SEE SHEET 2 FOR
INDEX OF SHEETS

ATTACHMENT NO. 1-22 TO SPECIAL AGREEMENT FOR CONSTRUCTION, MAINTENANCE AND OPERATIONS OF CONTINUOUS/SAFETY HIGHWAY ILLUMINATION SYSTEM DATED MARCH 16TH, 1993.
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.

CITY OF EL PASO

DocuSigned by:
Yvette Hernandez
F31C1FF18ACA4AD...

Grant Funded Program Director — TITLE

6/3/2022 — DATE

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

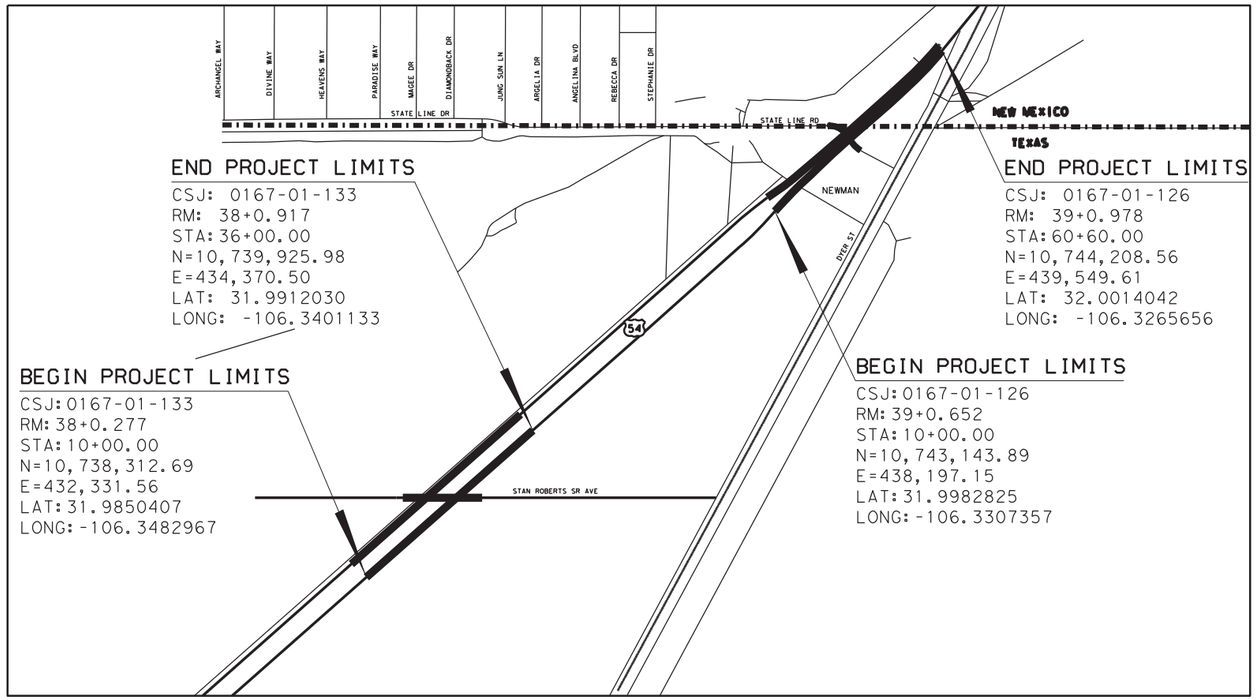
PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NO. STP 2022(821)HES, ETC

US54 REALIGN INTERSECTION AT (STATE LINE RD & STAN ROBERTS SR AVE)
EL PASO COUNTY

	LIMITS				
CSJ	FROM	TO	HWY	LENGTH (MI)	LENGTH (FT)
0167-01-126	0.22 MI SW OF STATE LINE RD	0.015 MI NE OF STATE LINE RD	US54	0.327	1,726.56
0167-01-133	0.32 MI S OF STAN ROBERTS SR AVE	0.32 MI N OF STAN ROBERTS SR AVE	US54	0.640	3,379.20
			TOTAL	0.967	5,105.76

FOR THE CONSTRUCTION OF SAFETY IMPROVEMENTS
CONSISTING OF HAZARD ELIMINATION & SAFETY



END PROJECT LIMITS
CSJ: 0167-01-133
RM: 38+0.917
STA: 36+00.00
N=10,739,925.98
E=434,370.50
LAT: 31.9912030
LONG: -106.3401133

BEGIN PROJECT LIMITS
CSJ: 0167-01-133
RM: 38+0.277
STA: 10+00.00
N=10,738,312.69
E=432,331.56
LAT: 31.9850407
LONG: -106.3482967

END PROJECT LIMITS
CSJ: 0167-01-126
RM: 39+0.978
STA: 60+60.00
N=10,744,208.56
E=439,549.61
LAT: 32.0014042
LONG: -106.3265656

BEGIN PROJECT LIMITS
CSJ: 0167-01-126
RM: 39+0.652
STA: 10+00.00
N=10,743,143.89
E=438,197.15
LAT: 31.9982825
LONG: -106.3307357

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

DESIGN SPEED	= 70MPH
POSTED SPEED	= 60-75MPH
A.D.T. (2020)	= 7,325
A.D.T. (2040)	= 10,255
PERCENT TRUCK A.A.D.T.	= 8.10%

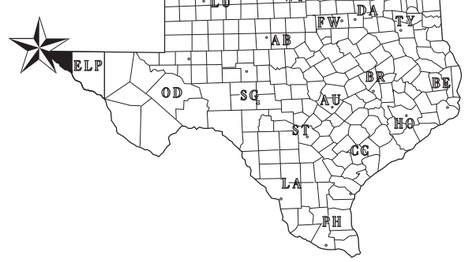
CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		1

FINAL PLANS

CONTRACTOR: _____
TIME CHARGES BEGAN: _____
DATE CONTRACTOR BEGAN WORK: _____
DATE WORK WAS COMPLETED: _____
DATE WORK WAS ACCEPTED: _____
TOTAL DAYS CHARGED: _____
ORIGINAL CONTRACT AMOUNT: $ _____
AMOUNT OF CONTRACT AMENDMENTS: $ _____
FINAL CONTRACT COST: $ _____

_____ 20 _____

_____
AREA ENGINEER



KEY TO COUNTIES

Texas Department of Transportation

STATE OF TEXAS
VICTOR J. DE LA GARZA
93717
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901
915-701-8796

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 2012)

REQUIRED SIGNS SHALL BE IN ACCORDANCE WITH BC(1)-21 THRU BC(12)-21 AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

RECOMMENDED FOR LETTING — 5/31/2022
DocuSigned by: Eduardo Perales, P.E.
2778C60AB5F7426... — ...IAN

5/31/2022
DocuSigned by: L. Raul Ortega Jr., P.E.
0F1750B98760474... — DISTRICT DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

5/31/2022
DocuSigned by: Tomas Trevino, P.E.
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STATE OF TEXAS
ERIC SIERRA-ORTEGA
124817
LICENSED
PROFESSIONAL ENGINEER

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH A "*" HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

ERIC SIERRA-ORTEGA, P.E. — NAME — 5/31/2022 — DATE

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH A "**" HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

CRUZ ALVAREZ, P.E. — NAME — 5/31/2022 — DATE

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH A "***" HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

CARLOS DURAN, P.E. — NAME — 5/31/2022 — DATE

STATE OF TEXAS
DOUGLAS BURNETT JR.
140757
LICENSED
PROFESSIONAL ENGINEER

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH A "****" HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

DOUGLAS BURNETT JR, P.E. — NAME — 5/31/2022 — DATE

CSJ: 0167-01-126
US54 STATE LINE RD

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE

INDEX OF SHEETS

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		2

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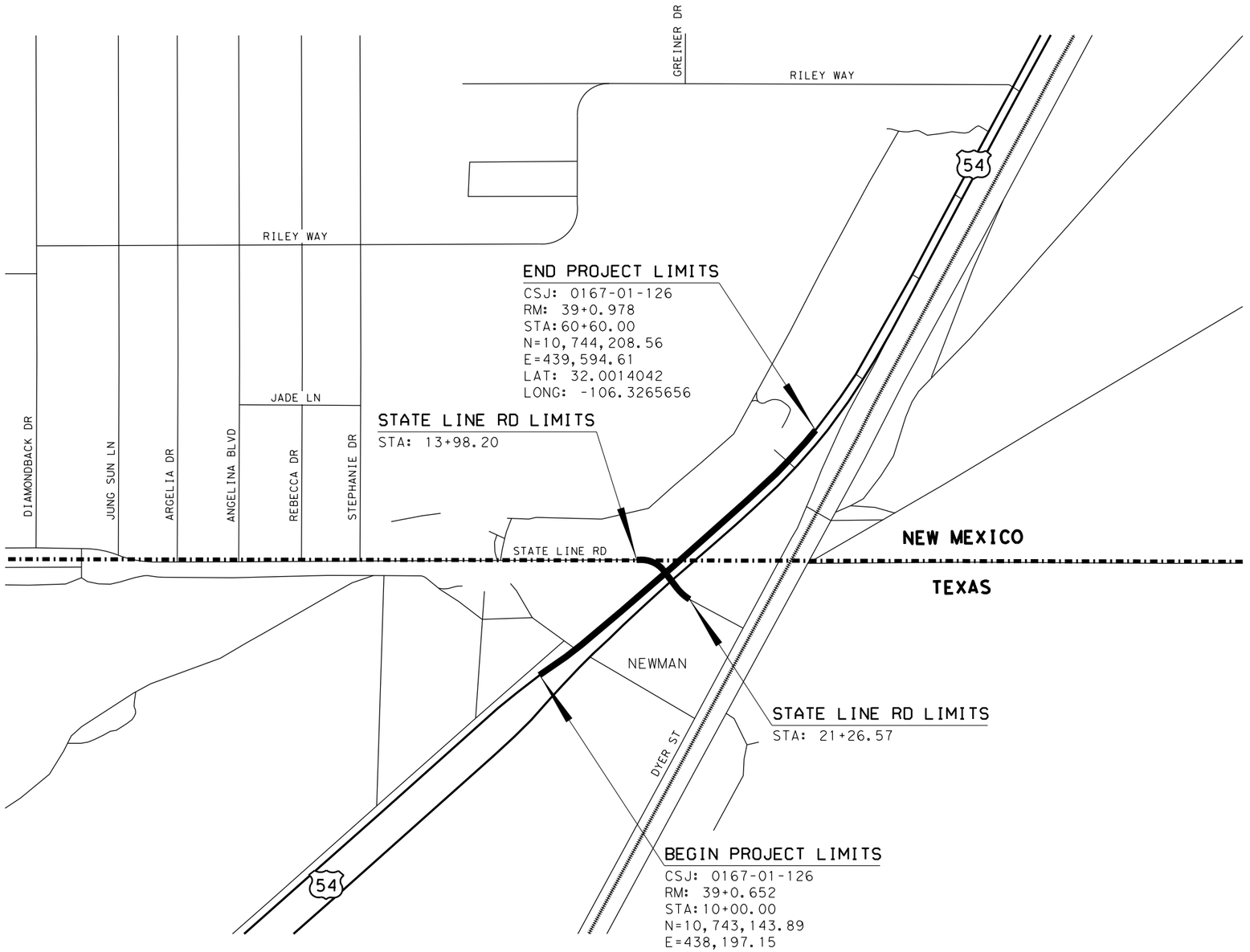

SCALE: N.T.S.

STATE OF TEXAS
VICTOR J. DE LA GARZA
93717
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

GENERAL

PROJECT LAYOUT

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		3

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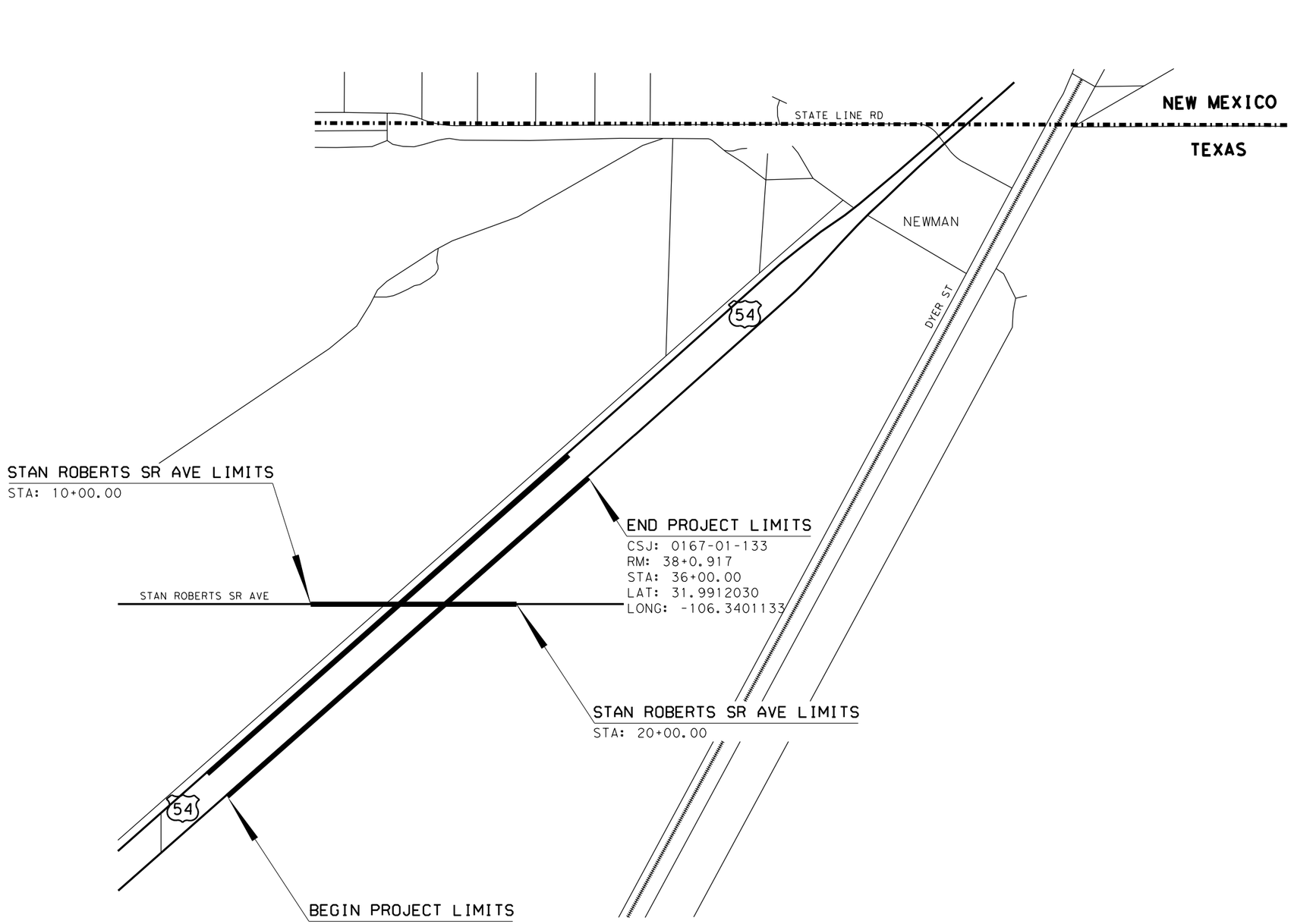

STAN ROBERTS SR AVE LIMITS
STA: 10+00.00

END PROJECT LIMITS
CSJ: 0167-01-133
RM: 38+0.917
STA: 36+00.00
LAT: 31.9912030
LONG: -106.3401133

STAN ROBERTS SR AVE LIMITS
STA: 20+00.00

BEGIN PROJECT LIMITS
CSJ: 0167-01-133
RM: 38+0.277
STA: 10+00.00
LAT: 31.9850407
LONG: -106.3482967

SCALE: N.T.S.

STATE OF TEXAS
VICTOR J. DE LA GARZA
93717
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE
GENERAL

PROJECT LAYOUT

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		4

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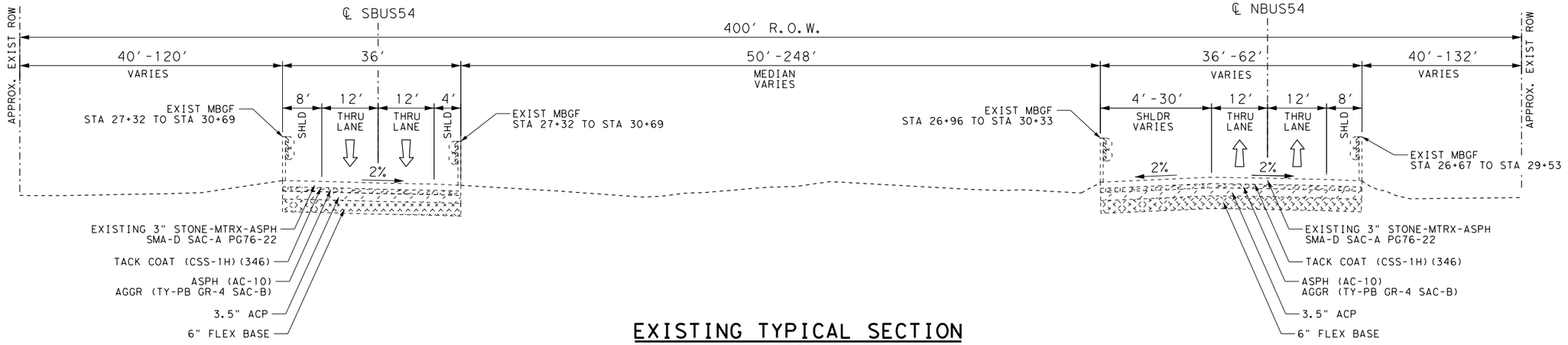
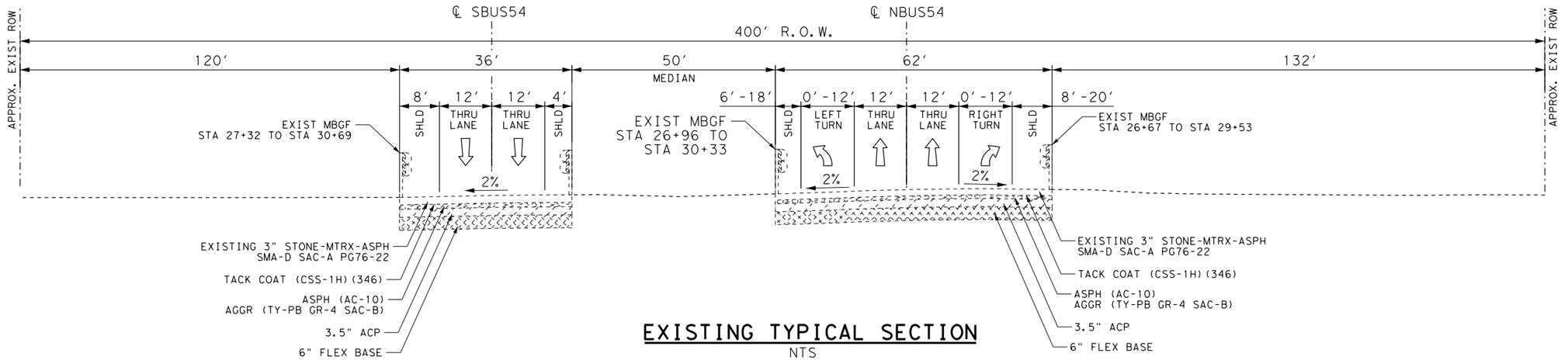


EXISTING TYPICAL SECTION

NTS

STA 11+00.00 TO STA 29+00.00



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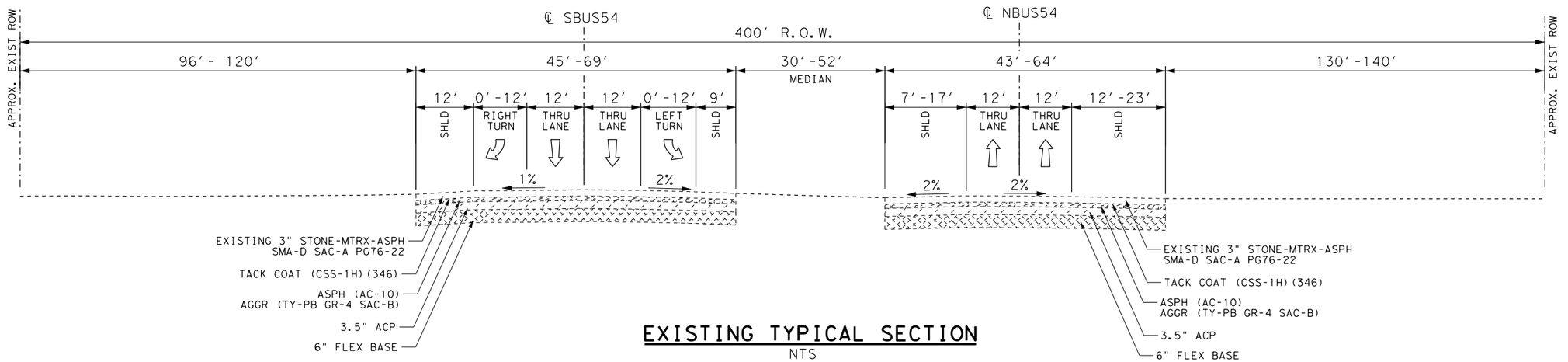
STA 29+00.00 TO STA 32+50.00



EXISTING TYPICAL SECTION

NTS

STA 32+50.00 TO STA 40+00.00

LEGEND

EXIST TRAFFIC FLOW

NOTES:

1. TYPICAL SECTION INFORMATION OBTAINED FROM AS-BUILT PLAN SET 0167-01-128. SIGNED AND SEALED 1/11/20
2. TYPICAL SECTIONS ARE FOR GENERAL INFORMATION ONLY. REFER TO STANDARDS FOR PROPER CONSTRUCTION.
3. ALL DIMENSIONS ARE TO THE EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
4. SEE ROADWAY PLAN LAYOUT SHEETS FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

EXISTING TYPICAL SECTIONS

SHEET 1 OF 2

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		5

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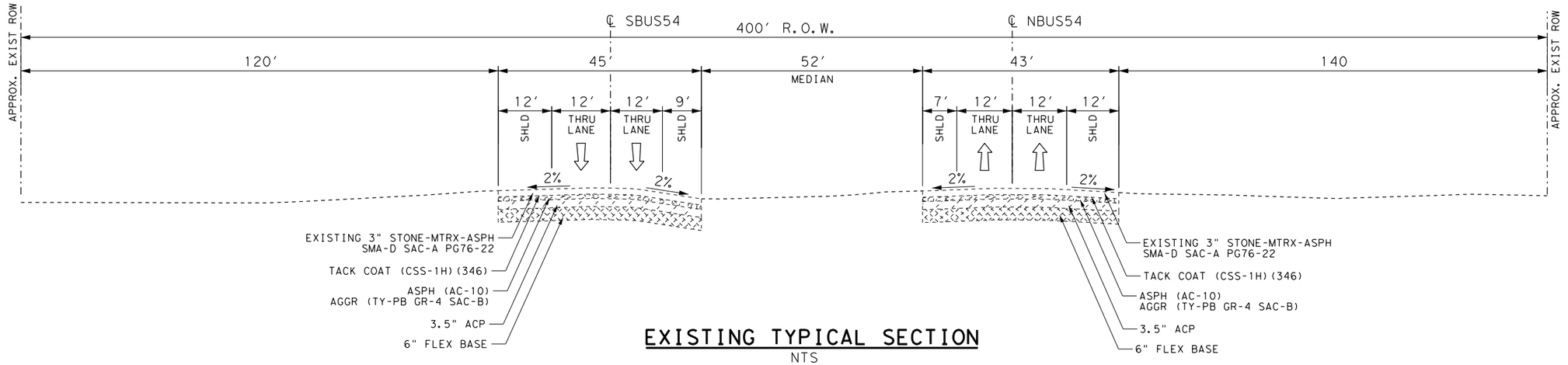
LEGEND

EXIST TRAFFIC FLOW



EXISTING TYPICAL SECTION

NTS

STA 40+00.00 TO STA 50+00.00

NOTES:

1. TYPICAL SECTION INFORMATION OBTAINED FROM AS-BUILT PLAN SET 0167-01-128. SIGNED AND SEALED 1/11/20
2. TYPICAL SECTIONS ARE FOR GENERAL INFORMATION ONLY. REFER TO STANDARDS FOR PROPER CONSTRUCTION.
3. ALL DIMENSIONS ARE TO THE EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
4. SEE ROADWAY PLAN LAYOUT SHEETS FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

EXISTING TYPICAL SECTIONS

SHEET 2 OF 2

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		6

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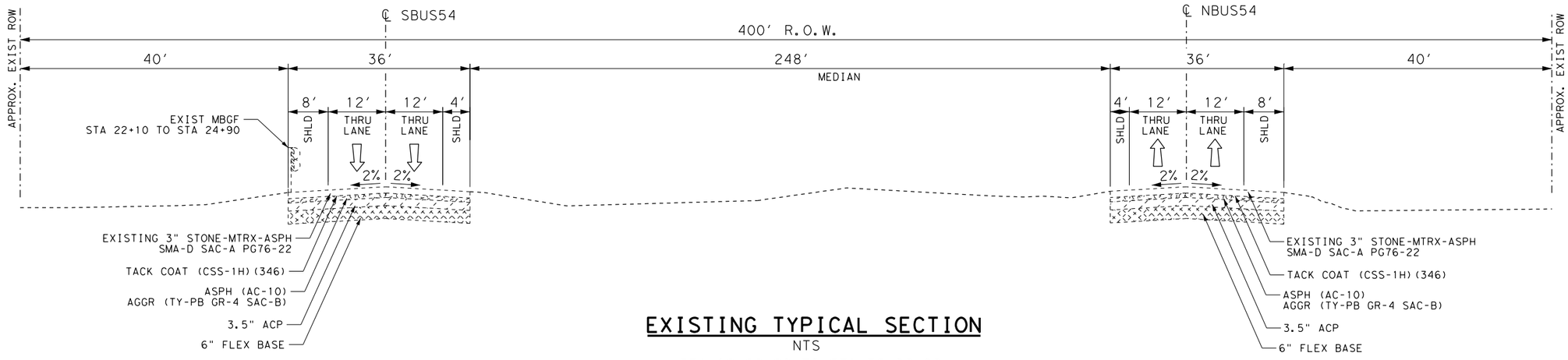


EXISTING TYPICAL SECTION

NTS

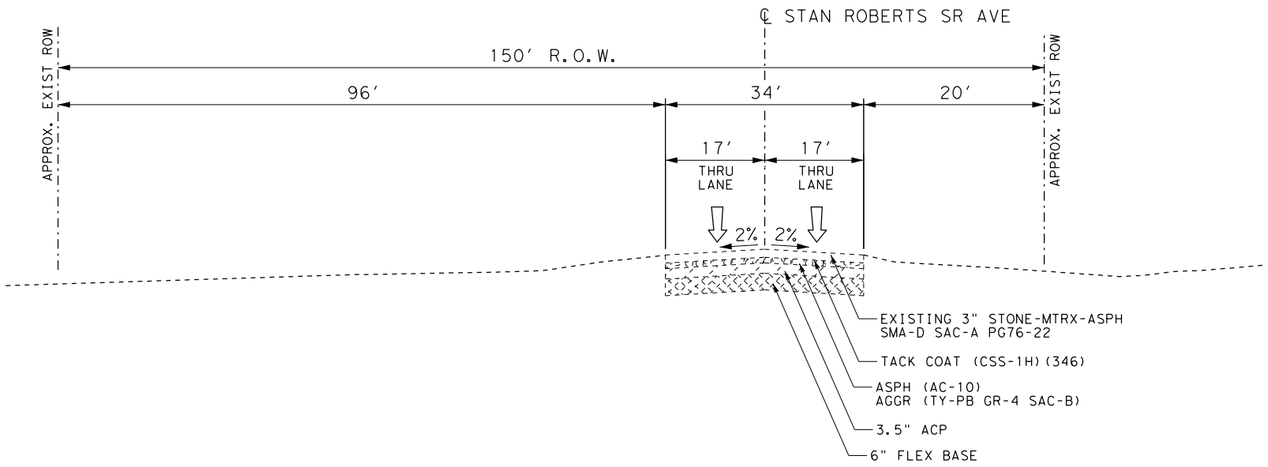
STA 10+00.00 TO STA 36+00.00

LEGEND

EXIST TRAFFIC FLOW

NOTES:

1. TYPICAL SECTION INFORMATION OBTAINED FROM AS-BUILT PLAN SET 0167-01-128.SIGNED AND SEALED ON 1/11/20
2. TYPICAL SECTIONS ARE FOR GENERAL INFORMATION ONLY. REFER TO STANDARDS FOR PROPER CONSTRUCTION.
3. ALL DIMENSIONS ARE TO THE EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
4. SEE ROADWAY PLAN LAYOUT SHEETS FOR ADDITIONAL INFORMATION.



EXISTING TYPICAL SECTION

NTS

STA 10+00.00 TO STA 20+00.00

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE

EXISTING TYPICAL SECTIONS

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		7

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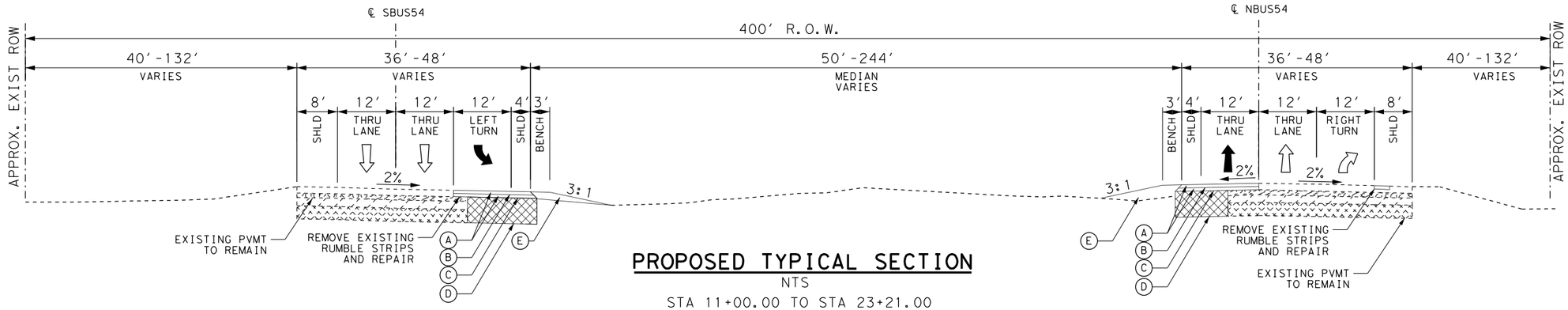


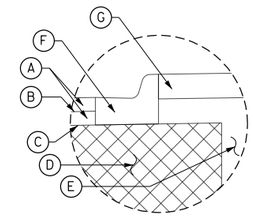
PROPOSED TYPICAL SECTION

NTS

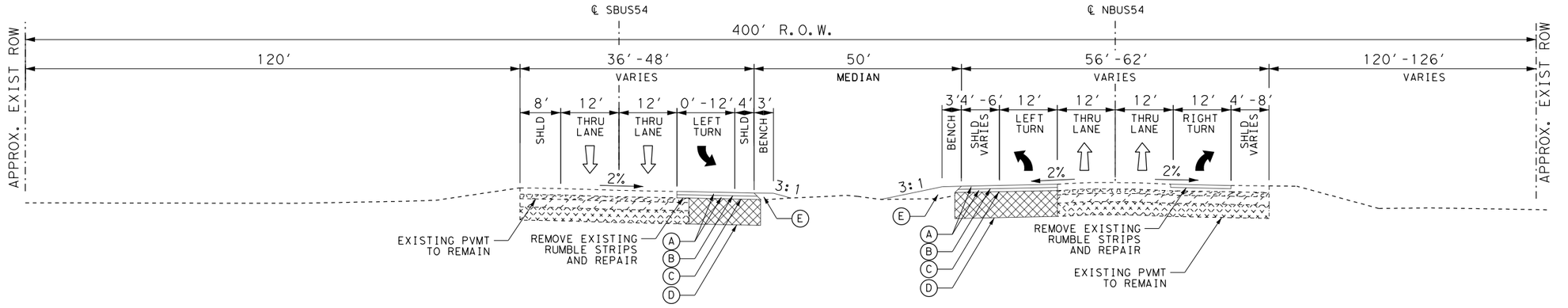
STA 11+00.00 TO STA 23+21.00

LEGEND

- EXIST TRAFFIC FLOW
- PHASED TRAFFIC FLOW
- (A) SP MIXES SP-C SAC-A PG70-22 2.5"=(275LBS/SY) 1.25" PER LIFTS
- (B) TACK COAT 0.15 GAL/SY
- (C) PRIME COAT (MULTI OPTION) 0.15 GAL/SY
- (D) FL BS (RDWY DEL) (TY A GR 1-2) 10"=(1,400LBS/CF)
- (E) EMBANKMENT (FINAL)(DENS CONT)(TY A)
- (F) TYPII CURB AND GUTTER
- (G) LOOSE AGGR FOR GROUNDCOVER



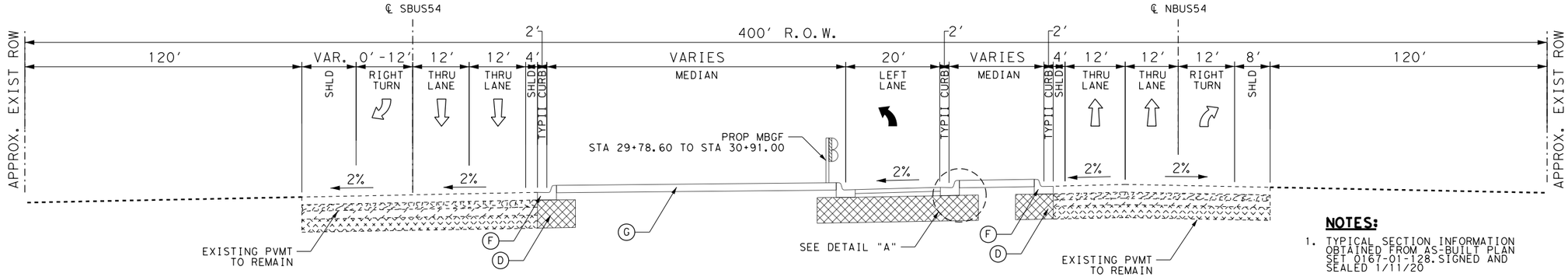
DETAIL "A"



PROPOSED TYPICAL SECTION

NTS

STA 23+21.00 TO STA 29+60.00



PROPOSED TYPICAL SECTION

NTS

STA 29+60.00 TO STA 32+50.00

NOTES:

1. TYPICAL SECTION INFORMATION OBTAINED FROM AS-BUILT PLAN SET 0167-01-128.SIGNED AND SEALED 1/11/20
2. TYPICAL SECTIONS ARE FOR GENERAL INFORMATION ONLY. REFER TO STANDARDS FOR PROPER CONSTRUCTION.
3. ALL DIMENSIONS ARE TO THE EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
4. SEE ROADWAY PLAN LAYOUT SHEETS FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

PROPOSED TYPICAL SECTIONS

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		8

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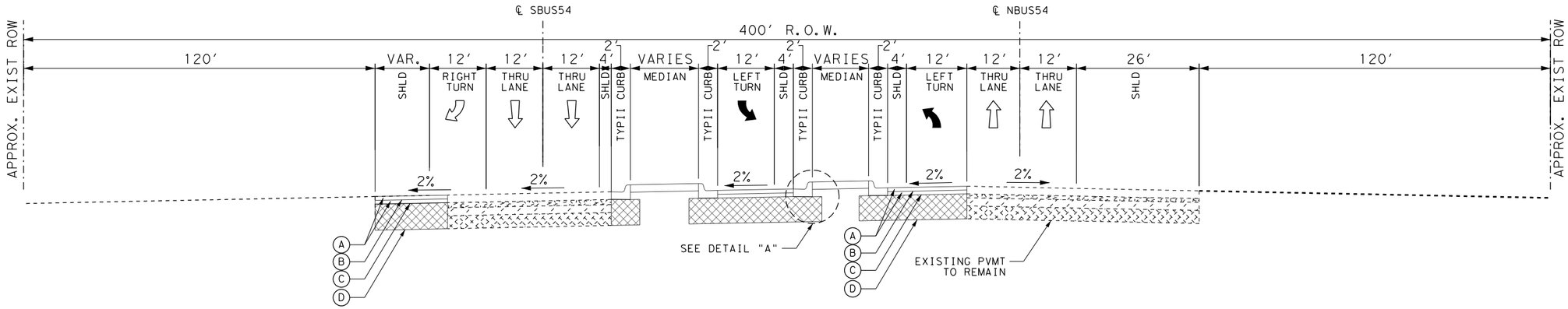


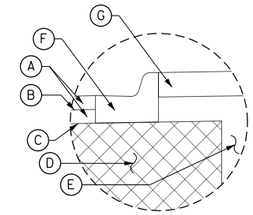
PROPOSED TYPICAL SECTION

NTS

STA 32+50.00 TO STA 42+68.00

LEGEND

- EXIST TRAFFIC FLOW
- PHASED TRAFFIC FLOW
- (A) SP MIXES SP-C SAC-A PG70-22 2.5" = (275LBS/SY) 1.25" PER LIFTS
- (B) TACK COAT 0.15 GAL/SY
- (C) PRIME COAT (MULTI OPTION) 0.15 GAL/SY
- (D) FL BS (RDWY DEL) (TY A GR 1-2) 10" = (1,400LBS/CF)
- (E) EMBANKMENT (FINAL) (DENS CONT) (TY A)
- (F) TYPII CURB AND GUTTER
- (G) LOOSE AGGR FOR GROUNDCOVER



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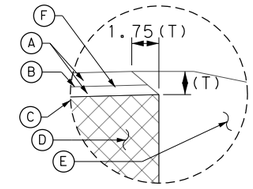

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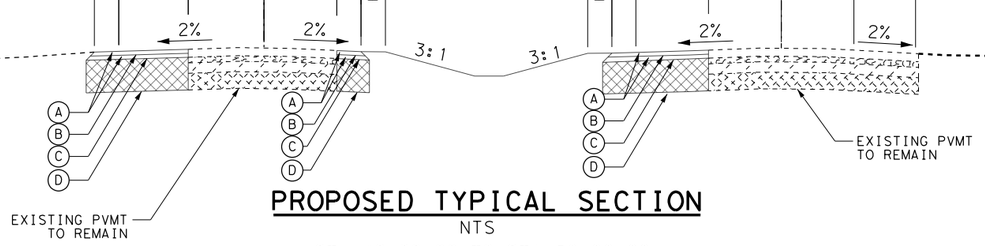
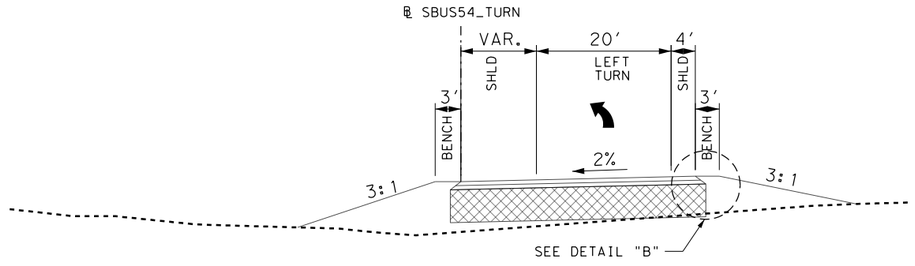


PROPOSED TYPICAL SECTION

NTS

STA 42+68.00 TO STA 50+00.00



PROPOSED TYPICAL SECTION

NTS

STA 19+00.00 TO STA 21+00.00

NOTES:

1. TYPICAL SECTION INFORMATION OBTAINED FROM AS-BUILT PLAN SET 0167-01-128.SIGNED AND SEALED 1/11/20
2. TYPICAL SECTIONS ARE FOR GENERAL INFORMATION ONLY. REFER TO STANDARDS FOR PROPER CONSTRUCTION.
3. ALL DIMENSIONS ARE TO THE EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
4. SEE ROADWAY PLAN LAYOUT SHEETS FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

PROPOSED TYPICAL SECTIONS

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		9

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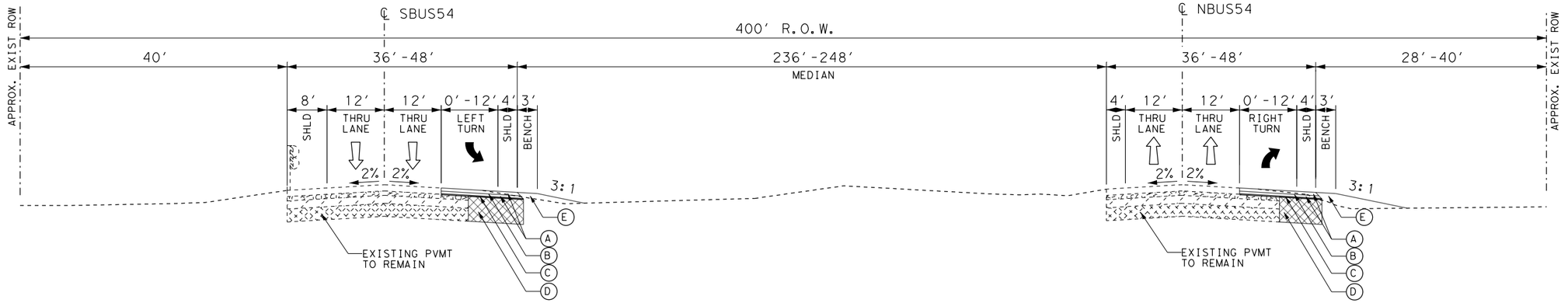

PROPOSED TYPICAL SECTION

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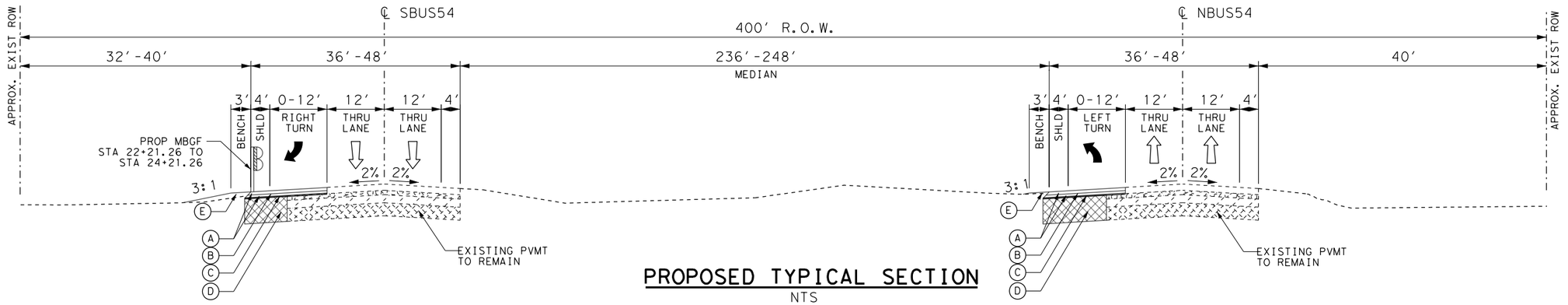

PROPOSED TYPICAL SECTION

NTS

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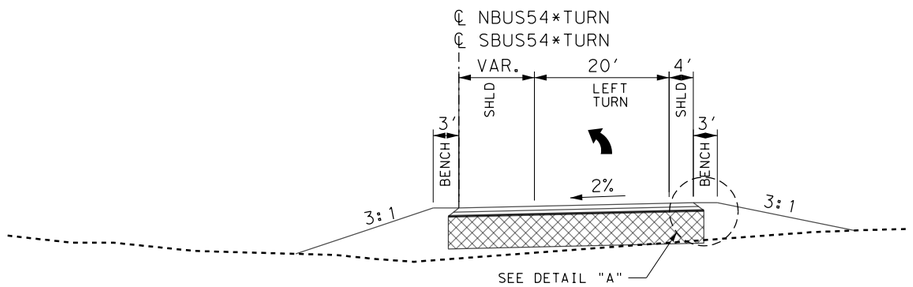


PROPOSED TYPICAL SECTION

NTS

STA 18+00.00 TO STA 21+00.00

LEGEND

EXIST TRAFFIC FLOW

PHASED TRAFFIC FLOW

(A) SP MIXES SP-C SAC-A PG70-22
2.5" = (275LBS/SY)
1.25" PER LIFTS

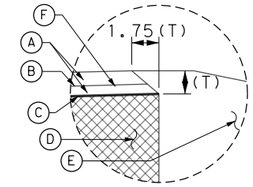
(B) TACK COAT
0.15 GAL/SY

(C) PRIME COAT (MULTI OPTION)
0.15 GAL/SY

(D) FL BS (RDWY DEL) (TY A GR 1-2)
10" = (1,400LBS/CF)

(E) EMBANKMENT (FINAL)(DENS CONT)
(TY A)

(F) TYPII CURB AND GUTTER



DETAIL "A"

NOTES:

1. TYPICAL SECTION INFORMATION OBTAINED FROM AS-BUILT PLAN SET 0167-01-128.SIGNED AND SEALED 1/11/20
2. TYPICAL SECTIONS ARE FOR GENERAL INFORMATION ONLY. REFER TO STANDARDS FOR PROPER CONSTRUCTION.
3. ALL DIMENSIONS ARE TO THE EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
4. SEE ROADWAY PLAN LAYOUT SHEETS FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE

PROPOSED TYPICAL SECTIONS

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		10

DATE: 5/31/2022 2:11:11 PM
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General Notes:

Tests to be in accordance with the Department's Standard Test Methods

Table 1
Compaction Requirements for Base Courses

Item	Description	Outside Roadway Course Density
132[1,2,3]	EMBANKMENT(FINAL)(DENSITY CONTROL) (TY A)	SEE BELOW

1. **To a depth of 6 in. below natural ground scarify and compact to a 95% minimum.**
2. **From natural ground to 24 in. below finished subgrade, 98% minimum compaction.**
3. **From 24 in. below finished subgrade to finished subgrade, 100% minimum compaction.**

Table 2
Basis of Estimate

Item	Description	Rate
247	FL BS (RDWY DEL) (TY A GR 1-2)	10" =1,400 LBS/CF
310	PRIME COAT (MULTI OPTION)	0.15 GAL/SY
3077	SP MIXES SP-C SAC-A PG70-22	2.5 IN = 275 LBS/SY
3077	TACK COAT	0.15 GAL/SY

1. **Deviation from the rates shown will require approval.**
2. **Tack Coat to be applied to each layer as directed by the Engineer. Rate shown is based on the desired residual application of 0.10 GAL/SY.**

General Requirements

Maintain the entire project area in a neat and orderly manner throughout the duration of the work. Remove all construction litter and undesirable vegetation within the right of way inside the project limits. This work will be subsidiary to the various bid items.

General Project Description – The project consists of a roadway realignment of two intersection:

- The first one at US 54 at State Line Rd. The intersection will be modified to accommodate a Restricted Crossing U-Turn Intersection and improvement included roadway, and drainage improvement as well as signing, pavement markings and illumination improvements.

- The second one at US54 at Stan Roberts Sr Ave. and implementing J-Turns for improved traffic circulation. The improvements consist of roadway, drainage, signing, pavement markings, and illumination improvements

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

Jonathan Concha, P.E.
West El Paso Area Engineer
Jonathan.Concha@txdot.gov

Aldo Madrid, P.E.
Director of Construction
Aldo.Madrid@txdot.gov

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

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:

https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

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

Traffic

Contact the Engineer or the City when construction operations are within 400 feet of a signalized intersection to determine/verify the location of loop detectors, conduit, ground-boxes, etc. Repair or replace any signal equipment damaged by construction operations. The method of repair or replacement shall be pre-approved and inspected. This work shall be completed at the Contractor's expense.

Contact the Department's El Paso District Signal Shop at txdotelplocates@txdot.gov to request all Department utility line locates within the project limits. The Signal Shop will locate one time only. Record locates for the purpose of refreshing and maintaining all markings throughout the duration of the project.

Contact City of El Paso Streets and Maintenance Department at linespots@elpasotexas.gov and pavementcut@elpasotexas.gov to request all City of El Paso utility line locates within project limits. The City will locate one time only. Record locates for refreshing and maintaining all markings throughout the duration of the project.

Item 4 – Scope of Work

Schedule and perform all work to assure proper drainage during the course of construction or maintenance operations. All labor, tools, equipment, and supervision required, to ensure drainage, removal, and handling of water shall be considered incidental work.

Item 5 – Control of Work

The Department will furnish horizontal and vertical reference points. Contractor must verify horizontal and vertical reference points with conventional survey methods before proceeding with

construction activities. Verification must be submitted for review and approval to the Department's R.P.L.S. prior to start of construction. Any discrepancies not reported will be at no additional cost to the Department.

Plan datum for this project is NAD 83 for horizontal and NAVD 88 for elevation based.

Keep traveled surfaces used in hauling operations clear and free of dirt or other material.

Existing pavement, utilities, structures, etc. damaged as a result of the operations will be repaired at no additional cost to the Department.

Protect from damage and destruction all areas of the right of way, which are not included in the actual limits of the proposed construction areas. Exercise care to prevent damage to trees, vegetation, and other natural features. Protect trees, shrubs, and other landscape features from abuse, marring, or damage within the actual construction and/or fenced protection areas designated for preservation.

Restore any area disturbed or damaged to a condition "as good as" or "better than" prior to start of construction operation. This work will be at the Contractor's expense.

Item 7 – Legal Relations and Responsibilities

Comply with all requirements of the Environmental Permits Issues and Commitments (EPIC) Sheet.

Do not discharge any liquid pollutant from vehicles onto the roadside. Immediately clean spills and dispose in compliance with local, state, and federal regulations to the satisfaction of the Engineer at no additional cost to the Department.

Occupational Safety & Health Administration (OSHA) regulations prohibit operations that bring people or equipment within 10 ft. of an energized electrical line. Where workers and/or equipment may be close to an energized electrical line, notify the electrical power company and make all necessary adjustments to ensure the safety of workers near the energized line.

Obtain any required traffic control permits from the City of El Paso when traffic control devices encroach City ROW or traffic control setup impacts City streets. The contractor shall be responsible for submitting a traffic control plan to the City of El Paso – Streets and Maintenance Department at tcp@elpasotexas.gov for review no later than two weeks prior to beginning of construction.

No significant traffic generator events identified.

Law Enforcement Personnel

Submit charge summary and invoices using the Department forms.

Patrol vehicles must be clearly marked to correspond with the officer's agency and equipped with appropriate lights to identify them as law enforcement. For patrol vehicles not owned by a law enforcement agency, markings will be retroreflective and legible from 100 ft. from both sides and the rear of the vehicle. Lights will be high intensity and visible from all angles.

No payment will be made for law enforcement personnel needed for moving equipment or payment for drive time to/from the event site.

Item 8 – Prosecution and Progress

Working days will be calculated in accordance with Section 8.3.1., "**Standard** Workweek."

Create and maintain a Bar Chart schedule.

Submit baseline schedule and obtain approval prior to beginning construction. The monthly progress payment will be held if the monthly update is not submitted.

Prior to beginning operations, schedule and attend a preconstruction conference with the Engineer. Provide the Department a written outline of the proposed sequence of work (Bar Chart Schedule) and an estimated progress schedule.

Item 9 – Measurement and Payment

Monthly progress payments will be made for items of work completed by the 27th day of each month. Any work completed after the 27th will be included for payment in the subsequent monthly progress payment.

Submit Material on Hand (MOH) payment requests at least **three (3)** working days before the end of the month for payment consideration on that month's estimate.

When approved, provide uniformed, off-duty law enforcement officers with marked vehicles during work that requires a lane closure. The officer in marked vehicles shall be located as approved to monitor or direct traffic during the closure. The method used to direct traffic at signalized intersections shall be as approved. Additional officers and vehicles may be provided when approved or directed.

Complete the daily tracking form provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided.

Show proof of certification by the Texas Commission on Law Enforcement Standards.

All law enforcement personnel used in Work Zone Traffic Control shall be trained for performing duties in work zones and are required to take "Safe and Effective Use of Law Enforcement Personnel in Work Zones" (Course #133119) which can be found online at the following site: **www.nhi.fhwa.dot.gov**

Certificates of completion should be available to all who finish the course. These should be kept by the officers in order to substantiate completion when reporting to the work site.

Minimums, scheduling fees, etc. will not be paid; TxDOT will consider paying cancellation fees on a case by case basis.

Item 100 – Preparing Right of Way

This Item will be used to remove the top **12** in. of existing material and soil. Removal of existing loose aggregate, concrete, asphalt, and any other materials deleterious to plant growth encountered within the limits during initial grading is subsidiary to this Item. Ground box adjustments to be subsidiary.

Item 110 – Excavation

To eliminate all drop-off conditions, construct tapers as directed. This work will not be paid for directly but will be considered subsidiary to pertinent bid items.

Item 132 – Embankment

Scarify and compact top 6 in. of existing roadway as directed before additional embankment or base course is placed. This work is subsidiary to various bid items. Track the side slopes of the embankment to control erosion. This work will be subsidiary to various bid items.

Item 150 – Blading

Sprinkling and rolling which may be required during the operation of Item 150 will not be measured or paid for directly but will be considered subsidiary to this item.

Item 247 – Flexible Base

A 20-ton vibratory pad foot roller will be required for compaction of lifts 10 inches or greater, unless otherwise directed by the Engineer.

When requested, stake with blue tops at 100-foot intervals, the lines, and grade shown in the plans. (For Item 247.4)

Provide flexible base that does not exceed a sulfate content of 1,000 ppm when tested in accordance with Tex-145-E. The sulfate concentration of water used for compaction shall not exceed 2,000 ppm.

Item 310 – Prime Coat

Cure prime coat for at least 48 hr. prior to beginning hot-mix asphalt placement operations.

Contractor is to place the seal coat or pavement course as indicated on plans within 14 calendar days of initial prime coat application. Otherwise, reapply prime coat as directed by the Engineer. Reapplication of the prime coat will be at the Contractor's expense.

Item 354 – Planning and Texturing Pavement

When a bridge deck is planned and textured, remove excess material. Do not broom to the sides of the bridge, under guardrail, etc. Cover or protect all sealed expansion joints, rails on bridge, and all railroad tracks encountered as approved by the engineer. Clean all of these features if they weren't properly protected. This work is subsidiary work to applicable bid items. Refer to Item 438, "Cleaning and Sealing Joints", for procedures and methods.

The Department will retain ownership of planed materials. The asphalt removed under this item shall be salvaged and stockpiled in separate stockpiles as directed by the Engineer at the following location:

West Area McCombs Maintenance Yard

Contact the West Area Maintenance Supervisor at (915) 757-5900 for coordination prior to delivery of materials. Stack in piles 12 to 13 feet maximum height. Place silt fence along the perimeter of stockpiled material. Silt fence will be paid under Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls". Final quantity of silt fence to be approved by the engineer prior to stockpiling. Hauling of material and incidentals to complete this work is subsidiary to this Item.

Item 416 – Drilled Shaft Foundations

Stake all foundations and locations approved by the Engineer prior to commencement of drilling operations to ensure no conflicts with utility lines. Coordinate with the Utility companies for utility location within the project limits.

Repair any damage to existing utilities to the satisfaction of the Engineer and the utility owner at no additional cost to the Department.
Use Class "C" concrete.

Cover drilled shafts with plywood and delineate them with cones, to the satisfaction of the Engineer, when not working in them and after work hours.

Replace faulty anchor bolts as directed. Do not weld anchor bolts.

Remove spoils, daily, out of the drainage areas or as directed.

Item 432 – Riprap

Wire mesh and fibers for concrete will not be allowed on this project for this Item. Reinforce all concrete riprap using bar reinforcement conforming to Item 440, "Reinforcement for Concrete,"

as shown on the plans, or as directed. For roadway illumination assemblies, riprap may include wire mesh per standard RID(2)-17.

Finish concrete riprap with a smooth (wood float) finish, unless otherwise directed.

Obtain approval for all stone riprap material sources.

Item 464 – Reinforced Concrete Pipe

Use Class III circular pipe for all proposed reinforced concrete, unless otherwise shown on the plans.

Use rubber gaskets as jointing material for concrete pipes.

Concrete collars will be paid under Item 420, “Concrete Substructure,” as shown on the plans.

Coordinate locations of all utilities and corresponding sequence of work. Repair any damage to existing utilities to the satisfaction of the Engineer and the utility owner at no additional cost to the Department.

Item 500 – Mobilization

The Contractor will be paid in accordance with the associated Item based work performed. This will fully compensate the Contractor for all associated activities.

Item 502 – Barricades, Signs, and Traffic Handling

Prior to beginning construction, the Engineer will approve the routing of traffic and sequence of work.

Additional signs and barricades, placed as directed, will be considered subsidiary to this Item.

In accordance with Section 7.2.6.1, designate, in writing, a Contractor Responsible Person (CRP) and a CRP alternate to take full responsibility for the set-up, maintenance, and necessary corrective measures of the traffic control plan. The CRP or CRP alternate must be present at site and implement the initial set up of every traffic control phase/stage, at each location, and/or each call out, for the entire duration of the project.

At the written request of the Engineer, immediately remove the CRP or CRP alternate from the project if, in the opinion of the Engineer, is not competent, not present at initial TCP set-ups, or does not perform in a proper, skillful, or safe manner. These individuals shall not be reinstated without written consent of the Engineer.

CRP and CRP alternate must be trained using Department approved training. Provide a copy of the certificate of completion to the Engineer for project records. Refer to Table 3 for Department approved Training.

Table 3
Contractor Responsible Person and Alternate

Provider	Course Number	Course Title	Duration	Notes
American Traffic Safety Services Association	TCS	Traffic Control Supervisor	2 days	
National Highway Institute	133112 133113	Design and Operation of Work Zone Traffic Control Work Zone Traffic Control for Maintenance Operations	1 day 1 day	Both courses are required to meet minimum required training.
Texas Engineering Extension Services	133112A	Design and Operation of Work Zone Traffic Control	3 days	
University of Texas Arlington Division for Enterprise Development	WKZ421	Traffic Control Supervisor	16 hours	Contact UTA for training needs.

All contractor workers involved with the traffic control implementation and maintenance must participate and complete a department approved training course. Provide a copy of the certificate of completion to the Engineer for project records. Refer to Table 4 for Department approved training.

Table 4
Other Work Zone Personnel

Provider	Course Number	Course Title	Duration	Notes
American Traffic Safety Services Association	TCT	Traffic Control Technician	1 day	
Texas Engineering Extension Services	HWS002	Work Zone Traffic Control	16 hours	Identical to HWS-410. Counts for 3-year CRP requirement.
National Highway Institute	133116	Maintenance of Traffic for Technicians	5 hours	Web based
National Highway Institute	134109-I	Maintenance Training Series: Basics of Work Zone Traffic Control	1 hour	Free, Web based
University of Texas at Arlington, Division for Enterprise Development	WKZ100	Work Zone Safety: Temporary Traffic Control	4 hours	Note name change. Free, Web based
TxDOT/AGC Joint Development	N/A	Safe Workers Awareness Highway Construction Work Zone Hazards	16 minutes 18 minutes	Videos available through AGC of Texas offices. English & Spanish
AGC America	N/A	Highway Work Zone Safety Training	1 day	
Texas Engineering Extension Service	HWS400	Temporary Traffic Control Worker	4 hours	Contact TEEX, if interested in course
TxDOT/AGC Joint Development	N/A	Work Zone Fundamentals	10 minutes	Videos available through ACT of Texas offices. English & Spanish

Contractor may choose to train workers involved with the traffic control implementation and maintenance with a contractor developed training in lieu of Department approved training. Contractor developed training must be equivalent to the Department approved training shown in Table 2. Provide the Engineer a copy of the course curriculum for pre-approval, prior to conducting

the contractor developed training. Provide the Engineer a copy of the log of attendees after training completion for project records.

Existing regulatory signs, route marker auxiliaries, guide signs, and warning signs that must be removed due to widening shall be relocated temporarily and erected on approved supports at locations shown in the plans, or as directed. This work will not be paid for directly but considered subsidiary to this Item.

Notify the Department officials when major traffic changes are to be made, such as detours. Coordinate with the Department on all traffic changes. Advance notification for the following week's work must be made by 5 P.M. on Wednesdays.

If Law Enforcement Personnel is required by the Engineer, coordinate with local law enforcement as directed or agreed. Complete the weekly tracking form provided by the Department and submit invoices with 5% allowance for Law Enforcement payments by Contractor that agree with the tracking form for payment at the end of each month where approved services were provided.

Always provide access to intersecting side roads and driveways, unless otherwise directed.

Any approved change to the sequence of work or TCP, must be signed and sealed by a Contractor's Licensed Professional Engineer assuming full responsibility for any additional barricade signs and devices needed.

Use striping operations to channelize traffic into the newly completed roadway, as directed. Maintain shoulders and median areas in a condition capable of serving as emergency paths, as approved. This work will be subsidiary to this Item.

Use portable changeable message signs (PCMS) to alert public of construction two weeks prior to construction.

Use flaggers when directed. Provide two-way radio communication for all flaggers.

Place and maintain sufficient additional warning signs, beacons, delineators, and barricades to warn and guide the public of all hazards through the construction zone at all times, and as directed.

Use flashing arrow boards on all tapers for each lane closure.

Some signs, barricades, and channelization devices may not be shown at the precise or measured position. Place the barricades, devices, or signs, with approval, in positions to meet field conditions.

Fill any holes left by barricade or sign supports and restore the area to its original condition.

Use Type A flashing warning lights or delineators to mark open excavation, footings, foundations, or other obstructions near lanes that may be open to traffic, as directed.

For additional information pertaining to channelization, signing, spacing details, and flagging procedures required to regulate, warn, and guide traffic through project, refer to the "Barricade and Construction Standards," BC(1)-14 and to the current *Texas Manual on Uniform Traffic Control Devices(TMUTCD)*.

Remove or cover signs that do not apply to current conditions at the end of each day's work.

Repair and/or replace all signs damaged by the public or due to weather events.

Safety Contingency

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

Item 506 – Temporary Erosion, Sedimentation, and Environmental Controls

Place Best Method Practices (BMP's) in locations as designated in the plans or as directed to meet field conditions

Place a weatherproof bulletin board containing the Texas Commission on Environmental Quality (TCEQ) required information on the project at a site as directed. Post the following documents:

TCEQ "TPDES Storm Water Program" Construction Site Notice; Primary Construction Site Notices from both Contractor and Department, completed and signed.

Place rain gauge(s) at locations, as designated.

The total disturbed area for this project is **2.27** acres. Establish the authorization requirements for Storm Water Discharges for soil disturbed area in this project, all project locations in the Contract, and Contractor Project Specific Locations (PSLs), within one mile of the project limits. Both the Department and the Contractor shall obtain an authorization to discharge storm water from TCEQ for the construction activities shown on the plans. Obtain required authorization from the TCEQ for any Contractor PSLs for construction support activities on or off right of way. When the total area disturbed for all projects in the Contract and PSLs within one mile of the project limits exceeds five acres, provide a copy of the Contractor NOI PSLs on the right of way to the Engineer (to the appropriate Municipal Separate Storm Sewer System (MS4) Operator when on an Off-system State route).

Best Method Practices (BMP's) may be adjusted to meet field conditions, or as directed. Engineer will verify all locations prior to placement of BMPs. Within the project limits, keep all inlets functional as long as possible to accept storm water as part of the Storm Water Pollution Prevention Plan (SWP3), as directed.

Grading operations will be limited to the catch point of the proposed cross-section.

Preserve any vegetation outside these limits.

Item 529 – Concrete Curb, Gutter and Combined Curb and Gutter

Use Class A concrete for these Items, unless otherwise shown on the plans. Wire mesh and fibers for concrete will not be allowed. Reinforce all concrete using reinforcement conforming to Item 440, "Reinforcement for concrete," as shown on the plans or as directed.

Construct the curb opening with metal plate configuration detailed in the plans, or as directed, to ensure roadway drainage to the earthen ditch. No direct payment will be made for these features. Payment will be made under this Item. All required manipulations or incidentals required to complete the work will be considered subsidiary to these items.

Perform all requiring grading for proposed concrete curb, gutter, and combined curb and gutter construction as shown on the plans. All grading, including excavation and fill/embankment will be subsidiary to this Item.

After construction, restore the adjacent surface to a condition approved by the Engineer. Consider this work subsidiary to this Item.

Item 540 – Metal Beam Guard Fence

Provide composite blackouts for all Metal Beam Guard Fence (MBGF) posts.

Install guardrails in the direction of traffic flow.

Stake the locations for approval prior to beginning the installation of the proposed MBGF.

Remove all delineators and object markers associated with the MBGF. This work will be subsidiary to the various bid items.

Verify MBGF post lengths and heights prior to ordering materials.

Place reflectors, as per Delineator and Pavement Marker Standard sheet D&OM (1)-20 on the metal beam rail element or as directed. This work will not be paid for directly but will be considered subsidiary to pertinent items.

At the end of each work day, protect all untreated, incomplete, MBGF/Rail blunt ends exposed to traffic flow during construction until the permanent end treatment is in place. All work and incidentals are considered subsidiary to this Item.

MBGF not used will become the property of the Contractor.

Item 544 –Guardrail End Treatments

Provide certifications from the approved manufacturer's online training for all personnel installing end treatments prior to beginning work.

Item 610 – Roadway Illumination Assemblies

Conductor runs in Illumination Layouts contain 5 ft. of slack.

Limitations on Use of the RIP-19 Standard

The Roadway Illumination Pole (RIP-19) 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 ft. above the elevation of surrounding terrain, in accordance with the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, Xth Edition (20XX) (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-ft. above the surrounding terrain, provide poles meeting the following requirements:

Submittals. Submit fabrication drawings and calculations sealed by a licensed professional engineer. Follow the electronic shop drawing submittal process (see Guide Electronic Shop Drawing Submittal), to submit fabrication drawings and calculations for approval.

Luminaire Structural Support Requirements. Lighting poles, arms, and anchor bolt assemblies shall have a 25-year design life to resist dead loads, ice loads, and the required basic wind speeds safely at the location of installation in accordance with the current edition of the AASHTO Design Specifications. For transformer base poles, the fabricator shall include transformer base and connecting hardware in 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.

Fabricate steel roadway illumination poles in accordance with Department standards RIP-2019 (Roadway Illumination Poles – RIP (1)-19). Poles fabricated according to RIP-2019 require no

shop drawings. Alternate designs to RIP-2019 or the use of aluminum to fabricate poles will require the submission of shop drawings electronically.

For instructions on submitting shop drawings electronically go to the Texas Department of Transportation (TxDOT) home page, http://txdot.gov, Business with TxDOT, Bridge information, Shop drawings. File is titled: Guide to Electronic Shop Drawing Submittal.

Item 618 – Conduit

The location of conduit is diagrammatic and may be varied to meet local conditions upon approval of the Engineer.

When shown on the plans, use underground warning tape in the trench installation of conduit (PVC).

For conduit placement in pavement, an earth-saw may be used provided the cut does not exceed 6 in. Backfill as shown on the trench details in the plans.

For all underground conduit bends of 45°, provide rigid metal conduit. Where the rigid metal conduit is exposed at any point and where rigid metal extends into ground boxes, bond the metal conduit to the grounding conductor with grounding type bushings or by other UL-listed grounding connectors, approved by the Engineer. Rigid metal bends will not be paid for directly but will be considered incidental to the PVC conduit system.

Use rigid metal conduit when crossing bridges or culverts. All clamps, expansion joints, bolts and accessories necessary to install the rigid metal will be subsidiary to this Item.

Backfill roadway and driveway trench with cement-stabilized backfill at the end of each working day. Place an ACP patch at the end of the week or as directed by the Engineer.

All conduit elbows and rigid metal extensions required to be installed on PVC conduit systems will not be paid for separately but will be considered subsidiary to the various bid items.

All bore items shall be directional and shall be paid for under this item. Bore quantities include the distance beneath the roadway plus an additional 2 ft. on either side of the curb, sidewalk, or edge of pavement.

For conduits install by open trench method, backfill the trench as shown on the plans.

Place conduit for fiber optic cable at a minimum of 48 in. below pavement surface. Place all other conduit at a minimum depth of 18 in. below the pavement surface. Place conduit prior to the new pavement construction.

Fit both ends of each raceway with a temporary cap to prevent dirt and debris from entering during construction.

Install a continuous green insulated copper wire No. 8 AWG or larger in every conduit throughout the electrical system in accordance with the electrical detail sheets, and the latest edition of the National Electrical Code.

When conduit is to be installed where riprap presently exists, take care in breaking the existing riprap for placement of the conduit. Do not break out a greater area that is required for placement of the conduit. Replace broken riprap with Class "C" concrete to the exact slope, pattern, color and thickness of the existing riprap. Replacement of riprap will be subsidiary to this Item.

Item 620 – Electrical Conductors

Use NEC type XHHW for all conductors.

Insulate grounding conductors with a green jacket and neutral conductors with a white jacket.

At every accessible point, bond together the grounding conductors which share the same conduit, junction box, ground box or structure in accordance with the electrical detail sheets and the latest edition of the National Electrical Code.

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holder as shown on the Department's Materials Producers List under "Roadway Illumination and Electrical Supplies." category. Fuse holder is shown on the list under Item 610, "Roadway Illumination Assemblies," and Item 620, "Electrical Conductors." Provide 10 amp time delay fuses.

Include extra cable length in each ground box or foundation for each run, to provide adequate slack, as provided in the plans or as directed.

Ensure a properly bonded electrical system by running one No. 8 wire between foundations and grounding it at each foundation ground-rod.

Bond metal junction boxes and metal conduit to the circuit grounding conductors in accordance with the National Electrical Code.

Refer to Article 7.18, "Electrical Requirements," for electrical certification and electrical licensing requirements

The required electrical certifications course is available and is scheduled periodically by Texas Engineering Extension Service (TEEX). Alternatively, Contractors may purchase an entire course for their personnel to be held at a time and location of their choice as negotiated through TEEX. For more information contact:

Texas Engineering Extension Service (TEEX)
TxDOT Electrical System Course
(979) 845-6563

Item 624 – Ground Boxes

Remove all conductors in ground boxes as shown on the plans to be abandoned. Payment for removal of conductors will be subsidiary to this Item.

Item 644 – Small Roadside Sign Assemblies

Stake all sign locations and receive approval prior to sign placement.

The 2-1/2-inch, Schedule 10 post will meet the following requirements:

- 0.120 in. nominal wall thickness
- Seamless or electric-resistance welded steel tubing or pipe
- Steel will be HSLAS Grade 55 per ASTM A1011 or ASTM A1008

Other steel may be used, if it meets the following:

- 55,000 psi minimum yield strength
- 70,000 psi minimum tensile strength
- 20% minimum elongation in 2 in.
- Wall thickness (uncoated) to be within the range of 0.108 in. to 0.132 in. galvanization per ASTM A123 or ASTM A653 G90

For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metalizing with zinc wire per ASTM B833.

Verify all post lengths to ensure the proper sign height. Remove and replace any sign installed incorrectly. This work will be done at no expense to the Department.

Provide Texas Universal Triangular Slip Base clamp type for all signs as shown on SMD (Slip-1)-08.

As directed, some regulatory and guide signs will be relocated before construction begins. Mark and locate each reference marker perpendicular to the road and along the right of way, or as directed, prior to removal. Re-erect reference markers at their original location upon completion of construction.

All signs removed will remain property of the Department.

Item 658 – Delineator and Object Marker Assemblies

Verify all locations with the Engineer prior to installation.

Removal and proper disposal of all existing delineators, object markers, and any non-standard hardware assemblies are not paid directly, but will be considered subsidiary to pertinent items for payment.

Item 666 –Retro-reflectorized Pavement Markings

Use a pilot line for final striping and remove pilot line after all striping is complete. Removal will be in accordance with the methods specified in Item 677, “Eliminating Existing Pavement Markings and Markers,” and will be subsidiary to this Item.

Air blasting is required as pavement surface preparation.

In those areas where existing pavement markings are to be covered or removed, field locate and record the existing pavement markings by survey or other approved method by the Engineer as directed. Place final striping on these locations.

Item 672 – Raised Pavement Markers

Use a pilot line for final striping and remove pilot line after all striping is complete. Removal will be in accordance with the methods specified in Item 677, “Eliminating Existing Pavement Markings and Markers,” and will be subsidiary to this Item.

Air blasting is required for pavement surface preparation.

Furnish adhesives that conform to DMS-6100, “Epoxies and Adhesives,” and DMS-6130, “Bituminous Adhesive for Pavement Markers,” for this Item.

Do not place raised pavement markers when the pavement surface temperature is below 60°F.

Removal of all existing raised pavement markers will be considered subsidiary to the various bid items.

Item 1005 – Loose Aggregate for Ground Cover

Clean and wash all aggregate for groundcover prior to placement.

Use crushed rhyolite rock, graded to range 3/4 in. to 1-1/2 in. size and placed in a uniform 3 in. layer for Type I aggregate. Use Franklin Red, as shown on plans or as approved prior to placement.

Use crushed rhyolite rock, graded to range 3 in. to 6 in. size and placed in a uniform 6 in. layer for Type II aggregate. Use Grey, as shown on plans or as approved prior to placement.

The Contractor will have option to produce both boulders and aggregate from project cut sections. Aesthetic colors will not be changed to match Contractor’s rock.

Provide a Sand color for Type I (Screening - Chad) and a Golden Brown color for Type II (graded to range from 3/4 in. to 1-1/2 in.). Place in a uniform 3 in. Secure approval prior to placement.

Item 3077 – Superpave Mixtures

Use Surface Aggregate Classification “A” material for all surface mixes.

In place of typical tack materials shown in Table 18 under Item 300, use a tracking resistant asphalt interlayer (TRAIL) material as a tack coat. Approved TRAIL products are found on TxDOT’s Material Producer List under Asphalt Interlayer (Tracking Resistant) through http://www.txdot.gov/business/resources/materials.html.

Hydrated Lime shall be added as an additive as per Item 301 “Asphalt Antistripping Agents” between the rates of 1.0% minimum and 2.0% maximum by weight. If the Hamburg Wheel Test cannot be met within these limits, Liquid Antistripping agents as approved by the Engineer may be used in conjunction with lime.

Supply Warm-Mix Asphalt (WMA) under this Item.

When Reclaimed Asphalt Pavement (RAP) is used in the production of hot-mix asphaltic concrete, use fractionated RAP. Do not exceed 10.0% of Fractionated RAP on surface mixtures.

Use of RAS is not allowed for any mixtures.

Substitute PG Binders (grade dumping) will not be allowed for any mixtures.

Obtain the current version of the templates at http://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/site-manager.html. Submit electronically to the Engineer.

Design the mixture at 50 gyrations (Ndesign).

Do not cover with asphaltic material, any existing survey monuments, manholes, or valve covers, etc. Adjustments will be done in coordination with the respective utility owners.

Place a string line or other suitable marking to ensure smooth, neat lines, or as directed. Provide smooth transitions to existing driveways and intersections.

Place longitudinal joints approximately 6 in. from the broken striping, or as directed, to avoid placing under the wheel path. Longitudinal joints will not be allowed to be placed on any outside lanes.

Operate the spreading and finishing machine at a uniform forward speed consistent with the plant production rate, hauling capability, and roller train capacity to result in a continuous operation. The speed will be slow enough, so that stopping between trucks is not ordinarily required. If the Engineer determines non-uniform delivery of material is affecting the HMA placement, the Engineer may require the paving operations to cease until acceptable methods are employed to minimize starting and stopping of the paver.

Item 6185 – Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)

All TMA Operators must participate in a TMA workshop to be conducted by the El Paso District Safety Office, on the proper use of TMAs, prior to working on Department Right of Way (ROW). A certificate of completion will be issued to TMA Operators that successfully complete the TMA workshop. The certificate of completion must be always carried by TMA Operators while working on Department right of way.

Acquire the TCP and TMA Operator's certificates of completion prior to the authorization to begin work. No time suspension will be granted, and no traffic control work will be allowed without certificates of completion.

In addition to the shadow vehicles with Truck Mounted Attenuator (TMA) that are specified as being required on the traffic control plan for this project, provide additional shadow vehicle(s) as detailed on General Note of this standard sheet.

Therefore, shadow vehicles with TMA will be required for this type of work. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

The supporting vehicle for the TMA shall have a minimum gross (i.e., ballasted) vehicular weight of 19,000 pounds.

Basis of Estimate for Stationary TMAs				
		TMA(Stationary)		
Phase	Standard	Required	Additional	TOTAL
1, 4, 5	TCP(2-1)-18 TCP(5-1)-18 TCP(2-6)-18 BC(9)-21	80	20	100

Basis of Estimate for Mobile TMAs			
	TMA(Mobile)		
1,4,5	10	10	20

CONTROL: 0167-01-126, ETC

COUNTY: EL PASO

HIGHWAY: US 54

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0167-01-126 **DISTRICT** El Paso **COUNTY** El Paso
HIGHWAY US 54

			CONTROL SECTION JOB		**0167-01-126**		**0167-01-133**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00066146**		**A00177504**			
			COUNTY		**El Paso**		**El Paso**			
			HIGHWAY		**US 54**		**US 54**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL		
	100-6001	PREPARING ROW		AC	1.430		1.590		3.020	
	104-6021	REMOVING CONC (CURB)		LF			555.000		555.000	
	105-6093	REMOVE STAB BASE AND ASPH PAV (2"-3")		SY	6,789.000				6,789.000	
	110-6001	EXCAVATION (ROADWAY)		CY	3,351.000		654.000		4,005.000	
	110-6003	EXCAVATION (SPECIAL)		CY	7.000				7.000	
	132-6002	EMBANKMENT (FINAL)(DENS CONT)(TY A)		CY	3,999.000		6,152.000		10,151.000	
	150-6001	BLADING		STA	41.000		26.000		67.000	
	247-6121	FL BS (RDWY DEL) (TY A GR 1-2)		TON	5,841.000		3,729.000		9,570.000	
	310-6001	PRIME COAT (MULTI OPTION)		GAL	1,013.000		1,499.000		2,512.000	
	354-6048	PLANE ASPH CONC PAV (3")		SY	3,414.000		7,715.000		11,129.000	
	416-6005	DRILL SHAFT (42 IN)		LF			21.000		21.000	
	416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)		LF	150.000				150.000	
	416-6088	DRILL SHAFT (RDWY ILL POLE) (24 IN)		LF			120.000		120.000	
	432-6001	RIPRAP (CONC)(4 IN)		CY	14.000		74.300		88.300	
	432-6009	RIPRAP (CONC) (CL B) (4")		CY	4.000				4.000	
	432-6022	RIPRAP (STONE COMMON)(DRY)(6 IN)		CY	9.000		8.000		17.000	
	432-6044	RIPRAP (CONC)(FLUME)		CY	12.000		14.000		26.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)		CY			13.000		13.000	
	464-6005	RC PIPE (CL III)(24 IN)		LF	20.000				20.000	
	464-6025	RC PIPE (CL V)(18 IN)		LF	300.000		201.000		501.000	
	467-6356	SET (TY II) (18 IN) (RCP) (3: 1) (C)		EA	4.000		6.000		10.000	
	467-6357	SET (TY II) (18 IN) (RCP) (3: 1) (P)		EA	2.000				2.000	
	467-6388	SET (TY II) (24 IN) (RCP) (3: 1) (C)		EA	1.000				1.000	
	496-6004	REMOV STR (SET)		EA	3.000				3.000	
	496-6007	REMOV STR (PIPE)		LF	93.000				93.000	
	500-6001	MOBILIZATION		LS	0.500		0.500		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	6.000		6.000		12.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)		LF	960.000		515.000		1,475.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)		LF	960.000		515.000		1,475.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")		LF	40.000				40.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)		LF	40.000				40.000	
	529-6002	CONC CURB (TY II)		LF	2,752.000		523.000		3,275.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)		LF	100.000		200.000		300.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION		EA	1.000		1.000		2.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE		LF	55.000		190.000		245.000	
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL		EA	1.000				1.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)		EA			1.000		1.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0167-01-126 **DISTRICT** El Paso **COUNTY** El Paso
HIGHWAY US 54

			CONTROL SECTION JOB		**0167-01-126**		**0167-01-133**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00066146**		**A00177504**			
			COUNTY		**El Paso**		**El Paso**			
			HIGHWAY		**US 54**		**US 54**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	610-6004	RELOCATE RD IL ASM (TRANS-BASE)	EA	2.000		6.000		8.000	
	610-6009	REMOVE RD IL ASM (TRANS-BASE)	EA			1.000		1.000	
	610-6102	REPLACE LUMINAIRE W/LED (250W EQ)	EA	7.000		6.000		13.000	
	610-6214	IN RD IL (TY SA) 40T-8 (250W EQ) LED	EA	8.000				8.000	
	610-6216	IN RD IL (TY SA) 40T-10 (250W EQ) LED	EA			6.000		6.000	
	618-6023	CONDT (PVC) (SCH 40) (2")	LF	2,556.000		2,235.000		4,791.000	
	618-6024	CONDT (PVC) (SCH 40) (2") (BORE)	LF	702.000		175.000		877.000	
	620-6008	ELEC CONDR (NO.8) INSULATED	LF	14,859.000				14,859.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF	1,725.000		12,645.000		14,370.000	
	624-6002	GROUND BOX TY A (122311)W/APRON	EA	9.000		3.000		12.000	
	624-6008	GROUND BOX TY C (162911)W/APRON	EA	6.000				6.000	
	624-6028	REMOVE GROUND BOX	EA	3.000		1.000		4.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	29.000		30.000		59.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	7.000		4.000		11.000	
	644-6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	6.000		6.000		12.000	
	644-6051	IN SM RD SN SUP&AM TYS80(2)SA(P-EXAL)	EA	2.000		2.000		4.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	14.000		10.000		24.000	
	644-6070	RELOCATE SM RD SN SUP&AM TY S80	EA	4.000		2.000		6.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	17.000		22.000		39.000	
	658-6057	INSTL OM ASSM (OM-3R)(TWT)GND	EA	1.000				1.000	
	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	EA	9.000				9.000	
	658-6064	INSTL DEL ASSM (D-SY)SZ 1(BRF)GF2	EA	8.000				8.000	
	658-6095	INSTL DEL ASSM (D-DY)SZ 1(YFLX)GND	EA	3.000				3.000	
	658-6100	INSTL OM ASSM (OM-2Z)(WFLX)GND(BI)	EA	2.000		4.000		6.000	
	666-6030	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF	835.000		2,145.000		2,980.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	4,618.000		2,130.000		6,748.000	
	666-6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	170.000		85.000		255.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	135.000		80.000		215.000	
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	10.000		6.000		16.000	
	666-6063	REFL PAV MRK TY I(W)(UTURN ARW)(100MIL)	EA	6.000		6.000		12.000	
	666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	26.000		16.000		42.000	
	666-6138	REFL PAV MRK TY I (Y)8"(SLD)(100MIL)	LF	550.000		160.000		710.000	
	666-6156	REFL PAV MRK TY I(Y)(MED NOSE)(100MIL)	EA	2.000		2.000		4.000	
	666-6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	9,592.000		6,590.000		16,182.000	
	666-6171	REFL PAV MRK TY II (W) 6" (BRK)	LF	1,890.000		1,220.000		3,110.000	
	666-6176	REFL PAV MRK TY II (W) 8" (DOT)	LF	835.000		2,145.000		2,980.000	
	666-6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	4,618.000		1,860.000		6,478.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0167-01-126 **DISTRICT** El Paso **COUNTY** El Paso
HIGHWAY US 54

				CONTROL SECTION JOB	0167-01-126		0167-01-133		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00066146		A00177504			
				COUNTY	El Paso		El Paso			
				HIGHWAY	US 54		US 54			
ALT	BID CODE	DESCRIPTION	UNIT		EST.	FINAL	EST.	FINAL		
	666-6180	REFL PAV MRK TY II (W) 12" (SLD)	LF		170.000		85.000		255.000	
	666-6182	REFL PAV MRK TY II (W) 24" (SLD)	LF		135.000		80.000		215.000	
	666-6184	REFL PAV MRK TY II (W) (ARROW)	EA		10.000		6.000		16.000	
	666-6187	REFL PAV MRK TY II (W) (UTURN ARROW)	EA		6.000		6.000		12.000	
	666-6192	REFL PAV MRK TY II (W) (WORD)	EA		26.000		16.000		42.000	
	666-6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF		9,160.000		6,555.000		15,715.000	
	666-6211	REFL PAV MRK TY II (Y) 8" (SLD)	LF		550.000		160.000		710.000	
	666-6217	REFL PAV MRK TY II (Y) (MED NOSE)	EA		2.000		2.000		4.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF		9,592.000		6,590.000		16,182.000	
	666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF		1,890.000		1,220.000		3,110.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF		9,160.000		6,555.000		15,715.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA				48.000		48.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA		441.000		248.000		689.000	
	1005-6001	LOOSE AGGR FOR GROUNDCOVER (TYPE I)	CY		23.000				23.000	
	3077-6022	SP MIXESSP-CSAC-A PG70-22	TON		2,002.000		1,374.000		3,376.000	
	3077-6075	TACK COAT	GAL		2,184.000		1,499.000		3,683.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA		42.000		4.000		46.000	
	6027-6003	CONDUIT (PREPARE)	LF		1,505.000		580.000		2,085.000	
	6027-6008	GROUND BOX (PREPARE)	EA		2.000		4.000		6.000	
	6064-6053	ITS POLE (55 FT)(REL)	EA				1.000		1.000	
	6185-6002	TMA (STATIONARY)	DAY		50.000		50.000		100.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY		10.000		10.000		20.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS		1.000		1.000		2.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS		1.000		1.000		2.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS		1.000		1.000		2.000	

SUMMARY OF ROADWAY REMOVAL ITEMS

ITEM	0100 6001	0105 6093	0354 6048	0496 6004	0496 6007	0542 6001	0542 6003
DESCRIPTION	PREPARING ROW	REMOVE STAB BASE AND ASPH PAV (2"-3")	PLANE ASPH CONC PAV (3")	REMOV STR (SET)	REMOV STR (PIPE)	REMOVE METAL BEAM GUARD FENCE	REMOVE DOWNSTREAM ANCHOR TERMINAL
	AC	SY	SY	EA	LF	LF	EA
SHEET 1 OF 9	0.07		130				
SHEET 2 OF 9	0.35		618	1			
SHEET 3 OF 9	0.20		1127				
SHEET 4 OF 9	0.06	227	1539			55	1
SHEET 5 OF 9	0.41	2235					
SHEET 6 OF 9	0.20	2068					
SHEET 7 OF 9	0.12	1972		2	93		
SHEET 8 OF 9	0.01	269					
SHEET 9 OF 9	0.01	18					
PROJECT TOTALS	**1.43**	**6789**	**3414**	**3**	**93**	**55**	**1**

BASIS OF ESTIMATE:

ITEM	DESCRIPTION	RATE	UNIT
0247-6121	FL BS (RDWY DEL) (TY A GR 1-2)	10" =1,400(LBS/CF)	TON
0310-6001	PRIME COAT (MULTI OPTION)	0.15(GAL/SY)	GAL
3077-6022	SP MIXES SP-C SAC-A PG70-22	2.5" =275(LBS/SY)	TON
3077-6075	TACK COAT	0.15(GAL/SY)	GAL

SUMMARY OF ROADWAY ITEMS

ITEM	0110 6001	0132 6002	0150 6001	0247 6121	0310 6001	0432 6001	0432 6022	0432 6044	0464 6005	0464 6025
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL)(DENS CONT)(TY A)	BLADING	FL BS (RDWY DEL) (TY A GR 1-2)	PRIME COAT (MULTI OPTION)	RIPRAP (CONC)(4 IN)	RIPRAP (STONE COMMON)(DR Y)(6 IN)	RIPRAP (CONC)(FLUM E)	RC PIPE (CL III)(24 IN)	RC PIPE (CL V)(18 IN)
	CY	CY	STA	TON	GAL	CY	CY	CY	LF	LF
SHEET 1 OF 9	10	189	4	183	72					
SHEET 2 OF 9	2	1,351	5	864	338		5		20	180
SHEET 3 OF 9	11	930	5	499	312					
SHEET 4 OF 9	2	272	6	194	291			2		
SHEET 5 OF 9	178	478	6	1,178		14	2	10		
SHEET 6 OF 9	1,536	359	6	1,583						
SHEET 7 OF 9	1,574	395	5	1,192			2			120
SHEET 8 OF 9	36	15	2	142						
SHEET 9 OF 9	2	10	2	5						
PROJECT TOTALS	**3351**	**3999**	**41**	**5841**	**1013**	**14**	**9**	**12**	**20**	**300**

SUMMARY OF ROADWAY ITEMS (CONTINUED)

ITEM	0467 6356	0467 6357	0467 6388	0529 6002	0540 6002	0540 6016	1005 6001	3077 6022	3077 6075
DESCRIPTION	SET (TY II) (18 IN) (RCP) (3:1) (C)	SET (TY II) (18 IN) (RCP) (3:1) (P)	SET (TY II) (24 IN) (RCP) (3:1) (C)	CONC CURB (TY II)	MTL W-BEAM GD FEN (STEEL POST)	DOWNSTREAM ANCHOR TERMINAL SECTION	LOOSE AGGR FOR GROUNDCOVER (TYPE I)	SP MIXES SP-C SAC-A PG70-22	TACK COAT
	EA	EA	EA	LF	LF	EA	CY	TON	GAL
SHEET 1 OF 9								66	72
SHEET 2 OF 9	4		1					310	338
SHEET 3 OF 9								286	312
SHEET 4 OF 9				182	100	1	6	266	291
SHEET 5 OF 9				2,526			17	309	337
SHEET 6 OF 9								415	452
SHEET 7 OF 9		2						312	341
SHEET 8 OF 9								37	41
SHEET 9 OF 9				44				1	2
PROJECT TOTALS	**4**	**2**	**1**	**2752**	**100**	**1**	**23**	**2002**	**2184**

CSJ: 0167-01-126
US54 STATE LINE RD

SUMMARY OF QUANTITIES

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		13

DATE: 6/1/2022 7:17:25 PM
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SUMMARY OF PAVEMENT MARKING ITEMS

ITEM	0666-6030	0666-6036	0666-6042	0666-6048	0666-6054	0666-6063	0666-6078	0666-6138	0666-6156	0666-6170	0666-6171	0666-6176
DESCRIPTION	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	REFL PAV MRK TY I (W)(ARROW)(100MIL)	REFL PAV MRK TY I (W)(UTURN ARW)(100MIL)	REFL PAV MRK TY I (W)(WORD)(100MIL)	REFL PAV MRK TY I (Y)8"(SLD)(100MIL)	REFL PAV MRK TY I (Y)(MEDNOSE)(100MIL)	REFL PAV MRK TY II (W)4"(SLD)	REFL PAV MRK TY II (W)6"(BRK)	REFL PAV MRK TY II (W)8"(DOT)
	LF	LF	LF	LF	EA	EA	EA	LF		LF	LF	LF
SHEET 1 OF 9										505	130	
SHEET 2 OF 9	130	190		20		1	3			1075	200	130
SHEET 3 OF 9	210	420				2	2			1015	260	210
SHEET 4 OF 9	105	1288	50		2		4		1	1067	300	105
SHEET 5 OF 9	45	1000	35	75	6	1	10	355	1	2565	300	45
SHEET 6 OF 9	175	1310	85		2	1	3			1200	300	175
SHEET 7 OF 9	125	410		40		1	3	150		990	300	125
SHEET 8 OF 9	45						5			405	100	45
SHEET 9 OF 9							1	40		770		
PROJECT TOTALS	**835**	**4618**	**170**	**135**	**10**	**6**	**26**	**550**	**2**	**9592**	**1890**	**835**

SUMMARY OF PAVEMENT MARKING ITEMS

ITEM	0666-6178	0666-6180	0666-6182	0666-6184	0666-6187	0666-6192	0666-6207	0666-6211	0666-6217	0666-6303	0666-6306	0666-6315	0672-6010
DESCRIPTION	REFL PAV MRK TY II (W)8"(SLD)	REFL PAV MRK TY II (W)12"(SLD)	REFL PAV MRK TY II (W)24"(SLD)	REFL PAV MRK TY II (W)(ARROW)	REFL PAV MRK TY II (W)(UTURN ARW)	REFL PAV MRK TY II (W)(WORD)	REFL PAV MRK TY II (Y)4"(SLD)	REFL PAV MRK TY II (Y)8"(SLD)	REFL PAV MRK TY II (Y)(MEDNOSE)	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	REFL PAV MRKR TY II-C-R
UNIT	LF	LF	LF	EA	EA	EA	LF	LF	EA	LF	LF	LF	EA
SHEET 1 OF 9							500			505	130	500	6
SHEET 2 OF 9	190		20		1	3	1020			1075	200	1020	42
SHEET 3 OF 9	420				2	2	1015			1015	260	1015	50
SHEET 4 OF 9	1288	50		2		4	1205		1	1067	300	1205	75
SHEET 5 OF 9	1000	35	75	6	1	10	1850	355	1	2565	300	1850	105
SHEET 6 OF 9	1310	85		2	1	3	1200			1200	300	1200	89
SHEET 7 OF 9	410		40		1	3	1185	150		990	300	1185	47
SHEET 8 OF 9							415	5		405	100	415	9
SHEET 9 OF 9						1	770	40		770		770	18
PROJECT TOTALS	**4618**	**170**	**135**	**10**	**6**	**26**	**9160**	**550**	**2**	**9592**	**1890**	**9160**	**441**

SUMMARY OF SIGNING REMOVAL ITEMS

ITEM	644	644	644
CODE	6068	6070	6076
DESCRIPTION	RELOCATE SM RD SN SUP&AM TY 10BWG	RELOCATE SM RD SN SUP&AM TY S80	REMOVE SM RD SN SUP&AM
	EA	EA	EA
SHEET 1 OF 9			
SHEET 2 OF 9			2
SHEET 3 OF 9	1		
SHEET 4 OF 9	3		3
SHEET 5 OF 9	9	4	10
SHEET 6 OF 9	1		1
SHEET 7 OF 9			1
SHEET 8 OF 9			
SHEET 9 OF 9			
PROJECT TOTALS	**14**	**4**	**17**

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CSJ: 0167-01-126
US54 STATE LINE RD

SUMMARY OF QUANTITIES

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		14

SUMMARY OF PROPOSED SIGNING ITEMS

ITEM	644	644	644	644	658	658	658	658	658
CODE	6001	6004	6007	6051	6057	6061	6064	6095	6100
DESCRIPTION	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	IN SM RD SN SUP&AM TYS80(2) SA (P-EXAL)	INSTL OM ASSM (OM-3R)(TWT)GND	INSTL DEL ASSM (D-SW) SZ (BRF) GF2	INSTL DEL ASSM (D-SY) SZ (BRF) GF2	INSTL DEL ASSM (D-DY) SZ 1 (YFLX) GND	INSTL OM ASSM (OM-2Z)(WFLX)GND(BI)
	EA	EA	EA	EA	EA	EA	EA	EA	EA
SHEET 1 OF 9									
SHEET 2 OF 9	10	1	2						2
SHEET 3 OF 9	2								
SHEET 4 OF 9	2	2			1	9	8		
SHEET 5 OF 9	8		1	2					
SHEET 6 OF 9	1	3							
SHEET 7 OF 9	5	1	2					3	
SHEET 8 OF 9									
SHEET 9 OF 9	1		1						
PROJECT TOTALS	**29**	**7**	**6**	**2**	**1**	**9**	**8**	**3**	**2**

SUMMARY OF LED SIGNING QUANTITIES

ITEM	0618-6023	0618-6024	0620-6010	0624-6008
DESCRIPTION	CONDT (PVC) (SCH 40)(2")	CONDT (PVC) (SCH 40)(2")(BORE)	ELEC CONDR (NO.8) INSULATED	GROUND BOX TYC (122311)W/ APRON
	LF	LF	LF	EA
SHEET 1 OF 1	30	25	1725	6
PROJECT TOTALS	**30**	**25**	**1725**	**6**

SUMMARY OF ROADWAY LIGHTING QUANTITIES

ITEM	0110-6003	0416-6029	0432-6009	0610-6004	0610-6102	0610-6214	0618-6023	0618-6024	0620-6008	0624-6002	0624-6028	6027-6003	6027-6008
DESCRIPTION	EXCAVATION (SPECIAL)	DRILLED SHAFT (RDWY ILL POLE)(30 IN)	RIPRAP (CONC) (CL B)(4")	RELOCATE RD IL ASM (TRANS-BASE)	REPLACE LUMINAIRE W/LED (250W EQ)	RD IL (TY SA)40T-8(250W EQ) LED	CONDT (PVC) (SCH 40)(2")	CONDT (PVC) (SCH 40)(2")(BORE)	ELEC CONDR (NO.8) INSULATED	GROUND BOX TY A (122311)W/ APRON	REMOVE GROUND BOX	CONDUIT (PREPARE)	GROUND BOX (PREPARE)
	CY	LF	CY	EA	EA	EA	LF	LF	LF	EA		LF	EA
SHEET 1 OF 9													
SHEET 2 OF 9	1	20	1.05			2	370		1140				
SHEET 3 OF 9	1	20	1.40		1	2	480		1545	1		15	
SHEET 4 OF 9	1				1				2670			790	
SHEET 5 OF 9	1	40		2	5		426	677	5679	7	3	700	1
SHEET 6 OF 9	1						590		1800	1			
SHEET 7 OF 9	1	60	1.00			3	660		2025				
SHEET 8 OF 9	1	10	.35			1							
SHEET 9 OF 9													
PROJECT TOTALS	**7**	**150**	**4**	**2**	**7**	**8**	**2526**	**677**	**14859**	**9**	**3**	**1505**	**1**

CSJ: 0167-01-126
US54 STATE LINE RD

SUMMARY OF EROSION CONTROL ITEMS

ITEM	0506 6038	0506 6039	0506 6040	0506 6043
DESCRIPTION	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (8")	BIODEG EROSN CONT LOGS (REMOVE)
	LF	LF	LF	LF
SHEET 1 OF 1	960	960	40	40
PROJECT TOTALS	**960**	**960**	**40**	**40**

SUMMARY OF TRAFFIC CONTROL ITEMS

ITEM	0500 6001	0502 6001	6001 6002	6185 6002	6185 6005
DESCRIPTION	MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	LS	MO	EA	DAY	DAY
SHEET 1 OF 1	0.5	6	4	50	10
PROJECT TOTALS	**0.5**	**6**	**4**	**50**	**10**

SUMMARY OF QUANTITIES

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		15

DATE: 6/1/2022 8:26:52 PM
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SUMMARY OF TRAFFIC CONTROL ITEMS					
ITEM	0500 6001	0502 6001	6001 6002	6185 6002	6185 6005
DESCRIPTION	MOBILIZATIO N	BARRICADES, SIGNS AND TRAFFIC HANDLING	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	LS	MO	EA	DAY	DAY
SHEET 1 OF 1	0.50	6	4	50	10
PROJECT TOTALS	**0.50**	**6**	**4**	**50**	**10**

SUMMARY OF ROADWAY REMOVAL ITEMS				
ITEM	0100 6001	0104 6021	0354 6048	0542 6001
DESCRIPTION	PREPARING ROW	REMOVING CONC (CURB)	PLANE ASPH CONC PAV (3")	REMOVE METAL BEAM GUARD FENCE
	AC	LF	SY	LF
SHEET 1 OF 2	0.88	402	4906	153
SHEET 2 OF 2	0.71	153	2809	37
PROJECT TOTALS	**1.59**	**555**	**7715**	**190**

SUMMARY OF ROADWAY ITEMS											
ITEM	0110 6001	0132 6002	0150 6001	0247 6121	0310 6001	0432 6001	0432 6022	0432 6044	0432 6045	0464 6025	0467 6356
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY A)	BLADING	FL BS (RDWY DEL) (TY A GR 1-2)	PRIME COAT (MULTI OPTION)	RIPRAP (CONC) (4 IN)	RIPRAP (STONE COMMON) (DRY) (6 IN)	RIPRAP (CONC) (FLUME)	RIPRAP (MOW STRIP) (4 IN)	RC PIPE (CLV) (18 IN)	SET (TY II) (18 IN) (RCP) (3: 1) (C)
	CY	CY	STA	TON	GAL	CY	CY	CY	CY	LF	EA
SHEET 1 OF 2	327	2,645	13	1,997	812	41	4	7	9	67	2
SHEET 2 OF 2	327	3,507	13	1,732	687	26	4	7	4	134	4
PROJECT TOTALS	**654**	**6152**	**26**	**3729**	**1499**	**67**	**8**	**14**	**13**	**201**	**6**

SUMMARY OF ROADWAY ITEMS (CONTINUED)						
ITEM	0529 6002	0540 6002	0540 6016	0544 6001	3077 6022	3077 6075
DESCRIPTION	CONC CURB (TY II)	MTL W-BEAM GD FEN (STEEL POST)	DOWNSTREAM ANCHOR TERMINAL SECTION	GUARDRAIL END TREATMENT (INSTALL)	SP MIXES SP-C SAC-A PG70-22	TACK COAT
	LF	LF	EA	EA	TON	GAL
SHEET 1 OF 2	295	179	1		745	812
SHEET 2 OF 2	228	21		1	630	687
PROJECT TOTALS	**523**	**200**	**1**	**1**	**1374**	**1499**

BASIS OF ESTIMATE:

ITEM	DESCRIPTION	RATE	UNIT
0247-6121	FL BS (RDWY DEL)(TY A GR 1-2)	10" =1,400(LBS/CF)	TON
0310-6001	PRIME COAT (MULTI OPTION)	0.15 (GAL/SY)	GAL
3077-6022	SP MIXES SP-C SAC-A PG70-22	2.5" =275(LBS/SY)	TON
3077-6075	TACK COAT	0.15(GAL/SY)	GAL

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE

SUMMARY OF QUANTITIES

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		16

DATE: 6/1/2022 4:01:08 PM
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SUMMARY OF PAVEMENT MARKING ITEMS

ITEM	0666 6030	0666 6036	0666 6042	0666 6048	0666 6054	0666 6063	0666 6078	0666 6138	0666 6156	0666 6170	0666 6171	0666 6176	0666 6178
DESCRIPTION	REFL PAV MRK TY I (W)8"(DOT) (100MIL)	REFL PAV MRK TY I (W)8"(SLD) (100MIL)	REFL PAV MRK TY I (W)12"(SLD) (100MIL)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	REFL PAV MRK TY I (W)(ARROW) (100MIL)	REFL PAV MRK TY I(W)(UTURN ARW)(100MIL)	REFL PAV MRK TY I(W)(WORD)(100MIL)	REFL PAV MRK TY I (Y)8"(SLD) (100MIL)	REFL PAV MRK TY I(Y)(MED NOSE)(100MIL)	REFL PAV MRK TY II (W) 4" (SLD)	REFL PAV MRK TY II (W) 6" (BRK)	REFL PAV MRK TY II (W) 8" (DOT)	REFL PAV MRK TY II (W) 8" (SLD)
	LF	LF	LF	LF	EA	EA	EA	LF	EA	LF	LF	LF	LF
SHEET 1 OF 2	1,055	1,265	60	40	4	3	9	95	1	3,355	620	1,055	995
SHEET 2 OF 2	1,090	865	25	40	2	3	7	65	1	3,235	600	1,090	865
PROJECT TOTALS	**2145**	**2130**	**85**	**80**	**6**	**6**	**16**	**160**	**2**	**6590**	**1220**	**2145**	**1860**

SUMMARY OF PAVEMENT MARKING ITEMS (CONTINUED)

	0666 6180	0666 6182	0666 6184	0666 6187	0666 6192	0666 6207	0666 6211	0666 6217	0666 6303	0666 6306	0666 6315	0672 6009	0672 6010
DESCRIPTION	REFL PAV MRK TY II (W) 12" (SLD)	REFL PAV MRK TY II (W) 24" (SLD)	REFL PAV MRK TY II (W) (ARROW)	REFL PAV MRK TY II (W) (UTURN ARROW)	REFL PAV MRK TY II (W) (WORD)	REFL PAV MRK TY II (Y) 4" (SLD)	REFL PAV MRK TY II (Y) 8" (SLD)	REFL PAV MRK TY II (Y) (MED NOSE)	RE PM W/RET REQ TY I (W)4"(SLD) (100MIL)	RE PM W/RET REQ TY I (W)6"(BRK) (100MIL)	RE PM W/RET REQ TY I (Y)4"(SLD) (100MIL)	REFL PAV MRKR TY II-A-A	REFL PAV MRKR TY II-C-R
	LF	LF	EA	EA	EA	LF	LF	EA	LF	LF	LF	EA	EA
SHEET 1 OF 2	60	40	4	3	9	3,360	95	1	3,355	620	3,360	27	137
SHEET 2 OF 2	25	40	2	3	7	3,195	65	1	3,235	600	3,195	21	111
PROJECT TOTALS	**85**	**80**	**6**	**6**	**16**	**6555**	**160**	**2**	**6590**	**1220**	**6555**	**48**	**248**

SUMMARY OF ROADWAY LIGHTING QUANTITIES

ITEM	0416 6088	0432 6001	0610 6004	0610 6009	0610 6102	0610 6216	0618 6023	0618 6024	0620 6010	0624 6002	0624 6028	6027 6003	6027 6008
DESCRIPTION	DRILL SHAFT (RDWY ILL POLE) (24 IN)	RIPRAP (CONC)(4 IN)	RELOCATE RD IL ASM (TRANS-BASE)	REMOVE RD IL ASM (TRANS-BASE)	REPLACE LUMINAIRE W/LED (250W EQ)	IN RD IL (TY SA) 40T-10 (250W EQ) LED	CONDT (PVC) (SCH 40) (2")	CONDT (PVC) (SCH 40) (2") (BORE)	ELEC CONDR (NO.6) INSULATED	GROUND BOX TY A (122311)W/ APRON	REMOVE GROUND BOX	CONDUIT (PREPARE)	GROUND BOX (PREPARE)
	LF	CY	EA	EA	EA	EA	LF	LF	LF	EA	EA	LF	EA
SHEET 1 OF 2	60	3	3	1	3	3	1,115		5,190	2	1	160	2
SHEET 2 OF 2	60	3	3		3	3	1,075	175	5,010	1		420	2
PROJECT TOTALS	**120**	**6**	**6**	**1**	**6**	**6**	**2190**	**175**	**10200**	**3**	**1**	**580**	**4**

SUMMARY OF SIGNING REMOVAL ITEMS

ITEM	0644 6068	0644 6070	0644 6076
DESCRIPTION	RELOCATE SM RD SN SUP&AM TY 10BWG	RELOCATE SM RD SN SUP&AM TY S80	REMOVE SM RD SN SUP&AM
	EA	EA	EA
SHEET 1 OF 2	7	1	14
SHEET 2 OF 2	3	1	8
PROJECT TOTALS	**10**	**2**	**22**

SUMMARY OF SIGNING ITEMS

ITEM	0644 6001	0644 6004	0644 6007	0644 6051	0658 6100
DESCRIPTION	IN SM RD SN SUP&AM TY10BWG(1) SA(P)	IN SM RD SN SUP&AM TY10BWG(1) SA(T)	IN SM RD SN SUP&AM TY10BWG(1) SA(U)	IN SM RD SN SUP&AM TYS80(2)SA (P-EXAL)	INSTL OM ASSM (OM-2Z)(WF LX)GND(BI)
	EA	EA	EA	EA	EA
SHEET 1 OF 2	15	2	3	1	4
SHEET 2 OF 2	15	2	3	1	
PROJECT TOTALS	**30**	**4**	**6**	**2**	**4**

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CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE

SUMMARY OF QUANTITIES

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		17

SUMMARY OF ITS QUANTITIES					
ITEM	0416 6005	0432 6001	0618 6023	0620 6010	6064 6053
DESCRIPTION	DRILL SHAFT (42 IN)	RIPRAP (CONC)(4 IN)	CONDT (PVC) (SCH 40) (2")	ELEC CONDR (NO.6) INSULATED	ITS POLE (55 FT)(REL)
	LF	CY	LF	LF	EA
SHEET 1 OF 1	21	1.3	45	2,445	1
PROJECT TOTALS	**21**	**1.3**	**45**	**2445**	**1**

SUMMARY OF EROSION CONTROL ITEMS		
ITEM	0506 6038	0506 6039
DESCRIPTION	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
	LF	LF
SHEET 1 OF 1	515	515
PROJECT TOTALS	**515**	**515**

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CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE

SUMMARY OF QUANTITIES

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		18

DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.

2.

☑ No Action Required ☐ Required Action

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

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

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

☑ No Permit Required

☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

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

1.

2.

3.

4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☑ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

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

☑ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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

☑ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

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

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

☐ Yes ☑ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

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

☐ Yes ☑ No

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

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

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

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

☑ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☑ No Action Required ☐ Required Action

Action No.

1.

2.

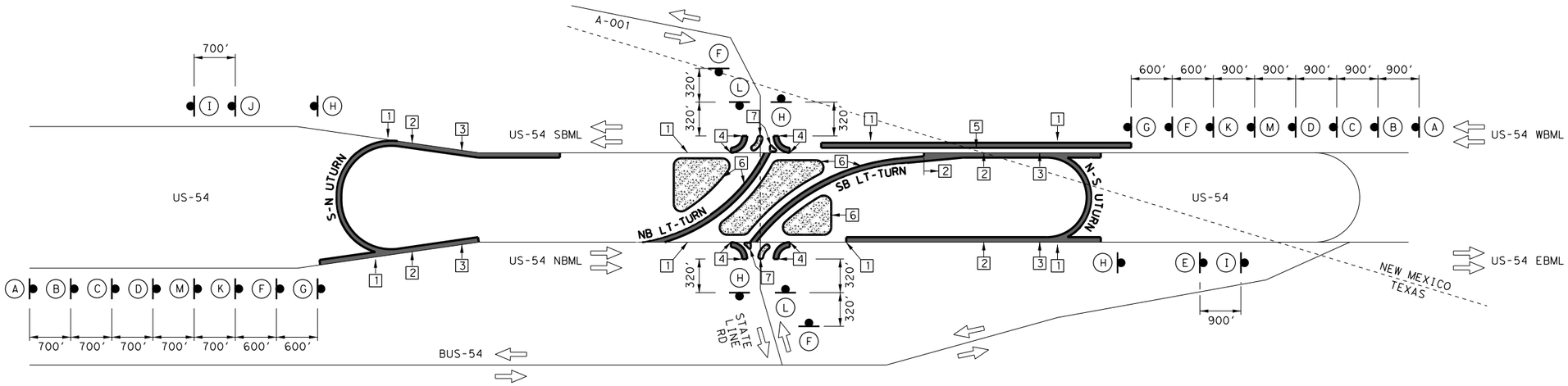
3.

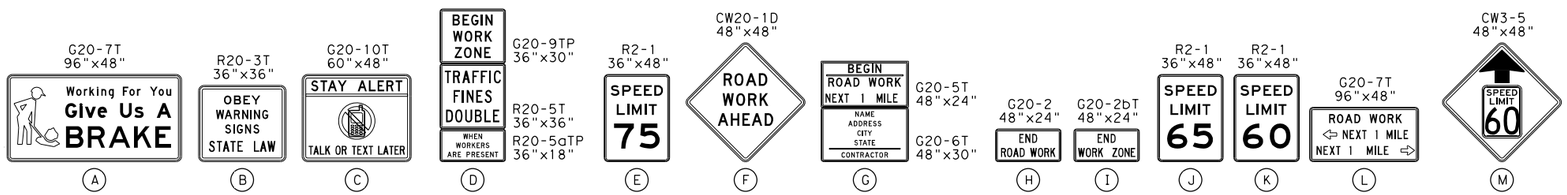
Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR	
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0167	01	126, ETC.	US-54	
12-12-2011 (DS)	DIST	COUNTY		SHEET NO.	
05-07-14 ADDED NOTE SECTION IV.	ELP	EL PASO		19	
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.					





LEGEND

- EXISTING TRAFFIC FLOW
- EXISTING ROADWAY
- PROPOSED ROADWAY
- PROPOSED RAISED MEDIAN

NOTES:

1. PLACE ADVANCE WARNING SIGNS ACCORDING TO STANDARDS BC(1)-21 TO BC (12)-21 UNLESS OTHERWISE DIRECTED.
2. APPLY TRAFFIC CONTROL PLAN AS DESCRIBED IN THE TCP SELECTION TABLE, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
3. DO NOT STORE ANY EQUIPMENT OR STOCKPILE ANY MATERIAL ON THE OPPOSITE DIRECTION OF THE WORK OR ON THE LANE CLOSURE.
4. CONTRACTOR SHALL WORK AT ONLY ONE LOCATION IN EACH DIRECTION AT A TIME UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. POSTED SPEED LIMIT REDUCED TO 60 MPH THROUGH THE WORK ZONE ON US-54.
6. LPCB, PTCB, AND CCA TO BE UTILIZED BY CONTRACTOR TO PROTECT WORK AREAS. LPCB TO BE PLACED ON STATE LINE RD. PCTB TO BE PLACED ALONG US-54 ML.
7. CONTRACTOR TO TAPER BARRIER (50:1 ML, 30:1 CROSS STREET) TO PROTECT THE WORK ZONE AND USE TMA AS NEEDED.

TCP SELECTION TABLE

PHASE NUMBER	ROADWAY	TYPE OF WORK	STANDARD SHEET	SHEET DESCRIPTION	SHEET	DIAGRAM DESCRIPTION	SUGGESTED USE
1	US-54	INSTALL PROPOSED ILLUMINATION	TCP (5-1)-18	TCP - SHOULDER WORK FOR FREEWAYS/EXPRESSWAYS	TCP (5-1b)	WORK AREA ON SHOULDER	APPLY SHOULDER CLOSURE TO INSTALL PROPOSED ILLUMINATION
2	US-54	CONSTRUCT S-N UTURN & N-S UTURN TIE-INS	TCP (2-6)-18	TCP - LANE CLOSURES ON DIVIDED HIGHWAYS	TCP (2-6a)	ONE LANE CLOSURE	APPLY INSIDE LANE CLOSURE FOR ROADWAY TIE-INS. TMA REQUIRED DURING WORKING HOURS. REMOVE LANE CLOSURE DURING NON-WORKING HOURS AND PROTECT THE WORK AREA IN ACCORDANCE WITH TXDOT EDGECON-21 STANDARD.
3	US-54	CONSTRUCT S-N UTURN & N-S UTURN IMPROVEMENTS	TCP (5-1)-18	TCP - SHOULDER WORK FOR FREEWAYS/EXPRESSWAYS	TCP (5-1b)	WORK AREA ON SHOULDER	APPLY SHOULDER CLOSURE TO COMPLETE UTURN CONSTRUCTION.
4	STATE LINE RD/A-001	CONSTRUCT CROSS STREET RADIUS ROADWAY IMPROVEMENTS	TCP (2-1)-18	TCP - CONVENTIONAL ROAD SHOULDER WORK	TCP (2-1b)	WORK SPACE ON SHOULDER	APPLY SHOULDER CLOSURE TO STATE LINE RD/A-001 TO COMPLETE CROSS STREET RADIUS ROADWAY IMPROVEMENTS.
			TCP (5-1)-18	TCP - SHOULDER WORK FOR FREEWAYS/EXPRESSWAYS	TCP (5-1b)	WORK AREA ON SHOULDER	APPLY SHOULDER CLOSURE TO US-54 TO COMPLETE CROSS STREET RADIUS ROADWAY IMPROVEMENTS.
5	US-54	CONSTRUCT US 54 SBML OUTSIDE PAVEMENT	TCP (2-6)-18	TCP - LANE CLOSURES ON DIVIDED HIGHWAYS	TCP (2-6a)	ONE LANE CLOSURE	APPLY OUTSIDE SBML CLOSURE FOR ROADWAY CONSTRUCTION. TMA REQUIRED DURING WORKING HOURS. REMOVE LANE CLOSURE DURING NON-WORKING HOURS AND PROTECT THE WORK AREA IN ACCORDANCE WITH TXDOT EDGECON-21 STANDARD.
6	US-54	CONSTRUCT INTERSECTION RECONFIGURATIONS (RCUT LEFT TURNS)	WZ(RCD)-13	WORK ZONE ROAD CLOSURE DETAILS	WZ(RCD)-13	ROAD CLOSURE AT THE INTERSECTION	CONSTRUCT ML LT-TURN LANES. APPLY US-54 INSIDE LANE CLOSURE USING TXDOT TCP (2-6)-18 STANDARD. TMA REQUIRED DURING WORKING HOURS. APPLY WZ(RCD)-13, DETOUR ML LT-TURNS TO NEWLY CONSTRUCTED UTURNS. REMOVE LANE CLOSURE DURING NON-WORKING HOURS AND PROTECT THE WORK AREA IN ACCORDANCE WITH TXDOT EDGECON-21 STANDARD.
			TCP (2-6)-18	TCP - LANE CLOSURES ON DIVIDED HIGHWAYS	TCP (2-6a)	ONE LANE CLOSURE	
7	STATE LINE RD/A-001	CONSTRUCT RAISED MEDIAN ISLANDS	TCP (2-3)-18	TCP - TRAFFIC SHIFT ON TWO-LANE ROADS	TCP (2-3b)	ONE LANE CLOSED INADEQUATE FIELD OF VIEW	SHIFT TRAFFIC TO THE OUTSIDE OF ROADWAY, APPLY TCP (2-3b) LANE SHIFT SIGNAGE TO CONTRUCT RAISED MEDIANS. CROSS STREET THROUGH MOVEMENT TO USE FINAL TRAFFIC FLOW PATTERN BY USING NEWLY CONSTRUCTED UTURNS.
8	US-54	PAVEMENT MARKING INSTALLATION	TCP(3-2)-13	TCP - MOBILE OPERATIONS DIVIDED HIGHWAYS	TCP(3-2)-13		APPLY PROPOSED PAVEMENT MARKINGS.
			TCP(3-3)-14	TCP - MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/REMOVAL	TCP(3-3)-14		
	STATE LINE RD/A-001	PAVEMENT MARKING INSTALLATION	TCP(3-4)-13	TCP - MOBILE OPERATIONS FOR ISOLATED WORK AREAS UNDIVIDED HIGHWAYS	TCP(3-4)-13		APPLY PROPOSED PAVEMENT MARKINGS.

SCALE: N.T.S.

STATE OF TEXAS
ERIC SIERRA-ORTEGA
124817
LICENSED
PROFESSIONAL ENGINEER

5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC CONTROL TCP LINE DIAGRAM

SHEET 1 OF 1

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		20

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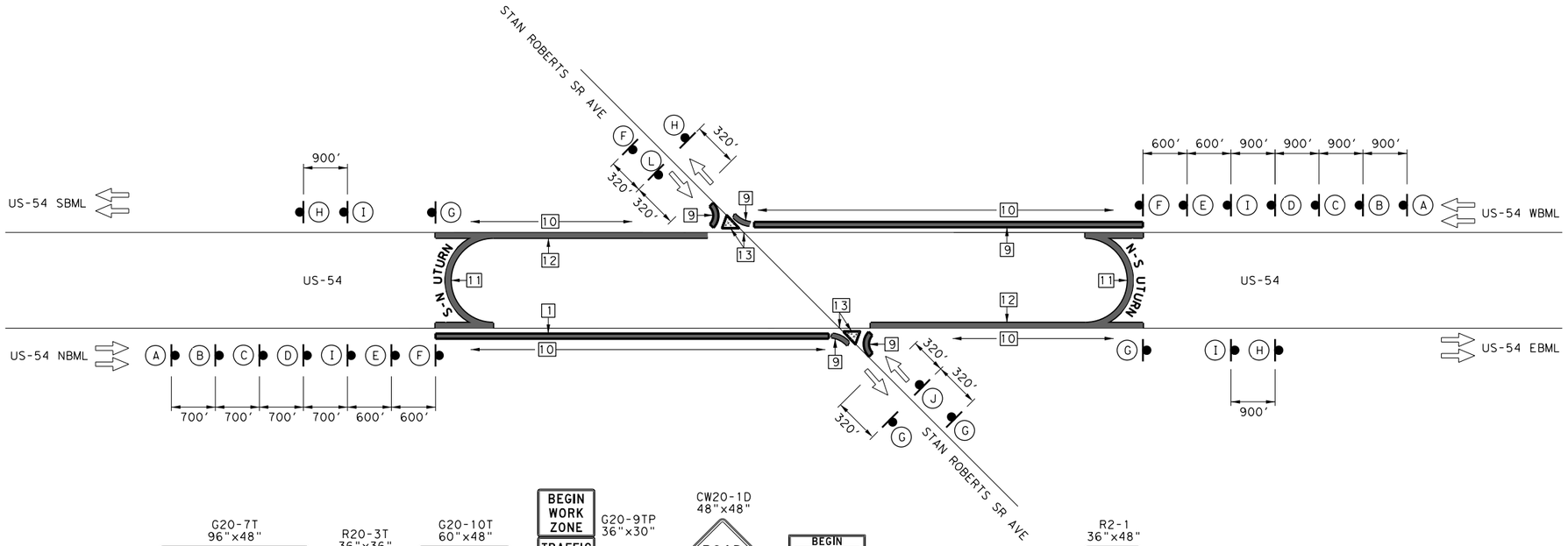

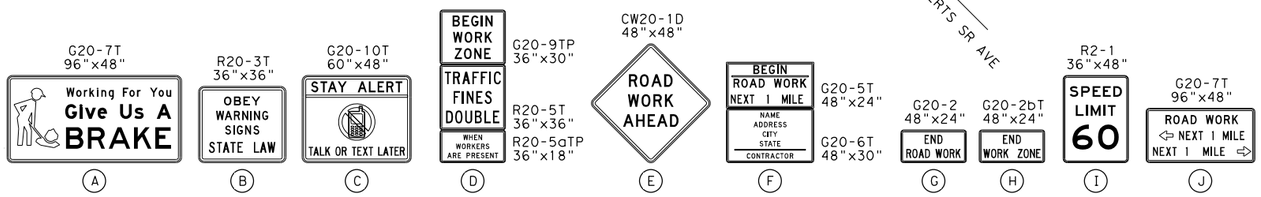

LEGEND

- EXISTING TRAFFIC FLOW
- EXISTING ROADWAY
- PROPOSED ROADWAY
- PROPOSED RAISED MEDIAN

NOTES:

1. PLACE ADVANCE WARNING SIGNS ACCORDING TO STANDARDS BC(1)-21 TO BC (12)-21 UNLESS OTHERWISE DIRECTED.
2. APPLY TRAFFIC CONTROL PLAN AS DESCRIBED IN THE TCP SELECTION TABLE, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
3. DO NOT STORE ANY EQUIPMENT OR STOCKPILE ANY MATERIAL ON THE OPPOSITE DIRECTION OF THE WORK OR ON THE LANE CLOSURE.
4. CONTRACTOR SHALL WORK AT ONLY ONE LOCATION IN EACH DIRECTION AT A TIME UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. POSTED SPEED LIMIT CHANGES FROM 65MPH TO 60MPH ON US-54 NO REDUCTION IN SPEED LIMIT REQUIRED IN THIS TCP.
6. LPCB, PTCB, AND CCA TO BE UTILIZED BY CONTRACTOR TO PROTECT WORK AREAS. LPCB TO BE PLACED ON STAN ROBERTS SIR AVE. PCTB TO BE PLACED ALONG US-54 ML.
7. CONTRACTOR TO TAPER BARRIER (50:1 ML, 30:1 CROSS STREET) TO PROTECT THE WORK ZONE AND USE TMA AS NEEDED.
8. PHASING MAY BE COMBINED AS DIRECTED BY THE ENGINEER.
9. U-TURNS TO BE BUILD PRIOR TO CLOSURE OF STAN ROBERTS SR AVE.

SCALE: N.T.S.

TCP SELECTION TABLE

CONSTRUCTION PHASE	ROADWAY	TYPE OF WORK	STANDARD SHEET	SHEET DESCRIPTION	SHEET	DIAGRAM DESCRIPTION	SUGGESTED USE
9	STAN ROBERTS SR AVE	CONSTRUCT CROSS STREET RADIUS ROADWAY IMPROVEMENTS	TCP (2-1)-18	TCP - CONVENTIONAL ROAD SHOULDER WORK	TCP (2-1b)	WORK SPACE ON SHOULDER	APPLY SHOULDER CLOSURE TO STAN ROBERTS SR AVE TO COMPLETE STREET RADIUS ROADWAY IMPROVEMENTS.
			TCP (5-1)-18	TCP - SHOULDER WORK FOR FREEWAYS/EXPRESSWAYS	TCP (5-1b)	WORK AREA ON SHOULDER	APPLY SHOULDER CLOSURE TO US-54 TO COMPLETE CROSS STREET RADIUS ROADWAY IMPROVEMENTS.
	US-54	CONSTRUCT US 54 SBML/NBML DECELERATION LANES	TCP (2-6)-18	TCP - LANE CLOSURES ON DIVIDED HIGHWAYS	TCP (2-6a)	ONE LANE CLOSURE	APPLY OUTSIDE SBML/NBML CLOSURE FOR ROADWAY CONSTRUCTION. TMA REQUIRED DURING WORKING HOURS. REMOVE LANE CLOSURE DURING NON-WORKING HOURS AND PROTECT THE WORK AREA IN ACCORDANCE WITH TXDOT EDGECON-21 STANDARD.
10	US-54	INSTALL PROPOSED ILLUMINATION	TCP (5-1)-18	TCP - SHOULDER WORK FOR FREEWAYS/EXPRESSWAYS	TCP (5-1b)	WORK AREA ON SHOULDER	APPLY SHOULDER CLOSURE TO INSTALL PROPOSED ILLUMINATION
11	US-54	CONSTRUCT S-N UTURN & N-S UTURN IMPROVEMENTS	TCP (5-1)-18	TCP - SHOULDER WORK FOR FREEWAYS/EXPRESSWAYS	TCP (5-1b)	WORK AREA ON SHOULDER	APPLY SHOULDER CLOSURE TO COMPLETE UTURN CONSTRUCTION.
12	US-54	CONSTRUCT S-N UTURN & N-S UTURN TIE-INS	TCP (2-6)-18	TCP - LANE CLOSURES ON DIVIDED HIGHWAYS	TCP (2-6a)	ONE LANE CLOSURE	APPLY INSIDE LANE CLOSURE FOR ROADWAY TIE-INS. TMA REQUIRED DURING WORKING HOURS. REMOVE LANE CLOSURE DURING NON-WORKING HOURS AND PROTECT THE WORK AREA IN ACCORDANCE WITH TXDOT EDGECON-21 STANDARD.
13	STAN ROBERTS SR AVE	DEMOLITION OF EXISTING INTERSECTION	WZ(RCD)-13	WORK ZONE ROAD CLOSURE DETAILS	WZ(RCD)-13	ROAD CLOSURE AT THE INTERSECTION	DEMO OF EXISTING INTERSECTION. APPLY US-54 INSIDE LANE CLOSURE USING TXDOT TCP (2-6)-18 STANDARD. TMA REQUIRED DURING WORKING HOURS. APPLY WZ(RCD)-13, DETOUR ML LT-TURNS TO NEWLY CONSTRUCTED U-TURNS. REMOVE LANE CLOSURE DURING NON-WORKING HOURS AND PROTECT THE WORK AREA IN ACCORDANCE WITH TXDOT EDGECON-21 STANDARD.
			TCP (2-6)-18	TCP - LANE CLOSURES ON DIVIDED HIGHWAYS	TCP (2-6a)	ONE LANE CLOSURE	
	STAN ROBERTS SR AVE	CONSTRUCT RAISED MEDIAN ISLANDS	BC (9)-21	BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES	BC (9)-21	SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS	APPLY CHANNELIZING DEVICES TO COMPLETE THE PROPOSED RAISED MEDIAN ISLAND.
14	US-54	PAVEMENT MARKING INSTALLATION	TCP(3-2)-13	TCP - MOBILE OPERATIONS DIVIDED HIGHWAYS	TCP(3-2)-13		APPLY PROPOSED PAVEMENT MARKINGS.
			TCP(3-3)-14	TCP - MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/REMOVAL	TCP(3-3)-14		
	STAN ROBERTS SR AVE	PAVEMENT MARKING INSTALLATION	TCP(3-4)-13	TCP - MOBILE OPERATIONS FOR ISOLATED WORK AREAS UNDIVIDED HIGHWAYS	TCP(3-4)-13		APPLY PROPOSED PAVEMENT MARKINGS.

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE

US-54 TRAFFIC CONTROL TCP LINE DIAGRAM

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		21

DATE: 5/31/2022 1:53:17 PM
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.

2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	0167	01	126,ETC.	US-54
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	ELP	EL PASO		22

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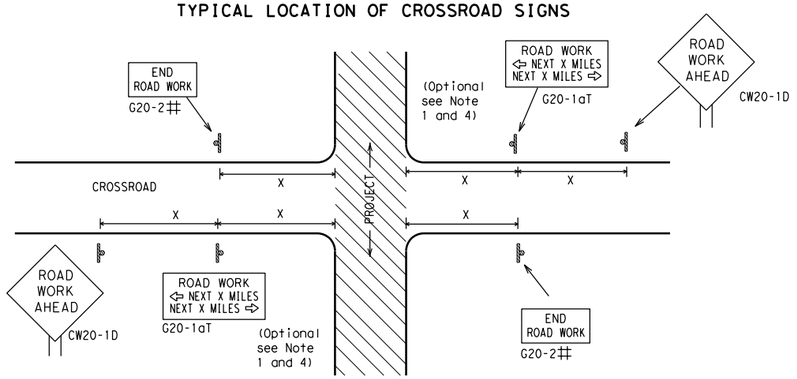
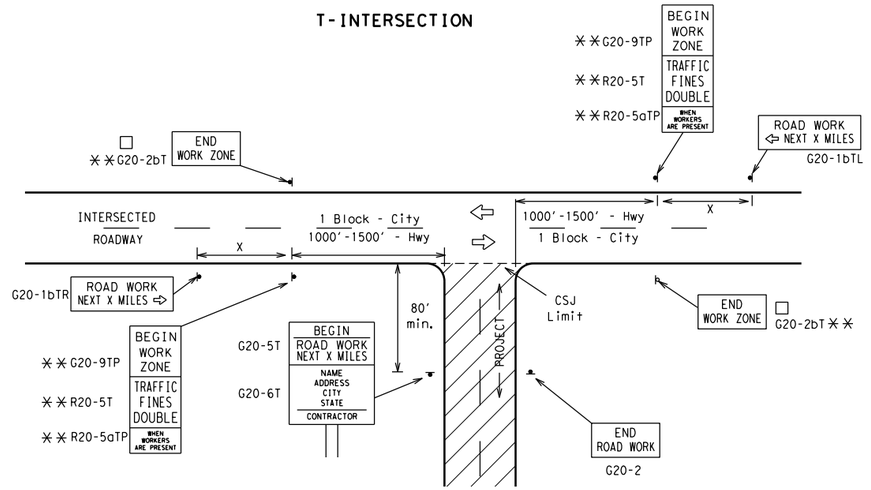
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
*	*[3]

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

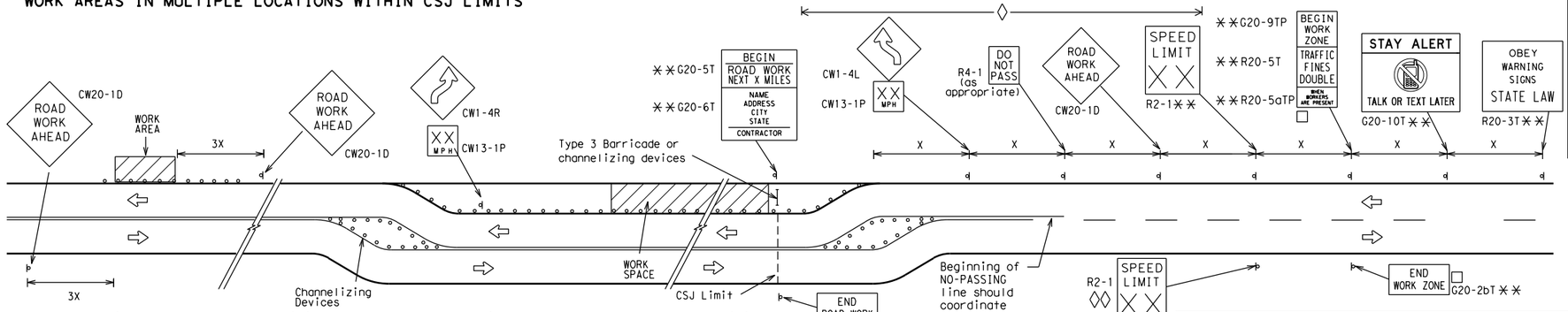
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

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

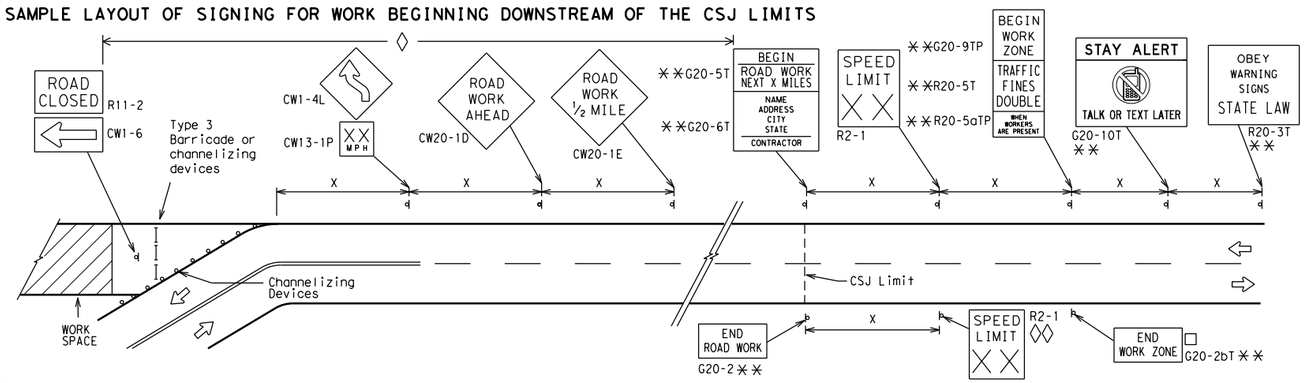
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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

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



NOTES

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

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

** CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◊ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

◊◊ Contractor will install a regulatory speed limit sign at the end of the work zone.

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	EL PASO		23

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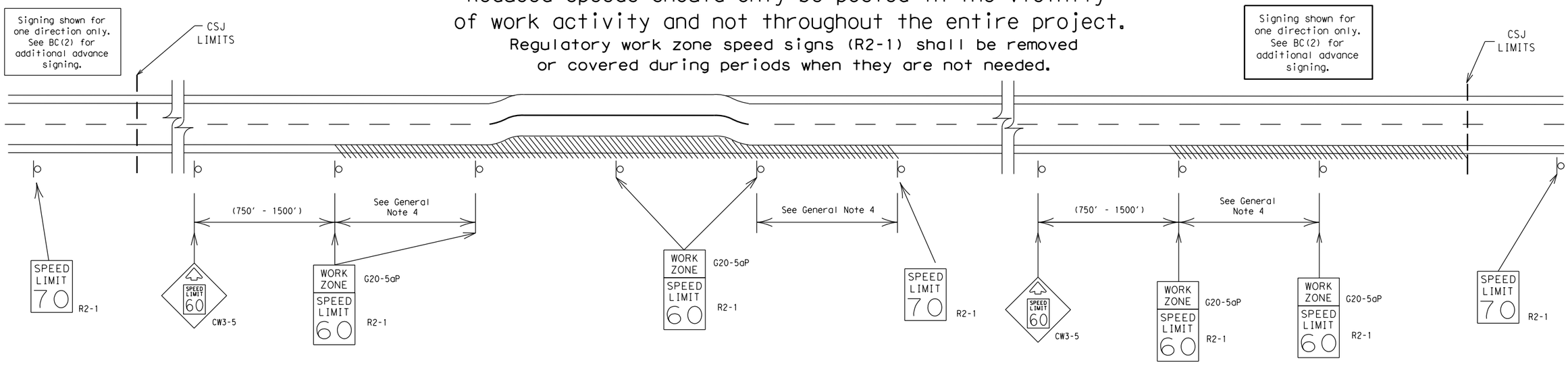
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the"ADVANCE SPEED LIMIT"(CW3-5)sign, "WORK ZONE"(G20-5aP) plaque and the "SPEED LIMIT"(R2-1)signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		24

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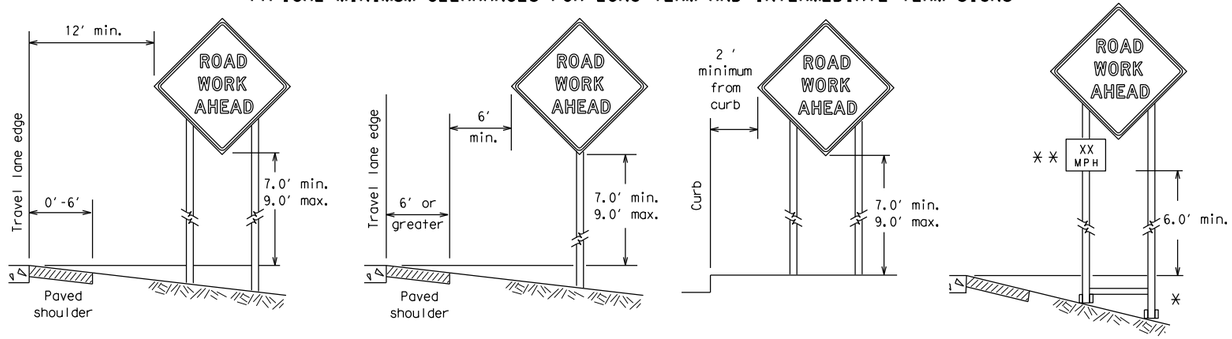
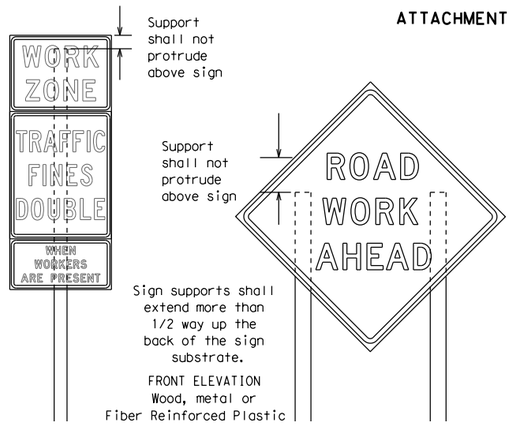
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

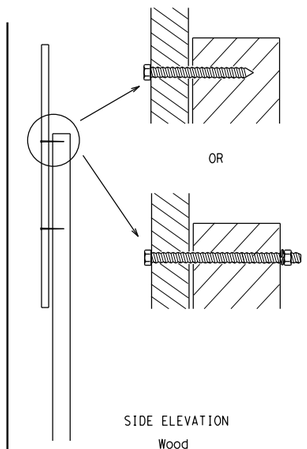


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





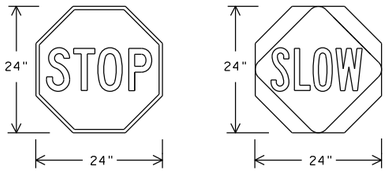
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

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

STOP/SLOW PADDLES

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



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets.The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height,the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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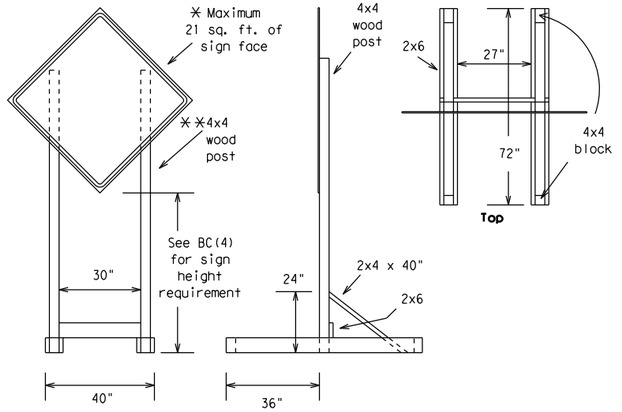
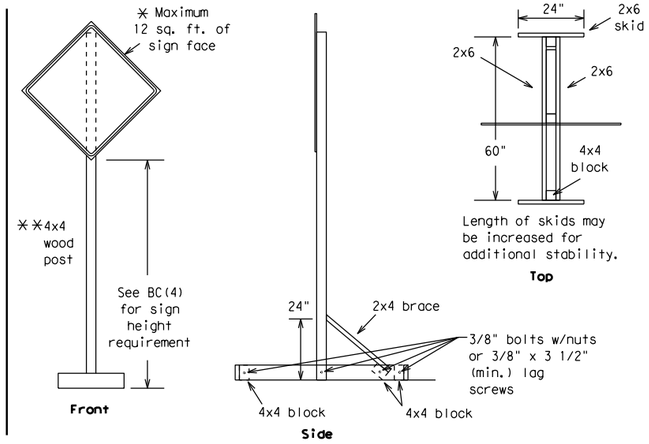
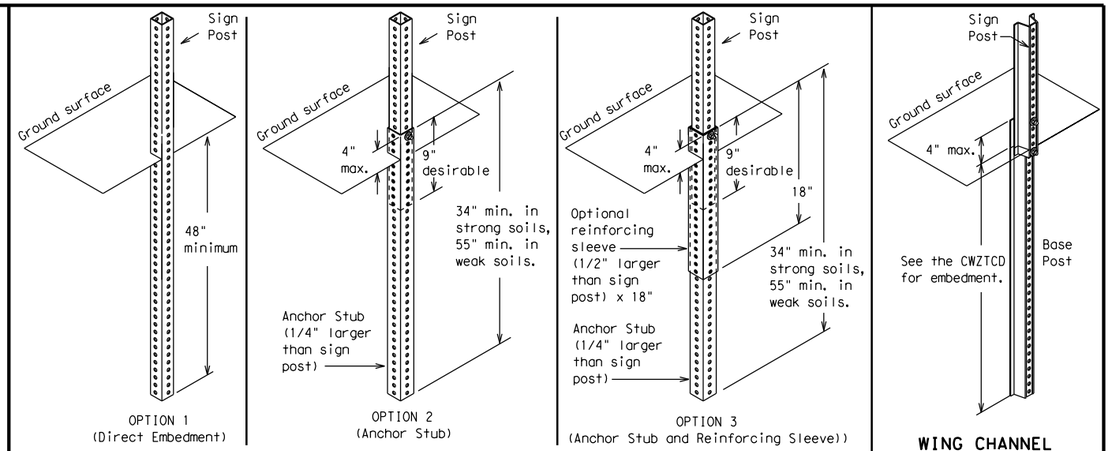




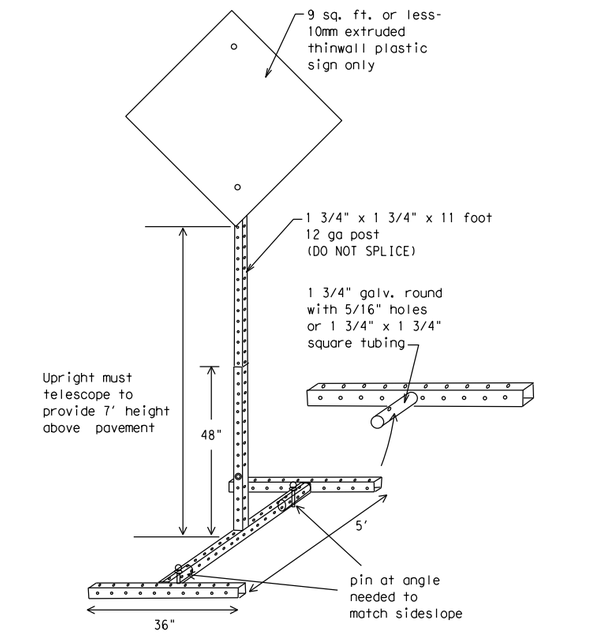
SKID MOUNTED WOOD SIGN SUPPORTS

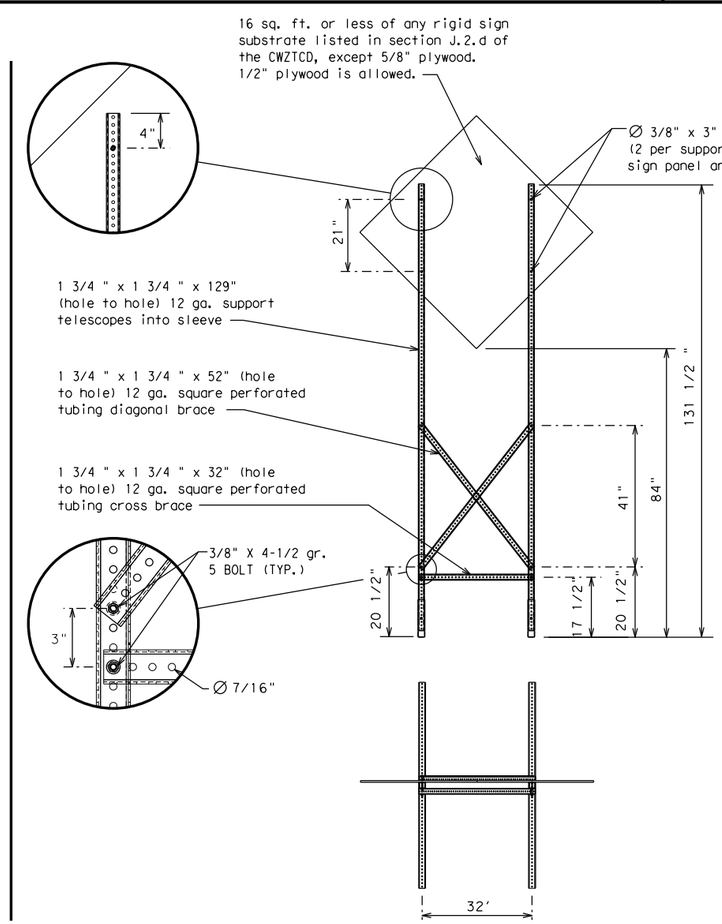
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

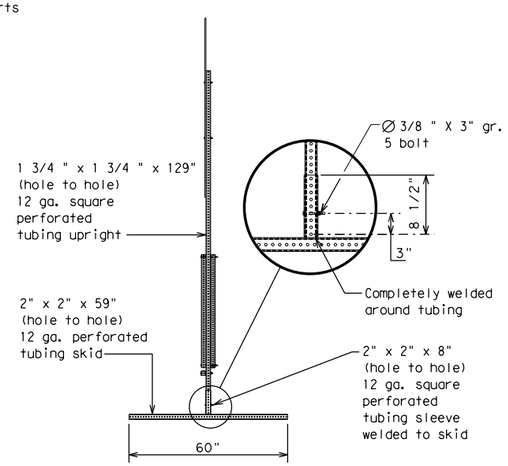


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

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

* See BC(4) for definition of "Work Duration."

** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

□ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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7-13 5-21	ELP	EL PASO		26

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	EL PASO		27

100

DATE: 5/31/2022 1:53:29 PM
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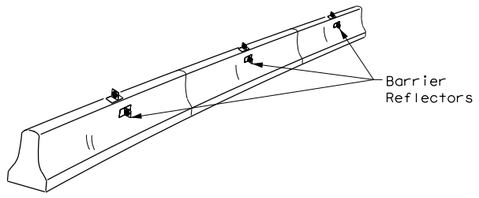
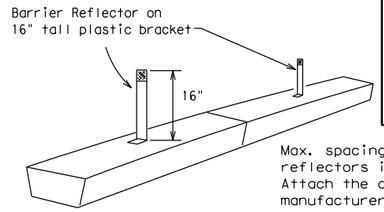
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



CONCRETE TRAFFIC BARRIER (CTB)

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

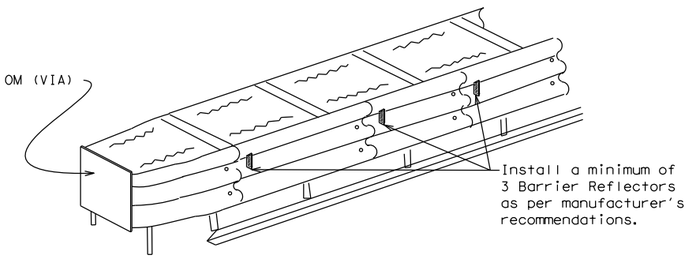


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

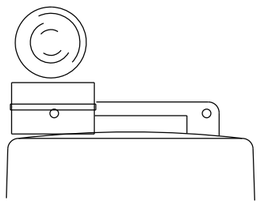


DELINEATION OF END TREATMENTS

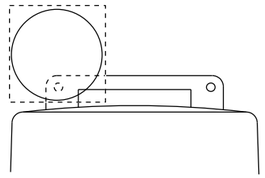
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

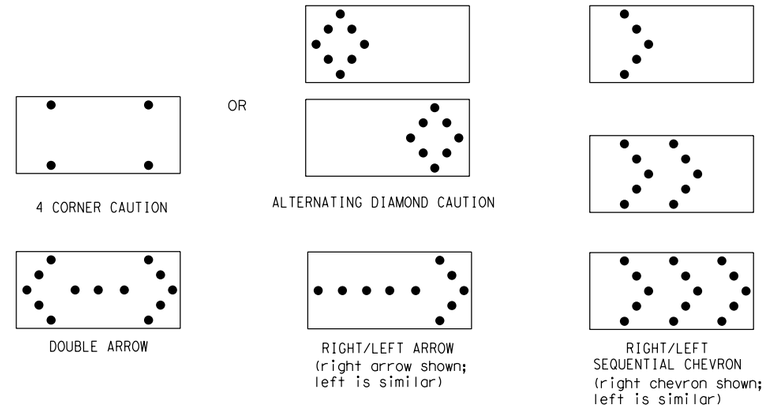
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



4 CORNER CAUTION

ALTERNATING DIAMOND CAUTION

DOUBLE ARROW

RIGHT/LEFT ARROW
(right arrow shown;
left is similar)

RIGHT/LEFT
SEQUENTIAL CHEVRON
(right chevron shown;
left is similar)

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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation — Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	EL PASO		28

101

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

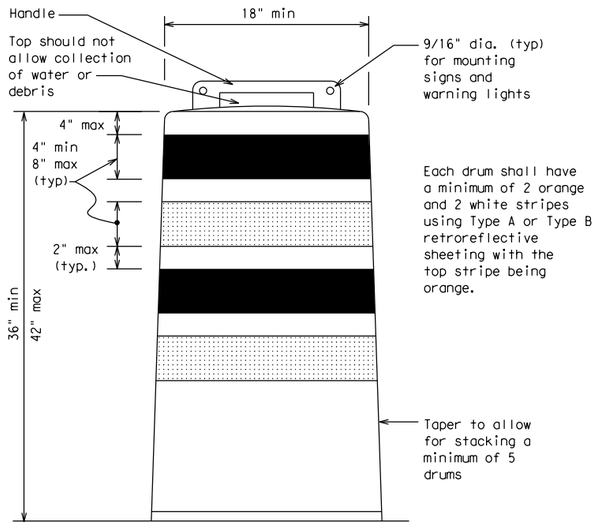
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

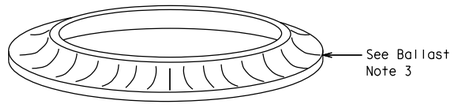
RETROREFLECTIVE SHEETING

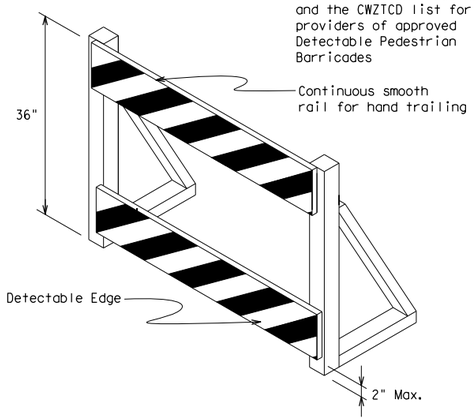
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

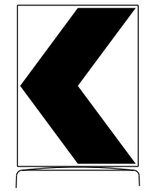




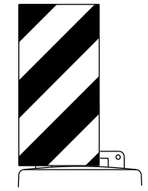


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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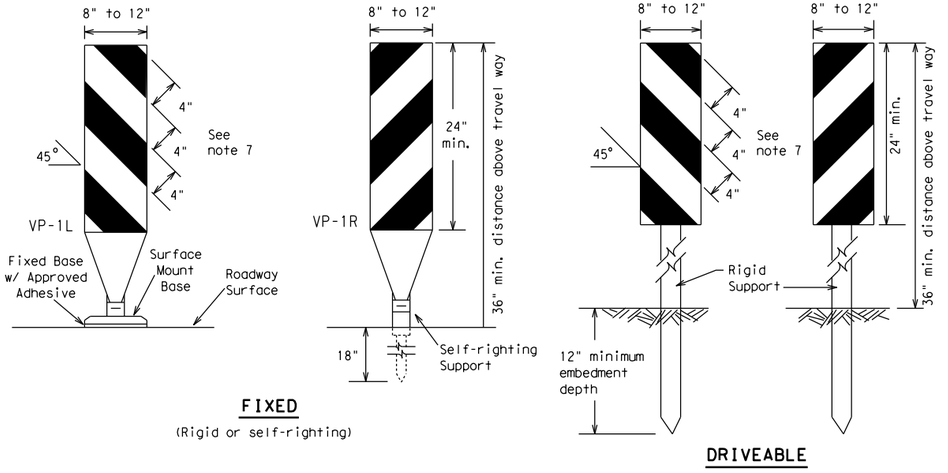
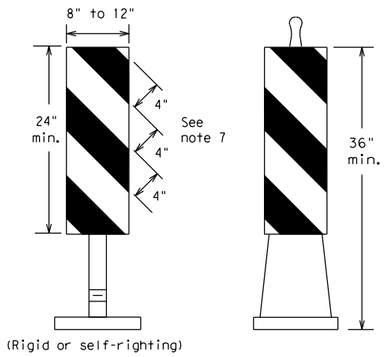


FIXED
(Rigid or self-righting)

DRIVEABLE

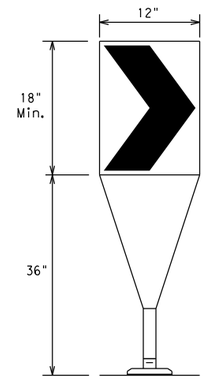


(Rigid or self-righting)

PORTABLE

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

VERTICAL PANELS (VPs)



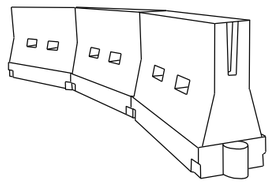
Fixed Base w/ Approved Adhesive
(Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

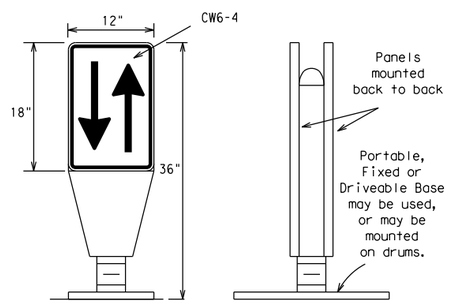
If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

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

Posted Speed	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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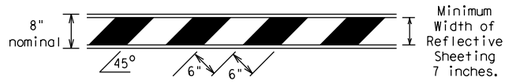
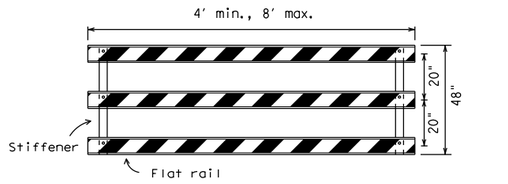
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



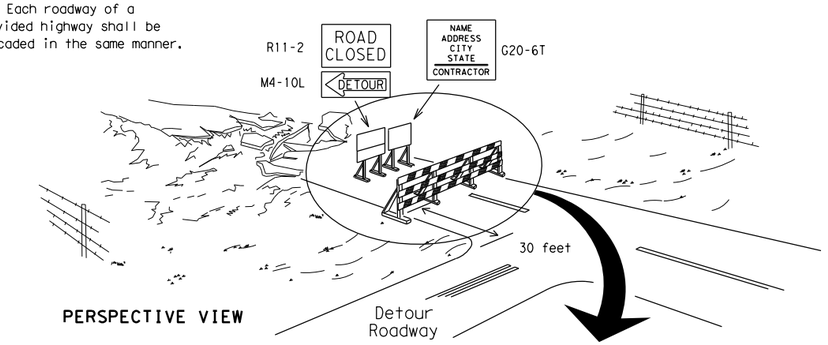
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

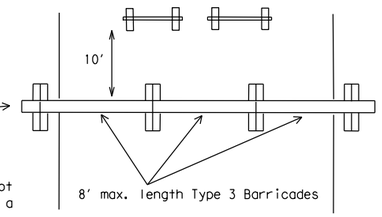
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

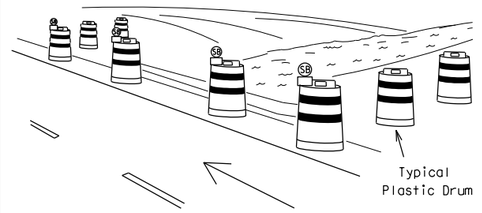
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

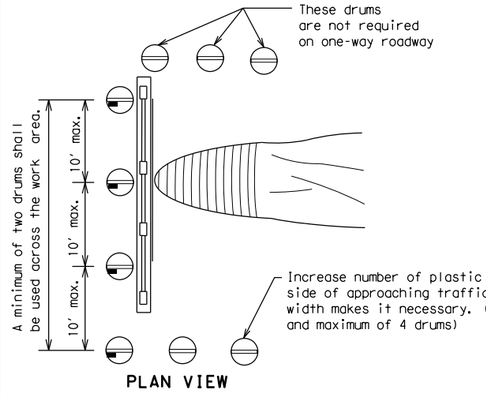
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

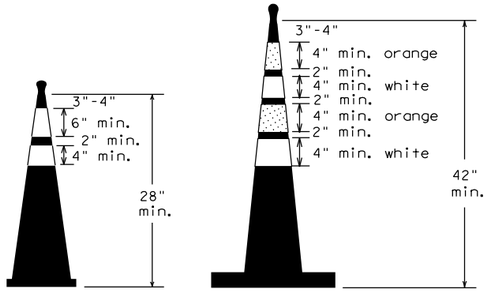
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.



