SHEET NO.

DESCRIPTION

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION,

SEPTEMBER 1, 2024 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, WILL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL - AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, OCTOBER 2023).

TITLE SHEET
SINDEX OF SHEETS

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

\_\_\_\_\_0

### PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT: STP () VRU

BELL COUNTY

#### IH-14

CSJ 023I-03-I56 PROJECT NET

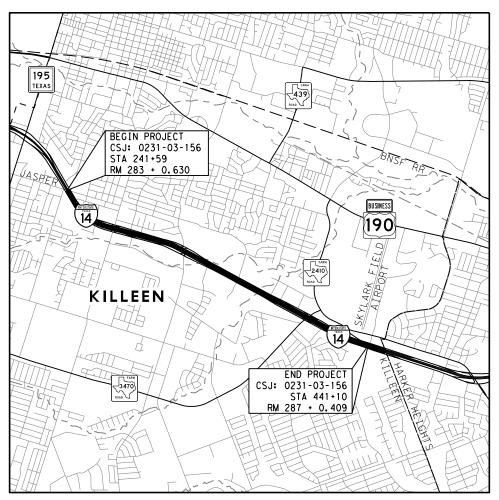
ROADWAY: FT= I8,644.00 MI.= 3.53I FT= I8,644.00 MI.= 3.53I

BRIDGE: FT= I307.00 MI.= 0.248 FT= I307.00 MI.= 0.248

TOTAL: FT= I9,95I.00 MI.= 3.779 FT= I9,95I.00 MI.= 3.779

CSJ 0231-03-156 LIMITS: FROM: JASPER DRIVE TO: ROSEWOOD DR

FOR THE CONSTRUCTION OF SAFETY CONSISTING OF INSTALL ILLUMINATION



EXCEPTIONS: NONE
EQUATIONS: NONE
RR CROSSINGS: NONE
SCALE: I" = 5280'(I.O MI)

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DESIGN	FED.RD. DIV.NO.	FEDER	HIGHWAY NO.	
GRAPHICS	6		STP ()VRU	IH-14
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	WACO	BELL	
CHECK	CONTROL	SECTION	JOB	] 1
	0231	03	156	i i

YEAR	ADT
2022	71272
2042	99781

ATTACHMENT NO. XX-XX TO SPECIAL AGREEMENT FOR CONSTRUCTION, MAINTENANCE AND OPERATION OF CONTINUOUS HIGHWAY ILLUMINATION SYSTEM WITHIN MUNICIPALITIES, DATED . THE CITY-STATE CONSTRUCTION, MAINTENANCE AND OPERATION RESPONSIBILITIES SHALL BE AS HERETOFORE AGREED TO, ACCEPTED, AND SPECIFIED IN THE AGREEMENT TO WHICH THESE PLANS ARE MADE A PART.

7	Texas Departmen	t of Transportation
	Recommended for Letting	
	Aug. 5-21-22	
	Area Engineer	
	Recommended for Letting	
	Director of Transportation & Development	Planning
	Approved for Letting	
	District Engineer	

7/11/2025

/+xdo+/pw\*online/+xdo+3/pa+rick.ialufka/d0785490/Ti+le\_Shee+

IODE

```
TRAFFIC CONTROL
           SEQUENCE OF CONSTRUCTION
           TRAFFIC CONTROL PLAN STANDARDS
* 8-19
           BC(1)-21 THRU BC(12)-21
* 20-24
           TCP(1-1)-18 THRU TCP(1-5)-18
* 25-26
           TCP(2-1)-18 THRU TCP(2-2)-18
* 27
           TCP(2-3)-23
* 28
           TCP (2-4) -18
* 29
           TCP (5-1) -18
* 30-34
          TCP(6-1)-12 THRU TCP(6-5)-12
           ROADWAY
           MBGF LAYOUT
  35-39
           ROADWAY DETAILS STANDARDS
           GF (31) - 19
* 41
           GF (31) MS-19
* 42
           GF (31) DAT-19
* 43
           RAIL-ADJ(A)-19
* 44
           SGT (11S) 31-18
* 45
           SGT (12S) 31-18
* 46
           SGT (15) 31-20
           <u>TRAFFIC</u>
           REMOVAL LAYOUT
  67-70
           EXISTING ELECTRICAL SCHEMATIC
  71-83
           SOIL BORING LOGS
           ILLUMINATION GENERAL NOTES & UTILITY LEGEND
  85-104 ILLUMINATION LAYOUT
          ELECTRICAL SERVICE DATA
  105
  106-110 PROPOSED ELECTRICAL SCHEMATIC
           TRAFFIC STANDARDS
* 111-117 ED(1)-25 THRU ED(7)-25
* 118
          ED(9)-25
* 119
          ED(11)-25
* 120-121 HMIF(1)-98 THRU HMIF(2)-98
* 122-124 RID(1)-20 THRU RID(3)-20
```

DESCRIPTION

\* 125-128 RIP(1)-19 THRU RIP(4)-19

D & OM(VIA)-25

**ENVIRONMENTAL** 

\* 135

\* 129-134 D & OM(1)-25 THRU D &OM(6)-25

\* 139-148 TA-BMP (WACO DISTRICT STANDARD)
\* 149-150 EC(1)-16 THRU EC(2)-16)

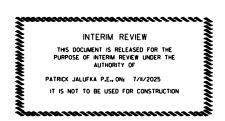
136-137 STORMWATER POLLUTION PREVENTION PLAN (SWP3)

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

GENERAL
TITLE SHEET
INDEX OF SHEETS
GENERAL NOTES
ESTIMATE & QUANTITY
CONSOLIDATED SUMMARIES

5-6

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



## PRELIMINARY NOT FOR CONSTRUCTION



### INDEX OF SHEETS

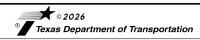
SHEET I OF I

				211	ו בו	I UF I
ANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	-	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		2

ď	_	5	
	П	)	

			SUMM	IARY OF ROAD	WAY ITEMS				
	104	432	540	540	540	542	544	544	658
	7005	7013	7002	7015	7028	7001	7001	7003	7018
MBGF LAYOUT SHEET NO.	REMOVING CONCRETE ( MOW STRIP)	RIPRAP (MOW STRIP) (4 IN)	MTL W-BEAM GD FEN (STEEL POST)	DOWNSTREAM ANCHOR TERMINAL SECTION	MTL BM GD FEN TRANS (31"-28")	REMOVE METAL BEAM GUARD FENCE	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)	INSTL DE ASSM (D-SW)SZ 1 (BRF)GF
	LF	CY	LF	EA	EA	LF	EA	EA	EA
1 OF 5		15	175		1	50	1	1	4
2 OF 5	53	10	75				1	1	3
3 OF 5		11	100	1			1		3
4 OF 5		12	125	1			1		3
5 OF 5	106	10	100				1	1	3
PROJECT TOTAL:	159	58	575	2	1	50	5	3	16

	SUN	MMARY OF ILLUM	INATION REMOV	AL ITEMS		
	610	610	624	628	690	690
	7006	7009	7013	7002	7144	7150
ILLUMINATION REMOVAL LAYOUT SHEET NO.	REMOVE RD IL ASM (BRIDGE MOUNT)	REMOVE RD IL ASM (TRANS-BASE)	REMOVE GROUND BOX	REMOVE ELECTRICAL SERVICES	REMOVE ABOVE - GROUND CONDUIT	REMOVE CONDUCTOR
	EA	EA	EA	EA	LF	LF
1 OF 20						
2 OF 20		3	2			2046
3 OF 20				1		
4 OF 20	1	2	3		261	5573
5 OF 20		2				798
6 OF 20				1		87
7 OF 20		1				1575
8 OF 20		4	4	1		9016
9 OF 20		4	3			5676
10 OF 20		4	4			5262
11 OF 20		3				3162
12 OF 20						
13 OF 20						
14 OF 20			1	1		624
15 OF 20		6				4524
16 OF 20		5		1		2817
17 OF 20		3	2			4623
18 OF 20			3	1		2286
19 OF 20						
20 OF 20						
	•			•		
PROJECT TOTAL:	1	37	22	6	261	48069

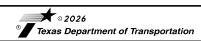


### CONSOLIDATED SUMMARIES

				SHE	EET	I OF 2	
HANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY	
	6	0231	03	156		IH-14	_
	STATE	DIST		COUNTY		SHEET NO.	
	TEXAS	WACO		BELL		5	

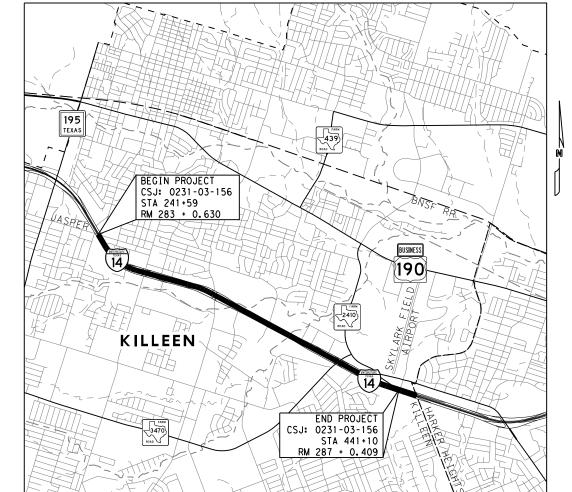
						SUMMARY (	OF ILLUMINAT	ION ITEMS								
	416	416	432	610	618	618	618	624	624	628	690	690	6013	6071	6083	6083
	7035	7040	7001	7124	7036	7061	7090	7014	7015	7049	7218	7220	7006	7003	7001	7002
ILLUMINATION LAYOUT SHEET NO.	DRILL SHAFT (HIGH MAST POLE) (48 IN)	IN)	RIPRAP (CONC) (4 IN)	40T-8 (250W EQ) LED	(SCH 40) (3")	CONDT (PVC) (SCH 80) (3") (BORE)	(PREPARE)	LID)	(W/SECURE LID)	060 (NS) SS (E) SP (U)	REPLACE FUSE	FUSE HOLDER	(PREPARE)	ALUMINUM ELECTRICAL COND (#6 XHHW)	LED HI MST(100 FT)(80MPH )(6FIXT)(T Y B)	) (6F I X T ) Y B) (SHL
	LF	LF	CY	EA	LF	LF	LF	EA	EA	EA	EA	EA	EA	LF	EA	EA
1 OF 20																
2 OF 20	30		4.66		714	243		6		1				3887		2
3 OF 20	18		2.33		1072	225		5	3					5195		1
4 OF 20	50		4.66		416		637	3	7					2196	2	
5 OF 20	23		2.33		1407			4						4383	1	
6 OF 20	45		4.66		2145	226		7	5	2			1	8111	2	
7 OF 20	18		2.33	1	1448	54	525	5	1					6081	1	
8 OF 20	45		4.66		398	71	1136	4	8	1				5605	2	
9 OF 20	25		2.33		1283	210		5						4921	1	
10 OF 20	35		4.66		280			2						840	2	
11 OF 20	25		2.33	2	1896		978	8	6	1				10681	1	
12 OF 20	48		4.66		1124			3						3372	2	
13 OF 20	25	20	2.33	2	851			4		1				2775	1	
14 OF 20	43		4.66		1193			7		1				7152	2	
15 OF 20	15		2.33		1910			5	3				1	5979	1	
16 OF 20	50		4.66		732			3	2	1			1	2196	2	
17 OF 20	18		2.33		1840			7						5913	1	
18 OF 20	18		2.33		820			5		2				4344	1	
19 OF 20																
20 OF 20																
* AS DIRECTED											20	10				
PROJECT TOTAL:	531	20	58	5	19529	1029	3276	83	35	10	20	10	3	83631	22	3

SUMMARY OF EROSION CONTROL ITEMS								
	164	164	168	506	506	506		
	7012	7015	7001	7039	7040	7041		
LOCATION	DRILL SEED (PERM_URB AN_CLAY)	DRILL SEED (TEMP_WAR M_COOL)	VEGETATIVE WATERING	TEMP SDMT CONT FENCE (INSTALL)	TEMP SDMT CONT FENCE (INLET PROTECTION)	TEMP SDMT CONT FENCE (REMOVE)		
	SY	SY	TGL	LF	LF	LF		
AS DIRECTED	2200	2200	36	2800	200	3000		
	-				-	-		
PROJECT TOTAL:	2200	2200	36	2800	200	3000		



### CONSOLIDATED SUMMARIES

				SHE	ET	2 OF 2	
ANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY	
	6	0231	03	156		IH-14	
	STATE	DIST		COUNTY		SHEET NO	
	TFXAS	WACO		RFLI		6	1



SCALE: 1" = 5280'

VICINITY MAP

- I. SIGNS G20-I WITH PLACE OR G20-5T, G20-6, G20-2a, G20-2b, CW20-ID, R20-3, R20-5, G20-9T AND R20-5 PLAQUE WILL BE REQUIRED AT PROJECT LIMITS.
- 2. CW20-ID AND G20-2g WILL BE REQUIRED AT ALL CROSSROADS.
- 3. G20-Ia WILL BE REQUIRED AT ALL MAJOR CROSSROADS.

	SIG	NAGE LEGEND
G20-I W/ PLAQUE	48X26	BEGIN ROAD WORK NEXT X MILES
OR G20-5T	48X24	BEGIN ROAD WORK NEXT X MILES
G20-6	48X30	NAME, ADDRESS, CITY, STATE, CONTRACTOR
G20-9T	36X30	BEGIN WORK ZONE
G20-2b	36XI8	END WORK ZONE
R20-3	48X42	OBEY WARNING SIGNS STATE LAW
G20-la	72X36	ROAD WORK NEXT X MILES
CW20-ID	48X48	ROAD WORK AHEAD
R20-5	36X36	TRAFFIC FINES DOUBLE
R20-5	36XI8	WHEN WORKERS ARE PRESENT
PLAQUE	20110	WHEN WURKERS ARE FRESENT
G20-2a	48X24	END ROAD WORK

#### NOTES:

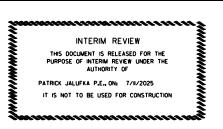
- I. ALL TRAFFIC CONTROL DEVICES WILL CONFORM WITH THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" (TMUTCD), AND WILL BE MAINTAINED AS DIRECTED. ADDITIONAL GUIDELINES FOR TRAFFIC CONTROL DEVICES MAY BE FOUND IN THE TMUTCD.
- 2. FOR CHANNELING DEVICE PLACEMENT AND SPACING FOR ALL PHASES, REFER TO THE TCP STANDARDS.

#### GENERAL

- A. INSTALL ALL SIGNS, BARRICADES AND TRAFFIC CONTROL DEVICES AS SHOWN AND IN ACCORDANCE WITH THE STANDARD BC SHEETS AND AS DIRECTED.
- B. ADDITIONAL SIGNS, BARRICADES OR TRAFFIC CONTROL DEVICES OTHER THAN THOSE SPECIFIED MAY BE REQUIRED FOR THE SAFE MOVEMENT OF TRAFFIC THROUGH THE PROJECT. PAYMENT FOR ALL SUCH SIGNS, BARRICADES OR TRAFFIC CONTROL DEVICES WILL BE CONSIDERED SUBSIDIARY TO THE ITEM "BARRICADES, SIGNS AND TRAFFIC HANDLING".
- C. WORK SITES SHOULD BE CAREFULLY MONITORED TO ENSURE THAT TRAFFIC CONTROL MEASURES ARE OPERATING EFFECTIVELY AND THAT ALL DEVICES USED ARE CLEARLY VISIBLE, CLEAN AND IN GOOD REPAIR.
- D. THE CONTRACTOR WILL PROVIDE SAFE ACCESS TO AND FROM ALL PRIVATE PROPERTY AT ALL TIMES AND IN ALL WEATHER CONDITIONS.
- E. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT A DETAILED SCHEDULE OF WORK PRIOR TO THE BEGINNING OF CONSTRUCTION WHICH GENERALLY CONFORMS TO THE SEQUENCE SHOWN ON THE TCP SEQUENCE OF OPERATION BELOW.
- F. COMPLETE ALL WORK ON PROJECT AS SHOWN ON THE VARIOUS PLAN SHEETS AND IN COMPLIANCE WITH THE GENERAL NOTES OF THIS CONTRACT.
- G. ANY REQUEST TO ALTER THE SEQUENCE OF OPERATION OR TRAFFIC CONTROL PLAN WILL BE SUBMITTED TO THE ENGINEER FOR HIS WRITTEN

#### SEQUENCE OF CONSTRUCTION

- A. LIMIT THE TIME THAT AN EXISTING SERVICE IS SHUT DOWN TO 10 WORKING DAYS. HAVE THE NEW SERVICE UP AND OPERATIONAL WITHIN THOSE IO WORKING DAYS.
- THE CONTRACTOR WILL BE REQUIRED TO SUBMIT A DETAILED SCHEDULE OF WORK TO THE AREA ENGINEER PRIOR TO THE BEGINNING OF CONSTRUCTION, WHICH GENERALLY CONFORMS TO THE FOLLOWING SEQUENCE:
  - SET PROJECT BARRICADES.
  - REMOVE AND INSTALL METAL BEAM GUARD FENCE.
  - INSTALL PROPOSED CONDUIT AND GROUND BOXES.
  - INSTALL HIGH MAST FOUNDATIONS AND SET POLES.
  - INSTALL NEW ELECTRICAL SERVICES.
  - DISCONNECT EXISTING SERVICE AND REMOVE REQUIRED CONDUIT AND CONDUCTORS.
  - PULL NEW CONDUCTORS.
  - CONNECT NEW ELECTRICAL SERVICE TO POWER.
  - COMPLETE ALL OTHER WORK AS DIRECTED.
  - 9. FINAL CLEAN-UP.



#### PRELIMINARY NOT FOR CONSTRUCTION



#### SEQUENCE OF **CONSTRUCTION**

CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WACO		BELL	7

#### 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:

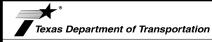
- 1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance 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

- Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.
- 2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

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

SHEET 1 OF 12

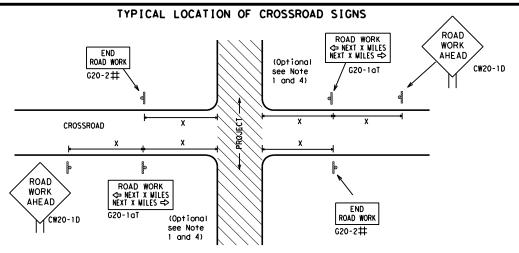


Standard

### BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

			•				
.E:	bc-21.dgn	DN: T:	×D0T	ck: TxDOT	DW:	TxDOT	ck: TxDOT
TxDOT	November 2002	CONT	SECT	JOB		HI	GHWAY
-03	REVISIONS 7-13	0231	03	156		IΗ	I-14
-07	8-14	DIST		COUNTY			SHEET NO.
-10	5-21	WACO		BELL			8



- $\sharp$  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.
- 2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK" (G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
- 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.
- 5. 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.

#### BEGIN T-INTERSECTION WORK ZONE ★ ★ G20-9TP ★ ★ R20-5T FINES DOUBL X R20-5aTP MORKERS ARE PRESENT ROAD WORK ← NEXT X WILES X X G20-2bT WORK ZONE G20-1bTI INTERSECTED 1000'-1500' - Hwy 1 Block - City 1000'-1500' - Hwy 1 Block - City ROADWAY $\Rightarrow$ ROAD WORK G20-16TR NEXT X MILES => WORK ZONE G20-2bT \* \* Limit BEGIN G20-5T \* \* G20-9TP ZONE TRAFFI G20-6T \* \* R20-5T FINES DOUBLE ★ × R20-5gTP BORKERS ARE PRESENT ROAD WORK G20-2

#### CSJ LIMITS AT T-INTERSECTION

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

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

#### SIZE

onventional

48" x 48"

36" × 36'

48" x 48"

### Expressway

Freeway

48" × 48'

48" x 48'

48" × 48'

/	Posted Speed	Sign∆ Spacing "X"
	MPH	Feet (Apprx.
	30	120
	35	160
	40	240
1	45	320
	50	400
	55	500 <sup>2</sup>
	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>
_	*	* 3

SPACING

\* 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.

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

#### GENERAL NOTES

Sign

Number

or Series

CW20' CW21

CW22

CW23

CW25

CW14

CW1, CW2,

CW7. CW8.

CW9, CW11

CW3, CW4,

CW5, CW6,

CW10, CW12

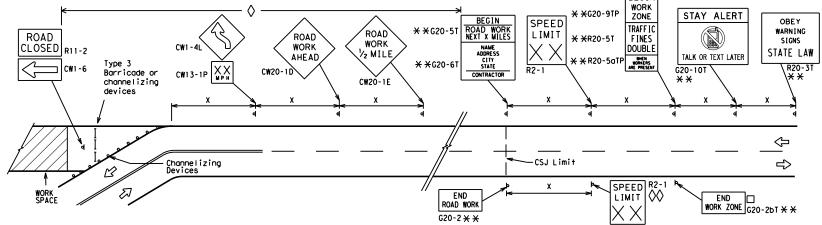
CW8-3,

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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS	SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS
ROAD WORK AREA AHEAD CW20-1D CW1-4R XX CW13-1P	** ** ** ** ** ** ** ** ** ** ** ** **
←	\$\ldots \ldots \
Channelizing Devices	WORK SPACE    CSJ Limit   PEND   SPEED   SPEED
When extended distances occur between minimal work spaces, the Engineer/In "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas within the project limits. See the applicable TCP sheets for exact location	to remind drivers they are still G20-2 ** location NOTES

the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizina devices.

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



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.

- The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2b1 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
- Contractor will install a regulatory speed limit sign at the end of the work zone.

	LEGEND				
ı—ı Туре 3 Barricade					
000	OO Channelizing Devices				
4	Sign				
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.				

SHEET 2 OF 12



Traffic Safety

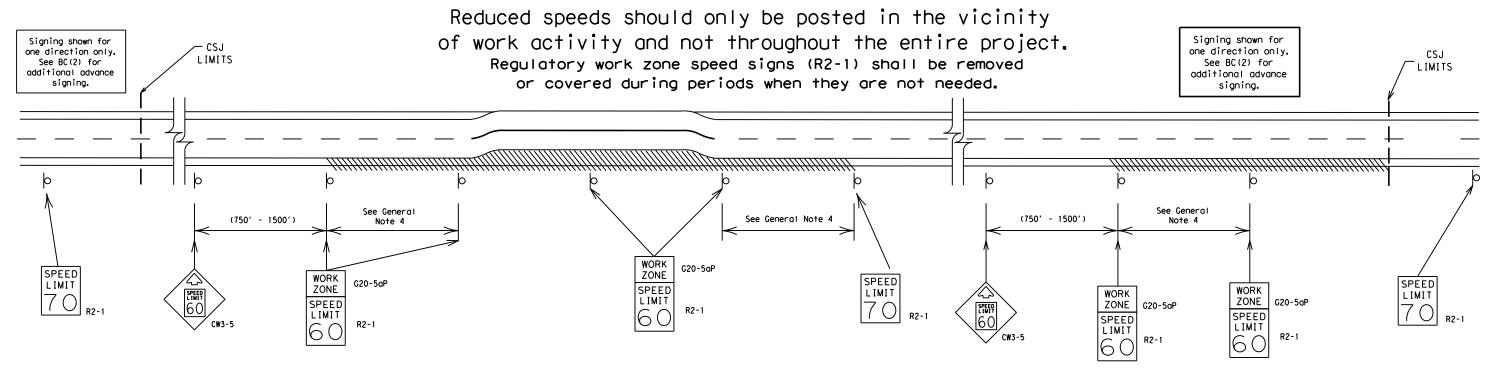
#### BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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-07	8-14	DIST		COUNTY			SHEET NO.
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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.



#### GUIDANCE FOR USE:

#### LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

#### SHORT TERM WORK ZONE SPEED LIMITS

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

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

#### GENERAL NOTES

- 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.
- 3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- 4. Frequency of work zone speed limit signs should be:

40 mph and greater 0.2 to 2 miles

35 mph and less 0.2 to 1 mile

- 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.
- 7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- 8. Techniques that may help reduce traffic speeds include but are not limited to:
  A. Law enforcement.
  - B. Flagger stationed next to sign.
  - C. Portable changeable message sign (PCMS).
  - D. Low-power (drone) radar transmitter.
  - E. Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only.
   Work Zone Speed Limits should only be posted as approved for each project.
- 10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

SHEET 3 OF 12



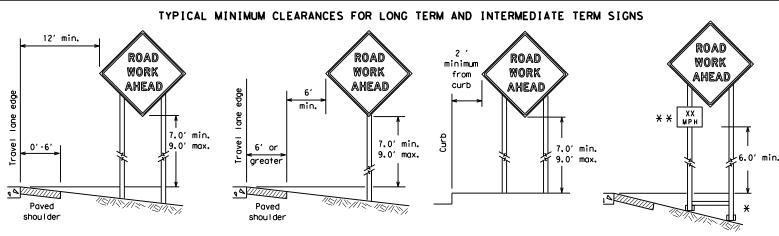
Traffic Safety Division Standard

### BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

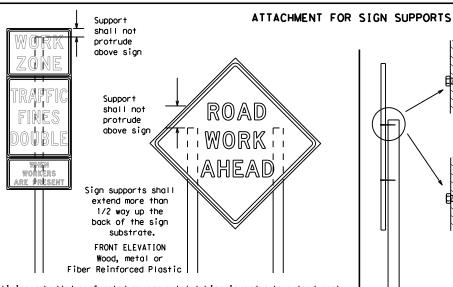
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9-07	-			COUNTY			SHEET NO.
7-13	3-21	WACO		BELL			10

97



\* 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.

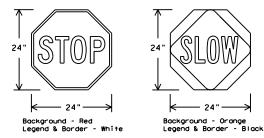


SIDE ELEVATION Wood

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

#### STOP/SLOW PADDLES

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



SHEETING RE	QUIREMENT	S (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

Attachment to wooden supports

will be by bolts and nuts

or screws. Use TxDOT's or

manufacturer's recommended

procedures for attaching sign

substrates to other types of

sign supports

Nails shall NOT

be allowed.

Each sign

shall be attached

directly to the sign

support. Multiple

signs shall not be

joined or spliced by

any means. Wood

supports shall not be

extended or repaired

by splicing or

other means.

- 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.

#### 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.

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

- The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
- a. Long-term stationary work that occupies a location more than 3 days.
- 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 plagues 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

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

#### SIGN LETTERS

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

#### REMOVING OR COVERING

- 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

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used. 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

1. Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face. SHEET 4 OF 12



#### BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

Traffic Safety Division Standard

BC(4)-21

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Welds to start on

opposite sides going in opposite directions. Minimum

weld, do not

back fill puddle.

weld starts here

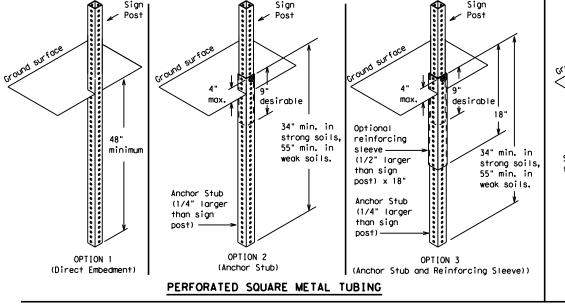
¥ Maximum 12 sq. ft. of \* Maximum wood 21 sq. ft. of sign face sign face 2x6 4×4 block block 72" Length of skids may Top be increased for wood additional stability. for sign Top 2x4 x 40" height 2x4 brace requirement for sign height 3/8" bolts w/nuts requiremen or 3/8" x 3 1/2" (min.) lag screws Front 4x4 block 40" 4x4 block 36" Side Front SKID MOUNTED WOOD SIGN SUPPORTS \* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

-2" x 2"

12 ga. upright

2"

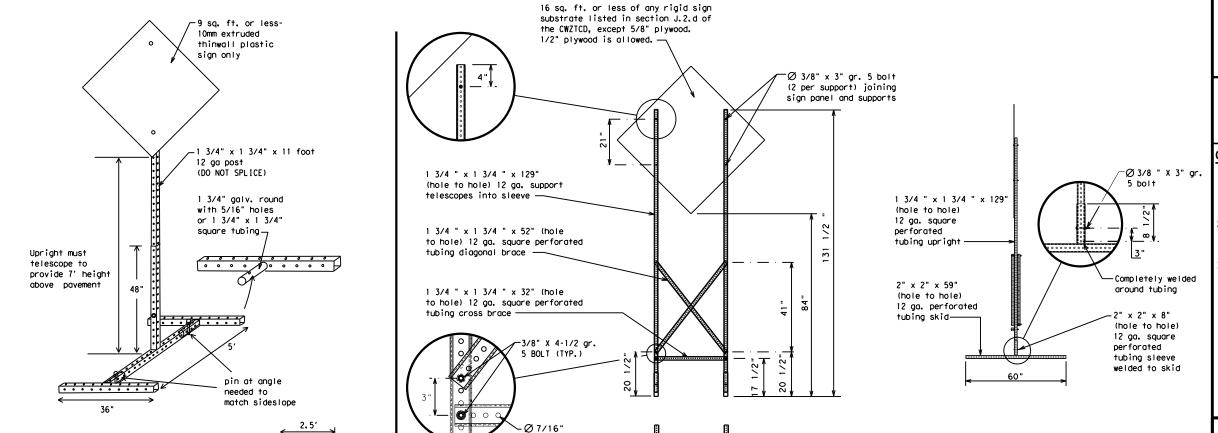
SINGLE LEG BASE



# Post See the CWZTCD for embedment. WING CHANNEL

#### 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.



#### **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
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CW7TCD 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



Traffic Safety Division Standard

#### BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC (5) -21

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9-07 8-1		DIST	r		COUNTY		5	SHEET NO.
7-13 5-2	?1	WAC	o		BELL			12

#### SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS \* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

32′

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

#### PORTABLE CHANGEABLE MESSAGE SIGNS

- 1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- 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
- 4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED," Do not use the term "RAMP,"
- 5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- 7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
- 8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
- 9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- 10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
- 11. Do not use the word "Danger" in message.
- 12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- 13. Do not display messages that scroll horizontally or vertically across the face of the sign.
- 14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
- 15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
- 16. Each line of text should be centered on the message board rather than left or right justified.
- 17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	мі
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	SL IP
Emergency Vehicle		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		Traffic	TRAF
Hazardous Material		Travelers	TRVLRS
High-Occupancy	HOV	Tuesday	TUES
Vehicle		Time Minutes	TIME MIN
Highway	HWY	Upper Level	UPR LEVEL
Hour (s)	HR, HRS	Vehicles (s)	VEH, VEHS
Information	INFO	Warning	WARN
It is	ITS	Wednesday	WED
Junction	JCT	Weight Limit	WT LIMIT
Left	LFT	West	W
Left Lane	LFT LN	Westbound	(route) W
Lane Closed	LN CLOSED	Wet Pavement	WET PVMT
Lower Level	LWR LEVEL	Will Not	WONT
Maintenance	MAINT		
MO IIII ELIULICE	Mrs 11/1		

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

#### RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

#### Phase 1: Condition Lists

Road/Lane/Ramp	o Closure List	Other Cond	ition List
FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT
XXXXXXX			

#### Phase 2: Possible Component Lists

mp Closure List	Other Cond	lition List	Action to Take/E Lis		Location List	Warning List	* * Advance Notice List
FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT	MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT	DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX- XX X PM-X AM
RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE	USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT	STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT	TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT	WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN	EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES	REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *	USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
* LANES SHIFT in Pho	se 1 must be used with	STAY IN LANE in Phase	STAY IN LANE *		* * Sec	e Application Guidelin	es Note 6.

#### APPLICATION GUIDELINES

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

#### WORDING ALTERNATIVES

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

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

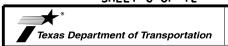
#### FULL MATRIX PCMS SIGNS

BLVD

CLOSED

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

#### SHEET 6 OF 12



Traffic Safety Division Standard

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

BC(6)-21

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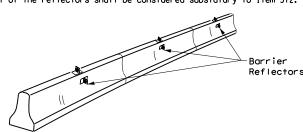
Warning reflector may be round

or square. Must have a yellow

reflective surface area of at least

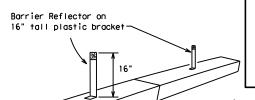
30 square inches

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



#### CONCRETE TRAFFIC BARRIER (CTB)

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

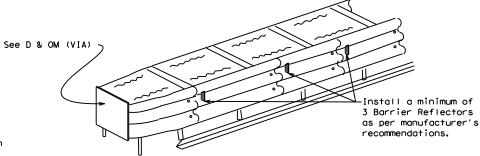


#### LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

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

#### LOW PROFILE CONCRETE BARRIER (LPCB)



#### DELINEATION OF END TREATMENTS

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

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

#### BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

#### WARNING LIGHTS

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

#### WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

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

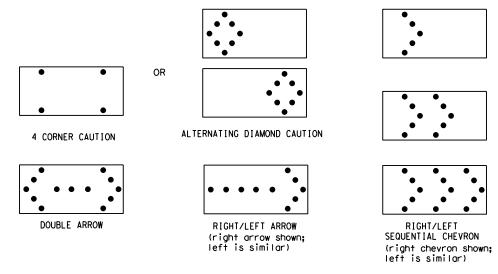
#### WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

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

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

- 1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.

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



- 5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- 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.

  9. The sequential arrow display is NOT ALLOWED.

  10. The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
- 11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
  12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
  13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility,
- flash rate and dimming requirements on this sheet for the same size arrow.
- 14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

	REQUIREMENTS									
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE							
В	30 × 60	13	3/4 mile							
С	48 × 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.
- 3. Refer to the CWZTCD for a list of approved TMAs.
- 4. TMAs are required on freeways unless otherwise noted in the plans.
- 5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
- 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.



Traffic Safety Division Standard

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

BC(7)-21

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#### GENERAL NOTES

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- 2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
- 3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
- 4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWTTCD).
- 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.
- 4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
- 5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
- 6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
- 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.
- to be neld down while separating the drum body from the base.

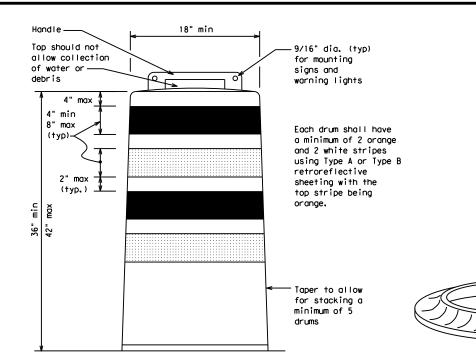
  8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- 9. Drum body shall have a maximum unballasted weight of 11 lbs.
- 10. Drum and base shall be marked with manufacturer's name and model number.

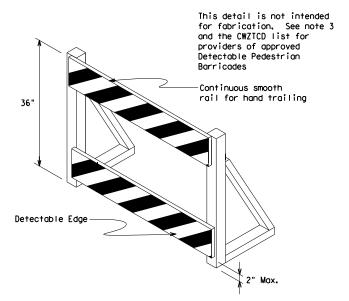
#### RETROREFLECTIVE SHEETING

- 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

- 1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
- 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.
- 6. Ballast shall not be placed on top of drums.
- 7. Adhesives may be used to secure base of drums to pavement.





#### DETECTABLE PEDESTRIAN BARRICADES

- When existing pedestrian facilities are disrupted, closed, or relocated in a TIC 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.
- 4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
- 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

See Ballast



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.
- 2. Chevrons and other work zone signs with an orange background shall be manufactured with Type  $B_{FL}$  or Type  $C_{FL}$  Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
- Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
- 4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
- 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.
- 7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
- 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

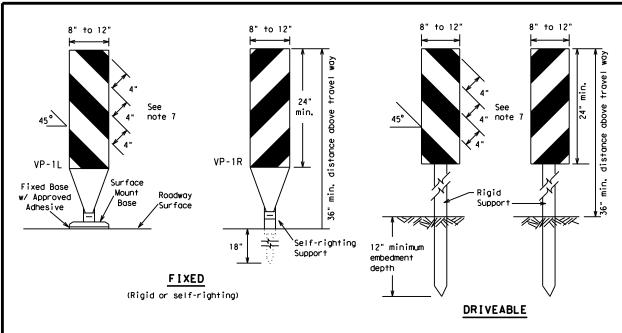


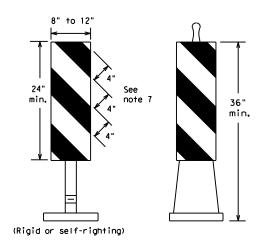
Traffic Safety Division Standard

### BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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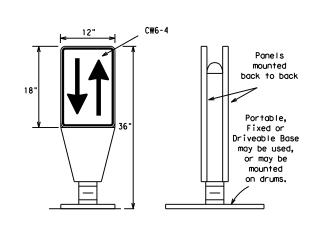




PORTABLE

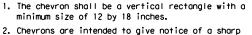
- 1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- 2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
- 3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
- 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.
- 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.

#### VERTICAL PANELS (VPs)



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

#### OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

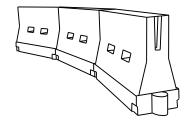


- Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
- 3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
- 4. To be effective, the chevron should be visible for at least 500 feet.
- 5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B<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

#### **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.
- 3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- 4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- 6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
- 7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



#### LONGITUDINAL CHANNELIZING DEVICES (LCD)

36'

Fixed Base w/ Approved Adhesive

(Driveable Base, or Flexible

Support can be used)

- 1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
- 2. LCDs may be used instead of a line of cones or drums.
- 3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- 4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- 5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- 6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

#### WATER BALLASTED SYSTEMS USED AS BARRIERS

- 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.
- 3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- 4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
- When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

Posted Speed	Formula	D	Minimur esirab er Len **	le	Suggested Maximum Spacing of Channelizing Devices			
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	2	150′	165′	1801	30'	60′		
35	$L = \frac{WS^2}{60}$	2051	225′	245'	35′	70′		
40	60	265′	295′	320′	40'	80′		
45		450′	495′	540′	45′	90′		
50		500′	550′	6001	50°	100′		
55	L=WS	550′	6051	660′	55 <i>°</i>	110′		
60		600'	660′	7201	60′	120′		
65		650′	715′	7801	65′	130′		
70		700′	770′	840′	70′	140′		
75		750′	8251	900'	75′	150′		
80		800′	880′	960′	80′	160′		

\*\*X 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



Traffic Safety Division Standard

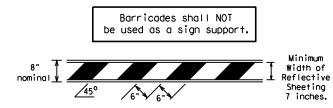
### BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

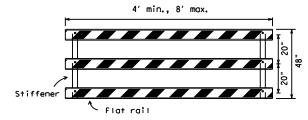
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C) TxDOT	November 2002	CONT	SECT	JOB		HIC	GHWAY
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9-07 8-14		DIST		COUNTY		,	SHEET NO.
7-13	5-21	WACO		BELL			16

#### TYPE 3 BARRICADES

- 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.
- 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.
- 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.
- 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".
- Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
- 7. Warning lights shall NOT be installed on barricades.
- Note that the content of the cont
- Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

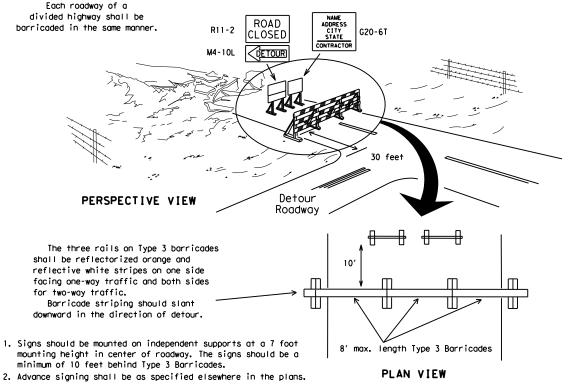


#### TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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



TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION

1. Where positive redirectional capability is provided, drums may be omitted. 2. Plastic construction fencing may be used with drums for safety as required in the plans. 3. Vertical Panels on flexible support may be substituted for drums when the Typical shoulder width is less than 4 feet. Plastic Drum 4. When the shoulder width is greater than 12 feet. steady-burn lights PERSPECTIVE VIEW may be omitted if drums are used. 5. Drums must extend the length These drums are not required of the culvert widening. on one-way roadway LEGEND Plastic drum Plastic drum with steady burn light um of two drums s locross the work or yellow warning reflector Steady burn warning light or yellow warning reflector Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums)

3"-4"

4" min. orange

2" min.

4" min. white

4" min. orange

2" min.

4" min. white

4" min. orange

4" min. orange

4" min. orange

2" min.

4" min. white

6" min. 2" min. 4" min.

PLAN VIEW

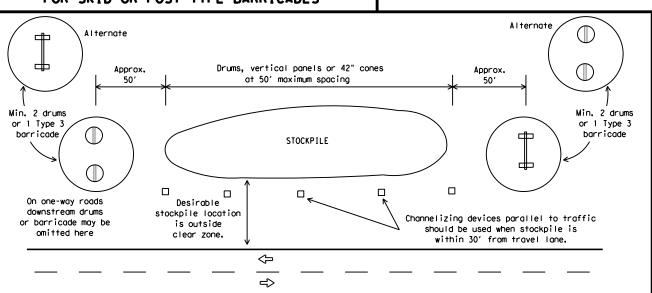
2" max. 3" min. 2" to 6" 3" min.

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

Two-Piece cones

One-Piece cones

Tubular Marker



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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.

- Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
- 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.
- 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.
- 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
- Cones or tubular markers used on each project should be of the same size and shape.

SHEET 10 OF 12



Traffic Safety Division Standard

### BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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7-13	5-21	WACO		BELL			17

#### 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).
- 6. When standard povement 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.

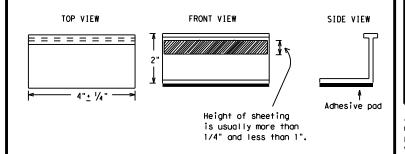
#### MAINTAINING WORK ZONE PAVEMENT MARKINGS

- 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.
- 3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
- 4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification 14pm 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.
- 7. 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.
- 10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

#### Temporary Flexible-Reflective Roadway Marker Tabs



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

- 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.
  - A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
  - B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
- 3. Small design variances may be noted between tab manufacturers.
- 4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

#### RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

- 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 SPECIFICATION	NS
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



Traffic Safety Division Standard

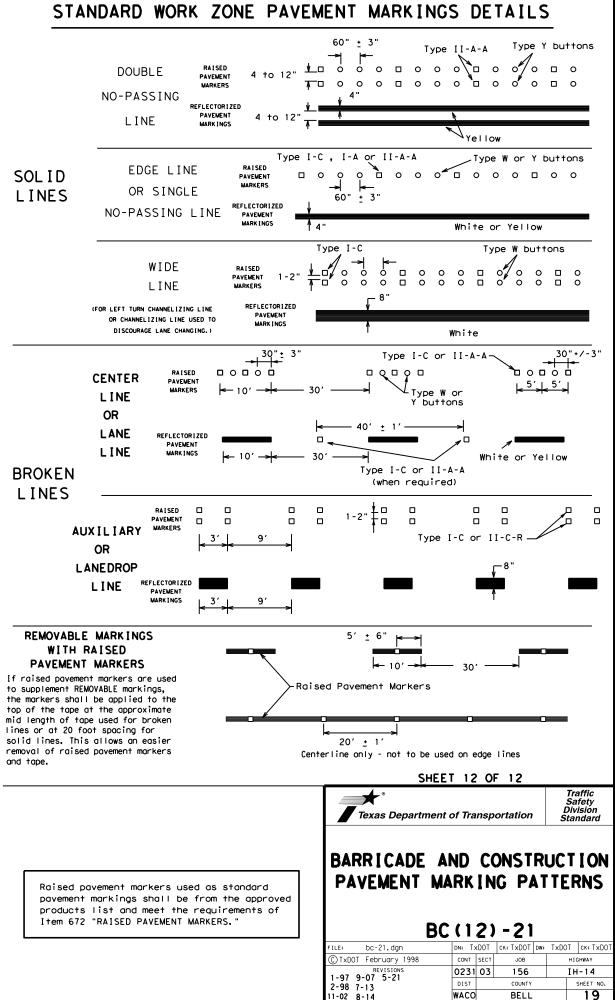
### BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

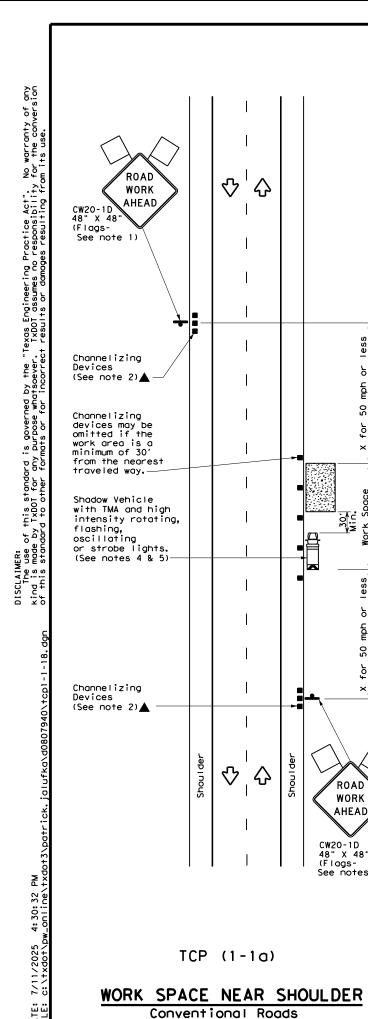
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	WACO		BELL			18

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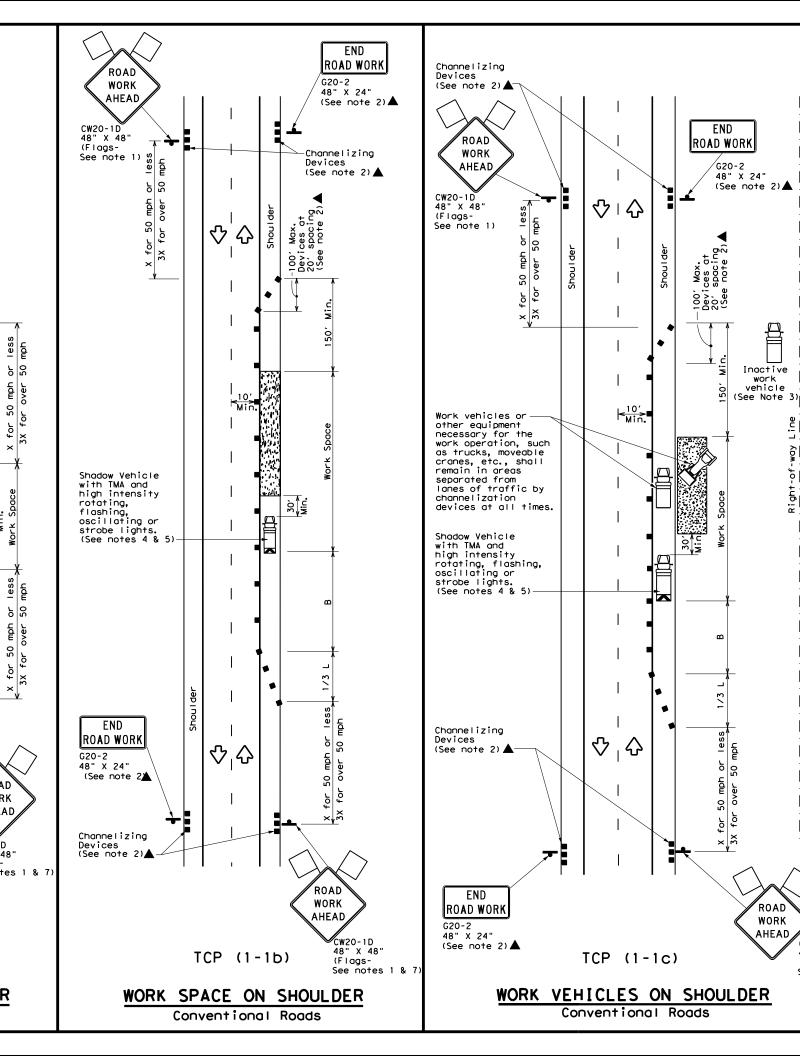
#### PAVEMENT MARKING PATTERNS 10 to 12" Type II-A-An 1 Q O O O O O O O O O ₹> `Yellow -Type Y buttons RAISED PAVEMENT MARKERS - PATTERN A REFLECTORIZED PAVEMENT MARKINGS - PATTERN A Type II-A-A <>> □وہ/ہ□ہہہ \$\frac{1}{4 \tau 8"} Type Y Type II-A-Abuttons-REFLECTORIZED PAVEMENT MARKINGS - PATTERN B RAISED PAVEMENT MARKERS - PATTERN B Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectorized pavement markings. CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE. TWO-WAY HIGHWAYS Type I-C Type W buttons-Type I-C or II-C-R 0000 0000 0000 Yellow Type I-A Type Y buttons ₹> Yellow White 0000 └Type I-C or II-C-R Type W buttons-REFLECTORIZED PAVEMENT MARKINGS RAISED PAVEMENT MARKERS Prefabricated markings may be substituted for reflectorized pavement markings. EDGE & LANE LINES FOR DIVIDED HIGHWAY Type I-C Type W buttons-0000 0000**0** 0000 0000 Type II-A-A Type Y buttons ♦ ₹> 0000 0000 Type W buttons-RAISED PAVEMENT MARKERS REFLECTORIZED PAVEMENT MARKINGS Prefabricated markings may be substituted for reflectorized pavement markings. LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS Type W buttons Type I-C-Type Y buttons-0 0 0 ➪ ₹> 0000 0000 0000 Type W buttons-└Type I-C REFLECTORIZED PAVEMENT MARKINGS RAISED PAVEMENT MARKERS Prefabricated markings may be substituted for reflectorized pavement markings. TWO-WAY LEFT TURN LANE



BELL



ROAD WORK AHEAD



	LEGEND								
~~~	Type 3 Barricade		Channelizing Devices						
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)						
<b>£</b>	Trailer Mounted Flashing Arrow Board	<b>M</b>	Portable Changeable Message Sign (PCMS)						
4	Sign	♡	Traffic Flow						
$\Diamond$	Flag	4	Flagger						

Speed	Formula	D	Minimur esirab er Len **	le	Spacii Channe		Minimum Sign Spacing Spacing Longituding Buffer Space		
*		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"B"	
30	ws <sup>2</sup>	150′	1651	1801	30′	60′	120′	90′	
35	L = WS	2051	2251	245'	35′	70′	160′	120′	
40	80	265′	295′	320′	40′	80′	240'	155′	
45		4501	4951	540′	45′	90′	320′	195′	
50		500'	5501	600'	50′	100′	400′	240′	
55	L=WS	550′	605′	660′	55′	110′	500′	295′	
60	L - W 3	600'	660′	720'	60′	120′	600′	350′	
65		650'	715′	780′	65′	130′	700′	410′	
70		7001	770′	840'	70′	140′	800′	475′	
75		750′	8251	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	MOBILE SHORT SHORT TERM INTERMEDIATE LONG TERM DURATION STATIONARY TERM STATIONARY STATIONARY							
	<b>√</b>	<b>√</b>						

#### GENERAL NOTES

ROAD

WORK

AHEAD

CW20-1D

48" X 48" (Flags-See notes 1 & 7)

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

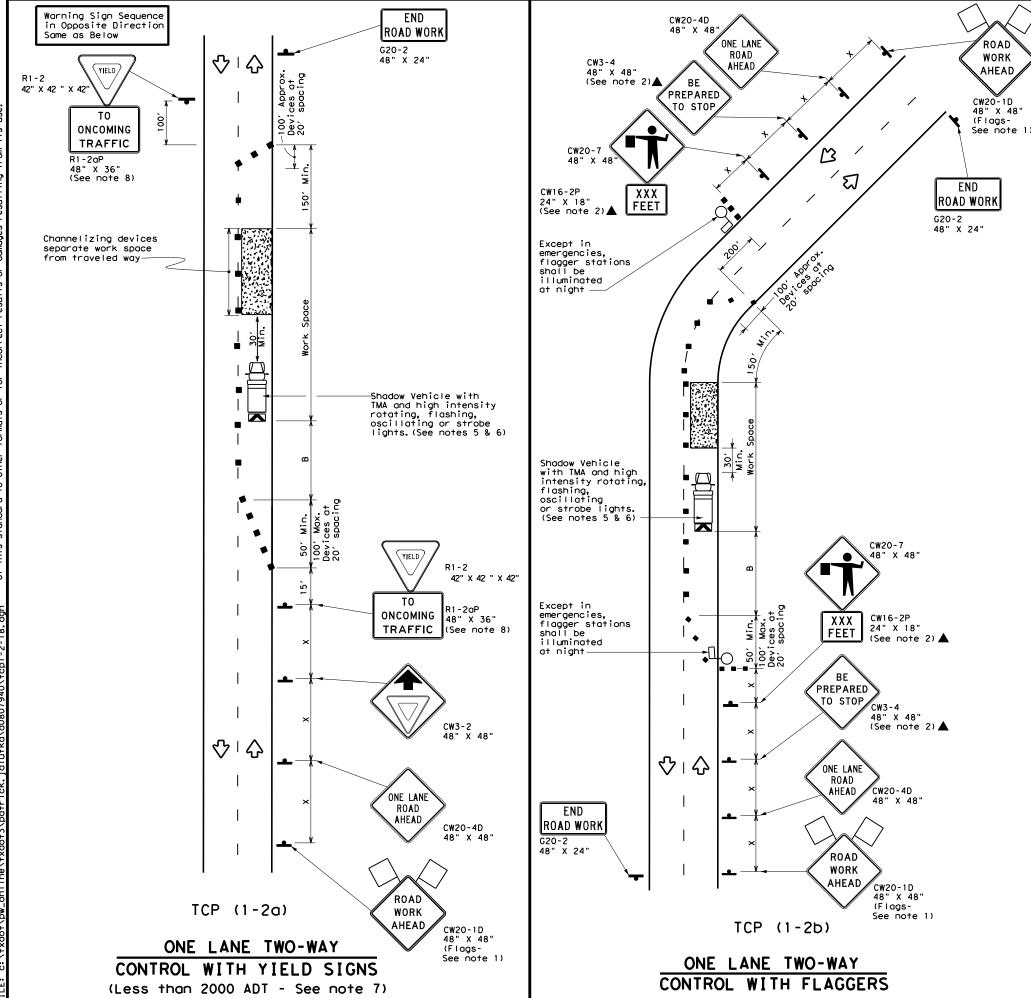
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

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-95 2-12	DIST		COUNTY		S	HEET NO.
-97 2-18	WACO		BELL			20
					_	



	LEGEND									
~~~	Type 3 Barricade		Channelizing Devices							
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)							
<b>E</b>	Trailer Mounted Flashing Arrow Board	(M	Portable Changeable Message Sign (PCMS)							
-	Sign	♡	Traffic Flow							
$\Diamond$	Flag	Ф	Flagger							

Posted Speed	Formula	D	Minimum esirab er Lend **	le	Spacii Channe		Sign Spacing	Sign Suggested Longitudinal Buffer Space	
*		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"B"	
30	2	150′	1651	1801	30'	60′	1201	90′	200'
35	L = \frac{WS^2}{60}	2051	225'	245′	35′	70′	160′	120′	250′
40	80	2651	2951	3201	40'	80′	240′	155′	305′
45		450′	4951	540′	45′	90'	320′	195′	360′
50		5001	550′	600,	50′	100′	4001	240′	425′
55	L=WS	550′	6051	660'	55′	110'	500′	295′	495′
60	L-#3	600'	660′	720′	60′	120′	600′	350′	570′
65		650′	715′	7801	65′	130'	700′	410′	645′
70		7001	7701	840′	701	140′	800′	475′	730′
75		750'	8251	900′	75′	150′	900′	540′	820′

\* Conventional Roads Only

\*\* Taper lengths have been rounded off.

L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE									
MOBILE	MOBILE SHORT SHORT TERM INTERMEDIATE LONG TERM DURATION STATIONARY TERM STATIONARY STATIONARY								
	1	1							

#### GENERAL NOTES

ROAD

WORK

AHEAD

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

#### TCP (1-2a)

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

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

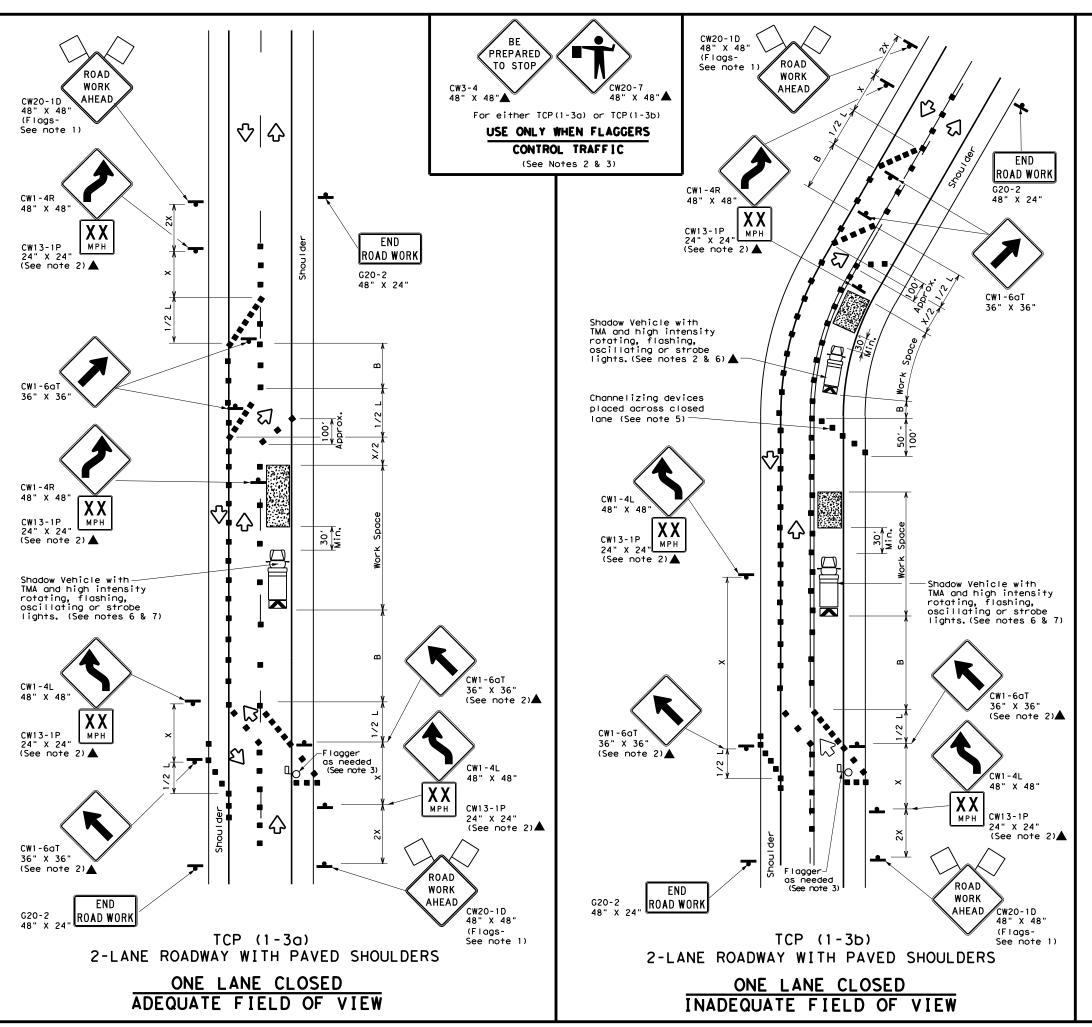


Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

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1-97 2-18	WACO		BELL		21



	LEGEND									
~~~	Type 3 Barricade		Channelizing Devices							
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)							
<b>E</b>	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)							
•	Sign	♡	Traffic Flow							
$\Diamond$	Flag	Ф	Flagger							

Posted Speed	Formula	D	Minimur esirab er Len * *	le gths	Spaci: Channe		Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space
*		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"B"
30	_ <u>WS</u> 2	150′	1651	1801	30′	60′	120'	90′
35	L = WS	2051	2251	2451	35′	701	160′	120′
40	80	265′	295′	3201	40′	80′	240'	155′
45		450′	4951	540'	45′	90′	320′	195′
50		5001	550′	6001	50′	1001	400′	240′
55	L=WS	550′	6051	660′	55′	110'	500′	295′
60	- "	600′	660′	720′	60′	120'	600′	350′
65		650′	715′	7801	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 SHORT TERM INTERMEDIATE LONG TERM DURATION STATIONARY TERM STATIONARY STATIONARY									
	1	✓							

#### **GENERAL NOTES**

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

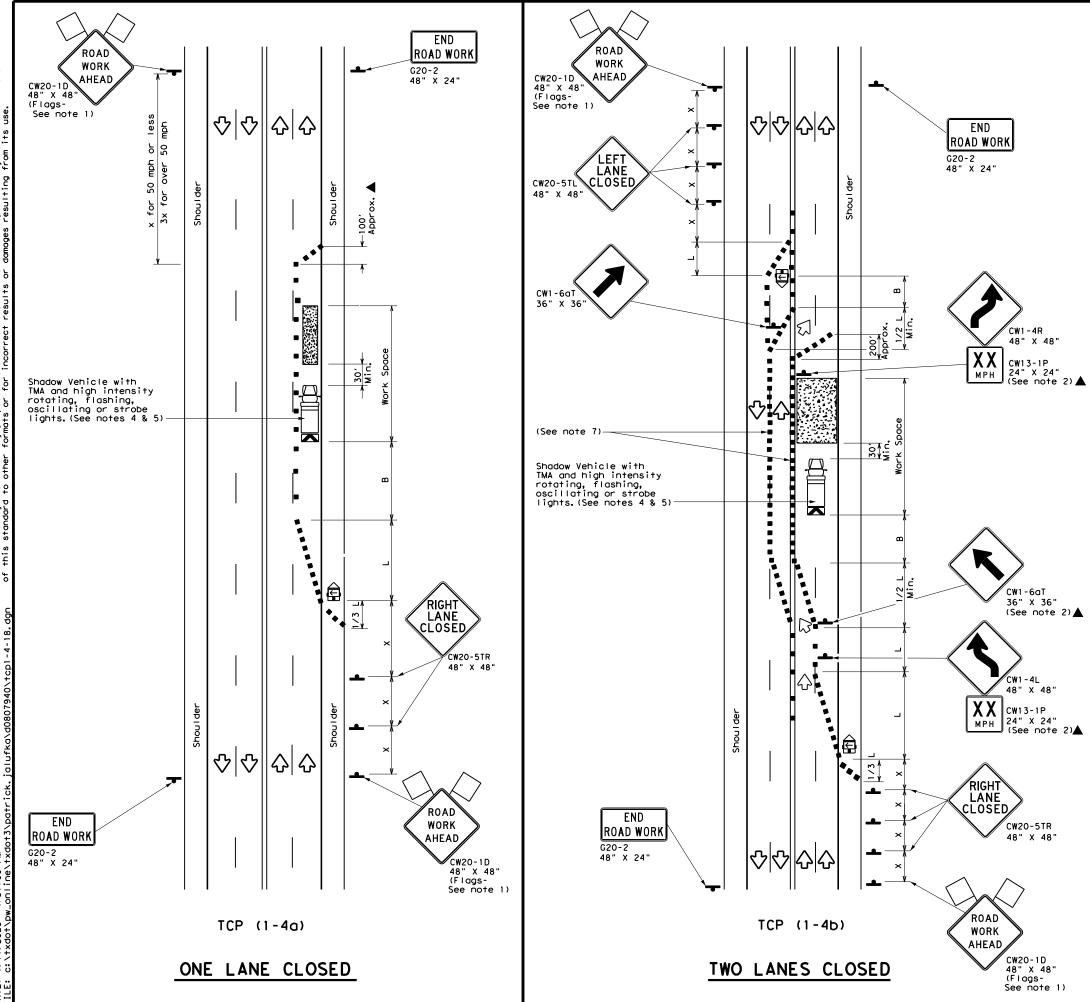


Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

FILE: tcp1-3-18.dgn	DN:		CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB		HIGHWAY
2-94 4-98 REVISIONS	0231	03	156		IH-14
8-95 2-12	DIST		COUNTY		SHEET NO.
1-97 2-18	WACO		BELL		22



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

Posted Speed	Formula	Minimum Desirable Taper Lengths * *			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space
*		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"B"
30	2	150′	165′	180′	30′	60′	120′	90′
35	L = WS <sup>2</sup>	2051	225′	245'	35′	70′	160′	120′
40	60	265′	295′	3201	40′	80′	240′	155′
45		450′	495′	540'	45′	90′	320′	195′
50		5001	550′	600′	50'	100′	400′	240′
55	L=WS	550′	605′	660′	55′	110'	500′	295′
60	L - W 3	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					
	1	1							

#### GENERAL NOTES

- 1. Flags attached to signs where shown are REQUIRED.
- 2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer. 3. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the
- visibility of the work zone is less than 1500 feet.

  4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- 5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

6. If this TCP is used for a left lane closure , CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.

7. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

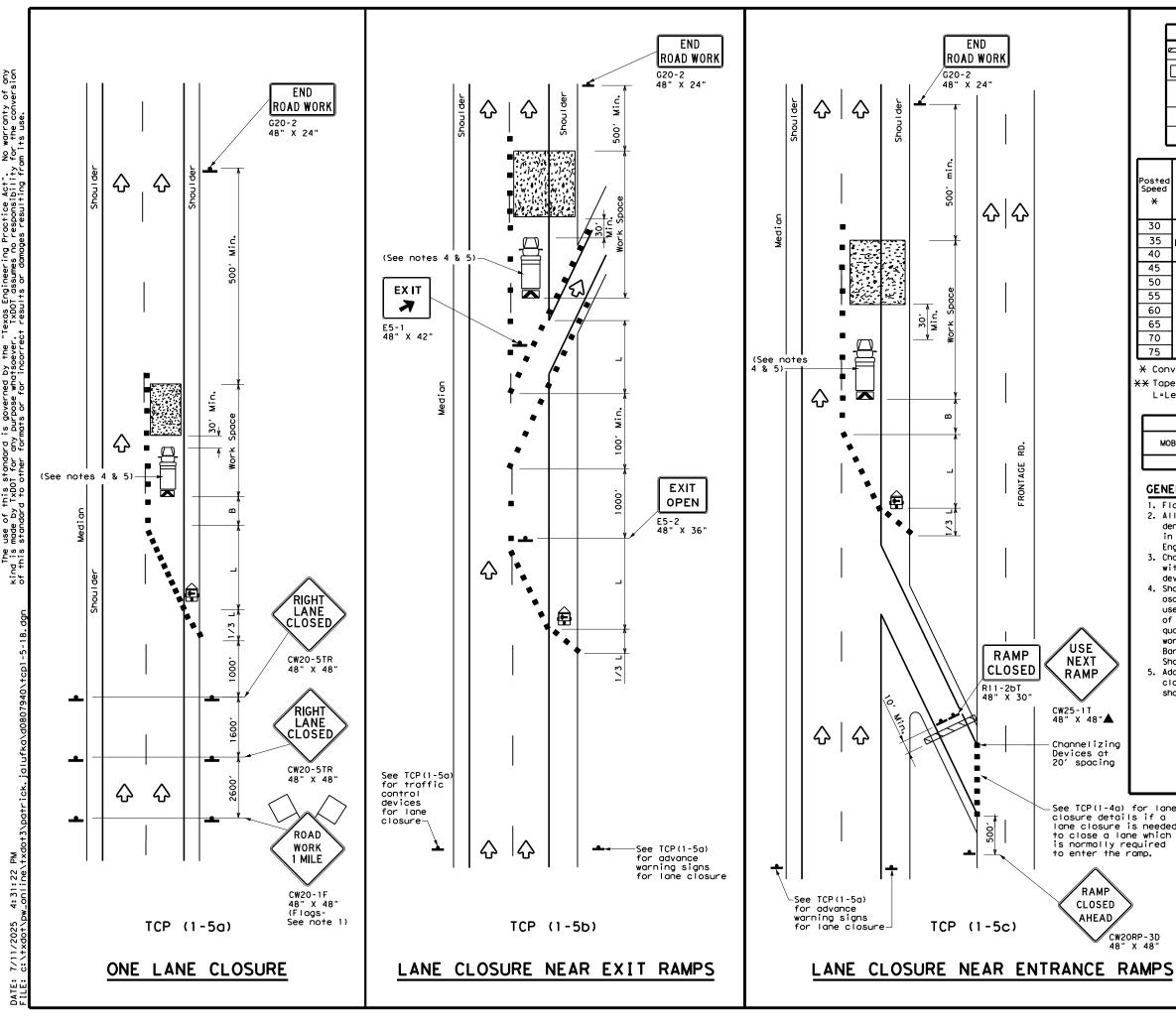


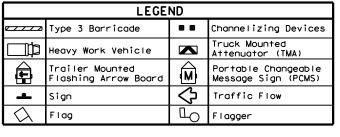
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

FILE:	tcp1-4-18, dgn	DN:		CK:	DW:	CK:	
(C) TxD	OT December 1985	CONT	SECT	JOB		HIGHWAY	
2-94	REVISIONS 4-98	0231	03	156		IH-14	
8-95	2-12	DIST	COUNTY			SHEET NO.	
1-97	2-18	WACO		BELL		23	





Speed	Formula	D	Minimum esirab er Lend **	le	Spacir Channe	uggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space			
*		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	"X" Distance	"B"			
30	2	150′	1651	180′	30′	60′	120′	90′			
35	$L = \frac{WS^2}{60}$	205′	225′	245′	35′	70′	160′	120′			
40	80	265′	295′	3201	40′	80′	240′	1551			
45		450′	495′	540′	45′	90′	3201	1951			
50		5001	550′	600,	50′	100′	400′	240′			
55	L=WS	550′	605′	660,	55′	110′	500′	295′			
60	L 113	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					
		1							

#### GENERAL NOTES

USE NEXT

RAMP

CW25-1T 48" X 48"

Channelizing Devices at 20' spacing

See TCP(1-4a) for lane closure details if a lane closure is needed

to close a lane which is normally required to enter the ramp.

CW2ORP-3D 48" X 48"

RAMP

CLOSED

AHEAD

RAMP

CLOSED

R11-2bT 48" X 30'

TCP (1-5c)

END Road Work

**쇼 쇼** 

G20-2 48" X 24"

Min.

公

公

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

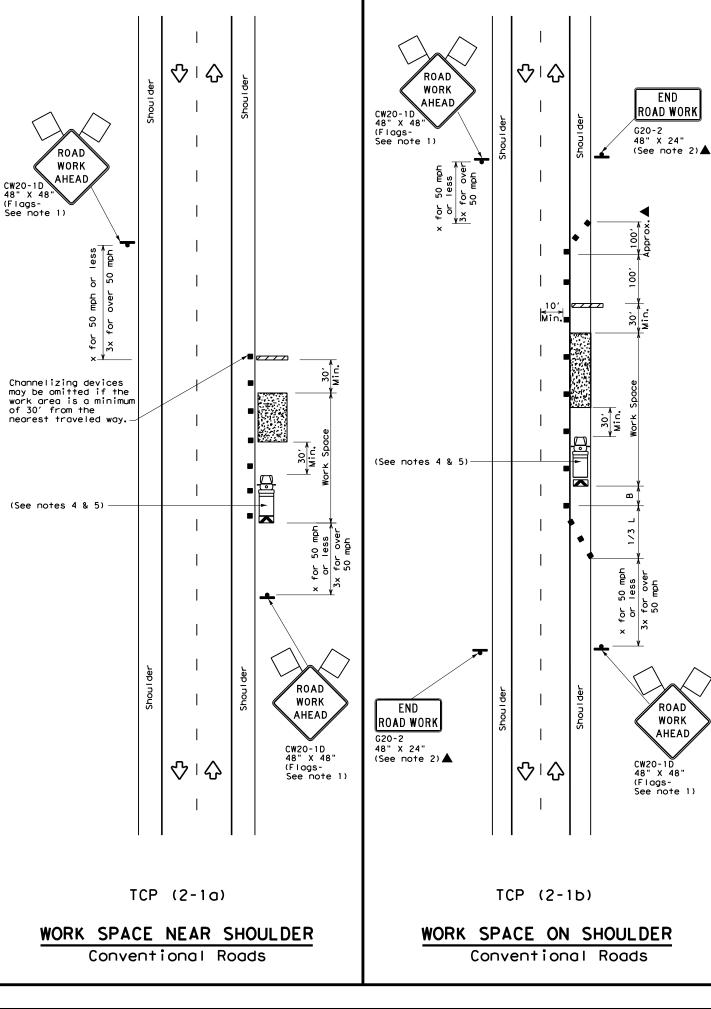
Texas Department of Transportation

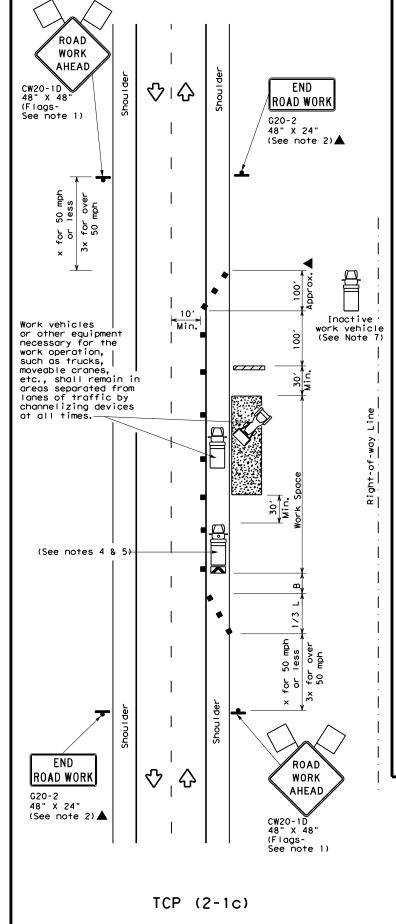
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

LE: †c	p1-5-18, dgn	DN:		CK:	DW:		CK:	
)TxDOT	February 2012	CONT	SECT	JOB		HIC	SHWAY	
-18	REVISIONS	0231	03	156		ΙH	-14	
-10		DIST		COUNTY			SHEET NO.	
		WACO		BELL			24	





WORK VEHICLES ON SHOULDER

Conventional Roads

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

_										
Posted Speed	Formula	D	Minimur esirab er Lend **	le	Spacii Channe		Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space		
*		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"B"		
30	L = WS <sup>2</sup>	150′	1651	1801	30′	60′	120′	90,		
35		2051	2251	245′	35′	70′	160′	120'		
40	80	2651	2951	3201	40′	80′	240′	155′		
45		4501	4951	540′	45′	90′	320′	195′		
50		500'	5501	6001	50′	100′	400′	240′		
55	L=WS	550′	605′	660′	55′	110′	500′	295′		
60	- " -	600'	660′	720′	60′	120′	600′	350′		
65	1	650′	715′	780′	65′	130′	700′	410′		
70		700′	770′	840′	70′	140′	800'	475′		
75		750′	8251	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					
	<b>√</b>	✓	<b>√</b>	<b>√</b>					

#### **GENERAL NOTES**

- 1. Flags attached to signs where shown, are REQUIRED.
- 2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer
- 3. Stockpiled material should be placed a minimum of 30 feet from
- nearest traveled way.

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

Texas Department of Transportation

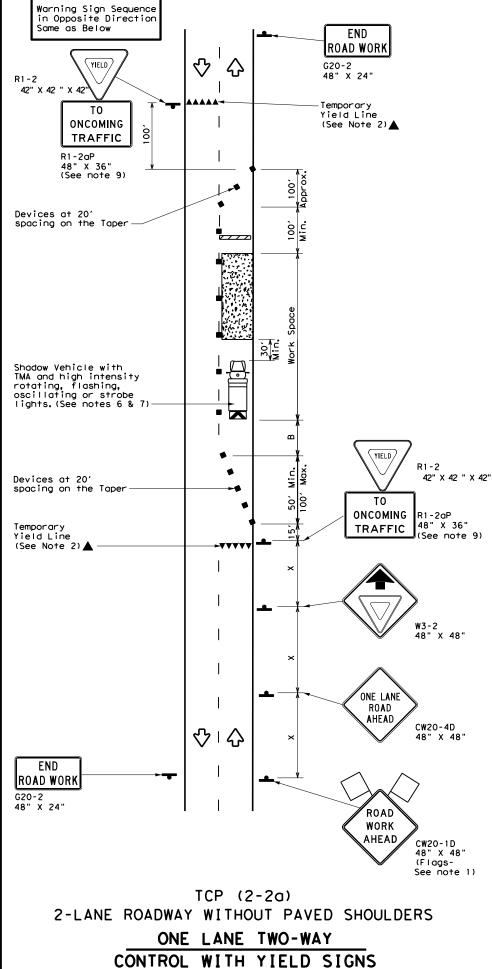
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

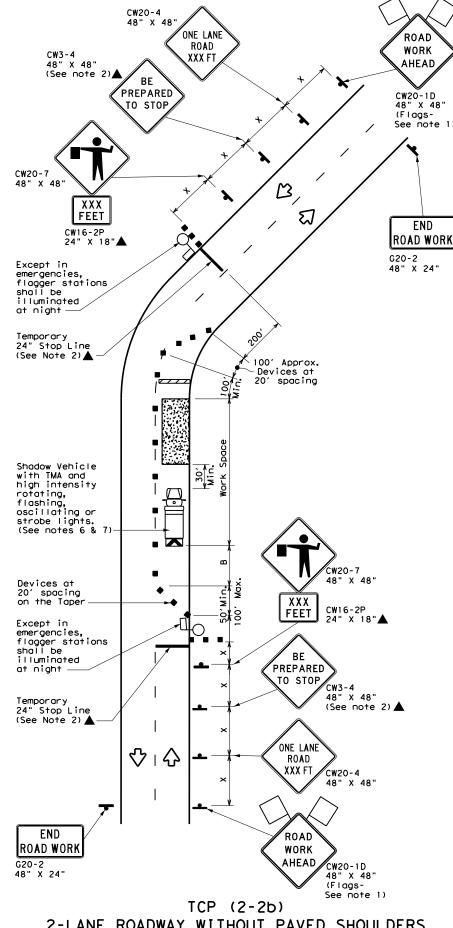
TCP(2-1)-18

		_			-		
:	tcp2-1-18.dgn	DN:		CK:	DW:		CK:
ΓxD	OT December 1985	CONT	SECT	JOB		HIC	HWAY
REVISIONS 34 4-98		0231	03	156 IH-		-14	
94 95	2-12	DIST	COUNTY		,	SHEET NO.	
7	2-18	WACO		BELL			25





(Less than 2000 ADT - See Note 9)



2-LANE ROADWAY WITHOUT PAVED SHOULDERS

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

	LEGE	ND	
~~~	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	<b>(</b>	Portable Changeable Message Sign (PCMS)
-	Sign	∿	Traffic Flow
$\Diamond$	Flag	Ŋ	Flagger

Speed	Formula	D	Minimur esirab er Lend **	le	Spacii Channe		Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space	Stopping Sight Distance
*		10' Offset	11' 12' On a On a Distance	"B"					
30	2	150′	165′	180′	30′	60′	120′	90′	2001
35	L = WS <sup>2</sup>	2051	2251	245'	35′	70′	160′	120′	250′
40	80	265′	295′	3201	40'	80'	240'	1551	305′
45		450′	495′	540′	45′	90′	3201	195′	360′
50		5001	550′	600′	50′	100'	400'	240′	425′
55	L=WS	550′	6051	660′	55'	110′	500′	295′	4951
60	_ "3	600′	660′	720′	60'	120′	600'	350'	570′
65		650′	715′	7801	65′	130′	700′	410′	645′
70		700′	770′	840′	70′	140′	800'	475′	730′
75		750′	825′	9001	75′	150′	900'	540′	820′

\* Conventional Roads Only

\*\* Taper lengths have been rounded off.

