PROJECT NO.			SHEET NO.
C1137-2-42,ETC			1
STATE	DISTRICT	COUNTY	
TX	PHR	CAMERON	
CONTROL	SECTION	JOB	HIGHWAY NO.
1137	02	042,ETC.	SL 499,ETC.

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT
STATE HIGHWAY NUMBER C 1137-02-042, Etc
CSJ: 1137-02-042, ETC.

NET LENGTH OF PROJECT = 8.169 MILES

CAMERON COUNTY
SL 499, ETC.

LIMITS: VARIOUS LOCATIONS

FOR THE CONSTRUCTION OF:
PREVENTATIVE MAINTENANCE
CONSISTING OF MILLING, OVERLAY, & PAVEMENT MARKINGS

FINAL PLANS

DATE OF LETTING: _____

DATE WORK BEGAN: _____

DATE WORK COMPLETED: _____

DATE WORK ACCEPTED: _____

FINAL CONTRACT COST: _____

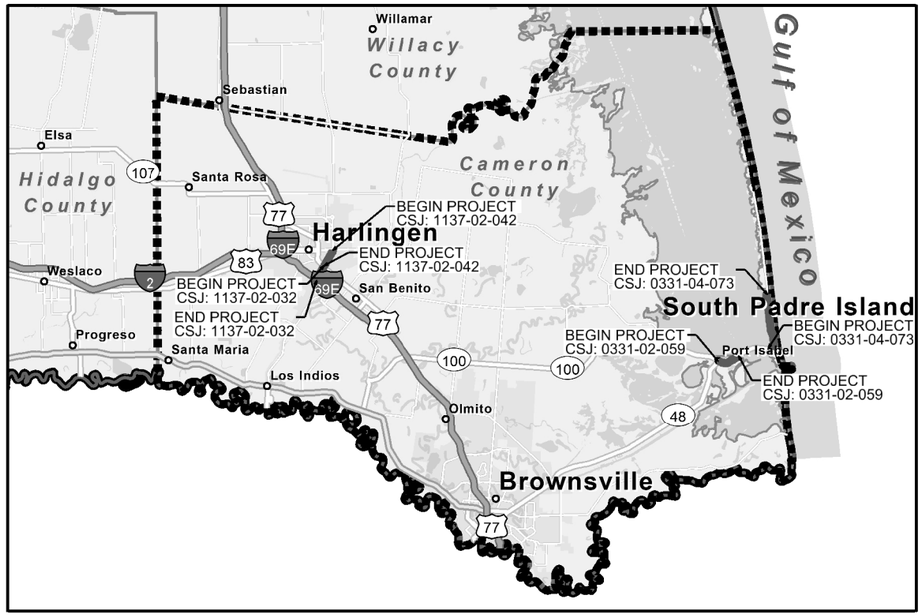
CONTRACTOR: _____

LIST OF APPROVED FIELD CHANGES, CHANGE ORDERS & SUPPLEMENTAL AGREEMENTS:

THIS IS TO CERTIFY THAT ALL CONSTRUCTION SUBSTANTIAL WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS SPECIFICATIONS AND CONTRACT. ALL PROPOSED CONSTRUCTION WAS COMPLETED UNLESS OTHERWISE NOTED.

ANDRES A. ESPINOZA, P.E.
SAN BENITO AREA ENGINEER

DATE



LOCATION MAP NOT TO SCALE

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: LOCATION 4

INDEX OF SHEETS
SEE SHEET No. 2

LOCATION #1
ADT: 23,248 (2021)
32,547 (2041)
FUNCTION CLASSIFICATION: PRINCIPAL ARTERIAL

LOCATION #2
ADT: 28,703 (2021)
40,184 (2041)
FUNCTION CLASSIFICATION: PRINCIPAL ARTERIAL

LOCATION #3
ADT: 21,637 (2021)
29,859 (2041)
FUNCTION CLASSIFICATION: PRINCIPAL ARTERIAL

LOCATION #4
ADT: 35,788 (2021)
50,103 (2041)
FUNCTION CLASSIFICATION: PRINCIPAL ARTERIAL

APPROVED FOR LETTING: DATE: 11/22/2023

DocuSigned by:
Pedro R. Alvarez
EABA335C2DAA48C...
DISTRICT ENGINEER

SUBMITTED FOR LETTING: DATE: 11/20/2023

DocuSigned by:
Eugene Calvin
8325CC1071A9427...
PROJECT ENGINEER

RECOMMENDED FOR LETTING: DATE: 11/22/2023

DocuSigned by:
Juan A. Sustaita Jr
E353D62C01B2433...
DIRECTOR OF MAINTENANCE

NO TDLR INSPECTION REQUIRED

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION ON NOVEMBER 1, 2014 AND SPECIFICATIONS ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON. THIS PROJECT. SPECIAL LABOR PROVISIONS FOR STATE PROJECTS. (SP 000-008).

	SHEET NO	DESCRIPTION
		GENERAL
	1	TITLE SHEET
	2	INDEX OF SHEETS
	3	COUNTY LAYOUT
	4-5	LOCATION MAPS
	6-7	SL 499 LOCATION #1 TYPICAL SECTIONS
	8-9	SH 100 LOCATION #2 TYPICAL SECTIONS
	10-11	PR 100 LOCATION #3 TYPICAL SECTIONS
	12	SL 499 LOCATION #4 TYPICAL SECTIONS
	13, 13A-13E	GENERAL NOTES
	14-15	ESTIMATE & QUANTITY SHEET
	16-20	BASIS OF ESTIMATE
	21	PAVEMENT STRUCTURE REPAIR SUMMARY SHEET
		TRAFFIC CONTROL PLAN STANDARDS
*	22-33	[S] BC (1)-21 THRU BC (12)-21
*	34	[S] TCP (1-1)-18
*	35	[S] TCP (1-3)-18
*	36	[S] TCP (1-4)-18
*	37	[S] TCP (1-5)-18
*	38	[S] TCP (2-1)-18
*	39	[S] TCP (2-3)-23
*	40	[S] TCP (2-4)-18
*	41	[S] TCP (2-6)-18
*	42	[S] TCP (3-1)-13
*	43	[S] TCP (3-2)-13
*	44	[S] TCP (3-3)-14
*	45	[S] WZ (STPM)-23

	SHEET NO	DESCRIPTION
		TRAFFIC ITEMS STANDARDS
*	101	[S] PM(1)-22
*	102	[S] PM(2)-22
*	103	[S] PM(3)-22
*	104	[S] PM(4)-22A
*	105	[S] BLPM-10
*	106	[S] D & OM(1)-20
*	107	[S] D & OM(2)-20
*	108	[S] D & OM(4)-20
*	109	[S] D & OM(6)-20
*	110	[S] LD (1)-03
*	111	[S] LD (2)-03
		RAILROAD CROSSING & RAILROAD STANDARD
	112	UNION PACIFIC RAILROAD LOCATION #4 CROSSING MAP
	113	RAILROAD SCOPE OF WORK
	114-115	RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS
	116	[S] RCD (1)-22
	117	[S] RCD (2)-22
		ENVIRONMENTAL ISSUES
	118-119	ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)
	120-122	TWPD BMPS
	123-124	TXDOT STORMWATER POLLUTION PLAN (SW3P)
		ENVIRONMENTAL ISSUES STANDARDS
*	125-127	[S] EC(9)-16

