FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2025(306), etc.		1
STATE	STATE DIST.	COUNTY	
TEXAS	LBB	LAMB, ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	046, ETC.	US 84
FILENAME	US0084_GEN_TITLE.dgn		

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL PROJECT

F 2025(306),etc.

CSJ	DESCRIPTION	ROADWAY LENGTH	BRIDGE LENGTH	LENGTH	NBI NUMBER
0052-05-046	TOM & TY B MILL/INLAY	41976.60 FT		7.95 MI	
0052-05-048	CABLE BARRIER	59553.00 FT		11.28 MI	
0052-05-049	RAIL REPLACEMENT		98.40 FT	0.02 MI	05-140-0-0052-05-008
0052-07-068	TOM & PVMT REPAIR	40682.00 FT		7.70 MI	
TOTAL LENGTH OF PROJECT		142211.60 FT	98.40 FT	26.95 MI	

US 84
LAMB & LUBBOCK COUNTIES

LIMITS:
CSJ 0052-05-046: FROM EAST LITTLEFIELD CITY LIMITS TO HOCKLEY COUNTY LINE
CSJ 0052-05-048: FROM NORTH SL 430 TO FM 1072
CSJ 0052-05-049: US 84 AT YELLOWHOUSE DRAW
CSJ 0052-07-068: FROM HOCKLEY COUNTY LINE TO SOUTH SL 388 SHALLOWATER

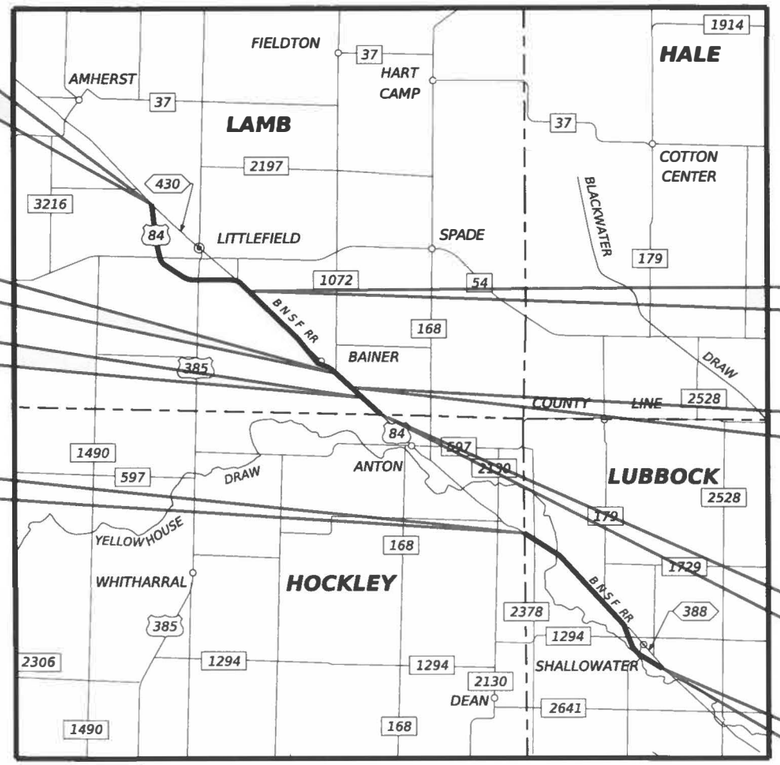
FOR THE CONSTRUCTION OF A RESTORATION OF EXISTING ROADWAY CONSISTING OF ROADWAY MILLING, THIN OVERLAY MIXTURE, CABLE BARRIER, PAVEMENT REPAIR, INSTALLATION OF TRAFFIC SIGNALS, HIGH MAST ILLUMINATION, BRIDGE RAIL REPLACEMENT, SIGNING AND STRIPING.

CABLE BARRIER BEGIN PROJECT CONTROL 0052-05-048 STATION 663+72

CABLE BARRIER END PROJECT CONTROL 0052-05-048 STATION 1259+25

BRIDGE RAIL REPLACEMENT END PROJECT CONTROL 0052-05-049 STATION 1361+31.7

OVERLAY BEGIN PROJECT CONTROL 0052-07-068 STATION 930+82



OVERLAY BEGIN PROJECT CONTROL 0052-05-046 STATION 985+00

BRIDGE RAIL REPLACEMENT BEGIN PROJECT CONTROL 0052-05-049 STATION 1360+33.3

OVERLAY END PROJECT CONTROL 0052-05-046 STATION 1405+75

OVERLAY END PROJECT CONTROL 0052-07-068 STATION 524+00

LAYOUT NO SCALE

NO EQUATIONS
NO EXCEPTIONS
NO RAILROAD CROSSINGS
NO TDLR INSPECTION REQUIRED

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, SEPTEMBER 1, 2024 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, OCTOBER, 2023).

Design Speed:
Main Lanes (Lamb County): 65 MPH
(Lubbock County): 50 MPH

Functional Class: Principal Arterial
2026 ADT: 8969
2046 ADT: 12416

CITY OF LITTLEFIELD CONCURRENCE:

MAYOR

CITY OF SHALLOWATER CONCURRENCE: 9/30/2024

DocuSigned by: ROWLING POTTER BDF66B621445427...

MAYOR

Texas Department of Transportation

STATE OF TEXAS — SHELLEY C. HARRIS — 99197 — LICENSED PROFESSIONAL ENGINEER

SUBMITTED FOR LETTING: 9/30/2024

DocuSigned by: Shelley C. Harris P.E. F9984108931347C...

DISTRICT DESIGN ENGINEER

RECOMMENDED FOR LETTING: 9/30/2024

DocuSigned by: Neil Welch, P.E. F73FB89E3214466...

LITTLEFIELD AREA ENGINEER

RECOMMENDED FOR LETTING: 9/30/2024

DocuSigned by: Joe Wells P.E. 40A0578F6367404...

LUBBOCK AREA ENGINEER

APPROVED FOR LETTING: 9/30/2024

DocuSigned by: Kelly P. Warren P.E. 642C665E4DDD46A...

DISTRICT ENGINEER

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

THE " * " STANDARD SHEETS INCLUDED HEREON HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

Texas Department of Transportation

INDEX OF SHEETS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		2

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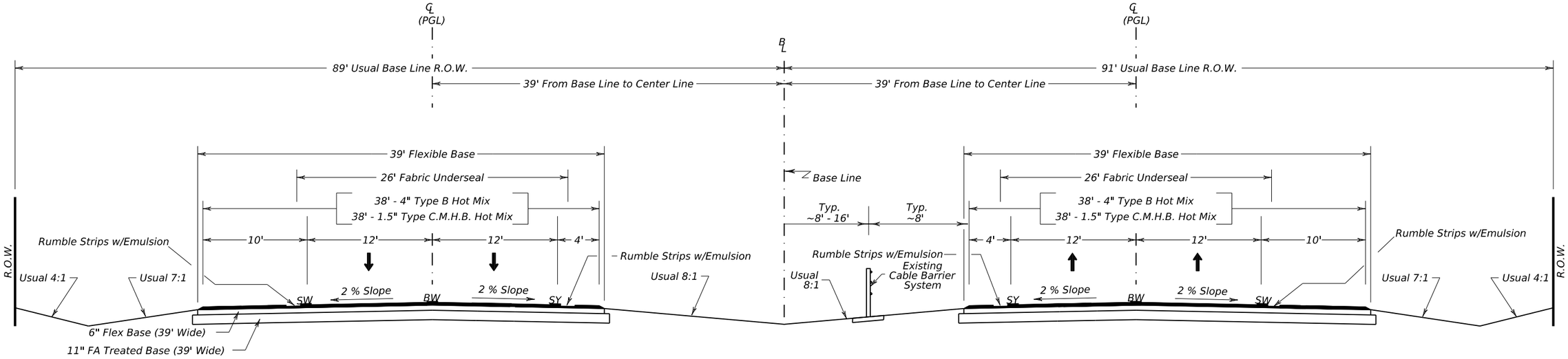

US 84 WESTBOUND

US 84 EASTBOUND

SW - Solid White Stripe (4")
BW - Broken White Stripe (4")
SY - Solid Yellow Stripe (4")

**26' FABRIC EXISTS IN LANES **

Sta. 663+72.50 to Sta. 1405+75.00
Sta. 1399+00.00 to Sta. 1402+32.31 - 1½" Type C.M.H.B. Only
Sta. 1259+24.50 to Sta. 1405+75.00 - Existing Cable Barrier System

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

EXISTING TYPICAL SECTION (LAMB COUNTY) NO SCALE

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		3

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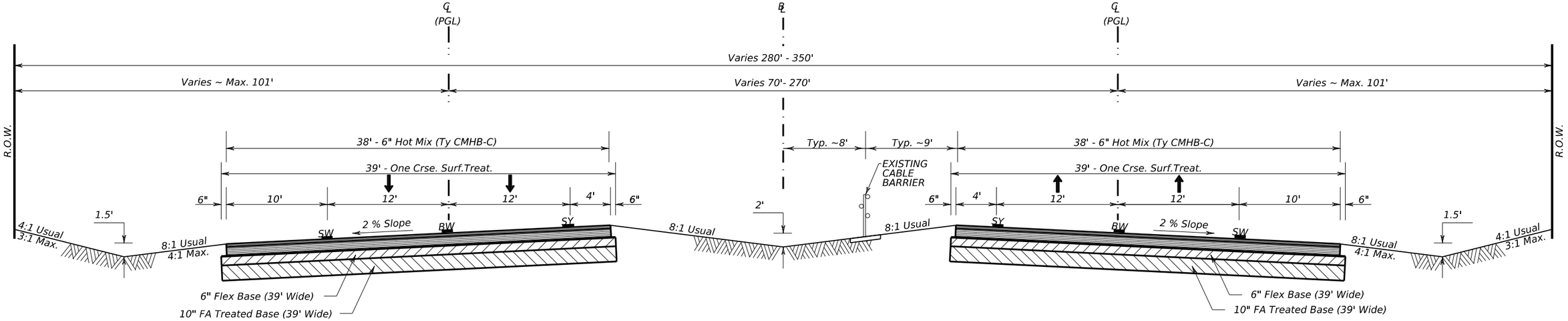
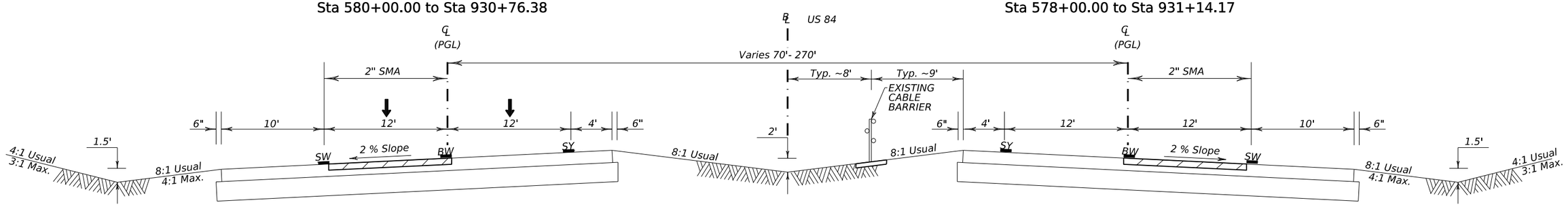


LEFT MAIN LANE
Sta 523+84.91 to Sta 549+00.00
Sta 580+00.00 to Sta 930+76.38

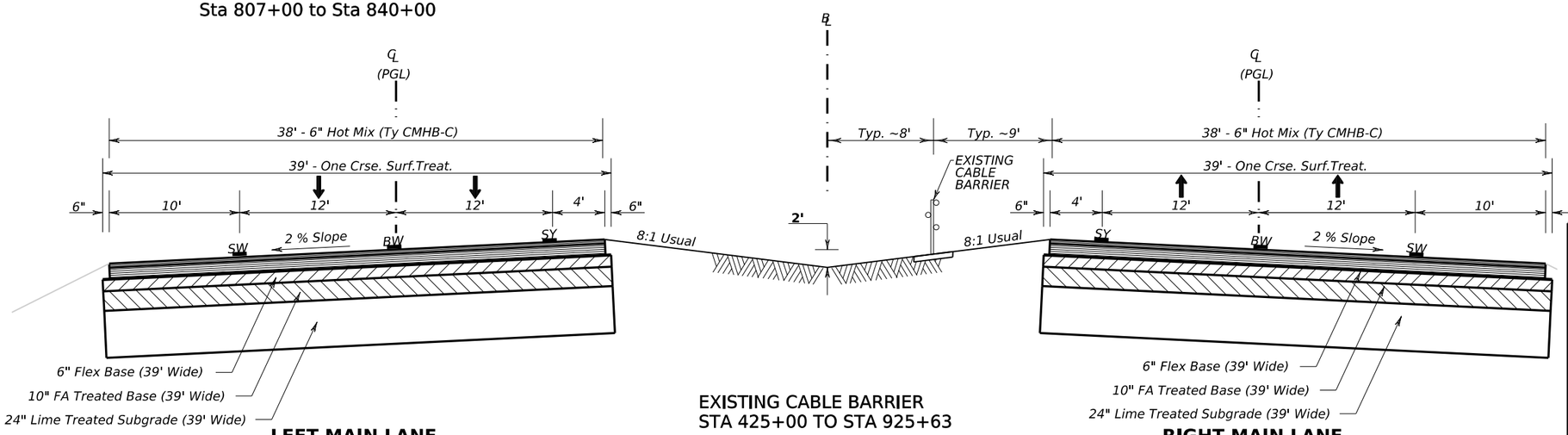
RIGHT MAIN LANE
Sta 524+29.93 to Sta 549+00.00
Sta 578+00.00 to Sta 931+14.17



East Bound
Sta 628+00 to Sta 643+00
Sta 685+00 to Sta 691+00
Sta 706+00 to Sta 739+00
Sta 745+00 to Sta 760+00
Sta 807+00 to Sta 840+00

EXISTING

West Bound
Sta 685+00 to Sta 703+00



SW - Solid White Stripe (4")
BW - Broken White Stripe (4")
SY - Solid Yellow Stripe (4")

LEFT MAIN LANE
Sta 549+00.00 to Sta 561+91.90
Sta 564+75.88 to Sta 580+00.00
(Bridge Exception : Sta 561+91.90 to Sta 564+75.88)

EXISTING CABLE BARRIER
STA 425+00 TO STA 925+63

RIGHT MAIN LANE
Sta 549+00.00 to Sta 562+93.97
Sta 565+22.03 to Sta 578+00.00
(Bridge Exception : Sta 562+93.97 to Sta 565+22.03)

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

EXISTING TYPICAL SECTION
(LUBBOCK COUNTY)
NO SCALE

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		4

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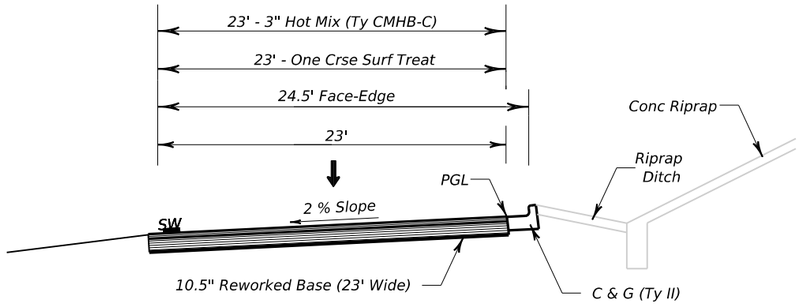
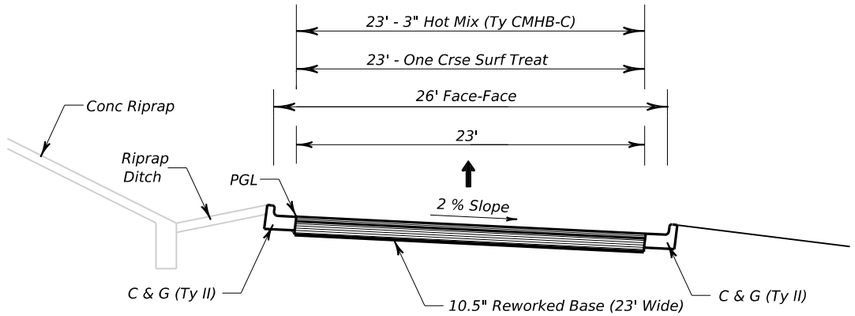
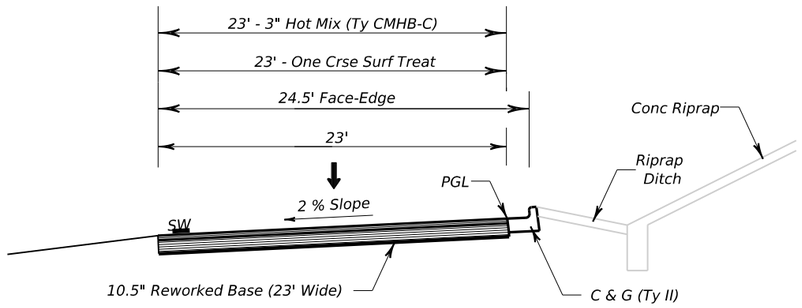


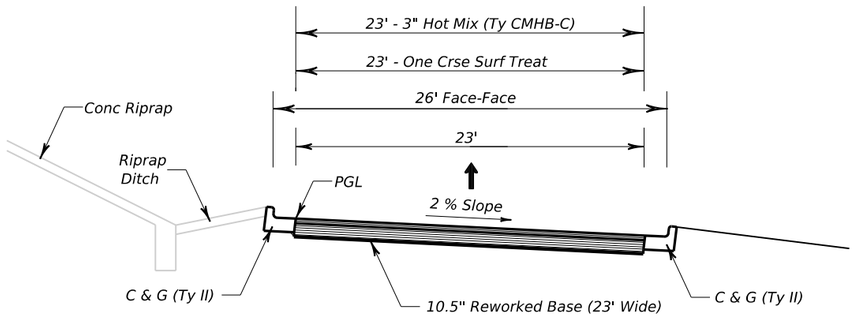
LEFT RAMP
Sta 15+95 (Lt Ramp) to Sta 17+45 (Lt Ramp)
Sta 18+84 (Lt Ramp) to Sta 20+34 (Lt Ramp)



RIGHT RAMP
Sta 17+90 (Rt Ramp) to Sta 19+55 (Rt Ramp)
Sta 20+97 (Rt Ramp) to Sta 22+47 (Rt Ramp)

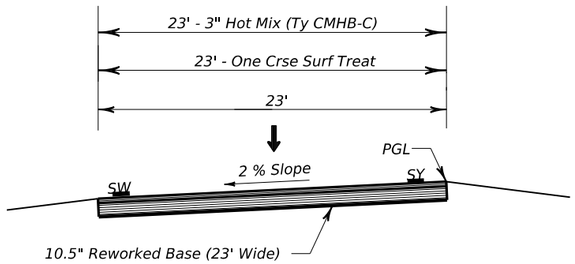


LEFT RAMP
Sta 7+85 (Lt Ramp) to Sta 10+95 (Lt Ramp)
Sta 10+95 (Lt Ramp) to Sta 15+95 (Lt Ramp)(Trans SW Stripe)
Sta 20+34 (Lt Ramp) to Sta 25+34 (Lt Ramp)(Trans SW Stripe)
Sta 25+34 (Lt Ramp) to Sta 32+47 (Lt Ramp)



RIGHT RAMP
Sta 8+32 (Rt Ramp) to Sta 12+90 (Rt Ramp)
Sta 12+90 (Rt Ramp) to Sta 17+90 (Rt Ramp)(Trans SW Stripe)
Sta 22+47 (Rt Ramp) to Sta 28+38 (Rt Ramp)(Trans SW Stripe)

SW - Solid White Stripe (4")
SY - Solid Yellow Stripe (4")



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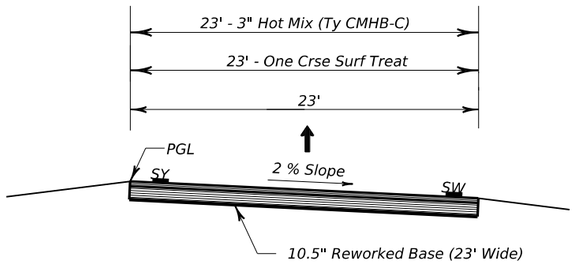
Sta 32+47 (Lt Ramp) to Sta 36+16 (Lt Ramp)



RIGHT RAMP
Sta 1+67 (Rt Ramp) to Sta 8+32 (Rt Ramp)
Sta 28+38 (Rt Ramp) to Sta 36+56 (Rt Ramp)

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

EXISTING TYPICAL SECTION
(LUBBOCK COUNTY)
SCALE 1" = 10'

SHEET 3 OF 6

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		5

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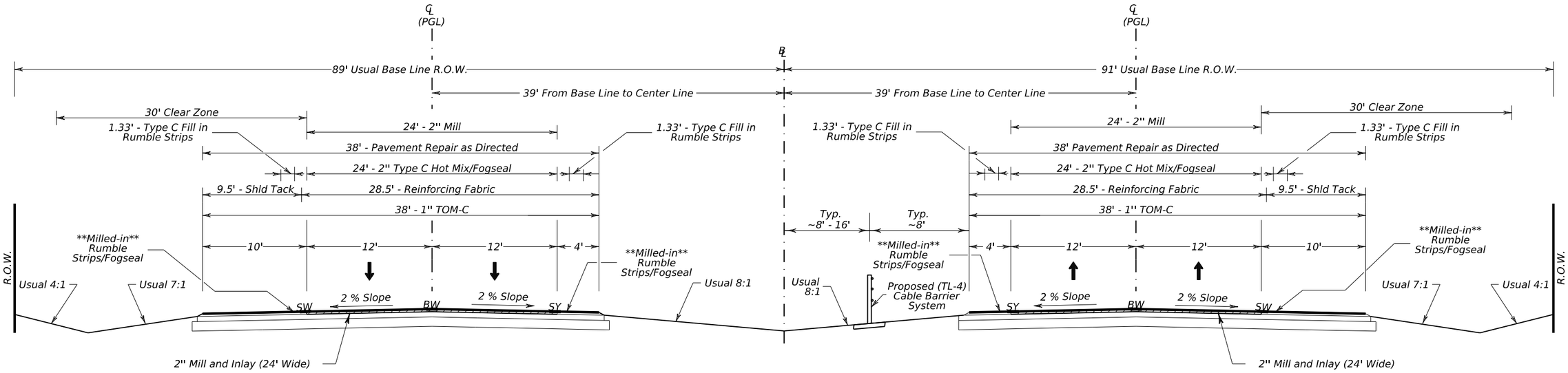
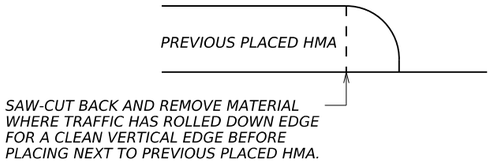
CK | DW | CK | DW



US 84 WESTBOUND

US 84 EASTBOUND

Sta. 663+72.50 to Sta. 1405+75.00
Sta. 663+72.50 to Sta. 1259+24.50 - Proposed Cable Barrier System
Shift New Rumble Strips by 6" to Avoid Old Rumble Strips



VERICAL EDGE DETAIL

SW - Solid White Stripe (6")
BW - Broken White Stripe (6")
SY - Solid Yellow Stripe (6")

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

PROPOSED TYPICAL SECTION
(LAMB COUNTY)
NO SCALE

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		6

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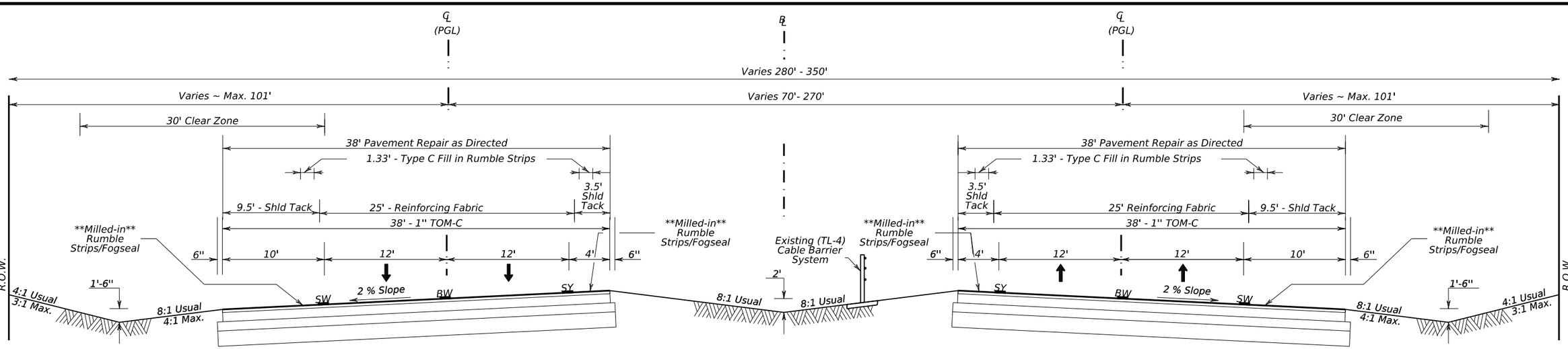
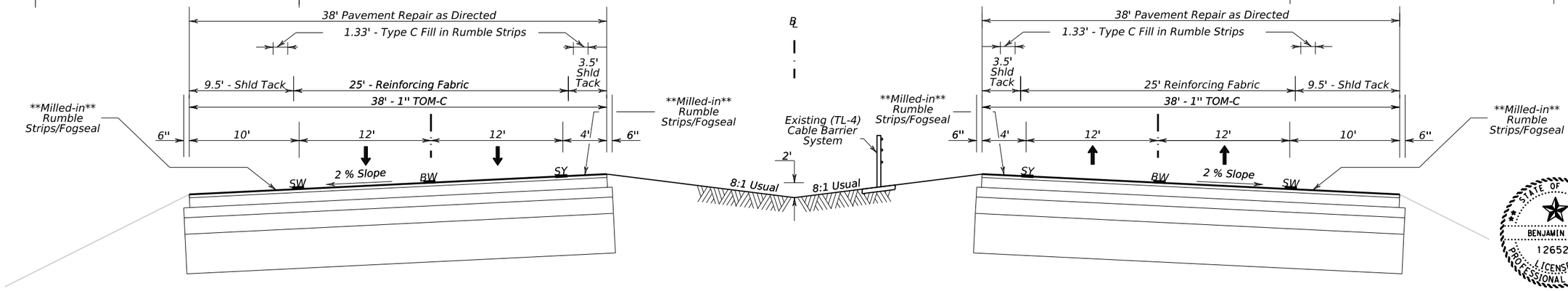
DW: DW
CK: CK
DW: DW



LEFT MAIN LANE
Sta 523+84.91 to Sta 549+00.00
Sta 580+00.00 to Sta 930+76.38

RIGHT MAIN LANE
Sta 524+29.93.00 to Sta 549+00.00
Sta 578+00.00 to Sta 931+14.17



Shift New Rumble Strips by 6" to Avoid Old Rumble Strips

LEFT MAIN LANE
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(Bridge Exception : Sta 561+91.90 to Sta 564+75.88)

RIGHT MAIN LANE
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(Bridge Exception : Sta 562+93.97 to Sta 565+22.03)

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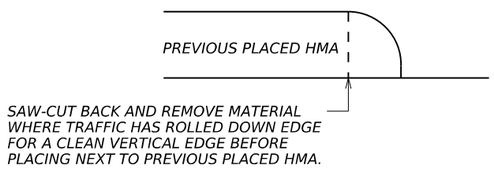

VERICAL EDGE DETAIL

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

PROPOSED TYPICAL SECTION
(LUBBOCK COUNTY)
NO SCALE

SHEET 5 OF 6

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		7

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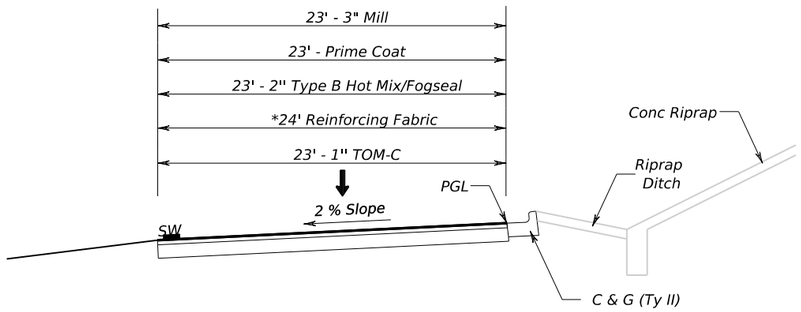

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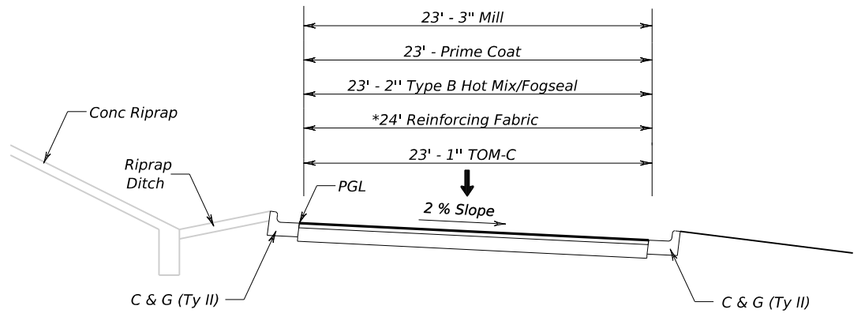

RIGHT RAMP

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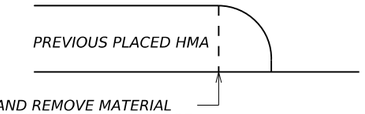
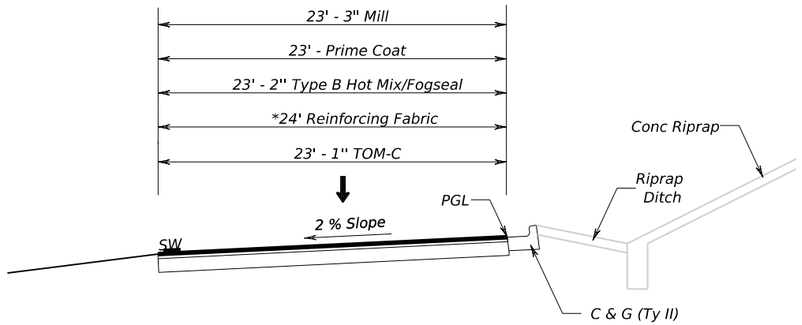


SAW-CUT BACK AND REMOVE MATERIAL WHERE TRAFFIC HAS ROLLED DOWN EDGE FOR A CLEAN VERTICAL EDGE BEFORE PLACING NEXT TO PREVIOUS PLACED HMA.

VERICAL EDGE DETAIL



LEFT RAMP

Sta 7+85 (Lt Ramp) to Sta 10+95 (Lt Ramp)
Sta 10+95 (Lt Ramp) to Sta 15+95 (Lt Ramp)(Trans SW Stripe)
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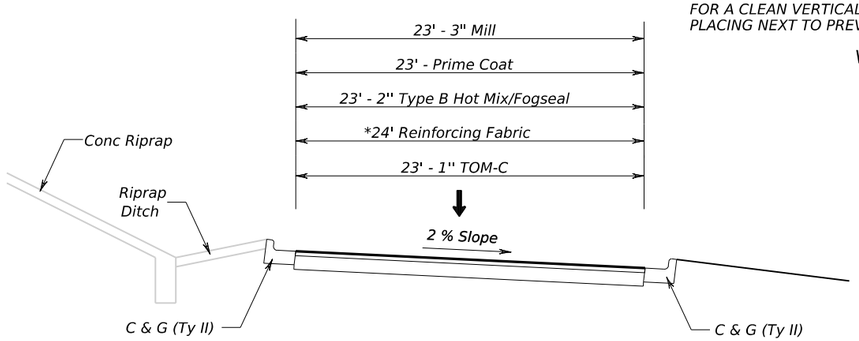
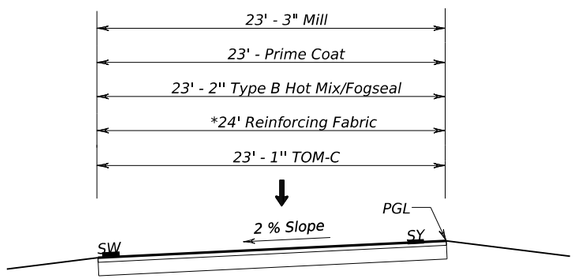


RIGHT RAMP

Sta 8+32 (Rt Ramp) to Sta 12+90 (Rt Ramp)
Sta 12+90 (Rt Ramp) to Sta 17+90 (Rt Ramp)(Trans SW Stripe)
Sta 22+47 (Rt Ramp) to Sta 28+38 (Rt Ramp)(Trans SW Stripe)



LEFT RAMP

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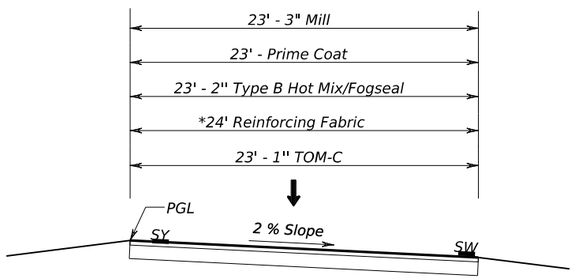
Sta 32+47 (Lt Ramp) to Sta 36+16 (Lt Ramp)



RIGHT RAMP

Sta 1+67 (Rt Ramp) to Sta 8+32 (Rt Ramp)
Sta 28+38 (Rt Ramp) to Sta 36+56 (Rt Ramp)

SW - Solid White Stripe (6")
SY - Solid Yellow Stripe (6")

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

PROPOSED TYPICAL SECTION
(LUBBOCK COUNTY)
NO SCALE

SHEET 6 OF 6

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		8

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GENERAL NOTES:

Hot Mix Basis of Estimate

ITEM	DESCRIPTION	*RATE (approx.)
341	2 IN. D-GR HMAC TYC, SAC-B, PG70-28	230 LBS/SY
347	1 IN. TOM-C, SAC-A, PG76-28	115 LBS/SY
347	5/8 IN. TOM-C, SAC-A, PG76-28	72 LBS/SY

*Actual rates will be determined by Engineer in Field

Hot Mix Area (SY)

CSJ	MIX TYPE	SY
0052-05-046	2” Type C	223867
0052-05-046	1” TOM	377568
0052-05-046	5/8” TOM	10589
0052-07-068	2” Type C	24117
0052-07-068	1” TOM	418524
0052-07-068	5/8” TOM	10831

Surface Treatment Basis of Estimate

DESCRIPTION	EMUL (ERSN CONT)	FOG SEAL	REINF. FABRIC	TACK COAT
ASPH TYPE & GRADE	CSS-1H	CSS-1H	PG76-28	PG
ASPH RATE (GAL/SY)	**0.26	**0.18	0.15	0.14

**Rate shown is after dilution to 50% Asphalt Emulsion and 50% Water or as directed.

Surface Treatment Area (SY)

CSJ	EMUL (ERSN CONT)	FOG SEAL	REINF. FABRIC	TACK COAT TY C	TACK COAT TOM Shldr
0052-05-046		261178	288954	223867	261178
0052-05-048	97342				
0052-07-068		60026	261575	24117	60026

County: Lamb, etc. **Control:** 0052-05-046, etc.

Highway: US 84 **Sheet 9**

W.S.C.R.P.

Provide coarse aggregate for all surface hotmix and overlays meeting a minimum class of **A** as published in the *AGGREGATE QUALITY MONITORING PROGRAM RATED SOURCE QUALITY CATALOGUE*.

Provide coarse aggregate for all base hotmix and surface treatments meeting a minimum class of **B** as published in the *AGGREGATE QUALITY MONITORING PROGRAM RATED SOURCE QUALITY CATALOGUE*.

General Requirements and Covenants - Items 1 thru 9

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

Neil Welch, Littlefield Area Engineer – neil.welch@txdot.gov (806) 385-3552
Alex Mendoza, Littlefield Assistant Area Engineer – alejandro.mendoza@txdot.gov (806) 385-3552

Contractor questions will be accepted through email, phone, and in person by the above individuals. Questions may also be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:

https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

All contractor questions will be reviewed by the Engineer. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page.

The Letting Pre-Bid Q&A web page for each project can be accessed by using the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.

Item 1 – Abbreviations and Definitions

Contract Prosecution – Each contract awarded by the Department stands on its own and as such, is separate from other contracts. A contractor awarded multiple contracts, must be capable and sufficiently staffed to concurrently process any and all contracts at the same time.

Item 2 – Instructions to Bidders

The following standards have been modified: GF(31)MS-19(MOD), HMIF(1)-98(MOD), and SMD(2-1)-24(MOD).

The construction time determination schedule will be posted on the Letting Pre-Bid Q&A web page.

View the plans on-line or download from the web at:
http://www.dot.state.tx.us/business/plansonline/agreement.htm
Choose "I Agree" then, "Click here", then "State-Let-Construction", pick the letting month, then "Plans" and then choose the plans set.

Order plans from any of the plan reproduction companies shown on the web at:
http://www.dot.state.tx.us/business/contractors_consultants/repro_companies.htm

By signing this proposal, a bidder acknowledges that he/she has a copy of the "Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges", adopted by the Texas Department of Transportation, September 1, 2024. This specification book may be purchased from the Department or downloaded at:
http://www.txdot.gov/business/resources/txdot-specifications.html

There is no survey data or cross-sections for this project.

Utilities

Overhead and underground utility installations exist within the project limits.

Call One Call to mark the locations of all utilities. Call the cities of Littlefield, Lubbock, Anton and Shallowater and TxDOT separately to have their respective utilities marked.

If any lights, signals, or other systems not part of the project are disconnected by the contactor, the contractor must restore all affected systems to working condition.

Item 5 – Control of the Work

Perform construction surveying in accordance with Article 5.9.3, "Method C."

Replace all damaged ROW and USGS monuments at the contractor's expense.

When deviation from the plans is requested by the Contractor, but not required for installation, the Contractor will bear any additional costs associated with the deviation.

Restore all disturbed areas due to trenching or any construction activity to a condition equivalent to the original condition within 14 working days from the time work began in the area including all necessary stabilization.

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

County: Lamb, etc. **Control:** 0052-05-046, etc.

Highway: US 84 **Sheet 9A**

At the end of each day remove from the ROW, inside or outside the project limits, any excess material and debris resulting from construction.

Correct any deficiencies identified during the final inspection including required paperwork.

Submit all required paperwork within 60 days of project acceptance.

Allow 5 business days for subcontractor approval.

Item 6 – Control of Materials

Use materials from pre-qualified producers. A list of material producers pre-qualified by the Construction Division (CST) of the Texas Department of Transportation (TxDOT) can be found at the following website:
http://www.txdot.gov/business/resources/producer-list.html

In addition to the requirements of the plans and specifications, make all material and equipment furnished, installed, modified, tested, or otherwise used on this contract, and becoming the property of TxDOT, fully functional within the manufacturer normal specifications, warranties, and guarantees. Make any additional functions of the material and equipment normally supplied by the manufacturer, but not specified by TxDOT, completely functional.

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

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

The Buy America Material Classification Sheet is located at the below link.
https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html for clarification on material categorization.

Provide the State 30 days to test all materials and resolve any disputes.

Item 7 – Legal Relations and Responsibilities

Coordinate street closures with the local fire, police, and other emergency personnel.

Maintain access to adjacent property at all times.

Notify, in writing, each residence and business 10 days prior to beginning construction of the phase/phases that are expected to affect their ingress and egress. This notice may be hand delivered or mailed.

When applicable, comply with all requirements of the Environmental Permits Issues and Commitments (EPIC) sheets.

Provide a lidded dumpster to be used by Contractor's personnel on the job site. The lid or covering to the dumpsters needs to be able to stay closed in high winds for preventing trash from being blown out. This shall be considered subsidiary to the various bid items.

Dispose of all waste materials in compliance with local, state, and federal regulations. Submit a list of all approved waste sites to the Engineer for review.

All vehicles in the work zone shall use flashing amber strobe lights visible 360 degrees.

No significant traffic generator events identified.

This project will require a railroad agreement, flagging, insurance, and right-of-entry.

Item 8 - Prosecution and Progress

This project is to be complete in 264 days and 16 months of barricades in accordance with the contract documents.

Liquidated damages as defined in SP 000-031 ($3,072) will be increased by the calculated road user cost of $1,890, for a total of $4,962 per day.

Monthly schedule updates are a very important aspect of managing the progress of this project. The Engineer may withhold the monthly estimate if the schedule update has not been received.

A bar chart will be required on this project.

Do not begin work before sunrise or end work after sunset unless authorized by the Engineer, and remove all equipment from the roadway before sundown.

Perform any erosion control measures such as seeding or sodding before beginning the next phase, or land, unless otherwise authorized by the Engineer.

Working days will be computed and charged in accordance with Article 8.3.1.4 Standard Workweek.

Shut down operations the working day before the following major traffic generating holidays: January 1st (New Year's); Last Monday in May (Memorial Day); July 4th (Independence Day); First Monday in September (Labor Day); Fourth Thursday in November (Thanksgiving); and December 24th (Christmas Eve).

County: Lamb, etc. **Control:** 0052-05-046, etc.

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If the season for TOM is past, time and work on the project will not be suspended until all other work is complete. When this work is complete, the Engineer will suspend time and work until TOM season begins.

The work zone shall not exceed 2 miles unless otherwise directed by the Engineer.

Payment for final 3% mobilization will be made once all project signage has been removed and all other items according to Article 500.3. Timeliness for submittal of required paperwork and correction of deficiencies is a consideration in developing the final contractor evaluation score.

Water may be hard to come by. Check for water restrictions.

The *60*-day convenience delay is for *aggregate stockpiling, median cable procurement, traffic signal pole fabrication, and high mast pole fabrication*.

Item 9 - Measurement and Payment

Submit material-on-hand payment requests by the monthly estimate cutoff date.

Material-on-hand will be paid item for item regardless of how the work was bid.

Item 134 - Backfilling Pavement Edges and Item 150 - Blading

Salvage existing topsoil and grass in windrows along the edge of the grading operations, or as directed by the Engineer. As a land is finished, spread the adjacent topsoil and grass uniformly over the disturbed area. Perform this work in phases not to exceed three miles, unless otherwise authorized by the Engineer.

Some reshaping of the ditch back slope may be required.

Water will be required as directed by the Engineer to compact backfill the pavement edges.

Item 314 - Emulsified Asphalt Treatment

Apply the emulsified asphalt and water mixture, as directed by the Engineer.

Item 315 - Fog Seal

Apply the emulsified asphalt and water mixture, as directed by the Engineer.

Item 320 – Equipment for Asphalt Concrete Pavement

Provide waterproof tarpaulins on all hauling equipment.

Items 341 and 347 – Hot Mix Asphalt Pavement

Provide a summary spreadsheet for each lot in accordance with Article 520.2 of the Standard Specifications.

Design the mixture with a Superpave Gyratory Compactor (SGC).

Aggregate will be subjected to five cycles of the magnesium sulfate soundness test in accordance with Test Method TEX-411-A. The loss shall not be greater than **20** percent.

The mix will be evaluated for stripping through the boil and hamburg wheel tests. If it is determined to be stripping then 1% lime, liquid anti-strip or a warm mix additive proven to prevent stripping will be required.

Schedule the placement width for the final hotmix surface in such a manner that all joints will coincide with proposed lane lines (+/- 6 inches).

Except for SMA Hot Mix, provide emulsified trackless asphalt for tack coat at a rate of 0.10-0.14 gal/sy.

The Contractor will be required to tack 100% of the surfaces prior to the subsequent lift including all vertical joints.

Use a self-propelled, wheel-mounted material transfer vehicle (MTV) capable of receiving hot mix from the haul trucks separate from the paver on this project or provide the PaveIR. Minimum requirements for the MTV are a storage capacity of approximately 25 tons, a pivoting discharge conveyor, a means of completely remixing the ACP prior to placement, and a paver hopper equipped with a separate surge storage insert with a minimum capacity of approximately 20 tons.

Provide straight edges including the outside edge. Any edges not conforming to the typical sections will be cut and removed at the Contractor's expense.

Lay the shoulders first, then the main lanes.

No TxDOT RAP is available for this project.

Do not pave when temperatures get below 32 degrees F in a 12 hour period.

No substitute PG grade binders will be allowed.

Provide a square edge by sawcutting before laying the adjacent lane of hotmix as directed by the Engineer.

Do not place hotmix if the sustained wind speed gets to over 25 miles per hour.

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Highway: US 84 **Sheet 9C**

Seal all joints between hotmix and curb and gutter.

All calibration pans will be mixed within the Lubbock District. Notify the Engineer two days prior to mixing pans to allow ample time for a TxDOT Level 2 technician to witness the calibration pans to be mixed.

Below is a quick attempt at setting required sample sizes for hot mix referee and performance tests. The table goes by number of sample boxes that everyone is familiar with. These are the 3 inch tall boxes that come white or brown. They can hold between 10,000g – 14,000g of mix.

Test	*Number of Boxes*
Lab molded density	*2*
Asphalt Content and Gradation	*1*
Hamburg	*2*
Overlay	*3*

Notice that the performance tests take 5 boxes total if both Hamburg and Overlay tests are to be done. Please talk to your contractor 1A technicians about sampling enough mix to set aside in case there would be performance tests needed to make decisions later in the project.

Item 341– Dense-Graded Hot-Mix Asphalt

PG 70-28 asphalt is required for this project.

Asphalt stabilized base will not be allowed as RAP.

Fractionate the RAP if used in the mixture design.

Post-consumer RAS will not be allowed.

No exempt production on driving lanes and shoulder.

The TY C hotmix is considered a surface layer and is subject to the Minimum Pavement Surface Temperature requirements in Tables 14A and 14B.

Item 347 – Thin Overlay Mixtures (TOM)

PG 76-28 asphalt is required for this project.

Place thin overlay mixture between May 1 and September 30.

Tack coat for the horizontal surface not receiving fabric prior to TOM placement will not be required. The reinforcing fabric binder will perform as the tack coat.

Tack coat all vertical joints unless otherwise directed.

Cement and kiln dust will not be allowed to be used as mineral fillers.

RAP will not be allowed.

If TOM fails performance tests then remove the Reinforcing Fabric and TOM, then relay new TY D, Reinforcing Fabric, and TOM at the Contractor's expense.

Locally sourced material may not produce a passing TOM mix.

Item 351 – Flexible Pavement Structure Repair

Saw cut at least two inches deep around the edges of concrete or asphaltic pavement to be removed, unless otherwise directed by the Engineer.

The type and grade of tack coat shall be AC or PG.

The type and grade of prime shall be AE-P.

A motor grader will be allowed only as directed by the Engineer.

Use a roadway structure of 6" TY C Hotmix placed in two 3" lifts for full depth repairs. Use a roadway structure of 2" TY C Hotmix placed in one lift for surface repairs.

The minimum repair area shall be 10' wide by 20' long.

Pavement repair shall be performed the same day as the mill and fill operation.

The full pavement repair design constitutes the flexible pavement repair and the overlying pavement.

Item 354 – Planing and Texturing Pavement

TxDOT to retain possession of planed material from Lamb County Mill and Inlay. The material will be approximately 5,600 CY and stockpiled at West US 84 and SL 430 intersection. Contact is Curt Masters 806-385-3661. Contractor to retain possession of all planed material from Lubbock County.

Item 416 – Drilled Shaft Foundations

For large diameter drilled shafts, when water is encountered during drilling and slurry is not used, the shaft needs to be re-worked the next day to achieve proper skin friction capacity.

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Reinforcement in drill shafts shall either be epoxy coated or galvanized rebar. Uncoated steel will not be allowed.

Item 420 - Concrete Substructures

Furnish and place preformed fiber material, a minimum one-half (1/2)-inch thick, as shown on the plans or directed by the Engineer.

Furnish a temperature recorder with the minimum capabilities of a 7-day recording time, 2 degree F division, and 120 VAC with 9-volt backup, for each curing tank used on the project. Supply all charts, recording pins, and other equipment necessary for complete operation of the temperature recorder during the project. The temperature recorder and all associated equipment will not be paid directly, but will be subsidiary to the various bid items.

Use Grade 3 or Grade 4 coarse aggregate in all concrete structures.

Cold weather protection requirements within 72 hours of a concrete pour as per the following table:

PROJECTED LOW TEMP	PROTECTION REQUIRED
< 20 degrees	DO NOT POUR
20-27 degrees	cover with plastic, then a insulating blanket, and plastic on top
28-35 degrees	cover with plastic, then a insulating blanket
> 35 degrees	no protection required

All projected temperatures will be based on the NOAA website. None of the above actions releases the Contractor from the responsibility for freeze damaged concrete for whatever reason.

Coring of structural classes of concrete will be at the Engineer's discretion. All coring of miscellaneous concrete shall be at the Contractor's expense including all prep work. Coring must be completed within 3 days of notice of failing 28-day samples; otherwise pay deductions apply using 28-day compressive strength.

Provide TY II curing compound for all curb and gutter, sidewalks, driveways, curb ramps, riprap, and cast-in-place SET's.

When doweling into concrete, clean out the hole, fill completely with epoxy, then place the dowel. Do not dip the dowel into epoxy first and shove it into the hole.

Do not place concrete when the wind gusts get to over 25 miles per hour.

Vibrate all concrete.

Provide the State with 48 hours notice before pouring concrete.

Item 421 - Hydraulic Cement Concrete

If fly ash is used, a maximum of 35% will be allowed.

Provide air entrainment in all concrete except for concrete used in drilled shafts and precast concrete members. Target an entrained air content of 4.0% +/- 1% for concrete pavement and 5.5% +/- 1% for all other concrete requiring air entrainment. Ensure the minimum entrained air content is at least 3.0% for all classes of concrete.

The Engineer will perform all concrete job control testing.

Immediately resample and retest the concrete if the air entrainment is more than 3% above the target range at time of placement. If the concrete exceeds the air range after the retest, and is used at the Contractor's option, the Engineer will make strength specimens as specified in Article 421.5., "Acceptance of Concrete."

Supply 2 – 4' x 8' sheets from a material that is flat, rigid, and non-absorbant, in order to perform required testing procedures at the location of concrete placements.

Use 4-inch by 8-inch cylinder molds for concrete with Grade 3 or smaller coarse aggregate. Supply new cylinder molds and lids subsidiary to the various bid items.

Provide sulphate resistant concrete for drilled shafts and bridge structure components in contact with the soil.

Concrete plant must be capable of providing automated moisture content control for both coarse and fine aggregate.

Item 427 - Surface Finishes For Concrete

Provide surface area I concrete surfaces with a rub finish as soon as forms are removed.

Item 432 - Riprap

Provide 5-inch thick Class A concrete for the median cable mow strip. Provide 5-inch thick Class B concrete for all other riprap, unless otherwise indicated in the plans.

Riprap shall be 3' wide and as shown in the plans.

Reinforcing steel for regular riprap will be #3 bars on 12"x12" spacing or #4 bars on 18"x18" spacing centered in the slab.

Reinforcing steel for mowstrip riprap will be #3 bars and placed at 16"x16" on centers. The center piece of reinforcing steel that falls over an anchoring hole/shaft may be cut to allow placement of cable fence posts.

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Fiber reinforcement or welded wire will not be allowed.

Provide one-half (1/2)-inch thick expansion joint material at approximately 100-foot intervals, or as determined by the Engineer.

3 pieces of longitudinal steel shall be placed in all cable barrier mowstrip.

Transverse bars shall be 32" in length and placed every 16" longitudinally.

Except where expansion joints are located, place tool joints every 20 ft for the length of the mowstrip.

Excavate trench for mow strip after blading.

Backfill mowstrip within 2 weeks of concrete placement. This will be considered subsidiary.

Follow cold weather protection requirements listed under Item 420.

Seal between concrete boundaries.

Item 502 - Barricades, Signs And Traffic Handling

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

Additional signs and barricades as directed by the Engineer shall be considered subsidiary to Item 502.

Provide flashing portable arrow panels for all lane closures.

Wash the channelizing devices and barricades following each rainfall or snowfall event and at times deemed necessary by the Engineer.

To ensure the safety and convenience of traffic, flaggers may be required when construction machinery is being operated along, across, or adjacent to lanes carrying traffic. If considered necessary by the Engineer, supplemental signs and barricades may be required.

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

Barricades, Signs and Traffic Handling is a plan quantity item. If time is suspended, no additional compensation will be made.

Traffic switches will not be permitted on Fridays or any working day preceding a holiday unless authorized by the Engineer.

Cones or chevrons may be used in lieu of vertical panels at the discretion of the Engineer. Cones cannot be used to separate opposing traffic.

Construct temporary ramps to maintain access to driveways and city streets as directed by the Engineer. Temporary ramp construction is subsidiary to Item 502.

The Contractor shall bid the traffic control plan shown in the plans. Any proposed alterations to the TCP (combining work areas / phasing / etc.) shall be submitted to the Engineer at least 10 days prior to anticipated changes.

Even when not explicitly shown in the project TCP, vertical panels shall be used with an opposing lane divider every 5th panel in accordance with BC(9) for all opposing traffic conditions without a positive barrier.

Square tubing sign supports may be used for temporary construction signs. Aluminum and wood signs may be mounted if the vertical supports are embedded into the ground. Square tubing supports on skids which are typically held in place with sand bags can only support signs made of light weight flutted plastic.

Any trench or drop off over 2” and less than 10” will require a safety slope of at least 1:1 if drop off is going to be existing for more than 2 nights. For drop-offs greater than 10”, a safety slope will be required at the end of operations for that day. This safety slope may be constructed with RAP, embankment, or other material approved by the Engineer. The placement, maintenance, and removal of this safety slope is the responsibility of the Contractor and will be considered subsidiary to the various bid items.

Provide an all-weather surface for all sections of the roadway prior to time suspension as directed by the Engineer. The all-weather surface shall be the original undisturbed asphalt pavement or a one course surface treatment on the constructed roadbed as shown in the typical sections.

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

Correct all noted deficiencies within 7 calendar days, otherwise, cease all operations until the noted deficiencies are corrected.

Stockpiles that meet the barricade requirements as shown on the BC(10) Standard are required to be erected at the time of material delivery in the Right-of-Way and maintained as long as the stockpile exists. Payment for Material-on-Hand will be withheld from the estimate for

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inadequate barricades or the failure to maintain barricades on a per stockpile basis as determined by the Engineer.

Like new traffic control devices will be required at the initial setup for all projects or as approved by the Engineer.

Provide flags and a CW8-15P “MOTORCYCLE WARNING” plaque on all CW20-1D “ROAD WORK AHEAD” signs except on side roads.

Use only the work zone speed limit and TCP signs that are relevant to the active work area and as directed. Reset signs for subsequent work phases as work progresses and approved by the Engineer. Reset normal speed limit signs as directed.

Stop adjacent traffic using TCP(1-2) during the application of asphalts unless otherwise authorized by the Engineer.

Provide pilot cars as directed by the Engineer.

Project limit signage is required on both sides of the roadway on a divided highway. Two sets of perimeter signs will be required.

All bid items and work requiring traffic control is the responsibility of the contractor, even when not explicitly detailed in the plans. Consider this work subsidiary to Item 502.

TMAs and Portable Changeable Message Boards will not be used as Arrow Boards.

When the roadway is open to traffic and final striping is completed, any subsequent work shall be done under daytime traffic control.

This project is for daytime work only. If you elect to work at night, all expenses for night work will not be compensated for.

The contractor is to respond on-site within 30 minutes to any traffic control maintenance after wind events, storms, etc., and as directed by the Engineer.

Ground mount all signs if possible.

All placards shall be 18”x18”.

Item 503 - Portable Changeable Message Sign

Provide messages as directed by the Engineer.

Provide 2 solar powered changeable message signs for the duration of this project.

Inform the public 2 weeks before construction begins.

Item 504 - Facilities for Field Laboratory

Furnish one Type B and one Type D structure. Field laboratory shall be located adjacent to the project site.

The field office is to remain in place until the project is accepted.

The Contractor will furnish a concrete cylinder breaker and cylinder bath, subsidiary to the furnished field laboratory. Provide calibration documentation for all supplied equipment.

Partition the floor of the Type D structure into a minimum of three interconnected rooms. Furnish each room with a door. Type D structure must have at least two windows and two exterior doors. Block and tie down portable structures.

Equip the Type D field lab with an eyewash facility capable of flushing the eyes for at least 15 minutes, connected to the main water supply or an approved stand-alone water supply.

Provide 2 tables and 1 meeting table. Provide 1 chair for each table and 6 chairs for the meeting table. Provide 2 filing cabinets. Equip the field lab with window blinds.

Provide internet connectivity, a printer/fax/scanner/copier, and telephone service to field offices, including installation, monthly charges and the phones.

Equip all field field labs with a surge protector at the circuit breaker panel.

Item 505 – Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)

Provide 2 TMAs for stationary use for the duration of the project. Stationary TMAs will be used during the various phases of work required for this project. Payment will be made by the day for each TMA used in stationary operations.

A TMA is considered stationary when the TMA is parked more than 15 minutes.

Provide 3 TMAs for mobile use. Mobile TMAs will be used for moving operations such as striping and RPM placement. Payment will be made by the day for each TMA used in mobile operations.

Item 506 - Temporary Erosion, Sedimentation, and Environmental Controls

Place a weatherproof bulletin board containing the TCEQ required information on the project at a site directed by the Engineer. Post the following documents: (1) "TCEQ TPDES Storm Water Program" Construction Site Notice and (2) TCEQ "TPDES Permit." Place rain gauge(s) at locations designated by the Engineer. At the completion of the contract, the bulletin board

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will become the property of the State and will remain in place until 70 percent vegetation coverage has been obtained.

Provide long-term, Type 1 construction exits, located at the Contractor's equipment storage area.

Silt fence, sandbags and other BMPs will be placed and relocated as directed by the Engineer in order to comply fully with the SW3P requirements.

The soil area disturbed by this project, including all disturbed areas within the limits of this project as described in the Contract and at Contractor project specific locations (PSLs) within one mile of the project limits, contributes to the establishment of the Texas Commission on Environmental Quality (TCEQ) Construction General Permit (CGP) requirements for storm water discharges. The Department will obtain an authorization from the TCEQ to discharge storm water for construction activities shown on the plans. The Contractor shall obtain the required authorization from the TCEQ for Contractor project specific locations (PSLs) for construction support activities off the right-of-way. As directed by the Engineer, the Contractor shall obtain any required authorization from the TCEQ for on-site PSLs. When the total area disturbed within the project limits and at PSLs within one mile of the project limits exceeds five acres, the Contractor shall provide a copy of the Contractor’s Notice of Intent (NOI) submission and Construction General Permit for PSLs on the right-of-way to the Engineer (and submit a copy of NOIs to appropriate MS4 operators).

Sediments removed from BMPs shall be paid for by force account. The Contractor shall submit an invoice for the work.

Correct all noted deficiencies within 7 calendar days, otherwise, cease all operations until the noted deficiencies are corrected.

Maintain 100 feet of silt fence, 100 feet of erosion control logs, and 50 sandbags on site at all times for repairs/replacement as needed.

Water for dust control at least twice a day for all areas that are disturbed but not stabilized.

Set SWP3 measures by phase.

Provide mulch/wood chips for erosion control logs. Straw will not be allowed.

Item 512 - Portable Concrete Traffic Barrier

Reimbursable repair or replacement will be paid at contract bid prices.

Reflectors are required every 100 ft per BC Standards.

Item 533 – Rumble Strips

Use Option 4 for edgeline rumble strips.

Item 540 - Metal Beam Guard Fence

Mount an amber or white delineator on the guard fence post at 100-foot intervals. Use prismatic reflective sheeting. Place a minimum of three delineators at each metal beam guard fence placement.

All metal beam guard fence shall have steel posts.

Material-on-hand for metal beam guard fence rail will not be paid unless it is properly stored (out of the elements) to reduce white rust.

Existing metal beam guardfence posts may be set in concrete.

Reimbursable repair or replacement will be paid at contract bid prices.

Install the MBGF from the structure out to ensure proper post spacing and connection to the concrete rail.

Hammer drilling will not be allowed when attaching the MBGF transitions to the concrete rail.

Backfill existing post holes after removing existing metal beam guard fence prior to installing new posts.

Item 543 – Cable Barrier System

Reimbursable repair or replacement will be paid at the contract bid prices,

All systems and requisite components shall meet TL-4 criteria.

Only pre-stressed cables shall be used.

Drilled shafts are considered subsidiary to this item.

Follow the manufacturer's installation and handling instructions and/or recommendations.

Cable post and anchor delineators will be considered subsidiary to Item 543 and shalkl be placed as near to 80' increments as practical.

Delineators attached to the cable barrier as shown in D&OM(6) shall be double sided and are subsidiary to Item 543.

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Ensure that the cable barrier manufacturer provides training to TxDOT maintenance forces and local emergency personnel on how to extract, repair, and maintain the system after it has been hit.

Item 544 – Guardrail End Treatments

Reimbursable repair or replacement will be paid at contract bid prices.

All guardrail end treatments shall have steel posts.

Guardrail end treatments require object marker stickers in accordance with D&OM (VIA).

Item 585 - Ride Quality for Pavement Surfaces

Use Surface Test Type B.

"Pay Adjustment Schedule" number 3 will be used on this project.

Provide IRI score to the Engineer before and after construction.

Corrective action, when required, shall be diamond grinding, as approved and directed by the Engineer. This work is considered subsidiary.

Item 610 – Roadway Illumination Assemblies

For project specific shop drawings, furnish seven sets of drawings of the complete assembly in accordance with Item 441, "Steel Structures". Deliver shop drawings to the Engineer at the project address.

Provide a schedule and notify the District Traffic Office a minimum of 3 days prior to any illumination installation. Contact via email at LBB-TRFOPS@TxDOT.GOV.

Item 618 - Conduit

The location of conduit is diagrammatic and may be varied to meet local conditions upon approval of the Engineer. Ensure all couplings and connectors are made wrench tight. Trenching depths shall provide a minimum of 2.5 feet (30 inches) of cover unless otherwise approved by the Engineer. The Contractor must ensure that conduit is not damaged during trench or bore pit backfilling operations. No conductors shall be pulled through conduit until all backfilling for the conduit run is complete and the template, having a diameter of not less than 75 percent of the inside diameter of the conduit, has been drawn through the conduit. Open ends of all conduit shall be fitted with temporary caps or plugs to prevent entry of dirt or debris during construction operations. A non-metallic pull rope shall be used to pull electrical conductors and traffic signal cables through non-metallic conduit. A flat, high tensile strength polyester fiber pull rope shall be pulled through each conduit run and shall remain in the conduit for future use.

A minimum of three feet of pull rope shall be neatly left coiled in the ground boxes at each end of the conduit run. The pull rope will not be paid for directly but shall be considered subsidiary to Item 618, "Conduit." After the work is completed, the Contractor shall restore any curbs, walks, driveways or raised concrete medians which have been damaged or disturbed to an equivalent original condition and to the satisfaction of the Engineer. This work shall not be paid for directly but shall be considered subsidiary to Item 618, "Conduit."

Use HDPE conduit for all traffic and illumination portion of this project. Bored conduit runs placed under driveways and streets or highway approaches shall maintain a minimum of 30 inches below the proposed natural ground elevation or 36 inches below the existing driveway or proposed top of pavement backfill and compact trenches the same day or erect plastic fencing to discourage entry into the trenched area by pedestrians or vehicles.

Item 620 – Electrical Conductors

Grounding conductors that share the same conduit, junction box, ground box or structure shall be bonded together at every accessible point in accordance with the electrical detail sheets (ED), and the latest edition of the National Electrical Code.

Use certified persons to perform electrical work. See Item 7 Section 18 "Electrical Requirements" for additional details.

Item 628 - Electrical Services

The STATE will be responsible for energy consumed and monthly telephone charges occurred by the new electrical service locations. These charges should be billed to the Texas Department of Transportation, 135 Slaton Highway, Lubbock, TX 79404-5201.

Provide circuit breaker and install when additional circuit from existing electrical service is called for in the plans.

Concrete for service pole foundations, when required, will be Class C and will be in accordance with Item 421: Hydraulic Cement Concrete, except that concrete will not be paid for directly but is to be considered subsidiary to Item 628: Electrical Services. Reinforcing steel for service pole foundations, when required, will be in accordance with Item 440: Reinforcing Steel, except that reinforcing steel will not paid for directly but is to be considered subsidiary to Item 628: Electrical Services.

If you disconnect any lights or signals that are not directly part of the project to do work for the project, then reconnect everything back to proper working order.

Item 644 - Small Roadside Sign Assemblies

All signs on this project, new or relocated, will require a retroreflective wrap on the sign support. This wrap shall be 12 inches in height, visible in all directions and shall be placed 3 ft.

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below the bottom of the sign. The color for YIELD, STOP, WRONG WAY, and DO NOT ENTER signs shall be red. The color for all other signs shall be yellow. This retroreflective wrap will not be paid for directly but considered subsidiary to Item 644.

Stake all sign locations, and receive approval from the Engineer, prior to sign placement.

The triangular slip bases will be the two bolt clamp type (Southern Plains Fabrication or equivalent). For more information refer to the approved materials producers list: http://www.txdot.gov/business/resources/producer-list.html

New sign studs and new sign posts will be necessary for relocating existing signs.

Item 647 – Large Roadside Sign Supports and Assemblies

To adjust the height of the existing sign, welding will only be allowed at the bottom of the flange.

Items 644 & 647

For all signs designated for removal:

- Salvage aluminum signs,
- Palletize and band salvaged aluminum signs,
- Stockpile signs at the Lamb County Maintenance Office in Littlefield, Texas. The office number is 806-385-3661. The contact is Curt Masters.

Item 658 - Delineator and Object Marker Assemblies

Delineator and object marker assembly posts shall be driveable and composed of post-consumer recycled materials. Embedded stub shall be perforated square tubing.

Driveable posts shall be the three-piece Flexible Delineator Post System, utilizing a 2-3/8" round post with a square to round flexible joint. The Embedded Anchor shall be 2" x 12 gauge x 24" long steel perforated square tubing. The Posts shall be permanently sealed at the top and have a 3-1/2" wide x 13" flattened surface to accommodate up to a 3" x 12" reflective sheet on both sides.

Surface Mount posts shall be the three-piece Flexible Delineator Post System, utilizing a 2-3/8" round post with a square to round flexible joint. The Base shall have 6 mounting holes to accommodate for mounting on narrow headwalls as well as all surfaces. The Posts shall be permanently sealed at the top and have a 3-1/2" wide x 13" flattened surface to accommodate up to a 3" x 12" reflective sheet on both sides.

Guard Fence Delineator posts shall be 33" in length and permanently sealed at the top and have a 3-1/2" wide x 13" flattened surface to accommodate up to a 3" x 12" reflective sheet on both

sides. They shall be flattened on both ends and transition to 2-3/8" round in the center for 360-degree visibility.

Item 662 - Work Zone Pavement Markings

Use short-term removable striping as directed by the Engineer.

Water based paint may be used for all non-removable striping if not prohibited in the plans and authorized by the Engineer. If water based paint is used, there will be no payment for striping refresh.

The deviation rate in alignment shall not exceed one inch per 200 feet of roadway. The maximum deviation shall not exceed 2 inches nor shall any deviation be abrupt. Striping not in conformance shall be removed and replaced at the Contractor's expense.

No guide markers will be placed on a finished surface unless they fall on a proposed lane line. Stick-down markings will be removed by the Contractor prior to final marking.

Remove tabs at the same time as the RPM placement. Cut off tabs or remove by a method acceptable to the Engineer.

Type I markings must be at least one twenty-fifth (1/25) of an inch thick.

Remove ceramic buttons, RPMs, and Adhesives as directed by the Engineer. Payment for this work is subsidiary to Item 662.

Use thermoplastic adhesive to glue down work zone buttons and RPMs. Bituminous adhesive will not be allowed.

Dispose of the backing from tabs in an appropriate manner.

Any roadway opened to traffic shall be striped within 14 days.

Item 666 - Reflectorized Pavement Markings

Mark the location of standard pavement markings, including barrier lines, no passing zones, gores, and transitions adjusting to meet latest standards or as directed by the Engineer.

After completion of all work and removal of the barricades, time charges will be suspended. The performance period for the project will not begin until all the striping has been completed. Final acceptance will not be granted until the performance period for pavement markings is complete. If replacement markings are needed, traffic control for moving operations will be required. No payment will be made for traffic control during replacement striping work. All traffic control work shall be considered subsidiary to the project's replacement striping work.

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The yellow or white long-line striping for re-striping operations will not lag one another by more than four (4) working days. The performance period for a roadway will not begin for a section of roadway or a project until all required striping for that section or project has been completed.

Provide a schedule and notify the District Traffic Office a minimum of 3 days prior to any striping operation. Contact via email at LBB-TRFOPS@TxDOT.GOV. If not notified, the time frame for testing and meeting the Retroreflectivity requirements in article 4.4 will start the day the department is made aware of that the markings have been applied.

Item 668 - Prefabricated Pavement Markings

Reference the "Standard Highway Sign Designs for Texas" manual for dimensions to words and symbols.

Manufacturer's sealer is subsidiary to this item. Surface preparation will be paid for separately under Item 678.

Item 677 - Eliminating Existing Pavement Markings and Markers

Eliminate existing pavement markings on asphalt surfaces by the Blasting Method.

Payment for covering a solid yellow line with a broken yellow line next to it, parallel to the centerline of the highway, will be by the linear foot. This payment will be made only once for two stripes side-by-side.

Item 680 - Highway Traffic Signals

Provide a schedule and notify the District Traffic Office a minimum of 3 days prior to any signal installation. Contact via email at LBB-TRFOPS@TxDOT.GOV.

Turn all non-operational signal heads down facing the roadway surface, or completely cover the lenses with an opaque material. The location of signal poles, conduit, ground boxes and controllers may be adjusted to accommodate existing utilities or local conditions with prior approval of the Engineer. Verify the location of all existing utilities in the field prior to construction. Provide a technician on call in the city at all times during the required 30-day test period.

Cameras and monitors will be furnished by the State under a force account and installed in accordance to the manufacturer's recommendations.

Item 682 - Vehicle and Pedestrian Signal Heads

Provide aluminum vehicle and pedestrian signal heads for this project. Furnish ABS formed black plastic back-plates with the vehicle signal heads. Attach back-plates to the vehicle signal

heads and with a minimum of ½ inch of material from the edge of mounting holes to the near edge of the back plate. Furnish aluminum visors for vehicle signal heads.

Mount the signal head for horizontally mounted vehicle signal heads, at least 18 feet but no more than 20 feet, above the pavement grade measured from the center of the roadway to the bottom of the signal head.

Item 685 – Roadside Flashing Beacon Assemblies

Provide screw-in foundations.

Provide a schedule and notify the District Traffic Office a minimum of 3 days prior to any flashing beacon installation. Contact via email at LBB-TRFOPS@TxDOT.GOV.

Item 686 - Traffic Signal Pole Assemblies (Steel)

Use bracket assembly Option C of the SMA-100 and DMA-100 Standard Sheets for signal head mounting for both horizontal and vertical mount signal heads. Check foundation elevations to assure compliance with mounting height requirements.

Attach dampening devices to mast arms 36 feet in length and longer. Dampening will not be paid for directly, but will be considered subsidiary to Item 686 – "Traffic Signal Pole Assemblies".

Internally wire signal cable for the vehicular signal heads without drip loops. Thread the hole in the mast arm shaft leading into the astro-bracket mount for a CGB connector or a galvanized pipe nipple. Furnish and install CGB connectors or galvanized pipe nipples. The materials and work necessary will not be paid for separately but will be considered subsidiary to Item 686 – "Traffic Signal Pole Assemblies".

Item 730 - Roadside Mowing

Mow full-width from pavement edge to Right-of-Way line 4 times. The Engineer shall dictate the times to mow and the areas in the project to mow.

Each mowing cycle is for the entire project in each county. Lamb County is 248 acres. Lubbock County is 136 acres.

Notify the Engineer by 9:00 am each day for work completed the previous day, including hand trimming and cleanup. The Engineer will then inspect the section(s) of roadway for acceptance, not more than two (2) working days after notification.

Mobile TMA will be required where median cable is present and the mower deck extends into the roadway.

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Truck mounted attenuators shall be used while mowing.

Item 734 – Litter Removal

Perform litter removal prior to mowing and as directed by the Engineer.

Item 3002 – Reinforced Paving Mat for Asphalt Pavement Overlays

Provide a letter from the manufacturer that authorizes the installer to install the product.

Submerge a 2 in x 2 in of sample in D-Limonene or other approved solvent for 60 minutes. The result is passing if the solvent remains clear.

Don't install more reinforcing fabric that can't be covered that same day.

Provide PG76-28 binder at a rate of 0.15 gal/sy.

Item 6016 – Temporary Speed Monitoring System

Provide 2 speed monitoring trailers for this project.

Utilize the speed monitoring trailers on the project for the duration of this project as directed for the protection of the workers.

Change locations of speed monitoring trailers on a regular basis to improve driver attention.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0052-05-046 **DISTRICT** Lubbock **COUNTY** Lamb, Lubbock
HIGHWAY US 84

													TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB		**0052-05-046**		**0052-05-048**		**0052-05-049**		**0052-07-068**			
			PROJECT ID		**A00124675**		**A00196968**		**A00198764**		**A00121086**			
			COUNTY		**Lamb**		**Lamb**		**Lamb**		**Lubbock**			
			HIGHWAY		**US 84**		**US 84**		**US 84**		**US 84**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	106-7002	OBLITERATING ABANDONED ROAD		SY	1,632.000								1,632.000	
	132-7005	EMBANK (FNL)(OC)(TY C)		CY	42.000								42.000	
	134-7002	BACKFILL (TY B)		STA			10.000						10.000	
	150-7001	BLADING		STA			10.000						10.000	
	216-7001	PROOF ROLLING		HR	20.000		10.000				20.000		50.000	
	314-7011	EMULS ASPH (EROSN CONT)(CSS-1H)		GAL			25,309.000						25,309.000	
	315-7004	FOG SEAL (CSS-1H)		GAL	47,012.000						10,805.000		57,817.000	
	341-7028	D-GR HMA TY-C SAC-B PG70-28		TON	25,745.000						2,773.000		28,518.000	
	341-7082	TACK COAT		GAL	31,341.000						3,376.000		34,717.000	
	347-7003	TOM-C PG76-28 SAC-A		TON	22,091.000						24,455.000		46,546.000	
	347-7011	TACK COAT		GAL	12,406.000						16,339.000		28,745.000	
	351-7001	FLEXIBLE PAVEMENT STRUCTURE REPAIR(2")		SY	10,634.000						11,030.000		21,664.000	
	351-7005	FLEXIBLE PAVEMENT STRUCTURE REPAIR(6")		SY	7,089.000						7,353.000		14,442.000	
	354-7031	PLANE ASPH CONC PAV(0" TO 1")		SY	427.000						551.000		978.000	
	354-7051	PLANE ASPH CONC PAV(2")		SY	223,440.000								223,440.000	
	354-7052	PLANE ASPH CONC PAV(3")		SY							24,177.000		24,177.000	
	416-7028	DRILL SHAFT (SIGN MTS) (24 IN)		LF			128.000						128.000	
	416-7038	DRILL SHAFT (HIGH MAST POLE) (66 IN)		LF			198.000						198.000	
	416-7044	DRILL SHAFT (TRF SIG POLE) (36 IN)		LF			26.000						26.000	
	416-7045	DRILL SHAFT (TRF SIG POLE) (42 IN)		LF			36.000						36.000	
	429-7008	CONC STR REPR(RAPID VERT AND OVERHEAD)		SF	200.000								200.000	
	432-7002	RIPRAP (CONC)(5 IN)		CY			15.920						15.920	
	432-7014	RIPRAP (MOW STRIP)(5 IN)		CY			2,540.000		35.200				2,575.200	
	451-7024	RETROFIT RAIL (TY SSTR)		LF					200.000				200.000	
	483-7016	SHOT BLASTING		SY	44.000								44.000	
	496-7037	REMOV STR (PIPE)		EA	1.000								1.000	
	500-7001	MOBILIZATION		LS	0.440		0.130				0.430		1.000	
	502-7001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	7.000		3.000				6.000		16.000	
	503-7001	PORTABLE CHANGEABLE MESSAGE SIGN		DAY	422.000		125.000				413.000		960.000	
	505-7001	TMA (STATIONARY)		DAY	232.000		69.000				227.000		528.000	
	505-7003	TMA (MOBILE OPERATION)		DAY	36.000		10.000				35.000		81.000	
	506-7020	CONSTRUCTION EXITS (INSTALL) (TY 1)		SY	444.000								444.000	
	506-7024	CONSTRUCTION EXITS (REMOVE)		SY	222.000								222.000	
	506-7034	CONSTRUCTION PERIMETER FENCE		LF	519.000								519.000	
	506-7035	SANDBAGS FOR EROSION CONTROL		EA			525.000						525.000	
	506-7045	BIODEG EROSN CONT LOGS (INSTL) (18")		LF	300.000		5,630.000						5,930.000	
	506-7046	BIODEG EROSN CONT LOGS (REMOVE)		LF	150.000		2,820.000						2,970.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0052-05-046 **DISTRICT** Lubbock **COUNTY** Lamb, Lubbock
HIGHWAY US 84

														TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0052-05-046**		**0052-05-048**		**0052-05-049**		**0052-07-068**					
		PROJECT ID		**A00124675**		**A00196968**		**A00198764**		**A00121086**					
		COUNTY		**Lamb**		**Lamb**		**Lamb**		**Lubbock**					
		HIGHWAY		**US 84**		**US 84**		**US 84**		**US 84**					
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL				
	512-7077	PTB (FUR&INST)(F SHAPE)(TY 1) OR (STL)	LF	900.000										900.000	
	512-7080	PTB (REMOVE)(F SHAPE)(TY 1) OR (STL)	LF	900.000										900.000	
	533-7001	MILL RUMBLE STRIPS (ASPHALT) (SHLDR)	LF	167,009.000						167,105.000				334,114.000	
	540-7002	MTL W-BEAM GD FEN (STEEL POST)	LF					300.000						300.000	
	540-7009	MTL W-BEAM GD FEN ADJUSTMENT	LF							4,975.000				4,975.000	
	540-7015	DOWNSTREAM ANCHOR TERMINAL SECTION	EA					2.000						2.000	
	540-7016	MTL BM GD FEN TRANS (NON - SYM)	EA					2.000						2.000	
	540-7020	MTL THRIE-BEAM GD FEN (STEEL POST)	EA					2.000						2.000	
	542-7001	REMOVE METAL BEAM GUARD FENCE	LF					300.000						300.000	
	542-7002	REMOVE TERMINAL ANCHOR SECTION	EA					2.000						2.000	
	543-7002	CABLE BARRIER SYSTEM (INSTALL)(TL-4)	LF			53,270.000								53,270.000	
	543-7018	CABLE BARRIER TERM SEC (INSTL)(TL-4)	EA			54.000								54.000	
	544-7001	GUARDRAIL END TREATMENT (INSTALL)	EA					2.000						2.000	
	544-7003	GUARDRAIL END TREATMENT (REMOVE)	EA					2.000						2.000	
	545-7004	CRASH CUSH ATTEN (REMOVE)	EA	2.000										2.000	
	545-7014	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	2.000										2.000	
	613-7008	HI MST IL POLE (175 FT)(100 MPH)	EA			3.000								3.000	
	614-7001	LED HI MST IL ASM (6 FIXT) (TY S)	EA			1.000								1.000	
	614-7003	LED HI MST IL ASM (6 FIXT) (TY B)	EA			2.000								2.000	
	618-7009	CONDT (HDPE) (2")	LF			2,755.000								2,755.000	
	618-7010	CONDT (HDPE) (2") BORE	LF			515.000								515.000	
	618-7015	CONDT (HDPE) (4")	LF			590.000								590.000	
	618-7016	CONDT (HDPE) (4") BORE	LF			350.000								350.000	
	620-7009	ELEC CONDR (NO.6) BARE	LF			2,520.000								2,520.000	
	620-7011	ELEC CONDR (NO.4) BARE	LF			1,645.000								1,645.000	
	620-7012	ELEC CONDR (NO.4) INSULATED	LF			3,290.000								3,290.000	
	620-7016	ELEC CONDR (NO.2) INSULATED	LF			135.000								135.000	
	624-7002	GROUND BOX TY A (122311)W/APRON	EA			24.000								24.000	
	624-7008	GROUND BOX TY D (162922)W/APRON	EA			10.000								10.000	
	628-7048	ELC SRV TY A 240/480 060(NS)SS(E)SP(O)	EA			1.000								1.000	
	628-7156	ELC SRV TY D 120/240 060(NS)SS(N)SP(O)	EA			1.000								1.000	
	636-7001	ALUMINUM SIGNS (TY A)	SF			285.000								285.000	
	636-7002	ALUMINUM SIGNS (TY G)	SF			981.500								981.500	
	644-7004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA			27.000								27.000	
	644-7025	IN SM RD SN SUP&AM TYS80(1)SA(P)	EA			1.000								1.000	
	644-7028	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA			7.000								7.000	
	644-7031	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA			4.000								4.000	

Estimate & Quantity Sheet

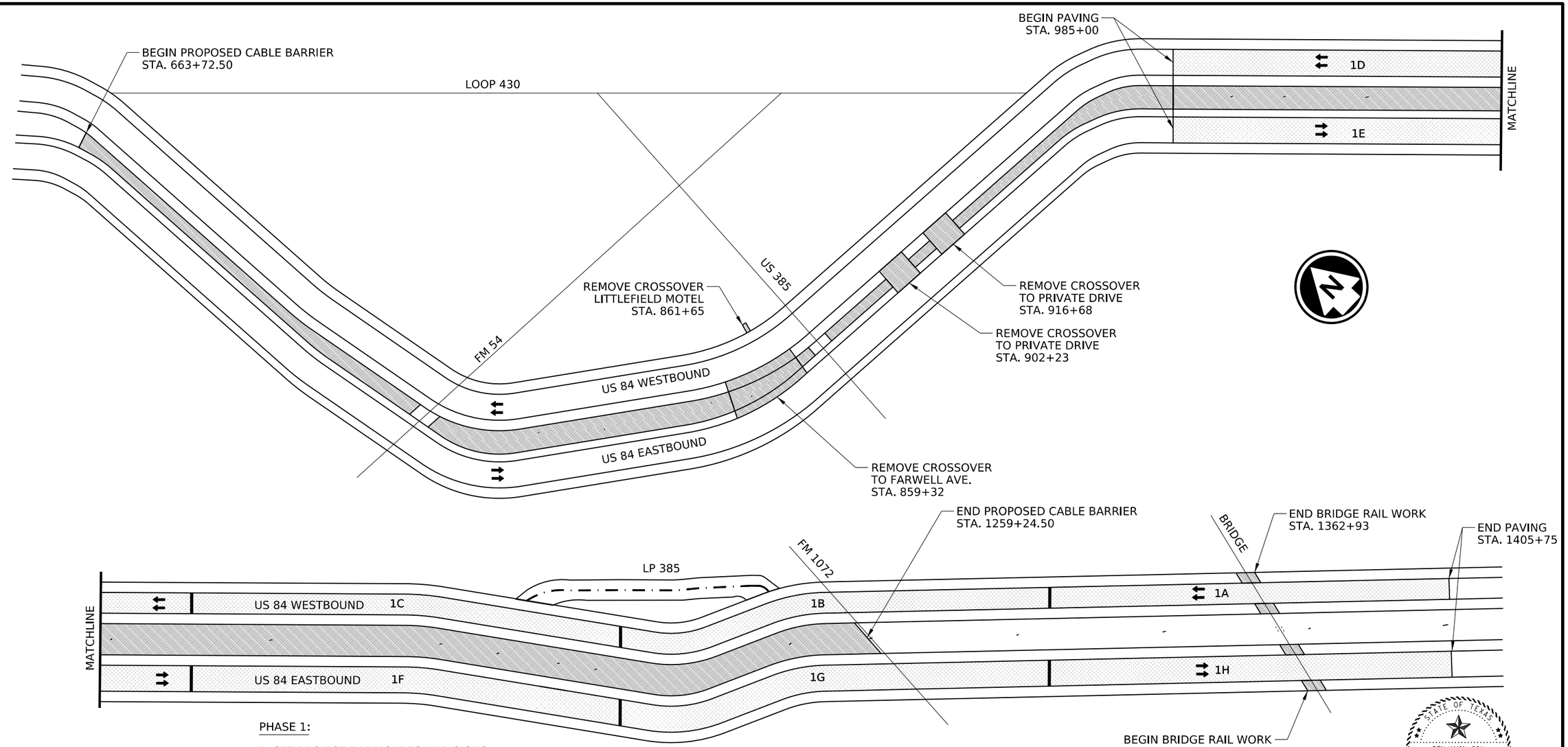
CONTROLLING PROJECT ID 0052-05-046 **DISTRICT** Lubbock **COUNTY** Lamb, Lubbock
HIGHWAY US 84

				0052-05-046		0052-05-048		0052-05-049		0052-07-068		TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB											
		PROJECT ID		**A00124675**		**A00196968**		**A00198764**		**A00121086**			
		COUNTY		**Lamb**		**Lamb**		**Lamb**		**Lubbock**			
		HIGHWAY		**US 84**		**US 84**		**US 84**		**US 84**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	644-7073	REMOVE SM RD SN SUP&AM	EA			46.000						46.000	
	647-7001	INSTALL LRSS (STRUCT STEEL)	LB			5,288.960						5,288.960	
	647-7003	REMOVE LRSA	EA			6.000						6.000	
	658-7014	INSTL DEL ASSM (D-SW)SZ 1(BRF)CTB (BR)	EA	10.000								10.000	
	658-7020	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BR)	EA	8.000								8.000	
	658-7050	INSTL DEL ASSM (D-DY)SZ 1(YFLX)GND	EA			54.000						54.000	
	658-7078	REMOVE DELIN & OBJECT MARKER ASSMS	EA	6.000								6.000	
	662-7005	WK ZN PAV MRK NON-REMOV (W)6"(BRK)	LF	41,780.000		10,758.000				43,160.000		95,698.000	
	662-7008	WK ZN PAV MRK NON-REMOV (W)6"(SLD)	LF	164,180.000		12,142.000				176,224.000		352,546.000	
	662-7010	WK ZN PAV MRK NON-REMOV (W)8"(DOT)	LF	4,666.000		392.000				3,670.000		8,728.000	
	662-7012	WK ZN PAV MRK NON-REMOV (W)8"(SLD)	LF	10,404.000		6,010.000				10,348.000		26,762.000	
	662-7038	WK ZN PAV MRK NON-REMOV (Y)6"(SLD)	LF	163,366.000		18,944.000				181,280.000		363,590.000	
	662-7058	WK ZN PAV MRK REMOV (TRAF BTN) TY W	LF	7,040.000								7,040.000	
	662-7060	WK ZN PAV MRK REMOV (TRAF BTN) TY Y	LF	7,040.000								7,040.000	
	662-7112	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	6,756.000		930.000				5,828.000		13,514.000	
	666-7018	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF	2,333.000		196.000				1,718.000		4,247.000	
	666-7024	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	5,202.000		3,005.000				4,856.000		13,063.000	
	666-7290	TY I HIGH PERF PM (W)6"(BRK)(100MIL)	LF	20,890.000		5,379.000				20,467.000		46,736.000	
	666-7293	TY I HIGH PERF PM (W)6"(SLD)(100MIL)	LF	82,090.000		6,071.000				83,913.000		172,074.000	
	666-7305	TY I HIGH PERF PM (Y)6"(SLD)(100MIL)	LF	81,683.000		9,472.000				84,808.000		175,963.000	
	668-7009	PREFAB PM TY B (W)(6")(SLD)	LF			150.000						150.000	
	668-7021	PREFAB PM TY B (W)(24")(SLD)	LF			16.000						16.000	
	668-7024	PREFAB PM TY B (W)(DBL ARROW)	EA			1.000						1.000	
	668-7051	PREFAB PM TY B (Y)(6")(SLD)	LF			134.000						134.000	
	668-7087	PREFAB PM TY C (W)(12")(SLD)	LF			361.000						361.000	
	668-7089	PREFAB PM TY C (W)(24")(SLD)	LF	246.000		139.000				204.000		589.000	
	668-7091	PREFAB PM TY C (W)(ARROW)	EA	56.000		3.000				48.000		107.000	
	668-7093	PREFAB PM TY C (W)(DBL ARROW)	EA			3.000						3.000	
	668-7111	PREFAB PM TY C (W)(36")(YLD TRI)	EA	289.000						218.000		507.000	
	672-7006	REFL PAV MRKR TY II-C-R	EA	899.000		378.000				822.000		2,099.000	
	677-7002	ELIM EXT PM & MRKS (6")	LF	184,663.000		28,651.000				200,332.000		413,646.000	
	677-7004	ELIM EXT PM & MRKS (8")	LF	7,535.000		6,206.000				7,009.000		20,750.000	
	677-7006	ELIM EXT PM & MRKS (12")	LF			361.000						361.000	
	677-7008	ELIM EXT PM & MRKS (24")	LF			16.000						16.000	
	678-7002	PAV SURF PREP FOR MRK (6")	LF	600.000		284.000				1,278.000		2,162.000	
	678-7008	PAV SURF PREP FOR MRK (24")	LF			16.000						16.000	
	678-7010	PAV SURF PREP FOR MRK (DBL ARROW)	EA			1.000						1.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0052-05-046 **DISTRICT** Lubbock **COUNTY** Lamb, Lubbock
HIGHWAY US 84

													TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0052-05-046**		**0052-05-048**		**0052-05-049**		**0052-07-068**				
		PROJECT ID		**A00124675**		**A00196968**		**A00198764**		**A00121086**				
		COUNTY		**Lamb**		**Lamb**		**Lamb**		**Lubbock**				
		HIGHWAY		**US 84**		**US 84**		**US 84**		**US 84**				
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL			
	680-7002	INSTALL HWY TRF SIG (ISOLATED)	EA			1.000							1.000	
	682-7001	VEH SIG SEC (12")LED(GRN)	EA			14.000							14.000	
	682-7002	VEH SIG SEC (12")LED(GRN ARW)	EA			2.000							2.000	
	682-7003	VEH SIG SEC (12")LED(YEL)	EA			22.000							22.000	
	682-7005	VEH SIG SEC (12")LED(RED)	EA			14.000							14.000	
	682-7042	BACKPLATE W/REF BRDR(3 SEC)(VENT)ALUM	EA			14.000							14.000	
	682-7043	BACKPLATE W/REF BRDR(4 SEC)(VENT)ALUM	EA			2.000							2.000	
	684-7010	TRF SIG CBL (TY A)(12 AWG)(5 CONDR)	LF			605.000							605.000	
	684-7012	TRF SIG CBL (TY A)(12 AWG)(7 CONDR)	LF			3,120.000							3,120.000	
	684-7017	TRF SIG CBL (TY A)(12 AWG)(12 CONDR)	LF			2,120.000							2,120.000	
	685-7001	INSTALL RDSD FLASH BEACON ASSEMBLY	EA			4.000							4.000	
	686-7033	INS TRF SIG PL AM(S)1 ARM(32')	EA			1.000							1.000	
	686-7037	INS TRF SIG PL AM(S)1 ARM(36')	EA			1.000							1.000	
	686-7161	INS TRF SIG PL AM(S)2 ARM(44-32')	EA			2.000							2.000	
	690-7011	INSTALL OF CABLES	LF			2,440.000							2,440.000	
	730-7019	FULL - WIDTH MOWING	CYC	2.000		1.000				1.000			4.000	
	734-7002	LITTER REMOVAL	CYC	2.000		1.000				1.000			4.000	
	772-7003	POST AND CABLE FENCE (NEW INSTALLATION)	LF	2,866.000									2,866.000	
	3002-7001	REINFORCED FAB FOR ASPH PVMNT OVERLAYS	SY	288,954.000						261,575.000			550,529.000	
	3002-7002	ASPH FOR REINF FAB (PG76-28)	GAL	43,343.000						39,236.000			82,579.000	
	6016-7001	TEMP SPEED MONITOR SYS	EA	1.000						1.000			2.000	
	12	RAILROAD FLAGGING: RAILROAD FORCE ACCOUNT WORK (PART)	LS	1.000									1.000	
	14	PUBLIC UTILITY FORCE ACCT WORK (PART)	LS	1.000									1.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000									1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000									1.000	
		ENVIRONMENTAL: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000									1.000	



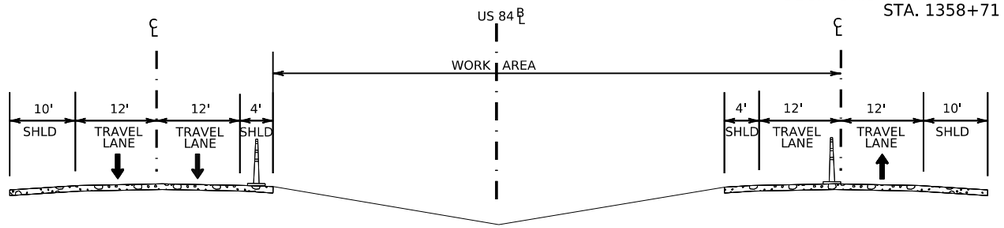
PHASE 1:

1. SET PROJECT BARRICADES AND SIGNS.
2. INSTALL SWP3 ITEMS.
3. REMOVE CROSSOVERS AND DRIVEWAY.
4. BRIDGE RAIL WORK.
5. CABLE BARRIER WORK.
6. BLADING AND BACKFILL TO CLEAN HIGH SPOTS.
7. EMULSION.
8. LARGE/SMALL SIGN WORK.

PHASE 1A-1H:

9. MILLING.
10. PAVEMENT REPAIR.
11. TY-C HOTMIX.
11. FOGSEAL
12. TEMPORARY STRIPING.

CABLE BARRIER WORK IS CONSIDERED STATIONARY WORK.



DAILY CLOSURE TYPICAL SECTION
(LT SIDE SIMILAR)
ONLY CLOSE LANE ON SIDE NEAREST TO WORK
TRAFFIC CONTROL DEVICES TO BE MOVED TO INSIDE SHOULDER
AT THE END OF THE WORK DAY OR WHEN NO WORK IS BEING DONE.

NOTES:
NO MORE THAN 2 WORK AREAS CAN BE OPENED AT ANY TIME, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

THE NEXT PHASE CANNOT BEGIN UNTIL THE PREVIOUS PHASE IS COMPLETE

LEGEND:
- WORKZONE PHASE 1
- WORKZONE PHASE 1A-1H
- TRAFFIC FLOW

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

CONSTRUCTION PHASE 1-1H
(LAMB COUNTY)
NO SCALE

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		13

DATE: 9/30/2024 12:54:34 PM
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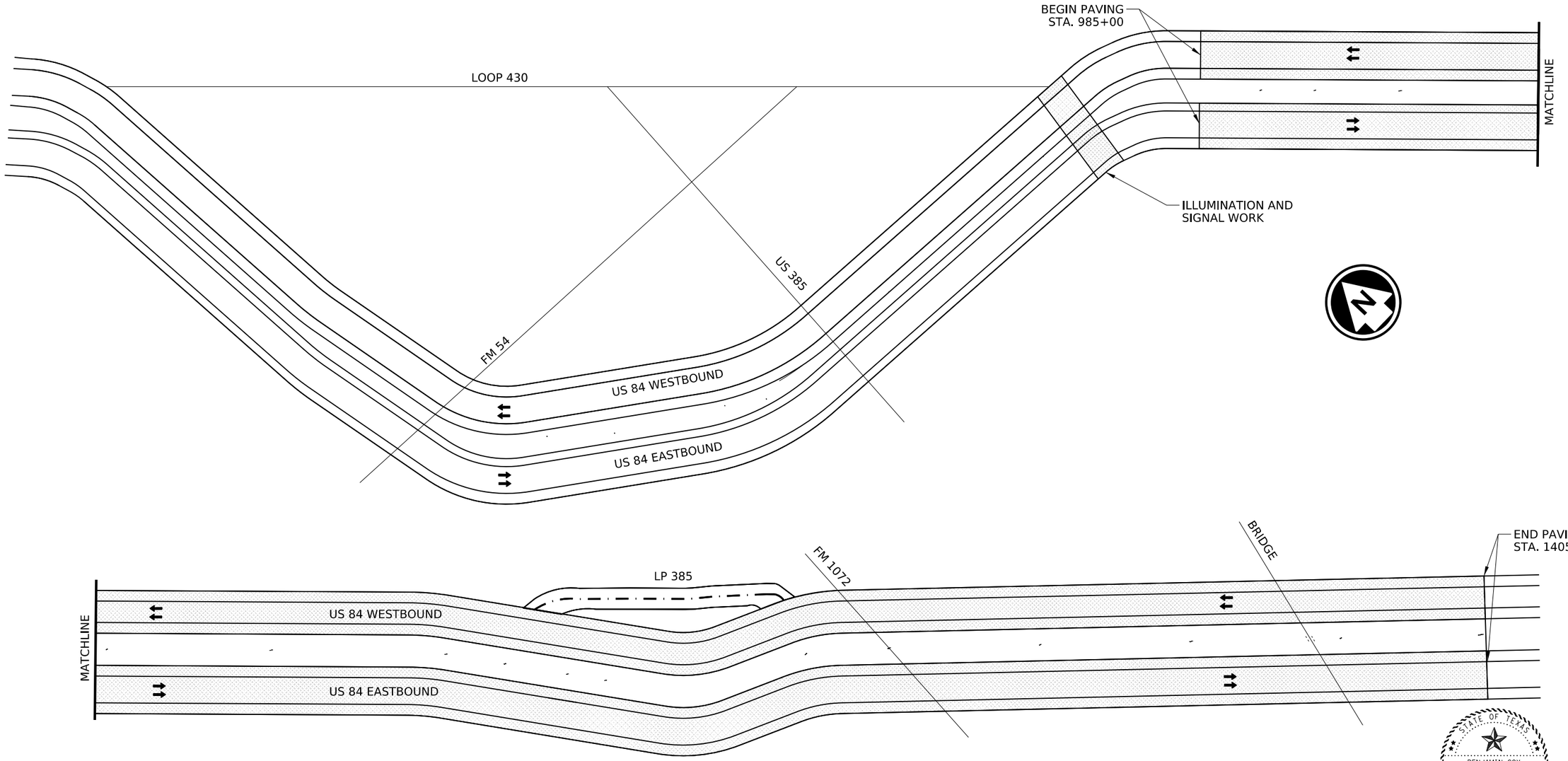


PHASE 2:

1. ILLUMINATION AND SIGNAL WORK

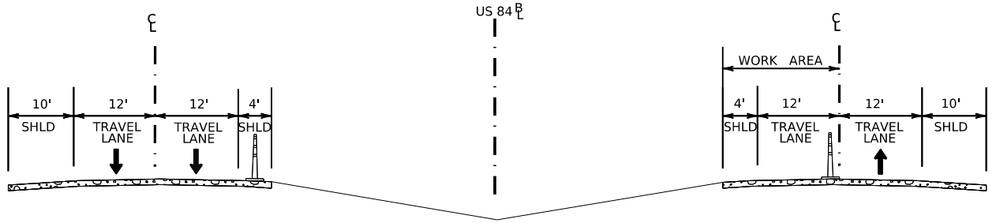
2. FILL IN RUMBLE STRIP WITH TOM-C HOTMIX.

3. FABRIC AND TOM-C HOTMIX OVERLAY WITH RUMBLE STRIP.

4. PERMANENT STRIPING.

NOTES:
NO MORE THAN 2 WORK AREAS CAN BE OPENED AT ALL TIMES, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

THE NEXT PHASE CANNOT BEGIN UNTIL THE PREVIOUS PHASE IS COMPLETE



DAILY CLOSURE TYPICAL SECTION
(LT SIDE SIMILAR)
ONLY CLOSE LANE ON SIDE NEAREST TO WORK
TRAFFIC CONTROL DEVICES TO BE MOVED TO INSIDE SHOULDER
AT THE END OF THE WORK DAY OR WHEN NO WORK IS BEING DONE.

LEGEND:
WORKZONE PHASE
TRAFFIC FLOW

STATE OF TEXAS
BENJAMIN COX
126523
PROFESSIONAL ENGINEER
LICENSED

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

CONSTRUCTION PHASE 2
(LAMB COUNTY)
NO SCALE

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		14

DATE: 9/30/2024 12:54:40 PM
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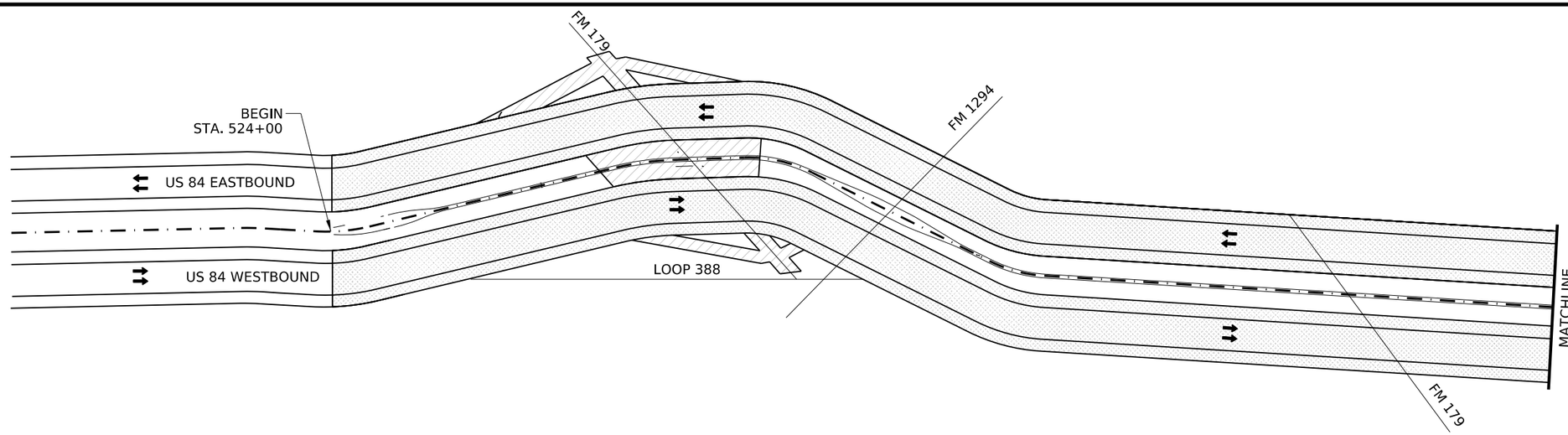
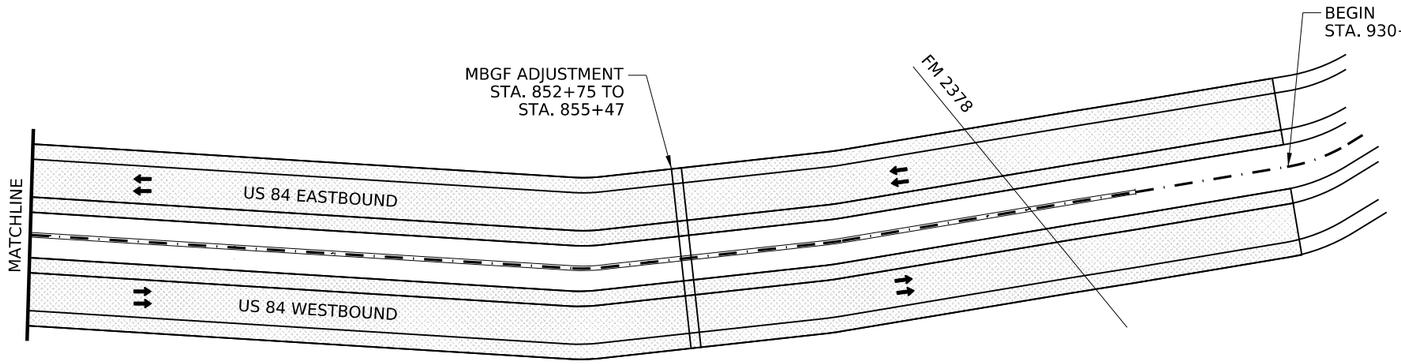


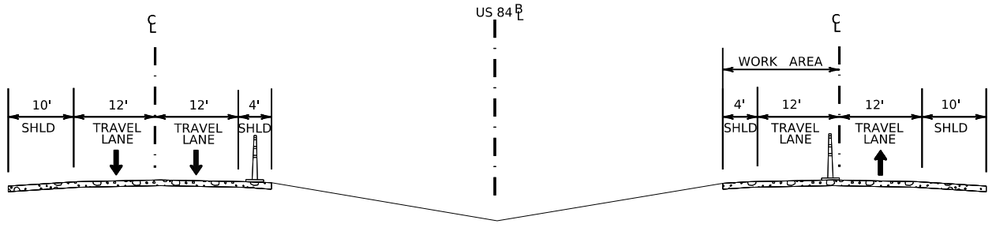


PHASE 3: FM 179 WORK

1. MILL FM 179 INTERSECTION AND RAMPS.
2. PAVEMENT REPAIR.
3. TY-C HOTMIX, FOG SEAL, TEMP STRIPE.
3. FILL IN RUMBLE STRIPS WITH TOM-C.
4. REINFORCING FABRIC AND TOM-C OVERLAY WITH RUMBLE STRIP.
5. INSTALL FINAL STRIPING.
6. MBGF ADJUSTMENT.

NOTES:
NO MORE THAN 2 WORK AREAS CAN BE OPENED AT ALL TIMES, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

THE NEXT PHASE CANNOT BEGIN UNTIL THE PREVIOUS PHASE IS COMPLETE. FM 179 WORK MUST BE COMPLETED BEFORE LUBBOCK COUNTY MAINLANE WORK CAN BEGIN.



DAILY CLOSURE TYPICAL SECTION
(LT SIDE SIMILAR)
ONLY CLOSE LANE ON SIDE NEAREST TO WORK
TRAFFIC CONTROL DEVICES TO BE MOVED TO INSIDE SHOULDER
AT THE END OF THE WORK DAY OR WHEN NO WORK IS BEING DONE.

PHASE 3: FM 179 MAINLANE WORK

1. PAVEMENT REPAIR.
2. FILL IN RUMBLE STRIPS WITH TOM-C.
3. REINFORCING FABRIC AND TOM-C OVERLAY WITH RUMBLE STRIP.
4. INSTALL FINAL STRIPING.

LEGEND:
WORKZONE PHASE
WORKZONE PHASE
TRAFFIC FLOW

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

CONSTRUCTION PHASE 3
(LUBBOCK COUNTY)
NO SCALE

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		15

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*US84 WORK ZONE STRIPING SUMMARY (LAMB COUNTY) CSJ: 0052-05-046, 0052-05-048, (LUBBOCK COUNTY) CSJ: 0052-07-068												
DESCRIPTION												
CSJ	FROM	TO	ELIM EXT PAV MRK	ELIM EXT PAV MRK	SW		DOT	BW	SY	TABS	BUTTON	BUTTON
			6"	8''	6"	8"	8" x 3'	6"	6"	TY W	TY W	TY Y
			LF	LF	LF	LF	LF	LF	LF	EA	LF	LF
0052-05-048	846+00	985+00	20922	3201	6071	3005	196	5379	9472	465		
0052-05-048	REFRESH				6071	3005	196	5379	9472	465		
0052-05-048 TOTAL	846+00	985+00	**20922**	**3201**	**12142**	**6010**	**392**	**10758**	**18944**	**930**		
0052-05-046	985+00	1405+00	184663	7535	82090	5202	2333	20890	81683	3378	3520	3520
0052-05-046	REFRESH				82090	5202	2333	20890	81683	3378	3520	3520
0052-05-046 TOTAL	985+00	1405+00	**184663**	**7535**	**164180**	**10404**	**4666**	**41780**	**163366**	**6756**	**7040**	**7040**
0052-07-068	500+00	930+00	200332	7009	88112	5174	1835	21580	90640	2914		
0052-07-068	REFRESH				88112	5174	1835	21580	90640	2914		
0052-07-068 TOTAL	500+00	930+00	**200332**	**7009**	**176224**	**10348**	**3670**	**43160**	**181280**	**5828**		
PROJECT TOTAL			**405917**	**17745**	**352546**	**26762**	**8728**	**95698**	**363590**	**13514**	**7040**	**7040**

* ESTIMATED PURPOSES ONLY

CONSTRUCTION SEQUENCE NOTES

PHASE 1 LAMB COUNTY CABLE BARRIER AND PHASE 3 LUBBOCK COUNTY OVERLAY WILL BEGIN AT SAME TIME. BRIDGE RAIL WORK, TRAFFIC SIGNAL AND ILLUMINATION CAN FLOAT.

PROJECT TRAFFIC CONTROL NOTES (ALL PHASES)

THIS PROJECT IS CONSIDERED STATIONARY WORK. IF MOBILE OPERATIONS ARE REQUESTED, THE STATE WILL PAY FOR ONE DAY OF STATIONARY TMA'S AND THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL OTHER COSTS.

SEQUENCE OF WORK WILL BE APPROVED BY THE ENGINEER.

STANDARD REGULATORY AND WARNING SIGNS WHICH ARE NOT SHOWN ON THE TCP SHEETS SHALL BE IN ACCORDANCE WITH THE CURRENT TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND STANARDS BC (1) - (12).

THE CONTRACTOR MAY BE REQUIRED TO FURNISH OTHER BARRICADES AND OTHER TYPES OF DEVICES AS DIRECTED BY THE ENGINEER OR AS INDICATED IN THE TMUTCD, BC, WZ, AND TCP STANDARDS.

PAVEMENT MARKING CONFORMING TO THE TMUTCD AND SHEETS BC (1) - (12) WILL BE IN PLACE BEFORE ANY OVERNIGHT TRAFFIC IS ALLOWED ON ANY CONSTRUCTION SURFACE.

ALL PAVEMENT MARKINGS AND SIGNS THAT CONFLICT WITH TRAFFIC MOVEMENTS WILL BE REMOVED. REMOVAL OF ITEM 662 "WORK ZONE PAVEMENT MARKINGS (REMOVABLE)" WILL NOT BE PAID FOR BUT CONSIDERED SUBIDIARY TO ITEM 662.

REFER TO "TREATMENT FOR VARIOUS EDGE CONDITIONS" SHEET FOR EDGE DROPOFF TREATMENT.

CW8-17 AND CW8-11 SIGNS SHALL BE PLACED AS DIRECTED BY THE ENGINEER.

ADVISORY SPEED LIMIT SIGNS SHALL BE PLACED AS DIRECTED BY THE ENGINEER.

BARRICADES SHALL NOT BE USED AS SIGN SUPPORTS.

ON ANY SERIES OF TRAFFIC CONTROL DEVICES WHERE REFLECTORS MAY BE USED, LIGHTS WILL BE REQUIRED AT THE BEGINNING AND END OF EACH SERIES.

SIGN, BARRICADES, AND CONES NOT IN USE FOR 3 WORKING DAYS WILL BE REMOVED FROM THE RIGHT-OF-WAY.

SIGNS AT THE BEGINNING AND END OF THE PROJECT SHALL BE IN ACCORDANCE WITH BC (1) - (12).

SIGNS G20-2 AND G20-1aT, OR CW20-1D SIGNS SHALL BE AT EACH INTERSECTING HIGHWAY, CITY STREET, AND COUNTY ROAD.

THE CONTRACTOR WILL CONTACT ADJACENT PROPERTY OWNERS CONCERNING INGRESS AND EGRESS OF THEIR PROPERTY DURING CONSTRUCTION.

THIS ROADWAY SHALL BE CONSIDERED A HIGH SPEED ROADWAY.

UNLESS OTHERWISE STATED IN THE PLANS, FLAGS ATTACHED TO SIGNS ARE REQUIRED.

IF USED, PROVIDE VERTICAL PANELS MOUNTED ON FIXED SUPPORTS USING AN APPROVED ADHESIVE.

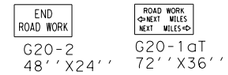
INSTALL BARRIER REFLECTORS ON PORTABLE CONCRETE TRAFFIC BARRIER AS SHOWN ON BC (7).

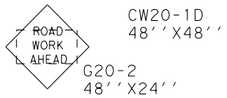
ALL TRANSVERSE EDGE HOT MIX TAPERS GREATER THAN ONE INCH, INTENDED TO CONVEY TRAFFIC, SHALL BE CONSTRUCTED AT A 100:1 SLOPE AND SHALL BE CONSIDERED SUBSIDIARY TO BARRICADES, SIGNS, AND TRAFFIC HANDLING.

POST TRAINED FLAGMEN AS NEEDED IN SPECIAL SITUATIONS AS DEEMED NECESSARY BY THE ENGINEER.

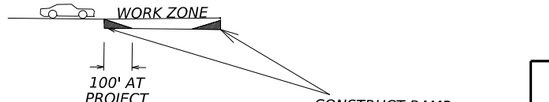
THE CONTRACTOR SHALL CONSTRUCT SALVAGE BASE OR HOT MIX RAMPS DURING CONSTRUCTION AT ALL INTERSECTIONS AND DRIVEWAYS FOR THE CONVENIENCE OF THE TRAVELING PUBLIC. CONSTRUCT RAMP WITH SUFFICIENT LENGTH TO PREVENT INTERFERENCE WITH SMALL PASSENGER VEHICLE. THIS WORK IS CONSIDERED SUBSIDIARY TO BARRICADES, SIGNS, AND TRAFFIC HANDLING.

CONSTRUCTION SPEED ZONE IN LAMB COUNTY MILL & INLAY PORTION ONLY SHALL BE 65 MPH UNLESS EXISTING SPEED LIMITS ARE LOWER, OR AS DIRECTED BY THE ENGINEER.





Mounted back to back on side roads.



CONSTRUCT RAMP WITH SUFFICIENT LENGTH TO PREVENT INTERFERENCE WITH SMALL PASSENGER VEHICLES.

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

WORK ZONE STRIPING SUMMARY AND TCP NOTES

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		16

DATE: 9/30/2024 12:55:03 PM
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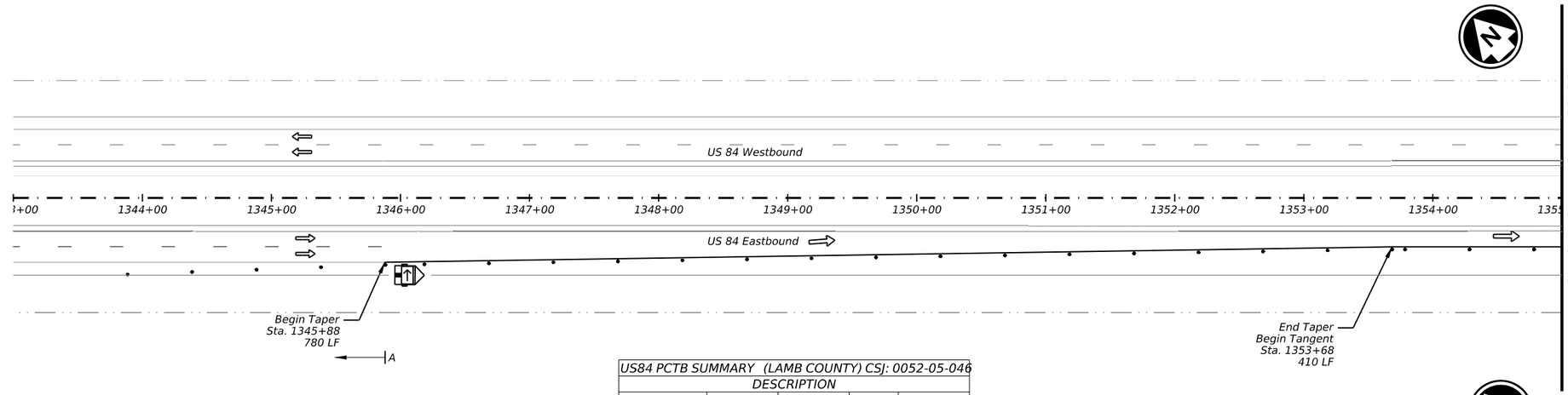
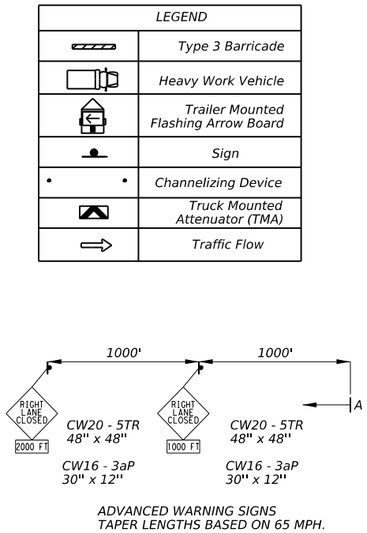
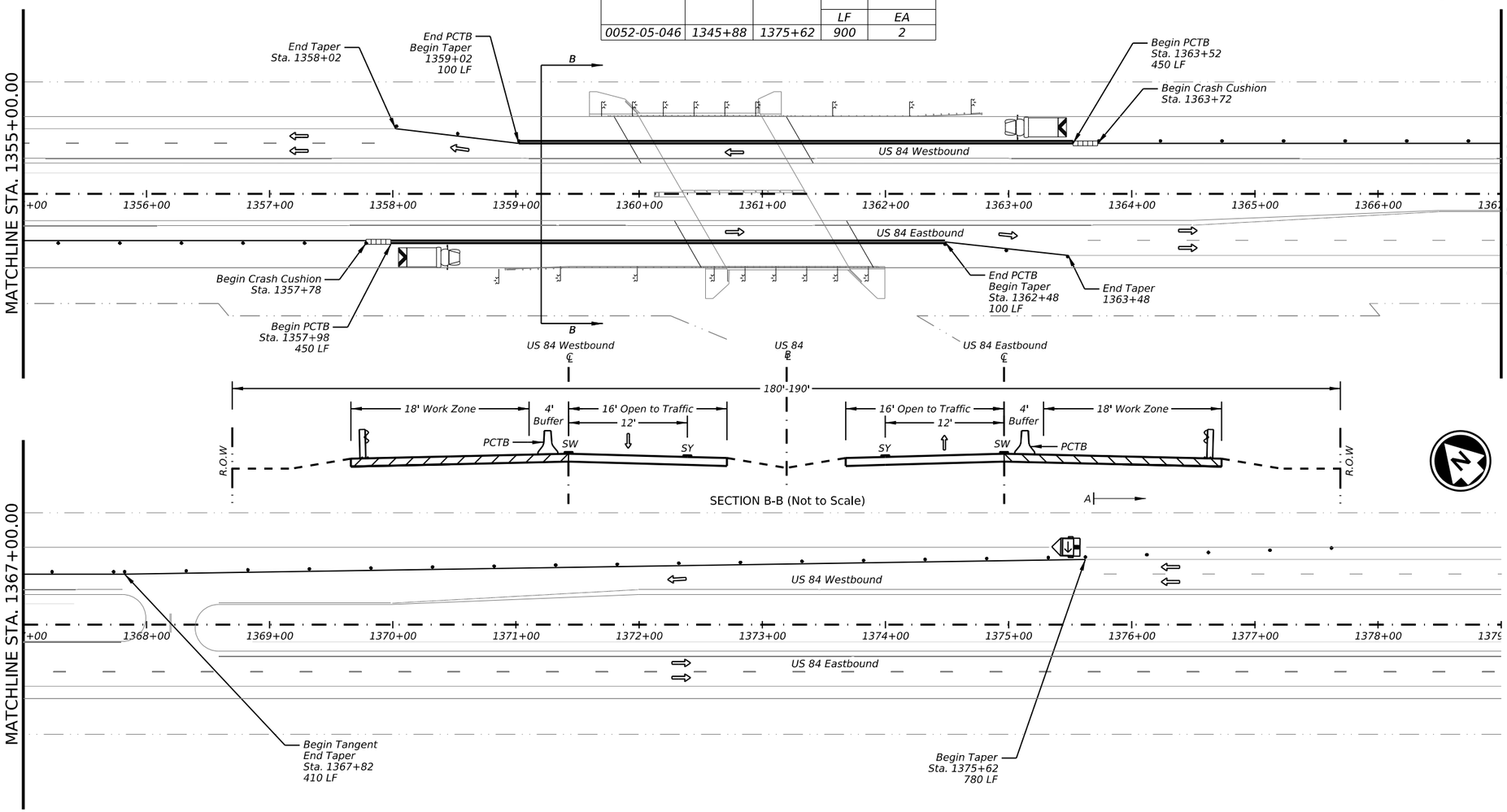




US84 PCTB SUMMARY (LAMB COUNTY) CSJ: 0052-05-046				
DESCRIPTION				
CSJ	FROM	TO	PCTB	CRASH CUSHION
			LF	EA
0052-05-046	1345+88	1375+62	900	2



STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

PCTB LAYOUT (LAMB COUNTY)

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		17

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FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/2. TCP/US0084_TCP_CTB3_.dgn

LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
															MOVE / RESET		L	L	R	R	S	S
							PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTALL	REMOVE	MOVE/ RESET	FROM LOC.#	N	W	N	W	N	W
1	1	17	US 84 EASTBOUND	1357+98	TL-3	UNI	ASPHALT	N/A	PCTB	24"	32"	25'	1								1	
1	1	17	US 84 WESTBOUND	1363+72	TL-3	UNI	ASPHALT	N/A	PCTB	24"	32"	25'	1								1	
1	2	17	US 84 EASTBOUND	1357+98	TL-3	UNI	ASPHALT	N/A	PCTB	24"	32"	25'		1								
1	2	17	US 84 WESTBOUND	1363+72	TL-3	UNI	ASPHALT	N/A	PCTB	24"	32"	25'		1								
												TOTALS	2	2								

LEGEND:
L=LOW MAINTENANCE
R=REUSABLE
S=SACRIFICIAL
N=NARROW
W=WIDE

FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.
http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwyise.htm

CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:	CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046,ETC.	US 84
	DIST	COUNTY	
	LBB	LAMB,ETC.	
	FEDERAL AID PROJECT	SHEET NO.
		18

DATE: 9/30/2024 12:55:46 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/2. TCP/STANDARDS/bc-21.dgn

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

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REVISIONS 4-03 7-13	0052	05	046, ETC.	US 84
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5-10 5-21	LBB	LAMB, ETC.		19

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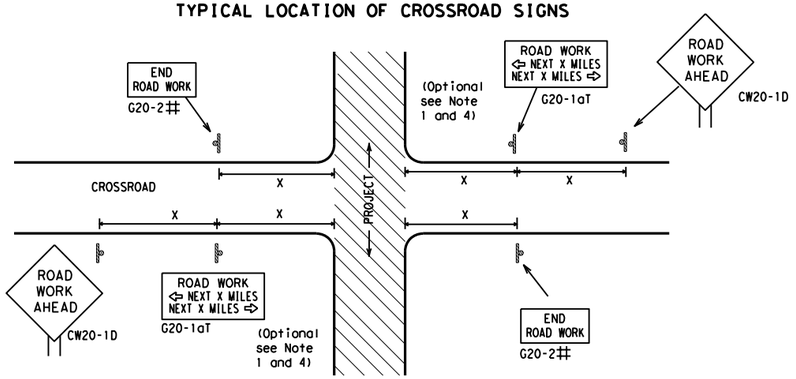
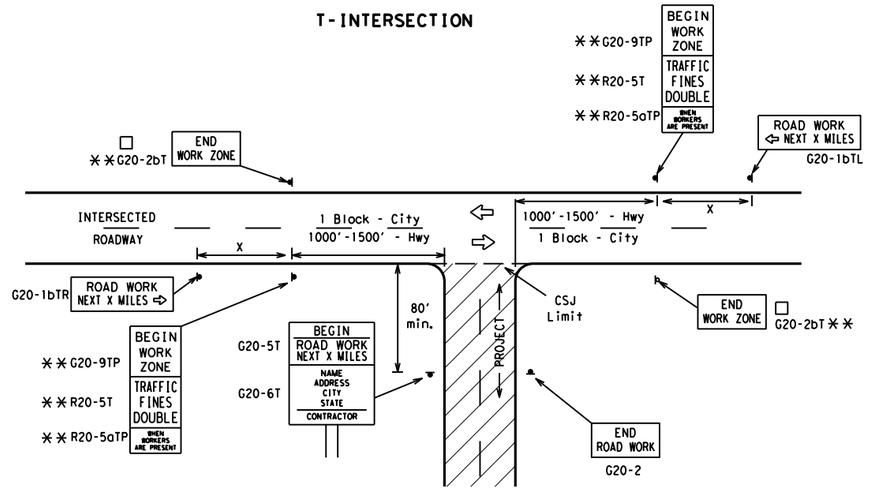
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

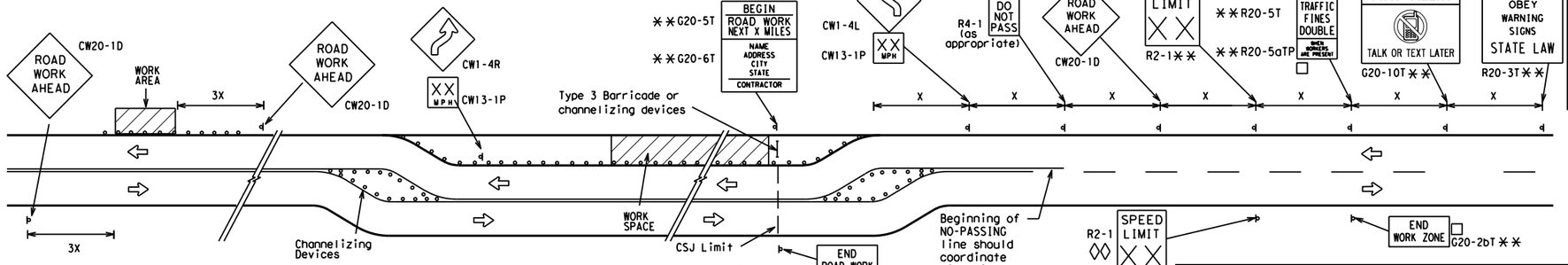
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ 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.

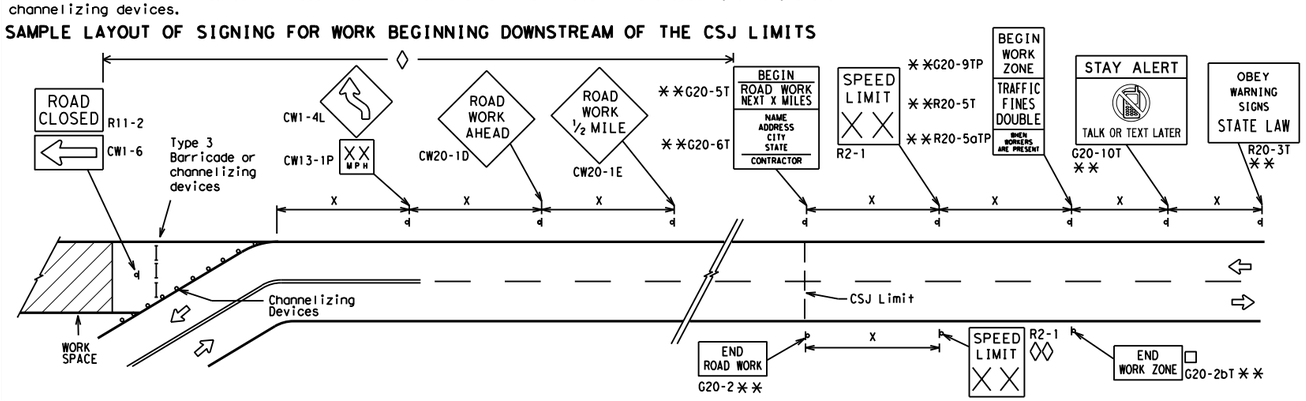
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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 AT THE CSJ LIMITS

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

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REVISIONS	0052	05	046, ETC.	US 84
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7-13 5-21	LBB	LAMB, ETC.		20

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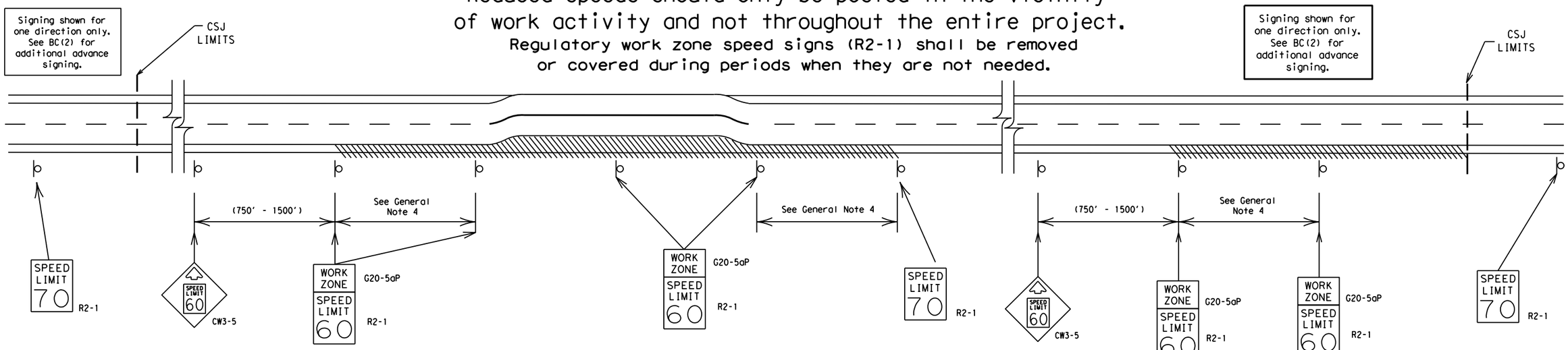
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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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REVISIONS	0052	05	046, ETC.	US 84
9-07 8-14	DIST	COUNTY		SHEET NO.
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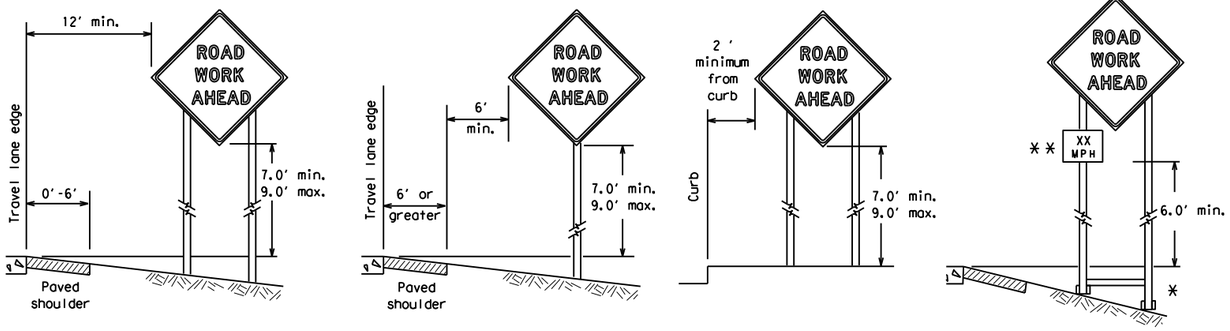
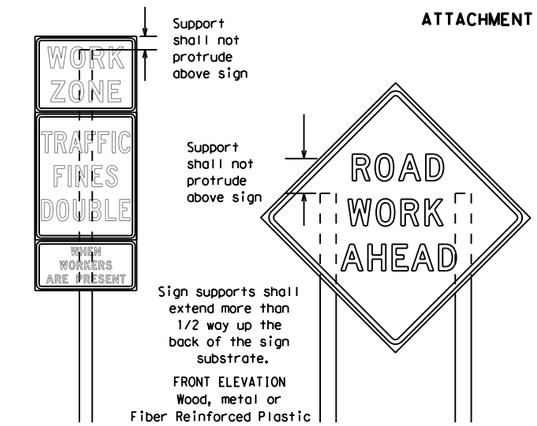
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

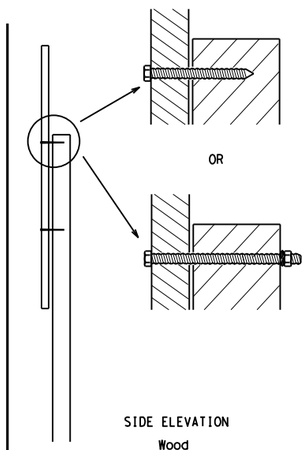


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





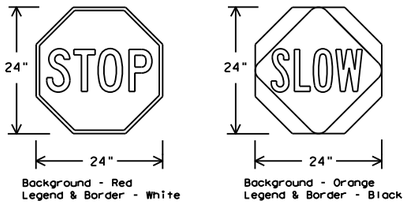
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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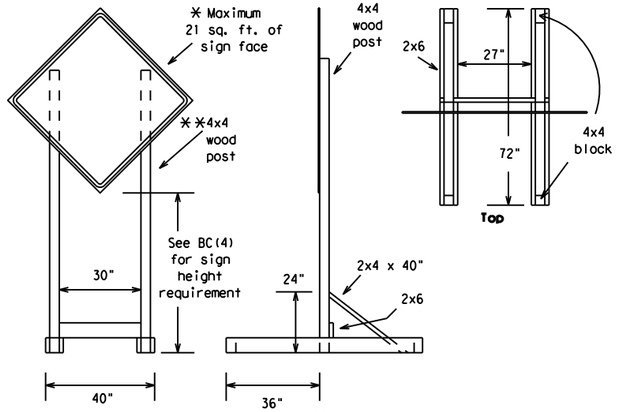
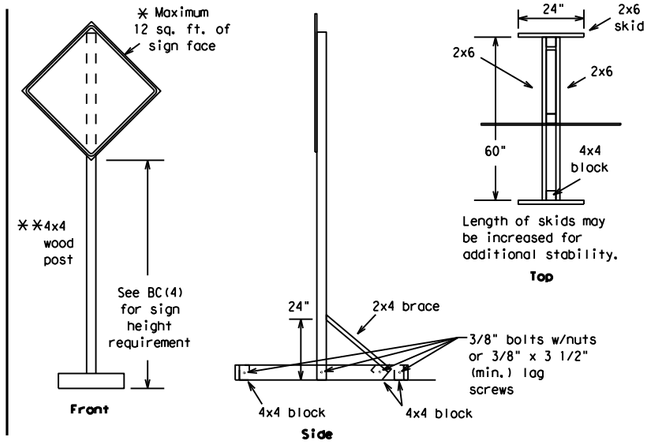
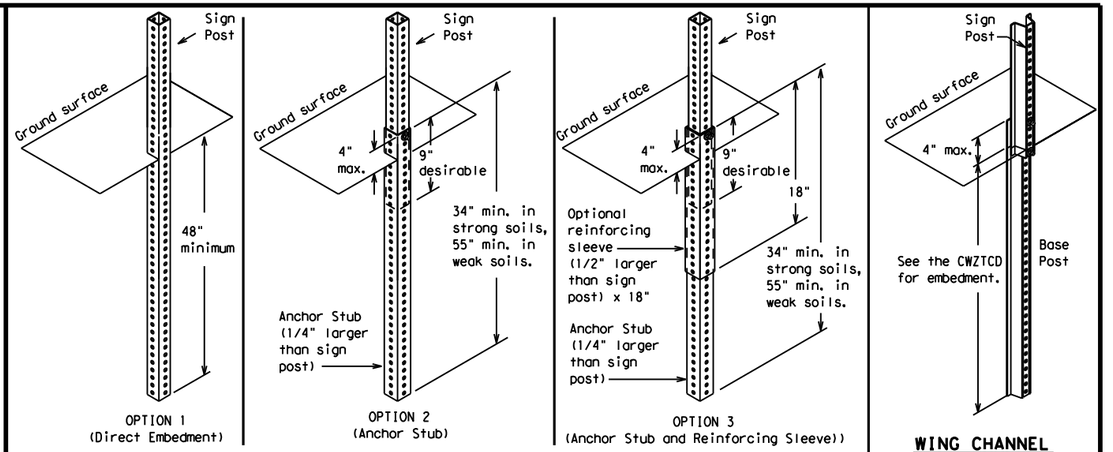
7-13 5-21	LBB	LAMB, ETC.		22





SKID MOUNTED WOOD SIGN SUPPORTS

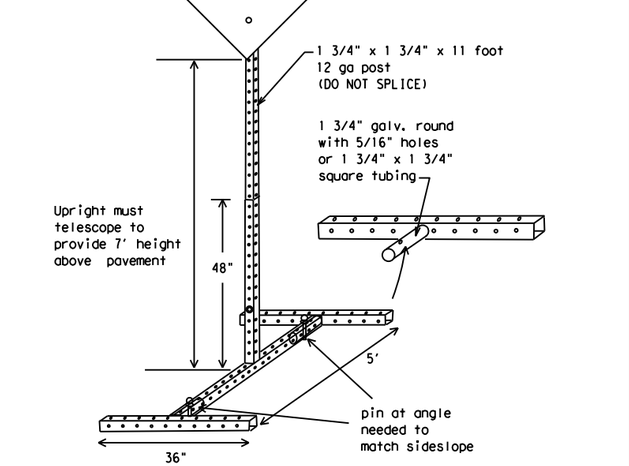
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

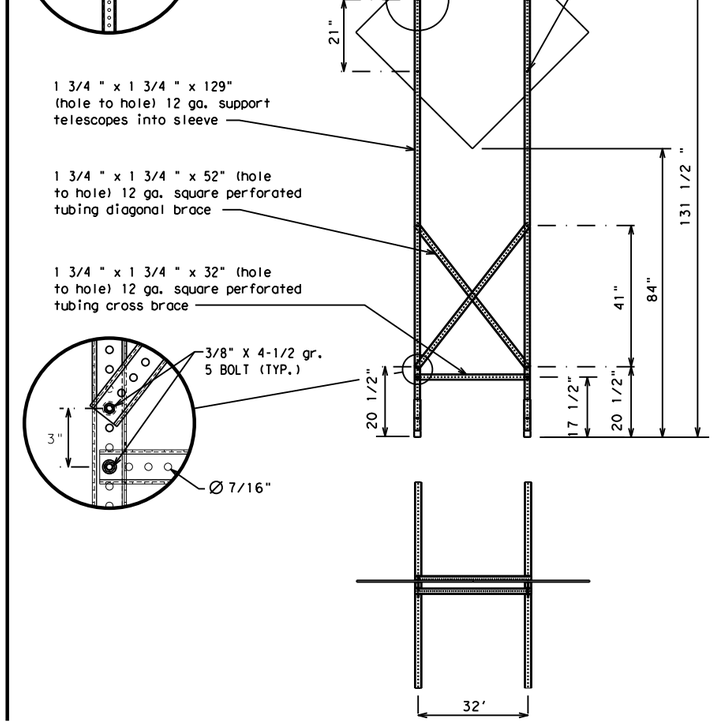


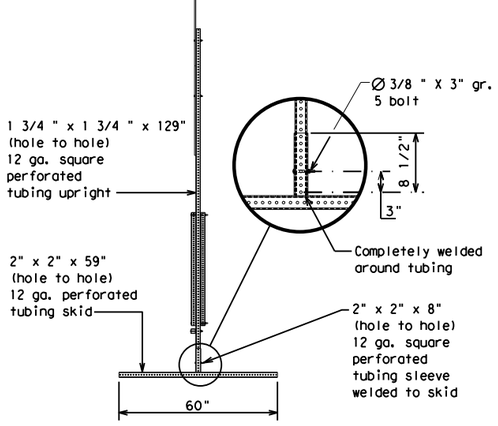
PERFORATED SQUARE METAL TUBING

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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REVISIONS	0052	05	046, ETC.	US 84
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	LBB	LAMB, ETC.		23

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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
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

** 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
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	LBB	LAMB, ETC.		24

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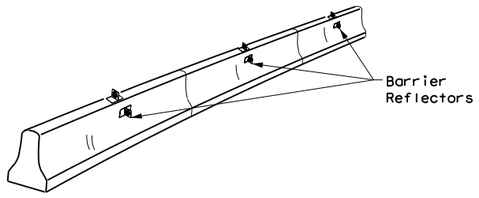
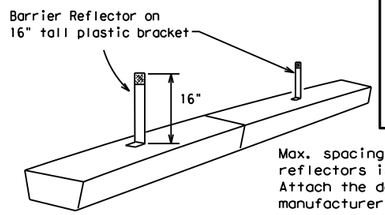
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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

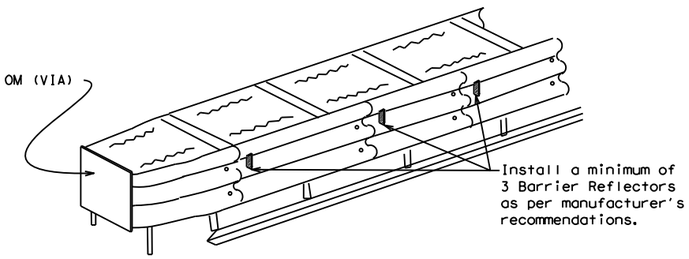


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

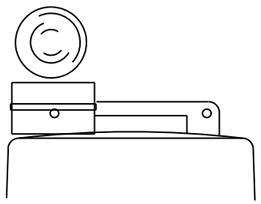


DELINEATION OF END TREATMENTS

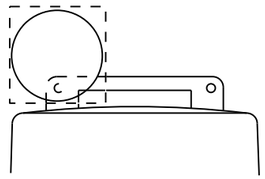
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

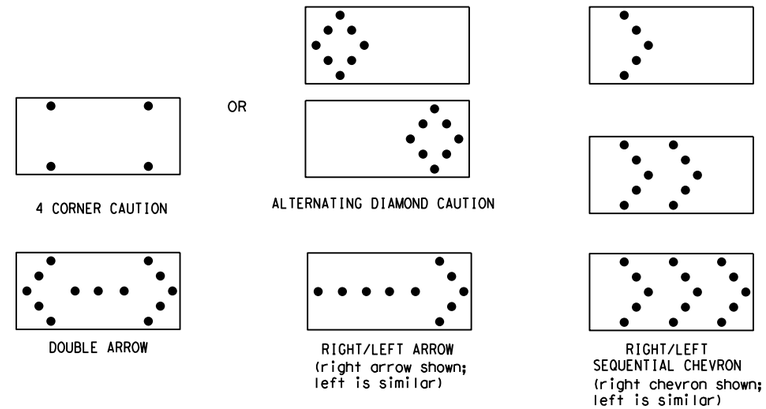
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	LBB	LAMB, ETC.		25

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

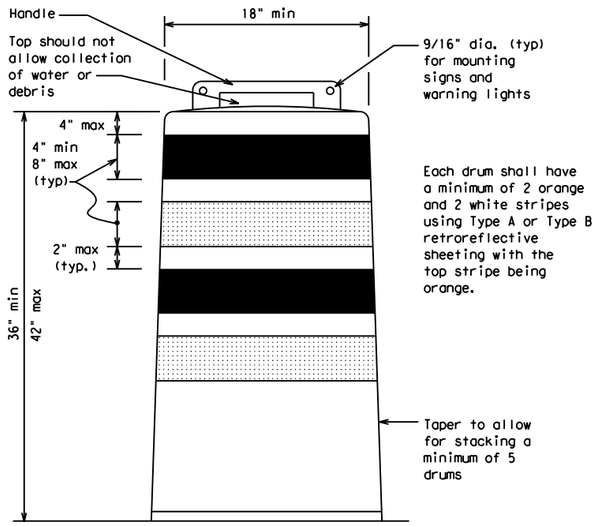
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

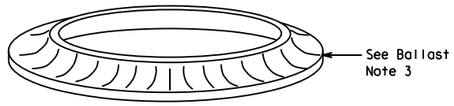
RETROREFLECTIVE SHEETING

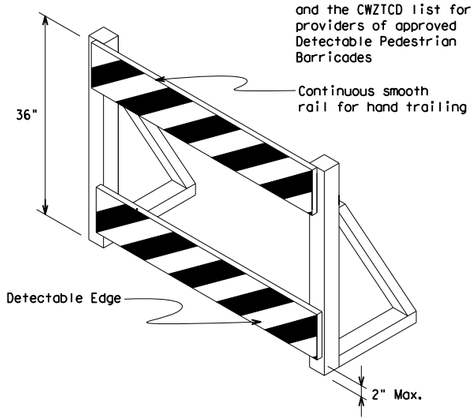
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

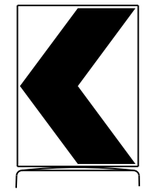




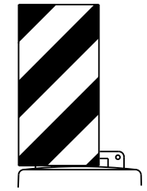


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	LBB	LAMB, ETC.		26
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DATE: 9/30/2024 12:55:49 PM
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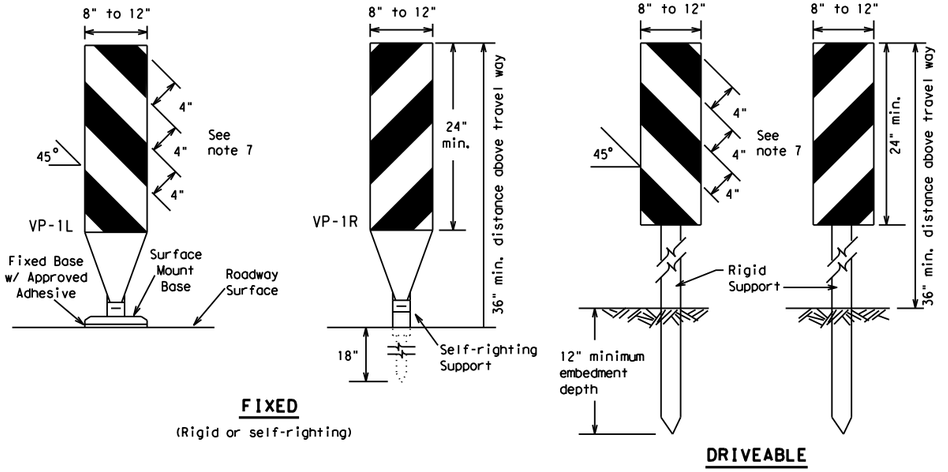
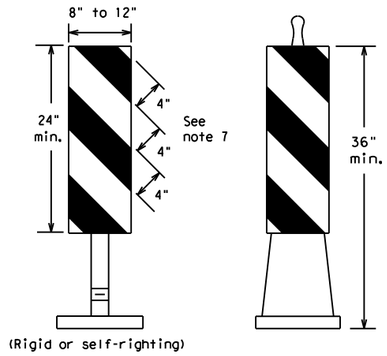


FIXED
(Rigid or self-righting)

DRIVEABLE

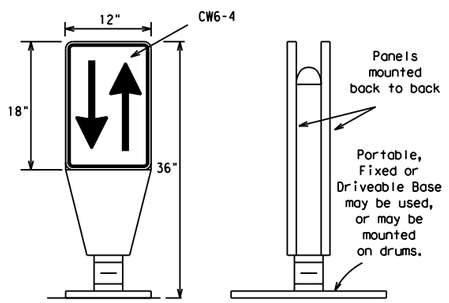


(Rigid or self-righting)

PORTABLE

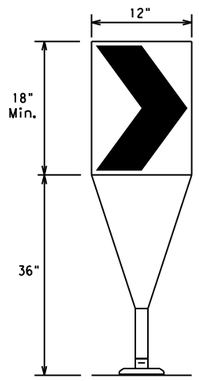
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



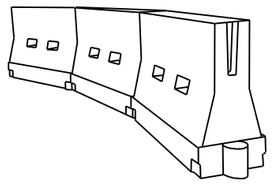
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

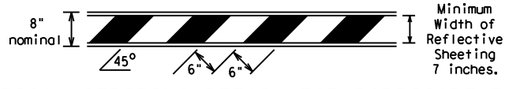
BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	LBB	LAMB, ETC.		27

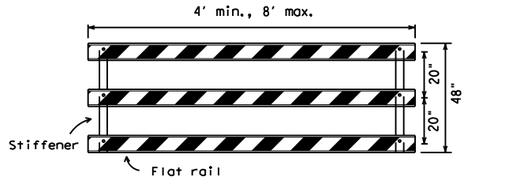
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



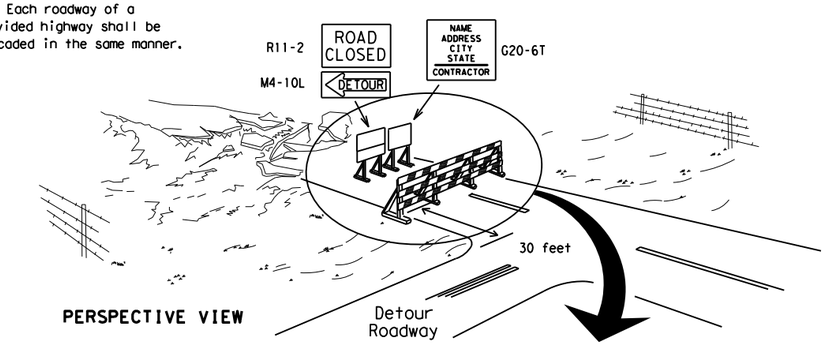
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

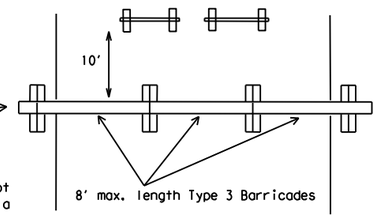
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

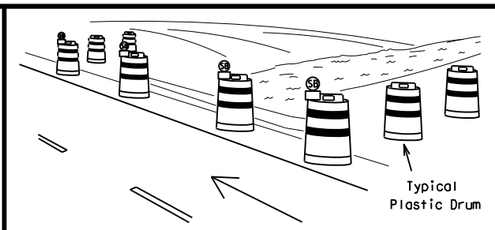
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

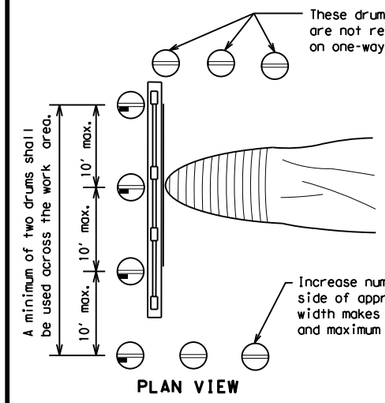
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

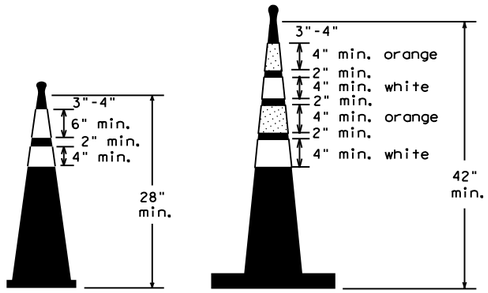
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



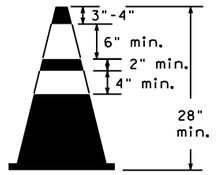
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

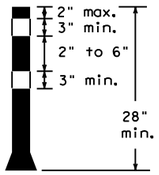
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

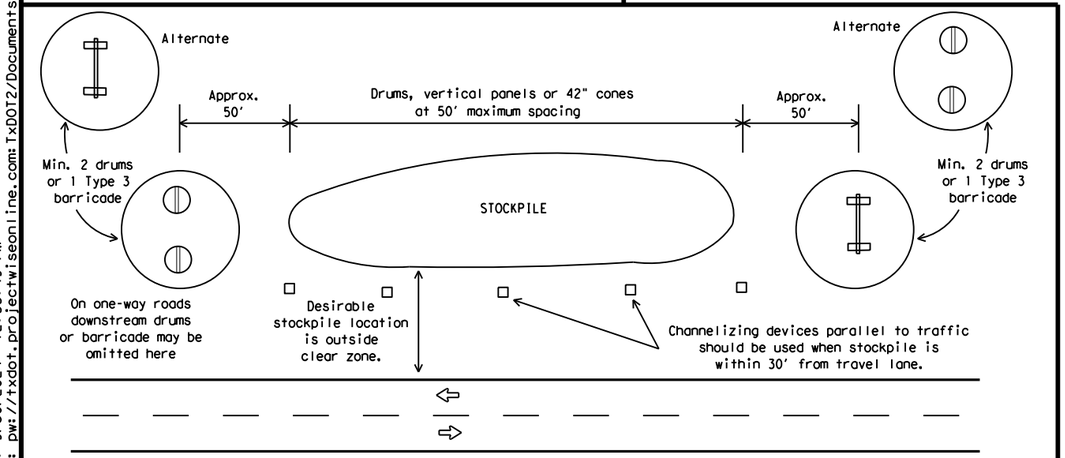


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	LBB	LAMB, ETC.		28

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FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/2. TCP/STANDARDS/bc-21.dgn

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.

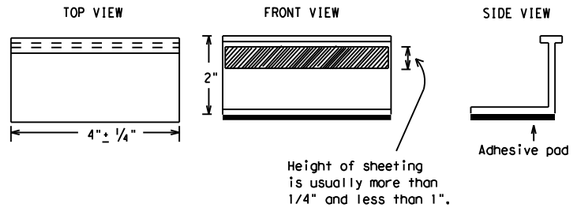
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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 1-02 7-13 11-02 8-14	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		29

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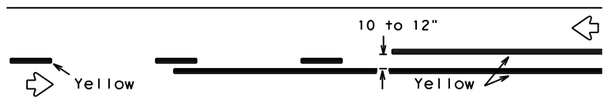
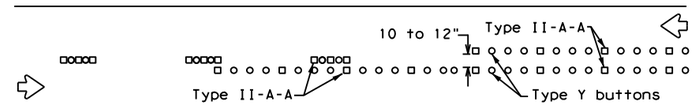
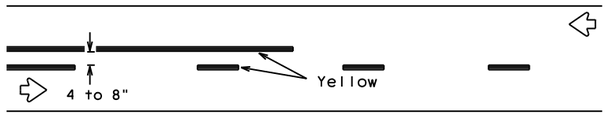
PAVEMENT MARKING PATTERNS



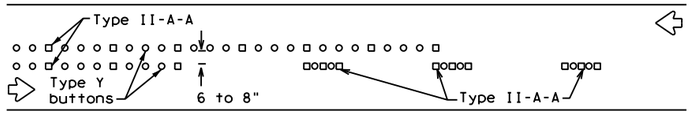
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



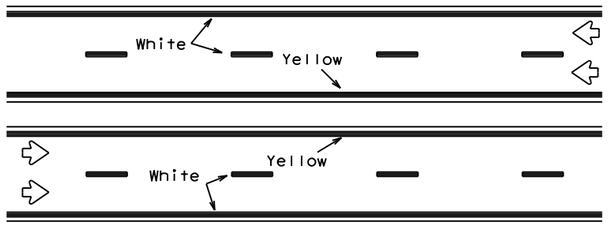
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



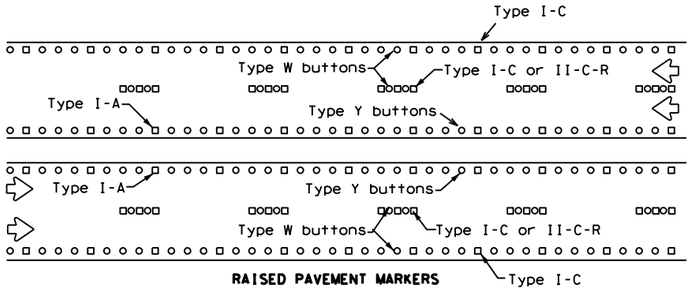
RAISED PAVEMENT MARKERS - PATTERN B

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



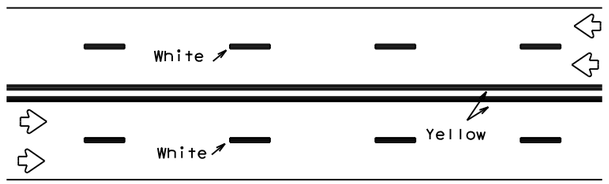
REFLECTORIZED PAVEMENT MARKINGS



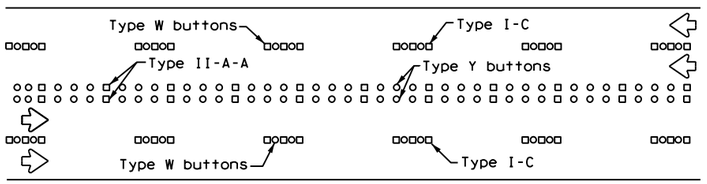
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



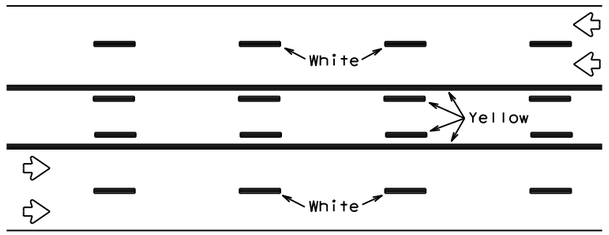
REFLECTORIZED PAVEMENT MARKINGS



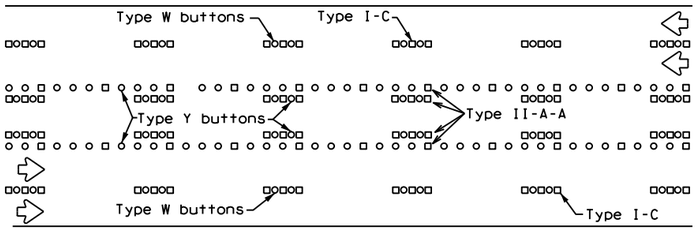
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

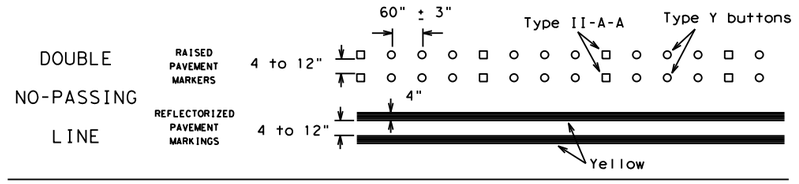
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

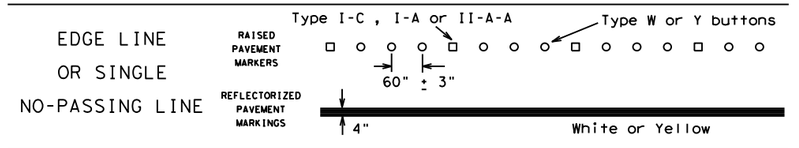
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

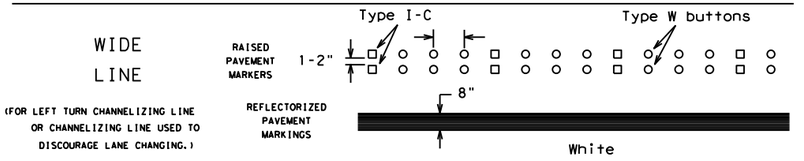


EDGE LINE OR SINGLE NO-PASSING LINE



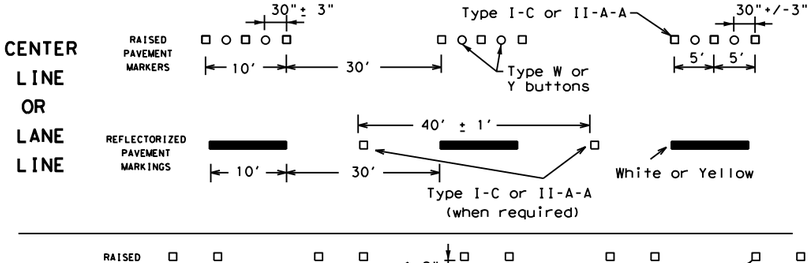
WIDE LINE

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

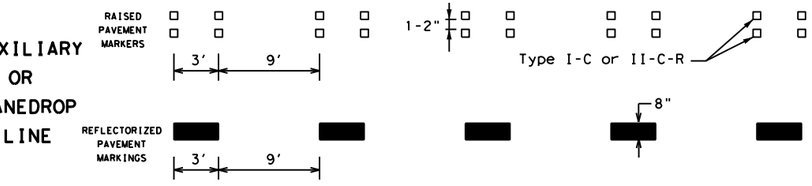


BROKEN LINES

CENTER LINE OR LANE LINE

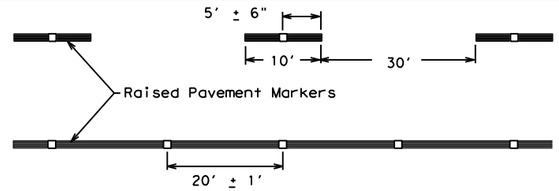


AUXILIARY OR LANEDROP LINE



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."

