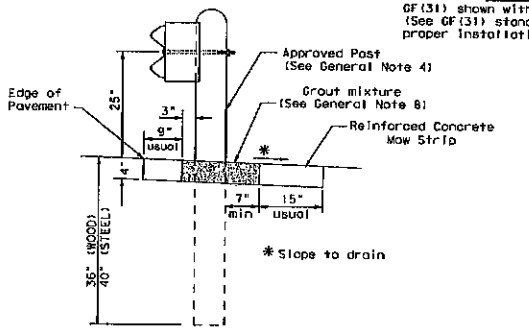


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



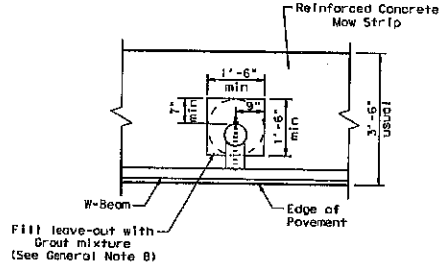
PLAN

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



SECTION A-A

Typical



MOW STRIP DETAIL

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

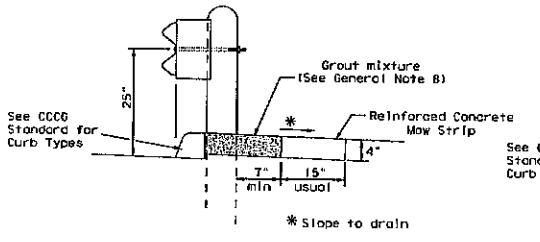
Note: Site Condition(s)

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

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

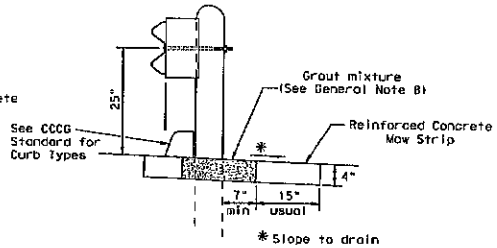
GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or 11 cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.



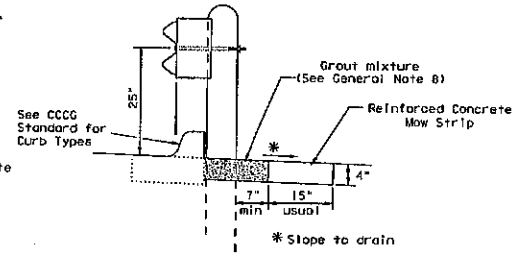
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

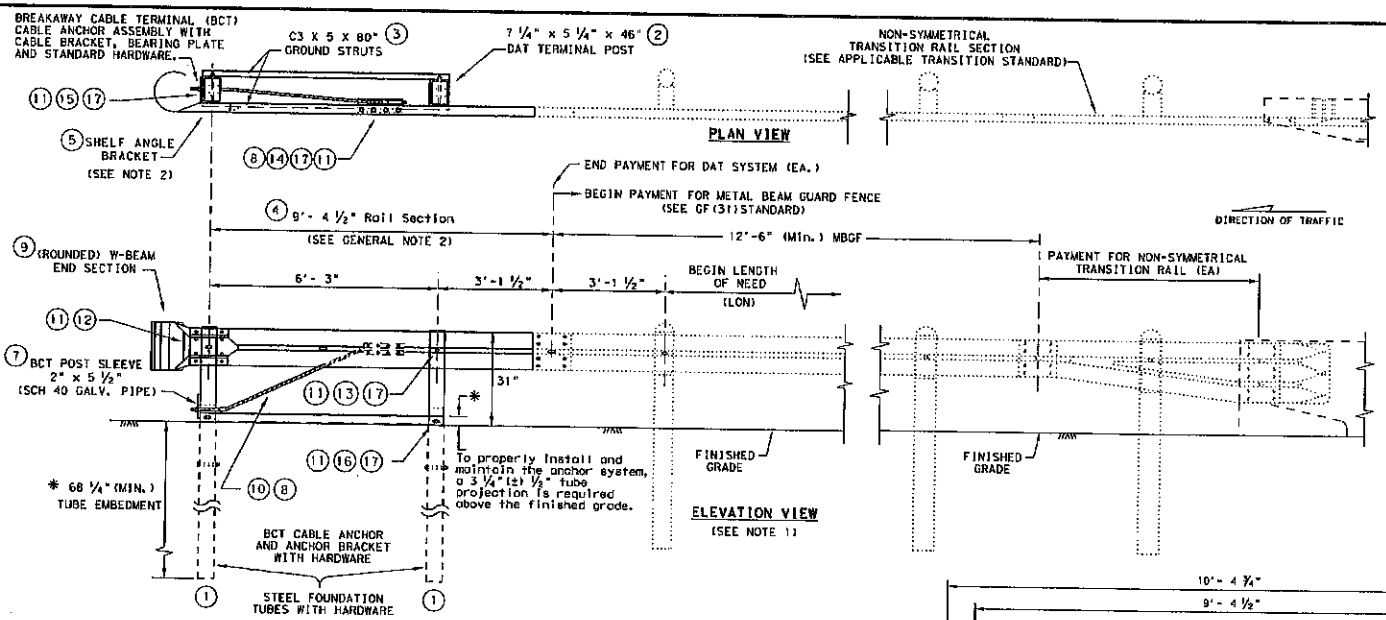
Texas Department of Transportation — Design Division Standard

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

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: COL/AG
©TxDOT NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 98d

DATE:
FILE:



DOWNSTREAM ANCHOR TERMINAL (DAT)

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

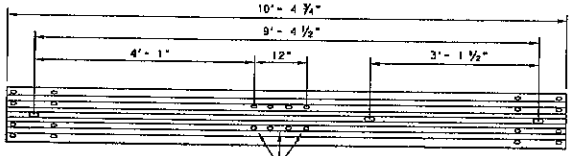
GENERAL NOTES

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

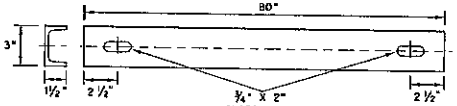
MOW STRIP INSTALLATION

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

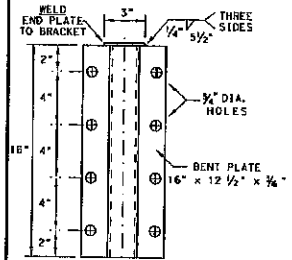
#	(DAT) PARTS LIST	QTY
(1)	STEEL FOUNDATION TUBE	2
(2)	DAT TERMINAL POST	2
(3)	CHANNEL STRUT	2
(4)	TERMINAL RAIL ELEMENT	1
(5)	SHELF ANGLE BRACKET	1
(6)	BCT BEARING PLATE	1
(7)	BCT POST SLEEVE	1
(8)	GUARDRAIL ANCHOR BRACKET	1
(9)	(ROUNDED) W-BEAM END SECTION	1
(10)	BCT CABLE ANCHOR	1
(11)	RECESSED NUT,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