L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE								
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY				
	1		1					

#### GENERAL NOTES

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

#### TCP (2-2a)

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

#### TCP (2-2b)

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

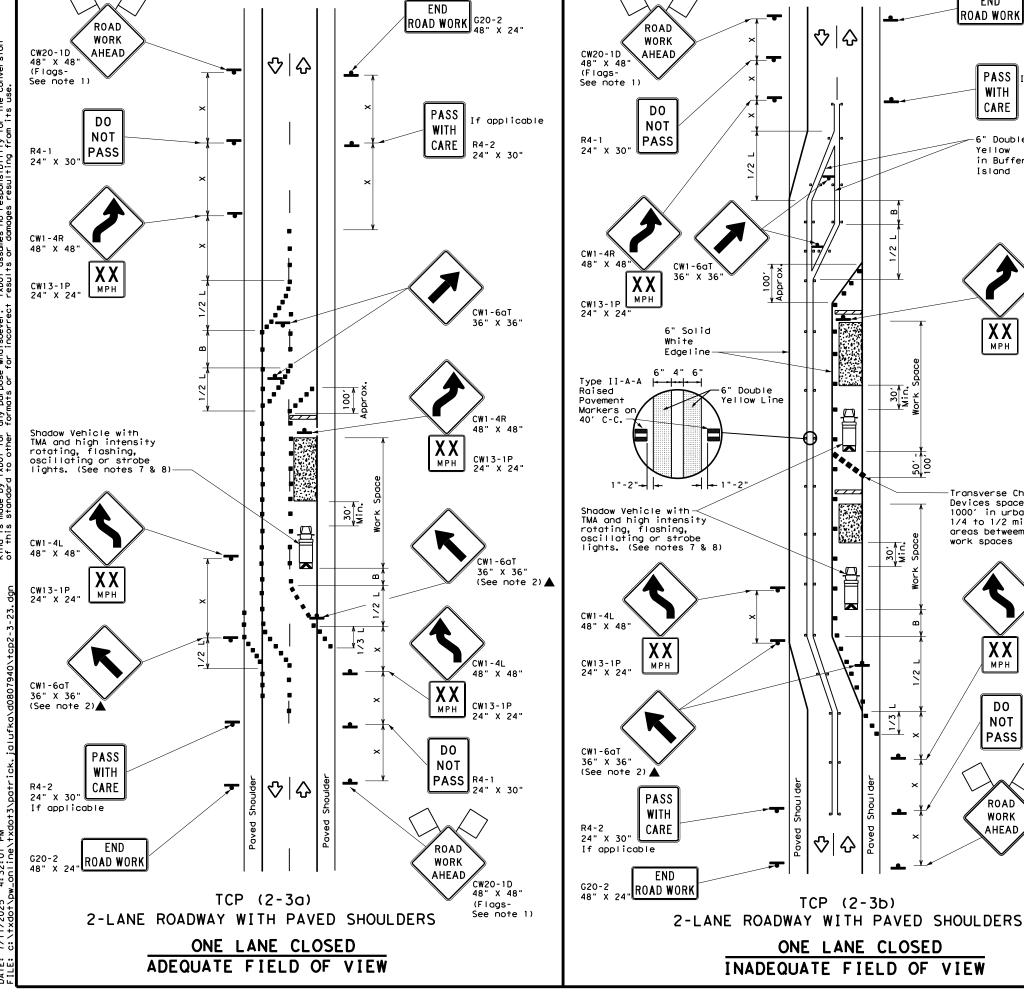


Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP (2-2) -18

FILE: tcp2-2-18.dgn	DN:		CK:	DW:		CK:
© TxDOT December 1985	CONT	SECT	JOB		ніс	SHWAY
REVISIONS 8-95 3-03	0231	03	156		ΙH	-14
1-97 2-12	DIST		COUNTY	•		SHEET NO.
4-98 2-18	WACO		BELL			26



LEGEND									
~~~	Type 3 Barricade		Channelizing Devices						
	Heavy Work Vehicle	K	Truck Mounted Attenuator (TMA)						
<b>F</b>	Trailer Mounted Flashing Arrow Board	••••	Raised Pavement Markers Ty II-AA						
4	Sign	∿	Traffic Flow						
$\Diamond$	Flag	ПО	Flagger						

Posted Speed	Desirable		Spacii Channe		Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space		
*		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"B"
30	2	150′	1651	1801	30'	60′	120'	90′
35	L = \frac{WS^2}{60}	2051	225′	245'	35′	70′	160′	120′
40	b	265′	295′	3201	40′	80′	240'	155′
45		450′	495′	540′	45′	90′	3201	195′
50		500′	550′	6001	50′	100′	400′	240′
55	L=WS	550′	6051	660′	55′	110′	500′	295′
60	L - W 3	600'	660′	7201	60′	120'	600′	350′
65		650′	715′	7801	65′	1301	700′	410′
70		700′	770′	840′	70′	140′	800′	475′
75		750′	8251	900'	75′	150′	900′	540′

\* Conventional Roads Only

\*\* Taper lengths have been rounded off.

L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

	TYPICAL USAGE								
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY					
				TCP (2-3b) ONLY					
		·	1	1					

#### GENERAL NOTES

ROAD WORK G20-2

If applicable

R4-2

24" X 30"

48" X 48"

CW13-1P

Transverse Channelizing

Devices spaced at 500° to 1000° in urban areas, or

1/4 to 1/2 mile in rural areas betweem recurrent

CW1-4L

CW13-1P

24" X 30"

CW20-1D

(Flags-

48" X 48"

See note 1)

48" X 48"

work spaces

**X X**MPH

DO

NOT

WORK

AHEAD

PASS R4-1

**PASS** 

WITH CARE

6" Double

in Buffer Island

Yellow

1. Flags attached to signs where shown, are REQUIRED.

- 2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate
- Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction
- regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
- Conflicting pavement marking shall be removed for long term projects.
- A Shadow Vehicle with a TMA should be used anytime it can be positioned  $30\ \text{to}\ 100\ \text{feet}$  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.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

#### TCP (2-3a)

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



TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON

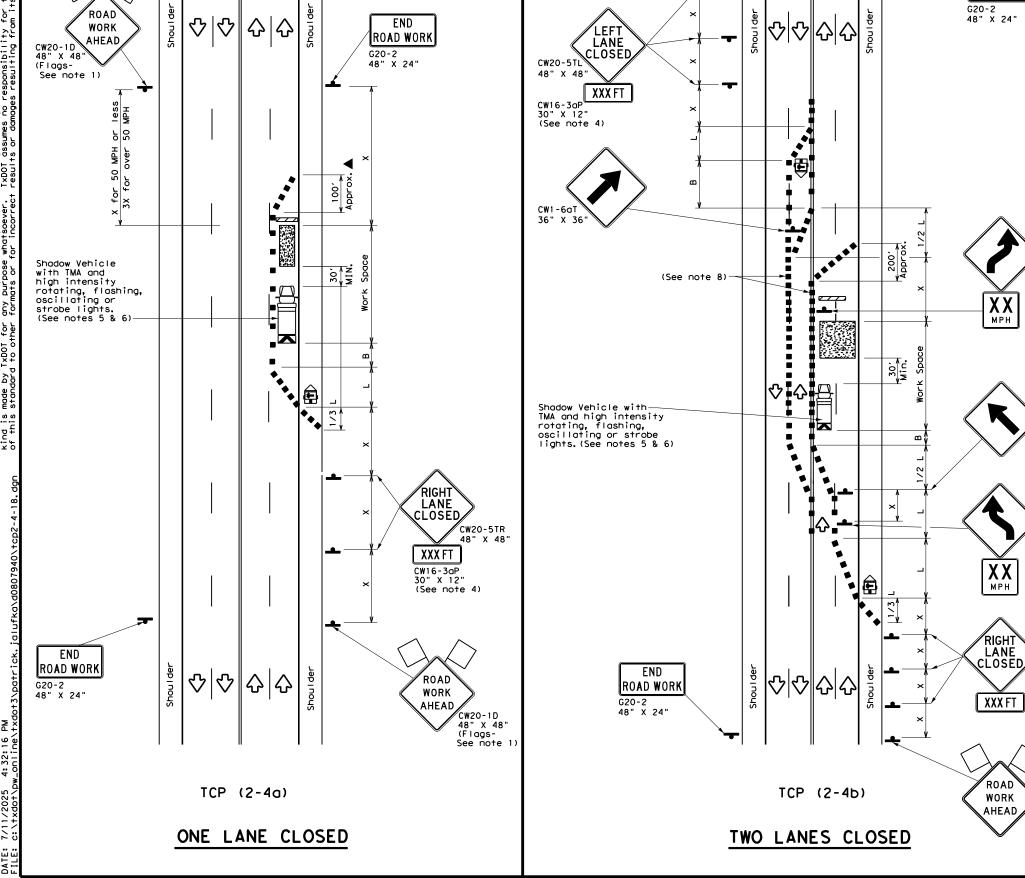
Traffic Safety Division Standard

TCP (2-3) -23

TWO-LANE ROADS

C) TxDOT April 2023 HIGHWAY IH-14 0231 03 156 12-85 4-98 2-18 8-95 3-03 4-23 1-97 2-12 27

- 1		7	ı
	6		



WORK AHEAD

CW20-1D 48" X 48" (Flags-See note 1)

1	LEGEND								
	~~~	Type 3 Barricade	8 8	Channelizing Devices					
		Heavy Work Vehicle	K	Truck Mounted Attenuator (TMA)					
		Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)					
	4	Sign	∿	Traffic Flow					
ı	$\Diamond$	Flag	Ф	Flagger					
_									

	<u> </u>	- •				,		
Speed	Formula	D	Minimum Desirable Taper Lengths **		Spacir Channe		Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space
*		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"B"
30	WS <sup>2</sup>	150′	1651	180′	30'	60′	120'	90'
35	L = WS	2051	225′	245'	35′	70′	160′	120′
40	60	265′	2951	320′	40'	801	240'	155′
45		450′	495′	5401	45′	90'	320'	195′
50		500′	550′	6001	50′	100′	400'	240′
55	L=WS	550′	605′	660′	55′	110′	500′	295′
60	- ""	600′	6601	720′	60`	120'	600,	350′
65		650′	715′	780′	65′	130′	700′	410′
70		7001	770′	8401	70′	140′	800'	475′
75		750′	825′	9001	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	MOBILE SHORT SHORT TERM INTERMEDIATE LONG TERM DURATION STATIONARY TERM STATIONARY STATIONARY								
		1	✓						

#### GENERAL NOTES

CW13-1P 24" X 24

CW1-6aT

36" X 36'

48" X 48"

CW13-1P

24" X 24'

CW20-5TR 48" X 48

CW16-3aP 30" X 12"

note 4)

CW20-1D 48" X 48" (Flags-See note 1

(See

X X MPH

RIGHT LANE

XXX FT

ROAD

WORK

AHEAD

END ROAD WORK

- 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 elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- 3. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
- 1. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
- 5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- . Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

#### CP (2-4a)

7. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the merging taper.

#### CP (2-4b)

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

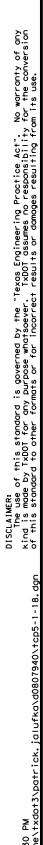


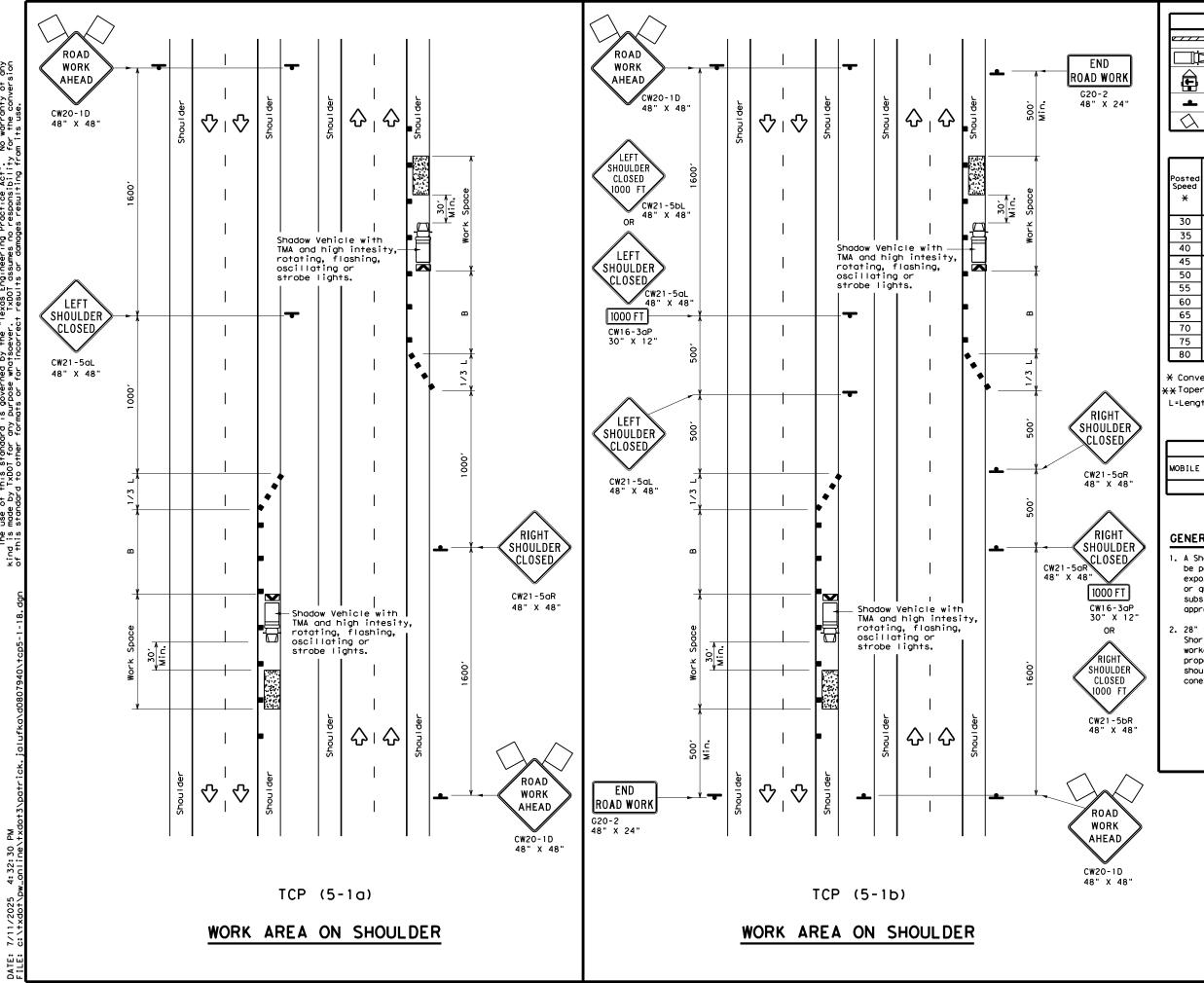
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

FILE: tcp2-4-18.dgn	DN:		CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB		HIGHWAY
8-95 3-03 REVISIONS	0231	03	156		IH-14
1-97 2-12	DIST		COUNTY		SHEET NO.
4-98 2-18	WACO		BELL		28





LEGEND ZZZZ∣Type 3 Barricade Channelizing Devices Truck Mounted Attenuator (TMA) eavy Work Vehicle M Portable Changeable Message Sign (PCMS) Trailer Mounted lashing Arrow Board Traffic Flow Sign ПО Flag Flagger

Posted Speed	Formula	Minimum Desirable Taper Lengths **			Spa Chan	sted Maximum acing of anelizing Devices	Suggested Longitudinal Buffer Space
*		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	"В"
30	2	150′	1651	180'	30′	60′	90′
35	$L = \frac{WS^2}{60}$	205′	225'	245'	35′	70′	120′
40	80	265′	2951	3201	40′	80′	155′
45		450'	495′	540′	45′	90′	195′
50		500′	5501	600′	50′	100′	240′
55	l L=WS	550′	605′	660′	55′	110′	295′
60	- " -	600′	660′	7201	60′	120′	350′
65		650′	715′	780′	65′	130′	410′
70		700′	7701	840′	70′	140′	475′
75		750′	8251	900′	75′	150′	540′
80		8001	880′	960′	80′	160′	615′

- \* 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	MOBILE SHORT SHORT TERM INTERMEDIATE LONG TERM DURATION STATIONARY TERM STATIONARY STATIONARY							
	TCP (5-1a)	TCP (5-1b)	TCP (5-1b)					

#### GENERAL NOTES

- 1. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely effecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.
- 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece

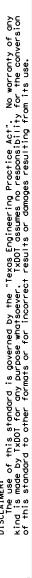


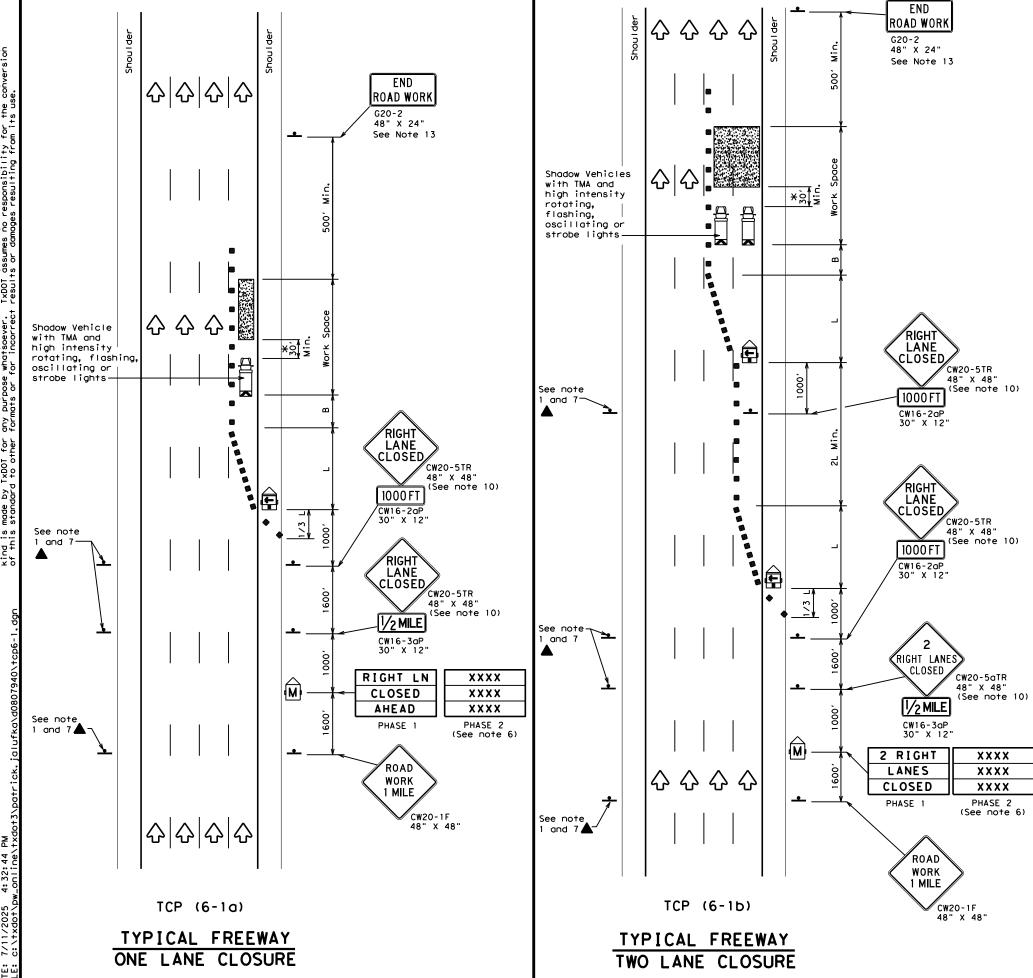
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP (5-1)-18

ILE:	tcp5-1-18.dgn		DN:		CK:	DW:		CK:
C) T×DOT	February	2012	CONT	SECT	JOB		ніс	SHWAY
	REVISIONS		0231	03	156		ΙH	-14
2-18			DIST		COUNTY		5	SHEET NO.
			WACO		BELL			29





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

					_		
Posted Speed	Formula	D	Minimum Desirable Taper Lengths "L" **			d Maximum ng of Iizing ices	Suggested Longitudinal Buffer Space
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	"B"
45		450′	4951	540′	45′	90'	1951
50		5001	550′	6001	50′	100'	240′
55	L=WS	550′	6051	660′	55′	110'	295′
60	- "3	600′	660′	720′	60′	120'	350′
65		650′	715′	780′	65′	130′	410′
70		7001	770′	840′	701	140′	475′
75		750′	825′	9001	75′	150′	540′
80		8001	880′	960′	80'	160'	615′

\*\* 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			
	1	1	1				

#### GENERAL NOTES

- 1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- 2. Drums or 42"cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
- 3. All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
- 4. The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
- 5. Static message boards or changeable message signs stating the date and duration of ramp or freeway lane closures shall be placed a minimum of seven (7) calendar days in advance of the actual closure.
- 6. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.
- 7. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
- 8. The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the TMUTCD.
- 9. Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
- 10. Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
- 11. When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
- 12. For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
- 13. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

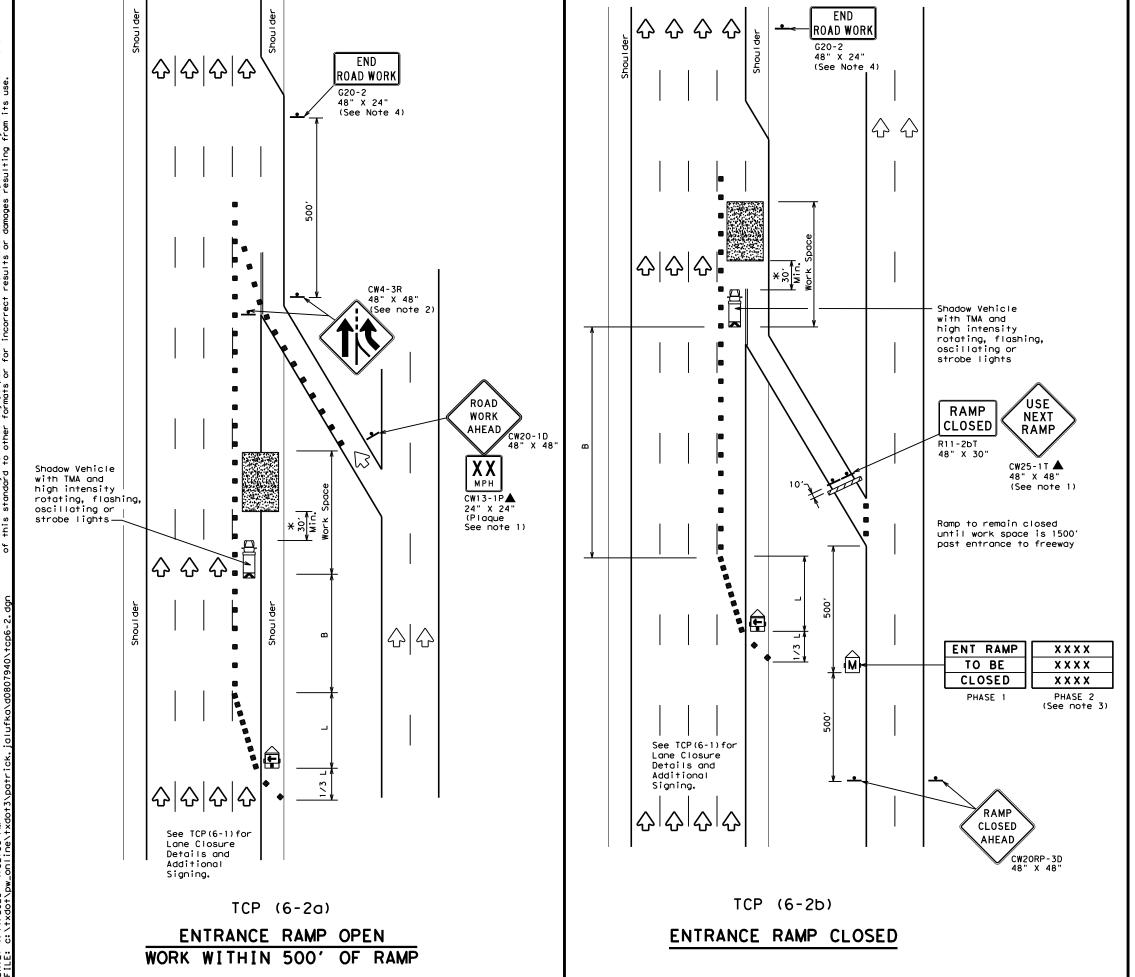
A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.



#### TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP (6-1)-12

			_	- •		_	
FILE:	tcp6-1.dgn	DN: T	×DOT	ck: TxDOT	DW:	TxDOT	ck: TxDOT
C TxD0T	February 1998	CONT	SECT	JOB		HIC	SHWAY
8-12	REVISIONS	0231	03	156		ΙH	-14
0-12		DIST		COUNTY			SHEET NO.
		WACO		BELL			30