SHEET 12 OF 12

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
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	LBB	LAMB, ETC.		30

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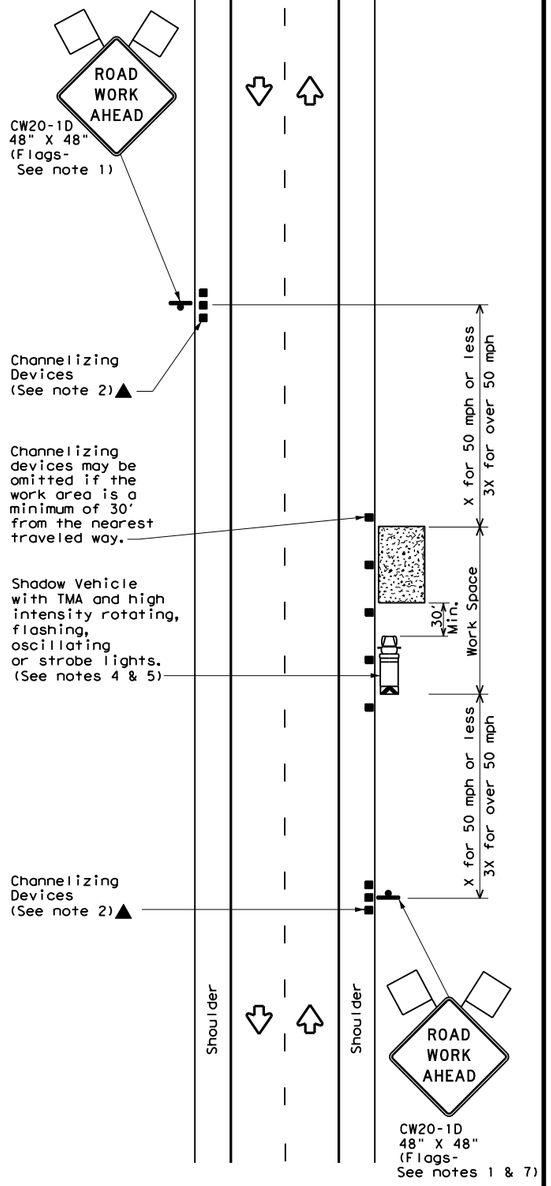
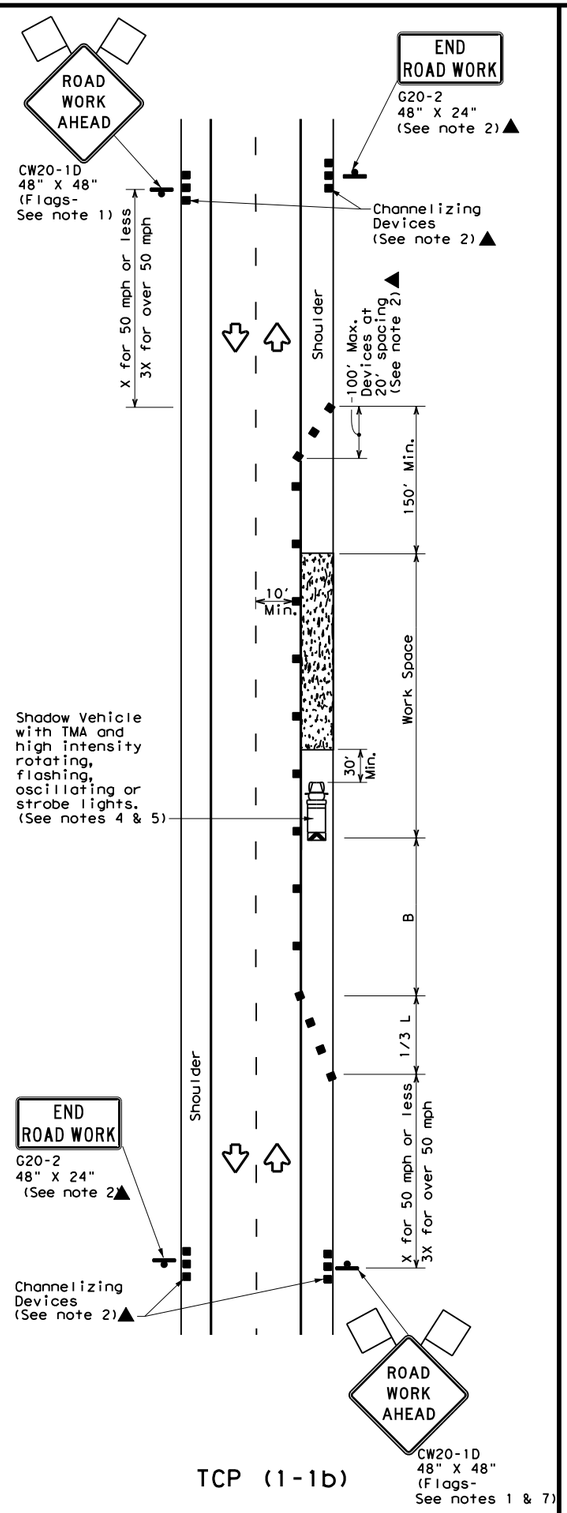


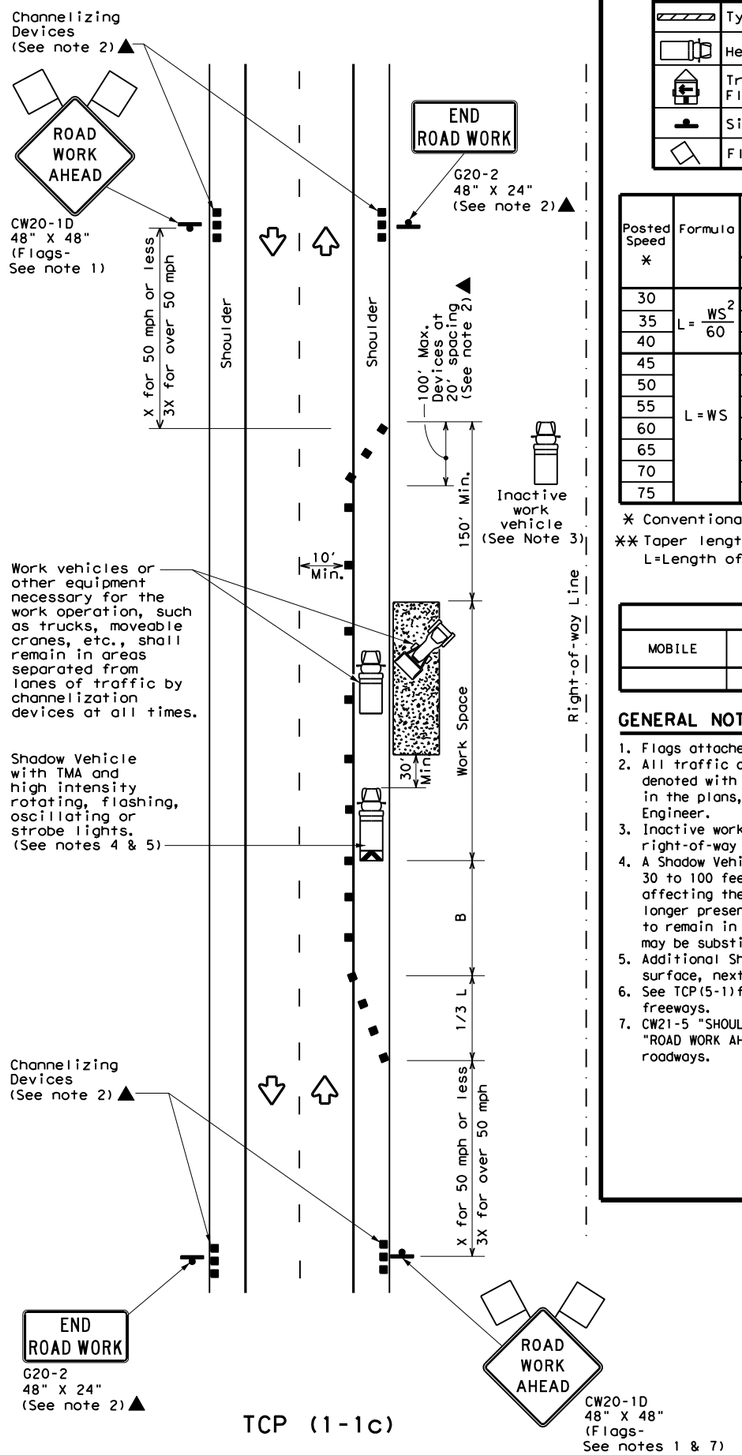
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
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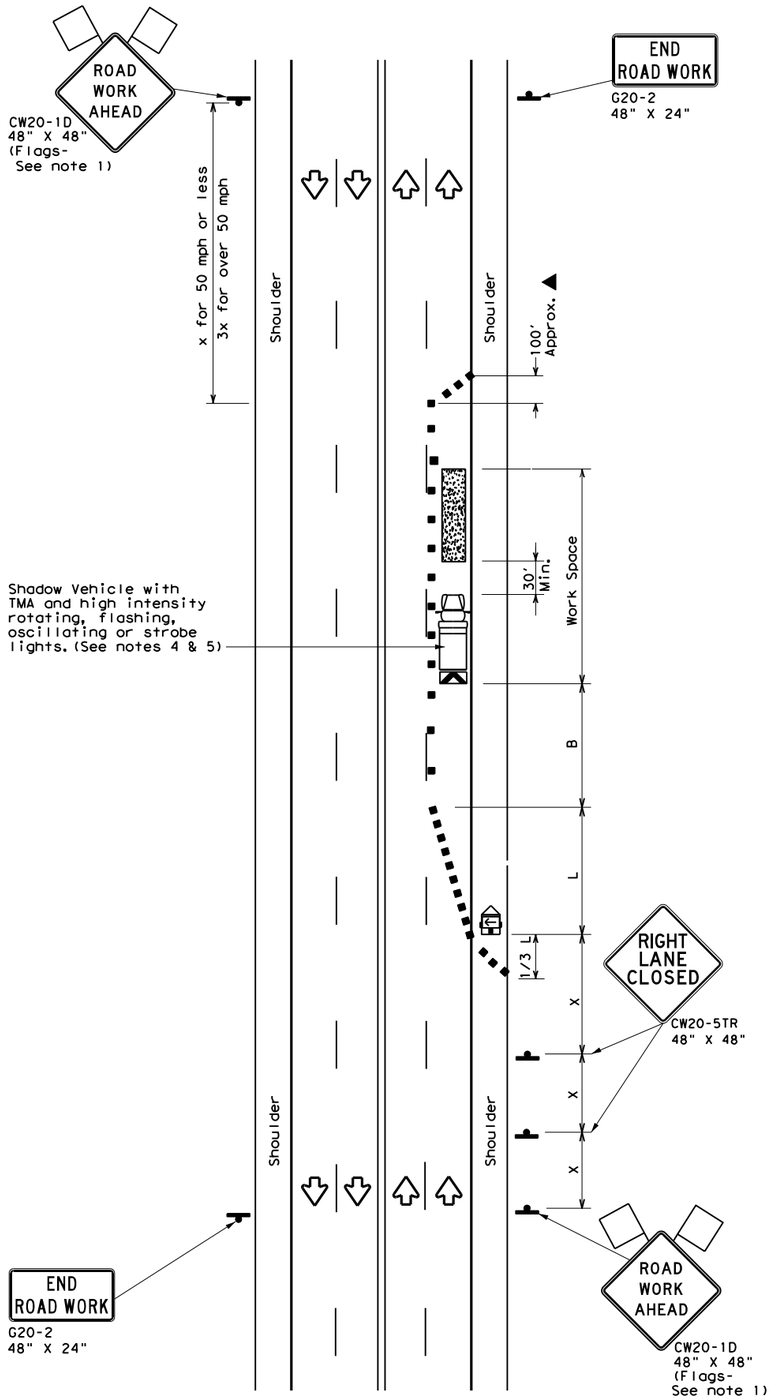
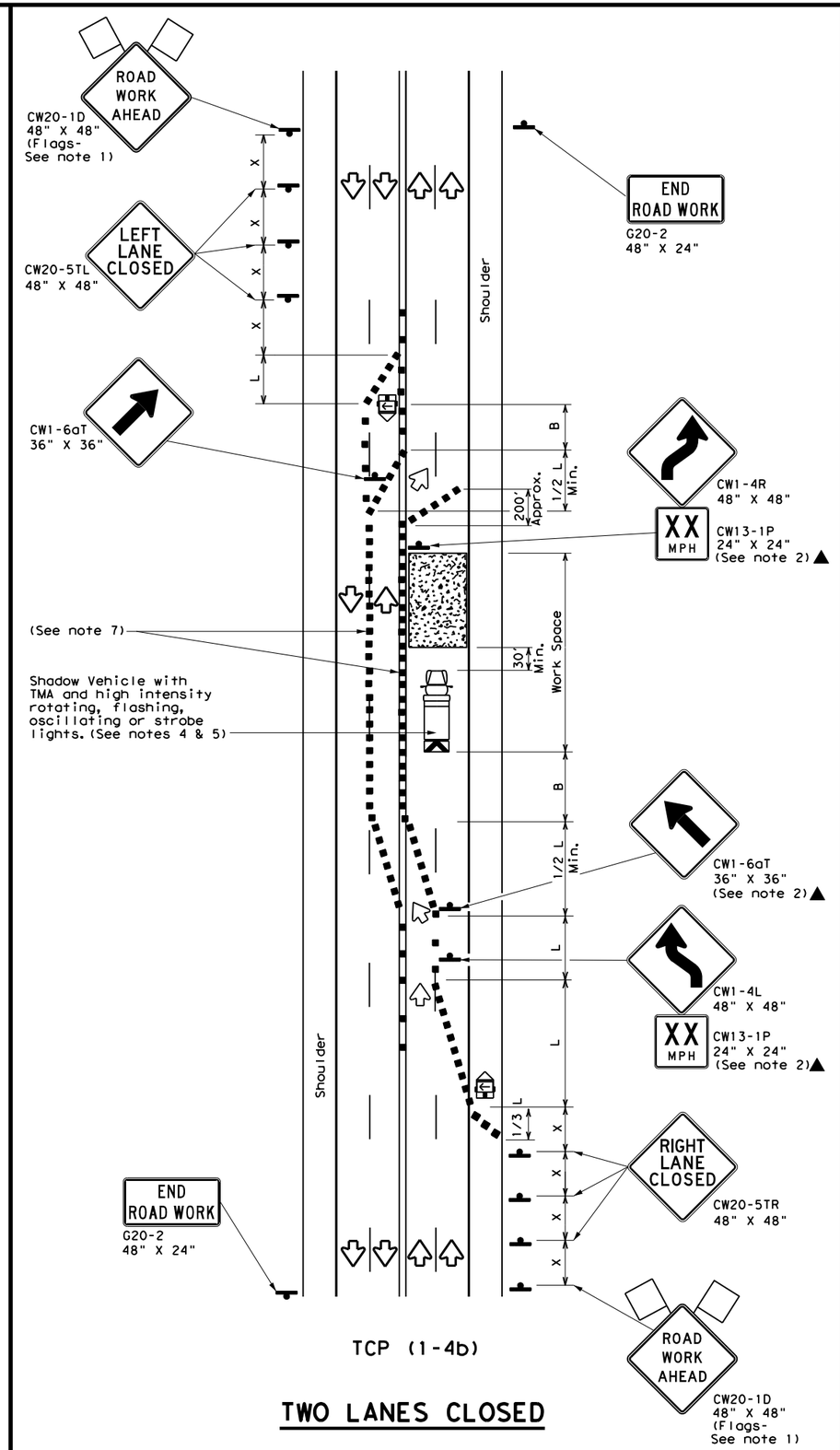


TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

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. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-4a)

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

TCP (1-4b)

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	LBB	LAMB, ETC.		32
1-97 2-18				

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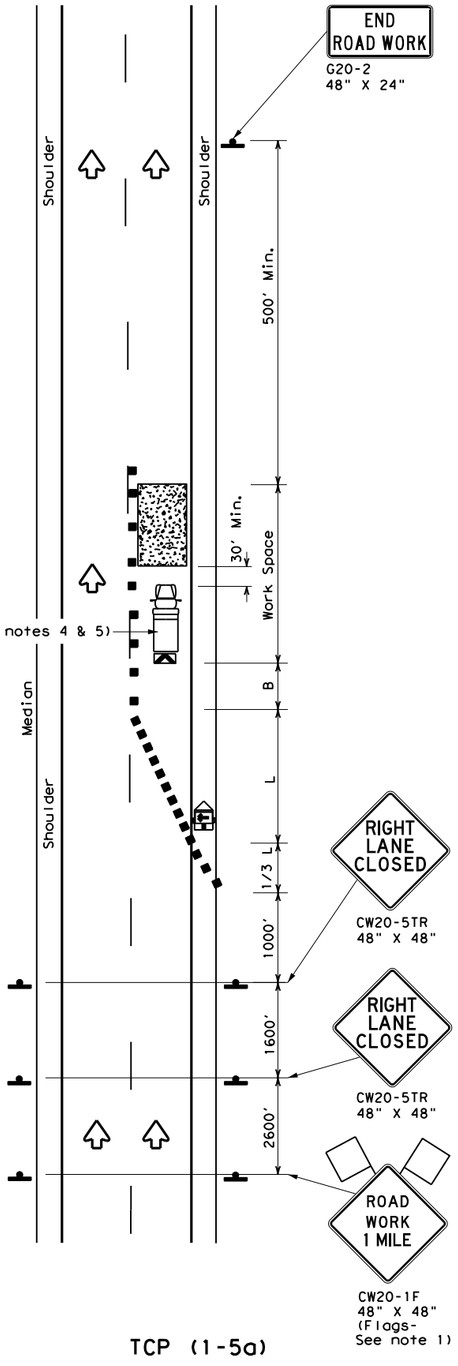
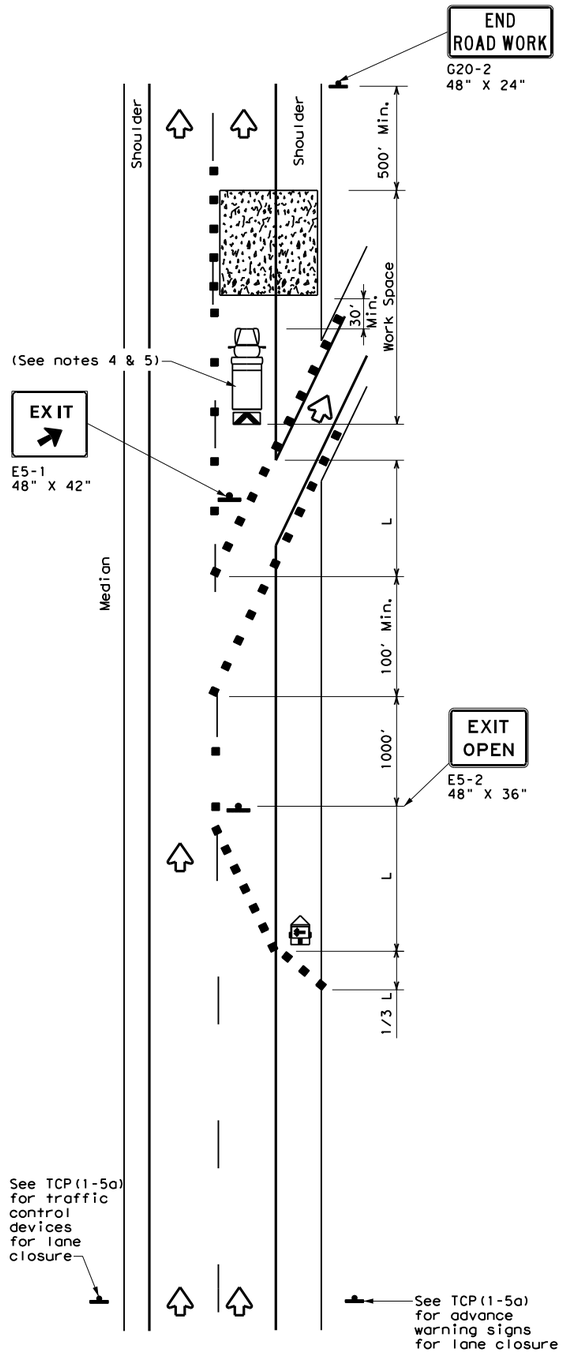


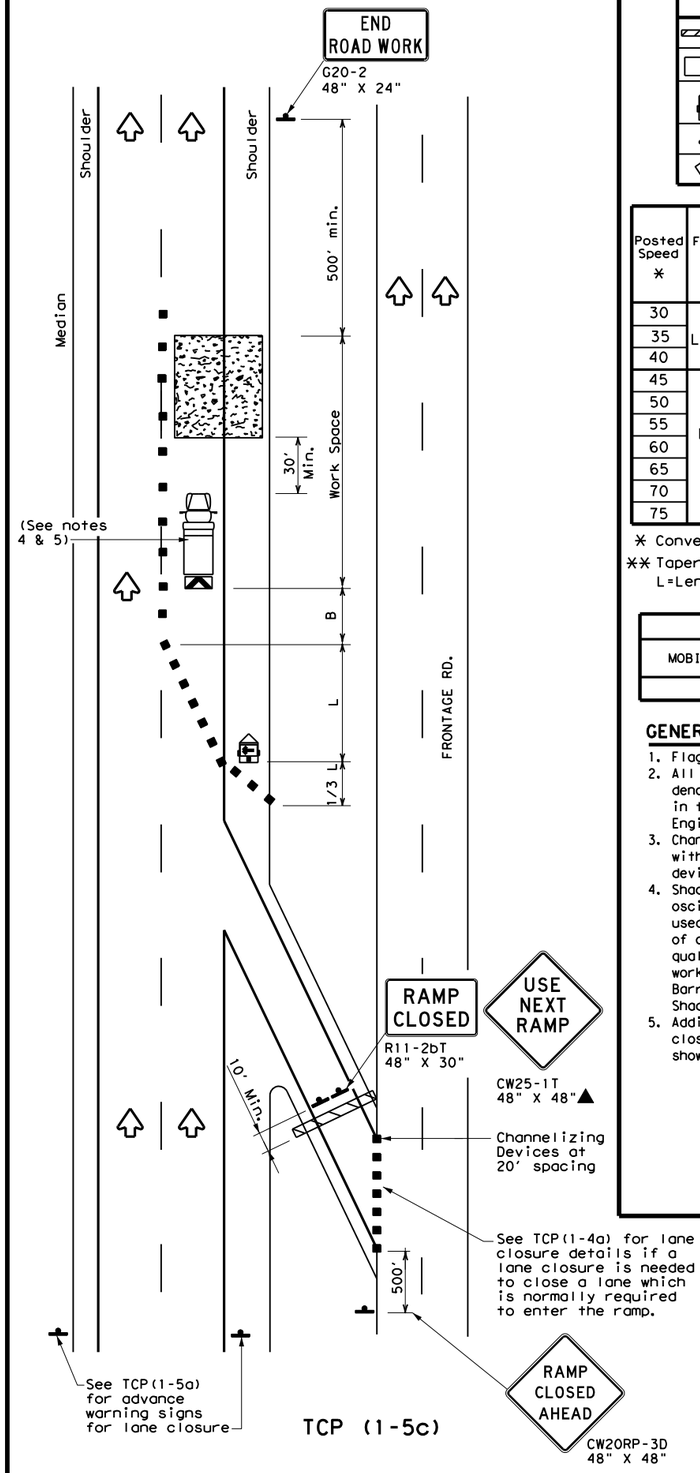
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

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. 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 in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

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	LBB	LAMB, ETC.		33

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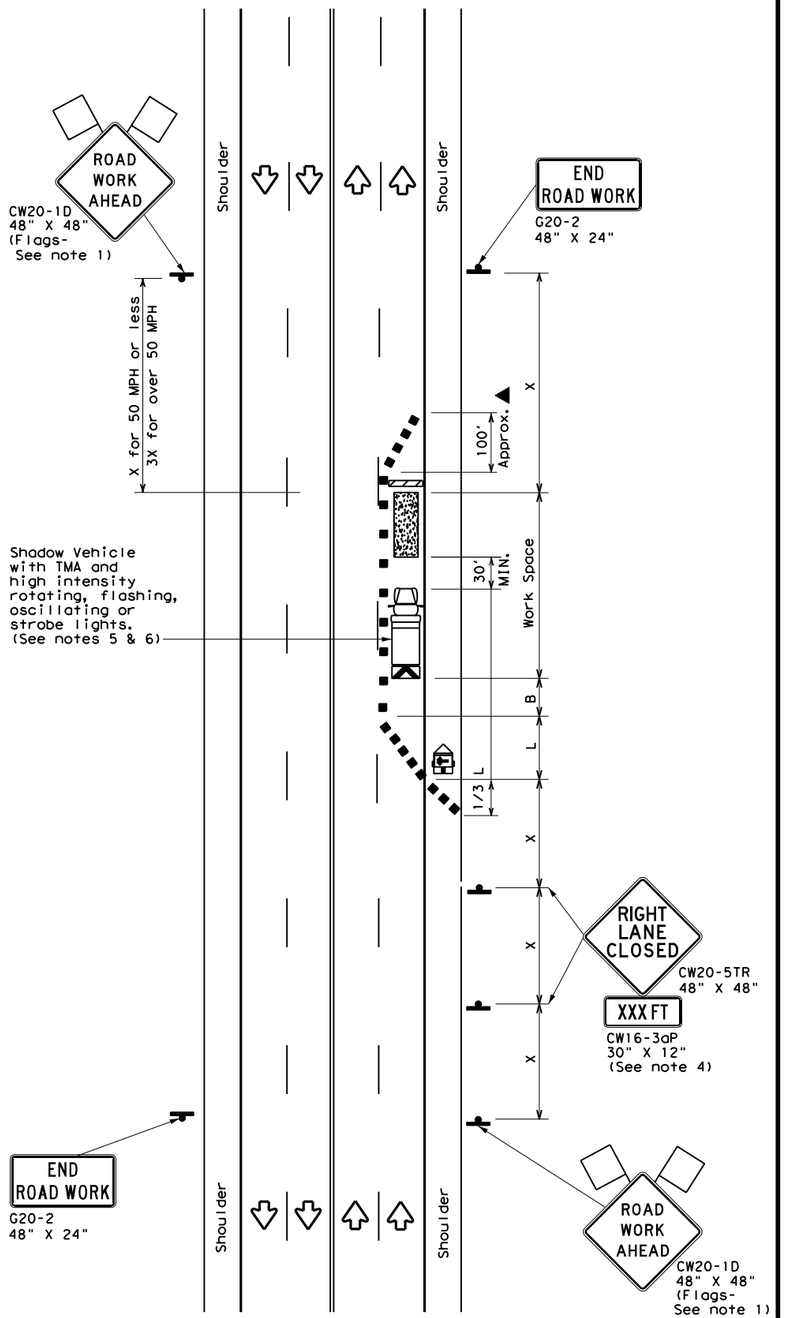
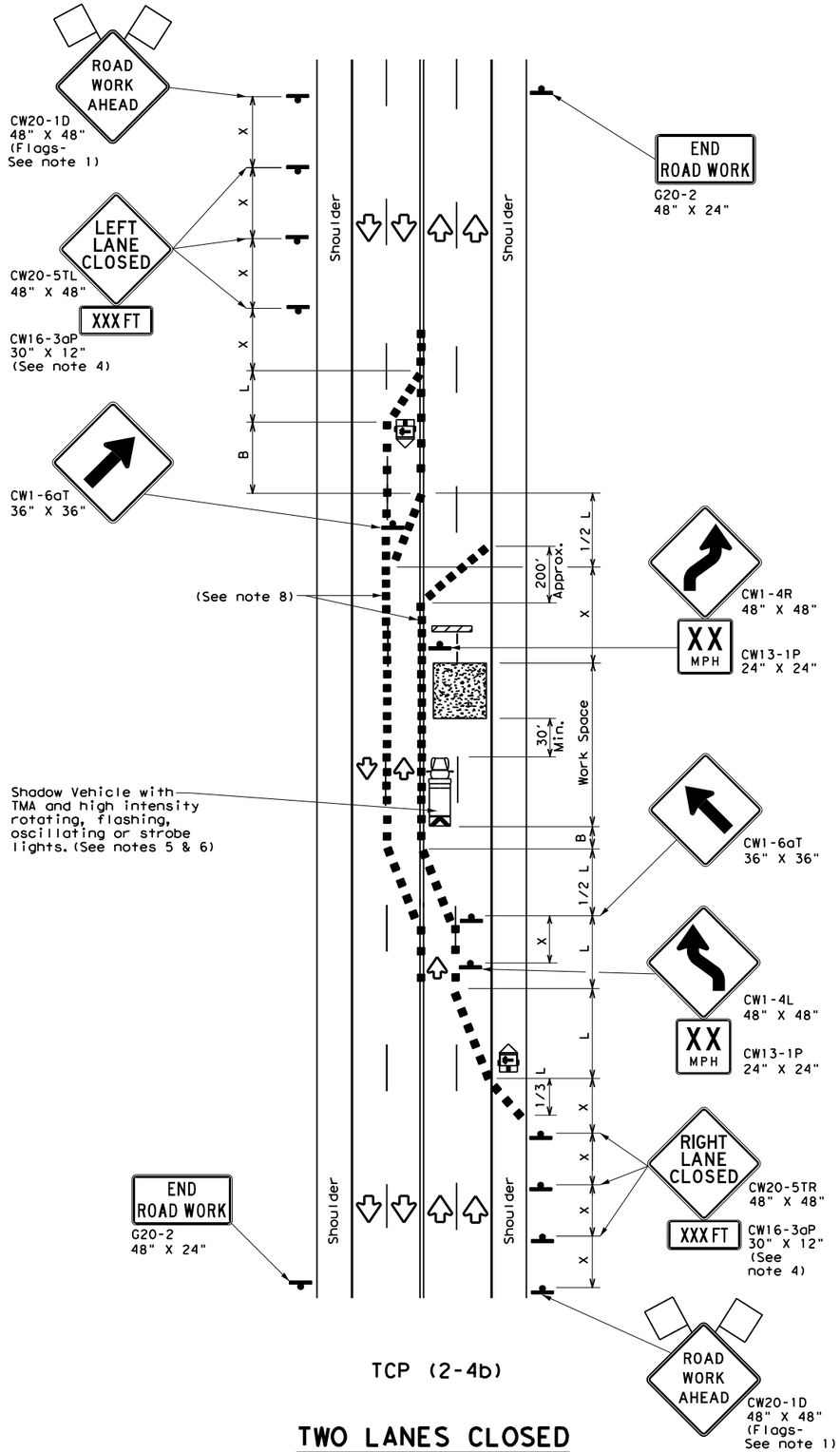


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. 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.

TCP (2-4a)

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

TCP (2-4b)

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

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1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	LBB	LAMB, ETC.		34

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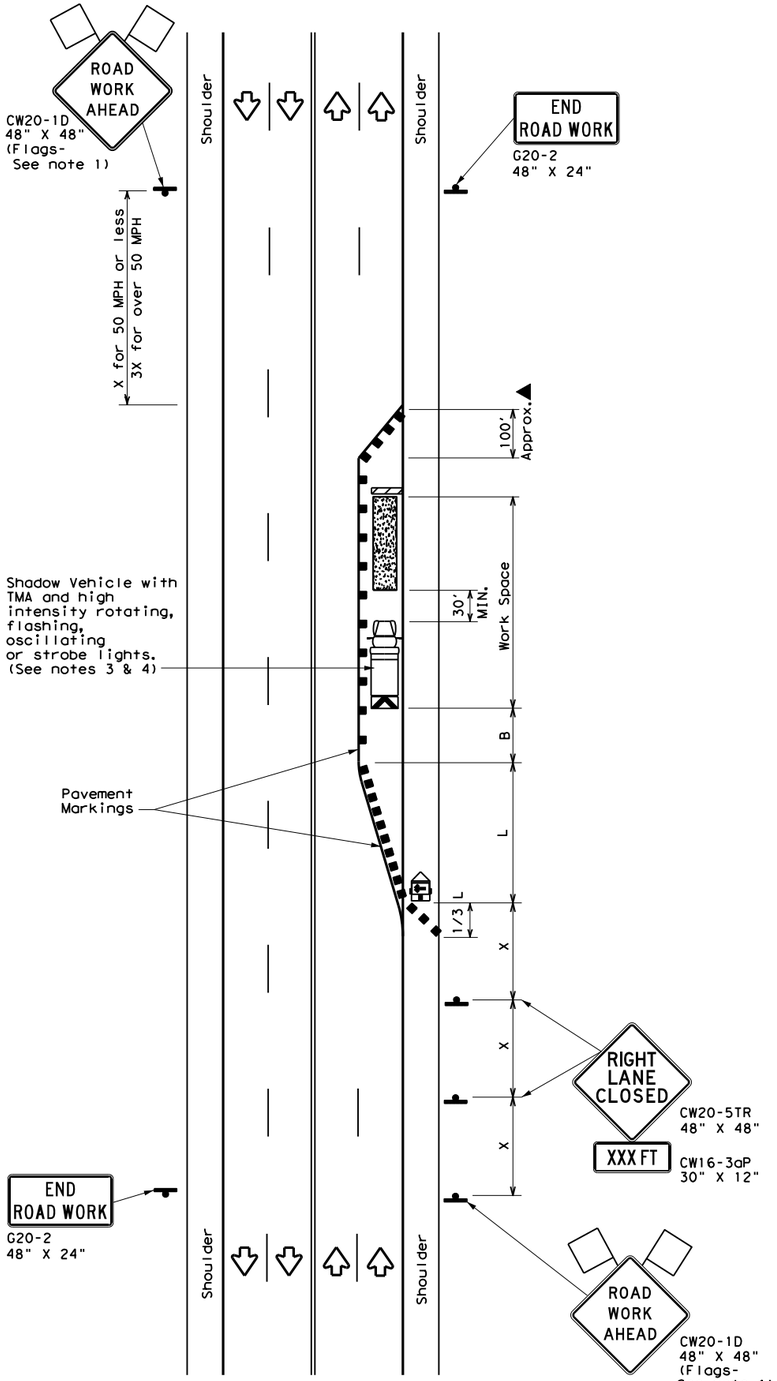
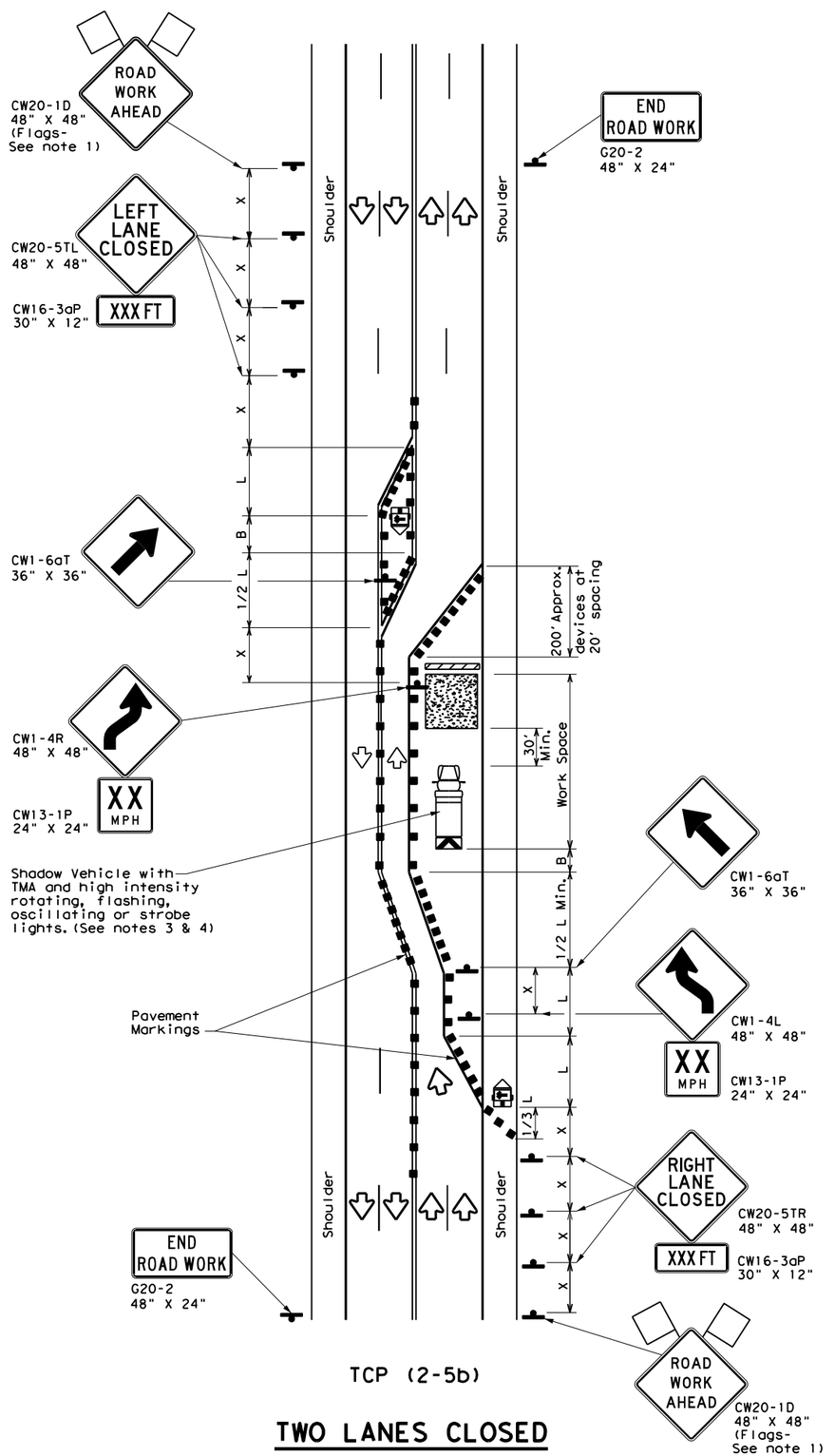


TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

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. 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 substitutued for the Shadow Vehicle and TMA.
4. 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.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

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

TCP (2-5b)

7. Conflicting pavement markings shall be removed for long-term projects.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

TCP(2-5)-18

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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1-97 3-03	DIST	COUNTY		SHEET NO.
4-98 2-18	LBB	LAMB, ETC.		35

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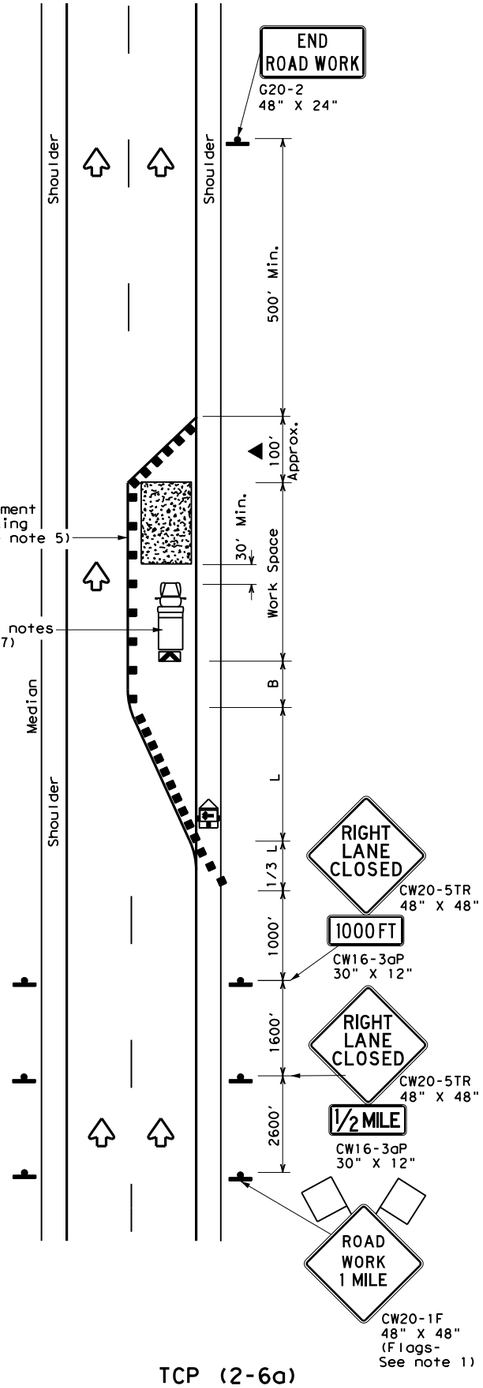
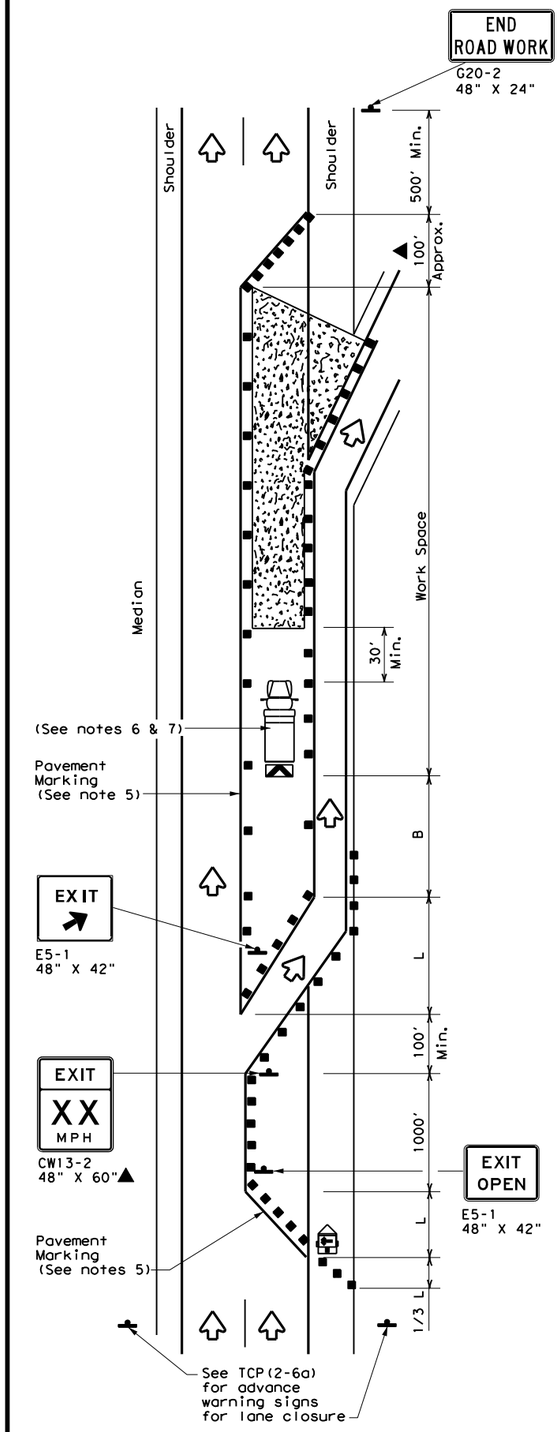


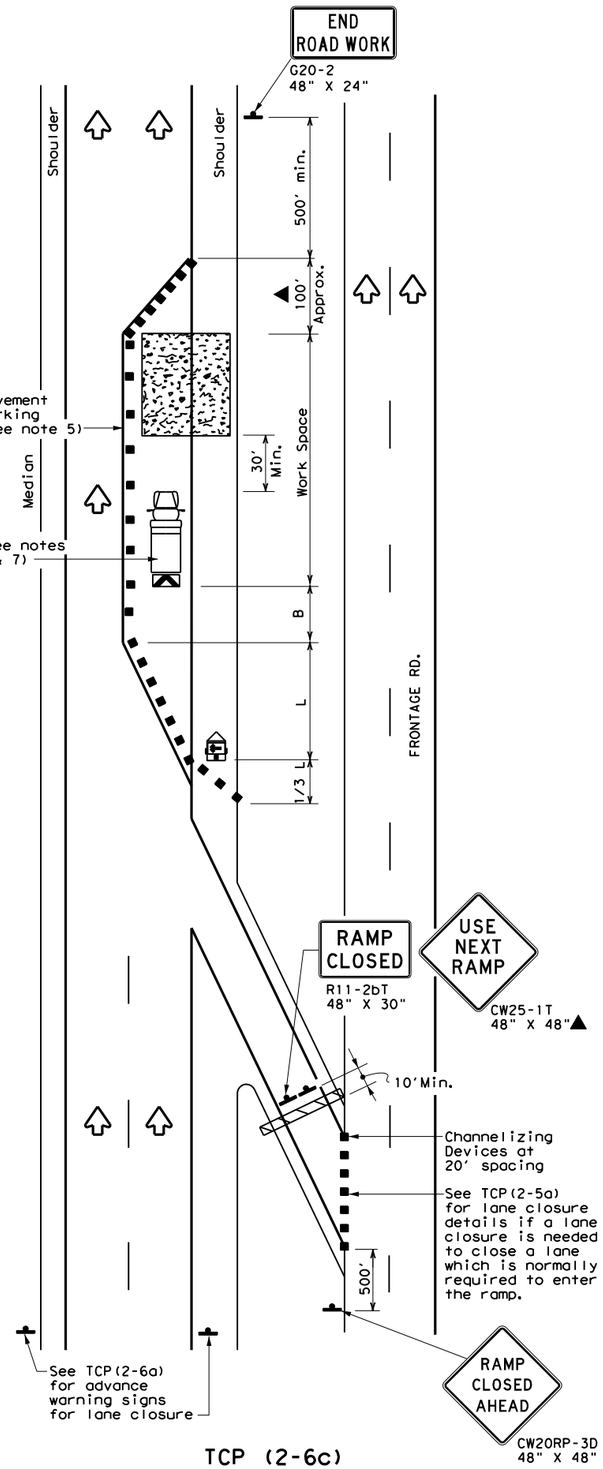
TCP (2-6a)

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

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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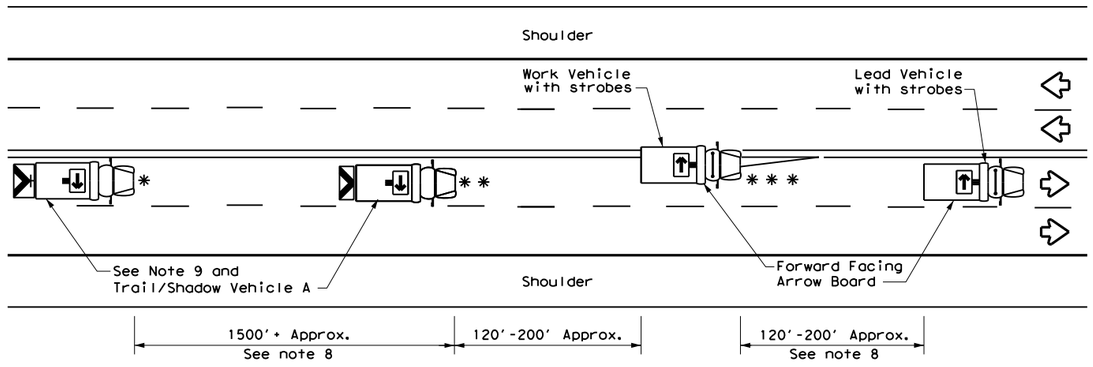
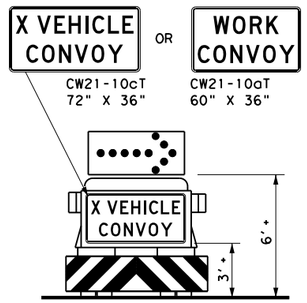


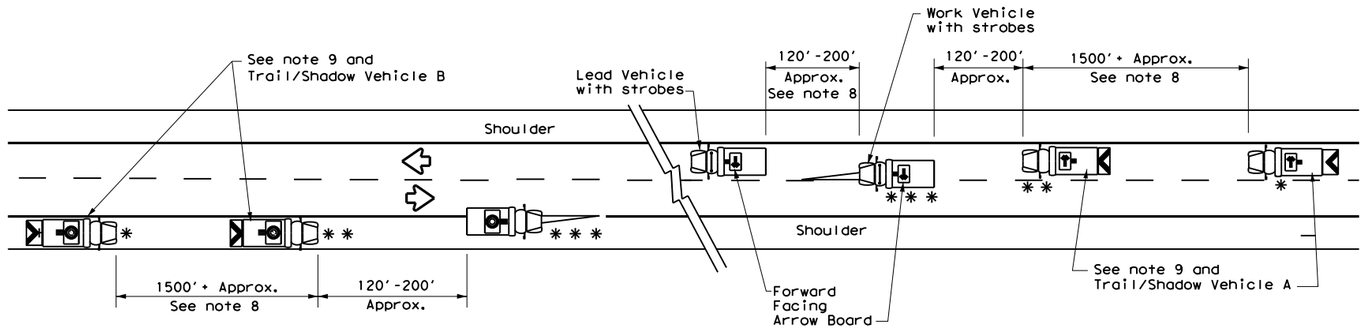
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

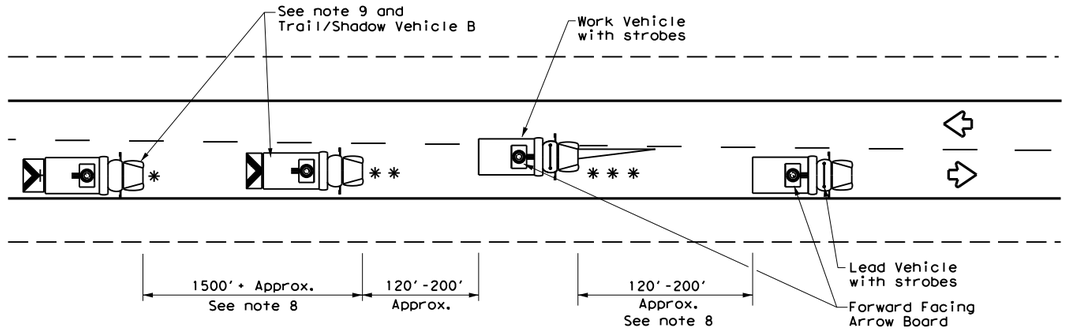


WORK ON SHOULDER

WORK ON TRAVEL LANE

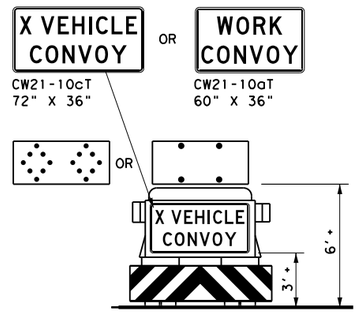
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

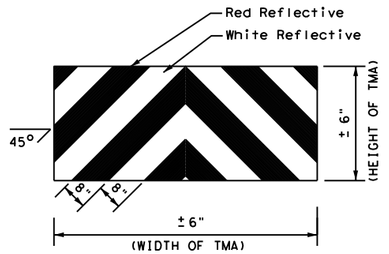
with Flashing Arrow Board in CAUTION display

LEGEND			
*	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 the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY"(CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

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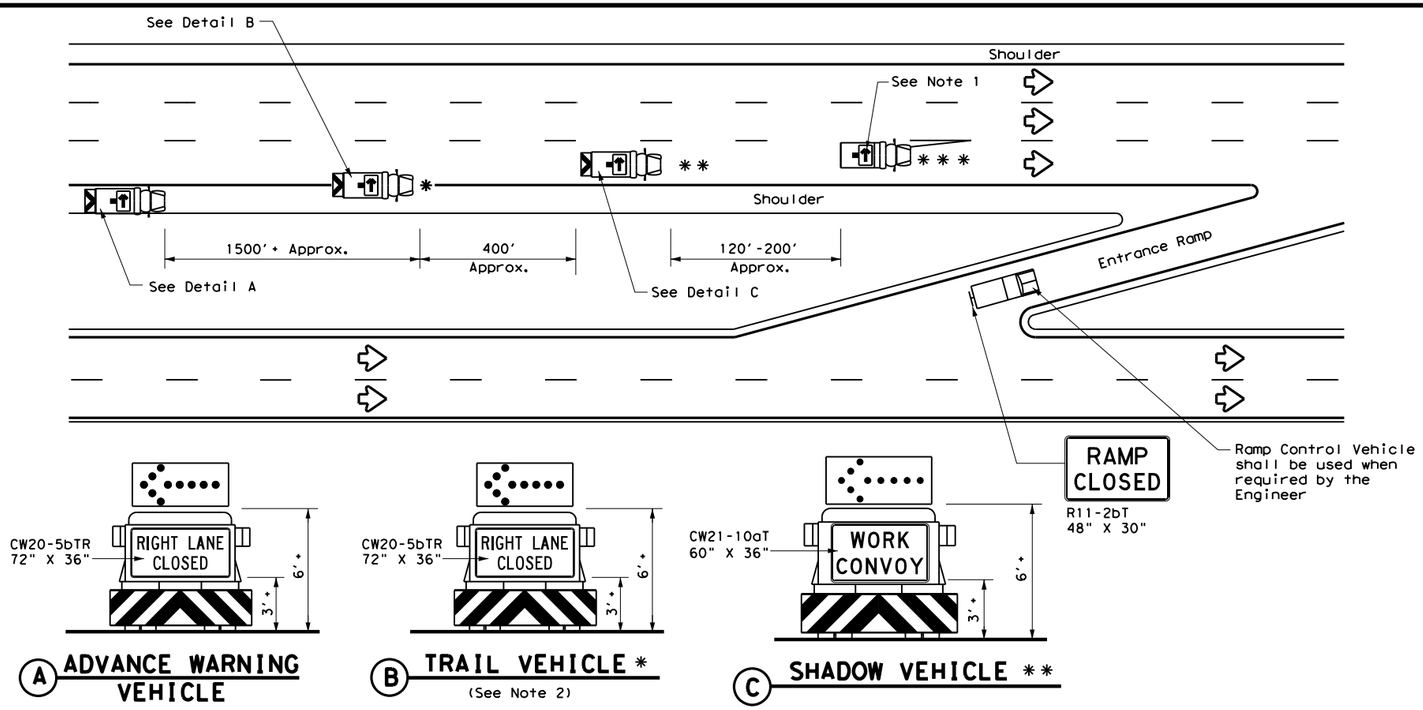
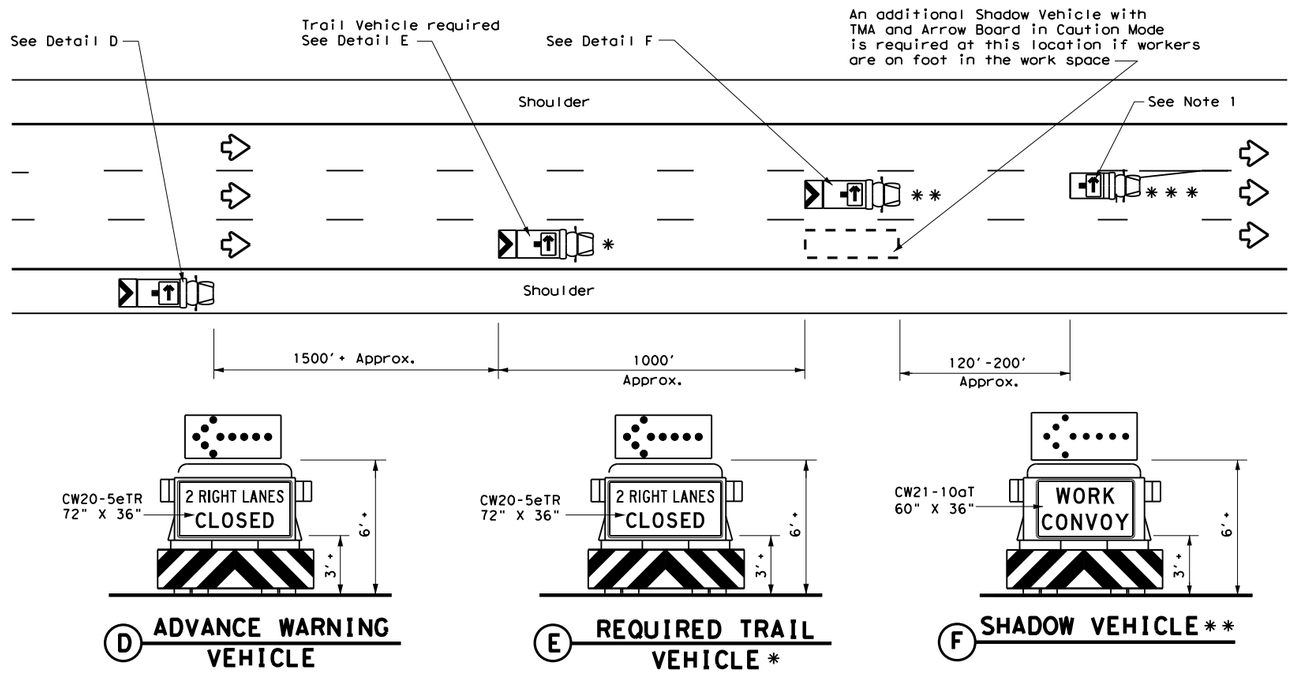


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



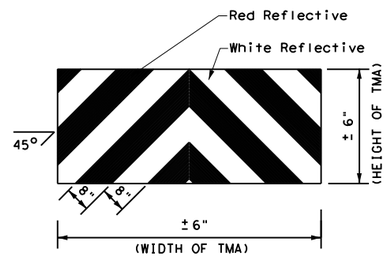
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	LBB	LAMB, ETC.		38
1-97				

176

DATE: 9/30/2024 12:57:44 PM
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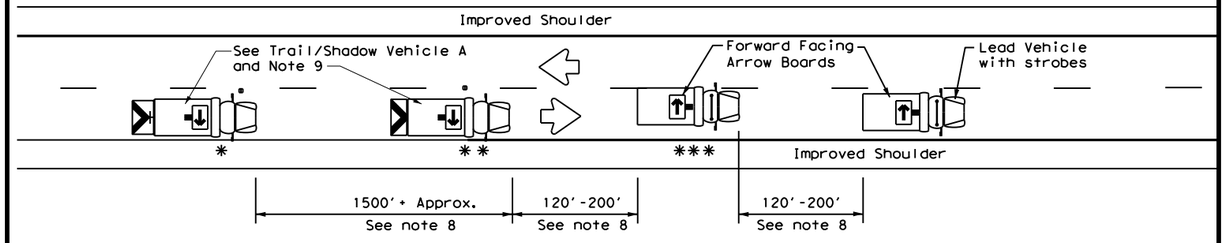
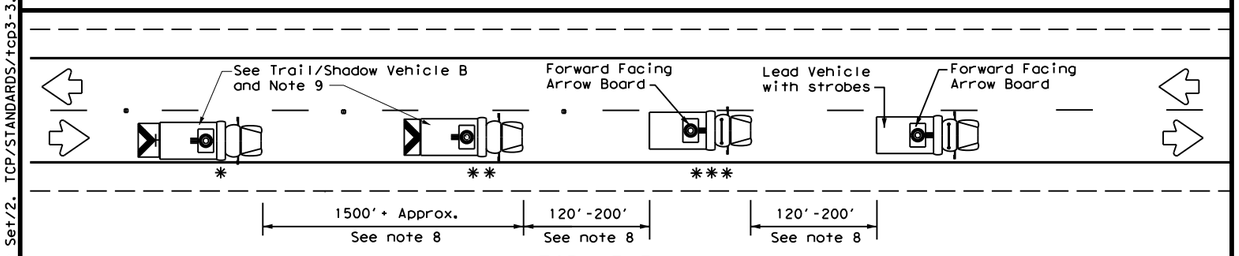


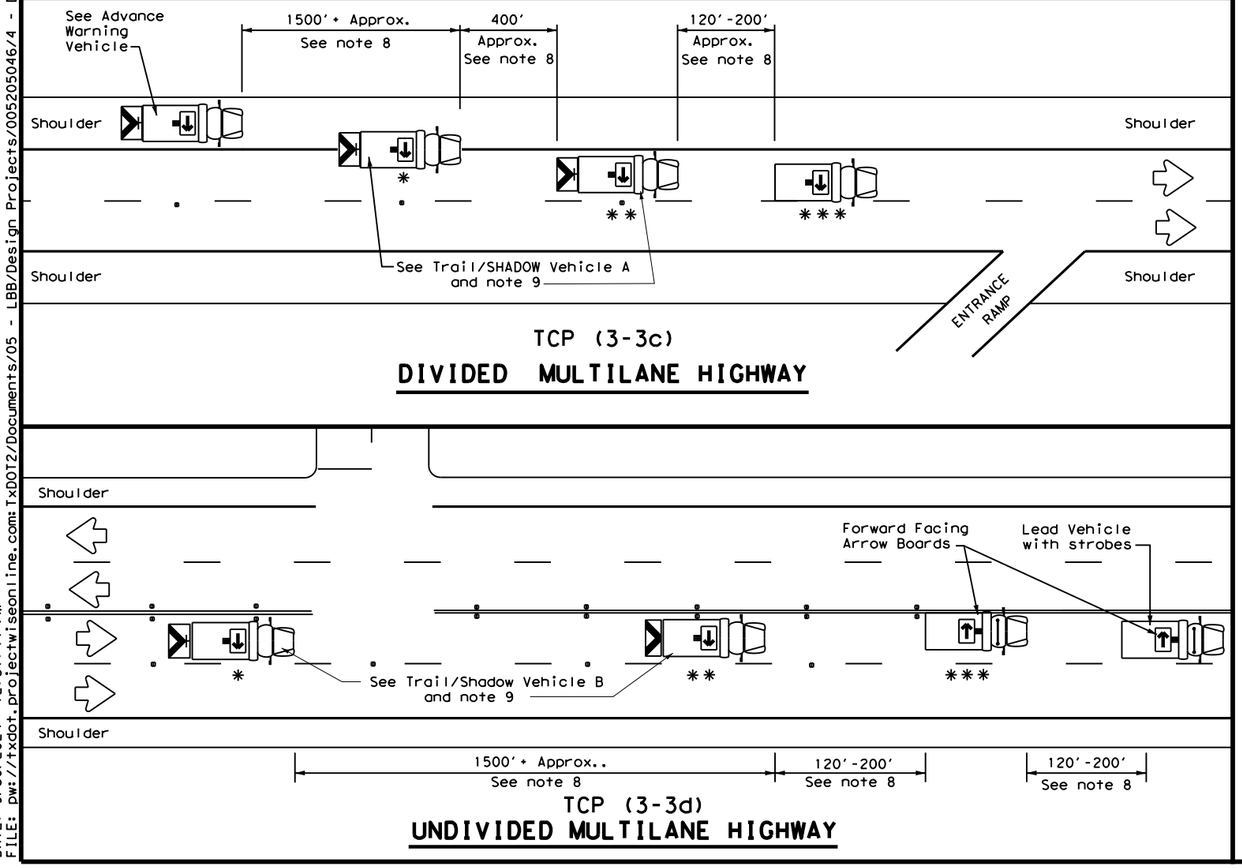
TCP (3-3a)

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



TCP (3-3b)

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

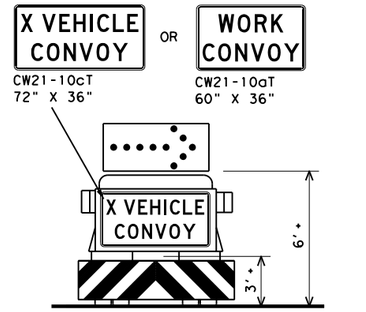


TCP (3-3c)

DIVIDED MULTILANE HIGHWAY

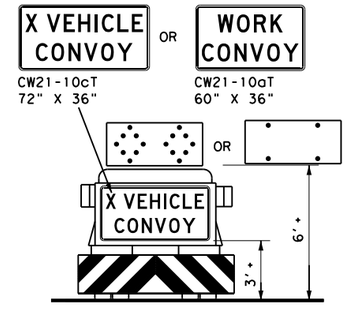
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



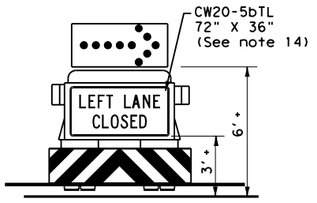
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

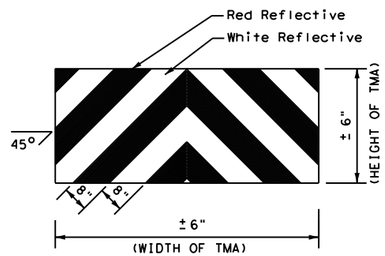


TRAIL/SHADOW VEHICLE B

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	LBB	LAMB, ETC.		39
1-97 7-14				

DATE: 9/30/2024 12:57:57 PM
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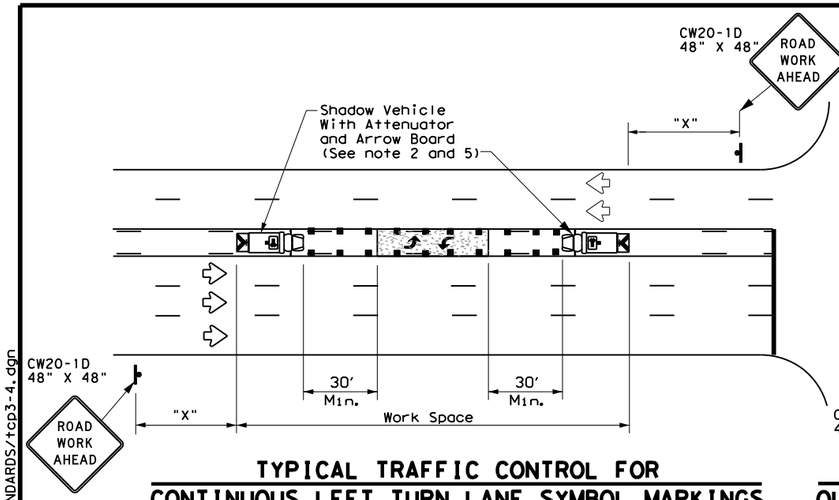
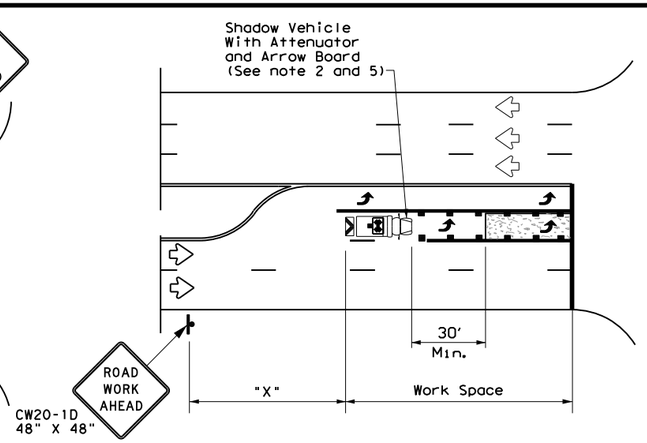
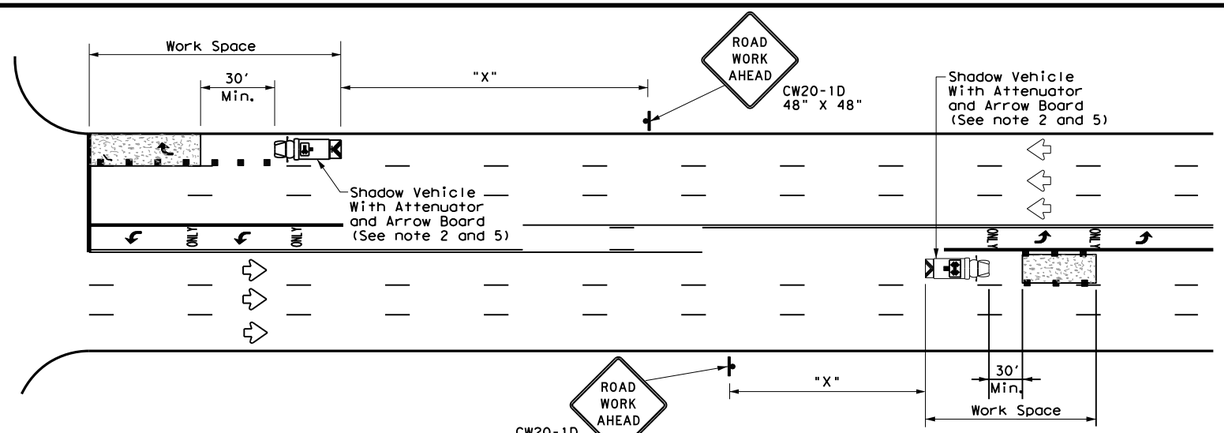


TYPICAL TRAFFIC CONTROL FOR CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS

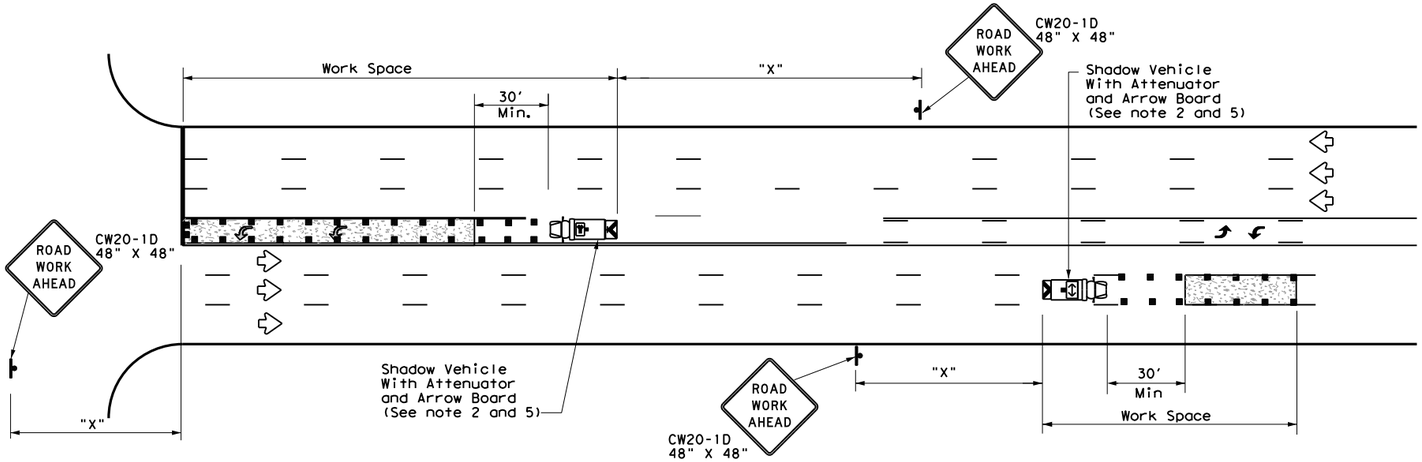


TYPICAL TRAFFIC CONTROL FOR OUTSIDE DUAL LEFT TURN LANE SYMBOL MARKINGS



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'

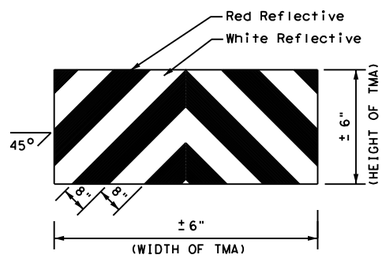
* Conventional Roads Only

** 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

FILE: tcp3-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT July, 2013	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		40

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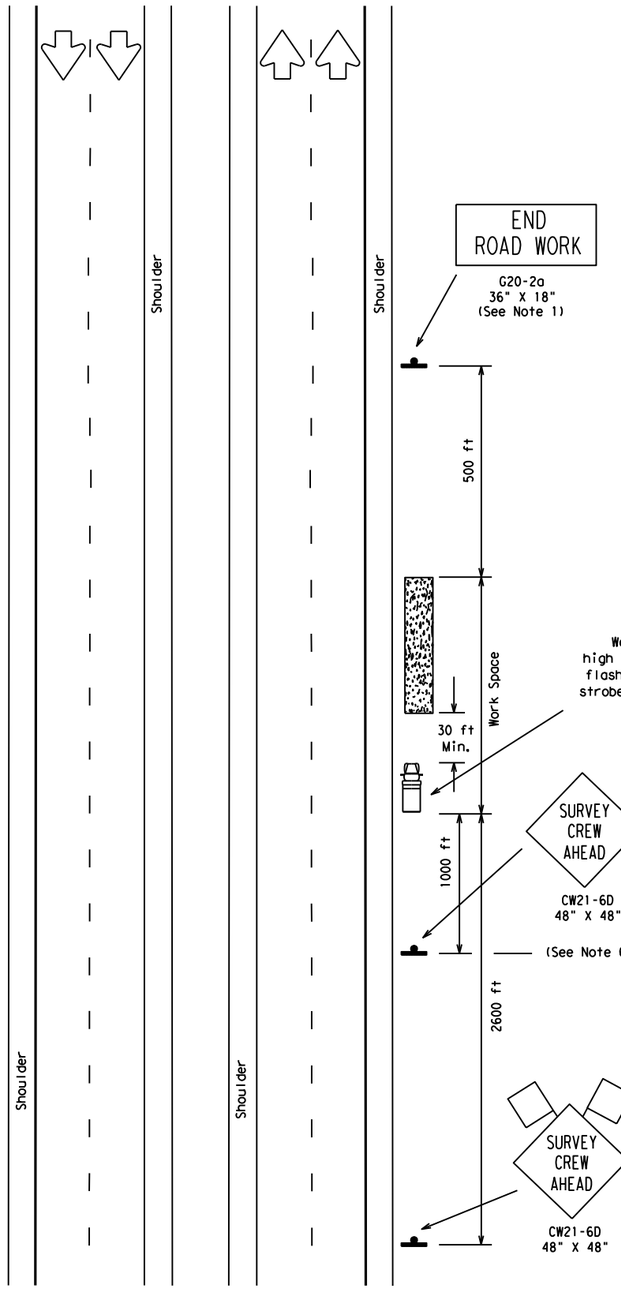
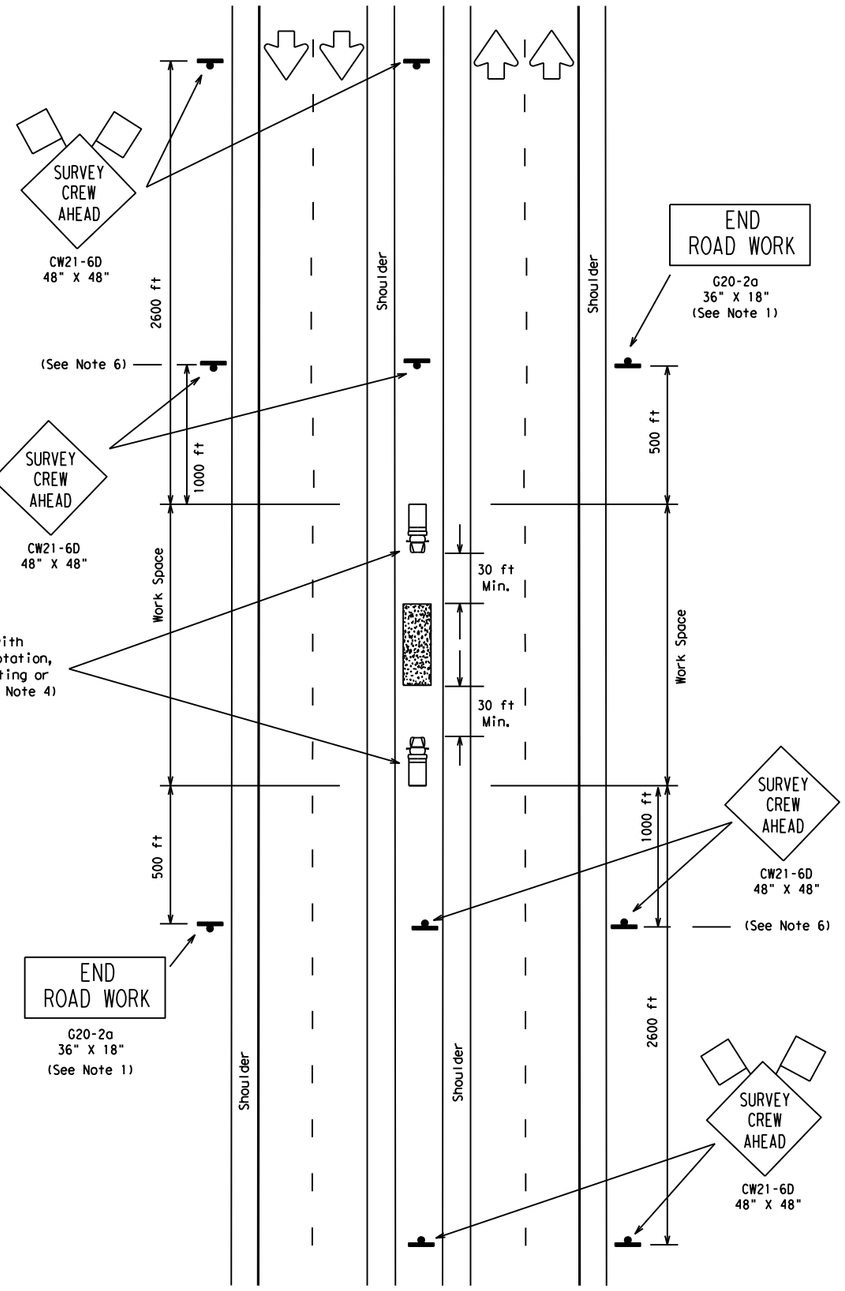


TCP (S-4a)
WORK OFF RIGHT SHOULDER
OF DIVIDED ROADWAYS



TCP (S-4b)
WORK IN MEDIAN
OF DIVIDED ROADWAYS

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECCESSARY PERIODS OF TIME ON THE ROAD SURFACE.

8-18-08 Revision

1 Corrected misspelling.

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'	90'
35		205'	225'	245'	35'	70'-90'	160'	120'
40		265'	295'	320'	40'	80'-100'	240'	155'
45	L=WS	450'	495'	540'	45'	90'-110'	320'	195'
50		500'	550'	600'	50'	100'-125'	400'	240'
55		550'	605'	660'	55'	110'-140'	500'	295'
60		600'	660'	720'	60'	120'-150'	600'	350'
65		650'	715'	780'	65'	130'-165'	700'	410'
70		700'	770'	840'	70'	140'-175'	800'	475'
75		750'	825'	900'	75'	150'-185'	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
	✓	✓		

DEFINITIONS:
SHORT DURATION - work that occupies a location up to 1 hour.
SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

GENERAL NOTES:

1. The G20-2a "END ROAD WORK" sign may be omitted for short duration (less than 1 hour) work.
2. When median work is protected on one side by existing median barriers, signing and protection vehicle may be omitted for the protected direction only.
3. CW20-1D "ROAD WORK AHEAD" signs may be substituted for "SURVEY CREW AHEAD" signs.
1 4. A Shadow Vehicle with a TMA and flashing warning lights/arrow panel in caution mode may be used in lieu of the Work Vehicle to protect the work space.
5. The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.
6. The CW21-6D "SURVEY CREW AHEAD" sign placed at 1000' ahead of the work space is optional, at the discretion of the Engineer. The signs shown at 2600' from the work space are required.
7. Cones may be placed at edge of pavement adjacent to the work space to enhance safety.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

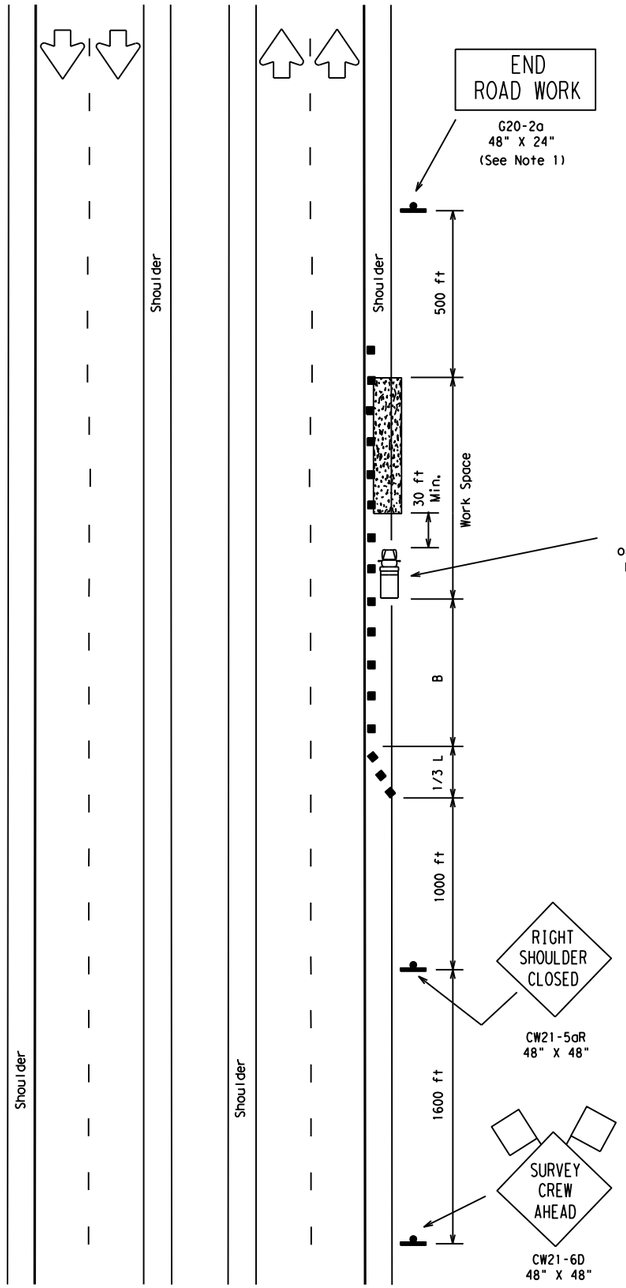
TCP(S-4)-08A

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

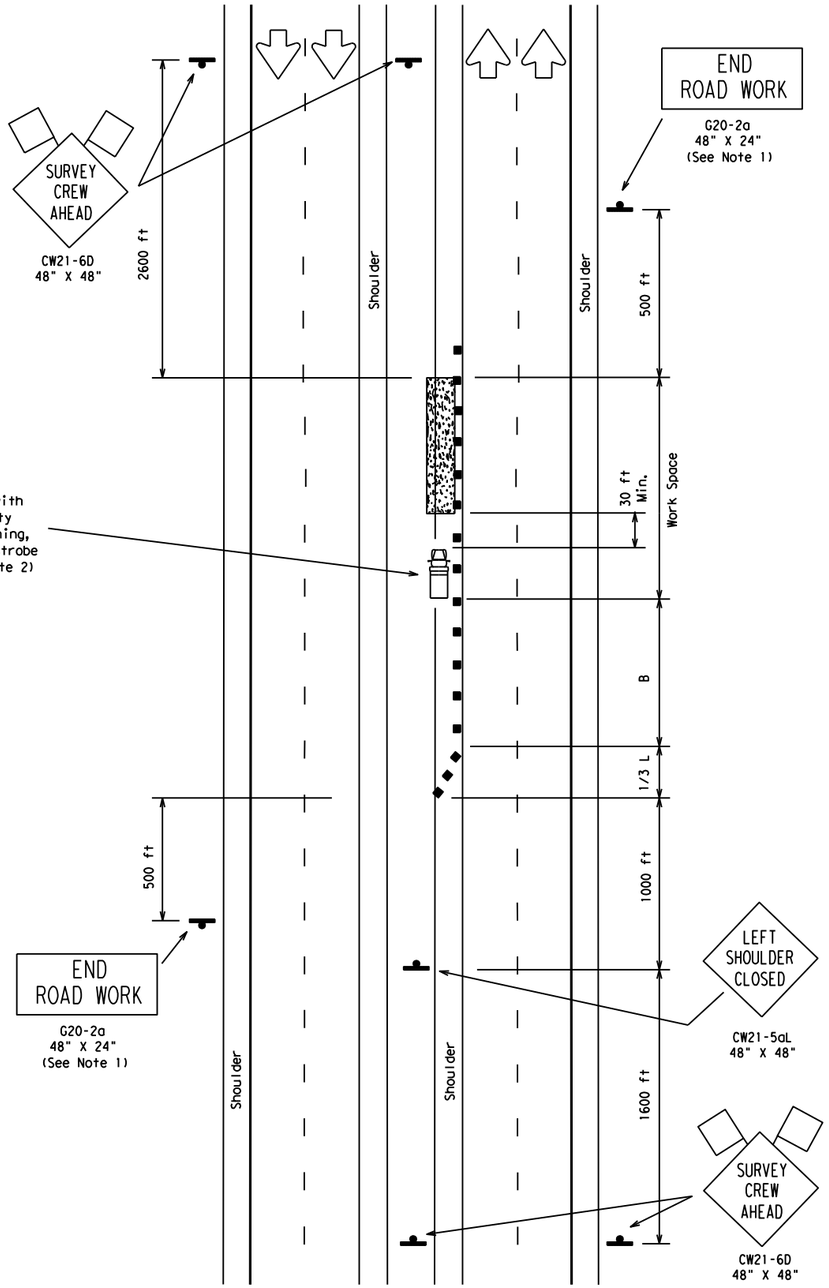
REVISIONS
8-08

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		41

DATE:
FILE:



TCP (S-5a)
WORK ON RIGHT SHOULDER
OF DIVIDED ROADWAYS



TCP (S-5b)
WORK ON MEDIAN SHOULDER
OF DIVIDED ROADWAYS

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECCESSARY PERIODS OF TIME ON THE ROAD SURFACE.

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'	90'
35		205'	225'	245'	35'	70'-90'	160'	120'
40		265'	295'	320'	40'	80'-100'	240'	155'
45	L=WS	450'	495'	540'	45'	90'-110'	320'	195'
50		500'	550'	600'	50'	100'-125'	400'	240'
55		550'	605'	660'	55'	110'-140'	500'	295'
60		600'	660'	720'	60'	120'-150'	600'	350'
65		650'	715'	780'	65'	130'-165'	700'	410'
70		700'	770'	840'	70'	140'-175'	800'	475'
75		750'	825'	900'	75'	150'-185'	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
	✓	✓		

DEFINITIONS:
SHORT DURATION - work that occupies a location up to 1 hour.
SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

GENERAL NOTES:

1. The G20-2a "END ROAD WORK" sign may be omitted for short duration (less than 1 hour) work.
2. For short duration work, the Shadow Vehicle with TMA may be replaced by another Work Vehicle with high intensity rotating, flashing or strobe lights.
3. Shadow Vehicles with a TMA are desirable when workers or equipment are in the work space. When approved by the engineer, Type III barricades or other channelizing devices may be substituted for the Shadow Vehicle.
4. If shoulders are not present, the 1/3L shoulder taper is to be omitted and four channelizing devices shall be placed in front of the arrow panel, perpendicular to traffic.
5. CW20-1D "ROAD WORK AHEAD" signs may be substituted for CW21-6D "SURVEY CREW AHEAD" signs.
6. The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP(S-5)-08

REVISIONS

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		42

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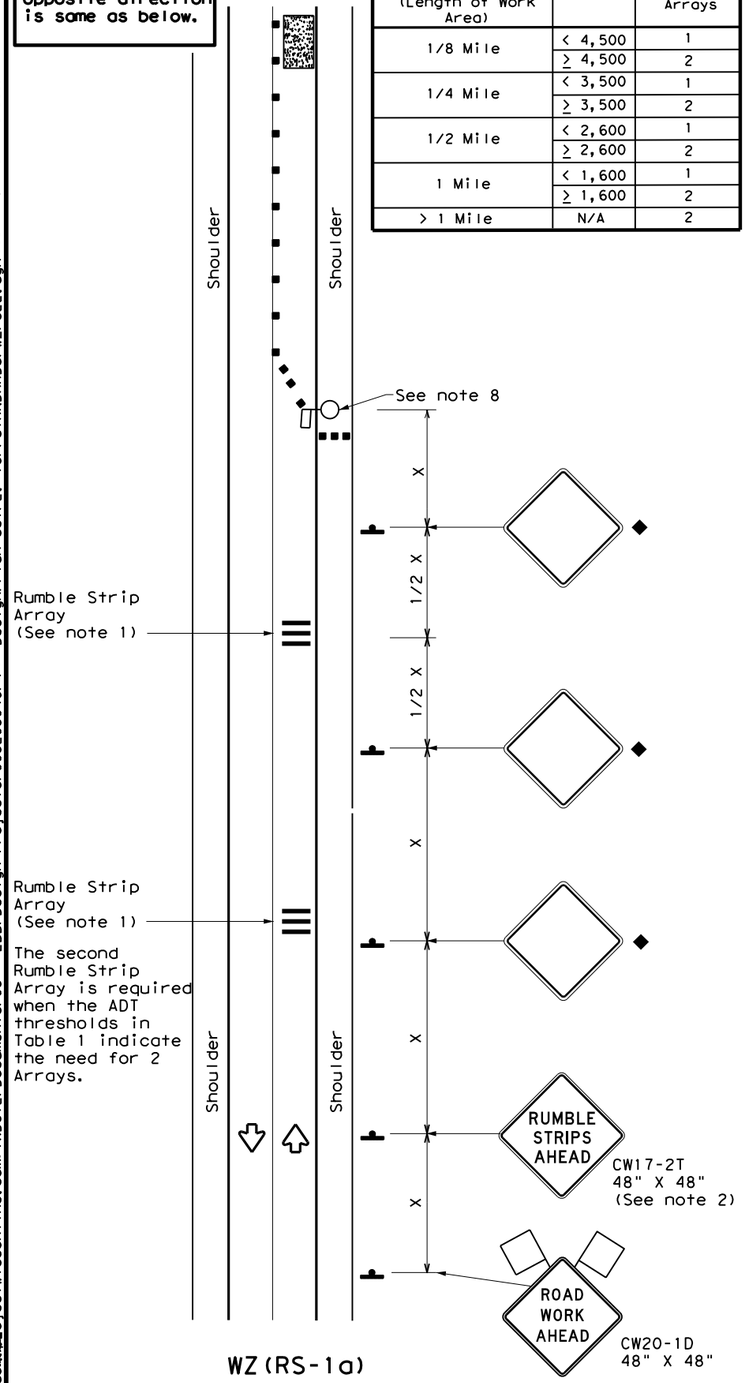
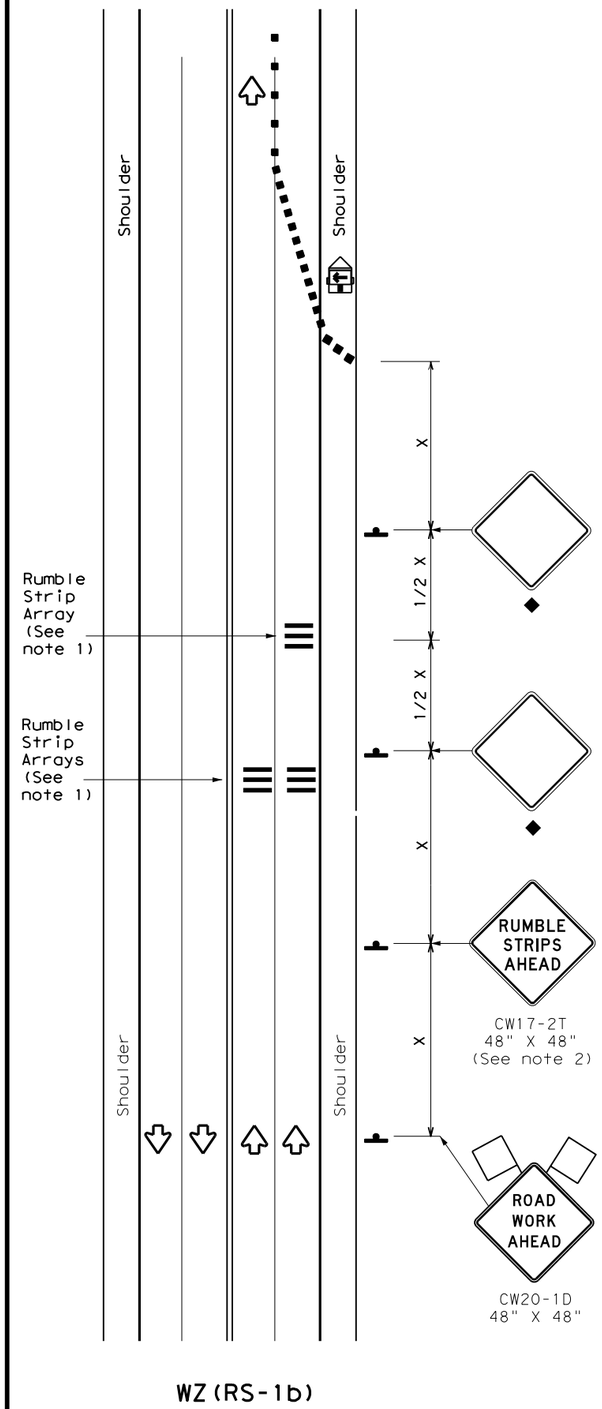
Warning sign and rumble strip sequence in opposite direction is same as below.

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	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		43

117

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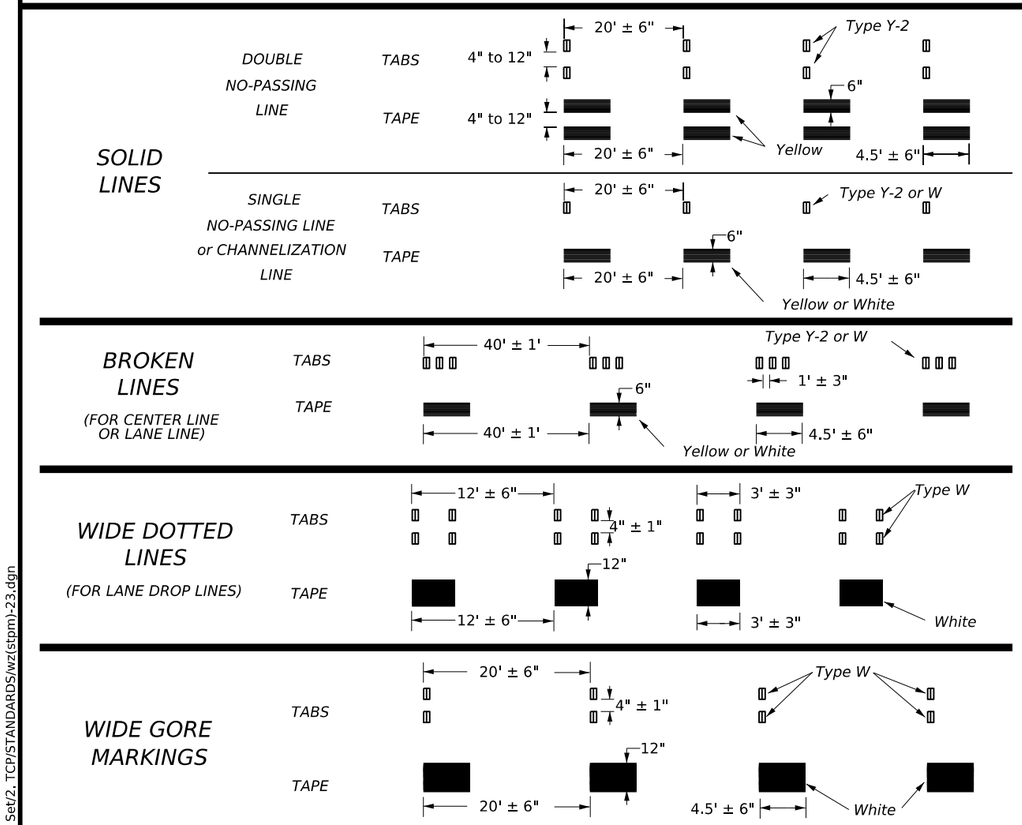
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



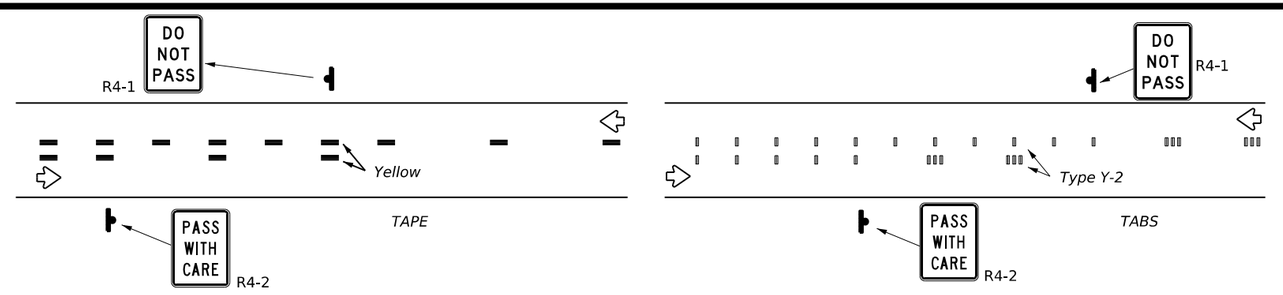
NOTES:

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.

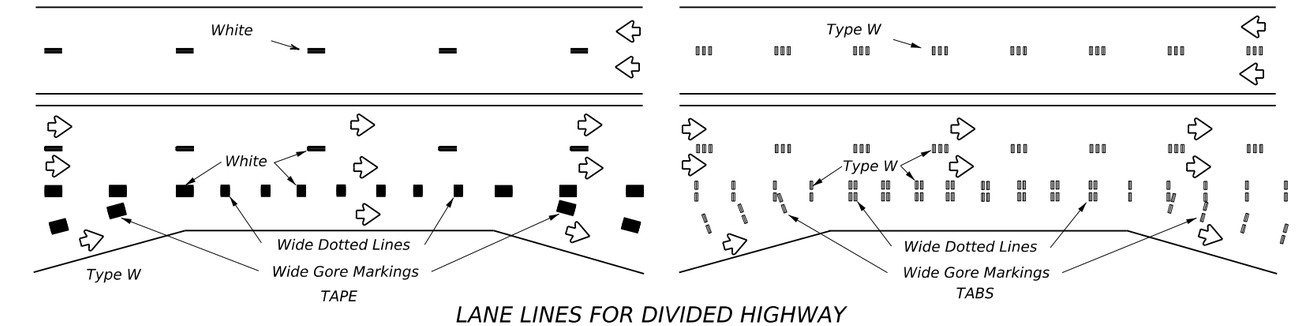
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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.

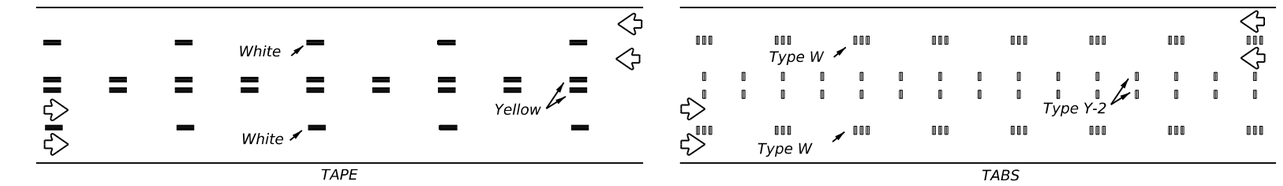
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



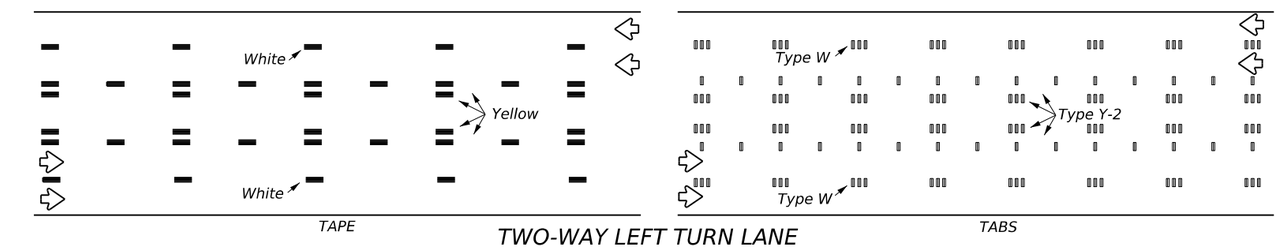
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



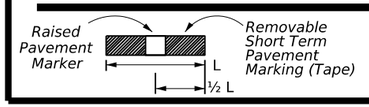
LANE LINES FOR DIVIDED HIGHWAY



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 Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

FILE: wzstpm-23.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
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4-92 7-13 1-97 2-23 3-03	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		44

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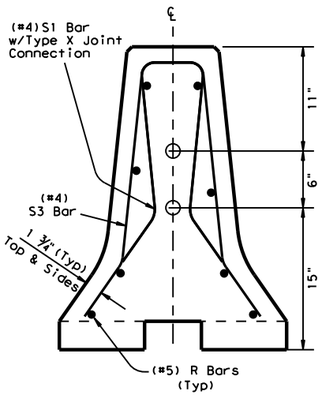
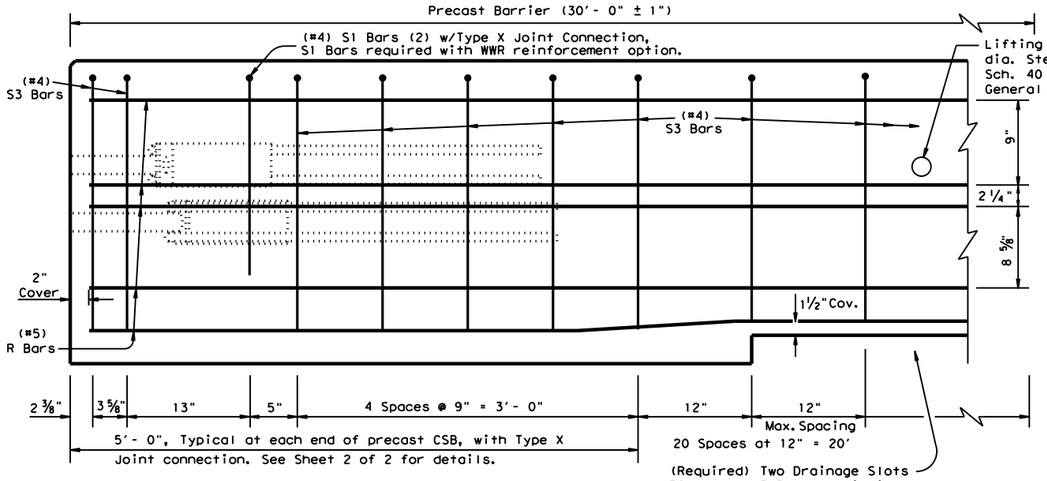


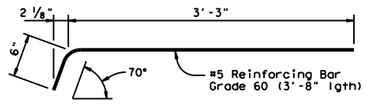
End View Precast Barrier

See sheet 2 of 3 for Joint connection Type X



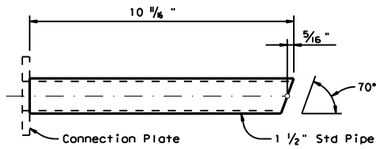
Reinforcement for Precast (CSB) Concrete Safety Barrier (Type 1)

Showing reinforcement for Joint Type X



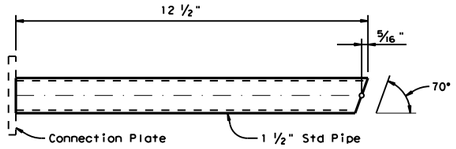
DEFORMED BAR ANCHOR DETAILS

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



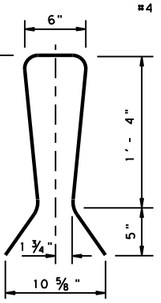
UPPER CONNECTION PIPE DETAILS

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



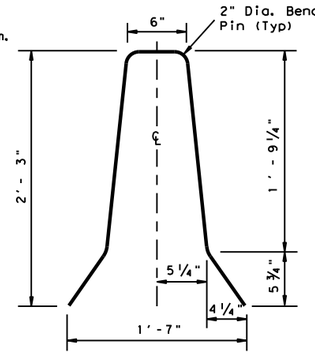
LOWER CONNECTION PIPE DETAILS

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



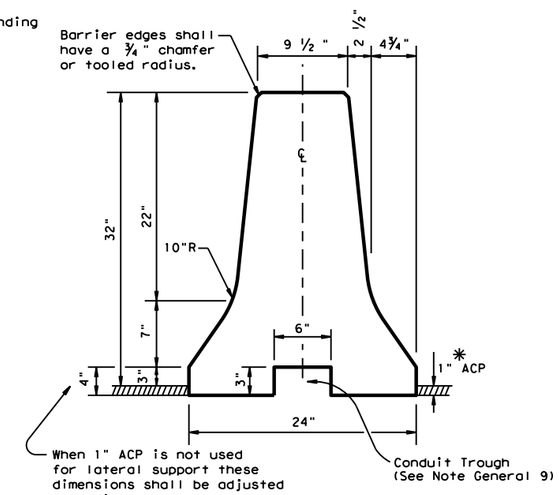
S1 Bar

#4 Bar (2)
(Joint Type X)



S3 Bar

#4 Bar

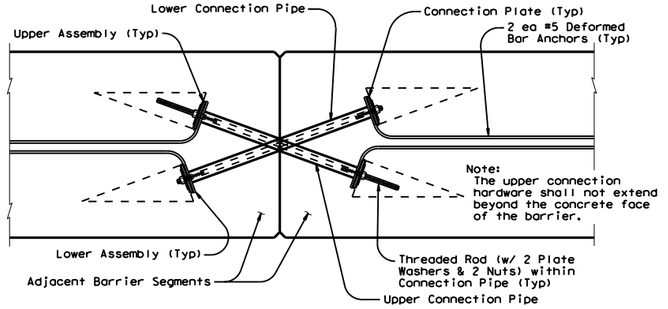


Concrete Safety Barrier

✱ 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.

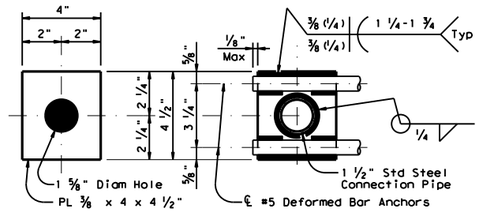
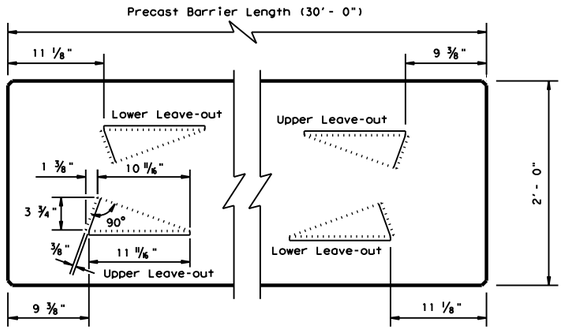


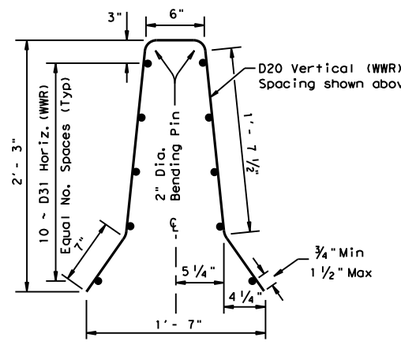
PLATE DIMENSIONS WELDING DETAILS

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.



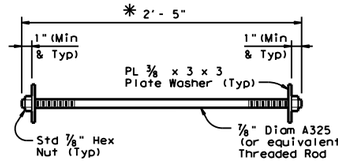
BARRIER PLAN AT END JOINTS



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

(WWR) General Notes

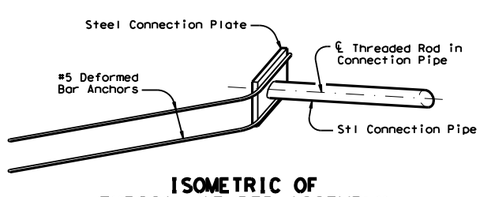
1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing 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

FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
© TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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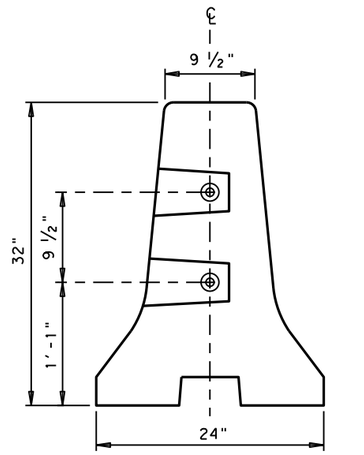
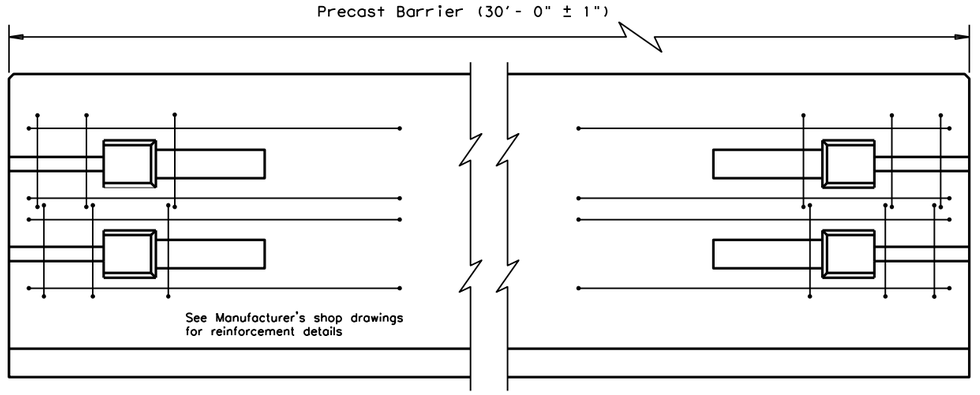
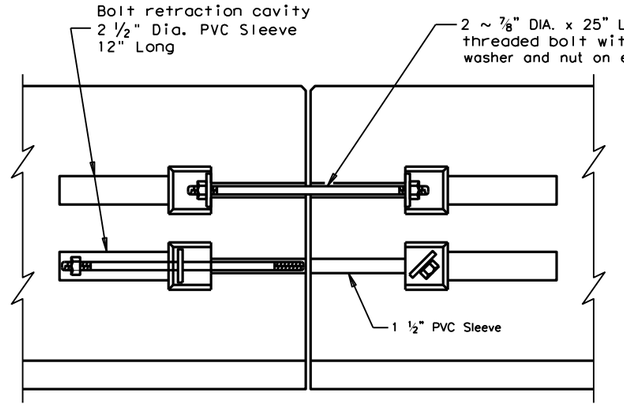


END VIEW (CSB) QUICK-BOLT
QUICK-BOLT POCKET LOCATIONS

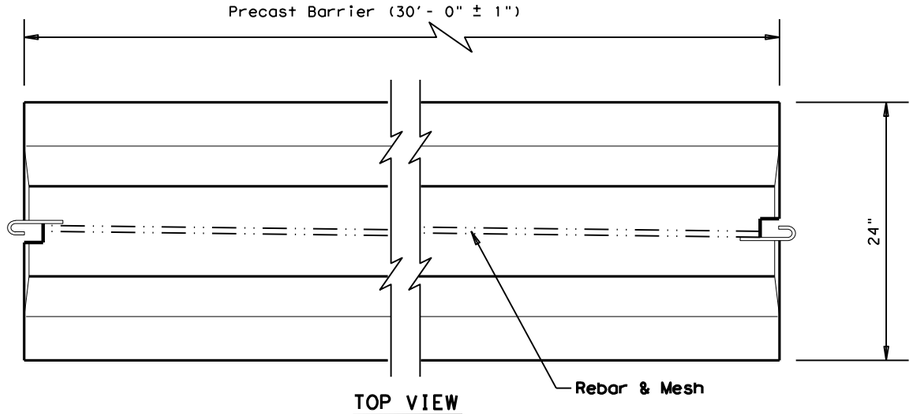


ELEVATION (CSB) QUICK-BOLT
See Manufacturer's shop drawing for additional details

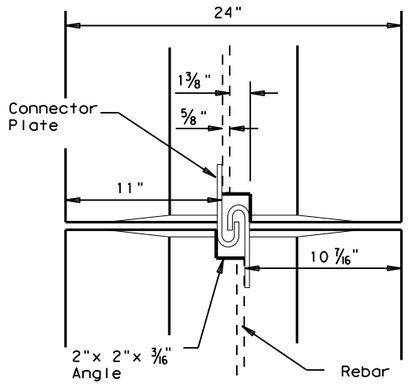


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

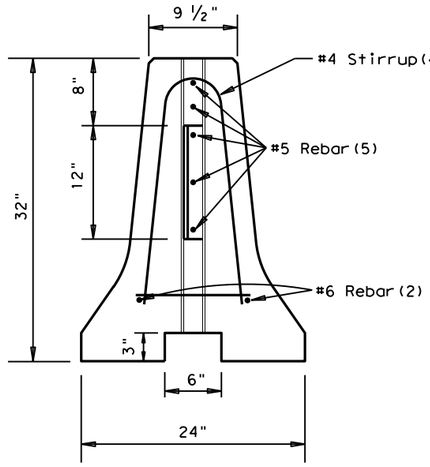
Joint Connection (Type Q)



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

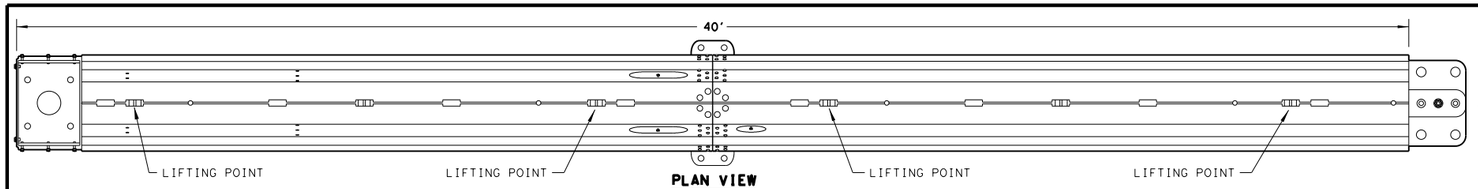
CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER
(TYPE 1)

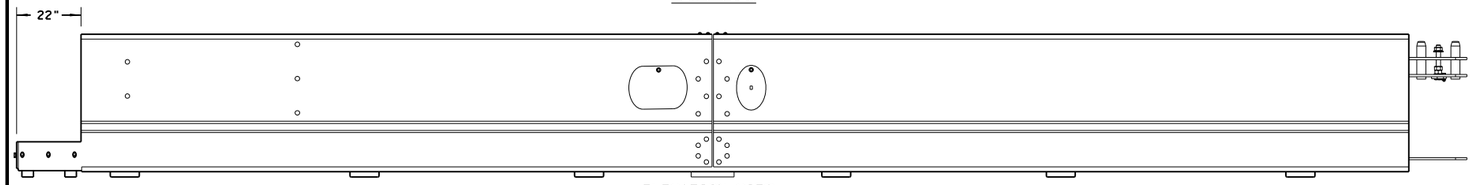
CSB(1)-10

FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		46

DATE:
FILE:

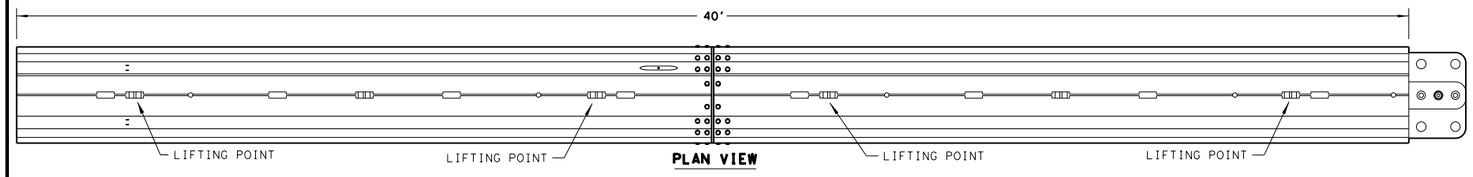


PLAN VIEW

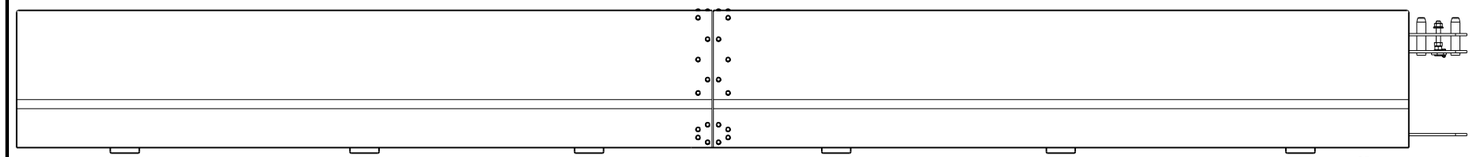


ELEVATION VIEW

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

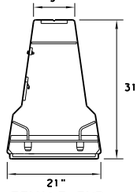


PLAN VIEW

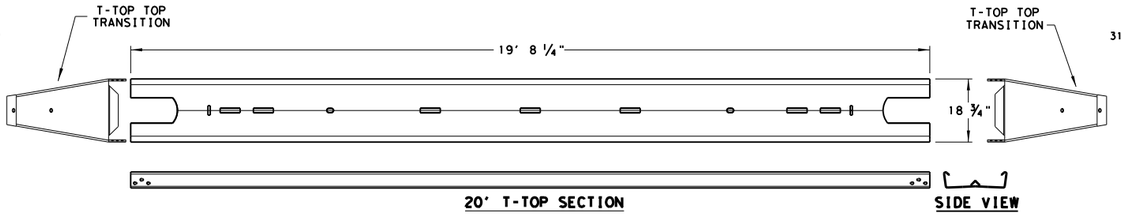


ELEVATION VIEW

BARRIERGUARD STANDARD SECTION - 40 FT.

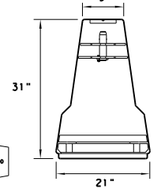


FEMALE END CROSS SECTION

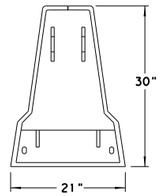


20' T-TOP SECTION

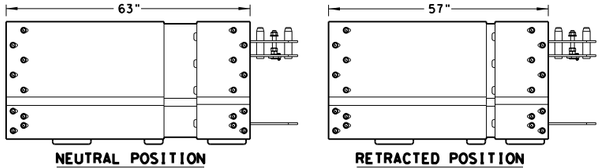
SIDE VIEW



MALE END CROSS SECTION

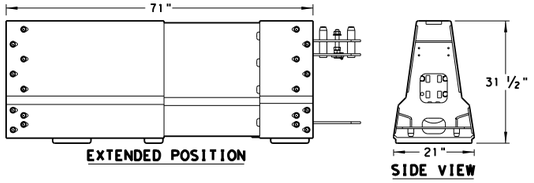


FULL HEIGHT TERMINAL COVER



NEUTRAL POSITION

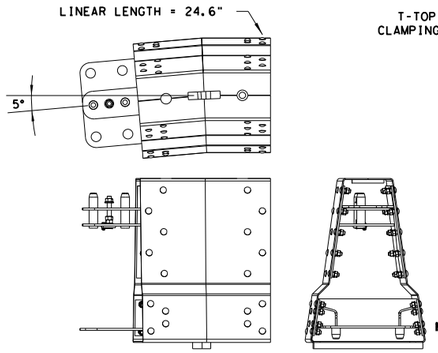
RETRACTED POSITION



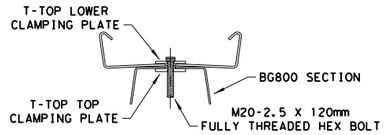
EXTENDED POSITION

SIDE VIEW

VARIABLE LENGTH BARRIER



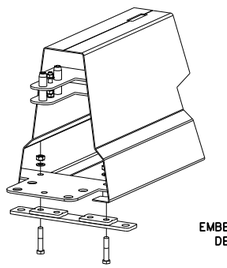
5° (LH) LEFT HAND ANGLE SECTION



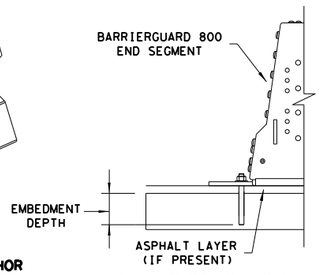
T-TOP MOUNTING DETAIL

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 ½"
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	0052	05	046	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		47

DATE: 9/30/2024
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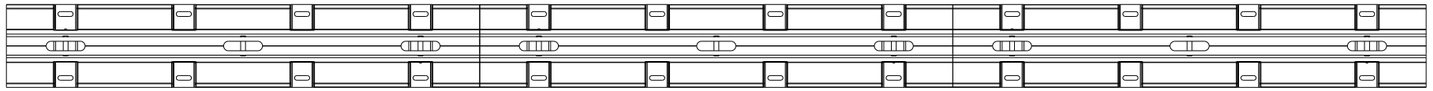
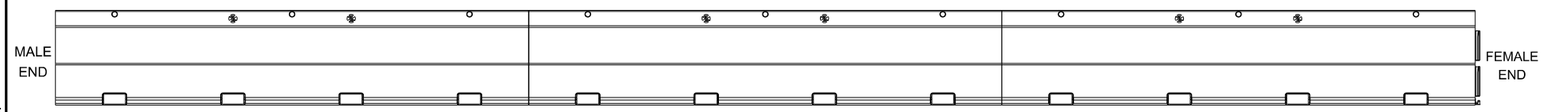
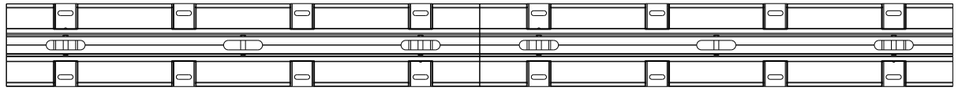


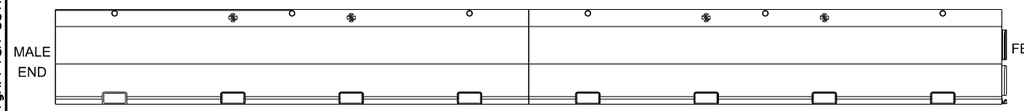
PLAN VIEW



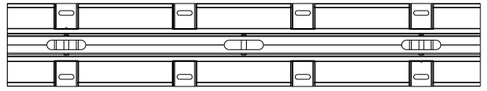
ELEVATION VIEW
ZONEGUARD STANDARD UNIT x 50'-0"



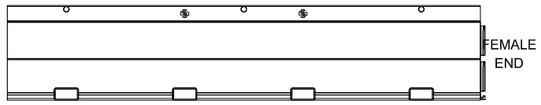
PLAN VIEW



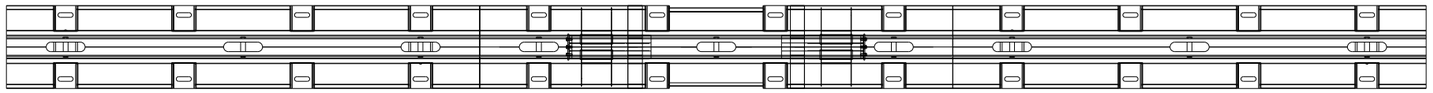
ELEVATION VIEW
ZONEGUARD STANDARD UNIT x 33'-4"



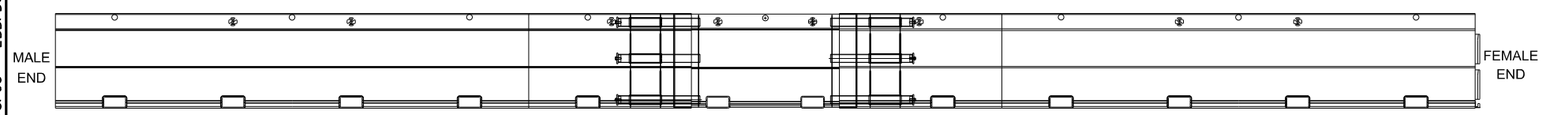
PLAN VIEW



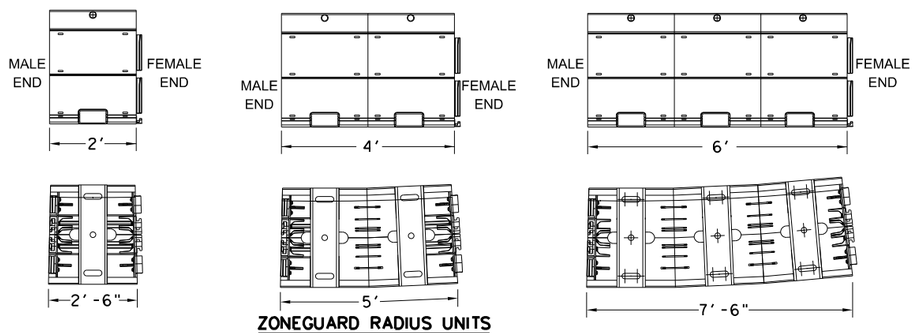
ELEVATION VIEW
ZONEGUARD STANDARD UNIT x 16'-8"



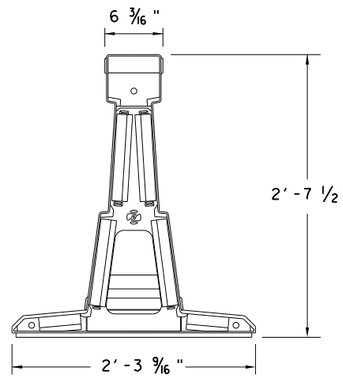
PLAN VIEW



ELEVATION VIEW
ZONEGUARD EXPANSION UNIT x 46'-5½"
(SEE GENERAL NOTE 5)



ZONEGUARD RADIUS UNITS



ZONEGUARD TYPICAL SECTION

GENERAL NOTES

1. FOR TECHNICAL AND APPLICATION SUPPORT PLEASE CONTACT HILL & SMITH INC. AT 614-340-6294.
2. ZONEGUARD HAS BEEN ACCEPTED BY FHWA AS A MASH TL-3 LONGITUDINAL BARRIER.
3. STANDARD INSTALLATIONS REQUIRE ANCHORING AT EACH END OF THE RUN. MINIMUM DEFLECTION INSTALLATIONS REQUIRE ANCHORING AT 33'-4 CENTERS. NO MODIFICATIONS ARE NECESSARY OTHER THAN INCREASED ANCHORING.
4. 50-0' UNITS CAN BE USED TO ACHIEVE DOWN TO AN 800' RADIUS CURVE. 16'-8" UNITS CAN BE USED TO ACHIEVE CURVES DOWN TO 250' RADIUS. SPECIAL SHORT UNITS (SHOWN) IN 2.5 DEGREE INCREMENTS CAN BE USED TO ACHIEVE DIRECTION CHANGES OR AT A FIXED RADIUS OF 47'-0".
5. HILL & SMITH OFFERS AN EXPANSION UNIT THAT CAN BE USED ACROSS A BRIDGE EXPANSION JOINT OR TO ACCOMMODATE THERMAL EXPANSION. THE UNIT IS ANCHORED IN THE MIDDLE, AND ADJUSTED ACCORDING TO THE TEMPERATURE AT THE TIME OF INSTALLATION. THE EXPANSION JOINT CAN BE USED WITH ENGINEER APPROVAL. THE EXPANSION UNIT HAS NOT BEEN ASSESSED TO MASH CRITERIA.
6. ANCHOR PINS ARE 1 ¼" DIAMETER. LENGTH IS 1'-8" FOR ASPHALT AND 1'-0" FOR CONCRETE. SEE ANCHORING TABLE FOR ADDITIONAL DETAILS.

	STANDARD INSTALLATION	MINIMUM DEFLECTION INSTALLATION CONCRETE	MINIMUM DEFLECTION INSTALLATION ASPHALT
	FOUR ANCHORS AT END OF THE RUN	TWO ANCHORS (ONE EACH SIDE) EVERY 33'-4"	TWO ANCHORS (ONE EACH SIDE) EVERY 33'-4"
MASH TL-3 DEFLECTION (2270 KG TRUCK @ 25° & 100 KM/HR)	6'-10"	5"	2'-0"

EXPECTED DEFLECTION TABLE

DESCRIPTION	ASPHALT	CONCRETE
1 1/4" PIN ANCHOR	1'-8" LONG, MINIMUM ASPHALT COVER OF 3"	1'-0" LONG, MINIMUM CONCRETE COVER OF 6"
1 1/4" ALL THREAD ANCHOR	-	1'-0" LONG, MINIMUM EMBEDMENT OF 6"

ANCHORING TABLE

ALTERNATE ANCHORING METHODS CERTIFIED BY HILL & SMITH, INC. ARE AVAILABLE PER FHWA APPROVAL LETTER.

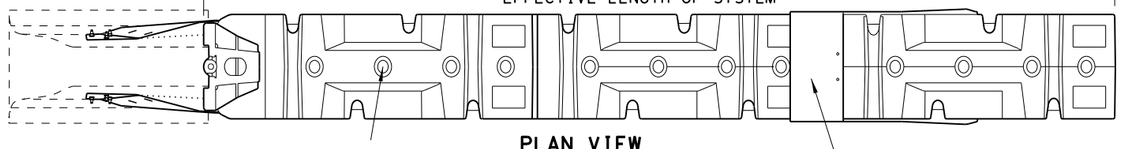
Texas Department of Transportation — Design Division Standard

ZONEGUARD SYSTEM
STEEL BARRIER
MASH TL-3
ZONEGUARD-19

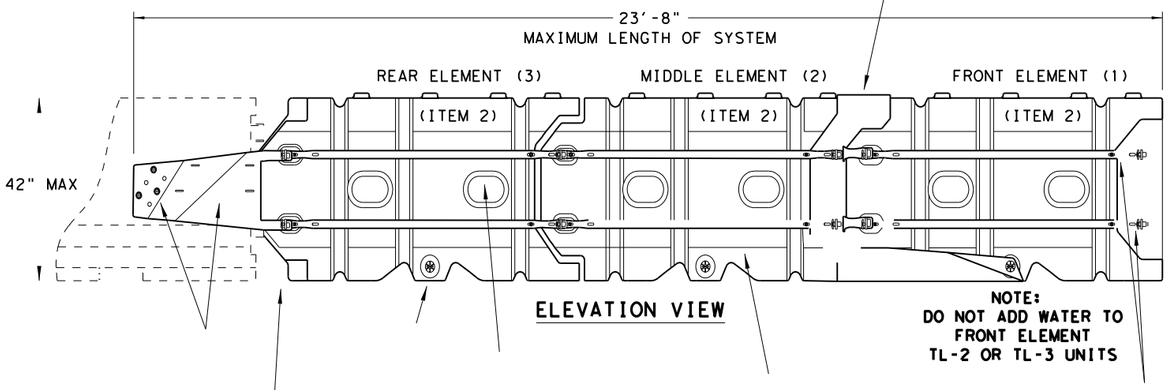
FILE: zoneguard19	DN: TxDOT	CK: KM	DW: VP	CK: CGL	
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0052	05	046, ETC.	US 84	
	DIST	COUNTY		SHEET NO.	
	LBB	LAMB, ETC.		48	

DATE: 9/30/2024
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/2. TCP/STANDARDS/absorbm19.dgn

SYSTEM SHOWN - ABSORB-M TL-3

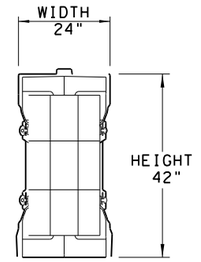


PLAN VIEW



ELEVATION VIEW

NOTE:
DO NOT ADD WATER TO
FRONT ELEMENT
TL-2 OR TL-3 UNITS



SECTION A-A

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"

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).

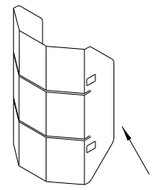
BILL OF MATERIALS (BOM) ABSORB-M TL-3 & TL-2 SYSTEMS			QTY	QTY
ITEM #	PART NUMBER	PART DESCRIPTION	TL-2 SYSTEM	TL-3 SYSTEM
1	BSI-1809036-00	TRANSITION-(GALV)	1	1
2	BSI-1808002-00	PRE-ASSEMBLED ABSORBING (ELEMENTS)	2	3
3	BSI-4004598	FILL CAPS	8	12
4	BSI-4004599	DRAIN PLUGS	2	3
5	BSI-1809053-00	TENSION 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

** APPLY DECAL



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.

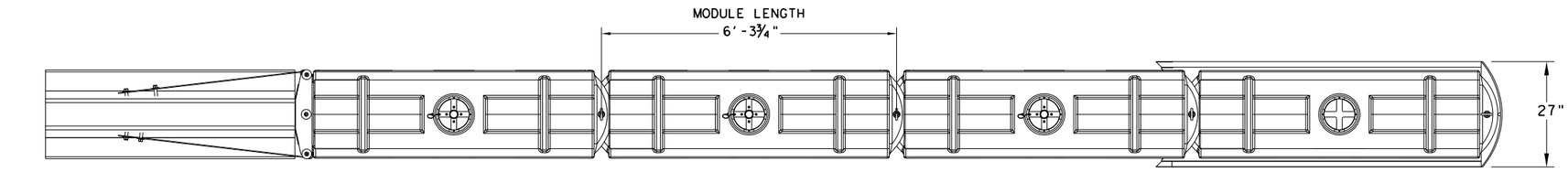
NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE ABSORB-M, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

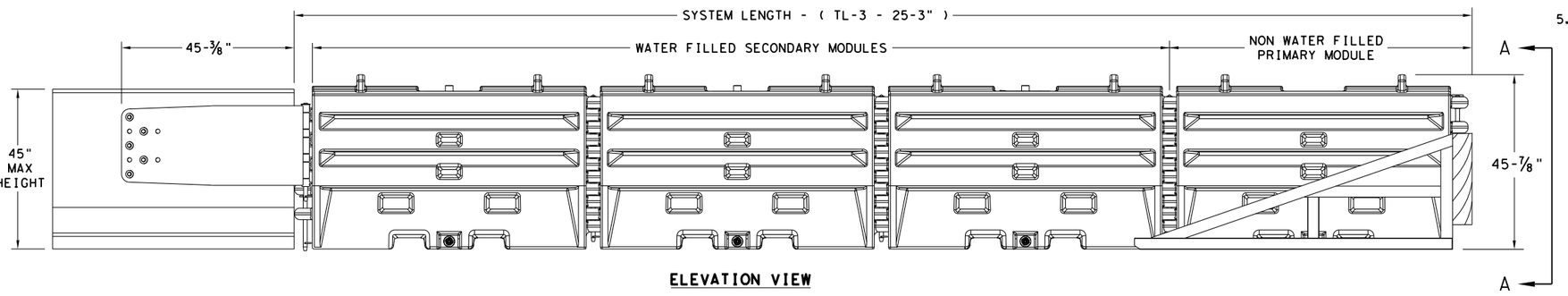
Texas Department of Transportation | Design Division Standard

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	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05 046, ETC.		US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		49



PLAN VIEW



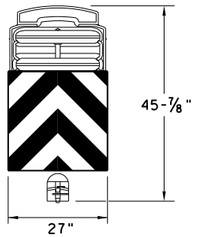
ELEVATION VIEW

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

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



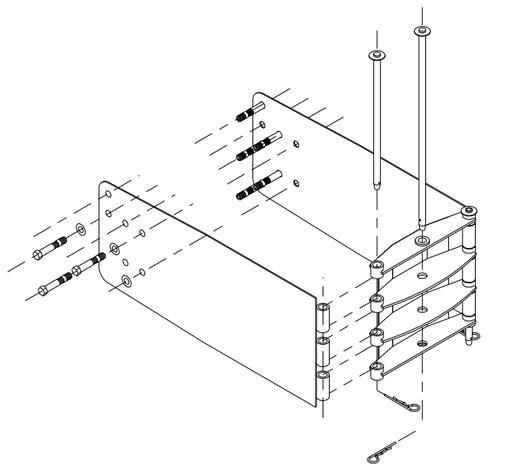
SECTION A-A

NOSE SHEETING PANEL DELINEATION

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

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

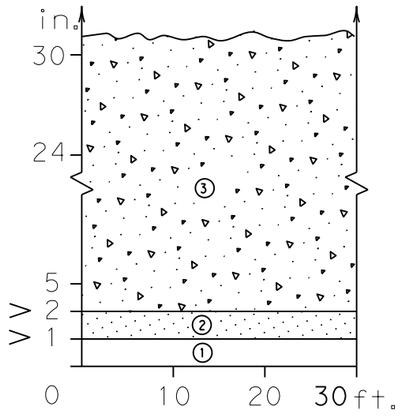
FILE: sled19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
©TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		50

DATE: 9/30/2024
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/2. TCP/STANDARDS/sled19.dgn

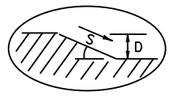
DATE: 9/30/2024 1:00:20 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052-05-046/Plan Set/2 roadway/edgecon.dgn

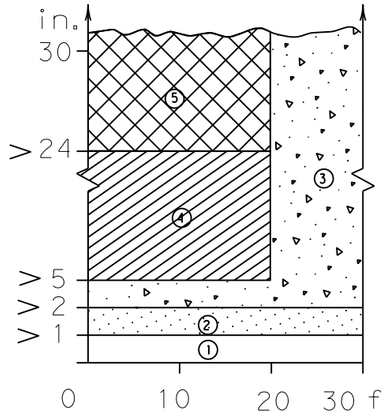
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

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

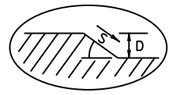


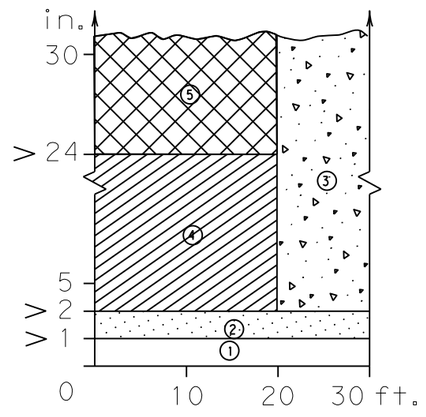
Edge Condition I
S = (3:1) (or flatter)



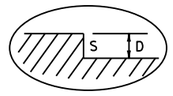


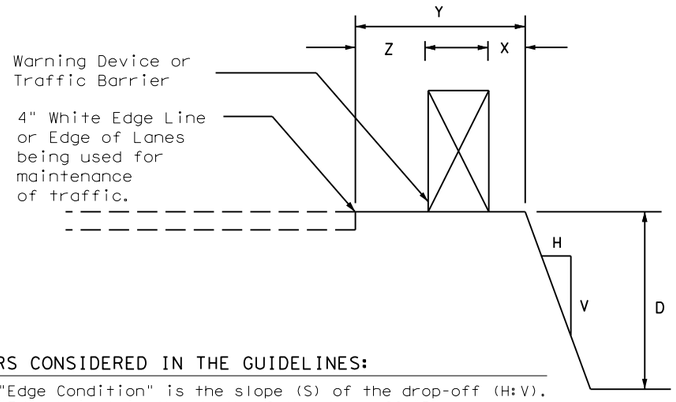
Edge Condition II
S = ((2.99):1) to (1:1)





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:

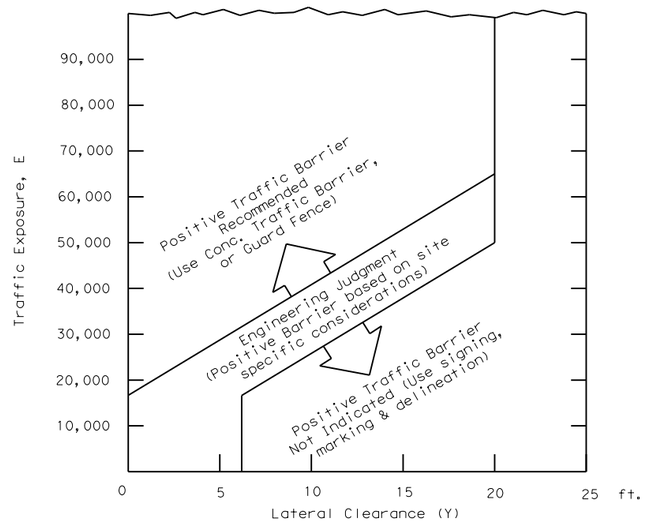
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

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
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

Date 9/30/2024

Texas Department of Transportation

Traffic Safety Division Standard

TREATMENT FOR VARIOUS EDGE CONDITIONS

FILE: edgecon.dgn	DN:	CK:	DW:	CK:
©TxDOT August 2000	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
03-01 08-01 9-21	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		51

Horizontal Alignment Review Report

Report Created: Tuesday, April 9, 2024
Time: 3:16:32 PM

Project:	Default
File Name:	c:\txdot\pw_online\txdot2\brandy.morse\d0773258\US 0084_GEOM_ALN_corrected.dgn
Last Revised:	4/4/2024 9:23
	Note: All units in this report are in feet unless specified otherwise.
Alignment Name:	US 84 LFD BL
Alignment Description:	
Alignment Style:	Alignment\Baseline

		Station	Northing	Easting
Element: Linear				
POT	( )	630+00.000 R1	7415576.653	795867.094
PC	( )	651+34.002 R1	7414009.022	797315.023
Tangential Direction:		S42°43'36.726"E		
Tangential Length:		2134.002		
Element: Circular				
PC	( )	651+34.002 R1	7414009.022	797315.023
PI	( )	656+46.384 R1	7413632.628	797662.677
CC	( )		7412453.885	795631.322
PT	( )	661+42.190 R1	7413144.025	797816.959
Radius:		2292.008		
Delta:		25°12'09.868"	Right	
Degree of Curvature (Arc):		02°29'59.305"		
Length:		1008.188		
Tangent:		512.382		
Chord:		1000.079		
Middle Ordinate:		55.211		
External:		56.574		
Back Tangent Direction:		S42°43'36.726"E		
Back Radial Direction:		S47°16'23.274"W		
Chord Direction:		S30°07'31.793"E		
Ahead Radial Direction:		S72°28'33.141"W		
Ahead Tangent Direction:		S17°31'26.859"E		
Element: Linear				
PT	( )	661+42.190 R1	7413144.025	797816.959
PC	( )	664+31.556 R1	7412868.088	797904.089
Tangential Direction:		S17°31'26.859"E		
Tangential Length:		289.367		
Element: Circular				
PC	( )	664+31.556 R1	7412868.088	797904.089
PI	( )	666+93.155 R1	7412618.63	797982.859
CC	( )		7412177.947	795718.452
PT	( )	669+52.500 R1	7412357.838	798003.39
Radius:		2292.008		
Delta:		13°01'21.339"	Right	
Degree of Curvature (Arc):		02°29'59.305"		
Length:		520.944		
Tangent:		261.599		
Chord:		519.823		
Middle Ordinate:		14.785		
External:		14.881		
Back Tangent Direction:		S17°31'26.859"E		
Back Radial Direction:		S72°28'33.141"W		
Chord Direction:		S11°00'46.189"E		
Ahead Radial Direction:		S85°29'54.481"W		
Ahead Tangent Direction:		S04°30'05.519"E		
Element: Linear				
PT	( )	669+52.500 R1	7412357.838	798003.39
PC	( )	734+16.008 R1	7405914.269	798510.684
Tangential Direction:		S04°30'05.519"E		
Tangential Length:		6463.507		
Element: Circular				
PC	( )	734+16.008 R1	7405914.269	798510.684
PI	( )	737+63.742 R1	7405567.607	798537.976
CC	( )		7406363.964	804222.648
PT	( )	741+10.624 R1	7405226.79	798606.991
Radius:		5729.639		
Delta:		06°56'45.934"	Left	
Degree of Curvature (Arc):		00°59'59.962"		
Length:		694.617		
Tangent:		347.734		
Chord:		694.191		
Middle Ordinate:		10.523		
External:		10.542		
Back Tangent Direction:		S04°30'05.519"E		
Back Radial Direction:		S85°29'54.481"W		
Chord Direction:		S07°58'28.487"E		
Ahead Radial Direction:		S78°33'08.546"W		
Ahead Tangent Direction:		S11°26'51.454"E		

Element: Linear				
PT	( )	741+10.624 R1	7405226.79	798606.991
PC	( )	774+55.986 R1	7401947.979	799270.952
Tangential Direction:		S11°26'51.454"E		
Tangential Length:		3345.362		
Element: Circular				
PC	( )	774+55.986 R1	7401947.979	799270.952
PI	( )	786+08.880 R1	7400818.021	799499.77
CC	( )		7402516.588	802078.888
PT	( )	796+48.158 R1	7400161.519	800447.488
Radius:		2864.929		
Delta:		43°50'28.701"	Left	
Degree of Curvature (Arc):		01°59'59.649"		
Length:		2192.172		
Tangent:		1152.894		
Chord:		2139.083		
Middle Ordinate:		207.129		
External:		223.271		
Back Tangent Direction:		S11°26'51.454"E		
Back Radial Direction:		S78°33'08.546"W		
Chord Direction:		S33°22'05.804"E		
Ahead Radial Direction:		S34°42'39.845"W		
Ahead Tangent Direction:		S55°17'20.155"E		
Element: Linear				
PT	( )	796+48.158 R1	7400161.519	800447.488
PC	( )	838+66.549 R1	7397759.405	803915.149
Tangential Direction:		S55°17'20.155"E		
Tangential Length:		4218.391		
Element: Circular				
PC	( )	838+66.549 R1	7397759.405	803915.149
PI	( )	855+17.074 R1	7396819.533	805271.936
CC	( )		7402469.364	807177.825
PT	( )	870+80.582 R1	7396745.493	806920.8
Radius:		5729.639		
Delta:		32°08'23.938"	Left	
Degree of Curvature (Arc):		00°59'59.962"		
Length:		3214.033		
Tangent:		1650.525		
Chord:		3172.059		
Middle Ordinate:		223.89		
External:		232.994		
Back Tangent Direction:		S55°17'20.155"E		
Back Radial Direction:		S34°42'39.845"W		
Chord Direction:		S71°21'32.124"E		
Ahead Radial Direction:		S02°34'15.907"W		
Ahead Tangent Direction:		S87°25'44.093"E		
Element: Linear				
PT	( )	870+80.582 R1	7396745.493	806920.8
PC	( )	957+41.972 R1	7396356.953	815573.471
Tangential Direction:		S87°25'44.093"E		
Tangential Length:		8661.391		
Element: Circular				
PC	( )	957+41.972 R1	7396356.953	815573.471
PI	( )	960+75.127 R1	7396342.008	815906.29
CC	( )		7394067.252	815470.654
PT	( )	964+03.647 R1	7396232.929	816221.082
Radius:		2292.008		
Delta:		16°32'26.151"	Right	
Degree of Curvature (Arc):		02°29'59.305"		
Length:		661.675		
Tangent:		333.154		
Chord:		659.38		
Middle Ordinate:		23.836		
External:		24.086		
Back Tangent Direction:		S87°25'44.093"E		
Back Radial Direction:		S02°34'15.907"W		
Chord Direction:		S79°09'31.018"E		
Ahead Radial Direction:		S19°06'42.058"W		
Ahead Tangent Direction:		S70°53'17.942"E		
Element: Linear				
PT	( )	964+03.647 R1	7396232.929	816221.082
PC	( )	966+98.651 R1	7396136.342	816499.826
Tangential Direction:		S70°53'17.973"E		
Tangential Length:		295.004		

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

HORIZONTAL ALIGNMENT DATA (LAMB COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		52

CK
DW
CK
DW

DATE: 9/30/2024 1:01:20 PM
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PI	( )	972+10.533 R1	7395968.607	816983.445
CC	( )		7393968.069	815747.796
PT	( )	977+05.926 R1	7395611.257	817349.947
Radius:		2294.985		
Delta:		25°08'50.180"	Right	
Degree of Curvature (Arc):		02°29'47.633"		
Length:		1007.275		
Tangent:		511.881		
Chord:		999.21		
Middle Ordinate:		55.041		
External:		56.393		
Back Tangent Direction:		S70°52'18.208"E		
Back Radial Direction:		S19°07'41.792"W		
Chord Direction:		S58°17'53.118"E		
Ahead Radial Direction:		S44°16'31.971"W		
Ahead Tangent Direction:		S45°43'28.029"E		
Element: Linear				
PT	( )	977+05.926 R1	7395611.257	817349.947
PI	( )	1006+55.759 R1	7393551.358	819461.423
Tangential Direction:		S45°42'30.190"E		
Tangential Length:		2949.833		
Element: Linear				
PI	( )	1006+55.759 R1	7393551.358	819461.423
PC	( )	1142+87.583 R1	7384032.112	829219.013
Tangential Direction:		S45°42'30.190"E		
Tangential Length:		13631.824		
Element: Circular				
PC	( )	1142+87.583 R1	7384032.112	829219.013
PI	( )	1147+38.742 R1	7383717.11	829541.996
CC	( )		7379929.578	825217.845
PT	( )	1151+88.043 R1	7383355.446	829811.706
Radius:		5730.631		
Delta:		09°00'10.601"	Right	
Degree of Curvature (Arc):		00°59'59.338"		
Length:		900.46		
Tangent:		451.159		
Chord:		899.534		
Middle Ordinate:		17.677		
External:		17.732		
Back Tangent Direction:		S45°42'59.952"E		
Back Radial Direction:		S44°17'00.048"W		
Chord Direction:		S41°12'54.651"E		
Ahead Radial Direction:		S53°17'10.650"W		
Ahead Tangent Direction:		S36°42'49.350"E		
Element: Linear				
PT	( )	1151+88.043 R1	7383355.446	829811.706
PC	( )	1204+76.272 R1	7379115.772	832972.485
Tangential Direction:		S36°42'19.470"E		
Tangential Length:		5288.229		
Element: Circular				
PC	( )	1204+76.272 R1	7379115.772	832972.485
PI	( )	1212+52.915 R1	7378493.122	833436.685
CC	( )		7380827.542	835268.548
PT	( )	1219+93.079 R1	7378190.296	834151.857
Radius:		2863.925		
Delta:		30°20'43.058"	Left	
Degree of Curvature (Arc):		02°00'02.173"		
Length:		1516.807		
Tangent:		776.643		
Chord:		1499.141		
Middle Ordinate:		99.832		
External:		103.438		
Back Tangent Direction:		S36°42'19.448"E		
Back Radial Direction:		S53°17'40.552"W		
Chord Direction:		S51°52'40.977"E		
Ahead Radial Direction:		S22°56'57.494"W		
Ahead Tangent Direction:		S67°03'02.506"E		
Element: Linear				
PT	( )	1219+93.079 R1	7378190.296	834151.857
PC	( )	1235+69.770 R1	7377575.518	835603.754
Tangential Direction:		S67°03'02.540"E		
Tangential Length:		1576.692		

Element: Circular				
PC	( )	1235+69.770 R1	7377575.518	835603.754
PI	( )	1242+35.042 R1	7377316.118	836216.369
CC	( )		7374057.12	834113.955
PT	( )	1248+87.107 R1	7376864.926	836705.258
Radius:		3820.815		
Delta:		19°45'15.765"	Right	
Degree of Curvature (Arc):		01°29'58.451"		
Length:		1317.337		
Tangent:		665.272		
Chord:		1310.821		
Middle Ordinate:		56.633		
External:		57.485		
Back Tangent Direction:		S67°03'02.506"E		
Back Radial Direction:		S22°56'57.494"W		
Chord Direction:		S57°10'24.623"E		
Ahead Radial Direction:		S42°42'13.259"W		
Ahead Tangent Direction:		S47°17'46.741"E		
Element: Linear				
PT	( )	1248+87.107 R1	7376864.926	836705.258
POT	( )	1415+81.484 R1	7365542.684	848973.472
Tangential Direction:		S47°17'46.740"E		
Tangential Length:		16694.377		

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

HORIZONTAL ALIGNMENT DATA (LAMB COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		53

DATE: 9/30/2024 1:01:20 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050464 - Design/Plan Set/3. Roadway/US0084_RDW_ALIGNMENT_DATA.dgn

CK DW CK DW

Horizontal Alignment Review Report

Report Created: Thursday, September 26, 2024
Time: 1:28:27 PM

Project:	Default
Description:	
File Name:	pw:\txdot.projectwiseonline.com:TxDOT2\Documents\05 - Design Projects\005205046\4 - Design\3D Corridor Modeling\Output Reports\US0084_GEOM_BL_ALN_LBB.dgn
Last Revised:	9/26/2024 13:08

Note: All units in this report are in feet unless specified otherwise.

Alignment Name:	BL CL
Alignment Description:	
Alignment Style:	Alignment\Baseline

		Station	Northing	Easting
Element: Linear				
PT	( )	497+44.533 R1	7309932.308	909297.278
PC	( )	548+44.799 R1	7312528.144	904907.022
Tangential Direction:		N59°24'19.304"W		
Tangential Length:		5100.266		
Element: Circular				
PC	( )	548+44.799 R1	7312528.144	904907.022
PI	( )	554+21.683 R1	7312823.194	904411.301
CC	( )		7317451.623	907837.452
PT	( )	559+94.691 R1	7313211.145	903984.348
Radius:		5729.578		
Delta:		11°29'56.116"	Right	
Degree of Curvature (Arc):		01°00'00.000"		
Length:		1149.892		
Tangent:		576.884		
Chord:		1147.963		
Middle Ordinate:		28.823		
External:		28.969		
Back Tangent Direction:		N59°14'20.778"W		
Back Radial Direction:		N30°45'39.222"E		
Chord Direction:		N53°29'22.720"W		
Ahead Radial Direction:		N42°15'35.338"E		
Ahead Tangent Direction:		N47°44'24.662"W		
Element: Linear				
PT	( )	559+94.691 R1	7313211.145	903984.348
PC	( )	574+54.641 R1	7314189.107	902900.354
Tangential Direction:		N47°56'37.365"W		
Tangential Length:		1459.949		
Element: Circular				
PC	( )	574+54.641 R1	7314189.107	902900.354
PI	( )	581+81.035 R1	7314681.889	902366.673
CC	( )		7316293.862	904843.81
PT	( )	588+77.444 R1	7315369.425	902132.274
Radius:		2864.789		
Delta:		28°27'21.817"	Right	
Degree of Curvature (Arc):		02°00'00.000"		
Length:		1422.803		
Tangent:		726.394		
Chord:		1408.225		
Middle Ordinate:		87.877		
External:		90.658		
Back Tangent Direction:		N47°16'54.127"W		
Back Radial Direction:		N42°43'05.873"E		
Chord Direction:		N33°03'13.219"W		
Ahead Radial Direction:		N71°10'27.690"E		
Ahead Tangent Direction:		N18°49'32.310"W		
Element: Linear				
PT	( )	588+77.444 R1	7315369.425	902132.274
PC	( )	628+97.466 R1	7319156.525	900783.773
Tangential Direction:		N19°35'58.790"W		
Tangential Length:		4020.022		
Element: Circular				
PC	( )	628+97.466 R1	7319156.525	900783.773
PI	( )	634+80.606 R1	7319704.57	900584.527
CC	( )		7318177.69	898091.395
PT	( )	640+48.026 R1	7320131.118	900186.899
Radius:		2864.789		
Delta:		23°00'40.384"	Left	
Degree of Curvature (Arc):		02°00'00.000"		
Length:		1150.561		
Tangent:		583.14		
Chord:		1142.844		
Middle Ordinate:		57.567		
External:		58.748		
Back Tangent Direction:		N19°58'44.831"W		
Back Radial Direction:		N70°01'15.169"E		
Chord Direction:		N31°29'05.023"W		
Ahead Radial Direction:		N47°00'34.785"E		
Ahead Tangent Direction:		N42°59'25.215"W		
Element: Linear				
PT	( )	640+48.026 R1	7320131.118	900186.899
PC	( )	835+04.792 R1	7334471.993	887037.562
Tangential Direction:		N42°31'05.240"W		
Tangential Length:		19456.766		

Element: Circular				
PC	( )	835+04.792 R1	7334471.993	887037.562
PI	( )	837+49.520 R1	7334650.489	886870.138
CC	( )		7332512.128	884948.077
PT	( )	839+93.063 R1	7334798.002	886674.864
Radius:		2864.789		
Delta:		09°45'55.497"	Left	
Degree of Curvature (Arc):		02°00'00.000"		
Length:		488.271		
Tangent:		244.728		
Chord:		487.68		
Middle Ordinate:		10.396		
External:		10.434		
Back Tangent Direction:		N43°09'59.661"W		
Back Radial Direction:		N46°50'00.339"E		
Chord Direction:		N48°02'57.410"W		
Ahead Radial Direction:		N37°04'04.841"E		
Ahead Tangent Direction:		N52°55'55.159"W		
Element: Linear				
PT	( )	839+93.063 R1	7334798.002	886674.864
PC	( )	878+03.669 R1	7337129.456	883660.724
Tangential Direction:		N52°16'40.283"W		
Tangential Length:		3810.606		
Element: Circular				
PC	( )	878+03.669 R1	7337129.456	883660.724
PI	( )	879+64.345 R1	7337227.282	883533.261
CC	( )		7332584.223	880172.325
PT	( )	881+24.937 R1	7337317.811	883400.516
Radius:		5729.578		
Delta:		03°12'45.637"	Left	
Degree of Curvature (Arc):		01°00'00.000"		
Length:		321.268		
Tangent:		160.676		
Chord:		321.226		
Middle Ordinate:		2.252		
External:		2.252		
Back Tangent Direction:		N52°29'39.476"W		
Back Radial Direction:		N37°30'20.524"E		
Chord Direction:		N54°06'02.294"W		
Ahead Radial Direction:		N34°17'34.888"E		
Ahead Tangent Direction:		N55°42'25.112"W		
Element: Linear				
PT	( )	881+24.937 R1	7337317.811	883400.516
PC	( )	957+64.421 R1	7341649.371	877107.718
Tangential Direction:		N55°27'32.246"W		
Tangential Length:		7639.484		
Element: Circular				
PC	( )	957+64.421 R1	7341649.371	877107.718
PI	( )	963+20.354 R1	7341952.066	876641.415
CC	( )		7339246.461	875547.898
PT	( )	968+62.638 R1	7342058.379	876095.742
Radius:		2864.789		
Delta:		21°57'51.615"	Left	
Degree of Curvature (Arc):		02°00'00.000"		
Length:		1098.217		
Tangent:		555.933		
Chord:		1091.505		
Middle Ordinate:		52.464		
External:		53.443		
Back Tangent Direction:		N57°00'39.162"W		
Back Radial Direction:		N32°59'20.838"E		
Chord Direction:		N67°59'34.969"W		
Ahead Radial Direction:		N11°01'29.224"E		
Ahead Tangent Direction:		N78°58'30.776"W		
Element: Linear				
PT	( )	968+62.638 R1	7342058.379	876095.742
POT	( )	970+63.832 R1	7342102.132	875899.363
Tangential Direction:		N77°26'23.527"W		
Tangential Length:		201.194		

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

BL

HORIZONTAL ALIGNMENT DATA
(LUBBOCK COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		54

DATE: 9/30/2024 1:01:35 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/3. Roadway/US0084_RDW_ALIGNMENT_DATA2.dgn

DW DW CK CK

Horizontal Alignment Review Report

Report Created: Wednesday, September 25, 2024
Time: 3:10:17 PM

Project:	Default
Description:	
File Name:	pw:\txdot.projectwiseonline.com:TxDOT2\Documents\05 - Design Projects\005205046\4 - Design\3D Corridor Modeling\Output Reports\US0084_GEOM_WB_ALN_LBB.dgn
Last Revised:	9/25/2024 14:41
	Note: All units in this report are in feet unless specified otherwise.
Alignment Name:	WB CL
Alignment Description:	
Alignment Style:	Alignment\Mainlane RT Label

		Station	Northing	Easting
Element: Linear				
PT	( )	513+97.770 R1	7310794.757	907921.957
PI	( )	515+30.810 R1	7310861.98	907807.15
Tangential Direction:		N59°38'58.700"W		
Tangential Length:		133.04		
Element: Linear				
PI	( )	515+30.810 R1	7310861.983	907807.146
PC	( )	548+71.683 R1	7312560.004	904929.968
Tangential Direction:		N59°27'07.961"W		
Tangential Length:		3340.873		
Element: Circular				
PC	(ML CL-6)	548+71.683 R1	7312560.004	904929.968
PI	( )	554+48.563 R1	7312855.026	904434.234
CC	( )		7317483.645	907860.126
PT	(ML CL-7)	560+21.567 R1	7313242.95	904007.261
Radius:		5729.578		
Delta:		11°29'55.834"	Right	
Degree of Curvature (Arc):		01°00'00.000"		
Length:		1149.884		
Tangent:		576.88		
Chord:		1147.955		
Middle Ordinate:		28.822		
External:		28.968		
Back Tangent Direction:		N59°14'32.172"W		
Back Radial Direction:		N30°45'27.828"E		
Chord Direction:		N53°29'34.255"W		
Ahead Radial Direction:		N42°15'23.663"E		
Ahead Tangent Direction:		N47°44'36.337"W		
Element: Linear				
PT	( )	560+21.567 R1	7313242.95	904007.261
PC	( )	574+50.876 R1	7314200.254	902945.899
Tangential Direction:		N47°57'03.109"W		
Tangential Length:		1429.308		
Element: Circular				
PC	( )	574+50.876 R1	7314200.254	902945.899
PI	( )	582+95.306 R1	7314770.117	902322.746
CC	( )		7316314.343	904879.198
PT	( )	590+93.226 R1	7315586.867	902108.314
Radius:		2864.789		
Delta:		32°50'49.206"	Right	
Degree of Curvature (Arc):		02°00'00.000"		
Length:		1642.35		
Tangent:		844.43		
Chord:		1619.952		
Middle Ordinate:		116.889		
External:		121.861		
Back Tangent Direction:		N47°33'27.339"W		
Back Radial Direction:		N42°26'32.661"E		
Chord Direction:		N31°08'02.736"W		
Ahead Radial Direction:		N75°17'21.867"E		
Ahead Tangent Direction:		N14°42'38.133"W		
Element: Linear				
PT	( )	590+93.226 R1	7315586.867	902108.314
PC	( )	593+69.770 R1	7315853.88	902036.333
Tangential Direction:		N15°05'13.468"W		
Tangential Length:		276.544		
Element: Circular				
PC	( )	593+69.770 R1	7315853.88	902036.333
PI	( )	593+95.814 R1	7315879.018	902029.526
CC	( )		7315105.095	899271.132
PT	( )	594+21.857 R1	7315904.029	902022.263
Radius:		2864.789		
Delta:		01°02'30.221"	Left	
Degree of Curvature (Arc):		02°00'00.000"		
Length:		52.086		
Tangent:		26.044		
Chord:		52.086		
Middle Ordinate:		0.118		
External:		0.118		
Back Tangent Direction:		N15°09'06.024"W		
Back Radial Direction:		N74°50'53.976"E		
Chord Direction:		N15°40'21.134"W		
Ahead Radial Direction:		N73°48'23.756"E		
Ahead Tangent Direction:		N16°11'36.244"W		
Element: Linear				
PT	( )	594+21.857 R1	7315904.029	902022.263
PC	( )	602+20.046 R1	7316670.599	901799.832
Tangential Direction:		N16°10'50.981"W		
Tangential Length:		798.189		

Element: Circular				
PC	( )	602+20.046 R1	7316670.599	901799.832
PI	( )	602+97.379 R1	7316744.701	901777.708
CC	( )		7315851.021	899054.78
PT	( )	603+74.676 R1	7316817.501	901751.618
Radius:		2864.789		
Delta:		03°05'33.360"	Left	
Degree of Curvature (Arc):		02°00'00.000"		
Length:		154.63		
Tangent:		77.334		
Chord:		154.611		
Middle Ordinate:		1.043		
External:		1.044		
Back Tangent Direction:		N16°37'25.735"W		
Back Radial Direction:		N73°22'34.265"E		
Chord Direction:		N18°10'12.415"W		
Ahead Radial Direction:		N70°17'00.905"E		
Ahead Tangent Direction:		N19°42'59.095"W		
Element: Linear				
PT	( )	603+74.676 R1	7316817.501	901751.618
PC	( )	608+19.596 R1	7317237.485	901604.757
Tangential Direction:		N19°16'25.689"W		
Tangential Length:		444.921		
Element: Circular				
PC	( )	608+19.596 R1	7317237.485	901604.757
PI	( )	609+09.371 R1	7317322.119	901574.815
CC	( )		7316282.004	898904.003
PT	( )	609+99.088 R1	7317404.713	901539.632
Radius:		2864.789		
Delta:		03°35'23.359"	Left	
Degree of Curvature (Arc):		02°00'00.000"		
Length:		179.491		
Tangent:		89.775		
Chord:		179.462		
Middle Ordinate:		1.406		
External:		1.406		
Back Tangent Direction:		N19°28'58.443"W		
Back Radial Direction:		N70°31'01.557"E		
Chord Direction:		N21°16'40.123"W		
Ahead Radial Direction:		N66°55'38.197"E		
Ahead Tangent Direction:		N23°04'21.803"W		
Element: Linear				
PT	( )	609+99.088 R1	7317404.713	901539.632
PC	( )	615+03.739 R1	7317869.524	901343.105
Tangential Direction:		N22°55'09.061"W		
Tangential Length:		504.651		
Element: Circular				
PC	( )	615+03.739 R1	7317869.524	901343.105
PI	( )	615+61.205 R1	7317922.296	901320.356
CC	( )		7316735.443	898712.349
PT	( )	616+18.655 R1	7317974.112	901295.509
Radius:		2864.789		
Delta:		02°17'53.995"	Left	
Degree of Curvature (Arc):		02°00'00.000"		
Length:		114.917		
Tangent:		57.466		
Chord:		114.909		
Middle Ordinate:		0.576		
External:		0.576		
Back Tangent Direction:		N23°19'12.648"W		
Back Radial Direction:		N66°40'47.352"E		
Chord Direction:		N24°28'09.646"W		
Ahead Radial Direction:		N64°22'53.357"E		
Ahead Tangent Direction:		N25°37'06.643"W		
Element: Linear				
PT	( )	616+18.655 R1	7317974.112	901295.509
PC	( )	620+02.291 R1	7318321.803	901133.374
Tangential Direction:		N25°00'02.028"W		
Tangential Length:		383.636		
Element: Circular				
PC	( )	620+02.291 R1	7318321.803	901133.374
PI	( )	621+43.008 R1	7318449.545	901074.356
CC	( )		7319521.666	903730.41
PT	( )	622+83.497 R1	7318582.462	901028.159
Radius:		2860.816		
Delta:		05°37'54.938"	Right	
Degree of Curvature (Arc):		02°00'10.000"		
Length:		281.206		
Tangent:		140.716		
Chord:		281.093		
Middle Ordinate:		3.454		
External:		3.459		
Back Tangent Direction:		N24°47'51.078"W		
Back Radial Direction:		N65°12'08.922"E		
Chord Direction:		N21°58'53.609"W		
Ahead Radial Direction:		N70°50'03.860"E		
Ahead Tangent Direction:		N19°09'56.140"W		
Element: Linear				
PT	( )	622+83.497 R1	7318582.462	901028.159
PC	( )	629+04.827 R1	7319168.25	900821.029
Tangential Direction:		N19°28'23.211"W		
Tangential Length:		621.33		

Element: Circular				
PC	( )	629+04.827 R1	7319168.25	900821.029
PI	( )	634+95.908 R1	7319723.876	900619.395
CC	( )		7318177.683	898091.42
PT	(ML CL-14)	640+71.055 R1	7320156.467	900216.604
Radius:		2903.789		
Delta:		23°00'40.616"	Left	
Degree of Curvature (Arc):		01°58'23.299"		
Length:		1166.227		
Tangent:		591.08		
Chord:		1158.405		
Middle Ordinate:		58.351		
External:		59.548		
Back Tangent Direction:		N19°56'44.464"W		
Back Radial Direction:		N70°03'15.536"E		
Chord Direction:		N31°27'04.772"W		
Ahead Radial Direction:		N47°02'34.921"E		
Ahead Tangent Direction:		N42°57'25.079"W		
Element: Linear				
PT	( )	640+71.055 R1	7320156.467	900216.604
PI	( )	642+23.029 R1	7320268.312	900113.712
Tangential Direction:		N42°36'44.320"W		
Tangential Length:		151.974		
Element: Linear				
PI	( )	642+23.029 R1	7320268.314	900113.71
PC	( )	835+27.813 R1	7334497.202	887067.122
Tangential Direction:		N42°31'04.715"W		
Tangential Length:		19304.785		
Element: Circular				
PC	( )	835+27.813 R1	7334497.202	887067.122
PI	( )	837+75.887 R1	7334678.263	886897.541
CC	( )		7332512.207	884947.738
PT	( )	840+22.759 R1	7334827.936	886699.706
Radius:		2903.789		
Delta:		09°45'57.471"	Left	
Degree of Curvature (Arc):		01°58'23.299"		
Length:		494.946		
Tangent:		248.074		
Chord:		494.347		
Middle Ordinate:		10.539		
External:		10.577		
Back Tangent Direction:		N43°07'28.723"W		
Back Radial Direction:		N46°52'31.277"E		
Chord Direction:		N48°00'27.459"W		
Ahead Radial Direction:		N37°06'33.806"E		
Ahead Tangent Direction:		N52°53'26.194"W		
Element: Linear				
PT	( )	840+22.759 R1	7334827.936	886699.706
PI	( )	841+29.675 R1	7334893.474	886615.233
Tangential Direction:		N52°11'39.458"W		
Tangential Length:		106.916		
Element: Linear				
PI	(ML CL-18)	841+29.675 R1	7334893.474	886615.232
PC	( )	878+33.360 R1	7337159.122	883685.364
Tangential Direction:		N52°17'07.620"W		
Tangential Length:		3703.686		
Element: Circular				
PC	( )	878+33.360 R1	7337159.122	883685.364
PI	( )	879+95.111 R1	7337257.267	883556.791
CC	( )		7332573.788	880185.192
PT	( )	881+56.778 R1	7337348.053	883422.921
Radius:		5768.578		
Delta:		03°12'44.300"	Left	
Degree of Curvature (Arc):		00°59'35.661"		
Length:		323.417		
Tangent:		161.751		
Chord:		323.375		
Middle Ordinate:		2.266		
External:		2.267		
Back Tangent Direction:		N52°38'38.521"W		
Back Radial Direction:		N37°21'21.479"E		
Chord Direction:		N54°15'00.671"W		
Ahead Radial Direction:		N34°08'37.180"E		
Ahead Tangent Direction:		N55°51'22.820"W		
Element: Linear				
PT	( )	881+56.778 R1	7337348.053	883422.921
PI	( )	882+31.864 R1	7337390.674	883361.103
Tangential Direction:		N55°24'52.047"W		
Tangential Length:		75.086		
Element: Linear				
PI	( )	882+31.864 R1	7337390.674	883361.103
PI	( )	920+31.863 R1	7339543.165	880229.526
Tangential Direction:		N55°29'50.290"W		
Tangential Length:		3799.999		
Element: Linear				
PI	( )	920+31.863 R1	7339543.165	880229.526
PI	( )	931+14.159 R1	7340155.597	879337.175
Tangential Direction:		N55°32'15.620"W		
Tangential Length:		1082.296		
Element: Linear				
PI	( )	931+14.159 R1	7340155.597	879337.175
PC	( )	958+03.928 R1	7341679.349	877120.638
Tangential Direction:		N55°29'36.778"W		
Tangential Length:		2689.769		

Element: Circular				
PC	( )	958+03.928 R1	7341679.349	877120.638
PI	( )	963+59.677 R1	7341981.673	876654.314
CC	( )		7339275.536	875562.209
PT	( )	969+01.790 R1	7342087.703	876108.773
Radius:		2864.789		
Delta:		21°57'26.114"	Left	
Degree of Curvature (Arc):		02°00'00.000"		
Length:		1097.863		
Tangent:		555.75		
Chord:		1091.157		
Middle Ordinate:		52.431		
External:		53.408		
Back Tangent Direction:		N57°02'38.567"W		
Back Radial Direction:		N32°57'21.433"E		
Chord Direction:		N68°01'21.623"W		
Ahead Radial Direction:		N10°59'55.320"E		
Ahead Tangent Direction:		N79°00'04.680"W		
Element: Linear				
PT	( )	969+01.790 R1	7342087.703	876108.773
POT	( )	971+08.222 R1	7342132.897	875907.349
Tangential Direction:		N77°21'13.624"W		
Tangential Length:		206.432		

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

WB

HORIZONTAL ALIGNMENT DATA
(LUBBOCK COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		55

DATE: 9/30/2024 1:01:35 PM
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CK DW CK DW

Horizontal Alignment Review Report

Report Created: Wednesday, September 25, 2024
Time: 11:04:30 PM

Project:	Default
Description:	
File Name:	pw:\txdot.projectwiseonline.com:TxDOT2\Documents\05 - Design Projects\005205046\4 - Design\3D Corridor Modeling\Output Reports\US0084_GEOM_EB_ALN_LBB.dgn
Last Revised:	9/25/2024 23:02

Note: All units in this report are in feet unless specified otherwise.

Alignment Name:	EB CL
Alignment Description:	
Alignment Style:	Alignment\Mainlane LT Label

		Station	Northing	Easting
Element: Linear				
PI	(ML CL-18)	514+84.540 R1	7310794.197	907768.428
PC	(ML CL-6)	548+33.267 R1	7312496.073	904884.404
Tangential Direction:		N59°27'17.824"W		
Tangential Length:		3348.727		
Element: Circular				
PC	( )	548+33.267 R1	7312496.073	904884.404
PI	( )	554+10.154 R1	7312791.131	904388.684
CC	( )		7317419.517	907814.893
PT	( )	559+83.165 R1	7313179.089	903961.734
Radius:		5729.578		
Delta:		11°29'56.312"	Right	
Degree of Curvature (Arc):		01°00'00.000"		
Length:		1149.898		
Tangent:		576.886		
Chord:		1147.969		
Middle Ordinate:		28.823		
External:		28.969		
Back Tangent Direction:		N59°14'18.313"W		
Back Radial Direction:		N30°45'41.687"E		
Chord Direction:		N53°29'20.157"W		
Ahead Radial Direction:		N42°15'37.999"E		
Ahead Tangent Direction:		N47°44'22.001"W		
Element: Linear				
PT	(ML CL-6)	559+83.165 R1	7313179.089	903961.734
PC	(ML CL-7)	574+39.503 R1	7314154.484	902880.288
Tangential Direction:		N47°57'05.561"W		
Tangential Length:		1456.338		
Element: Circular				
PC	( )	574+39.503 R1	7314154.484	902880.288
PI	( )	580+49.781 R1	7314566.267	902429.873
CC	( )		7316268.842	904813.293
PT	( )	586+42.082 R1	7315125.869	902186.388
Radius:		2864.789		
Delta:		24°03'05.697"	Right	
Degree of Curvature (Arc):		02°00'00.000"		
Length:		1202.579		
Tangent:		610.278		
Chord:		1193.769		
Middle Ordinate:		62.871		
External:		64.282		
Back Tangent Direction:		N47°33'56.053"W		
Back Radial Direction:		N42°26'03.947"E		
Chord Direction:		N35°32'23.204"W		
Ahead Radial Direction:		N66°29'09.644"E		
Ahead Tangent Direction:		N23°30'50.356"W		
Element: Linear				
PT	(ML CL-7)	586+42.082 R1	7315125.869	902186.388
PI	( )	592+75.638 R1	7315705.007	901929.501
Tangential Direction:		N23°55'14.005"W		
Tangential Length:		633.555		
Element: Linear				
PI	(ML CL-21)	592+75.638 R1	7315705.007	901929.501
PI	( )	593+28.910 R1	7315753.832	901908.192
Tangential Direction:		N23°34'43.767"W		
Tangential Length:		53.272		
Element: Linear				
PI	(ML CL-22)	593+28.910 R1	7315753.832	901908.192
PC	(ML CL-8)	602+52.246 R1	7316604.901	901550.098
Tangential Direction:		N22°49'09.443"W		
Tangential Length:		923.336		
Element: Circular				
PC	( )	602+52.246 R1	7316604.901	901550.098
PI	( )	603+35.962 R1	7316682.278	901518.143
CC	( )		7317698.403	904197.978
PT	( )	604+19.630 R1	7316761.389	901490.762
Radius:		2864.789		
Delta:		03°20'51.627"	Right	
Degree of Curvature (Arc):		02°00'00.000"		
Length:		167.384		
Tangent:		83.716		
Chord:		167.36		
Middle Ordinate:		1.222		
External:		1.223		
Back Tangent Direction:		N22°26'21.421"W		
Back Radial Direction:		N67°33'38.579"E		
Chord Direction:		N20°45'55.608"W		
Ahead Radial Direction:		N70°54'30.205"E		
Ahead Tangent Direction:		N19°05'29.795"W		

Element: Linear				
PT	(ML CL-8)	604+19.630 R1	7316761.389	901490.762
PC	(ML CL-9)	608+51.189 R1	7317168.034	901346.25
Tangential Direction:		N19°33'50.345"W		
Tangential Length:		431.559		
Element: Circular				
PC	( )	608+51.189 R1	7317168.034	901346.25
PI	( )	609+34.707 R1	7317247.036	901319.158
CC	( )		7318097.311	904056.132
PT	( )	610+18.178 R1	7317327.482	901296.715
Radius:		2864.789		
Delta:		03°20'23.204"	Right	
Degree of Curvature (Arc):		02°00'00.000"		
Length:		166.989		
Tangent:		83.518		
Chord:		166.965		
Middle Ordinate:		1.217		
External:		1.217		
Back Tangent Direction:		N18°55'40.657"W		
Back Radial Direction:		N71°04'19.343"E		
Chord Direction:		N17°15'29.055"W		
Ahead Radial Direction:		N74°24'42.546"E		
Ahead Tangent Direction:		N15°35'17.454"W		
Element: Linear				
PT	(ML CL-9)	610+18.178 R1	7317327.482	901296.715
PC	(ML CL-10)	615+14.097 R1	7317803.932	901159.126
Tangential Direction:		N16°06'27.424"W		
Tangential Length:		495.919		
Element: Circular				
PC	( )	615+14.097 R1	7317803.932	901159.126
PI	( )	615+64.370 R1	7317852.273	901145.323
CC	( )		7318590.511	903913.815
PT	( )	616+14.633 R1	7317901.068	901133.224
Radius:		2864.789		
Delta:		02°00'38.575"	Right	
Degree of Curvature (Arc):		02°00'00.000"		
Length:		100.536		
Tangent:		50.273		
Chord:		100.531		
Middle Ordinate:		0.441		
External:		0.441		
Back Tangent Direction:		N15°56'10.538"W		
Back Radial Direction:		N74°03'49.462"E		
Chord Direction:		N14°55'51.251"W		
Ahead Radial Direction:		N76°04'28.036"E		
Ahead Tangent Direction:		N13°55'31.964"W		
Element: Linear				
PT	(ML CL-10)	616+14.633 R1	7317901.068	901133.224
PC	(ML CL-11)	620+43.731 R1	7318317.118	901028.212
Tangential Direction:		N14°09'56.633"W		
Tangential Length:		429.098		
Element: Circular				
PC	( )	620+43.731 R1	7318317.118	901028.212
PI	( )	621+77.623 R1	7318446.693	900994.483
CC	( )		7317596.454	898259.655
PT	( )	623+11.321 R1	7318572.551	900948.8
Radius:		2860.816		
Delta:		05°21'33.263"	Left	
Degree of Curvature (Arc):		02°00'10.000"		
Length:		267.59		
Tangent:		133.893		
Chord:		267.493		
Middle Ordinate:		3.128		
External:		3.132		
Back Tangent Direction:		N14°35'25.753"W		
Back Radial Direction:		N75°24'34.247"E		
Chord Direction:		N17°16'12.385"W		
Ahead Radial Direction:		N70°03'00.984"E		
Ahead Tangent Direction:		N19°56'59.016"W		
Element: Linear				
PT	(ML CL-11)	623+11.321 R1	7318572.551	900948.8
PC	(ML CL-12)	629+14.470 R1	7319141.228	900747.814
Tangential Direction:		N19°27'53.280"W		
Tangential Length:		603.149		
Element: Circular				
PC	( )	629+14.470 R1	7319141.228	900747.814
PI	( )	634+89.673 R1	7319681.955	900551.669
CC	( )		7318177.632	898091.394
PT	( )	640+49.370 R1	7320102.98	900159.756
Radius:		2825.789		
Delta:		23°00'40.542"	Left	
Degree of Curvature (Arc):		02°01'39.370"		
Length:		1134.9		
Tangent:		575.202		
Chord:		1127.288		
Middle Ordinate:		56.784		
External:		57.948		
Back Tangent Direction:		N19°56'16.295"W		
Back Radial Direction:		N70°03'43.705"E		
Chord Direction:		N31°26'36.566"W		
Ahead Radial Direction:		N47°03'03.162"E		
Ahead Tangent Direction:		N42°56'56.838"W		
Element: Linear				
PT	(ML CL-12)	640+49.370 R1	7320102.98	900159.756
PI	( )	642+01.345 R1	7320214.901	900056.945
Tangential Direction:		N42°34'14.239"W		
Tangential Length:		151.975		

Element: Linear				
PI	(ML CL-28)	642+01.345 R1	7320214.901	900056.945
PC	(ML CL-13)	835+06.127 R1	7334443.981	887010.57
Tangential Direction:		N42°31'01.637"W		
Tangential Length:		19304.782		
Element: Circular				
PC	( )	835+06.127 R1	7334443.981	887010.57
PI	( )	837+47.529 R1	7334620.146	886845.523
CC	( )		7332511.971	884948.431
PT	( )	839+87.760 R1	7334765.762	886652.986
Radius:		2825.789		
Delta:		09°45'56.175"	Left	
Degree of Curvature (Arc):		02°01'39.370"		
Length:		481.633		
Tangent:		241.401		
Chord:		481.05		
Middle Ordinate:		10.255		
External:		10.292		
Back Tangent Direction:		N43°08'02.284"W		
Back Radial Direction:		N46°51'57.716"E		
Chord Direction:		N48°01'00.372"W		
Ahead Radial Direction:		N37°06'01.541"E		
Ahead Tangent Direction:		N52°53'58.459"W		
Element: Linear				
PT	(ML CL-13)	839+87.760 R1	7334765.762	886652.986
PI	( )	840+94.699 R1	7334831.632	886568.742
Tangential Direction:		N51°58'42.741"W		
Tangential Length:		106.939		
Element: Linear				
PI	(ML CL-30)	840+94.699 R1	7334831.632	886568.742
PC	(ML CL-14)	877+98.380 R1	7337097.498	883639.048
Tangential Direction:		N52°16'52.058"W		
Tangential Length:		3703.681		
Element: Circular				
PC	( )	877+98.380 R1	7337097.498	883639.048
PI	( )	879+57.982 R1	7337194.414	883512.241
CC	( )		7332576.202	880183.536
PT	( )	881+17.500 R1	7337284.069	883380.201
Radius:		5690.578		
Delta:		03°12'47.037"	Left	
Degree of Curvature (Arc):		01°00'24.672"		
Length:		319.12		
Tangent:		159.602		
Chord:		319.078		
Middle Ordinate:		2.237		
External:		2.238		
Back Tangent Direction:		N52°36'36.844"W		
Back Radial Direction:		N37°23'23.156"E		
Chord Direction:		N54°13'00.363"W		
Ahead Radial Direction:		N34°10'36.119"E		
Ahead Tangent Direction:		N55°49'23.881"W		
Element: Linear				
PT	(ML CL-14)	881+17.500 R1	7337284.069	883380.201
PI	( )	881+92.508 R1	7337326.446	883318.311
Tangential Direction:		N55°36'01.295"W		
Tangential Length:		75.008		
Element: Linear				
PI	(ML CL-32)	881+92.508 R1	7337326.446	883318.311
PI	( )	919+92.510 R1	7339479.268	880186.958
Tangential Direction:		N55°29'28.558"W		
Tangential Length:		3800.002		
Element: Linear				
PI	(ML CL-33)	919+92.510 R1	7339479.268	880186.958
PI	( )	930+74.904 R1	7340103.368	879302.608
Tangential Direction:		N54°47'19.540"W		
Tangential Length:		1082.394		
Element: Linear				
PI	(ML CL-34)	930+74.904 R1	7340103.368	879302.608
PC	(ML CL-15)	957+50.394 R1	7341618.039	877097.156
Tangential Direction:		N55°31'09.541"W		
Tangential Length:		2675.49		
Element: Circular				
PC	( )	957+50.394 R1	7341618.039	877097.156
PI	( )	963+06.312 R1	7341921.335	876631.262
CC	( )		7339217.171	875534.194
PT	( )	968+48.581 R1	7342028.365	876085.744
Radius:		2864.789		
Delta:		21°57'49.517"	Left	
Degree of Curvature (Arc):		02°00'00.000"		
Length:		1098.188		
Tangent:		555.918		
Chord:		1091.476		
Middle Ordinate:		52.461		
External:		53.44		
Back Tangent Direction:		N56°56'09.356"W		
Back Radial Direction:		N33°03'50.644"E		
Chord Direction:		N67°55'04.115"W		
Ahead Radial Direction:		N11°06'01.127"E		
Ahead Tangent Direction:		N78°53'58.873"W		
Element: Linear				
PT	(ML CL-15)	968+48.581 R1	7342028.365	876085.744
POT	( )	970+19.595 R1	7342065.554	875918.823
Tangential Direction:		N77°26'23.527"W		
Tangential Length:		171.014		

STATE OF TEXAS
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9/30/2024

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EB

HORIZONTAL ALIGNMENT DATA
(LUBBOCK COUNTY)

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		56

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HORIZONTAL ALIGNMENT CHECK

PROPOSED DESIGN										RADIUS AND SUPERELEVATION CHECK					DEFLECTION CHECK	
PI NO.	LOCATION	PC	PI	PT	DEFLECTION ANGLE	R	E	E (NORMAL)	L	DESIGN SPEED	E MAX	R MIN	E REQ.	MEETS	MAX DEFL.	MEETS
				(FORWARD)	(DEG, MIN, SEC)	(FT)	(FT/FT)	(FT/FT)	(FT)	(MPH)	(FT/FT)	(FT)	(FT/FT)			
US 84 Lamb County, CSJ 0052-05-046																
1	West Bound	1142+87.58	1147+41.80	1151+94.17	09°00'10.7" RT	5,769.64	0.033	-0.020	906.59	65	0.060	5,085	0.033	YES		N/A
2	West Bound	1204+76.27	1212+42.34	1219+72.43	30°20'43.1" LT	2,824.93	0.055	-0.020	1496.15	70	0.060	2,805	0.055	YES		N/A
3	West Bound	1235+69.78	1242+41.84	1249+00.56	19°45'15.8" RT	3,859.82	0.046	-0.020	1330.79	70	0.060	3,770	0.046	YES		N/A

HORIZONTAL ALIGNMENT CHECK

PROPOSED DESIGN										RADIUS AND SUPERELEVATION CHECK					DEFLECTION CHECK	
PI NO.	LOCATION	PC	PI	PT	DEFLECTION ANGLE	R	E	E (NORMAL)	L	DESIGN SPEED	E MAX	R MIN	E REQ.	MEETS	MAX DEFL.	MEETS
				(FORWARD)	(DEG, MIN, SEC)	(FT)	(FT/FT)	(FT/FT)	(FT)	(MPH)	(FT/FT)	(FT)	(FT/FT)			
US 84 Lamb County, CSJ 0052-05-046																
1	East Bound	1142+87.59	1147+35.68	1151+81.93	09°00'10.7" RT	5,691.64	0.033	-0.020	894.34	65	0.060	5,085	0.033	YES		N/A
2	East Bound	1204+76.27	1212+63.49	1220+13.73	30°20'43.1" LT	2,902.93	0.055	-0.020	1537.46	70	0.060	2,805	0.055	YES		N/A
3	East Bound	1235+69.78	1242+28.26	1248+73.67	19°45'15.8" RT	3,781.82	0.046	-0.020	1303.89	70	0.060	3,770	0.046	YES		N/A

Information taken from As-Built CSJ: 0052-05-034

This project meets the basic safety requirements of the 3R design criteria. Guard fence (including connections to structures, post spacing, and end treatments), signing and pavement markings meet current standards. Cross drainage box and pipe culvert, parallel and driveway culverts, mailbox support, luminare supports and sign supports within the required obsbtruction clearance of 30 feet have been treated or upgraded to standard.