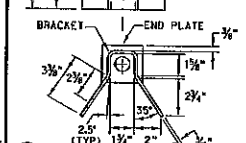


(4) TERMINAL RAIL ELEMENT FOR DAT

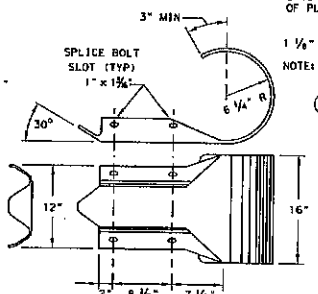


(3) CHANNEL STRUT C3 X 5 X 80", GRADE A36

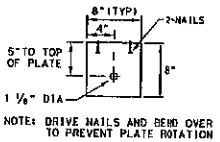




(8) GUARDRAIL ANCHOR BRACKET

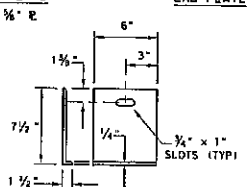


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

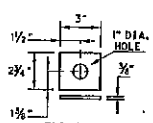


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

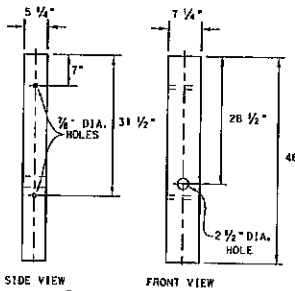
(6) BEARING PLATE 8"x 8"x 5/8" ℄



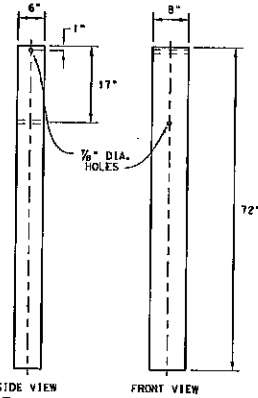
(5) SHELF ANGLE BRACKET



END PLATE



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



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

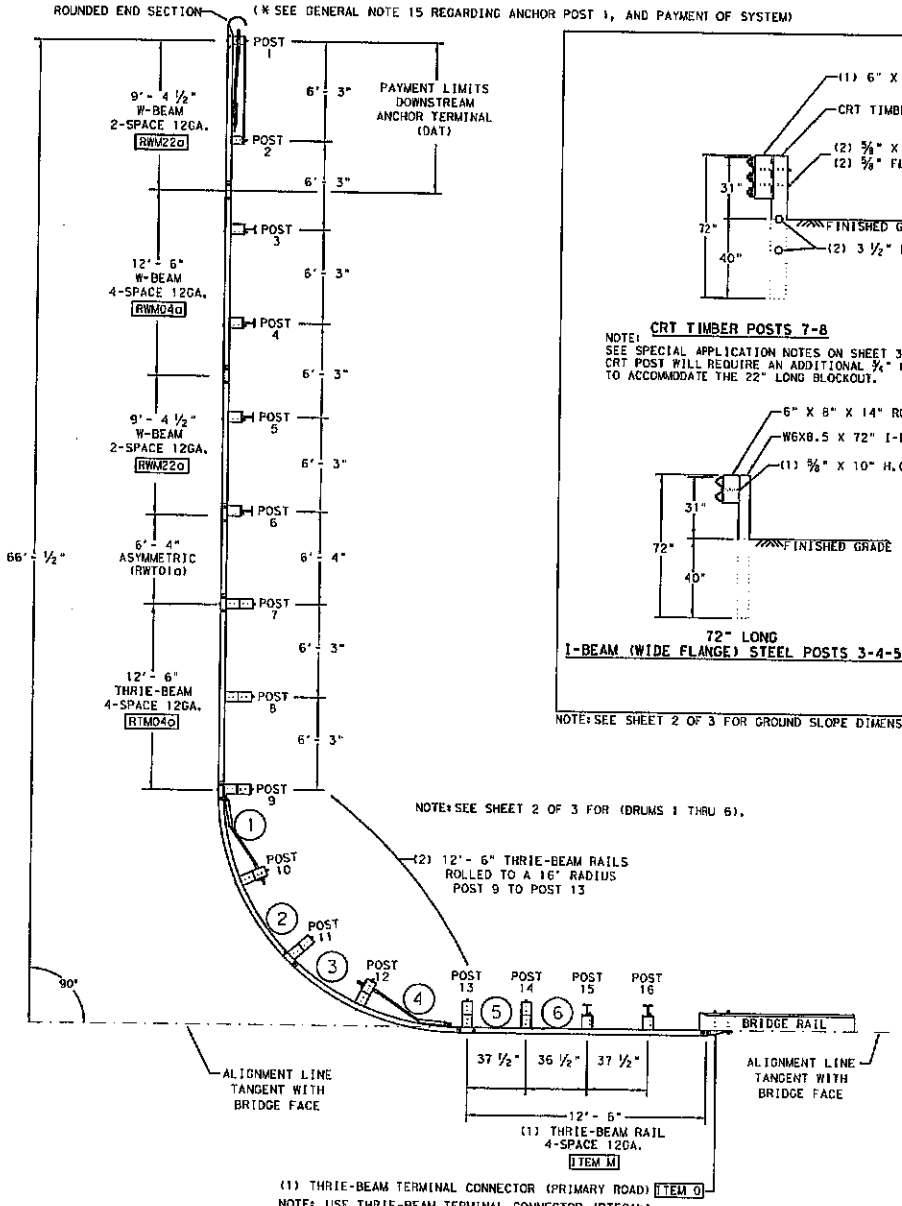
Texas Department of Transportation — Design Division Standard

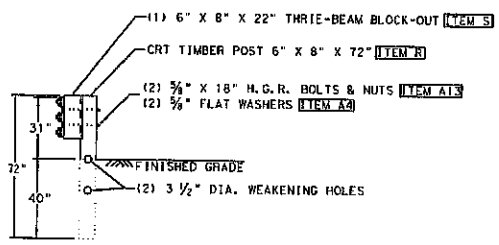
METAL BEAM GUARD FENCE
(DOWNSTREAM ANCHOR TERMINAL)
TL-3 MASH COMPLIANT
GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
© TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 98e

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.

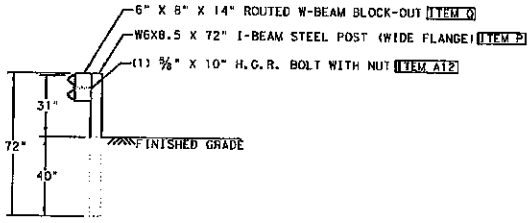
DATE:
FILE:



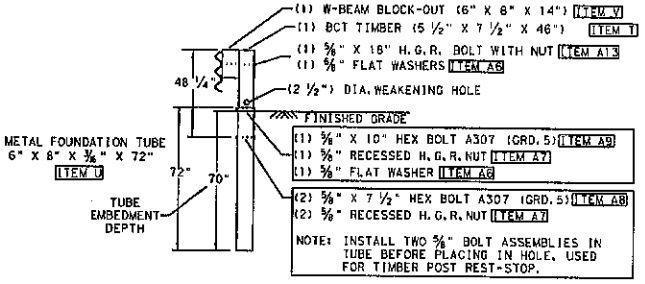


CRT TIMBER POSTS 7-8

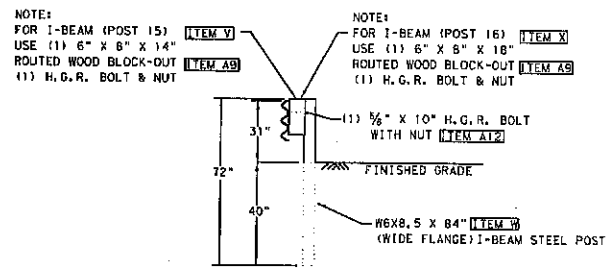
NOTE:
SEE SPECIAL APPLICATION NOTES ON SHEET 3 OF 3.
CRT POST WILL REQUIRE AN ADDITIONAL ¾" HOLE TO ACCOMMODATE THE 22" LONG BLOCKOUT.