PLAN VIEW

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

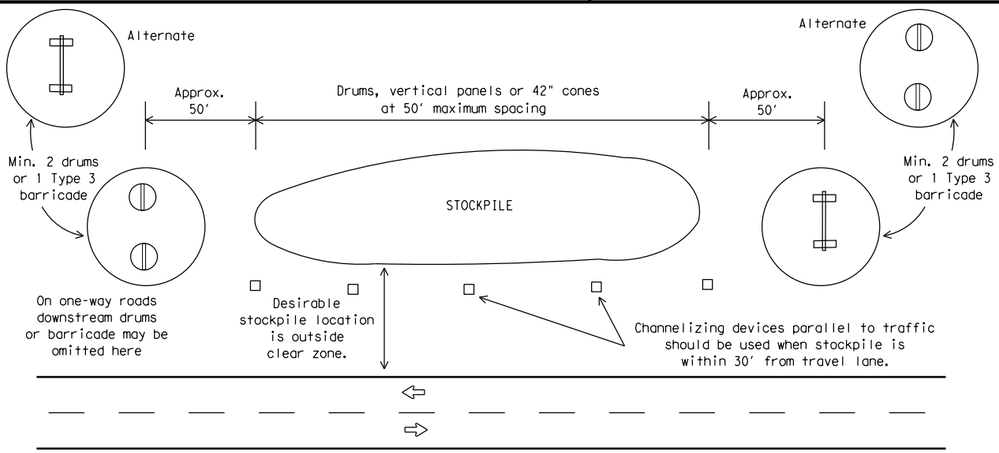
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

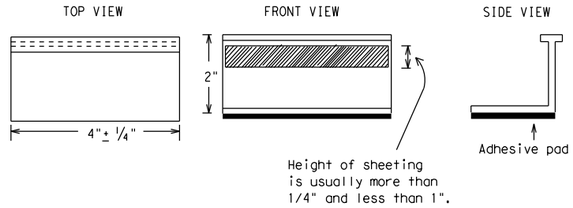
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21	0167	01	126,ETC.	US-54
1-02 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	ELP	EL PASO		32

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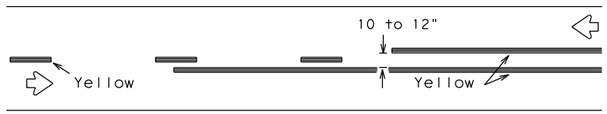
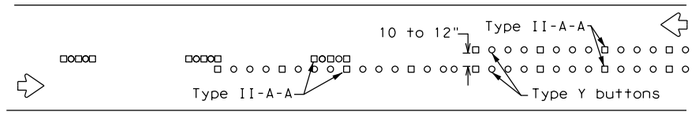
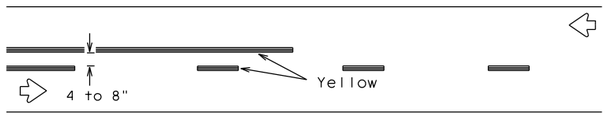
PAVEMENT MARKING PATTERNS



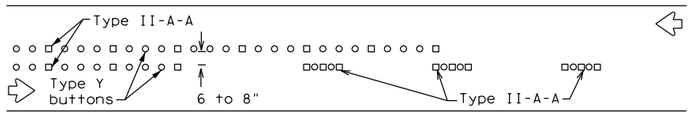
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



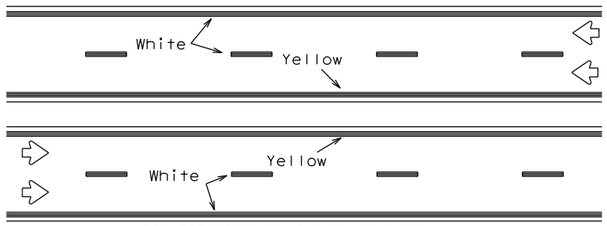
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



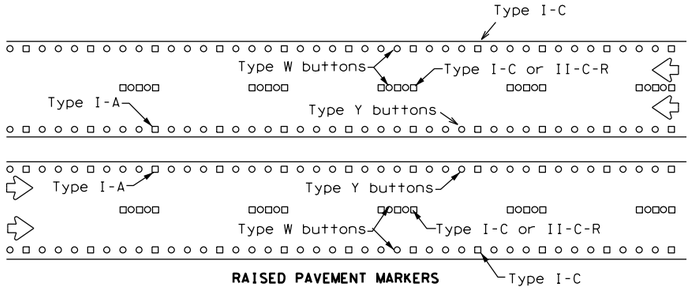
RAISED PAVEMENT MARKERS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

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



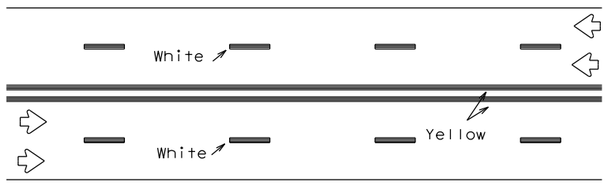
REFLECTORIZED PAVEMENT MARKINGS



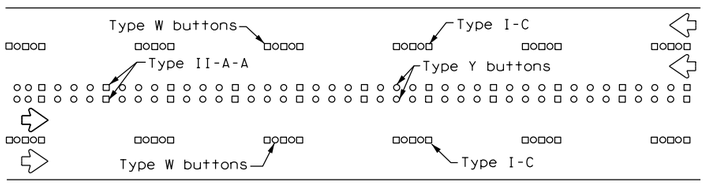
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



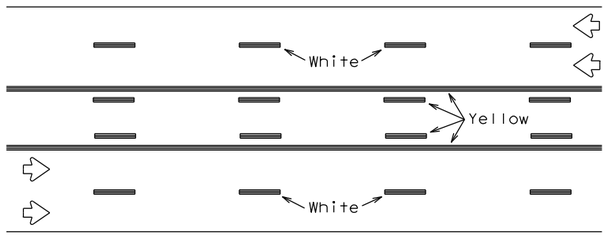
REFLECTORIZED PAVEMENT MARKINGS



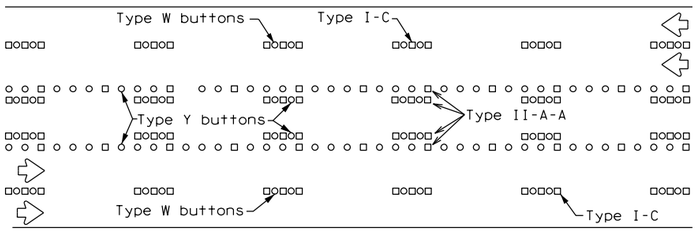
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

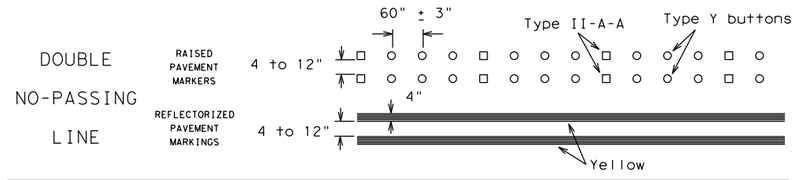
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

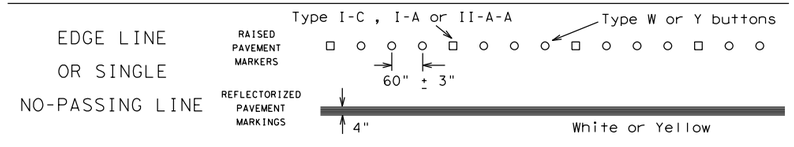
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

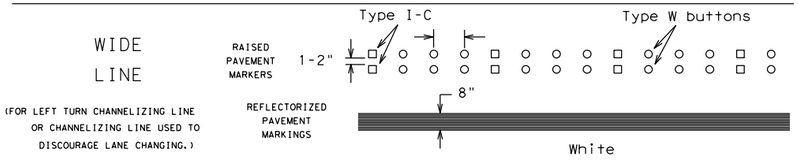


EDGE LINE OR SINGLE NO-PASSING LINE



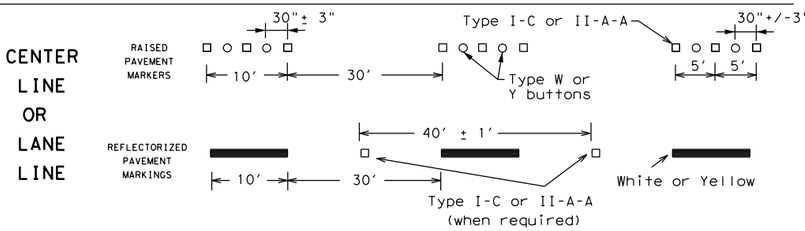
WIDE LINE

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

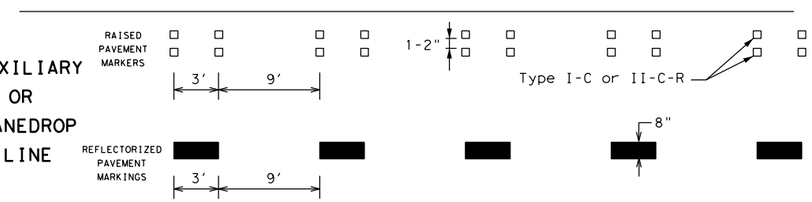


BROKEN LINES

CENTER LINE OR LANE LINE

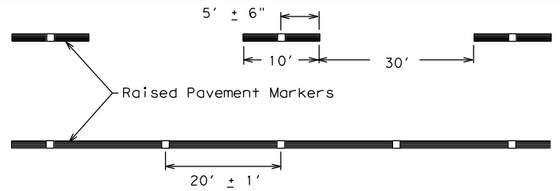


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only - not to be used on edge lines

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		33

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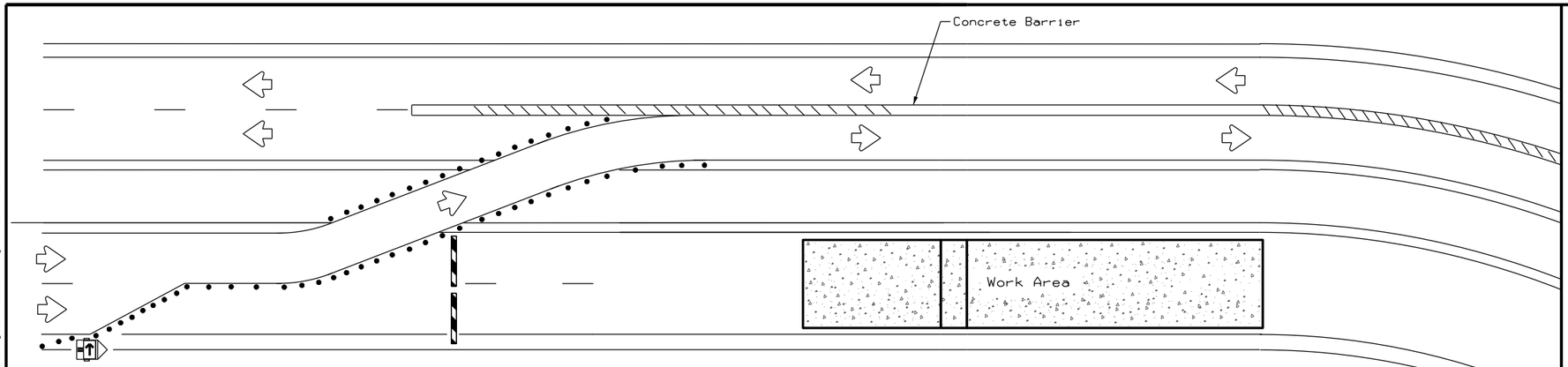


NOTES:

1. Length of Safety Glare screen will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular safety glare screen units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one safety glare screen unit.
3. Screen Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one glare screen panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

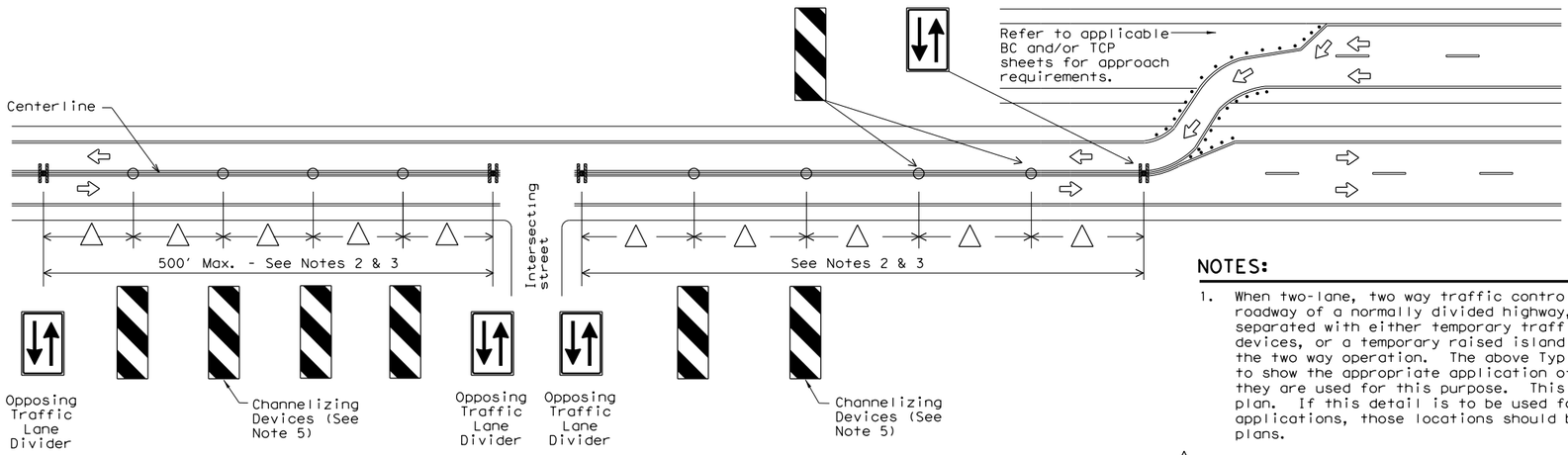
BARRIER DELINEATION WITH MODULAR GLARE SCREENS

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

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

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

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



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

NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. △ Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100′.
3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-17

FILE: wztd-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 2-17 3-03 7-13	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		34

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DATE: 5/31/2022 1:53:50 PM
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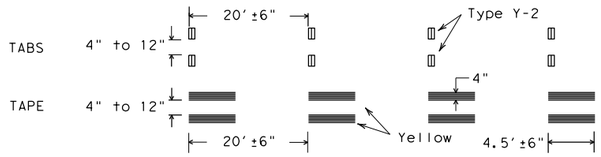
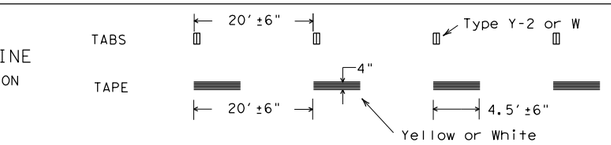
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

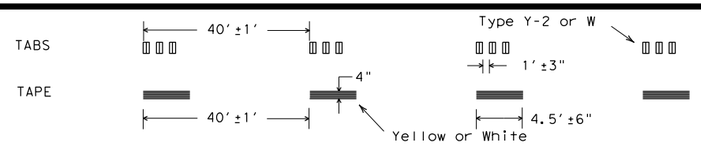


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



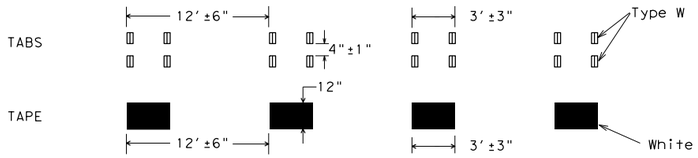
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

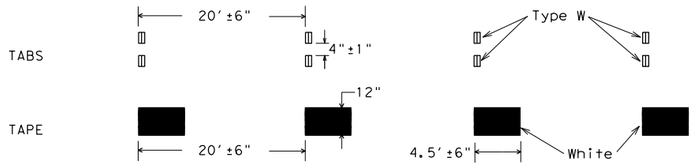


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



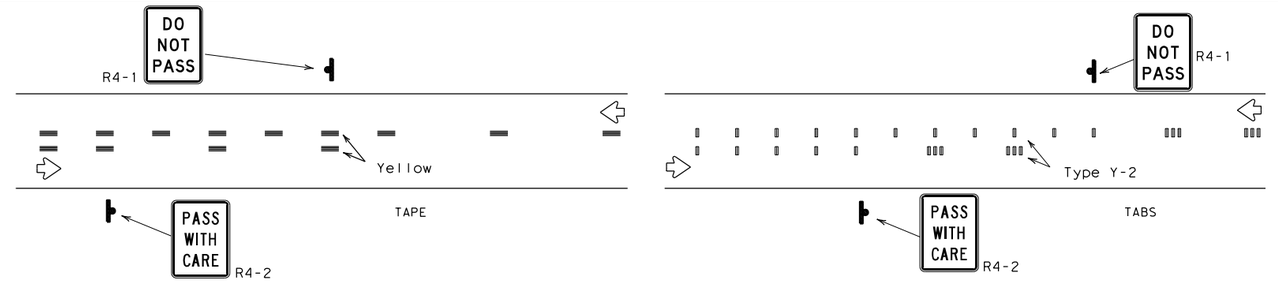
NOTES:

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

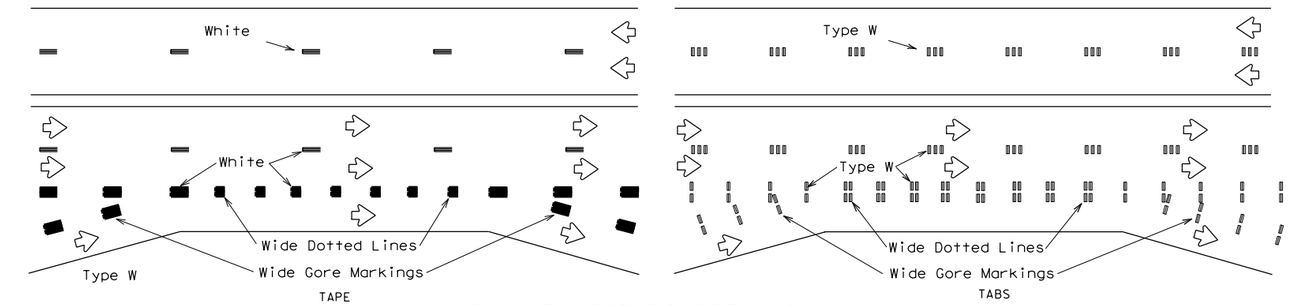
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

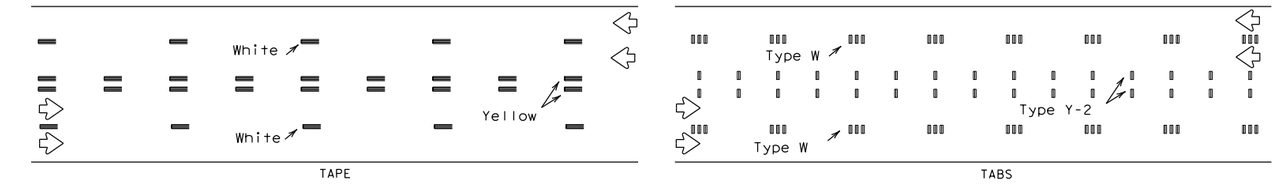
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



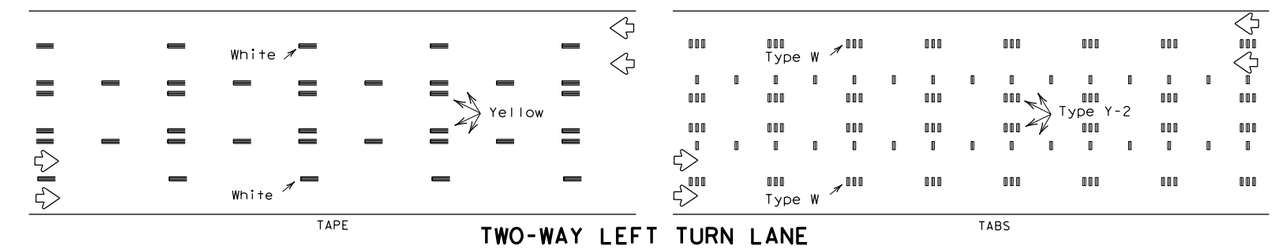
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



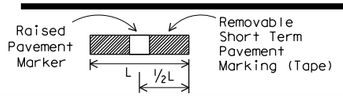
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

Texas Department of Transportation

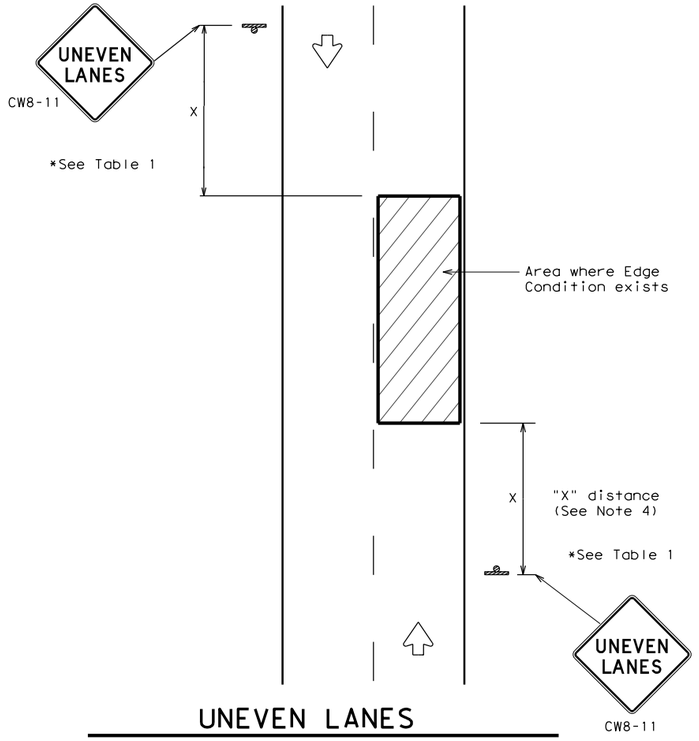
Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

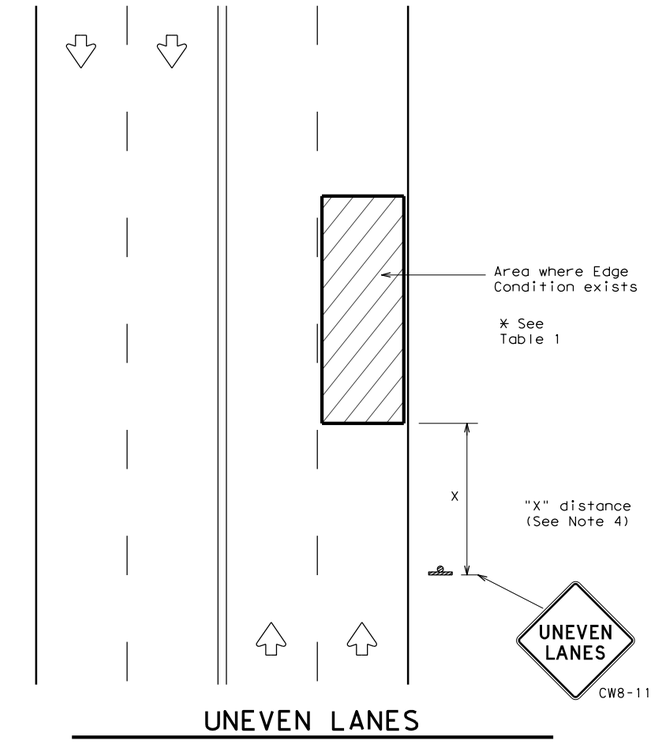
WZ(STPM)-13

FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		0167	01	126,ETC.	US-54
1-97		DIST	COUNTY		SHEET NO.
3-03		ELP	EL PASO		35
7-13					

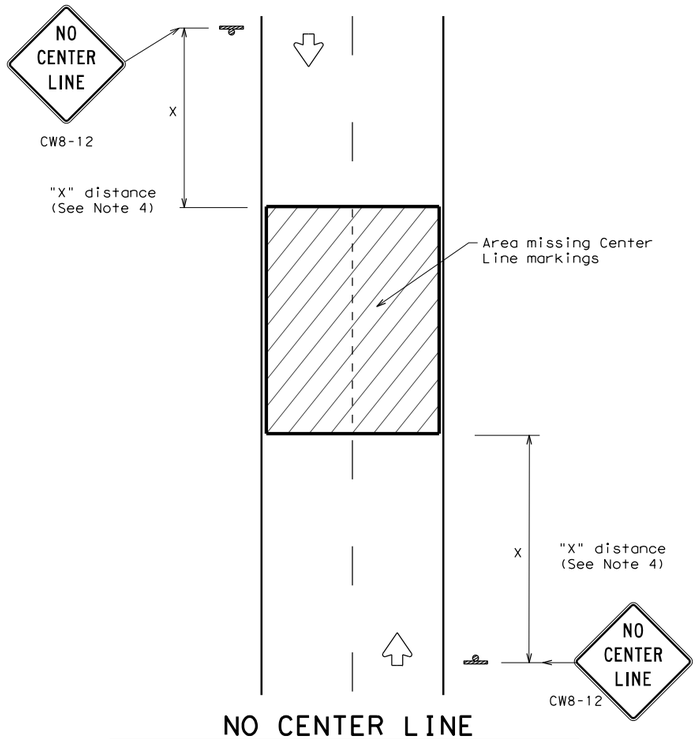
111



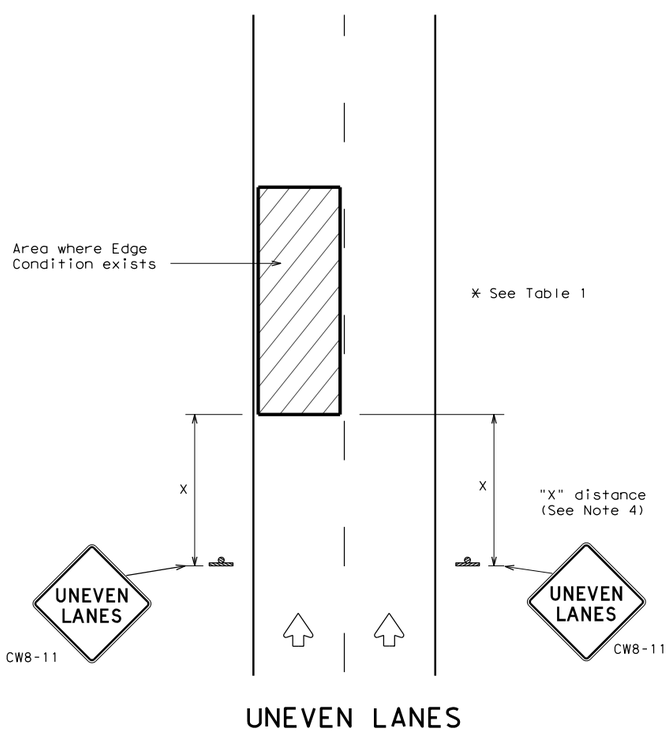
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

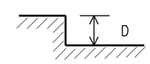
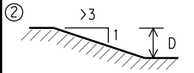
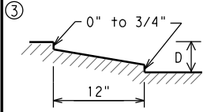
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

TABLE 1

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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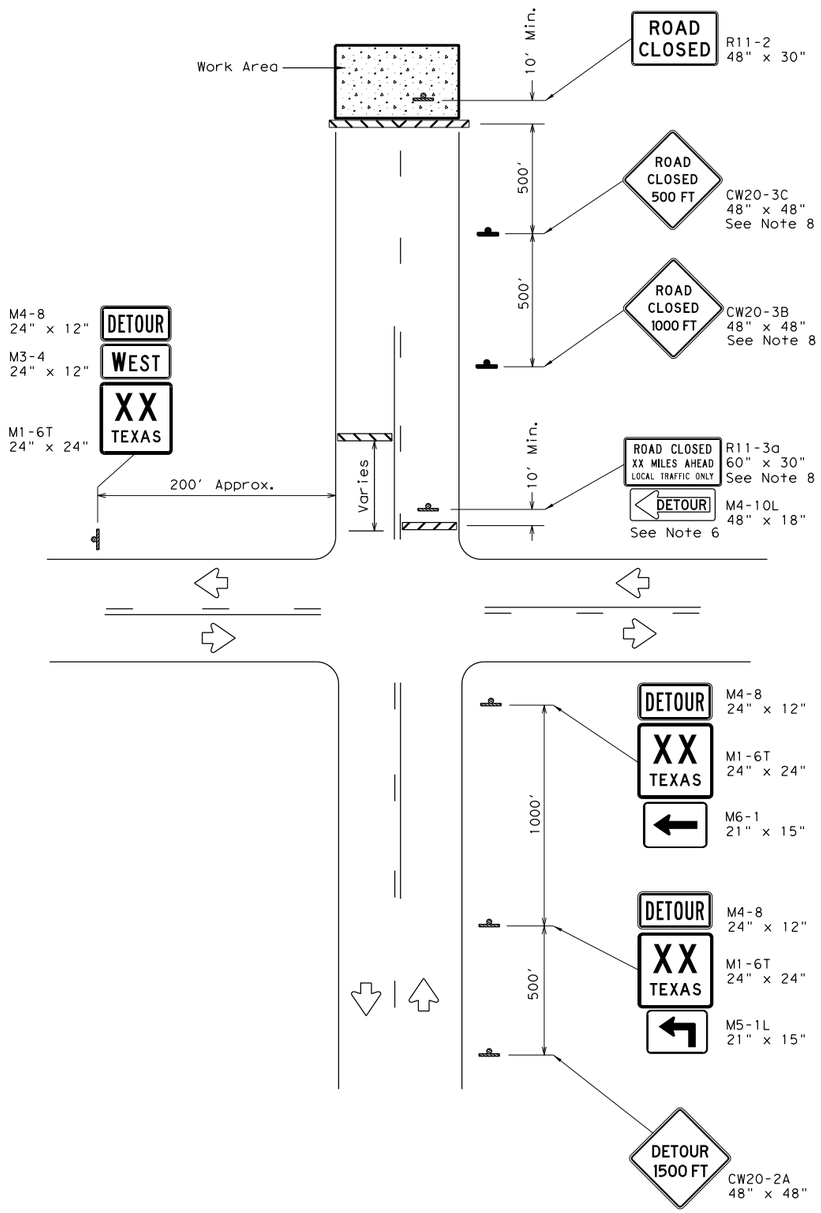
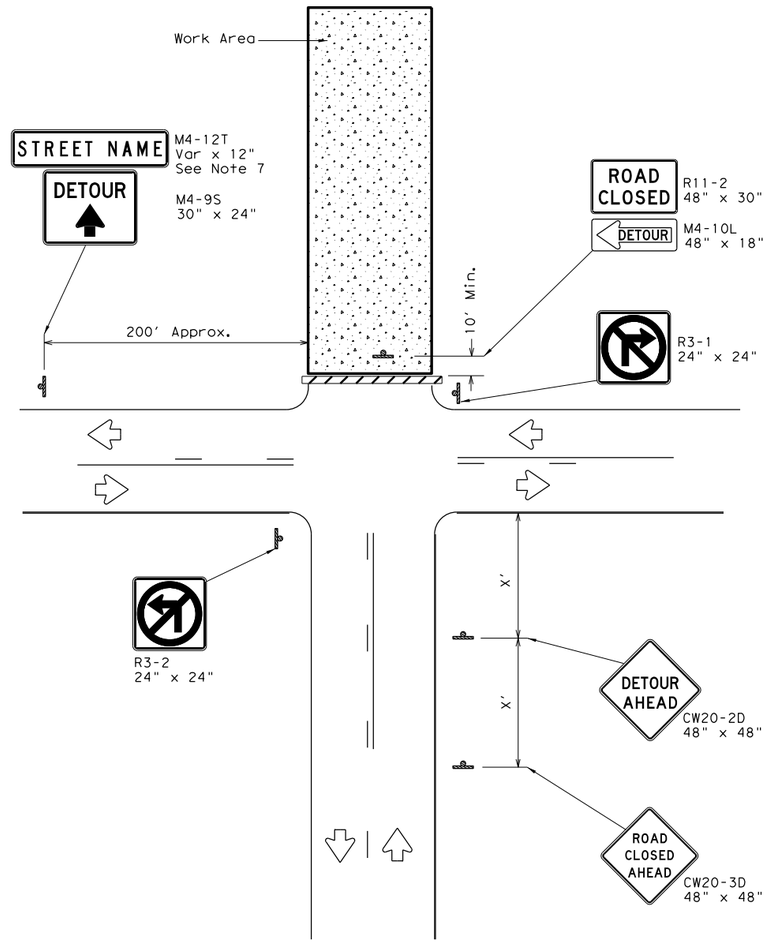


ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
	Type 3 Barricade
	Sign

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

* Conventional Roads Only

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

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Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

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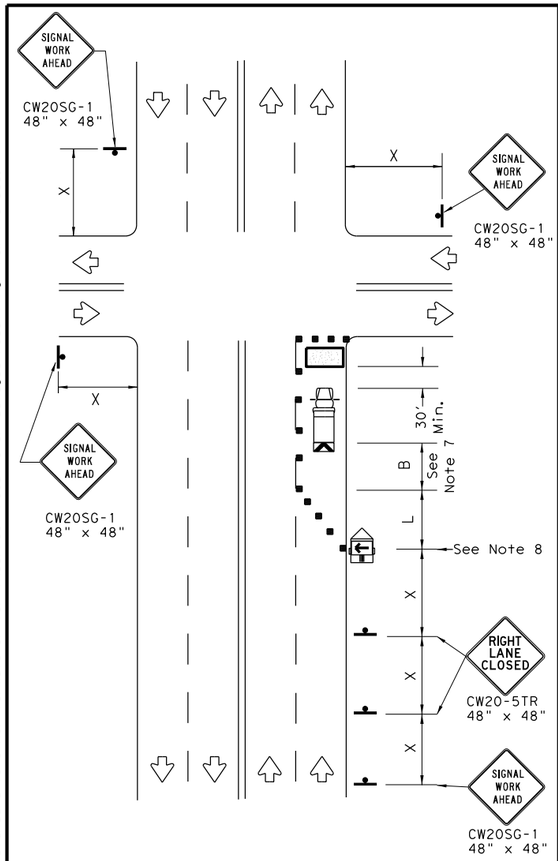
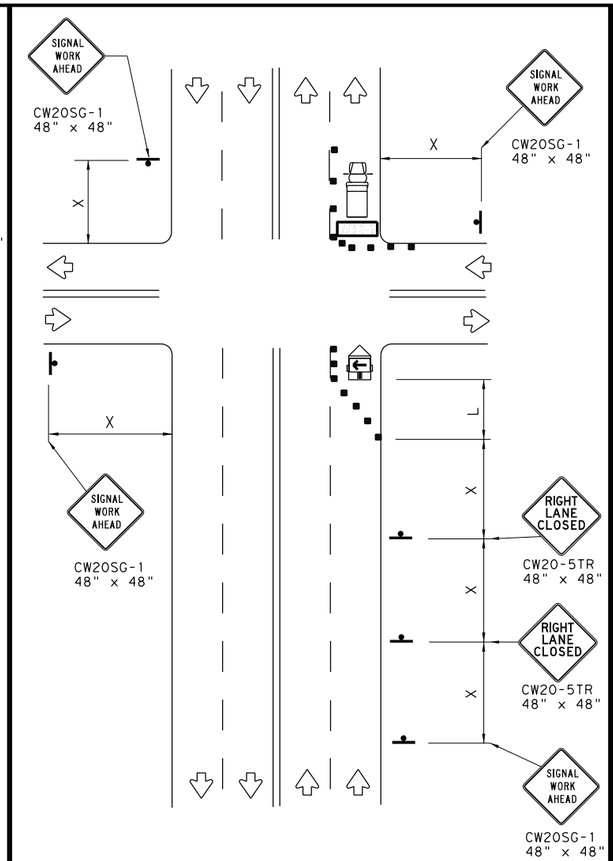
2-98 3-03	ELP	EL PASO		37



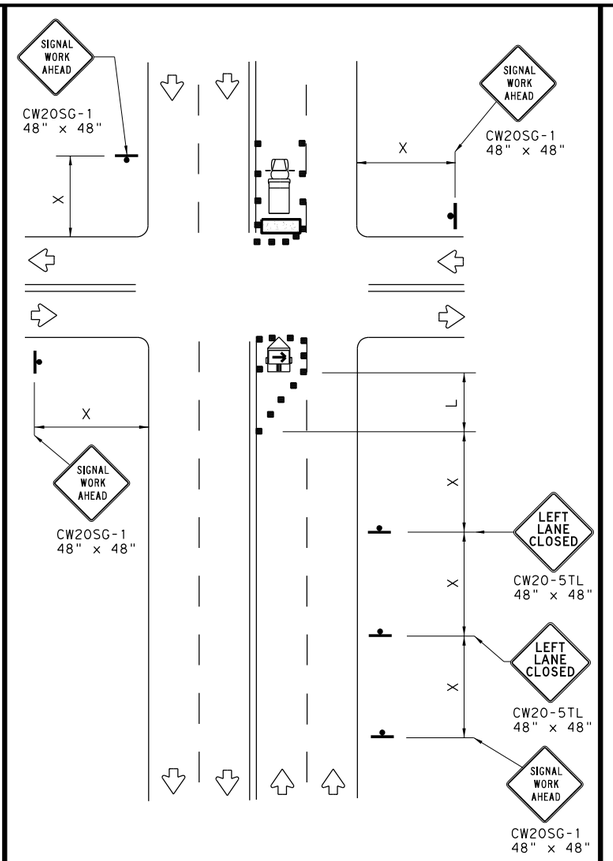
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE RIGHT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY

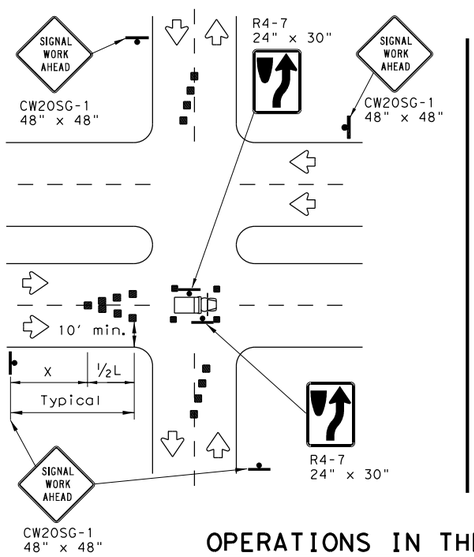
LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

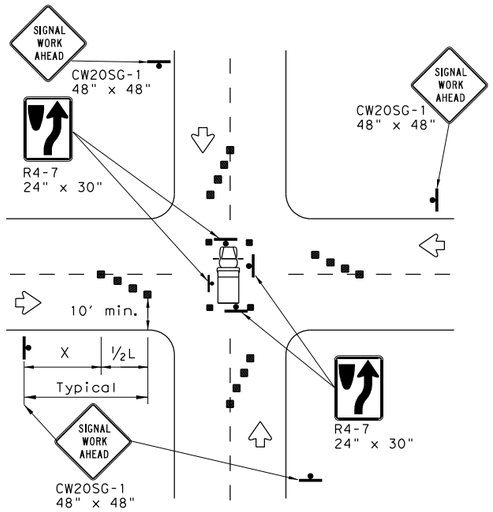
Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'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

* Conventional Roads Only

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

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.





OPERATIONS IN THE INTERSECTION

SHORT DURATION

GENERAL NOTES

1. The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
2. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
3. Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
4. Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
5. High level warning devices (flag trees) may be used at corners of the vehicle.
6. When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
7. For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
8. The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
9. Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

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4-98 3-03	ELP	EL PASO		38

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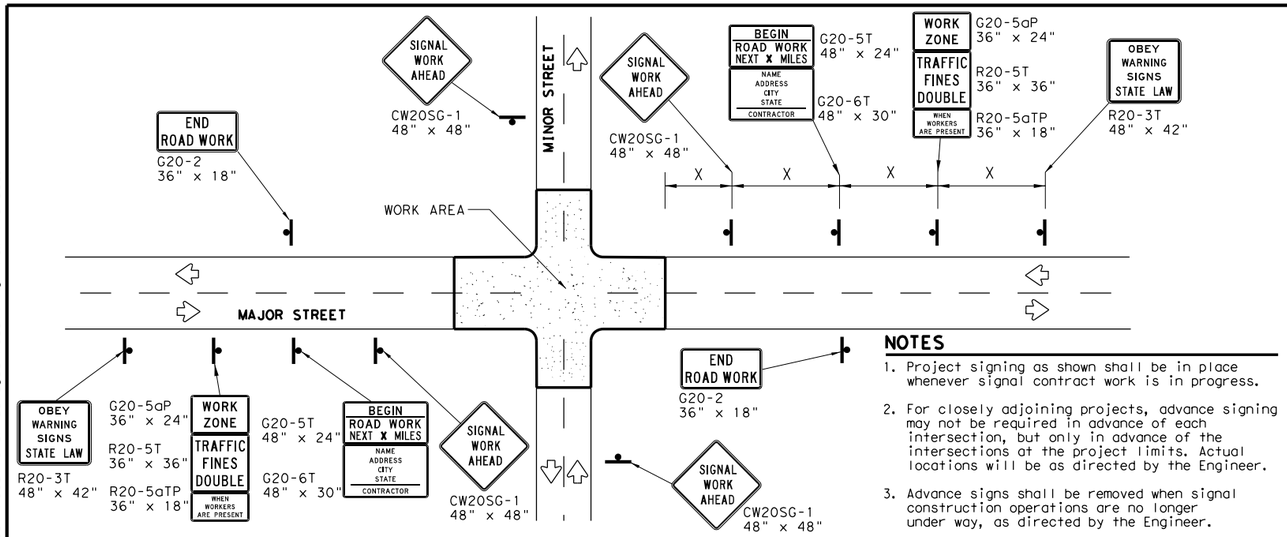


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

1. Project signing as shown shall be in place whenever signal contract work is in progress.
2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
4. Warning sign spacing shown is typical for both directions.
5. See the Table on sheet 1 of 2 for Typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
8. Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
9. 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".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. 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, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

SIGN SUPPORT WEIGHTS

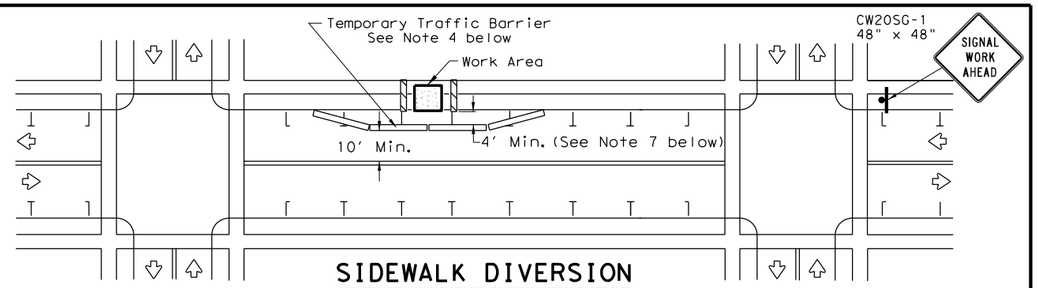
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber, such as tire inner tubes, shall not be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fastners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

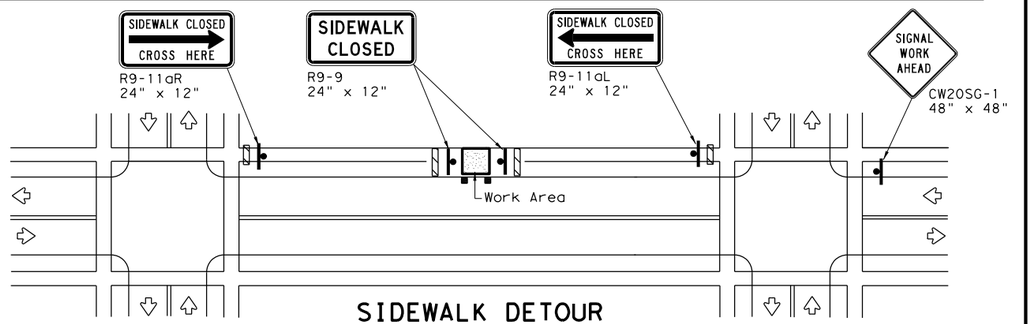
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

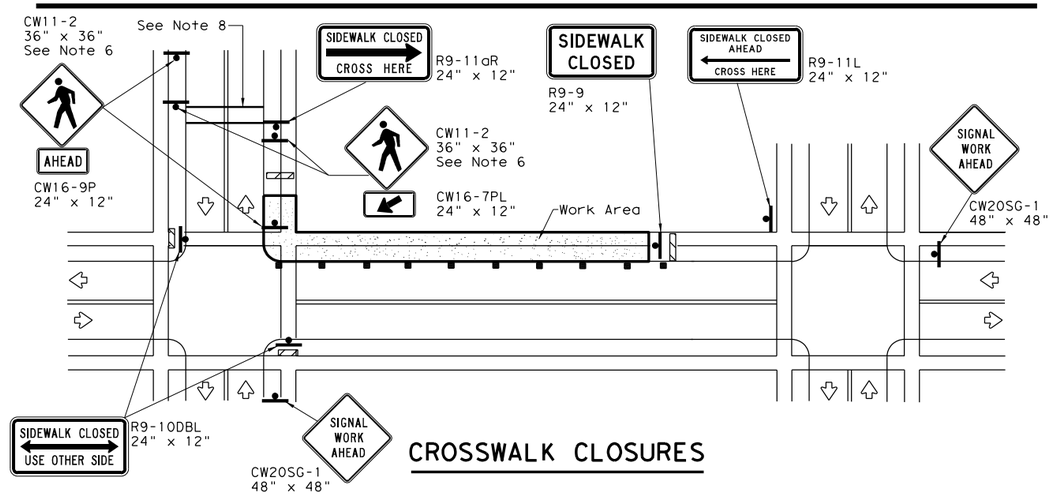
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
3. R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
5. Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practical.
8. Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
9. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

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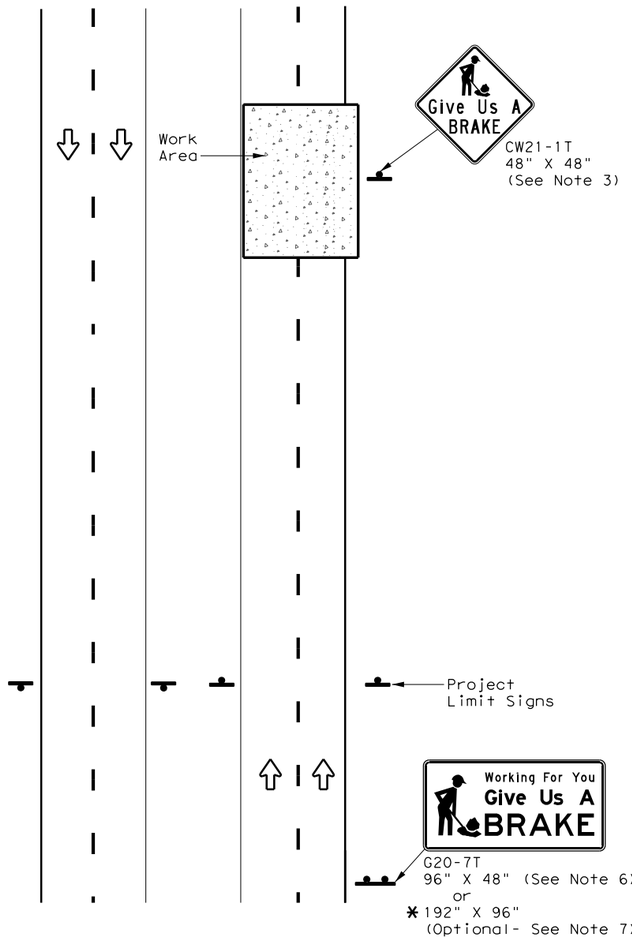
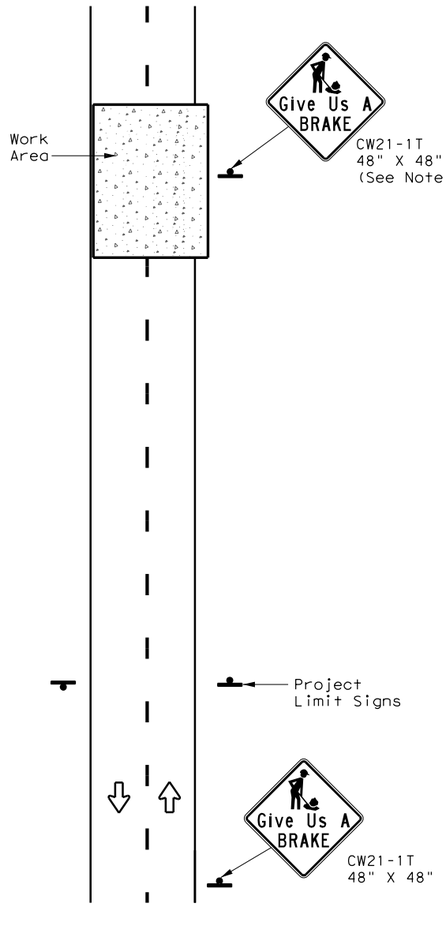


DIVIDED HIGHWAY



UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL			DRILLED SHAFT 24" DIA. (LF)
						Size	(LF) ①	(LF) ②	
Orange	G20-7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

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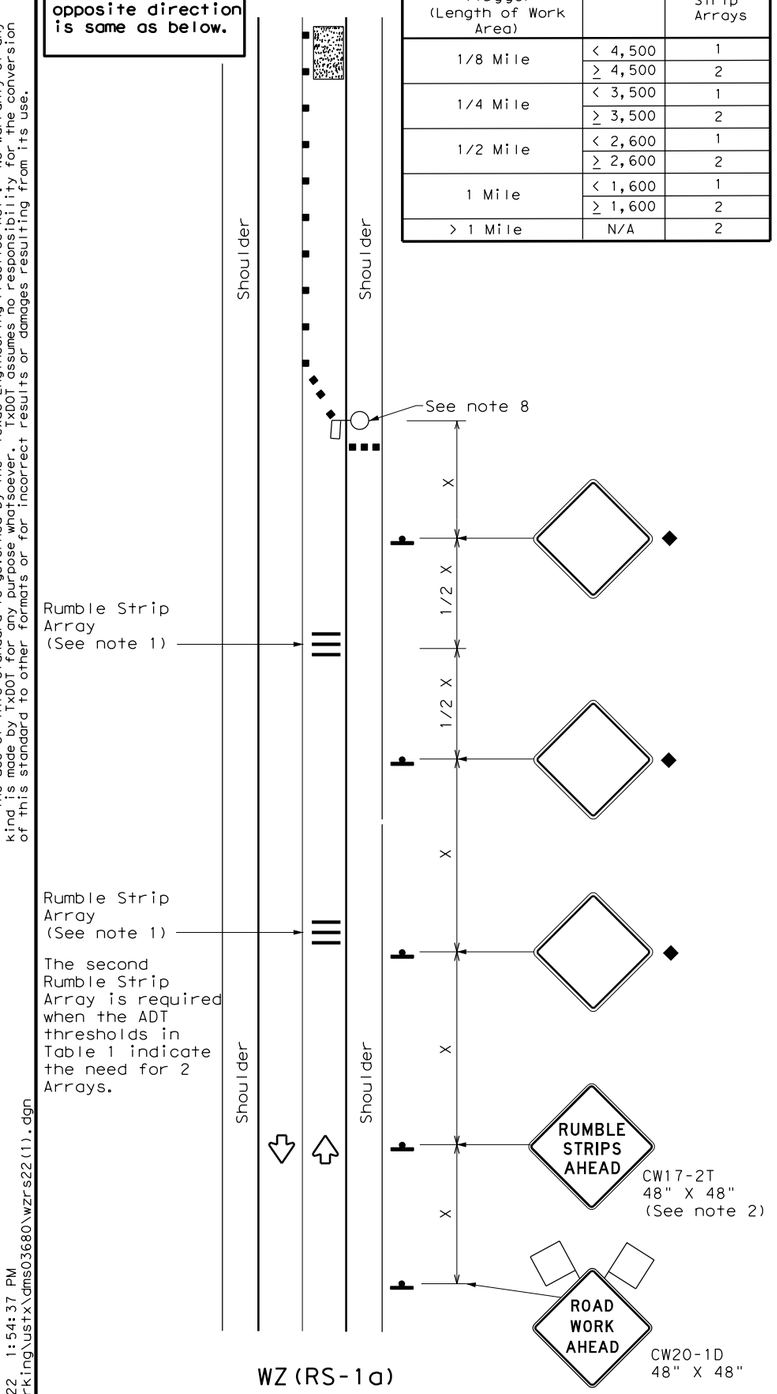
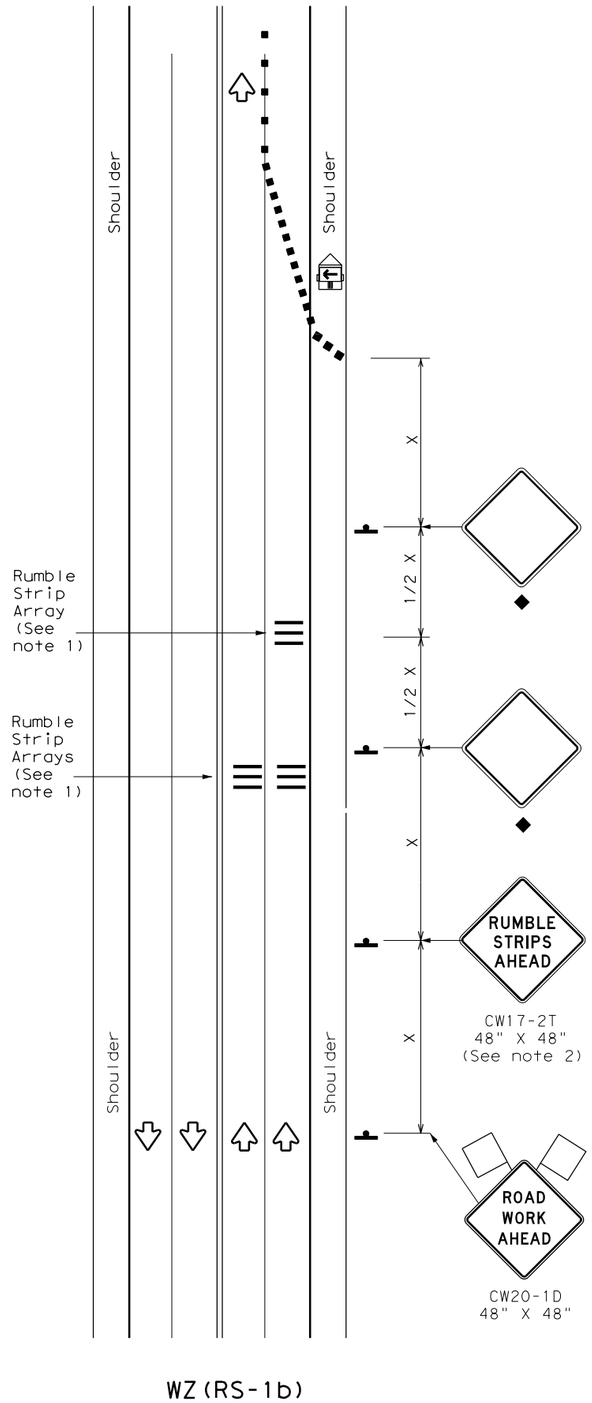
Warning sign and rumble strip sequence in opposite direction is same as below.

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



WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

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

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

* Conventional Roads Only

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

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

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

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

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

Texas Department of Transportation

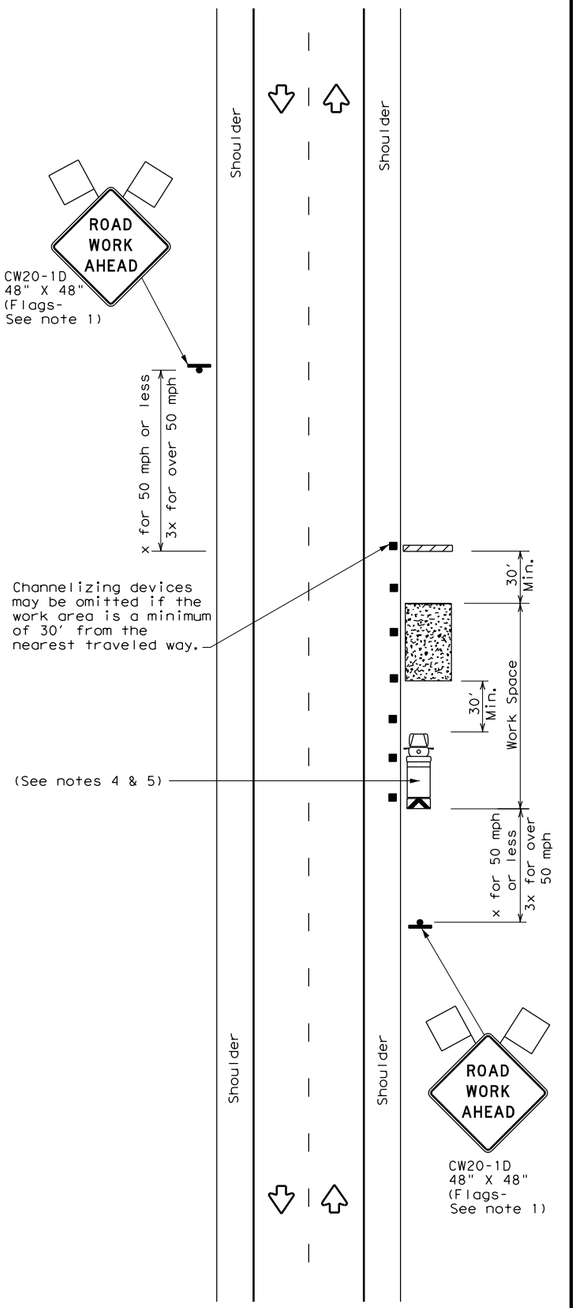
Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-22

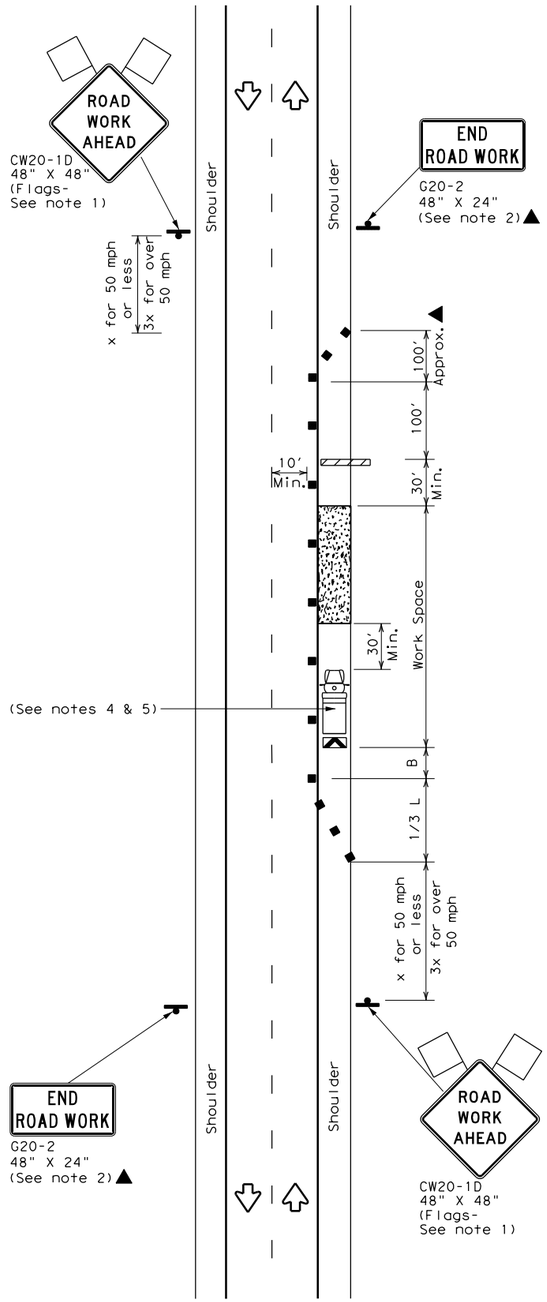
FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-14 1-22 4-16	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		41

117



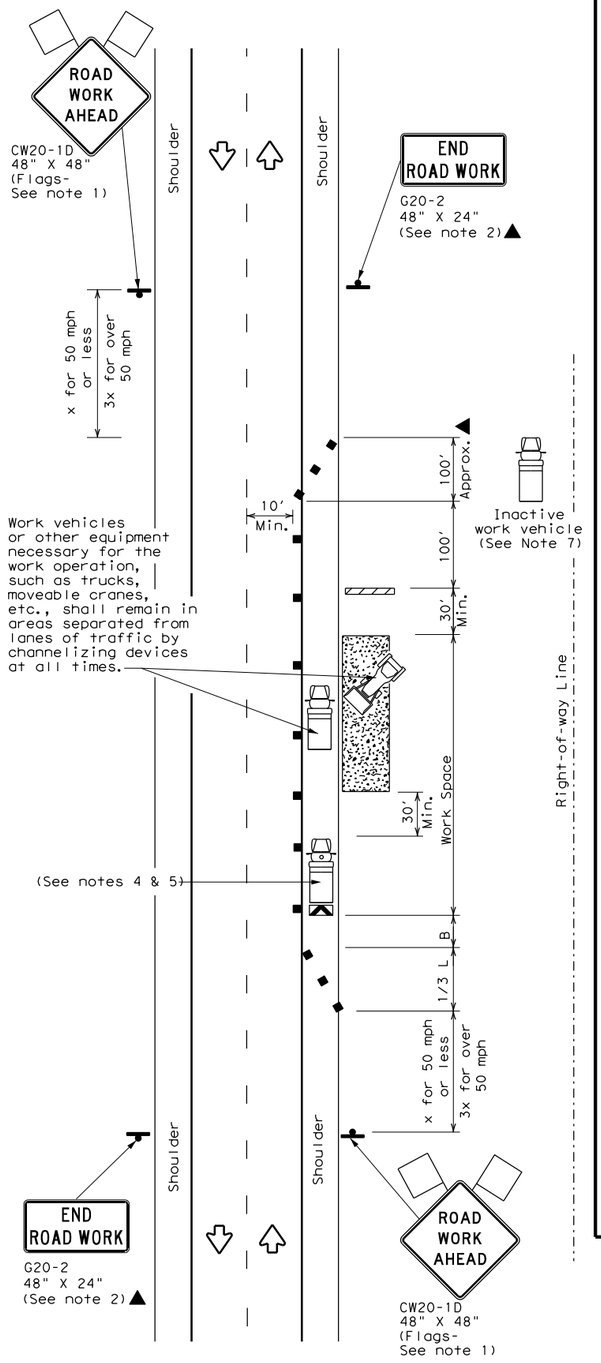
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	ELP	EL PASO		42
1-97 2-18				

161

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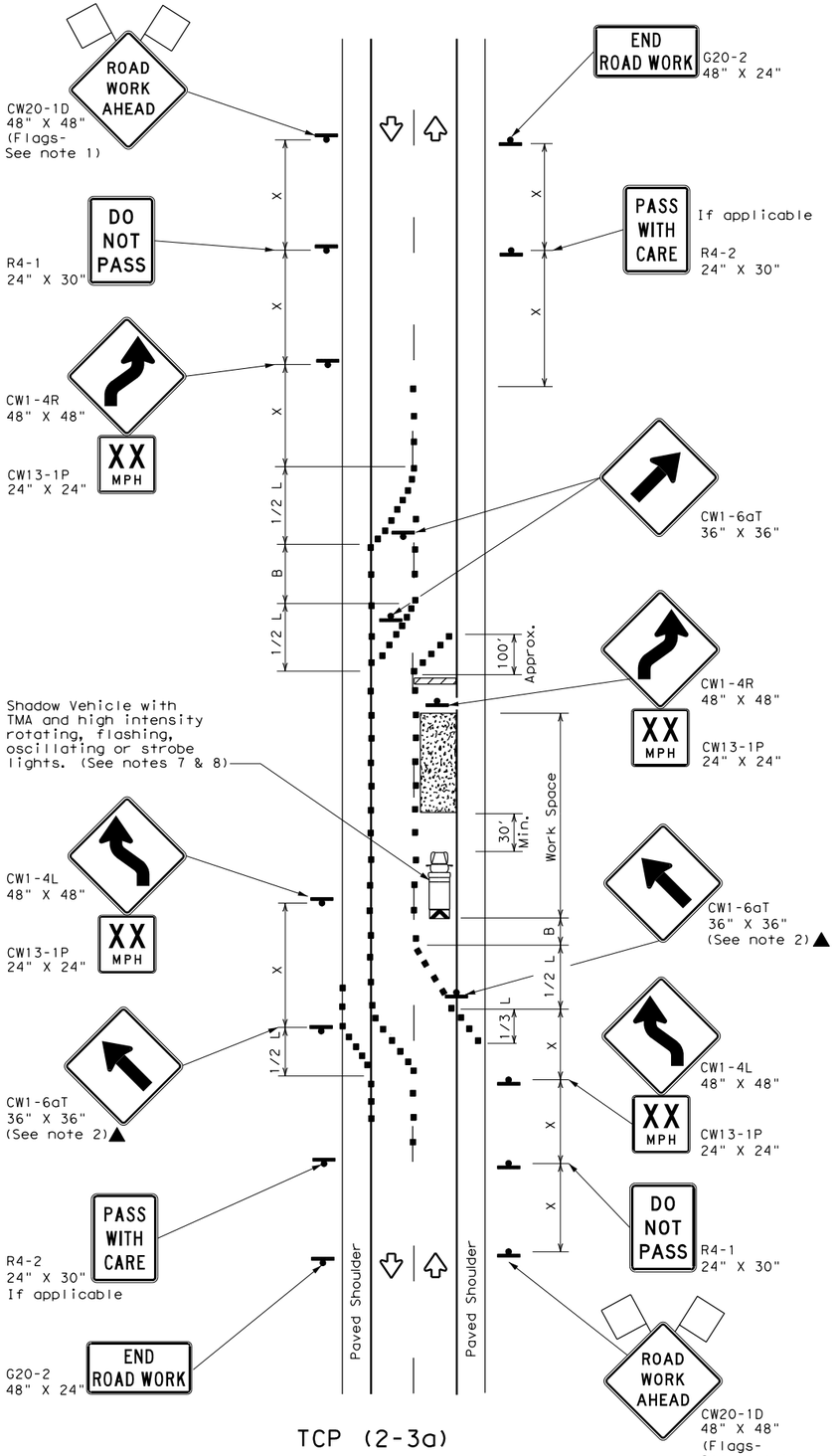
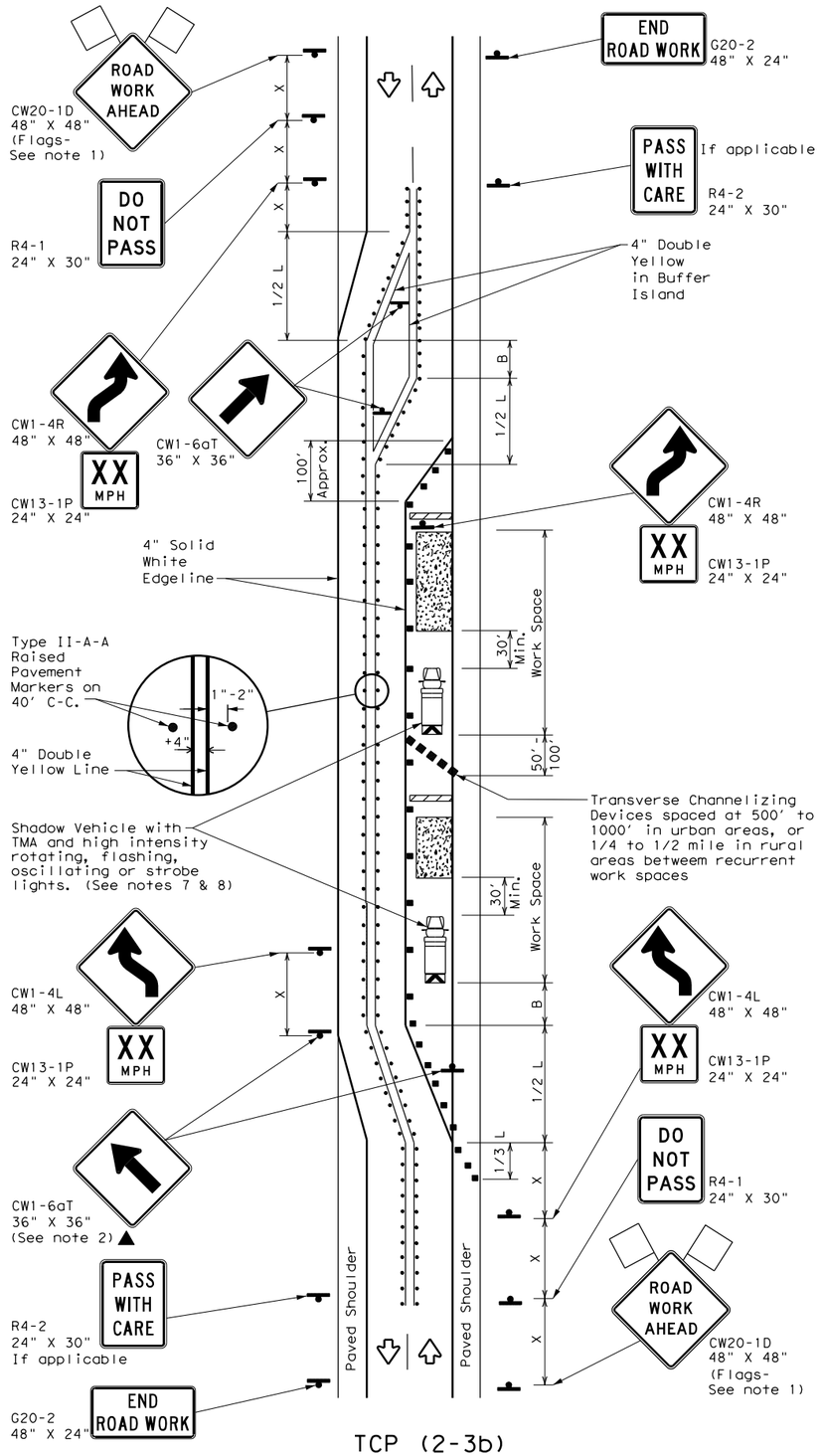


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



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

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND

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

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

* Conventional Roads Only

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

TYPICAL USAGE

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

GENERAL NOTES

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

TCP (2-3a)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		43

163

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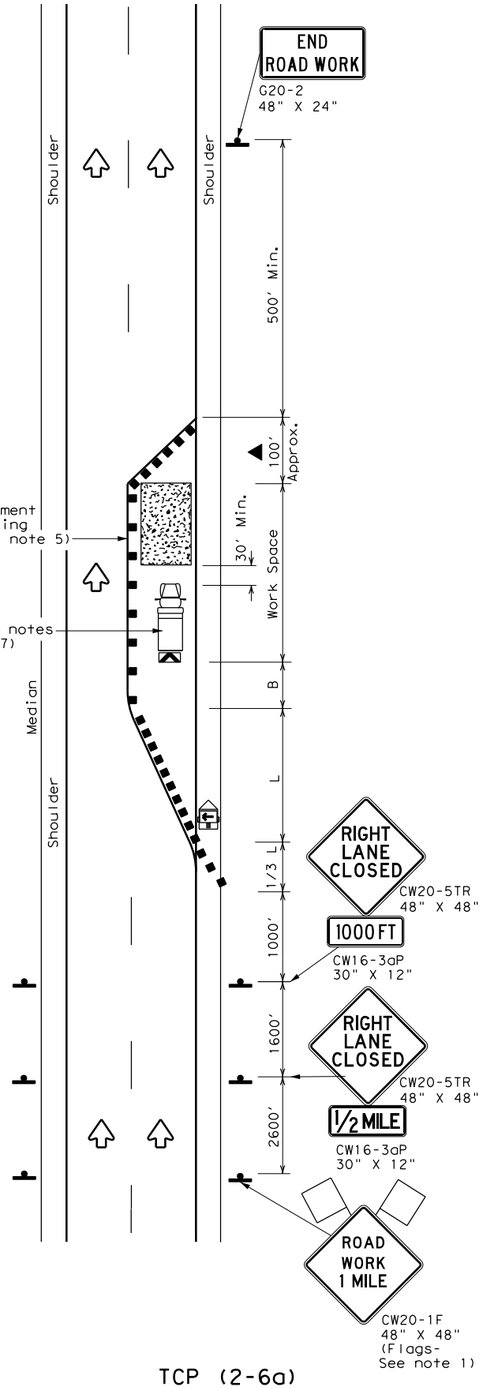
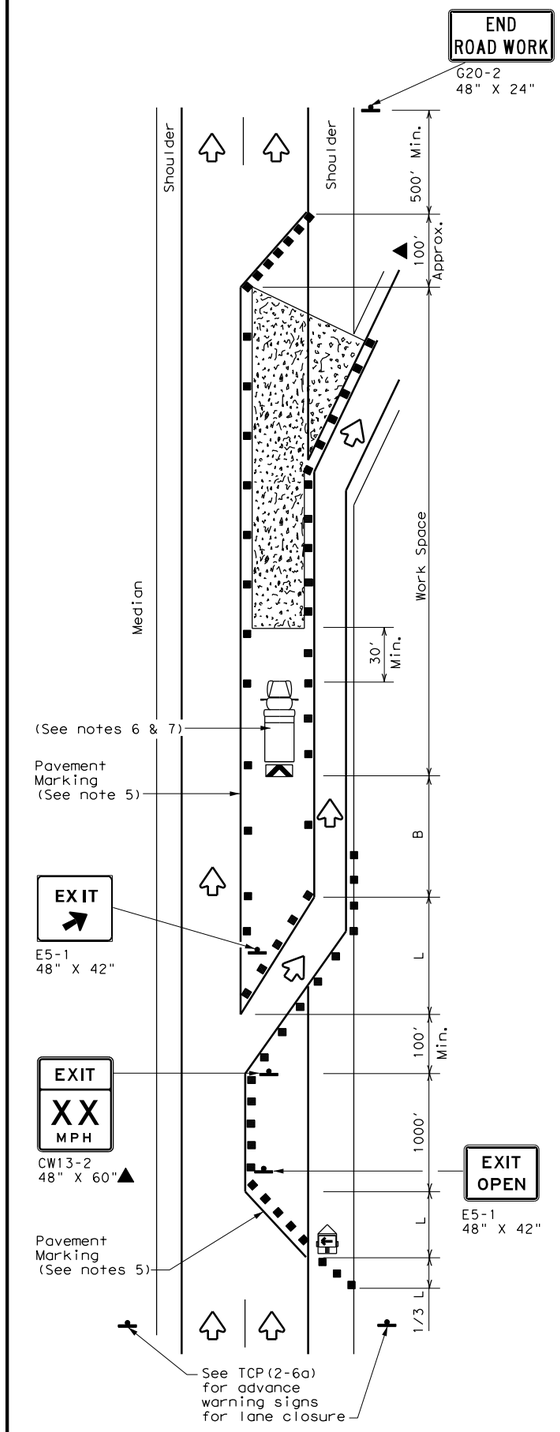


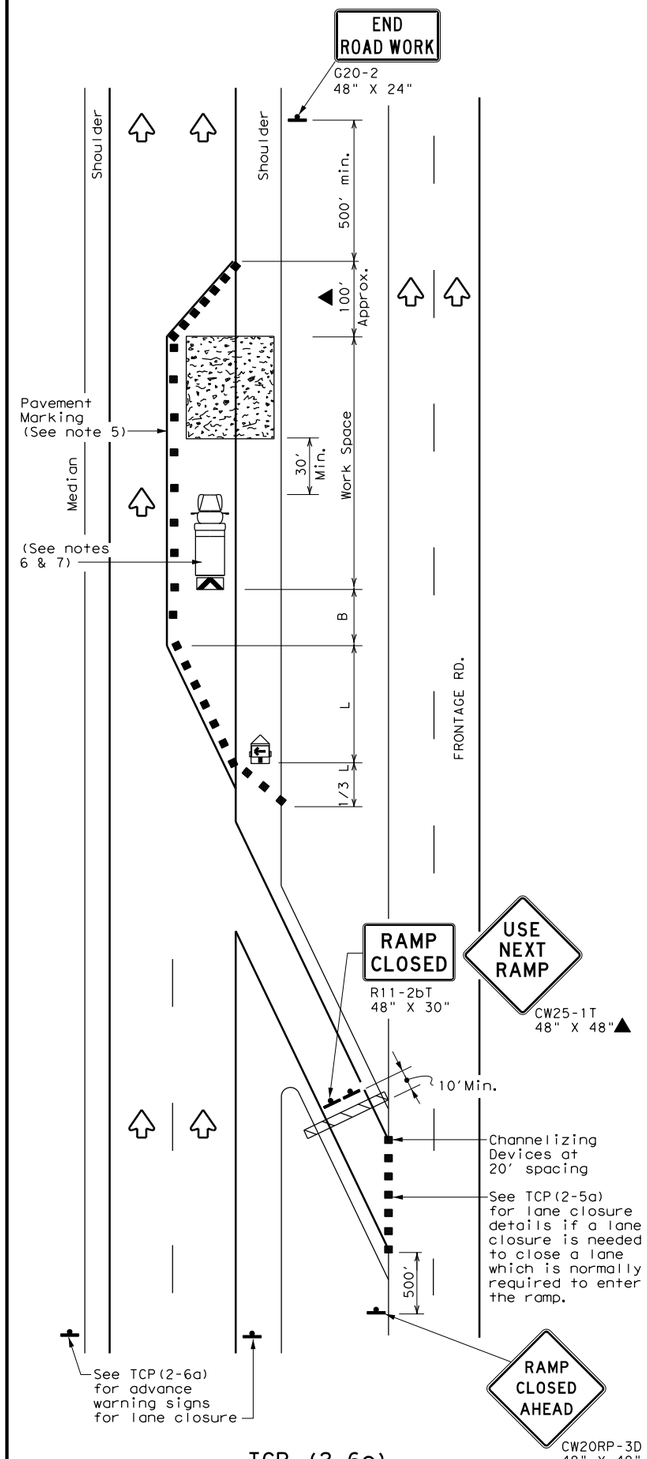
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		44

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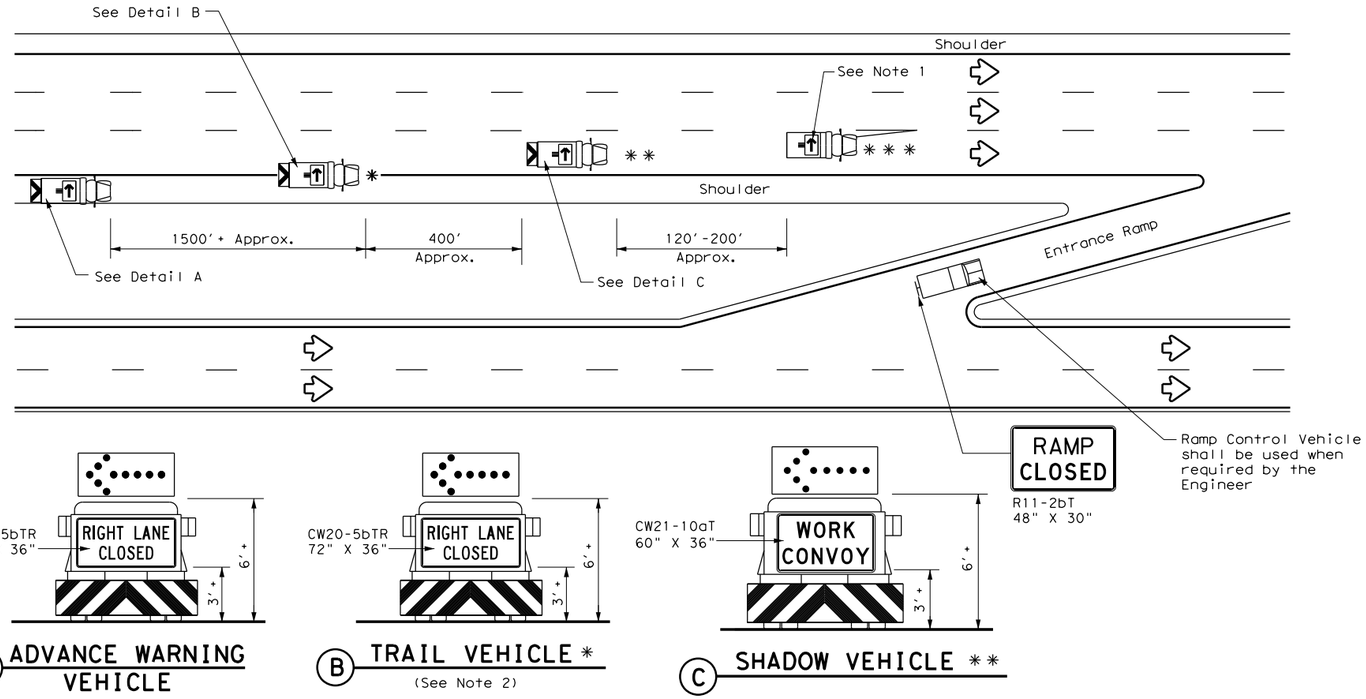
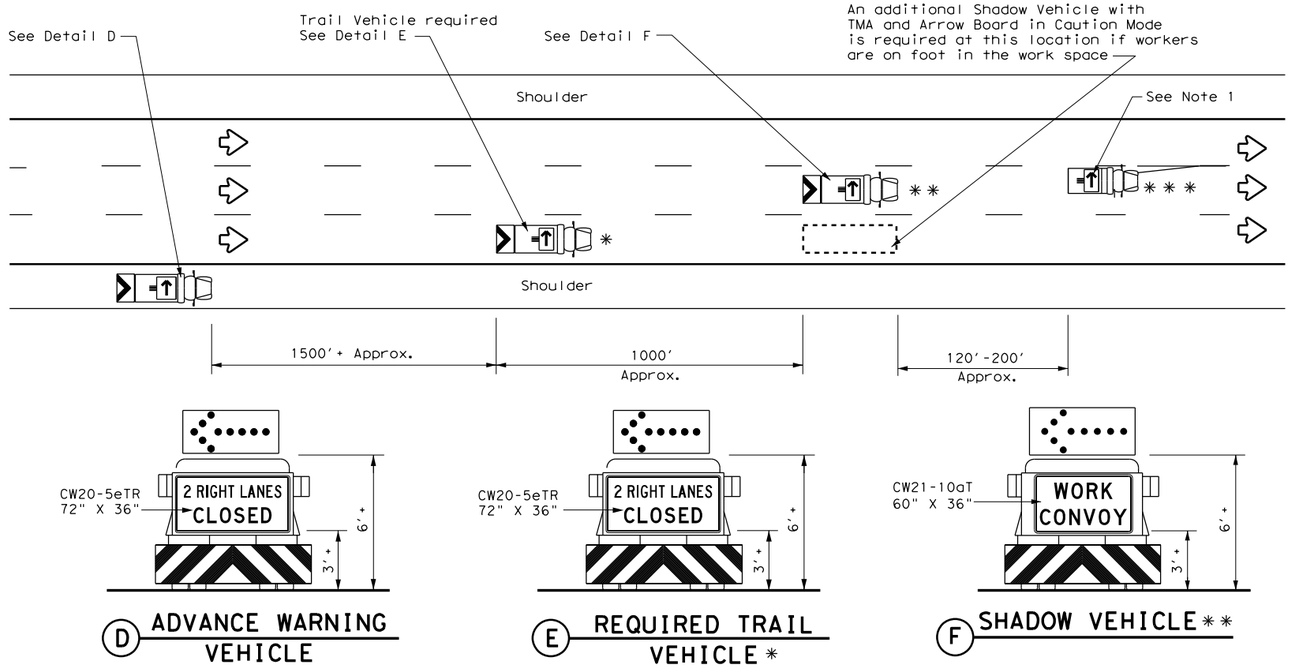


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



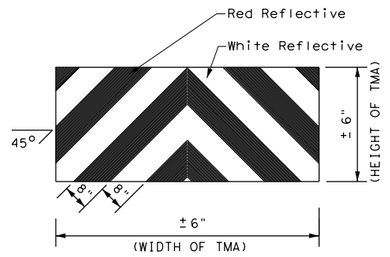
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

1. ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the vehicle.
2. For TCP(3-2a) the Engineer will determine if the TRAIL VEHICLE is required based on prevailing roadway conditions, traffic volume, and sight distance restrictions. All other vehicles shown for both TCP(3-2a) and TCP(3-2b) are required.
3. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
4. The use of truck mounted attenuators (TMA) on the ADVANCE WARNING, SHADOW, and TRAIL vehicles are required.
5. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DMS 8300, Type A.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE may vary according to terrain, work activity and other factors.
9. Standard 48" X 48" diamond shaped warning signs with the same message as those shown may be used where adequate mounting space exists.
10. The signs shown should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or a truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board, must be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
12. The principles on this sheet may be used to close lanes from the left side of the roadway considering the number of lanes, shoulder width, sight distance, and ramp frequency.
13. Signs and flashing arrow board modes shall be appropriately altered when implementing left lane closures or interior closures which close the left lanes.
14. The Advance Warning Vehicle may straddle the edgeline when shoulder width makes it necessary.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
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176

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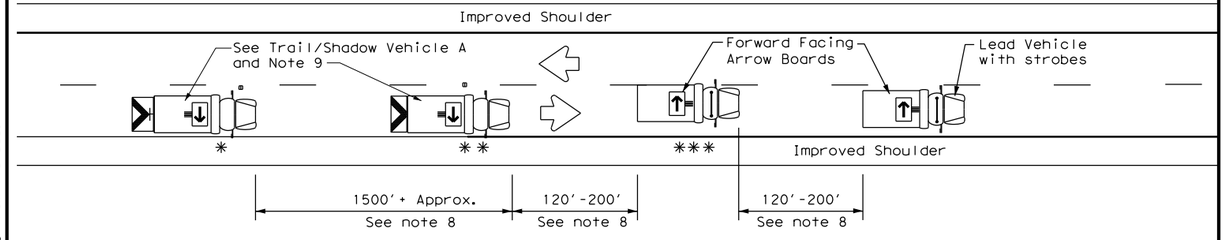
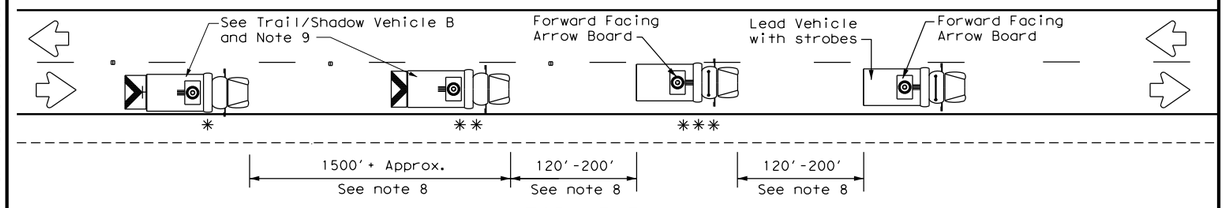


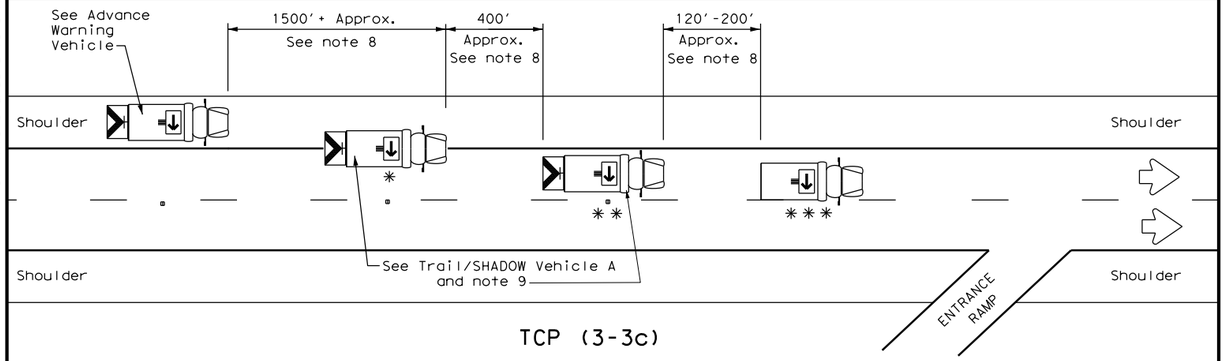
TCP (3-3a)

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



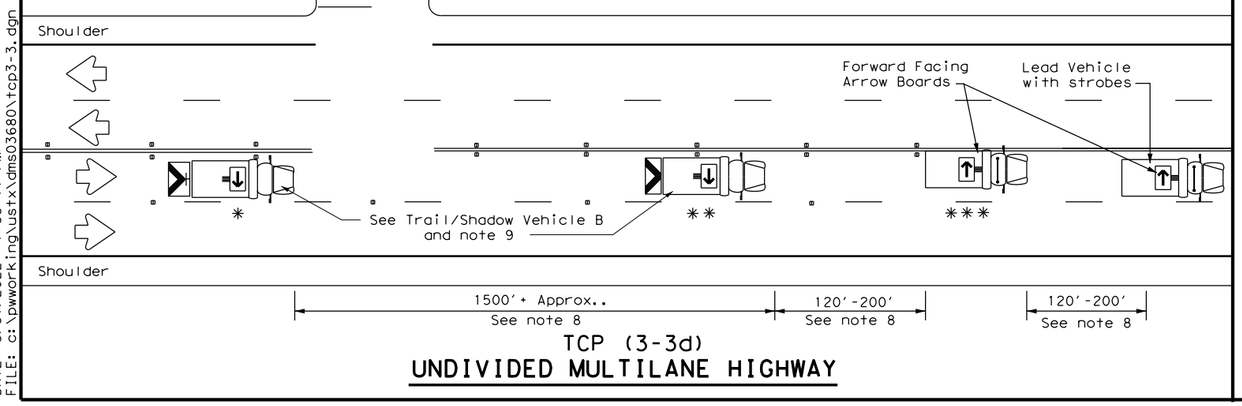
TCP (3-3b)

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



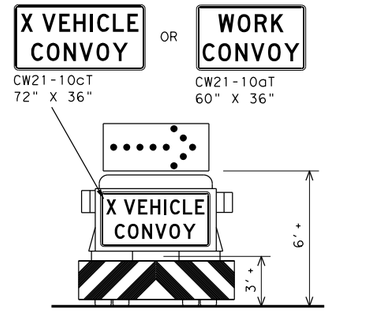
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



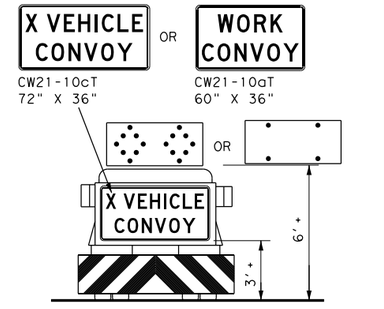
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



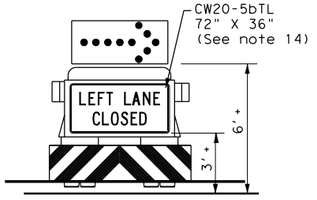
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

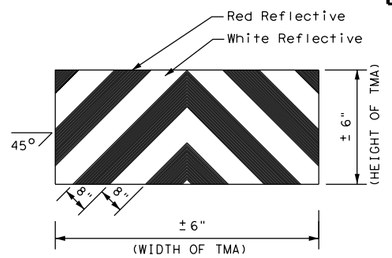


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	ELP	EL PASO		46
1-97 7-14				

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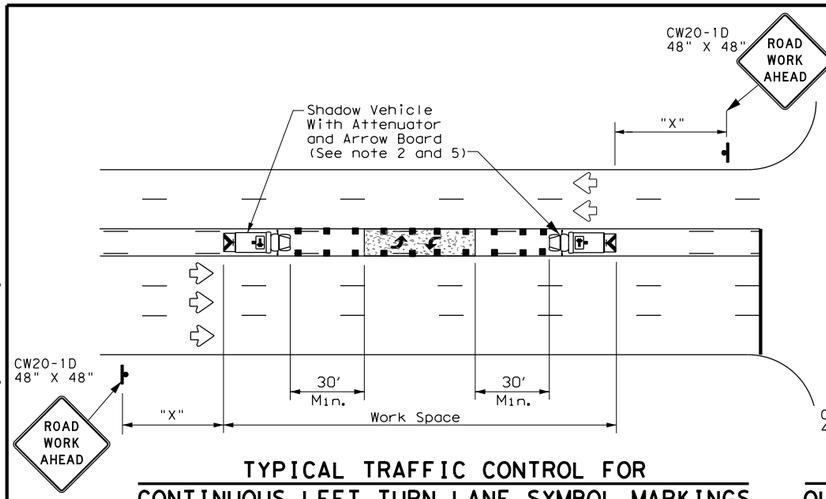
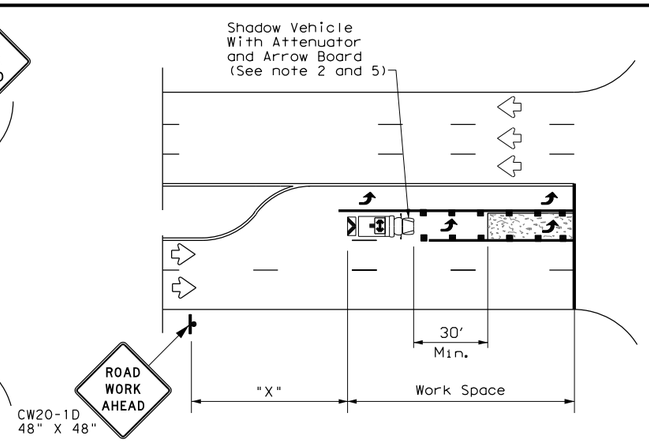
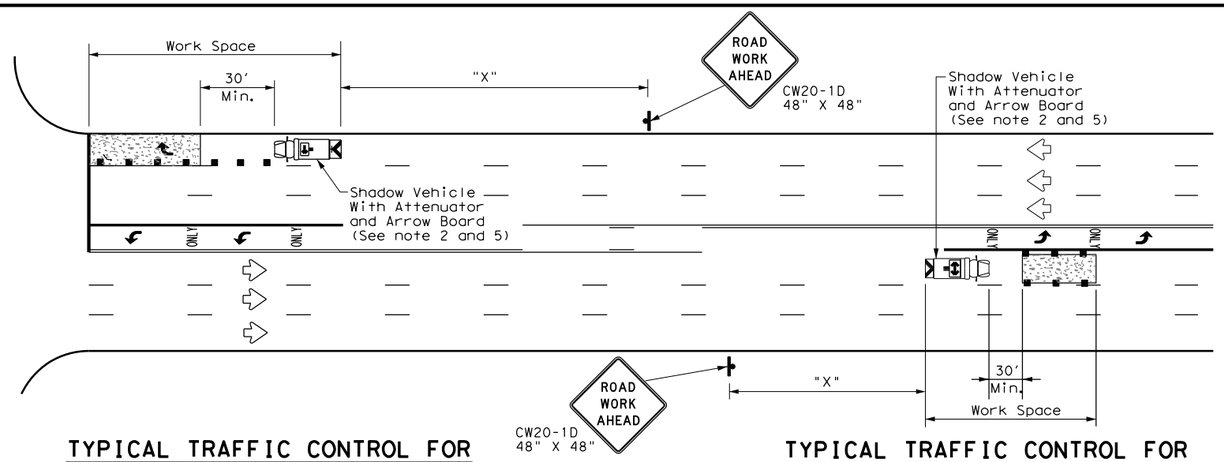


TYPICAL TRAFFIC CONTROL FOR
CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS

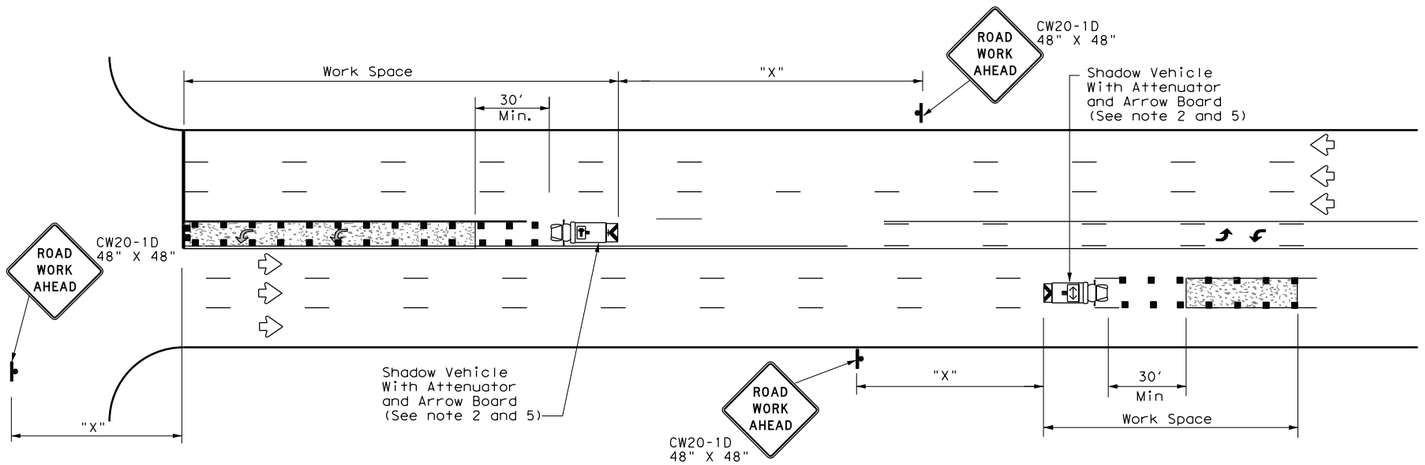


TYPICAL TRAFFIC CONTROL FOR
OUTSIDE DUAL LEFT TURN LANE SYMBOL MARKINGS



TYPICAL TRAFFIC CONTROL FOR
OUTSIDE LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
INSIDE LANE MARKINGS



TYPICAL TRAFFIC CONTROL FOR
LEFT TURN LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
CENTER LANE MARKINGS

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

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

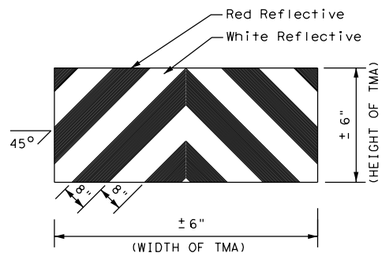
✳ Conventional Roads Only

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS FOR ISOLATED WORK AREAS UNDIVIDED HIGHWAYS

TCP(3-4)-13

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©TxDOT July, 2013	CONT	SECT	JOB	HIGHWAY
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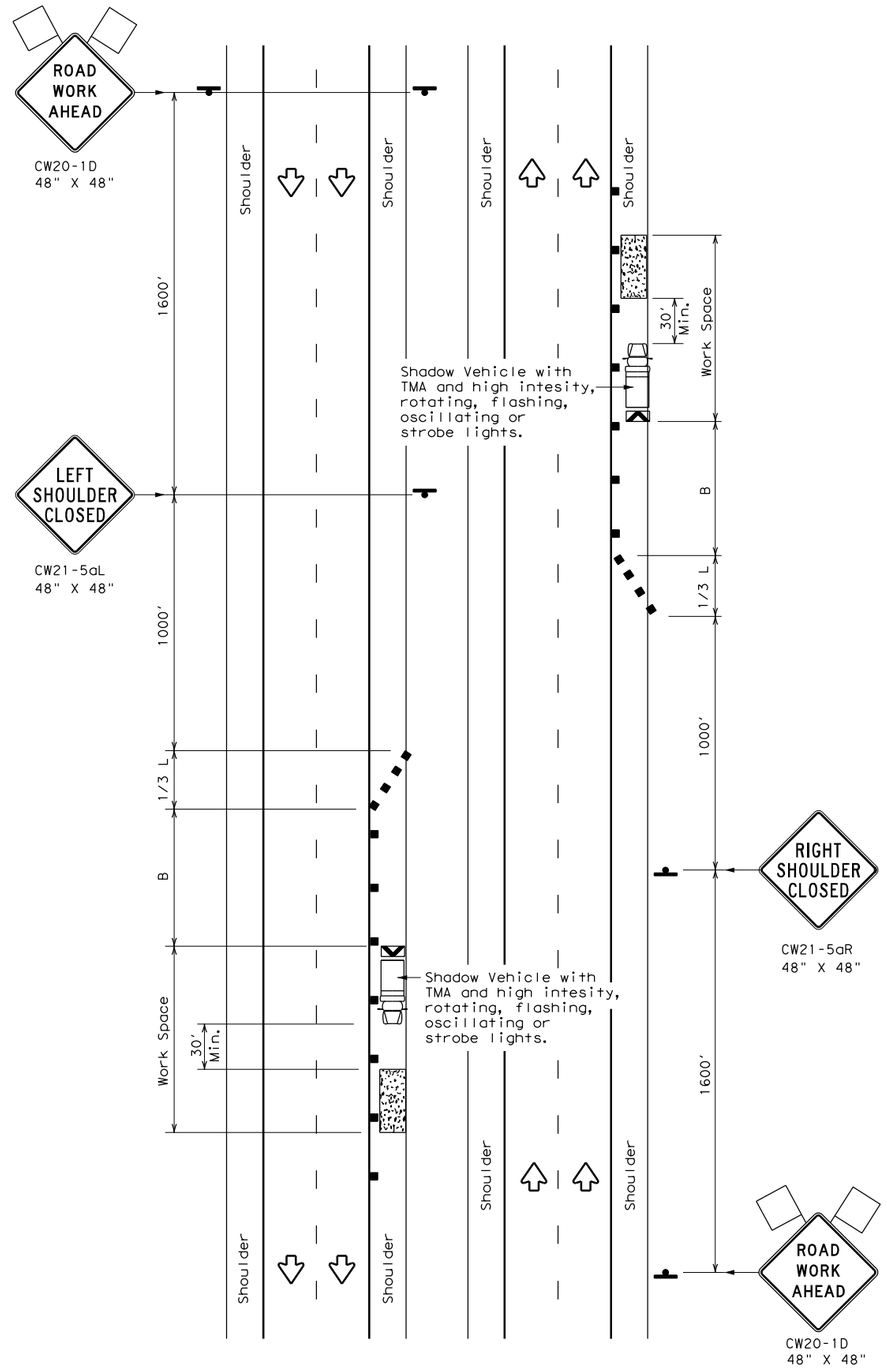
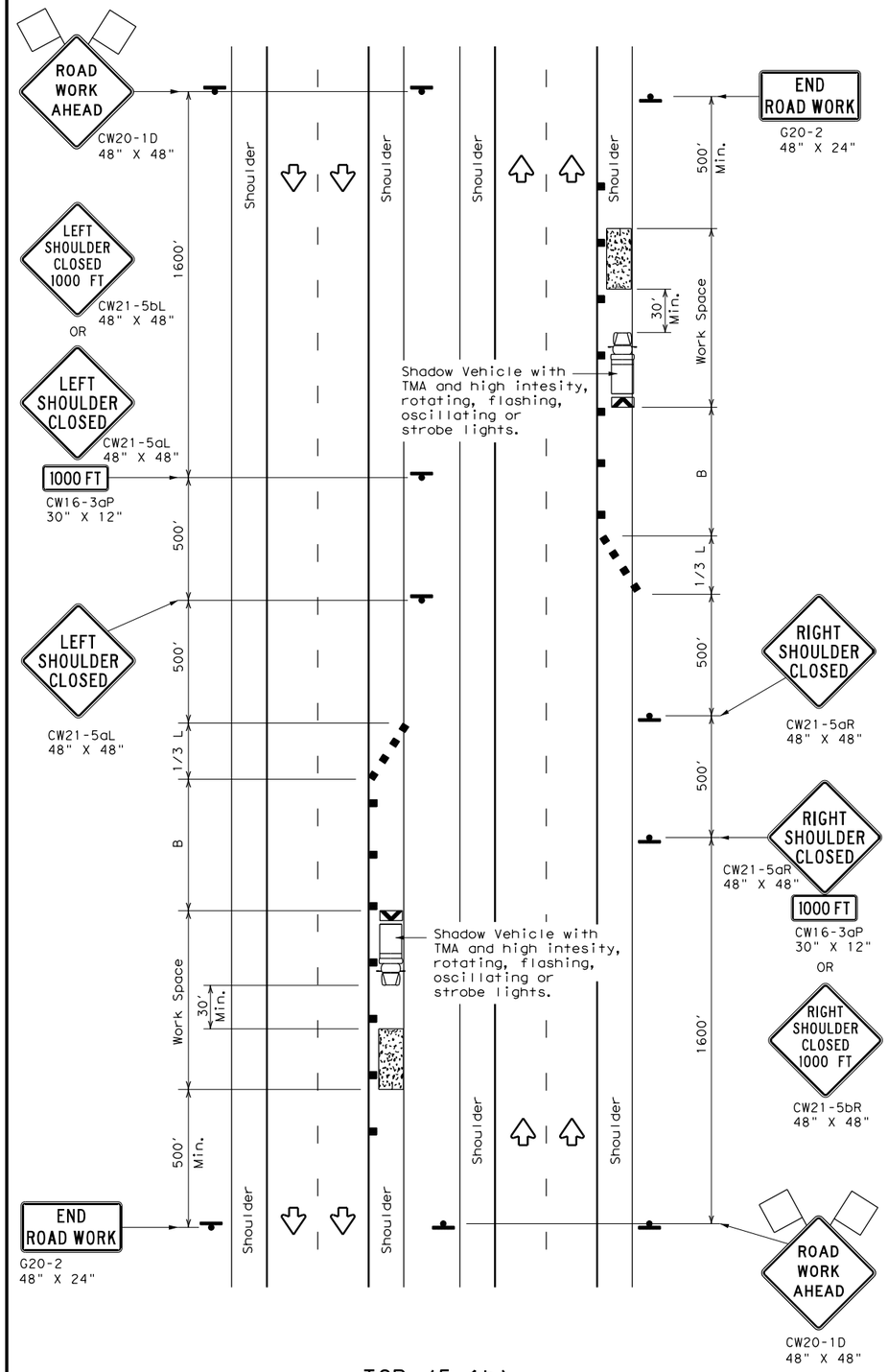


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		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'

* 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(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.
2. 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 cones.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

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©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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	ELP	EL PASO		48

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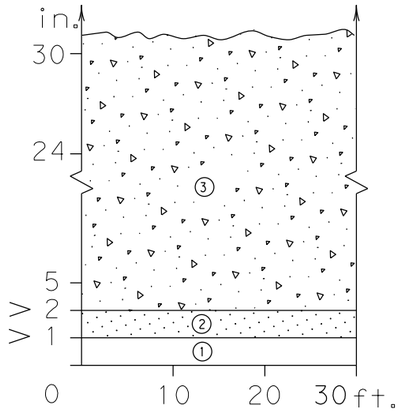
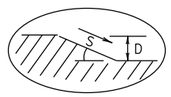
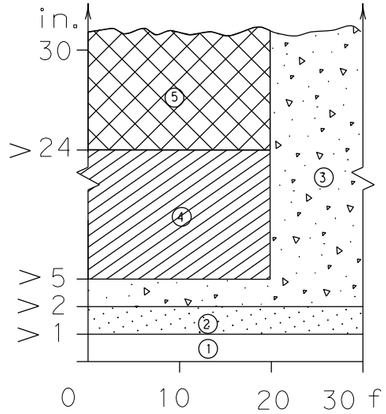
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

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

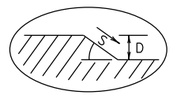


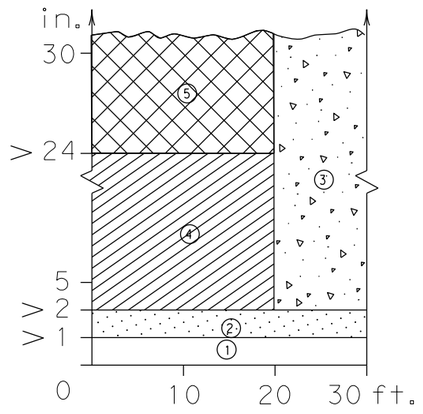
Edge Condition I
S = (3:1) (or flatter)



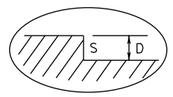


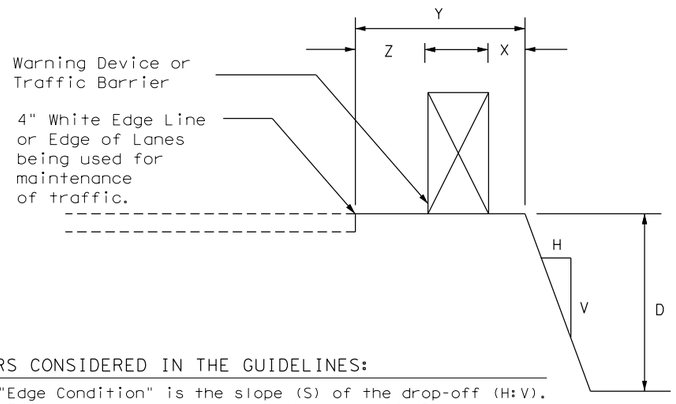
Edge Condition II
S = ((2.99):1) to (1:1)





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





FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.

5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

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

Edge Condition Notes:

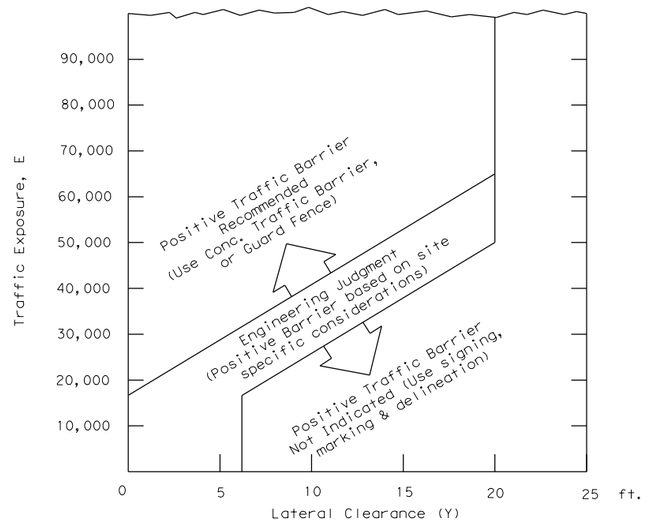
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▨)



1. E = ADT x T
   Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.

2. Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.

3. An approved end treatment should be provided for any positive barrier end located within the clear zone.

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

Engineer's Seal

STATE OF TEXAS
ERIC SIERRA-ORTEGA
124817
LICENSED
PROFESSIONAL ENGINEER

Date 5/31/2022

Texas Department of Transportation

Traffic Safety Division Standard

TREATMENT FOR VARIOUS EDGE CONDITIONS

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© TxDOT August 2000	CONT	SECT	JOB	HIGHWAY
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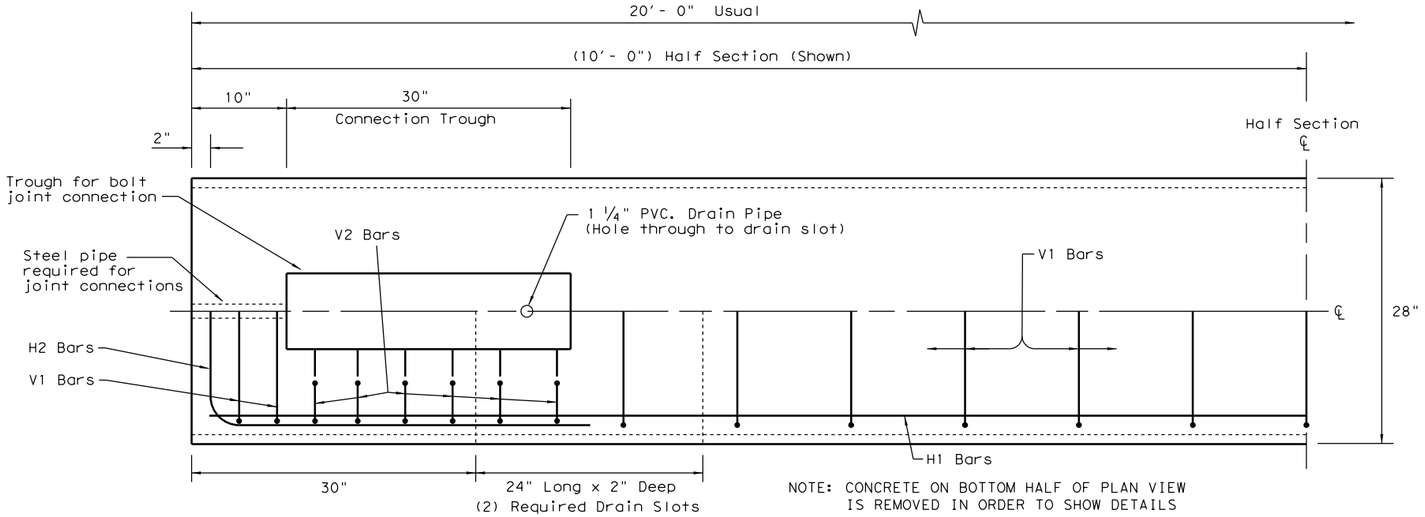
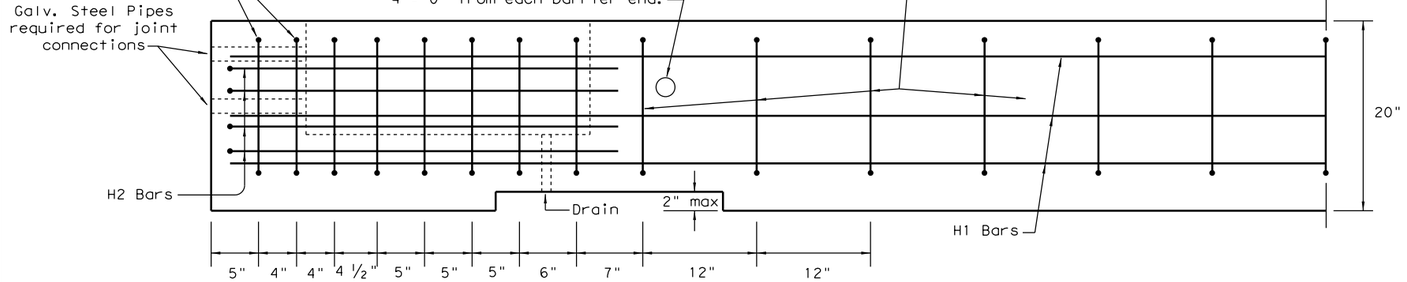
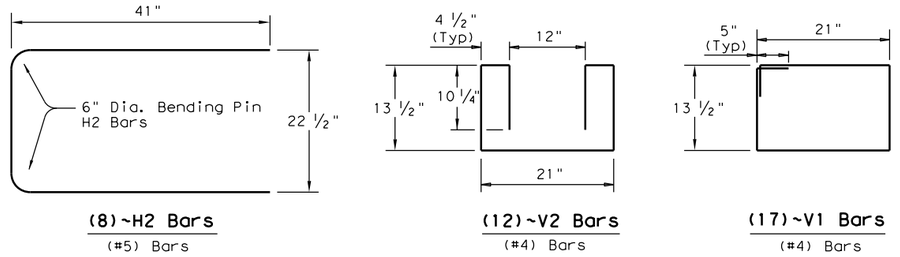


NOTE: CONCRETE ON BOTTOM HALF OF PLAN VIEW IS REMOVED IN ORDER TO SHOW DETAILS

PLAN
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



ELEVATION
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



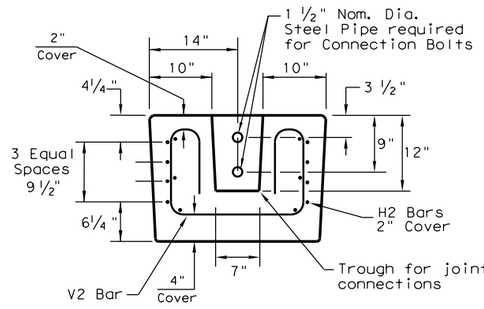
(8)~H2 Bars (#5) Bars

(12)~V2 Bars (#4) Bars

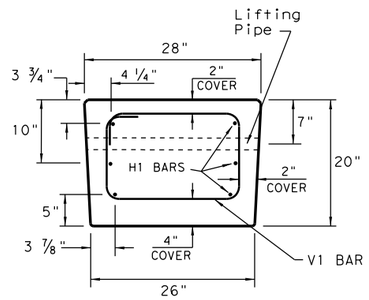
(17)~V1 Bars (#4) Bars

REINFORCING STEEL DETAILS
TYPE 1 - BARRIER SEGMENT

Note: Use 2" Dia. Bending Pin, unless otherwise shown



SECTION A-A



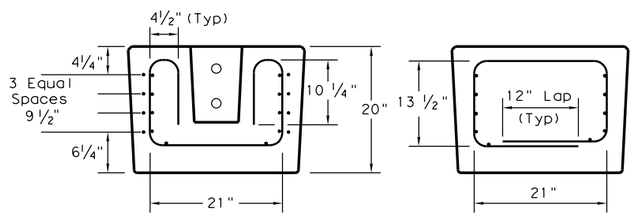
SECTION B-B

GENERAL NOTES

1. Low Profile Concrete Barrier (LPCB), is approved for use in temporary work zone locations, where the posted speed is 45 mph, or less.
2. Concrete shall be Class H for precast barrier with a minimum compressive strength of 3,600 psi.
3. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
4. Precast LPCB barrier length shall be 20 ft.
5. All barrier edges shall have ¾" chamfer or a tooled radius.
6. Joint connection hardware shall be in accordance with Item 449, "Anchor Bolts." and is considered subsidiary.
7. Steel pipe required for joint connection bolts shall be galvanized in accordance with Item 445,"Galvanizing."
8. Welded wire reinforcement (WWR) may be used in lieu of conventional reinforcement for Type 1 barrier, and shall meet the requirements shown.

FOR CONTRACTORS INFORMATION ONLY

(TYPE 1) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	2.6
REINFORCING STEEL	LBS	330
TOTAL BARRIER WT.	LBS	11000



SECTION A-A SECTION B-B

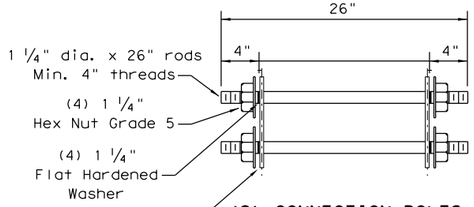
(WWR) GENERAL NOTES

1. Deformed Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded wire cage may be cut or bent, if necessary, but must be approved by the Engineer.
3. Combinations of reinforcing steel and WWR are permitted, as directed by the Engineer. The dimensions from the end of the barrier section to the first wire shall not exceed 3".

REQUIRED (WWR) WIRE DESIGN

8 ~ (D31) Horizontal Wires (Equally spaced)
10 ~ (D20) Horizontal Wires (Equally spaced)
29 ~ (D20) Vertical Wires (Spaced as shown in Elevation View)

WELDED WIRE REINFORCEMENT (WWR)- OPTIONAL REINFORCING



(2) CONNECTION BOLTS
ASTM A36

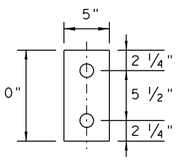


PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 1)
LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126, ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		50

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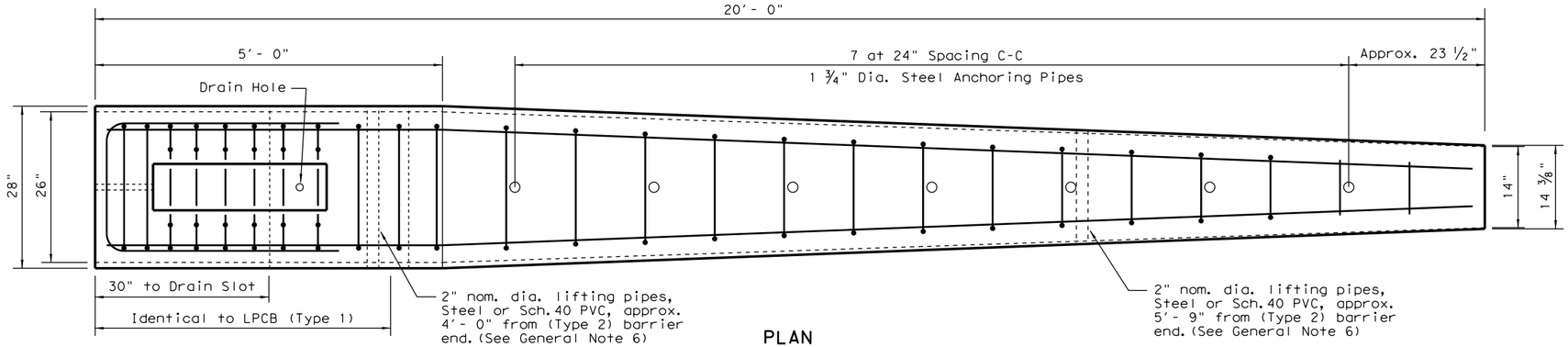
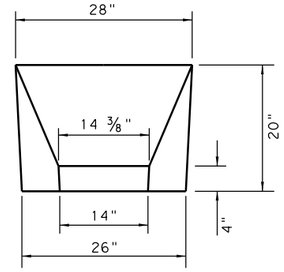
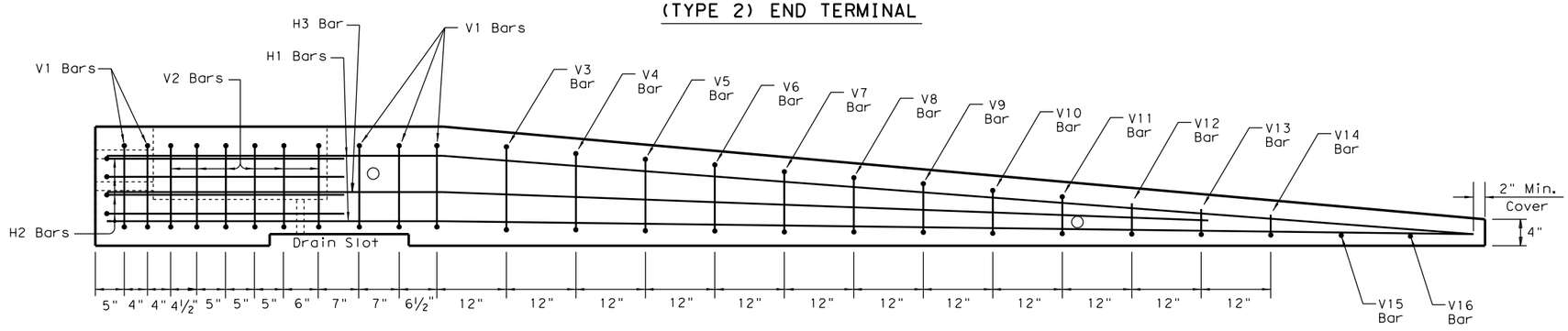


PLAN
(TYPE 2) END TERMINAL



APPROACH VIEW

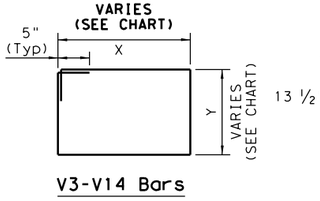


ELEVATION
(TYPE 2) END TERMINAL

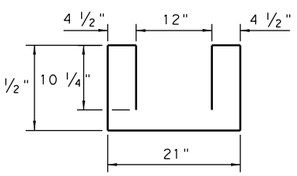
Note:
Anchoring pipes not shown in Elevation View

TYPE 2 - NOTES

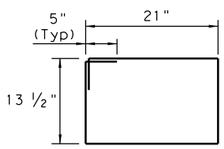
1. Welded wire reinforcment (WWR) is "not" an option for Type 2 Barrier.
2. Type 2 Barrier shall be used as an end treatment for the Type 1 barrier segments, when applicable.
3. The end treatment can be used without the anchor pins in locations that can accommodate approximately 4 ft. of lateral displacement of the end treatment. The use of non-pinned end treatment does not affect the performance or the deflection of the Low-Profile barrier system.
4. The anchor pins are all the same length and are to be driven flush with the top of the (Type 2) barrier surface.
5. The bends in the H3 and H1 bars are slight, no formal bend is necessary.
6. The Type 2 barrier segment must be lifted from the rear first, to prevent cracking of sloped section.
7. See LPCB sheet 1 for additional information.



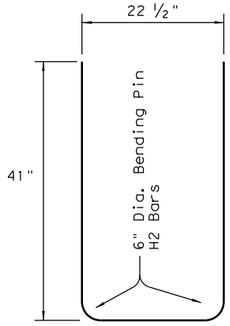
V3-V14 Bars



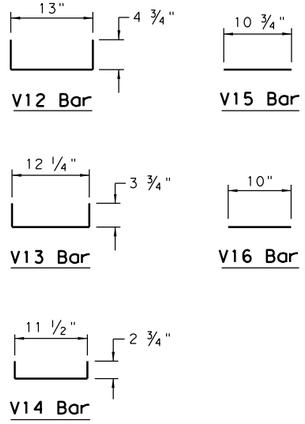
(6)~V2 Bars



(5)~V1 Bars



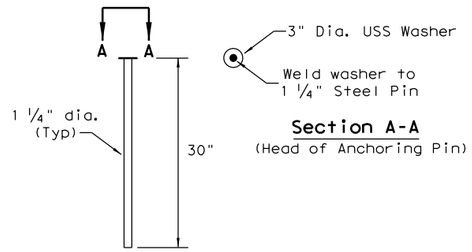
(4)~H2 Bars
(#5) Bars



Note: All V Bars are (#4)

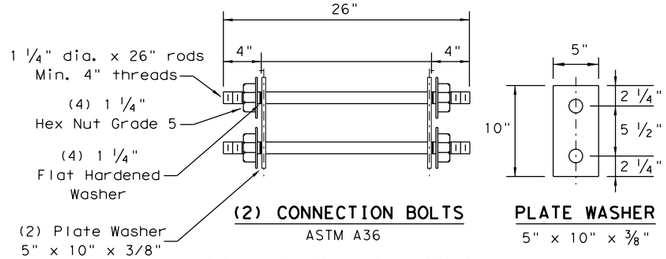
BAR(#4)	X (IN.)	Y (IN.)
V3 BAR	20 ¼	14 ½
V4 BAR	19 ½	13 ½
V5 BAR	18 ½	12 ¼
V6 BAR	17 ½	11 ¼
V7 BAR	17	10 ¼
V8 BAR	16 ¼	9
V9 BAR	15 ½	8
V10 BAR	14 ½	7
V11 BAR	13 ¾	6

REINFORCING STEEL DETAILS
TYPE 2 - END TERMINAL



(7) Anchor Pins
ASTM A36 Steel
(See Note 3)

Section A-A
(Head of Anchoring Pin)

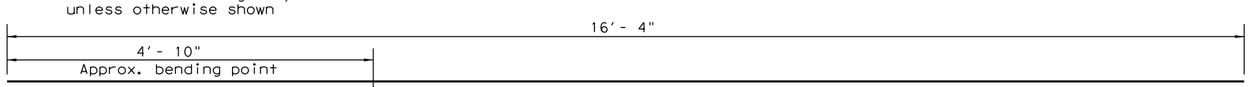


(2) CONNECTION BOLTS
ASTM A36

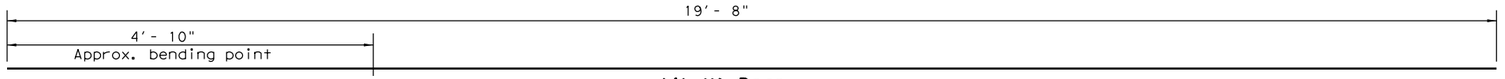
PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

Note: Use 2" Dia. Bending Pin, unless otherwise shown



(2)~H3 Bars
(#5) Bar



Note: Bends on H1 and H3 bars are slight and do not require formal bends.

(4)~H1 Bars
(#5) Bar

FOR CONTRACTORS INFORMATION ONLY

(TYPE 2) APPROX. QUANTITIES	20 FT. SECTION	
CONCRETE	CY	1.65
REINFORCING STEEL	LBS	240
TOTAL BARRIER WT.	LBS	7000

Texas Department of Transportation
Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 2)
LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
© TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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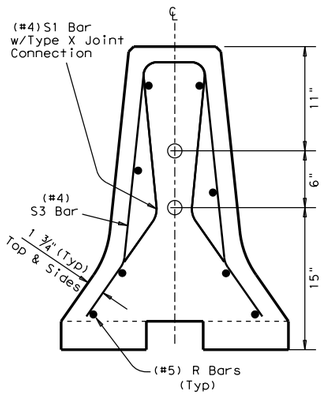
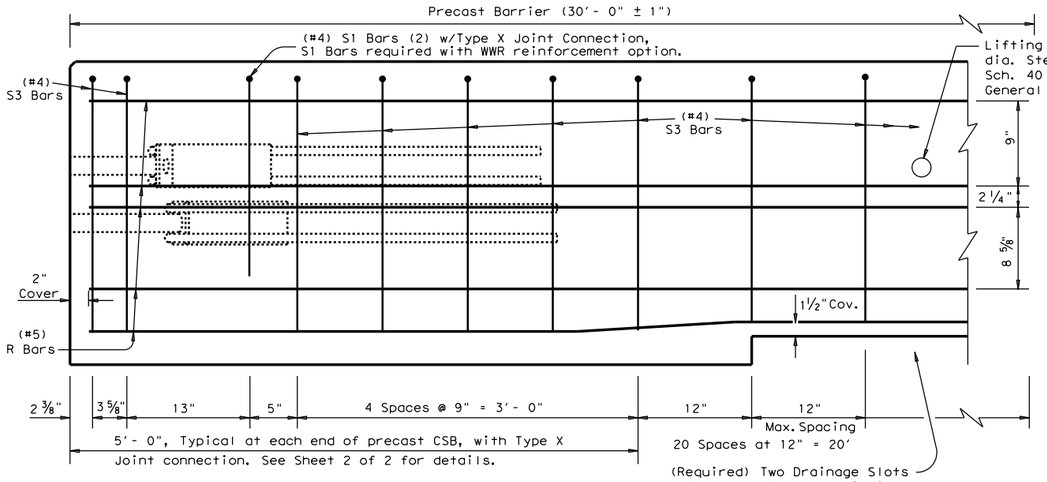


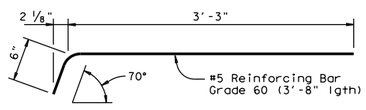
End View Precast Barrier

See sheet 2 of 3 for Joint connection Type X



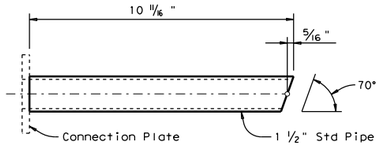
Reinforcement for Precast (CSB) Concrete Safety Barrier (Type 1)

Showing reinforcement for Joint Type X



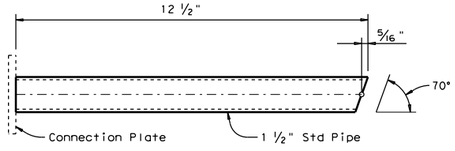
DEFORMED BAR ANCHOR DETAILS

Two (2) Bars required per assembly.
Eight (8) required per Joint.



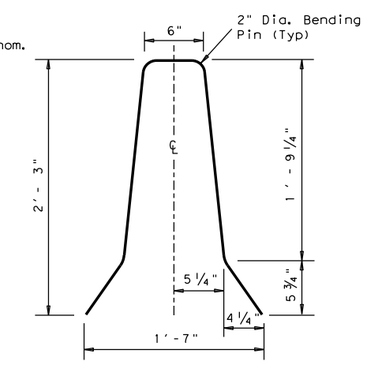
UPPER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Upper Assembly.
Two (2) required per Joint.



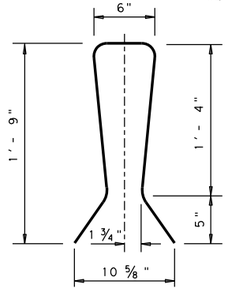
LOWER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Lower Assembly.
Two (2) required per Joint.



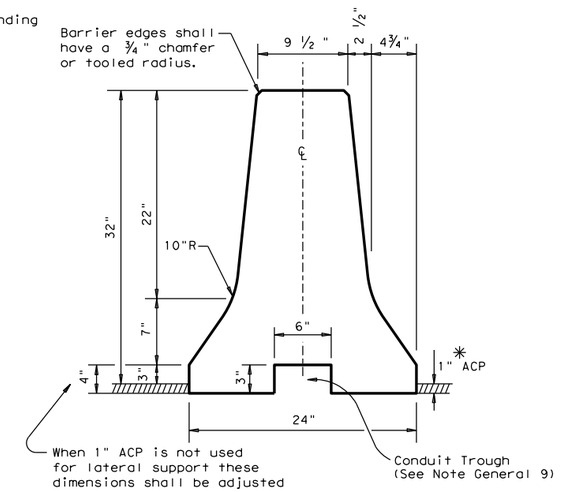
S3 Bar

#4 Bar



S1 Bar

#4 Bar (2)
(Joint Type X)

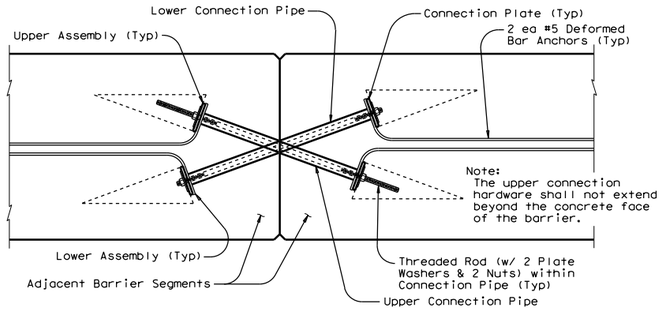


Concrete Safety Barrier

✳ When 1" ACP is "not" used as lateral support for permanent barrier placement. A permissible method of attaining the equivalent lateral support may be used, See CSB(6) sheet.

GENERAL NOTES

1. Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
4. All precast barrier edges shall have a ¾" chamfer or tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. All steel assemblies for joint shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
7. Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
8. Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items involved.
9. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.



TYPE X JOINT INSTALLATION DETAIL

Barrier reinforcing and Type X Joint Leave-Out dimensions not shown for clarity.

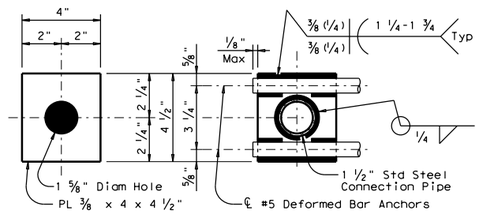
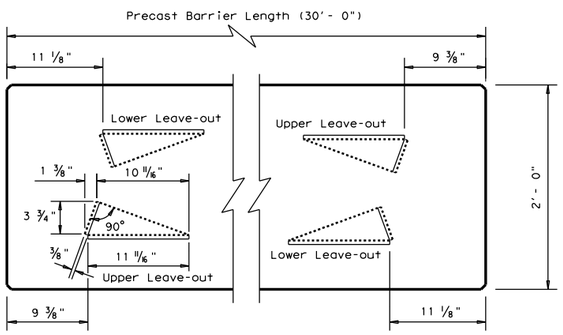


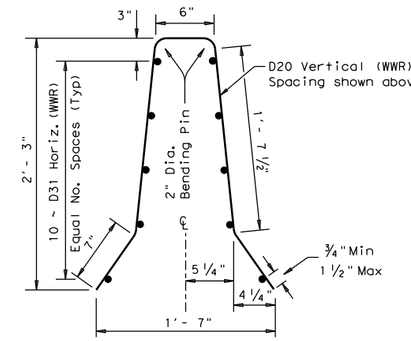
PLATE DIMENSIONS WELDING DETAILS

CONNECTION PLATE DETAILS

One (1) Plate required per assembly.
Four (4) required per Joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.



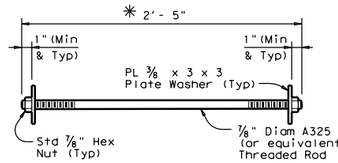
BARRIER PLAN AT END JOINTS



Welded Wire Reinforcement (WWR) Option for Bars R and S3

(WWR) General Notes

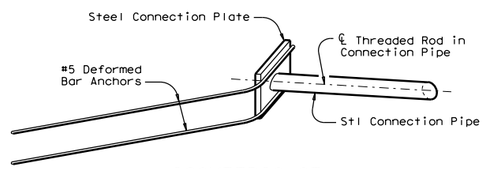
1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing steel and WWR will be permitted, as directed by the Engineer. The dimension from the end of the barrier section to the first wire shall not exceed 3".



CONNECTION BOLT OR THREADED ROD DETAIL

Two (2) Threaded Rods (Or Equivalent Hex Hd. Bolts)
(w/ Two (2) PL ⅜ x 3 x 3 Plate Washers & Two (2) Std Hex Nuts) required per Joint.

✳ The connection hardware shall not extend beyond the concrete face of the barrier. Hex head bolts may be provided. The proper length of all hardware should be verified.



ISOMETRIC OF TYPICAL WELDED ASSEMBLY

Four (4) [2 Upper & 2 Lower] Assemblies required per Joint.

Weight of one Precast 30 ft. (CSB) segment = Approx. 6.5 Tons or 440 lbs per ft.

SHEET 1 OF 2

Texas Department of Transportation

Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER (TYPE 1)

CSB(1)-10

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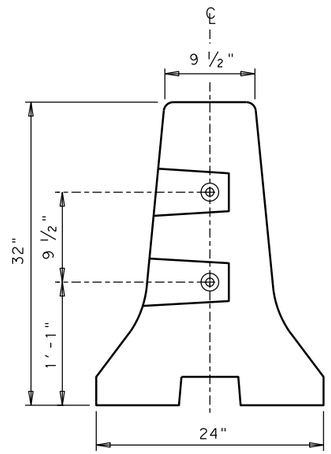
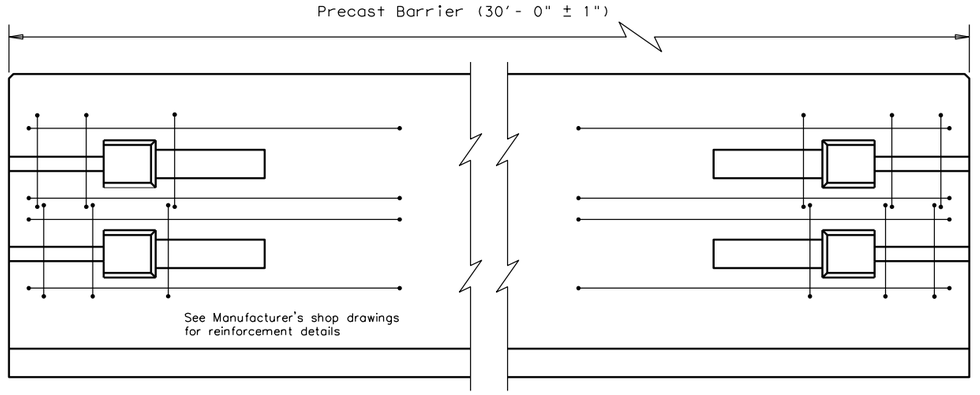
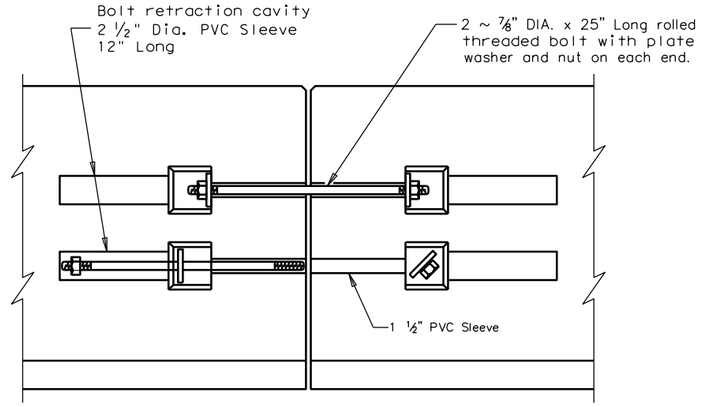


END VIEW (CSB) QUICK-BOLT
QUICK-BOLT POCKET LOCATIONS

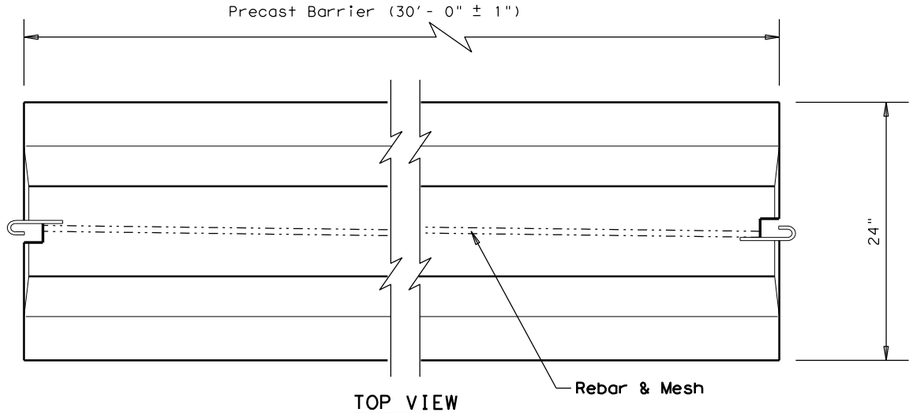


ELEVATION (CSB) QUICK-BOLT
See Manufacturer's shop drawing for additional details

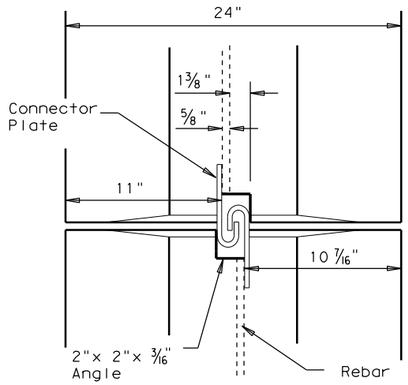


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

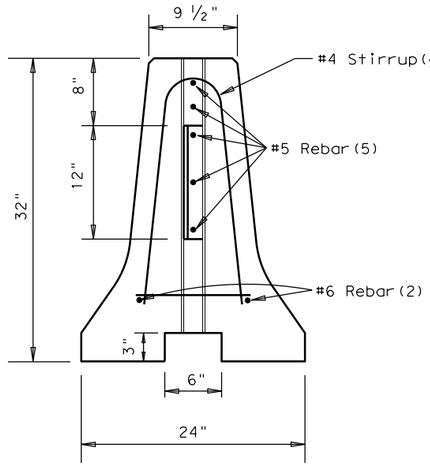
Joint Connection (Type Q)



TOP VIEW
PRECAST (CSB) WITH J-J HOOKS
See Manufacturer's shop drawing for additional details



VIEW FROM ABOVE
J-J HOOK CONNECTION



END VIEW
J-J HOOK CONNECTION

Joint Connection (Type J)

Proprietary Joint Connections (CSB)

Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

J-J Hooks by Easi-Set Industries, (800)547-4045
Quick-Bolt by Bexar Concrete, (210)497-3773

If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.

Texas Department of Transportation
Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER
(TYPE 1)

CSB(1)-10

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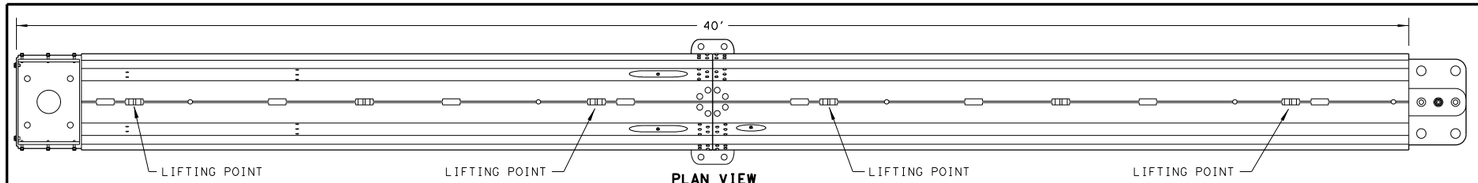
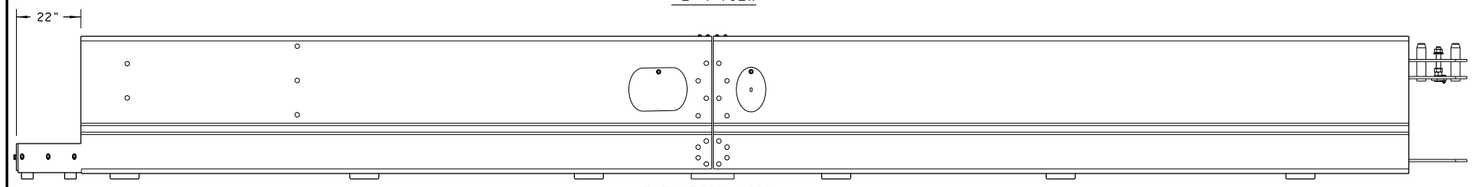
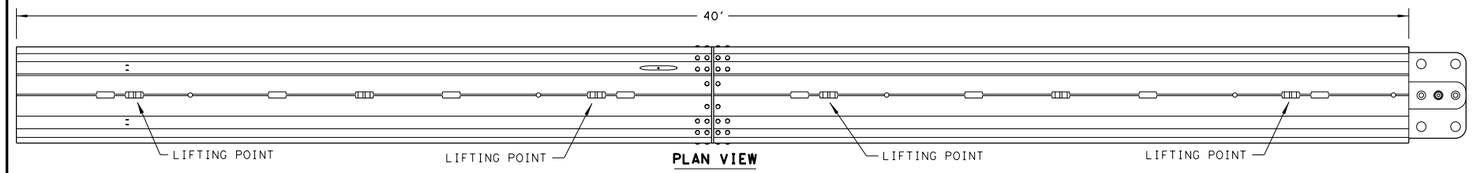


PLAN VIEW

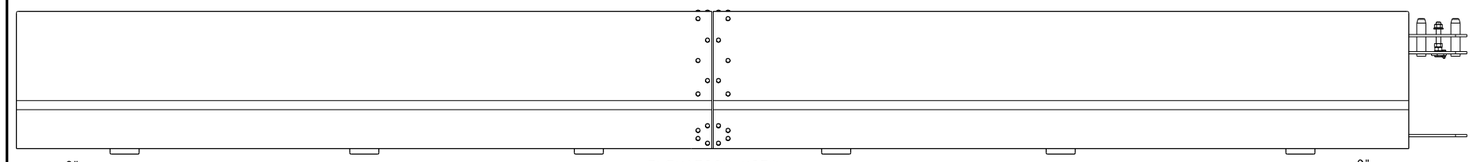


ELEVATION VIEW

BARRIERGUARD END SECTION - 40 FT. MALE OR FEMALE END SECTION

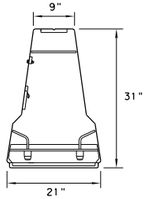


PLAN VIEW

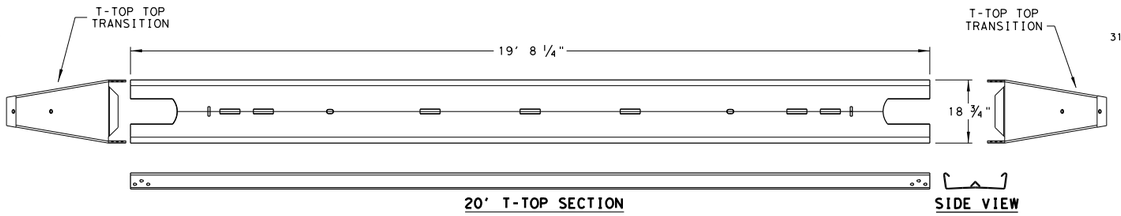


ELEVATION VIEW

BARRIERGUARD STANDARD SECTION - 40 FT.