Structures meet HS-93 Loading.

All curves meet 65 mph criteria.

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LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

HORIZONTAL ALIGNMENT CHECK (LAMB COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		57

DATE: 9/30/2024 3:28:19 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/US0084_RDW_ALIGNMENT_CHECK.dgn

HORIZONTAL ALIGNMENT CHECK

PROPOSED DESIGN										RADIUS AND SUPERELEVATION CHECK					DEFLECTION CHECK	
PI NO.	LOCATION	PC	PI	PT	DEFLECTION ANGLE	R	E PROP.	E (NORMAL)	L	DESIGN SPEED	E MAX	R MIN	E REQ.	MEETS	MAX DEFL.	MEETS
				(FORWARD)	(DEG, MIN, SEC)	(FT)	(FT/FT)	(FT/FT)	(FT)	(MPH)	(FT/FT)	(FT)	(FT/FT)			
US 84 Lubbock County, CSJ 0052-07-068																
1	West Bound	548+71.68	554+48.56	560+21.57	11°29'55.83" RT	5,729.58	0.024	0.020	1149.88	*50	0.060	4600	0.024	YES		N/A
2	West Bound	574+50.88	582+95.31	590+93.23	32°50'49.21" RT	2864.79	0.035	0.020	1642.35	*50	0.060	2840	0.035	YES		N/A
3	West Bound	593+69.77	593+95.81	594+21.89	1°02'30.22" LT	2864.79	0.035	0.020	52.09	*50	0.060	2840	0.035	YES		N/A
4	West Bound	602+20.05	602+97.38	603+74.68	3°05'33.36" LT	2864.79	0.035	0.020	154.63	*50	0.060	2840	0.035	YES		N/A
5	West Bound	608+19.60	609+09.37	609+99.09	3°35'23.36" LT	2864.79	0.035	0.020	179.49	*50	0.060	2840	0.035	YES		N/A
6	West Bound	615+03.74	615+61.20	616+18.66	2°17'54.00" LT	2864.79	0.035	0.020	114.92	*50	0.060	2840	0.035	YES		N/A
7	West Bound	620+02.29	621+43.01	622+83.50	5°37'54.94" RT	2,860.82	0.035	0.020	281.21	*50	0.060	2840	0.035	YES		N/A
8	West Bound	629+04.83	634+95.91	640+71.05	23°00'40.61" LT	2,903.79	0.035	0.020	1166.23	*50	0.060	2840	0.035	YES		N/A
9	West Bound	835+27.81	837+75.89	840+22.76	9°45'57.47" LT	2,903.79	0.035	0.020	494.95	*50	0.060	2840	0.035	YES		N/A
10	West Bound	878+33.36	879+95.11	881+56.78	3°12'44.30" LT	5768.58	0.024	0.020	323.42	*50	0.060	4600	0.024	YES		N/A

*A MINIMUM DESIGN SPEED OF 50 MPH MUST BE MET WITH THE SHOWN SUPERELEVATION RATE (E REQ.)

Information taken from As-Built CSJ: 0052-07-058

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

WB

HORIZONTAL ALIGNMENT CHECK
(LUBBOCK COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		58

DATE: 10/1/2024 12:59:59 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/US0084_RDW_ALIGNMENT_CHECK.dgn

PROPOSED DESIGN										RADIUS AND SUPERELEVATION CHECK					DEFLECTION CHECK	
PI NO.	LOCATION	PC	PI	PT	DEFLECTION ANGLE	R	E PROP.	E (NORMAL)	L	DESIGN SPEED	E MAX	R MIN	E REQ.	MEETS	MAX DEFL.	MEETS
				(FORWARD)	(DEG, MIN, SEC)	(FT)	(FT/FT)	(FT/FT)	(FT)	(MPH)	(FT/FT)	(FT)	(FT/FT)			
US 84 Lubbock County, CSJ 0052-07-068																
1	East Bound	548+33.27	554+10.15	559+83.16	11°29'56.31" RT	5729.58	0.024	0.020	1149.90	*50	0.060	4850	0.024	YES		N/A
2	East Bound	574+39.50	580+49.78	586+42.08	24°03'05.70" RT	2864.79	0.035	0.020	1202.58	*50	0.060	2495	0.035	YES		N/A
3	East Bound	592+75.64	593+02.28	593+28.91	1°03'55.67" RT	2864.79	0.035	0.020	53.27	*50	0.060	2840	0.035	YES		N/A
4	East Bound	602+52.25	603+35.96	604+19.63	3°20'51.63" RT	2864.79	0.035	0.020	167.38	*50	0.060	2840	0.035	YES		N/A
5	East Bound	608+51.19	609+34.71	610+18.18	3°20'23.20" RT	2864.79	0.035	0.020	166.99	*50	0.060	2840	0.035	YES		N/A
6	East Bound	615+14.10	615+64.37	616+14.63	2°00'38.58" RT	2864.79	0.035	0.020	100.54	*50	0.060	2840	0.035	YES		N/A
7	East Bound	620+44.78	621+78.67	623+12.37	5°21'33.26" LT	2860.82	0.035	0.020	267.59	*50	0.060	2495	0.035	YES		N/A
8	East Bound	629+15.52	634+90.72	640+50.42	23°00'40.54" LT	2825.79	0.035	0.020	1134.9	*50	0.060	2495	0.035	YES		N/A
9	East Bound	835+07.18	837+48.58	839+88.81	9°45'56.18" LT	2825.79	0.035	0.020	481.63	*50	0.060	2495	0.035	YES		N/A
10	East Bound	877+99.43	879+59.03	881+18.55	3°12'47.04" LT	5690.58	0.024	0.020	319.12	*50	0.060	4850	0.024	YES		N/A

*A MINIMUM DESIGN SPEED OF 50 MPH MUST BE MET WITH THE SHOWN SUPERELEVATION RATE (E REQ.)

Information taken from As-Built CSJ: 0052-07-058

STATE OF TEXAS
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Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

EB

HORIZONTAL ALIGNMENT CHECK
(LUBBOCK COUNTY)

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		59

DATE: 10/1/2024 12:59:59 PM
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VERTICAL ALIGNMENT CHECK

LOCATION	PI STATION	LENGTH	G1	G2	E	K-VALUE CALC.	K-VALUE MIN.	CREST OR SAG?	MEETS MIN. K?	UNDER MAX. GRADE?	MEETS DESIGN SPEED
		(FT)	(%)	(%)	(FT)			(C/S)	(Y/N)	(Y/N)	MPH
US 84 Lamb County, CSJ 0052-05-046											
West Bound	990+00	400.00	-0.6120	-0.1662	0.22	897	231	S	Y	Y	80
West Bound	1011+00	800.00	-0.1662	-1.1818	-1.02	788	384	C	Y	Y	80
West Bound	1022+00	800.00	-1.1818	-0.315	0.87	923	231	S	Y	Y	80
West Bound	1035+00	800.00	-0.3154	-1.0578	-0.74	1,078	384	C	Y	Y	80
West Bound	1044+00	800.00	-1.0578	-0.3018	0.76	1,058	231	S	Y	Y	80
West Bound	1055+00	800.00	-0.3018	-0.3739	-0.07	11,096	384	C	Y	Y	80
West Bound	1068+00		-0.3739	-0.3864	NO VERTICAL CURVE, G2-G1 < 0.5					Y	80
West Bound	1079+00	800.00	-0.3864	-0.3518	0.03	23,121	231	S	Y	Y	80
West Bound	1090+00	800.00	-0.3518	-0.1180	0.23	3,422	231	S	Y	Y	80
West Bound	1100+00	800.00	-0.1180	-0.2100	-0.09	8696	384	C	Y	Y	80
West Bound	1110+00	800.00	-0.2100	-0.3331	-0.12	6499	384	C	Y	Y	80
West Bound	1123+00	800.00	-0.3331	-0.1958	0.14	5827	231	S	Y	Y	80
West Bound	1135+00	800.00	-0.1958	-0.2993	-0.10	7729	384	C	Y	Y	80
West Bound	1151+88	800.00	-0.2993	-0.4748	-0.18	4558	384	C	Y	Y	80
West Bound	1163+00	800.00	-0.4748	0.0128	0.49	1641	231	S	Y	Y	80
West Bound	1181+00	800.00	0.0128	-0.2200	-0.23	3436	384	C	Y	Y	80
West Bound	1193+00	400.00	-0.2200	-0.8275	-0.30	658	384	C	Y	Y	80
West Bound	1197+00	400.00	-0.8275	-0.2583	0.28	703	231	S	Y	Y	80
West Bound	1209+00	900.00	-0.2583	-0.2157	0.05	21127	231	S	Y	Y	80
West Bound	1222+00	900.00	-0.2157	-0.0415	0.20	5166	231	S	Y	Y	80
West Bound	1235+00		-0.0415	-0.0371	NO VERTICAL CURVE, G2-G1 < 0.5					Y	80
West Bound	1249+00	900.00	-0.0371	-0.1177	-0.09	11166	384	C	Y	Y	80
West Bound	1260+00	950.00	-0.1177	-0.2085	-0.11	10463	384	C	Y	Y	80
West Bound	1273+00	950.00	-0.2085	-0.5617	-0.42	2690	384	C	Y	Y	80
West Bound	1285+00	900.00	-0.5617	-0.3350	0.26	3970	231	S	Y	Y	80
West Bound	1295+00	900.00	-0.3350	-0.6620	-0.37	2752	384	C	Y	Y	80
West Bound	1305+00	900.00	-0.6620	-0.0858	0.65	1562	231	S	Y	Y	80
West Bound	1317+00	900.00	-0.0858	-0.6233	-0.60	1674	384	C	Y	Y	80
West Bound	1326+00	900.00	-0.6233	-0.3900	0.26	3858	231	S	Y	Y	80
West Bound	1340+00	900.00	-0.3900	-0.2013	0.21	4769	231	S	Y	Y	80
West Bound	1355+00	600.00	-0.2013	0.0000	0.15	2981	231	S	Y	Y	80
West Bound	1367+50	600.00	0.0000	-0.1768	-0.13	3394	384	C	Y	Y	80
West Bound	1380+00		-0.1768	-0.0911	NO VERTICAL CURVE, G2-G1 < 0.5					Y	80

Information taken from As-Built CSJ: 0052-05-034
All vertical curves meet a design speed of 80 mph.

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

WB

VERTICAL ALIGNMENT CHECK (LAMB COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		60

DATE: 9/30/2024 3:28:20 PM
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VERTICAL ALIGNMENT CHECK

LOCATION	PI STATION	LENGTH	G1	G2	E	K-VALUE CALC.	K-VALUE MIN.	CREST OR SAG?	MEETS MIN. K?	UNDER MAX. GRADE?	MEETS DESIGN SPEED
		(FT)	(%)	(%)	(FT)			(C/S)	(Y/N)	(Y/N)	MPH
US 84 Lamb County, CSJ 0052-05-046											
East Bound	990+00	400.00	-0.6540	-0.2500	0.20	990	231	S	Y	Y	80
East Bound	996+00	600.00	-0.2500	-0.1438	0.08	5,650	231	S	Y	Y	80
East Bound	1012+00	800.00	-0.1438	-1.230	-1.09	737	384	C	Y	Y	80
East Bound	1022+00	400.00	-1.230	-0.2620	0.48	413	231	S	Y	Y	80
East Bound	1032+00	800.00	-0.2620	-0.9030	-0.64	1,248	384	C	Y	Y	80
East Bound	1042+00	600.00	-0.9030	-0.5500	0.26	1,700	231	S	Y	Y	80
East Bound	1052+00	600.00	-0.5500	-0.3300	0.17	2,727	231	S	Y	Y	80
East Bound	1062+00	600.00	-0.3300	-0.2950	0.03	17,143	231	S	Y	Y	80
East Bound	1072+00	600.00	-0.2950	-0.5550	-0.20	2,308	384	C	Y	Y	80
East Bound	1082+00	800.00	-0.5550	-0.1100	0.45	1798	231	S	Y	Y	80
East Bound	1092+00	800.00	-0.1100	-0.2350	-0.13	6400	384	C	Y	Y	80
East Bound	1102+00	800.00	-0.2350	-0.1400	0.10	8421	231	S	Y	Y	80
East Bound	1112+00	800.00	-0.1400	-0.2905	-0.15	5316	384	C	Y	Y	80
East Bound	1132+00		-0.2905	-0.2995	NO VERTICAL CURVE, G2-G1 < 0.5					Y	80
East Bound	1150+00	800.00	-0.2995	-0.4127	-0.11	7067	384	C	Y	Y	80
East Bound	1163+00	600.00	-0.4127	-0.0070	0.30	1479	231	S	Y	Y	80
East Bound	1183+00	800.00	-0.0070	-0.3143	-0.31	2603	384	C	Y	Y	80
East Bound	1190+00	600.00	-0.3143	-0.4767	-0.12	3695	384	C	Y	Y	80
East Bound	1202+00	800.00	-0.4767	-0.2900	0.19	4285	231	S	Y	Y	80
East Bound	1214+00	800.00	-0.2900	-0.0706	0.22	3646	231	S	Y	Y	80
East Bound	1238+00	800.00	-0.0706	0.0497	0.12	6650	231	S	Y	Y	80
East Bound	1250+00	800.00	0.0497	-0.1600	-0.21	3815	384	C	Y	Y	80
East Bound	1265+00	800.00	-0.1600	-0.2000	-0.04	20000	384	C	Y	Y	80
East Bound	1275+00	800.00	-0.2000	-0.7670	-0.57	1411	384	C	Y	Y	80
East Bound	1285+00	800.00	-0.7670	-0.2123	0.55	1442	231	S	Y	Y	80
East Bound	1298+00	400.00	-0.2123	-0.9457	-0.37	545	384	C	Y	Y	80
East Bound	1305+00	600.00	-0.9457	-0.0233	0.69	650	231	S	Y	Y	80
East Bound	1317+00	800.00	-0.0233	-0.6391	-0.62	1299	384	C	Y	Y	80
East Bound	1328+00	900.00	-0.6391	-0.3191	0.36	2813	231	S	Y	Y	80
East Bound	1339+00	800.00	-0.3191	-0.2876	0.03	25397	231	S	Y	Y	80
East Bound	1356+00	600.00	-0.2876	0.0000	0.22	2086	231	S	Y	Y	80
East Bound	1367+50	600.00	0.0000	-0.2023	-0.15	2966	384	C	Y	Y	80
East Bound	1376+00	800.00	-0.2023	-0.0656	0.14	5852	231	S	Y	Y	80
East Bound	1385+00		-0.0656	-0.0836	NO VERTICAL CURVE, G2-G1 < 0.5					Y	80

Information taken from As-Built CSJ: 0052-05-034
All vertical curves meet a design speed of 80 mph.

STATE OF TEXAS
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126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

EB

VERTICAL ALIGNMENT CHECK (LAMB COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		61

DATE: 9/30/2024 3:28:20 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050464 - Design/Plan Set/3. Roadway/US0084_RDW_ALIGNMENT_CHECK.dgn

DW | CK | DW | CK

VERTICAL ALIGNMENT CHECK

LOCATION	PI STATION	LENGTH	G1	G2	E	K-VALUE CALC.	K-VALUE MIN.	CREST OR SAG?	MEETS MIN. K?	UNDER MAX. GRADE?	MEETS DESIGN SPEED
		(FT)	(%)	(%)	(FT)			(C/S)	(Y/N)	(Y/N)	MPH
US 84 Lubbock County, CSJ 0052-07-068											
West Bound	525+46.28	600.00	-2.5000	0.0218	1.89	238	231	S	Y	Y	80
West Bound	550+75.00	550.00	0.0218	3.3733	2.30	164	157	S	Y	Y	65
West Bound	563+69.00	1765.00	3.3733	-2.4533	-12.85	303	247	C	Y	Y	70
West Bound	576+00.00	450.00	-2.4533	0.2941	1.55	164	157	S	Y	Y	65
West Bound	604+90.58	400.00	0.2941	0.3340	0.02	10,025	231	S	Y	Y	80
West Bound	616+89.72	400.00	0.3340	0.6896	0.18	1,125	231	S	Y	Y	80
West Bound	626+90.34	500.00	0.6896	0.2946	-0.25	1,266	384	C	Y	Y	80
West Bound	644+21.67	400.00	0.2946	0.6107	0.16	1265	231	S	Y	Y	80
West Bound	658+21.67	400.00	0.6107	0.3159	-0.15	1357	384	C	Y	Y	80
West Bound	680+21.67	400.00	0.3159	0.5417	0.11	1771	231	S	Y	Y	80
West Bound	692+21.67	600.00	0.5417	0.3278	-0.16	2805	384	C	Y	Y	80
West Bound	710+21.67	400.00	0.3278	0.3540	0.01	15267	231	S	Y	Y	80
West Bound	735+21.67	1000.00	0.3540	-0.1386	-0.62	2030	384	C	Y	Y	80
West Bound	770+21.67	400.00	-0.1386	-0.3575	-0.11	1827	384	C	Y	Y	80
West Bound	790+21.67	800.00	-0.3575	-0.5795	-0.22	3604	384	C	Y	Y	80
West Bound	812+21.67	800.00	-0.5795	0.0058	0.59	1367	231	S	Y	Y	80
West Bound	855+34.96	400.00	0.0058	1.0591	0.53	380	231	S	Y	Y	80
West Bound	866+34.98	600.00	1.0591	0.3473	-0.53	843	384	C	Y	Y	80
West Bound	890+39.34	400.00	0.3473	1.0833	0.37	543	231	S	Y	Y	80
West Bound	902+39.34	600.00	1.0833	0.1523	-0.70	644	384	C	Y	Y	80

Information taken from As-Built CSJ: 0052-07-058
All vertical curves meet a design speed of 65 mph.

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

WB

VERTICAL ALIGNMENT CHECK (LUBBOCK COUNTY)

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		62

DATE: 9/30/2024 1:03:07 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050464 - Design/Plan Set/3. Roadway/US0084_RDW_ALIGNMENT_CHECK.dgn

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VERTICAL ALIGNMENT CHECK

LOCATION	PI STATION	LENGTH	G1	G2	E	K-VALUE CALC.	K-VALUE MIN.	CREST OR SAG?	MEETS MIN. K?	UNDER MAX. GRADE?	MEETS DESIGN SPEED
		(FT)	(%)	(%)	(FT)			(C/S)	(Y/N)	(Y/N)	MPH
US 84 Lubbock County, CSJ 0052-07-068											
East Bound	525+00.00	600.00	-2.5000	0.0204	1.89	238	231	S	Y	Y	80
East Bound	551+81.03	550.00	0.0204	3.6431	2.49	152	136	S	Y	Y	60
East Bound	563+40.00	1750.00	3.6431	-2.3112	-13.03	294	247	C	Y	Y	70
East Bound	576+93.00	550.00	-2.3112	0.3563	1.83	206	181	S	Y	Y	70
East Bound	605+00.00	400.00	0.3563	0.0500	-0.15	1,306	384	C	Y	Y	80
East Bound	617+00.00	400.00	0.0500	0.6900	0.32	625	231	S	Y	Y	80
East Bound	627+00.00	500.00	0.6900	0.3000	-0.24	1,282	384	C	Y	Y	80
East Bound	644+00.00	400.00	0.3000	0.5893	0.14	1383	231	S	Y	Y	80
East Bound	658+00.00	400.00	0.5893	0.3409	-0.12	1610	384	C	Y	Y	80
East Bound	680+00.00	400.00	0.3409	0.4583	0.06	3407	231	S	Y	Y	80
East Bound	692+00.00	600.00	0.4583	0.3694	-0.07	6749	384	C	Y	Y	80
East Bound	710+00.00	400.00	0.3694	0.3340	-0.02	11299	384	C	Y	Y	80
East Bound	735+00.00	1000.00	0.3340	-0.1100	-0.56	2252	384	C	Y	Y	80
East Bound	770+00.00	400.00	-0.1100	-0.3575	-0.12	1616	384	C	Y	Y	80
East Bound	790+00.00	400.00	-0.3575	-0.6250	-0.13	1495	384	C	Y	Y	80
East Bound	812+00.00	800.00	-0.6250	-0.0058	0.62	1292	231	S	Y	Y	80
East Bound	855+00.00	400.00	-0.0058	1.1045	0.56	360	231	S	Y	Y	80
East Bound	866+00.00	600.00	1.1045	0.3479	-0.57	793	384	C	Y	Y	80
East Bound	890+00.00	400.00	0.3479	1.0833	0.37	544	231	S	Y	Y	80
East Bound	902+00.00	600.00	1.0833	0.1580	-0.69	648	384	C	Y	Y	80

Information taken from As-Built CSJ: 0052-07-058
All vertical curves meet a design speed of 60 mph.

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

EB

VERTICAL ALIGNMENT CHECK
(LUBBOCK COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		63

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DW CK DW CK

	ROADWAY ITEMS (US 84 LAMB & LUBBOCK COUNTY) MAINLANES CSJ: 0052-05-046, 0052-07-068															
	FLEXIBLE PAVEMENT STRUCTURE REPAIR (6") 2% OF ROADWAY AREA	FLEXIBLE PAVEMENT STRUCTURE REPAIR (2") 3% OF ROADWAY AREA	PLANE ASPH CONC PAV (0"-1")	PLANE ASPH CONC PAV (2")	PLANE ASPH CONC PAV (3")	REINF. FABRIC AREA	REINF. FABRIC ASPHALT BINDER	2" TY-C HMA	TACK COAT	1" TOM-C	FILL-IN RUMBLE STRIPS TOM-C	TOM SHOULDER TACK	FOG SEAL (CSS-1H)	RUMBLE STRIPS (SHOULDER)	POST & CABLE	*METAL BEAM GUARD FENCE ADJUSTMENT
	SY	SY	SY	SY	SY	SY	GAL	TON	GAL	TON	TON	GAL	GAL	LF	LF	LF
CSJ: 0052-05-046 TOTAL	7089.00	10634.00	426.67	223440.00		288954.43	43343.12	25744.67	31341.33	21710.15	381.21	12405.90	47012.00	167009.00	2866.00	
										22091.36						
CSJ: 0052-07-068 TOTAL	7353.00	11030.00	551.11		24177.00	261574.83	39236.20	2773.46	3376.38	24065.11	389.93	16338.79	10804.74	167105.00		4975.00
										24455.04						
PROJECT TOTAL	14442.00	21664.00	977.78	223440.00	24177.00	550529.26	82579.32	28518.13	34717.71	45775.26	771.14	28744.69	57816.74	334114.00	2866.00	4975.00
										46546.40						

*ADJUSTMENT OF THRIE-BEAM,TAS, & GUARDRAIL-END TERMINAL SUBSIDIARY TO MBGF ADJUSTMENT

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

ROADWAY SUMMARY
(OVERALL)

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		64

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FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/US0084_RDW_ROADWAY_SUM.dgn

DW | CK | DW | CK

CK | DW | CK | DW

ROADWAY ITEMS (US 84 LAMB COUNTY) MAINLANES CSJ: 0052-05-046

STATION	STATION	LENGTH	WIDTH	SIDE OF ROADWAY	AREA	INFORMATION	FLEXIBLE PAVEMENT STRUCTURE REPAIR (6")	FLEXIBLE PAVEMENT STRUCTURE REPAIR (2")	PLANE ASPH CONC PAV (0"-1")	PLANE ASPH CONC PAV (2")	*REINF. FABRIC WIDTH	REINF. FABRIC AREA	REINF. FABRIC ASPHALT BINDER	TY-C HMA	TACK COAT	TOM-C	FILL-IN RUMBLE STRIPS TOM-C	**TOM SHOULDER TACK	***FOG SEAL (CSS-1H)	RUMBLE STRIPS (SHOULDER)
							2% OF ROADWAY AREA	3% OF ROADWAY AREA					0.15 GAL/SY	230 LBS/SY 2"	0.14 GAL/SY	115 LBS/SY 1"	72 LBS/SY 5/8"	0.14 GAL/SY	0.18 GAL/SY	
FROM	TO	FT	FT	RT/LT/BOTH	SY		SY	SY	SY	SY	FT	SY	GAL	TON	GAL	TON	TON	GAL	GAL	LF
846+00.00	985+00.00	13900		BOTH		RUMBLE STRIP IN REMOVED DECEL AREAS														3636.00
985+00.00	990+00.00	500	48	BOTH	2666.67	MILL AND INLAY DRIVING/PASSING LANES			106.67	2560.00	49.00	2722.22	408.33	306.67	373.33	153.33			480.00	
985+00.00	990+00.00	500	28	BOTH	1555.56	OVERLAY SHOULDERS					8.00	444.44	66.67			89.44	4.67	147.78	80.00	2000.00
990+00.00	1014+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
990+00.00	1014+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	21.83	709.33	384.00	9356.00
1014+00.00	1038+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
1014+00.00	1038+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	21.56	709.33	384.00	9241.00
1038+00.00	1062+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
1038+00.00	1062+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	22.40	709.33	384.00	9600.00
1062+00.00	1086+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
1062+00.00	1086+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	22.11	709.33	384.00	9475.00
1086+00.00	1110+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
1086+00.00	1110+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	21.98	709.33	384.00	9422.00
1110+00.00	1134+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
1110+00.00	1134+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	21.86	709.33	384.00	9367.00
1134+00.00	1158+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
1134+00.00	1158+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	22.05	709.33	384.00	9449.00
1158+00.00	1182+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
1158+00.00	1182+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	21.74	709.33	384.00	9316.00
1182+00.00	1206+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
1182+00.00	1206+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	21.11	709.33	384.00	9046.00
1206+00.00	1230+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
1206+00.00	1230+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	22.40	709.33	384.00	9600.00
1230+00.00	1254+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
1230+00.00	1254+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	22.60	709.33	384.00	9684.00
1254+00.00	1278+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
1254+00.00	1278+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	21.63	709.33	384.00	9272.00
1278+00.00	1302+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
1278+00.00	1302+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	22.14	709.33	384.00	9489.00
1302+00.00	1326+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
1302+00.00	1326+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	22.40	709.33	384.00	9600.00
1326+00.00	1350+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
1326+00.00	1350+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	21.50	709.33	384.00	9216.00
1350+00.00	1374+00.00	2300	48	BOTH	12266.67	****MILL AND INLAY DRIVING/PASSING LANES			213.33	12053.33	49.00	12522.22	1878.33	1410.67	1717.33	705.33			2208.00	
1350+00.00	1374+00.00	2300	28	BOTH	7155.56	****OVERLAY SHOULDERS					8.00	2044.44	306.67			411.44	21.18	679.78	368.00	9077
1374+00.00	1398+00.00	2400	48	BOTH	12800.00	MILL AND INLAY DRIVING/PASSING LANES				12800.00	49.00	13066.67	1960.00	1472.00	1792.00	736.00			2304.00	
1374+00.00	1398+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS					8.00	2133.33	320.00			429.33	22.40	709.33	384.00	9600
1398+00.00	1405+75.00	775	48	BOTH	4133.33	MILL AND INLAY DRIVING/PASSING LANES			106.67	4026.67	49.00	4219.44	632.92	475.33	578.67	237.67			744.00	
1398+00.00	1405+75.00	775	28	BOTH	2411.11	OVERLAY SHOULDERS					8.00	688.89	103.33			138.64	3.65	229.06	124.00	1563
				CSJ: 0052-05-046 TOTAL			7089	10634	426.67	223440.00	1083.00	265841.65	39876.25	25744.67	31341.33	20381.13	381.21	12405.90	47012.00	167009.00
																20762.34				

* 6" OVERLAP INCLUDES DRIVING LANES, PASSING LANES, & INSIDE 4' SHOULDERS

** TACK COAT 9.5' OF BOTH OUTSIDE SHOULDERS

***FOG SEAL DRIVING LANES, PASSING LANES, & 2' WIDE RUMBLE STRIP AREAS

**** OMIT BRIDGE CLASS CULVERT DECK OVER YELLOW HOUSE CANYON DRAW

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

ROADWAY SUMMARY
(LAMB COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		65

DATE: 9/30/2024 1:03:38 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/Roadway/US0084_RDW_ROADWAY_SUM.dgn

CK | DW | CK | DW

ROADWAY ITEMS (US 84 LUBBOCK COUNTY) MAINLANES CSJ: 0052-07-068

STATION	STATION	LENGTH	WIDTH	SIDE OF ROADWAY	AREA	INFORMATION	FLEXIBLE PAVEMENT STRUCTURE REPAIR (6")	FLEXIBLE PAVEMENT STRUCTURE REPAIR (2")	PLANE ASPH CONC PAV (0"-1")	PLANE ASPH CONC PAV (3")	*REINF. FABRIC WIDTH	REINF. FABRIC AREA	REINF. FABRIC ASPHALT BINDER	TY-C HMA	TACK COAT	TOM-C	FILL-IN RUMBLE STRIPS TOM-C	**TOM SHOULDER TACK	FOG SEAL (CSS-1H)	RUMBLE STRIPS (SHOULDER)
							2% OF ROADWAY AREA	3% OF ROADWAY AREA					0.15 GAL/SY	230 LBS/SY 2"	0.14 GAL/SY	115 LBS/SY 1"	72 LBS/SY 5/8"	0.14 GAL/SY	0.18 GAL/SY	
FROM	TO	FT	FT	RT/LT/BOTH	SY		SY	SY	SY	SY	FT	SY	GAL	TON	GAL	TON	TON	GAL	GAL	LF
524+00.00	545+00.00	2100	48	BOTH	11200.00	OVERLAY DRIVING/PASSING LANES			106.67		50.00	11666.67	1750.00			644.00				
524+00.00	545+00.00	2100	28	BOTH	6533.33	OVERLAY SHOULDERS										375.67	17.27	849.33	336.00	7400.00
545+00.00	569+00.00	2400	48	BOTH	12800.00	***OVERLAY DRIVING/PASSING LANES			213.33		50.00	11755.56	1763.33			648.91				
545+00.00	569+00.00	2400	28	BOTH	7466.67	***OVERLAY SHOULDERS			124.44							378.53	39.54	855.80	338.56	16945.00
545+00.00	569+00.00			BOTH	24117.00	MILL/FILL INTERSECTING FM 179 AND RAMPS				24117.00		24117.00	3617.55	2773.46	3376.38	1386.73			4341.06	
569+00.00	593+00.00	2400	48	BOTH	12800.00	OVERLAY DRIVING/PASSING LANES					50.00	13333.33	2000.00			736.00				
569+00.00	593+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS										429.33	25.91	970.67	384.00	11105.00
593+00.00	617+00.00	2400	48	BOTH	12800.00	OVERLAY DRIVING/PASSING LANES					50.00	13333.33	2000.00			736.00				
593+00.00	617+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS										429.33	21.22	970.67	384.00	9094.00
617+00.00	641+00.00	2400	48	BOTH	12800.00	OVERLAY DRIVING/PASSING LANES					50.00	13333.33	2000.00			736.00				
617+00.00	641+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS										429.33	21.18	970.67	384.00	9077.00
641+00.00	665+00.00	2400	48	BOTH	12800.00	OVERLAY DRIVING/PASSING LANES					50.00	13333.33	2000.00			736.00				
641+00.00	665+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS										429.33	22.40	970.67	384.00	9600.00
665+00.00	689+00.00	2400	48	BOTH	12800.00	OVERLAY DRIVING/PASSING LANES					50.00	13333.33	2000.00			736.00				
665+00.00	689+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS										429.33	22.11	970.67	384.00	9475.00
689+00.00	713+00.00	2400	48	BOTH	12800.00	OVERLAY DRIVING/PASSING LANES					50.00	13333.33	2000.00			736.00				
689+00.00	713+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS										429.33	21.41	970.67	384.00	9176.00
713+00.00	737+00.00	2400	48	BOTH	12800.00	OVERLAY DRIVING/PASSING LANES					50.00	13333.33	2000.00			736.00				
713+00.00	737+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS										429.33	22.40	970.67	384.00	9600.00
737+00.00	761+00.00	2400	48	BOTH	12800.00	OVERLAY DRIVING/PASSING LANES					50.00	13333.33	2000.00			736.00				
737+00.00	761+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS										429.33	21.72	970.67	384.00	9307.00
761+00.00	785+00.00	2400	48	BOTH	12800.00	OVERLAY DRIVING/PASSING LANES					50.00	13333.33	2000.00			736.00				
761+00.00	785+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS										429.33	21.79	970.67	384.00	9340.00
785+00.00	809+00.00	2400	48	BOTH	12800.00	OVERLAY DRIVING/PASSING LANES					50.00	13333.33	2000.00			736.00				
785+00.00	809+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS										429.33	23.13	970.67	384.00	9912.00
809+00.00	833+00.00	2400	48	BOTH	12800.00	OVERLAY DRIVING/PASSING LANES					50.00	13333.33	2000.00			736.00				
809+00.00	833+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS										429.33	22.03	970.67	384.00	9442.00
833+00.00	857+00.00	2400	48	BOTH	12800.00	OVERLAY DRIVING/PASSING LANES					50.00	13333.33	2000.00			736.00				
833+00.00	857+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS										429.33	21.19	970.67	384.00	9080.00
857+00.00	881+00.00	2400	48	BOTH	12800.00	OVERLAY DRIVING/PASSING LANES					50.00	13333.33	2000.00			736.00				
857+00.00	881+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS										429.33	21.81	970.67	384.00	9346.00
881+00.00	905+00.00	2400	48	BOTH	12800.00	OVERLAY DRIVING/PASSING LANES					50.00	13333.33	2000.00			736.00				
881+00.00	905+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS										429.33	22.40	970.67	384.00	9600.00
905+00.00	929+00.00	2400	48	BOTH	12800.00	OVERLAY DRIVING/PASSING LANES					50.00	13333.33	2000.00			736.00				
905+00.00	929+00.00	2400	28	BOTH	7466.67	OVERLAY SHOULDERS										429.33	20.72	970.67	384.00	8878.00
929+00.00	930+82.00	182	48	BOTH	970.67	OVERLAY DRIVING/PASSING LANES			106.67		50.00	1011.11	151.67			55.81				
929+00.00	930+82.00	182	28	BOTH	566.22	OVERLAY SHOULDERS										32.56	1.70	73.61	29.12	728.00
VARIOUS			76	BOTH	VARIES	SUPERELEVATION UPGRADES										2313.98				
CSJ: 0052-07-068 TOTAL							7353	11030	551.11	24117.00	900.00	248550.29	37282.55	2773.46	3376.38	23316.14	389.93	16338.79	10804.74	167105.00
																23706.07				

* 6" OVERLAP INCLUDES DRIVING LANES& PASSING LANES

** TACK COAT 9.5' OF BOTH OUTSIDE SHOULDERS AND 3.5' OF BOTH INSIDE SHOULDERS

*** OMIT BRIDGE DECK AND APPROACH SLABS OVER FM 179

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

ROADWAY SUMMARY
(LUBBOCK COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		66

DATE: 9/30/2024 1:03:38 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/US0084_RDW_ROADWAY_SUM.dgn

CK | DW | CK | DW

ROADWAY ITEMS (US 84 LAMB COUNTY) INSIDE DECEL LANES CSJ: 0052-05-046

CROSSOVER NO.	INFORMATION	DESCRIPTION	PROPOSED/ EXISTING	LOCATION		LENGTH	BEGIN WIDTH	END WIDTH	SIDE OF ROADWAY	DESCRIPTION	LANE AREA	TAPER AREA	AREA	REINF. FABRIC AREA	REINF. FABRIC ASPHALT BINDER	TOM-C
				STATION											0.15 GAL/SY	115 LBS/SY
																1"
		LANE/TAPER		FROM	TO	FT	FT	FT	LT/RT	DECEL	SY	SY	SY	SY	GAL	TON
CR 1 STA 995+50	PRIVATE DRIVE	TAPER	EXISTING	996+00.00	998+00.00	200.00	0	8	RT	DECEL		88.89	88.89	88.89	13.33	5.11
		LANE		998+00.00	999+11.00	111.00	8	8			98.67		98.67	98.67	14.80	5.67
		TAPER		999+11.00	999+89.00	78.00	8	0				34.67	34.67	34.67	5.20	1.99
		TAPER	EXISTING	999+11.00	999+89.00	78.00	0	8	LT	DECEL		34.67	34.67	34.67	5.20	1.99
		LANE		999+89.00	1001+00.00	111.00	8	8			98.67		98.67	98.67	14.80	5.67
		TAPER		1001+00.00	1003+00.00	200.00	8	0				88.89	88.89	88.89	13.33	5.11
CR 2 STA 1012+40	PRIVATE DRIVE	TAPER	EXISTING	1009+00.00	1011+00.00	200.00	0	8	RT	DECEL		88.89	88.89	88.89	13.33	5.11
		LANE		1011+00.00	1012+01.00	101.00	8	8			89.78		89.78	89.78	13.47	5.16
		TAPER		1012+01.00	1012+79.00	78	8	0				34.67	34.67	34.67	5.20	1.99
		TAPER	EXISTING	1012+01.00	1012+79.00	78	0	8	LT	DECEL		34.67	34.67	34.67	5.20	1.99
		LANE		1012+79.00	1014+00.00	121.00	8	8			107.56		107.56	107.56	16.13	6.18
		TAPER		1014+00.00	1016+00.00	200.00	8	0				88.89	88.89	88.89	13.33	5.11
CR 3 STA 1032+79	COUNTY ROAD 227	TAPER	EXISTING	1029+00.00	1031+00.00	200.00	0	8	RT	DECEL		88.89	88.89	88.89	13.33	5.11
		LANE		1031+00.00	1032+22.00	122.00	8	8			108.44		108.44	108.44	16.27	6.24
		TAPER		1032+22.00	1033+35.00	113.00	8	0				50.22	50.22	50.22	7.53	2.89
		TAPER	EXISTING	1032+22.00	1033+35.00	113.00	0	8	LT	DECEL		50.22	50.22	50.22	7.53	2.89
		LANE		1033+35.00	1035+00.00	165.00	8	8			146.67		146.67	146.67	22.00	8.43
		TAPER		1035+00.00	1037+00.00	200.00	8	0				88.89	88.89	88.89	13.33	5.11
CR 4 STA 1070+85	PRIVATE DRIVE	TAPER	EXISTING	1067+00.00	1069+00.00	200.00	0	8	RT	DECEL		88.89	88.89	88.89	13.33	5.11
		LANE		1069+00.00	1070+46.00	146.00	8	8			129.78		129.78	129.78	19.47	7.46
		TAPER		1070+46.00	1071+24.00	78.00	8	0				34.67	34.67	34.67	5.20	1.99
		TAPER	EXISTING	1070+46.00	1071+24.00	78.00	0	8	LT	DECEL		34.67	34.67	34.67	5.20	1.99
		LANE		1071+24.00	1073+00.00	176.00	8	8			156.44		156.44	156.44	23.47	9.00
		TAPER		1073+00.00	1075+00.00	200.00	8	0				88.89	88.89	88.89	13.33	5.11
CR 5 STA 1110+13	COUNTY ROAD 237	TAPER	EXISTING	1106+50.00	1108+50.00	200.00	0	8	RT	DECEL		88.89	88.89	88.89	13.33	5.11
		LANE		1108+50.00	1109+58.00	108.00	8	8			96.00		96.00	96.00	14.40	5.52
		TAPER		1109+58.00	1110+69.00	111.00	8	0				49.33	49.33	49.33	7.40	2.84
		TAPER	EXISTING	1109+58.00	1110+69.00	111.00	0	8	LT	DECEL		49.33	49.33	49.33	7.40	2.84
		LANE		1110+69.00	1112+00.00	131.00	8	8			116.44		116.44	116.44	17.47	6.70
		TAPER		1112+00.00	1114+00.00	200.00	8	0				88.89	88.89	88.89	13.33	5.11
CR 6 STA 1152+00	DPS WEIGH STATION	TAPER	EXISTING	1148+52.00	1150+51.00	199.00	0	8	RT	DECEL		88.44	88.44	88.44	13.27	5.09
		LANE		1150+51.00	1151+50.00	99.00	8	8			88.00		88.00	88.00	13.20	5.06
		TAPER		1151+50.00	1152+44.00	94.00	8	0				41.78	41.78	41.78	6.27	2.40
		TAPER	EXISTING	1151+50.00	1152+44.00	94.00	0	8	LT	DECEL		41.78	41.78	41.78	6.27	2.40
		LANE		1152+44.00	1153+44.00	100.00	8	8			88.89		88.89	88.89	13.33	5.11
		TAPER		1153+44.00	1155+44.00	200.00	8	0				88.89	88.89	88.89	13.33	5.11
CR 7 STA 1166+22	LOOP 385	TAPER	EXISTING	1161+81.00	1164+81.00	300.00	0	8	RT	DECEL		133.33	133.33	133.33	20.00	7.67
		LANE		1164+81.00	1165+81.00	100.00	8	8			88.89		88.89	88.89	13.33	5.11
		TAPER		1165+81.00	1166+69.00	88.00	8	0				39.11	39.11	39.11	5.87	2.25
		TAPER	EXISTING	1165+81.00	1166+69.00	88.00	0	8	LT	DECEL		39.11	39.11	39.11	5.87	2.25
		LANE		1166+69.00	1167+69.00	100.00	8	8			88.89		88.89	88.89	13.33	5.11
		TAPER		1167+69.00	1169+69.00	200.00	8	0				88.89	88.89	88.89	13.33	5.11
CR 8 STA 1181+37	COUNTY ROAD 334	TAPER	EXISTING	1177+91.00	1179+91.00	200.00	0	8	RT	DECEL		88.89	88.89	88.89	13.33	5.11
		LANE		1179+91.00	1180+96.00	105.00	8	8			93.33		93.33	93.33	14.00	5.37
		TAPER		1180+96.00	1181+80.00	84.00	8	0				37.33	37.33	37.33	5.60	2.15
		TAPER	EXISTING	1180+96.00	1181+80.00	84.00	0	8	LT	DECEL		37.33	37.33	37.33	5.60	2.15
		LANE		1181+80.00	1183+00.00	120.00	8	8			106.67		106.67	106.67	16.00	6.13
		TAPER		1183+00.00	1185+00.00	200.00	8	0				88.89	88.89	88.89	13.33	5.11
CR 9 STA 1190+59	COUNTY ROAD 247	TAPER	EXISTING	1187+08.00	1189+08.00	200.00	0	8	RT	DECEL		88.89	88.89	88.89	13.33	5.11
		LANE		1189+08.00	1190+12.00	104.00	8	8			92.44		92.44	92.44	13.87	5.32
		TAPER		1190+12.00	1191+07.00	95.00	8	0				42.22	42.22	42.22	6.33	2.43
		TAPER	EXISTING	1190+12.00	1191+07.00	95.00	0	8	LT	DECEL		42.22	42.22	42.22	6.33	2.43
		LANE		1191+07.00	1192+12.00	105.00	8	8			93.33		93.33	93.33	14.00	5.37
		TAPER		1192+12.00	1195+12.00	300.00	8	0				133.33	133.33	133.33	20.00	7.67
											CSJ: 0052-05-046 SUBTOTAL		4305.34	645.76	247.55	

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FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/US0084_RDW_DECEL_QTY.dgn

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

DECEL LANE ITEMS SUMMARY (LAMB COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		67

ROADWAY ITEMS (US 84 LAMB COUNTY) INSIDE DECEL LANES CSJ: 0052-05-046

CROSSOVER NO.	INFORMATION	DESCRIPTION	PROPOSED/ EXISTING	LOCATION		LENGTH	BEGIN WIDTH	END WIDTH	SIDE OF ROADWAY	DESCRIPTION	LANE AREA	TAPER AREA	AREA	REINF. FABRIC AREA	REINF. FABRIC ASPHALT BINDER 0.15 GAL/SY	TOM-C 115 LBS/SY 1"
				STATION												
		LANE/TAPER		FROM	TO	FT	FT	FT	LT/RT	DECEL	SY	SY	SY	SY	GAL	TON
CR 10 STA 1240+21	LOOP 385	TAPER	EXISTING	1236+71.00	1238+71.00	200.00	0	8	RT	DECEL		88.89	88.89	88.89	13.33	5.11
		LANE		1238+71.00	1239+71.00	100.00	8	8			88.89		88.89	88.89	13.33	5.11
		TAPER		1239+71.00	1240+60.00	89.00	8	0				39.56	39.56	39.56	5.93	2.27
		TAPER	EXISTING	1239+82.00	1240+69.00	87.00	0	8	LT	DECEL		38.67	38.67	38.67	5.80	2.22
		LANE		1240+69.00	1241+69.00	100.00	8	8			88.89		88.89	88.89	13.33	5.11
		TAPER		1241+69.00	1243+69.00	200.00	8	0				88.89	88.89	88.89	13.33	5.11
		TAPER		1238+80.00	1240+90.00	210.00	0	6				70.00	70.00	70.00	10.50	4.03
		LANE		1240+90.00	1243+90.00	300.00	6	6			200.00		200.00	200.00	30.00	11.50
		TAPER		1243+90.00	1246+90.00	300.00	6	0				100.00	100.00	100.00	15.00	5.75
CR 11 STA 1260+18	FM 1072	TAPER	EXISTING	1255+50.00	1258+50.00	300.00	0	8	RT	DECEL		133.33	133.33	133.33	20.00	7.67
		LANE		1258+50.00	1259+63.00	113.00	8	8			100.44		100.44	100.44	15.07	5.78
		TAPER		1259+63.00	1260+75.00	112.00	8	0				49.78	49.78	49.78	7.47	2.86
		TAPER	EXISTING	1259+63.00	1260+75.00	112.00	0	8	LT	DECEL		49.78	49.78	49.78	7.47	2.86
		LANE		1260+75.00	1262+00.00	125.00	8	8			111.11		111.11	111.11	16.67	6.39
		TAPER		1262+00.00	1264+00.00	200.00	8	0				88.89	88.89	88.89	13.33	5.11
		TAPER		1258+91.00	1260+12.00	121.00	0	6				40.33	40.33	40.33	6.05	2.32
		LANE		1260+12.00	1263+38.00	326.00	6	6			217.33		217.33	217.33	32.60	12.50
		TAPER		1263+38.00	1266+38.00	300.00	6	0				100.00	100.00	100.00	15.00	5.75
CR 12 STA 1296+30		TAPER	EXISTING	1292+50.00	1294+50.00	200.00	0	8	RT	DECEL		88.89	88.89	88.89	13.33	5.11
		LANE		1294+50.00	1295+91.00	141.00	8	8			125.33		125.33	125.33	18.80	7.21
		TAPER		1295+91.00	1296+69.00	78.00	8	0				34.67	34.67	34.67	5.20	1.99
		TAPER	EXISTING	1295+91.00	1296+69.00	78.00	0	8	LT	DECEL		34.67	34.67	34.67	5.20	1.99
		LANE		1296+69.00	1298+00.00	131.00	8	8			116.44		116.44	116.44	17.47	6.70
		TAPER		1298+00.00	1300+00.00	200.00	8	0				88.89	88.89	88.89	13.33	5.11
CR 13 STA 1332+40	COUNTY ROAD 267	TAPER	EXISTING	1328+50.00	1330+50.00	200.00	0	8	RT	DECEL		88.89	88.89	88.89	13.33	5.11
		LANE		1330+50.00	1331+81.00	131.00	8	8			116.44		116.44	116.44	17.47	6.70
		TAPER		1331+81.00	1332+99.00	118.00	8	0				52.44	52.44	52.44	7.87	3.02
		TAPER	EXISTING	1331+81.00	1332+99.00	118.00	0	8	LT	DECEL		52.44	52.44	52.44	7.87	3.02
		LANE		1332+99.00	1334+00.00	101.00	8	8			89.78		89.78	89.78	13.47	5.16
		TAPER		1334+00.00	1336+00.00	200.00	8	0				88.89	88.89	88.89	13.33	5.11
CR 14 STA 1368+20		TAPER	EXISTING	1364+50.00	1366+50.00	200.00	0	8	RT	DECEL		88.89	88.89	88.89	13.33	5.11
		LANE		1366+50.00	1367+81.00	131.00	8	8			116.44		116.44	116.44	17.47	6.70
		TAPER		1367+81.00	1368+59.00	78.00	8	0				34.67	34.67	34.67	5.20	1.99
		TAPER	EXISTING	1367+81.00	1368+59.00	78.00	0	8	LT	DECEL		34.67	34.67	34.67	5.20	1.99
		LANE		1368+59.00	1370+00.00	141.00	8	8			125.33		125.33	125.33	18.80	7.21
		TAPER		1370+00.00	1372+00.00	200.00	8	0				88.89	88.89	88.89	13.33	5.11
CR 15 STA 1401+66	COUNTY ROAD 277	TAPER	EXISTING	1398+10.00	1400+10.00	200.00	0	8	RT	DECEL		88.89	88.89	88.89	13.33	5.11
		LANE		1400+10.00	1400+90.00	80.00	8	8			71.11		71.11	71.11	10.67	4.09
											CSJ: 0052-05-046 SUBTOTAL			3321.44	498.21	190.99
											CSJ: 0052-05-046 TOTAL			7626.78	1143.97	438.54

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

DECEL LANE ITEMS SUMMARY (LAMB COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		68

ROADWAY ITEMS (US 84 LUBBOCK COUNTY) INSIDE DECEL LANES CSJ: 0052-07-068

CROSSOVER NO.	INFORMATION	DESCRIPTION	PROPOSED/ EXISTING	LOCATION		LENGTH	BEGIN WIDTH	END WIDTH	SIDE OF ROADWAY	DESCRIPTION	LANE AREA	TAPER AREA	AREA	REINF. FABRIC AREA	REINF. FABRIC ASPHALT BINDER	TOM-C
				STATION											0.15 GAL/SY	115 LBS/SY
																1"
		LANE/TAPER		FROM	TO	FT	FT	FT	LT/RT	DECEL	SY	SY	SY	SY	GAL	TON
CR 1 STA 606+00	FM 1294	TAPER	EXISTING	600+24.00	603+44.00	320.00	0	8	RT	DECEL		142.22	142.22	142.22	21.33	8.18
		LANE		603+44.00	605+19.00	175.00	8	8			155.56		155.56	155.56	23.33	8.94
		TAPER		605+19.00	606+07.00	88.00	8	0				39.11	39.11	39.11	5.87	2.25
		TAPER	EXISTING	605+84.00	606+88.00	104.00	0	8	LT	DECEL		46.22	46.22	46.22	6.93	2.66
		LANE		606+88.00	608+63.00	175.00	8	8			155.56		155.56	155.56	23.33	8.94
		TAPER		608+63.00	611+83.00	320.00	8	0				142.22	142.22	142.22	21.33	8.18
CR 2 STA 626+00	PRIVATE DRIVE	TAPER	EXISTING	620+51.00	623+71.00	320.00	0	8	RT	DECEL		142.22	142.22	142.22	21.33	8.18
		LANE		623+71.00	625+46.00	175.00	8	8			155.56		155.56	155.56	23.33	8.94
		TAPER		625+46.00	626+48.00	102.00	8	0				45.33	45.33	45.33	6.80	2.61
		TAPER	EXISTING	625+48.00	626+50.00	102.00	0	8	LT	DECEL		45.33	45.33	45.33	6.80	2.61
		LANE		626+50.00	628+25.00	175.00	8	8			155.56		155.56	155.56	23.33	8.94
		TAPER		628+25.00	631+45.00	320.00	8	0				142.22	142.22	142.22	21.33	8.18
CR 3 STA 701+14	FM 179N	TAPER	EXISTING	695+73.00	698+93.00	320.00	0	8	RT	DECEL		142.22	142.22	142.22	21.33	8.18
		LANE		698+93.00	700+68.00	175.00	8	8			155.56		155.56	155.56	23.33	8.94
		TAPER		700+68.00	701+66.00	98.00	8	0				43.56	43.56	43.56	6.53	2.50
		TAPER	EXISTING	700+63.00	701+61.00	98.00	0	8	LT	DECEL		43.56	43.56	43.56	6.53	2.50
		LANE		701+61.00	703+36.00	175.00	8	8			155.56		155.56	155.56	23.33	8.94
		TAPER		703+36.00	706+56.00	320.00	8	0				142.22	142.22	142.22	21.33	8.18
CR 4 STA 746+00	COUNTY ROAD 5700	TAPER	EXISTING	743+17.00	744+97.00	180.00	0	8	RT	DECEL		80.00	80.00	80.00	12.00	4.60
		LANE		744+97.00	745+47.00	50.00	8	8			44.44		44.44	44.44	6.67	2.56
		TAPER		745+47.00	746+58.00	111.00	8	0				49.33	49.33	49.33	7.40	2.84
		TAPER	EXISTING	745+49.00	746+54.00	105.00	0	8	LT	DECEL		46.67	46.67	46.67	7.00	2.68
		LANE		746+54.00	747+04.00	50.00	8	8			44.44		44.44	44.44	6.67	2.56
		TAPER		747+04.00	748+84.00	180.00	8	0				80.00	80.00	80.00	12.00	4.60
CR 5 STA 777+37	COUNTY ROAD 1200	TAPER	EXISTING	774+57.00	776+37.00	180.00	0	8	RT	DECEL		80.00	80.00	80.00	12.00	4.60
		LANE		776+37.00	776+87.00	50.00	8	8			44.44		44.44	44.44	6.67	2.56
		TAPER		776+86.00	777+92.00	106.00	8	0				47.11	47.11	47.11	7.07	2.71
		TAPER	EXISTING	776+81.00	777+91.00	110.00	0	8	LT	DECEL		48.89	48.89	48.89	7.33	2.81
		LANE		777+91.00	778+41.00	50.00	8	8			44.44		44.44	44.44	6.67	2.56
		TAPER		778+41.00	780+21.00	180.00	8	0				80.00	80.00	80.00	12.00	4.60
CR 6 STA 794+00	PRIVATE DRIVE	TAPER	EXISTING	791+35.00	793+15.00	180.00	0	8	RT	DECEL		80.00	80.00	80.00	12.00	4.60
		LANE		793+15.00	793+65.00	50.00	8	8			44.44		44.44	44.44	6.67	2.56
		TAPER		793+65.00	794+33.00	68.00	8	0				30.22	30.22	30.22	4.53	1.74
		TAPER	EXISTING	793+60.00	794+40.00	80.00	0	8	LT	DECEL		35.56	35.56	35.56	5.33	2.04
		LANE		794+40.00	794+90.00	50.00	8	8			44.44		44.44	44.44	6.67	2.56
		TAPER		794+90.00	796+70.00	180.00	8	0				80.00	80.00	80.00	12.00	4.60
CR 7 STA 819+05	PRIVATE DRIVE	TAPER	EXISTING	816+40.00	818+20.00	180.00	0	8	RT	DECEL		80.00	80.00	80.00	12.00	4.60
		LANE		818+20.00	818+70.00	50.00	8	8			44.44		44.44	44.44	6.67	2.56
		TAPER		818+70.00	819+49.00	79.00	8	0				35.11	35.11	35.11	5.27	2.02
		TAPER	EXISTING	818+60.00	819+43.00	83.00	0	8	LT	DECEL		36.89	36.89	36.89	5.53	2.12
		LANE		819+43.00	819+93.00	50.00	8	8			44.44		44.44	44.44	6.67	2.56
		TAPER		819+93.00	821+73.00	180.00	8	0				80.00	80.00	80.00	12.00	4.60
CR 8 STA 847+54	ROADSIDE PARK	TAPER	EXISTING	842+06.00	845+26.00	320.00	8	8	RT	DECEL		142.22	142.22	142.22	21.33	8.18
		LANE		845+26.00	847+01.00	175.00	8	8			155.56		155.56	155.56	23.33	8.94
		TAPER		847+01.00	848+07.00	106.00	8	0				47.11	47.11	47.11	7.07	2.71
		TAPER	EXISTING	847+04.00	848+07.00	103.00	0	8	LT	DECEL		45.78	45.78	45.78	6.87	2.63
		LANE		848+07.00	849+82.00	175.00	8	8			155.56		155.56	155.56	23.33	8.94
		TAPER		849+82.00	853+02.00	320.00	8	0				142.22	142.22	142.22	21.33	8.18
											CSJ: 0052-07-068 SUBTOTAL			4063.55	609.50	233.67

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

DECEL LANE ITEMS SUMMARY (LUBBOCK COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		69

DATE: 9/30/2024 1:04:26 PM
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CK
DW
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DW

ROADWAY ITEMS (US 84 LUBBOCK COUNTY) INSIDE DECEL LANES CSJ: 0052-07-068

CROSSOVER NO.	INFORMATION	DESCRIPTION	PROPOSED/ EXISTING	LOCATION		LENGTH	BEGIN WIDTH	END WIDTH	SIDE OF ROADWAY	DESCRIPTION	LANE AREA	TAPER AREA	AREA	REINF. FABRIC AREA	REINF. FABRIC ASPHALT BINDER	TOM-C
				STATION											0.15 GAL/SY	115 LBS/SY
		LANE/TAPER		FROM	TO	FT	FT	FT	LT/RT	DECEL	SY	SY	SY	SY	GAL	1" TON
CR 9 STA 866+49	PRIVATE DRIVE	TAPER		861+09.00	864+29.00	320.00	0	8				142.22	142.22	142.22	21.33	8.18
		LANE	EXISTING	864+29.00	866+04.00	175.00	8	8	RT	DECEL	155.56		155.56	155.56	23.33	8.94
		TAPER		866+04.00	867+02.00	98.00	8	0				43.56	43.56	43.56	6.53	2.50
		TAPER		865+96.00	866+97.00	101.00	0	8				44.89	44.89	44.89	6.73	2.58
		LANE	EXISTING	866+97.00	868+72.00	175.00	8	8	LT	DECEL	155.56		155.56	155.56	23.33	8.94
		TAPER		868+72.00	871+92.00	320.00	8	0				142.22	142.22	142.22	21.33	8.18
CR 10 STA 905+51	PRIVATE DRIVE	TAPER		902+81.00	904+61.00	180.00	0	8				80.00	80.00	80.00	12.00	4.60
		LANE	EXISTING	904+61.00	905+11.00	50.00	8	8	RT	DECEL	44.44		44.44	44.44	6.67	2.56
		TAPER		905+10.00	905+95.00	85.00	8	0				37.78	37.78	37.78	5.67	2.17
		TAPER		905+05.00	905+80.00	75.00	0	8				33.33	33.33	33.33	5.00	1.92
		LANE	EXISTING	905+80.00	906+30.00	50.00	8	8	LT	DECEL	44.44		44.44	44.44	6.67	2.56
		TAPER		906+30.00	908+10.00	180.00	8	0				80.00	80.00	80.00	12.00	4.60
CR 11 STA 912+47	FM 2378	TAPER		909+63.00	911+43.00	180.00	0	8				80.00	80.00	80.00	12.00	4.60
		LANE	EXISTING	911+43.00	911+93.00	50.00	8	8	RT	DECEL	44.44		44.44	44.44	6.67	2.56
		TAPER		911+93.00	913+18.00	125.00	8	0				55.56	55.56	55.56	8.33	3.19
		TAPER		911+84.00	912+97.00	113.00	0	8				50.22	50.22	50.22	7.53	2.89
		LANE	EXISTING	912+97.00	913+47.00	50.00	8	8	LT	DECEL	44.44		44.44	44.44	6.67	2.56
		TAPER		913+47.00	915+27.00	180.00	8	0				80.00	80.00	80.00	12.00	4.60
CR 12 STA 927+36	PRIVATE DRIVE	TAPER	EXISTING	924+74.00	926+54.00	180.00	0	8	RT	DECEL		80.00	80.00	80.00	12.00	4.60
		LANE		926+54.00	927+04.00	50.00	8	8			44.44		44.44	44.44	6.67	2.56
		TAPER		927+04.00	927+82.00	78.00	8	0				34.67	34.67	34.67	5.20	1.99
		TAPER		926+93.00	927+69.00	76.00	0	8				33.78	33.78	33.78	5.07	1.94
		LANE	EXISTING	927+69.00	928+19.00	50.00	8	8	LT	DECEL	44.44		44.44	44.44	6.67	2.56
		TAPER		928+19.00	929+99.00	180.00	8	0				100.00	100.00	100.00	15.00	5.75
											CSJ: 0052-07-068 SUBTOTAL			1695.99	254.40	97.53
											CSJ: 0052-07-068 TOTAL			5759.54	863.90	331.20

STATE OF TEXAS
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9/30/2024

Texas Department of Transportation

DECEL LANE ITEMS SUMMARY (LUBBOCK COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		70

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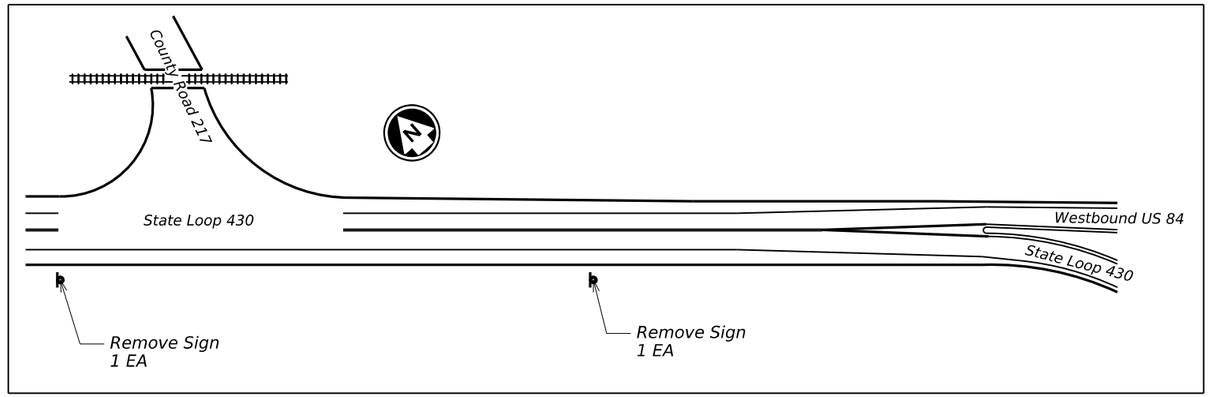
REMOVAL ITEMS (US 84 LAMB COUNTY)						
			0106-7002	0496-7037	0644-7073	0658-7078
STATION	STATION	INFORMATION	OBLITERATING ABANDONED ROAD	REMOVE STR (PIPE)	REMOVE SM RD SN SUP&AM	REMOVE DELIN & OBJECT MARKER ASSMS
FROM	TO		SY	EA	EA	EA
846+00	858+00	REMOVE CROSSOVER & DECEL LANES	183			
858+00	870+00	REMOVE CROSSOVER & DECEL LANES	261	1		2
894+00	906+00	REMOVE CROSSOVER & DECEL LANES	1005			2
906+00	918+00	REMOVE CROSSOVER & DECEL LANES	128			2
918+00	930+00	REMOVE CROSSOVER & DECEL LANES	55			
0052-05-046 TOTAL:			1632	1		6
654+00	1266+00	REMOVE SIGNS			44	
LOOP 430 & CR 217		REMOVE NON-APPLICABLE SIGNS			2	
0052-05-048 TOTAL:					46	
PROJECT TOTAL:			1632	1	46	6



State Loop 430
& County Road 217
Advanced Warning Sign Removal

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9/30/2024

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REMOVAL SUMMARY
(LAMB COUNTY)

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		71

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US 84 CABLE BARRIER CSJ: 0052-05-048

CABLE RUN	Station		BASELINE OFFSET (LEFT OR RIGHT)	ENTIRE LENGTH	* BLADING & BACKFILL (TY B)	543-7002 CABLE BARRIER SYSTEM (TL-4)	543-7018 END TERM (EA)	3" WIDE MOW STRIP LENGTH	5" MOW STRIP AREA	432-7014 5" MOW STRIP (CY)	658-7050 INSTL DEL ASSM (D-DY)SZ 1(YFLX)GND	EMULS ASPH (EROSION CONT) (WIDTH)	EMULS ASPH (EROSION CONT) (AREA)	314-7011 EMULS ASPH (EROSION CONT) (CSS-1H) (0.26gal/sy)
	From	To		LF	STA	LF	EA	LF	SY	CY	EA	LF	SY	GAL
1	663+72.50	674+07.50	LT	1035.00		980	2	1039	346.33	48.10	2	16	1840.00	478.40
2	675+58.50	686+73.50	RT	1115.00		1060	2	1119	373.00	51.81	2	16	1982.22	515.38
3	688+10.50	723+25.50	LT	3515.00		3460	2	3519	1173.00	162.92	2	16	6248.89	1624.71
4	724+64.50	742+79.50	RT	1815.00		1760	2	1819	606.33	84.21	2	16	3226.67	838.93
5	744+24.50	769+39.50	LT	2515.00		2460	2	2519	839.67	116.62	2	16	4471.11	1162.49
6	774+82.50	814+17.50	RT	3935.00		3880	2	3939	1313.00	182.36	2	16	6995.56	1818.84
7	815+97.50	837+92.50	LT	2195.00		2140	2	2199	733.00	101.81	2	16	3902.22	1014.58
8	839+43.50	846+58.50	RT	715.00		660	2	719	239.67	33.29	2	16	1271.11	330.49
9	848+20.50	873+15.50	LT	2495.00		2440	2	2499	833.00	115.69	2	16	4435.56	1153.24
10	878+52.50	894+87.50	RT	1635.00		1580	2	1639	546.33	75.88	2	16	2906.67	755.73
11	896+37.50	908+92.50	LT	1255.00		1200	2	1259	419.67	58.29	2	16	2231.11	580.09
12	910+35.50	927+90.50	RT	1755.00		1700	2	1759	586.33	81.44	2	16	3120.00	811.20
13	929+35.50	941+10.50	LT	1175.00		1120	2	1179	393.00	54.58	2	16	2088.89	543.11
14	942+54.50	954+49.50	RT	1195.00		1140	2	1199	399.67	55.51	2	16	2124.44	552.36
15	955+81.50	964+76.50	LT	895.00		840	2	899	299.67	41.62	2	16	1591.11	413.69
16	966+20.50	981+15.50	LT	1495.00		1440	2	1499	499.67	69.40	2	16	2657.78	691.02
17	982+55.50	998+70.50	LT	1615.00		1560	2	1619	539.67	74.95	2	16	2871.11	746.49
18	1000+27.50	1011+62.50	RT	1135.00		1080	2	1139	379.7	52.7	2	16	2017.78	524.62
19	1013+12.50	1031+87.50	LT	1875.00		1820	2	1879	626.3	87.0	2	16	3333.33	866.67
20	1033+69.50	1070+04.50	RT	3635.00		3580	2	3639	1213.0	168.5	2	16	6462.22	1680.18
21	1071+59.50	1109+14.50	LT	3755.00		3700	2	3759	1253.0	174.0	2	16	6675.56	1735.64
22	1110+99.50	1151+14.50	LT	4015.00		3960	2	4019	1339.7	186.1	2	16	7137.78	1855.82
23	1152+81.50	1165+36.50	RT	1255.00		1200	2	1259	419.7	58.3	2	16	2231.11	580.09
24	1167+00.50	1180+55.50	LT	1355.00		1300	2	1359	453.0	62.9	2	16	2408.89	626.31
25	1182+12.50	1189+67.50	RT	755.00		700	2	759	253.00	35.14	2	16	1342.22	348.98
26	1191+40.50	1239+35.50	RT	4795.00		4740	2	4799	1599.67	222.18	2	16	8524.44	2216.36
27	1240+99.50	1259+24.50	LT	1825.00		1770	2	1829	609.67	84.68	2	16	3244.44	843.56
			CSJ: 0052-05-048 TOTAL	54755.00	10.00	53270	54	54863	18287.67	2539.95	54	432	97342.22	25308.98

* BLADING AND BACKFILL TO CLEAN HIGH SPOTS AS DIRECTED

** LENGTH BASED ON 20FT POST SPACING

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9/30/2024

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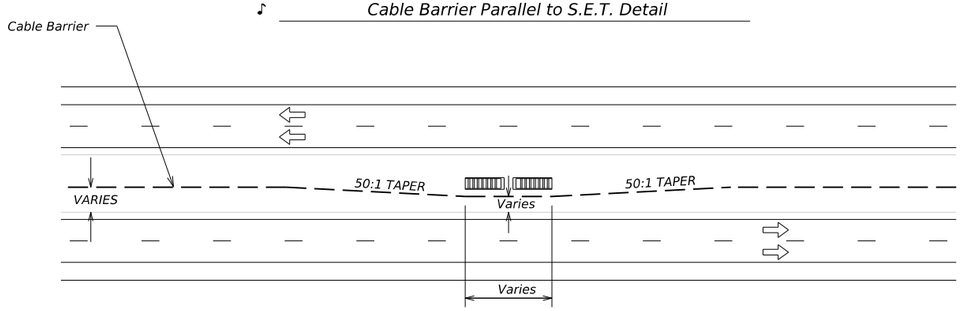
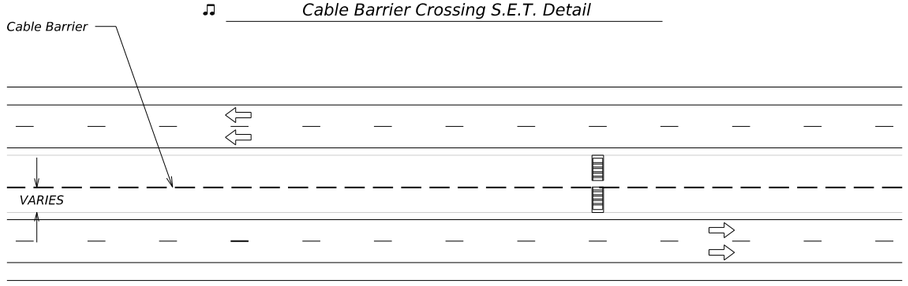
CABLE BARRIER SUMMARY (LAMB COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		72

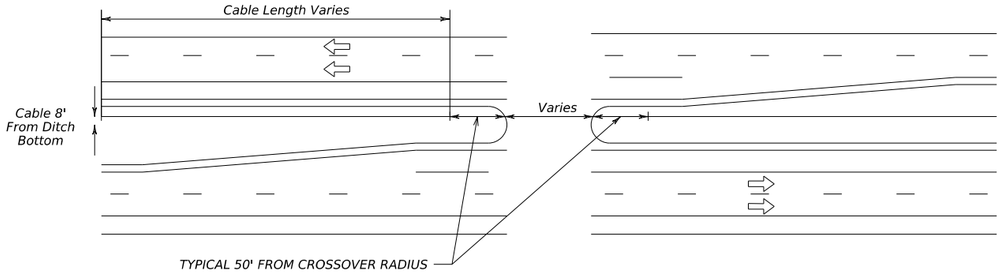
Cable Barrier Parallel to S.E.T. Detail



Cable Barrier Crossing S.E.T. Detail



TERMINAL SECTION AT CROSSOVER DETAIL

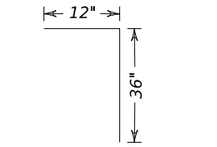


♪ *Place concrete riprap connecting median inlets and structures parallel to the road, to the adjacent cable barrier mow strip.*

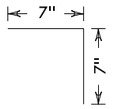
♫ *Do not continue mowstrip through an S.E.T. perpendicular to the cable barrier. Run the cable according to the plans over the S.E.T. Should it become apparent a that a cable post will come into conflict with an S.E.T., place the post on the upstream side relative to the direction the cable will be tensioned; i.e. maintain cable post spacing at a length not greater than dictated in the applicable standard(s), and shorten the distance between the posts as needed to achieve no conflict with the S.E.T.*

♫ *Length of overlap is typically 80', plus the length of anchor terminals; field conditions may dictate otherwise.*

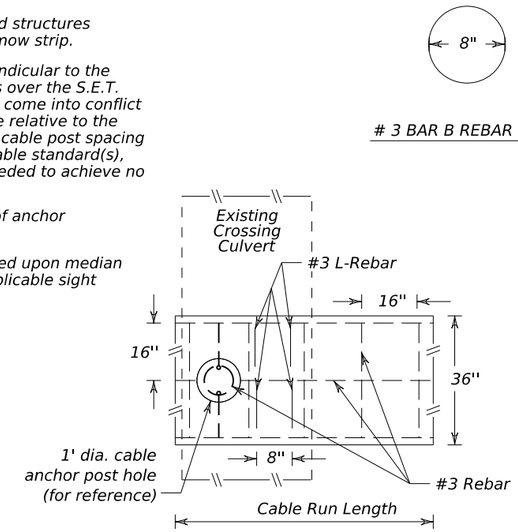
♫♫ *Length of cable break will be field determined based upon median width, TxDOT, Law Enforcement input and any applicable sight distance considerations.*



3 BAR A REBAR (2 EA.)



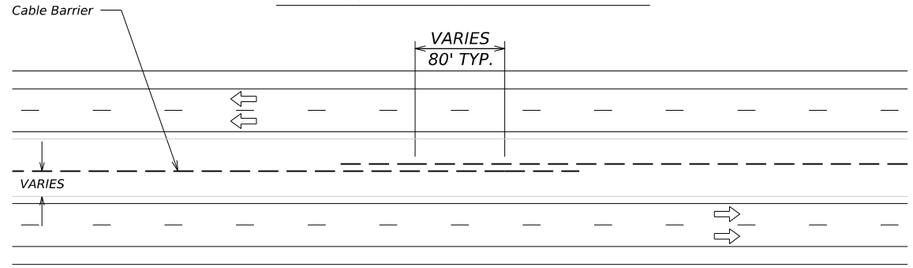
3 L-REBAR DETAIL



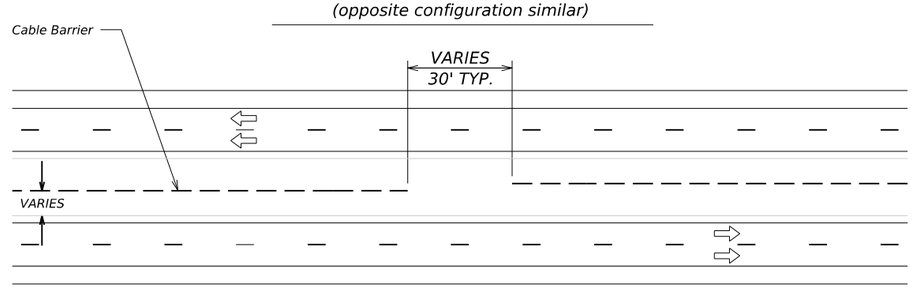
3 BAR B REBAR (6 EA.)

REBAR DETAIL

Cable Barrier Overlap Detail (opposite configuration similar)

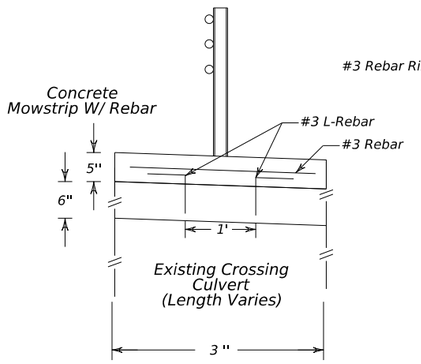


Cable Barrier Break Detail (opposite configuration similar)

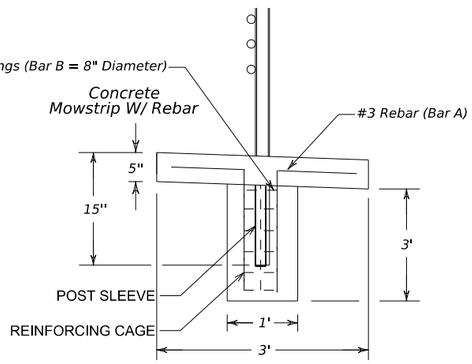


Notes:

1. *Riprap mowstrip shall be Class A concrete 3' wide and be 5'' thick for the entire length of a cable run. Place mowstrip 2' beyond all anchor terminals.*
2. *Number 3 reinforcing steel shall be used for all riprap mowstrip. No welded wire, wire mesh, or fiber-reinforced concrete will be allowed.*
3. *See steel detail below for dimensions and spacing.*
4. *Drill shafts shall be TY A concrete and placed in accordance with manufacturer's recommendations. Removed dirt from drill shaft installation shall not be used as backfill.*
5. *Provide expansion material at joints 100' apart for the length of the mowstrip.*
6. *Except where expansion joints are located, place tool joints every 20' for the length of the mowstrip.*
7. *Cold weather protection requirements will apply for mowstrip placement.*
8. *Riprap cross-slope shall match existing front slope; ensure water does not pond between mowstrip and edge of pavement.*
9. *Limits of pay for windrows vary. Additional soil removed will not be paid for but will be returned to existing conditions at no cost to the Department.*
10. *Provide 2'' of clear cover for rebar in the mowstrip.*
11. *The center piece of longitudinal rebar shall be cut then resumed after any cable anchor post holes. A maximum length of 16'' will be permissible.*
12. *Tie all transverse steel pieces at all 3 longitudinal steel pieces.*
13. *Make sure ALL object markers are placed according to cable barrier standards and object marker standards.*
14. *If field conditions differ from the plans, promptly notify the Engineer.*
15. *Blade and backfill daily with cable mowstrip construction.*
16. *Tie mowstrip into top of culvert boxes with 7'' x 7'' #3 L-Bars spaced @ 8'' .*
17. *At least one post needs to be bolted into the top of any existing culverts.*



CROSSING CULVERT DETAIL (PROFILE)



DRILLED SHAFT DETAIL

STATE OF TEXAS
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126523
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9/30/2024

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CABLE BARRIER DETAILS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		73

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US 84 CROSSOVER SUMMARY (LAMB COUNTY)							
			WIDTH	CROSSOVER	REINF. FABRIC	REINF. FABRIC ASPHALT BINDER	TOM-C
NO	INFORMATION	STA	FT				115 LBS/SY
				AREA	AREA	0.15 GAL/SY	1''
				SY	SY	GAL	TON
CR 1	PRIVATE DRIVE	999+50	40	203	203	30.45	11.67
CR 2	PRIVATE DRIVE	1012+40	40	203	203	30.45	11.67
CR 3	COUNTY ROAD 227	1032+79	40	351	351	52.65	20.18
CR 4	PRIVATE DRIVE	1070+85	40	203	203	30.45	11.67
CR 5	COUNTY ROAD 237	1110+13	40	341	341	51.15	19.61
CR 6	DPS WEIGH STATION	1152+00	50	246	246	36.90	14.15
CR 7	LOOP 385	1166+22	41.5	246	246	36.90	14.15
CR 8	COUNTY ROAD 334	1181+38	40	232	232	34.80	13.34
CR 9	COUNTY ROAD 247	1190+59	40	275	275	41.25	15.81
CR 10	LOOP 385	1240+21	50	251	251	37.65	14.43
CR 11	FM 1072	1260+18	42	346	346	51.90	19.90
CR 12		1296+30	40	203	203	30.45	11.67
CR 13	COUNTY ROAD 267	1332+40	47.6	372	372	55.80	21.39
CR 14		1368+20	40	203	203	30.45	11.67
CR 15	COUNTY ROAD 277	1401+66	130	410	410	61.50	23.58
US 84 CSJ: 0052-05-046 TOTAL					4085	612.75	234.89

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9/30/2024

Texas Department of Transportation

CROSSOVER SUMMARY (LAMB COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		74

DATE: 9/30/2024 1:05:29 PM
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CK: DW: CK: DW:

US 84 CROSSOVER SUMMARY (LUBBOCK COUNTY)							
			WIDTH	CROSSOVER	REINF. FABRIC	REINF. FABRIC ASPHALT BINDER	TOM-C
NO	INFORMATION	STA	FT				115 LBS/SY
				AREA	AREA	0.15 GAL/SY	1"
				SY	SY	GAL	TON
CR 1	FM 1294	606+00	45	1234	1234	185.10	70.96
CR 2	PRIVATE	626+00	70	308	308	46.20	17.71
CR 3	FM 179N	701+14	63	288	288	43.20	16.56
CR 4	CR 5700	746+00	73	334	334	50.10	19.21
CR 5	CR 1200	777+37	70	323	323	48.45	18.57
CR 6	PRIVATE	794+00	40	200	200	30.00	11.50
CR 7	PRIVATE	819+04	38	201	201	30.15	11.56
CR 8	ROADSIDE PARK	847+54	68	316	316	47.40	18.17
CR 9	PRIVATE	866+49	56	277	277	41.55	15.93
CR 10	PRIVATE	905+51	46	216	216	32.40	12.42
CR 11	FM 2378	912+47	95	406	406	60.90	23.35
CR 12	PRIVATE	927+36	38	148	148	22.20	8.51
US 84 CSJ: 0052-07-068 TOTAL					4251	637.65	244.45

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

CROSSOVER SUMMARY (LUBBOCK COUNTY)

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		75

DW | CK | DW | CK

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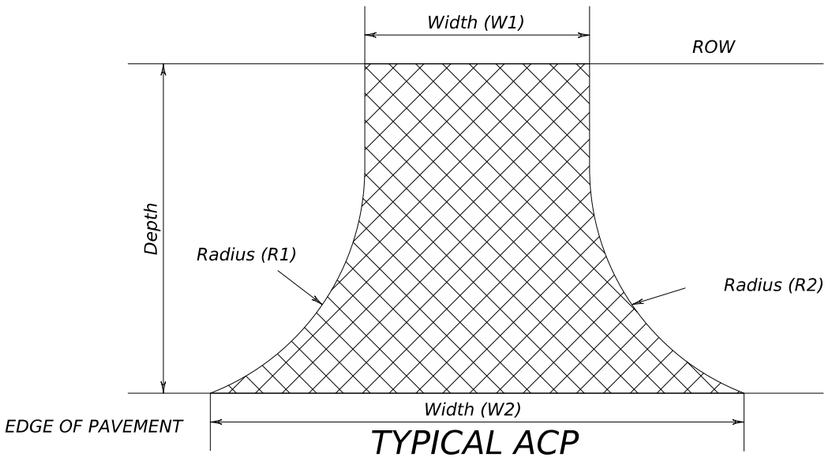
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/US0084_RDW_CROSSOVER_SUMMARY.dgn

US 84 INTERSECTION/DRIVEWAY AND ADDITIONAL ROADWAY SUMMARY (LAMB)													
			INTERSECTION/DRIVEWAY WITH RADIUS OR ADDITIONAL ROADWAY							INTERSECTION/DRIVEWAY	REINF. FABRIC	REINF. FABRIC ASPHALT BINDER	TOM-C
NO	*RR DOT NO.	STA	W1 FT	W2 FT	D FT	R1 FT	R2 FT	RT/LT	DESCRIPTION	AREA SY	AREA SY	0.15 GAL/SY GAL	1'' 115 LBS/SY TON
1		999+50	19	77	30	30	30	RT	DRIVEWAY (PRIVATE)	106	106	15.90	6.10
2		1011+80	22	82	30	30	30	RT	DRIVEWAY (PRIVATE)	116	116	17.40	6.67
3	014887V	1032+79	29	103	28	21	70	LT	CO. RD. 227	148	148	22.20	8.51
4		1032+79	20	149	102	40	70	RT	CO. RD. 227	438	438	65.70	25.19
5	014889J	1110+13	32	123	28	24	95	LT	CO. RD. 237	176	176	26.40	10.12
6		1110+13	20	147	102	40	70	RT	CO. RD. 237	430	430	64.50	24.73
7		1151+06 to 1163+00	SEE INTERSECTION & ROADWAY DETAILS					LT	DPS WEIGH STATION	2444	2444	366.60	140.53
8		1166+22	42	180	73	100	45	LT	LP 385	564	564	84.60	32.43
9		1181+21	20	111	112	90	17	LT	CO. RD. 334	311	311	46.65	17.88
10		1181+38	20	101	79	60	25	RT	CO. RD. 334	263	263	39.45	15.12
11		1181+21	16	69	30	25	25	LT	DRIVEWAY (PRIVATE)	92	92	13.80	5.29
12		1190+59	SEE INTERSECTION & ROADWAY DETAILS					LT	CO. RD. 247	1355	1355	203.25	77.91
13		1190+59	SEE INTERSECTION & ROADWAY DETAILS					RT	CO. RD. 247	1842	1842	276.30	105.92
14		1190+59	SEE INTERSECTION & ROADWAY DETAILS					RT	DRIVEWAY 1 (PRIVATE)	247	247	37.05	14.20
15		1190+59	SEE INTERSECTION & ROADWAY DETAILS					RT	DRIVEWAY 2 (PRIVATE)	126	126	18.90	7.25
16		1240+22	SEE INTERSECTION & ROADWAY DETAILS					LT	LP 385	848	848	127.20	48.76
17	014891K	1260+18	62	122	74	40	60	LT	FM 1072	486	486	72.90	27.95
18		1260+18	20	155	75	45	96	RT	FM 1072	472	472	70.80	27.14
19	014892S	1332+40	30	112	28	25	100	LT	CO. RD. 267	173	173	25.95	9.95
20		1332+40	20	101	36	25	50	RT	CO. RD. 267	168	168	25.20	9.66
21		1401+23	21	79	42	30	30	RT	DRIVEWAY (PRIVATE)	141	141	21.15	8.11
22	014893Y	1401+66	30	113	28	25	100	LT	CO. RD. 277	174	174	26.10	10.01
23		1401+66	26	116	62	25	96	RT	CO. RD. 277	281	281	42.15	16.16
US 84 CSJ: 0052-05-046 TOTAL											11401	1710.15	655.59

*PROPOSED WORK MAY ENCROACH UPON RAILROAD R.O.W.



TYPICAL ACP
INTERSECTION/DRIVEWAY
CONSTRUCTION DETAIL
(NO SCALE)

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

INTERSECTION/DRIVEWAY
& ADDITIONAL ROADWAY
SUMMARY
(LAMB COUNTY)

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		76

DATE: 9/30/2024 3:28:59 PM
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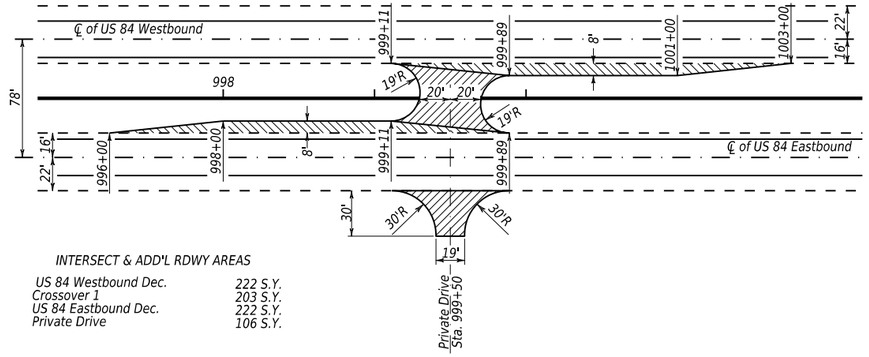
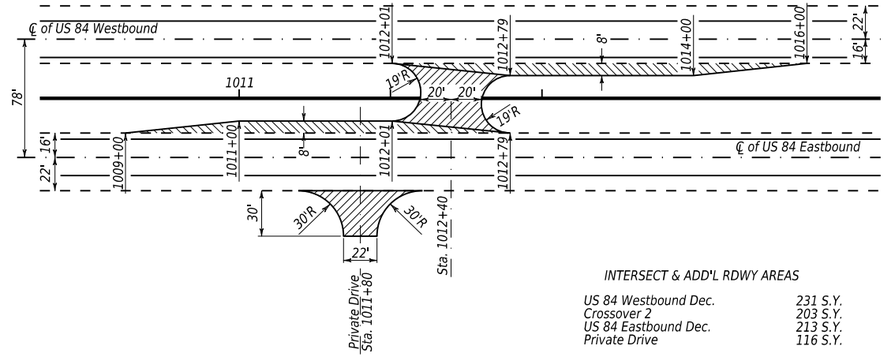


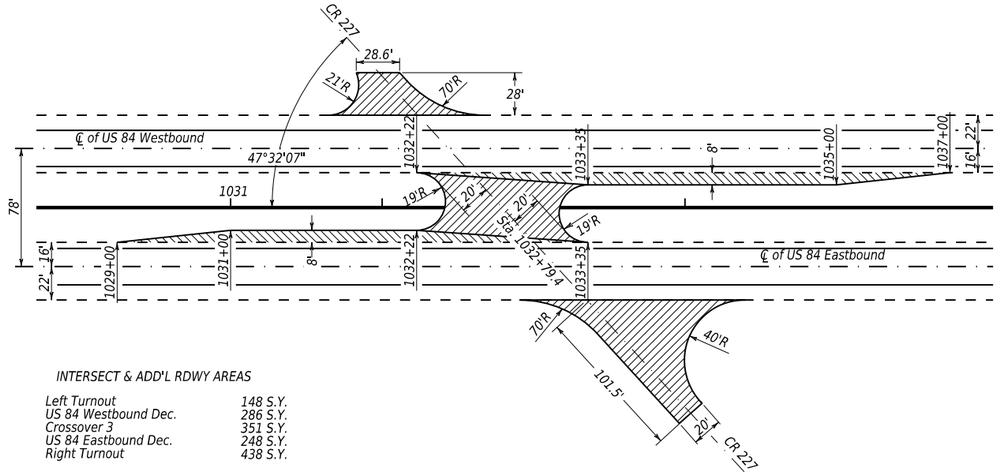
INTERSECT & ADD'L RDWY AREAS

US 84 Westbound Dec.	222 S.Y.
Crossover 1	203 S.Y.
US 84 Eastbound Dec.	222 S.Y.
Private Drive	106 S.Y.



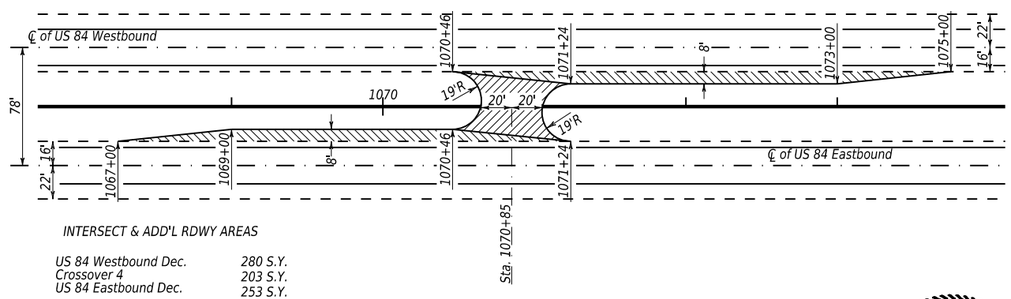
INTERSECT & ADD'L RDWY AREAS

US 84 Westbound Dec.	231 S.Y.
Crossover 2	203 S.Y.
US 84 Eastbound Dec.	213 S.Y.
Private Drive	116 S.Y.



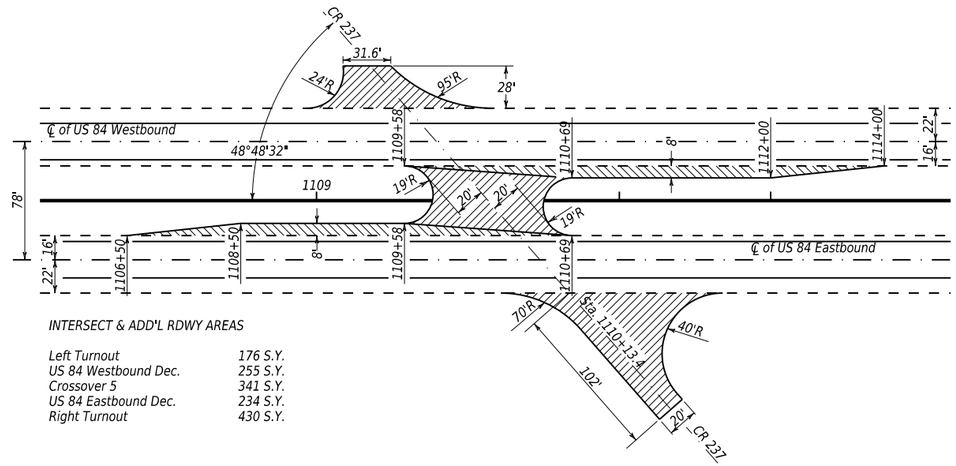
INTERSECT & ADD'L RDWY AREAS

Left Turnout	148 S.Y.
US 84 Westbound Dec.	286 S.Y.
Crossover 3	351 S.Y.
US 84 Eastbound Dec.	248 S.Y.
Right Turnout	438 S.Y.



INTERSECT & ADD'L RDWY AREAS

US 84 Westbound Dec.	280 S.Y.
Crossover 4	203 S.Y.
US 84 Eastbound Dec.	253 S.Y.



INTERSECT & ADD'L RDWY AREAS

Left Turnout	176 S.Y.
US 84 Westbound Dec.	255 S.Y.
Crossover 5	341 S.Y.
US 84 Eastbound Dec.	234 S.Y.
Right Turnout	430 S.Y.

STATE OF TEXAS
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PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

INTERSECTION/DRIVEWAY DETAILS (LAMB COUNTY) NO SCALE

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		77

DATE: 9/30/2024 1:05:43 PM
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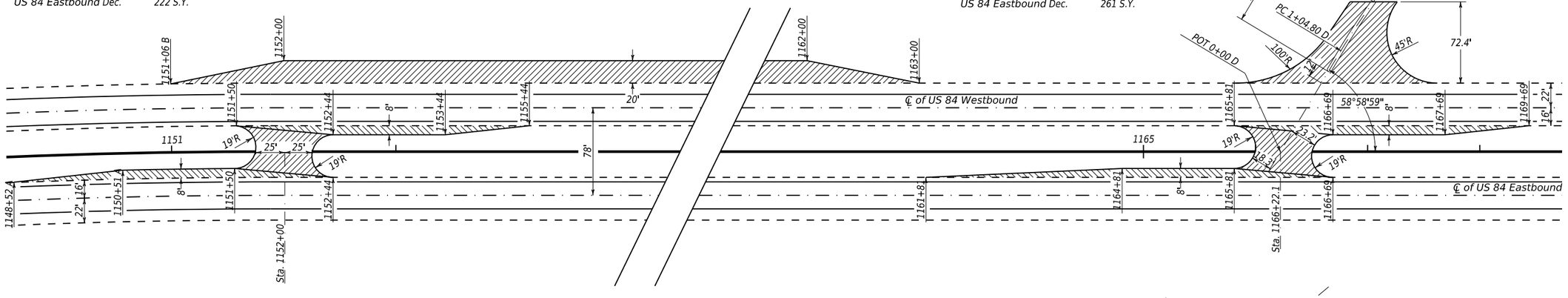
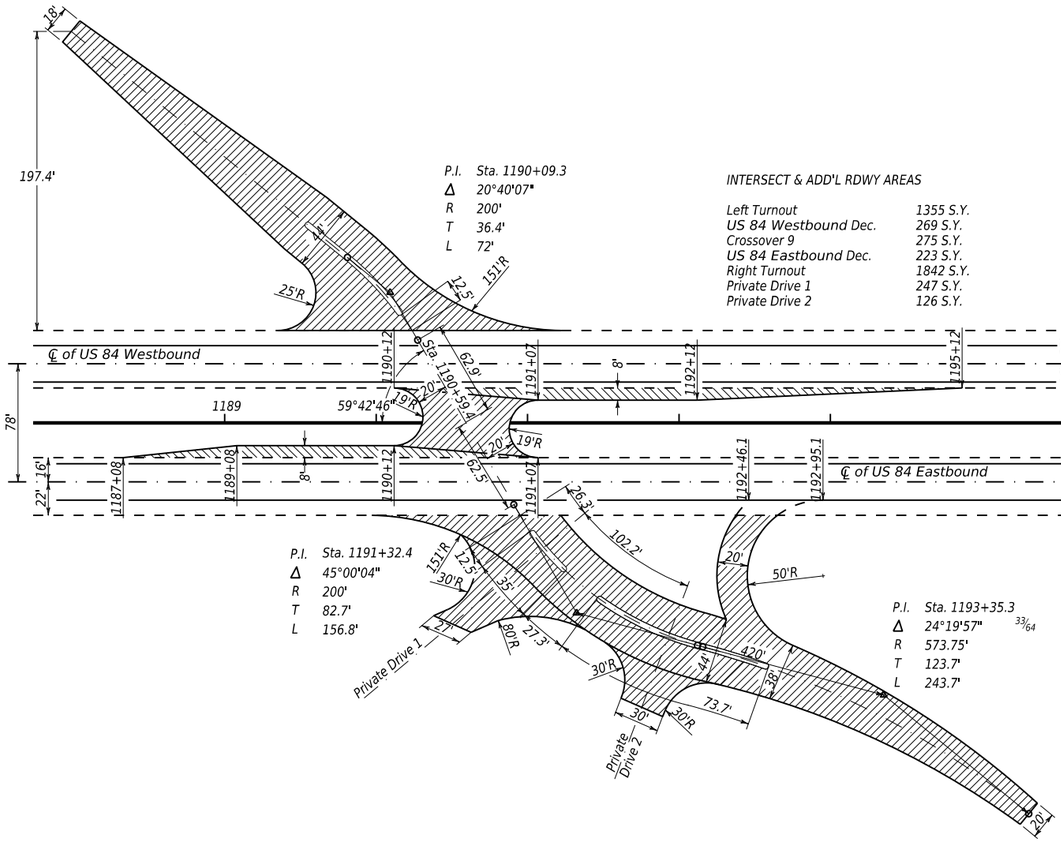
INTERSECT & ADD'L RDWY AREAS

DPS Weigh Sta.	2444 S.Y.
US 84 Westbound Dec.	216 S.Y.
Crossover 6	246 S.Y.
US 84 Eastbound Dec.	222 S.Y.



INTERSECT & ADD'L RDWY AREAS

Left Turnout.	564 S.Y.
US 84 Westbound Dec.	217 S.Y.
Crossover 7	246 S.Y.
US 84 Eastbound Dec.	261 S.Y.

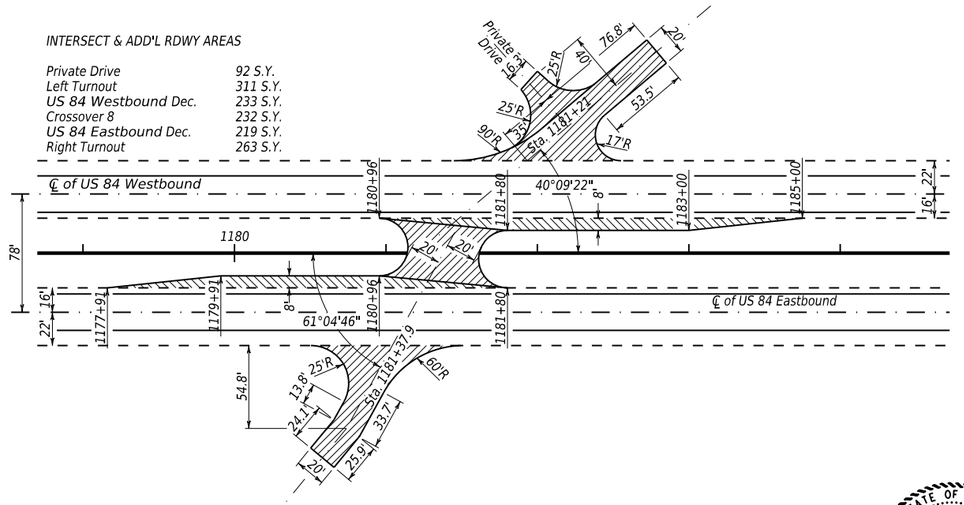


INTERSECT & ADD'L RDWY AREAS

Left Turnout	1355 S.Y.
US 84 Westbound Dec.	269 S.Y.
Crossover 9	275 S.Y.
US 84 Eastbound Dec.	223 S.Y.
Right Turnout	1842 S.Y.
Private Drive 1	247 S.Y.
Private Drive 2	126 S.Y.

INTERSECT & ADD'L RDWY AREAS

Private Drive	92 S.Y.
Left Turnout	311 S.Y.
US 84 Westbound Dec.	233 S.Y.
Crossover 8	232 S.Y.
US 84 Eastbound Dec.	219 S.Y.
Right Turnout	263 S.Y.



STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

INTERSECTION/DRIVEWAY DETAILS (LAMB COUNTY) NO SCALE

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		78

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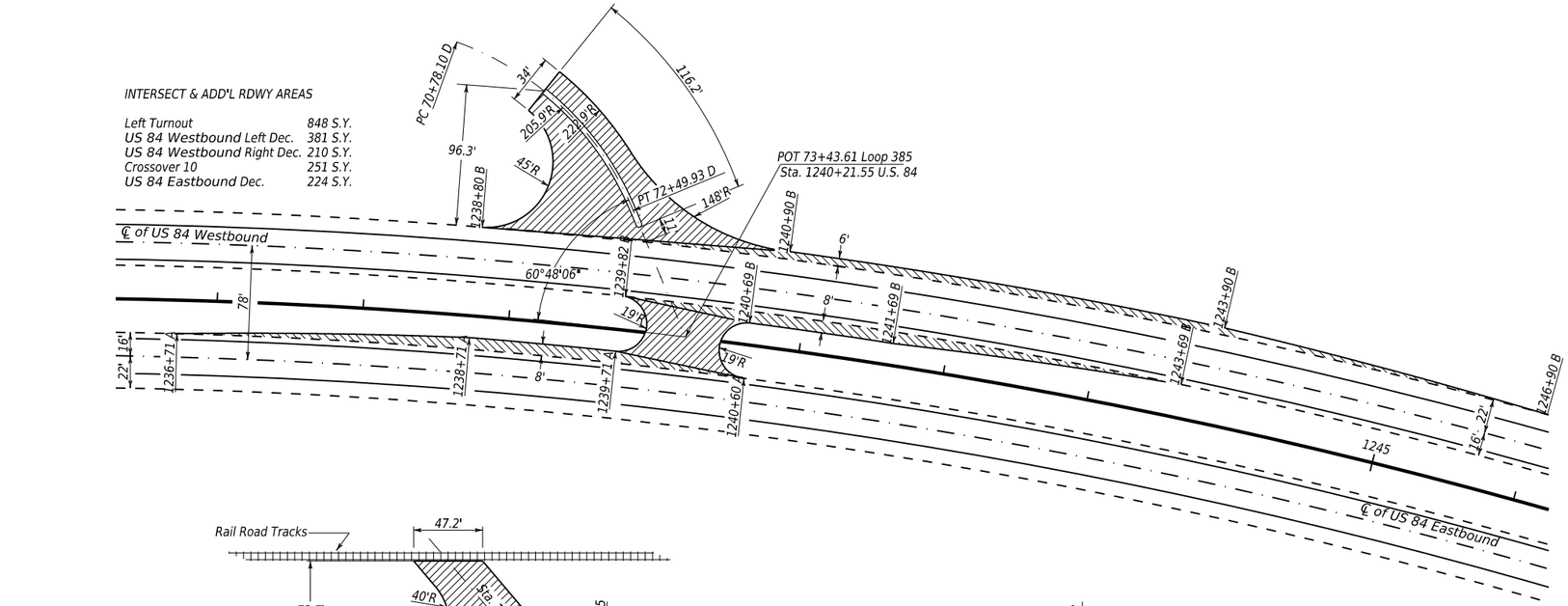

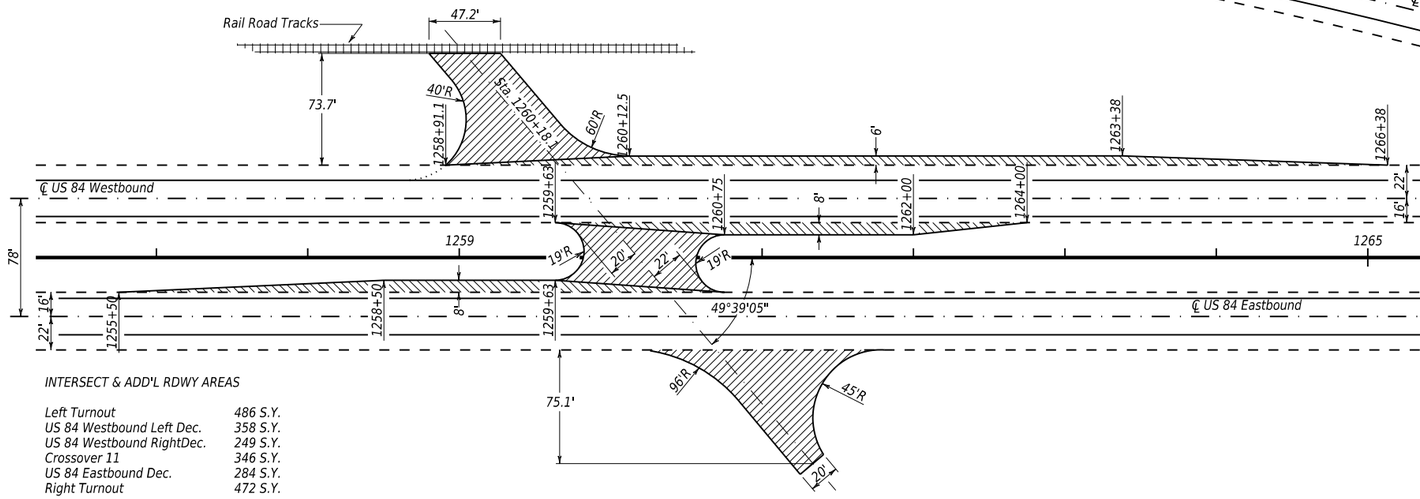

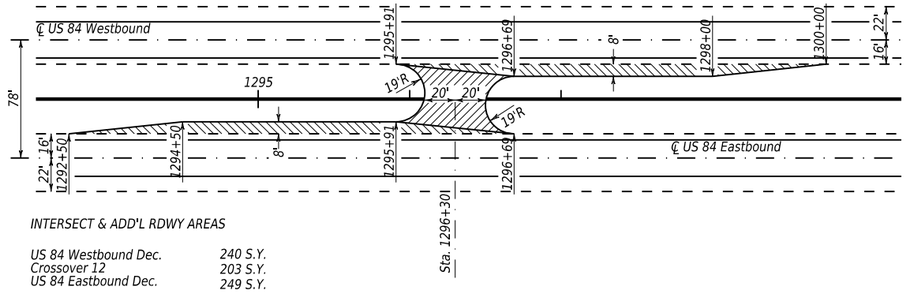

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

INTERSECTION/DRIVEWAY DETAILS (LAMB COUNTY) NO SCALE

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		79

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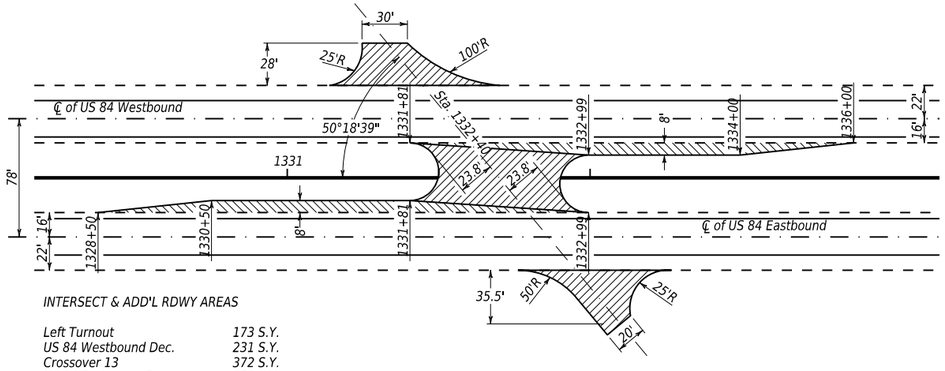
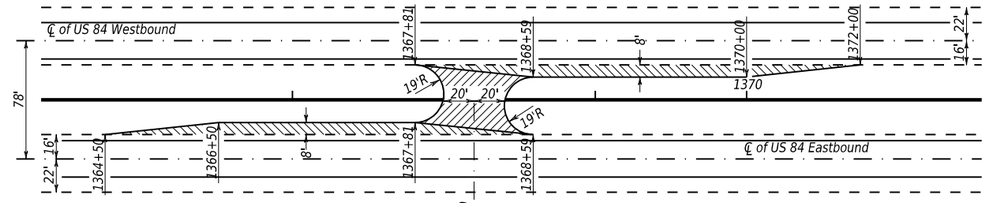


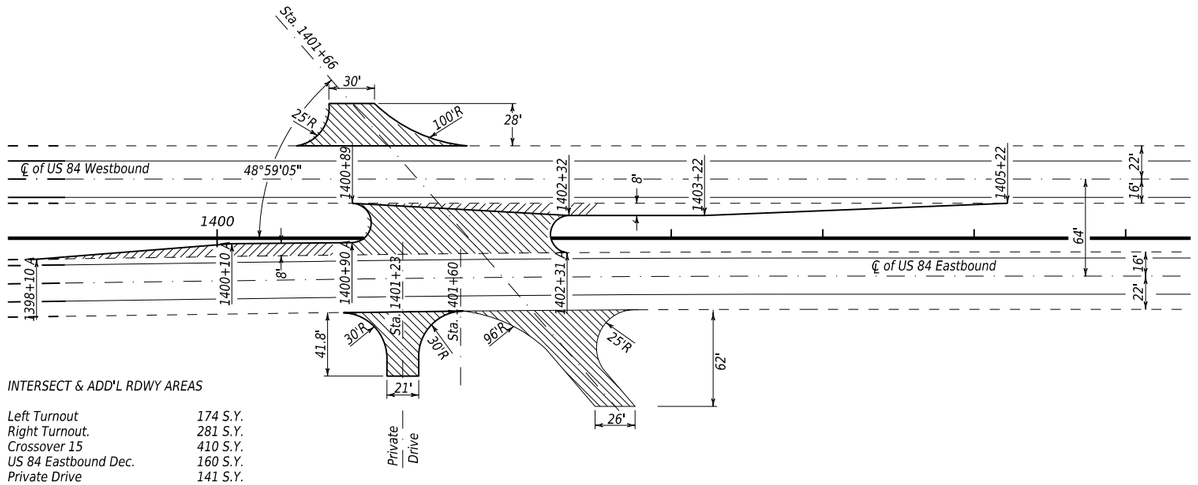
INTERSECT & ADD'L RDWY AREAS

Left Turnout	173 S.Y.
US 84 Westbound Dec.	231 S.Y.
Crossover 13	372 S.Y.
US 84 Eastbound Dec.	258 S.Y.
Right Turnout	168 S.Y.



INTERSECT & ADD'L RDWY AREAS

US 84 Westbound Dec.	249 S.Y.
Crossover 14	203 S.Y.
US 84 Eastbound Dec.	240 S.Y.



INTERSECT & ADD'L RDWY AREAS

Left Turnout	174 S.Y.
Right Turnout.	281 S.Y.
Crossover 15	410 S.Y.
US 84 Eastbound Dec.	160 S.Y.
Private Drive	141 S.Y.

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

INTERSECTION/DRIVEWAY DETAILS (LAMB COUNTY) NO SCALE

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		80

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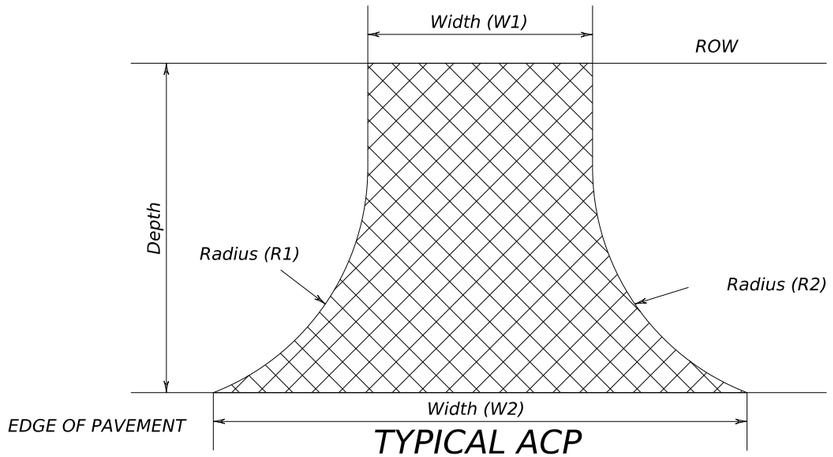
CK DW CK DW

US 84 INTERSECTION/DRIVEWAY AND ADDITIONAL ROADWAY SUMMARY (LUBBOCK)													
	*RR DOT NO.		INTERSECTION/DRIVEWAY WITH RADIUS OR ADDITIONAL ROADWAY							INTERSECTION/DRIVEWAY	REINF. FABRIC	REINF. FABRIC ASPHALT BINDER	TOM-C
			W1	W2	D	R1	R2						
NO		STA	FT	FT	FT	FT	FT	RT/LT	DESCRIPTION				115 LBS/SY
										AREA	AREA	0.15 GAL/SY	1"
										SY	SY	GAL	TON
1		531+99	25	115	73	30	75	LT	CO. RD. 1500	332	332	49.80	19.09
2		531+99	25	102	79	30	60	RT	CO. RD. 1500	339	339	50.85	19.49
3		606+00	51	181	71	100	60	RT	FM 1294	626	626	93.90	36.00
4		606+00	70	152	26	50	50	LT	FM 1294	277	277	41.55	15.93
5		626+00	20	100	27	50	65	RT	DRIVEWAY (PRIVATE)	124	124	18.60	7.13
6		631+37	36	127	29	150	55	RT	DRIVEWAY (PRIVATE)	225	225	33.75	12.94
7		701+14	30	109	36	25	75	LT	NORTH CO. RD. 1300	199	199	29.85	11.44
8	014908L	701+14	80	145	27	45	100	RT	NORTH FM 179	318	318	47.70	18.29
9		746+00	35	111	23	75	25	LT	CO. RD. 5700	146	146	21.90	8.40
10	014907E	777+28	25	75	28	25	40	RT	CO. RD. 1200	120	120	18.00	6.90
11	014903C	912+67	45	104	33	25	45	LT	NORTH FM 2378	213	213	31.95	12.25
12		912+76	25	60	26	15	45	RT	NORTH CO. RD. 1000	95	95	14.25	5.46
US 84 CSJ: 0052-07-068 TOTAL											3014	452.10	173.32

*PROPOSED WORK MAY ENCROACH UPON RAILROAD R.O.W.



TYPICAL ACP
INTERSECTION/DRIVEWAY
CONSTRUCTION DETAIL
(NO SCALE)

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

INTERSECTION/DRIVEWAY
& ADDITIONAL ROADWAY
SUMMARY
(LUBBOCK COUNTY)

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, etc.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		81

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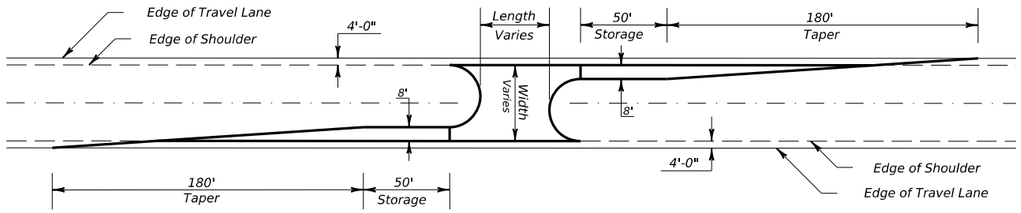
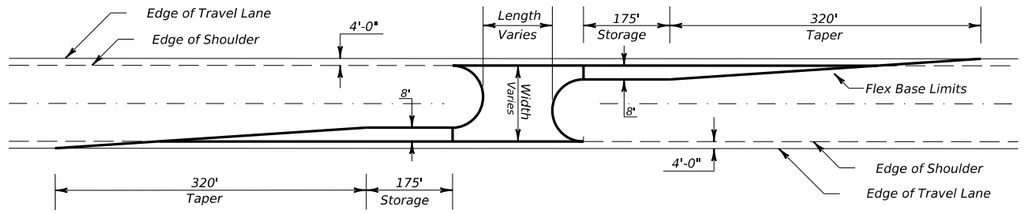
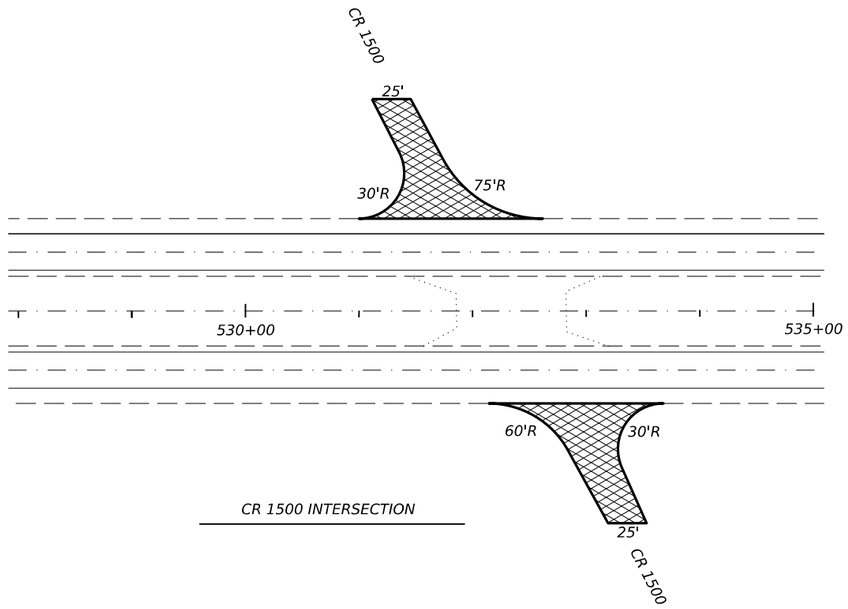


MEDIAN OPENINGS
(County Roads & Private Drives)



MEDIAN OPENINGS
(FM Highways & Roadside Parks)



CR 1500 INTERSECTION

CROSSOVERS ~ See CROSSOVER SUMMARY for Quantities

DECEL LANES ~ See DECEL LANE ITEMS SUMMARY for Quantities

INTERSECTIONS/DRIVEWAYS & ADDITIONAL ROADWAY~ See INTERSECTIONS/DRIVEWAYS & ADDITIONAL ROADWAY SUMMARY for Quantities

STATE OF TEXAS
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126523
LICENSED
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Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

INTERSECTION/DRIVEWAY DETAILS (LUBBOCK COUNTY) NO SCALE

SHEET 1 OF 5

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		82

DATE: 9/30/2024 1:07:12 PM
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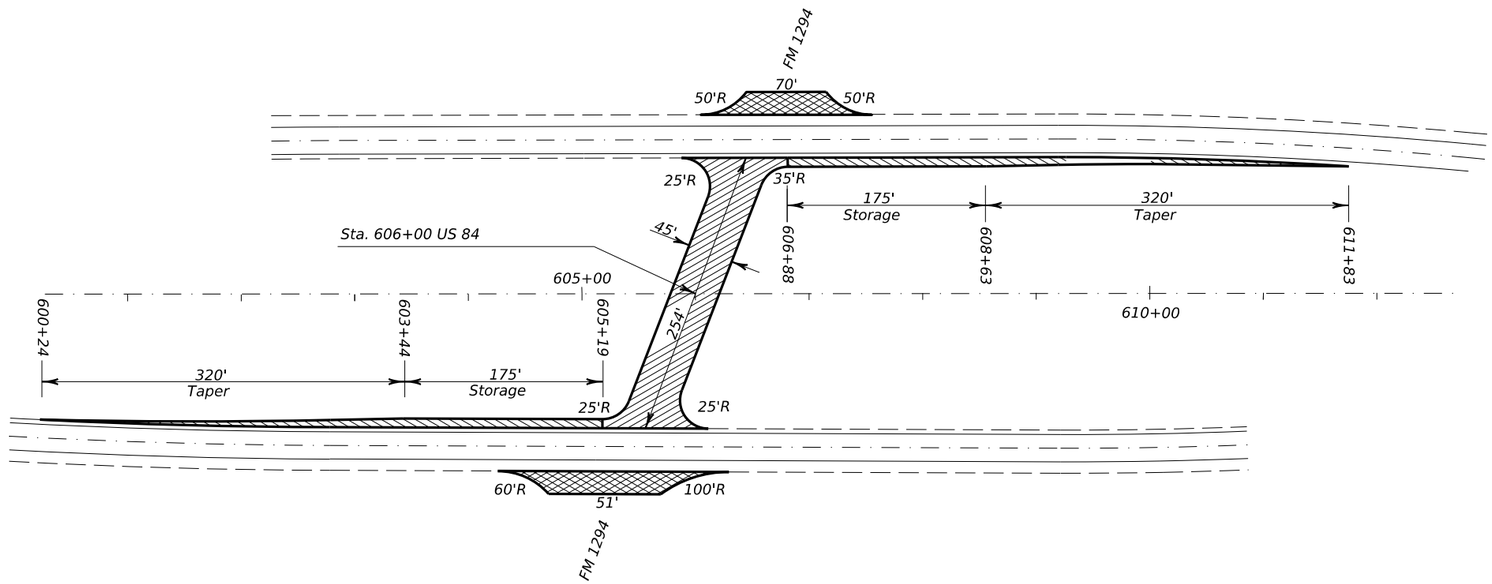
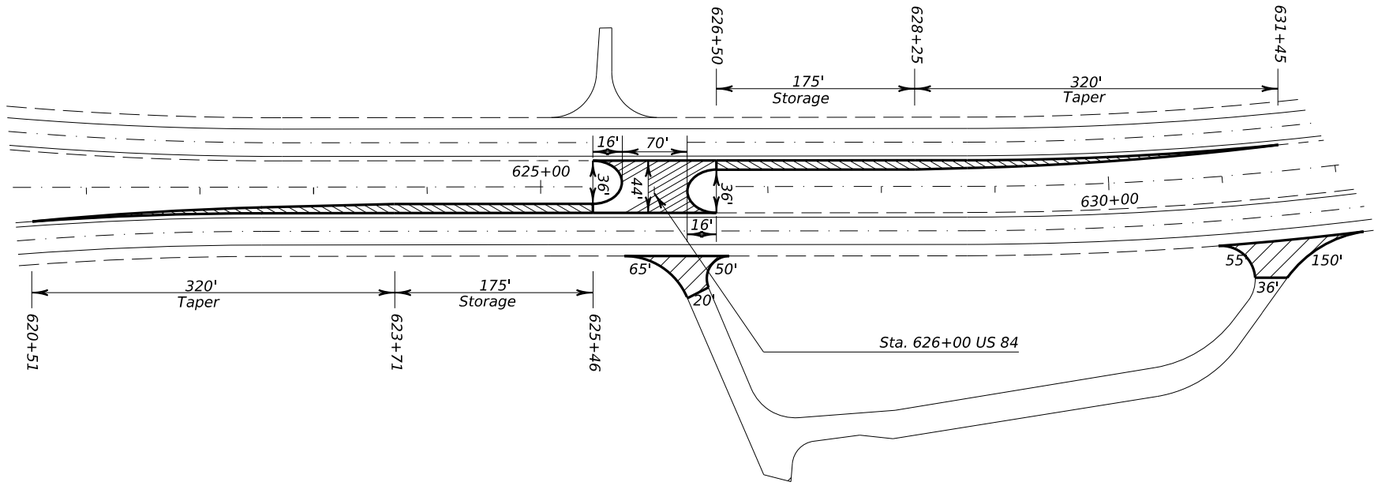


FM 1294 INTERSECTION



CROSSOVERS ~ See CROSSOVER SUMMARY for Quantities

DECEL LANES ~ See DECEL LANE ITEMS SUMMARY for Quantities

INTERSECTIONS/DRIVEWAYS & ADDITIONAL ROADWAY~ See INTERSECTIONS/DRIVEWAYS & ADDITIONAL ROADWAY SUMMARY for Quantities

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

INTERSECTION/DRIVEWAY DETAILS (LUBBOCK COUNTY) NO SCALE

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		83

DATE: 9/30/2024 1:07:13 PM
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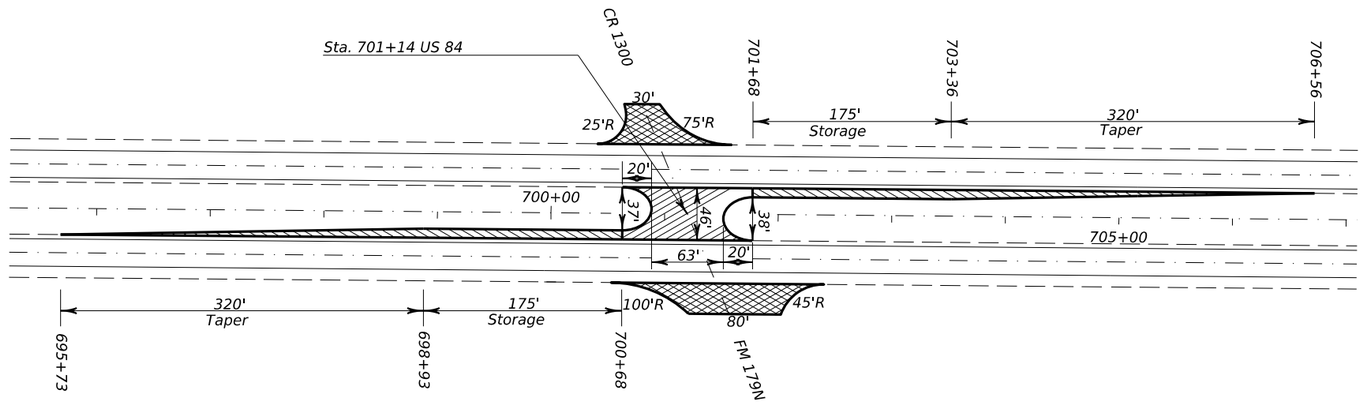
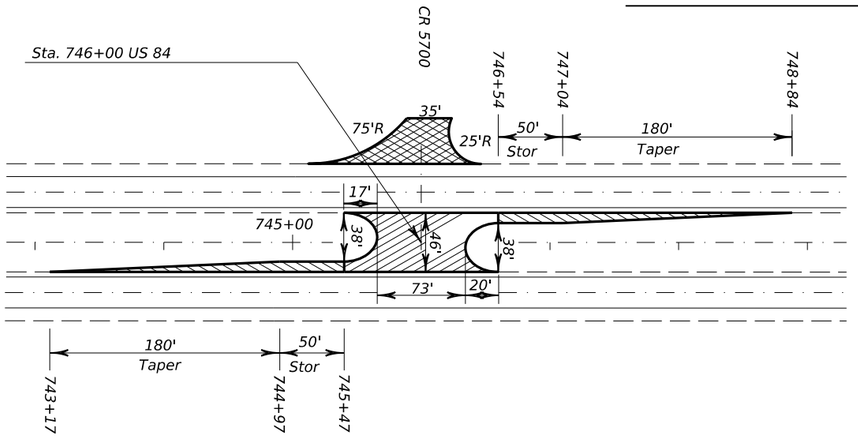
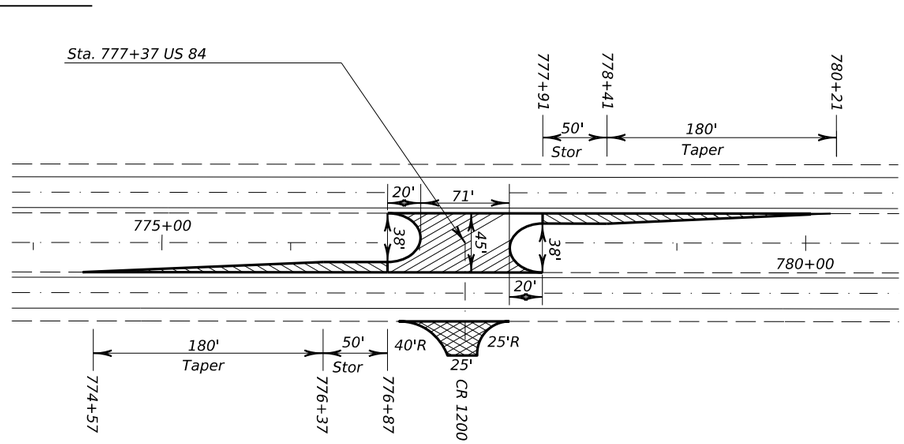


FM 179N INTERSECTION



CR 5700 INTERSECTION



CR 1200 INTERSECTION

CROSSOVERS ~ See CROSSOVER SUMMARY for Quantities

DECEL LANES ~ See DECEL LANE ITEMS SUMMARY for Quantities

INTERSECTIONS/DRIVEWAYS & ADDITIONAL ROADWAY~ See INTERSECTIONS/DRIVEWAYS & ADDITIONAL ROADWAY SUMMARY for Quantities

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

INTERSECTION/DRIVEWAY DETAILS (LUBBOCK COUNTY) NO SCALE

SHEET 3 OF 5

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		84

DATE: 9/30/2024 1:07:13 PM
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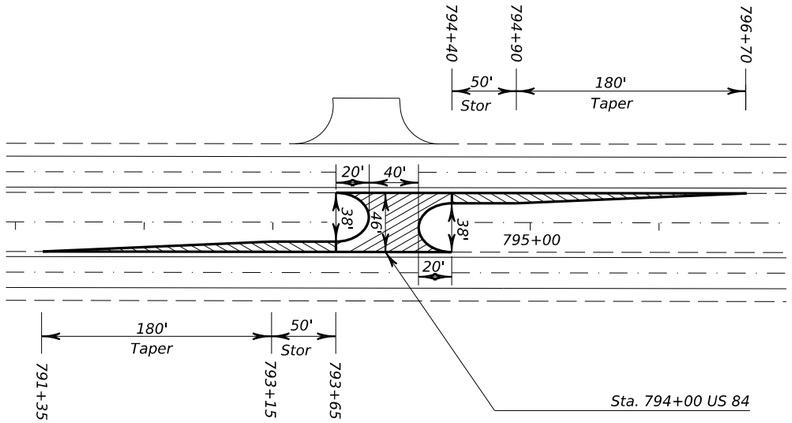

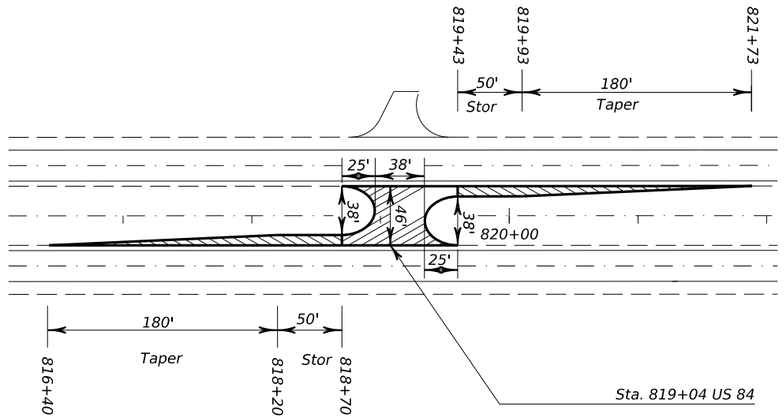

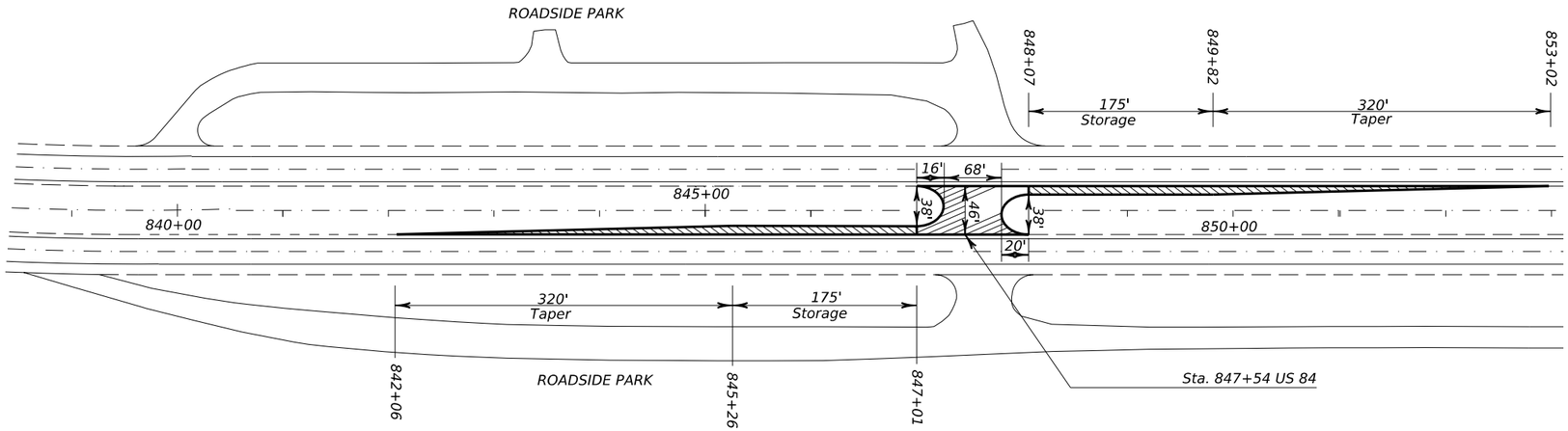

CROSSOVERS ~ See CROSSOVER SUMMARY for Quantities

DECEL LANES ~ See DECEL LANE ITEMS SUMMARY for Quantities

INTERSECTIONS/DRIVEWAYS & ADDITIONAL ROADWAY~ See INTERSECTIONS/DRIVEWAYS & ADDITIONAL ROADWAY SUMMARY for Quantities

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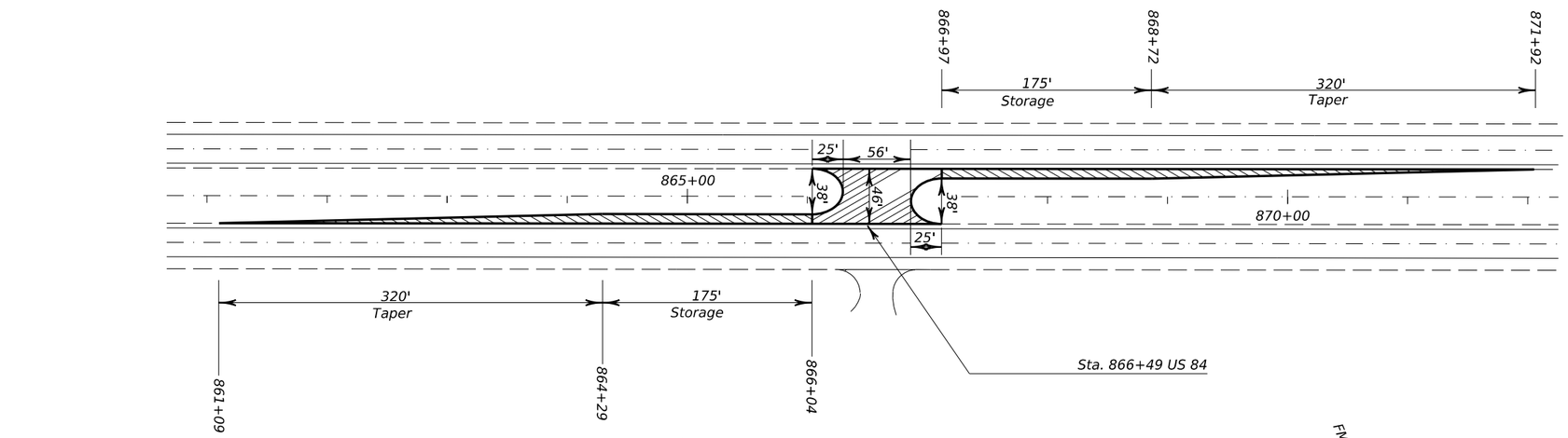
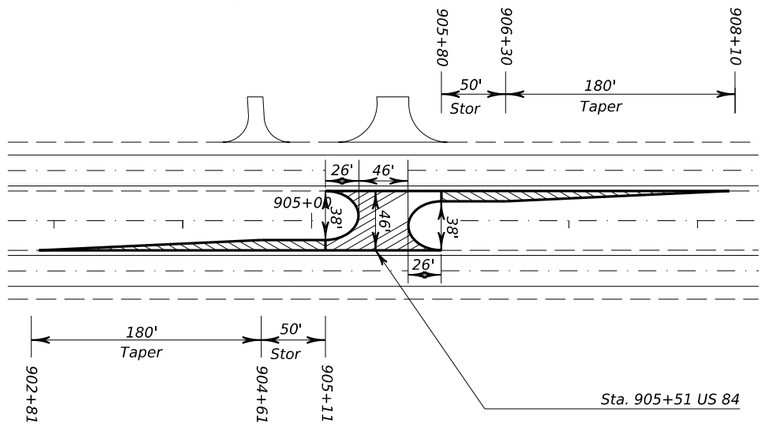
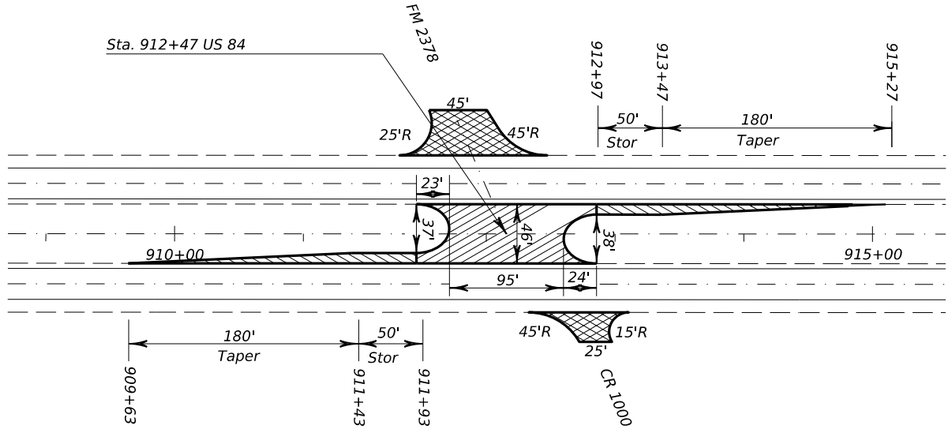
INTERSECTION/DRIVEWAY DETAILS (LUBBOCK COUNTY) NO SCALE

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		85

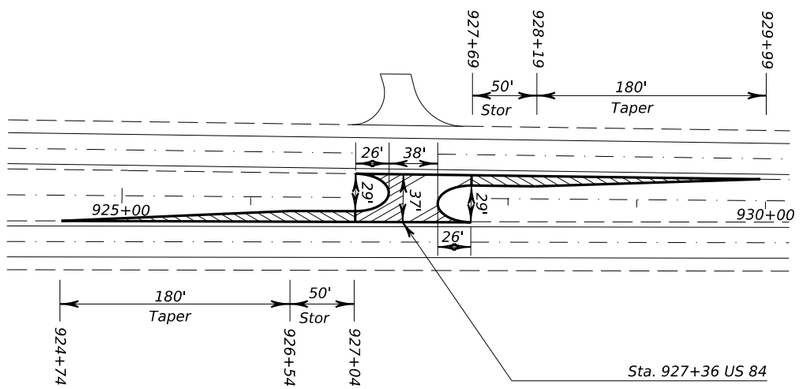
DATE: 9/30/2024 1:07:13 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050464 - Design/Plan Set/3. Roadway/US0084_RDW_INTER.dgn







FM 2378 INTERSECTION



CROSSOVERS ~ See CROSSOVER SUMMARY for Quantities

DECEL LANES ~ See DECEL LANE ITEMS SUMMARY for Quantities

INTERSECTIONS/DRIVEWAYS & ADDITIONAL ROADWAY~ See INTERSECTIONS/DRIVEWAYS & ADDITIONAL ROADWAY SUMMARY for Quantities

STATE OF TEXAS
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Texas Department of Transportation

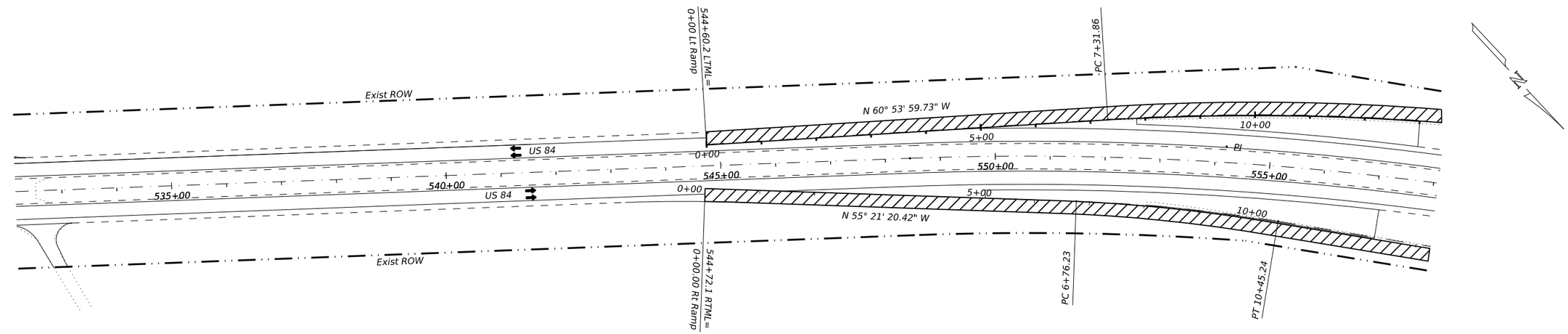
INTERSECTION/DRIVEWAY DETAILS (LUBBOCK COUNTY) NO SCALE

SHEET 5 OF 5

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		86

DATE: 9/30/2024 1:07:13 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050464 - Design/Plan Set/3. Roadway/US0084_RDW_INTER.dgn

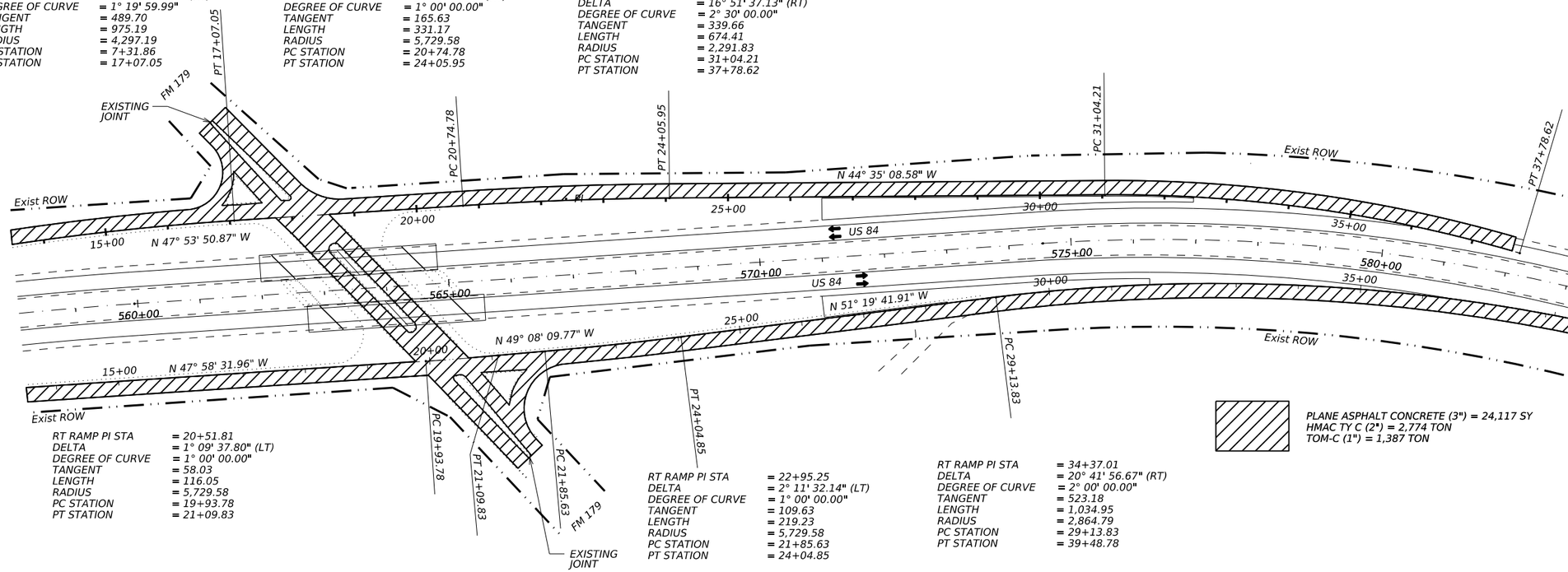
CK DW CK DW



LT RAMP PI STA	= 12+21.56
DELTA	= 13° 00' 08.86" (RT)
DEGREE OF CURVE	= 1° 19' 59.99"
TANGENT	= 489.70
LENGTH	= 975.19
RADIUS	= 4,297.19
PC STATION	= 7+31.86
PT STATION	= 17+07.05

LT RAMP PI STA	= 22+40.41
DELTA	= 3° 18' 42.28" (RT)
DEGREE OF CURVE	= 1° 00' 00.00"
TANGENT	= 165.63
LENGTH	= 331.17
RADIUS	= 5,729.58
PC STATION	= 20+74.78
PT STATION	= 24+05.95

LT RAMP PI STA	= 34+43.87
DELTA	= 16° 51' 37.13" (RT)
DEGREE OF CURVE	= 2° 30' 00.00"
TANGENT	= 339.66
LENGTH	= 674.41
RADIUS	= 2,291.83
PC STATION	= 31+04.21
PT STATION	= 37+78.62



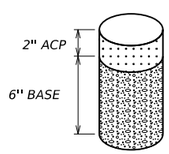
RT RAMP PI STA	= 20+51.81
DELTA	= 1° 09' 37.80" (LT)
DEGREE OF CURVE	= 1° 00' 00.00"
TANGENT	= 58.03
LENGTH	= 116.05
RADIUS	= 5,729.58
PC STATION	= 19+93.78
PT STATION	= 21+09.83

RT RAMP PI STA	= 22+95.25
DELTA	= 2° 11' 32.14" (LT)
DEGREE OF CURVE	= 1° 00' 00.00"
TANGENT	= 109.63
LENGTH	= 219.23
RADIUS	= 5,729.58
PC STATION	= 21+85.63
PT STATION	= 24+04.85

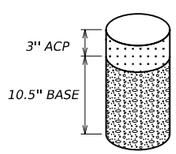
RT RAMP PI STA	= 34+37.01
DELTA	= 20° 41' 56.67" (RT)
DEGREE OF CURVE	= 2° 00' 00.00"
TANGENT	= 523.18
LENGTH	= 1,034.95
RADIUS	= 2,864.79
PC STATION	= 29+13.83
PT STATION	= 39+48.78

PLANE ASPHALT CONCRETE (3") = 24,117 SY
HMAC TY C (2") = 2,774 TON
TOM-C (1") = 1,387 TON

CORE DATA



FM 179 NB/SB DRIVING LANES
CORE STA. 564+00 (US 84)



WB EXIT RAMP
CORE (STA. 18+00)
EB EXIT RAMP
CORE (STA. 20+00)

STATE OF TEXAS
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9/30/2024

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FM 179 INTERSECTION & ADDITIONAL QUANTITIES

PLAN VIEW
(LUBBOCK COUNTY)
SCALE 1"=200'

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		87

DATE: 10/1/2024 9:48:42 AM
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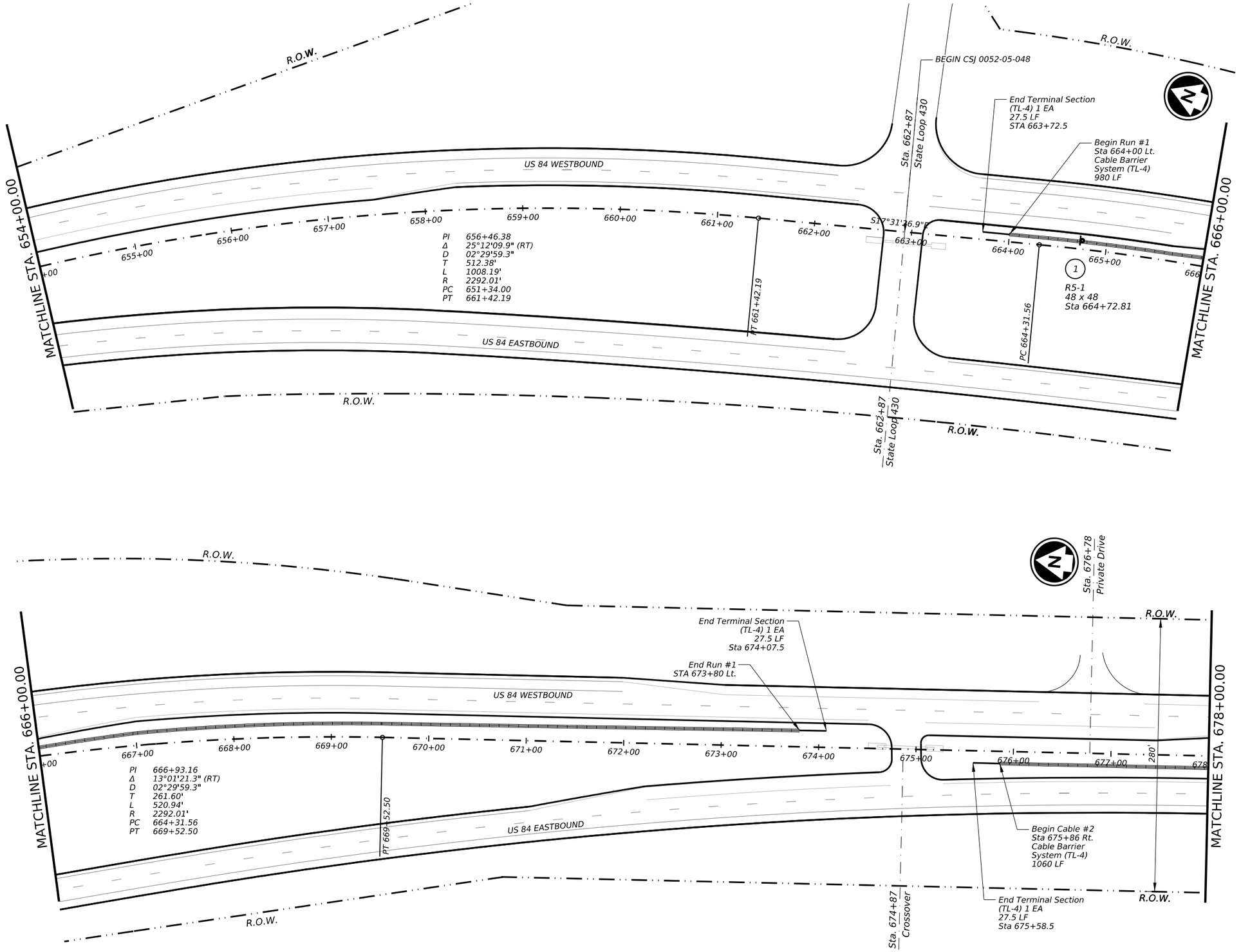

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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9/30/2024

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 1 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		88

DATE: 9/30/2024 1:07:46 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LAMB.dgn

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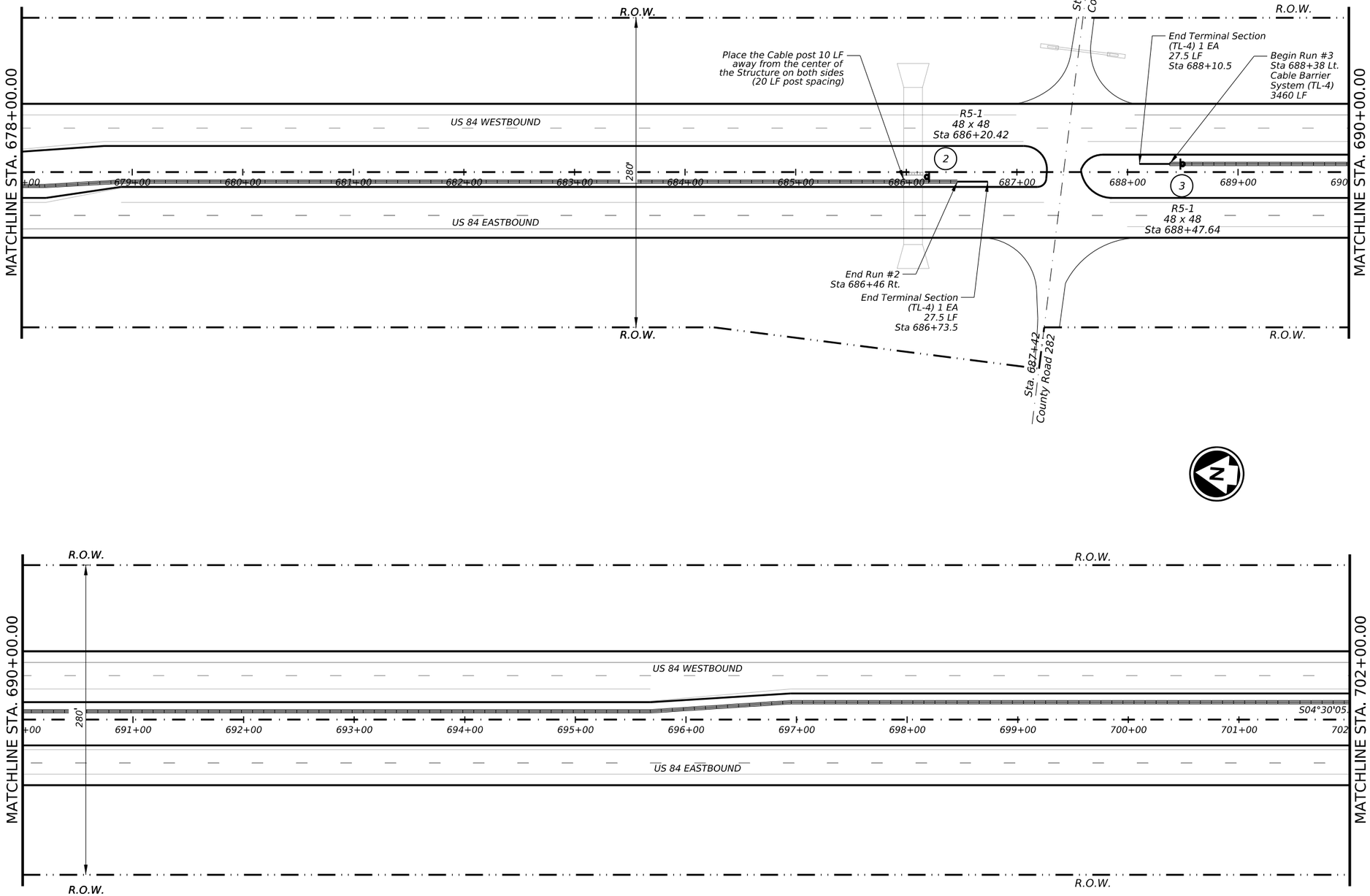

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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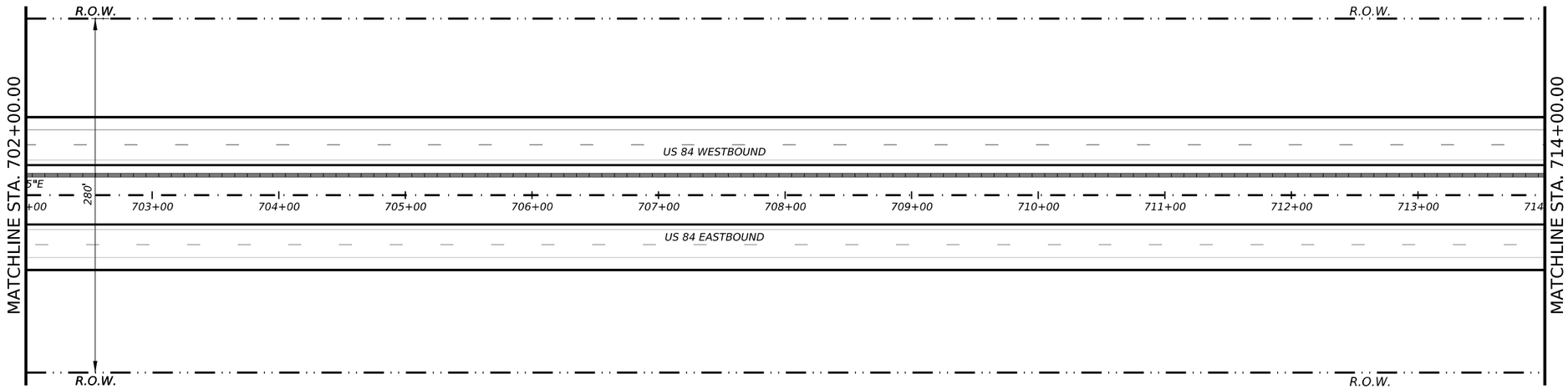
PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

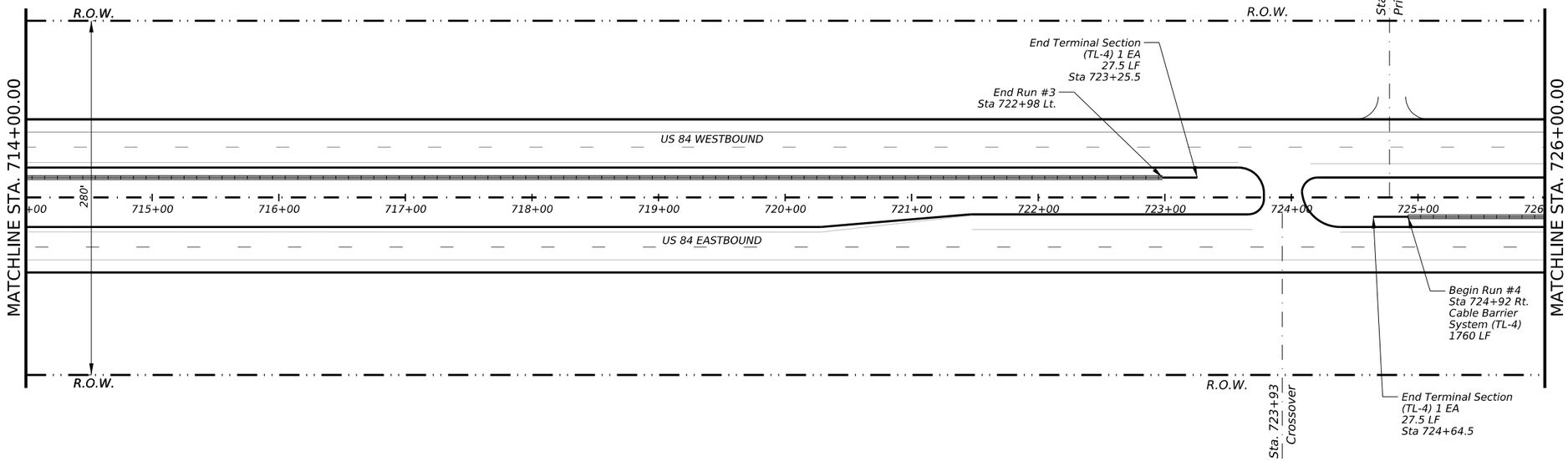
SHEET 2 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		89

DATE: 9/30/2024 1:07:46 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LAMB.dgn

CK
DW
CK
DW





Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

STATE OF TEXAS
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Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 3 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		90

DATE: 9/30/2024 1:07:47 PM
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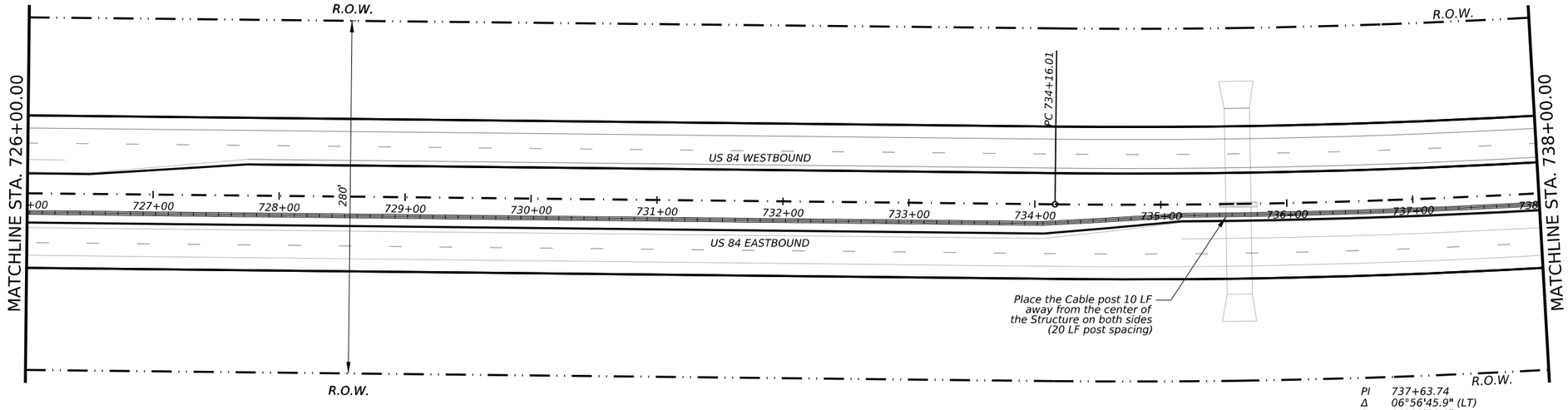
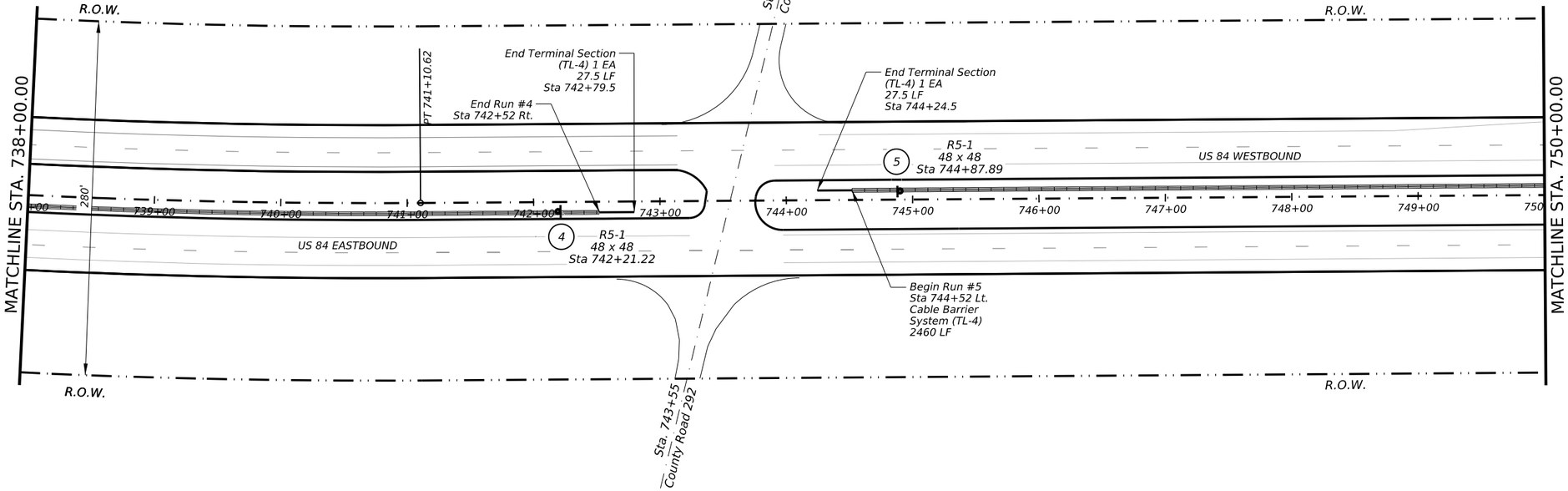