72" LONG
I-BEAM (WIDE FLANGE) STEEL POSTS 3-4-5-6

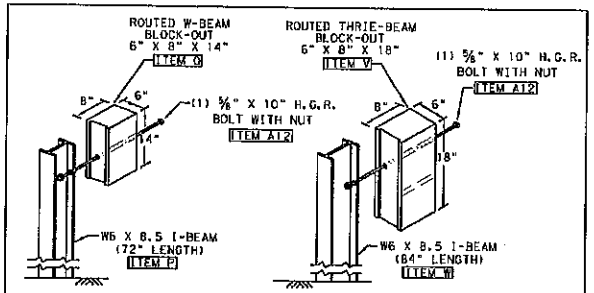


BCT TIMBER POSTS WITH METAL FOUNDATION TUBES
9-10-11-12-13-14



84" LONG
I-BEAM WIDE FLANGE STEEL POSTS 15-16

NOTE: SEE SHEET 2 OF 3 FOR GROUND SLOPE DIMENSIONS.



INSTALLATION DETAIL
ROUTED WOOD BLOCK-OUT WITH WIDE FLANGE STEEL POST

NOTE:
POST SYSTEM USES TWO TYPES OF 14" WOOD BLOCK-OUTS.
FOR CRT & BCT WOOD POSTS USE: (PDB01a)
FOR I-BEAM STEEL POSTS USE: (PDB01b)

POST (3-4-5-6)	USE: 14" BLOCK-OUT (PDB01b)
POST (7-8)	USE: 22" BLOCK-OUT (PDB02)
POST (9 THRU 14)	USE: 14" BLOCK-OUT (PDB01a)
POST (15)	USE: 14" BLOCK-OUT (PDB01b)
POST (16)	USE: 18" BLOCK-OUT (PDB01)

(MASH TL-2 COMPLIANT)
TESTED TO MASH TL-2 WITH A 3:1 SLOPE

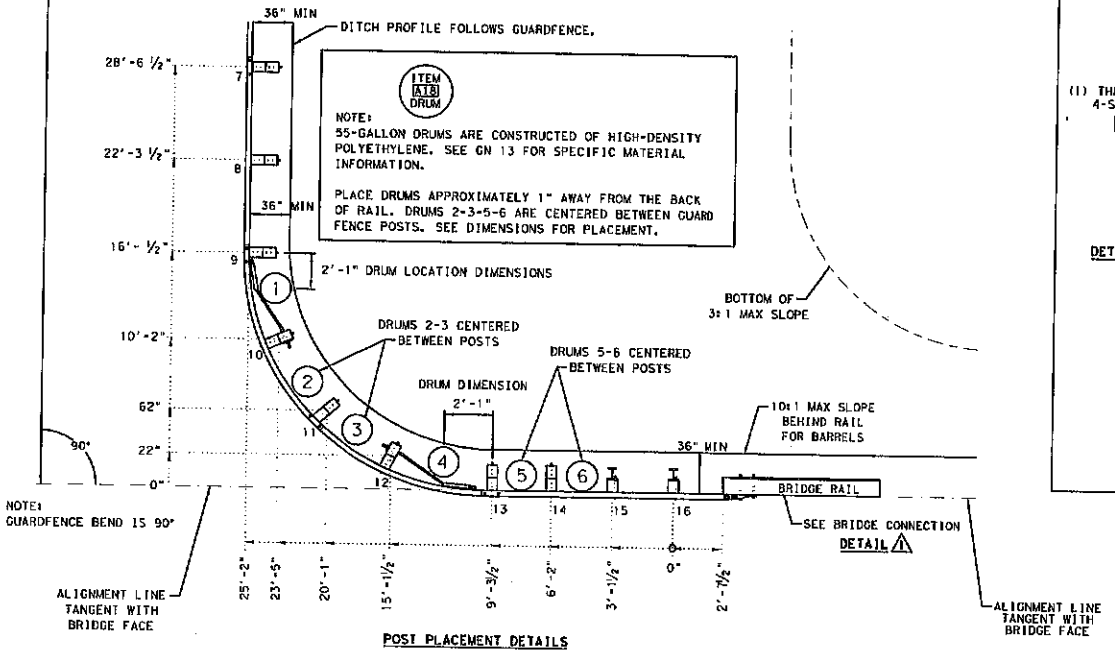
SHEET 1 OF 3

Texas Department of Transportation
Design Division Standard

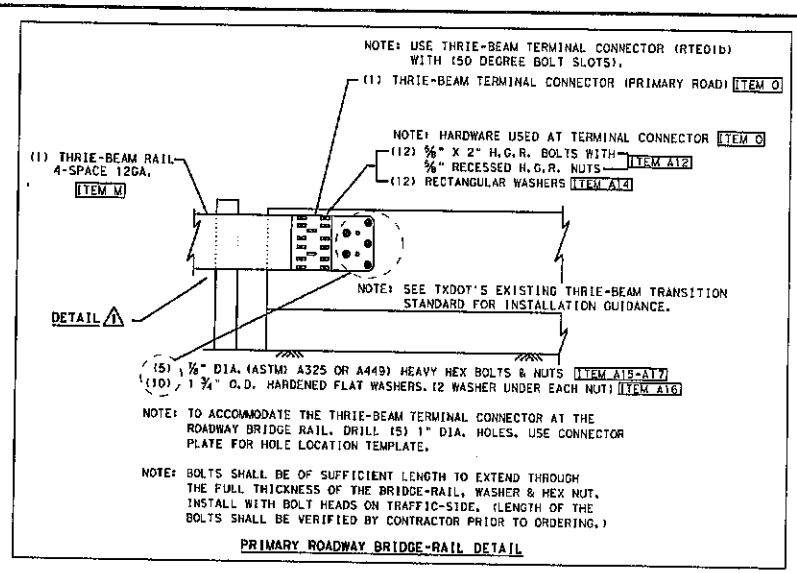
TL-2
SHORT RADIUS GUARDRAIL MASH COMPLIANT
SRG(TL-2)-21

FILE: srg(tl2)21	TxDOT	CK:KM	DW:VP	CK:CO
© TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO. 08F

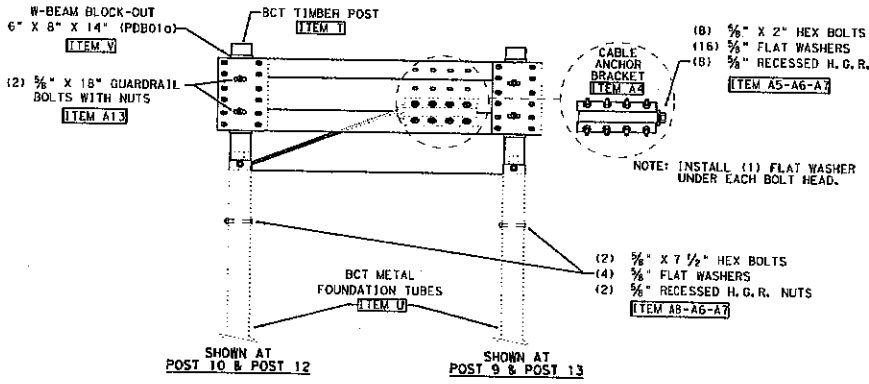
DOWN STREAM ANCHOR TERMINAL (DAT)
NOT SHOWN FOR CLARITY