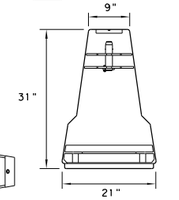


FEMALE END CROSS SECTION

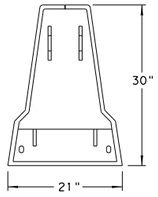


20' T-TOP SECTION

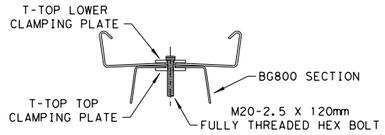
SIDE VIEW



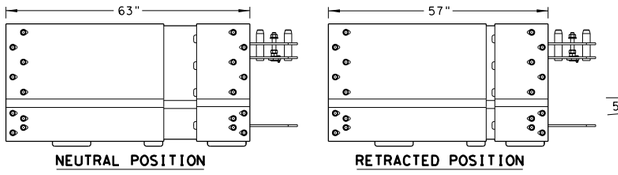
MALE END CROSS SECTION



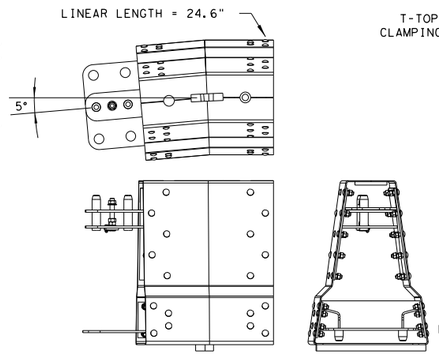
FULL HEIGHT TERMINAL COVER



T-TOP MOUNTING DETAIL



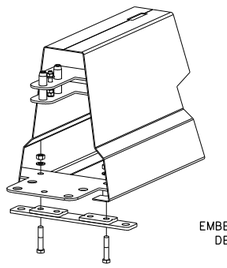
VARIABLE LENGTH BARRIER



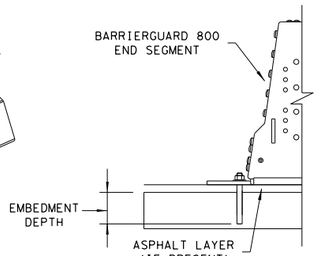
5° (LH) LEFT HAND ANGLE SECTION

NOTE: ADDITIONAL ANGLE SECTION AVAILABLE

5° (RH) RIGHT HAND ANGLE SECTION
10° (LH) LEFT HAND ANGLE SECTION
10° (RH) RIGHT HAND ANGLE SECTION



INTERMEDIATE ANCHOR AT QUICKLINK



SEE ANCHORING TABLE

GENERAL NOTES

1. THE SYSTEM SHOWN ON THIS DRAWING IS A PROPRIETARY BARRIER TRADED AS BARRIERGUARD 800 AND BARRIERGUARD 800 MDS AND HAS BEEN DESIGNED AND MANUFACTURED BY LAURA METAAL ROAD SAFETY INC. FOR TECHNICAL ASSISTANCE AND APPLICATION SUPPORT CONTACT LEE STUART AT LAURA METAAL ROAD SAFETY INC. AT (702) 664-2009 OR lstuart.laurametaal@outlook.com
2. THE BARRIERGUARD 800 SYSTEM HAS BEEN CRASH TESTED TO MASH AND HAS FHWA APPROVAL AS A TL-3 BARRIER. THE DEFLECTION TABLE OUTLINES BASIC SYSTEM PERFORMANCE AND COMPONENT ANCHORING REQUIREMENTS.
3. THIS DRAWING PACKAGE PROVIDES THE RELEVANT INFORMATION AND GENERAL GRAPHICS REQUIRED TO IDENTIFY THE COMPONENT PARTS OF BARRIERGUARD 800 AND THEIR INCORPORATION AS A WHOLE SYSTEM FOR DEPARTMENTAL STANDARD APPLICATIONS.
4. BARRIERGUARD 800 REQUIRES ANCHORING (PINNING) AT EACH END OF THE INSTALLED LENGTH. (INTERMEDIATE ANCHORS CAN BE USED TO REDUCE DEFLECTION).
5. INSTALLATION OF BARRIERGUARD 800 OR BARRIERGUARD 800 MDS, NORMALLY STARTS WITH A MALE TERMINAL SECTION AND IS FINISHED WITH A FEMALE TERMINAL SECTION. STANDARD SECTIONS ARE USED BETWEEN THE TERMINAL SECTIONS TO OBTAIN THE REQUIRED LENGTH OF POSITIVE BARRIER PROTECTION.
6. THE FULL HEIGHT TERMINAL (FHT) SECTIONS MAY BE CAPPED WITH A FHT COVER, HOWEVER IF EXPOSED TO ON-COMING TRAFFIC THE END SHOULD BE PROTECTED WITH A SUITABLE CRASH CUSHION. THE BARRIERGUARD 800 RANGE IS COMPATIBLE WITH MOST COMMONLY USED CRASH CUSHION END TREATMENTS. FOR DETAILS OF BARRIERGUARD 800 CRASH CUSHION CONNECTIONS THAT ARE NOT DETAILED WITHIN THESE DRAWINGS, PLEASE CONTACT LAURA METAAL ROAD SAFETY INC. FOR MORE DETAILS. THE FULL HEIGHT TERMINAL COVER IS SUITABLE FOR THE "DOWN STREAM" END OF A SYSTEM THAT DOES NOT HAVE EXPOSURE TO ON-COMING TRAFFIC.
7. WHEN INSTALLING THE MINIMUM DEFLECTION SYSTEM (MDS),THE SYSTEM CAN BE INSTALLED WITH ADDITIONAL INTERMEDIATE ANCHORS ALONG THE LENGTH OF THE BARRIER RUN AT INTERVALS SHOWN IN THE DEFLECTION TABLE. EACH BARRIER RUN CAN BE MADE UP OF ANY MIXTURE OF THE SYSTEMS BY THE INTRODUCTION OF INTERMEDIATE ANCHORS AND/OR T-TOP AS REQUIRED.
8. THERE ARE SEVERAL METHODS OF ACHIEVING RADIUS IN A LENGTH OF BARRIERGUARD 800. RADIUS CAN BE ACHIEVED USING VARIOUS METHODS AND THUS ALLOWING THE BARRIERGUARD TO FOLLOW THE DESIRED CURVATURE IN THE INSTALLATION, THESE METHODS ARE, THE MOVEMENT IN THE QUICKLINK, ADJUSTABLE 20FT. SECTIONS OR SHORT ANGLED SECTIONS WHICH ALLOW A RADIUS AS LOW AS 12FT. FOR FURTHER INFORMATION AND ADVICE CONTACT LAURA METAAL ROAD SAFETY INC.
9. A BARRIERGUARD 800 VARIABLE LENGTH BARRIER (VLB) SECTION SHOULD BE USED WHEN BARRIERGUARD 800 OR BARRIERGUARD 800 MDS IS ANCHORED ACROSS A BRIDGE EXPANSION JOINT. IF T-TOP IS TO BE USED IN CONJUNCTION WITH THE VLB, THE T-TOP SHOULD BE USED FOR MINIMUM 40FT ON EITHER SIDE OF THE VLB AND TERMINATED WITH TRANSITIONS. THE VLB SECTION PROVIDES APPROXIMATELY 7in OF EXTENSION AND 7in OF CONTRACTION. MULTIPLE VLB'S CAN BE LINKED TOGETHER TO PROVIDE MORE EXPANSION OR CONTRACTION. THE VLB'S SHOULD BE PLACED IN THE VICINITY OF THE EXPANSION JOINT. THE VLB DOES NOT NEED TO BE PLACED DIRECTLY OVER THE EXPANSION JOINT BUT MUST BE BETWEEN THE NEAREST ANCHORS ON EACH SIDE OF THE JOINT. IT IS RECOMMENDED THAT THE VLB IS PLACED WITHIN 40FT OF THE JOINT.
10. THE T-TOP CAN BE INSTALLED EITHER BEFORE OR AFTER THE BARRIERGUARD 800 HAS BEEN FULLY ASSEMBLED AND ANCHORED IN PLACE. T-TOP IS REQUIRED WHEN THE BARRIERGUARD 800 IS USED AS A MDS, ANCHORED EVERY 20FT, GATE SECTIONS AND VARIABLE LENGTH BARRIERS. THE T-TOP SHOULD EXTEND 40FT ON EITHER SIDE OF THESE CONDITIONS AND BE TERMINATED WITH TRANSITIONS.
11. THE BARRIERGUARD 800 RANGE HAS BEEN DESIGNED TO BE USED ON AND HAS BEEN TESTED ANCHORED ON ASPHALT, CONCRETE AND COMPACTED SUBBASE. CONTACT LAURA METAAL ROAD SAFETY INC. FOR FURTHER INFORMATION.
12. BARRIERGUARD 800 COMPONENTS ARE MANUFACTURED IN SI [METRIC] UNITS. ENGLISH UNITS SHOWN ARE APPROXIMATE. ALL COMPONENTS ARE FULLY GALVANIZED.
13. BARRIERGUARD 800 SYSTEMS SHALL BE ASSEMBLED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS DETAILED DRAWINGS, PROCEDURES AND SPECIFICATIONS. FOR ANY INSTALATIONS OUTSIDE OF THE SCOPE OF THESE DRAWINGS PLEASE CONTACT LAURA METAAL ROAD SAFETY INC. FOR DETAILS.

BARRIERGUARD 800 DEFLECTION TABLE

	STANDARD SYSTEM	MINIMUM DEFLECTION SYSTEMS (MDS)
DESCRIPTION	ONLY ANCHORED AT THE EXTREME ENDS OF THE BARRIER LENGTH	ANCHORED EVERY 20 FT.
DEFLECTION AT MASH TL-3	5'-6"	18 1/2"
T-TOP REQUIREMENTS	NONE REQUIRED	REQUIRED FOR MDS SECTIONS

STANDARD ANCHORING REQUIREMENTS (TABLE)

	RESIN STUD ANCHORS			DRIVEN ANCHORS		Hilti HSL-3 SHALLOW MECHANICAL
	CONCRETE *	UNREINFORCED CONCRETE *	ASPHALT	ASPHALT	SUBBASE/SOIL	CONCRETE
ANCHOR DIAMETER	1 in.	1 in.	1 in.	1-3/16 in.	5-1/2 in.	* *
EMBEDMENT DEPTH	6 in.	8 in.	16 in.	16 in.	32 in.	* *
DRILL DIAMETER	1-1/8 in.	1-1/8 in.	1-1/8 in.	1-3/16 in.	DRIVEN	* *
PULL OUT CAPACITY (MIN)	17500 lb	17500 lb	N/A	N/A	N/A	* *
SHEAR CAPACITY (MIN)	25000 lb	25000 lb	N/A	N/A	N/A	* *

* ALTERNATIVE ANCHORS INCLUDING MECHANICAL ANCHORS FOR CONCRETE MAYBE USED IF THEY MEET THE STRENGTH REQUIREMENTS LISTED, DETAILS WILL BE MANUFACTURER SPECIFIC.

* * CONTACT: LAURA METAAL ROAD SAFETY INC. FOR SPECIFIC APPLICATION.

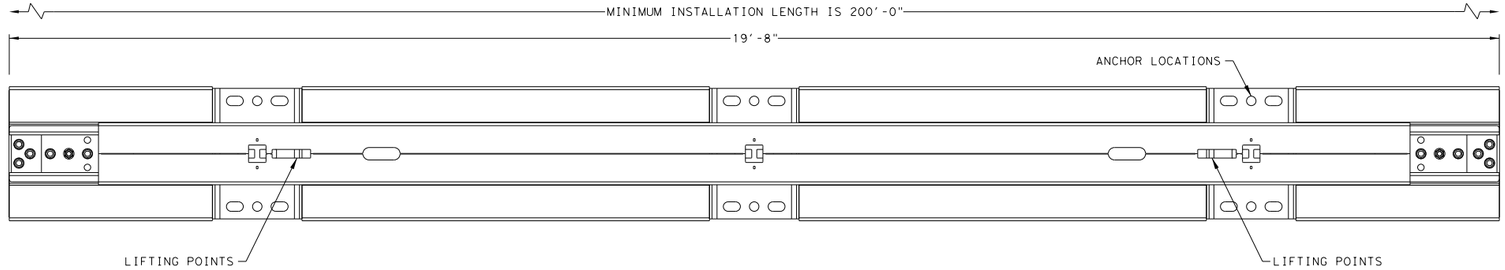
Texas Department of Transportation

Design Division Standard

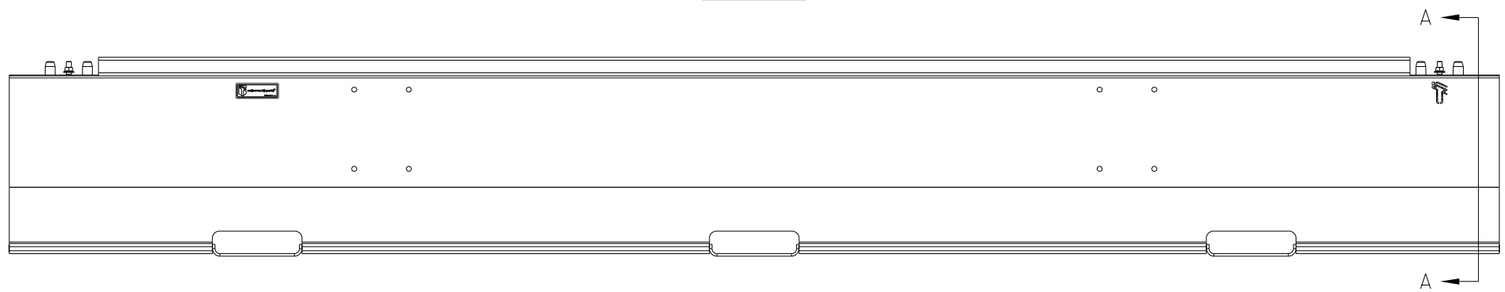
BARRIERGUARD 800 SYSTEM
STEEL BARRIER
MASH TL-3
BARRIERGUARD-19

FILE: barrierguard19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		54

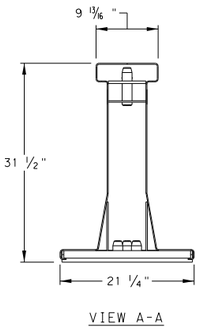
DATE:
FILE:



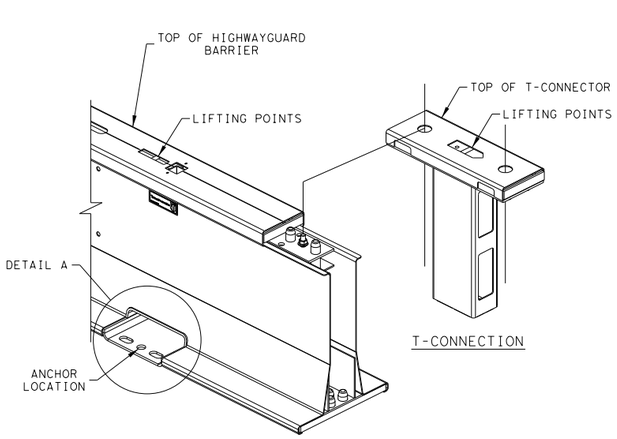
PLAN VIEW



ELEVATION VIEW
LEFT SIDE

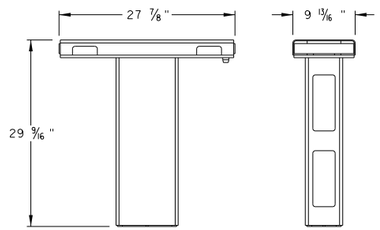


VIEW A-A

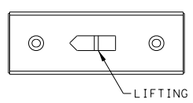


ISOMETRIC VIEW

T-CONNECTION



ELEVATION VIEW SIDE VIEW

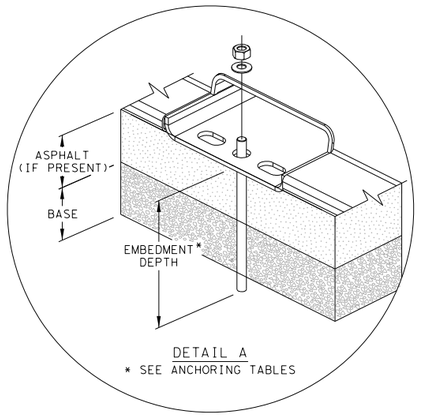


PLAN VIEW

T-CONNECTOR DETAILS

HIGHWAYGUARD BARRIER T-CONNECTOR TABLE *		
METHOD	DESCRIPTION	APPROX. RADIUS (FT)
1	20FT BARRIER SECTION WITH STANDARD T-CONNECTIONS AT MAXIMUM ANGLE	581
2	20FT BARRIER SECTION WITH 2.5° T-CONNECTION	460
3	20FT BARRIER SECTION WITH 5° T-CONNECTION	230
4	20FT BARRIER SECTION WITH 10° T-CONNECTION	115
5	20FT BARRIER SECTION WITH 10° BARRIER SECTION AND STANDARD T-CONNECTION	135
6	10° BARRIER SECTION WITH STANDARD T-CONNECTIONS	22
7	10° BARRIER SECTION WITH 10° T-SECTION	12

* SEE PRODUCT MANUAL OR CONTACT HIGHWAY CARE LTD. FOR MORE INFORMATION ON ANGLE T-CONNECTORS



DETAIL A
* SEE ANCHORING TABLES

GENERAL NOTES

1. THE SYSTEM SHOWN ON THIS DRAWING IS A PROPRIETARY BARRIER TRADED AS HIGHWAYGUARD AND HIGHWAYGUARD LDS AND HAS BEEN DESIGNED AND MANUFACTURED BY HIGHWAY CARE LTD. FOR TECHNICAL ASSISTANCE AND APPLICATION SUPPORT CONTACT AT (888) 323-6374 OR engineering@highwaycare.com
2. THE HIGHWAYGUARD HAS BEEN CRASH TESTED TO MASH AND HAS FHWA APPROVAL AS A TL-3 & TL-4 BARRIER. THE DEFLECTION TABLE OUTLINES BASIC SYSTEM PERFORMANCE AND COMPONENT ANCHORING REQUIREMENTS.
3. THIS DRAWING PACKAGE PROVIDES THE RELEVANT INFORMATION AND GENERAL GRAPHICS REQUIRED TO IDENTIFY THE COMPONENT PARTS OF HIGHWAYGUARD AND THEIR INCORPORATION AS A WHOLE SYSTEM FOR DEPARTMENTAL STANDARD APPLICATIONS.
4. INSTALLATION OF HIGHWAYGUARD BARRIER OR HIGHWAYGUARD LDS BARRIER, NORMALLY STARTS WITH AN END CAP THAT MUST BE PROTECTED WITH A SUITABLE CRASH CUSHION END TREATMENT IF EXPOSED TO ONCOMING TRAFFIC. THE CRASH CUSHION CONNECTIONS ARE NOT DETAILED WITHIN THESE DRAWINGS, PLEASE CONTACT HIGHWAY CARE LTD. FOR MORE DETAILS.
5. THE FULL HEIGHT OF HIGHWAYGUARD BARRIER 20FT SEGMENT IS 31.5". EACH SEGMENT IS LOWERED INTO POSITION WITH THE T-CONNECTION ALREADY ATTACHED TO THE END OF THE BARRIER THAT IS BEING JOINED TO THE RUN OF BARRIER. ENSURE ORIENTATION OF T-CONNECTOR ALLOWS ALIGNMENT PINS TO BE LOWERED ONTO NEXT SECTION. THE T-CONNECTOR ALLOWS THE BARRIER FOR ADJUSTMENTS, QUICK INSTALLATION, QUICK REMOVAL AND REPLACEMENT OF DAMAGED BARRIERS. MINIMUM INSTALLATION LENGTH OF HIGHWAYGUARD BARRIER IS 200'-0".
6. THERE ARE SEVERAL METHODS OF ACHIEVING RADIUS IN A LENGTH OF HIGHWAYGUARD BARRIER. RADIUS CAN BE ACHIEVED USING VARIOUS T-CONNECTORS AND THUS ALLOWING THE HIGHWAYGUARD BARRIER TO FOLLOW THE DESIRED CURVATURE IN THE INSTALLATION, THESE TYPE OF T-CONNECTORS ARE, 2.5°, 5° AND 10° ANGLES. FOR FURTHER INFORMATION AND ADVICE CONTACT HIGHWAY CARE LTD.
7. USING HIGHWAYGUARD BARRIER OR HIGHWAYGUARD BARRIER LDS ON BRIDGE STRUCTURES, POSSIBLE ANCHORING SHOULD TAKE PLACE OFF BRIDGE DECKS. ANY ANCHORING ON BRIDGE DECKS NEEDS TO BE AGREED IN ADVANCE WITH THE TECHNICAL EXPERT RESPONSIBLE FOR THE BRIDGE TO ENSURE IT IS NOT DAMAGED. IF ANCHORING EITHER SIDE OF A BRIDGE DECK EXPANSION JOINT, THEN THIS MOVEMENT MUST BE MIRRORED IN THE BARRIER. FOR FURTHER INFORMATION AND ADVICE CONTACT HIGHWAY CARE LTD.
8. THE HIGHWAYGUARD BARRIER SECTIONS CAN BE EQUIPPED WITH OPTIONAL WHEELSETS THAT ALLOW THE BARRIERS TO BE MANEUVERED WITHOUT LIFTING THE MACHINERY/ EQUIPMENT SUCH AS INSTALLING IN TUNNELS OR AREAS WITH OVERHEAD RESTRICTIONS. THE WHEELSETS CAN BE RAISED AND LOWERED FROM THE TOP OF THE BARRIER USING A MANUAL WRENCH AND 1" SOCKET.
9. THE HIGHWAYGUARD BARRIER HAS BEEN MASH TESTED, USING 1 3/16" DIA. DROP IN PIN ANCHORS AND EMBEDDED 1'-6" INTO ASPHALT. ALTERNATIVE GROUND EMBEDMENT CONDITIONS MAY BE ACCEPTABLE BUT MIGHT REQUIRE DIFFERENT ANCHOR SOLUTIONS, PLEASE CONTACT HIGHWAY CARE LTD. FOR FURTHER INFORMATION.
10. ALL COMPONENTS ARE FULLY GALVANIZED.
11. HIGHWAYGUARD BARRIER SYSTEMS SHALL BE ASSEMBLED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS DETAILED DRAWINGS, PROCEDURES AND SPECIFICATIONS. FOR ANY INSTALLATIONS OUTSIDE OF THE SCOPE OF THESE DRAWINGS, PLEASE CONTACT HIGHWAY CARE LTD. FOR DETAILS.
12. FOR ANCHORING LAYOUTS FOR HIGHWAYGUARD AND HIGHWAYGUARD LDS, PLEASE SEE MANUFACTURER'S PRODUCT MANUAL OR CONTACT HIGHWAY CAR LTD. FOR INFORMATION.

STANDARD ANCHORING REQUIREMENTS (ASPHALT) **				
	ANCHOR OPTIONS	ANCHOR LENGTH	EMBEDMENT DEPTH (MIN.)	DRILL DIAMETER
1	1" GALV. RESIN THREADED ANCHOR (WITH 1" GALV. WASHER & NUT)	1'-1"	11 3/4"	1 1/8"
2	1 3/16" GALV. DROP IN PIN (NOT DRIVEN PIN)	1'-2 3/8"	1'-1 3/4"	1 1/4"
3	1" GALV. RESIN THREADED ANCHOR (WITH 1" GALV. WASHER & NUT)	1'-6"	1'-4 1/2"	1 1/4"
4	1" GALV. CHEMICAL THREADED "LEFTY" KELKEN REMOVABLE ANCHOR (WITH 1" GALV. WASHER & NUT)	NA	1'-0"	1 1/4"

** 2" MIN. ASPHALT DEPTH ABOVE AN APPROPRIATELY COMPACTED DGA SUBBASE AND 2" MIN. ASPHALT DEPTH ABOVE A MIN. OF 6" REINFORCED CONCRETE SUBBASE.

NOTE:
ANCHORS ARE TO BE POSITIONED A MINIMUM OF 5 3/4" AWAY FROM THE EDGE OF AN EXCAVATION FOR RESIN ANCHORS OR 7 3/4" FOR DROP IN PINS.

STANDARD ANCHORING REQUIREMENTS (CONCRETE) ***				
	ANCHOR OPTIONS	ANCHOR LENGTH	EMBEDMENT DEPTH (MIN.)	DRILL DIAMETER
1	1" GALV. RESIN THREADED ANCHOR (WITH 1" GALV. WASHER & NUT)	9"	6"	1 1/8"
2	1" HILTI HSL-3 MECHANICAL ANCHOR	9 1/4"	****	****
3	1" GALV. CHEMICAL THREADED "LEFTY" KELKEN REMOVABLE ANCHOR (WITH 1" GALV. WASHER & NUT)	NA	6"	1 1/4"
4	1 3/16" GALV. DROP IN PIN (NOT DRIVEN PIN)	1'-2 3/8"	1'-1 3/4"	1 1/4"

*** 7 7/8" MINIMUM REINFORCED CONCRETE DEPTH.
10" MINIMUM UNREINFORCED CONCRETE DEPTH.
**** CONTACT: HIGHWAY CARE LTD. FOR SPECIFIC APPLICATION.

NOTE:
ANCHORS ARE TO BE POSITIONED A MINIMUM OF 11 7/8" FROM THE EDGE OF THE CONCRETE PAD.

HIGHWAYGUARD DEFLECTION TABLE		
	STANDARD SYSTEM	MINIMUM DEFLECTION SYSTEMS (LDS)
DESCRIPTION	ONLY ANCHORED AT THE FIRST AND ENDS OF THE BARRIER LENGTH	ANCHORS ARE STAGGERED EVERY 39'-4 1/2"
DEFLECTION AT MASH TL-3	64"	2'-3"
DEFLECTION AT MASH TL-4	71"	2'-7"

NOTE:
SEE PRODUCT MANUAL OR CONTACT HIGHWAY CARE LTD. FOR MORE INFORMATION ON ANCHOR REQUIREMENTS FOR THE LENGTH OF BARRIER.

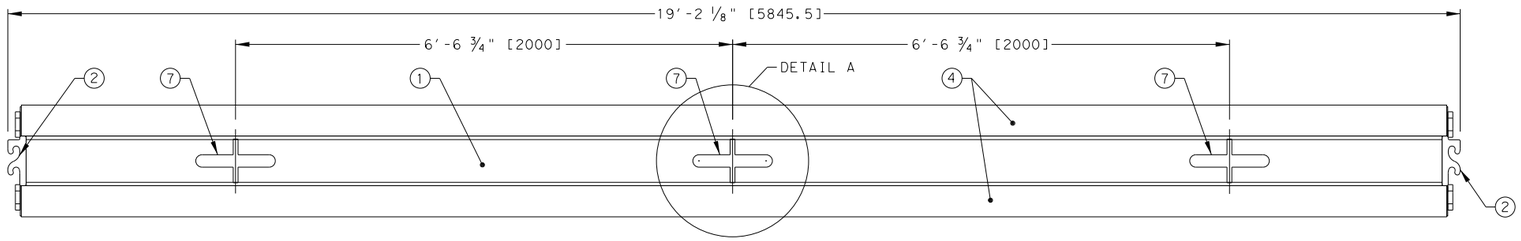
Texas Department of Transportation

Design Division Standard

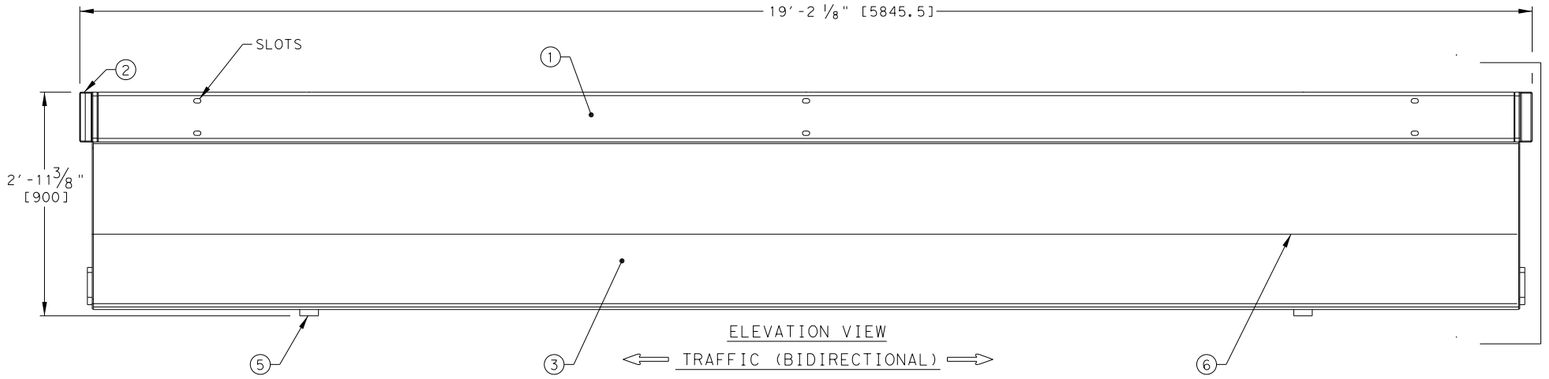
HIGHWAYGUARD SYSTEM
STEEL BARRIER
MASH TL-3 & TL-4
HIGHWAYGUARD-21

FILE: highwayguard21.dgn	DN: TXDOT	CK: KM	DW: SS	CK: XX
©TxDOT: JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		55

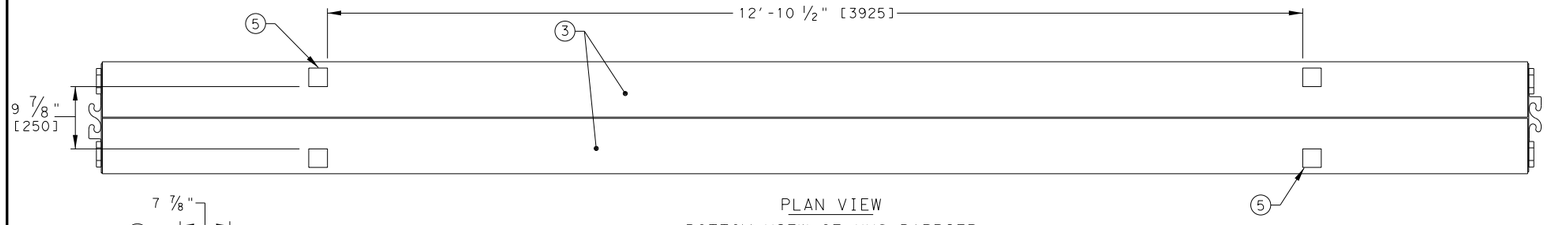
DATE:
FILE:



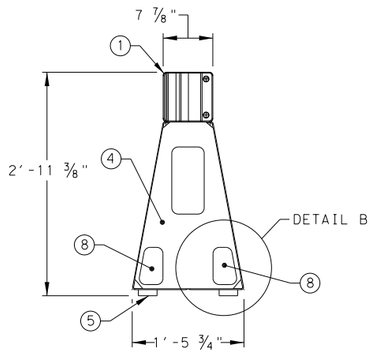
PLAN VIEW
HV2 SQUARE TOP RAIL



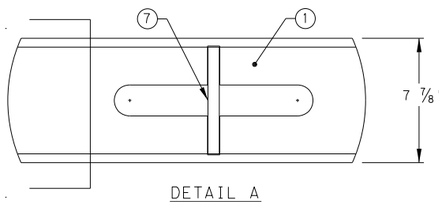
ELEVATION VIEW
TRAFFIC (BIDIRECTIONAL)



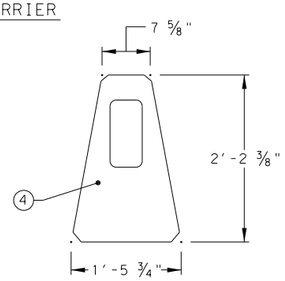
PLAN VIEW
BOTTOM VIEW OF HV2 BARRIER



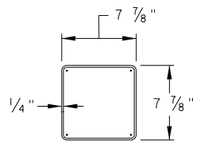
VIEW A-A
SCALE 1:25



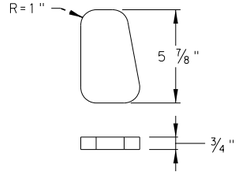
DETAIL A
HV2 LIFTING BAR
SCALE 1:20



HV2 END
SCALE 1:25



VIEW B-B
HV2 SQUARE TOP RAIL
SCALE 1:10



DETAIL B
HV2 SPACER
SCALE 1:5

ITEM NO.	PART NUMBER	DESCRIPTION
1	SRP000036	HV2 SQUARE TOP RAIL
2	SRP000037	CONNECTOR
3	SRP000038	HV2 SKIN
4	SRP000039	HV2 END
5	SRP000040	HV2 FEET
6	SRP000041	CONCRETE BALLAST
7	SRP000043	HV2 LIFTING BAR
8	SRP000048	HV2 SPACER

GENERAL NOTES

1. FOR TECHNICAL AND APPLICATION SUPPORT PLEASE CONTACT SAFEROADS PTY, LTD, AT (859)469-0364, WEBSITE: www.saferoads.com.au OR www.hv2barrier.com.
2. HV2 BARRIER HAS BEEN ACCEPTED BY FHWA AS A MASH TL-4 LONGITUDINAL BARRIER.
3. STANDARD INSTALLATIONS IS A FREE STANDING TEMPORARY LONGITUDINAL BARRIER SYSTEM. HIGH CONTAINMENT AND LOW DEFLECTION INSTALLATIONS REQUIRE NO ANCHORING. NO MODIFICATIONS ARE NECESSARY OTHER THAN FAST DEPLOYMENT AND RETRIEVAL.
4. OVERALL LENGTH PER BARRIER IS 19.2FT. AND WEIGHS 4,600LBS EACH. HV2 SAFETY BARRIER CAN BE DEPLOYED ON A HORIZONTAL RADIUS AS TIGHT AS 255.9FT/78M. HV2 SAFETY BARRIER INSTALLATIONS REQUIRE A MIN. DEPLOYMENT LENGTH OF 323.5FT/98.6M (17NO. HV2 BARRIERS) PLUS THE REQUIRED END TREATMENTS, TO SAFELY CONTAIN AND REDIRECT AT MASH TL3.
5. SAFEROADS HV2 SAFETY BARRIER SHOULD NOT BE INSTALLED IF THERE IS:
   - CURVATURE TIGHTER THAN 262 FT (80m) RADIUS.
   - CROSS SLOPE STEEPER THAN 5%.
   - LONGITUDINAL SLOPE STEEPER THAN 5%.
   - CREST SHARPER THAN 5%.
   - DITCH SHARPER THAN 5%.
   - CURBS OR SIMILAR OBSTACLES RESTRICTING DEFLECTION.
6. SAFEROADS HV2 SAFETY BARRIER COMPONENTS ARE MANUFACTURED IN SI [METRIC] UNITS. ENGLISH UNITS SHOWN ARE APPROXIMATE. ALL COMPONENTS ARE CONSTRUCTED FROM STEEL WITH CONCRETE BALLASTING.
7. WHEN TAPERING HV2 SAFETY BARRIER OUTSIDE THE CLEAR ZONE, THE LENGTH OF NEED BEGINS AND ENDS 74FT/22.5M FROM THE ENDS OF THE SYSTEM FOR A MASH TL-3 DEPLOYMENT AND 164FT/50M FROM THE ENDS OF THE SYSTEM FOR A MASH TL-4 DEPLOYMENT.

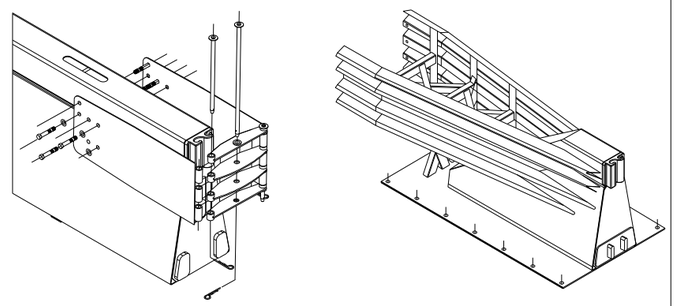
HV2 BARRIER DEFLECTION TABLE (TL-3)

SPEED	25°	20°	15°	10°	5°
62MPH	4′-10" [1.47]	3′-11" [1.18]	2′-11" [0.88]	2′-0" [0.59]	1′-0" [0.30]
56MPH	4′-5" [1.33]	3′-7" [1.07]	2′-8" [0.80]	1′-10" [0.54]	11" [0.27]
50MPH	3′-11" [1.18]	3′-2" [0.95]	2′-4" [0.71]	1′-7" [0.48]	10" [0.24]
43MPH	3′-5" [1.03]	2′-9" [0.83]	2′-1" [0.62]	1′-5" [0.42]	9" [0.21]
37MPH	2′-11" [0.89]	2′-4" [0.71]	1′-9" [0.53]	1′-3" [0.36]	8" [0.18]
31MPH	2′-6" [0.74]	2′-0" [0.59]	1′-6" [0.44]	1′-0" [0.30]	6" [0.15]
25MPH	2′-0" [0.59]	1′-7" [0.48]	1′-3" [0.36]	10" [0.24]	5" [0.12]

HV2 BARRIER DEFLECTION TABLE (TL-4)

SPEED	15°	10°	5°
56MPH	7′-10" [2.37]	5′-3" [1.58]	2′-8" [0.79]
50MPH	7′-0" [2.11]	4′-8" [1.41]	2′-4" [0.71]
43MPH	6′-1" [1.85]	4′-1" [1.23]	2′-1" [0.62]
37MPH	5′-3" [1.58]	3′-6" [1.06]	1′-9" [0.53]
31MPH	4′-4" [1.32]	2′-11" [0.88]	1′-6" [0.44]
25MPH	3′-6" [1.06]	2′-4" [0.71]	1′-2" [0.35]

END TREATMENT TYPES FOR SYSTEM TRANSITIONS *



* NOTE:
REFER TO SAFERROADS HV2 BARRIER MANUFACTURERS MANUAL AND/OR THE APPLICABLE TRANSITION MANUFACTURERS INSTALLATION MANUAL FOR FURTHER TRANSITION DETAILS.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SAFEROADS HV2 BARRIER, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

Texas Department of Transportation

Design Division Standard

SAFEROADS HV2 SAFETY STEEL BARRIER

MASH TL-4

HV2 BARRIER-21

FILE: hv2barrier21.dgn	DN: TxDOT	CK: KM	DW: SS	CK: AG
©TxDOT: JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		56

METHOD 1: WOOD EMBEDMENT

STEPS:

Step 1. Determine sign height (Hs), width (Ws), average mounting height from bottom of sign to ground (Hbs), and temporary guide sign wind zone. Temporary guide sign wind zone is determined from Wind Velocity Worksheet. (Page 30A on the Traffic Standards web page) and Table 1.

TABLE 1

Wind Zone on Wind Velocity Worksheet	Temporary Guide Sign Wind Zone
90 mph	70 mph
80 mph	70 mph
70 mph	60 mph

Step 2. Determine number of posts and post size from temporary guide sign wind zone using Hs, Ws, Hbs below (Figure 1: 60 mph and Figure 2: 70 mph). Determine spacing of posts (A) and distance from edge of sign to outside posts (0.5A) from 'Post Spacing and Sign Placement' detail on TLRS(2).

Step 3. Determine minimum post embedment depth from Table 2. For cohesionless soils, another method should be used to determine embedment depth.

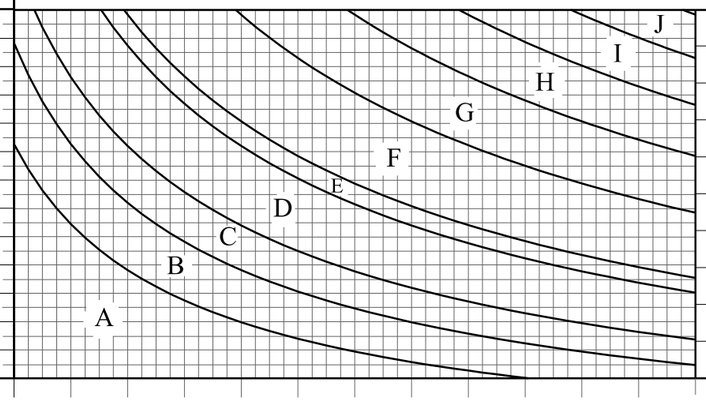
TABLE 2

Wooden Post Size	Embedment Depth (ft)
4x6	3
6x8	4
6x10	5

Step 4. Fabricate posts using 'Wood Post' detail on TLRS(2). Attach sign (plywood or extruded aluminum) using a method on TLRS(3). Wooden parts are not required to be painted.

FIGURE 1

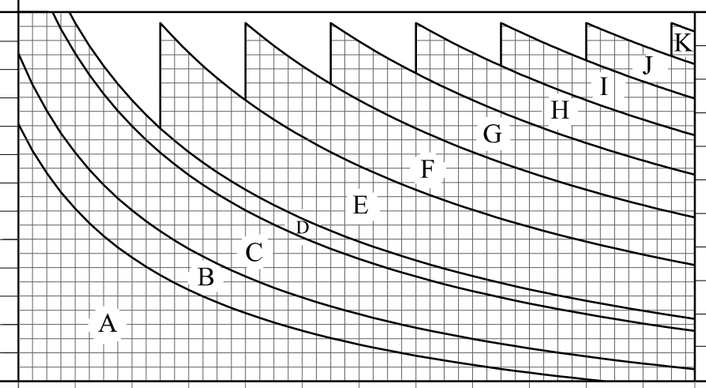
Average Height Above Ground (Hbs)(ft)	13-16	10-13	7-10
Sign Face Height (Hs) (ft)	13	14	15
	12	13	14
	11	12	13
	10	11	12
	9	10	11
	8	9	10
	7	8	9
	6	7	8
	5	6	7
	4	5	6
	3	4	5
	2	3	4
	1	2	3



Post Qty	Post Size
7	6" x 10"
6	6" x 10"
5	6" x 10"
4	6" x 10"
3	6" x 10"
2	6" x 10"
3	6" x 8"
2	6" x 8"
3	4" x 6"
2	4" x 6"

FIGURE 2

Average Height Above Ground (Hbs)(ft)	13-16	10-13	7-10
Sign Face Height (Hs) (ft)	13	14	15
	12	13	14
	11	12	13
	10	11	12
	9	10	11
	8	9	10
	7	8	9
	6	7	8
	5	6	7
	4	5	6
	3	4	5
	2	3	4
	1	2	3



Post Qty	Post Size
9	6" x 10"
8	6" x 10"
7	6" x 10"
6	6" x 10"
5	6" x 10"
4	6" x 10"
3	6" x 10"
2	6" x 10"
3	6" x 8"
2	6" x 8"
3	4" x 6"

GENERAL NOTES

1. See plans for specifications and pay item information. Temporary guide signs required for contractor changes to traffic control plan are subsidiary to item 502.
2. Contractor may use any of the 3 methods (Wood Embedment, Steel Embedment or Wood Skid) as long as sign height requirements are met and approved by the Engineer.
3. See SMD (2-3) for details on attaching panels and plaques to parent signs.
4. Nails are not allowed in temporary sign support structures.

METHOD 2: STEEL EMBEDMENT

STEPS:

Step 1. Determine sign height (Hs), width (Ws), average mounting height from bottom of sign to ground (Hbs), and wind zone from Wind Velocity Worksheet.

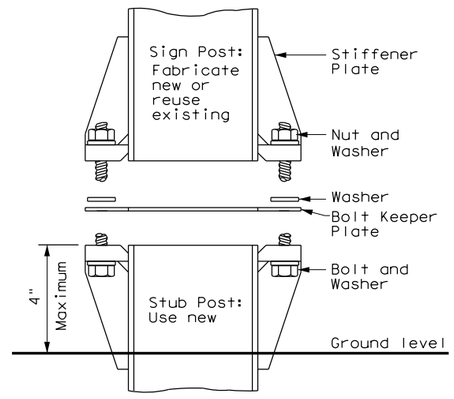
Step 2. Determine number of posts, post size, and post spacing from SMD(2-3) and SMD(8W1). Alternatively, the sign posts from an existing sign may be used if 7' minimum height from pavement to bottom of sign can be maintained at new location. In this case, only a new stub post without concrete foundation is required. See Detail A and SMD(2-2) for more information.

Step 3. Determine minimum stub post embedment depth from Table 3. No concrete foundation is required. For cohesionless soils, another method should be used to determine embedment depth.

TABLE 3

Steel Support Post Size	Embedment Depth (ft)
W6x9	4
W6x12	4.5
W6x15	5
W8x18	6
W8x21	6.5
W10x22	7.5
W10x26	8
W12x26	8.5
S3x5.7	3
S4x7.7	3.5

Step 4. Attach sign using SMD(2-3) for an extruded aluminum sign or using TLRS(3) for a plywood sign.



DETAIL A

SHEET 1 OF 4

Texas Department of Transportation | Traffic Operations Division Standard

TEMPORARY LARGE ROADSIDE SIGNS

TLRS(1)-17

FILE: tlrs-17.dgn	DN:	CK:	DW:	CK:
©TxDOT May 2017	CONT	SECT	JOB	HIGHWAY
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	ELP	EL PASO		57

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DATE: 5/31/2022 1:56:20 PM
FILE: c:\pwworking\ustx\dms03680\tlrs-17.dgn

METHOD 3: WOOD SKID

STEPS:

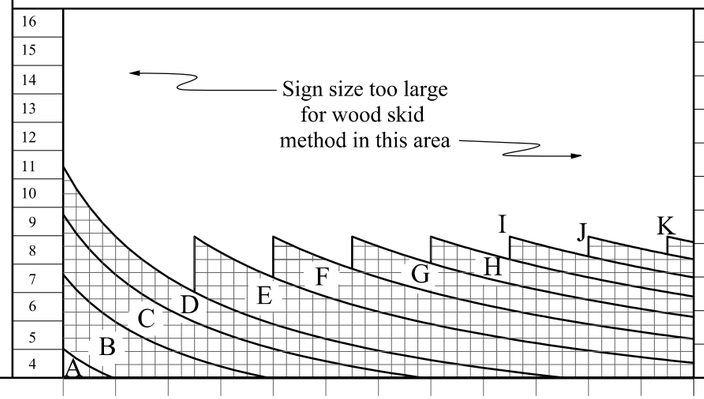
Step 1. Determine sign height (Hs) and width (Ws). Note that the wood skid method is only intended for use on level terrain. The skid height from ground to bottom of sign is 7'6". If this causes the distance from edge of pavement to the bottom of the sign to be less than 7', the wood skid method is not to be used.

Step 2. Determine number of 4"x6" (nominal 3.5"x 5.5") posts from Figure 3 below. Determine spacing of posts (A) and distance from edge of sign to outside posts (0.5A) from 'Post Spacing and Sign Placement' detail.

Step 3. Determine number of 40 pound sandbags from Figure 4.

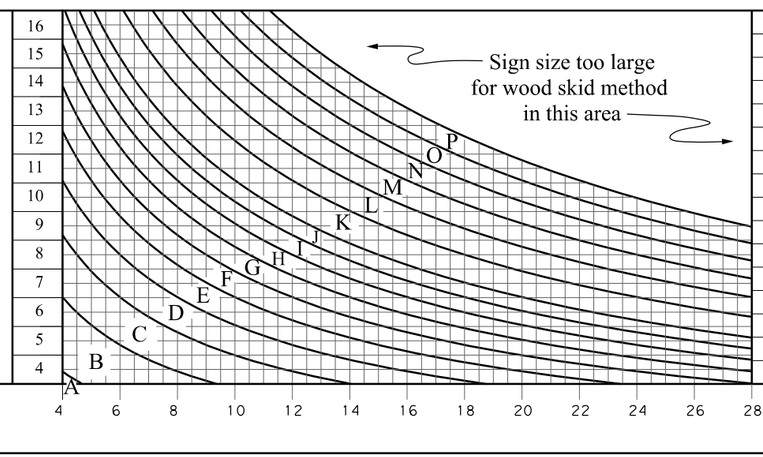
Step 4. Assemble skid as shown on TLRS(4) standard. Attach sign (plywood or extruded aluminum) using a method on TLRS(3). Wooden parts are not required to be painted.

FIGURE 3



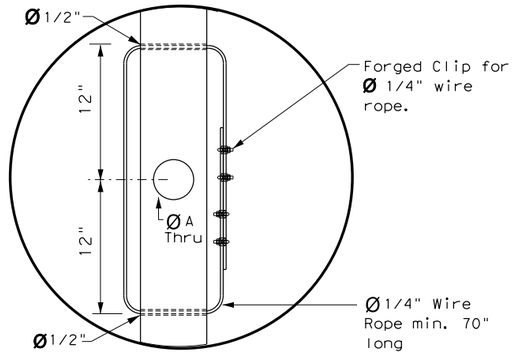
Post Qty	Post Size
K 9	3.5" x 5.5"
J 8	3.5" x 5.5"
I 7	3.5" x 5.5"
H 6	3.5" x 5.5"
G 5	3.5" x 5.5"
F 4	3.5" x 5.5"
E 3	3.5" x 5.5"
D 2	3.5" x 5.5"
C 3	3.5" x 3.5"
B 2	3.5" x 3.5"
A 1	3.5" x 3.5"

FIGURE 4



Bags
P 110
O 100
N 090
M 080
L 070
K 060
J 050
I 045
H 040
G 035
F 030
E 025
D 020
C 015
B 010
A 005

WIRE ROPE BREAKAWAY FEATURE

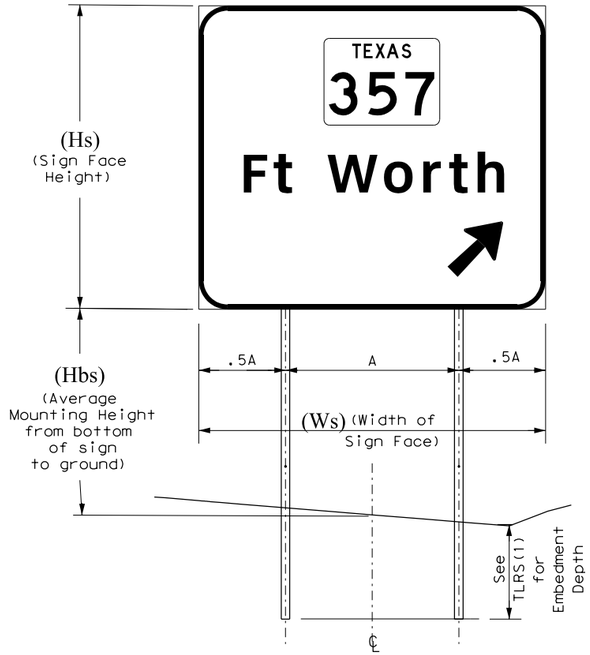


DETAIL B

NOTES:

1. Wire rope breakaway feature required on all wooden posts. This breakaway feature includes the clamped cable with 2 holes to mount the cable, 4 cable clips, and hole A which the cable surrounds.
2. Breakaway feature is designed so wooden post fractures at hole A, with post staying attached to sign structure via the clamped cable.

POST SPACING AND SIGN PLACEMENT



WOODEN POST SPACING NOTES:

1. Spacing between posts: A = Ws / # of posts required
2. Spacing between edge of sign and outside posts: 0.5A

STEEL POST SPACING NOTE:

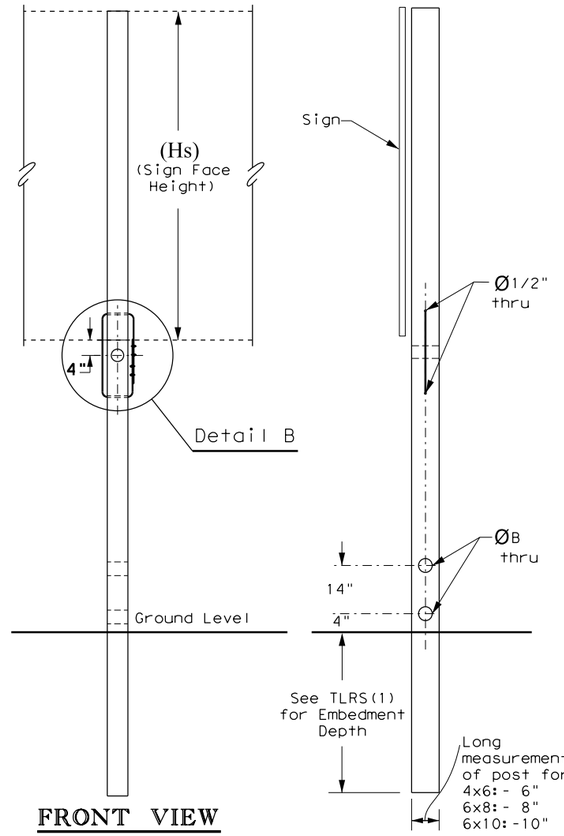
See SMD(2-3) for post spacing unless reusing existing sign posts.

SIGN PLACEMENT NOTE:

See SMD(2-3) for sign placement details.

WOOD POST

TABLE 4		
Support Size	ØA	ØB
4x6	1 1/2"	2"
6x8	3 5/8"	4"
6x10	3 5/8"	4"



NOTE:
All holes shown here are required for breakaway features to function properly.

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TEMPORARY LARGE ROADSIDE SIGNS

TLRS(2)-17

FILE: tlrs-17.dgn	DN:	CK:	DW:	CK:
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	ELP	EL PASO		58

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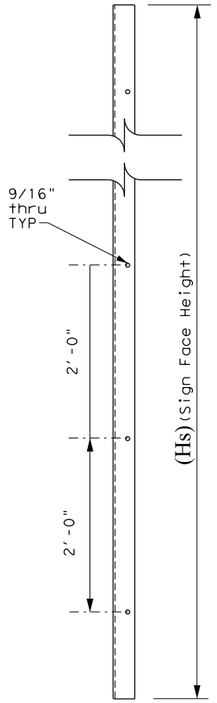
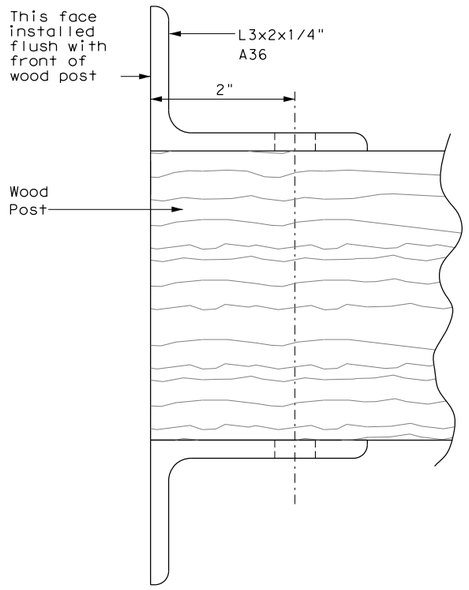
ANGLE STIFFENER METHOD (WOOD POST)



SIDE VIEW

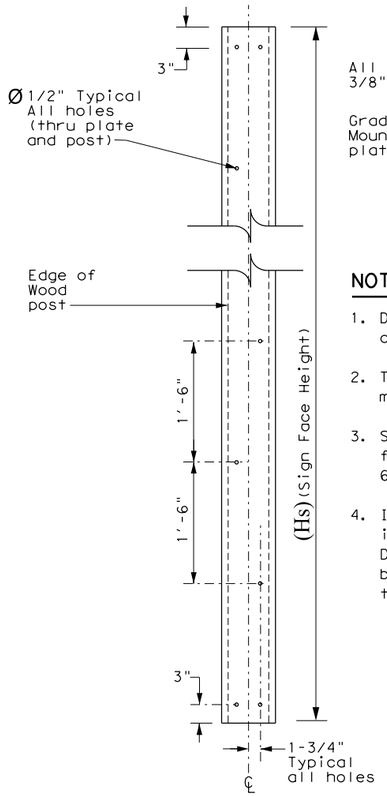


TOP VIEW

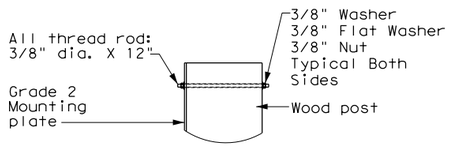
NOTES:

1. Drill holes evenly spaced from each edge of angle stiffener, with 2' between holes.
2. Attach 2 angle stiffeners to each post using A307 1/2" dia. x 2" long lag screws for 4x6 post, or A307 1/2" dia. x 3" long lag screws for 6x8 or 6x10 post.

MOUNTING PLATE METHOD (WOOD POST)



FRONT VIEW

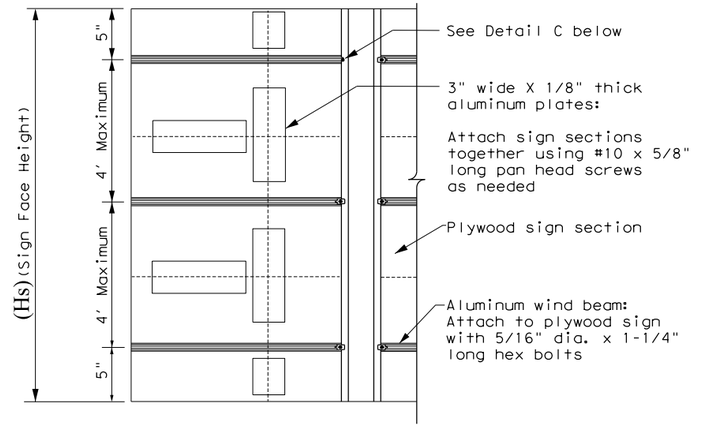


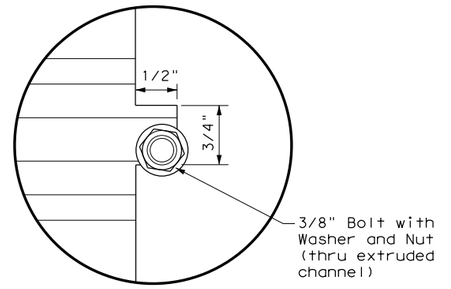
SIDE VIEW

NOTES:

1. Drill holes evenly spaced from each edge of mounting plate, with 1'6" between holes.
2. Two holes drilled 3" from each end of mounting plate.
3. Steel mounting plate 6" wide x 1/4" thick for 4x6 post, or 8" wide x 1/4" thick for 6x8 or 6x10 post.
4. Install mounting plate so plate overhang is the same on both sides of wood post. Drill 1/2" dia. holes thru wood post before attaching mounting plate using 3/8" threaded rod.

MOUNTING A PLYWOOD SIGN



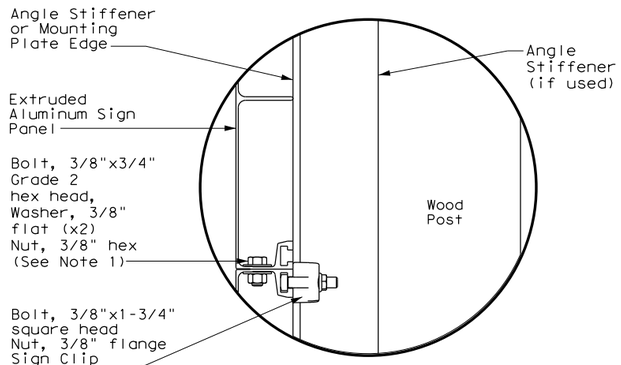


DETAIL C

NOTES:

1. Recommended sign thickness 5/8".
2. Attach an aluminum wind beam approx. 5" from the top and bottom of sign thru the width of the sign and then as needed so there is a maximum 4' spacing between beams.
3. Attach sign sections with aluminum plates as needed.
4. Attach sign to post using bolts with sign clips as shown in 'Mounting Plate and Angle Stiffener Attachment to Extruded Aluminum Sign' detail. On the top bolt, cut out a 1/2" wide x 3/4" tall notch and tighten the bolt in the notch with a nut and washer. A sign clip is not used here. See Detail C.
5. This option works for the angle stiffener or mounting plate methods. Clamp plate method not recommended with aluminum wind beams.
6. Alternatively, contractor may drill holes thru plywood sign and attach to post using angle stiffener, mounting plate, or clamp plate method. Vertical bolt spacing should not be greater than 12" with 3/8" bolts.

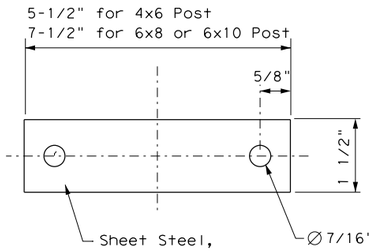
MOUNTING PLATE AND ANGLE STIFFENER ATTACHMENT TO EXTRUDED ALUMINUM SIGN

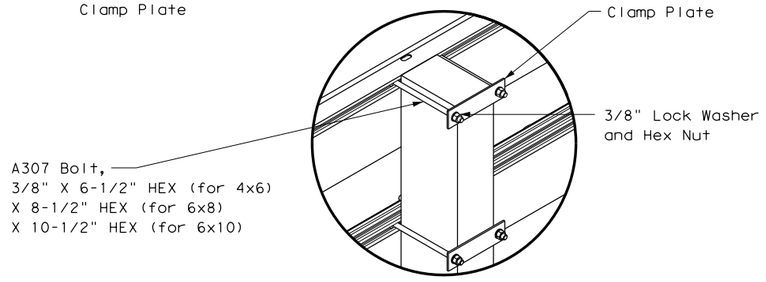


NOTES:

1. Space this hardware at 24" at each joint between panels.
2. Install this hardware on both sides of the wood post for proper attachment.

CLAMP PLATE METHOD (WOOD POST)





SHEET 3 OF 4

Texas Department of Transportation | Traffic Operations Division Standard

TEMPORARY LARGE ROADSIDE SIGNS: MOUNTING DETAILS

TLRS(3)-17

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	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		59

117C

DATE: 5/31/2022 1:56:21 PM
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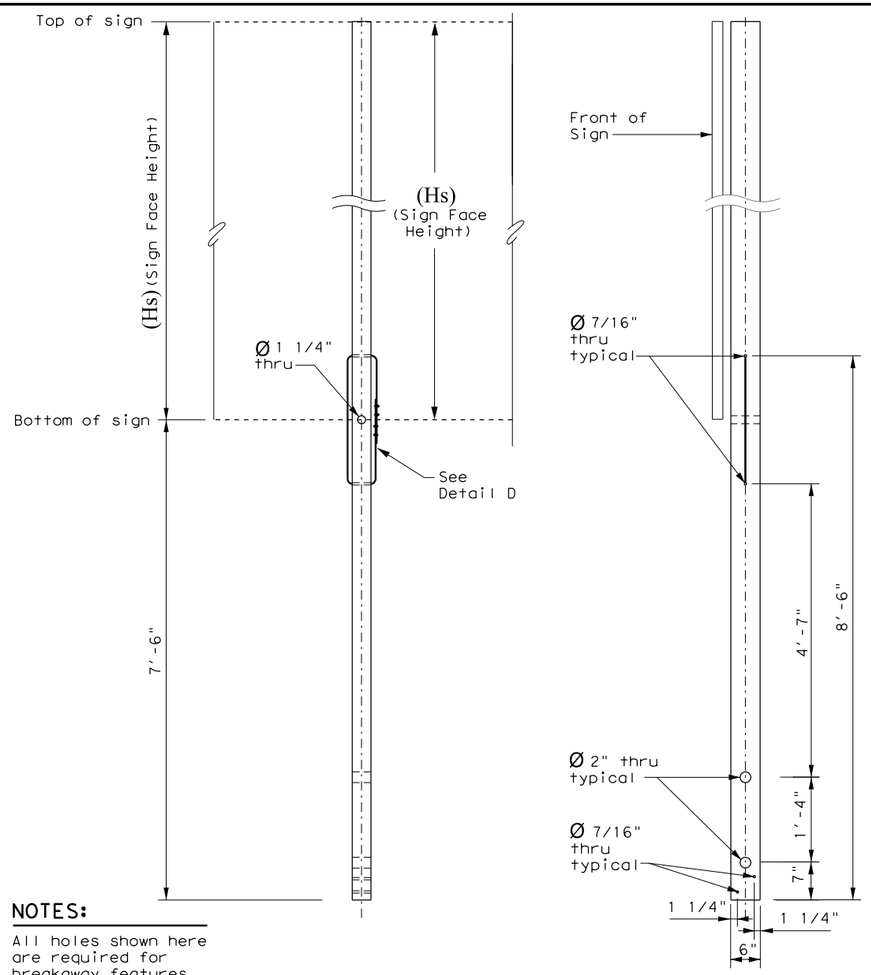
WOOD POST (4 x 6)



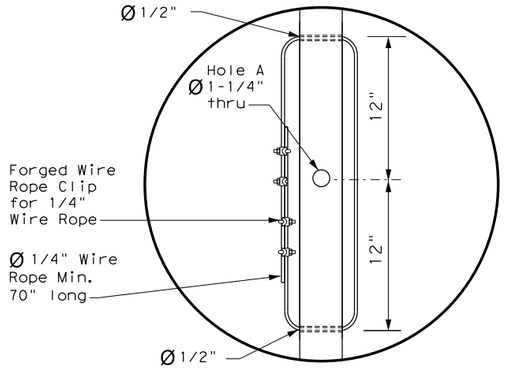
NOTES:

All holes shown here are required for breakaway features to function properly.

FRONT VIEW

SIDE VIEW

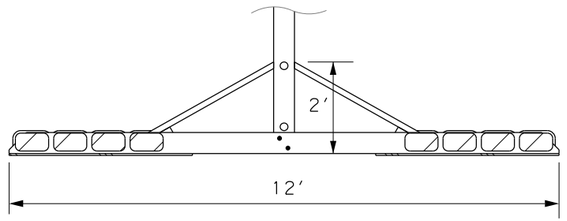
WIRE ROPE BREAKAWAY FEATURE



DETAIL D

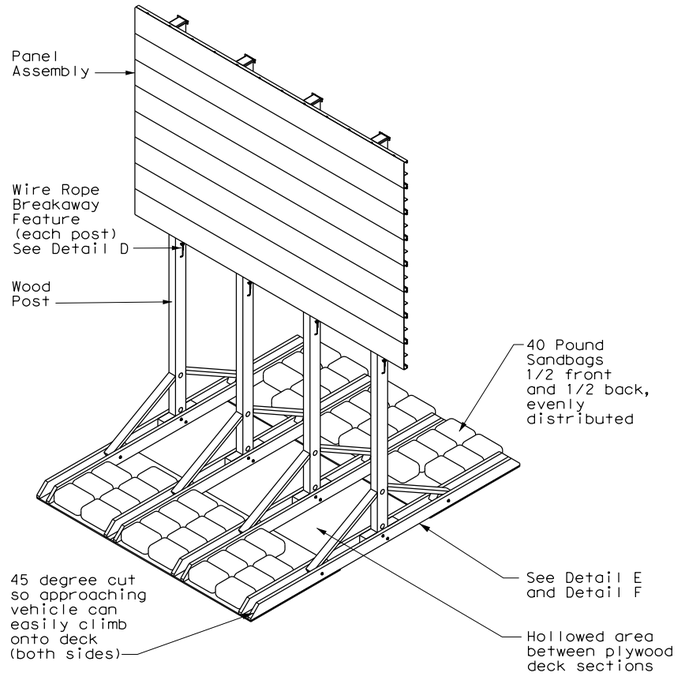
NOTES:

1. Wire rope breakaway feature required on all wooden posts. This breakaway feature includes the clamped cable with 2 holes to mount the cable, 4 cable clips, and hole A which the cable surrounds.
2. Breakaway feature is designed so wood post fractures at hole A, with post staying attached to sign structure via the clamped cable.

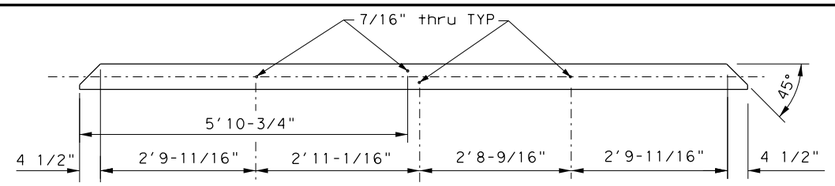


DETAIL E

WOOD SKID



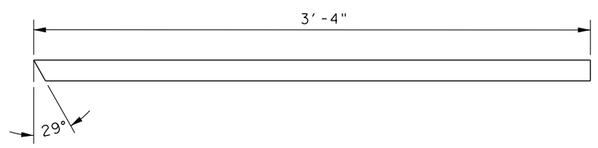
SKID (2 x 6)



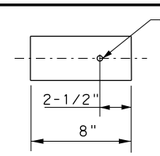
NOTES:

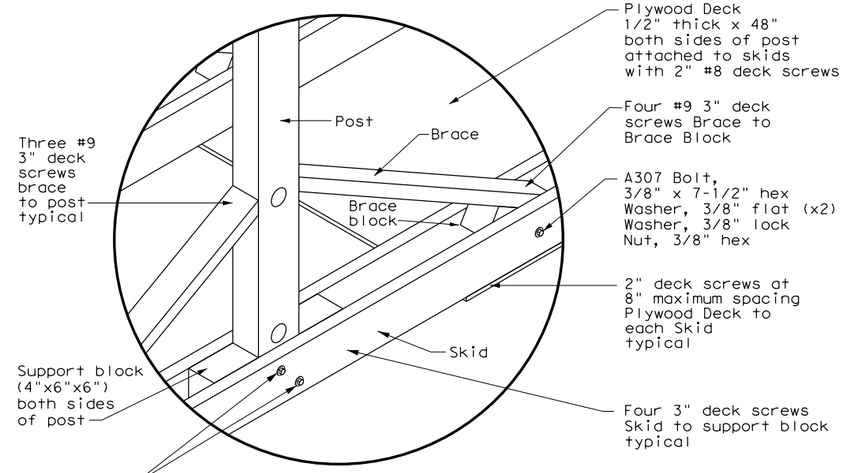
The 2 center holes are drilled 1-1/4" above and below skid centerline for attachment to post.

BRACE (2 x 4)



BRACE BLOCK (4 x 4)





DETAIL F

NOTE:

Contractor shall have the option to use another method to support the sandbags, provided the material under the sandbags does not exceed 0.75" in height. Examples include use of marine grade plywood or composite decking. Contractor may drill holes in plywood as needed for drainage.

Texas Department of Transportation

Traffic Operations Division Standard

TEMPORARY LARGE ROADSIDE SIGNS: WOOD SKID

TLRS(4)-17

FILE: tlrs-17.dgn	DN:	CK:	DW:	CK:
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	ELP	EL PASO		60

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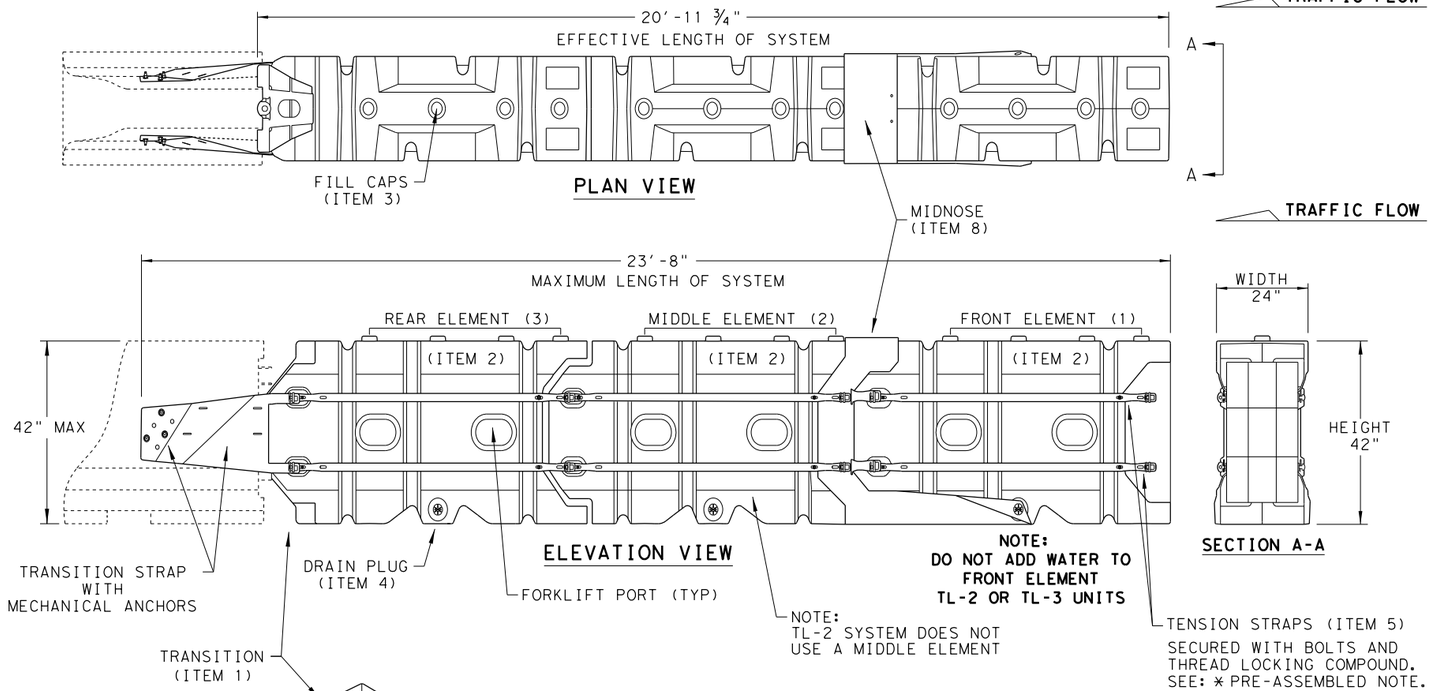
FILE: c:\pwworking\ustx\dms03680\absorbm19.dgn

SYSTEM SHOWN - ABSORB-M TL-3



THE ABSORB-M IS A NON-REDIRECTIVE, GATING, CRASH CUSHION DESIGNED TO MEET THE LATEST TL-3 & TL-2 MASH REQUIREMENTS.

THE SYSTEM IS DESIGNED TO ACCOMMODATE A VARIETY OF F-SHAPE AND SINGLE SLOPE CONCRETE BARRIERS. CONTACT THE MANUFACTURER FOR GUIDANCE REGARDING OTHER ALLOWABLE SHAPES.

TEST LEVEL	NUMBER OF ELEMENTS	EFFECTIVE LENGTH	MAXIMUM LENGTH
TL-2	2	14'- 7 3/4"	17'- 4"
TL-3	3	20'- 11 3/4"	23'- 8"

NOTE:
CROSS SLOPES OF UP TO 8% (OR 1:12 SLOPE) CAN BE ACCOMMODATED WITH STANDARD HARDWARE SHOWN WITHIN THE INSTRUCTIONS MANUAL. FOR SLOPES WITH EXCESS OF 8% (OR 1:12) CONTACT, LINDSAY TRANSPORTATION SOLUTIONS.

GENERAL NOTES

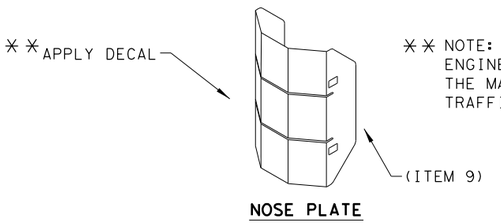
1. FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
2. THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
3. THE ABSORB-M IS A WATER FILLED NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO A FOUNDATION AND CAN BE INSTALLED ON TOP OF CONCRETE, ASPHALT, OR ANY SURFACE CAPABLE OF BEARING THE WEIGHT OF THE SYSTEM.
4. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
5. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
6. THE ABSORB-M SHOULD BE LOCATED APPROXIMATELY PARALLEL WITH THE BARRIER.
7. THE USE OF THE ABSORB-M IS RESTRICTED TO A BARRIER HEIGHT OF UP TO 42 INCHES.
8. DO NOT ADD WATER TO FRONT ELEMENT (TL-2 OR TL-3 UNIT).

BILL OF MATERIALS (BOM) ABSORB-M TL-3 & TL-2 SYSTEMS			QTY	QTY
ITEM #		PART NUMBER	PART DESCRIPTION	TL-2 SYSTEM	TL-3 SYSTEM
1		BSI-1809036-00	TRANSITION-(GALV)	1	1
*	2	BSI-1808002-00	PRE-ASSEMBLED ABSORBING (ELEMENTS)	2	3
*	3	BSI-4004598	FILL CAPS	8	12
*	4	BSI-4004599	DRAIN PLUGS	2	3
*	5	BSI-1809053-00	TENSION STRAP-(GALV)	8	12
*	6	BSI-2001998	C-SCR FH 3/8-16 X 1 1/2 GR5 PLT	8	12
*	7	BSI-2001999	C-SCR FH 3/8-16 X 1 GR5 PLT	8	12
8		BSI-1809035-00	MIDNOSE-(GALV)	1	1
9		BSI-1808014-00	NOSE PLATE	1	1
10		BSI-1809037-00	TRANSITION STRAP (LEFT-HAND)-(GALV)	1	1
11		BSI-1809038-00	TRANSITION STRAP (RIGHT-HAND)-(GALV)	1	1
12		BSI-1808005-00	PIN ASSEMBLY	8	10
13		BSI-2002001	ANC MECH 5/8-11X5 (GALV)	6	6
14		ABSORB-M	INSTALLATION AND INSTRUCTIONS MANUAL	1	1

*COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

DELINEATION DECAL PLACEMENT GUIDE

TRAFFIC FLOW LEFT-SIDE BARRIER | TRAFFIC FLOW BOTH-SIDE BARRIER | TRAFFIC FLOW RIGHT-SIDE BARRIER



NOSE PLATE

** NOTE: (PROVIDED BY OTHERS)
ENGINEER OR CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER FOR THE CORRECT DECAL PER TRAFFIC FLOW, LEFT, RIGHT OR BOTH-SIDES.

NOTE:
APPLY A HIGH REFLECTIVE DECAL TO THE NOSE PLATE. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR (TRAFFIC CONTROL DEVICES). DECALs ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE ABSORB-M, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

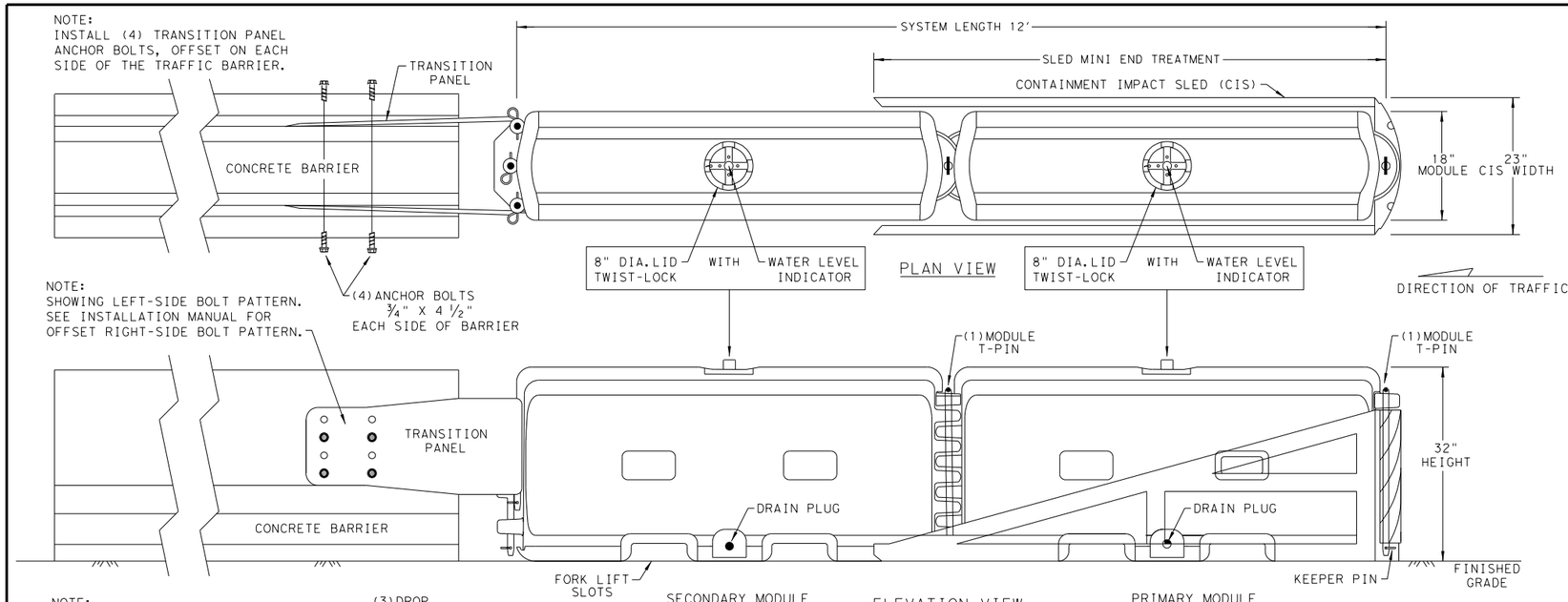
SACRIFICIAL

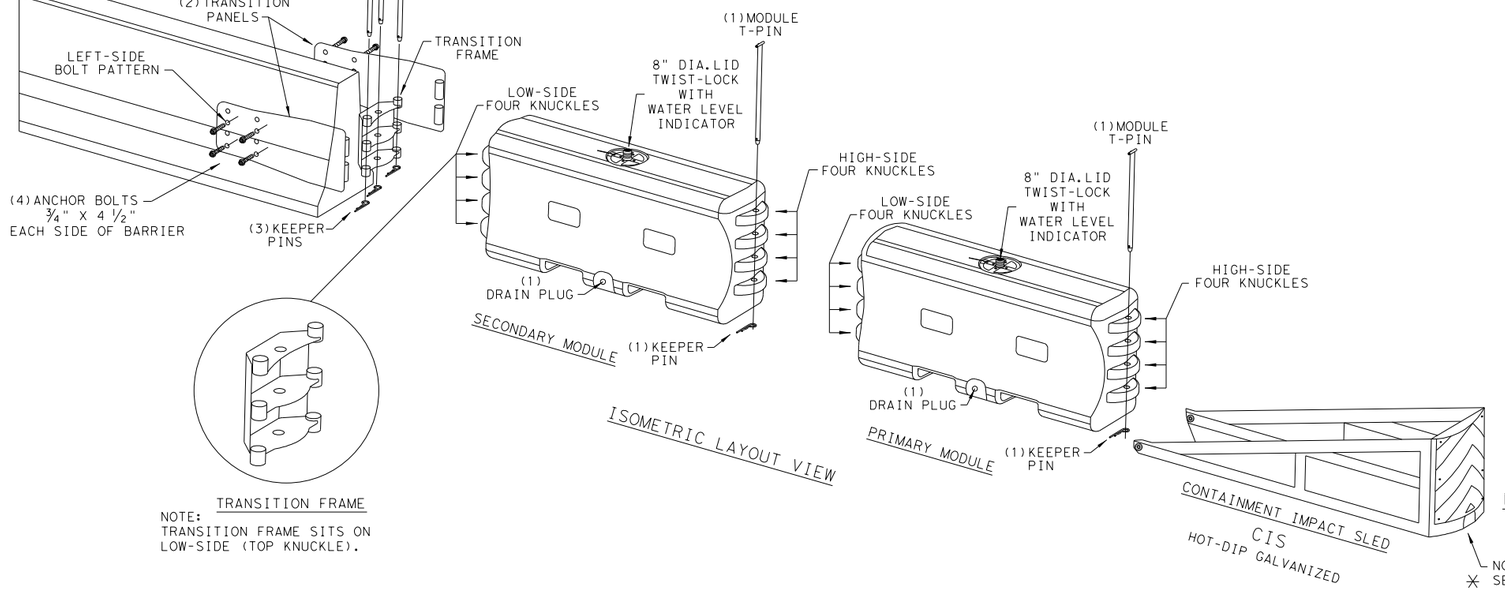
Texas Department of Transportation — Design Division Standard

LINDSAY TRANSPORTATION SOLUTIONS
CRASH CUSHION
(MASH TL-3 & TL-2)
TEMPORARY - WORK ZONE
ABSORB(M)-19

FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: JULY 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		61

DATE:
FILE:





GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT Traffix Devices, Inc. AT 1(949)361-5663
2. THE SLED MINI IS A MASH APPROVED TEST LEVEL 2 (TL-2) CRASH CUSHION APPROVED FOR USE WITHIN TEMPORARY WORK ZONE LOCATIONS. TL-2 IS APPROVED FOR SPEEDS OF 45 MPH OR LESS.
3. THE SLED MINI IS A GATING, NON-REDIRECTIVE CRASH CUSHION THAT DOES NOT NEED TO BE BOLTED TO THE GROUND AND CAN BE INSTALLED ON CONCRETE, ASPHALT, GRAVEL OR COMPACTED SOIL.
4. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, AND DEPRESSIONS.
5. THE SLED MINI CAN BE ATTACHED TO CONCRETE BRIDGE ABUTMENTS, CONCRETE BARRIER, STEEL BARRIER AND PLASTIC BARRIER.

SLED MINI TL-2 - BILL OF MATERIALS

QTY:	PART #	PART DESCRIPTIONS
2	45332-MY	WATER FILLED MODULE
2	45032-CPGAL	T-PINS - LENGTH 26" WITH KEEPER PINS - FOR MODULES
2	18009-B-I	WATER LEVEL INDICATOR FLOAT LID
1	45032-S	CONTAINMENT IMPACT SLED (CIS)
2	45151	UNIVERSAL TRANSITION PANELS
1	45132	TRANSITION FRAME
1	45141	DROP PIN - LENGTH 26.50" WITH KEEPER PIN
2	45142	DROP PINS - LENGTH 18.50" WITH KEEPER PINS
8	45050	TRANSITION PANEL ANCHOR BOLTS ¾" X 4 ½" (4 EA. SIDE)

MODULE SPECIFICATIONS	(CIS) SPECIFICATIONS
LENGTH: 73" (PIN TO PIN)	LENGTH: 87 ⅞"
HEIGHT: 32"	HEIGHT: 32"
WIDTH: 18"	WIDTH: 23"
EMPTY WEIGHT: 110 lbs.	APPROX. WEIGHT: 1250 lbs.
FILLED WEIGHT: 1100 lbs.	
FILL CAPACITY: 118.5 Gal	

NOTES:
⁎ SEE DELINEATION GUIDE FOR DECAL PLACEMENT.
SEE INSTALLATION MANUAL FOR CUSTOMIZED DELINEATION NOSE SHEETING FOR DECAL PLACEMENT.

DELINEATION DECAL PLACEMENT GUIDE

⁎ NOTE:
ENGINEER OR CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER FOR THE CORRECT DECAL PER TRAFFIC FLOW, LEFT, RIGHT OR BOTH-SIDES.

NOTE:
APPLY A HIGH REFLECTIVE DECAL TO THE NOSE PLATE. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR TRAFFIC CONTROL DEVICES. DECALS ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE. THE ORIENTATION BETWEEN THE LEFT-SIDE AND RIGHT-SIDE TRAFFIC IS CHANGED BY ROTATING THE DECAL 90 DEGREES AND REINSTALLING.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SLED MINI, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

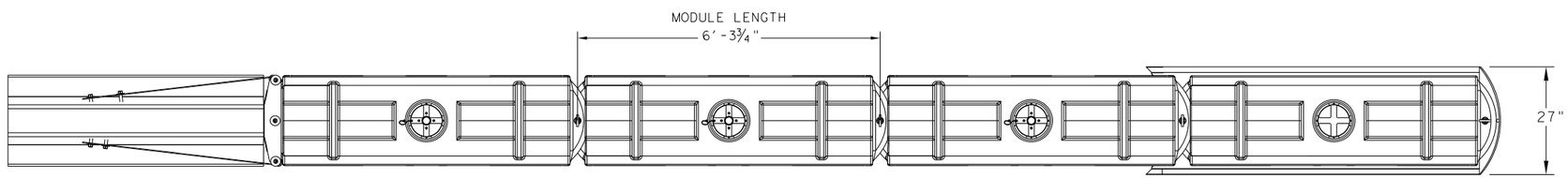
Texas Department of Transportation

Design Division Standard

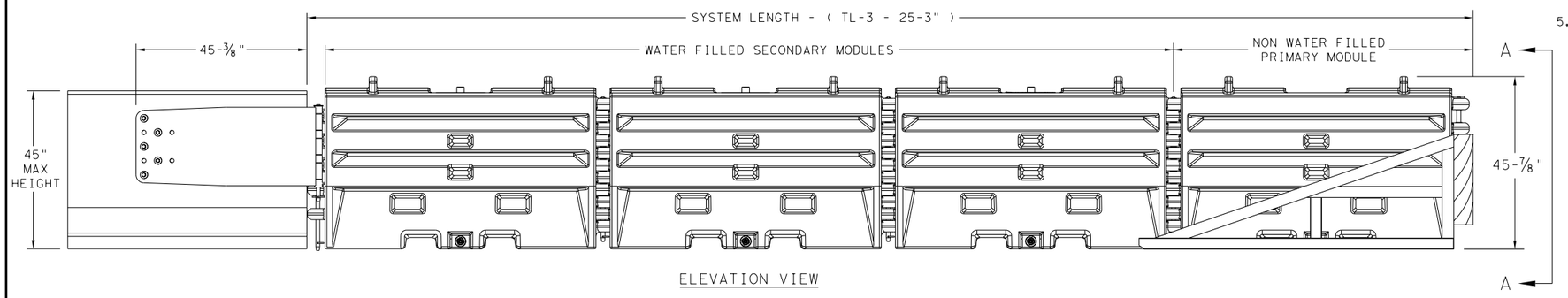
SLED MINI
END TREATMENT
TL-2 MASH COMPLIANT
(TEMPORARY, WORK ZONE)
SLEDMINI-19

FILE: sledmini19	DN: TxDOT	CK: KM	DN: VP	CK:			
©TxDOT: DECEMBER 2019	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0167	01	126, ETC.		US-54		
	DIST	COUNTY			SHEET NO.		
	ELP	EL PASO			62		

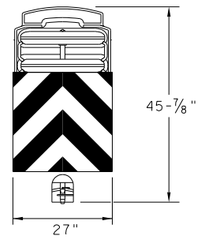
DATE:
FILE:



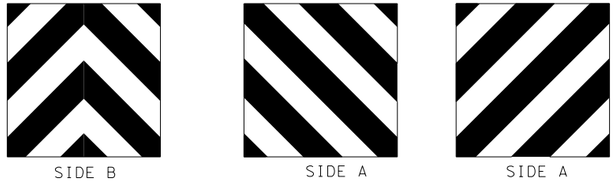
PLAN VIEW



ELEVATION VIEW



SECTION A-A



NOSE SHEETING PANEL DELINEATION

NOTE:
SEE INSTALLATION MANUAL FOR CUSTOMIZED DELINEATION NOSE SHEETING FOR DECAL PLACEMENT.

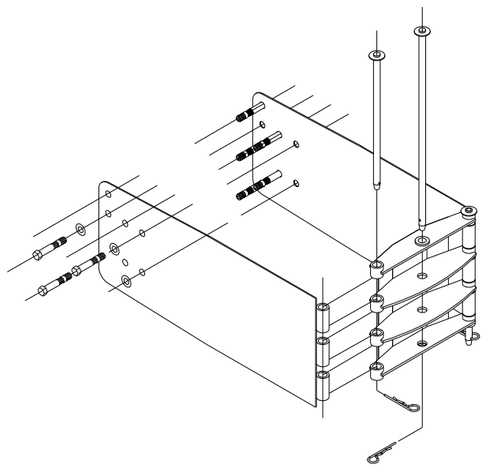
TEST LEVEL	NUMBER OF SECONDARY MODULES	SYSTEM LENGTH
TL-3	3	25′ 3"

GENERAL NOTES

1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO THE GROUND AND CAN BE INSTALLED ON CONCRETE, ASPHALT, GRAVEL OR COMPACTED SOIL.
3. MAXIMUM PERMISSIBLE CROSS SLOPE IS 8° (DEGREES) (14%).
4. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
5. THE SLED SYSTEM CAN BE ATTACHED TO:

- CONCRETE BARRIER, TEMPORARY OR PERMANENT, 45" MAXIMUM HEIGHT
- STEEL BARRIER
- PLASTIC BARRIER
- CONCRETE BRIDGE ABUTMENTS
- W-BEAM GUARD RAIL
- THRIE BEAM GUARD RAIL

BILL OF MATERIAL		
PART NUMBER	DESCRIPTION	QTY: TL-3
45131	TRANSITION FRAME, GALVANIZED	1
45150	TRANSITION PANEL, GALVANIZED	2
45147-CP	TRANSITION SHORT DROP PIN W/ KEEPER PIN, GALVANIZED	2
45148-CP	TRANSITION LONG DROP PIN W/ KEEPER PIN, GALVANIZED	1
45050	ANCHOR BOLTS	9
12060	WASHER, 3/4" ID X 2" OD	9
45044-Y	SLED YELLOW WATER FILLED MODULE	3
45044-YH	SLED YELLOW "NO FILL" MODULE	1
45044-S	CIS (CONTAINMENT IMPACT SLED), GALVANIZED	1
45043-CP	T-PIN W/ KEEPER PIN	4
18009-B-I	FILL CAP W/ "DRIVE BY" FLOAT INDICATOR	3
45033-RC-B	DRAIN PLUG	3
45032-DPT	DRAIN PLUG REMOVAL TOOL	1



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

NOTE:
SEE MANUFACTURER'S INSTALLATION MANUAL FOR FURTHER DETAILS.

TRANSITION OPTIONS
SLED TRANSITION TO CONCRETE TRAFFIC BARRIER (TEMPORARY OR PERMANENT)
SLED TRANSITION TO STEEL TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO PLASTIC TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO W-BEAM OR THRIE BEAM GUARD RAIL (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO CONCRETE BRIDGE ABUTMENT

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SLED, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

Texas Department of Transportation

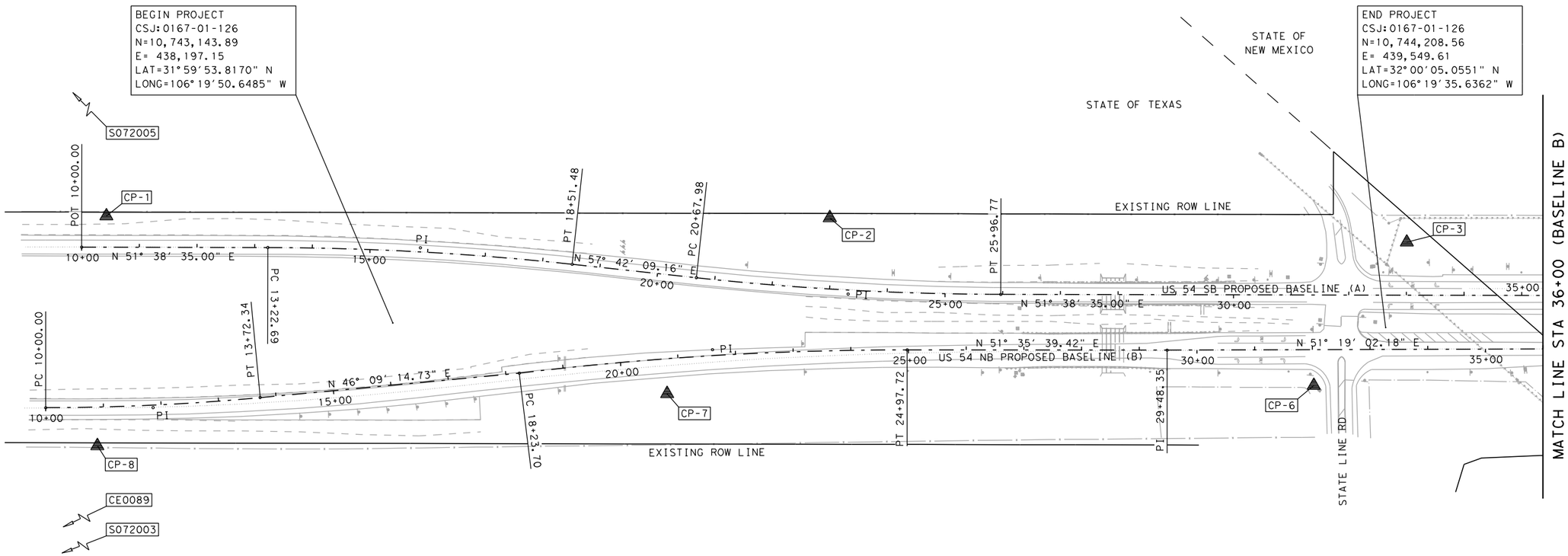
Design Division Standard

SLED
CRASH CUSHION
TL-3 MASH COMPLIANT
(TEMPORARY, WORK ZONE)
SLED-19

FILE: sled19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
©TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126, ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		63

4/6/2022 8:50:05 AM

PI STATION	= 15+87.33	PI STATION	= 23+32.62	PI STATION	= 11+86.30	PI STATION	= 21+61.13
DELTA	= 6° 03′ 34.16" (RT)	DELTA	= 6° 03′ 34.16" (LT)	DELTA	= 5° 19′ 02.70" (LT)	DELTA	= 6° 59′ 27.70" (RT)
DEGREE OF CURVE	= 1° 08′ 45.30"	DEGREE OF CURVE	= 1° 08′ 45.30"	DEGREE OF CURVE	= 1° 25′ 41.20"	DEGREE OF CURVE	= 1° 02′ 13.98"
TANGENT	= 264.64	TANGENT	= 264.64	TANGENT	= 186.30	TANGENT	= 337.43
LENGTH	= 528.79	LENGTH	= 528.79	LENGTH	= 372.34	LENGTH	= 674.02
RADIUS	= 5,000.00	RADIUS	= 5,000.00	RADIUS	= 4,012.00	RADIUS	= 5,524.00
PC STATION	= 13+22.69	PC STATION	= 20+67.98	PC STATION	= 10+00.00	PC STATION	= 18+23.70
PT STATION	= 18+51.48	PT STATION	= 25+96.77	PT STATION	= 13+72.34	PT STATION	= 24+97.72



0 50 100 200
SCALE: 1"=200′

From	To	Direction	Distance
CP-1	CP-2	N 51° 40′ 53" E	1,254.33′
CP-2	CP-3	N 53° 56′ 46" E	1,001.32′
CP-3	CP-4	N 48° 33′ 35" E	1,200.94′
CP-5	CP-6	S 51° 16′ 45" W	1,150.25′
CP-6	CP-7	S 50° 48′ 19" W	1,121.07′
CP-7	CP-8	S 46° 18′ 39" W	992.10′

NOTES:
1. ALL BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ.).

2. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (GEOID 12A).

3. COORDINATES AND DISTANCES ARE U.S. SURVEY FEET, DISPLAYED IN SURFACE VALUES, AND MAY BE CONVERTED TO NAD83 (GRID) VALUES BY APPLYING THE COMBINED ADJUSTMENT FACTOR (CAF) OF 1.000231, USING THE FORMULA: SURFACE / CAF = GRID

4. HORIZONTAL COORDINATES ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS MEASURED FROM TxDOT CORS TXWT DURING SEPTEMBER, 2021.

5. ELEVATIONS ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS, ADJUSTED WITH DIGITAL LEVELING.

6. EXISTING CONTROL WAS PROVIDED BY THE STATE AS "CONTROL SHEET" FOR NE PARKWAY WITH NO FIRM NAME, SIGNATURE, SEAL OR DATE THEREON, UPDATED BY RODS IN SEPTEMBER 2020, CSJ# 0924-06-136. THE FOLLOWING RECOVERED CONTROL POINTS WERE HELD FOR THIS PROJECT (P,N,E,Z,D):

S072003,10718314.51,423884.87,3958.58,TADIC
S072005,10739942.00,413834.87,4052.77,TADIC

Point	North	East	Elevation	Baseline	Station	Offset	Description
CP-1	10,742,980.21	437,692.72	4,007.68′	A	10+42.62	54.26′ LT	SET 5/8" IR W/TxDOT ALUM DISK IN CONC(1)
				B	11+14.97	330.89′ LT	
CP-2	10,743,757.94	438,676.84	4,005.00′	A	22+92.46	123.12′ LT	SET 5/8" IR W/TxDOT ALUM DISK(2)
				B	23+68.74	230.37′ LT	
CP-3	10,744,347.26	439,486.37	4,004.70′	A	33+00.64	91.91′ LT	SET 5/8" IR W/TxDOT ALUM DISK(3)
				B	33+64.75	185.70′ LT	
CP-6	10,744,052.37	439,514.56	4,004.27′	A	31+39.75	156.83′ RT	SET 5/8" IR W/TxDOT ALUM DISK IN CONC(6)
				B	32+02.45	62.12′ RT	
CP-7	10,743,343.90	438,645.73	4,005.36′	A	20+39.33	205.33′ RT	SET 5/8" IR W/TxDOT ALUM DISK(7)
				B	20+76.77	60.47′ RT	
CP-8	10,742,658.61	437,928.34	4,008.11′	A	10+27.81	344.14′ RT	SET 5/8" IR W/TxDOT ALUM DISK(8)
				B	10+88.01	66.93′ RT	
CE0089	10,731,005.78	432,378.83	4,006.12′	N/A	Off Chain	Off Chain	FND DISK IN CONCRETE (J 110 1932)
S072003	10,718,314.51	423,884.87	3,958.58′	N/A	Off Chain	Off Chain	FND BRASS DISK IN CONC (S072003)
S072005	10,739,942.00	413,834.87	4,052.77′	N/A	Off Chain	Off Chain	FND DISK IN CONC (S072005)
TXWT	10,698,462.28	400,976.81	3,996.90′	N/A	Off Chain	Off Chain	TXWT

THE CONTROL POINTS SHOWN HEREIN WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION.

STATE OF TEXAS
REGISTERED
JIMMY D. WALTON
5889
PROFESSIONAL
LAND SURVEYOR
4-6-2022

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

Sheet 1 of 2
Survey Date: September, 2021

RODS Surveying, Inc.
6810 LEE ROAD, STE.100
SPRING, TEXAS 77379
TEL (281) 257-4020
FAX (281) 257-4021
TBPELS SURVEYING FIRM REG. No. 10030700

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

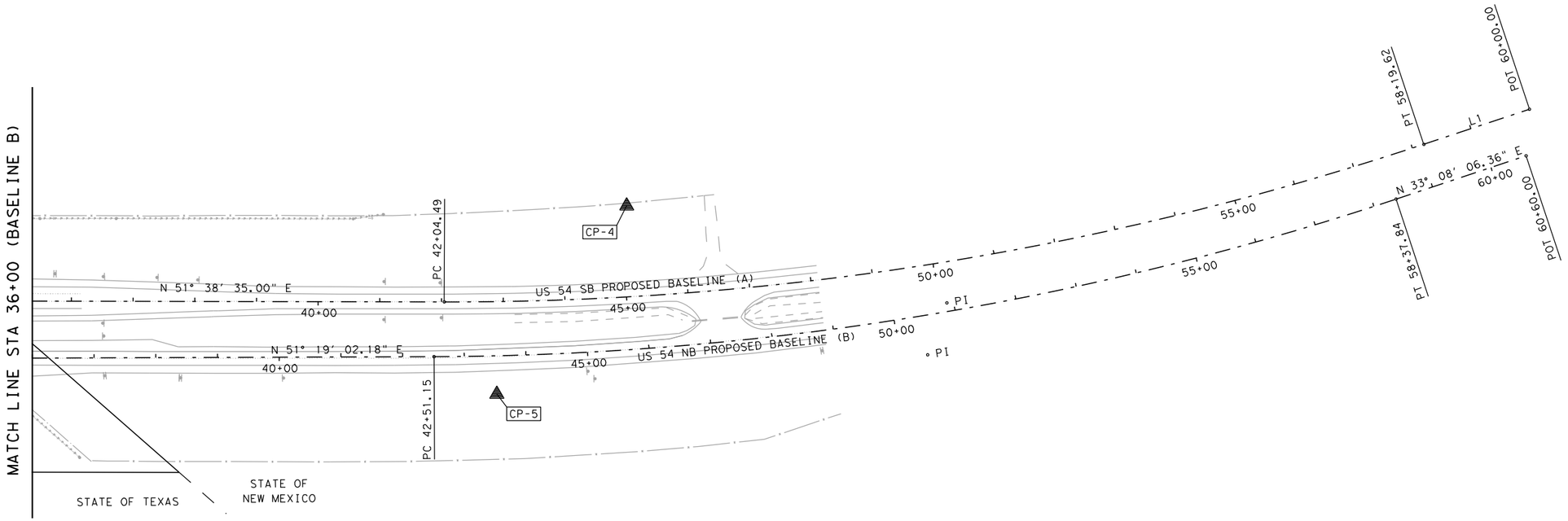
US 54
SURVEY CONTROL INDEX SHEET

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US 54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		64

N:\AECOM-URS 149\21913001\CAD\V8&V Control\V8&V Index Sheet 1.dgn

4/6/2022 8:42:33 AM

PI STATION	= 50+19.15	PI STATION	= 50+51.22
DELTA	= 18° 30′ 28.64" (LT)	DELTA	= 18° 10′ 55.82" (LT)
DEGREE OF CURVE	= 1° 08′ 45.30"	DEGREE OF CURVE	= 1° 08′ 45.30"
TANGENT	= 814.66	TANGENT	= 800.07
LENGTH	= 1,615.12	LENGTH	= 1,586.69
RADIUS	= 5,000.00	RADIUS	= 5,000.00
PC STATION	= 42+04.49	PC STATION	= 42+51.15
PT STATION	= 58+19.62	PT STATION	= 58+37.84



Line	Bearing
L1	N 33° 08′ 06.36" E

From	To	Direction	Distance
CP-3	CP-4	N 48° 33′ 35" E	1,200.94′
CP-4	CP-5	S 03° 54′ 56" E	371.08′
CP-5	CP-6	S 51° 16′ 45" W	1,150.25′

Point	North	East	Elevation	Baseline	Station	Offset	Description
CP-4	10,745,142.09	440,386.65	4,002.15′	A	45+09.01	147.51′ LT	SET 5/8" IR W/TxDOT ALUM DISK IN CONC(4)
				B	45+79.85	233.18′ LT	
CP-5	10,744,771.88	440,411.99	4,002.68′	A	42+87.49	150.24′ RT	SET 5/8" IR W/TxDOT ALUM DISK(5)
				B	43+51.45	62.38′ RT	

NOTES:
1. ALL BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ.).

2. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (GEOID 12A).

3. COORDINATES AND DISTANCES ARE U.S. SURVEY FEET, DISPLAYED IN SURFACE VALUES, AND MAY BE CONVERTED TO NAD83 (GRID) VALUES BY APPLYING THE COMBINED ADJUSTMENT FACTOR (CAF) OF 1.000231, USING THE FORMULA: SURFACE / CAF = GRID

4. HORIZONTAL COORDINATES ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS MEASURED FROM TxDOT CORS TXWT DURING SEPTEMBER, 2021.

5. ELEVATIONS ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS, ADJUSTED WITH DIGITAL LEVELING.

6. EXISTING CONTROL WAS PROVIDED BY THE STATE AS "CONTROL SHEET" FOR NE PARKWAY WITH NO FIRM NAME, SIGNATURE, SEAL OR DATE THEREON, UPDATED BY RODS IN SEPTEMBER 2020, CSJ# 0924-06-136. THE FOLLOWING RECOVERED CONTROL POINTS WERE HELD FOR THIS PROJECT (P,N,E,Z,D):

S072003,10718314.51,423884.87,3958.58,TADIC
S072005,10739942.00,413834.87,4052.77,TADIC

Control Name	Published Coordinate Information			Measured Coordinate Information			Deferent (Published - Measured)		
	North	East	Elev.	North	East	Elev.	North	East	Elev.
S072003	10,718,314.51	423,884.87	3,958.58	10,718,314.51	423,884.87	3,958.58	0.00	0.00	0.00
CE0089	10,731,026	432,366	4,006.37	10,731,005.78	432,378.83	4,006.12	20	-13	0.25

Notes:
1. Measured values are based on redundant GPS VRS observations.

2. NGS monument CE0089 is of first vertical order, class II; Published values are based on NAD83 (1986) and NAVD88; Coordinates are approximate; Elevations were leveled in June, 1991.

3. S027203's published values are from the LP375 North East corridor control survey performed by RODS during September 2020 (CSJ 0924-06-136).

THE CONTROL POINTS SHOWN HEREIN WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION.

STATE OF TEXAS
REGISTERED
JIMMY D. WALTON
5889
PROFESSIONAL
LAND SURVEYOR

4-6-2022

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

Sheet 2 of 2
Survey Date: September, 2021

RODS Surveying, Inc.
Control Infrastructure Transportation Land Development
6810 LEE ROAD, STE.100
SPRING, TEXAS 77379
TEL (281) 257-4020
FAX (281) 257-4021
TBPELS SURVEYING FIRM REG. No. 10030700

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

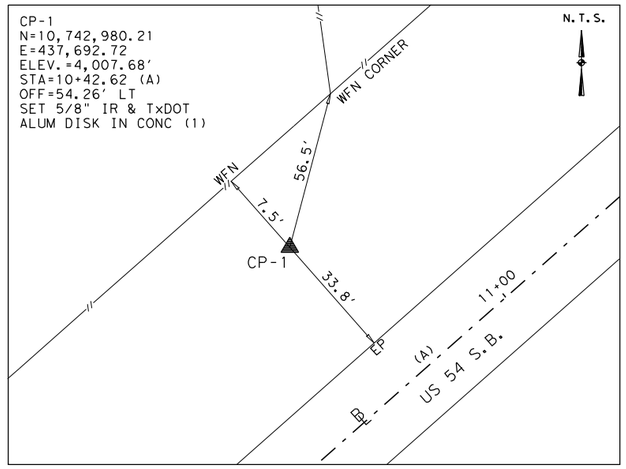
Texas Department of Transportation

US 54
SURVEY CONTROL INDEX SHEET

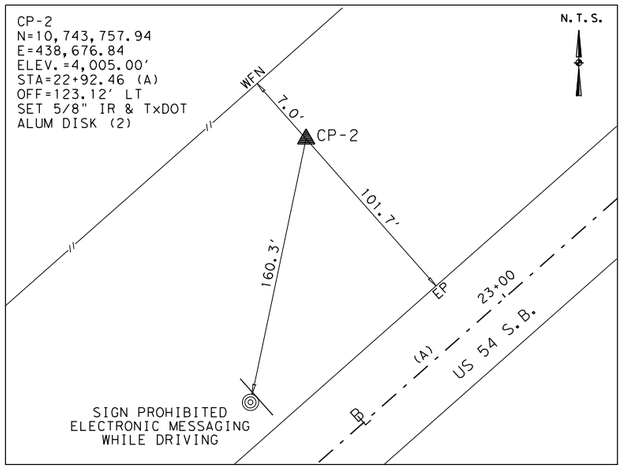
CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US 54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		65

N:\AECOM-URS 149\219130001\CAD\VH&V Control\VH&V Index Sheet 2.dgn

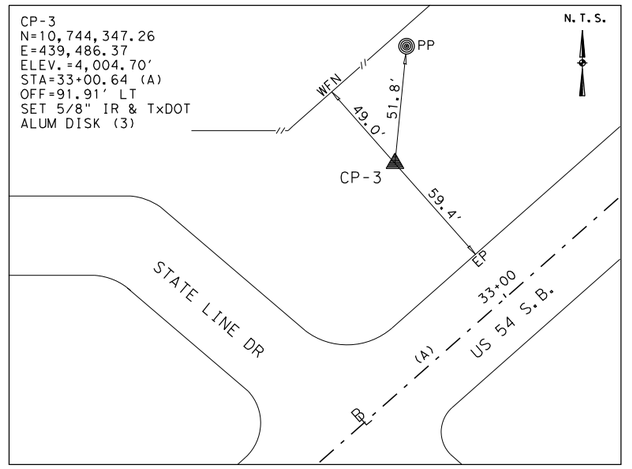
4/1/2022 10:28:17 AM



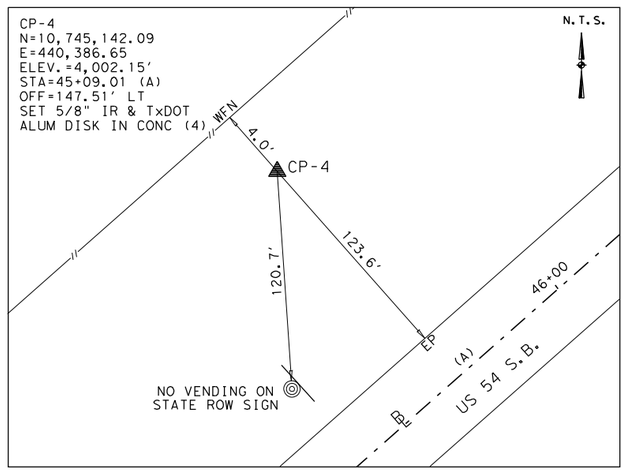
STATION IS LOCATED ON THE NORTH SIDE OF US 54 S.B., AND LYING 0.41 MILE SOUTH OF STATE LINE DR.



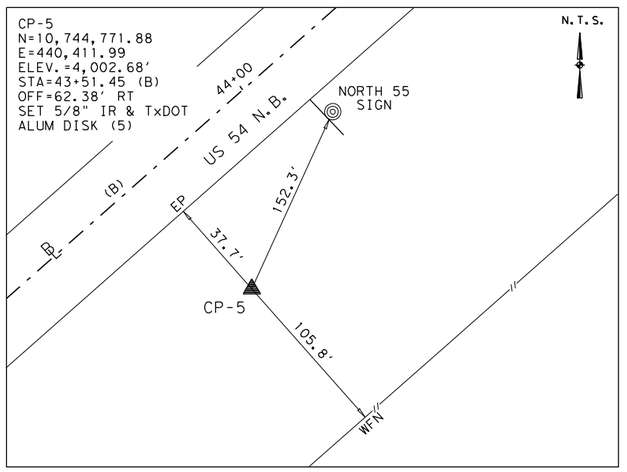
STATION IS LOCATED ON THE NORTH SIDE OF US 54 S.B., AND LYING 0.17 MILE SOUTH OF STATE LINE DR.



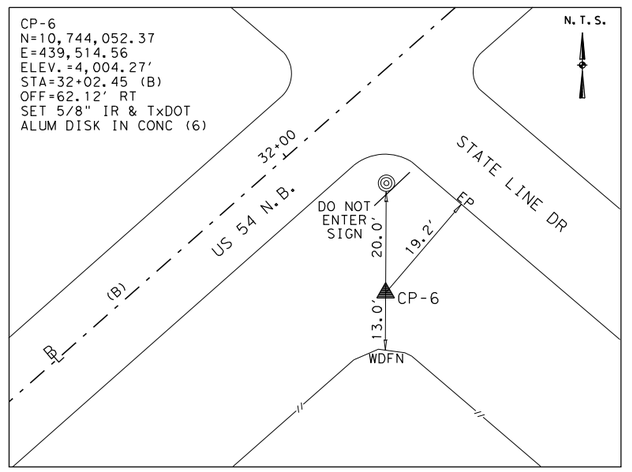
STATION IS LOCATED ON THE NORTH CORNER OF THE INTERSECTION OF STATE LINE DR AND US 54 S.B.



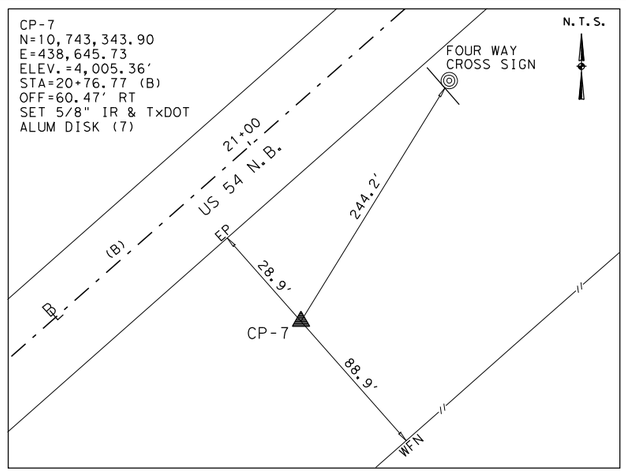
STATION IS LOCATED ON THE NORTH SIDE OF US 54 S.B., AND LYING 0.25 MILE NORTH OF STATE LINE DR.



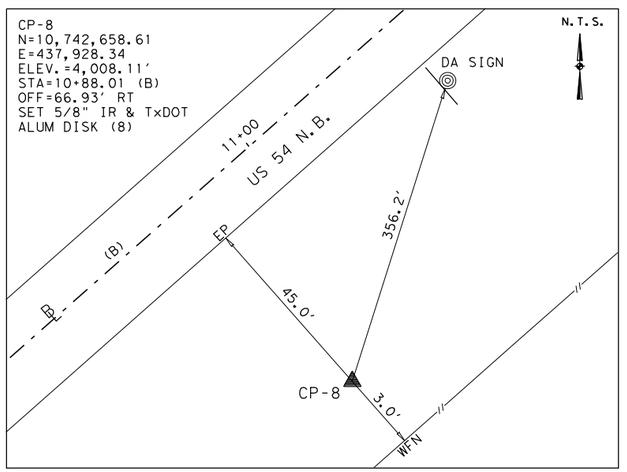
STATION IS LOCATED ON THE SOUTH SIDE OF US 54 N.B., AND LYING 0.21 MILE NORTH OF STATE LINE DR.



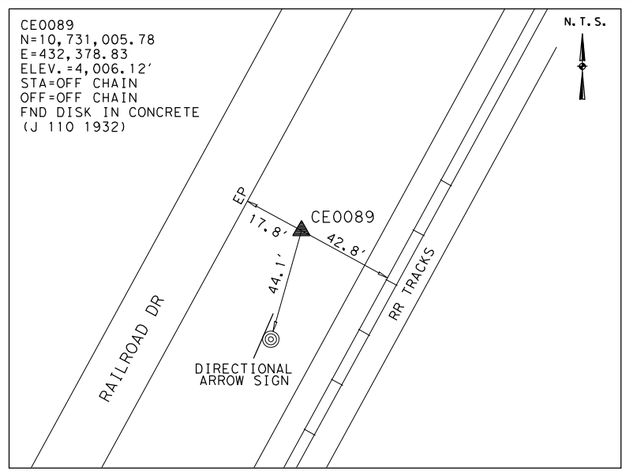
STATION IS LOCATED ON THE SOUTH CORNER OF THE INTERSECTION OF STATE LINE DR AND US 54 N.B.



STATION IS LOCATED ON THE SOUTH SIDE OF US 54 N.B., AND LYING 0.22 MILE SOUTH OF STATE LINE DR.



STATION IS LOCATED ON THE SOUTH SIDE OF US 54 N.B., AND LYING 0.41 MILE SOUTH OF STATE LINE DR.



STATION IS LOCATED ON THE EAST SIDE RAILROAD DR, AND LYING 0.12 MILE EAST OF US 54.

NOTES:
1. ALL BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ.).

2. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (GEOID 12A).

3. COORDINATES AND DISTANCES ARE U.S. SURVEY FEET, DISPLAYED IN SURFACE VALUES, AND MAY BE CONVERTED TO NAD83 (GRID) VALUES BY APPLYING THE COMBINED ADJUSTMENT FACTOR(CAF) OF 1.000231, USING THE FORMULA: SURFACE / CAF = GRID

4. HORIZONTAL COORDINATES ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS MEASURED FROM TxDOT CORS TXWT DURING SEPTEMBER, 2021.

5. ELEVATIONS ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS, ADJUSTED WITH DIGITAL LEVELING.

6. EXISTING CONTROL WAS PROVIDED BY THE STATE AS "CONTROL SHEET" FOR NE PARKWAY WITH NO FIRM NAME, SIGNATURE, SEAL OR DATE THEREON, UPDATED BY RODS IN SEPTEMBER 2020, CSJ# 0924-06-136. THE FOLLOWING RECOVERED CONTROL POINTS WERE HELD FOR THIS PROJECT (P,N,E,Z,D):
S072003,10718314.51,423884.87,3958.58,TADIC
S072005,10739942.00,413834.87,4052.77,TADIC

THE CONTROL POINTS SHOWN HEREIN WERE DETERMINED BY A SURVEY MADE ON THE GROUND UNDER MY SUPERVISION.

STATE OF TEXAS
REGISTERED
JIMMY D. WALTON
5889
PROFESSIONAL
LAND SURVEYOR
4-6-2022

THIS SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E

Sheet 1 of 2
Survey Date: September, 2021

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6810 LEE ROAD, STE.100
SPRING, TEXAS 77379
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TBPELS SURVEYING FIRM REG. No. 10030700
Control Infrastructure Transportation Land Development

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation
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US 54
HORIZONTAL & VERTICAL CONTROL SHEET

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US 54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		66

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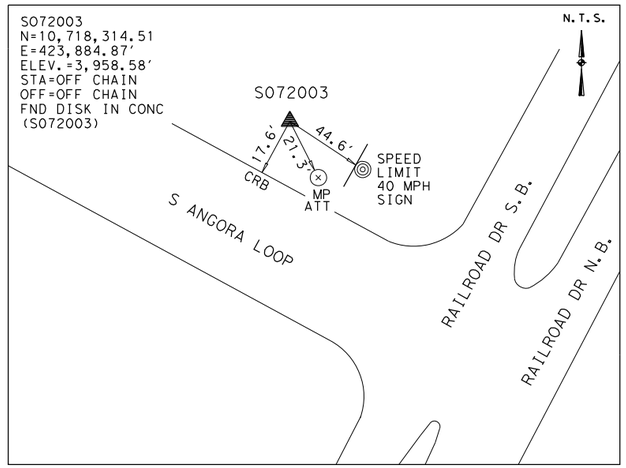
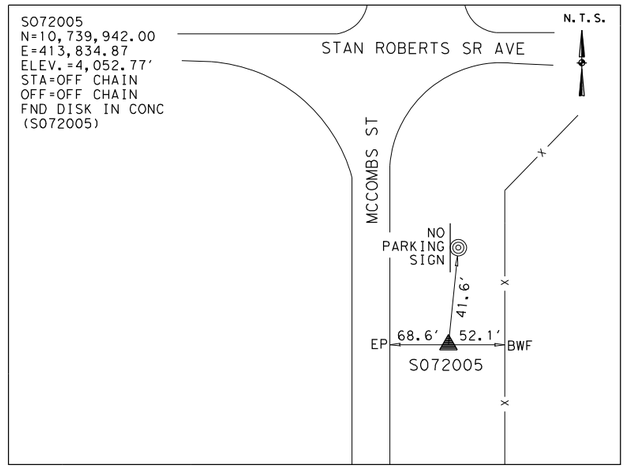


STATION IS LOCATED ON THE NORTH SIDE OF S ANGORA LOOP, AND LYING 171' WEST OF RAILROAD DR S.B.



STATION IS LOCATED ON THE EAST SIDE OF MCCOMBS ST, AND LYING 366' SOUTH OF STAN ROBERTS SR AVE.

NOTES:
1. ALL BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ.).

2. ALL ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (GEOID 12A).

3. COORDINATES AND DISTANCES ARE U.S. SURVEY FEET, DISPLAYED IN SURFACE VALUES, AND MAY BE CONVERTED TO NAD83 (GRID) VALUES BY APPLYING THE COMBINED ADJUSTMENT FACTOR(CAF) OF 1.000231, USING THE FORMULA: SURFACE / CAF = GRID

4. HORIZONTAL COORDINATES ARE BASED ON REDUNDANT GPS RTN OBSERVATIONS MEASURED FROM TxDOT CORS TXWT DURING SEPTEMBER, 2021.

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S072003,10718314.51,423884.87,3958.58,TADIC
S072005,10739942.00,413834.87,4052.77,TADIC

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Control
Infrastructure
Transportation
Land Development

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

US 54
HORIZONTAL & VERTICAL CONTROL SHEET

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US 54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		67

N:\AECOM-URS 149\219130001\CAD\H&V Control\H&V Sketches.dgn

HORIZONTAL ALIGNMENT DATA

ALIGN "NBUS54"

Chain NBUS54 contains:
CUR NBUS541 CUR NBUS542 NBUS002 CUR NBUS543 NBUS003

Beginning chain NBUS54 description

Curve NBUS541						
P.I. Station		11+86.30	N	10,742,770.5184	E	437,963.0077
Delta	=	5° 19′ 02.70"	(LT)			
Degree	=	1° 25′ 41.20"				
Tangent	=	186.3034				
Length	=	372.3394				
Radius	=	4,012.0000				
External	=	4.3233				
Long Chord	=	372.2058				
Mid. Ord.	=	4.3187				
P.C. Station		10+00.00	N	10,742,654.4693	E	437,817.2628
P.T. Station		13+72.34	N	10,742,899.5748	E	438,097.3708
C.C.			N	10,745,793.0509	E	435,318.1730
Back	= N	51° 28′ 17.43" E				
Ahead	= N	46° 09′ 14.73" E				
Chord Bear	= N	48° 48′ 46.08" E				

Course from PT NBUS541 to PC NBUS542 N 46° 09′ 14.73" E Dist 451.3633

Curve NBUS542						
P.I. Station		21+61.13	N	10,743,452.4880	E	438,659.8363
Delta	=	6° 59′ 27.70"	(RT)			
Degree	=	1° 02′ 13.98"				
Tangent	=	337.4282				
Length	=	674.0190				
Radius	=	5,524.0000				
External	=	10.2961				
Long Chord	=	673.6009				
Mid. Ord.	=	10.2770				
P.C. Station		18+23.70	N	10,743,212.2438	E	438,422.8964
P.T. Station		24+97.72	N	10,743,662.1072	E	438,924.2557
C.C.			N	10,739,333.3269	E	442,355.9080
Back	= N	44° 36′ 11.72" E				
Ahead	= N	51° 35′ 39.42" E				
Chord Bear	= N	48° 05′ 55.57" E				

Course from PT NBUS542 to NBUS002 N 51° 35′ 39.42" E Dist 450.6322

Point NBUS002 N 10,743,942.0516 E 439,277.3852 Sta 29+48.35

Course from NBUS002 to PC NBUS543 N 51° 19′ 02.18" E Dist 1,302.7959

Curve NBUS543						
P.I. Station		50+51.22	N	10,745,256.3597	E	440,918.9238
Delta	=	18° 10′ 55.82"	(LT)			
Degree	=	1° 08′ 45.30"				
Tangent	=	800.0724				
Length	=	1,586.6937				
Radius	=	5,000.0000				
External	=	63.6070				
Long Chord	=	1,580.0443				
Mid. Ord.	=	62.8080				
P.C. Station		42+51.15	N	10,744,756.3086	E	440,294.3723
P.T. Station		58+37.84	N	10,745,926.3275	E	441,356.2554
C.C.			N	10,748,659.4028	E	437,169.3354
Back	= N	51° 19′ 02.18" E				
Ahead	= N	33° 08′ 06.36" E				
Chord Bear	= N	42° 13′ 34.27" E				

Course from PT NBUS543 to NBUS003 N 33° 08′ 06.36" E Dist 222.1566

Point NBUS003 N 10,746,112.3579 E 441,477.6896 Sta 60+60.00

Ending chain NBUS54 description

ALIGN "NBUS54*TURN"

Chain NBUS54*TURN contains:
NBT001 CUR NBUS54*TURN1 CUR NBUS54*TURN2 CUR NBUS54*TURN3

Beginning chain NBUS54*TURN description

Point NBT001 N 10,744,308.5523 E 439,690.3362 Sta 10+00.00

Course from NBT001 to PC NBUS54*TURN1 N 51° 19′ 02.18" E Dist 751.3729

Curve NBUS54*TURN1						
P.I. Station		19+57.49	N	10,744,906.9881	E	440,437.7677
Delta	=	4° 44′ 51.52"	(LT)			
Degree	=	1° 09′ 08.53"				
Tangent	=	206.1130				
Length	=	411.9901				
Radius	=	4,972.0000				
External	=	4.2703				
Long Chord	=	411.8722				
Mid. Ord.	=	4.2667				
P.C. Station		17+51.37	N	10,744,778.1659	E	440,276.8721
P.T. Station		21+63.36	N	10,745,048.6851	E	440,587.4491
C.C.			N	10,748,659.4028	E	437,169.3354
Back	= N	51° 19′ 02.18" E				
Ahead	= N	46° 34′ 10.65" E				
Chord Bear	= N	48° 56′ 36.41" E				

Curve NBUS54*TURN2						
P.I. Station		21+83.77	N	10,745,062.7130	E	440,602.2675
Delta	=	90° 01′ 41.22"	(LT)			
Degree	=	280° 55′ 48.91"				
Tangent	=	20.4050				
Length	=	32.0464				
Radius	=	20.3950				
External	=	8.4550				
Long Chord	=	28.8500				
Mid. Ord.	=	5.9771				
P.C. Station		21+63.36	N	10,745,048.6851	E	440,587.4491
P.T. Station		21+95.41	N	10,745,077.5245	E	440,588.2323
C.C.			N	10,745,063.4962	E	440,573.4281
Back	= N	46° 34′ 10.65" E				
Ahead	= N	43° 27′ 30.56" W				
Chord Bear	= N	1° 33′ 20.04" E				

Curve NBUS54*TURN3						
P.I. Station		22+15.81	N	10,745,092.3359	E	440,574.1971
Delta	=	90° 01′ 41.22"	(LT)			
Degree	=	280° 55′ 48.94"				
Tangent	=	20.4050				
Length	=	32.0464				
Radius	=	20.3950				
External	=	8.4550				
Long Chord	=	28.8500				
Mid. Ord.	=	5.9771				
P.C. Station		21+95.41	N	10,745,077.5245	E	440,588.2323
P.T. Station		22+27.46	N	10,745,078.2935	E	440,559.3926
C.C.			N	10,745,063.4962	E	440,573.4281
Back	= N	43° 27′ 30.56" W				
Ahead	= S	46° 30′ 48.22" W				
Chord Bear	= N	88° 28′ 21.17" W				

Ending chain NBUS54*TURN description

ALIGN "N*STATE*LINE"

Chain N*STATE*LINE contains:
NSL001 CUR N*STATE*LINE1 CUR N*STATE*LINE2 NSL002

Beginning chain N*STATE*LINE description

Point NSL001 N 10,743,984.4698 E 439,282.1634 Sta 10+00.00

Course from NSL001 to PC N*STATE*LINE1 N 44° 49′ 35.71" E Dist 184.7339

Curve N*STATE*LINE1						
P.I. Station		12+73.53	N	10,744,178.4704	E	439,474.9931
Delta	=	83° 12′ 31.12"	(LT)			
Degree	=	57° 17′ 44.81"				
Tangent	=	88.7976				
Length	=	145.2265				
Radius	=	100.0000				
External	=	33.7349				
Long Chord	=	132.7965				
Mid. Ord.	=	25.2252				
P.C. Station		11+84.73	N	10,744,115.4912	E	439,412.3940
P.T. Station		13+29.96	N	10,744,248.0778	E	439,419.8584
C.C.			N	10,744,185.9876	E	439,341.4696
Back	= N	44° 49′ 35.71" E				
Ahead	= N	38° 22′ 55.41" W				
Chord Bear	= N	3° 13′ 20.15" E				

Course from PT N*STATE*LINE1 to PC N*STATE*LINE2 N 38° 22′ 55.41" W Dist 19.3713

Curve N*STATE*LINE2						
P.I. Station		14+35.80	N	10,744,331.0464	E	439,354.1407
Delta	=	48° 56′ 29.73"	(LT)			
Degree	=	30° 09′ 20.42"				
Tangent	=	86.4711				
Length	=	162.2965				
Radius	=	190.0000				
External	=	18.7516				
Long Chord	=	157.4072				
Mid. Ord.	=	17.0672				
P.C. Station		13+49.33	N	10,744,263.2627	E	439,407.8307
P.T. Station		15+11.63	N	10,744,335.0841	E	439,267.7639
C.C.			N	10,744,145.2913	E	439,258.8920
Back	= N	38° 22′ 55.41" W				
Ahead	= N	87° 19′ 25.13" W				
Chord Bear	= N	62° 51′ 10.27" W				

Course from PT N*STATE*LINE2 to NSL002 N 87° 19′ 25.13" W Dist 231.0261

Point NSL002 N 10,744,345.8716 E 439,036.9898 Sta 17+42.65

Ending chain N*STATE*LINE description

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 7

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		68

DATE: 5/31/2022 1:22:54 PM
FILE: c:\pwworking\ustx\dms01391\US54_HC-001.dgn

HORIZONTAL ALIGNMENT DATA

ALIGN "SBUS54"

Chain SBUS54 contains:
SBUS001 CUR SBUS541 CUR SBUS542 CUR SBUS543 SBUS002

Beginning chain SBUS54 description

Point SBUS001 N 10,742,911.2143 E 437,692.9711 Sta 10+00.00

Course from SBUS001 to PC SBUS541 N 51° 38′ 35.00" E Dist 322.6879

Curve Data

Curve SBUS541					
P.I. Station	15+87.33	N 10,743,275.6867	E	438,153.5315	
Delta =	6° 03′ 34.16"	(RT)			
Degree =	1° 08′ 45.30"				
Tangent =	264.6418				
Length =	528.7901				
Radius =	5,000.0000				
External =	6.9986				
Long Chord =	528.5437				
Mid. Ord. =	6.9888				
P.C. Station	13+22.69	N 10,743,111.4610	E	437,946.0101	
P.T. Station	18+51.48	N 10,743,417.0888	E	438,377.2294	
C.C.		N 10,739,190.6610	E	441,048.8035	
Back = N	51° 38′ 35.00" E				
Ahead = N	57° 42′ 09.16" E				
Chord Bear = N	54° 40′ 22.08" E				

Course from PT SBUS541 to PC SBUS542 N 57° 42′ 09.16" E Dist 216.4986

Curve Data

Curve SBUS542					
P.I. Station	23+32.62	N 10,743,674.1692	E	438,783.9304	
Delta =	6° 03′ 34.16"	(LT)			
Degree =	1° 08′ 45.30"				
Tangent =	264.6418				
Length =	528.7901				
Radius =	5,000.0000				
External =	6.9986				
Long Chord =	528.5437				
Mid. Ord. =	6.9888				
P.C. Station	20+67.98	N 10,743,532.7672	E	438,560.2325	
P.T. Station	25+96.77	N 10,743,838.3949	E	438,991.4518	
C.C.		N 10,747,759.1949	E	435,888.6584	
Back = N	57° 42′ 09.16" E				
Ahead = N	51° 38′ 35.00" E				
Chord Bear = N	54° 40′ 22.08" E				

Course from PT SBUS542 to PC SBUS543 N 51° 38′ 35.00" E Dist 1,607.7279

Curve Data

Curve SBUS543					
P.I. Station	50+19.15	N 10,745,341.6276	E	440,890.9900	
Delta =	18° 30′ 28.64"	(LT)			
Degree =	1° 08′ 45.30"				
Tangent =	814.6580				
Length =	1,615.1238				
Radius =	5,000.0000				
External =	65.9321				
Long Chord =	1,608.1108				
Mid. Ord. =	65.0740				
P.C. Station	42+04.49	N 10,744,836.0845	E	440,252.1678	
P.T. Station	58+19.62	N 10,746,023.8092	E	441,336.2944	
C.C.		N 10,748,756.8845	E	437,149.3743	
Back = N	51° 38′ 35.00" E				
Ahead = N	33° 08′ 06.36" E				
Chord Bear = N	42° 23′ 20.68" E				

Course from PT SBUS543 to SBUS002 N 33° 08′ 06.36" E Dist 180.3816

Point SBUS002 N 10,746,174.8579 E 441,434.8937 Sta 60+00.00

Ending chain SBUS54 description

ALIGN "SBUS54*TURN"

Chain SBUS54*TURN contains:
SBT001 CUR SBUS54*TURN1 CUR SBUS54*TURN2 CUR SBUS54*TURN3 CUR SBUS54*TURN4

Beginning chain SBUS54*TURN description

Point SBT001 N 10,743,854.0395 E 439,037.6753 Sta 10+00.00

Course from SBT001 to PC SBUS54*TURN1 S 50° 43′ 11.57" W Dist 304.9098

Curve Data

Curve SBUS54*TURN1					
P.I. Station	14+41.30	N 10,743,581.9766	E	438,690.4854	
Delta =	3° 06′ 27.92"	(RT)			
Degree =	1° 08′ 22.32"				
Tangent =	136.3942				
Length =	272.7215				
Radius =	5,028.0000				
External =	1.8496				
Long Chord =	272.6881				
Mid. Ord. =	1.8490				
P.C. Station	13+04.91	N 10,743,660.9973	E	438,801.6569	
P.T. Station	15+77.63	N 10,743,509.0992	E	438,575.1933	
C.C.		N 10,747,759.1949	E	435,888.6584	
Back = S	54° 35′ 41.24" W				
Ahead = S	57° 42′ 09.16" W				
Chord Bear = S	56° 08′ 55.20" W				

Course from PT SBUS54*TURN1 to PC SBUS54*TURN2 S 57° 42′ 09.16" W Dist 216.4986

Curve Data

Curve SBUS54*TURN2					
P.I. Station	18+39.01	N 10,743,369.4386	E	438,354.2504	
Delta =	1° 02′ 03.95"	(LT)			
Degree =	1° 09′ 08.53"				
Tangent =	44.8840				
Length =	89.7655				
Radius =	4,972.0000				
External =	0.2026				
Long Chord =	89.7643				
Mid. Ord. =	0.2026				
P.C. Station	17+94.13	N 10,743,393.4208	E	438,392.1902	
P.T. Station	18+83.90	N 10,743,344.7754	E	438,316.7498	
C.C.		N 10,739,190.6610	E	441,048.8035	
Back = S	57° 42′ 09.16" W				
Ahead = S	56° 40′ 05.21" W				
Chord Bear = S	57° 11′ 07.18" W				

Curve Data

Curve SBUS54*TURN3					
P.I. Station	19+24.14	N 10,743,322.6595	E	438,283.1223	
Delta =	43° 50′ 52.20"	(LT)			
Degree =	57° 17′ 44.81"				
Tangent =	40.2482				
Length =	76.5289				
Radius =	100.0000				
External =	7.7957				
Long Chord =	74.6750				
Mid. Ord. =	7.2320				
P.C. Station	18+83.90	N 10,743,344.7754	E	438,316.7498	
P.T. Station	19+60.42	N 10,743,283.4146	E	438,274.1915	
C.C.		N 10,743,261.2252	E	438,371.6986	
Back = S	56° 40′ 05.21" W				
Ahead = S	12° 49′ 13.01" W				
Chord Bear = S	34° 44′ 39.11" W				

Curve Data

Curve SBUS54*TURN4					
P.I. Station	22+15.42	N 10,743,034.7777	E	438,217.6100	
Delta =	147° 13′ 12.53"	(LT)			
Degree =	76° 23′ 39.74"				
Tangent =	254.9936				
Length =	192.7107				
Radius =	75.0000				
External =	190.7946				
Long Chord =	143.9045				
Mid. Ord. =	53.8370				
P.C. Station	19+60.42	N 10,743,283.4146	E	438,274.1915	
P.T. Station	21+53.14	N 10,743,213.1870	E	438,399.7964	
C.C.		N 10,743,266.7726	E	438,347.3218	
Back = S	12° 49′ 13.01" W				
Ahead = N	45° 36′ 00.48" E				
Chord Bear = S	60° 47′ 23.25" E				

Ending chain SBUS54*TURN description

ALIGN "S*STATE*LINE"

Chain S*STATE*LINE contains:
SSL001 SSL002 CUR S*STATE*LINE1 CUR S*STATE*LINE2 SSL003

Beginning chain S*STATE*LINE description

Point SSL001 N 10,744,822.3485 E 440,260.5932 Sta 10+00.00

Course from SSL001 to SSL002 S 49° 33′ 26.24" W Dist 330.9537

Point SSL002 N 10,744,607.6630 E 440,008.7192 Sta 13+30.95

Course from SSL002 to PC S*STATE*LINE1 S 49° 05′ 38.65" W Dist 590.8448

Curve Data

Curve S*STATE*LINE1					
P.I. Station	20+17.49	N 10,744,158.1074	E	439,489.8465	
Delta =	87° 28′ 34.06"	(LT)			
Degree =	57° 17′ 44.81"				
Tangent =	95.6893				
Length =	152.6746				
Radius =	100.0000				
External =	38.4068				
Long Chord =	138.2725				
Mid. Ord. =	27.7492				
P.C. Station	19+21.80	N 10,744,220.7665	E	439,562.1671	
P.T. Station	20+74.47	N 10,744,083.0977	E	439,549.2602	
C.C.		N 10,744,145.1880	E	439,627.6490	
Back = S	49° 05′ 38.65" W				
Ahead = S	38° 22′ 55.41" E				
Chord Bear = S	5° 21′ 21.62" W				

Course from PT S*STATE*LINE1 to PC S*STATE*LINE2 S 38° 22′ 55.41" E Dist 77.2425

Curve Data

Curve S*STATE*LINE2					
P.I. Station	22+03.25	N 10,743,982.1508	E	439,629.2183	
Delta =	19° 29′ 40.45"	(LT)			
Degree =	19° 05′ 54.94"				
Tangent =	51.5348				
Length =	102.0733				
Radius =	300.0000				
External =	4.3942				
Long Chord =	101.5817				
Mid. Ord. =	4.3308				
P.C. Station	21+51.72	N 10,744,022.5483	E	439,597.2203	
P.T. Station	22+53.79	N 10,743,954.7475	E	439,672.8634	
C.C.		N 10,744,208.8190	E	439,832.3867	
Back = S	38° 22′ 55.41" E				
Ahead = S	57° 52′ 35.85" E				
Chord Bear = S	48° 07′ 45.63" E				

Course from PT S*STATE*LINE2 to SSL003 S 57° 52′ 35.85" E Dist 198.9095

Point SSL003 N 10,743,848.9785 E 439,841.3209 Sta 24+52.70

Ending chain S*STATE*LINE description

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

HORIZONTAL ALIGNMENT DATA

SHEET 2 OF 7

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		69

DATE: 5/31/2022 1:23:03 PM
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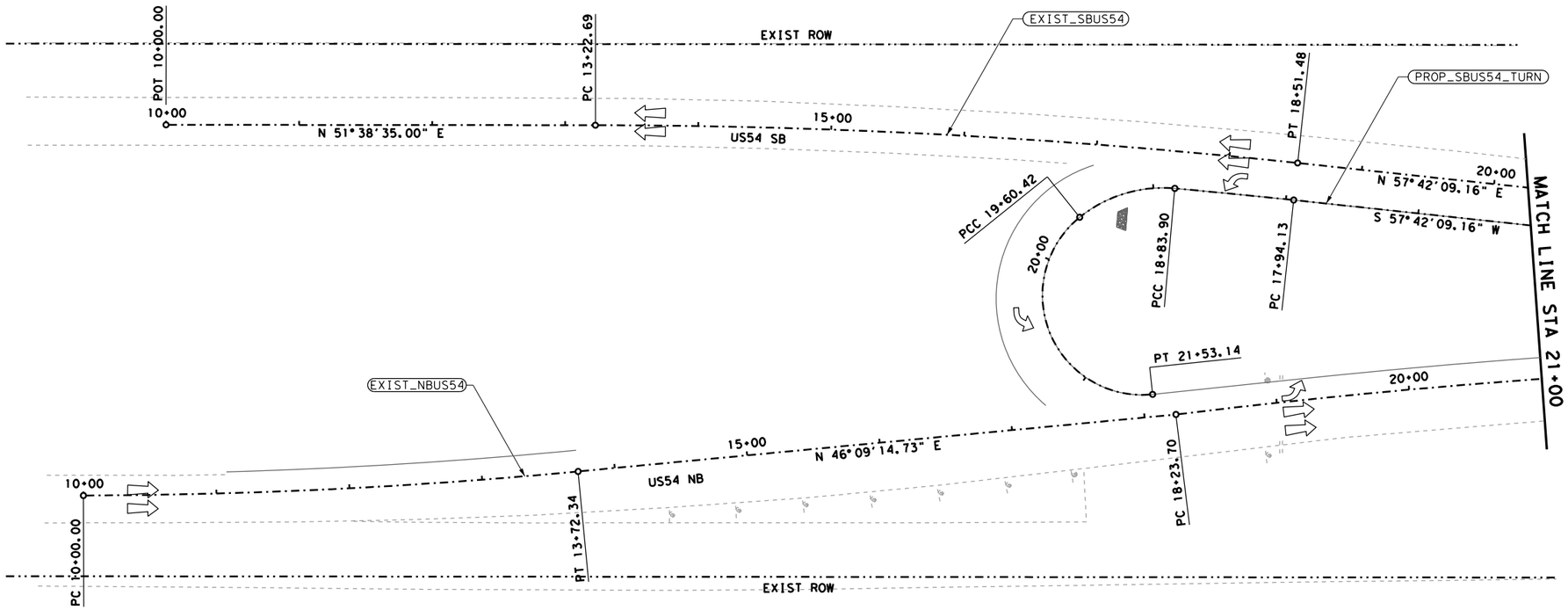

LEGEND

XXXXX XXXX-XX ALIGNMENT NAME
EXISTING ROW
ALIGNMENT
TRAFFIC DIRECTION

0 25 50
SCALE: 1"=50'

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 1 THRU 2 FOR CURVE DATA

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

HORIZONTAL ALIGNMENT DATA

STA 10+00.00 TO STA 21+00.00

SHEET 3 OF 7

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		70

DATE: 5/31/2022 1:23:12 PM
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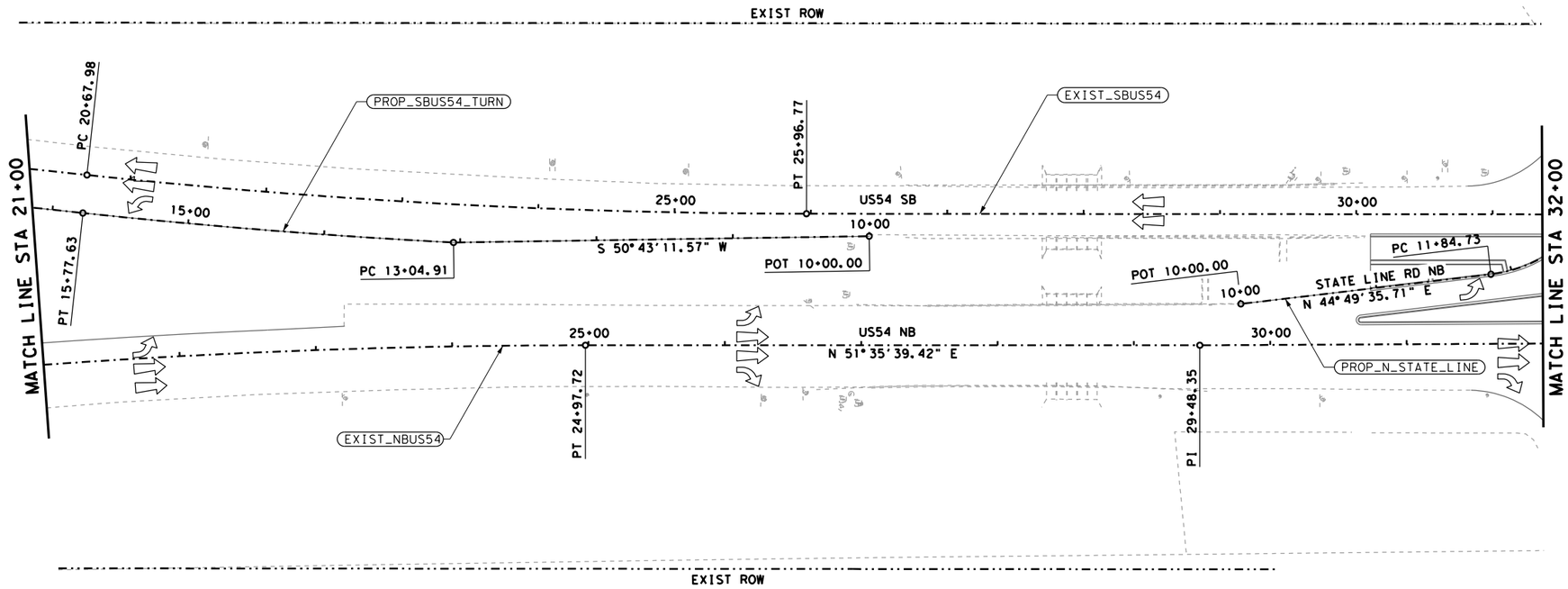

LEGEND

- XXXXX XXXX-XX — ALIGNMENT NAME
- EXISTING ROW
- ALIGNMENT
- TRAFFIC DIRECTION

0 25 50

SCALE: 1"=50'

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 1 THRU 2 FOR CURVE DATA

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

HORIZONTAL ALIGNMENT DATA

STA 21+00.00 TO STA 32+00.00

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		71

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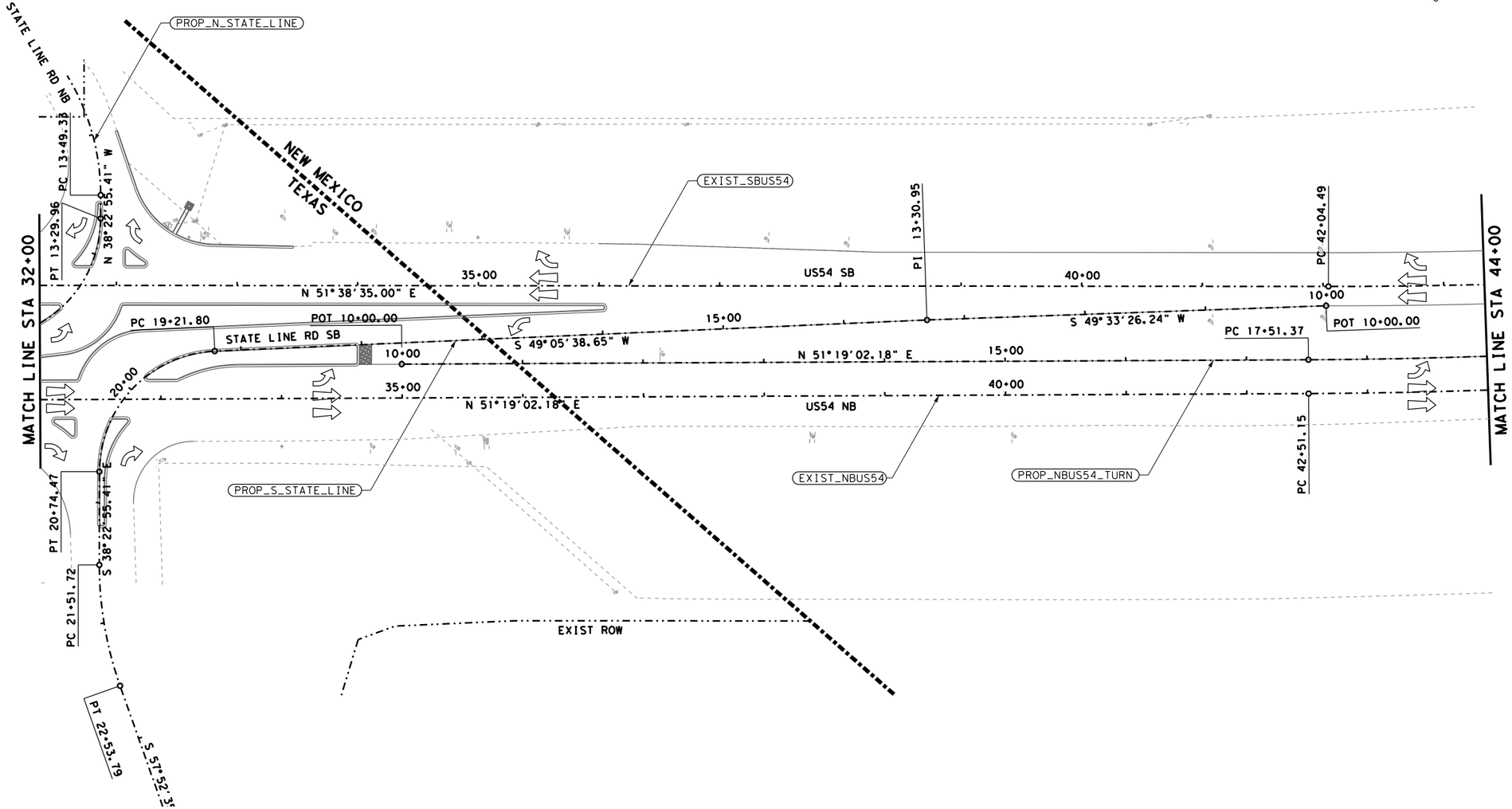