	LEGEND									
~~~	Type 3 Barricade	00	Channelizing Devices							
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)							
<b>₽</b>	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)							
-	Sign	♡	Traffic Flow							
$\Diamond$	Flag	ПО	Flagger							

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" **			Spacir Channe		Suggested Longitudinal Buffer Space
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	"B"
45		450′	495′	540′	45′	90′	195′
50		500′	550′	600'	50′	100′	240'
55	L=WS	550′	605′	660′	55′	110′	295′
60	L-#3	600'	660′	720′	60′	120'	350′
65		650′	715′	780′	65′	130′	410′
70		700′	770′	840′	70′	140′	475′
75		750′	825′	900′	75′	150′	540′
80		800′	880′	960′	80'	160′	615'

\*\* 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				
	1	<b>√</b>	<b>√</b>					

#### **GENERAL NOTES**

- 1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- 2. ADDED LANE Symbol (CW4-3) sign may be omitted when sign
- between ramp and mainlane can be seen from both roadways.

  3. See "Advance Notice List" on BC(6) for recommended date
- and time formatting options for PCMS Phase 2 message.
  4. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

\*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

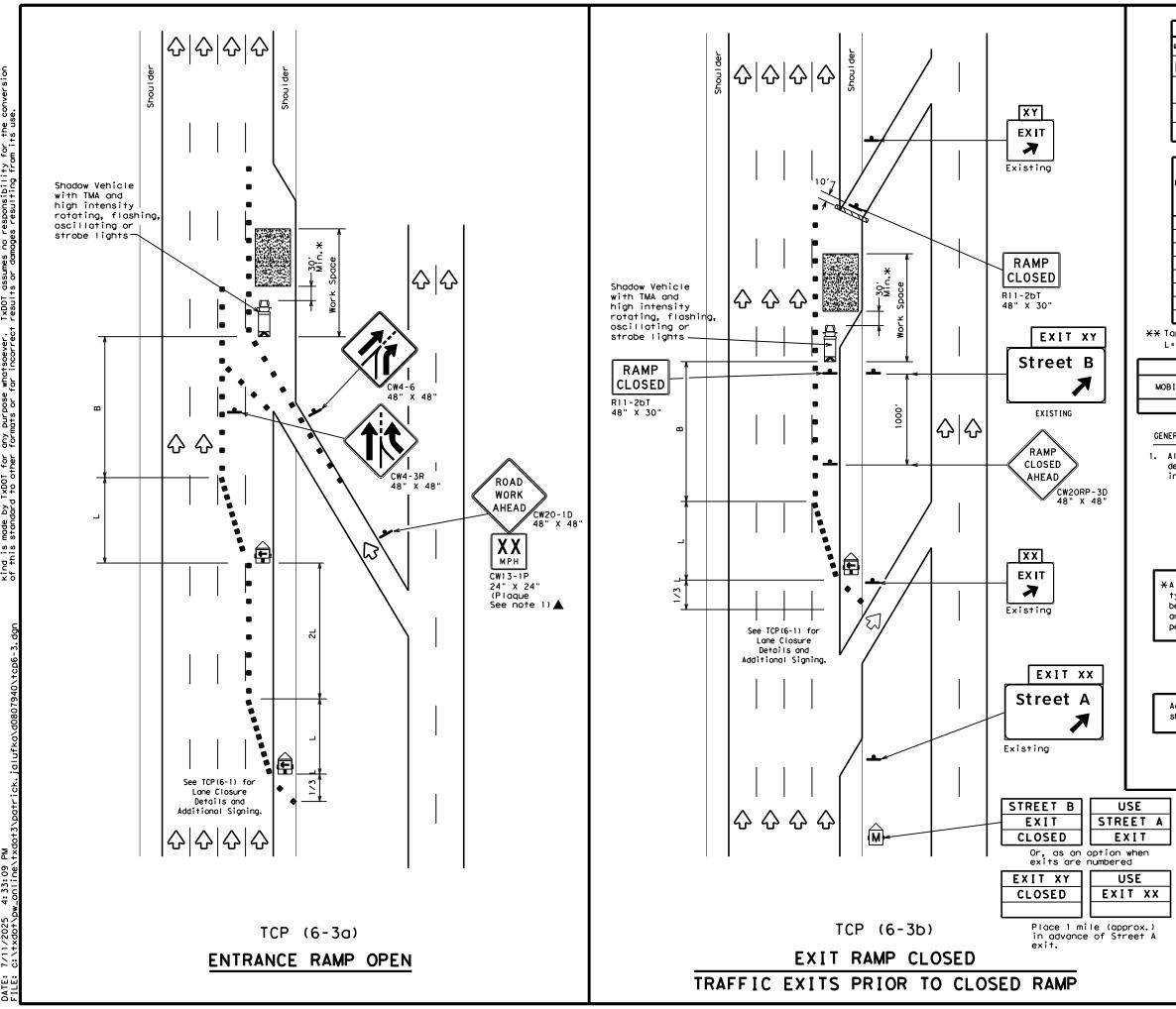
Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.



#### TRAFFIC CONTROL PLAN WORK AREA NEAR RAMP

TCP(6-2)-12

FILE:	tcp6-2.dgn	DN: T	×D0T	ck: TxDOT	DW:	TxDOT	ck: TxDOT
© TxD0T	February 1994	CONT	SECT	JOB		HIO	GHWAY
	REVISIONS	0231	03	156		IΗ	I-14
1-97 8-9	-	DIST		COUNTY			SHEET NO.
4-98 8-1	2	WACO		BELL			31



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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" * *		Spacin Channe		Suggested Longitudinal Buffer Space	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	"B"
45		450′	495′	540'	45′	90′	195′
50		5001	550′	6001	50′	100′	240′
55	L=WS	550′	605′	660′	55′	110′	295′
60	L-#3	600′	660′	720′	60′	120′	350′
65		650′	715′	780′	65 <i>°</i>	130′	410′
70		700′	770′	840′	70′	140′	475′
75		750′	825′	9001	75′	150′	540′
80		800′	880′	960′	80`	160′	615′

\*\* Taper lengths have been rounded off.

L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MP

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

#### GENERAL NOTES:

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere

\*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

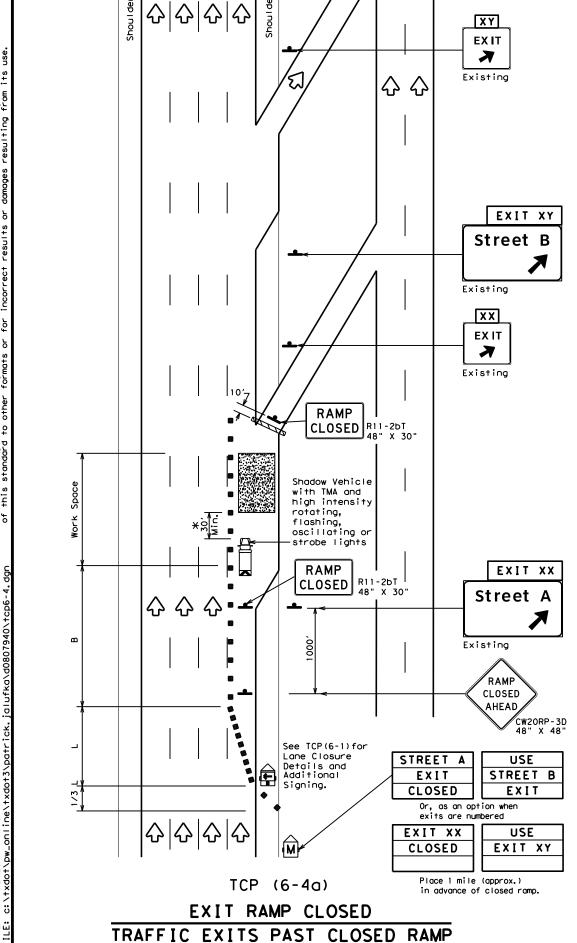


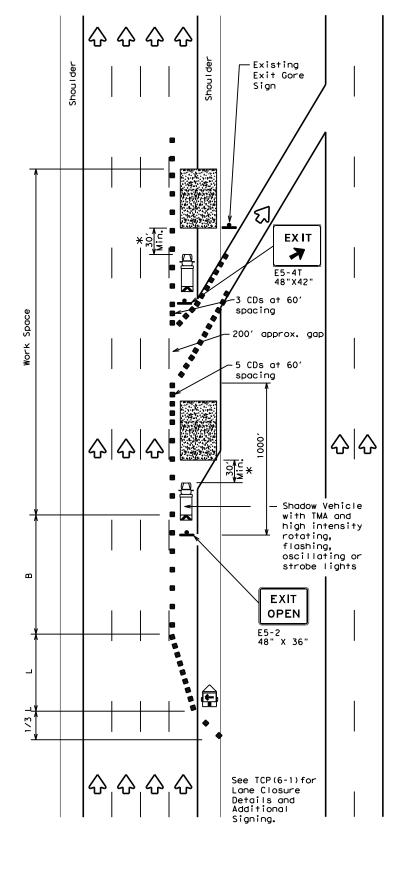
▼ Texas Department of Transportation Traffic Operations Division Standard

#### TRAFFIC CONTROL PLAN WORK AREA BEYOND RAMP

TCP (6-3) -12

		_		_			_	
.E:	tcp6-3.dgn		DN: T	DOT	ck: TxDOT	DW:	TxDOT	ck: TxDOT
)TxDOT	February	1994	CONT	SECT	JOB		HIC	SHWAY
	REVISIONS		0231	03	156		ΙH	-14
97 8-98 98 8-12			DIST		COUNTY			SHEET NO.
98 8-12			WACO		BELL			32





TCP (6-4b)

EXIT RAMP OPEN

	LEGEND								
	Type 3 Barricade		Channelizing Devices (CDs)						
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)						
	Trailer Mounted Flashing Arrow Board	3	Portable Changeable Message Sign (PCMS)						
<b>+</b>	Sign	♡	Traffic Flow						
$\Diamond$	Flag	ПO	Flagger						

Posted Speed	Formula	Taper	Minimur esirab Lengti XX	le	Spacii Channe		Suggested Longitudinal Buffer Space
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	"B"
45		450′	4951	540′	45′	90′	195′
50		500′	550′	600'	50′	100'	240′
55	L=WS	550′	605′	660′	55′	110′	295′
60	- " -	600′	660′	720′	60′	120′	350′
65		650′	715′	780′	65′	130'	410′
70		7001	770′	840′	701	140'	475′
75		750′	825′	9001	75′	150′	540′
80		800′	880′	960′	80′	160'	615′

\*\* 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			
	1	1	✓				

#### GENERAL NOTES

- 1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- 2. See BC Standards for sign details.

 $\ensuremath{\mathsf{XA}}$  shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

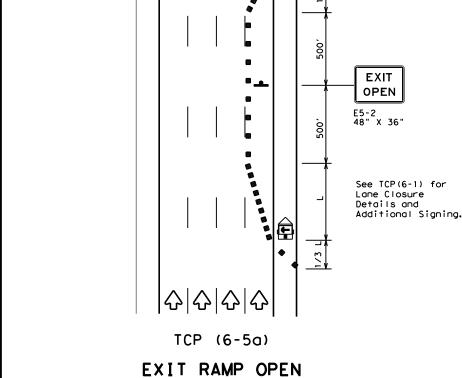


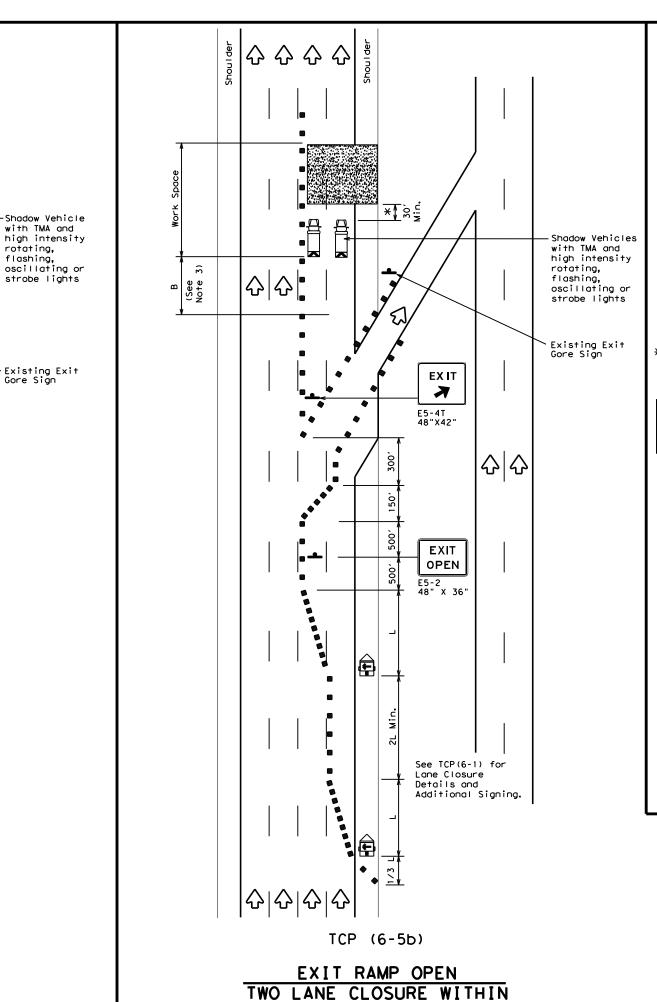
#### TRAFFIC CONTROL PLAN WORK AREA AT EXIT RAMP

TCP (6-4) -12

	- •	·- •	•	- *	-	_	
FILE:	tcp6-4.dgn	DN: T>	DOT	ck: TxDOT	DW:	TxDOT	ck: TxDOT
C TxD0T	Feburary 1994	CONT	SECT	JOB		HIC	SHWAY
	REVISIONS	0231	03	156		ΙH	-14
1-97 8-98		DIST		COUNTY			SHEET NO.
4-98 8-12		WACO		BELL			33

(See Note





1500' PAST EXIT RAMP

rotating, flashing, oscillating or

strobe lights

Existing Exit Gore Sign

**EXIT** A E5-4T 48"X42"

LEGEND Channelizing Devices Type 3 Barricade Truck Mounted Attenuator (TMA) Heavy Work Vehicle Portable Changeable Message Sign (PCMS) Trailer Mounted Flashing Arrow Board Traffic Flow  $\overline{\Diamond}$ П Flagger

Posted Speed	Formula	D	Minimur esirab Lengtl * *	le	Spacii Channe		Suggested Longitudinal Buffer Space
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	"B"
45		450′	495′	540'	45′	90′	1951
50		5001	550′	600'	50′	100'	240′
55	L=WS	550′	605′	660′	55′	110'	295′
60	- 113	600'	660′	720′	60′	120′	350′
65		650′	715′	780′	65′	130′	410′
70		700′	770′	840′	70′	140′	475′
75		750′	825′	900′	75′	150′	540′
80		800′	880′	9601	80′	160'	615′

\*\* 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		
	<b>√</b>	✓	<b>√</b>			

#### **GENERAL NOTES**

- 1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere  $% \left( 1\right) =\left( 1\right) \left( 1$ in the plans.
- 2. See BC standards for sign details.
- If adequate longitudinal buffer length "B" does not exist between the work space and the exit ramp, consideration should be given to closing

\*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

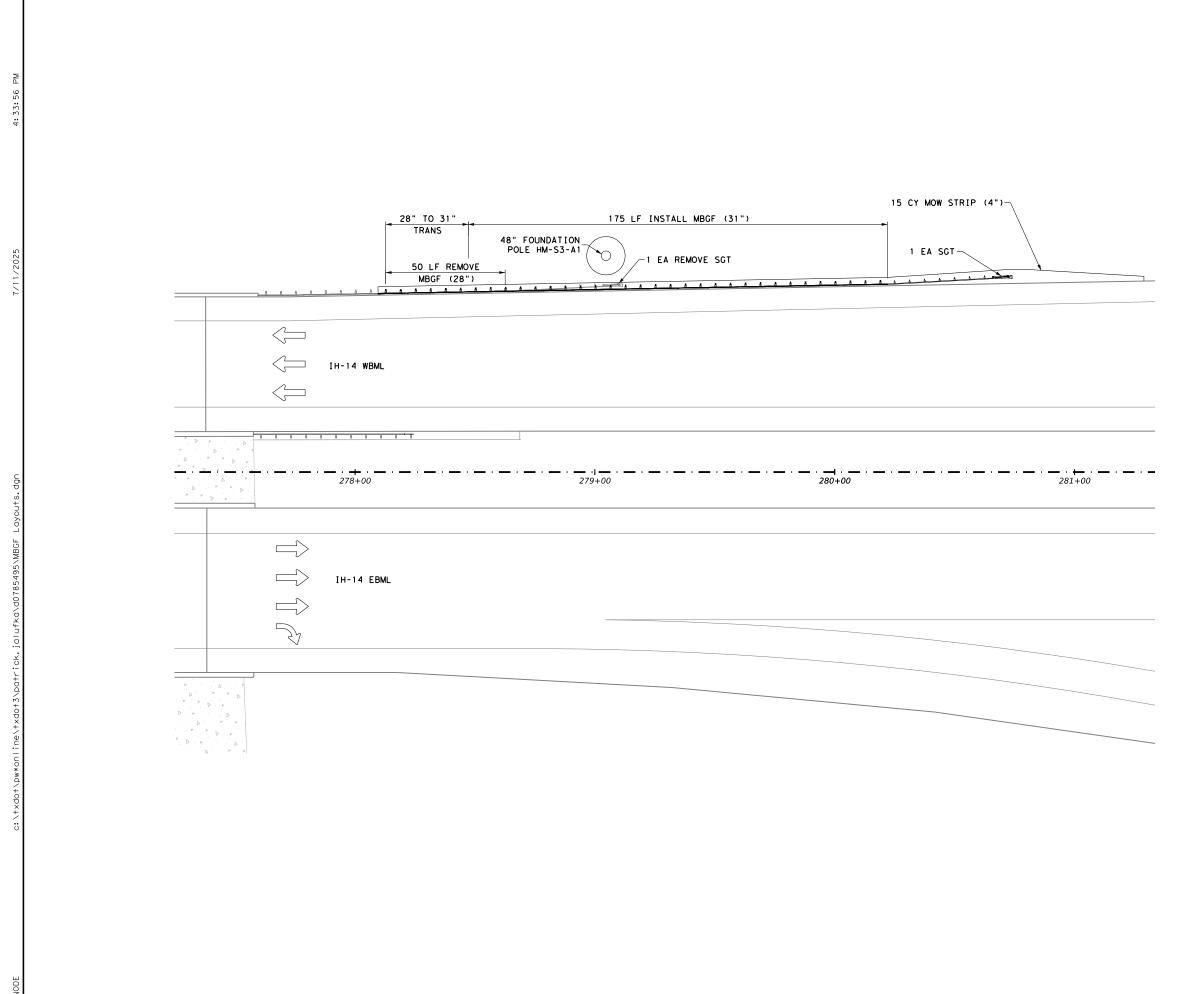
Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer

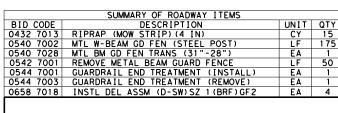


#### TRAFFIC CONTROL PLAN WORK AREA BEYOND EXIT RAMP

TCP (6-5) -12

			_	•		_	
FILE:	tcp6-5.dgn	DN: T	<dot< td=""><td>ck: TxDOT</td><td>DW:</td><td>TxDOT</td><td>ck: TxDOT</td></dot<>	ck: TxDOT	DW:	TxDOT	ck: TxDOT
© TxD0T	Feburary 1998	CONT	SECT	JOB		HIGHWAY	
	REVISIONS	0231	03	156		ΙH	-14
	98	DIST		COUNTY			SHEET NO.
4-98 8-	·12	WACO		BELL			34





INTERIM REVIEW

PATRICK JALUFKA P.E., ON: 7/II/2025 IT IS NOT TO BE USED FOR CONSTRUCTION

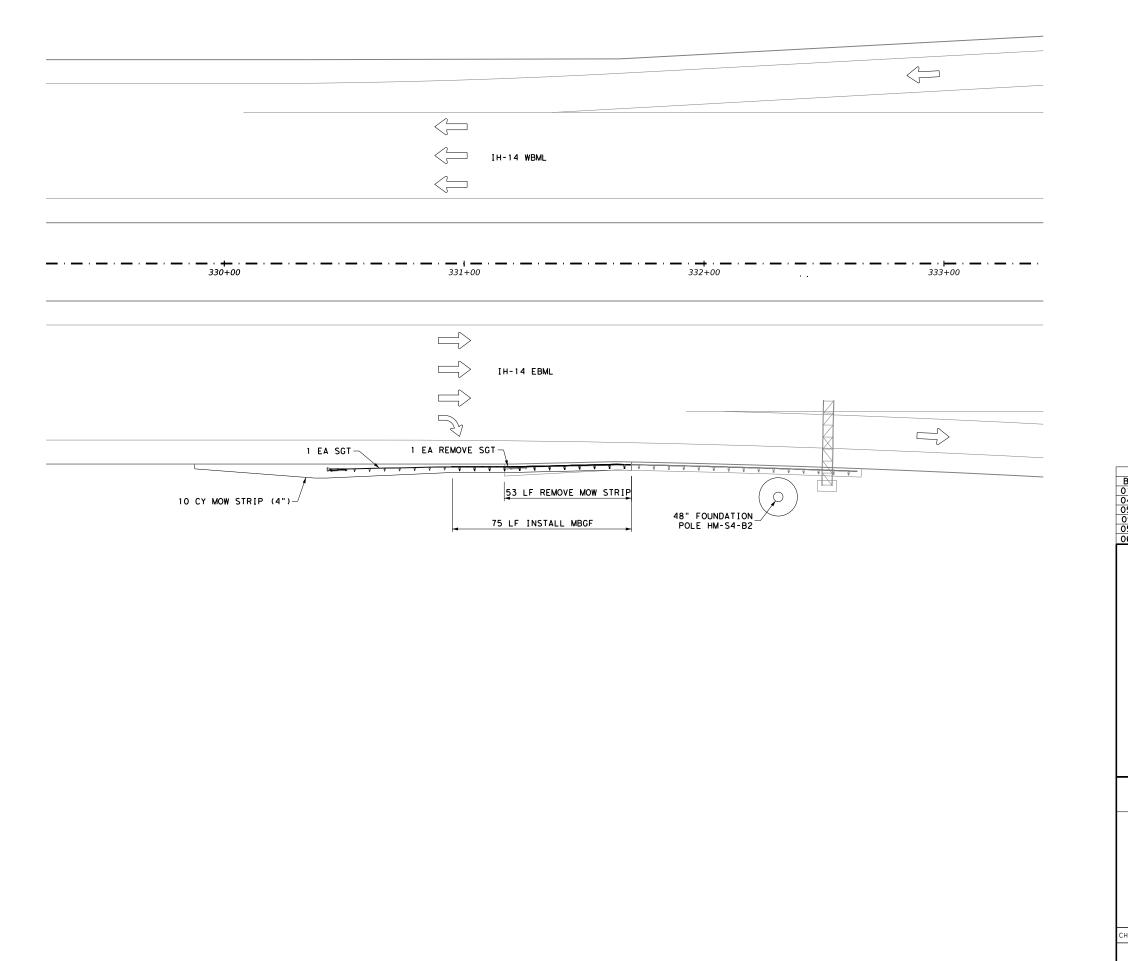
# PRELIMINARY NOT FOR CONSTRUCTION

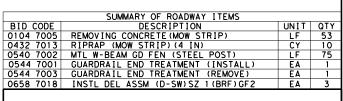


#### MBGF LAYOUT

	SCALE:	10 20		FEET		
		= 40'	HORI		SHE	ET I OF 5
NGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB		HIGHWAY
	6	0231	03	156		IH-14

CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	_	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		35





INTERIM REVIEW

PATRICK JALUFKA P.E., ON: 7/II/2025 IT IS NOT TO BE USED FOR CONSTRUCTION

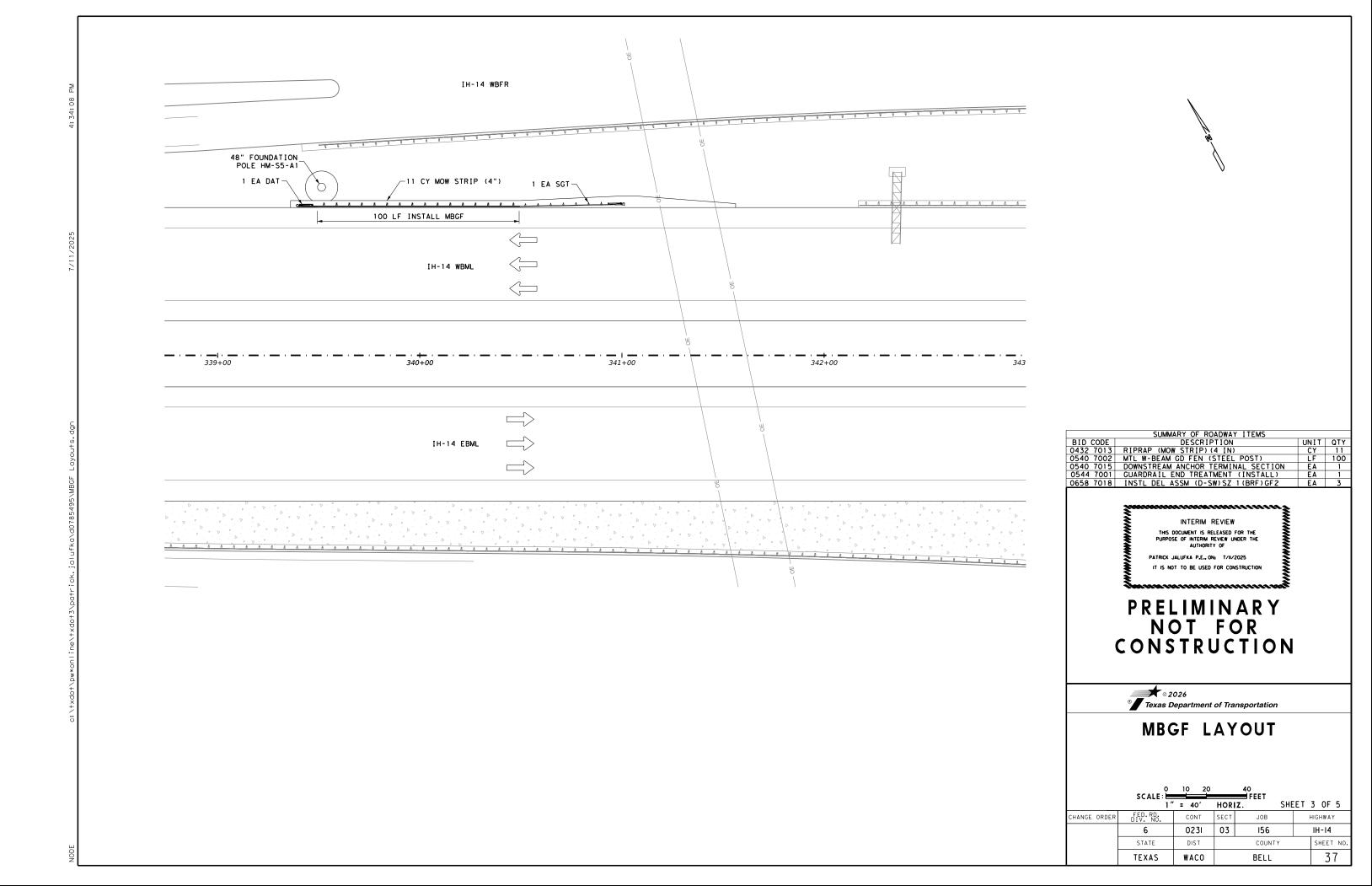
# PRELIMINARY NOT FOR CONSTRUCTION

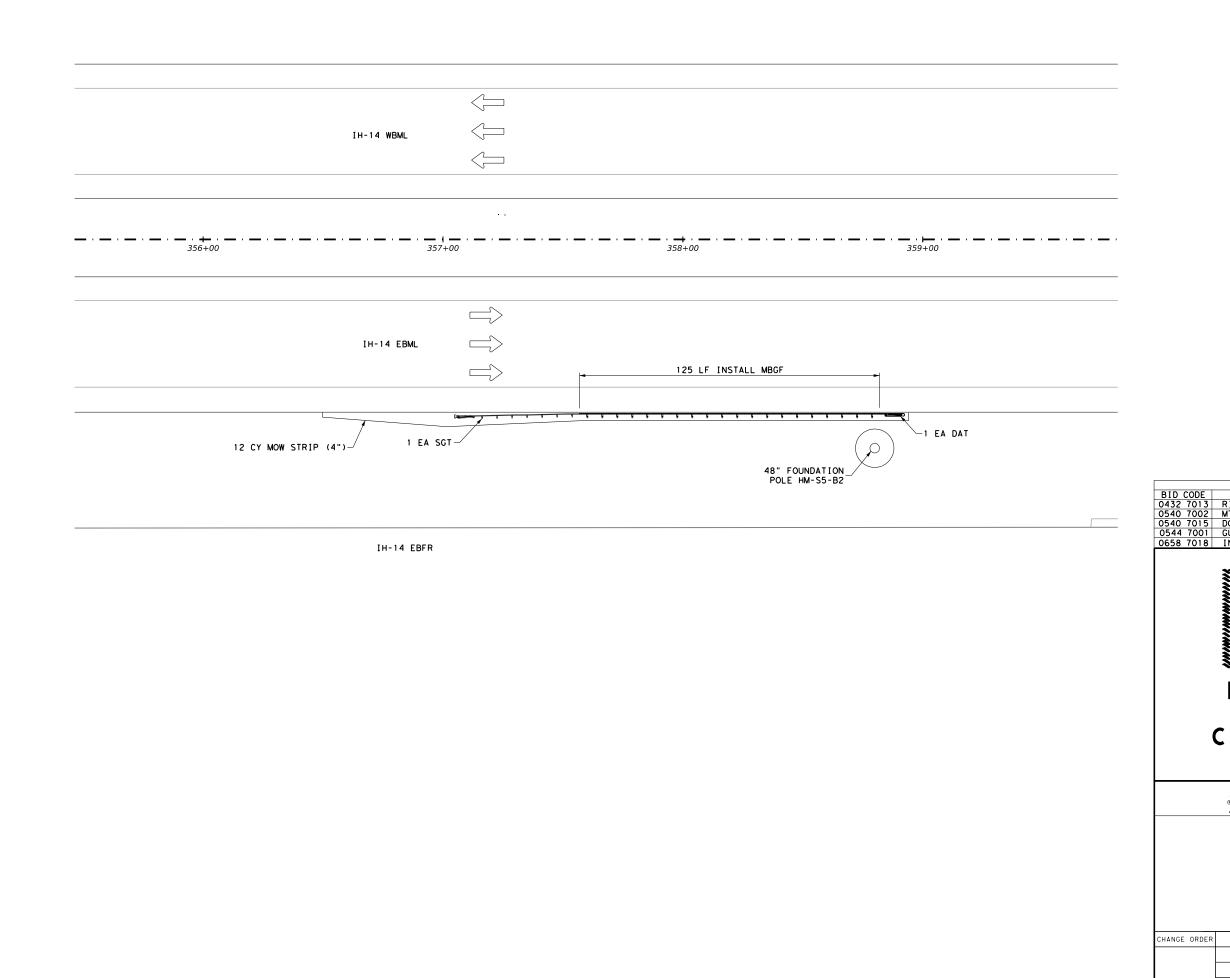


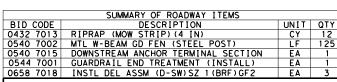
#### MBGF LAYOUT

	SCALE:	10	20		40 FEET
		= 40	)′	HOR	IZ.
ORDER	FED. RD.	CON	ΙT	SECT	JOB

	1"		HORI	Z. SHE	ET :	2 OF 5
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		36







INTERIM REVIEW

PATRICK JALUFKA P.E., ON: 7/II/2025
IT IS NOT TO BE USED FOR CONSTRUCTION

# PRELIMINARY NOT FOR CONSTRUCTION



#### MBGF LAYOUT

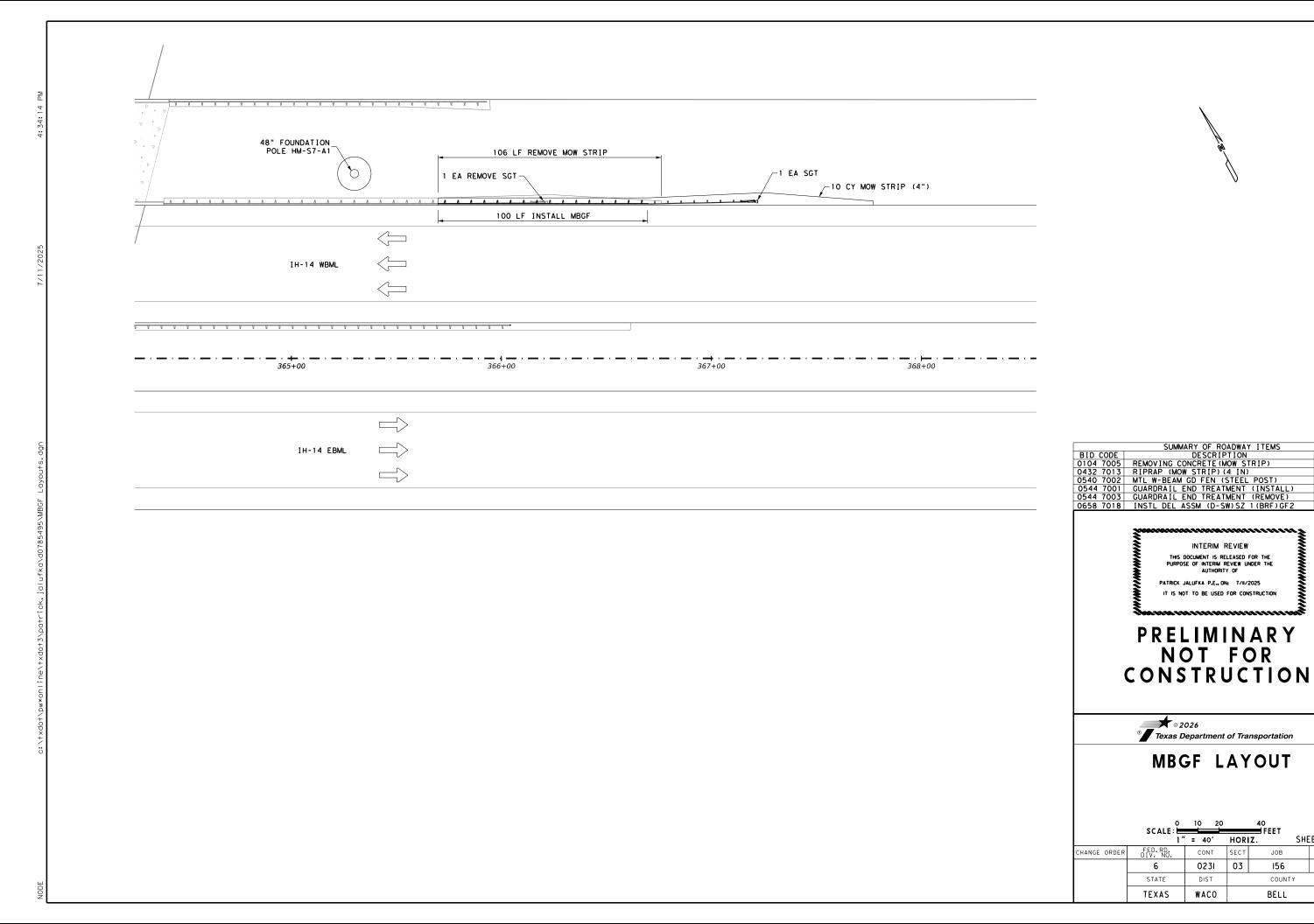
	SCALE:	10 20		FEET		
		' <b>=</b> 40'	HORI		SHEET	4 OF
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB		HIGHWA
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET

WACO

TEXAS

38

BELL



SHEET 5 OF 5

HIGHWAY

IH-14

SHEET NO

39

JOB

156

COUNTY

Texas Department of Transportation

METAL BEAM GUARD FENCE TL-3 MASH COMPLIANT

GF (31) - 19

ILE: gf3119.dgn DN:TxDOT CK:KM DW:VP CK:CGL/A TXDOT: NOVEMBER 2019 CONT SECT JOB HIGHWAY 0231 03 156 TH-14 BELL

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.

H S ᄶ

FBB02 = 2"

FBB03 = 10"

FBBO4 = 18'

POST & BLOCK LENGTH

BUTTON HEAD BOLT NOTE: SEE GENERAL NOTE 3 FOR

SPLICE & POST BOLT DETAILS.

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

MID-SPAN

RAIL SPLICE DETAIL

Ф

DIRECTION OF TRAFFIC

% " X 1 ¼" BUTTON HEAD SPLICE BOLTS WITH RECCESSED NUTS.

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

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 3/4" WASHER (FWC160)

4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING. FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.

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

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.

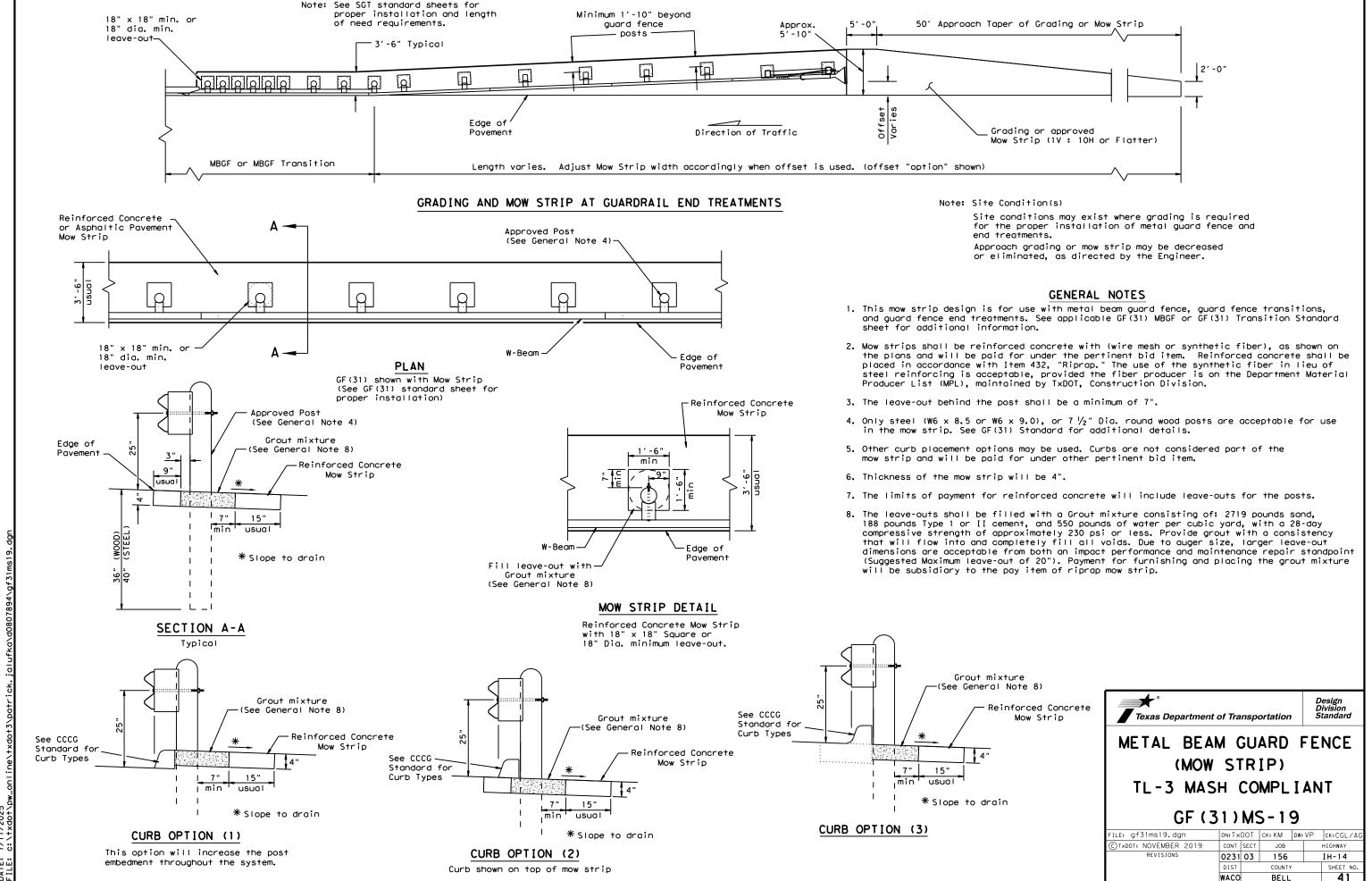
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS

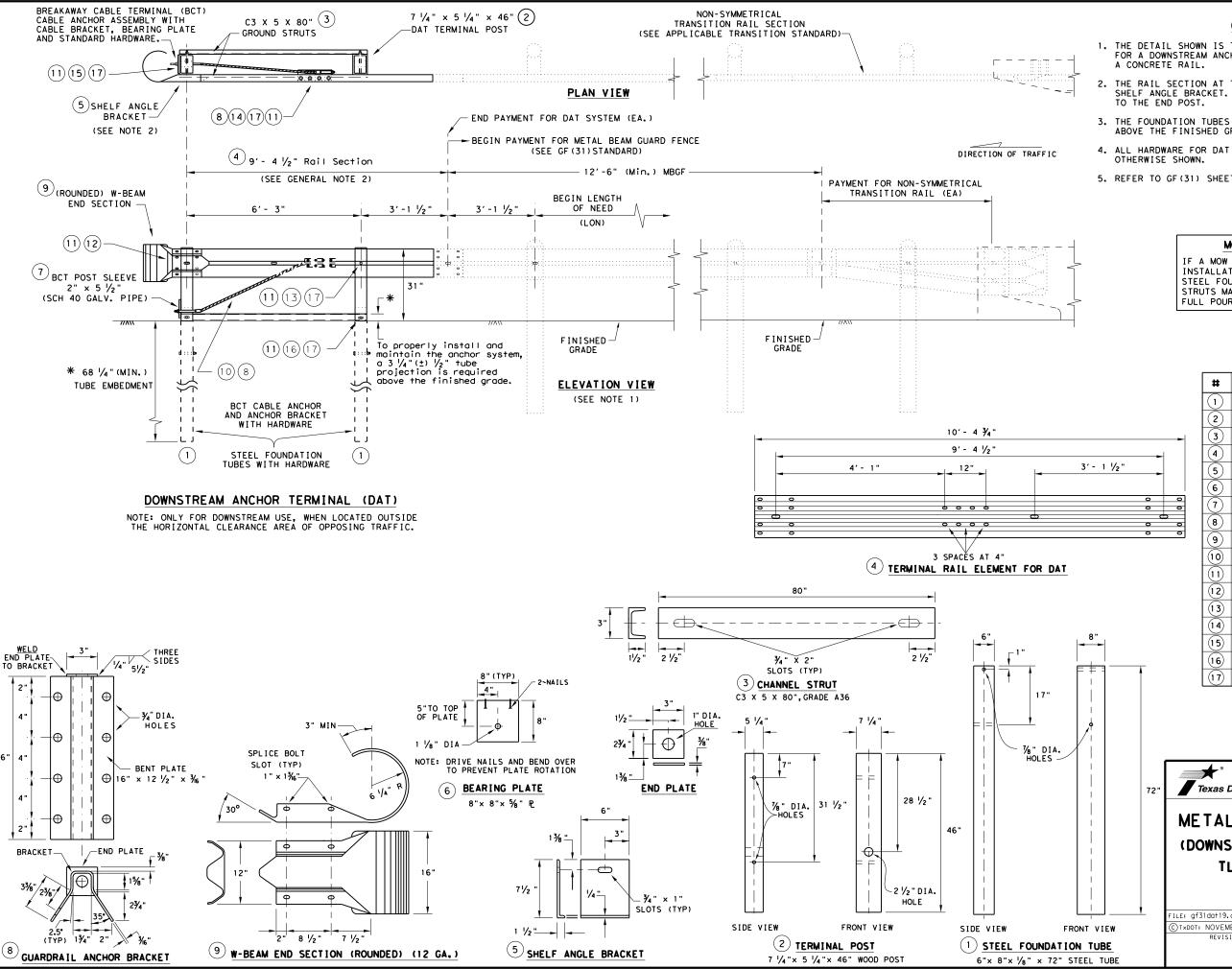
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS

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.

14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT S 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

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





#### GENERAL NOTES

- 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  $\frac{7}{4}\,^{\prime\prime}$  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)	% " X 2" HEX HEAD BOLT	8
15)	% " X 8" HEX HEAD BOLT	4
16	%" X 10" HEX HEAD BOLT	2
17	% " FLAT WASHER	18

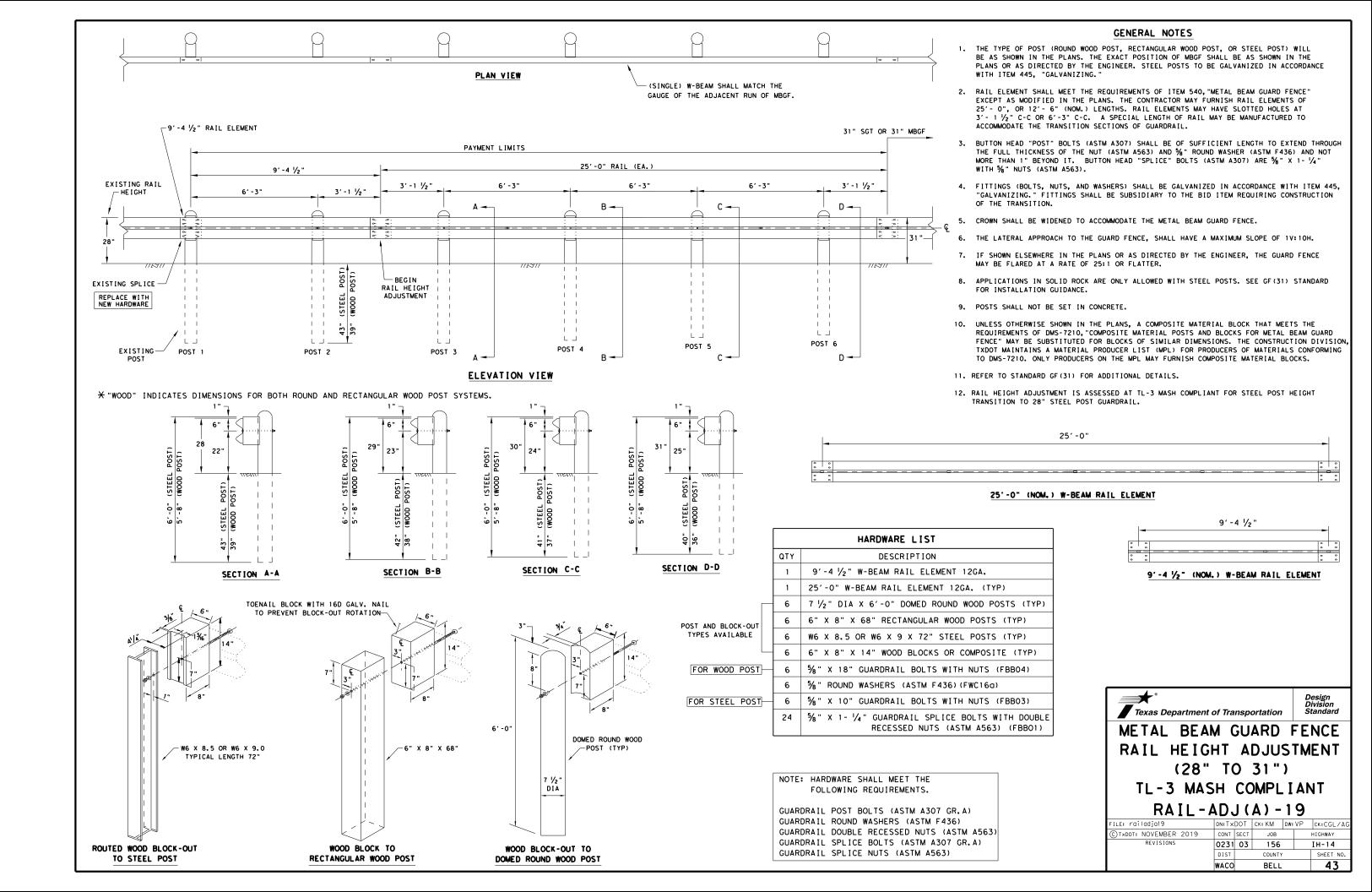


Design Division Standard

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

GF (31) DAT-19

FILE: gf31da+19.dgn	DN: Tx	DOT	ck: KM	DW:	:VP CK:CGL/A	
© T×DOT: NOVEMBER 2019	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0231	03	156		IH-14	
	DIST		COUNTY			SHEET NO.
	WACO		BELL			42



#### GENERAL NOTES

- FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
- 2. FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE; MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
- 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.
- 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.
- 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.

I TEM#	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	W6×9 I-BEAM POST 6FTGALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	% " x 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	34" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	5/8" X 1 1/4" GUARD FENCE BOLTS (GR. 2) MGAL	48
18	2001840	5/8" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	% " WASHER F436 STRUCTURAL MGAL	2
20	4001116	% " RECESSED GUARD FENCE NUT (GR. 2)MGAL	59
21	BSI-2001888	%" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	1/4" X 3/4" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWRO3	1
25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL, 8-SPACE, 12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

Texas Department of Transportation

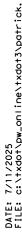
Design Division Standard

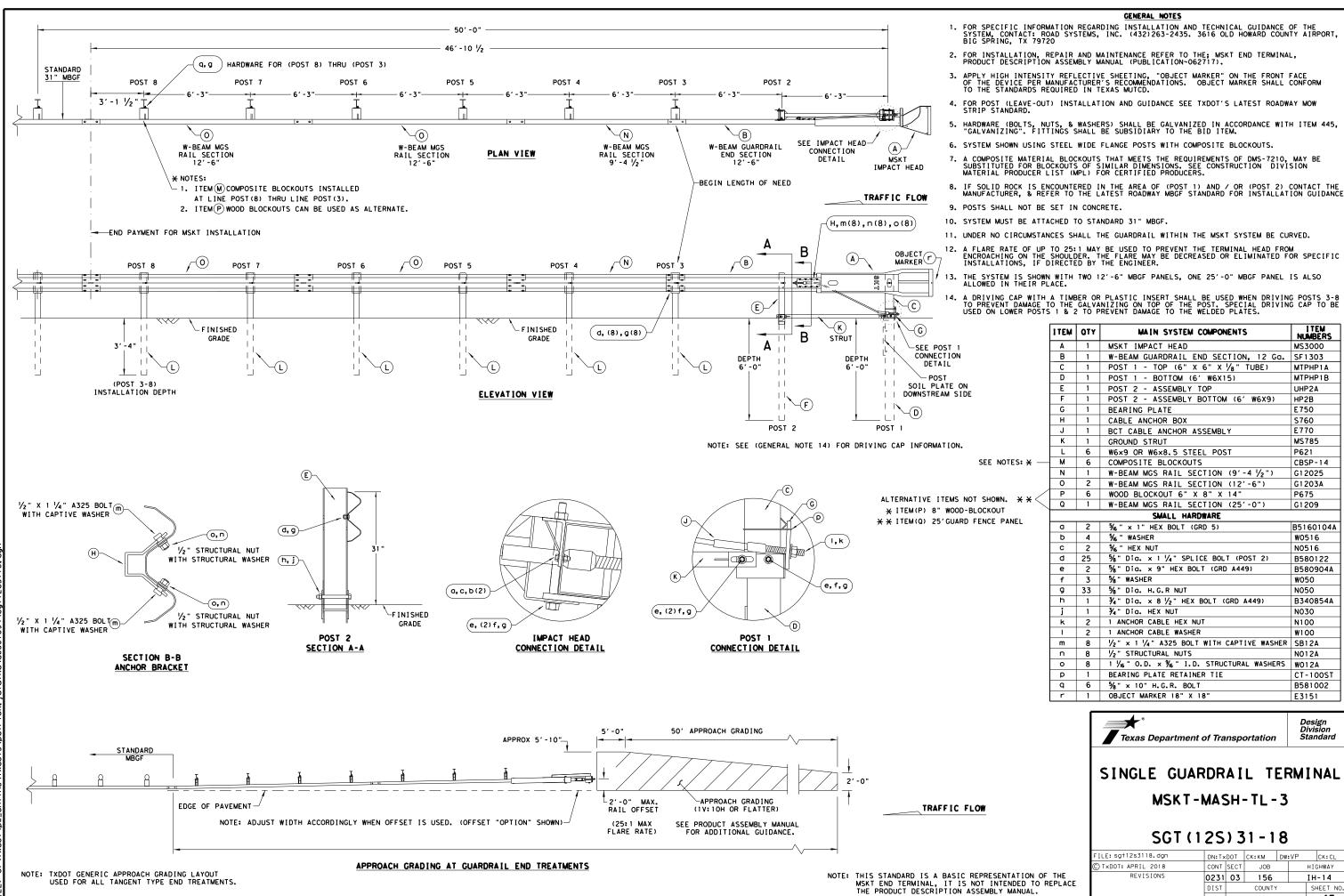
MAX-TENSION END TERMINAL

MASH - TL-3

SGT (11S) 31-18

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REVISIONS	0231	03	156		IH-14	
	DIST		COUNTY			SHEET NO.
	WACO		BELL			44





I TEM NUMBERS

MS3000

MTPHP1A

MTPHP1B

UHP2A

HP2B

E750 S760

F770

P621

MS785

CBSP-14

G12025 G1203A

P675

G1209

W0516

N0516

W050

N050

N030

N100

W100

N012A

W012A

CT-100S1

B581002

Design Division Standard

CK: CL

HIGHWAY

IH-14

SHEET N

45

JOB

156 COUNTY

WACO

E3151

B580122

B580904A

B340854A

B5160104A

GENERAL NOTES 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 NOTE: THERE ARE NO SUBSTITUTE GUARDRAIL PANELS FOR (MODIFIED PANEL 4) \* NOTE: GUARDRAIL PANELS 2 & 3 (ITEM C) MAY BE SUBSTITUTED WITH ONE 25'-0" GUARDRAIL PANEL (ITEM D). END OF LENGTH OF NEED PANEL 4 MODIFIED PANEL 1 2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL. MODIFIED PANEL 2 PANEL 3 9'-4 1/2" 12'-6" 12'-6" (b, (2d), e, f) 12'-6" 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. -3′ 1½<del>"-|-</del>3′ 1½ <del>"</del> -6′**-**3 (a, d, f) POST 1 POST 2 FIELDSIDE FACE -(H)STRUT C GR PANEL B2 GR PANEL 4. THE NOMINAL HEIGHT OF THE GUARDRAIL BEAM IS 31 INCHES WITH A TOLERANCE OF +/- ONE INCH. C GR PANEL 5. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD. POSŤ 3 PLAN VIEW (Q) (POST 2 THROUGH POST 8) ARE MODIFIED STEEL-YIELDING POSTS WITH YIELDING HOLES AT GROUND LEVEL. THERE ARE NO SUBSTITUTE POSTS. LENGTH OF NEED COMPOSITE BLOCKOUTS (ITEM F) MAY BE SUBSTITUTED WITH (ITEM G) WOOD BLOCKOUTS. BGR PANEL NOTE: CONFIRM ALL POST OFFSET'S AS SHOWN ON THE PRODUCT DESCRIPTION ASSEMBLY MANUAL 7. POSTS SHALL NOT BE SET IN CONCRETE. POST POST 2 END PAYMENT FOR SGT DO NOT BOLT MODIFIED (PANEL 4) TO WOOD POST TRAFFIC-SIDE VIEW IF SOLID ROCK IS ENCOUNTERED FOR ANY OF THE POSTS IN THE SYSTEM, CONTACT THE MANUFACTURER FOR SPECIFIC INSTALLATION GUIDANCE. OFFSET DISTANCE 3 TO POST 2 = 8 3 TO POST 1 = 6 BEGIN STANDARD 31 MBGF TRAFFIC FLOW GRABBER HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM. HARDWARE RAIL SPLICE HARDWARE LAP GUARDRAIL SPLICES IN DIRECTION OF TRAFFIC FLOW GRABBER TEETH LOCKED ONTO FRONT (h, (2i), e, f 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. (8) 5/8" X 1 1/4" GR BOLTS OF THE MODIFIED GUARDRAIL PANEL YIELDING POST HARDWARE WITH 5/8" GR HEX NUTS WOOD BREAKAWAY (1) %"× 10" GR BOLT NO BOLTS IN WITH %" GR HEX NUT REAR TWO HOLES 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. POST J-(c, f) **(c,** f) MPACT A HEAD (**1,**m) (b, f) -(b, f) -(b, f) RF ID CHIP I TEM QTY MAIN SYSTEM COMPONENTS ITEM # 4 111111 A 1 SGET IMPACT HEAD SIH1A 126SPZGF 1 MODIFIED GUARDRAIL PANEL 12'-6" CĂBLE Q-YIELDING E-POST MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA GP94 └(I,m)¾" X 3" GR5 LAG SCREWS 2 STANDARD GUARDRAIL PANEL 12'-6" 12GA GP126 STANDARD GUARDRAIL PANEL 25'-0" GP25 11 -11 ∕FINISHED GRADE \\_(H)STRUT MODIFIED YIELDING I-BEAM POST W6x8.5 1/2 " YIELDING YP6MOD 11 11 -11 -11 (g, (2i), j, k BEARING ALTERNATIVE ITEMS COMPOSITE BLOCKOUT 6" X 8" X 14" CB08 HOLES AT 41" || POST NOTE: WOOD BLOCKOUT 6" X 8" X 14" WBO8 DEPTH -11 1.1 (TYP 8-2) (b, (2d),e,f 1 STRUT 3" X 3" X 80" x 1/4" A36 ANGLE HARDWARE SEE PLAN VIEW STR80 11 11 11 1.1 11 1 FOUNDATION TUBE 6" X 8" X 72" x 3/6 FNDT6 11 11 H 11 WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50" WBRK50 POST POST 8 POST 7 POST 6 POST 5 POST 4 POST 3 POST 2 WOOD STRIKE BLOCK WSBLK14 STRUT POST 1 STRIKE PLATE 1/4" A36 BENT PLAT SPLT8 **ELEVATION VIEW** M 1 REINFORCEMENT PLATE 12 GA. GR55
N 1 GUARDRAIL GRABBER 2 ½" X 2 ½" X 16 ½"
O 1 BEARING PLATE 8" X 8 5% X 5% A36 REPLT17 ITEM (E) (YIELDING POST 8 THRU 2) ARE MODIFIED W6X8.5 STEEL GGR17 POST WITH FOUR 1/2" YIELDING HOLES, TWO HOLES PER FLANGE. BPLT8 TRAFFIC SIDE VIEW P 1 PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.) PSLV4 Q 1 BCT CABLE 3/4" X 81" LENGTH CBL81 5 1/2" X 7 1/2" X 50" WOOD BREAKAWAY POST SMALL HARDWARE WOOD STRIKE BLOCK (K)-FIELD SIDE TRAFFIC 6" X 8" X 14' W6X8.5 I-BEAM POST X 12" GUARDRAIL BOLT 307A HDG 12GRBLT COMPOSITE BLOCKOUT WITH YEILDING HOLES STRIKE PLATE (L) NO BOLTS IN \SIDE \ 17" GUARDRAIL N-MODIFIED B-REINFORCEMENT b 7 %" X 10" GUARDRAIL BOLT 307A HDG 1 OGRBL T REAR TWO HOLES RAIL M PLATE ITEM (F) -Œ I TEM REFLECTIVE SHEETING PROVIDED BY COMPANY ' X 1 ¼" GR SPLICE BOLTS 307A HDG 1 GRBL T  $rac{5}{8}$ " X 1  $rac{1}{4}$ " GR SPLICE BOLIS 30 $rac{5}{8}$ " FLAT WASHER F436 A325 HDG SGET (A)-√N GUARDRAII GRABBER 58FW436 IMPACT HEAD SEE (GENERAL NOTE 3) **1...** (h, (2i), J, K %" LOCK WASHER HDG 58LW GUARDRAIL HEX NUT HDG 58HN563 39 (1) % " X 10" GR BOLT BEARING (O) -(Q)BCT CABLE X 2" STRUT BOLT A325 HDG (1) % " GR NUT 2BLT BEARING O HSTRUT PLATE PIPE SLEEVE " X 1 ¼" PLATE BOLT A325 HDG 125BLT FLAT WASHER F436 A325 HDG 12FWF436 (2) 1/2 (6h) ½" X 1 ¼" BOLTS STRUT (H)-/ MAXIMUM √2" LOCK WASHER HDG 12LW (b, (2d), e, f YEILDING HOLE (12i) ½" FLAT WASHER (6j) ½" LOCK WASHER TUBE HEIGHT 3" X 3" X 80" 5/8" × 10" GR BOLT 5/8" FLAT WASHER HEX NUT A563 HDG 12HN563 PÖST LENGTH ABOVE GROUND 1/4" THICKNESS " X 3" HEX LAG SCREW GR5 HDG 38LS YEILDING -FINISHED % " HEX NUT (6k) 38" FLAT WASHER F436 A325 HDG 38FW844 LOCK WASHER POST GRADE 70" TUBE 2 1" FLAT WASHER F436 A325 HDG 1FWF436 GR NUT TUBE Œ 0 2 | 1" HEX NUT A563DH HDG LENGTH 1HN563 TWO FLAT WASHERS | EMBED PER BOLT, ONE EACH SIDE OF PANEL. POST 2 1 18" TO 24" LONG ZIP TIE RATED 175-200LB ZPT18 q 1 1 1/2" X 4" SCH-40 PVC PIPE STRUT POST PSPCR4 6" X 8" X 72" %" THICKNESS (I)-/ 1 RFID CHIP RATED MIL-STD-810F RF I D8 1 OF s 1 IMPACT HEAD REFLECTIVE SHEETING RS30M SIDE VIEW POST 1 FIELD SIDE VIEW REINFORCEMENT PLATE SIDE VIEW POST 1 POST 8 - POST 3 (TYP) FRONT END VIEW WITH GUARDRAIL GRABBER Texas Department of Transportation SPIG INDUSTRY, LLC 50' APPROACH GRADING SPECIAL NOTE: APPROX 5'-10" SGET MAXIMUM (OFFSET), HORIZONTAL FLARE STANDARD SINGLE GUARDRAIL TERMINAL OVER THE FIRST 50 FEET = 1 FOOT. SGET - TL-3 - MASH SGT (15) 31-20 EDGE OF PAVEMENT APPROACH GRADING -2'-0" MAX. ILE: sg+153120.dgr DN:TxDOT CK:KM DW:VP (1V: 10H OR FLATTER) RAIL OFFSET NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN TxDOT: APRIL 2020 JOB HIGHWAY THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED 0231 03 156 IH-14 APPROACH GRADING AT GUARDRAIL END TREATMENTS TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL BELL

EXIST TY A GROUND BOX TO BE REMOVED

EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)

-® EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)

EXIST GROUND BOX (TY A)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

EXIST RIGID METAL CONDUIT

EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)

EXIST ELEC SERVICE

POLE DESIGNATION

RIP-S#-A#
POLE #
CIRCUIT #
SERVICE #

CONDUIT DESIGNATION

RUN #
SERVICE #
EXISTING CONDUIT

INTERIM REVIEW
THIS DOCUMENT IS RELEASED FOR THE
PURPOSE OF INTERIM REVIEW UNDER THE
AUTHORITY OF

PATRICK JALUFKA P.E., ON: 1/11/2025
IT IS NOT TO BE USED FOR CONSTRUCTION

## PRELIMINARY NOT FOR CONSTRUCTION



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	SCALE: =			FEET	
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	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WACO		BELL	47



EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)

EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)

EXIST GROUND BOX (TY A)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

EXIST RIGID METAL CONDUIT

EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)

EXIST ELEC SERVICE

#### POLE DESIGNATION

CONDUIT DESIGNATION

RIP-S#-A# POLE #
CIRCUIT #
SERVICE #



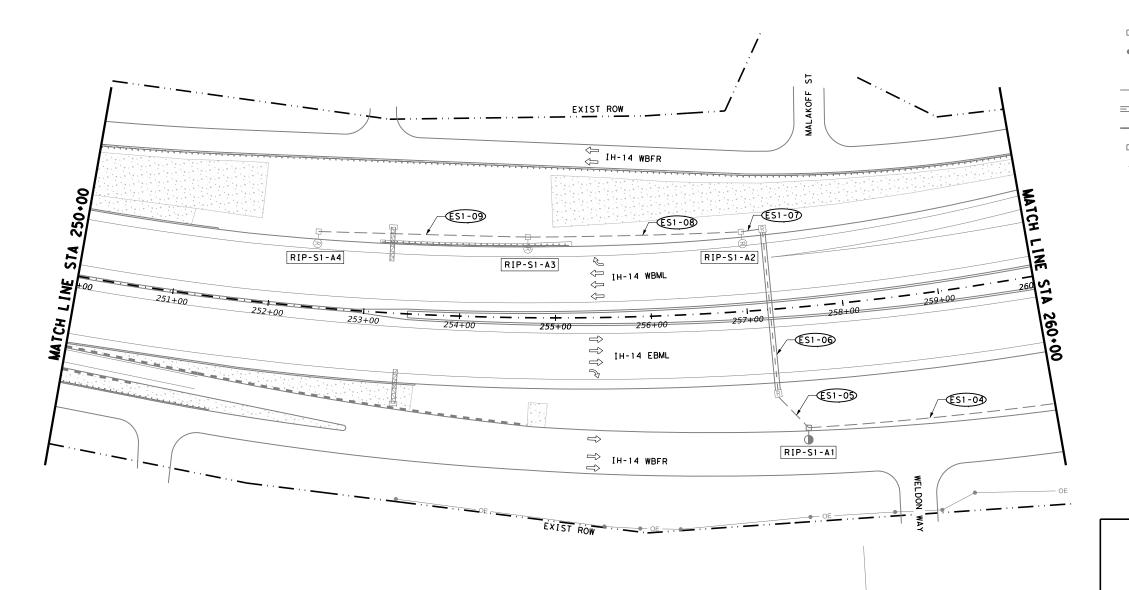


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	STATE	DIST		COUNTY	5	SHEET NO.
	TEXAS	WACO		BELL		48



EXISTING CONDUIT AND CONDUCTOR RUNS								
				690	0690			
				7144	7150			
RUN NAME   SERVICE   CIR		CIRCUITS	RUN LENGTH	REMOVE ABOVE - GROUND CONDUIT	REMOVE CONDUCTOR			
				Ŀ	LF			
ES1-04	ES1	Α	259	NO WORK				
ES1-05	ES1	Α	48		144			
ES1-06	ES1	Α	172		516			
ES1-07	ES1	Α	22		66			
ES1-08	ES1	A	220		660			
ES1-09	ES1	A	220		660			
		SH	EET TOTAL:		2046			

	SUMMARY OF REMOVAL ITEMS
BID CODE	DESCRIPTION
610 7009	REMOVE RD IL ASM (TRANS-BASE)
624 7013	REMOVE GROUND BOX
690 7150	REMOVE CONDUCTOR



EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)

EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)

EXIST GROUND BOX (TY A)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

EXIST RIGID METAL CONDUIT

EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)

EXIST ELEC SERVICE

#### POLE DESIGNATION

RIP-S#-A# POLE #
CIRCUIT #
SERVICE #

CONDUIT DESIGNATION

ES#-## —RUN # —SERVICE # —EXISTING CONDUIT

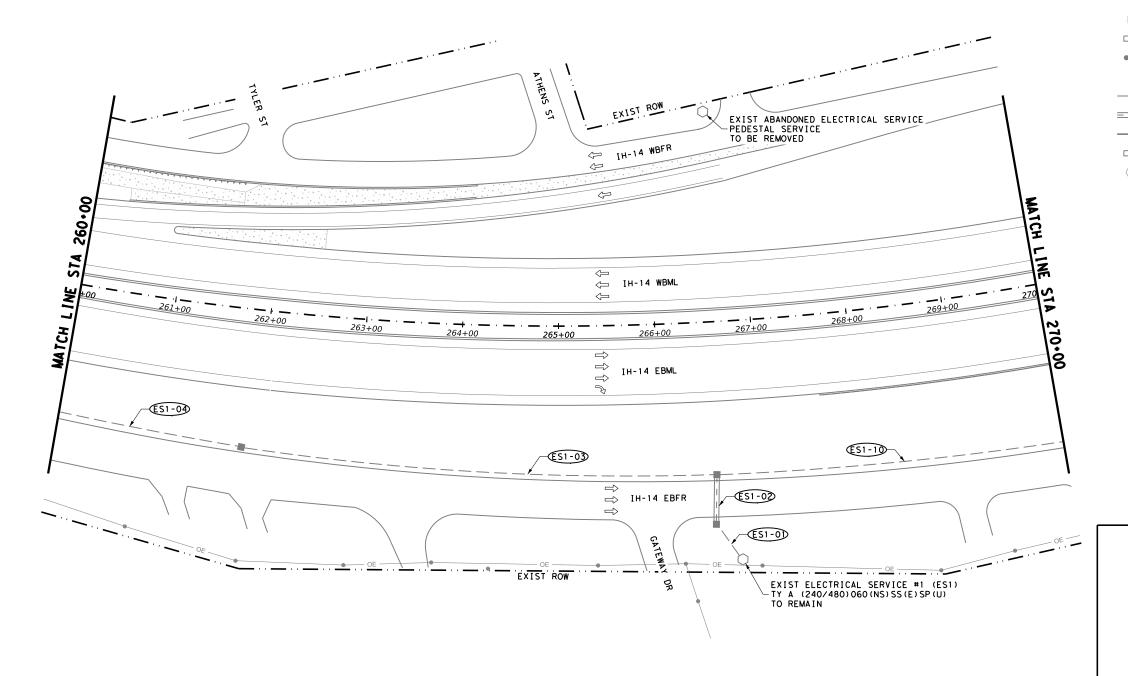
### INTERIM REVIEW THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF PATRICK JALUFKA P.E., ON: 7/II/2025 IT IS NOT TO BE USED FOR CONSTRUCTION

### PRELIMINARY NOT FOR CONSTRUCTION



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FED.RD.	CON	Т	SECT	JOE		

	1 "		HOR	IZ. SHE	EET	3 OF 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	1	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		49



	EXISTING CONDUIT AND CONDUCTOR RUNS							
			690	0690				
				7144	7150			
RUN NAME	SERVICE	CIRCUITS	RUN LENGTH	REMOVE ABOVE - GROUND CONDU I T	REMOVE CONDUCTOR			
				LF	LF			
ES1-01	ES1	ABC	46	NO W	ORK			
ES1-02	ES1	ABC	52	NO W	ORK			
ES1-03	ES1	Α	498	NO W	ORK			
ES1-04	ES1	Α	194	NO W	ORK			
ES1-10	ES1	BC	365	NO W	ORK			
SHEET TOTAL:								

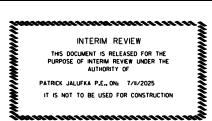
	SUMMARY OF REMOVAL ITEMS		
BID CODE	DESCRIPTION	UNIT	QTY
628 7002	REMOVE ELECTRICAL SERVICES	EA	1

- EXIST TY A GROUND BOX TO BE REMOVED
- EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)
- EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)
  - EXIST GROUND BOX (TY A)
- EXIST CONDUIT (TRENCHED)
- EXIST CONDUIT (BORED) EXIST RIGID METAL CONDUIT
- EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)
- EXIST ELEC SERVICE

POLE DESIGNATION

CONDUIT DESIGNATION

RIP-S#-A# POLE #
CIRCUIT #
SERVICE # -RUN # -SERVICE # -EXISTING CONDUIT

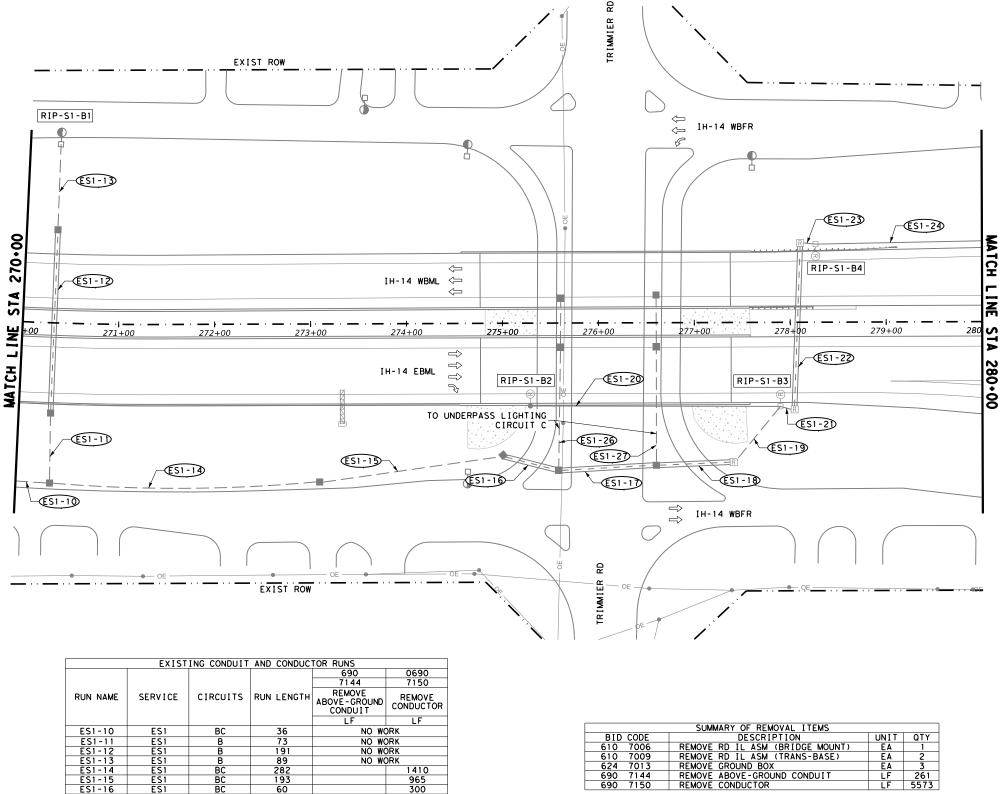


### PRELIMINARY NOT FOR CONSTRUCTION



**★** © 2026

	o SCALE: <del> </del>	25 50		100 FEET	
	1"	= 100'	HOR		EET 4 OF 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WACO		BELL	50



EXISTING CONDUIT AND CONDUCTOR RUNS							
				690	0690		
				7144	7150		
RUN NAME	SERVICE	CIRCUITS	RUN LENGTH	REMOVE ABOVE - GROUND CONDU I T	REMOVE CONDUCTOR		
				LF	LF		
ES1-10	ES1	BC	36	NO WO	ORK		
ES1-11	ES1	В	73	NO WO	)RK		
ES1-12	ES1	В	191	NO WO	ORK		
ES1-13	ES1	В	89	NO WO	)RK		
ES1-14	ES1	BC	282		1410		
ES1-15	ES1	BC	193		965		
ES1-16	ES1	BC	60		300		
ES1-17	ES1	BC	102		510		
ES1-18	ES1	В	81		243		
ES1-19	ES1	В	76		228		
ES1-20	ES1	В	261	261	783		
ES1-21	ES1	В	15		45		
ES1-22	ES1	В	174		522		
ES1-23	ES1	В	16		48		
ES1-24	ES1	В	173		519		
ES1-26	ES1	С	128	NO WO	ORK		
ES1-27	ES1	С	123	NO WO	ORK		
SHEET TOTAL: 261 5573							

				7144	7150
RUN NAME	SERVICE	CIRCUITS	RUN LENGTH	REMOVE ABOVE - GROUND CONDU I T	REMOVE CONDUCTOR
				LF	LF
ES1-10	ES1	BC	36	NO WO	)RK
ES1-11	ES1	В	73	NO WO	)RK
ES1-12	ES1	В	191	NO WO	)RK
ES1-13	ES1	В	89	NO WO	)RK
ES1-14	ES1	BC	282		1410
ES1-15	ES1	BC	193		965
ES1-16	ES1	BC	60		300
ES1-17	ES1	BC	102		510
ES1-18	ES1	В	81		243
ES1-19	ES1	В	76		228
ES1-20	ES1	В	261	261	783
ES1-21	ES1	В	15		45
ES1-22	ES1	В	174		522
ES1-23	ES1	В	16		48
ES1-24	ES1	В	173		519
ES1-26	ES1	С	128	NO WO	DRK

EXIST TY A GROUND BOX TO BE REMOVED

EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)

EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)

EXIST GROUND BOX (TY A)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

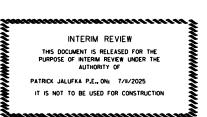
EXIST RIGID METAL CONDUIT EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)

EXIST ELEC SERVICE

POLE DESIGNATION

CONDUIT DESIGNATION

RIP-S#-A# POLE #
CIRCUIT #
SERVICE # --RUN # --SERVICE # --EXISTING CONDUIT



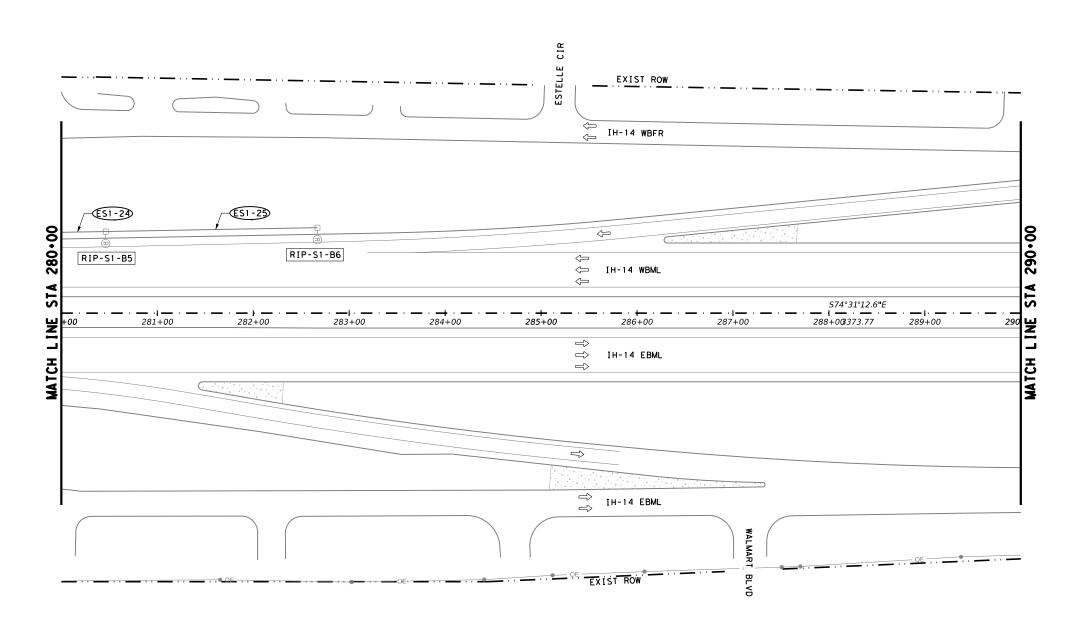
### PRELIMINARY NOT FOR CONSTRUCTION



## REMOVAL LAYOUT

SCALE:	25	50		100 FEE1
1"	= 100	) <i>'</i>	HOR	
ED. RD.	CON	Т	SECT	JOI

	SCALE: =	23 30		FEET	
	1"	100′	HORI		ET 5 OF 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WACO	BELL		51



EXICTING CONDUIT AND CONDUCTOR DUNC						
LXIST	ZXISTINO CONDOLT	AND CONDOC	690	0690		
			7144	7150		
SERVICE	CIRCUITS	RUN LENGTH	REMOVE ABOVE - GROUND CONDUIT	REMOVE CONDUCTOR		
			LF	LF		
ES1	В	46		138		
ES1	В	220		660		
SHEET TOTAL: 798						
	SERVICE ES1	SERVICE CIRCUITS  ES1 B ES1 B	SERVICE CIRCUITS RUN LENGTH  ES1 B 46 ES1 B 220	SERVICE   CIRCUITS   RUN LENGTH		

SUMMARY OF REMOVAL ITEMS
DESCRIPTION
REMOVE RD IL ASM (TRANS-BASE)
REMOVE CONDUCTOR

	EXIST	ING CONDUIT	AND CONDUC	TOR RUNS	
				690	0690
				7144	7150
RUN NAME SER	SERVICE	CIRCUITS	RUN LENGTH	REMOVE ABOVE - GROUND CONDUIT	REMOVE CONDUCTO
				LF	LF
ES1-24	ES1	В	46		138
ES1-25	ES1	В	220		660



EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)

EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)

EXIST GROUND BOX (TY A)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

EXIST RIGID METAL CONDUIT

EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)

EXIST ELEC SERVICE

POLE DESIGNATION

CONDUIT DESIGNATION

RIP-S#-A# POLE #
CIRCUIT #
SERVICE # ES#-## --RUN # --SERVICE # --EXISTING CONDUIT

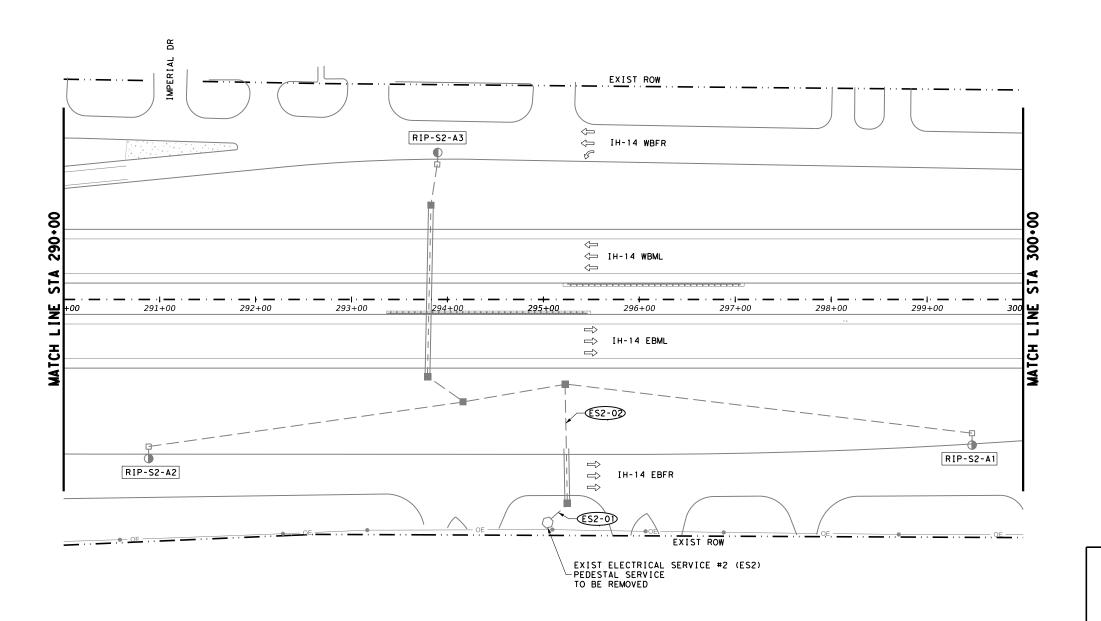
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CONSTRUCTION



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		= 100	HORI	Z. SHE	EI 6 UF 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WACO		BELL	52



EXISTING CONDUIT AND CONDUCTOR RUNS							
				690	0690		
				7144	7150		
RUN NAME	SERVICE	CIRCUITS	RUN LENGTH	REMOVE ABOVE - GROUND CONDUIT	REMOVE CONDUCTOR		
				LF	LF		
ES2-01	ES2	Α	29		87		
ES2-02	ES2	Α	124	NO WORK			
		SH	EET TOTAL:		87		

	SUMMARY OF REMOVAL ITEMS		
BID CODE	DESCRIPTION	UNIT	QTY
628 7002	REMOVE ELECTRICAL SERVICES	EA	1
690 7150	REMOVE CONDUCTOR	I F	87



EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)

EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)

EXIST GROUND BOX (TY A)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

EXIST RIGID METAL CONDUIT

EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)

EXIST ELEC SERVICE

#### POLE DESIGNATION

RIP-S#-A#

ES#-## POLE #
CIRCUIT #
SERVICE #

CONDUIT DESIGNATION

--RUN # --SERVICE # --EXISTING CONDUIT

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PATRICK JALUFKA P.E., ON: 7/II/2025 IT IS NOT TO BE USED FOR CONSTRUCTION

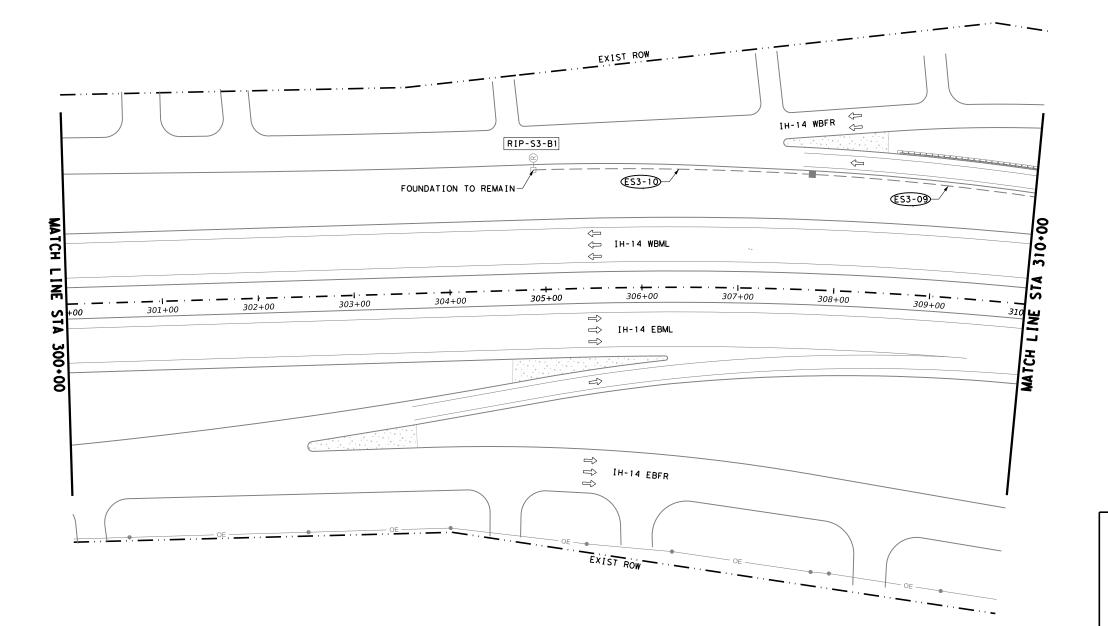
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## REMOVAL LAYOUT

CALE	<u>^</u>	2	5 5	0		100 FE	E
	1"	=	100′	H	IORI		_
							_

	SCALE:	25 50		FEET		
	1"	= 100′	HORI		EET	7 OF 20
NGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		53



	EXIST	ING CONDUIT	AND CONDUC	TOR RUNS			
				690	0690		
				7144	7150		
RUN NAME	SERVICE	CIRCUITS	RUN LENGTH	REMOVE ABOVE - GROUND CONDU I T	REMOVE CONDUCTOR		
				LF	LF		
ES3-09	ES3	В	234		702		
ES3-10	ES3	В	291		873		
		SH	EET TOTAL:		1575		

SUMMARY OF REMOVAL ITEMS

DESCRIPTION

REMOVE RD IL ASM (TRANS-BASE)

REMOVE CONDUCTOR

- EXIST TY A GROUND BOX TO BE REMOVED
- **□**-® EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)
- EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)
- EXIST GROUND BOX (TY A)
- EXIST CONDUIT (TRENCHED)
- EXIST CONDUIT (BORED)
- EXIST RIGID METAL CONDUIT
- EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)
- EXIST ELEC SERVICE

#### POLE DESIGNATION

ES3-13

ES4-07)

**ES4-01** 

STA

MATCH

RIP-S3-B2

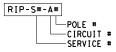
ES4-02

318+00

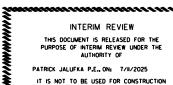
ES4-03

ち

CONDUIT DESIGNATION







#### PRELIMINARY NOT FOR CONSTRUCTION



#### **REMOVAL** LAYOUT

	SCALE: =			FEET .	
	1"	= 100'	HOR		ET 8 OF 20
CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WACO		BELL	54

0 25 50

## EXISTING CONDUIT AND CONDUCTOR RUNS 690 7144 CIRCUITS RUN LENGTH REMOVE ABOVE-GROUND CONDUCTOR

5676

SHEET TOTAL:

ES3-14)

323+00

324+00

ES3-13

RIP-S3-B3

321+00

RUN NAME

SERVICE

320.00

STA

MATCH

	SUMMARY OF REMOVAL ITEMS		
BID CODE	DESCRIPTION	UNIT	QTY
610 7009	REMOVE RD IL ASM (TRANS-BASE)	EA	4
624 7013	REMOVE GROUND BOX	EA	3
690 7150	REMOVE CONDUCTOR	LF	5676

ES3-16

<del>328+00</del>

RIP-S3-B5

329+00

EXIST ROW

IH-14 WBFR

IH-14 WBML

IH-14 EBML

⇒ IH-14 EBML

EXIST ROW

RIP-S3-B4

327+00

 $\bigcirc$ 

ŶŶ

16

ES4-08

ES3-15

325+00

#### **LEGEND**

- EXIST TY A GROUND BOX TO BE REMOVED
- EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)
- EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)
- EXIST GROUND BOX (TY A)
- EXIST CONDUIT (TRENCHED)
- EXIST CONDUIT (BORED)

CONDUIT DESIGNATION

—RUN # —SERVICE # —EXISTING CONDUIT



### PRELIMINARY NOT FOR CONSTRUCTION



#### **REMOVAL** LAYOUT

	SCALE:	25 50		100 FEET	
	1"	' = 100'	HORI		EET 9 OF 20
HANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WACO		BELL	55

EXIST RIGID METAL CONDUIT

EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)

EXIST ELEC SERVICE

POLE DESIGNATION

RIP-S#-A#

POLE #
CIRCUIT #
SERVICE #

330.00

STA

RIP-S4-A4

ES4-10



® EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)

-® EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)

EXIST GROUND BOX (TY A)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

EXIST RIGID METAL CONDUIT

EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)

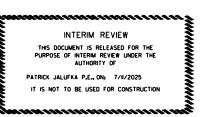
EXIST ELEC SERVICE

#### POLE DESIGNATION

CONDUIT DESIGNATION

POLE #
CIRCUIT #
SERVICE #

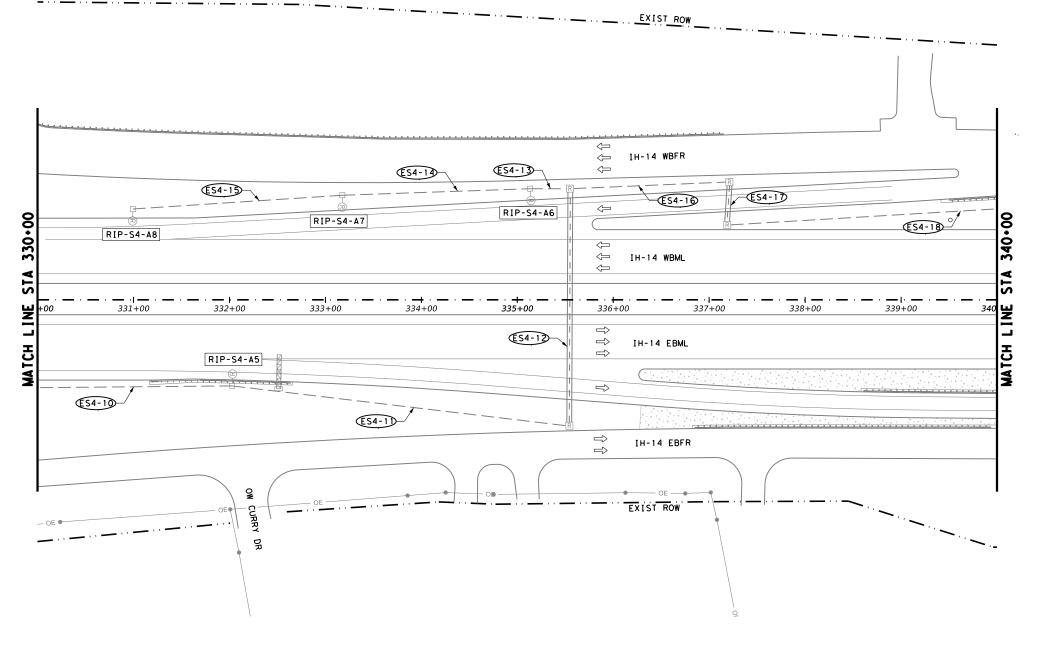
RUN #
SERVICE #
EXISTING CONDUIT



# PRELIMINARY NOT FOR CONSTRUCTION



	o SCALE: <del>□</del>	25 50		100 FEET	
	1"	= 100'	HORI		ET 10 OF 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO
	TEXAS	WACO		BELL	56



	EXIST	ING CONDUIT	AND CONDUC	TOR RUNS	
				690	0690
				7144	7150
RUN NAME	SERVICE	CIRCUITS	RUN LENGTH	REMOVE ABOVE - GROUND CONDUIT	REMOVE CONDUCTOR
				LF	LF
ES4-10	ES4	Α	203		609
ES4-11	ES4	Α	354		1062
ES4-12	ES4	Α	247		741
ES4-13	ES4	Α	42		126
ES4-14	ES4	Α	196		588
ES4-15	ES4	Α	219		657
ES4-16	ES4	Α	166		498
ES4-17	ES4	Α	45		135
ES4-18	ES4	Α	282		846
		SH	EET TOTAL:		5262

EXIST TY A GROUND BOX TO BE REMOVED

EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)

**LEGEND** 

EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)

EXIST GROUND BOX (TY A)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

EXIST RIGID METAL CONDUIT

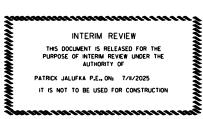
EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)

EXIST ELEC SERVICE

POLE DESIGNATION

CONDUIT DESIGNATION

RIP-S#-A# POLE #
CIRCUIT #
SERVICE # ES#-## —RUN # —SERVICE # —EXISTING CONDUIT



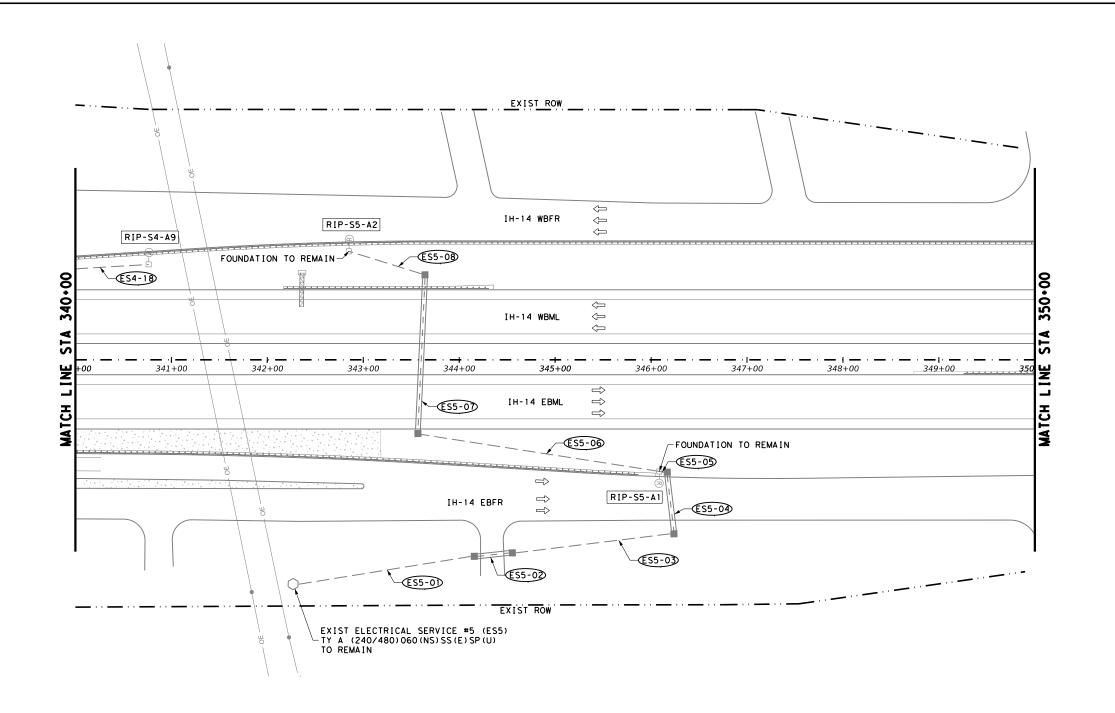
### PRELIMINARY NOT FOR CONSTRUCTION



### REMOVAL LAYOUT

O SCALE: =	25 50	100 FEET		
	= 100'	HORIZ.		S
FED.RD. DIV. NO.	CONT	SECT	JOB	

	1"		HOR		ET	II 0F 20
NGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		57



	EXISTING CONDUIT AND CONDUCTOR RUNS								
				690	0690				
				7144	7150				
RUN NAME	SERVICE	CIRCUITS	RUN LENGTH	REMOVE ABOVE - GROUND CONDU I T	REMOVE CONDUCTOR				
				LF	LF				
ES4-18	ES4	Α	76		228				
ES5-01	ES5	Α	191		573				
ES5-02	ES5	Α	40		120				
ES5-03	ES5	Α	170		510				
ES5-04	ES5	Α	65		195				
ES5-05	ES5	Α	8		24				
ES5-06	ES5	Α	255		765				
ES5-07	ES5	Α	166		498				
ES5-08	ES5	Α	83		249				
		SH	EET TOTAL:		3162				

SUMMARY OF REMOVAL ITEMS

DESCRIPTION

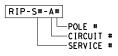
REMOVE RD IL ASM (TRANS-BASE)

REMOVE CONDUCTOR

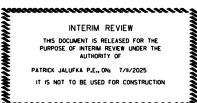
- EXIST TY A GROUND BOX TO BE REMOVED
- EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)
- -® EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)
  - EXIST GROUND BOX (TY A)
  - EXIST CONDUIT (TRENCHED)
  - EXIST CONDUIT (BORED)
  - EXIST RIGID METAL CONDUIT
- EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)
- EXIST ELEC SERVICE

#### POLE DESIGNATION

CONDUIT DESIGNATION







## PRELIMINARY NOT FOR CONSTRUCTION

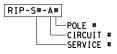


	o SCALE: <b>≔</b>	25 50		100 FEET		
	1"	' = 100'	HORI		EET I	2 OF 20
CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	F	IIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		58

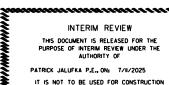
- EXIST TY A GROUND BOX TO BE REMOVED
- EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)
- EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)
- EXIST GROUND BOX (TY A)
- EXIST CONDUIT (TRENCHED)
- EXIST CONDUIT (BORED) EXIST RIGID METAL CONDUIT
- EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)
- EXIST ELEC SERVICE

#### POLE DESIGNATION

CONDUIT DESIGNATION







PRELIMINARY
NOT FOR
CONSTRUCTION



CALE	<u>^</u>	2	5 5	0	10	O FEE
	1"	:	100′	НС	RIZ.	
	$ \tau$					

	SCALE: =	25 50		FEET		
	1"	100′	HORI		ET I	13 OF 20
HANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	-	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		59

EXIST TY A GROUND BOX TO BE REMOVED

-® EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)

-® EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)

EXIST GROUND BOX (TY A)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

EXIST RIGID METAL CONDUIT

EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)

EXIST ELEC SERVICE

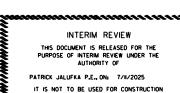
POLE DESIGNATION

CONDUIT DESIGNATION

RIP-S#-A#

POLE #
CIRCUIT #
SERVICE #

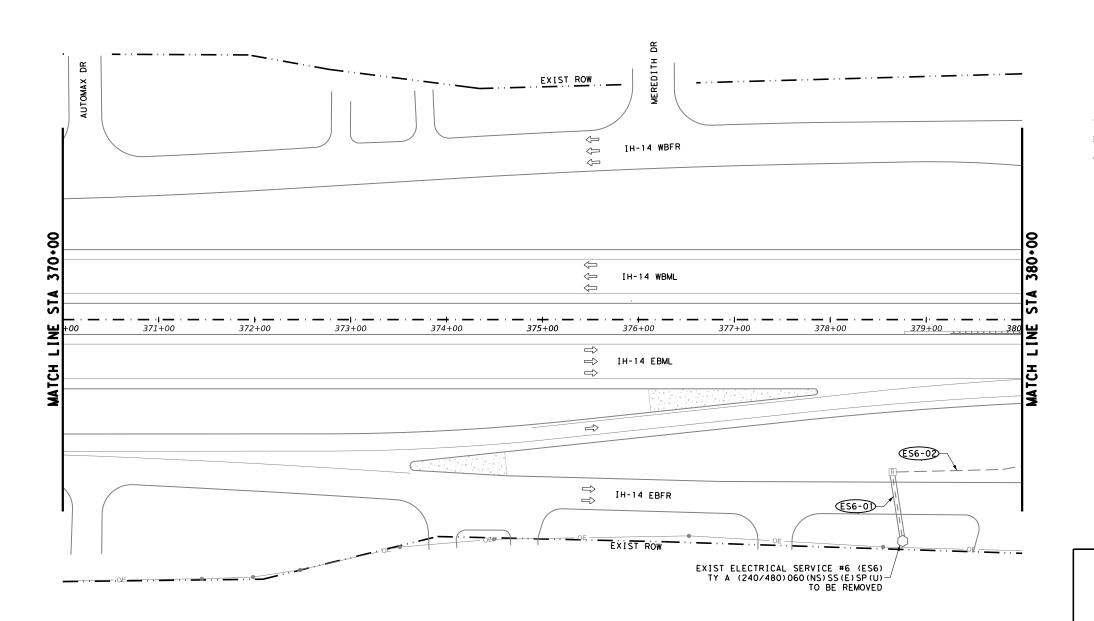
RUN #
SERVICE #
EXISTING CONDUIT



PRELIMINARY
NOT FOR
CONSTRUCTION



	o SCALE: <del> </del>	25 50		100 FEET		
	1"	= 100'	HOR		HEET I	14 OF 20
NGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO
	TEXAS	WACO		BELL		60



	FYIST	INC CONDUIT	AND CONDUC	TOR RUNS				
	LXIJI	THO COMBOTT	AND CONDOC	690	0690			
				7144	7150			
RUN NAME	SERVICE	CIRCUITS	RUN LENGTH	REMOVE ABOVE - GROUND CONDU I T	REMOVE CONDUCTOR			
				LF	LF			
ES6-01	ES6	Α	73		219			
ES6-02	ES6	Α	135		405			
		SH	EET TOTAL:		624			

	SUMMARY OF REMOVAL ITEMS		
BID CODE	DESCRIPTION	UNIT	QTY
610 7006	REMOVE RD IL ASM (BRIDGE MOUNT)	EA	
610 7009	REMOVE RD IL ASM (TRANS-BASE)	EA	
624 7013	REMOVE GROUND BOX	EA	1
628 7002	REMOVE ELECTRICAL SERVICES	EA	1
690 7144	REMOVE ABOVE-GROUND CONDUIT	LF	0
690 7147	REMOVE UNDERGROUND CONDUIT	LF	0
690 7150	REMOVE CONDUCTOR	LF	624

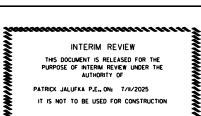
- EXIST TY A GROUND BOX TO BE REMOVED
- EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)
- ■──® EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)
  - EXIST GROUND BOX (TY A)
  - EXIST CONDUIT (TRENCHED)
- EXIST CONDUIT (BORED)
- EXIST RIGID METAL CONDUIT
- EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)
- EXIST ELEC SERVICE

#### POLE DESIGNATION

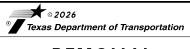
CONDUIT DESIGNATION

POLE #
CIRCUIT #
SERVICE #

RUN #
SERVICE #
EXISTING CONDUIT



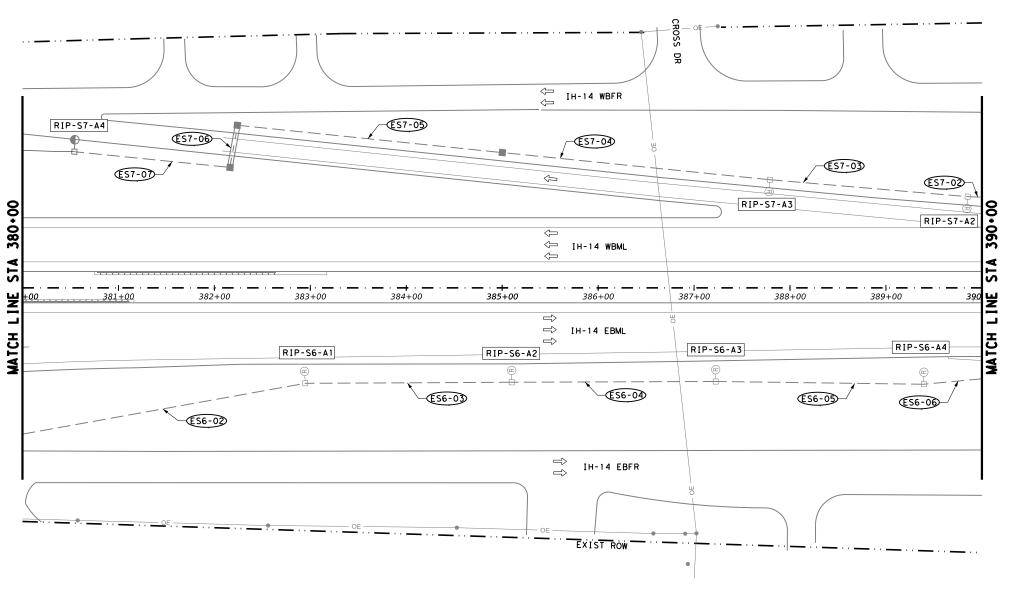
## PRELIMINARY NOT FOR CONSTRUCTION



#### REMOVAL LAYOUT

0 25 50

	SCALE: =			FFFT	
	1"	' = 100'	HOR		ET 15 OF 20
HANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WACO		BELL	61



EXISTING CONDUIT AND CONDUCTOR RUNS									
				690	0690				
				7144	7150				
RUN NAME	SERVICE	CIRCUITS	RUN LENGTH	REMOVE ABOVE - GROUND CONDUIT	REMOVE CONDUCTOR				
				LF	LF				
ES6-02	ES6	Α	300		900				
ES6-03	ES6	Α	215		645				
ES6-04	ES6	Α	213		639				
ES6-05	ES6	Α	217		651				
ES6-06	ES6	Α	61		183				
ES7-02	ES7	Α	15		45				
ES7-03	ES7	Α	207		621				
ES7-04	ES7	Α	280		840				
ES7-05	ES7	Α	278	NO WO	ORK				
ES7-06	ES7	Α	45	NO WO	ORK				
ES7-07	ES7	Α	163	NO WO	ORK				
	SHEET TOTAL: 4524								

SUMMARY OF REMOVAL ITEMS

DESCRIPTION

REMOVE RD IL ASM (TRANS-BASE)

REMOVE CONDUCTOR

EXIST TY A GROUND BOX TO BE REMOVED

EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)

EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)

EXIST GROUND BOX (TY A)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

EXIST RIGID METAL CONDUIT

EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)

EXIST ELEC SERVICE

RIP-S#-A#

POLE DESIGNATION

CONDUIT DESIGNATION

ES#-## —RUN # —SERVICE # —EXISTING CONDUIT

POLE #
CIRCUIT #
SERVICE #

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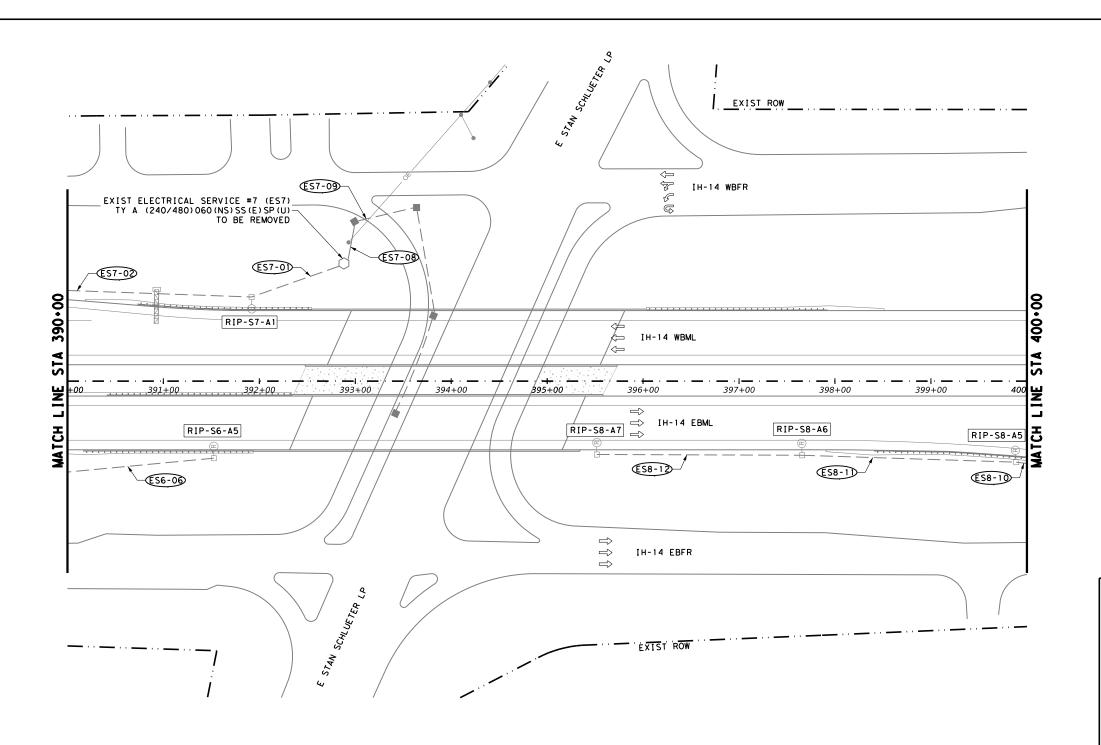
PRELIMINARY NOT FOR CONSTRUCTION



**★** © 2026

25 50

SHEET 16 OF 20 HORIZ. CHANGE ORDER FED. RD. DIV. NO. CONT SECT JOB HIGHWAY 6 0231 03 156 IH-14 STATE DIST COUNTY SHEET NO TEXAS 62 WACO BELL



EXISTING CONDUIT AND CONDUCTOR RUNS						
				690	0690	
				7144	7150	
RUN NAME	SERVICE	CIRCUITS	RUN LENGTH	RUN LENGTH REMOVE ABOVE-GROUND CONDUIT	REMOVE CONDUCTOR	
				LF	LF	
ES6-06	ES6	Α	153		459	
ES7-01	ES7	Α	102		306	
ES7-02	ES7	Α	192		576	
ES7-08	ES7	В	44		132	
ES7-09	ES7	В	66	NO WO	ORK	
ES8-10	ES8	Α	11		33	
ES8-11	ES8	Α	223		669	
ES8-12	ES8	Α	214		642	
SHEET TOTAL: 2817						

SUMMARY OF REMOVAL ITEMS

DESCRIPTION

REMOVE RD IL ASM (TRANS-BASE)

REMOVE ELECTRICAL SERVICES

REMOVE CONDUCTOR

CONDUC	TOR RUNS			
_ENGTH	690	0690		
	7144	7150		
	REMOVE ABOVE - GROUND CONDUIT	REMOVE CONDUCTOR		
	LF	LF		
53		459		
02		306		
92		576		
44		132		
66	NO WORK			
1 1		33		
23		669		
11/1		642		



-® EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)

■──® EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)

EXIST GROUND BOX (TY A)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

EXIST RIGID METAL CONDUIT

EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)

EXIST ELEC SERVICE

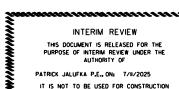
POLE DESIGNATION

CONDUIT DESIGNATION

POLE #
CIRCUIT #
SERVICE #

RUN #
SERVICE #
EXISTING CONDUIT





# PRELIMINARY NOT FOR CONSTRUCTION



#### REMOVAL LAYOUT

	SCALE:			FEET	
	1"	= 100'	HOR		EET 17 OF 20
ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.

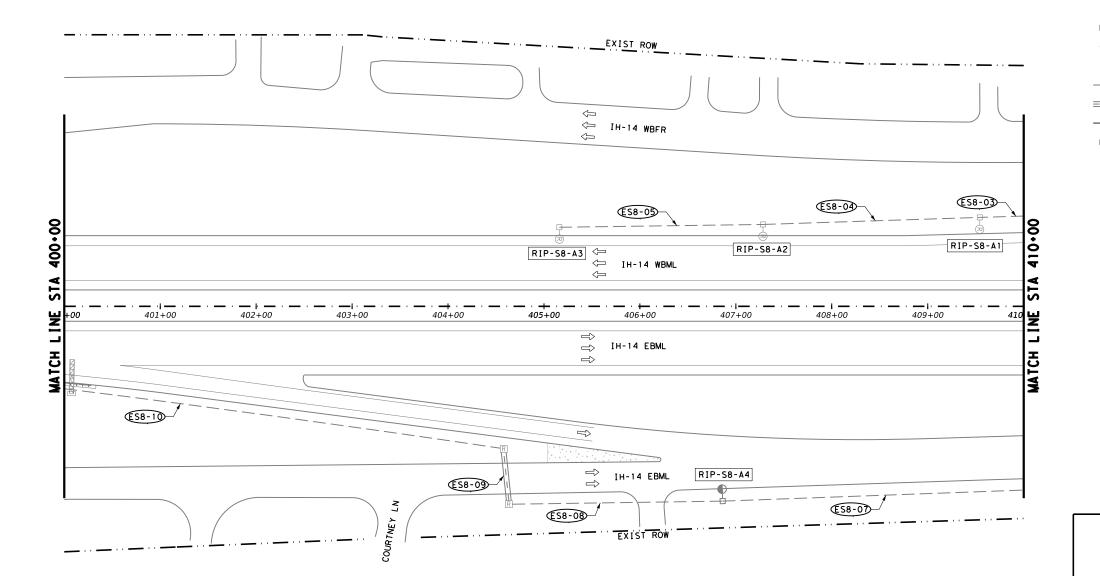
BELL

WACO

TEXAS

63

CHANGE



	EXIST	<u>ING CONDUIT</u>	AND CONDUC	TOR RUNS			
				690	0690		
				7144	7150		
RUN NAME	SERVICE	CIRCUITS	RUN LENGTH	REMOVE ABOVE - GROUND CONDUIT	REMOVE CONDUCTOR		
				LF	LF		
ES8-03	ES8	Α	46		138		
ES8-04	ES8	Α	226		678		
ES8-05	ES8	Α	212		636		
ES8-07	ES8	Α	314		942		
ES8-08	ES8	Α	223		669		
ES8-09	ES8	Α	58		174		
ES8-10	ES8	Α	462		1386		
SHEET TOTAL: 4623							

	SUMMARY OF REMOVAL ITEMS		
BID CODE	DESCRIPTION	UNIT	QTY
610 7009	REMOVE RD IL ASM (TRANS-BASE)	EA	3
624 7013	REMOVE GROUND BOX	EA	2
690 7150	REMOVE CONDUCTOR	LF	4623

EXIST TY A GROUND BOX TO BE REMOVED

EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)

EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)

EXIST GROUND BOX (TY A)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

EXIST RIGID METAL CONDUIT

EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)

EXIST ELEC SERVICE

POLE DESIGNATION

CONDUIT DESIGNATION

RIP-S#-A# POLE #
CIRCUIT #
SERVICE # —RUN # —SERVICE # —EXISTING CONDUIT



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### REMOVAL LAYOUT

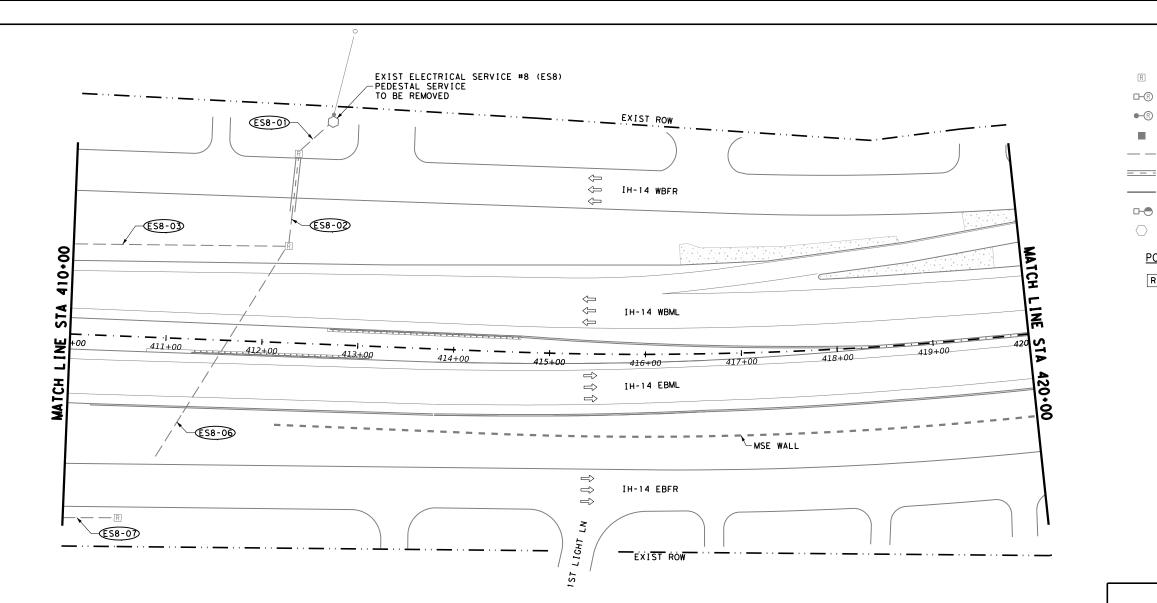
	SCALE:	23 30		FEET	
	1"	100′	HOR		EET 18 OF 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.

BELL

WACO

TEXAS

64



EXISTING CONDUIT AND CONDUCTOR RUNS							
				690	0690		
				7144	7150		
RUN NAME	SERVICE	CIRCUITS	RUN LENGTH	REMOVE ABOVE - GROUND CONDU I T	REMOVE CONDUCTOR		
				LF	LF		
ES8-01	ES8	Α	49		147		
ES8-02	ES8	Α	97		291		
ES8-03	ES8	Α	224		672		
ES8-06	ES8	Α	335		1005		
ES8-07	ES8	Α	57		171		
SHEET TOTAL: 2286							

		SUMMARY OF REMOVAL ITEMS		
BID	CODE	DESCRIPTION	UNIT	QTY
624	7013	REMOVE GROUND BOX	EΑ	3
628	7002	REMOVE ELECTRICAL SERVICES	EΑ	1
690	7150	REMOVE CONDUCTOR	LF	2286

EXIST ROW

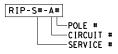
EXISTING CONDUIT AND CONDUCTOR RUNS							
	EXISTING CONDUIT AND CONDUCTOR RONS 690 0690						
				7144	7150		
RUN NAME SI	SERVICE	CIRCUITS	RUN LENGTH	REMOVE ABOVE - GROUND CONDUIT	REMOVE CONDUCTOR		
				LF	LF		
NO REMOVALS THIS SHEET							

#### **LEGEND**

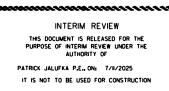
- R EXIST TY A GROUND BOX TO BE REMOVED
- EXIST RDWY ILLUM ASSEM TO BE REMOVED (TRANS BASE)
- ●──® EXIST RDWY ILLUM ASSEM TO BE REMOVED (BRIDGE MOUNT)
  - EXIST GROUND BOX (TY A)
  - EXIST CONDUIT (TRENCHED)
  - EXIST CONDUIT (BORED)
  - EXIST RIGID METAL CONDUIT
- EXIST RDWY ILLUM ASSEM TO REMAIN (TRANS BASE)
- EXIST ELEC SERVICE

#### POLE DESIGNATION

CONDUIT DESIGNATION







# PRELIMINARY NOT FOR CONSTRUCTION



#### REMOVAL LAYOUT

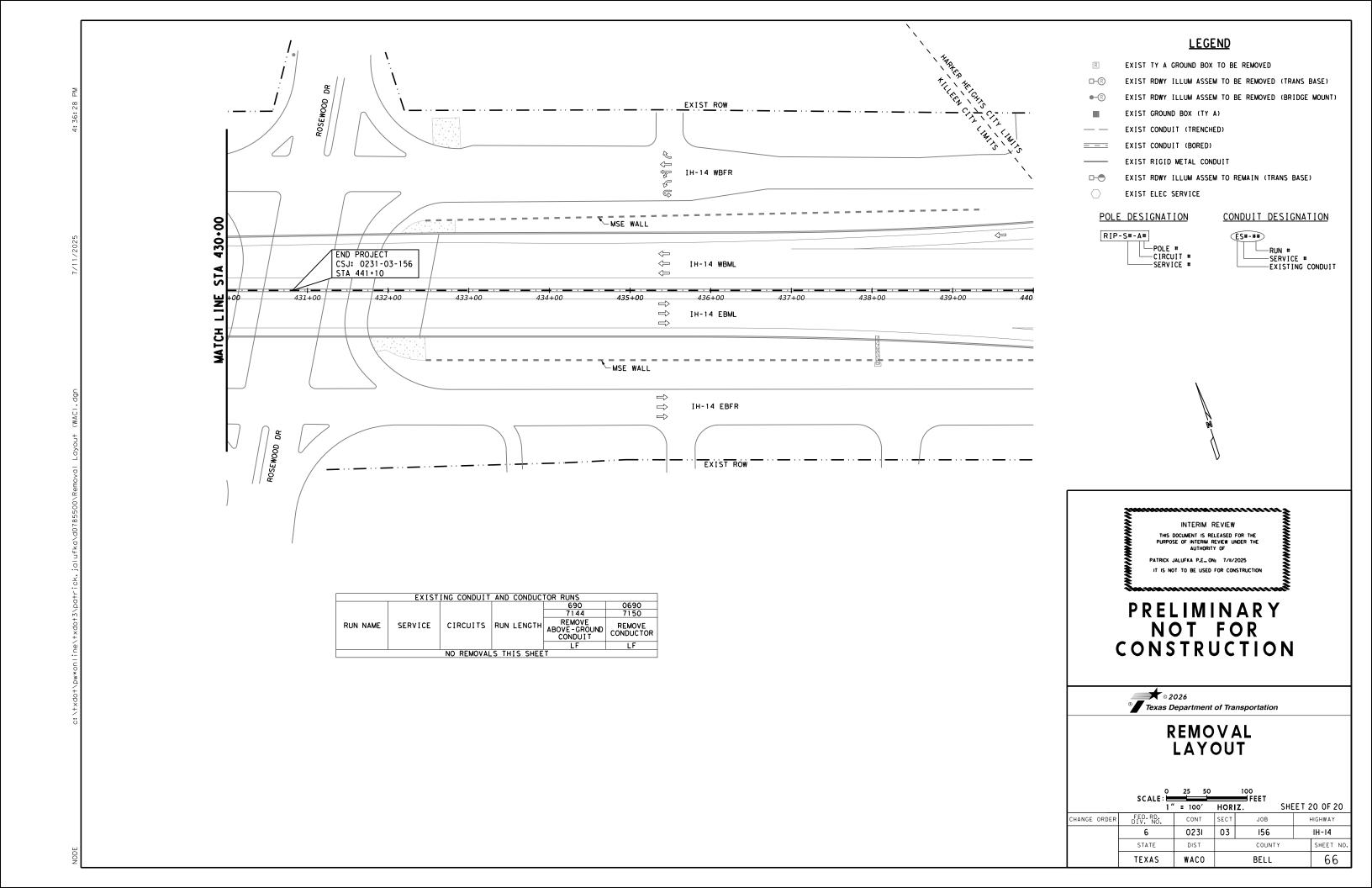
	SCALE: =	23 30		FEET	
	1"	100′	HOR		EET 19 OF 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.

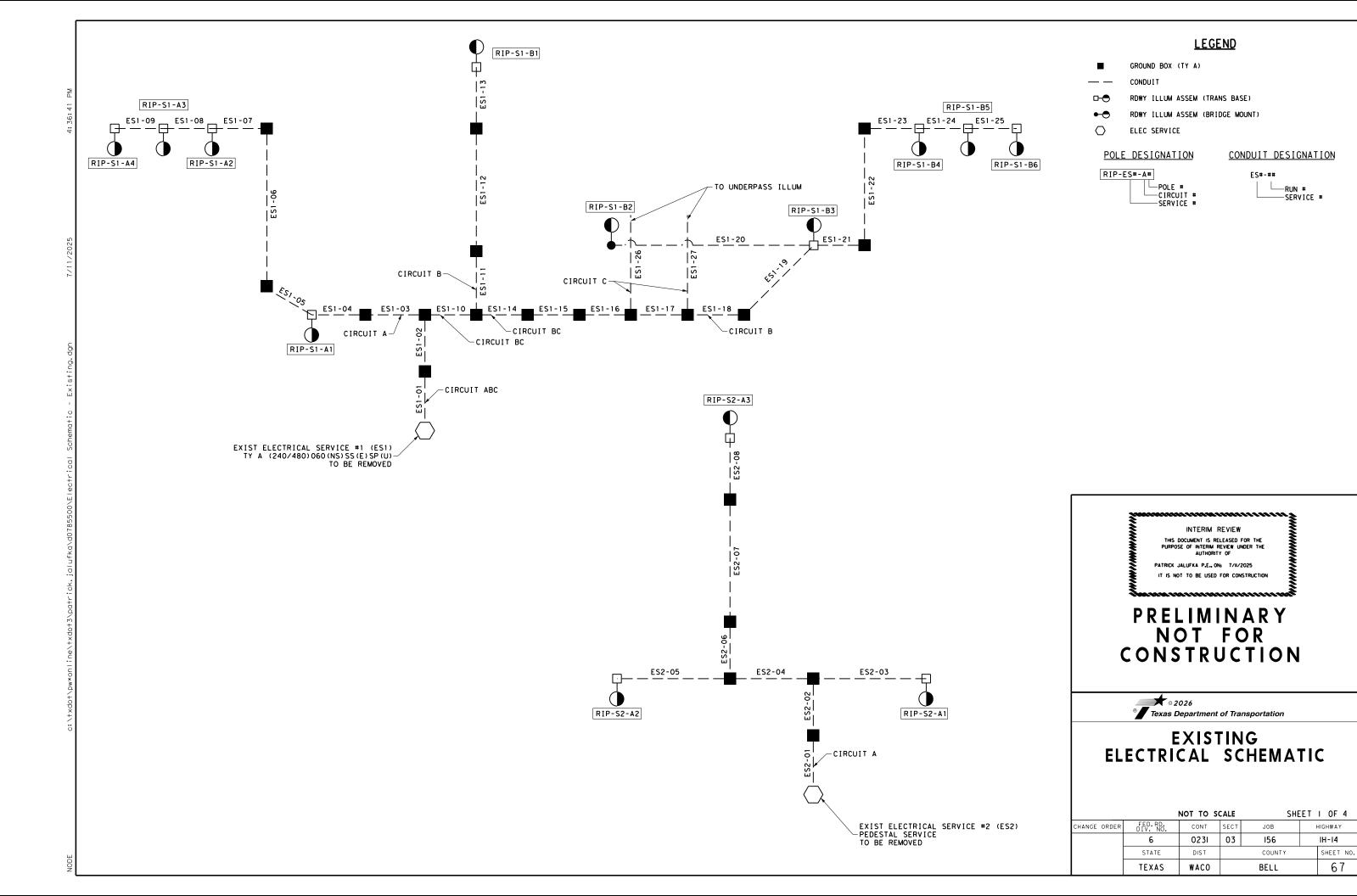
BELL

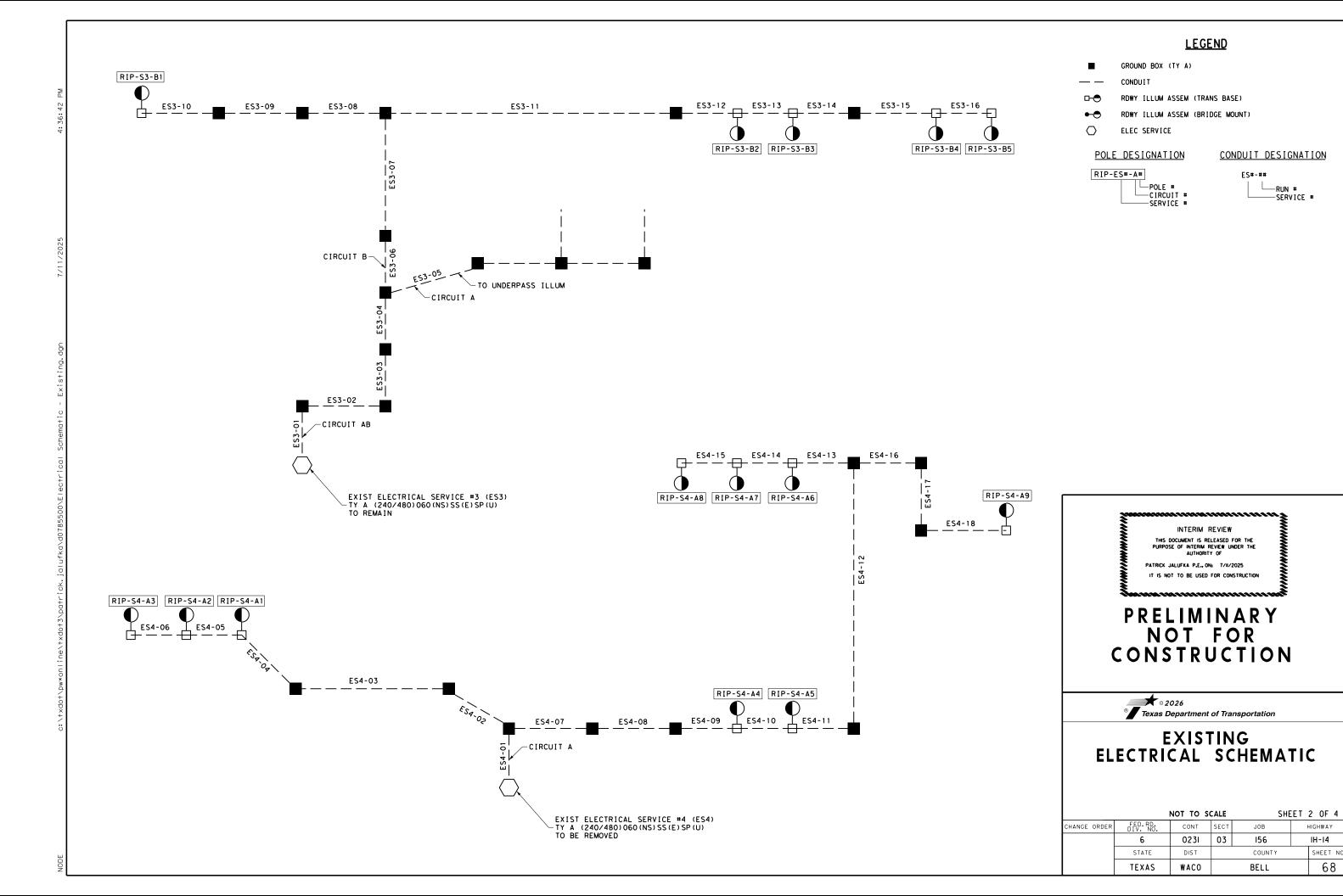
65

WACO

TEXAS







GROUND BOX (TY A)

- CONDUIT

□── RDWY ILLUM ASSEM (TRANS BASE)

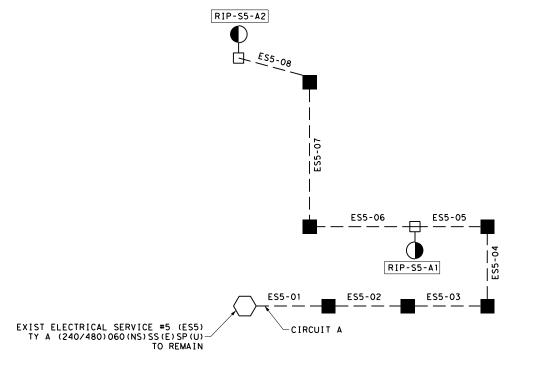
●── RDWY ILLUM ASSEM (BRIDGE MOUNT)

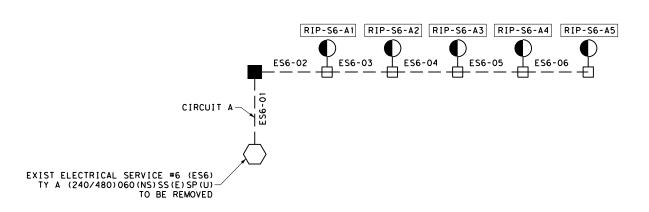
ELEC SERVICE

POLE DESIGNATION

CONDUIT DESIGNATION

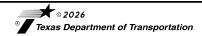
RIP-ES#-A#
POLE #
CIRCUIT #
SERVICE #





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# PRELIMINARY NOT FOR CONSTRUCTION



## EXISTING ELECTRICAL SCHEMATIC

		NOT TO SO	CALE	SHE	SHEET 3 OF 4				
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	ı	HIGHWAY			
	6	0231	03	156		IH-14			
	STATE	DIST		COUNTY		SHEET NO.			
	TEXAS	WACO		BELL		69			

GROUND BOX (TY A)