PI 737+63.74
Δ 06°56'45.9" (LT)
D 01°00'00.0"
T 347.73'
L 694.62'
R 5729.64'
PC 734+16.01
PT 741+10.62

Legend	
Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	



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9/30/2024

Texas Department of Transportation

PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 4 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, etc.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		91

DATE: 9/30/2024 1:07:48 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LAMB.dgn

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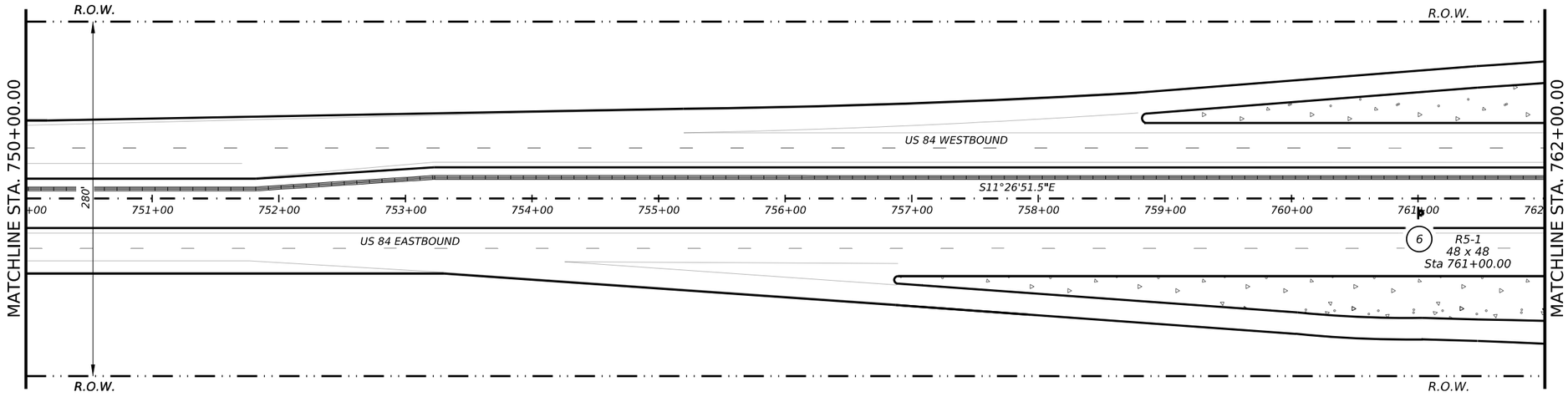

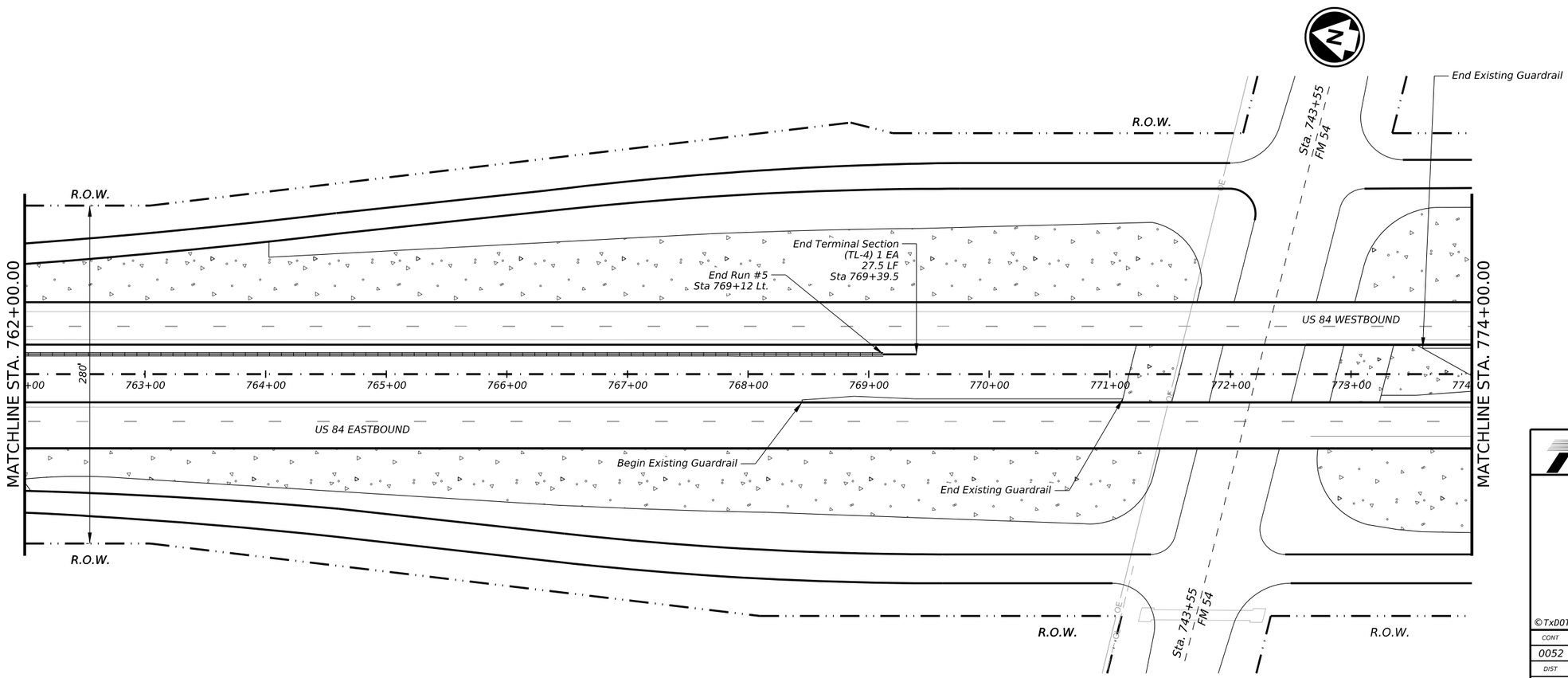

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

STATE OF TEXAS
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9/30/2024

Texas Department of Transportation

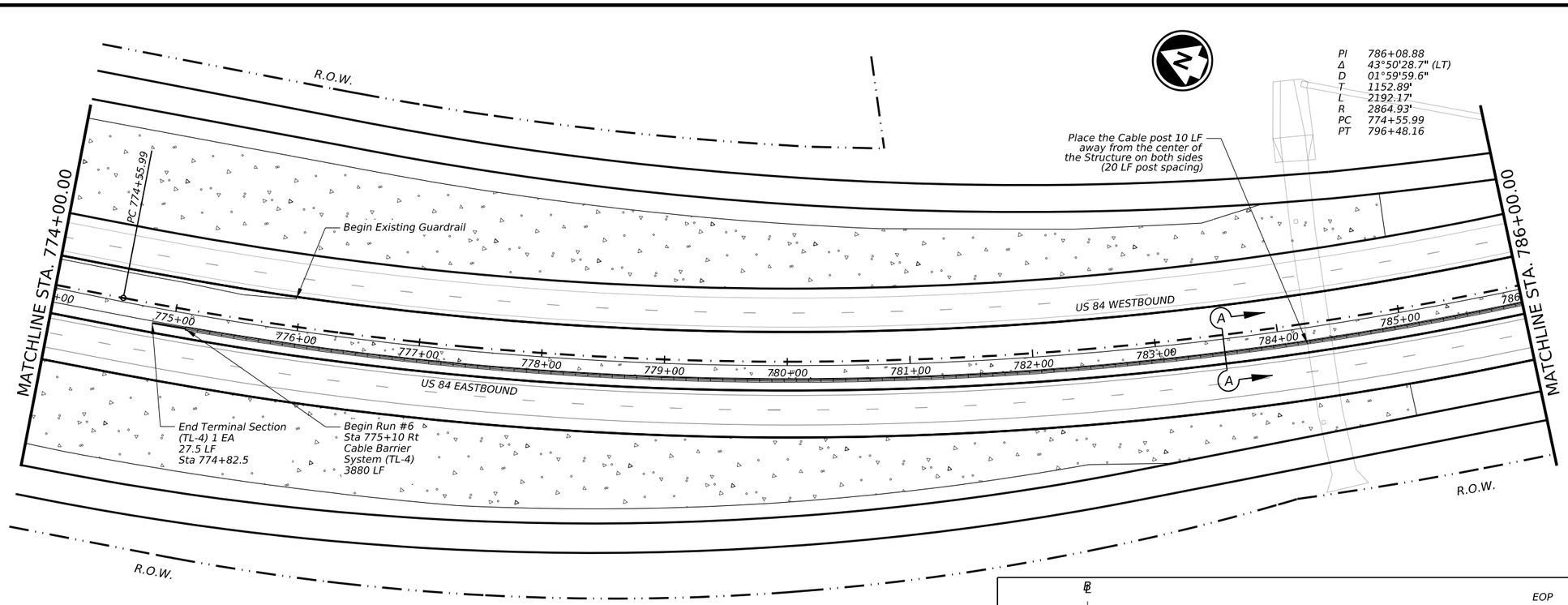
PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

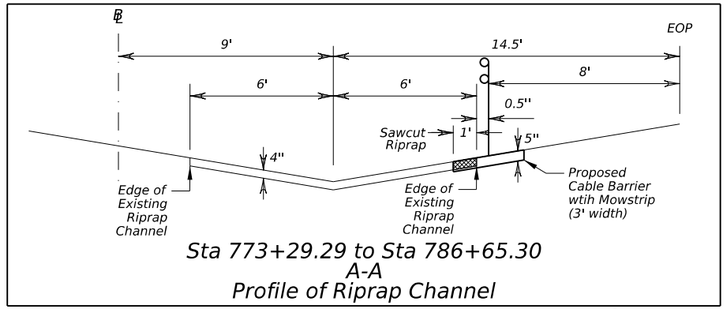
SHEET 5 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		92

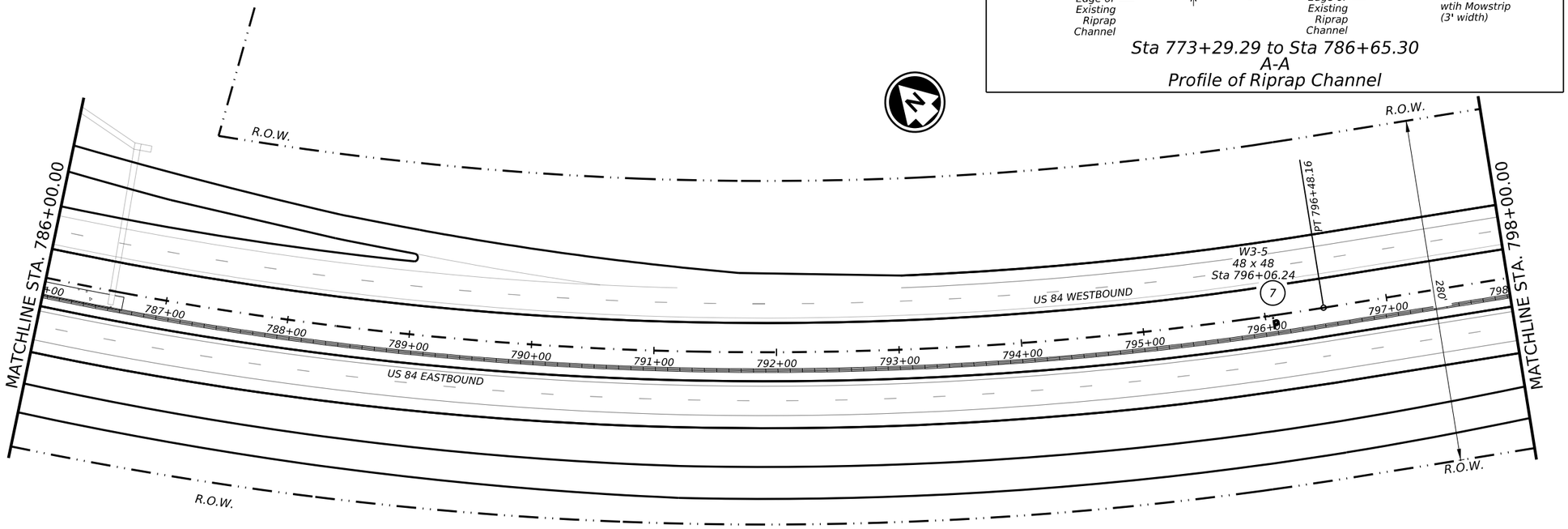
DATE: 9/30/2024 1:07:48 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LAMB.dgn

CK DW CK DW





Sta 773+29.29 to Sta 786+65.30
A-A
Profile of Riprap Channel



Legend	
Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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9/30/2024

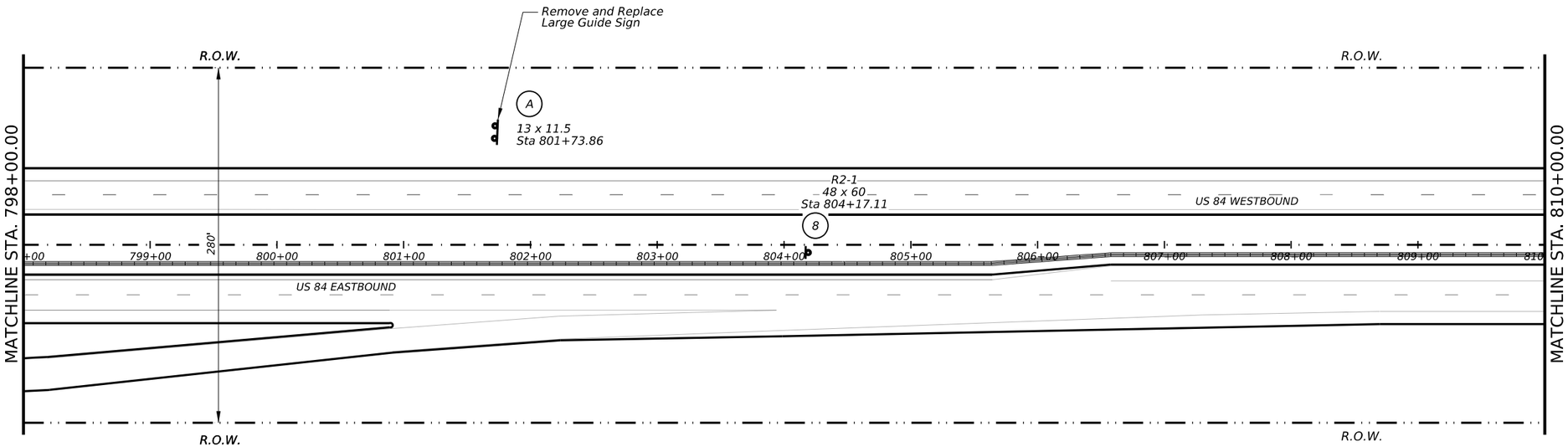
Texas Department of Transportation

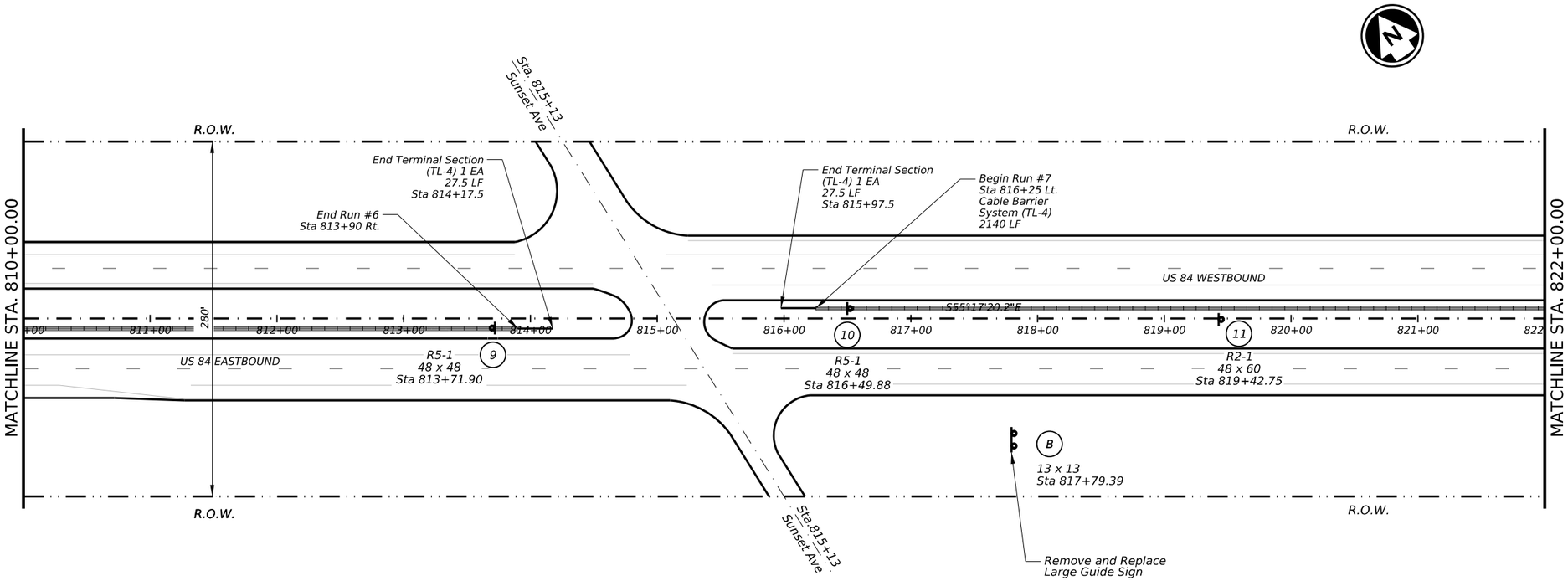
PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 6 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		93

DATE: 9/30/2024 1:07:49 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050464 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LAMB.dgn





Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

STATE OF TEXAS
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Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 7 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		94

DATE: 9/30/2024 1:07:50 PM
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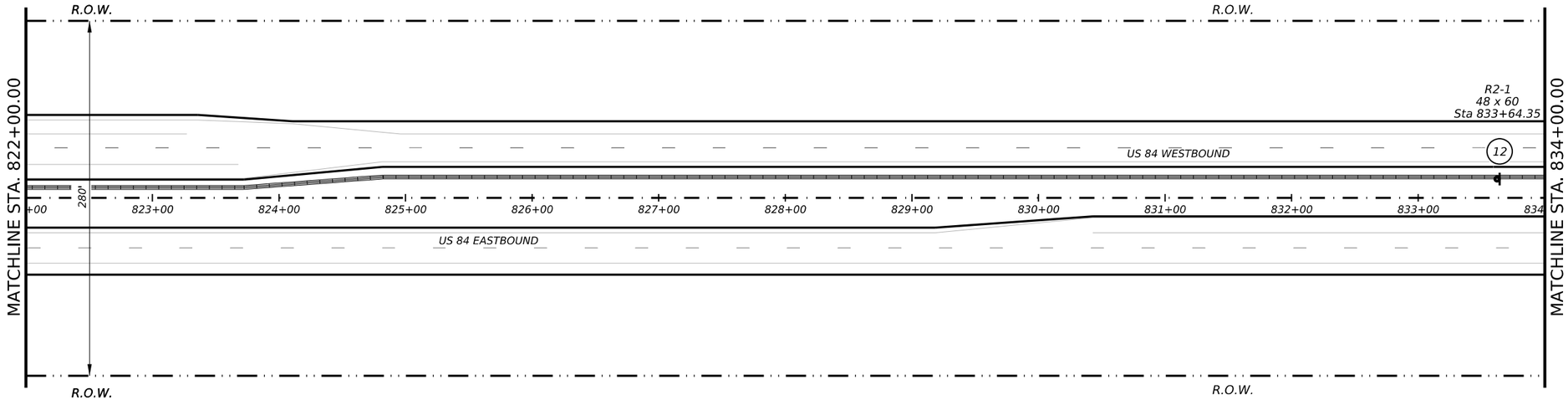

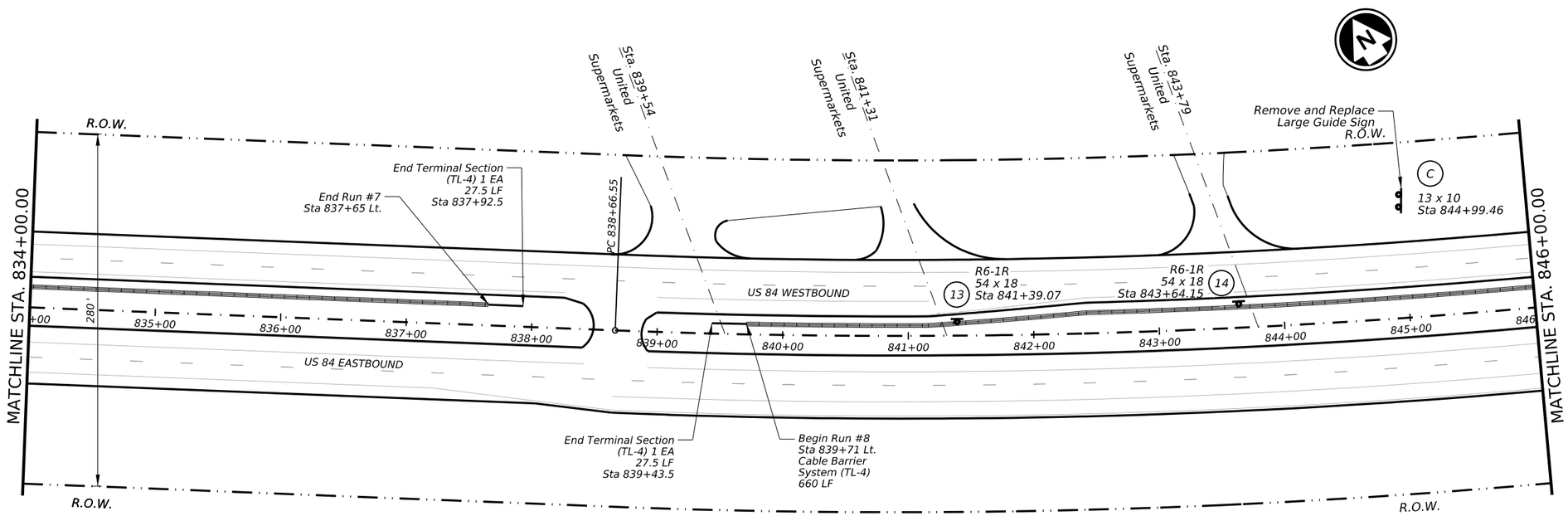

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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9/30/2024

Texas Department of Transportation

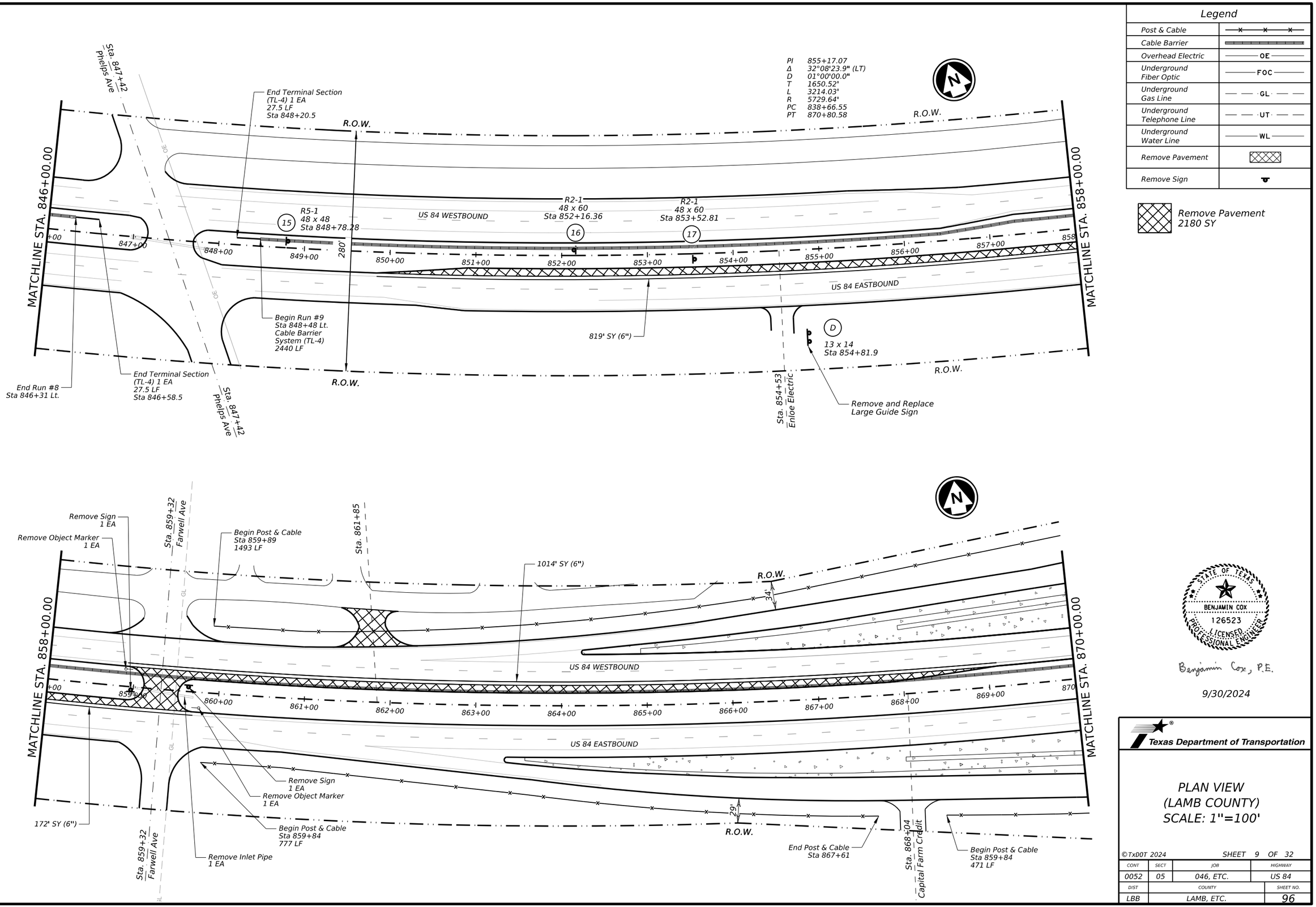
PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 8 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		95

DATE: 9/30/2024 1:07:50 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LAMB.dgn

CK DW CK DW



Legend

Post & Cable	
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

Remove Pavement
2180 SY

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 9 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		96

DATE: 9/30/2024 1:07:51 PM
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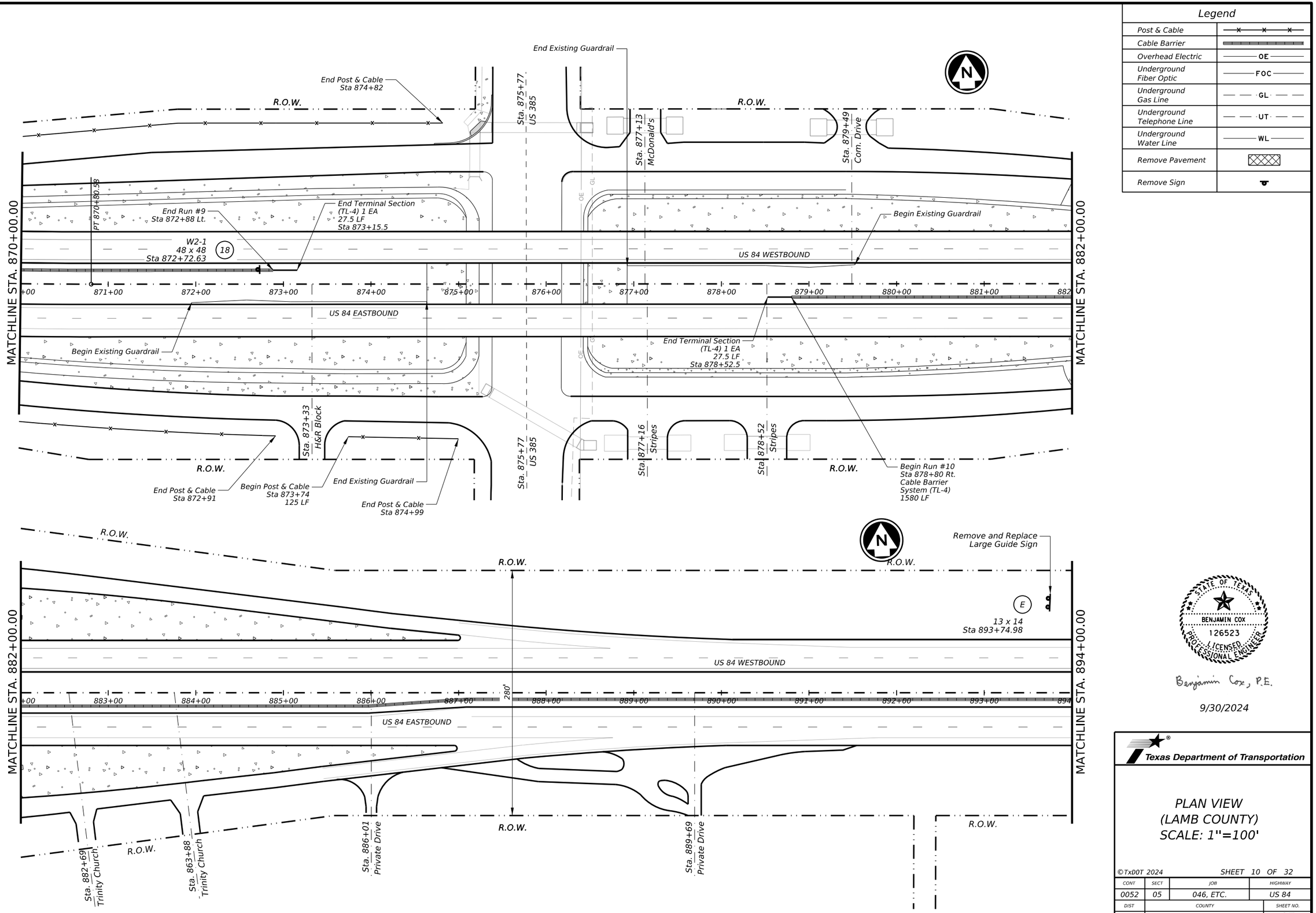

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 10 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		97

DATE: 9/30/2024 1:07:52 PM
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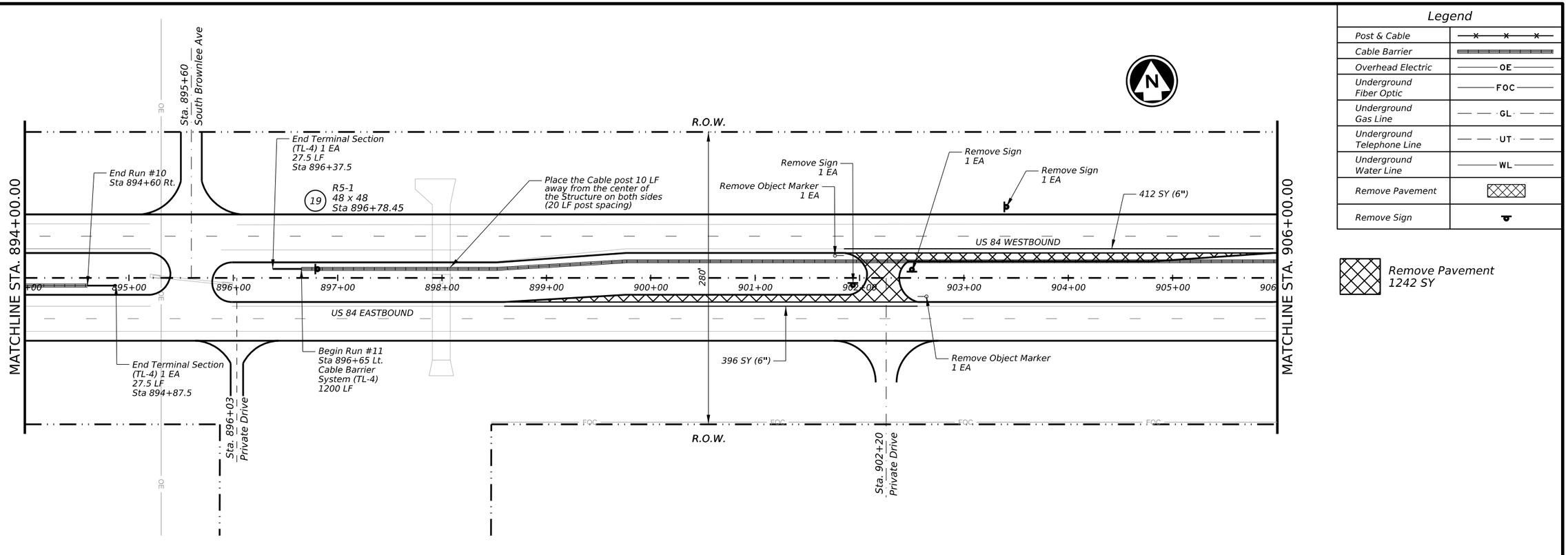

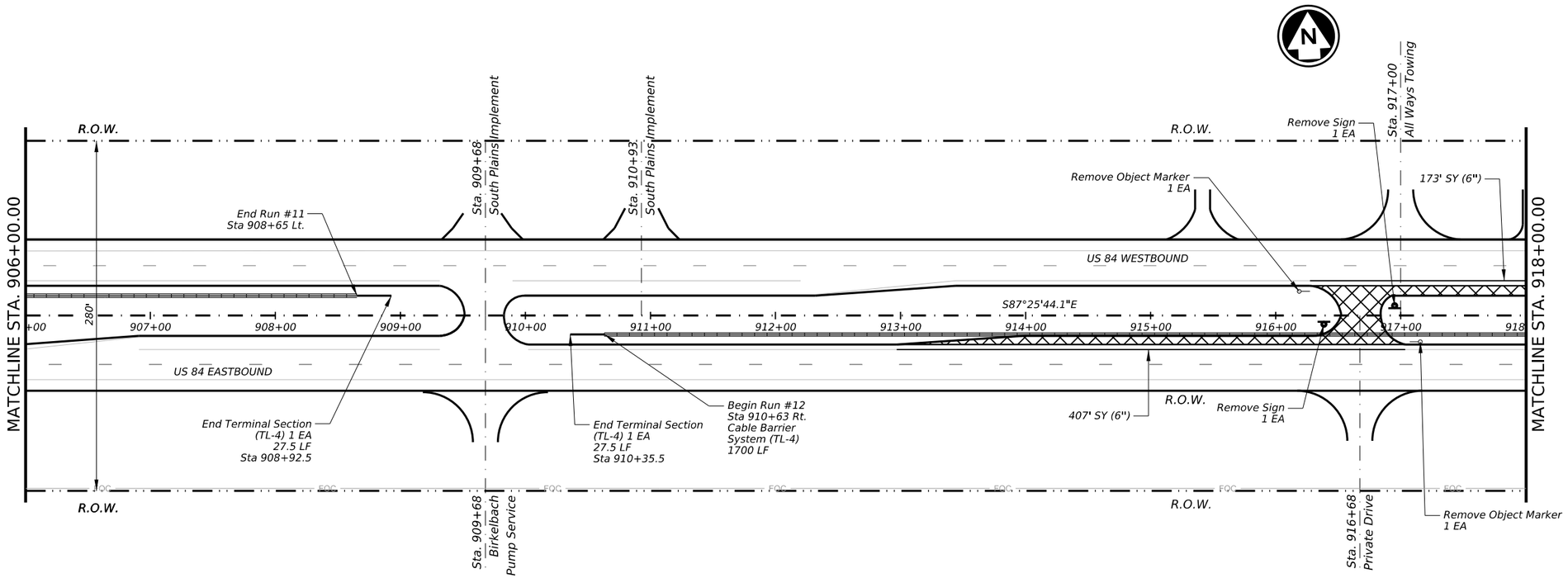

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 11 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		98

DATE: 9/30/2024 1:07:52 PM
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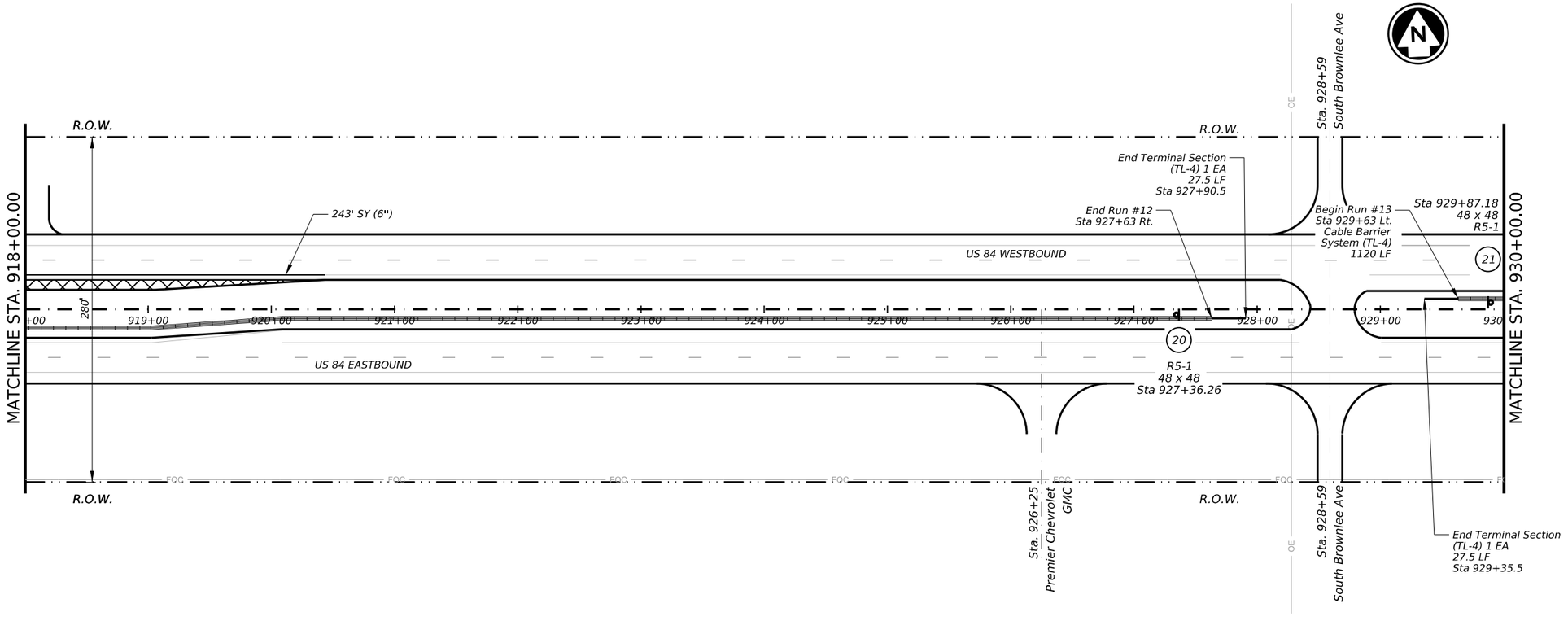

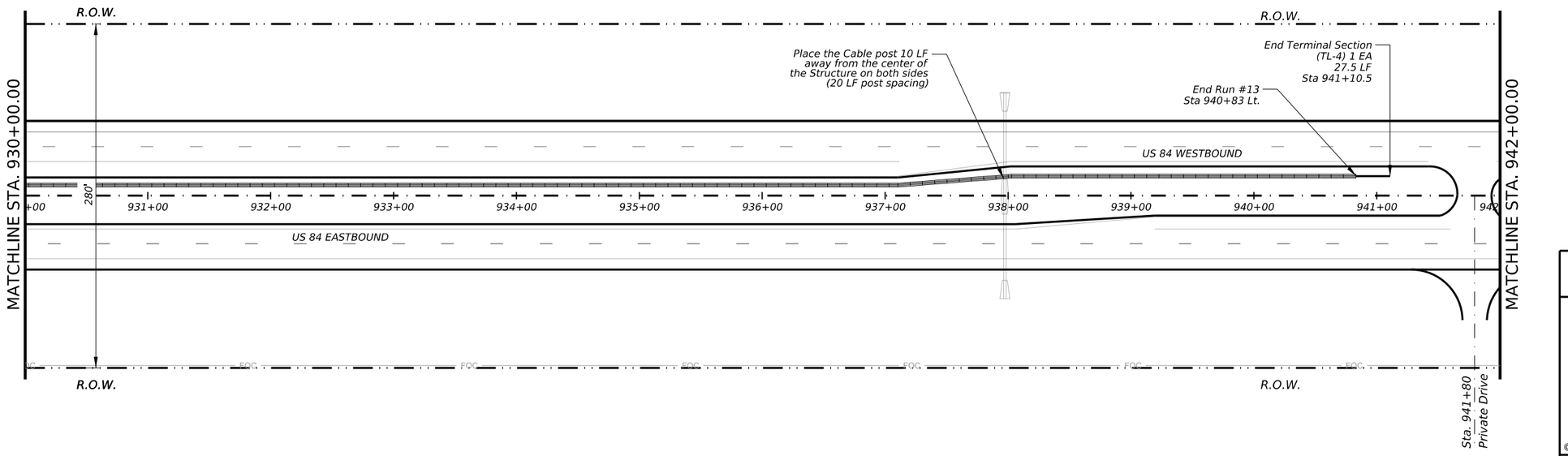

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

Remove Pavement
155 SY

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 12 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		99

DATE: 9/30/2024 1:07:53 PM
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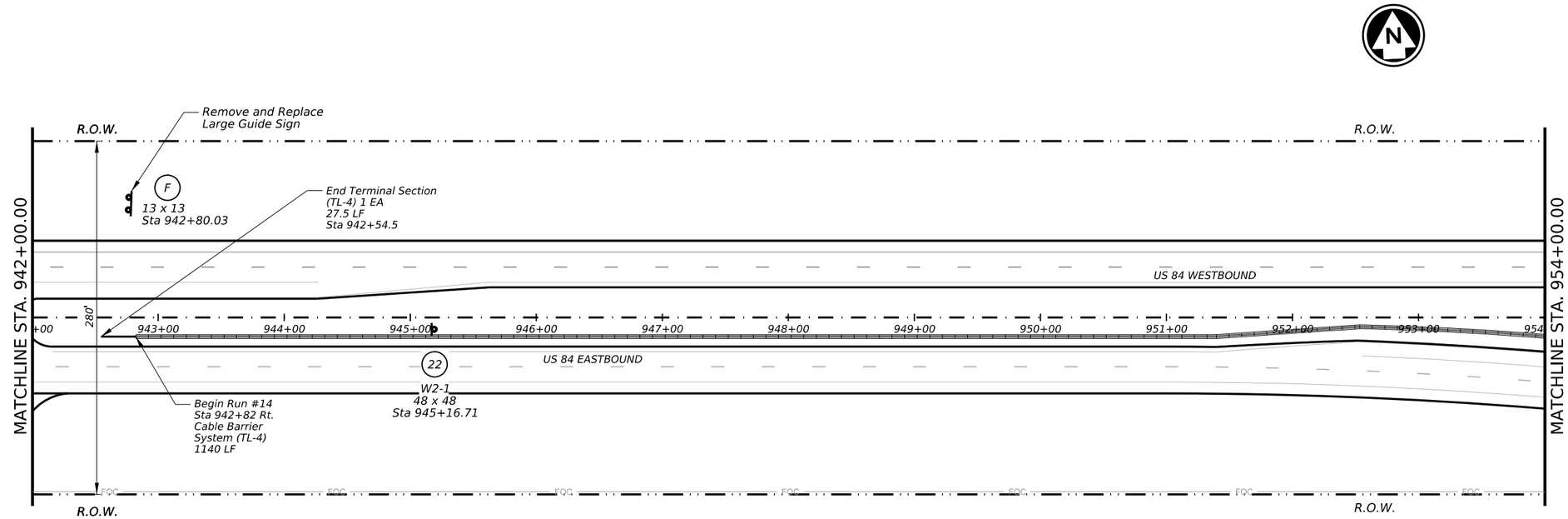

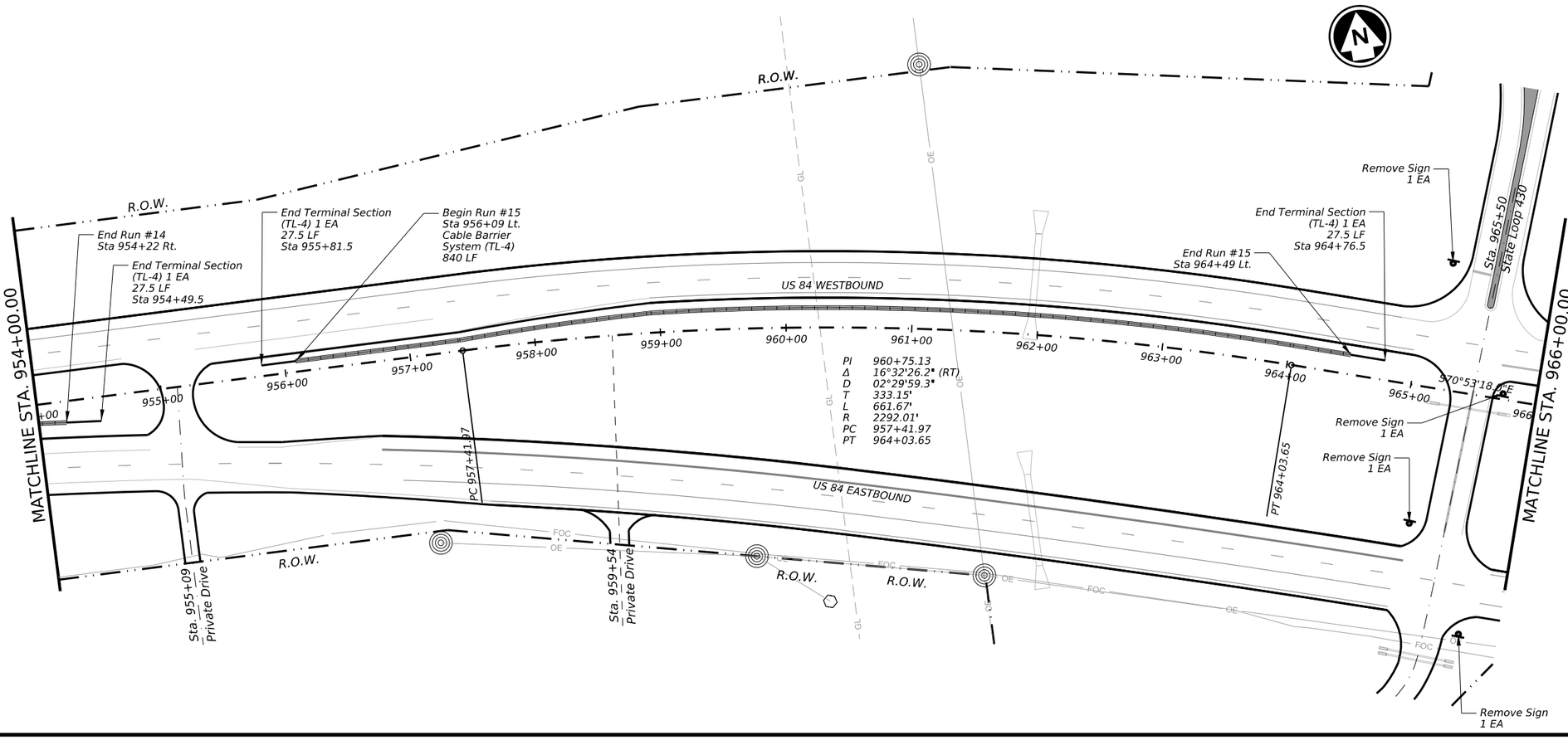

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 13 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		100

DATE: 9/30/2024 1:07:54 PM
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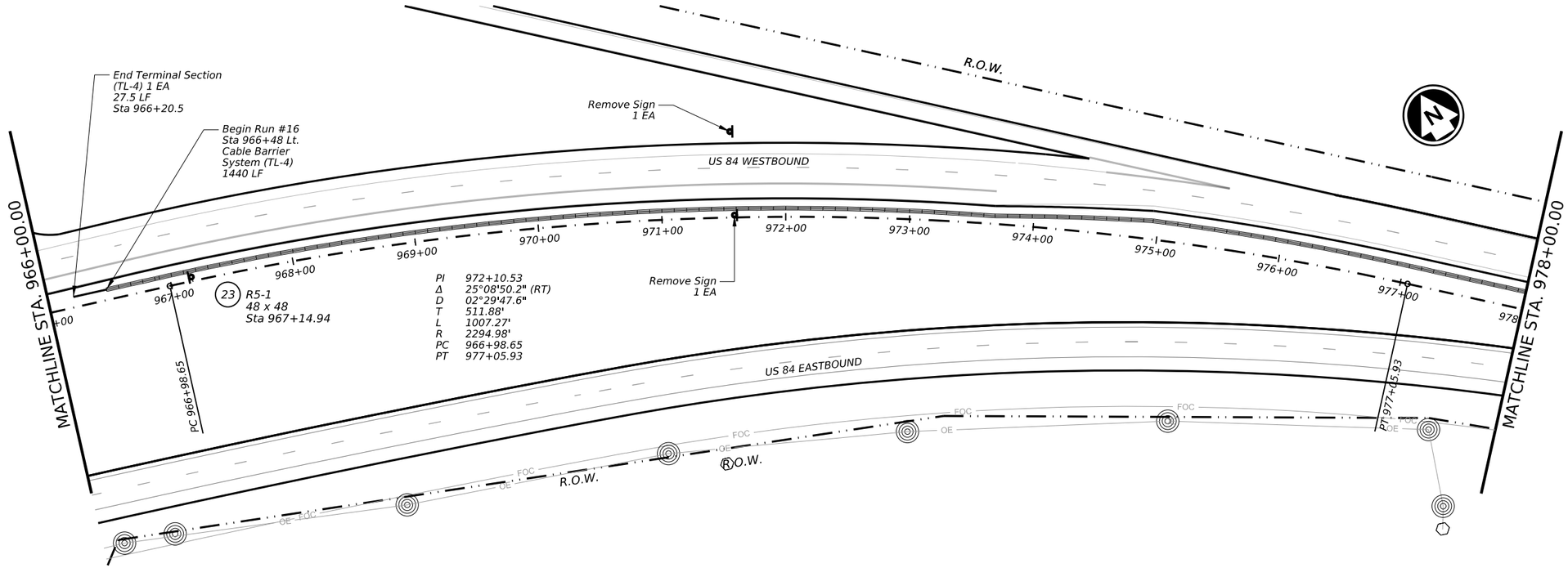

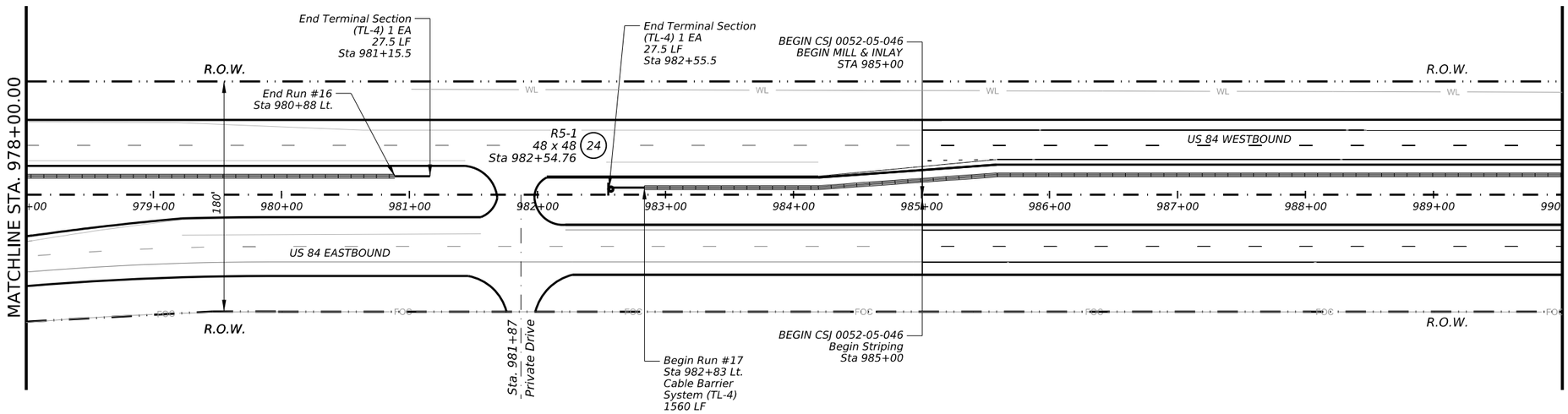

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 14 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		101

DATE: 9/30/2024 1:07:54 PM
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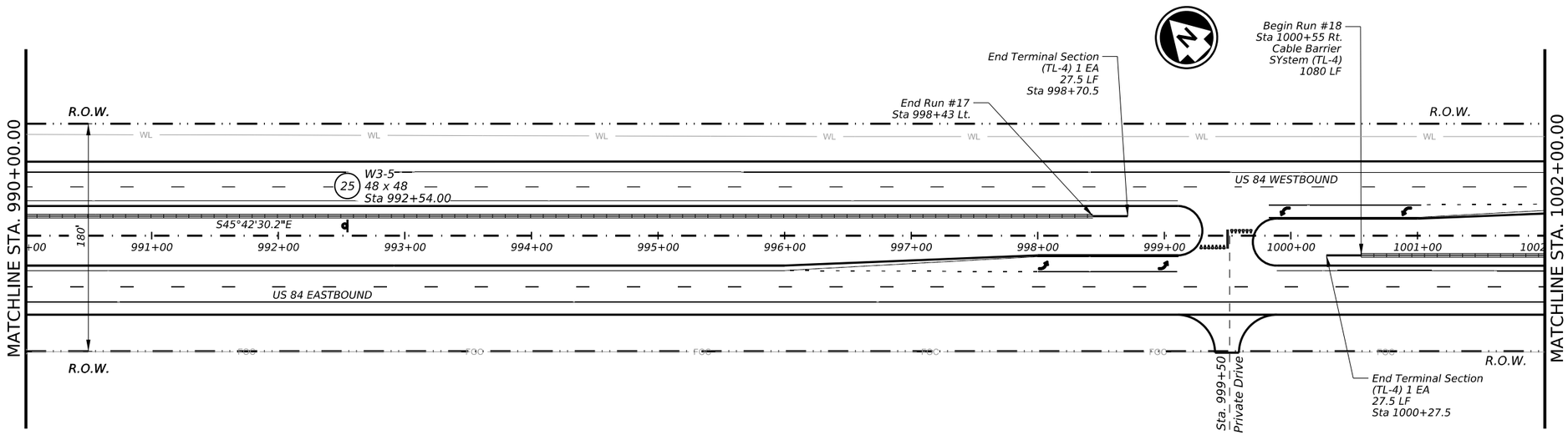

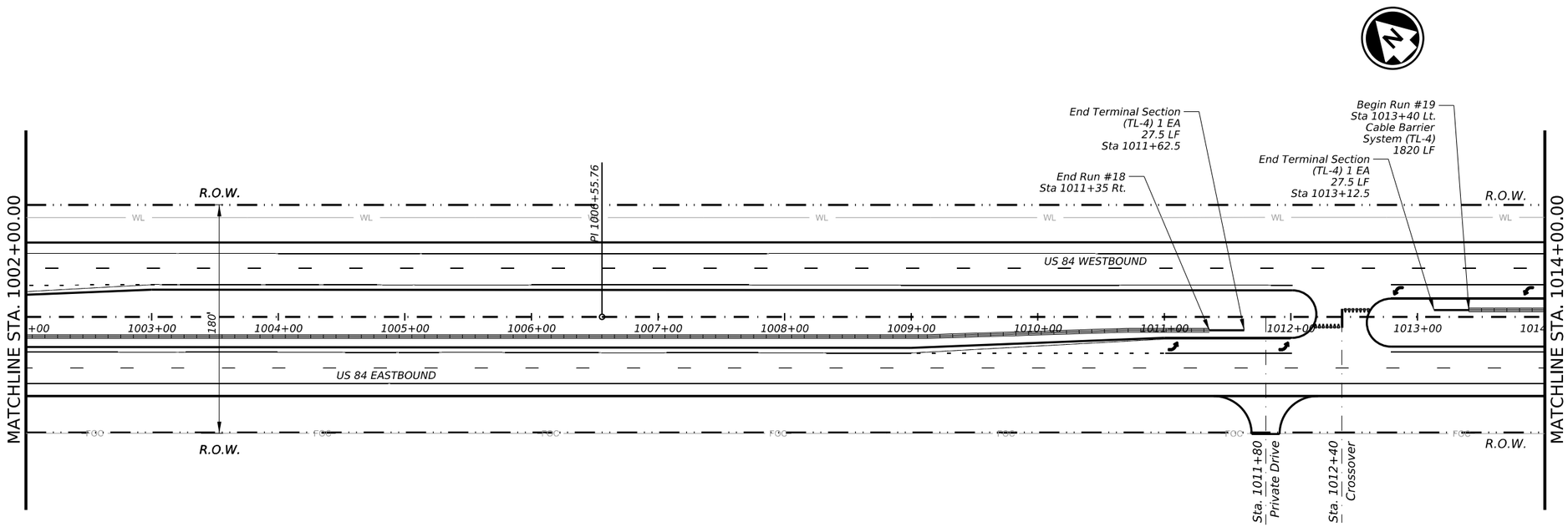

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 15 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		102

DATE: 9/30/2024 1:07:55 PM
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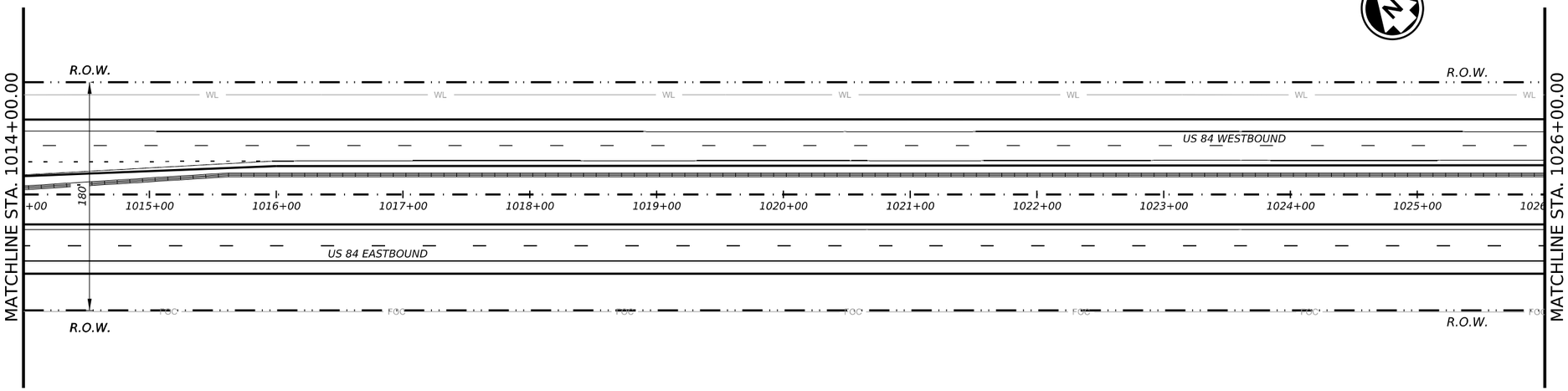

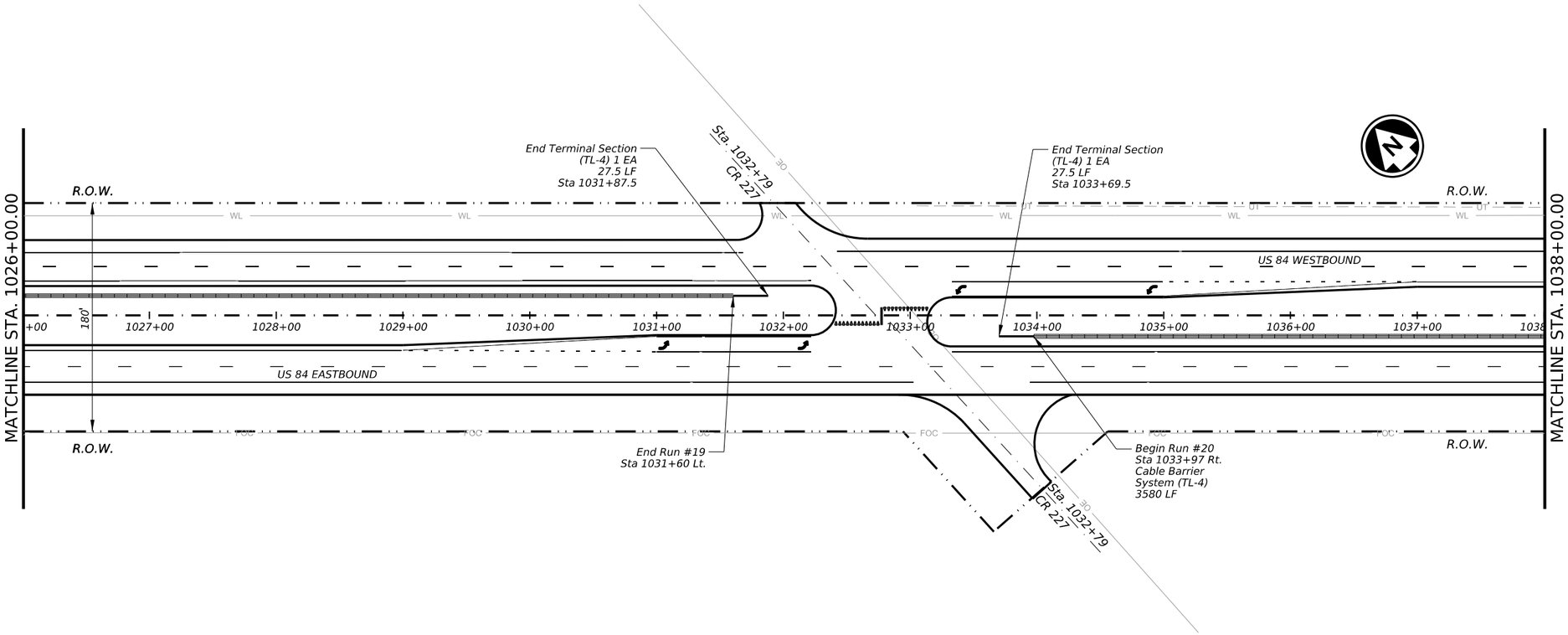

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 16 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		103

DATE: 9/30/2024 1:07:55 PM
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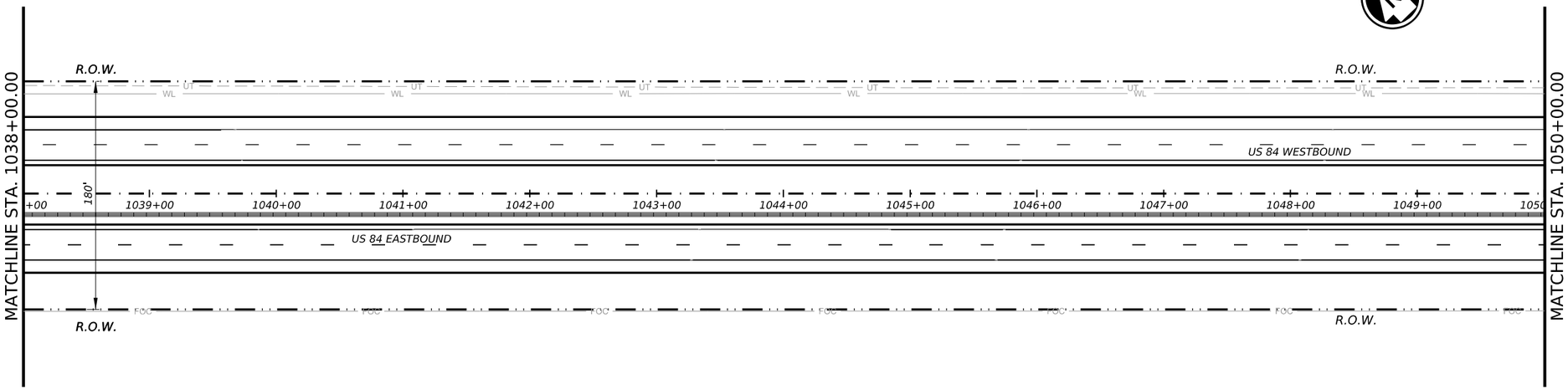

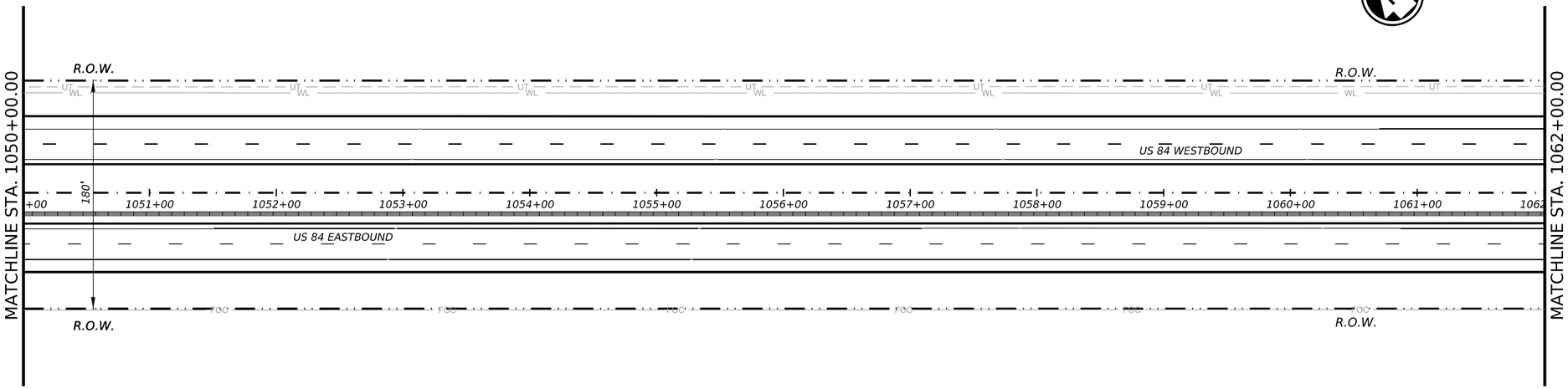

Legend

Post & Cable	
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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Texas Department of Transportation

PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 17 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		104

DATE: 9/30/2024 1:07:56 PM
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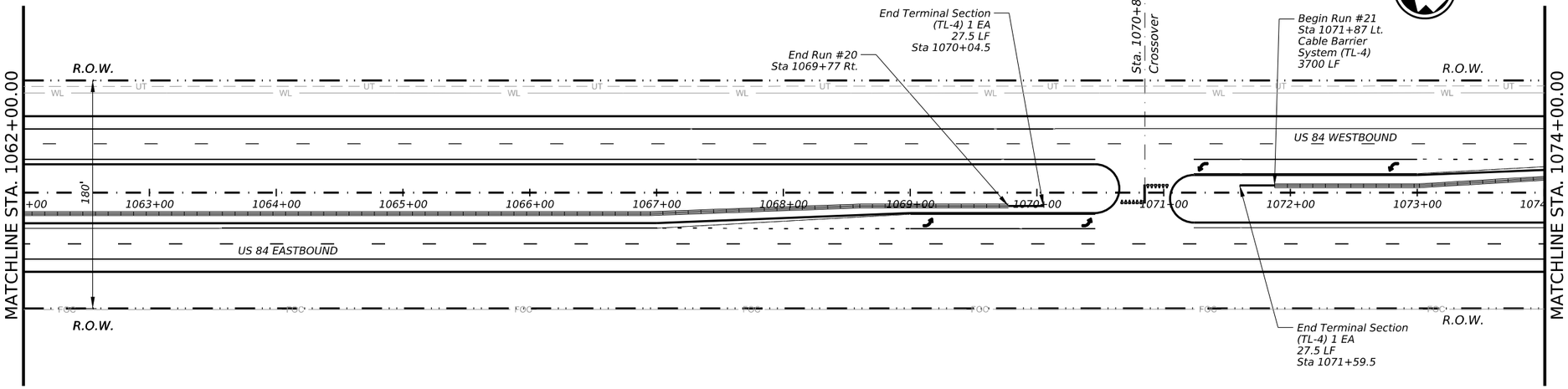

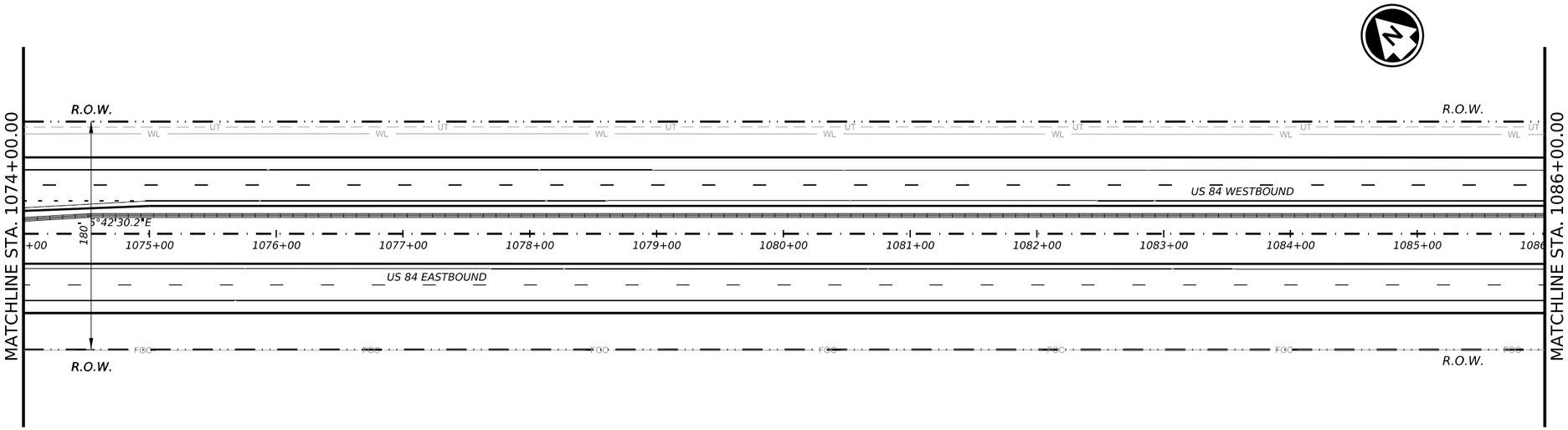

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 18 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		105

DATE: 9/30/2024 1:07:57 PM
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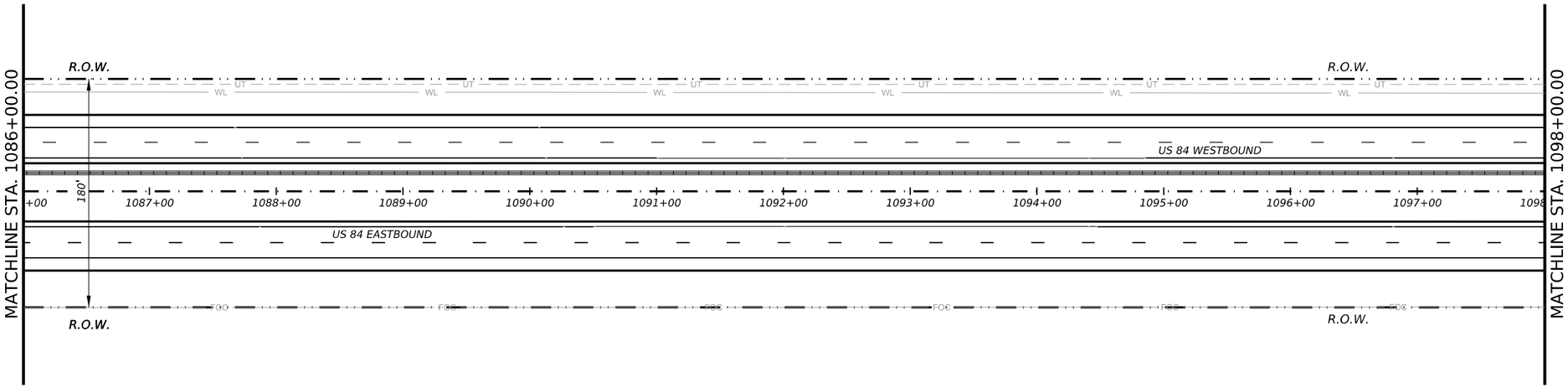

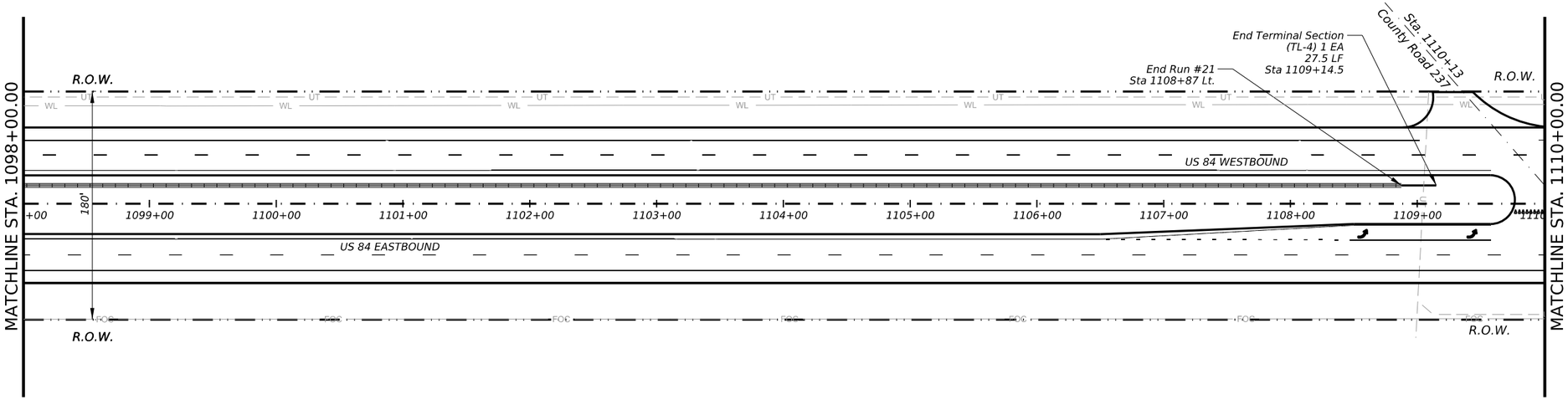

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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9/30/2024

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 19 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		106

DATE: 9/30/2024 1:07:57 PM
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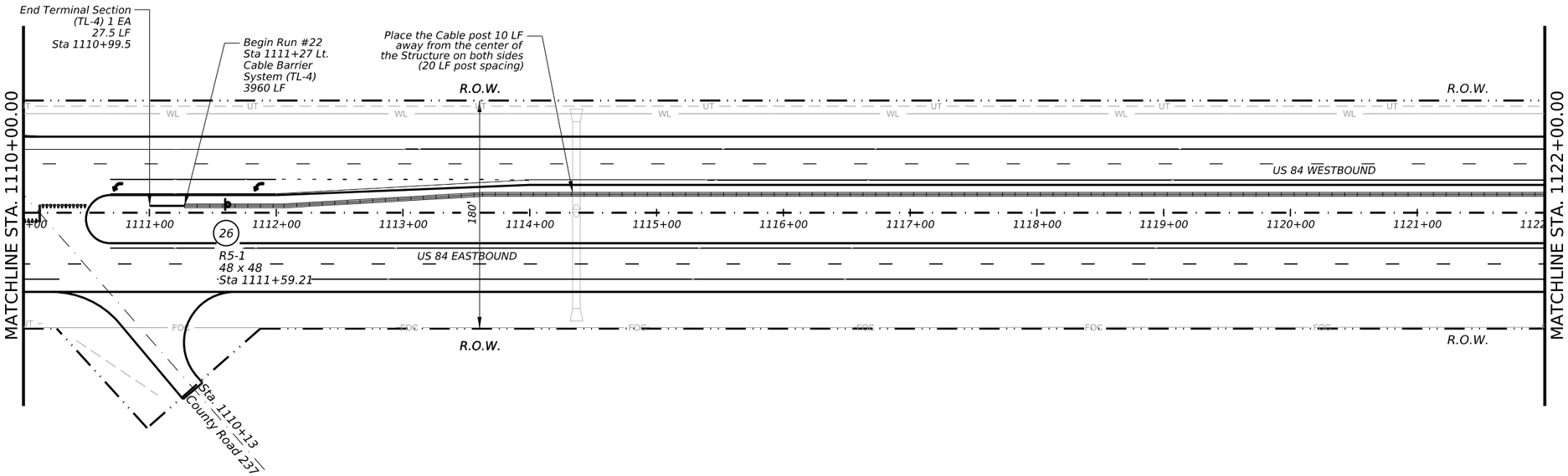

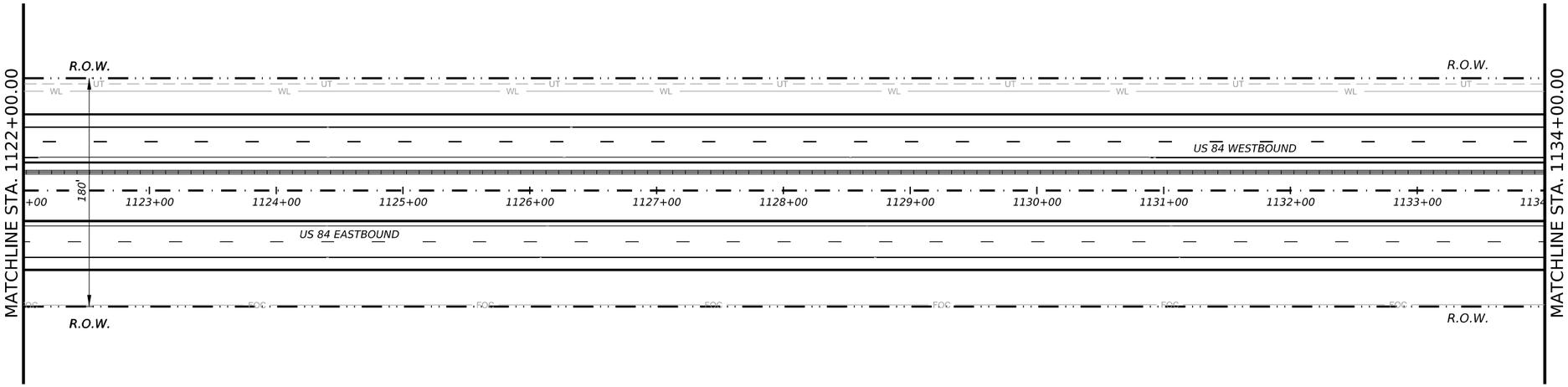

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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9/30/2024

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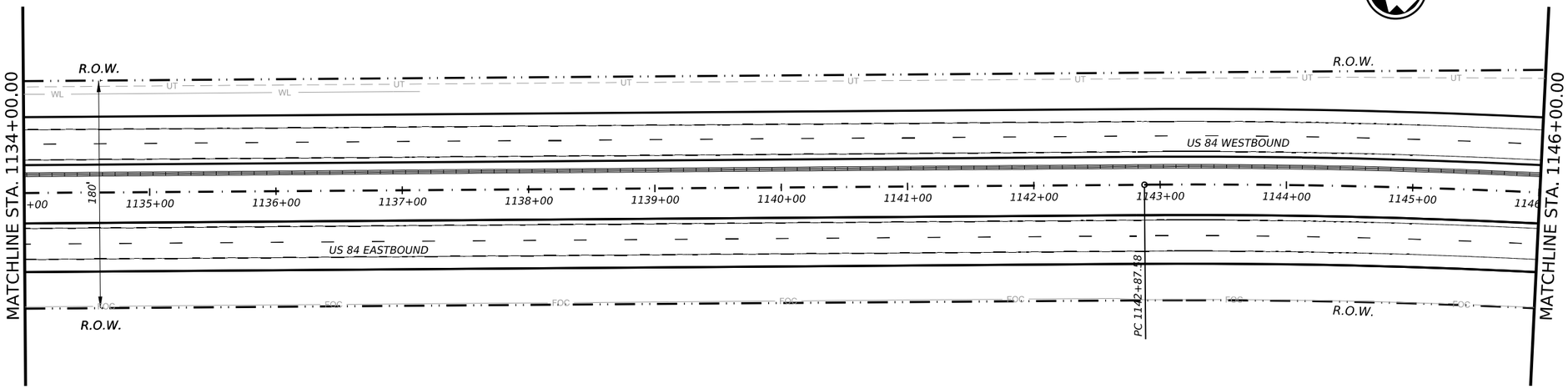
PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

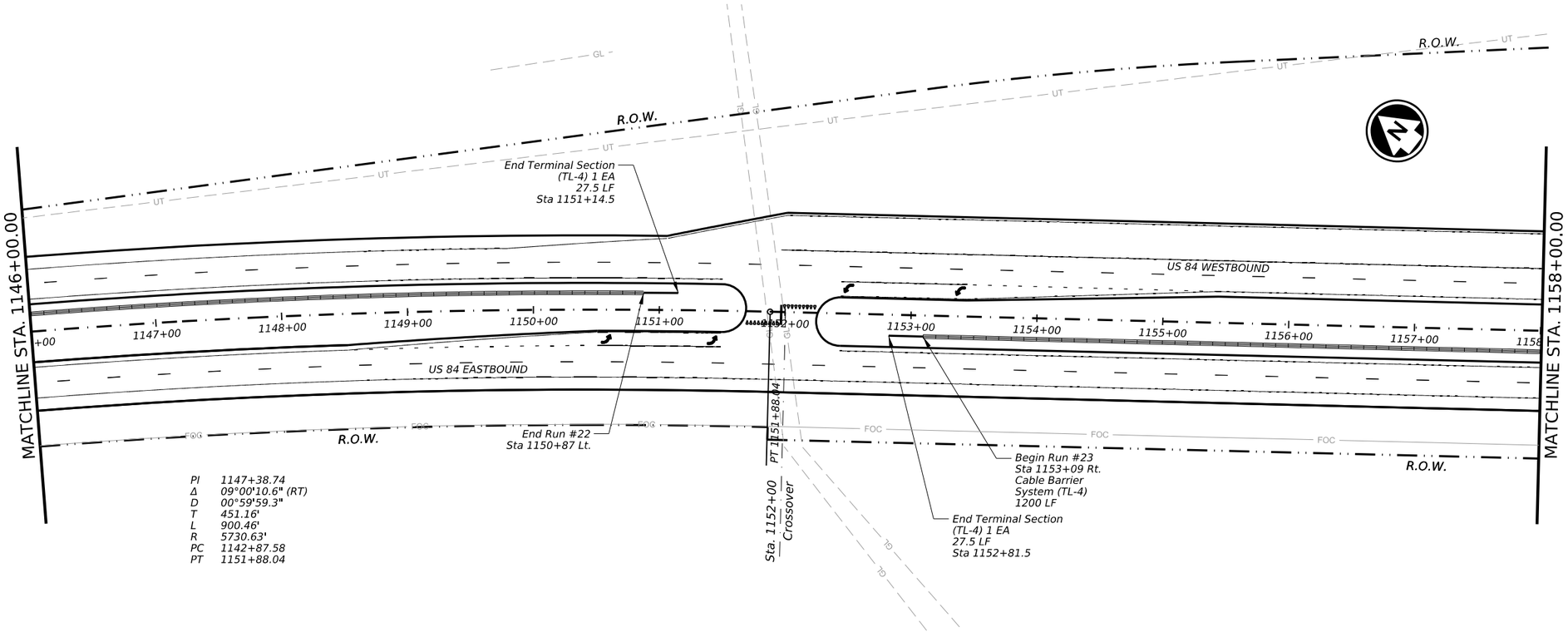
SHEET 20 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		107

DATE: 9/30/2024 1:07:58 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LAMB.dgn

CK: DW: CK: DW:





PI 1147+38.74
Δ 09°00'10.6" (RT)
D 00°59'59.3"
T 451.16'
L 900.46'
R 5730.63'
PC 1142+87.58
PT 1151+88.04

Legend

Post & Cable	
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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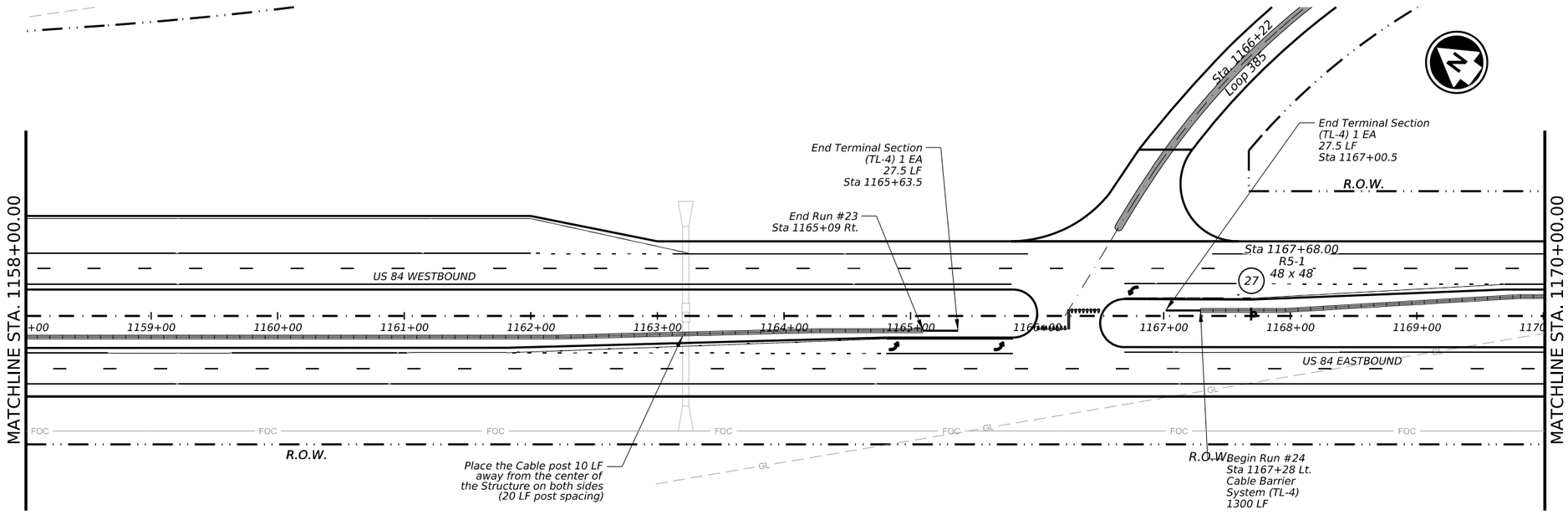
PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

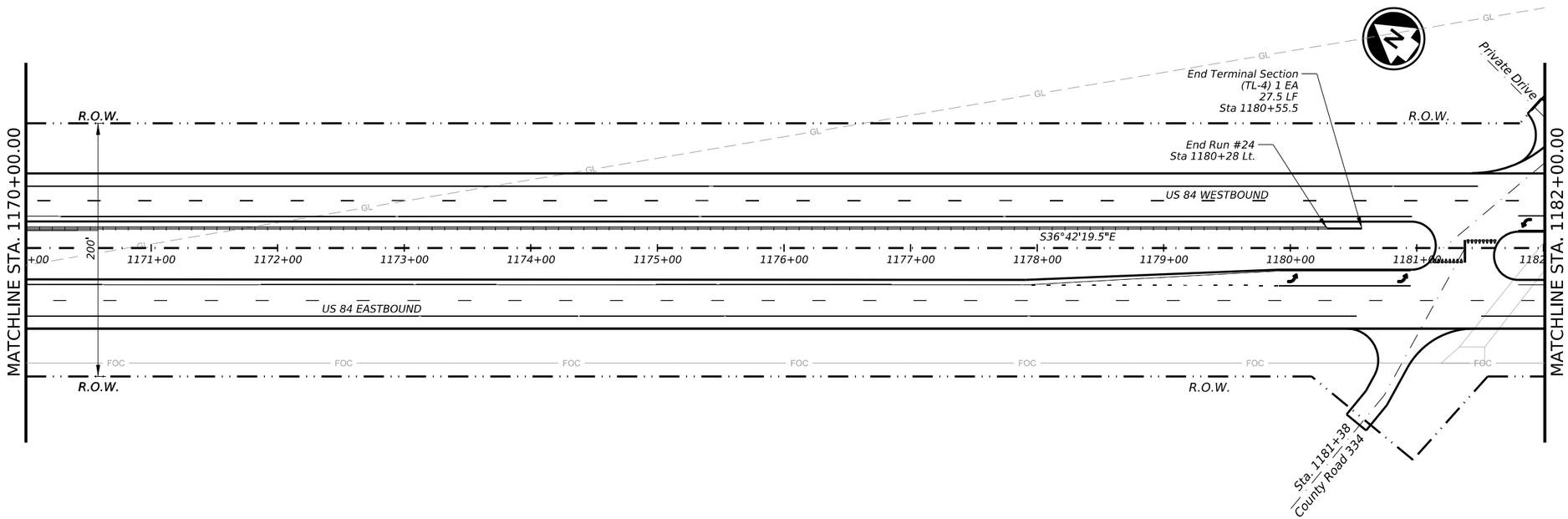
SHEET 21 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		108

DATE: 9/30/2024 1:07:58 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LAMB.dgn

CK DW CK DW





Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 22 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		109

DATE: 9/30/2024 1:07:59 PM
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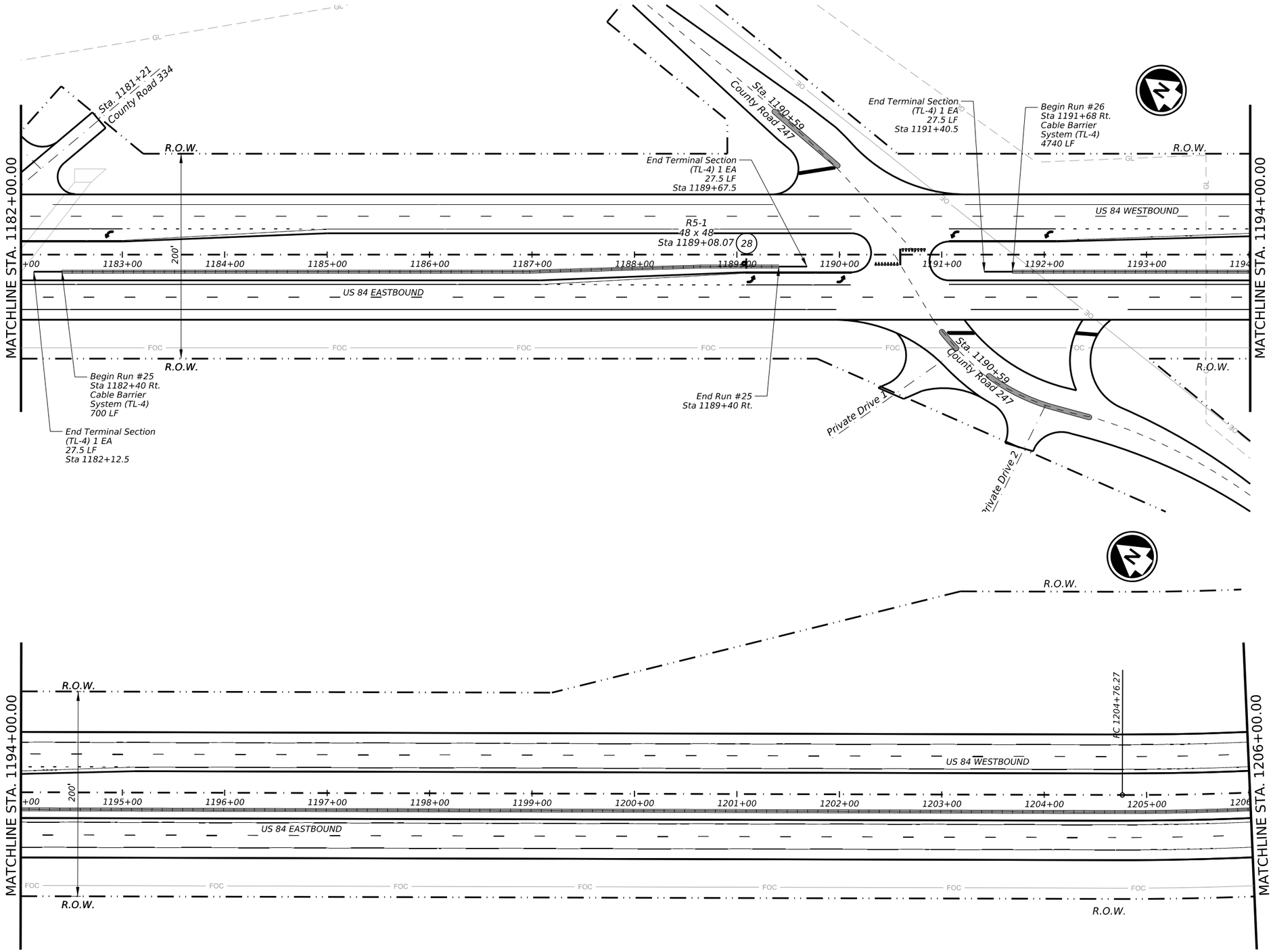
CK DW CK DW



Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 23 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		110

DATE: 9/30/2024 1:08:00 PM
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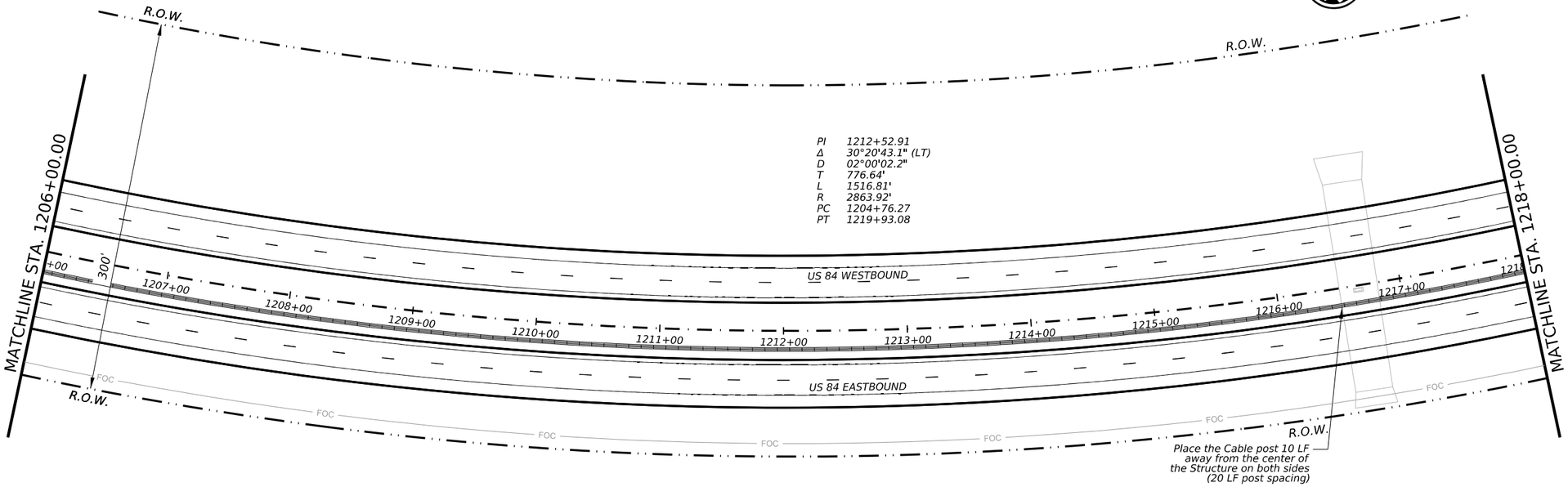

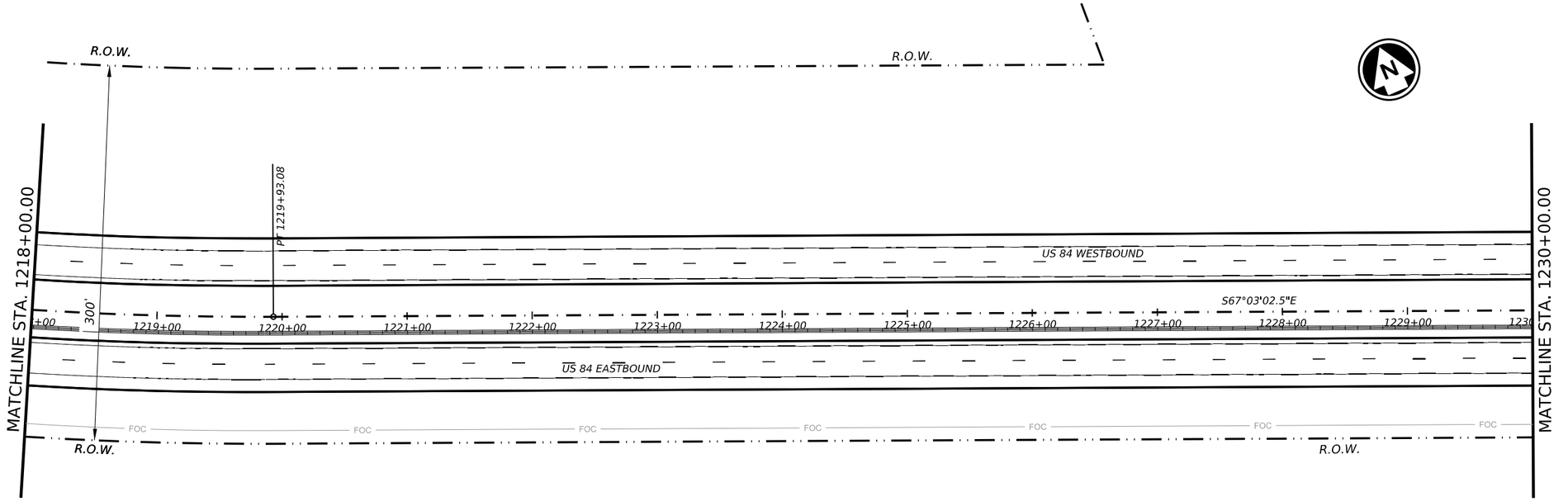

Legend	
Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 24 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		111

DATE: 9/30/2024 1:08:00 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084 ROW PLAN LAMB.dgn

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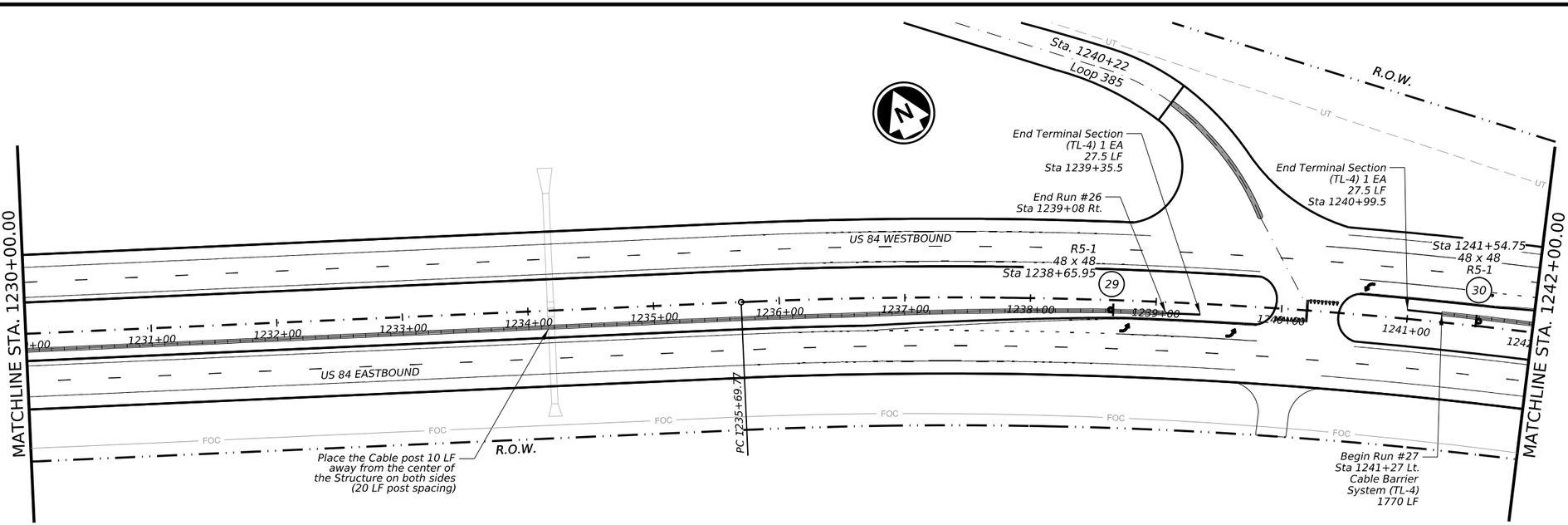

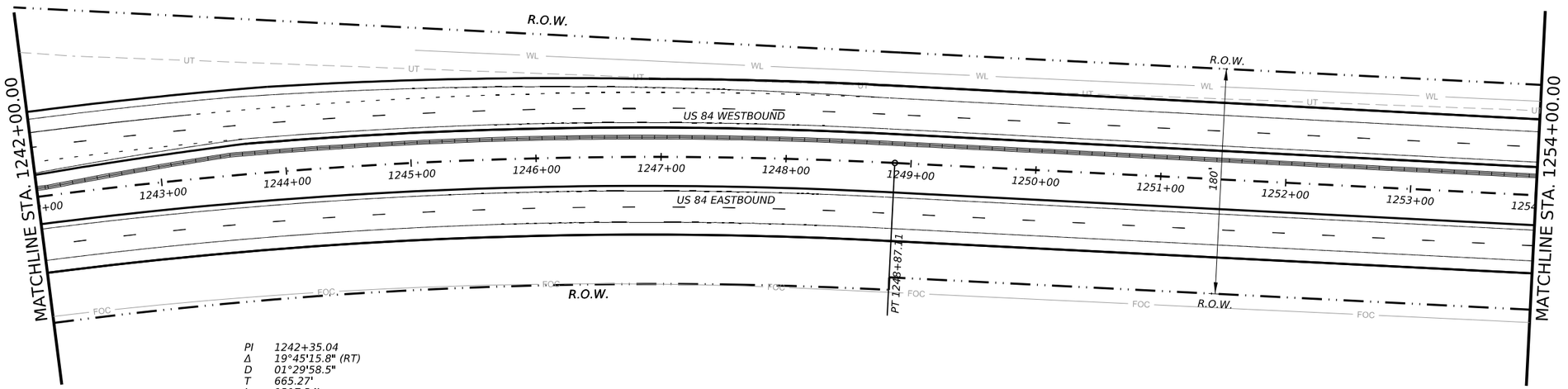

PI 1242+35.04
Δ 19°45'15.8" (RT)
D 01°29'58.5"
T 665.27'
L 1317.34'
R 3820.81'
PC 1235+69.77
PT 1248+87.11

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 25 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		112

DATE: 9/30/2024 1:08:01 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LAMB.dgn

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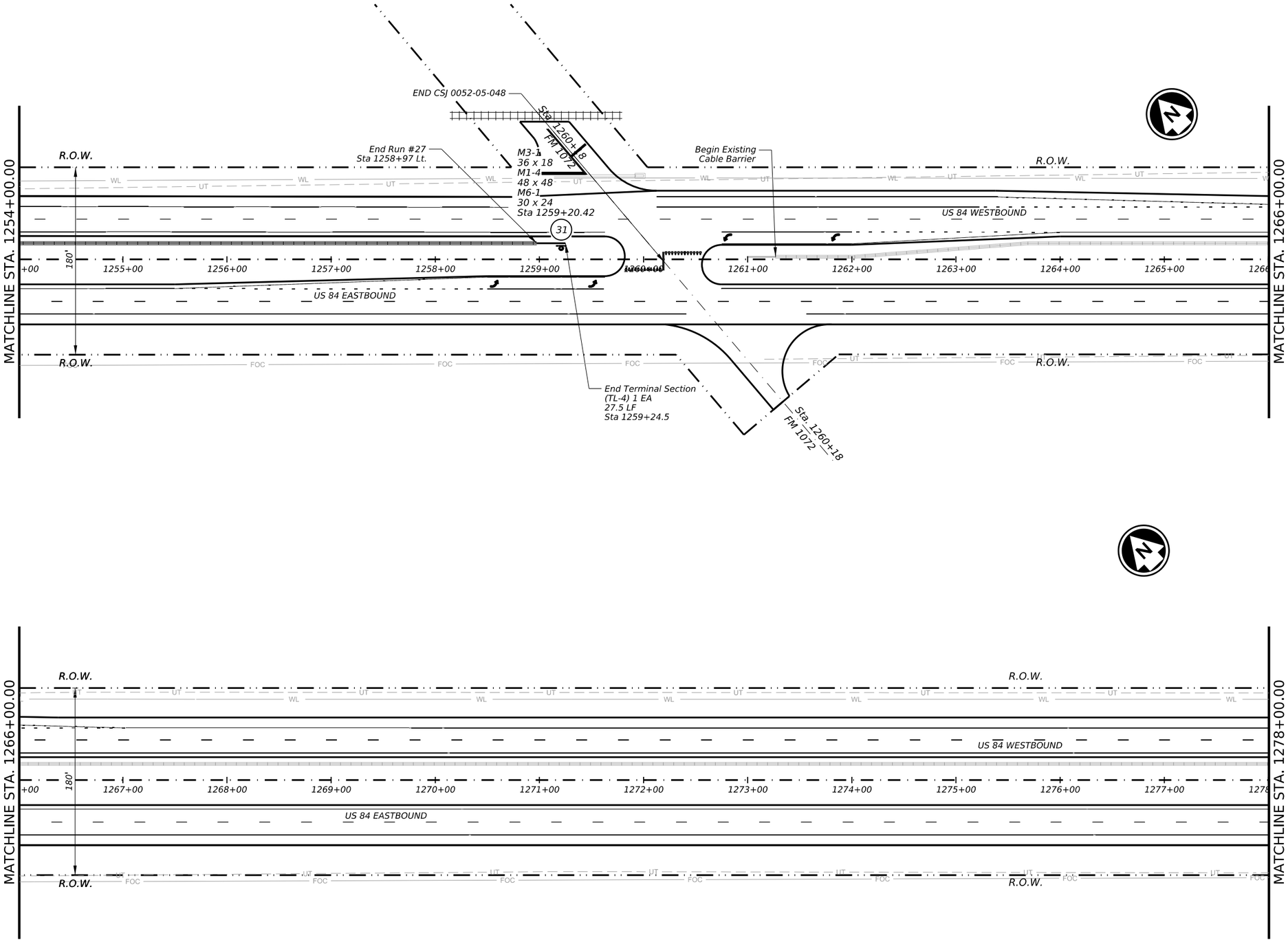

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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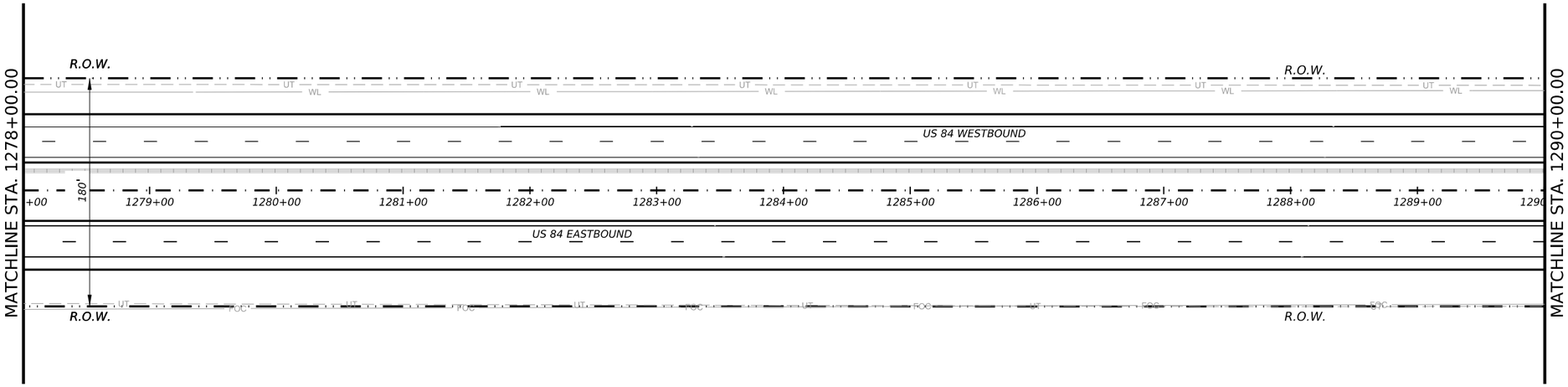
PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

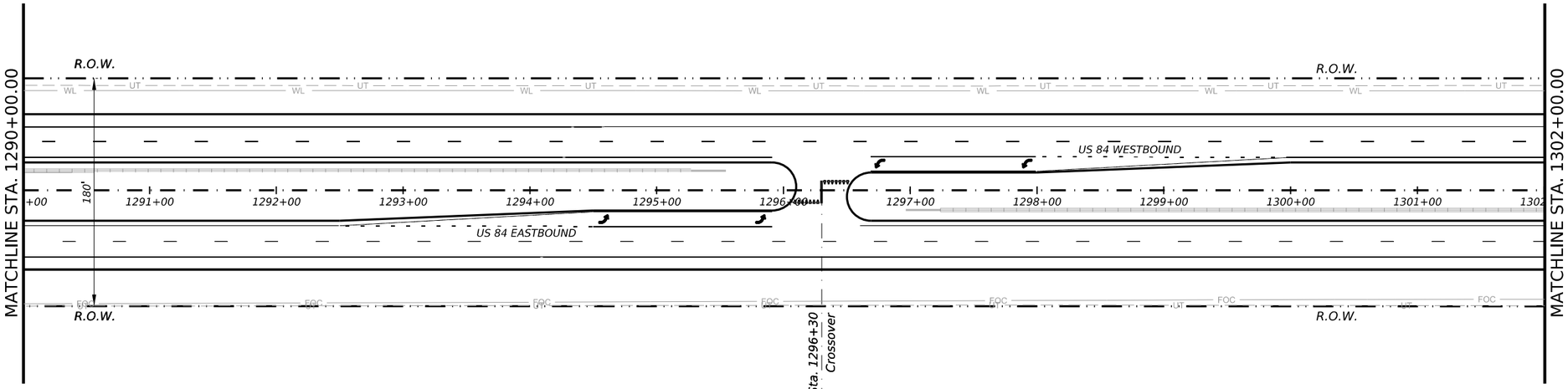
SHEET 26 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		113

DATE: 9/30/2024 1:08:02 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LAMB.dgn

CK
DW
CK
DW





Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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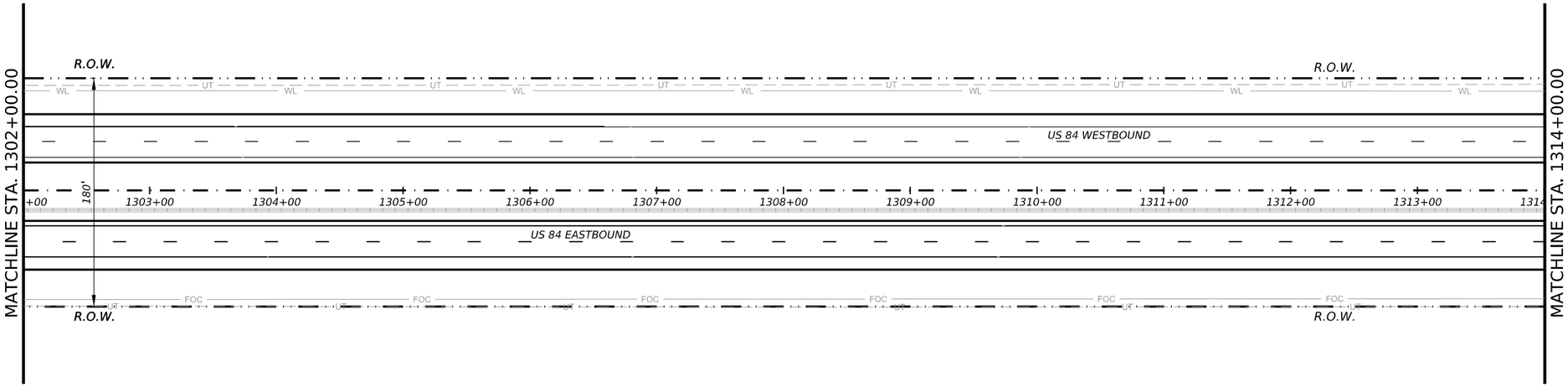
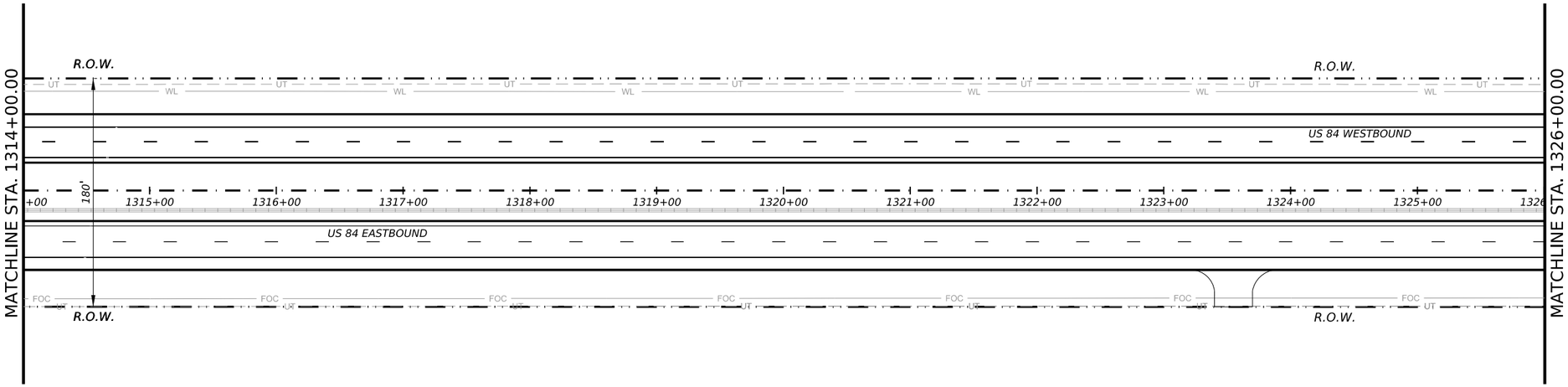
PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 27 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		114

DATE: 9/30/2024 1:08:02 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LAMB.dgn





Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 28 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		115

DATE: 9/30/2024 1:08:03 PM
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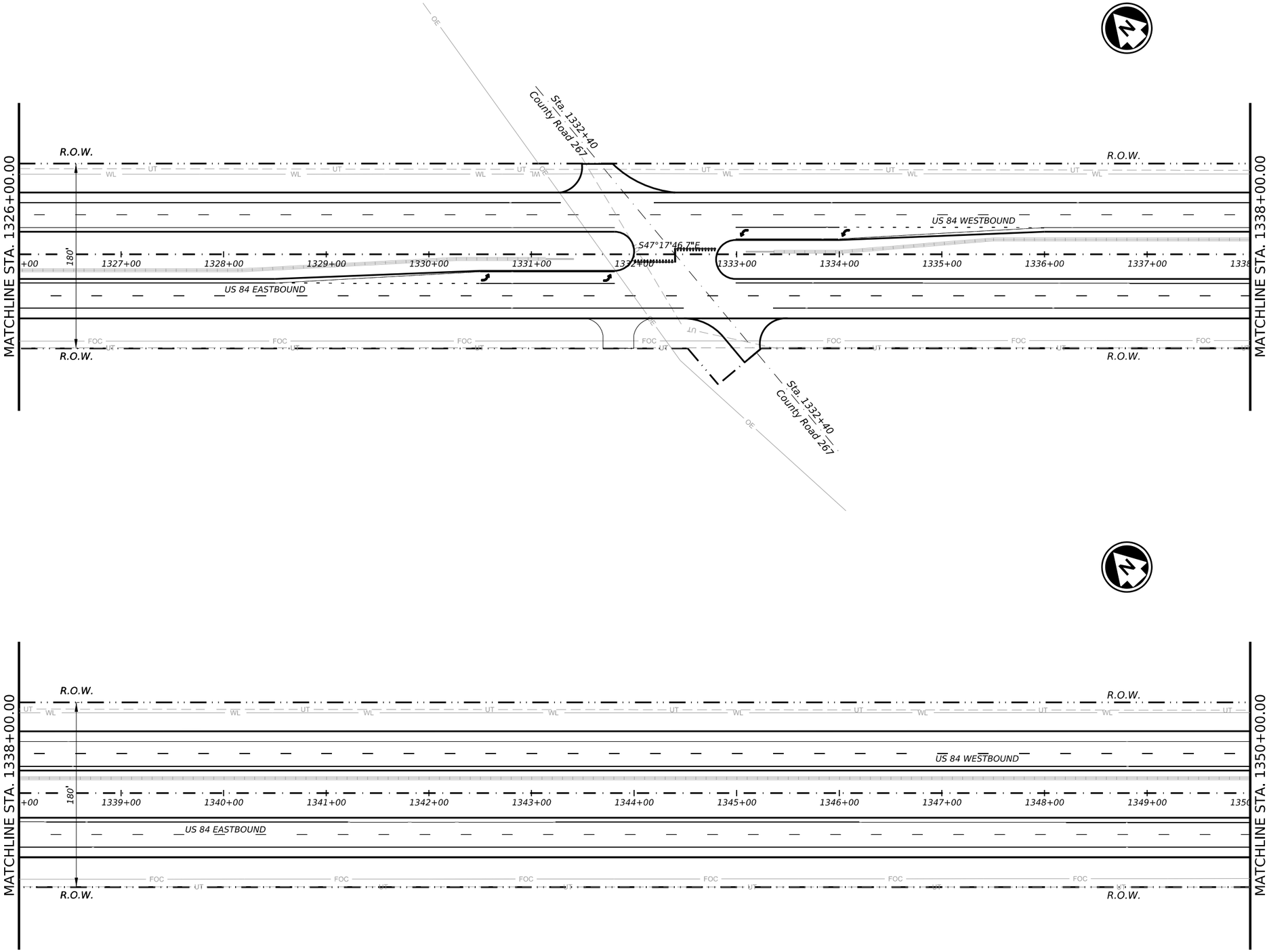
CK DW CK DW



Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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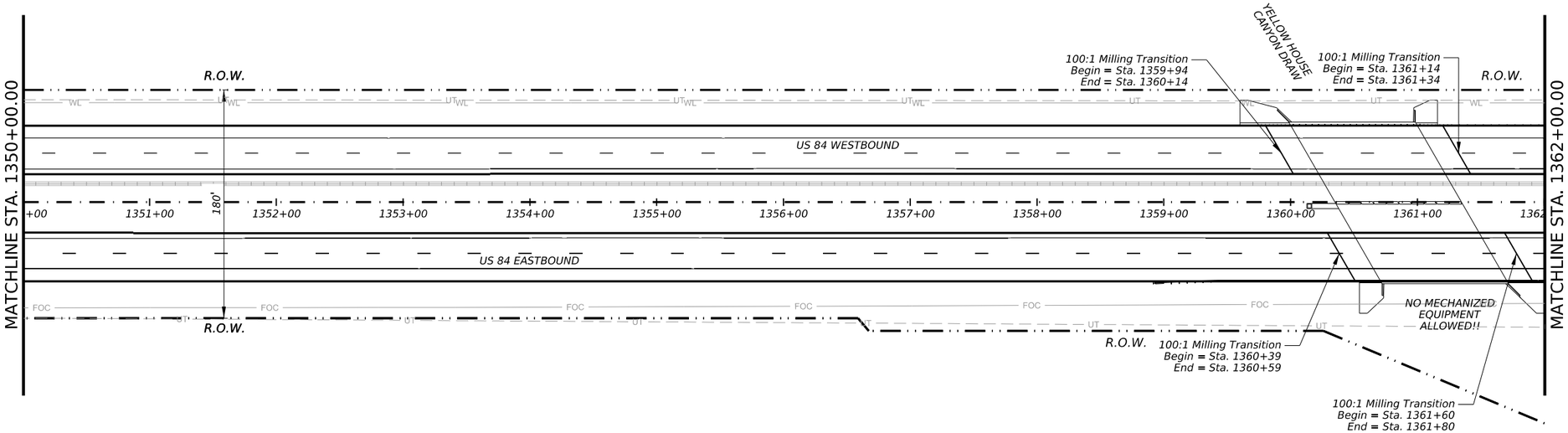
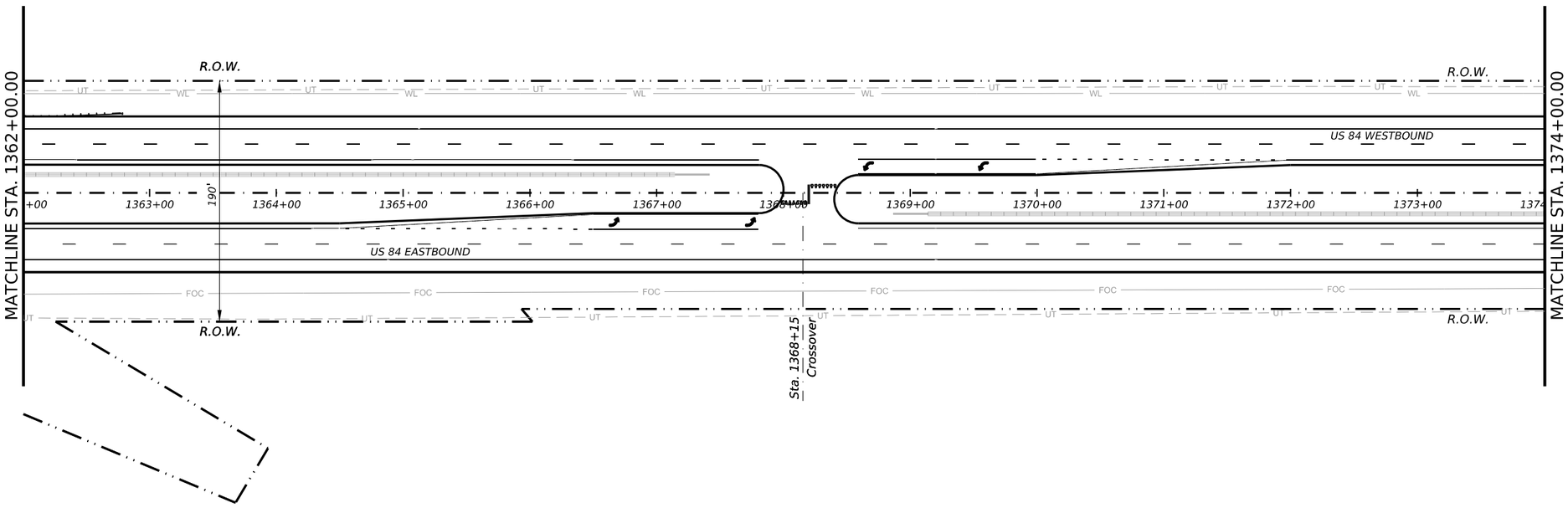
PLAN VIEW (LAMB COUNTY) SCALE: 1"=100'

SHEET 29 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		116

DATE: 9/30/2024 1:08:04 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LAMB.dgn





Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 30 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		117

DATE: 9/30/2024 1:08:04 PM
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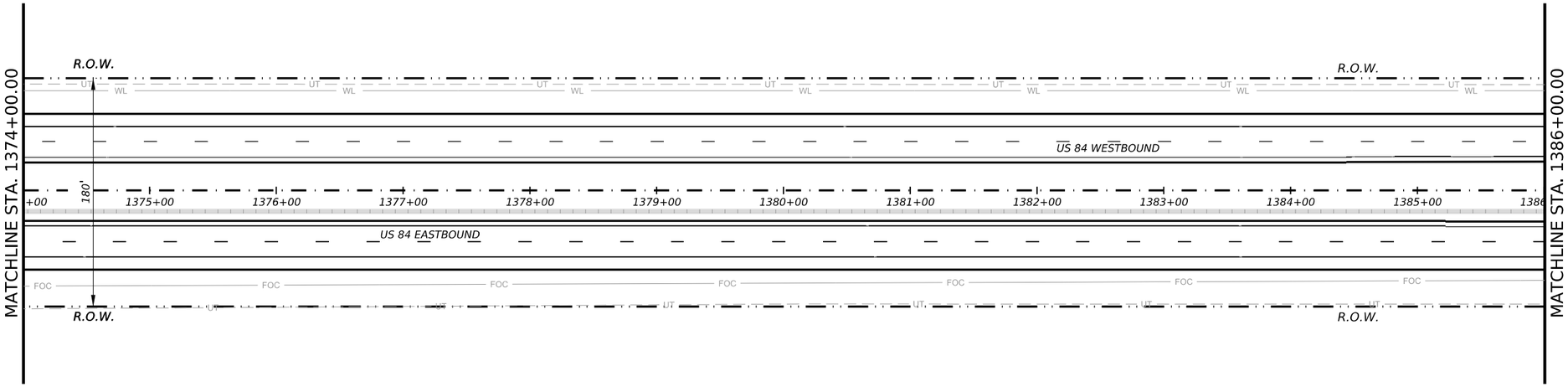

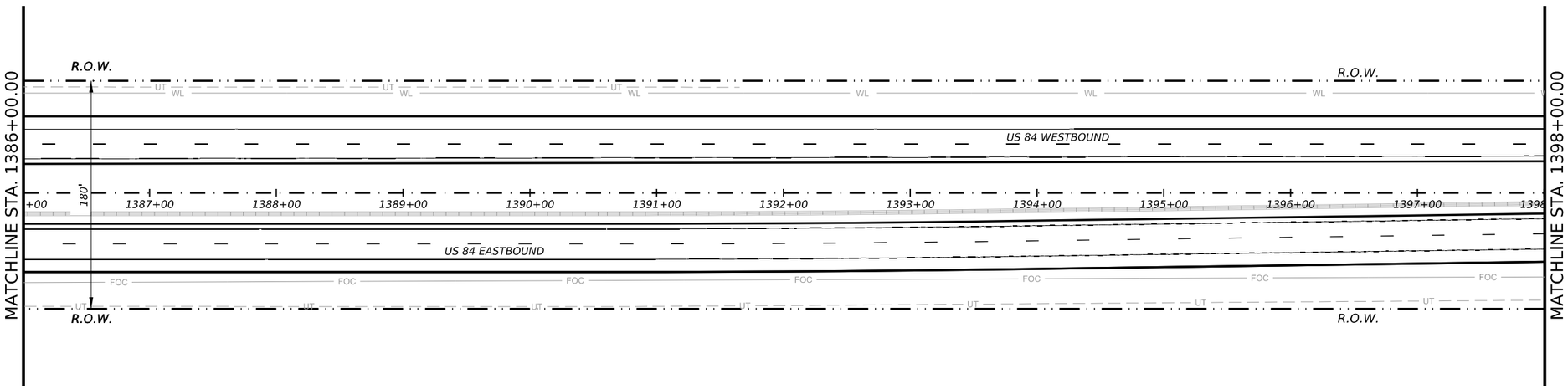

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 31 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		118

DATE: 9/30/2024 1:08:05 PM
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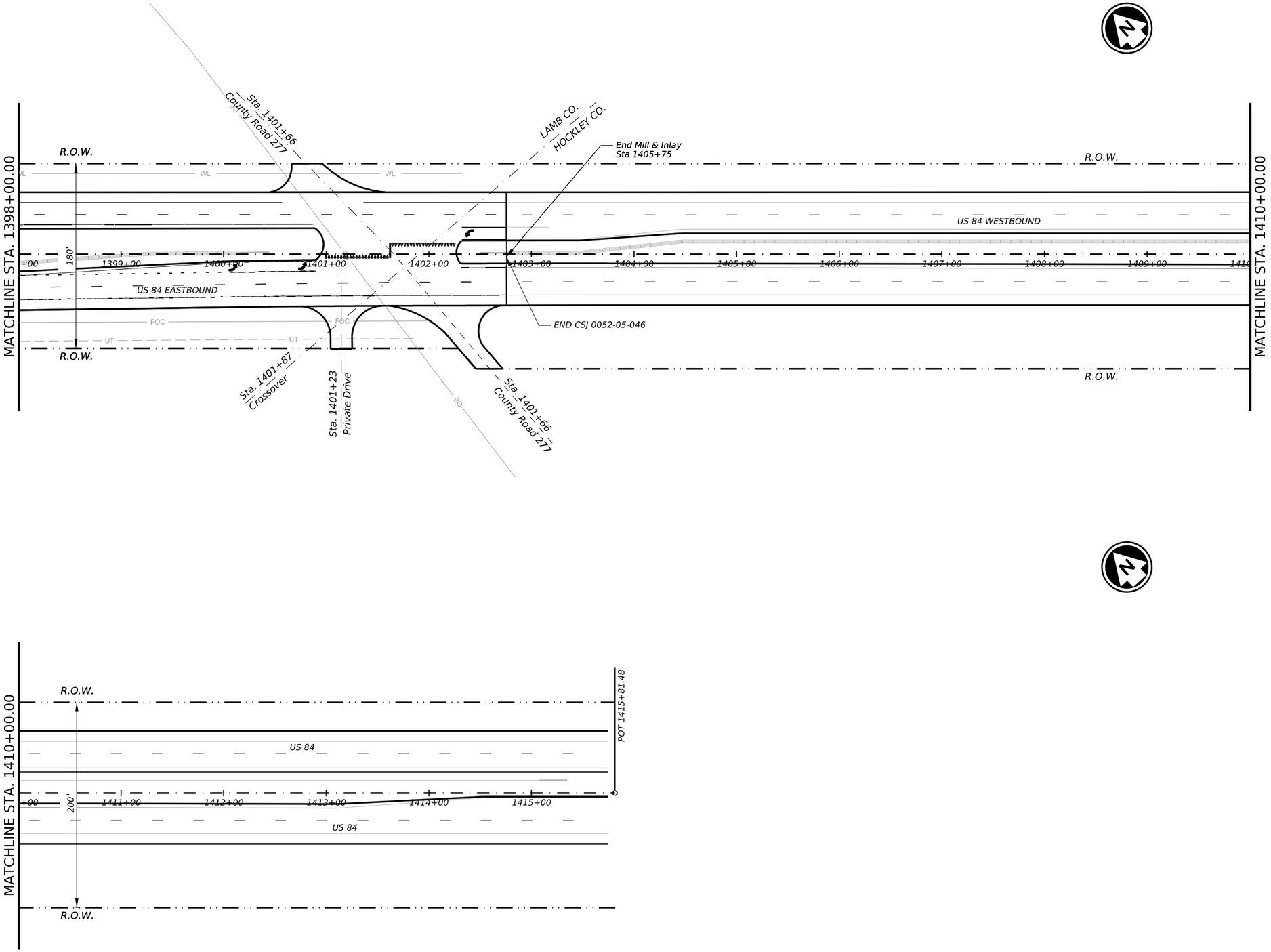

Legend

Post & Cable	x x x
Cable Barrier	
Overhead Electric	OE
Underground Fiber Optic	FOC
Underground Gas Line	GL
Underground Telephone Line	UT
Underground Water Line	WL
Remove Pavement	
Remove Sign	

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PLAN VIEW
(LAMB COUNTY)
SCALE: 1"=100'

SHEET 32 OF 32

CONT	SECT	JOB	HIGHWAY
0052	05	046, etc.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		119

DATE: 9/30/2024 1:08:06 PM
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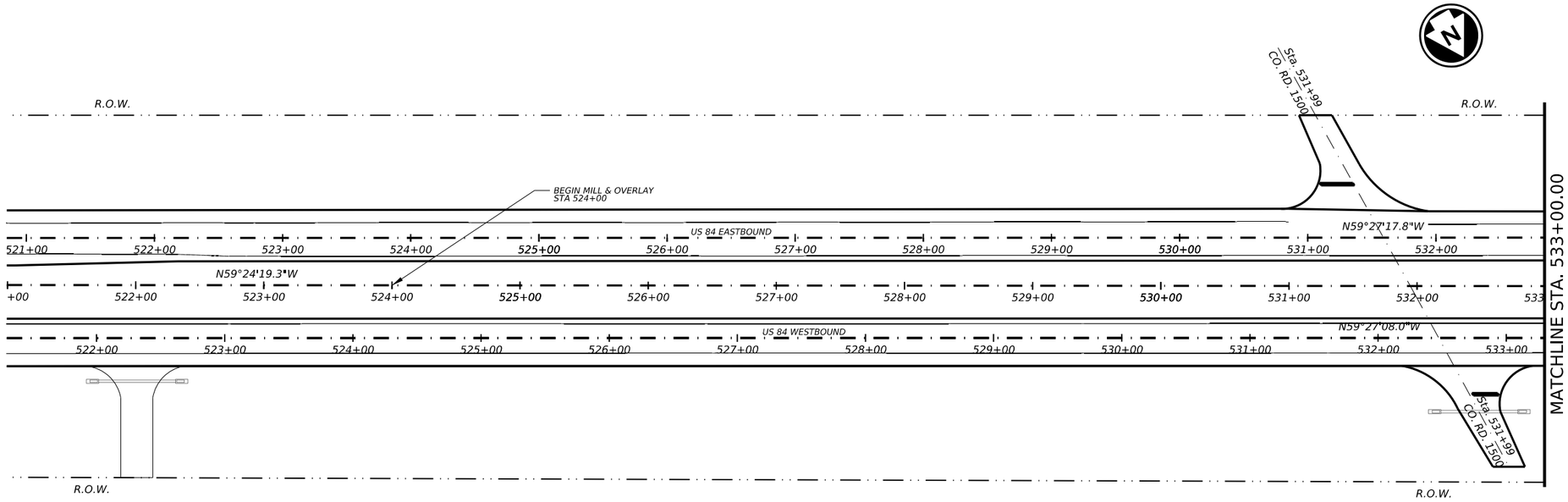

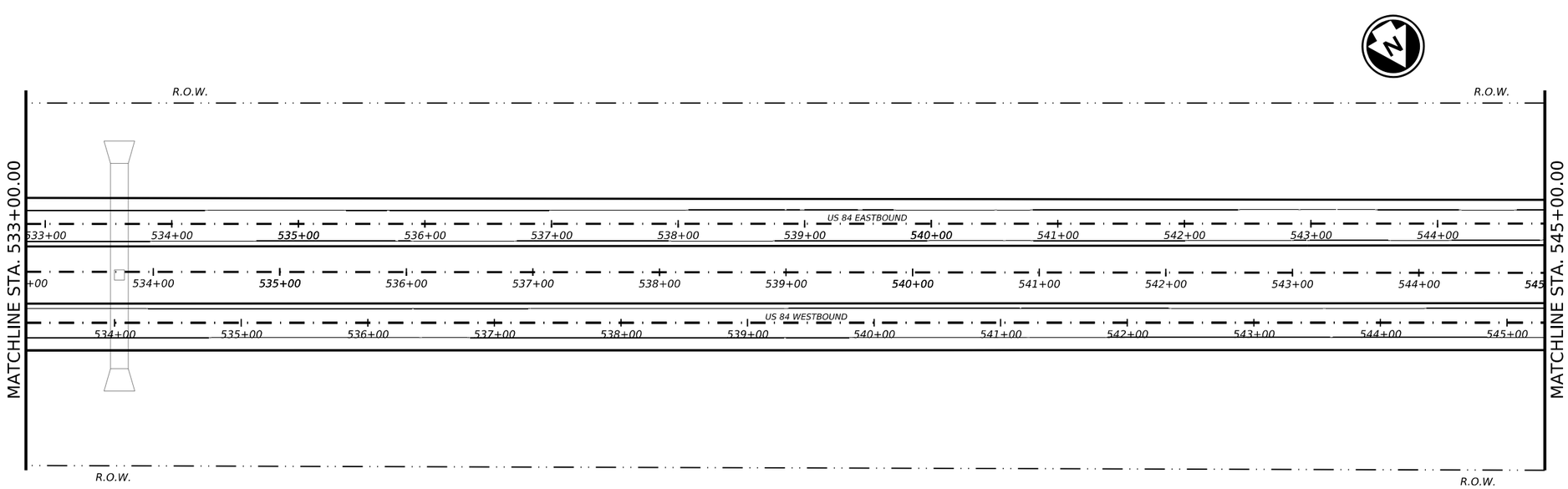

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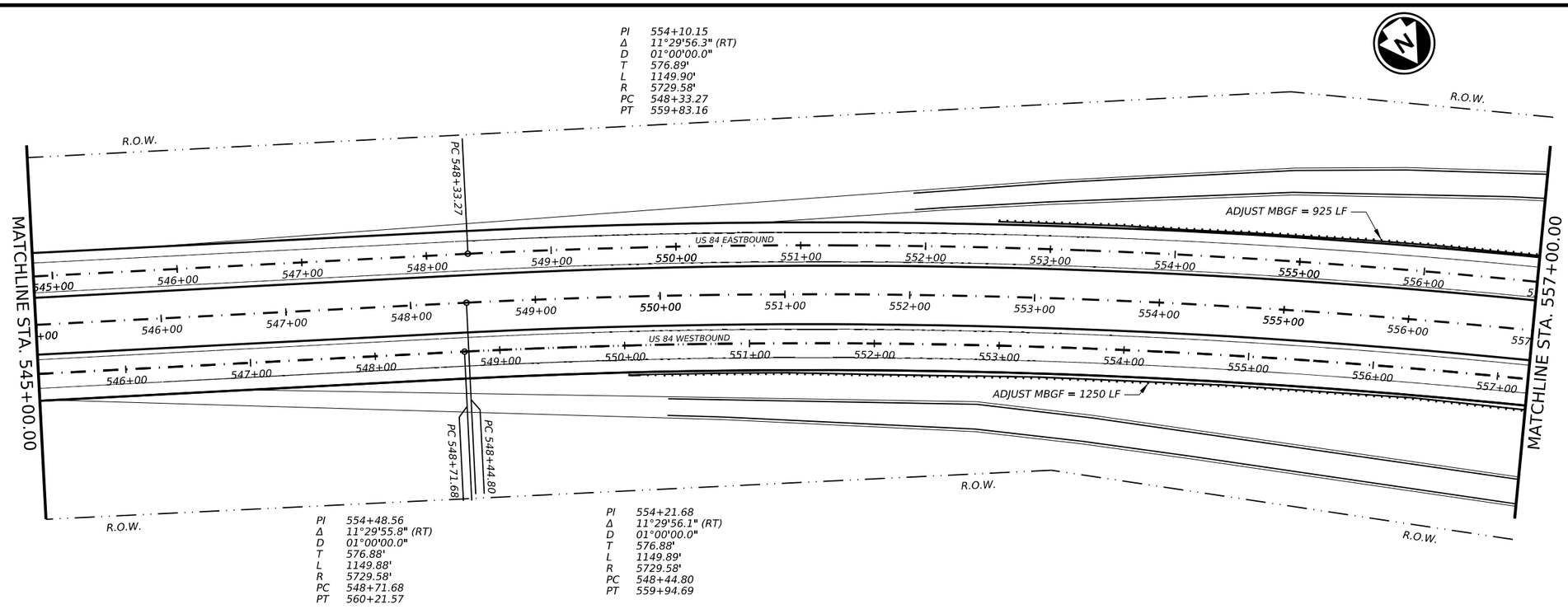
PLAN VIEW
(LUBBOCK COUNTY)
SCALE: 1"=100'

SHEET 1 OF 18

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		120

DATE: 9/30/2024 1:08:23 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LUBBOCK.dgn

CK | DW | CK | DW



Finished Slopes EBML

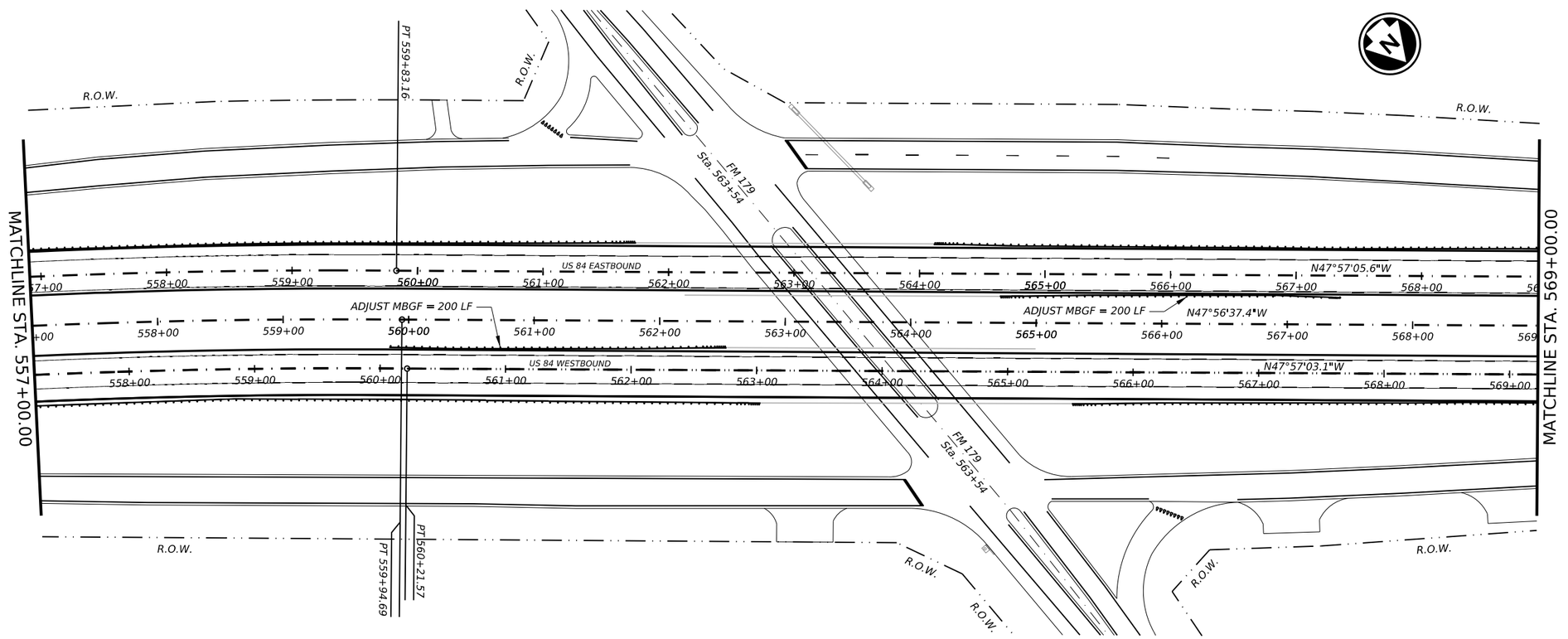
-2.0	2.0	545+26
2.4	-2.4	549+00
2.4	-2.4	559+16
-1.2	1.2	562+90

℄

Finished Slopes WBML

2.0	-2.0	545+64
2.4	-2.4	549+38
2.4	-2.4	559+55
1.9	-1.9	563+29

℄



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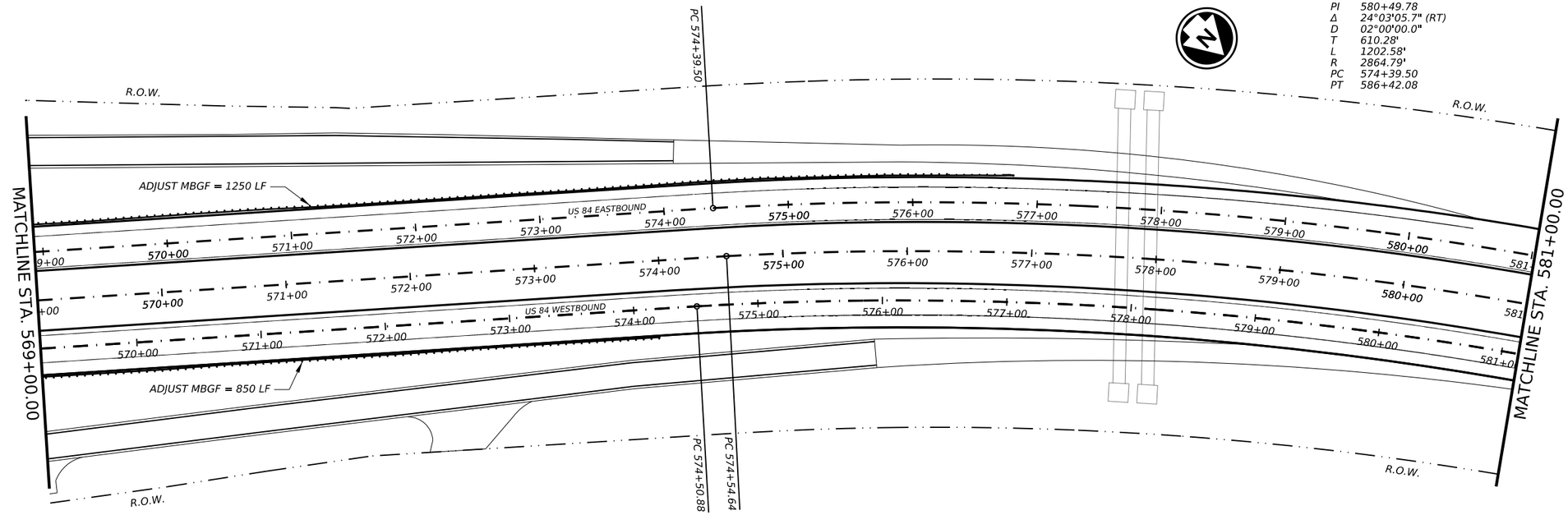
PLAN VIEW
(LUBBOCK COUNTY)
SCALE: 1"=100'

SHEET 2 OF 18

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		121

DATE: 9/30/2024 1:08:24 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LUBBOCK.dgn



PI 580+49.78
Δ 24°03'05.7" (RT)
D 02°00'00.0"
T 610.28'
L 1202.58'
R 2864.79'
PC 574+39.50
PT 586+42.08

Finished Slopes EBML

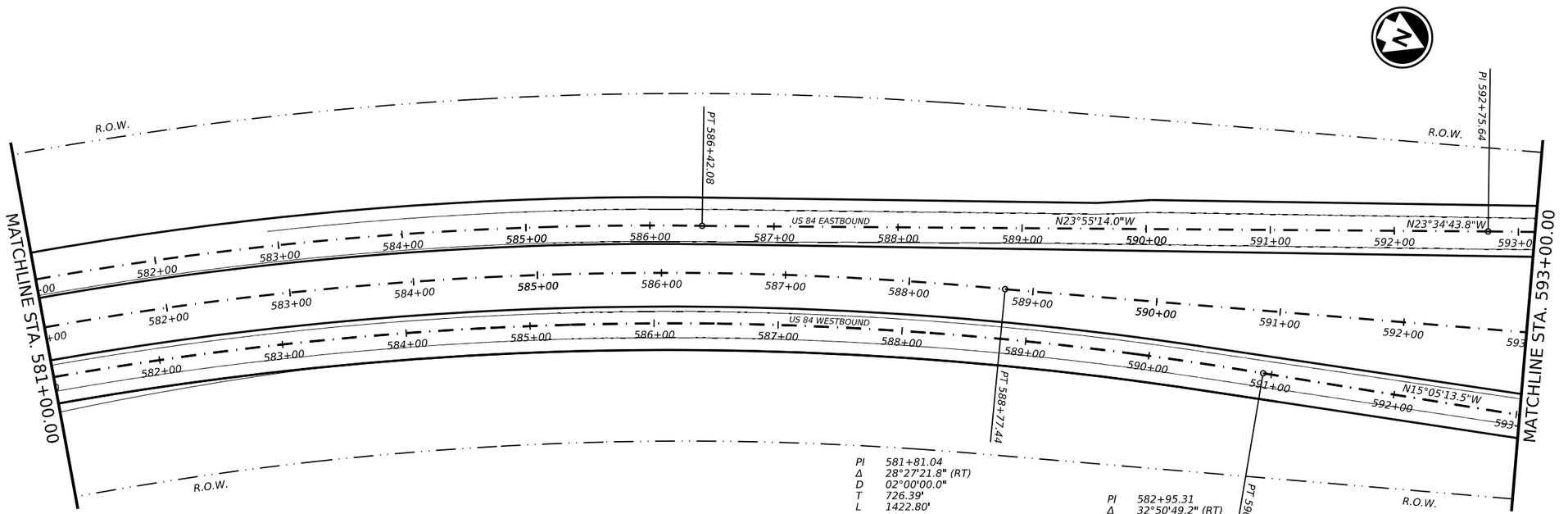
-1.8	1.8	571+84
3.5	-3.5	575+06
3.5	-3.5	585+75
-2.0	2.0	588+97
-2.0	2.0	590+44
3.5	-3.5	592+78

℄

Finished Slopes WBML

1.9	-1.9	571+96
3.5	-3.5	575+18
3.5	-3.5	590+27
2.46	-2.46	592+87

℄



PI 581+81.04
Δ 28°27'21.8" (RT)
D 02°00'00.0"
T 726.39'
L 1422.80'
R 2864.79'
PC 574+54.64
PT 588+77.44

PI 582+95.31
Δ 32°50'49.2" (RT)
D 02°00'00.0"
T 844.43'
L 1642.35'
R 2864.79'
PC 574+50.88
PT 590+93.23

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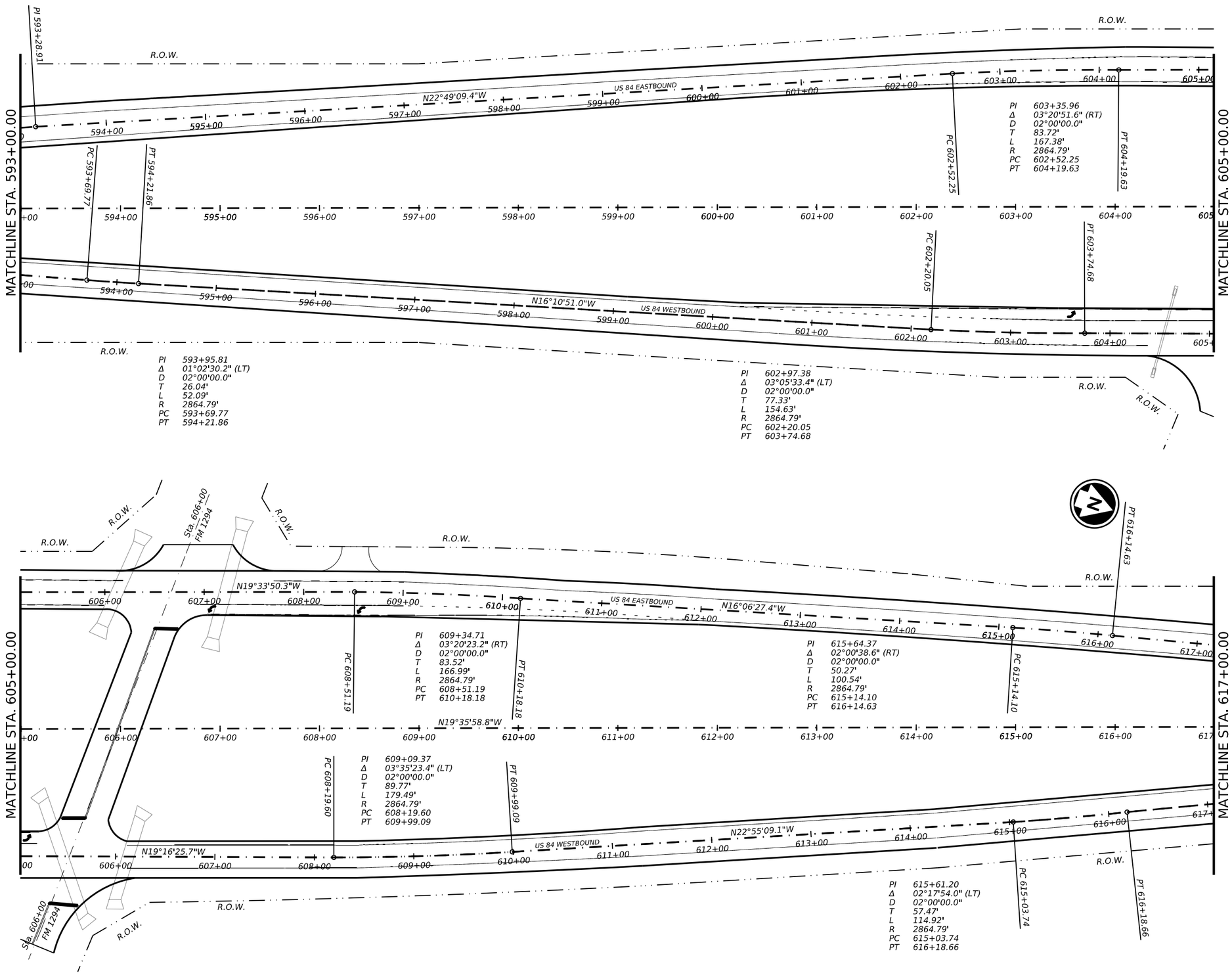
PLAN VIEW
(LUBBOCK COUNTY)
SCALE: 1"=100'

SHEET 3 OF 18

CONT	SECT	JOB	HIGHWAY
0052	05	046, etc.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		122

DATE: 9/30/2024 1:08:25 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LUBBOCK.dgn

CK: DW: CK: DW:



Finished Slopes EBML

3.5	-3.5	593+03
-2.0	2.0	595+37
-2.0	2.0	600+76
3.5	-3.5	
3.5	-3.5	603+23
		603+48
-2.0	2.0	605+82
-2.0	2.0	606+87
3.5	-3.5	
3.5	-3.5	609+22
		609+47
-2.0	2.0	611+81
-2.0	2.0	613+18
3.5	-3.5	
3.5	-3.5	615+52
		615+77

℄

Finished Slopes WBML

-3.5	3.5	593+83
-3.5	3.5	594+08
2.0	-2.0	595+78
2.0	-2.0	601+07
-3.5	3.5	602+77
-3.5	3.5	603+18
2.0	-2.0	604+88
2.0	-2.0	607+06
-3.5	3.5	608+76
-3.5	3.5	609+42
2.0	-2.0	611+12
2.0	-2.0	613+78
-3.5	3.5	615+48
-3.5	3.5	615+73

℄

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PLAN VIEW
(LUBBOCK COUNTY)
SCALE: 1"=100'

SHEET 4 OF 18

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		123

DATE: 9/30/2024 1:08:26 PM
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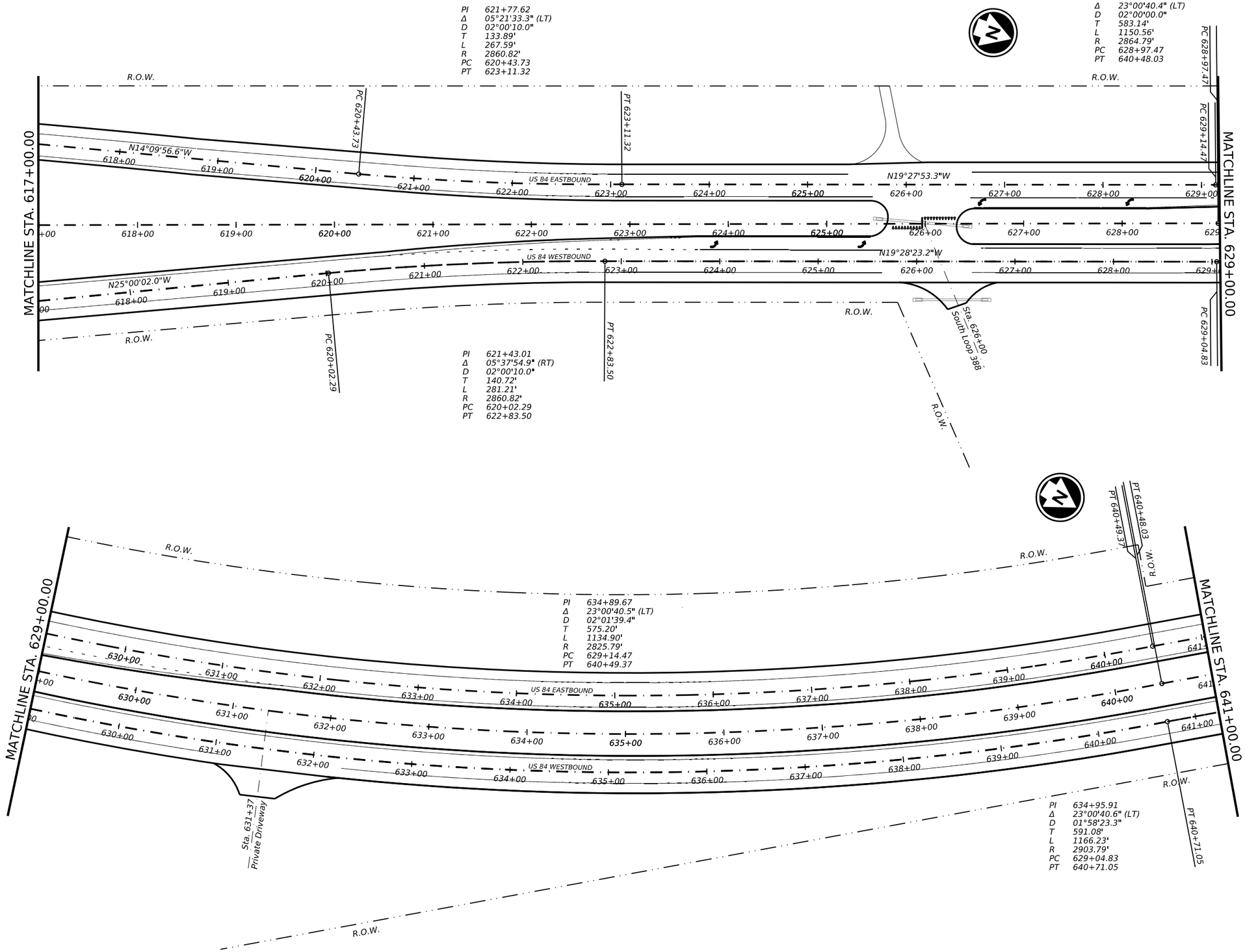

Finished Slopes EBML

-2.0	2.0	618+11
-3.5	3.5	621+11
-3.5	3.5	622+46
-2.0	2.0	625+68
-2.0	2.0	626+60
-3.5	3.5	629+82
-3.5	3.5	639+84

℄

Finished Slopes WBML

2.0	-2.0	617+44
2.0	-2.0	617+48
3.5	-3.5	620+70
3.5	-3.5	622+18
2.0	-2.0	625+40
2.0	-2.0	626+51
-3.5	3.5	629+73
-3.5	3.5	640+05

℄

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PLAN VIEW
(LUBBOCK COUNTY)
SCALE: 1"=100'

SHEET 5 OF 18

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		124

DATE: 9/30/2024 1:08:27 PM
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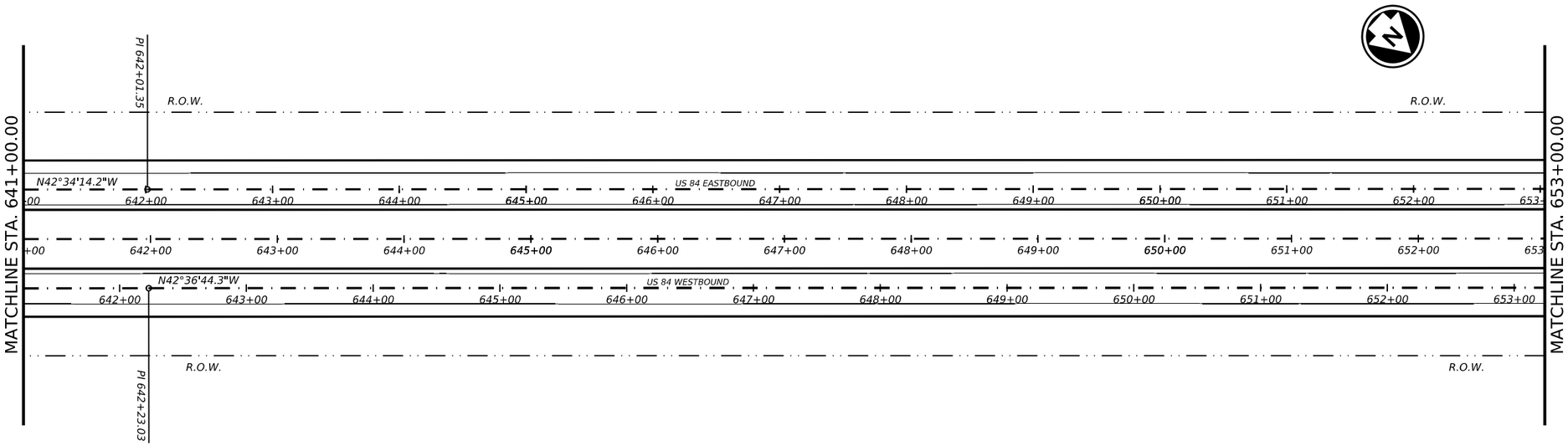
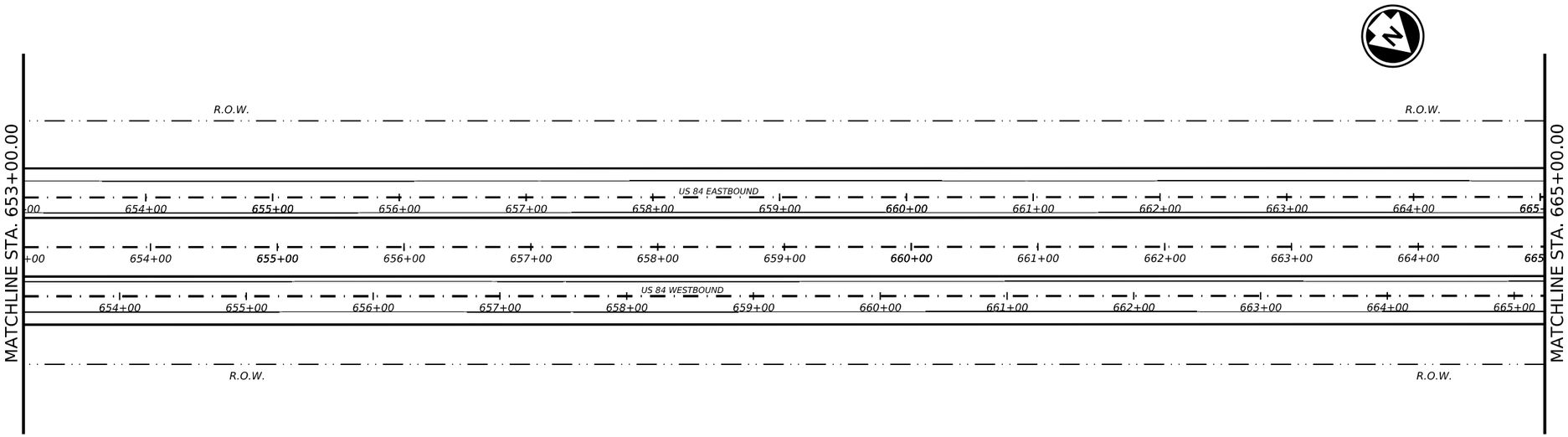
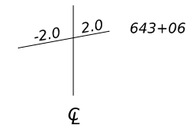
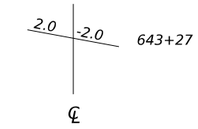




Finished Slopes EBML



Finished Slopes WBML



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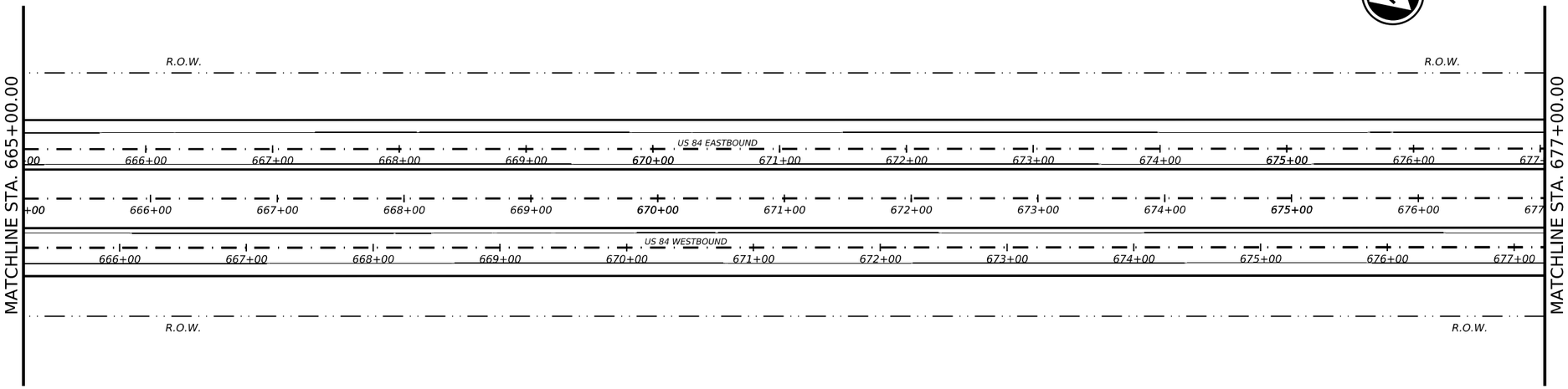
PLAN VIEW
(LUBBOCK COUNTY)
SCALE: 1"=100'

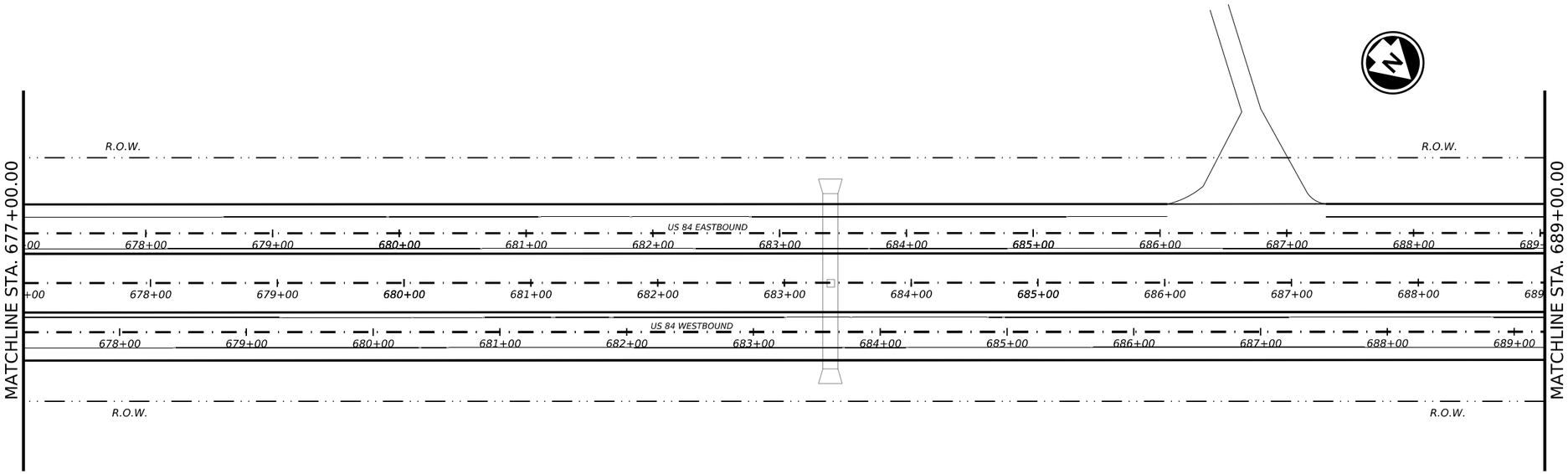
SHEET 6 OF 18

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		125

DATE: 9/30/2024 1:08:28 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LUBBOCK.dgn

CK: DW: CK: DW:





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PLAN VIEW
(LUBBOCK COUNTY)
SCALE: 1"=100'

SHEET 7 OF 18

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		126

DATE: 9/30/2024 1:08:29 PM
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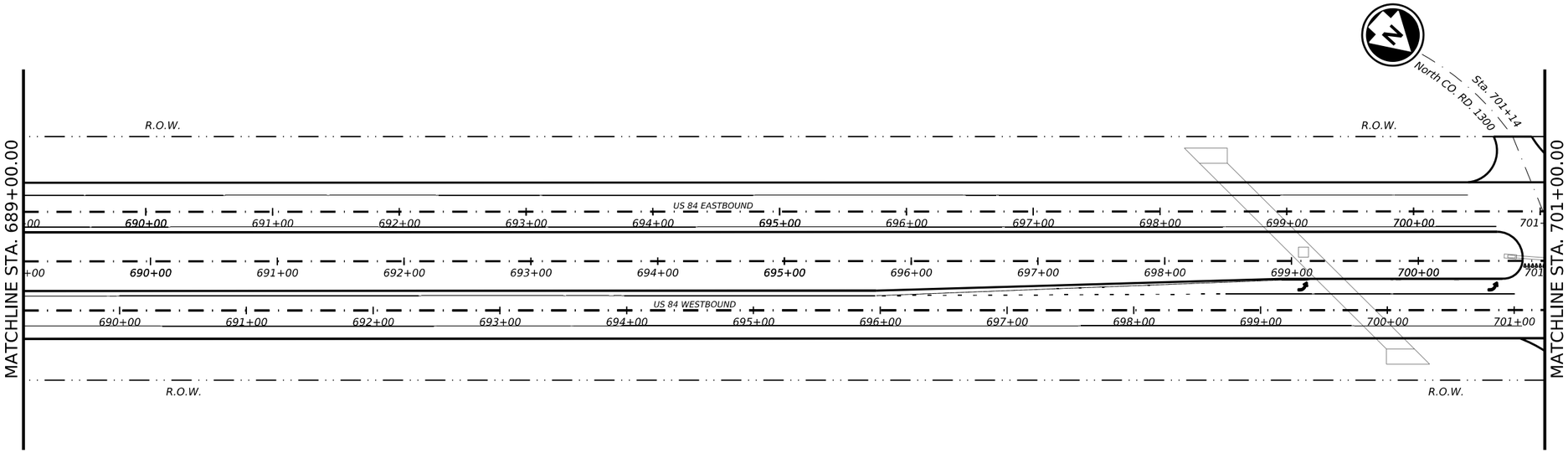
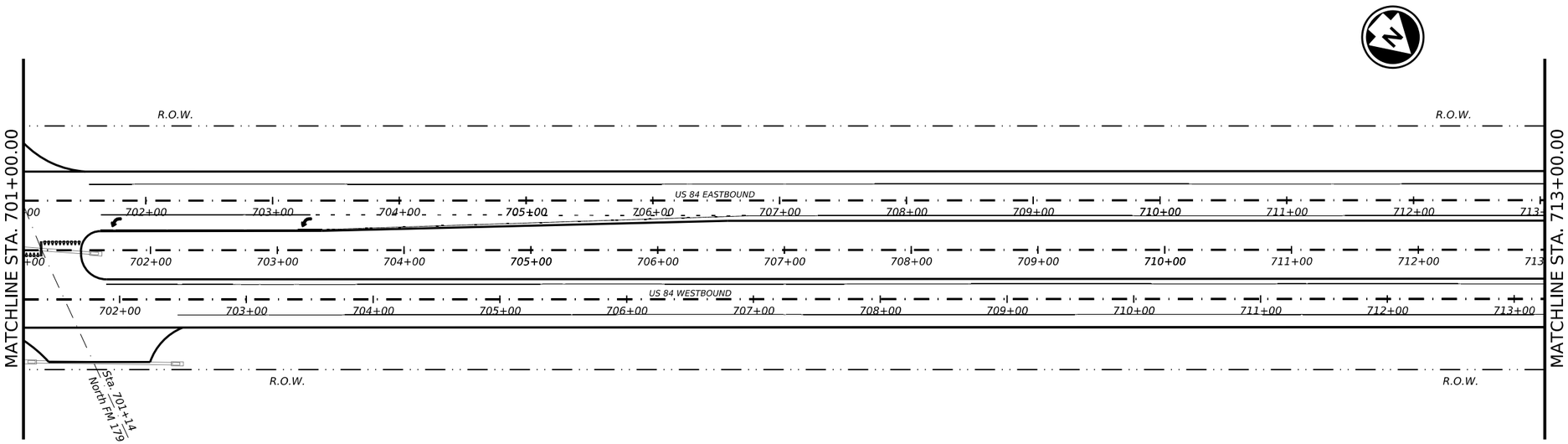
CK | DW | CK | DW