ROADWAY DETAILS

46-52	SL 499 LOCATION #1 & #4 PAVING PLAN LAYOUT
53-56	SH 100 LOCATION #2 PAVING PLAN LAYOUT
57-69	PR 100 LOCATION #3 PAVING PLAN LAYOUT
70	SL 499 LOCATION #1 METAL BEAM GUARD FENCE REMOVAL PLAN

ROADWAY DETAILS STANDARDS

71	[S] GF(31)-19
72	[S] GF(31)MS-19
73-74	[S] GF(31)TR TL3-20
75	[S] SGT(12S)31-18
76	[S] SGT(15)31-20

TRAFFIC ITEMS

77-83	SL 499 LOCATION #1 & #4 PAVEMENT MARKING LAYOUT
84-87	SH 100 LOCATION #2 PAVEMENT MARKING LAYOUT
88-100	PR 100 LOCATION #3 PAVEMENT MARKING LAYOUT

LEGEND

[S] STATE STANDARDS

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

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

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED
PROFESSIONAL ENGINEER

11/6/2023

Texas Department of Transportation

INDEX OF SHEETS

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		2

OVERLAY LOCATIONS

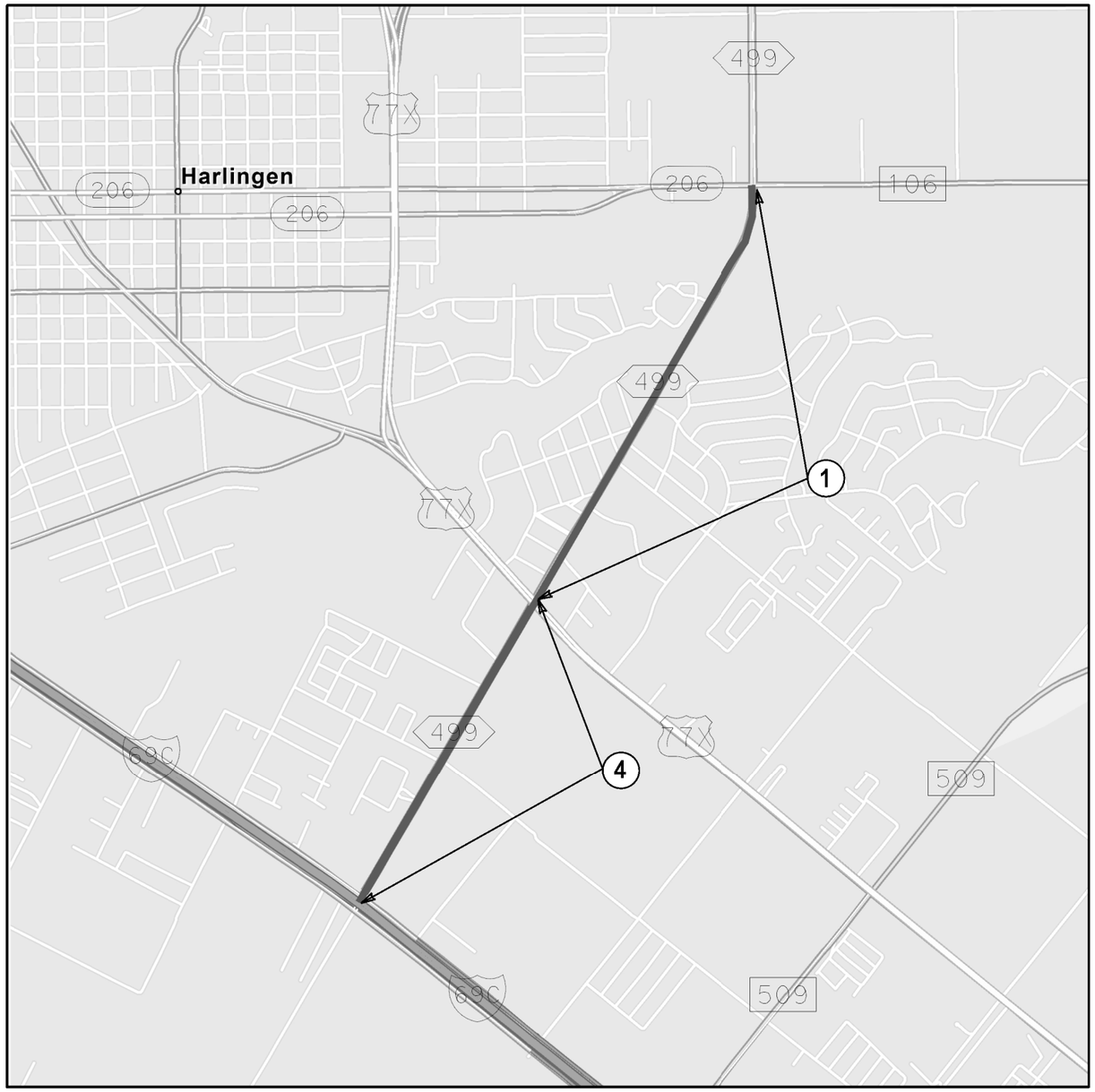
LOC. NO.	LENGTH	
	ROADWAY	MILES
1	SL 499	1.331
2	SH 100	1.524
3	PR 100	4.366
4	SL 499	0.948
	Project Total:	8.169

Texas Department of Transportation

COUNTY LAYOUT

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		3

LOCATION MAPS



N

LOC. NO.	CSJ	ROADWAY	FROM	TO	LENGTH (MI)
1	1137-02-042	SL 499	FM 106	BU 77X	1.331
4	1137-01-032	SL 499	BU 77X	IH 69E	0.948