LEGEND

- XXXXX XXXX-XX — ALIGNMENT NAME
- EXISTING ROW
- ALIGNMENT
- TRAFFIC DIRECTION

0 25 50

SCALE: 1"=50'

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 1 THRU 2 FOR CURVE DATA

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

HORIZONTAL ALIGNMENT DATA

STA 32+00.00 TO STA 44+00.00

SHEET 5 OF 7

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		72

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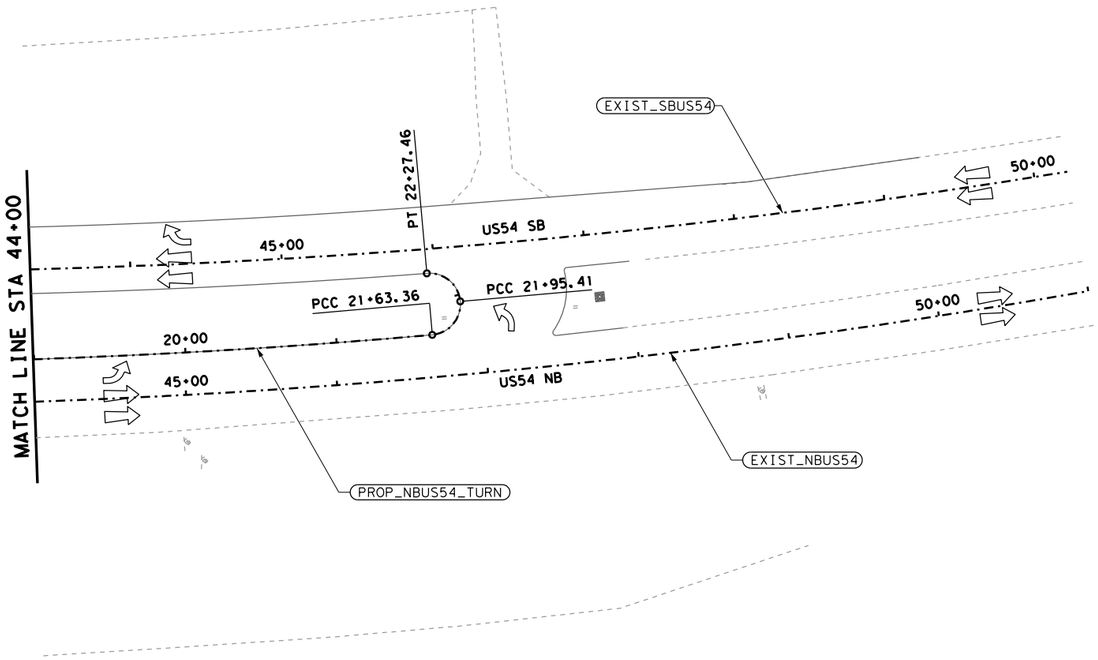

LEGEND

- XXXXX XXXX-XX — ALIGNMENT NAME
- EXISTING ROW
- ALIGNMENT
- TRAFFIC DIRECTION

0 25 50

SCALE: 1"=50'

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 1 THRU 2 FOR CURVE DATA

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

HORIZONTAL ALIGNMENT DATA

STA 44+00.00 TO END

SHEET 6 OF 7

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		73

DATE: 5/31/2022 1:23:41 PM
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LEGEND

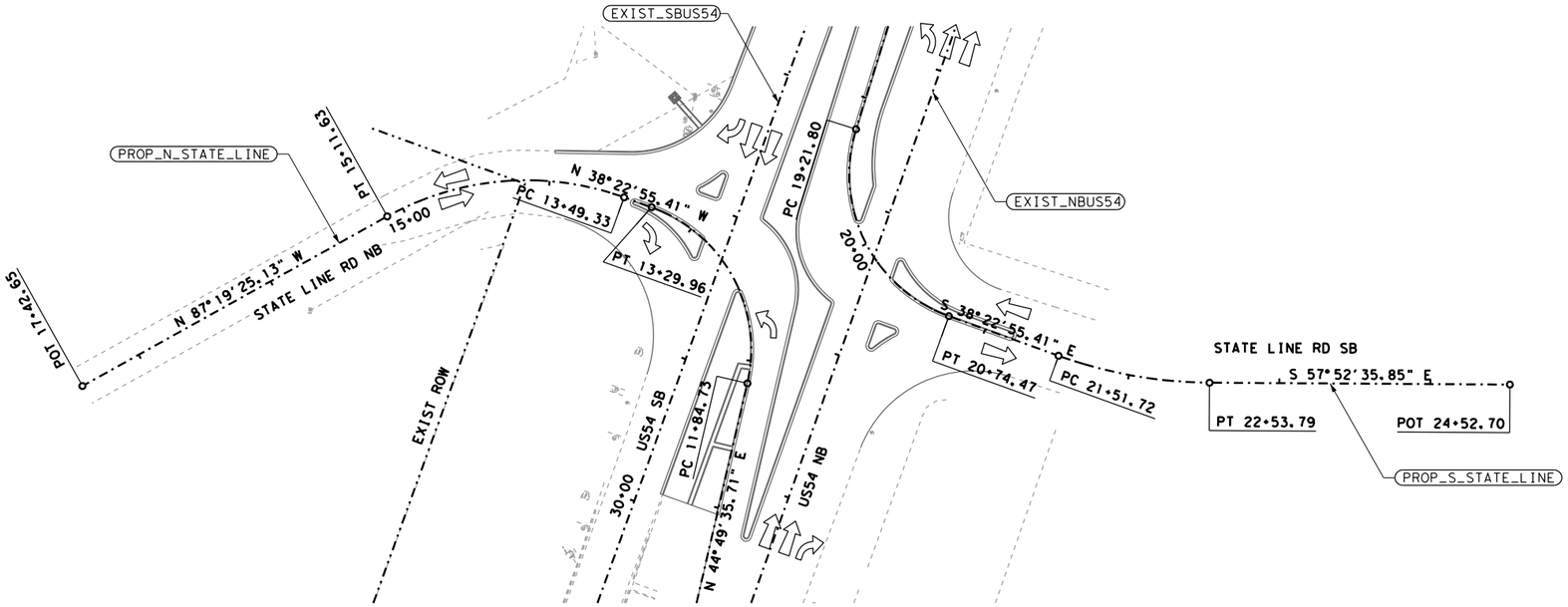
- XXXXX XXXX-XX — ALIGNMENT NAME
- EXISTING ROW
- ALIGNMENT
- TRAFFIC DIRECTION

0 25 50

SCALE: 1"=50'

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 1 THRU 2 FOR CURVE DATA



STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

HORIZONTAL ALIGNMENT DATA

STA 10+00.00 TO STA 21+00.00

SHEET 7 OF 7

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		74

DATE: 5/31/2022 1:23:50 PM
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HORIZONTAL ALIGNMENT DATA

ALIGN "NBUS54"

```
<*       1    DESCRIBE CHAIN NBUS54

Chain NBUS54 contains:
 NBUS001 NBUS002

Beginning chain NBUS54 description
================================================================================

Point NBUS001          N  10,738,312.6859 E      432,331.5593 Sta       10+00.00

Course from NBUS001 to NBUS002 N 51° 38' 51.14" E Dist 2,600.0000

Point NBUS002          N  10,739,925.9790 E      434,370.5015 Sta       36+00.00

================================================================================
Ending chain NBUS54 description
```

ALIGN "NBUS54*TURN"

```
<*       2    DESCRIBE CHAIN NBUS54*TURN

Chain NBUS54*TURN contains:
 NBUST001 NBUST002 CUR NBUS54*TURN1 CUR NBUS54*TURN2

Beginning chain NBUS54*TURN description
================================================================================

Point NBUST001         N  10,739,244.5104 E      433,486.5014 Sta       10+00.00

Course from NBUST001 to NBUST002 N 48° 59' 45.31" E Dist 300.3216

Point NBUST002         N  10,739,441.5552 E      433,713.1429 Sta       13+00.32

Course from NBUST002 to PC NBUS54*TURN1 N 51° 38' 51.14" E Dist 508.4881

                                        Curve Data
                                       *----------*
Curve NBUS54*TURN1
P.I.  Station                  18+88.86  N      10,739,806.7402  E       434,174.6778
Delta          =      90° 02' 03.26" (LT)
Degree         =      71° 37' 11.01"
Tangent        =             80.0478
Length         =            125.7115
Radius         =             80.0000
External       =             33.1709
Long Chord     =            113.1709
Mid. Ord.      =             23.4484
P.C.  Station                  18+08.81  N      10,739,757.0708  E       434,111.9036
P.T.  Station                  19+34.52  N      10,739,869.4847  E       434,124.9708
C.C.                                     N      10,739,819.8074  E       434,062.2638
Back         = N  51° 38' 51.14" E
Ahead        = N  38° 23' 12.12" W
Chord Bear   = N   6° 37' 49.51" E

Course from PT NBUS54*TURN1 to PC NBUS54*TURN2 N 38° 23' 12.12" W Dist 76.0878

                                        Curve Data
                                       *----------*
Curve NBUS54*TURN2
P.I.  Station                  20+90.56  N      10,739,991.7928  E       434,028.0768
Delta          =      89° 57' 50.42" (LT)
Degree         =      71° 37' 11.01"
Tangent        =             79.9498
Length         =            125.6134
Radius         =             80.0000
External       =             33.1016
Long Chord     =            113.1015
Mid. Ord.      =             23.4137
P.C.  Station                  20+10.61  N      10,739,929.1252  E       434,077.7229
P.T.  Station                  21+36.22  N      10,739,942.1861  E       433,965.3780
C.C.                                     N      10,739,879.4479  E       434,015.0159
Back         = N  38° 23' 12.12" W
Ahead        = S  51° 38' 57.46" W
Chord Bear   = N  83° 22' 07.33" W

================================================================================
Ending chain NBUS54*TURN description
```

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE ROADWAY

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 5

NOTES:

1. SURVEY CONTROL INFORMATION OBTAINED FROM AS-BUILT PLAN SET 0167-01-091, SIGNED AND SEALED 10/23/19.

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		75

DATE: 5/31/2022 1:23:59 PM
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HORIZONTAL ALIGNMENT DATA

ALIGN "SBUS54"

<* 3 DESCRIBE CHAIN SBUS54

Chain SBUS54 contains:
 SBUS001 SBUS002

Beginning chain SBUS54 description

Point SBUS001 N 10,738,532.1021 E 432,157.9204 Sta 10+00.00
Course from SBUS001 to SBUS002 N 51° 38′ 57.46" E Dist 2,600.0000
Point SBUS002 N 10,740,145.3327 E 434,196.9122 Sta 36+00.00

Ending chain SBUS54 description

ALIGN "SBUS54*TURN"

<* 4 DESCRIBE CHAIN SBUS54*TURN

Chain SBUS54*TURN contains:
 SBUST001 SBUST002 CUR SBUS54*TURN1 CUR SBUS54*TURN2

Beginning chain SBUS54*TURN description

Point SBUST001 N 10,739,212.4739 E 433,044.0325 Sta 10+00.00
Course from SBUST001 to SBUST002 S 49° 24′ 17.78" W Dist 300.2303
Point SBUST002 N 10,739,017.1114 E 432,816.0594 Sta 13+00.23
Course from SBUST002 to PC SBUS54*TURN1 S 51° 38′ 57.46" W Dist 478.4874

Curve Data

Curve SBUS54*TURN1
P.I. Station 18+58.77 N 10,738,670.5537 E 432,378.0387
Delta = 90° 02′ 09.58" (LT)
Degree = 71° 37′ 11.01"
Tangent = 80.0503
Length = 125.7140
Radius = 80.0000
External = 33.1726
Long Chord = 113.1726
Mid. Ord. = 23.4492
P.C. Station 17+78.72 N 10,738,720.2227 E 432,440.8164
P.I. Station 19+04.43 N 10,738,607.8073 E 432,427.7472
C.C. N 10,738,657.4845 E 432,490.4542
Back = S 51° 38′ 57.46" W
Ahead = S 38° 23′ 12.12" E
Chord Bear = S 6° 37′ 52.67" W

Course from PT SBUS54*TURN1 to PC SBUS54*TURN2 S 38° 23′ 12.12" E Dist 76.0334

Curve Data

Curve SBUS54*TURN2
P.I. Station 20+60.42 N 10,738,485.5399 E 432,524.6090
Delta = 89° 57′ 56.74" (LT)
Degree = 71° 37′ 11.01"
Tangent = 79.9522
Length = 125.6159
Radius = 80.0000
External = 33.1033
Long Chord = 113.1033
Mid. Ord. = 23.4146
P.C. Station 19+80.47 N 10,738,548.2094 E 432,474.9614
P.I. Station 21+06.08 N 10,738,535.1500 E 432,587.3082
C.C. N 10,738,597.8867 E 432,537.6684
Back = S 38° 23′ 12.12" E
Ahead = N 51° 38′ 51.14" E
Chord Bear = S 83° 22′ 10.49" E

Ending chain SBUS54*TURN description

ALIGN "STAN*ROBERTS*SR"

<* 5 DESCRIBE CHAIN STAN*ROBERTS*SR

Chain STAN*ROBERTS*SR contains:
 SRS001 SRS002

Beginning chain STAN*ROBERTS*SR description

Point SRS001 N 10,739,261.4652 E 432,730.2449 Sta 10+00.00
Course from SRS001 to SRS002 S 86° 46′ 30.76" E Dist 1,000.0000
Point SRS002 N 10,739,205.2118 E 433,728.6614 Sta 20+00.00

Ending chain STAN*ROBERTS*SR description

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE
ROADWAY

HORIZONTAL ALIGNMENT DATA

NOTES:

1. SURVEY CONTROL INFORMATION OBTAINED FROM AS-BUILT PLAN SET 0167-01-091. SIGNED AND SEALED 10/23/19.

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		76

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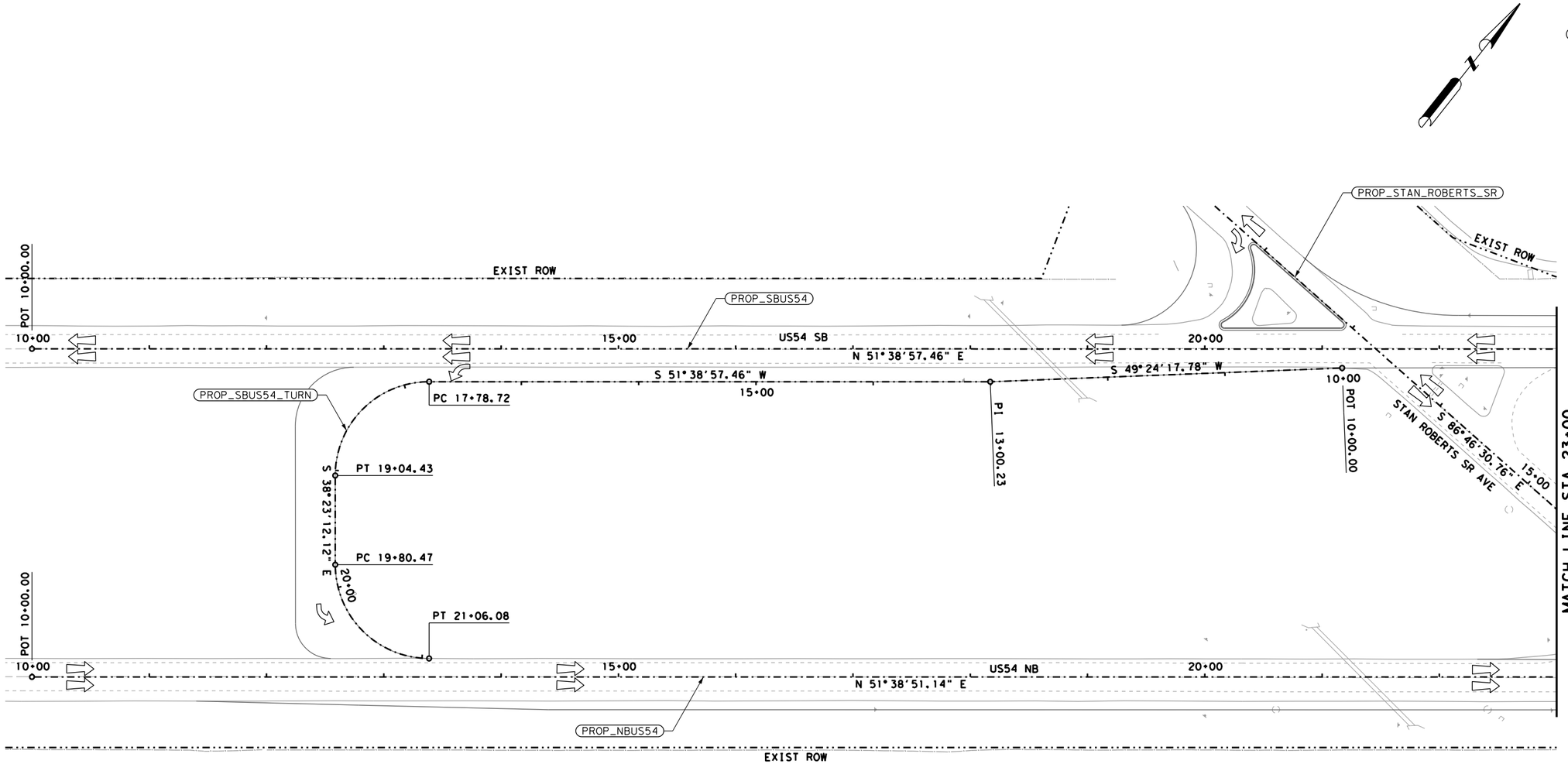

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 1 THRU 2 FOR CURVE DATA

0 25 50 100

SCALE: 1"=100'

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER

5/31/2022

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE ROADWAY

HORIZONTAL ALIGNMENT DATA

STA 10+00.00 TO STA 23+00.00

SHEET 3 OF 5

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		77

DATE: 5/31/2022 1:24:18 PM
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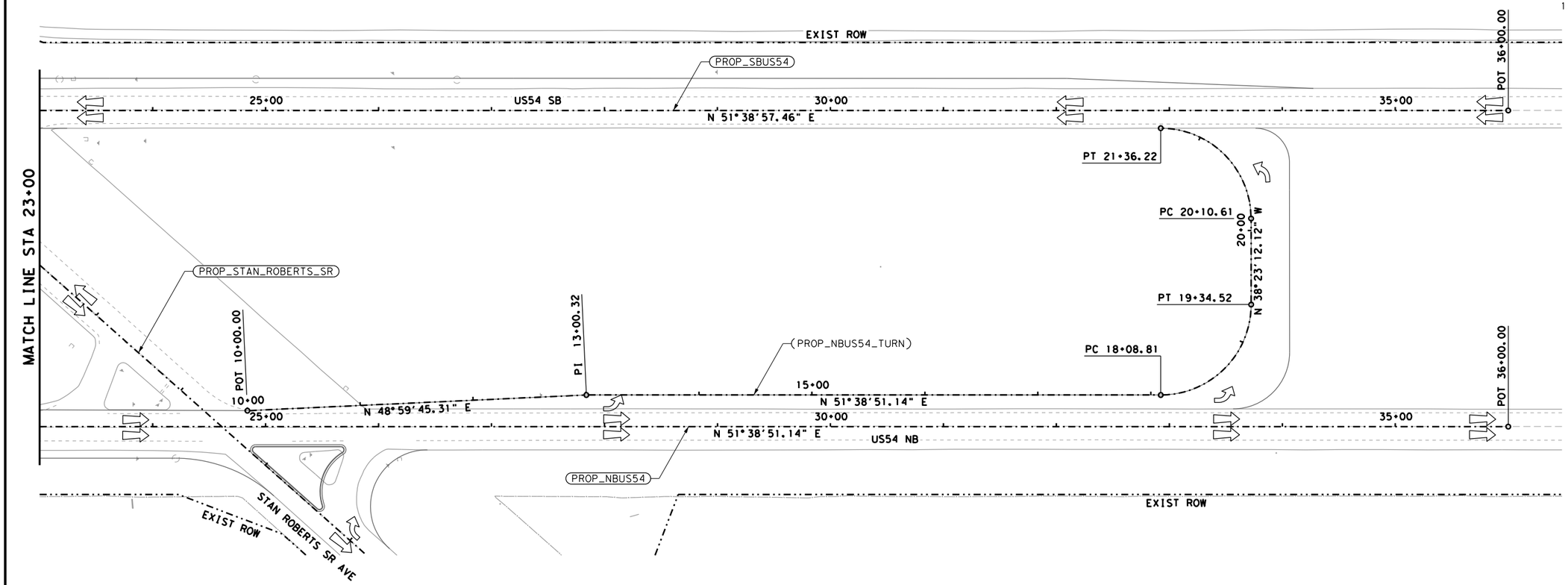
LEGEND

XXXXX XXXX-XX — ALIGNMENT NAME
EXISTING ROW
ALIGNMENT
TRAFFIC DIRECTION

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 1 THRU 2 FOR CURVE DATA



0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE ROADWAY

HORIZONTAL ALIGNMENT DATA

STA 23+00.00 TO STA 36+18.83

SHEET 4 OF 5

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		78

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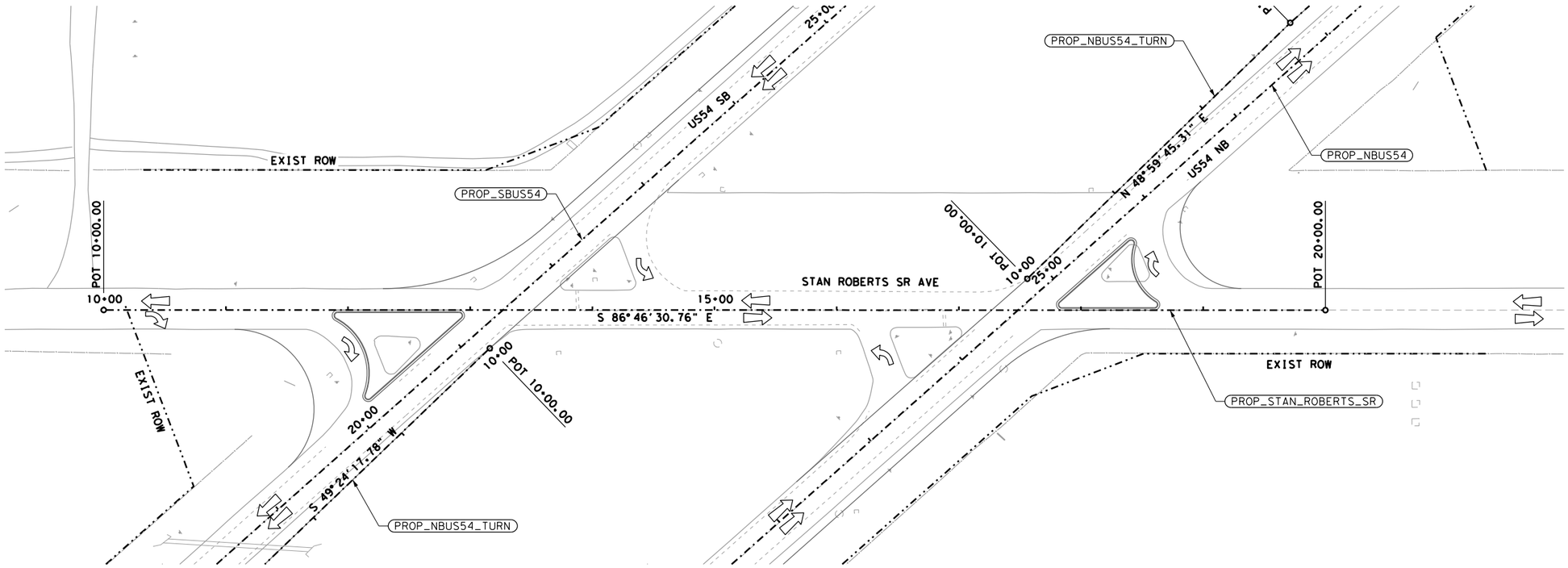

LEGEND

- XXXXX XXXX-XX — ALIGNMENT NAME
- EXISTING ROW
- ALIGNMENT
- TRAFFIC DIRECTION

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS 1 THRU 2 FOR CURVE DATA

0 25 50 100

SCALE: 1"=100'

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER

5/31/2022

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE
ROADWAY

HORIZONTAL ALIGNMENT DATA

STA 10+00.00 TO STA 20+75.20

SHEET 5 OF 5

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		79

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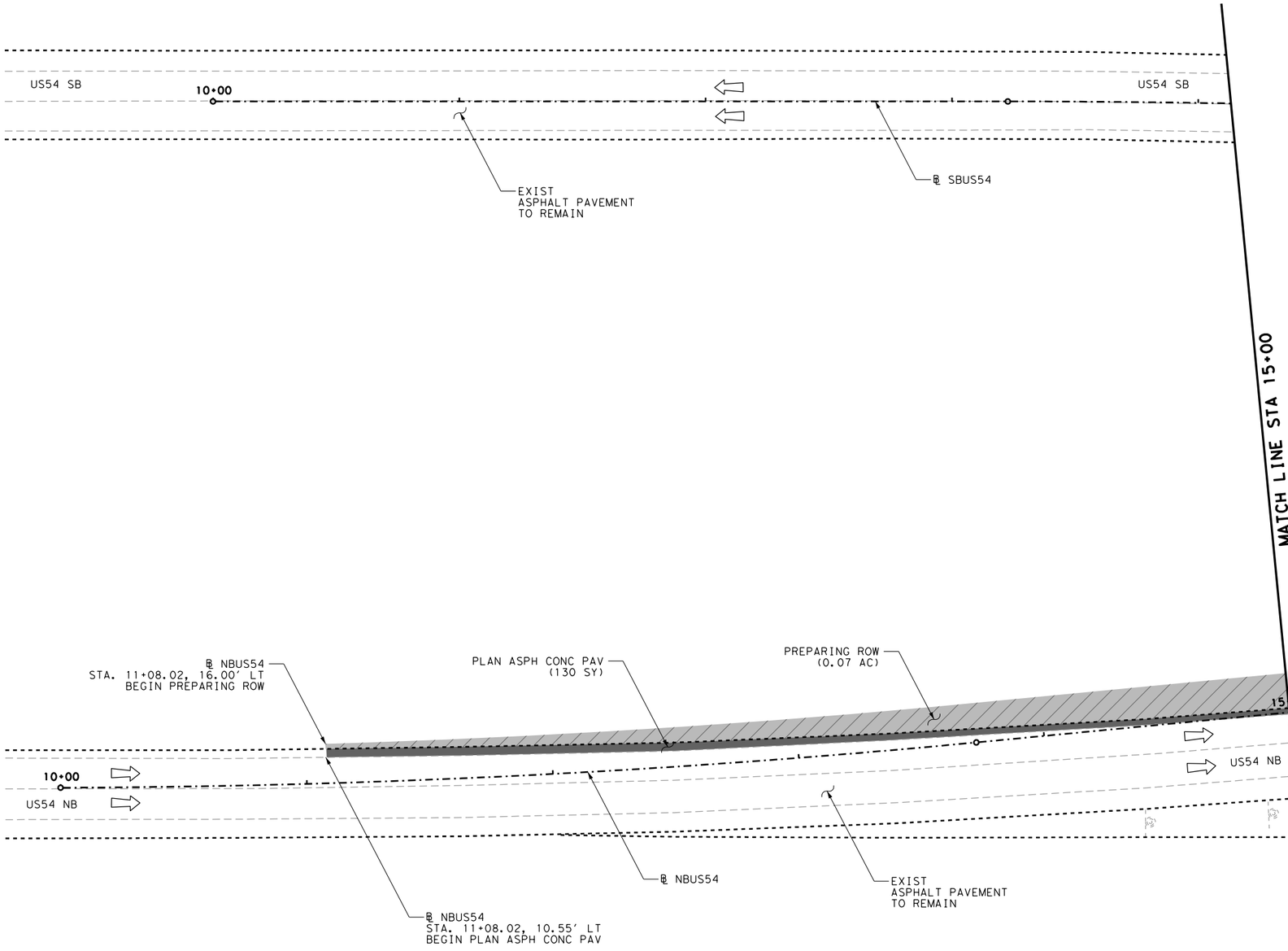

LEGEND

- PREPARING ROW
- REMOVE STAB BASE AND ASPH PAV
- PLAN ASPH CONC PAV
- EXISTING DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. COORDINATE DEMOLITION WORK WITH TRAFFIC CONTROL PLAN.
2. REFER TO "SIGNING AND PAVEMENT MARKING LAYOUT" SHEETS FOR REMOVAL OF EXISTING SIGNS.

ROADWAY REMOVAL QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
0100 6001	PREPARING ROW	AC	0.07
0354 6048	PLANE ASPH CONC PAV (3")	SY	130

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

REMOVAL LAYOUT

SHEET 1 OF 9

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		80

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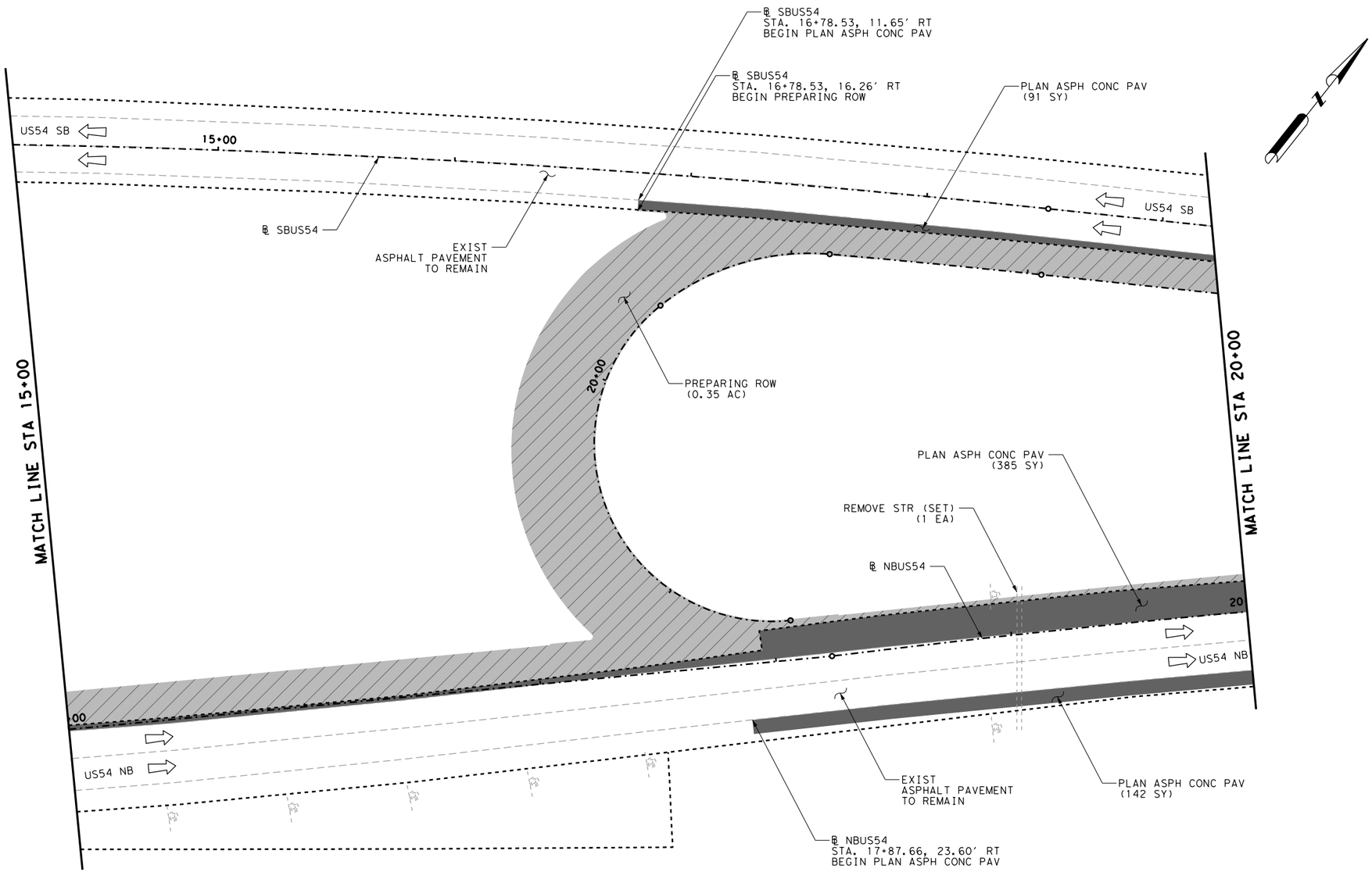

LEGEND

- PREPARING ROW
- REMOVE STAB BASE AND ASPH PAV
- PLAN ASPH CONC PAV
- EXISTING DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. COORDINATE DEMOLITION WORK WITH TRAFFIC CONTROL PLAN.
2. REFER TO "SIGNING AND PAVEMENT MARKING LAYOUT" SHEETS FOR REMOVAL OF EXISTING SIGNS.

ROADWAY REMOVAL QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
0100 6001	PREPARING ROW	AC	0.35
0354 6048	PLANE ASPH CONC PAV (3")	SY	618
0496 6004	REMOV STR (SET)	EA	1

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

REMOVAL LAYOUT

SHEET 2 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		81

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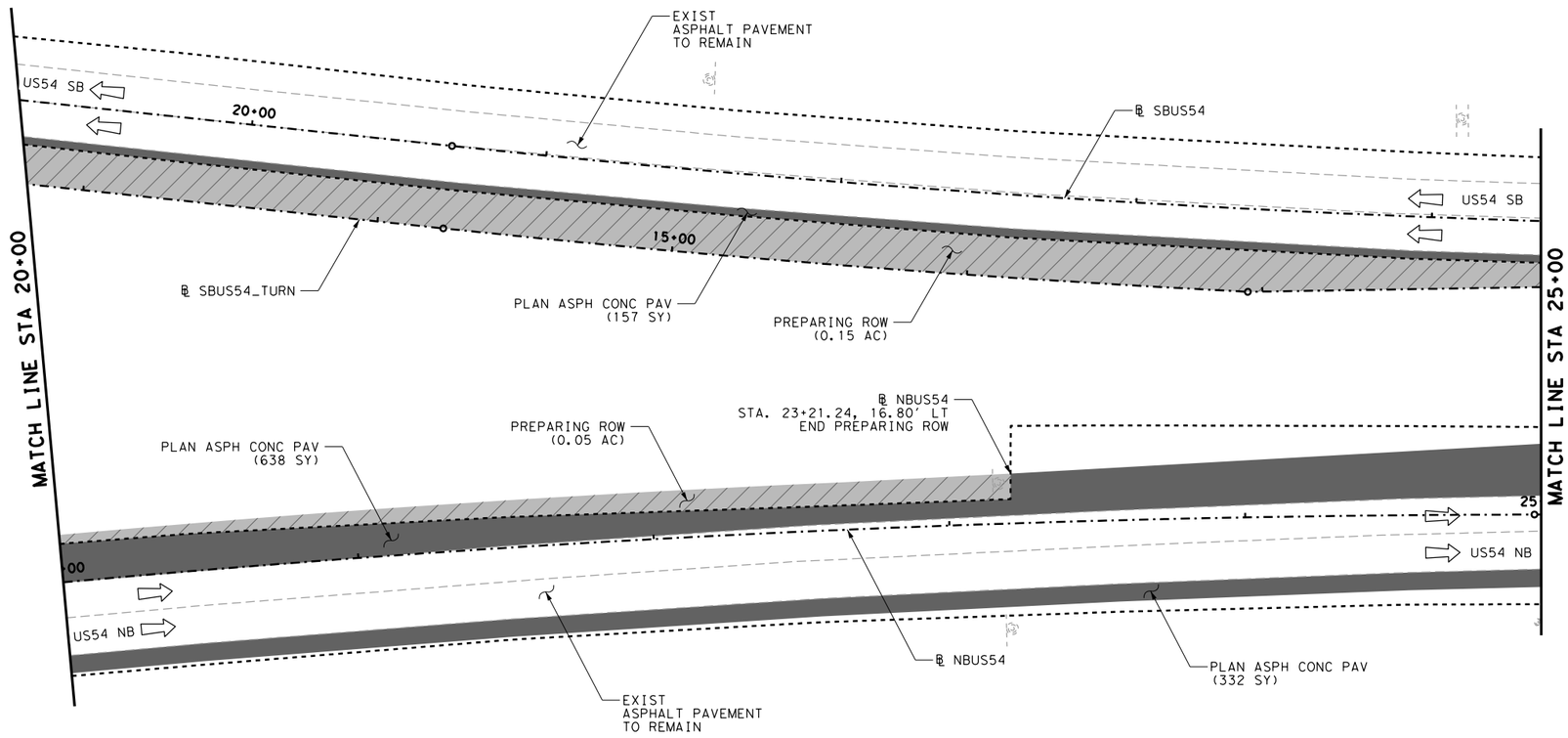

LEGEND

- PREPARING ROW
- REMOVE STAB BASE AND ASPH PAV
- PLAN ASPH CONC PAV
- EXISTING DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. COORDINATE DEMOLITION WORK WITH TRAFFIC CONTROL PLAN.
2. REFER TO "SIGNING AND PAVEMENT MARKING LAYOUT" SHEETS FOR REMOVAL OF EXISTING SIGNS.

ROADWAY REMOVAL QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
0100 6001	PREPARING ROW	AC	0.20
0354 6048	PLANE ASPH CONC PAV (3")	SY	1127

STATE OF TEXAS
CRUZ ALVAREZ
134425
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5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

REMOVAL LAYOUT

SHEET 3 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		82

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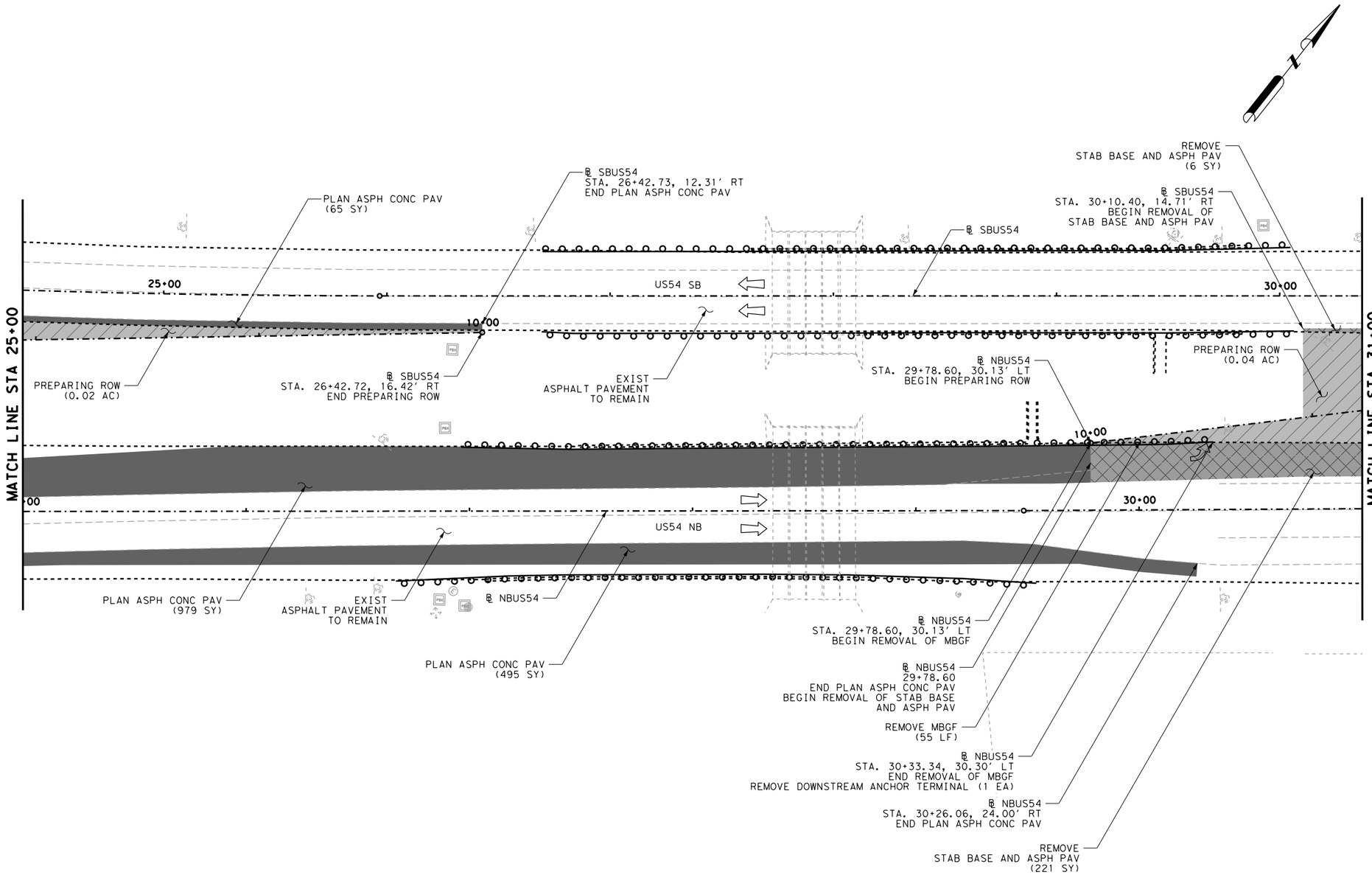
LEGEND

- PREPARING ROW
- REMOVE STAB BASE AND ASPH PAV
- PLAN ASPH CONC PAV
- EXISTING DIRECTION OF TRAFFIC

0 25 50
SCALE: 1"=50'



NOTES:

1. COORDINATE DEMOLITION WORK WITH TRAFFIC CONTROL PLAN.
2. REFER TO "SIGNING AND PAVEMENT MARKING LAYOUT" SHEETS FOR REMOVAL OF EXISTING SIGNS.

ROADWAY REMOVAL QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100 6001	PREPARING ROW	AC	0.06
0105 6093	REMOVE STAB BASE AND ASPH PAV (2"-3")	SY	227
0354 6048	PLANE ASPH CONC PAV (3")	SY	1539
0542 6001	REMOVE METAL BEAM GUARD FENCE	LF	55
0542 6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA	1

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

REMOVAL LAYOUT

SHEET 4 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		83

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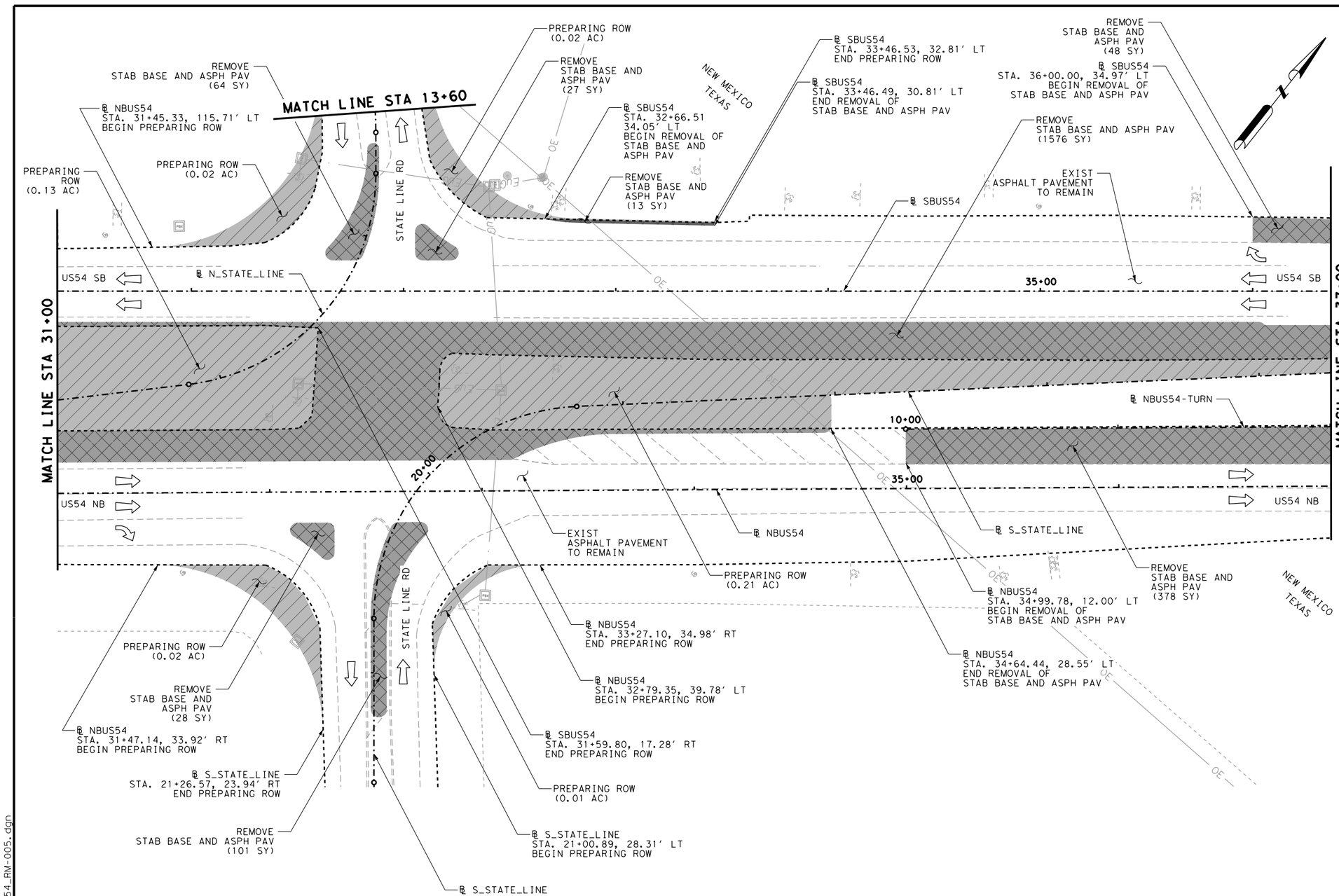

LEGEND

- PREPARING ROW
- REMOVE STAB BASE AND ASPH PAV
- PLAN ASPH CONC PAV
- EXISTING DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. COORDINATE DEMOLITION WORK WITH TRAFFIC CONTROL PLAN.
2. REFER TO "SIGNING AND PAVEMENT MARKING LAYOUT" SHEETS FOR REMOVAL OF EXISTING SIGNS.

ROADWAY REMOVAL QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100 6001	PREPARING ROW	AC	0.41
0105 6093	REMOVE STAB BASE AND ASPH PAV (2"-3")	SY	2235

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED PROFESSIONAL ENGINEER
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CSJ: 0167-01-126
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ROADWAY

REMOVAL LAYOUT

SHEET 5 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		84

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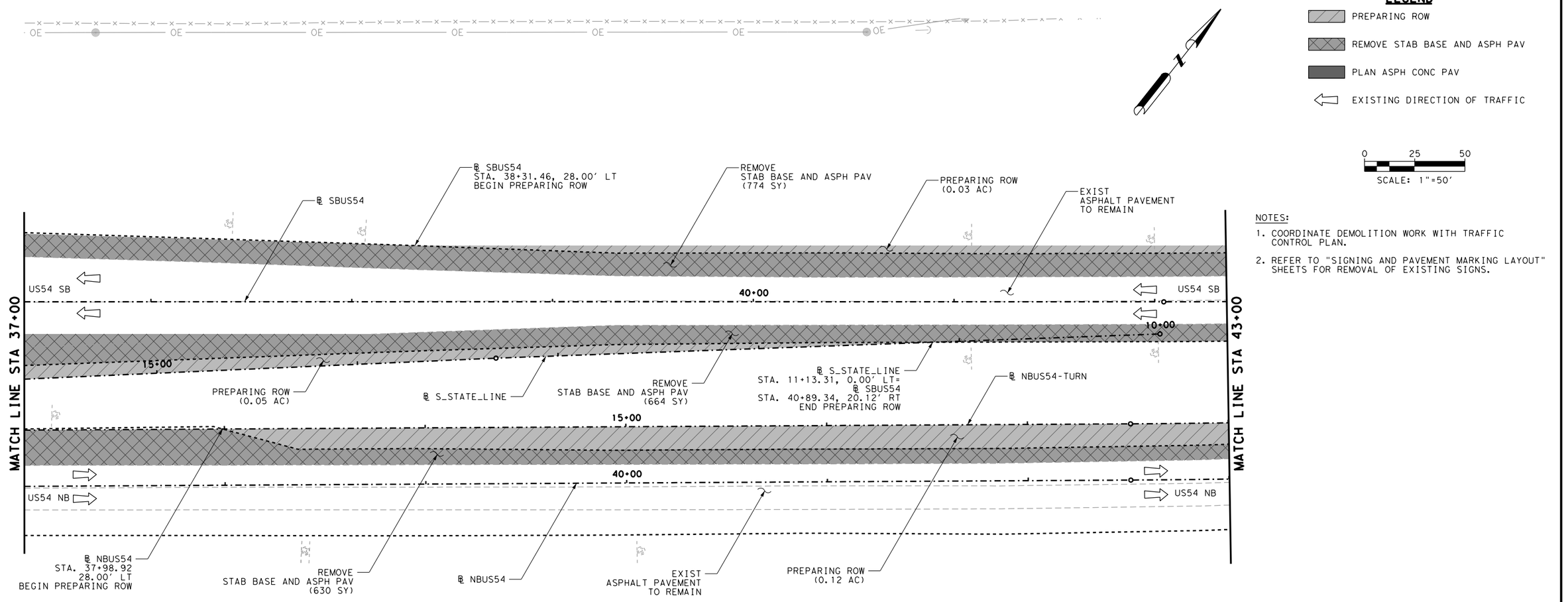

NOTES:

1. COORDINATE DEMOLITION WORK WITH TRAFFIC CONTROL PLAN.
2. REFER TO "SIGNING AND PAVEMENT MARKING LAYOUT" SHEETS FOR REMOVAL OF EXISTING SIGNS.

ROADWAY REMOVAL QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100 6001	PREPARING ROW	AC	0.20
0105 6093	REMOVE STAB BASE AND ASPH PAV (2"-3")	SY	2068

STATE OF TEXAS
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CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

REMOVAL LAYOUT

SHEET 6 OF 9

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		85

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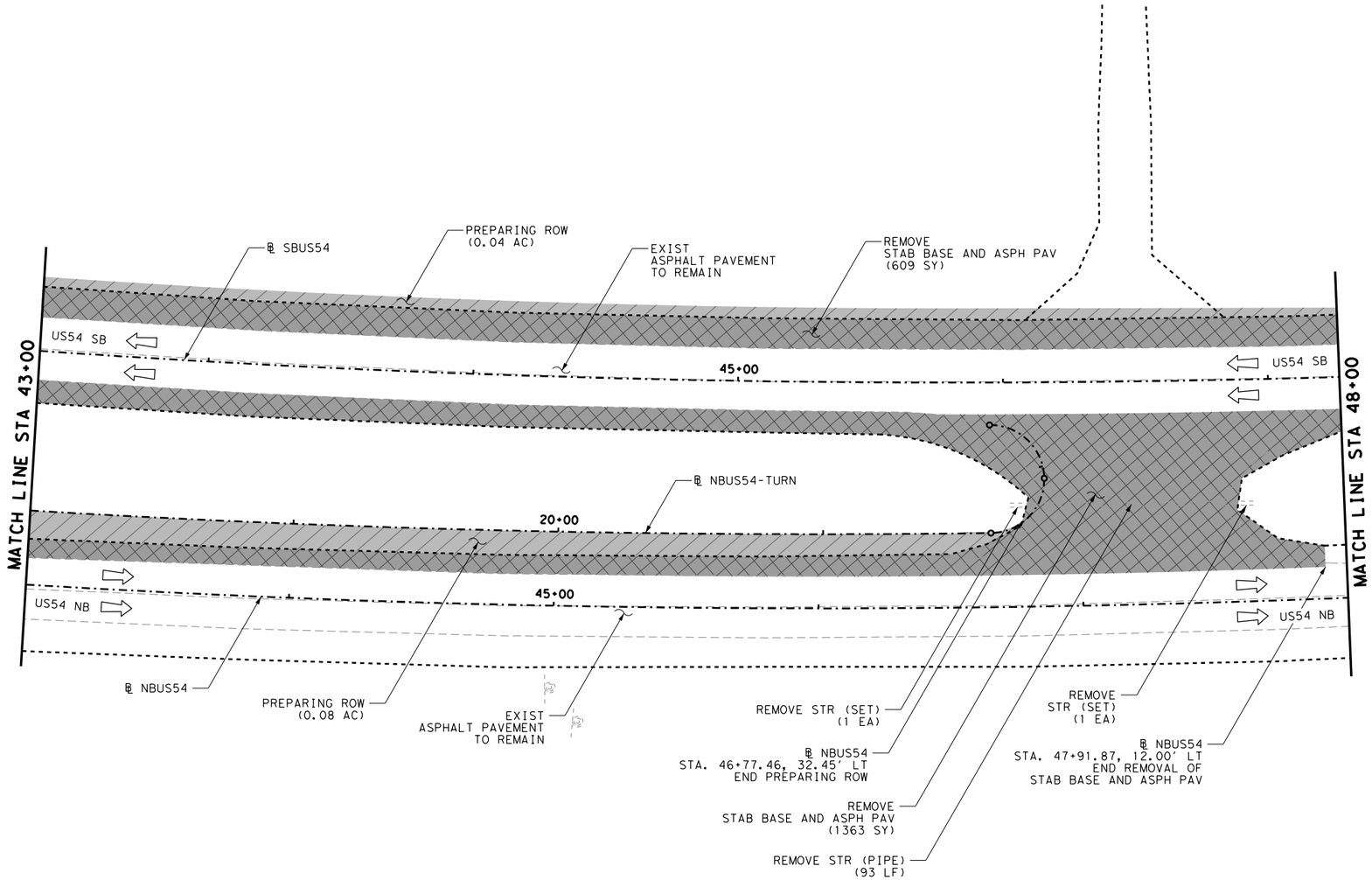

LEGEND

- PREPARING ROW
- REMOVE STAB BASE AND ASPH PAV
- PLAN ASPH CONC PAV
- EXISTING DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. COORDINATE DEMOLITION WORK WITH TRAFFIC CONTROL PLAN.
2. REFER TO "SIGNING AND PAVEMENT MARKING LAYOUT" SHEETS FOR REMOVAL OF EXISTING SIGNS.

ROADWAY REMOVAL QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100 6001	PREPARING ROW	AC	0.12
0105 6093	REMOVE STAB BASE AND ASPH PAV (2"-3")	SY	1972
0496 6004	REMOV STR (SET)	EA	2
0496 6007	REMOV STR (PIPE)	LF	93

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

REMOVAL LAYOUT

SHEET 7 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		86

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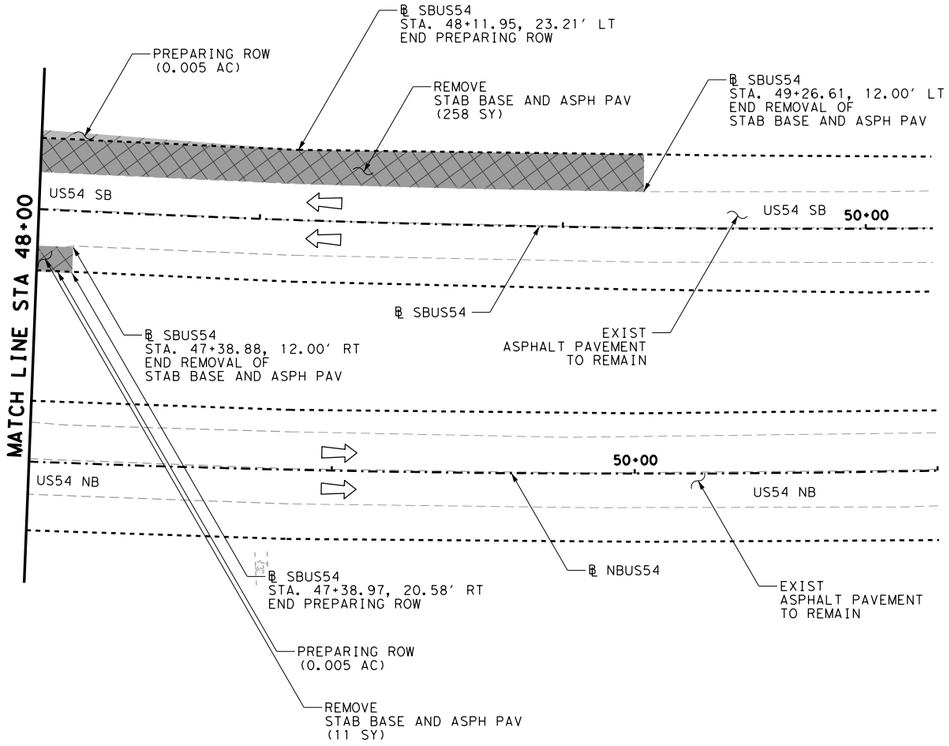

LEGEND

- PREPARING ROW
- REMOVE STAB BASE AND ASPH PAV
- PLAN ASPH CONC PAV
- EXISTING DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. COORDINATE DEMOLITION WORK WITH TRAFFIC CONTROL PLAN.
2. REFER TO "SIGNING AND PAVEMENT MARKING LAYOUT" SHEETS FOR REMOVAL OF EXISTING SIGNS.

ROADWAY REMOVAL QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100 6001	PREPARING ROW	AC	0.01
0105 6093	REMOVE STAB BASE AND ASPH PAV (2"-3")	SY	269

STATE OF TEXAS
CRUZ ALVAREZ
134425
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US54 STATE LINE RD

ROADWAY

REMOVAL LAYOUT

SHEET 8 OF 9

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		87

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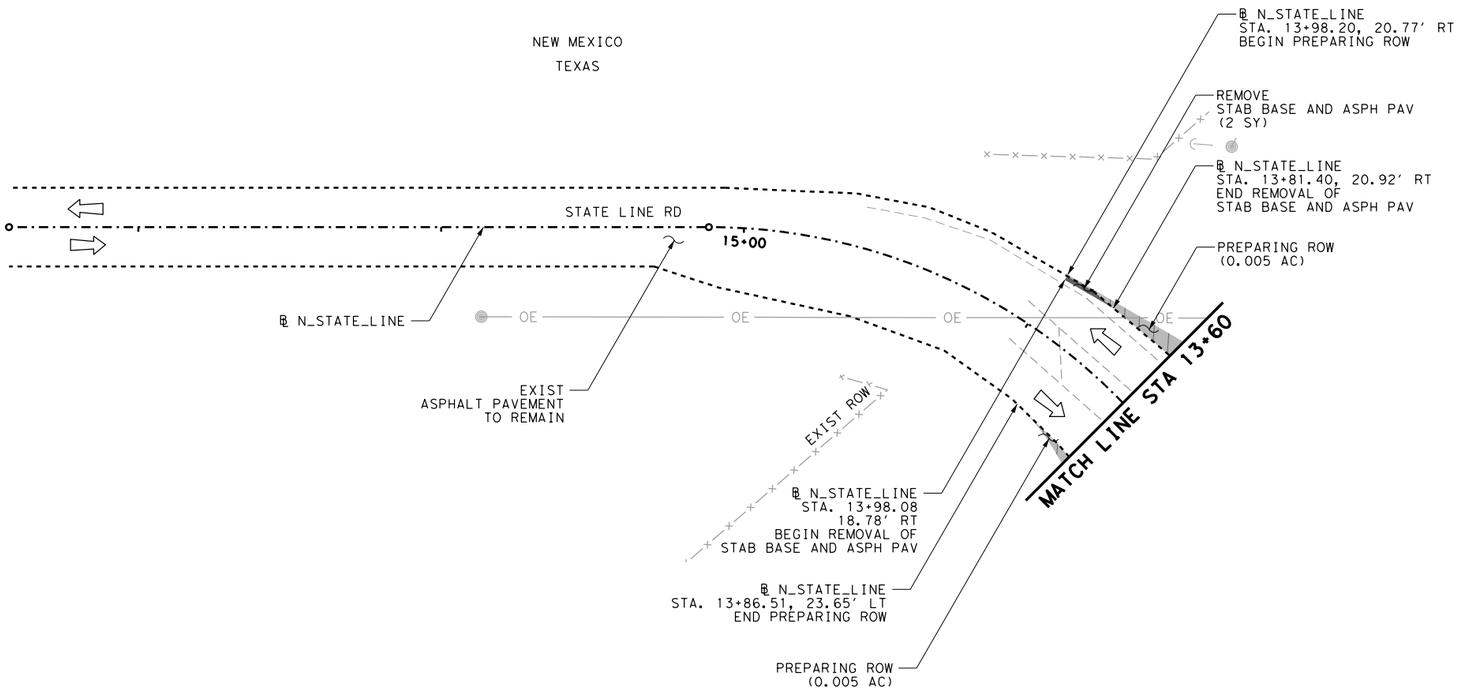

LEGEND

- PREPARING ROW
- REMOVE STAB BASE AND ASPH PAV
- PLAN ASPH CONC PAV
- EXISTING DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. COORDINATE DEMOLITION WORK WITH TRAFFIC CONTROL PLAN.
2. REFER TO "SIGNING AND PAVEMENT MARKING LAYOUT" SHEETS FOR REMOVAL OF EXISTING SIGNS.

ROADWAY REMOVAL QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100 6001	PREPARING ROW	AC	0.01
0105 6093	REMOVE STAB BASE AND ASPH PAV (2"-3")	SY	18

STATE OF TEXAS
CRUZ ALVAREZ
134425
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CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

REMOVAL LAYOUT

SHEET 9 OF 9

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		88

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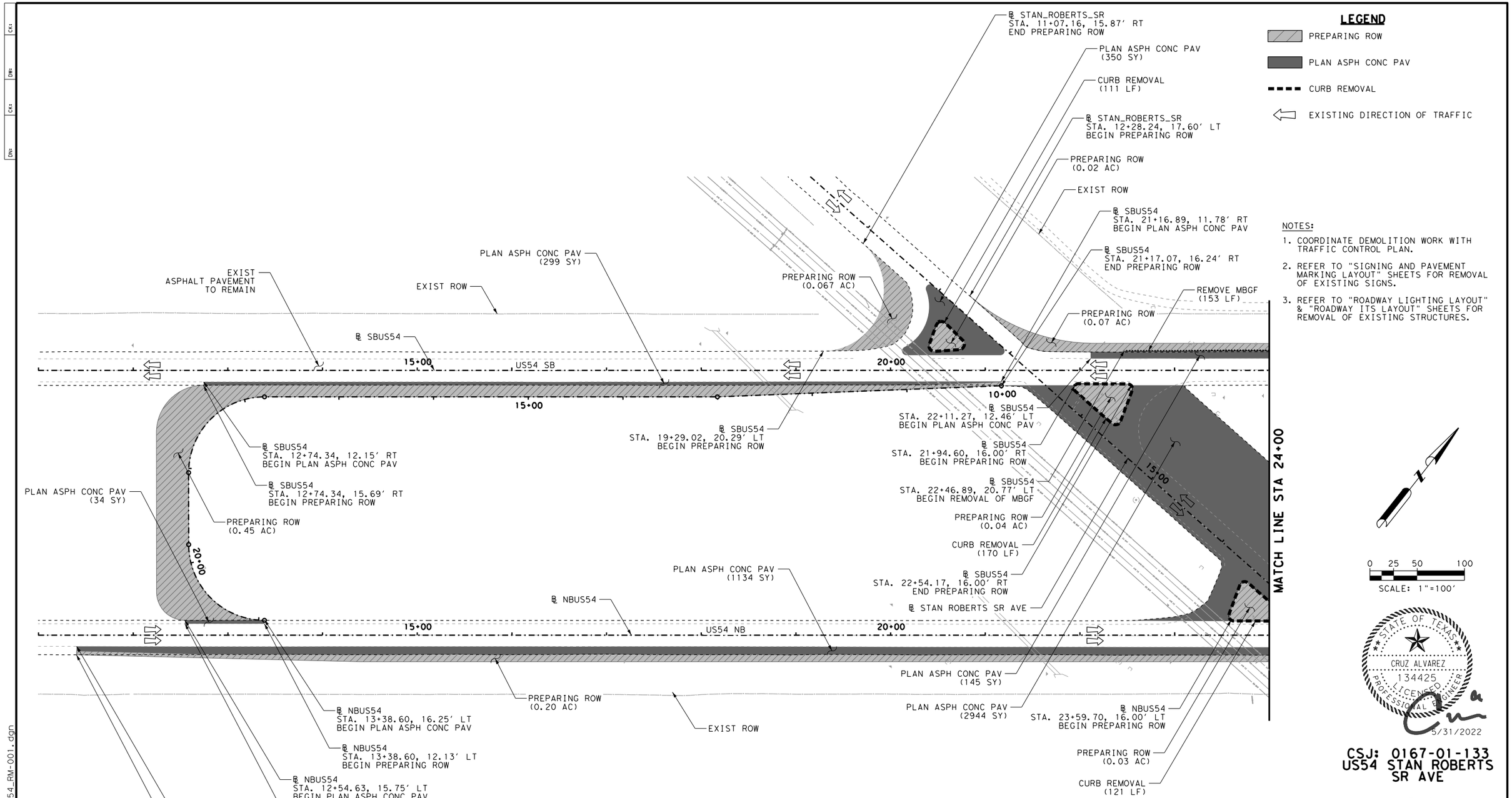

LEGEND

- PREPARING ROW
- PLAN ASPH CONC PAV
- CURB REMOVAL
- EXISTING DIRECTION OF TRAFFIC

NOTES:

1. COORDINATE DEMOLITION WORK WITH TRAFFIC CONTROL PLAN.
2. REFER TO "SIGNING AND PAVEMENT MARKING LAYOUT" SHEETS FOR REMOVAL OF EXISTING SIGNS.
3. REFER TO "ROADWAY LIGHTING LAYOUT" & "ROADWAY ITS LAYOUT" SHEETS FOR REMOVAL OF EXISTING STRUCTURES.

0 25 50 100

SCALE: 1"=100'

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE

ROADWAY

REMOVAL LAYOUT

SHEET 1 OF 2

ROADWAY REMOVAL QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
0100 6001	PREPARING ROW	AC	0.88
0104 6021	REMOVING CONC (CURB)	LF	402
0354 6048	PLANE ASPH CONC PAV (3")	SY	4906
0542 6001	REMOVE METAL BEAM GUARD FENCE	LF	153

AECOM
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Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		89

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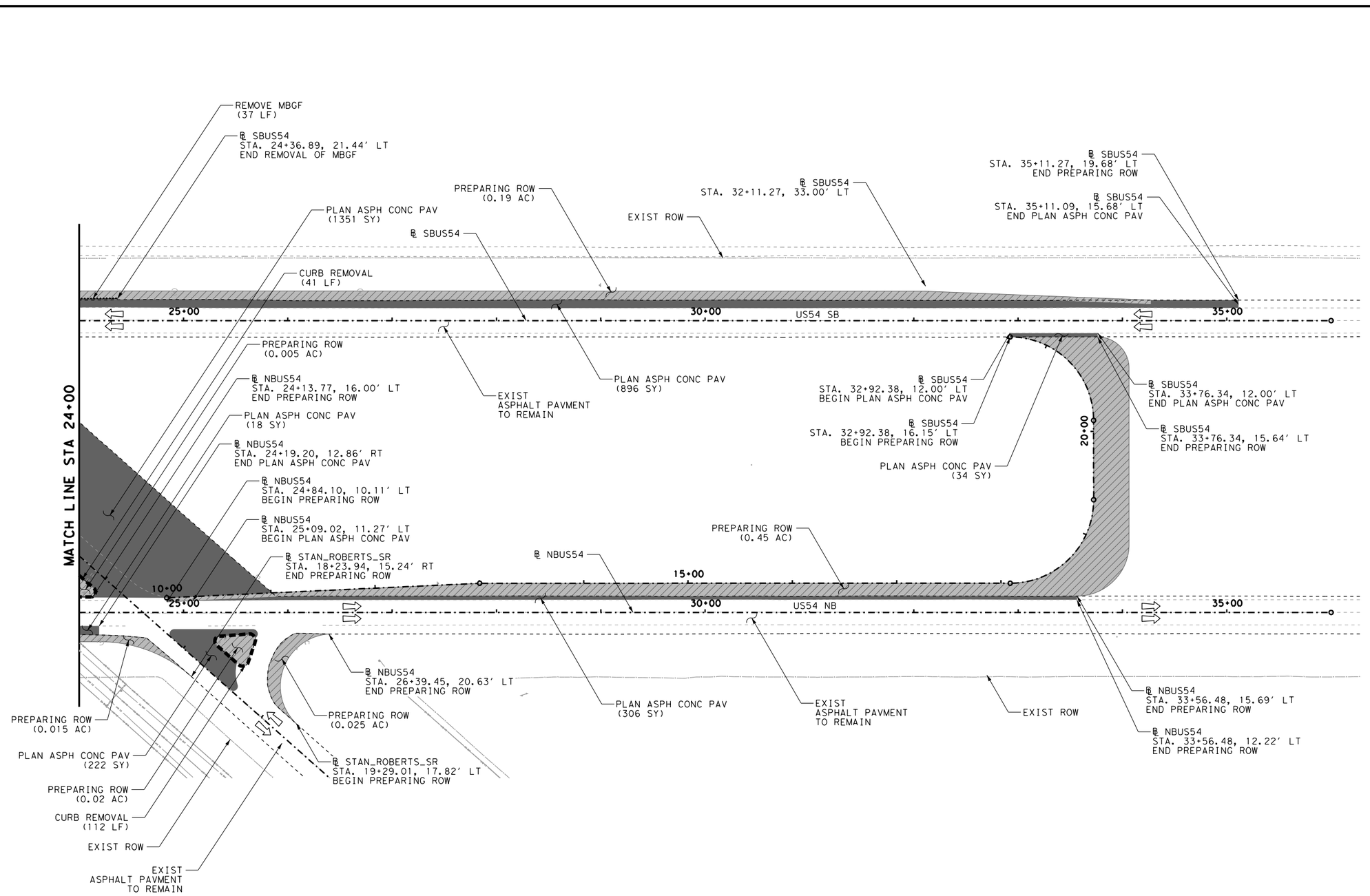

LEGEND

- PREPARING ROW
- PLAN ASPH CONC PAV
- CURB REMOVAL
- EXISTING DIRECTION OF TRAFFIC

NOTES:

1. COORDINATE DEMOLITION WORK WITH TRAFFIC CONTROL PLAN.
2. REFER TO "SIGNING AND PAVEMENT MARKING LAYOUT" SHEETS FOR REMOVAL OF EXISTING SIGNS.
3. REFER TO "ROADWAY LIGHTING LAYOUT" & "ROADWAY ITS LAYOUT" SHEETS FOR REMOVAL OF EXISTING STRUCTURES.

0 25 50 100

SCALE: 1"=100'

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE

ROADWAY

REMOVAL LAYOUT

SHEET 2 OF 2

ROADWAY REMOVAL QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
0100 6001	PREPARING ROW	AC	0.71
0104 6021	REMOVING CONC (CURB)	LF	153
0354 6048	PLANE ASPH CONC PAV (3")	SY	2809
0542 6001	REMOVE METAL BEAM GUARD FENCE	LF	37

AECOM
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EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		90

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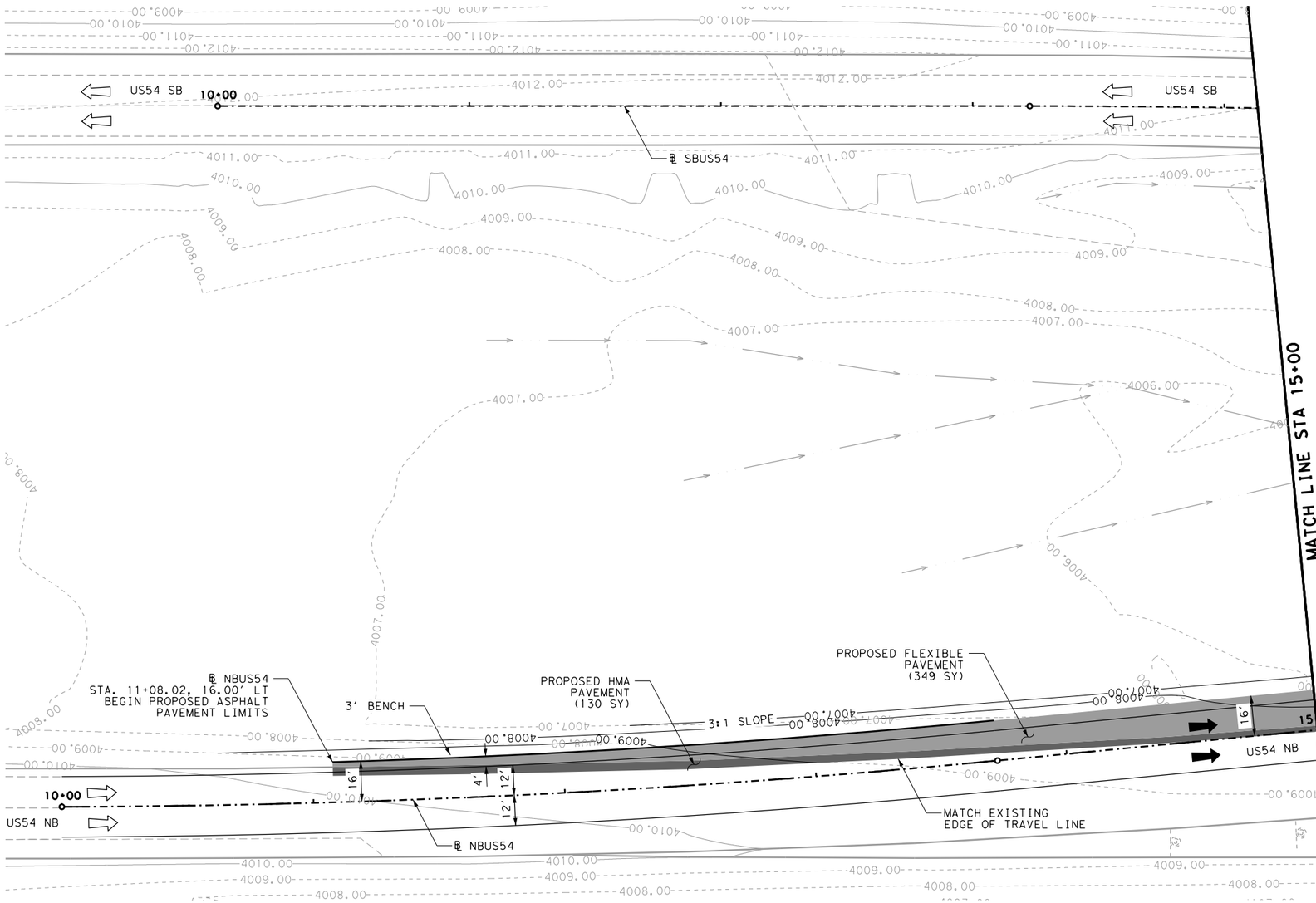

LEGEND

- PROPOSED HMA PAVEMENT
- PROPOSED FLEXIBLE PAVEMENT
- PROPOSED CONCRETE
- STONE RIP-RAP 6" COMMON
- LOOSE AGGREGATE
- 6" STANDARD CURB & GUTTER
- 6" STANDARD CURB
- EXISTING ROW
- EXISTING DITCH
- PROPOSED DITCH
- EXISTING DIRECTION OF TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. REFER TO "HORIZONTAL ALIGNMENT DATA" SHEETS FOR ALIGNMENT INFORMATION.
2. REFER TO "MEDIAN LAYOUT" SHEETS FOR MEDIAN GEOMETRY INFORMATION.
3. REFER TO "PROPOSED DRAINAGE AREA MAP & CALCULATIONS" SHEETS FOR INFORMATION ON HYDRAULIC ITEMS.
4. REFER TO "UTILITY LAYOUT" SHEETS FOR INFORMATION ON EXISTING UTILITIES.
5. ROADWAY DIMENSIONS MEASURED TO FACE OF CURB UNLESS OTHERWISE NOTED.

ROADWAY QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0110 6001	EXCAVATION (ROADWAY)	CY	10
0132 6002	EMBANKMENT (FINAL)(DENS CONT)(TY A)	CY	189
0150 6001	BLADING	STA	4
0247 6121	FL BS (RDWY DEL) (TY A GR 1-2)	TON	183
0310 6001	PRIME COAT (MULTI OPTION)	GAL	72
3077 6022	SP MIXES SP-C SAC-A PG70-22	TON	66
3077 6075	TACK COAT	GAL	72

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

ROADWAY PLAN LAYOUT

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		91

DATE: 5/31/2022 1:26:43 PM
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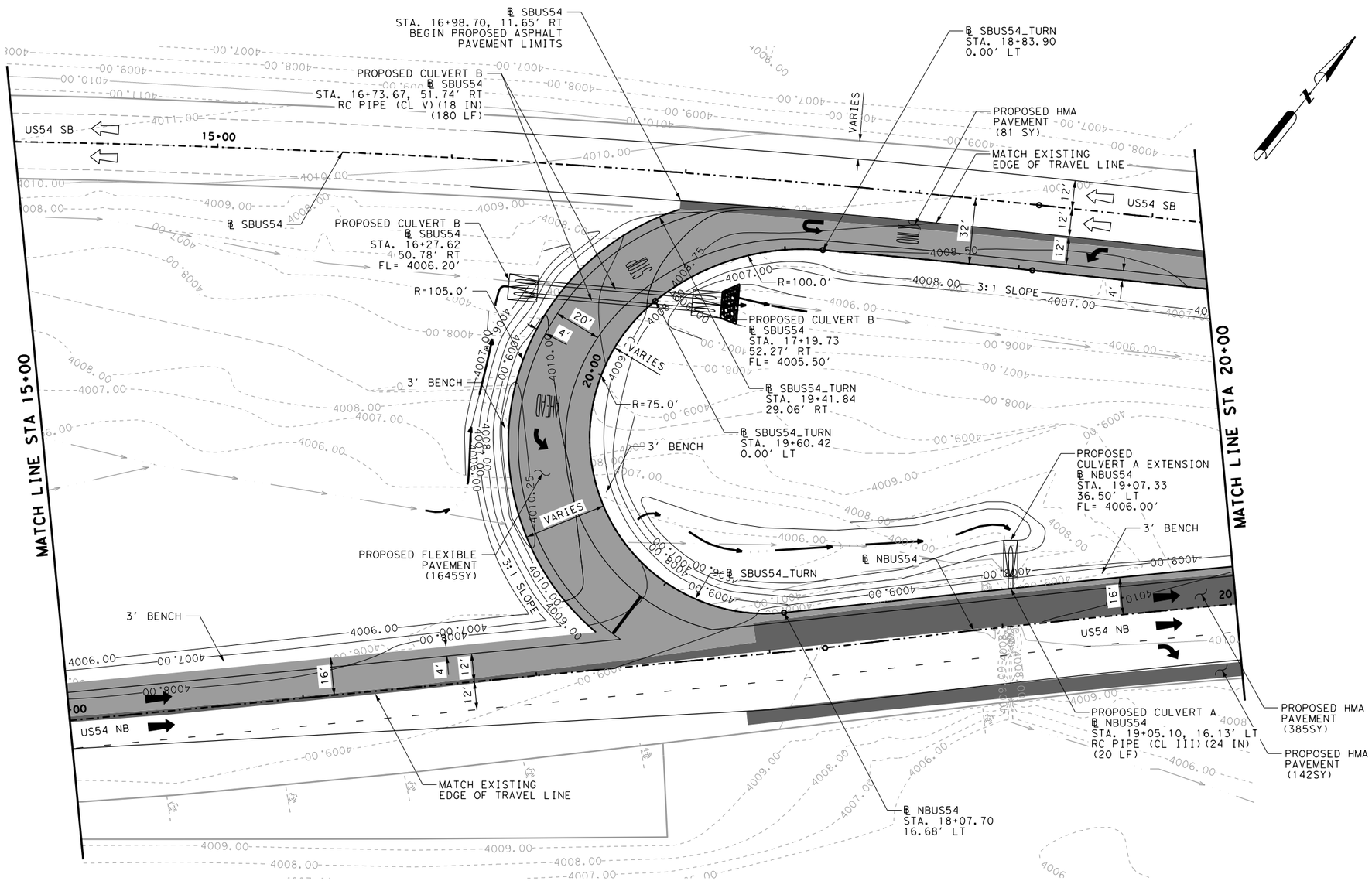

LEGEND

- PROPOSED HMA PAVEMENT
- PROPOSED FLEXIBLE PAVEMENT
- PROPOSED CONCRETE
- STONE RIP-RAP 6" COMMON
- LOOSE AGGREGATE
- 6" STANDARD CURB & GUTTER
- 6" STANDARD CURB
- EXISTING ROW
- EXISTING DITCH
- PROPOSED DITCH
- EXISTING DIRECTION OF TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. REFER TO "HORIZONTAL ALIGNMENT DATA" SHEETS FOR ALIGNMENT INFORMATION.
2. REFER TO "MEDIAN LAYOUT" SHEETS FOR MEDIAN GEOMETRY INFORMATION.
3. REFER TO "PROPOSED DRAINAGE AREA MAP & CALCULATIONS" SHEETS FOR INFORMATION ON HYDRAULIC ITEMS.
4. REFER TO "UTILITY LAYOUT" SHEETS FOR INFORMATION ON EXISTING UTILITIES.
5. ROADWAY DIMENSIONS MEASURED TO FACE OF CURB UNLESS OTHERWISE NOTED.

ROADWAY QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0110 6001	EXCAVATION (ROADWAY)	CY	2
0132 6002	EMBANKMENT (FINAL)(DENS CONT)(TY A)	CY	1351
0150 6001	BLADING	STA	5
0247 6121	FL BS (RDWY DEL) (TY A GR 1-2)	TON	864
0310 6001	PRIME COAT (MULTI OPTION)	GAL	338
0432 6022	RIPRAP (STONE COMMON)(DRY)(6 IN)	CY	5
0464 6005	RC PIPE (CL III)(24 IN)	LF	20
0464 6025	RC PIPE (CL V)(18 IN)	LF	180
0467 6356	SET (TY II) (18 IN) (RCP) (3:1) (C)	EA	4
0467 6388	SET (TY II) (24 IN) (RCP) (3:1) (C)	EA	1
3077 6022	SP MIXES SP-C SAC-A PG70-22	TON	310
3077 6075	TACK COAT	GAL	338

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

ROADWAY PLAN LAYOUT

SHEET 2 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		92

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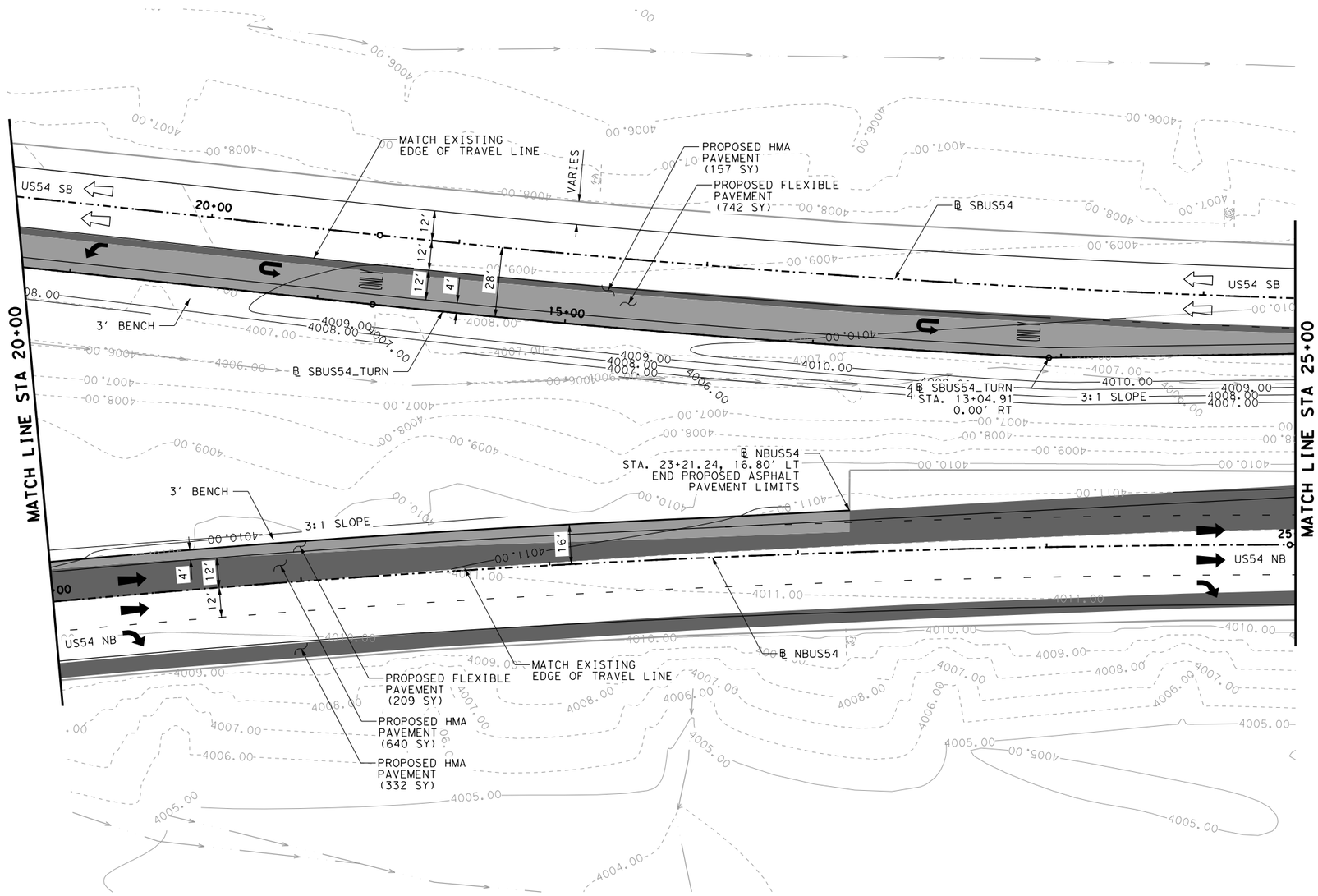

LEGEND

- PROPOSED HMA PAVEMENT
- PROPOSED FLEXIBLE PAVEMENT
- PROPOSED CONCRETE
- STONE RIP-RAP 6" COMMON
- LOOSE AGGREGATE
- 6" STANDARD CURB & GUTTER
- 6" STANDARD CURB
- EXISTING ROW
- EXISTING DITCH
- PROPOSED DITCH
- EXISTING DIRECTION OF TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. REFER TO "HORIZONTAL ALIGNMENT DATA" SHEETS FOR ALIGNMENT INFORMATION.
2. REFER TO "MEDIAN LAYOUT" SHEETS FOR MEDIAN GEOMETRY INFORMATION.
3. REFER TO "PROPOSED DRAINAGE AREA MAP & CALCULATIONS" SHEETS FOR INFORMATION ON HYDRAULIC ITEMS.
4. REFER TO "UTILITY LAYOUT" SHEETS FOR INFORMATION ON EXISTING UTILITIES.
5. ROADWAY DIMENSIONS MEASURED TO FACE OF CURB UNLESS OTHERWISE NOTED.

ROADWAY QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0110 6001	EXCAVATION (ROADWAY)	CY	11
0132 6002	EMBANKMENT (FINAL)(DENS CONT)(TY A)	CY	930
0150 6001	BLADING	STA	5
0247 6121	FL BS (RDWY DEL) (TY A GR 1-2)	TON	499
0310 6001	PRIME COAT (MULTI OPTION)	GAL	312
3077 6022	SP MIXES SP-C SAC-A PG70-22	TON	286
3077 6075	TACK COAT	GAL	312

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

ROADWAY PLAN LAYOUT

SHEET 3 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		93

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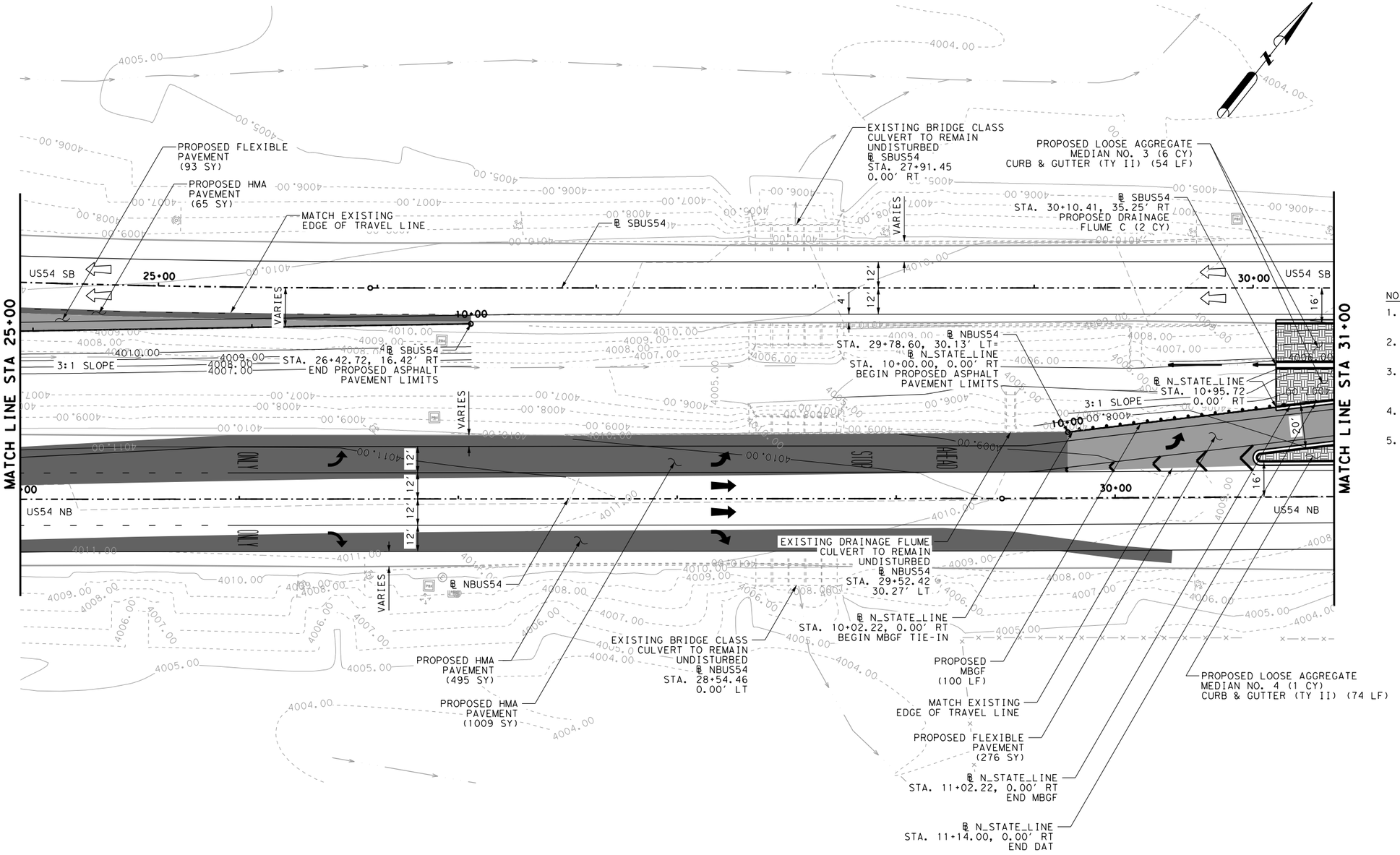

LEGEND

- PROPOSED HMA PAVEMENT
- PROPOSED FLEXIBLE PAVEMENT
- PROPOSED CONCRETE
- STONE RIP-RAP 6" COMMON
- LOOSE AGGREGATE
- 6" STANDARD CURB & GUTTER
- 6" STANDARD CURB
- EXISTING ROW
- EXISTING DITCH
- PROPOSED DITCH
- EXISTING DIRECTION OF TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. REFER TO "HORIZONTAL ALIGNMENT DATA" SHEETS FOR ALIGNMENT INFORMATION.
2. REFER TO "MEDIAN LAYOUT" SHEETS FOR MEDIAN GEOMETRY INFORMATION.
3. REFER TO "PROPOSED DRAINAGE AREA MAP & CALCULATIONS" SHEETS FOR INFORMATION ON HYDRAULIC ITEMS.
4. REFER TO "UTILITY LAYOUT" SHEETS FOR INFORMATION ON EXISTING UTILITIES.
5. ROADWAY DIMENSIONS MEASURED TO FACE OF CURB UNLESS OTHERWISE NOTED.

ROADWAY QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0110 6001	EXCAVATION (ROADWAY)	CY	2
0132 6002	EMBANKMENT (FINAL)(DENS CONT)(TY A)	CY	272
0150 6001	BLADING	STA	6
0247 6121	FL BS (RDWY DEL) (TY A GR 1-2)	TON	194
0310 6001	PRIME COAT (MULTI OPTION)	GAL	291
0432 6044	RIPRAP (CONC)(FLUME)	CY	2
0529 6002	CONC CURB (TY II)	LF	182
0540 6002	MTL W-BEAM GD FEN (STEEL POST)	LF	100
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	1
1005 6001	LOOSE AGGR FOR GROUNDCOVER (TYPE I)	CY	6
3077 6022	SP MIXES SP-C SAC-A PG70-22	TON	266
3077 6075	TACK COAT	GAL	291

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

ROADWAY PLAN LAYOUT

SHEET 4 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		94

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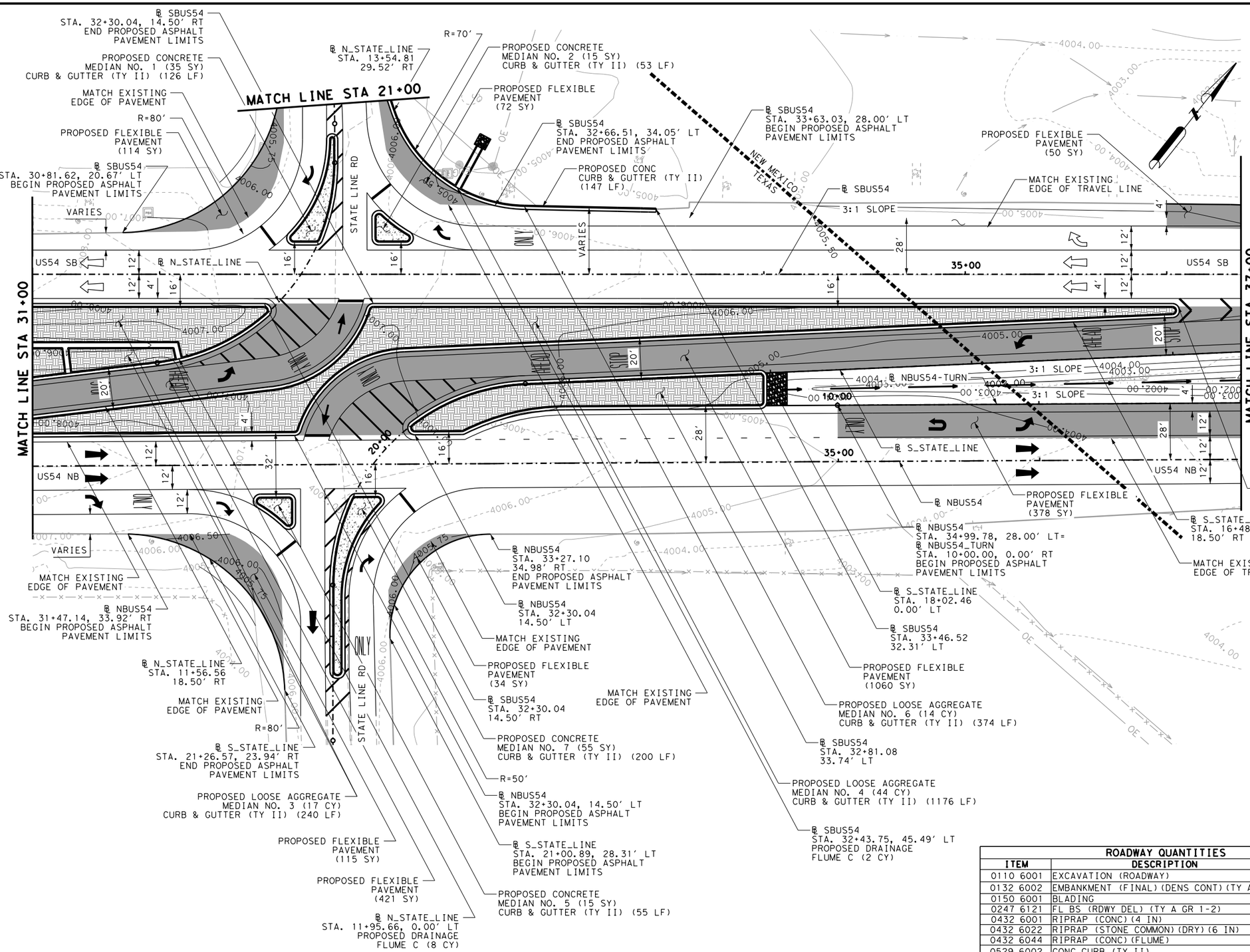

LEGEND

- PROPOSED HMA PAVEMENT
- PROPOSED FLEXIBLE PAVEMENT
- PROPOSED CONCRETE
- STONE RIP-RAP 6" COMMON
- LOOSE AGGREGATE
- 6" STANDARD CURB & GUTTER
- 6" STANDARD CURB
- EXISTING ROW
- EXISTING DITCH
- PROPOSED DITCH
- EXISTING DIRECTION OF TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. REFER TO "HORIZONTAL ALIGNMENT DATA" SHEETS FOR ALIGNMENT INFORMATION.
2. REFER TO "MEDIAN LAYOUT" SHEETS FOR MEDIAN GEOMETRY INFORMATION.
3. REFER TO "PROPOSED DRAINAGE AREA MAP & CALCULATIONS" SHEETS FOR INFORMATION ON HYDRAULIC ITEMS.
4. REFER TO "UTILITY LAYOUT" SHEETS FOR INFORMATION ON EXISTING UTILITIES.
5. ROADWAY DIMENSIONS MEASURED TO FACE OF CURB UNLESS OTHERWISE NOTED.

ROADWAY QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0110 6001	EXCAVATION (ROADWAY)	CY	178
0132 6002	EMBANKMENT (FINAL)(DENS CONT)(TY A)	CY	478
0150 6001	BLADING	STA	6
0247 6121	FL BS (RDWY DEL) (TY A GR 1-2)	TON	1178
0432 6001	RIPRAP (CONC)(4 IN)	CY	14
0432 6022	RIPRAP (STONE COMMON)(DRY)(6 IN)	CY	2.0
0432 6044	RIPRAP (CONC)(FLUME)	CY	10
0529 6002	CONC CURB (TY II)	LF	2526
1005 6001	LOOSE AGGR FOR GROUNDCOVER (TYPE I)	CY	17
3077 6022	SP MIXES SP-C SAC-A PG70-22	TON	309
3077 6075	TACK COAT	GAL	337

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

ROADWAY PLAN LAYOUT

SHEET 5 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		95

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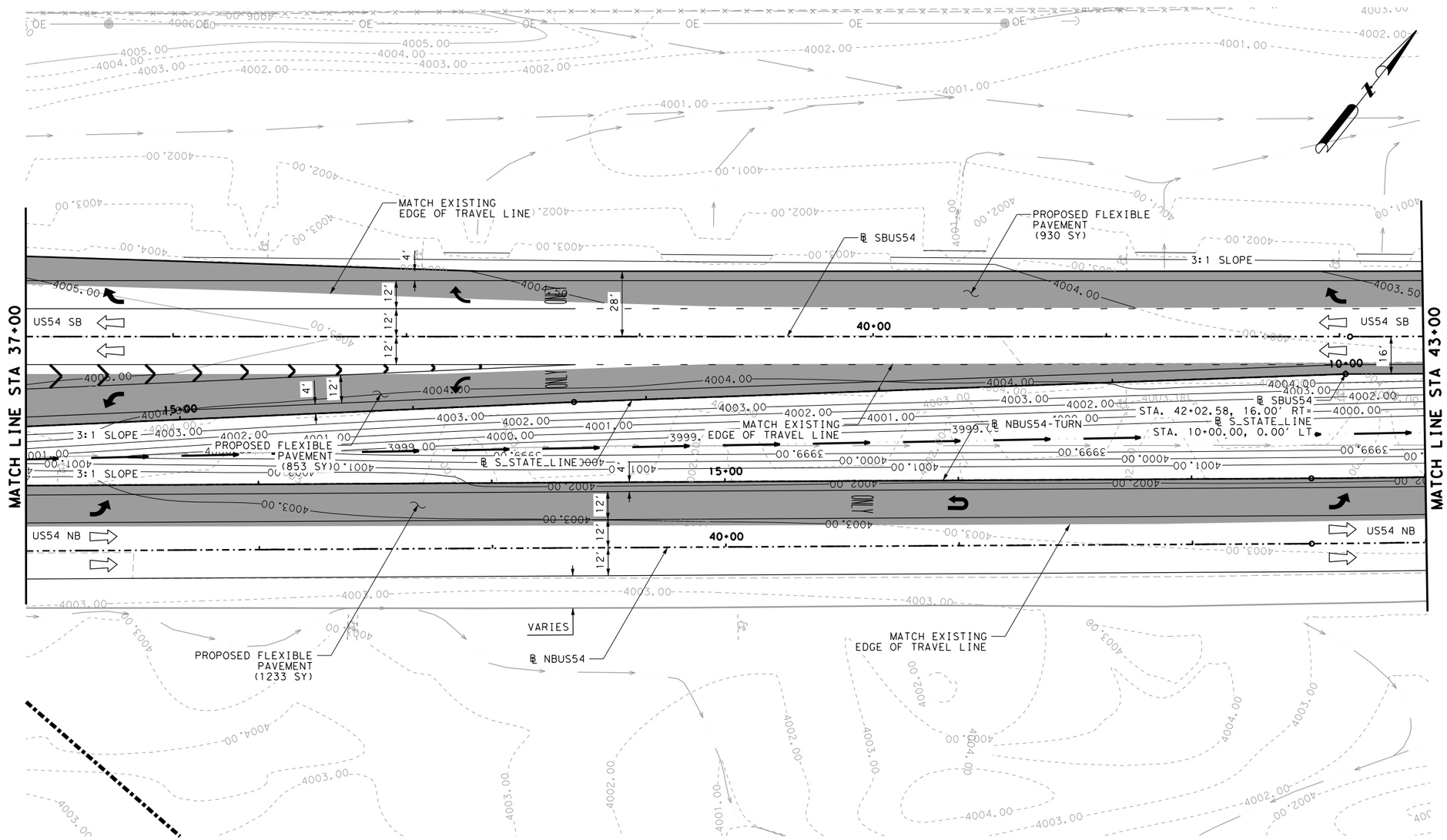

LEGEND

- PROPOSED HMA PAVEMENT
- PROPOSED FLEXIBLE PAVEMENT
- PROPOSED CONCRETE
- STONE RIP-RAP 6" COMMON
- LOOSE AGGREGATE
- 6" STANDARD CURB & GUTTER
- 6" STANDARD CURB
- EXISTING ROW
- EXISTING DITCH
- PROPOSED DITCH
- EXISTING DIRECTION OF TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. REFER TO "HORIZONTAL ALIGNMENT DATA" SHEETS FOR ALIGNMENT INFORMATION.
2. REFER TO "MEDIAN LAYOUT" SHEETS FOR MEDIAN GEOMETRY INFORMATION.
3. REFER TO "PROPOSED DRAINAGE AREA MAP & CALCULATIONS" SHEETS FOR INFORMATION ON HYDRAULIC ITEMS.
4. REFER TO "UTILITY LAYOUT" SHEETS FOR INFORMATION ON EXISTING UTILITIES.
5. ROADWAY DIMENSIONS MEASURED TO FACE OF CURB UNLESS OTHERWISE NOTED.

ROADWAY QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0110 6001	EXCAVATION (ROADWAY)	CY	1536
0132 6002	EMBANKMENT (FINAL) (DENS CONT) (TY A)	CY	359
0150 6001	BLADING	STA	6
0247 6121	FL BS (RDWY DEL) (TY A GR 1-2)	TON	1583
3077 6022	SP MIXES SP-C SAC-A PG70-22	TON	415
3077 6075	TACK COAT	GAL	452

STATE OF TEXAS
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134425
LICENSED PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

ROADWAY PLAN LAYOUT

SHEET 6 OF 9

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
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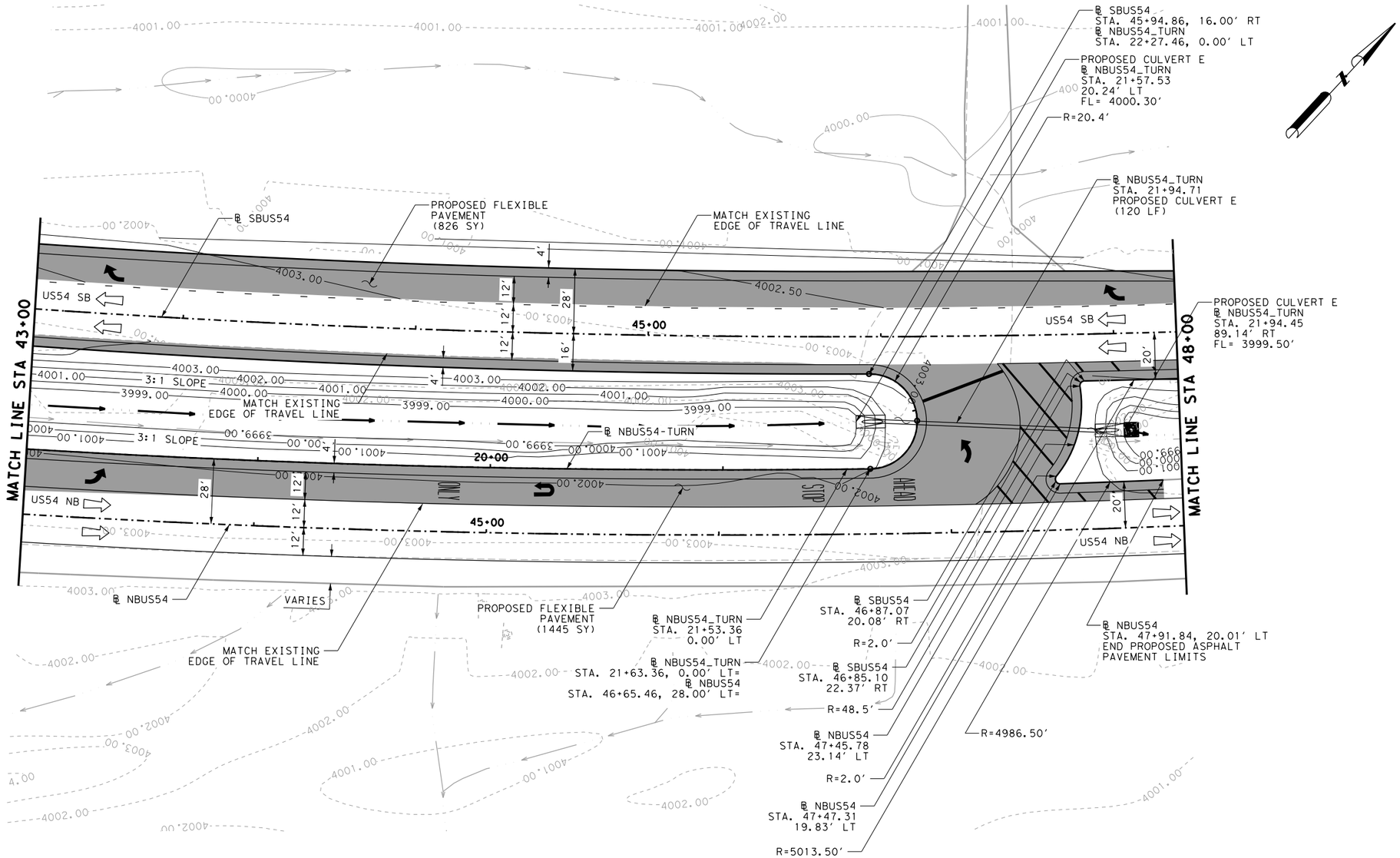

LEGEND

- PROPOSED HMA PAVEMENT
- PROPOSED FLEXIBLE PAVEMENT
- PROPOSED CONCRETE
- STONE RIP-RAP 6" COMMON
- LOOSE AGGREGATE
- 6" STANDARD CURB & GUTTER
- 6" STANDARD CURB
- EXISTING ROW
- EXISTING DITCH
- PROPOSED DITCH
- EXISTING DIRECTION OF TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. REFER TO "HORIZONTAL ALIGNMENT DATA" SHEETS FOR ALIGNMENT INFORMATION.
2. REFER TO "MEDIAN LAYOUT" SHEETS FOR MEDIAN GEOMETRY INFORMATION.
3. REFER TO "PROPOSED DRAINAGE AREA MAP & CALCULATIONS" SHEETS FOR INFORMATION ON HYDRAULIC ITEMS.
4. REFER TO "UTILITY LAYOUT" SHEETS FOR INFORMATION ON EXISTING UTILITIES.
5. ROADWAY DIMENSIONS MEASURED TO FACE OF CURB UNLESS OTHERWISE NOTED.

ROADWAY QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0110 6001	EXCAVATION (ROADWAY)	CY	1574
0132 6002	EMBANKMENT (FINAL)(DENS CONT)(TY A)	CY	395
0150 6001	BLADING	STA	5
0247 6121	FL BS (RDWY DEL) (TY A GR 1-2)	TON	1192
0432 6022	RIPRAP (STONE COMMON)(DRY)(6 IN)	CY	2.0
0464 6025	RC PIPE (CL V)(18 IN)	LF	120
0467 6357	SET (TY II) (18 IN) (RCP) (3:1) (P)	EA	2
3077 6022	SP MIXES SP-C SAC-A PG70-22	TON	312
3077 6075	TACK COAT	GAL	341

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

ROADWAY PLAN LAYOUT

SHEET 7 OF 9

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		97

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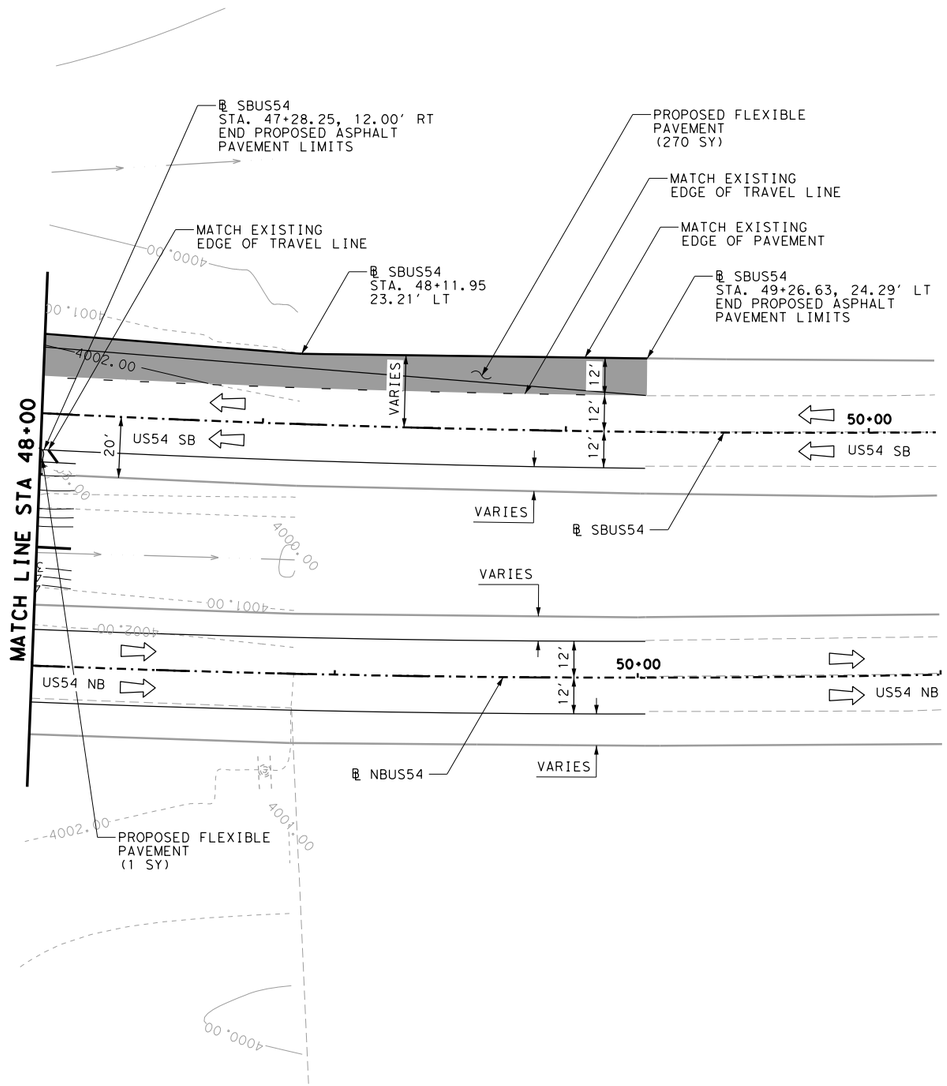

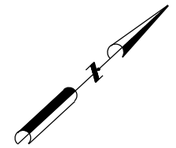

LEGEND

- PROPOSED HMA PAVEMENT
- PROPOSED FLEXIBLE PAVEMENT
- PROPOSED CONCRETE
- STONE RIP-RAP 6" COMMON
- LOOSE AGGREGATE
- 6" STANDARD CURB & GUTTER
- 6" STANDARD CURB
- EXISTING ROW
- EXISTING DITCH
- PROPOSED DITCH
- EXISTING DIRECTION OF TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. REFER TO "HORIZONTAL ALIGNMENT DATA" SHEETS FOR ALIGNMENT INFORMATION.
2. REFER TO "MEDIAN LAYOUT" SHEETS FOR MEDIAN GEOMETRY INFORMATION.
3. REFER TO "PROPOSED DRAINAGE AREA MAP & CALCULATIONS" SHEETS FOR INFORMATION ON HYDRAULIC ITEMS.
4. REFER TO "UTILITY LAYOUT" SHEETS FOR INFORMATION ON EXISTING UTILITIES.
5. ROADWAY DIMENSIONS MEASURED TO FACE OF CURB UNLESS OTHERWISE NOTED.

ROADWAY QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0110 6001	EXCAVATION (ROADWAY)	CY	36
0132 6002	EMBANKMENT (FINAL)(DENS CONT)(TY A)	CY	15
0150 6001	BLADING	STA	2
0247 6121	FL BS (RDWY DEL) (TY A GR 1-2)	TON	142
3077 6022	SP MIXES SP-C SAC-A PG70-22	TON	37
3077 6075	TACK COAT	GAL	41

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

ROADWAY PLAN LAYOUT

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		98

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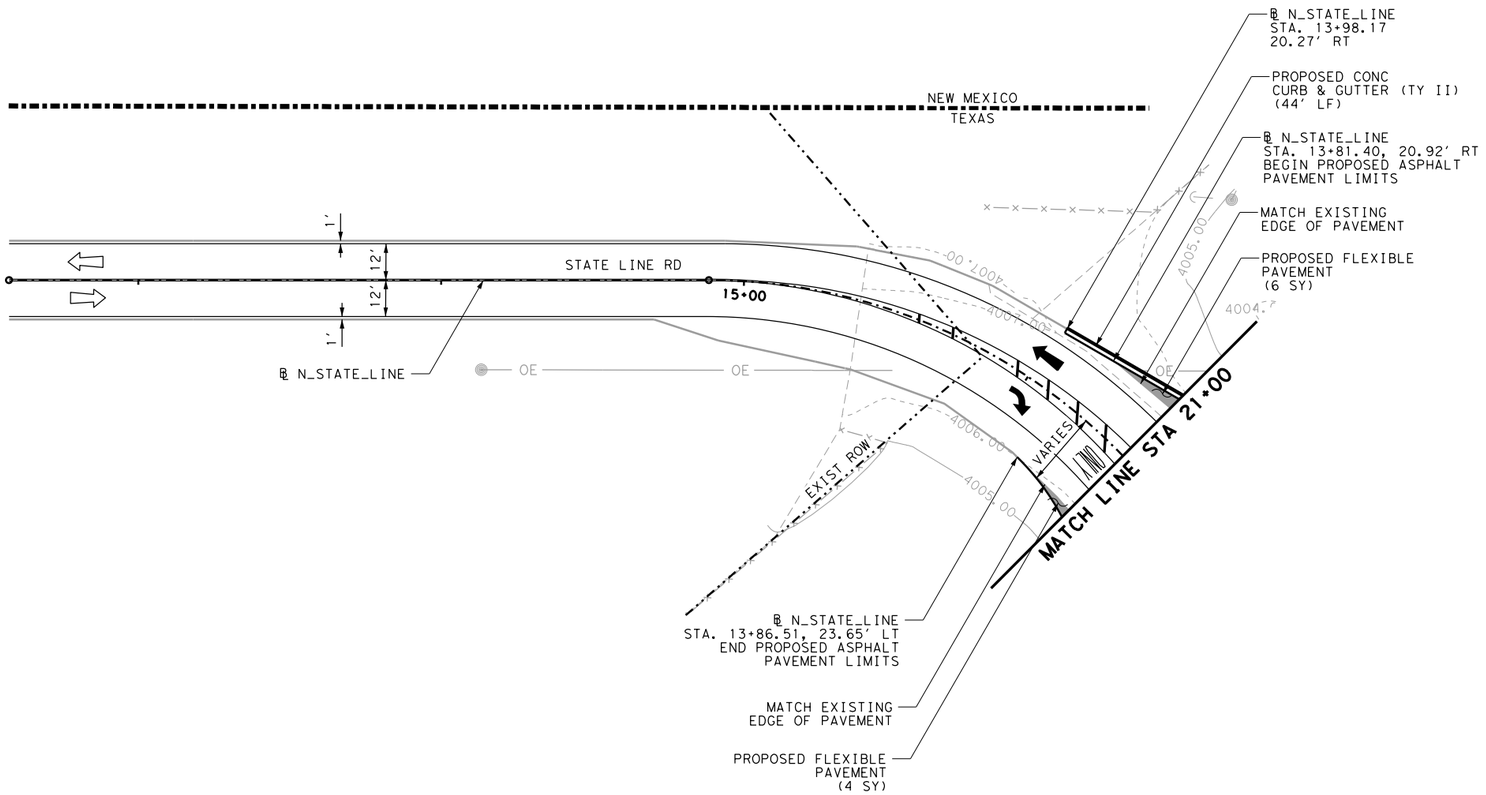

LEGEND

- PROPOSED HMA PAVEMENT
- PROPOSED FLEXIBLE PAVEMENT
- PROPOSED CONCRETE
- STONE RIP-RAP 6" COMMON
- LOOSE AGGREGATE
- 6" STANDARD CURB & GUTTER
- 6" STANDARD CURB
- EXISTING ROW
- EXISTING DITCH
- PROPOSED DITCH
- EXISTING DIRECTION OF TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

NOTES:

1. REFER TO "HORIZONTAL ALIGNMENT DATA" SHEETS FOR ALIGNMENT INFORMATION.
2. REFER TO "MEDIAN LAYOUT" SHEETS FOR MEDIAN GEOMETRY INFORMATION.
3. REFER TO "PROPOSED DRAINAGE AREA MAP & CALCULATIONS" SHEETS FOR INFORMATION ON HYDRAULIC ITEMS.
4. REFER TO "UTILITY LAYOUT" SHEETS FOR INFORMATION ON EXISTING UTILITIES.
5. ROADWAY DIMENSIONS MEASURED TO FACE OF CURB UNLESS OTHERWISE NOTED.

ROADWAY QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
0110 6001	EXCAVATION (ROADWAY)	CY	2
0132 6002	EMBANKMENT (FINAL)(DENS CONT)(TY A)	CY	10
0150 6001	BLADING	STA	2
0247 6121	FL BS (RDWY DEL) (TY A GR 1-2)	TON	5
0529 6002	CONC CURB (TY II)	LF	44
3077 6022	SP MIXES SP-C SAC-A PG70-22	TON	1
3077 6075	TACK COAT	GAL	2

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

ROADWAY PLAN LAYOUT

SHEET 9 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		99

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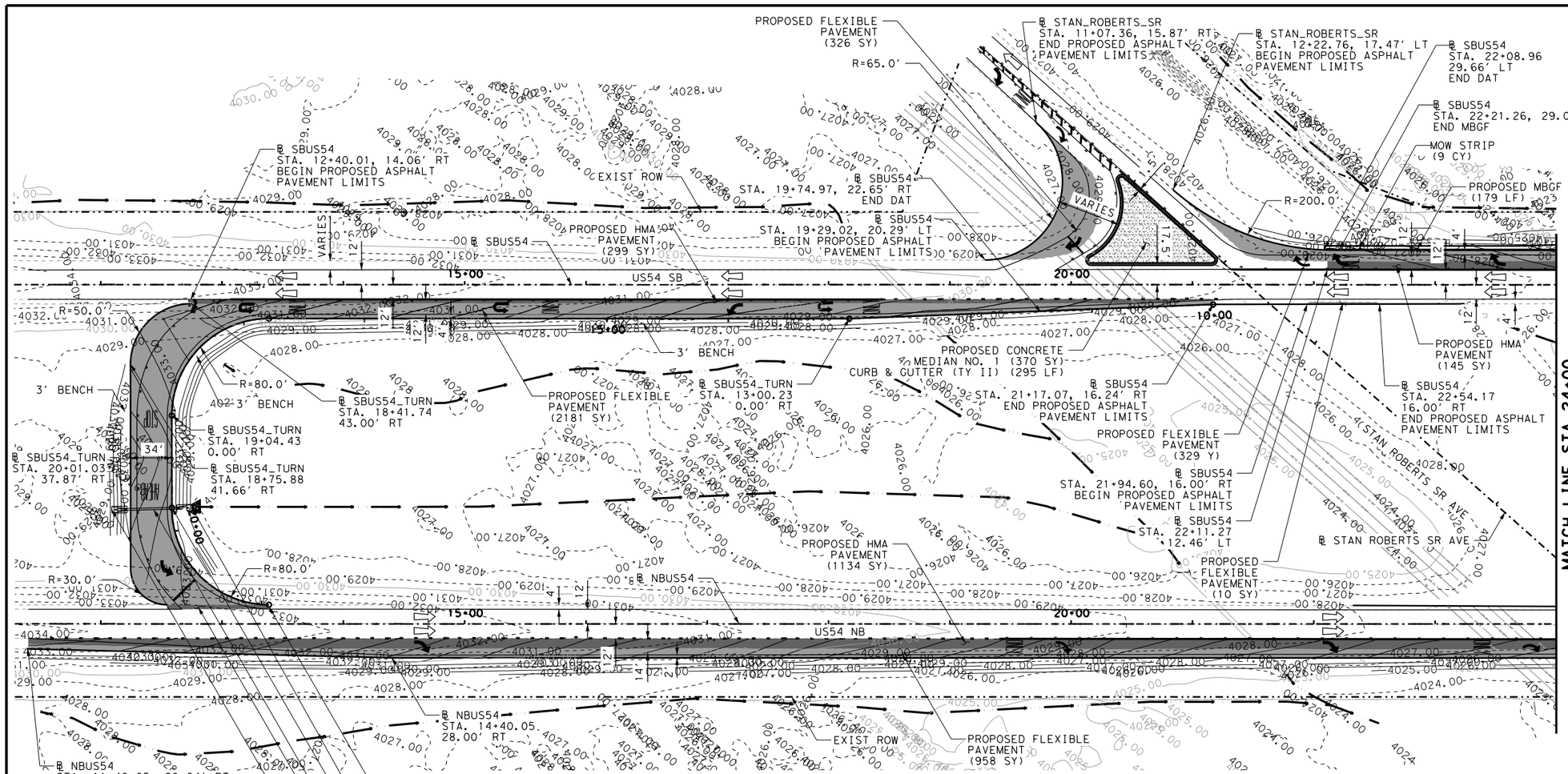

LEGEND

- PROPOSED HMA PAVEMENT
- PROPOSED FLEXIBLE PAVEMENT
- PROPOSED CONCRETE
- STONE RIP-RAP 6" COMMON
- 6" STANDARD CURB & GUTTER
- 6" STANDARD CURB
- EXISTING ROW
- EXISTING DITCH
- PROPOSED DITCH
- EXISTING DIRECTION OF TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC

NOTES:

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3. REFER TO "PROPOSED DRAINAGE AREA MAP & CALCULATIONS" SHEETS FOR INFORMATION ON HYDRAULIC ITEMS.
4. REFER TO "UTILITY LAYOUT" SHEETS FOR INFORMATION ON EXISTING UTILITIES.
5. ROADWAY DIMENSIONS MEASURED TO FACE OF CURB UNLESS OTHERWISE NOTED.
6. REFLECTIVE TAPE TO BE INSTALLED ON BOTH SIDES OF THE PROPOSED BARRIER GATE.

0 25 50 100

SCALE: 1"=100'

ROADWAY QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0110 6001	EXCAVATION (ROADWAY)	CY	327
0132 6002	EMBANKMENT (FINAL) (DENS CONT) (TY A)	CY	2645
0150 6001	BLADING	STA	13
0247 6121	FL BS (RDWY DEL) (TY A GR 1-2)	TON	1997
0310 6001	PRIME COAT (MULTI OPTION)	GAL	812
0432 6001	RIPRAP (CONC) (4 IN)	CY	41
0432 6022	RIPRAP (STONE COMMON) (DRY) (6 IN)	CY	4
0432 6044	RIPRAP (CONC) (FLUME)	CY	7
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	9
0464 6025	RC PIPE (CL V) (18 IN)	LF	67
0467 6356	SET (TY II) (18 IN) (RCP) (3: 1) (C)	EA	2
0529 6002	CONC CURB (TY II)	LF	295
0540 6002	MTL W-BEAM GD FEN (STEEL POST)	LF	179
0540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	1
3077 6022	SP MIXES SP-C SAC-A PG70-22	TON	745
3077 6075	TACK COAT	GAL	812

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE ROADWAY

ROADWAY PLAN LAYOUT

SHEET 1 OF 2

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		100

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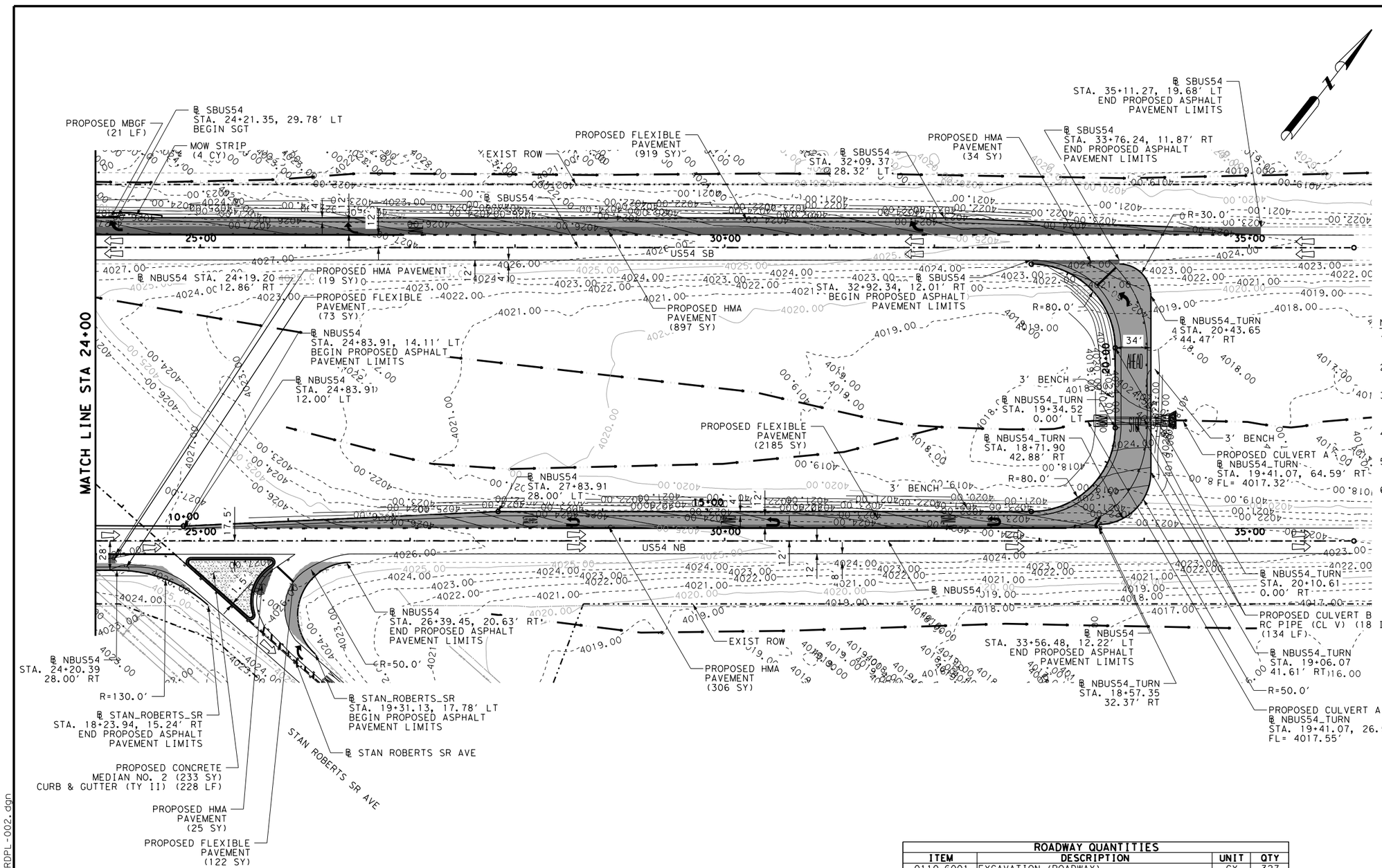

LEGEND

- PROPOSED FLEXIBLE PAVEMENT
- PROPOSED CONCRETE
- STONE RIP-RAP 6" COMMON
- 6" STANDARD CURB & GUTTER
- 6" STANDARD CURB
- EXISTING ROW
- EXISTING DITCH
- PROPOSED DITCH
- EXISTING DIRECTION OF TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC

NOTES:

1. REFER TO "HORIZONTAL ALIGNMENT DATA" SHEETS FOR ALIGNMENT INFORMATION.
2. REFER TO "MEDIAN LAYOUT" SHEETS FOR MEDIAN GEOMETRY INFORMATION.
3. REFER TO "PROPOSED DRAINAGE AREA MAP & CALCULATIONS" SHEETS FOR INFORMATION ON HYDRAULIC ITEMS.
4. REFER TO "UTILITY LAYOUT" SHEETS FOR INFORMATION ON EXISTING UTILITIES.
5. ROADWAY DIMENSIONS MEASURED TO FACE OF CURB UNLESS OTHERWISE NOTED.
6. REFLECTIVE TAPE TO BE INSTALLED ON BOTH SIDES OF THE PROPOSED BARRIER GATE.

0 25 50 100
SCALE: 1"=100'

ROADWAY QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0110 6001	EXCAVATION (ROADWAY)	CY	327
0132 6002	EMBANKMENT (FINAL) (DENS CONT) (TY A)	CY	3507
0150 6001	BLADING	STA	13
0247 6121	FL BS (RDWY DEL) (TY A GR 1-2)	TON	1732
0310 6001	PRIME COAT (MULTI OPTION)	GAL	687
0432 6001	RIPRAP (CONC) (4 IN)	CY	26
0432 6022	RIPRAP (STONE COMMON) (DRY) (6 IN)	CY	4
0432 6044	RIPRAP (CONC) (FLUME)	CY	7
0432 6045	RIPRAP (MOW STRIP) (4 IN)	CY	4
0464 6025	RC PIPE (CL V) (18 IN)	LF	134
0467 6356	SET (TY II) (18 IN) (RCP) (3: 1) (C)	EA	4
0529 6002	CONC CURB (TY II)	LF	228
0540 6002	MTL W-BEAM GD FEN (STEEL POST)	LF	21
0544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	1
3077 6022	SP MIXES SP-C SAC-A PG70-22	TON	630
3077 6075	TACK COAT	GAL	687

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CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE ROADWAY

ROADWAY PLAN LAYOUT

SHEET 2 OF 2

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		101

DATE: 5/31/2022 1:28:27 PM
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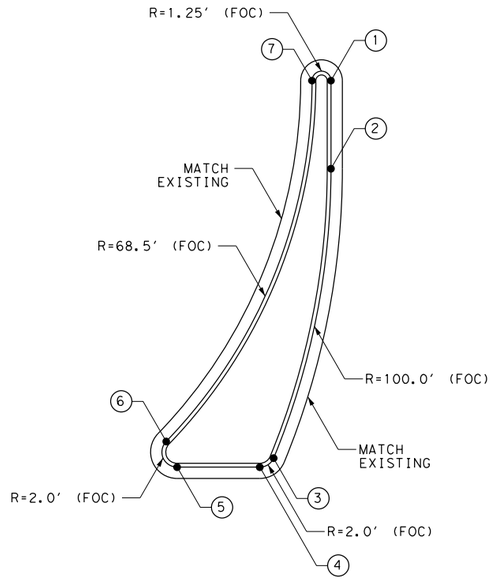
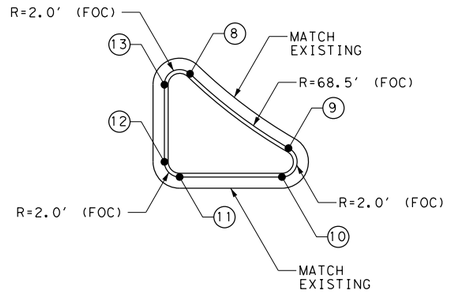
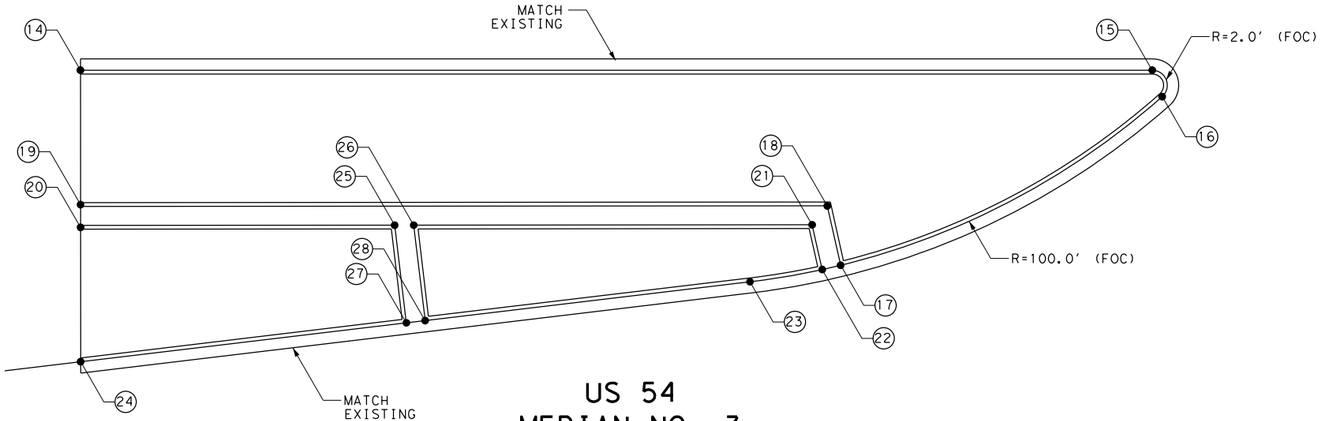


US 54
MEDIAN NO. 1



US 54
MEDIAN NO. 2



US 54
MEDIAN NO. 3

US 54 MEDIAN CURB DATA TABLE			
CONTROL POINT	CENTERLINE	STATION	OFFSET
1	N STATE LINE	13+41.59	0.00' LT
2	N STATE LINE	13+29.96	0.00' LT
3	N STATE LINE	12+90.80	0.00' LT
4	SBUS54	31+77.54	16.00' LT
5	SBUS54	31+66.62	16.00' LT
6	N STATE LINE	12+86.82	13.88' LT
7	N STATE LINE	13+41.59	2.50' LT
8	N STATE LINE	13+09.35	26.05' RT
9	N STATE LINE	13+04.39	41.11' RT
10	SBUS54	32+22.47	16.00' LT
11	SBUS54	32+08.96	16.00' LT
12	N STATE LINE	12+99.74	25.70' RT
13	N STATE LINE	13+07.64	23.05' RT
14	SBUS54	30+10.40	16.00' RT

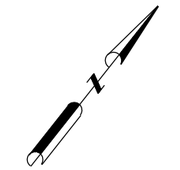
US 54 MEDIAN CURB DATA TABLE (CONTINUED)			
CONTROL POINT	CENTERLINE	STATION	OFFSET
15	SBUS54	31+51.92	16.00' RT
16	N STATE LINE	12+45.32	0.00' RT
17	N STATE LINE	11+96.91	0.00' RT
18	N STATE LINE	11+97.07	8.03' LT
19	SBUS54	30+10.41	33.75' RT
20	SBUS54	30+10.41	36.75' RT
21	N STATE LINE	11+94.37	6.04' LT
22	N STATE LINE	11+94.41	0.00' LT
23	N STATE LINE	11+84.73	0.00' RT
24	N STATE LINE	10+95.72	0.00' RT
25	N STATE LINE	11+39.04	12.97' LT
26	N STATE LINE	11+41.54	12.68' LT
27	N STATE LINE	11+39.04	0.00' RT
28	N STATE LINE	11+41.54	0.00' RT

LEGEND

(X) MEDIAN CURB DATA CONTROL POINT, REFER TO US 54 MEDIAN CURB DATA TABLE FOR ADDITIONAL INFORMATION.

NOTES:

1. MATCH EXISTING ELEVATIONS ALONG US 54.
2. PLACE CURB ELEVATIONS AS PER CONTOURS PROVIDED IN THE ROADWAY PLAN LAYOUT SHEETS.
3. CONTRACTOR TO ASSURE POSITIVE DRAINAGE TO DRAINAGE STRUCTURES.



0 5 10 20
SCALE: 1"=20'

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

MEDIAN LAYOUT

SHEET 1 OF 3

AECOM
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221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		102

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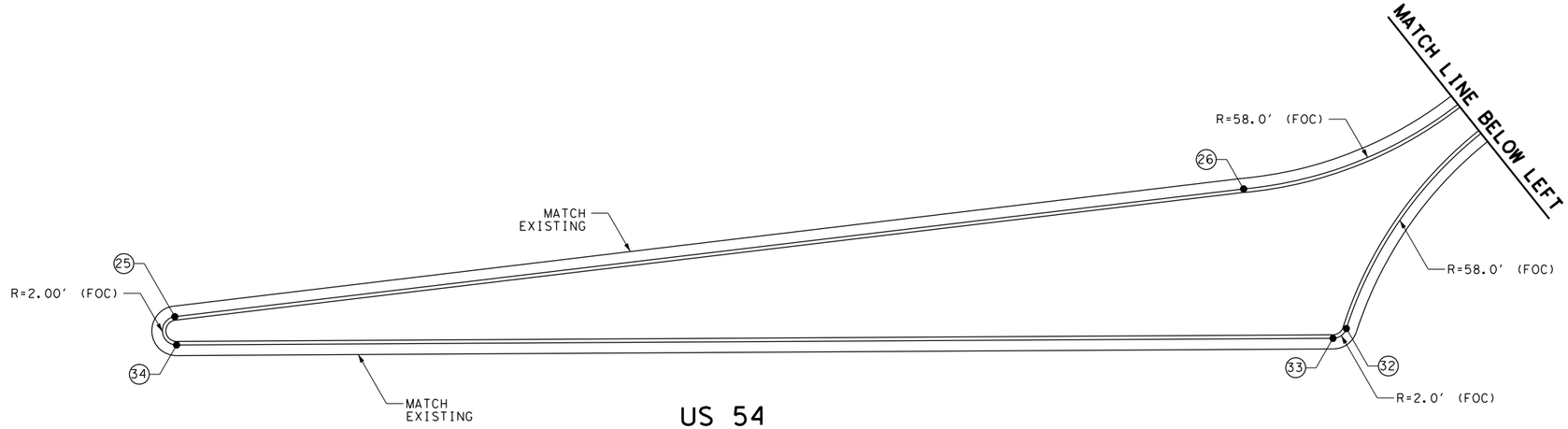


US 54
MEDIAN NO. 4

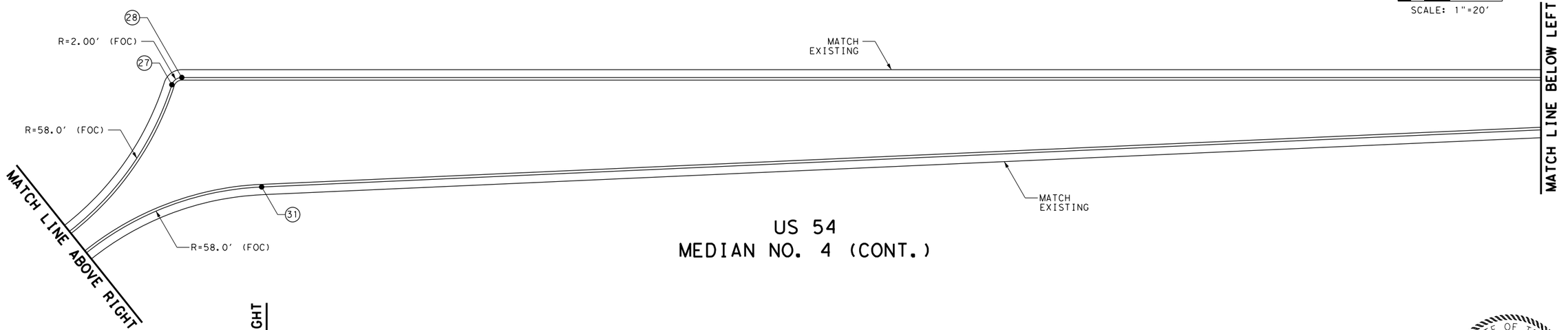
LEGEND

(X) MEDIAN CURB DATA CONTROL POINT, REFER TO US 54 MEDIAN CURB DATA TABLE FOR ADDITIONAL INFORMATION.

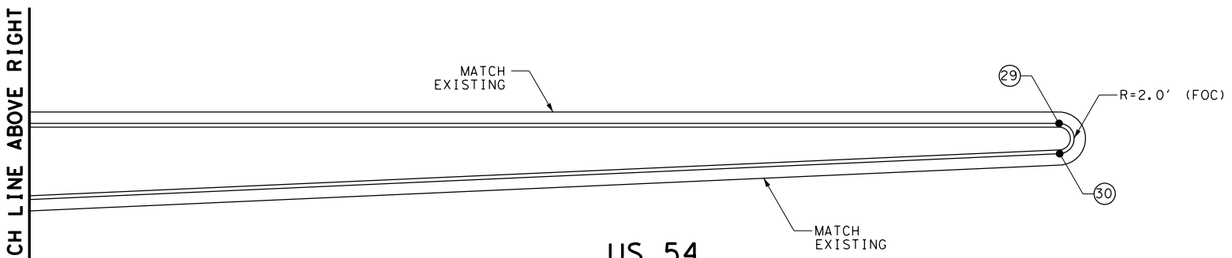
NOTES:

1. MATCH EXISTING ELEVATIONS ALONG US 54.
2. PLACE CURB ELEVATIONS AS PER CONTOURS PROVIDED IN THE ROADWAY PLAN LAYOUT SHEETS.
3. CONTRACTOR TO ASSURE POSITIVE DRAINAGE TO DRAINAGE STRUCTURES.

0 5 10 20
SCALE: 1"=20'



US 54
MEDIAN NO. 4 (CONT.)



US 54
MEDIAN NO. 4 (CONT.)

US 54 MEDIAN CURB DATA TABLE			
CONTROL POINT	CENTERLINE	STATION	OFFSET
25	N STATE LINE	10+86.10	20.00' RT
26	N STATE LINE	12+26.65	31.37' RT
27	N STATE LINE	12+74.38	37.99' RT
28	SBUS54	32+06.10	16.00' RT
29	SBUS54	36+02.80	16.00' RT
30	S STATE LINE	15+99.28	20.00' RT
31	S STATE LINE	19+67.71	33.86' RT
32	S STATE LINE	20+16.28	40.30' RT
33	NBUS54	32+30.04	16.00' LT
34	NBUS54	30+66.63	16.00' LT

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CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

MEDIAN LAYOUT

SHEET 2 OF 3

AECOM
AECOM Technical Services Inc. F-3580
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Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		103

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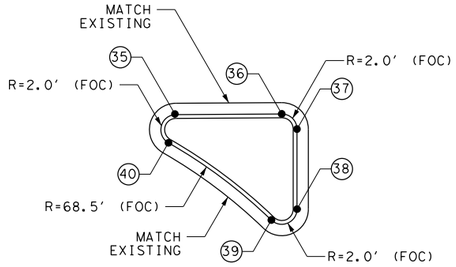
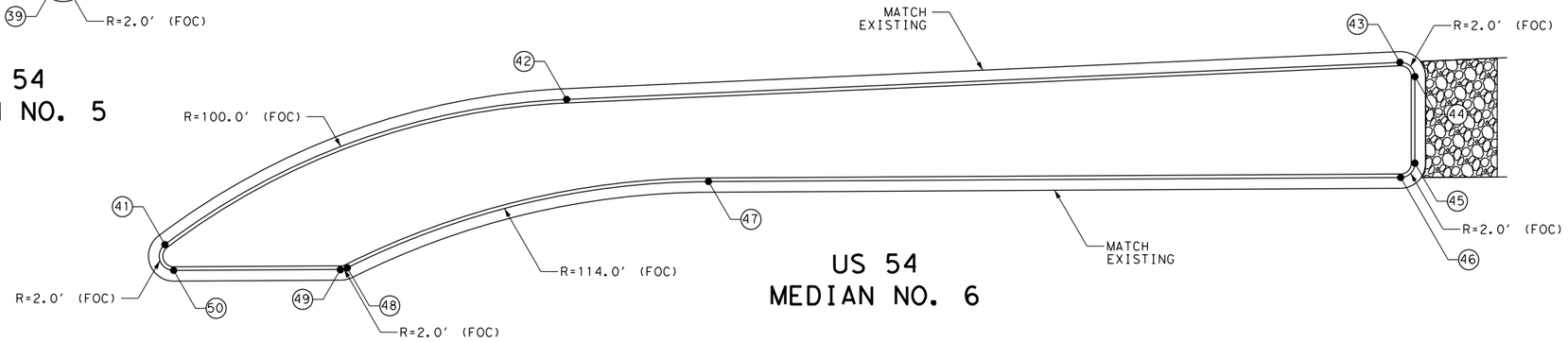
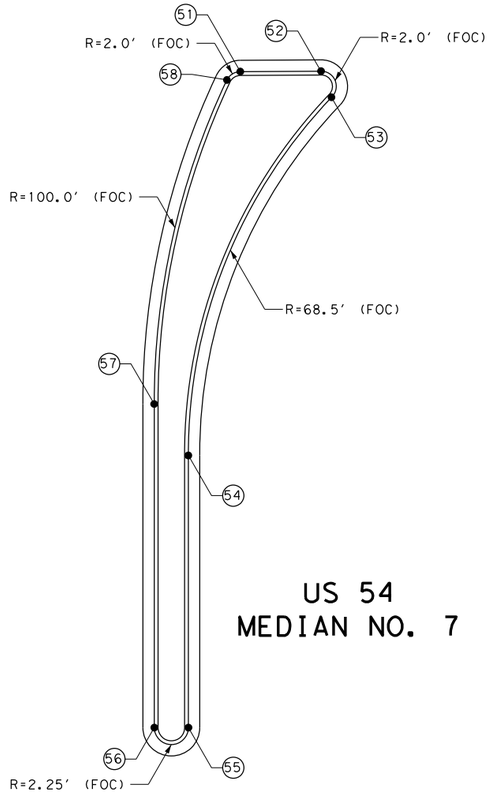


US 54
MEDIAN NO. 5



US 54
MEDIAN NO. 6



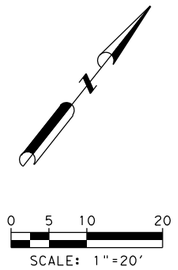
US 54
MEDIAN NO. 7

LEGEND

(X) MEDIAN CURB DATA CONTROL POINT, REFER TO US 54 MEDIAN CURB DATA TABLE FOR ADDITIONAL INFORMATION.

NOTES:

1. MATCH EXISTING ELEVATIONS ALONG US 54.
2. PLACE CURB ELEVATIONS AS PER CONTOURS PROVIDED IN THE ROADWAY PLAN LAYOUT SHEETS.
3. CONTRACTOR TO ASSURE POSITIVE DRAINAGE TO DRAINAGE STRUCTURES.



0 5 10 20
SCALE: 1"=20′

US 54 MEDIAN CURB DATA TABLE			
CONTROL POINT	CENTERLINE	STATION	OFFSET
35	NBUS54	32+12.98	16.00′ RT
36	NBUS54	32+26.96	16.00′ RT
37	S STATE LINE	20+41.02	27.04′ RT
38	S STATE LINE	20+49.09	23.97′ RT
39	NBUS54	32+25.51	30.00′ RT
40	NBUS54	32+11.98	19.73′ RT
41	S STATE LINE	19+86.50	0.00′ RT
42	S STATE LINE	19+21.80	0.00′ RT
43	S STATE LINE	18+05.33	0.00′ RT
44	S STATE LINE	18+03.34	2.09′ LT
45	S STATE LINE	18+03.87	14.18′ LT
46	NBUS54	34+61.25	28.00′ LT
47	NBUS54	33+64.60	28.00′ LT
48	NBUS54	33+14.11	16.21′ LT
49	NBUS54	33+13.22	16.00′ LT
50	NBUS54	32+89.87	16.00′ LT
51	NBUS54	32+60.36	16.00′ RT
52	NBUS54	32+71.02	16.00′ RT
53	S STATE LINE	20+25.73	13.42′ LT
54	S STATE LINE	20+81.27	4.50′ LT
55	S STATE LINE	21+17.19	4.50′ LT
56	S STATE LINE	21+17.19	0.00′ LT
57	S STATE LINE	20+74.47	0.00′ LT
58	S STATE LINE	20+30.32	0.00′ LT

CSJ: 0167-01-126
US54 STATE LINE RD

ROADWAY

MEDIAN
LAYOUT

SHEET 3 OF 3

AECOM
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CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		104

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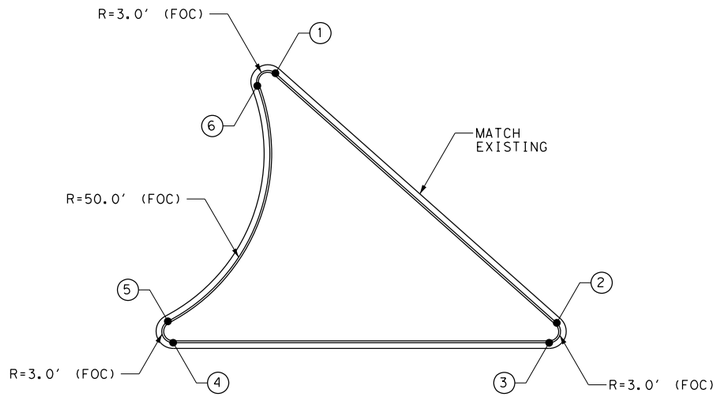
LEGEND

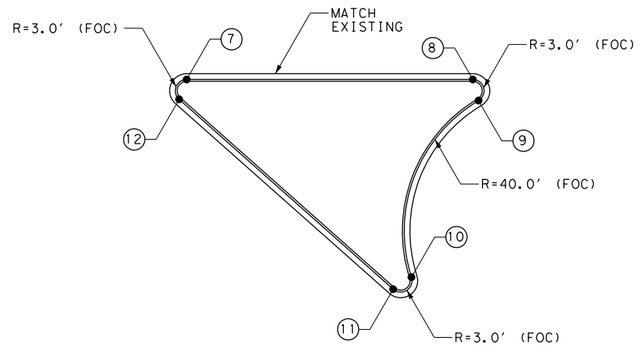
(X) MEDIAN CURB DATA CONTROL POINT, REFER TO US 54 MEDIAN CURB DATA TABLE FOR ADDITIONAL INFORMATION.

NOTES:

1. MATCH EXISTING ELEVATIONS ALONG US 54.
2. PLACE CURB ELEVATIONS AS PER CONTOURS PROVIDED IN THE ROADWAY PLAN LAYOUT SHEETS.
3. CONTRACTOR TO ASSURE POSITIVE DRAINAGE TO DRAINAGE STRUCTURES.