- CONDUIT

→ RDWY ILLUM ASSEM (TRANS BASE)

●── RDWY ILLUM ASSEM (BRIDGE MOUNT)

ELEC SERVICE

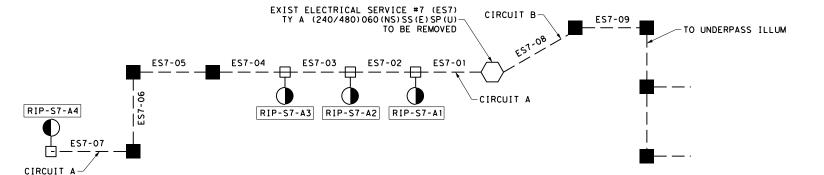
POLE DESIGNATION

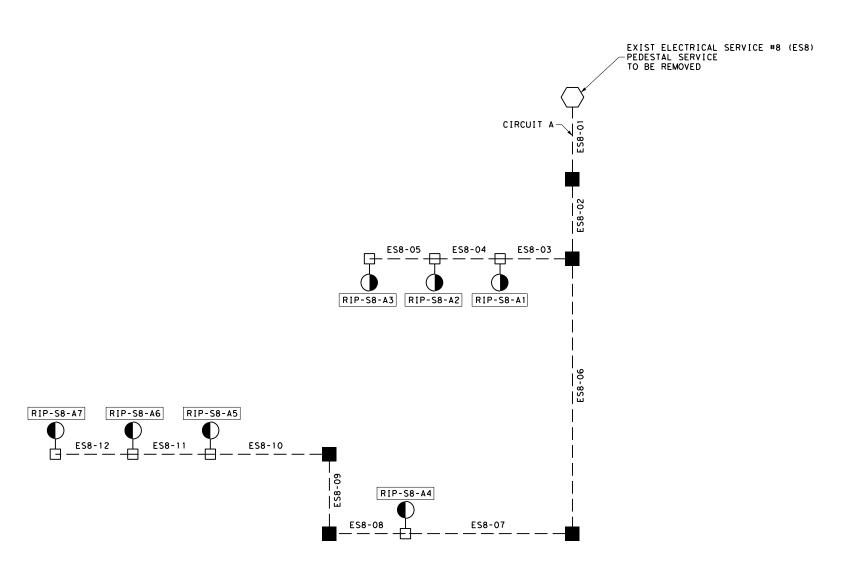
CONDUIT DESIGNATION

RIP-ES#-A#
POLE #
CIRCUIT #
SERVICE #

ES#-##

RUN #
SERVICE #





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# PRELIMINARY NOT FOR CONSTRUCTION



## EXISTING ELECTRICAL SCHEMATIC

	NOT TO SCALE SHEET						
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY		
	6	0231	03	156		IH-14	
	STATE	DIST		COUNTY		SHEET NO.	
	TEXAS	WACO		BELL		70	

#### NOTES:

1. FOR CONTRACTOR INFORMATION ONLY.

**DRILLING LOG** 

**DRILLING LOG** 

District Waco
Date 03/27/24
Grnd. Elev. 100.00 ft
GW Elev. N/A

				Triav	ial Test		Prope	erties		
Elev. (ft)		C Texas Cone Penetrometer	Strata Description		Deviator	мс	LL	PI	Wet Den. (pcf)	Additional Remarks
	-		CLAY, very stiff to very hard, dry to moist, brown to tan, sandy, with limestone lenses and fossil shells (CL)							
	5	50 (1.5) 50 (1)	- ()			8				
	1									
	10 -	29 (6) 45 (6)				8	33	19		a/ B
'	"]									% Passing #200 = 52
	=									
1	15 –	50 (5) 50 (1.75)				23				
82.0	7	<u></u>	LIMESTONE, tan, weathered, with clay	-						
2	20	50 (1.75) 50 (1.75)	seams							
	=									
75.0 2	25	50 (1.75) 50 (0.5)	LIMESTONE, gray, with clay seams			14				
	=	Ī	and fossil shells							DUN 051 001 DE0 077/ DOD 07/
,	30 -	50 (0.75) 50 (0.5)								RUN: 25'-30'; REC: 67%; RQD 0%
	-	İ		0	824	4			136	
	#	50 (0.5) 50 (0.25)								RUN: 30'-35'; REC: 87%; RQD: 26'
3	35 -									
	3	I T								RUN: 35'-40'; REC: 50%; RQD: 0%
4	10	50 (0.5) 50 (0.25)	-							
	=	I T								RUN: 40'-45'; REC: 87%; RQD: 0%
4	15	50 (0.5) 50 (0)	-	0	871	5			133	
	=									RUN: 45'-50'; REC: 88%; RQD: 16'
50.0 5	50	50 (0.5) 50 (0.25)		0	621	4			140	
	=									
5	- - 55 -									
Rema	arks:		1	1						
Latitu	ude =	: 31.09638 Longitude	e = -97.73733							
The gr	round	water elevation was not	determined during the course of this boring.							
Drillo										Organization: Baba Kistner

### Elev. O (ft) G CLAY, very hard, tan, dry, with limestone fragments (CL) 50 (0.75) 50 (0.5) 90.0 10 50 (0.5) 50 (0.25) RUN: 10'-15'; REC: 75%; RQD: 30% 15 50 (0.5) 50 (0.25) 80.0 20 50 (0.25) 50 (0.25) SHALE, gray, interbedded with 25 - 50 (0.5) 50 (0.25) 30 - 50 (1.75) 50 (0.75) 35 50 (0.5) 50 (0.25) RUN: 35'-40'; REC: 100%; RQD: 60% 40 50 (0.5) 50 (0.25) 45 = 50 (0.5) 50 (0.25) RUN: 45'-50'; REC: 65%; RQD: 7% 50.0 50 50 (0.5) 50 (0.25) Remarks: Latitude = 31.09808 Longitude = -97.73828

The ground water elevation was not determined during the course of this boring.

Organization: Raba-Kistner Consultants, Inc. B-17

Organization: Raba-Kistner, Inc. B-18

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SOIL BORING LOGS

SHEET I OF 13

				311		1 01 13
ANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	-	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		71

Planar
Disparationer
of Transpositation

10 25 (6) 14 (6)

15 \_\_\_\_\_\_\_50 (3) 50 (4)

20 21 (6) 16 (6)

25 50 (0.5) 50 (0)

70.0 30 50 (0.13) 50 (0)

35 50 (0.25) 50 (0.13)

40 50 (0.5) 50 (0.25) 45 50 (0.5) 50 (0)

50.0 50 50 (0.5) 50 (0)

Driller: ETTL

Remarks: Latitude = 31.09586 Longitude = -97.73524

The ground water elevation was not determined during the course of this boring.

#### NOTES:

1. FOR CONTRACTOR INFORMATION ONLY.

**DRILLING LOG** 

Triaxial Test Properties

Lateral Deviator Press. Stress (psi) (psi) MC LL PI Den. (pcf)

County Bell Highway IH-14 CSJ 0231-03-155

CLAY, hard, brown to tan, dry, sandy, with limestone fragments (CH)

LIMESTONE, tan, weathered, with clay

LIMESTONE, light gray

Waco 07/18/24 100.00 ft N/A

RUN: 25'-30'; REC: 35%; RQD: 0%

Organization: Raba-Kistner Consultants, Inc. B-19

**DRILLING LOG** 

El-	.,	L	Texas Cone			ial Test		Prope	erties	184.4	
Ele (ft		O G	Penetrometer	Strata Description	Press. (psi)	Deviator Stress (psi)	мс	LL	PI	Wet Den. (pcf)	Additional Remarks
	-			CLAY, very hard, dry to moist, dark brown, with limestone fragments, and trace sand (CH)			43	66	41		PP = 4.5 tsf; % Passing #200 = 55
97.0	5 -		13 (6) 20 (6)	CLAY, very stiff to very hard, dry, light brown to tan, with limestone fragments and trace sand (CL)	0	126	16	42	26	105	PP = 4.5 tsf
	10 -		50 (1.5) 50 (1.5)								
35.0	15 -		50 (2) 50 (2.5)	LIMESTONE, tan, weathered, with clay			27	34	19		% Passing #200 = 69
	-		50 (0.5) 50 (0.75)	seams							RUN: 15'-20'; REC: 38%; RQD: 0%
30.0	20 - - -		30 (0.3) 30 (0.73)	LIMESTONE, gray, with fossil shells and some clay							RUN: 20'-25'; REC: 83%; RQD: 18
	25 - -		50 (1) 50 (0)		0	706	7			142	
	30 -		50 (1.5) 50 (0.25)								RUN: 25'-30'; REC: 88%; RQD: 64
	-				0	769	3			142	RUN: 30'-35'; REC: 93%; RQD: 89
	35 - - -		50 (0.25) 50 (0.25)		0	1712	10			142	
	40 -	Ħ	50 (0.25) 50 (0.25)			2					RUN: 35'-40'; REC: 93%; RQD: 84
	-	Ħ	50 (0.5) 50 (0.25)		0	1203	5			143	RUN: 40'-45'; REC: 92%; RQD: 77
	45 - - -										RUN: 45'-50'; REC: 94%; RQD: 12
50.0	50 -	H	50 (0.5) 50 (0.25)								
	55 -										
Ren	narks tude	s:	1.09456 Longitude	= -97.7336							
The	aroun	ıd wa	iter elevation was not d	determined during the course of this boring.							

Organization: Raba-Kistner Consultants, Inc. B-20

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SOIL BORING LOGS

CHEET 2 OF 13

				246	LEI	2 UF 13
CHANGE ORDER	FED. RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		72

#### NOTES:

1. FOR CONTRACTOR INFORMATION ONLY.

**DRILLING LOG** 

	L				al Test		Prope	erties		
Elev.	Ö	Texas Cone Penetrometer	Strata Description	Lateral	Deviator Stress (psi)	мс	LL	PI	Wet Den. (pcf)	Additional Remarks
-			CLAY, very stiff, dry to moist, brown to tan, with limestone fragments, ferrous staining, and fossil shells (CL)							
5		37 (6) 37 (6)				6				
10 –		30 (6) 24 (6)				13	39	23		PP = 4.5+ tsf; % Passing #200 = 8
15		50 (2.75) 50 (1)	SAND, very dense, dry to moist, tan, clayey, with limestone fragments (SC)			4	31	17		PP = 2.0 tsf; % Passing #200 = 50
-										
20 -		50 (1) 50 (0.5)				9	23	10		% Passing #200 = 48
-		50 (1.75) 50 (0.5)	CLAY, very hard, dry to moist, tan, sandy, with limestone fragments (CL)			17	25	11		
25 — —	Í I		LIMESTONE, tan, weathered, with clay seams							% Passing #200 = 69
30 -	I	50 (0.5) 50 (0.25)								RUN: 25'-30'; REC: 70%; RQD: 0%
	I									RUN: 30'-35'; REC: 30%; RQD: 0%
35	#	50 (0.25) 50 (0.25)	LIMESTONE, dark gray, with fossil shells	0	407	4			137	
-	İ	50 (0.75) 50 (0.25)		0	682	8			143	RUN: 35'-40'; REC: 87%; RQD: 62
40 -	$\pm$	30 (0.73) 30 (0.23)		0	1324	4			139	
45	I	50 (0.5) 50 (0.25)		0	1414	4			137	RUN: 40'-45'; REC: 85%; RQD: 67
1	İ			0	1620	2			138	RUN: 45'-50'; REC: 97%; RQD: 57
50		50 (0.25) 50 (0.25)								
- 55 -										
emarks:	_		L	1		-				

**DRILLING LOG** 

Ele		L	Texas Cone			ial Test		Prope	erties		
(ft)		O G	Penetrometer	Strata Description	Press. (psi)	Deviator Stress (psi)	мс	LL	PI	Wet Den. (pcf)	Additional Remarks
	-			CLAY, soft, moist, dark brown, with gravel and limestone fragments (CH)	" "						
	_		8 (6) 10 (6)				30	82	57		
	5 -		0 (0) 10 (0)				- 50		- 51		PP = 2.5 tsf; % Passing #200 = 96
92.0	-		20 (6) 50 (4.25)	CLAY, very stiff, dry to moist, tan, with sand, fossil shells, calcareous			13	38	23		
	10 -			deposits and limestone fragments (CL)				50			% Passing #200 = 80
	15 -		50 (1.75) 50 (0.75)	-			10	25	11		% Passing #200 = 76
82.0	-										
	20 -	Ħ	50 (1.5) 50 (1.25)	LIMESTONE, tan to light gray, with fossil shells and clay seams			10				
	-	Ħ									
	25 - -	Ħ	50 (0.5) 50 (0.25)	_							
	-	Ē									
	30 -	Ħ	50 (0.5) 50 (0.25)	_							
67.0	-	Ξ		LIMESTONE, light gray to dark gray,							
	35 -	급	50 (0.25) 50 (0.25)	with fossil shells and clay seams	0	1094	8			145	
		Ħ	50 (0.75) 50 (0.05)			1001					RUN: 35'-40'; REC: 73%; RQD: 58%
	40 -	Ē	50 (0.75) 50 (0.25)	-	0	780	3			141	
		Ħ	50 (0.5) 50 (0.25)								RUN: 40'-45'; REC: 93%; RQD: 23%
	45 - -	Ħ			0	748	7			143	
50.0	50 -	Ħ	50 (0.5) 50 (0.25)								RUN: 45'-50'; REC: 97%; RQD: 32%
	-										
	55 -										
	narks tude		1.09361 Longitude	e = -97.72954							
				determined during the course of this boring.							

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SOIL BORING LOGS

SHEET 3 OF 13

				3111		3 01 13
GE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	-	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		73

Planar
Disparationer
of Transpositation

Elev. O (ft) G

26 (6) 25 (6)

15 - 50 (0.75) 50 (0.25)

25 50 (0.5) 50 (0.25)

30 - 50 (0.75) 50 (0.5)

65.0 35 50 (0.5) 50 (0.25)

40 50 (0.5) 50 (0.5)

45 - 50 (0.5) 50 (0.25)

50 (0.5) 50 (0.25)

Remarks: Latitude = 31.09316 Longitude = -97.72758

Driller: Rubicon

The ground water elevation was not determined during the course of this boring.

#### NOTES:

1. FOR CONTRACTOR INFORMATION ONLY.

**DRILLING LOG** 

Triaxial Test Properties

Lateral Deviator Press. Stress (psi) (psi) MC LL PI Den. (pcf)

County Bell Highway IH-14 CSJ 0231-03-155

82.0 LIMESTONE, tan, weathered, with clay seams LIMESTONE, light gray, vuggy, with clay seams

CLAY, soft, moist, dark brown (CH)

LIMESTONE, gray to dark gray, with fossil shells and some clay

1 of 1

trict	Waco
te	03/28/24
nd. Elev.	100.00 ft
/ Elev.	N/A

PP = 3.0 tsf; % Passing #200 = 95

PP = 4.5+ tsf; % Passing #200 = 81

RUN: 20'-25'; REC: 78%; RQD: 14%

RUN: 25'-30'; REC: 77%; RQD: 0%

RUN: 45'-50'; REC: 85%; RQD: 13%

Organization: Raba-Kistner, Inc. B-23

DRILLING LOG District Waco
Date 03/28/24
Grnd. Elev. 100.00 ft
GW Elev. N/A

Elev. (ft)		L	Texas Cone Penetrometer	Strata Description	Triaxial Test			Properties				
		Ö G			Lateral Press. (psi)	Deviator Stress (psi)	мс			Wet Den. (pcf)	Additional Remarks	
	-			CLAY, stiff to very hard, dry to moist, brown to tan, sandy, with ferrous staining, fossil shells, calcareous								
	5 -		12 (6) 12 (6)	deposits and limestone lenses (CL)			10	34	19		PP = 4.5+ tsf; % Passing #200 = 66	
	-										FF = 4.5+ tsi, // Fassing #200 = 0	
	-											
	10 -		28 (6) 23 (6)				9	32	17		PP = 4.5+ tsf; % Passing #200 = 6	
	-											
	15 -		50 (1.75) 50 (1.5)				13					
	-											
82.0	_			LIMESTONE, tan, weathered, with clay	-							
80.0	20 -	Ħ	50 (1.75) 50 (1)	seams LIMESTONE, light gray, with fossil								
	_	Ξ		shells and clay seams							RUN: 20'-25'; REC: 33%; RQD: 0%	
	- 25 -	Ħ	50 (0.5) 50 (0.25)								1011. 20 20 , 1120. 00 10, 1140. 0 10	
		Ī										
	-	Ξ									RUN: 25'-30'; REC: 60%; RQD: 0%	
	30 -	Ħ	50 (0.5) 50 (0.5)									
	_	Ħ									RUN: 30'-35'; REC: 55%; RQD: 0%	
65.0	35 -	Ħ	50 (1.25) 50 (1)	LIMESTONE, gray to dark gray, with								
	=	Ē		fossil shells								
	_	Ħ	FO (O F) FO (O OF)								RUN: 35'-40'; REC: 42%; RQD: 21%	
	40 – –	Η	50 (0.5) 50 (0.25)		0	1214	1_			135		
	-	Ħ			0	919	9			146	RUN: 40'-45'; REC: 84%; RQD: 48%	
	45 -	Ξ	50 (0.5) 50 (0.5)			919				140		
	=											
		Ħ	50 (0.75) 50 (0.5)								RUN: 45'-50'; REC: 78%; RQD: 0%	
50.0	50 -											
	=											
	55 -											
	narks itude		1.09265 Longitude	= -97.72559								
			_									
The	groun	d wa	ater elevation was not d	letermined during the course of this boring.								

Logger: Bradley Coffman

Organization: Raba-Kistner, Inc. B-24

1 of 1

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SOIL BORING LOGS

SHEET	٠ 4	0F	13
JE.E. 1		٠.	

				3111		כו זט די		
ANGE ORDER	FED.RD. DIV. NO.	CONT	SECT JOB		HIGHWAY			
	6	0231	03	3 156		IH-14		
	STATE	DIST		COUNTY		SHEET NO.		
	TEXAS WACO BELL			74				

### NOTES:

1. FOR CONTRACTOR INFORMATION ONLY.

DRILLING LOG

**DRILLING LOG** 

	T			Triax	ial Test		Prope	erties		
Elev (ft)	.	C Texas Cone Penetrometer	Strata Description	Lateral	Deviator Stress (psi)	мс	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, stiff, moist, dark brown, with sand (CH)							
95.5	5 -	12 (6) 12 (6)	CLAY, stiff, dry to moist, tan, with sand, ferrous staining, calcareous deposits, fossil shells and limestone fragments (CL)			26	65	40		PP = 4.0 tsf; % Passing #200 = 81
1	10	20 (6) 19 (6)	_			14	29	14		PP = 4.5+ tsf; % Passing #200 = 79
B7.0	15	50 (2.25) 50 (1)	LIMESTONE, tan, weathered, with fossil shells and clay seams							
2	20 –	50 (1.75) 50 (0.75)								
77.0	25 –	50 (1.25) 50 (0.75)	LIMESTONE, tan to light gray, with fossil shells and clay seams	-						
\$	30 -	50 (0.5) 50 (0.25)								
65.0	35 —	50 (0.5) 50 (0.25)	LIMESTONE, dark gray to gray, with fossil shells	0	794	2			139	
_	40	50 (0.25) 50 (0.25)		0	436	6			142	RUN: 35'-40'; REC: 87%; RQD: 66%
	-			0	978	5			139	RUN: 40'-45'; REC: 88%; RQD: 69%
4	45	50 (0.5) 50 (0.25)	-	0	1719	2			134	
50.0	50	50 (0.5) 50 (0.25)		0	522	2			135	RUN: 45'-50'; REC: 100%; RQD: 76%
,	_ _ _ 55 —									

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SOIL BORING LOGS

SHEET 5 OF 13

				211		5 UF 13
NGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		75

	ט	KILLING	LUG		
unty	Bell	Hole	051	District	Waco
ghway	IH-14	Structure	Light Poles	Date	07/18/2
J	0231-03-155	Station		Grnd. Elev.	100.00
		Offset		GW Elev.	N/A

		L			Triax		Prope	erties			
Ele (ft		Ċ	) Texas Cone	Strata Description		Deviator	мс	LL	PI	Wet Den. (pcf)	Additional Remarks
		1		CLAY, stiff, brown, dry, with sand and limestone fragments (CL)	(psi)	(psi)	17	49	29	(pci)	PP = 4.5+ tsf; % Passing #200 =
	5	1	17 (6) 22 (6)								
		1									
	10		50 (5) 50 (3)	_			14	46	32		% Passing #200 = 77
87.0		1		CLAY, very stiff to very hard, tan, dry							
	15		22 (6) 26 (6)	to moist, sandy, with limestone fragments (CL)			16	44	27		% Passing #200 = 58
82.0 80.0	20	Ė	26 (6) 50 (4)	LIMESTONE, tan, weathered, with clay seams							
00.0		ŧ		LIMESTONE, tan to light gray, with some clay							
	25	ŧ	50 (1) 50 (0.5)	_							
		ŧ			0	885	9			140	RUN: 25'-30'; REC: 63%; RQD: 1
	30	ŧ	50 (1) 50 (3)	_							
	35	Ė	50 (0.5) 50 (0.25)		0	896	8			134	RUN: 30'-35'; REC: 53%; RQD: 0
		Ī									RUN: 35'-40'; REC: 80%; RQD: 2
60.0	40	#	50 (0) 50 (0)	LIMESTONE, light gray							
		#	[		0	485	10			140	RUN: 40'-45'; REC: 98%; RQD: 2
	45	ŧ	50 (0) 50 (0)								
50.0	50	1	50 (0) 50 (0.5)		0	1394	4			144	RUN: 45'-50'; REC: 96%; RQD:
		1									
	55	=									

Organization: Raba-Kistner Consultants, Inc. B-25

Elev. O (ft) G

50 (1) 50 (0.5)

50 (0.25) 50 (0)

85.0 15 50 (0.25) 50 (0.25)

20 50 (0.5) 50 (0.25)

25 50 (0.25) 50 (0)

30 50 (0.25) 50 (0.25)

35 50 (0.25) 50 (0) 40 50 (0.5) 50 (0)

45 50 (0.25) 50 (0)

50.0 50 50 (0.25) 50 (0)

Remarks: Latitude = 31.09126 Longitude = -97.71951

The ground water elevation was not determined during the course of this boring.

### NOTES:

1. FOR CONTRACTOR INFORMATION ONLY.

**DRILLING LOG** 

0 1155 8

0 1576

CLAY, very hard, brown, dry to moist, with sand and limestone fragments (CL)
LIMESTONE, tan, weathered, with clay seams

LIMESTONE, gray

Waco 07/19/24 100.00 ft N/A

RUN: 10'-15'; REC: 25%; RQD: 0%

RUN: 35'-40'; REC: 83%; RQD: 67%

RUN: 45'-50'; REC: 83%; RQD: 59%

Organization: Raba-Kistner Consultants, Inc. B-27

Driller: Texas Geobore

**DRILLING LOG** 

Organization: Raba-Kistner Consultants, Inc. B-28

		lı l			Triax	ial Test		Prope	erties		
Ele (ft		L O G	Texas Cone Penetrometer	Strata Description	Lateral Press. (psi)	Deviator Stress (psi)	мс	LL	PI	Wet Den. (pcf)	Additional Remarks
	=			CLAY, soft, tan to brown, dry to moist, with sand and limestone fragments (CL)			17	49	28		% Passing #200 = 77
	_=		5 (6) 13 (6)	(02)							
	5 - -		(,)				11	32	10		
91.5			50 (0.5) 50 (0.5)	CLAY, very hard, dry to moist, dark brown, sandy (CH)			30	69	44		
90.0	10 – –		, , , , , , , ,	LIMESTONE, tan, with clay seams							% Passing #200 = 58
		Ξ	50 (0.5) 50 (0.5)								
85.0	15 — —		, , , , , , , , ,	LIMESTONE, fossiliferous, gray, interbedded with shale	0	591	2			144	
		Ξ	50 (0.5) 50 (0.25)								RUN: 15'-20'; REC: 88%; RQD: 719
	20 -	Ï									
	=	Ξ	50 (0.5) 50 (0.5)		0	489	5			145	RUN: 20'-25'; REC: 100%; RQD: 72
	25 – –	Ξ	25 (215) 25 (215)		0	871	9			144	
	=	=	50 (0.5) 50 (0.5)								RUN: 25'-30'; REC: 68%; RQD: 56'
70.0	30 -	$\exists$	55 (5.5) 55 (5.5)	LIMESTONE, light gray, interbedded with shale							
	_	Ξ	50 (0.5) 50 (0.5)								RUN: 30'-35'; REC: 98%; RQD: 91%
	35 — —	Ħ									
	40 -	$\exists$	50 (2) 50 (1)		0	352	7			148	RUN: 35'-40'; REC: 87%; RQD: 319
	40 -	₫	(-)								
		$\Xi$	50 (0.5) 50 (0.5)		0	919	5			147	RUN: 40'-45'; REC: 85%; RQD: 59
	45 – –	Ħ									
	_	Ξ	50 (2) 50 (2)		0	766	4			146	RUN: 45'-50'; REC: 62%; RQD: 189
50.0	50 — —		, , (-,								
	- 55 -										
	33										

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SOIL BORING LOGS

	SHEET	6 OF 13	
JOB		HIGHWAY	

				3111		0 01 13
HANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		76

### NOTES:

1. FOR CONTRACTOR INFORMATION ONLY.

**DRILLING LOG** 

Elev.	L			Triaxial Test		Properties		erties		
(ft)	G	Danatuamatan	Strata Description	Press. (psi)	Deviator Stress (psi)	мс	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, very hard, dry to moist, orange, with fossil shells and limestone gravel (CL)	(1-1-7	(F=-/				(F/	
5	; <u> </u>	50 (1) 50 (0.25)	_			18	37	17		PP = 4.5+ tsf; % Passing #200 = 9
.0	É		LIMESTONE, light tan, with fossil shells							
10	, <u>‡</u>	50 (0.25) 50 (0.25)	_			14				
	1									
15		50 (0.5) 50 (0.25)	_			10				
0	7	50 (0.5) 50 (0.25)	LIMESTONE, dark gray, with fossil							
20	1	00 (0.0) 00 (0.20)	shells, interbedded shale and clay seams	0	706	2			138	
25	<u></u>	50 (0.5) 50 (0.25)								RUN: 20'-25'; REC: 92%; RQD: 87
	4			0	673	2			144	DUNG OFFI ONE DEPO 4000/C DOD O
30	3	50 (0.75) 50 (0.5)		0	558	1			131	RUN: 25'-30'; REC: 100%; RQD: 7
	3									RUN: 30'-35'; REC: 88%; RQD: 88
35	:	50 (0.5) 50 (0.25)	_	0	1022	3			136	
	-									RUN: 35'-40'; REC: 97%; RQD: 97
40	<b>'</b>	50 (0.5) 50 (0.25)	-							
0	Ī	50 (0.25) 50 (0.25)	SHALE, dark gray, with fossil shells and interbedded limestone lenses	0	481	7			147	RUN: 40'-45'; REC: 82%; RQD: 58
0 45		00 (0.23) 30 (0.23)	LIMESTONE, dark gray, with fossil shells							
.0 50		50 (0.25) 50 (0.25)								RUN: 45'-50'; REC: 98%; RQD: 87
	=									
55	;									
Remar Latitud	rks: de = :	31.08857 Longitude	e = -97.71589							

WinCo Versio				unty Bell hway IH-14 J 0231-03-155	Hole Struc Statio Offse	on	056 Light Po	oles			Da G	istrict ate rnd. Elev. W Elev.	Waco 07/17/24 100.00 ft N/A
		Τ. Τ				Triax	ial Test		Prope	erties			
Ele (fi		L O G	Texas Cone Penetrometer	Strata Descri		Lateral	Deviator Stress (psi)	мс	LL	PI	Wet Den. (pcf)	Addi	tional Remarks
	-			CLAY, very stiff to very to brown, sandy, with fragments (CL)	hard, dry, tan imestone							PP = 3.5 tsf	
	5 -		50 (0.75) 50 (0.25)									PP = 4.5 tsf	
	10 -		50 (0.75) 50 (0.25)										
	-											RUN: 10'-15'	; REC: 87%; RQD: 54%
85.0	15 -		50 (0.5) 50 (0.25)	LIMESTONE, gray, with fragments	shell			38	33	17		% Passing #	200 = 57
	_	Ħ	50 (0.25) 50 (0.25)	-								RUN: 15'-20'	; REC: 89%; RQD: 67%
	20 - - -	Ħ	, , , , , , , , , , , , , , , , , , , ,			0	1160	8			135	DIIN. 20' 25'	; REC: 92%; RQD: 89%
	25 -	Ē	50 (0.5) 50 (0.25)	_								KUN. 20 -25	, REC. 92%, RQD. 09%
	-											RUN: 25'-30'	; REC: 100%; RQD: 89
	30 -	Ħ	50 (0.5) 50 (0.25)									Bully on our	DEC 000/ DOD 0000
	35 -		50 (0.5) 50 (0.5)									KUN: 30'-35'	; REC: 98%; RQD: 88%
	-	Ħ				0	814	10			153	RUN: 35'-40'	; REC: 83%; RQD: 55%
	40 – –		50 (0.5) 50 (0.25)										
	45 -	Ē	50 (0.25) 50 (0.25)			0	1282	6			139	RUN: 40'-45'	; REC: 88%; RQD: 47%

**DRILLING LOG** 

Remarks: Latitude = 31.08808 Longitude = -97.71357

Organization: Raba-Kistner Consultants, Inc. B-30

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SOIL BORING LOGS

SHEET 7 OF 13

				246	LEI	7 05 13
NGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		77

35 (6) 37 (6)

50 (3) 50 (0.5)

79.0 20 50 (1.5) 50 (0.25)

25 50 (0.5) 50 (0)

30 50 (1.5) 50 (0)

35 50 (0.5) 50 (0)

40 50 (0) 50 (0)

50.0 50 50 (0.5) 50 (0)

Driller: ETTL

Remarks: Latitude = 31.08722 Longitude = -97.71174

The ground water elevation was not determined during the course of this boring.

85.0 15 50 (0.25) 50 (0.13) LIMESTONE, tan, weathered, with clay seams

CLAY, very hard, tan, dry, sandy, with limestone fragments (CL)

LIMESTONE, light gray, interbedded with shale

### NOTES:

1. FOR CONTRACTOR INFORMATION ONLY.

**DRILLING LOG** 

Strata Description

Strata Description

CLAY, very stiff, brown to tan, dry, with sand and limestone fragments (CH)

Triaxial Test
Lateral Deviator
Press. Stress
(psi) (psi) (psi) (pcf)

Waco 07/19/24 100.00 ft N/A

RUN: 30'-35'; REC: 82%; RQD: 54%

RUN: 35'-40'; REC: 82%; RQD: 18%

Organization: Raba-Kistner Consultants, Inc. B-31

1 of 1

Tonas Department of Transportation
WinCore
Version 3.3

Driller: Texas Geobore

DRILLING LOG

Waco 07/31/24 100.00 ft N/A

Organization: Raba-Kistner Consultants, Inc. B-32

Elev (ft)		L	Texas Cone						erties		
	)	O G	Penetrometer	Strata Description	Lateral Press. (psi)	ial Test Deviator Stress (psi)	мс	LL	PI	Wet Den. (pcf)	Additional Remarks
				SAND, very dense, moist, tan, clayey							
0.8	-			(SC) CLAY, very hard, moist, tan, with			20	69	48		PP = 4.5 tsf; % Passing #200 = 47
	-			limestone fragments (CH)							
5.0	5 -		50 (1.5) 50 (1)	CLAY band doubt maint for with			25	78	55		PP = 3.0 tsf
	-			CLAY, very hard, dry to moist, tan, with limestone fragments (CL)							
0.0	- 10 -		50 (1.5) 50 (1)	LIMESTONE, tan, with clay seams			31	32	17		% Passing #200 = 63
	-	Ħ		, , , , , , ,							RUN: 10'-15'; REC: 58%; RQD: 15
	15 - -		50 (1) 50 (1)	_	_						
	-	Ħ			0	549	12			139	RUN: 15'-20'; REC: 93%; RQD: 34'
	20 -	Ħ	50 (1) 50 (0.5)								
	-	Ξ									RUN: 20'-25'; REC: 72%; RQD: 17'
5.0	25 -	ш	50 (0.5) 50 (0.75)	LIMESTONE, gray, interbedded with	0	1055	7			144	
	-	Ħ		shale							RUN: 25'-30'; REC: 88%; RQD: 79'
	30 -	Ī	50 (0.5) 50 (0.5)	-							
	-	Ħ									RUN: 30'-35'; REC: 88%; RQD: 67'
	35 - -	Ħ	50 (1) 50 (1)								
	-	Ξ	50 (0.5) 50 (0.5)		0	491	8			140	RUN: 35'-40'; REC: 93%; RQD: 87'
	40 - - -	$\exists$	30 (0.3) 30 (0.3)			491				140	
	- 45 -	Ħ	50 (1) 50 (0.5)								RUN: 40'-45'; REC: 88%; RQD: 0%
		Ξ									
0.0	50 -		50 (0.5) 50 (0.25)		0	468	8			148	RUN: 45'-50'; R0EC: 87%; RQD: 1
.U	JU - -										
	- 55 -										
				1							I
Rem Latit			1.08633 Longitude	= -97.70994							

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SOIL BORING LOGS

SHEET	8	0F	13	

				SHE	ELI	8 UF 13
ANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	_	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		78

Planar
Disparationer
of Transpositation

Elev. (ft) G

Texas Cone Penetrometer

50 (2.5) 50 (2)

90.0 10 50 (0.25) 50 (0.25)

85.0 15 50 (0.5) 50 (0.5)

20 50 (0.75) 50 (0.75)

25 50 (0.5) 50 (0.5)

30 50 (0.5) 50 (0.25)

35 50 (0.5) 50 (0.25) 40 50 (0.5) 50 (0.5)

45 50 (0.5) 50 (0)

50.0 50 50 (0.5) 50 (0.5)

Remarks: Latitude = 31.08544 Longitude = -97.70814

The ground water elevation was not determined during the course of this boring.

CLAY, stiff, dark brown, moist, with sand and limestone fragments (CL) CLAY, stiff, moist, dark brown, sandy, with limestone fragments (CL)

LIMESTONE, gray, interbedded, with shale

### NOTES:

1. FOR CONTRACTOR INFORMATION ONLY.

**DRILLING LOG** 

0 4712

Waco 07/29/24 100.00 ft N/A

PP = 2.0 tsf; % Passing #200 = 71

RUN: 10'-15'; REC: 68%; RQD: 14%

RUN: 20'-25'; REC: 92%; RQD: 78%

RUN: 35'-40'; REC: 85%; RQD: 57%

RUN: 45'-50'; REC: 58%; RQD: 31%

Organization: Raba-Kistner Consultants, Inc. B-33

Driller: Rubicon

DRILLING LOG

Waco 07/18/24 100.00 ft 85.00 ft

Organization: Raba-Kistner Consultants, Inc. B-34

1 of 1

		1.1			Triax	ial Test		Prope	erties		
Ele (ft		L O G	Texas Cone Penetrometer	Strata Description	Lateral	Deviator Stress (psi)	мс	LL	PI	Wet Den. (pcf)	Additional Remarks
	_	1		CLAY, soft to stiff, brown, with	, u						
	-			limestone fragments (CH)			_	68	43		PP = 2.0 tsf; % Passing #200 = 88
	-	1									
	5 -		5 (6) 5 (6)		0	42	15			131	PP = 4.5+ tsf
	-	/									
	-	1	. (0) 40 (0)								
90.0	10 -	1	9 (6) 13 (6)	CLAY, very hard, moist, brown to tan,				66	46		PP = 2.5 tsf; % Passing #200 = 95
				sandy (CL)							
	-										
	15 -	1/4	5 (6) 12 (6)					43	26		PP = 1.5 tsf; % Passing #200 = 55
	-										FF = 1.5 tsi, /6 Fassing #200 = 55
	-										
											% Passing #200 = 70
30.0	20 -	14	50 (0.5) 50 (0.25)	LIMESTONE, gray, interbedded with				29	15		
		Ħ		shale							
		Ħ									
		۲,	50 (0.75) 50 (0.25)								
	25 -	H	,	1							
	-	出			0	446	9			148	
	-	Н									RUN: 25'-30'; REC: 83%; RQD: 45
	30 -	Į,	50 (0.5) 50 (0.25)		0	1410	10			143	
	-	Ħ									
		Ħ									RUN: 30'-35'; REC: 95%; RQD: 35
	-	丗,	50 (0.5) 50 (0.25)								
55.0	35 -	Ħ	30 (0.3) 30 (0.23)	SHALE, gray, interbedded with							
	-	Ħ		limestone							
	-	Ŧ			0	110	17			141	RUN: 35'-40'; REC: 83%; RQD: 65'
	40 -	Ð,	50 (0.5) 50 (0.25)								
	-	H									
		Ħ									RUN: 40'-45'; REC: 95%; RQD: 53
	-	Ħ.	FO (4 75) FO (4 05)		_		l				KON. 40 -43 , REC. 55%, RQD. 55
	45 -	E'	50 (1.75) 50 (1.25)	-	0	59	23			130	
	-	H									
	-	↤									RUN: 45'-50'; REC: 85%; RQD: 33
50.0	50 -	Ħ,	50 (0.5) 50 (0.25)								
.0.0	-	4									
	-	1									
		11									
	55 -	Ш									
	mark										
Lati	itude	= 31	.08456 Longitude	= -97.70634							

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SOIL BORING LOGS

CHEET O OF 13

				240		9 01 13
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		79

### NOTES:

1. FOR CONTRACTOR INFORMATION ONLY.

**DRILLING LOG** 

Waco 06/19/24 100.00 ft

RUN: 25'-30'; REC: 95%; RQD: 72%

Offset							W Elev. N/A
	Triax	ial Test		Prope	erties		
Strata Description	Lateral Press. (psi)	Deviator Stress (psi)	мс	LL	PI	Wet Den. (pcf)	Additional Remarks
AND, very stiff, brown, moist, clayey SC)			24	40	25		DD = 0.0 4-6-0/ D
LAY, stiff to very stiff, brown to tan, lry, sandy, with limestone fragments CL)							PP = 2.0 tsf; % Passing #200 = 32
oc,			11	27	13		PP = 4.0 tsf; % Passing #200 = 87
			13	38	23		PP = 4.5+ tsf; % Passing #200 = 68
MESTONE, tan, weathered, with clay earns							
	0	928	6			139	RUN: 15'-20'; REC: 92%; RQD: 70%
MESTONE, gray							1011. 10 20 , 1120. 0274, 1125. 1074
MEGTONE, gray							
	0	154	3			133	RUN: 20'-25'; REC: 95%; RQD: 51% RUN: 45'-50'; REC: 93%; RQD: 72%

30 50 (0) 50 (0) 35 50 (1) 50 (0.5) 35 50 (0) 50 (0.25) 0 1374 3 50 (3) 50 (0) 0 1456 6

Remarks: Latitude = 31.08367 Longitude = -97.70454

16 (6) 23 (6)

80.0 20 50 (1.5) 50 (2)

25 50 (0) 50 (0)

15 - 50 (2) 50 (0.5) Lili s

The ground water elevation was not determined during the course of this boring.

Organization: Raba-Kistner Consultants, Inc. B-35 Driller: ETTL

**DRILLING LOG** 

		L				ial Test		Prope	511163		
Elev (ft)		Ö G	Texas Cone Penetrometer	Strata Description	Press. (psi)	Deviator Stress (psi)	мс	LL	PI	Wet Den. (pcf)	Additional Remarks
		/		CLAY, hard, tan to light brown, dry to	(psi)	(psi)				(pci)	
	_			moist, with marl and limestone fragments (CH)			15	57	40		% Passing #200 = 95
	-			rragments (CH)							
95.0	5 -	<b>/</b> ];	60 (4) 50 (4.5)								
15.0	<b>5</b> –			CLAY, hard, tan, dry to moist, with	<b>-</b>		12	43	27		
	-			sand and limestone fragments (CL)							
	-										
90.0 1	10 –	1	8 (6) 19 (6)	CLAY hand too majet with sound and			36	49	33		% Passing #200 = 81
	-	/		CLAY, hard, tan, moist, with sand and limestone fragments (CH)							
	-			and the second s							
1	15 -	/	0 (1.5) 50 (3)	-			64	60	40		% Passing #200 = 89
	_										
	_										
	-	<b>/</b> ],	0 (0.75) 50 (0.5)				45	57	38		
80.0 2	20 –	1	0 (0.73) 30 (0.3)	LIMESTONE, fossiliferous, gray			43	31	30		% Passing #200 = 85
		Ш									
	-	Н									RUN: 20'-25'; REC: 88%; RQD: 579
	- 25 -	٦,	0 (0.5) 50 (0.25)		0	352	3			137	
•	25 - -	Ħ									
	-	Ш									
	-	Н									RUN: 25'-30'; REC: 52%; RQD: 0%
70.0	30 -	₩:	0 (0.5) 50 (0.5)	LIMEGRANIE Bakk annu baka da da d	0	582	11			139	
	-	Ħ		LIMESTONE, light gray, interbedded with shale							
		H									RUN: 30'-35'; REC: 92%; RQD: 539
	_	Η.									1014. 50 -55 , NEO. 52 /6, NQD. 55
3	35 –	Ξ.	60 (1) 50 (1)	-							
		П									
	-				0	700	7			145	RUN: 35'-40'; REC: 93%; RQD: 669
		Π,	0 (0.5) 50 (0.5)								
4	40 – –	H,	(0.0) 00 (0.0)	1							
	-	Ħ.									
	-										RUN: 40'-45'; REC: 91%; RQD: 67'
	- 45 -	!	0 (0.25) 50 (0.25)		0	2315	5			141	
	-	H									
	-	Н									RUN: 45'-50': REC: 93%: RQD: 299
		П									RUN: 45'-50'; REC: 93%; RQD: 29'
50.0	50 -	Η.	60 (0.5) 50 (0.25)		-						
	-										
	-										
	55 –										
Rema											
Latit	ude	= 31	.0828 Longitude	= -97.70272							

Organization: Raba-Kistner Consultants, Inc. B-36

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SOIL BORING LOGS

SHEET IO OF I3

				211	ו ו בו	0 01 13
ANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	-	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		80

Planar
Disparationer
of Transpositation

Elev. (ft)

50 (3) 50 (3.5)

10 50 (2) 50 (3.25)

20 50 (0.25) 50 (0.25)

25 50 (0.5) 50 (0.25)

30 - 50 (1.25) 50 (0.5)

35 50 (2.75) 50 (1.25)

45 50 (0.5) 50 (0.25)

50.0 50 50 (0.25) 50 (0.25)

Driller: Rubicon

Remarks: Latitude = 31.08142 Longitude = -97.70125

The ground water elevation was not determined during the course of this boring.

County Bell Highway IH-14 CSJ 0231-03-155

15 50 (0.5) 50 (0.25) LIMESTONE, gray, with fossil shells, interbedded clay and shale seams

LIMESTONE, dark gray, fossiliferous, with interbedded shale and clay seams

SAND, dense, dry to moist, tan, clayey (SC)
CLAY, hard, dry, tan to reddish tan, sandy, with fossil shells, limestone gravel and interbedded shaley clay seams from 6 feet to 8 feet (CL)

SHALE, dark gray, with fossil shells and interbedded limestone lenses

LIMESTONE, light gray, with fossil shells

### NOTES:

1. FOR CONTRACTOR INFORMATION ONLY.

**DRILLING LOG** 

0 878 8

0 1351 9

Waco 04/16/24 100.00 ft N/A

PP = 4.5+ tsf; % Passing #200 = 42

RUN: 25'-30'; REC: 83%; RQD: 58%

RUN: 35'-40'; REC: 83%; RQD: 72%

Organization: Raba-Kistner, Inc.

DRILLING LOG

Texas Cone Penetrometer 40 (6) 50 (0.75) 50 (3) 50 (3) 50 (0.25)	Strata Description  CLAY, very hard, brown, with limestone fragments (CL)  LIMESTONE, tan, with clay seams	Lateral Press. (psi)	Deviator Stress (psi)	MC 20	43	PI 27	Wet Den. (pcf)	Additional Remarks
50 (3) 50 (3)	limestone fragments (CL)	X=-7		20	43	27	JF17	
50 (3) 50 (3)				20	43	27		
50 (3) 50 (3)	LIMESTONE, tan, with day seams							
50 (3) 50 (3)								
50 (3) 50 (3)								
50 (0.5) 50 (0.25)								
50 (0.5) 50 (0.25)	_							
50 (0.5) 50 (0.25)	_							
50 (0.5) 50 (0.25)	-							
П								
50 (5.5) 50 (4.75)	-							
_								
H								
50 (0.5) 50 (0.25)	-							
-	SHALE, gray, interbedded with limestone							
50 (2) 50 (0.25)	imestone	0	176	11			143	-
_ 30 (2) 30 (0.23)	LIMESTONE, gray, with trace fossils,							
Д	interbedded with shale	0	79	20			131	
H								RUN: 30'-35'; REC: 80%; RQD: 63%
50 (1) 50 (0.5)		0	479	7			151	
								1
4				١.				
П		0	1655	9			147	RUN: 35'-40'; REC: 100%; RQD: 30'
50 (0.75) 50 (0.25)								
d								
Н								
								RUN: 40'-45'; REC: 100%; RQD: 67
50 (0.5) 50 (0.25)	-							
1								
4		0	1035	14			140	RUN: 45'-50'; REC: 97%; RQD: 30%
H_50 (0.5) 50 (0.0=								
50 (0.5) 50 (0.25)		-						
31.08038 Longitude	e = -97.69935							
	determined during the course of this boring.							
	50 (0.5) 50 (0.25) 50 (0.5) 50 (0.25)	50 (0.5) 50 (0.25)	50 (0.5) 50 (0.25) 50 (0.5) 50 (0.25) 11.08038 Longitude = -97.69935	50 (0.75) 50 (0.25)  50 (0.5) 50 (0.25)  0 1035  11.08038 Longitude = -97.69935	50 (0.75) 50 (0.25)  50 (0.5) 50 (0.25)  0 1035 14  10.8038 Longitude = -97.69935	50 (0.75) 50 (0.25)  50 (0.5) 50 (0.25)  0 1035 14  10.88038 Longitude = -97.69935	50 (0.75) 50 (0.25)  50 (0.5) 50 (0.25)  0 1035 14  11.08038 Longitude = -97.69935	50 (0.75) 50 (0.25)  50 (0.5) 50 (0.25)  0 1035 14 140  10.8038 Longitude = -97.69935

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SOIL BORING LOGS

CHEET II OF 13

				246	LEI	11 01 13
ANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		81

Planar
Disparationer
of Transpositation

Elev. C G

9 (6) 12 (6)

15 30 (6) 50 (3.75)

20 - 50 (2.75) 50 (1.75)

25 50 (0.5) 50 (0.25)

35 - 50 (0.5) 50 (0.25)

40 50 (6) 42 (6)

45 50 (4) 50 (1.5)

50.0 50 50 (0.5) 50 (0.25)

Driller: Rubicon

Remarks: Latitude = 31.07944 Longitude = -97.69756

The ground water elevation was not determined during the course of this boring.

52.5

### NOTES:

1. FOR CONTRACTOR INFORMATION ONLY.

**DRILLING LOG** 

District Waco
Date 03/25/24
Grnd. Elev. 100.00 ft
GW Elev. N/A

1 of 1

		L			Triax	ial Test		Prope	erties		
Ele <sup>1</sup>		O G	Texas Cone Penetrometer	Strata Description		Deviator	мс	LL	PI	Wet Den. (pcf)	Additional Remarks
				SAND, very dense, moist, brown,	1						
	-	- 1		clayey (SC)							
	-	-									
95.0	5 -		24 (6) 33 (6)				12	20	9		8/ Bi #200 - 44
35.0	5 -			CLAY, very stiff to very hard, dry to							% Passing #200 = 44
	-	-1/1		moist, tan to light gray, with sand, limestone lenses and fossil shells at							
	-	1/4		18 feet (CL)							
	-	1/2:	34 (6) 39 (6)	` '			12	23	8		DD - 4 5 4 5 6 6 D
	10 -										PP = 4.5+ tsf; % Passing #200 = 7
	-	1/4									
	-	1/2									
	15 -		50 (4) 50 (2.5)				9				
	15	K									
	-	-									
	-	1									
	20 -		50 (2) 50 (0.75)				11				
	-										
75.0	25 -	14	50 (1) 50 (0.25)								
	-	H		LIMESTONE, tan and gray, with interbedded clay seams, ferrous							
	-	Н		staining and fossil shells							DUN 051 001 DEC 052/ DOD 04/
	-	Н									RUN: 25'-30'; REC: 65%; RQD: 24
	30 -	4	50 (0.75) 50 (0.25)	-							
	-	Ш									
68.0		Д		LIMESTONE, gray and tan, with fossil							RUN: 30'-35'; REC: 53%; RQD: 119
	-	Щ.	EO (4 OE) EO (0 OE)	shells and interbedded clay seams	0	349	3			133	110111 00 00 111201 00 70, 11201 117
	35 -	ш	50 (1.25) 50 (0.25)	-							
63.0		Ы									
33.0	-	Н		LIMESTONE, dark gray, with fossil shells and interbedded clay seams							RUN: 35'-40'; REC: 62%; RQD: 239
	-	-Д,	50 (0.75) 50 (0.5)	shells and interbedded clay seams							
	40 -	ш	30 (0.73) 30 (0.3)								
		Ш									
	-	+			0	128	17			141	RUN: 40'-45'; REC: 87%; RQD: 479
		Ħ,	50 (1.5) 50 (1.25)								
	45 -	H									
	-	Н									
	-	-П			0	628	12			135	RUN: 45'-50'; REC: 78%; RQD: 489
50.0	50 -	Ш	50 (0.5) 50 (0.25)								
0.0	-	4									
	-	- 1									
	-	1									
	55 -	1									
				1	1						1
	nark: tude		.07914 Longitude	= -97.69532							
Luti		- 51	I - Longitude								
The	grour	nd wat	er elevation was not	determined during the course of this boring.							
Deill	ler: F	Rubio	con	Logger: Bradle	y Coffma	n					Organization: Raba-Kistner, I

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SOIL BORING LOGS

				SHE	E I I	2 OF 13
ANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	-	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		82

County Bell Highway IH-14 CSJ 0231-03-155

CLAY, very stiff, dry to moist, gray to light gray, with gravel (CL)

LIMESTONE, tan to light brown, with fossil shells and interbedded shale

30 43 (6) 50 (6) SHALE, dark gray, weathered, with fossil shells

SHALE, dark gray

Triaxial Test Properties

Lateral Deviator Press. Stress (psi) (psi) MC LL PI Den. (pcf)

PP = 2.0 tsf; % Passing #200 = 98

PP = 4.5+ tsf; % Passing #200 = 86

Organization: Raba-Kistner, Inc. B-39

Waco 04/18/24 100.00 ft N/A

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### NOTES:

1. FOR CONTRACTOR INFORMATION ONLY.

**DRILLING LOG** 

Hole Structure

ole 067 ructure Light Poles ation District Wac Date 04/1 Grnd. Elev. 100. GW Elev. 56.0

		_	_									
Ele	w		L	Texas Cone		Triax	ial Test Deviator		Prope	erties	Wet	
(f			O G	Penetrometer	Strata Description	Press. (psi)	Stress (psi)	мс	LL	PI	Den. (pcf)	Additional Remarks
					CLAY, very stiff to very hard, moist, brown to tan, sandy, with gravel, fossil shells and calcareous nodules (CL)	W - /	W				W - 7	
		; -{	1	38 (6) 22 (6)				14				
	10	۱-۱		47 (6) 50 (5.25)				12				
	1	;   		50 (2.25) 50 (1.75)				9	28	14		% Passing #200 = 60
80.0	20	1	4	50 (1.5) 50 (0.25)								
		=	I T		LIMESTONE, tan, weathered, with fossil shells and interbedded shaley clay seams							
	2	;	I	50 (1.75) 50 (0.75)								
		7	Τ									
72.5		+	Ι		LIMESTONE, dark gray							
	30	,‡	Į	50 (4.25) 50 (1.75)								
		Ŧ	Ι									
		7	Ι									
	35	: =	Ι	50 (6) 42 (6)				14				
	3:	'∓	Ц									
		1	_									
		+	_	50 (5.5) 47 (6)								
	40	'‡	∄	30 (3.3) 47 (0)								
		+	_									
		1	_									
	4	<b>5</b> +	#	50 (0.5) 50 (0.25)								
		7	+									
		1	Ť									
50.0	50	1	Ė	50 (0.75) 50 (0.25)		-						
		1										
		+										
	55	, ]										
Lat	ma	rks: de =	31	1.07778 Longitude		1						
Any	gro	und d. T	wa he	ter elevation informatio actual groundwater ele	on provided on this boring log is representative of c evation may fluctuate due to time, climatic condition	conditions ens, and/or o	existing on to construction	he day activit	and for y.	the sp	ecific lo	cation where this information was

Logger: Bradley Coffman

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SOIL BORING LOGS

SHEET 13 OF 13

				эпі		2 01 12	
ANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY	
	6	0231	03	156		IH-14	
	STATE	DIST		COUNTY		SHEET NO.	
	TEXAS	WACO		BELL		83	

#### ILLUMINATION GENERAL NOTES

- 1. EXISTING FIBER OPTICS, STORM SEWER, TELEPHONE, GAS, ITS, AND ELECTRICAL SYSTEMS WITHIN PROJECT AREA MAY NOT BE IN EXACT LOCATION AS SHOWN OR NOT SHOWN ON PLANS OR OTHER PLANS. BEFORE DIGGING, DRILLING OR BORING IN THE PROJECT AREA, THE CONTRACTOR SHALL PERFORM A "ONE CALL" AND NOTIFY THE UTILITY COMPANIES 72 HOURS PRIOR TO CONSTRUCTION.
- INSTALLATION OF HIGH MAST POLES REQUIRES COORDINATION WITH THE FEDERAL AVIATION ADMINISTRATION. THE CONTRACTOR IS RESPONSIBLE FOR RECORDING THE LATITUDE, LONGITUDE, AND ELEVATION OF EACH FINALIZED POLE LOCATION AND PROVIDE TO THE ENGINEER. THIS WORK WILL NOT BE PAID FOR DIRECTLY AND WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS. PROVIDE DATA AND NOTIFY THE ENGINEER NO LATER THAN 3 CALENDAR DAYS AFTER A POLE IS ERECTED. THIS WILL BE DONE FOR EACH HIGH MAST LOCATION.
- 3. ALL HIGH MAST ILLUMINATION POLES WILL HAVE AVIATION WARNING LIGHTS INSTALLED. THIS IS SUBSIDIARY TO SPECIAL SPECIFICATION 6083.
- THIS PROJECT INCLUDES TWO TYPES OF ILLUMINATION CONTINUOUS ILLUMINATION TO BE MAINTAINED BY THE CITY OF KILLEEN USING HIGH MAST POLES, AND SAFETY LIGHTING TO BE MAINTAINED BY TXDOT USING ROADWAY ILLUMINATION POLES AND UNDERPASS LIGHTING FIXTURES. THESE TWO TYPES OF LIGHTING ARE TO BE POWERED USING SEPARATE SERVICES. SAFETY LIGHTING AND CONTINUOUS LIGHTING ARE NOT ALLOWED TO SHARE THE SAME CONDUIT. THEY ARE ALLOWED TO USE THE SAME TRENCH AND GROUND BOX.
- 5. ALL ELECTRICAL CONDUCTOR SPLICES INVOLVING ALUMINUM MUST BE PERFORMED BY A MASTER ELECTRICIAN.
- ALL NEW GROUND BOXES WILL BE TYPE D WITH APRON. NEW GROUND BOXES WILL BE SECURED USING A METHOD APPROVED BY THE ENGINEER. NEW GROUND BOXES WILL BE PAID FOR USING ITEM 624 7014 (INSTL GROUND BOX W/SECURE LID).
- 7. WHERE CALLED OUT, EXISTING GROUND BOXES THAT ARE TO REMAIN WILL HAVE THEIR LIDS REPLACED WITH ONES THAT ARE LOCKABLE. THIS WILL BE PAID FOR USING ITEM 624 7015 (RETRO GROUND BOX W/SECURE LID).
- SERVICE, GROUND BOX, CONDUIT, ILLUMINATION POLES, AND HIGH MAST LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED MARGINALLY TO BETTER FIT FIELD CONDITIONS. HIGH MAST POLES SHOULD NOT BE ADJUSTED TO BE WITHIN THE CLEAR ZONE IF THEY ARE NOT PROTECTED, HIGH MAST LOCATIONS ARE TO BE APROVED BY THE ENGINEER BEFORE CONSTRUCTION.
- WHEN APPLICABLE, LOCATE NEW SERVICES AS CLOSE AS PRACTICAL TO ORIGINAL SERICE TO PRESERVE EXISTING SERVICE ADDRESS AND ESID NUMBER.
- WHEN AN EXISTING CIRCUIT CHANGES IDENTIFIERS (A, B, C, ETC.) GOING FROM EXISTING LAYOUT TO PROPOSED, REPLACE ALL CIRCUIT IDENTIFIER TAGS THAT WERE AFFECTED AND ARE ACCESSIBLE.