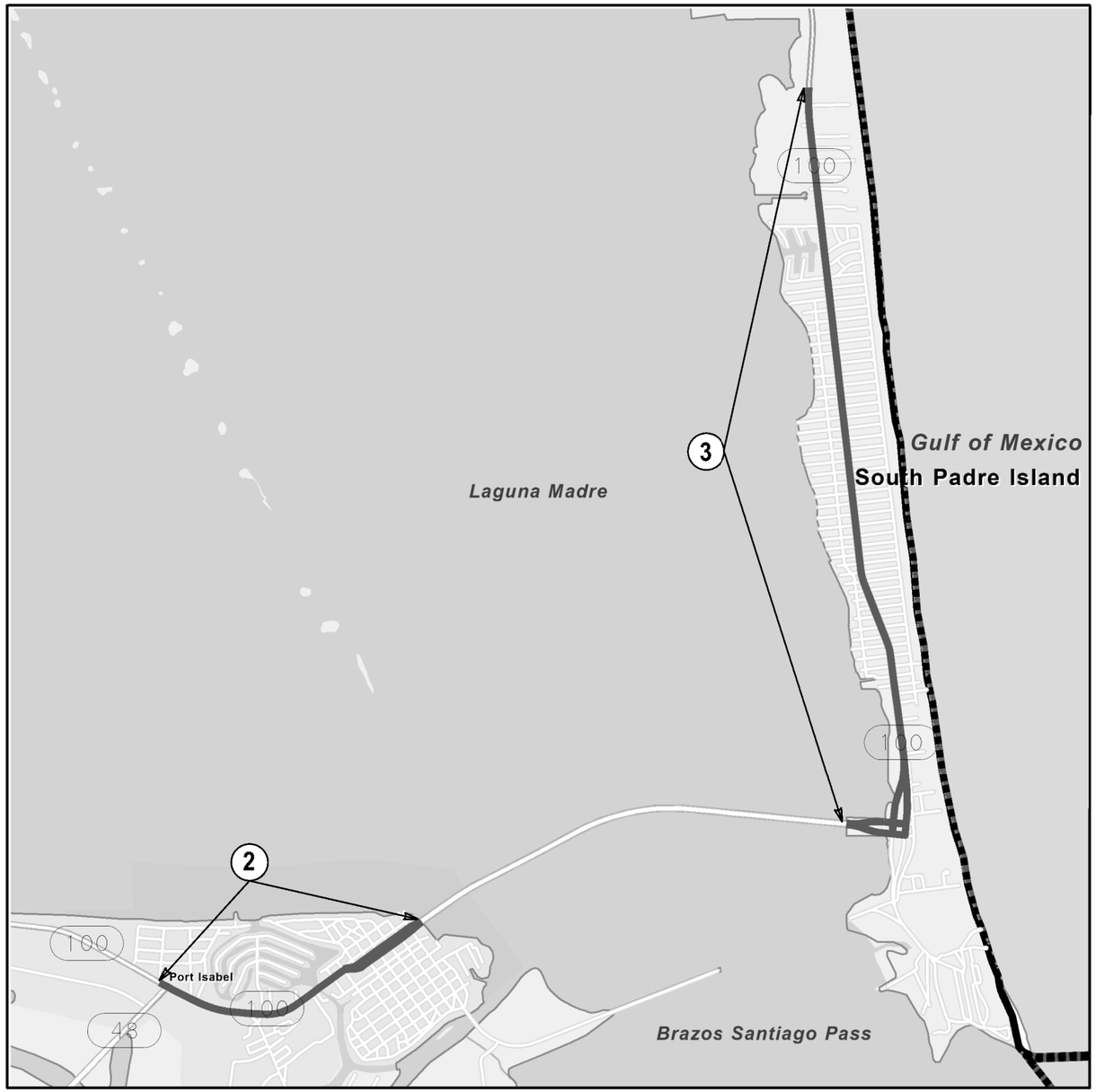
Texas Department of Transportation

LOCATIONS MAPS -
LOCATIONS 1 & 4

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		4

LOCATION MAPS

LOC. NO.	CSJ	ROADWAY	FROM	TO	LENGTH (MI)
2	0331-02-059	SH 100	SH 48	Queen Isabella Causeway	1.524
3	0331-04-073	PR 100	Orca Circle	Queen Isabella Causeway	4.366

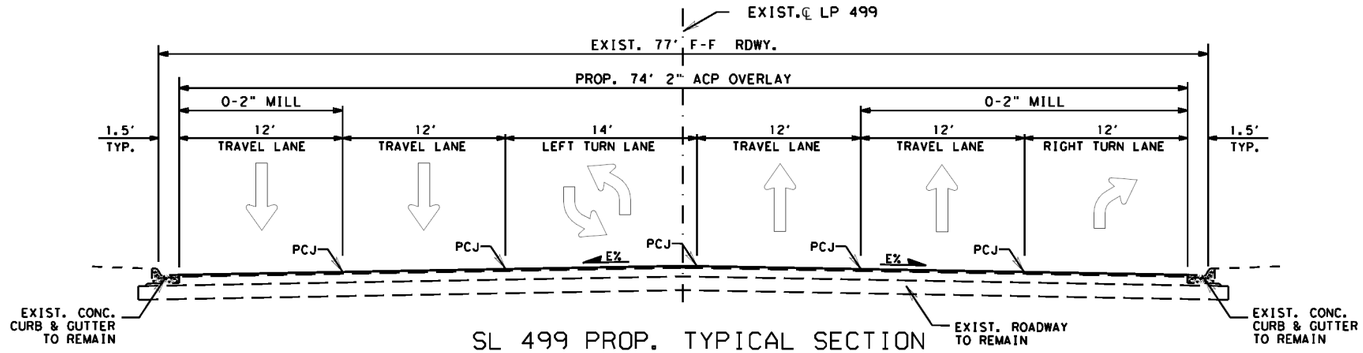


Texas Department of Transportation

LOCATION MAPS - LOCATIONS 2 & 3

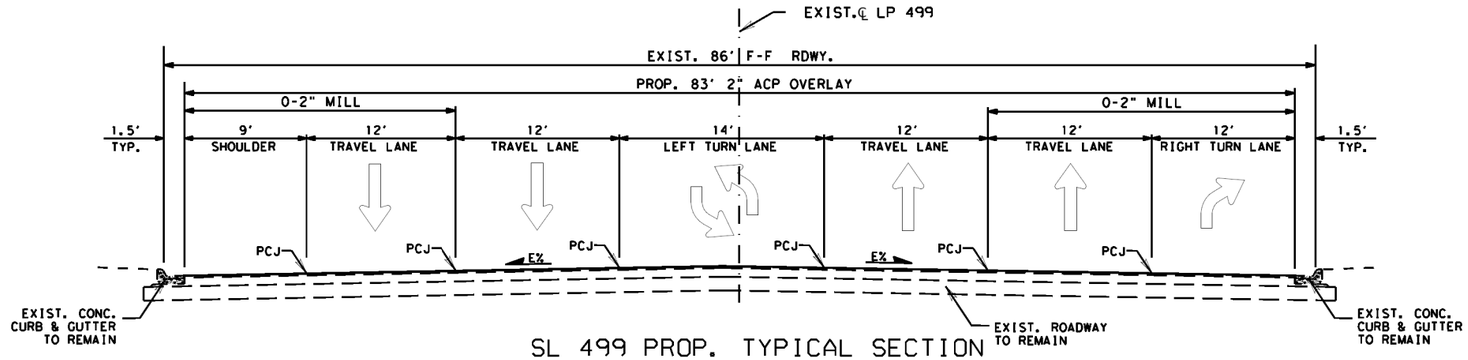
SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		5



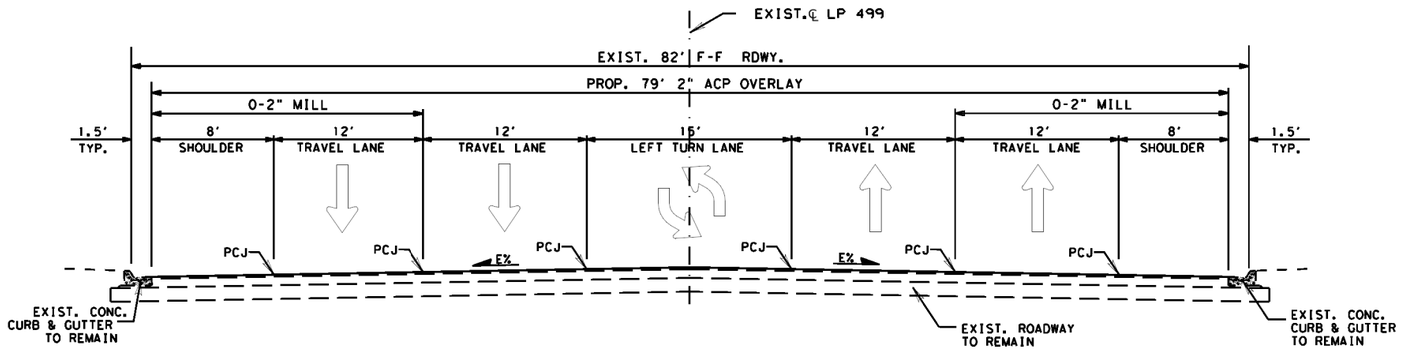
SL 499 PROP. TYPICAL SECTION

STA. 154+77 TO STA. 160+80
STA. 160+80 TO STA. 164+60 (TRANSITION)