US 54
MEDIAN NO. 1



US 54
MEDIAN NO. 2

US 54 MEDIAN CURB DATA TABLE			
CONTROL POINT	CENTERLINE	STATION	OFFSET
1	STAN ROBERTS	11+91.53	1.50' RT
2	STAN ROBERTS	12+90.85	1.50' RT
3	SBUS54	21+15.97	17.50' LT
4	SBUS54	20+16.66	17.50' LT
5	SBUS54	20+15.27	23.16' LT
6	STAN ROBERTS	11+90.15	7.16' RT
7	NBUS54	24+91.10	17.50' RT
8	NBUS54	25+66.66	17.50' RT
9	NBUS54	25+68.18	23.08' RT
10	STAN ROBERTS	18+61.44	7.08' LT
11	STAN ROBERTS	18+59.91	1.50' LT
12	STAN ROBERTS	17+84.36	1.50' LT

0 10 20 40
SCALE: 1"=40'

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CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE
ROADWAY

MEDIAN LAYOUT

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		105

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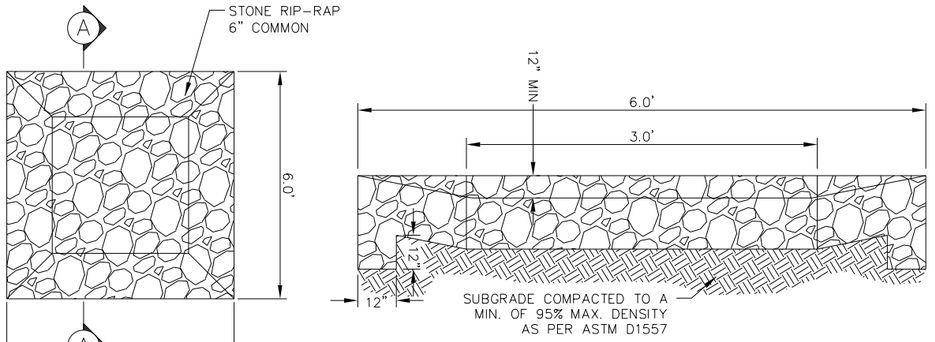
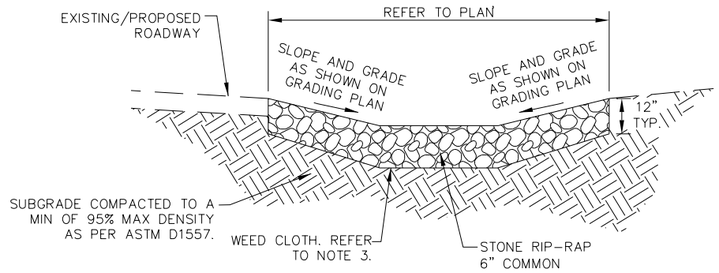


STONE RIP-RAP BASIN

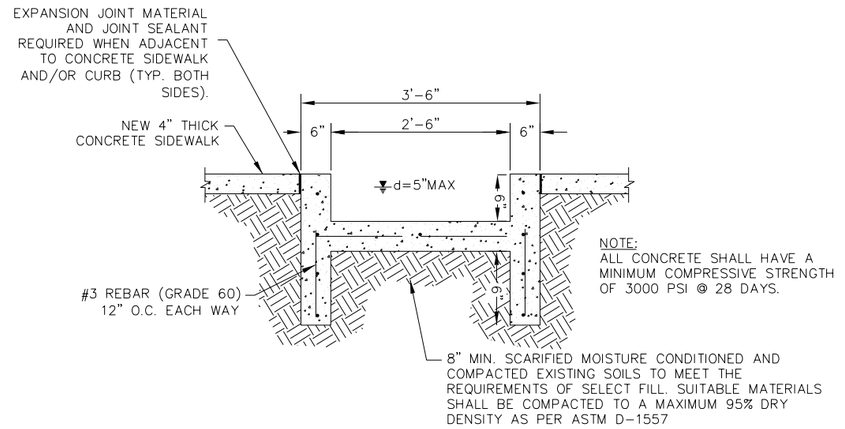


STONE RIP-RAP SWALE

SCALE: N.T.S.

NOTES

1. STONE RIP-RAP SHALL BE PLACED WHERE REQUIRED FOR EROSION PROTECTION AS SHOWN IN THESE CONSTRUCTION DOCUMENTS.
2. STONE RIP-RAP SHALL BE A MINIMUM OF 6" IN DIAMETER.
3. WEED CLOTH SHALL BE DEWITT PRO-FIVE OR APPROVED EQUIVALENT. WEED CLOTH TO BE PINNED ON 3' CENTERS WITH U-SHAPE METAL PINS ALONG ALL OVERLAPS AND EDGES.



CONCRETE DRAINAGE FLUME

SCALE: N.T.S.

NOTES:

CONTRACTION JOINTS EVERY 25' O.C. EXPANSION JOINTS EVERY 100' O.C. WITH JOINT SEALING COMPOUND: WHERE JOINTS IN CONCRETE CONSTRUCTION ARE SHOWN TO BE SEALED, THE JOINT SEALING COMPOUND SHALL BE COLD-APPLIED TWO-COMPONENT POLY-SULFIDE SEALANT SPECIFICALLY RECOMMENDED BY THE MANUFACTURER FOR USE IN SUBMERGED JOINTS. THE HANDLING PRIOR TO SEALING SHALL BE IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER. JOINT SEALING COMPOUND SHALL BE SIKAFLEX -2C NS EZ MIX OR ENGINEER APPROVED EQUIVALENT. A TWO COMPOUND EPOXY PRIMER SUITABLE FOR THE USE IN SUBMERGED JOINTS AND COMPATIBLE WITH THE SEALER SHALL BE USED IN ALL JOINTS, COMPOUND TO BE SONNEBORN OR ENGINEER APPROVED EQUIVALENT.

CSJ: 0167-01-126
US54 STATE LINE RD

MISCELLANEOUS ROADWAY DETAILS

SHEET 1 OF 1

AECOM
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Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		106

DATE: 5/31/2022 1:29:16 PM
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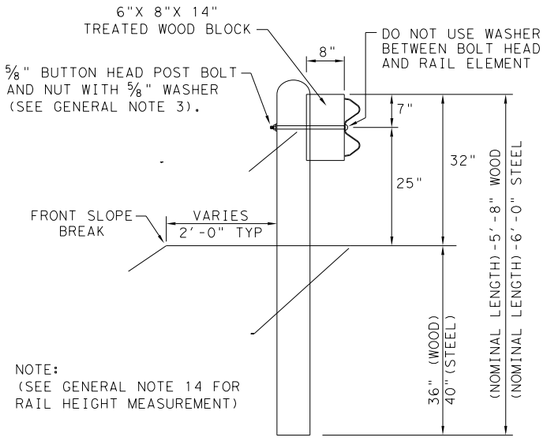
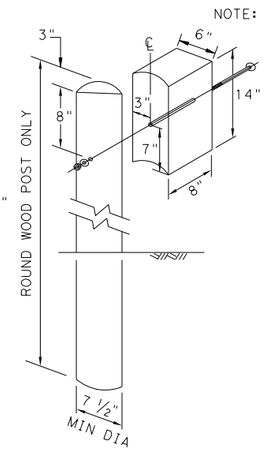
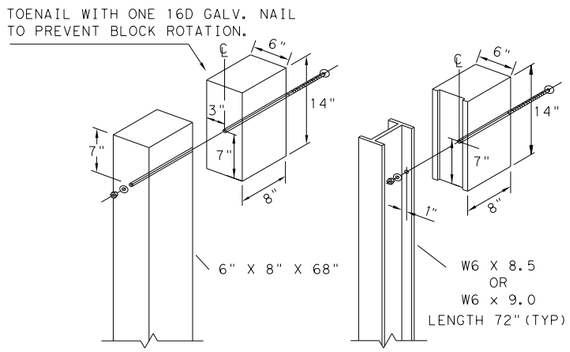
DATE:
FILE:



TYPICAL POST PLACEMENT



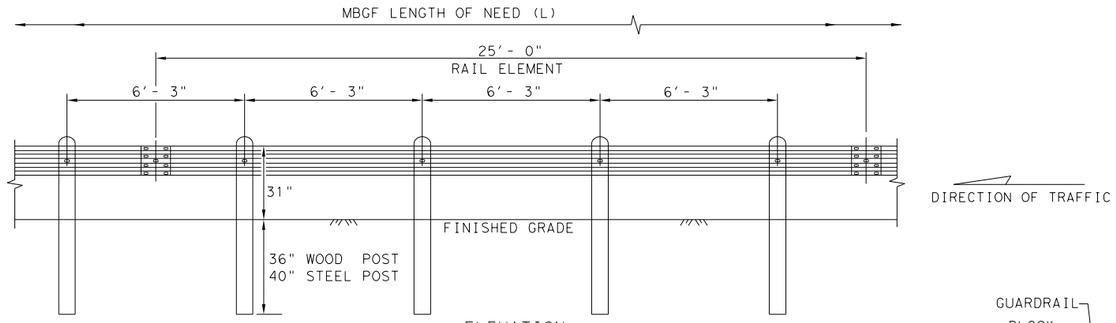
WOOD BLOCK TO
ROUND WOOD POST



WOOD BLOCK TO
RECTANGULAR WOOD POST

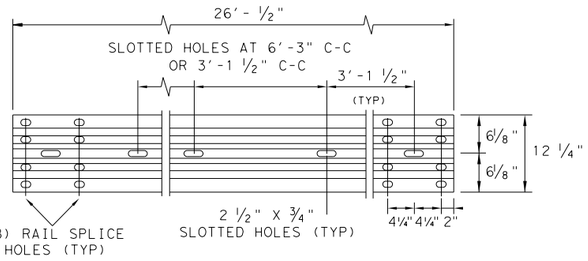
ROUTED WOOD BLOCK
TO I-BEAM STEEL POST

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



ELEVATION
MID-SPAN RAIL SPLICE

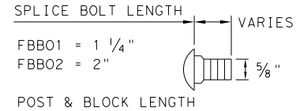
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



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

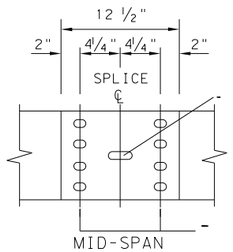
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

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



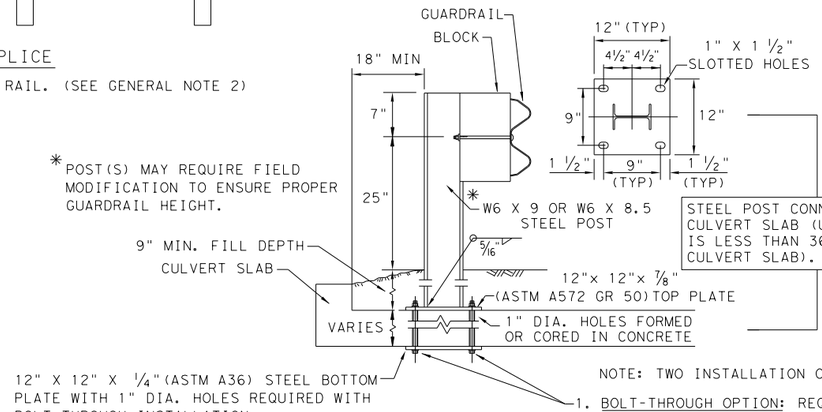
BUTTON HEAD BOLT

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



MID-SPAN
RAIL SPLICE DETAIL

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



LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

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

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

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

GENERAL NOTES

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

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.

Texas Department of Transportation — Design Division Standard

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

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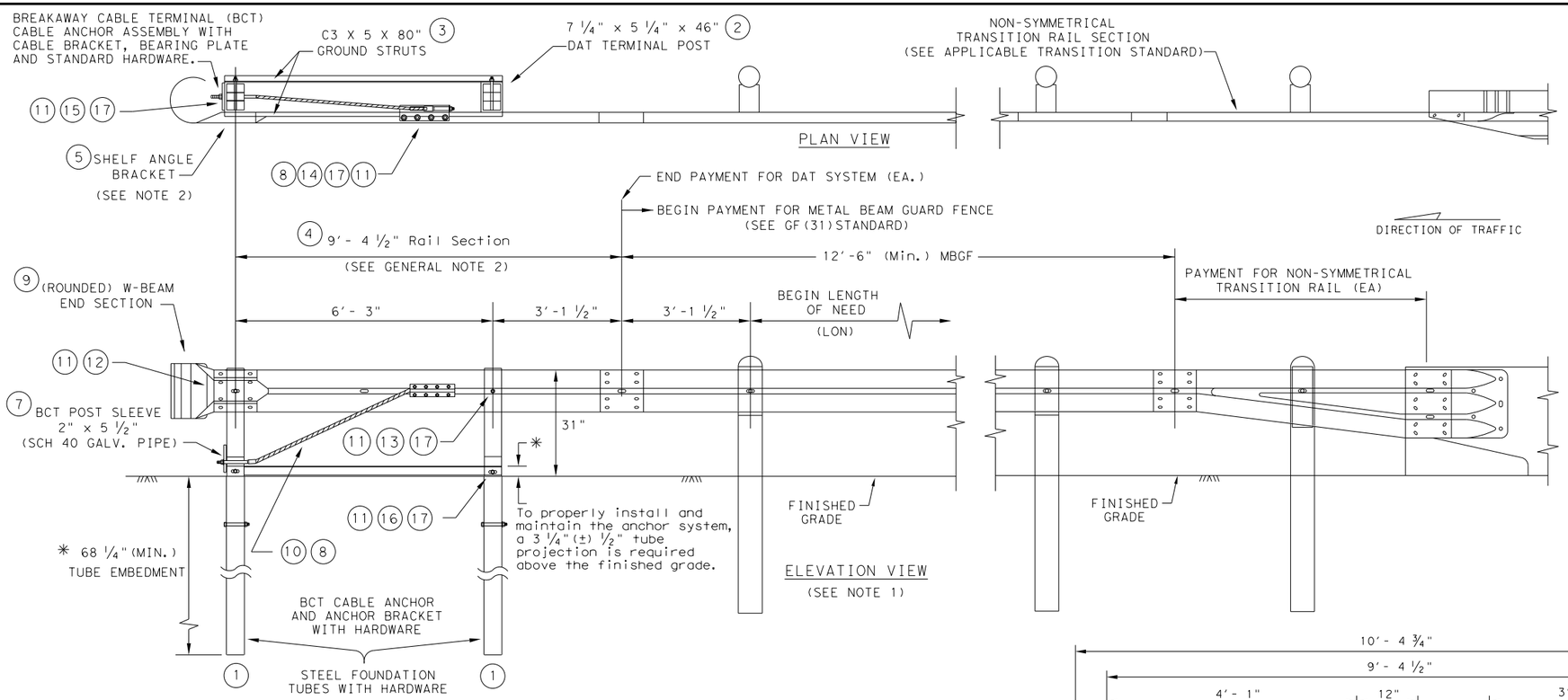


DOWNSTREAM ANCHOR TERMINAL (DAT)

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

GENERAL NOTES

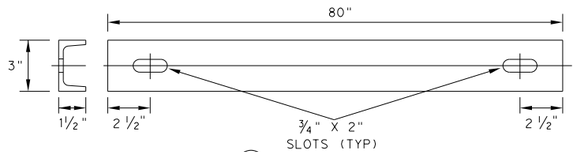
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN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

MOW STRIP INSTALLATION

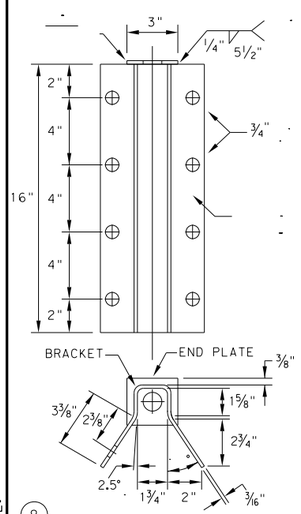
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

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

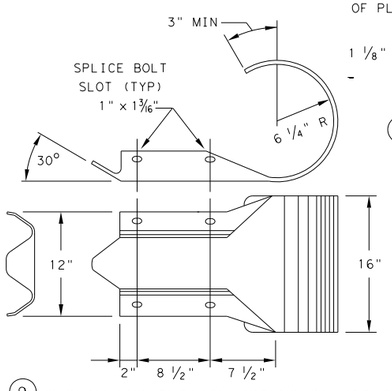
(4) TERMINAL RAIL ELEMENT FOR DAT



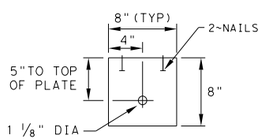
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



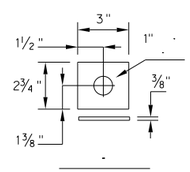
(8) GUARDRAIL ANCHOR BRACKET

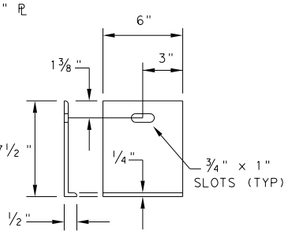


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

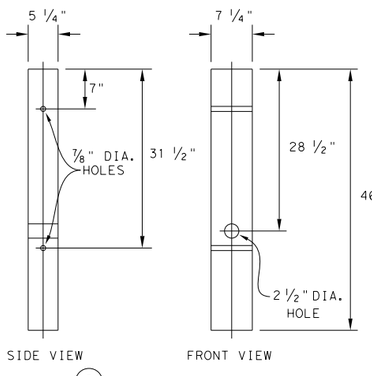


(6) BEARING PLATE
8"x 8"x 5/8" R

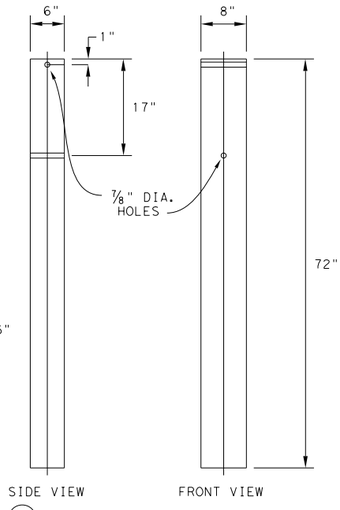




(5) SHELF ANGLE BRACKET



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



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

Texas Department of Transportation

Design Division Standard

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

GF(31)DAT-19

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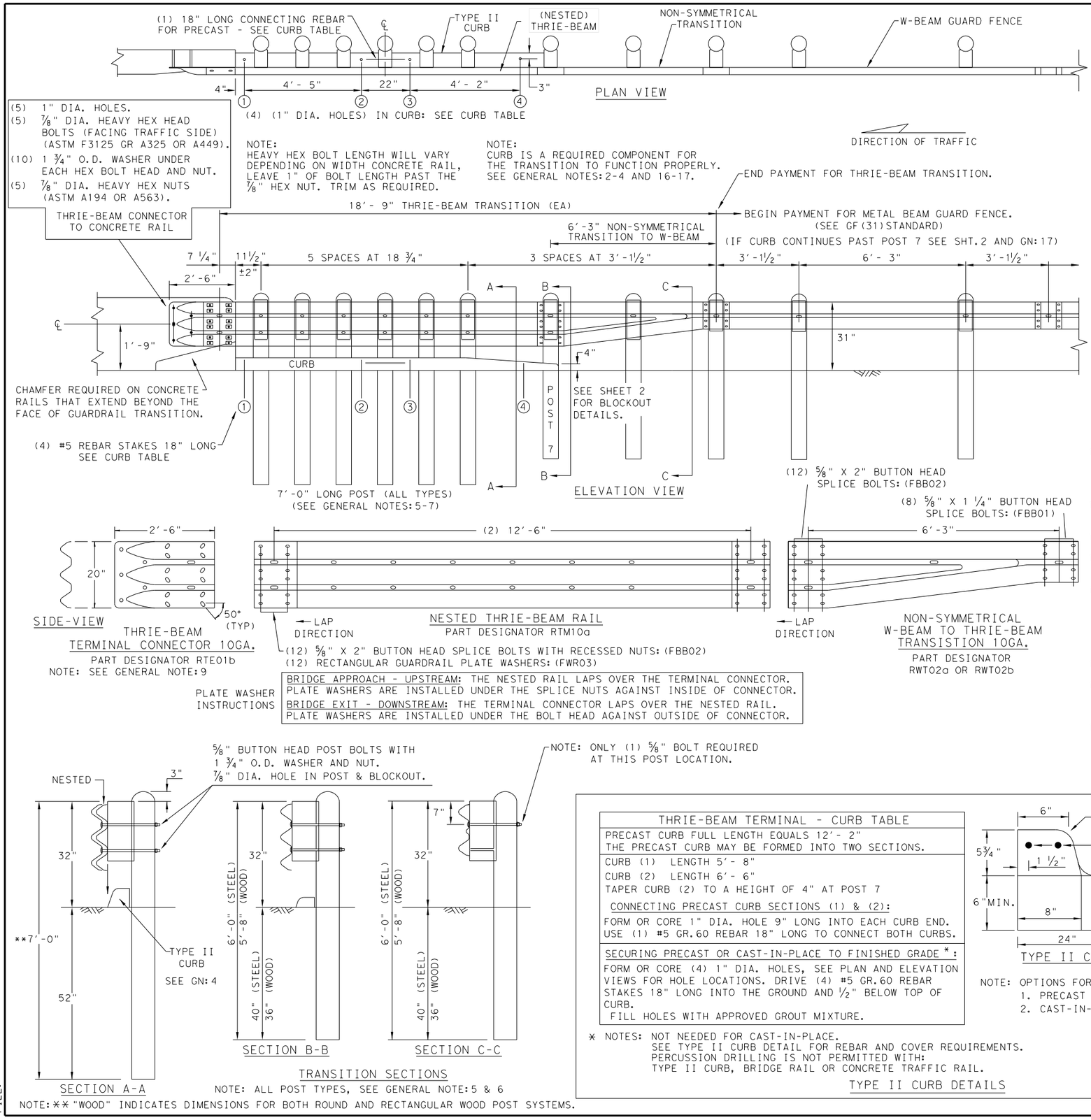


GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- 3/4" HEIGHT); SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE: 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 1/2" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST 5/8" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. 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. TXDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED)(TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED)(STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

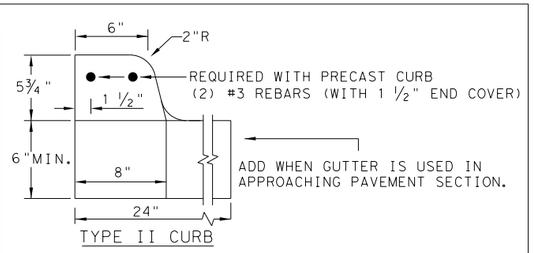
THRIE-BEAM TERMINAL - CURB TABLE

PRECAST CURB FULL LENGTH EQUALS 12'- 2"
THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.

CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7

CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END.
USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.

SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND 1/2" BELOW TOP OF CURB.
FILL HOLES WITH APPROVED GROUT MIXTURE.



TYPE II CURB

NOTE: OPTIONS FOR TYPE II CURB:
1. PRECAST
2. CAST-IN-PLACE

* NOTES: NOT NEEDED FOR CAST-IN-PLACE.
SEE TYPE II CURB DETAIL FOR REBAR AND COVER REQUIREMENTS.
PERCUSSION DRILLING IS NOT PERMITTED WITH:
TYPE II CURB, BRIDGE RAIL OR CONCRETE TRAFFIC RAIL.

TYPE II CURB DETAILS

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

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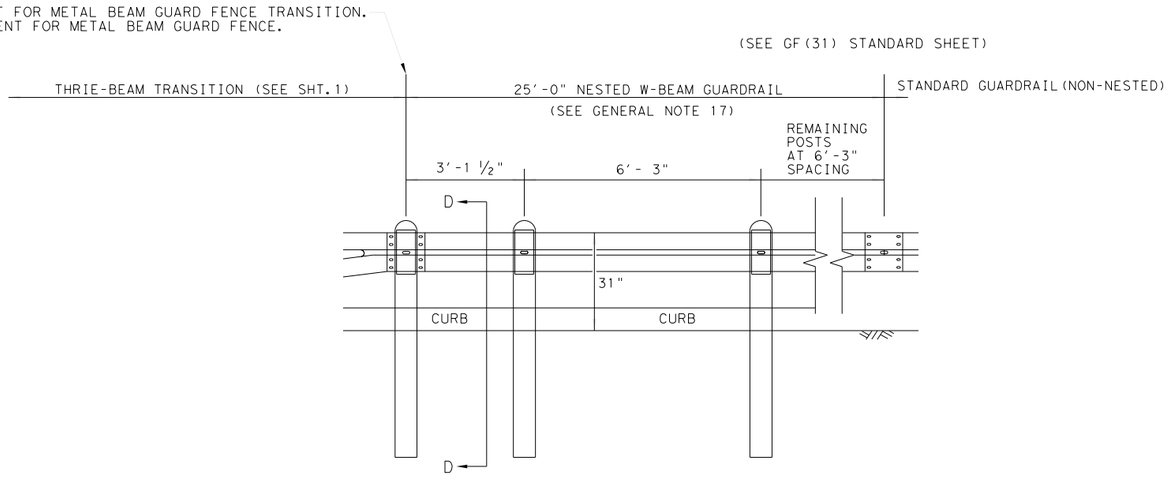
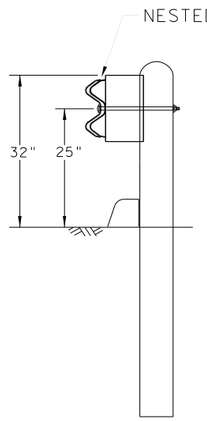
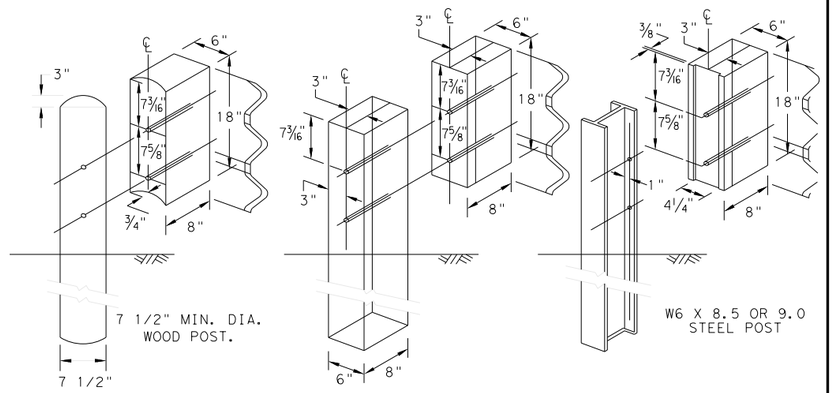
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

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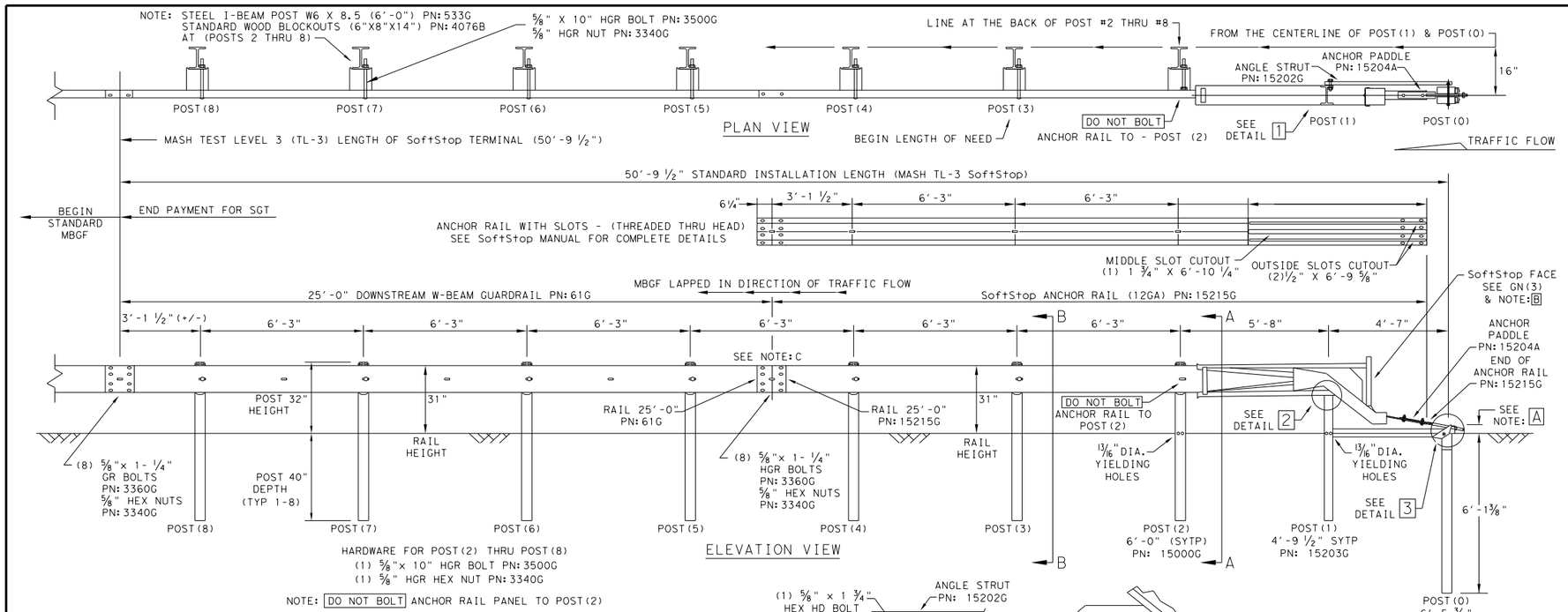

GENERAL NOTES

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

NOTE: A	THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-¾" MIN. TO 4" MAX. ABOVE FINISHED GRADE.
NOTE: B	PART PN: 5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING) PART PN: 5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)
NOTE: C	W-BEAM SPLICE LOCATED BETWEEN LINE POST(4) AND LINE POST(5) GUARDRAIL PANEL 25'-0" PN: 61G ANCHOR RAIL 25'-0" PN: 15215G LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW.

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0")
15205A	1	POST #0 - ANCHOR POST (6'- 5 ⅞")
15203G	1	POST #1 - (SYTP) (4'- 9 ½")
15000G	1	POST #2 - (SYTP) (6'- 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")
6777B	7	BLOCKOUT - COMPOSITE (4" x 7 ½" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (½" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
		HARDWARE
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR.DH
3717G	2	¾" x 2 ½" HEX BOLT A325
3701G	4	¾" ROUND WASHER F436
3704G	2	¾" HEAVY HEX NUT A563 GR.DH
3360G	16	⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	⅝" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	⅝" x 10" HGR POST BOLT A307
3391G	1	⅝" x 1 ¾" HEX HD BOLT A325
4489G	1	⅝" x 9" HEX HD BOLT A325
4372G	4	⅝" WASHER F436
105285G	2	⅝" x 2 ½" HEX HD BOLT GR-5
105286G	1	⅝" x 1 ½" HEX HD BOLT GR-5
3240G	6	⅝" ROUND WASHER (WIDE)
3245G	3	⅝" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE: B

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

Texas Department of Transportation

Design Division Standard

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

FILE: sgt10s3116		DN: TxDOT	CK: KM	DW: VP	CK: MB/VP		
©TxDOT: JULY 2016		CONT	SECT	JOB	HIGHWAY		
REVISIONS		0167	01	126,ETC.	US-54		
		DIST	COUNTY		SHEET NO.		
		ELP	EL PASO		111		

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DATE:
FILE:

(SEE GN NOTE 15)
STANDARD 31" MBGF

ITEM (6)
INNER SIDE SLIDER
(ISS) PANEL FOR RAIL 3

FIELD-SIDE
(RAIL 3)

NOTE:
RECESSED HEX NUTS FACING
TRAFFIC-SIDE SEE DETAIL (C)

REFERENCE LINE USED TO INSTALL
LINE POST(9) THRU POST(2)

POST 1 OFFSET DISTANCE MEASURED
7-5/8" FROM REFERENCE LINE

ITEM (10)
CABLE ASSEMBLY

ITEM (2)
GROUNDSTRUT

NO BLOCKOUT
AT (POST 1)

POST 9 POST 8 POST 7 POST 6 POST 5 POST 4 POST 3 POST 2

RAIL 4 RAIL 3 RAIL 2 RAIL 1

CABLES

NOTES:
1. ITEM (12) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST(9) THRU LINE POST(2).
2. DO NOT INSTALL A BLOCKOUT AT LINE POST(1).

PLAN VIEW

ITEM (5)
TRAFFIC SIDE SLIDER
(TSS) PANEL FOR RAIL 2

NOTE: SECURE THE (TSS) PANEL TO OUTSIDE OF RAIL 2 WITH THE PANEL ARROWS POINTING TOWARDS THE HEAD.

MBGF
RAIL 2

INSTALL GUARD FENCE RECESSED
HEX NUTS ON TRAFFIC-SIDE

MBGF
RAIL 1

DETAIL (C)

TRAFFIC FLOW

END PAYMENT (SGT) BY EACH

DO NOT BOLT
RAIL TO POST 6

BEGIN LENGTH OF NEED

ITEM (25)
MAX-TENSION HEAD
SEE DETAIL (A)

INSTALLATION LENGTH 55'- 1/2"

49'-8 9/16"

6'-3" 6'-3" 6'-3" 6'- 3/4" 6'-3" 6'-3" 6'-3" 37 1/2" 5'-3 11/16"

RAIL
HEIGHT

31"

ARROWS

ITEM (13) RAIL 4

ITEM (13) RAIL 3

DETAIL
(D)

ITEM (13) RAIL 2

ITEM (13) RAIL 1

CABLES

FINISHED
GRADE

RAIL
HEIGHT

31"

HEAD
HEIGHT

DETAIL
(B)

32-1/4"

ITEM (10)
CABLE
ASSEMBLY

ITEM (2)
GROUNDSTRUT

68-1/8"

POST 9 POST 8 POST 7 POST 6 POST 5 POST 4 POST 3 POST 2 POST 1

ITEM (4)
I-BEAM
W6 X 9

NO BLOCKOUT
AT (POST 1)

SOIL
ANCHOR POST
ITEM (1)

(8) X-LITE LINE POST - ITEM (11)

ELEVATION VIEW

A

A

TSS PANEL
GALVANIZED
ITEM (5)

RSS PLATE
GALVANIZED
ITEM (8)

INSTALL THE TSS AND RSS
WITH THE ARROWS POINTING
TOWARDS THE MAX-HEAD

TSS PANEL AND RSS PLATE
DETAIL (D)

HEAD
HEIGHT

32-1/4"

TOP OF POST

31-7/8"

FINISHED
GRADE

40-1/8"

68-1/8"
ANCHOR POST
DEPTH

ITEM (1)
ANCHOR

ITEM (11)
LINE POSTS
2 THRU 9

(NOTE: ITEM (4) POST 1 (NOT SHOWN), TO BE INSTALLED AT SAME DEPTH AS LINE POSTS.)

SOIL ANCHOR, POST 1
& LINE POST 2 THRU 9

SECTION VIEW A-A

NOTE:
USE THE MASH APPROVED
X-TENSION CABLE ASSEMBLY.

7 5/16"

2 1/8"

UPPER CABLE
(BACK SIDE)

LOWER CABLE
(TRAFFIC SIDE)

DETAIL (B)

CABLE
FRICTION PLATE
HEAD UNIT
ITEM (9)

NOTE:
INSTALL 5/8" RECESSED HEX
NUTS ON TRAFFIC SIDE.

ITEM (24)

ITEM (21)

ITEM (20)
8X

ITEM (17)
8X

(RAIL 1)

ITEM (23)
6X
3 SCREWS
EACH SIDE

ITEM (22)
BRACKET
SHIPPED FLAT

ITEM (3)

ITEM (16)
4X

* ITEM (25)
HIGH INTENSITY
REFLECTIVE SHEETING

NOTE: DELINEATION MARKER IN ACCORDANCE WITH TEXAS MUTCD.

SPLICE FOR IMPACT-HEAD
TO GUARD FENCE (RAIL1)

DETAIL (A)

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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

APPROX 5'-10"

5'-0"

50' APPROACH GRADING

STANDARD
MBGF

2'-0"

TRAFFIC FLOW

EDGE OF PAVEMENT

NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

2'-0" MAX.
RAIL OFFSET

APPROACH GRADING
(1V:10H OR FLATTER)
SEE PRODUCT ASSEMBLY MANUAL
FOR ADDITIONAL GUIDANCE.

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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

GENERAL NOTES

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

ITEM #	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	5/8" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	3/4" 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	5/8" WASHER F436 STRUCTURAL MGAL	2
20	4001116	5/8" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	5/8" 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 FWR03	1
* 25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
** 26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
** 27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

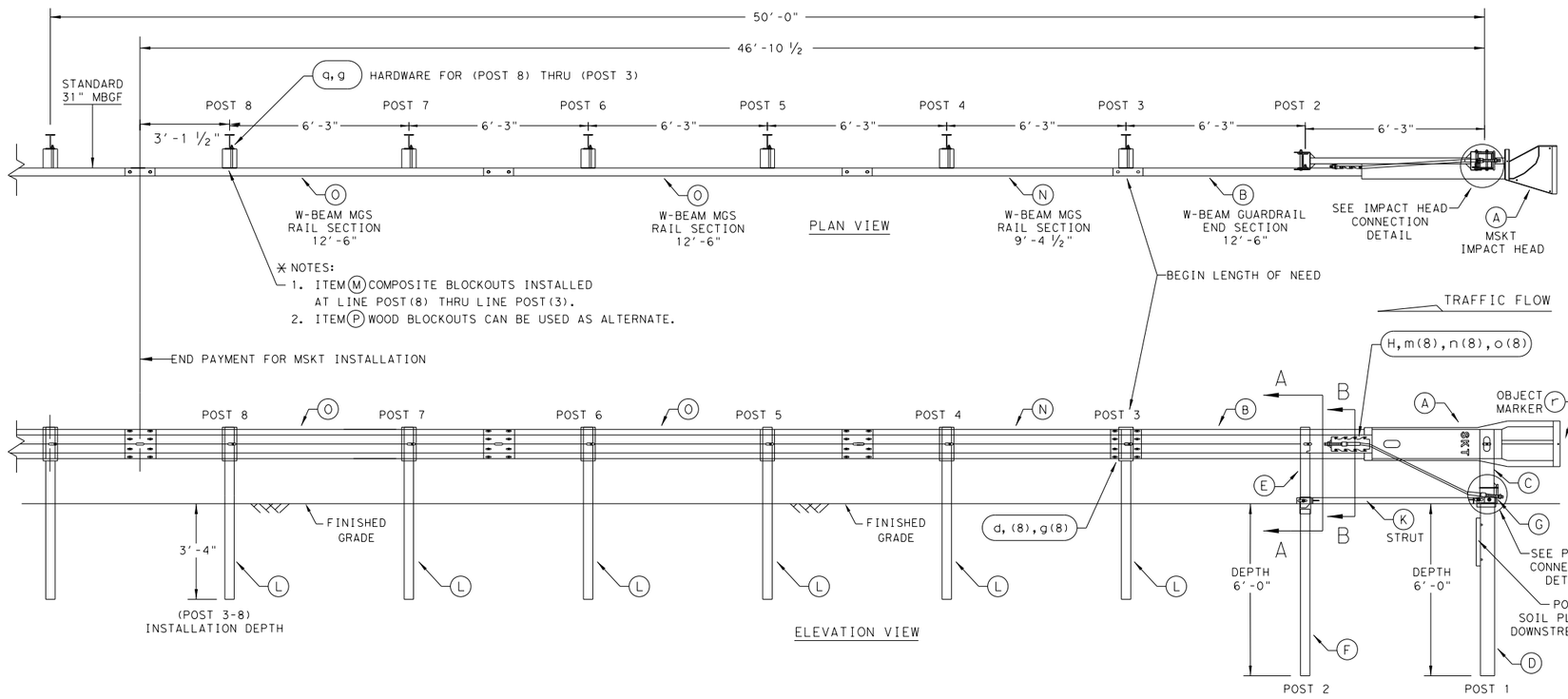
Texas Department of Transportation

Design Division Standard

MAX-TENSION END TERMINAL
MASH - TL-3
SGT(11S)31-18

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		112

DATE:
FILE:



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

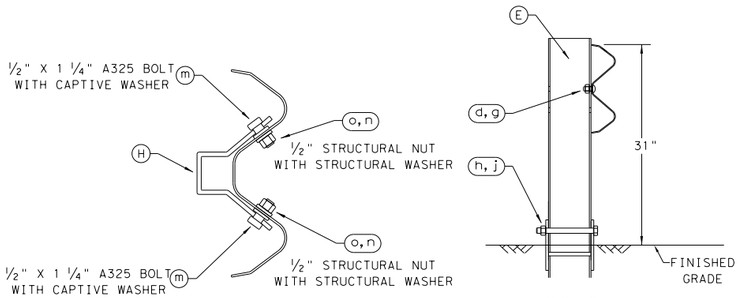
GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION~062717).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
7. A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
8. IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
13. THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
14. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	5/8" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/8" WASHER	W0516
c	2	5/8" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

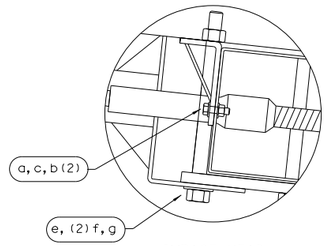
SEE NOTES: ✳

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

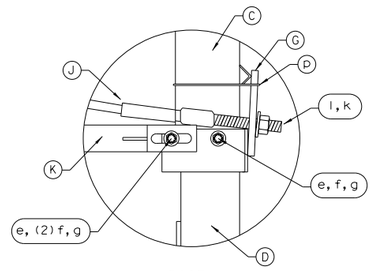


SECTION B-B
ANCHOR BRACKET

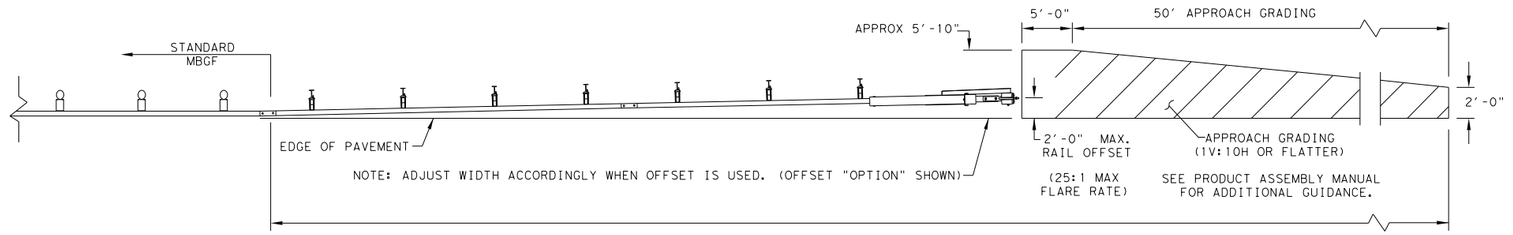
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

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

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

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

SGT(12S)31-18

FILE: sgt12s3118.dgn	DN:TxDOT	CK:KM	DW:VP	CK:CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0167	01	126,ETC.	US-54	
	DIST	COUNTY		SHEET NO.	
	ELP	EL PASO		113	

DATE:
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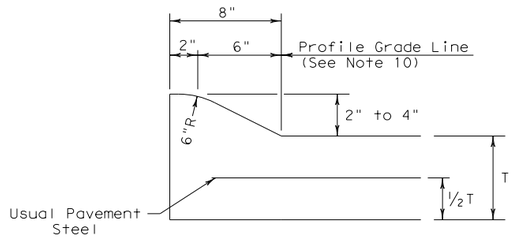
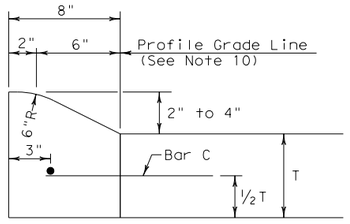
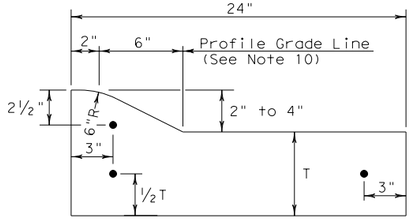


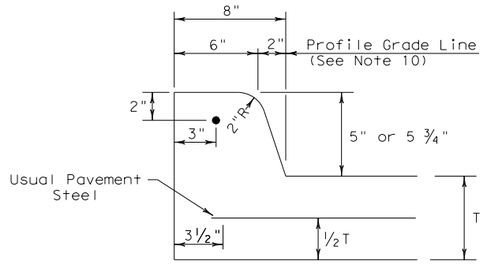
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



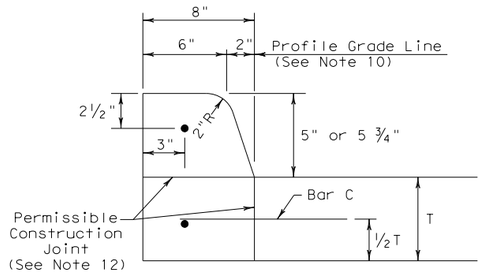
TYPE I CURB
2" - 4" HEIGHT



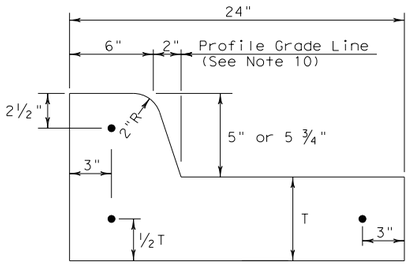
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



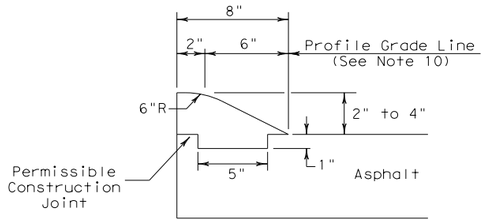
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



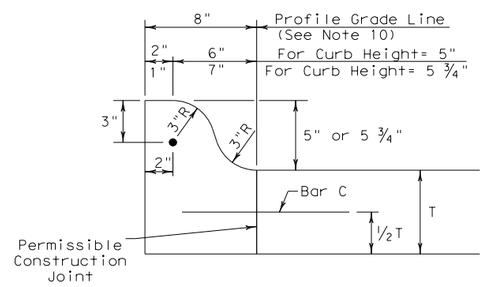
TYPE II CURB
5" - 5 ¾" HEIGHT



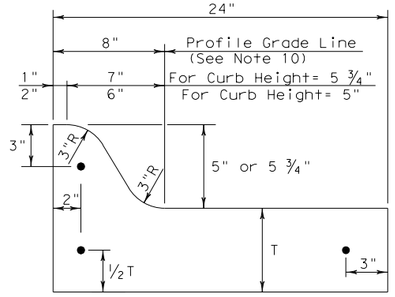
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



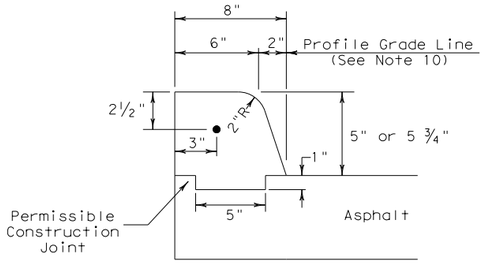
TYPE III CURB (KEYED)
2" - 4" HEIGHT



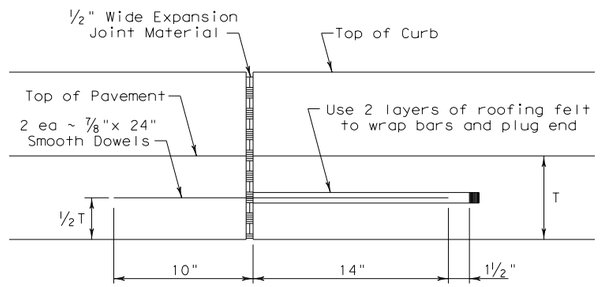
TYPE IIa CURB
5" - 5 ¾" HEIGHT



TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT

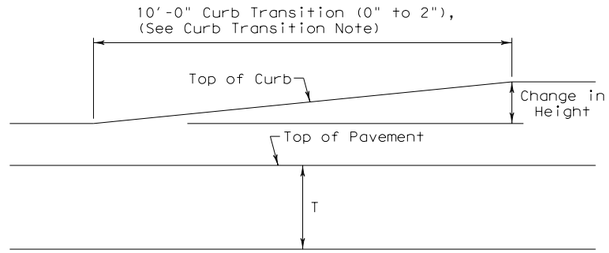


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

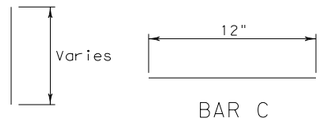
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and the grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B used as needed to support curb reinforcing steel during concrete placement.



BAR B

BAR C

Texas Department of Transportation

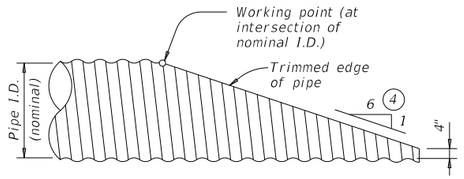
Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

CCCG-21

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: SS	CK: KM
© TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		114

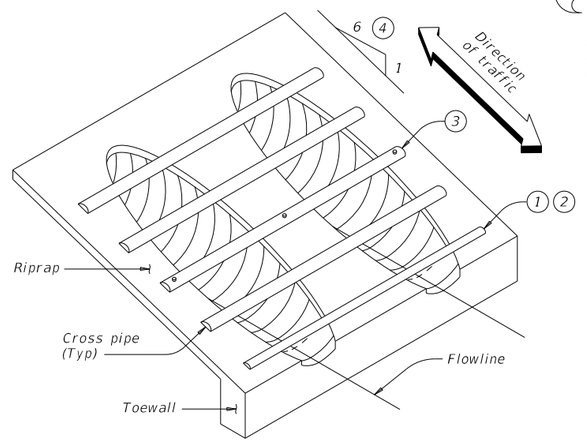
DATE:
FILE:



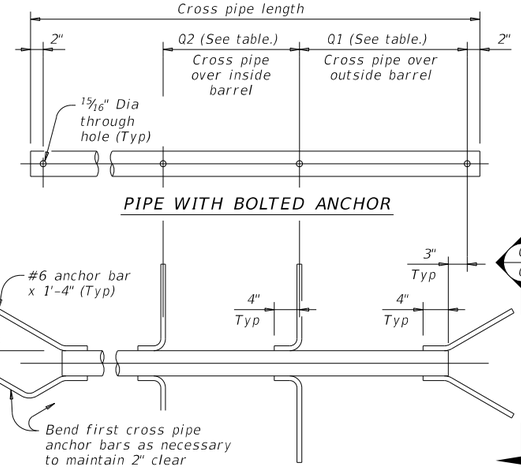
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

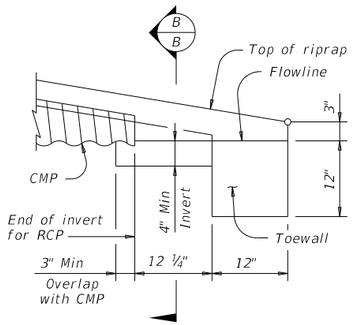
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

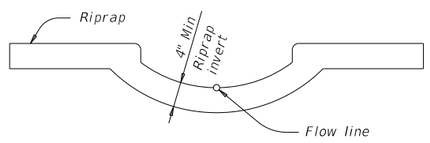


CROSS PIPE DETAILS



DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

(Cross pipes not shown for clarity.)

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES (2)

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"		
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"		
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"	3 or more pipe culverts	3 1/2" Std (4.000" O.D.)
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	2 or more pipe culverts	
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

(1) The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

(2) Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

(3) Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

(4) Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.

(5) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

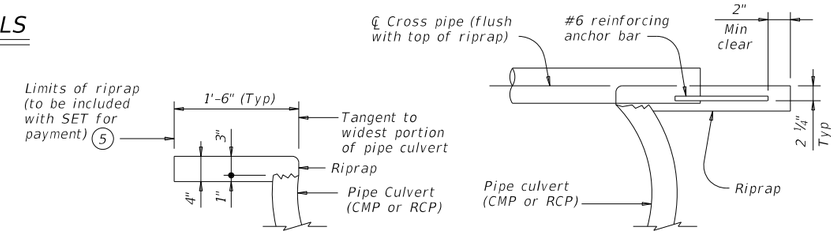
GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.

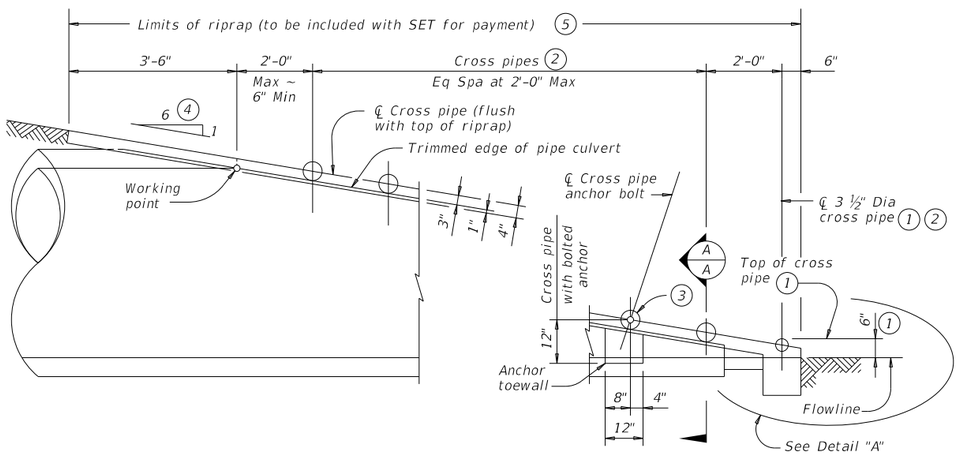
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.



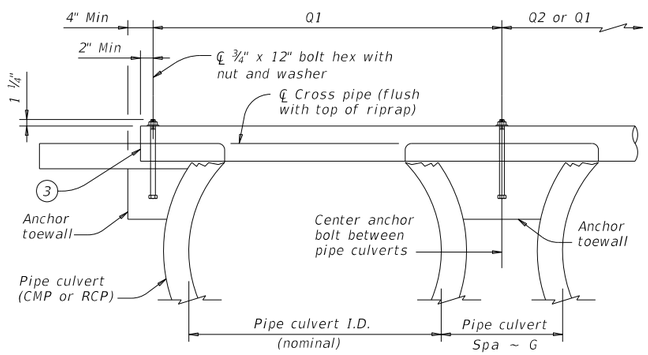
SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SHOWING CROSS PIPE WITH ANCHOR BAR



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

Texas Department of Transportation

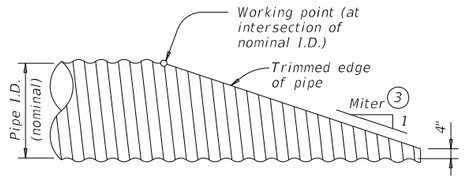
Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 72" DIA
PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD

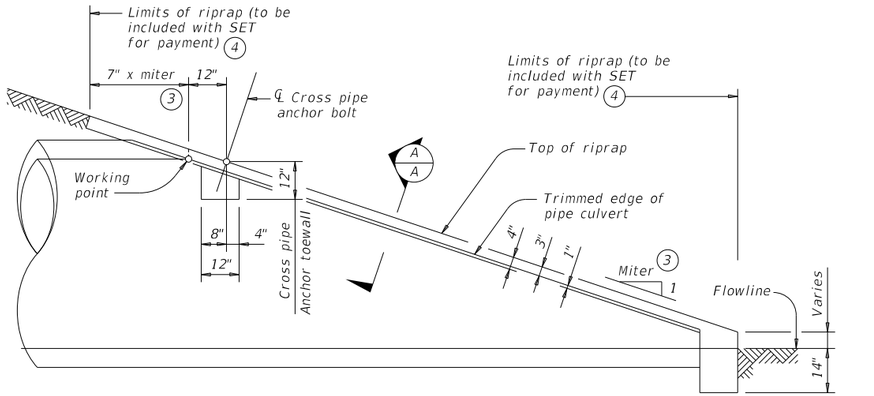
FILE: setppdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK. GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		115



NOTE: All pipe runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

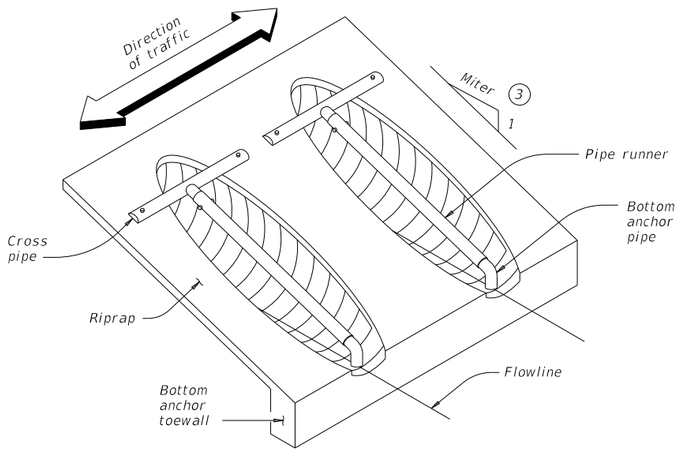
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert.
Details of reinforced concrete pipe (RCP) culvert are similar.)



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert.
Details of corrugated metal pipe (CMP) culvert
are similar. Pipe runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS (1) (2)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' – 7"	3' – 5"	N/A	N/A	N/A	5' – 10"	N/A	N/A	N/A	8' – 1"	N/A	N/A	N/A	12' – 9"
27"	1' – 8"	3' – 8"	N/A	N/A	5' – 5"	6' – 11"	N/A	N/A	7' – 7"	9' – 7"	N/A	N/A	11' – 11"	14' – 11"
30"	1' – 10"	3' – 11"	N/A	N/A	6' – 4"	8' – 0"	N/A	N/A	8' – 9"	11' – 0"	N/A	N/A	13' – 8"	17' – 0"
33"	1' – 11"	4' – 2"	6' – 2"	6' – 5"	7' – 3"	9' – 1"	8' – 6"	8' – 10"	10' – 0"	12' – 5"	13' – 3"	13' – 9"	15' – 5"	19' – 2"
36"	2' – 1"	4' – 5"	6' – 11"	7' – 3"	8' – 2"	10' – 2"	9' – 6"	9' – 11"	11' – 2"	13' – 10"	14' – 9"	15' – 3"	17' – 2"	21' – 3"
42"	2' – 4"	4' – 11"	8' – 6"	8' – 10"	9' – 11"	12' – 4"	11' – 7"	12' – 0"	13' – 6"	16' – 8"	17' – 9"	18' – 5"	20' – 8"	25' – 7"
48"	2' – 7"	5' – 5"	10' – 1"	10' – 5"	11' – 9"	N/A	13' – 7"	14' – 2"	15' – 10"	N/A	20' – 9"	21' – 6"	24' – 2"	N/A
54"	3' – 0"	5' – 11"	11' – 8"	12' – 1"	N/A	N/A	15' – 8"	16' – 3"	N/A	N/A	23' – 10"	24' – 8"	N/A	N/A
60"	3' – 3"	6' – 5"	13' – 3"	N/A	N/A	N/A	17' – 9"	N/A	N/A	N/A	26' – 10"	N/A	N/A	N/A

TYPICAL PIPE CULVERT MITERS (3)

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS (1)

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10' – 0"
4" STD	4.500"	4.026"	19' – 8"
5" STD	5.563"	5.047"	34' – 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

(1) Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.

(2) This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT Roadway Design Manual.

(3) Miter = slope of mitered end of pipe culvert.

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(5) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		116

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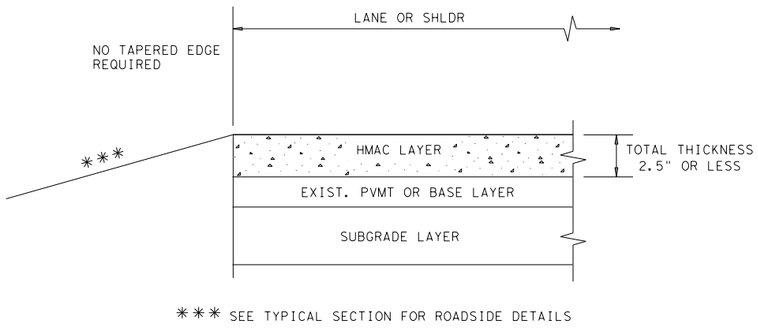
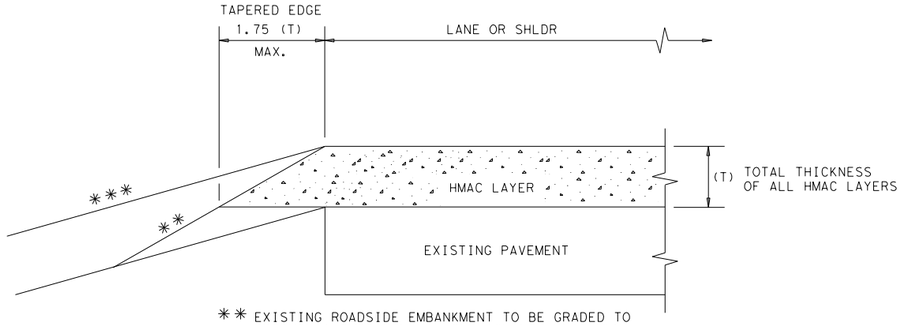


*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

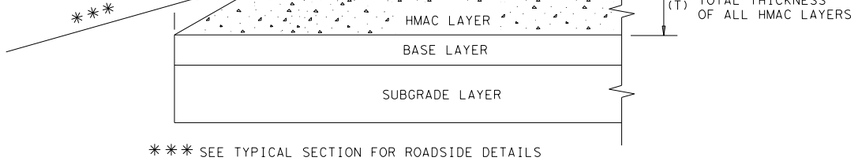
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY
WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

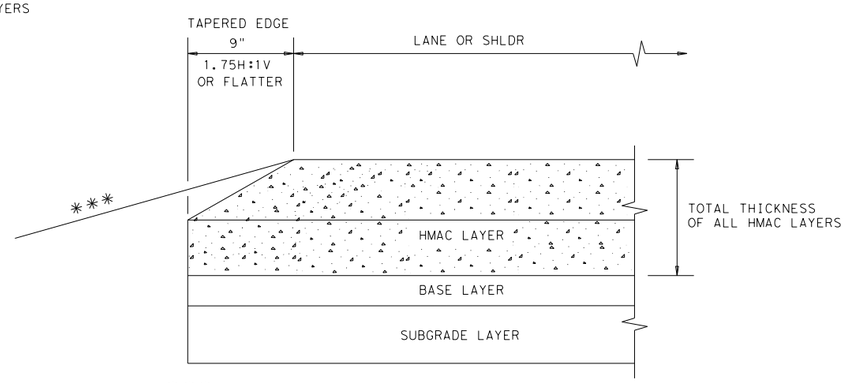
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
OVERLAY OF EXISTING PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 5" OR GREATER

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

(NOT TO SCALE)

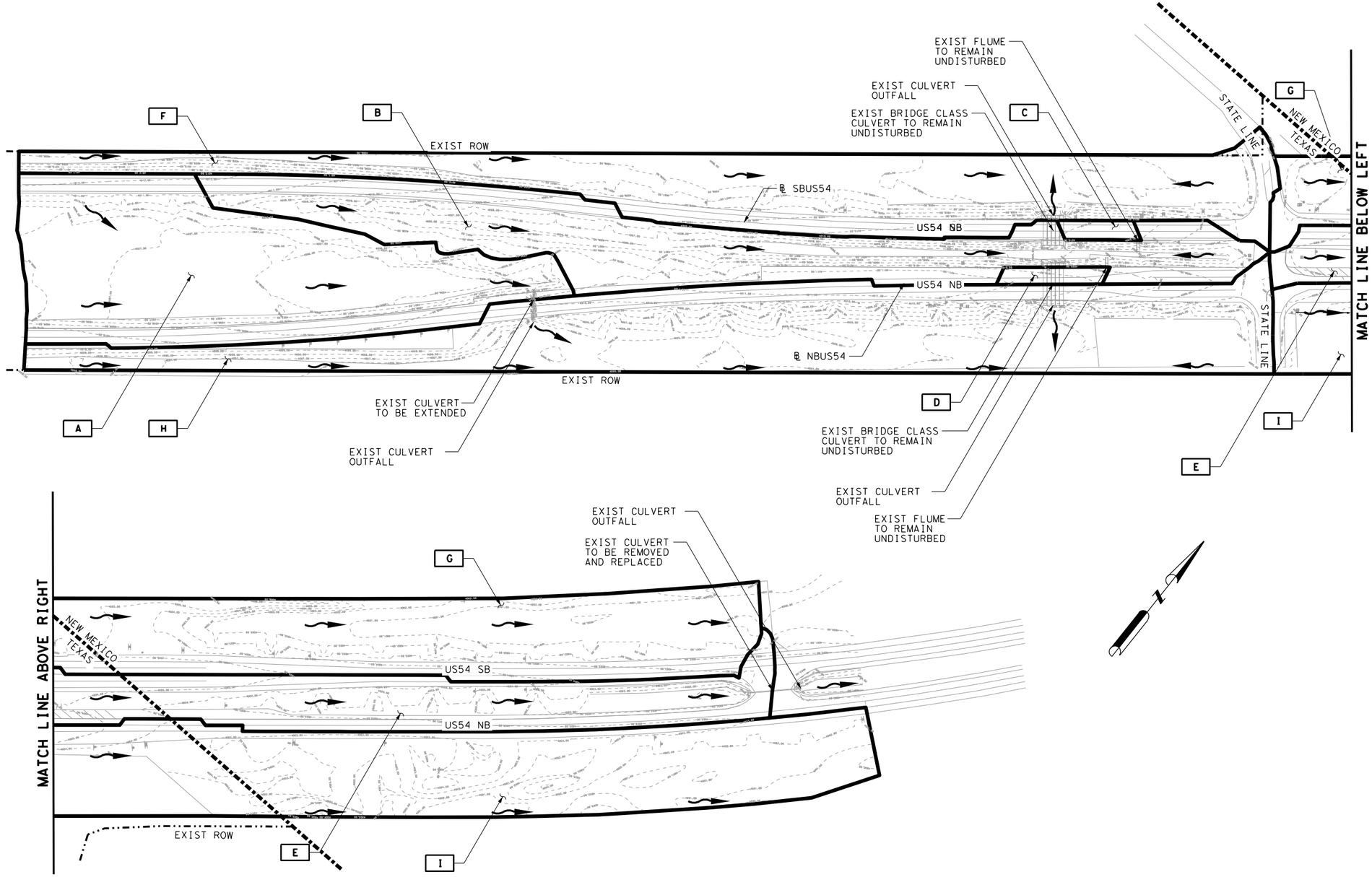
Texas Department of Transportation

Design Division Standard

TAPERED EDGE DETAILS
HMAC PAVEMENT

TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:	
© TxDOT January 2011	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0167	01	126,ETC.	US-54	
	DIST	COUNTY		SHEET NO.	
	ELP	EL PASO		117	



LEGEND

- EXISTING CONTOURS
- AREA BOUNDARY
- FLOW ARROW
- XX DRAINAGE AREA ID

0 50 100 200

SCALE: 1"=200'

NOTES:

1. HYDROLOGY FOR DA A,B,C,D,E,F,G,I PERFORMED IN GEOPAK DRAINAGE USING THE RATIONAL METHOD.
2. HYDROLOGY BASED ON RATIONAL METHOD DESCRIBED IN THE TXDOT HYDRAULIC MANUAL, JULY 2016 SECTION 13 OF CHAPTER 4.
3. RAINFALL INTENSITY-DURATION-FREQUENCY COEFFICIENTS FOR TEXAS, BASED ON UNITED STATES GEOLOGICAL SURVEY (USGS) SCIENTIFIC INVESTIGATIONS, REPORT 2004-5041 "ATLAS OF DEPTH-DURATION-FREQUENCY OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS." (SPREADSHEET RELEASE DATE: AUGUST 31, 2015; DATA TABLE RESHUFFLE BY ASQUITH JULY 14, 2016).

EXISTING DRAINAGE AREA AND RUNOFF COMPUTATIONS

AREA ID	AREA (ac)	AREA TIME OF CONC (min)	AREA C-VALUE	AREA 10-YR INTENSITY	AREA 10-YR DISCHARGE	AREA 100-YR INTENSITY	AREA 100-YR DISCHARGE
A	4.96	15.00	0.50	4.09	10.15	6.06	15.04
B	4.39	15.00	0.50	4.09	8.98	6.06	13.31
C	0.11	10.00	0.95	4.09	0.44	6.06	0.65
D	0.14	10.00	0.95	4.09	0.54	6.06	0.81
E	3.19	15.00	0.50	4.09	6.53	6.06	9.67
F	5.11	15.00	0.50	4.09	10.44	6.06	15.47
G	4.81	15.00	0.50	4.09	9.84	6.06	14.58
H	6.34	15.00	0.50	4.09	12.97	6.06	19.21
I	5.98	15.00	0.50	4.09	12.22	6.06	18.11

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

DRAINAGE

EXISTING DRAINAGE AREA MAP & CALCULATIONS

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		118

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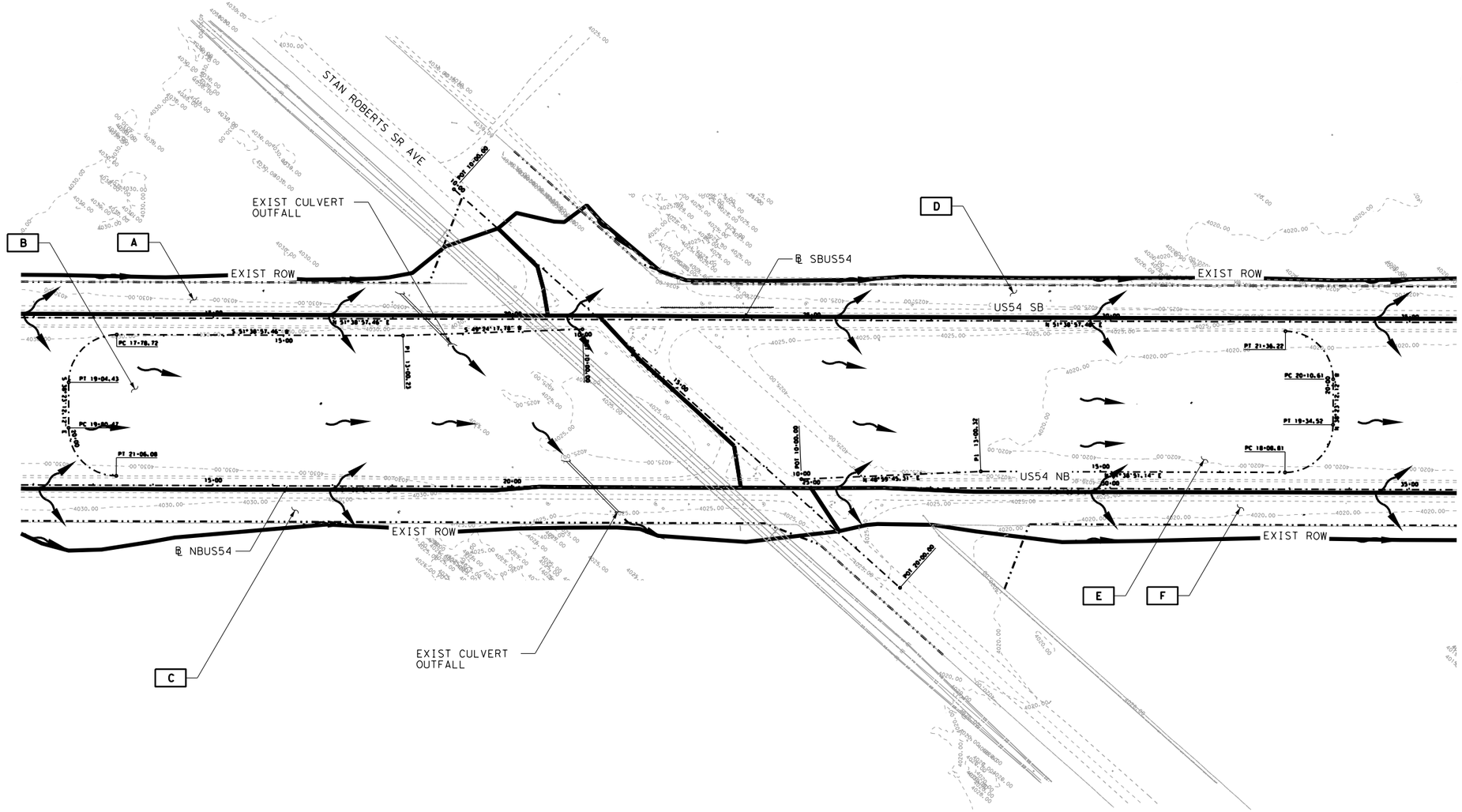

LEGEND

- EXISTING CONTOURS
- AREA BOUNDARY
- FLOW ARROW
- XX — DRAINAGE AREA ID

0 50 100 200

SCALE: 1"=200'

NOTES:

1. HYDROLOGY FOR DA A,B,C,D,E, AND F PERFORMED IN GEOPAK DRAINAGE USING THE RATIONAL METHOD.
2. HYDROLOGY BASED ON RATIONAL METHOD DESCRIBED IN THE TXDOT HYDRAULIC MANUAL, JULY 2016 SECTION 13 OF CHAPTER 4.
3. RAINFALL INTENSITY-DURATION-FREQUENCY COEFFICIENTS FOR TEXAS, BASED ON UNITED STATES GEOLOGICAL SURVEY (USGS) SCIENTIFIC INVESTIGATIONS, REPORT 2004-5041 "ATLAS OF DEPTH-DURATION-FREQUENCY OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS." (SPREADSHEET RELEASE DATE: AUGUST 31, 2015; DATA TABLE RESHUFFLE BY ASQUITH JULY 14, 2016).

EXISTING DRAINAGE AREA AND RUNOFF COMPUTATIONS

AREA ID	AREA (ac)	AREA TIME OF CONC (min)	AREA C-VALUE	AREA 10-YR INTENSITY	AREA 10-YR DISCHARGE	AREA 100-YR INTENSITY	AREA 100-YR DISCHARGE
A	1.77	10.00	0.55	4.09	3.98	6.06	5.89
B	8.06	10.00	0.55	4.09	18.12	6.06	26.85
C	2.45	10.00	0.55	4.09	5.50	6.06	8.15
D	3.30	10.00	0.55	4.09	7.43	6.06	11.01
E	11.33	10.00	0.55	4.09	25.49	6.06	37.77
F	2.71	10.00	0.55	4.09	6.10	6.06	9.04

STATE OF TEXAS
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PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE
DRAINAGE

EXISTING DRAINAGE AREA MAP & CALCULATIONS

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		119

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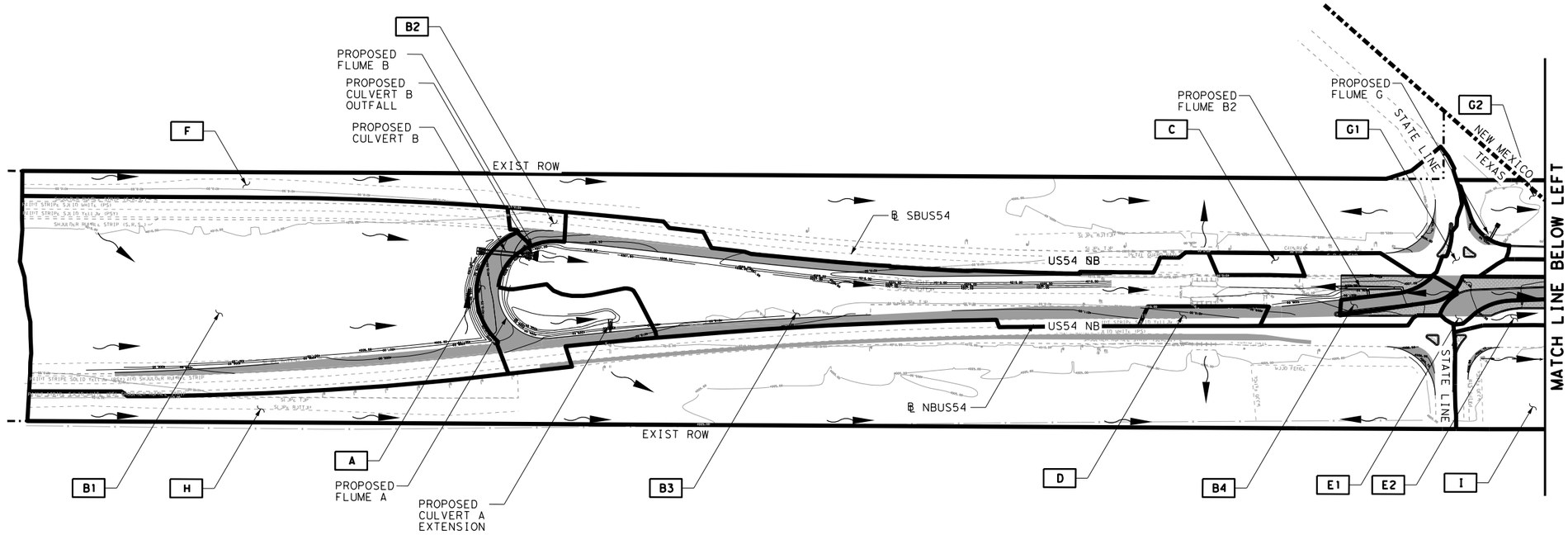
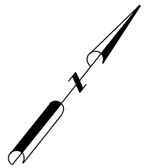


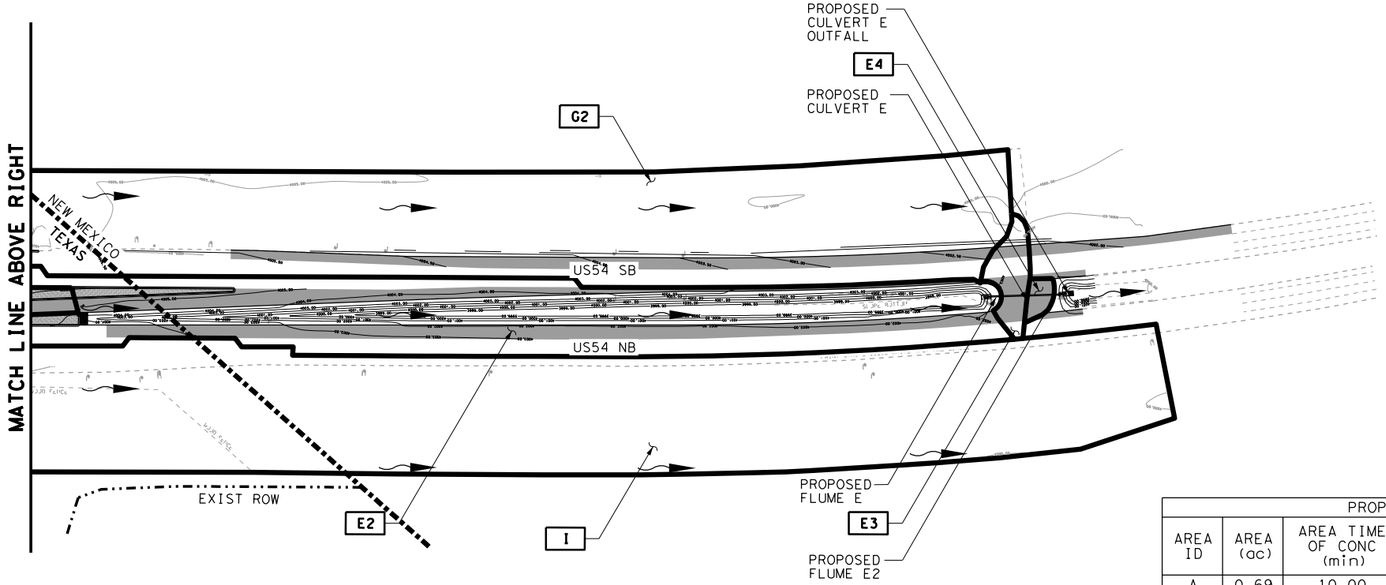


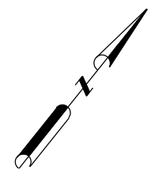
LEGEND

- EXISTING CONTOURS
- AREA BOUNDARY
- FLOW ARROW
- XX DRAINAGE AREA ID

0 50 100 200

SCALE: 1"=200'





PROPOSED DRAINAGE AREA AND RUNOFF COMPUTATIONS							
AREA ID	AREA (ac)	AREA TIME OF CONC (min)	AREA C-VALUE	AREA 10-YR INTENSITY	AREA 10-YR DISCHARGE	AREA 100-YR INTENSITY	AREA 100-YR DISCHARGE
A	0.69	10.00	0.75	4.09	2.10	6.06	3.12
B1	5.24	15.00	0.50	4.09	10.71	6.06	15.87
B2	0.10	10.00	0.95	4.09	0.38	6.06	0.57
B3	3.27	15.00	0.50	4.09	6.69	6.06	9.91
B4	0.11	10.00	0.95	4.09	0.41	6.06	0.60
C	0.11	10.00	0.95	4.09	0.44	6.06	0.65
D	0.14	10.00	0.95	4.09	0.54	6.06	0.81
E1	0.22	10.00	0.95	4.09	0.84	6.06	1.24
E2	2.84	15.00	0.50	4.09	5.81	6.06	8.61
E3	0.14	10.00	0.95	4.09	0.55	6.06	0.82
E4	0.04	10.00	0.95	4.09	0.15	6.06	0.22
F	5.08	15.00	0.50	4.09	10.38	6.06	15.38
G1	0.17	10.00	0.95	4.09	0.66	6.06	0.98
G2	4.67	15.00	0.50	4.09	9.55	6.06	14.14
H	6.29	15.00	0.50	4.09	12.87	6.06	19.07
I	5.98	15.00	0.50	4.09	12.22	6.06	18.11

CSJ: 0167-01-126
US54 STATE LINE RD

DRAINAGE

PROPOSED DRAINAGE AREA MAP & CALCULATIONS

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		120

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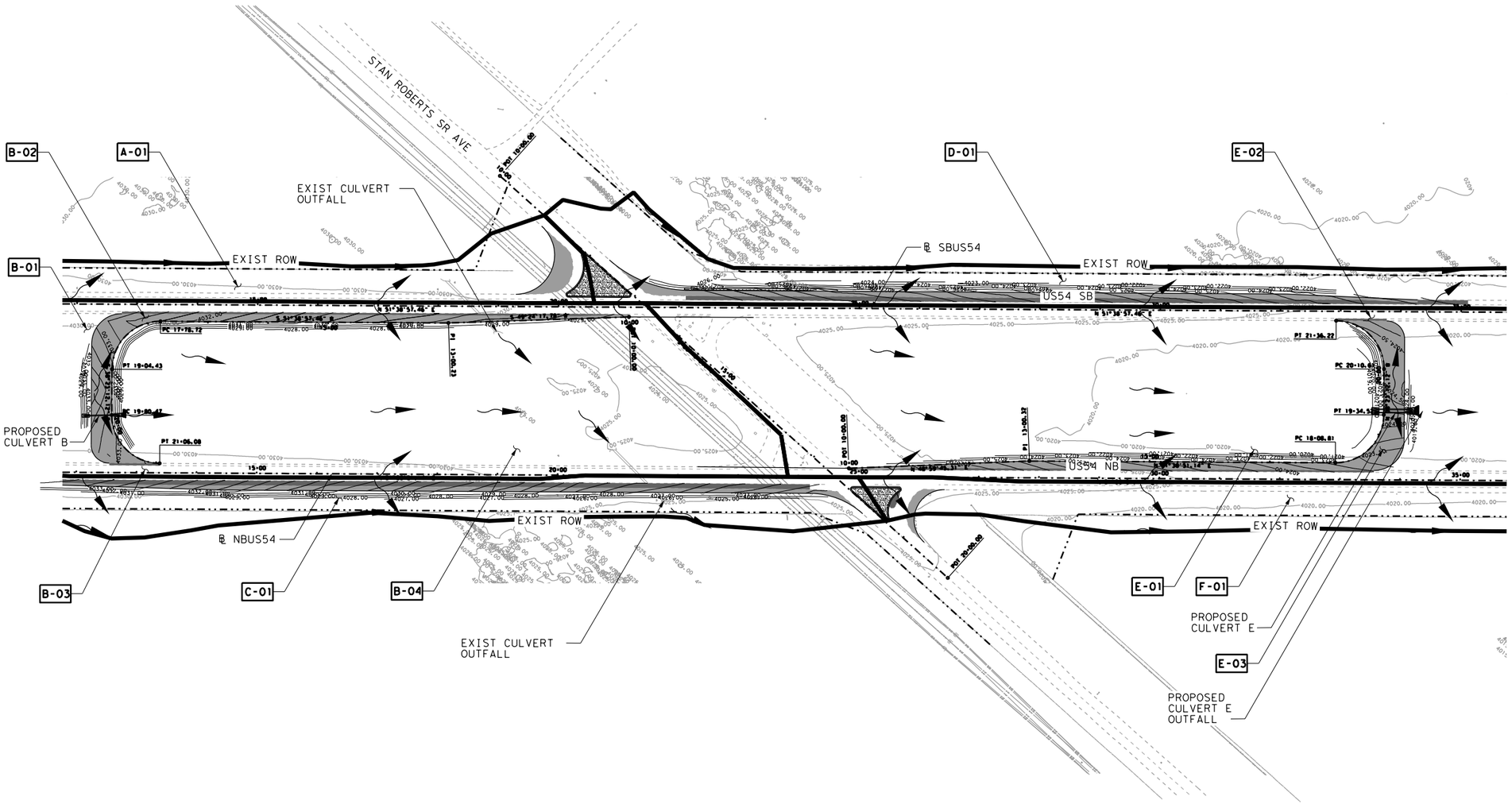

LEGEND

- EXISTING CONTOURS
- AREA BOUNDARY
- FLOW ARROW
- XX DRAINAGE AREA ID

0 50 100 200
SCALE: 1"=200'

NOTES:

1. HYDROLOGY FOR DA A-01, B-01, B-02, B-03, B-04, C-01, D-01, E-01, E-02, E-03, E-04, AND F-01 PERFORMED IN GEOPAK DRAINAGE USING THE RATIONAL METHOD.
2. HYDROLOGY BASED ON RATIONAL METHOD DESCRIBED IN THE TXDOT HYDRAULIC MANUAL, JULY 2016 SECTION 13 OF CHAPTER 4.
3. RAINFALL INTENSITY-DURATION-FREQUENCY COEFFICIENTS FOR TEXAS, BASED ON UNITED STATES GEOLOGICAL SURVEY (USGS) SCIENTIFIC INVESTIGATIONS, REPORT 2004-5041 "ATLAS OF DEPTH-DURATION-FREQUENCY OF PRECIPITATION ANNUAL MAXIMA FOR TEXAS." (SPREADSHEET RELEASE DATE: AUGUST 31, 2015; DATA TABLE RESHUFFLE BY ASQUITH JULY 14, 2016).

PROPOSED DRAINAGE AREA AND RUNOFF COMPUTATIONS

AREA ID	AREA (ac)	AREA TIME OF CONC (min)	AREA C-VALUE	AREA 10-YR INTENSITY	AREA 10-YR DISCHARGE	AREA 100-YR INTENSITY	AREA 100-YR DISCHARGE
A-01	1.78	10.00	0.55	4.09	4.01	6.06	5.94
B-01	1.02	10.00	0.60	4.09	2.51	6.06	3.72
B-02	0.19	10.00	0.95	4.09	0.75	6.06	1.11
B-03	0.16	10.00	0.95	4.09	0.63	6.06	0.93
B-04	6.68	10.00	0.60	4.09	16.39	6.06	24.28
C-01	2.45	10.00	0.60	4.09	6.00	6.06	8.89
D-01	3.30	10.00	0.60	4.09	8.11	6.06	12.01
E-01	7.06	10.00	0.60	4.09	17.33	6.06	25.68
E-02	0.16	10.00	0.95	4.09	0.62	6.06	0.92
E-03	0.19	10.00	0.95	4.09	0.75	6.06	1.11
E-04	0.19	10.00	0.55	4.09	0.43	6.06	0.64
F-01	3.92	10.00	0.60	4.09	9.61	6.06	14.23

STATE OF TEXAS
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5/31/2022

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE DRAINAGE

PROPOSED DRAINAGE AREA MAP & CALCULATIONS

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		121

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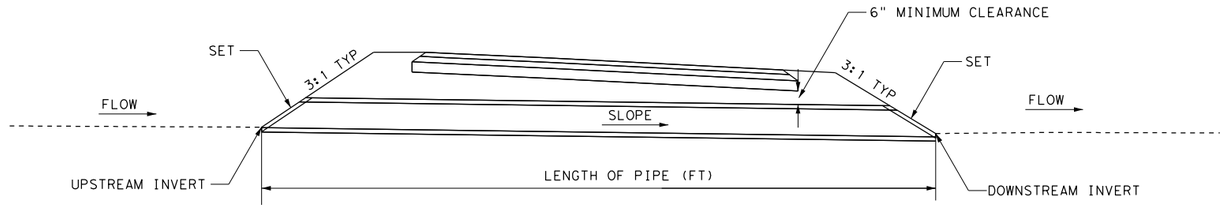

TYPICAL CULVERT SECTION

NTS

Culvert Analysis Results for CULVERT B

Circular
Concrete
18 Inch Dia. Circular
Rise = 1.500
Number Of Barrels = 2
Length = 67.177
Slope = 0.010
Upstream Invert = 4006.200
Downstream Invert = 4005.500
N value = 0.012
Entrance KE value = 0.700

Culvert Discharge	MAX HW	Inlet HW	Outlet HW	Tailwater Elev.
10.710	4007.568	4007.568	4007.568	4005.500

Culvert Discharge	Outlet Velocity	Uniform Depth	Critical Depth	Critical Slope	Friction Slope
10.710	6.443	0.715	0.892	0.005	0.010

Overtopping Definition - Overtopping Profile Supplied

Discharge	Culvert Discharge	Overtopping Discharge	Headwater
10.710	10.710	0.000	4007.568

Number of Overtopping Points = 9

X	Y
0.000	4009.952
4.502	4009.911
7.045	4009.880
7.366	4009.873
14.476	4009.798
14.668	4009.796
16.421	4009.785
17.878	4009.769
20.000	4009.746

Tailwater Definition - User Supplied Tailwater Elevations

Discharge	Tailwater
10.710	4005.500

Culvert Analysis Results for CULVERT E

Circular
Concrete
18 Inch Dia. Circular
Rise = 1.500
Number Of Barrels = 1
Length = 91.348
Slope = 0.009
Upstream Invert = 4000.300
Downstream Invert = 3999.500
N value = 0.012
Entrance KE value = 0.700

Culvert Discharge	MAX HW	Inlet HW	Outlet HW	Tailwater Elev.
5.810	4001.753	4001.753	4001.753	3999.500

Culvert Discharge	Outlet Velocity	Uniform Depth	Critical Depth	Critical Slope	Friction Slope
5.810	6.138	0.792	0.931	0.005	0.009

Overtopping Definition - Overtopping Profile Supplied

Discharge	Culvert Discharge	Overtopping Discharge	Headwater
5.810	5.810	0.000	4001.753

Number of Overtopping Points = 1

X	Y
0.000	4002.900

Tailwater Definition - User Supplied Tailwater Elevations

Discharge	Tailwater
5.810	3999.500

STATE OF TEXAS
CRUZ ALVAREZ
134425
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PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

CULVERT SUMMARY

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		122

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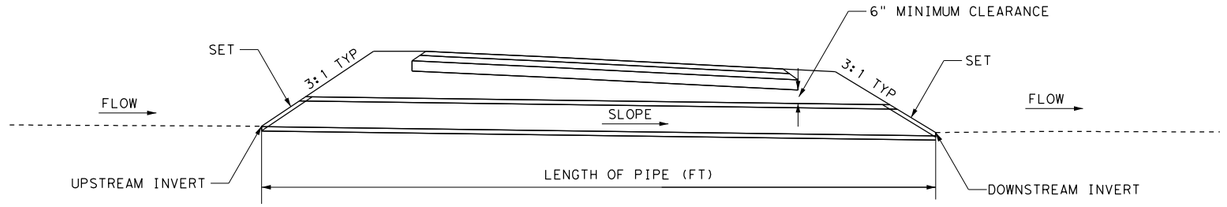

TYPICAL CULVERT SECTION

NTS

Culvert Analysis Results for CULVERT_B

Circular
Concrete
24 Inch Dia. Circular
Rise = 2.000
Number Of Barrels = 1
Length = 42.008
Slope = 0.016
Upstream Invert = 4028.798
Downstream Invert = 4028.142
N value = 0.012
Entrance KE value = 0.700

Culvert Discharge	MAX HW	Inlet HW	Outlet HW	Tailwater Elev.
1.020	4029.264	4029.264	4029.264	1.000

Culvert Discharge	Outlet Velocity	Uniform Depth	Critical Depth	Critical Slope	Friction Slope
1.020	4.493	0.250	0.350	0.004	0.016

Overtopping Definition - Overtopping Profile Supplied

Discharge	Culvert Discharge	Overtopping Discharge	Headwater
1.020	1.020	0.000	4029.264

Number of Overtopping Points = 4

X	Y
0.000	4033.550
9.989	4033.597
9.989	4033.597
20.000	4033.684

Tailwater Definition - User Supplied Tailwater Elevations

Discharge	Tailwater
1.020	1.000

Culvert Analysis Results for CULVERT_E

Circular
Concrete
24 Inch Dia. Circular
Rise = 2.000
Number Of Barrels = 2
Length = 47.286
Slope = 0.005
Upstream Invert = 4017.557
Downstream Invert = 4017.325
N value = 0.012
Entrance KE value = 0.500

Culvert Discharge	MAX HW	Inlet HW	Outlet HW	Tailwater Elev.
17.330	4019.119	4019.119	4019.119	1.000

Culvert Discharge	Outlet Velocity	Uniform Depth	Critical Depth	Critical Slope	Friction Slope
17.330	5.483	1.005	1.050	0.004	0.005

Overtopping Definition - Overtopping Profile Supplied

Discharge	Culvert Discharge	Overtopping Discharge	Headwater
17.330	17.330	0.000	4019.119

Number of Overtopping Points = 5

X	Y
0.000	4024.188
6.704	4024.241
6.848	4024.244
15.630	4024.316
20.000	4024.348

Tailwater Definition - User Supplied Tailwater Elevations

Discharge	Tailwater
17.330	1.000

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE

CULVERT SUMMARY

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		123

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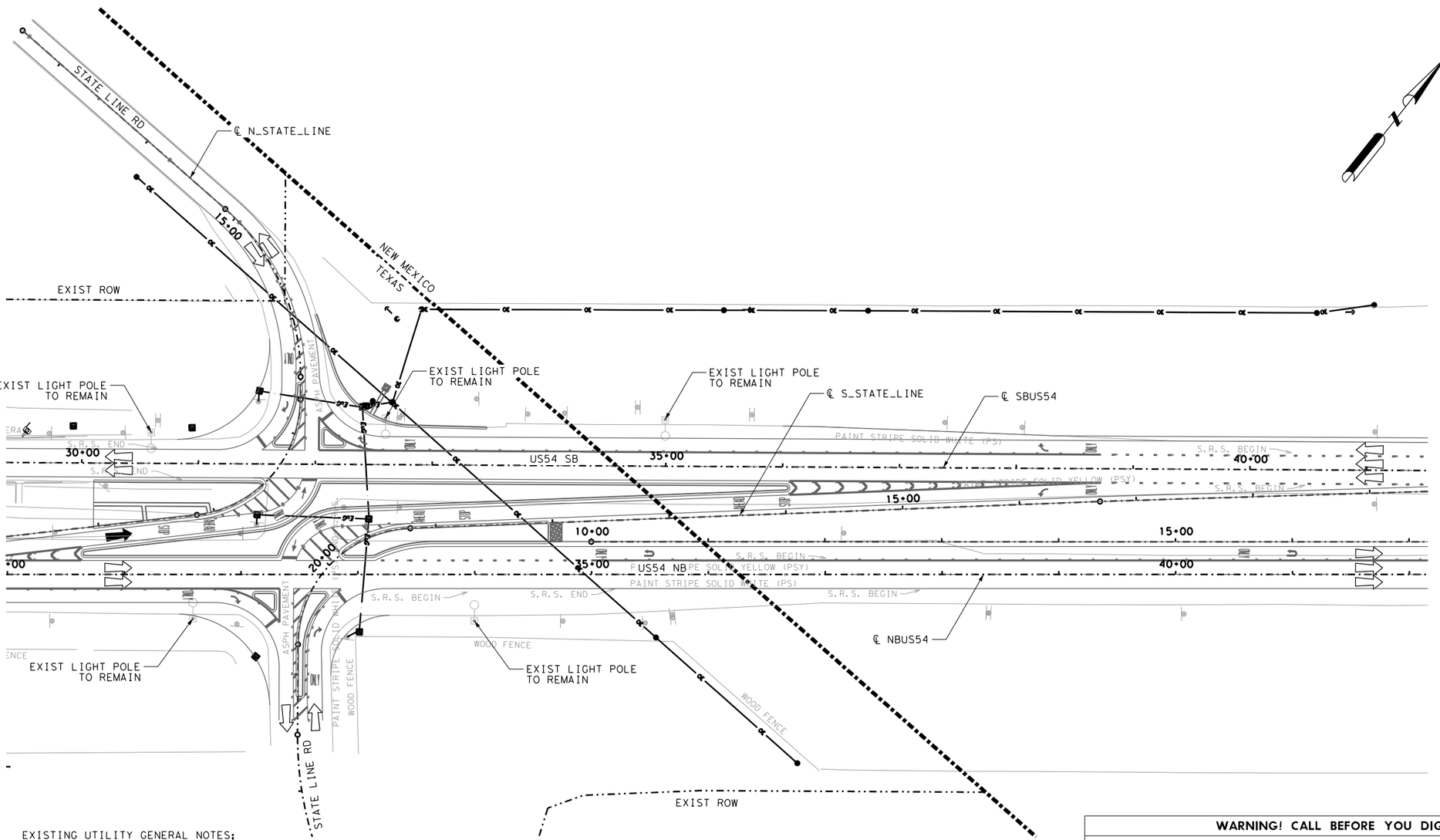

LEGEND

- EXIST OVERHEAD POWER LINE
- EXIST UNDERGROUND POWER LINE
- EXIST CCTV
- EXIST UTILITY POLE
- EXIST LIGHT POLE
- EXIST GUY ANCHOR
- GROUND MOUNTED SIGN
- DOUBLE SIDED SIGN
- EXIST PULL BOX
- DIRECTION OF TRAFFIC (EXISTING)
- DIRECTION OF TRAFFIC (PROPOSED)

EXISTING UTILITY GENERAL NOTES;

1. ALL UTILITIES SHOWN ARE DEPICTED AT QUALITY LEVEL D (QLD) PER ASCE CI/ASCE 3802, STANDARD GUIDELINE FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA, AS FOLLOWS:

   - QUALITY LEVEL D (QLD): INFORMATION DERIVED FROM EXISTING RECORDS OR ORAL RECOLLECTIONS.

2. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATIONS AS TO TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERE TO. THE CONTRACTOR SHALL VERIFY LOCATION (HORIZONTAL AND VERTICAL) OF UNDERGROUND PIPELINE, CONDUITS, AND STRUCTURES BY CONTACTING OWNERS OF UNDERGROUND UTILITIES AND BY PROSPECTING IN ADVANCE OF EXCAVATING OPERATIONS.

3. ACTIVE SERVICE LINE UTILITIES INCLUDING WATER AND SANITARY SEWER, WHETHER OR NOT SHOWN ON THE DRAWINGS, SHALL BE ADEQUATELY PROTECTED FROM DAMAGE. ANY DAMAGED UTILITIES SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. SERVICE MUST BE PROVIDED AT ALL TIMES.

4. INACTIVE OR ABANDONED UTILITIES ENCOUNTERED DURING CONSTRUCTION SHALL BE REMOVED, CAPPED, OR PLUGGED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. IN THE ABSENCE OF SPECIFIC REQUIREMENTS, ALL WORK UNDER THIS HEADING SHALL BE DONE IN ACCORDANCE WITH LOCAL CODES OR REGULATIONS OR AS DIRECTED BY THE ENGINEER.

5. EXISTING GAS MAINS CURRENTLY IN SERVICE MUST REMAIN IN SERVICE THROUGHOUT CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING GAS MAINS, INCLUDING SERVICE LINES, FROM DAMAGE AS A RESULT OF THE CONSTRUCTION ACTIVITIES. IN THE EVENT THAT EXISTING GAS MAINS ARE IN CONFLICT WITH CONSTRUCTION, CONTRACTOR SHALL NOTIFY ENGINEER.

6. CALL FOR LINE SPOT BEFORE BEGINNING CONSTRUCTION OR EXCAVATION. TEXAS GAS SERVICE RECOMMENDS THAT CONTRACTOR CALL FOR LINE SPOTS PRIOR TO EXCAVATING IN THE AREA. IT IS REQUIRED THAT CONTRACTOR CALL TEXAS GAS SERVICE 48 HOURS PRIOR TO EXCAVATING THE AREA NEAR HIGH PRESSURE AND INTERMEDIATE PRESSURE GAS MAINS.

7. THE CONTRACTOR SHALL NOT INTERRUPT THE SERVICE FUNCTION OR DISTURB THE SUPPORT OF ANY UTILITY WITHOUT AUTHORITY FROM THE OWNER OR ORDER FROM THE ENGINEER. ALL VALVES, SWITCHES, VAULTS AND METERS SHALL BE MAINTAINED READILY ACCESSIBLE FOR EMERGENCY SHUTOFF.

8. WHEN NECESSARY, THE CONTRACTOR SHALL CONDUCT ITS OPERATIONS AS TO PERMIT ACCESS TO THE WORK SITE AND PROVIDE TIME FOR UTILITY WORK TO BE ACCOMPLISHED DURING THE PROGRESS OF THE WORK.

9. ACTIVE WATER AND SANITARY SEWER MAIN LINE UTILITIES (INCLUDING SERVICE LINES), WHETHER OR NOW SHOWN ON THESE DRAWINGS, SHALL BE ADEQUATELY PROTECTED WITH BERMS AND/OR BRIDGING DURING CONSTRUCTION SO AS NOT TO DAMAGE THE EXISTING MAINS. ANY DAMAGES CAUSED BY THE CONTRACTOR WILL BE REPAIRED AS NECESSARY IN ACCORDANCE WITH THE EL PASO WATER UTILITIES STANDARDS AND SPECIFICATIONS, AT NO ADDITIONAL COST TO THE OWNER.

WARNING! CALL BEFORE YOU DIG.

COORDINATION WITH UTILITIES:

CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES PRIOR TO ANY EXCAVATION AND/OR RELOCATION OF EXISTING UTILITIES ENCOUNTERED DURING CONSTRUCTION WORK.

CALL TEXAS EXCAVATION SAFETY SYSTEM AT LEAST TWO WORKING DAYS BEFORE YOU DIG ANYWHERE IN TEXAS FOR UTILITY LOCATES (800)344-8377 (DIGTESS)

UTILITY CONTACTS:

EL PASO WATER UTILITIES:
PUBLIC SERVICE BOARD
AMY CASTNER
1154 HAWKINS BLVD.
EL PASO TX 79961
(915)594-5647

TEXAS GAS SERVICE:
SAUL MAGALLANES
4700 POLLARD STREET
EL PASO, TEXAS 79930
(915)680-7275

TIME WARNER CABLE:
RAYMOND MENDOZA
20 CONCORD STREET
EL PASO, TEXAS 79906
(915)775-7415

SPRINT COMMUNICATIONS:
JAMES STUART
1616 MARYLAND RD
IRVING, TX 75061
(972)791-8556

EL PASO ELECTRIC CO. (DIST.):
FRANK VEJIL
100 N STANTON ST.
EL PASO, TEXAS 79901
(915)543-2075

AT&T TEXAS:
DIANA McKOWN
11200 PELLICANO DRIVE
EL PASO, TEXAS 79935
(915)595-5142

MAGELLAN MIDSTREAM PARTNERS:
GREG MELTON
(915)637-4005

VINTON PIPELINE LIC:
MIGUEL CARRERA
W. SILVER, INC
9059 DONIPHAN DR
VINTON, TX 79913
(915)217-2929

0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

UTILITY

UTILITY LAYOUT

STA 458+00.00 TO STA 470+00.00

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		124

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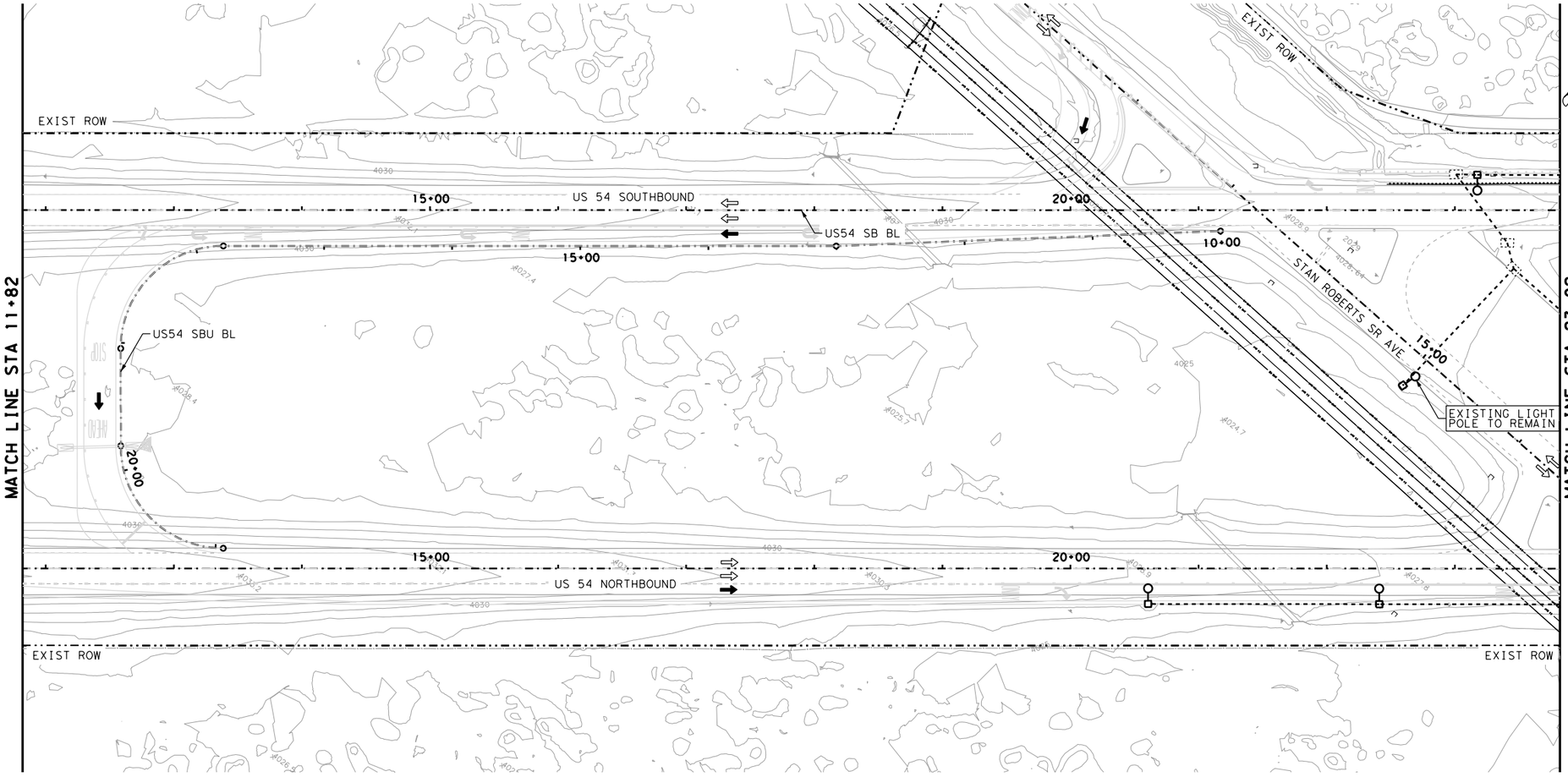

UTILITY LEGEND

- EXIST OVERHEAD POWER LINE
- EXIST GAS LINE
- EXIST WASTE WATER LINE
- EXIST TX FIBER OPTIC CABLE
- EXIST UNDERGROUND POWER LINE
- EXIST WATER LINE
- EXIST TELECOM FIBER OPTIC
- EXIST ONEOK GAS LINE
- EXIST STORM DRAIN LINE
- EXIST UTILITY POLE
- EXIST LIGHT POLE
- EXIST TRAFFIC CONTROL BOX
- EXIST UTILITY MANHOLE
- EXIST FIRE HYDRANT
- EXIST UTILITY PEDESTAL
- EXIST PULL BOX
- EXIST PULL BOX
- DIRECTION OF TRAFFIC (EXISTING)
- DIRECTION OF TRAFFIC (PROPOSED)

0 25 50 100

SCALE: 1"=100'

EXISTING UTILITY GENERAL NOTES:

1. ALL UTILITIES SHOWN ARE DEPICTED AT QUALITY LEVEL D (QLD) PER ASCE CI/ASCE 3802, STANDARD GUIDELINE FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA, AS FOLLOWS:
   - QUALITY LEVEL D (QLD): INFORMATION DERIVED FROM EXISTING RECORDS OR ORAL RECOLLECTIONS.
2. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATIONS AS TO TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERE TO. THE CONTRACTOR SHALL VERIFY LOCATION (HORIZONTAL AND VERTICAL) OF UNDERGROUND PIPELINE, CONDUITS, AND STRUCTURES BY CONTACTING OWNERS OF UNDERGROUND UTILITIES AND BY PROSPECTING IN ADVANCE OF EXCAVATING OPERATIONS.
3. ACTIVE SERVICE LINE UTILITIES INCLUDING WATER AND SANITARY SEWER, WHETHER OR NOT SHOWN ON THE DRAWINGS, SHALL BE ADEQUATELY PROTECTED FROM DAMAGE. ANY DAMAGED UTILITIES SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. SERVICE MUST BE PROVIDED AT ALL TIMES.
4. INACTIVE OR ABANDONED UTILITIES ENCOUNTERED DURING CONSTRUCTION SHALL BE REMOVED, CAPPED, OR PLUGGED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. IN THE ABSENCE OF SPECIFIC REQUIREMENTS, ALL WORK UNDER THIS HEADING SHALL BE DONE IN ACCORDANCE WITH LOCAL CODES OR REGULATIONS OR AS DIRECTED BY THE ENGINEER.
5. EXISTING GAS MAINS CURRENTLY IN SERVICE MUST REMAIN IN SERVICE THROUGHOUT CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING GAS MAINS, INCLUDING SERVICE LINES, FROM DAMAGE AS A RESULT OF THE CONSTRUCTION ACTIVITIES. IN THE EVENT THAT EXISTING GAS MAINS ARE IN CONFLICT WITH CONSTRUCTION, CONTRACTOR SHALL NOTIFY ENGINEER.
6. CALL FOR LINE SPOT BEFORE BEGINNING CONSTRUCTION OR EXCAVATION. TEXAS GAS SERVICE RECOMMENDS THAT CONTRACTOR CALL FOR LINE SPOTS PRIOR TO EXCAVATING IN THE AREA. IT IS REQUIRED THAT CONTRACTOR CALL TEXAS GAS SERVICE 48 HOURS PRIOR TO EXCAVATING THE AREA NEAR HIGH PRESSURE AND INTERMEDIATE PRESSURE GAS MAINS.
7. THE CONTRACTOR SHALL NOT INTERRUPT THE SERVICE FUNCTION OR DISTURB THE SUPPORT OF ANY UTILITY WITHOUT AUTHORITY FROM THE OWNER OR ORDER FROM THE ENGINEER. ALL VALVES, SWITCHES, VAULTS AND METERS SHALL BE MAINTAINED READILY ACCESSIBLE FOR EMERGENCY SHUTOFF.
8. WHEN NECESSARY, THE CONTRACTOR SHALL CONDUCT ITS OPERATIONS AS TO PERMIT ACCESS TO THE WORK SITE AND PROVIDE TIME FOR UTILITY WORK TO BE ACCOMPLISHED DURING THE PROGRESS OF THE WORK.
9. ACTIVE WATER AND SANITARY SEWER MAIN LINE UTILITIES (INCLUDING SERVICE LINES), WHETHER OR NOW SHOWN ON THESE DRAWINGS, SHALL BE ADEQUATELY PROTECTED WITH BERMS AND/OR BRIDGING DURING CONSTRUCTION SO AS NOT TO DAMAGE THE EXISTING MAINS. ANY DAMAGES CAUSED BY THE CONTRACTOR WILL BE REPAIRED AS NECESSARY IN ACCORDANCE WITH THE EL PASO WATER UTILITIES STANDARDS AND SPECIFICATIONS, AT NO ADDITIONAL COST TO THE OWNER.

STATE OF TEXAS
DOUGLAS BURNETT JR.
140757
LICENSED
PROFESSIONAL ENGINEER
5.31.22

Doug Burnett

US-54

CSJ: 0167-01-133
US 54 STAN ROBERTS SR AVE

UTILITY LAYOUT
STA 11+82 TO STA 23+82

SHEET 1 OF 2

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-612
11701 Stonehollow Dr | Suite 100 | Austin, TX 78758
Phone: 512-821-2081 | Fax: 512-821-2086

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		125

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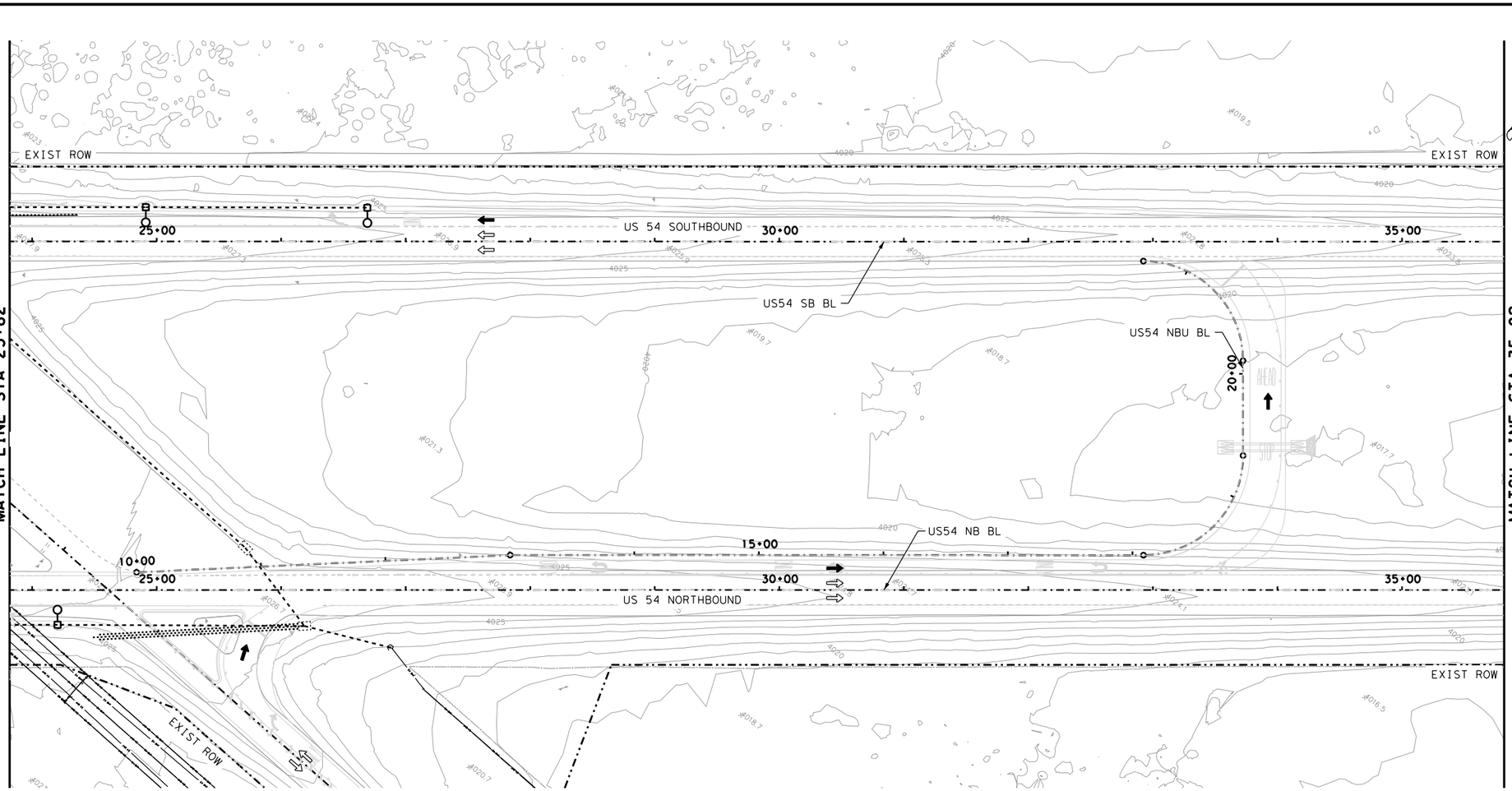

UTILITY LEGEND

- EXIST OVERHEAD POWER LINE
- EXIST GAS LINE
- EXIST WASTE WATER LINE
- EXIST TX FIBER OPTIC CABLE
- EXIST UNDERGROUND POWER LINE
- EXIST WATER LINE
- EXIST TELECOM FIBER OPTIC
- EXIST ONEOK GAS LINE
- EXIST STORM DRAIN LINE
- EXIST UTILITY POLE
- EXIST LIGHT POLE
- EXIST TRAFFIC CONTROL BOX
- EXIST UTILITY MANHOLE
- EXIST FIRE HYDRANT
- EXIST UTILITY PEDESTAL
- EXIST PULL BOX
- EXIST PULL BOX
- DIRECTION OF TRAFFIC (EXISTING)
- DIRECTION OF TRAFFIC (PROPOSED)

EXISTING UTILITY GENERAL NOTES:

1. ALL UTILITIES SHOWN ARE DEPICTED AT QUALITY LEVEL D (QLD) PER ASCE CI/ASCE 3802, STANDARD GUIDELINE FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA, AS FOLLOWS:
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0 25 50 100
SCALE: 1"=100'

STATE OF TEXAS
DOUGLAS BURNETT JR.
140757
LICENSED PROFESSIONAL ENGINEER
5.31.22

US-54

CSJ: 0167-01-133
US 54 STAN ROBERTS SR AVE

UTILITY LAYOUT
STA 23+82 TO STA 35+82

SHEET 2 OF 2

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812
11701 Stonelake Dr | Suite 100 | Austin, TX 78758
Phone: 512-821-2081 | Fax: 512-821-2086

AECOM
AECOM Technical Services Inc, F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		126

DATE: 5/31/2022 11:26:55 AM
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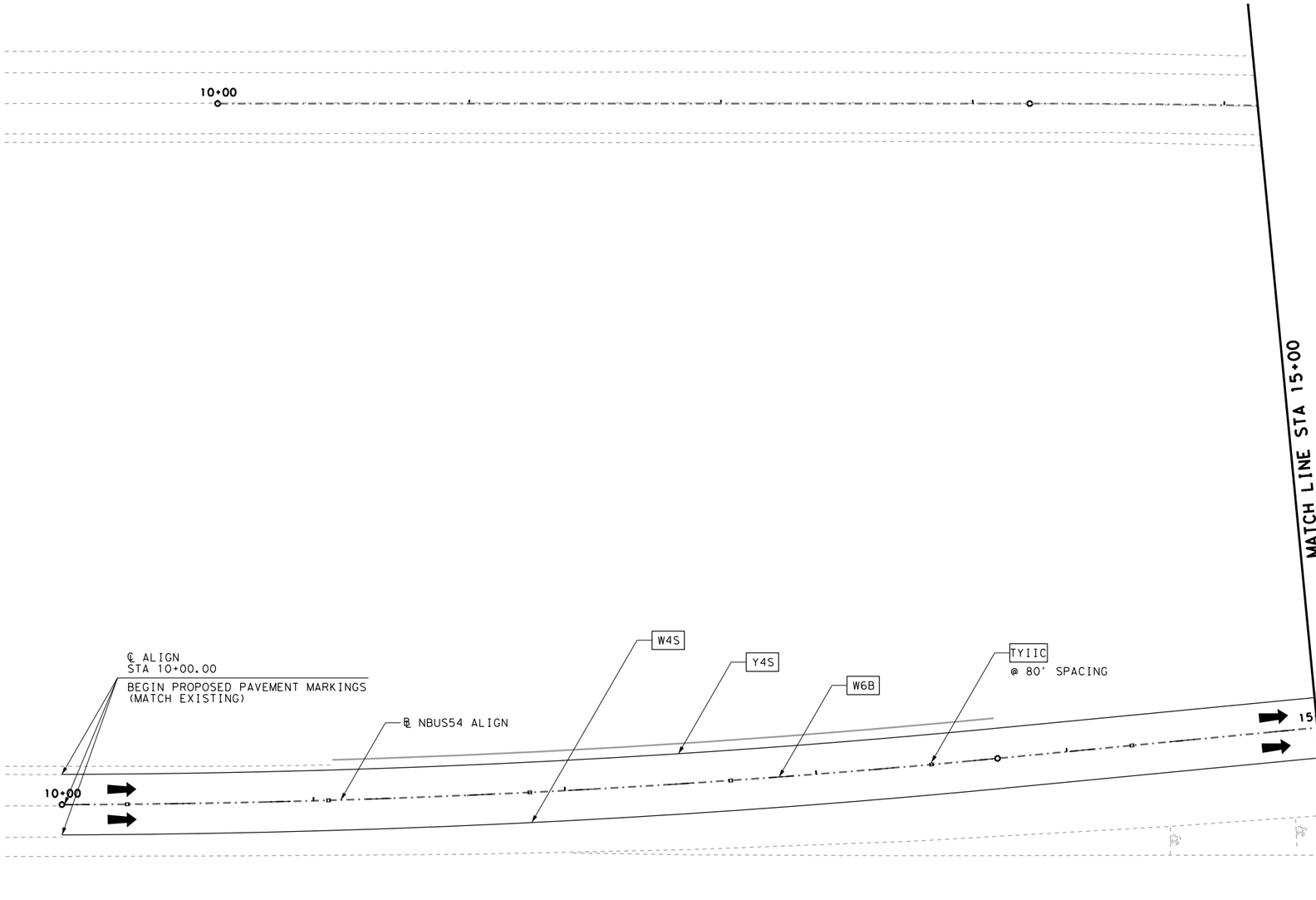

LEGEND

W4S	RE PM W/RET REQ (W) 4" (SLD)
Y4S	RE PM W/ RET REQ (Y) 4" (SLD)
W6B	REFL PAV MRK (W) 6" (BRK)
Y8S	RE PM W/ RET REQ (Y) 8" (SLD)
W8S	REFL PAV MRK (W) 8" (SLD)
W8D	REFL PAV MRK (W) 8" (DOT) 3' STRIPE + 9' GAP
W12S	REFL PAV MRK (W) 12" (SLD)
W24S	REFL PAV MRK (W) 24" (SLD)
YMED	REFL PAV MRK (Y) 24" (MED NOSE)
TYIIC	REFL PAV MRK TY II-C-R
WRD	REFL PAV MRK (W) (WORD)
ARW	REFL PAV MRK (W) (ARROW)
U-ARW	REFL PAV MRK (W) (UTURN ARROW)

DIRECTION OF TRAFFIC (EXISTING)

DIRECTION OF TRAFFIC (PROPOSED)

0 25 50

SCALE: 1"=50'

PAVEMENT MARKING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0666	6170	REFL PAV MRK TY II (W)4"(SLD)	LF	505
0666	6171	REFL PAV MRK TY II (W)6"(BRK)	LF	130
0666	6207	REFL PAV MRK TY II (Y)4"(SLD)	LF	500
0666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	505
0666	6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	130
0666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	500
0672	6010	REFL PAV MRKR TY II-C-R	EA	6

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

PROPOSED PAVEMENT MARKINGS

SHEET 1 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		127

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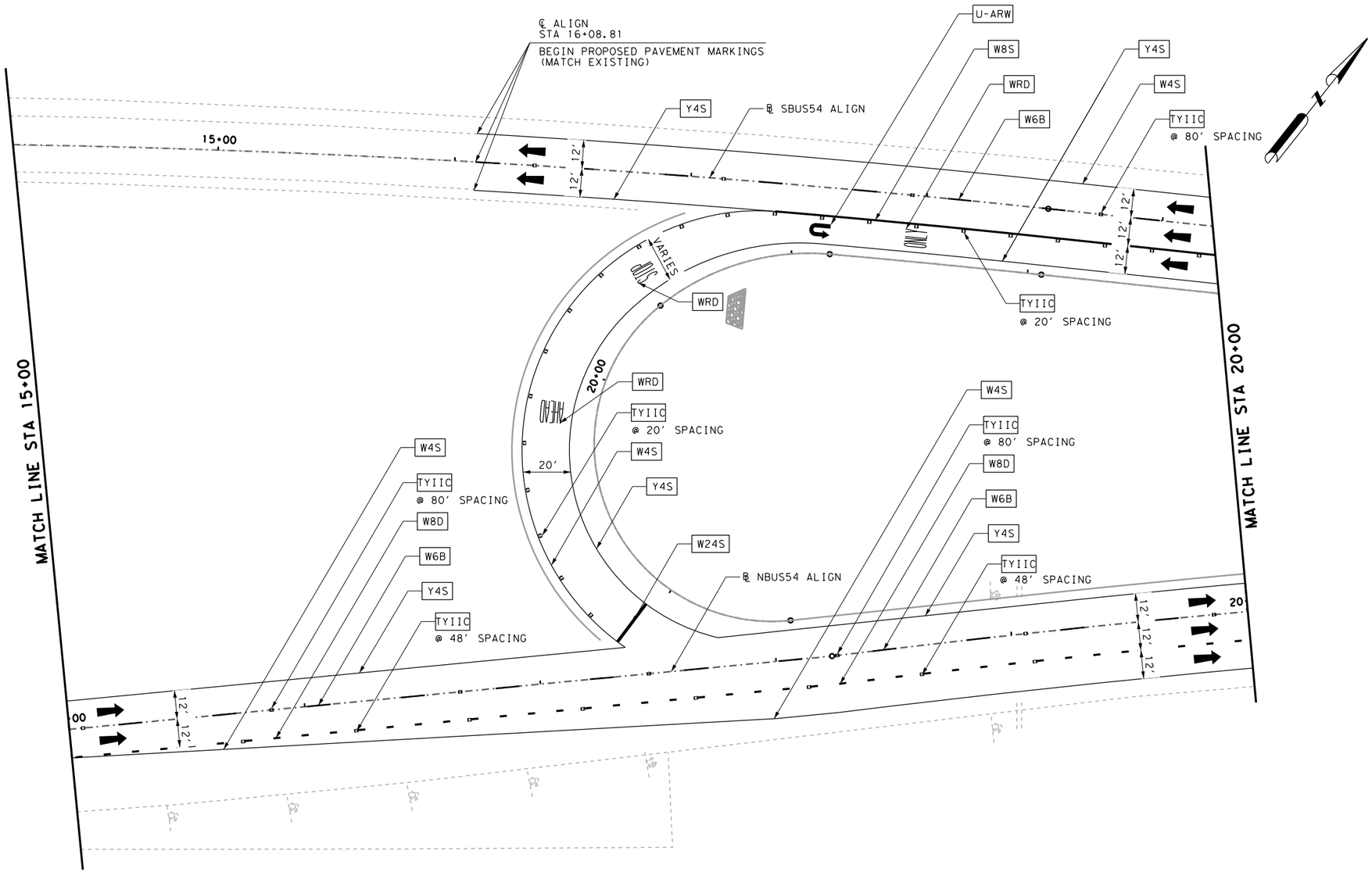

LEGEND

W4S	RE PM W/RET REQ (W) 4" (SLD)
Y4S	RE PM W/ RET REQ (Y) 4" (SLD)
W6B	REFL PAV MRK (W) 6" (BRK)
Y8S	RE PM W/ RET REQ (Y) 8" (SLD)
W8S	REFL PAV MRK (W) 8" (SLD)
W8D	REFL PAV MRK (W) 8" (DOT) 3' STRIPE + 9' GAP
W12S	REFL PAV MRK (W) 12" (SLD)
W24S	REFL PAV MRK (W) 24" (SLD)
YMED	REFL PAV MRK (Y) 24" (MED NOSE)
TYIIC	REFL PAV MRK TY II-C-R
WRD	REFL PAV MRK (W) (WORD)
ARW	REFL PAV MRK (W) (ARROW)
U-ARW	REFL PAV MRK (W) (UTURN ARROW)

DIRECTION OF TRAFFIC (EXISTING)
DIRECTION OF TRAFFIC (PROPOSED)

0 25 50
SCALE: 1"=50'

PAVEMENT MARKING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0666	6030	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF	130
0666	6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	190
0666	6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	20
0666	6063	REFL PAV MRK TY I (W)(UTURN ARW)(100MIL)	EA	1
0666	6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	3
0666	6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	1075
0666	6171	REFL PAV MRK TY II (W) 6" (BRK)	LF	200
0666	6176	REFL PAV MRK TY II (W) 8" (DOT)	LF	130
0666	6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	190
0666	6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	20
0666	6187	REFL PAV MRK TY II (W) (UTURN ARROW)	EA	1
0666	6192	REFL PAV MRK TY II (W) (WORD)	EA	3
0666	6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF	1020
0666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	1075
0666	6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	200
0666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	1020
0672	6010	REFL PAV MRKR TY II-C-R	EA	42

CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS
Carlos Duran P.E.
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

PROPOSED
PAVEMENT MARKINGS

SHEET 2 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		128

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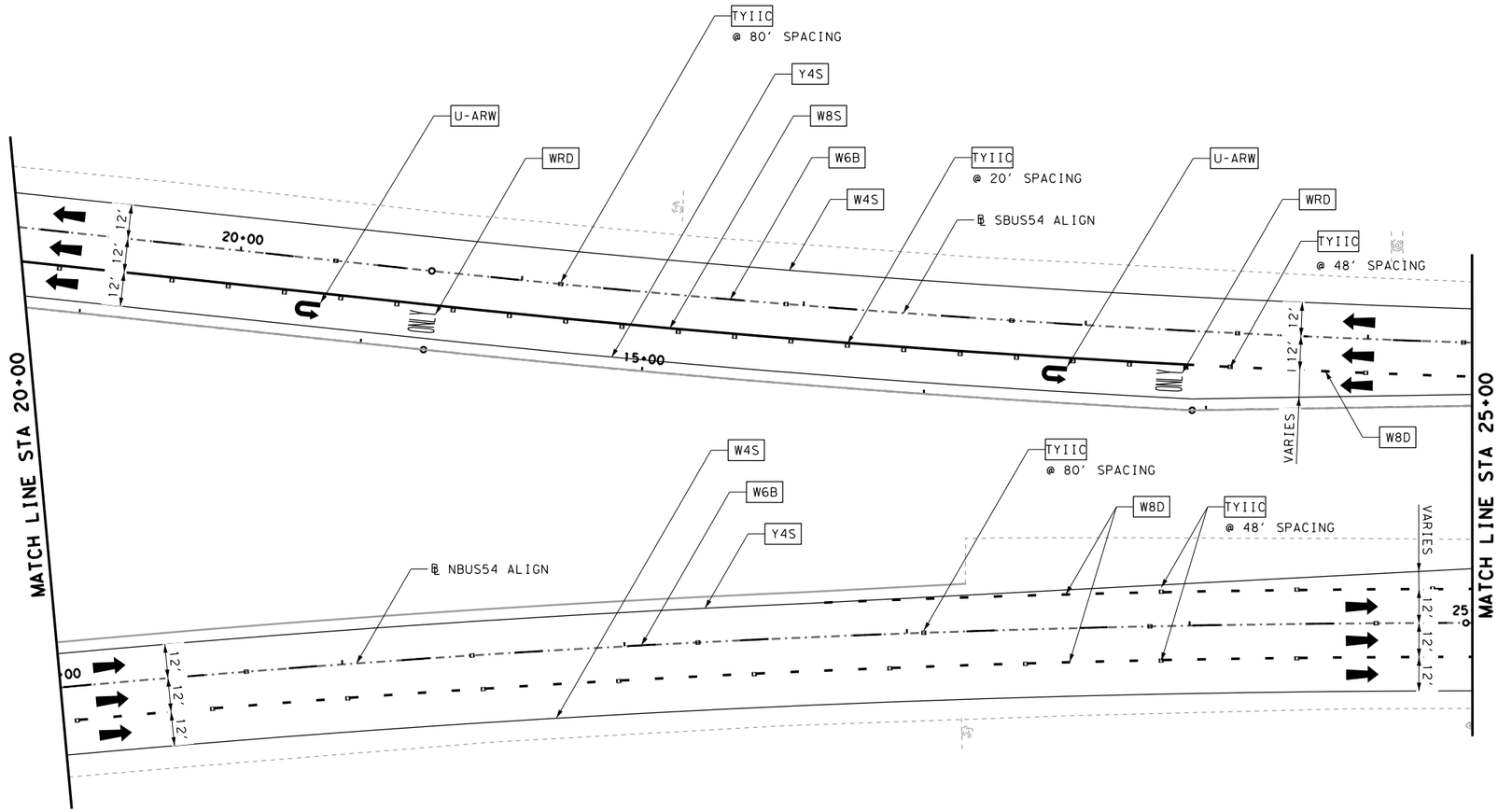

LEGEND

W4S	RE PM W/RET REQ (W) 4" (SLD)
Y4S	RE PM W/ RET REQ (Y) 4" (SLD)
W6B	REFL PAV MRK (W) 6" (BRK)
Y8S	RE PM W/ RET REQ (Y) 8" (SLD)
W8S	REFL PAV MRK (W) 8" (SLD)
W8D	REFL PAV MRK (W) 8" (DOT) 3' STRIPE + 9' GAP
W12S	REFL PAV MRK (W) 12" (SLD)
W24S	REFL PAV MRK (W) 24" (SLD)
YMED	REFL PAV MRK (Y) 24" (MED NOSE)
TYIIC	REFL PAV MRK TY II-C-R
WRD	REFL PAV MRK (W) (WORD)
ARW	REFL PAV MRK (W) (ARROW)
U-ARW	REFL PAV MRK (W) (UTURN ARROW)

DIRECTION OF TRAFFIC (EXISTING)

DIRECTION OF TRAFFIC (PROPOSED)

0 25 50

SCALE: 1"=50'

PAVEMENT MARKING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0666	6030	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF	210
0666	6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	420
0666	6063	REFL PAV MRK TY I (W)(UTURN ARW)(100MIL)	EA	2
0666	6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	2
0666	6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	1015
0666	6171	REFL PAV MRK TY II (W) 6" (BRK)	LF	260
0666	6176	REFL PAV MRK TY II (W) 8" (DOT)	LF	210
0666	6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	420
0666	6187	REFL PAV MRK TY II (W) (UTURN ARROW)	EA	2
0666	6192	REFL PAV MRK TY II (W) (WORD)	EA	2
0666	6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF	1015
0666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	1015
0666	6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	260
0666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	1015
0672	6010	REFL PAV MRKR TY II-C-R	EA	50

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

PROPOSED
PAVEMENT MARKINGS

SHEET 3 OF 9

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		129

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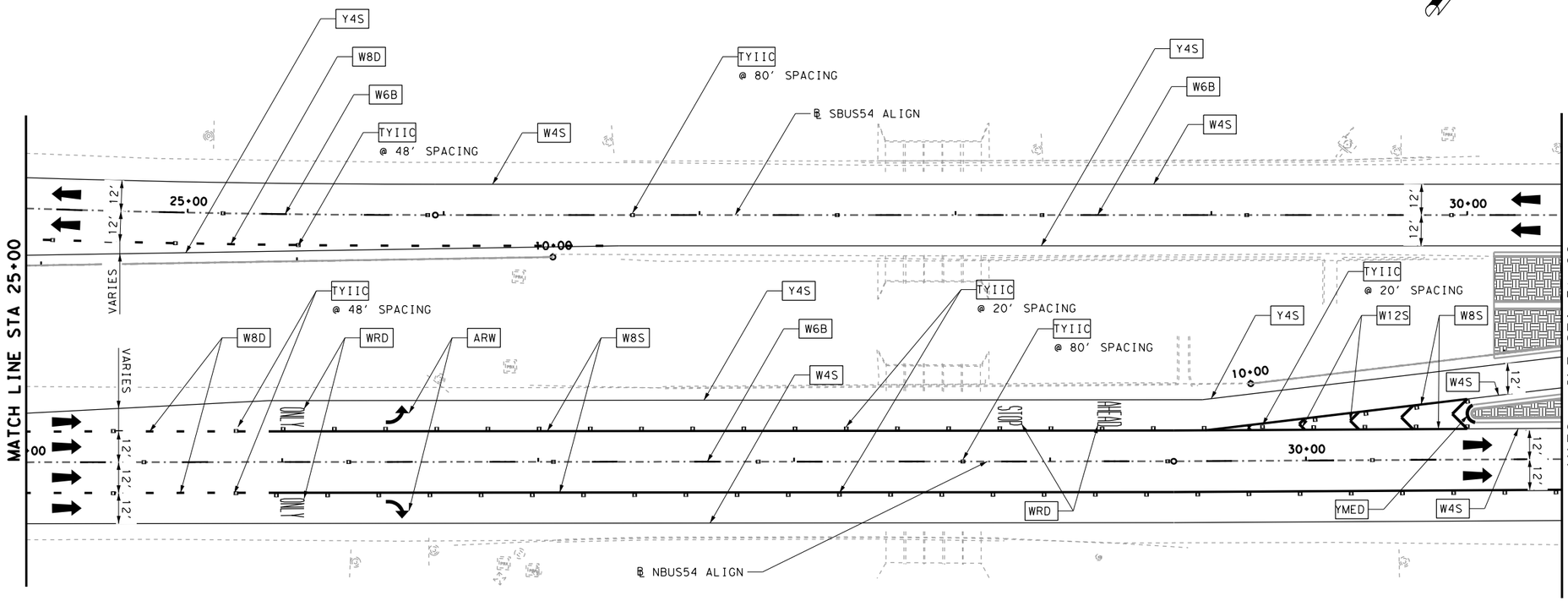

LEGEND

W4S	RE PM W/RET REQ (W) 4" (SLD)
Y4S	RE PM W/ RET REQ (Y) 4" (SLD)
W6B	REFL PAV MRK (W) 6" (BRK)
Y8S	RE PM W/ RET REQ (Y) 8" (SLD)
W8S	REFL PAV MRK (W) 8" (SLD)
W8D	REFL PAV MRK (W) 8" (DOT) 3' STRIPE + 9' GAP
W12S	REFL PAV MRK (W) 12" (SLD)
W24S	REFL PAV MRK (W) 24" (SLD)
YMED	REFL PAV MRK (Y) 24" (MED NOSE)
TYIIC	REFL PAV MRK TY II-C-R
WRD	REFL PAV MRK (W) (WORD)
ARW	REFL PAV MRK (W) (ARROW)
U-ARW	REFL PAV MRK (W) (UTURN ARROW)

DIRECTION OF TRAFFIC (EXISTING)

DIRECTION OF TRAFFIC (PROPOSED)

0 25 50

SCALE: 1"=50'

PAVEMENT MARKING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0666	6030	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF	105
0666	6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	1288
0666	6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	50
0666	6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	2
0666	6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	4
0666	6156	REFL PAV MRK TY I(Y)(MED NOSE)(100MIL)	EA	1
0666	6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	1067
0666	6171	REFL PAV MRK TY II (W) 6" (BRK)	LF	300
0666	6176	REFL PAV MRK TY II (W) 8" (DOT)	LF	105
0666	6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	1288
0666	6180	REFL PAV MRK TY II (W) 12" (SLD)	LF	50
0666	6184	REFL PAV MRK TY II (W) (ARROW)	EA	2
0666	6192	REFL PAV MRK TY II (W) (WORD)	EA	4
0666	6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF	1205
0666	6217	REFL PAV MRK TY II (Y) (MED NOSE)	EA	1
0666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	1067
0666	6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	300
0666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	1205
0672	6010	REFL PAV MRKR TY II-C-R	EA	75

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

PROPOSED PAVEMENT MARKINGS

SHEET 4 OF 9

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		130

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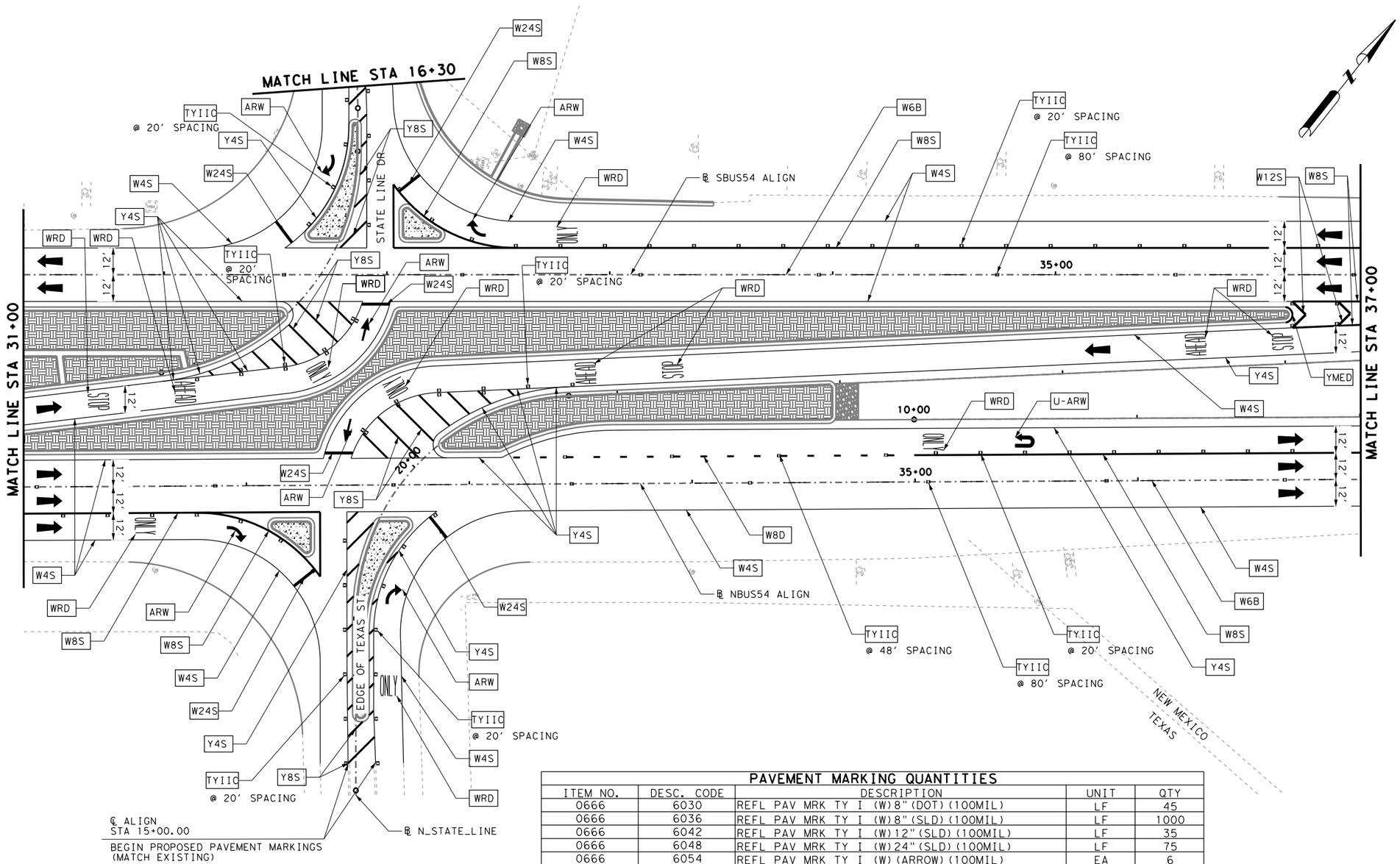

LEGEND

W4S	RE PM W/RET REQ (W) 4" (SLD)
Y4S	RE PM W/ RET REQ (Y) 4" (SLD)
W6B	REFL PAV MRK (W) 6" (BRK)
Y8S	RE PM W/ RET REQ (Y) 8" (SLD)
W8S	REFL PAV MRK (W) 8" (SLD)
W8D	REFL PAV MRK (W) 8" (DOT) 3' STRIPE + 9' GAP
W12S	REFL PAV MRK (W) 12" (SLD)
W24S	REFL PAV MRK (W) 24" (SLD)
YMED	REFL PAV MRK (Y) 24" (MED NOSE)
TYIIC	REFL PAV MRK TY II-C-R
WRD	REFL PAV MRK (W) (WORD)
ARW	REFL PAV MRK (W) (ARROW)
U-ARW	REFL PAV MRK (W) (UTURN ARROW)

DIRECTION OF TRAFFIC (EXISTING)
DIRECTION OF TRAFFIC (PROPOSED)

0 25 50
SCALE: 1"=50'

PAVEMENT MARKING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0666	6030	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF	45
0666	6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	1000
0666	6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	35
0666	6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	75
0666	6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	6
0666	6063	REFL PAV MRK TY I (W)(UTURN ARW)(100MIL)	EA	1
0666	6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	10
0666	6138	REFL PAV MRK TY I (Y)8"(SLD)(100MIL)	LF	355
0666	6156	REFL PAV MRK TY I(Y)(MED NOSE)(100MIL)	EA	1
0666	6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	2565
0666	6171	REFL PAV MRK TY II (W) 6" (BRK)	LF	300
0666	6176	REFL PAV MRK TY II (W) 8" (DOT)	LF	45
0666	6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	1000
0666	6180	REFL PAV MRK TY II (W) 12" (SLD)	LF	35
0666	6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	75
0666	6184	REFL PAV MRK TY II (W) (ARROW)	EA	6
0666	6187	REFL PAV MRK TY II (W) (UTURN ARROW)	EA	1
0666	6192	REFL PAV MRK TY II (W) (WORD)	EA	10
0666	6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF	1850
0666	6211	REFL PAV MRK TY II (Y) 8" (SLD)	LF	355
0666	6217	REFL PAV MRK TY II (Y) (MED NOSE)	EA	1
0666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	2565
0666	6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	300
0666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	1850
0672	6010	REFL PAV MRKR TY II-C-R	EA	105

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

PROPOSED
PAVEMENT MARKINGS

SHEET 5 OF 9

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		131

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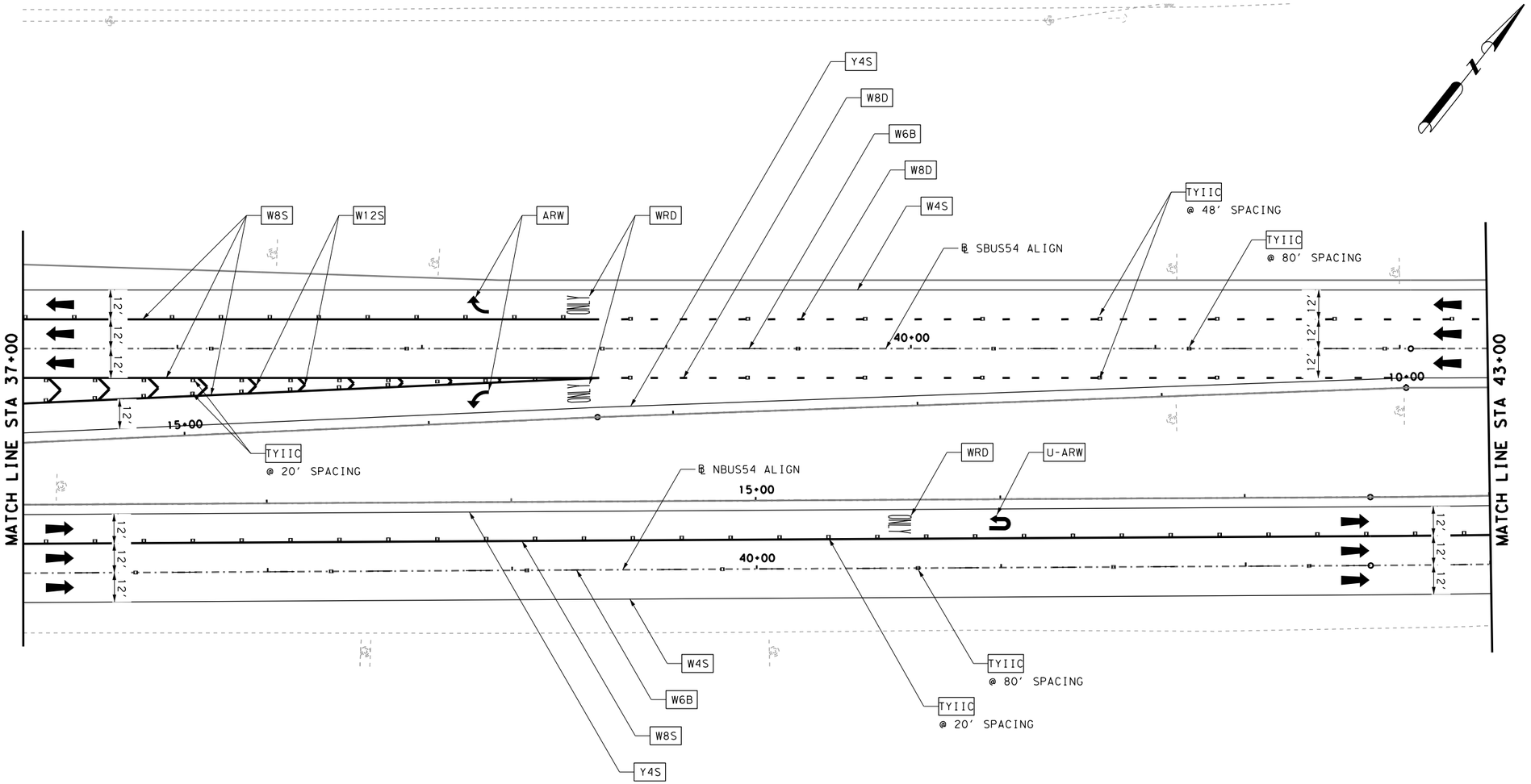

LEGEND

W4S	RE PM W/RET REQ (W) 4" (SLD)
Y4S	RE PM W/ RET REQ (Y) 4" (SLD)
W6B	REFL PAV MRK (W) 6" (BRK)
Y8S	RE PM W/ RET REQ (Y) 8" (SLD)
W8S	REFL PAV MRK (W) 8" (SLD)
W8D	REFL PAV MRK (W) 8" (DOT) 3' STRIPE + 9' GAP
W12S	REFL PAV MRK (W) 12" (SLD)
W24S	REFL PAV MRK (W) 24" (SLD)
YMED	REFL PAV MRK (Y) 24" (MED NOSE)
TYIIC	REFL PAV MRK TY II-C-R
WRD	REFL PAV MRK (W) (WORD)
ARW	REFL PAV MRK (W) (ARROW)
U-ARW	REFL PAV MRK (W) (UTURN ARROW)

DIRECTION OF TRAFFIC (EXISTING)

DIRECTION OF TRAFFIC (PROPOSED)

0 25 50

SCALE: 1"=50'

PAVEMENT MARKING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0666	6030	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF	175
0666	6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	1310
0666	6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	85
0666	6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	2
0666	6063	REFL PAV MRK TY I (W)(UTURN ARW)(100MIL)	EA	1
0666	6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	3
0666	6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	1200
0666	6171	REFL PAV MRK TY II (W) 6" (BRK)	LF	300
0666	6176	REFL PAV MRK TY II (W) 8" (DOT)	LF	175
0666	6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	1310
0666	6180	REFL PAV MRK TY II (W) 12" (SLD)	LF	85
0666	6184	REFL PAV MRK TY II (W) (ARROW)	EA	2
0666	6187	REFL PAV MRK TY II (W) (UTURN ARROW)	EA	1
0666	6192	REFL PAV MRK TY II (W) (WORD)	EA	3
0666	6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF	1200
0666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	1200
0666	6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	300
0666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	1200
0672	6010	REFL PAV MRKR TY II-C-R	EA	89