- 11. REPLACE FUSES AND BREAKAWAY FUSE HOLDERS IN EXISTING ILLUMINATION POLES THAT ARE LABELED AND ARE TO REMAIN. THIS IS FOR ANTICIPATED BREAKAGE WHEN REMOVING EXISTING CONDUCTORS.
- 12. SOME ROADWAY ILLUMINATION POLES HAVE DIFFERENT DESIGNATIONS FROM EXISTING TO PROPOSED DUE TO CHANGING CIRCUITS AND/OR SERVICES.
- 13. ABANDONED CONDUIT NOT SHOWN ON ILLUMINATION LAYOUT FOR CLARITY.

### **LEGEND OF UTILITY TYPES**

COMMUNICATIONS	QL "B"
BRIGHTSPEED (TELE)	T1
MILLENIUM TELECOM (TELE)	T2
BRIGHTSPEED (FOC)	F0C1
UNITE PRIVATE NETWORKS (FOC)	—— - —— FOC2—— - ——
FIBERLIGHT (FOC)	F0C3
WINDSTREAM (FOC)	FOC4
LUMEN (FOC)	F0C5
TRANSTELCO (FOC)	F0C6 QL "C"
SPECTRUM (OVH FOC)	 QL "D"
AT&T (FOC)	—- <del>[FOC1]</del>
SUDDENLINK (OVH)	—- <del>(FOC2)</del> -—
GAS ATMOS	QL "B" G1
WATER CITY OF KILLEEN	QL "D" . — W1— · —
WASTEWATER CITY OF KILLEEN	QL "D"
ELECTRIC ONCOR	QL "C" - — — (Œ1)— — —

### INTERIM REVIEW THIS DOCUMENT IS RELEASED FOR THE URPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF PATRICK JALUFKA P.E., ON: 7/II/2025 IT IS NOT TO BE USED FOR CONSTRUCTION

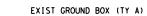
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### ILLUMINATION GENERAL NOTES & UTILITY LEGEND

CHEET I OF I

				246	EI	I UF I	
ANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	-	HIGHWAY	
	6	0231	03	156		IH-14	
	STATE	DIST		COUNTY		SHEET NO.	
	TEXAS	WACO		BELL		84	



PROP GROUND BOX (TY D W/ APRON)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)

→ PROP HIGH MAST ILLUM POLE W/ GB

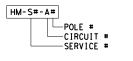
EXIST RDWY ILLUM ASSEM (TRANS)

EXIST/PROP ELEC SERVICE
RETROFIT GROUND BOX LID

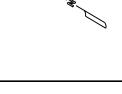
GROUND BOX (PREPARE)

### POLE DESIGNATION

### CONDUIT DESIGNATION







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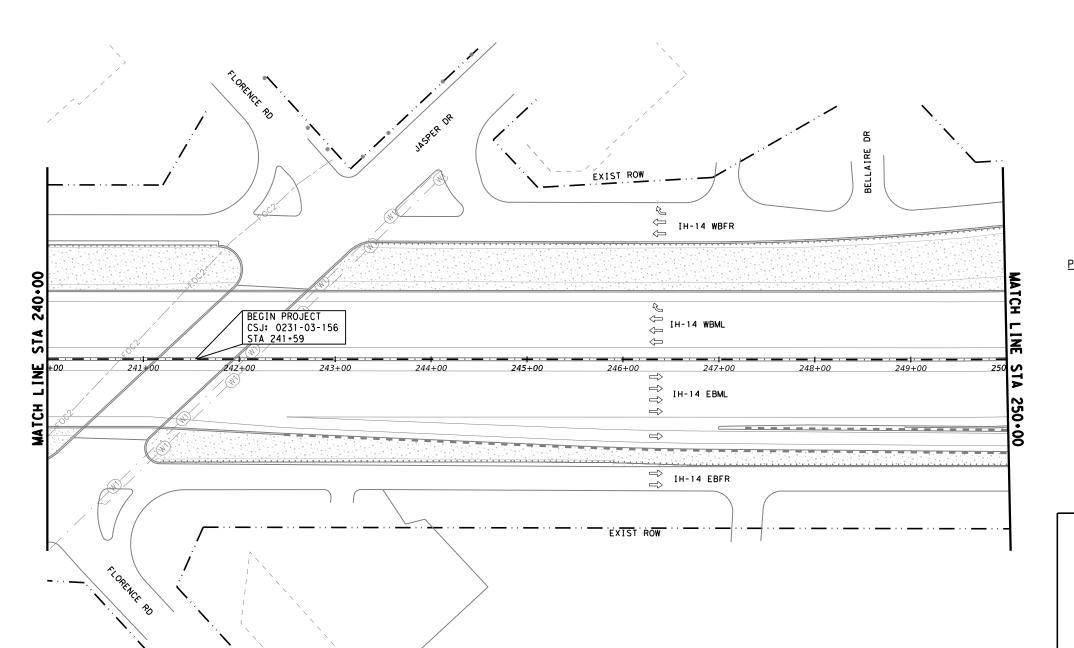
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### ILLUMINATION LAYOUT

	O SCALE: <del> </del>	25 50		100 FEET	
	1"	= 100'	HOR		ET I OF 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WACO		BELL	85



			COND	UIT AND COND	DUCTOR RUNS			
RUN NAME			I		CONDUIT		EQUIPMENT GROUNDING CONDUCTOR	ELECTRICAL CONDUCTOR
			5	0618	0618	0618	6071	6071
			ENGTH	7036	7061	7090	6003	6003
RUN NAME	SERVICE	CIRCUITS	RUN LE	CONDT (PVC) (SCH 40) (3")	CONDT (PVC) (SCH 80) (3") (BORE)	CONDUIT (PREPARE)	ALUMINUM ELECTRICAL COND (#6 XHHW)	ALUMINUM ELECTRICAL COND (#6 XHHW)
				LF	LF	LF	LF	LF
				NO WORK THIS	SHEFT			

EXIST	GROUND	BOX	(TY

PROP GROUND BOX (TY D W/ APRON)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

— PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

NOW I TELOM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)
PROP HIGH MAST ILLUM POLE W/ GB

EXIST RDWY ILLUM ASSEM (TRANS)

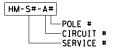
EXIST/PROP ELEC SERVICE

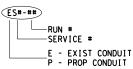
RETROFIT GROUND BOX LID

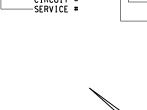
(2) GROUND BOX (PREPARE)

### POLE DESIGNATION

#### CONDUIT DESIGNATION









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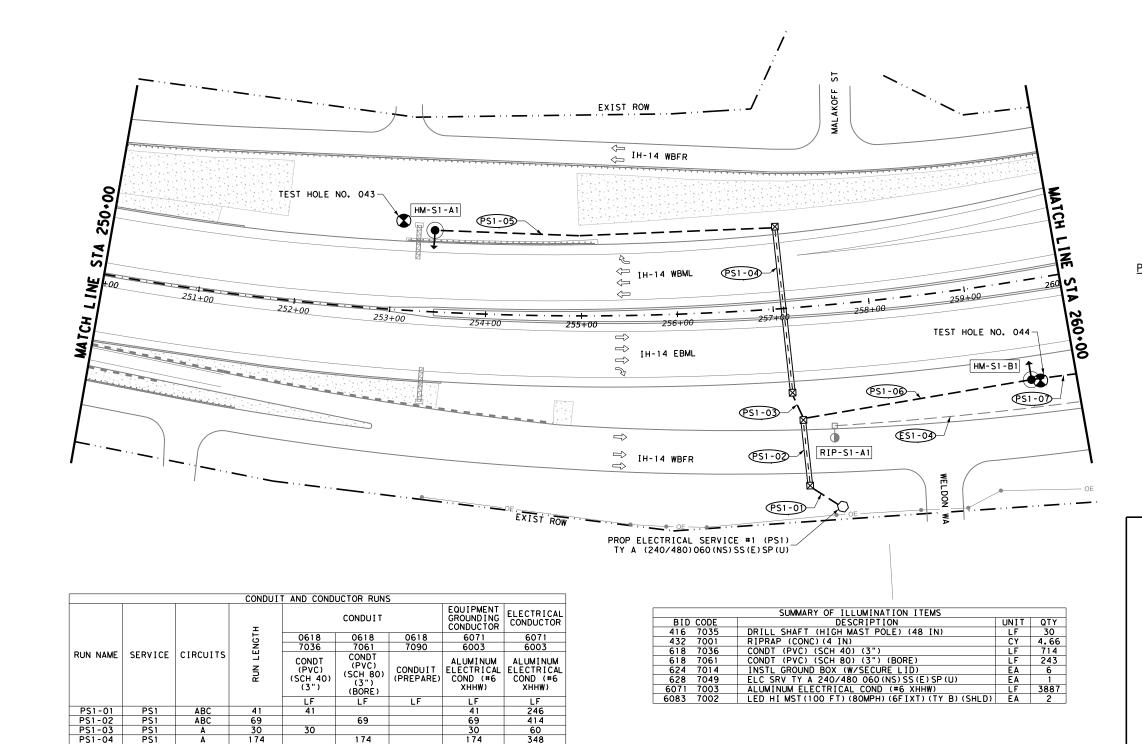
## PRELIMINARY NOT FOR CONSTRUCTION



LAYOUT

0	25	50	100
CALE:			FEET

	1 "	<b>' =</b> 100'	HORI	Z. SHE	EET 2	0F 20
HANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HI	GHWAY
	6	0231	03	156	- 1	H-14
	STATE	DIST		COUNTY	:	SHEET NO.
	TEXAS	WACO		BELL		86



957 2930

SHEET TOTAL: 714 243

ILLUMINATION ASSEMBLY SUMMARY										
POLE	LOCATION		ASSEMBLY TYPE	FOUNDATION	FOUNDATION					
POLE	STATION	OFFSET (FT)	ASSEMBLI TIPE	DIAMETER (IN)	LENGTH (FT) *					
HM-S1-A1	253+05	94 LT	(100 FT) (80MPH) (6FIXT) (TY B) (SHLD)	48	15					
HM-S1-B1	259+55	104 RT	(100 FT) (80MPH) (6FIXT) (TY B) (SHLD)	48	15					
* INCLUDE	* INCLUDES 3 FEET EXPOSURE									

EXIST GROUND BOX (TY A)

PROP GROUND BOX (TY D W/ APRON)

- EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

— PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)

PROP HIGH MAST ILLUM POLE W/ GB

EXIST RDWY ILLUM ASSEM (TRANS)

EXIST/PROP ELEC SERVICE

RETROFIT GROUND BOX LID

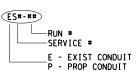
GROUND BOX (PREPARE)

 $(\bullet)$ 

CONDUIT DESIGNATION

HM-S#-A#
POLE #
CIRCUIT #
SERVICE #

POLE DESIGNATION





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### ILLUMINATION LAYOUT

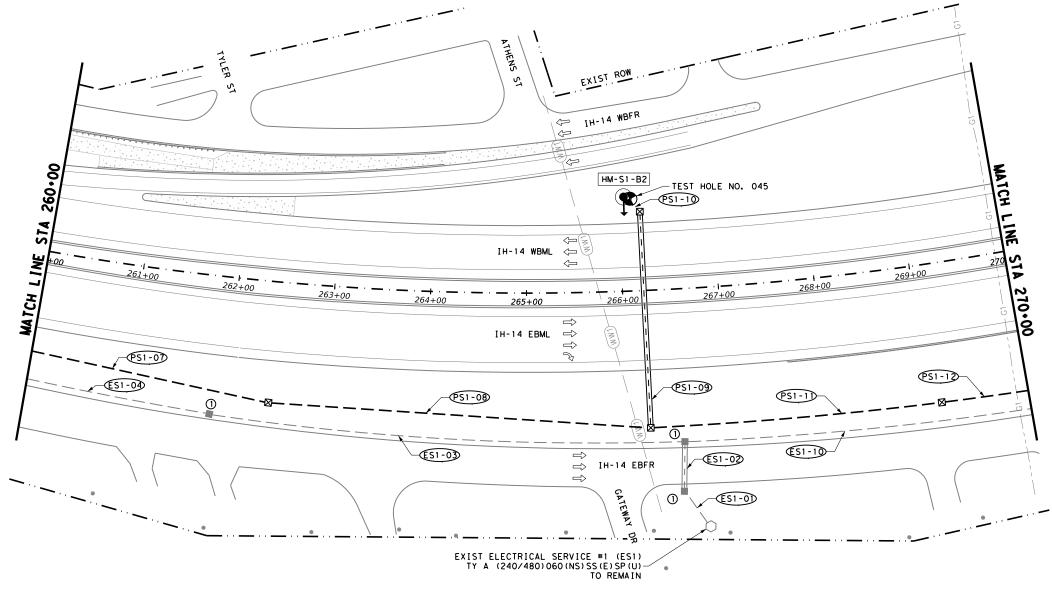
	SCALE:	23 30		FEET	
	1 "	' = 100'	HOR		HEET 3 OF 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.

BELL

87

WACO

TEXAS



	CONDUIT AND CONDUCTOR RUNS									
				AND COND	CONDUIT	,	EQUIPMENT GROUNDING CONDUCTOR	ELECTRICAL CONDUCTOR		
			LENGTH	0618	0618	0618	6071	6071		
RUN NAME	SERVICE	CIRCUITS	ᄪ	7036	7061	7090	6003	6003		
RUN NAME	32.11702	omeoris.	RUN L	CONDT (PVC) (SCH 40) (3")	CONDT (PVC) (SCH 80)	CONDUIT (PREPARE)	ALUMINUM ELECTRICAL COND (#6 XHHW)	ALUMINUM ELECTRICAL COND (#6 XHHW)		
				LF	LF	LF	LF	LF		
PS1-07	PS1	BC	252	252			252	1008		
PS1-08	PS1	BC	400	400			400	1600		
PS1-09	PS1	В	225		225		225	450		
PS1-10	PS1	В	24	24			24	48		
PS1-11	PS1	С	305	305			305	610		
PS1-12	PS1	С	91	91			91	182		
ES1-01	ES1	ABC	46			NO WORK				
ES1-02	ES1	ABC	52			NO WORK	ζ			
ES1-03	ES1	Α	498			NO WORK	(			
ES1-04	ES1	Α	194			NO WORK	(			
ES1-10	ES1	BC	365	SPLICE EXISTING TO PROPOSED						
		SHEE	T TOTAL:	1072	225		1297	3898		

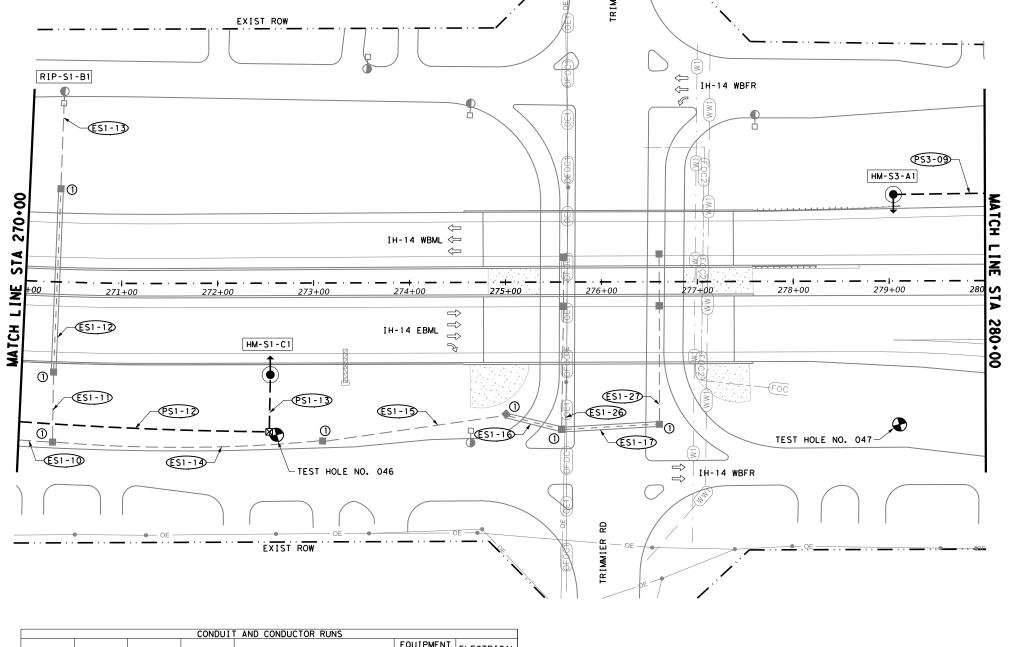
		SUMMARY OF ILLUMINATION ITEMS		
BID	CODE	DESCRIPTION	UNIT	QTY
416	7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	18
432	7001	RIPRAP (CONC) (4 IN)	CY	2.33
618	7036	CONDT (PVC) (SCH 40) (3")	LF	1072
618	7061	CONDT (PVC) (SCH 80) (3") (BORE)	LF	225
624	7014	INSTL GROUND BOX (W/SECURE LID)	EΑ	5
624	7015	RETRO GROUND BOX (W/SECURE LID)	EΑ	3
6071	7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	5195
6083	7002	LED HI MST(100 FT) (80MPH) (6FIXT) (TY B) (SHLD)	EΑ	1

| ILLUMINATION ASSEMBLY SUMMARY

| POLE | LOCATION | STATION | OFFSET (FT) | ASSEMBLY TYPE | FOUNDATION | LENGTH (FT) \*
| HM-S1-B2 | 266+05 | 98 LT | (100 FT) (80MPH) (6FIXT) (TY B) (SHLD) | 48 | 18 |
| \* INCLUDES 3 FEET EXPOSURE

RUN NAME | SERVICE | CIRCUITS

SHEET TOTAL: 416



AND CONDUCTOR RUNS										
	CONDUIT	EQUIPMENT GROUNDING CONDUCTOR	ELECTRICAL CONDUCTOR							
0618	0618	0618	6071	6071						
7036	7061	7090	6003	6003						
CONDT (PVC) (SCH 40) (3")	CONDT (PVC) (SCH 80)	CONDUIT (PREPARE)	ALUMINUM ELECTRICAL COND (#6 XHHW)	ALUMINUM ELECTRICAL COND (#6 XHHW)						
LF	LF	LF	LF	LF						
261										
60										
	SPL I CE	EXISTING T	O PROPOSED							
	SPL I CE	EXISTING T	O PROPOSED							
		NO WORK								
		NO WORK								
		282	282	564						
		193	193	386						
		60	60	120						
		102	102	204						
	SPLICE		O PROPOSED							
	SPLICE EXISTING TO PROPOSED									
95			95	190						

637 732 1464

	SUMMARY OF ILLUMINATION ITEMS		
BID CODE	DESCRIPTION	UNIT	QTY
416 7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	50
432 7001	RIPRAP (CONC) (4 IN)	CY	4.66
618 7036	CONDT (PVC) (SCH 40) (3")	LF	416
618 7090	CONDUIT (PREPARE)	LF	637
624 7014	INSTL GROUND BOX (W/SECURE LID)	EA	3
624 7015	RETRO GROUND BOX (W/SECURE LID)	EA	7
6071 7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	2196
6083 7001	LED HI MST (100 FT) (80MPH) (6FIXT) (TY B)	EA	2

POLE		ATION	ASSEMBLY TYPE	FOUNDATION					
	STATION	OFFSET (FT)	ASSEMBET THE	DIAMETER	LENGTH (FT) *				
HM-S1-C1	272+55	95 RT	(100 FT) (80MPH) (6FIXT) (TY B)	48	25				
HM-S3-A1	279+05	90 LT	(100 FT) (80MPH) (6FIXT) (TY B)	48	25				
* INCLUDE	INCLUDES 3 FEET EXPOSURE								

### **LEGEND**

EXIST GROUND BOX (TY A)

PROP GROUND BOX (TY D W/ APRON)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE) PROP HIGH MAST ILLUM POLE W/ GB

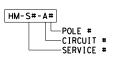
EXIST RDWY ILLUM ASSEM (TRANS)

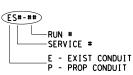
EXIST/PROP ELEC SERVICE 1 RETROFIT GROUND BOX LID

GROUND BOX (PREPARE)

POLE DESIGNATION

CONDUIT DESIGNATION







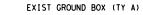
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### **ILLUMINATION** LAYOUT

	SCALE:	25 50		100 FEET	
	1"		HORI		EET 4 OF 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WACO		BELL	88



PROP GROUND BOX (TY D W/ APRON)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)

PROP HIGH MAST ILLUM POLE W/ GB

EXIST RDWY ILLUM ASSEM (TRANS)

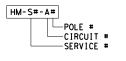
EXIST/PROP ELEC SERVICE

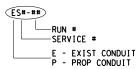
1 RETROFIT GROUND BOX LID

GROUND BOX (PREPARE)

### POLE DESIGNATION

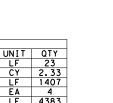
### CONDUIT DESIGNATION













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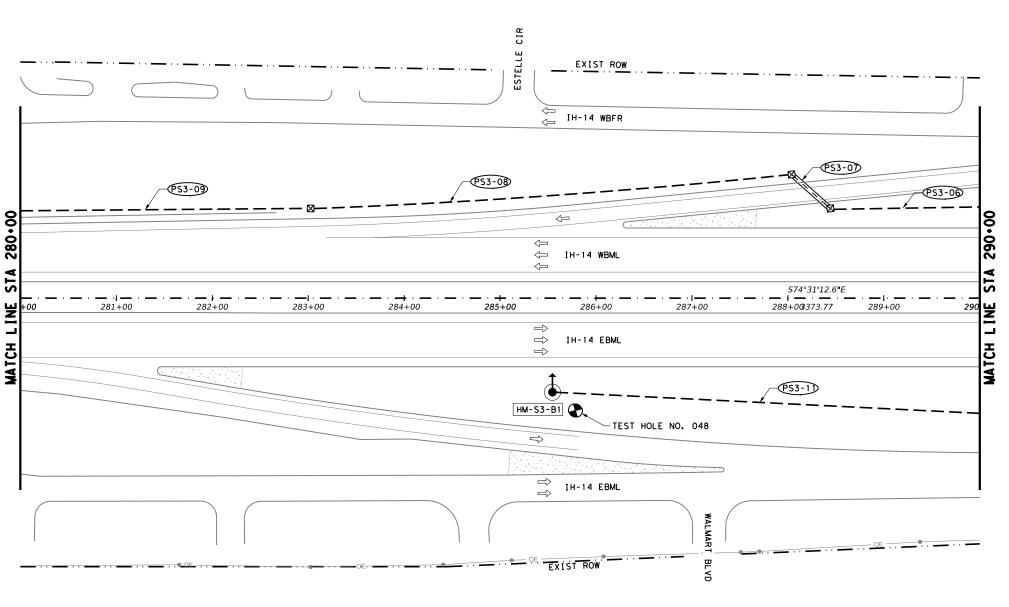
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0	25	50	100	
SCALE:		_	FEET	
1"	= 100	oʻ l	HORIZ	

	1"	= 100'	HOR	IZ. SHE	ET 5	0F 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIC	GHWAY
	6	0231	03	156	H	H-14
	STATE	DIST		COUNTY	S	SHEET NO.
	TEXAS	WACO		BELL		89



			CONDUI	T AND COND	UCTOR RUNS			
			LENGTH		CONDUIT		EQUIPMENT GROUNDING CONDUCTOR	ELECTRICAL CONDUCTOR
			9	0618	0618	0618	6071	6071
RUN NAME	SERVICE	CIRCUITS	ᅋ	7036	7061	7090	6003	6003
	<b>32192</b>		RUN L	CONDT (PVC) (SCH 40) (3") LF	CONDT (PVC) (SCH 80) LF	CONDUIT (PREPARE)	ALUMINUM ELECTRICAL COND (#6 XHHW) LF	ALUMINUM ELECTRICAL COND (#6 XHHW) LF
PS3-06	PS3	Α	156	156			156	312
PS3-07	PS3	Α	54		54		54	108
PS3-08	PS3	Α	502	502			502	1004
PS3-09	PS3	Α	303	303			303	606
PS3-11	PS3	В	446	446			446	892
		SHEE	T TOTAL:	1407	54		1461	2922

SUMMARY OF ILLUMINATION ITEMS		
DESCRIPTION	UNIT	QTY
DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	23
RIPRAP (CONC) (4 IN)	CY	2.33
CONDT (PVC) (SCH 40) (3")	LF	1407
INSTL GROUND BOX (W/SECURE LID)	EA	4
ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	4383
LED HI MST(100 FT) (80MPH) (6FIXT) (TY B)	EA	1
	DESCRIPTION DRILL SHAFT (HIGH MAST POLE) (48 IN) RIPRAP (CONC) (4 IN) CONDT (PVC) (SCH 40) (3") INSTL GROUND BOX (W/SECURE LID) ALUMINUM ELECTRICAL COND (#6 XHHW)	DESCRIPTION

ILLUMINATION ASSEMBLY SUMMARY										
POLE	LOC STATION	CATION (FT)	ASSEMBLY TYPE	FOUNDATION DIAMETER	FOUNDATION LENGTH (FT) *					
HM-S3-B1	285+55	98 RT	(100 FT) (80MPH) (6FIXT) (TY B)	48	23					
* INCLUDE	INCLUDES 3 FEET EXPOSURE									

			LENG	0618	0618	0618	6071	6071	
RUN NAME	SERVICE	CIRCUITS	🗓	山 7036 7061		7090	6003	6003	
NOW HAND	32.117.02	01.1001.13	RUN L	CONDT (PVC)	CONDT (PVC)	CONDUIT	ALUMINUM ELECTRICAL	ALUMINUM ELECTRICAL	
			<u> </u>	(SCH 40) (3")	(SCH 80)	(PREPARE)	COND (#6 XHHW)	COND (#6 XHHW)	
				ĹF	LF	LF	LF	LF	
PS2-01	PS2	Α	29	29			29	58	
ES2-02	PS2	Α	124		SPL I CE	EXISTING 1	O PROPOSED		
PS3-01	PS3 ABCD	PS3 ABCD	PS3 ABCD	23	23			23	184
PS3-02	PS3	ABCD	61		61		61	488	
PS3-03	PS3	AD	82	82			82	328	
PS3-04	PS3	AD	165		165		165	660	
PS3-05	PS3	Α	517	517			517	1034	
PS3-06	PS3	Α	205	205			205	410	
PS3-10	PS3	В	568	568			568	1136	
PS3-11	PS3	В	119	119			119	238	
PS3-12	PS3	С	178	178			178	356	
PS3-13	PS3	С	145	145			145	290	

CONDUIT

EQUIPMENT GROUNDING CONDUCTOR

2371

CONDUIT AND CONDUCTOR RUNS

SHEET TOTAL: 2145 226

		SUMMARY OF ILLUMINATION ITEMS		
BID	CODE	DESCRIPTION	UNIT	QTY
416	7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	45
432	7001	RIPRAP (CONC) (4 IN)	CY	4.66
618	7036	CONDT (PVC) (SCH 40) (3")	LF	2145
618	7061	CONDT (PVC) (SCH 80) (3") (BORE)	LF	226
624	7014	INSTL GROUND BOX (W/SECURE LID)	EΑ	7
624	7015	RETRO GROUND BOX (W/SECURE LID)	EΑ	5
628	7049	ELC SRV TY A 240/480 060(NS)SS(E)SP(U)	EΑ	2
6013	7006	GROUND BOX (PREPARE)	EΑ	1
6071	7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	8111
6083	7001	LED HI MST(100 FT) (80MPH) (6FIXT) (TY B)	EΑ	2

		TITIM	INATION ASSEMBLY SUMMARY		
50.5	LOC	ATION		FOUNDATION	FOUNDATION
POLE	STATION	OFFSET (FT)	ASSEMBLY TYPE	DIAMETER	LENGTH (FT) *
HM-S3-A2	292+05	98 LT	(100 FT) (80MPH) (6FIXT) (TY B)	48	25
HM-S3-C1	298+55	98 RT	(100 FT) (80MPH) (6FIXT) (TY B)	48	20
<ul><li>* INCLUDE</li></ul>	S 3 FEET EX	POSURE			

### **LEGEND**

EXIST GROUND BOX (TY A)

PROP GROUND BOX (TY D W/ APRON)

- EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

- PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)

→ PROP HIGH MAST ILLUM POLE W/ GB

EXIST RDWY ILLUM ASSEM (TRANS)

EXIST ROWY ILLUM ASSEM (TRANS)

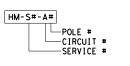
EXIST/PROP ELEC SERVICE

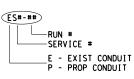
RETROFIT GROUND BOX LID

GROUND BOX (PREPARE)

POLE DESIGNATION

CONDUIT DESIGNATION









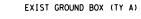
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### ILLUMINATION LAYOUT

	O SCALE: <del> </del>	25 50		100 FEET	
	1"	= 100'	HORI		EET 6 OF 20
HANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WACO		BELL	90

TY A (240/480) 060 (NS) SS(E) SP(U)



EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE) PROP HIGH MAST ILLUM POLE W/ GB

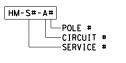
EXIST RDWY ILLUM ASSEM (TRANS)

EXIST/PROP ELEC SERVICE 1 RETROFIT GROUND BOX LID

GROUND BOX (PREPARE)

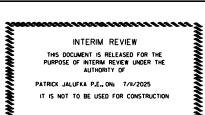
POLE DESIGNATION

CONDUIT DESIGNATION









# PRELIMINARY NOT FOR CONSTRUCTION



## ILLUMINATION LAYOUT

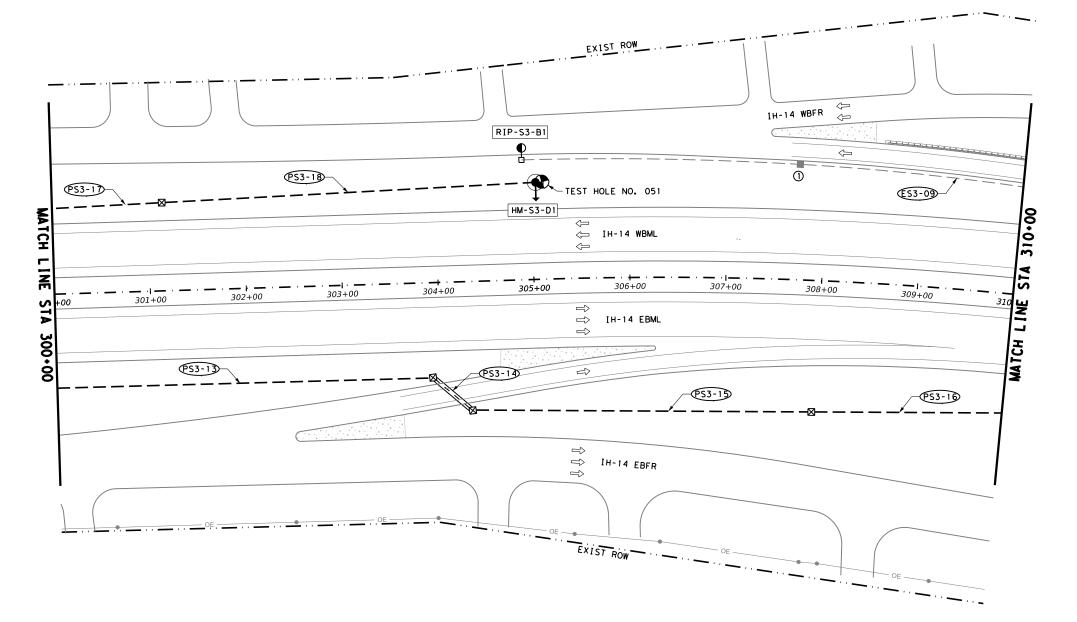
	SCALE:	25 50		FEET	
	1"		HORI		EET 7 OF 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.

WACO

TEXAS

91

BELL



	CONDUIT AND CONDUCTOR RUNS									
			LENGTH		CONDUIT		EQUIPMENT GROUNDING CONDUCTOR	ELECTRICAL CONDUCTOR		
			۶	0618	0618	0618	6071	6071		
RUN NAME	SERVICE	CIRCUITS	ᇤ	7036	7061	7090	6003	6003		
	SERVICE CIRCUIT		RUN L	CONDT (PVC) (SCH 40) (3")	CONDT (PVC) (SCH 80)	CONDUIT (PREPARE)	ALUMINUM ELECTRICAL COND (#6 XHHW)	ALUMINUM ELECTRICAL COND (#6 XHHW)		
				ĹF	LF	LF	LF	LF		
PS3-13	PS3	С	392	392			392	784		
PS3-14	PS3	С	54		54		54	108		
PS3-15	PS3	С	353	353			353	706		
PS3-16	PS3	С	198	198			198	396		
PS3-17	PS3	D	115	115			115	230		
PS3-18	PS3	D	390	390			390	780		
ES3-09	ES3	В	234			234	234	468		
ES3-10	ES3	В	291			291	291	582		
	SHEET TOTAL: 1448 54 525 2027 4054									

	SUMMARY OF ILLUMINATION ITEMS		
BID CODE	DESCRIPTION	UNIT	QTY
416 7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	18
432 7001	RIPRAP (CONC) (4 IN)	CY	2.33
610 7124	IN RD IL (TY SA) 40T-8 (250W EQ) LED	EA	1
618 7036	CONDT (PVC) (SCH 40) (3")	LF	1448
618 7061	CONDT (PVC) (SCH 80) (3") (BORE)	LF	54
618 7090	CONDUIT (PREPARE)	LF	525
624 7014	INSTL GROUND BOX (W/SECURE LID)	EA	5
624 7015	RETRO GROUND BOX (W/SECURE LID)	EA	1
6071 7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	6081
6071 7004	ALUMINUM ELECTRICAL COND (#8 XHHW)	LF	1575
6083 7001	LED HI MST (100 FT) (80MPH) (6FIXT) (TY B)	EA	1

	ILLUMINATION ASSEMBLY SUMMARY										
POLE	LOC	ATION	ASSEMBLY TYPE	FOUNDATION	FOUNDATION						
POLE	STATION	OFFSET (FT)	ASSEMBLI TIFE	DIAMETER	LENGTH (FT) *						
HM-S3-D1	305+05	101 LT	(100 FT) (80MPH) (6FIXT) (TY B)	48	18						
* INCLUDE	INCLUDES 3 FEET EXPOSURE										

### **LEGEND** EXIST GROUND BOX (TY A) PROP GROUND BOX (TY D W/ APRON) EXIST CONDUIT (TRENCHED) EXIST CONDUIT (BORED) PROP CONDUIT (TRENCHED) EXIST CONDUIT (BORED) RDWY ILLUM ASSEM (TRANS) TEST HOLE NO. 053 RDWY ILLUM ASSEM (SHOE/BRIDGE) PROP HIGH MAST ILLUM POLE W/ GB EXIST RDWY ILLUM ASSEM (TRANS) EXIST/PROP ELEC SERVICE HM-S4-A1 1 RETROFIT GROUND BOX LID GROUND BOX (PREPARE) POLE DESIGNATION CONDUIT DESIGNATION HM-S#-A# ES#-## POLE # CIRCUIT # SERVICE # 317400 318+00 \_E - EXIST CONDUIT P - PROP CONDUIT

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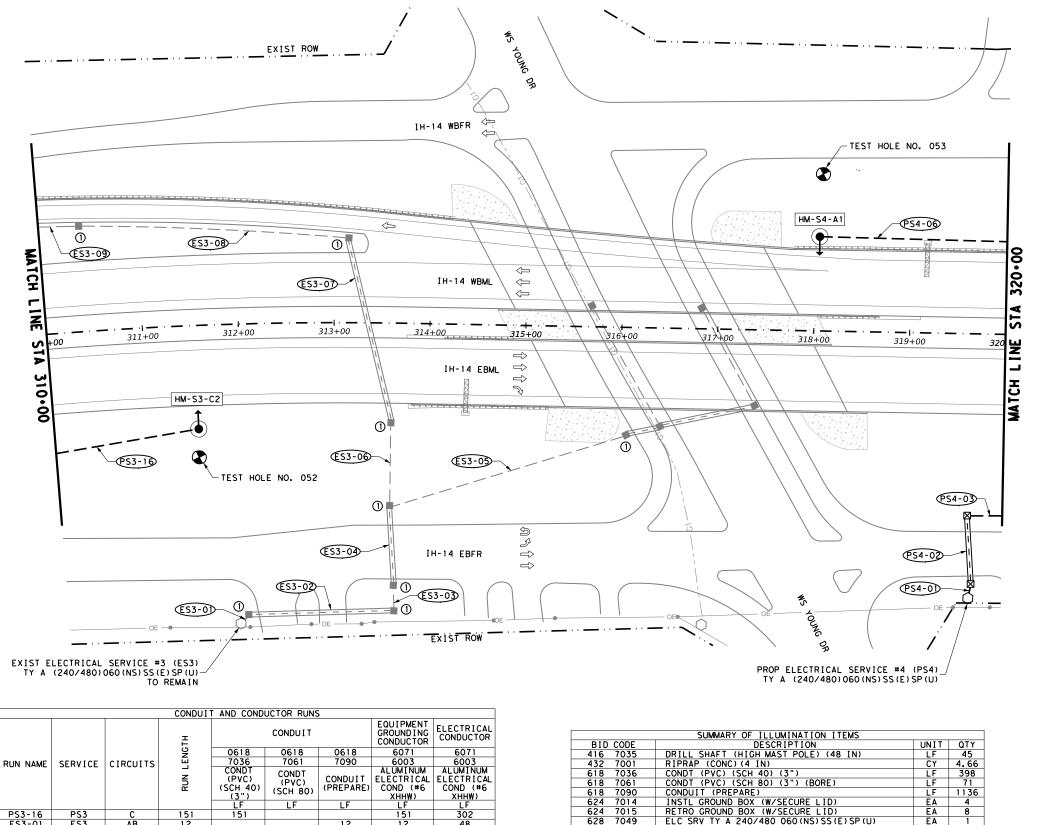
INTERIM REVIEW



### **ILLUMINATION** LAYOUT

	SCALE:			FEET	
	1"		HORI	Z. SH	EET 8 OF 20
HANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WACO		BELL	92

0 25 50



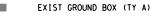
	ENGTH		CONDUIT		CONDUCTOR	CONDUCTOR
	9	0618	0618	0618	6071	6071
IRCUITS	듑	7036	7061	7090	6003	6003
		CONDT	CONDT		ALUMINUM	ALUMINUM
	NO.	(PVC)	(PVC)	CONDUIT	ELECTRICAL	ELECTRICAL
	<u>~</u>	(SCH 40)	(SCH 80)	(PREPARE)	COND (#6	COND (#6
		(3")			XHHM)	XHHM)
		LF	LF	LF	LF	LF
С	151	151			151	302
AB	12			12	12	48
AB	151			151	151	604
AB	26			26	26	104
AB	83			83	83	332
Α	257			257	257	514
В	86			86	86	172
В	197			197	197	394
В	282			282	282	564
В	42			42	42	84
AB	15	15			15	60
AB	71		71		71	284
AB	37	37			37	148
Α	195	195			195	390

SHEET TOTAL: 398 71 1136 1605 4000

	SUMMARY OF ILLUMINATION ITEMS		
BID CODE	DESCRIPTION	UNIT	QTY
416 7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	45
432 7001	RIPRAP (CONC) (4 IN)	CY	4.66
618 7036	CONDT (PVC) (SCH 40) (3")	LF	398
618 7061	CONDT (PVC) (SCH 80) (3") (BORE)	LF	71
618 7090	CONDUIT (PREPARE)	LF	1136
624 7014	INSTL GROUND BOX (W/SECURE LID)	EA	4
624 7015	RETRO GROUND BOX (W/SECURE LID)	EA	8
628 7049	ELC SRV TY A 240/480 060(NS)SS(E)SP(U)	EA	1
6071 7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	5605
6071 7004	ALUMINUM ELECTRICAL COND (#8 XHHW)	LF	864
6083 7001	LED HI MST(100 FT) (80MPH) (6FIXT) (TY B)	EA	2

ILLUMINATION ASSEMBLY SUMMARY										
POLE	LOC	ATION	ASSEMBLY TYPE	FOUNDATION						
1 OLL	STATION	OFFSET (FT)	ASSEMBLI THE	DIAMETER	LENGTH (FT) *					
HM-S3-C2	311+55	108 RT	(100 FT) (80MPH) (6FIXT) (TY B)	48	20					
HM-S4-A1	318+05	98 LT	(100 FT) (80MPH) (6FIXT) (TY B)	48	25					
* INCLUDE	S 3 FEET EX	POSURE								

### LEGEND OX (TY A) X (TY D W/ APRO



PROP GROUND BOX (TY D W/ APRON)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

PROP CONDUIT (TRENCHED)
EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)

PROP HIGH MAST ILLUM POLE W/ GB

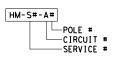
EXIST RDWY ILLUM ASSEM (TRANS)

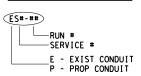
EXIST/PROP ELEC SERVICERETROFIT GROUND BOX LID

GROUND BOX (PREPARE)

POLE DESIGNATION

CONDUIT DESIGNATION







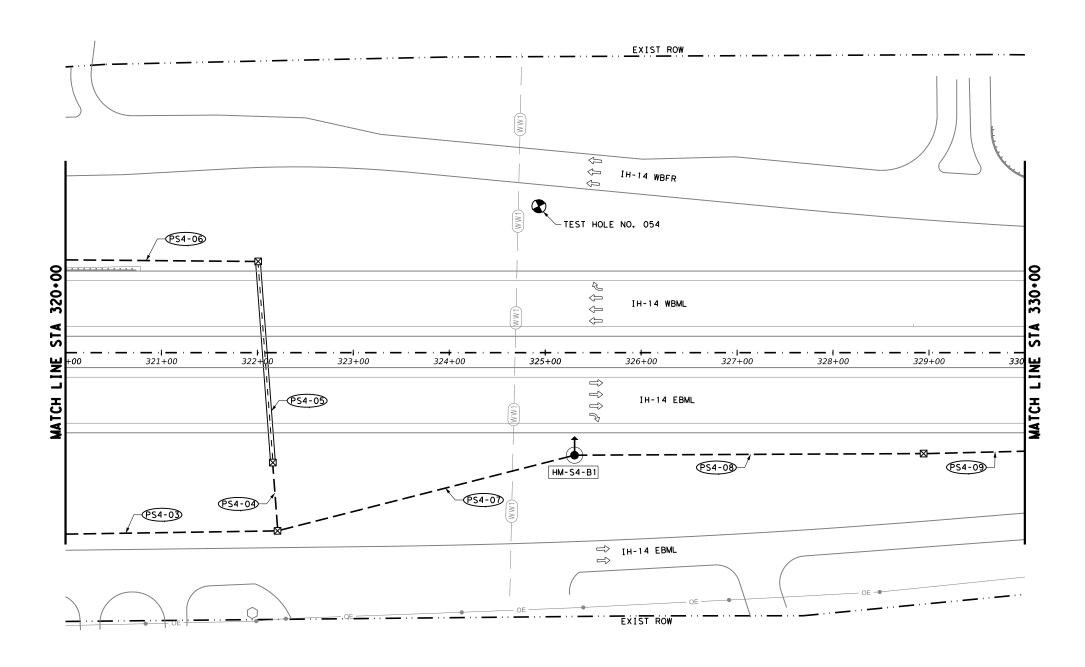
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## ILLUMINATION LAYOUT

	SCALE: =			FEET	
	3CALE: E	' <b>=</b> 100'	HORI		EET 9 OF 20
HANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO
	TEXAS	WACO		BELL	93



	CONDUIT AND CONDUCTOR RUNS									
			LENGTH STIMOUL		CONDUIT			ELECTRICAL CONDUCTOR		
			9	0618	0618	0618	6071	6071		
RUN NAME	SERVICE	CIRCUITS	편	7036	7061	7090	6003	6003		
	ME SERVICE CIRCUITS		RUN L	CONDT (PVC) (SCH 40) (3")	CONDT (PVC) (SCH 80)	CONDUIT (PREPARE)	ALUMINUM ELECTRICAL COND (#6 XHHW)	ALUMINUM ELECTRICAL COND (#6 XHHW)		
				LF	LF	LF	LF	LF		
PS4-03	PS4	AB	221	221			221	884		
PS4-04	PS4	Α	72	72			72	144		
PS4-05	PS4	Α	210		210		210	420		
PS4-06	PS4	Α	201	201			201	402		
PS4-07	PS4	В	319	319			319	638		
PS4-08	PS4	В	364	364			364	728		
PS4-09	PS4	В	106	106			106	212		
		SHEE	T TOTAL:	1283	210		1493	3428		

	SUMMARY OF ILLUMINATION ITEMS		
BID CODE	DESCRIPTION	UNIT	QTY
416 7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	25
432 7001	RIPRAP (CONC) (4 IN)	CY	2.33
618 7036	CONDT (PVC) (SCH 40) (3")	LF	1283
618 7061	CONDT (PVC) (SCH 80) (3") (BORE)	LF	210
624 7014	INSTL GROUND BOX (W/SECURE LID)	EA	5
6071 7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	4921
6083 7001	LED HI MST (100 FT) (80MPH) (6FIXT) (TY B)	EA	1

		ILLUM	INATION ASSEMBLY SUMMARY		
POLE	LOC STATION	ATION OFFSET (FT)	ASSEMBLY TYPE	FOUNDATION DIAMETER	FOUNDATION LENGTH (FT) *
HM-S4-B1	325+31	107 RT	(100 FT) (80MPH) (6FIXT) (TY B)	48	25
* INCLUDE	S 3 FEET EX	POSURE			



PROP GROUND BOX (TY D W/ APRON)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)

PROP HIGH MAST ILLUM POLE W/ GB

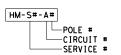
EXIST RDWY ILLUM ASSEM (TRANS)

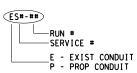
EXIST/PROP ELEC SERVICE RETROFIT GROUND BOX LID

GROUND BOX (PREPARE)

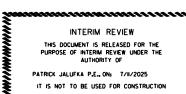
### POLE DESIGNATION

#### CONDUIT DESIGNATION









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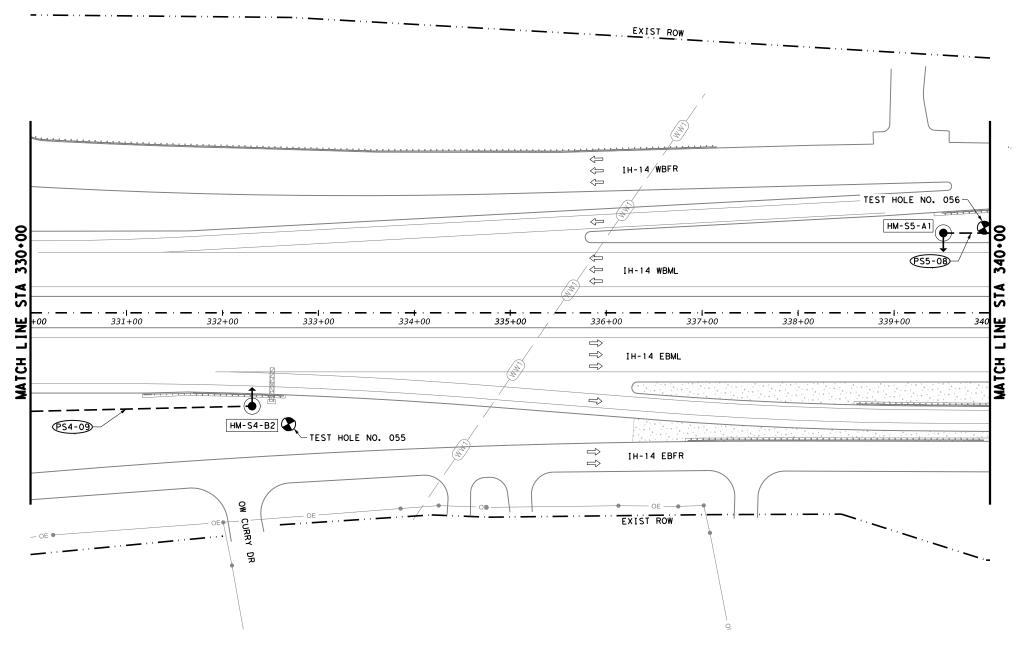


## ILLUMINATION LAYOUT

SCALE:	)	2	5	50		100 FE
	1"		100	,	HORI	Z.
550 00	$\neg$					

CHANGE

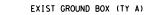
	SCALE:	25 50		100 FEET			
	1"	' = 100'	HOR		SHEET IO OF 20		
ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY	
	6	0231	03	156		IH-14	
	STATE	DIST		COUNTY		SHEET NO.	
	TEXAS	WACO		BELL		94	



	CONDUIT AND CONDUCTOR RUNS								
			LENGTH		CONDUIT	EQUIPMENT GROUNDING CONDUCTOR	ELECTRICAL CONDUCTOR		
			9	0618	0618	0618	6071	6071	
RUN NAME	SERVICE	CIRCUITS	ᄑ	7036	7061	7090	6003	6003	
NON NAME	SENTICE	cincoris	RUN L	CONDT (PVC) (SCH 40) (3")	CONDT (PVC) (SCH 80)	CONDUIT (PREPARE)	ALUMINUM ELECTRICAL COND (#6 XHHW)	ALUMINUM ELECTRICAL COND (#6 XHHW)	
				ĹF	LF	LF	LF	LF	
PS4-09	PS4	В	231	231			231	462	
PS5-08	PS5	Α	49	49			49	98	
SHEET TOTAL: 280 280 56							560		

	SUMMARY OF ILLUMINATION ITEMS									
BID CODE	DESCRIPTION	UNIT	QTY							
416 7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	35							
432 7001	RIPRAP (CONC) (4 IN)	CY	4.66							
618 7036	CONDT (PVC) (SCH 40) (3")	LF	280							
624 7014	INSTL GROUND BOX (W/SECURE LID)	EA	2							
6071 7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	840							
6083 7001	LED HI MST (100 FT) (80MPH) (6FIXT) (TY B)	EA	2							

ILLUMINATION ASSEMBLY SUMMARY									
ם ב	LOC	ATION	ACCEMBLY TYPE	FOUNDATION FOUN					
POLE	STATION	OFFSET (FT)	ASSEMBLY TYPE	DIAMETER	LENGTH (FT) *				
HM-S4-B2	332+58	103 RT	(100 FT) (80MPH) (6FIXT) (TY B)	48	20				
HM-S5-A1	339+51	83 LT	(100 FT) (80MPH) (6FIXT) (TY B)	48	15				
INCLUDES 3 FEET EXPOSURE									



PROP GROUND BOX (TY D W/ APRON)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)

PROP HIGH MAST ILLUM POLE W/ GB

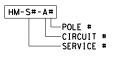
EXIST RDWY ILLUM ASSEM (TRANS)

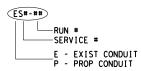
EXIST/PROP ELEC SERVICE

RETROFIT GROUND BOX LID GROUND BOX (PREPARE)

POLE DESIGNATION

CONDUIT DESIGNATION







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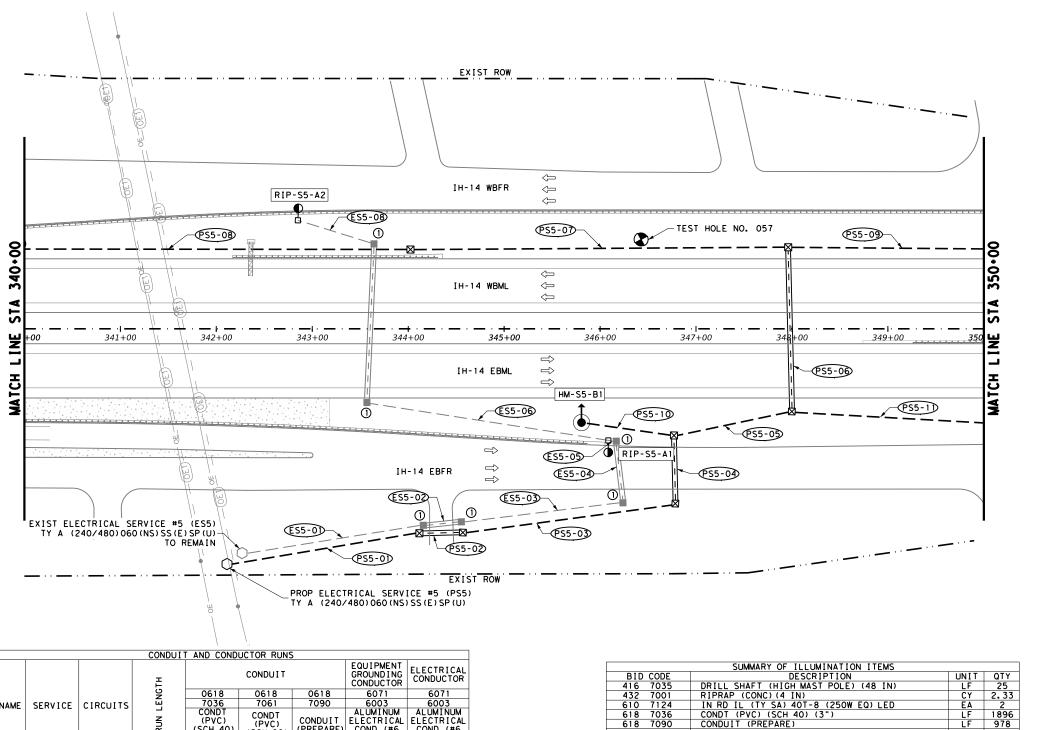
### PRELIMINARY NOT FOR CONSTRUCTION



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### LAYOUT

	O SCALE: <del> </del>	25 50		100 FEET		
	JCALE.	= 100'	HORI		IEET II OF	20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY	
	6	0231	03	156	IH-14	
	STATE	DIST		COUNTY	SHEET	NO.
	TEXAS	WACO		BELL	95	



			CONDUIT	T AND COND	UCTOR RUNS	5		
			LENGTH		CONDUIT	EQUIPMENT GROUNDING CONDUCTOR	ELECTRICAL CONDUCTOR	
			일	0618	0618	0618	6071	6071
RUN NAME	SERVICE	CIRCUITS	ᄑ	7036	7061	7090	6003	6003
NON NAME	SERVICE	o moor is	RUN L	CONDT (PVC) (SCH 40) (3")	CONDT (PVC) (SCH 80) LF	CONDUIT (PREPARE)	ALUMINUM ELECTRICAL COND (#6 XHHW) LF	ALUMINUM ELECTRICAL COND (#6 XHHW) LF
PS5-01	PS5	AB	203	203	-		203	812
PS5-02	PS5	AB	46	46			46	184
PS5-03	PS5	AB	224	224			224	896
PS5-04	PS5	AB	70		70		70	280
PS5-05	PS5	AB	125	125			125	500
PS5-06	PS5	Α	171		171		171	342
PS5-07	PS5	Α	394	394			394	788
PS5-08	PS5	Α	402	402			402	804
PS5-09	PS5	Α	204	204			204	408
PS5-10	PS5	В	97	97			97	194
PS5-11	PS5	В	201	201			201	402
ES5-01	ES5	Α	191			191	191	382
ES5-02	ES5	Α	40			40	40	80
ES5-03	ES5	Α	170			170	170	340
ES5-04	ES5	A	65			65	65	1 30
ES5-05	ES5	Α	8			8	8	16
ES5-06	ES5	Α	255			255	255	510
ES5-07	ES5	Α	166			166	166	332
ES5-08	ES5	Α	83			83	83	166
		SHEE	T TOTAL:	1896	241	978	3115	7566

	SUMMARY OF ILLUMINATION ITEMS									
BID	CODE	DESCRIPTION	UNIT	QTY						
416	7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	25						
432	7001	RIPRAP (CONC) (4 IN)	CY	2.33						
610	7124	IN RD IL (TY SA) 40T-8 (250W EQ) LED	EΑ	2						
618	7036	CONDT (PVC) (SCH 40) (3")	LF	1896						
618	7090	CONDUIT (PREPARE)	LF	978						
624	7014	INSTL GROUND BOX (W/SECURE LID)	EA	8						
624	7015	RETRO GROUND BOX (W/SECURE LID)	EA	6						
628	7049	ELC SRV TY A 240/480 060(NS)SS(E)SP(U)	EA	1						
6071	7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	10681						
6071	7004	ALUMINUM ELECTRICAL COND (#8 XHHW)	LF	978						
6083	7001	LED HI MST(100 FT) (80MPH) (6FIXT) (TY B)	EA	1						

	ILLUMINATION ASSEMBLY SUMMARY								
POLE	LOCATION		ASSEMBLY TYPE	FOUNDATION	FOUNDATION				
POLE	STATION	OFFSET (FT)	ASSEMBLI TIFE	DIAMETER	LENGTH (FT) *				
HM-S5-B1	345+80	98 RT	(100 FT) (80MPH) (6FIXT) (TY B)	48	25				
INCLUDE	INCLUDES 3 FEET EXPOSURE								

EXIST GROUND BOX (TY A)

PROP GROUND BOX (TY D W/ APRON)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)

PROP HIGH MAST ILLUM POLE W/ GB

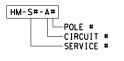
EXIST RDWY ILLUM ASSEM (TRANS)

EXIST/PROP ELEC SERVICE 1 RETROFIT GROUND BOX LID

GROUND BOX (PREPARE)

### POLE DESIGNATION

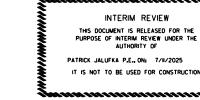
#### CONDUIT DESIGNATION











# PRELIMINARY NOT FOR CONSTRUCTION



### **ILLUMINATION** LAYOUT

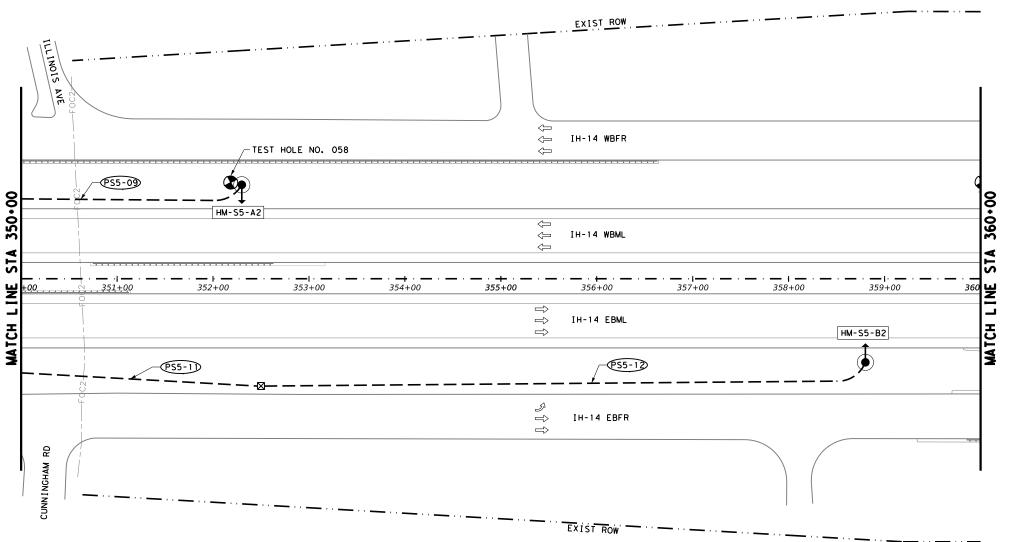
	SCALE:	25 50		FEET	
	1"	= 100'	HOR		EET 12 OF 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.

BELL

96

WACO

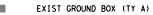
TEXAS



			CONDUI	T AND COND	JCTOR RUNS	5		
			LENGTH		EQUIPMENT GROUNDING CONDUCTOR	ELECTRICAL CONDUCTOR		
			9	0618	0618	0618	6071	6071
RUN NAME	SERVICE	CIRCUITS	ᇤ	7036	7061	7090	6003	6003
	52	011100110	RUN L	CONDT (PVC) (SCH 40) (3")	CONDT (PVC) (SCH 80) LF	CONDUIT (PREPARE)	ALUMINUM ELECTRICAL COND (#6 XHHW) LF	ALUMINUM ELECTRICAL COND (#6 XHHW)
PS5-09	PS5	Α	236	236			236	472
PS5-11	PS5	В	250	250			250	500
PS5-12	PS5	В	638	638			638	1276
	·	SHEE	T TOTAL:	1124	·		1124	2248

		SUMMARY OF ILLUMINATION ITEMS		
BID	CODE	DESCRIPTION	UNIT	QTY
416	7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	48
432	7001	RIPRAP (CONC) (4 IN)	CY	4.66
618	7036	CONDT (PVC) (SCH 40) (3")	LF	1124
624	7014	INSTL GROUND BOX (W/SECURE LID)	EA	3
6071	7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	3372
6083	7001	LED HI MST(100 FT) (80MPH) (6FIXT) (TY B)	EA	2

	ILLUMINATION ASSEMBLY SUMMARY								
POLE	LOC	ATION	ASSEMBLY TYPE	FOUNDATION					
FOLE	STATION	OFFSET (FT)	ASSEMBLI TIFE	DIAMETER	LENGTH (FT) *				
HM-S5-A2	352+30	98 LT	(100 FT) (80MPH) (6FIXT) (TY B)	48	23				
HM-S5-B2	358+80	87 RT	(100 FT) (80MPH) (6FIXT) (TY B)	48	25				
* INCLUDE	INCLUDES 3 FEET EXPOSURE								



PROP GROUND BOX (TY D W/ APRON)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)

PROP HIGH MAST ILLUM POLE W/ GB

EXIST RDWY ILLUM ASSEM (TRANS)

EXIST/PROP ELEC SERVICE

1 RETROFIT GROUND BOX LID

GROUND BOX (PREPARE)

### POLE DESIGNATION

HM-S#-A# POLE #
—CIRCUIT #
—SERVICE #

### CONDUIT DESIGNATION







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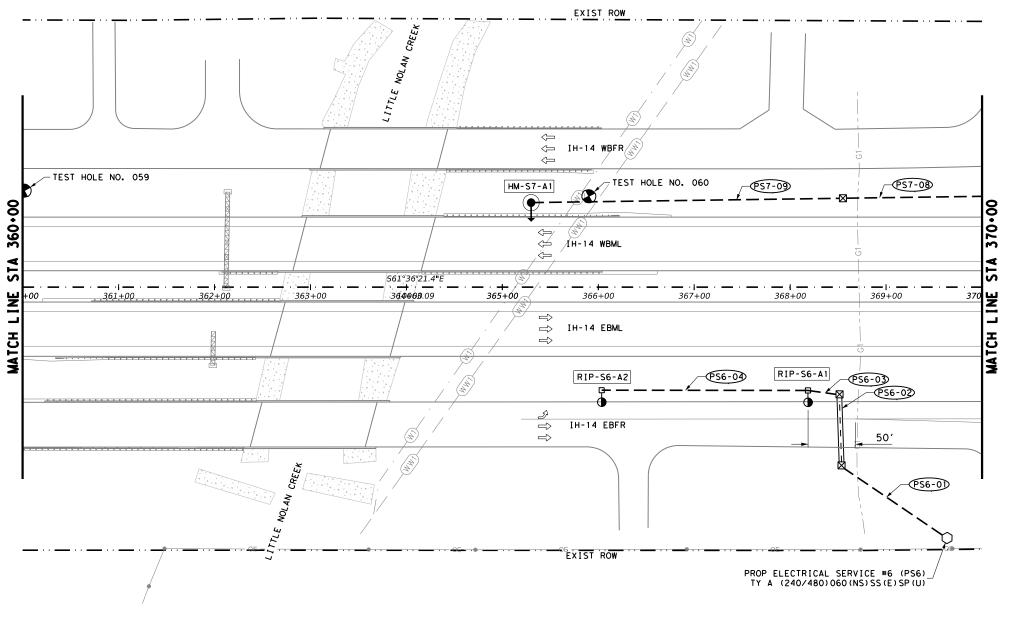
### PRELIMINARY NOT FOR CONSTRUCTION



LAYOUT

SCALE: \_\_\_\_\_\_

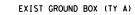
	1 "	= 100'	HORI	I <b>Z</b> . SHE	ETI	3 OF 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	F	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO
	TEXAS	WACO		BELL		97



	CONDUIT AND CONDUCTOR RUNS									
			LENGTH		CONDUIT	EQUIPMENT GROUNDING CONDUCTOR	ELECTRICAL CONDUCTOR			
			۶	0618	0618	0618	6071	6071		
RUN NAME	SERVICE	CIRCUITS	편	7036	7061	7090	6003	6003		
NOW HAVE	SENTICE	01.1001.13		CONDT	CONDT		ALUMINUM	ALUMINUM		
			NO.	(PVC)	(PVC)	CONDUIT	ELECTRICAL	ELECTRICAL		
			≅	(SCH 40)	(SCH 80)	(PREPARE)	COND (#6	COND (#6		
				(3")			XHHW)	XHHW)		
				LF	LF	LF	LF	LF		
PS6-01	PS6	Α	133	133			133	266		
PS6-02	PS6	Α	74		74		74	148		
PS6-03	PS6	Α	33	33			33	66		
PS6-04	PS6	Α	215	215			215	430		
PS7-08	PS7	Α	145	145			145	290		
PS7-09	PS7	Α	325	325			325	650		
		SHEE	T TOTAL:	851	74		925	1850		

	SUMMARY OF ILLUMINATION ITEMS		
BID CODE	DESCRIPTION	UNIT	QTY
416 7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	25
416 7040	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	20
432 7001	RIPRAP (CONC) (4 IN)	CY	2.33
610 7124	IN RD IL (TY SA) 40T-8 (250W EQ) LED	EA	2
618 7036	CONDT (PVC) (SCH 40) (3")	LF	851
618 7061	CONDT (PVC) (SCH 80) (3") (BORE)	LF	
618 7090	CONDUIT (PREPARE)	LF	
624 7014	INSTL GROUND BOX (W/SECURE LID)	EΑ	4
624 7015	RETRO GROUND BOX (W/SECURE LID)	EΑ	
628 7049	ELC SRV TY A 240/480 060(NS)SS(E)SP(U)	EΑ	1
690 7218	REPLACE FUSE	EΑ	
690 7220	REPLACE BREAKAWAY FUSE HOLDER	EA	
6027 6003	CONDUIT (PREPARE)	LF	
6013 7006	GROUND BOX (PREPARE)	EA	
6071 7001	ALUMINUM ELECTRICAL COND (#4 XHHW)	LF	
6071 7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	2775
6071 7004	ALUMINUM ELECTRICAL COND (#8 XHHW)	LF	
6083 7001	LED HI MST(100 FT) (80MPH) (6FIXT) (TY B)	EΑ	1
6083 7002	LED HI MST (100 FT) (80MPH) (6FIXT) (TY B) (SHLD)	EΑ	

ILLUMINATION ASSEMBLY SUMMARY									
POLE	LO	CATION	ASSEMBLY TYPE	FOUNDATION					
FOLE	STATION	OFFSET (FT)	A33EMDLT TIFE	DIAMETER	LENGTH (FT) *				
HM-S7-A1	365+30	88 LT	(100 FT) (80MPH) (6FIXT) (TY B)	48	25				
RIP-S6-A2	366+04	SEE RID(2)-20	(TY SA)40T-8(250W EQ)LED	30	10				
RIP-S6-A1	368+19	SEE RID(2)-20	(TY SA)40T-8(250W EQ)LED	30	10				
<ul> <li>INCLUDE</li> </ul>	S 3 FEET EX	POSURE FOR HIGH	MAST						



EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)

PROP HIGH MAST ILLUM POLE W/ GB

EXIST RDWY ILLUM ASSEM (TRANS)

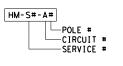
EXIST/PROP ELEC SERVICE

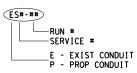
1 RETROFIT GROUND BOX LID

GROUND BOX (PREPARE)

POLE DESIGNATION

CONDUIT DESIGNATION







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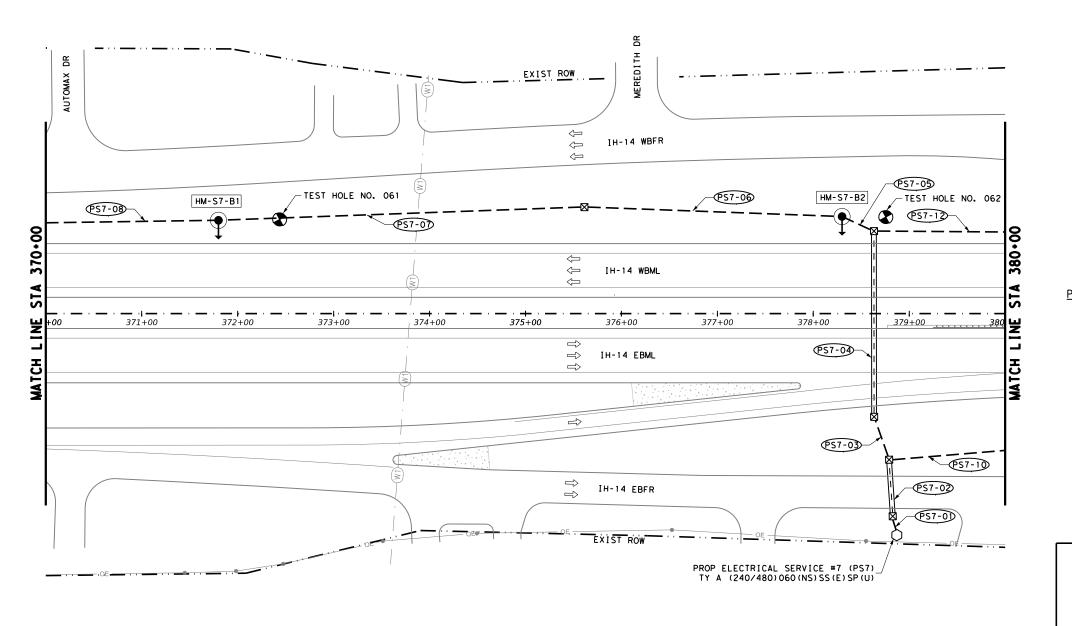


## ILLUMINATION LAYOUT

SCALE:	25	50	100 FE
	= 10	0' I	HORIZ.

CHANGE

	SCALE: =	25 50		FEET		
	1"	= 100'	HORI		ET I	4 OF 20
ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	ŀ	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		98



	CONDUIT AND CONDUCTOR RUNS									
			LENGTH		CONDUIT	EQUIPMENT GROUNDING CONDUCTOR	ELECTRICAL CONDUCTOR			
			9	0618	0618	0618	6071	6071		
RUN NAME	SERVICE	CIRCUITS	ᄑ	7036	7061	7090	6003	6003		
			RUN L	CONDT (PVC) (SCH 40) (3")	CONDT (PVC) (SCH 80)	CONDUIT (PREPARE)	ALUMINUM ELECTRICAL COND (#6 XHHW)	ALUMINUM ELECTRICAL COND (#6 XHHW)		
				ĹF	LF	LF	LF	LF		
PS7-01	PS7	ABCD	20	20			20	160		
PS7-02	PS7	ABCD	59		59		59	472		
PS7-03	PS7	ABD	47	47			47	282		
PS7-04	PS7	ABD	194		194		194	1164		
PS7-05	PS7	AB	37	37			37	148		
PS7-06	PS7	AB	269	269			269	1076		
PS7-07	PS7	AB	382	382			382	1528		
PS7-08	PS7	Α	180	180			180	360		
PS7-10	PS7	С	121	121			121	242		
PS7-12	PS7	D	137	137			137	274		
	SHEET TOTAL: 1193 253 1446 5706									

	SUMMARY OF ILLUMINATION ITEMS		
BID CODE	DESCRIPTION	UNIT	QTY
416 7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	43
432 7001	RIPRAP (CONC) (4 IN)	CY	4.66
618 7036	CONDT (PVC) (SCH 40) (3")	LF	1193
624 7014	INSTL GROUND BOX (W/SECURE LID)	EA	7
628 7049	ELC SRV TY A 240/480 060(NS)SS(E)SP(U)	EA	1
6071 7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	7152
6083 7001	LED HI MST(100 FT) (80MPH) (6FIXT) (TY B)	EA	2

ILLUMINATION ASSEMBLY SUMMARY									
POLE	LOC	ATION	ASSEMBLY TYPE	FOUNDATION	FOUNDATION				
FULE	STATION	OFFSET (FT)	ASSEMBLI TIFE	DIAMETER	LENGTH (FT) *				
HM-S7-B1	371+80	97 LT	(100 FT) (80MPH) (6FIXT) (TY B)	48	25				
HM-S7-B2	378+30	101 LT	(100 FT) (80MPH) (6FIXT) (TY B)	48	18				
* INCLUDE	INCLUDES 3 FEFT EXPOSURE								

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE) PROP HIGH MAST ILLUM POLE W/ GB

EXIST RDWY ILLUM ASSEM (TRANS)

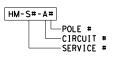
EXIST/PROP ELEC SERVICE

1 RETROFIT GROUND BOX LID

GROUND BOX (PREPARE)

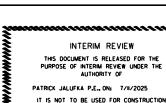
POLE DESIGNATION

CONDUIT DESIGNATION









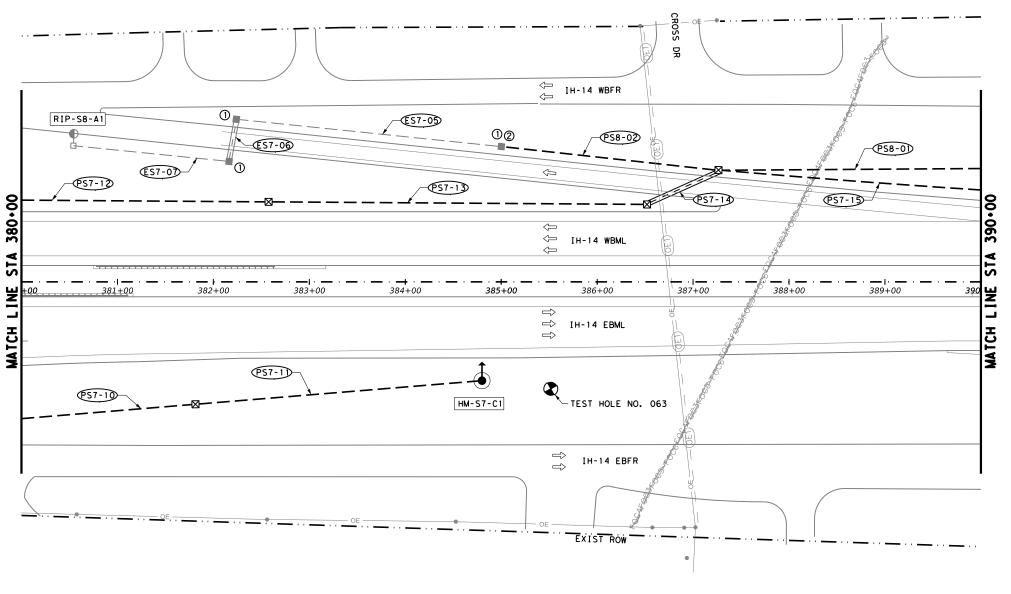
# PRELIMINARY NOT FOR CONSTRUCTION



## ILLUMINATION LAYOUT

O SCALE: <del> </del>	25 50		100 FEET		
1'	' = 100'	HORI		SHE	ΕT
FED.RD. DIV. NO.	CONT	SECT	JOB		
6	0231	03	156		

	1 "	= 100'	HORI	Z. SHE	EL I	5 OF 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		99

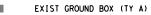


			CONDUIT	AND COND	JCTOR RUNS	5		
			ENGTH		CONDUIT		EQUIPMENT GROUNDING CONDUCTOR	ELECTRICAL CONDUCTOR
			9	0618	0618	0618	6071	6071
RUN NAME	SERVICE	CIRCUITS	9	7036	7061	7090	6003	6003
NOW WANTE	32732	011100113	RUN L	CONDT (PVC) (SCH 40) (3")	CONDT (PVC) (SCH 80)	CONDUIT (PREPARE)	ALUMINUM ELECTRICAL COND (#6 XHHW)	ALUMINUM ELECTRICAL COND (#6 XHHW)
				LF	LF	LF	LF	LF
PS7-10	PS7	С	182	182			182	364
PS7-11	PS7	С	300	300			300	600
PS7-12	PS7	D	258	258			258	516
PS7-13	PS7	D	394	394			394	788
PS7-14	PS7	D	83		83		83	166
PS7-15	PS7	D	274	274			274	548
PS8-01	PS8	Α	274	274			274	548
PS8-02	PS8	Α	228	228			228	456
ES7-05	PS8	Α	278		SPLICE	EXISTING T	O PROPOSED	
ES7-06	PS8	Α	45			NO WORK	(	
ES7-07	PS8	Α	163			NO WORK	(	
		SHEE	T TOTAL:	1910	83		1993	3986

	SUMMARY OF ILLUMINATION ITEMS		
BID CODE	DESCRIPTION	UNIT	QTY
416 7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	15
432 7001	RIPRAP (CONC) (4 IN)	CY	2.33
618 7036	CONDT (PVC) (SCH 40) (3")	LF	1910
624 7014	INSTL GROUND BOX (W/SECURE LID)	EA	5
624 7015	RETRO GROUND BOX (W/SECURE LID)	EA	3
6013 7006	GROUND BOX (PREPARE)	EA	1
6071 7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	5979
6083 7001	LED HI MST (100 FT) (80MPH) (6FIXT) (TY B)	EA	1

ILLUMINATION ASSEMBLY SUMMARY							
POLE	LOCATION		ASSEMBLY TYPE	FOUNDATION	FOUNDATION		
POLE	STATION	OFFSET (FT)	ASSEMBLI TIPE	DIAMETER	FOUNDATION LENGTH (FT) *		
HM-S7-C1	384+80	103 RT	(100 FT) (80MPH) (6FIXT) (TY B)	48	15		
* INCLUDE	INCLUDES 3 FEET EXPOSURE						





EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)

PROP HIGH MAST ILLUM POLE W/ GB

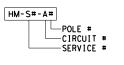
EXIST RDWY ILLUM ASSEM (TRANS)

EXIST/PROP ELEC SERVICE RETROFIT GROUND BOX LID

GROUND BOX (PREPARE)

POLE DESIGNATION

CONDUIT DESIGNATION







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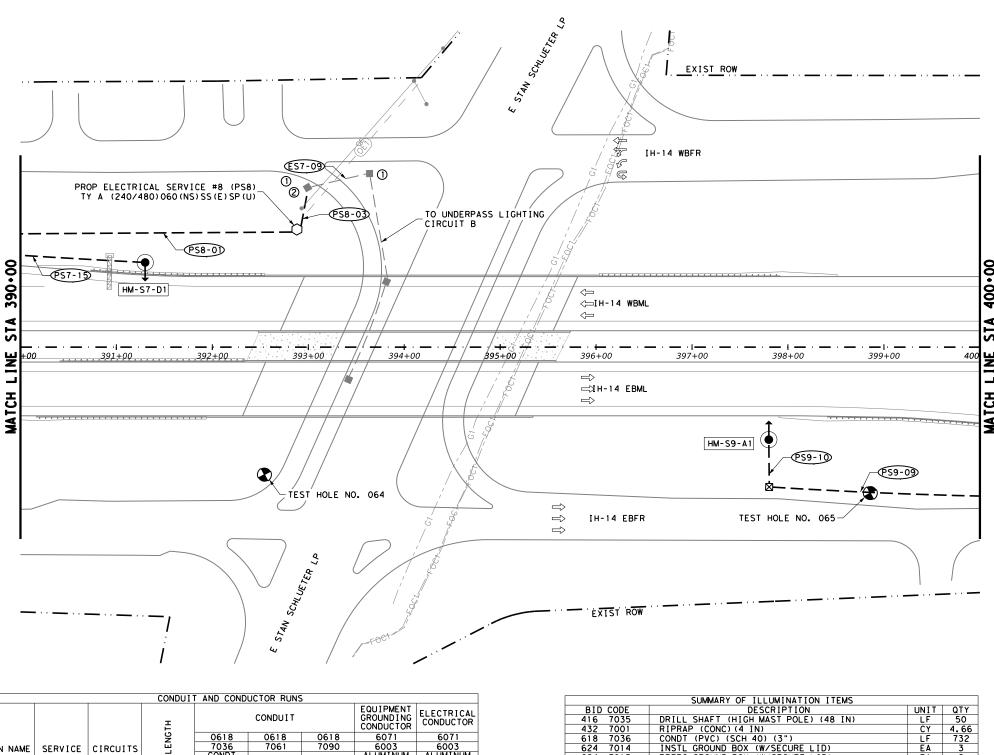
### PRELIMINARY NOT FOR CONSTRUCTION



**★** © 2026

### SCALE: 0 25 50

	1 "	= 100'	HORI	Z. SHE	ET 16 OF 20
HANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	HIGHWAY
	6	0231	03	156	IH-14
	STATE	DIST		COUNTY	SHEET NO.
	TEXAS	WACO		BELL	100



			CONDUI	T AND COND	UCTOR RUNS	5		
			LENGTH		CONDUIT		EQUIPMENT GROUNDING CONDUCTOR	ELECTRICAL CONDUCTOR
			9	0618	0618	0618	6071	6071
RUN NAME	SERVICE	CIRCUITS	□.	7036	7061	7090	6003	6003
	02		RUN L	CONDT (PVC) (SCH 40) (3")	CONDT (PVC) (SCH 80)	CONDUIT (PREPARE)	ALUMINUM ELECTRICAL COND (#6 XHHW)	ALUMINUM ELECTRICAL COND (#6 XHHW)
				LF	LF	LF	LF	LF
PS7-15	PS7	D	130	130			130	260
PS8-01	PS8	Α	288	288			288	576
PS8-03	PS8	В	45	45			45	90
ES7-09	PS8	В	66		SPL I CE	EXISTING 1	O PROPOSED	
PS9-09	PS9	Α	220	220			220	440
PS9-10	PS9	Α	49	49			49	98
		SHEE	T TOTAL:	732			732	1464

		SUMMARY OF ILLUMINATION ITEMS		
BID	CODE	DESCRIPTION	UNIT	QTY
416	7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	50
432	7001	RIPRAP (CONC) (4 IN)	CY	4.66
618	7036	CONDT (PVC) (SCH 40) (3")	LF	732
624	7014	INSTL GROUND BOX (W/SECURE LID)	EA	3
624	7015	RETRO GROUND BOX (W/SECURE LID)	EA	2
628	7049	ELC SRV TY A 240/480 060(NS)SS(E)SP(U)	EA	1
6013	7006	GROUND BOX (PREPARE)	EA	1
6071	7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	2196
6083	7001	LED HI MST(100 FT)(80MPH)(6FIXT)(TY B)	EA	2

	ILLUMINATION ASSEMBLY SUMMARY						
POLE	LOC	ATION	ASSEMBLY TYPE	FOUNDATION			
FOLE	STATION	OFFSET (FT)	ASSEMBLI TIFE	DIAMETER	LENGTH (FT) *		
HM-S7-D1	391+30	88 LT	(100 FT) (80MPH) (6FIXT) (TY B)	48	25		
HM-S9-A1	397+80	96 RT	(100 FT) (80MPH) (6FIXT) (TY B)	48	25		
* INCLUDE	INCLUDES 3 FEET EXPOSURE						



PROP GROUND BOX (TY D W/ APRON)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)

PROP HIGH MAST ILLUM POLE W/ GB EXIST RDWY ILLUM ASSEM (TRANS)

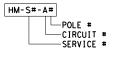
EXIST/PROP ELEC SERVICE

1 RETROFIT GROUND BOX LID

GROUND BOX (PREPARE)

### POLE DESIGNATION

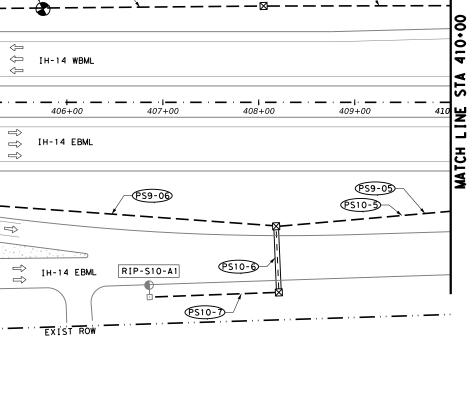
### CONDUIT DESIGNATION











(PS9-12)

EXIST ROW

IH-14 WBFR

(PS9-13)

Î Î

TEST HOLE NO. 066-

405+00

HM-S9-B1

PS9-07

1971 3942

			LENGTH		CONDUIT		EQUIPMENT GROUNDING CONDUCTOR	ELECTRICAL CONDUCTOR
			9	0618	0618	0618	6071	6071
RUN NAME	SERVICE	CIRCUITS	🖳	7036	7061	7090	6003	6003
	02		RUN L	CONDT (PVC) (SCH 40) (3")	CONDT (PVC) (SCH 80)	CONDUIT (PREPARE)	ALUMINUM ELECTRICAL COND (#6 XHHW)	ALUMINUM ELECTRICAL COND (#6 XHHW)
				LF	LF	LF	LF	LF
PS9-05	PS9	A	183	183			183	366
PS9-06	PS9	Α	332	332			332	664
PS9-07	PS9	Α	62		62		62	124
PS9-08	PS9	Α	374	374			374	748
PS9-09	PS9	Α	63	63			63	126
PS9-12	PS9	В	195	195			195	390
PS9-13	PS9	В	375	375			375	750
PS10-5	PS10	Α	183	183			183	366
PS10-6	PS10	Α	69		69		69	138
PS10-7	PS10	Α	135	135			135	270

SHEET TOTAL: 1840 131

CONDUIT AND CONDUCTOR RUNS

402+00

PS9-08

401+00

PS9-09

403+00

	SUMMARY OF ILLUMINATION ITEMS		
BID CODE	DESCRIPTION	UNIT	QTY
416 7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	18
432 7001	RIPRAP (CONC) (4 IN)	CY	2.33
618 7036	CONDT (PVC) (SCH 40) (3")	LF	1840
624 7014	INSTL GROUND BOX (W/SECURE LID)	EA	7
6071 7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	5913
6083 7001	LED HI MST(100 FT) (80MPH) (6FIXT) (TY B)	EA	1

BID	CODE	DESCRIPTION	UNIT	QTY
416	7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	18
432	7001	RIPRAP (CONC) (4 IN)	CY	2.33
618	7036	CONDT (PVC) (SCH 40) (3")	LF	1840
624	7014	INSTL GROUND BOX (W/SECURE LID)	EΑ	7
6071	7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	5913
6083	7001	LED HI MST(100 FT) (80MPH) (6FIXT) (TY B)	EA	1

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## ILLUMINATION LAYOUT

SCALE	<u>-</u>	25	50		100 FEE1
	1"	= 10	00′	HOR	

	1"	= 100'	HORI	Z. SHE	E I I	7 OF 20
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	-	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		101

EXIST GROUND BOX (TY A)

PROP GROUND BOX (TY D W/ APRON)

EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

PROP CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)

PROP HIGH MAST ILLUM POLE W/ GB

EXIST RDWY ILLUM ASSEM (TRANS)

RETROFIT GROUND BOX LID

EXIST/PROP ELEC SERVICE 1

GROUND BOX (PREPARE)

POLE DESIGNATION

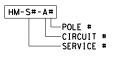
 $(\bullet)$ 

MATCH

419+00

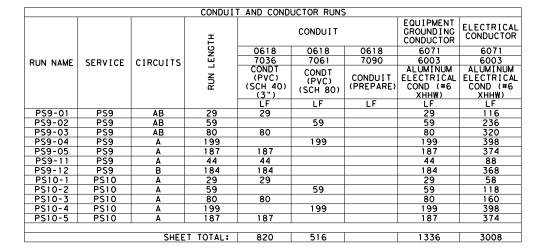
─MSE WALL

CONDUIT DESIGNATION









PROP ELECTRICAL SERVICE #9 (PS9) TY A (240/480)060(NS)SS(E)SP(U)

PS9-12

411+00

PS9-05 PS10-5

410.00

STA

PS9-01

(PS9-03)

412+00

-(PS9-1)

PS10-3

PS9-04

PS10-4

HM-S9-A2

(PS10-1)

PS10-2

413+00

TEST HOLE NO. 067

PROP ELECTRICAL SERVICE #10 (PS10)
TY A (240/480)060(NS)SS(E)SP(U)

414+00

EXIST ROW

IH-14 WBFR

IH-14 WBML

IH-14 EBML

IH-14 EBFR

15+00 416+00 417+00 418+00 419+00

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 $\stackrel{\Longrightarrow}{}$ 

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LIGHT

415+00

		ILLUMINATION ASSEMBLY SUMMARY		
BID	CODE	DESCRIPTION	UNIT	QTY
416	7035	DRILL SHAFT (HIGH MAST POLE) (48 IN)	LF	18
432	7001	RIPRAP (CONC) (4 IN)	CY	2.33
618	7036	CONDT (PVC) (SCH 40) (3")	LF	820
624	7014	INSTL GROUND BOX (W/SECURE LID)	EA	5
628	7049	ELC SRV TY A 240/480 060(NS)SS(E)SP(U)	EA	2
6071	7003	ALUMINUM ELECTRICAL COND (#6 XHHW)	LF	4344
6083	7001	LED HI MST(100 FT) (80MPH) (6FIXT) (TY B)	EA	1

HIGH MAST ILLUMINATION SUMMARY							
POLE	LOC	ATION	ASSEMBLY TYPE	FOUNDATION	FOUNDATION		
POLE	STATION	OFFSET (FT)	ASSEMBLI TIPE	DIAMETER	LENGTH (FT) *		
HM-S9-A2	411+45	84 RT	(100 FT) (80MPH) (6FIXT) (TY B)	48	18		
* INCLUDE	S 3 FEET EX	POSURE					

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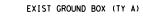


● 2026

**ILLUMINATION** LAYOUT

SCALE:	25 50		FFFT		
	100'	HOR	IZ.	SHEET	I
FED.RD. DIV. NO.	CONT	SECT	JOB		
6	0231	03	156		

18 OF 20 CHANGE ORDER HIGHWAY IH-14 STATE DIST COUNTY SHEET NO 102 TEXAS WACO BELL



EXIST CONDUIT (TRENCHED)

EXIST CONDUIT (BORED)

PROP CONDUIT (TRENCHED) EXIST CONDUIT (BORED)

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE) PROP HIGH MAST ILLUM POLE W/ GB

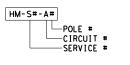
EXIST RDWY ILLUM ASSEM (TRANS)

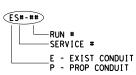
EXIST/PROP ELEC SERVICE 1 RETROFIT GROUND BOX LID

GROUND BOX (PREPARE)

POLE DESIGNATION

CONDUIT DESIGNATION







PATRICK JALUFKA P.E., ON: 7/II/2025 IT IS NOT TO BE USED FOR CONSTRUCTION

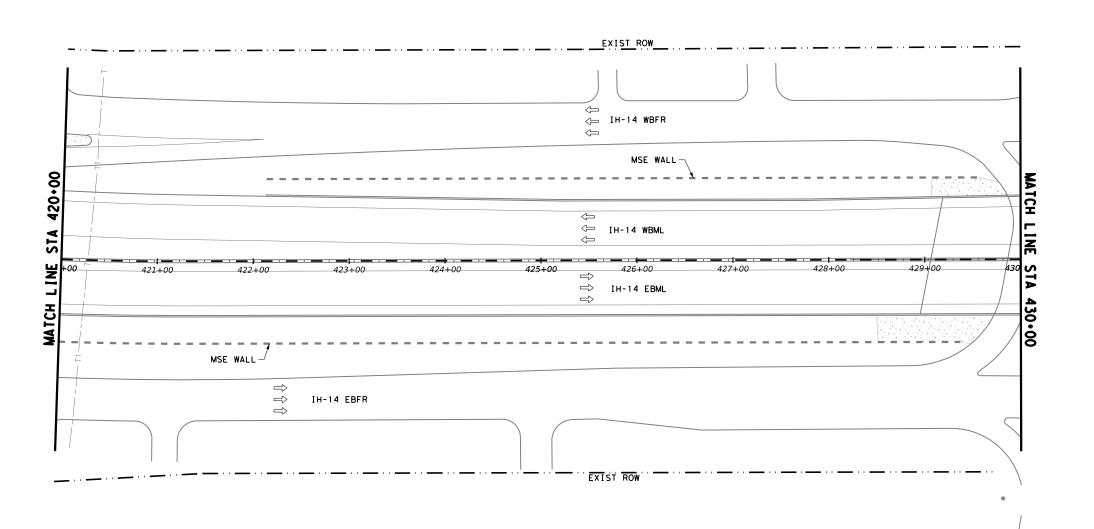
# PRELIMINARY NOT FOR CONSTRUCTION



**→** © 2026

CHANGE ORDER

1 "	= 100'	HORI	IZ. SHE	ET I	9 OF 20
FED.RD. DIV. NO.	CONT	SECT	JOB	H	HIGHWAY
6	0231	03	156		IH-14
STATE	DIST		COUNTY		SHEET NO
TEXAS	WACO		BELL		103



			CONDUI	T AND COND	UCTOR RUNS	3				
			ТН		CONDUIT		EQUIPMENT GROUNDING CONDUCTOR	ELECTRICAL CONDUCTOR		