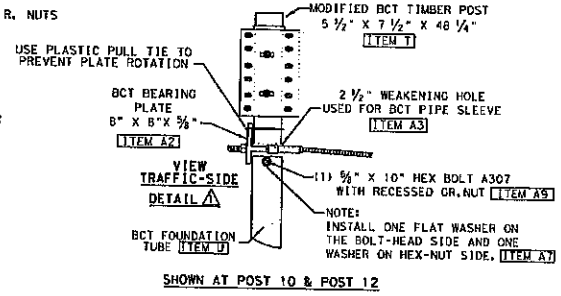


POST PLACEMENT DETAILS



PRIMARY ROADWAY BRIDGE-RAIL DETAIL





SHOWN AT POST 10 & POST 12

BCT TIMBER POST WITH METAL FOUNDATION TUBE

(MASH TL-2 COMPLIANT)
TESTED TO MASH TL-2 WITH A 3:1 SLOPE

SHEET 2 OF 3

Texas Department of Transportation — Design Division Standard

TL-2
SHORT RADIUS GUARDRAIL
MASH COMPLIANT

SRG(TL-2)-21

FILE: srg01221	TxDOT	CK: KM	DW: VP	CK: CDL
© TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 98

DATE:
FILE:

DATE:
FILE:

ITEM	ALL LARGE & SMALL COMPONENT DESCRIPTIONS
A	POST 1 & 2 BCT TIMBER (5 ½" X 7 ½" X 48 ¼") (PDF01)
B	POST 1 & 2 BCT TUBE (6" X 8" X ⅜" X 72" LENGTH) (PTE05)
C	POST 1 & 2 CHANNEL STRUTS (C3 X 5 X 80") A36
D	POST 1 SHELF ANGLE BRACKET (6" X 7 ½" X ¼") SEE DAT DETAIL
E	POST 1 BCT POST SLEEVE (FMM02a)
F	POST 1 BCT CABLE BEARING PLATE (⅝" X 8" X 8") (FPB01)
G	BCT CABLE ANCHOR ASSEMBLIES (¾" X 6'-6 ¾" LENGTH) (FCA01)
H	W-BEAM RAIL (ROUNDED END ANCHOR-TYPE) 12GA. (RWE03a)
I	W-BEAM RAIL (LENGTH 9'-4 ½") 12GA. (RWM22a)
J	W-BEAM RAIL (LENGTH 12'-6") 12GA. (4 SPACE) (RWM04a)
K	W-BEAM RAIL (LENGTH 9'-4 ½") 12GA. (RWM22a)
L	W-BEAM TO THRIE-BEAM ASYMMETRIC RAIL (RWT01a). (LENGTH 6'-4")
M	THRIE-BEAM RAIL (LENGTH 12'-6") 12GA. (4 SPACE) (RTM04a)
N	THRIE-BEAM RAIL (LENGTH 12'-6") 12GA. (16' RADIUS) (RTM02a)
O	THRIE BEAM RAIL (TERMINAL CONNECTOR) (BRIDGE-RAIL) (RTE01b)
P	POSTS 3, 4, 5, 6 I-BEAM POSTS (LENGTH W6X8.5 X 72") (PWE01)
Q	POSTS 3, 4, 5, 6, 15 ROUTED W-BEAM BLOCK-OUTS (6" X 8" X 14") (PDB01b)
R	POSTS 7, 8 CRT TIMBER POSTS (LENGTH 6" X 8" X 72") (PDE09)
S	POSTS 7, 8 THRIE-BEAM BLOCK-OUTS (6" X 8" X 22") (PDB02a)
T	POSTS 9, 10, 11, 12, 13, 14 BCT TIMBER (5 ½" X 7 ½" X 46") (PDF04)
U	POSTS 9, 10, 11, 12, 13, 14 BCT TUBE (6" X 8" X ⅜" X 72") (PTE05)
V	POSTS 9, 10, 11, 12, 13, 14, W-BEAM BLOCK-OUTS (6" X 8" X 14") (PDB01a)
W	POSTS 15, 16 I-BEAM POSTS (LENGTH W6X8.5 X 84") (PWE07)
X	POSTS 16 ROUTED THRIE-BEAM BLOCK-OUT (6" X 8" X 18") (PDB01)
A1	MODIFIED BCT CABLE ANCHOR ASSEMBLIES (¾" X LENGTH 5'-5")
A2	BCT CABLE BEARING PLATE (⅝" X 8" X 8") (POST 10 & POST 12) (FPB01)
A3	BCT CABLE POST SLEEVE (POST 10 & POST 12) (FMM02)
A4	BCT CABLE ANCHOR BRACKET (AT POST 9 & POST 13) (FPA01)
A5	⅝" X 2" HEX BOLTS A307 GRD.5 (FOR CABLE ANCHOR BRACKETS)
A6	⅝" FLAT WASHER A307 GRD.5 (1 WASHER UNDER BOLT & 1 WASHER UNDER NUT)
A7	⅝" RECESSED H.G.R. NUTS (FOR ALL ⅝" BOLTS)
A8	⅝" X 7 ½" HEX BOLTS A307 GRD.5 BCT POSTS (9-10-11-12-13-14)
A9	⅝" X 10" HEX BOLTS A307 GRD.5 BCT POSTS (9-10-11-12-13-14)
A10	⅝" X 1 ¼" H.G.R. BOLTS SPLICES AT POST (2-3-4-5-6-7-9-11-13) (FBB01)
A11	⅝" X 2" H.G.R. BOLTS (ROUND TERM-POST 10-END SPLICE) (FBB02)
A12	⅝" X 10" H.G.R. BOLTS (I-BEAM POSTS RAIL & BLOCKOUT) (FBB03)
A13	⅝" X 18" H.G.R. BOLTS (POSTS 9, 10, 11, 12, 13, 14) (FBB04)
A14	RECTANGULAR WASHERS (FWH03) (FOR TERMINAL CONNECTOR RTE01b)
A15	⅞" X (LENGTH VARIES) HEX BOLTS A325 OR A449 GR.5
A16	1 ¾" O.D. HARDENED FLAT WASHER A325
A17	⅞" HEX NUT GR.5 A325
A18	55 GALLON DRUM - FILLED WITH SAND 700-715lbs.

TL-2 DOWNSTREAM ANCHOR TERMINAL (DAT) □ (PAYABLE BY EA.)