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

PROPOSED
PAVEMENT MARKINGS

SHEET 6 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		132

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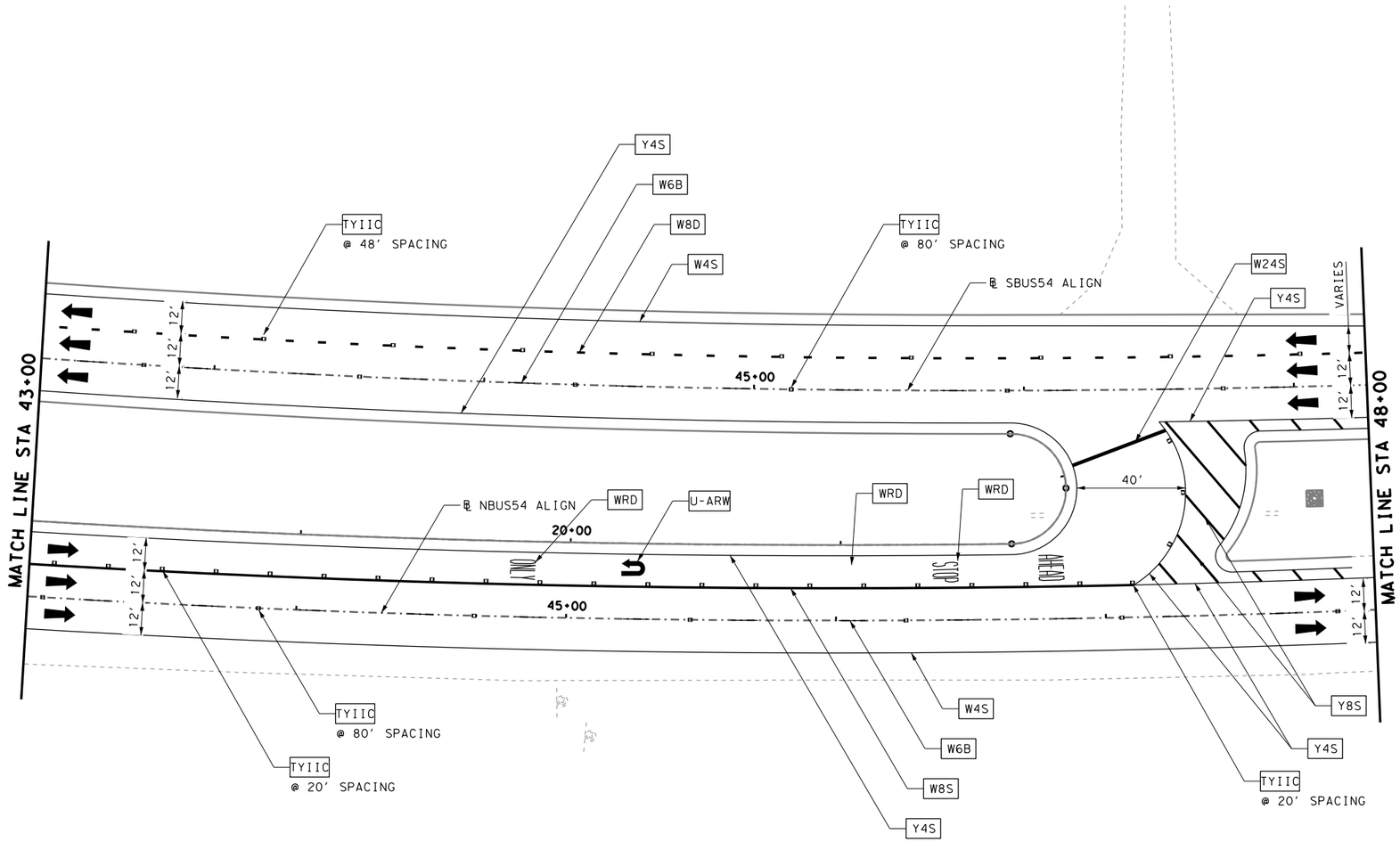

LEGEND

W4S	RE PM W/RET REQ (W) 4" (SLD)
Y4S	RE PM W/ RET REQ (Y) 4" (SLD)
W6B	REFL PAV MRK (W) 6" (BRK)
Y8S	RE PM W/ RET REQ (Y) 8" (SLD)
W8S	REFL PAV MRK (W) 8" (SLD)
W8D	REFL PAV MRK (W) 8" (DOT) 3' STRIPE + 9' GAP
W12S	REFL PAV MRK (W) 12" (SLD)
W24S	REFL PAV MRK (W) 24" (SLD)
YMED	REFL PAV MRK (Y) 24" (MED NOSE)
TYIIC	REFL PAV MRK TY II-C-R
WRD	REFL PAV MRK (W) (WORD)
ARW	REFL PAV MRK (W) (ARROW)
U-ARW	REFL PAV MRK (W) (UTURN ARROW)

DIRECTION OF TRAFFIC (EXISTING)

DIRECTION OF TRAFFIC (PROPOSED)

0 25 50

SCALE: 1"=50'

PAVEMENT MARKING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0666	6030	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF	125
0666	6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	410
0666	6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	40
0666	6063	REFL PAV MRK TY I (W)(UTURN ARW)(100MIL)	EA	1
0666	6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	3
0666	6138	REFL PAV MRK TY I (Y)8"(SLD)(100MIL)	LF	150
0666	6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	990
0666	6171	REFL PAV MRK TY II (W) 6" (BRK)	LF	300
0666	6176	REFL PAV MRK TY II (W) 8" (DOT)	LF	125
0666	6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	410
0666	6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	40
0666	6187	REFL PAV MRK TY II (W) (UTURN ARROW)	EA	1
0666	6192	REFL PAV MRK TY II (W) (WORD)	EA	3
0666	6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF	1185
0666	6211	REFL PAV MRK TY II (Y) 8" (SLD)	LF	150
0666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	990
0666	6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	300
0666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	1185
0672	6010	REFL PAV MRKR TY II-C-R	EA	47

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

PROPOSED PAVEMENT MARKINGS

SHEET 7 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		133

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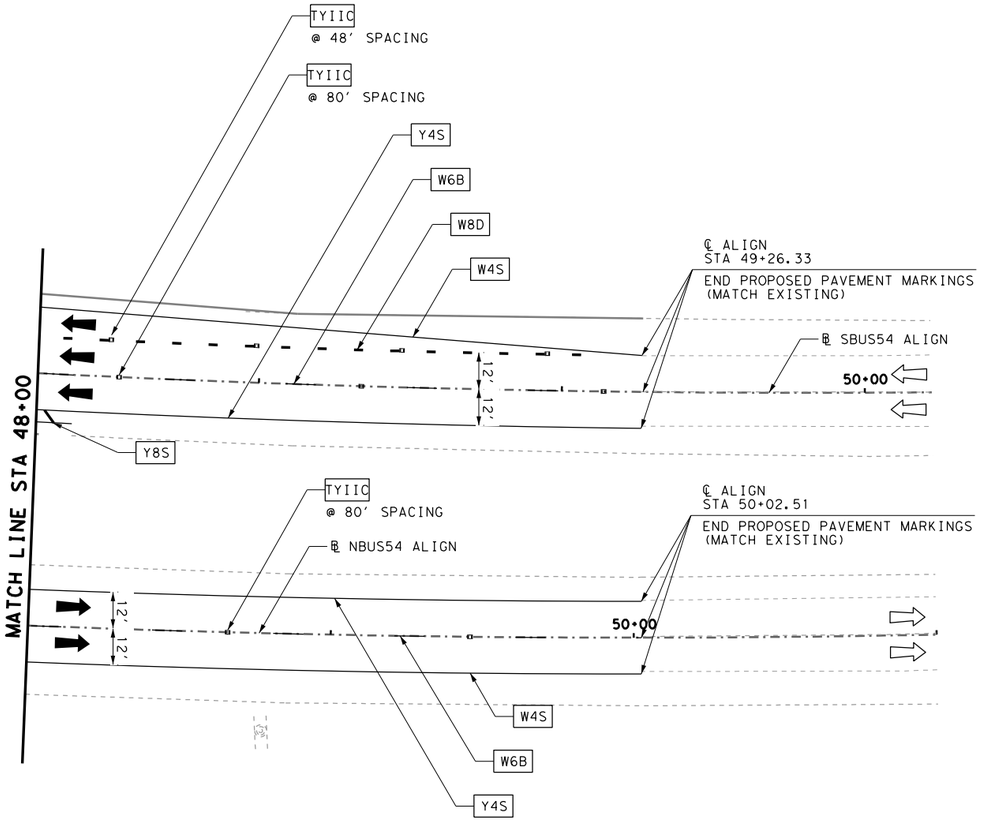

LEGEND

W4S	RE PM W/RET REQ (W) 4" (SLD)
Y4S	RE PM W/ RET REQ (Y) 4" (SLD)
W6B	REFL PAV MRK (W) 6" (BRK)
Y8S	RE PM W/ RET REQ (Y) 8" (SLD)
W8S	REFL PAV MRK (W) 8" (SLD)
W8D	REFL PAV MRK (W) 8" (DOT) 3' STRIPE + 9' GAP
W12S	REFL PAV MRK (W) 12" (SLD)
W24S	REFL PAV MRK (W) 24" (SLD)
YMED	REFL PAV MRK (Y) 24" (MED NOSE)
TYIIC	REFL PAV MRK TY II-C-R
WRD	REFL PAV MRK (W) (WORD)
ARW	REFL PAV MRK (W) (ARROW)
U-ARW	REFL PAV MRK (W) (UTURN ARROW)

DIRECTION OF TRAFFIC (EXISTING)

DIRECTION OF TRAFFIC (PROPOSED)

0 25 50

SCALE: 1"=50'

PAVEMENT MARKING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0666	6030	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF	45
0666	6138	REFL PAV MRK TY I (Y)8"(SLD)(100MIL)	LF	5
0666	6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	405
0666	6171	REFL PAV MRK TY II (W) 6" (BRK)	LF	100
0666	6176	REFL PAV MRK TY II (W) 8" (DOT)	LF	45
0666	6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF	415
0666	6211	REFL PAV MRK TY II (Y) 8" (SLD)	LF	5
0666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	405
0666	6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	100
0666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	415
0672	6010	REFL PAV MRKR TY II-C-R	EA	9

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

PROPOSED
PAVEMENT MARKINGS

SHEET 8 OF 9

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		134

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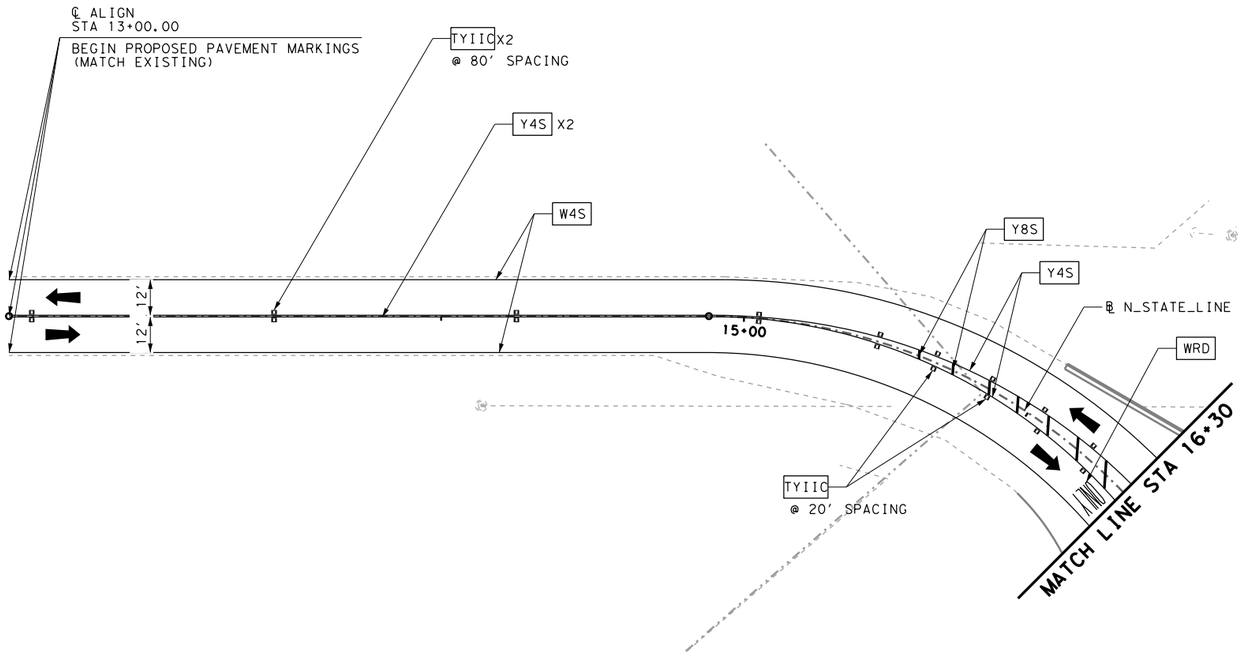

LEGEND

W4S	RE PM W/RET REQ (W) 4" (SLD)
Y4S	RE PM W/ RET REQ (Y) 4" (SLD)
W6B	REFL PAV MRK (W) 6" (BRK)
Y8S	RE PM W/ RET REQ (Y) 8" (SLD)
W8S	REFL PAV MRK (W) 8" (SLD)
W8D	REFL PAV MRK (W) 8" (DOT) 3' STRIPE + 9' GAP
W12S	REFL PAV MRK (W) 12" (SLD)
W24S	REFL PAV MRK (W) 24" (SLD)
YMED	REFL PAV MRK (Y) 24" (MED NOSE)
TYIIC	REFL PAV MRK TY II-C-R
WRD	REFL PAV MRK (W) (WORD)
ARW	REFL PAV MRK (W) (ARROW)
U-ARW	REFL PAV MRK (W) (UTURN ARROW)

DIRECTION OF TRAFFIC (EXISTING)
DIRECTION OF TRAFFIC (PROPOSED)

0 25 50
SCALE: 1"=50'

PAVEMENT MARKING QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0666	6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	1
0666	6138	REFL PAV MRK TY I (Y)8"(SLD)(100MIL)	LF	40
0666	6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	770
0666	6192	REFL PAV MRK TY II (W) (WORD)	EA	1
0666	6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF	770
0666	6211	REFL PAV MRK TY II (Y) 8" (SLD)	LF	40
0666	6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	770
0666	6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	770
0672	6010	REFL PAV MRKR TY II-C-R	EA	18

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

PROPOSED
PAVEMENT MARKINGS

SHEET 9 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		135

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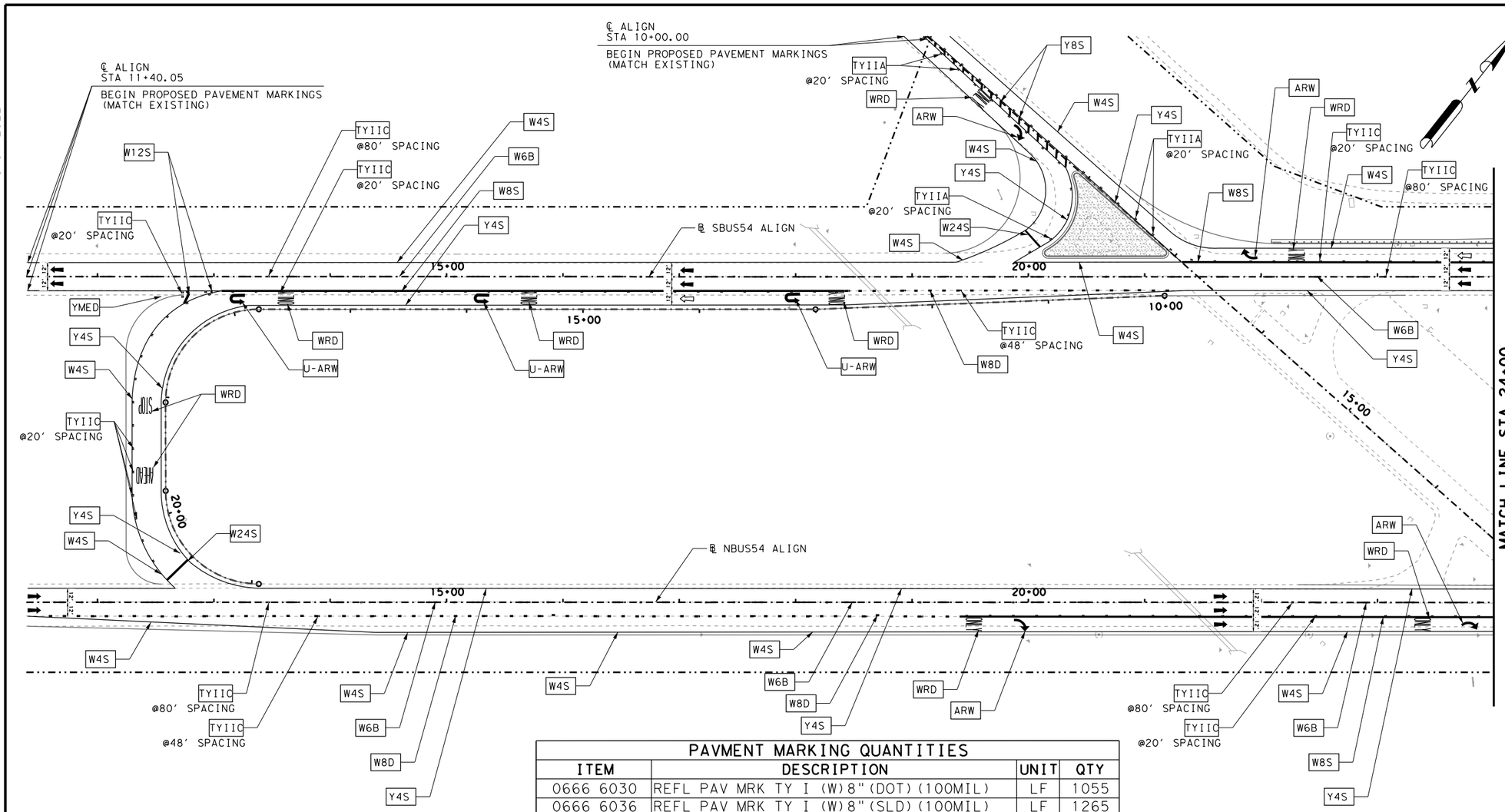

LEGEND

W4S	RE PM W/RET REQ (W) 4" (SLD)
Y4S	RE PM W/ RET REQ (Y) 4" (SLD)
W6B	REFL PAV MRK (W) 6" (BRK)
Y8S	RE PM W/ RET REQ (Y) 8" (SLD)
W8S	REFL PAV MRK (W) 8" (SLD)
W8D	REFL PAV MRK (W) 8" (DOT) 3' STRIPE + 9' GAP
W12S	REFL PAV MRK (W) 12" (SLD)
W24S	REFL PAV MRK (W) 24" (SLD)
YMED	REFL PAV MRK (Y) 24" (MED NOSE)
TYIIA	REFL PAV MRK TY II-A-A
TYIIC	REFL PAV MRK TY II-C-R
WRD	REFL PAV MRK (W) (WORD)
ARW	REFL PAV MRK (W) (ARROW)
U-ARW	REFL PAV MRK (W) (UTURN ARROW)

DIRECTION OF TRAFFIC (EXISTING)
DIRECTION OF TRAFFIC (PROPOSED)

0 25 50 100
SCALE: 1"=100'

PAVMENT MARKING QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0666 6030	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF	1055
0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	1265
0666 6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	60
0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	40
0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	4
0666 6063	REFL PAV MRK TY I(W)(UTURN ARW)(100MIL	EA	3
0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	9
0666 6138	REFL PAV MRK TY I (Y)8"(SLD)(100MIL)	LF	95
0666 6156	REFL PAV MRK TY I(Y)(MED NOSE)(100MIL)	EA	1
0666 6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	3355
0666 6171	REFL PAV MRK TY II (W) 6" (BRK)	LF	620
0666 6176	REFL PAV MRK TY II (W) 8" (DOT)	LF	1055
0666 6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	995
0666 6180	REFL PAV MRK TY II (W) 12" (SLD)	LF	60
0666 6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	40
0666 6184	REFL PAV MRK TY II (W) (ARROW)	EA	4
0666 6187	REFL PAV MRK TY II (W) (UTURN ARROW)	EA	3
0666 6192	REFL PAV MRK TY II (W) (WORD)	EA	9
0666 6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF	3360
0666 6211	REFL PAV MRK TY II (Y) 8" (SLD)	LF	95
0666 6217	REFL PAV MRK TY II (Y) (MED NOSE)	EA	1
0666 6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL	LF	3355
0666 6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL	LF	620
0666 6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL	LF	3360
0672 6009	REFL PAV MRKR TY II-A-A	EA	27
0672 6010	REFL PAV MRKR TY II-C-R	EA	137

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-133
US 54 Stan Roberts Sr Ave

TRAFFIC

PROPOSED PAVEMENT MARKINGS

SHEET 1 OF 2

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		136

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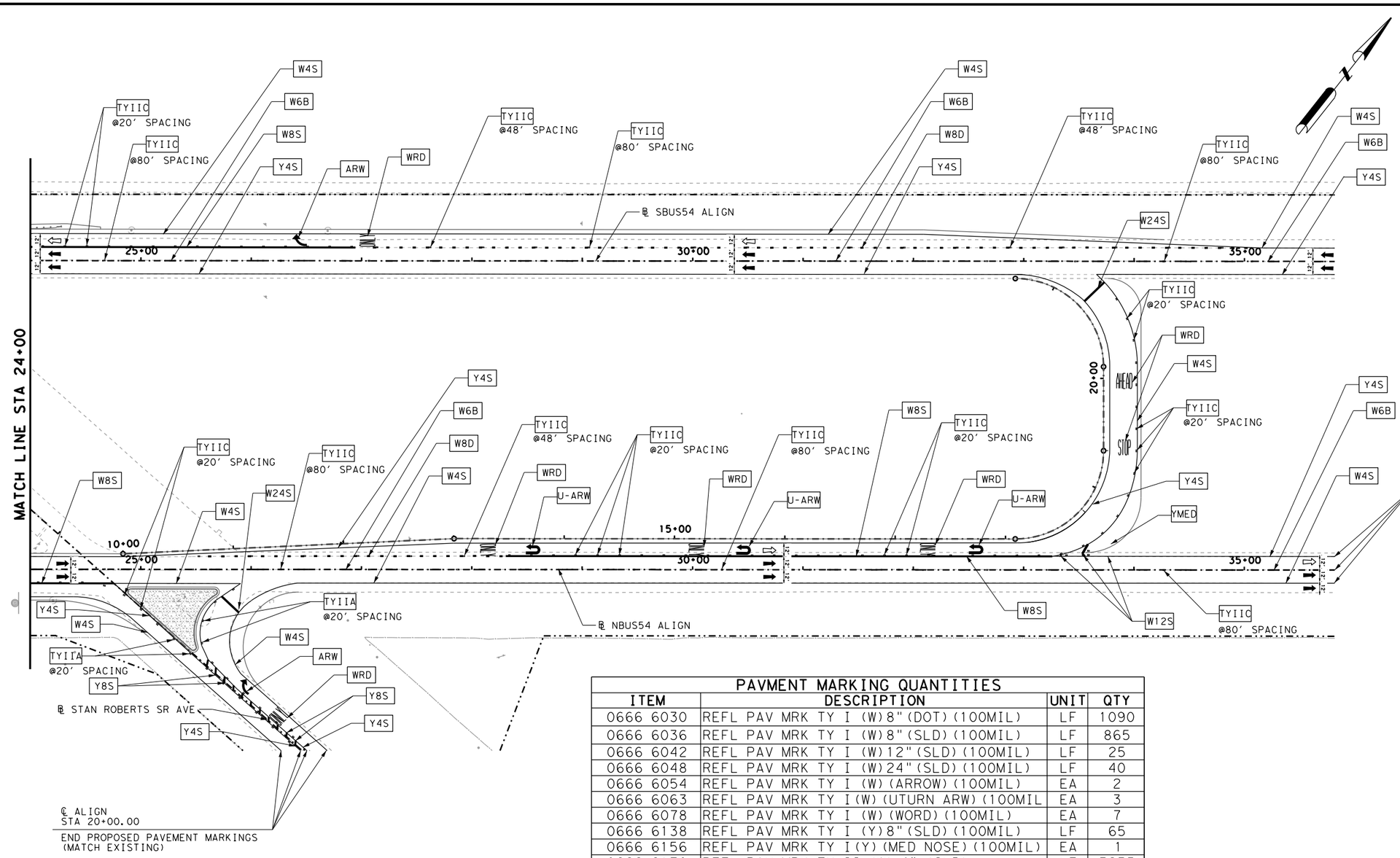


LEGEND

W4S	RE PM W/RET REQ (W) 4" (SLD)
Y4S	RE PM W/ RET REQ (Y) 4" (SLD)
W6B	REFL PAV MRK (W) 6" (BRK)
Y8S	RE PM W/ RET REQ (Y) 8" (SLD)
W8S	REFL PAV MRK (W) 8" (SLD)
W8D	REFL PAV MRK (W) 8" (DOT) 3' STRIPE + 9' GAP
W12S	REFL PAV MRK (W) 12" (SLD)
W24S	REFL PAV MRK (W) 24" (SLD)
YMED	REFL PAV MRK (Y) 24" (MED NOSE)
TYIIA	REFL PAV MRK TY II-A-A
TYIIC	REFL PAV MRK TY II-C-R
WRD	REFL PAV MRK (W) (WORD)
ARW	REFL PAV MRK (W) (ARROW)
U-ARW	REFL PAV MRK (W) (UTURN ARROW)

DIRECTION OF TRAFFIC (EXISTING)

DIRECTION OF TRAFFIC (PROPOSED)

PAVMENT MARKING QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0666 6030	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF	1090
0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	865
0666 6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	25
0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	40
0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	2
0666 6063	REFL PAV MRK TY I(W)(UTURN ARW)(100MIL	EA	3
0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	7
0666 6138	REFL PAV MRK TY I (Y)8"(SLD)(100MIL)	LF	65
0666 6156	REFL PAV MRK TY I(Y)(MED NOSE)(100MIL)	EA	1
0666 6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	3235
0666 6171	REFL PAV MRK TY II (W) 6" (BRK)	LF	600
0666 6176	REFL PAV MRK TY II (W) 8" (DOT)	LF	1090
0666 6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	865
0666 6180	REFL PAV MRK TY II (W) 12" (SLD)	LF	25
0666 6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	40
0666 6184	REFL PAV MRK TY II (W) (ARROW)	EA	2
0666 6187	REFL PAV MRK TY II (W) (UTURN ARROW)	EA	3
0666 6192	REFL PAV MRK TY II (W) (WORD)	EA	7
0666 6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF	3195
0666 6211	REFL PAV MRK TY II (Y) 8" (SLD)	LF	65
0666 6217	REFL PAV MRK TY II (Y) (MED NOSE)	EA	1
0666 6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL	LF	3235
0666 6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL	LF	600
0666 6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL	LF	3195
0672 6009	REFL PAV MRKR TY II-A-A	EA	21
0672 6010	REFL PAV MRKR TY II-C-R	EA	111

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-133
US 54 Stan Roberts Sr Ave

TRAFFIC

PROPOSED PAVEMENT MARKINGS

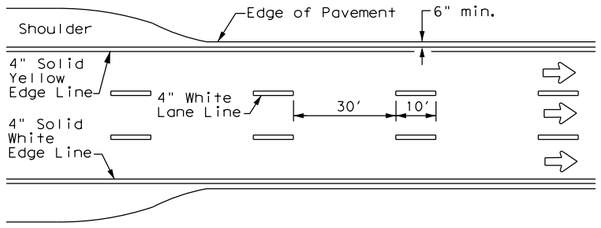
SHEET 2 OF 2

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

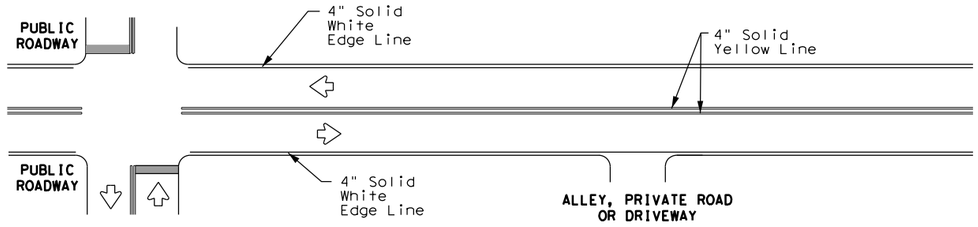
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		137

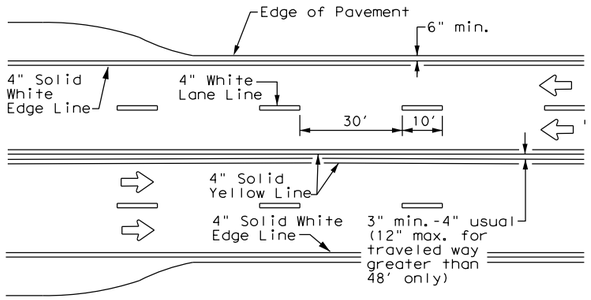
c:\pwworking\ustx\dms06965\US54*PM-002.dgn



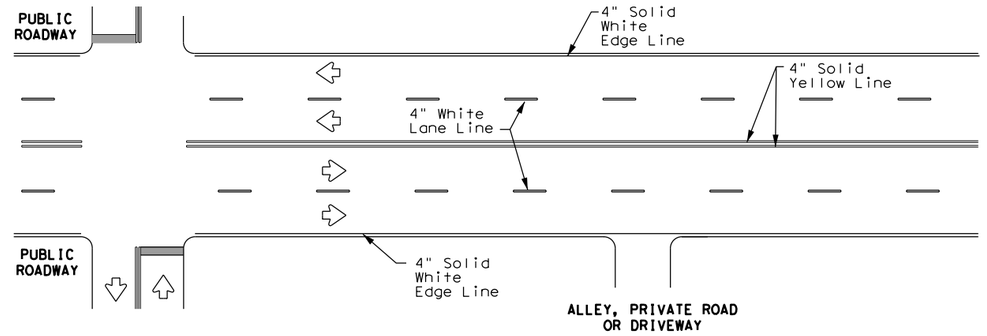
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



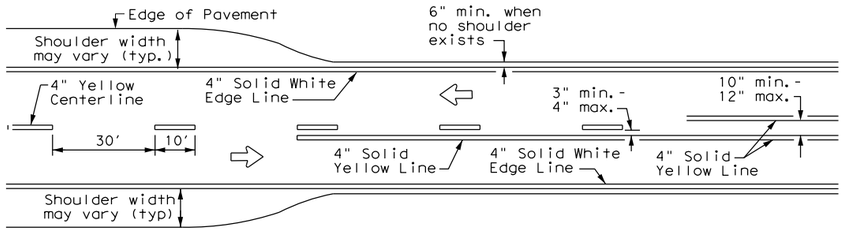
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



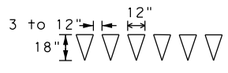
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



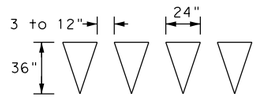
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

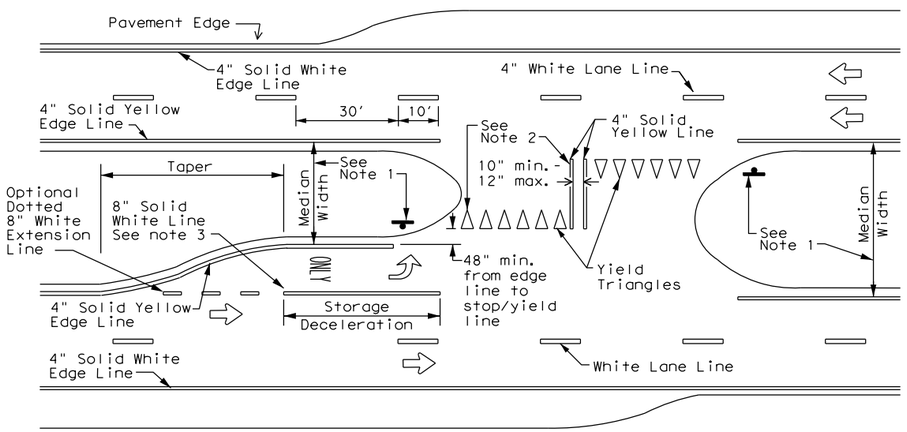


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

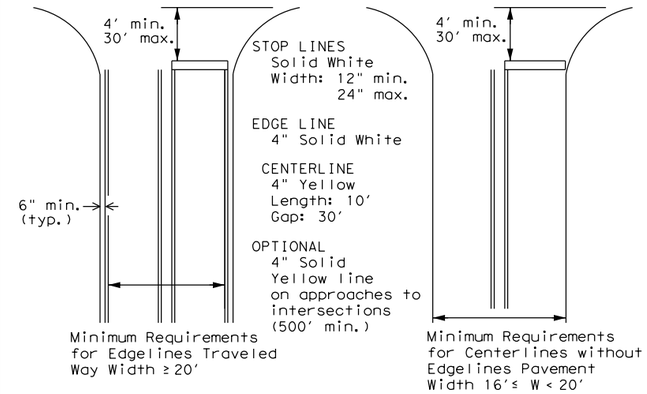
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

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

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



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

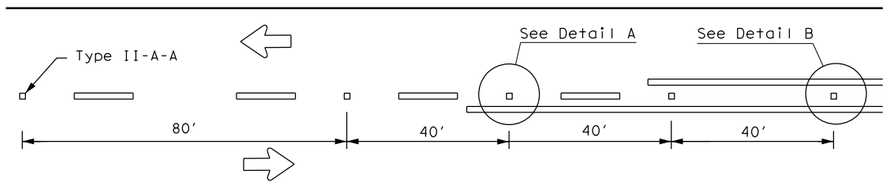
PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0167	01	126, ETC.	US-54
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	ELP	EL PASO		138

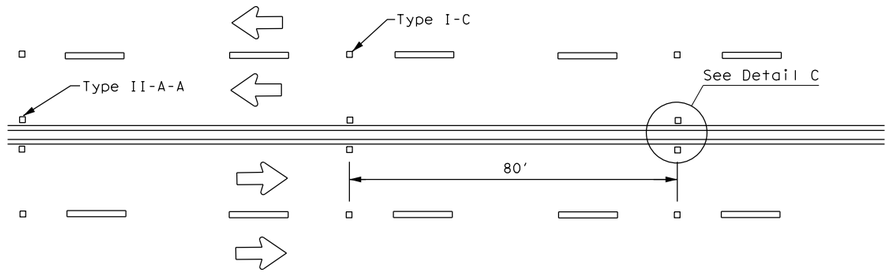
22B

DATE:
FILE:

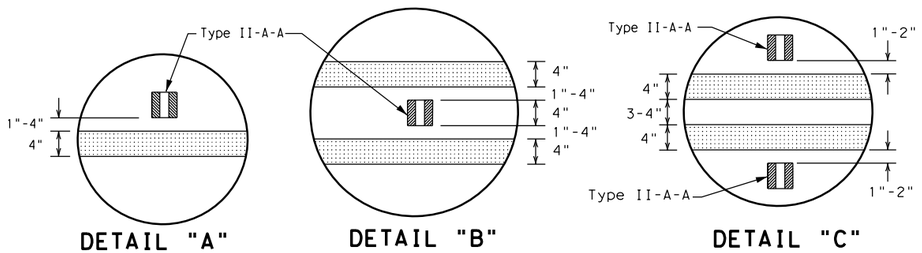
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



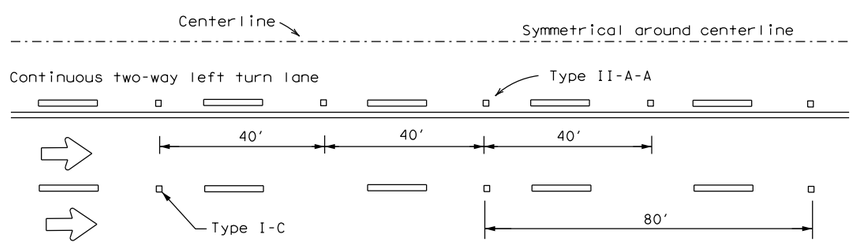
CENTERLINE FOR ALL TWO LANE ROADWAYS



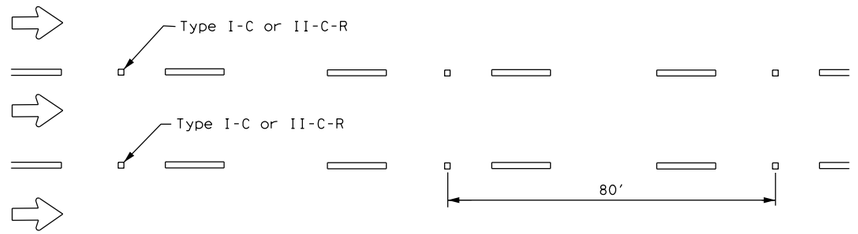
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



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



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

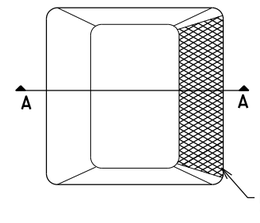


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

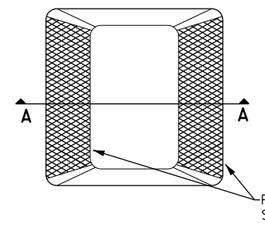
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

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

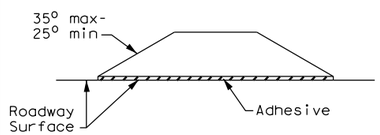
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

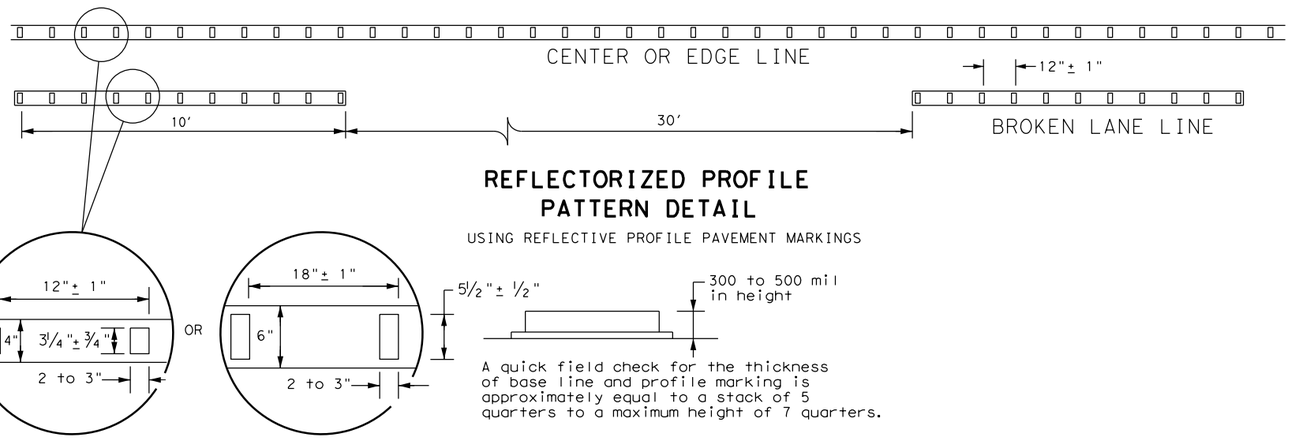


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

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

4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

NOTE

Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

Texas Department of Transportation

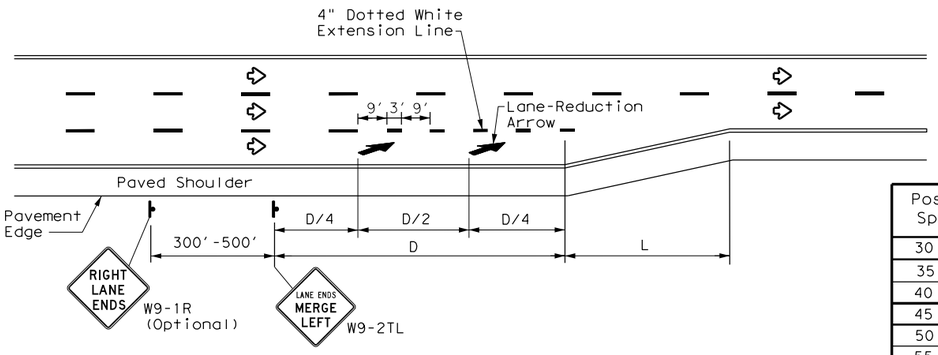
Traffic Safety Division Standard

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

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10 5-00 2-12 8-00 6-20	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		139

22B

DATE:
FILE:

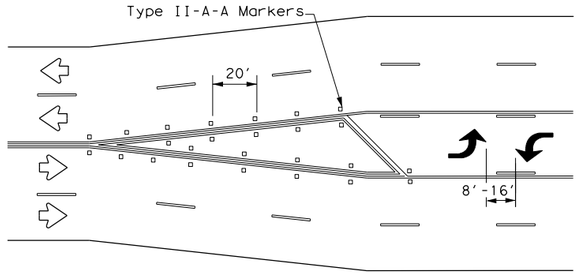


LANE REDUCTION

Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

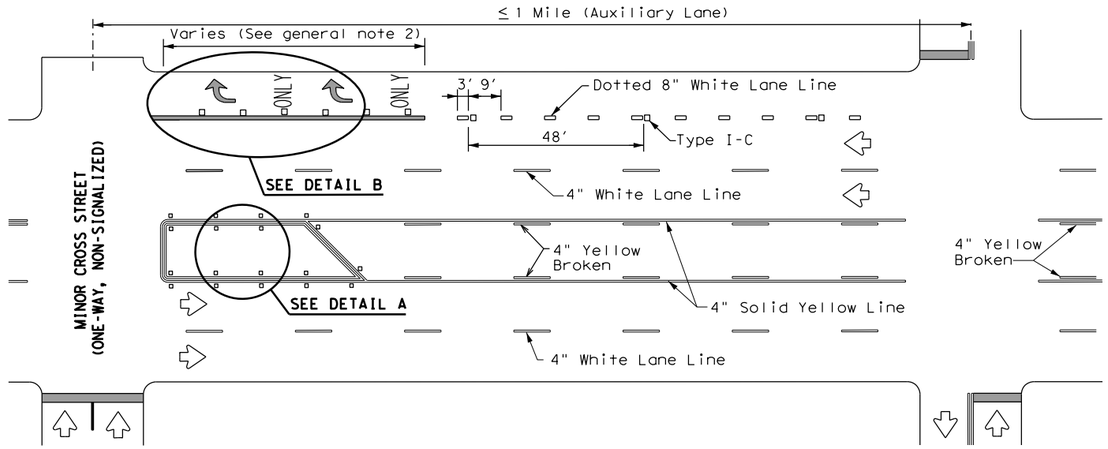
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

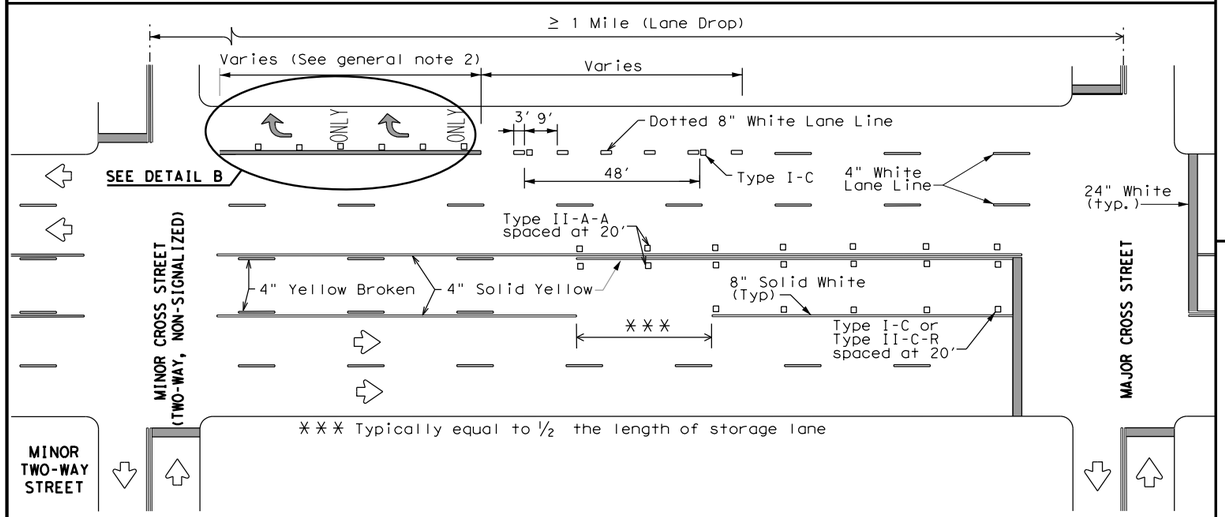
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

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

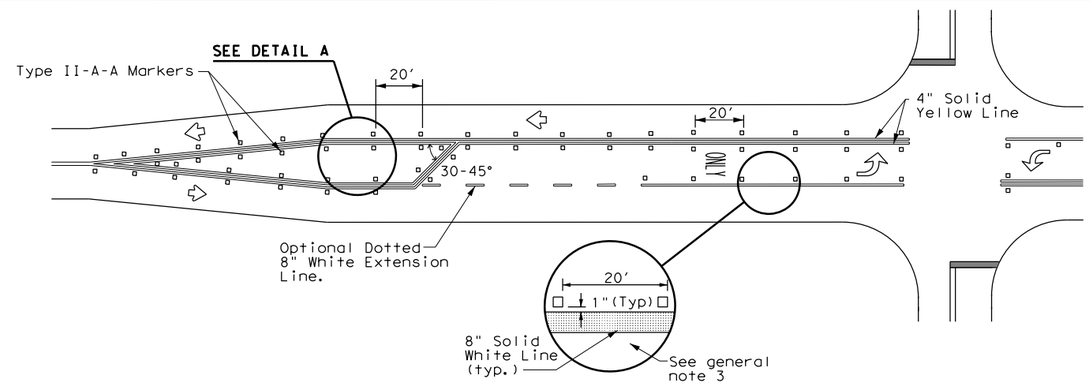
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



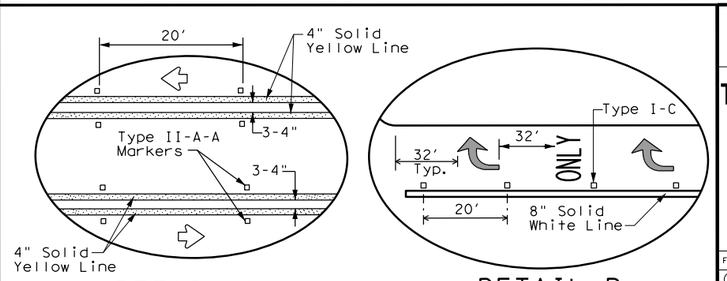
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



Texas Department of Transportation

Traffic Safety Division Standard

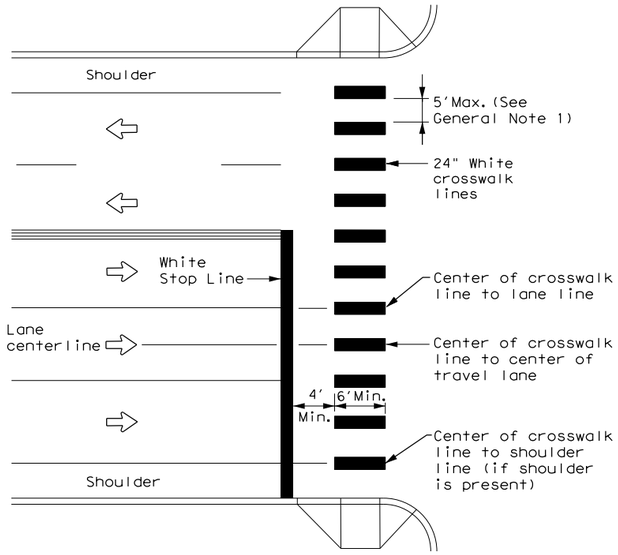
TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
5-00 2-10	DIST	COUNTY		SHEET NO.
8-00 2-12	ELP	EL PASO		140
3-03 6-20				

22D

DATE:
FILE:



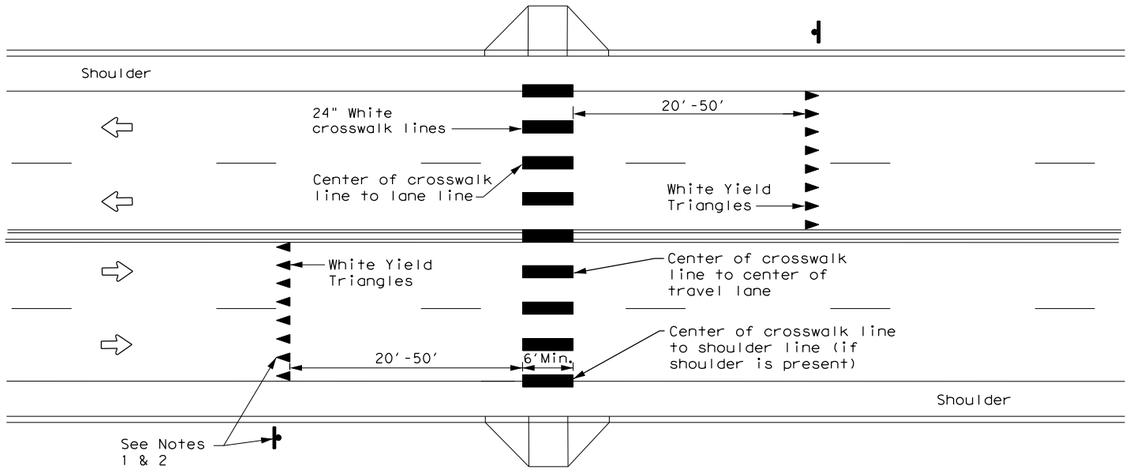
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar/Yield Triangles and Crosswalk shall be approved by the Engineer in the field.

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

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



UNSIGNALIZED MID BLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES

1. Use yield triangles with "Yield Here to Pedestrians" signs at unsignalized mid block crosswalks.
2. Use stop bars with "Stop Here on Red" signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-20

FILE: pm4-20.dgn	DN:	CK:	DW:	CK:
© TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		141

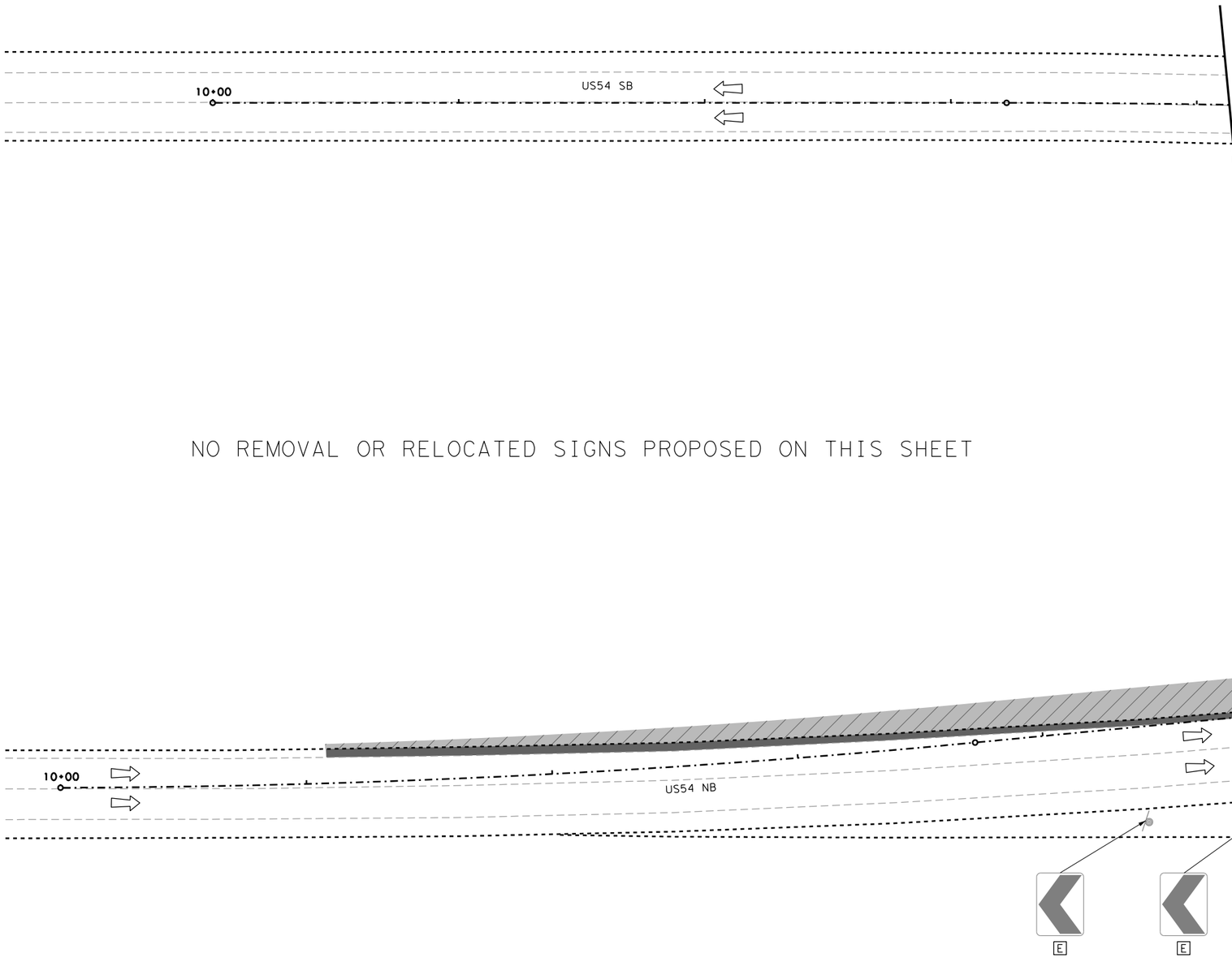
22D

DATE:
FILE:

5/31/2022 1:35:10 PM

LEGEND

- (R) REMOVED SIGN
- [E] EXISTING SIGN TO REMAIN
- [R] EXISTING SIGN TO BE RELOCATED
- EXISTING SIGN
- REMOVE LANDSCAPE
- REMOVE ASPHALT PAVEMENT
- EXISTING TRAFFIC FLOW DIRECTION



NO REMOVAL OR RELOCATED SIGNS PROPOSED ON THIS SHEET

0 25 50
SCALE: 1"=50'

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US 54 State Line Rd

TRAFFIC

EXISTING SIGNING REMOVAL LAYOUT

SHEET 1 OF 9

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		142

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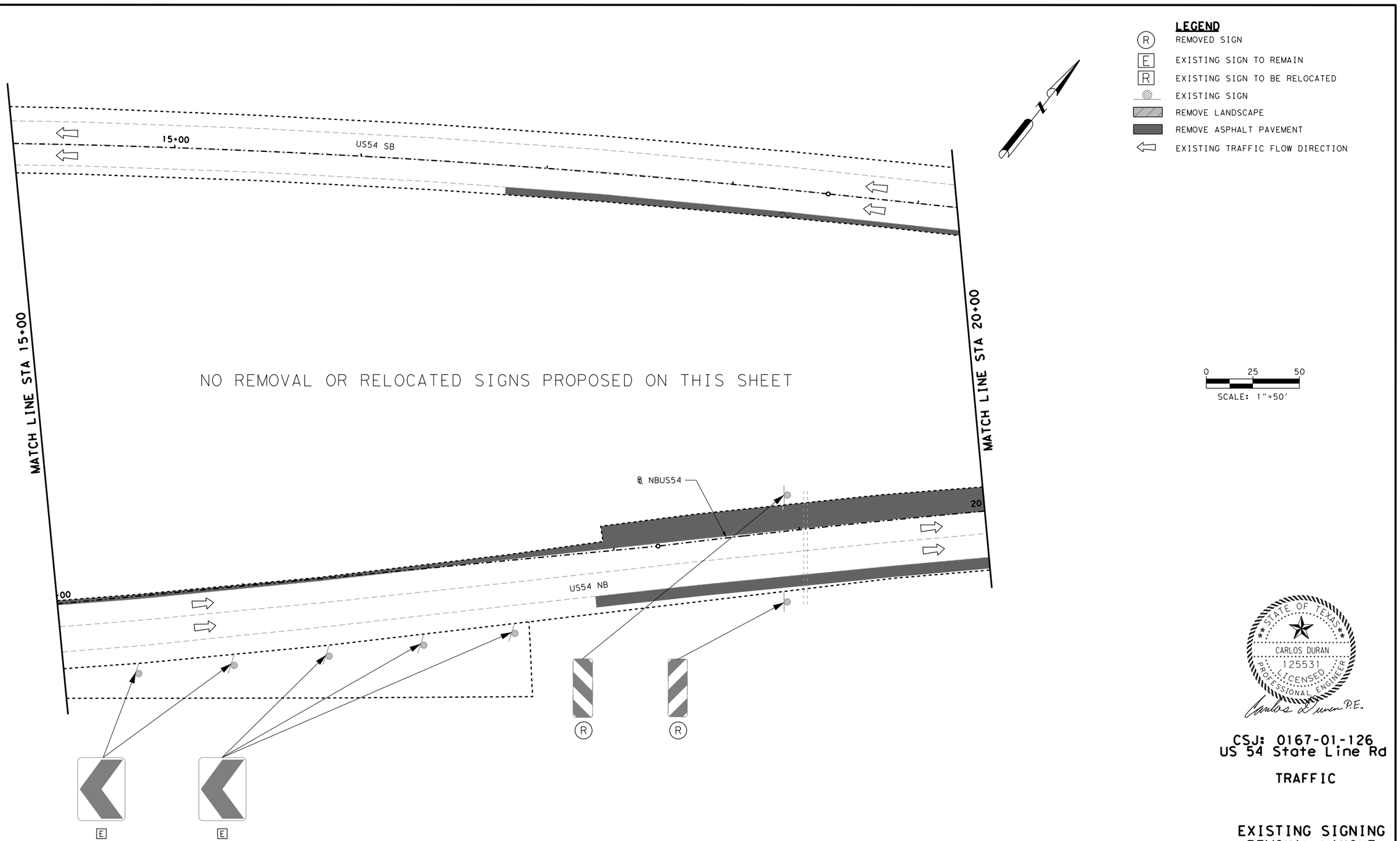


SIGNING REMOVAL QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
644	6076	REMOVE SM RD SN SUP&AM	EA	2

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US 54 State Line Rd

TRAFFIC

EXISTING SIGNING REMOVAL LAYOUT

SHEET 2 OF 9

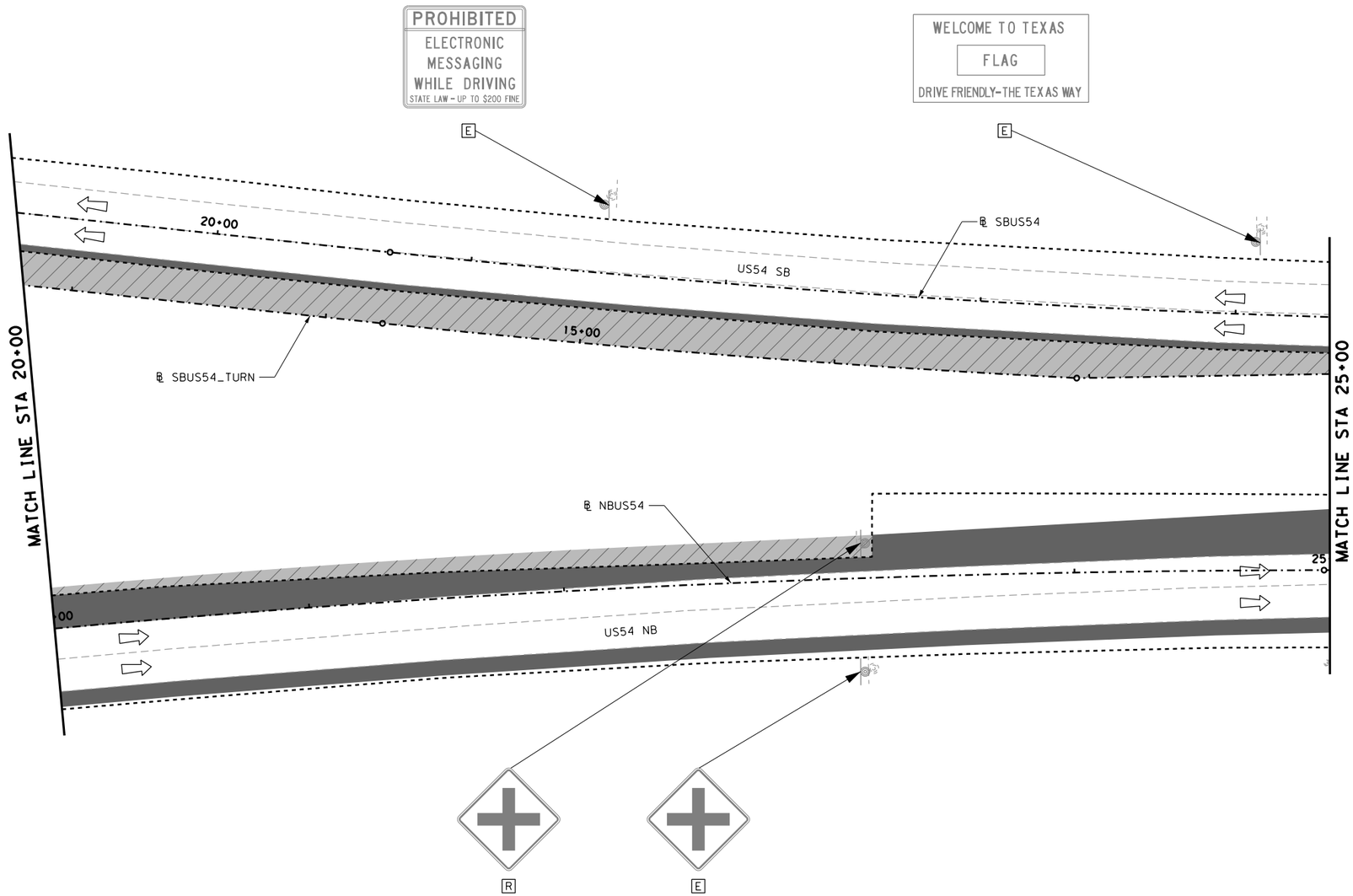
AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		143

c:\pwworking\ustx\dms01391\US54*RM*SGN-002.dgn

5/31/2022 1:35:32 PM



LEGEND

- (R) REMOVED SIGN
- [E] EXISTING SIGN TO REMAIN
- [R] EXISTING SIGN TO BE RELOCATED
- EXISTING SIGN
- REMOVE LANDSCAPE
- REMOVE ASPHALT PAVEMENT
- EXISTING TRAFFIC FLOW DIRECTION

0 25 50
SCALE: 1"=50'

SIGNING REMOVAL QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
644	6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	1

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US 54 State Line Rd

TRAFFIC

EXISTING SIGNING REMOVAL LAYOUT

SHEET 3 OF 9

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		144

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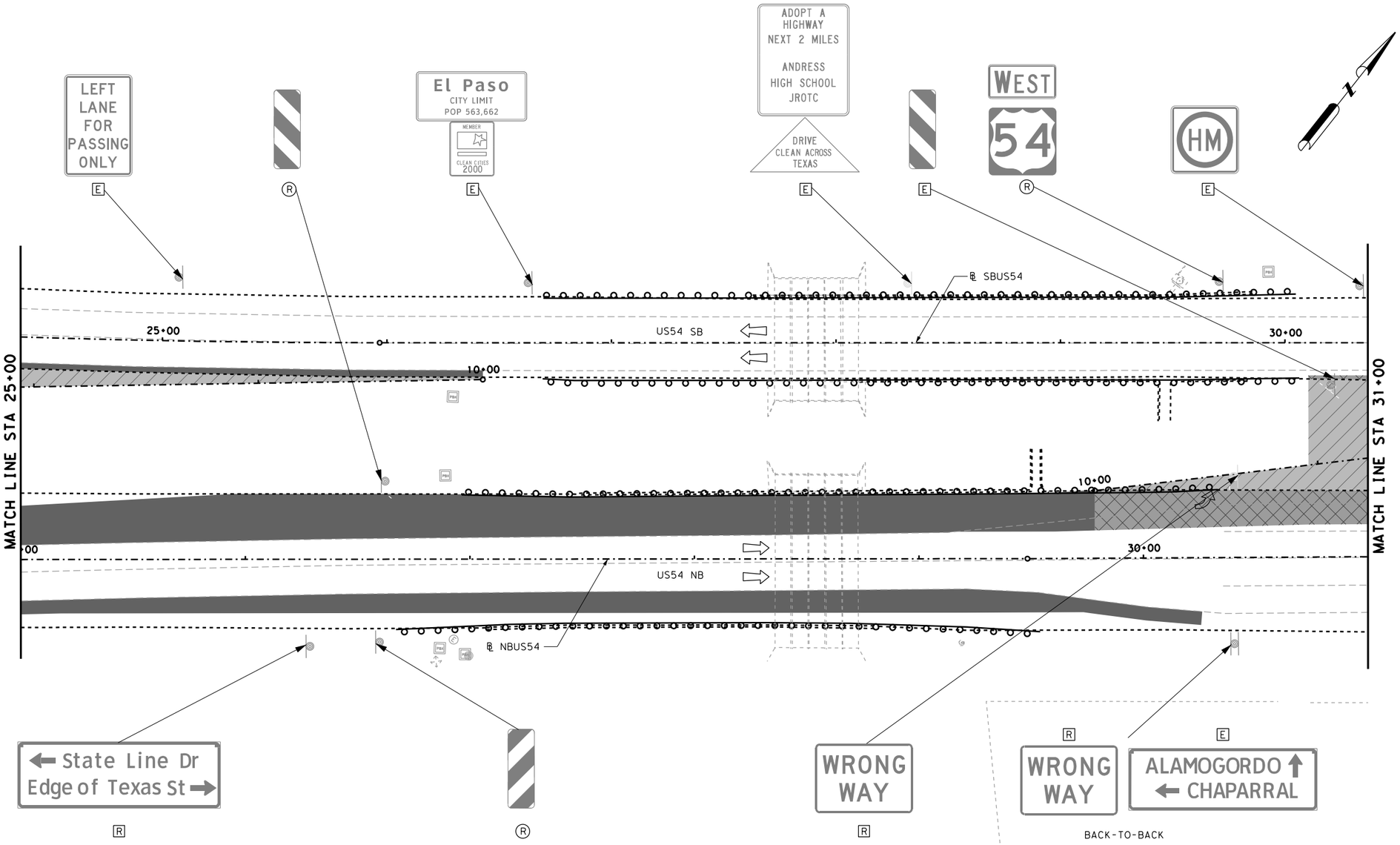

LEGEND

- (R) REMOVED SIGN
- [E] EXISTING SIGN TO REMAIN
- [R] EXISTING SIGN TO BE RELOCATED
- EXISTING SIGN
- REMOVE LANDSCAPE
- REMOVE ASPHALT PAVEMENT
- EXISTING TRAFFIC FLOW DIRECTION

0 25 50
SCALE: 1"=50'

SIGNING REMOVAL QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
644	6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	3
644	6076	REMOVE SM RD SN SUP&AM	EA	3

STATE OF TEXAS
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EXISTING SIGNING REMOVAL LAYOUT

SHEET 4 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		145

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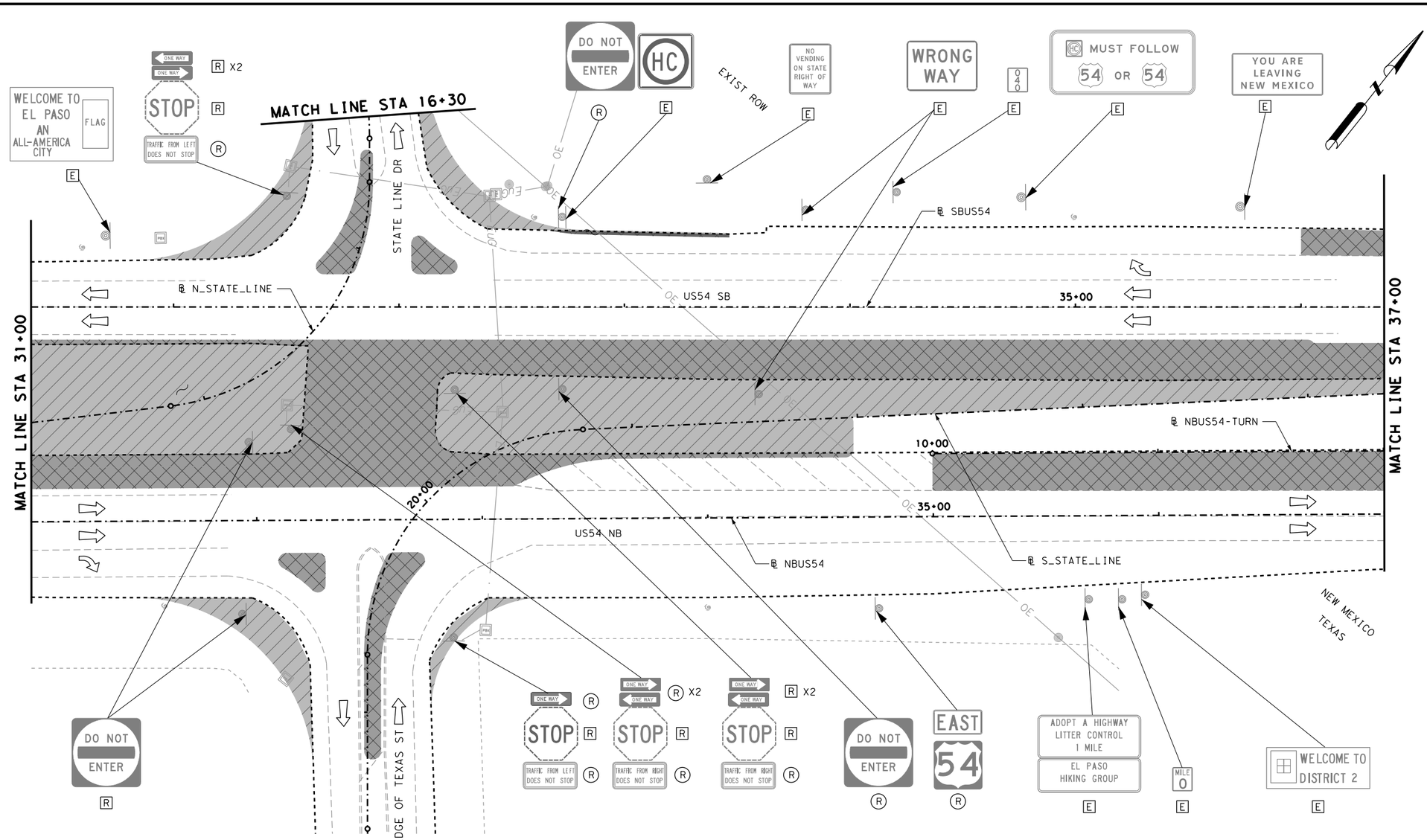

LEGEND

- (R) REMOVED SIGN
- [E] EXISTING SIGN TO REMAIN
- [R] EXISTING SIGN TO BE RELOCATED
- EXISTING SIGN
- REMOVE LANDSCAPE
- REMOVE ASPHALT PAVEMENT
- EXISTING TRAFFIC FLOW DIRECTION

NOTES:

1. ALL STOP SIGNS ON THIS INTERSECTION ARE LED SIGNS AND SHOULD BE REMOVED AND PREPARED FOR RELOCATION ON THE PROPOSED INTERSECTION ALL WORK FOR RELOCATION IS SUBSIDARY TO ITEM 644.
2. RELOCATED LED STOP SIGNS SHOULD BE INSTALLED IN TYPE S80 POLE.

0 25 50

SCALE: 1"=50'

SIGNING REMOVAL QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
644	6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	9
644	6070	RELOCATE SM RD SN SUP&AM TY S80	EA	4
644	6076	REMOVE SM RD SN SUP&AM	EA	10

STATE OF TEXAS
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EXISTING SIGNING REMOVAL LAYOUT

SHEET 5 OF 9

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		146

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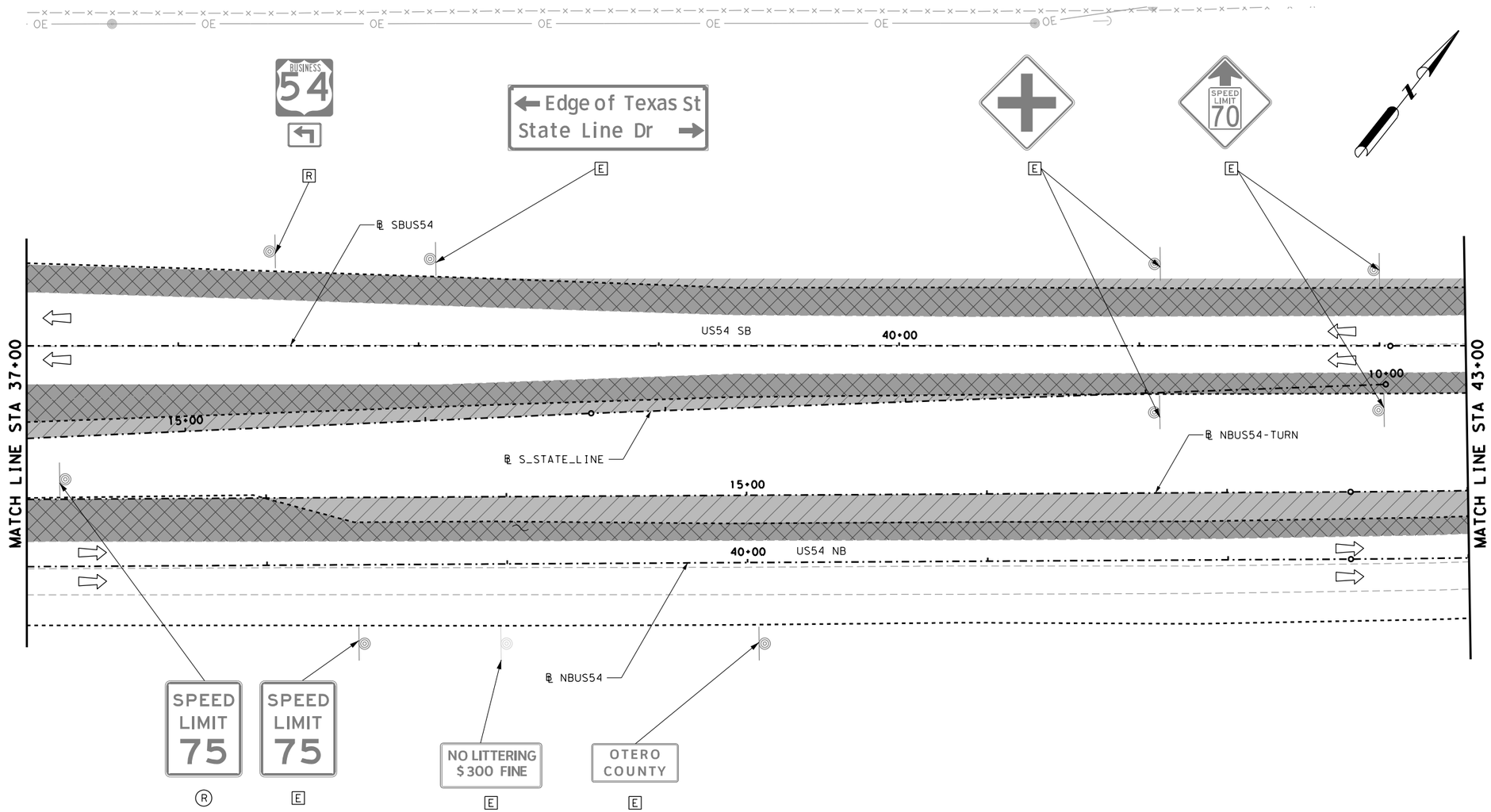

LEGEND

- (R) REMOVED SIGN
- [E] EXISTING SIGN TO REMAIN
- [R] EXISTING SIGN TO BE RELOCATED
- EXISTING SIGN
- REMOVE LANDSCAPE
- REMOVE ASPHALT PAVEMENT
- EXISTING TRAFFIC FLOW DIRECTION

0 25 50
SCALE: 1"=50'

SIGNING REMOVAL QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
644	6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	1
644	6076	REMOVE SM RD SN SUP&AM	EA	1

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EXISTING SIGNING REMOVAL LAYOUT

SHEET 6 OF 9

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		147

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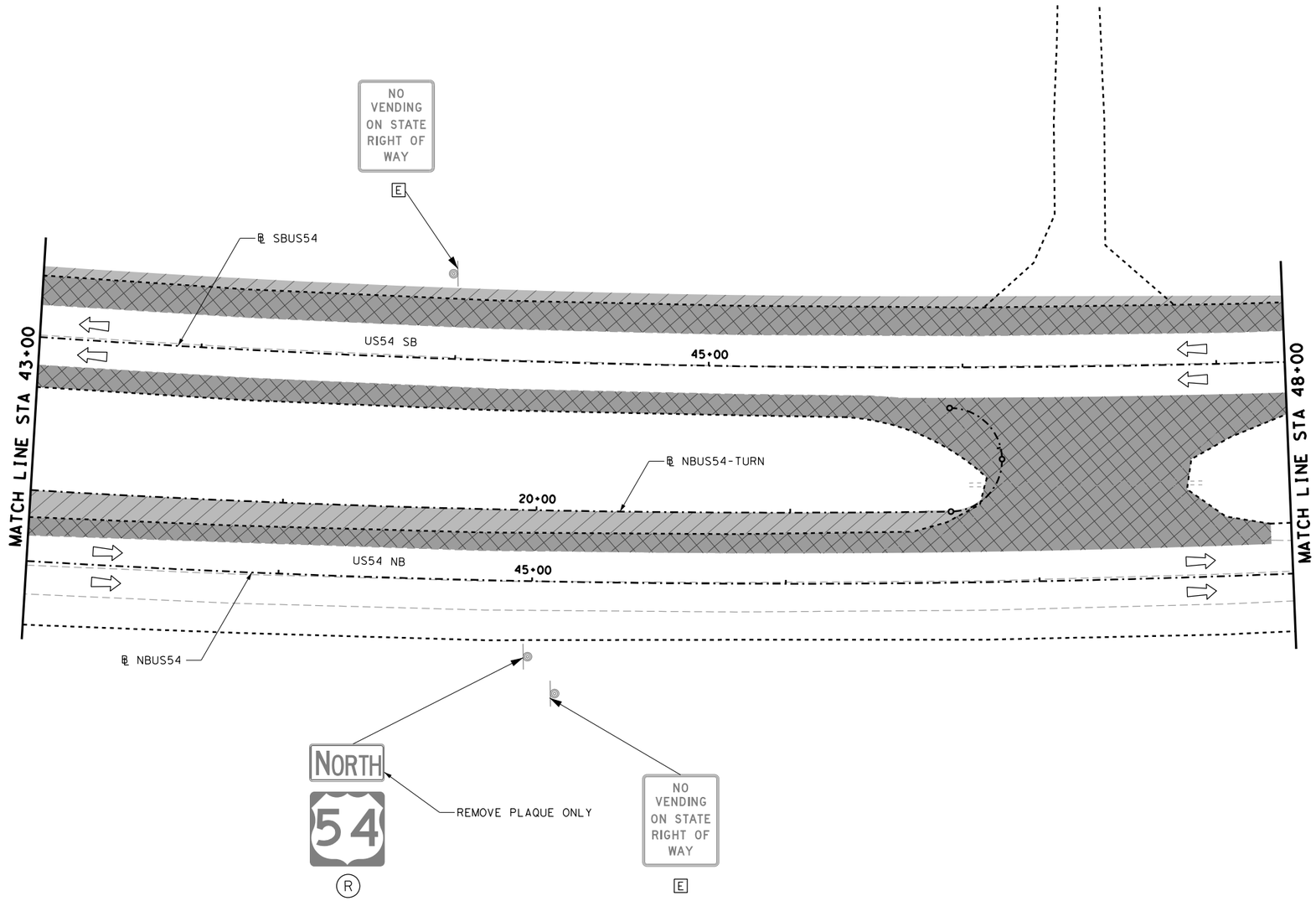

LEGEND

- (R) REMOVED SIGN
- [E] EXISTING SIGN TO REMAIN
- [R] EXISTING SIGN TO BE RELOCATED
- EXISTING SIGN
- REMOVE LANDSCAPE
- REMOVE ASPHALT PAVEMENT
- EXISTING TRAFFIC FLOW DIRECTION

0 25 50

SCALE: 1"=50'

SIGNING REMOVAL QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
644	6076	REMOVE SM RD SN SUP&AM	EA	1

STATE OF TEXAS
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EXISTING SIGNING REMOVAL LAYOUT

SHEET 7 OF 9

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		148

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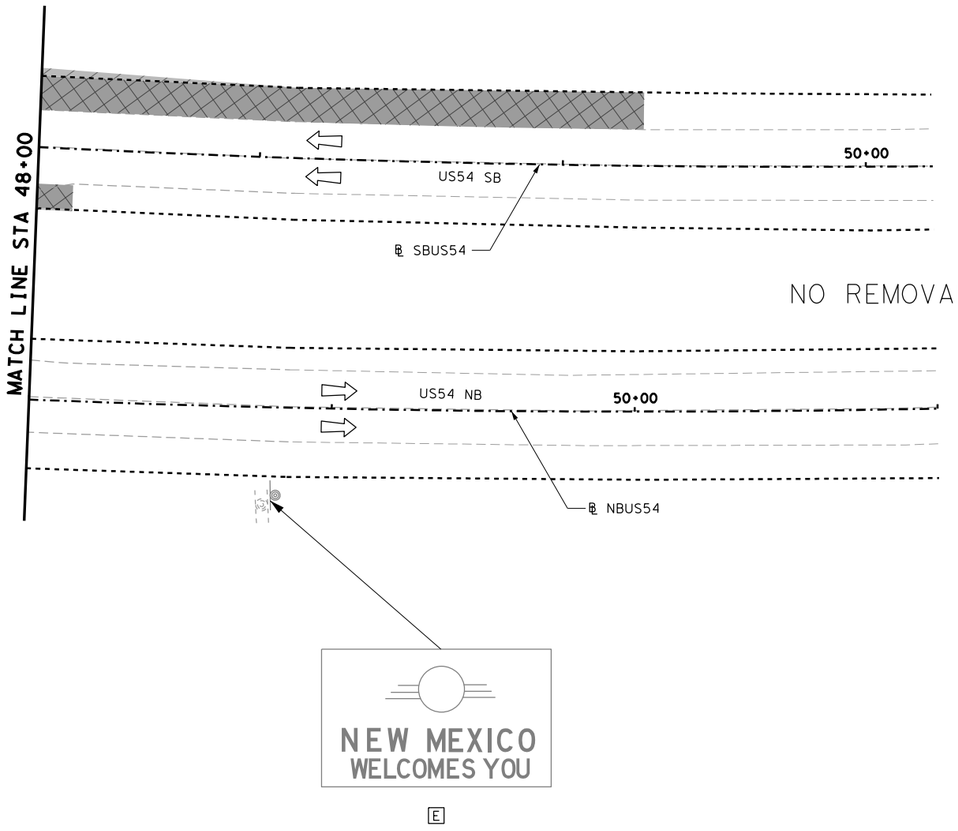
LEGEND

- (R) REMOVED SIGN
- [E] EXISTING SIGN TO REMAIN
- [R] EXISTING SIGN TO BE RELOCATED
- EXISTING SIGN
- REMOVE LANDSCAPE
- REMOVE ASPHALT PAVEMENT
- EXISTING TRAFFIC FLOW DIRECTION



NO REMOVAL OR RELOCATED SIGNS PROPOSED ON THIS SHEET

0 25 50
SCALE: 1"=50'

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US 54 State Line Rd

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EXISTING SIGNING REMOVAL LAYOUT

SHEET 8 OF 9

AECOM
AECOM Technical Services Inc, F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		149

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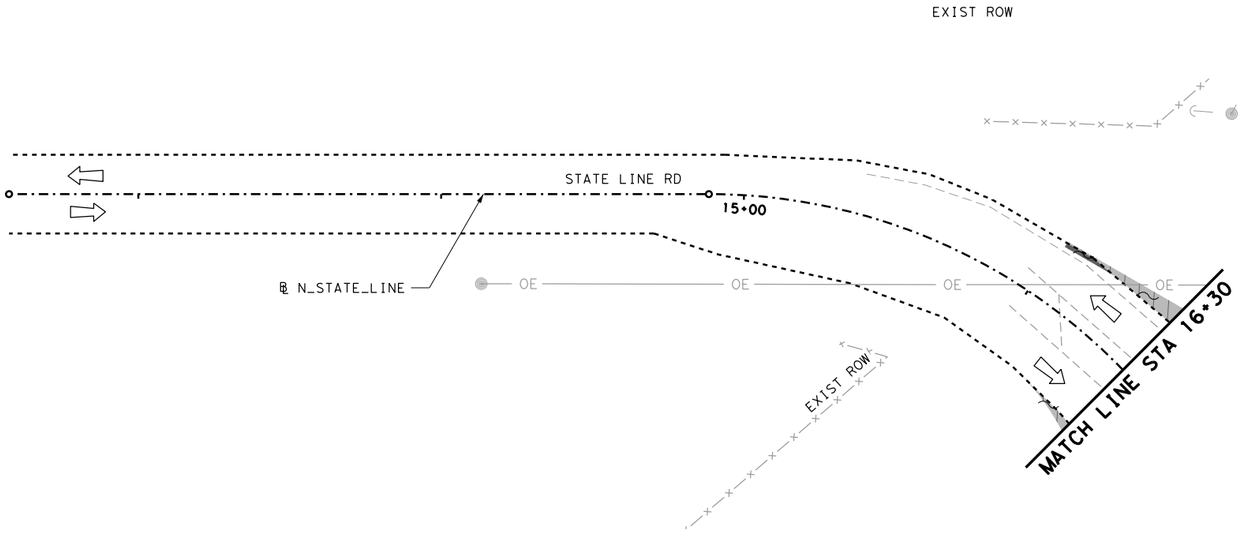
LEGEND

- (R) REMOVED SIGN
- [E] EXISTING SIGN TO REMAIN
- [R] EXISTING SIGN TO BE RELOCATED
- EXISTING SIGN
- REMOVE LANDSCAPE
- REMOVE ASPHALT PAVEMENT
- EXISTING TRAFFIC FLOW DIRECTION



0 25 50

SCALE: 1"=50'

NO REMOVAL OR RELOCATED SIGNS PROPOSED ON THIS SHEET

STATE OF TEXAS
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EXISTING SIGNING REMOVAL LAYOUT

SHEET 9 OF 9

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
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Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		150

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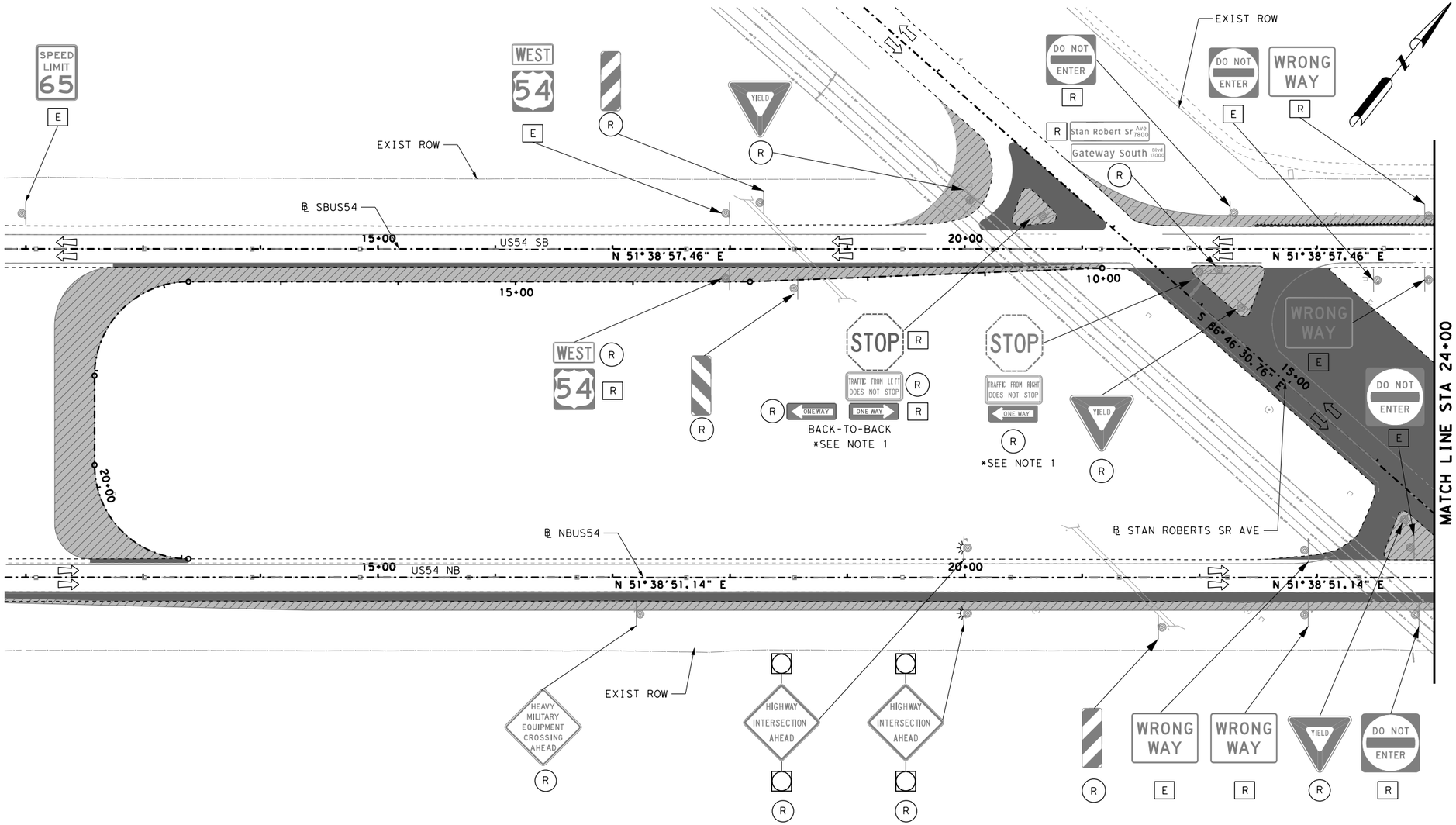

LEGEND

- (R) REMOVED SIGN
- [E] EXISTING SIGN TO REMAIN
- [R] EXISTING SIGN TO BE RELOCATED
- EXISTING SIGN
- REMOVE LANDSCAPE
- REMOVE ASPHALT PAVEMENT
- EXISTING TRAFFIC FLOW DIRECTION

NOTES:

1. EXISTING LED STOP SIGN EQUIPMENT TO BE RELOCATED, IF REMOVED IT SHOULD BE RETURNED TO TXDOT FACILITIES. RELOCATION IS SUBSIDARY TO ITEM 644.

0 25 50 100
SCALE: 1"=100'

SIGNING REMOVAL QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
0644 6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	7
0644 6070	RELOCATE SM RD SN SUP&AM TY S80	EA	1
0644 6076	REMOVE SM RD SN SUP&AM	EA	14

STATE OF TEXAS
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6/1/2022

CSJ: 0167-01-133
US 54 Stan Roberts Sr Ave
TRAFFIC

EXISTING SIGNING REMOVAL LAYOUT

SHEET 1 OF 2

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		151

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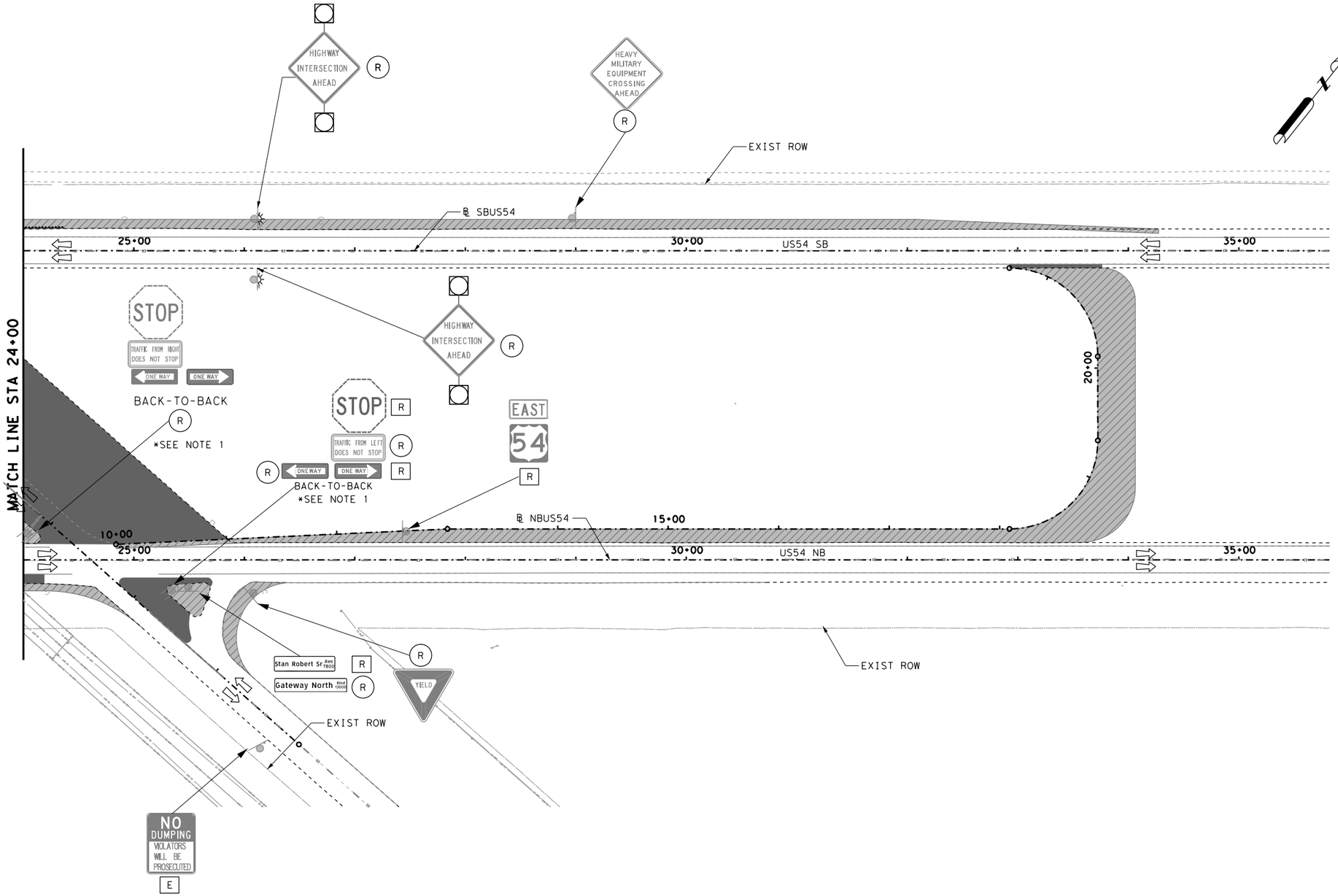

LEGEND

- (R) REMOVED SIGN
- [E] EXISTING SIGN TO REMAIN
- [R] EXISTING SIGN TO BE RELOCATED
- EXISTING SIGN
- REMOVE LANDSCAPE
- REMOVE ASPHALT PAVEMENT
- EXISTING TRAFFIC FLOW DIRECTION

NOTES:

1. EXISTING LED STOP SIGN EQUIPMENT TO BE RELOCATED, IF REMOVED IT SHOULD BE RETURNED TO TXDOT FACILITIES. RELOCATION IS SUBSIDARY TO ITEM 644.

0 25 50 100
SCALE: 1"=100'

SIGNING REMOVAL QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
0644 6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	3
0644 6070	RELOCATE SM RD SN SUP&AM TY S80	EA	1
0644 6076	REMOVE SM RD SN SUP&AM	EA	8

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.
6/1/2022

CSJ: 0167-01-133
US 54 Stan Roberts Sr Ave
TRAFFIC

EXISTING SIGNING REMOVAL LAYOUT

SHEET 2 OF 2

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		152

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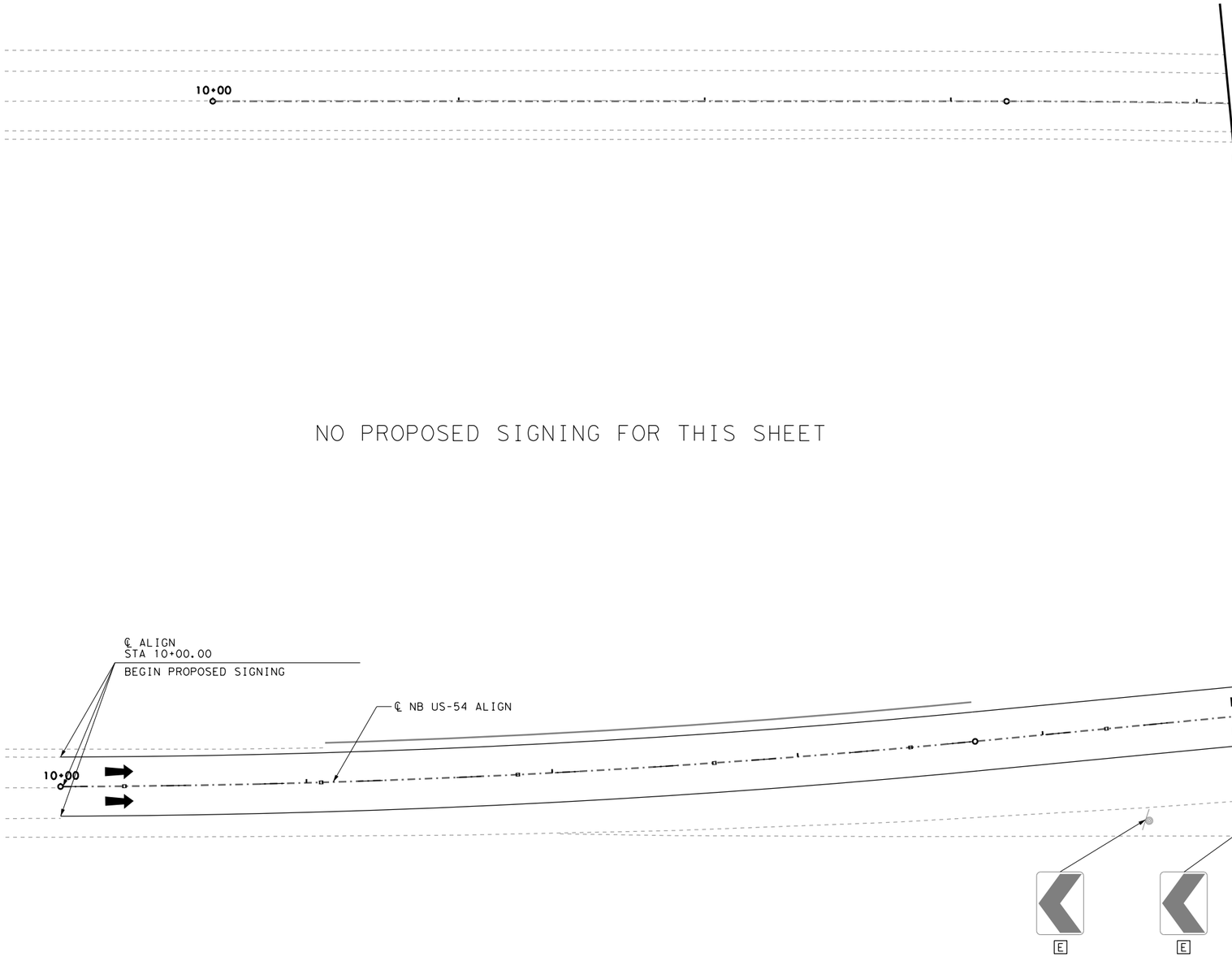

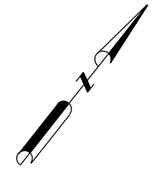

LEGEND

- PROPOSED SIGN NUMBER
- EXISTING SIGN TO REMAIN
- RELOCATED SIGN
- EXISTING/PROPOSED SIGN
- WHITE DELINEATOR
- YELLOW DELINEATOR
- EXISTING TRAFFIC FLOW ARROW
- PROPOSED TRAFFIC FLOW ARROW

NOTES:

1. PROPOSED LOCATION OF RELOCATED SIGNS ARE SHOWN ON THE PROPOSED SIGNING LAYOUT SHEET AND ARE QUANTIFIED AND PAID UNDER ITEM 644-6068 AS SHOWN ON THE EXISTING SIGNS REMOVAL LAYOUT SHEETS.

0 25 50

SCALE: 1"=50'

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US 54 State Line Rd

TRAFFIC

PROPOSED SIGNING LAYOUT

SHEET 1 OF 9

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		153

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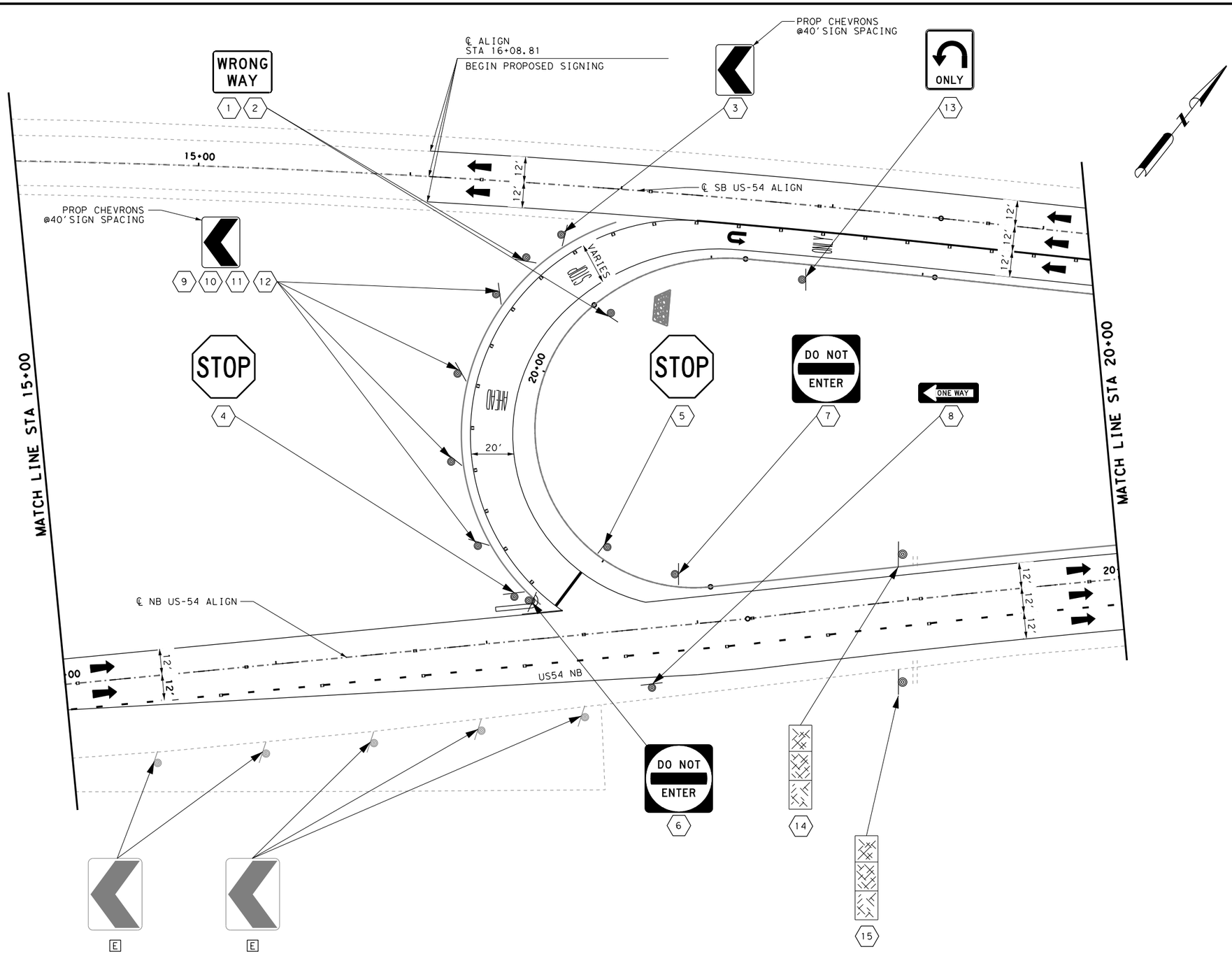

LEGEND

- (#) PROPOSED SIGN NUMBER
- [E] EXISTING SIGN TO REMAIN
- [R#] RELOCATED SIGN
- EXISTING/PROPOSED SIGN
- WHITE DELINEATOR
- YELLOW DELINEATOR
- EXISTING TRAFFIC FLOW ARROW
- PROPOSED TRAFFIC FLOW ARROW

NOTES:

1. PROPOSED LOCATION OF RELOCATED SIGNS ARE SHOWN ON THE PROPOSED SIGNING LAYOUT SHEET AND ARE QUANTIFIED AND PAID UNDER ITEM 644-6068 AS SHOWN ON THE EXISTING SIGNS REMOVAL LAYOUT SHEETS.

0 25 50
SCALE: 1"=50'

SIGNING QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	10
644	6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1
644	6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	2
658	6100	INSTL OM ASSM (OM-2Z)(WFLX)GND(BI)	EA	2

STATE OF TEXAS
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PROPOSED SIGNING LAYOUT

SHEET 2 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		154

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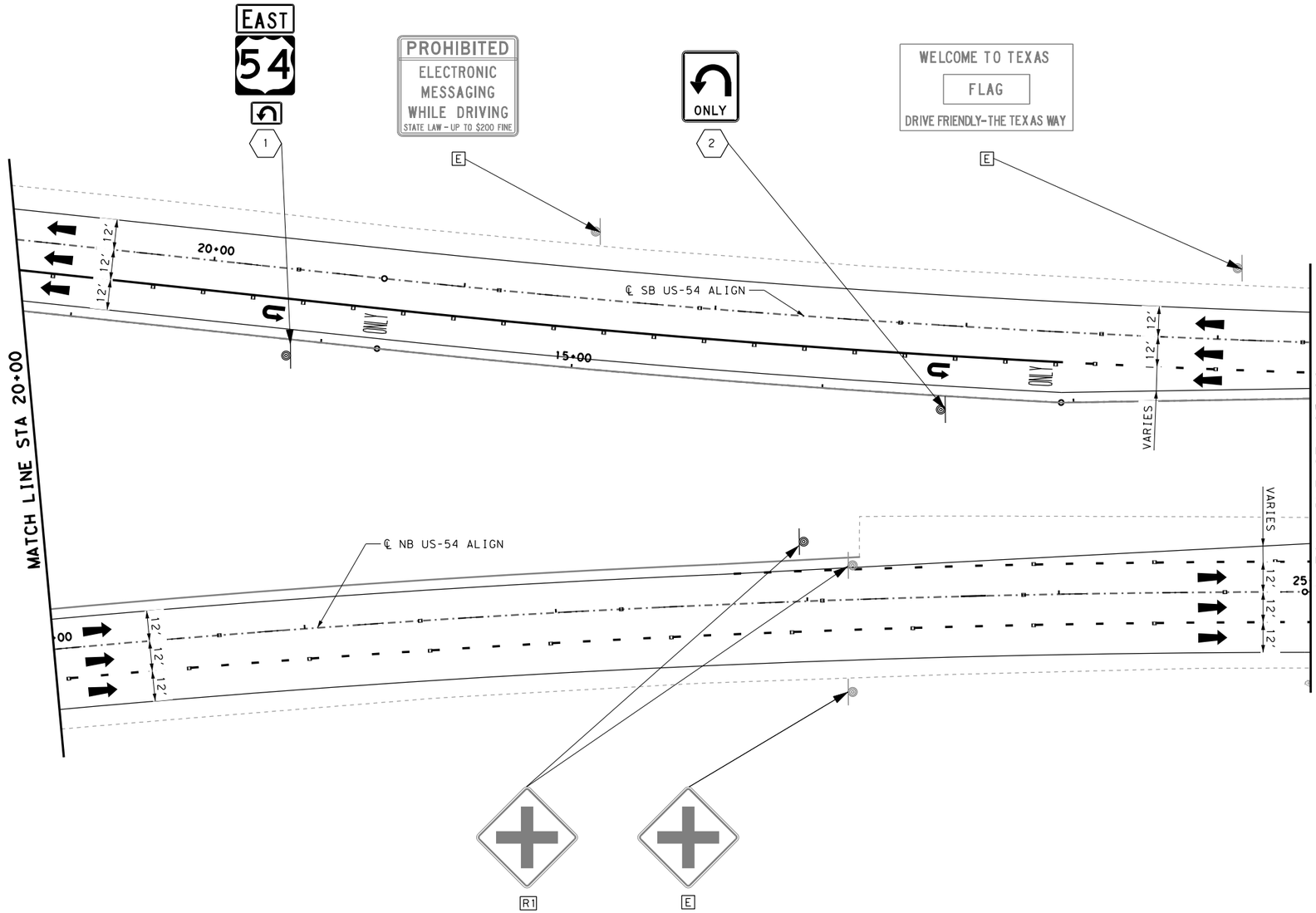

LEGEND

- (#) PROPOSED SIGN NUMBER
- [E] EXISTING SIGN TO REMAIN
- [R#] RELOCATED SIGN
- EXISTING/PROPOSED SIGN
- WHITE DELINEATOR
- YELLOW DELINEATOR
- EXISTING TRAFFIC FLOW ARROW
- PROPOSED TRAFFIC FLOW ARROW

NOTES:

1. PROPOSED LOCATION OF RELOCATED SIGNS ARE SHOWN ON THE PROPOSED SIGNING LAYOUT SHEET AND ARE QUANTIFIED AND PAID UNDER ITEM 644-6068 AS SHOWN ON THE EXISTING SIGNS REMOVAL LAYOUT SHEETS.

0 25 50

SCALE: 1"=50'

SIGNING QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	2

STATE OF TEXAS
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PROPOSED SIGNING LAYOUT

SHEET 3 OF 9

AECOM
AECOM Technical Services Inc. F- 3580
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EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		155

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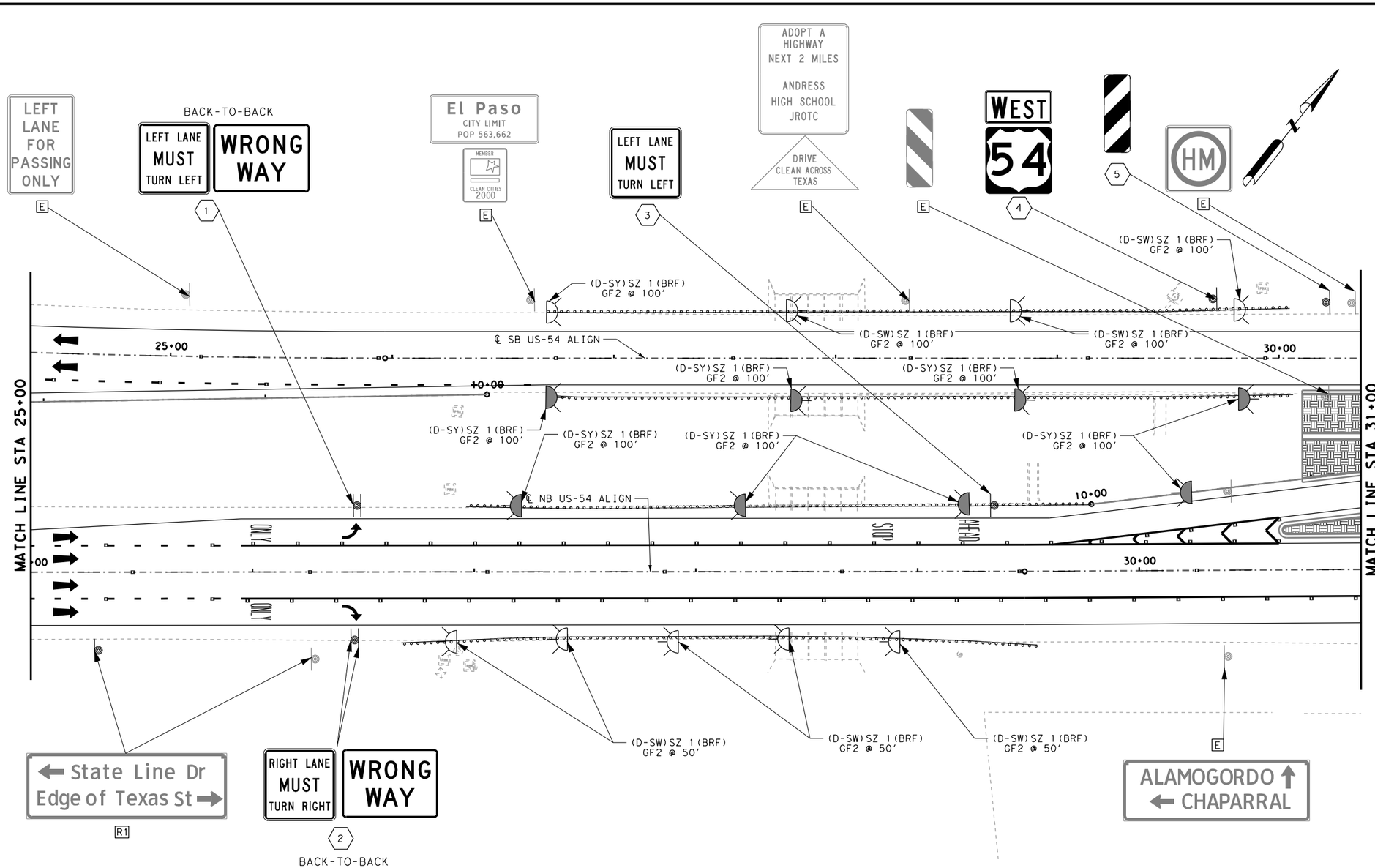

LEGEND

- PROPOSED SIGN NUMBER
- EXISTING SIGN TO REMAIN
- RELOCATED SIGN
- EXISTING/PROPOSED SIGN
- WHITE DELINEATOR
- YELLOW DELINEATOR
- EXISTING TRAFFIC FLOW ARROW
- PROPOSED TRAFFIC FLOW ARROW

NOTES:

1. PROPOSED LOCATION OF RELOCATED SIGNS ARE SHOWN ON THE PROPOSED SIGNING LAYOUT SHEET AND ARE QUANTIFIED AND PAID UNDER ITEM 644-6068 AS SHOWN ON THE EXISTING SIGNS REMOVAL LAYOUT SHEETS.

0 25 50

SCALE: 1"=50'

SIGNING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	2
644	6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2
658	6057	INSTL OM ASSM (OM-3R)(TWT)GND	EA	1
658	6061	INSTL DEL ASSM (D-SW) SZ (BRF) GF2	EA	9
658	6064	INSTL DEL ASSM (D-SY) SZ (BRF) GF2	EA	8

STATE OF TEXAS
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PROPOSED SIGNING LAYOUT

SHEET 4 OF 9

AECOM
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221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		156

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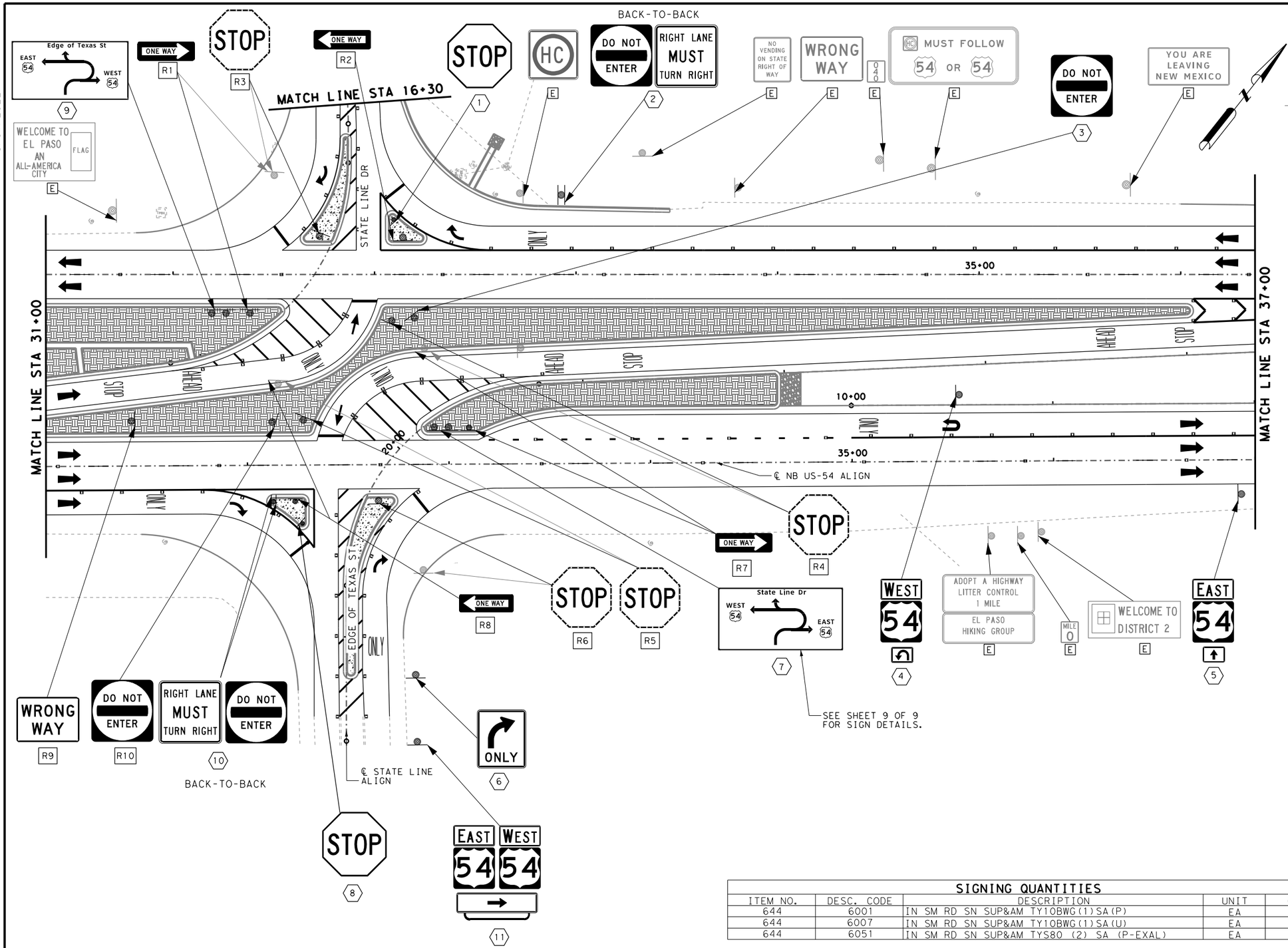

LEGEND

- (#) PROPOSED SIGN NUMBER
- [E] EXISTING SIGN TO REMAIN
- [R#] RELOCATED SIGN
- EXISTING/PROPOSED SIGN
- WHITE DELINEATOR
- YELLOW DELINEATOR
- EXISTING TRAFFIC FLOW ARROW
- PROPOSED TRAFFIC FLOW ARROW

NOTES:

1. PROPOSED LOCATION OF RELOCATED SIGNS ARE SHOWN ON THE PROPOSED SIGNING LAYOUT SHEET AND ARE QUANTIFIED AND PAID UNDER ITEM 644-6068 AS SHOWN ON THE EXISTING SIGNS REMOVAL LAYOUT SHEETS.

0 25 50

SCALE: 1"=50'

SIGNING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	8
644	6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	1
644	6051	IN SM RD SN SUP&AM TYS80 (2) SA (P-EXAL)	EA	2

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PROPOSED SIGNING LAYOUT

SHEET 5 OF 9

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		157

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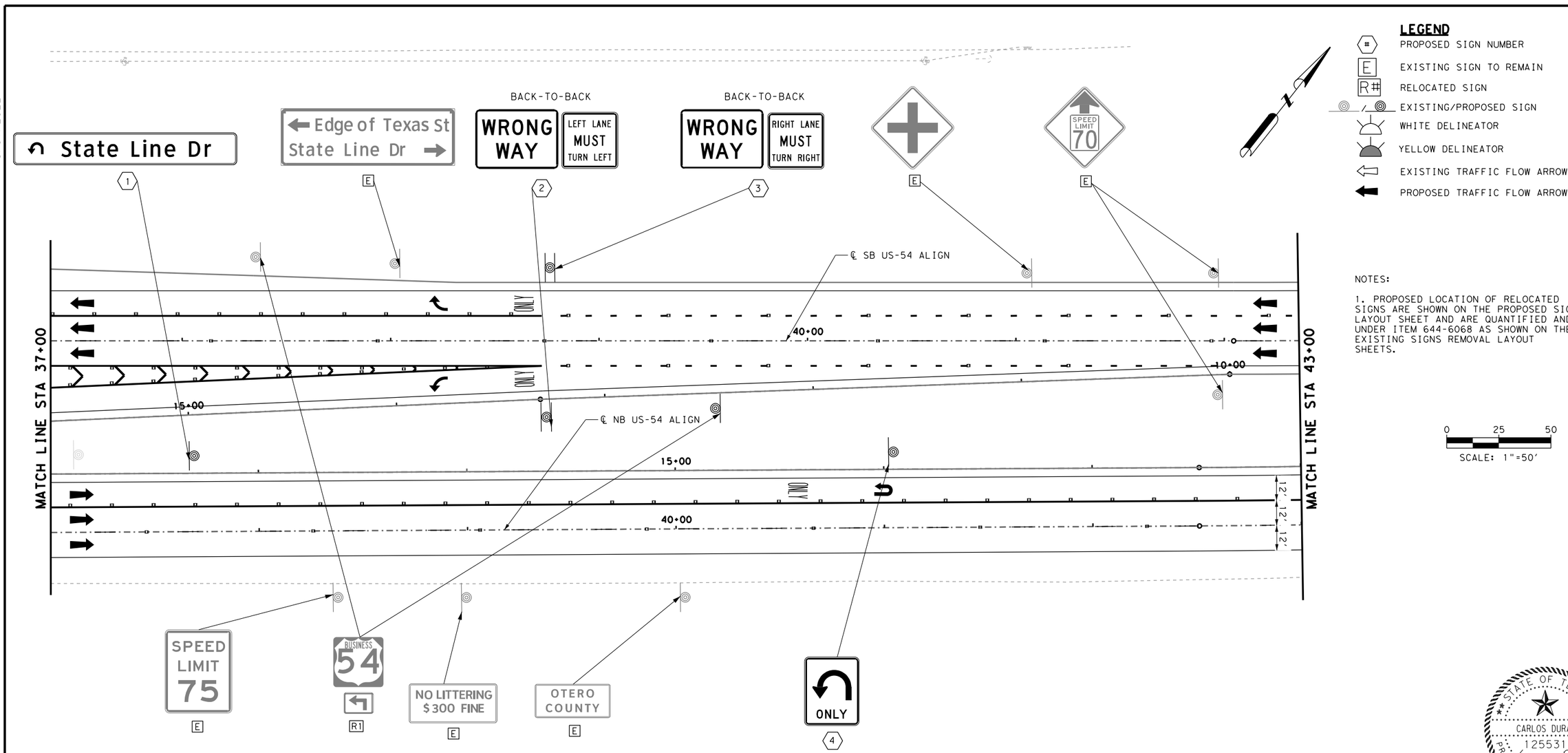

LEGEND

- PROPOSED SIGN NUMBER
- EXISTING SIGN TO REMAIN
- RELOCATED SIGN
- EXISTING/PROPOSED SIGN
- WHITE DELINEATOR
- YELLOW DELINEATOR
- EXISTING TRAFFIC FLOW ARROW
- PROPOSED TRAFFIC FLOW ARROW

NOTES:

1. PROPOSED LOCATION OF RELOCATED SIGNS ARE SHOWN ON THE PROPOSED SIGNING LAYOUT SHEET AND ARE QUANTIFIED AND PAID UNDER ITEM 644-6068 AS SHOWN ON THE EXISTING SIGNS REMOVAL LAYOUT SHEETS.

0 25 50

SCALE: 1"=50'

SIGNING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
644	6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	3

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US 54 State Line Rd

TRAFFIC

PROPOSED SIGNING LAYOUT

SHEET 6 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		158

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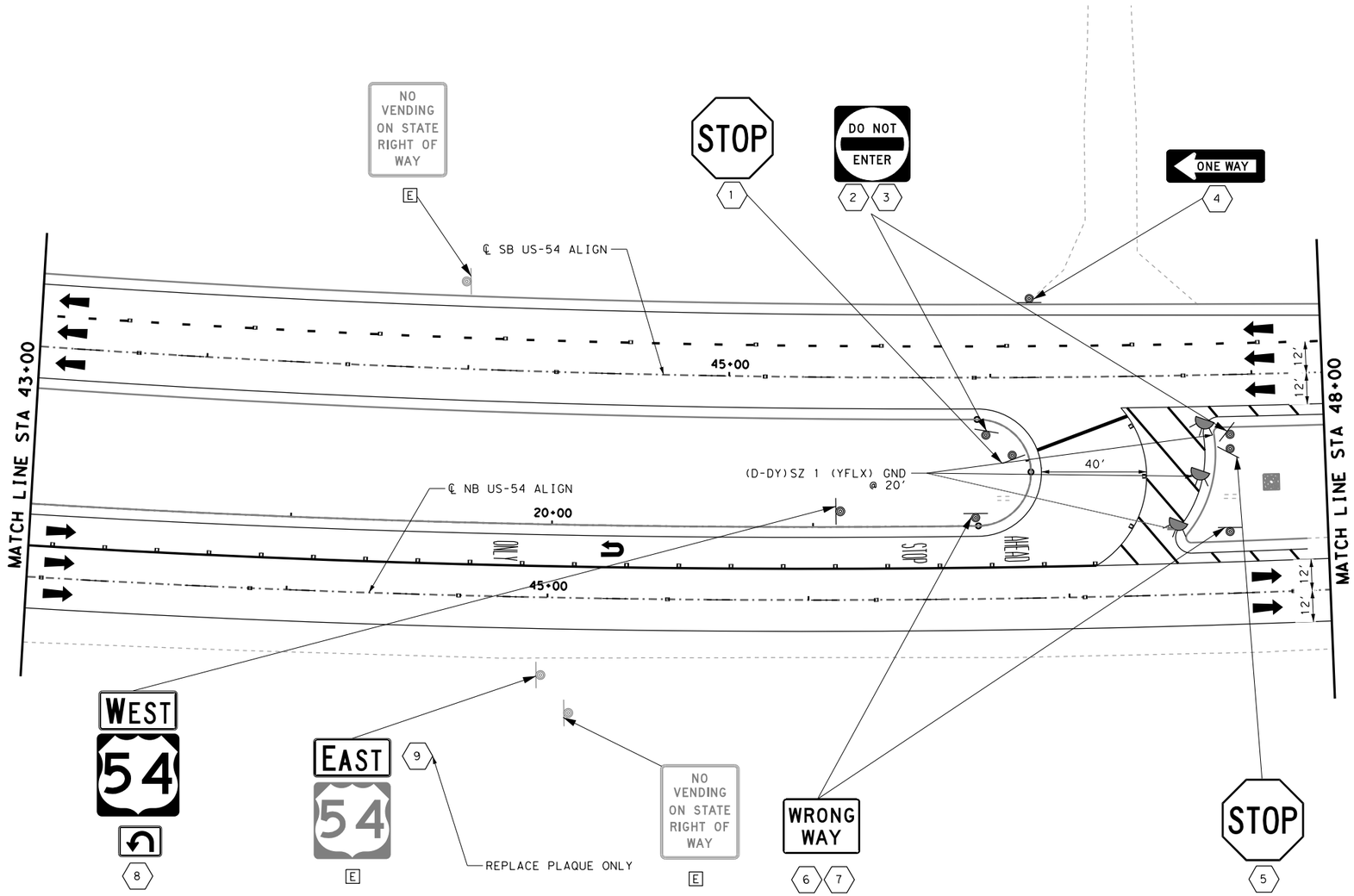

LEGEND

- PROPOSED SIGN NUMBER
- EXISTING SIGN TO REMAIN
- RELOCATED SIGN
- EXISTING/PROPOSED SIGN
- WHITE DELINEATOR
- YELLOW DELINEATOR
- EXISTING TRAFFIC FLOW ARROW
- PROPOSED TRAFFIC FLOW ARROW

NOTES:

1. PROPOSED LOCATION OF RELOCATED SIGNS ARE SHOWN ON THE PROPOSED SIGNING LAYOUT SHEET AND ARE QUANTIFIED AND PAID UNDER ITEM 644-6068 AS SHOWN ON THE EXISTING SIGNS REMOVAL LAYOUT SHEETS.

0 25 50
SCALE: 1"=50'

SIGNING QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	5
644	6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1
644	6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	2
658	6095	INSTL DEL ASSM (D-DY) SZ 1 (YFLX) GND	EA	3

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US 54 State Line Rd

TRAFFIC

PROPOSED SIGNING LAYOUT

SHEET 7 OF 9

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		159

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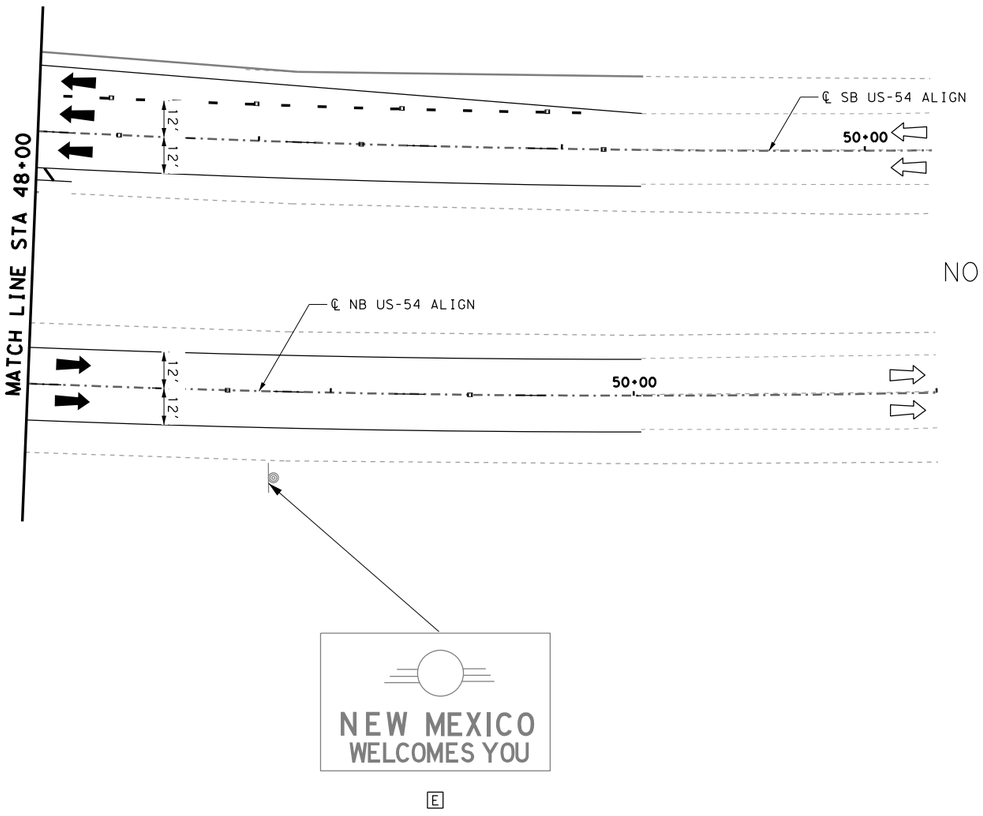
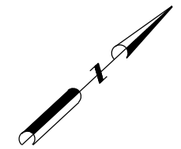


NO PROPOSED SIGNING FOR THIS SHEET



LEGEND

- PROPOSED SIGN NUMBER
- EXISTING SIGN TO REMAIN
- RELOCATED SIGN
- EXISTING/PROPOSED SIGN
- WHITE DELINEATOR
- YELLOW DELINEATOR
- EXISTING TRAFFIC FLOW ARROW
- PROPOSED TRAFFIC FLOW ARROW

NOTES:

1. PROPOSED LOCATION OF RELOCATED SIGNS ARE SHOWN ON THE PROPOSED SIGNING LAYOUT SHEET AND ARE QUANTIFIED AND PAID UNDER ITEM 644-6068 AS SHOWN ON THE EXISTING SIGNS REMOVAL LAYOUT SHEETS.

0 25 50
SCALE: 1"=50'

CSJ: 0167-01-126
US 54 State Line Rd

TRAFFIC

PROPOSED SIGNING LAYOUT

SHEET 8 OF 9

AECOM
AECOM Technical Services Inc, F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		160

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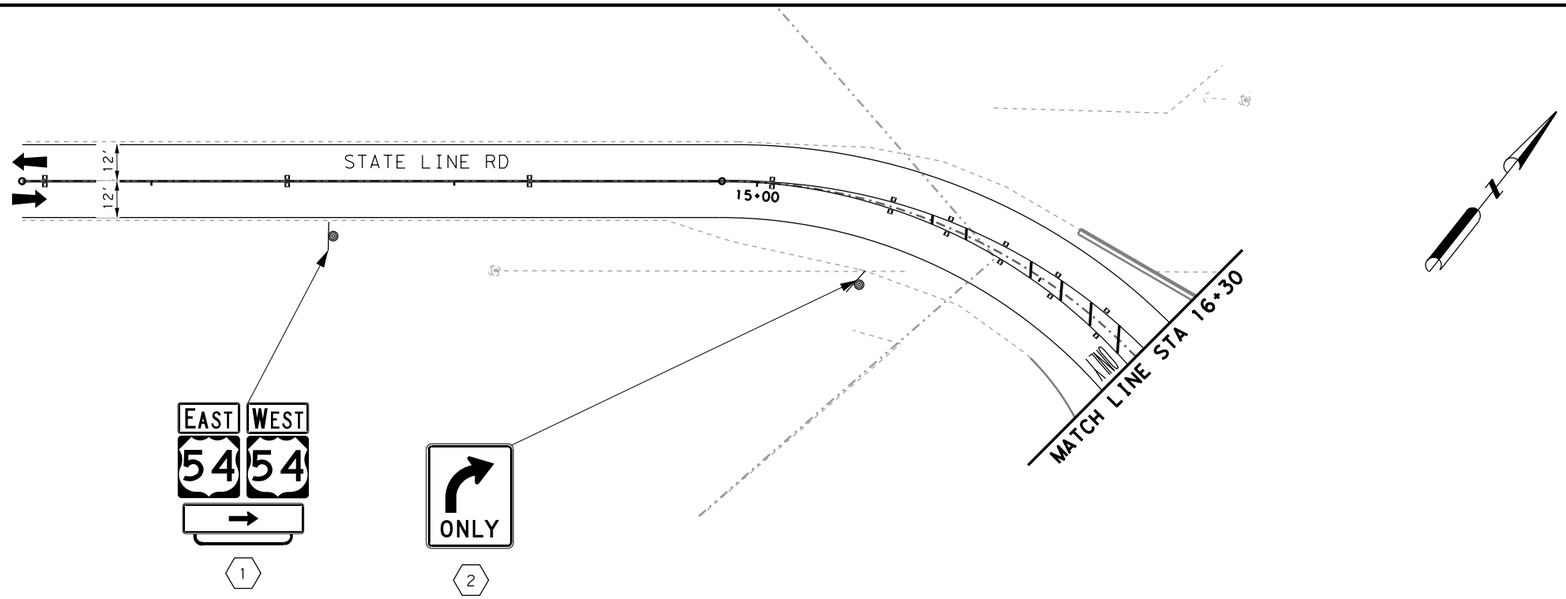

LEGEND

- PROPOSED SIGN NUMBER
- EXISTING SIGN TO REMAIN
- RELOCATED SIGN
- EXISTING/PROPOSED SIGN
- WHITE DELINEATOR
- YELLOW DELINEATOR
- EXISTING TRAFFIC FLOW ARROW
- PROPOSED TRAFFIC FLOW ARROW

NOTES:

1. PROPOSED LOCATION OF RELOCATED SIGNS ARE SHOWN ON THE PROPOSED SIGNING LAYOUT SHEET AND ARE QUANTIFIED AND PAID UNDER ITEM 644-6068 AS SHOWN ON THE EXISTING SIGNS REMOVAL LAYOUT SHEETS.

0 25 50

SCALE: 1"=50'

SIGNING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
644	6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	1

STATE OF TEXAS
CARLOS DURAN
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Carlos Duran P.E.

CSJ: 0167-01-126
US 54 State Line Rd

TRAFFIC

PROPOSED SIGNING LAYOUT

SHEET 9 OF 9

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		161

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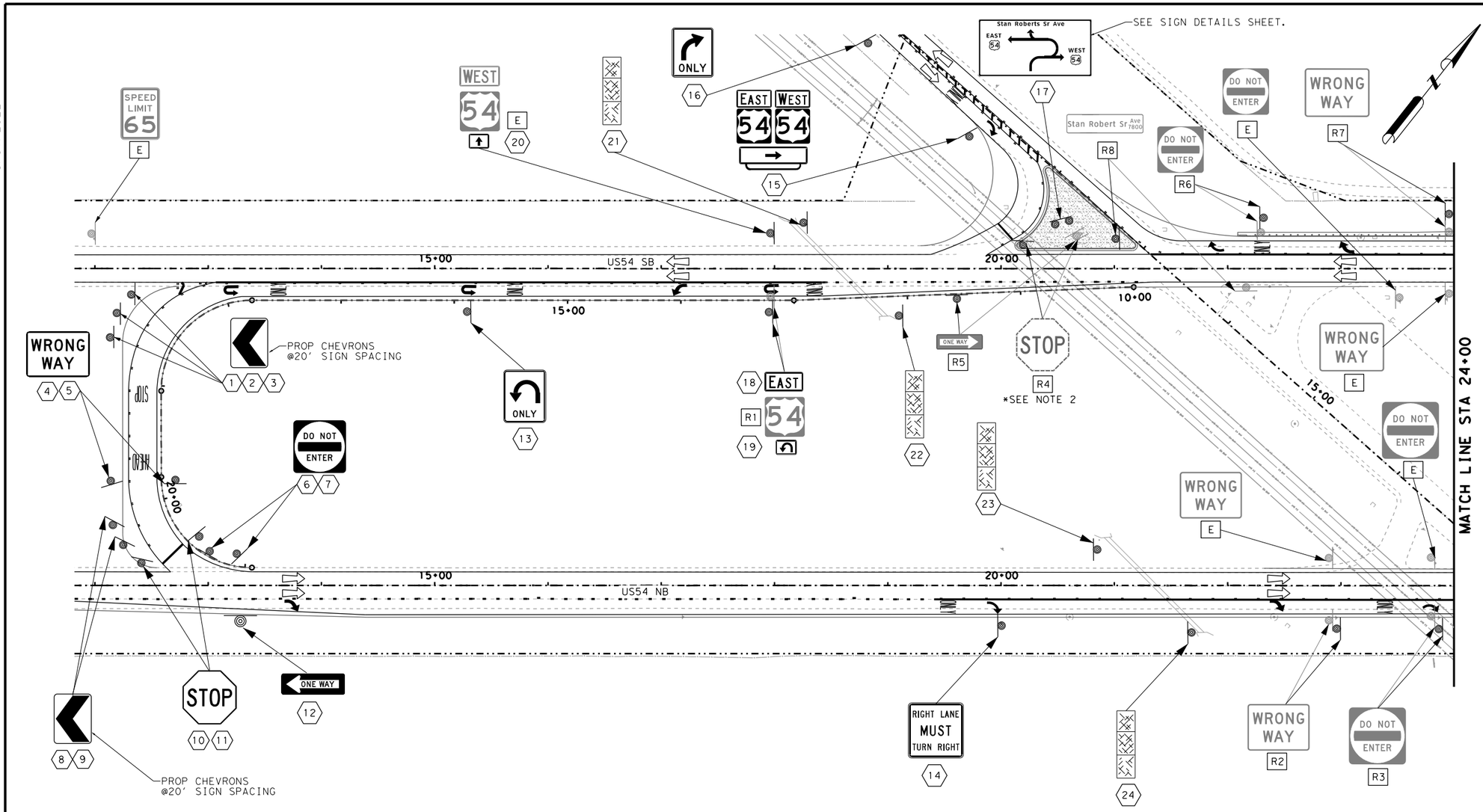

LEGEND

- (#) PROPOSED SIGN NUMBER
- [E] EXISTING SIGN TO REMAIN
- [R#] RELOCATED SIGN
- EXISTING/PROPOSED SIGN
- WHITE DELINEATOR
- YELLOW DELINEATOR
- EXISTING TRAFFIC FLOW ARROW
- PROPOSED TRAFFIC FLOW ARROW

0 25 50 100

SCALE: 1"=100'

NOTES:

1. PROPOSED LOCATION OF RELOCATED SIGNS ARE SHOWN ON THE PROPOSED SIGNING LAYOUT SHEET AND ARE QUANTIFIED AND PAID UNDER ITEM 644-6068 AS SHOWN ON THE EXISTING SIGNS REMOVAL LAYOUT SHEETS.
2. EXISTING LED EQUIPMENT TO BE REMOVED AND PREPARED TO BE RELOCATED ON PROPOSED LOCATION. RELOCATION IS SUBSIDIARY TO ITEM 644.

SIGNING QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	15
0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2
0644 6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	3
0644 6051	IN SM RD SN SUP&AM TYS80(2)SA(P-EXAL)	EA	1
0658 6100	INSTL OM ASSM (OM-2Z)(WFLX)GND(BI)	EA	4

STATE OF TEXAS
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CSJ: 0167-01-133
US 54 Stan Roberts Sr Ave

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PROPOSED SIGNING LAYOUT

SHEET 1 OF 2

AECOM
AECOM Technical Services Inc, F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		162

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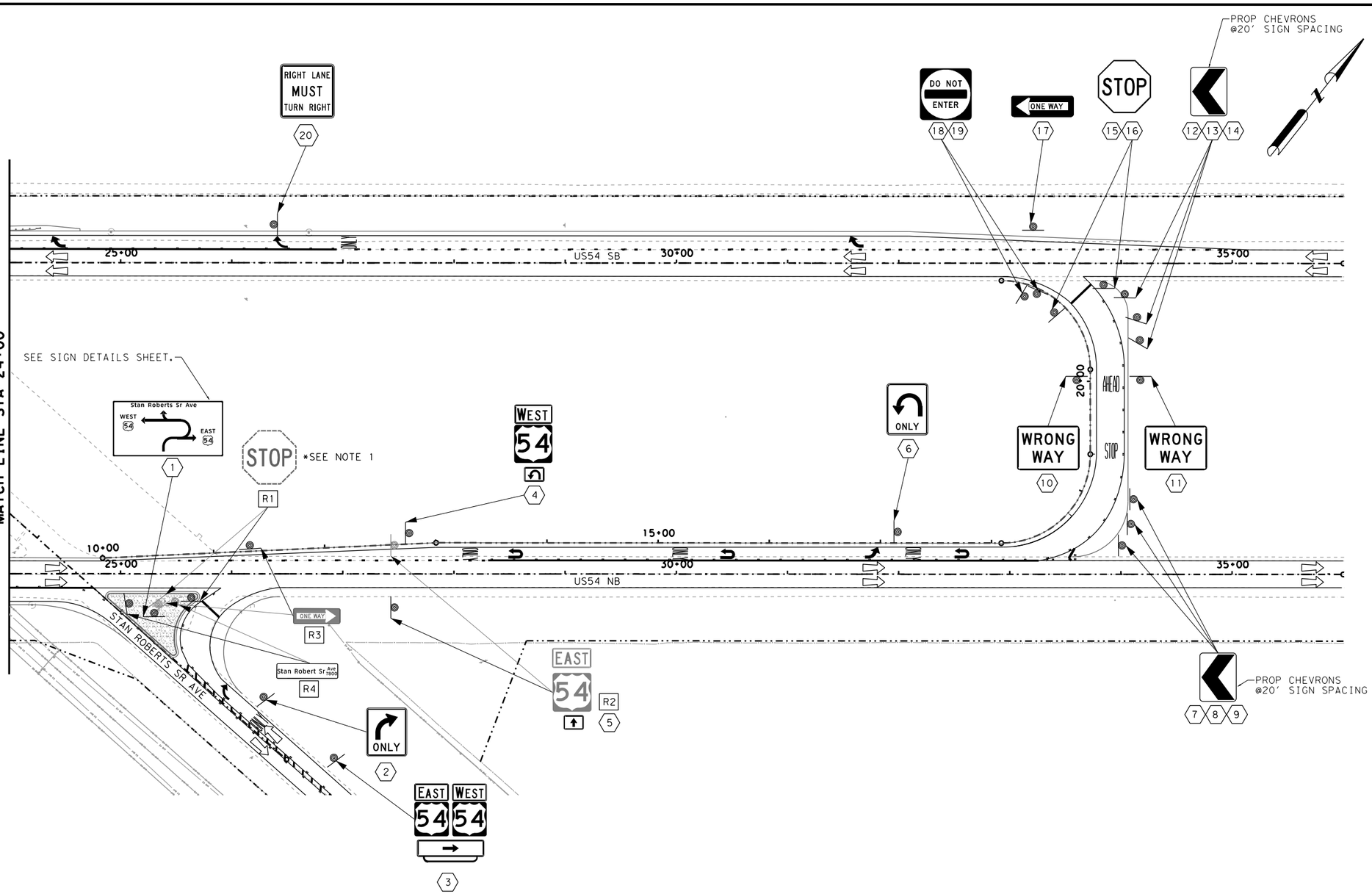

LEGEND

- (#) PROPOSED SIGN NUMBER
- [E] EXISTING SIGN TO REMAIN
- [R#] RELOCATED SIGN
- EXISTING/PROPOSED SIGN
- WHITE DELINEATOR
- YELLOW DELINEATOR
- EXISTING TRAFFIC FLOW ARROW
- PROPOSED TRAFFIC FLOW ARROW

0 25 50 100
SCALE: 1"=100'

NOTES:

1. PROPOSED LOCATION OF RELOCATED SIGNS ARE SHOWN ON THE PROPOSED SIGNING LAYOUT SHEET AND ARE QUANTIFIED AND PAID UNDER ITEM 644-6068 AS SHOWN ON THE EXISTING SIGNS REMOVAL LAYOUT SHEETS.
2. EXISTING LED EQUIPMENT TO BE REMOVED AND PREPARED TO BE RELOCATED ON PROPOSED LOCATION. RELOCATION IS SUBSIDIARY TO ITEM 644.