			LENGTH	0618	0618	0618	6071	6071		
RUN NAME	SERVICE	CIRCUITS		CIRCUITS	7036	7061	7090	6003	6003	
	02	011100110	RUN L	CONDT (PVC) (SCH 40) (3")	CONDT (PVC) (SCH 80)	CONDUIT (PREPARE)	ALUMINUM ELECTRICAL COND (#6 XHHW)	ALUMINUM ELECTRICAL COND (#6 XHHW)		
				LF	LF	LF	LF	LF		
			NO	WORK THIS	SHEET					

SHEET 20 OF 20

BELL

TEXAS

WACO

HIGHWAY

IH-14

SHEET NO

104

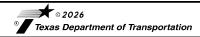
ELEC. SERVICE NO.	ELEC. SERVICE NAME *	SHEET NO.		CEDVICE									
			ELECTRICAL SERVICE DESCRIPTION	SERVICE CONDUIT SIZE	SERVICE CONDUCTOR NO./SIZE	SAFEIT	MAIN CKT. BKR. POLES/A MPS	TWO-POLE CONTACTOR AMPS	BRANCH CIRCUIT NO.	BRANCH CKT. BKR. POLES/AMPS	CIRCUIT	KVA LOA[	
									A (HIGH MAST)	2P/30	7.5		
PS1 023	3103156 (CL) (PS1) KILLEEN	2 OF 20	ELC SRV TY A 240/480 060 (NS)SS(E)SP(U)	2"	3/#6	N/A	2P/60	60	B (HIGH MAST)	2P/30	15	14.	
									C (HIGH MAST)	2P/30	7.5		
PS2	023103156 (SL) (PS2)	6 OF 20	ELC SRV TY A 240/480 060 (NS) SS(E) SP(U)	2"	3/#6	N/A	2P/60	60	A (RDWY ILLUM POLE)	2P/20	1.05	0.5	
									A (HIGH MAST)	2P/30	15		
PS3 023	3103156 (CL) (PS3) KILLEEN	6 OF 20	ELC SRV TY A 240/480 060 (NS) SS(E) SP(U)	2"	3/#6	N/A	2P/60	60	B (HIGH MAST)	2P/30	7.5	21.6	
1 33   023	3103130 (CE) (1 33) KIELELI	0 01 20	EEC 3/(V 11 # 240/400 000 (N3/33/E/3/(0/	-	3,0	117.5	21 7 00	21,700		C (HIGH MAST)	2P/30	15	
									D (HIGH MAST)	2P/30	7.5		
PS4 023	3103156 (CL) (PS4) KILLEEN	8 OF 20	ELC SRV TY A 240/480 060 (NS) SS(E) SP(U)	2"	3/#6	N/A	2P/60	60	A (HIGH MAST)	2P/30	7.5	10.8	
1 34 023	5105150 (CE) (1 54) KIEEEEN	0 01 20	EEC 3/(V 11 # 240/400 000 (N3/33/E/3/(0/		370	117.5	21700	00	B (HIGH MAST)	2P/30	15	10.0	
PS5 023	3103156 (CL) (PS5) KILLEEN	11 OF 20	ELC SRV TY A 240/480 060 (NS) SS(E) SP(U)	2"	3/#6	N/A	2P/60	60	A (HIGH MAST)	2P/30	15	14,4	
					J				B (HIGH MAST)	2P/30	15		
PS6	023103156 (SL) (PS6)	13 OF 20	ELC SRV TY A 240/480 060 (NS)SS(E)SP(U)	2"	3/#6	N/A	2P/60	60	A (RDWY ILLUM POLE)	2P/20	0.7	0.3	
									A (HIGH MAST)	2P/30	7.5		
PS7 023	3103156 (CL) (PS7) KILLEEN	14 OF 20	ELC SRV TY A 240/480 060 (NS)SS(E)SP(U)	2"	3/#6	N/A	2P/60	60	B (HIGH MAST)	2P/30	15	10.8	
131 023	STOSTSO (CE) (I ST) KIELELI	17 01 20	EEC 3/(V 11 A 240/400 000 (N3/33/E/3/(0/	-	370	177.5	21700		C (HIGH MAST)	2P/30	7.5	_ '0.0	
									D (HIGH MAST)	2P/30	7.5		
PS8	023103156 (SL) (PS8)	16 OF 20	ELC SRV TY A 240/480 060 (NS) SS(E) SP(U)	2"	3/#6	N/A	2P/60	60	A (RDWY ILLUM POLE)	2P/20	0.35	1.1	
1 30	023103130 (32) (130)	10 01 20			370	117.5	21700	00	B (UNDERPASS ILLUM)	1P/20	4	'''	
PS9 023	3103156 (CL) (PS9) KILLEEN	18 OF 20	ELC SRV TY A 240/480 060 (NS) SS(E) SP(U)	2"	3/#6	N/A	2P/60	60	A (HIGH MAST)	2P/30	15	10.8	
					J				B (HIGH MAST)	2P/30	7.5		
	023103156 (SL) (PS10) ICE WITH NAME PER DMS 11080	18 OF 20	ELC SRV TY A 240/480 060 (NS) SS(E) SP(U)	2"	3/#6	N/A	2P/60	60	A (RDWY ILLUM POLE)	2P/30	0.35	0.2	

	NEW	SERVICE INFORMATION						
	NEW SERVICE INFORMATION							
PROPOSED SERVICE	ADJACENT EXISTING SERVICE (EXISTING REPLACED)	SERVICE ADDRESS	ESID					
PS1	NEW LOCATION	-	-					
PS2	ES2	UNMETERED						
PS3	NEW LOCATION	-	-					
PS4	ES4	2200 S W S YOUNG DR HLTS	10443720008015737					
PS5	NEW LOCATION	-	-					
PS6	NEW LOCATION	-	-					
PS7	ES6	3700 E CENTRAL TEXAS EXPY SGNL	10443720009915696					
PS8	ES7	4005 E CENTRAL TEXAS EXPY HLTS	10443720008015799					
PS9	NEW LOCATION	-	-					
PS10	ES8	UNMETERED						

EXISTING SERVICE INFORMATION (EXISTING SERVICES TO REMAIN, NO SERVICE WORK ANTICIPATED)						
EXISTING SERVICE SERVICE ADDRESS ESID						
ES1	800 E CENTRAL TEXAS PKWY ODLT	10443720000318695				
ES3	2006 E CENTRAL TEXAS PKWY ODLT	10443720000318757				
ES5	3100 E CENTRAL TEXAS PKWY ODLT	10443720000318788				

# PATRICK JALUFKA P.E., ON: 7/11/2025

# PRELIMINARY NOT FOR CONSTRUCTION



## ELECTRICAL SERVICE DATA

SHEET I OF I

				211	LE 1	I UF I
ANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	-	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		105

GROUND BOX (TY A)

GROUND BOX (TY D)

CONDUIT

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)

HIGH MAST ILLUM POLE

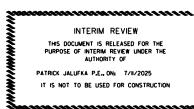
ELEC SERVICE

POLE DESIGNATION

ES#-##

CONDUIT DESIGNATION

HM-S#-A# POLE #
CIRCUIT #
SERVICE # RUN #
SERVICE # \_E - EXIST CONDUIT P - PROP CONDUIT

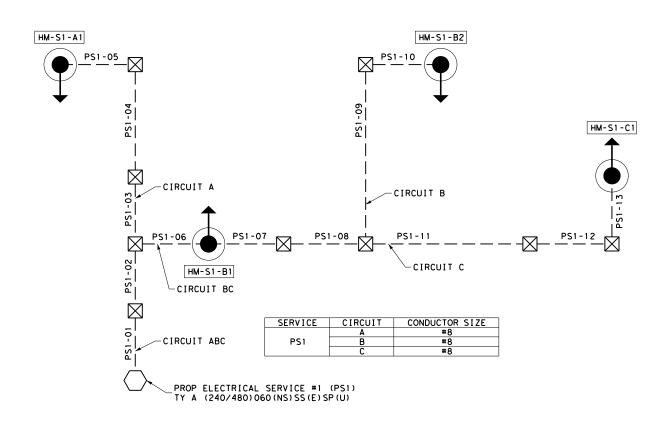


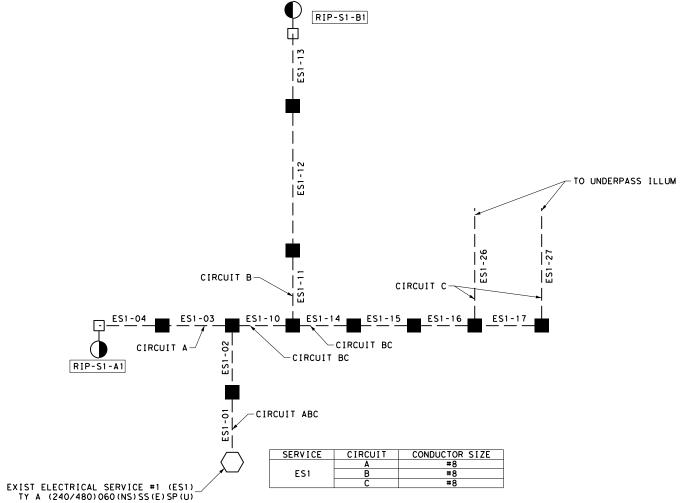
### PRELIMINARY NOT FOR CONSTRUCTION

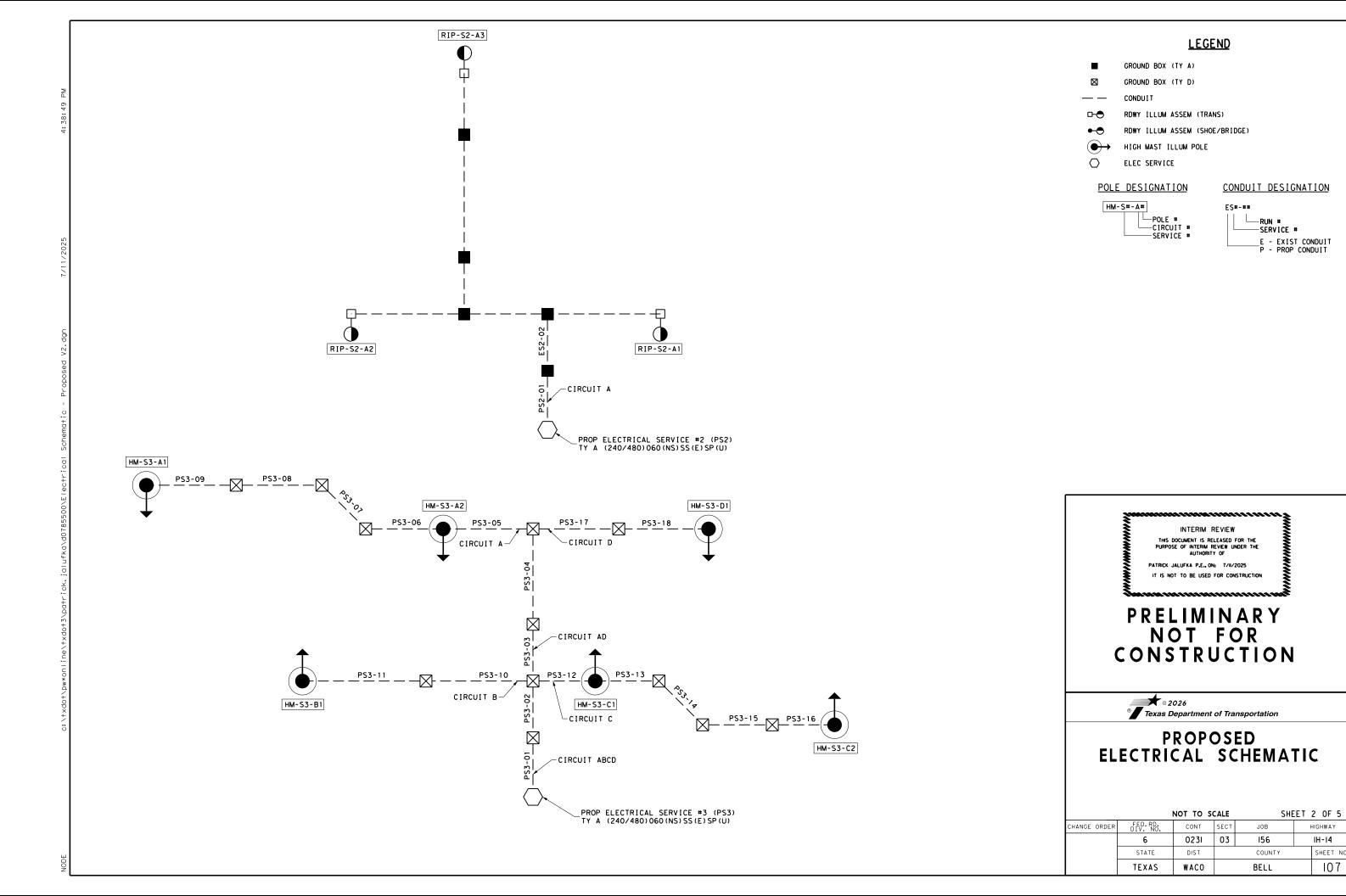


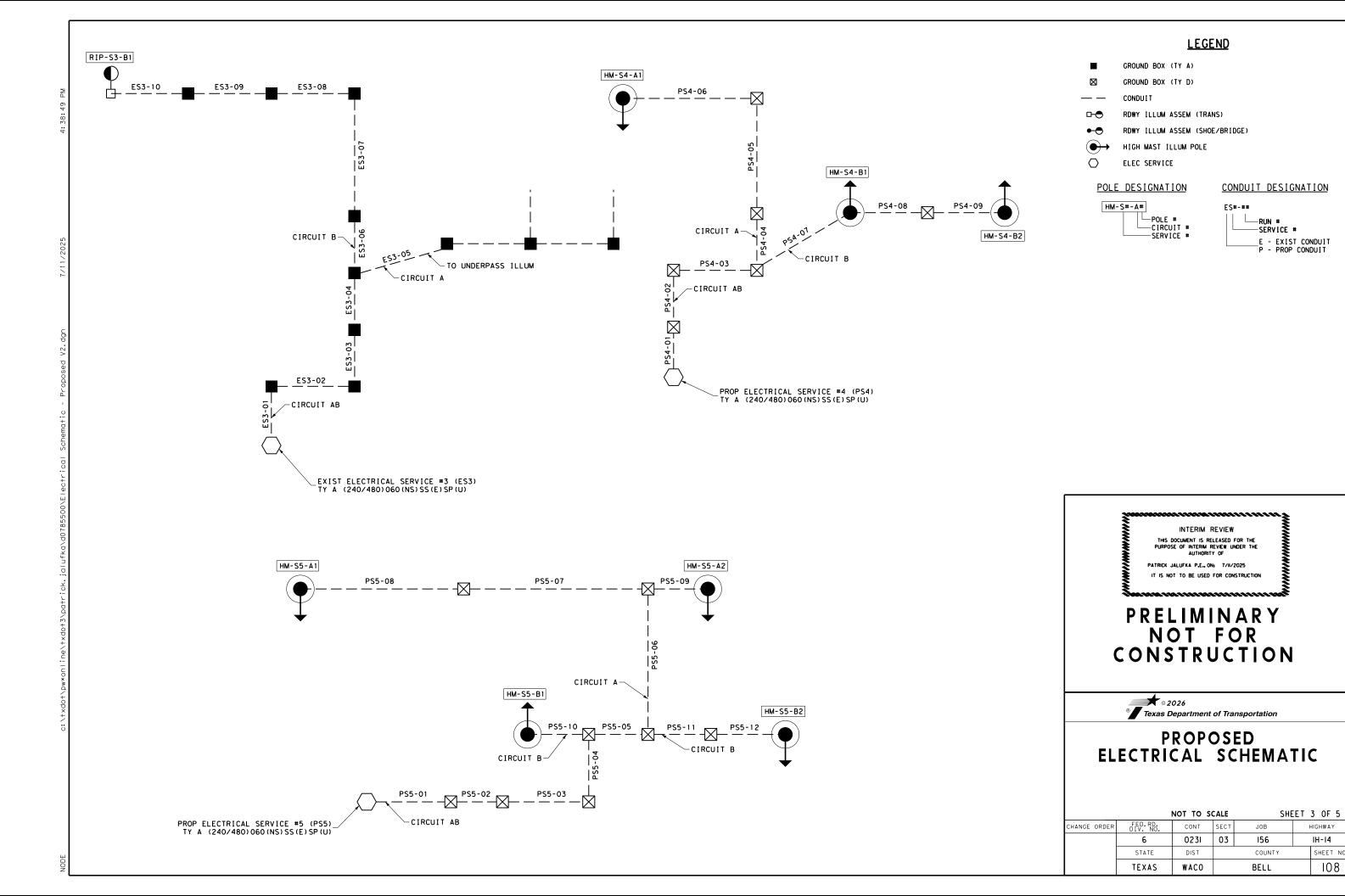
## PROPOSED ELECTRICAL SCHEMATIC

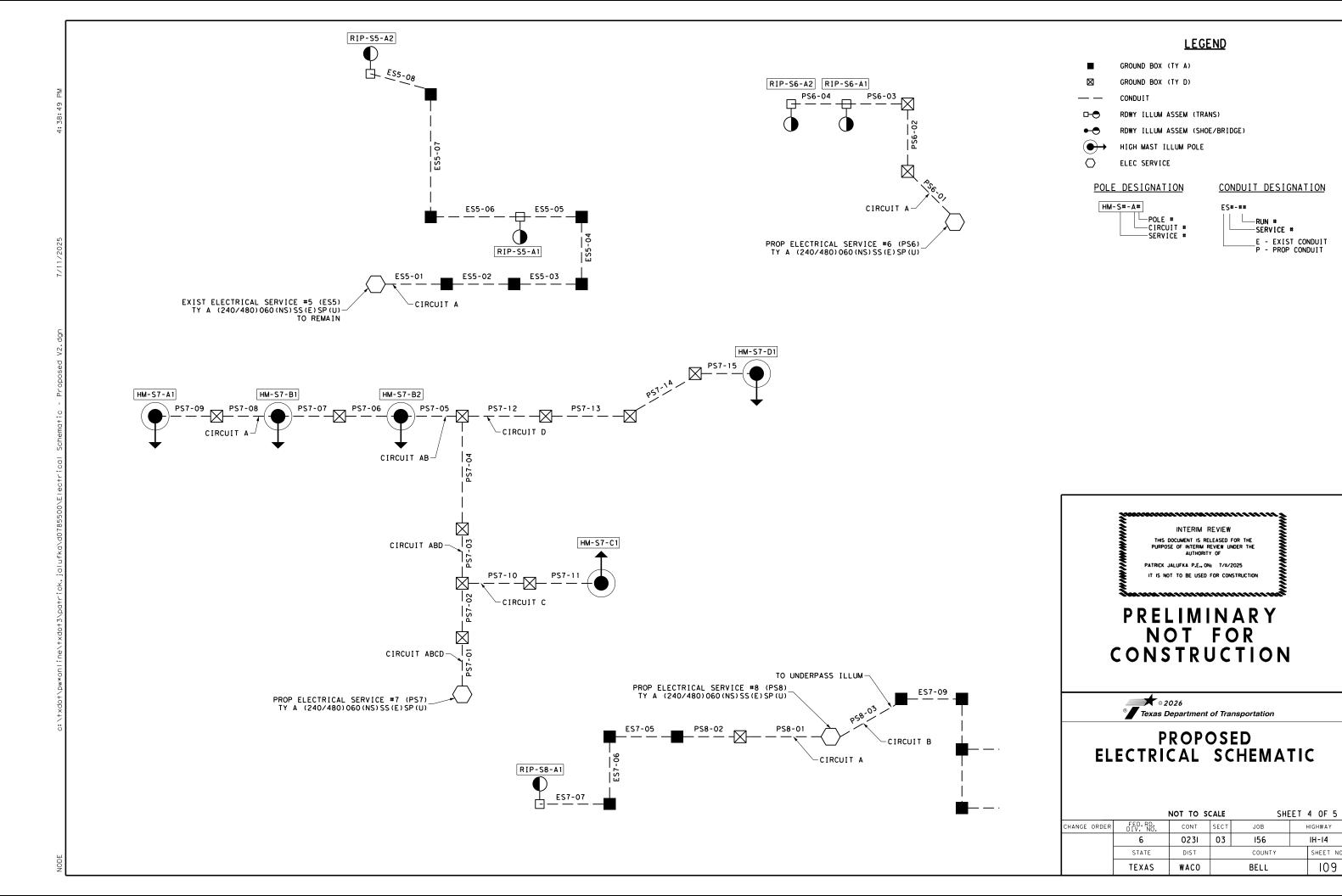
	I OF 5					
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	1	HIGHWAY
	6	0231	03	156		IH-14
	STATE	DIST		COUNTY		SHEET NO.
	TEXAS	WACO		BELL		106











GROUND BOX (TY A)

GROUND BOX (TY D)

CONDUIT

HM-S#-A#

RDWY ILLUM ASSEM (TRANS)

RDWY ILLUM ASSEM (SHOE/BRIDGE)

HIGH MAST ILLUM POLE

ELEC SERVICE

POLE DESIGNATION

POLE #
CIRCUIT #
SERVICE #

ES#-##

RUN #
SERVICE # \_E - EXIST CONDUIT P - PROP CONDUIT

CONDUIT DESIGNATION

PATRICK JALUFKA P.E., ON: 7/II/2025

# PRELIMINARY NOT FOR CONSTRUCTION



## PROPOSED ELECTRICAL SCHEMATIC

NOT TO SCALE SHEET 5 OF						
CHANGE ORDER	FED.RD. DIV. NO.	CONT	SECT	JOB	-	HIGHWAY
	6	0231	03	156	IH-14	
	STATE	DIST		COUNTY	COUNTY	
	TEXAS	WACO		BELL		

#### 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, unused, and undamaged materials. Ensure that all materials and installations comply with 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 CSA Group, Intertek Testing Services, or FM Approvals 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 NEMA. 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 an 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 Producer 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 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 Metal 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 are present, count the conductors as if all are of the larger size. For situations not applicable to this table, size junction boxes per the NEC.

	JUN	CTION BOX SIZES	
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 internal volumes up to 100 cu. in. and that are supported by entering raceways must have threaded entries or hubs identified for the intended purpose and be supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the box or within 18 in. of the box if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. in.
- 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 sized as directed above, listed and approved for outdoor use, unless otherwise noted on the plans. 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, unless otherwise shown in the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system.

#### A. MATERIALS (CONTINUED)

- 9. 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. below grade or bottom of the ground box, ground the RMC elbow with 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. Elbows are subsidiary to various bid items.
- 10. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to DMS-11060, "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors according to DMS-11030 for PVC conduit bid under Item 618. Provide conduit of the size and schedule as shown on the plans. Do not extend HDPE conduit into ground boxes or foundations. Provide PVC elbows at all ground boxes and foundations.
- 11. Use two-hole straps or strut straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized strut straps or stand-off 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 surfaces of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit supports 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 subgrade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the subbase 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. 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 affix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.
- 7. Ensure conduit entry into the top of an 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.
- 8. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding bushing on all metal conduit terminations.
- 9. 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.
- 10. 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).
- 11. After completion of conductor installation, immediately seal ends of all conduits emerging from ground with duct seal, expandable foam, or other methods approved by the Engineer. Do not use silicone caulking. Do not use duct tape as a permanent seal.
- 12. File smooth the cut ends of all mounting strut and conduit. To avoid overspray, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% min. zinc content as specified on DMS-8103 and listed on the MPL for Galvanizing Repair Paints) before installing. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with zinc rich paint as an alternative for materials required to be galvanized.
- 13. For all conduits, ensure the burial depth is 18" min. For conduits placed under a roadway, ensure the burial depth is 24" min.

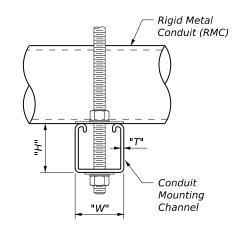


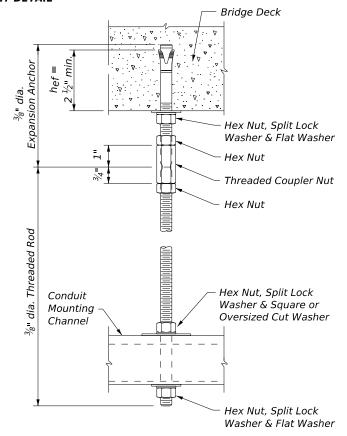
#### ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-25

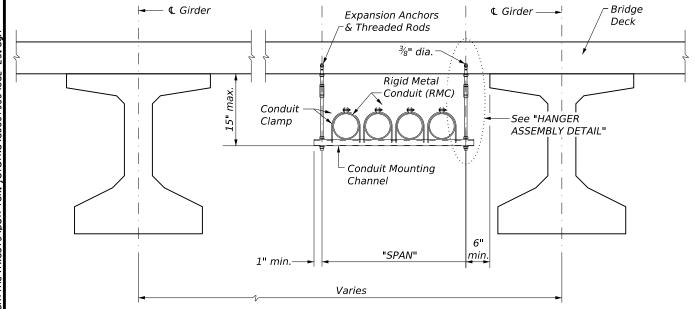
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LE:	ed1-25.dgn	DN: Tx	D0T	ск: TxD0T	DW:	TxD0T	ск: TxD0T		
TxDOT	April 2025	CONT	SECT	JOB		HIGHWAY			
	REVISIONS	0231	03	03 156			IH-14		
92 3 <b>-</b> 03 98 5 <b>-</b> 03	4-25	DIST	DIST COUNTY				SHEET NO.		
-00 10-14		WACO		BELL			111		

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



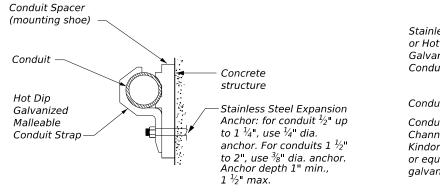


#### **CONDUIT HANGING DETAIL**



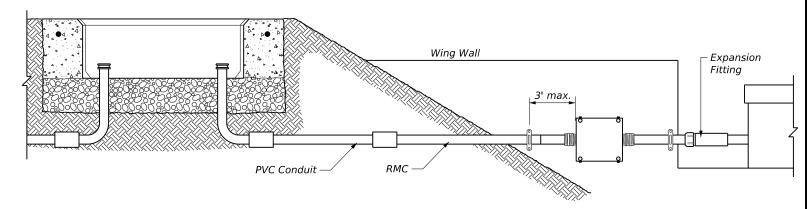
#### **CONDUIT MOUNTING OPTIONS**

ATTACHMENT TO CONCRETE SURFACES -SEE ED(1), CONDUIT, NOTE B.2



#### Concrete Stainless Steel structure or Hot Dip Galvanized $3\!\!\!/$ " Stainless Steel Conduit Clamp Expansion Anchor. Anchor depth 1" min., $1\frac{1}{2}$ " max. Conduit Conduit Mounting Channel (B-line, Kindorf, Unistrut or equal) (Hot dip galvanized)

#### TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL



#### **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
- 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 zincplated carbon steel or stainless steel. Provide only stainless steel anchor bodies and expansion wedges for applications in marine environments.
- 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, (hef), as shown. Increase (hef) as needed to ensure sufficient thread length for proper torquing and tightening of anchors.
- Use anchors of at least 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 (hef). No lateral loads shall be introduced after conduit installation.



#### **ELECTRICAL DETAILS CONDUIT SUPPORTS**

ED(2)-25

FILE:	ed2-25.dgn	DN: Tx	D0T	ск: TxD0T	DW:	TxDOT CK: TxDOT		
© TxDOT	April 2025	CONT	SECT	JOB		HIGHWAY		
	REVISIONS	0231	03	156		ΙH	I-14	
10-14 10-22		DIST	COUNTY			SHEET NO.		
4-25		WACO		BELL		112		

#### **ELECTRICAL CONDUCTORS**

#### A. MATERIAL INFORMATION

- Provide Type XHHW insulated copper conductors in accordance with Departmental Material Specification DMS-11040, "Conductors" and Item 620, "Electrical Conductors." Provide conductors as listed on the Material Producer List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620.
- 2. 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 at each accessible location.
- 3. Insulated grounding conductors may be substituted for bare conductors, unless otherwise shown in the plans. Insulated grounding conductors must be color coded green in accordance with Note 2.
- 4. Provide a 6 AWG bare solid copper 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.
- 5. Where two or more circuits are present in one conduit or enclosure, permanently label the conductors of each branch circuit by attaching a non-metallic, weather resistant tag around both circuit conductors at each accessible location. Provide one-piece tags with two  $^3$ /<sub>16</sub>" 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.
- 6. Use listed compression connectors, mechanical lugs, 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.
- 2. Leave 2 ft. to 3 ft. of length for each conductor up to the splice in ground boxes. Leave 3 ft. to 4 ft. of length for each conductor in ground boxes when pulled through with no splice. Leave 1 ft. to 1.5 ft. of length for each conductor at enclosures and pole bases. Leave 1.5 ft. to 3 ft. of length as required by electric utility for conductors exiting weatherheads.
- 3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression connectors, mechanical lugs, 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 each conductor 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.
- 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 or that fail an insulation resistance test at no additional cost to the Department.
- Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.

#### **B. CONSTRUCTION METHODS (CONTINUED)**

- Do not terminate more than one conductor under a single lug unless it is rated for multiple conductors. Do not exceed the lug's listing for maximum number and size of conductors allowed.
- 11. 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 a 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 MPI.
- 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 in the conduit. Bond all EGCs together at every accessible location. For ITS installations, bond and ground metal ground box covers and other metal equipment as shown on ITS standards.

#### C. TEMPORARY WIRING

- Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
- Provide a ground fault circuit interrupter (GFCI) for powering 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.
- 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. When 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**

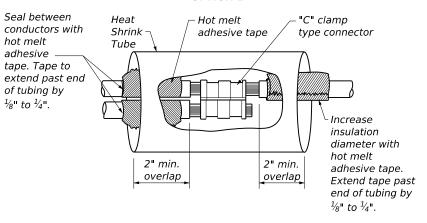
#### A. MATERIAL INFORMATION

 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 locations. Concrete encased grounding electrodes may be called for in some locations including electrical services — see plan sheets.

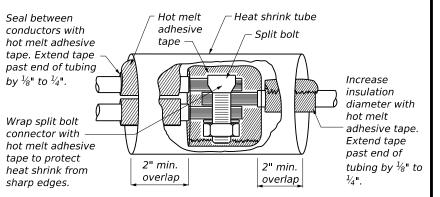
#### **B. CONSTRUCTION METHODS**

- 1. Furnish and install ground rods 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 or concrete pole.
- 3. Install ground rods so the imprinted part number is at the upper end of the rod.
- Remove all non-conductive material 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 4 in.
- Unless otherwise called for in the plans, protect grounding electrode conductors with nonmetallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding 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.

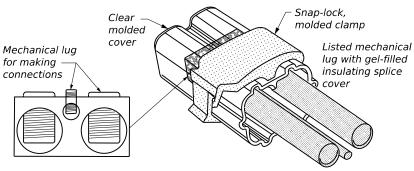
#### COMPRESSION SPLICE OPTION 1



#### SPLIT BOLT SPLICE OPTION 2



#### GEL-FILLED INSULATED SPLICE OPTION 3





#### CONDUCTORS

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#### APRON FOR GROUND BOX

#### SECTION A - A **PLAN VIEW** No. 3 reinforcina Ground Reinforcing steel typ. steel Concrete apron (when required) (2)Apron - full 4) Grounding depth of box bushing for typ. 3" to 6" RMC. Bell end fitting for 9" Aggregate PVC Ground box Conduit elbow Conduit or duct cable

#### SECTION A - A NOTES:

- ① Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.
- 2 Maintain sufficient space between conduits to allow for proper installation of bushing.
- ③ Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.
- (4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOXES									
TYPE	OUTSIDE DIMENSIONS (Width x Length X Depth)								
Α	12" X 23" X 11"								
В	12" X 23" X 22"								
С	16" X 29" X 11"								
D	16" X 29" X 22"								
Е	12" X 23" X 17"								

#### **NOTES:**

#### A. MATERIALS

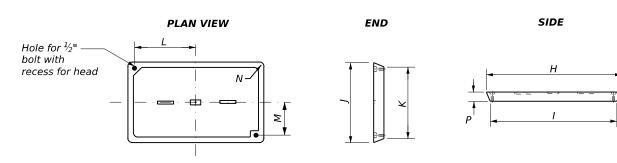
- 1. Provide polymer concrete ground boxes measuring 16 in. x 30 in. x 24 in. (W x L x D) or smaller in accordance with Departmental Material Specification DMS-11070, "Ground Boxes" and Item 624, "Ground Boxes."
- 2. Provide Type A, B, C, D, and E ground boxes as shown in the plans and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.
- 3. Ensure ground box cover is correctly labeled in accordance with DMS-11070.
- 4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

#### **B. CONSTRUCTION METHODS**

- 1. Before setting ground box and after placing and capping conduits, lay an aggregate bed a minimum of 9 in. deep that extends 10 in. beyond the sides of the ground box. Provide coarse aggregate sized 3/4 in. to 2 in., with no more than 20% material passing through a no. 8 sieve, and as defined by the current ASTM C33/33M standard. Clean aggregate and dirt from conduits according to Item 618.
- 2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.
- 3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.
- 4. Install all conduits and elbows in a professional and skillful manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.
- 5. Temporarily seal all conduits in the ground box until conductors are installed.
- 6. Permanently seal conduits immediately after the completion of conductor installation. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit seal. Do not use silicone caulk as a sealant.
- 7. Bond all equipment grounding conductors in a ground box together with listed connectors.
- 8. When a Type B or D ground box is stacked to meet volume requirements, an appropriately sized hole may be cut for conduit entry in the side wall at least 18 in. below grade.
- 9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper that is the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.
- 10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.
- 11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

#### **GROUND BOX COVER**

	GROUND BOX COVERS										
TYPE	DIMENSIONS										
7772	Н	H I J K L		L	М	N	P				
A, B & E	23 1/4"	23"	13 ¾"	13 ½"	9 %"	5 ½"	1 <sup>3</sup> / <sub>8</sub> "	2"			
C & D	30 ½"	30 ¾"	17 ½"	17 ½"	13 ¾"	6 <sup>3</sup> ⁄4"	1 <sup>3</sup> /8"	2"			





#### **ELECTRICAL DETAILS GROUND BOXES**

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#### **ELECTRICAL SERVICES NOTES**

- Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS)-11080, "Electrical Services" and Item 628, "Electrical Services." Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.
- Coordinate with the Engineer and the utility provider for metering and compliance with utility
  requirements. Primary line extensions, connection charges, meter charges, and other charges by the
  utility company to provide power to the location are paid for in accordance with Item 628. Get approval for
  the costs associated with these charges prior to engaging the utility company to do the work. Consult with
  the utility provider to determine costs and requirements, and coordinate the work as approved.
- 3. Provide a Master Lock, Model No. 2, M1, or 6121, keyed to code 2195. Master Lock 2195 keys and locks become property of the Department. Unless otherwise approved, do not energize electrical service equipment until locks are installed.
- 4. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.
- 5. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.
- 6. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify conductors per ED(3). Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 1.5 ft. to 3 ft. as required by electric utility.
- 7. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 in. underground and then couple to the type and schedule of the conduit shown on the plans. Install a grounding bushing on the RMC where it terminates in the service enclosure.
- 8. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees from each other. Size this LFMC the same size as the service entrance conduit. LFMC must not exceed 3 ft. in length. Strap LFMC within 1 ft. of each end. Terminate each end of the LFMC with a grounding bushing or fitting. The LFMC must contain a grounded (neutral) conductor. Ensure bends in LFMC do not exceed 180 degrees. A pull test is required on all installed conductors, with at least 6 in. of free conductor movement demonstrated to the satisfaction of the Engineer.
- 9. Ensure all mounting hardware and installation details of services conform to utility company specifications.
- 10. Provide the following documents in the electrical service document pocket: schematic drawing unique to the service from the UL 508 shop; plan sheet showing Electrical Service Data Chart for the service; plan sheets for the circuits powered by the service; and red lined plan sheets if installation differs from the original design. Reduce larger sheets to 8  $\frac{1}{2}$  in. x 11 in. and laminate all documents.
- 11. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to  $8\frac{1}{2}$  in. x 11 in. before laminating. When the enclosure has no door pocket, deliver these drawings to the Engineer before completion of the work.
- 12. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a watertight conduit hub or meter hub.

#### **MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS**

- 1. Field drill flange-mounted remote operator handle, if needed, to ensure handle is lockable in both the "On" and "Off" positions.
- 2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

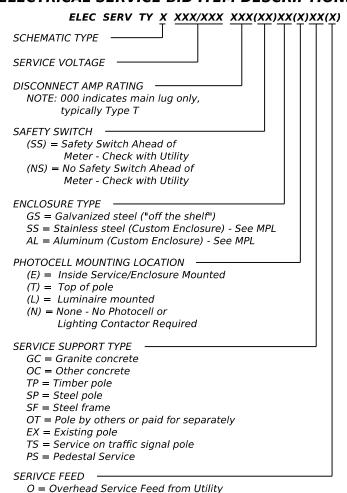
#### PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

	ELECTRICAL SERVICE DATA (EXAMPLE) *											
ELEC.	PLAN		SERVICE	SERVICE	SAFETY	MAIN	LIGHTING	PANELBOARD/	BRANCH	BRANCH	BRANCH	KVA
SERVICE	SHEET	ELECTRICAL SERVICE DESCRIPTION	CONDUIT	CONDUCTORS	SWITCH	CKT. BKR.	CONTACTOR	LOADCENTER	CIRCUIT	CKT. BKR.	CIRCUIT	LOAD
ID	NUMBER		SIZE **	NO./SIZE	AMPS	POLE/AMPS	AMPS	AMP RATING	ID	POLE/AMPS	AMPS	LUAD
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	2P/100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 1/4"	3/#6	N/A	2P/60	2P/30	100	Sig. Controller	1P/30	23	5.3
									Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 1/4"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

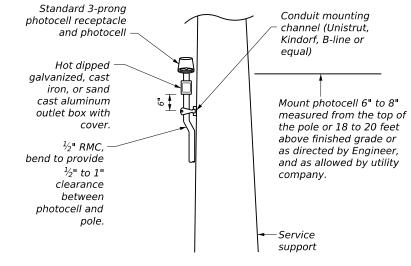
- \* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.
- \* \* Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National Electrical Code.

#### **ELECTRICAL SERVICE BID ITEM DESCRIPTIONS**

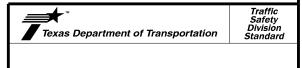


U = Underground Service Feed from Utility

#### TOP MOUNTED PHOTOCELL



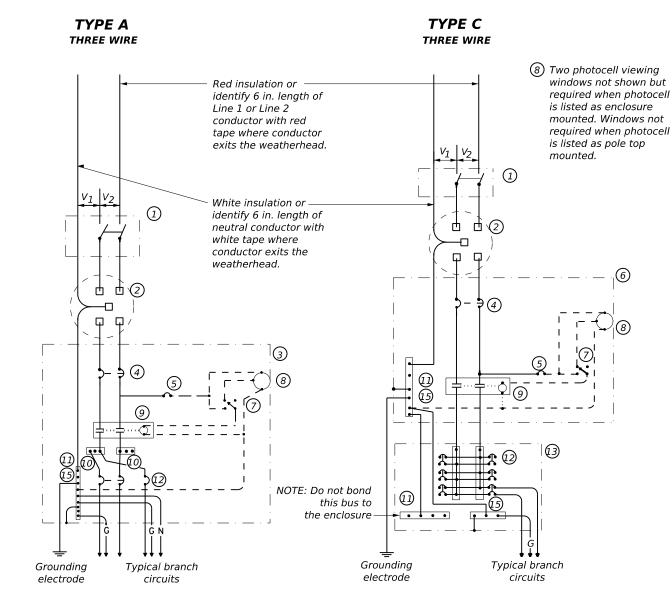
Install conduit strap maximum 3 ft. from box. Spacing between straps supporting conduit is 5 ft. maximum.



#### ELECTRICAL DETAILS SERVICE NOTES & DATA

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WIRING LEGEND

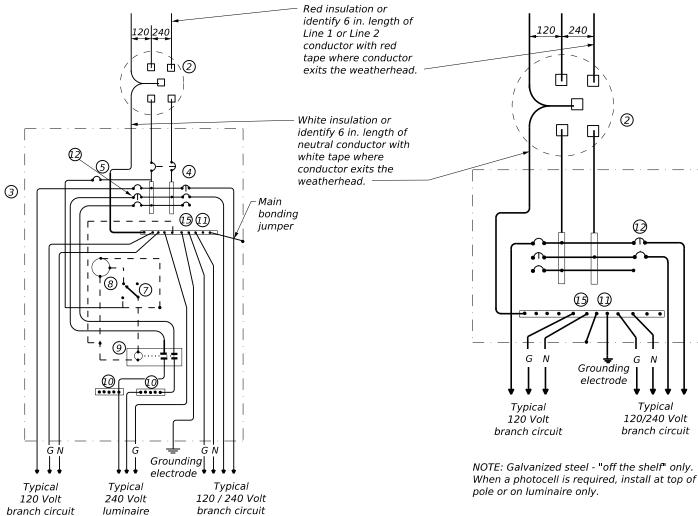
Equipment grounding conductor (always required)

Power Wiring

Control Wiring

Neutral Conductor

#### TYPE D - CUSTOM 120/240 VOLTS - THREE WIRE



#### **SCHEMATIC NOTES:**

- Safety Switch (when required)
- Meter (when required verify with electric utility provider)

branch circuit

- 3 Service Assembly Enclosure
- Main Disconnect Breaker (See Electrical Service Data)
- (5) Circuit Breaker, 15 Amp (Control Circuit)
- 6 Auxiliary Enclosure
- Control Station ("H-O-A" Switch)
- Photo Electric Control (enclosure-mounted shown)
- Lighting Contactor
- 10 Power Distribution Terminal Blocks
- (12) Branch Circuit Breaker (See Electrical Service Data)
- Separate Circuit Breaker Panelboard
- 14) Load Center
- Ground Bus



TYPE T

120/240 VOLTS - THREE WIRE

#### **ELECTRICAL DETAILS SERVICE SCHEMATICS** AND NOTES

120/240 Volt

branch circuit

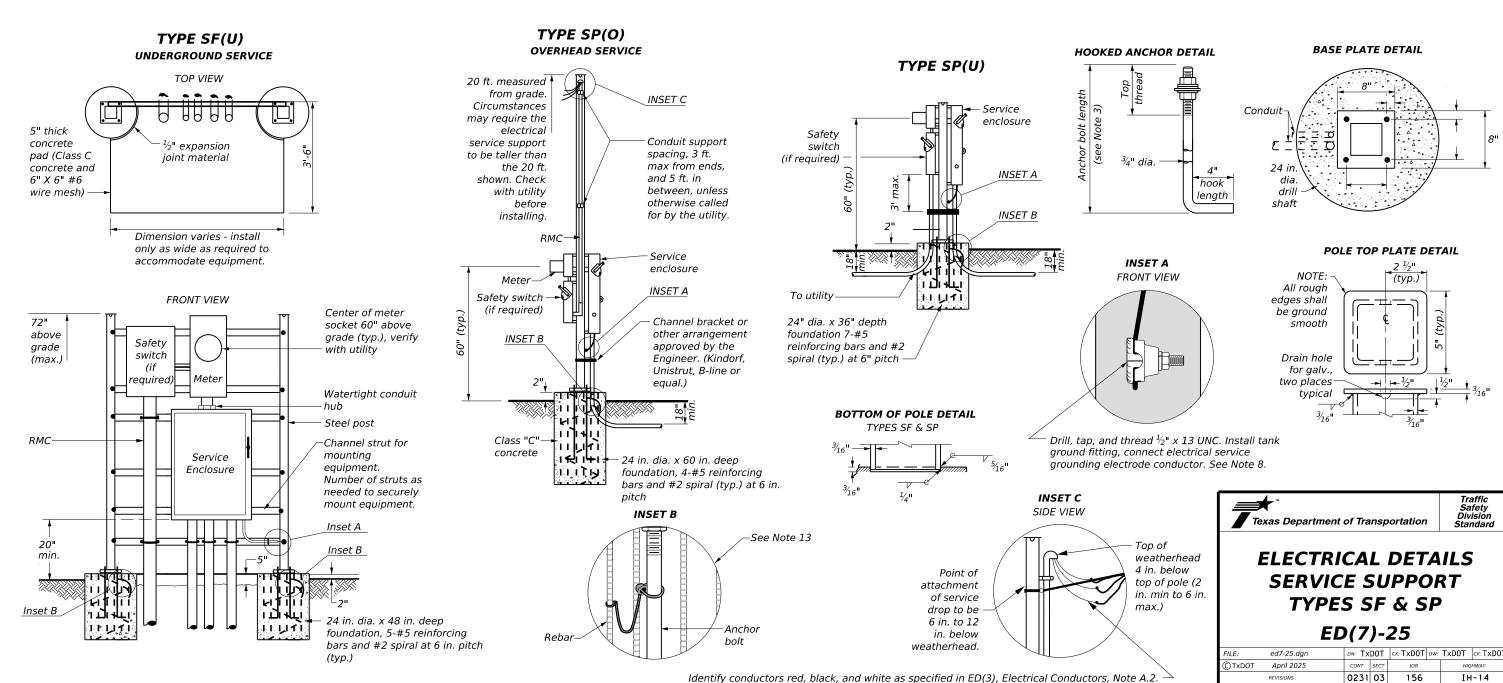
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#### SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF) NOTES:

- 1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification DMS-11080, "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut,  $1\frac{1}{2}$  in. or  $1\frac{5}{8}$  in. wide by 1 in. to  $3\frac{3}{4}$  in. deep Unistrut, Kindorf, B-line or equal. Drill, tap, and bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field-cut ends of all channel with zinc-rich paint before installing.
- Install a one point rack or eye bolt bracket 6 in. to 12 in. below the weatherhead as an overhead service drop anchoring point for the
  electric utility. Attaching bolt must pass through the pole and use a nut, washer, and locking washer on the other size. Self-tapping screws
  or lag bolts are not allowed.
- 3. Provide and install galvanized  $\frac{3}{4}$  in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized  $\frac{3}{4}$  in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in. of thread, with 3  $\frac{1}{4}$  in. to 3  $\frac{1}{2}$  in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.
- 4. Use Class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3 in. of unobstructed concrete cover.
- 5. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.
- 6. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.
- 7. Placement of the meter and service enclosure may vary based on the installation of a safety switch.

- 8. Drill and tap steel poles and frames for ½ in. x 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. directly below the electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting.
- 9. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See SF, SP details and Inset A for more information.
- 10. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a watertight conduit hub or meter hub.
- 11. If steel pole or frame is painted, bond each separate painted piece with a bonding jumper and lugs screwed into tapped holes.
- 12. Provide ¼ in. x 20 UNC machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install 6 AWG or larger stranded copper bonding jumpers. Make up all threaded bonding connections wrench-tight.
- 13. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.

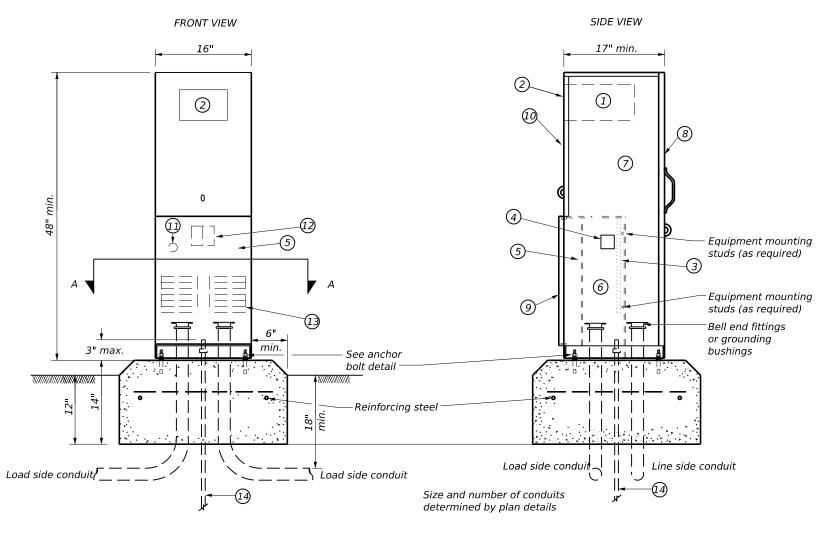


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Provide 1.5 ft. to 3 ft. of conductor length as required by electric utility.

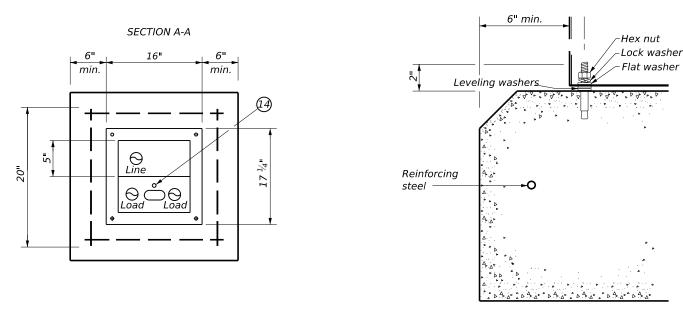
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NOTE: Type D shown, Type A similar except that Type A shall have circuit breakers (CB) mounted on an equipment mounting panel. CB handles shall protrude through hinged deadfront trim.

#### ANCHOR BOLT DETAIL



#### **DETAIL CALLOUTS:**

- 1) Meter socket (when required)
- 2) Meter socket window (when required)
- 3 Equipment mounting panel
- (4) Photoelectric control window (when required)
- 5 Hinged deadfront trim
- 6 Load side conduit area
- 7 Line side conduit area
- 8 Utility access door, with handle
- Pedestal door
- (10) Hinged meter access
- (1) Control station (H-O-A switch)
- (12) Main disconnect
- (13) Branch circuit breakers
  - Copper clad ground rod (in load side of cabinet) 5/8" x 10'

#### NOTES:

- 1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications DMS-11080, "Electrical Services," DMS-11085, "Electrical Services-Pedestal (PS)" and Item 628, "Electrical Services." Provide pedestal electrical services listed on the Material Producer list (MPL) under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.
- When a meter socket is required, provide a socket with a 100 amp (minimum) rating that complies with local utility requirements.
- 3. Provide concrete for pedestal service foundations in accordance with Item 656, "Foundations for Traffic Control Devices" except that concrete will not be paid for directly but is considered subsidiary to Item 628.
- Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."
- 5. Install ½ in. X 2 ¼6 in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Match anchor location to mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a ½ in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.
- 6. Finish top of concrete foundation in a professional and skillful manner. If leveling washers are used, ensure no more than <sup>1</sup>/<sub>8</sub> in. of gap exists at any corner. Do not exceed a maximum dip or rise in the foundation of <sup>1</sup>/<sub>8</sub> in. per foot. Ensure the top of the service enclosure is level front to back and side to side within <sup>1</sup>/<sub>4</sub> in. Repair rocking or movement of the service enclosure at no additional cost to the Department.
- 7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal services.
- 8. Ensure all elbows in the foundation are sized to meet utility provider's conduit requirements for underground conduit and feeders. PVC conduit extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a properly terminated bonding jumper.



Traffic Safety Division Standard

#### ELECTRICAL DETAILS PEDESTAL SERVICE TYPE PS

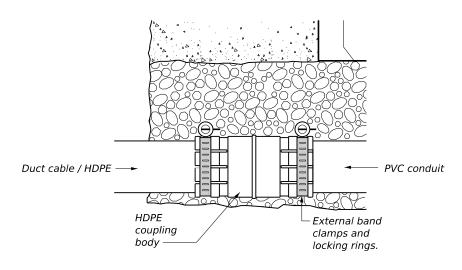
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-03 4-25		WACO		BELL			118	

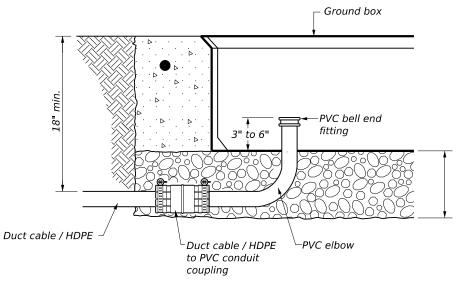
#### **NOTES:**

- Provide duct cable in accordance with Departmental Material Specification DMS-11060, "Duct Cable" and Special Specification 6000, "Duct Cable." Provide duct cable as listed on the Material Producer List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Special Specification 6000 - Duct Cable. Provide and install duct cable according to NEC Article 354, Nonmetallic Underground Conduit with Conductors (NUCC).
- 2. Provide High-Density Polyethylene (HDPE) conduit in accordance with DMS-11030 and Item 618, "Conduit." Provide HDPE as listed on the MPL on the Department web site under "Roadway Illumination and Electrical Supplies," Item 618.
- 3. Supply duct cable with a minimum 2 in. diameter, unless otherwise shown in the plans. Provide duct cable and HDPE conduit as shown by descriptive code or on the plans. Bend duct cable and HDPE conduit as recommended by the manufacturer, with a minimum bending radius of 26 in. for 2 in. duct. Follow manufacturers' recommendations when handling duct cable and HDPE conduit reels and during installation of duct cable and HDPE conduit.
- 4. Do not splice conductors within duct cable or HDPE conduit. Couple duct cable and HDPE entering a ground box or foundation to a PVC elbow. When galvanized steel rigid metal conduit (RMC) elbows are called for in the plans and any portion of the RMC elbow is buried less than 18 in. from possible contact, ground the RMC elbow.
- 5. When conduit casing is called for in the plans, extend duct cable or HDPE conduit through the conduit casing in one continuous length without connection to the casing.
- 6. Seal the ends of duct cable or HDPE conduit with duct seal, expandable foam, or other approved method after installation.
- 7. Provide minimum cover of 24 in. under roadways, 18 in. in other locations, or as shown on the plans.
- 8. Furnish and install listed fittings to couple duct cable or HDPE conduit to other types of conduit. Duct cable and HDPE conduit may be field-threaded and spliced with PVC or RMC threaded couplings; connected with listed tie-wrap fittings; connected using listed couplings made of HDPE with stainless steel external banding clamps and locking rings; connected with approved electrofusion conduit couplings; or connected using an approved chemical fusion method using an epoxy or adhesive specifically designed for HDPE couplings and connectors. Install connectors in accordance with manufacturer's instructions. Do not use PVC glue on HDPE. Do not use water pipe fittings, or connect conduit with heat shrink tubing.

#### **DUCT CABLE / HDPE TO PVC**



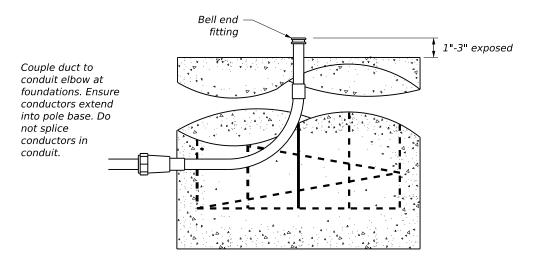
#### **DUCT CABLE/HDPE AT GROUND BOX**



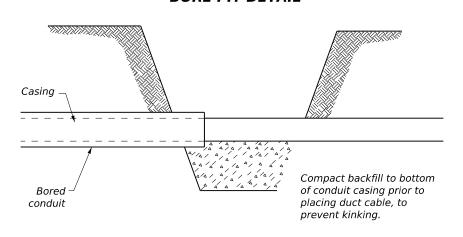
When the upper end of an RMC elbow does not enter the ground box,it may be extended with a SCH-40 PVC conduit nipple and bell end, provided there is a minimum of 18 in. of cover over all parts of the elbow. If not, a rigid extension and ground bushing is required.

Bed of aggregate is to be a minimum of 9 in. deep, placed under and not in the ground box. Ensure the aggregate does not encroach into the interior of the box.

#### **DUCT CABLE / HDPE AT FOUNDATION**



#### **BORE PIT DETAIL**



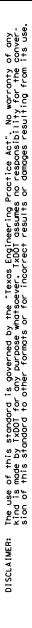


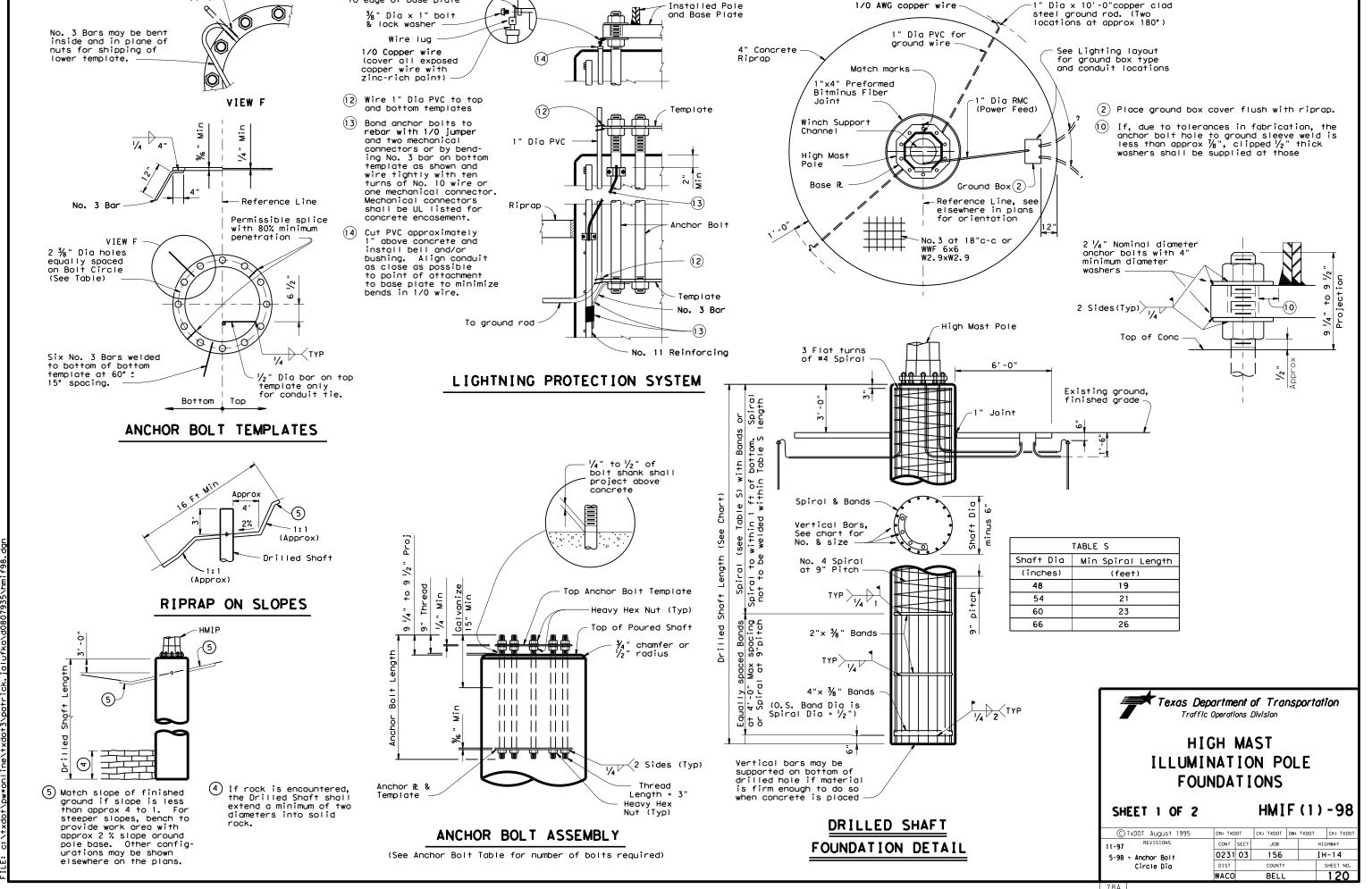
Traffic Safety Division Standard

#### ELECTRICAL DETAILS DUCT CABLE/ HDPE CONDUIT

ED(11)-25

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03	WACO		BELL		119			





1" Dia  $\times$  10'-0"copper clad

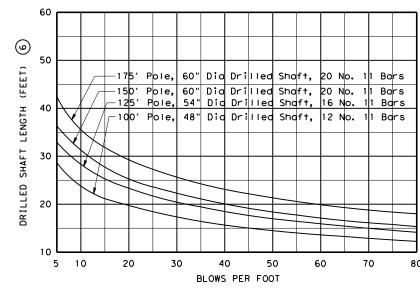
1/0 AWG copper wire

In field tack weld  $\frac{3}{8}$ " nut

to edge of base plate

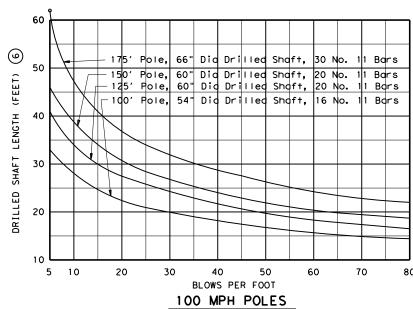
1/4 4"

6 Includes normal 3 Ft exposure. Shafts with more than 3 Ft exposure must have additional length.



#### 80 MPH POLES

Do not extrapolate below 5 Blows/Ft. A special design will be required for soil less than 5 Blows/Ft.



Do not extrapolate below 5 Blows/Ft. A special design will be required for soil less than 5 Blows/Ft.

#### TEXAS CONE PENETROMETER TEST TABLES

NOTE: Use average "N" value over the top third of the embedded shaft. Ignore the top 2' of soil.

	ANCHOR BOLT TABLE										
	Pole	BoI†	No. of	Bolt Cir							
	Height	Diameter	Length	0 D	I D	Bolts	Dia				
	(feet)	(inches)	(feet)	(inches)	(inches)	?	(inches)				
•			8	SIDED PO	DLE						
	175	2.25	4.83	45.5	36.5	16	41				
SNS	150	2.25	4.83	42.5	33.5	12	38				
DESIGNS	125	2.25	4.83	39.5	30.5	8	35				
핌	100	2.25	4.83	35.5	26.5	6	31				
MPH	12 SIDED POLE										
	175	2.25	4.83	48.5	39.5	12	44				
8	150	2.25	4.83	45.5	36.5	10	41				
	125	2.25	4.83	40.5	31.5	8	36				
,	100	2.25	4.83	36.5	27.5	6	32				
			8	SIDED PO	DLE						
1	175	2.25	4.83	50.5	41.5	20	46				
S	150	2.25	4.83	47.5	38.5	16	43				
DESIGNS	125	2.25	4.83	43.5	34.5	12	39				
ESI	100	2.25	4.83	38.5	29.5	10	34				
			12	2 SIDED F	POLE						
MPH	175	2.25	4.83	50.5	41.5	16	46				
8	150	2.25	4.83	48.5	39.5	12	44				
2	125	2.25	4.83	44.5	35.5	10	40				
<u>.</u>	100	2, 25	4.83	40.5	31.5	6	36				

MISCELLANEOUS QUANTITIES - ONE HMIF									
Shaft Diameter	(in)	7	48	54	60				
Concrete Riprap	(CY)		2.33	2.44	2.56				
Reinforcing	(Lbs)	®	94	99	103				
Ground Box	(ea)		1	1	1				
R O W Marker	(ea)	9	1	1	1				

- $\widehat{ to}$  See elsewhere on plans for length of Drilled Shaft required.
- 8 For Contractors information only.
- (9) Designated elsewhere on plans if required.

#### **GENERAL NOTES:**

Unless otherwise noted, the welded steel bands may be replaced with spiral as shown on the foundation details.

Anchor bolts shall be placed in foundation so there are always two bolts on reference line.

Drilled shaft lengths as determined from the foundation design chart or other acceptable methods are to be as shown elsewhere on the plans.

ODSR may not be used for  $\ensuremath{\mathsf{HMIF}}$  drilled shafts.

Concrete for drilled shafts shall be Class C.

Repair welded areas with zinc-rich paint.

All Anchor Bolts, Nuts and Washers shall
be galvanized in accordance with Item 445,
"Galvanizing".



## HIGH MAST ILLUMINATION POLE FOUNDATIONS

SHEET 2 OF 2

HMIF (2) -98

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	WACO	BELL				121

#### ROADWAY ILLUMINATION ASSEMBLY NOTES

- Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies."
  Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper
  construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State
  such warranties or guarantees.
- 2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.
- 3. 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, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.
- 4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.
- 5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.
  - a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.
  - b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25' above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 6th Edition (2013) of the AASHTO Design Specifications. For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25' above the surrounding terrain, provide poles meeting the following requirements:
    - i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).
    - ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.
- 6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.
- Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.
- 8. Install T-Base with following procedure:
  - a. Anchor Bolt Tightening.
    - i. Coat the threads of the anchor bolts with electrically conductive lubricant.
    - ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.
    - iii.Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.
    - iv. Using a torque wrench, tighten each nut to 150 ft-Ib. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-Ibs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-Ibs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation.
    - v. Check top of T-base for level. If not level then foundation must be leveled.
  - b. Top Bolt Procedure
    - i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

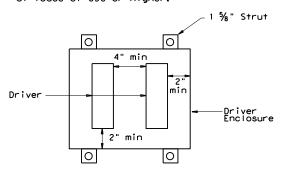
- ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."
- iii. Tighten each nut to 150 ft-Ib. using a torque wrench.
- c. Level and Plumb
  - Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.
- 9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).
- 10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.
- 11. Mount luminaires on arms level as shown by the luminaire level indicator.
- 12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.

#### Wiring Diagram Notes:

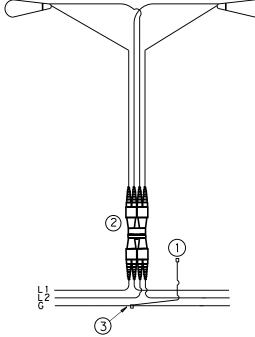
- Use 1/2 in.-13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.
- Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.
- (3) Split Bolt or other connector.

#### Decorative LED Lighting Notes:

- LED Drivers in Remote Outdoor enclosures (for drivers that do not include an enclosure as part of a factory assembly);
  - a. Provide NEMA 3R outdoor enclosure or as approved.
  - b. Install enclosure at least 12" above ground or other horizontal surface. Mount vertically or on ceiling, and avoid direct sun where possible.
  - Install drivers with at least 2 inches of space from enclosure walls.
  - d. For multiple drivers in an enclosure, provide at least 4 inches side to side and 1 inch end to end from other drivers or electronic equipment
  - e. For drivers mounted on back wall of enclosure, mount enclosure on 1 5/8" strut or other standoff to dissipate heat, or mount driver to side of the enclosure or to the metal cover.
  - f. Provide remote drivers with a maximum of 100 watts
  - g. Provide drivers with documentation of 100,000 hr lifetime at Tcase of 65C or higher.



Driver Spacing In Remote Enclosure



L1,L2 = Hot Conductors G = Grounding Conductor

#### TYPICAL WIRING DIAGRAM

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR 120/240 VOLT SERVICE.



RID(1)-20

DETAILS

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7-17	DIST		COUNTY		5	SHEET NO.
2-20	WACO		RFII			122

72A

4 Anchor

Bolts.

When required 4" concrete riprap

 $(W2.9 \times W2.9)$ welded wire fabric reinforcement

with 6"x 6"

warranty of any the conversion

#### When shown on the plans 4" concrete riprap with 6"x 6" $(W2.9 \times W2.9)$ 1/4 " welded wire fabric tooled reinforcement radius -—Level finish Foundation even with finished 24" -Conduit ht. 2"(±1.0) Ξ. - #4 Bors Condui Template -**1**-1 -1 + 2" minimum

TABLE 2								
RECOMMENDED FOUNDATION LENGTHS (See note 1)								
MOUNTING TEXAS CONE PENETROMETER N Blows/ft								
11610111	10	15	40					
<20 ft.	6' 6' 6'							
>20 ft. to 30 ft.	8′	8' 6' 6'						
>30 ft. to 40 ft.	8' 8' 6'							
>40 ft. to 50 ft.	10'	8,	6,					

TABLE 1

ANCHOR BOLTS

Shoe Base

13 in.

15 in.

MOUNTING

<40 ft.

40-50 ft.

BOLT CIRCLE

T-Base

14 in.

17 ¼in

ANCHOR

BOL T

SIZE

1in.x

30in.

1 ¼in. x 30in

	TABLE 3									