SL 499 PROP. TYPICAL SECTION

STA. 164+60 TO STA. 169+00
STA. 169+00 TO STA. 169+75 (TRANSITION)



SL 499 PROP. TYPICAL SECTION

STA. 169+75 TO STA. 187+40
STA. 187+40 TO STA. 192+09 (TRANSITION)

LEGEND

EXIST.	EXISTING
RDWY.	ROADWAY
PROP.	PROPOSED
SHLDR	SHOULDER
ACP	ASPHALT CONCRETE PAVEMENT
NB	NORTH BOUND
WB	WEST BOUND
EB	EAST BOUND
SB	SOUTH BOUND
N.T.S	NOT TO SCALE
F-F	FACE TO FACE
PCJ	PERMISSIBLE CONSTRUCTION JOINT
E	EXISTING CROSS SLOPE

NOTES

1. WHERE PERMISSIBLE, OR UNLESS DIRECTED BY THE ENGINEER, PERMISSIBLE CONSTRUCTION JOINTS SHALL FALL ON STRIPING LINES AS SHOWN.
2. FOR STRIPING CONFIGURATION SEE PAVEMENT MARKING DETAILS.
3. PROPOSED BONDING COURSE RATE 0.07 GAL/SY IS FOR ESTIMATING PURPOSES ONLY. RATE TO BE ADJUSTED IN THE FIELD AS PER SPEC AND THE ENGINEER.
4. SEE BASIS OF BASIS OF ESTIMATE PLAN SHEETS FOR FOR TRANSITION AREA QUANTITIES.

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED PROFESSIONAL ENGINEER

11/6/2023

N. T. S.

Texas Department of Transportation

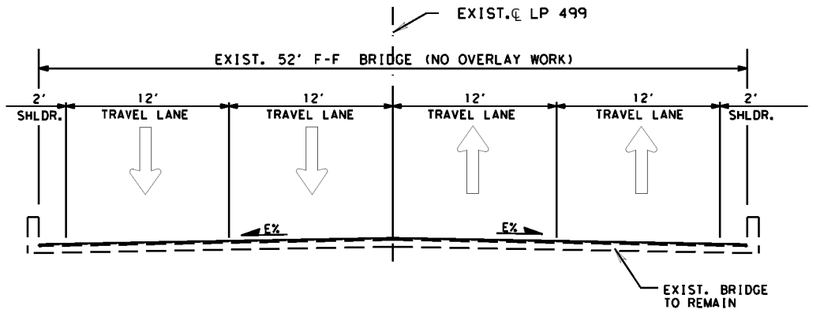
SL 499
LOCATION 1
TYPICAL SECTIONS

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		6

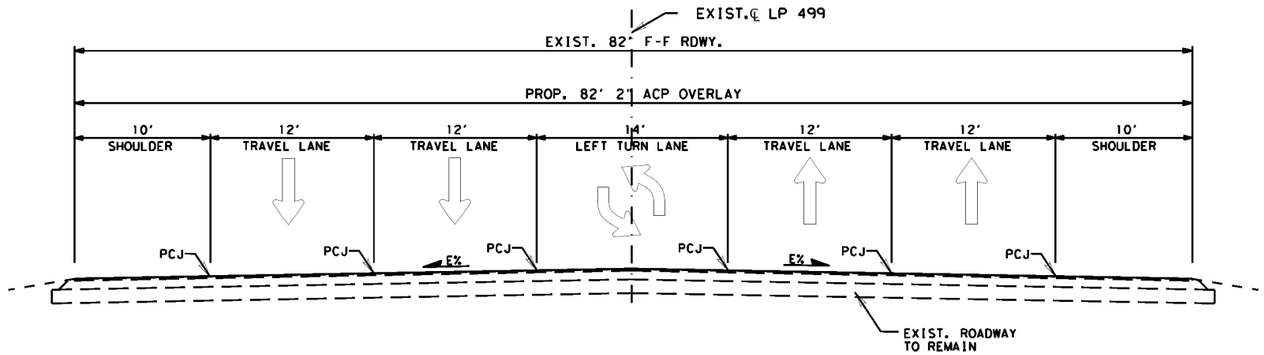
LEGEND

EXIST. - EXISTING
RDWY. - ROADWAY
PROP. - PROPOSED
SHLDR - SHOULDER
ACP - ASPHALT CONCRETE PAVEMENT
NB - NORTH BOUND
WB - WEST BOUND
EB - EAST BOUND
SB - SOUTH BOUND
N.T.S - NOT TO SCALE
F-F - FACE TO FACE
PCJ - PERMISSIBLE CONSTRUCTION JOINT
E - EXISTING CROSS SLOPE



SL 499 PROP. TYPICAL SECTION

STA. 192+09 TO STA. 202+50 (CONCRETE BRIDGE)
STA. 202+50 TO STA. 206+60 (TRANSITION)



SL 499 PROP. TYPICAL SECTION

STA. 206+60 TO STA. 221+64
STA. 221+64 TO STA. 225+05 (INTERSECTION)

NOTES

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STATE OF TEXAS
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105110
LICENSED
PROFESSIONAL ENGINEER
11/6/2023

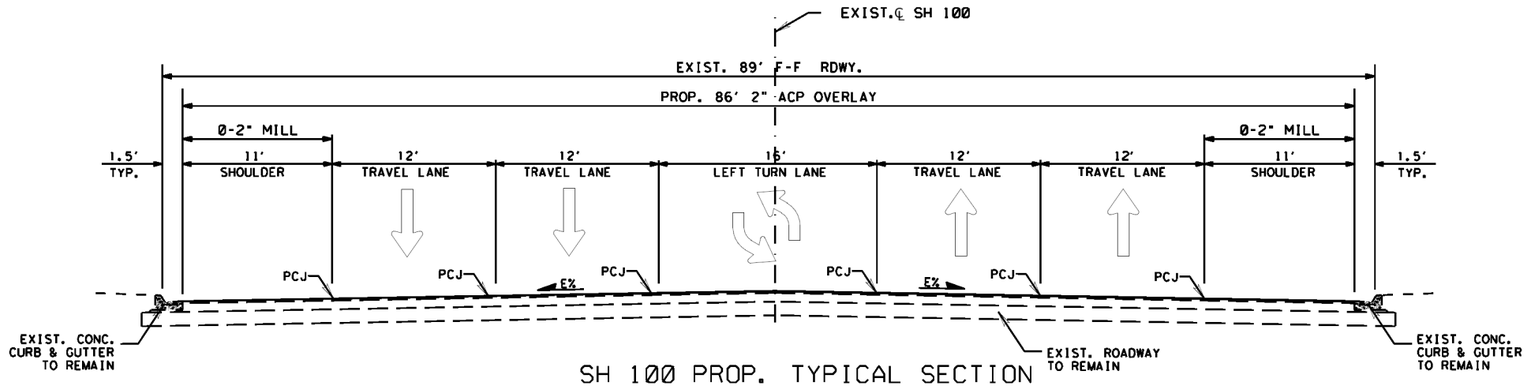
N. T. S.