SIGNING QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	15
0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2
0644 6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	3
0644 6051	IN SM RD SN SUP&AM TYS80(2)SA(P-EXAL)	EA	1

STATE OF TEXAS
CARLOS DURAN
125531
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PROFESSIONAL ENGINEER
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CSJ: 0167-01-133
US 54 Stan Roberts Sr Ave

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PROPOSED SIGNING LAYOUT

SHEET 2 OF 2

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		163

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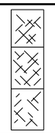
SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
123	1	R5-1a		42x30	X		10BWG	1	SA	U		
	2	R5-1a		42x30	X		10BWG	1	SA	U		
123	3	W1-8L		18x24	X		10BWG	1	SA	P		
123	4	R1-1		36x36	X		10BWG	1	SA	P		
	5	R1-1		36x36	X		10BWG	1	SA	P		
123	6	R5-1		36x36	X		10BWG	1	SA	P		
	7	R5-1		36x36	X		10BWG	1	SA	P		
123	8	R6-1L		54x18	X		10BWG	1	SA	T		
123	9	W1-8L		18x24	X		10BWG	1	SA	P		
	10	W1-8L		18x24	X		10BWG	1	SA	P		
	11	W1-8L		18x24	X		10BWG	1	SA	P		
	12	W1-8L		18x24	X		10BWG	1	SA	P		
123	13	R3-8uT		30x36	X		10BWG	1	SA	P		
123	14	OM-2Z		3x12	X		10BWG	1	SA	P		
	15	OM-2Z		3x12	X		10BWG	1	SA	P		
124	1	M3-2		24x12	X		10BWG	1	SA	P		
		M1-4		24x24	X							
		M5-3T		21x15	X							
124	2	R3-8uT		30x36	X		10BWG	1	SA	P		
124	R1	W2-1		RELOCATED EXISTING SIGN	X		10BWG	1	SA	P		
125	1	R3-7L	BACK-TO-BACK 	30x36	X		10BWG	1	SA	T		
		R5-1a		42x30	X							

CSJ: 0167-01-126
US 54 State Line Rd

SUMMARY OF SMALL SIGNS

SHEET 1 OF 4

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		164

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SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
125	2	R3-7R	BACK-TO-BACK RIGHT LANE MUST TURN RIGHT / WRONG WAY	30x36	X		10BWG	1	SA	T		
		R5-1a		RELOCATED	X							
				EXISTING SIGN								
125	3	R3-7L	LEFT LANE MUST TURN LEFT	30x36	X		10BWG	1	SA	P		
125	4	M3-4	WEST 54	24x12	X		10BWG	1	SA	P		
		M1-4		24x24	X							
125	5	OM-3R		12x36	X		TWT	1	SA	P		
125	R1	D1-2	← State Line Dr Edge of Texas St →	RELOCATED	X		10BWG	1	SA	T		
				EXISTING SIGN								
126	1	R1-1	STOP	36x36	X		10BWG	1	SA	P		
126	2	R3-7R	BACK-TO-BACK DO NOT ENTER / RIGHT LANE MUST TURN RIGHT	30x36	X		10BWG	1	SA	P		
		R5-1		36x36	X							
126	3	R5-1	DO NOT ENTER	36x36	X		10BWG	1	SA	P		
126	4	M3-4	WEST 54	24x12	X		10BWG	1	SA	P		
		M1-4		24x24	X							
		M5-3T		21x15	X							
126	5	M3-2	EAST 54	24x12	X		10BWG	1	SA	P		
		M1-4		24x24	X							
		M6-3		21x15	X							
126	6	R3-5R	ONLY	30x36	X		10BWG	1	SA	P		

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.
5/31/2022

CSJ: 0167-01-126
US 54 State Line Rd

SUMMARY OF SMALL SIGNS

SHEET 2 OF 4

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		165

5/31/2022 1:39:09 PM

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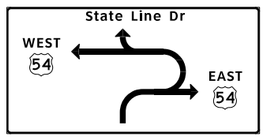
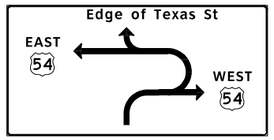
5/31/2022 1:39:18 PM

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
126	7	D1-1 (MOD)		132x66	X		80SCH	2	SA	P	EXAL	
126	8	R1-1		36x36	X		10BWG	1	SA	P		
126	9	D1-1 (MOD)		132x66	X		80SCH	2	SA	P	EXAL	
126	10	R3-7R	BACK-TO-BACK 	30x36	X		10BWG	1	SA	T		
		R5-1		RELOCATED	X							
				EXISTING SIGN								
126	11	M3-2		24x12	X		10BWG	1	SA	U		
		M1-4		24x24	X							
		M6-1T		60x15	X							
		M3-4		24x12	X							
		M1-4		24x24	X							
		M6-1T		60x15	X							
126	R1	R6-1R		RELOCATED	X		10BWG	1	SA	T		
				EXISTING SIGN								
126	R2	R6-1L		RELOCATED	X		10BWG	1	SA	T		
				EXISTING SIGN								
126	R3	LED R1-1		RELOCATED	X		S80	1	SA	P		
	R4	LED R1-1		RELOCATED	X		S80	1	SA	P		
	R5	LED R1-1		RELOCATED	X		S80	1	SA	P		
	R6	LED R1-1		RELOCATED	X		S80	1	SA	P		
				EXISTING SIGN								
126	R7	R6-1R		RELOCATED	X		10BWG	1	SA	T		
				EXISTING SIGN								
126	R8	R6-1L		RELOCATED	X		10BWG	1	SA	T		
				EXISTING SIGN								
126	R9	R5-1a		RELOCATED	X		10BWG	1	SA	U		
				EXISTING SIGN								
126	R10	R5-1		RELOCATED	X		10BWG	1	SA	P		
				EXISTING SIGN								

CSJ: 0167-01-126
US 54 State Line Rd

SUMMARY OF SMALL SIGNS

SHEET 3 OF 4

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		166

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SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
127	1	D1-1L	State Line Dr	84x12	X		10BWG	1	SA	T		
127	2	R3-7L R5-1a	BACK-TO-BACK WRONG WAY / LEFT LANE MUST TURN LEFT	30x36 42x30	X X		10BWG	1	SA	T		
127	3	R3-5R R5-1a	BACK-TO-BACK WRONG WAY / RIGHT LANE MUST TURN RIGHT	30x36 42x30	X X		10BWG	1	SA	T		
127	4	R3-8uT	ONLY	30x36	X		10BWG	1	SA	P		
127	R1	M1-4 M5-1L	BUSINESS 54	RELOCATED EXISTING SIGN	X		10BWG	1	SA	P		
128	1	R1-1	STOP	36x36	X		10BWG	1	SA	P		
128	2	R5-1	DO NOT ENTER	36x36	X		10BWG	1	SA	P		
	3	R5-1		36x36	X		10BWG	1	SA	P		
128	4	R6-1L	ONE WAY	54x18	X		10BWG	1	SA	T		
128	5	R1-1	STOP	36x36	X		10BWG	1	SA	P		
128	6	R5-1a	WRONG WAY	42x30	X		10BWG	1	SA	U		
	7	R5-1a		42x30	X		10BWG	1	SA	U		
128	8	M3-4 M1-4 M5-3T	WEST 54	24x12 24x24 21x15	X X X		10BWG	1	SA	P		
128	9	M3-2	EAST	24x12	X		10BWG	1	SA	P		
130	1	M3-2 M1-4 M6-1T M3-4 M1-4 M6-1T	EAST 54 WEST 54	24x12 24x24 60x15 24x12 24x24 60x15	X X X X X X		10BWG	1	SA	U		
130	2	R3-5R	ONLY	30x36	X		10BWG	1	SA	P		

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.
5/31/2022

CSJ: 0167-01-126
US 54 State Line Rd

SUMMARY OF SMALL SIGNS

SHEET 4 OF 4

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		167

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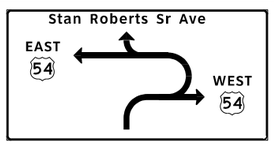
SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
1 OF 2	1	W1-8L		18x24	X		10BWG	1	SA	P		
	2	W1-8L		18x24	X		10BWG	1	SA	P		
	3	W1-8L		18x24	X		10BWG	1	SA	P		
1 OF 2	4	R5-1a		42x30	X		10BWG	1	SA	U		
	5	R5-1a		42x30	X		10BWG	1	SA	U		
1 OF 2	6	R5-1		36x36	X		10BWG	1	SA	P		
	7	R5-1		36x36	X		10BWG	1	SA	P		
1 OF 2	8	W1-8L		18x24	X		10BWG	1	SA	P		
	9	W1-8L		18x24	X		10BWG	1	SA	P		
1 OF 2	10	R1-1		36x36	X		10BWG	1	SA	P		
	11	R1-1		36x36	X		10BWG	1	SA	P		
1 OF 2	12	R6-1L		54x18	X		10BWG	1	SA	T		
1 OF 2	13	R3-8uT		30x36	X		10BWG	1	SA	P		
1 OF 2	14	R3-7R		36x36	X		10BWG	1	SA	P		
1 OF 2	15	M3-2		24x12	X		10BWG	1	SA	U		
		M1-4		24x24	X							
		M6-1T		60x15	X							
		M3-4		24x12	X							
		M1-4		24x24	X							
		M6-1T		60x15	X							
1 OF 2	16	R3-5R		30x36	X		10BWG	1	SA	P		
1 OF 2	17	D1-1 (MOD)		132x66	X		S80	2	SA	P	EXAL	

CSJ: 0167-01-133
US 54 Stan Roberts Sr Ave

SUMMARY OF SMALL SIGNS

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		168

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5/31/2022 1:39:45 PM

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
1 OF 2	18	M3-2	EAST	MOUNTED ON EXISTING POLE								
1 OF 2	19	M5-3T										
1 OF 2	20	M6-3		21x15	X		10BWG	1	SA	P		
1 OF 2	21	OM-2Z		3X12	X		10BWG	1	SA	P		
	22	OM-2Z		3X12	X		10BWG	1	SA	P		
	23	OM-2Z		3X12	X		10BWG	1	SA	P		
	24	OM-2Z		3X12	X		10BWG	1	SA	P		
1 OF 2	R1	M3-4	54	RELOCATED EXISTING SIGN	X		10BWG	1	SA	P		
1 OF 2	R2	R5-1a	WRONG WAY	RELOCATED EXISTING SIGN	X		10BWG	1	SA	U		
1 OF 2	R3	R5-1	DO NOT ENTER	RELOCATED EXISTING SIGN	X		10BWG	1	SA	P		
1 OF 2	R4	LED R1-1	STOP	RELOCATED EXISTING SIGN	X		S80	1	SA	P		
1 OF 2	R5	R6-1R	ONE WAY	RELOCATED EXISTING SIGN	X		10BWG	1	SA	T		
1 OF 2	R6	R5-1	DO NOT ENTER	RELOCATED EXISTING SIGN	X		10BWG	1	SA	P		
1 OF 2	R7	R5-1a	WRONG WAY	RELOCATED EXISTING SIGN	X		10BWG	1	SA	U		
1 OF 2	R8	D3-1G	Stan Robert Sr Ave 7800	RELOCATED EXISTING SIGN	X		10BWG	1	SA	P		

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.
5/31/2022

CSJ: 0167-01-133
US 54 Stan Roberts Sr Ave

SUMMARY OF SMALL SIGNS

SHEET 2 OF 4

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		169

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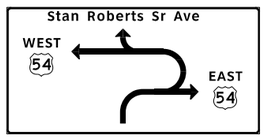
SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
2 OF 2	1	D1-1 (MOD)		132x66	X		S80	2	SA	P	EXAL	
2 OF 2	2	R3-5R		30x36	X		10BWG	1	SA	P		
2 OF 2	3	M3-2		24x12	X		10BWG	1	SA	U		
		M1-4		24x24	X							
		M6-1T		60x15	X							
		M3-4		24x12	X							
		M1-4		24x24	X							
		M6-1T		60x15	X							
2 OF 2	4	M3-4		24x12	X		10BWG	1	SA	P		
		M1-4		24x24	X							
		M5-3T		21x15	X							
2 OF 2	5	M6-3		MOUNTED ON EXISTING POLE								
2 OF 2	6	R3-8uT		30x36	X		10BWG	1	SA	P		
2 OF 2	7	W1-8L		18x24	X		10BWG	1	SA	P		
	8	W1-8L		18x24	X		10BWG	1	SA	P		
	9	W1-8L		18x24	X		10BWG	1	SA	P		
2 OF 2	10	R5-1a		42x30	X		10BWG	1	SA	U		
	11	R5-1a		42x30	X		10BWG	1	SA	U		
2 OF 2	12	W1-8L		18x24	X		10BWG	1	SA	P		
	13	W1-8L		18x24	X		10BWG	1	SA	P		
	14	W1-8L		18x24	X		10BWG	1	SA	P		
2 OF 2	15	R1-1		36x36	X		10BWG	1	SA	P		
	16	R1-1		36x36	X		10BWG	1	SA	P		
2 OF 2	17	R6-1L		54x18	X		10BWG	1	SA	T		

CSJ: 0167-01-133
US 54 Stan Roberts Sr Ave

SUMMARY OF SMALL SIGNS

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		170

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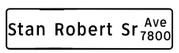
SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
2 OF 2	18	R5-1		36x36	X		10BWG	1	SA	P		
	19	R5-1		36x36	X		10BWG	1	SA	P		
2 OF 2	20	R3-7R		36x36	X		10BWG	1	SA	P		
2 OF 2	R1	LED R1-1		RELOCATED EXISTING SIGN	X		S80	1	SA	P		
2 OF 2	R2	M3-2 M1-4		RELOCATED EXISTING SIGN	X X		10BWG	1	SA	P		
2 OF 2	R3	R6-1R		RELOCATED EXISTING SIGN	X		10BWG	1	SA	T		
2 OF 2	R4	D3-1G		RELOCATED EXISTING SIGN	X		10BWG	1	SA	P		

CSJ: 0167-01-133
US 54 Stan Roberts Sr Ave

SUMMARY OF SMALL SIGNS

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		171

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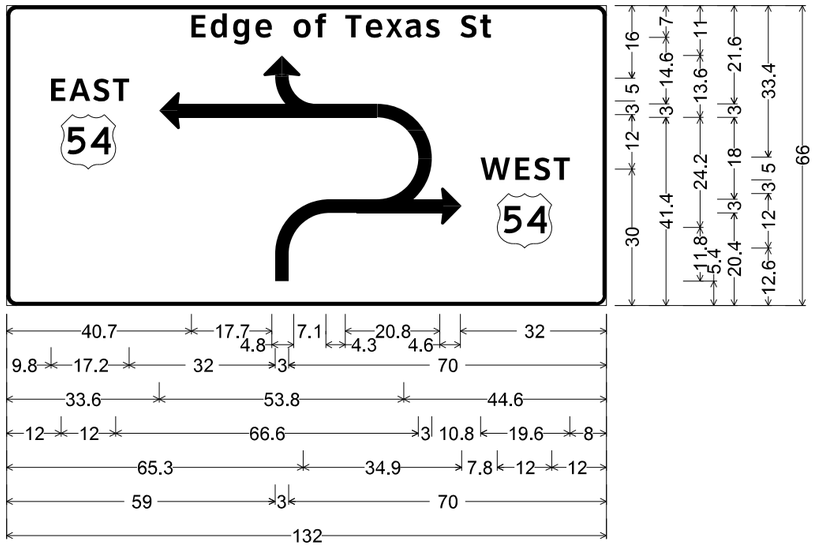
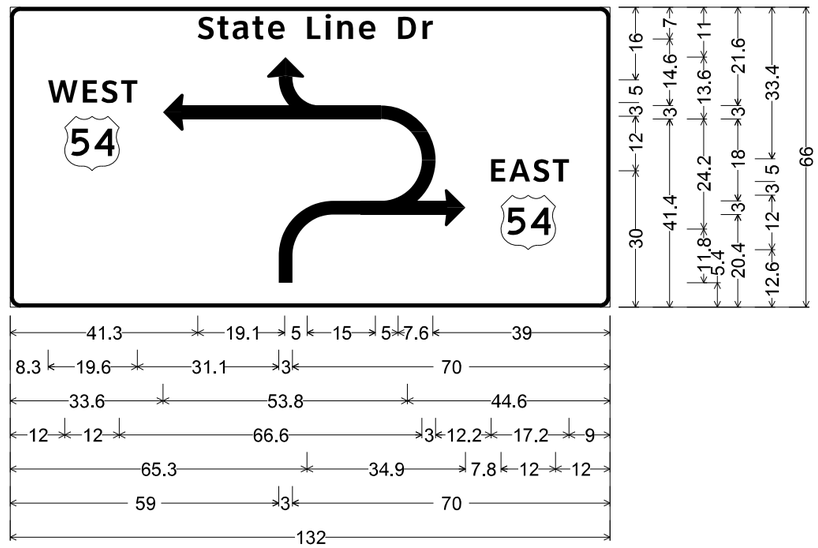
SIGN DETAILS



2.25" Radius, 0.75" Border, White on Green;
[Edge of Texas St] ClearviewHwy-5-W-R; [EAST] ClearviewHwy-5-W-R;
US 54 M1-4; [WEST] ClearviewHwy-5-W-R; US 54 M1-4;



2.25" Radius, 0.75" Border, White on Green;
[State Line Dr] ClearviewHwy-5-W-R; [WEST] ClearviewHwy-5-W-R;
US 54 M1-4; [EAST] ClearviewHwy-5-W-R; US 54 M1-4;

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STATE OF TEXAS
CARLOS DURAN
125531
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Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

SIGN DETAILS

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		172

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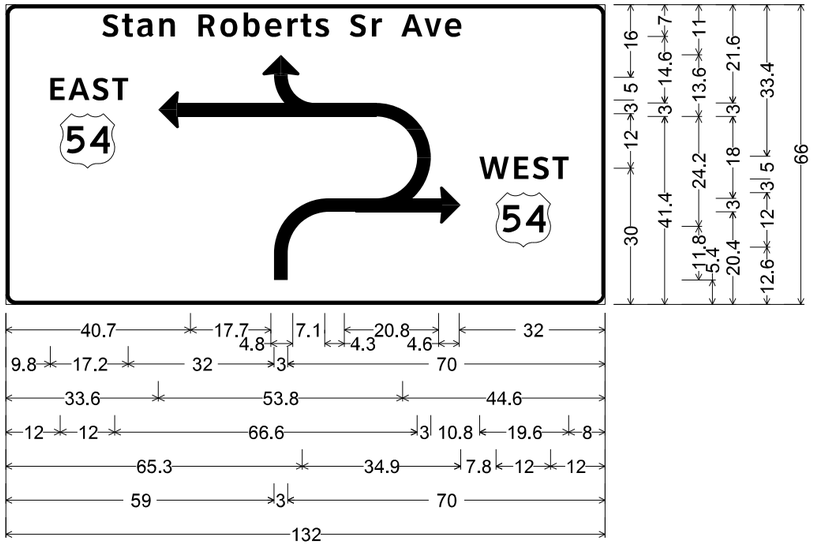
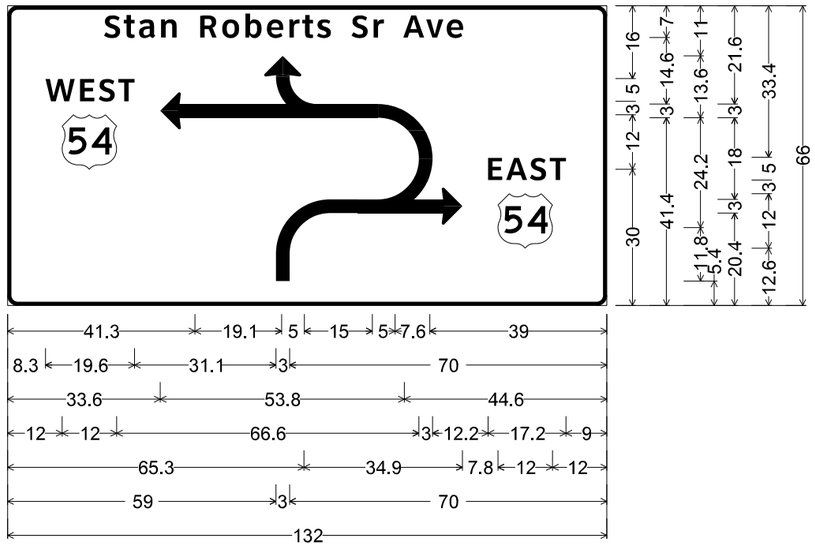
SIGN DETAILS



2.25" Radius, 0.75" Border, White on Green. Arrow White;
[Stan Roberts Sr Ave] ClearviewHwy-5-W-R; [EAST] ClearviewHwy-5-W-R;
US 54 M1-4; [WEST] ClearviewHwy-5-W-R; US 54 M1-4;



2.25" Radius, 0.75" Border, White on Green. Arrow White;
[Stan Roberts Sr Ave] ClearviewHwy-5-W-R; [WEST] ClearviewHwy-5-W-R;
US 54 M1-4; [EAST] ClearviewHwy-5-W-R; US 54 M1-4;

STATE OF TEXAS
CARLOS DURAN
125531
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PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-133
US 54 Stan Roberts Sr Ave

TRAFFIC

SIGN DETAILS

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		173

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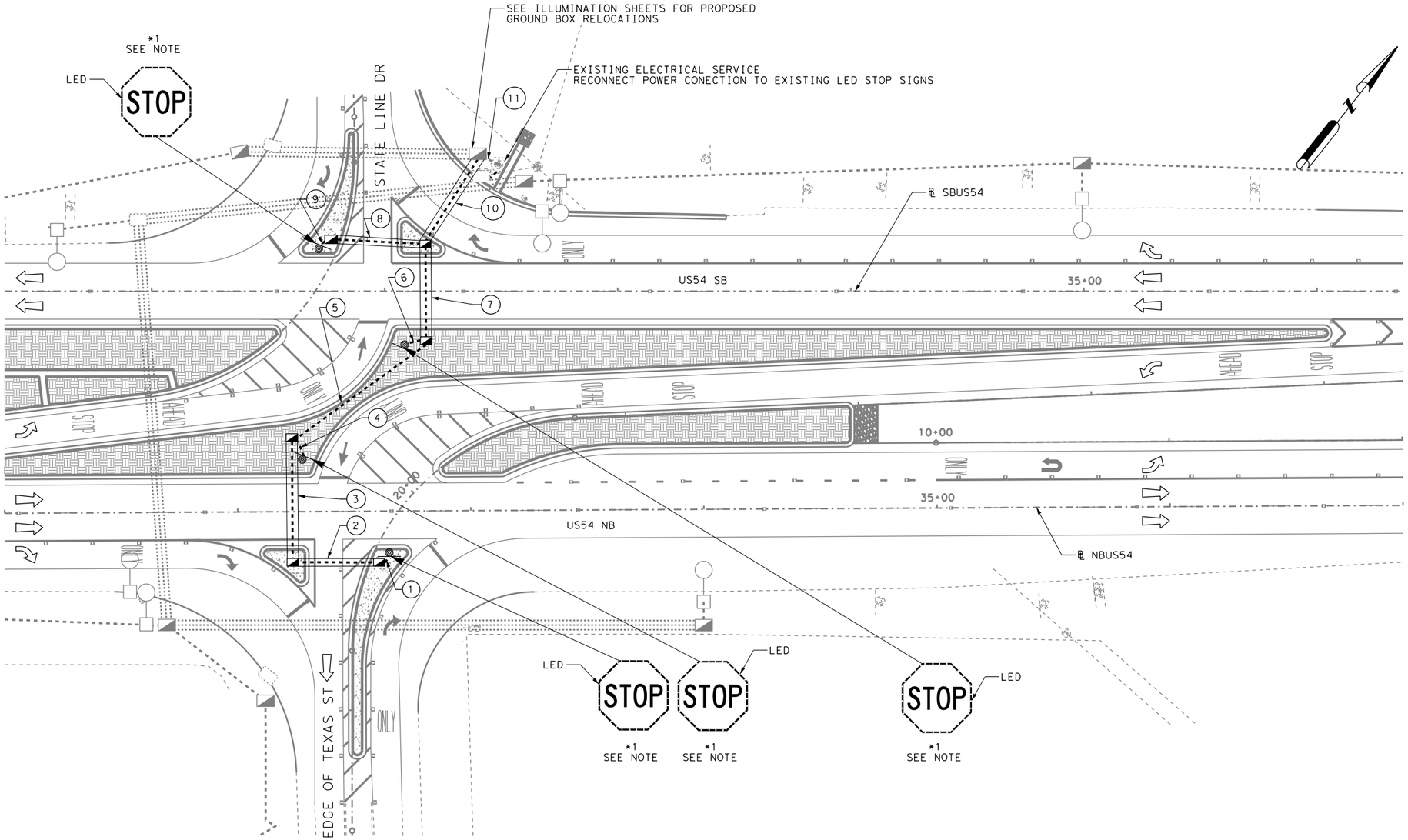

LEGEND

- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORED)
- PROPOSED CONDUIT (CONC ENCSE)
- PROPOSED CONDUIT (RMC)
- EXISTING CONDUIT
- EXISTING LUMINAIRE
- GROUND BOX TY C W/APRON
- EXISTING GROUND BOX
- PROPOSED/EXISTING ELECTRICAL SERVICE
- (#) RUN NUMBER
- DIRECTION OF TRAFFIC

0 25 50
SCALE: 1"=50'

CONDUIT AND CONDUCTOR SUMMARY									
RUN NUMBER	RUN LENGTH (FEET)	CONDUIT				CONDUCTOR			
		PVC SCH 40 (2") (TRENCH)		PVC SCH 40 (2") (BORE)		#8 INSULATED (GROUND)		#8 INSULATED (POWER)	
		NO.	LF	NO.	LF	NO.	LF	NO.	LF
1	5			1	5	1	10	2	20
2	35	1	5			1	35	2	70
3	50	1	5			1	50	2	100
4	10			1	5	1	10	2	20
5	70	1	5			1	140	2	280
6	10			1	5	1	10	2	20
7	40	1	5			1	120	2	240
8	40	1	5			1	40	2	80
9	5			1	5	1	10	2	20
10	35	1	5			1	140	2	280
11	5			1	5	1	10	2	20
TOTAL (LF)			30		25		575		1150

LED SIGNIG QUANTITIES			
ITEM	DESCRIPTION	UNIT	QUANTITY
0618 6023	CONDT (PVC) (SCH 40) (2")	LF	30
0618 6024	CONDT (PVC) (SCH 40) (2")(BORE)	LF	25
0620 6008	ELEC CONDR (NO.8) INSULATED	LF	1725
0624 6008	GROUND BOX TY C (162911)W/APRON	EA	6

NOTES

(1) LED STOP SIGN INSTALLATION TO BE SUBSIDARY TO BID ITEM 644-6070. SEE EXSTING SIGNING REMOVAL LAYOUT.

STATE OF TEXAS
CARLOS DURAN
125531
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PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

LED SIGNING PLAN

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		174

DATE: 5/31/2022 1:40:37 PM
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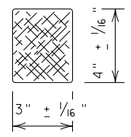
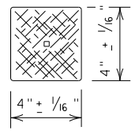
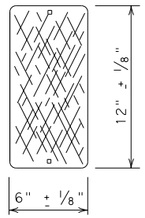
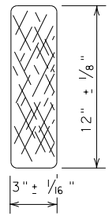
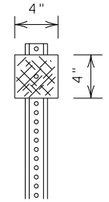
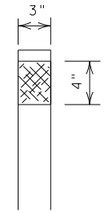
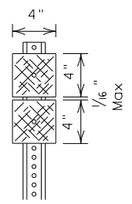
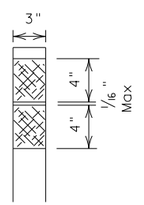
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

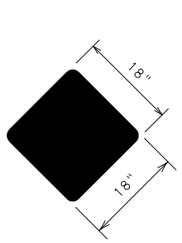
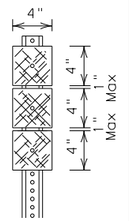
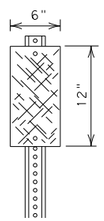
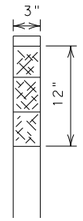
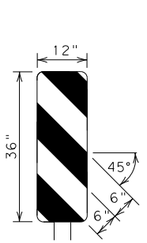
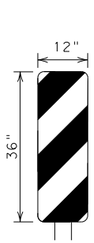
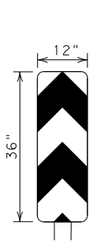
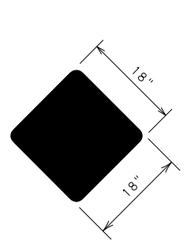
INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

- NUMBER OF REFLECTORS
  - S = Single
  - D = Double
- COLOR OF REFLECTORS
  - W = White
  - Y = Yellow
  - R = Red
- REFLECTOR UNIT SIZE
  - 1 or 2
- TYPE OF POST OR DELINEATOR
  - WC = Wing Channel Post
  - YFLX = Yellow Flexible Post
  - WFLX = White Flexible Post
  - BRF = Barrier Reflector
- TYPE OF MOUNT
  - GND = Embedded (drivable or set in concrete)
  - CTB = Concrete Barrier Mount
  - GF1 or GF2 = Guard Fence Attachment
  - SRF = Surface Mount
- DIRECTION
  - If Required
  - BI = Bi-Directional
  - BR = Bi-Directional with red on back

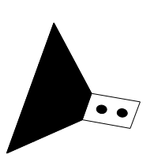
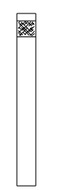
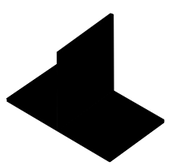
INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

- TYPE OF OBJECT MARKER
  - 1, 2, 3, or 4
- NUMBER OF REFLECTORS OR DIRECTION
  - X = 3-Size 2 reflector units (Type 2 only)
  - Y = 1-Size 3 reflector unit (Type 2 only)
  - Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
  - L = Left Side (Type 3 Object Marker only)
  - R = Right Side (Type 3 Object Marker only)
  - C = Center (Type 3 Object Marker only)
- TYPE OF POST
  - WC = Wing Channel Post
  - WFLX = White Flexible Post
  - TWT = Thin Walled Tubing
- TYPE OF MOUNT
  - GND = Embedded (drivable)
  - SRF = Surface Mount
  - WAS = Wedge Anchor Steel
  - WAP = Wedge Anchor Plastic
- DIRECTION
  - If Required
  - BI = Bi-Directional

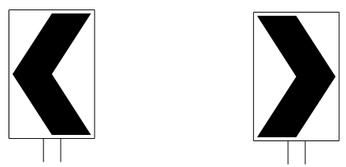
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

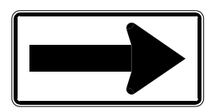
BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE	 W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	
NOTE	1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).			

ONE DIRECTION LARGE ARROW

DEVICE	 W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

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

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

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DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	ELP	EL PASO		175

20A

DATE: 5/31/2022 1:40:48 PM
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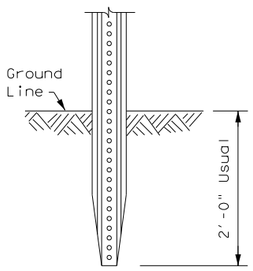
POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

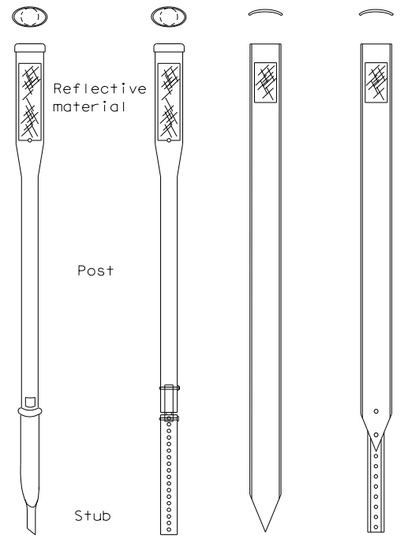


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

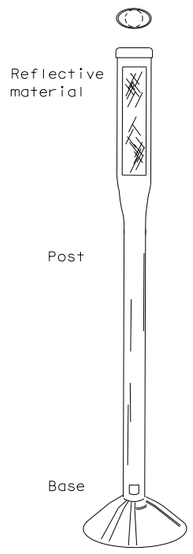
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



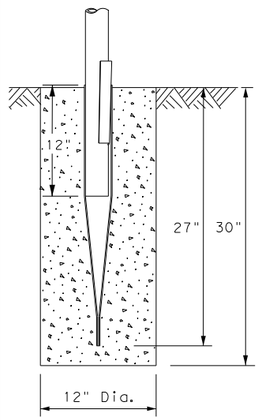
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

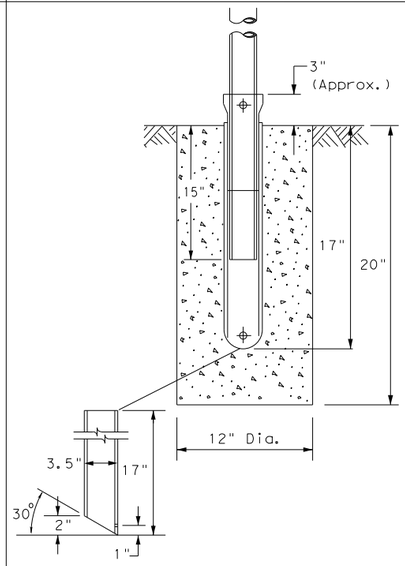
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

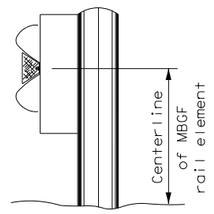
NOTE

1. Install per manufacturer's recommendations.

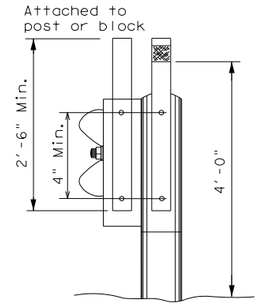
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

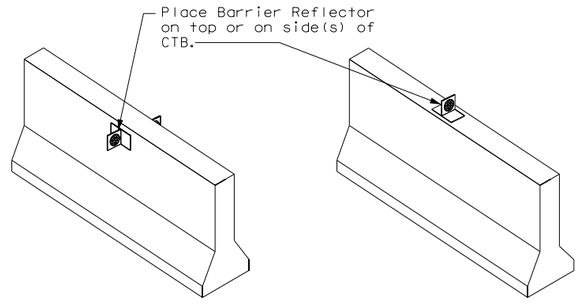
GF1



GF2



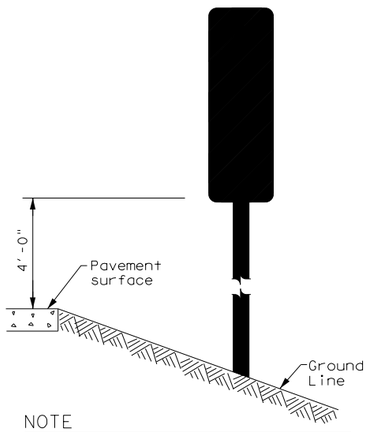
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

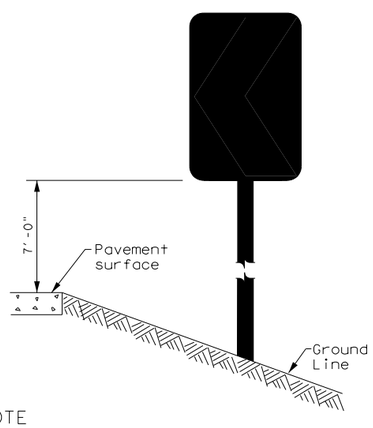
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

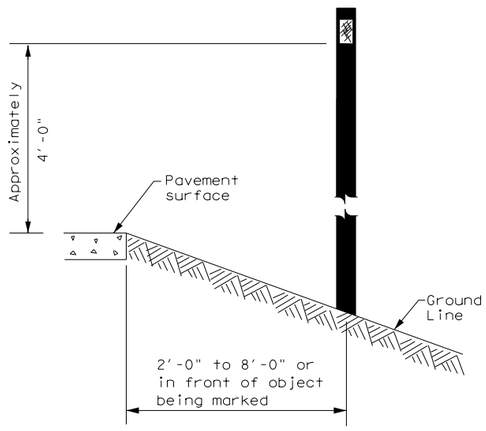
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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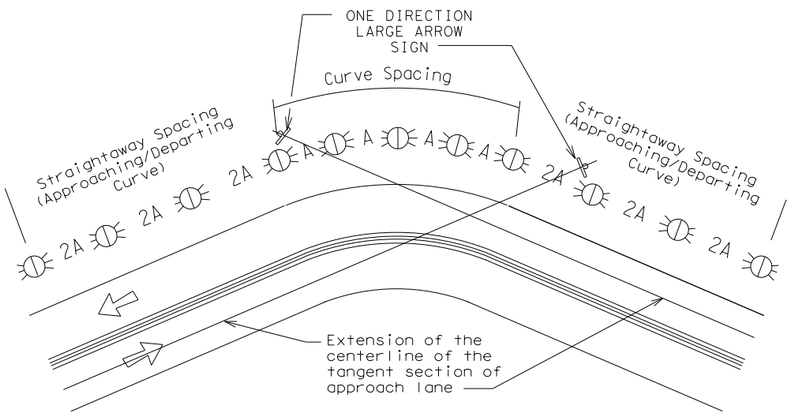
REVISIONS	0167	01	126, ETC.	US-54
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	ELP	EL PASO		176

20B

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

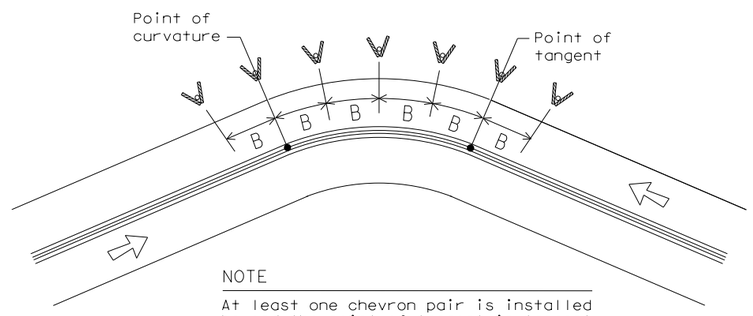
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

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

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

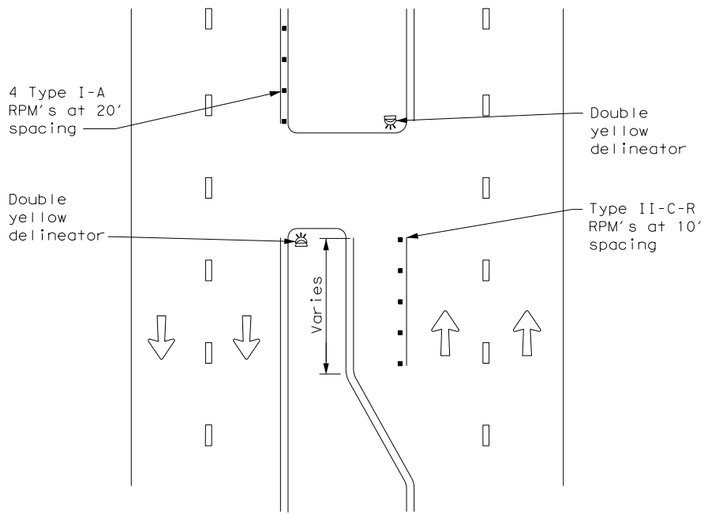
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	ELP	EL PASO		177

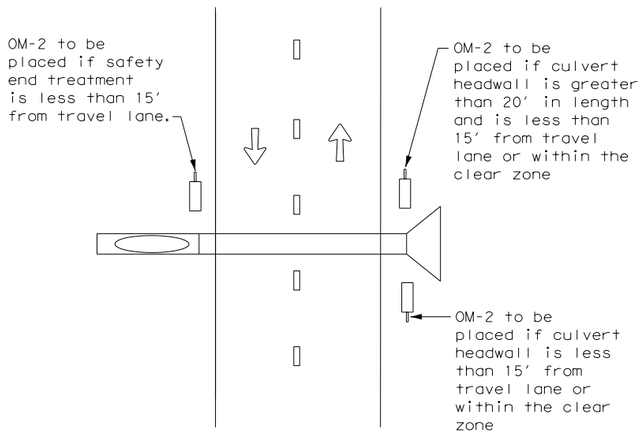
20C

CROSSOVERS



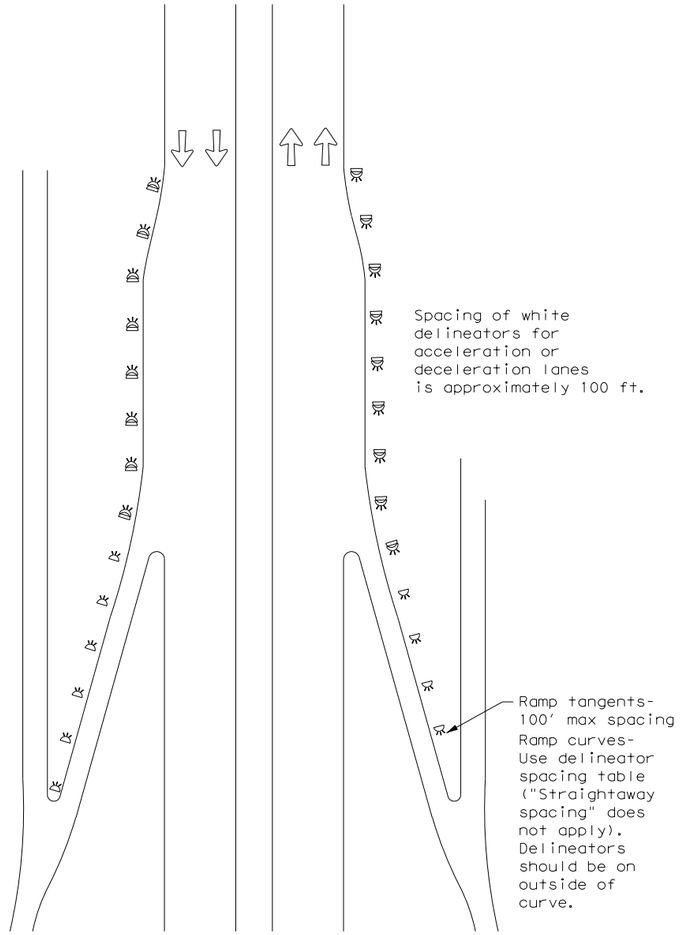
DETAIL 1

FOR CULVERTS WITHOUT MBGF



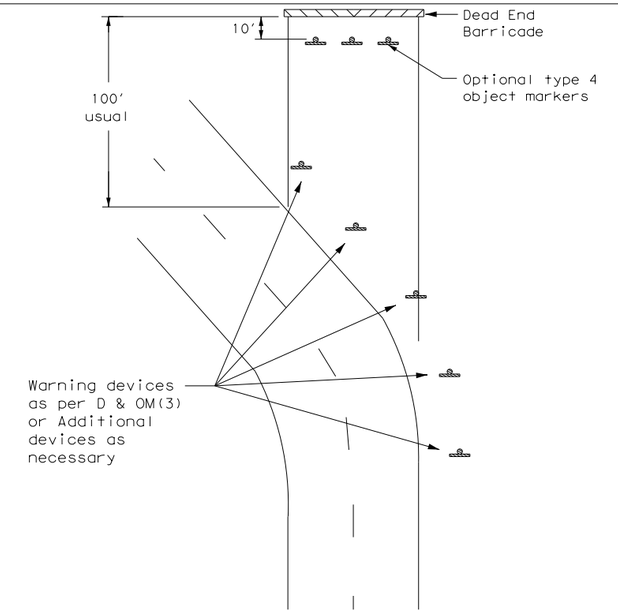
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



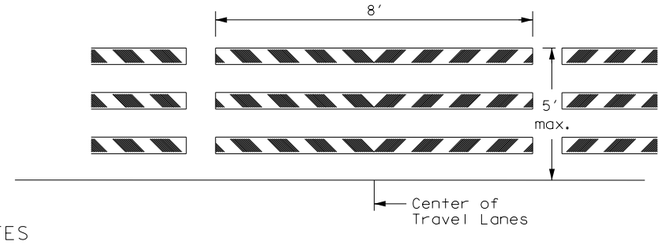
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 3-15 7-20	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		178

20D

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DATE: 5/31/2022 1:41:27 PM
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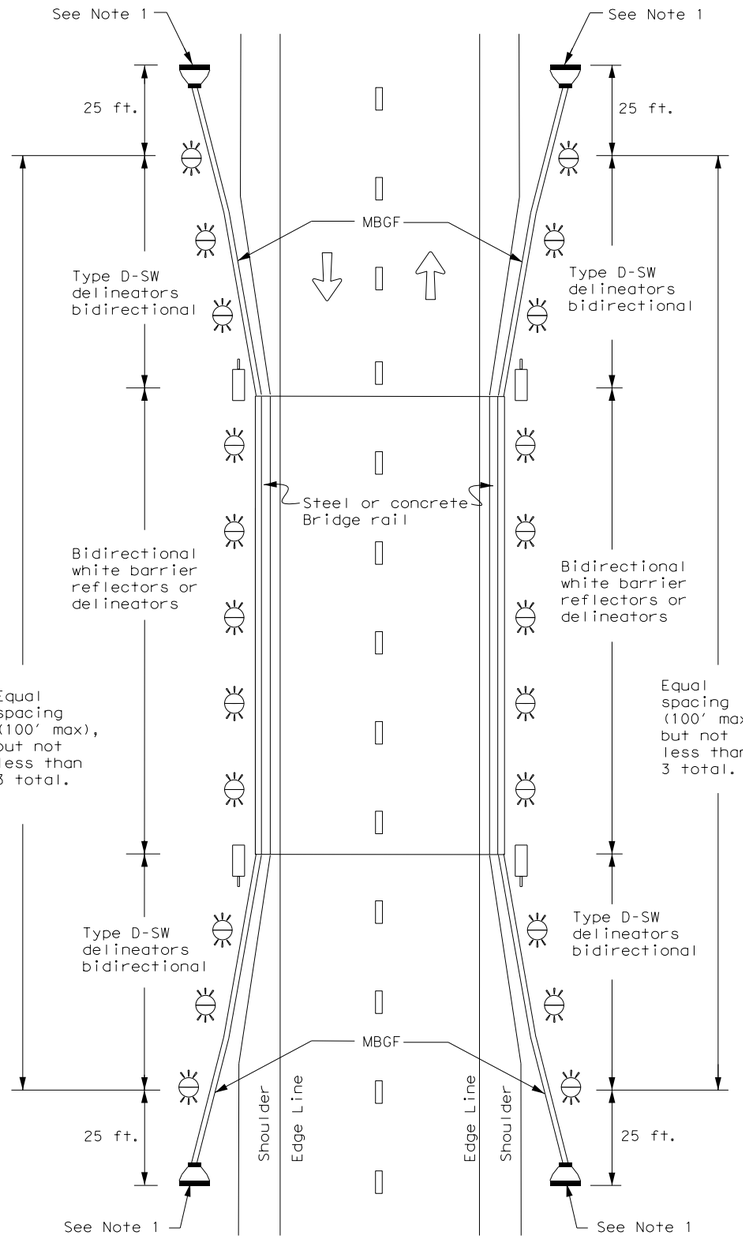
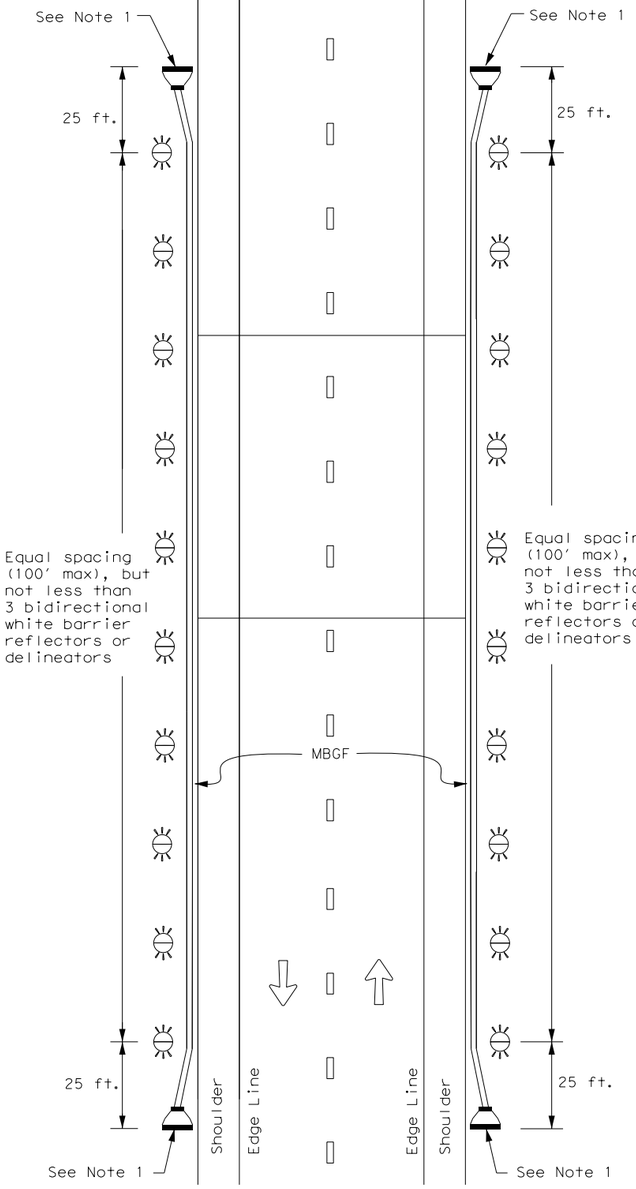
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

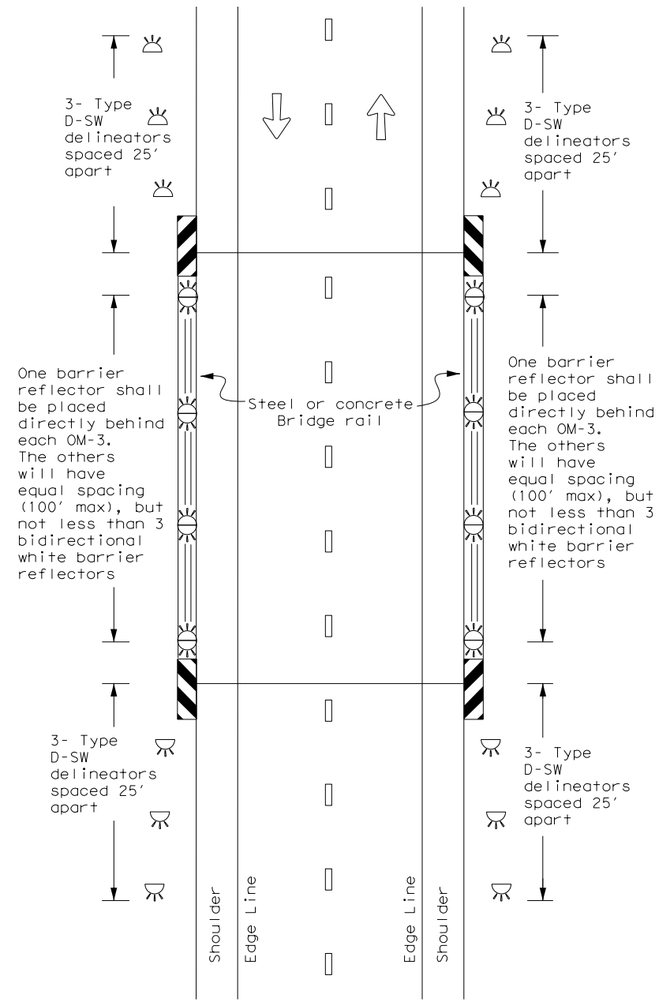
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

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



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
7-20	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		179

20E

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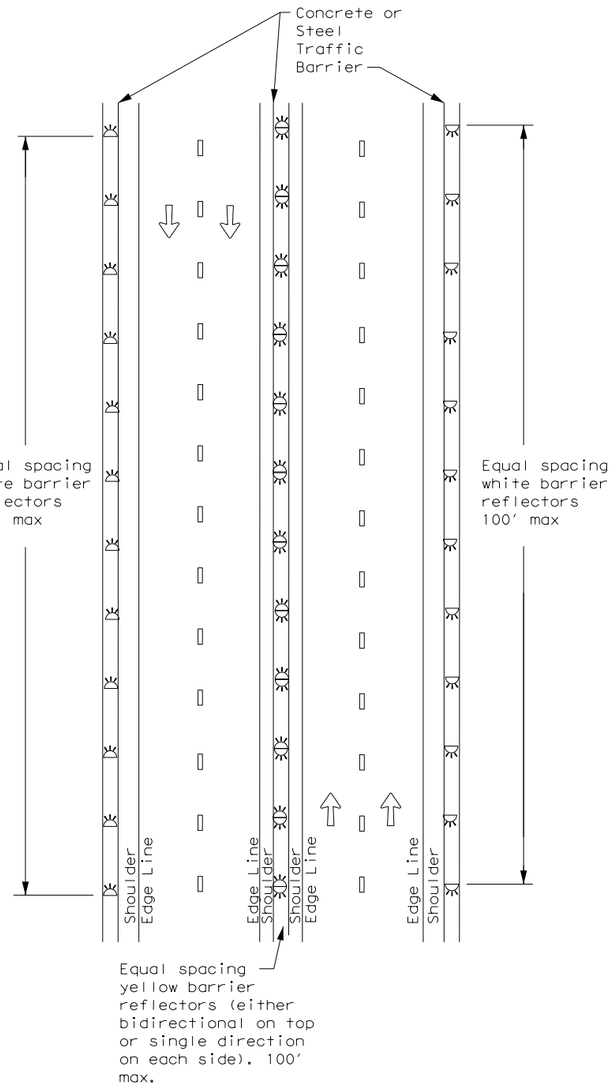
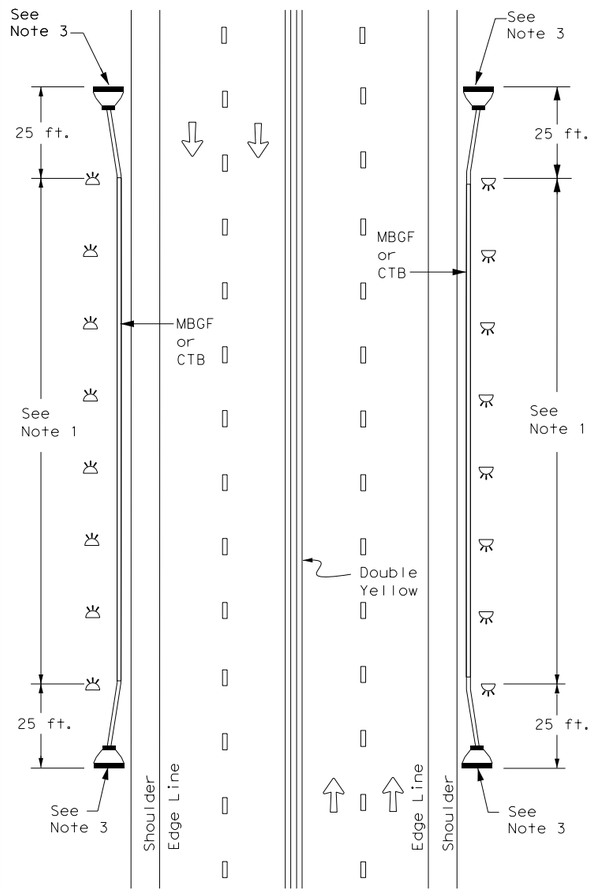
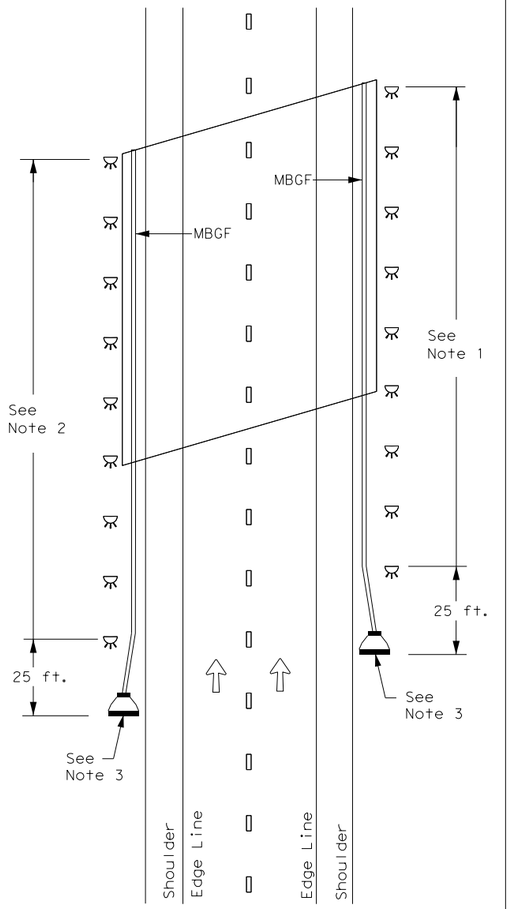
CONTINUOUS CONCRETE OR STEEL BARRIER



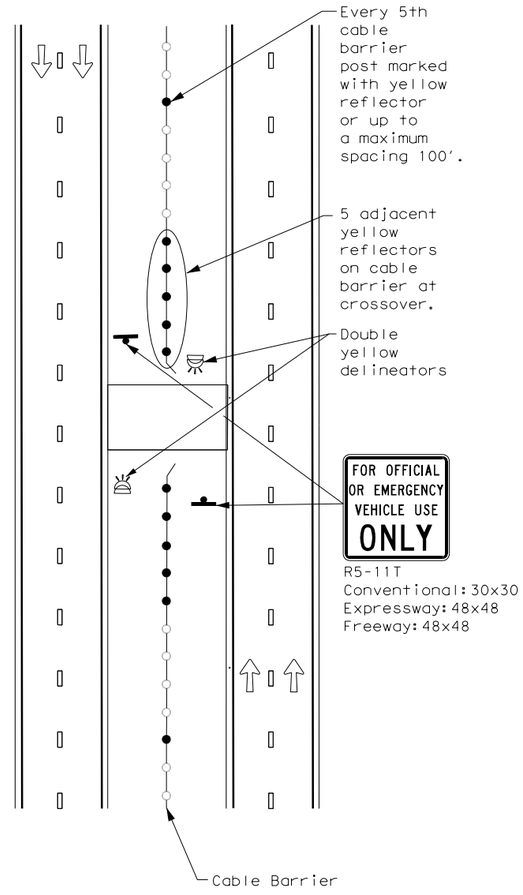
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100′ max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100′ max.)
2. Equal spacing (100′ max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

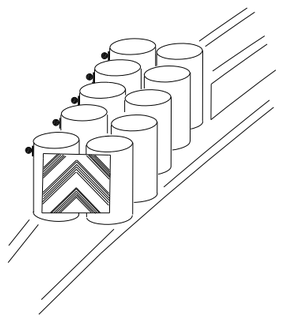
Texas Department of Transportation

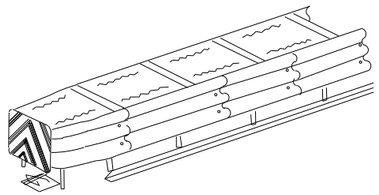
Traffic Safety Division Standard

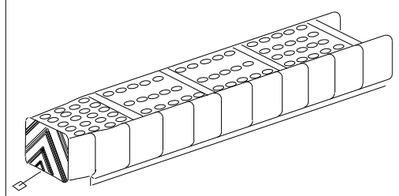
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

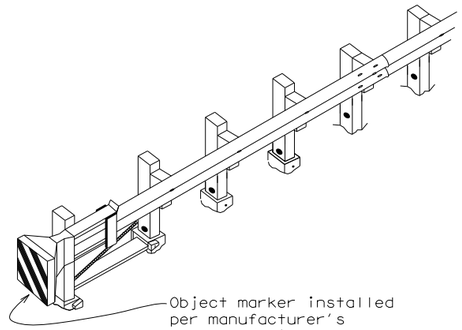
D & OM(6)-20

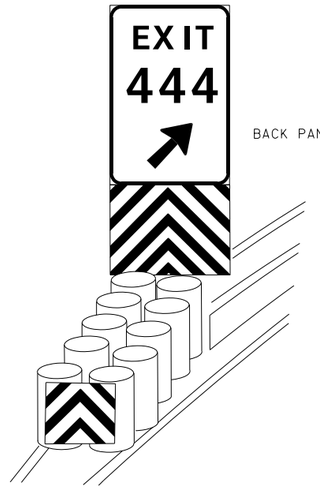
FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
7-20	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		180

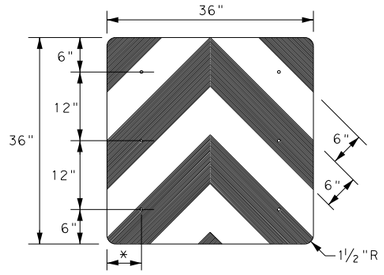


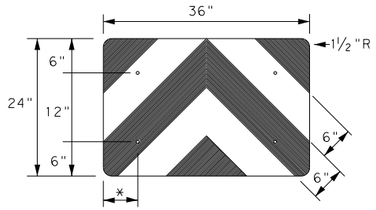




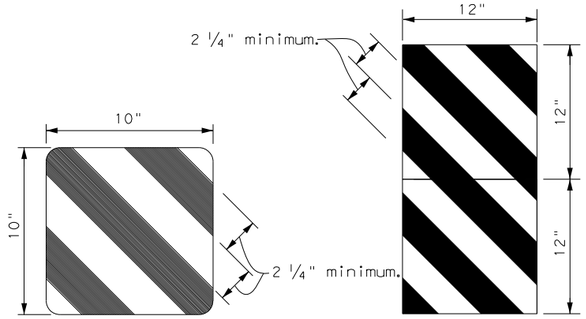




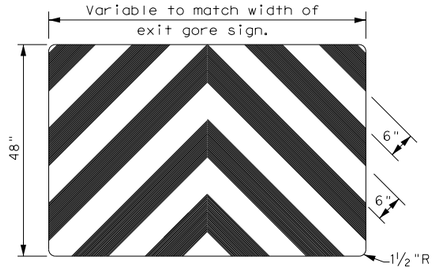


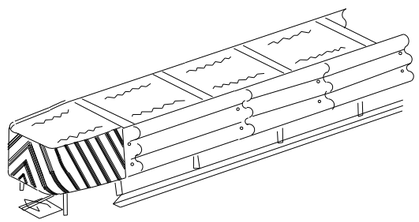


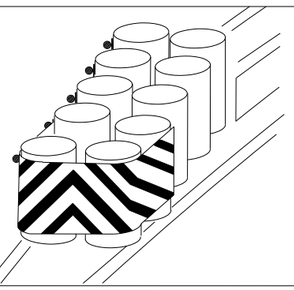
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

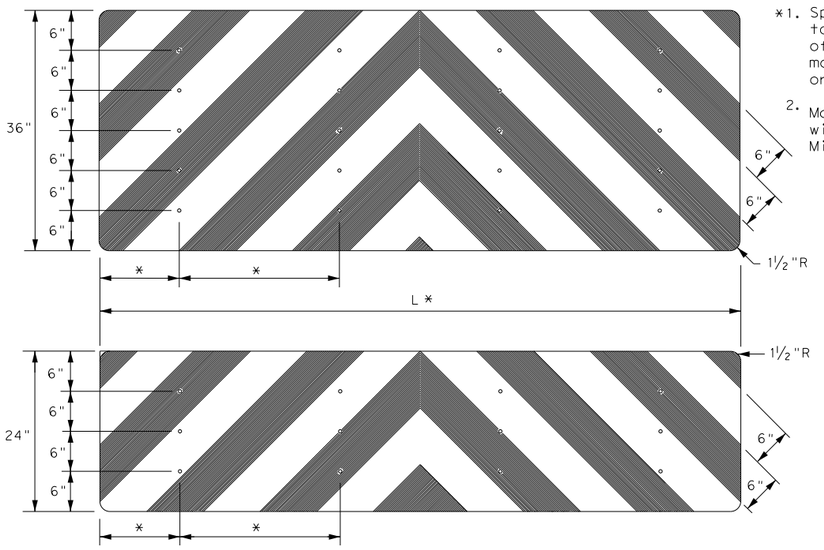


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

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

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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REVISIONS	0167	01	126,ETC.	US-54
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	ELP	EL PASO		181
4-98 7-20				

20G

DATE: 5/31/2022 1:41:44 PM
FILE: c:\pwworking\ustx\dms01391\US54*PSS-007.dgn

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

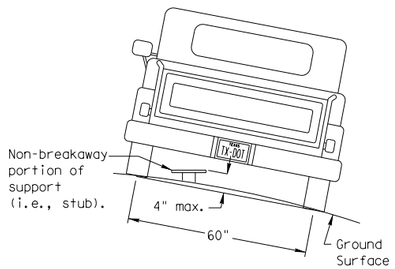
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

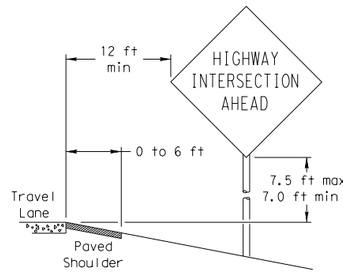
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

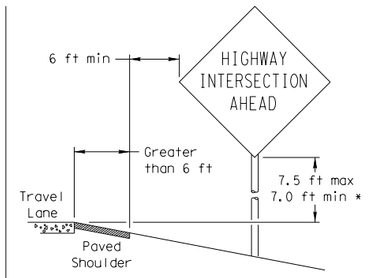
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

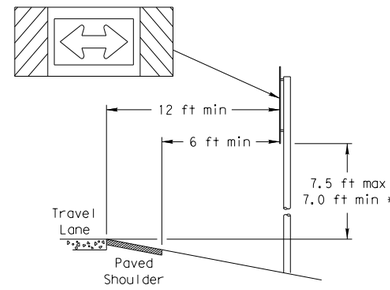
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



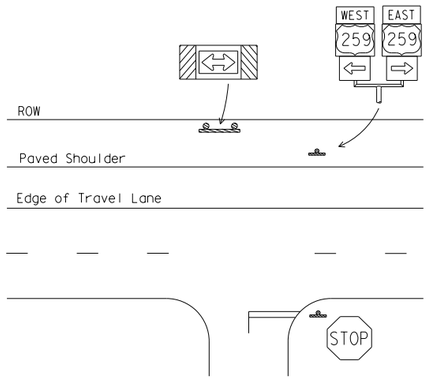
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

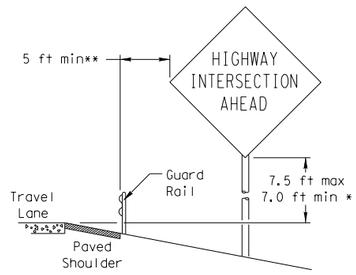
T-INTERSECTION



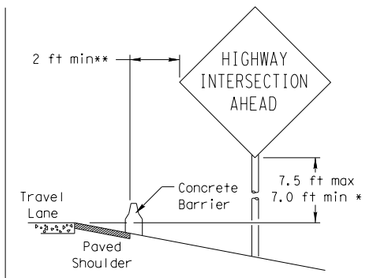
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

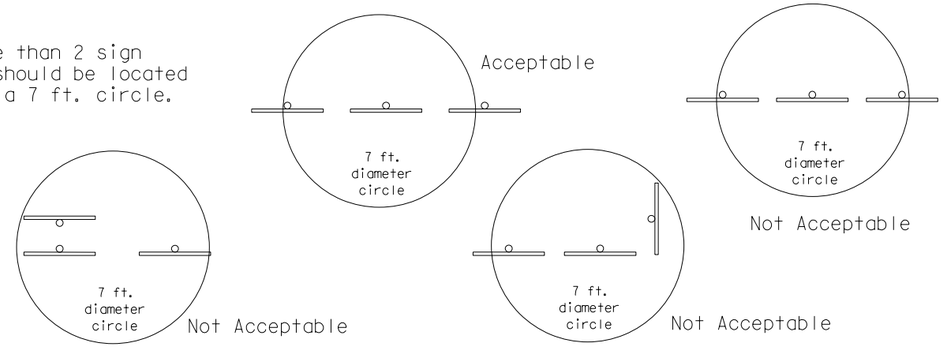
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

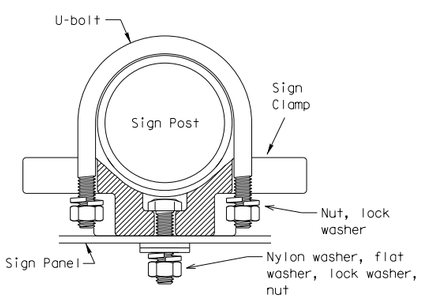
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

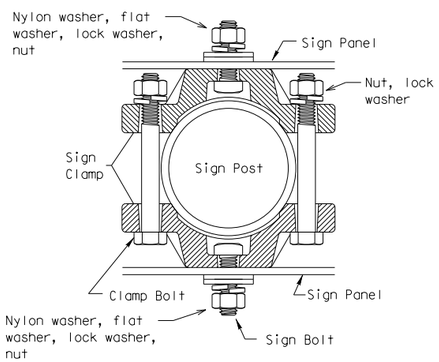


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

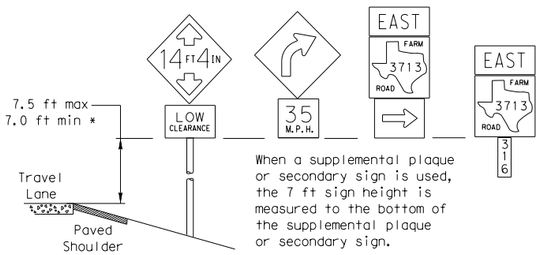
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



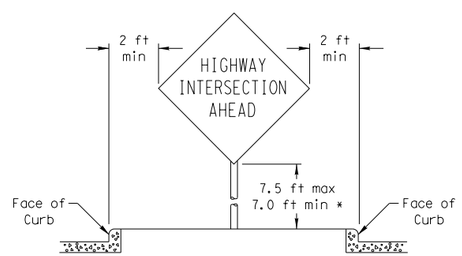
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



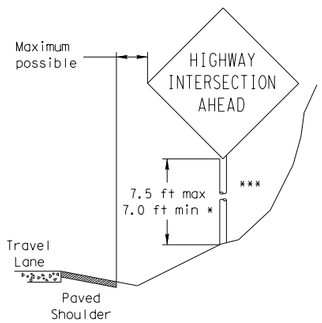
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

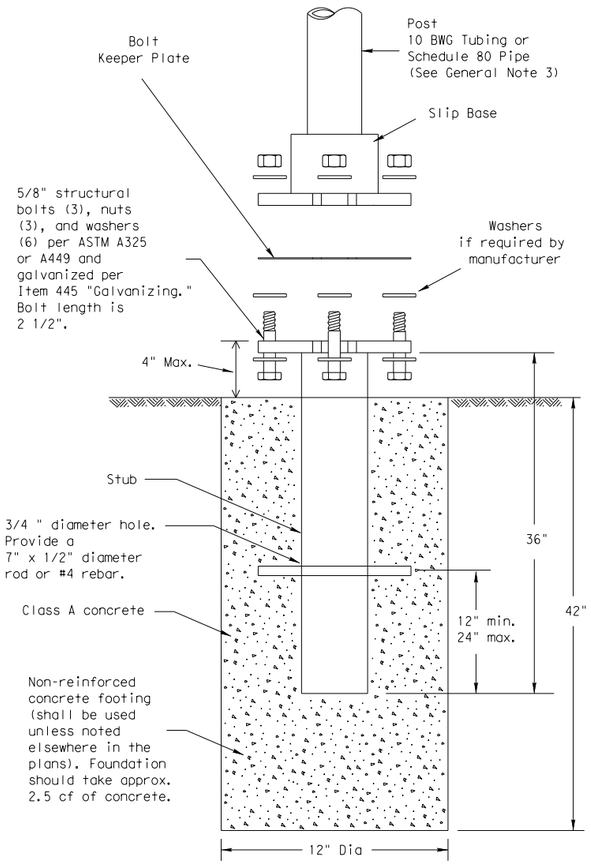
SMD(GEN)-08

©TxDOT July 2002	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		182

26A

DATE:
FILE:

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

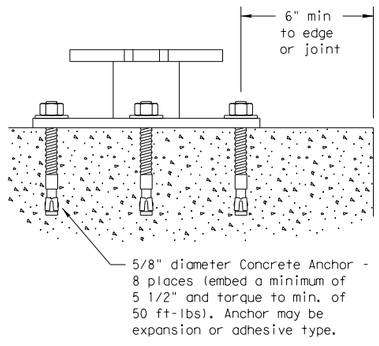
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

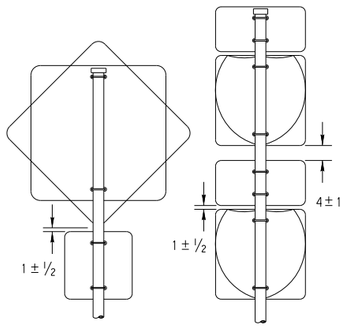
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

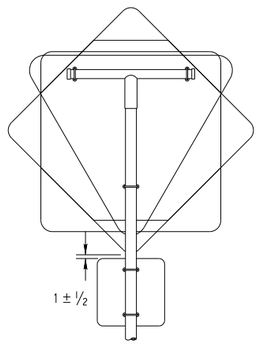
CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54

DIST	COUNTY	SHEET NO.
ELP	EL PASO	183

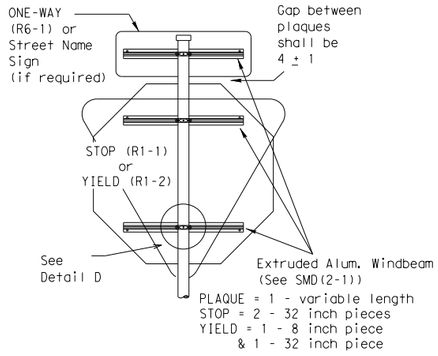
DATE:
FILE:



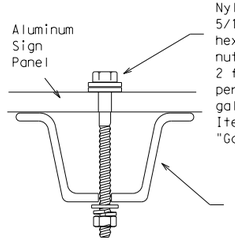
SM RD SGN ASSM TY XXXXX(1)XX(P)



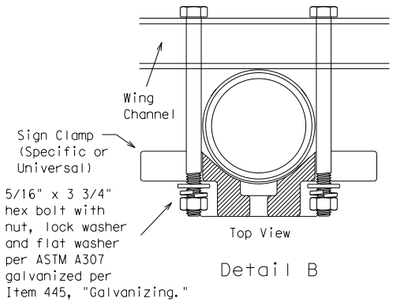
SM RD SGN ASSM TY XXXXX(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A



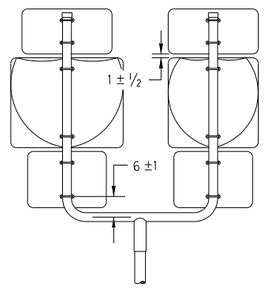
Detail B

GENERAL NOTES:

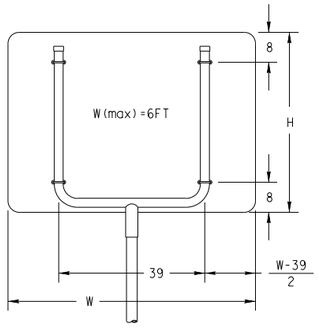
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

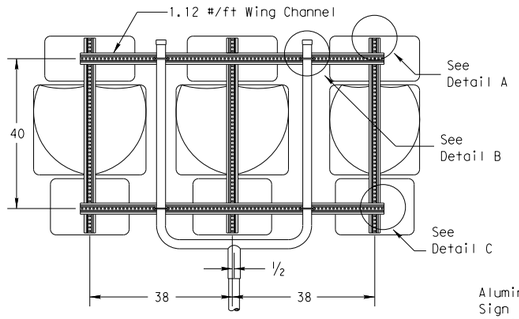
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



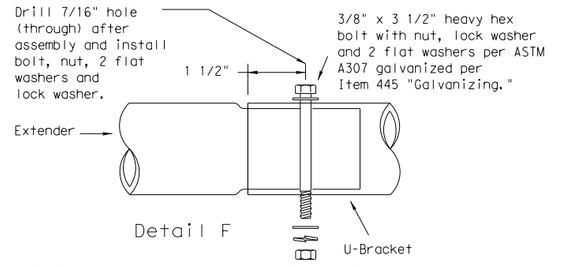
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

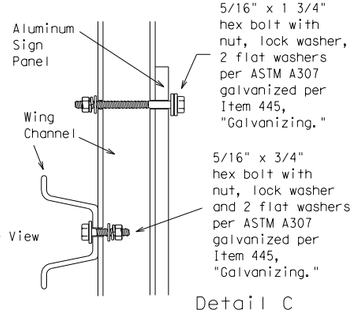


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)



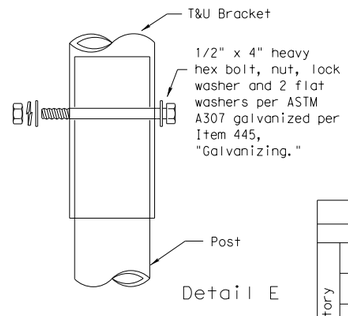
Detail F

Splices shall only be allowed behind the sign substrate.

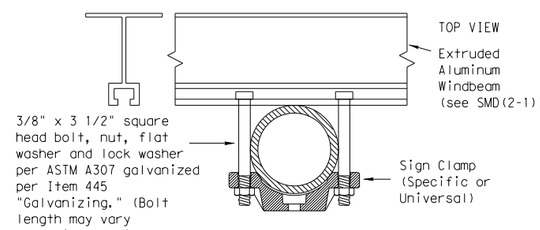


SIDE VIEW

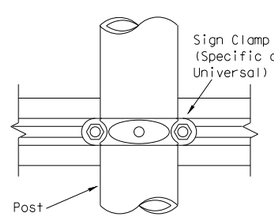
Detail C



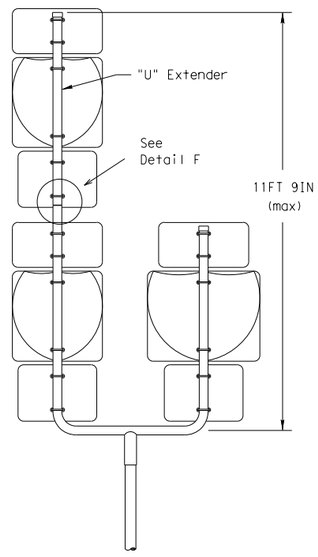
Detail E



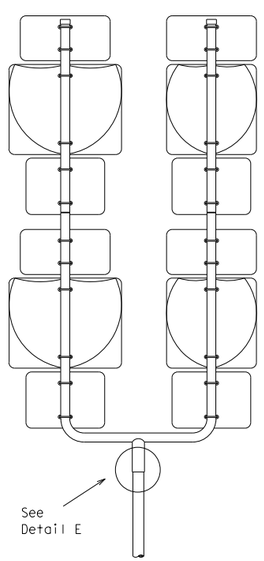
Detail D



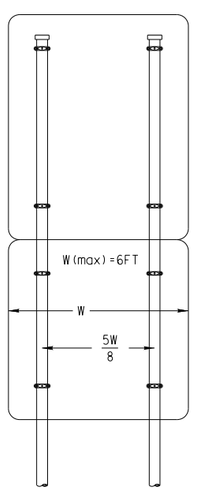
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



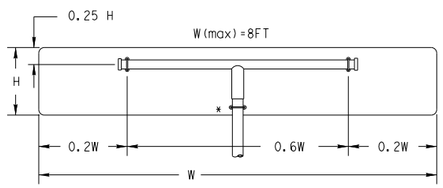
SM RD SGN ASSM TY S80(1)XX(U-1EXT)



SM RD SGN ASSM TY S80(1)XX(U-2EXT)



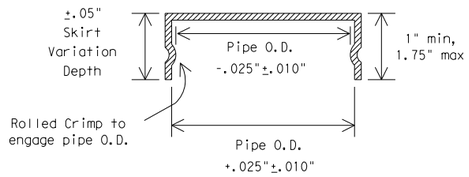
SM RD SGN ASSYM TY XXXXX(2)XX(P)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

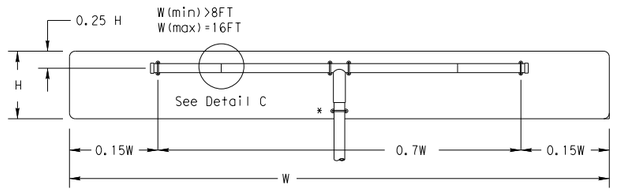
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		184

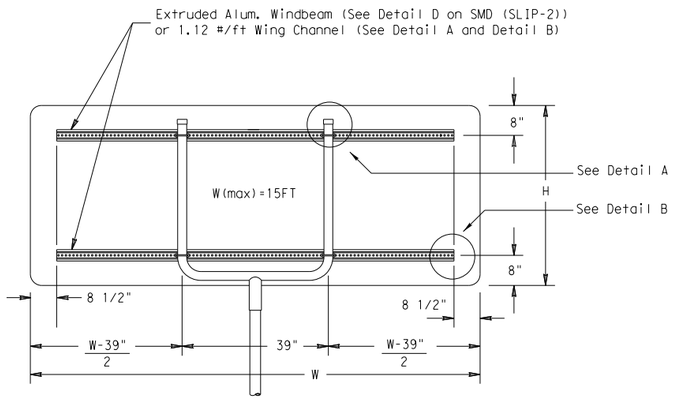
26C

DATE:
FILE:

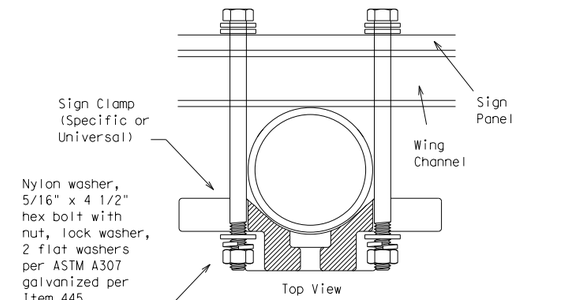
DATE:
FILE:



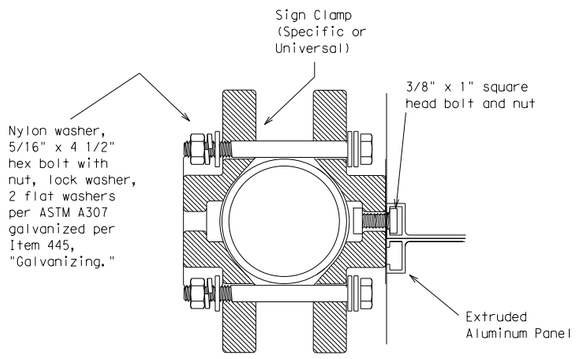
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



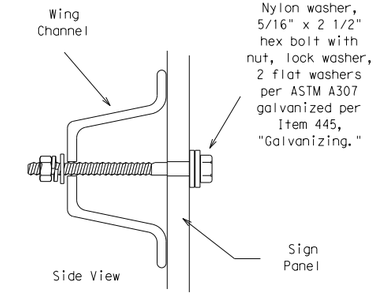
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



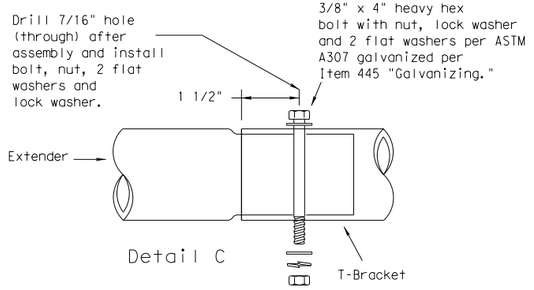
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

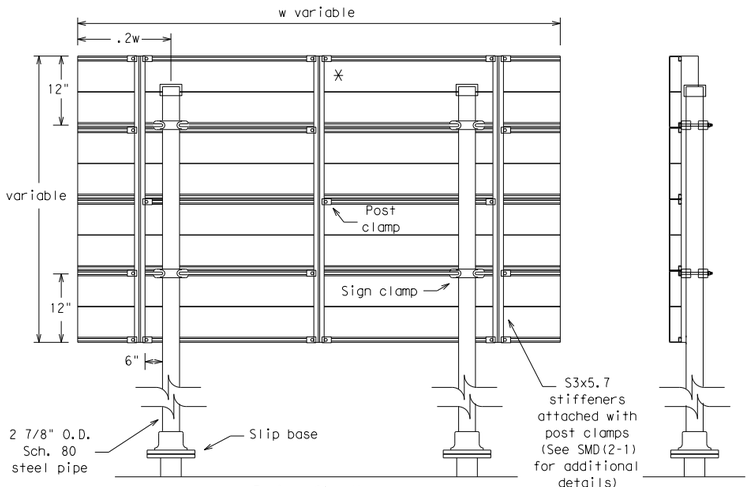


Detail B



Detail C

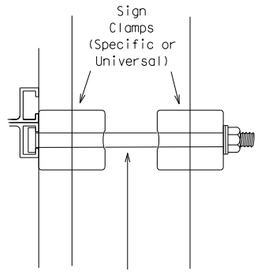
Splices shall only be allowed behind the sign substrate.



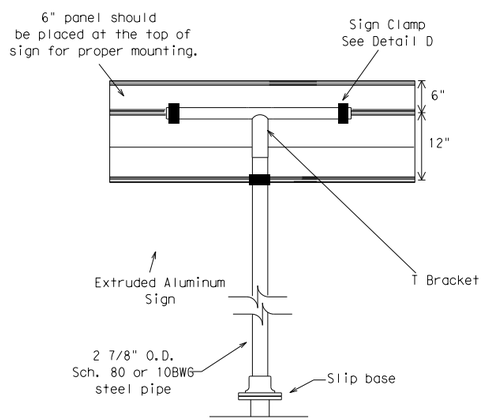
Typical Sign Mount
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

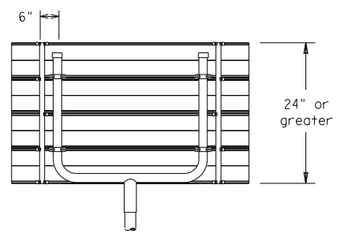
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
6. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
11. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

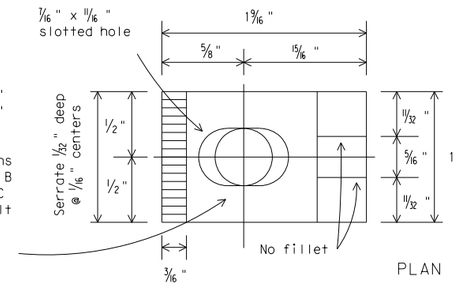
CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54

DIST	COUNTY	SHEET NO.
ELP	EL PASO	185

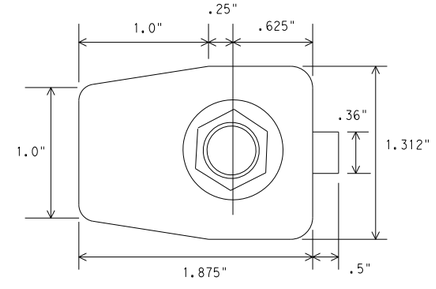
26D

DATE: 5/31/2022 1:42:27 PM
FILE: c:\pwworking\ustx\dms01391\US54*PSS-012.dgn

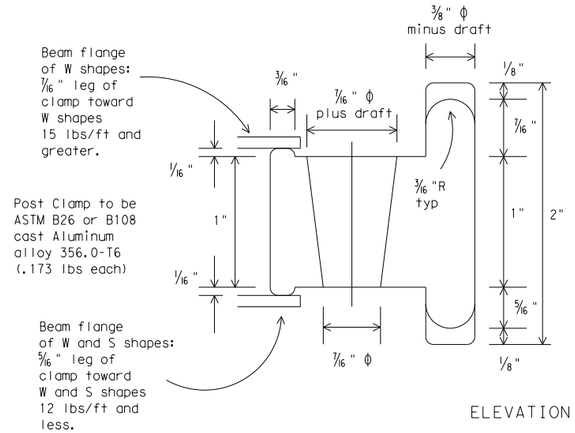
NOTE: centerline of hole for 3/8" diameter squarehead bolt x 2 1/4" long with a flat washer and self-locking nut, or lock washer and hex. nut. Bolt head dimensions shall be in accordance with ANSI B 18.2.1 as referred to in the AISC Manual of steel construction. Bolt assembly shall be galvanized.



PLAN

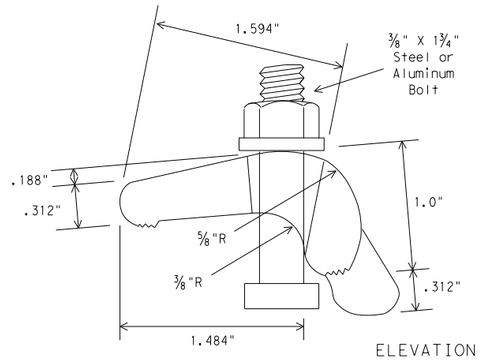


PLAN



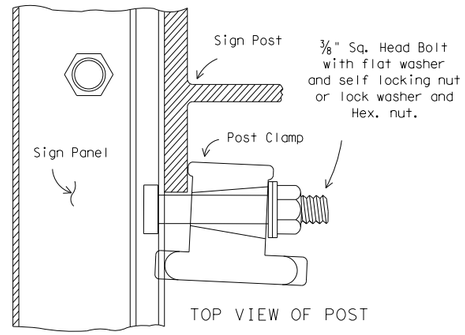
ELEVATION

POST CLAMP DETAIL

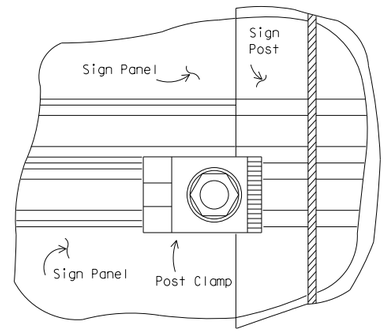


ELEVATION

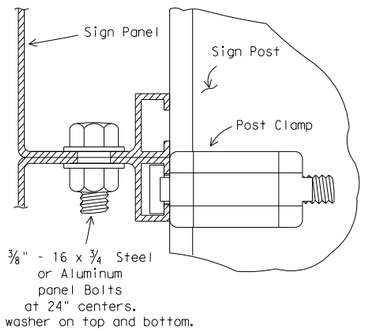
ALTERNATE POST CLAMP DETAIL



TOP VIEW OF POST



TOP VIEW OF CLAMP



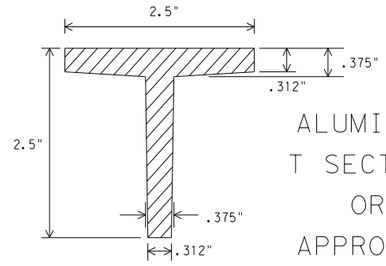
SIDE VIEW OF PANELS

CONNECTION DETAILS

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN HARDWARE	DMS-7120

GENERAL NOTES:

1. Design conforms with AASHTO Specifications for the design and construction of structural supports for highway signs.
2. Materials and fabrication shall conform to the requirements of the Department material specifications.
3. Structural steel shall be "low-alloy steel" for non-bridge structures per Item 442, "Metal For Structures."
4. For fiberglass substrate connection details, see manufacturer's recommendations.

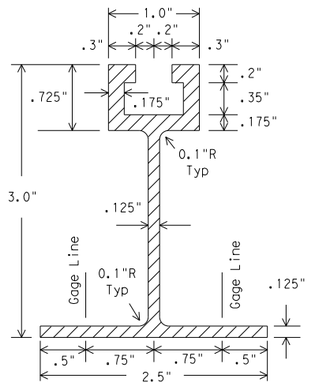


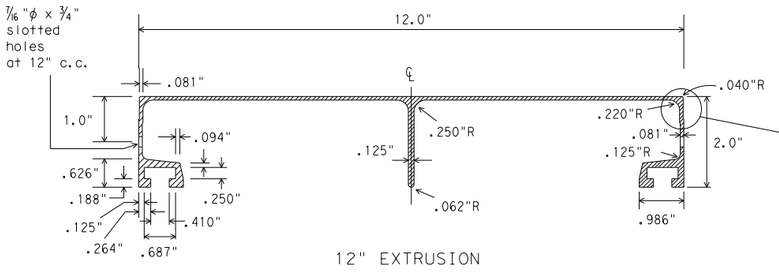
1.912 lbs/ft

ALUMINUM T SECTION OR APPROVED ALTERNATIVE

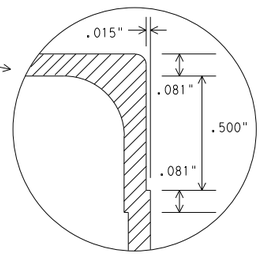
WINDBEAM CROSS SECTION

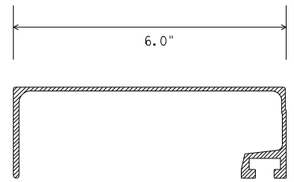
Windbeam to be extruded aluminum (1.175 lbs/ft) or approved alternative



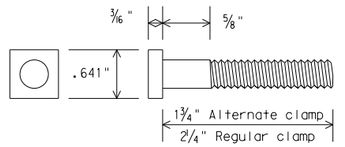


12" EXTRUSION





6" EXTRUSION



POST CLAMP BOLT DETAIL

ALUMINUM SIGN PANEL EXTRUSION DETAILS

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS- EXTRUDED ALUMINUM SIGN PANELS & HARDWARE

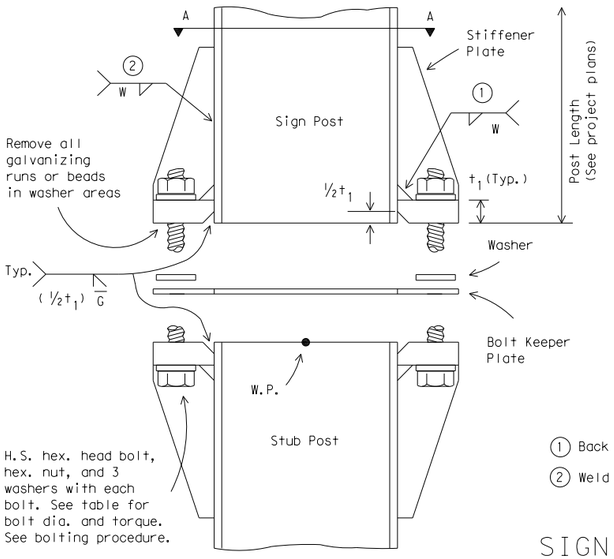
SMD(2-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

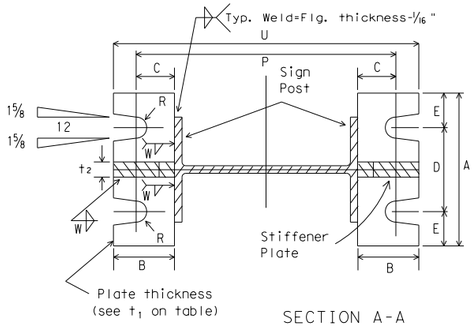
CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54

DIST	COUNTY	SHEET NO.
ELP	EL PASO	186

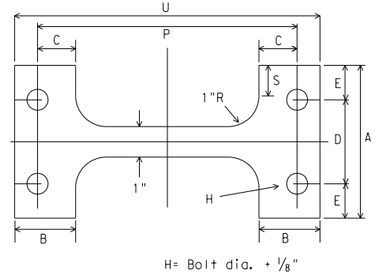
9-08 REVISIONS



ELEVATION

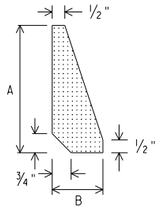


SECTION A-A



H= Bolt dia. + ⅛"

BOLT KEEPER PLATE
30 Ga galv. sheet steel



STIFFENER PLATE DETAIL

Steel Plate (thickness = t_2)

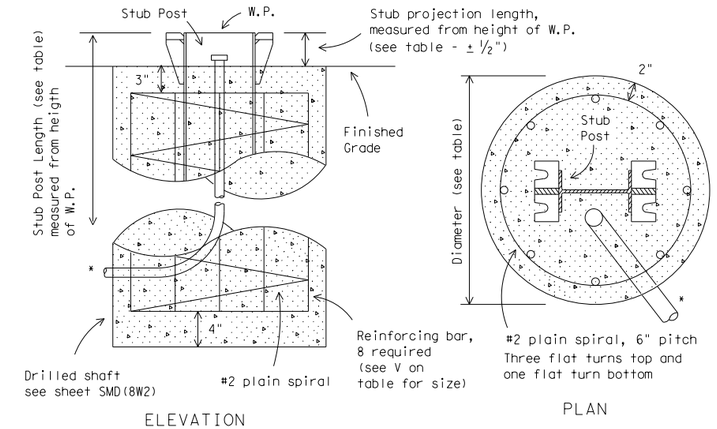
(See table for dimensions)

① Back up weld to be made before installing stiffener plate

② Weld W may be continued across clips to seal joint

SIGN POST AND STUB POST

(For W Shapes)

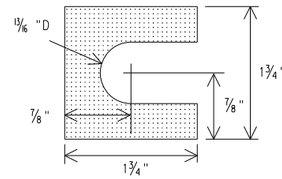


ELEVATION

PLAN

FOUNDATION DETAIL

*Note: For signs with electrical apparatus, see ED(10) for conduit required in founation.



SHIM DETAIL

Furnish two .012"+ thick and two .032"+ thick shims per post. Shims shall be fabricated from brass shim stock or strip conforming to ASTM B36.

BOLTING PROCEDURE FOR ASSEMBLY OF BASE CONNECTION:

1. Assemble sign post, BOLT KEEPER PLATE and stub post with bolts and three flat washers per bolt as shown.
2. Shim as required to plumb post.
3. Tighten all bolts the maximum possible with a 12 to 15 inch wrench to clean bolt threads and to bed washers and shims.
4. Loosen each bolt in sequence and retighten bolts in a systematic order to the prescribed torque. Do not overtighten.
5. To prevent nut loosening, burr threads of bolt at junction with nut using a center punch.

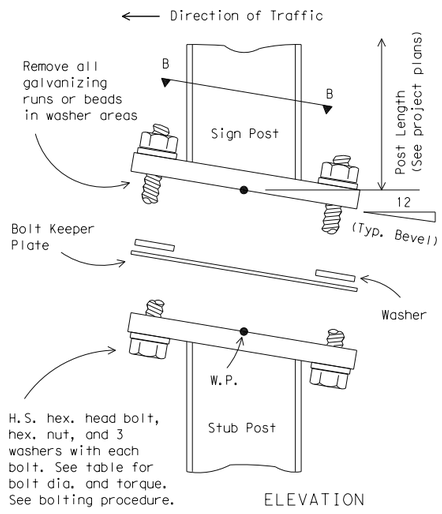
Dimensions / Post Size	Base Connection Data Table: Bolt Size & Torque	A	B	C	D	E	t_1	t_2	W	R
W6x9	⅝"ϕ x 2¾" 440-450 inch pounds 36-38 foot pounds	5"	2"	1¼"	2¾"	1⅛"	¾"	½"	¼"	11/32"
W6x12										
W6x15										
W8x18										
W8x21	¾"ϕ x 3½" 740-750 inch pounds 62-63 foot pounds	6"	2¼"	1⅜"	3½"	1¼"	1"	¾"	5/16"	13/32"
W10x22										
W10x26										
W12x26										
S3x5.7	½"ϕ x 2½" 440-450 inch pounds 36-38 foot pounds	See Detail Below								
S4x7.7										

Perforated Fuse Plate Data Table												Bolt Keeper Data			Foundation Data			
F	G	J	K	M	d_1	d_2	t_3	Bolt Dia.	Wt. (ea.) (lbs.)	Bolt length	P	S	U	Stub length	Stub projection	Dr. Shaft diameter	Bar V Size
4¼"	2"	4"	2¼"	1"	9/16"	¾"	¼"	½"	1.01	1½"	8⅜"	1"	9⅞"	2'-0"	3"	24"	#5
											8½"		10"	2'-0"	3"		#5
5"	2½"	6"	3½"	1½"	11/16"	1¼"	⅜"	⅝"	2.51	2¼"	8½"		10"	2'-6"	3"		#6
5"	2½"	5¼"	2¾"	1¼"	11/16"	1 1/16"	⅜"	⅝"	2.26	2¼"	10⅝"		12⅛"	2'-6"	3"		#7
5½"	2½"	5¼"	2¾"	1¼"	13/16"	1"	½"	¾"	3.35	2¼"	11"	1½"	12¾"	3'-0"	2½"		#8
											12⅞"		14⅝"	3'-0"	2½"		#9
6"	3"	5¾"	2¾"	1⅜"	13/16"	1⅛"	½"	¾"	4.03	2¼"	13⅜"		14⅞"	3'-0"	2½"		#10
6"	3"	6½"	3½"	1⅝"	13/16"	1 5/16"	½"	¾"	4.47	2¼"	15"		16¾"	3'-0"	2½"		#11
3¾"	1½"	2⅝"	1½"	⅝"	9/16"	⅜"	¼"	½"	0.60	1½"	See Detail Below			3'-3½"	3½"	12"	Non-reinforced ③

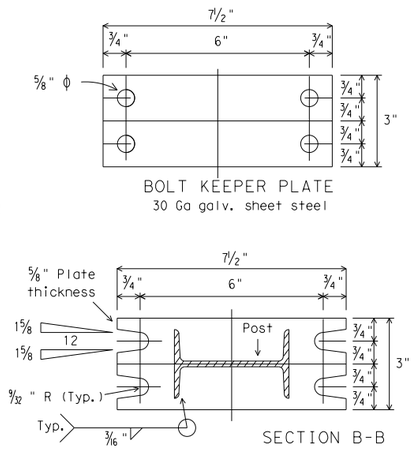
③ Foundation design shall be Type G Mount, see SMD (TY G).

PERFORATED FUSE PLATE DETAIL

Use H.S. hex head bolts, hex head nut and bevel or flat washer (where req'd) under nut. All holes shall be drilled, sub-punched and reamed. All plate cuts shall preferably be saw cuts. However, flame cutting will be permitted provided all edges are ground. Metal projecting beyond the plane of the plate face will not be permitted. Steel fuse plates shall conform to the requirements of ASTM A36. ASTM A572 Grade 50 or ASTM A588 may be substituted for A36 at the option of the fabricator. Mill test reports shall be submitted for Fuse Plates. Steel used shall have an ultimate tensile strength not to exceed 80 KSI. For alternative Fuse Plate contact Traffic Operations Division.

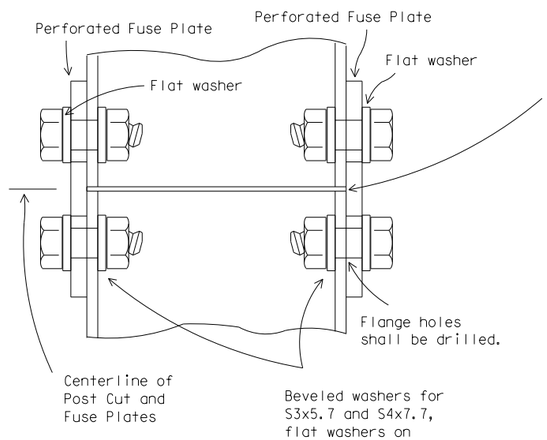


ELEVATION



SIGN POST AND STUB POST

(For S4x7.7 and S3x5.7)



DETAIL "A"

Parts shall be saw cut either before galvanizing and the galvanized cut cleaned of zinc build-up, or saw cut after galvanizing and the cut surface repaired per Item 445, "Galvanizing."

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS- LARGE ROADSIDE SIGNS FOUNDATION & STUB

SMD(2-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

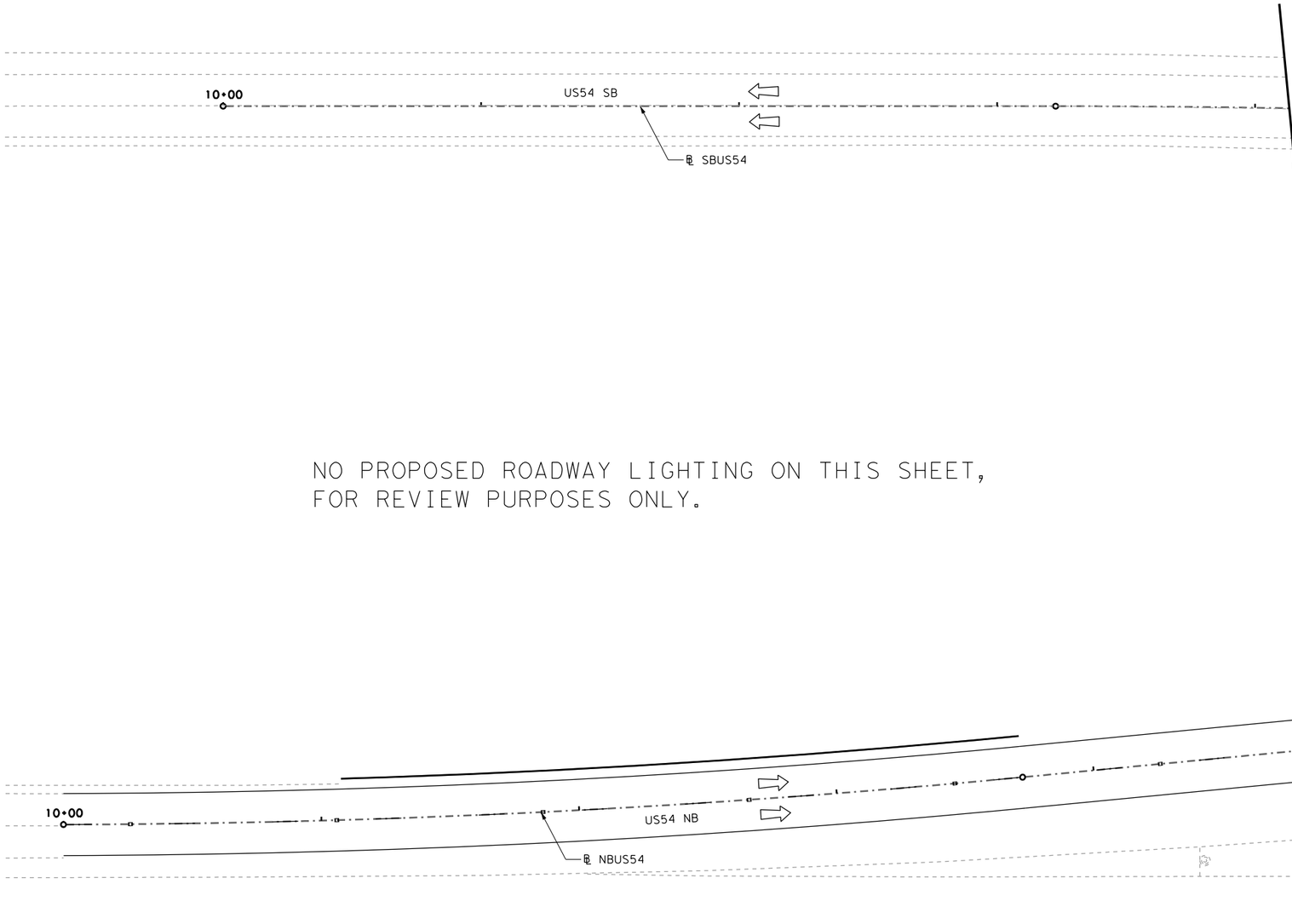
REVISIONS
4-98
9-08

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54

DIST	COUNTY	SHEET NO.
ELP	EL PASO	187

27B

DATE:
FILE:



NO PROPOSED ROADWAY LIGHTING ON THIS SHEET,
FOR REVIEW PURPOSES ONLY.

LEGEND

- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORED)
- EXISTING CONDUIT
- PROPOSED RD IL(TY SA)40T-8(250W EQ)LED
- EXISTING LUMINAIRE
- PROPOSED GROUND BOX TY A W/APRON
- EXISTING GROUND BOX
- EXISTING/PROPOSED ELECTRICAL SERVICE
- EXISTING CCTV CAMERA
- 1-1 — RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- 1-1 — EXISTING RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- 1A-1 — POLE DESIGNATION
  - POLE NUMBER
  - CIRCUIT IDENTIFICATION
  - SERVICE NUMBER
- DIRECTION OF TRAFFIC

0 25 50
SCALE: 1"=50'

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

ROADWAY LIGHTING LAYOUT

SHEET 1 OF 9

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		188

DATE: 5/31/2022 1:42:45 PM
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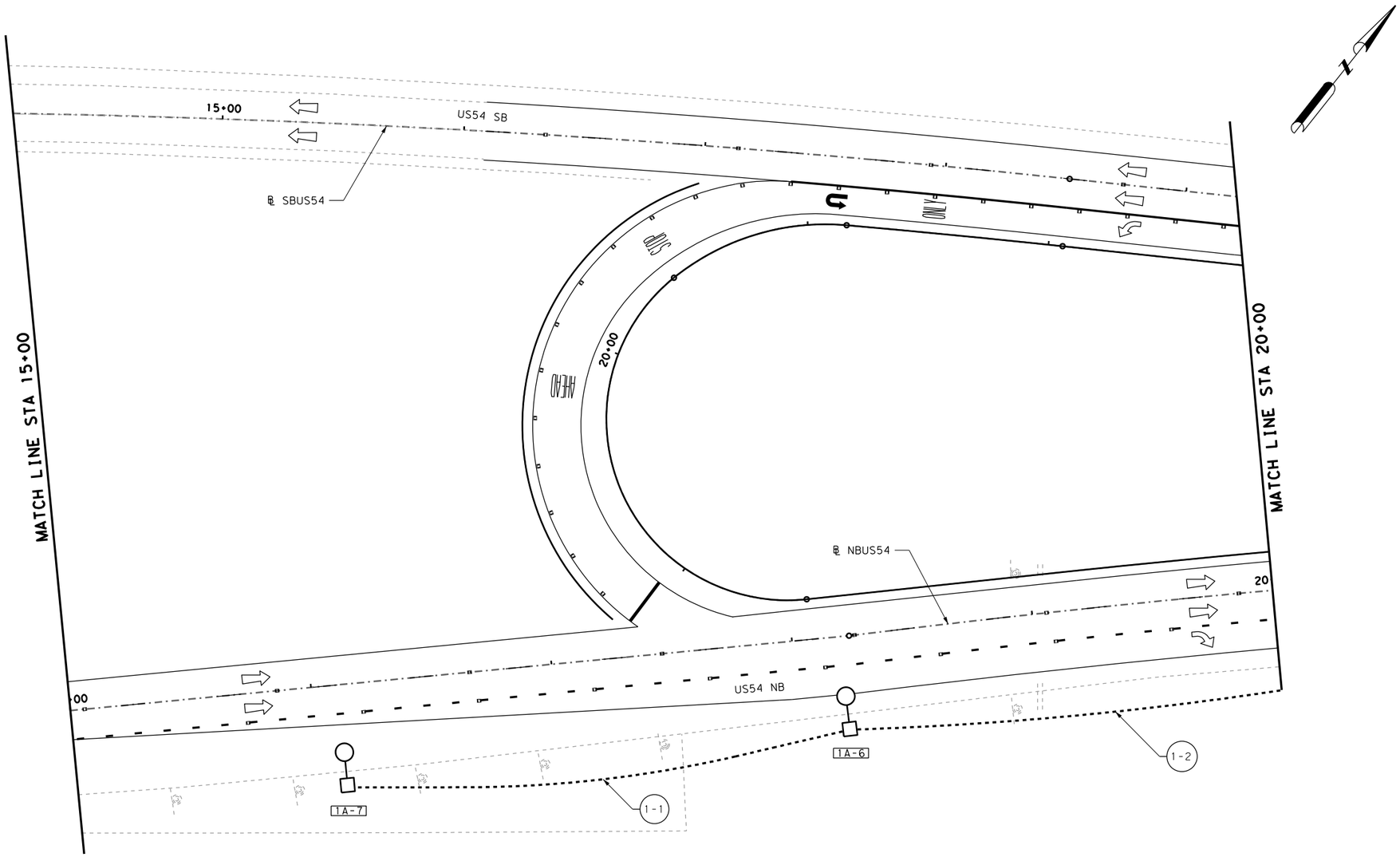

LEGEND

- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORED)
- EXISTING CONDUIT
- PROPOSED RD IL(TY SA)40T-8(250W EQ)LED
- EXISTING LUMINAIRE
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  - RUN NUMBER
  - SERVICE NUMBER
- 1A-1 — POLE DESIGNATION
  - POLE NUMBER
  - CIRCUIT IDENTIFICATION
  - SERVICE NUMBER
- DIRECTION OF TRAFFIC

0 25 50
SCALE: 1"=50'

ILLUMINATION POLE ASSEMBLY LOCATIONS				
ASSEMBLY	BASELINE	STATION	OFFSET	DESCRIPTION
1A-7	BL NBUS54	16+11.25	42.60' RT	IN RD IL (TY SA) 40T-8(250W EQ)LED
1A-6	BL NBUS54	18+20.34	38.74' RT	IN RD IL (TY SA) 40T-8(250W EQ)LED

CONDUIT AND CABLE SCHEDULE										
SERVICE NUMBER	RUN NUMBER	RUN LENGTH (FEET)	CONDUIT				CONDUCTOR			
			CONDT (PVC) 2"		CONDT (PVC) 2" (BORE)		#8 INSULATED (GROUND)		#8 INSULATED (POWER)	
			NO.	LF	NO.	LF	NO.	LF	NO.	LF
1	1	210	1	210			1	215	2	430
1	2	160	1	160			1	165	2	330
SHEET TOTALS				370				380		760

ROADWAY LIGHTING QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0110	6003	EXCAVATION (SPECIAL)	CY	1
0416	6029	DRILLED SHAFT (RDWY ILL POLE)(30 IN)	LF	20
0432	6009	RIPRAP (CONC) (CL B)(4")	CY	1.05
0610	6214	RD IL (TY SA)40T-8(250W EQ) LED	EA	2
0618	6023	CONDT (PVC) (SCH 40)(2")	LF	370
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	1140

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

ROADWAY LIGHTING LAYOUT

SHEET 2 OF 9

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		189

DATE: 6/1/2022 8:23:03 PM
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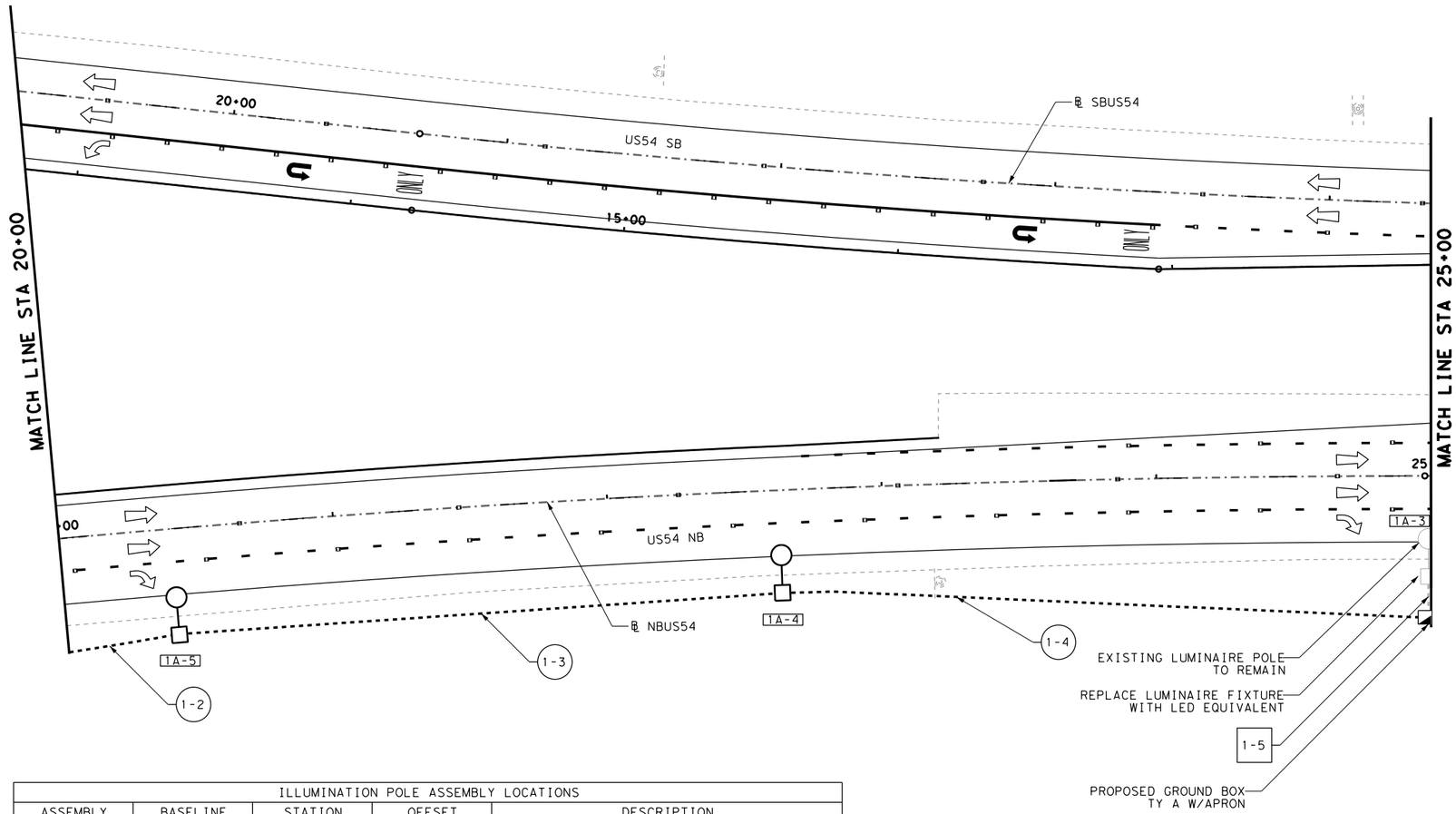

LEGEND

- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORED)
- EXISTING CONDUIT
- PROPOSED RD IL(TY SA)40T-8(250W EQ)LED
- EXISTING LUMINAIRE
- PROPOSED GROUND BOX TY A W/APRON
- EXISTING GROUND BOX
- EXISTING/PROPOSED ELECTRICAL SERVICE
- EXISTING CCTV CAMERA
- 1-1 RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- 1-1 EXISTING RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- 1A-1 POLE DESIGNATION
  - POLE NUMBER
  - CIRCUIT IDENTIFICATION
  - SERVICE NUMBER
- DIRECTION OF TRAFFIC

0 25 50
SCALE: 1"=50'

ILLUMINATION POLE ASSEMBLY LOCATIONS				
ASSEMBLY	BASELINE	STATION	OFFSET	DESCRIPTION
1A-5	BL SBUS54	24+98.69	36.35' RT	IN RD IL (TY SA) 40T-8(250W EQ)LED
1A-4	BL NBUS54	22+62.35	37.42' RT	IN RD IL (TY SA) 40T-8(250W EQ)LED
1A-3	BL NBUS54	20+40.82	38.39' RT	REPLACE LUMINAIRE W/LED (250W EQ)

CONDUIT AND CABLE SCHEDULE												
SERVICE NUMBER	RUN NUMBER	RUN LENGTH (FEET)	CONDUIT						CONDUCTOR			
			CONDT (PVC) 2"		CONDT (PVC) 2" (BORE)		CONDT (PREPARE)		#8 INSULATED (GROUND)		#8 INSULATED (POWER)	
			NO.	LF	NO.	LF	NO.	LF	NO.		LF	
1	2	40	1	40					1	45	2	90
1	3	220	1	220					1	225	2	450
1	4	220	1	220					1	225	2	450
1	*5	15					1	15	1	20	2	40
SHEET TOTALS				480				15		515		1030

* RUN IS EXISTING CONDUIT

ROADWAY LIGHTING QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0110	6003	EXCAVATION (SPECIAL)	CY	1
0416	6029	DRILLED SHAFT (RDWY ILL POLE)(30 IN)	LF	20
0432	6009	RIPRAP (CONC) (CL B)(4")	CY	1.40
0610	6102	REPLACE LUMINAIRE W/LED (250W EQ)	EA	1
0610	6214	RD IL (TY SA)40T-8(250W EQ) LED	EA	2
0618	6023	CONDT (PVC) (SCH 40)(2")	LF	480
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	1545
0624	6002	GROUND BOX TY A (122311)W/APRON	EA	1
6027	6003	CONDUIT (PREPARE)	LF	15

STATE OF TEXAS
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US54 STATE LINE RD

TRAFFIC

ROADWAY LIGHTING LAYOUT

SHEET 3 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		190

DATE: 6/1/2022 8:23:15 PM
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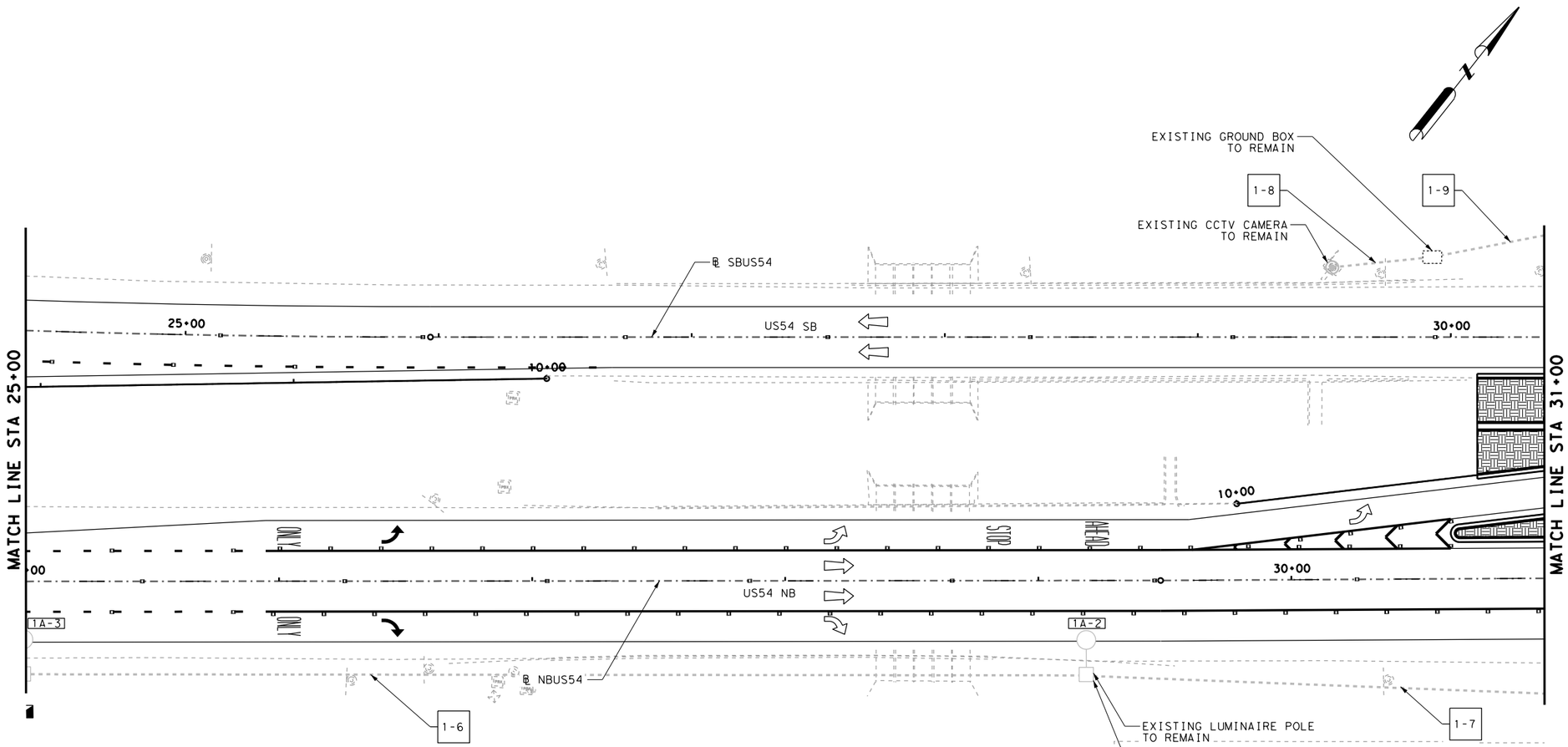

LEGEND

- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORED)
- EXISTING CONDUIT
- PROPOSED RD IL(TY SA)40T-8(250W EQ)LED
- EXISTING LUMINAIRE
- PROPOSED GROUND BOX TY A W/APRON
- EXISTING GROUND BOX
- EXISTING/PROPOSED ELECTRICAL SERVICE
- EXISTING CCTV CAMERA
- 1-1 RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- 1-1 EXISTING RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- 1A-1 POLE DESIGNATION
  - POLE NUMBER
  - CIRCUIT IDENTIFICATION
  - SERVICE NUMBER
- DIRECTION OF TRAFFIC

0 25 50
SCALE: 1"=50'

CONDUIT AND CABLE SCHEDULE

SERVICE NUMBER	RUN NUMBER	RUN LENGTH (FEET)	CONDT (PREPARE)		#8 INSULATED (GROUND)		#8 INSULATED (POWER)	
			NO.	LF	NO.	LF	NO.	LF
1	*6	415	1	415	1	420	2	840
1	*7	235	1	235	1	240	2	480
1**	*8	40	1	100	1	45	2	90
1**	*9	47	1	40	1	45	2	450
SHEET TOTALS				790		770		1900

* RUN IS EXISTING CONDUIT
** ITS RUN

ROADWAY LIGHTING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0110	6003	EXCAVATION (SPECIAL)	CY	1
0610	6102	REPLACE LUMINAIRE W/LED (250W EQ)	EA	1
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	2670
6027	6003	CONDUIT (PREPARE)	LF	790

STATE OF TEXAS
CARLOS DURAN
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Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

ROADWAY LIGHTING LAYOUT

SHEET 4 OF 9

AECOM
AECOM Technical Services Inc, F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		191

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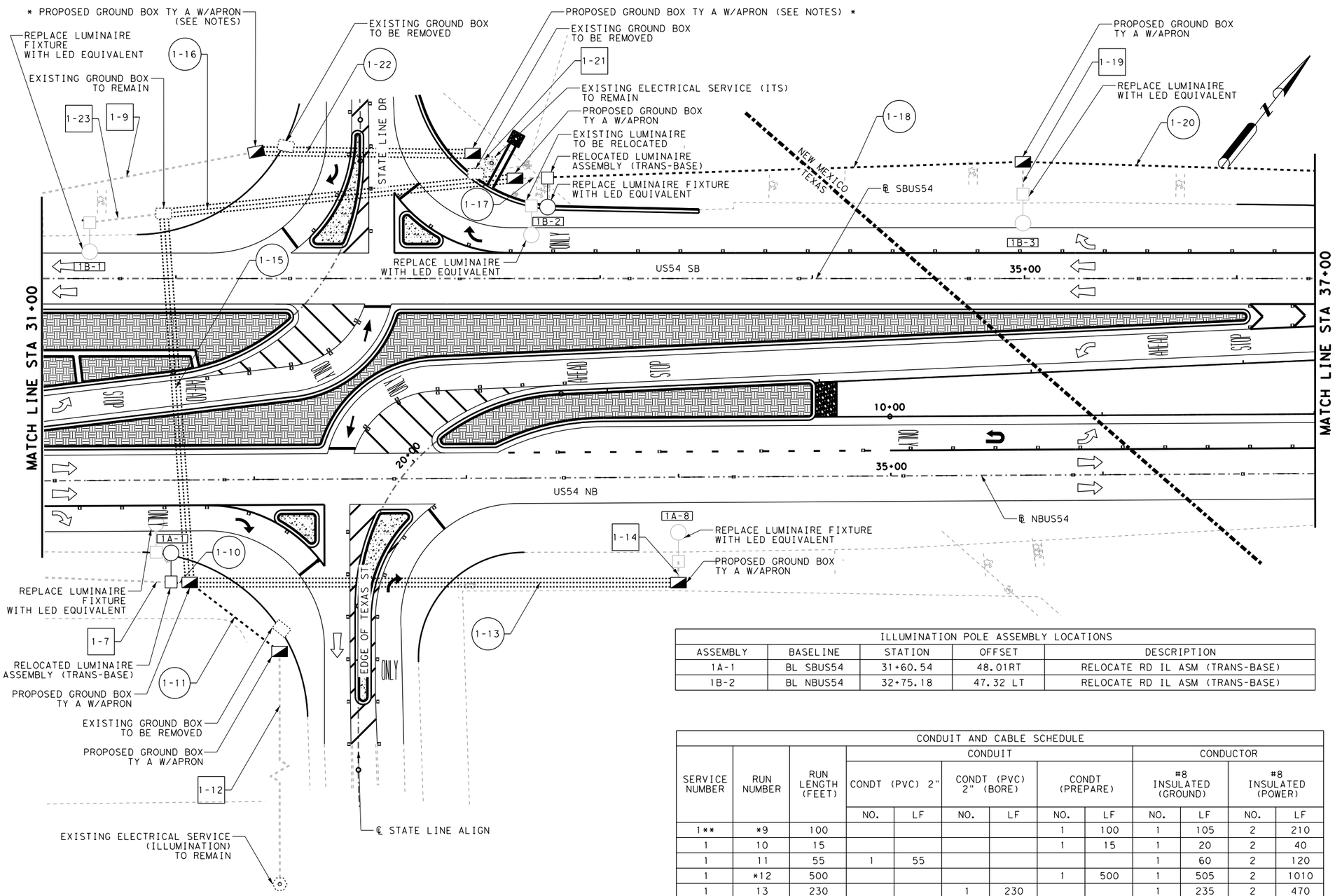

LEGEND

- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORED)
- EXISTING CONDUIT
- PROPOSED RD IL(TY SA)40T-8(250W EQ)LED
- EXISTING LUMINAIRE
- PROPOSED GROUND BOX TY A W/APRON
- EXISTING GROUND BOX
- EXISTING/PROPOSED ELECTRICAL SERVICE
- EXISTING CCTV CAMERA
- 1-1 EXISTING RUN DESIGNATION (RUN NUMBER, SERVICE NUMBER)
- 1-1 RUN DESIGNATION (RUN NUMBER, SERVICE NUMBER)
- 1A-1 POLE DESIGNATION (POLE NUMBER, CIRCUIT IDENTIFICATION, SERVICE NUMBER)
- DIRECTION OF TRAFFIC

NOTES:

* CONTRACTOR TO DISCONNECT POWER OF EXISTING ITS EQUIPMENT, AND PULL CABLES TO PROPOSED GROUND BOXES. INSTALL NEW CONDUIT AND RECONNECT ITS EQUIPMENT TO POWER SOURCE.
* BREAKERS FOR SYSTEM SHOULD BE SUBSIDIARY TO ITEM 620.

0 25 50

SCALE: 1"=50'

ILLUMINATION POLE ASSEMBLY LOCATIONS

ASSEMBLY	BASELINE	STATION	OFFSET	DESCRIPTION
1A-1	BL SBUS54	31+60.54	48.01RT	RELOCATE RD IL ASM (TRANS-BASE)
1B-2	BL NBUS54	32+75.18	47.32 LT	RELOCATE RD IL ASM (TRANS-BASE)

ROADWAY LIGHTING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0110	6003	EXCAVATION (SPECIAL)	CY	1
0416	6029	DRILLED SHAFT (RDWY ILL POLE) (30 IN)	LF	40
0610	6004	RELOCATE RD IL ASM (TRANS-BASE)	EA	2
0610	6102	REPLACE LUMINAIRE W/LED (250W EQ)	EA	5
0618	6023	CONDT (PVC) (SCH 40)(2")	LF	426
0618	6024	CONDT (PVC) (SCH 40)(2")(BORE)	LF	677
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	5679
0624	6002	GROUND BOX TY A (122311)W/APRON	EA	7
0624	6028	REMOVE GROUND BOX	EA	3
6027	6003	CONDUIT (PREPARE)	LF	700
6027	6008	GROUND BOX (PREPARE)	EA	1

CONDUIT AND CABLE SCHEDULE

SERVICE NUMBER	RUN NUMBER	RUN LENGTH (FEET)	CONDUIT						CONDUCTOR			
			CONDT (PVC) 2"		CONDT (PVC) 2" (BORE)		CONDT (PREPARE)		#8 INSULATED (GROUND)		#8 INSULATED (POWER)	
			NO.	LF	NO.	LF	NO.	LF	NO.	LF	NO.	LF
1**	*9	100					1	100	1	105	2	210
1	10	15					1	15	1	20	2	40
1	11	55	1	55					1	60	2	120
1	*12	500					1	500	1	505	2	1010
1	13	230			1	230			1	235	2	470
1	*14	10					1	10	1	15	2	30
1	15	175			1	175			1	180	2	360
1	16	167			1	167			1	172	2	344
1	*17	10					1	10	1	15	2	30
1	18	240	1	240					1	245	2	490
1	*19	15					1	15	1	20	2	40
1	20	131	1	131					1	136	2	272
1**	*21	10					1	10	1	15	2	30
1**	22	105			1	105			1	110	2	220
1**	*23	40					1	40	1	45	3	135
SHEET TOTALS				426		677		700		1878		3801

* RUN IS EXISTING CONDUIT
** ITS RUNS

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

ROADWAY LIGHTING LAYOUT

SHEET 5 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		192

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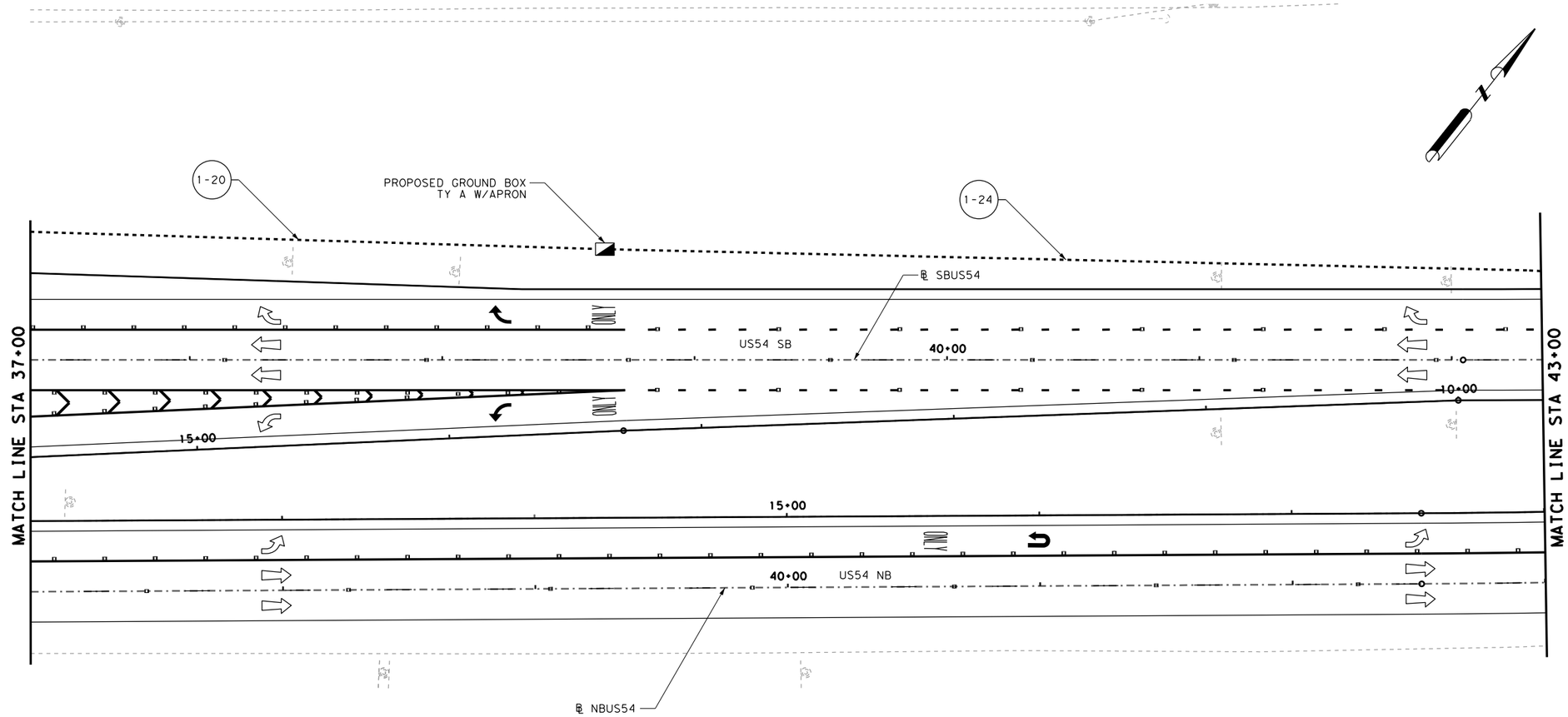

LEGEND

- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORED)
- EXISTING CONDUIT
- PROPOSED RD IL(TY SA)40T-8(250W EQ)LED
- EXISTING LUMINAIRE
- PROPOSED GROUND BOX TY A W/APRON
- EXISTING GROUND BOX
- EXISTING/PROPOSED ELECTRICAL SERVICE
- EXISTING CCTV CAMERA
- 1-1 EXISTING RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- 1-1 RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- 1A-1 POLE DESIGNATION
  - POLE NUMBER
  - CIRCUIT IDENTIFICATION
  - SERVICE NUMBER
- DIRECTION OF TRAFFIC

0 25 50
SCALE: 1"=50'

CONDUIT AND CABLE SCHEDULE

SERVICE NUMBER	RUN NUMBER	RUN LENGTH (FEET)	CONDUIT				CONDUCTOR			
			CONDT (PVC) 2"		CONDT (PVC) 2" (BORE)		#8 INSULATED (GROUND)		#8 INSULATED (POWER)	
			NO.	LF	NO.	LF	NO.	LF	NO.	LF
1	20	225	1	225			1	230	2	460
1	24	365	1	365			1	370	2	740
SHEET TOTALS				590				600		1200

ROADWAY LIGHTING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0110	6003	EXCAVATION (SPECIAL)	CY	1
0618	6023	CONDT (PVC) (SCH 40)(2")	LF	590
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	1800
0624	6002	GROUND BOX TY A (122311)W/APRON	EA	1

STATE OF TEXAS
CARLOS DURAN
125531
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PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

ROADWAY
LIGHTING LAYOUT

SHEET 6 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		193

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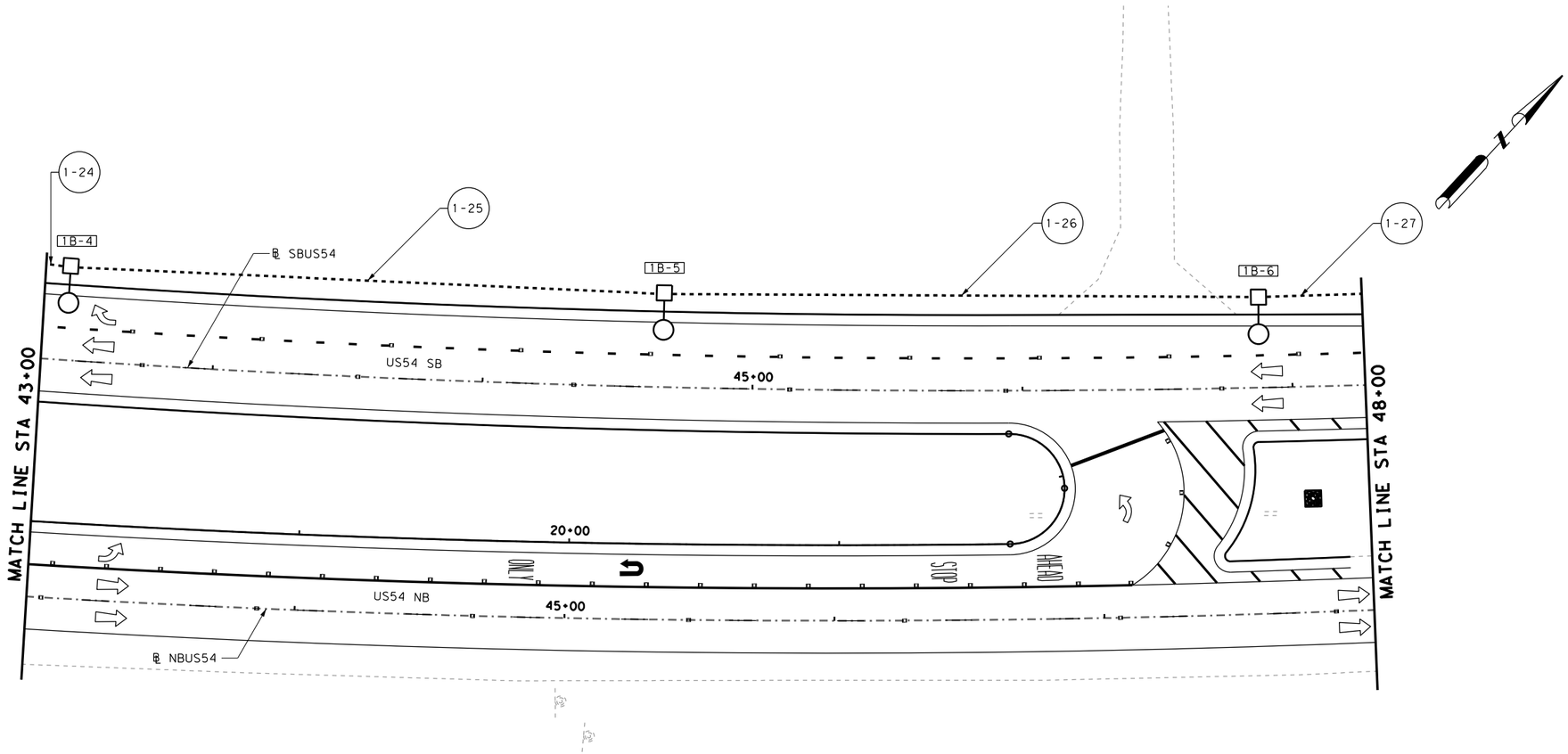

LEGEND

- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORED)
- EXISTING CONDUIT
- PROPOSED RD IL(TY SA)40T-8(250W EQ)LED
- EXISTING LUMINAIRE
- PROPOSED GROUND BOX TY A W/APRON
- EXISTING GROUND BOX
- EXISTING/PROPOSED ELECTRICAL SERVICE
- EXISTING CCTV CAMERA
- 1-1 EXISTING RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- 1-1 RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- 1A-1 POLE DESIGNATION
  - POLE NUMBER
  - CIRCUIT IDENTIFICATION
  - SERVICE NUMBER
- DIRECTION OF TRAFFIC

0 25 50
SCALE: 1"=50'

CONDUIT AND CABLE SCHEDULE

SERVICE NUMBER	RUN NUMBER	RUN LENGTH (FEET)	CONDUIT				CONDUCTOR			
			CONDT (PVC) 2"		CONDT (PVC) 2" (BORE)		#8 INSULATED (GROUND)		#8 INSULATED (POWER)	
			NO.	LF	NO.	LF	NO.	LF	NO.	LF
1	25	220	1	220			1	225	2	450
1	26	220	1	220			1	225	2	450
1	27	220	1	220			1	225	2	450
SHEET TOTALS				660				675		1350

ROADWAY LIGHTING QUANTITIES

ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0110	6003	EXCAVATION (SPECIAL)	CY	1
0416	6029	DRILLED SHAFT (RDWY ILL POLE)(30 IN)	LF	60
0432	6009	RIPRAP (CONC) (CL B)(4")	CY	1
0610	6214	RD IL (TY SA)40T-8(250W EQ) LED	EA	3
0618	6023	CONDT (PVC) (SCH 40)(2")	LF	660
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	2025

STATE OF TEXAS
CARLOS DURAN
125531
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Carlos Duran P.E.

CSJ: 0167-01-126
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ROADWAY LIGHTING LAYOUT

SHEET 7 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		194

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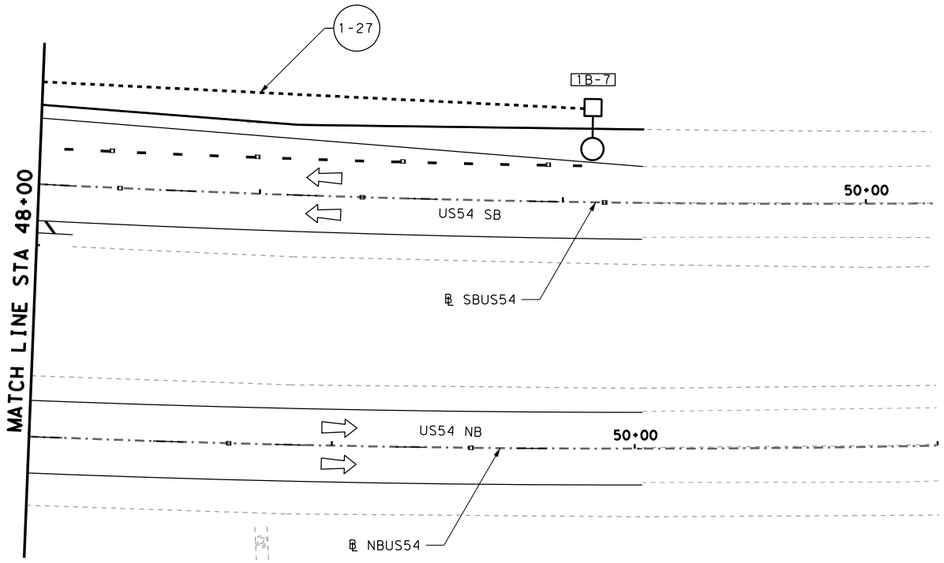

LEGEND

- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORED)
- EXISTING CONDUIT
- PROPOSED RD IL(TY SA)40T-8(250W EQ)LED
- EXISTING LUMINAIRE
- PROPOSED GROUND BOX TY A W/APRON
- EXISTING GROUND BOX
- EXISTING/PROPOSED ELECTRICAL SERVICE
- EXISTING CCTV CAMERA
- 1-1 EXISTING RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- 1-1 RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- 1A-1 POLE DESIGNATION
  - POLE NUMBER
  - CIRCUIT IDENTIFICATION
  - SERVICE NUMBER
- DIRECTION OF TRAFFIC

0 25 50
SCALE: 1"=50'

ILLUMINATION POLE ASSEMBLY LOCATIONS				
ASSEMBLY	BASELINE	STATION	OFFSET	DESCRIPTION
1B-7	BL SBUS54	49+09.52	30.78' LT	IN RD IL (TY SA) 40T-8(250W EQ)LED

ROADWAY LIGHTING QUANTITIES				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY
0110	6003	EXCAVATION (SPECIAL)	CY	1
0416	6029	DRILLED SHAFT (RDWY ILL POLE)(30 IN)	LF	10
0432	6009	RIPRAP (CONC) (CL B)(4")	CY	0.35
0610	6214	RD IL (TY SA)40T-8(250W EQ) LED	EA	1

STATE OF TEXAS
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CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

ROADWAY
LIGHTING LAYOUT

SHEET 8 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126,ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		195

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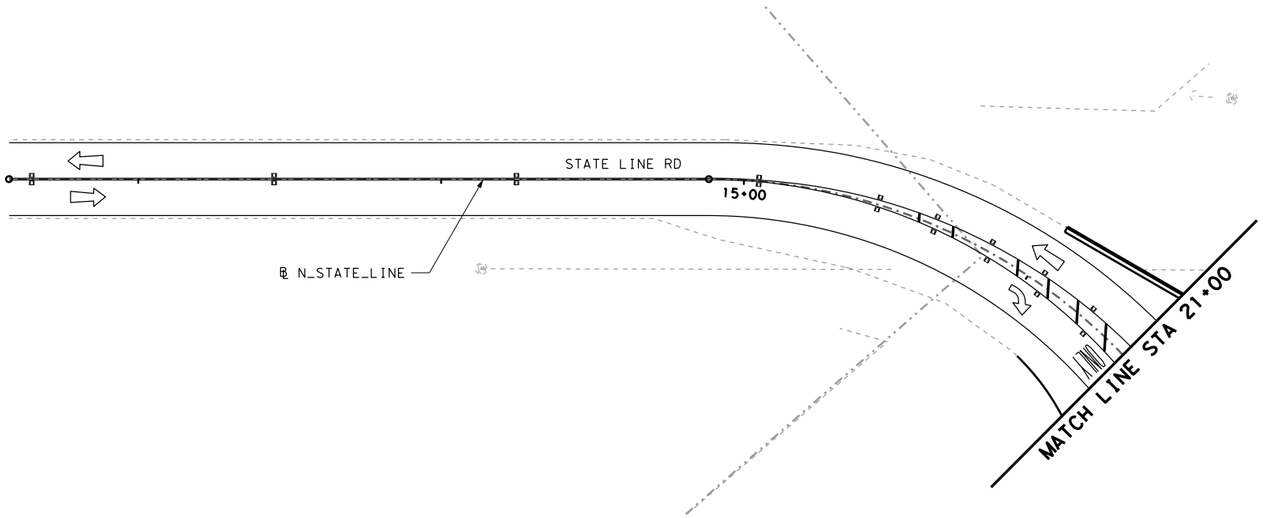

LEGEND

- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORED)
- EXISTING CONDUIT
- PROPOSED RD IL(TY SA)40T-8(250W EQ)LED
- EXISTING LUMINAIRE
- PROPOSED GROUND BOX TY A W/APRON
- EXISTING GROUND BOX
- EXISTING/PROPOSED ELECTRICAL SERVICE
- EXISTING CCTV CAMERA
- (1-1) EXISTING RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- [1-1] RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- [1A-1] POLE DESIGNATION
  - POLE NUMBER
  - CIRCUIT IDENTIFICATION
  - SERVICE NUMBER
- DIRECTION OF TRAFFIC

0 25 50
SCALE: 1"=50'

NO PROPOSED ROADWAY LIGHTING FOR THIS SHEET,
FOR REVIEW PURPOSES ONLY.

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED
PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

ROADWAY
LIGHTING LAYOUT

SHEET 9 OF 9

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		196

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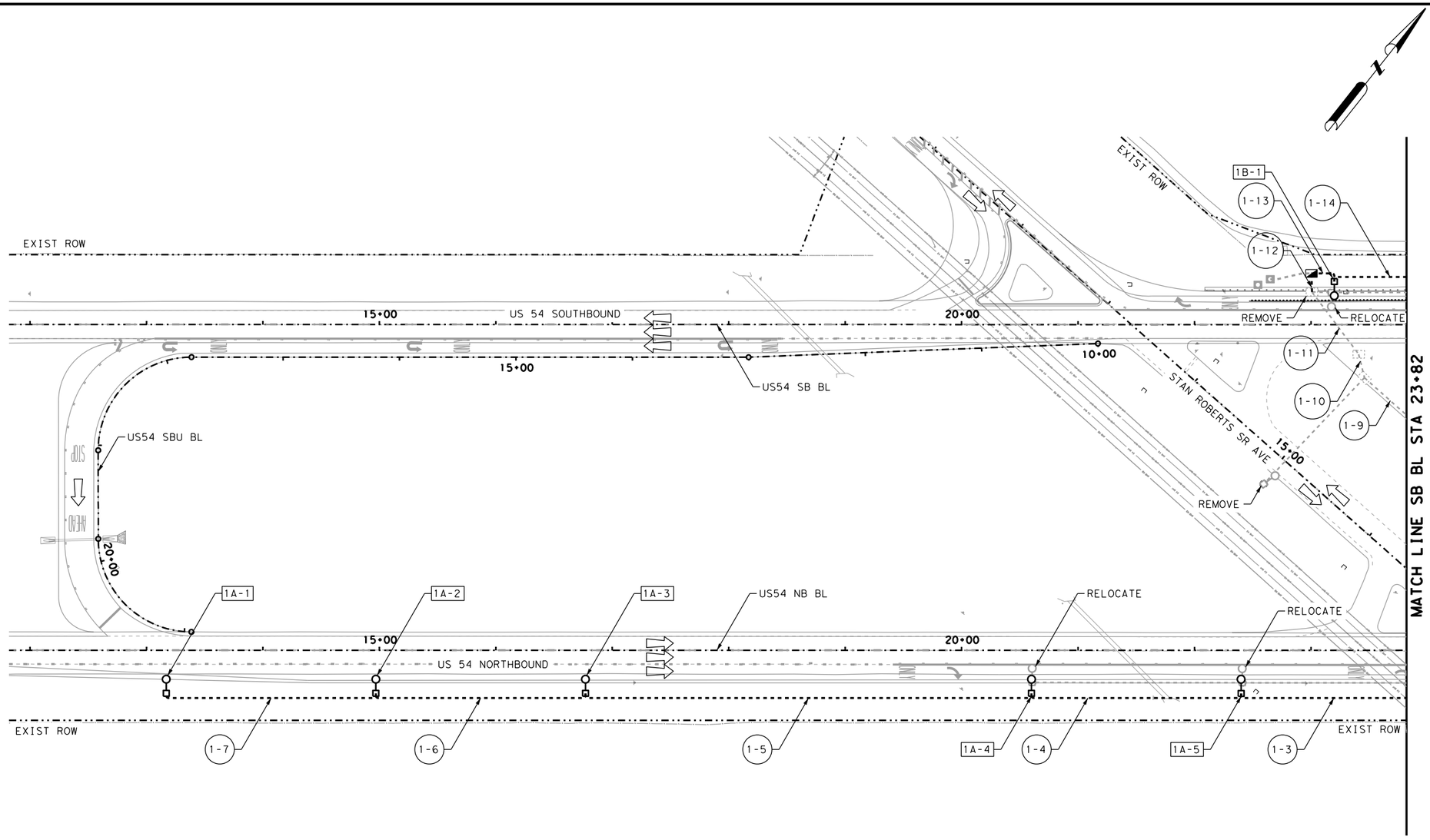

LEGEND

- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORED)
- EXISTING CONDUIT
- PROPOSED RD IL(TY SA)40T-X(250W EQ)LED
- EXISTING LUMINAIRE
- PROPOSED GROUND BOX TY A W/APRON
- EXISTING GROUND BOX
- EXISTING/PROPOSED ELECTRICAL SERVICE
- EXISTING CCTV CAMERA
- (1-1) RUN DESIGNATION — RUN NUMBER — SERVICE NUMBER
- [1A-1] POLE DESIGNATION — POLE NUMBER — CIRCUIT IDENTIFICATION — SERVICE NUMBER
- DIRECTION OF TRAFFIC

0 25 50 100
SCALE: 1"=100'

ROADWAY LIGHTING QUANTITIES				
BID CODE		DESCRIPTION	UNIT	QTY
0416	6088	DRILL SHAFT (RDWY ILL POLE) (24 IN)	LF	60
0432	6001	RIPRAP (CONC)(4 IN)	CY	3
0610	6004	RELOCATE RD IL ASM (TRANS-BASE)	EA	3
0610	6009	REMOVE RD IL ASM (TRANS-BASE)	EA	1
0610	6102	REPLACE LUMINAIRE W/LED (250W EQ)	EA	3
0610	6216	IN RD IL (TY SA) 40T-10 (250W EQ) LED	EA	3
0618	6023	CONDT (PVC) (SCH 40) (2")	LF	1115
0620	6010	ELEC CONDR (NO.6) INSULATED	LF	5190
0624	6002	GROUND BOX TY A (122311)W/APRON	EA	2
0624	6028	REMOVE GROUND BOX	EA	1
6027	6003	CONDUIT (PREPARE)	LF	160
6027	6008	GROUND BOX (PREPARE)	EA	2

NOTES:
1. SUBUTILITIES ARE NOT SHOWN ON PLANS. CONTRACTOR SHALL FIELD VERIFY EXISTNG SUBUTILITES BEFORE BEGINNING WORK.
2. ALL EXISTING ILLUMINATION CONDUIT TO BE ABONDONDED UNLESS NOTED OTHERWISE.