ITEM	QTY
A	2
B	2
C	2
D	1
E	1
F	1
G	1
H	1
I	2
A5	8
A6	18
A7	20
A8	4
A9	2
A10	4
A12	2

TL-2 SHORT RADIUS GUARDRAIL COMPLETE SYSTEM (INCL DAT) △ (ALL PAY ITEMS)

ITEM	TOTAL QTY
A	2
B	2
C	2
D	1
E	1
F	1
G	1
H	1
I	2
J	1
K	1
L	1
M	1
N	2
O	1
P	4
Q	5
R	2
S	2
T	6
U	6
V	6
W	2
X	1
A1	2
A2	2
A3	2
A4	2
A5	24
A6	48
A7	152
A8	12
A9	6
A10	72
A11	18
A12	10
A13	10
A14	12
A15	5
A16	10
A17	5
A18	6

GENERAL NOTES

1. FOR ADDITIONAL INSTALLATION INFORMATION AND GUIDANCE CONTACT: TEXAS DEPARTMENT OF TRANSPORTATION, (TXDOT'S DESIGN DIVISION), (512) 416-2678. THE EXACT POSITION OF MBGF SHALL BE SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER. THE SIGHT DISTANCE OF THE INSTALLATION WILL NEED TO BE VERIFIED WITH RESPECT TO THE SPECIFIC SITE PLACEMENT.
2. STEEL POSTS ARE NOT PERMITTED AT CRT OR BCT POST POSITIONS.
3. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 12 ½" OR 25 FOOT NOMINAL LENGTHS.
4. BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND TYPE A (1 ¾" O.D.) WASHER AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE ⅝" X 1 ¼" OR 2" LONG AT TRIPLE RAIL SPLICES WITH A DOUBLE RECESSED NUT (ASTM A563).
5. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
7. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A SLOPE RATE OF NOT MORE THAN 1V:10H.
8. IT IS NOT RECOMMENDED THAT GUARD FENCE BE PLACED IN THE VICINITY OF CURBS.
9. GUARDRAIL POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
10. SPECIAL RAIL FABRICATION WILL BE REQUIRED FOR THRIE BEAM RAIL RADIUS (ITEM J).
11. ALL MATERIAL AND WORK INVOLVED IS SUBSIDIARY TO SHORT RADIUS BID ITEM, INCLUDING, BUT NOT LIMITED TO FOUNDATIONS, GRADING, THRIE BEAM RAIL, SAND DRUMS, AND OTHER PARTS.
12. ALL CABLE ASSEMBLIES SHOULD BE TAUT AFTER INSTALLATION. WHEN CABLES ARE MANIPULATED BY HAND THE CABLES SHOULD NOT MOVE MORE THAN 1" IN ANY DIRECTION PERPENDICULAR TO THE CABLE.
13. THE DRUMS ARE EAGLE MODEL 1656 FILLED WITH 715 LB (+/-15) SAND WITH THE PLASTIC LEVER-LOCK) OR AN APPROVED EQUIVALENT. THE APPROXIMATE HEIGHT OF THE DRUM IS 37" (+/-).
14. WHEN THE SHORT RADIUS SYSTEM IS TERMINATED BY A DAT, REFER TO THE LATEST DAT STANDARD FOR INSTALLATION OF THE DAT SYSTEM. IF THE SYSTEM IS TERMINATED BY ANOTHER END TERMINAL SYSTEM, REFER TO THE CORRESPONDING END TERMINAL STANDARD.
* 15. WHEN THE PLANNED LOCATION OF POST (1) IS WITHIN THE RIGHT-OF-WAY AND WITHIN THE CLEAR ZONE OF THE DIRECTION OF THE OPPOSING TRAFFIC, AN APPROPRIATE CRASHWORTHY END TERMINAL SHALL BE INSTALLED IN PLACE OF THE DOWNSTREAM ANCHOR TERMINAL (DAT). THE PAYMENT OF THE COMPLETE SHORT RADIUS SYSTEM WITH A DAT AT THE TERMINUS WILL BE WITH BID ITEMS: 540 6016 DOWNSTREAM ANCHOR TERMINAL SECTION, AND 540 6046 TL-2 31" SHORT RADIUS (W/O DAT). THE PAYMENT OF THE SYSTEM TERMINATED BY A CRASHWORTHY END TERMINAL (IN LIEU OF THE DAT) WILL BE WITH BID ITEMS: 540 6046 TL-2 31" SHORT RADIUS (W/O DAT), AND 544 6001 GUARDRAIL END TREATMENT (INSTALL).
16. TESTED TO MASH WITH A 3:1 SLOPE OR SHALLOWER IS PREFERABLE IN THE LIMITS OF THE TOP AND BOTTOM OF THE SLOPE AS SHOWN IN THE PLAN VIEW. IF FIELD CONDITIONS REQUIRE A STEEPER SLOPE, THIS MAY BE ALLOWABLE UP TO A 2:1 SLOPE. CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE.

NOTE: SEE SHEET 1 OF 3.

SPECIAL APPLICATION NOTES.

1. THIS IS A MASH COMPLIANT TL-2 SHORT RADIUS GUARDRAIL SYSTEM 31 INCHES TALL. THE SYSTEM REQUIRES A MINIMUM PLACEMENT FOOTPRINT OF 35' ALONG THE PRIMARY ROAD AND 30' ALONG THE SECONDARY DRIVEWAY.
2. THE SYSTEM ALSO REQUIRES A MINIMUM 3' WIDE (WORK ZONE) DIRECTLY BEHIND THE GUARDRAIL SYSTEM, WITH A SLOPE AT 1V:10H, FROM THERE A 3:1 SLOPE IS RECOMMENDED. SEE SHEET 2 OF 3 FOR SLOPE DETAILS.
3. NOTE FOR INSTALLER: THE TWO (2) CRT POSTS ITEM (R), AT POST LOCATIONS 7 & 8.), WILL REQUIRE THE FOLLOWING FIELD ADJUSTMENT. USING A ¾" X 10" LONG SPADE BIT DRILL ONE (1) ADDITIONAL HOLE 7-⅞" DIRECTLY BELOW THE EXISTING TOP HOLE TO ACCOMMODATE THE HARDWARE FOR THE 22" LONG BLOCKOUT.

   OPTION FOR ADDITIONAL ¾" HOLE. THE 22" LONG BLOCKOUT (PDB01a) IS MANUFACTURED WITH TWO ¾" DRILLED HOLES FOR THE POST HARDWARE, THEREFORE THE BLOCKOUT CAN BE USED AS A TEMPLATE GUIDE FOR THE BOTTOM ¾" HOLE. AFTER INSTALLING THE CRT POST USE THE TOP HOLE TO MOUNT THE 22" LONG BLOCKOUT TO POST, USE THE BLOCKOUT'S PRE-DRILLED HOLE AS A GUIDE FOR THE BOTTOM ¾" HOLE.