Texas Department of Transportation

SL 499
LOCATION 1
TYPICAL SECTIONS

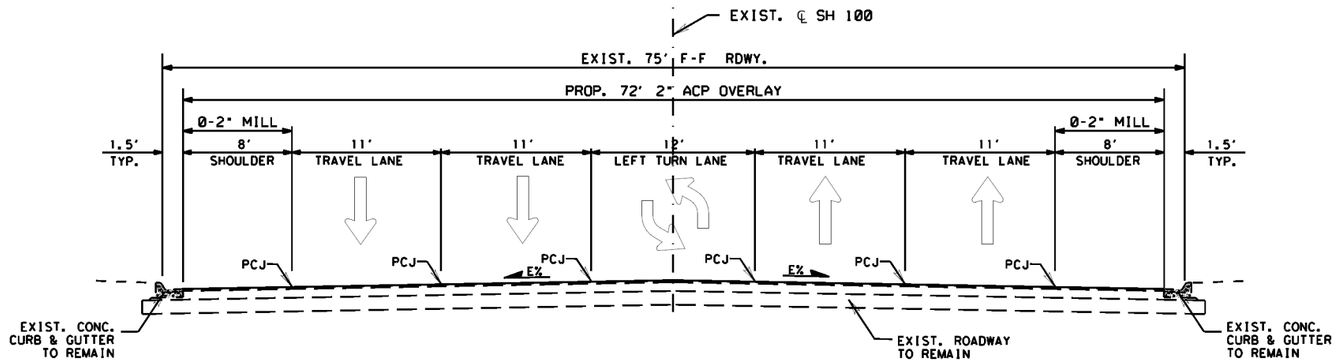
SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		7



SH 100 PROP. TYPICAL SECTION

STA. 100+00 TO STA. 104+50 (TRANSITION)
STA. 104+50 TO STA. 125+00
STA. 125+00 TO STA. 131+50 (TRANSITION)



SH 100 PROP. TYPICAL SECTION

STA. 131+50 TO STA. 147+10
STA. 147+10 TO STA. 148+25 (BRIDGE)
STA. 148+25 TO STA. 155+80
STA. 155+80 TO STA. 157+82 (TRANSITION)

LEGEND

EXIST. - EXISTING
RDWY. - ROADWAY
PROP. - PROPOSED
SHLDR - SHOULDER
ACP - ASPHALT CONCRETE PAVEMENT
NB - NORTH BOUND
WB - WEST BOUND
EB - EAST BOUND
SB - SOUTH BOUND
N.T.S - NOT TO SCALE
F-F - FACE TO FACE
PCJ - PERMISSIBLE CONSTRUCTION JOINT
E - EXISTING CROSS SLOPE

NOTES

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STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED
PROFESSIONAL ENGINEER
11/6/2023

N. T. S.

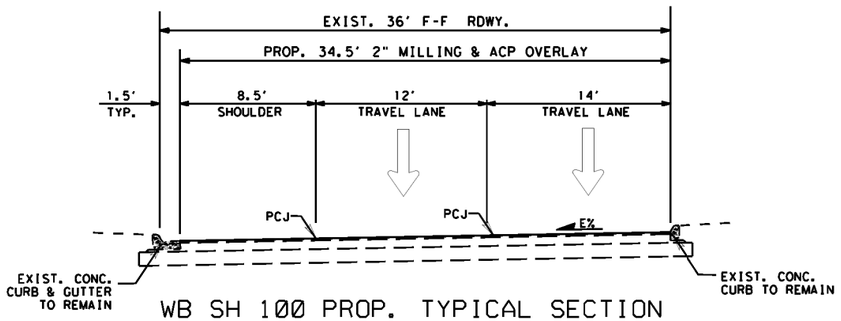
Texas Department of Transportation

SH 100
LOCATION 2
TYPICAL SECTIONS

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		8

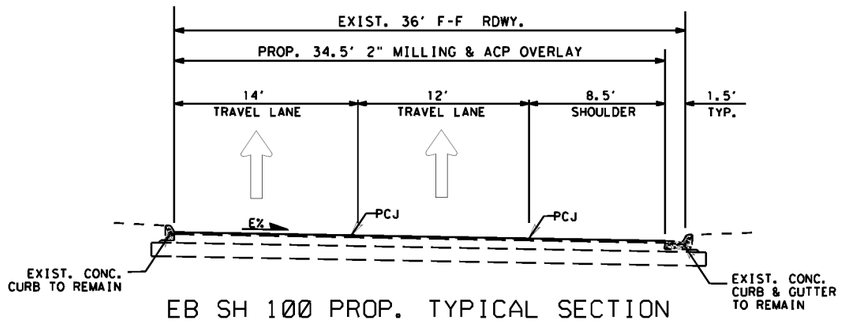
LEGEND

EXIST. - EXISTING
RDWY. - ROADWAY
PROP. - PROPOSED
SHLDR - SHOULDER
ACP - ASPHALT CONCRETE PAVEMENT
NB - NORTH BOUND
WB - WEST BOUND
EB - EAST BOUND
SB - SOUTH BOUND
N.T.S - NOT TO SCALE
F-F - FACE TO FACE
PCJ - PERMISSIBLE CONSTRUCTION JOINT
E - EXISTING CROSS SLOPE



WB SH 100 PROP. TYPICAL SECTION

STA.	157+82	TO STA. 159+80	(TRANSITION)
STA.	159+80	TO STA. 160+40	(CROSSOVER)
STA.	160+40	TO STA. 162+00	(TRANSITION)
STA.	162+00	TO STA. 163+38	
STA.	163+38	TO STA. 163+95	(CROSSOVER)
STA.	163+95	TO STA. 166+00	(TRANSITION)
STA.	166+00	TO STA. 167+00	
STA.	167+00	TO STA. 167+53	(CROSSOVER)
STA.	167+53	TO STA. 169+20	(TRANSITION)
STA.	169+20	TO STA. 170+60	
STA.	170+60	TO STA. 171+10	(CROSSOVER)
STA.	171+10	TO STA. 172+90	(TRANSITION)
STA.	172+90	TO STA. 174+20	
STA.	174+20	TO STA. 174+70	(CROSSOVER)
STA.	174+70	TO STA. 176+50	(TRANSITION)
STA.	176+50	TO STA. 177+80	
STA.	177+80	TO STA. 178+40	(CROSSOVER)
STA.	178+40	TO STA. 180+46	(TRANSITION)



EB SH 100 PROP. TYPICAL SECTION

STA.	157+82	TO STA. 159+80	(TRANSITION)
STA.	159+80	TO STA. 160+40	(CROSSOVER)
STA.	160+40	TO STA. 161+60	
STA.	161+60	TO STA. 163+38	(TRANSITION)
STA.	163+38	TO STA. 163+95	(CROSSOVER)
STA.	163+95	TO STA. 165+20	
STA.	165+20	TO STA. 167+00	(TRANSITION)
STA.	167+00	TO STA. 167+53	(CROSSOVER)
STA.	167+53	TO STA. 168+84	
STA.	168+84	TO STA. 170+60	(TRANSITION)
STA.	170+60	TO STA. 171+10	(CROSSOVER)
STA.	171+10	TO STA. 172+40	
STA.	172+40	TO STA. 174+20	(TRANSITION)
STA.	174+20	TO STA. 174+70	(CROSSOVER)
STA.	174+70	TO STA. 176+10	
STA.	176+10	TO STA. 177+80	(TRANSITION)
STA.	177+80	TO STA. 178+40	(CROSSOVER)
STA.	178+40	TO STA. 180+46	(TRANSITION)

11/6/2023

Eugene Palacios

NOTES

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2. FOR STRIPING CONFIGURATION SEE PAVEMENT MARKING DETAILS.
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4. SEE BASIS OF BASIS OF ESTIMATE PLAN SHEETS FOR FOR TRANSITION AREA QUANTITIES.