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PLAN VIEW
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SCALE: 1"=100'

SHEET 8 OF 18

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		127

DATE: 9/30/2024 1:08:30 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LUBBOCK.dgn

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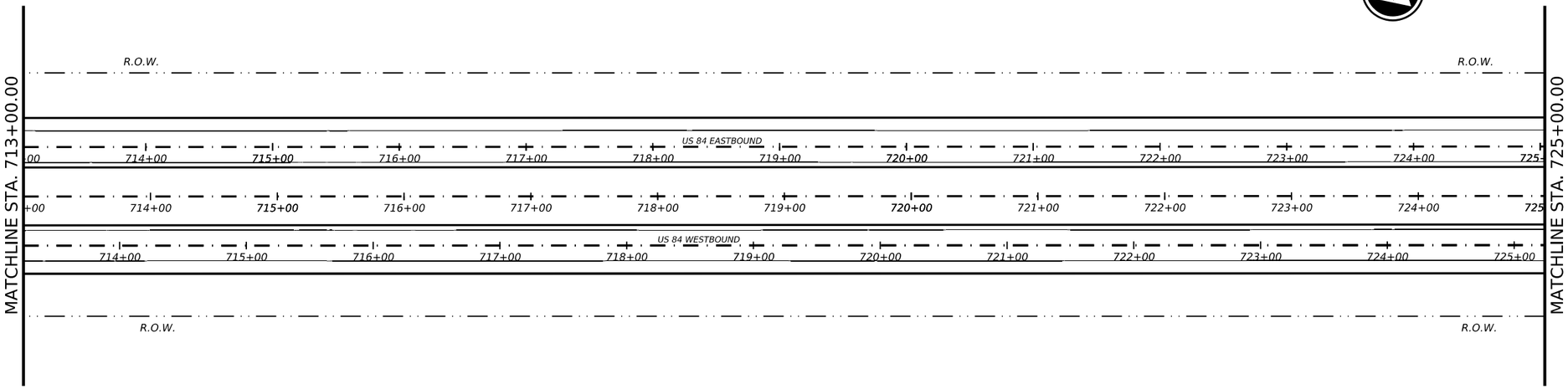

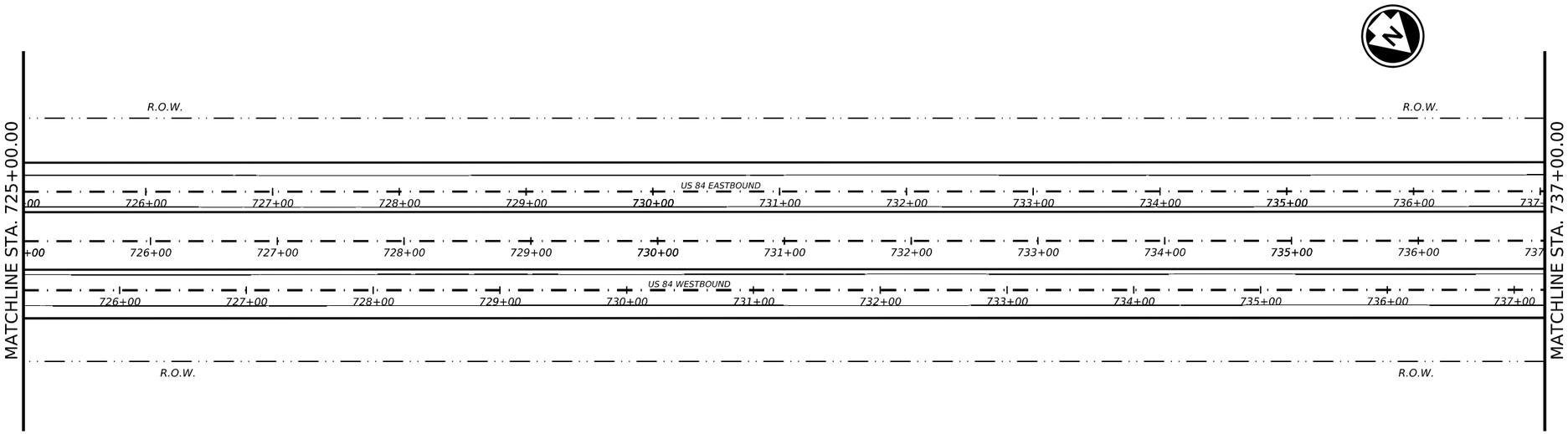

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PLAN VIEW
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SCALE: 1"=100'

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		128

DATE: 9/30/2024 1:08:31 PM
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CK
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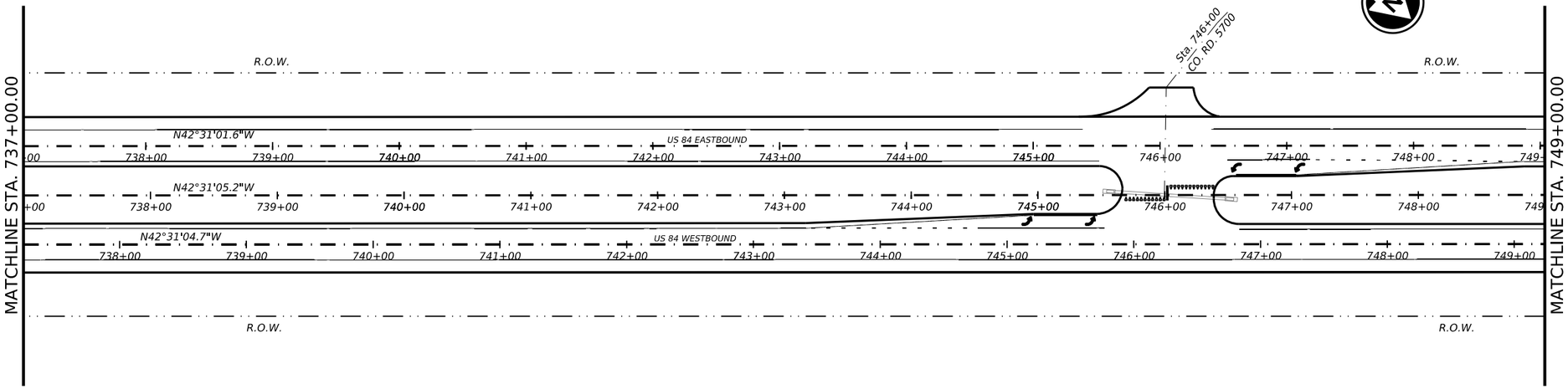

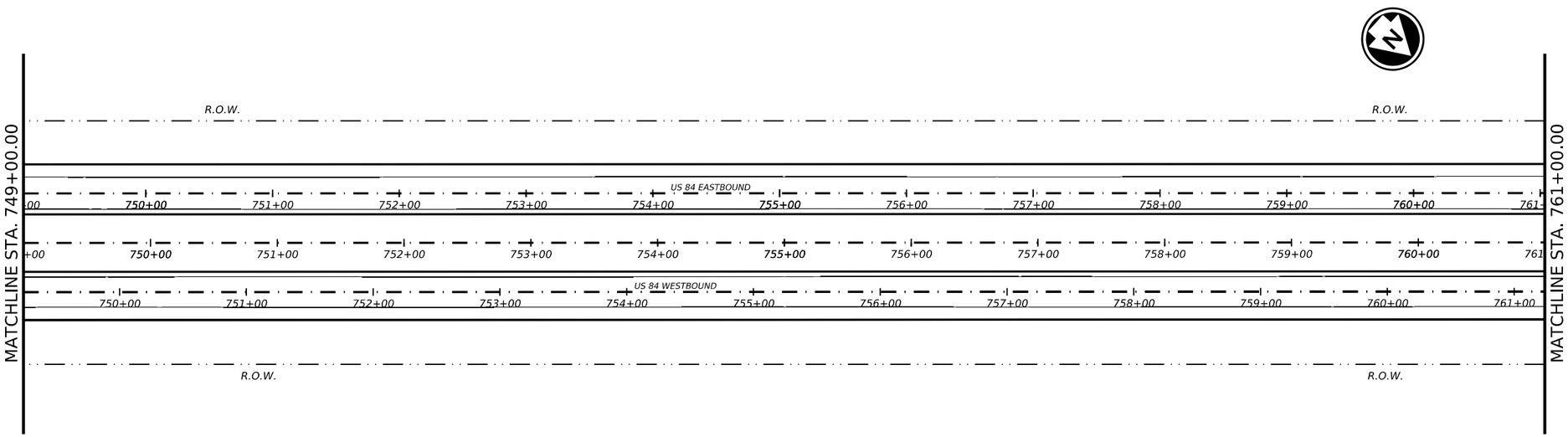

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PLAN VIEW
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SCALE: 1"=100'

SHEET 10 OF 18

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		129

DATE: 9/30/2024 1:08:32 PM
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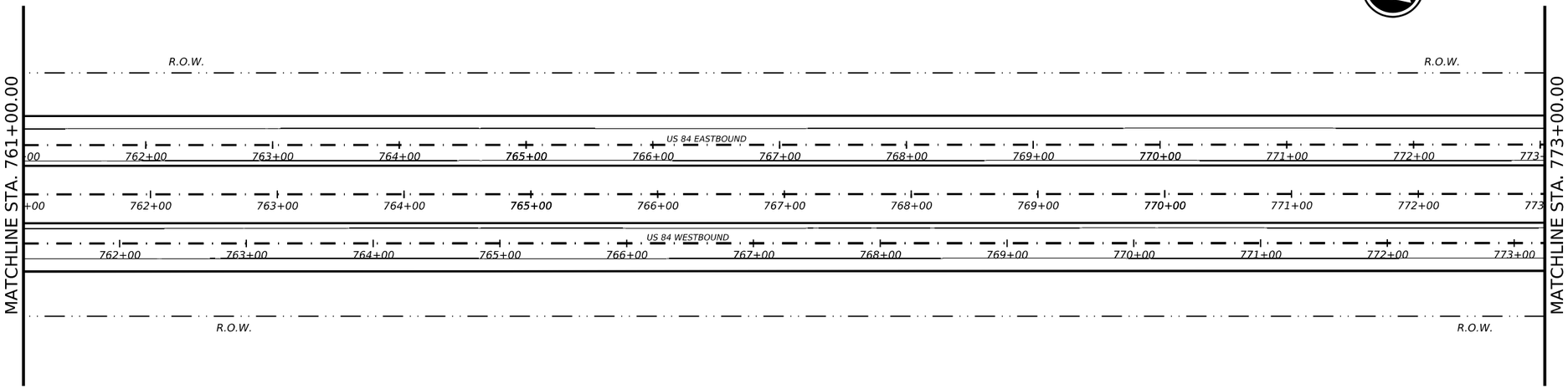

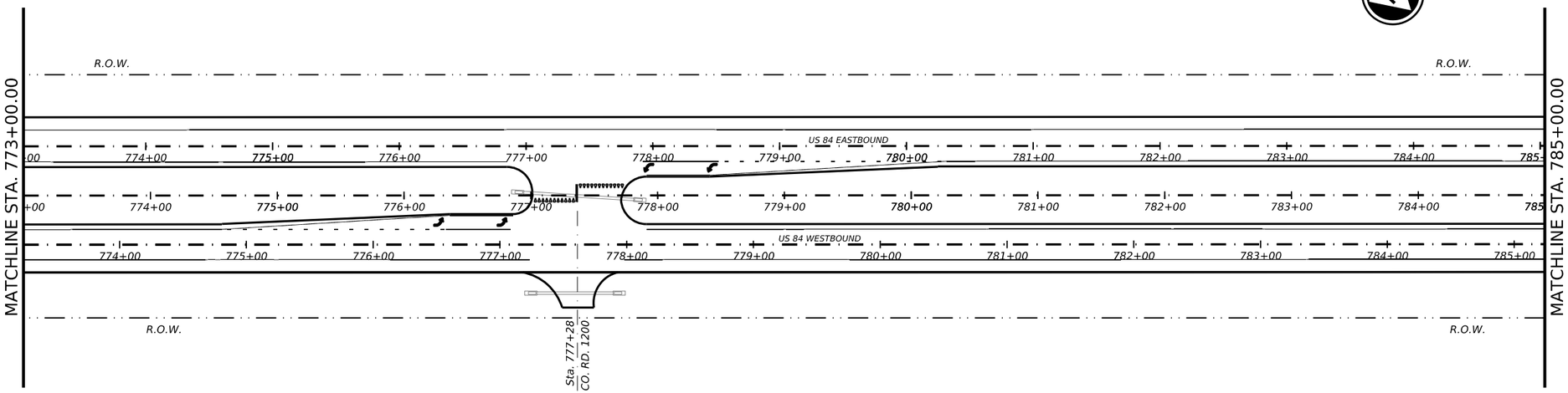

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PLAN VIEW
(LUBBOCK COUNTY)
SCALE: 1"=100'

SHEET 11 OF 18

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		130

DATE: 9/30/2024 1:08:33 PM
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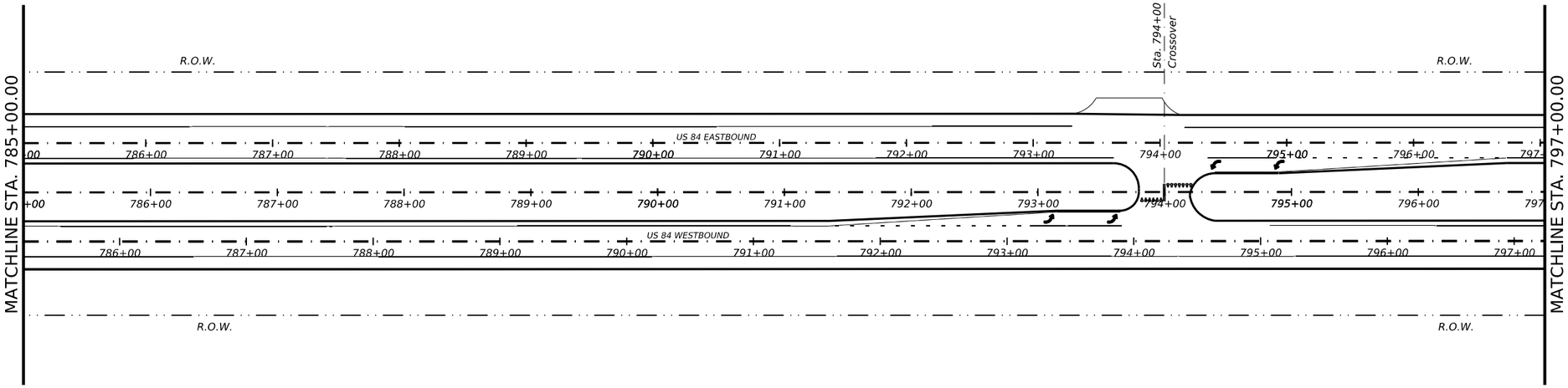

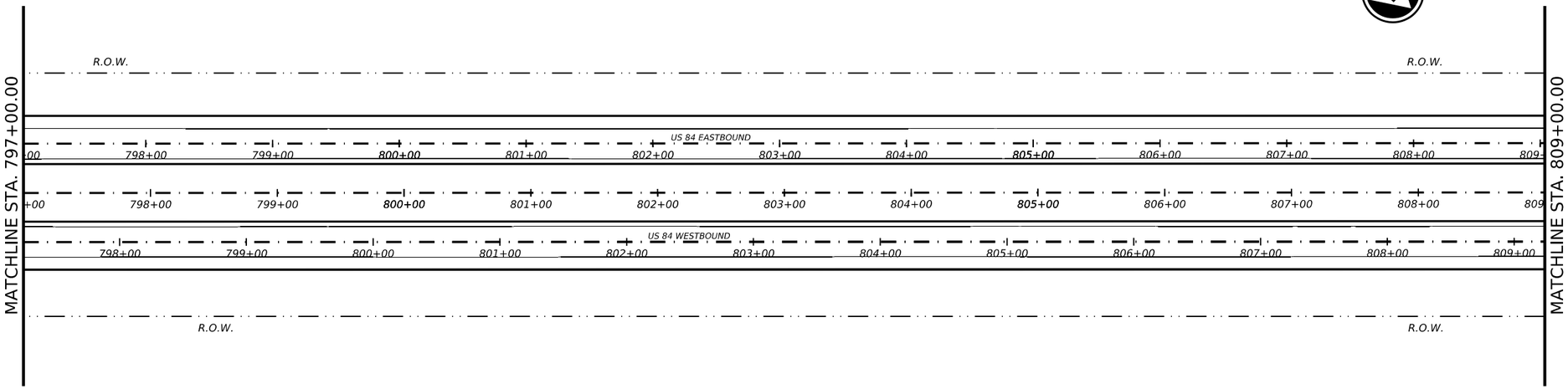

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PLAN VIEW
(LUBBOCK COUNTY)
SCALE: 1"=100'

SHEET 12 OF 18

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		131

DATE: 9/30/2024 1:08:34 PM
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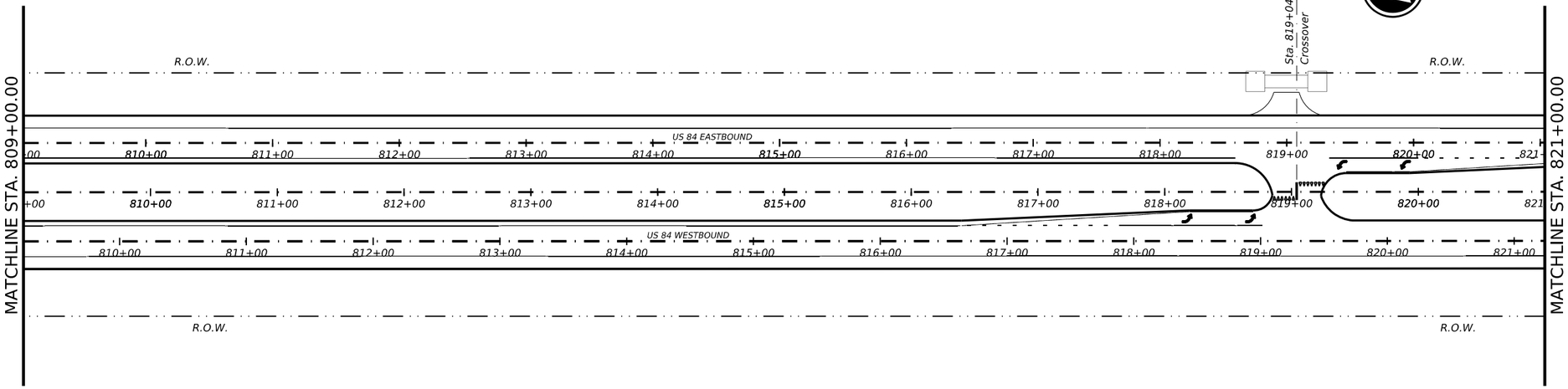

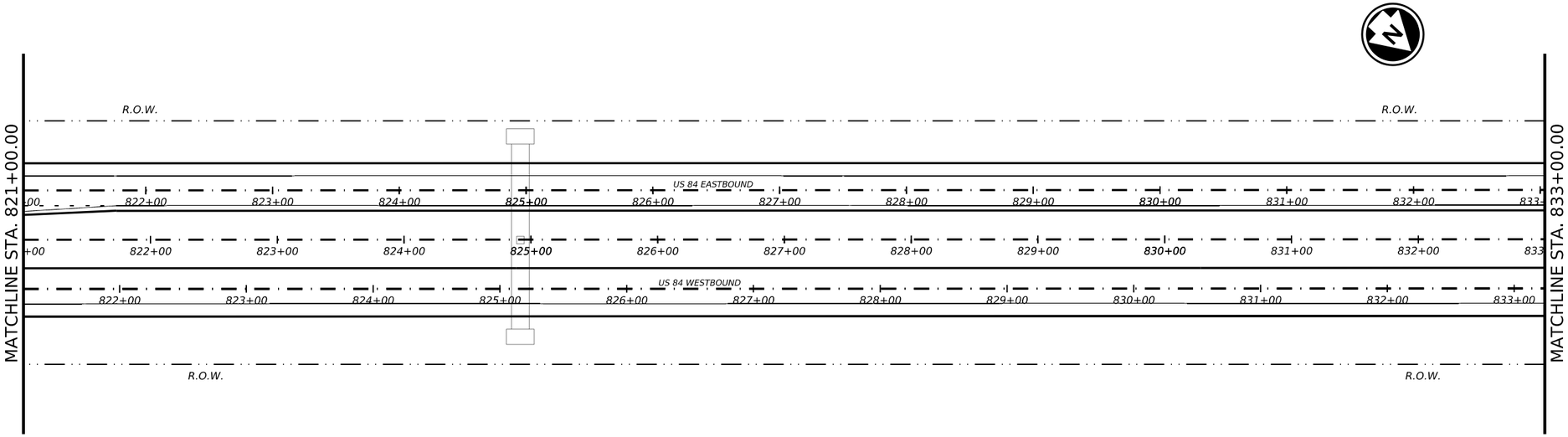

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PLAN VIEW
(LUBBOCK COUNTY)
SCALE: 1"=100'

SHEET 13 OF 18

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		132

DATE: 9/30/2024 1:08:35 PM
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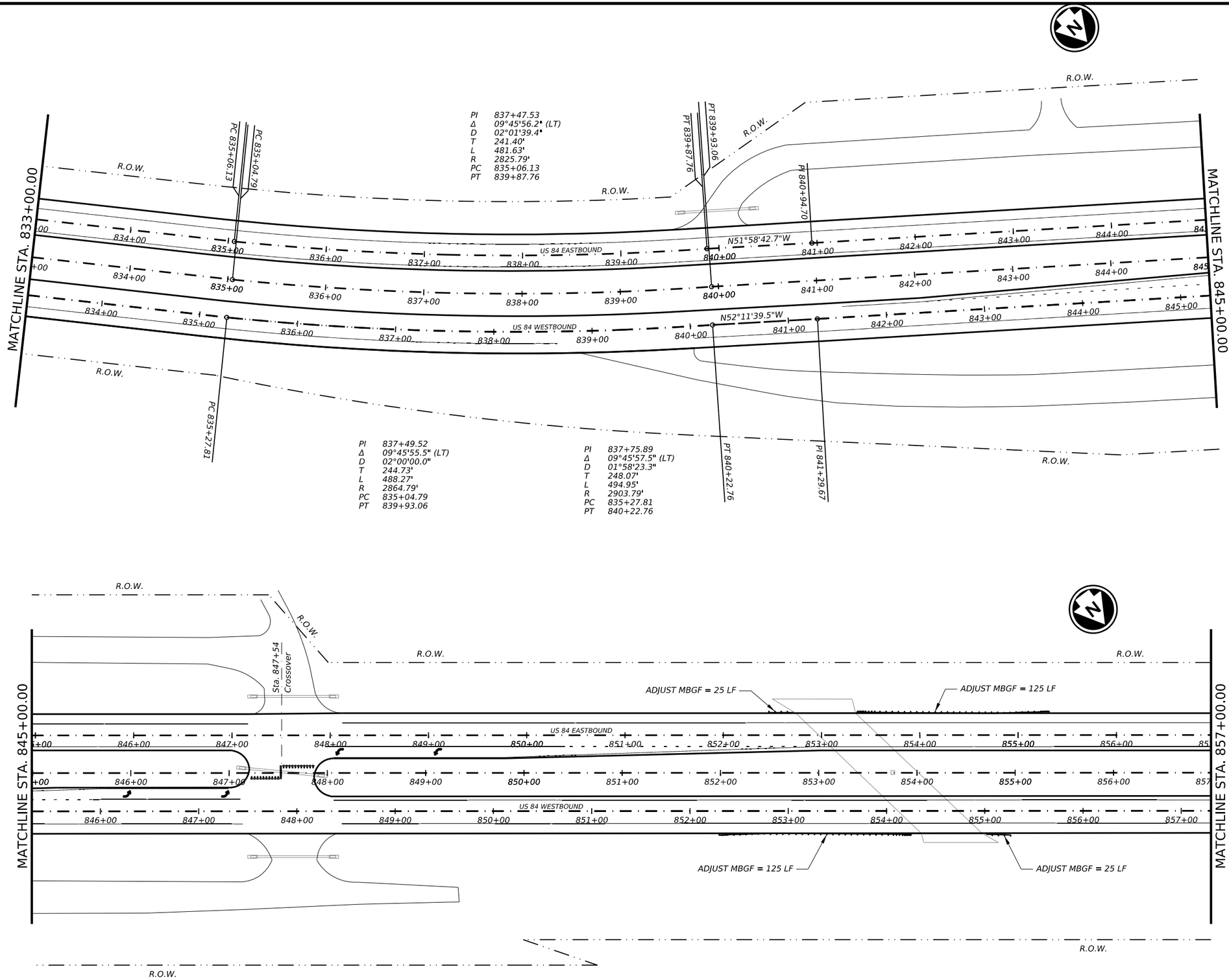

Finished Slopes EBML

-2.0	2.0	832+52
-3.5	3.5	835+74
-3.5	3.5	839+22
-2.0	2.0	842+44

℄

Finished Slopes WBML

2.0	-2.0	832+74
-3.5	3.5	835+96
-3.5	3.5	839+57
2.0	-2.0	842+79

℄

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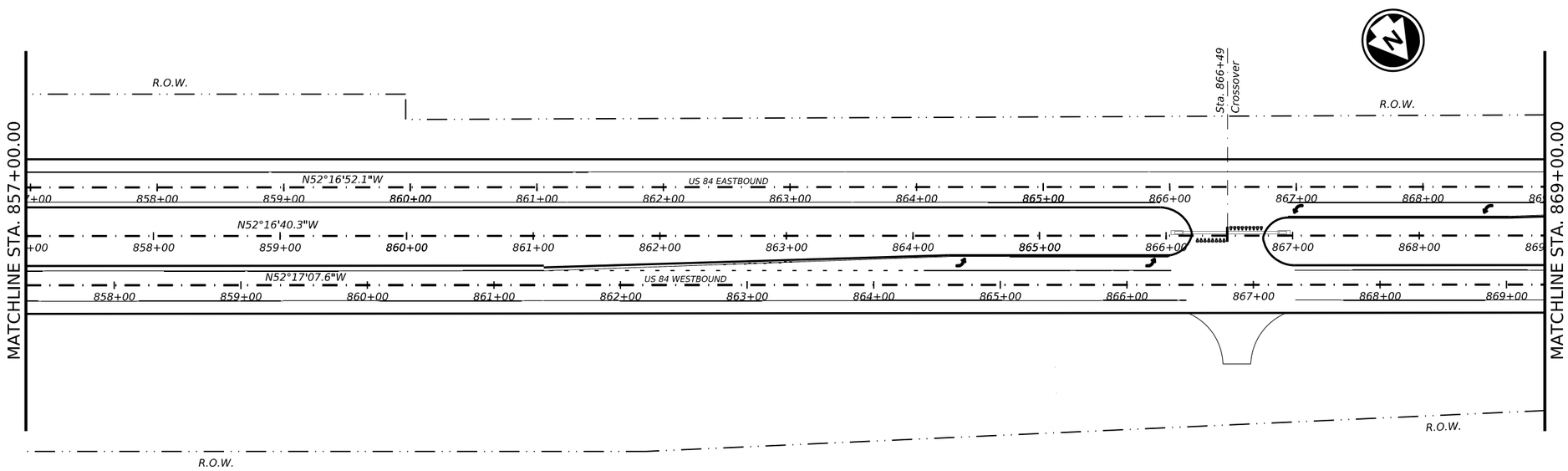
PLAN VIEW
(LUBBOCK COUNTY)
SCALE: 1"=100'

SHEET 14 OF 18

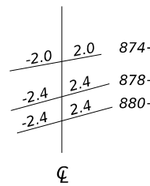
CONT	SECT	JOB	HIGHWAY
0052	05	046, etc.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		133

DATE: 9/30/2024 1:08:37 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084 RDW PLAN LUBBOCK.dgn

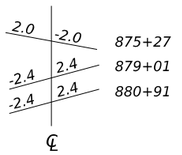
CK DW CK DW

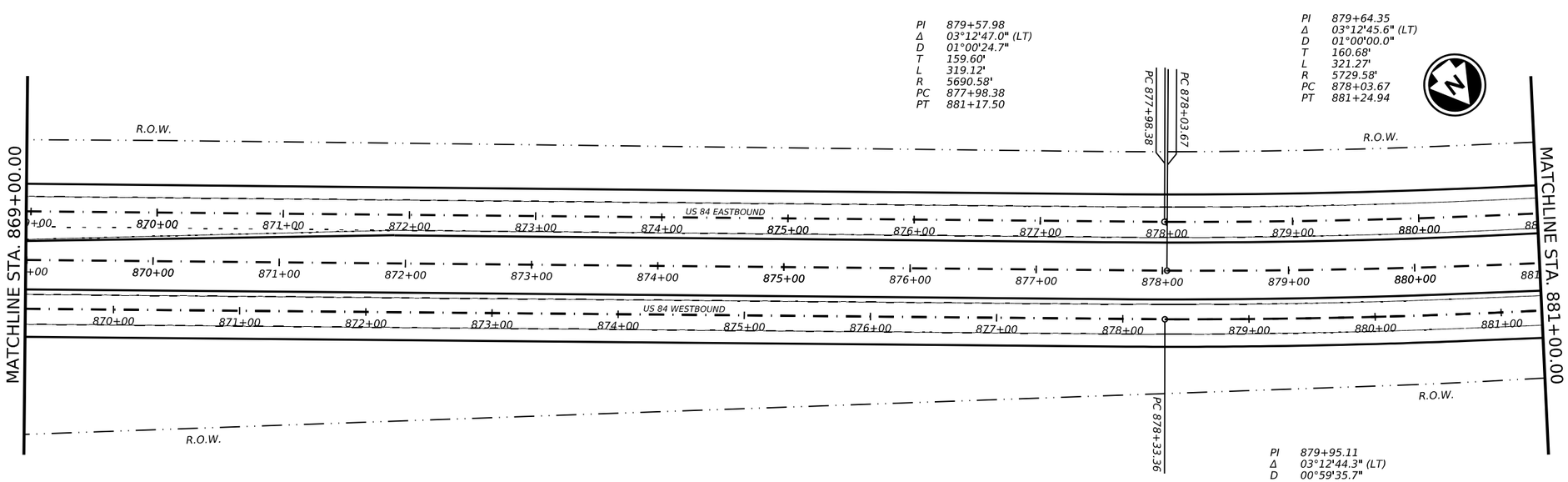


Finished Slopes EBML



Finished Slopes WBML





PI 879+57.98
Δ 03°12'47.0" (LT)
D 01°00'24.7"
T 159.60'
L 319.12'
R 5690.58'
PC 877+98.38
PT 881+17.50

PI 879+64.35
Δ 03°12'45.6" (LT)
D 01°00'00.0"
T 160.68'
L 321.27'
R 5729.58'
PC 878+03.67
PT 881+24.94

PI 879+95.11
Δ 03°12'44.3" (LT)
D 00°59'35.7"
T 161.75'
L 323.42'
R 5768.58'
PC 878+33.36
PT 881+56.78

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Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

PLAN VIEW
(LUBBOCK COUNTY)
SCALE: 1"=100'

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		134

DATE: 9/30/2024 1:08:38 PM
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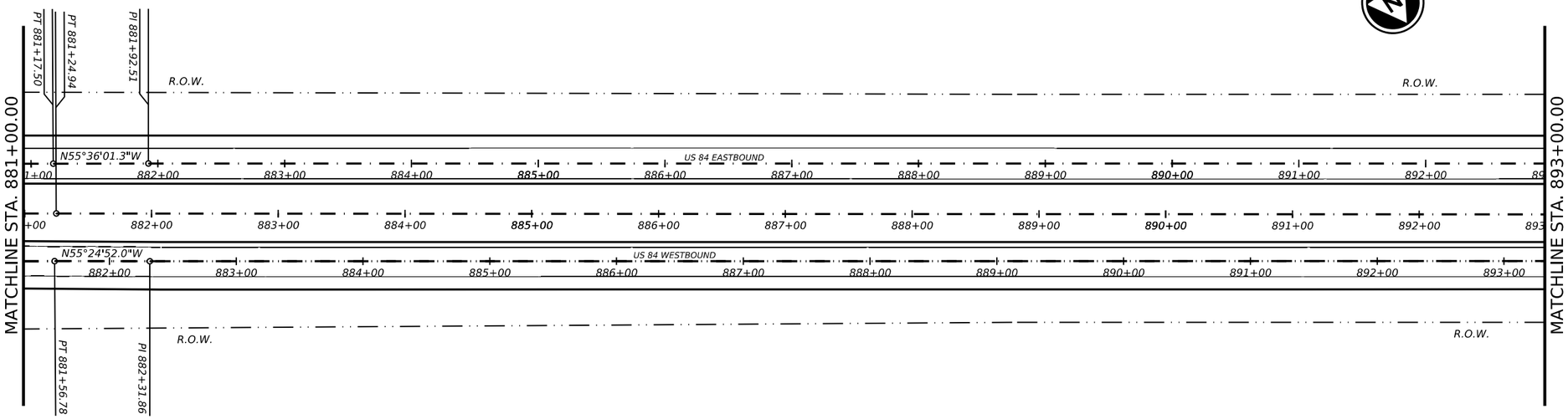
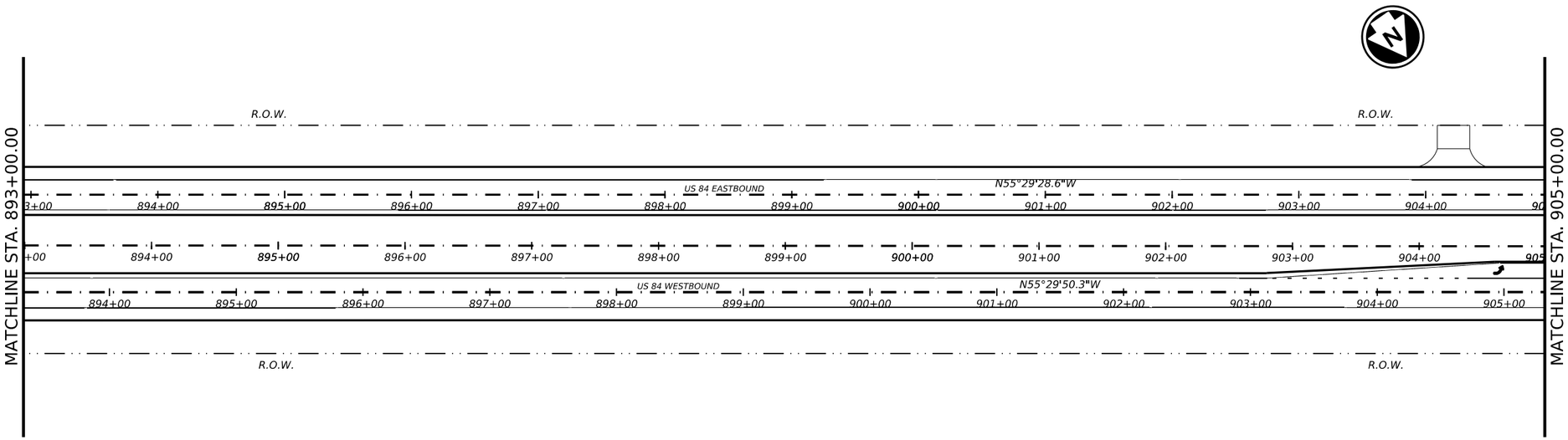
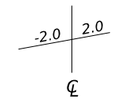
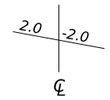




Finished Slopes EBML



Finished Slopes WBML



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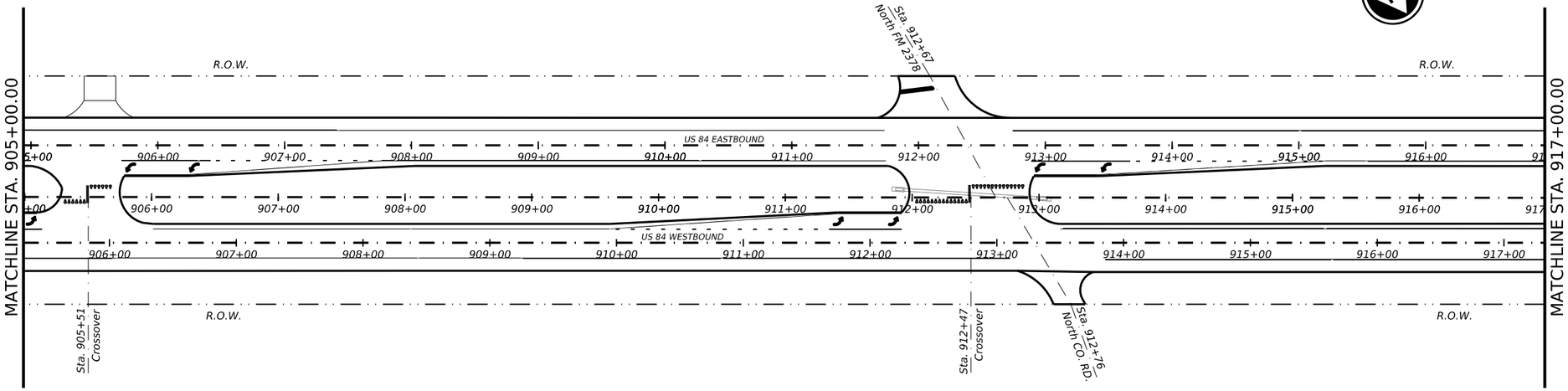
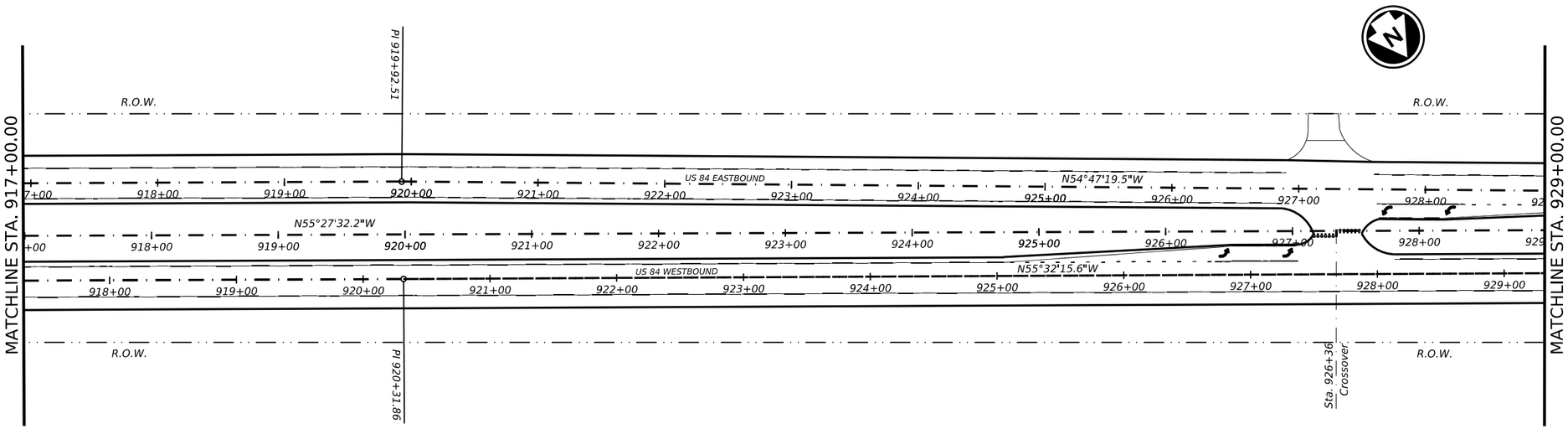
PLAN VIEW
(LUBBOCK COUNTY)
SCALE: 1"=100'

SHEET 16 OF 18

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		135

DATE: 9/30/2024 1:08:39 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LUBBOCK.dgn





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PLAN VIEW
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SCALE: 1"=100'

SHEET 17 OF 18

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		136

DATE: 9/30/2024 1:08:40 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/PLAN SHEETS/US0084_RDW_PLAN_LUBBOCK.dgn

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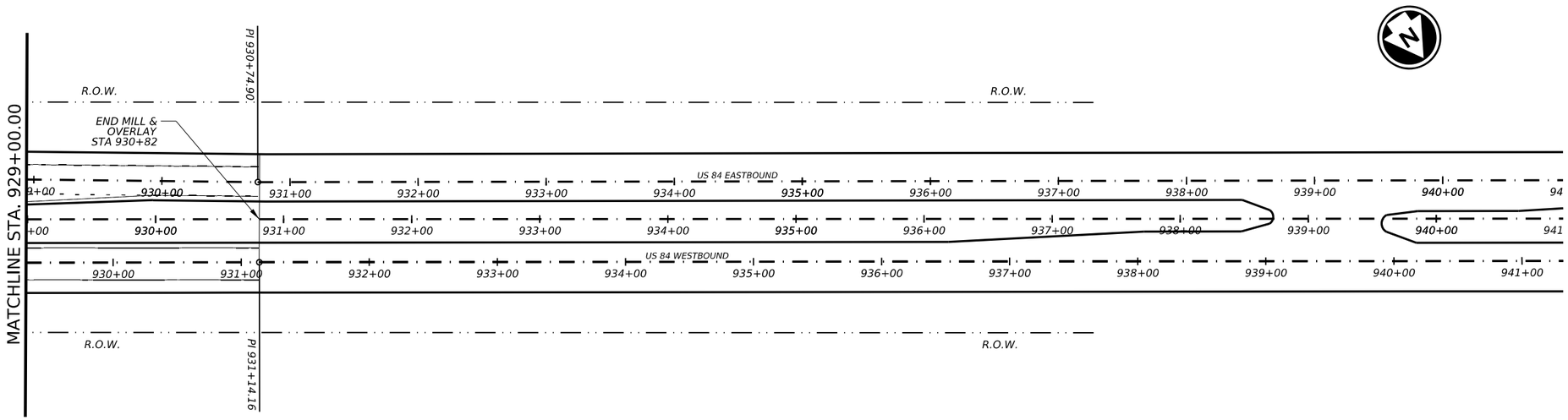

DATE: 9/30/2024 1:08:40 PM
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CK | DW | CK | DW

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9/30/2024

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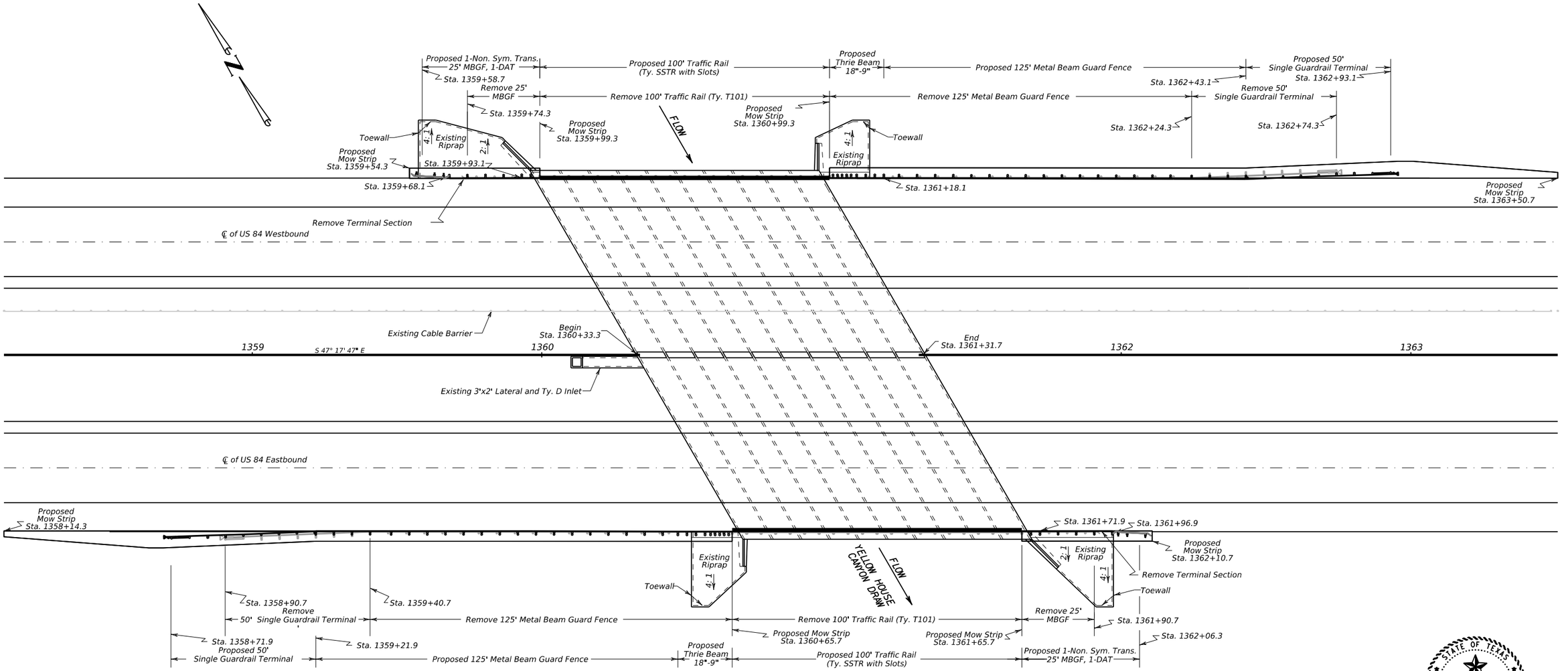
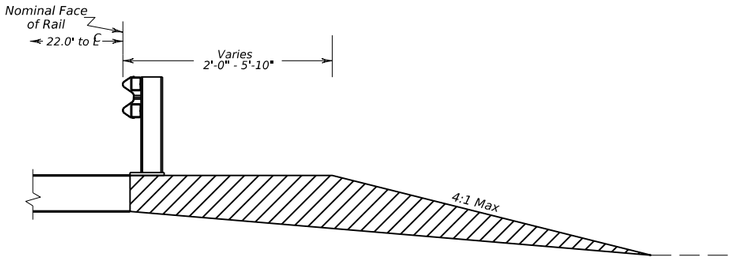
PLAN VIEW
(LUBBOCK COUNTY)
SCALE: 1"=100'

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		137





MBGF Embankment

METAL BEAM GUARD FENCE ITEMS

CSJ	STATION		SIDE OF ROADWAY	MTL W-BEAM GD FEN (STEEL POST)	MTL BEAM GD FEN TRANS (THRIE - BEAM)	MTL BEAM GD FEN NON-SYMMETRICAL TRANS.	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	GUARDRAIL END TREATMENT (REMOVE)	GUARDRAIL END TREATMENT (INSTALL)	DOWNSTREAM ANCHOR TERMINAL (INSTALL)	*REMOVE RAIL (TY 101)
	TO	TO	RT/LT	LF	EA	EA	LF	EA	EA	EA	EA	LF
0052-05-049	1358+71	1362+06	RT	150	1	1	150	1	1	1	1	100
0052-05-049	1359+58	1362+93	LT	150	1	1	150	1	1	1	1	100
			TOTAL	300	2	2	300	2	2	2	2	200

* SUBSIDIARY TO ITEM 451 RETROFIT RAIL

RIPRAP (MOW STRIP) ITEM

CSJ	STATION		SIDE OF ROADWAY	TOTAL LENGTH	AREA	THICKNESS	RIPRAP (MOW STRIP) (5 IN)	CSJ	STATION		SIDE OF ROADWAY	EMBANKMENT
	TO	TO	RT/LT	FT	SF	FT	CY		TO	TO	RT/LT	CY
0052-05-049	1358+14	1360+66	RT	252	973.65	0.42	15.15	0052-05-046	1358+14	1360+66	RT	18
0052-05-049	1359+54	1359+99	LT	45	157.50	0.42	2.45	0052-05-046	1359+54	1359+99	LT	3
0052-05-049	1360+99	1363+51	LT	252	973.62	0.42	15.15	0052-05-046	1360+99	1363+51	LT	18
0052-05-049	1361+66	1362+11	RT	45	157.50	0.42	2.45	0052-05-046	1361+66	1362+11	RT	3
						TOTAL	35.20				TOTAL	42

NBI NO. 051400005205008

CSJ	STATION		SIDE OF ROADWAY	BRIDGE ITEM	ROADWAY ITEMS	
				RETROFIT RAIL (TY SSTR)	**CONC STR REPR (RAPID VERT AND OVERHEAD)	SHOT BLASTING
	TO	TO	RT/LT	LF	SF	SY
0052-05-049	1358+71	1362+06	RT	100		
0052-05-049	1359+58	1362+93	LT	100		22
0052-05-046	1358+71	1362+06	RT		100	22
0052-05-046	1359+58	1362+93	LT		100	22
			TOTAL	200	200	44

** QUANTITY SHOWN IS FOR ESTIMATE PURPOSES

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

YELLOW HOUSE CANYON
BRIDGE RAIL DETAILS (LAMB COUNTY)
NO SCALE

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		138

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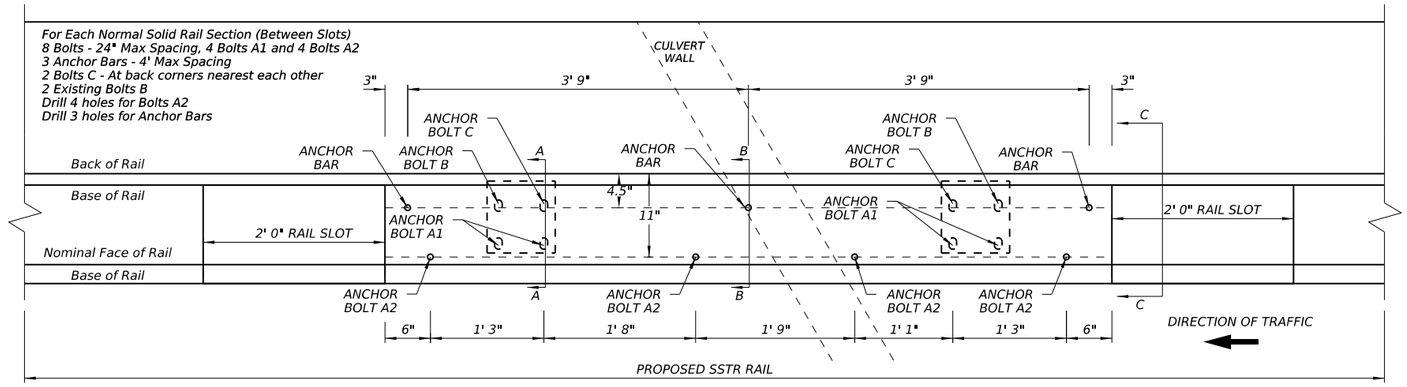
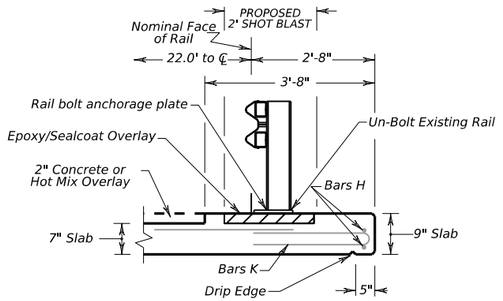
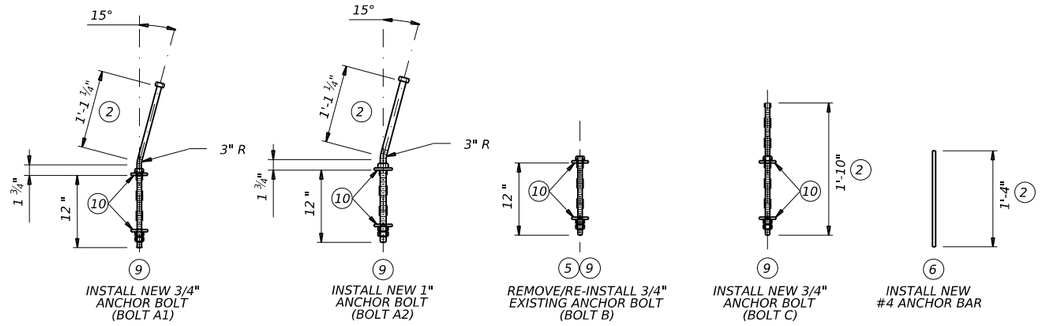


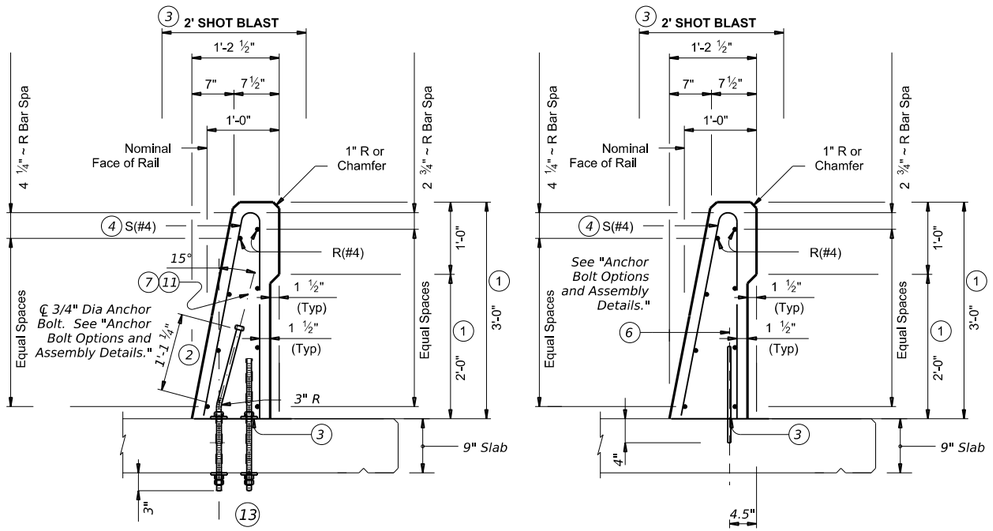
PLAN VIEW
EXISTING RAIL BOLT ANCHORAGE PLATES (8)



EXISTING
END OF SLAB
& RAIL DETAIL

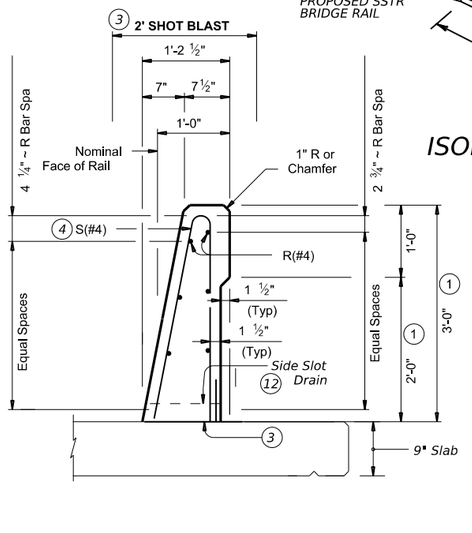


ANCHOR BOLT OPTIONS (11) AND ASSEMBLY DETAILS



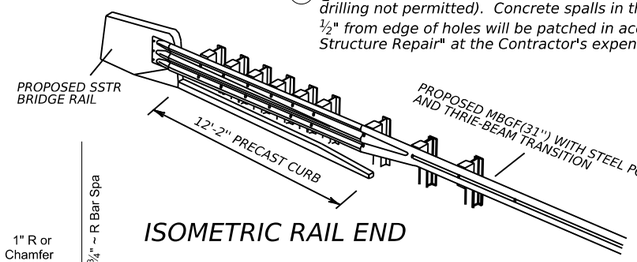
A-A (8)

B-B (8)

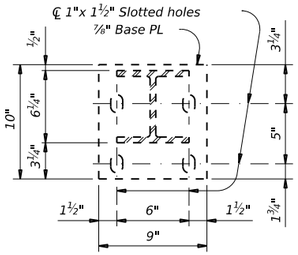


C-C (8)

PROFILE VIEW
PROPOSED SSTR RAIL



ISOMETRIC RAIL END



EXISTING
RAIL BOLT
ANCHORAGE
PLATE

1. Increase 2" for structures with Overlay.
2. Increase by amount of existing overlay/seal coat thickness, not to exceed 2". If thickness of existing overlay/seal coat is greater than 2" at toe of rail, taper overlay at a 1:10 or flatter slope over shoulder width to a thickness of 2" or less at toe of rail.
3. Do not cast rails or parapet walls on top of overlays/seal coats. Clean off by shot blasting.
4. See appropriate rail standard for reinforcing steel. Modify length of vertical reinforcing bars as required to fit existing structure. Longitudinal reinforcing bars may be removed only if their position puts them in conflict with un-removed portions of existing structure.
5. Re-install existing anchor bolt. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".
6. Embed secondary (#4) anchor bars 1'-4" in length with a Type III Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 10 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing". (#4) anchor bars spaced longitudinally along rail at 4 ft Max (Spaced 3" longitudinally from outside edge and edge of side slot drains).
7. ℄ 3/4" Dia Anchor Bolts Spaced longitudinally along rail in existing bolt holes and additional ℄ 1" Dia Anchor Bolts Spaced longitudinally at 24" Max (Spaced 6" longitudinally from outside edge and edge of optional side slot drains).
8. Showing location of anchor bars and anchor bolts in a rail retrofit condition. See appropriate rail standard for details and notes shown.
9. ℄ 3/4" Dia or ℄ 1" Dia ASTM F1554 Gr 55 Anchor Bolt. Nuts must conform to ASTM A563 requirements. Heavy Hex Nuts required.
10. Plate Washer 3/8 x 3 x 3 ASTM A36 with 1 1/16" Dia Hole for 1" diameter anchor bolts and 13/16" Dia Hole for 3/4" diameter anchor bolts.
11. Galvanize anchor bolts, nuts and plate washers.
12. Provide 8'-0" Min clear spacing between drain slots.
13. ℄ 1 1/16" to 1 ¼" Dia holes. Core drill holes through existing deck (percussion drilling not permitted). Concrete spalls in the bottom of the deck exceeding ½" from edge of holes will be patched in accordance with Item 429, "Concrete Structure Repair" at the Contractor's expense.

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9/30/2024

Texas Department of Transportation

YELLOW HOUSE CANYON
BRIDGE RAIL DETAILS (LAMB COUNTY) NO SCALE

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		139

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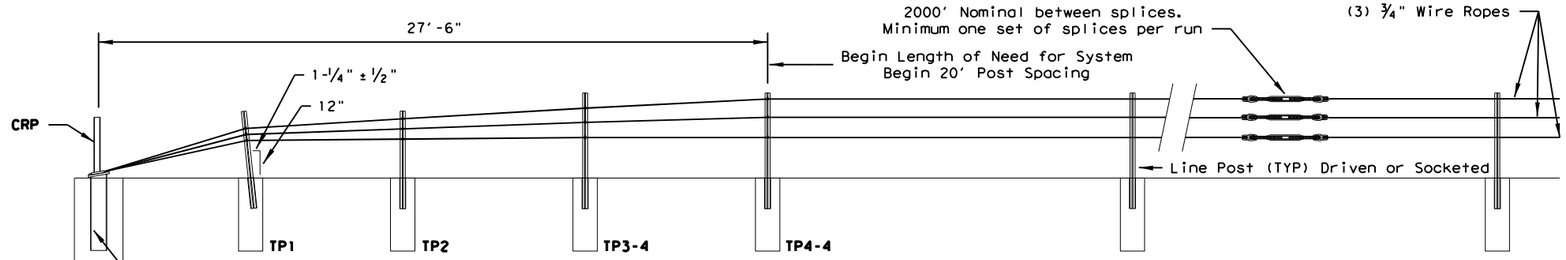
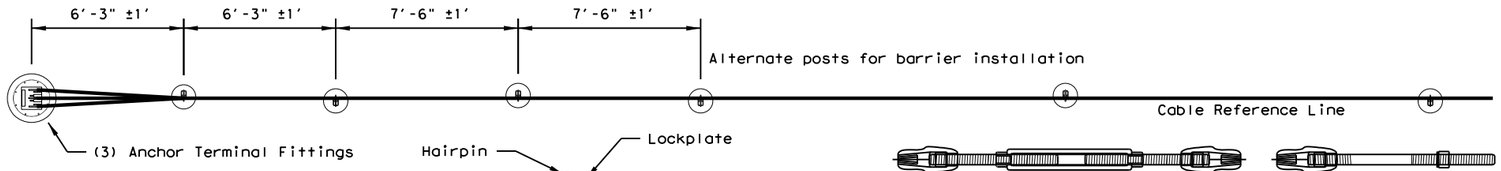
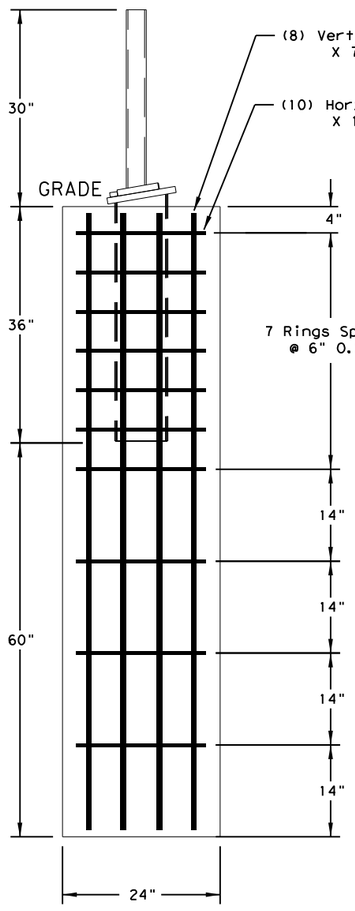
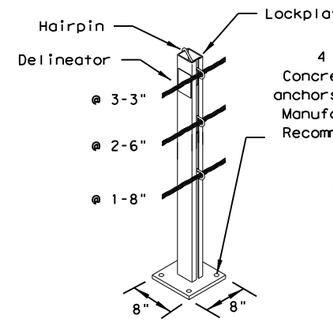


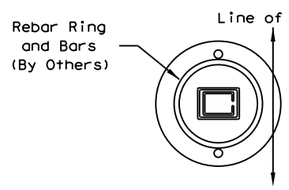




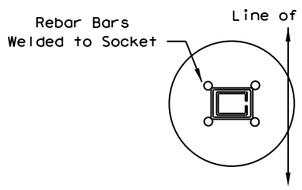
CABLE RELEASE AND ANCHOR POST



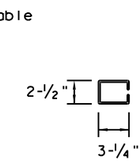
LINE POST
(BASE-PLATED OPTION)
Low-Fill Box Culvert Less than 15" Fill



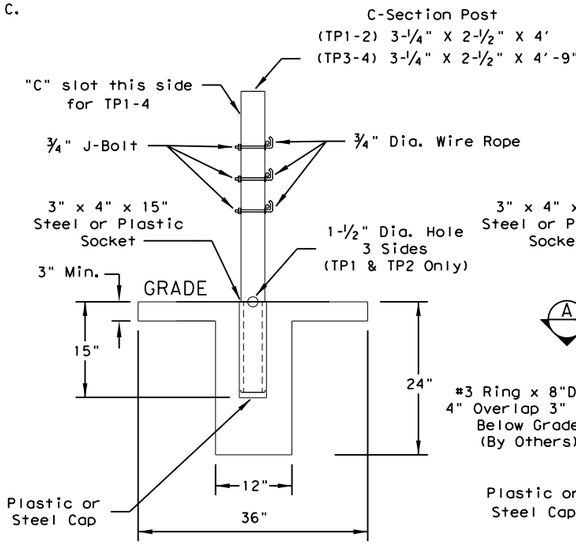
SECTION A



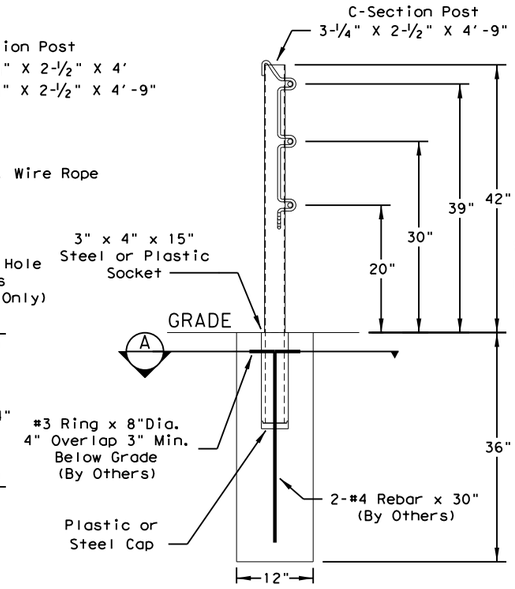
SECTION B



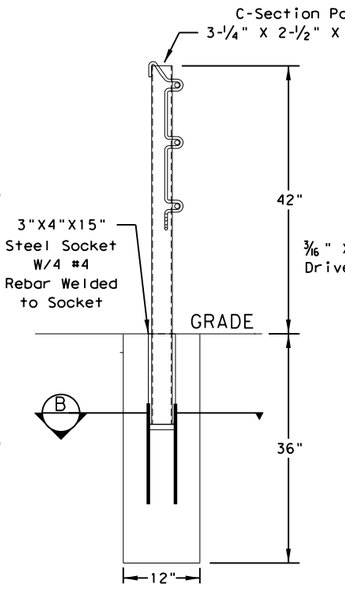
C-SECTION POST



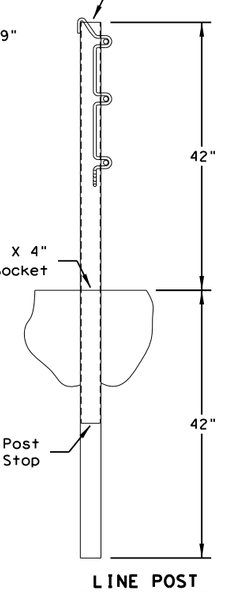
TERMINAL POST
(SHOWN WITH CONCRETE MOWSTRIP)
(Shown with Tube Plate Option)
(See Note 10)



LINE POST SOCKETED
(Shown with Rebar Ring/Bars Socket Option)
(See Note 9)



LINE POST SOCKETED
(Shown with Welded Rebar Socket Option)
(See Note 9)



LINE POST
(DRIVEN OPTION)
(Shown with Driven
Socket Option)
(See Note 9)

GENERAL NOTES

1. For additional information contact Gibraltar, Inc. at 1-800-495-8957, 830-798-5444, or see the manufacturer's product manual.
2. All concrete shall be CLASS A.
3. The Cable Barrier System shall be installed on shoulders or on medians with slopes of 6:1 or flatter. If installed on slopes steeper than 6:1 up to 4:1 the TL-4 system performs as a TL-3 and Gibraltar must be contacted for various guidelines related to placement.
4. The Cable Barrier System is accepted by the FHWA Test Level - 4.
5. See the Texas MUTCD for proper "Barrier" delineation.
6. Rock Clause: Where solid rock is encountered:
   A. For socketed post, continue digging 12" diameter, 15" deep into rock or the required plan depth, whichever comes first.
   B. For driven post, core drill a 4" diameter hole 18" deep into rock or the required plan depth, whichever comes first.
   C. For Anchor post, continue digging 24" diameter, 30" deep into rock or the required plan depth, whichever comes first.
7. Tolerances:
   * LP = 3" out of plumb, at top
   * Cable height = 1"
   * Anchor Post = 5" off of Cable Reference Line
8. The Gibraltar cable barrier system shall be installed in NCHRP Report 350 standard compacted soil. Soil must be well drained.
9. All non-welded rebar by others.
10. Minimum recommended line post foundation.
    A. Without mowstrip, 36" Deep x 12" diameter foundations with #3 rebar ring x 8" diameter with two #4 rebar vertical bars 30" long
    B. With 4" minimum depth hot mix asphalt, 30" deep x 12" diameter foundations with #3 rebar ring x 8" diameter with two #4 rebar vertical bars 30" long.
    C. With 3" minimum depth concrete mowstrip, 24" deep x 12" diameter foundations. (No rebar required)
    D. Direct drive post 42" deep.

CABLE TENSION CHART*	
-10 °F	8000
0 °F	7600
10 °F	7200
20 °F	6800
30 °F	6400
40 °F	6000
50 °F	5600
60 °F	5200
70 °F	4800
80 °F	4400
90 °F	4000
100 °F	3600
110 °F	3200

DEFLECTION	
Deflection	Post Spacing
8'-0"	20 FT
7'-0"	12 FT
6'-8"	10 FT

* Allowable Deviation from Chart +/- 10%

Texas Department of Transportation — Design Division Standard

GIBRALTAR CABLE BARRIER SYSTEM (TL-4)

GBRLTR(TL4)-14

FILE: gbrltrt1414.dgn	DN: TxDOT	CK: RM	DW: VP	CK:
©TxDOT: March 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		140

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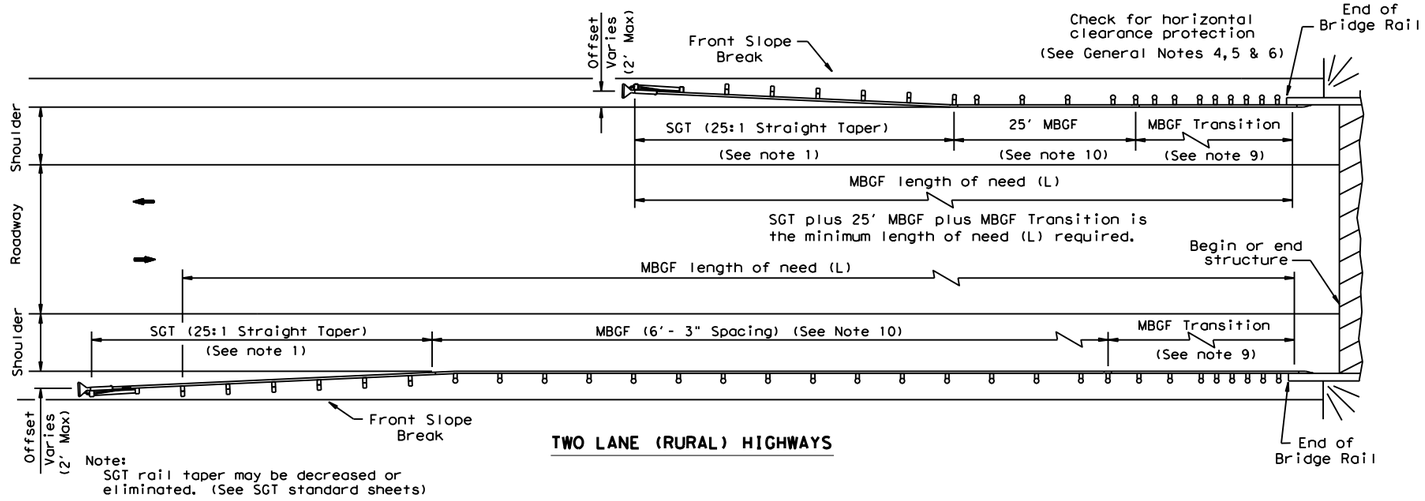
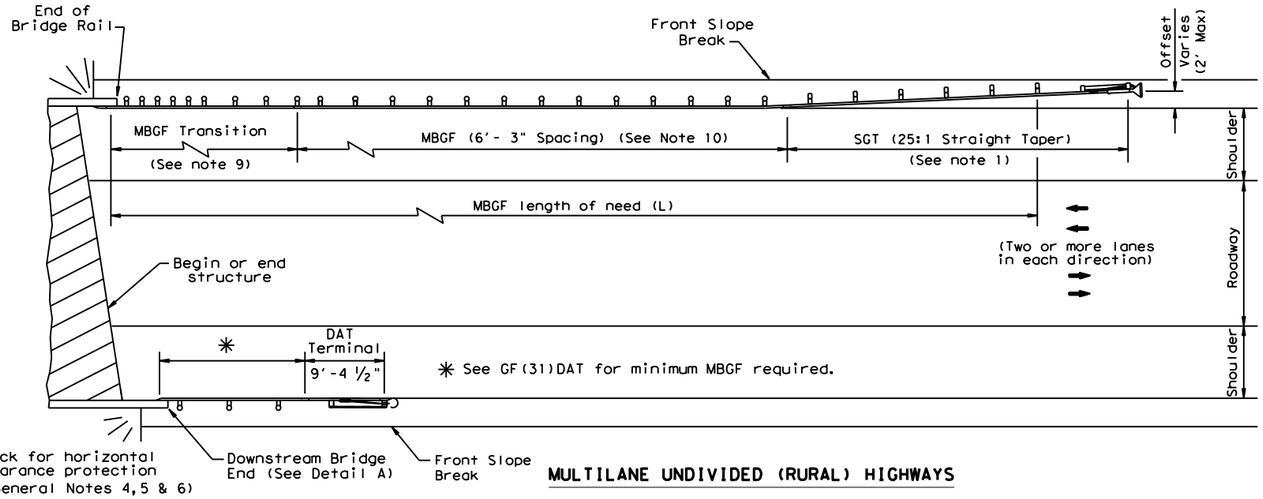
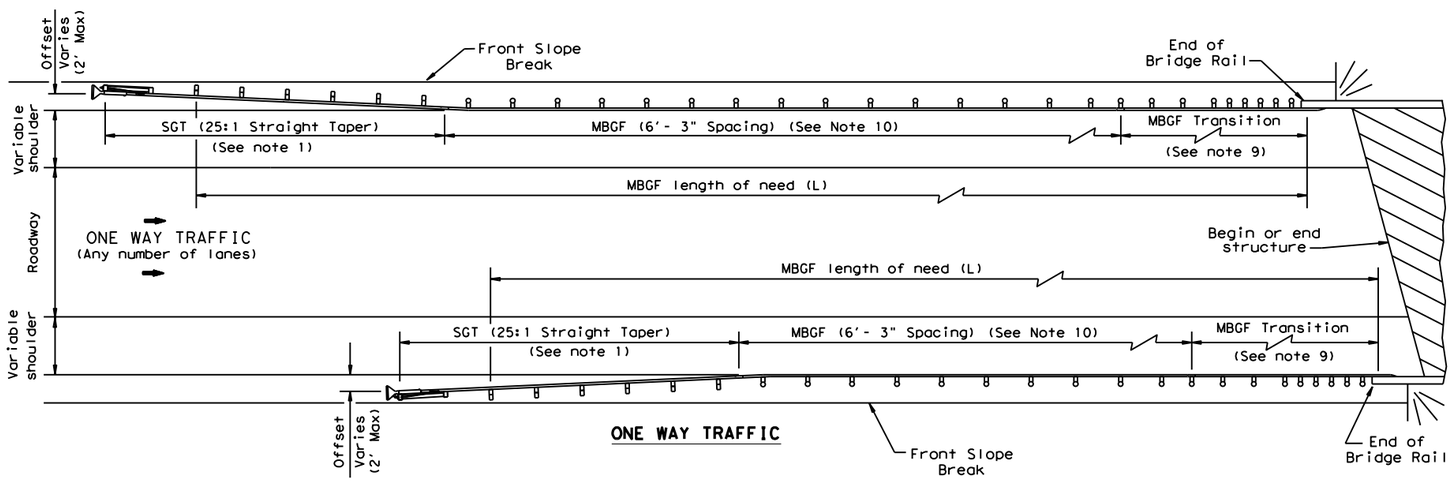


TWO LANE (RURAL) HIGHWAYS

Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)



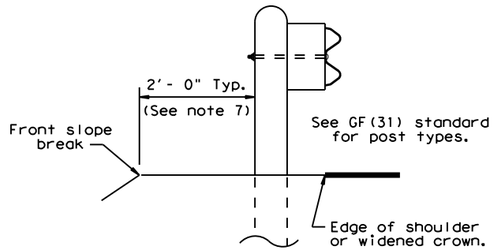
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



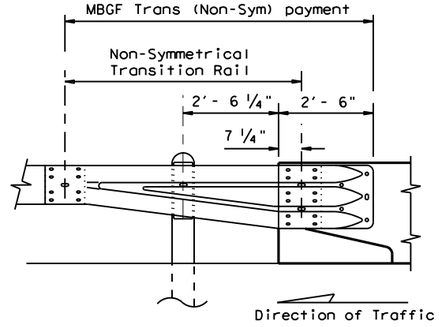
ONE WAY TRAFFIC

GENERAL NOTES

1. For more detail: See GF(31), SGT( )31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'- 0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. For restrictive bridge widths: The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft. "maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.



TYPICAL CROSS SECTION AT MBGF



Note:
All rail elements shall be lapped in the direction of adjacent traffic.

DETAIL A

Showing Downstream Rail Attachment

Texas Department of Transportation

Design Division Standard

BRIDGE END DETAILS

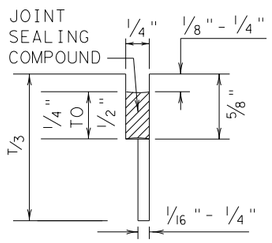
(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

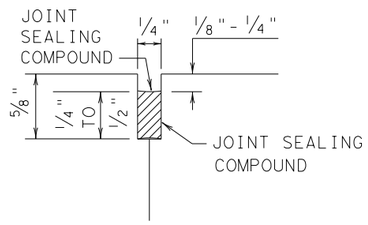
FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
REVISED APRIL 2014 SEE (MEMO 0414)	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		141

DATE: 9/30/2024
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/3. Roadway/STANDARDS/js14.dgn

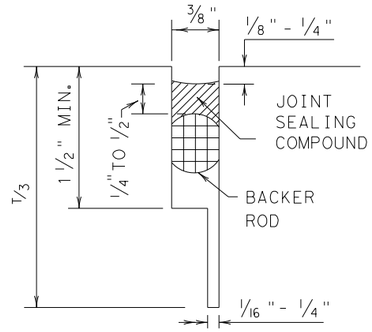
METHOD B: JOINT SEALING COMPOUND



LONGITUDINAL SAWED
CONTRACTION JOINT



LONGITUDINAL OR TRANSVERSE
CONSTRUCTION JOINT



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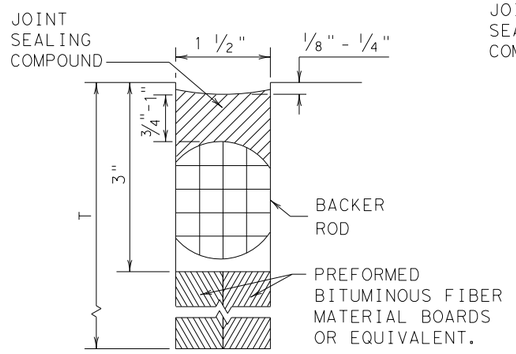
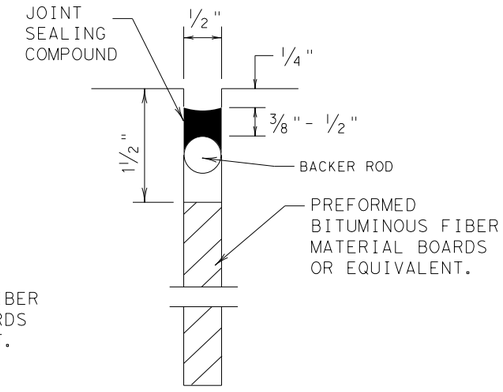
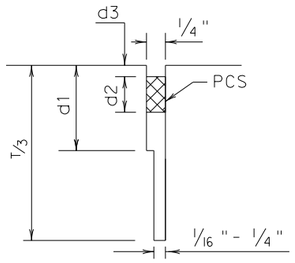


TRANSVERSE FORMED
EXPANSION JOINT



FORMED
ISOLATION JOINT

METHOD A: PREFORMED COMPRESSION SEALS (PCS)(DMS-6310 CLASS 6)



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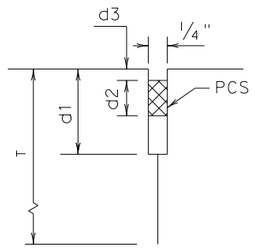
CONTRACTION JOINT



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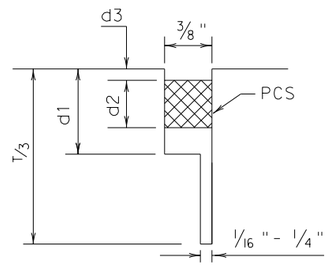
CONSTRUCTION JOINT



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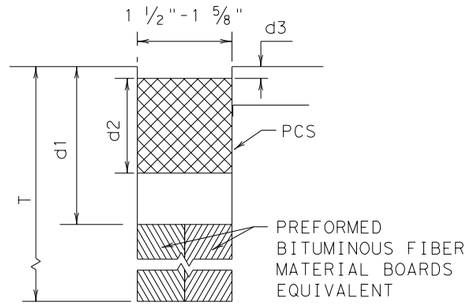
CONTRACTION JOINT



TRANSVERSE FORMED
EXPANSION JOINT

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
2. THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
3. THE JOINT RESERVOIR FOR SEALANT OR PCS SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION JOINTS AND THE SAWED JOINTS.
4. DIMENSIONS d1, d2, AND d3 SHOWN IN METHOD A SHALL BE IN ACCORDANCE WITH THE PREFORMED COMPRESSION SEAL MANUFACTURER'S RECOMMENDATION.
5. REFER TO DMS-6310 "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
6. FOR SAWED LONGITUDINAL JOINT, LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT, USE JOINT SEALANT CLASS 5 OR 8 UNLESS OTHERWISE SHOWN ON THE PLAN OR APPROVED.
7. FOR TRANSVERSE SAWED CONTRACTION, TRANSVERSE FORMED EXPANSION JOINT, AND ISOLATION JOINT USE JOINT SEALANT CLASS 5 OR 8 AT NEW JOINTS. USE JOINT SEALANT CLASS 4,5,7,OR 8 FOR MAINTAINING EXISTING JOINTS.
8. THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 "CLEANING AND SEALING JOINTS" OR ITEM 713 "CLEANING AND SEALING JOINTS AND CRACKS (CONCRETE PAVEMENT)".
9. ISOLATION JOINTS ACCOMMODATE HORIZONTAL AND VERTICAL MOVEMENTS THAT OCCUR BETWEEN A PAVEMENT AND A STRUCTURE. ISOLATION JOINTS MAY BE USED FOR BRIDGE ABUTMENTS, INTERSECTIONS, CURB AND GUTTER, OLD AND NEW PAVEMENTS, OR AROUND DRAINAGE INLETS, MANHOLES, FOOTINGS AND LIGHTING STRUCTURES.

Texas Department of Transportation | Design Division Standard

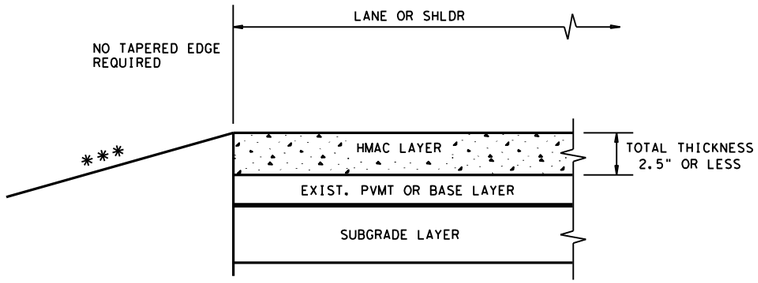
CONCRETE PAVING DETAILS

JOINT SEALS

JS-14

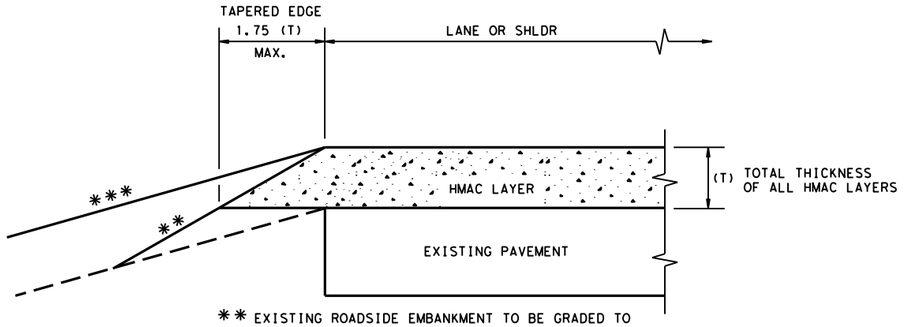
FILE: js14.dgn	DN: TxDOT		DN: HC	DW: HC		CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0052	05	046, ETC.		US 84	
	DIST	COUNTY			SHEET NO.	
	LBB	LAMB, ETC.			142	

DATE: 9/30/2024
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/3. Roadway/STANDARDS/tehmac11.dgn



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

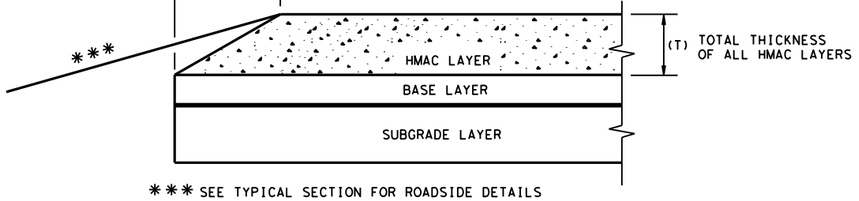
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

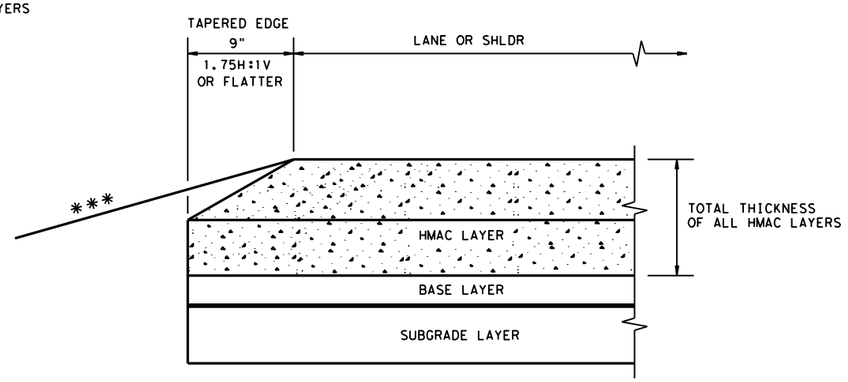
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
OVERLAY OF EXISTING PAVEMENT HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 5" OR GREATER

(NOT TO SCALE)

GENERAL NOTES

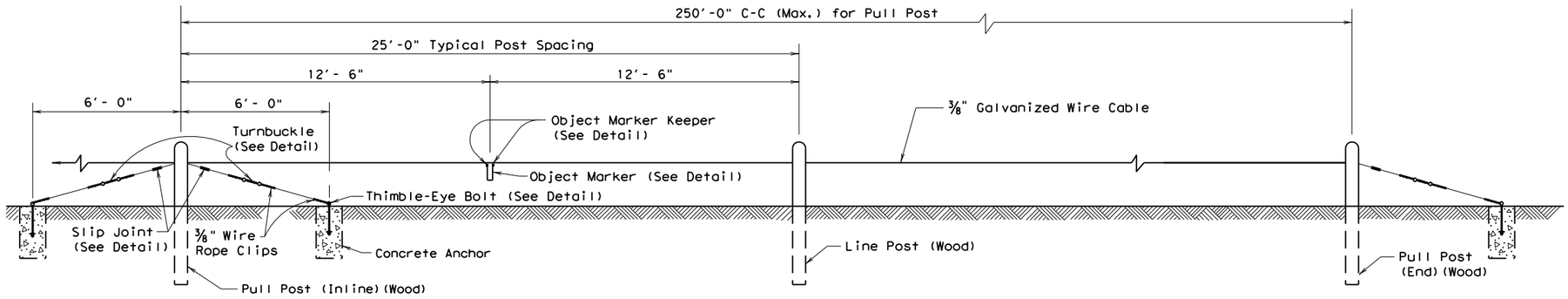
1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

Texas Department of Transportation | Design Division Standard

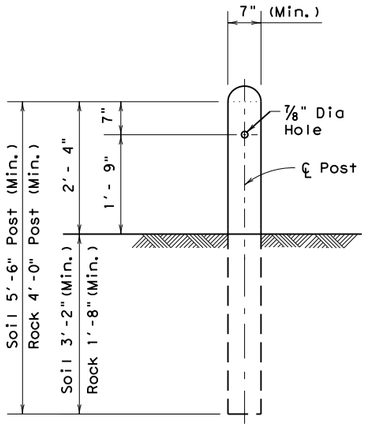
TAPERED EDGE DETAILS
HMAC PAVEMENT

TE(HMAC)-11

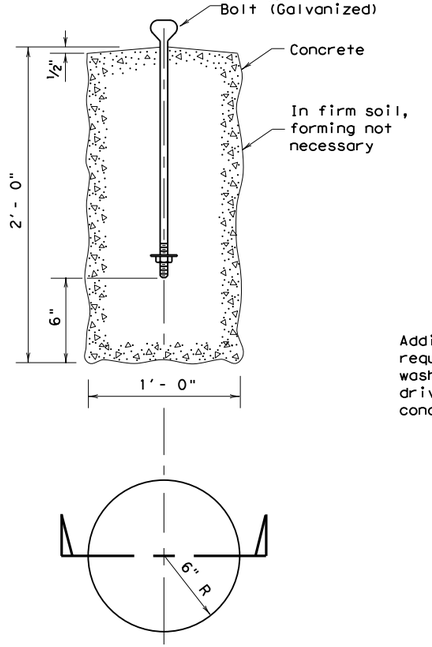
FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:
©TxDOT January 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		143



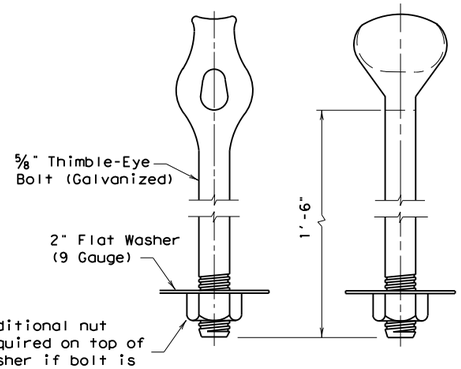
WOOD POST & CABLE UNIT



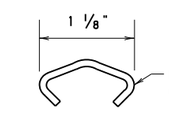
WOOD POST DETAIL



CONCRETE ANCHOR DETAILS

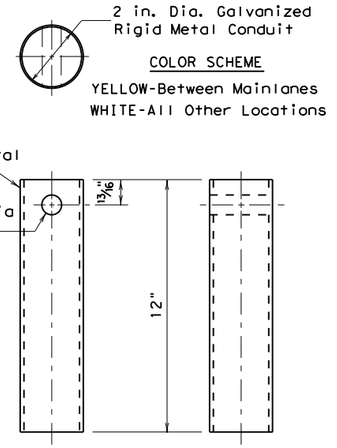


THIMBLE-EYE BOLT DETAILS



Clamp keepers on both sides of Reflector as shown above.

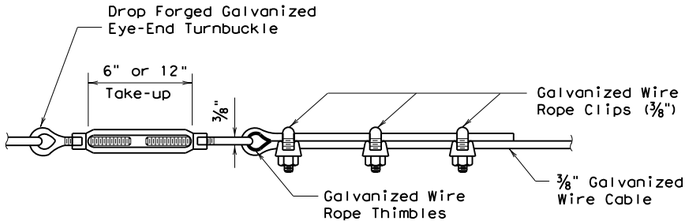
OBJECT MARKER KEEPER DETAIL



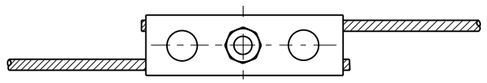
OBJECT MARKER (Reflector Detail)

GENERAL NOTES

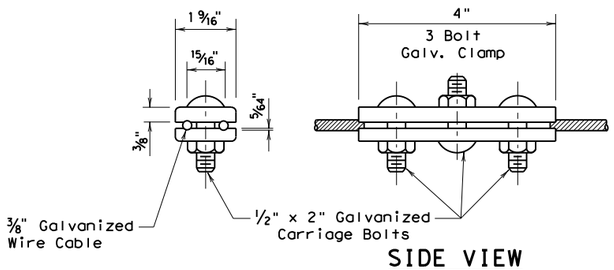
1. Furnish Class "B" or better concrete in accordance with Item 421, "Hydraulic Cement Concrete". Cure concrete anchors at least five (5) days before attaching the cable.
2. Furnish galvanized cable fittings in accordance with the Item 445, Galvanizing.
3. Furnish posts meeting the requirements of DMS 7200, "Timer Posts and Blocks for Metal Beam Guard Fence." Do not use painted timber posts.
4. Cover the entire surface of object marker (reflector) with a reflectorized sheeting material conforming to Departmental Material Specification DMS 8300, "Sign Face Materials", Type C.
5. Furnish cable conforming to ASTM designation A475.



WIRE CABLE CONNECTION (at turnbuckles & eyebolts) DETAIL



TOP VIEW



SIDE VIEW

SLIP JOINT DETAIL

LEVELS DISPLAYED

1	3	4	5	6	7	8	9	10	11	21	31	41	51	61		
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63		

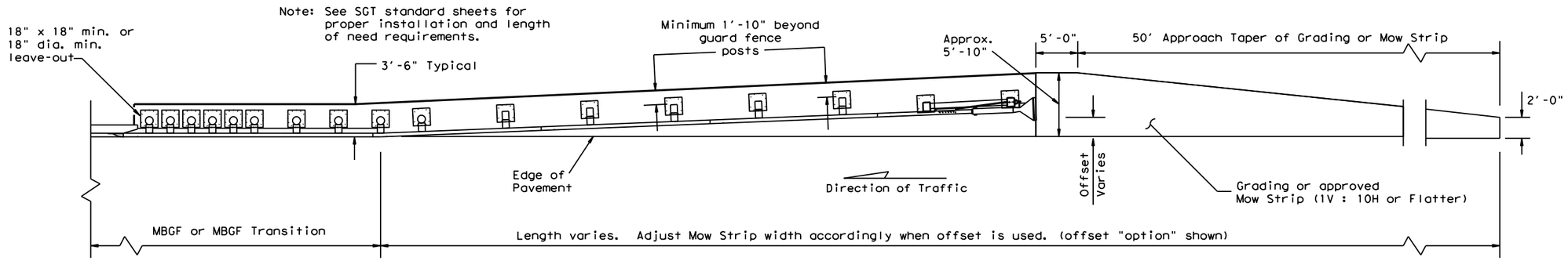
Texas Department of Transportation
Maintenance Division

POST & CABLE FENCE

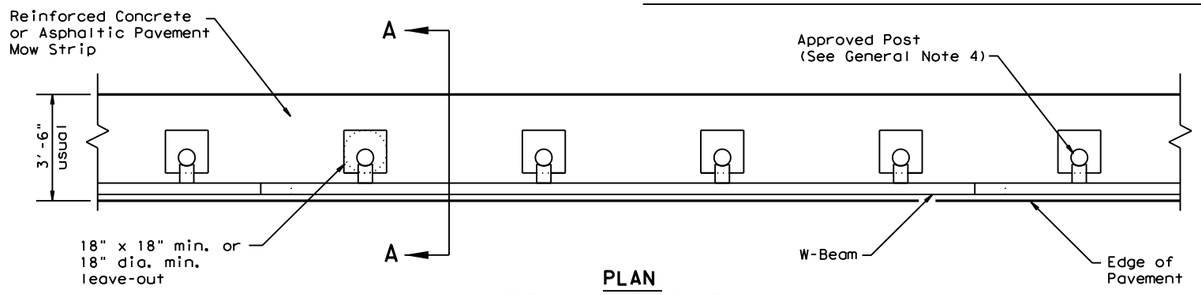
PCF-05

FILE: pcf05.dgn	DN:	CK:	DW: LJB	CK: JC	NEG:	
© TxDOT FEB. 2005	DIST	FED REG	FEDERAL AID PROJECT #			SHEET
REVISIONS 2/02 Rev.Design Div. PCF-99	LBB	6				144
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	LAMB, ETC		0052	05	046,ETC.	US 84

DATE: 9/30/2024
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/3. Roadway/STANDARDS/gf31ms19.dgn

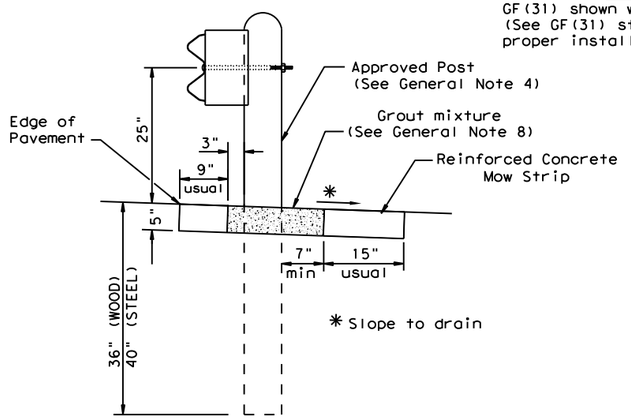


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



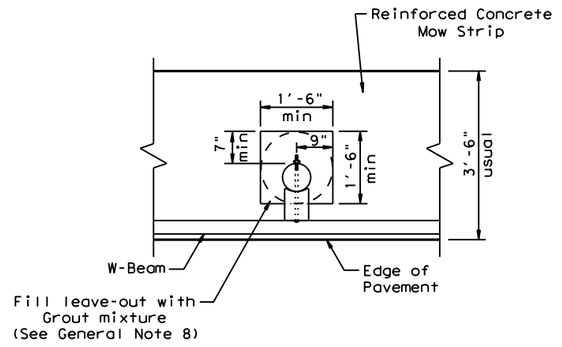
PLAN

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



SECTION A-A

Typical



MOW STRIP DETAIL

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

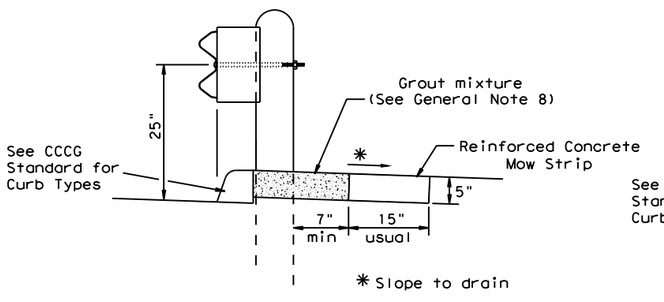
Note: Site Condition(s)

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

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

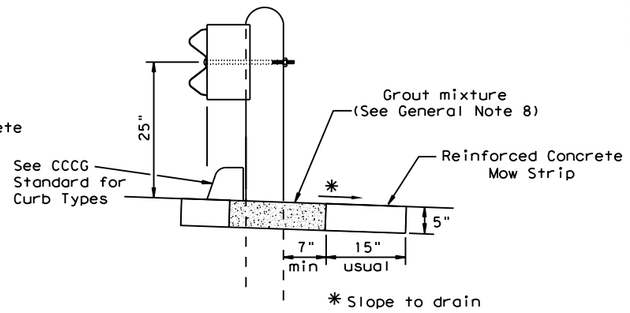
GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with No.3 at 12" c-c or No.4 at 18"c-c, as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 5".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.



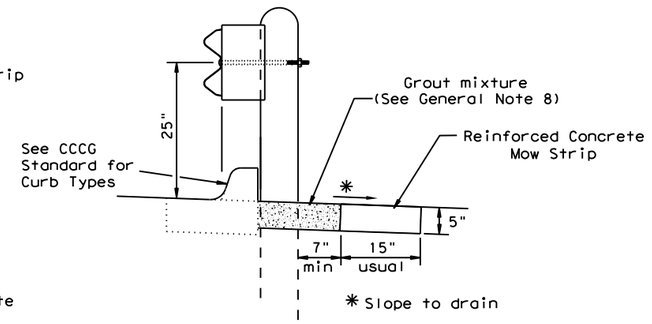
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

MODIFICATION

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

Design Division Standard

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

GF(31)MS-19 (MOD)

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0052	05	046, ETC.	US 84	
	DIST	COUNTY		SHEET NO.	
	LBB	LAMB, ETC.		145	

DATE: 9/30/2024
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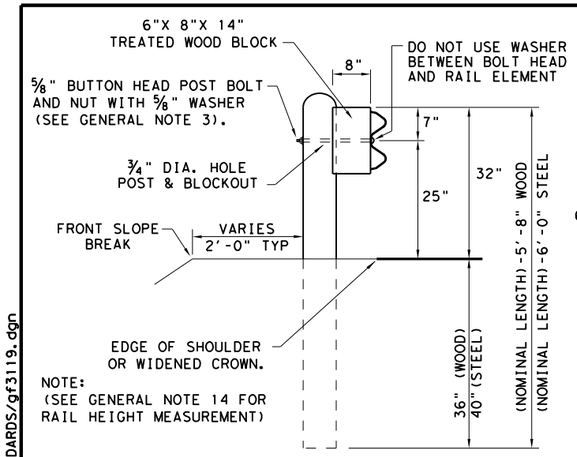
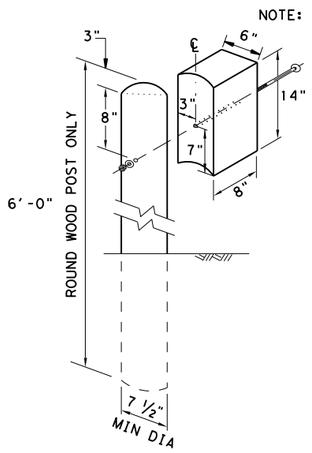
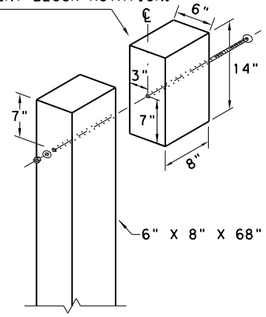


TYPICAL POST PLACEMENT

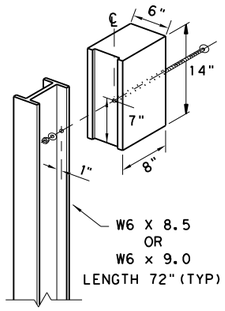


WOOD BLOCK TO ROUND WOOD POST

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

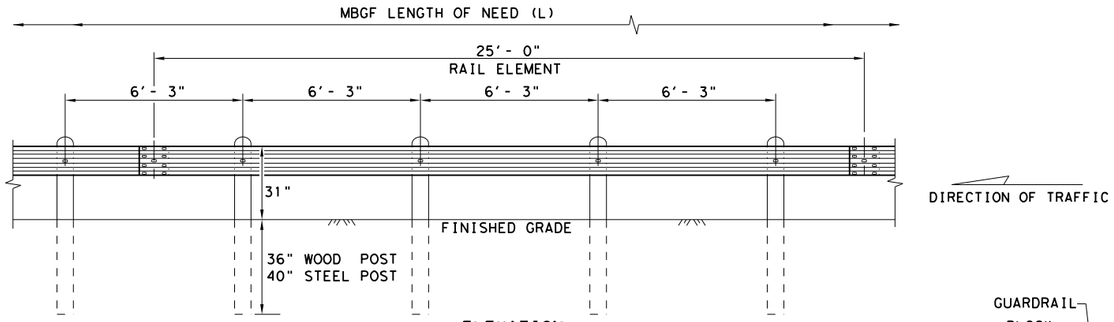


WOOD BLOCK TO RECTANGULAR WOOD POST



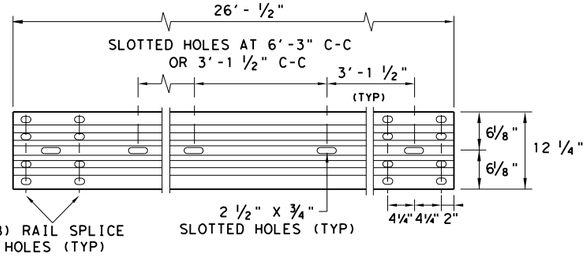
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



ELEVATION
MID-SPAN RAIL SPLICE

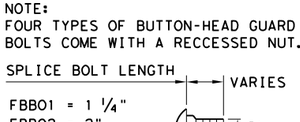
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



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

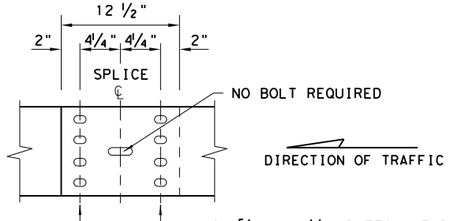
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

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



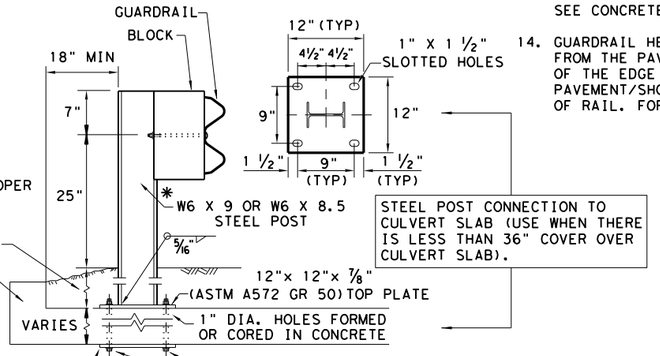
BUTTON HEAD BOLT

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.

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

GENERAL NOTES

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

Texas Department of Transportation

Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
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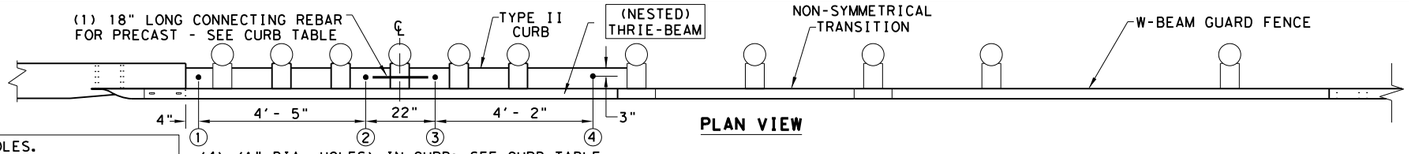
REVISIONS	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		146

DATE: 9/30/2024
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/3. Roadway/STANDARDS/gf31tr*1320.dgn



PLAN VIEW

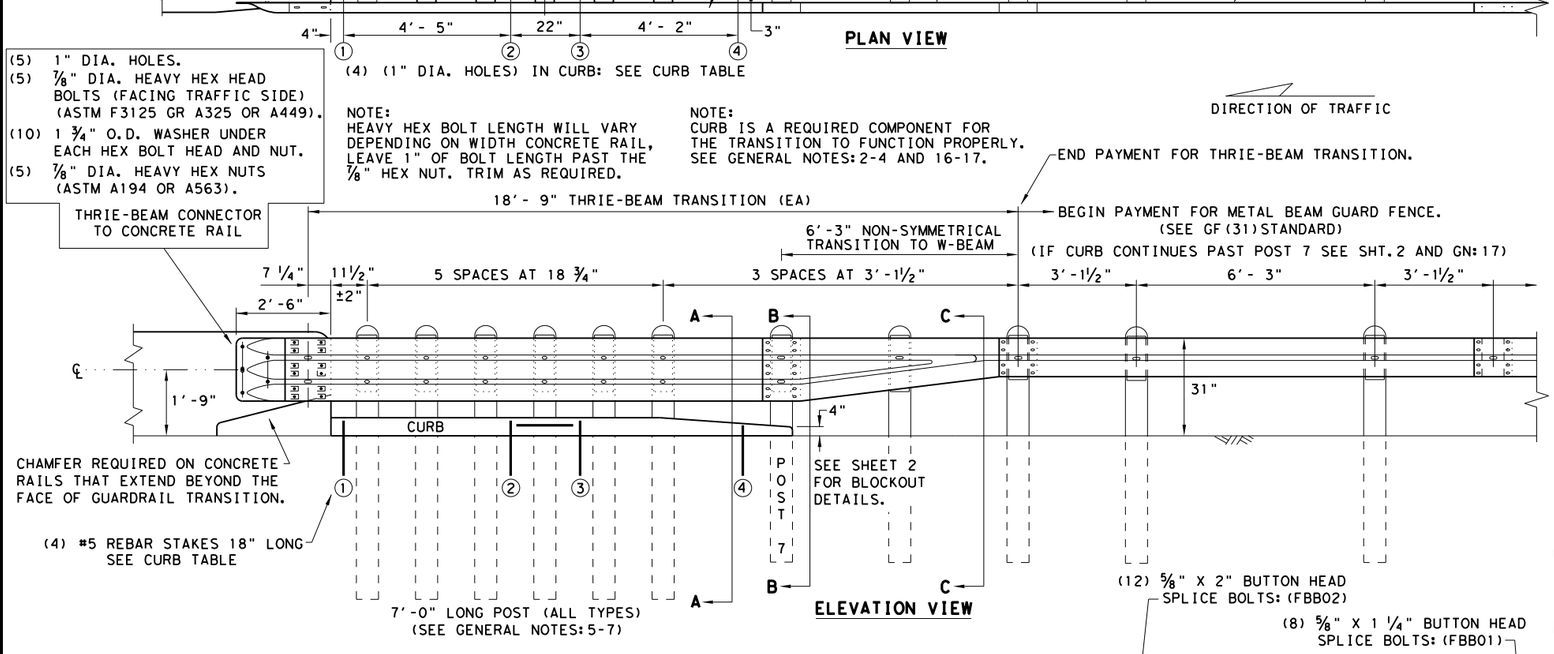
(4) (1" DIA. HOLES) IN CURB: SEE CURB TABLE

(5) 1" DIA. HOLES.
(5) ⅞" DIA. HEAVY HEX HEAD BOLTS (FACING TRAFFIC SIDE) (ASTM F3125 GR A325 OR A449).
(10) 1 ¾" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.
(5) ⅞" DIA. HEAVY HEX NUTS (ASTM A194 OR A563).

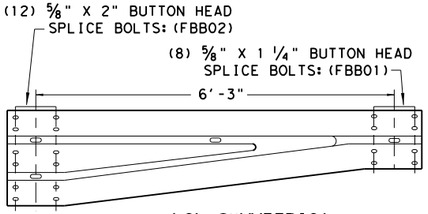
NOTE:
HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL, LEAVE 1" OF BOLT LENGTH PAST THE ⅞" HEX NUT. TRIM AS REQUIRED.

NOTE:
CURB IS A REQUIRED COMPONENT FOR THE TRANSITION TO FUNCTION PROPERLY. SEE GENERAL NOTES: 2-4 AND 16-17.

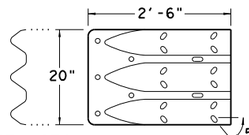
DIRECTION OF TRAFFIC



ELEVATION VIEW

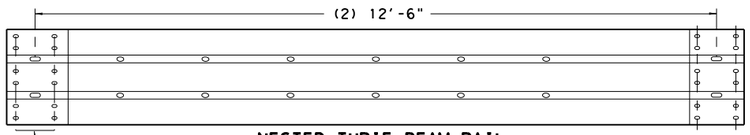


NON-SYMMETRICAL W-BEAM TO THRIE-BEAM TRANSISTION 10GA.
PART DESIGNATOR RWT02a OR RWT02b



SIDE-VIEW

THRIE-BEAM TERMINAL CONNECTOR 10GA.
PART DESIGNATOR RTE01b
NOTE: SEE GENERAL NOTE: 9



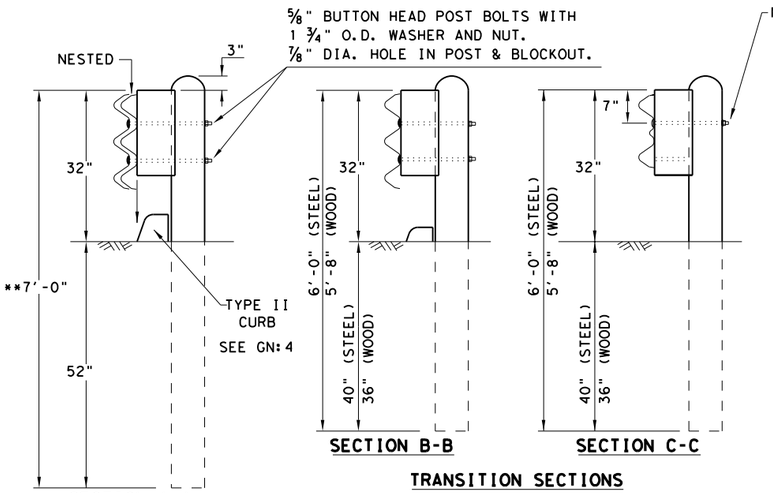
NESTED THRIE-BEAM RAIL
PART DESIGNATOR RTM10a

(12) ⅝" X 2" BUTTON HEAD SPLICE BOLTS WITH RECESSED NUTS: (FBB02)
(12) RECTANGULAR GUARDRAIL PLATE WASHERS: (FWR03)

PLATE WASHER INSTRUCTIONS

BRIDGE APPROACH - UPSTREAM: THE NESTED RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.

BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.



SECTION A-A

SECTION B-B

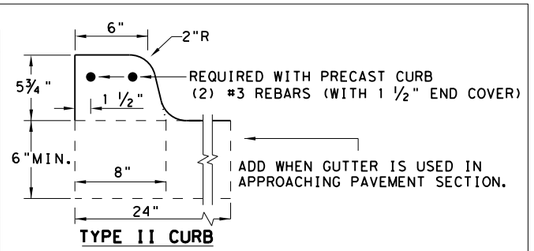
SECTION C-C

TRANSITION SECTIONS

NOTE: ALL POST TYPES, SEE GENERAL NOTE: 5 & 6

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

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 ½" 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

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- ¾" 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 ½" 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 ⅝" 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 ⅝" 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.

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

FILE: gf31tr*1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
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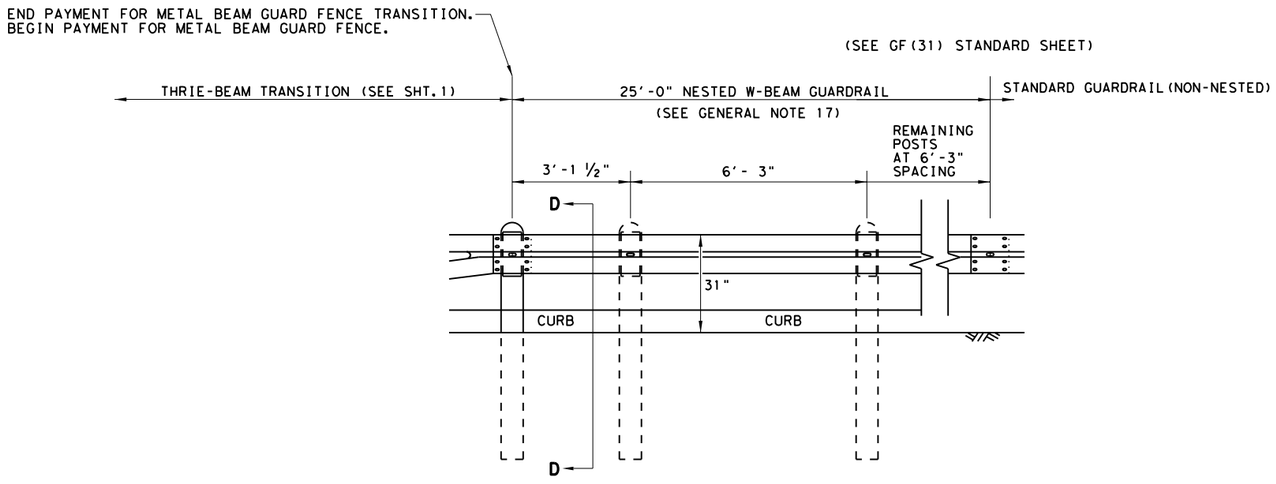
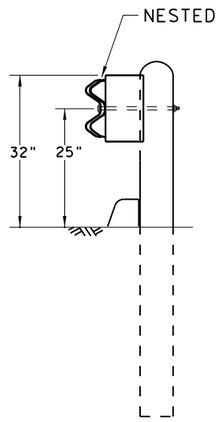
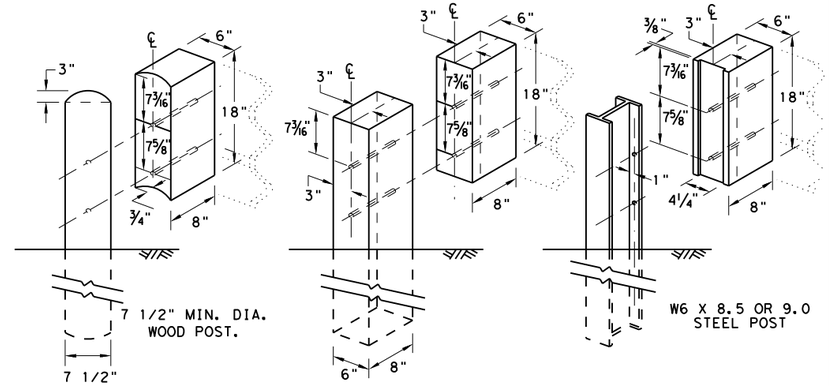
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



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

FILE: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG	
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REVISIONS	0052	05	046, ETC.	US 84	
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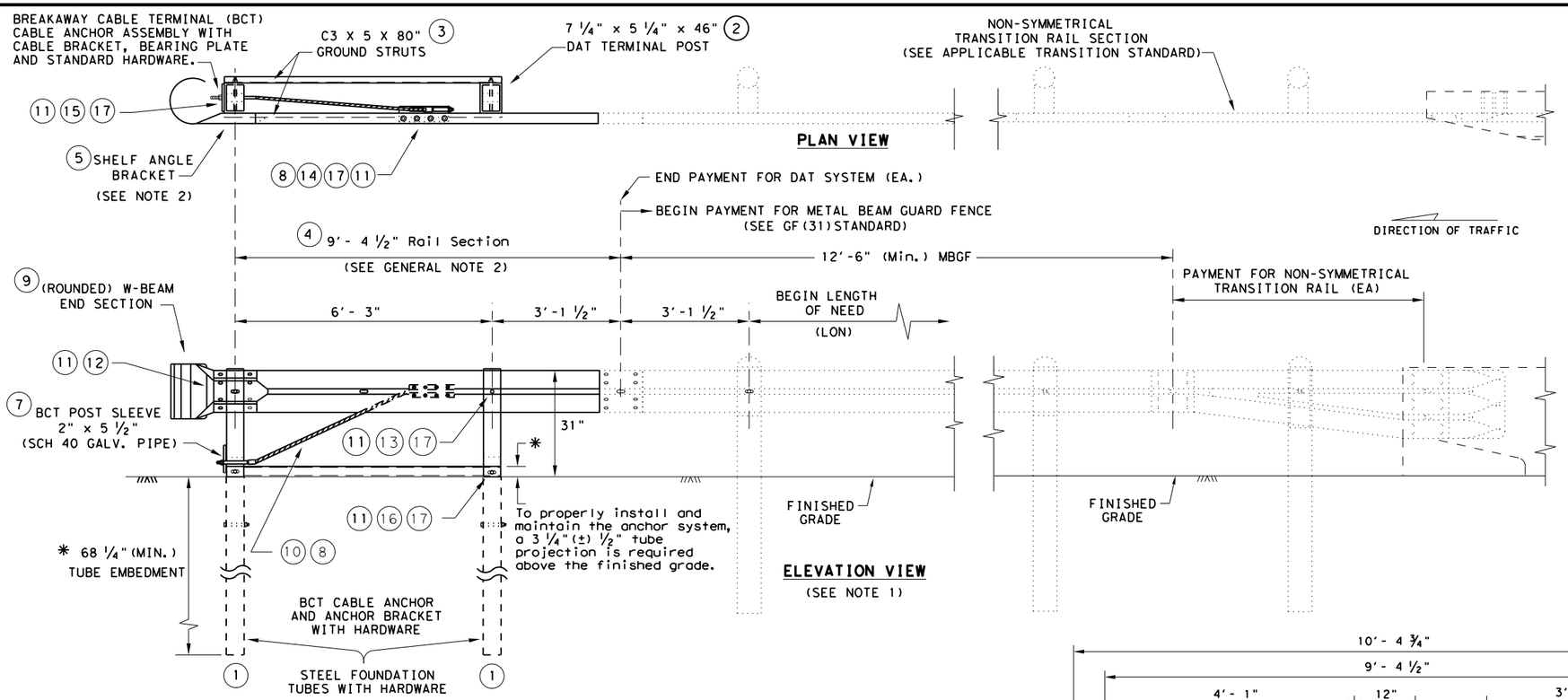


DOWNSTREAM ANCHOR TERMINAL (DAT)

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

GENERAL NOTES

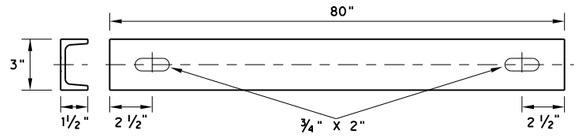
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 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

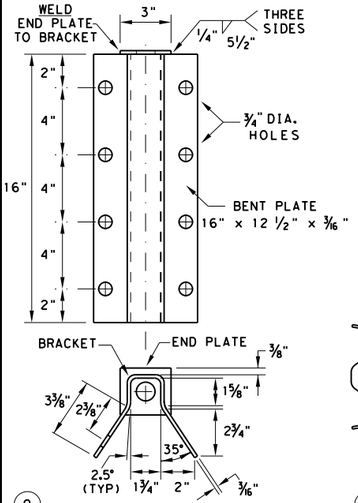
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(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

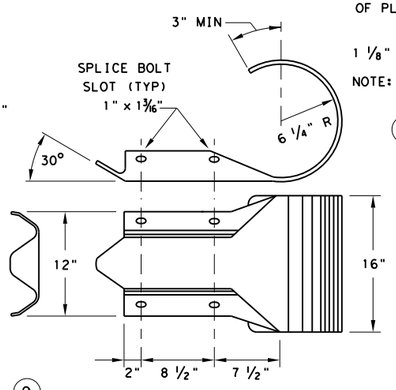
(4) TERMINAL RAIL ELEMENT FOR DAT



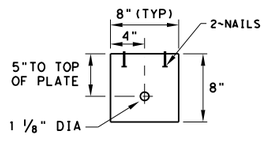
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

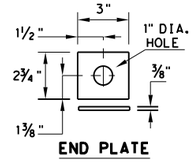


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

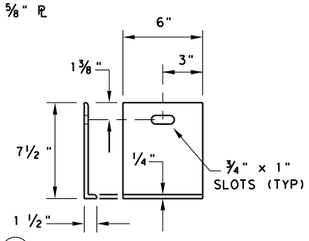


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

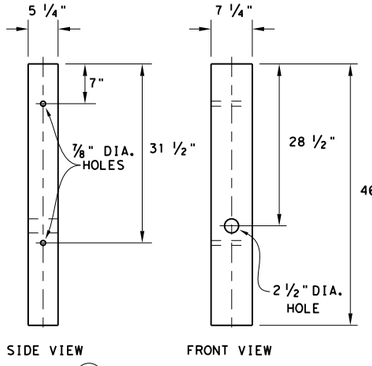
(6) BEARING PLATE
8"x 8"x 5/8" PL



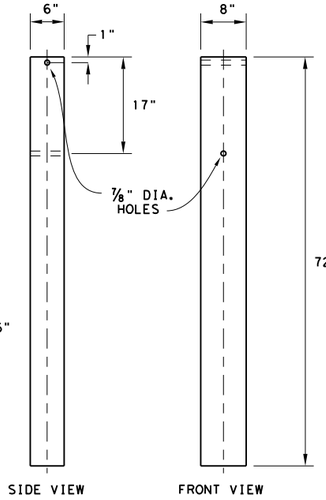
END PLATE



(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

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
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REVISIONS	0052	05	046, ETC.	US 84	
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	LBB	LAMB, ETC.		149	

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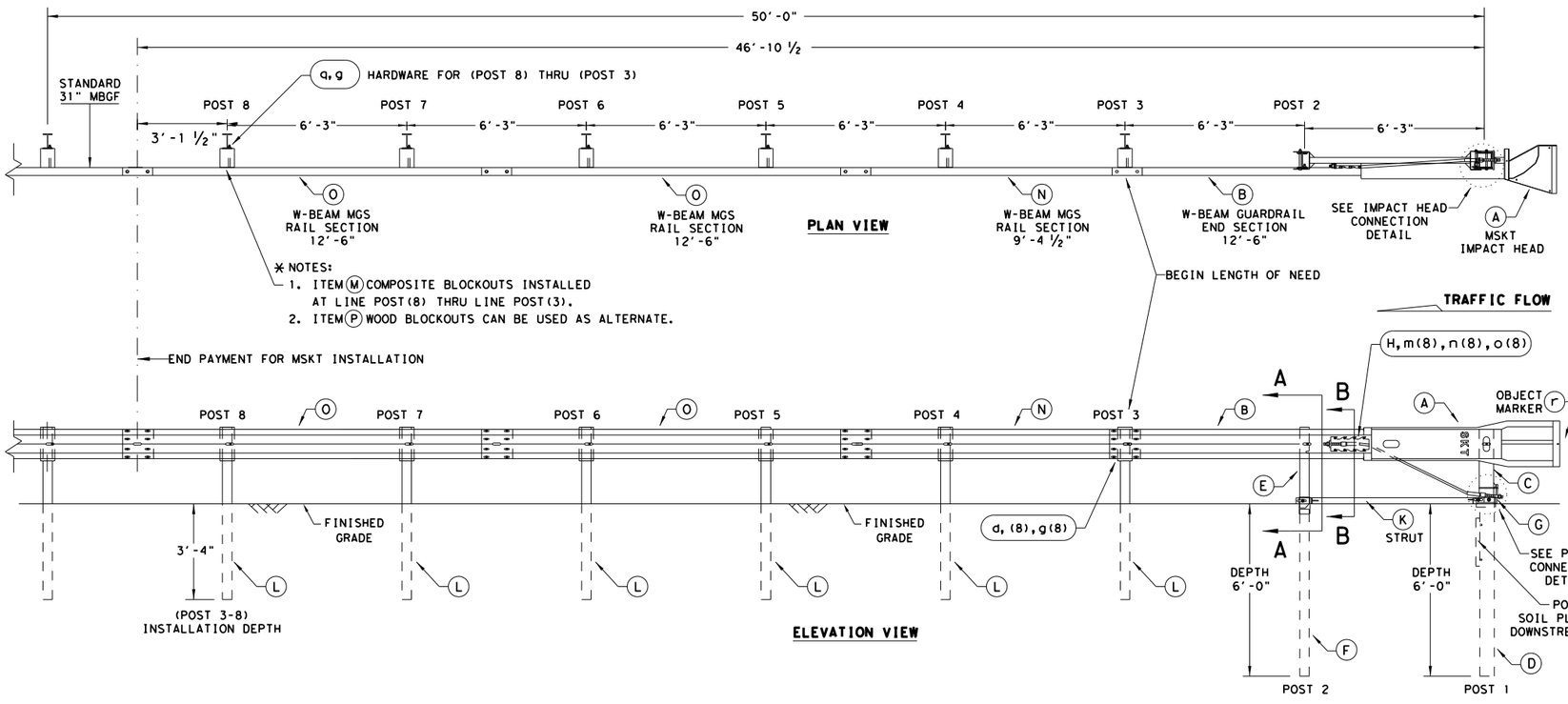
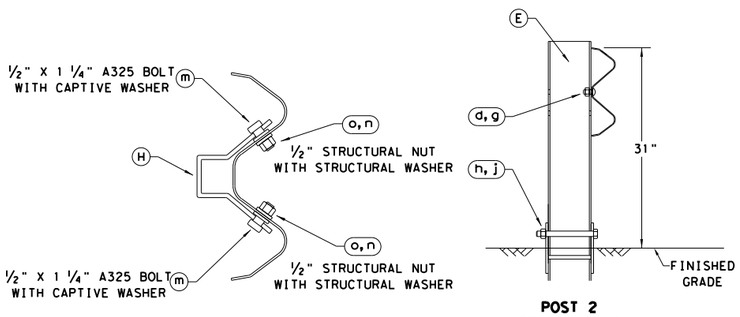
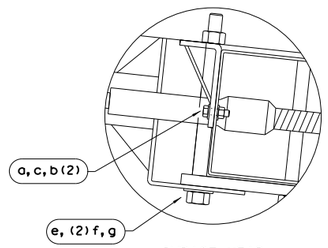


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

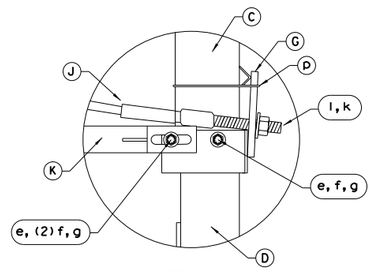


SECTION B-B
ANCHOR BRACKET

POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL

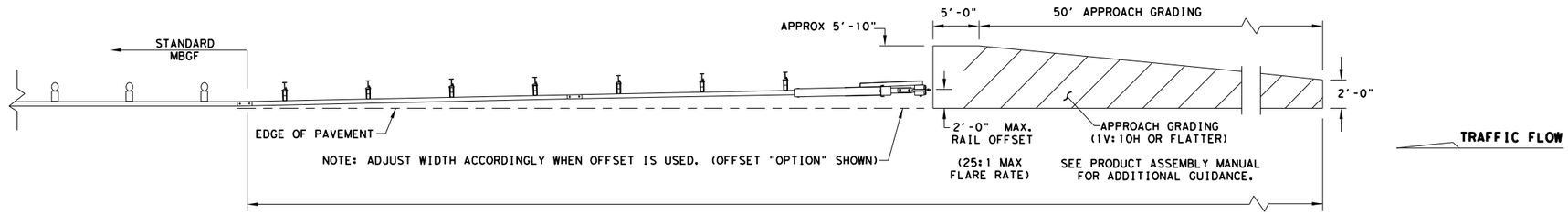
SEE NOTES: *

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

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION~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 ⅛" 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 ½")	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	⅝" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅝" WASHER	W0516
c	2	⅝" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

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	0052	05	046, ETC.	US 84	
	DIST	COUNTY		SHEET NO.	
	LBB	LAMB, ETC.		150	

DATE: 9/30/2024
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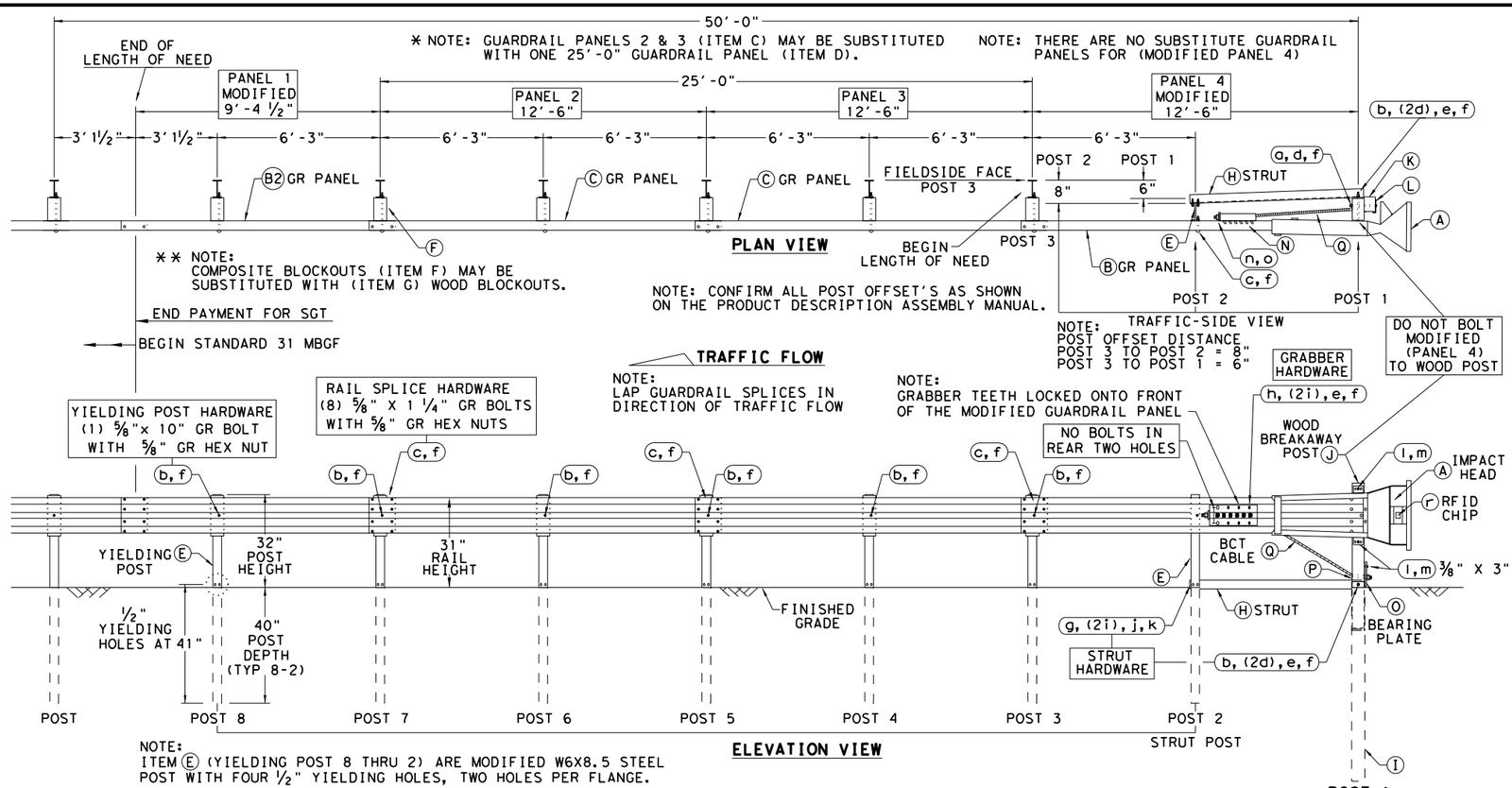
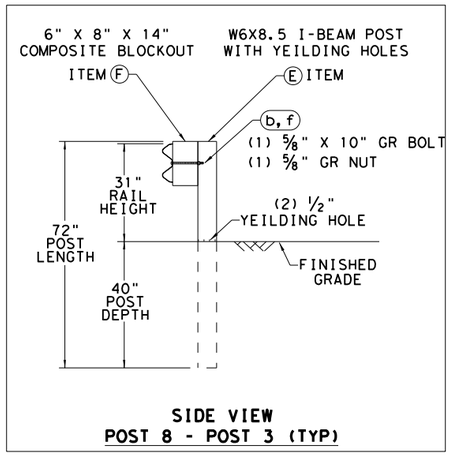


GENERAL NOTES

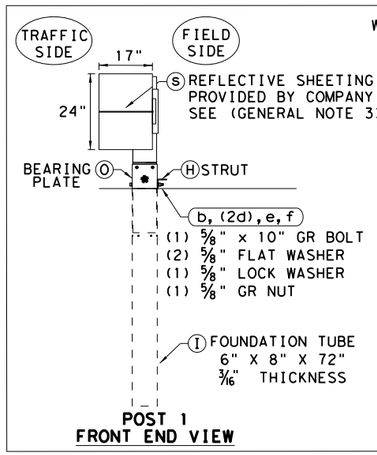
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D *	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CBO8
G **	6	WOOD BLOCKOUT 6" X 8" X 14"	WBO8
H	1	STRUT 3" X 3" X 80" x 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" x 3/16"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
		SMALL HARDWARE	
a	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563DH HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M

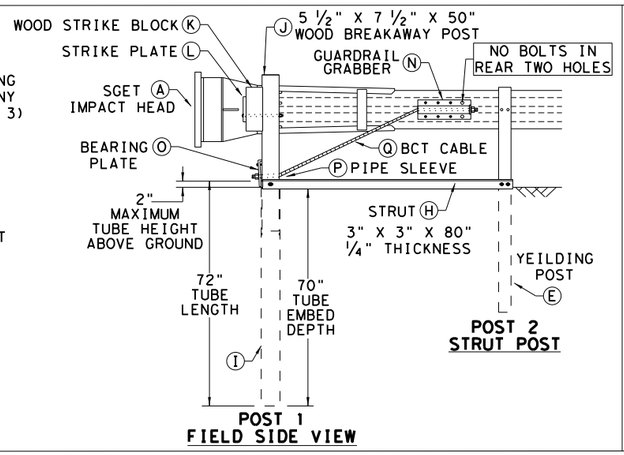
* ALTERNATIVE ITEMS
** NOTE: SEE PLAN VIEW



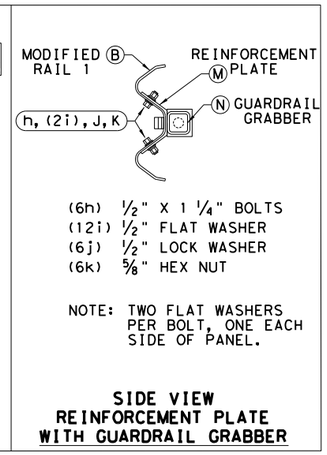
SIDE VIEW
POST 8 - POST 3 (TYP)



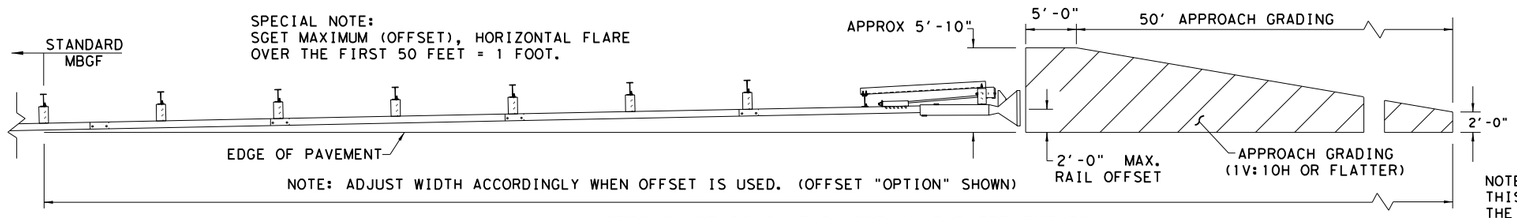
POST 1
FRONT END VIEW



POST 1
FIELD SIDE VIEW



SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

Texas Department of Transportation
Design Division Standard

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

FILE: sgt153120.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		151

DATE: 9/30/2024 1:11:44 PM
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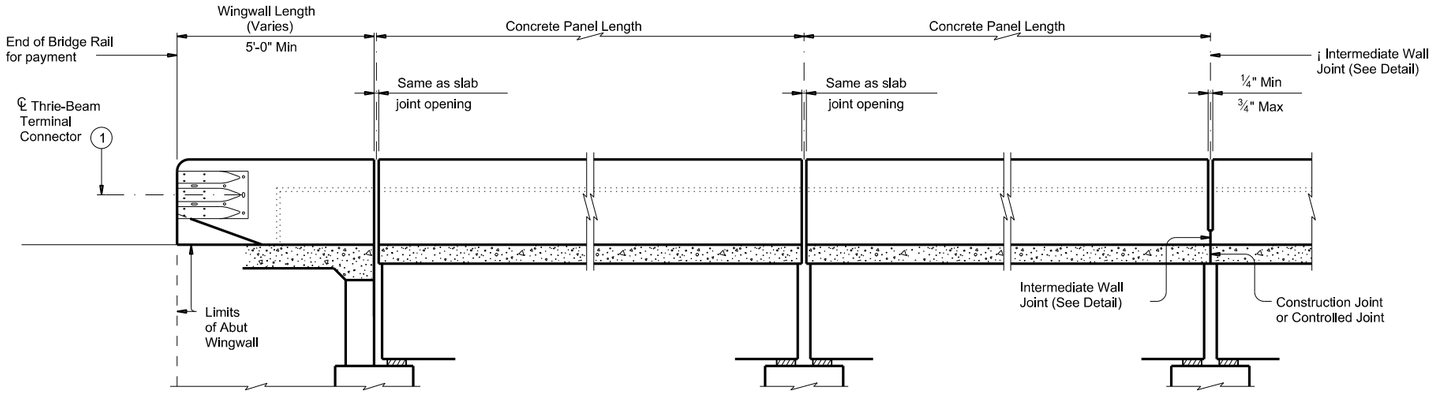
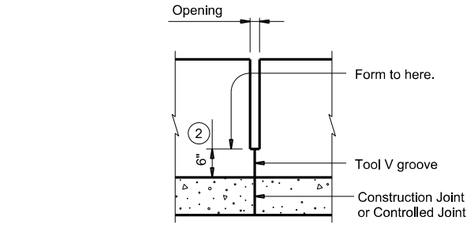


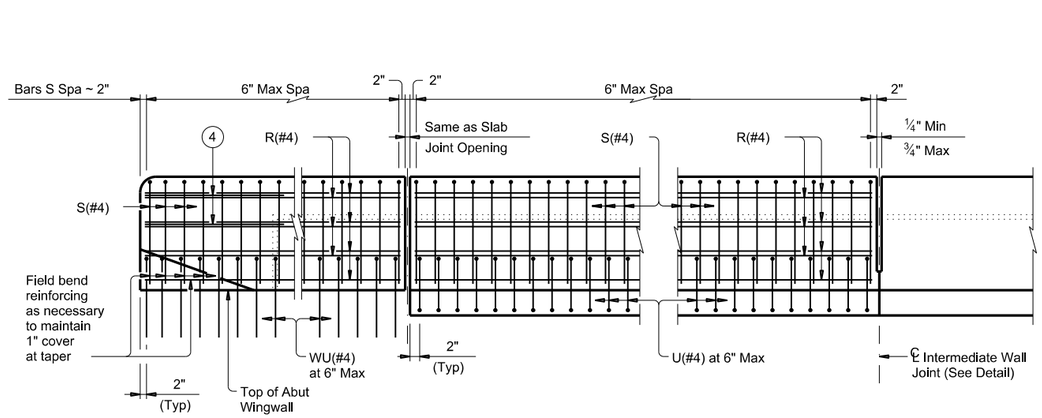
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL



INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.

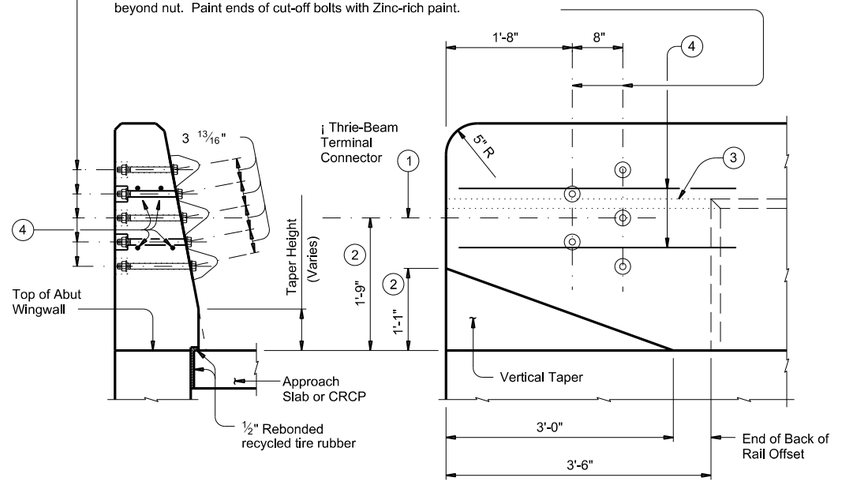


ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

□ 5 ~ 1" Dia holes and 2 ½" Dia x 2" deep recesses. Form or core holes and recesses. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes and recesses. Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail. Tighten the 5 Terminal Connection Bolts in a well distributed pattern so to prevent damage or distortion of the Thrie-Beam Connection and the MBGF Transition. Cut bolts off after installation so as to extend no more than ¾" beyond nut. Paint ends of cut-off bolts with Zinc-rich paint.



SECTION | ELEVATION

TERMINAL CONNECTION DETAILS

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence." Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Increase 2" for structures with Overlay.
3. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
4. Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required.

Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL
SINGLE SLOPE

TYPE SSTR

FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		152

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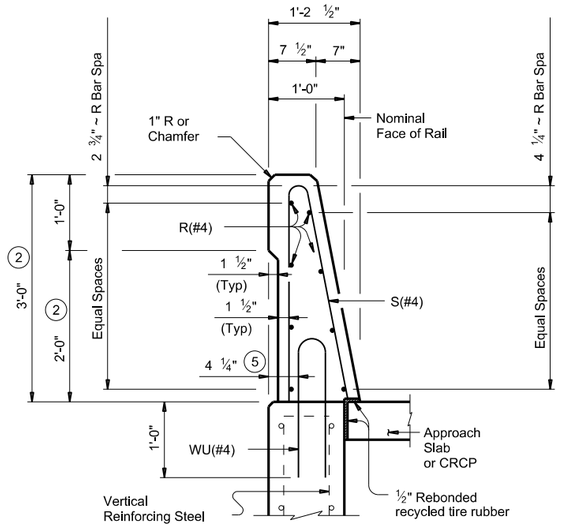
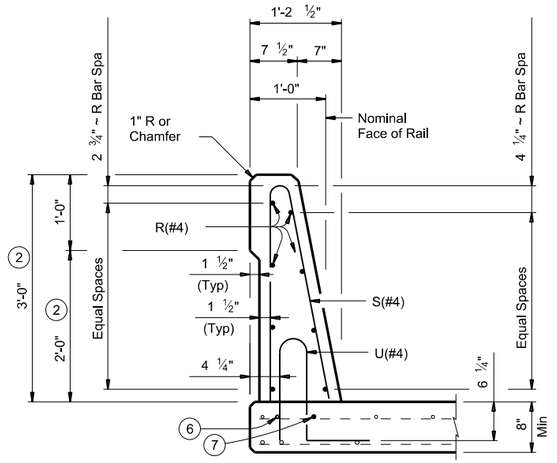


ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL

(2) Increase 2" for structures with Overlay.

(5) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(6) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.

(7) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(8) No longitudinal wires may be within upper bend.

(9) Bend or cut as required to clear drain slots.

(10) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a ⅜" width x ¼" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

The back of railing must be vertical unless otherwise shown in the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM A1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-4 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

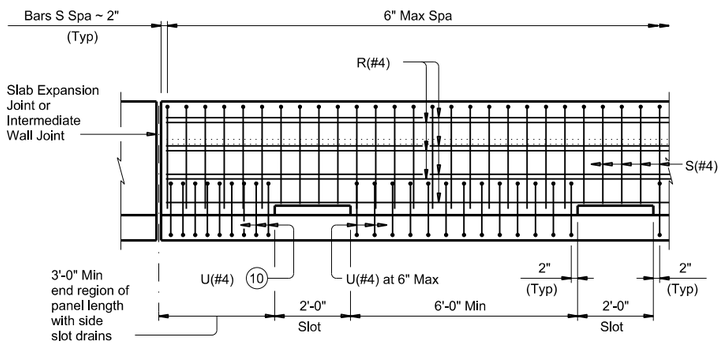
BARS S (#4)

BARS U (#4)

BARS WU (#4)

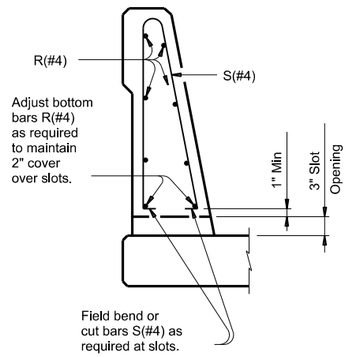
OPTIONAL WELDED WIRE
REINFORCEMENT (WWR)

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
	No. of Wires	Spacing
Minimum	8	4"
Maximum	10	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



SECTION THRU
OPTIONAL SIDE SLOT DRAIN

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL
SINGLE SLOPE

TYPE SSTR

FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		153

TRAFFIC SIGNALS, ADVANCE SIGNS, & FLASHING BEACONS OVERALL SUMMARY CSJ: 0052-05-048					
ITEM NO.	DESCRIPTION	UNITS	TRAFFIC SIGNAL TOTAL	ADVANCE SIGNS & FLASHING BEACON TOTAL	PROJECT TOTAL
0416 7044	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	26		26
0416 7045	DRILL SHAFT (TRF SIG POLE) (42 IN)	LF	36		36
0618 7009	CONDT (HDPE) (2")	LF		1305	1305
0618 7010	CONDT (HDPE) (2") BORE	LF		320	320
0618 7015	CONDT (HDPE) (4")	LF	590		590
0618 7016	CONDT (HDPE) (4") BORE	LF	350		350
0620 7009	ELEC CONDR (NO.6) BARE	LF	895	1625	2520
0620 7016	ELEC CONDR (NO.2) INSULATED	LF	135		135
0624 7002	GROUND BOX TY A (122311)W/APRON	EA		10	10
0624 7008	GROUND BOX TY D (162922)W/APRON	EA	10		10
0628 7156	ELC SRV TY D 120/240 060(NS)SS(N)SP(O)	EA	1		1
0636 7001	ALUMINUM SIGNS (TY A)	SF		222	222
0644 7004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA		4	4
0644 7031	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA		4	4
0680 7002	INSTALL HWY TRF SIG (ISOLATED)	EA	1		1
0682 7001	VEH SIG SEC (12")LED(GRN)	EA	14		14
0682 7002	VEH SIG SEC (12")LED(GRN ARW)	EA	2		2
0682 7003	VEH SIG SEC (12")LED(YEL)	EA	14	8	22
0682 7005	VEH SIG SEC (12")LED(RED)	EA	14		14
0682 7042	BACKPLATE W/REF BRDR(3 SEC)(VENT)ALUM	EA	14		14
0682 7043	BACKPLATE W/REF BRDR(4 SEC)(VENT)ALUM	EA	2		2
0684 7010	TRF SIG CBL (TY A)(12 AWG)(5 CONDR)	LF	605		605
0684 7012	TRF SIG CBL (TY A)(12 AWG)(7 CONDR)	LF	120	3000	3120
0684 7017	TRF SIG CBL (TY A)(12 AWG)(12 CONDR)	LF	2120		2120
0685 7001	INSTALL RDSD FLASH BEACON ASSEMBLY	EA		4	4
0686 7033	INS TRF SIG PL AM(S)1 ARM(32')	EA	1		1
0686 7037	INS TRF SIG PL AM(S)1 ARM(36')	EA	1		1
0686 7161	INS TRF SIG PL AM(S)2 ARM(44-32')	EA	2		2
0690 7011	INSTALL OF CABLES	LF	2440		2440

STATE OF TEXAS
JEREMY T. DEARING
98218
LICENSED
PROFESSIONAL ENGINEER

Jeremy T. Dearing, P.E.

9/30/2024

Texas Department of Transportation

TRAFFIC SIGNALS,
ADVANCE SIGNS,
& FLASHING BEACONS
OVERALL SUMMARY

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		154

DATE: 9/30/2024 1:11:59 PM
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US 84 & LOOP 430 TRAFFIC SIGNAL CONDUIT AND CABLE SUMMARY							
RUN	CONDUIT QUANTITY		LENGTH(LF)	CONDUCTOR QUANTITY			
	4"T(LF)EA	4"B(LF)EA		1C#2(EA)	12C#12(EA)	#6 BARE(EA)	RADAR(EA)**
R-1	1		45	3			
R-2	1		25		3	1	3
R-3	1		20		3	1	2
R-4		1	85		1	1	2
R-5	1		15		1	1	2
R-6		1	70		2	1	1
R-7	1		15		2	1	1
R-8	1		130		3	1	3
R-9		1	55		3	1	3
R-10	1		145		3	1	3
R-11	1		150		3	1	3
R-12		1	70		2	1	1
R-13	1		20		2	1	1
R-14		1	70		1	1	2
R-15	1		25		1	1	2
*TOTALS	590	350		135	2,120	895	2,120

*TOTALS DERIVED FROM LENGTH MULTIPLIED BY QUANTITY

**RADAR CONDUCTOR WILL BE PROVIDED BY THE STATE.
PAID FOR UNDER ITEM 690-6011

US 84 & LOOP 430 SIGNAL INSTALLATION SUMMARY			
ITEM NO.	DESCRIPTION	UNITS	TOTAL
0416 7044	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	26
0416 7045	DRILL SHAFT (TRF SIG POLE) (42 IN)	LF	36
0618 7015	CONDT (HDPE) (4")	LF	590
0618 7016	CONDT (HDPE) (4") BORE	LF	350
0620 7009	ELEC CONDR (NO.6) BARE	LF	895
0620 7016	ELEC CONDR (NO.2) INSULATED	LF	135
0624 7008	GROUND BOX TY D (162922)W/APRON	EA	10
0628 7156	ELC SRV TY D 120/240 060(NS)SS(N)SP(O)	EA	1
0680 7002	INSTALL HWY TRF SIG (ISOLATED)	EA	1
0682 7001	VEH SIG SEC (12")LED(GRN)	EA	14
0682 7002	VEH SIG SEC (12")LED(GRN ARW)	EA	2
0682 7003	VEH SIG SEC (12")LED(YEL)	EA	14
0682 7005	VEH SIG SEC (12")LED(RED)	EA	14
0682 7042	BACKPLATE W/REF BRDR(3 SEC)(VENT)ALUM	EA	12
0682 7043	BACKPLATE W/REF BRDR(4 SEC)(VENT)ALUM	EA	2
0684 7010	TRF SIG CBL (TY A)(12 AWG)(5 CONDR)	LF	605
0684 7012	TRF SIG CBL (TY A)(12 AWG)(7 CONDR)	LF	120
0684 7017	TRF SIG CBL (TY A)(12 AWG)(12 CONDR)	LF	2120
0686 7033	INS TRF SIG PL AM(S)1 ARM(32')	EA	1
0686 7037	INS TRF SIG PL AM(S)1 ARM(36')	EA	1
0686 7161	INS TRF SIG PL AM(S)2 ARM(44-32')	EA	2
0690 7011	INSTALL OF CABLES	LF	2440

POLE/MAST ARM DETAILS							
POLE NUMBER	MAST ARM NUMBER	MAST ARM LENGTH (LF)	FOUNDATION TYPE	FOUNDATION DEPTH (LF)	5C #12 (LF)	7C #12 (LF)	RADAR** (LF)
P-1	Arm-1	32	36-A	13	45	60	100
P-2	Arm-2	44	42-A	18	160		
	Arm-3	32			95		50
P-3	Arm-4	32	42-A	18	95		50
	Arm-5	44			160		
P-4	Arm-6	36	36-A	13	50	60	120
			TOTALS		605	120	320

**RADAR CONDUCTOR WILL BE PROVIDED BY THE STATE.
PAID FOR UNDER ITEM 690-6011

HEAD SCHEDULE			
Signal Head Number	3,4,5,10,11,12	1,6,7,8,9,13	2,14
Signal Indications (12" LED)	R Y G	R Y G	R Y G G
Flash Mode	Y	R	
Reset Mode	G	R	

GROUND BOX SUMMARY	
NO.	TYPE
GB-01	D
GB-02	D
GB-03	D
GB-04	D
GB-05	D
GB-06	D
GB-07	D
GB-08	D
GB-09	D
GB-10	D

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	Lighting Contactor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
ES1		ELC SRV TY D 120/240 060 (NS)SS(N)SP(O)	2''	3/#2	N/A	2P/60	N/A	100	SIGNALS	1P/50	24	2.9

STATE OF TEXAS
JEREMY T. DEARING
98218
LICENSED
PROFESSIONAL ENGINEER

Jeremy T. Dearing, P.E.

9/30/2024

Texas Department of Transportation

TRAFFIC SIGNAL SUMMARY
(LOOP 430)

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		155

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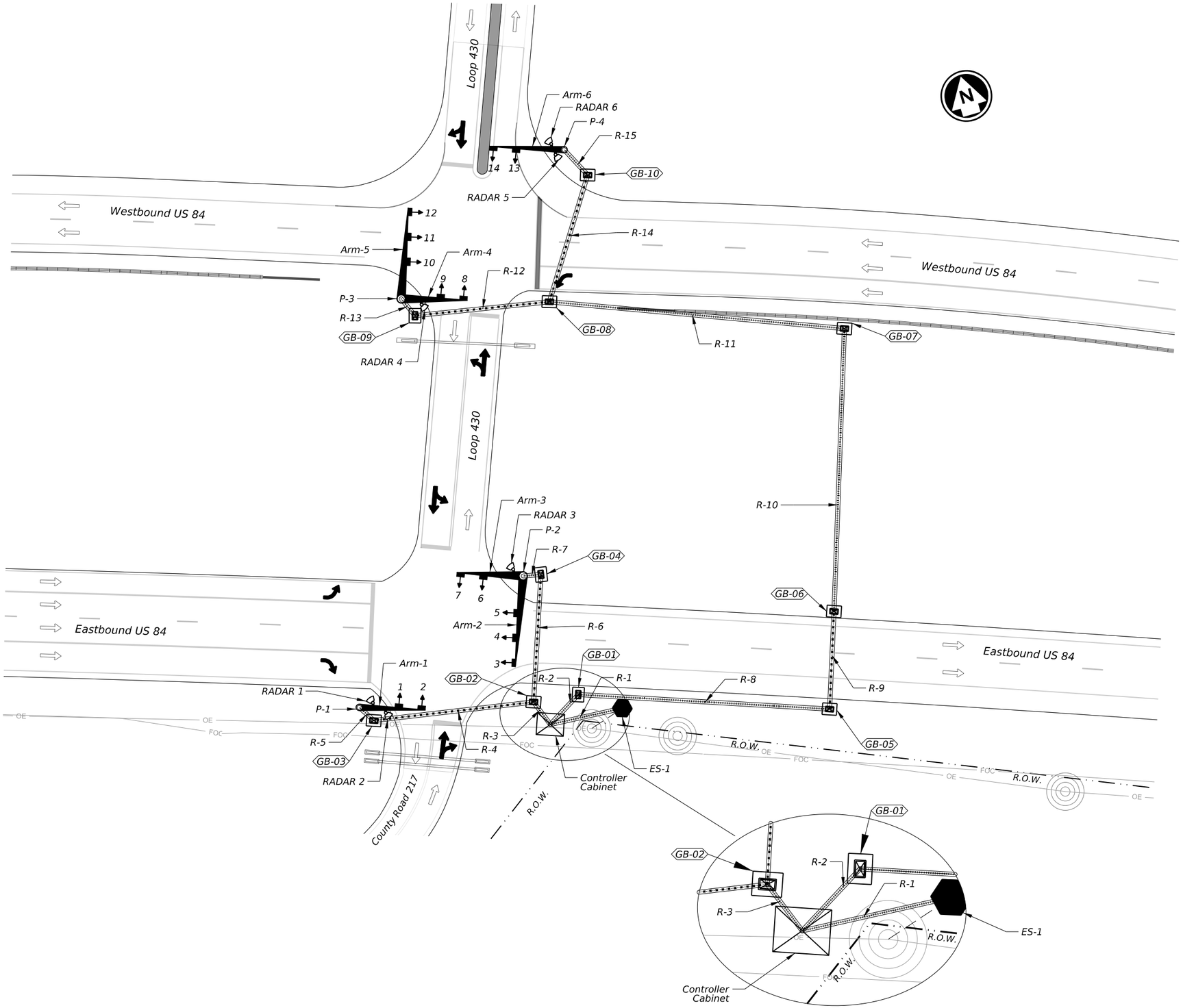

OE — OVERHEAD UTILITY

FOC — UNDERGROUND FIBER OPTIC

GL — UNDERGROUND GAS LINE

2" CONDUIT (TRENCH)

2" CONDUIT (BORE)

TYPICAL SIGNAL POLE/ MAST ARM ASSEMBLY

PROP ELECTRICAL SERVICE

EXISTING ELECTRICAL SERVICE

EXISTING POWER POLE

GROUND BOX

CONTROLLER CABINET

R-XX — CONDUIT RUN NUMBER

GB-XX — GROUND BOX ID

TRAFFIC FLOW

PAVEMENT ARROW

STATE OF TEXAS
JEREMY T. DEARING
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9/30/2024

Texas Department of Transportation

TRAFFIC SIGNAL LAYOUT (LOOP 430) NO SCALE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		156

DATE: 9/30/2024 1:12:30 PM
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US 84 & LOOP 430 BEACONS CONDUIT AND CABLE SUMMARY					
RUN	CONDUIT QUANTITY		LENGTH(LF)	CONDUCTOR QUANTITY	
	2"T(LF)EA	2"B(LF)EA		7C#12(EA)	#6 BARE(EA)
R-1	1		20	1	1
R-2		1	90	1	1
R-3	1		20	1	1
R-4	1		245	2	1
R-5	1		305	2	1
R-6		1	70	2	1
R-7	1		30	2	1
R-8	1		50	2	1
R-9	1		500	2	1
R-10		1	80	2	1
R-11	1		95	2	1
R-12	1		20	1	1
R-13		1	80	1	1
R-14	1		20	1	1
*TOTALS	1,305	320		3,000	1,625

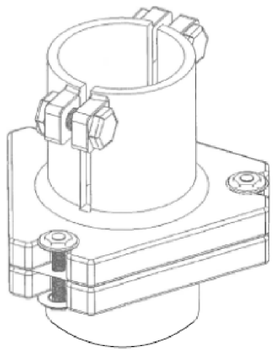
*TOTALS DERIVED FROM LENGTH MULTIPLIED BY QUANTITY

BEACON DETAILS		
POLE NUMBER	FOUNDATION TYPE	7C (LF)
FB #1	SCREW-IN	20
FB #2	SCREW-IN	20
FB #3	SCREW-IN	20
FB #4	SCREW-IN	20
	TOTALS	80

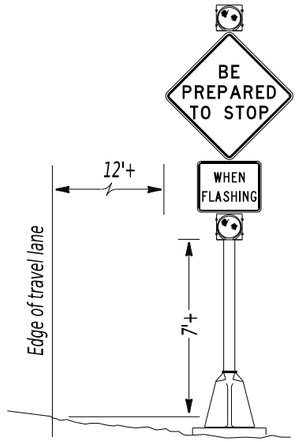
GROUND BOX SUMMARY	
NO.	TYPE
GB-01	A
GB-02	A
GB-03	A
GB-04	A
GB-05	A
GB-06	A
GB-07	A
GB-08	A
GB-09	A
GB-10	A

BEACON LAMPS	ADVANCE SIGNS & BEACON SUPPORTS		
VEH SIG SEC (12")LED(YEL)	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	IN SM RD SN SUP&AM TYS80(1)SA(U)	INSTALL RDSD FLASH BEACON ASSEMBLY
EA	EA	EA	EA
8	4	4	4

USE FOR SIGNS
A, B, E - H, K, L



TWO BOLT CLAMP
TRIANGULAR SLIP BASE



FLASHING BEACON
SIGN ASSEMBLY

**CONDUIT FOR FLASHING BEACONS WILL BE RUN THROUGH TRAFFIC SIGNAL CONTROLLER CABINET INSTALLED ON ''TRAFFIC SIGNAL LAYOUT''
(SCREW-IN ANCHORS WILL BE CONSIDERED SUBSIDIARY TO ITEM 0685-7001)

ALL ITEMS PAID FOR UNDER CSJ: 0052-05-048

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

ADVANCE SIGNS &
FLASHING BEACONS SUMMARY
(LOOP 430)

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		157

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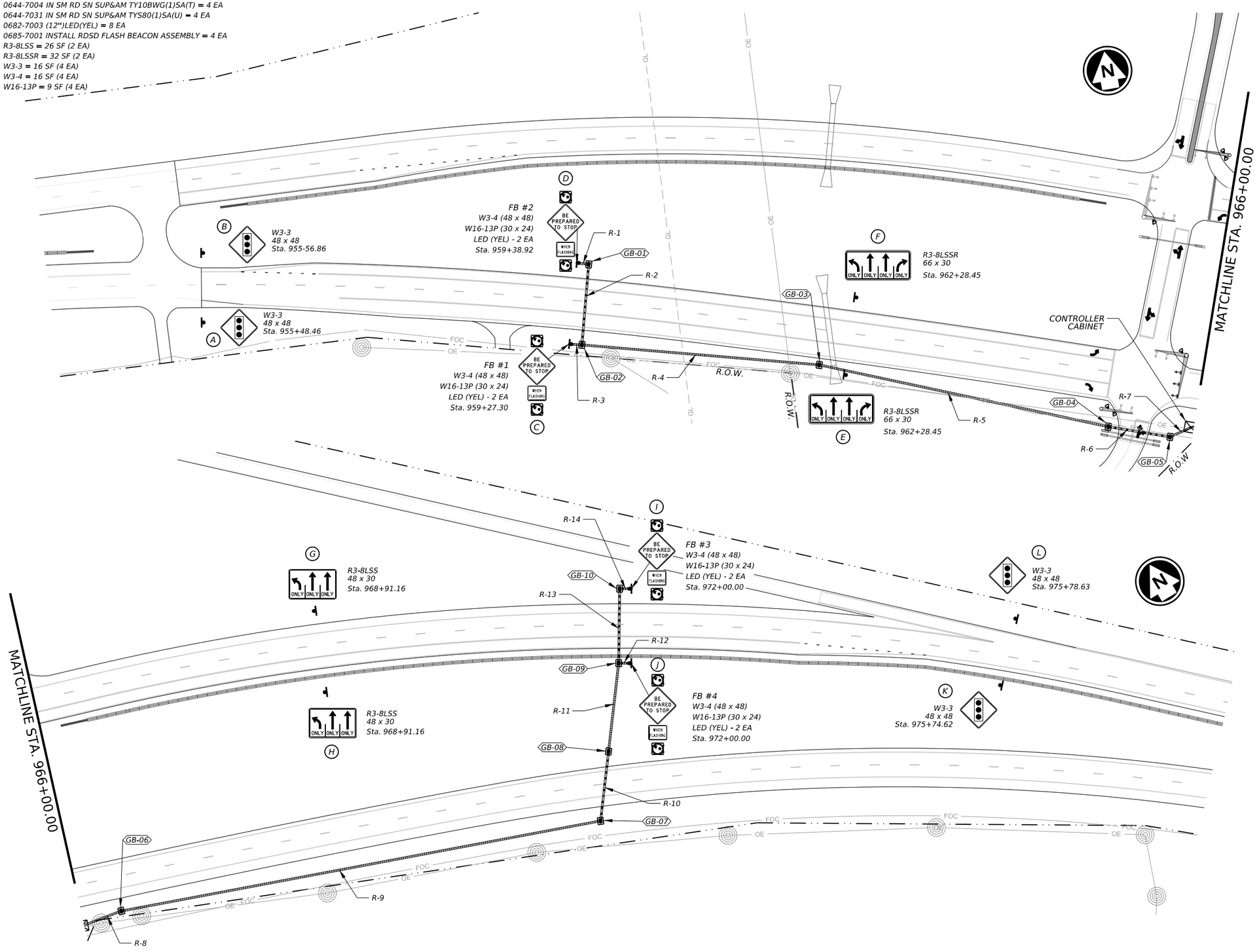
SHEET TOTALS

CSJ: 0052-05-048

0624-7002 TY A GB W/APRON - 10 EA
0636-7001 ALUMINUM SIGNS (TY A) - 222 SF
0644-7004 IN SM RD SN SUP&AM TY10BWG(1)SA(T) = 4 EA
0644-7031 IN SM RD SN SUP&AM TYS80(1)SA(U) = 4 EA
0682-7003 (12")LED(YEL) = 8 EA
0685-7001 INSTALL RDSD FLASH BEACON ASSEMBLY = 4 EA
R3-8LSS = 26 SF (2 EA)
R3-8LSSR = 32 SF (2 EA)
W3-3 = 16 SF (4 EA)
W3-4 = 16 SF (4 EA)
W16-13P = 9 SF (4 EA)



STATE OF TEXAS
BENJAMIN COX
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LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

ADVANCE SIGNS & FLASHING BEACONS LAYOUT (LOOP 430)
SCALE: 1"=100'

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		158

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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

FILE:	ed1-14.dgn	DN:	CK:	DW:	CK:
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0052	05	046, ETC.	US 84
		DIST	COUNTY		SHEET NO.
		LBB	LAMB, ETC.		159

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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.

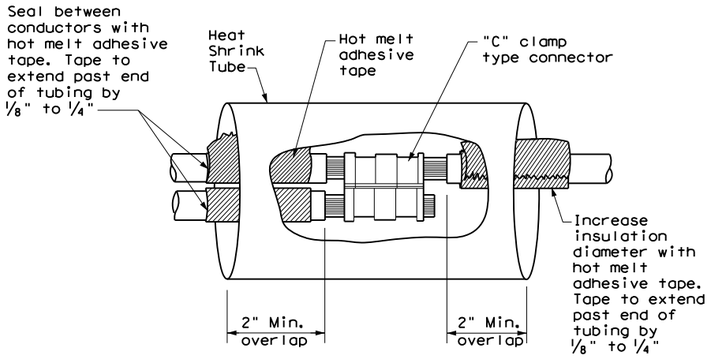
3. Install ground rods so the imprinted part number is at the upper end of the rod.