ILLUMINATION POLE ASSEMBLY LOCATIONS			
ILLUM. NO.	DESCRIPTION	BL STATION	OFFSET (FT)
1A-1	IN RD IL (TY SA)40T-10 (250W EQ)LED	NB STA 13+17	37' RT
1A-2	IN RD IL (TY SA)40T-10 (250W EQ)LED	NB STA 14+97	37' RT
1A-3	IN RD IL (TY SA)40T-10 (250W EQ)LED	NB STA 16+77	37' RT
1A-4	RELOCATE RD IL ASM (TRANS-BASE)	NB STA 20+60	37' RT
1A-5	RELOCATE RD IL ASM (TRANS-BASE)	NB STA 22+40	37' RT
1B-1	RELOCATE RD IL ASM (TRANS-BASE)	SB STA 23+20	37' LT

CONDUIT AND CABLE SCHEDULE				
RUN NO.	RUN LENGTH (FT)	CONDUIT SIZE AND TYPE		CONDUCTOR SIZE AND TYPE
		(PVC) (SCHD 40) (2") (TRENCH)	CONDT (PREPARE)	NO.6 XHHW
1-3	150	1		3
1-4	190	1		3
1-5	395	1		3
1-6	190	1		3
1-7	190	1		3
1-9	55		1	3
1-10	30		1	3
1-11	75		1	3
1-12	190	1		3
1-13	190	1		3
1-14	75	1		3
TOTALS		1115	160	5190

STATE OF TEXAS
DOUGLAS BURNETT JR.
140757
LICENSED PROFESSIONAL ENGINEER
5.31.22
Doug Burnett

US-54

CSJ: 0167-01-133
US 54 STAN ROBERTS SR AVE

ROADWAY LIGHTING LAYOUT

PROJECT BEGIN TO STA 23+82

SHEET 1 OF 2

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812
11701 Stonehollow Dr | Suite 100 | Austin, TX 78758
Phone: 512-821-2081 | Fax: 512-821-2086

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		197

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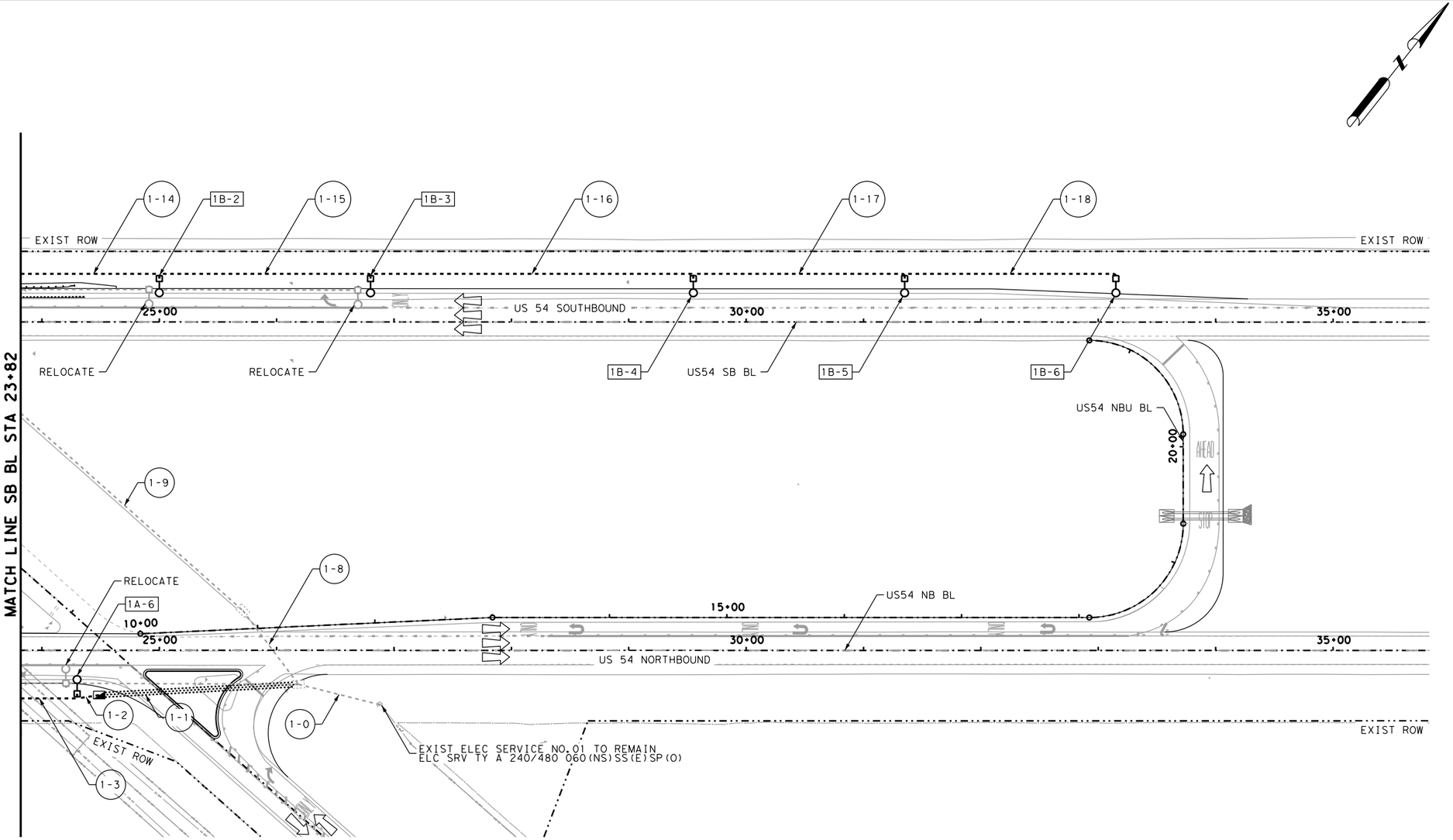

LEGEND

- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORED)
- EXISTING CONDUIT
- PROPOSED RD IL(TY SA)40T-X(250W EQ)LED
- EXISTING LUMINAIRE
- PROPOSED GROUND BOX TY A W/APRON
- EXISTING GROUND BOX
- EXISTING/PROPOSED ELECTRICAL SERVICE
- EXISTING CCTV CAMERA
- 1-1 — RUN DESIGNATION — RUN NUMBER — SERVICE NUMBER
- 1A-1 — POLE DESIGNATION — POLE NUMBER — CIRCUIT IDENTIFICATION — SERVICE NUMBER
- DIRECTION OF TRAFFIC

0 25 50 100

SCALE: 1"=100'

SHEET QUANTITY				
BID CODE		DESCRIPTION	UNIT	QTY
416	6088	DRILL SHAFT (RDWY ILL POLE) (24 IN)	LF	60
432	6001	RIPRAP (CONC)(4 IN)	CY	3
610	6004	RELOCATE RD IL ASM (TRANS-BASE)	EA	3
610	6102	REPLACE LUMINAIRE W/LED (250W EQ)	EA	3
610	6216	IN RD IL (TY SA) 40T-10 (250W EQ) LED	EA	3
618	6023	CONDT (PVC) (SCH 40) (2")	LF	1075
618	6024	CONDT (PVC) (SCH 40) (2")(BORE)	LF	175
620	6010	ELEC CONDR (NO.6) INSULATED	LF	5010
624	6002	GROUND BOX TY A (122311)W/APRON	EA	1
6027	6003	CONDUIT (PREPARE)	LF	420
6027	6008	GROUND BOX (PREPARE)	EA	2

ILLUMINATION POLE ASSEMBLY LOCATIONS			
ILLUM. NO.	DESCRIPTION	BL STATION	OFFSET (FT)
1A-6	IN RD IL (TY SA)40T-10 (250W EQ)LED	NB STA 24+30	37' RT
1B-2	RELOCATE RD IL ASM (TRANS-BASE)	SB STA 25+00	37' LT
1B-3	RELOCATE RD IL ASM (TRANS-BASE)	SB STA 26+80	37' LT
1B-4	IN RD IL (TY SA)40T-10 (250W EQ)LED	SB STA 29+55	37' LT
1B-5	IN RD IL (TY SA)40T-10 (250W EQ)LED	SB STA 31+35	37' LT
1B-6	IN RD IL (TY SA)40T-10 (250W EQ)LED	SB STA 33+15	37' LT

CONDUIT AND CABLE SCHEDULE					
RUN NO.	RUN LENGTH (FT)	CONDUIT SIZE AND TYPE			CONDUCTOR SIZE AND TYPE
		(PVC) (SCHD 40) (2") (TRENCH)	(PVC) (SCHD 40) (2") (BORE)	CONDT (PREPARE)	NO.6 XHHW
1-0	80			1	3
1-1	175		1		3
1-2	30	1			3
1-3	60	1			3
1-8	85			1	3
1-9	255			1	3
1-14	130	1			3
1-15	185	1			3
1-16	290	1			3
1-17	190	1			3
1-18	190	1			3
TOTALS		1075	175	420	5010

NOTES:
1. SUBUTILITIES ARE NOT SHOWN ON PLANS. CONTRACTOR SHALL FIELD VERIFY EXISTNG SUBUTILITES BEFORE BEGINNING WORK.
2. ALL EXISTING ILLUMINATION CONDUIT TO BE ABONDONDED UNLESS NOTED OTHERWISE.

STATE OF TEXAS
DOUGLAS BURNETT JR.
140757
LICENSED
PROFESSIONAL ENGINEER
5.31.22

Doug Burnett

US-54

CSJ: 0167-01-133
US 54 STAN ROBERTS SR AVE

ROADWAY LIGHTING LAYOUT

STA 23+82 TO PROJECT END

SHEET 2 OF 2

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812
11701 Stonehollow Dr Suite 100 I Austin, TX 78758
Phone: 512-821-2081 I Fax: 512-821-2086

AECOM
AECOM Technical Services Inc, F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		198

DATE: 5/31/2022 11:39:12 AM
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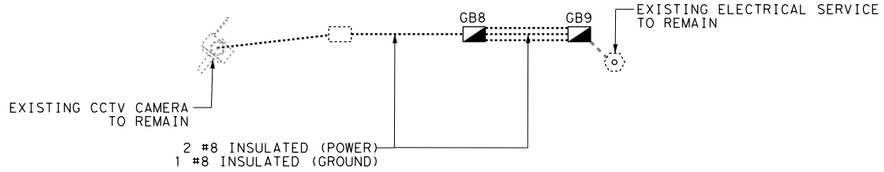
ELECTRICAL SERVICE DESCRIPTION (SEE ED (05) - 14)	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN CKT. BKR. POLE/AMP	LIGHTING CONTRACTOR AMPS	PANELBD/ LOADCENTER AMP RATING	BRANCH CIRCUIT ID	BRANCH CKT. BKR. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
EXISTING ELEC. SERV. (ILLUMINATION) ELC SRV TY A 240/480 060 (NS)SS(E)GC(O)	2"	3#8	N/A	2P/60	2P/60	N/A	A	2P/20	5.72	5.3
							B	2P/20	5.20	

LEGEND

- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORED)
- EXISTING CONDUIT
- PROPOSED RD IL(TY SA)40T-8(250W EQ)LED
- EXISTING LUMINAIRE
- PROPOSED GROUND BOX TY A W/APRON
- EXISTING GROUND BOX
- EXISTING/PROPOSED ELECTRICAL SERVICE
- EXISTING CCTV CAMERA
- 1-1 EXISTING RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- 1-1 RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- 1A-1 POLE DESIGNATION
  - POLE NUMBER
  - CIRCUIT IDENTIFICATION
  - SERVICE NUMBER
- DIRECTION OF TRAFFIC

ITS ELECTRICAL SERVICE LINE #1



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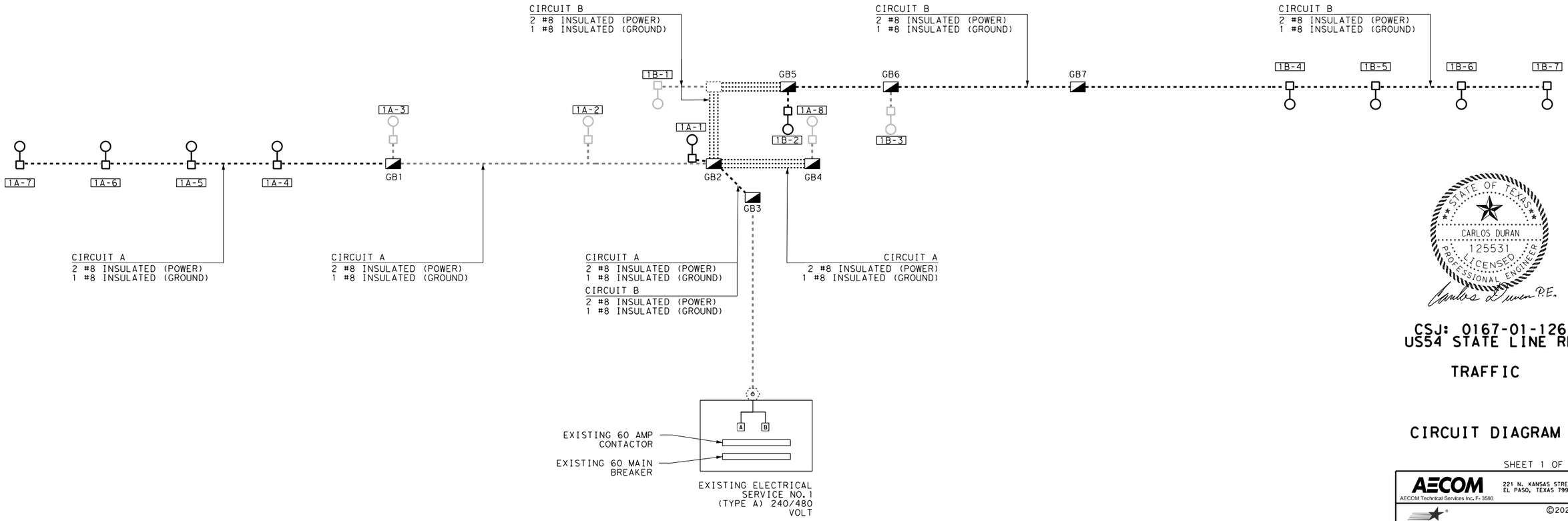

STATE OF TEXAS
CARLOS DURAN
125531
LICENSED PROFESSIONAL ENGINEER
Carlos Duran P.E.

CSJ: 0167-01-126
US54 STATE LINE RD

TRAFFIC

CIRCUIT DIAGRAM

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0167	01	126, ETC.	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		199

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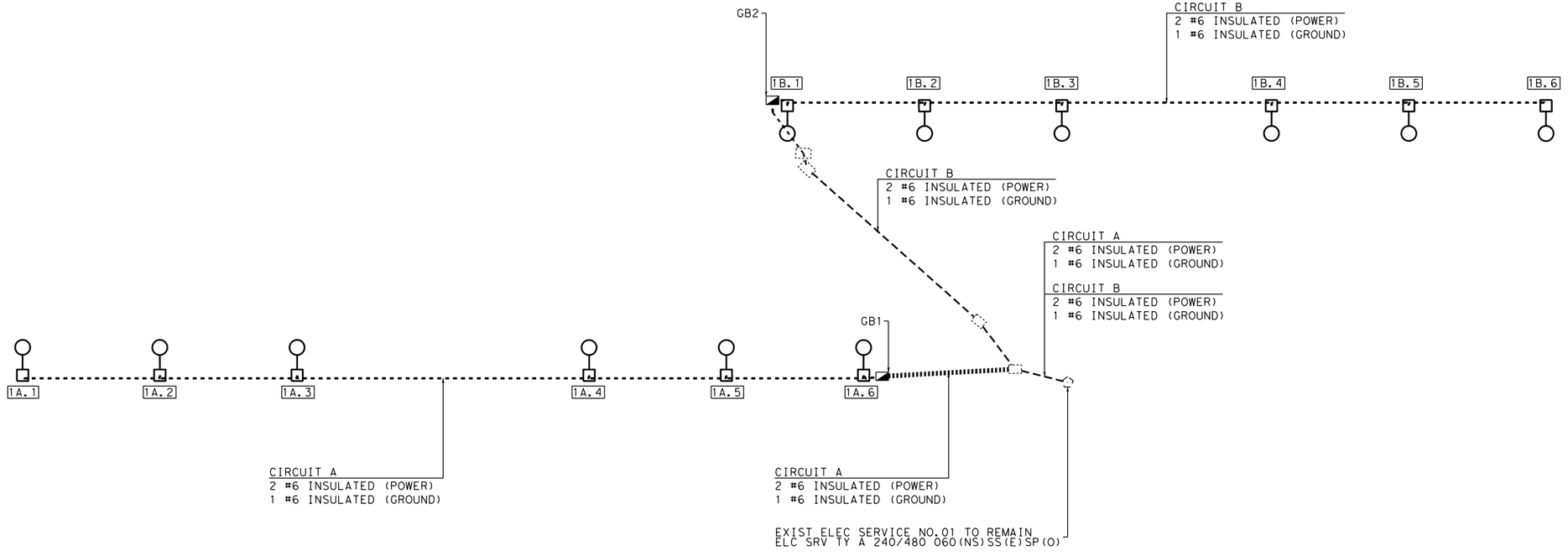
DW:
CK:
DN:

LEGEND

- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORED)
- EXISTING CONDUIT
- PROPOSED RD IL(TY SA)40T-X(250W EQ)LED
- EXISTING LUMINAIRE
- PROPOSED GROUND BOX TY A W/APRON
- EXISTING GROUND BOX
- EXISTING/PROPOSED ELECTRICAL SERVICE
- EXISTING CCTV CAMERA
- (1-1) RUN DESIGNATION
  - RUN NUMBER
  - SERVICE NUMBER
- [1A-1] POLE DESIGNATION
  - POLE NUMBER
  - CIRCUIT IDENTIFICATION
  - SERVICE NUMBER
- DIRECTION OF TRAFFIC



NOT TO SCALE

STATE OF TEXAS
DOUGLAS BURNETT JR.
140757
LICENSED
PROFESSIONAL ENGINEER
5.31.22
Doug Burnett

US-54

CSJ: 0167-01-133
US 54 STAN ROBERTS SR AVE

ROADWAY LIGHTING CIRCUIT DIAGRAM

SHEET 1 OF 1

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-612
11701 Stonehollow Dr Bldg 100 | Austin, TX 78758
Phone: 512-821-0061 | Fax: 512-821-2080

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY		SHEET NO.
ELP	EL PASO		200

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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

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

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

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© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0167	01	126,ETC.	US-54
		DIST	COUNTY		SHEET NO.
		ELP	EL PASO		201

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.

2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.

3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.

4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.

2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.

3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.

4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.

5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.

6. Support conductors in illumination poles with a J-hook at the top of the pole.

7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.

8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.

9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.

10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.

11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

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

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.

2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.

3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.

4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.

5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

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

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.

2. Do not place ground rods in the same drilled hole as a timber pole.

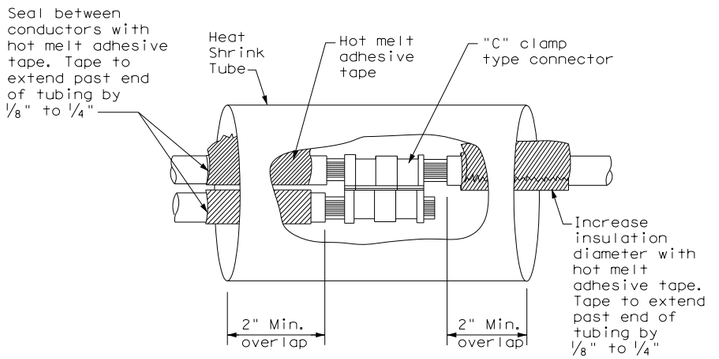
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

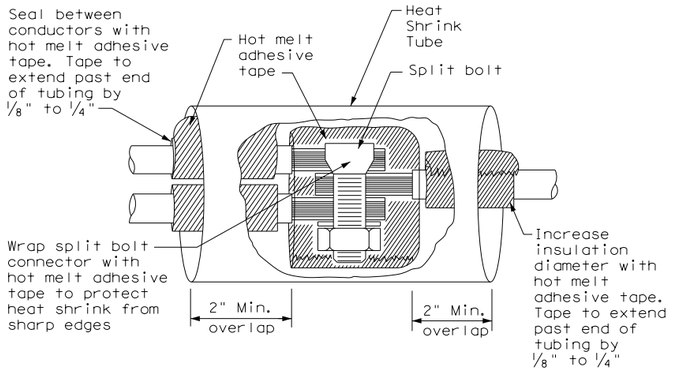
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

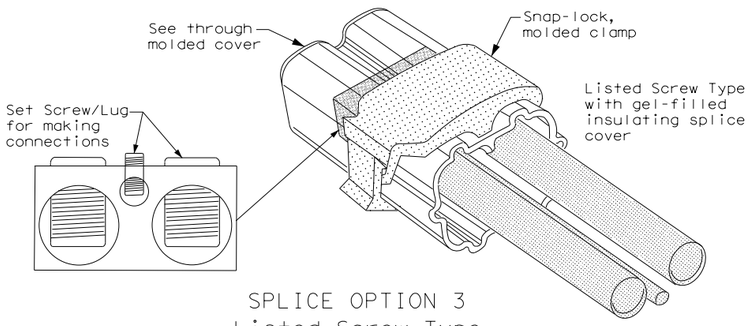
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

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REVISIONS		0167	01	126,ETC.	US-54
		DIST	COUNTY		SHEET NO.
		ELP	EL PASO		202

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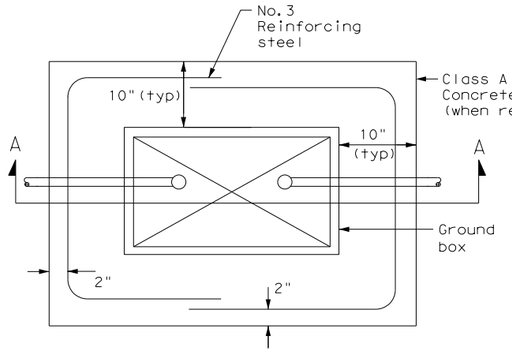
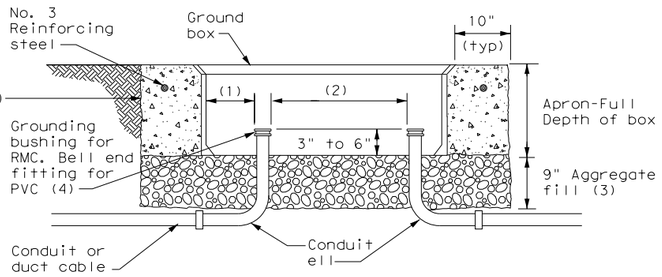


PLAN VIEW



SECTION A - A

APRON FOR GROUND BOX

(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.

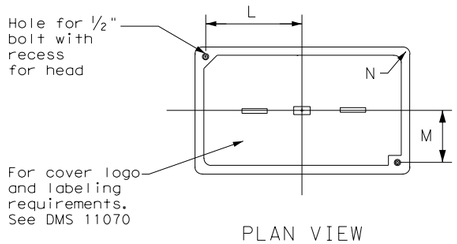
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

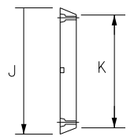
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



PLAN VIEW



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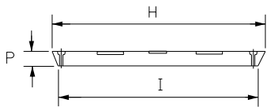


SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) 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. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.

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 ells in a neat and workmanlike 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 and pull tests. 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 sealant. Do not use silicone caulk as a sealant.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches 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 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.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
GROUND BOXES

ED(4)-14

FILE: ed4-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		203

71D

DATE:
FILE:

ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.

2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services,"DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. 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.

3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.

4. 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.

5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.

6. 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.

7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.

8. 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 size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. 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 12 inches minimum, 18 inches maximum, or as required by utility.

9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.

10. 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 that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.

11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.

12. Ensure all mounting hardware and installation details of services conform to utility company specifications.

13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.

14. 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 ½ in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.

15. 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 conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.

2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.

3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.

4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

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

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	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 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

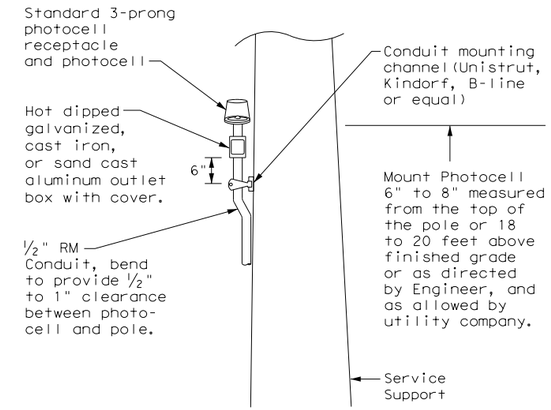
* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National ELectrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

- Schematic Type
- Service Voltage V / V
- Disconnect Amp Rating
  000 indicates main lug only/
  Typically Type T
- (SS)= Safety Switch Ahead of Meter-Check with Utility
  (NS)= No safety Switch Ahead of Meter-Check with Utility
- Enclosure Type
  GS= Galvanized steel("off the shelf")
  SS= Stainless steel(Custom Enclosure)See MPL
  AL= Aluminum (Custom Enclosure)See MPL
- Photocell Mounting Location
  (E)= Inside Service/Enclosure Mounted
  (T)= Top of pole
  (L)= Luminaire mounted
  (N)= None/No Photocell or Lighting Contactor Required
- Service Support Type
  GC= Granite concrete
  OC= Other concrete
  TP= Timber pole
  SP= Steel pole
  SF= Steel frame
  OT= Pole by others or paid for separately
  EX= Existing pole
  TS= Service on traffic signal pole
  PS= Pedestal Service
- O= Overhead Service Feed from Utility
  U= Underground Service Feed from Utility



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

ED(5)-14

FILE: ed5-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		204

DATE:
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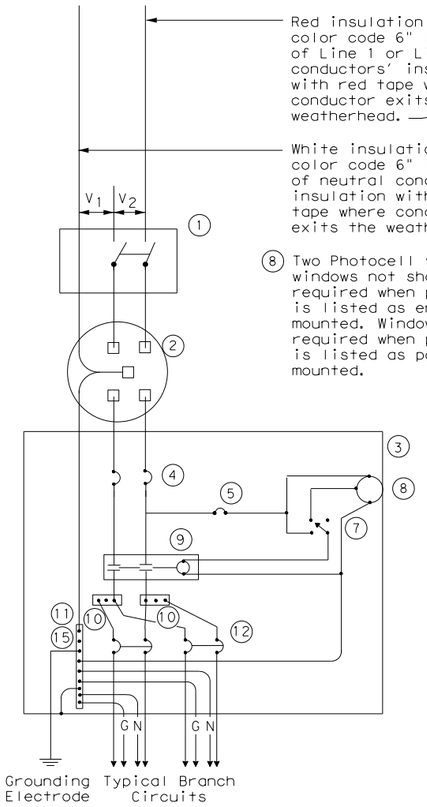
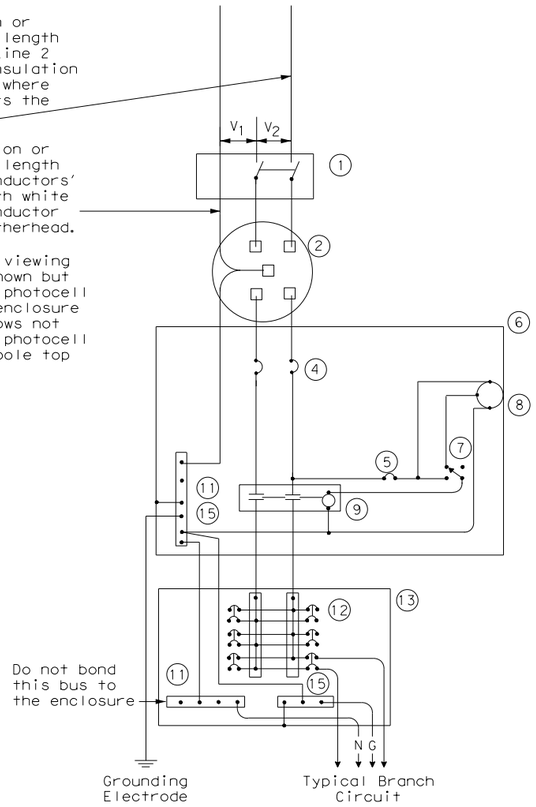
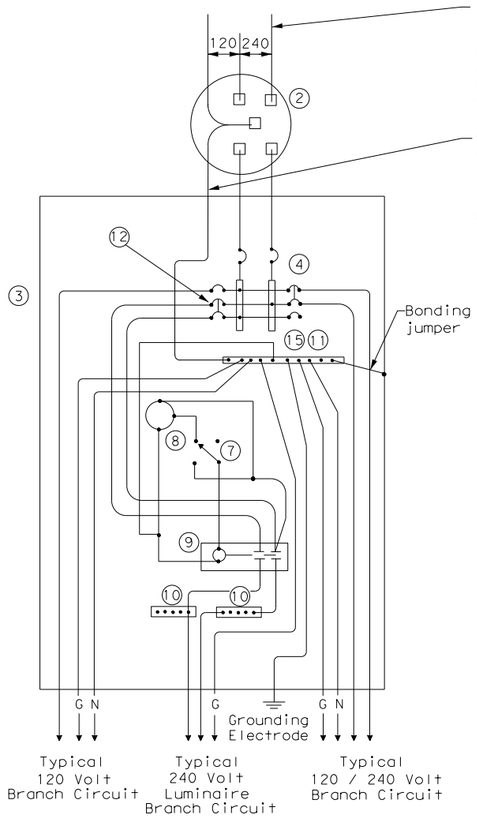


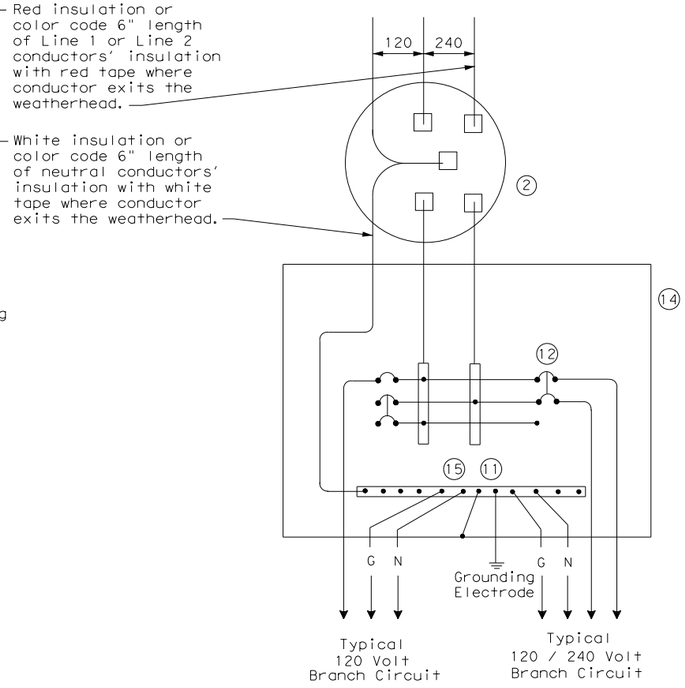
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



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



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
———	Power Wiring
———	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		205

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DATE:
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TIMBER POLE(TP)SERVICE SUPPORT NOTES

1. Ensure electrical service support is a class 5 treated timber pole as per Item 627 "Treated Timber Poles." Embed timber pole to depth required in Item 627.
2. Conduit and electrical conductors attached to the electrical service pole and underground within 12 in. of service pole are not paid for directly but are subsidiary to the electrial service.
3. Install pole-top mounted photocell (T) on north side of pole, or in service enclosure (E) as required. See Electrical Service Data chart in plan set.
4. Gain pole as required to provide flat surface for each channel. Gain timber pole to $\frac{5}{8}$ in. max. depth and $1\frac{7}{8}$ in. max. height. Gain pole in a neat and workmanlike manner.
5. Mount meter and service equipment on stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Provide channel sized 1 in. to $3\frac{3}{4}$ in. maximum depth, and $1\frac{1}{2}$ in. to $1\frac{5}{8}$ in. maximum width. File smooth the cut ends of galvanized channel and paint with zinc rich paint before installing on pole. Secure each channel section to timber pole with two galvanized or SS lag bolts, $\frac{1}{4}$ in. minimum diameter by $1\frac{1}{2}$ in. minimum length. Use a galvanized or SS flat washer on each lag bolt. Do not stack channel.
6. When excess length must be trimmed from poles, trim from the top end only.

(1) Class 5 pole, height as required

(2) Service drop from utility company (attached below weatherhead)

(3) Service conduit (RMC)and service entrance conductors - One Red, One Black, One White (See Electrical Service Data)

(4) Safety switch (when required)

(5) Meter (when required)

(6) Service enclosure

(7) 6 AWG bare grounding electrode conductor in $\frac{1}{2}$ in. PVC to ground rod - extend $\frac{1}{2}$ in. PVC 6 in. underground.

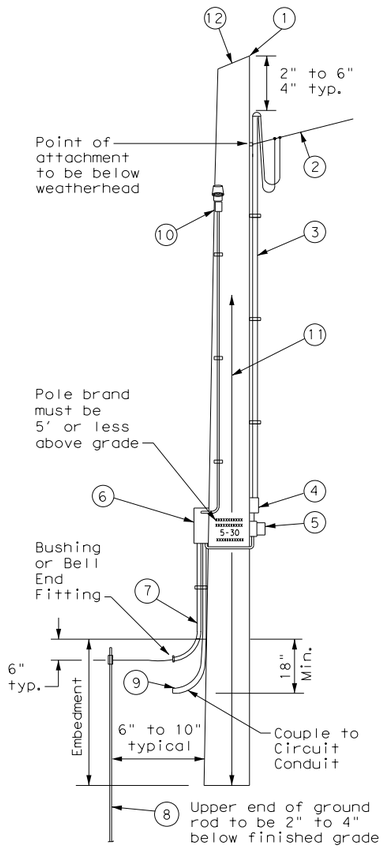
(8) $\frac{5}{8}$ in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.

(9) RMC same size as branch circuit conduit.

(10) See pole-top mounted photocell detail on ED(5).

(11) When required by the serving utility provide bare 6 AWG copper conductor. Run wire from pole top to butt wrap or copper butt plate. Protect conductor with non-conductive material to a height of 8 ft. above finished grade.

(12) When required by utility, cut top of pole at an angle to enhance rain run off.

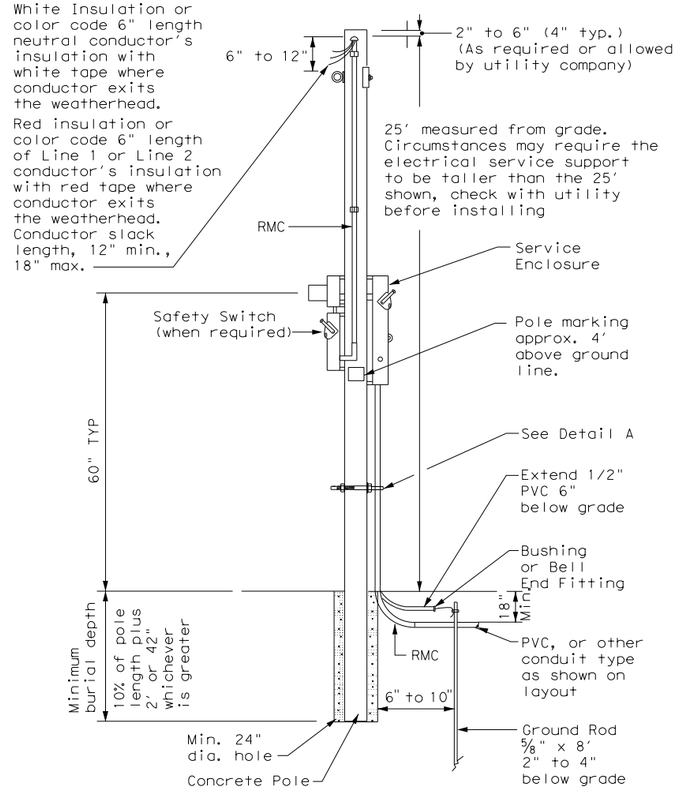


SERVICE SUPPORT TYPE TP (O)

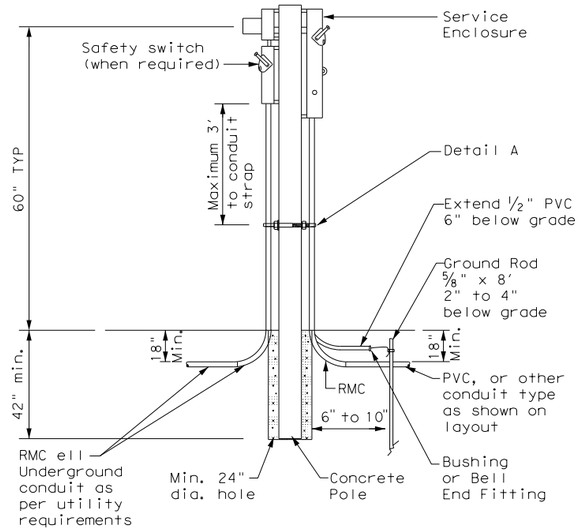
GRANITE CONCRETE(GC)& OTHER CONCRETE(OC)NOTES

Ensure electrical service support structures bid as type Granite Concrete (GC) or Other Concrete (OC) meet the following requirements.

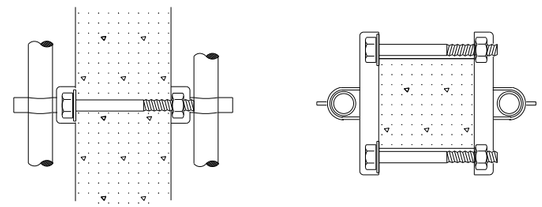
1. Provide GC and OC poles that meet the requirements of DMS 11080 "Electrical Services."
2. Provide prestressed concrete poles suitable for direct embedment into the ground without special foundations.
3. Verify poles are marked as required on DMS 11080. Location of marking should be approximately 4' above final grade. Use the two-point pickup locations when handling pole in horizontal position, and one-point pickup location for use in raising the pole to a vertical position. These marks are small but conspicuous.
4. Embed poles 42 in. or 10% of the length plus 2 ft., whichever is greater.
5. Ensure all installation details of services are in accordance with utility company specifications.
6. Install a one point rack or eye bolt bracket 6 inches to 12 inches below the weatherhead as an overhead service drop anchoring point for the electric utility.
7. Furnish and install galvanized or stainless steel channel strut 1 $\frac{1}{2}$ in. or 1 $\frac{5}{8}$ in. wide by 1 in. up to $3\frac{3}{4}$ in. deep (Unistrut, Kindorf, B-line or equal). Attach channel strut with stainless steel concrete anchors (max. 1" depth), square U-bolts or back to back channel strut with long bolts, or other secure mounting as approved by the Engineer. Ensure bolts are galvanized in accordance with ASTM A153. Do not stack channel struts.
8. Backfill the holes thoroughly by tamping in 6 in. lifts. After tamping to grade, place additional backfill material in a 6 inch high cone around the pole to allow for settling. Use material equal in composition and density to the surrounding area. Backfilling will not be paid for directly but is subsidiary to various bid items.



CONCRETE SERVICE SUPPORT
Overhead(O)



CONCRETE SERVICE SUPPORT
Underground(U)



DETAIL A

See Note 7. Before installing channel that has been cut, file sharp edges and paint with zinc-rich paint. Ensure there is no paint splatter on the pole.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, & TP

ED(10)-14

FILE: ed10-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		206

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ROADWAY ILLUMINATION ASSEMBLY NOTES

1. 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.

7. 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-lb. 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-lbs, 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-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base 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-lb. using a torque wrench.

   c. Level and Plumb

      i. 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.

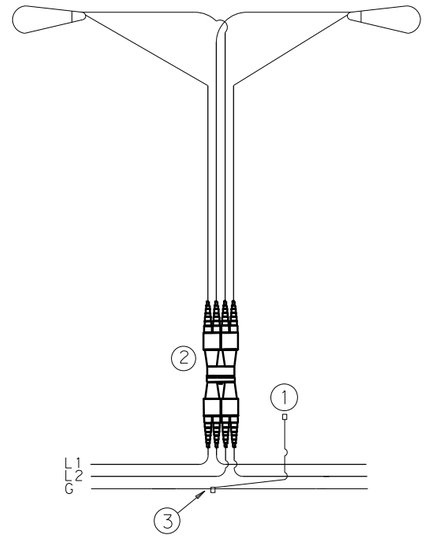
12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.

Wiring Diagram Notes:

(1) 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.

(2) 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.



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.

Decorative LED Lighting Notes:

1. 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.

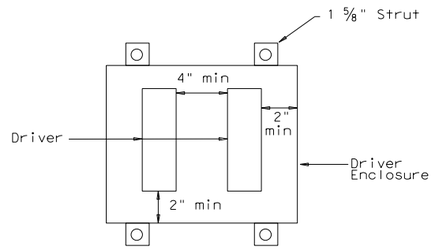
   c. Install drivers with at least 2 inches of space from enclosure walls.

   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

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION DETAILS

RID(1)-20

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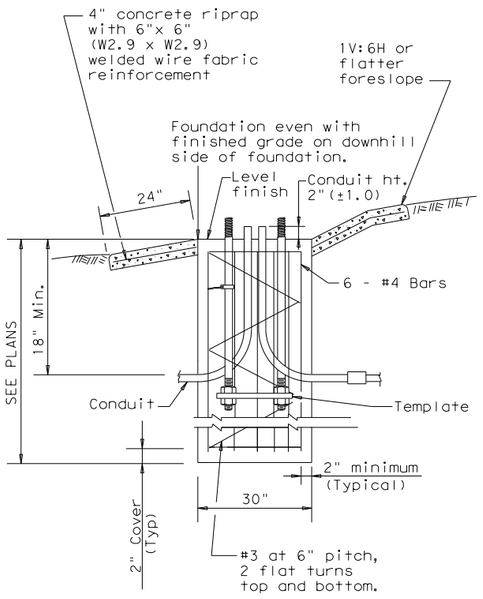
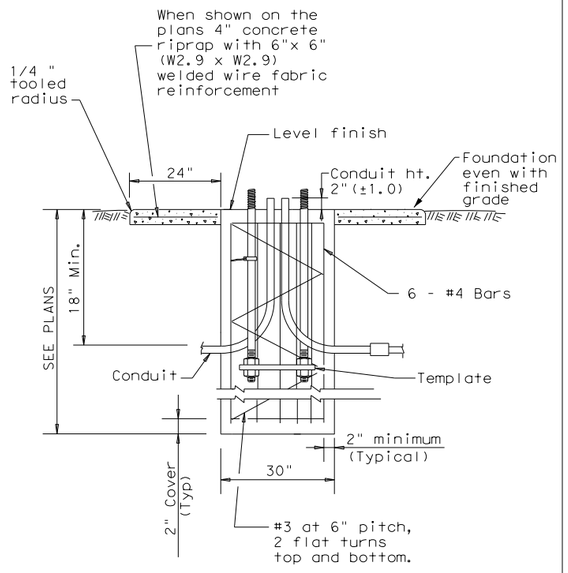


SECTION A-A
SHOWING SLOPED GRADE



SECTION A-A
SHOWING CONSTANT GRADE

TABLE 1

ANCHOR BOLTS

POLE MOUNTING HEIGHT	BOLT CIRCLE		ANCHOR BOLT SIZE
	Shoe Base	T-Base	
<40 ft.	13 in.	14 in.	1in. x 30in.
40-50 ft.	15 in.	17 ¼in.	1 ¼in. x 30in.

TABLE 2

RECOMMENDED FOUNDATION LENGTHS (See note 1)

MOUNTING HEIGHT	TEXAS CONE PENETROMETER N Blows/ft		
	10	15	40
≤20 ft.	6′	6′	6′
>20 ft. to 30 ft.	8′	6′	6′
>30 ft. to 40 ft.	8′	8′	6′
>40 ft. to 50 ft.	10′	8′	6′

TABLE 3

PAY QUANTITY OF RIPRAP PER FOUNDATION (Install only when shown on the plans)

Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

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 size.
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 Department.
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.
10. 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.
11. 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.

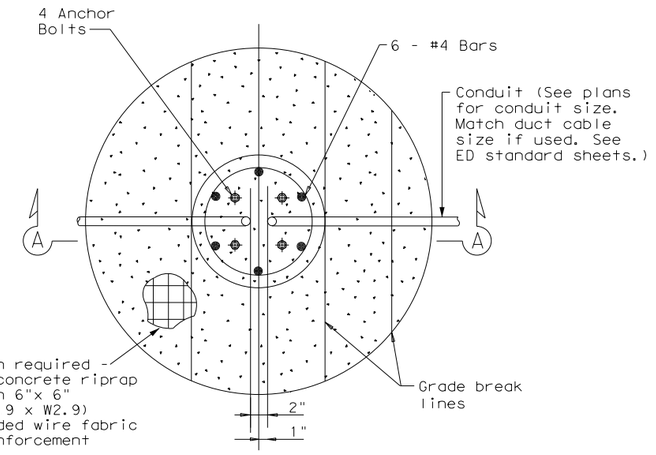
TABLE 4

BREAKAWAY POLE PLACEMENT (See note 6)

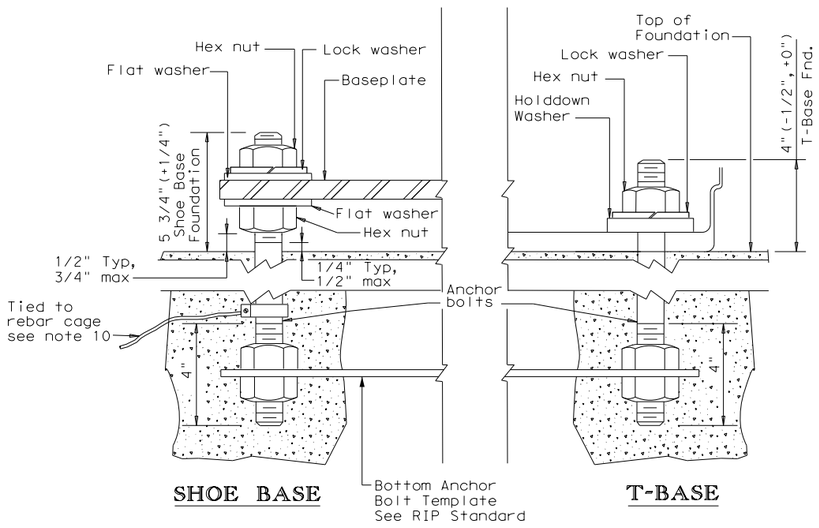
ROADWAY FUNCTIONAL CLASSIFICATION	** POLE OFFSET (DISTANCE TO FACE OF TRANSFORMER BASE)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum*(15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

* 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 guidelines.



FOUNDATION DETAIL



ANCHOR BOLT DETAIL

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION DETAILS
(RDWY ILLUM FOUNDATIONS)

RID(2)-20

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SHIPPING PARTS LIST - POLES AND LUMINAIRE ARMS

Nominal Mounting Ht. (ft)	Shoe Base Designation Pole	A1	A2	Luminaire	Quantity	T-Base Designation Pole	A1	A2	Luminaire	Quantity	CSB/SSCB Mounted Designation 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	8	(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	7	(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	

OTHER Designation Pole	A1	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 shown herein.

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.
      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.
      3. Aluminum poles shall be equipped with vibration mitigation devices, as approved by the engineer.
      4. 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 Arm Fitting: 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'-0" lower than the nominal height, unless otherwise shown or directed.

EXPLANATION OF ROADWAY ILLUMINATION ASSEMBLY DESIGNATIONS

(TYPE SA 50 T - X - X) (400W EQ) LED

SA: Pole and mast arm may be steel or aluminum.
ST: Pole and mast arm must be steel.
AL: Pole and mast arm must be aluminum.
SP: Special (ovalized) steel or aluminum pole for installing on CSB or SSCB. See standard sheet CSB (4), or SSCB (4).

Two numerical digits denote nominal mounting height in feet.

Next letter denotes type of base, (S-Shoe Base, T-Transformer Base, or B-Bridge/Ret.Wall Mount)

First number denotes length of mast arm in feet.

Use of second mast arm is indicated by second dashed number which denotes length in feet.

Luminaire rating in watts (i.e. 400W). Equivalent wattage LED fixtures will include EQ (i.e. 400W EQ)

Last letters indicate light source (S - High Pressure Sodium; LED - LED luminaire)

SHEET 1 OF 4

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(1)-19

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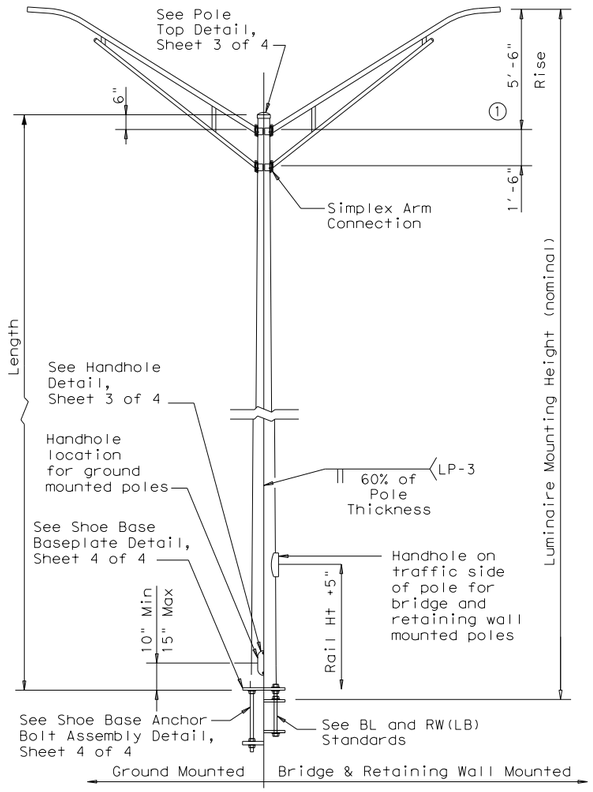
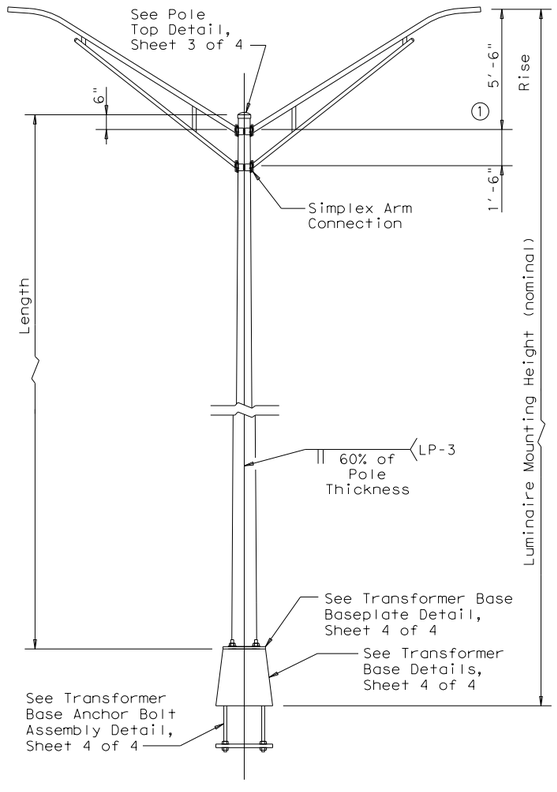


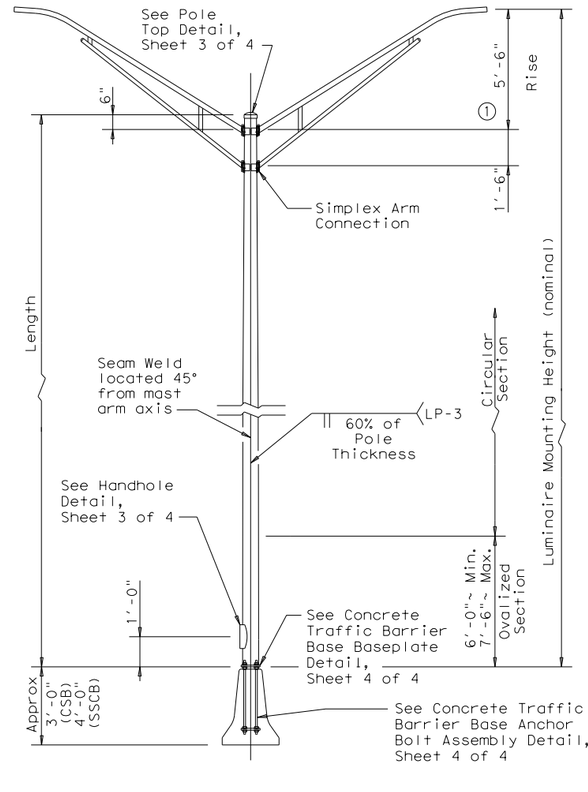
SHOE BASE POLE

SHOE 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	4.90	15.00	0.1196	7.1
30.00	7.50	4.00	25.00	0.1196	13.2
31.00-39.00	8.00	4.36-3.24	26.00-34.00	0.1196	20.7
40.00	8.50	3.60	35.00	0.1196	20.7
50.00	10.50	4.20	45.00	0.1196	30.3



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



CONCRETE TRAFFIC BARRIER BASE POLE

CONCRETE TRAFFIC BARRIER BASE POLE (CSB/SSCB)						
Luminaire Mounting Height (Nominal) (ft)	Base ② Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)	
					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

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.

② Before 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	+1"
I.D. of outside piece of slip fitting pieces	+1/8", -1/16"
O.D. of inside piece of slip fitting pieces	+1/32", -1/8"
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"
Pole centered on baseplate	±1/4"
Location of Attachments	±1/4"
Bolt hole spacing	±1/16"

GENERAL NOTES:

1. Designs conform to AASHTO 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.
2. Structures are designed to support two 12' luminaire mast arms and luminaires. Mast arms are designed to support a 60-pound luminaire having an effective projected area of 1.6 square feet.
3. 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 the larger height.
5. 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 field-assembled 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.
8. Alternate material equal to or better than material specified may be substituted with the approval of the Engineer.
9. 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, "Galvanizing."
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).

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Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

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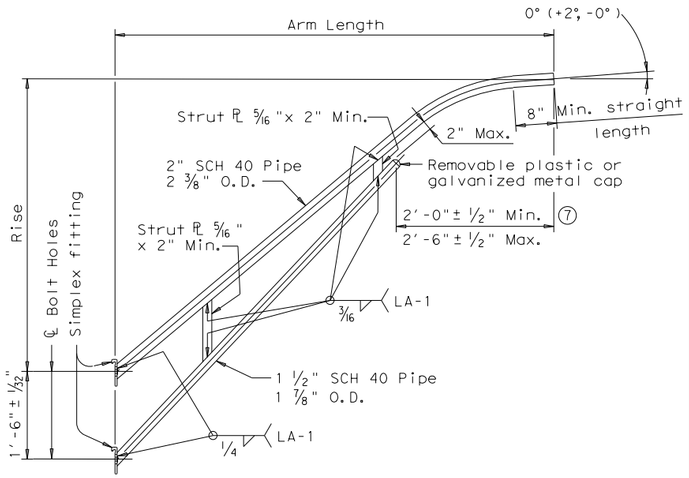
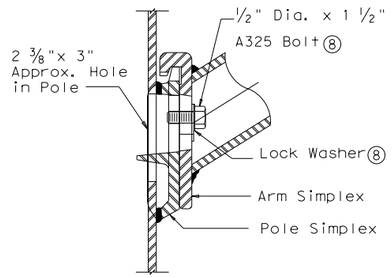


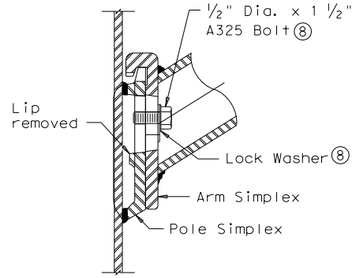
LUMINAIRE ARM

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"

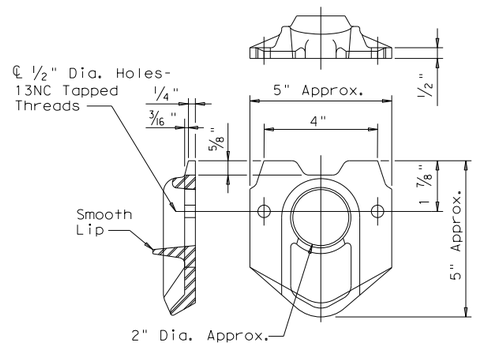


UPPER SIMPLEX FITTING
(Gusset not shown for clarity)

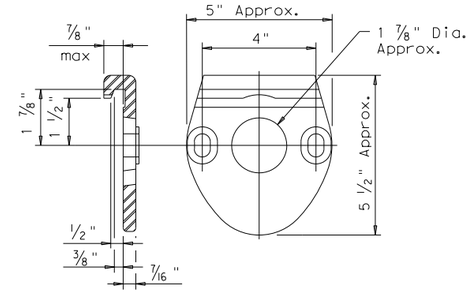


LOWER SIMPLEX FITTING
(Gusset not shown for clarity)

SECTION B-B



POLE SIMPLEX DETAIL ⑨



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.

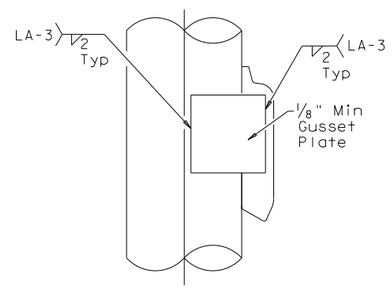
⑦ Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

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.

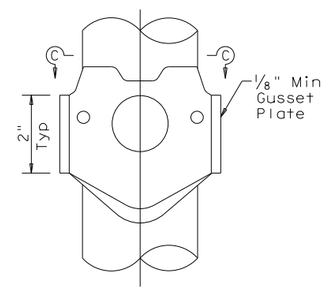
⑨ Proposed deviations in arm simplex dimensions or materials must be submitted to the Department for approval.

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 ⑤, 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



SIDE



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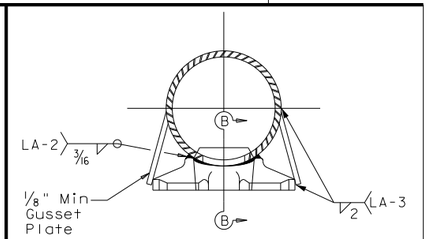
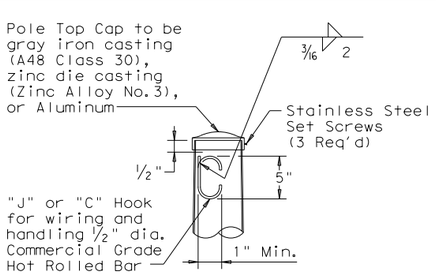
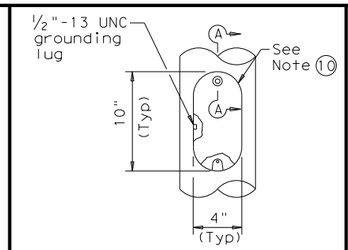


SECTION C-C

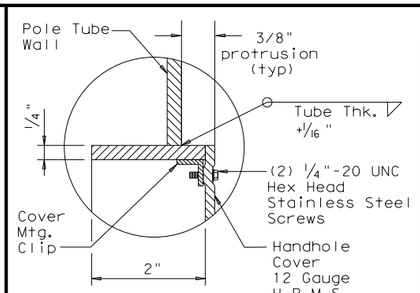
SIMPLEX ATTACHMENT DETAIL



POLE TOP



ELEVATION



SECTION A-A

HANDHOLE

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(3)-19

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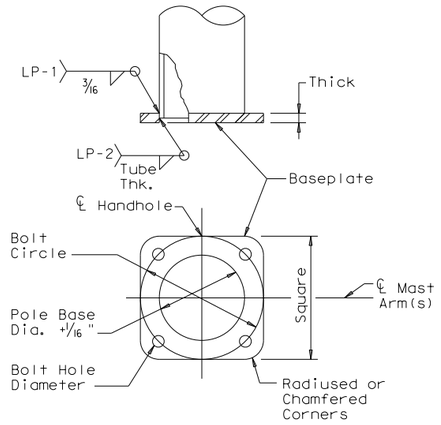
7-17	DIST	COUNTY		SHEET NO.
12-19	ELP	EL PASO		211

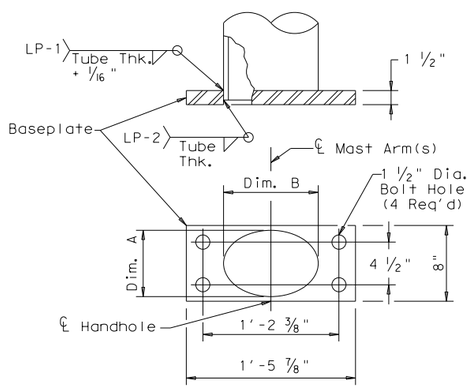
73C

DATE:
FILE:



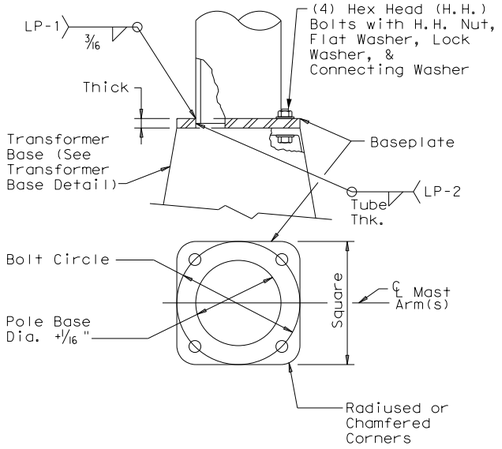
SHOE BASE BASEPLATE

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 1/2"	1 1/2"



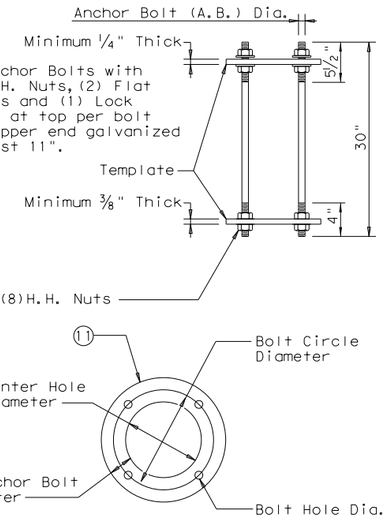
CONCRETE TRAFFIC BARRIER BASE BASEPLATE

CONCRETE TRAFFIC BARRIER BASE BASEPLATE TABLE			
MOUNTING HEIGHTS (nominal)	POLE DIA.(12)	DIM. A	DIM. B
28′ - 38′	9"	7" ± 1/4"	10" ± 1/4"
48′	10 1/2"	7" ± 1/4"	13" ± 1/4"



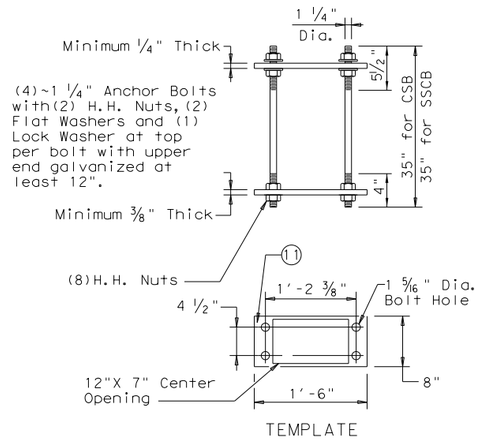
TRANSFORMER BASE BASEPLATE

TRANSFORMER BASE BASEPLATE TABLE						
MOUNTING HEIGHTS (nominal)	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"	B
50′	15"	15"	1 1/2"	1 1/4"	1 1/2"	B



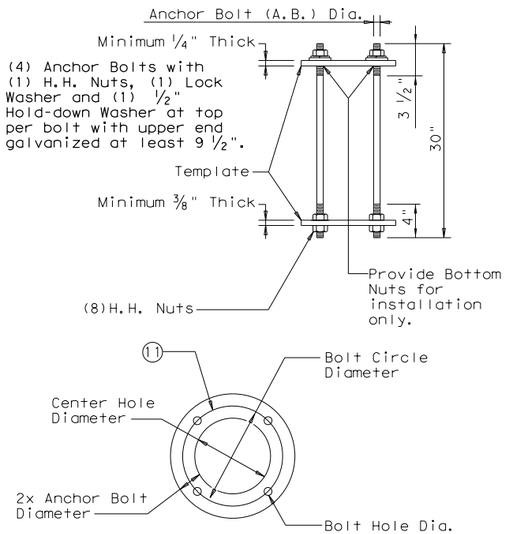
SHOE BASE ANCHOR BOLT ASSEMBLY

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 1/2"	1 5/16"



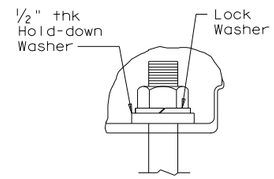
CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY

TRANSFORMER BASE ANCHOR BOLT ASSEMBLY TABLE				
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 3/4"	1 5/16"

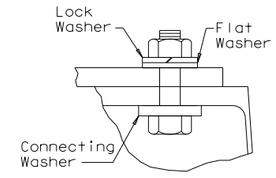


TRANSFORMER BASE ANCHOR BOLT ASSEMBLY

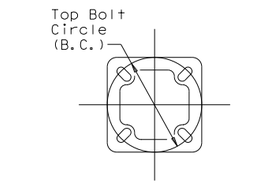
TRANSFORMER BASE TABLE		
TYPE	TOP B.C.	BTM. B.C.
A	13"	14"
B	15"	17 1/4"



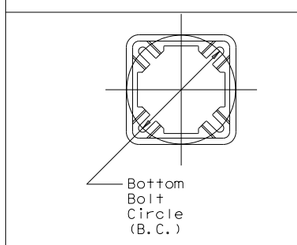
DETAIL A



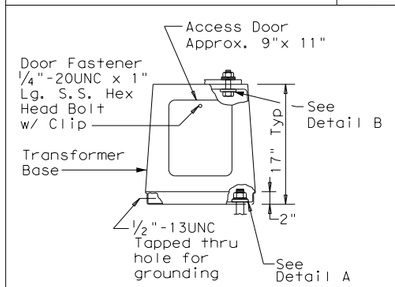
DETAIL B



TOP PLAN



BOTTOM PLAN



ELEVATION

TRANSFORMER BASE DETAILS

GENERAL NOTES:

1. For mounting heights between those shown in the table, use the values in the table for the larger mounting height.
2. All breakaway bases shall meet the breakaway requirements of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto, and shall have been tested by FHWA-approved methods. All bases shall have been structurally tested to resist 150% of the design moment.
3. Transformer bases shall be cast from aluminum, ASTM B108 or B26 Alloy 356.0-T6, or other material approved by the Engineer. Four Hex Head (H.H.) bolts with four H.H. nuts, four lock washers, four flat washers, and connecting and hold-down washers as recommended by the manufacturer, galvanized to ASTM A153 Class C or D, or B695 Class 50, shall be provided with each transformer base for connecting the pole. Bolts shall be ASTM A325 or approved equal. Nuts shall be ASTM A563 grade DH galvanized.
4. Bases shall be stamped, incised or by other approved permanent means, marked to show fabricator's name or logo, and model number. Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door.
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 by grit blast cleaning after heat treatment. Certification by the manufacturer of heat 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 manufacturer for testing.

NOTES:

(11) Anchor Bolt Templates do not need to be galvanized.

(12) Pole diameter before ovalized.

ANCHOR BOLT FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Length	± 1/2"
Threaded length	± 1/2"
Galvanized length (if required)	- 1/4"

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(4)-19

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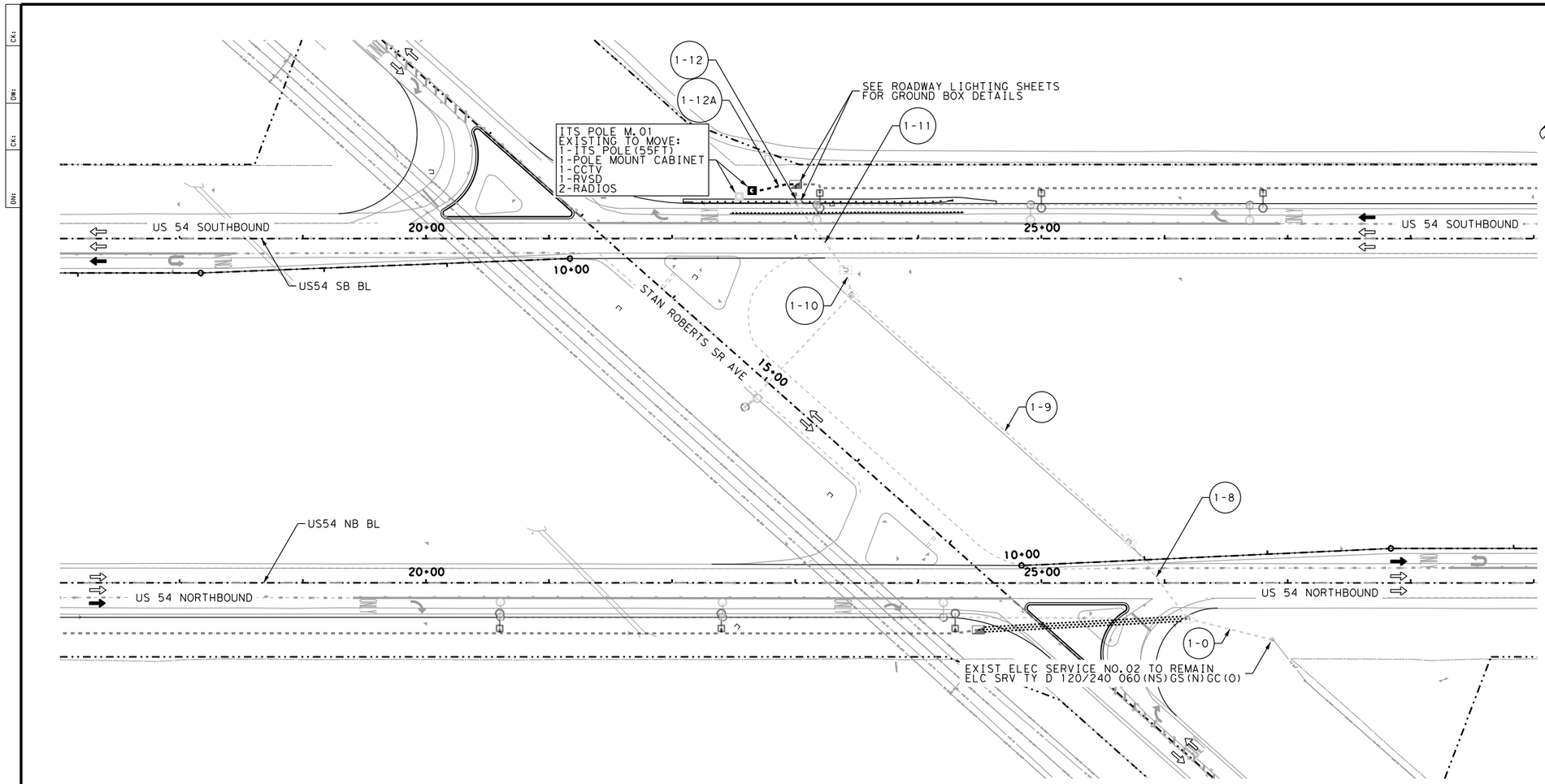
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		212

730



ITS LEGEND

- EXIST ITS POLE TO BE MOVED
- EXIST ITS POLE LOCATION
- PROP CONDT (PVC) (SCH 40) (2")
- EXIST CONDT TO REMAIN
- PROP GROUND BOX TY A (122311)W/APRON
- EXIST GROUND BOX TO REMAIN
- EXIST ELEC SERVICE TO REMAIN
- M.01 ITS POLE CALLOUT (M=EXIST(MOVE))
- 1-12A RUN DESIGNATION 1=SERVICE NO - 12A=RUN NO
- PROP TRAFFIC FLOW
- EXIST TRAFFIC FLOW

0 25 50 100

SCALE: 1"=100'

SHEET QUANTITY				
BID CODE		DESCRIPTION	UNIT	QTY
0416	6005	DRILL SHAFT (42 IN)	LF	21
0432	6001	RIPRAP (CONC)(4 IN)	CY	1.3
0618	6023	CONDT (PVC) (SCH 40) (2")	EA	45
0620	6010	ELEC CONDR (NO.6) INSULATED	EA	2445
6064	6053	ITS POLE (55 FT)(REL)	EA	1

ITS POLE LOCATION			
ITS POLE NO.	DESCRIPTION	BL STATION	OFFSET (FT)
M.01	ITS POLE (55 FT)(REL)	SB STA 22+65	39' LT

CONDUIT AND CABLE SCHEDULE				
RUN NO.	RUN LENGTH (FT)	CONDUIT SIZE AND TYPE		CONDUCTOR SIZE AND TYPE
		(PVC) (SCHD 40) (2") (TRENCH)	CONDT (PREPARE)	NO.6 XHHW
1-0	80		*	3
1-8	85		*	3
1-9	310		*	3
1-10	30		*	3
1-11	75		*	3
1-12	190		*	3
1-12A	45	1		3
TOTALS		45	*	2445

* CONDT (PREPARE) QUANTIFIED IN ROADWAY LIGHTING PLANS

STATE OF TEXAS
DOUGLAS BURNETT JR.
140757
LICENSED PROFESSIONAL ENGINEER
5.31.22
Doug Burnett

CSJ: 0167-01-133
US 54 STAN ROBERTS SR AVE

ROADWAY ITS LAYOUT

SHEET 1 OF 1

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812
11701 Stonehollow Dr Ste 100 Austin, TX 78758
Phone:512-821-2081 Fax:512-821-2085

AECOM
AECOM Technical Services Inc, F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

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0167	01	133	US-54
DIST	COUNTY		SHEET NO.
ELP	EL PASO		213

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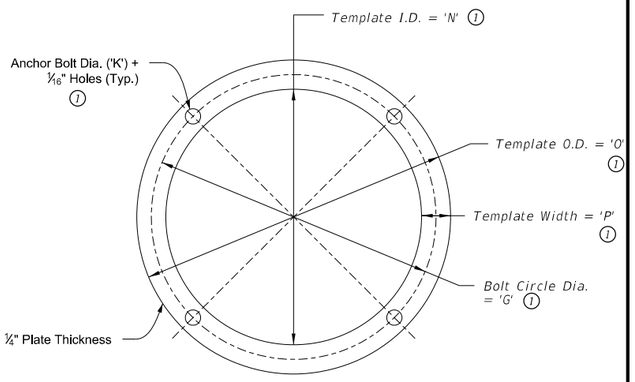
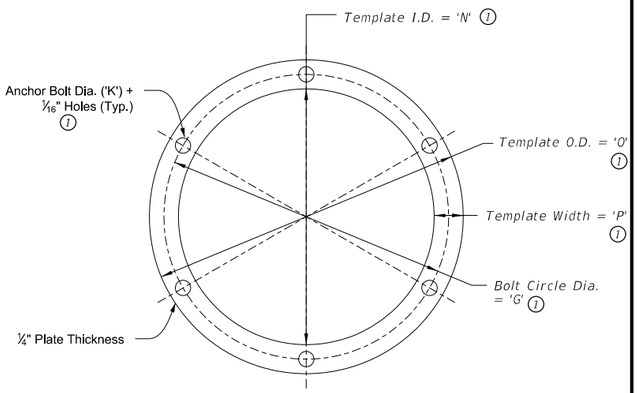
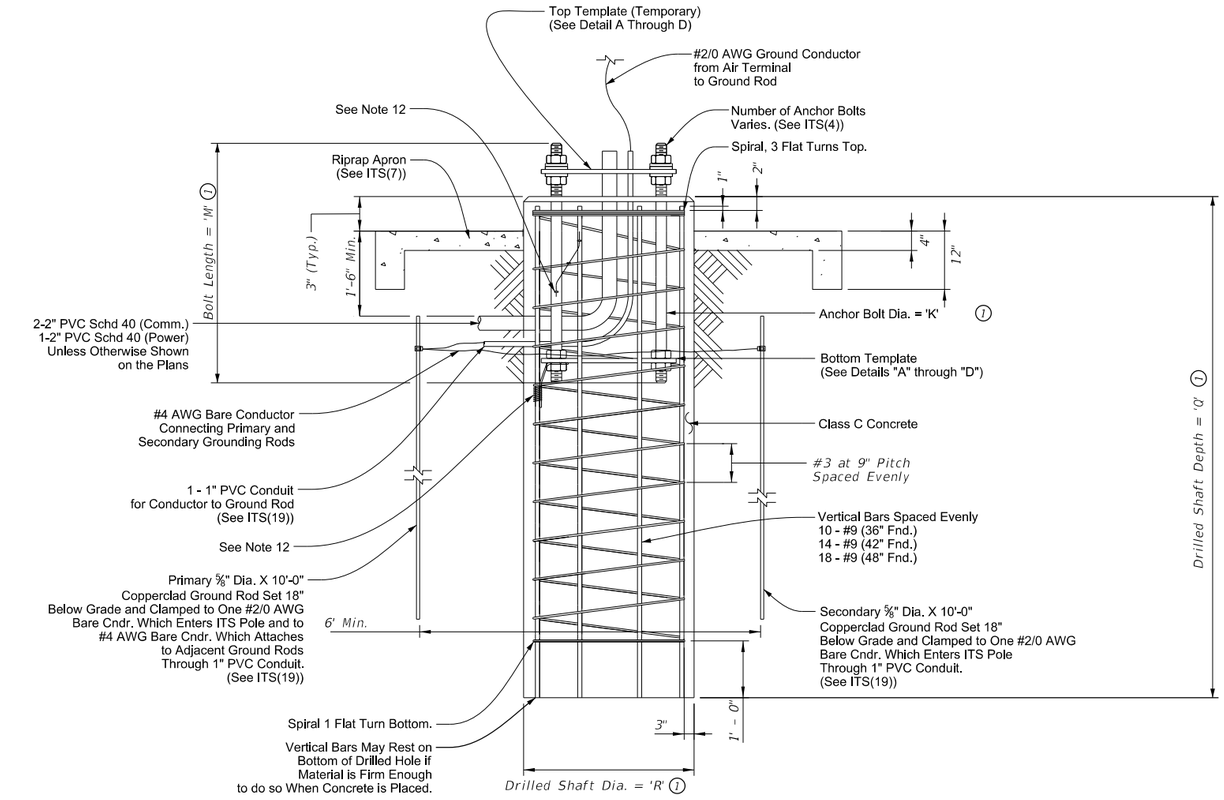


Top and Bottom Template (Four Bolt)
Detail A



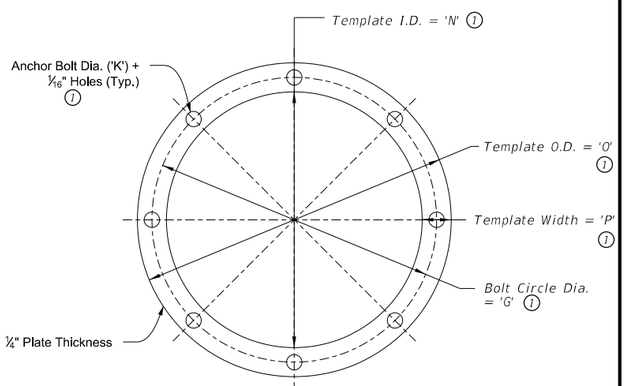
Top and Bottom Template (Six Bolt)
Detail B



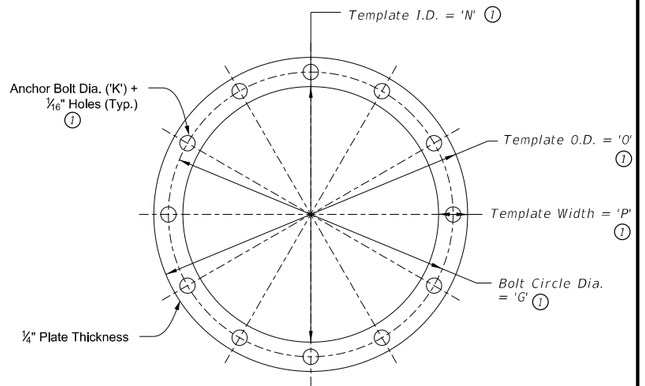
Foundation Details (Typical)
Elevation
Not to Scale

General Notes:

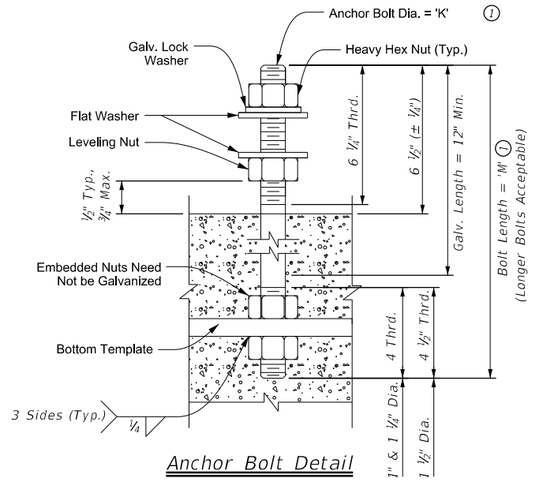
1. Drilled shaft concrete shall be Class "C" (f'c = 3,600 PSI) in accordance with Item 416, "Drilled Shaft Foundations."
2. Reinforcing bars shall be Grade 60 (Fy = 60 KSI) and conform to ASTM A-615. All reinforcing shall conform to Item 440, "Reinforcing Steel."
3. Provide ASTM A-36 steel for templates. Top and bottom templates need not be galvanized.
4. Anchor bolts shall be rigidly held in position during concrete placement using steel templates at the top and bottom. Top templates shall remain in place until the concrete has cured in place beyond initial set time.
5. Lubricate and tighten anchor bolts, when erecting pole, in accordance with Item 449, "Anchor Bolts."
6. Anchor bolts shall conform to ASTM F1554 Grade 55, or ASTM A193 B7 with ASTM A194 Grade 2H or A563 heavy hex nuts with F436 washers. Galvanize a minimum of the top end thread length plus 6 inches for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing."
7. All vertical reinforcement shall be carried to the bottom of the drilled shaft.
8. Place three flat turns of the spiral bar at the top and one flat turn at the bottom of the drilled shaft.
9. Drilled shaft shall be measured by the linear foot and paid under Item 416, "Drill Shaft Foundations."
10. If rock is encountered, the drilled shaft to extend a minimum of two diameters into solid rock.
11. Location for conduit entering foundation may vary. Orient conduit entering foundation to coincide with location of ground boxes and primary ground rod.
12. Bond anchor bolts to rebar with #2/0 AWG jumper and two mechanical connectors or by bending No. 3 bar on bottom template as shown and wire tightly with ten turns of No. 10 wire or one mechanical connector. Mechanical connectors shall be UL Listed for concrete encasement.



Top and Bottom Template (Eight Bolt)
Detail C



Top and Bottom Template (Twelve Bolt)
Detail D



Anchor Bolt Detail
Detail D

Reference Notes:

(1) See tables on Sheet ITS(4) for values of dimension variables.

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE FOUNDATION DETAILS

ITS(3)-16

FILE: its(3)-16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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TABLE 1: ITS POLE – 90 MPH (W/ 2 SOLAR PANELS) (4)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1)(10)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO. OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH – TEXAS CONE PENETROMETER (N – BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
		'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'	'Q'			'R'
8 SIDED	20	10	8	1/2	10-1/16	21	16	1-1/4	1-1/2	9	1	4	29	14	18	2	12	11	10	36
	30	13	9	1/2	13-1/16	24	19	1-9/16	1-1/2	10	1-1/4	4	35	16-1/2	21-1/2	2-1/2	15	13	10	36
	40	15	9	1/2	15-1/16	26	21	1-9/16	1-1/2	10	1-1/4	6	35	18-1/2	23-1/2	2-1/2	17	14	11	42
	45	16	10	1/2	16-1/16	27	22	1-9/16	1-1/2	11	1-1/4	6	35	19-1/2	24-1/2	2-1/2	18	16	12	42
	50	17	10	1/2	17-1/16	28	23	1-9/16	1-1/2	11	1-1/4	6	35	20-1/2	25-1/2	2-1/2	19	16	12	42
	55 (6)(7)	19	11	5/8	19-1/16	30	25	1-13/16	2	12	1-1/2	6	40	22	28	3	21	18	13	42
	60 (6)(7)	20	11	5/8	20-1/16	31	26	1-13/16	2	12	1-1/2	6	40	23	29	3	21	19	14	48

TABLE 2: ITS POLE – 110 MPH (W/ 2 SOLAR PANELS) (4)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1)(10)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO. OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH – TEXAS CONE PENETROMETER (N – BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
		'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'	'Q'			'R'
8 SIDED	20	10	8	1/2	10-1/16	21	16	1-1/4	1-1/2	9	1	4	29	14	18	2	14	12	10	36
	30	13	9	1/2	13-1/16	24	19	1-9/16	1-3/4	10	1-1/4	6	35	16-1/2	21-1/2	2-1/2	18	15	11	36
	40	15	9	1/2	15-1/16	25	21	1-9/16	1-3/4	10	1-1/4	6	35	18-1/2	23-1/2	2-1/2	20	17	12	42
	45	16	10	1/2	17-1/16	27	22	1-9/16	1-3/4	11	1-1/4	8	35	19-1/2	24-1/2	2-1/2	21	18	13	42
	50	17	10	1/2	18-1/16	28	23	1-9/16	1-3/4	11	1-1/4	8	35	20-1/2	25-1/2	2-1/2	22	19	14	42
	55 (7)	19	11	5/8	19-1/16	30	25	1-9/16	2	12	1-1/4	8	35	22-1/2	27-1/2	2-1/2	24	20	14	42
	60 (7)	20	11	5/8	20-1/16	31	26	1-13/16	2	12	1-1/2	6	40	23	29	3	25	21	15	48

TABLE 3: ITS POLE – 130 MPH (W/ 1 SOLAR PANEL) (5)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1)(10)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO. OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH – TEXAS CONE PENETROMETER (N – BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
		'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'	'Q'			'R'
8 SIDED	20	10	8	1/2	10-1/16	21	16	1-9/16	1-3/4	9	1-1/4	4	35	13-1/2	18-1/2	2-1/2	16	14	10	36
	30	13	9	1/2	15-1/16	24	19	1-9/16	1-3/4	10	1-1/4	6	35	16-1/2	21-1/2	2-1/2	18	16	11	36
	40	15	9	1/2	15-1/16	26	21	1-9/16	1-3/4	10	1-1/4	6	35	18-1/2	23-1/2	2-1/2	21	18	13	42
	45	16	10	1/2	16-1/16	27	22	1-9/16	1-3/4	11	1-1/4	8	35	19-1/2	24-1/2	2-1/2	23	19	14	42
	50	17	10	1/2	17-1/16	28	23	1-9/16	2	11	1-1/2	8	40	20	26	3	24	20	14	42
	55 (7)	19	11	5/8	19-1/16	30	25	1-13/16	2	12	1-1/2	8	40	22	28	3	27	22	15	42
	60 (7)	20	11	5/8	20-1/16	31	26	1-13/16	2	12	1-1/2	8	40	23	29	3	28	23	16	48

TABLE 4: ITS POLE WITH STIFFENERS – 90 MPH (W/ 4 SOLAR PANELS) (8)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO. OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH – TEXAS CONE PENETROMETER (N – BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
		'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'	'Q'			'R'
8 SIDED	30	13	9	3/8	13-1/16	28	22	1-1/4	1-3/4	10	1	8	29	20	24	2	17	15	11	42
	40	15	9	1/2	15-1/16	30	24	1-1/4	2	10	1	8	29	22	26	2	20	17	12	42
	45	16	10	1/2	16-1/16	31	25	1-9/16	2	11	1-1/4	8	35	22-1/2	27-1/2	2-1/2	21	18	13	42
	50	17	10	1/2	17-1/16	32	26	1-9/16	2	11	1-1/4	8	35	23-1/2	28-1/2	2-1/2	21	18	13	42
12 sided	55 (7)	19	11	5/8	19-1/16	34	27	1-9/16	2	12	1-1/4	12	35	24-1/2	29-1/2	2-1/2	21	18	13	48
	60 (7)	20	12	5/8	20-1/16	35	28	1-9/16	2	13	1-1/4	12	35	25-1/2	30-1/2	2-1/2	22	19	14	48

TABLE 5: ITS POLE WITH STIFFENERS – 110 MPH (W/ 4 SOLAR PANELS) (8)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO. OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH – TEXAS CONE PENETROMETER (N – BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
		'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'	'Q'			'R'
8 SIDED	30	13	9	1/2	13-1/16	28	22	1-9/16	2-1/4	10	1-1/4	8	35	19-1/2	24-1/2	2-1/2	20	17	12	42
	40	16	10	1/2	16-1/16	31	25	1-9/16	2-1/4	11	1-1/4	8	35	22-1/2	27-1/2	2-1/2	24	20	14	42
	45	17	11	1/2	17-1/16	32	26	1-9/16	2-1/4	12	1-1/4	8	35	23-1/2	28-1/2	2-1/2	25	21	15	42
	50	18	11	1/2	18-1/16	32	26	1-13/16	2-1/2	12	1-1/2	8	40	23	29	3	25	21	15	48
12 SIDED	55 (7)	19	11	5/8	19-1/16	34	27	1-9/16	2-1/4	12	1-1/4	12	35	24-1/2	29-1/2	2-1/2	24	21	15	48
	60 (7)	20	12	5/8	20-1/16	35	28	1-9/16	2-1/4	13	1-1/4	12	35	25-1/2	30-1/2	2-1/2	25	22	15	48

TABLE 6: ITS POLE WITH STIFFENERS – 130 MPH (W/ 3 SOLAR PANELS) (9)

POLE TYPE (1)	POLE HEIGHT (FT)	POLE SHAFT (1)			BASE PLATE (1)					TOP PLATE (2)	ANCHOR BOLT (3)						FOUNDATION (3)			
		BOTTOM OUTSIDE DIA. (IN)	TOP OUTSIDE DIA. (IN)	WALL THICKNESS (IN)	INSIDE DIA. (IN)	OUTSIDE DIA. (IN)	BOLT CIRCLE DIA. (IN)	BOLT HOLE DIA. (IN)	THICKNESS (IN)	OUTSIDE DIA. (IN)	DIA. (IN)	NO. OF BOLTS	LENGTH OF BOLT MIN. (IN)	TEMPLATE INSIDE DIA. (IN)	TEMPLATE OUTSIDE DIA. (IN)	TEMPLATE WIDTH (IN)	DRILL SHAFT DEPTH – TEXAS CONE PENETROMETER (N – BLOWS/FT.) (SEE NOTE 5)			DRILLED SHAFT DIA. (IN)
																	N = 10	N = 15	N = 40	
		'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'	'O'	'P'	'Q'			'R'
8 SIDED	30	13	9	1/2	13-1/16	28	22	1-9/16	2-1/2	10	1-1/4	8	35	19-1/2	24-1/2	2-1/2	23	19	14	42
	40	16	10	1/2	16-1/16	31	25	1-9/16	2-1/2	11	1-1/2	8	40	22	28	3	25	21	14	42
	45	17	11	1/2	17-1/16	32	26	1-13/16	2-1/2	12	1-1/2	8	40	23	29	3	26	22	16	48
	50	18	11	1/2	18-1/16	33	27	1-13/16	2-1/2	12	1-1/2	8	40	24	30	3	27	23	16	48
12 SIDED	55 (7)	19	11	5/8	19-1/16	34	27	1-9/16	2-1/4	12	1-1/4	12	35	24-1/2	29-1/2	2-1/2	26	22	16	48
	60 (7)	20	12	5/8	20-1/16	35	28	1-9/16	2-1/4	13	1-1/4	12	35	25 1/2	30 1/2	2-1/2	27	23	16	48

General Notes:

1. Designed according to Sixth Edition 2013 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto.
2. Table 1 and Table 4 design wind speed equals 90 MPH (3-Second Wind Gusts) with a 1.14 gust factor. A wind importance factor of 1.00 is applied to adjust the wind speed to a 50 year recurrence interval at 33 FT above the ground for Exposure C category in accordance with TxDOT WV&IZ(LTS2013). Design values listed in the table allow the base of the pole to be elevated above the surrounding ground level no more than 20 FT.
3. Table 2 and Table 5 design wind speed equals 110 MPH (3-Second Wind Gusts) with a 1.14 gust factor. A wind importance factor of 1.00 is applied to adjust the wind speed to a 50 year recurrence interval at 33 FT above the ground for Exposure C category in accordance with TxDOT WV&IZ(LTS2013). Design values listed in the table allow the base of the pole to be elevated above the surrounding ground level no more than 20 FT.
4. Table 3 and Table 6 design wind speed equals 130 MPH (3-Second Wind Gusts) with a 1.14 gust factor. A wind importance factor of 1.00 is applied to adjust the wind speed to a 50 year recurrence interval at 33 FT above the ground for Exposure C category in accordance with TxDOT WV&IZ(LTS2013). Design values listed in the table allow the base of the pole to be elevated above the surrounding ground level no more than 20 FT.
5. Recommended embedment lengths are for information purposes only. Foundation embedment depth is based off Texas Cone Penetrometer Value N = 10 blows/ft. for soft soils and up to 40 blows/ft. for hard soils. 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.
6. Deviation from the design criteria and values contained in the tables above constitute and alternative design and will require submission of shop drawings and calculations for approval, sealed by a Texas Professional Engineer.
7. 12-sided or round poles as a direct substitution for 8-sided and round poles as a direct substitution for 12-sided poles, meeting the design criteria and values contained in the tables above, require submission of shop drawings for approval.

Reference Notes

(1) See the following ITS Pole Standard sheets:
- 8-sided Pole – ITS(1)
- 12-sided Pole – ITS(2)

(2) Provision for 2" Dia. opening in top plate for poles requiring cameras mounted on top.
- See ITS Pole Mounting Details – ITS(6)

(3) See ITS Pole Foundation Details – ITS(3)

(4) Designed to support the following:
- Two Type 3 ITS pole mounted cabinets (280 LBS/EA and EPA = 14.50 sq. ft. per cabinet). See ITS(16).
- Two 250 W (50 LBS/EA and EPA = 30.70 sq. ft. per panel) solar panels (see ITS(24) "Solar Panel Matrix Table")
- Combined ITS equipment dead load of 170 LBS with an EPA = 6 sq. ft.

(5) Designed to support the following:
- Two Type 3 ITS pole mounted cabinets (280 LBS/EA and EPA = 14.50 sq. ft. per cabinet). See ITS(16).
- One 250 W (50 LBS/EA and EPA = 30.70 sq. ft. per panel) solar panels (see ITS(24) "Solar Panel Matrix Table")
- Combined ITS equipment dead load of 170 LBS with an EPA = 6 sq. ft.

(6) Pole heights at 55 Ft. and 60 Ft. located in the AMA, CHS, and LBB Districts, will require special design and design values shown shall not be used. Submit shop drawings for pole design and supporting calculations for 55 Ft. and 60 Ft. pole heights signed and sealed by a Texas Professional Engineer for approval.

(7) Ensure minimum nominal splice length is 1.5 times the average pole diameter at the splice to the nearest inch. Ensure longitudinal seam welds that will be in contact at a slip joint splice are ground smooth for the length of splice plus a minimum of six inches. Ensure a 100% longitudinal seam weld for a length of 1.5 pole diameter plus a minimum of 6 inches in outer sections at splices and at base plate. Provide 85% penetration in longitudinal seam welds at other pole sections.

(8) Designed to support the following:
- Two Type 3 ITS pole mounted cabinets (280 LBS/EA and EPA = 14.50 sq. ft. per cabinet). See ITS(16).
- Four 250 W (50 LBS/EA and EPA = 30.70 sq. ft. per panel) solar panels (see ITS(24) "Solar Panel Matrix Table")
- Combined ITS equipment dead load of 170 LBS with an EPA = 6 sq. ft.

Refer to ITS(4A) for stiffening plate details at the pole to base plate connection.

(9) Designed to support the following:
- Two Type 3 ITS pole mounted cabinets (280 LBS/EA and EPA = 14.50 sq. ft. per cabinet). See ITS(16).
- Three 250 W (50 LBS/EA and EPA = 30.70 sq. ft. per panel) solar panels (see ITS(24) "Solar Panel Matrix Table")
- Combined ITS equipment dead load of 170 LBS with an EPA = 6 sq. ft.

Refer to ITS(4A) for stiffening plate details at the pole to base plate connection.

(10) When solar panels are not provisioned in the plans, ITS pole wall thickness may be reduced by 1/8".

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE DESIGN DETAILS DATA LOOKUP TABLE

ITS(4)-15

FILE: its(4)-15.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2015	CONT	SECT	JOB	HIGHWAY
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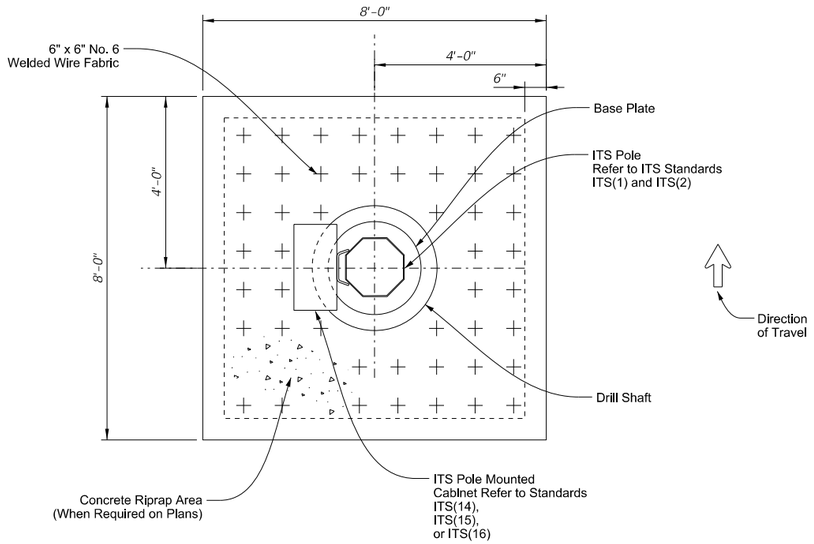
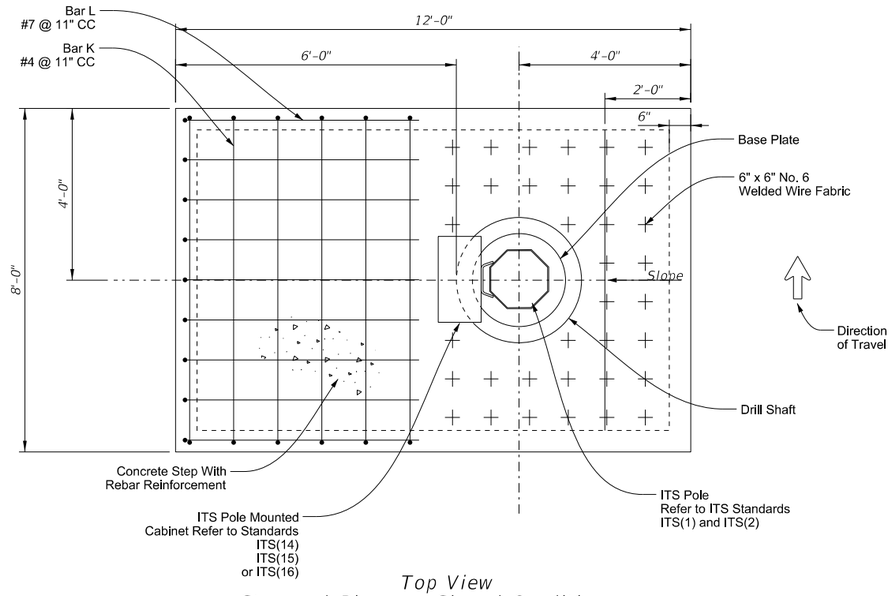
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		215



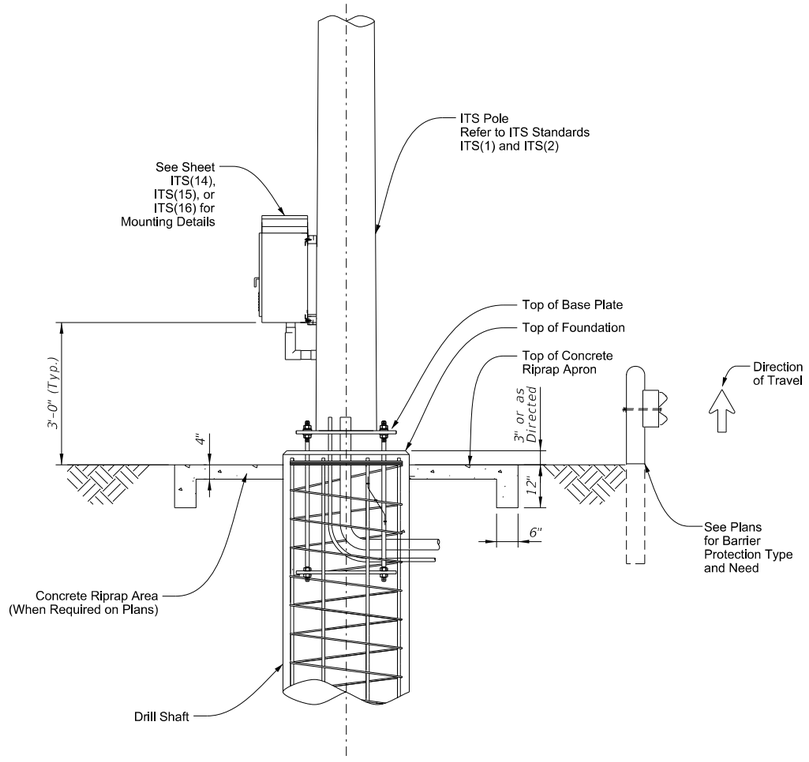
Top View

Riprap - Non-Sloped Conditions



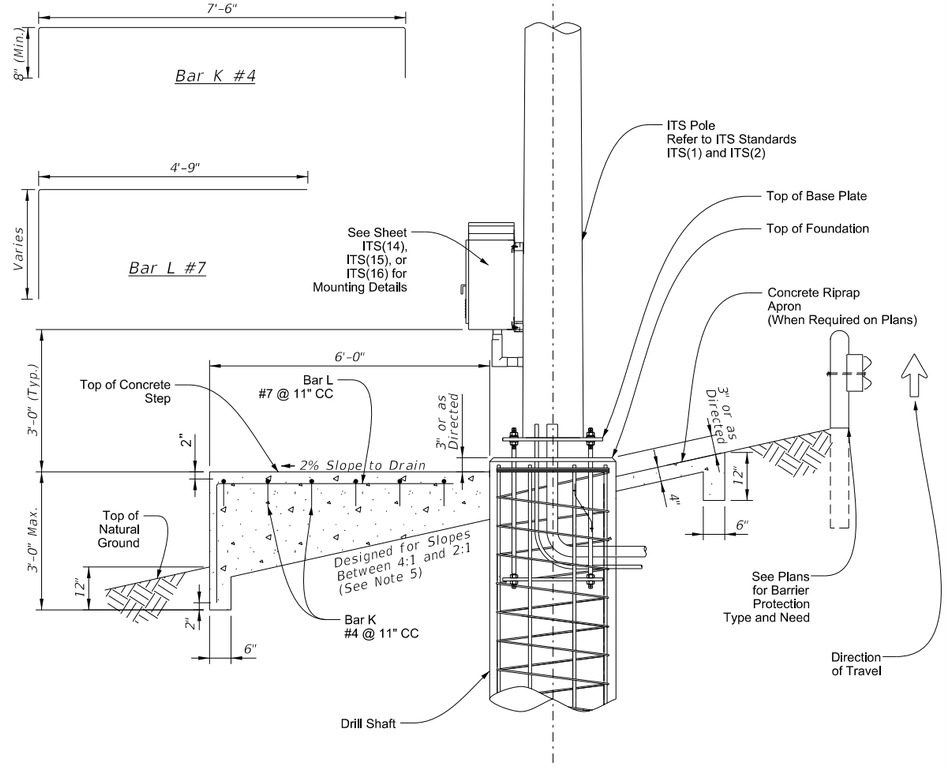
Top View

Step and Riprap - Sloped Conditions



Elevation View

Riprap Apron Detail - Non-Sloped Conditions



Elevation View

Riprap Apron/Step Detail - Sloped Conditions

(Slopes Exceeding 4:1)

General Notes:

1. For non-sloped grassy areas, an 8' x 8' concrete riprap apron shall be poured around ITS pole foundations (see detail on this sheet), estimated at 1.25 CY per site, paid for under Item 432 "Riprap."
2. For sloped grassy areas, a concrete "step" (for maintenance personnel to access cabinet) shall be poured as part of the riprap apron. The step shall vary in height depending on slope, but shall extend 6' horizontally from ITS pole drilled shaft foundation and be the same width as riprap apron (8'). Step shall be poured at same time as riprap apron (see detail on this sheet). Any additional concrete necessary to fabricate step (over and above the 1.25 CY) shall be considered subsidiary to the various bid items and no direct payment shall be made.
3. For sloped areas where riprap exists, a 6' (horizontal from drilled shaft foundation) x 4' wide step shall be installed (see detail this sheet). Concrete for step shall be considered subsidiary to the various bid items and no direct payment shall be made.
4. Cabinet orientation may vary depending on field conditions or project constraints. Accommodate configuration of platform according to cabinet orientation.
5. Slopes greater than a 2:1 or when 3'-0" Max. step wall height is exceeded, an alternative design with safety railing is required and shall be detailed in the shop drawings for approval.

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE RIPRAP DETAILS

ITS(7)-15

FILE: its(7)-15.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		216

DATE: 5/31/2022 1:46:33 PM
FILE: US54_ITS-004.dgn

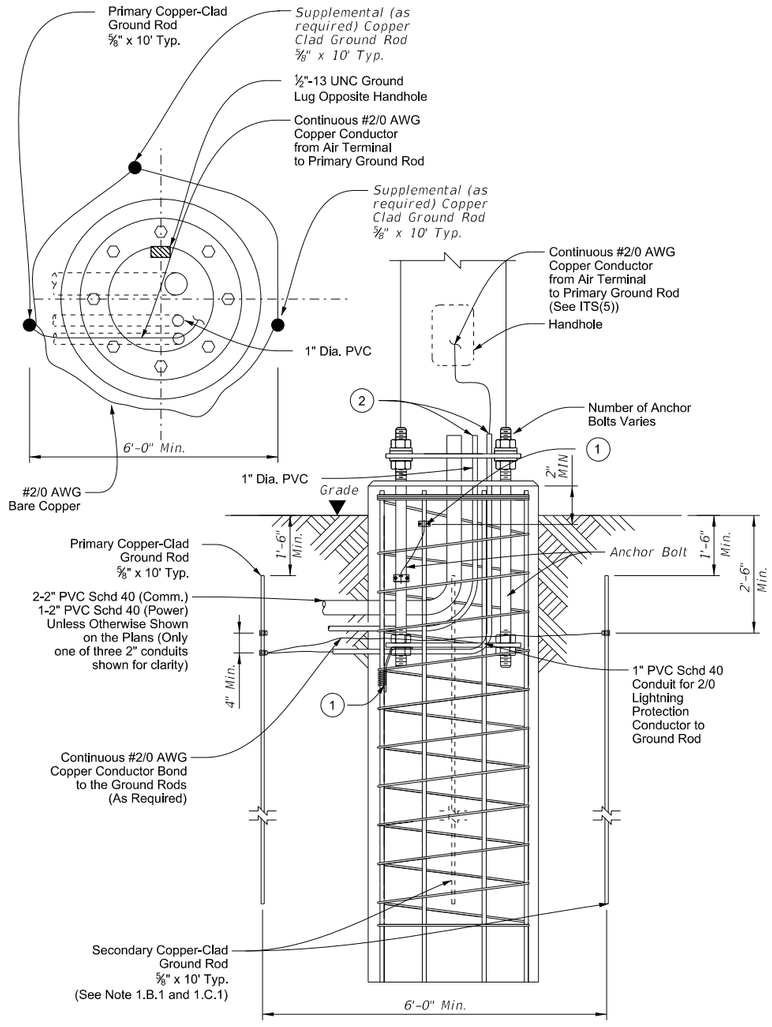
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

General Notes:

1. Grounding System:
   - A. Description:
     1. Provide ground system consisting of copper wires, ground rods, and concrete-encased grounding electrodes (Ufers), of the configuration shown to minimize potential gradient irregularities, drain leakage, and fault currents to earth.
   - B. Performance:
     1. Provide a grounding system, consisting of a minimum one ground rod, having a resistance not greater than 5 Ohms to ground. Provide up to 2 additional supplemental ground rods if necessary to achieve a resistance not greater than 5 Ohms to ground. If a total of 3 ground rods is needed then install as as part of a ground ring.
     2. If a ground ring is required, provide a minimum conductor length of 20 ft. placed at a minimum depth of 30 in..
   - C. Design Criteria:
     1. The grounding system of the ITS pole may be bonded below grade to the grounding systems of other nearby equipment to meet the specified grounding resistance. A minimum of one ground rod for the ITS pole is still required.
     2. Separately measure the grounding resistance of each system before bonding together below grade.
     3. Only provide UL-approved materials listed for grounding systems.
     4. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture, unless moisture is permanently excluded from the junction of such materials.
     5. Submit product data for the materials and products used to perform the work of this section.
   - D. Materials:
     1. Conductors:
        - a. Bare Ground Conductor:
          1) Provide prequalified copper conductors appearing on the Material Producers List according to Item 618.
     2. Ground Compression Connectors:
        - a. Provide molds, thermite packages, and other material for exothermic welding of grounding connections.
        - b. Provide listed compression connectors fully rated to carry 100% of the cable rating and that meet IEEE 837. Provide compression materials from a single manufacturer througout the project.
     3. Ground Rods:
        - a. Provide copper-clad steel ground rods conforming to the requirements specified in DMS 11040.
          1) Diameter: ⅝ in.
          2) Length: 10 ft.

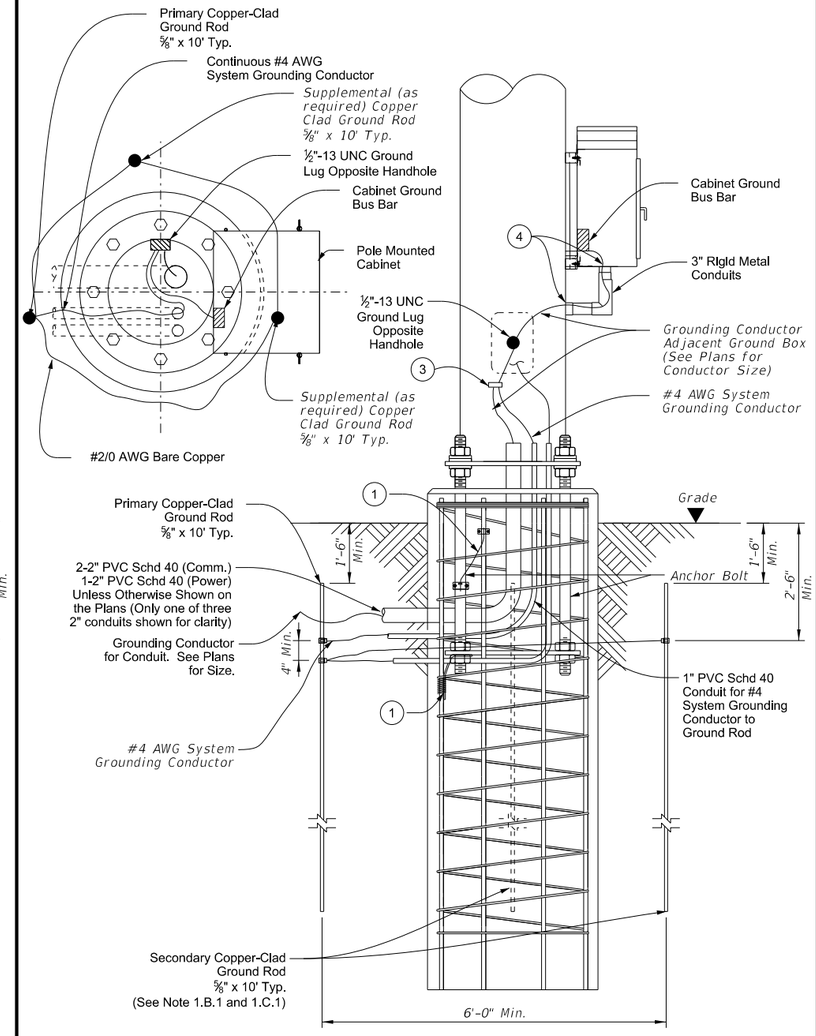
2. Installation:
   - A. Install grounding components and systems in accordance with the requirements specified in IEEE 142.
   - B. System Grounding:
     1. Ground Rods:
        - a. Drive ground rods into the ground until the tops of the rods are a minimum of 18 in. below finished grade.
        - b. If multiple ground rods are needed to meet the minimum resistance of 5 Ohms, space ground rods as evenly as possible, at least 6 feet apart, so conductors will be connected below grade.
     2. Conductors:
        - a. Provide minimum No. 2/0 AWG ground wire for lightning protection from air terminal.
        - b. Provide minimum No. 4 AWG ground wire for system and equipment grounding.
        - c. Using suitable fasteners, securely attach exposed ground wires to structural supports at not more than 2 ft. intervals, where applicable.
        - d. Bends in ground wires greater than 45 degrees are unacceptable.
     3. Cable Connections:
        - a. Use exothermic-welded connections or listed compression connectors for conductor splices and connections between conductors and other components.

3. Testing:
   - A. Resistance Test:
     1. Test Procedure:
        - a. The ground-resistance measurements of each ground Rod shall be taken.
          1) The resistance to ground shall be measured in accordance with the fall-of-potential method specified in IEEE 81 and IEEE 142.
          2) Ground-resistance measurements shall be made in normally dry weather, not less than 48 hours after rainfall, and with the ground under test isolated from other grounds.
        - b. Test reports shall be prepared that indicate the location of the ground rod, the grounding system, and the resistance and soil conditions at the time the test was performed.
     2. Acceptance Criteria:
        - a. The grounding system must have a resistance not greater than 5 Ohms.
        - b. Do not energize any part of the electrical distribution system prior to the resistance testing of that system's ground rods and grounding system, and submission of the test results for approval.
     3. Inspections:
        - a. Prepare and submit as-built record drawings of the grounding system as installed and test reports for approval.



Grounding System

Not to Scale



Grounding System with Pole Mounted Cabinet

Not to Scale

Reference Notes:

1. Bond anchor bolts to rebar with #2/0 AWG jumper and two mechanical connectors or by bending No. 3 bar on bottom template as shown and wire tightly with ten turns of No. 10 wire or one mechanical connector. Mechanical connectors shall be UL Listed for concrete encasement.
2. Cut PVC approximately 1 in. above concrete and install bell or bushing. Align conduit as close as possible to point of attachment to base plate to minimize bends in #2/0 wire.
3. Bond grounding conductors via cadweld or mechanical connector, rated for size and number of conductors.
4. Provide and install a grounding type bushing on metal conduit terminations. 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.

Texas Department of Transportation

Traffic Operations Division Standard

ITS POLE GROUNDING DETAILS

ITS(19)-17

FILE: its(19)-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT June 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 7-17	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		217

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STORM WATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TPDES General Permit TXR150000. The operator, The Texas Department of Transportation ensures that: Project specifications provide that adequate BMPs have been developed for this project. The contractor shall be the party responsible for implementing the BMPs described herein. The contractor shall implement changes approved by the Project Engineer to the SWP3 within the times specified in the SWP3 or the TPDES General Permit. Operators affected by modifications to specifications will be notified in a timely manner.

1. SITE OR PROJECT DESCRIPTION:

NATURE OF THE CONSTRUCTION ACTIVITY: SEE TITLE SHEET

POTENTIAL POLLUTANTS AND	**SOURCES:**
Sediment laden storm water	*Storm water conveyance over disturbed areas*
Fuels, oils, and lubricants	*Construction vehicles and storage areas*
Construction debris and waste	*Various construction activities*
Sanitary waste	*Restroom facilities*
Trash	*Construction site and Receptacles*

SEQUENCE OF ACTIVITIES THAT WILL DISTURB SOILS:

1. *CONSTRUCT CROSS STREET RADIUS & DECELERATION ROADWAY IMPROVEMENTS*
2. *INSTALL PROPOSED ILLUMINATION*
3. *CONSTRUCT S-N UTURN & N-S UTURN IMPROVEMENTS*
4. *CONSTRUCT S-N UTURN & N-S UTURN TIE-INS*
5. *CONSTRUCT RAISED MEDIAN ISLANDS*
6. *PAVEMENT MARKING INSTALLATION*
7.
8.

AREAS:

TOTAL AREA OF PROJECT: 53.00 ACRES

TOTAL AREA OF SOIL DISTURBANCE: 7.43 ACRES

TOTAL AREA OFF-SITE: OFFSITE AREA WILL NOT BE AFFECTED.

WEIGHTED RUNOFF COEFFICIENT (BEFORE AND AFTER CONSTRUCTION): *0.50/0.51*

DATA DESCRIBING THE SOIL: Existing soil consist of two soil groups. North of the State Line is Hueco-Wink association, hummocky with a B hydrologic soil group rating. South of the State Line is Pintura-Dona Ana complex, 0 to 5 percent slopes with an A hydrological soil group rating.

GENERAL LOCATION MAP: SEE TITLE SHEET

DETAILED SITE MAP: SEE EROSION CONTROL MEASURES SHEET.

THE LOCATION AND DESCRIPTION OF CONCRETE AND ASPHALT PLANTS:

Supporting Concrete Plant Facilities shall be located off site.

Supporting Asphalt Plant Facilities shall be located off site.

NAME OF RECEIVING WATERS: *Stormwater runoff sheetflows into existing roadway ditches that is conveyed into a nearby arroyo.*

A COPY OF TPDES CGP TXR150000 IS INCLUDED IN THE SWP3 FILE.

REMARKS: ***See SWP3 Notebook for environmental, archeological, and historical documentation.***

401 WATER QUALITY CERTIFICATION: YES____ NO__X__

2. BEST MANAGEMENT PRACTICES (BMPs):

EROSION AND SEDIMENT CONTROLS: Erosion and sediment controls have been designed to retain sediment on-site. Controls shall be utilized to reduce off site transport of suspended sediments and pollutants if it is necessary to pump water from the site. Control measures shall be installed per specifications or as directed. Sediment must be removed from controls per the plan requirements or manufacturers recommendations, but no later than the time that design capacity has been reduced by 50%. If sediment escapes the site, accumulations will be removed to minimize further negative effects. Controls will be developed to limit the off site transportation of litter, construction debris, and construction materials.

INTERIM(INT), PERMANENT(PER), AND 401 CERTIFICATION BMP'S:

EROSION CONTROLS:	401	INT	PER
☐ *Compaction & Tracking of slopes*	__	__	__
☐ *Diversion Dike*	__	__	__
☐ *Preserve Existing Vegetation*	__	__	__
☐ *Soil Stabilization*	__	__	__
☐ *Permanent Vegetation*	__	__	__
☐ *No Erosion Controls are Required.*			

SEDIMENT CONTROLS:	401	INT	PER
☒ *Silt Fence*	__	X	__
☐ *Sand Bags*	__	__	__
☒ *Erosion Control Logs*	__	X	__
☐ *Vegetative Filter Strips*	__	__	__
☐ *Ditch Block*	__	__	__
☐ *No Sediment Controls are Required.*			

POST CONSTRUCTION TSS CONTROL (401 CERTIFICATION ONLY):

- ☐ *Vegetation Lined Drainage Ditch*
- ☐ *Retention/Irrigation*
- ☐ *Erosion Control Compost*
- ☐ *Grassy Swales*
- ☐ *Vegetative Filter Strips*
- ☒ *No Post Construction TSS Control Required.*

SEQUENCE OR SCHEDULE OF IMPLEMENTATION:

1. *Install temporary sediment control fence.*
2. *Install temporary erosion control logs at curb inlets.*
3. *Maintain temporary sediment control fence and erosion control logs.*
4.
5.
6.
7.

The El Paso District of the Texas Department of Transportation uses Site-Manager, a computer based construction record-keeping system. Documentation describing major grading activities, temporary or permanent cessation of construction, and stabilization measures is a part of this system and is incorporated by reference into this SWPPP.

Stabilization measures must be initiated within 14 days when practicable in portions of the site where construction has temporarily or permanently ceased, if earth disturbing activities will not be resumed within 21 days.

3. STRUCTURAL CONTROL PRACTICES:

Structural control practices for this project are listed elsewhere herein.

4. PERMANENT STORM WATER CONTROLS:

Structural control practices installed during construction will be maintained and inspected after construction has ceased on the site and until final stabilization is attained. Unless specified in the plans, after project acceptance TxDOT will assume maintenance responsibilities for the controls and measures. Other permanent controls include existing and proposed; riprap at culvert inlets and outlets, diversion dikes, swales, retaining walls, and other similar devices.

5. OTHER CONTROLS:

OFF-SITE VEHICLE TRACKING OF SEDIMENTS AND THE GENERATION OF DUST: The off site vehicle tracking of sediments shall be minimized by removal of excess dirt from the road and at entrances to the work site. The generation of dust will be minimized as directed by the Project Engineer by dampening haul roads and covering haul trucks with a tarpaulin.

CONSTRUCTION AND WASTE MATERIALS: The contractor will maintain a clean, orderly construction site. Construction waste including trash, rubble, scrap and vegetation shall be disposed of in lidded dumpsters or in a manner approved by the Project Engineer. Disposal methods must meet Federal, State, and Local waste management guidelines. No construction waste will be buried or burned on site. Spoils disposal, material storage, and materials resulting from the destruction of existing roads and structures shall be stored in areas designated by the Project Engineer and protected from run-off. All waterways shall be cleared of temporary embankment, temporary bridges, matting, false work, piling, debris, or other obstructions placed during construction operations, that are not part of the finished work, as soon as practicable. All excess soil generated by the construction will be collected and disposed of by the contractor. Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, water body, or stream bed.

POLLUTANT SOURCES FROM AREAS OTHER THAN CONSTRUCTION: Staging areas and vehicle maintenance areas shall be located and constructed in a manner to minimize the runoff of pollutants. If potential pollutant sources are identified after the start of construction, controls and measures shall be implemented as directed by the Project Engineer.

5. OTHER CONTROLS (CONT):

DEDICATED ASPHALT PLANTS: Asphalt or asphaltic material for this project will be produced off site. If the project requires a dedicated asphalt plant and the plant within 1 mile of the project limits it will be considered an off site PSL. Consideration shall be given to on site plant and storage facilities and measures implemented as directed by the Project Engineer.

DEDICATED CONCRETE PLANTS: Cement or Concrete material for this project will be produced off site. If the project requires a dedicated concrete plant and the plant is within 1 mile of the project limits it will be considered an off site PSL. Consideration shall be given to on site plant and storage facilities and measures implemented as directed by the Project Engineer. Concrete trucks shall be wasted or washed out in locations designated by the Project Engineer. The locations shall be protected by a berm sufficient to contain all waste and wash water. Wash water shall not be allowed to enter any storm drainage system or waterway. The residual material and contaminated soil shall be collected and disposed of in accordance with Federal, State, and Local guidelines. Staging areas and vehicle maintenance areas shall be located and constructed in a manner to minimize the runoff of pollutants.

HAZARDOUS MATERIALS AND SPILL REPORTING: The contractor shall take appropriate measures to prevent, minimize, and control the spillage or leakage of hazardous materials and any associated wastes on site and in maintenance and staging areas. hazardous materials shall include but are not limited to paints, acids, solvents, asphalt products, chemical additives, curing compounds, oils, fuels, and lubricants. Hazardous materials shall not be stored, accumulated, or transported in open containers subject to precipitation or spillage, but shall be stored, accumulated, or transported in closed containers of the type recommended by the manufacturer. In the event of a spill the Project Engineer should be contacted immediately. All spills shall be immediately cleaned and any contaminated soil removed and disposed of in accordance with Local, State, and Federal laws. Fuel tanks shall be protected by a secondary containment, such as a lined berm, capable of containing 1.5 times the capacity of the tank, or as approved by the Project Engineer.

OFF SITE PSLs: All off site project specific locations including dedicated asphalt plants, concrete plants, or utility installations, required by the contractor, are the contractor's responsibility. The contractor shall secure all permits required by local, state, or federal laws for off site PSLs. The contractor shall provide diagrams and areas of disturbance for all PSL's within 1 mile of the project.

SANITARY FACILITIES: All sanitary or septic wastes that are generated onsite shall be treated and disposed of in accordance with state and local regulations. Raw sewage or septage shall not be discharged or buried on site. Precaution shall be taken to prevent illicit discharges to storm water. Licensed waste management contractors shall be required to dispose of sanitary waste. Porta johns will be required for the construction site or as directed by the Project Engineer.

VELOCITY DISSIPATION DEVICES: Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as shown in the plans or as directed by the Project Engineer to provide a non-erosive flow velocity from the structure to a watercourse so that the natural physical and biological characteristics and functions are maintained and protected.

6. APPROVED STATE AND LOCAL PLANS:

This SWP3 is consistent with requirements specified in applicable sediment and erosion site plans or site permits, or storm water management site plans or permits approved by federal, state, or local officials.

7. MAINTENANCE:

Control measures shall be properly installed according to specifications. If inspections or other information indicates a control has been installed, used, or is performing inadequately, the contractor must replace or modify the control as soon as practicable after discovery. Control measures shall be maintained in effective operating condition. If inspections determine that BMPs are not operating effectively maintenance will be performed as necessary to continue the effectiveness of the controls. Maintenance must be accomplished as soon as practicable. Controls adjacent to creeks, culverts, bridges, and water crossings shall have priority. Controls that have been disabled, run over, removed, or otherwise rendered ineffective must be corrected immediately upon discovery.

8. INSPECTION OF CONTROLS:

A TxDOT inspector will inspect disturbed areas of the site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, and structural controls for evidence of, or the potential for, pollutants entering the drainage system. Sediment and erosion controls measures identified in the SWP3 will be inspected to ensure that they are operating correctly. Locations where vehicles enter or exit the site will be inspected for evidence of off-site vehicle tracking. Inspections will be conducted every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater. The SWP3 will be modified based on the result of these inspections. Revisions will be completed within 7 Calendar days following the inspection. Revised implementation schedules will be described in the SWP3 and implemented as soon as practicable. Rain gages will be maintained on site for the duration of the project. Reports summarizing the scope of the inspections are included in the SWP3 file.

9. NON-STORM WATER COMPONENTS:

The contractor shall be required to implement appropriate pollution prevention controls and measures for all eligible non-storm water components of the discharge as approved and directed by the Project Engineer.

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

REV: 07-2014

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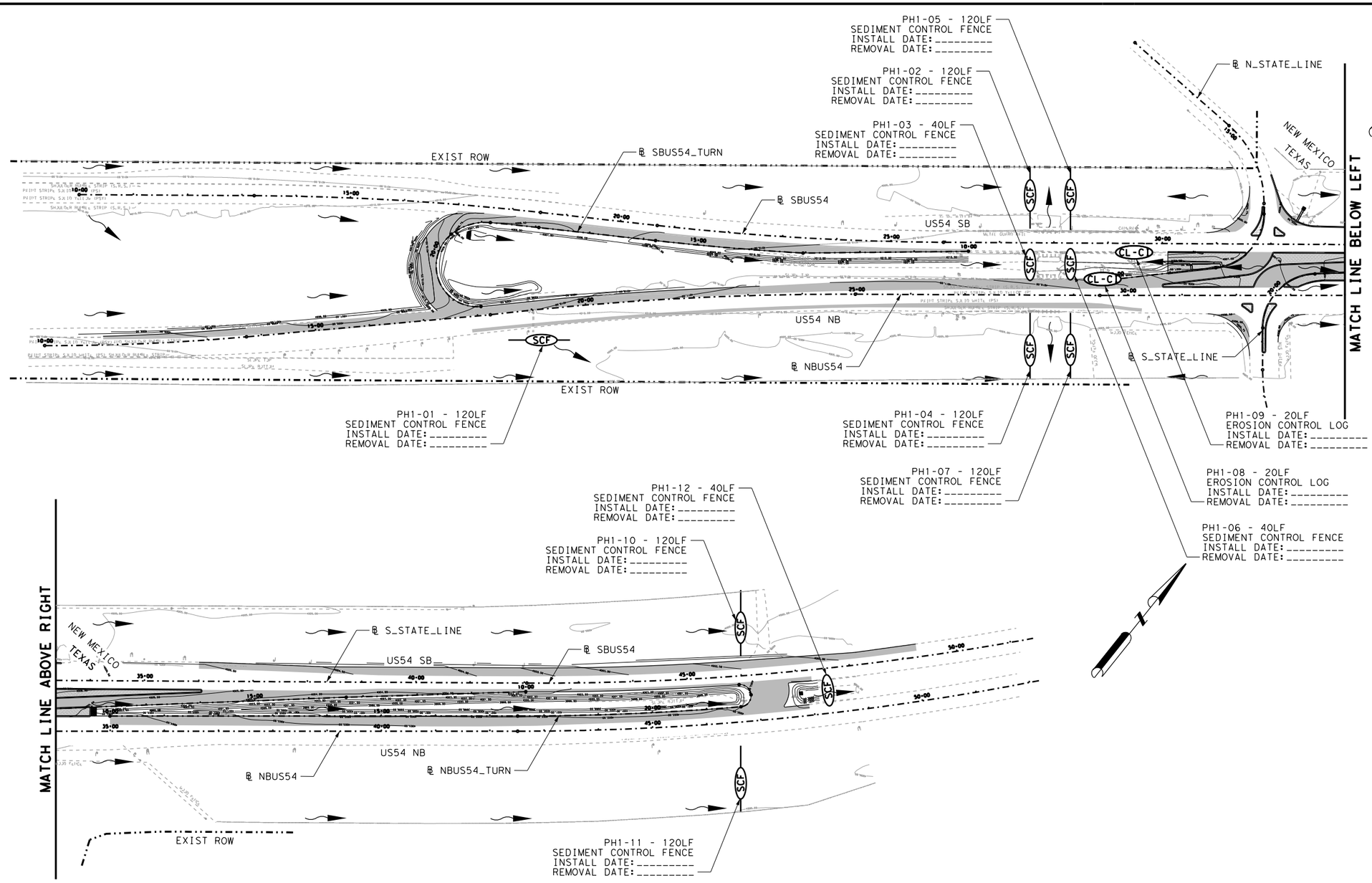
TEXAS	ELP	EL PASO	
CONT.	SECT.	JOB	HIGHWAY NO.
0167	01	126	US-54



EROSION CONTROL QUANTITES			
ITEM	DESCRIPTION	UNIT	QTY
0506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	960
0506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	960
0506 6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	40
0506 6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	40

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED
PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-126
US54 STATE LINE RD

ENVIRONMENTAL

EROSION CONTROL PLAN

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F- 3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY		SHEET NO.
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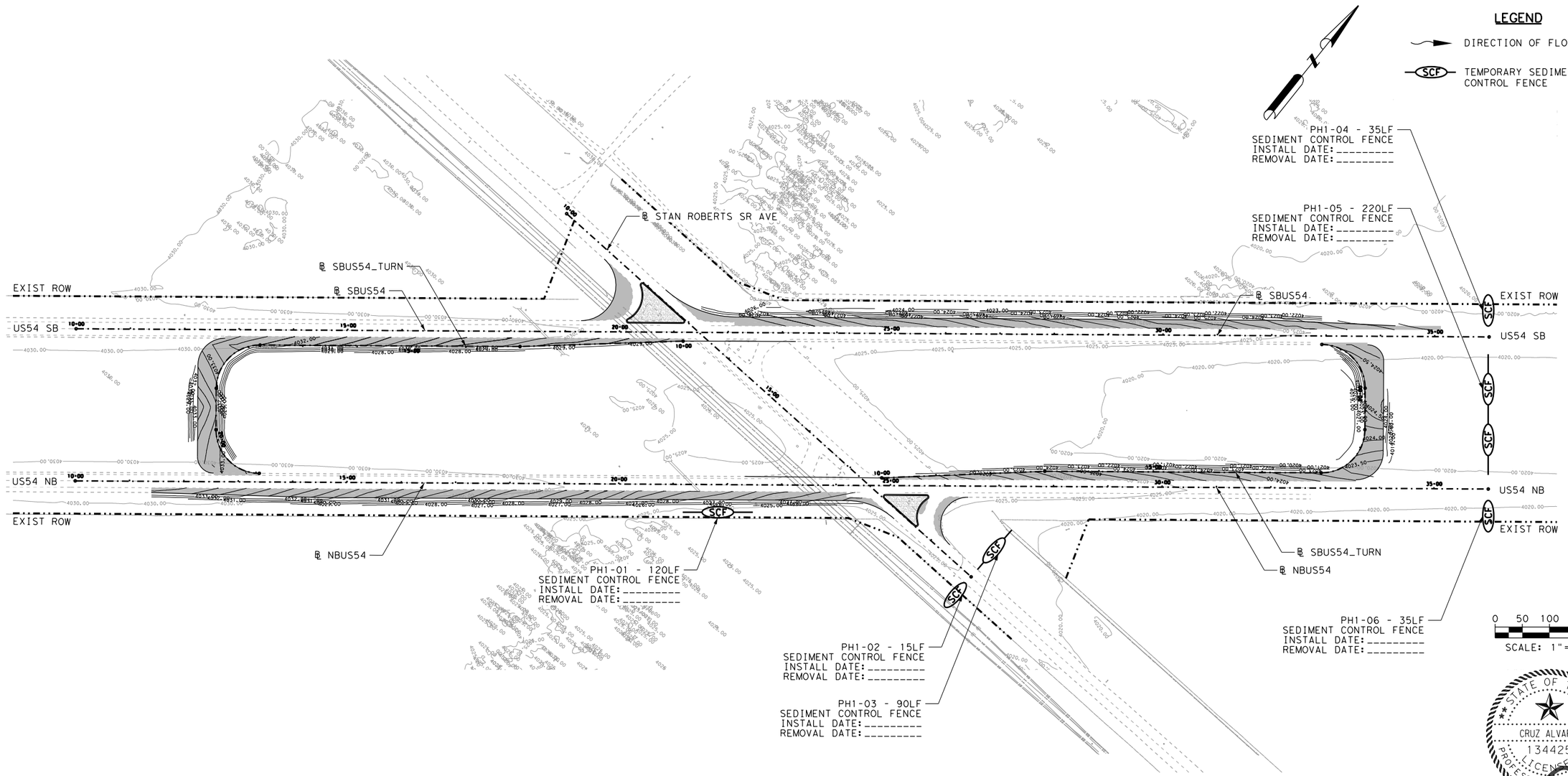

EROSION CONTROL QUANTITYS			
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0506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	515

STATE OF TEXAS
CRUZ ALVAREZ
134425
LICENSED PROFESSIONAL ENGINEER
5/31/2022

CSJ: 0167-01-133
US54 STAN ROBERTS SR AVE
ENVIRONMENTAL

EROSION CONTROL PLAN

SHEET 1 OF 1

AECOM
AECOM Technical Services Inc. F-3580
221 N. KANSAS STREET
EL PASO, TEXAS 79901

Texas Department of Transportation

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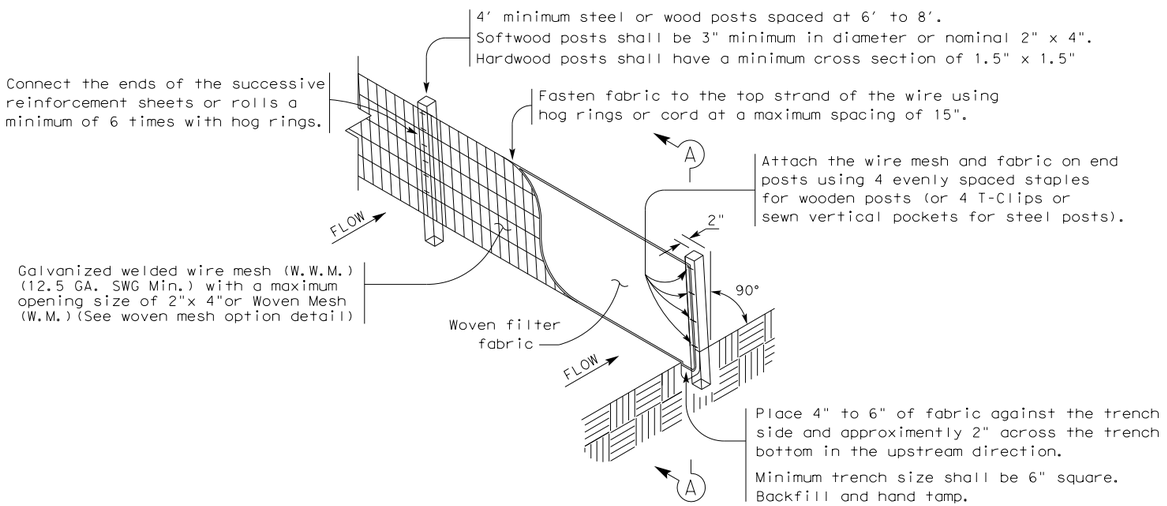
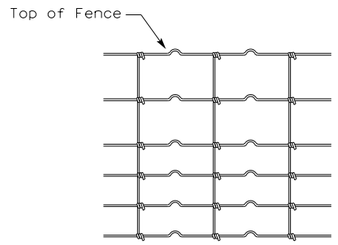
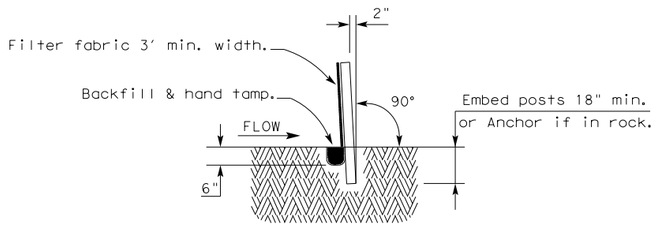


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

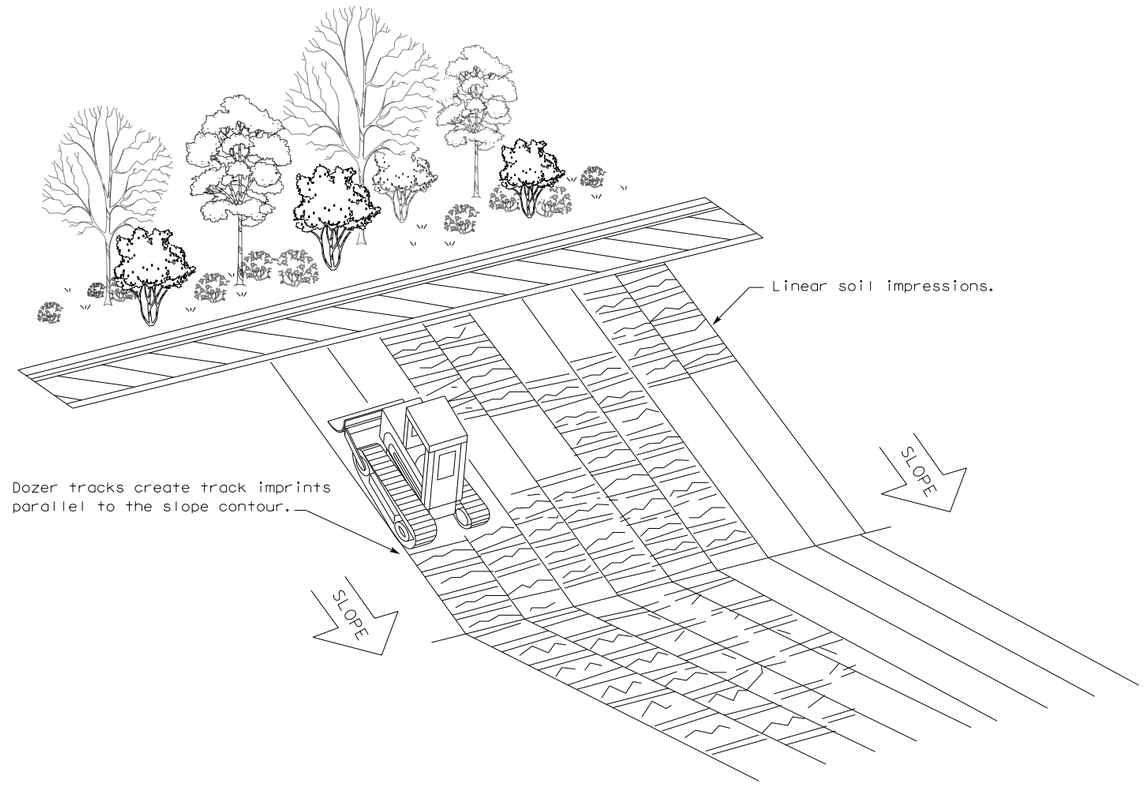
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

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© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
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	DIST	COUNTY			SHEET NO.		
	ELP	EL PASO			221		

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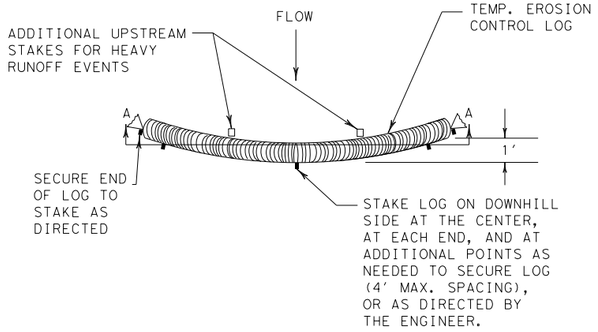
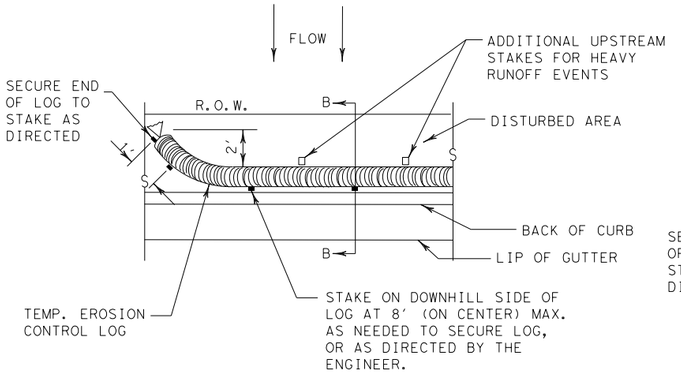


PLAN VIEW



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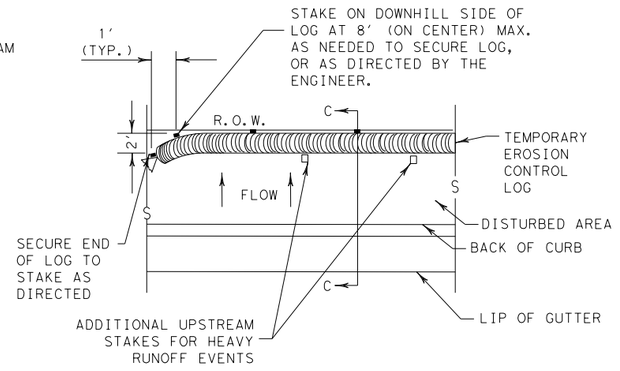

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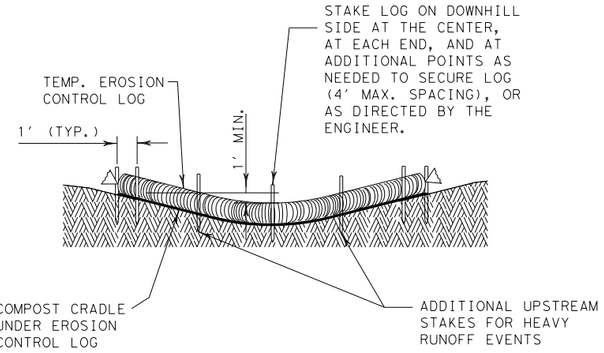
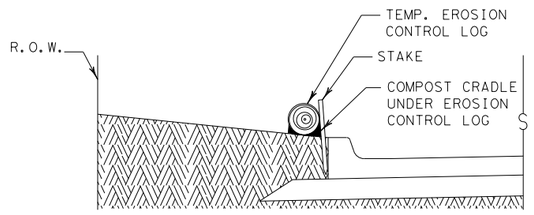


SECTION A-A

EROSION CONTROL LOG DAM

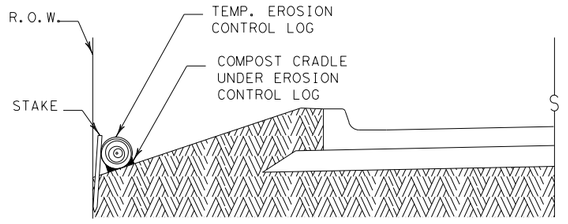
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



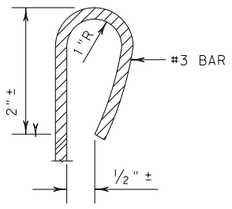
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW

LEGEND

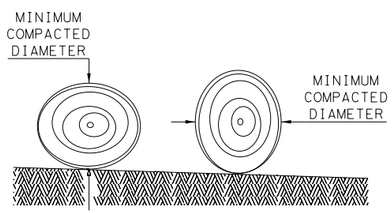
- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL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



REBAR STAKE DETAIL

GENERAL NOTES:

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



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

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

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

SHEET 1 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916			DN: TxDOT	CK: KM	DW: LS/PT	CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
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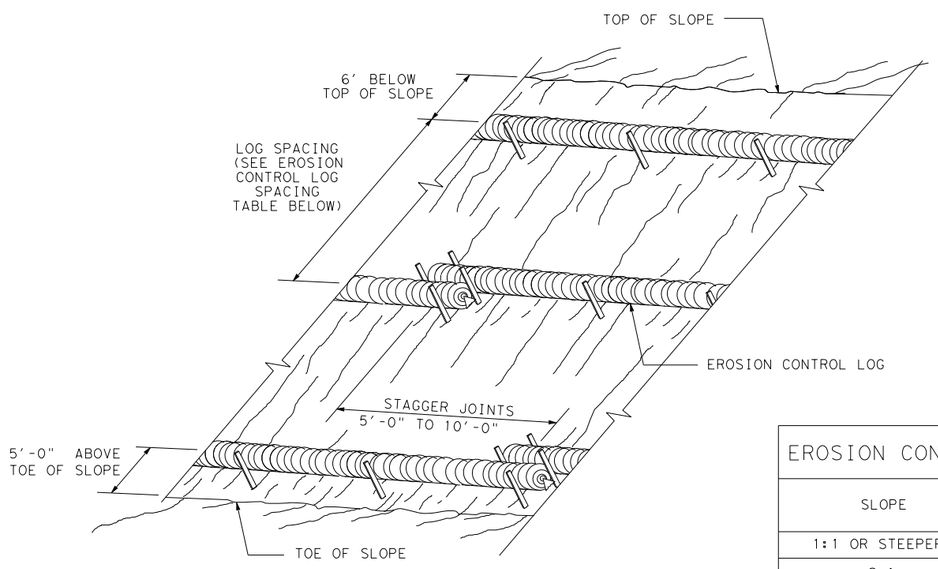
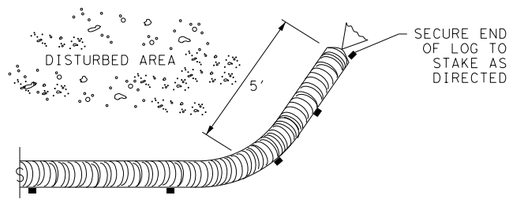
	ELP	EL PASO			222		



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

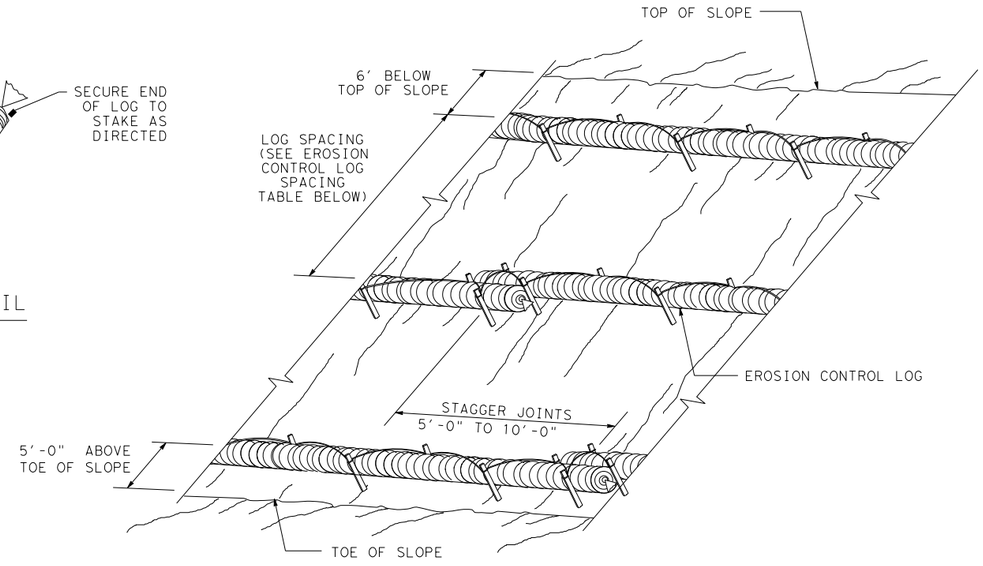
CL-SST



END SECTION RAP DETAIL

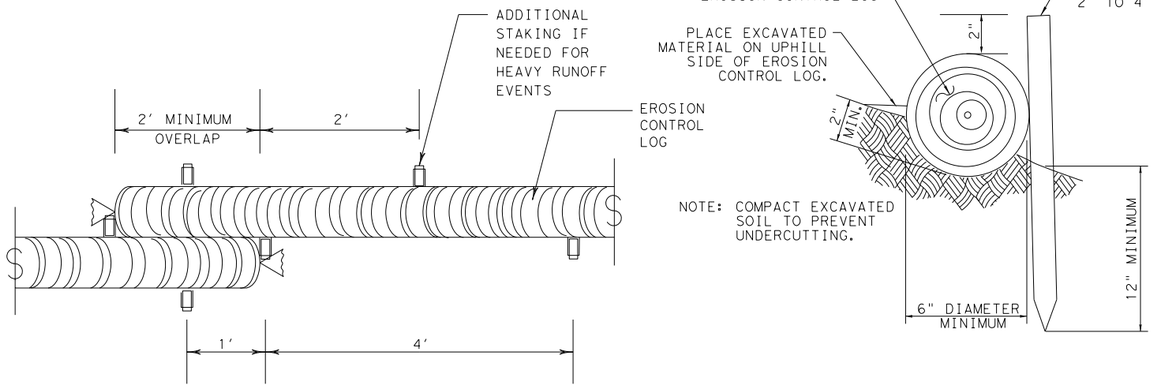
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5′	10′	15′	20′
2:1	10′	20′	30′	40′
3:1	15′	30′	45′	60′
4:1 OR FLATTER	20′	40′	60′	80′

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



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

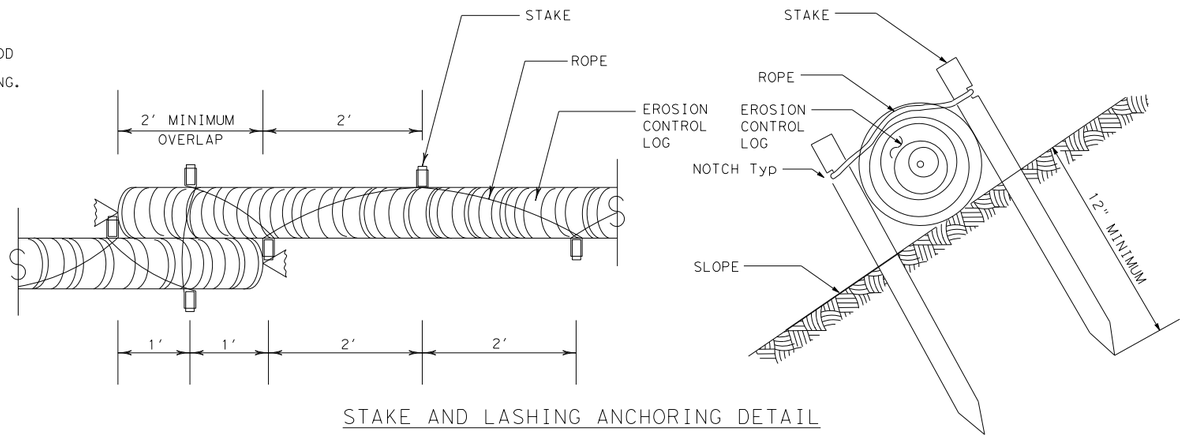
CL-SSL



STAKE AND TRENCHING ANCHORING DETAIL

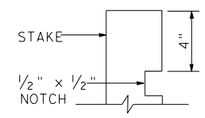
CL-SST

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



STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

DATE:
FILE:

Texas Department of Transportation

Design Division Standard

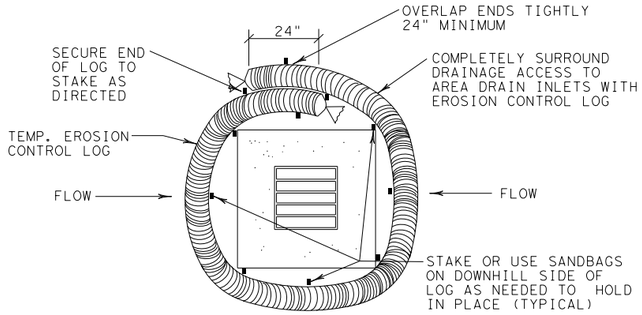
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

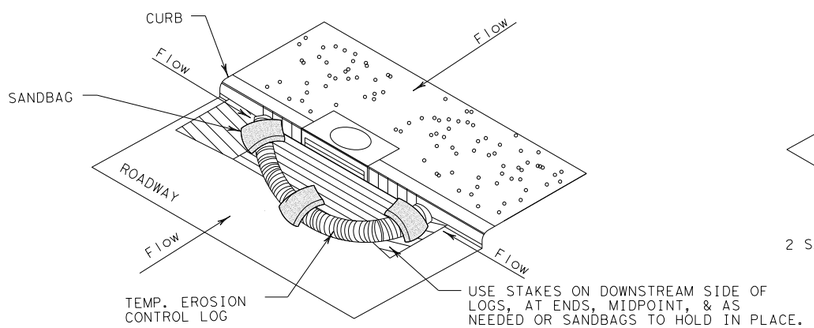
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0167	01	126,ETC.	US-54
	DIST	COUNTY		SHEET NO.
	ELP	EL PASO		223

DATE:
FILE:



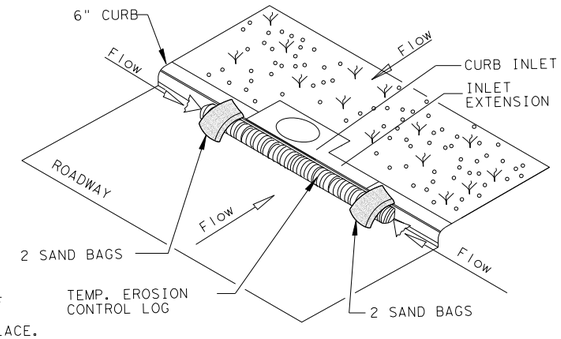
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

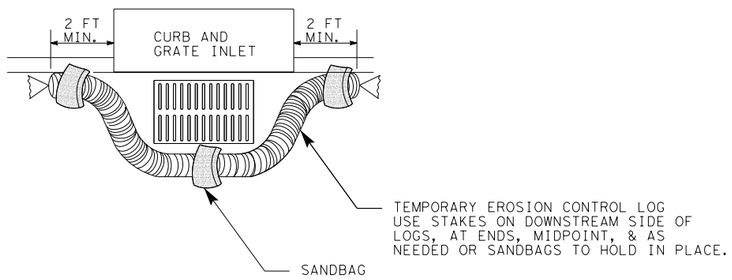
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

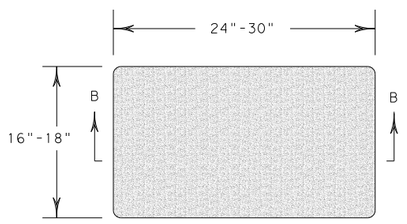
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0167	01	126,ETC.		US-54		
	DIST	COUNTY			SHEET NO.		
	ELP	EL PASO			224		