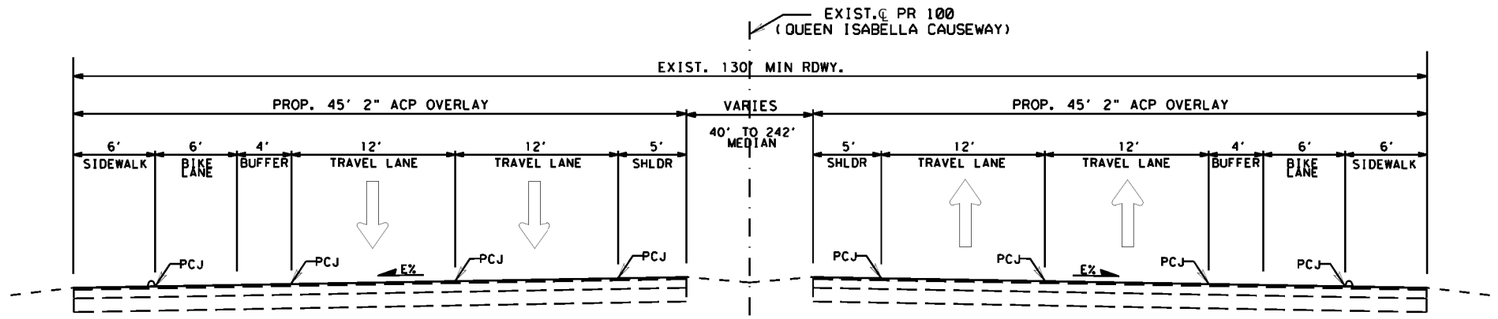
N. T. S.

Texas Department of Transportation

SH 100
LOCATION 2
TYPICAL SECTIONS

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		9



WB PR 100 PROP. TYPICAL SECTION

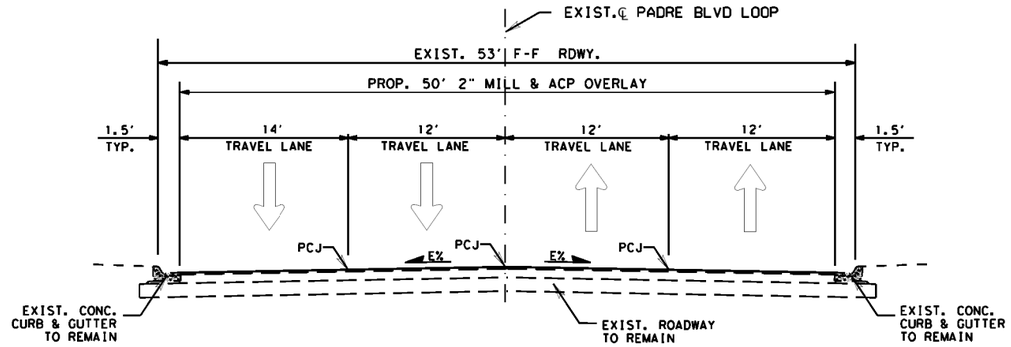
STA. 100+00 TO STA. 101+50 (TRANSITION)
STA. 101+50 TO STA. 103+60
STA. 103+60 TO STA. 109+00 (TRANSITION)
STA. 103+60 TO STA. 110+00 (CROSSOVER)
STA. 110+00 TO STA. 114+85

EB PR 100 PROP. TYPICAL SECTION

STA. 100+00 TO STA. 101+50 (TRANSITION)
STA. 101+50 TO STA. 103+60
STA. 103+60 TO STA. 105+50 (TRANSITION)
STA. 105+50 TO STA. 109+00
STA. 109+00 TO STA. 110+00 (CROSSOVER)
STA. 110+00 TO STA. 112+80
STA. 112+80 TO STA. 114+85 (TRANSITION)

LEGEND

EXIST. - EXISTING
RDWY. - ROADWAY
PROP. - PROPOSED
SHLDR - SHOULDER
ACP - ASPHALT CONCRETE PAVEMENT
NB - NORTH BOUND
WB - WEST BOUND
EB - EAST BOUND
SB - SOUTH BOUND
N.T.S - NOT TO SCALE
F-F - FACE TO FACE
PCJ - PERMISSIBLE CONSTRUCTION JOINT
E - EXISTING CROSS SLOPE



PR 100 PROP. TYPICAL SECTION

STA. 10+00 TO STA. 10+95 (TRANSITION)
STA. 10+95 TO STA. 49+80
STA. 48+80 TO STA. 50+54 (TRANSITION)

NOTES

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4. SEE BASIS OF BASIS OF ESTIMATE PLAN SHEETS FOR FOR TRANSITION AREA QUANTITIES.

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED
PROFESSIONAL ENGINEER
11/6/2023

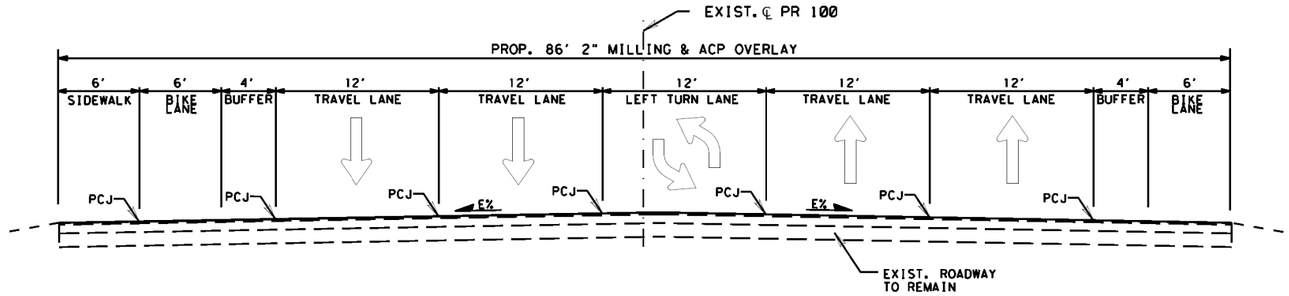
N. T. S.