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.

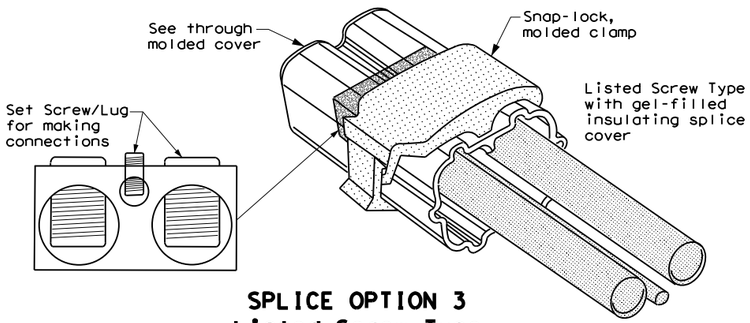
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

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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©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
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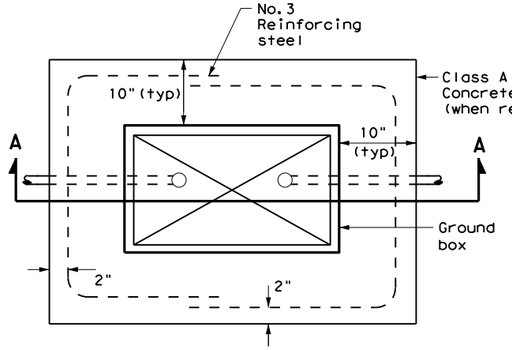
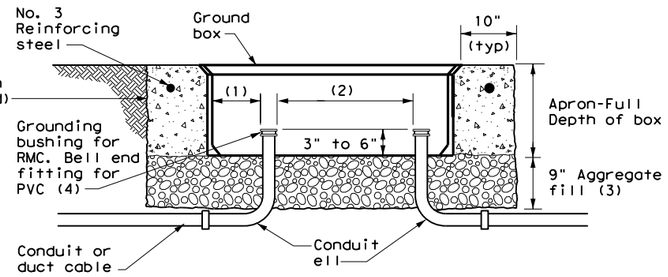


PLAN VIEW



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

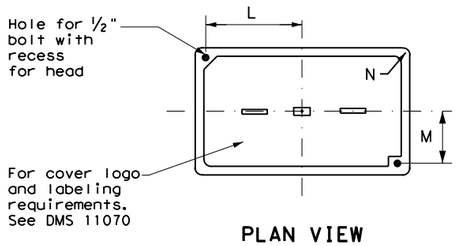
GROUND BOXES

A. MATERIALS

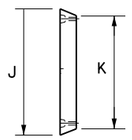
1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."
2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers 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

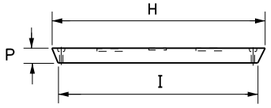
1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the 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.



PLAN VIEW



END



SIDE

GROUND BOX COVER

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS GROUND BOXES

ED(4)-14

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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

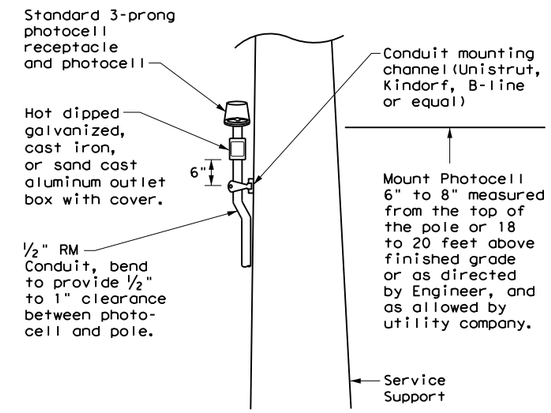
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

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

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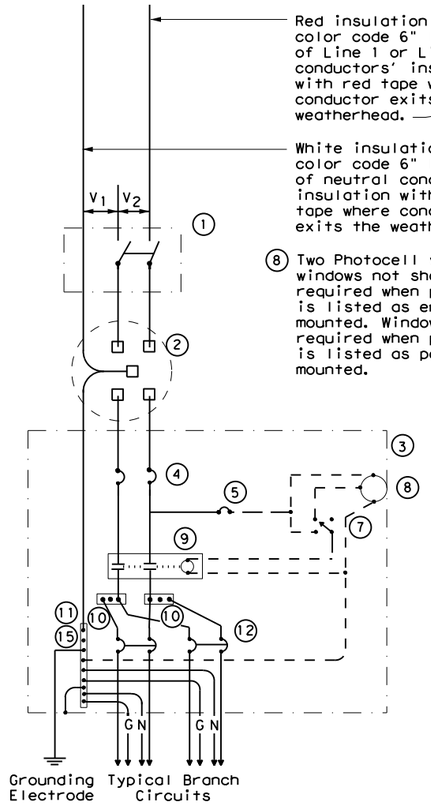
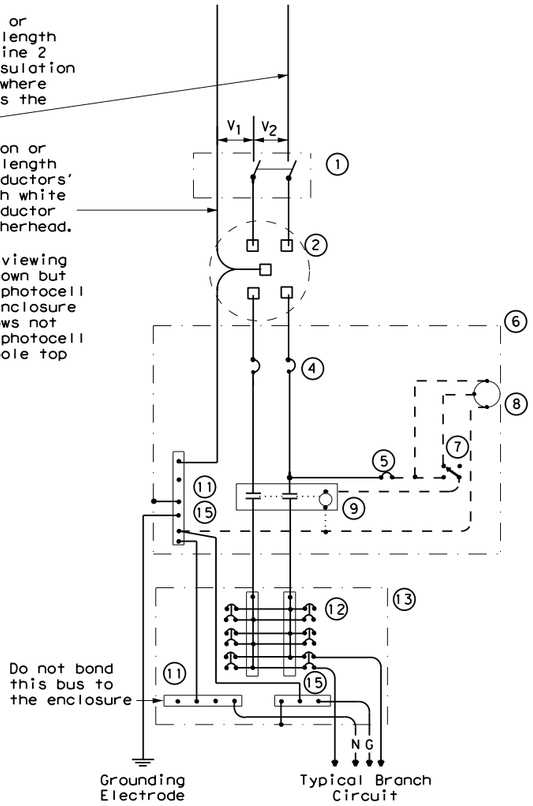
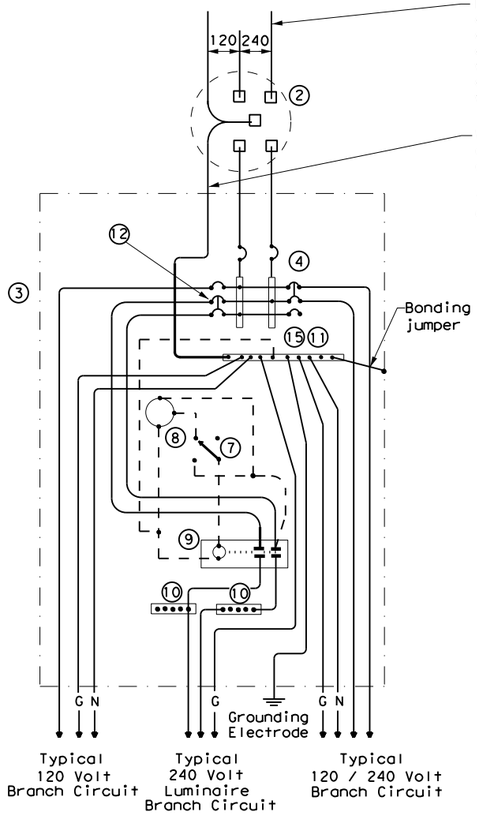


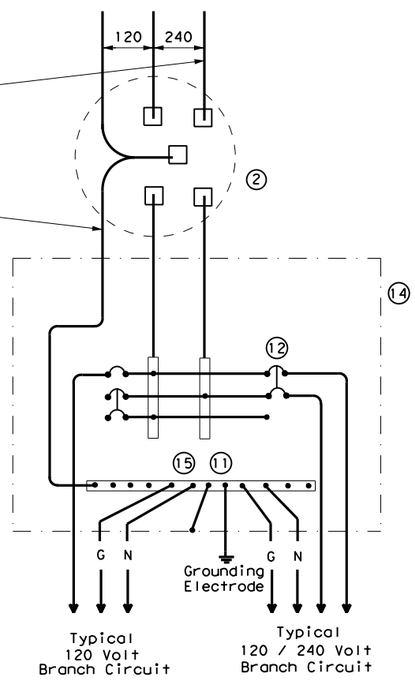
SCHEMATIC TYPE A
THREE WIRE



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

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SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS)11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ¾ in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.

2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.

3. Provide and install galvanized ¾ in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized ¾ in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 ¼ in. to 3 ½ in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.

4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.

5. Furnish and install rigid metallic ells in all steel pole and steel frame foundations for all conduits entering the service from underground.

6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.

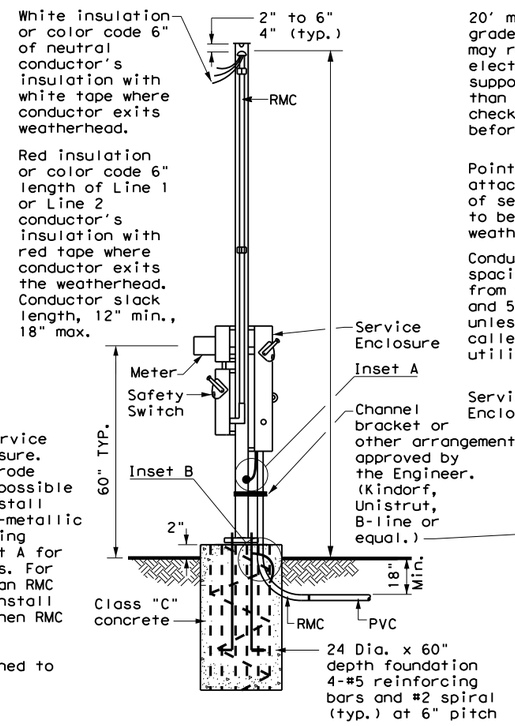
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.

8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.

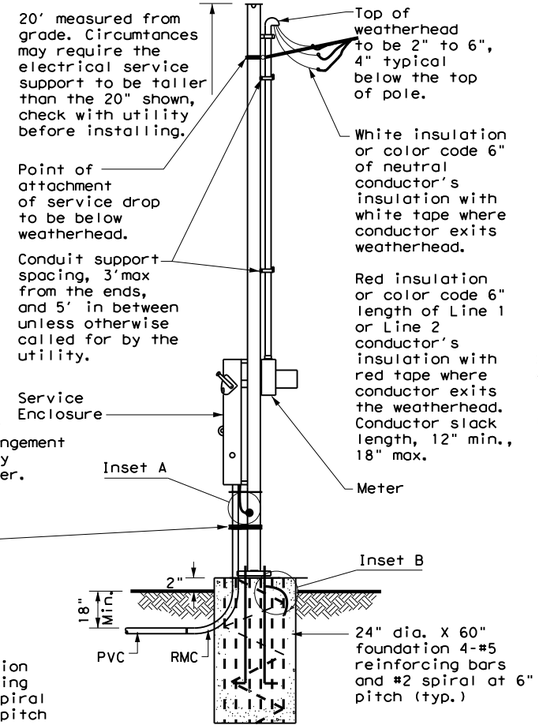
9. Provide ¼" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.

10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.

11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.

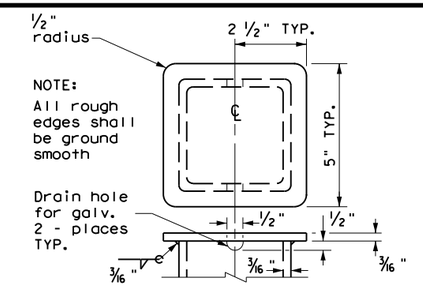


WITH SAFETY SWITCH

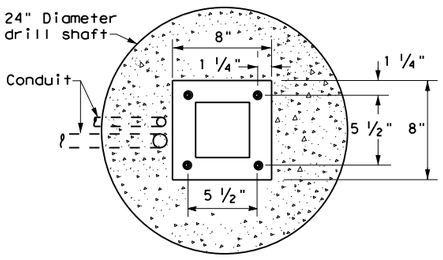


WITHOUT SAFETY SWITCH

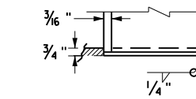
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



POLE TOP PLATE

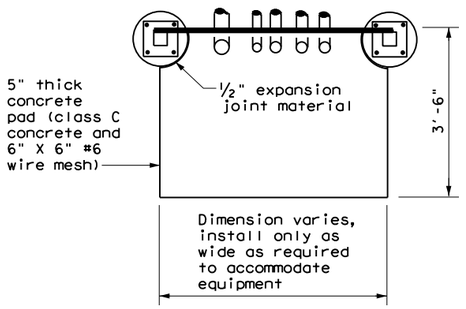


BASE PLATE DETAIL



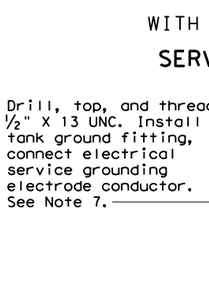
BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



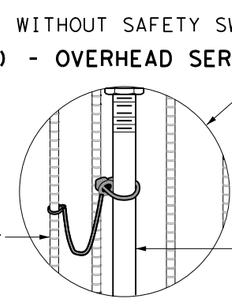
TOP VIEW

SERVICE SUPPORT TY SF (O) & SF (U)

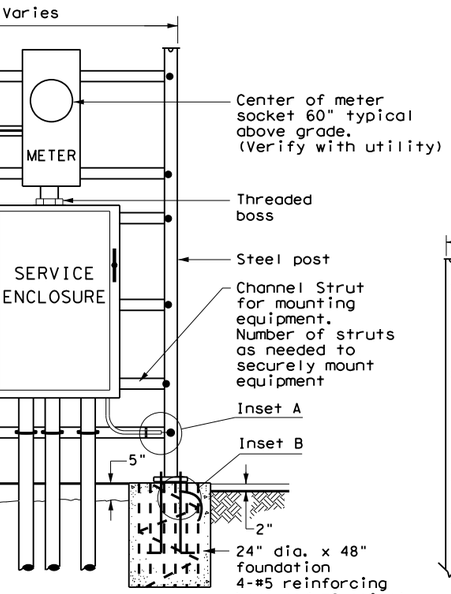


FRONT VIEW

INSET A

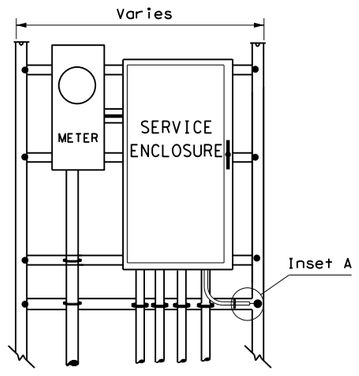


INSET B



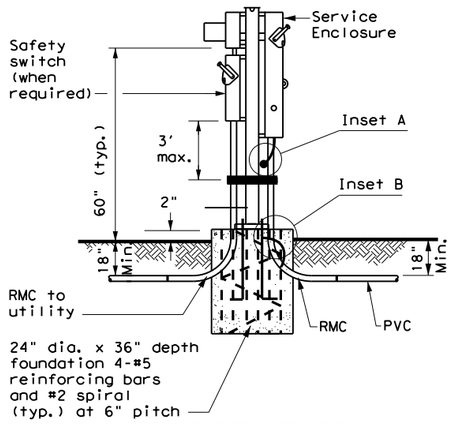
WITH SAFETY SWITCH

FRONT VIEW

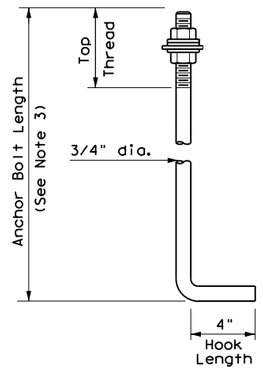


WITHOUT SAFETY SWITCH

SERVICE SUPPORT TYPE SF(U) - UNDERGROUND SERVICE



WITH SAFETY SWITCH



HOOKED ANCHOR DETAIL

SERVICE SUPPORT TYPE SP(U) - UNDERGROUND SERVICE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP

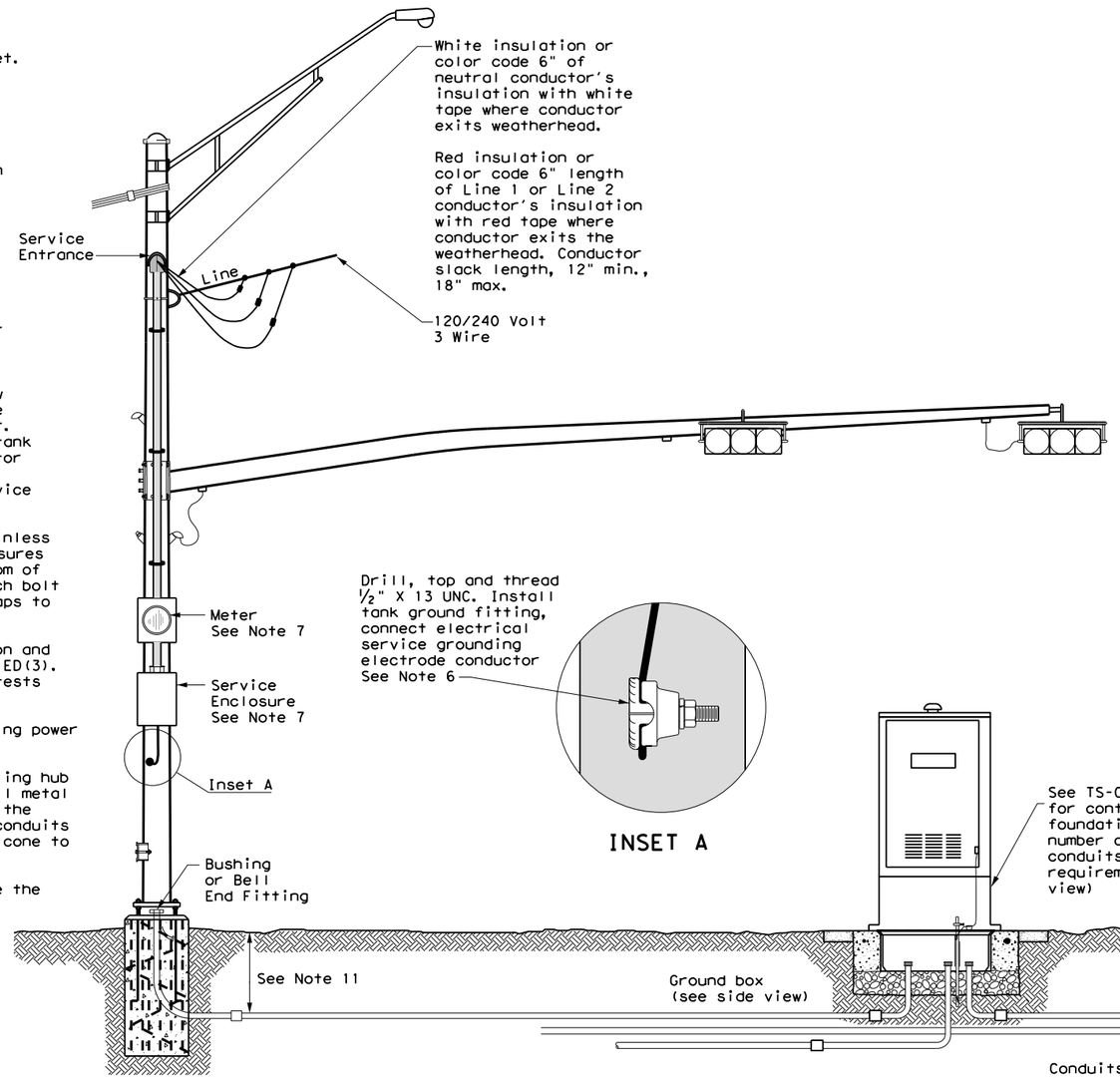
ED(7)-14

FILE: ed7-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		164

DATE: 9/30/2024 1:15:15 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/00520504 6/4 - Design/Plan Set/8. Traffic/SIGNALS/STANDARDS/ed8-14.dgn

TRAFFIC SIGNAL NOTES

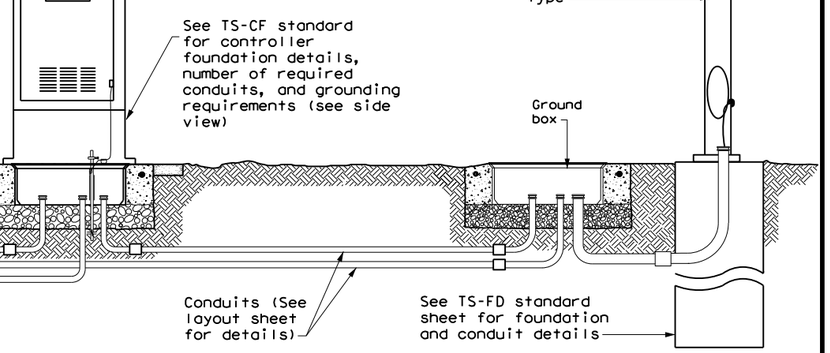
1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TXDOT standard TS-FD for further details.
6. Drill and tap signal poles for ½ in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of ¾ in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".



SIGNAL POLE WITH SERVICE

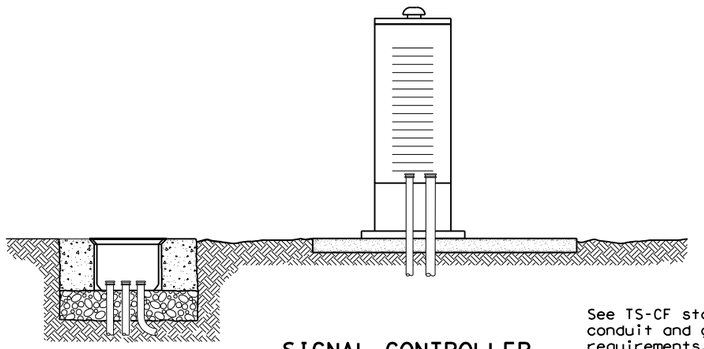
Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

INSET A



SIGNAL CONTROLLER FRONT VIEW

SIGNAL POLE



SIGNAL CONTROLLER SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

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FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/00520504/4 - Design/Plan Set/8. Traffic/SIGNALS/STANDARDS/ed9-14.dgn

PEDESTAL SERVICE NOTES

1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS)11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services. "Provide pedestal electrical services as listed on the Material Producers list (MPL) on the Department's web site under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.

2. When a meter socket is required, provide a socket with a minimum 100 amp rating that complies with local utility requirements.

3. Provide Class A or C concrete for pedestal service foundations in accordance with Item 420, "Concrete Substructures," except that concrete will not be paid for directly but is considered subsidiary to Item 628.

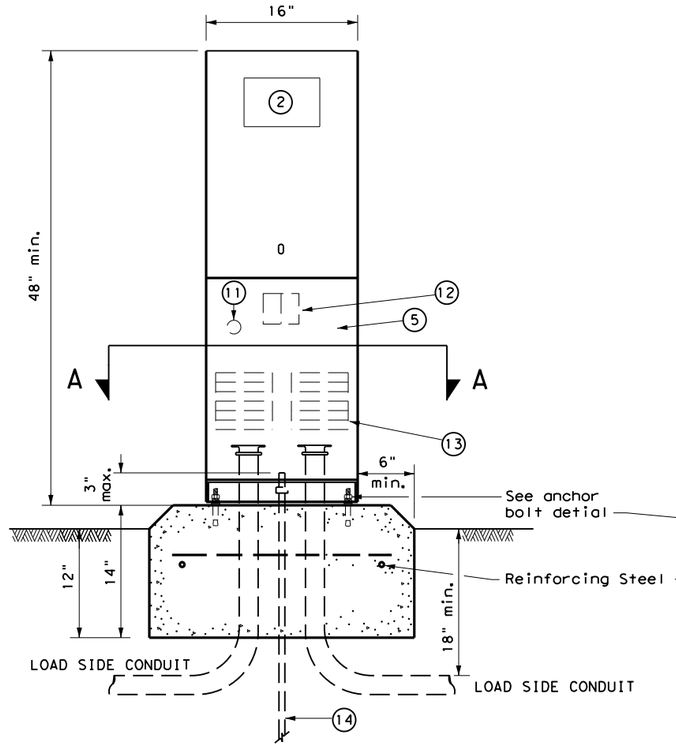
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

5. Install ½ in. X 2 ⅛ in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a ½ in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.

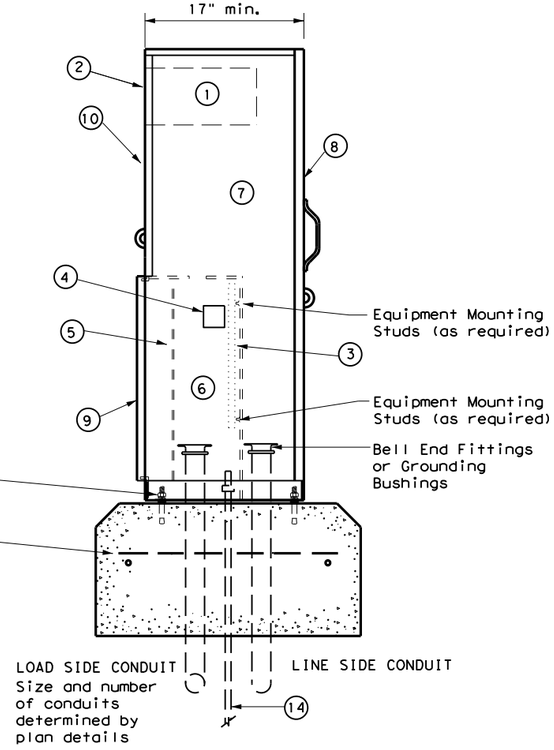
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within ¼ in. Repair rocking or movement of the service enclosure at no additional cost to the department.

7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal type services.

8. Ensure all elbows in the foundation are sized as per utility provider's conduit requirements for underground conduit and feeders. PVC extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a bonding jumper properly terminated.

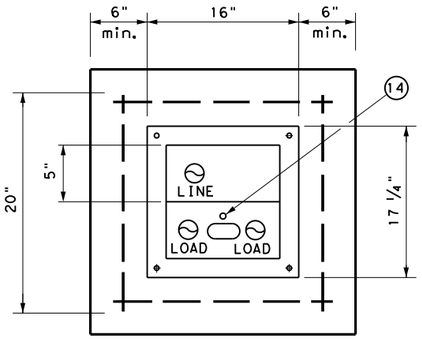


FRONT VIEW

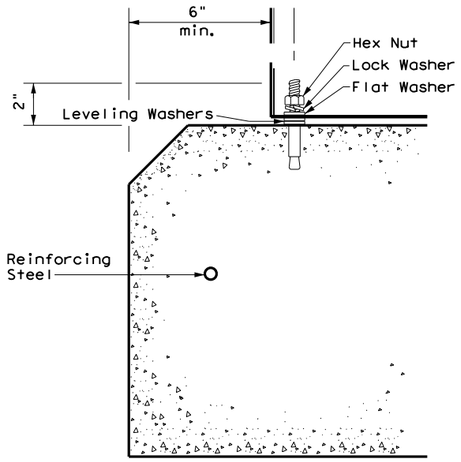


SIDE VIEW

TYPE C shown, TYPE A similar except that TYPE A shall have individual circuit breakers (CB) mounted on an equipment mounting panel. CB Handles shall protrude through hinged deadfront trim.



SECTION A-A



ANCHOR BOLT DETAIL

LEGEND	
1	Meter Socket, (when required)
2	Meter Socket Window, (when required)
3	Equipment Mounting Panel
4	Photo Electric Control Window, (When required)
5	Hinged Deadfront Trim
6	Load Side Conduit Trim
7	Line Side Conduit Area
8	Utility Access Door, with handle
9	Pedestal Door
10	Hinged Meter Access
11	Control Station (H-O-A Switch)
12	Main Disconnect
13	Branch Circuit Breakers
14	Copper Clad Ground Rod - 5/8" X 10'

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
ELECTRICAL SERVICE SUPPORT
PEDESTAL SERVICE TYPE PS

ED(9)-14

FILE: ed9-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	LBB	LAMB, ETC.		166

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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 5/8 in. max. depth and 1 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 3/4 in. maximum depth, and 1 1/2 in. to 1 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, 1/4 in. minimum diameter by 1 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 1/2 in. PVC to ground rod - extend 1/2 in. PVC 6 in. underground.

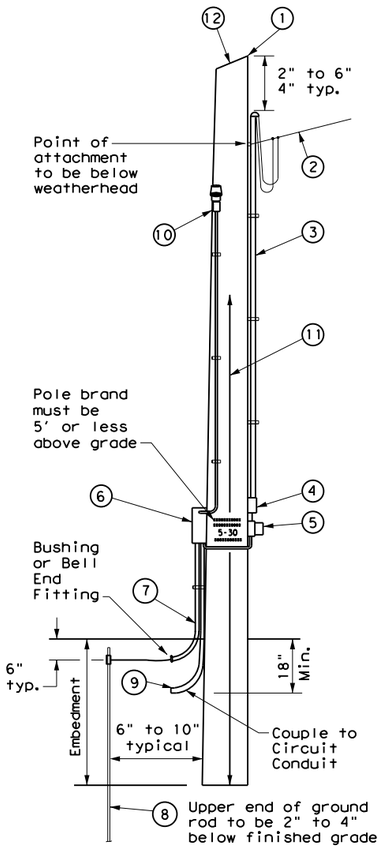
(8) 5/8 in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.

(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.

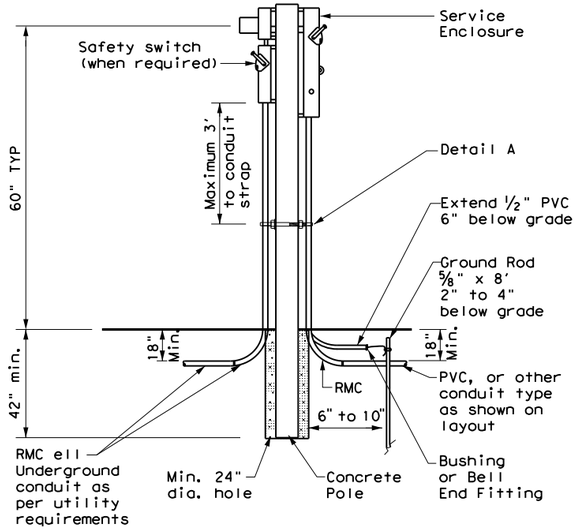


SERVICE SUPPORT TYPE TP (O)

GRANITE CONCRETE (GC) & OTHER CONCRETE (OC) NOTES

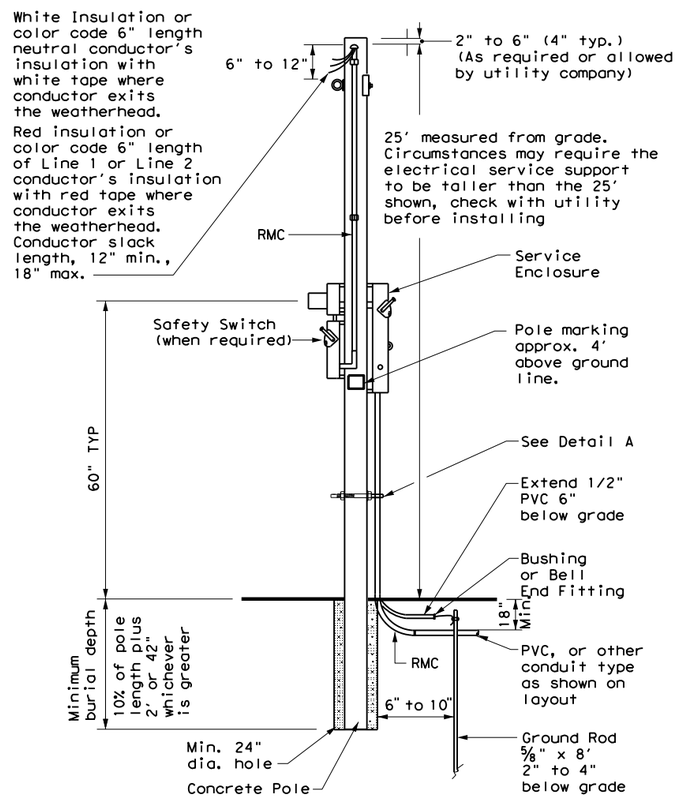
Ensure electrical service support structures bid as type Granite Concrete (GC) or Other Concrete (OC) meet the following requirements.

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 1/2 in. or 1 5/8 in. wide by 1 in. up to 3 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.



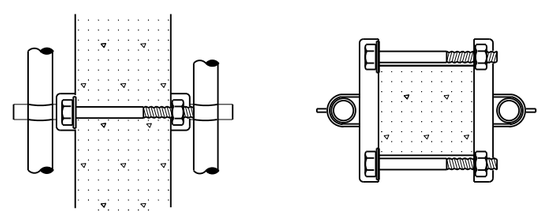
CONCRETE SERVICE SUPPORT

Underground (U)



CONCRETE SERVICE SUPPORT

Overhead (O)



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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	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		167

71K

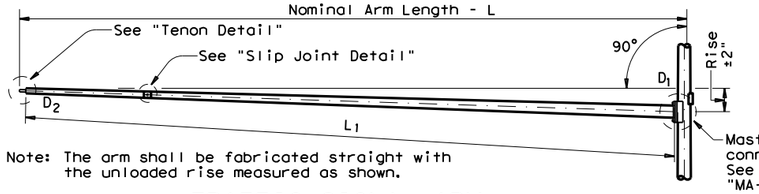
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
24	12.0	9.3	8.6	7.8	.239	13.0	10.0	9.2	8.3	.239	36-A
28	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
32	13.0	10.3	9.6	8.8	.239	14.0	11.0	10.2	9.3	.239	36-A
36	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
40	14.0	11.3	10.6	9.8	.239	16.0	13.0	12.2	11.3	.239	36-B
44	14.5	11.8	11.1	10.3	.239	16.5	13.5	12.7	11.8	.239	36-B

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	① thk	Rise	L_1	D_1	② D_2	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	8.0	5.3	.179	1'-8"	19.1	8.0	3.5	.179	1'-7"
24	23.1	9.0	5.8	.179	1'-9"	23.1	9.0	3.5	.179	1'-8"
28	27.1	9.5	5.7	.179	1'-10"	27.1	10.0	3.5	.179	1'-9"
32	31.0	9.5	5.2	.239	1'-11"	31.0	9.5	3.5	.239	1'-10"
36	35.0	10.0	5.1	.239	2'-0"	35.0	10.0	3.5	.239	1'-11"
40	39.0	10.5	5.1	.239	2'-3"	39.0	11.0	3.5	.239	2'-1"
44	43.0	11.0	5.1	.239	2'-8"	43.0	11.5	4.0	.239	2'-3"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

① Thickness shown are minimums, thicker materials may be used.

② D_2 may be increased by up to 1" for polygonal arms.



Note: The arm shall be fabricated straight with the unloaded rise measured as shown.

TRAFFIC SIGNAL ARM

(Fixed Mount)

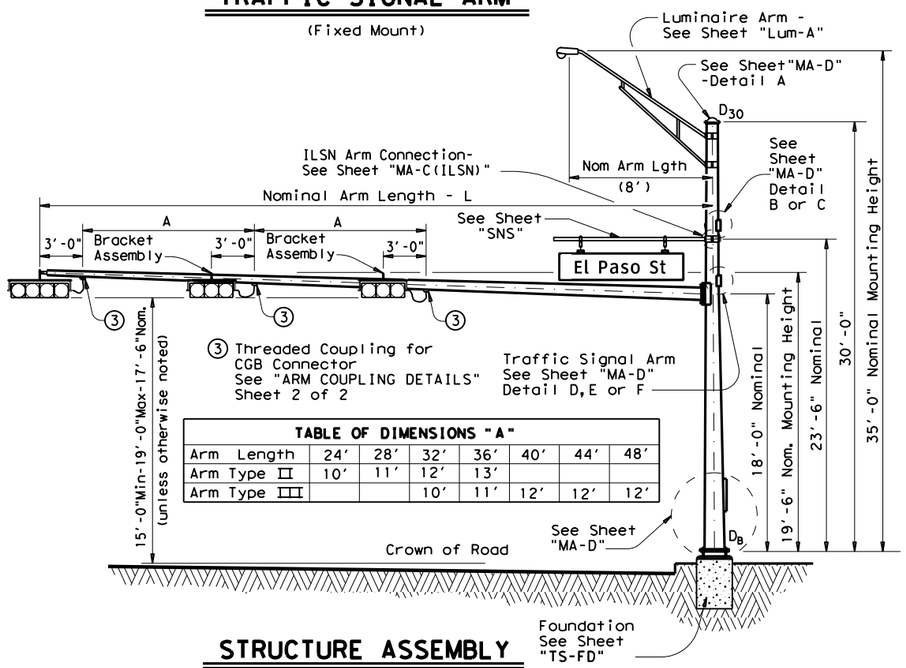


TABLE OF DIMENSIONS "A"

Arm Length	24'	28'	32'	36'	40'	44'	48'
Arm Type II	10'	11'	12'	13'			
Arm Type III			10'	11'	12'	12'	12'

TRAFFIC SIGNAL ARM

STRUCTURE ASSEMBLY

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30' Poles With Luminaire		24' Poles With ILSN		19' Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-100		20S-100		20-100	
24	24L-100		24S-100		24-100	
28	28L-100		28S-100		28-100	
32	32L-100		32S-100		32-100	1
36	36L-100		36S-100		36-100	1
40	40L-100		40S-100		40-100	
44	44L-100		44S-100		44-100	

Traffic Signal Arms (1 per pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-100					
24	24I-100		24II-100			
28	28I-100		28II-100			
32			32II-100		32III-100	1
36			36II-100		36III-100	1
40					40III-100	
44					44III-100	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ½"	3'-4"	
1 ¾"	3'-10"	2
2"	4'-3"	

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

SHEET 1 OF 2

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(100 MPH WIND ZONE)

SMA-100(1)-12

REVISIONS
5-96
11-99
1-12

DN: MS	CK: JSY	DW: MMF	CK: JSY
CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		168

123A

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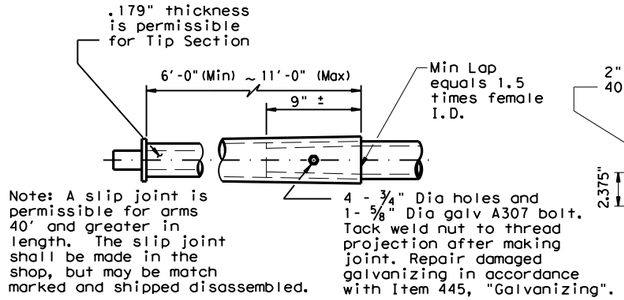
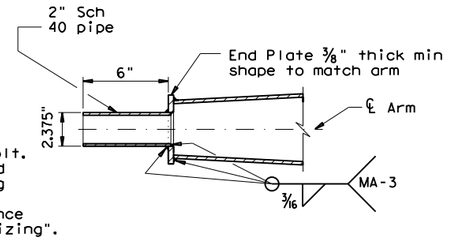
616263



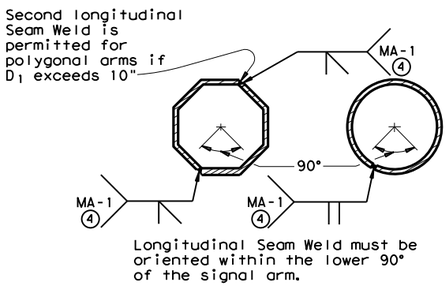
SLIP JOINT DETAIL



TENON DETAIL

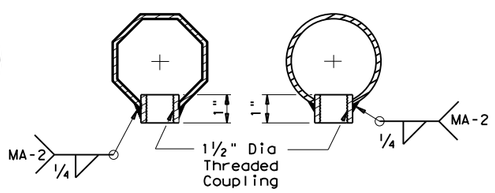
Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

④60% Min. penetration
100% pemetration within 6" of circumferential base welds.



ARM COUPLING DETAILS

VIBRATION WARNING

Mast Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backpates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 100 mph plus a 1.3 gust factor.

Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and 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 this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(100 MPH WIND ZONE)

SMA-100(2)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		169

DATE: 9/30/2024 1:16:25 PM
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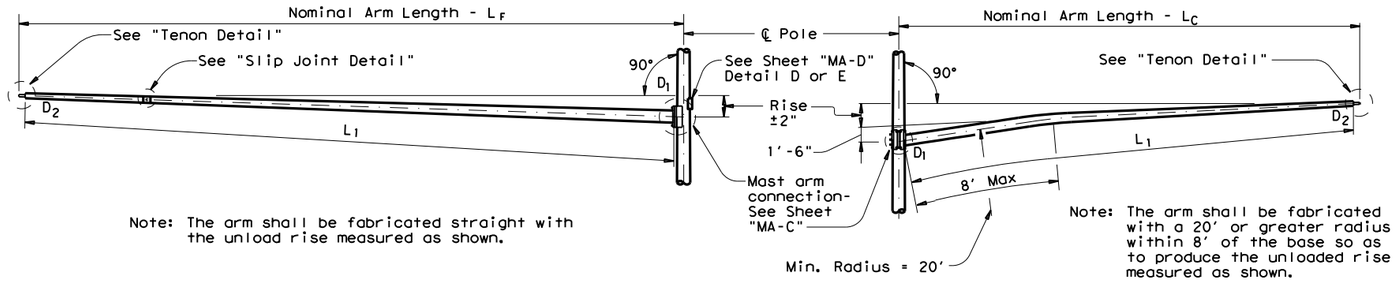
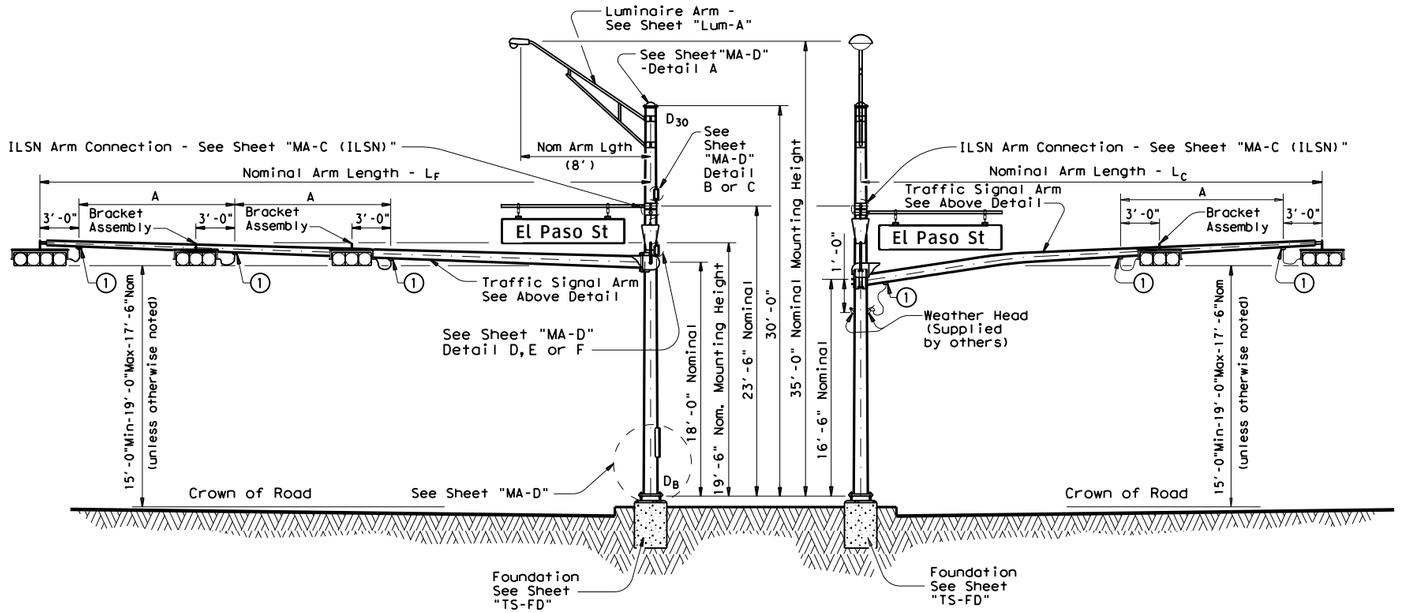


Note: The arm shall be fabricated straight with the unload rise measured as shown.

Note: The arm shall be fabricated with a 20' or greater radius within 8' of the base so as to produce the unloaded rise measured as shown.

FIXED MOUNT TRAFFIC SIGNAL ARM

CLAMP-ON TRAFFIC SIGNAL ARM



ELEVATION

(Showing fixed mount arm)

STRUCTURE ASSEMBLY

① Threaded Coupling for CGB Connector
See "ARM COUPLING DETAILS" Sheet 2 of 3

ELEVATION

(Showing clamp mount arm)

TABLE OF DIMENSIONS "A"						
Arm Length	24'	28'	32'	36'	40'	44'
Arm Type II	10'	11'	12'	13'		
Arm Type III			10'	11'	12'	12'

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 100 mph plus a 1.3 gust factor. Designs are based on an arm included angle of 90 degrees or more. Angles of less than approximately 75 degrees will require a special design.

Poles are designed to support one 8'-0" luminaire arm, two 9'-0" internally lighted street name signs and two traffic signal arms with length combinations as tabulated. The specified luminaire load applied at the end of luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign applied 4'-6" from the centerline of the pole equals 85 lbs vertical dead load plus the horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and 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 this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
DUAL MAST ARM ASSEMBLY
(100 MPH WIND ZONE)
DMA-100 (1)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		170

125A

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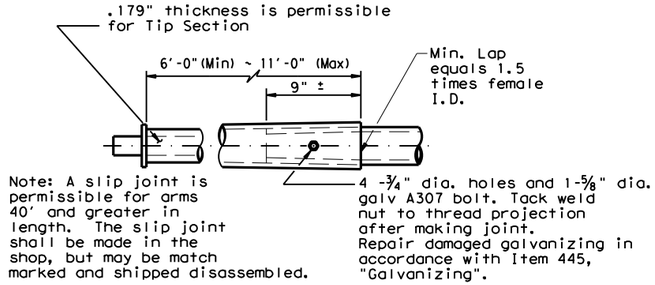
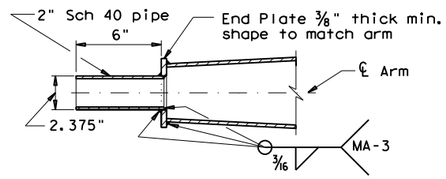


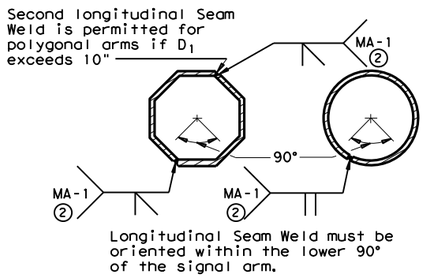
SLIP JOINT DETAIL



TENON DETAIL

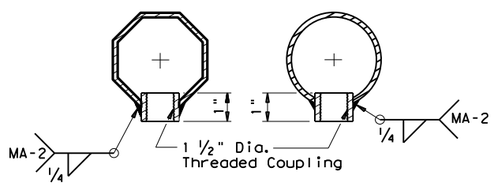
Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

(2) 60% Min. penetration
100% pemetration within 6" of circumferential base welds.



ARM COUPLING DETAILS

VIBRATION WARNING

Mast Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backpates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
DUAL MAST ARM ASSEMBLY
(100 MPH WIND ZONE)
DMA-100 (2)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
05-96
1-12

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		171

125B

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SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length		30' Poles With Luminaire		24' Poles With ILSN		19' Poles With no Luminaire and no ILSN	
		See note above plus: one (or two if ILSN attached) small hand hole, clamp-on simplex		See note above plus one small hand hole		See note above	
LF ft.	Lc ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20	2020L-100		2020S-100		2020-100	
24	20	2420L-100		2420S-100		2420-100	
	24	2424L-100		2424S-100		2424-100	
28	20	2820L-100		2820S-100		2820-100	
	24	2824L-100		2824S-100		2824-100	
	28	2828L-100		2828S-100		2828-100	
32	20	3220L-100		3220S-100		3220-100	
	24	3224L-100		3224S-100		3224-100	
	28	3228L-100		3228S-100		3228-100	
	32	3232L-100		3232S-100		3232-100	
36	20	3620L-100		3620S-100		3620-100	
	24	3624L-100		3624S-100		3624-100	
	28	3628L-100		3628S-100		3628-100	
	32	3632L-100		3632S-100		3632-100	
	36	3636L-100		3636S-100		3636-100	
40	20	4020L-100		4020S-100		4020-100	
	24	4024L-100		4024S-100		4024-100	
	28	4028L-100		4028S-100		4028-100	
	32	4032L-100		4032S-100		4032-100	
	36	4036L-100		4036S-100		4036-100	
44	20	4420L-100		4420S-100		4420-100	
	24	4424L-100		4424S-100		4424-100	
	28	4428L-100		4428S-100		4428-100	
	32	4432L-100		4432S-100		4432-100	2
	36	4436L-100		4436S-100		4436-100	

Traffic Signal Arms (Fixed Mount) (1 per pole) Ship each arm w/ the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal) 1 CGB connector		Type II Arm (2 Signals) 1 Bracket Assembly and 2 CGB Connectors		Type III Arm (3 Signals) 2 Bracket Assemblies and 3 CGB Connectors	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-100					
24	24I-100		24II-100			
28	28I-100		28II-100			
32			32II-100		32III-100	
36			36II-100		36III-100	
40					40III-100	
44					44III-100	2

Traffic Signal Arms (Clamp-On Mount) (1 per pole) Ship each arm w/ the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal) 2 CGB connector and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 1 Bracket Assembly, 3 CGB Connectors, and 1 clamp w/bolts and washers		Type III Arm (3 Signals) 2 Bracket Assembly, 4 CGB Connectors, and 1 clamp w/bolts and washers	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-100					
24	24I-100		24II-100			
28	28I-100		28II-100			
32			32II-100		32III-100	2
36			36II-100		36III-100	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	

ILSN Arm (1 or 2 per pole) ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ¾"	3'-10"	
2"	4'-3"	
2 ¼"	4'-9"	2

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

ARMS LF ft.	ARMS Lc ft.	ROUND POLES D_B in.	D_{19} in.	D_{24} in.	D_{30} in.	③ thk in.	POLYGONAL POLES D_B in.	D_{19} in.	D_{24} in.	D_{30} in.	③ thk in.	Foundation Type
20	20	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
24	20	12.5	9.8	9.1	8.3	.239	13.5	10.5	9.7	8.8	.239	36-A
	24	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
28	20	13.0	10.3	9.6	8.8	.239	14.5	11.5	10.7	9.8	.239	36-A
	24	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A
	28	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
32	20	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
	24	13.5	10.8	10.1	9.3	.239	15.0	12.0	11.2	10.3	.239	36-A
	28	14.0	11.3	10.6	9.8	.239	15.5	12.5	11.7	10.8	.239	36-B
	32	14.0	11.3	10.6	9.8	.239	15.5	12.5	11.7	10.8	.239	36-B
36	20	14.0	11.3	10.6	9.8	.239	15.5	12.5	11.7	10.8	.239	36-B
	24	14.0	11.3	10.6	9.8	.239	16.0	13.0	12.2	11.3	.239	36-B
	28	14.5	11.8	11.1	10.3	.239	16.0	13.0	12.2	11.3	.239	36-B
	32	14.5	11.8	11.1	10.3	.239	16.0	13.0	12.2	11.3	.239	36-B
	36	14.5	11.8	11.1	10.3	.239	16.5	13.5	12.7	11.8	.239	36-B
40	20	14.5	11.8	11.1	10.3	.239	16.5	13.5	12.7	11.8	.239	36-B
	24	15.0	12.3	11.6	10.8	.239	16.5	13.5	12.7	11.8	.239	36-B
	28	15.0	12.3	11.6	10.8	.239	17.0	14.0	13.2	12.3	.239	42-A
	32	15.0	12.3	11.6	10.8	.239	17.0	14.0	13.2	12.3	.239	42-A
	36	15.5	12.8	12.1	11.3	.239	17.5	14.5	13.7	12.8	.239	42-A
44	20	15.5	12.8	12.1	11.3	.239	17.5	14.5	13.7	12.8	.239	42-A
	24	15.5	12.8	12.1	11.3	.239	17.5	14.5	13.7	12.8	.239	42-A
	28	16.0	13.3	12.6	11.8	.239	18.0	15.0	14.2	13.3	.239	42-A
	32	16.0	13.3	12.6	11.8	.239	18.0	15.0	14.2	13.3	.239	42-A
	36	16.0	13.3	12.6	11.8	.239	18.0	15.0	14.2	13.3	.239	42-A

Arm L_F or L_C	ROUND ARMS L_1 ft.	D_1 in.	D_2 in.	③ thk in.	Rise	POLYGONAL ARMS L_1 ft.	D_1 in.	④ D_2 in.	③ thk in.	Rise
20	19.1	8.0	5.3	.179	1'-8"	19.1	8.0	3.5	.179	1'-7"
24	23.1	9.0	5.8	.179	1'-9"	23.1	9.0	3.5	.179	1'-8"
28	27.1	9.5	5.7	.179	1'-10"	27.1	10.0	3.5	.179	1'-9"
32	31.0	9.5	5.2	.239	1'-11"	31.0	9.5	3.5	.239	1'-10"
36	35.0	10.0	5.1	.239	2'-0"	35.0	10.0	3.5	.239	1'-11"
40	39.0	10.5	5.1	.239	2'-3"	39.0	11.0	3.5	.239	2'-1"
44	43.0	11.0	5.1	.239	2'-8"	43.0	11.5	4.0	.239	2'-3"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L_F = Fixed Arm Length
L_C = Clamp-on Arm Length (36' Max)

③ Thickness shown are minimums, thicker materials may be used.

④ D_2 may be increased by up to 1.0" for polygonal arms.

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

SHEET 3 OF 3

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
DUAL MAST ARM ASSEMBLY
(100 MPH WIND ZONE)
DMA-100 (3)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

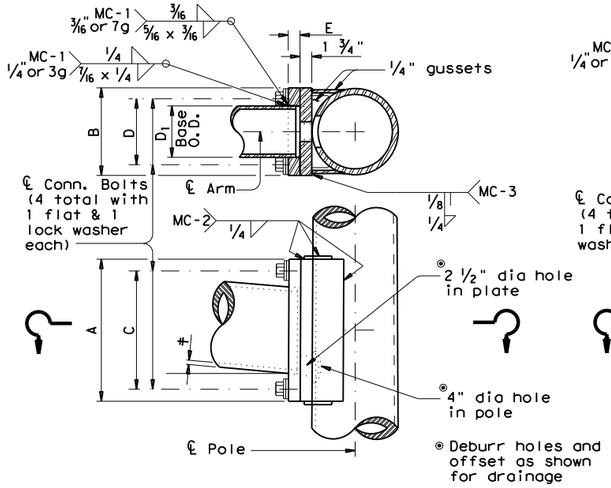
REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		172

125C

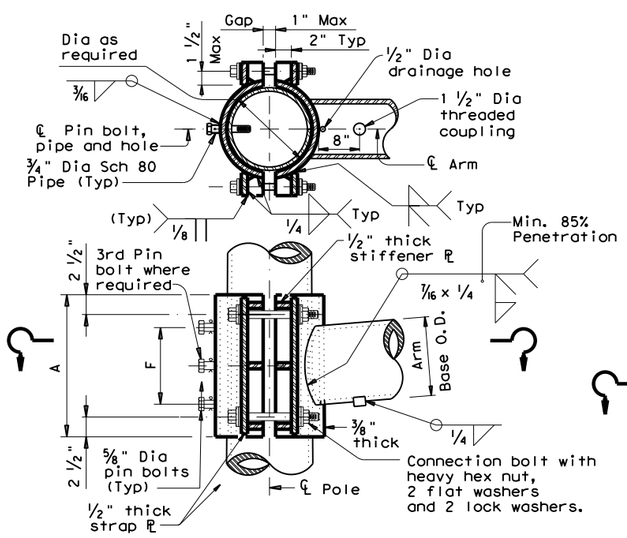
DATE:
FILE:

ARM SIZE D_1	ARM SIZE ϕ	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
6.5	.179	12	9	9	6	1 ¾	1
7.5	.179	13	9	10	6	1 ¾	1
8.0	.179	14	10	11	7	2	1 ¼
9.0	.179	16	11	13	8	2	1 ¼
9.5	.179	17	12	14	9	2	1 ¼
9.5	.239	18	12	15	9	2	1 ¼
10.0	.239	18	12	15	9	2	1 ¼
10.5	.239	18	13	15	10	3	1 ½
11.0	.239	18	13	15	10	3	1 ½



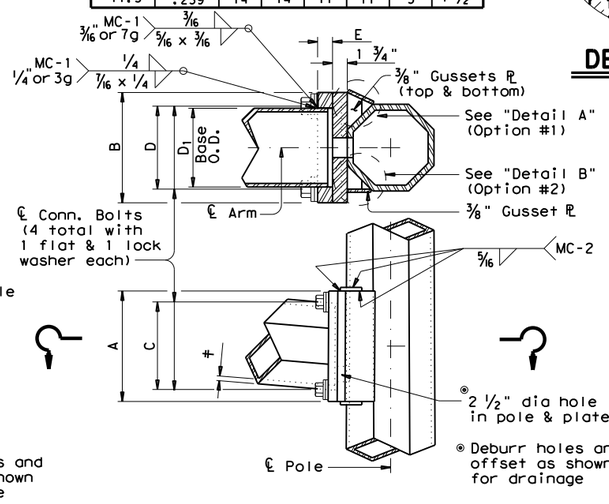
FIXED MOUNT DETAIL 1

ARM SIZE D_1	ARM SIZE ϕ	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	⅝
7.5	.179	14	8	4	1	2	⅝
8.0	.179	14	8	4	1	2	⅝
9.0	.179	16	10	4	1	2	⅝
9.5	.179	18	12	4	1 ¼	3	⅝
9.5	.239	18	12	4	1 ¼	3	⅝
10.0	.239	18	12	4	1 ¼	3	⅝

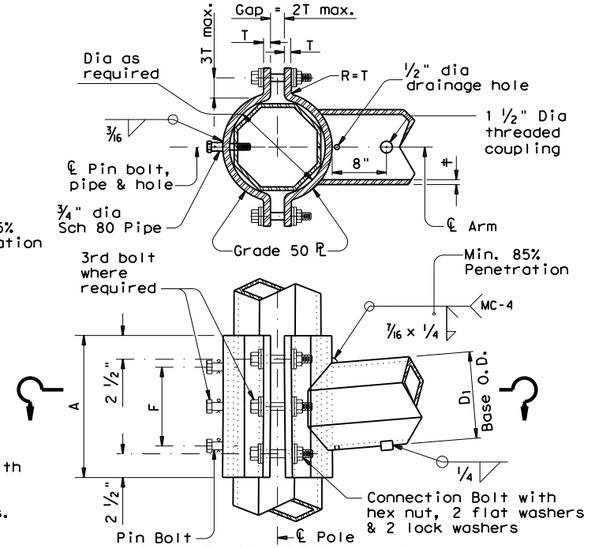


CLAMP-ON DETAIL 1

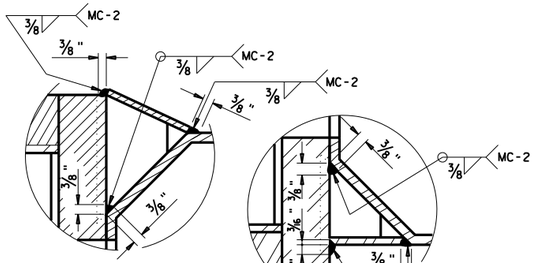
ARM SIZE D_1	ARM SIZE ϕ	A	F	T	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	in.	ea.	in.	ea.	in.
7.0	.179	12	6	¾	4	¾	2	⅝
7.5	.179	14	8	¾	4	¾	2	⅝
8.0	.179	14	8	¾	4	¾	2	⅝
9.0	.179	16	10	⅞	4	1	2	⅝
10.0	.179	18	10	⅞	4	1	2	⅝
9.5	.239	18	10	1	6	1	3	⅝
10.0	.239	18	10	1	6	1	3	⅝



FIXED MOUNT DETAIL 2

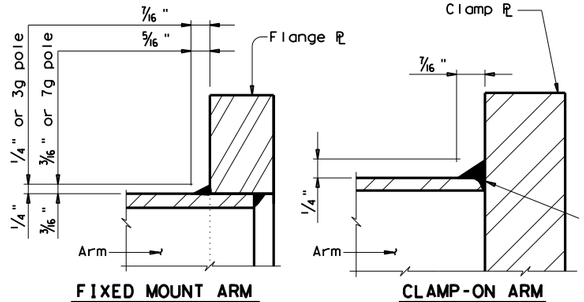


CLAMP-ON DETAIL 2



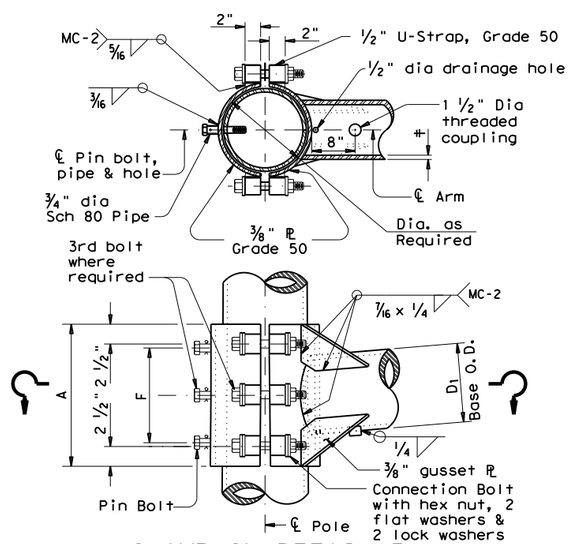
DETAIL A

DETAIL B



ARM BASE WELD DETAILS

ARM SIZE D_1	ARM SIZE ϕ	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	⅝
7.5	.179	14	8	4	1	2	⅝
8.0	.179	14	8	4	1	2	⅝
9.0	.179	16	10	4	1	2	⅝
9.5	.179	18	12	6	1	3	⅝
9.5	.239	18	12	6	1	3	⅝
10.0	.239	18	12	6	1	3	⅝



CLAMP-ON DETAIL 3

MATERIALS	
Round Shafts or Polygonal Shafts ①	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ②
Plates ①	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe ①	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

① ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

② ASTM A1011 SS Gr.50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 ½" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 3/16" dia holes for a ⅛" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST ARM CONNECTIONS

MA-C-12

DN: MS	CK: JSY	DW: MMF	CK: JSY
REVISIONS	CONT	SECT	JOB	HIGHWAY
5-96	0052	05	046, ETC.	US 84
5-09	DIST	COUNTY		SHEET NO.
1-12	LBB	LAMB, ETC.		173

126A

38

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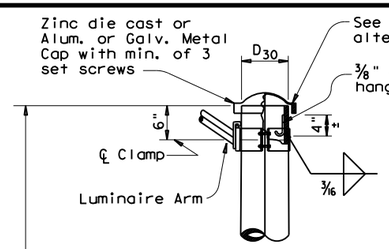
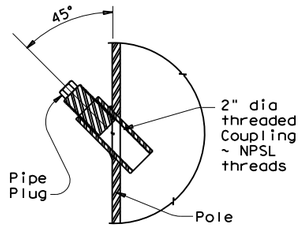
DATE:
FILE:

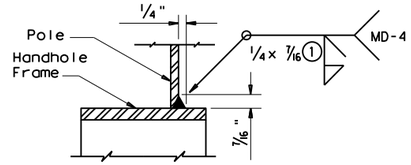


DETAIL A

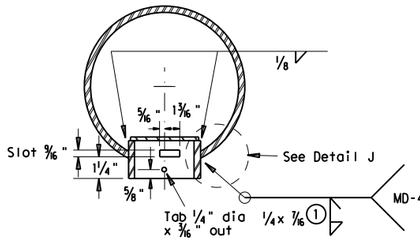
(for pole with luminaire)



POLE COUPLING DETAIL

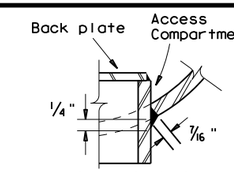


DETAIL G

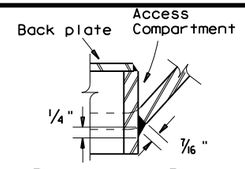


SECTION X-X

Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.

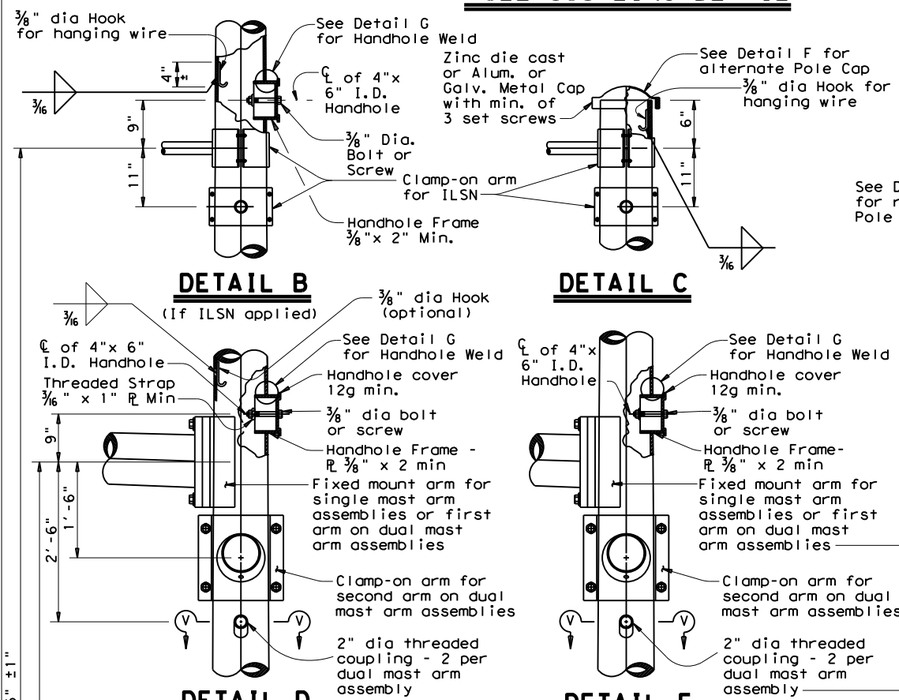


Round Pole



Polygonal Pole

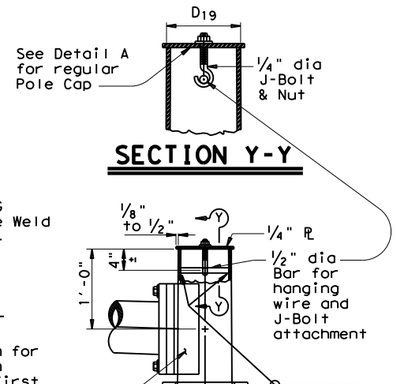
DETAIL J



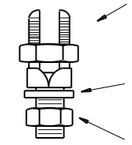
DETAIL B

(If ILSN applied)

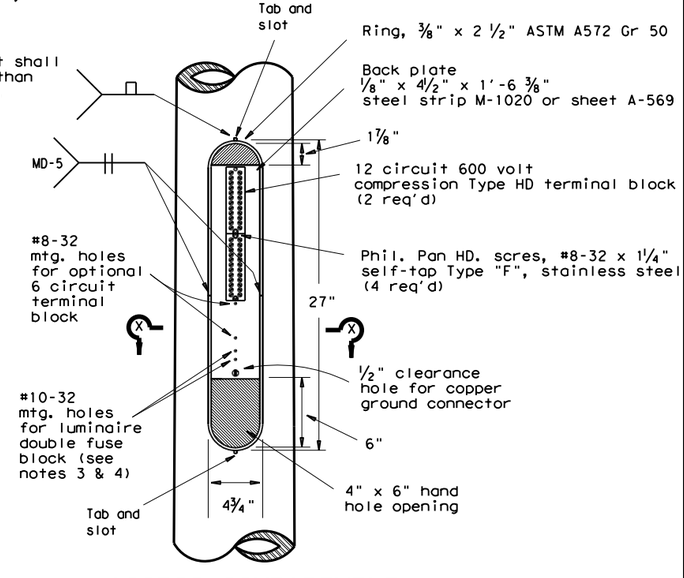
DETAIL C



SECTION Y-Y



COPPER GROUND CONNECTOR



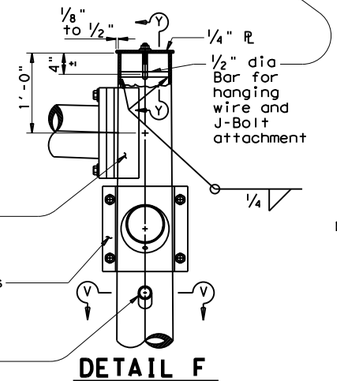
ACCESS COMPARTMENT

DETAIL D

(for 30' pole with luminaire and ILSN sign)

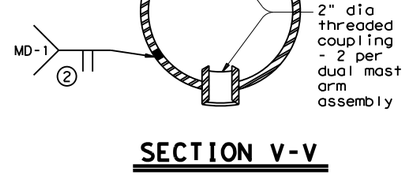
DETAIL E

(for 24' pole with ILSN sign and no luminaire)



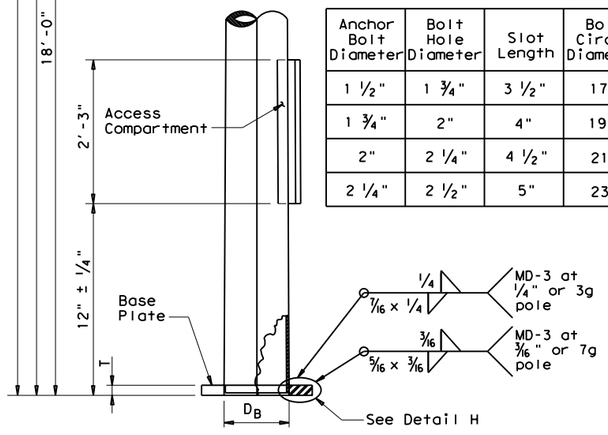
DETAIL F

(for 19' pole with no ILSN sign and no luminaire)

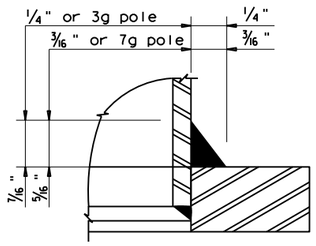


SECTION V-V

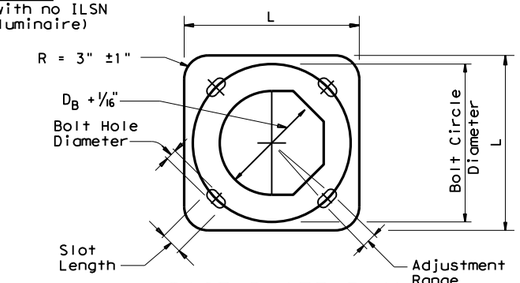
Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base ℞ Dim. L x T	Adjust. Range
1 1/2"	1 3/4"	3 1/2"	17"	18" x 1 1/2"	13.4°
1 3/4"	2"	4"	19"	20" x 1 3/4"	13.5°
2"	2 1/4"	4 1/2"	21"	22" x 2"	13.6°
2 1/4"	2 1/2"	5"	23"	24" x 2 1/4"	13.7°



POLE ELEVATION



DETAIL H



BASE PLATE PLAN

(1) 85% Min. penetration

(2) 60% Min. penetration 100% pemetration within 6" of circumferential base welds.

NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12

REVISIONS
8-99
1-12

DN: MS	CK: JSY	DW: FDN	CK: CAL

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84

DIST	COUNTY	SHEET NO.
LBB	LAMB, ETC.	174

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DATE:
FILE:

FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft ④, ⑤, ⑥			ANCHOR BOLT DESIGN ①				FOUNDATION DESIGN LOAD ②		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
				10	15	40							
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

NOTES:

① Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

② Foundation Design Loads are the allowable moments and shears at the base of the structure.

③ Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

④ Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

⑤ If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

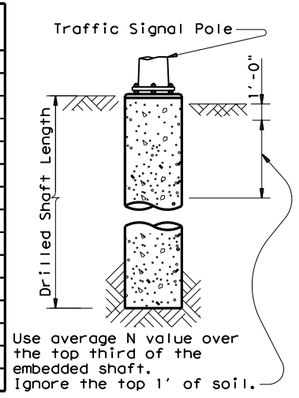
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET)				
				24-A	30-A	36-A	36-B	42-A
P-1	10	36-A	1			13		
P-2	10	42-A	1					18
P-3	10	42-A	1					18
P-4	10	32-A	1			13		
TOTAL DRILLED SHAFT LENGTHS						26		36

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'



Use average N value over the top third of the embedded shaft. Ignore the top 1' of soil.

ANCHOR BOLT & TEMPLATE SIZES

BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and interim revisions thereto.

Reinforcing steel shall conform to Item 440, "Reinforcing Steel".

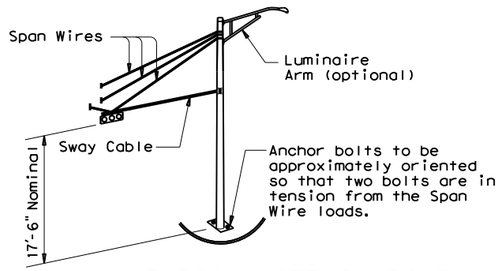
Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of 8UN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

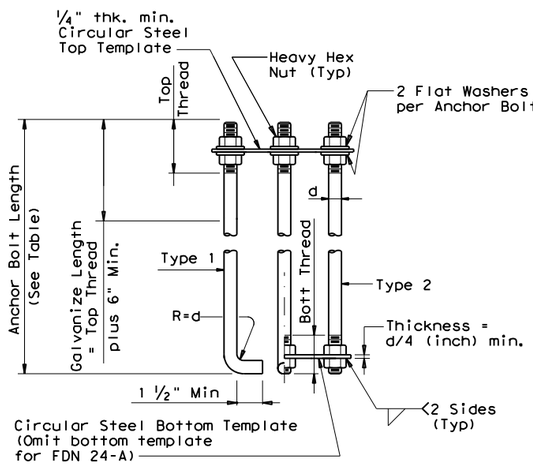
Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".

EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



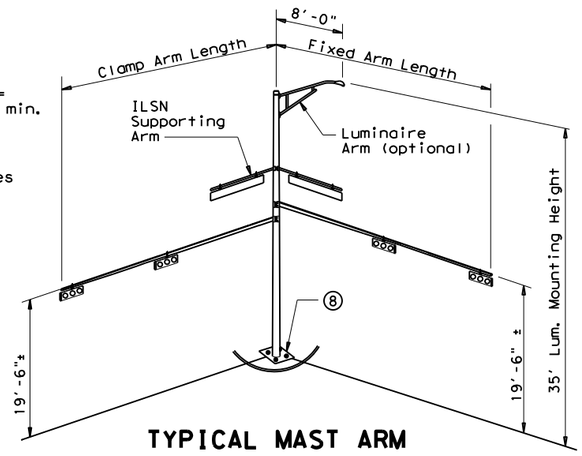
TYPICAL STRAIN POLE ASSEMBLY



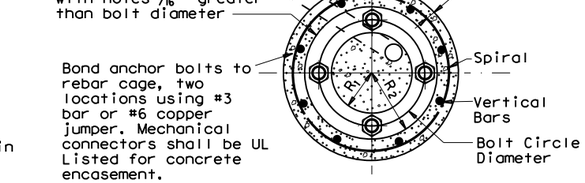
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

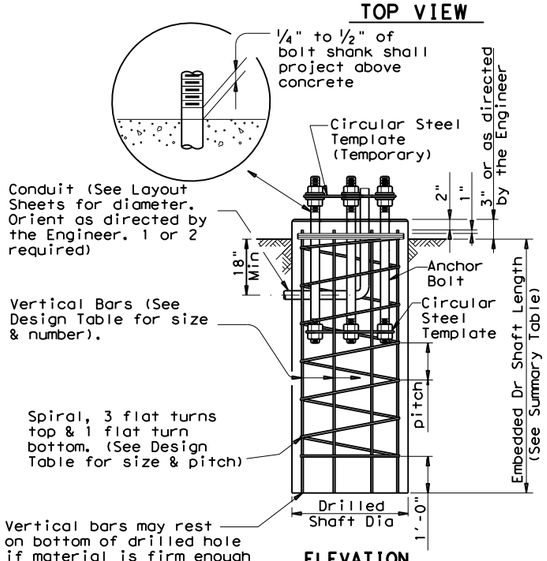
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



TYPICAL MAST ARM ASSEMBLY



TOP VIEW



ELEVATION

FOUNDATION DETAILS

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

REVISIONS	DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB
5-96 11-98 1-12	CONT	SECT	JOB	HIGHWAY
	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		175

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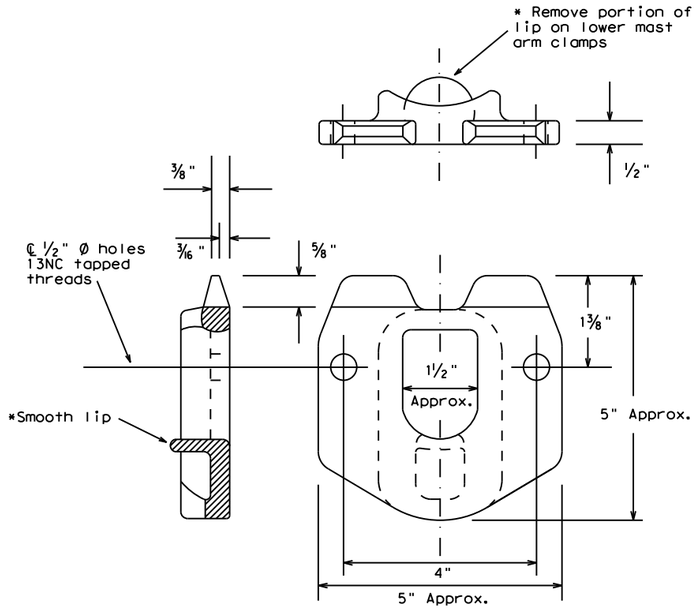
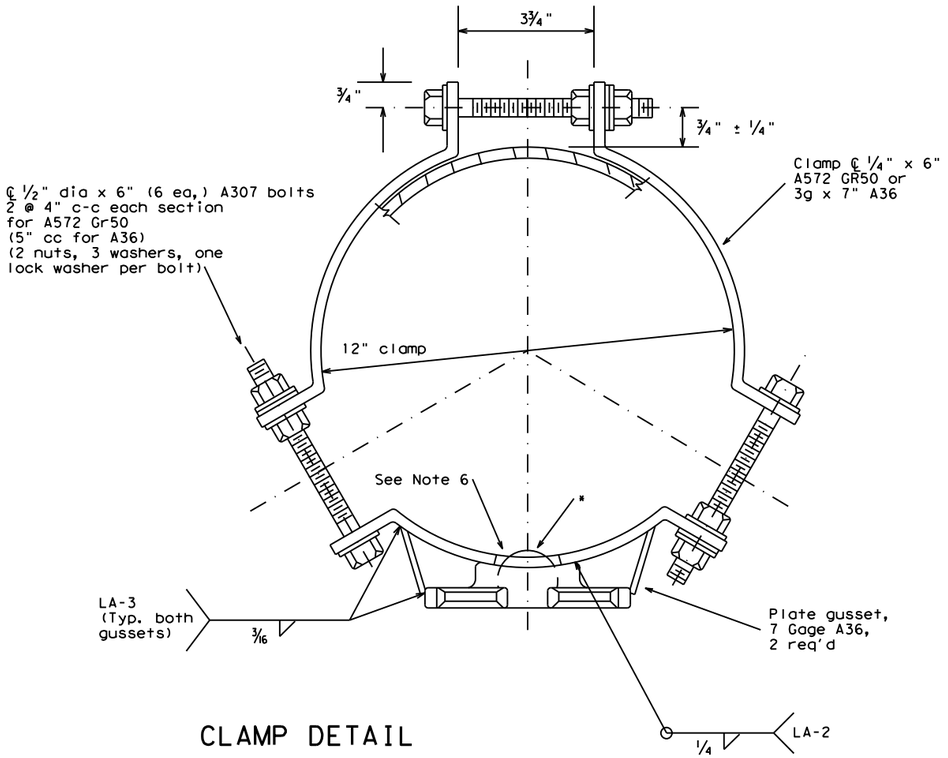
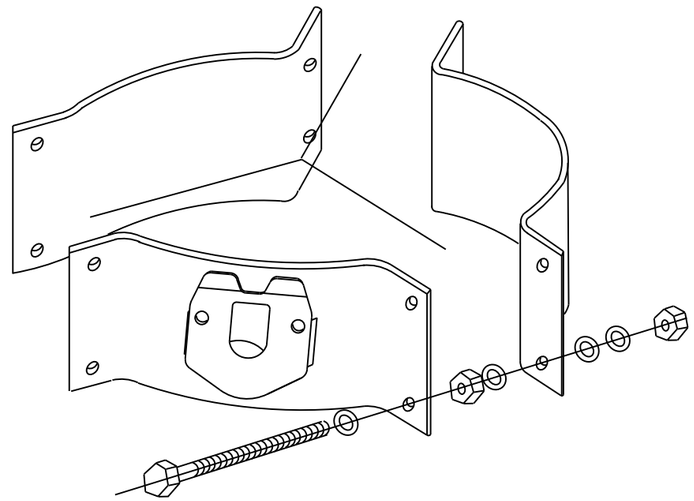


POLE SIMPLEX DETAILS



CLAMP DETAIL



PROJECTION

OTHER MATERIALS:

1. Pole simplex shall be ASTM A27 GR65-35 or A148 GR80-50 or A576 GR1021. ASTM A576 must be suitable for forging and also meet minimum tensile of 65ksi, minimum yield of 35ksi, and a minimum elongation of 22 percent in 2 inches.
2. Welded tabs and backplates shall be ASTM A-36 steel or better.
3. Nylon insert locknuts shall conform to ASTM A563.

GENERAL NOTES:

1. Materials and fabrication shall be in accordance with Standard Sheet "MA-C" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
2. All parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing". The throat of the Simplex shall be made free of all rough or sharp edges resulting from the galvanizing process.
3. Each simplex fitting shall be supplied with 2 ASTM A325 bolts, ½in. X 1½in. and 2 lock washers. The bolts and lock washers shall be secured to the clamp with the other hardware items. The Fabricator shall ship clamp assembly together in a single package, including all bolts, nuts, and washers required for the clamp and simplex fitting.
4. Design conforms to 1994 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" and interim revisions thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor. Clamps are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq.ft.,12 ft. maximum arm length.
5. Each assembly shall consist of one upper piece simplex fitting having a smooth lip and one lower piece simplex fitting with the lip removed.
6. Approximately 2 in. diameter hole in upper mast arm clamp.

For 8.9 - 12 inch diameter Signal Poles
(Two req'd for each mast arm)

Texas Department of Transportation
Traffic Operations Division

CLAMP ON FITTING ASSEMBLY FOR LUMINAIRE MAST ARM

CFA-12

© TxDOT	DN: KAB	CK: RES	DW: FDN	CK: CAL
REVISIONS	CONT	SECT	JOB	HIGHWAY
11-99	0052	05	046, ETC.	US 84
1-12	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		176

DATE:
FILE:

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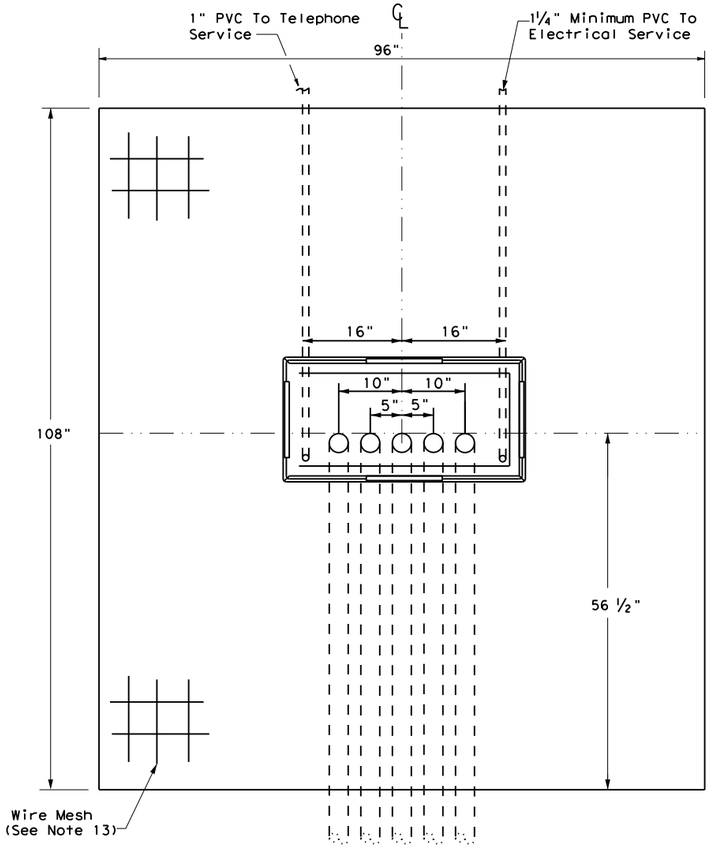
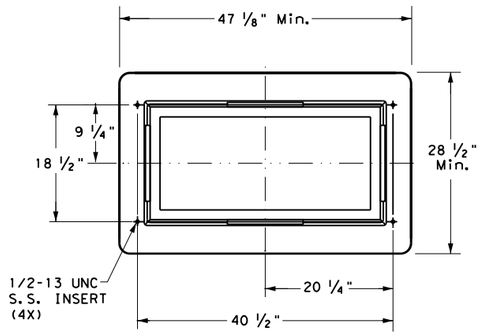
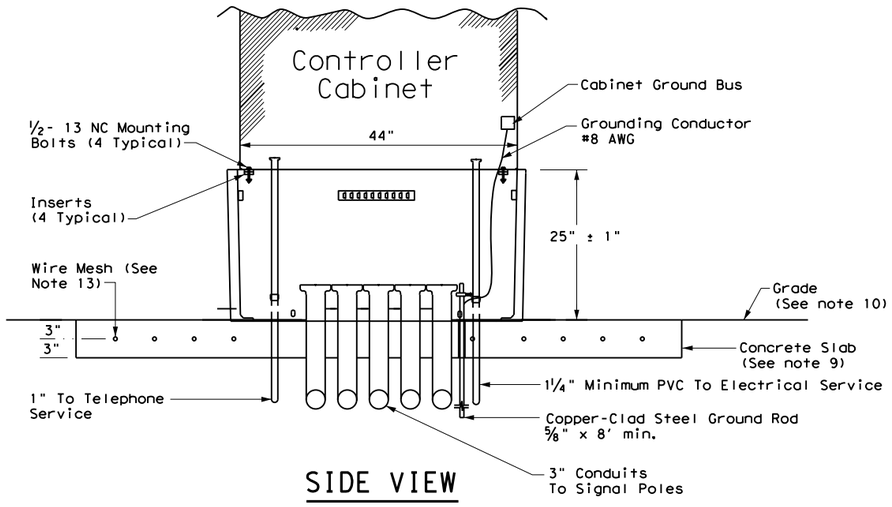


TOP VIEW



CABINET BASE



SIDE VIEW

TRAFFIC SIGNAL CONTROLLER BASE:

1. Provide a traffic signal controller base (cabinet base) manufactured of polymer concrete material consisting of calcareous and siliceous stone; glass fibers and thermoset polyester resin. The polymer concrete cabinet base must be reinforced on the inside of the cabinet base with fiberglass matting. Provide one of the following bases: Armorcast Part # A6001848X24, Quazite Model # PG3048Z709, or other as approved by TxDOT Traffic Safety Division.
2. The polymer concrete material must have a minimum compressive strength of 10,300 pounds per square inch (psi), minimum flexural strength of 3600 psi, and minimum shear strength of 3600 psi.
3. The polymer concrete cabinet base must conform to the dimensions shown and must accommodate a standard TxDOT basemount cabinet.
4. Supply the cabinet base with four 1#2"-13 UNC stainless steel inserts for attachment of the cabinet to the base. Inserts must withstand a minimum torque of 50 ft-lb and a minimum straight pull out strength of 750 lbs.
5. Provide the cabinet base with 4 cable racks mounted one on each side of the base 2" to 7 " from the top edge of the base. Unless approved otherwise, cable racks must be 1-1/2 x 9#16x 3#16inch steel channel with eight T-slots spaced at 1-1/2 inches. The cable racks must easily accommodate the insertion of tie wraps to attach field wiring to the racks to serve as strain relief. Secure cable racks to the base using 1#2"-13 UNC stainless steel screws and inserts.
6. The cabinet base, when secured to the concrete slab with controller cabinet attached, must withstand a minimum wind load of 125 mph or a 850 lb force applied at 49" above the bottom of the base without causing the base or cabinet to come out of their anchored position or cause any permanent deformation. The manufacturer must supply certification by an independent testing laboratory or sealed by a Texas Licensed Professional Engineer. Provide the cabinet base with hardware for attachment to a concrete slab.
7. The traffic signal base must be permanently marked either by impress or by permanent ink with the manufacturer's model number and name or logo.
8. Seal the base to the concrete with a silicone caulk bead and fastened to the slab per manufacturer's instructions.

CONCRETE SLAB:

9. Traffic signal controller pad must be a portland cement concrete slab poured in place, must conform to the dimensions shown, and must be level.
10. Grade earthwork such that it is flush with the concrete pad on all four sides, unless otherwise shown on the plans. Subsidiary to ITEM 680, four inch rip rap may be used in lieu of earthwork. Slopes shall gradually contour to match plans.
11. Bond a #8 AWG copper ground wire and an 8 ft ground rod bonded to the reinforcing mesh by a suitable UL Listed clamp and terminated to the cabinet grounding bus for the purpose of providing a local ground for the electrical grounding conductor. The electrical grounding conductor specified in Item 680-3.A.4 is required and must be terminated to the cabinet ground bus.
12. Install a PVC sleeve to prevent the ground rod from direct embedment in the slab.
13. Provide welded wire mesh 6X6-W2.9 X W2.9 for reinforcement. Provide joints and splices in the mesh with a minimum 6-inch overlap. Center the mesh between top and bottom and provide a minimum 3 inch cover on the edges.
14. Provide Class B concrete minimum for the slab in accordance with Item 421. Construct the slab in accordance with Item 531.

CONDUITS:

15. Stub up and run 3-inch conduits through the slab to the various traffic signal poles and ground boxes as shown on the layouts. Install the number of conduits as shown on layouts plus two additional 3 inch conduits for future use. Terminate the conduits with a bushing between 2 and 4-inches above the slab.
16. Extend conduits for future use at least 18-inches from the edge of the slab, terminate underground with a coupling, and cap and seal so that the seal can be removed without damaging the coupling. This must also apply to unused telephone conduit.
17. Stub up two separate conduits through the slab from the electrical and telephone services. Run the conduit for the electrical feed directly to the electrical service enclosure. Run the conduit for the telephone line directly to the telephone service, usually located on the same pole as the electrical service. Telephone must not under any circumstance share a conduit with any other function.
18. Terminate electric and telephone conduits above the slab with a coupling. After the base is installed, extend the conduits above the top of the base and secure to the base using a steel one-hole strap or similar suitable substitute.

CONTROLLER CABINET:

19. Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.
20. The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:

21. Bid TS-CF as subsidiary to Item 680.

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD
TS-CF-21

FILE: ts-cf-21.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2000	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-04 2-21	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		177

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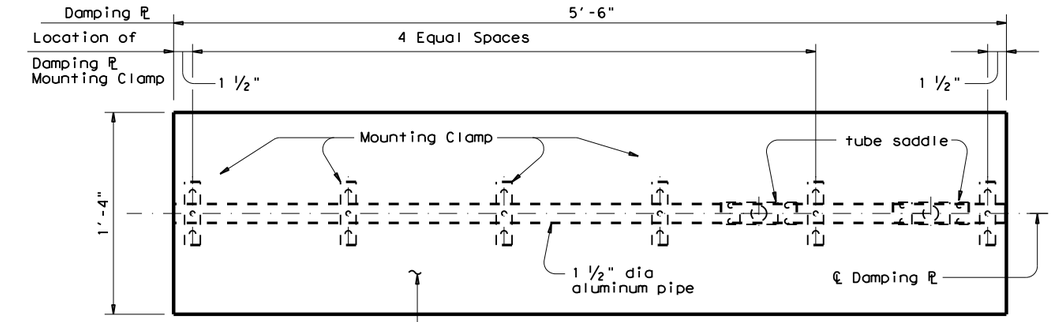
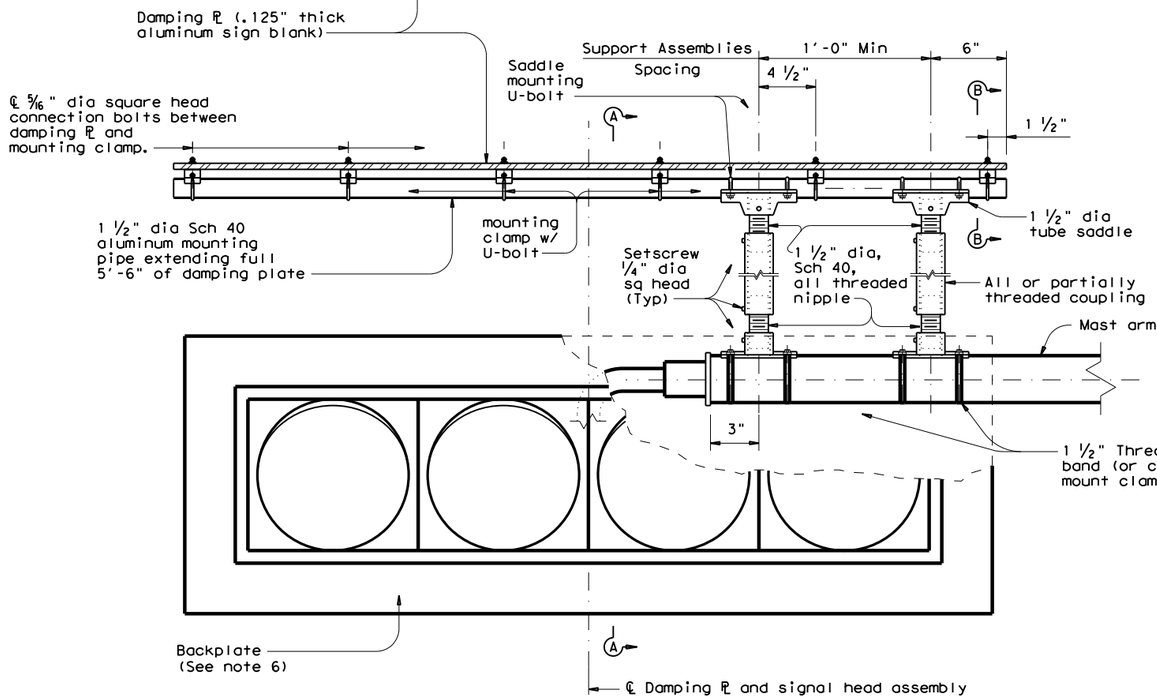


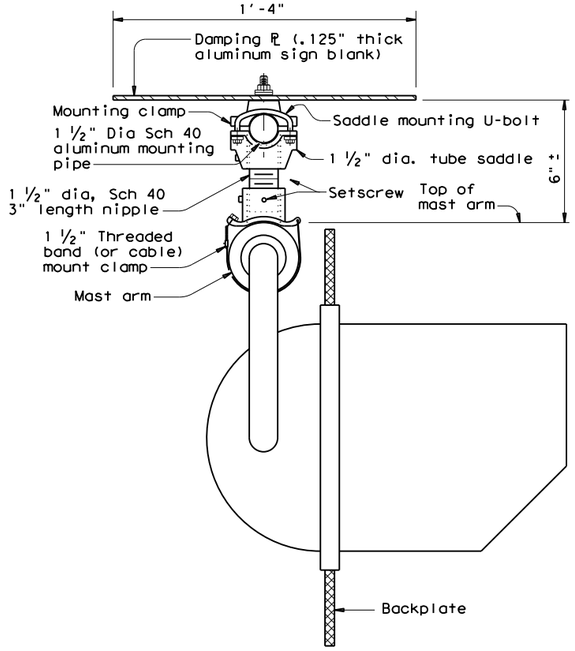
PLAN



ELEVATION

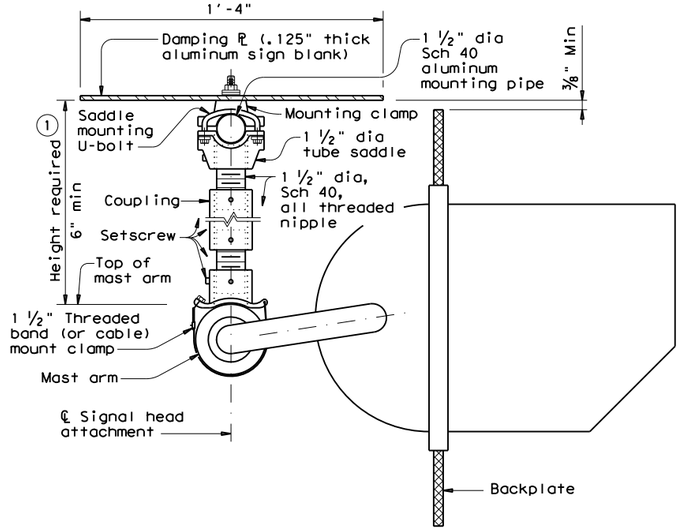
DAMPING PLATE MOUNTING DETAILS

(Showing alternate placement of signal head)



SECTION A-A

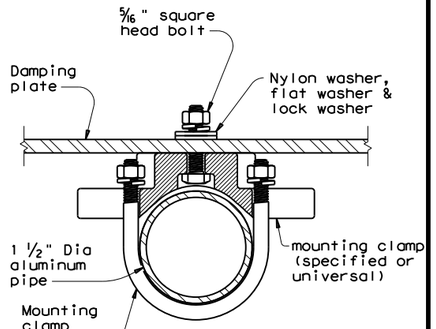
(Showing standard placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)



SECTION A-A

(Showing alternate placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)

① Recommended supporting assemblies to achieve required height for horizontal section heads			
Height required	One nipple each length	Two nipples each length plus	One coupling each length
6"-6 ¾"	3"	-	-
7"-8 ½"	4"	-	-
9"-10 ½"	6"	-	-
11"-15 ½"	-	4"	5"
16"-24"	-	6"	10"



SECTION B-B

(Showing damping plate attachment)

GENERAL NOTES:

1. In accordance with the findings of TxDOT sponsored research, the installation of a damping plate in accordance with the details shown here at the end of signal mast arms of SMA and DMA standard structures reduces excessive harmonic vertical vibration, and thus fatigue damage. Any deviation from these details may reduce the effectiveness of this damping device.
2. Aluminum sign blank for damping plate will conform to Departmental Material Specifications DMS-7110. Materials for mast arm mounting clamp and tube saddle will be aluminum castings or aluminum alloys as in accordance with manufacturers' stipulations. Mounting pipe, pipe nipple and coupling will be aluminum alloy 6061-T6 or 6063-T6. Damping plate mounting clamp and u-bolt assemblies will conform to Standard sheet SMD(GEN). U-bolts for saddle mounting will have a minimum yield strength of 36 ksi.
3. Damping plate will be mounted horizontally. Position centerline of damping plate to align with centerline of mast arm or horizontal signal head assembly. Vertical clearance between signal head (with or without backing plate)and bottom of damping plate will be maintained as shown. The attachments shown here are examples only, other supporting details which meet both alignment and vertical clearance requirements are also acceptable.
4. Unless stipulated by the manufacturers, all steel parts will be galvanized finish in accordance with Standard Specification Item 445, "Galvanizing".
5. Contractor will verify applicable field dimensions before the installation.
6. Backplates are optional for traffic signals. When backplates are used, Backplates will have a 2-inch fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 "Sign Face Materials." See Sheet TS-BP-20 for backplate details.

Texas Department of Transportation

Traffic Safety Division Standard

MAST ARM DAMPING PLATE DETAILS

MA-DPD-20

FILE: ma-dpd-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
6-20	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		178

DATE: 9/30/2024 1:18:28 PM
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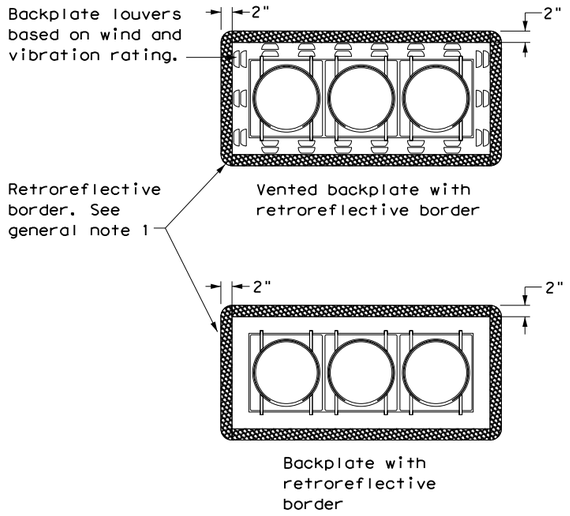
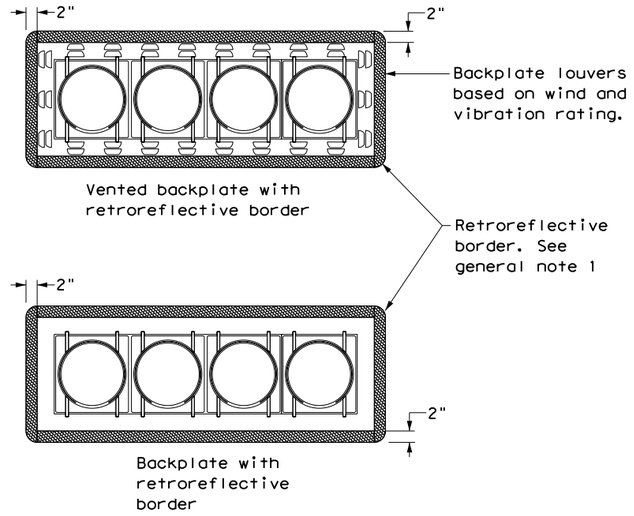
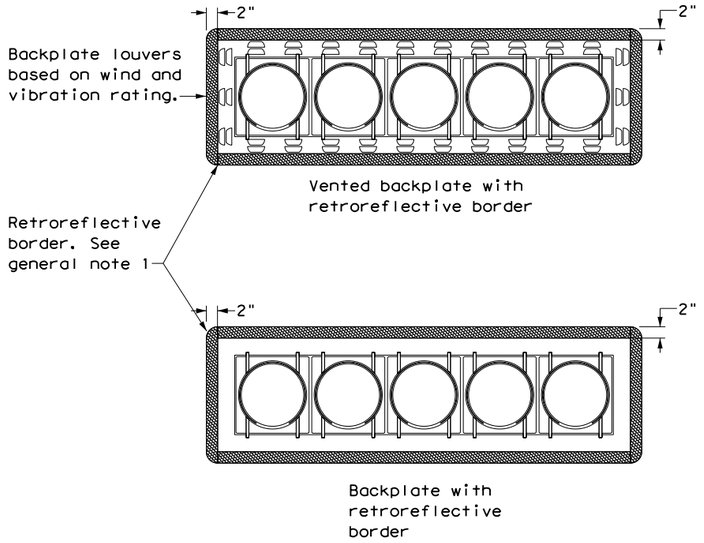


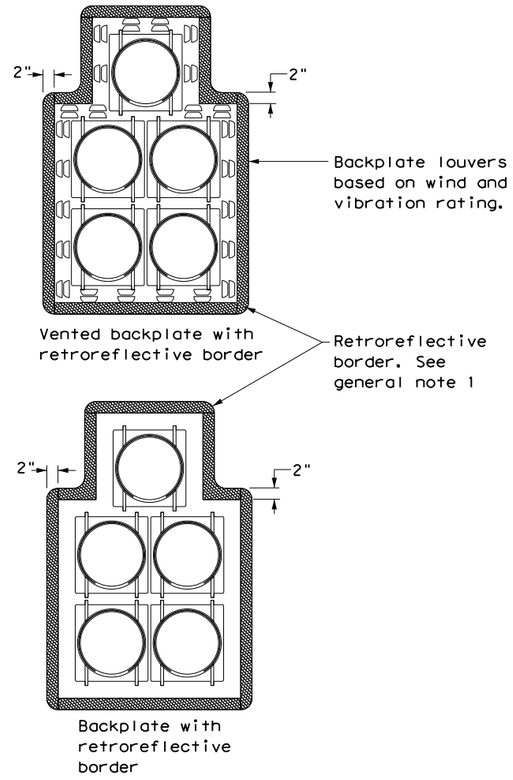
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



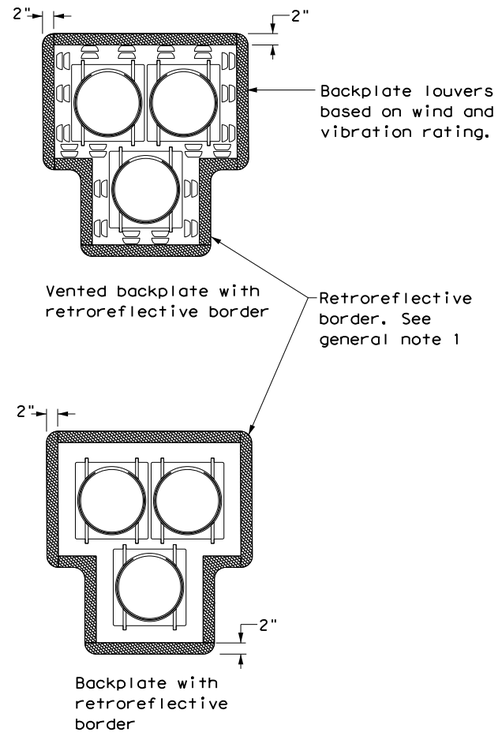
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
CLUSTER



PEDESTRIAN HYBRID
BEACON

GENERAL NOTES:

1. Backplates are optional for traffic signals and pedestrian hybrid beacons. When backplates are used, a 2-inch wide fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 is required. Place on all approaches when used.
2. Signal head and backplate compatability must be verified by the contractor prior to installation.
3. When using backplates on signal heads, venting is preferred to reduce cyclic vibration stress.
4. When a vented backplate is used, the retroreflective border must not be placed over the louvers.
5. This standard sheet applies to all signal heads with backplates, including but not limited to:
   - Pole mounted
   - Overhead mounted
   - Span wire mounted
   - Mast arm mounted
   - Vertical signal heads
   - Horizontal signal heads
   - Clustered signal heads
   - Pedestrian hybrid beacons

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL HEAD WITH BACKPLATE

TS-BP-20

FILE: ts-bp-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
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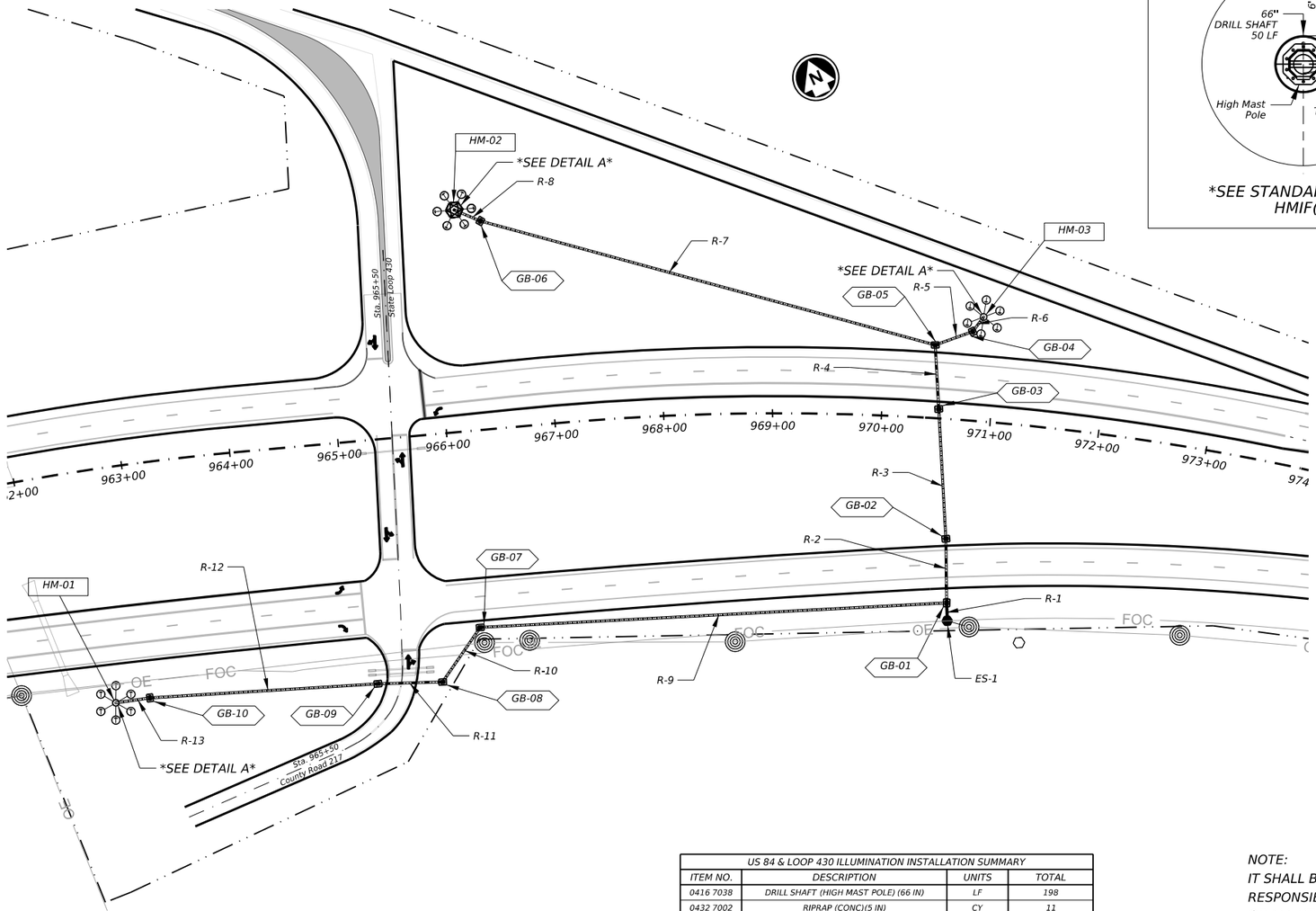

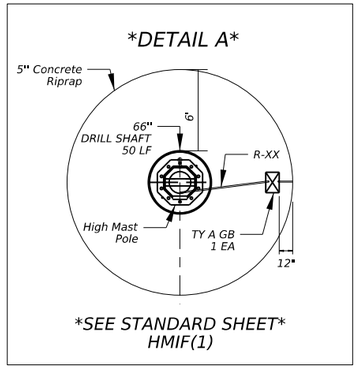

OE — OVERHEAD UTILITY

FOC — UNDERGROUND FIBER OPTIC

GL — UNDERGROUND GAS LINE

2" PVC CONDUIT (TRENCH)

2" PVC CONDUIT (BORE)

PROP ELECTRICAL SERVICE

EXISTING ELECTRICAL SERVICE

EXISTING POWER POLE

PROP HIGH MAST-TYPE S (175 FT) WITH AIMING ARROWS (SYMMETRICAL)

PROP HIGH MAST-TYPE B (175 FT) WITH AIMING ARROWS (ASYMMETRICAL)

GROUND BOX

R-XX — CONDUIT RUN NUMBER

HM-XX — HIGH MAST ID (PROP)

GB-XX — GROUND BOX ID

US 84 & LOOP 430 CONDUIT AND CABLE SUMMARY					
RUN	CONDUIT QUANTITY		LENGTH (LF)	CONDUCTOR QUANTITY	
	2" T(LF)EA	2"B(LF)EA		#4 BARE(EA)	#4 INSULATED(EA)
R-01	1		25	1	2
R-02		1	65	1	2
R-03	1		125	1	2
R-04		1	65	1	2
R-05	1		45	1	2
R-06	1		25	1	2
R-07	1		440	1	2
R-08	1		30	1	2
R-09	1		435	1	2
R-10	1		70	1	2
R-11		1	65	1	2
R-12	1		215	1	2
R-13	1		40	1	2
TOTALS:	1450	195		1645	3290

US 84 & LOOP 430 ILLUMINATION INSTALLATION SUMMARY			
ITEM NO.	DESCRIPTION	UNITS	TOTAL
0416 7038	DRILL SHAFT (HIGH MAST POLE) (66 IN)	LF	198
0432 7002	RIPRAP (CONC)(5 IN)	CY	11
0613 7008	HI MST IL POLE (175 FT) (100MPH)	EA	3
0614 7001	LED HI MST IL ASM (6 FIXT) (TY S)	EA	1
0614 7003	LED HI MST IL ASM (6 FIXT) (TY B)	EA	2
0618 7009	CONDT (HDPE) (2")	LF	1450
0618 7010	CONDT (HDPE) (2") BORE	LF	195
0620 7011	ELEC CONDR (NO.4) BARE	LF	1645
0620 7012	ELEC CONDR (NO. 4) INSULATED	LF	3290
0624 7002	GROUND BOX TY A (122311)W/APRON	EA	14
0628 7048	ELC SRV TY A 240/480 060(NS)SS(E)SP(O)	EA	1

ILLUMINATION ASSEMBLIES					
DESCRIPTION	POLE ID	STATION	OFFSET FROM BL (FT)	DRILL SHAFT DIAMETER/LENGTH	RIPRAP (CONC) (5 IN)
HI MST IL POLE (175 FT) (100MPH)	HM-01	962+61.83	215.11	66IN/50FT	2.56
HI MST IL POLE (175 FT) (100MPH)	HM-02	966+25.53	203.34	66IN/50FT	2.56
HI MST IL POLE (175 FT) (100MPH)	HM-03	970+86.50	98.81	66IN/50FT	2.56

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service *Conduit Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Lighting Contactor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
ES1		ELC SRV TY A 240/480 060 (NS)SS(E)SP(O)	2"	3/#2	N/A	2P/60	2P/ 60	N/A	HIGH MAST	2P/50	7.5	3.6

NOTE:
IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE LOCATION OF ALL UTILITIES AND UNDERGROUND STRUCTURES BEFORE MAKING EXCAVATIONS.

HIGH MAST LIGHTING
WILL OPERATE AT 480 VOLTS

TY S FIXTURES SHALL BE SYMMETRICAL
TY B FIXTURES SHALL BE ASYMMETRICAL

ALL ITEMS PAID FOR UNDER CSJ: 0052-05-048

STATE OF TEXAS
JEREMY T. DEARING
98218
LICENSED
PROFESSIONAL ENGINEER

Jeremy T. Dearing, P.E.

9/30/2024

Texas Department of Transportation

ILLUMINATION LAYOUT & SUMMARY (LOOP 430)
SCALE: 1"=150'

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		180

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CK: DW CK: DW

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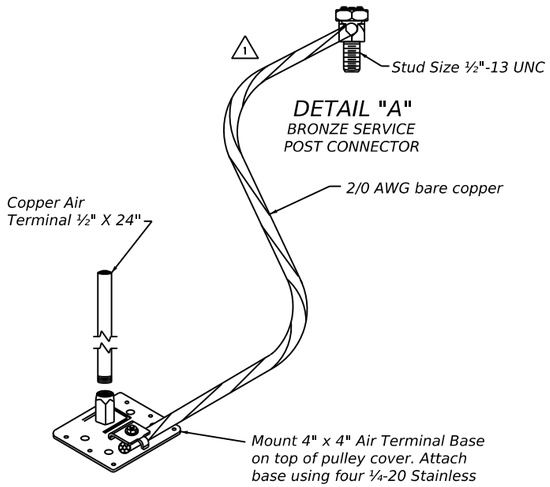
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/8. Traffic/ILLUMINATION/STANDARDS/hmid-24.dgn

NOTES:

1. Assemble and erect pole, ring, and ring support so that Reference Line is parallel to center line of roadway or as shown in the plans.
2. Place fixtures on ring to provide a min. clearance of 7" between fixtures.

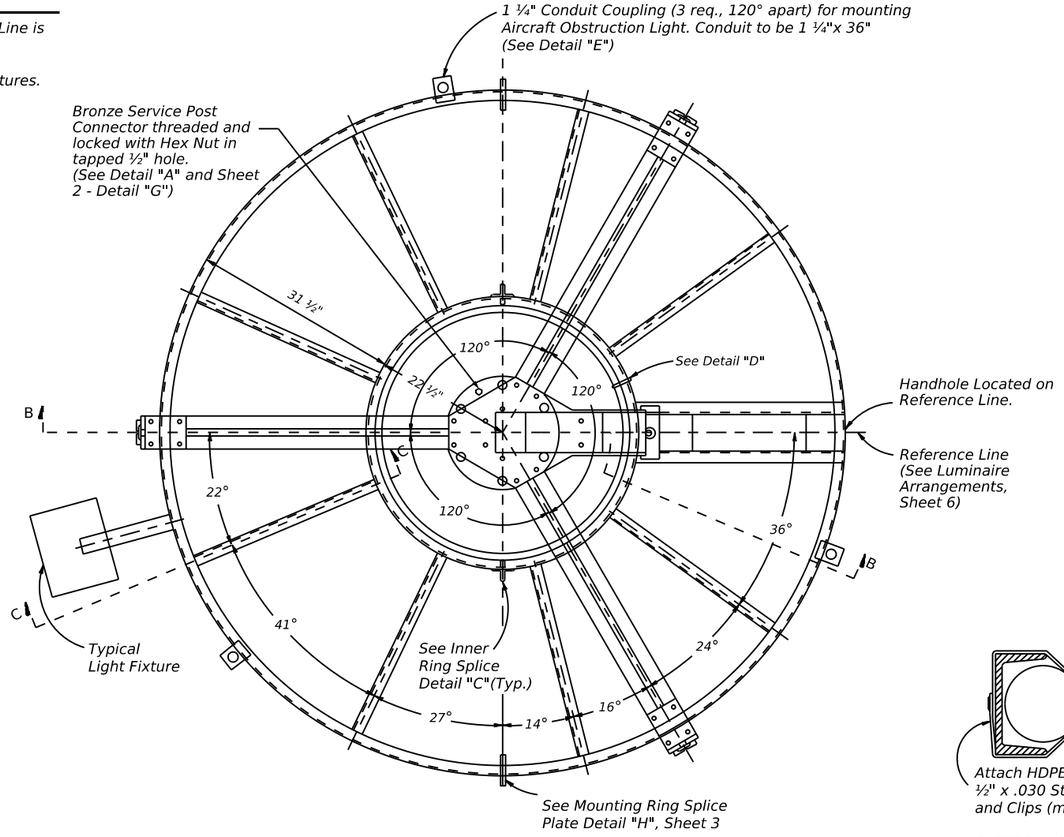


DETAIL "A"
BRONZE SERVICE POST CONNECTOR

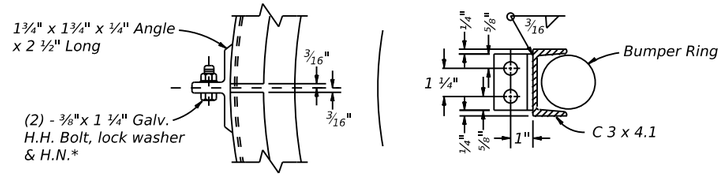
DETAIL "B"
AIR TERMINAL BASE

NOTE:

All lightning protection materials and components shall comply in size and composition with NFPA-780 requirements for this type of structure.

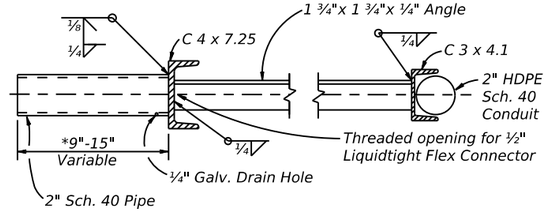


LIGHT MOUNTING RING & SUPPORT ASSEMBLY



DETAIL "C"
INNER RING SPLICE

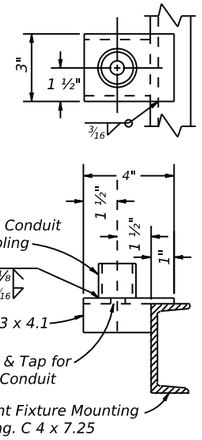
* Note: Torque bolts to 30 foot pounds or as recommended by the manufacturer



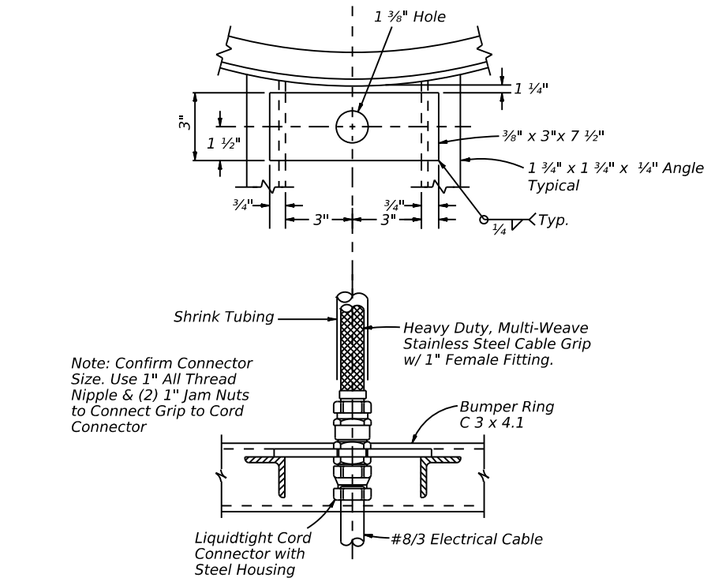
SECTION C-C

* Note: Determine tenon length according to required clearance and fixture used.

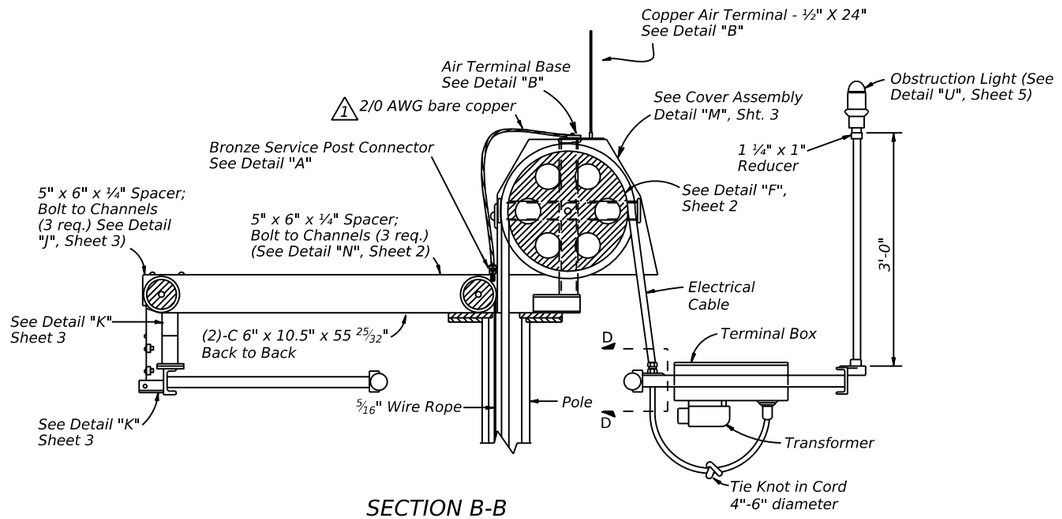
DETAIL "D"
BUMPER RING ATTACHMENT



DETAIL "E"
CONDUIT ATTACHMENT FOR OBSTRUCTION LIGHTS. TYPICAL (3) PLACES



SECTION D-D



SECTION B-B

NOTE:

2 Cover cable grip with heat shrink or cold shrink tubing for entire length of cable grip. Stainless steel bands are no longer used to hold cable grip.

1 Rev. lightning Rod Details
2 Rev. Cord Grip Details

Texas Department of Transportation — Traffic Safety Division Standard

HIGH MAST ILLUMINATION DETAILS

HMID(1)-24

FILE: hmid-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-86 5-87 2-24 5-86 10-87 4-87 4-96	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		181

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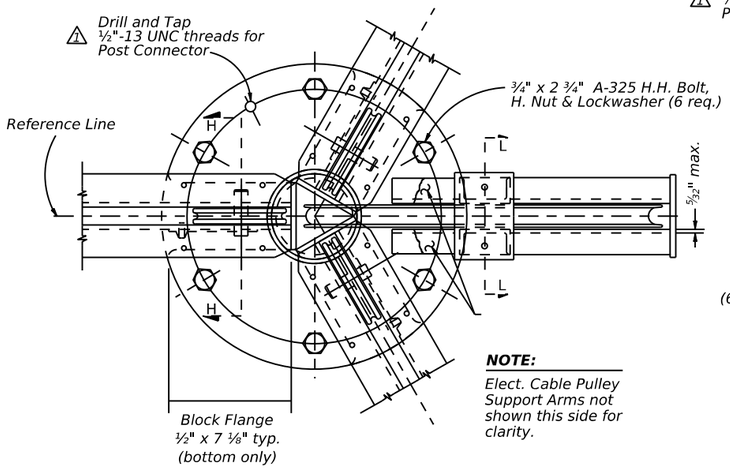
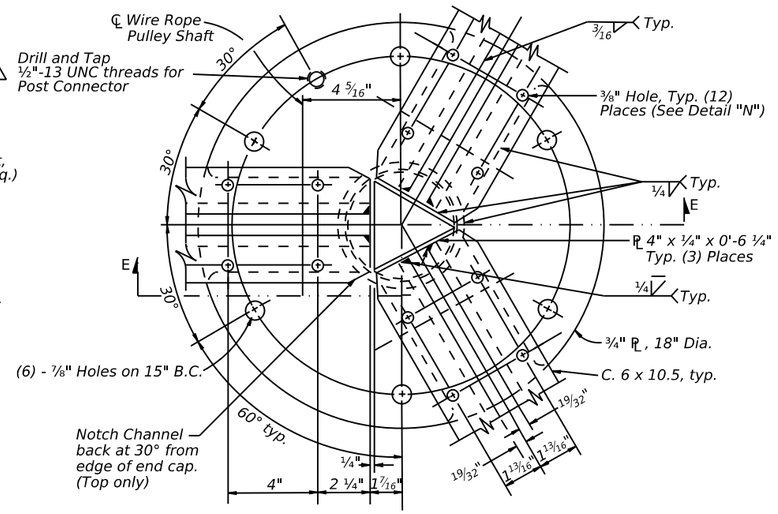
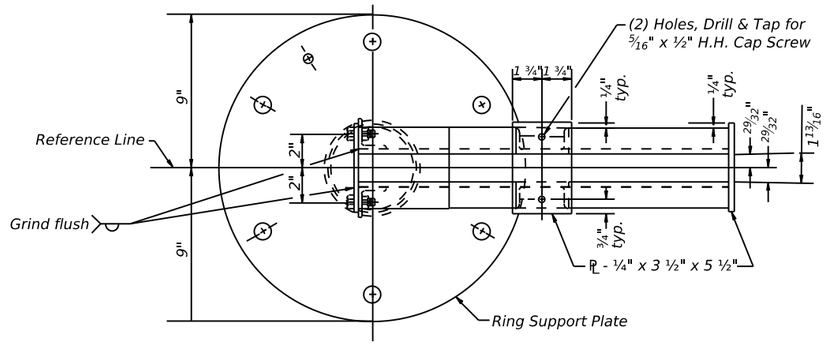


NOTE:
Elect. Cable Pulley Support Arms not shown this side for clarity.

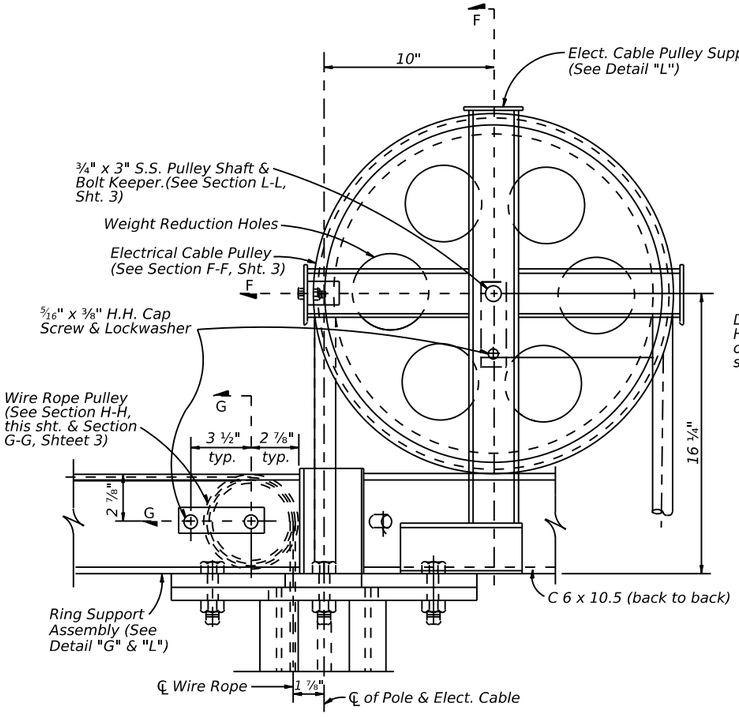
PLAN VIEW



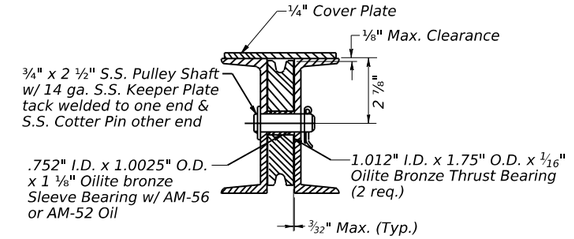
DETAIL "G"
TOP PLATE CONNECTION
(LESS ELECT. CABLE PULLEY SUPPORT)
(See DETAIL "L")



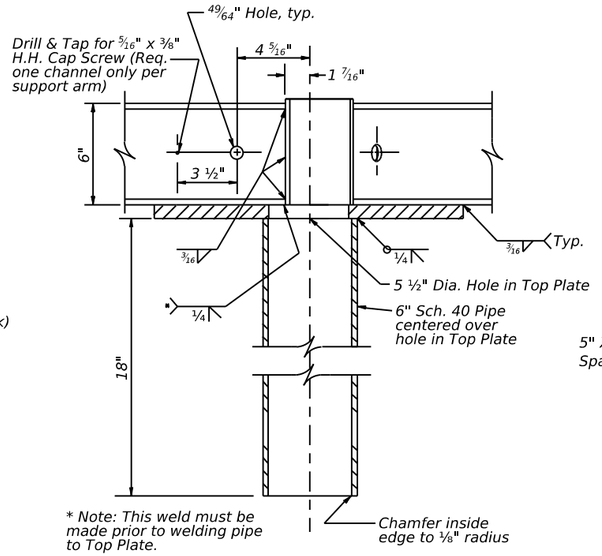
PLAN VIEW



DETAIL "F"
RING SUPPORT ASSEMBLY
(near side Support Arm & Elect. Cable Pulley Cover not shown for clarity)

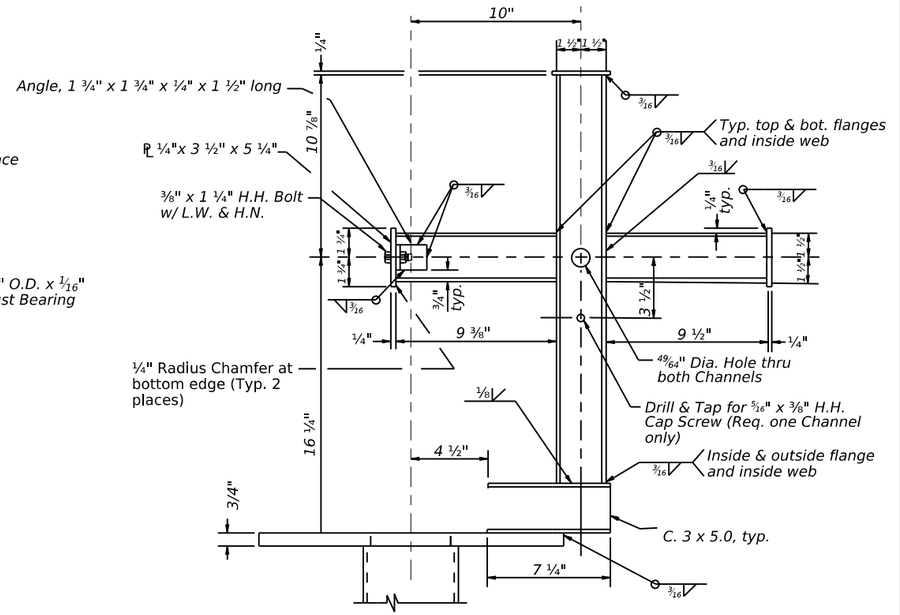


SECTION "H-H"
PULLEY MOUNTING FOR RING SUPPORT ARMS

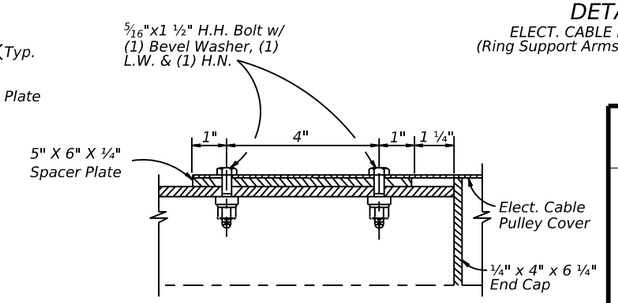


* Note: This weld must be made prior to welding pipe to Top Plate.

SECTION "E - E"



DETAIL "L"
ELECT. CABLE PULLEY SUPPORT
(Ring Support Arms not shown for clarity)



DETAIL "N"

Texas Department of Transportation

Traffic Safety Division Standard

HIGH MAST ILLUMINATION DETAILS

HMID(2)-24

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REVISIONS	0052	05	046, ETC.	US 84
1-86 5-87 2-24 4-86 12-87 5-86 4-96	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		182

1 Revised Hole Size For Lightning Rod

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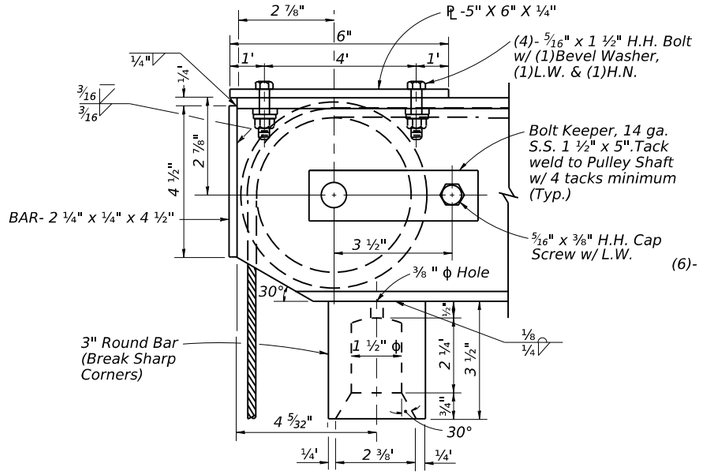
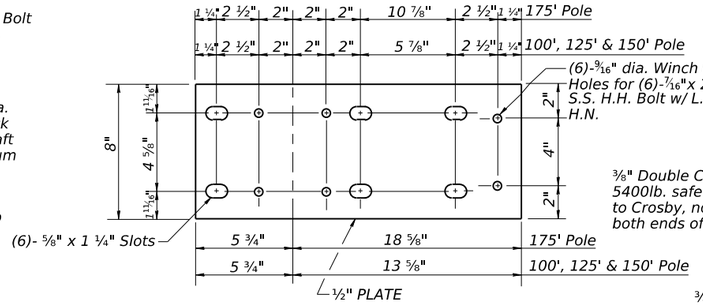
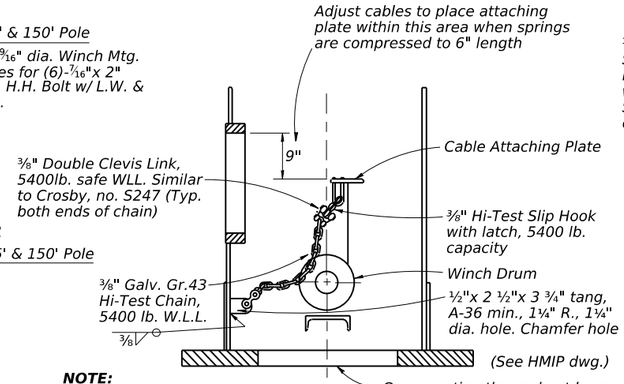


DETAIL "J"



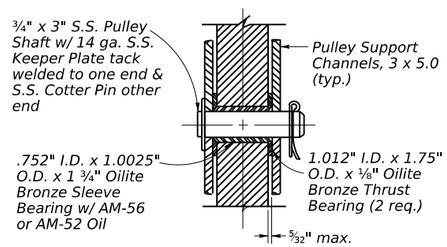
DETAIL "V"

WINCH MOUNTING PLATE
Dimensions may vary - Verify with winch manufacturer.



NOTE:
Adjust chain length such that it does not relieve tension on cable, 4" max. slack

SAFETY LANYARD DETAIL



SECTION L-L

ELECTRICAL CABLE PULLEY MOUNTING

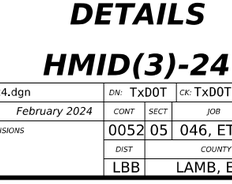
PLAN

PLAN

1 Cover to be 14 ga. galv. sht. metal

SECTION F-F

ELECTRICAL CABLE PULLEY
(Pulley material to be aluminum alloy, Type 356-T6 or equal)

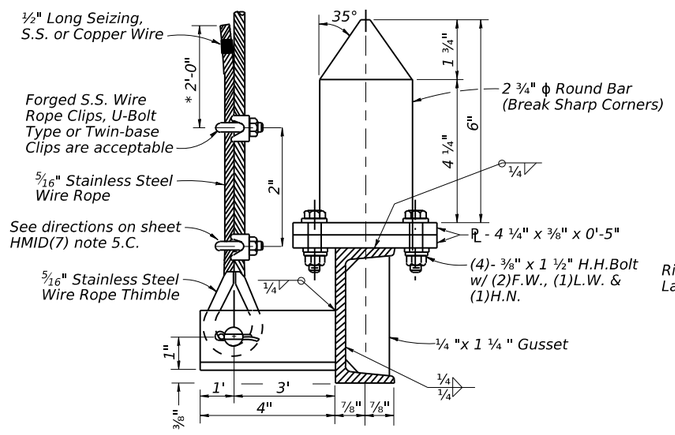


PLAN

DETAIL "H"

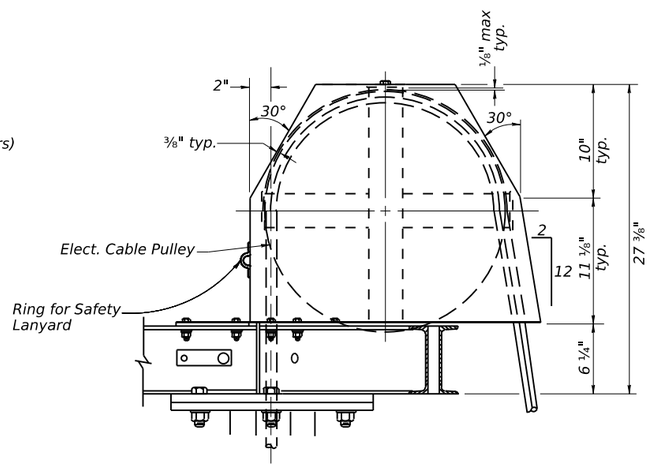
MOUNTING RING SPLICE PLATE

** Note: Torque bolts to 70 foot pounds or as recommended by the manufacturer*



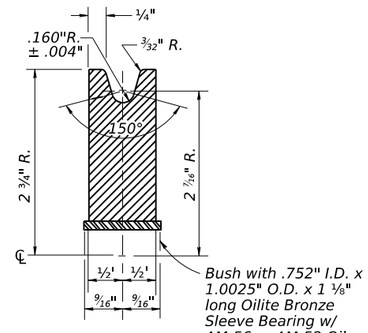
DETAIL "K"

MOUNTING RING CONNECTION & STABILIZER
** Extra 2'-0" of wire cable to be coiled and attached to ring with SS Bands as directed by Engineer.*



DETAIL "M"

COVER CAP ASSEMBLY



SECTION G-G

WIRE ROPE PULLEY

1 *(See DMS-11021 for pulley material specification)*

1 Revised Pulley and Cover Material

Texas Department of Transportation

Traffic Safety Division Standard

HIGH MAST ILLUMINATION DETAILS

HMID(3)-24

FILE: hmid-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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1-86 10-88 5-86 4-96 10-86 2-24	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		183

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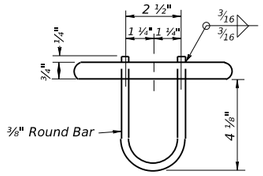
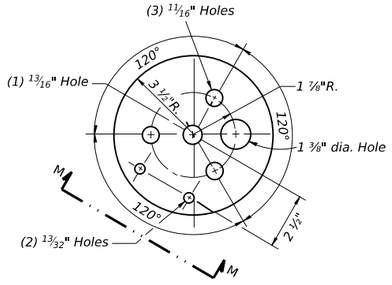
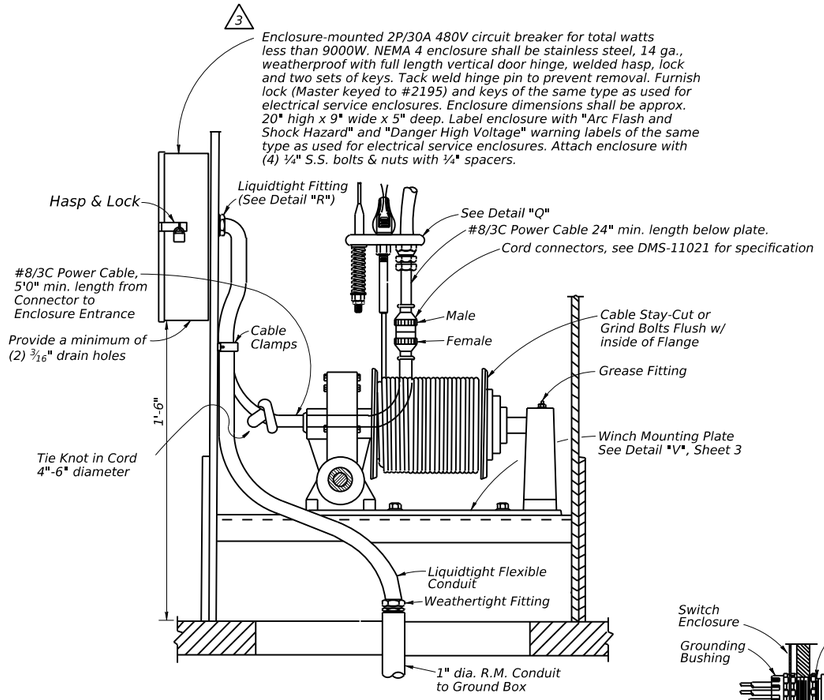


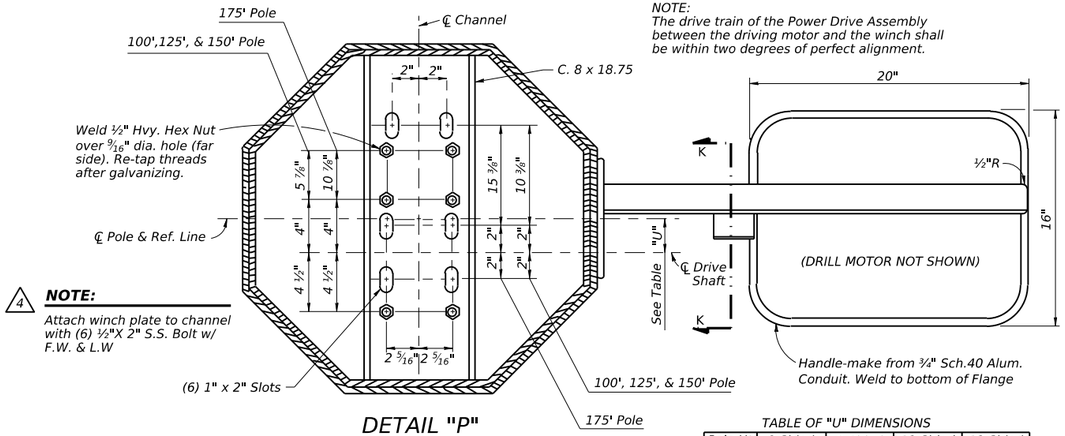
VIEW "M-M"



PLAN VIEW



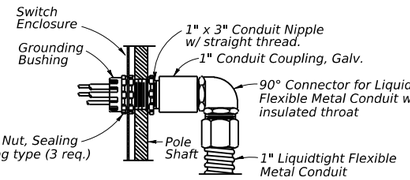
SECTION J-J
(WINCH ASSEMBLY)



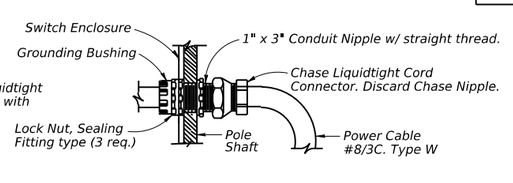
DETAIL "P"
(WINCH MOUNTING CHANNEL)
Dimensions may vary - Verify with winch manufacturer.

TABLE OF "U" DIMENSIONS

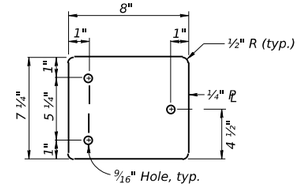
Pole Ht. Ft.	8 Sided 80 MPH	8 Sided 100 MPH	12 Sided 80 MPH	12 Sided 100 MPH
100	3 ½"	3 ½"	2 ½"	2 ½"
125	3 ½"	3 ½"	2 ½"	2 ½"
150	3 ½"	3 ½"	2 ½"	2 ½"
175	4 ½"	4 ½"	3 ½"	3 ½"



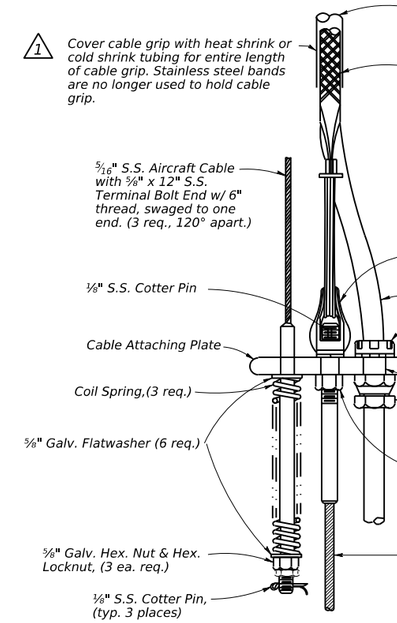
(POWER FEED FROM GROUND BOX)



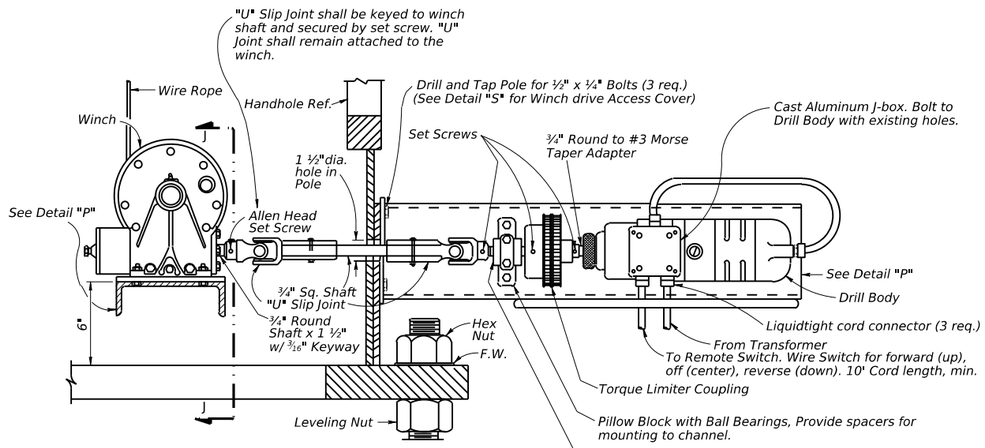
(POWER OUT TO LIGHT RING)



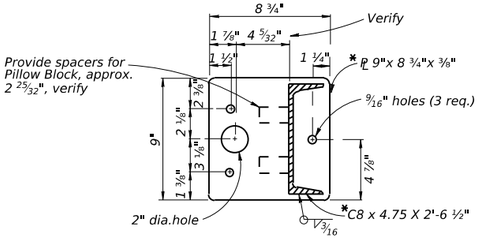
DETAIL "S"
(WINCH DRIVE ACCESS COVER)



DETAIL "Q"
(CABLE ATTACHING PLATE)



POWER DRIVE ASSEMBLY



SECTION K-K
(DRILL MOTOR MOUNTING PLATE)
*Make from 6061-T6 Aluminum

1 Revised Cable Grip
2 Revised Bushings
3 Revised Enclosure
4 Revised Bolts

Texas Department of Transportation
Traffic Safety Division Standard

HIGH MAST ILLUMINATION DETAILS

HMID(4)-24

FILE: hmid-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2024	CONT	SECT	JOB	HIGHWAY
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1-86 12-86 10-93 4-86 12-87 4-96 5-86 4-89 2-24	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		184

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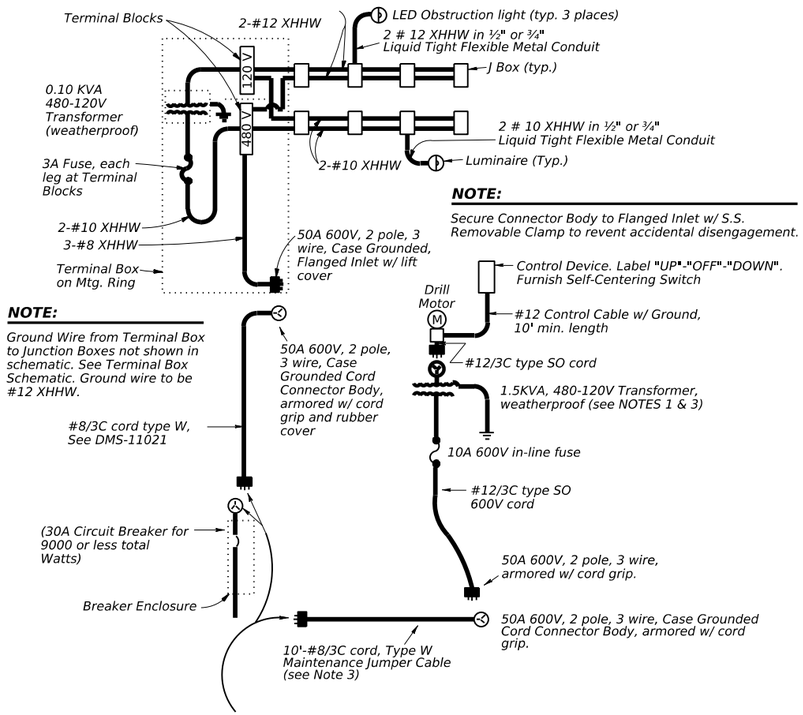
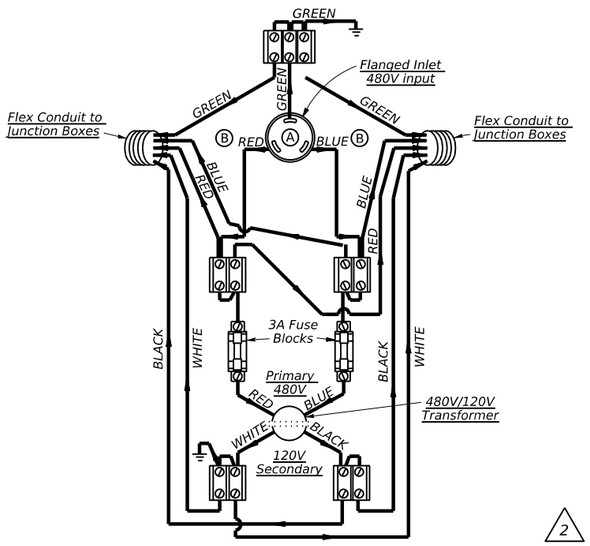


ONE-LINE SCHEMATIC

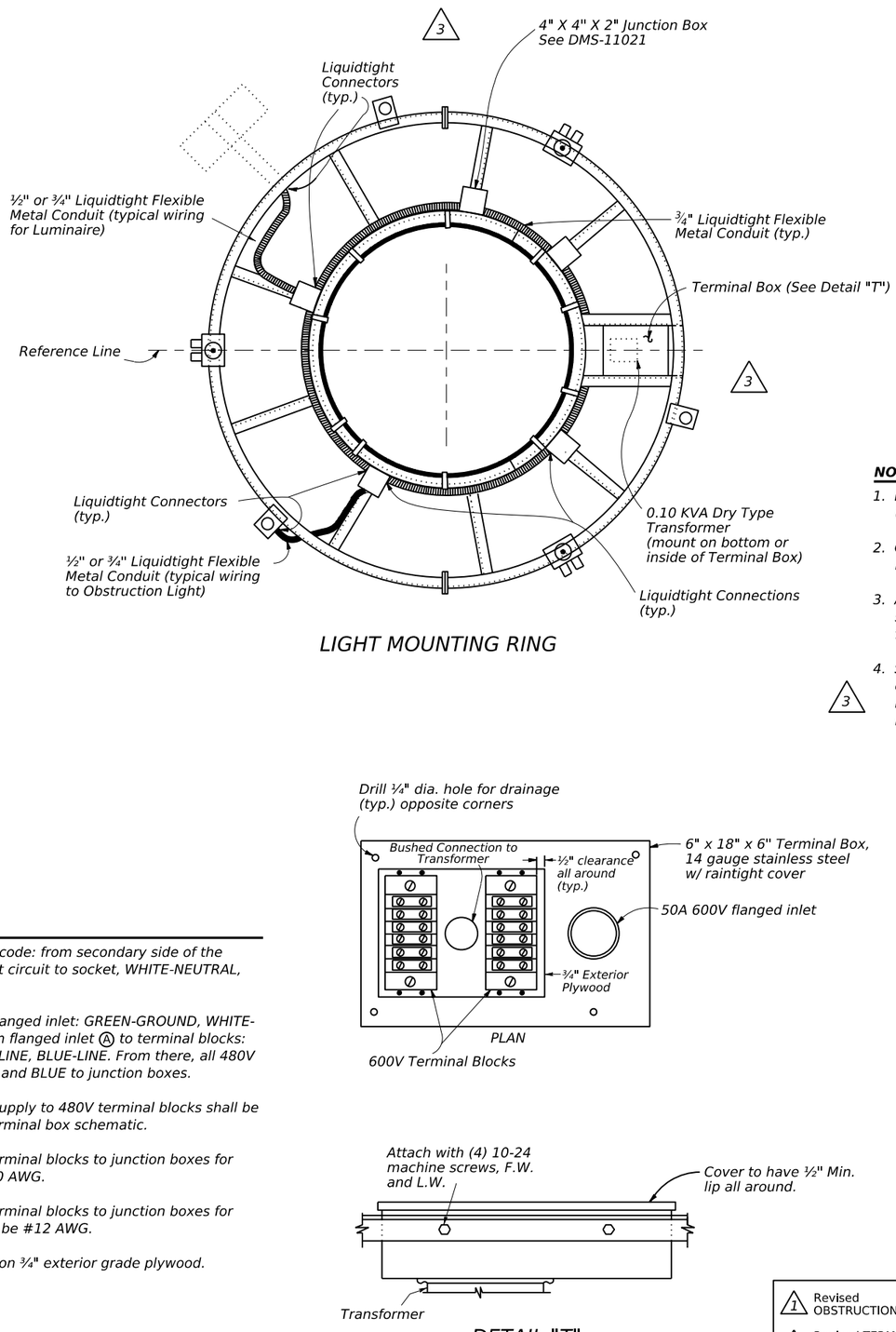


TERMINAL BOX SCHEMATIC

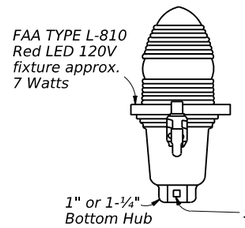
TERMINAL BOX NOTES:

1. Obstruction light color code: from secondary side of the transformer throughout circuit to socket, WHITE-NEUTRAL, BLACK-LOAD.
2. Power supply cord to flanged inlet: GREEN-GROUND, WHITE-LINE, BLACK-LINE. From flanged inlet (A) to terminal blocks: GREEN-GROUND, RED-LINE, BLUE-LINE. From there, all 480V circuit wires to be RED and BLUE to junction boxes.
3. Wire size from power supply to 480V terminal blocks shall be #8 AWG - see (B) on terminal box schematic.
4. Wire size from 480V terminal blocks to junction boxes for luminaires shall be #10 AWG.
5. Wire size from 120V terminal blocks to junction boxes for obstruction lights shall be #12 AWG.
6. Mount terminal blocks on ¾" exterior grade plywood.

△2



LIGHT MOUNTING RING



△1 DETAIL "U"
(OBSTRUCTION LIGHT)

NOTES:

1. Provide handle on 1.5 KVA Transformer for portability. (see ONE-LINE SCHEMATIC)
2. Conduit entries into terminal box shall be into side of the box.
3. A minimum of one (1) maintenance jumper cable shall be supplied for each project. Supply (1) portable transformer for each power drive unit required for project.
4. Strap LFMC within 12" of each box and at intervals not to exceed 4 ½ feet. If strapping of LFMC within 12 in of Luminaire is not possible, then the strapping distance may be increased up to 3 ft from luminaire.

△3

DETAIL "T"
(TERMINAL BOX)

△1 Revised OBSTRUCTION LIGHT
△2 Revised TERMINAL BOX NOTES
△3 Revised RING LFMC

Texas Department of Transportation

Traffic Safety Division Standard

HIGH MAST ILLUMINATION DETAILS

HMID(5)-24

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©TxDOT February 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
1-86 10-88 2-24 6-87 10-93 11-87 4-96	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		185

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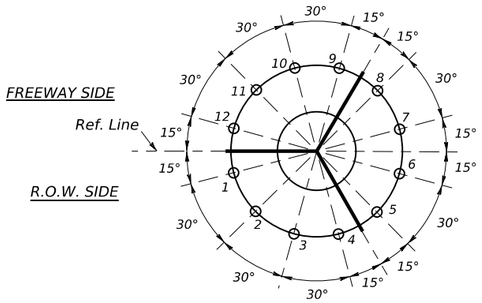
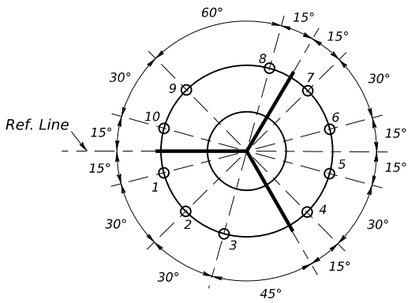


12-LIGHT SETTING



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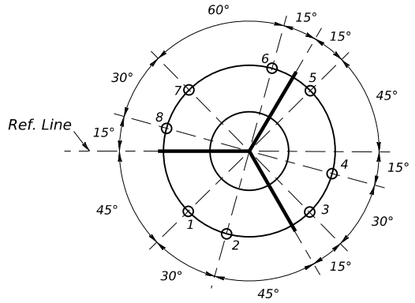
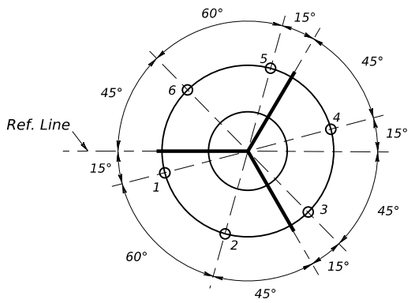
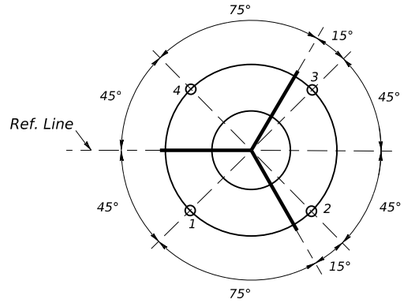


8-LIGHT SETTING



6-LIGHT SETTING



4-LIGHT SETTING

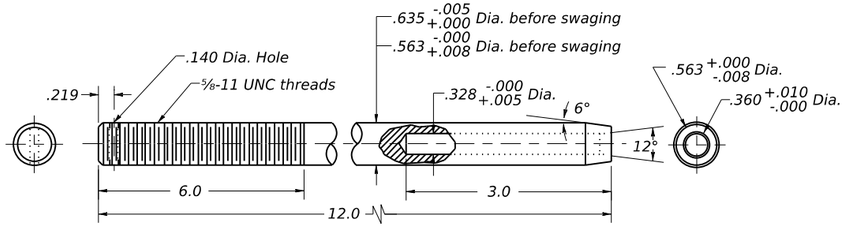
LUMINAIRE ARRANGEMENTS

1

NOTE:

Aircraft obstruction light locations not shown. Three are required,located approximately 120° apart. Locations will vary dependent on the light setting used.

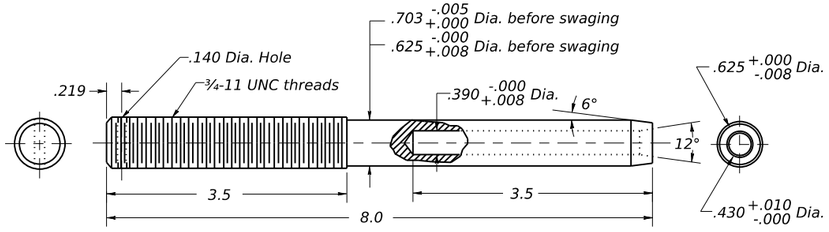
Note: Min. Swage Length = 2.06
Max. Swage Length = 2.94



TERMINAL FOR 5/16" WIRE ROPE

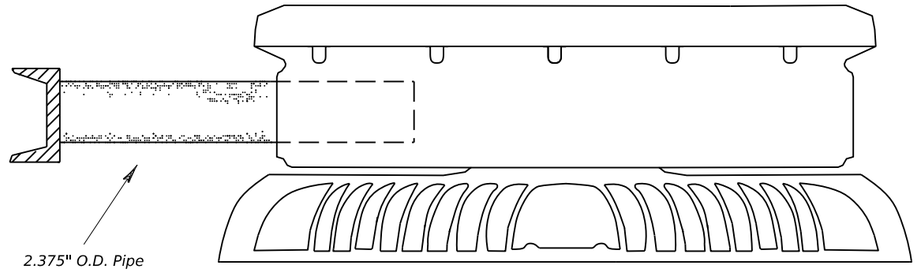
Material: Stainless Steel, Type 303SE or 304 with 115,000 P.S.I. max. ultimate tensile strength

Note: Min. Swage Length = 3.12
Max. Swage Length = 3.44



TERMINAL FOR 3/8" WIRE ROPE

Material: Stainless Steel, TYPE 303SE or 304 with 115,000 P.S.I. max. ultimate tensile strength



LUMINAIRE MOUNTING ASSEMBLY (TYP.)

NOTE:

For Type A, B, and C luminaires, orient optics of each fixture in the same direction, as shown on the plans, to properly illuminate the adjacent roadway(s). For type S luminaires, orient all optics radially from the center.

1 Added alternate luminaire arrangements

Texas Department of Transportation

Traffic Safety Division Standard

HIGH MAST ILLUMINATION DETAILS

HMID(6)-24

FILE: hmid-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
1-86 4-96 10-93 3-03 10-95 2-24	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		186

76F

1. **GENERAL**

A. All material shall be in accordance with the applicable sections of the NEC. All conduit and conductors shall meet the requirements of Items 618 and 620. Heat shrink tubing, for use with cable grips and cable splicing, shall meet the requirements of Item 620. Luminaires shall meet the requirements of Item 614 and DMS-11020. High mast kit materials shall meet the requirements of Item 614 and DMS-11021.

B. Obstruction Lights

1. When obstruction lights are required by layout sheets, summary sheets, or general notes; control the entire high mast assembly with an FAA-approved photocell - mounted inside the service enclosure. Control luminaires with a photo control installed on each fixture. This will allow operation of obstruction lights at twilight and luminaires during darkness. Submit alternate control methods for approval.

   a) Provide service enclosure mounted photocell (FAA photocell) that turns on at light levels below 35 foot-candles and turns off above 58 foot-candles. FAA photocell shall be rated for operation at 240 volts. Install a permanent placard on the inside of the service enclosure door, to indicate that an FAA approved photocell is required.

   b) Install a one foot-candle photocell, rated for the operating voltage, in the photocell receptacle of each fixture. Provide photocells that turn on at light levels below 1.0 foot-candle (plus or minus 0.5), and turn off at 2 foot-candles higher than this level.

2. When obstruction lights are not required, eliminate the 3 obstruction light fixtures, 3 mounting posts, 480/120 volt transformer, 120 volt wiring, fixture-mounted photocells, FAA photocell, and 3 mounting post support connections shown on detail "E", sheet 1.

2. **TESTING**

A. After the high mast assembly has been completely assembled, the Engineer may require the Contractor to fully lower and raise each high mast ring one time to demonstrate proper operation of the lowering mechanism or for inspection of the ring or fixtures. If any malfunction occurs, correct the problem at the Contractor's expense and repeat the lowering test.

3. **WINCH**

A. Any winch that is operated without oil shall be considered damaged and shall be replaced by the Contractor at the Contractor's expense.

4. **POWER DRIVE ASSEMBLY (ONE ONLY FOR THIS CONTRACT UNLESS OTHERWISE SHOWN ELSEWHERE ON THE PLANS)**

A. Torque Limiter Coupling

1. Run-in the torque limiter coupling for 4 minutes at approximately 60 RPM at a torque setting of 70% to 80% of spring rating. Provide written certification that run-in has been accomplished.

2. After run-in, set the torque limiter coupling to a torque limit of 35 pound-feet or as directed by the Engineer. Demonstrate the proper setting of the coupling to the Engineer.

5. **CONSTRUCTION METHODS**

A. Fabrication

1. Drill (do not punch) all holes supporting pulley shafts prior to galvanizing.

2. Fabricate mounting rings and ring support assemblies with the use of jigs that have been inspected and approved by Materials and Tests Division (MTD) personnel.

3. Manufacturer shall proof test wire rope terminals to 40% of the rated strength of the wire rope. Furnish manufacturer's certification of proof test to the Engineer. Permanently incise manufacturer's logo on wire rope terminal.

B. Wire Rope Installation

1. Deliver wire rope on a reel from the manufacturer.

2. Use extreme care to prevent wire rope from kinking, nicking, or from sustaining other damage during installation. Do not install rope by pulling from flat coil, instead carefully unroll its full length or place on a horizontal axis and unreel according to wire rope industry standards. Before installation, inspect the wire rope for kinks, nicks, and flaws. Reject, if defects are found.

3. For right-lay wire rope, attach the rope to the drum on the end opposite the winch gear train. Wind rope on the drum so that the free end comes off the backside of the drum during normal operation of the winch. Carefully unroll wire rope as stated above. Ensure that all layers lay full and tight on drum.

4. Install all wire rope only under direct supervision of the Engineer or his authorized representative. Do not remove wire rope from the manufacturer's reel until authorized by the Engineer. Install wire rope on winch in accordance with the above and accepted industry practice. Install the three hoist cables from the top end of the pole.

5. Provide winch cable of sufficient length to leave a minimum of one full layer of cable on the drum when the fixture mounting ring is in the full down position.

6. Inspect wire rope for damage, kinks, and fraying, whenever ring is lowered.

C. Wire Rope Clips Installation

1. Turn back approx. 2' 3" of rope, measured from the top of thimble. Apply seizing to pigtail end of wire rope prior to cutting to length. See detail "K", Sheet 3. Apply first clip approx. 3" from the top of thimble with U-bolt over dead end and live end in clip saddle. Tighten nuts evenly to 30 foot-pounds of torque, or as recommended by manufacturer.

2. Install second clip as near thimble as possible, take out slack and torque nuts evenly to 30 foot-pounds or as recommended by manufacturer.

3. After final erection and assembly of the pole and high mast assembly, retighten nuts to required torque.

D. Light Ring and Luminaire Installation

1. Prior to mounting luminaires to the light ring, ensure the ring is level. Install luminaires level on the light ring.

2. Orient all Type A, B, or C luminaires on each ring in the same direction, as shown on plans. Orient Type S luminaires radially from the center.

E. Operation and Maintenance

1. When lowering ring, protect hardware and equipment at the base of the pole from damage.

2. Follow safe work practices when servicing the ring, luminaires, and associated equipment.

3. Inspect wire rope for damage, kinks, and fraying.

⚠1

⚠1	Transferred material info to DMS 11020 and DMS 11021

Texas Department of Transportation

Traffic Safety Division Standard

HIGH MAST ILLUMINATION DETAILS

HMID(7)-24

FILE: hmid-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
1-86 4-96 9-91 3-03 10-93 2-24	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		187

76G

DATE: 9/30/2024 1:19:27 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/8. Traffic/ILLUMINATION/STANDARDS/hmid-24.dgn

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DATE: 06/14/2024 07:00 PM
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℄ 4 Permissible 1" Dia assembly holes 180° apart. (Typ each splice)

4 additional 1" Dia holes are permissable 12" from assembly holes

6" Min
12" Max

12"

12"

SPLICE DETAIL

7/8" Dia Holes equally spaced on 15" Dia Bolt Circle

85 Percent Minimum Penetration

3/4"

3/8"

HM-6

7 1/4" Dia

Match Mark

Reference Line

VIEW C

8"

1/4" Plate

1"

5 1/4"

1"

3 1/2"

7 1/4"

1"

6"

1"

Provide 3~ 1/2" Dia x1 1/4" bolts

WINCH DRIVE ACCESS COVER

Reference Line

O.D. of Base Plate

Match marks

C 8x18.75 for mounting winch (See Detail)

VIEW E (2 opposite corners)

℄ 2 ~ 1 3/8" Dia holes 24" above Base Plate

2 3/4" Dia Bolt Holes equally spaced on Bolt circle

℄ Pole

2"

2"

I.D. Base Plate

T

Galvanizing drain slots are not permitted in base plate. Drain to small end.