	PAY QUANTITY OF RIPRAP PER FOUNDATION (Install only when shown on the plans)									
	Foundation RIPRAP RIPRAP Diameter DIAMETER (CONC) (CL B)									
l	30 in.	78 in.	0.35 CY							

# (Typical) 30" 2" Cover (Typ) #3 at 6" pitch. 2 flat turns top and bottom.

SECTION A-A SHOWING CONSTANT GRADE

Conduit (See plans for conduit size. Match duct cable size if used. See ED standard sheets.) Grade break

- #4 Bars

lines

FOUNDATION DETAIL

#### Top of Foundation Hex nut – Lock washer Fnd. Lock washer Flat washer Hex nut -Baseplate (-1/2" Base Ho I ddown Washer -Flat washer Hex nut 1/2" Typ, 3/4" max-1/4" Typ, -1/2" max Anchor bolts Tied to rebar cage see note -Bottom Anchor SHOE BASE T-BASE Bolt Template See RIP Standard

ANCHOR BOLT DETAIL

#### **GENERAL NOTES:**

- 1. "Recommended Foundation Lengths" table is for information purposes only. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations." unless otherwise shown on the plans.
- 2. Erect roadway illumination assembly poles plumb and true. Form and level the top 6" of the foundation so the pole will be plumb. Use leveling nuts to plumb shoe base poles. Do not use shims or leveling nuts under transformer bases. Do not grout between baseplate and the foundation.
- 3. Ensure Class 2A and 2B fit for anchor bolts and nuts. Tap and chase nuts after galvanizing. Anchor bolt body with rolled threads need not be full
- 4. Use appropriate class of concrete as specified in Items 416 and 432. Concrete for riprap may be upgraded to Class C at no extra cost to the
- 5. Place riprap around the foundation when called for elsewhere in the plans. Riprap will be paid for under Item 432.
- 6. Locate breakaway roadway illumination assemblies as shown in the placement table, unless otherwise dimensioned on the plans. Protect non-breakaway illumination assemblies from vehicular impact (i.e. 2.5 ft. behind guard rail or mounted on traffic barrier), or located outside the clear zone, except that 2.5 ft. from curb face is minimum desired for light poles on city streets, 45 mph or less. See Roadway Design Manual for further information.
- 7. Use 4 hold down and 4 connecting washers on transformer base poles as recommended by the manufacturer and supplied with base.
- 8. Install a minimum of 2 conduits in each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Cap unused conduits in foundations on both ends.
- 9. Conduit location in foundations is critical for breakaway devices. Place conduits 2 in. apart on centerline as shown.
- Bond anchor bolt to rebar cage with #6 bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. The bonded steel in the foundation creates a concrete encased grounding electrode which replaces the ground rod.
- Grade earthwork around T-base foundations even with the finished grade as shown in Section A-A to ensure proper function of the breakaway device. Use riprap on T-base foundations that are located on sloped grades, and as shown on the plans for level grades.

#### TABLE 4 BREAKAWAY POLE PLACEMENT (See note 6) \*\* POLE OFFSET (DISTANCE TO FACE OF TRANSFORMER BASE) ROADWAY FUNCTIONAL CLASSIFICATION Freeway Mainlanes 15 ft. (minimum and (roadway with full control of access) typical) from lane edge All curbed, 45 mph 2.5 ft. minimum (15 ft. or less design speed desirable) from curb face 10 ft. minimum\*(15 ft. desirable) from lane edge All others

- \* or as close to ROW line as is practical
- \*\* provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design auidelines.

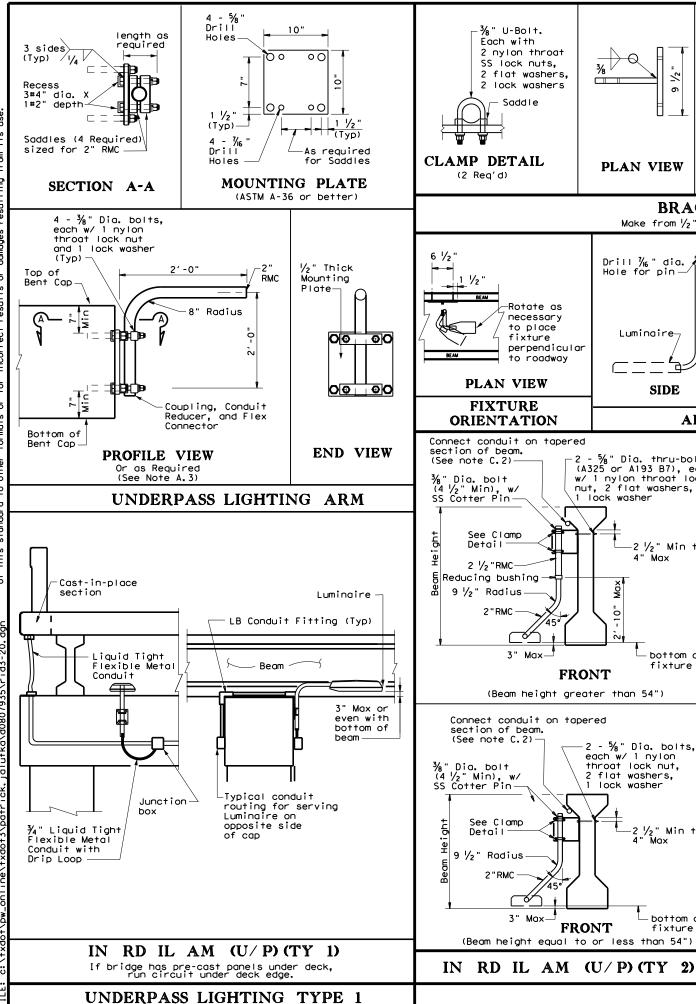
Texas Department of Transportation

Traffic Safety Division Standard

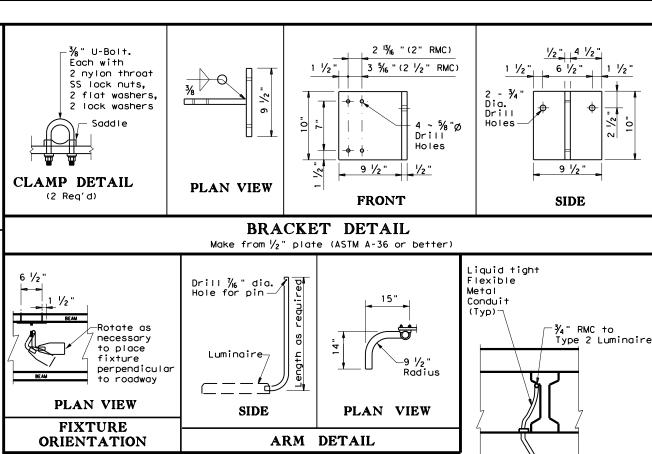
ROADWAY ILLUMINATION DETAILS (RDWY ILLUM FOUNDATIONS) DID (2) - 20

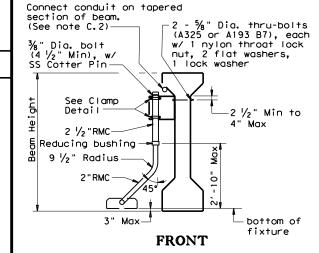
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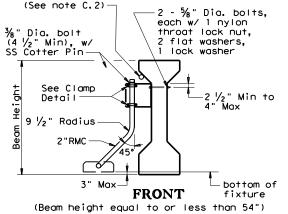


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(Beam height greater than 54") Connect conduit on tapered section of beam. (See note C.2) 2 - 5%" Dia. bolts, each w/ 1 nylon throat lock nut,



CONDUIT CONNECTION PROFILE Reinforcina

3 - No. 12 XHHW

in 3/4" RMC for

Branch Circuit

disconnect to

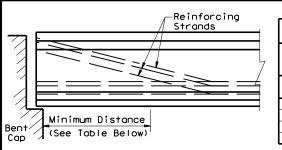
underpass

Luminaires

runs from fused

CONDUIT DETAIL

Reducer



### TABLE 5 LOCATION OF UNDERPASS LIGHT

MOUNTING BR	ACKET TABLE
SPAN	MINIMUM
LENGTH	DISTANCE
<u>&lt;</u> 50′	10′-0"
50′ - 70′	15′-0"
70′- 90′	20′-0"
> 90′	25′-0"

A. ALL 150 watt HPS and 150 watt equivalent LED Luminaires

- 1. Luminaire locations, conduit and conductor sizes and routing are typical and diagrammatic only. See project layout sheets for specific details.
- 2. Conduit will be paid for under Item 618, "Conduit" and conductors will be paid for under Item 620, "Electrical Conductors," unless otherwise shown on the plans.
- 3. Adjust conduit in saddles to place fixture height and orientation as required. See fixture orientation detail and plans. Where practicable, place luminaires so the bottom of luminaire is above the bottom of the beam, maximum of 3 in. (See detail UNDERPASS LIGHTING ARM TYPE 2)
- Except as noted, galvanize all structural steel and exposed bolts, nuts, and washers in accordance with Item 445 'Galvanizing".
- 5. Fabrication of brackets and support arms will not be paid for directly but is subsidiary to Item 610, "Roadway Illumination
- 6. Install a heavy duty NEMA 3R fused disconnect or breaker enclosure rated at 30 amps and 480 volts to switch underpass luminaires as shown on plans, with at least one per bridge circuit. Install 20 amp time-delay fuses or inverse-time circuit breakers. Mount disconnect or breaker enclosure 10 ft. (min) above grade on columns or bent caps as approved by the Department. Modify disconnect to allow padlocking in the "ON" and "OFF" positions. Padlocks and disconnect switches or circuit breakers for underpass fixtures will not be paid for directly but are subsidiary to the various bid items of the contract.
- 7. Conduit on columns, caps, and slab is shown surface mounted. For new columns and caps, embed PVC conduit in concrete. Bond and ground metal junction boxes and conduit.

#### B. TYPE 1

used Disconnec

-Ground Box

Appropriate Accessible

Conduit Body

LOCATION OF UNDERPASS LIGHT MOUNTING BRACKET

(As shown on

layout sheets

**GENERAL NOTES:** 

- 1. Provide 2 in, rigid metal conduit (2.375" O.D., 0.146" wall) for Type 1 arm shaft.
- 2. Use  $\frac{3}{8}$  in. stainless steel bolt or stud non-epoxy type expansion anchors for concrete for Type 1 mounting. Except as noted, provide an allowable 2650 lbs minimum pull-out force (after consideration of adjustment factors for edge distance and bolt spacing) for each anchor. Install each anchor to the embedment depth recommended by the manufacturer.
- 3. Attach conduit to plate with 4 saddles, four  $\frac{3}{8}$  in. diameter bolts, nylon throat lock nuts, and lock washers.

#### C. TYPE 2

- 1. Provide 2 in. rigid metal conduit (2.375" 0.D., 0.146" wall) or provide a combination of  $2\frac{1}{2}$  in. (2.875" O.D., 0.193" wall) and 2 in. (2.375" O.D., 0.146" wall) rigid metal conduits with a reducing bushing as beam height stipulated for Type 2 arm shaft. Field cutting and threading will be permitted. Paint cut and threaded areas with zinc rich paint after conduit is connected to adjacent fitting.
- 2. Connecting conduit may be strapped to tapered section only of precast beams as shown. Anchor as approved by the Engineer. Maximum anchor depth is 1 in.
- Indiscriminate drilling into precast concrete beams may result in reduced beam strength. Use drilling location and method as directed by the Engineer. See Location of Underpass Lighting Mounting Bracket detail. The locations shown in the table are such that reinforcing strands will not be damaged.

Texas Department of Transportation

Traffic Safety Division Standard

#### ROADWAY ILLUMINATION DETAILS

(UNDERPASS LIGHT FIXTURES)

RID(3) - 20

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UNDERPASS LIGHTING TYPE 2

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	SHIPPING PARTS LIST - POLES AND LUMINAIRE ARMS								
Nominal	Shoe Bo	ose		T-Bas	е			CSB/SSCB Mounted	
Mounting Ht.	Designation		0	Designation		0	Des	signation	0.,,,,
(f+)	Pole A1 A2	Luminaire	Quantity	Pole A1 A2	Luminaire	Quantity	Pole	A1 A2 Luminaire	Quantity
20	(Type SA 20 S - 4)	(150W EQ) LED		(Type SA 20 T - 4)	(150W EQ) LED				
	(Type SA 20 S - 4 - 4)	(150W EQ) LED		(Type SA 20 T - 4 - 4)	(150W EQ) LED				
30	(Type SA 30 S - 4)	(250W EQ) LED		(Type SA 30 T - 4)	(250W EQ) LED		(Type SP 28 S	- 4) (250W EQ) LED	
	(Type SA 30 S - 4 - 4)	(250W EQ) LED		(Type SA 30 T - 4 - 4)	(250W EQ) LED		(Type SP 28 S	- 4 - 4) (250W EQ) LED	
	(Type SA 30 S - 8)	(250W EQ) LED		(Type SA 30 T - 8)	(250W EQ) LED		(Type SP 28 S	- 8) (250W EQ) LED	
	(Type SA 30 S - 8 - 8)	(250W EQ) LED		(Type SA 30 T - 8 - 8)	(250W EQ) LED		(Type SP 28 S	- 8 - 8) (250W EQ) LED	
40	(Type SA 40 S - 4)	(250W EQ) LED		(Type SA 40 T - 4)	(250W EQ) LED		(Type SP 38 S	- 4) (250W EQ) LED	
	(Type SA 40 S - 4 - 4)	(250W EQ) LED		(Type SA 40 T - 4 - 4)	(250W EQ) LED		(Type SP 38 S	- 4 - 4) (250W EQ) LED	
	(Type SA 40 S - 8)	(250W EQ) LED		(Type SA 40 T - 8)	(250W EQ) LED		(Type SP 38 S	- 8) (250W EQ) LED	
	(Type SA 40 S - 8 - 8)	(250W EQ) LED		(Type SA 40 T - 8 - 8)	(250W EQ) LED		(Type SP 38 S	- 8 - 8) (250W EQ) LED	
	(Type SA 40 S - 10)	(250W EQ) LED		(Type SA 40 T - 10)	(250W EQ) LED		(Type SP 38 S	- 10) (250W EQ) LED	
	(Type SA 40 S - 10 - 10)	(250W EQ) LED		(Type SA 40 T - 10 - 10)	(250W EQ) LED		(Type SP 38 S	- 10 - 10) (250W EQ) LED	
	(Type SA 40 S - 12)	(250W EQ) LED		(Type SA 40 T - 12)	(250W EQ) LED		(Type SP 38 S	- 12) (250W EQ) LED	
	(Type SA 40 S - 12 - 12)	(250W EQ) LED		(Type SA 40 T - 12 - 12)	(250W EQ) LED		(Type SP 38 S	- 12 - 12) (250W EQ) LED	
50	(Type SA 50 S - 4)	(400W EQ) LED		(Type SA 50 T - 4)	(400W EQ) LED		(Type SP 48 S	- 4) (400W EQ) LED	
	(Type SA 50 S - 4 - 4)	(400W EQ) LED		(Type SA 50 T - 4 - 4)	(400W EQ) LED		(Type SP 48 S	- 4 - 4) (400W EQ) LED	
	(Type SA 50 S - 8)	(400W EQ) LED		(Type SA 50 T - 8)	(400W EQ) LED		(Type SP 48 S	- 8) (400W EQ) LED	
	(Type SA 50 S - 8 - 8)	(400W EQ) LED		(Type SA 50 T - 8 - 8)	(400W EQ) LED		(Type SP 48 S	- 8 - 8) (400W EQ) LED	
	(Type SA 50 S - 10)	(400W EQ) LED		(Type SA 50 T - 10)	(400W EQ) LED		(Type SP 48 S	- 10) (400W EQ) LED	_
	(Type SA 50 S - 10 - 10)	(400W EQ) LED		(Type SA 50 T - 10 - 10)	(400W EQ) LED		(Type SP 48 S	- 10 - 10) (400W EQ) LED	
	(Type SA 50 S - 12)	(400W EQ) LED		(Type SA 50 T - 12)	(400W EQ) LED		(Type SP 48 S	- 12) (400W EQ) LED	
	(Type SA 50 S - 12 - 12)	(400W EQ) LED		(Type SA 50 T - 12 - 12)	(400W EQ) LED		(Type SP 48 S	- 12 - 12) (400W EQ) LED	

		0.7.1	IED							
	OTHER									
	Designation									
Pole	A 1	A2	Luminaire	Quantity						

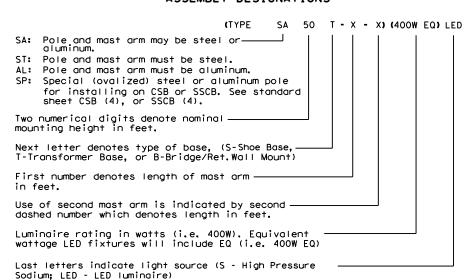
#### **GENERAL NOTES:**

- 1. All work, materials and services not shown on the plans which may be necessary for complete and proper construction shall be performed, furnished and installed by the Contractor. Faulty fabrication or poor workmanship in any material, equipment or installation will be considered justification for rejection. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the Department such warranties or guarantees.
- 2. The location of poles and fixtures are diagrammatic only and may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.
- 3. Standard Steel Pole Designs. Steel poles fabricated in accordance with the details and dimensions shown herein, shall be considered standard designs. Submission of shop drawings and design calculations for standard designs is not required.
- 4. Optional Steel Pole Designs. Multi-sided steel poles may be allowed as optional designs, if steel poles are permitted or required, pending approval by the Department as outlined below.
  - a. Shop Drawings. Optional designs require submission of shop drawings and design calculations bearing the seal of an engineer licensed in the State of Texas, in accordance with Item 441, "Steel Structures." The Department may elect to pre-approve some shop drawings for optionally designed poles. Submission of shop drawings and design calculations is not required for structures fabricated in accordance with the details of shop drawings on the pre-approved list maintained by the TxDOT Traffic Operations Division. Any deviation from the pre-approved shop drawings will require submission of shop drawings of the complete assembly and design calculations as described above.
  - b. Structural Support Design for Luminaires. Lighting support structures shall be designed for a 25 year design life in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto. All poles shall be designed for 110 mph 3-second gust wind speeds. The Gust Factor, G, and Wind Importance Factor, Ir, shall be applied as per the AASHTO Specifications assuming a 25-year design life. The design wind pressure for hurricane wind velocities greater than 100 mph shall not be less than the design wind pressure using 100 mph with the non-hurricane Wind Importance Factor, Ir, value. For transformer base poles, fabricator shall include transformer base and connecting hardware in design calculations and shop drawing submittals. All transformer bases shall have been structurally tested to resist the theoretical plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished shall be submitted with the shop drawings. Shop drawings shall show breakaway base model number, and manufacturer's name and logo.
  - Manufacturer's shop drawings shall include the ASTM designations for all materials to be used.

    c. Mast Arm Attachments. All poles and attachments shall be structurally designed to support two 12-foot mast arms and luminaires. Poles shall be supplied with mast arm combinations as shown in the plans. All
  - mast arms shall be designed for a 60-pound luminaire having an effective projected area of 1.6 square feet. d. Anchor Bolt Assembly. Anchor bolt assemblies for optionally designed poles shall be the same as those
- 5. Aluminum Pole Designs. Aluminum pole designs may be allowed, if aluminum poles are permitted or required, pending approval by the Department as outlined below.
  - a. Meet all of the requirements stated above for optional steel pole designs and the following:
    1. Aluminum poles shall be fabricated in accordance with "Structural Welding Code-Aluminum" AWS D1.2.
    - Aluminum pole designs shall use the same anchor bolt assembly and be subject to the same geometric restraints and other requirements for steel poles specified herein.
       Aluminum poles shall be equipped with vibration mitigation devices, as approved by the engineer.

    - Aluminum poles shall be equipped with vibration mitigation devices, as approved by the engineer. Pole components shall be constructed using the following material:
      Shaft: ASTM B221 or B241 Alloy 6063-T6, ASTM B209 Alloy 5086-H34, ASTM B221 Alloy 6005-T5.
      Base Flange: ASTM B26 Alloy 356.0-T6 or ASTM B108 Alloy 356.0-T6 (Yield strength test required).
      Mast Arms: ASTM B209 Alloy 6061-T6 or ASTM B221 Alloy 6005-T5.
      Mast Arms: ASTM B241 Alloy 6061-T6 or Alloy 6063-T6.
      Pole Cap: ASTM B209 Alloy 5086-H32 or ASTM B108 or B26 Alloy 356.0-T6.
      Bolts: Stainless Steel AISI 300 series. Bolts threading into aluminum threads shall be treated with anti-seize compound, Never-Seez Compound, Permatex 133K or equal.
- 6. Special Designs. Poles with architectural treatments shall meet the requirements shown elsewhere in the plans.
- 7. Luminaire Mounting Height. Actual luminaire mounting height shall be the nominal mounting height given on RIP(2) for all pole-arm combinations except for poles with 4 ft. luminaire arms, which shall be  $3^7$ -0" lower than the nominal height, unless otherwise shown or directed.

#### EXPLANATION OF ROADWAY ILLUMINATION ASSEMBLY DESIGNATIONS







#### ROADWAY ILLUMINATION POLES

RIP(1) - 19

FILE: rip-19.dgn	DN:		CK:	DW:		CK:
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See Pole

Top Detail,

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1

Simplex Arm

60% of (LP-3

Handhole on

bridge and

traffic side of pole for

retaining wall

mounted poles

Thickness

See BL and RW(LB)

Standards

Ra:

Connection

#### SHOE BASE POLE

ı									
I	SHOE BASE POLE								
	Luminaire Mounting Height (Nominal)(ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)			
ı	20.00	7.00	4.90	15.00	0.1196	7.1			
ı	30.00	7.50	4.00	25.00	0.1196	13.2			
ı	31.00-39.00	8.00	4.36-3.24	26.00-34.00	0.1196	20.7			
1	40.00	8.50	3.60	35.00	0.1196	20.7			
ı	50.00	10.50	4.20	45.00	0.1196	30.3			

#### See Pole Top Detail. 1 Simplex Arm Connection 60% of CP-3 Pole Thickness See Transformer Base Baseplate Detail, Sheet 4 of 4 See Transformer Base Details. Sheet 4 of 4 See Transformer Base Anchor Bolt Assembly Detail,

#### TRANSFORMER BASE POLE

TRANSFORMER BASE POLE							
Luminaire Mounting Height (Nominal)(ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)		
20.00	7.00	5.11	13.50	0.1196	7.1		
30.00	7.50	4.21	23.50	0.1196	13.2		
31.00-39.00	8.00	4.57-3.45	24.50-32.50	0.1196	20.7		
40.00	8.50	3.81	33.50	0.1196	20.7		
50.00	10.00	3.91	43.50	0.1196	30.3		

#### Rise ① Simplex Arm Connection Seam Weld Ę located 45° from mast arm axis 60% of Thickness See Handhole Detail, Sheet 3 of 4 Max. 6' -0" 7' -6" 0val Sect See Concrete Traffic Barrier Base Baseplate Detail. Sheet 4 of 4 See Concrete Traffic Barrier Base Anchor Bolt Assembly Detail, Sheet 4 of 4

See Pole

Top Detail,

#### CONCRETE TRAFFIC BARRIER BASE POLE

CONCRETE TRAFFIC BARRIER BASE POLE (CSB/SSCB)							
Luminaire Mounting	Base② Diameter	Top Diameter		Pole Thickness (in)	Design Moment (K-ft)		
Height (Nominal)(ft)	/in)	(in)	(f†)		About & of Rail	Perp. to Rail	
28.00	9.00	5.78	23.00	0.1196	10.3	13.2	
38.00	9.00	4.38	33.00	0.1196	16.6	20.8	
48.00	10.50	4.48	43.00	0.1345	25.1	30.5	
•							

#### GENERAL NOTES:

- . Designs conform to AASHTO Standard Specifications Designs conform to AASHIO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto. Design 3-Second Gust Wind Speed equals 110 mph with a 1.14 gust factor. A wind importance factor of 0.80 is applied to adjust the wind speed to a 25 year recurrence interval. Design moments listed in tables assume base of pole is 25' above natural ground level.
- Structures are designed to support two 12' luminaire most arms and luminaires. Most arms are designed to support a 60-pound luminaire having an effective projected area of 1.6 square feet.
- Fabrication shall be in accordance with the Specifications and with the details, dimensions, and weld procedures shown herein. Do not submit shop drawings for roadway illumination pole assemblies fabricated in accordance with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of these sheets and the Specifications. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.

- 4. For mounting heights between values shown in the tables, use base diameter and thickness values for
- Unless otherwise noted, all steel parts shall be galvanized in accordance with Item 445, "Galvanizing."
- 6. Steel poles shall be fabricated in accordance with Item 441, "Steel Structures." Longitudinal seam welds for pole sections shall have 60% minimum penetration. All welding shall be in accordance with AWS D1.1, Structural Welding Code-Steel.
- 7. Two-section poles joined by circumferential welds will not be permitted, unless otherwise shown on the plans. Poles may be fabricated in two sections and fieldassembled by the lap-joint method. The two sections shall telescope together with a lap length of not less than 1-1/2 times the shaft diameter at the lap joint.
- Alternate material equal to or better than material specified may be substituted with the approval of the
- Lubricate and tighten anchor bolts, when erecting shoe base poles and concrete traffic barrier base poles, in accordance with Item 449, "Anchor Bolts.

- 10. All poles, except Transformer Base Poles, shall have hand holes with reinforcing frames and covers. For ground mounted shoe base poles, hand holes shall be placed 90 degrees to mast arm unless otherwise noted on the plans. For poles mounted on a concrete traffic barrier with one luminaire arm, hand holes shall be located 180 degrees from luminaire arm. For poles mounted on a concrete traffic barrier with two luminaire arms, all hand holes shall be on the same side of the barrier. For poles mounted on a bridge lighting bracket or a retaining wall lighting bracket, hand hole shall be on traffic side of the pole, at a height that will clear the barrier.
- 11. The finished pole shall have a smooth, uniform finish free of pits, blisters, or other defects. Scratched, chipped, and other damaged galvanized areas on poles and mast arms shall be repaired in accordance with Item 445,
- 12. Pole length is based on a 5'-6" luminaire arm rise. 4 ft. luminaire arms have a 2'-6" rise. A pole with 4 ft. luminaire arms will have an actual mounting height 3'-0" less than the nominal mounting height. Increasing the pole length to meet the nominal mounting height is allowed, but unnecessary unless otherwise directed by the engineer.
- 13. Erect transformer base poles in accordance with sheet RID(1).

MATERIAL DATA						
COMPONENT	ASTM DESIGNATION	MIN. YIELD (ksi)				
Pole Shaft (0.14"/ft. Taper)	A572 Gr 50, A595 Gr A, A1011 HSLAS Gr 50 Cl 2 ③, or A1008 HSLAS Gr 50 Cl 2	50				
Base Plate and Handhole Frame	A572 Gr.50, or A36	36				
T-Base Connecting Bolts	F3125 Gr A325	92				
Anchor Bolts	F1554 Gr 55, A193-B7 or A321	55 105				
Anchor Bolt Templates	A36	36				
Heavy Hex (H.H.) Nuts	A194 Gr 2H, or A563 Gr DH					
Flat Washers	F436					

#### NOTES:

- (1)2'-6" rise for 4 ft. luminaire arms.
- ②Before ovalized as shown on Concrete Traffic Barrier Base Baseplate details, Sheet 4 of 4.
- (3) A1011 SS Gr 50 may be used instead of HSLAS, provided the material meets the elongation requirements for HSLAS.

#### POLE ASSEMBLY FABRICATION TOLERANCES TABLE DIMENSION **TOLERANCE** Shaft length I.D. of outside piece +1/8", -1/16" of slip fitting pieces O.D. of inside piece +1/32", -1/8" of slip fitting pieces Shaft diameter: other +3/16" Out of "round" 1/4" Straightness of shaft ±1/4" in 10 ft Twist in multi-sided shaft 4° in 50 ft Perpendicular to baseplate 1/8" in 24" ±1/4" Pole centered on baseplate Location of Attachments ±1/4"

SHEET 2 OF 4



Traffic Safety Division Standard

±1/16"

ROADWAY ILLUMINATION **POLES** 

RIP(2) - 19

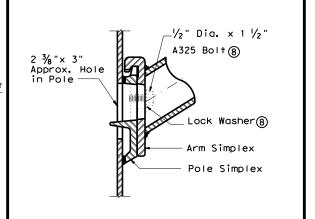
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Bolt hole spacing

#### LUMINAIRE ARM

LUMINAIRE ARM DIMENSIONS						
Nominal Arm Length	Arm Length	Rise				
4′-0"	3′-6"	2′-6"				
6′-0"	5′-6"	5′-6"				
8′-0"	7′-6"	5′-6"				
10'-0"	9′-6"	5′-6"				
12'-0"	11′-6"	5′-6"				

ARM ASSEMBLY FABRICATION TOLERANCES TABLE						
DIMENSION	TOLERANCE					
Arm Length	±1"					
Arm Rise	±1"					
Deviation from flat	1/8" in 12"					
Spacing between holes	±1/32"					



#### UPPER SIMPLEX FITTING

LOWER SIMPLEX FITTING (Gusset not shown for clarity)

SECTION B-B

SIDE

½" Dia. x 1 ½"

-Lock Washer®

<sub>√2</sub> \LA-3

Тур

Gusset Plate

A325 Bolt(8)

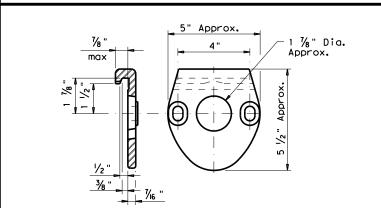
Arm Simplex Pole Simplex

(Gusset not shown for clarity)

Lip

LA-3>-/2

Тур



POLE SIMPLEX DETAIL 9

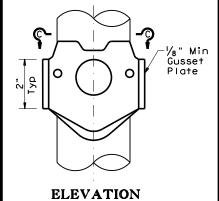
5" Approx.

ARM SIMPLEX DETAIL 9

#### NOTES:

- (4) Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.
- (5) A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.
- (6) A572, A1008 HSLAS-F, and A1011 HSLAS-F materials may have higher yield strengths but shall not have less elongation than the grade indicated.
- 7 Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.
- 8 Each pole simplex fitting shall be supplied with 2 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans.
- Proposed deviations in arm simplex dimensions or materials must be submitted to the Department for approval.
- (10) A welded handhole frame is permissible. Maximum of two (2) CJP weld splices is allowed.

MATERIALS				
Pole or Arm Simplex	ASTM A27 Gr 65-35 or Gr 70-36, A148 Gr 80-50, A576 Gr 1021 (\$), or A36 (Arm only)			
Arm Pipes	ASTM A53 Gr A or B,A500 Gr B, A501, A 1008 HSLAS-F Gr 50 ⑥, or A1011 HSLAS-F Gr 50 ⑥			
arm Struts and Gusset Plates (4)	ASTM A36, A572 Gr 50 6, or A588			
Misc.	ASTM designations as noted			



€ ½" Dia. Holes-

Smooth

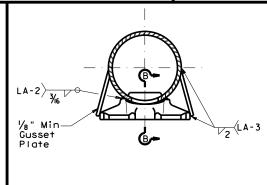
1/4"

2" Dia. Approx.

13NC Tapped

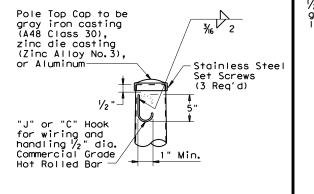
Threads



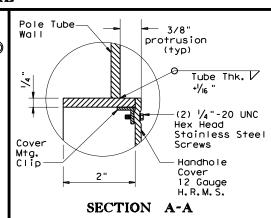


SECTION C-C

#### SIMPLEX ATTACHMENT DETAIL



1/2"-13 UNC grounding lug Note (1) 10" Typ) **ELEVATION** 



SHEET 3 OF 4



Traffic Safety Division Standard

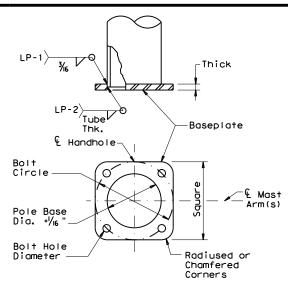
#### ROADWAY ILLUMINATION **POLES**

RIP(3) - 19

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12-19	WACO		BELL			127

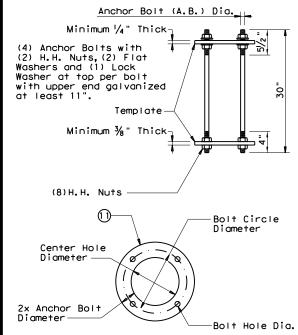
POLE TOP

**HANDHOLE** 



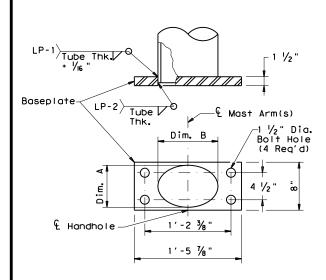
#### SHOE BASE BASEPLATE

SHOE BASE BASEPLATE TABLE								
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	BOLT HOLE DIAMETER				
20' - 39'	13"	13"	1 1/4"	1 1/4"				
40′	15"	15"	1 1/4"	1 1/2 "				
50′	15"	15"	1 ½"	1 ½"				



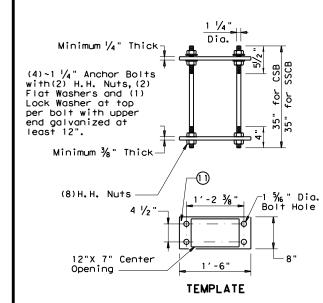
#### SHOE BASE ANCHOR BOLT ASSEMBLY

SHOE BASE ANCHOR BOLT ASSEMBLY TABLE						
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER		
20′-39′	1 "	13"	11"	1 1/16 "		
40′ -50′	1 1/4"	15"	12 ½"	1 % "		



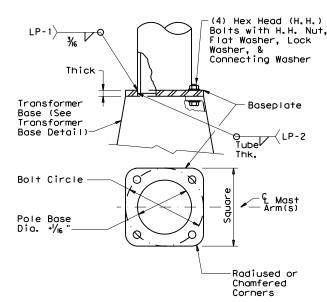
#### CONCRETE TRAFFIC BARRIER BASE BASEPLATE

CONCRETE TRAFFIC BARRIER BASE BASEPLATE TABLE					
MOUNTING HEIGHTS (noming)	POLE DIA.	DIM. A	DIM. B		
28' - 38'	9"	7"± 1/4"	10"± 1/4"		
48′	10 ½"	7"± 1/4"	13"± 1/4"		



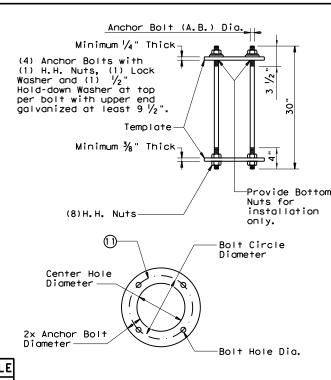
#### CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY

TRANSFORM	IER BA	SE ANCHO	OR BOLT AS	SEMBLY TABL
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20' - 39'	1 "	14"	12"	1 1/16 "
40' - 50'	1 1/4"	17 1/4"	14 ¾"	1 1/6"

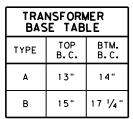


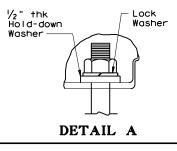
#### TRANSFORMER BASE BASEPLATE

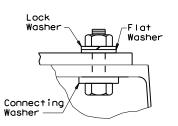
	TRANSFORMER BASE BASEPLATE TABLE						
MOUNTING HEIGHTS (noming)	BOLT CIRCLE	SQUARE	THICK	CONNECTING BOLT DIA.	BOLT HOLE DIAMETER	TRANSFOMER BASE TYPE	
20' - 39'	13"	13"	1 1/4"	1"	1 1/4"	A	
40′	15"	15"	1 1/4"	1 1/4"	1 1/2"	В	
50′	15"	15"	1 1/2"	1 1/4"	1 ½"	В	



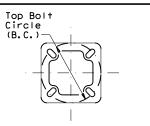
TRANSFORMER BASE ANCHOR BOLT ASSEMBLY



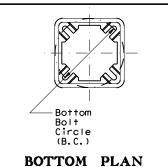








#### TOP PLAN



#### NOTES:

- (1) Anchor Bolt Templates do not need to be aalvanized.
- 🔞 Pole diameter before ovalized.

manufacturer for testing.

**GENERAL NOTES:** 

the design moment.

the larger mounting height.

1. For mounting heights between those shown in the table, use the values in the table for

2. All breakaway bases shall meet the breakaway

Specifications for Structural Supports for

FHWA-approved methods. All bases shall have

been structurally tested to resist 150% of

3. Transformer bases shall be cast from aluminum, ASTM B108 or B26 Alloy 356.0-T6, or other

material approved by the Engineer. Four  $\ensuremath{\mathsf{Hex}}$ 

Head (H.H.) bolts with four H.H. nuts, four

and hold-down washers as recommended by the

Bolts shall be ASTM A325 or approved equal.

4. Bases shall be stamped, incised or by other approved permanent means, marked to show

Nuts shall be ASTM A563 grade DH galvanized.

fabricator's name or logo, and model number.

5. Doors for transformer bases shall be made of plastic, fiberglass or other non-metallic material approved by the Engineer and shall

be attached with stainless steel screws or bolts. Transformer bases shall be cleaned

Certification by the manufacturer of heat

by grit blast cleaning after heat treatment.

treatment shall be furnished with transformer bases. The certification shall show the metal

alloy and temper and that the base meets those requirements, chemical and physical. The

certification shall also show the material ASTM

specification. Transformer bases shall be cast with a removable tab bar for material testing. Some bars may have been removed by the

Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door.

lock washers, four flat washers, and connecting

manufacturer, galvanized to ASTM A153 Class C

or D, or B695 Class 50, shall be provided with

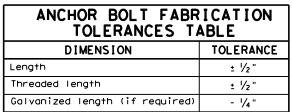
each transformer base for connecting the pole.

6th Edition (2013) and Interim Revisions

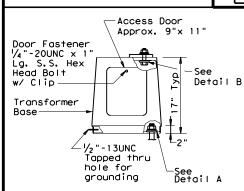
thereto, and shall have been tested by

Highway Signs, Luminaires and Traffic Signals,

requirements of the AASHTO Standard

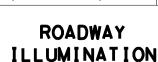


Texas Department of Transportation



**ELEVATION** 

TRANSFORMER BASE **DETAILS** 



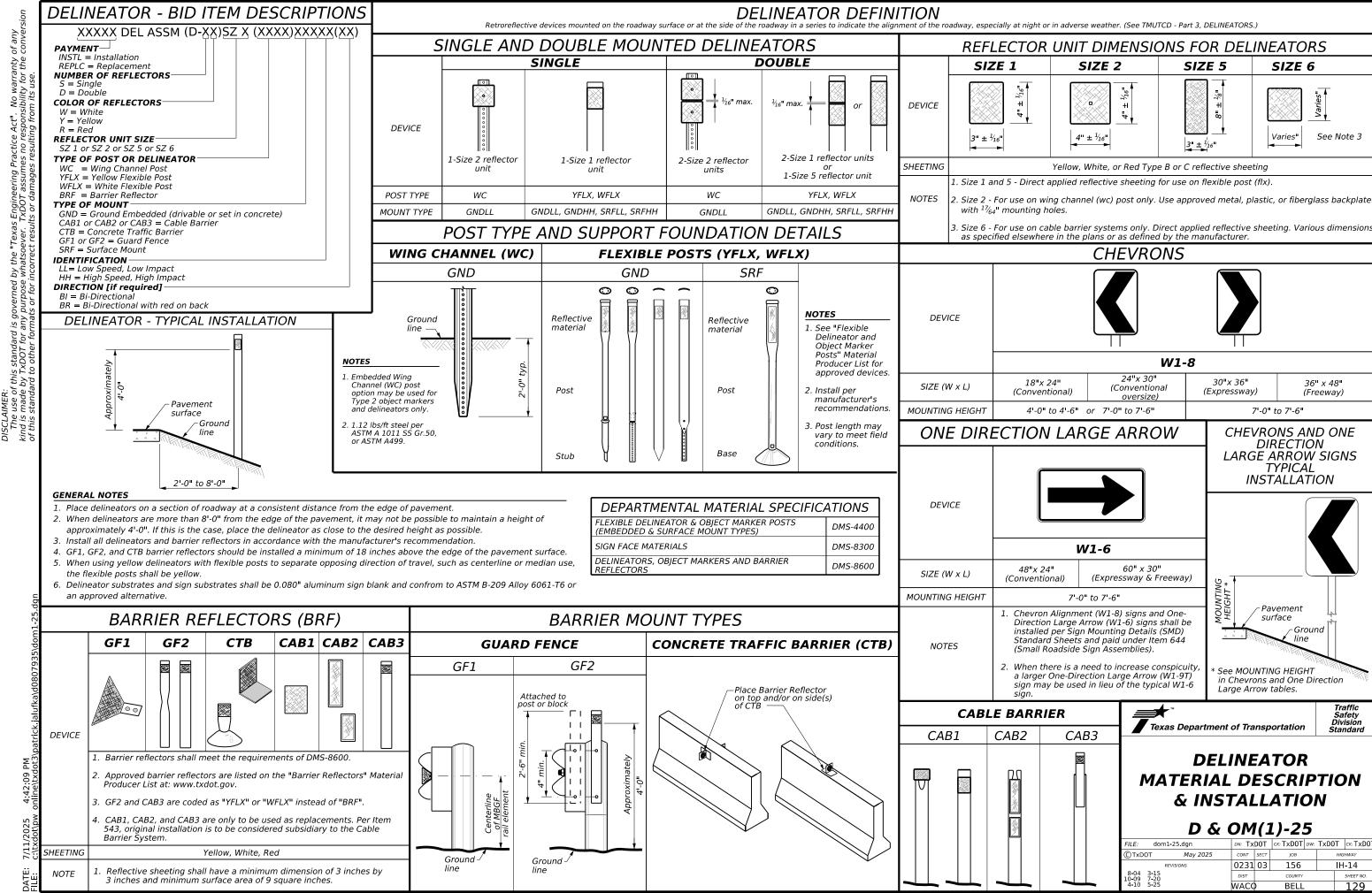
SHEET 4 OF 4

Traffic Safety Division Standard

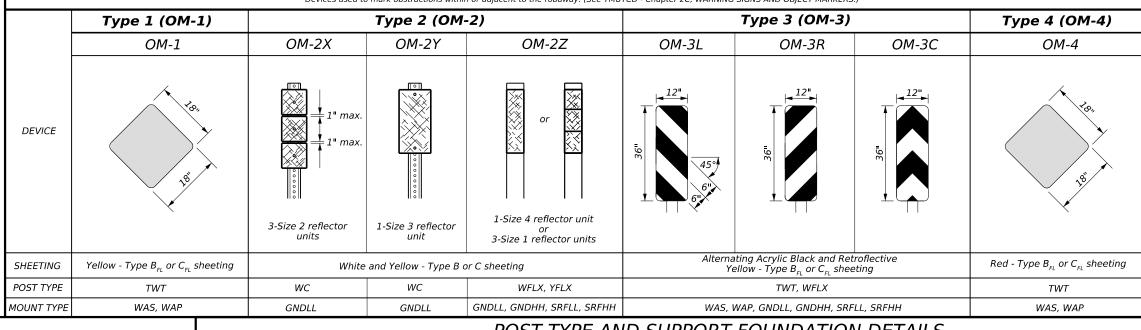
**POLES** 

RIP(4)-19

ı	FILE: rip-19.dgn	DN:		CK:	DW:		CK:
	© TxDOT January 2007	CONT	SECT	JOB		нІ	CHWAY
ı	REVISIONS	0231	03	156		ΙH	I-14
ı	7-17 12-19	DIST		COUNTY			SHEET NO.
	12 19	WACO		BELL			128



#### OBJECT MARKER DEFINITION Devices used to mark obstructions within or adjacent to the roadway. (See TMUTCD - Chapter 2C, WARNING SIGNS AND OBJECT MARKERS.)



#### REFLECTOR UNIT DIMENSIONS FOR OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE	3" ± ½6"	4" ± ½6*	6" ± ½", 12 1 12 11 12 12 12 12 12 12 12 12 12 1	12" ± 1/8"

NOTE

Ground-

Pavement -

surface

1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx).

Ground-

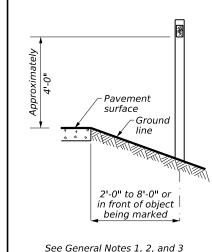
line

2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic, or fiberglass backplate with 17/64" mounting holes.

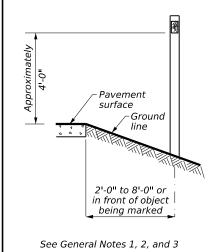
#### TYPES 1, 3, AND 4 OBJECT MARKERS TYPICAL INSTALLATION

Travel

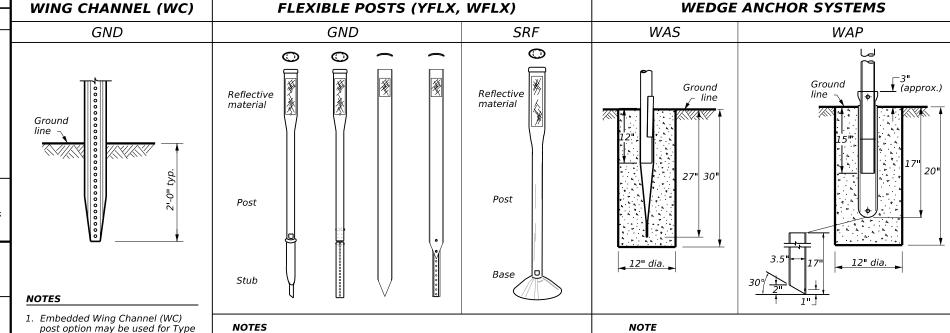
Lane



#### TYPE 2 OBJECT MARKERS TYPICAL INSTALLATION



#### POST TYPE AND SUPPORT FOUNDATION DETAILS



#### **GENERAL NOTES**

2 object markers and delineators

2. 1.12 lbs/ft steel per ASTM A 1011

SS Gr. 50, or ASTM A499.

1. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.

2. Install per manufacturer's recommendations.

3. Post length may vary to meet field conditions

- 2. When Type 2 object markers are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4 -0". If this is the case, place the object marker as close to the recommended height as possible
- 3. Install all object markers in accordance with the manufacturer's recommendation.
- 4. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.
- 5. Object marker substrates shall be 0.080" aluminum sign blank and conform to ASTM B-209 Alloy 6061-T6 or an approved alternative.

1. See "Flexible Delineator and Object Marker Posts" Material Producer

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



1. Install per manufacturer's recommendations.

Traffic Safety Division Standard

#### **OBJECT MARKER MATERIAL DESCRIPTION** & INSTALLATION

D & OM(2)-25

FILE: dom2-25.dgn	DN: Tx	D0T	ск: TxD0T	DW:	TxD0T	ск: TxD0T
©TxDOT May 2025	CONT	SECT	JOB		HIG	5HWAY
REVISIONS	0231	03	156		II	I-14
8-04 5-25 3-15	DIST		COUNTY			SHEET NO.
7-20	WACO		BELL			130

	s Engineering Practice Act". No warranty of any	TxDOT assumes no responsibility for the conversion	Its or damages resulting from its use.	
DISCLAIMEN:	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.	

	TOR AND OBJECT M. ICATION AND SPACE		M
CONDITION	REQUIRED TREATMENT	MINIMUM SPACING	Amount by whicl Advisory Speed i less than Posted Speed
Fwy./Exp. Tangent	RPMs	See PM and FPM standard sheets	5 MPH
Fwy./Exp. Curve	Single delineators on right side	See delineator spacing table	10 MPH 15 MPH
		100 feet on ramp tangents	13 /// //
Fwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 4a on D&OM(4))	Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)	
Acceleration/ Deceleration Lane	Double delineators (see Detail 4a on D&OM(4))	100 feet (See Detail 4a on D & OM(4))	20 MFTT
Truck Escape Ramp	Single red delineators on both sides	50 feet	25 MPH or more
Bridge Rail (steel or concrete) and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators	
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max	NOTE A roadway is cor
Cable Barrier	Reflectors matching the color of the edge line  Bi-Directional Delineators when within clearzone	Every 5th cable barrier post (up to 100'max)	present. A roadv markings.
Cable Barrier Terminus / Impact Head	Object marker on end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end	
Guard Rail Terminus / Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	See D & OM(6)  Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end	Straightawa Straightawa (Approachin (Approachin 2A 3D=
		See D & OM(5) and D & OM(6)	DE N
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)	
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM(VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end	
Culverts without	Type 2 Object Markers	See D & OM(5) See Detail 2	<b>NOTE</b> ONE DIR
MBGF	Double yellow delineators	on D & OM(4)  See Detail 1	located a extensio
Pavement Narrowing (lane merge) on Freeways/Expressway	and RPMs  Single delineators adjacent to affected lane for full length of transition	on D & OM(4)  100 feet	approaci

#### MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

mount by which dvisory Speed is	Turn/Curve Advisory Speed				
ess than Posted Speed	Turn (30 MPH or less)	Curve (35 MPH or more)			
MPH	RPMs and Pavement Markings				
) MPH	<ul><li>Advance Horizontal Alignment War</li><li>RPMs and Pavement Markings</li></ul>	ning Sign with Advisory Speed Plaque; and			
5 MPH	<ul> <li>Advance Horizontal Alignment Warning Sign with Advisory Speed Plaque; and</li> </ul>	<ul> <li>Advance Horizontal Alignment Warning Sign with Advisory Speed Plaque; and</li> </ul>			
	RPMs, Pavement Markings, and     Delineators: or	RPMs, Pavement Markings, and Chevrons: or			

- - RPMs, Pavement Markings, and One Direction Large Arrow sign(s) where geometric conditions or roadside obstacles prevent the installation of chevrons
- Advance Horizontal Alignment Warning Sign with Advisory Speed Plaque; and • RPMs, Pavement Markings, and Chevrons; or • RPMs, Pavement Markings, and One Direction Large Arrow sign(s) where geometric conditions or roadside obstacles prevent the installation of chevrons
- Advance Horizontal Alignment Warning Sign with Advisory Speed Plague; and

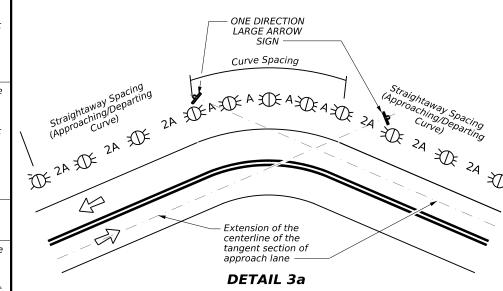
RPMs, Pavement Markings, and

One Direction Large Arrow sign(s)

- RPMs, Pavement Markings, and Chevrons; or
- RPMs, Pavement Markings, and One Direction Large Arrow sign(s) where geometric conditions or roadside obstacles prevent the installation of chevrons
- Advance Horizontal Alignment Warning Sign with Advisory Speed Plague; and
- RPMs, Pavement Markings, and Chevrons

roadway is considered to have pavement markings when either a center line, edge lines, or both are resent. A roadway is considered to have RPMs when they are used to supplement centerline pavement

#### SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



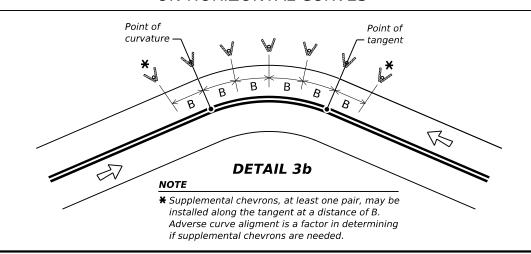
ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

**LEGEND**  $\pi$ Delineator  $\stackrel{\wedge}{\bowtie}$ Bi-directional Delineator

#### **GENERAL NOTES**

- 1. Unless otherwise indicated, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
- 2. Barrier reflectors may be used to replace required delineators.
- 3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications.

#### SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



#### **DELINEATOR AND CHEVRON SPACING**

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

			FEET	
Degree of Curve	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		Α	2A	В
1	5730	225	450	
2	2865	160	320	
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

#### **DELINEATOR AND CHEVRON SPACING**

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

		FEET				
Advisory Speed (MPH)	Spacing in Curve	in in				
	Α	2A	В			
65	130	260	200			
60	110	220	160			
<i>55</i>	100	200	160			
50	85	170	160			
45	<i>75</i>	150	120			
40	70	140	120			
35	60	120	120			
30	55	110	80			
25	50	100	80			
20	40	80	80			
15	35	70	40			

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed

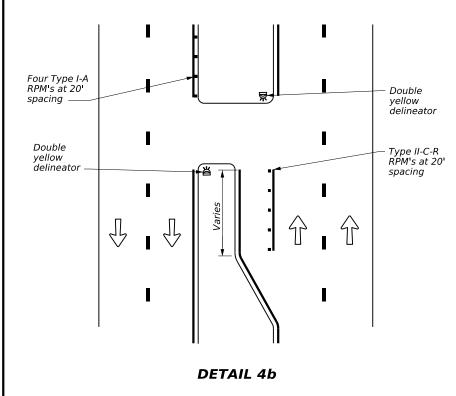


Traffic Safety Division Standard

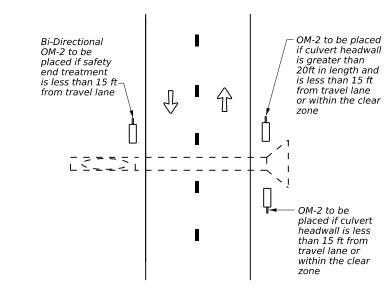
**DELINEATOR & OBJECT MARKER PLACEMENT DETAILS APPLICATION & SPACING** D & OM(3)-25

FILE: dom3-25.c	lgn	DN: Tx	D0T	ск: TxD0T	DW:	TxD0T	ск: TxD0T
©TxDOT	May 2025	CONT	SECT	JOB		HIGHWAY	
REVISIONS		0231	03	156		IH	I-14
8-04 7-20 3-15 5-25		DIST		COUNTY			SHEET NO.
8-15		WACO		BELL			131

#### CROSSOVERS



#### FOR CULVERTS WITHOUT METAL BEAM GUARD FENCE (MBGF)

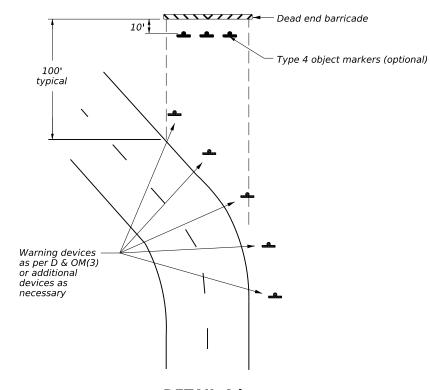


#### **DETAIL 4c**

#### NOTES

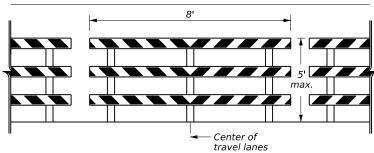
- This detail applies for all existing culverts without MBGF, for application of OMs. New bridge-class culverts require safety end treatments, MBGF, or bridge railing. See the TxDOT Bridge Railing Manual.
- 2. For culverts with MBGF, see Sheet 5.

#### TYPICAL APPLICATION OF DEAD END BARRICADE



#### DETAIL 4d

#### TYPICAL DEAD END BARRICADE INSTALLATION



#### **DETAIL 4e**

#### NOTES

- 1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
- 2. Barricade striping is red and white sloping toward the center of the roadway.
- 3. Type 3 Barricade Supports should be anchored to soil or pavement as described in the Compliant Work Zone Traffic Control Devices list (CWZTCD).

	LEGEND
$\mathbf{x}$	Delineator
₩	Double delineator
	OM-2
-	Sign
-	Raised Pavement Marker (RPM)
	Traffic Flow



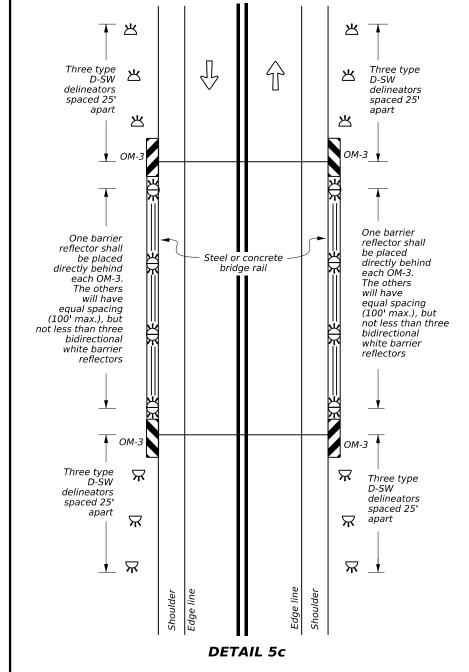
Traffic Safety Division Standard

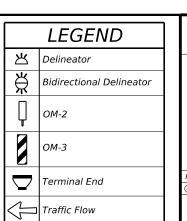
# DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

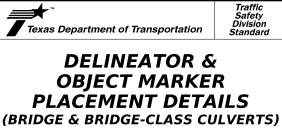
D & OM(4)-25

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REVISIONS		0231	03	156		IH	-14	
04 15	5-25		DIST		COUNTY			SHEET NO.
-20			WACO		BELL			132

#### TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL







D & OM(5)-25

DN: TXDOT CK: TXDOT DW: TXDOT CK: TXDO FILE: dom5-25.dgn C) TxDOT May 2025 0231 03 156 IH-14 8-15 7-20 5-25 133

See D and OM definitions on D&OM(1) and D&OM(2), respectively

134

20F

**DETAIL 7a** 

\*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers

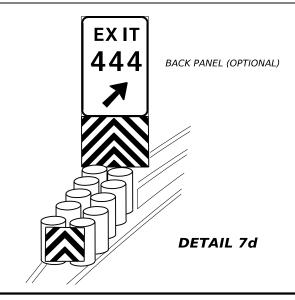
**DETAIL 7b** 

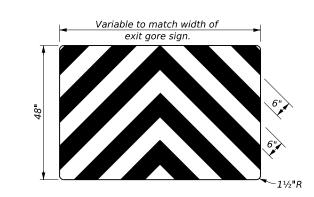
TYPICAL ATTENUATOR INSTALLATION

**DETAIL 7e** 

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

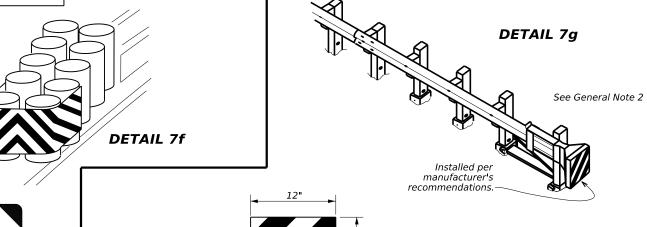
#### TYPICAL APPLICATION OF OPTIONAL BACK PANEL

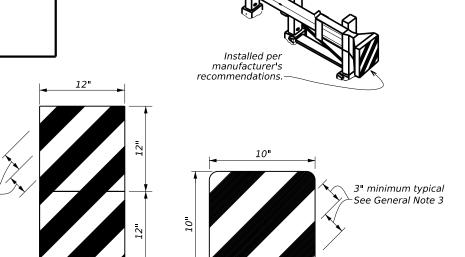


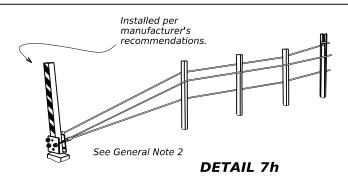


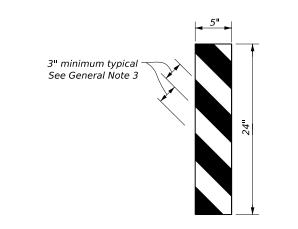
#### GUARDRAIL END TREATMENT

#### CABLE BARRIER END TREATMENT









#### **GENERAL NOTES**

3" minimum typical

See General Note 3

**DETAIL 7c** 

\* Adjust to fit attenuator per manufacturer's

or as directed by

- 1. Markers [with the appearance of a Type 3 object marker (OM-3)] shall conform to the TMUTCD and meet the color and reflectivity requirement of the Departmental Material Specification (DMS-8300). Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.
- 2. Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail and cable barrier end treatments, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts, or tears. A radius at the corners is not required for direct applied sheeting.