Texas Department of Transportation

PR 100
LOCATION 3
TYPICAL SECTIONS

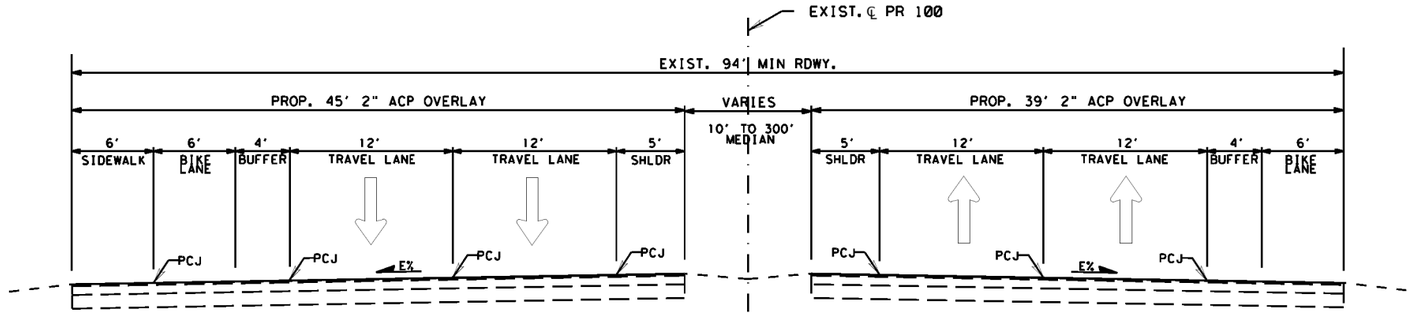
SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		10



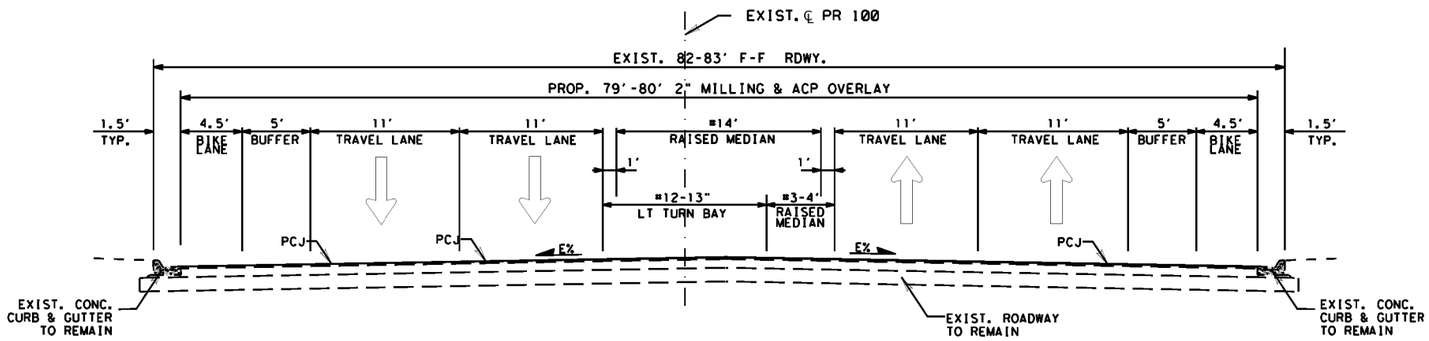
PR 100 PROP. TYPICAL SECTION

STA. 200+00 TO STA. 202+60 (TRANSITION)
STA. 202+60 TO STA. 208+60



PR 100 PROP. TYPICAL SECTION

STA. 208+60 TO STA. 241+50



PR 100 PROP. TYPICAL SECTION

STA. 241+50 TO STA. 430+54

LEGEND

EXIST. - EXISTING
RDWY. - ROADWAY
PROP. - PROPOSED
SHLDR - SHOULDER
ACP - ASPHALT CONCRETE PAVEMENT
NB - NORTH BOUND
WB - WEST BOUND
EB - EAST BOUND
SB - SOUTH BOUND
N.T.S - NOT TO SCALE
F-F - FACE TO FACE
PCJ - PERMISSIBLE CONSTRUCTION JOINT
E - EXISTING CROSS SLOPE

SEE BASIS OF ESTIMATE FOR ADDITIONAL TRANSITION DETAILS

NOTES

1. WHERE PERMISSIBLE, OR UNLESS DIRECTED BY THE ENGINEER, PERMISSIBLE CONSTRUCTION JOINTS SHALL FALL ON STRIPING LINES AS SHOWN.
2. FOR STRIPING CONFIGURATION SEE PAVEMENT MARKING DETAILS.
3. PROPOSED BONDING COURSE RATE 0.07 GAL/SY IS FOR ESTIMATING PURPOSES ONLY. RATE TO BE ADJUSTED IN THE FIELD AS PER SPEC AND THE ENGINEER.
4. SEE BASIS OF BASIS OF ESTIMATE PLAN SHEETS FOR FOR TRANSITION AREA QUANTITIES.

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED
PROFESSIONAL ENGINEER

11/6/2023

N. T. S.

Texas Department of Transportation

PR 100
LOCATION 3
TYPICAL SECTIONS

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		11

LEGEND

EXIST. - EXISTING
RDWY. - ROADWAY
PROP. - PROPOSED
SHLDR - SHOULDER
ACP - ASPHALT CONCRETE PAVEMENT
NB - NORTH BOUND
WB - WEST BOUND
EB - EAST BOUND
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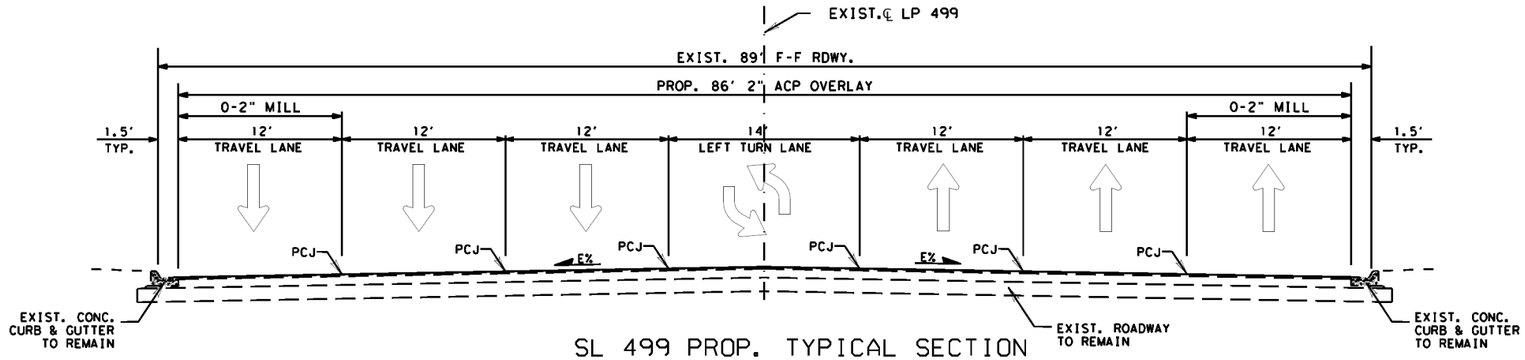


SL 499 PROP. TYPICAL SECTION

STA. 100+00 TO STA. 101+50 (TRANSITION)
STA. 101+50 TO STA. 141+20
STA. 141+20 TO STA. 141+40 (RAILROAD)
STA. 141+40 to STA. 150+06

NOTES

1. WHERE PERMISSIBLE, OR UNLESS DIRECTED BY THE ENGINEER, PERMISSIBLE CONSTRUCTION JOINTS SHALL FALL ON STRIPING LINES AS SHOWN.
2. FOR STRIPING CONFIGURATION SEE PAVEMENT MARKING DETAILS.
3. PROPOSED BONDING COURSE RATE 0.07 GAL/SY IS FOR ESTIMATING PURPOSES ONLY. RATE TO BE ADJUSTED IN THE FIELD AS PER SPEC AND THE ENGINEER.
4. SEE BASIS OF BASIS OF ESTIMATE PLAN SHEETS FOR FOR TRANSITION AREA QUANTITIES.

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED
PROFESSIONAL ENGINEER

11/6/2023

N. T. S.

Texas Department of Transportation

SL 499
LOCATION 4
TYPICAL SECTIONS

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		12

2014 SPECS GENERAL NOTES:

****

General Requirements and Covenants to ITEMS 1 thru 9:
For all pits or quarries, comply with the "Texas Aggregate Quarry and Pit Safety Act."