(MASH TL-2 COMPLIANT)
TESTED TO MASH TL-2 WITH A 3:1 SLOPE

SHEET 3 OF 3

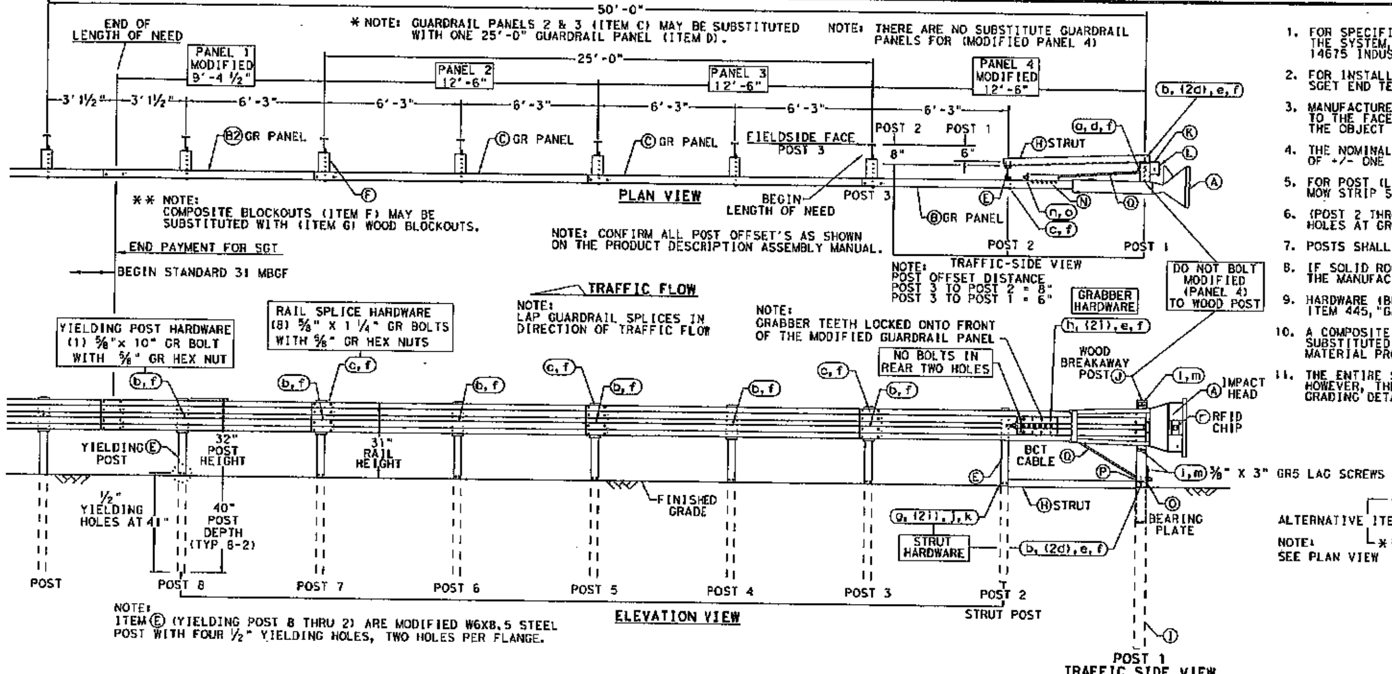
Texas Department of Transportation — Design Division Standard

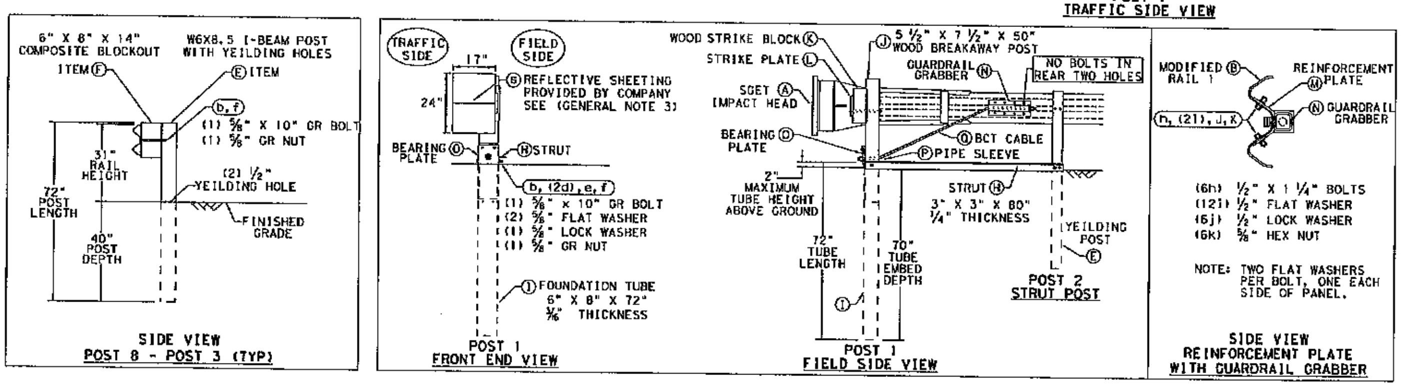
TL-2
SHORT RADIUS GUARDRAIL
MASH COMPLIANT

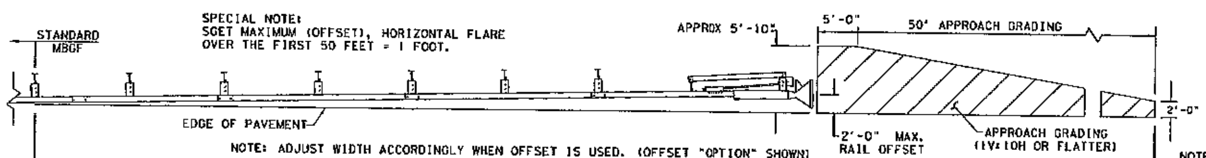
SRG(TL-2)-21

FILE: srg1221	TXDOT	CK: KM	DW: P	CK: CCL
© TXDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO. 98h

DATE:
FILE:







APPROACH GRADING AT GUARDRAIL END TREATMENTS

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510, 14675 INDUSTRIAL PARK RD, BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL.
3. MANUFACTURER WILL APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" TO THE FACE PLATE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. THE OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. THE NOMINAL HEIGHT OF THE GUARDRAIL BEAM IS 31 INCHES WITH A TOLERANCE OF +/- ONE INCH.
5. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
6. (POST 2 THROUGH POST 8) ARE MODIFIED STEEL-YIELDING POSTS WITH YIELDING HOLES AT GROUND LEVEL. THERE ARE NO SUBSTITUTE POSTS.
7. POSTS SHALL NOT BE SET IN CONCRETE.
8. IF SOLID ROCK IS ENCOUNTERED FOR ANY OF THE POSTS IN THE SYSTEM, CONTACT THE MANUFACTURER FOR SPECIFIC INSTALLATION GUIDANCE.
9. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
10. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS DMS-7210 REQUIREMENTS MAY BE SUBSTITUTED FOR AN APPROVED WOOD BLOCKOUT. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
11. THE ENTIRE SYSTEM MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY CURVE. HOWEVER, THE SYSTEM CAN BE OFFSET BY TWO FEET AS SHOWN ON THE APPROACH GRADING DETAIL TO HELP OFF-SET THE IMPACT HEAD FROM SHOULDER OF THE ROAD.

ALTERNATIVE ITEMS * / ** (E, F / G)
NOTE: SEE PLAN VIEW

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6X8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CB08
G	6	WOOD BLOCKOUT 6" X 8" X 14"	WB08
H	1	STRUT 3" X 3" X 80" x 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" x 3/16"	FND16
J	1	WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/4" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
		SMALL HARDWARE	
a	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	5/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	5/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563DH HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M