SECTION A-A

℄ Winch Drive

Reference Line

U

Cut channel to fit for 100' & 125' 12 Sided Poles

4 1/2" 4" 5 7/8" 100',125' & 150' Poles
10 7/8" 175' Pole

6 ~ 1/2" Heavy Hex Nuts welded under 9/16" Dia holes. Tap nuts after galvanizing.

2 5/16"

2 5/16"

2"2"

℄ Channel

6 ~ 1"x2" Slots 2"2" 10 3/8" 100',125' & 150' Poles
15 3/8" 175' Pole

WINCH MOUNTING CHANNEL

Nominal Pole Height

Taper 0.1600 in/ft(for 80 MPH) and 0.1900 in/ft(for 100 MPH)

Splice Length

A
B
C
D
E
F

8 SIDED

Taper 0.1750 in/ft(for 80 MPH) and 0.1850 in/ft(for 100 MPH)

Section Length

A
B
C
D

12 SIDED

POLE ELEVATIONS

(Showing 175 Ft Poles)

VIEW C

T

1/2"

Handhole Frame

HM-3

1/4

3/4x 3/8

1/4

HM-7

Winch Drive Access Cover

Tang

Channel

8"

6"

VIEW F

VIEW D

HM-8

3/8

1/2"x2 1/2"x3 3/4" Tang, A36 Min, 1 1/4" R, 1 1/4" Dia chamfered hole. Place Tang on flat adjacent to handhole.

SECTION B-B

1'-0"

B

Access Cover to be 1/4" Plate

Drill and tap for 1/2"x1" cap screw (4 req'd)

A

Ground Sleeve

R=3 1/2"

1'-6"

A

1/4"

Typ

S

Drill and Tap for 3 1/2" bolts.

1 1/2" Dia Hole

5 1/4"

5 5/16"

3"

3"

8 7/8"

8 7/8"

1'-0"

1'-7"

See HMIF for Anchor Bolt Detail

3/8" U

6"

VIEW G

B

ELEV OF POLE BASE

U

Reference Line

6 ~ 5/8"x1 1/4" Slots 4 1/2" 4" 5 7/8" 100',125' & 150' Poles
10 7/8" 175' Pole

2 1/2"

1 1/4"

2"2"2"

2 1/2"

1 1/4"

1 11/16"

8"

4 5/8"

2"

4"

2"

1 11/16"

1/2" Plate

6 ~ 3/4" Dia holes 2"2" 10 3/8" 100',125' & 150' Poles
15 3/8" 175' Pole

WINCH MOUNTING PLATE

G

HM-9

G

S

A bent and welded handhole frame is permissable. Heating, bending, and finish grinding must be approved with the HM-9 weld procedure.

OPTIONAL HANDHOLE FRAME

t

3/8"

1/4

tx3/8

HM-1

+

STANDARD WELD

1/4

Chip & Grind

OPTIONAL WELD STEP 1

(a) Prepare Shaft and ground sleeve.
(b) Weld shaft to base plate, chip and grind flush (1/8 " max radius.)

t

3/8"

1/4

tx3/8

HM-2

+

OPTIONAL WELD STEP 2

(c) Positiion ground sleeve.
(d) Weld to base plate with tapered reinforcement.

VIEWS D

85% Minimum penetration

HM-5

Ground sleeve to be same thickness as lower pole section, except shall not be less than 0.375 inch

Provide 100% penetration in outer sections at splices and at base plates for 1.5 pole diameters plus 6". Also provide 100% penetration for ground sleeve seam welds.

VIEW E

t

HM-4

7/8xt

7/8"

VIEW F

℄ Winch Drive

1 3/8" Min

G

Provide welded and ground filler or cover plate where winch drive conflicts with bend line in ground sleeve for the 8 sided, 80 mph, 100' pole, the 12 sided, 100 mph, 100' pole, and the 12 sided, 80 mph, 175', 125' and 100' poles.

VIEW G

SHEET 1 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

HIGH MAST ILLUMINATION POLES 100' - 125' - 150' - 175'

HMIP(1)-16

FILE: hmip-16.dgn	DN:	CK:	DW:	CK:
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
5-98	DIST	COUNTY		SHEET NO.
8-16	LBB	LAMB, ETC.		188

77A

DATE: 06/14/2024 07:00 PM
FILE: DOCUMENT NAME

TABLE OF VARIABLE POLE DIMENSIONS

	Ht (ft)	Section	8 SIDED POLE Diameter (Inches) Bottom	Top	Thickness (inches)	Length (feet)	Splice (inches)	12 SIDED POLE Diameter (Inches) Bottom	Top	Thickness (inches)	Length (feet)	Splice (inches)
80 MPH DESIGNS	175	A	13.083	7.750	.250	33.33	19	16.792	7.750	.250	51.67	24
		B	17.792	12.205	.375	34.92	25	24.858	15.817	.313	51.67	36
		C	22.250	16.583	.375	35.42	32	32.625	23.583	.313	51.67	48
		D	25.375	20.948	.438	27.67	36	36.250	31.175	.375	29.00	~
		E	28.375	23.895	.500	28.00	41					
		F	31.250	26.703	.500	28.42	~					
	150	A	13.083	7.750	.250	33.33	19	16.792	7.750	.250	51.67	24
		B	17.792	12.205	.375	34.92	25	24.858	15.817	.313	51.67	36
		C	22.250	16.583	.375	35.42	32	32.625	23.583	.313	51.67	~
		D	25.375	20.948	.438	27.67	36					
		E	28.375	23.895	.500	28.00	~					
	125	A	13.083	7.750	.250	33.33	19	16.792	7.750	.250	51.67	24
		B	17.792	12.205	.375	34.92	25	24.858	15.817	.313	51.67	36
		C	22.250	16.583	.375	35.67	32	28.250	23.583	.313	26.67	~
		D	25.375	20.948	.438	27.67	~					
	100	A	13.083	7.750	.250	33.33	19	16.792	7.750	.250	51.67	24
		B	17.792	12.205	.375	34.67	25	24.625	15.817	.313	50.33	~
		C	22.250	16.583	.375	35.67	~					
100 MPH DESIGNS	175	A	14.208	7.875	.313	33.33	20	17.433	7.875	.375	51.67	25
		B	19.792	13.142	.375	35.00	28	25.747	16.173	.438	51.75	37
		C	25.250	18.473	.438	35.67	36	33.750	24.176	.438	51.75	49
		D	29.000	23.680	.500	28.00	42	37.375	31.995	.500	29.08	~
		E	32.625	27.210	.563	28.50	47					
		F	36.125	30.631	.563	28.92	~					
	150	A	14.208	7.875	.313	33.33	20	17.433	7.875	.375	51.67	25
		B	19.792	13.142	.375	35.00	28	25.747	16.173	.438	51.75	37
		C	25.250	18.473	.438	35.67	36	33.750	24.176	.438	51.75	~
		D	29.00	23.680	.500	28.00	42					
		E	32.625	27.210	.563	28.50	~					
	125	A	14.208	7.785	.313	33.33	20	17.433	7.875	.375	51.67	25
		B	19.792	13.142	.375	35.00	28	25.747	16.173	.438	51.75	37
		C	25.250	18.473	.438	35.67	36	29.125	24.176	,438	26.75	~
		D	29.00	23.680	.500	28.00	~					
	100	A	14.208	7,875	.313	33.33	20	17.433	7.875	.375	51.67	25
		B	19.792	13.142	.375	35.00	28	25.500	16.173	.375	50.42	~
		C	25.250	18.473	.438	35.67	~					

Diameters are measured across the flats.

TABLE OF VARIABLE BASE DIMENSIONS

	Ht (ft)	O.D. (inches)	I.D. (inches)	Bolt Cir (inches)	No. Bolts	S (inches)	T (inches)	U (inches)
	8 SIDED POLE							
80 MPH DESIGNS	175'	47	22	41	16	2.00	3.75	4.50
	150'	44	18	38	12	2.00	4.00	3.50
	125'	41	16	35	8	2.00	4.50	3.50
	100'	37	14	31	6	2.00	5.00	3.50
	12 SIDED POLE							
	175'	50	24	44	12	1.75	3.50	3.50
	150'	47	22	41	10	1.75	3.50	2.50
	125'	42	18	36	8	1.75	3.75	2.50
	100'	38	13	32	6	1.75	4.00	2.50
	8 SIDED POLE							
100 MPH DESIGNS	175'	52	27	46	20	1.75	3.50	4.50
	150'	49	23	43	16	1.75	4.00	3.50
	125'	45	21	39	12	1.75	4.50	3.50
	100'	40	17	34	10	1.75	4.50	3.50
	12 SIDED POLE							
	175'	52	27	46	16	1.75	3.25	3.50
	150'	50	25	44	12	1.75	3.50	2.50
	125'	46	22	40	10	1.75	3.75	2.50
	100'	42	19	36	6	1.75	4.00	2.50

NOTE: Base Plate may be round or with 8 or 12 equal segments matching the pole.

MATERIALS

Polygonal Shafts Ground Sleeves	ASTM A709 Grade 50 A572 Grade 50 (1) (2)
Base Plate and Handhole Frame	ASTM A709 Grade 50 A572 Grade 50 (1) A633 Grade C (1)
Miscellaneous Steel	ASTM A36 or equal

(1) ASTM A572 and A633 may have higher yield strength but shall not have less elongation than the grade indicated.

(2) The silicon content of all steel shall be controlled to ensure high quality galvanizing and to avoid discoloration.

GENERAL NOTES:

1. Design conforms to AASHTO 1994 Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals and Interim Revisions thereto. The Design Wind Speed is 80 mph or 100 mph.

2. The required design height and wind speed shall be as shown elsewhere in the plans.

3. Each pole section, top flange plate and base plate shall be permanently marked on the reference line. The required mark locations are shown on the baseplate, top plate, and foundation plan details. These marks shall be used in pole assembly and erection alignment. The reference line and anchor bolt orientation shall be parallel to roadway centerline unless otherwise shown on Lighting Layouts.

Texas Department of Transportation

Traffic Operations Division Standard

HIGH MAST ILLUMINATION POLES 100' - 125' - 150' - 175'

HMIP(2)-16

FILE: hmip-16.dgn	DN:	CK:	DW:	CK:
© TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS 5-98 8-16	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		189

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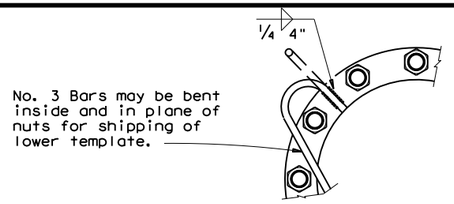
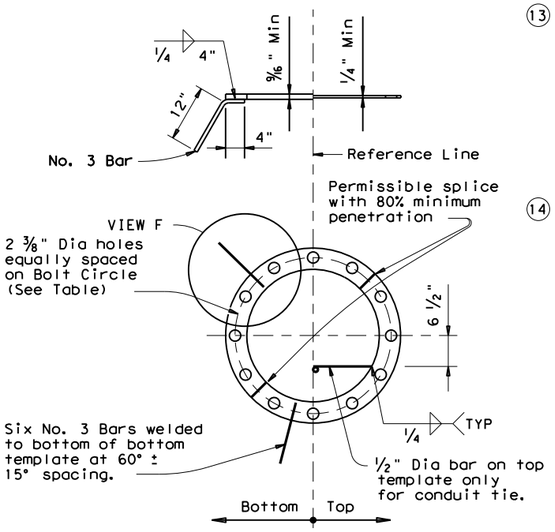
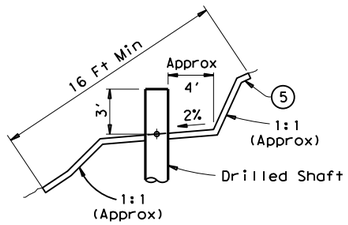
DATE:
FILE:



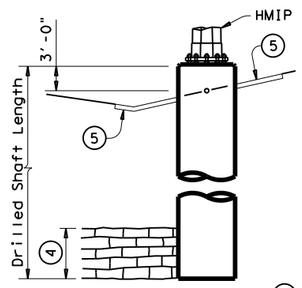
VIEW F



ANCHOR BOLT TEMPLATES

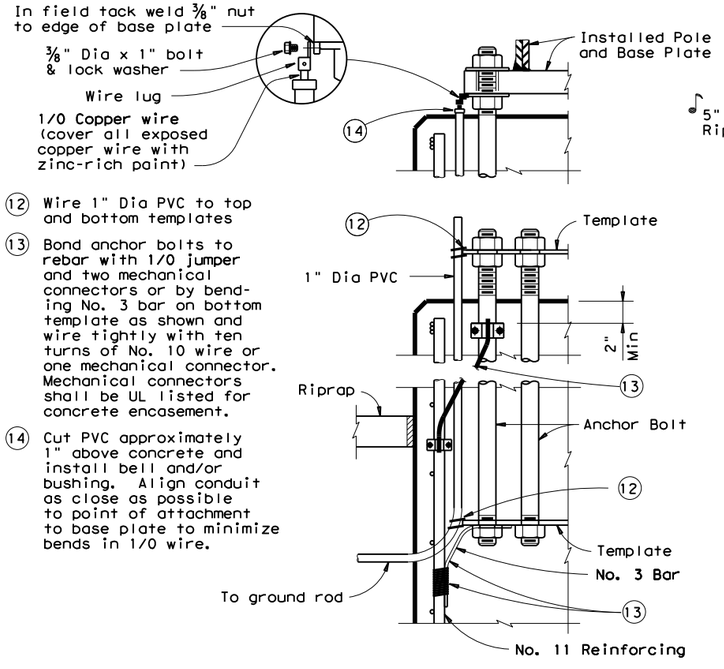


RIPRAP ON SLOPES



(5) Match slope of finished ground if slope is less than approx 4 to 1. For steeper slopes, bench to provide work area with approx 2 % slope around pole base. Other configurations may be shown elsewhere on the plans.

(4) If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

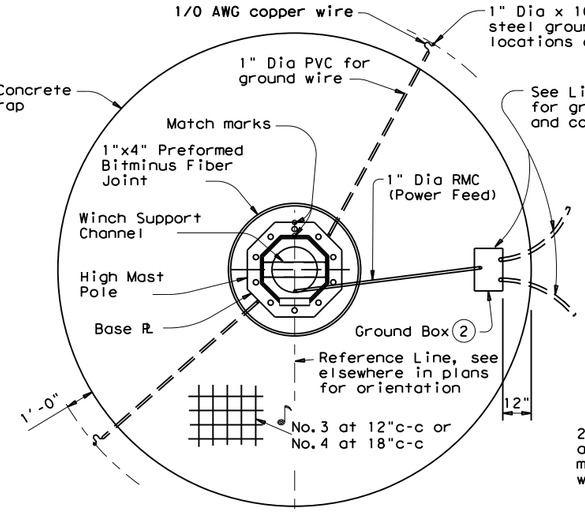


(12) Wire 1" Dia PVC to top and bottom templates

(13) Bond anchor bolts to rebar with 1/0 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.

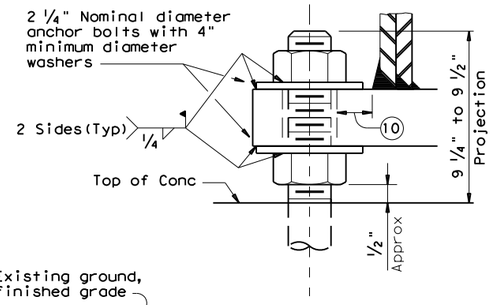
(14) Cut PVC approximately 1" above concrete and install bell and/or bushing. Align conduit as close as possible to point of attachment to base plate to minimize bends in 1/0 wire.

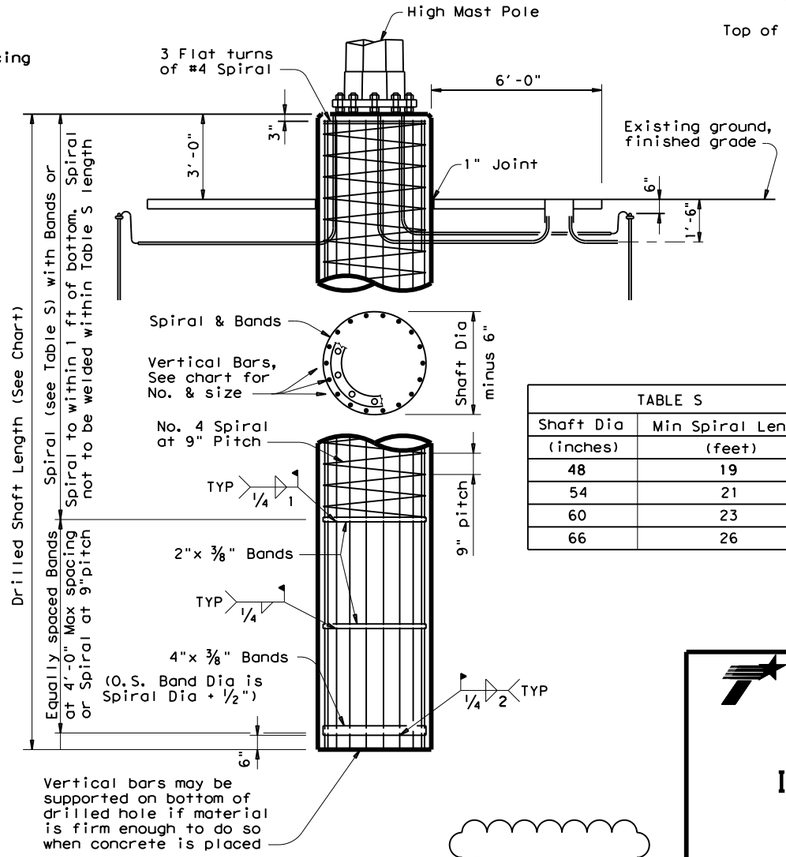
LIGHTNING PROTECTION SYSTEM



(2) Place ground box cover flush with riprap.

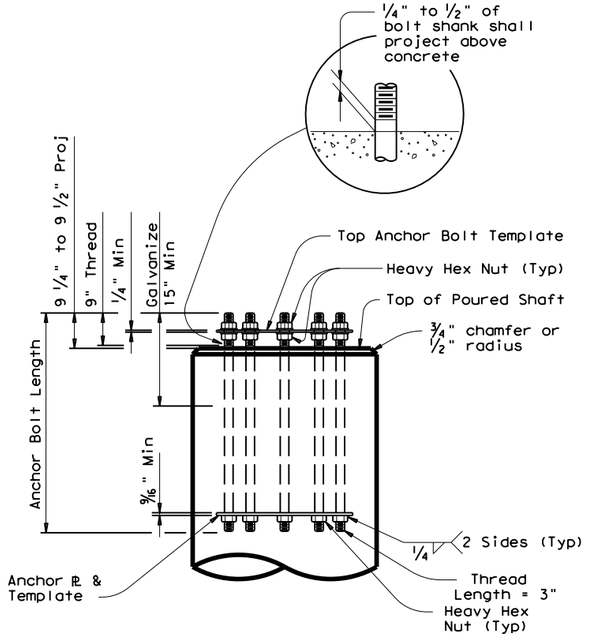
(10) If, due to tolerances in fabrication, the anchor bolt hole to ground sleeve weld is less than approx 7/8", clipped 1/2" thick washers shall be supplied at those





DRILLED SHAFT FOUNDATION DETAIL

TABLE S	
Shaft Dia (inches)	Min Spiral Length (feet)
48	19
54	21
60	23
66	26



ANCHOR BOLT ASSEMBLY

(See Anchor Bolt Table for number of bolts required)

MODIFICATION

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION POLE FOUNDATIONS

SHEET 1 OF 2

HMIF(1)-98 (MOD)

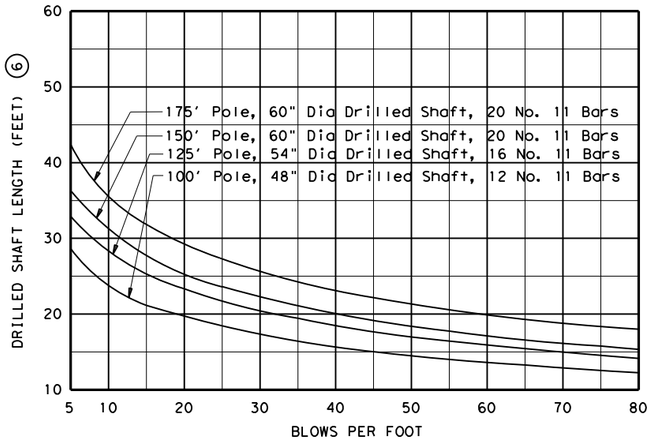
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
11-97
5-98 ~ Anchor Bolt Circle Dia

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		190

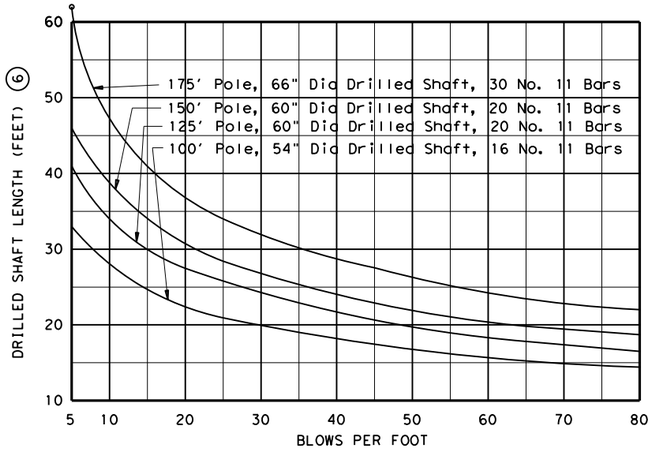
DATE:
FILE:

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



80 MPH POLES

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



100 MPH POLES

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

TEXAS CONE PENETROMETER TEST TABLES

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

ANCHOR BOLT TABLE

	Pole Height	Bolt Diameter	Bolt Length	Bolt Templates O D	Bolt Templates I D	No. of Bolts	Bolt Cir Dia
	(feet)	(inches)	(feet)	(inches)	(inches)	~	(inches)
80 MPH DESIGNS	8 SIDED POLE						
	175	2.25	4.83	45.5	36.5	16	41
	150	2.25	4.83	42.5	33.5	12	38
	125	2.25	4.83	39.5	30.5	8	35
	100	2.25	4.83	35.5	26.5	6	31
	12 SIDED POLE						
	175	2.25	4.83	48.5	39.5	12	44
	150	2.25	4.83	45.5	36.5	10	41
	125	2.25	4.83	40.5	31.5	8	36
	100	2.25	4.83	36.5	27.5	6	32
100 MPH DESIGNS	8 SIDED POLE						
	175	2.25	4.83	50.5	41.5	20	46
	150	2.25	4.83	47.5	38.5	16	43
	125	2.25	4.83	43.5	34.5	12	39
	100	2.25	4.83	38.5	29.5	10	34
	12 SIDED POLE						
	175	2.25	4.83	50.5	41.5	16	46
	150	2.25	4.83	48.5	39.5	12	44
	125	2.25	4.83	44.5	35.5	10	40
	100	2.25	4.83	40.5	31.5	6	36

MISCELLANEOUS QUANTITIES - ONE HMIF

Shaft Diameter	(in) ⑦	48	54	60
Concrete Riprap	(CY)	2.33	2.44	2.56
Reinforcing	(Lbs) ⑧	94	99	103
Ground Box	(ea)	1	1	1
R O W Marker	(ea) ⑨	1	1	1

⑦ See elsewhere on plans for length of Drilled Shaft required.
⑧ For Contractors information only.
⑨ Designated elsewhere on plans if required.

GENERAL NOTES:

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

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

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

ODSR may not be used for HMIF drilled shafts.

Concrete for drilled shafts shall be Class C.

Repair welded areas with zinc-rich paint.

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

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION POLE FOUNDATIONS

SHEET 2 OF 2 **HMIF(2)-98**

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
5-98 - Anchor Bolt Circle Dia

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		191

SUMMARY OF PAVEMENT MARKING ITEMS (OVERALL)																					
LOCATION	666 7018	666 7024	666 7290	666 7293	666 7305	668 7009	668 7021	668 7024	668 7051	668 7087	668 7089	668 7091	668 7093	668 7111	672 7006	677 7002	677 7004	677 7006	677 7008	678 7002	678 7008	678 7010
	REFL PAV MRK TY I (W)8"(DOT) (100MIL)	REFL PAV MRK TY I (W)8"(SLD) (100MIL)	TY I HIGH PERF PM (W)6"(BRK) (100MIL)	TY I HIGH PERF PM (W)6"(SLD) (100MIL)	TY I HIGH PERF PM (Y)6"(SLD) (100MIL)	PREFAB PM TY B (W) (6") (SLD)	PREFAB PM TY B (W) (24") (SLD)	PREFAB PM TY B (W (DBL ARROW)	PREFAB PM TY B (Y) (6") (SLD)	PREFAB PM TY C (W) (12") (SLD)	PREFAB PM TY C (W) (24") (SLD)	PREFAB PM TY C (W) (ARROW)	PREFAB PM TY C (W) (DBL ARROW)	PREFAB PM TY C (W) (36") (YLD TRI)	REFL PAV MRKR TY II-C-R	ELIM EXT PM & MRKS (6")	ELIM EXT PM & MRKS (8")	ELIM EXT PM & MRKS (12")	ELIM EXT PM & MRKS (24")	PAV SURF PREP FOR MRK (6")	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (DBL ARROW)
CSJ	LF	LF	LF	LF	LF	LF	LF	EA	LF	LF	LF	EA	EA	EA	EA	LF	LF	LF	LF	LF	LF	EA
0052-05-048 TOTAL:	196	3005	5379	6071	9472	150	16	1	134	361	139	3	3		378	7729	3005	361	16	284	16	1
0052-05-046 TOTAL:	2333	5202	20890	82090	81683						246	56		289	899					600		
0052-07-068 TOTAL:	1718	4856	20467	83913	84808						204	48		218	822					1278		
PROJECT TOTAL	4247	13063	46736	172074	175963	150	16	1	134	361	589	107	3	507	2099	7729	3005	361	16	2162	16	1

SUMMARY OF DELINEATION (OVERALL)		
LOCATION	658 7014	658 7020
	INSTL DEL ASSM (D-SW)SZ 1(BRF)CTB (BR)	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2 (BR)
CSJ	EA	EA
0052-05-048 TOTAL:		
0052-05-046 TOTAL:	10	8
0052-05-049 TOTAL:		
0052-07-068 TOTAL:		
PROJECT TOTAL	10	8

SUMMARY OF SIGNING ITEMS (OVERALL)									
LOCATION	416 7028	432 7002	636 7001	636 7002	644 7004	644 7025	644 7028	647 7001	647 7003
	DRILL SHAFT (SIGN MTS) (24 IN)	RIPRAP (CONC) (5 IN)	ALUMINUM SIGNS (TY A)	ALUMINUM SIGNS (TY G)	IN SM RD SN SUP&AM TY10BWG(1)SA (T)	IN SM RD SN SUP&AM TYS80(1)SA(P)	IN SM RD SN SUP&AM TYS80(1)SA(T)	INSTALL LRSS (STRUCT STEEL)	REMOVE LRSA
STATION TO STATION	LF	CY	SF	SF	EA	EA	EA	LB	EA
0052-05-048 TOTAL:	128	4.92	63	981.5	23	1	7	5288.96	6

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

OVERALL SIGNING & STRIPING SUMMARY

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		192

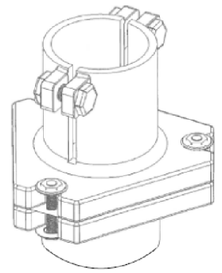
DATE: 9/30/2024 1:21:07 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/8. Traffic/US0084_TRF_STRIPING_SUM.dgn

CK DW CK DW

SUMMARY OF PAVEMENT MARKING ITEMS (LAMB COUNTY)																							
LOCATION	666	666	666	666	666	668	668	668	668	668	668	668	668	668	672	677	677	677	677	678	678	678	
	7018	7024	7290	7293	7305	7009	7021	7024	7051	7087	7089	7091	7093	7111	7006	7002	7004	7006	7008	7002	7008	7010	
	REFL PAV MRK TY I (W)8"(SLD)		RF PM (W)6"(SLD)	RF PM (W)6"(SLD)	RF PM (Y)6"(SLD)	M TY B (W) (6")	M TY B (W) (24")	M TY B (W (DBL)	PM TY B (Y) (6")	M TY C (W) (12")	M TY C (W) (24")	PM TY C (W)	M TY C (W) (D)	TY C (W) (36")	PAV MRKR TY I	XT PM & MRKR	XT PM & MRKR	XT PM & MRKR	XT PM & MRKR	RF PREP FOR MR	R PREP FOR MR	RAV SURF PREP FOR MRK (DBL ARROW	
STATION TO STATION	LF	LF	LF	LF	LF	LF	LF	EA	LF	LF	EA	EA	EA	EA	EA	LF	LF	LF	LF	LF	LF	EA	
846+00 TO 858+00					819																		
858+00 TO 870+00					1186																		
894+00 TO 906+00					808																		
906+00 TO 918+00					580																		
918+00 TO 930+00					243																		
952+00 TO 964+00	85	1552	4360	1684	1685										215	7729	1552						
964+00 TO 976+00	43	1013	559	2586	2479	150	16	1	134	361	139	3	3		110		1013	361	16	284	16	1	
976+00 TO 985+00	68	440	460	1801	1672										53		440						
0052-05-048 TOTAL:	196	3005	5379	6071	9472	150	16	1	134	361	139	3	3		378	7729	3005	361	16	284	16	1	
985+00 TO 990+00	19		250	1000	1000										4								
990+00 TO 1002+00	106	270	600	2400	2280							4		13	39								
1002+00 TO 1014+00	67	220	600	2400	2276							4		14	33								
1014+00 TO 1026+00	67		600	2400	2400										11								
1026+00 TO 1038+00	133	289	600	2235	2206							4		24	43								
1038+00 TO 1050+00			600	2400	2400										8								
1050+00 TO 1062+00			600	2400	2400										8								
1062+00 TO 1074+00	100	322	600	2400	2275							4		12	44								
1074+00 TO 1086+00	33		600	2400	2400										9								
1086+00 TO 1098+00			600	2400	2400										8								
1098+00 TO 1110+00	67	108	600	2307	2315							2		8	22								
1110+00 TO 1122+00	56	135	600	2275	2292							2		16	24								
1122+00 TO 1134+00			600	2400	2400										8								
1134+00 TO 1146+00			600	2400	2400										8								
1146+00 TO 1158+00	133	796	600	2404	2245							4		18	94								
1158+00 TO 1170+00	209	599	600	2400	2400						22	4		16	77								
1170+00 TO 1182+00	67	126	600	2248	2268							3		16	24								
1182+00 TO 1194+00	197	307	600	2004	2242						82	5		16	47								
1194+00 TO 1206+00	37		600	2400	2400										10								
1206+00 TO 1218+00			600	2400	2400										8								
1218+00 TO 1230+00			600	2400	2400										8								
1230+00 TO 1242+00	77	391	600	2382	2502						60	4		16	50								
1242+00 TO 1254+00	242	130	600	2400	2400										31								
1254+00 TO 1266+00	226	548	600	2143	2329						82	4		24	72								
1266+00 TO 1278+00	34		600	2400	2400										9								
1278+00 TO 1290+00			600	2400	2400										8								
1290+00 TO 1302+00	133	272	600	2400	2289							4		14	41								
1302+00 TO 1314+00			600	2400	2400										8								
1314+00 TO 1326+00			600	2400	2400										8								
1326+00 TO 1338+00	133	232	600	2222	2194							4		26	37								
1338+00 TO 1350+00			600	2400	2400										8								
1350+00 TO 1362+00			600	2400	2400										8					600			
1362+00 TO 1374+00	133	270	600	2400	2277							4		14	41								
1374+00 TO 1386+00			600	2400	2400										8								
1386+00 TO 1398+00			600	2400	2400										8								
1398+00 TO 1405+00	64	187	240	870	693									42	25								
0052-05-046 TOTAL:	2333	5202	20890	82090	81683						246	56		289	899					600			

SUMMARY OF DELINEATION (LAMB)		
LOCATION	658 7014	658 7020
	INSTL DEL ASSM (D-SW)SZ 1(BRF)CTB (BR)	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2 (BR)
STATION TO STATION	EA	EA
1350+00 TO 1362+00	10	6
1362+00 TO 1374+00		2
0052-05-046 TOTAL	10	8

SUMMARY OF SIGNING ITEMS (LAMB COUNTY)									
LOCATION	416 7028	432 7002	636 7001	636 7002	644 7004	644 7025	644 7028	647 7001	647 7003
	DRILL SHAFT (SIGN MTS) (24 IN)	RIPRAP (CONC) (5 IN)	ALUMINUM SIGNS (TY A)	ALUMINUM SIGNS (TY G)	IN SM RD SN SUP&AM TY10BWG(1)SA (T)	IN SM RD SN SUP&AM TYS80(1)SA(P)	IN SM RD SN SUP&AM TYS80(1)SA(T)	INSTALL LRSS (STRUCT STEEL)	REMOVE LRSA
STATION TO STATION	LF	CY	SF	SF	EA	EA	EA	LB	EA
0052-05-048 TOTAL:	128	4.92	63	981.5	23	1	7	5288.96	6



Use two-bolt clamp triangular slip base for the signs on this project.

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

SIGNING & STRIPING SUMMARY (LAMB COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		193

CK DW CK DW

DATE: 9/30/2024 1:21:07 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/8. Traffic/US0084_TRF_STRIPING_SUM.dgn

SUMMARY OF PAVEMENT MARKING ITEMS (LUBBOCK COUNTY)										
LOCATION	666 7018	666 7024	666 7290	666 7293	666 7305	672 7006	668 7089	668 7093	668 7111	678 7002
	REFL PAV MRK TY I (W)8"(DOT) (100MIL)	REFL PAV MRK TY I (W)8"(SLD) (100MIL)	TY I HIGH PERF PM (W)6"(BRK) (100MIL)	TY I HIGH PERF PM (W)6"(SLD) (100MIL)	TY I HIGH PERF PM (Y)6"(SLD) (100MIL)	REFL PAV MRKR TY II-C-R	PREFAB PM TY C (W) (24") (SLD)	PREFAB PM TY C (W) (ARROW)	PREFAB PM TY C (W) (36") (YLD TRI)	PAV SURF PREP FOR MRK (6")
STATION TO STATION	LF	LF	LF	LF	LF	EA	LF	EA	EA	LF
524+00 TO 533+00			450	1800	800	6	46			
533+00 TO 545+00			600	2400	2400	8				
545+00 TO 557+00		979	600	3169	3591	106				
557+00 TO 569+00			770	5812	5477	10	54		15	1278
569+00 TO 581+00		876	600	2717	3588	96				
581+00 TO 593+00			600	2400	2400	8				
593+00 TO 605+00	71	225	600	2337	2400	34		1		
605+00 TO 617+00	99	216	600	2145	2700	34	77	3		
617+00 TO 629+00	112	425	600	2185	2214	56		4	21	
629+00 TO 641+00	82		600	2278	2400	11				
641+00 TO 653+00			600	2400	2400	8				
653+00 TO 665+00			600	2400	2400	8				
665+00 TO 677+00			600	2400	2400	8				
677+00 TO 689+00			600	2275	2400	8				
689+00 TO 701+00	92	228	600	2320	2330	35		2	6	
701+00 TO 713+00	116	165	600	2227	2299	30		2	14	
713+00 TO 725+00			600	2400	2400	8				
725+00 TO 737+00			600	2400	2400	8				
737+00 TO 749+00	110	165	600	2300	2207	30		4	23	
749+00 TO 761+00			600	2400	2400	8				
761+00 TO 773+00			600	2400	2400	8				
773+00 TO 785+00	121	111	600	2326	2214	24		4	23	
785+00 TO 797+00	117	126	600	2312	2800	21		4	13	
797+00 TO 809+00			600	2400	2400	8				
809+00 TO 821+00	76	180	600	2400	2242	29		4	13	
821+00 TO 833+00	24		600	2400	2400	9				
833+00 TO 845+00	77		600	2260	2400	8				
845+00 TO 857+00	107	356	600	2204	2216	44		4	21	
857+00 TO 869+00	100	390	600	2314	2232	51		4	17	
869+00 TO 881+00	96		600	2400	2400	12				
881+00 TO 893+00			600	2400	2400	8				
893+00 TO 905+00	53	61	600	2400	2400	16		1		
905+00 TO 917+00	154	217	600	2225	2053	36	27	7	40	
917+00 TO 929+00	78	136	600	2331	2269	25		4	12	
929+00 TO 930+88	33		47	376	376	3				
0052-07-068 TOTAL:	1718	4856	20467	83913	84808	822	204	48	218	1278

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

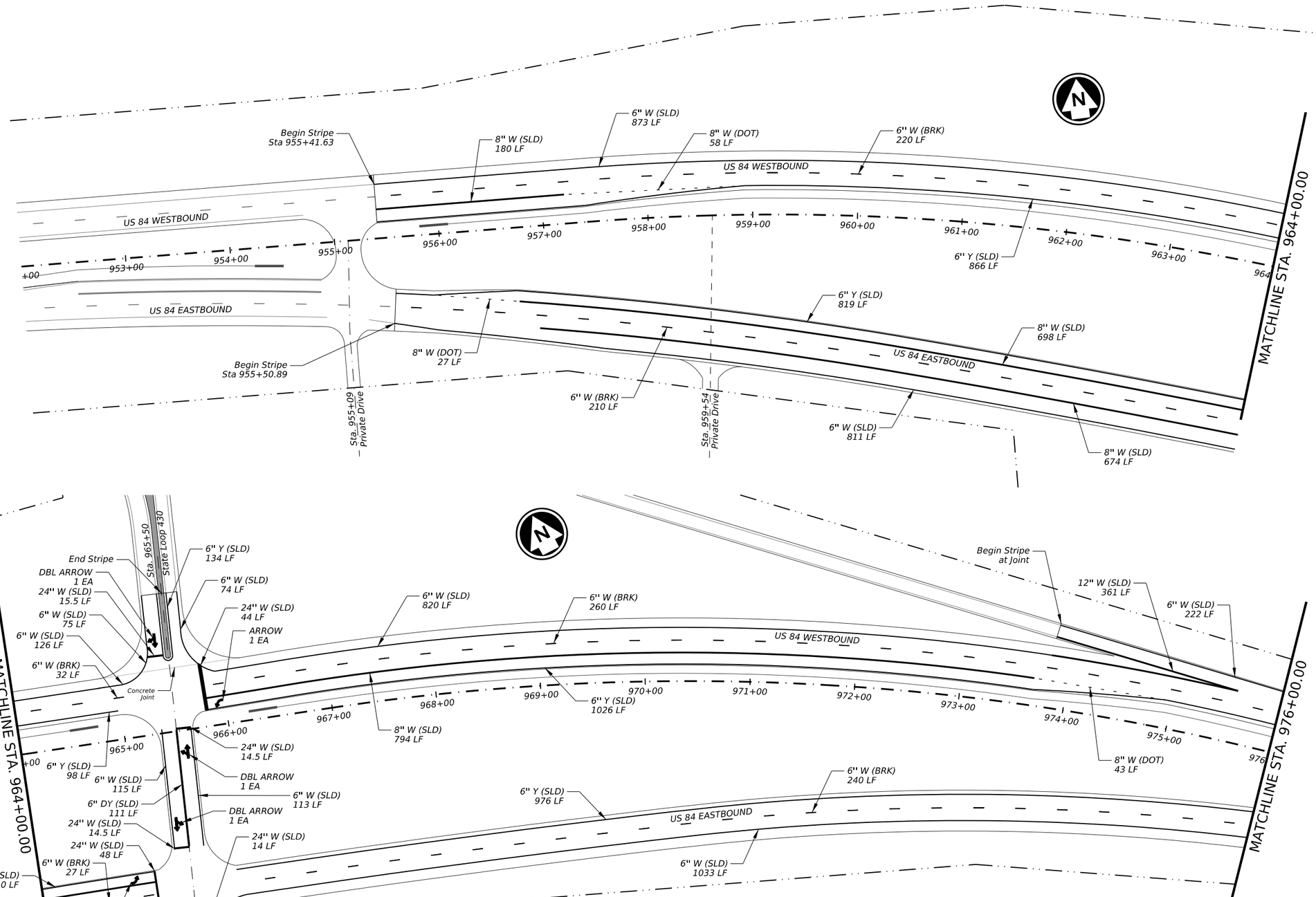
9/30/2024

Texas Department of Transportation

SIGNING & STRIPING SUMMARY (LUBBOCK COUNTY)

CONT	SECT	JOB	HIGHWAY
0052	05	046, etc.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		194

DATE: 9/30/2024 1:21:08 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/8. Traffic/US0084 TRF STRIPING SUM.dgn



STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

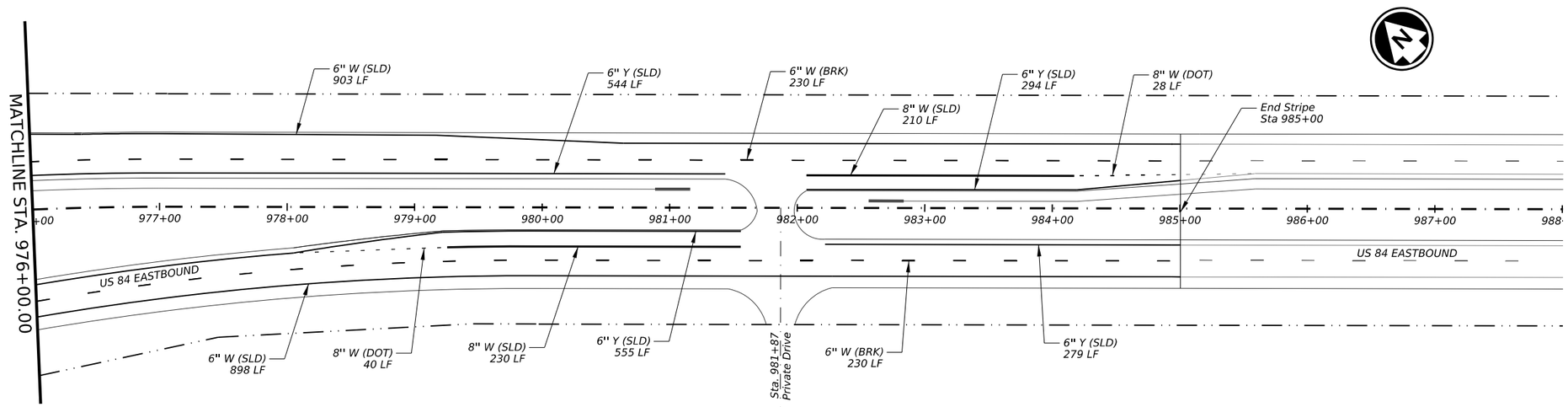
Texas Department of Transportation

LOOP 430
STRIPING DETAIL
SCALE: 1"=100'

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		195

DATE: 9/30/2024 1:21:33 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050464 - Design/Plan Set/8. Traffic/US0084 TRF LOOP430 STRIPE DETAIL.dgn



Benjamin Cox, P.E.

9/30/2024

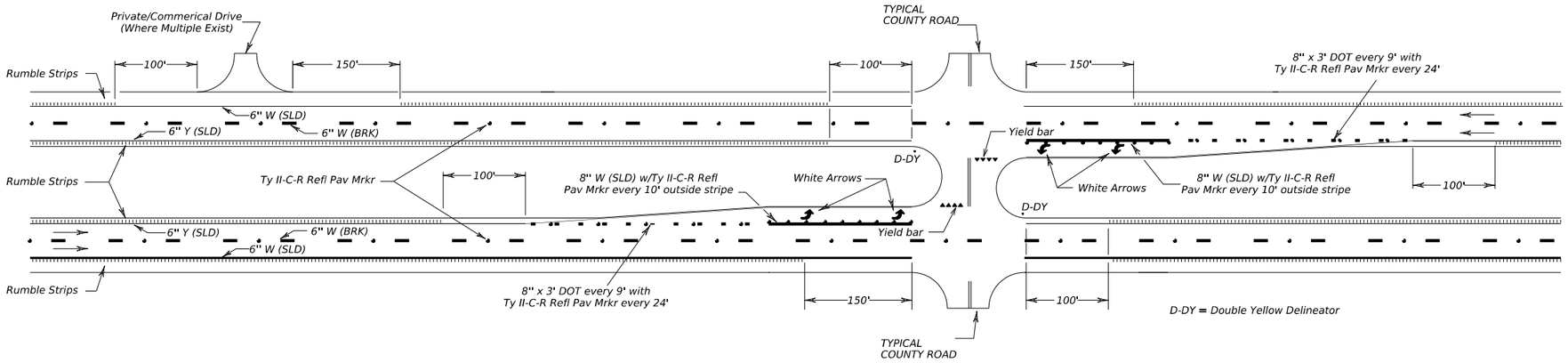
Texas Department of Transportation

LOOP 430
STRIPING DETAIL
SCALE: 1"=100'

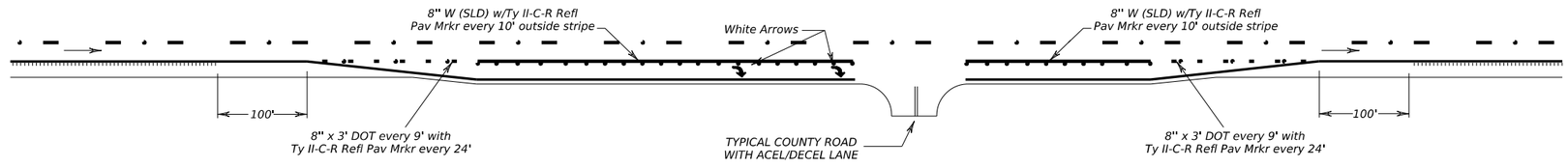
SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0052	05	046, etc.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		196

DATE: 9/30/2024 1:21:34 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/8. Traffic/US0084_TRF_LOOP430_STRIPE_DETAIL.dgn



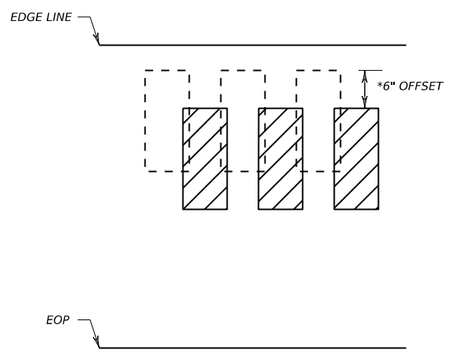
TYPICAL STRIPING/RUMBLE STRIP DETAIL



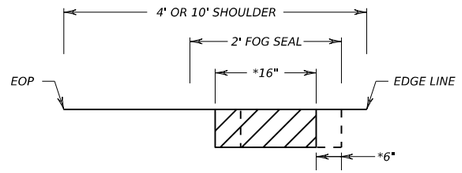
TYPICAL STRIPING/RUMBLE STRIP DETAIL WITH OUTSIDE A & D LANES

Median Acel Lane similar to outside Acel Lane.

NOTE:
1. ALL STRIPING SHALL COMPLY WITH THE CURRENT TMUTCD AND TXDOT PM STANDARD SHEETS.



PLAN VIEW



PROFILE VIEW

RUMBLE STRIP DETAIL

*SHIFT BY 6" TO AVOID OLD RUMBLE STRIPS
*PLACE BETWEEN EXISTING FILLED IN RUMBLE STRIPS

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

TYPICAL CROSSOVER STRIPING DETAIL

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, etc.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		197

DATE: 9/30/2024 1:21:52 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/8. Traffic/US0084 TRF_CROSSOVER_STRIPING_DETAIL.dgn

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	1	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
2	2	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
2	3	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
4	4	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
4	5	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
5	6	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
6	7	W3-5	<SYMBOL - REDUCED SPEED AHD> (SPEED)	48 x 48	1		10BWG	1	SA	T		
7	8	R2-1	SPEED LIMIT (SPEED)	48 x 60	1		S80	1	SA	T		
7	9	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
7	10	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
7	11	R2-1	SPEED LIMIT (SPEED)	48 x 60	1		S80	1	SA	T		
8	12	R2-1	SPEED LIMIT (SPEED)	48 x 60	1		S80	1	SA	T		
8	13	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	1		S80	1	SA	T		
8	14	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	1		S80	1	SA	T		
9	15	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
9	16	R2-1	SPEED LIMIT (SPEED)	48 x 60	1		S80	1	SA	T		
9	17	R2-1	SPEED LIMIT (SPEED)	48 x 60	1		S80	1	SA	T		
10	18	W2-1	SYMBOL - 4-WAY INTERSECTION AHEAD	48 x 48	1		10BWG	1	SA	T		
11	19	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
12	20	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
12	21	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
13	22	W2-1	SYMBOL - 4-WAY INTERSECTION AHEAD	48 x 48	1		10BWG	1	SA	T		
14	23	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
14	24	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
15	25	W3-5	<SYMBOL - REDUCED SPEED AHD> (SPEED)	48 x 48	1		10BWG	1	SA	T		
20	26	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
22	27	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
23	28	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
25	29	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		
25	30	R5-1	DO NOT ENTER	48 x 48	1		10BWG	1	SA	T		

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

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

http://www.txdot.gov/

NOTE:

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

SHEET 1 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
4-16 8-16	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		198

18

DATE: 9/30/2024 1:22:11 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/8. Traffic/SUMMARY OF SMALL SIGNS

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	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
26	31	M3-1	NORTH <AUXILIARY SIGN>	36 x 18	1		S80	1	SA	P		
		M4-1	ALTERNATE <AUXILIARY SIGN>	48 x 48	1							
		M6-1	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	30 x 24	1							
	A	W3-3	SYMBOL - SIGNALIZED INTERSECTION AHEAD	48 x 48	1		10BWG	1	SA	T		
	B	W3-3	SYMBOL - SIGNALIZED INTERSECTION AHEAD	48 x 48	1		10BWG	1	SA	T		
	C	W3-4	BE PREPARED TO STOP	48 x 48	1		FLASHING BEACON ASSEMBLY					
		W16-13P	WHEN FLASHING (PLAQUE)	30 x 24	1							
	D	W3-4	BE PREPARED TO STOP	48 x 48	1		FLASHING BEACON ASSEMBLY					
		W16-13P	WHEN FLASHING (PLAQUE)	30 x 24	1							
	E	R3-8LSSR	<4 LN ASSIGNEMNT ARROWS>	66 x 30	1		S80	1	SA	U		
	F	R3-8LSSR	<4 LN ASSIGNEMNT ARROWS>	66 x 30	1		S80	1	SA	U		
	G	R3-8LSS	<3 LN ASSIGNMENT ARROWS>	48 x 30	1		S80	1	SA	U		
	H	R3-8LSS	<3 LN ASSIGNMENT ARROWS>	48 x 30	1		S80	1	SA	U		
	I	W3-4	BE PREPARED TO STOP	48 x 48	1		FLASHING BEACON ASSEMBLY					
		W16-13P	WHEN FLASHING (PLAQUE)	30 x 24	1							
	J	W3-4	BE PREPARED TO STOP	48 x 48	1		FLASHING BEACON ASSEMBLY					
		W16-13P	WHEN FLASHING (PLAQUE)	30 x 24	1							
	K	W3-3	SYMBOL - SIGNALIZED INTERSECTION AHEAD	48 x 48	1		10BWG	1	SA	T		
	L	W3-3	SYMBOL - SIGNALIZED INTERSECTION AHEAD	48 x 48	1		10BWG	1	SA	T		

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

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

http://www.txdot.gov/

NOTE:

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

SHEET 2 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0052	05	046, ETC.	US 84
4-16		DIST	COUNTY		SHEET NO.
8-16		LBB	LAMB, ETC.		199

18

DATE: 9/30/2024 1:22:12 PM
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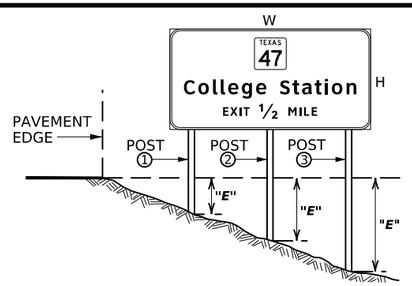
DATE: 9/30/2024 1:22:29 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050464 - Design/Plan Set/8. Traffic/SUMMARY OF LARGE SIGNS (TYPE G)

SUMMARY OF LARGE SIGNS - GROUND MOUNT (TY G)

PLAN SHEET NO.	STATION OR LOCATION (ie. LAT, LONG COUNTY Lat. Clearance)	SIGN NO.	SIGN BACK-GROUND COLOR	SIGN IMAGE OR TEXT	SIGN DIMENSIONS (WxH) (FT)	PLAQUES, & OTHER ATTACHMENTS (SQ FT)		BACKGROUND SUBSTRATE (SQ FT)		TYPE OF MOUNT	"E" DIMENSION ⚹			GALVANIZED STRUCTURAL STEEL					DRILLED SHAFT		RIPRAP APRON
								INSTALL	REPLACE						LINEAR FEET			TOTAL	LINEAR FEET		
						DIRECT APPLY	ALUMINUM (TYPE A) ⚹⚹	GROUND MOUNT (TYPE G)	GROUND MOUNT (TYPE G)		Post ①	Post ②	Post ③	SIZE	Post ①	Post ②	Post ③	WEIGHT LBS.	NON-REINF 12"Ø	REINF 24"Ø	(CY)
7	801+73.86	A	GREEN	IH 54 Littlefield	13' x 11.5'		9	149.5			0.4	0		W8x21	17.4	16.75		806.55		20	0.82
7	817+79.39	B	GREEN	US 385 Littlefield Levelland EXIT 1 MILE	13' x 13'		11.25	169			0.73	0.16		W10x22	17.73	17.16		859.58		22	0.82
8	844+99.46	C	GREEN	IH 54 Littlefield EXIT 1 MILE	13' x 10'		9	130			1.5	1.35		W8x21	18.5	18.35		863.25		20	0.82
9	854+81.9	D	GREEN	US 385 Littlefield Levelland	13' x 14'		11.25	182			2	1.8		W10x22	19	18.8		923.6		22	0.82
10	893+74.98	E	GREEN	US 385 Littlefield Levelland	13' x 14'		11.25	182			2.21	2.55		W10x22	19.21	19.55		944.72		22	0.82
13	942+80.03	F	GREEN	US 385 Littlefield Levelland EXIT 1 MILE	13' x 13'		11.25	169			1.51	0.82		W10x22	18.51	17.82		891.26		22	0.82
PAGE TOTALS							63	981.5										5288.96		128	4.92



NOTES:

1. ⚹ The **"E"** dimension is the elevation difference at the post between the ground and the edge of pavement or top of curb.
2. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
3. The post lengths listed here are approximations, the corrected post lengths will be furnished by the Contractor, after the stud posts are placed. Tower heights shall be verified with the Engineer before fabrication.

ATTACHMENT NOTE:

1. ⚹⚹ This column is for aluminum Type A and not direct apply. Direct apply is subsidiary to the sign. See TSR(2) and TSR(5).

LARGE ROADSIDE SIGN DESIGN PROCESS

1. Determine sign design, sign dimensions, sign location, and sign mounting height above ground, using slope or elevation measurements.
2. Determine each post length, including the **"E"** dimensions of each post.
3. Determine the wind zone using the Wind Velocity Worksheet.
4. Determine post size using SMD(LRSS). Use LRSS(1) for Zone 1 (90 mph), LRSS(2) for Zone 2 (80 mph), and LRSS(3) for Zone 3 (70 mph).
5. Determine initial leg post weights using the 'Post Weight Data' table value shown on LRSS(1), LRSS(2), or LRSS(3). Then add any extra post length weight to determine total weight beyond 10' post length.

   Example: For a sign with two posts, size W8x21, with each post 15' long, the total steel weight would be:

   *509.4+(15-10)*21*2 = 719.4 lbs*

   Note: the '21' in W8x21 refers to the weight of beam in pounds/foot.
6. Determine foundation diameter, base connection data, perforated fuse plate data, and bolt keeper data on SMD(2-2). (Only foundation diameter is needed for this sheet).
7. Determine foundation depth using the TxDOT Cone Penetration Test data on SMD(LRSS-4). Alternatively, Cohfric Design may be used.

TYPE OF MOUNT 3 3 1
- 1st 3: Wind Design Zone
- 2nd 3: Series No.
- 1: 1 Aluminum
- No. of Posts: 2 or 3

Texas Department of Transportation

Traffic Safety Division Standard

SUMMARY OF LARGE SIGNS GROUND MOUNT

SOLS(TY G)

FILE: SOLS(TY G)-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS 5-87 5-01 5-24 11-93 1-04 8-95 9-08	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		200

SUMMARY OF LARGE SIGNS TO BE REMOVED

SIGN LABEL OR NUMBER	APPROXIMATE LOCATION OR STATION	SIGN IMAGE OR TEXT	REMOVE SIGN *	TY G: REMOVE LRSA (EA) SIGN	TY G: REMOVE LRSA (EA) STEEL	TY G: REMOVE LRSA (EA) FOUNDATION	TY G: REMOVE LRSA (EA) GRADE	TY G: REMOVE LRSA FOUNDATION ONLY (EA) 12 IN.	TY G: REMOVE LRSA FOUNDATION ONLY (EA) 24 IN.	REMOVE RIPRAP APRON	TY O: REMOVE SIGN SUPPORT (SIGN ONLY) (EA)	TY O: REMOVE SIGN SUPPORT (EA)	TY O: REMOVE WALKWAY (EA)
A	801+73.86	IH 54 Littlefield	X	X						X			
B	817+79.39	385 Littlefield Levelland EXIT 1 MILE	X	X						X			
C	844+99.46	IH 54 Littlefield EXIT 1 MILE	X	X						X			
D	854+81.9	385 Littlefield Levelland	X	X						X			
E	893+74.98	385 Littlefield Levelland	X	X						X			
F	942+80.03	385 Littlefield Levelland EXIT 1 MILE	X	X						X			
COLUMN TOTAL				6						6			

SIGN LABEL OR NUMBER	APPROXIMATE LOCATION OR STATION	SIGN IMAGE OR TEXT	REMOVE SIGN *	TY G: REMOVE LRSA (EA) SIGN	TY G: REMOVE LRSA (EA) STEEL	TY G: REMOVE LRSA (EA) FOUNDATION	TY G: REMOVE LRSA (EA) GRADE	TY G: REMOVE LRSA FOUNDATION ONLY (EA) 12 IN.	TY G: REMOVE LRSA FOUNDATION ONLY (EA) 24 IN.	REMOVE RIPRAP APRON	TY O: REMOVE SIGN SUPPORT (SIGN ONLY) (EA)	TY O: REMOVE SIGN SUPPORT (EA)	TY O: REMOVE WALKWAY (EA)
COLUMN TOTAL													
PAGE TOTALS				6						6			

NOTE:

1. ∗ *For information only. Typically used in conjuction with replacement of signs TY G or TY O.*

2. ∗∗ *Removal of existing riprap apron is subsidiary to Item 647.*

Texas Department of Transportation

Traffic Safety Division Standard

SUMMARY OF LARGE SIGNS REMOVAL

SOLSR

FILE: SOLSR-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		201

19B

DATE: 9/30/2024 1:22:29 PM
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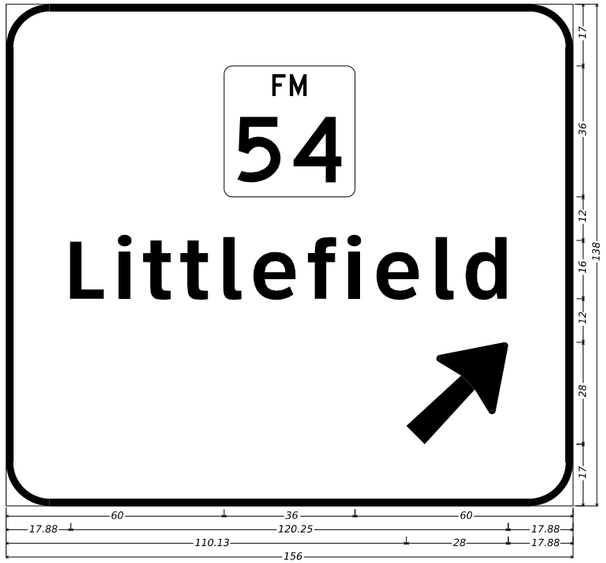
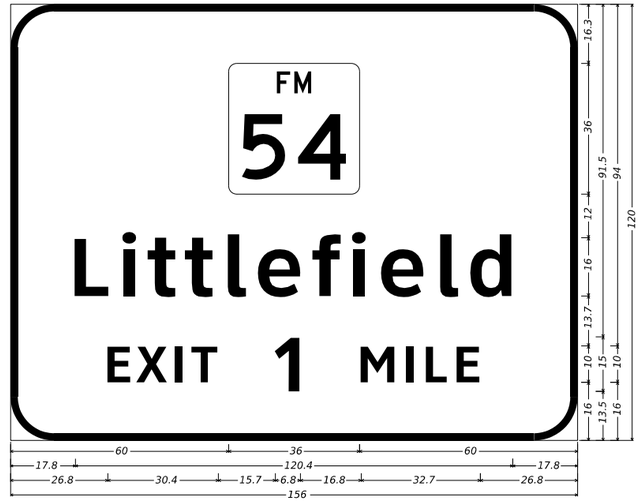


12.00" Radius, 2.00" Border, White on Green;
State Highway 54 M1-6F2; "Littlefield", ClearviewHwy-5-W-R; Arrow A-3 - 35.63" 45°;

Sign A
Sta 801+73.86



I-2dT 10in;
12.0" Radius, 2.0" Border, White on Green;
State Highway 54 M1-6F2; "Littlefield", ClearviewHwy-5-W-R; "EXIT 1 MILE", ClearviewHwy-5-W-R;

Sign C
Sta 844+99.46

12.00" Radius, 2.00" Border, White on Green;
"Littlefield", ClearviewHwy-5-W-R; "Levelland", ClearviewHwy-5-W-R; "EXIT", ClearviewHwy-5-W-R; "1", ClearviewHwy-5-W-R; "MILE", ClearviewHwy-5-W-R;

Signs B & F
Sta 817+79.39 & Sta 942+80.03

12.00" Radius, 2.00" Border, White on Green;
"Littlefield", ClearviewHwy-5-W-R; "Levelland", ClearviewHwy-5-W-R; Arrow A-3 - 35.63" 45°;

Signs D & E
Sta 854+81.90 & Sta 893+74.98

NOTE: ALL DIMENSIONS ARE SHOWN IN INCHES

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

D-SERIES
LARGE GUIDE SIGNS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		202

DATE: 9/30/2024 1:22:47 PM
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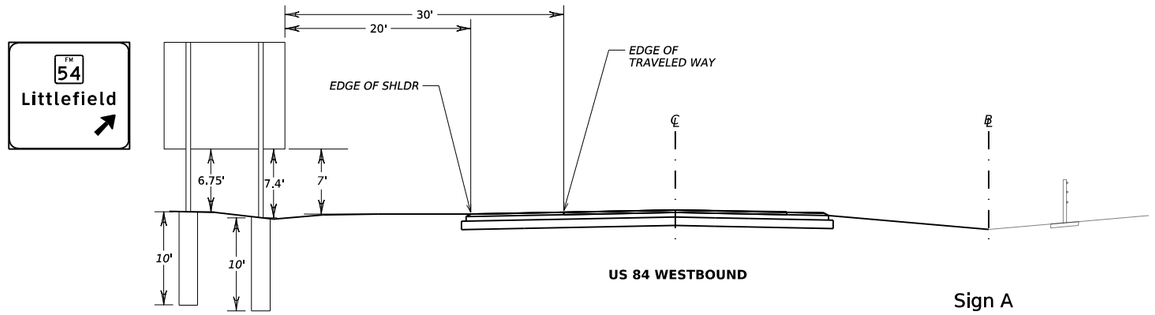
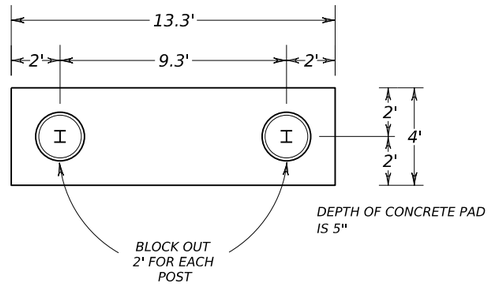
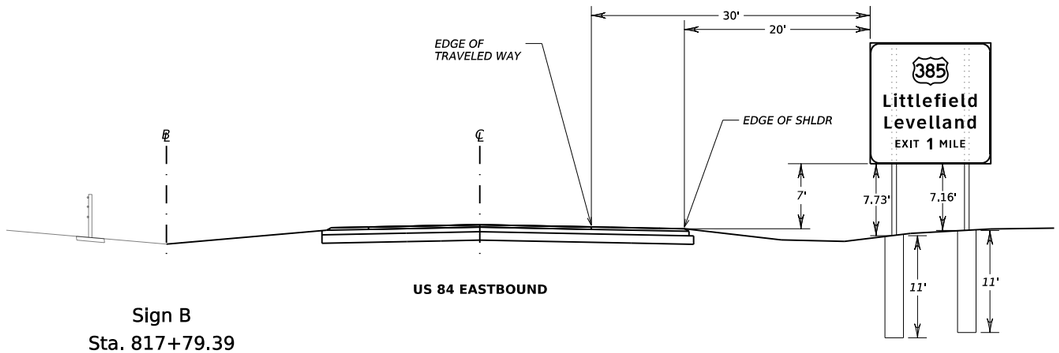
CK DW CK DW



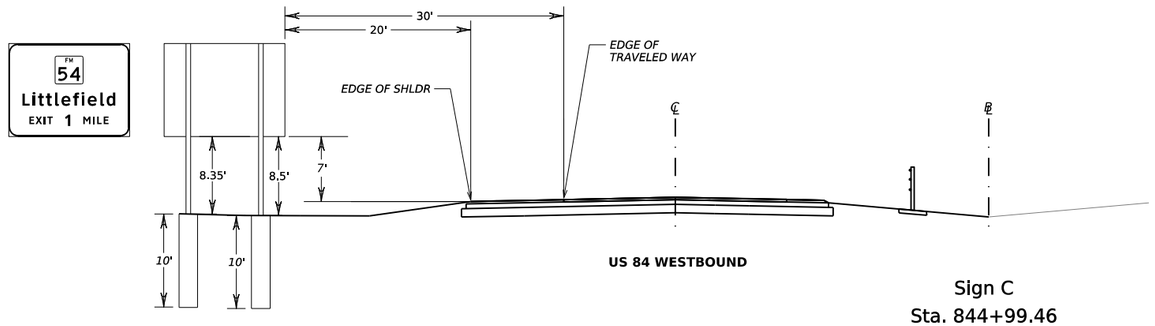
Sign A
Sta. 801+73.86



SIGN PAD DETAIL
V= 0.82 CY



Sign B
Sta. 817+79.39



Sign C
Sta. 844+99.46

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

LARGE GUIDE SIGN CROSS SECTIONS

NO SCALE

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		203

DATE: 9/30/2024 1:23:04 PM
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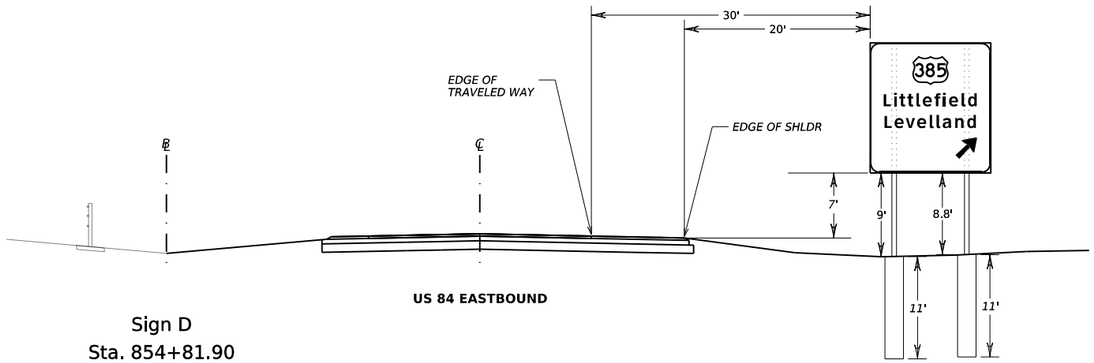
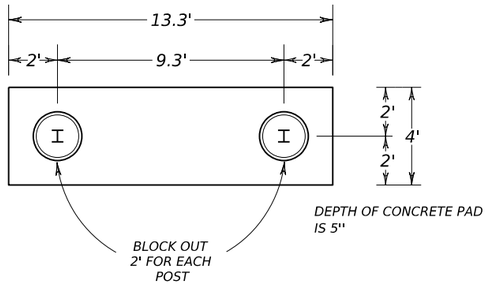
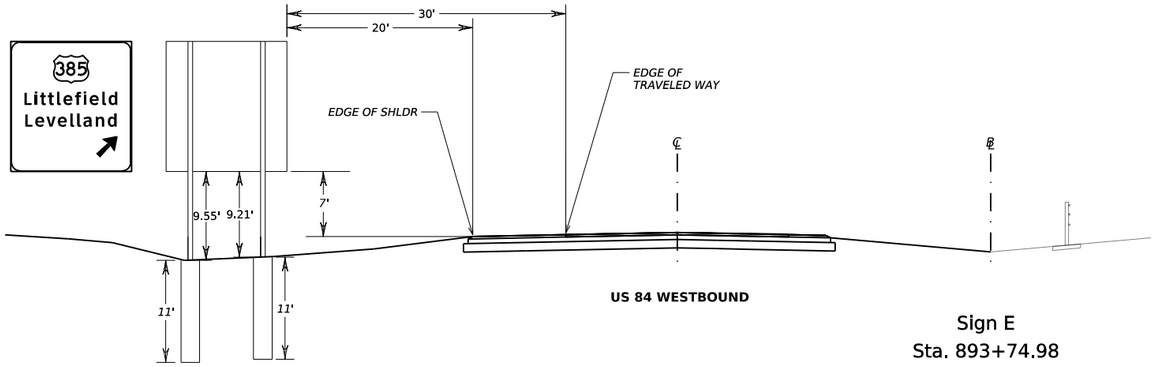


US 84 EASTBOUND

Sign D
Sta. 854+81.90

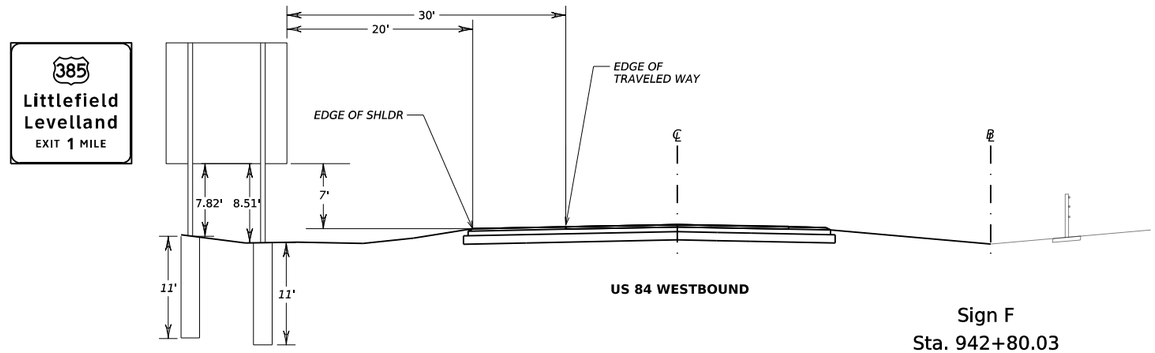


SIGN PAD DETAIL
V= 0.82 CY



US 84 WESTBOUND

Sign E
Sta. 893+74.98



US 84 WESTBOUND

Sign F
Sta. 942+80.03

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

LARGE GUIDE SIGN
CROSS SECTIONS

NO SCALE

SHEET 2 OF 2

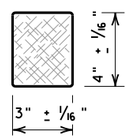
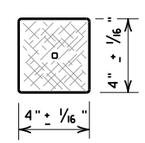
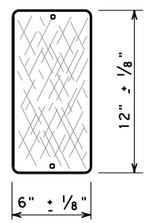
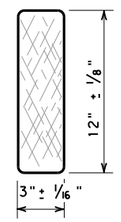
CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		204

DATE: 9/30/2024 1:23:04 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050464 - Design/Plan Set/8. Traffic/US0084 TRF LGS XS.dgn

CK | DW | CK | DW

DATE: 9/30/2024 1:23:21 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/00520504 6/4 - Design/Plan Set/8. Traffic/STANDARDS/dom1-20.dgn

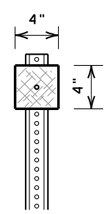
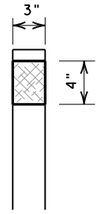
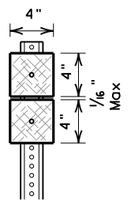
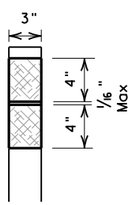
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			

NOTE

1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx).
2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

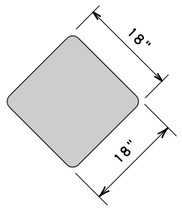
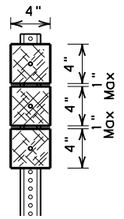
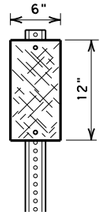
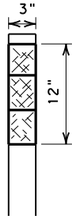
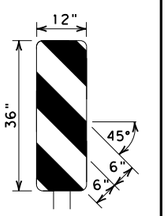
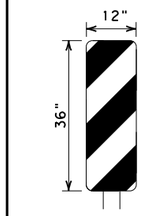
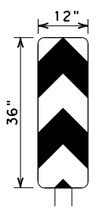
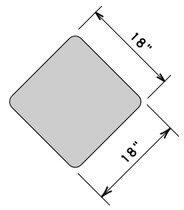
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

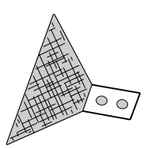
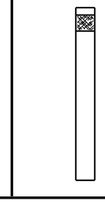
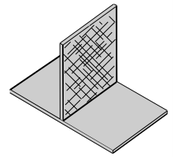
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS

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

BARRIER REFLECTORS (BRF)

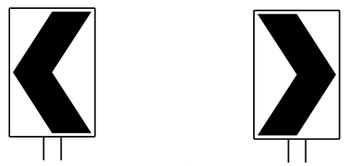
	GF1	GF2	CTB
DEVICE			

1. Barrier reflectors shall meet the requirements of DMS 8600.
2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.

SHEETING: Yellow, White, Red

NOTE
1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.

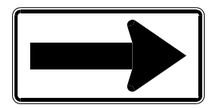
CHEVRONS

DEVICE:  W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

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"	

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

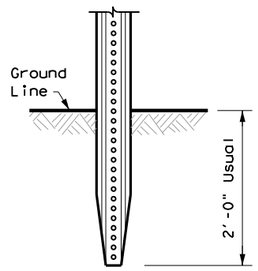
FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	LBB	LAMB, ETC.		205

20A

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

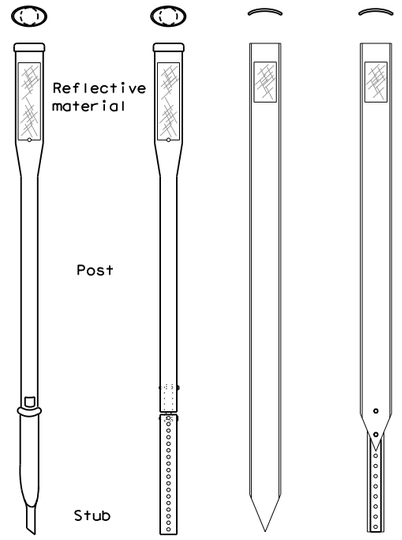


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

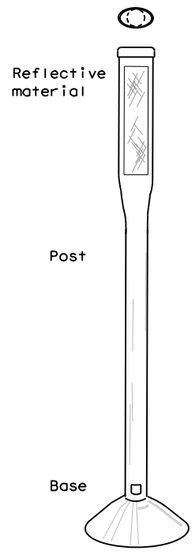
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



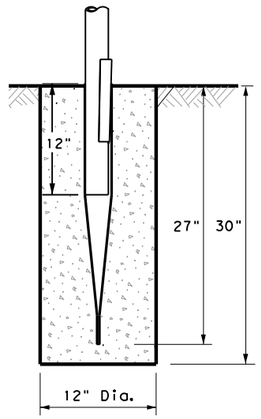
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

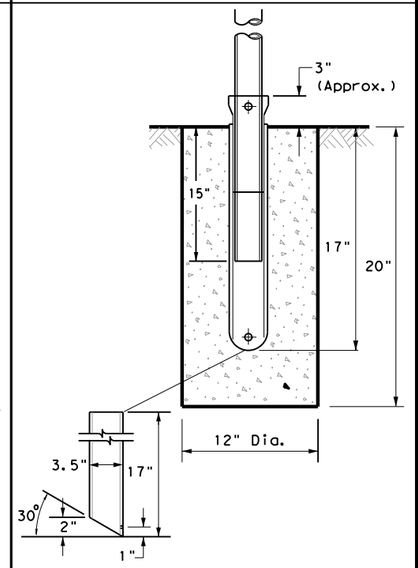
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

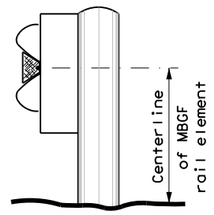
NOTE

1. Install per manufacturer's recommendations.

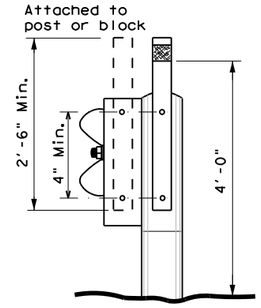
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

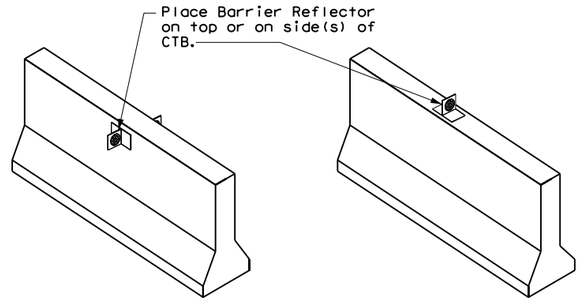
GF1



GF2



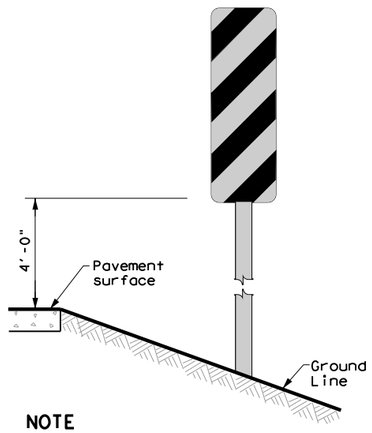
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

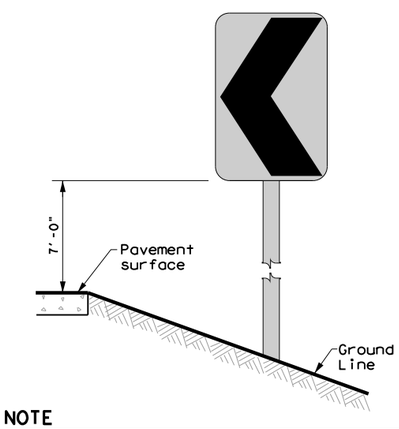
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

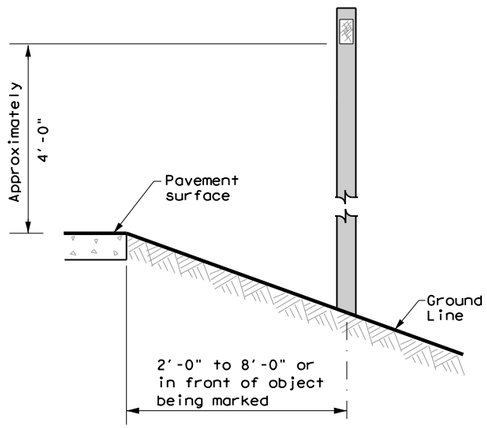
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	LBB	LAMB, ETC.		206

20B

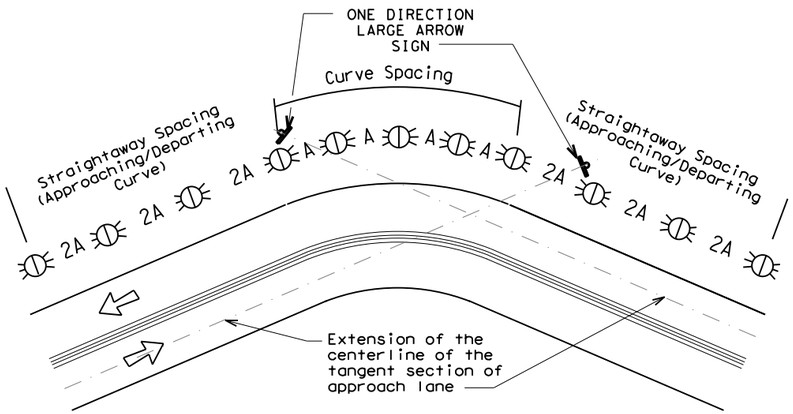
DATE: 9/30/2024 1:23:37 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/8. Traffic/STANDARDS/dom2-20.dgn

DATE: 9/30/2024 1:23:58 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/8. Traffic/STANDARDS/dom3-20.dgn

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

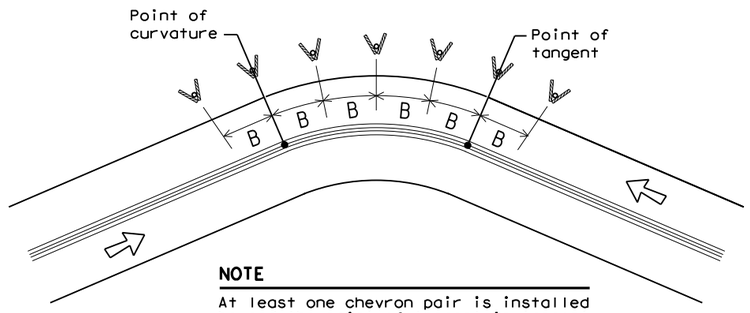
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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	0052	05	046, ETC.	US 84
3-15 8-15 8-15 7-20	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		207

20C

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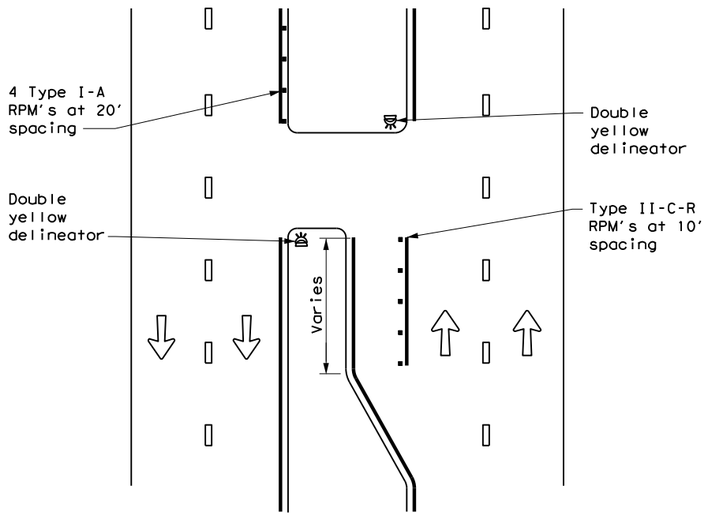
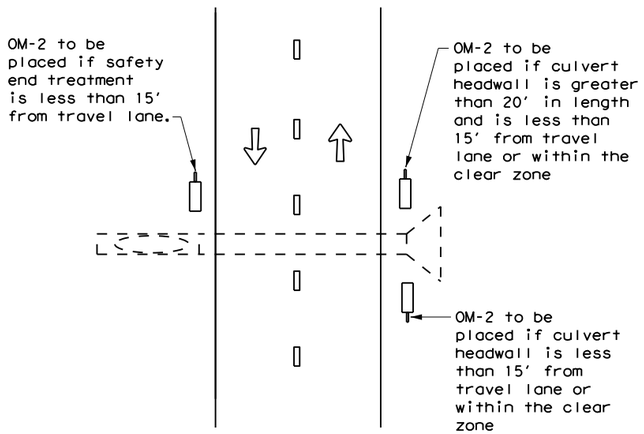
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/8. Traffic/STANDARDS/dom4-20.dgn

CROSSOVERS



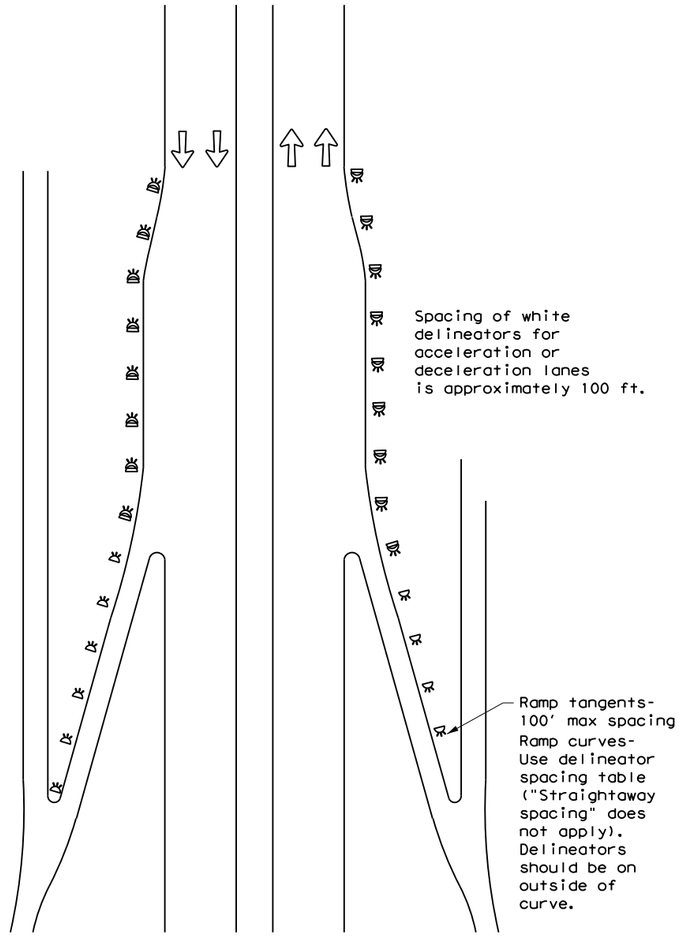
DETAIL 1

FOR CULVERTS WITHOUT MBGF



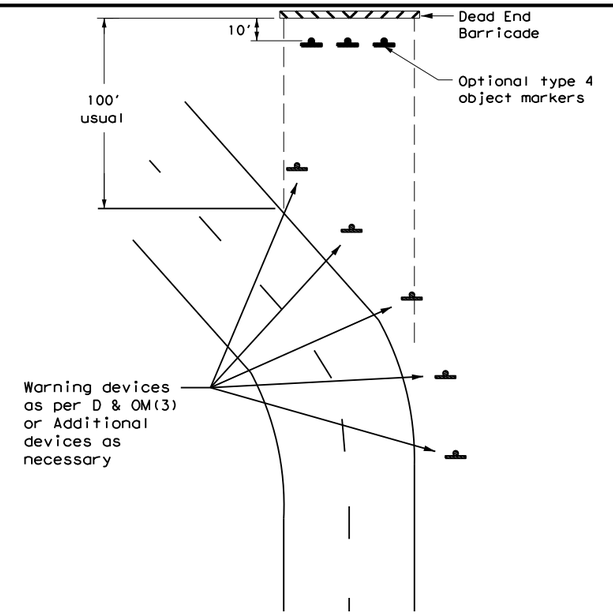
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



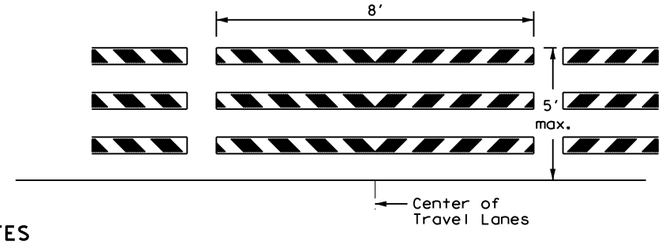
DETAIL 3

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	0052	05	046, ETC.	US 84
3-15	DIST	COUNTY		SHEET NO.
7-20	LBB	LAMB, ETC.		208

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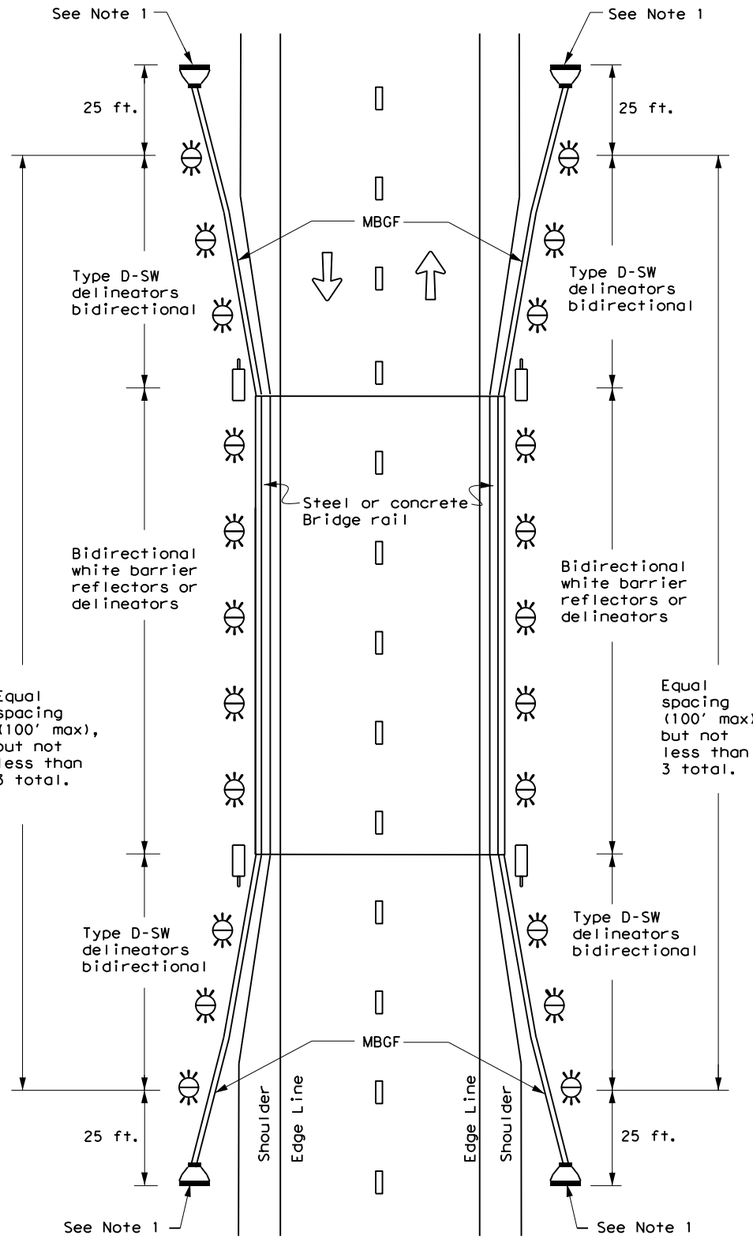
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/00520546/4 - Design/Plan Set/8. Traffic/STANDARDS/dom5-20.dgn

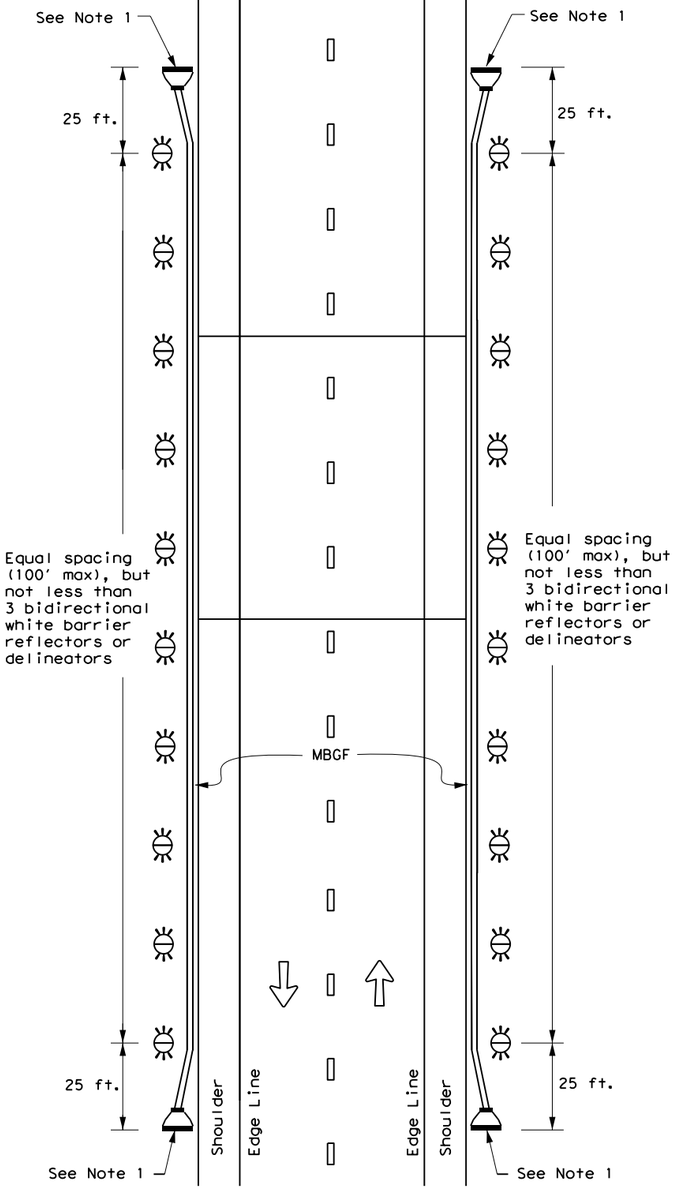
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



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.

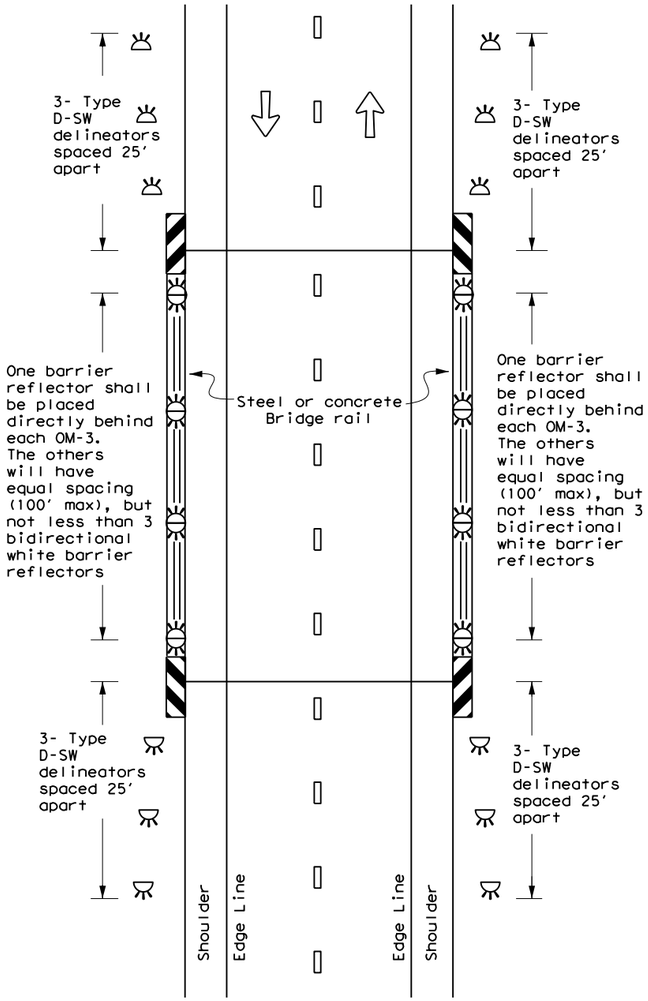
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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	0052	05	046, ETC.	US 84
7-20	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		209

20E

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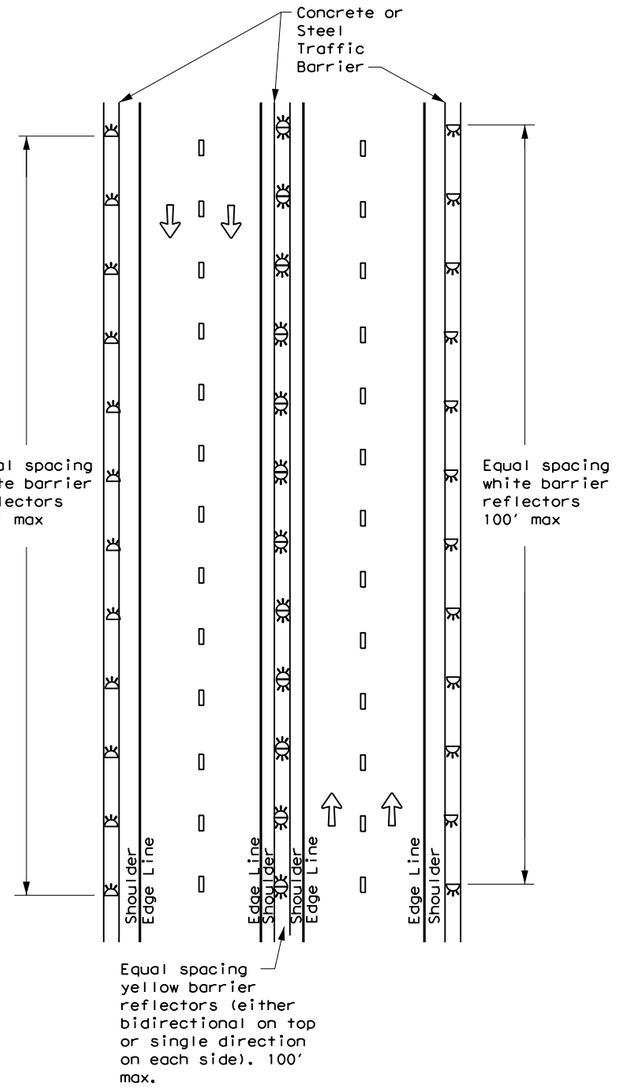
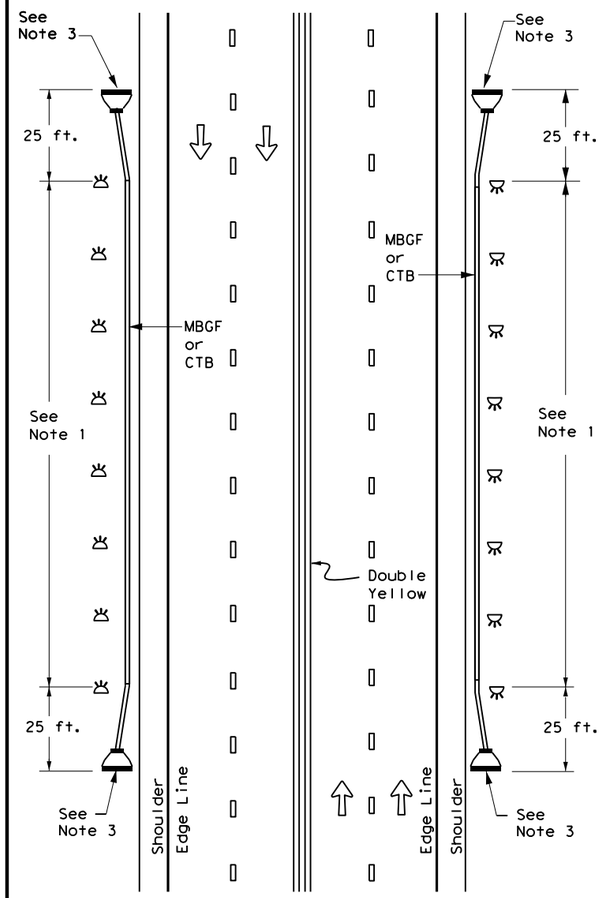
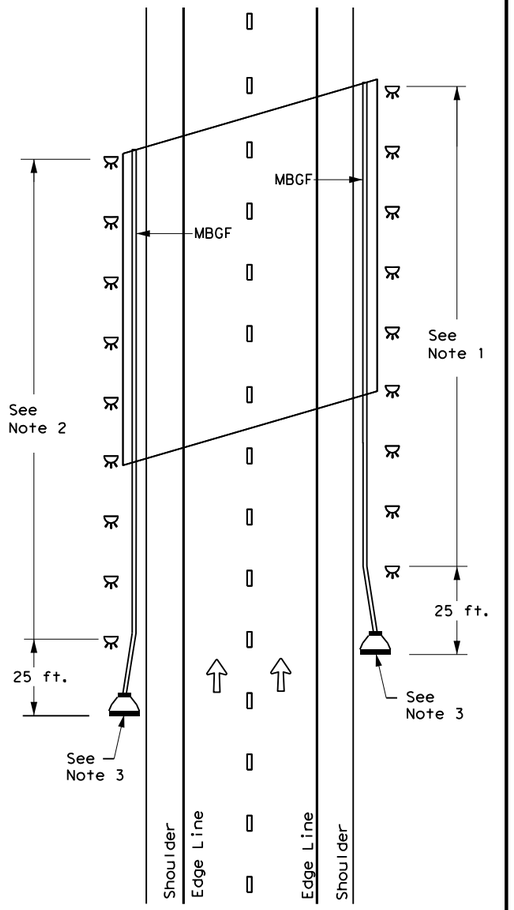
CONTINUOUS CONCRETE OR STEEL BARRIER



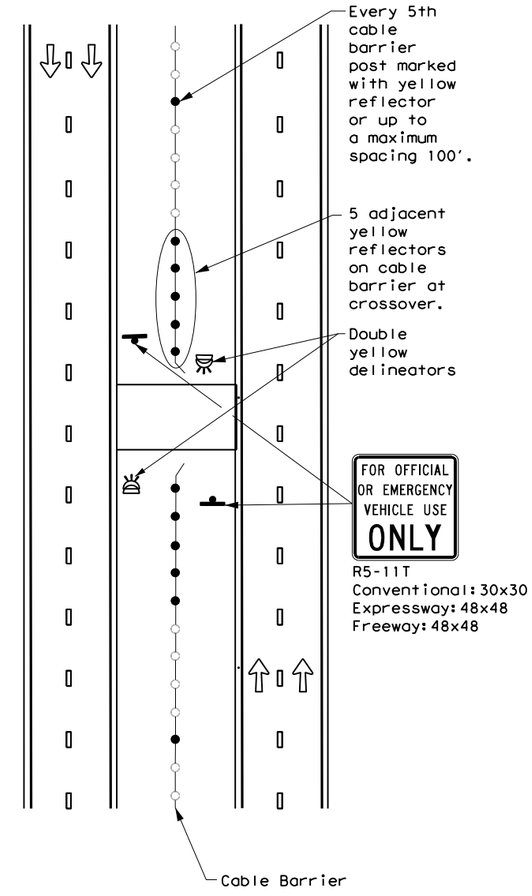
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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
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	LBB	LAMB, ETC.		210

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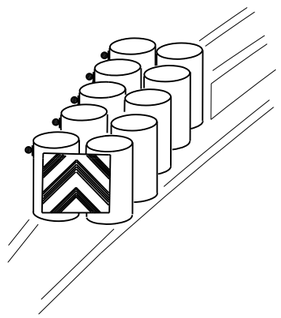
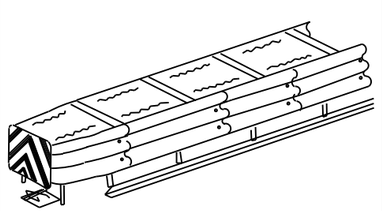
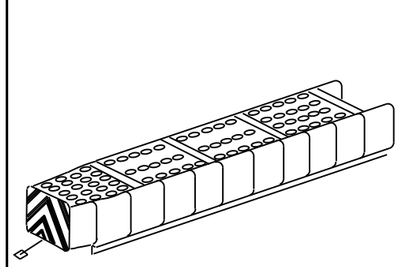
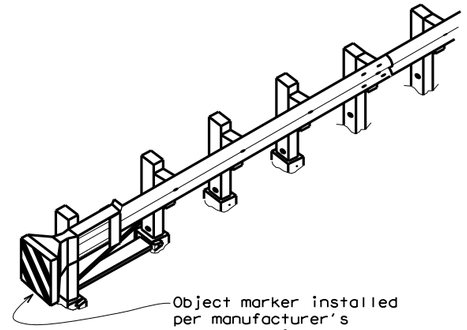
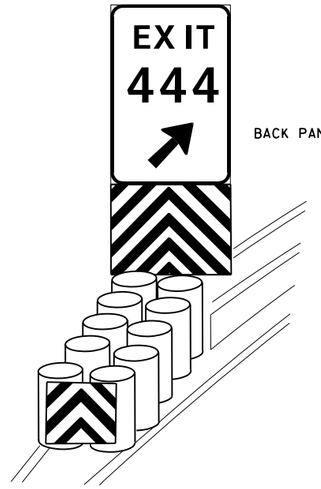
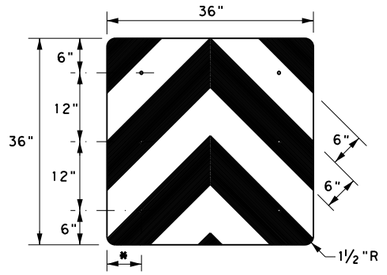


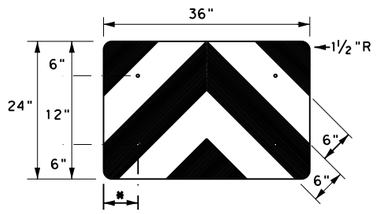




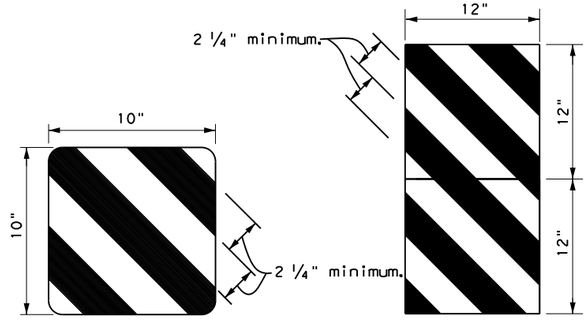




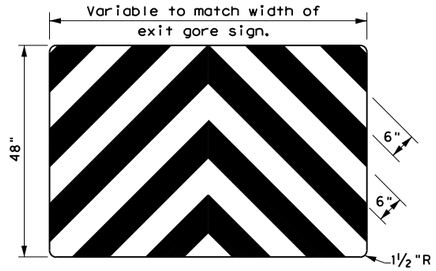


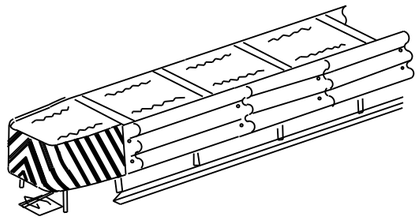


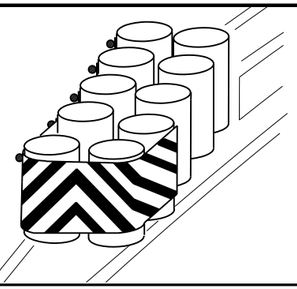
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

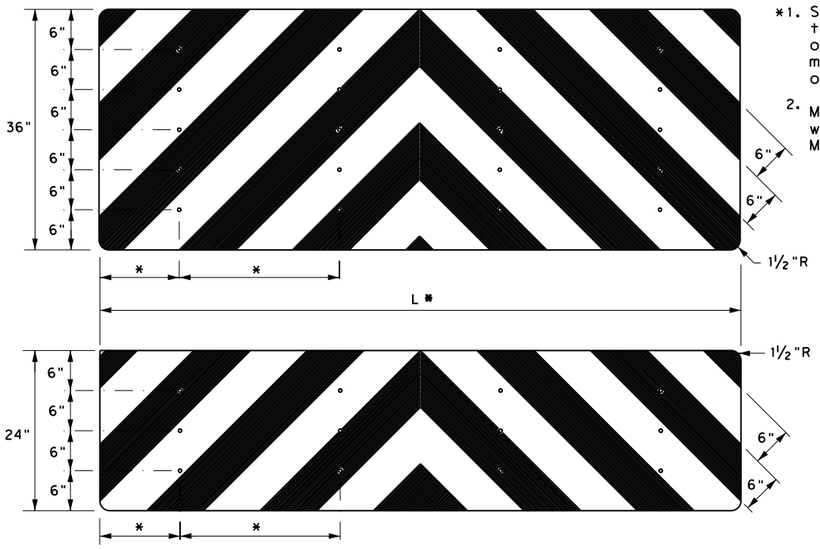


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

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

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	LBB	LAMB, ETC.		211
4-98 7-20				

20G

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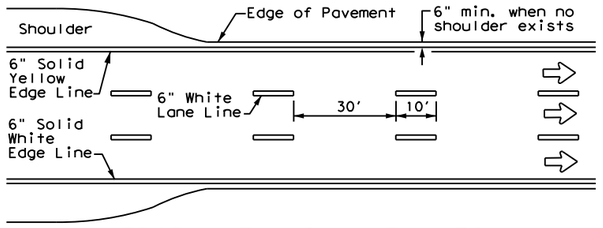
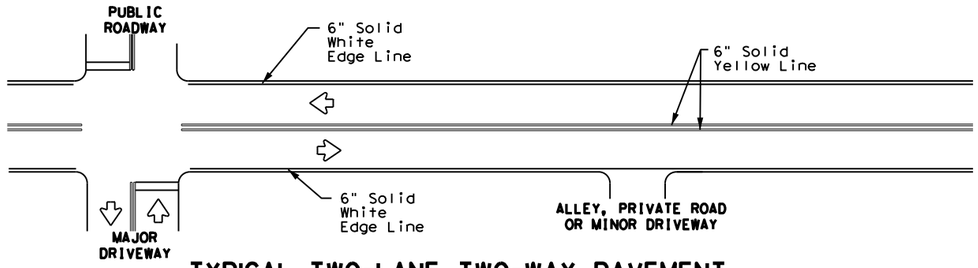
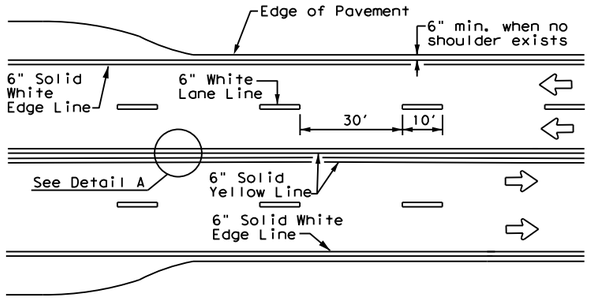
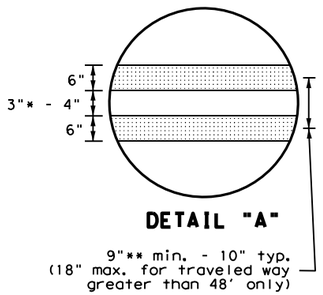


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

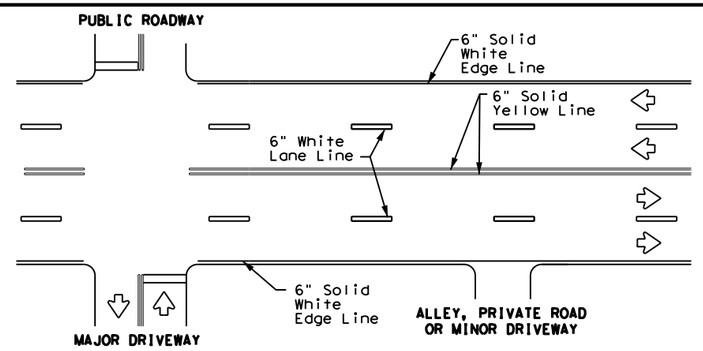




CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

** 8" minimum for restripe projects when approved by the Engineer.



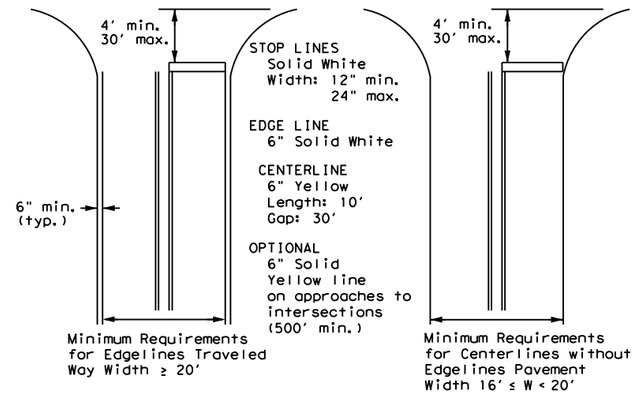
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines 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 center of edge line to the center of edge line 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

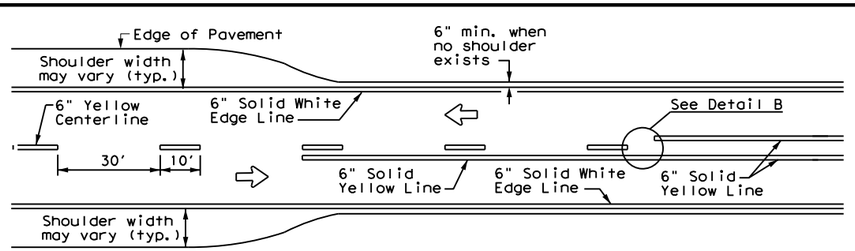
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



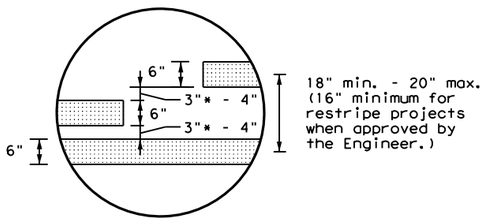
NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

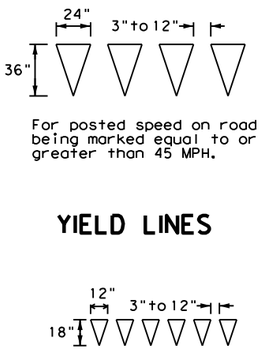
Based on Traveled Way and Pavement Widths for Undivided Roadways

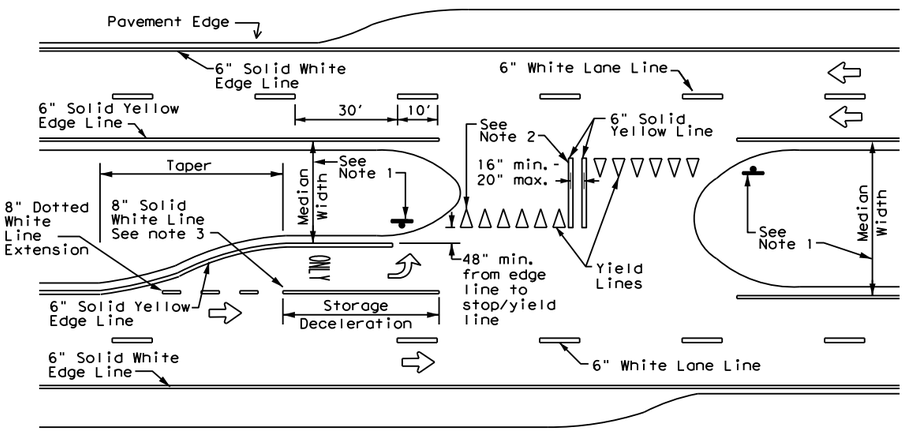


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



* 2" minimum for restripe projects when approved by the Engineer.





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 and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines 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.

Texas Department of Transportation

Traffic Safety Division Standard

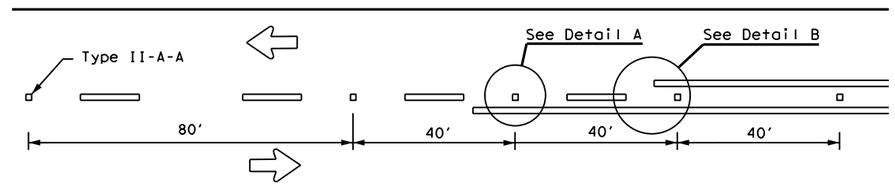
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

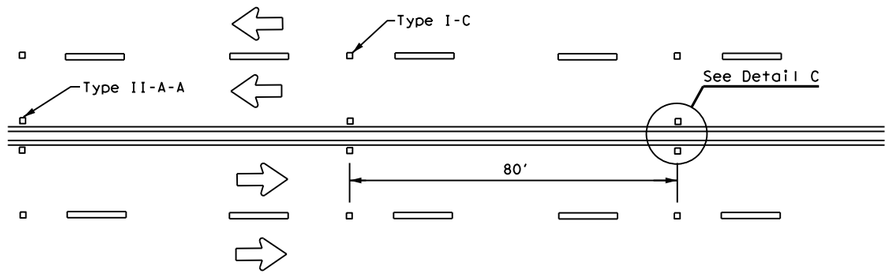
FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
11-78 8-00 6-20	DIST	COUNTY		SHEET NO.
8-95 3-03 12-22	LBB	LAMB, ETC.		212
5-00 2-12				

22A

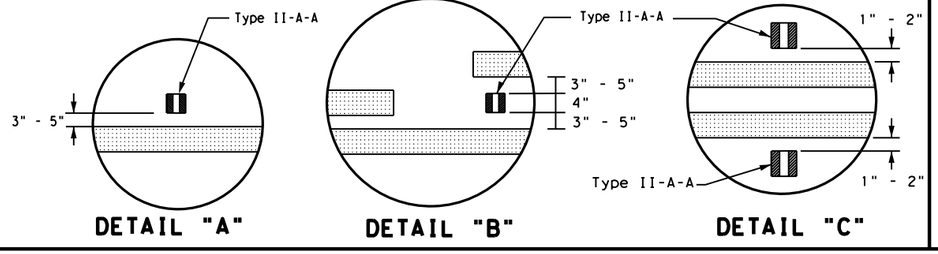
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

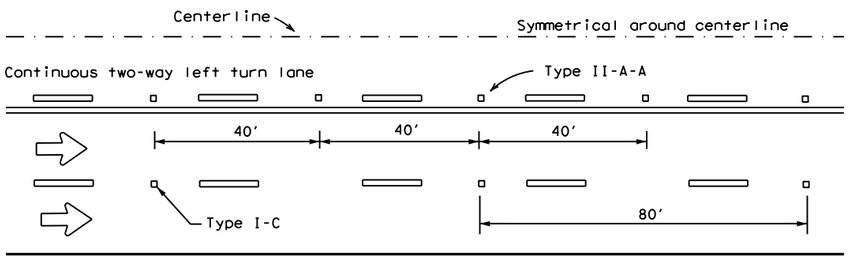


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

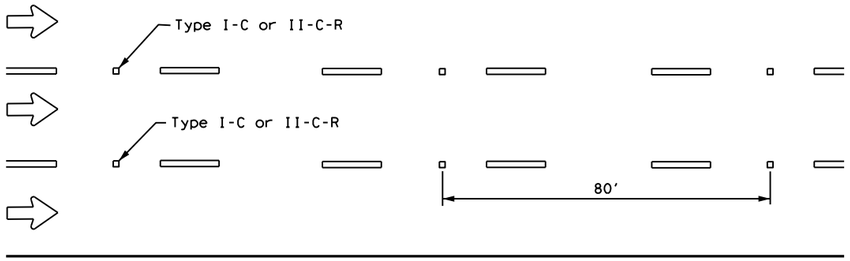


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



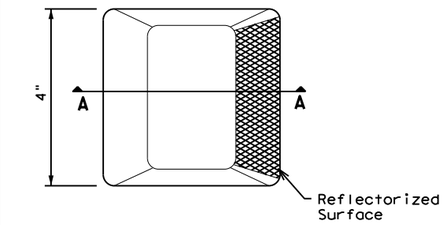
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

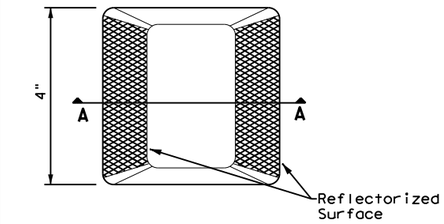
See Note 3.

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

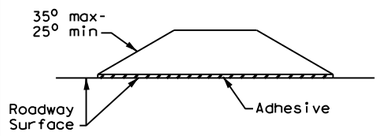
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

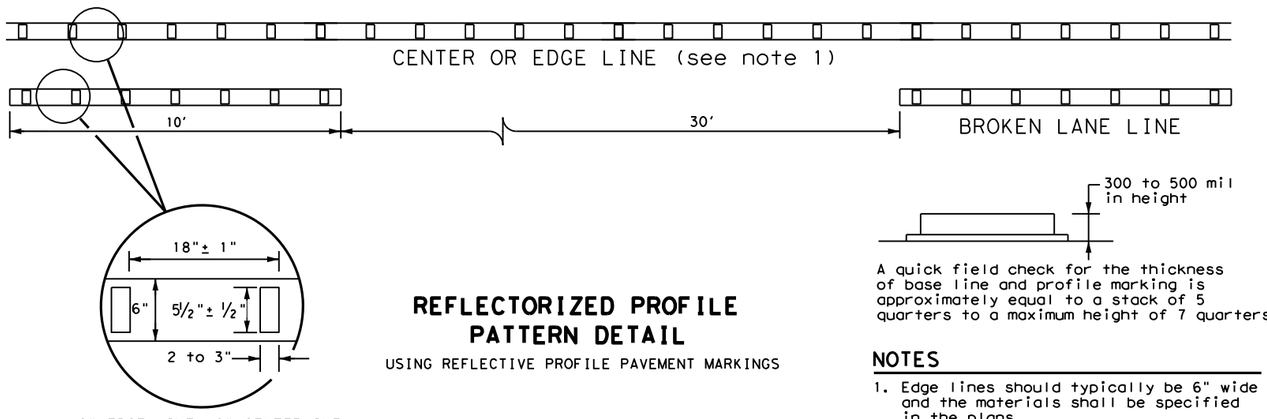


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. 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 along 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.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians, and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

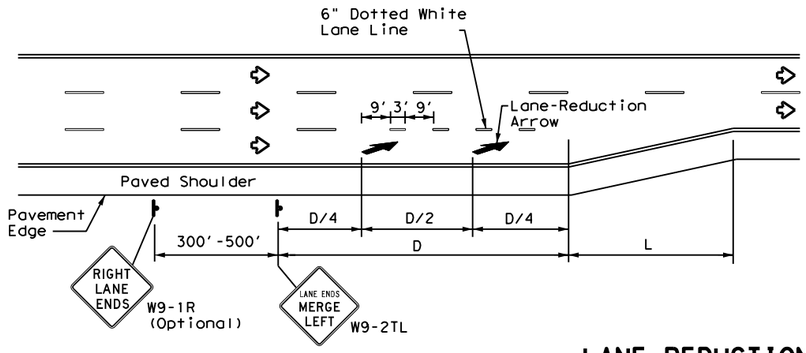
POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		213

22B

DATE: 9/30/2024 1:25:51 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050464 - Design/Plan Set/8. Traffic/STANDARDS/pm2-22.dgn

DATE: 9/30/2024 1:26:11 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/00520504 6/4 - Design/Plan Set/8. Traffic/STANDARDS/pm3-22.dgn

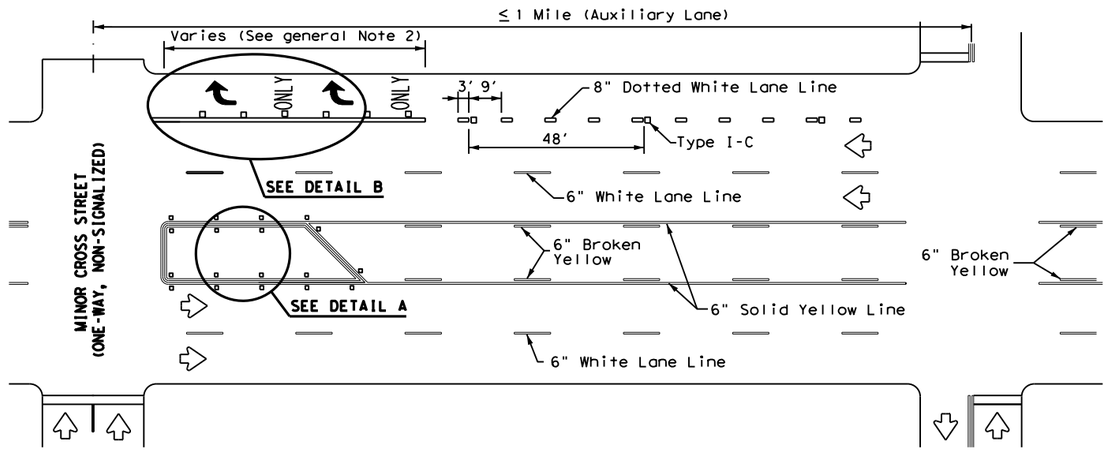


LANE REDUCTION

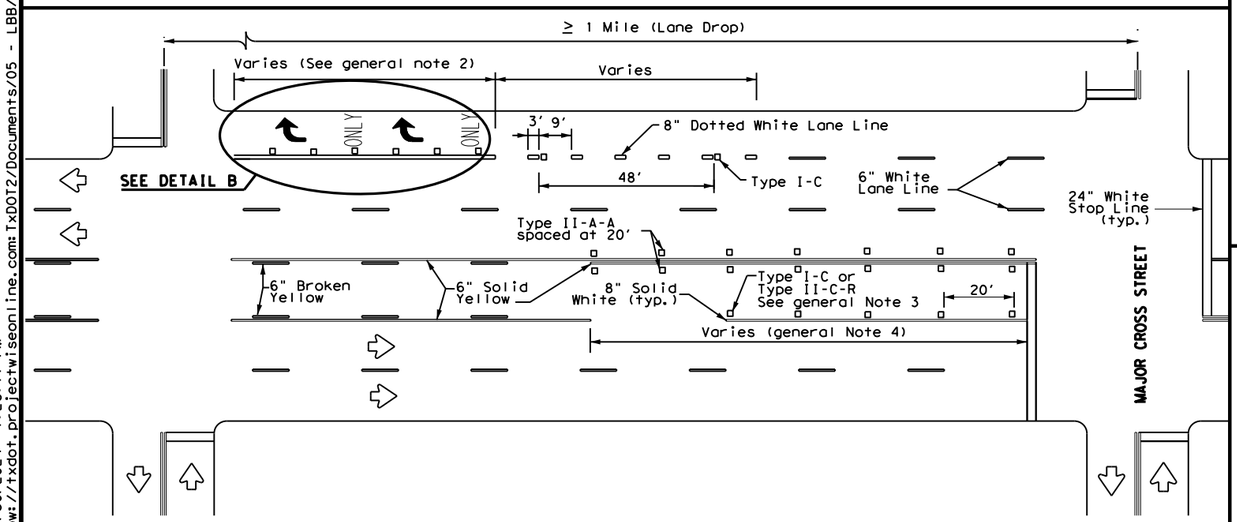
NOTES

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 RIGHT LANE ENDS (W9-1R) 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.

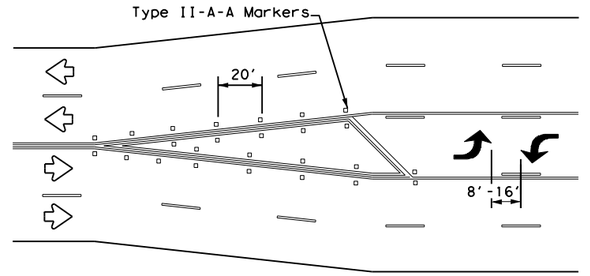
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	



TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



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.

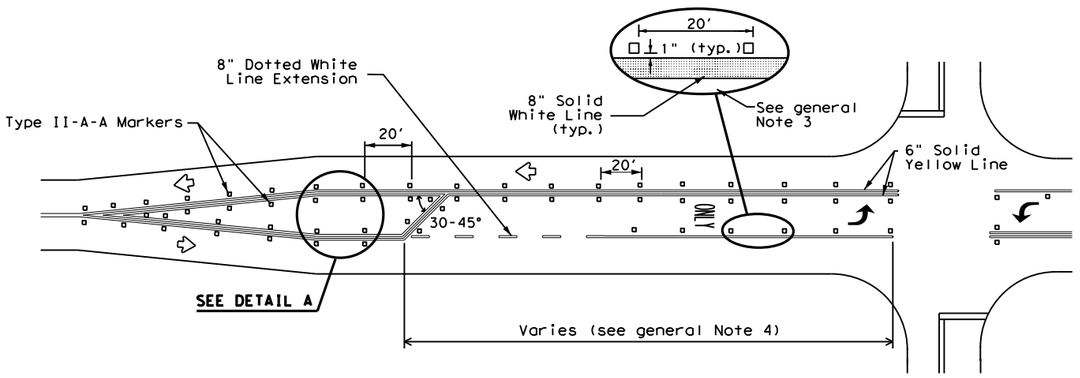
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

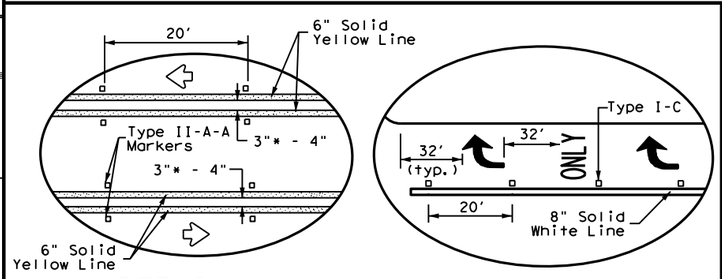
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn 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. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

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 TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



* 2" minimum allowed for restripe projects when approved by the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

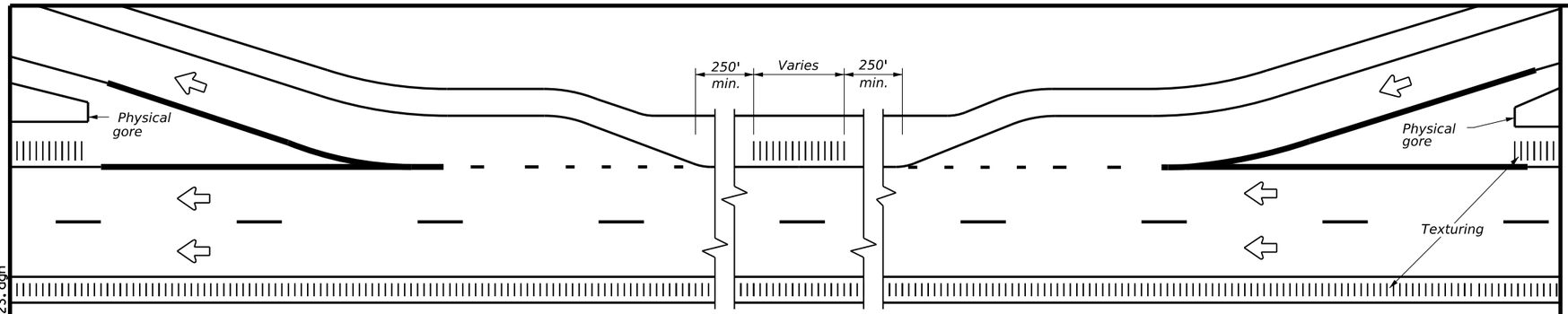
TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

PM(3)-22

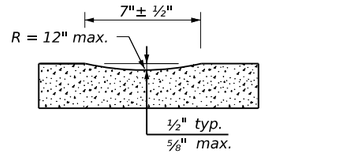
FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20 5-00 2-10 12-22 8-00 2-12	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		214

22C

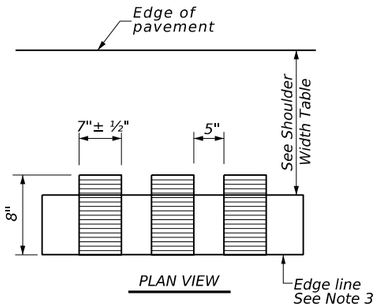
DATE: 9/30/2024 1:26:34 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205/0674 - Design/Plan Set/8. Traffic/STANDARDS/rs(1)-23.dgn



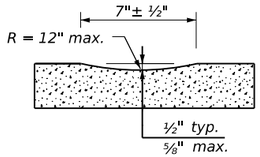
TYPICAL RUMBLE STRIP PLACEMENT AT EXIT AND ENTRANCE RAMPS



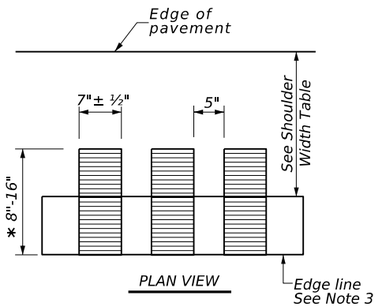
PROFILE VIEW
OPTION 1



CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

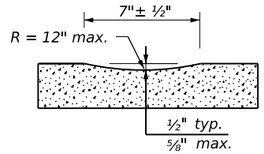


PROFILE VIEW
OPTION 2

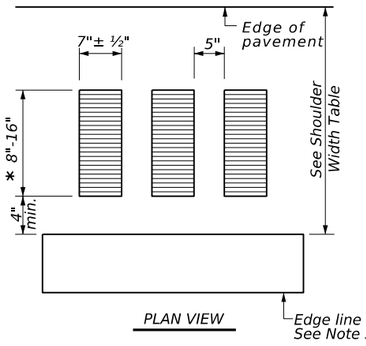


* This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

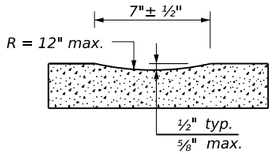


PROFILE VIEW
OPTION 3

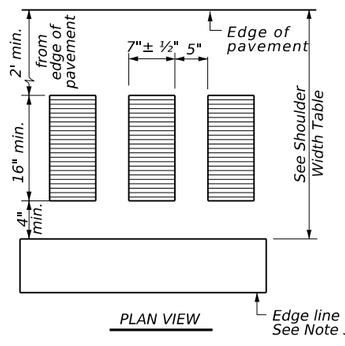


* This distance may vary based on width of shoulder

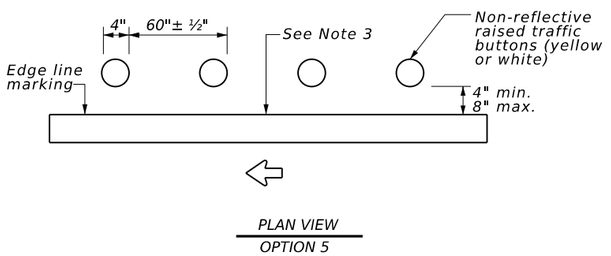
CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PROFILE VIEW
OPTION 4

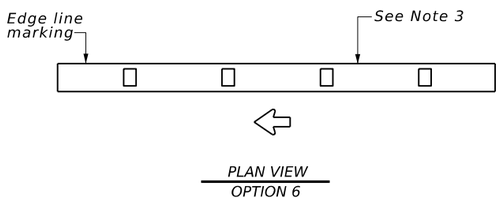


CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PLAN VIEW
OPTION 5

RAISED EDGE LINE
(Rumble Strips)



PLAN VIEW
OPTION 6

PROFILE EDGE LINE MARKINGS
(Rumble Strips)

SHOULDER WIDTH TABLE

EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5, or 6	Option 1, 2, 3, 5, or 6	Option 2, 4, 5, or 6

GENERAL NOTES

1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use standard sheets PM(2) and FPM(1) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the Shoulder Width Table below for determining what options may be used for edge line rumble strips.
5. Breaks in edge line rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections, or driveways with high usage of large trucks when installed on conventional highways.
6. Rumble strips shall not be placed across exit or entrance ramps, acceleration or deceleration lanes, crossovers, gore areas, or intersections with other roadways.
7. Consideration should be given to noise levels when edge line rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
8. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING MILLED DEPRESSION EDGE LINE RUMBLE STRIPS:

9. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
10. Pavement markings can be applied over milled shoulder rumble strips to create an edge line rumble stripe.

WHEN INSTALLING RAISED OR PROFILE EDGE LINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edge line when used as a rumble strip. The color of the button should match the color of the adjacent edge line marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. The minimum distance between the edge line and the buttons should be used if the shoulder is less than 8 feet in width.
15. Raised profile thermoplastic markings used as edge lines may substitute for buttons.

Texas Department of Transportation

Traffic Safety Division Standard

EDGE LINE RUMBLE STRIPS ON FREEWAYS AND DIVIDED HIGHWAYS RS(1)-23

FILE: rs(1)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
4-06 1-23	DIST	COUNTY		SHEET NO.
2-10	LBB	LAMB, ETC.		215
10-13				

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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)

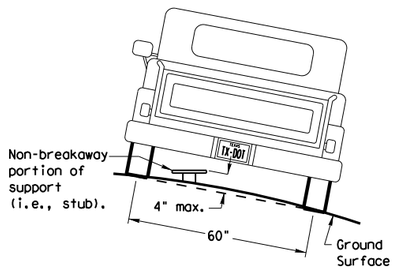
Anchor Type

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))

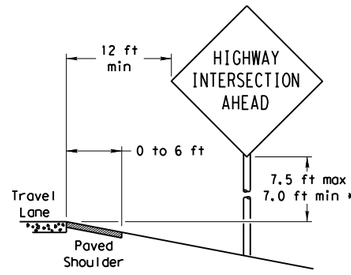
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

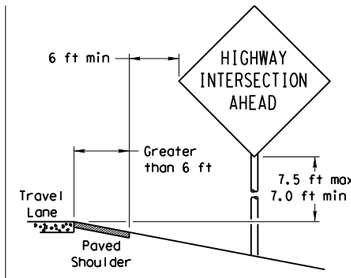
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

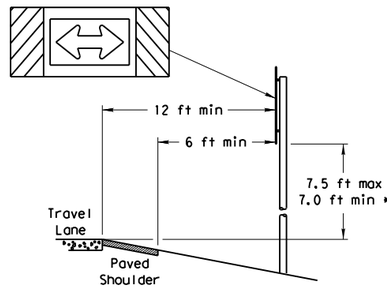
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



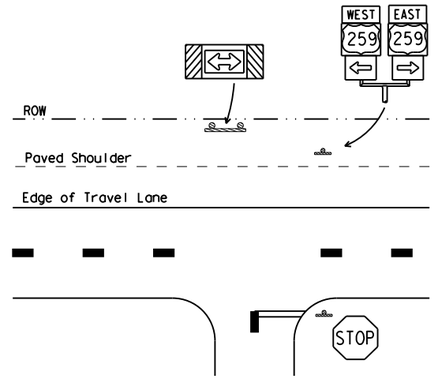
GREATER THAN 6 FT. WIDE

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.

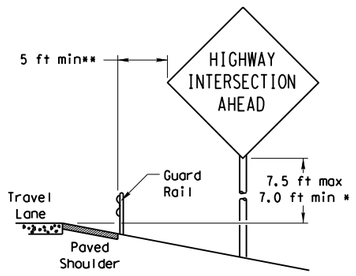
T-INTERSECTION



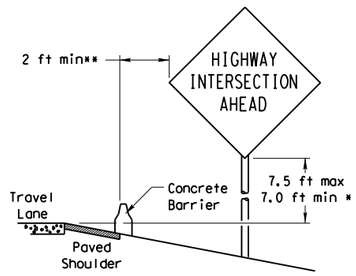
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



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:

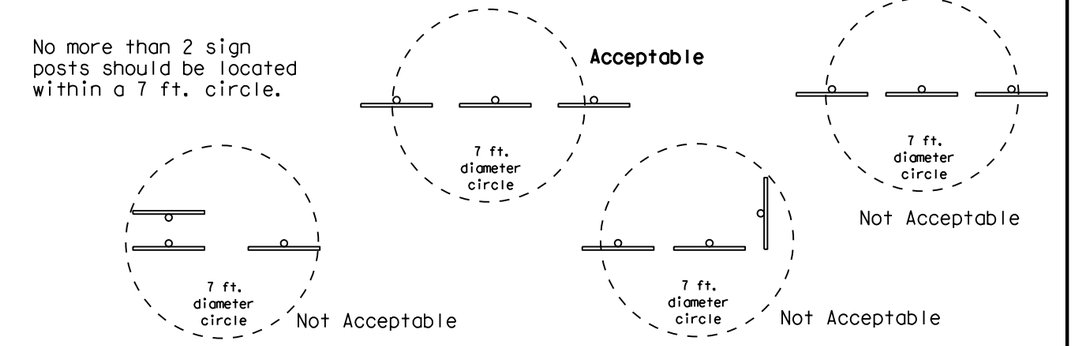
(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(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.

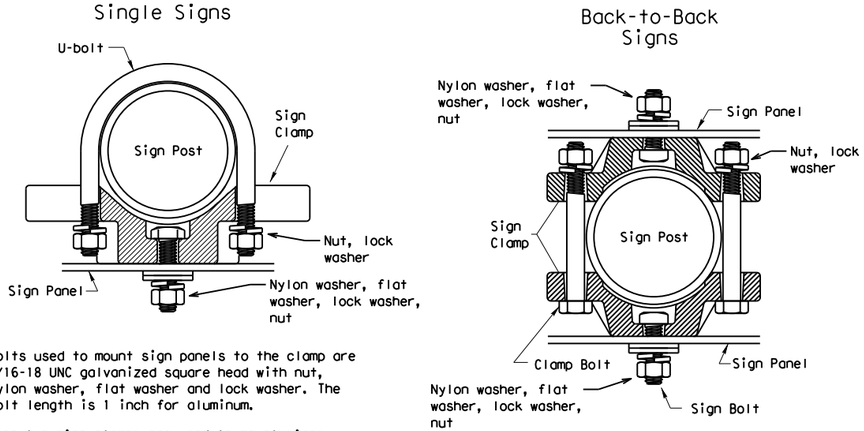
The maximum values may be increased when directed by the Engineer.

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



TYPICAL SIGN ATTACHMENT DETAIL



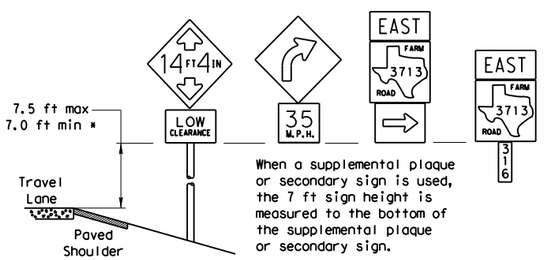
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

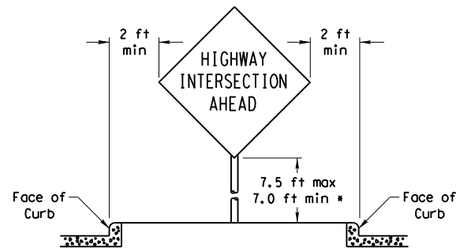
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



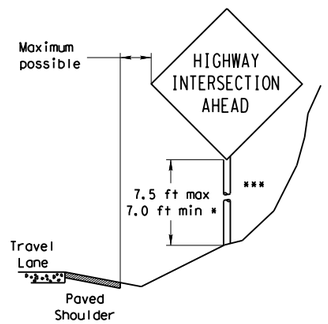
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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

REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

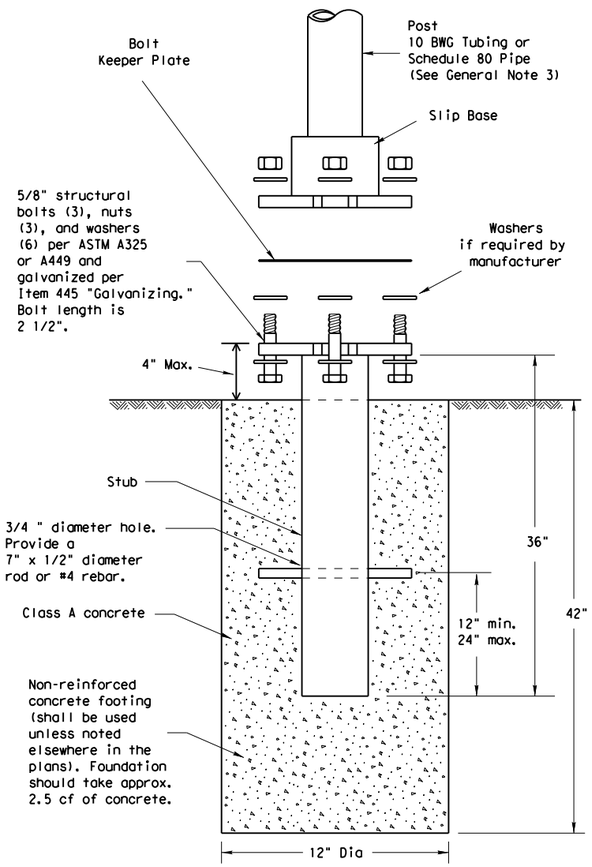
CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84

DIST	COUNTY	SHEET NO.
LBB	LAMB, ETC.	216

DATE:
FILE:

DATE: 9/30/2024 1:27:13 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/8. Traffic/STANDARDS/smdsl.dgn

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.

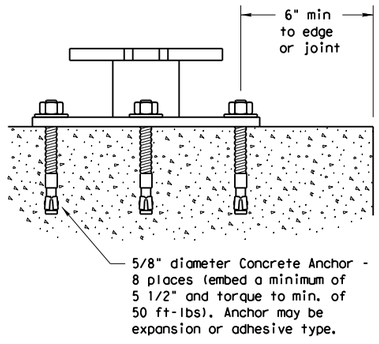
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		217

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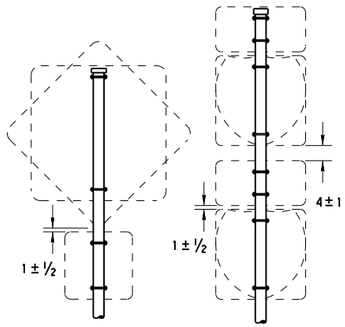
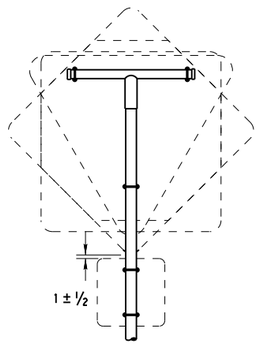


SM RD SGN ASSM TY XXXXX(1)XX(P)



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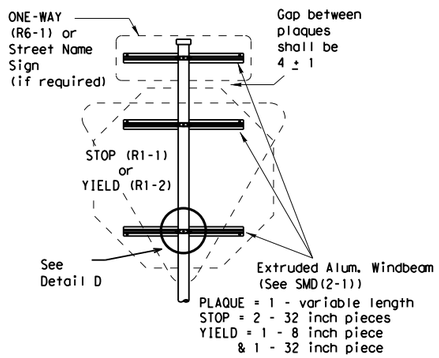

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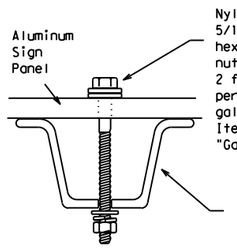
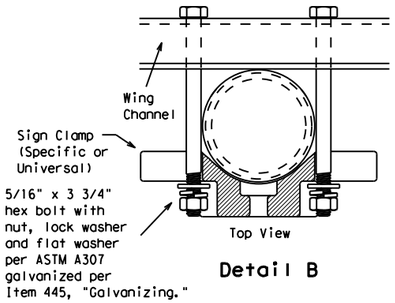
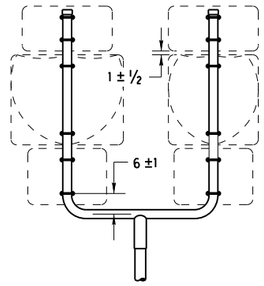


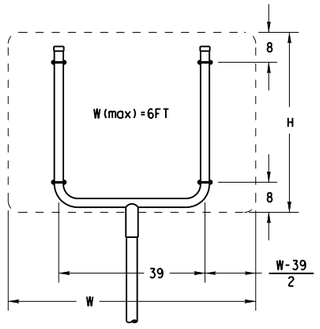
Detail A



Detail B



SM RD SGN ASSM TY XXXXX(1)XX(U)



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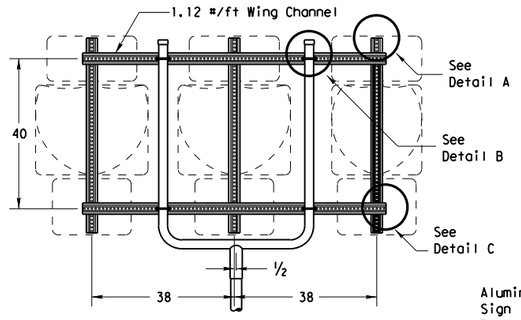
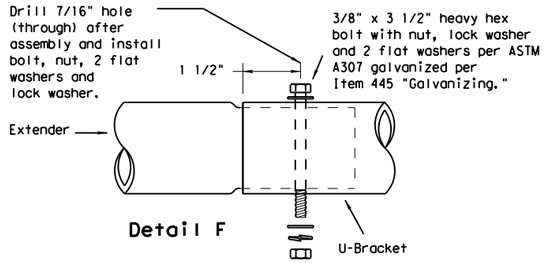
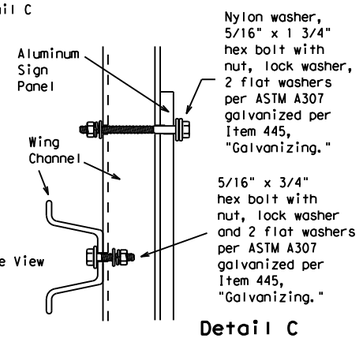


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

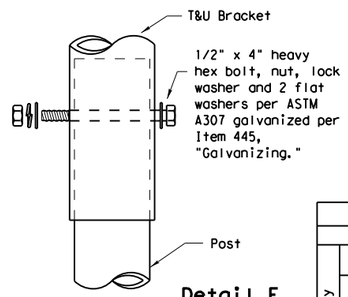


Detail F

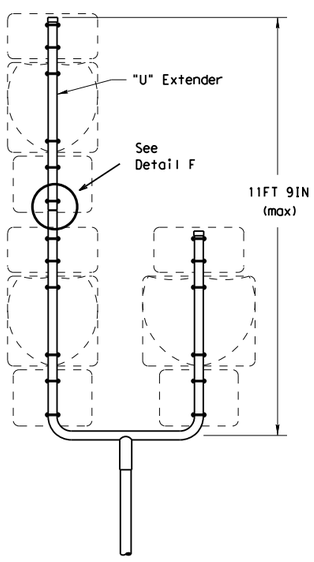
Splices shall only be allowed behind the sign substrate.



Detail C



Detail E



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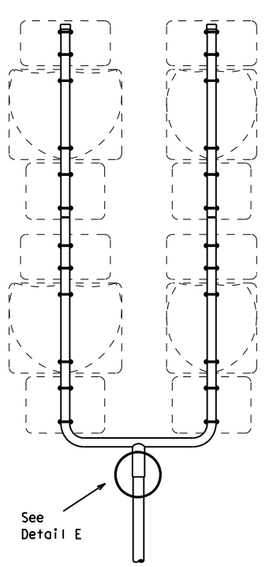

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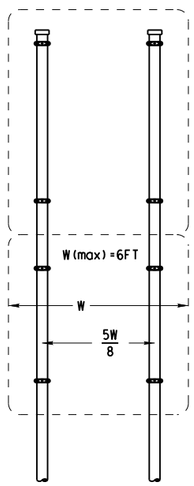
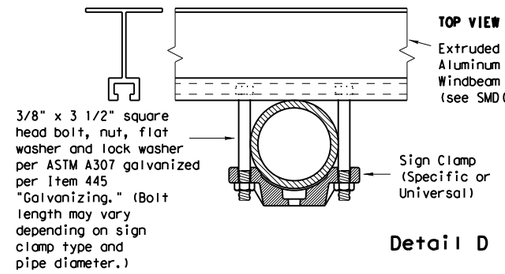
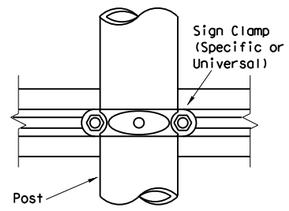


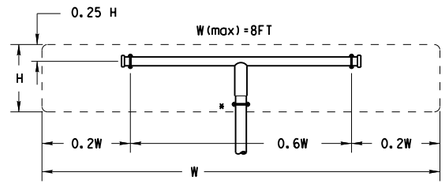
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

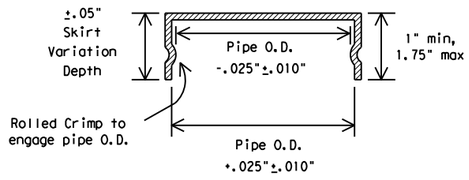




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

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.

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.

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-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		218

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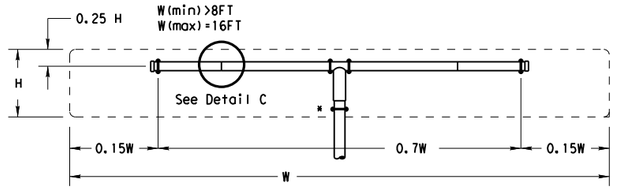
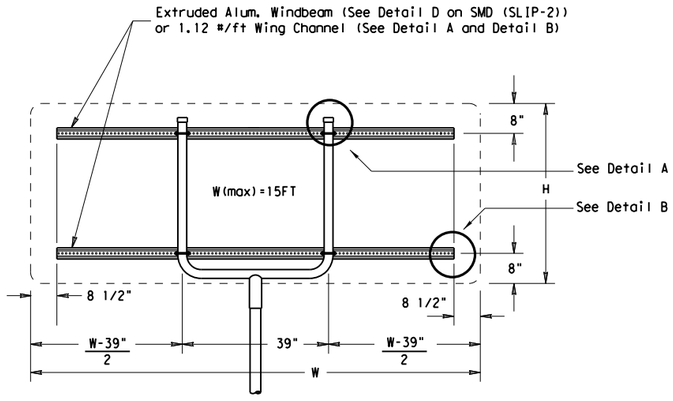
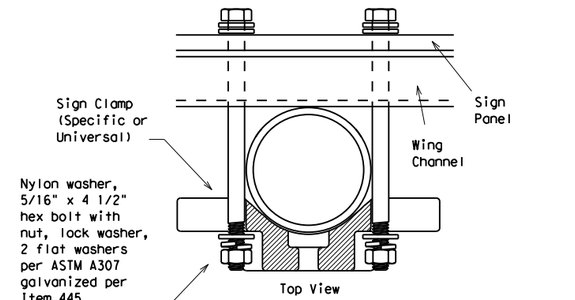


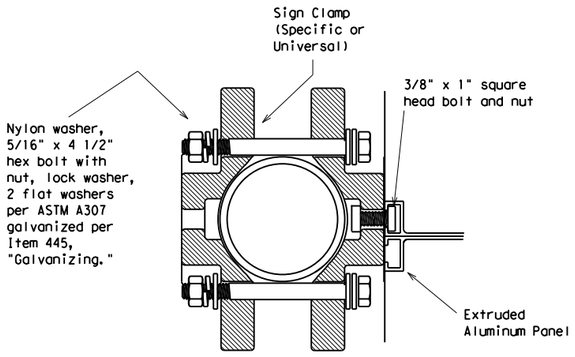
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



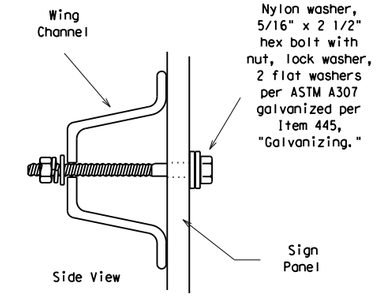
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



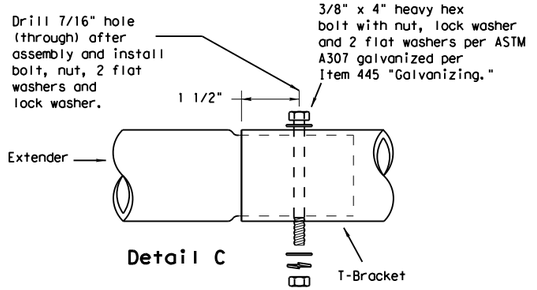
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

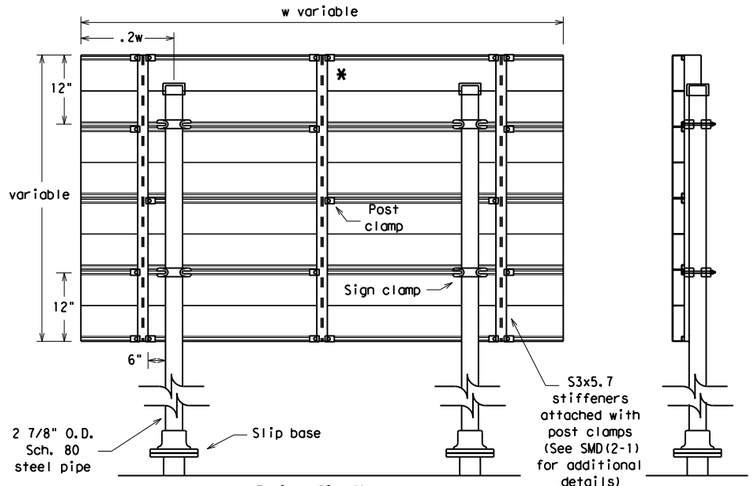


Detail B



Detail C

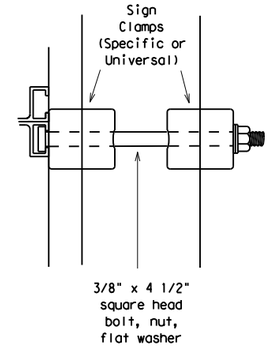
Splices shall only be allowed behind the sign substrate.



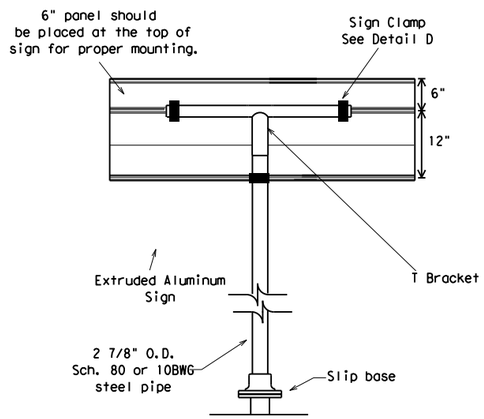
Typical Sign Mount

SM RD SGN ASSM TY S80(2)XX(P-EXAL)

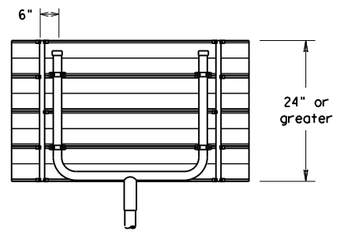
* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.



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. See table above.
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

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
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		219

DATE: 9/30/2024 1:28:13 PM
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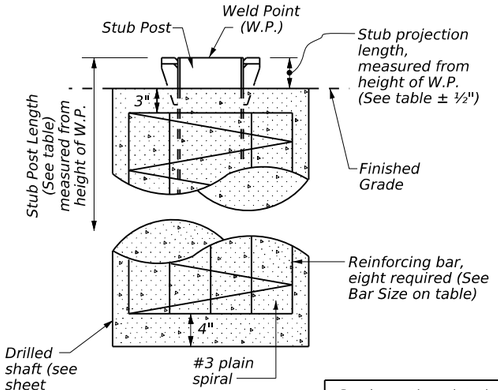
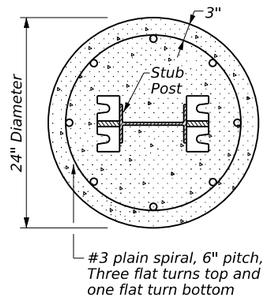
REINFORCED FOUNDATION DETAIL



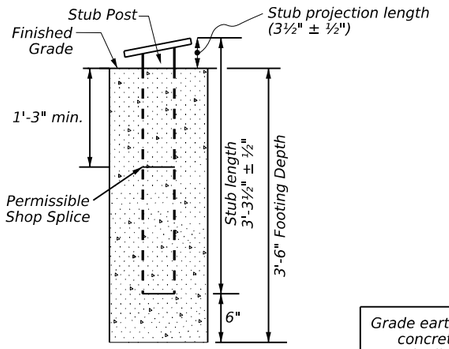
ELEVATION



PLAN

Grade earthwork to be flush with the concrete footing. Slopes shall gradually contour to match plans.

⊛ NON-REINFORCED FOUNDATION DETAIL



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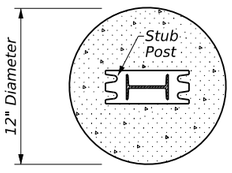


PLAN

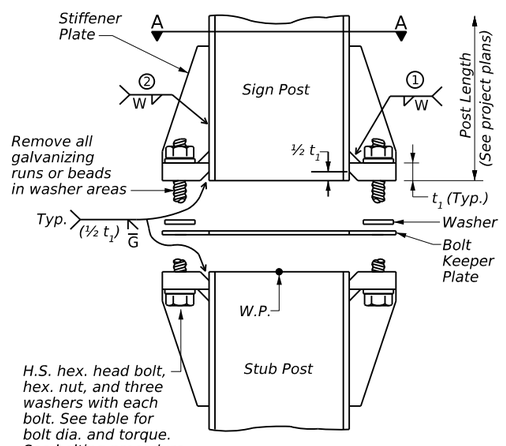
Grade earthwork to be flush with the concrete footing. Slopes shall gradually contour to match plans.

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 to 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.

STRUCTURAL DATA TABLE

DIMENSIONS	BASE CONNECTION										BOLT KEEPER PLATE			FOUNDATION				
Post Size	Bolt Size & Torque	A	B	C	D	E	t_1	t_2	W	R	P	S	U	Stub length	Stub projection	Drill Shaft diameter	Bar Size	Concrete Type
W12x26	¾"Φ x 3½" 740-750 inch pounds 62-63 foot pounds	6"	2¼"	1⅜"	3½"	1¼"	1"	¾"	5/16"	13/32"	15"	1½"	16¾"	3'-0"	2½"	24"	#11	C
W10x22											12⅞"		14⅝"	3'-0"	2½"		#9	
W8x21											11"		12¾"	3'-0"	2½"		#8	
W8x18	⅝"Φ x 2¾" 440-450 inch pounds 36-38 foot pounds	5"	2"	1¼"	2¾"	1⅛"	¾"	½"	¼"	11/32"	10⅝"	1"	12⅛"	2'-6"	3"		#7	
W6x15											8½"		10"	2'-6"	3"		#6	
W6x9											8⅜"		9⅞"	2'-0"	3"		#5	
S4x7.7	½"Φ x 2½" 440-450 inch pounds 36-38 foot pounds	See Sign Post Stub (S4x7.7 and S3x5.7)									See Sign Post Stub (S4x7.7 and S3x5.7)			3'-3½"	3½"	12"	Non-reinforced ⊛	A
S3x5.7																		



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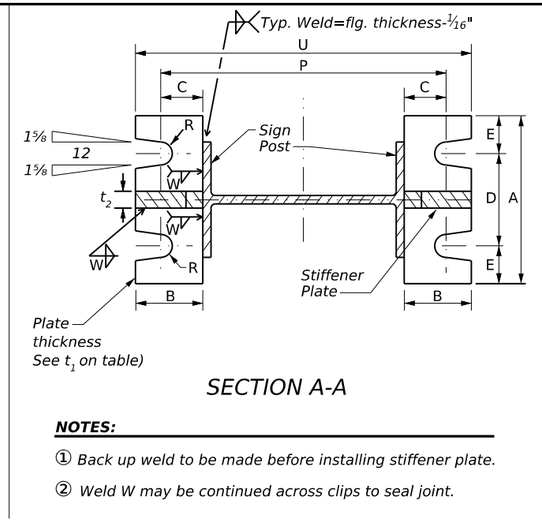
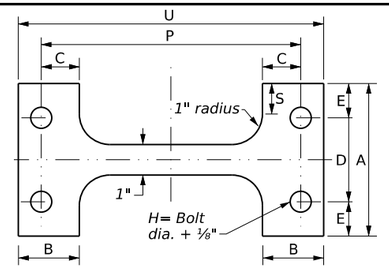


SECTION A-A

NOTES:

① Back up weld to be made before installing stiffener plate.

② Weld W may be continued across clips to seal joint.

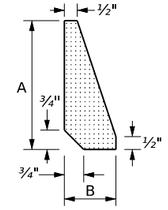


BOLT KEEPER PLATE
30 Ga galv. sheet steel

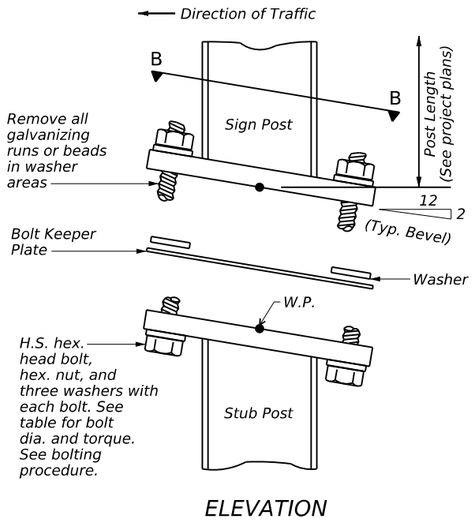
STIFFENER PLATE DETAIL

Steel Plate (thickness = t2)

(See Structural Data Table for dimensions)



SIGN POST AND STUB POST FOR WIDE FLANGE BEAMS (W)



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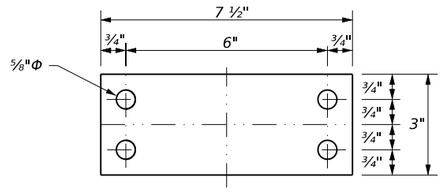
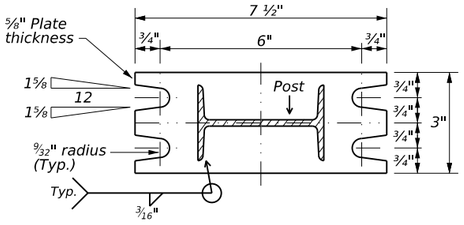
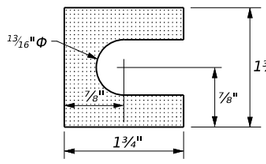


BOLT KEEPER PLATE
30 ga. galv. sheet steel



SECTION B-B

SIGN POST AND STUB POST (FOR S4x7.7 AND S3x5.7)



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.

SHEET: 1 OF 2

Texas Department of Transportation

Traffic Safety Division Standard

SIGN MOUNTING DETAILS LARGE ROADSIDE SIGNS FOUNDATION & STUB

SMD(2-1)-24 (MOD)

FILE: smd(2-1)-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
8-95 5-24 4-98 9-08	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		220

27A

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

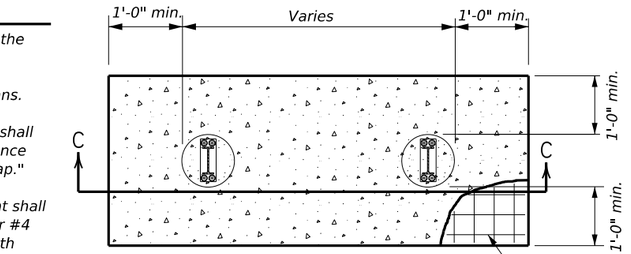
9/30/2024

9/30/2024 1:28:14 PM
pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/8. Traffic/STANDARDS/smd(2-1)-24 (MOD).dgn

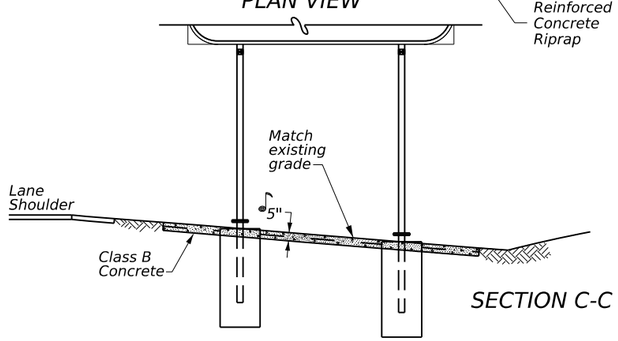
SIGN RIPRAP APRON DETAIL

NOTES:

1. If used, the depth of the apron shall be 5" or as indicated elsewhere on the plans.
2. Reinforced concrete shall be placed in accordance with Item 432, "Riprap."
3. Typical reinforcement shall be #3 @ 12" x 12" or #4 bars @ 18" c.c. in both directions.

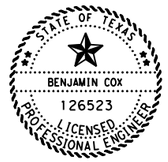


PLAN VIEW



SECTION C-C

MODIFICATION



Benjamin Cox, P.E.