- 3. The combined width of alternating black and yellow stripes is typically 6". Marker size may be reduced to fit smaller devices. Markers smaller than 3ft<sup>2</sup> may have reduced width stripes of a minimum of  $2\frac{1}{4}$ " (combined  $4\frac{1}{2}$ " width).
- 4. Pop rivets, screws, or nuts and bolts may be used to attach markers and reflectors. Holes, slots, or other openings may be cut or drilled through markers to allow cable or other attachments.
- 5. Marker or object marker placed on or at nose of attenuator is subsidiary to the attenuator.



#### **OBJECT MARKER** FOR VEHICLE IMPACT **ATTENUATORS**

D & OM(VIA)-25

FILE:	don	nvia-25.dgn	DN: TX	D0T	ск: TxD0T	DW:	TxD01	ск: TxD0T
©TxDOT May 2025		CONT	SECT	JOB		HIGHWAY		
REVISIONS		0231	03	156			IH-14	
12-89 4-92	4-98 8-04	7-20 5-25	DIST		COUNTY			SHEET NO.
8-95 3-15			WACC		BELL			135

NOTES recommendation, or as directed by the Engineer.

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

#### STORMWATER POLLUTION PRVENTION 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 projects with less than one acre of soil disturbing activity and that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

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):

0231-03-156

#### **1.2 PROJECT LIMITS:**

From: Jasper Drive

To: Rosewood Dr

#### 1.3 PROJECT COORDINATES:

BEGIN: (Lat) 31.100646,

(Long) -97.740397

END: (Lat) 31.075119, (Long) -97.685105

#### 1.4 TOTAL PROJECT AREA (Acres): 185

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.45

#### 1.6 NATURE OF CONSTRUCTION ACTIVITY:

HIGH MAST ILLUMINATION INSTALLATION

#### 1.7 MAJOR SOIL TYPES:

Soil Type	Description
SaB	San Saba Clay
PrB	Purves Silty Clay
DeB	Denton Silty 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

X No PSLs planned for construction

Туре	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

Excavate and prepare subgrade for proposed pavement

Grading operations, excavation, and embankment

widenina

Remove existing culverts, safety end treatments (SETs) X Remove existing metal beam guard fence (MBGF), bridge rail

Install proposed pavement per plans

Install culverts, culvert extensions, SETs

X 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:

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

Other:

X Discharges from concrete washout activities, runoff from concrete cutting activities, and other concrete related activities

Utner:	
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
South Nolan Creek	Brazos River (Segment 1218B)
Little Nolan Creek	Brazos River (Segment 1218C)
Trimmer Creek	Brazos River (Segment 1216A)

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

#### 1.12 ROLES AND RESPONSIBILITIES: TxDOT

X Development of plans and specifications

X Perform SWP3 inspections

X Maintain SWP3 records and update to reflect daily operations

Other:			

#### 1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

X Day To Day Operational Control

X Maintain schedule of major construction activities

X Install, maintain and modify BMPs

□ Other:			
□ Other			

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



\* July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.		PROJECT NO.				
					136	
STATE		STATE DIST.	C	OUNTY		
TEXAS	5	WACO	BELL			
CONT.		SECT.	JOB	HIGHWAY NO.		
0231		03	156	IH-14		

#### STORMWATER POLLUTION PRVENTION PLAN (SWP3):

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

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

2.1 E	ROSION CONTROL AND SOIL
	STABILIZATION BMPs:
T / P	
	Protection of Existing Vegetation
	Vegetated Buffer Zones
	Soil Retention Blankets
	Geotextiles Mulching/ Hydromulching
	Soil Surface Treatments
	Temporary Seeding
	Permanent Planting, Sodding or Seeding
	Biodegradable Erosion Control Logs
	Rock Filter Dams/ Rock Check Dams
	Vertical Tracking
	Interceptor Swale
	Riprap
	Diversion Dike
	Temporary Pipe Slope Drain
	Embankment for Erosion Control Paved Flumes
	Other:
	Other:
	Other:
	Other:
2.2 S	EDIMENT CONTROL BMPs:
T / P	
	Biodegradable Erosion Control Logs
	Dewatering Controls
	Inlet Protection
	Rock Filter Dams/ Rock Check Dams
	Sandbag Berms Sediment Control Fence
	Stabilized Construction Exit
	Floating Turbidity Barrier
	Vegetated Buffer Zones
	Vegetated Buller Zones Vegetated Filter Strips
	Other:
	Other:
	Other:
	Other:

located in Attachment 1.2 of this SWP3

#### 2.3 PERMANENT CONTROLS:

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

Turne	Stationing			
Type	From	То		
Refer to the Environmental Layo ocated in Attachment 1.2 of this		Layout Sh		

2.4 OFFSITE VEHICLE TRACKING CONTROLS:
X Excess dirt/mud on road removed daily
☐ Haul roads dampened for dust control
☐ Loaded haul trucks to be covered with tarpaulin
□ Stabilized construction exit
□ Daily street sweeping
□ Other:
□ Other:
□ Other:
-
□ Other:

#### 2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- X Concrete and Materials Waste Management
- X Debris and Trash Management
- Dust Control

☐ Other:

X Sanitary Facilities

□ Other: _		
□ Other: _		
☐ Other: _		

#### **2.6 VEGETATED BUFFER ZONES:**

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

Tymo	Stationing					
Туре	From	То				

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

#### 2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

#### 2.8 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

#### 2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

#### 2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

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



\* July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.		PROJECT NO.						
STATE		STATE DIST.	COUNTY					
TEXAS	5	WACO	l	BELL				
CONT.	CONT. SECT. JOB HIGHWAY NO.				٧0.			
0231 03		156	IH-14					

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater	•		1	Defeat to Tubot Standard St. 151	anting to the amount bistories the		lies to all pro			
required for projects with 1 disturbed soil must protect f				·	cations in the event historical issues or and during construction. Upon discovery of	· · ·			(the Act) for personnel who will be we meetings prior to beginning construct	-
Item 506.	or erostori unu seutmentati	ion in accordance with		archeological artifacts (bones,	burnt rock, flint, pottery, etc.) cease		=	-	meetings prior to beginning construct s in the workplace. Ensure that all wo	
List MS4 Operator(s) that may	y receive discharaes from	this project.		work in the immediate area and o	contact the Engineer immediately.	_	' <del>'</del>		ent appropriate for any hazardous mater	
They may need to be notified	·			☐ No Action Required	X Required Action			-	Data Sheets (MSDS) for all hazardous p	
1. City of Killeen MS4				☐ NO ACTION REQUIRED	A REQUITED ACTION				out are not limited to the following c s, chemical additives, fuels and concr	-
i. City of Killeen was				Action No.		7	• •	-	s, chemical additives, tuels and concr d storage, off bare ground and covered	-
2.								-	n product labelling as required by the	•
No Action Required	Required Action			1. SEE STATEMENT ABOVE		• • • • • • • • • • • • • • • • • • •			oill response materials, as indicated	
	_								mitigate the spill as indicated in the and contact the District Spill Coordin	•
Action No.							·	•	ponsible for the proper containment an	
<ol> <li>Prevent stormwater polluti accordance with TPDES Perm</li> </ol>		and sedimentation in				of all product spi				
2. Comply with the SW3P and r	revise when necessary to co	ontrol pollution or				Contact the Engine			wing are detected: identified as normal)	
required by the Engineer.	•	•	l			* Trash piles,	drums, canist	er, barre		
<ol> <li>Post Construction Site Not the site, accessible to th</li> </ol>			10.	VEGETATION RESOURCES		* Undesirable * Evidence of			substances	
4. Project will disturb more	•			Preserve native vegetation to the	·	Does the proje	ct involve any	bridge c	lass structure rehabilitation or	
					ruction Specification Requirements Specs 167 52 in order to comply with requirements for	replacements (	-	tructures	not including box culverts)?	
					ndscaping, and tree/brush removal commitmen	s. Yes	No			
II. WORK IN OR NEAR STREAM		ETLANDS CLEAN WATER		☐ No Action Required	X Required Action					
ACT SECTIONS 401 AND 4	104			And the Ma				tos inspe	ction positive (is asbestos present)?	
USACE Permit required for f	<i>5. 5 5.</i>	,		Action No.		☐ Yes	∑ No			
water bodies, rivers, creeks	,			1. SEE STATEMENT ABOVE					SHS licensed asbestos consultant to as	
The Contractor must adhere the following permit(s):	to all of the terms and co	anditions associated with							itigation procedures, and perform mand ation form to DSHS must be postmarked	-
_						15 working day	-			G1 16091
No Permit Required						If "No" thee	Typot to oftill		d to potify DSUS 15 working days orion	
Nationwide Permit 14 - PC	CN not Required (less than	1/10th acre waters or				scheduled demo		required	d to notify DSHS 15 working days prior	то апу
wetlands affected)						In either case,	, the Contracto	or is resp	ponsible for providing the date(s) for	· abatement
Nationwide Permit 14 - PC	CN Required (1/10 to <1/2 o	acre, 1/3 in tidal waters)	lv.	FEDERAL LISTED. PROPOSED	THREATENED, ENDANGERED SPECIES,				eful coordination between the Engineer	
🗌 Individual 404 Permit Req	quired				ISTED SPECIES, CANDIDATE SPECIES	asbestos consu	Itant in order	to minim	ize construction delays and subsequent	claims.
☐ Other Nationwide Permit R	Required: NWP#			AND MIGRATORY BIRDS.		1	_		e hazardous materials or contamination	
Required Actions: List waters	of the US permit applies	to. location in project			V Post to the total	on site. Hazar	dous Materials	s or Conto	amination Issues Specific to this Proj	ect:
and check Best Management Pro		•		No Action Required	X Required Action	No Action	n Required		Required Action	
and post-project TSS.				Action No.		Action No.				
1,				1. Comply with Migratory Bird T	reaty Act (MBTA)					
2.				2 CEE CIATEMENT DELOW		1.				
3.				2. SEE STATEMENT BELOW						
4.										
5.						VII OTHER ENV	I DOMATAL TAL	I C C LIF C		
6.						VII. OTHER ENV				
7.						(includes re	egional issues	such as E	Edwards Aquifer District, etc.)	
8.						X No Actio	n Required		Required Action	
The elevation of the ordinary to be performed in the water:						<u> </u>		_		
permit can be found on the Bi	_	ase of a nationwide				Action No.				
						1.				
Best Management Practice	s:		I f	ony of the listed species are ch	served, cease work in the immediate area,	2.				
Erosion S	Sedimentation	Post-Construction TSS		•	nd contact the Engineer immediately. The			_		
☐ Temporary Vegetation	Silt Fence	☐ Vegetative Filter Strips	worl	k may not remove active nests fr	om bridges and other structures during	3.			*	Design Division
	Rock Berm	Retention/Irrigation Systems		ting season of the birds associa discovered, cease work in the i	ted with the nests. If caves or sinkholes				Texas Department of Transportation	Standard
	∏ Triangular Filter Dike	Extended Detention Basin		ineer immediately.	and the second s			<u> </u>		
_		=				$\dashv$			ENVIRONMENTAL PER	≀MITS,
	Sand Bag Berm	Constructed Wetlands		LIST OF AB	BREVIATIONS				ISSUES AND COMMIT	MENTS
	Straw Bale Dike	☐ Wet Basin		est Management Practice	SPCC: Spill Prevention Control and Countermeasu	e			1330E3 AND COMMIT	MENI2
	Brush Berms	☐ Erosion Control Compost		construction General Permit exas Department of State Health Service	SW3P: Storm Water Pollution Prevention Plan es PCN: Pre-Construction Notification				ED I C	
	Erosion Control Compost	Mulch Filter Berm and Socks	FHWA: F	ederal Highway Administration Jemorandum of Agreement	PSL: Project Specific Location TCEQ: Texas Cammission on Environmental Quality				EPIC	
Mulch Filter Berm and Socks	<u> </u>	_	MOU: M	lemorandum of Understanding	TPDES: Texas Pollutant Discharge Elimination Sys	em			FILE: epic.dgn   DN:TxDOT   CK:RG   DW:	v: VP CK: AR
Compost Filter Berm and Socks [				lunicipal Separate Stormwater Sewer Sys: ligratory Bird Treaty Act	tem TPWD: Texas Parks and Wildlife Department TxDOT: Texas Department of Transportation				© TxDOT: February 2015 CONT SECT JOB	HIGHWAY
-	_		NOT: N	lotice of Termination lationwide Permit	T&E: Threatened and Endangered Species USACE: U.S. Army Corps of Engineers				REVISIONS 0231 03 155 12-12-2011 (DS) 07-14 ADDED NOTE SECTION IV. DIST COUNTY	
	Sediment Basins	Grassy Swales		lotice of Intent	USFWS: U.S. Fish and Wildlife Service				DIST COUNTY D1-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.  WACO BELL	SHEET NO.
			-			-				

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

III. CULTURAL RESOURCES

- 1. Prior to TxDOT allowing the Contractor to start construction, the Contractor will provide the required storm water and 404 permit documentation and support activities, including but not limited to the following:
  - Provide a list of all chemicals, construction and waste products that will be generated, stored or brought upon TxDOT ROW. The list includes expected construction debris, sanitary wastes, construction chemicals and petroleum products used or generated by the Contractor and sub-contractors. Along with the list, the Contractor will supply a spill prevention plan and clean up procedures that will include each of these chemical products or generated waste.
  - Provide in the construction schedule the necessary line items that will comply with the schedule and planning requirements of the storm water permit.
  - Post the IxDOI storm water permit and any Contractor permits, per permit requirements.
  - Provide copies of storm water permits for Contractor PSL(s). As new PSL(s) may be obtained for the project, provide copies of new or amended permits to TxDOT. The Contractor will not disturb soil without the proper permits.
  - Provide scale drawings of off ROW PSL's within one mile of the project, for field offices, borrow sources, plant sites or other uses,
  - Provide permit information on any Contractor batch plants or concrete crushing plants to be located at a Contractor PSL(s) within one mile of the project limits or boundaries. Copies of the air and water permits are to be provided to TxDOT before materials will be used on the project. No asphalt or concrete batch plants or concrete crushing plants will be located on TxDOT ROW.
  - Provide a letter indicating a Contractor Responsible Person for environmental compliance (CRP) for the project, and maintain a CRP throughout the project duration,
  - Provide all environmental documentation including certification of compliance and EMS training documents/certificates prior to starting work. The Contractor is to provide daily BMP inspection reports that document all field BMPs needing repair or replacement. The Contractor is to clearly document specific BMPs needing repair and location each work day.

    The Contractor is encouraged to be proactive in fixing BMPs without TxDOT direction.
  - Provide documentation required for Waters of the US, Note =3 and submittals for Item 496 bridge removal. Bridge removal methods submitted will follow all Waters of the US note requirements. The Contractor is not to start construction within the Ordinary High Water Marks of any stream until receiving approval for stream channel construction methods from TxDOT.
  - Provide a written procedure for managing all chemicals and construction items placed in vertical containment structures. Also, provide methods to be used for the treatment, disposal, collection or release of storm water.
  - Provide an estimated date by letter, for the submittal of marked up bridge drawings, indicating cut locations for any structural steel requiring cutting or torching of steel, coated with lead containing paints.
- 2. Place and maintain trash cans and portable sanitary facilities at locations where there is active construction. Worker generated trash and construction debris will be kept from being transported by storm water and will be collected daily from the ground and routinely hauled from the work area.
- 3. Contractor will provide TxDOT copies of all correspondence with MS4s, TCEO, EPA, DSHS and Corps of Engineers regarding activities on this project.
- 4. Contractor to conduct storm water inspections and develop SWPPP documents to support Contractor permits obtained for the project including PSL(s).
- 5. Contractor will maintain written documentation of locations of all portable sanitary facilities. The Contractor is required to document the location and disposition of all spills and cleanups from portable sanitary facilities.
- 6. Contractor will not store chemicals on TxDOT ROW, unless chemicals are stored following all environmental and safety regulations. Fuels for construction equipment will not be stored on TxDOT ROW.
- 7. The Contractor will store fuels and bulk chemicals on Contractor PSL(s) using a secondary containment method, such as double lined tanks and/or free standing containment reservoirs made of plastic or steel designed to hold bulk chemicals or drums.
- 8. The Contractor will not remove sediment controls without the prior approval of TxDOT, except for a sediment control that may back up water and cause safety or traffic problems.

SCALE = NTS SHEET 1 OF 10

Texas Department of Transportation

Waco District Standard

TYPICAL APPLICATIONS
FOR
BEST MANAGEMENT
PRACTICES

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- 9. Any sediment controls removed by the Contractor must be re-installed before the next rainfall event or by the end of day, as approved in advance,
- 10. Vegetative buffer strips may be used in place of temporary sediment controls such as silt fences and rock filter dams. The amount of disturbed soil area will be limited to 1/3 of an acre or less for a minimum of 50 feet of grassed ditch and 2/3 of an acre of disturbed soil for a minimum of 100 feet of grassed ditch.
- 11. Construction equipment found to be leaking oil, fuel or coolant will be immediately stopped, the leaking fluid collected and the equipment fixed. Equipment continuing to leak will be removed from the project at no cost to TxDOT. Leaking fluids from equipment will be collected and removed from the project or PSL.
- 12. Earth berms or mounds typically used to stockpile topsoil and used in place of boundary silt fence will be seeded upon being constructed. Long term use of earth berms or mounds will not be continued without establishing grass on the control.
- 13. The Contractor will inform TxDOT of new areas where soil will be disturbed to facilitate planning for new sediment controls. Areas of vegetated soil will not be disturbed by the Contractor, unless adequate sediment controls can be installed before the next rainfall event. The Contractor will assist TxDOT in keeping an accurate set of working SWPPP drawings that show the locations of all temporary sediment and erosion controls.
- 14. The Contractor will maintain an adequate amount of temporary sediment controls on hand at the field office or project staging area for critical SWPPP maintenance, including silt fence (minimum of 200 feet) and rock / fabric for rock filter dams (minimum for 100 feet of Type III dams).

The requirement for BMP rock quantities on hand is waived for small projects for on and off system bridge installations. The Contractor having a BMP Subcontractor does not eliminate the requirement for the Contractor to have the required silt fence and rock on hand, typically stored at the Contractor PSL.

- 15. Failure of a sub-contractor to complete storm water work on time will require the Contractor to start storm water sediment control work immediately and complete the work with high priority, or be subject to stop work on the entire project.
- 16. Earth materials on roads as a result of soil tracking will not be allowed to be transported off ROW in storm water. Soil or rock material found on roadways deposited from Contractor equipment will be removed daily.
- 17. Unless approved, completed concrete curb inlets will not be blocked by sediment controls. The contractor will frequently sweep the completed or partially completed roadway to keep sediment out of drainage pipes.
- 18. The Contractor will be responsible for proper dust control and will route construction traffic in a manner that minimizes dust generation.
- 19. Water for dust control will contain no pollutants, but may be non-potable from upland stock ponds. No quantity of water to be used for construction purposes may be taken from a 404 stream, prior to the proper authorizations or permits being obtained by the Contractor.
- 20. Contractor is to direct workers and sub-contractors to use portable sanitary facilities provided by the Contractor and not to trespass off ROW.
- 21. Contractor will provide written verification to TxDOT that earth borrow pits and disposal sources meet environmental and regulatory requirements, prior to use. Excavations will meet all OSHA requirements and the current safety guidelines established for TxDOT Quarries and Pits.
- 22. Boundary silt fences that are terminated down slope, with one end being at the lowest elevation, will be installed with an L hook to contain sediment. Boundary silt fences that are installed on flat ground will have L-hooks on both ends.
- 23. Rock filter dams across ditches will be constructed where the rock filter dam ends are embedded within the ditch side slopes and ditch bottom. The top center elevation of the rock filter dam will be at least 6 inches lower than the elevations on the rock filter dam ends.
- 24. Silt fence will be constructed in a U or V pattern across ditch lines and up the ditch side slope to keep storm water from flowing around the ends of the silt fence. Small silt fences that do not adequately span the ditch and allows storm water around the end(s) will not be used. Where there is adequate space, large U pattern silt fences are preferred to facilitate sediment collection and sediment removal with equipment.
- 25. Sediment controls (RFDs or silt fences) will be located along road ditches as marked on the SWPPP drawings. Modifications to the sediment control spacing will be adjusted during the project based on sediment control effectiveness. The installation and maintenance of sediment controls at or near outfalls, where storm water leaves TxDOT ROW, takes persistent over ditch line sediment controls.

SCALE = NTS SHEET 2 OF 10



TYPICAL APPLICATIONS
FOR
BEST MANAGEMENT
PRACTICES

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- 26. Storm water draining sheet flow over disturbed soil sloped towards the ROW property line, will be intercepted by a boundary silt fence typically installed with L-shaped ends.
- 27. For ditch grading and shoulder up work, the Contractor is limited during good weather to remove up to one mile (limited to five acres of disturbed soil) of ditch line sediment controls; on one side of the roadway. Outfall controls cannot be removed during this activity. Ditch line controls must be replaced upon completion of work and before the next rain event.
- 28. Sediment controls damaged by the Contractor, as defined by permit, must be fixed or replaced immediately upon discovery.
- 29. Notches in silt fences are not typically allowed. Specific silt fences that back up water onto lanes of traffic may be notched if approved.
- 30. For silt fence maintenance, the Contractor will leave approximately 4 inches of deposited sediment up stream of silt fences and not over excavate around silt fences or rock filter dams.
- 31. The Contractor will inform TxDOT of new construction areas and where soil is planned to be disturbed. Sediment controls will be installed at outfalls prior to the Contractor beginning soil disturbing activities up slope from the outfall.
- 32. Water from concrete saw cutting, concrete grinding and concrete coring activities; or fine materials from concrete chipping and salvage will not be allowed to enter storm drains or enter streams.
- 33. Storm water containing suspended sediment and turbidity needing to be removed from excavations or low areas will be pumped or gravity drained through vegetated buffer strips (50 foot minimum) or placed in ditches with temporary sediment controls, prior to the water being discharged into a stream.
- 34. Uncontaminated water from natural groundwater seepage, springs, foundations and drains that does not contain suspended sediment or any pollutants may be discharged without storm water controls.
- 35. Lime or cement if spilled in ditches or outside the defined limits of application is considered a pollutant and will be excavated and removed the same day, to avoid contaminating streams.
- 36. If located along the project ROW, RAP stockpiles will be located where there is a minimum 100 feet of vegetative buffer strip before storm water will reach a stream. RAP will not be used as a construction material within the Ordinary High Water Marks of a stream channel of a 404 designated stream.
- 37. If allowed on the project, concrete truck wash out areas will have adequate volume to allow 12 inch freeboard for rain and will be lined with 6 mils of plastic. No concrete will be stored higher than the 12 inch freeboard. Cleaning of truck chutes and equipment does not constitute concrete truck wash out and this activity may be completed at the concrete placement location. Wash out areas will not be located closer than 50 ft from down slope inlets or stream channels.
- 38. For outfalls near stock ponds closer than 50 foot from disturbed soil at the ROW line, redundant sediment controls will be provided, typically a combination of rock filter dam and a silt fence constructed in line of the flow.
- 39. Earth stockpiles will utilize silt fence sediment controls, positioned on the low end of the stockpile drainage area with L-hooks or silt fence installed around the entire stockpile.
- 40. Sediment controls including rock filter dams and silt fences will not be installed across any 404 streams. Sediment controls at 404 streams will be positioned to limit sediment entering the stream from the banks and around structures/culverts, and will allow free flow of storm water to pass through the ROW without being dammed by any sediment controls. Remove loose materials from stream channels prior to each rain event.
- 41. Sediment controls for non-404 streams may be constructed across the drainage channel in unlimited locations. It is appropriate to use sediment control details typically used for 404 streams for non-404 streams when flow velocities are high. Remove loose material from stream channels prior to each rain event.
- 42. Incomplete drainage pipe installation across the roadway does not remove the requirement for having sediment controls around the ends of the pipe. To stay within permit requirements, sediment controls should be installed over and around the terminated end and along each side of the banks as soon as construction on the pipe has been completed. Remove loose material from stream channels prior to each rain event.
- 43. Safety end / headwall construction temporarily will require the removal of part of the sediment control placed over and around the pipe end. Retain in place as much functioning sediment control as possible. Replace the silt fence over and around the top of the pipe, immediately upon concrete placement and form removal. Do not remove culvert sediment controls that cannot be replaced before the next rain event. Sediment control at the ends of culverts must be in place and available for any rain event until the disturbed soil areas are re-vegetated.

SCALE = NTS SHEET 3 OF 10

Texas Department of Transportation

Waco District Standard

TYPICAL APPLICATIONS
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BEST MANAGEMENT
PRACTICES

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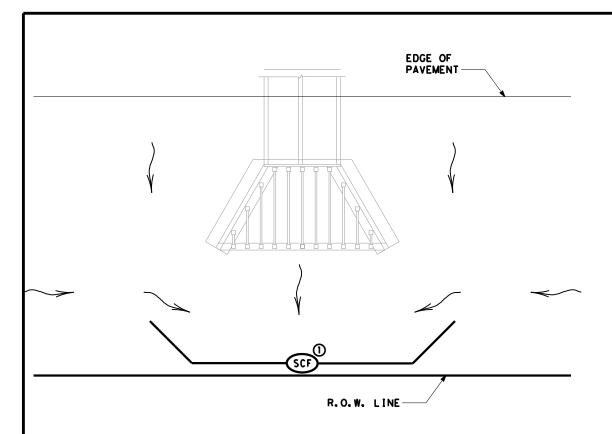
- 44. Between the Ordinary High Water Marks of a 404 stream channel, the Contractor will disturb only the minimum amount of stream channel that is necessary to complete the work.
- 45. Rock riprop for erosion control does not replace the requirements to maintain sediment control until vegetation is re-established. Replace sediment controls immediately after installing erosion rock.
- 46. At the direction of TxDOT, sediment deposited into existing and new culverts will be removed subsidiary to ltem 506. Sediment to be removed is either pre-existing material before construction starts or sediment generated as a part of this project.
- 47. Provide treated 2X4 cross bracing for rectangular inlet silt fence, subsidiary to Item 506.
- 48. Loose or granular earth materials will not be used to repair silt fence undercuts. Silt fence undercut repairs will be conducted with well compacted soils or the silt fence will be reset in a nearby location.
- 49. Silt fence steel T posts of approximately 1.25 pounds per foot are allowed at a spacing of 8 feet or less. Silt fence steel T posts between approximately 1.25 pounds per foot and 0.85 pounds per foot are allowed for T post spacing of 5 feet or less.
- 50. Silt fence to be used to slow the flow of storm water down slopes will be positioned approximately horizontal (on the contour) with L hooks on the ends and limited to approximately 200 feet in length. Multiple sections and levels of silt fence may be required in addition to temporary / permanent erosion control flumes.
- 51. Soil retention blankets will be installed rolled down the slope with the small dimension side embedded at the top of slope, unless recommended otherwise by the manufacturer. Excess grass, rocks, trash, debris or clods will be removed before seeding and installing soil retention blankets. All installations will be by the manufacturer recommendations. Contractor equipment, including tractor mowers will be kept off areas with soil retention blankets until the grass is established.

SCALE = NTS SHEET 4 OF 10



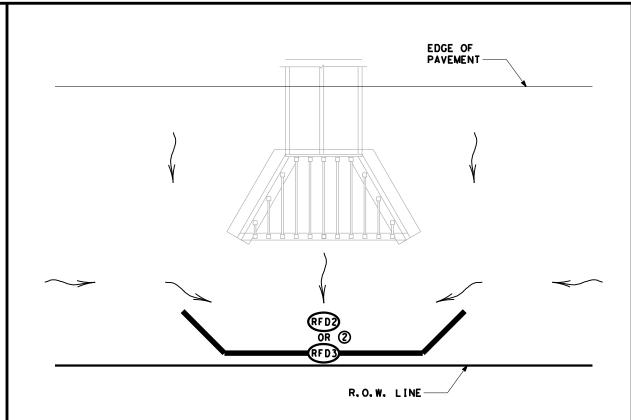
# TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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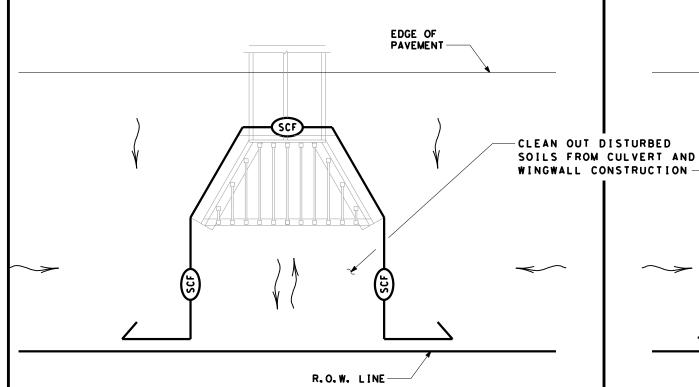
#### BEST MANAGEMENT PRACTICE (BMP) #1

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



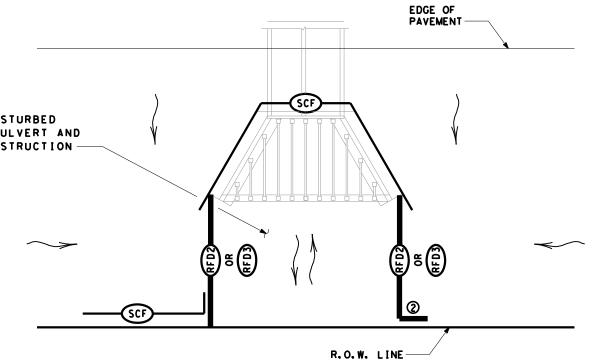
#### BEST MANAGEMENT PRACTICE (BMP) #2

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



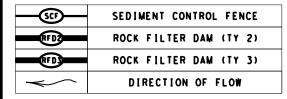
#### BEST MANAGEMENT PRACTICE (BMP) #3

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT



#### BEST MANAGEMENT PRACTICE (BMP) #4

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT



#### NOTES:

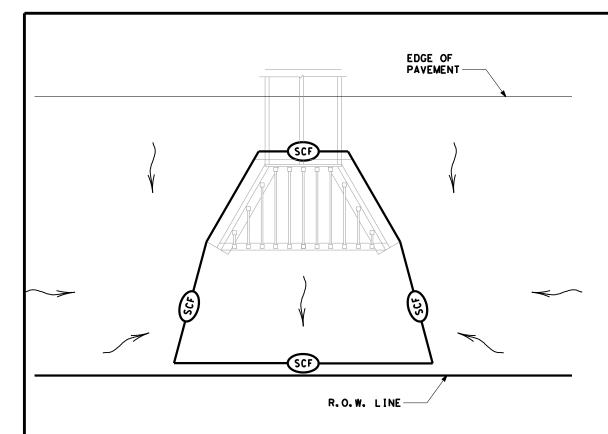
- ① EXTEND SILT FENCE SO STORM WATER DOES NOT GO AROUND THE ENDS. USE L-HOOKS ON ENDS AS REQUIRED.
- ② EXTEND ROCK FILTER DAM SO STORM WATER DOES NOT GO AROUND THE ENDS.

SCALE = NTS SHEET 5 OF 10



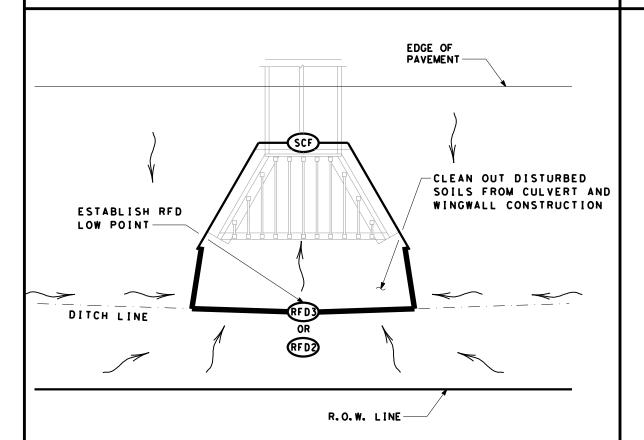
# TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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	WACO		BELL			143



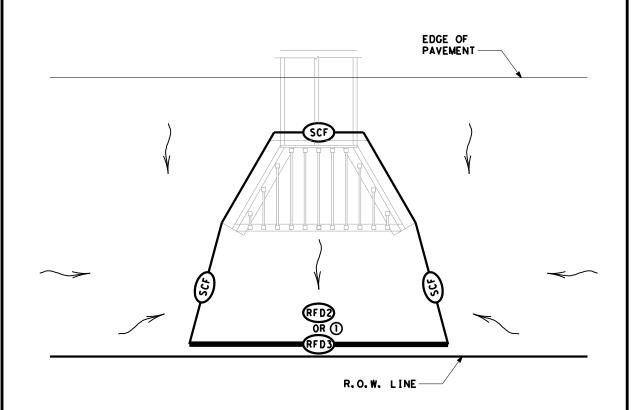
#### BEST MANAGEMENT PRACTICE (BMP) #5

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



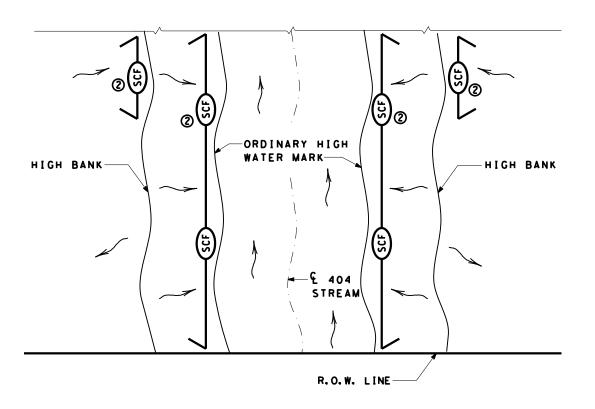
#### BEST MANAGEMENT PRACTICE (BMP) #7

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT ENTRANCE OF CULVERT



#### BEST MANAGEMENT PRACTICE (BMP) #6

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



#### BEST MANAGEMENT PRACTICE (BMP) #8

FOR 404 STREAMS ~ SEDIMENT CONTROL DURING PROJECT CLEARING AND GRUBBING

	SEDIMENT CONTROL FENCE
RF CO	ROCK FILTER DAM (TY 2)
RFD.	ROCK FILTER DAM (TY 3)
~	DIRECTION OF FLOW

#### NOTES:

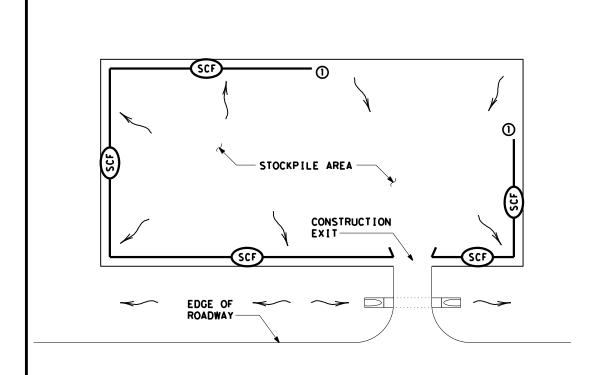
- ① PROVIDE OVERLAP OF SILT FENCE WITH ROCK FILTER DAM.
- ② USE SILT FENCE L-HOOKS ON ENDS TO BLOCK STORM WATER SEDIMENT

SCALE = NTS SHEET 6 OF 10



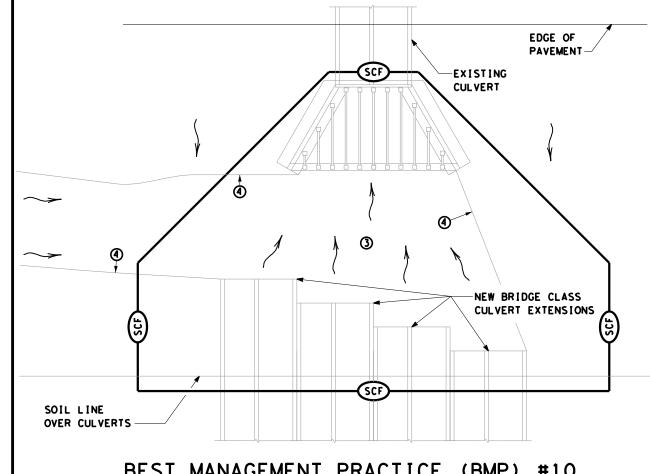
# TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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)TxDOT 2009	CONT	SECT	JOB		HIGHWAY			
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	WACO		BELL			144		



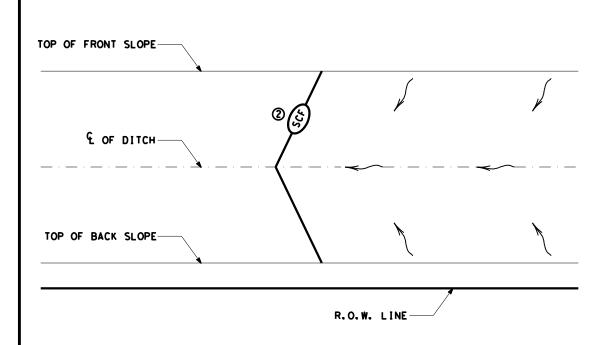
#### BEST MANAGEMENT PRACTICE (BMP) #9

STOCKPILE SEDIMENT CONTROL



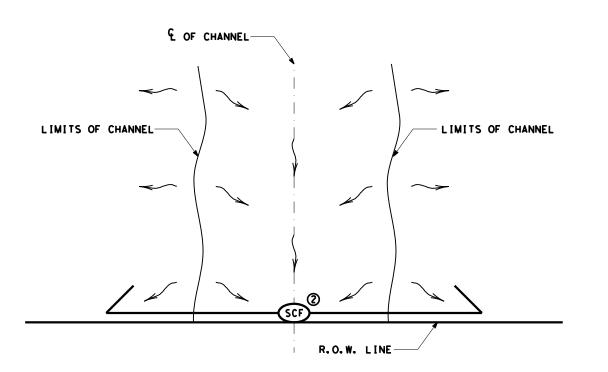
#### BEST MANAGEMENT PRACTICE (BMP) #10

FOR 404 OR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT PHASED CONSTRUCTION OF BRIDGE CLASS CULVERTS



BEST MANAGEMENT PRACTICE (BMP) #11

BOUNDRY SEDIMENT CONTROL - BOTH ENDS OF CONTROL TERMINATED UP SLOPE



#### BEST MANAGEMENT PRACTICE (BMP) #12

BOUNDRY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED DOWN SLOPE

—(12)	SEDIMENT CONTROL FENCE
RF D2	ROCK FILTER DAM (TY 2)
RFD.	ROCK FILTER DAM (TY 3)
~	DIRECTION OF FLOW

#### NOTES:

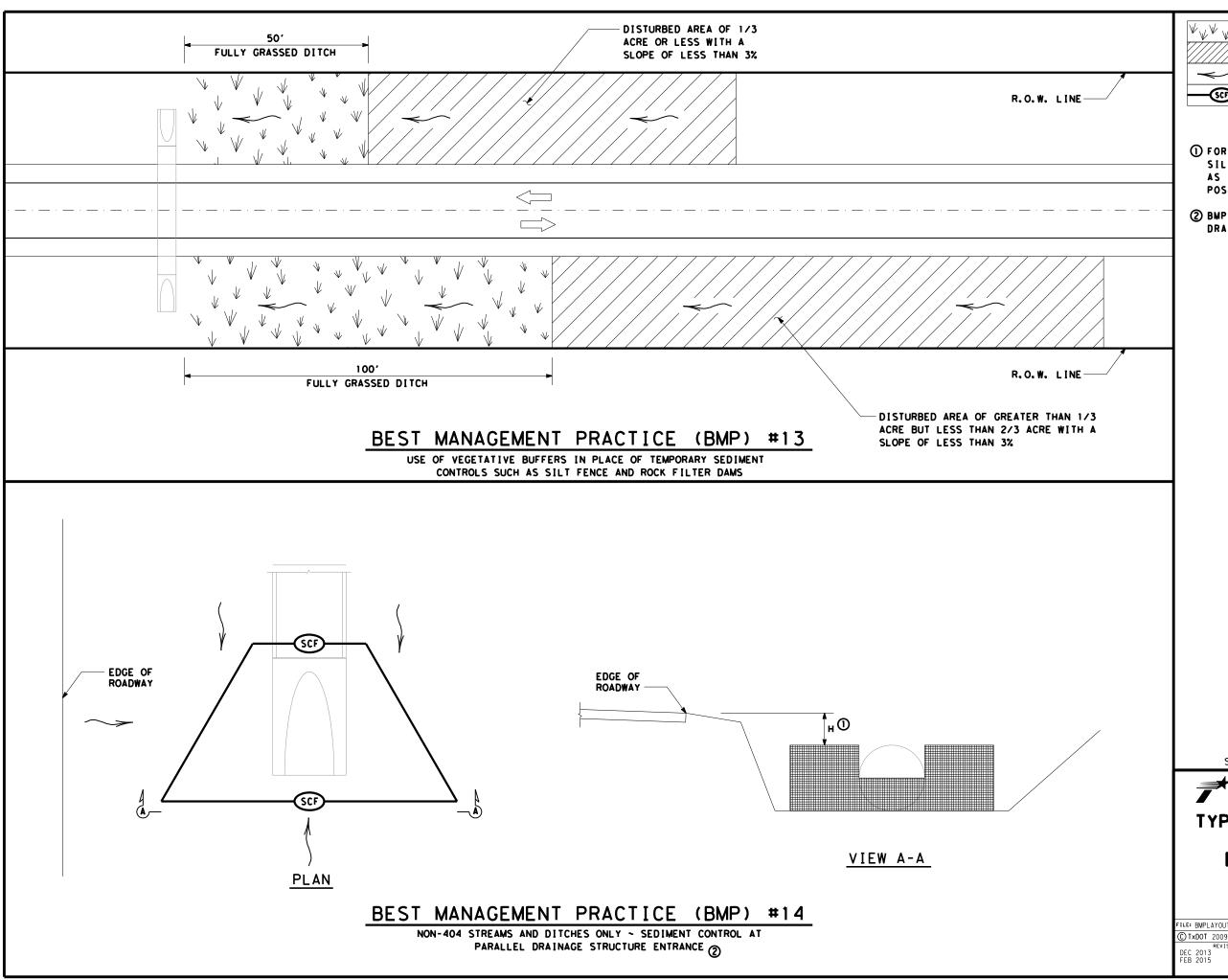
- (1) START SEDIMENT CONTROL AT LOCATION SO ALL STORM WATER WITH SEDIMENT IS COLLECTED
- (2) ROCK FILTER DAMS OR EARTH/GRASSED EMBANKMENTS CAN BE SUBSTITUTED AS DIRECTED.
- 3 PROVIDE A SMOOTH TRANSITION FROM THE INVERT ELEVATIONS BETWEEN CULVERTS. REMOVE LOOSE SOIL FROM EXCAVATED AREA BETWEEN CULVERTS.
- 4 PROVIDE AND INSTALL PNEUMATICALLY PLACED CONCRETE ON THE DITCH BOTTOM AND SIDE SLOPES BETWEEN TEMPORARY TERMINATIONS BETWEEN OLD AND NEW CULVERTS. PNEUMATICALLY PLACED CONCRETE WILL BE PLACED TO THE HEIGHT OF THE LARGEST CULVERT ON THE DITCH SIDE SLOPES: AND TO A LIMIT 10 FEET OUTSIDE THE LOCATION OF BMPS ALONG THE DITCH BOTTOM. CEMENT STABILIZED SAND MAY BE SUBSTITUTED FOR PNEUMATICALLY PLACED CONCRETE. IN AREAS WHERE INSTALLATION WORKS AND AT THE OPTION OF TXDOT.

SCALE = NTS SHEET 7 OF 10



#### TYPICAL APPLICATIONS FOR **BEST MANAGEMENT PRACTICES**

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EB 2015	DIST	DIST COUNTY			SHEET NO.			
WACO BELL				145				



DISTURBED AREA

DIRECTION OF FLOW

SEDIMENT CONTROL FENCE

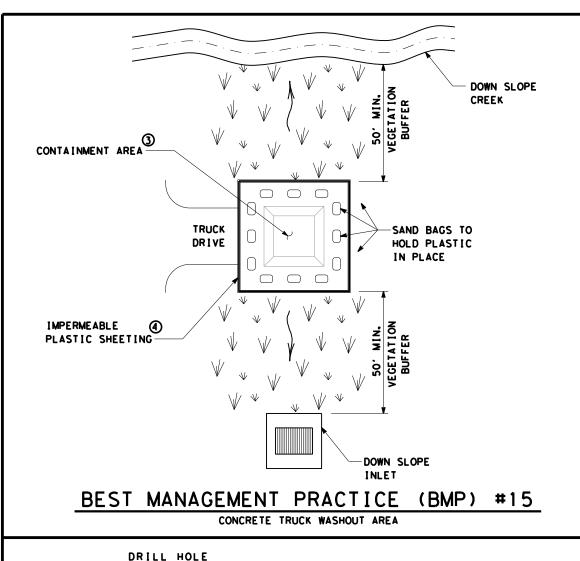
- ① FOR H DIMENSIONS LESS THAN 1.5'
  SILT FENCE MAY NEED TO BE NOTCHED
  AS SHOWN IN VIEW A-A. ADD EXTRA
  POSTS AT NOTCH.
- ② BMP #14 MAY BE USED AT CROSS DRAINAGE STRUCTURES AS DIRECTED.

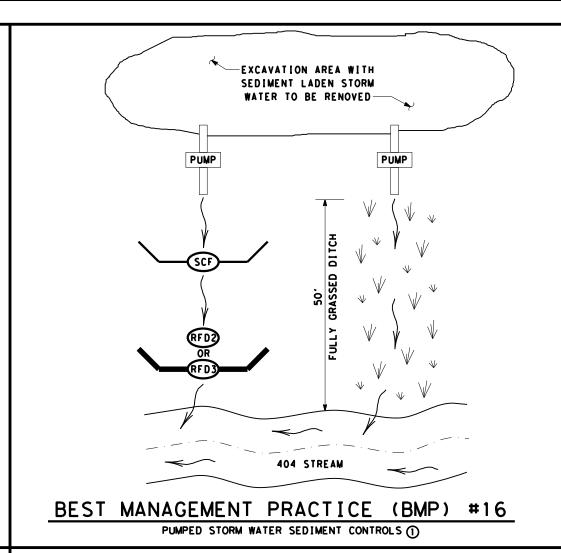
SCALE = NTS SHEET 8 OF 10



# TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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	WACO	BELL				146	





DRILL HOLE
FOR POST

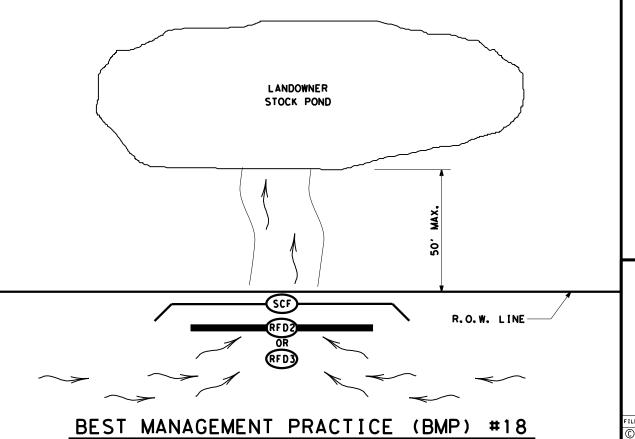
SEE DETAIL A

HORIZONTAL INLET
AND CONCRETE RIPRAP

SILT FENCE BRACE
(TREATED 2×4 LUMBER)

BEST MANAGEMENT PRACTICE (BMP) #17

HORIZONTAL INLET SEDIMENT CONTROL



LANDOWNER STOCKPOND SEDIMENT CONTROL (2)

FULLY GRASSED DITCH

DIRECTION OF FLOW

SCE

SEDIMENT CONTROL FENCE

RFD2

RFD3

ROCK FILTER DAM (TY 2)

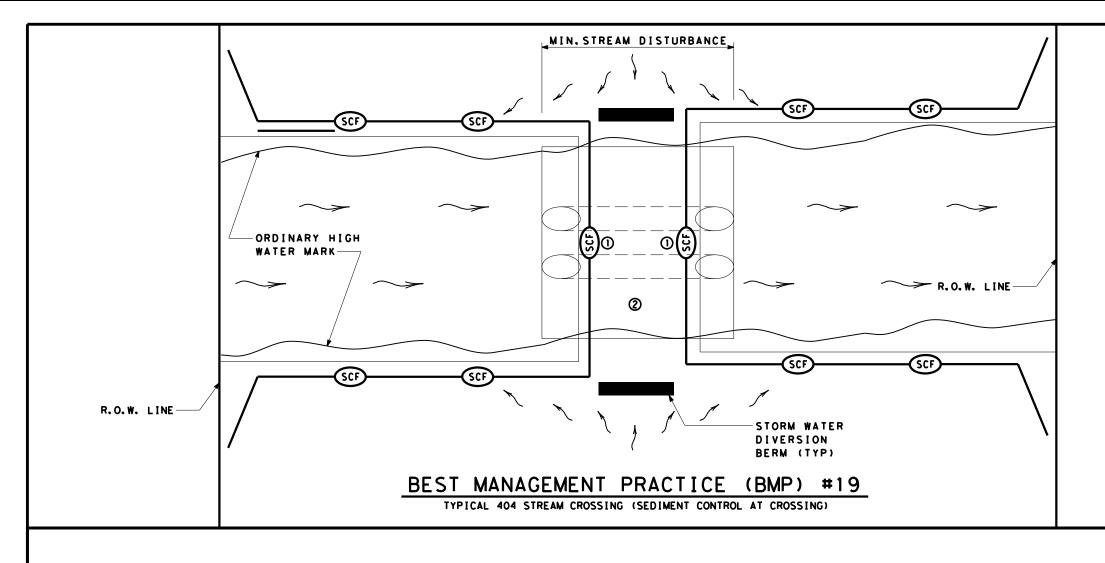
- ① PUMPED STROM WATER FROM AN EXCAVATION AREA SHOULD BE DISCHARGED IN A 50' VEGETATIVE BARRIER OR THROUGH TWO TEMPORARY SEDIMENT CONTROLS BEFORE ENTERING A 404 STREAM.
- ② FOR LANDOWNER STOCKPONDS WITHIN 50 OF THE RIGHT OF WAY LINE, PROVIDE REDUNDANT SEDIMENT CONTROLS AT THE CONVEYANCE OF THE POND. MINIMUM OF TWO SEDIMENT CONTROLS.
- (3) WHEN CONTAINMENT AREA REACHES 1'
  FREEBOARD, DISCONTINUE WASHOUT
  PLACEMENT AND REMOVE MATERIAL
  UPON SOLIDIFICATION.
- EACH TIME SOLIDIFIED MATERIAL IS REMOVED REPLACE PLASTIC SHEETING.

SCALE = NTS SHEET 9 OF 10



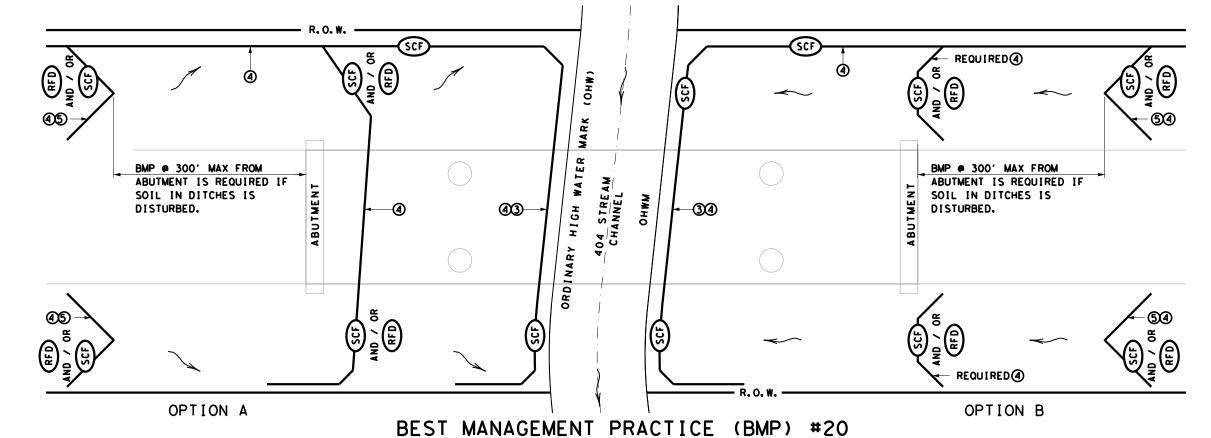
# TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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B 2015	DIST		COUNTY			SHEET NO.		
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	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD—	ROCK FILTER DAM
	SECURITY FENCING

- 1 HAY BALES MAY BE SUBSTITUTED FOR SILT FENCE OVER THE STREAM CROSSING.
- ② CROSSING WILL BE AS PER REQUIREMENTS OF THE WATERS OF THE US GENERAL NOTES.
- (3) INSTALL SILT FENCE SLIGHTLY UP FROM OHW MARK FROM R.O.W. TO R.O.W.
- 4 USE SILT FENCE L-HOOKS ON LEVEL OR DOWN SLOPING ENDS TO BLOCK STORM WATER SEDIMENT
- (S) INSTALL LARGE V OR U SHAPED BMP'S FROM ABUTMENT AS SHOWN. IF THERE IS STEEP DITCH CONDITIONS DECREASE SPACING AND CONSIDER RFD'S. ADD ADDITIONAL BMP'S IF GRADE IS STEEP OR IF FLOW IS HIGH.



FOR 404 STREAMS ~ BMP'S AT BRIDGES

SCALE = NTS SHEET 10 OF 10



# TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

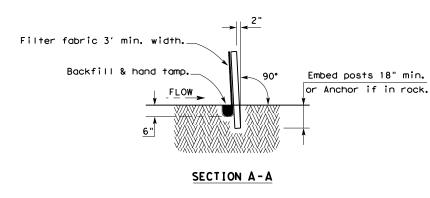
FILE: BMPLAYOUTS.dgn	DN: TXDOT		ck: TXDOT	ck:TXDOT Dw:		ck: TXDOT	
	CONT	CONT SECT JOB		HIGHWAY			
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FEB 2015	DIST		COUNTY			SHEET NO.	
	WACO		BELL			148	

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the "Texas Engineering Practice Act". No warranty of any kind conversion of this standard to other formats or for incorrect

this standard is governed by as no responsibility for the



4' minimum steel or wood posts spaced at 6' to 8'.

Woven filter

fabric-

TEMPORARY SEDIMENT CONTROL FENCE

(SCF)

Softwood posts shall be 3" minimum in diameter or nominal 2" x 4". Hardwood posts shall have a minimum cross section of 1.5"  $\times$  1.5"

> Attach the wire mesh and fabric on end posts using 4 evenly spaced staples for wooden posts (or 4 T-Clips or

sewn vertical pockets for steel posts).

Place 4" to 6" of fabric against the trench side and approximently 2" across the trench

bottom in the upstream direction. Minimum trench size shall be 6" square.

Backfill and hand tamp.

Fasten fabric to the top strand of the wire using

hog rings or cord at a maximum spacing of 15".

#### HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

#### SEDIMENT CONTROL FENCE USAGE GUIDELINES

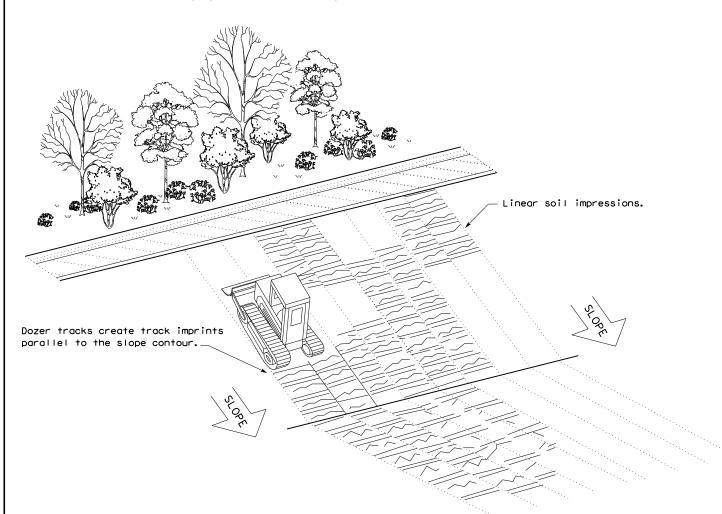
A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

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

#### **LEGEND**

#### **GENERAL NOTES**

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



VERTICAL TRACKING

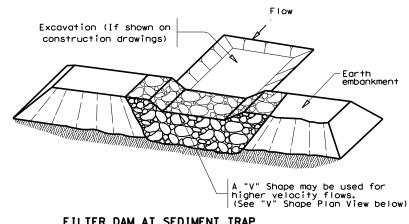


TEMPORARY EROSION. SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE & VERTICAL TRACKING

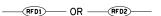
EC(1)-16

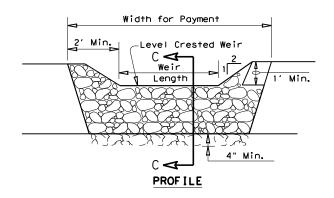
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© TxDOT: JULY 2016	CONT	SECT	CT JOB		HIGHWAY		
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	WACO		BELL			149	

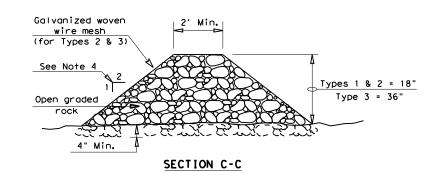
Sediment Control Fence —(SCF)—



#### FILTER DAM AT SEDIMENT TRAP







Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60  ${\sf GPM/FT^2}$  of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

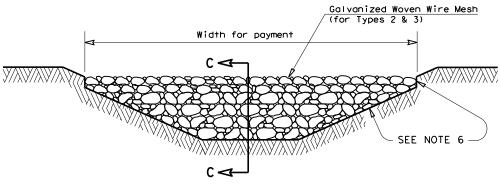
used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.



#### FILTER DAM AT CHANNEL SECTIONS

#### **GENERAL NOTES**

- 1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
- 2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation
- 3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
- Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
- 5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
- 6. Filter dams should be embedded a minimum of 4" into existing ground.
- 7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
- 8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
- 9. Sack Gabions should be staked down with  $\frac{3}{4}$ " dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2  $\frac{1}{2}$ " x 3  $\frac{1}{4}$ "
- 10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
- 11. The guidelines shown hereon are suggestions only and may be modified by

#### PLAN SHEET LEGEND

Type 1 Rock Filter Dam Type 2 Rock Filter Dam Type 3 Rock Filter Dam



TEMPORARY EROSION. SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2) - 16

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REVISIONS	0231	03	3 156			IH-14		
	DIST	COUNTY		SHEET NO.				
	WACO	O BELL				150		

#### ROCK FILTER DAM USAGE GUIDELINES

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be

——(RFD4)—