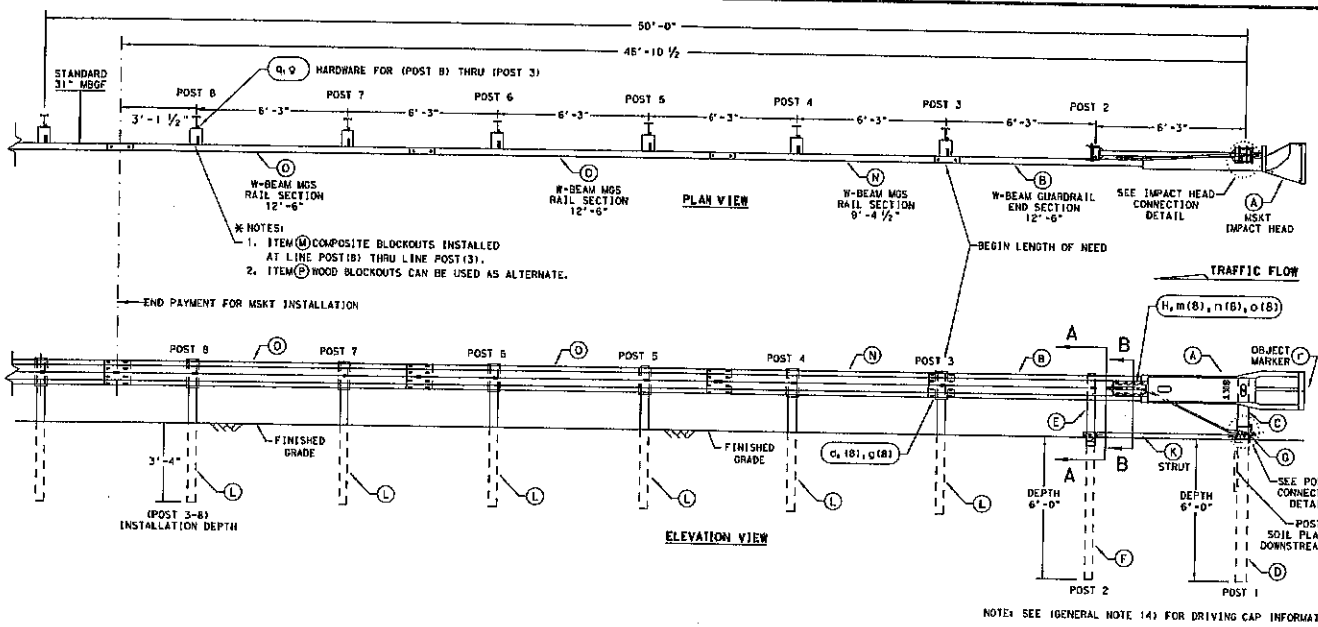
NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

Texas Department of Transportation — Design Division Standard

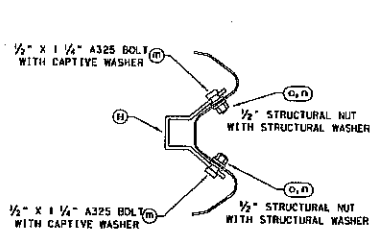
SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT(15)31-20

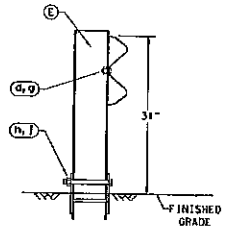
FILE: sgt1531 20.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST		COUNTY	SHEET NO. 981

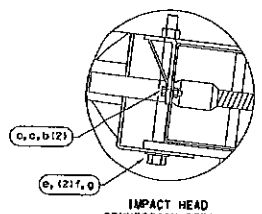
DATE:
FILE:

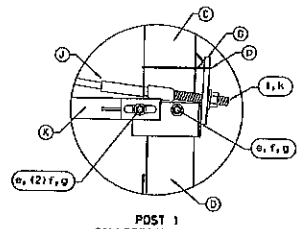


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.









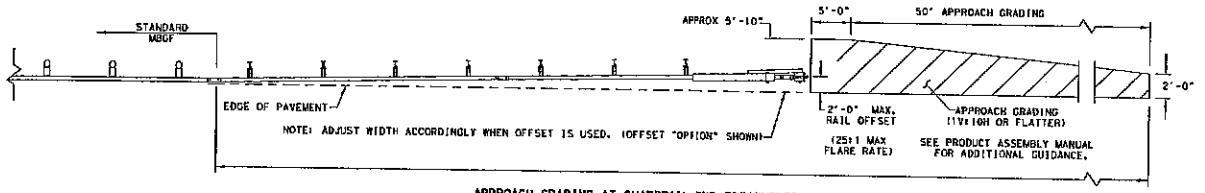
SEE NOTES: *

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

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435, 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE: MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION-0527117).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MON STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. SYSTEM SHOWN USEND STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
7. A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
8. IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
13. THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
14. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	M5300D
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X ½" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BOT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MST85
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 ½")	G12D25
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
SMALL HARDWARE			
a	2	⅞" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅞" WASHER	W0516
c	2	⅞" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 ⅛" O.D. x ⅝" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151



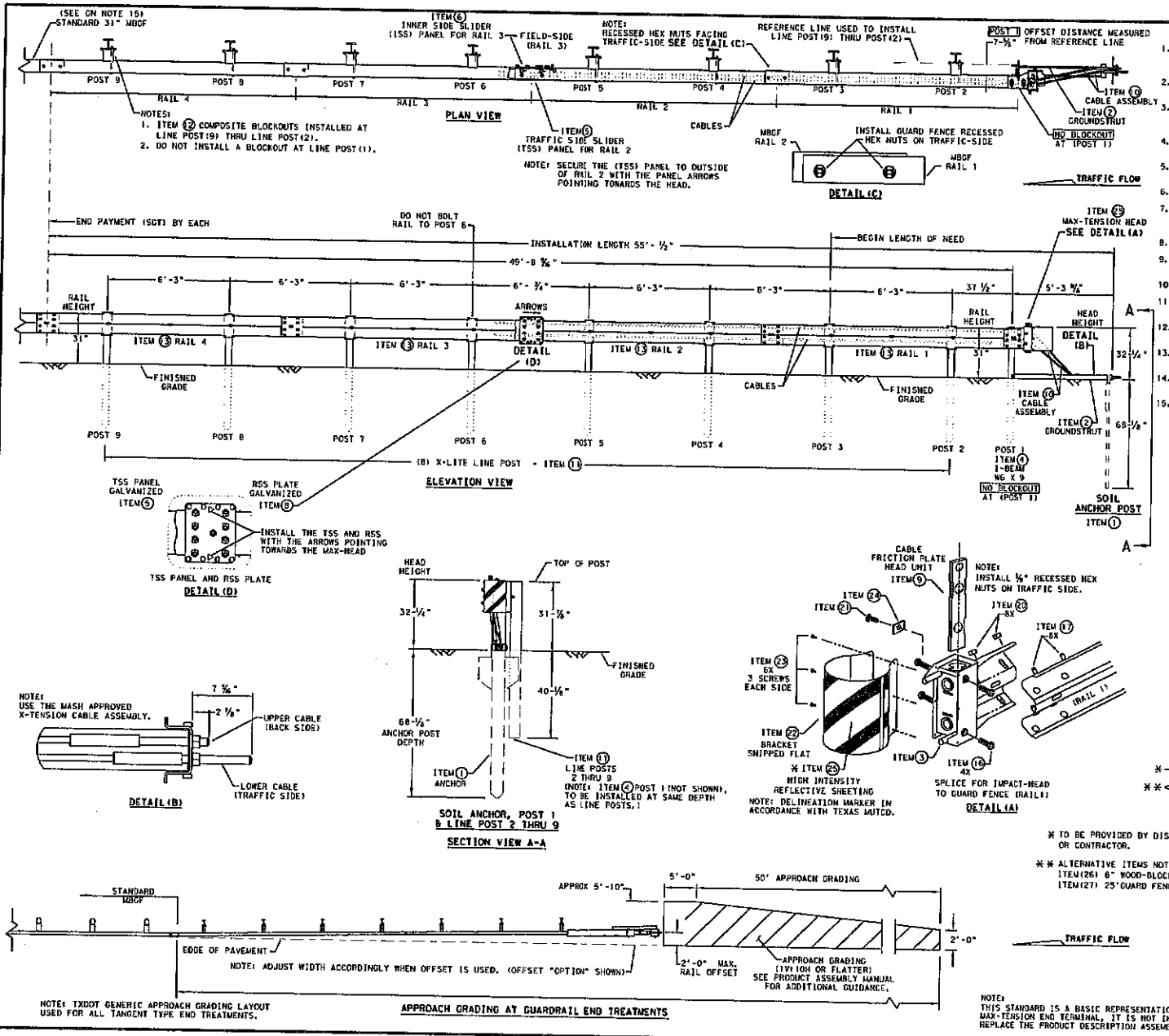
NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