9/30/2024

SHEET: 2 OF 2

Texas Department of Transportation

Traffic Safety Division Standard

SIGN MOUNTING DETAILS LARGE ROADSIDE SIGNS FOUNDATION & STUB

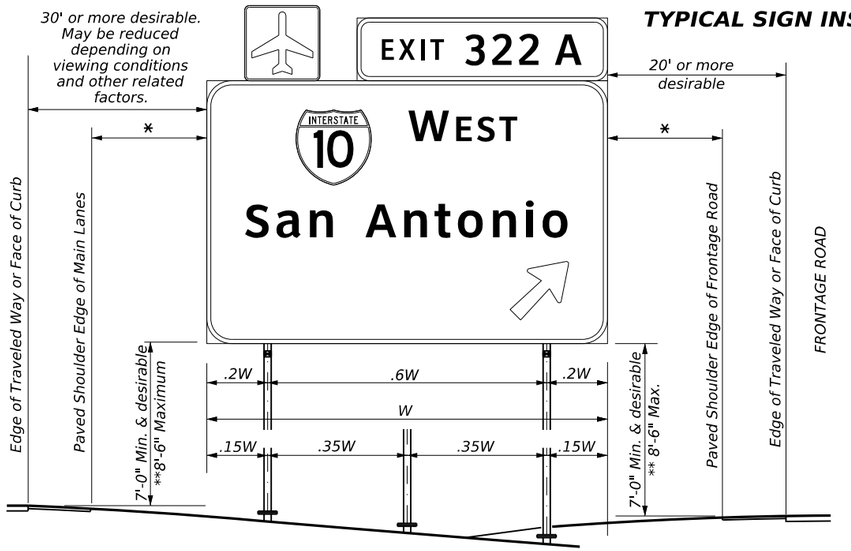
SMD(2-1)-24 (MOD)

FILE: smd(2-1)-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
○TxDOT May 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
8-95 5-24	DIST	COUNTY		SHEET NO.
4-98	LBB	LAMB, ETC.		221
9-08				

27A

DATE: 9/30/2024 1:28:38 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050464 - Design/Plan Set/8. Traffic/STANDARDS/smd(2-2)-24.dgn

TYPICAL SIGN INSTALLATION AND LOCATION



LATERAL CLEARANCE NOTES:

1. Lateral clearances of signs mounted on the median side of the main lanes are the same as shown, where space will permit. Where a sign is to be located behind guardrail, an allowable minimum clearance of 5' may be used, measured from the face of the guardrail to the near edge of sign.
2. * 6' minimum and desirable may be used only in areas of limited lateral clearance and when approved by the Engineer.

POST SPACING NOTES:

1. Post spacing on a two post sign may be varied a maximum of ±10% of the total sign width to fit field conditions.
2. Post spacing on a three post sign may be varied a maximum of ±5% of the total sign width to fit field conditions.

SIGN HEIGHT NOTES:

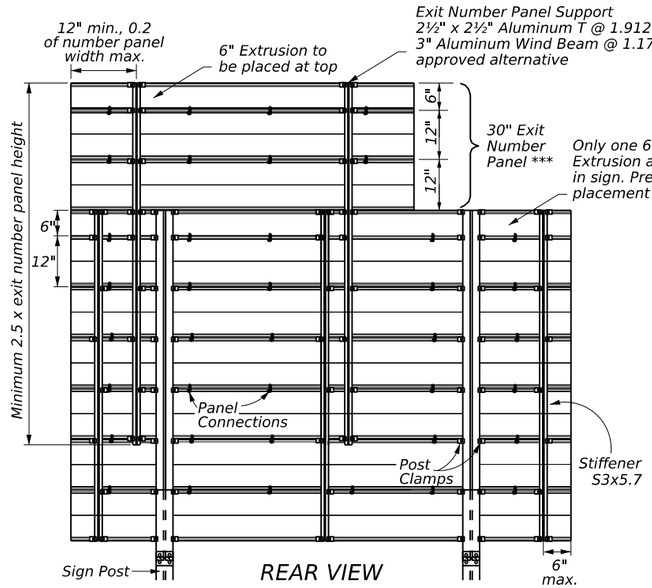
1. ** The 8'-6" maximum may be exceeded when placing signs on extreme slopes. In these conditions, a 7' minimum from natural ground to bottom of sign must be maintained.

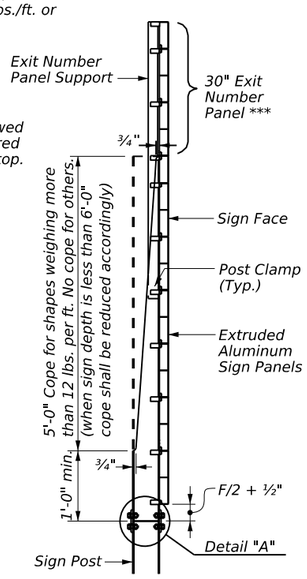
GENERAL NOTES:

1. Exit number panel supports shall be ASTM A36 structural steel galvanized after fabrication, or ASTM B221 aluminum alloy 6061-T6 or approved alternative.
2. In accordance with DMS-7120, High-Strength (H.S.) Bolts, Nuts, and Washers shall be galvanized per ASTM Designation: B695 Class 50, or A153 Class C or D.
3. Posts, parent sign panels, and exit number panels shall comply with notes on sheets SMD(2-1) and SMD(2-3).
4. Signs (such as exit number panels) attached above a parent sign shall be made of the same type material as the parent sign. General Service and Routing sign plaques may be fabricated from flat sheet aluminum.
5. Exit number panel supports and other connection hardware required to fasten exit number panel to parent sign shall be subsidiary to "Aluminum Signs".
6. Signs to be furnished shall be detailed elsewhere in the plans. Refer to the "Typical Sign Requirements" standard for additional information.
7. *** Alternate exit number panel heights may be used, in accordance with the "Standard Highway Sign Designs for Texas (SHSD)."

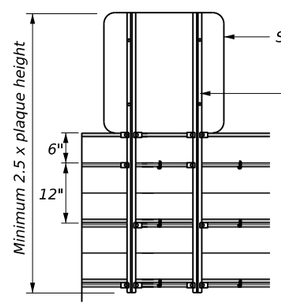
DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN HARDWARE	DMS-7120

ALUMINUM PARENT SIGN & EXIT NUMBER PANEL MOUNTING DETAILS





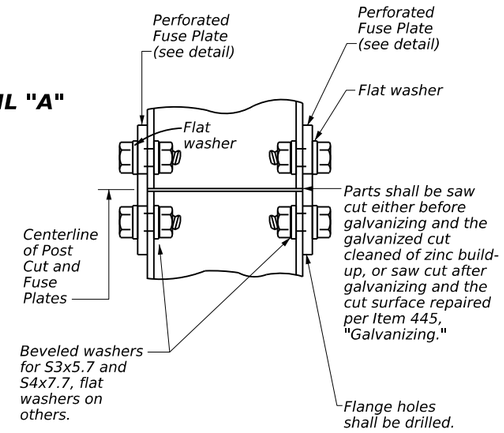
SIGN PLAQUE MOUNTING DETAIL



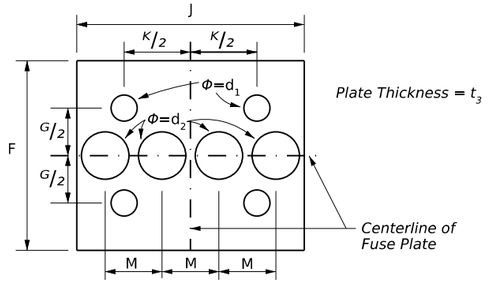
NOTE:

A sign plaque may be mounted to the parent sign or the exit number panel. See TSR(2) for typical plaque placement.

DETAIL "A"



PERFORATED FUSE PLATE DETAIL



NOTE:

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 Plates, contact the Traffic Safety Division.

STRUCTURAL DATA TABLE

DIMENSIONS	PERFORATED FUSE PLATE										
Post Size	F	G	J	K	M	d_1	d_2	t_3	Bolt Dia.	Wt. (ea.) (lbs.)	Bolt length
W12x26	6"	3"	6½"	3½"	1⅜"	13/16"	1 5/16"	½"	¾"	4.47	2¼"
W10x22	6"	3"	5¾"	2¾"	1⅜"	13/16"	1⅛"	½"	¾"	4.03	2¼"
W8x21	5½"	2½"	5¼"	2¾"	1¼"	13/16"	1"	½"	¾"	3.35	2¼"
W8x18	5"	2½"	5¼"	2¾"	1¼"	11/16"	1 1/16"	⅜"	⅝"	2.26	2¼"
W6x15	5"	2½"	6"	3½"	1½"	11/16"	1¼"	⅜"	⅝"	2.51	2¼"
W6x9	4¼"	2"	4"	2¼"	1"	9/16"	¾"	¼"	½"	1.01	1½"
S4x7.7	3¾"	1½"	2⅝"	1½"	⅝"	9/16"	⅜"	¼"	½"	0.60	1½"
S3x5.7											

Texas Department of Transportation

Traffic Safety Division Standard

SIGN MOUNTING DETAILS LARGE ROADSIDE SIGNS EXTRUDED ALUMINUM

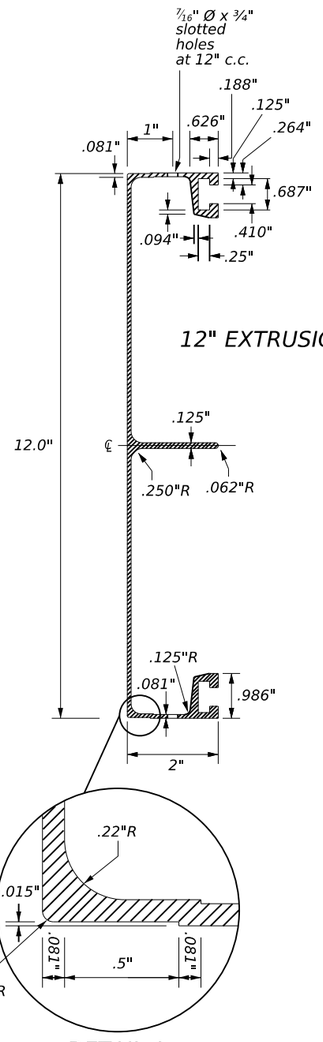
SMD(2-2)-24

FILE: smd(2-2)-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
8-95 9-08 5-24	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		222

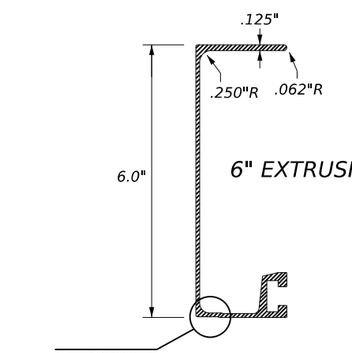
27B

DATE: 9/30/2024 1:29:02 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205048/Sheet Files/smd(2-3)-24.dgn

ALUMINUM SIGN PANEL EXTRUSION DETAILS

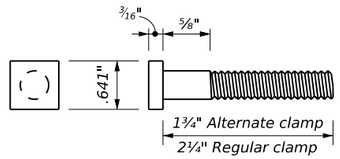


12" EXTRUSION



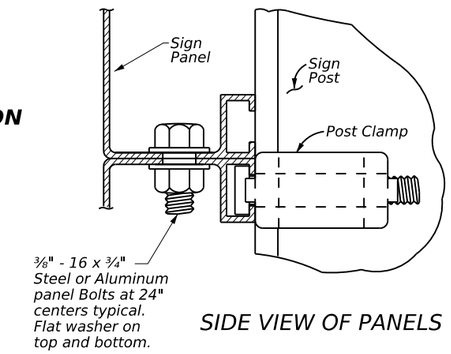
DETAIL A

6" EXTRUSION



POST CLAMP BOLT DETAIL

PANEL CONNECTION DETAIL



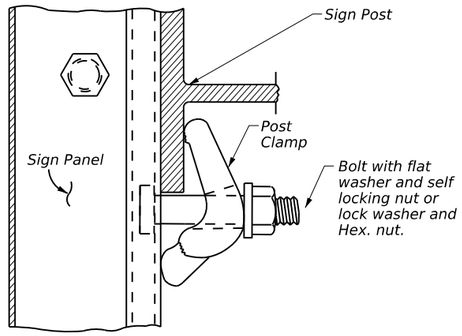
SIDE VIEW OF PANELS

GENERAL NOTES:

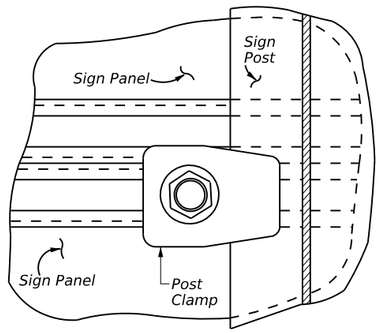
1. Design conforms with the 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals (Large Roadside Signs with a 25-year Mean Recurrence Interval, MRI, and Overhead Signs with a 50-year MRI).
2. Materials and fabrication shall conform to the requirements of the Department Material Specifications.
3. Structural steel shall be "low-alloy steel" for non-bridge structures per Item 442, "Metal For Structures."

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN HARDWARE	DMS-7120

POST CONNECTION DETAIL

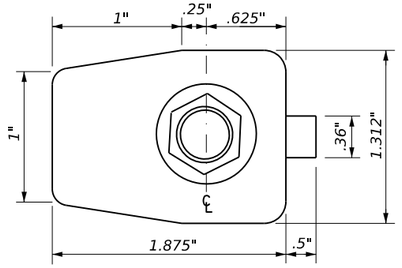


TOP VIEW OF POST

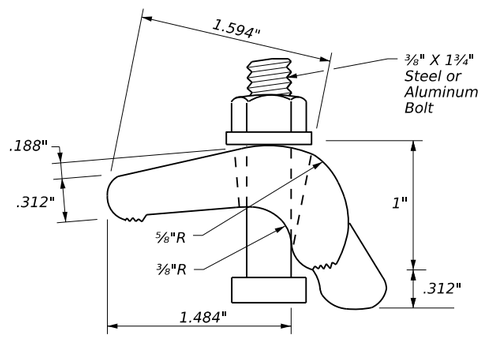


TOP VIEW OF CLAMP

REGULAR POST CLAMP DETAIL



PLAN

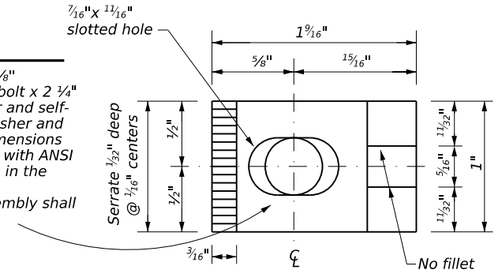


ELEVATION

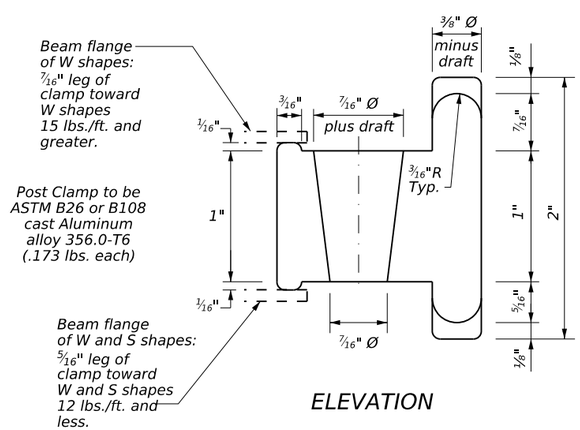
ALTERNATE POST CLAMP DETAIL

NOTE:

Centerline of hole for 3/8" diameter squarehead bolt x 2 ¼" 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.

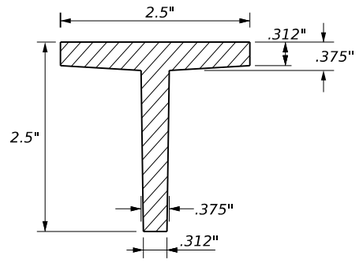


PLAN



ELEVATION

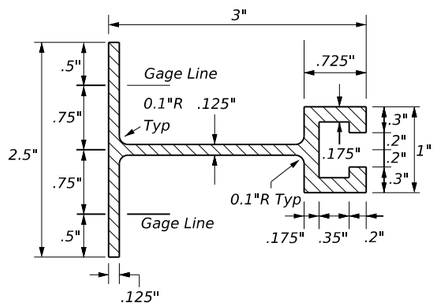
ALUMINUM T SECTION OR APPROVED ALTERNATIVE



1.912 lbs/ft

WINDBEAM CROSS SECTION

Windbeam to be extruded aluminum (1.175 lbs./ft.) or approved alternative



Texas Department of Transportation

Traffic Safety Division Standard

SIGN MOUNTING DETAILS SIGN PANELS & HARDWARE EXTRUDED ALUMINUM

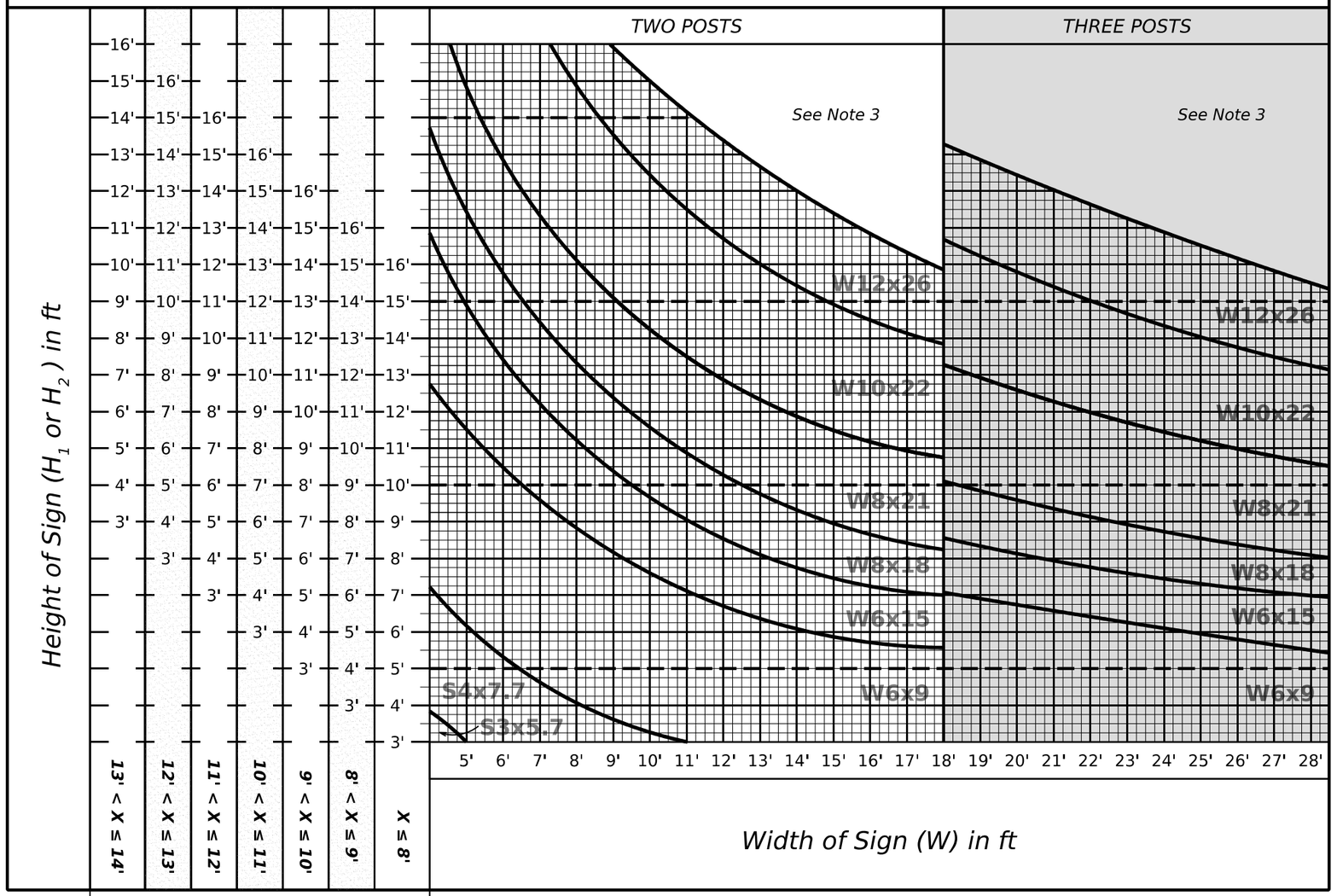
SMD(2-3)-24

FILE: smd(2-3)-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
2001 9-08 5-24	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		223

27C

DATE: 9/30/2024 1:29:27 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/8. Traffic/STANDARDS/smd-lrss-24.dgn

Zone 1 - 90 MPH Wind Chart

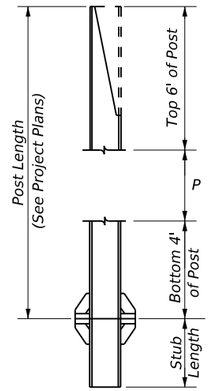


13' < X ≤ 14'	12' < X ≤ 13'	11' < X ≤ 12'	10' < X ≤ 11'	9' < X ≤ 10'	8' < X ≤ 9'	X ≤ 8'

X *= the average height from the ground line to the bottom edge of the sign.*

NOTES:

1. *The Post Weight Data Table shows the weight of a one, two, or three post(s) assembly - (this includes the top 6' and bottom 4' of the post, the foundation stub, related base connection plates and stiffeners, perforated fuse plates, and all high strength bolts, nuts, and washers).*
2. *See the Wind Velocity Worksheet to determine the wind zone for each large roadside sign.*
3. *Sign design falls outside of designed support tolerances - adjust sign height and/or width or sign location. In some cases, two post sign designs may be adjusted and increased to a three post sign design.*



For total post weight add length (P) times post weight per ft. to weight shown in table below.

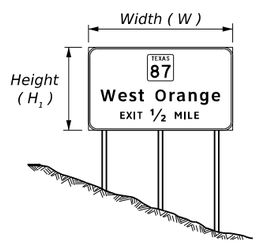
Weight Shown in Table + *P* x *Post Weight per ft.* = *Total Post Weight*

See SOLS (TYG) - Note 5, for example calculation.

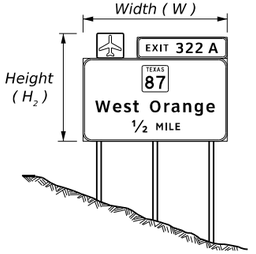
POST WEIGHT DATA

Post Size	Weight of One Post Assembly (lbs)	Weight of Two Post Assembly (lbs)	Weight of Three Post Assembly (lbs)
W12x26*	308.6	617.2	925.8
W10x22*	266.0	532.0	798.0
W8x21*	254.7	509.4	764.1
W8x18*	201.8	403.6	605.4
W6x15*	167.8	335.6	503.4
W6x9*	123.2	246.4	369.6
S4x7.7*	112.2	224.4	336.6
S3x5.7*	85.9	171.8	257.7

** Second number = POST WEIGHT PER FOOT*
(Example: W12X26 weighs 26 pounds/foot of the post length)



OR



NOTE:
If an exit number panel or sign plaque is present, H_2 is to be used when determining post size. H_2 is measured from the bottom of the parent sign to the top of the highest attachment.

SHEET 1 OF 4

Texas Department of Transportation

Traffic Safety Division Standard

LARGE ROADSIDE SIGN SUPPORT POST SELECTION WORKSHEET
Zone 1 - 90 MPH
SMD(LRSS-1)-24

FILE: lrss-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
7-78 9-08 1-82 5-24 5-01	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		224

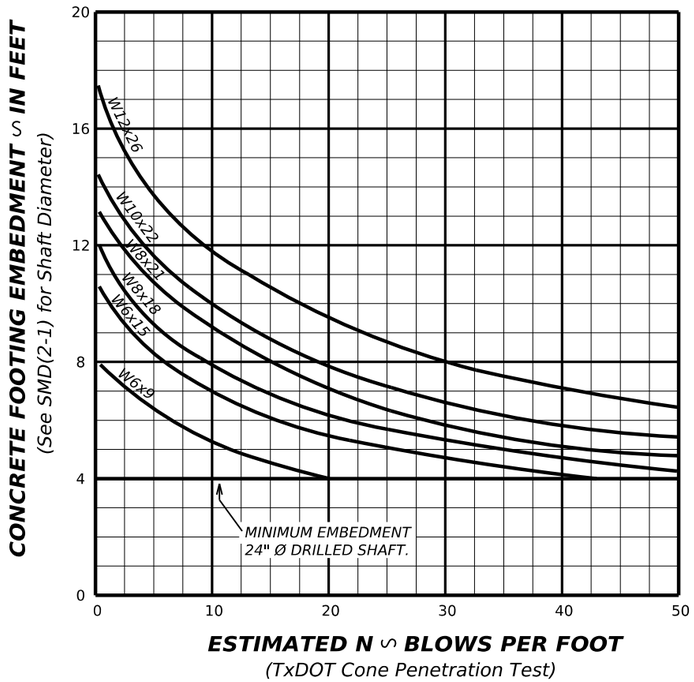
29A

DATE: 9/30/2024 1:29:28 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/8. Traffic/STANDARDS/smd-lrss-24.dgn

DRILLED CONCRETE FOOTING DEPTH CHART

(TxDOT PENETROMETER DESIGN)

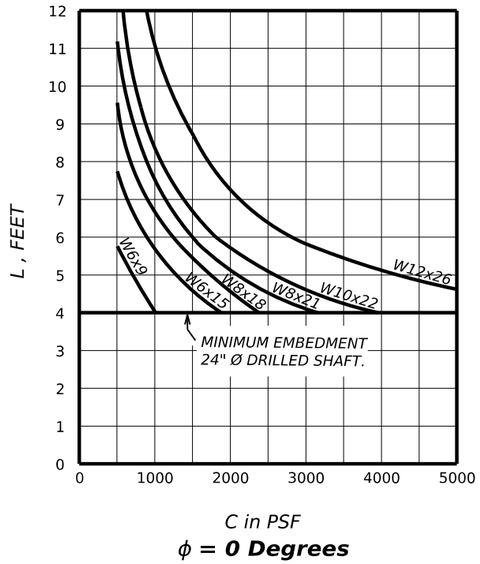
The estimated N value should be based at approximately the upper one-third point of the drilled concrete footing below the ground line.



GENERAL NOTES:

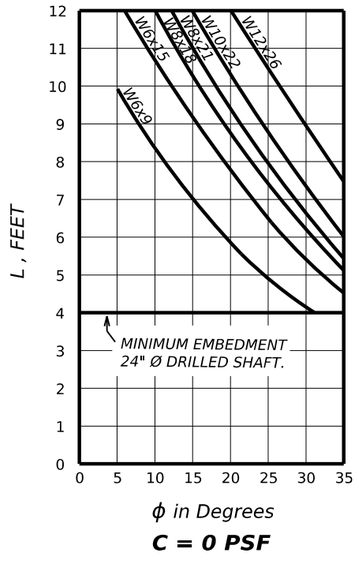
1. Curves shown on this sheet are applicable for reinforced concrete footings only.
2. Reinforced concrete footings shall use class C concrete.
3. Footings for S3x5.7 and S4x7.7 post sizes shall be non-reinforced and use class A concrete. For non-reinforced concrete footings see SMD (2-1).

I



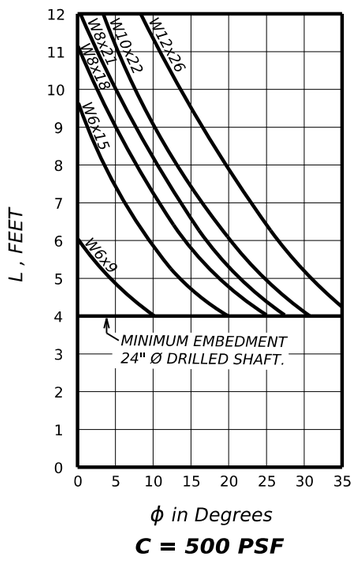
ϕ = 0 Degrees

II



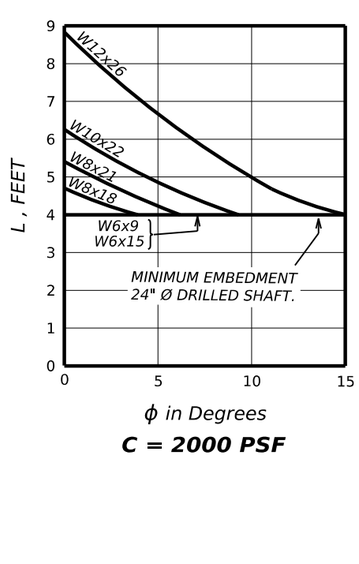
C = 0 PSF

III



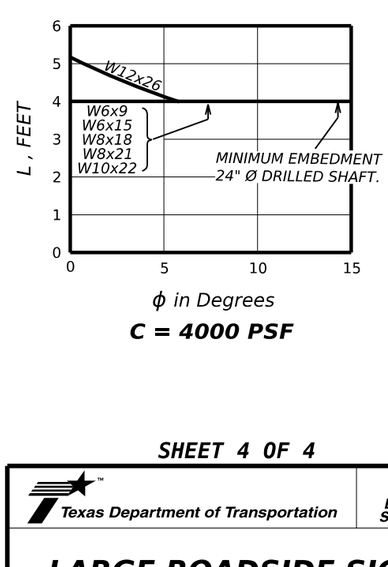
C = 500 PSF

IV



C = 2000 PSF

V



C = 4000 PSF

DRILLED CONCRETE FOOTING DEPTH CHARTS

(COHFRIC DESIGN)

These charts may be used as an alternate to the chart above, provided that soil cohesion and internal friction (cohfric) data are available.

LEGEND

L = Required embedment of concrete drilled shaft, in feet
C = Cohesive shear strength of soil, in psf
ϕ = Angle of internal friction of soil, in degrees

For values of C and ϕ, which are intermediate to those on the charts, embedments may be determined by straight line interpolation.

SHEET 4 0F 4

Texas Department of Transportation

Traffic Safety Division Standard

LARGE ROADSIDE SIGN SUPPORT FOUNDATION WORKSHEET

SMD(LRSS-4)-24

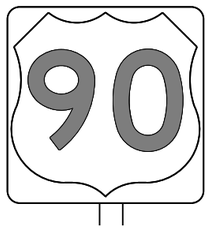
FILE: lrss-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
7-72 9-08 5-74 5-24 4-78	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		225

29D

DATE: 9/30/2024 1:29:51 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/8. Traffic/STANDARDS/tsr3-13.dgn

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

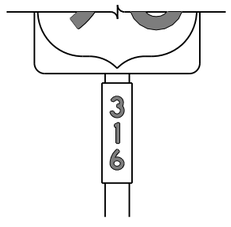
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING

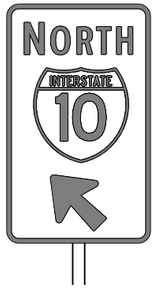


TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING





TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).
4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.
6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

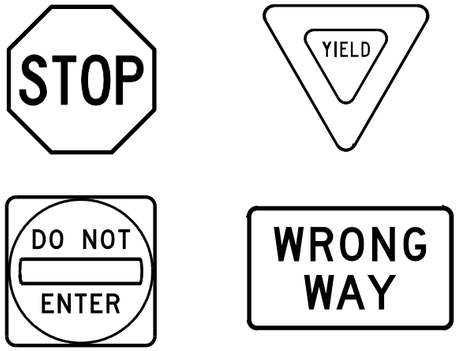
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	LBB	LAMB, ETC.		226

DATE: 9/30/2024 1:30:14 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/8. Traffic/STANDARDS/tsr4-13.dgn

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

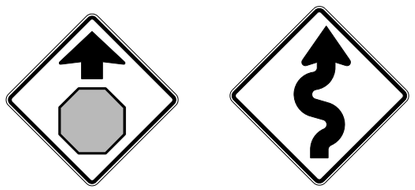
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

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

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

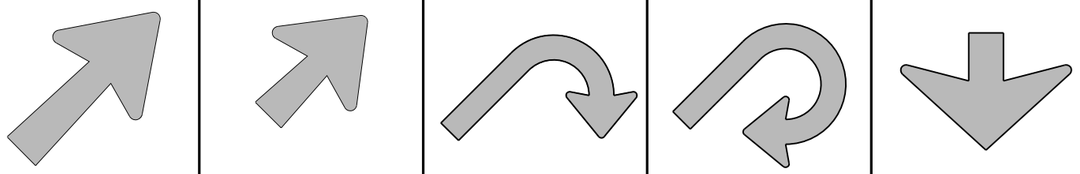
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		227

DATE: 9/30/2024 1:30:37 PM
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/00520504 - Design/Plan Set/8. Traffic/STANDARDS/tsr5-13.dgn

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

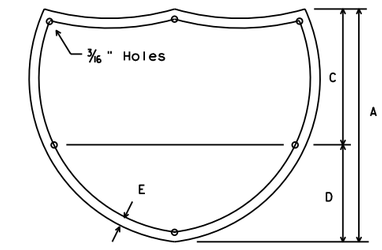
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

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

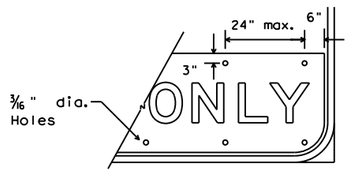
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

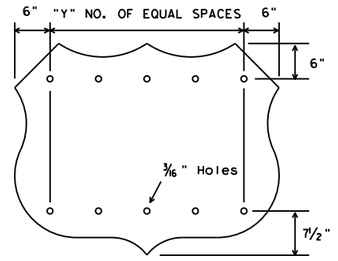


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

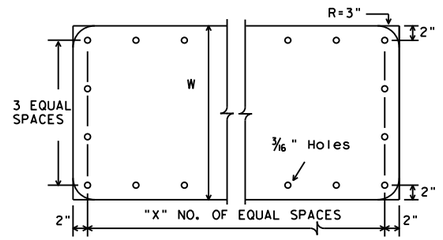


EXIT ONLY PANEL



U.S. ROUTE MARKERS

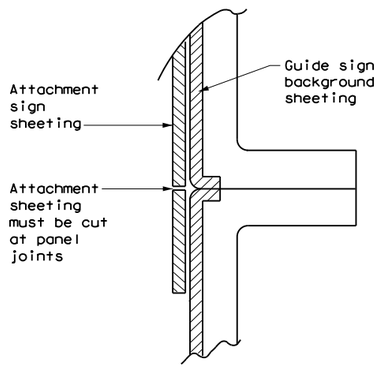
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



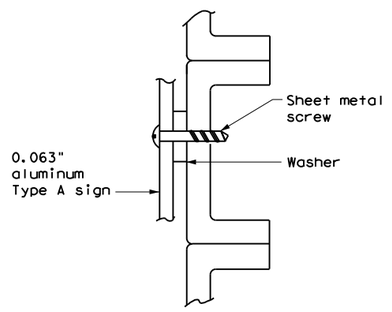
STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

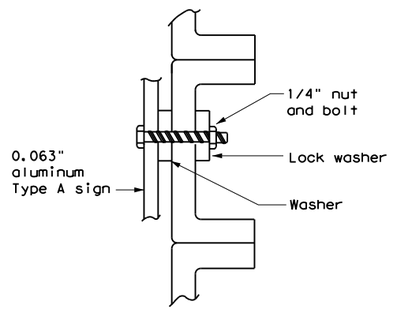
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



DIRECT APPLIED ATTACHMENT



SCREW ATTACHMENT



NUT/BOLT ATTACHMENT

NOTE:

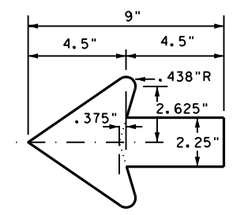
1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".

NOTE:

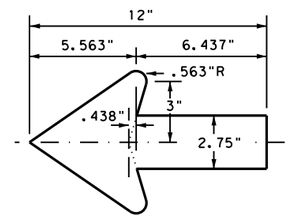
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		228

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

☑ This project is adjacent or parallel work, not within RR ROW:

DOT No.: SEE ATTACHMENT

Crossing Type: SEE ATTACHMENT

RR Company Operating Track at Crossing: SEE ATTACHMENT

RR Company Owning Track at Crossing: SEE ATTACHMENT

RR MP: SEE ATTACHMENT

RR Subdivision: SEE ATTACHMENT

City: SEE ATTACHMENT

County: SEE ATTACHMENT

CSJ at this Crossing: SEE ATTACHMENT

Scope of Work, including any TCP, to be performed by State Contractor:

Roadway milling, thin overlay mixture, cable barrier installation, pavement repair, and bridge rail replacement.

Scope of Work to be performed by Railroad Company:

NONE

II. FLAGGING & INSPECTION

No. of Days of Railroad Flagging Expected: 0

On this project, night or weekend flagging is:

☐ Expected

☑ Not Expected

Flagging services will be provided by:

☐ Railroad Company: TxDOT will pay flagging invoices. Flagging Agreement with Railroad will be needed

☐ Outside Party: Contractor will pay flagging invoices to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30-day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

☐ **UPRR** UP.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
UP.request@nrssinc.net
Call Center 877-984-677

☐ **BNSF** BNSFinfo@railprosfs.com
Call Center 877-315-0513, Select #1 for flagging

☐ **KCS** KCS.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
Bottom Line On-Track Safety Services
bottomline076@aol.com, 903-767-7630

☐ OTHERS:

Contractor must incorporate Construction Inspection into anticipated construction schedule.

☑ Not Required

☐ Required. Contact Information for Construction Inspection:

III. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

☐ Required. Railroad Point of Contact: _____

☑ Not Required

Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.

IV. RAILROAD INSURANCE REQUIREMENTS

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies and corresponding certificates of insurance must be issued by the contractor on behalf of the Railroad. Separate insurance policies and certificates are required when more than one Railroad Company is operating on the same right of way, or when several Railroad Companies are involved and operate on their own separate right of ways.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Escalated Limits	
Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
Commercial General Liability	$2,000,000 / $4,000,000
Business Automobile	$2,000,000

Railroad Protective Liability Limits	
☑ Not Required	
☐ Non - Bridge/Typical Maintenance Projects. Includes repairs to overpass/underpass and culvert structures	$2,000,000 / $6,000,000
☐ Bridge Structure Projects. Includes new construction or replacement of overpass/ underpass structures	$5,000,000 / $10,000,000
☐ Other: _____	

V. CONTRACTOR'S RIGHT OF ENTRY (CROE)

☑ Not Required

☐ Required: UPRR Maintenance Consent Letter. TxDOT to assist

☐ Required: TxDOT to assist in obtaining the UPRR CROE

☐ Required: Contractor to obtain

- ☐ BNSF: _____
  https://bnsf.railpermitting.com
- ☐ KCS
  https://jllrpg.360works.com/fmi/webd/rpo_web_kcs.fmp12
- ☐ Other Railroads: _____

To view previously approved CROE templates agreed upon between the State and Railroad, see: https://www.txdot.gov/business/resources/railroad-highway-crossing/sample-right-of-entry-agreements.html

Approved CROE templates are not to be modified by the Contractor.

Contractor shall not operate within Railroad Right of Way without an executed Construction & Maintenance Agreement between the State and the Railroad and an executed CROE between the Contractor and the Railroad if required on project.

VI. RAILROAD COORDINATION MEETING

A Railroad Coordination Meeting is required. See item 5, Article 8.1, of the Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges Manual for more details.

VII. RAILROAD SAFETY ORIENTATION

A. Complete the Railroad's course "Orientation for Contractor's Safety," and maintain registration prior to working on the Railroad's property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

UPRR, BNSF, KCS/TEXMEX will not accept on-track safety training certificates from other Railroads. Refer to each Railroad's specific contractor right of entry for training information.

Know and follow the Contractor's Right of Entry Agreement EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are subject to the same insurance requirements as the Prime Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency

Call: BNSF RAILROAD EMERGENCY LINE

Railroad Emergency Line at: 800-832-5452

Location: DOT 017379R, ETC.

RR Milepost: 0590.012

Subdivision: PLAINVIEW

RRD Review Only

Initials: _____

Date: 04/17/2024

Texas Department of Transportation — Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: rr-scope-of-work.pdf		DN: TxDOT	CK:	DW:		CK:
© TxDOT June 2014		CONT	SECT	JOB		HIGHWAY
REVISIONS		0052	05	046		US 84
3/2023		DIST	COUNTY			SHEET NO.
		LBB	LAMB			229

DOT#	CROSSING TYPE	TRACK OWNER	TRACK OPERATOR	RR MP	SUBDIVISION	CITY	COUNTY	CSJ	TRAINS PER DAY	SWITCHING MOVEMENTS	% OF WORK
014887V	PUBLIC	BNSF	BNSF	56.613	SLATON	LITTLEFIELD	LAMB	0052-05-046, 0052-05-048	8	0	1
014889J	PUBLIC	BNSF	BNSF	58.077	SLATON	LITTLEFIELD	LAMB	0052-05-046, 0052-05-048	8	0	1
*014891K	PUBLIC	BNSF	BNSF	60.876	SLATON	ANTON	LAMB	0052-05-046, 0052-05-048	8	0	1
014892S	PUBLIC	BNSF	BNSF	62.244	SLATON	ANTON	LAMB	0052-05-046, 0052-05-048, 0052-05-049	8	0	1
014893Y	PUBLIC	BNSF	BNSF	63.560	SLATON	ANTON	LAMB	0052-05-046, 0052-05-048, 0052-05-049	8	0	1

DOT#	CROSSING TYPE	TRACK OWNER	TRACK OPERATOR	RR MP	SUBDIVISION	CITY	COUNTY	CSJ	TRAINS PER DAY	SWITCHING MOVEMENTS	% OF WORK
014903C	PUBLIC	BNSF	BNSF	71.686	SLATON	ANTON	LUBBOCK	0052-07-068	8	0	1
014907E	PUBLIC	BNSF	BNSF	74.272	SLATON	SHALLOWATER	LUBBOCK	0052-07-068	8	0	1
*014908L	PUBLIC	BNSF	BNSF	75.707	SLATON	SHALLOWATER	LUBBOCK	0052-07-068	8	0	1

*WORK WILL ENCROACH UPON R.O.W.

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS
BNSF Crossings

SHEET 2 OF 2
ATTACHMENT SHEET

FILE: RSOW.dgn	DN: TxDOT	CK:	DW:	CK:
© TxDOT June 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		230

PART 1 - GENERAL

1.01 DESCRIPTION

This project includes construction work within the right of way and/or properties of the Railroad and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right of Way or when impacting current or future Railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT Standard Specifications, Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

For purposes of this project, the Railroad Designated Representative is the person or persons designated by the Railroad Manager of Industry and Public Projects to handle specific tasks related to the project.

1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right of Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right of Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

1.03 PLANS / SPECIFICATIONS

TxDOT has received written Railroad approval of the plans and specifications for this project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad website or by contacting the Railroad Designated Representative.

PART 3 - CONSTRUCTION

3.01 GENERAL

A. Perform all work in compliance with all applicable Railroad, Federal Railroad Administration (FRA), and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.

B. Construction activities within 15 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 15 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.

C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.

D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with Railroad approval.

E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.

F. Railroad requirements do not allow work within 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment. Additional allowances may be pursued as outlined in 3.02 and 3.03.

G. All permanent clearances shall be verified before project closing.

3.02 RAILROAD OPERATIONS

A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.

B. All railroad tracks within and adjacent to the contract site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.

C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:

1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a railroad flag person will be required. At the direction of the railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.

2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. Railroad flag persons will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

A. Do not perform any work within Railroad Right of Way without a valid executed Right of Entry Agreement if required on this project.

B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right of Way and observe the Railroad's rules and regulations with respect thereto.

C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.15 for railroad flagging requirements.

D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request:
1. Exactly what the work entails.
2. The days and hours that work will be performed.
3. The exact location of work, and proximity to the tracks.
4. The type of window requested and the amount of time requested.
5. The designated contact person.

Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.

E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

3.04 INSURANCE

Do not begin work upon or over Railroad Right of Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right of Entry Agreement", and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

3.05 RAILROAD SAFETY ORIENTATION

A. Complete the railroad course "Orientation for Contractor's Safety", and maintain current registration prior to working on railroad property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

"UPRR, BNSF, KCS/TEXMEX will not accept on-track safety training certificates from other railroads. Refer to Railroad specific contractor right of entry for training information."

B. Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

3.06 COOPERATION

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right of Way in performing the work.

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

Abide by the following minimum temporary clearances during the course of construction:
A. 15' - 0" (BNSF)(UPRR)and 14'-0" (KCS) horizontal from centerline of track
B. 22' (KCS) and 21' - 6" (UPRR & BNSF) vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Operating Unit review and approval.

3.08 APPROVAL OF REDUCED CLEARANCES

A. Maintain minimum track clearances during construction as specified in Section 3.07.

B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.

C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		231

3.09 MAINTENANCE OF RAILROAD FACILITIES

A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right of Way and repair any other damage to the property of the Railroad, or its tenants.

B. Perform all such maintenance and repair of damages due to the Contractors's operations at Contractor's expense.

C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the project site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
   1. Pre-construction meetings.
   2. Pile driving/drilling of caissons or drilled shafts.
   3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
   4. Erection of precast concrete or steel bridge superstructure.
   5. Placement of waterproofing (prior to placing ballast on bridge deck).
   6. Completion of the bridge structure.

B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.

C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.11 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad at expense of TxDOT to protect Railroad facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.

B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other railroad facilities may be subject to settlement or movement.

C. During any clearing, grubbing, excavation or grading in proximity to railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger railroad facilities or operations.

D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.

E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.12 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOT. This work by the Railroad will be done by its own forces and it is not a part of the Work under this Contract.

3.13 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around railroad facilities with the Railroad Designated Representative.

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".

B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

   UPRR 1-800-336-9193
   7:00 AM to 9:00 PM CST Monday-Friday except holidays,
   staffed 24 hrs/day for emergencies
   48 hrs notice required

   BNSF 1-800-533-2891
   24 hour number
   5 working days notice required

   KCS 1-800-344-8377
   Texas One Call, a 24 hour number
   48 hrs notice required, excluding weekends and holidays

   If a telecommunications system is buried anywhere on or near railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near railroad property. Refer to the project General Notes for additional information.

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of 1/4 inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.15 RAILROAD FLAGGING

Per the Right of Entry Agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor's work and at least 30 working days in advance of any Contractor's work in which any person or equipment will be within 25 feet of nearest rail or as specified in the Contractor Right of Entry (CROE).

3.16 CLEANING OF RIGHT-OF-WAY

When work is complete, remove all tools, implements, and other materials brought into Railroad Right of Way and leave the right of Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

Texas Department of Transportation — Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		232

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

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

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):

0052-05-046, 0052-05-048, 0052-05-049, 0052-07-068

1.2 PROJECT LIMITS:

From: North SL 430 (Littlefield)

To: South SL 388 (Shallowater)

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 33°56'50.88" N ,(Long) 102°21'38.69" W

END: (Lat) 33°40'32.32" N ,(Long) 101°59'00.18" W

1.4 TOTAL PROJECT AREA (Acres): 519.36

1.5 TOTAL AREA TO BE DISTURBED (Acres): 56.59

1.6 NATURE OF CONSTRUCTION ACTIVITY:

Restoration consisting of roadway milling, overlay, cable barrier, pavement repair, and bridge rail replacement.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Estacado clay loam, 0-1% slopes	85% Estacado soils, well drained, negligible runoff class, slight erosion hazard
Portales loam, 1-3% slopes	85% Portales soils, well drained, negligible runoff class, slight erosion hazard
Amarillo fine sandy loam, 0-1% soils	90% Amarillo soils, well drained, negligible runoff class, slight erosion hazard

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

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

☐ PSLs determined during preconstruction meeting
☒ PSLs determined during construction
☐ No PSLs planned for construction

Type	Sheet #s

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

1.9 CONSTRUCTION ACTIVITIES:

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

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

1.10 POTENTIAL POLLUTANTS AND SOURCES:

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

1.11 RECEIVING WATERS:

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

Tributaries	Classified Waterbody
Yellow House Draw, North Fork Double Mountain Fork Brazos River, Buffalo Springs Lake, Lake Ransom Canyon	* Double Mountain Fork Brazos River (1241); impaired for bacteria
NO TDMLS or I PLANS	

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☐ Submit NOI/CSN to local MS4
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other:
☐ Other:

NOTE: Environmental Documentation shall be uploaded to Site Manager and Projectwise within 7 calendar days per CGP Part III.E.

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☐ Submit NOI/CSN to local MS4
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other:
☐ Other:

NOTE: Environmental Documentation must be readily available

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity
NONE

LBB DISTRICT ADVISEMENT:Within the project area there area identified Waters of the United States (W.O.T.U.S). Please review the EPIC for any applicable permits, best management practices, or environmental commitments that may apply. Listed Below are the identified WOTUS(s) in the project limits:

Yellowhouse Draw

LBB DISTRICT NOTE:
Concrete truck wash-out is allowed if the following are provided:
a) wash-out of concrete trucks to surface waters in the state, including storm sewer drains and inlets is prohibited.
b) washout shall be to a structural control
c) the direct discharge of wash-out water is prohibited at all times
d) the discharge shall not contribute to groundwater contamination
e) wash-out areas must be shown on the site map;
f) wash-out pits shall be bermed and lined with plastic

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9/30/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3) OVER 1 ACRE

July 2023 Sheet 1 of 3

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			233
STATE	STATE DIST.	COUNTY	
TEXAS	LBB	LAMB	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	046	US 84

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

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

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

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☒ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- ☐ ☐ Permanent Planting, Sodding or Seeding
- ☒ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☒ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☒ ☐ Sandbag Berms
- ☐ ☐ Sediment Control Fence
- ☒ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

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

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - ☐ Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☒ Required (>10 acres), but not feasible due to:
    - ☒ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

2.3 PERMANENT CONTROLS:

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

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
N/A		

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☒ Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☒ Loaded haul trucks to be covered with tarpaulin
- ☒ Stabilized construction exit
- ☒ Daily street sweeping
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☒ Chemical Management
- ☒ Concrete and Materials Waste Management
- ☒ Debris and Trash Management
- ☒ Dust Control
- ☒ Sanitary Facilities
- ☒ Other: LIDDED DUMPSTER (Part III.G.4.c in CGP)

Litter and Construction Debris:
Storage of construction and waste materials on-site shall be temporary. The project contractor shall establish a schedule for the regular removal of litter and construction debris: the schedule shall be approved by the project engineer; and, once approved, implemented by the contractor. As needed. The project engineer shall direct the contractor to establish good housekeeping measures consistent with the TCEQ's Construction General Permit.

2.6 VEGETATED BUFFER ZONES: NONE

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

Type	Stationing	
	From	To
N/A		

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

NOTE: Discharges from dewatering activities are prohibited unless managed by appropriate controls per the CGP. Part III.G.3

2.8 DEWATERING:

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

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

When dewatering activities are present, a daily inspection will be conducted once per day during those activities and documented in accordance with CGP and TxDOT requirements.

2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

Inspection of Controls:
Lubbock District: an Informal Inspection of controls shall occur every work day; a formal inspection of controls accompanied by an inspection report using Form 2118 shall occur every seven calendar days. Inspectors must inspect disturbed areas that have not been finally stabilized, areas that are used for storage of materials and that are exposed to rain. discharge locations and structural controls for evidence of, or the potential for. pollutants entering the drainage system. The SWP3 must be modified based on the results of Inspections to better control pollutants In runoff. Revisions to the SWP3 must be completed within seven calendar days following inspection. If existing BMPs are modified or if additional BMPs are necessary, an implementation schedule must be described In the SWP3 and wherever possible those changes implemented before the next storm event.

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9/30/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3) OVER 1 ACRE

July 2023 Sheet 2 of 3

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			234
STATE	STATE DIST.	COUNTY	
TEXAS	LBB	LAMB	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	046	US 84

DESCRIPTION OF BMPs USED TO MINIMIZE POLLUTION IN RUNOFF:

EROSION AND SEDIMENT CONTROLS: If it is necessary to pump water, BMP's shall be used to reduce the off-site transport of sediment. BMP's shall be installed per the manufacturer specifications or as directed by the Engineer.

GENERAL SCHEDULE FOR IMPLEMENTATION OF SW3P CONTROLS:

CONTROL	IMPLEMENTATION SCHEDULE AND DESCRIPTION	REMOVAL SCHEDULE
general, various controls	control measures are to be provided at a time and in a manner that will minimize impacts to receiving waters	at final stabilization; at the resumption of construction (temporary measures); at the direction of the SW3P plan; at the direction of the project manager
rock filter dams	to be installed prior to soil disturbing activities in the surrounding areas	at final stabilization or as directed by the project engineer
sandbag berms	to be installed prior to the start of construction; sandbag berms are to serve as water velocity dissipaters, as ditch blocks, as sedimentation basins, in support of other control devices, and as a final multiple control for water leaving the construction zone	at final stabilization or as directed by the project engineer
silt fence	silt fence will be installed prior to the start of construction along right-of-way lines silt fence will be installed as quickly as feasible (where it is reasonable to do so) at the toe of header bank and other slopes silt fence may be installed at the start of construction, during construction as appropriate, and during construction to support other controls as needed	at final stabilization or as directed by the project engineer at final stabilization or as directed by the project engineer at the removal of the construction exit, at final stabilization, or as directed by the project engineer
tackifiers/emulsions	soil tackifiers may be used to control dust	erosion controls that are designed to remain in-place for a indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal (CGP, page 23)
water	to be used to suppress dust and compact dirt on an as needed schedule	erosion controls that are designed to remain in-place for a indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal (CGP, page 23)
seed, temporary	to be installed, when apprpropriate, in disturbed areas where construction has temporarily ceased for 21 days	erosion controls that are designed to remain in-place for a indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal (CGP, page 23)
seed, permanent	to be installed as a final stabilization measure where construction is complete or as directed by the Engineer	erosion controls that are designed to remain in-place for a indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal (CGP, page 23)
construction exits	to be installed at all construction vehicle exit points to publicly traveled ways prior to the use of these exits by construction vehicles	as directed by construction conditions or by the Engineer
erosion control logs	to be installed prior to the start of construction; erosion control logs are to serve as water velocity dissipaters, as ditchblocks, as sedimentation basins, and in support of other control devices.	as directed by construction conditions or by the Engineer
soil retention blankets	to be installed as a final stabilization measure where construction is complete or as directed by the Engineer	erosion controls that are designed to remain in-place for a indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal (CGP, page 23)
inlet protectors	to be installed to cover curb inlets with support from sandbags or as directed by the Engineer	as directed by construction conditions or by the Engineer
compost socks	to be installed as channel blocks, inlet protectors, and to support sandbag berms, silt fences or as directed by the Engineer	as directed by construction conditions or by the Engineer

Notes from the Lubbock District:

-This is a general schedule for the installation of and removal of SW3P best management practice controls. The final determination of the implementation and removal of controls is at the discretion of the project engineer.

-Control measures must be properly selected, installed, and maintained according to the manufacturer's or designer's specifications. If periodic inspections or other information indicates control has been used incorrectly, or that the control is performing inadequately, the operator must replace or modify the control as soon as practicable after the discovery that the control has been used incorrectly, is performing inadequately, or is damaged.

-Sediment must be removed from traps and sedimentation ponds no later than the time that design capacity has been reduced by 50 percent.

-If sediment escapes the site, accumulations must be removed at a frequency to minimize further negative effects, and whenever feasible, prior to the next rain event.

-Controls must be developed to limit, to the extent practicable, the off-site transport of litter, construction debris, and construction materials.

-Erosion and sediment controls must be designed to retain sediment on-site to the extent practicable with consideration for local topography, soil type, and rainfall. Controls must also be designed and utilized to reduce the off-site transport of suspended sediments and other pollutants if it is necessary to pump or channel standing water.

MAINTENANCE REQUIREMENTS:

Control measures shall be properly installed and maintained according to the manufacturer's specifications. Sediment must be removed from BMP's as directed by the SW3P plan requirements, and as directed by the manufacturer's recommendations, but no later than the time at which the capacity of the BMP has been reduced by 50 percent. If sediment or other pollutants escape the site, accumulations will be removed to reduce further negative effects. If inspections or other information indicates a control has been installed, used, or is performing inadequately, the contractor must modify or replace the control as soon as practicable after the problem is discovered. Controls shall be maintained in effective operating condition. If inspections determine that BMPs are not operating effectively, maintenance shall be performed as necessary to continue the effectiveness of the controls. Controls that have been intentionally disabled, run over, removed, or otherwise made ineffective, must be corrected or replaced at discovery.

LITTER AND CONSTRUCTION DEBRIS:

The project contractor shall establish a schedule for the regular removal of litter and construction debris; this schedule shall be approved by the project engineer; and, once approved, implemented by the contractor. As needed, the project engineer shall direct the contractor to establish good housekeeping measures consistent with the TCEQ's Construction General Permit.

DESCRIPTION OF PERMANENT STORM WATER CONTROLS:

PERMANENT STORM WATER CONTROLS: A description of controls that will stay in-place after construction is completed must be included in the SW3P.

1. Riprap: concrete riprap can be installed as a permanent stabilization measure at locations where construction is completed must be included in the SW3P.
2. Existing Vegetation & Vegetative Buffers: to the extent practicable, existing vegetation will not be disturbed by construction activities; and, where feasible (especially at storm water discharge sites), existing vegetation will remain undisturbed to form a vegetative buffer between construction areas and areas undisturbed by construction.
3. Permanent Sodding/Seeding & Plantings: this is the establishment of permanent perennial vegetation. Permanent vegetation stabilizes soil by holding soil particles in-place. Vegetation filters sediments, helps soil absorb water, improves wildlife habitat, and enhances aesthetics of the site.
4. Permanent vegetation will remain in vegetated channels.

SEDIMENT CONTROL PRACTICES:

1. Sandbags: the purpose of a sandbag is to intercept sediment laden storm water from disturbed areas, create a detention pond, detain sediment and release water in a sheet flow. Sandbag berms are a general purpose sediment control device and will be used throughout the project to detain sediment on site. Sandbags will be placed in ditches and channels to form sedimentation basins. Sandbags will also be used where runoff exits the construction site to enter receiving waters and to support other storm water controls.
2. Silt fence: silt fence is to be installed with construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. This is a general use control that will be used to create detention basins that retain sediment on-site; they will also be used in support of other controls such as construction exits and rock filter dams.
   Silt fence will be used along playa lakes to reduce the loss of sediment from roadway front slopes; it may be used in ditches, channels, discharge points to support sandbag berms; may be used to support stabilized construction exits.
3. Rock Filter Dams: the purpose of a rock filter dam is to intercept and slow sediment laden water runoff from disturbed areas, retain the sediment and release the water in sheet flow. Rock filter dams will generally be used in high water velocity flow channels.
4. Stabilized Construction Exit: the purpose of the stabilized exit is to reduce the tracking of sediment and dirt onto public roadways beyond the construction zone.
   Stabilized Construction Exits are to be in-place at exit points to streets and thoroughfares in urban areas and are to be used by all construction vehicles regardless of size. They are to be supported where appropriate with silt fence and mechanized brooms.

Sediment basins are required where feasible for common drainage locations that serve an area with 10 or more acres disturbed at one time. Temporary or permanent sediment basins that provide water storage capacity are located on the project; the following controls provide, where feasible, structural controls / sediment basins:

1. Sandbag Berm as a Sediment Basin: a temporary basin designed to intercept sediment-laden storm water runoff and to trap sediment on-site.
2. Vegetative Buffer Strip: vegetative buffer strips reduce water velocity which reduces the potential of water erosion and allows sediments to fall out of the storm water.
3. Silt Fence will be used to reduce the loss of sediment from roadway front slopes adjacent to playa lakes by filtering out silt laden storm water from construction area.

Erosion control and stabilization measures must be initiated immediately in portions of the site where construcion activities have ceased and will not resume for a period exceeding 14 calendar days. Stabilization measures that provide a protective cover must be initiated immediately in portions of the site where construction activities have permanently ceased (CGP Part III Sect. F2(b)iii page 33).

STABILIZATION PRACTICES AND OTHER REQUIRED CONTROLS AND BMPs:

1. Stabilized Construction Exit: a stabilized pad of stone, timber, or other stabilized surface located at points where construction traffic will leave the construction zone to enter a public roadway. The purpose of the stabilized exit is to reduce the tracking of sediment and dirt onto public roadways beyond the construction zone. Stabilized Construction Exits will be placed as needed.
2. Water: water will be used to temporarily suppress dust and compact dirt.
3. Tackifiers: tackifiers such as asphalt emulsion, guar, (and other natural tackifiers), and synthetic tackifiers will be used to control air (dust) & water erosion.
4. Existing Vegetation & Vegetative Buffers: to the extent practicable, existing vegetation will not be disturbed by construction activities; where feasible (especially at storm water discharge sites), existing vegetation will remain undisturbed to form a vegetative buffer between construction areas and areas undisturbed by construction.
5. Cleaning and Sweeping: clean and sweep curb and gutter sections twice a month to reduce dirt and trash or as directed.
6. Riprap: concrete riprap can be installed as a permanent stabilization measure at locations where construction is complete and permanent stabilization is required.
7. Tracking and Dust: Off-site tracking and generation of dust must be minimized.

ON-SITE STORAGE OF CONSTRUCTION AND WASTE MATERIALS:

1. Disposal methods must meet federal, state, and local waste management requirements. No construction waste shall be buried or burned on-site. Spoils of disposal, material storage, and waste materials from the demolition of existing roads and structures shall be stored in areas designated by the project engineer, and prevented from becoming a pollutant source with appropriate BMPs. Construction and waste materials that might be temporarily stored on-site include concrete and steel pipe; steel reinforcing bar, forms and frames; sand and gravel; wire, concrete and steel beams; wood and steel building units; and controls, construction signs and barricades. A list of construction and waste materials stored on site and controls will be presented to the Project Engineer.
2. Contractor shall design and utilize appropriate controls to minimize the offsite transport of suspended sediments and other pollutants, if it is necessary to pump or channel standing water from the site.
3. Litter, construction debris, and construction material exposed to stormwater shall be managed in a manner that prevents this material from becoming a pollutant. A regular sweep of the project shall be made to pick up litter. No construction material of any kind (including dirt) shall be discharged to a water of the United States (ephemeral streams and playa lakes) without a permit from the Corps of Engineers.
4. Oil, gasoline, grease, solvents, and other petroleum products are not to be stored on-site. Major vehicle maintenance shall occur on-site only under emergency conditions, and when this maintenance type is necessary, a plastic cover shall be used (and properly disposed of) to prevent petroleum products from contaminating the surrounding soil.
5. Potential Pollutant Sources from Areas Other than Construction:
   oil, grease, and other petroleum fluids construction traffic at concrete plant and field office
   sediment laden stormwater disturbed soil from concrete batch plant and field office
   litter, motorists driving through the project

All best management practices available to this construction project are available to control non-construction generated pollutants including sand bag berms, silt fence, stabilized construction exits, sedimentation basins, and litter management programs among other controls listed in this document.

STORAGE TANKS:

Storage tanks that are above ground, regardless of whether they are used to store petroleum products, hazardous waste, or other hazardous material must follow the Summary of Federal Requirements.

Aboveground storage tanks (ASTs) used for the storage of petroleum products is regulated primarily under 40 CFR 112. These containers are used for purposes including, but not limited to, the storage of oil prior to use, while being used, or prior to further distribution in commerce.

A bulk storage container is 55 gal. or greater and may be aboveground, partially buried, bunkered, or completely burled. AST's include mobile storage containers such as trailers and tanked vehicles. Oil-filled electrical, operating, or manufacturing equipment is not a bulk storage container.

All bulk storage container installations must be constructed so a secondary means of containment is provided for the entire capacity of the largest single container and sufficient freeboard to contain precipitation. Diked areas must be sufficiently impervious to contain discharged oil.

Mobile/Portable AST:

Mobile or portable oil bulk storage containers must be positioned or located to prevent a discharge and furnished with a secondary means of containment, such as a dike or catchment basin, sufficient to contain the capacity of the largest single compartment or container with sufficient freeboard to contain precipitation.

DETERMINATION OF REPORTABLE QUANTITIES:

A list of each substance designated as hazardous in 40 CFR Part 116 is found in the project's SW3P folder. The 40 CFR 116 registration applies to quantities, when discharged into or upon the Waters of the United States, adjoining shorelines, into or upon the contiguous zone, or beyond the contiguous zone as provided in the Act.

NOTE:

Sediment basins are not feasible on the project because right-of-way is limited and the construction of a sedimentation basin would be within the boundaries of the roadway's clear zone and for the safety of motorists, sedimentation basins cannot be constructed within the clear zone. Since sedimentation basins are not feasible due to lack of right-of-way, mathematical calculations have not been developed.

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BENJAMIN COX
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Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

STORMWATER POLLUTION PREVENTION PLAN (SWP3) NARRATIVE - OVER 1 ACRE

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			235
STATE	STATE DIST.	COUNTY	
TEXAS	LBB	LAMB	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	046	US 84

CK
DW
CK
DW

OVERALL SWP3 SUMMARY						
LOCATION	506 7020	506 7024	506 7034	506 7035	506 7045	506 7046
	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	CONSTRUCTION PERIMETER FENCE	SANDBAGS FOR EROSION CONTROL	BIODEG EROSN CONT LOGS (INSTL) (18")	BIODEG EROSN CONT LOGS (REMOVE)
CSJ	SY	SY	LF	EA	LF	LF
0052-05-046 TOTAL	444	222	519		300	150
0052-05-048 TOTAL				525	5630	2820
PROJECT TOTAL:	**444**	**222**	**519**	**525**	**5930**	**2970**

SUMMARY OF EROSION CONTROL LOGS							
EROSION CONTROL NO.	APPROX. STATION	DESCRIPTION	INSTALL QTY (LF)	REMOVE QTY (LF)	DATE INSTALLED	DATE REMOVED	DATE REPLACED
ECL-1	663+50	NB DITCH	30	15			
ECL-2	674+33	SB DITCH	40	20			
ECL-3	674+59	INLET	60	30			
ECL-4	675+20	INLET	60	30			
ECL-5	675+39	NB DITCH	40	20			
ECL-6	686+06	CULVERT/INLET	60	30			
ECL-7	686+90	SB DITCH	30	15			
ECL-8	688+04	NB DITCH	30	15			
ECL-9	705+74	DITCH	40	20			
ECL-10	723+44	SB DIITCH	30	15			
ECL-11	724+51	NB DITCH	30	15			
ECL-12	733+00	DITCH	40	20			
ECL-13	735+61	CULVERT/INLET	100	50			
ECL-14	743+00	SB DITCH	30	15			
ECL-15	744+00	NB DITCH	30	15			
ECL-16	759+00	DITCH	40	20			
ECL-17	770+00	DITCH	40	20			
ECL-18	774+51	DITCH	40	20			
ECL-19	786+56	CULVERT/INLET	60	30			
ECL-20	789+00	DITCH	40	20			
ECL-21	803+99	DITCH	40	20			
ECL-22	814+49	SB DITCH	30	15			
ECL-23	815+68	NB DITCH	30	15			
ECL-24	831+00	DITCH	30	15			
ECL-25	838+00	SB DITCH	30	15			
ECL-26	839+20	NB DITCH	30	15			
ECL-27	846+68	DITCH	30	15			
ECL-28	847+01	CULVERT/INLET	60	30			
ECL-29	847+90	CULVERT/INLET	60	30			
ECL-30	848+08	NB DITCH	30	15			
ECL-31	858+00	DITCH	30	15			
ECL-32	860+97	DRIVEWAY	40	20			
ECL-33	862+58	DRIVEWAY	30	15			
ECL-34	865+50	DITCH	30	15			
ECL-35	873+48	DITCH	40	20			
ECL-36	878+00	DITCH	40	20			
ECL-37	895+00	SB DITCH	30	15			
ECL-38	895+23	CULVERT/INLET	40	20			
ECL-39	895+94	CULVERT/INLET	40	20			
ECL-40	896+26	NB DITCH	30	15			
ECL-41	897+99	CULVERT/INLET	80	40			
ECL-42	898+53	DITCH	30	15			
ECL-43	906+09	DITCH	40	20			
ECL-44	909+06	SB DITCH	30	15			
ECL-45	910+19	NB DITCH	30	15			
ECL-46	915+00	DITCH	30	15			
ECL-47	920+43	DITCH	30	15			
ECL-48	927+98	SB DITCH	30	15			
ECL-49	929+21	NB DITCH	30	15			
ECL-50	937+97	CULVERT/INLET	120	60			
ECL-51	941+18	SB DITCH	30	15			
CSJ 0052-05-048 SUBTOTAL			2070	1040			

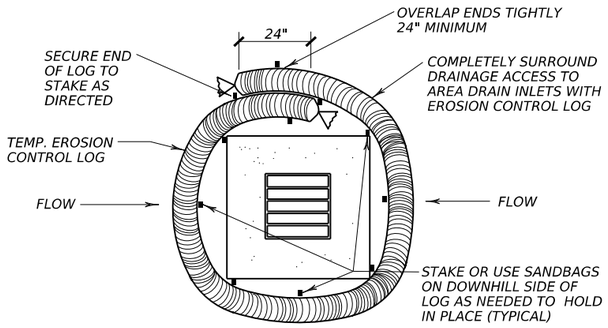
SUMMARY OF EROSION CONTROL LOGS							
EROSION CONTROL NO.	APPROX. STATION	DESCRIPTION	INSTALL QTY (LF)	REMOVE QTY (LF)	DATE INSTALLED	DATE REMOVED	DATE REPLACED
ECL-52	942+36	NB DITCH	30	15			
ECL-53	954+70	SB DITCH	30	15			
ECL-54	955+71	NB DITCH	30	15			
ECL-55	961+94	CULVERT/INLET	60	30			
ECL-56	961+96	CULVERT/INLET	60	30			
ECL-57	961+96	CULVERT/INLET	60	30			
ECL-58	962+22	CULVERT/INLET	60	30			
ECL-59	964+87	SB DITCH	30	15			
ECL-60	965+20	CULVERT/INLET	40	20			
ECL-61	965+77	CULVERT/INLET	40	20			
ECL-62	966+10	NB DITCH	30	15			
ECL-63	981+28	SB DITCH	30	15			
ECL-64	982+32	NB DITCH	30	15			
ECL-65	998+88	SB DITCH	30	15			
ECL-66	1000+11	NB DITCH	30	15			
ECL-67	1011+72	SB DITCH	30	15			
ECL-68	1013+00	NB DITCH	30	15			
ECL-69	1022+00	DITCH	40	20			
ECL-70	1032+00	SB DITCH	30	15			
ECL-71	1033+54	NB DITCH	30	15			
ECL-72	1052+00	DITCH	40	20			
ECL-73	1070+21	SB DITCH	30	15			
ECL-74	1071+43	NB DITCH	30	15			
ECL-75	1090+00	DITCH	40	20			
ECL-76	1109+24	SB DITCH	30	15			
ECL-77	1110+79	NB DITCH	30	15			
ECL-78	1114+36	CULVERT/INLET	40	20			
ECL-79	1123+00	DITCH	40	20			
ECL-80	1137+00	DITCH	40	20			
ECL-81	1151+22	SB DITCH	30	15			
ECL-82	1152+58	NB DITCH	30	15			
ECL-83	1163+21	CULVERT/INLET	60	30			
ECL-84	1165+51	SB DITCH	30	15			
ECL-85	1166+74	NB DITCH	30	15			
ECL-86	1180+67	SB DITCH	30	15			
ECL-87	1181+90	NB DITCH	30	15			
ECL-88	1189+77	SB DITCH	30	15			
ECL-89	1191+27	NB DITCH	30	15			
ECL-90	1205+92	DITCH	40	20			
ECL-91	1215+00	DITCH	40	20			
ECL-92	1216+66	CULVERT/INLET	40	20			
ECL-93	1224+00	DITCH	40	20			
ECL-94	1234+18	CULVERT/INLET	60	30			
ECL-95	1239+53	SB DITCH	30	15			
ECL-96	1240+82	NB DITCH	30	15			
ECL-97	1259+35	SB DITCH	30	15			
CSJ 0052-05-048 SUBTOTAL:			1680	840			
CSJ 0052-05-048 Replacement:			1880	940			
CSJ 0052-05-048 TOTAL:			5630	2820			
ECL-98	1360+07	CULVERT/INLET	40	20			
ECL-99	1360+74	CULVERT/INLET	260	130			
CSJ 0052-05-046 TOTAL:			300	150			

CONSTRUCTION EXITS				
US 84	INSTALL QTY (SY)	REMOVE QTY (SY)	DATE INSTALLED	DATE REMOVED
0052-05-046 TOTAL	444	222		
PROJECT TOTAL	**444**	**222**		

SAND BAGS			
US 84	QTY (EA)	DATE INSTALLED	DATE REMOVED
0052-05-048 TOTAL	525		
***PROJECT TOTAL**	**525**		

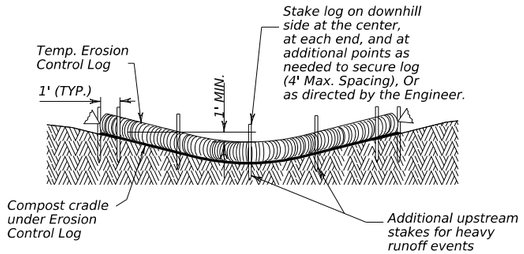
*FOR ESTIMATE PURPOSES, USE ONLY AS DIRECTED.

CONSTRUCTION PERIMETER FENCE			
US 84	QTY (LF)	DATE	DATE REMOVED
0052-05-046 TOTAL	519		
PROJECT TOTAL	**519**		



EROSION CONTROL LOG AT DROP INLET

NOTE:
1. Soak Erosion Control Log with water at installation to help hold log in place.
2. Only Use Wooden Stakes-no rebar allowed to anchor logs.
3. Use Mulch Filled Logs.



EROSION CONTROL LOG DAM

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126523
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PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

SWP3 SUMMARY
(LAMB COUNTY)

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		236

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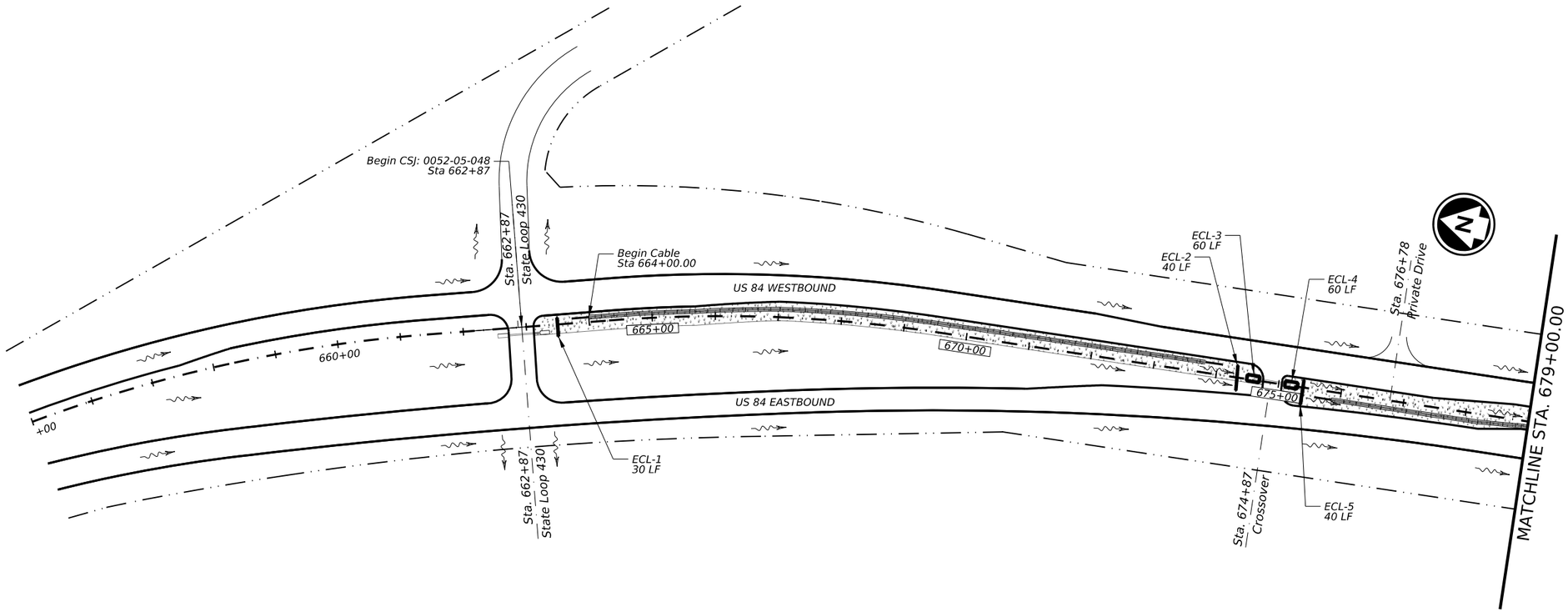

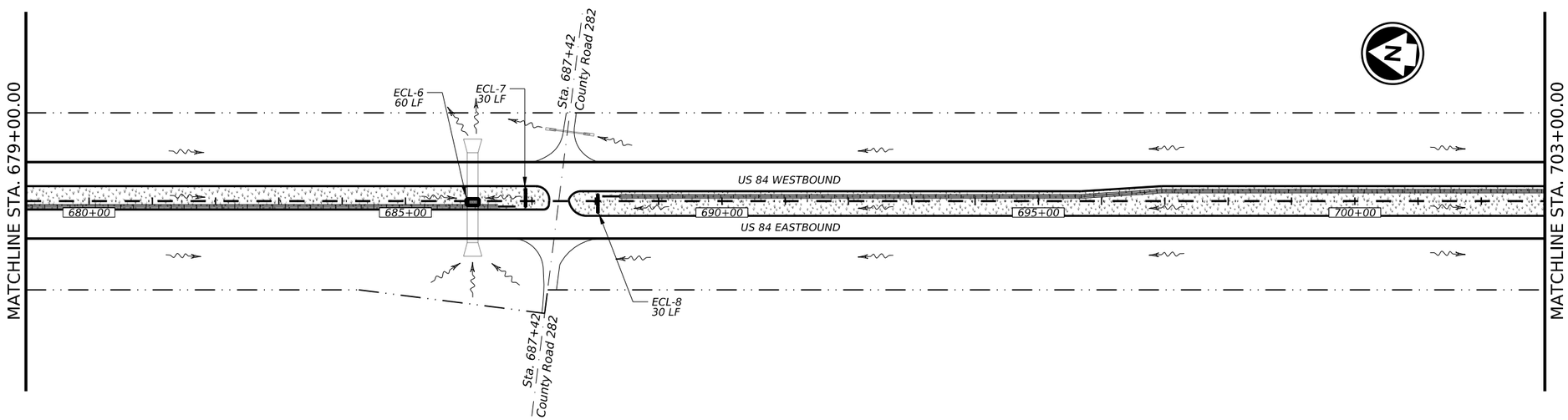

Legend

Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

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SWP3 LAYOUT
(LAMB COUNTY)
SCALE: 1"=200'

SHEET 1 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		237

DATE: 9/30/2024 1:33:58 PM
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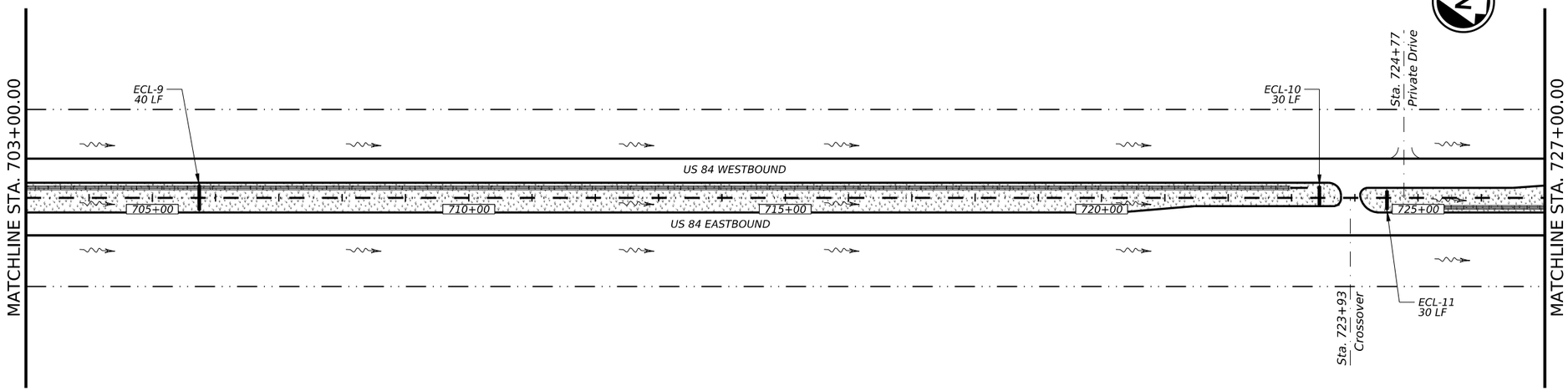

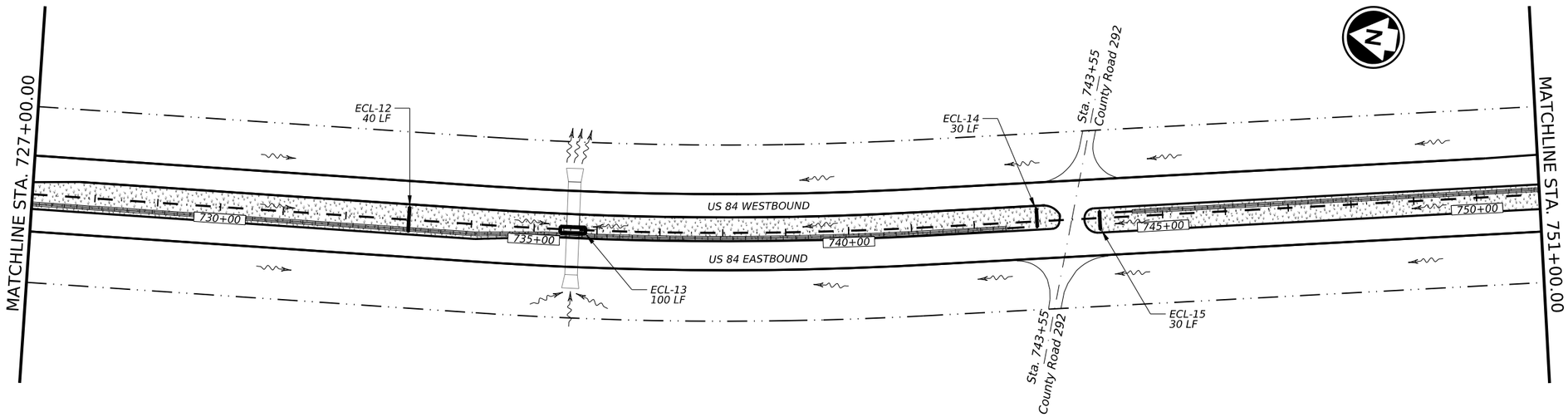

Legend

Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

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SWP3 LAYOUT
(LAMB COUNTY)
SCALE: 1"=200'

SHEET 2 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		238

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CK | DW | CK | DW

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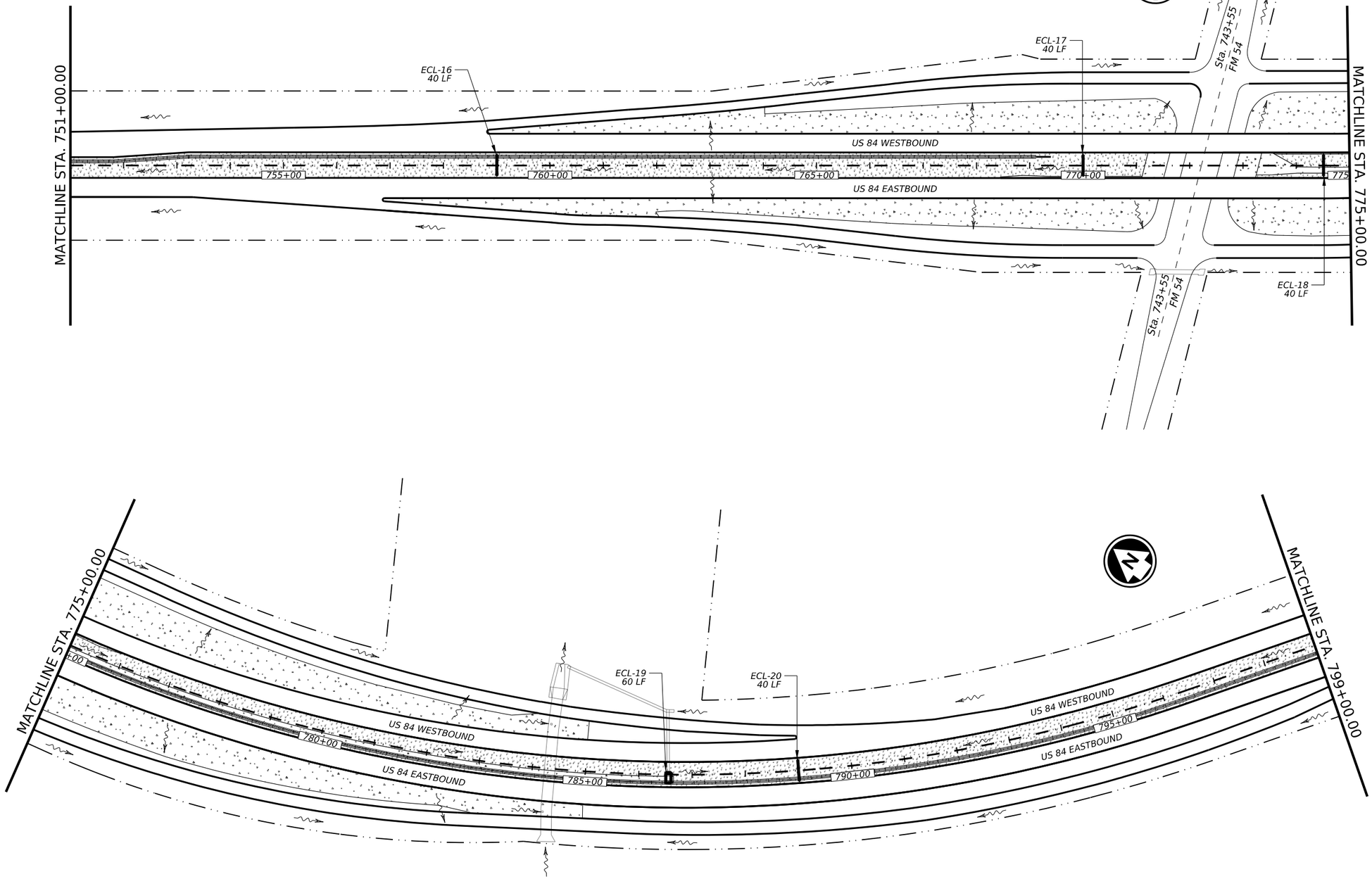
DW



Legend

Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

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SWP3 LAYOUT
(LAMB COUNTY)
SCALE: 1"=200'

SHEET 3 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		239

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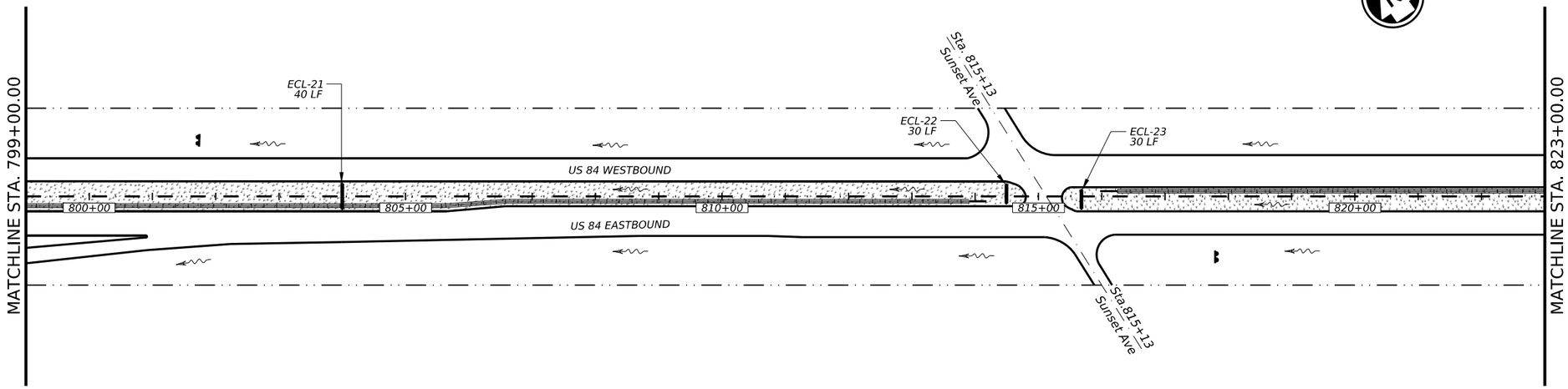

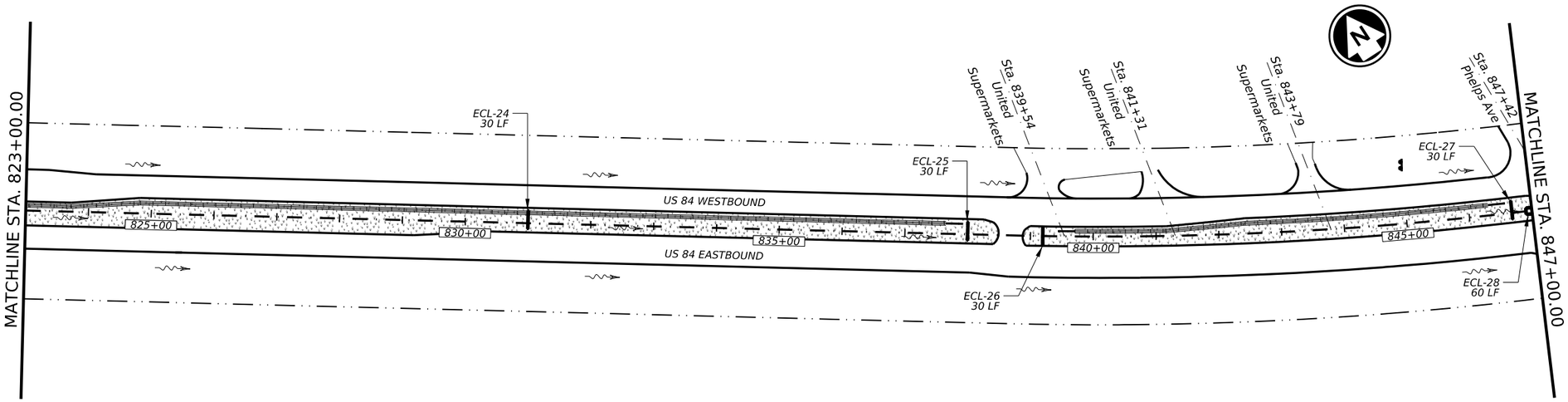

Legend

Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

STATE OF TEXAS
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SWP3 LAYOUT
(LAMB COUNTY)
SCALE: 1"=200'

SHEET 4 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		240

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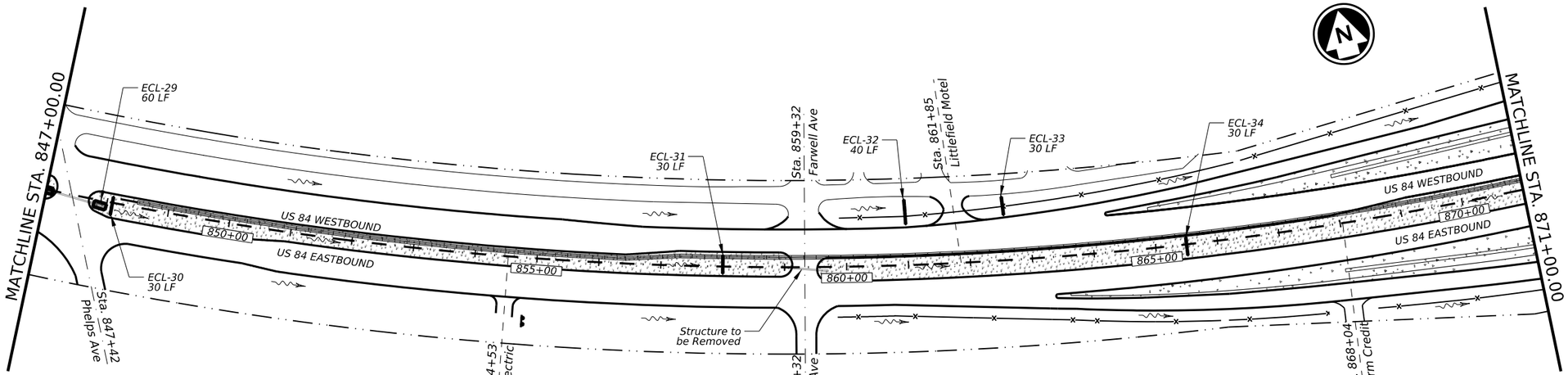

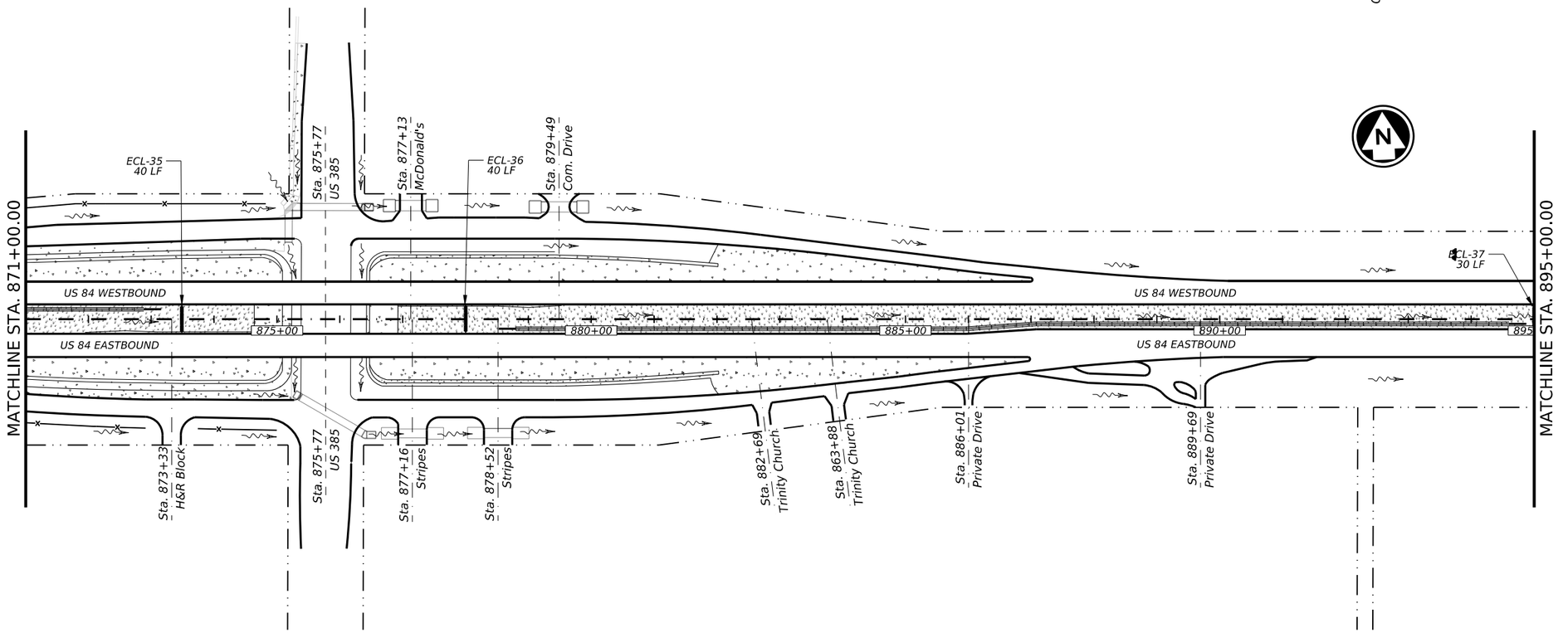

Legend

Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

STATE OF TEXAS
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9/30/2024

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SWP3 LAYOUT
(LAMB COUNTY)
SCALE: 1"=200'

SHEET 5 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		241

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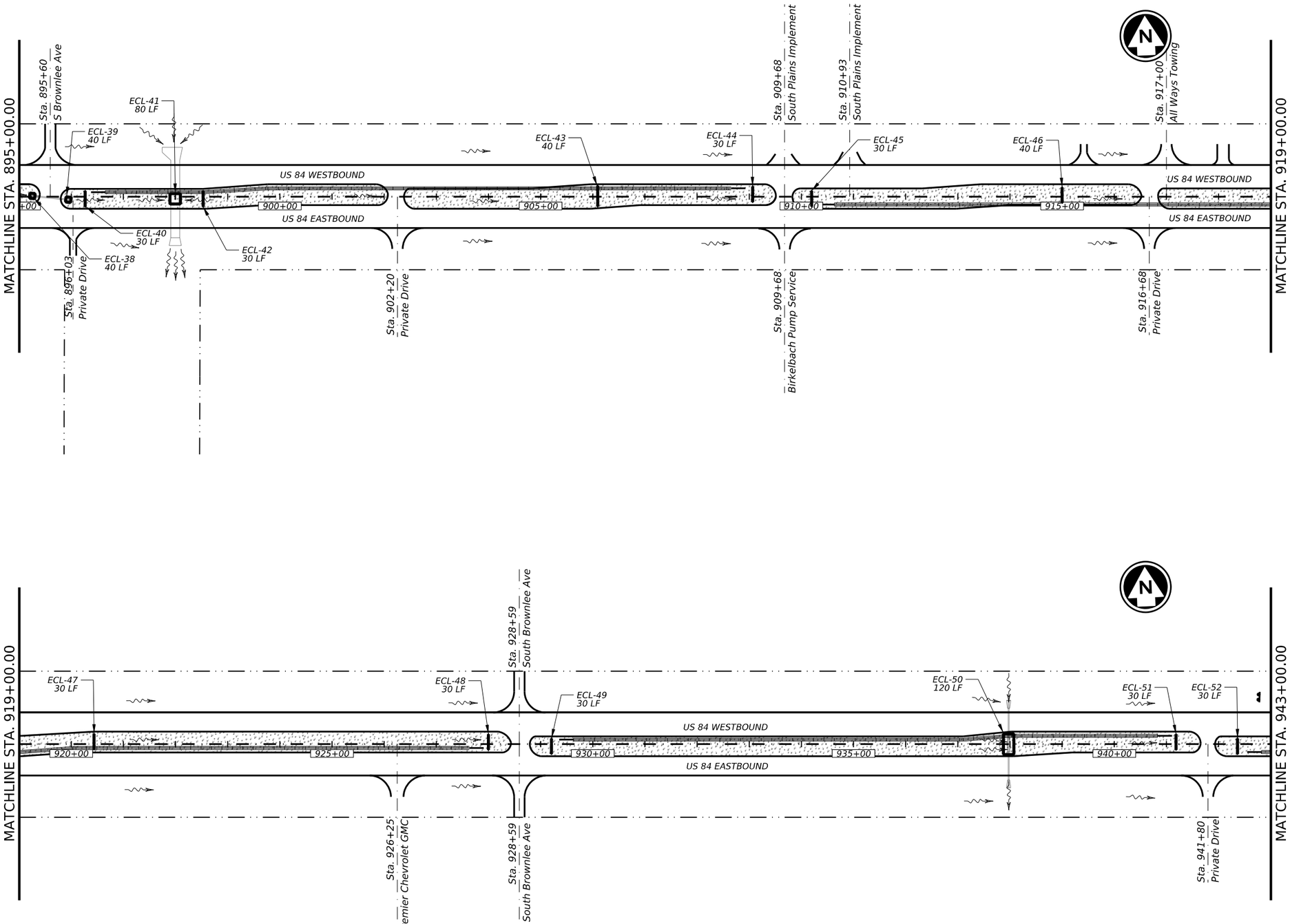

Legend

Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

STATE OF TEXAS
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9/30/2024

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SWP3 LAYOUT
(LAMB COUNTY)
SCALE: 1"=200'

SHEET 6 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		242

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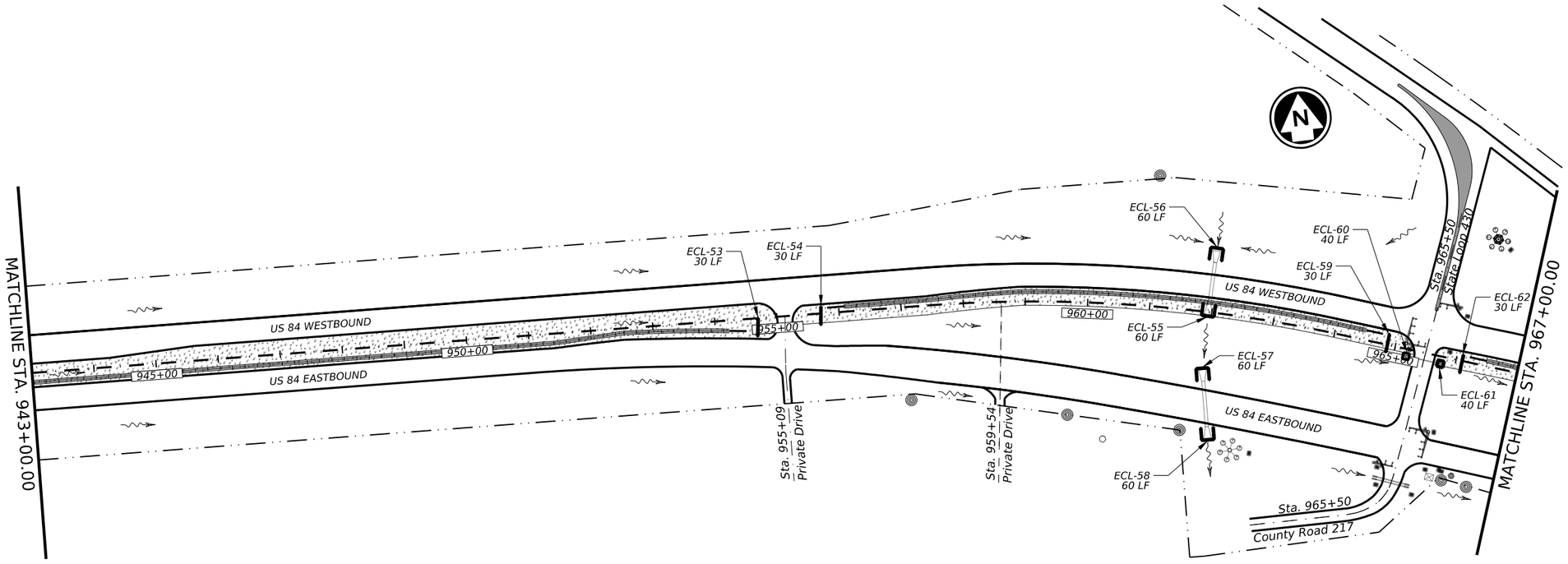

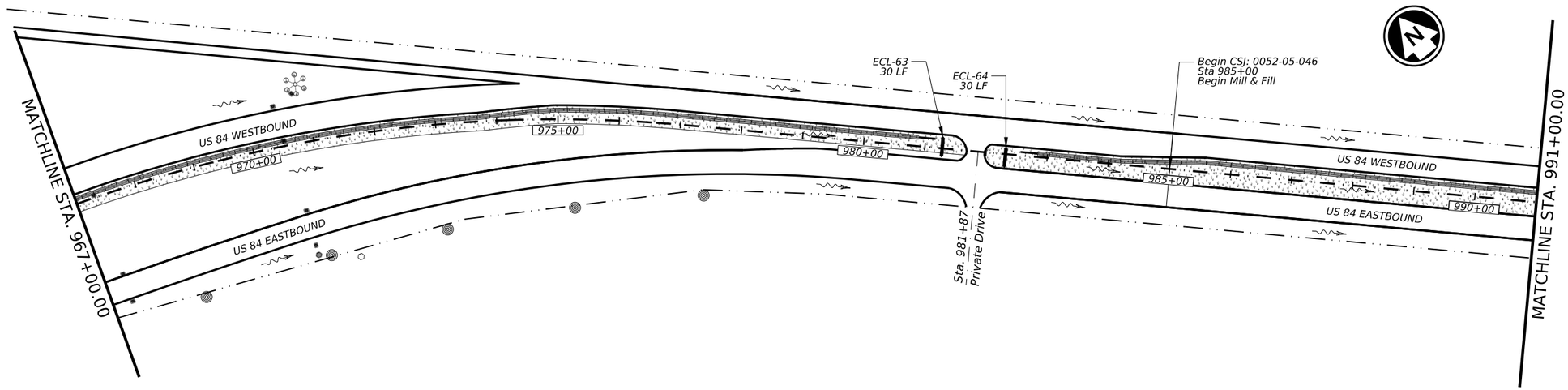

Legend

Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

STATE OF TEXAS
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9/30/2024

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SWP3 LAYOUT
(LAMB COUNTY)
SCALE: 1"=200'

SHEET 7 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		243

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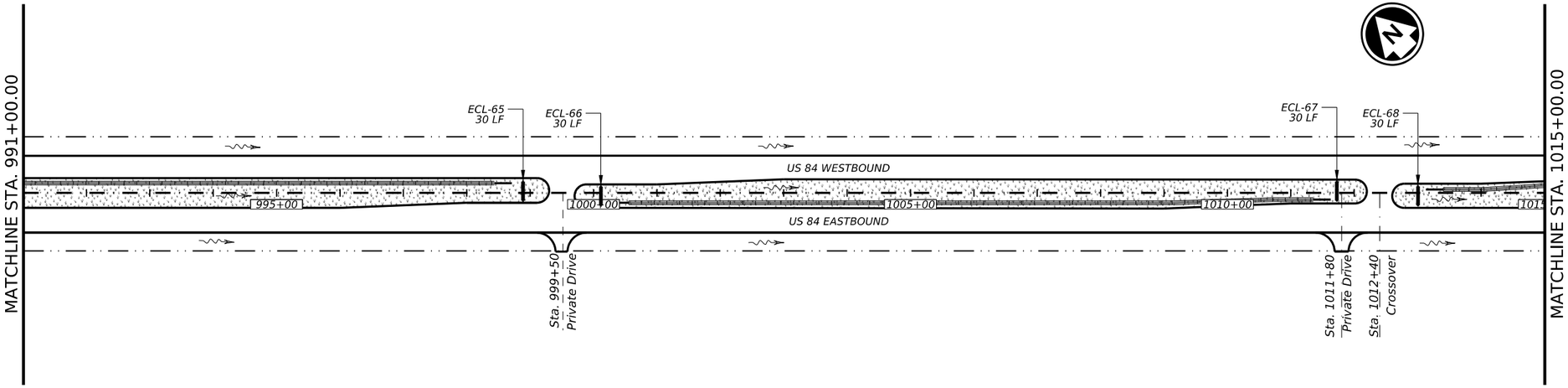

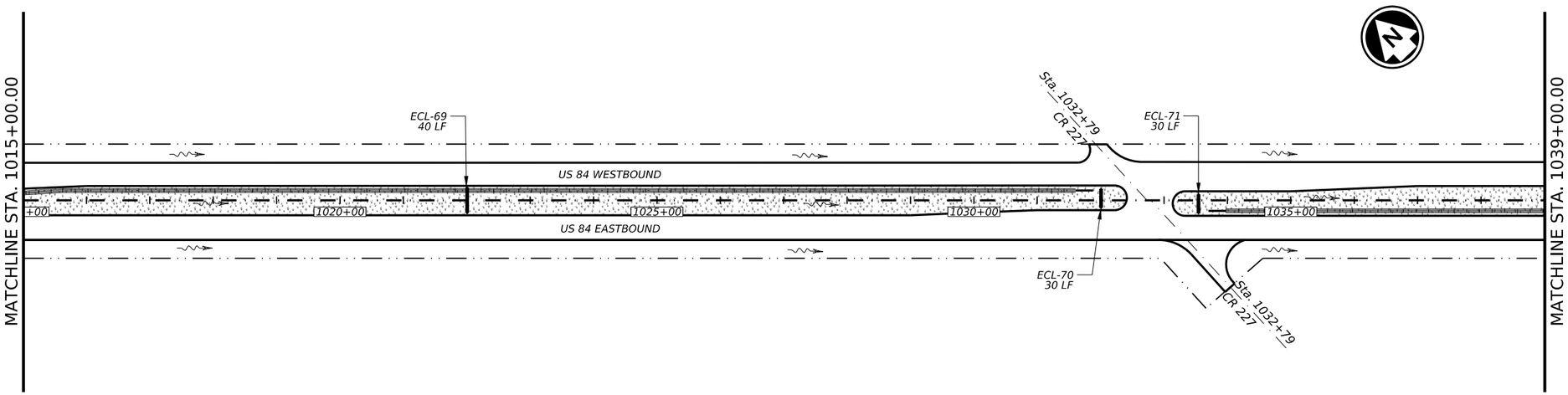

Legend

Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

STATE OF TEXAS
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9/30/2024

Texas Department of Transportation

SWP3 LAYOUT (LAMB COUNTY) SCALE: 1"=200'

SHEET 8 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		244

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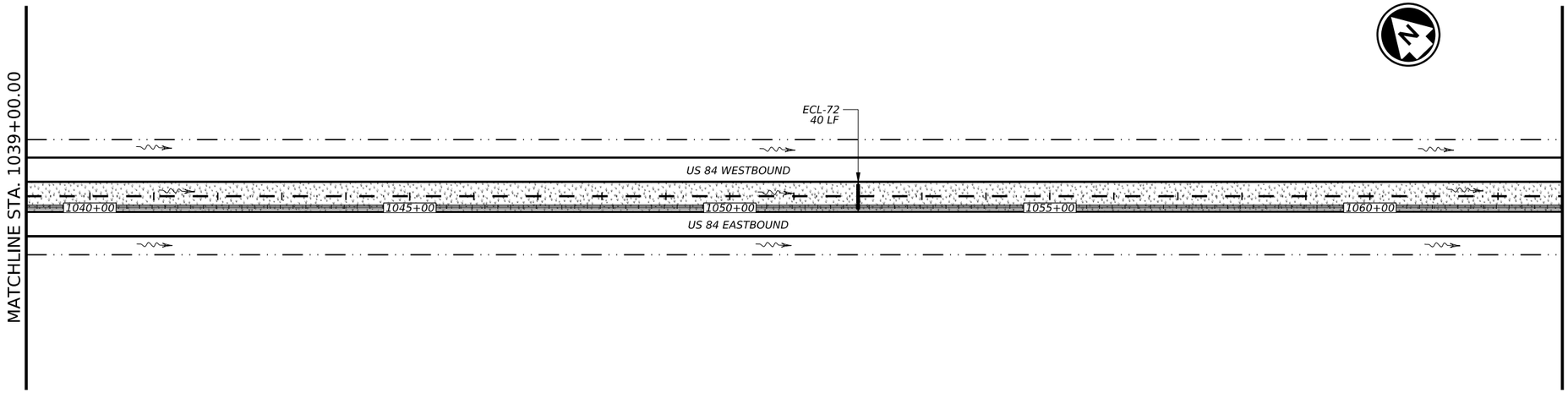

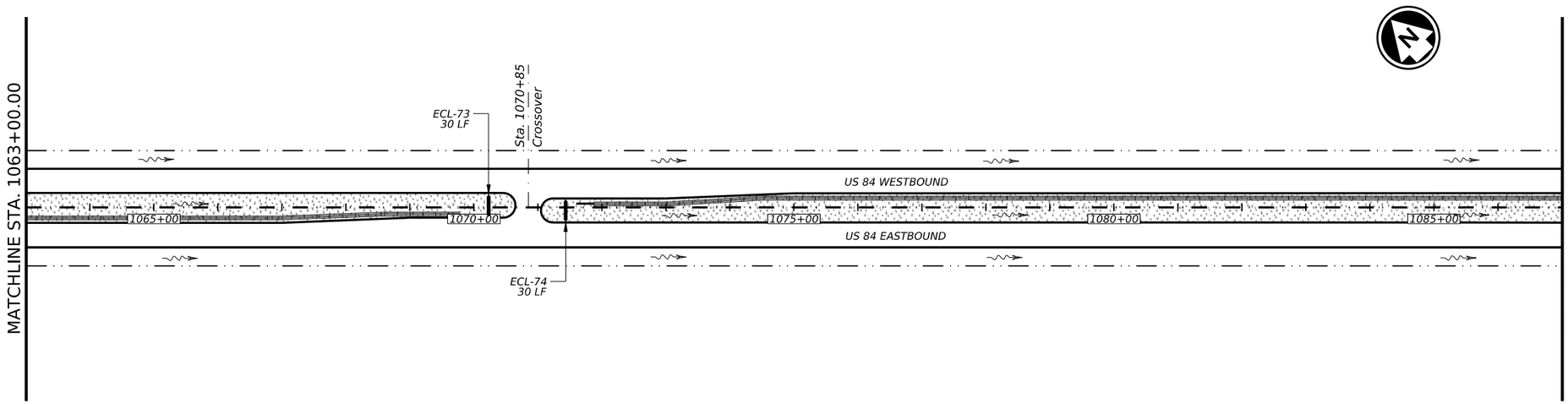

Legend

Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

STATE OF TEXAS
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9/30/2024

Texas Department of Transportation

SWP3 LAYOUT
(LAMB COUNTY)
SCALE: 1"=200'

SHEET 9 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		245

DATE: 9/30/2024 1:34:13 PM
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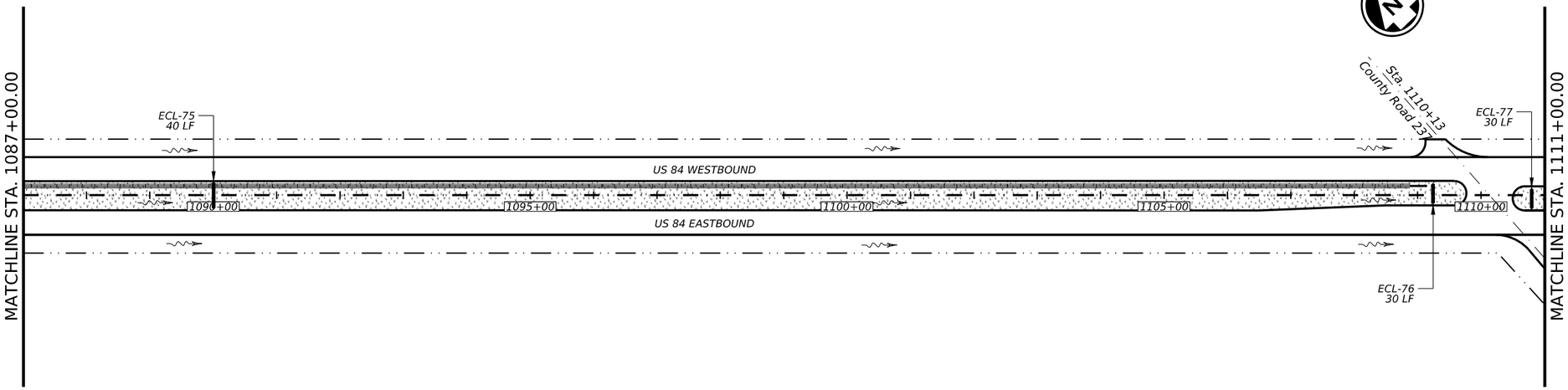

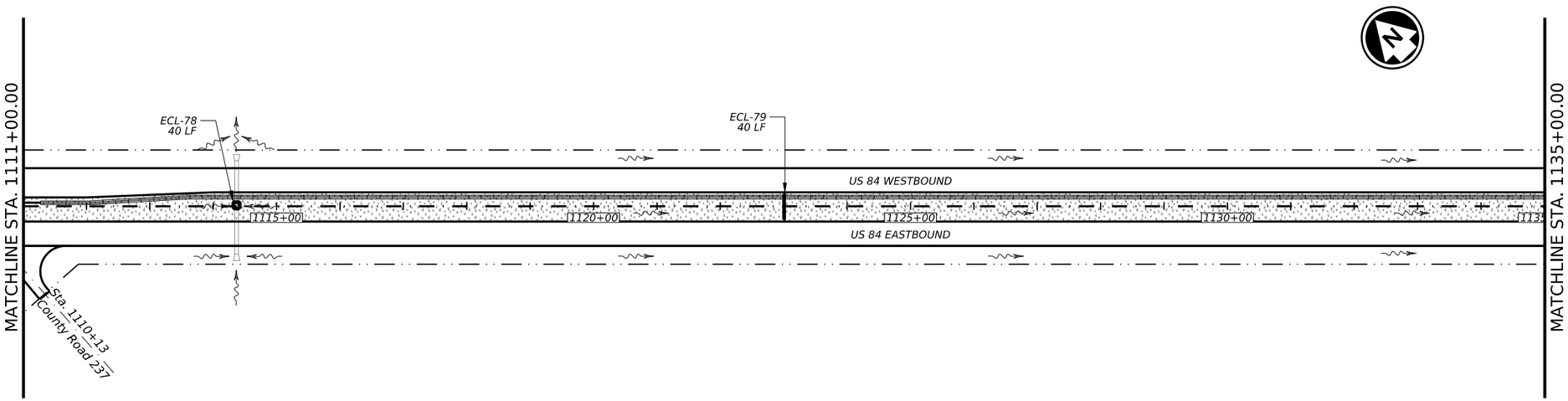

Legend

Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

STATE OF TEXAS
BENJAMIN COX
126523
LICENSED
PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

SWP3 LAYOUT
(LAMB COUNTY)
SCALE: 1"=200'

SHEET 10 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		246

DATE: 9/30/2024 1:34:14 PM
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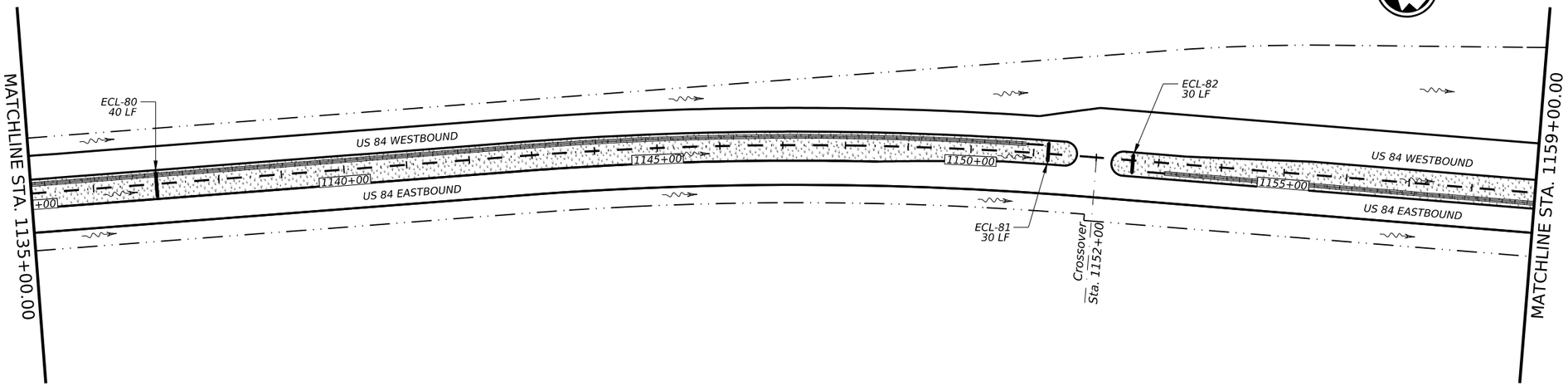

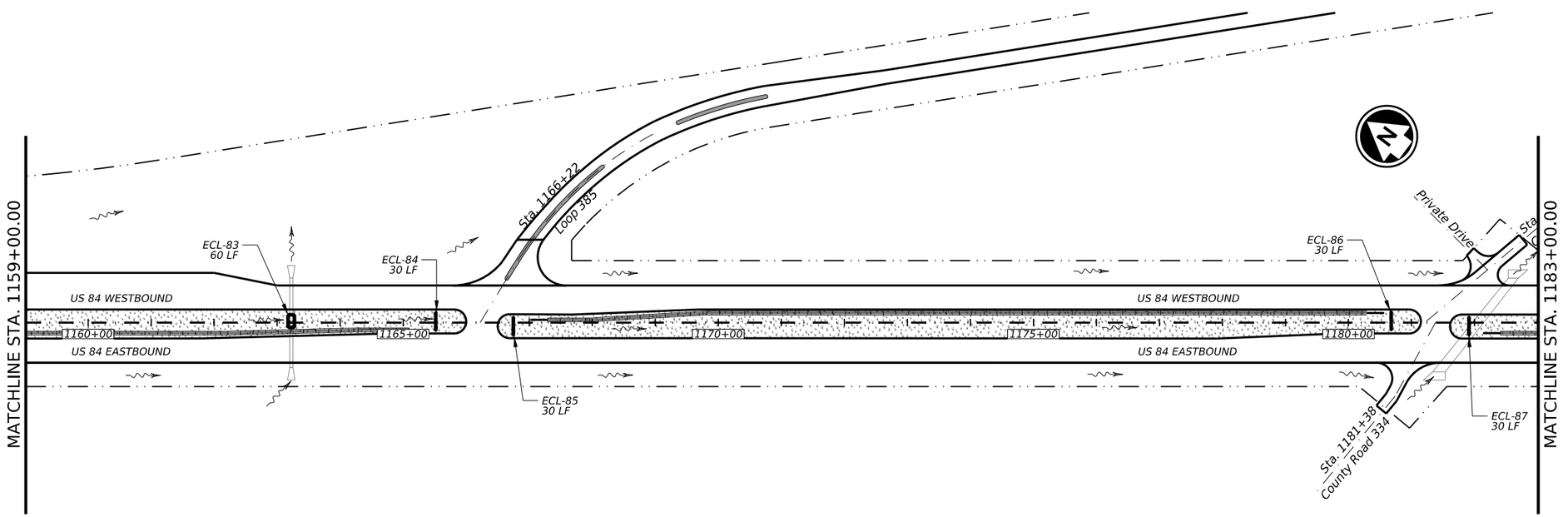

Legend

Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

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Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

SWP3 LAYOUT
(LAMB COUNTY)
SCALE: 1"=200'

SHEET 11 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		247

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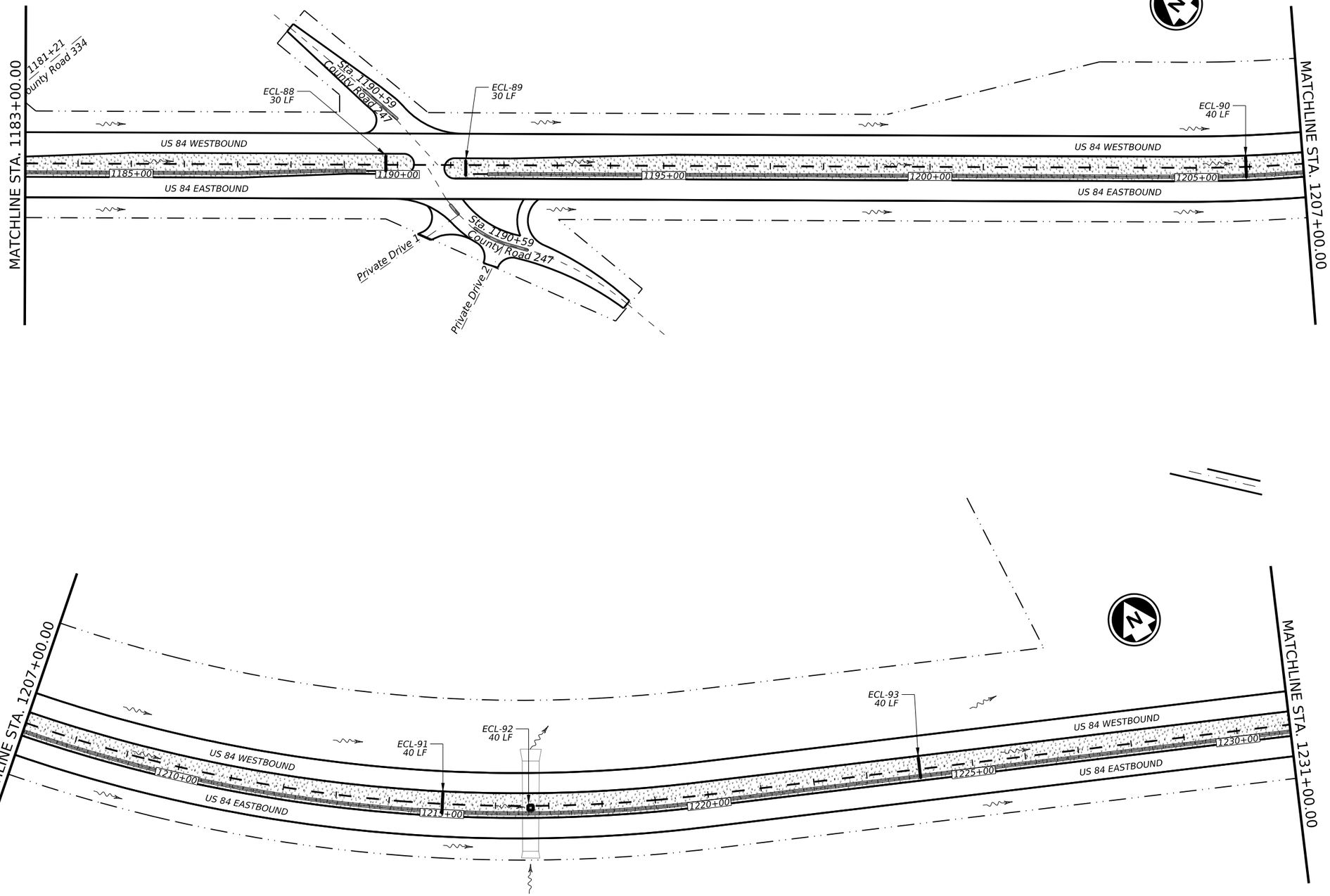

Legend

Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

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PROFESSIONAL ENGINEER

Benjamin Cox, P.E.

9/30/2024

Texas Department of Transportation

SWP3 LAYOUT
(LAMB COUNTY)
SCALE: 1"=200'

SHEET 12 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		248

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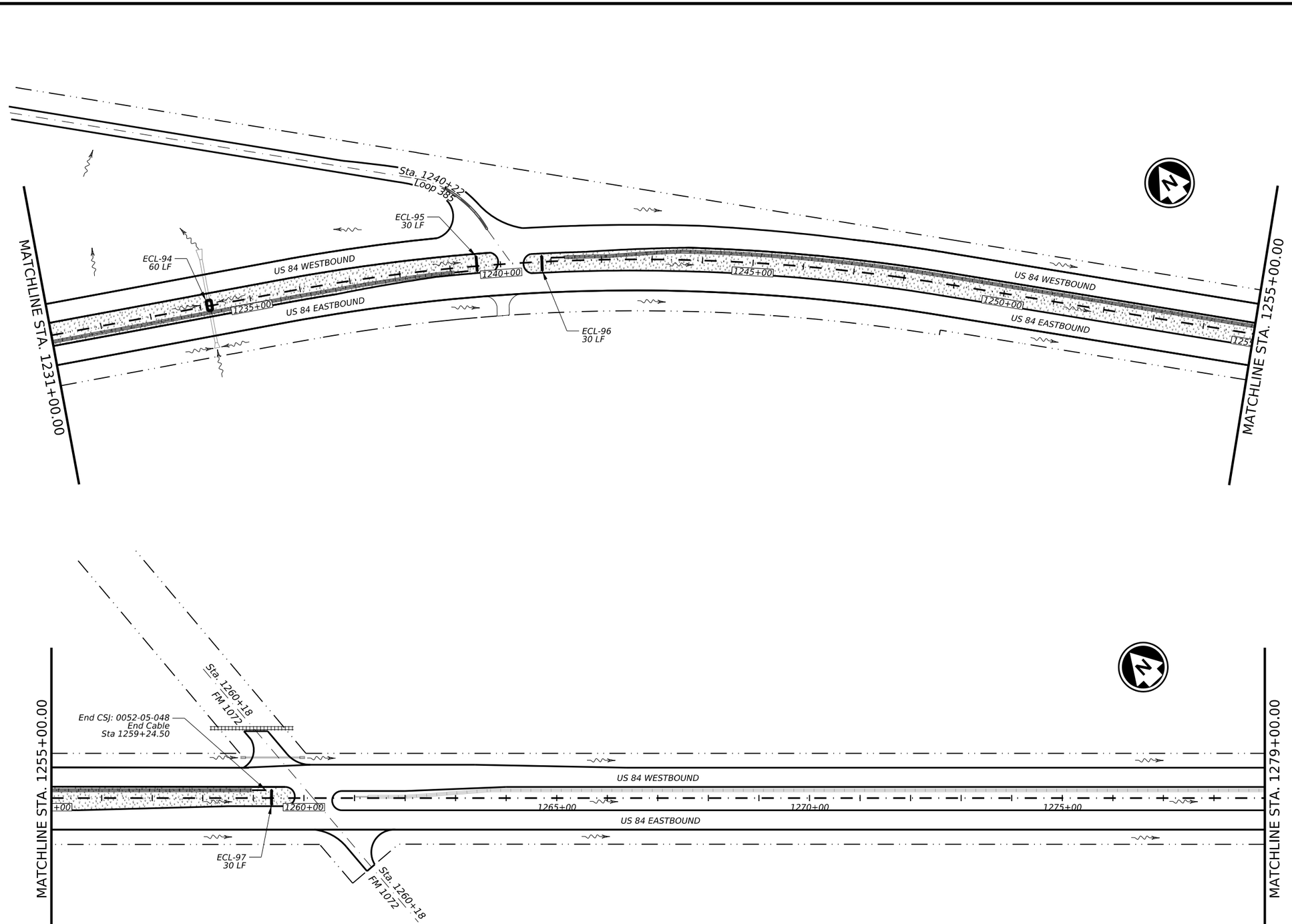

Legend

Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

STATE OF TEXAS
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9/30/2024

Texas Department of Transportation

SWP3 LAYOUT
(LAMB COUNTY)
SCALE: 1"=200'

SHEET 13 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		249

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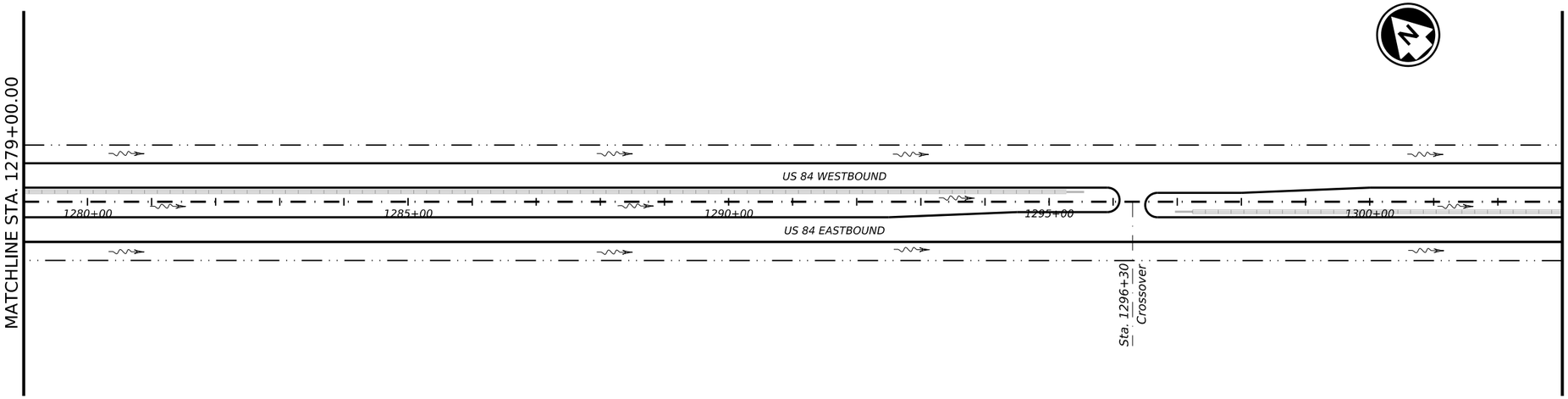

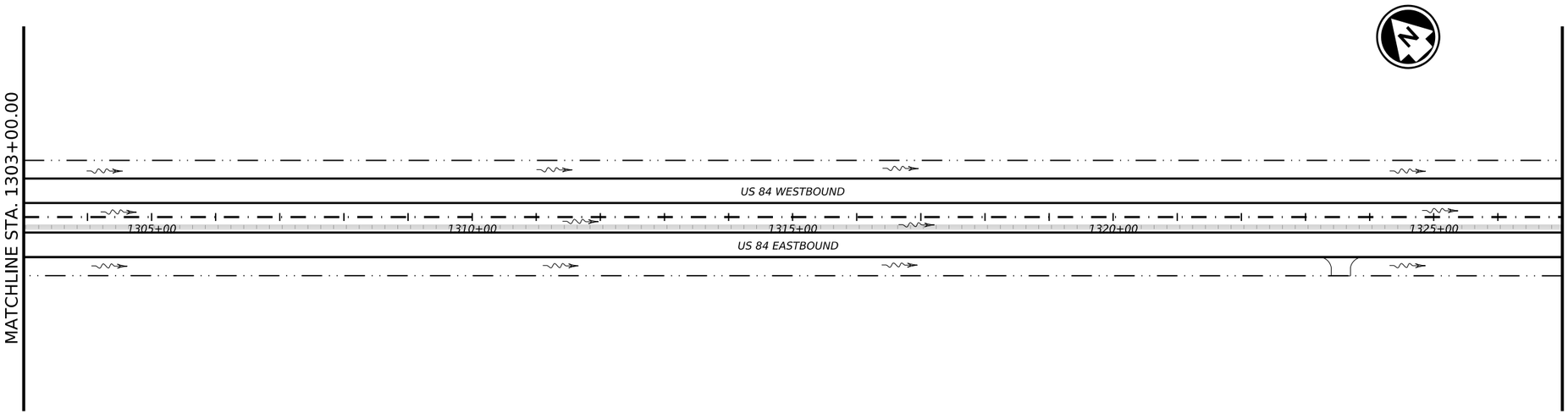

Legend	
Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

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9/30/2024

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SWP3 LAYOUT
(LAMB COUNTY)
SCALE: 1"=200'

SHEET 14 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		250

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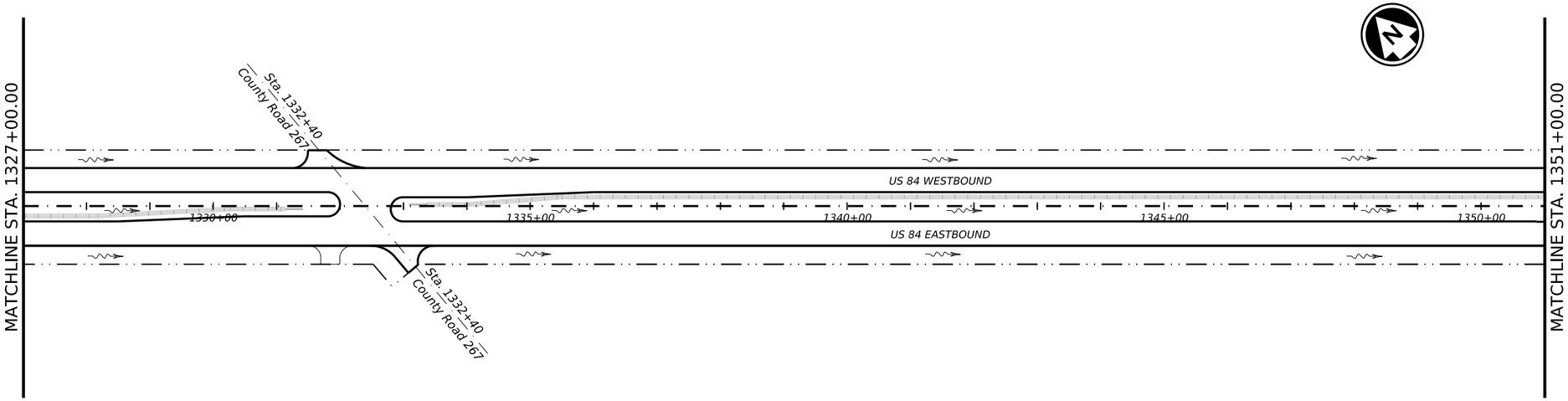

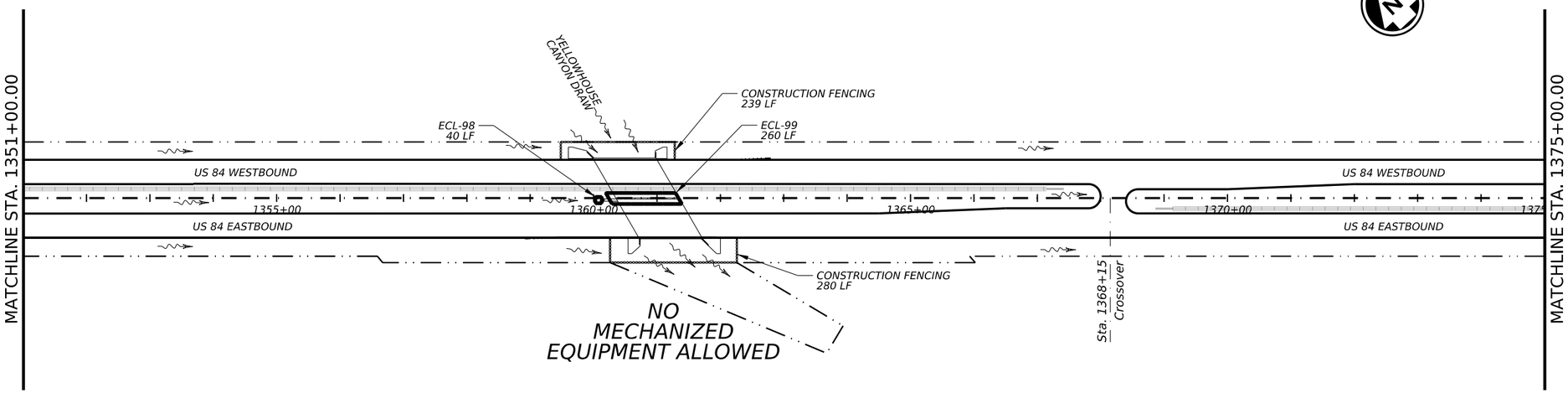

Legend

Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

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SWP3 LAYOUT
(LAMB COUNTY)
SCALE: 1"=200'

SHEET 15 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		251

DATE: 9/30/2024 1:34:22 PM
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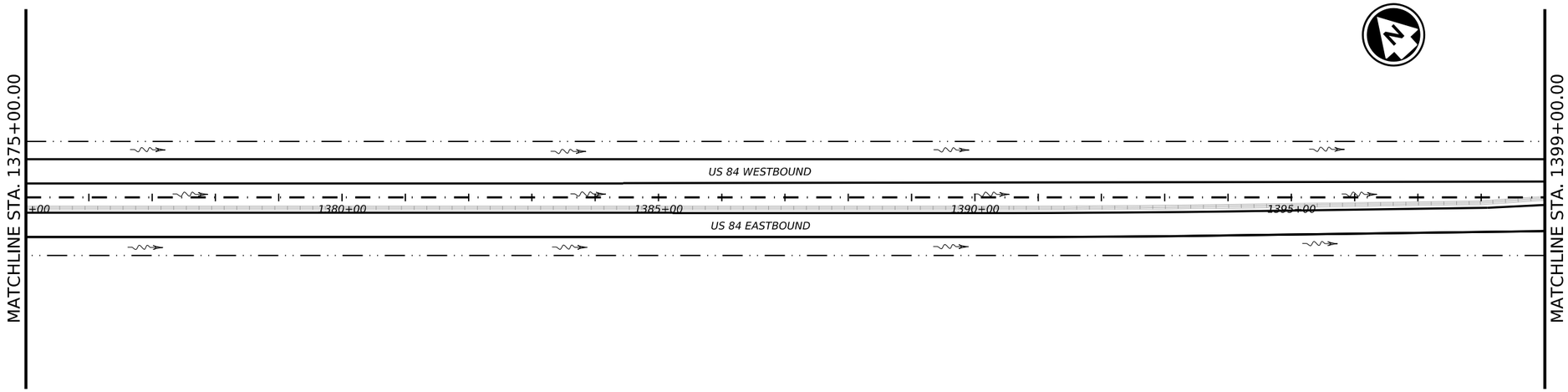

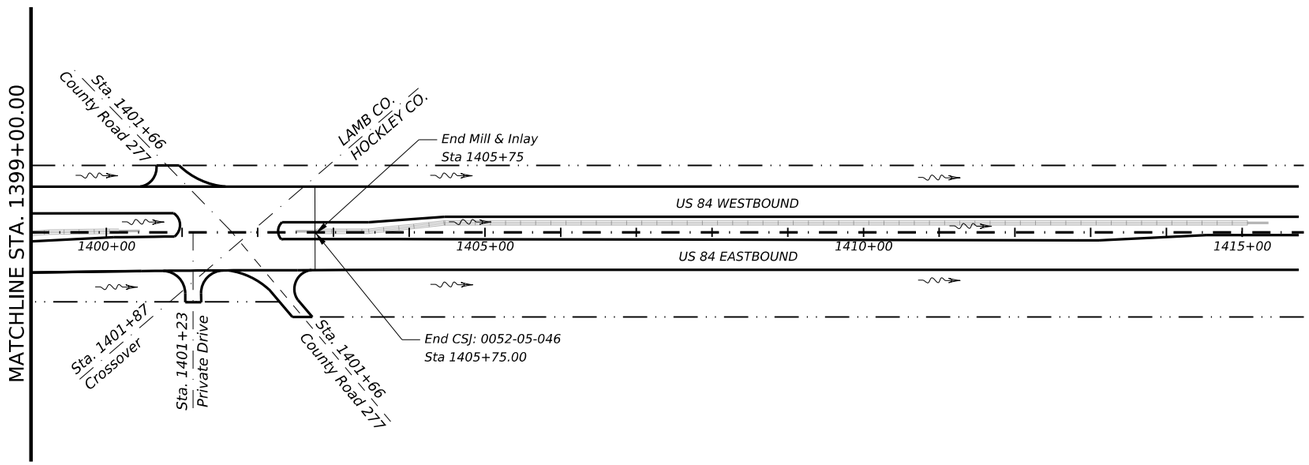

Legend

Flow Arrows	
Erosion Control Logs	
Construction Fence	
Emulsion	
Conc. Riprap	
Prop. Ground Box	
Prop. High Mast Poles	
Prop. Traffic Signals	

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9/30/2024

Texas Department of Transportation

SWP3 LAYOUT (LAMB COUNTY) SCALE: 1"=200'

SHEET 16 OF 16

CONT	SECT	JOB	HIGHWAY
0052	05	046, ETC.	US 84
DIST	COUNTY		SHEET NO.
LBB	LAMB, ETC.		252

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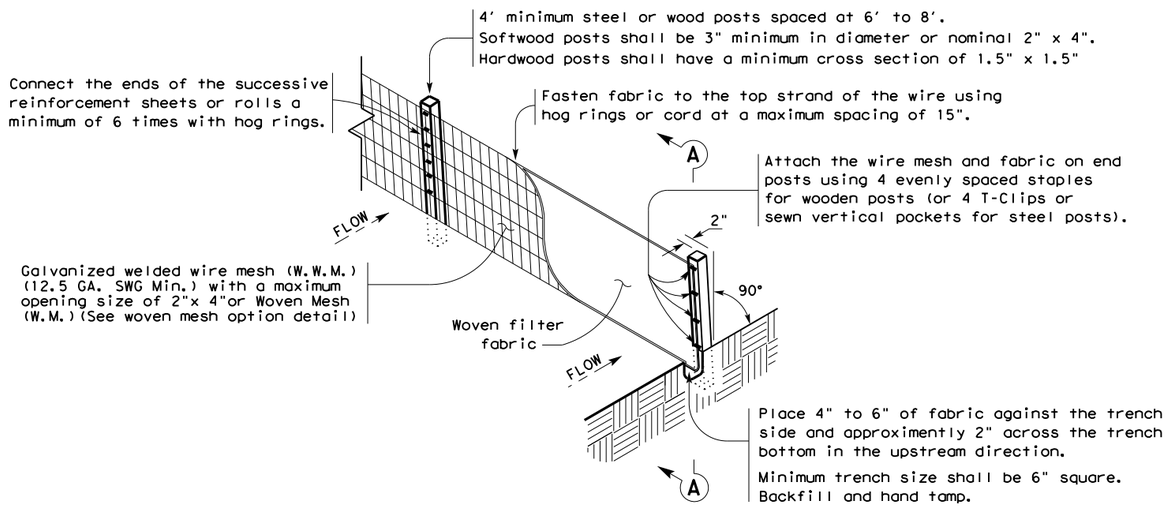
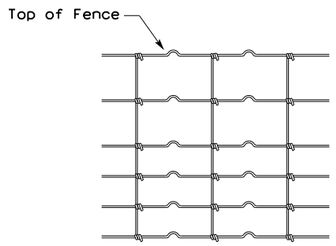
CK | DW | CK | DW

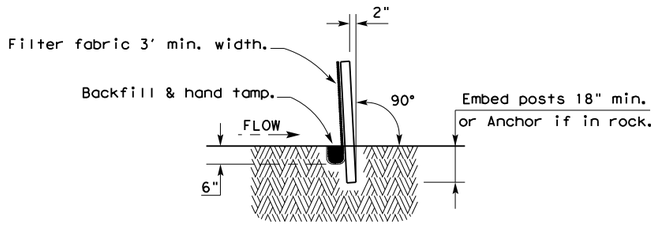
9/30/2024
pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/9. Environmental/STANDARDS/ec116.dgn



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

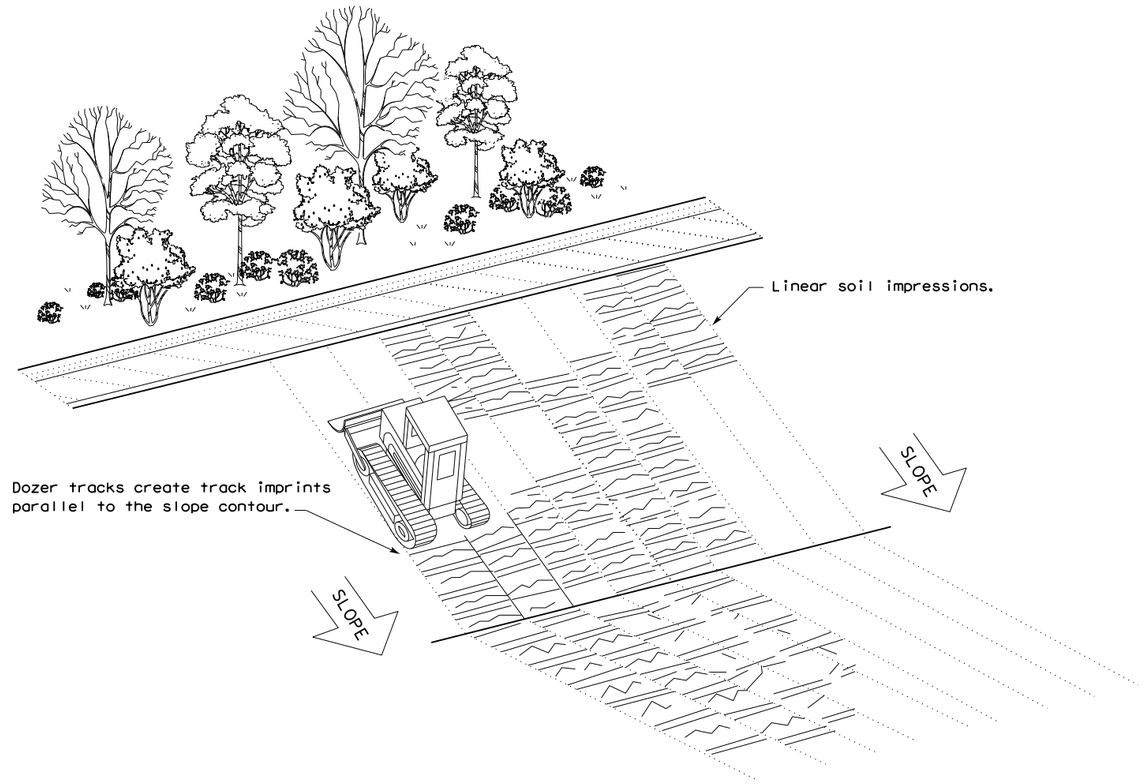
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

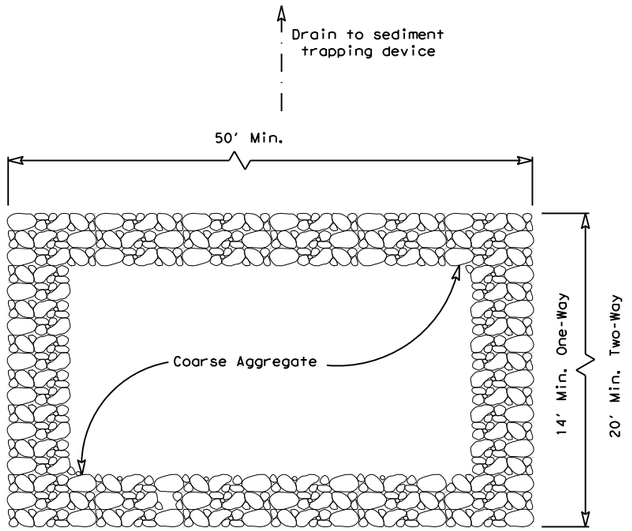
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

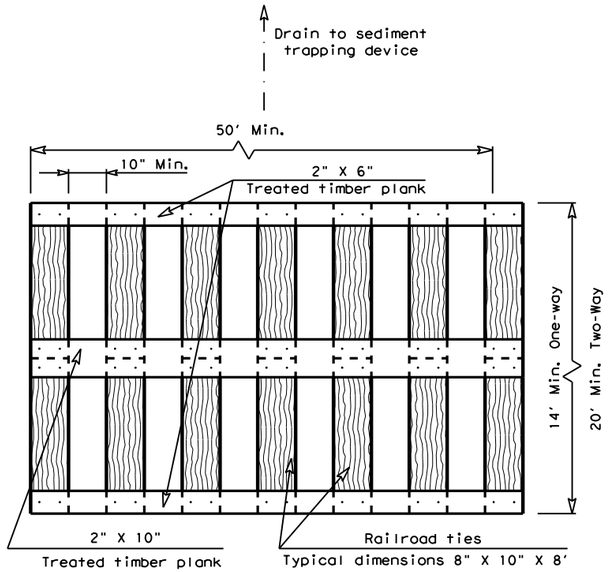
EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB			HIGHWAY	
REVISIONS	0052	05	046, ETC.			US 84	
	DIST	COUNTY				SHEET NO.	
	LBB	LAMB, ETC.				253	

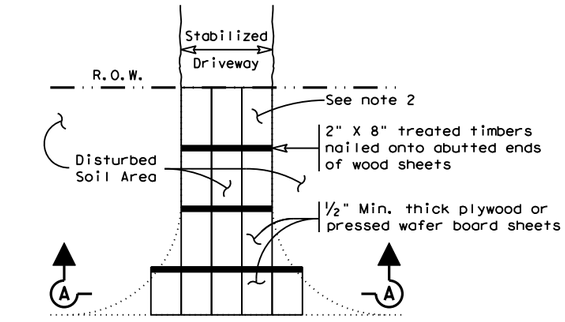
DATE: 9/30/2024
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/9. Environmental/STANDARDS/ec316.dgn



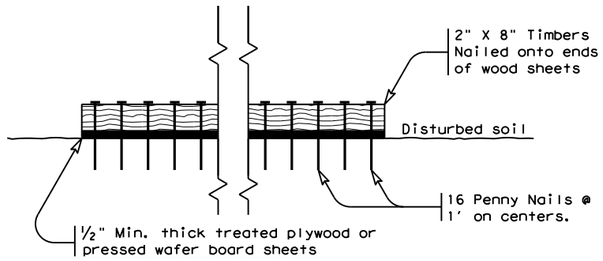
PLAN VIEW



PLAN VIEW



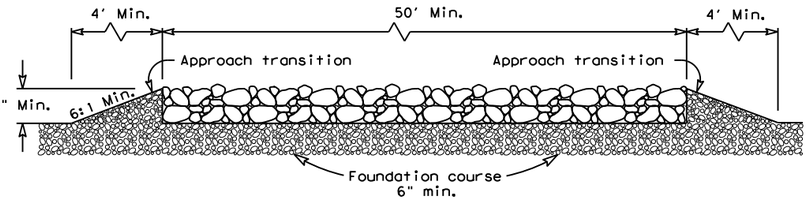
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

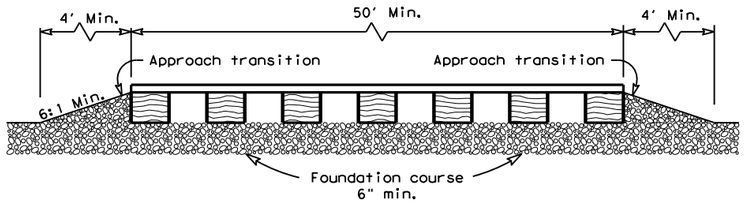
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

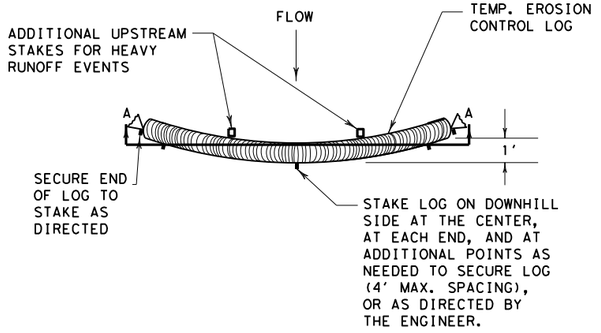
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

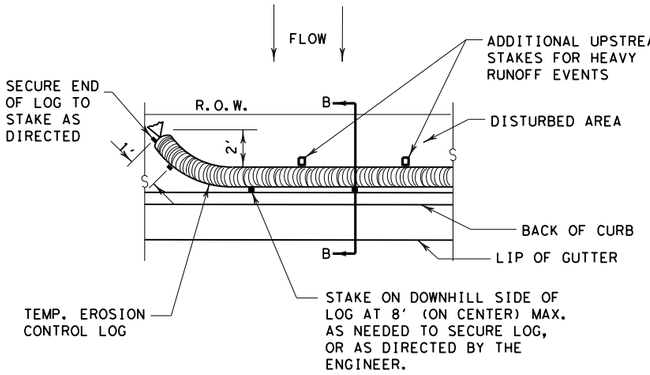
EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		254

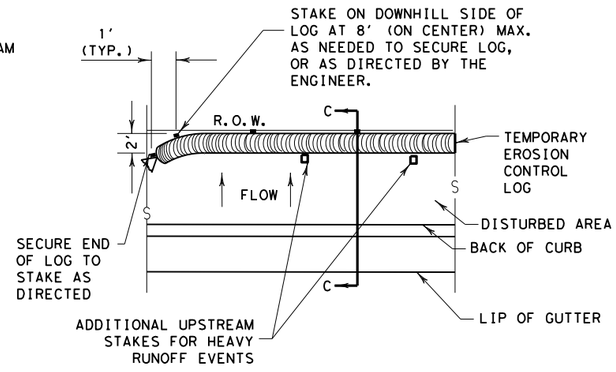
DATE: 9/30/2024
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/9. Environmental/STANDARDS/ec916.dgn



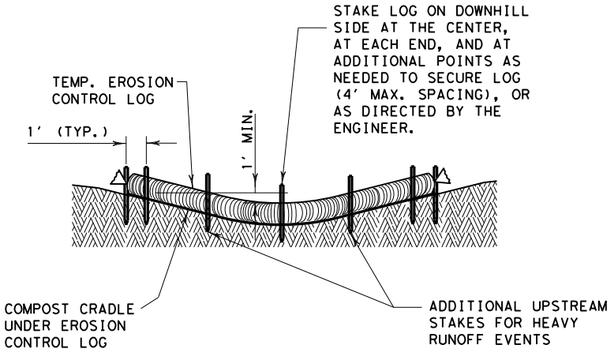
PLAN VIEW



PLAN VIEW



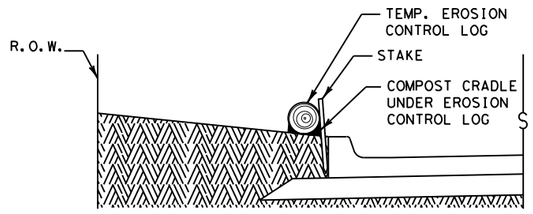
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

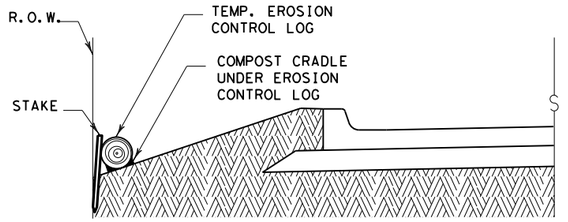
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

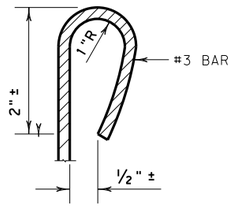
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



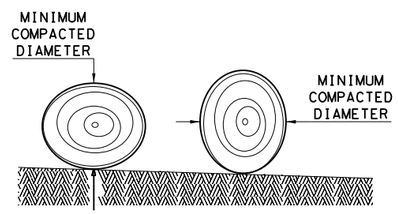
REBAR STAKE DETAIL

LEGEND

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

GENERAL NOTES:

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



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.

Texas Department of Transportation

Design Division Standard

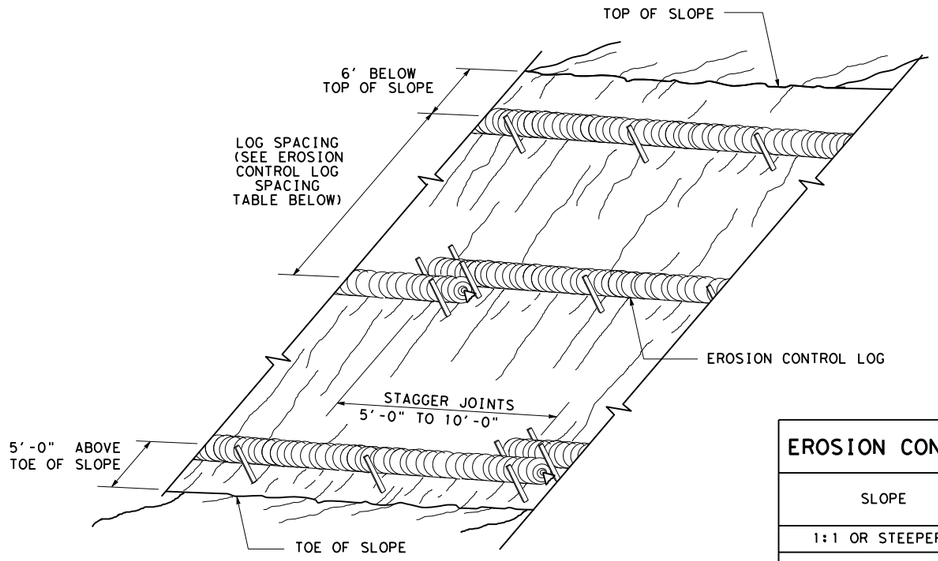
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

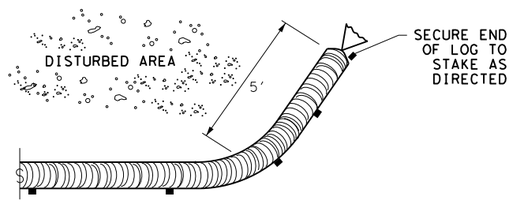
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		255

DATE: 9/30/2024
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/005205046/4 - Design/Plan Set/9. Environmental/STANDARDS/ec916.dgn



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

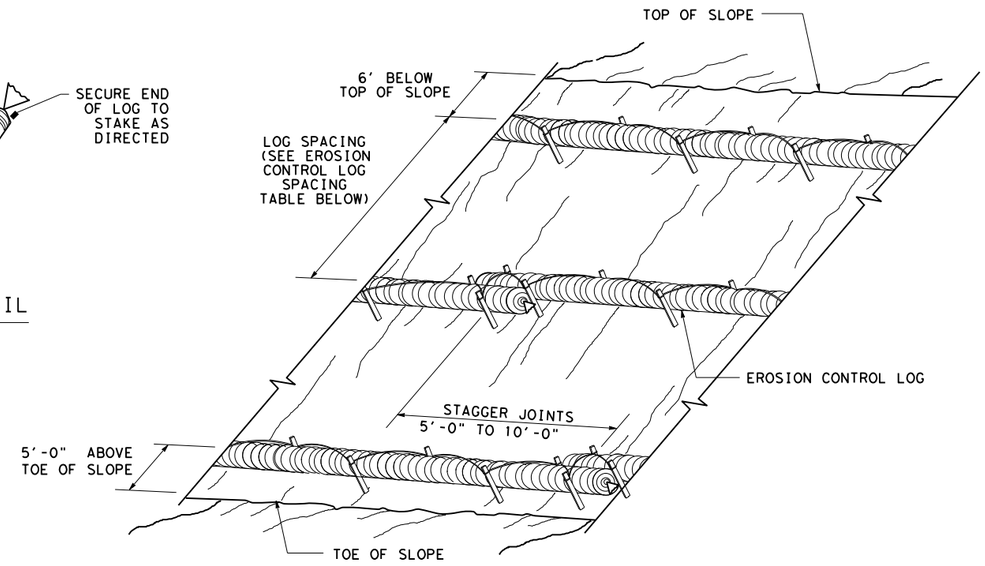
CL-SST



END SECTION RAP DETAIL

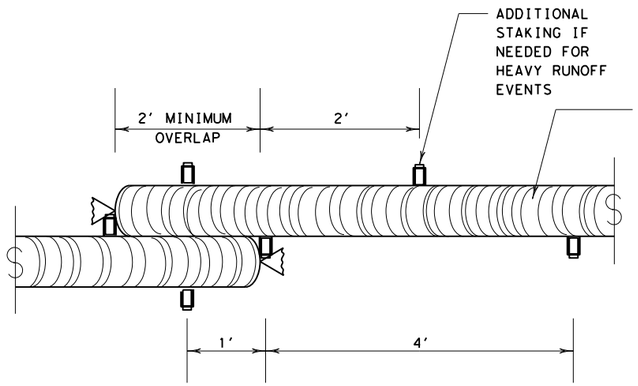
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

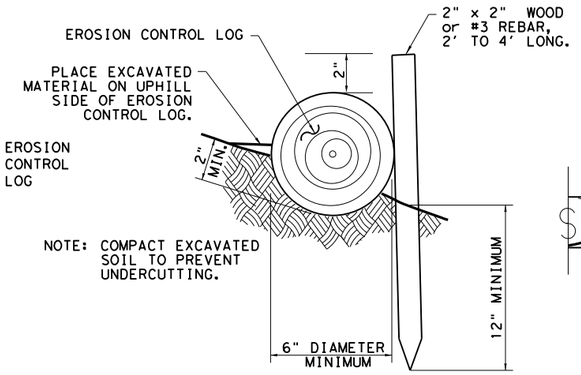
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

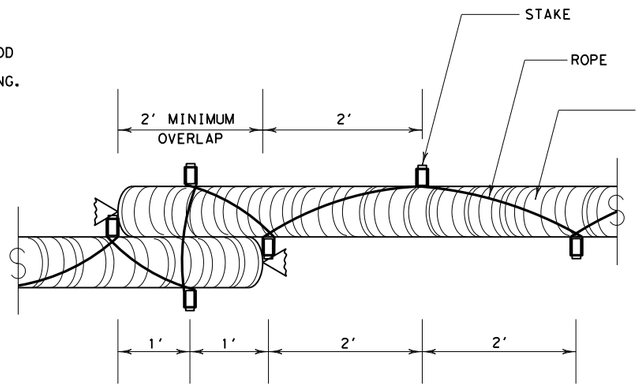


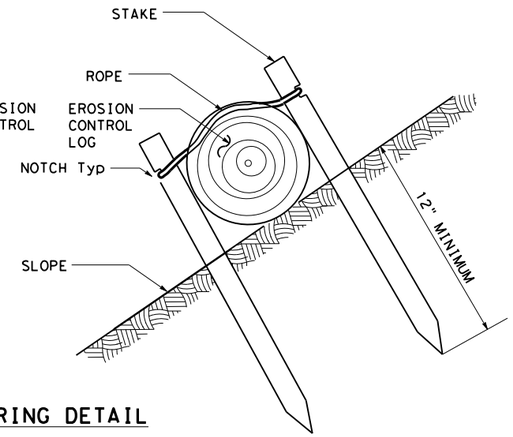


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

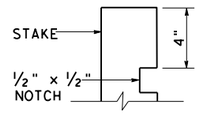
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



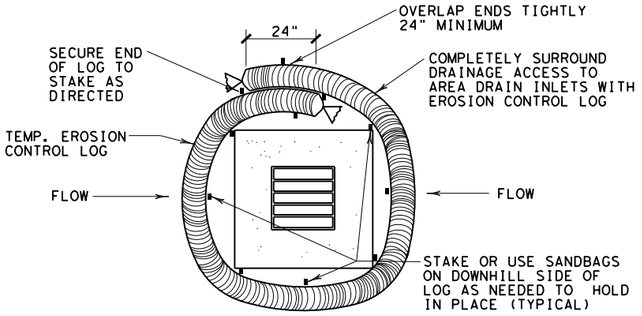
STAKE NOTCH DETAIL

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

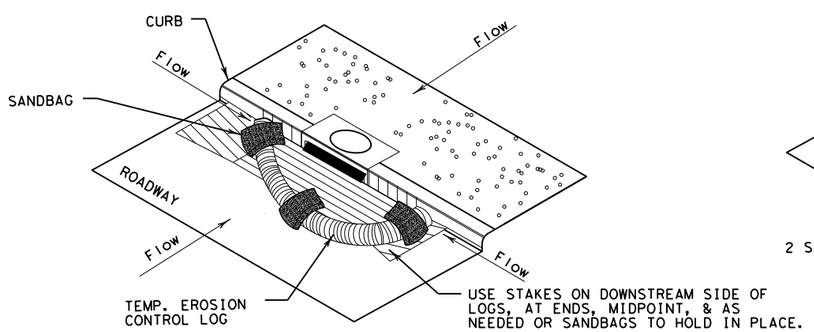
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		256

DATE: 9/30/2024
FILE: pw://txdot.projectwiseonline.com:TxDOT2/Documents/05 - LBB/Design Projects/0052050046/4 - Design/Plan Set/9. Environmental/STANDARDS/ec916.dgn



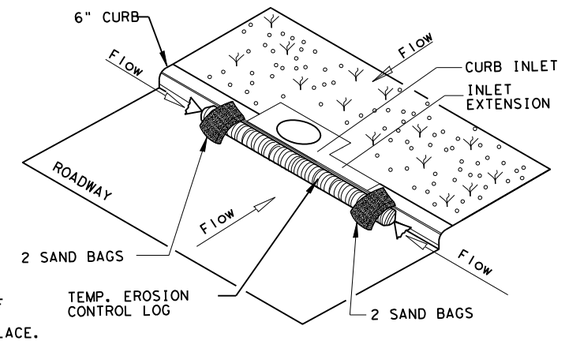
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

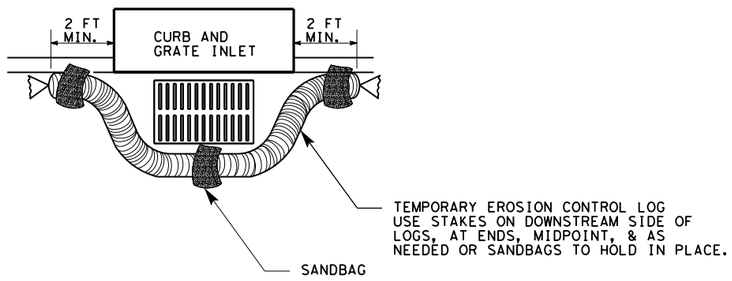
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

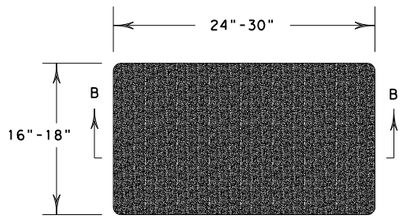
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS		
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0052	05	046, ETC.		US 84	
	DIST	COUNTY			SHEET NO.	
	LBB	LAMB, ETC.			257	

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. None

2.

☐ No Action Required ☒ Required Action

Action No.

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

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

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

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	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

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. Comply with Executive Order 13112 on Invasive Plant Species.
2. Comply with TxDOT Executive Memorandum on beneficial landscaping.
3. Comply with temporary and permanent vegetation stabilization protocols of the SW3P.

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. Do not handle or harm Texas horned lizards, prairie dogs, barn swallows or burrowing owls.
2. No prairie dog towns can be damaged or crossed with equipment without approval of the Engineer.
3. No nests of burrowing owls (in prairie dog holes) can be disturbed or damaged (See General Notes).
4. No nests of barn swallows (likely on structures such as bridges) can be disturbed or damaged (See General Notes).
5. Obey the Bald and Golden Eagle Protection Act. Do not handle, harm, capture, disturb, or kill the species. Do not handle, harm, or take nests, eggs, feathers, bones, or eagles.
6. Obey the Migratory Bird Treaty Act of 1916, of which details there cannot be any handling or harming of migratory bird species; including their eggs, nests, or feathers.

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.

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.

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):

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

VII. OTHER ENVIRONMENTAL ISSUES

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

☐ No Action Required ☒ Required Action

Action No.

1. Maintain equipment muffler systems and work hour restrictions to reduce traffic noise.
2. No PSL's may be located in the prairie dog towns, playa lakes (wet or dry) or stream beds (wet or dry).
3. No dumping of construction material in playa lakes or stream beds regardless of property owner requests.
4. Contractor must obtain historical and archaeological clearances for off-site PSL's.
5. Contractor is responsible for air quality permits for concrete and asphalt batch and similar plants.
6. Contractor is responsible for water appropriation or impoundment TCEQ permits.
7. Contractor will protect environmentally sensitive areas with fencing, work sequencing or scheduling as directed.
8. PSL's beyond the project right-of-way have "individual operator" status under the TPDES Construction General Permit and the Contractor is responsible for the SWP3 and any TCEQ permits.
9. No waste material of any type may be placed at any location where it could be washed into a water of the U.S. or a surface water of Texas.
10. Flood elevations will not be increased to a level that would violate flood plain regulations or ordinances.
11. Contractor shall remove all construction debris daily from the waterway by close of business, where applicable.
12. The SWP3, including best management practices, must be in-place prior to disturbing soil.
13. No mechanized equipment may enter YellowHouse Draw.

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 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0052	05	046, ETC.	US 84
	DIST	COUNTY		SHEET NO.
	LBB	LAMB, ETC.		258