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

Texas Department of Transportation — Design Division Standard

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

FILE: sgt12s31tb.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				98



GENERAL NOTES

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

ITEM #	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1612078-00	X-LITE LINE POST-GALVANIZED	8
12	8090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	⅝" X 7" THREAD BOLT HH (GR.5) GEOMET	1
16	BSI-2001885	½" X 3" ALL-THREAD BOLT HH (GR.5) GEOMET	4
17	4001115	⅝" X 1 ¼" GUARD FENCE BOLTS (GR.2) MGAL	48
18	2001840	⅝" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	⅝" WASHER F436 STRUCTURAL MGAL	2
20	4001116	⅝" RECESSED GUARD FENCE NUT (GR.2) MGAL	59
21	BSI-2001888	⅝" X 2" ALL THREAD BOLT (GR.5) GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	¼" X ¾" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FW703	1
25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB018	8
27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL, 8-SPACE, 12GA.	2
28	MANMAX Rev-(0)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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

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

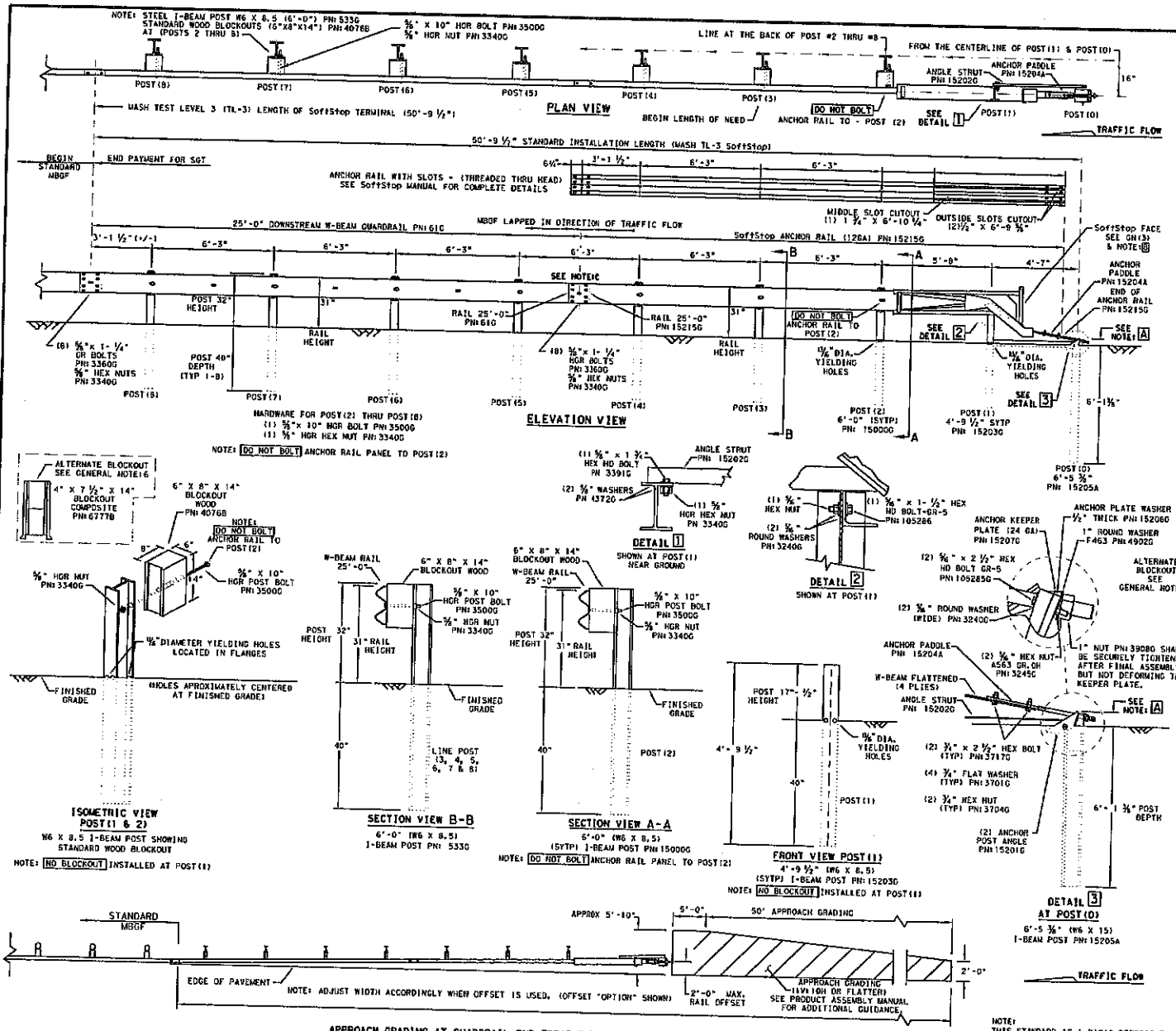
Texas Department of Transportation — Design Division Standard

MAX-TENSION END TERMINAL MASH - TL-3

SGT(11S)31-18

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				98K

DATE:
FILE:



DATE:
FILE:

GENERAL NOTES

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

NOTE: A	THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-¾" MIN. TO 4" MAX. ABOVE FINISHED GRADE.
NOTE: B	PART PN 58528 RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING) PART PN 58518 LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)
NOTE: C	W-BEAM SPLICE LOCATED BETWEEN LINE POST (4) AND LINE POST (5) GUARDRAIL PANEL 25'-0" PN 616 ANCHOR RAIL 25'-0" PN 15215G LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW.

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
616	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0")
15205A	1	POST #0 - ANCHOR POST (6'- 5 ⅜")
15203G	1	POST #1 - (SYTP) (4'- 9 ½")
15000G	1	POST #2 - (SYTP) (6'- 0")
5330	6	POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")
6777B	7	BLOCKOUT - COMPOSITE (4" x 7 ½" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (½" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
		HARDWARE
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR. DH
3717G	2	½" x 2 ½" HEX BOLT A325
3701G	4	¾" ROUND WASHER F436
3704G	2	¾" HEAVY HEX NUT A563 GR. DH
3360G	16	⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HDR
3340G	25	⅝" W-BEAM RAIL SPLICE NUTS HDR
3500G	7	⅝" x 10" HDR POST BOLT A307
3391G	1	⅝" x 1 ¾" HEX HD BOLT A325
4489G	1	⅝" x 9" HEX HD BOLT A325
4372G	4	⅝" WASHER F436
1052855G	2	¾" x 2 ½" HEX HD BOLT GR-5
1052860	1	⅝" x 1 ½" HEX HD BOLT GR-5
3240G	6	⅝" ROUND WASHER (WIDE)
3245G	3	⅝" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE: B

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

Texas Department of Transportation — Design Division Standard

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

FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP
© TxDOT: JULY 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO. 98