Provide on a weekly basis a list of equipment, including idle equipment, utilized on the project that week.

The 1-800 call services for utility locations do not include TxDOT facilities. Contact the Pharr District Signal Section (956-702-6225) for coordination regarding TxDOT underground lines.

GENERAL: SP-D Balanced Mix Design
Coordinate the work with the Texas A&M Transportation Institute (TTI) to develop a Balanced Mix Design (SS 3074). The Contractor will provide a mixture design for a SS 3077 Superpave Mixture to TTI. The materials for this mixture design (asphalt binder, aggregate, additives) will also be provided by the Contractor to TTI. After the SS 3077 Superpave mixture design and materials are provided to TTI, a minimum of two months will be needed to develop the SS 3074 Balanced Mix Design for the project. TTI will assist in sampling and perform the Hamburg Wheel Tracking Test (HWTT), Overlay Test, Ideal-RT, and Ideal CT tests then provide results to the Contractor and the Department.

The TTI contact person for this project: Jon A. Epps jepps@tti.tamu.edu, phone no. 979-820-1981. The Department contact person: Travis Patton, P.E. travis.patton@txdot.gov, phone no. 512-506-5841.

1. The Contractor is to provide the mix design information for the SS 3077 Superpave mixture to TTI and samples of the asphalt binder, the aggregates, and any additives (lime, warm mix additive, liquid antistrip, etc.) that the Contractor will use on the project.
2. TTI is to perform Balanced Mix Design Tests on the SS 3077 Superpave mixture. The tests to include HWTT and overlay tests. If the test criteria are met for both of these tests, the SS 3077 mixture meets both the Superpave and Balanced Mix Design Criteria. Then TTI is to perform the Ideal RT (Ideal rutting) and Ideal CT (Ideal cracking) tests.
3. If the Contractor's SS 3077 mix design does not meet the Balanced Mix Design Criteria, TTI will develop a Balanced Mix Design for the aggregates and asphalt binder provided by the Contractor. Typically, gradation and asphalt binder contents can be changed to meet the Balanced Mix design criteria. TTI is to first use the Ideal CT and Ideal RT tests to develop a mixture that meets the Balanced Mix Design Criteria for these two tests. Once these two Ideal test criteria are satisfied, perform the HWTT and overlay tests. This may be an iterative process.
4. If gradation and asphalt binder content changes cannot produce a Balanced Mix Design, it may be necessary to consider other aggregates or asphalt binders. If this is the case, repeat Step 3 until a Balanced Mix Design is obtained. TTI is to work with the Contractor to ensure that the mixture designed is as economical as possible.

Project Number:

County: Cameron **Control:** 1137-02-042, Etc.

Highway: SL 499, Etc.

5. The Contractor is to perform as many of the tests outlined above as directed by the Engineer as part of the mixture design process. One of the goals of this project is to develop Balanced Mix Design expertise in the contracting community.
6. Once a Balance Mix Design is available, the Contractor produces a Trial Batch and depending on the time available, performs the Ideal RT and Ideal CT tests. If additional time is available, perform the HWTT and overlay tests to ensure that the plant's produced mixture meets acceptance criteria.
7. During construction, TTI will provide two technicians to assist the Contractor and the Department with sampling the produced hot mix at a rate of approximately 4 sublots per lot (days production). The Contractor, the Department, and TTI test these samples. Information is to be exchanged among these parties to obtain production variability with mixtures that meet the Balanced Mix Design criteria.
8. Perform control of production during construction as defined in SS 3074 for the project.
9. The Contractor is to have meetings with TTI and the Department before and during the construction of the SP-D Balanced Mix Design. In addition, the amount of materials samples is considerable and more than most projects.
10. TTI is to brief the Contractor and the Department after the testing and test data are available.

The tests and work performed for the above are not paid directly but subsidiary to Item 3074.

ITEM 2: Instructions to Bidders
Contractor questions on this project are to be addressed to the following individual(s):

Andres Espinoza, P.E., Pharr Area Engineer; Andres.Espinoza@txdot.gov
Gabriel Villarreal, P.E., Assist. Area Engineer; Gabriel.Villarreal@txdot.gov

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.

Information found on TxDOT's FTP server will be considered for informational purposes only. Index of /pub/txdot-info/Pre-Letting Responses/Pharr District/21-Pharr District (Construction) (state.tx.us)

ITEM 7: Legal Relations and Responsibilities
No significant traffic generator events identified.

Roadway or Lane closures during the following key dates and/or special events are prohibited:

- National Holidays
- The day before a National Holiday
- During emergency events such as natural disasters or as directed by the Engineer
- Local Special Event

ITEM 8: Prosecution and Progress
A total of 135 working days will be allowed for this project. Working days will be computed and charged in accordance with Article 8.3.1.4 Standard Workweek. Nighttime work for all locations shall be done in accordance with Article 8.3.3.2.1. Prepare progress schedules as a Bar Chart.

ITEM 134: Backfilling Pavement Edges
Areas to be backfilled shall extend approximately 3-ft out from the edges of the proposed overlay. Final slopes shall be uniform and smooth. The 100-foot station payment includes backfilling of both sides.

Backfill Ty A shall not contain particles more than two inches in size and shall have a minimum PI of 10 and a maximum PI of 20.

Any additional backfill material necessary due to pre-existing edge conditions or to replace existing fill removed during blading operations will not be paid for directly. It will be considered subsidiary to this bid Item.

ITEM 301: Asphalt Antistripping Agents
Hydrated Lime shall be added as an Antistripping additive between the rates of 1% minimum and 2.0% maximum by weight for Items 292, 3076, 3077, and 3080. If the Hamburg Wheel Test cannot be met within these limits, Liquid Antistripping agents as approved by the Engineer may be used in conjunction with lime for Items 3076, 3077, and 3080.

ITEM 351: Flexible Pavement Structure Repair
Repair pavement structure for areas identified in the plans.

Notify the Engineer when differing site conditions are encountered that require structural repair. The contractor shall utilize Item 351 to repair pavement structure as approved by the Engineer.

Project Number:

County: Cameron **Control:** 1137-02-042, Etc.

Highway: SL 499, Etc.

ITEM 354: Planing and Texturing Pavement
Contractor is to place seal coat or ACP layer(s) as indicated on plans within 14-calendar days of planing/milling operation unless otherwise directed by the Engineer.

All planing/milling operation drop offs greater than 1-inch need to have a 3:1 slope taper unless otherwise directed by the Engineer. The cost of the 3:1 slope taper is subsidiary to Item 354.

For locations on the plans that propose full width planning/milling as shown on the typical sections, Contractor is to place seal coat or ACP layer(s) as indicated on the plans within 2-calendar days of the planing/milling operation unless otherwise directed by the Engineer. Contractor will not be allowed to move onto the next planing/milling location or seal coat/ACP overlay location until the exposed area is covered as per above. Contractor cannot get paid for the planing/milling operation until exposed area is covered as per above.

Manholes in roadway shall be identified by contractor prior to milling operations.

RAP generated from this project will become the property of the Contractor.

ITEM 421: Hydraulic Cement Concrete
Provide equipment at the batch plant for determining the free moisture and/or absorption of aggregates in accordance with applicable TXDOT Test.

Provide the following items for concrete batch inspection in accordance with specifications outlined in DMS-10101, “Computer Equipment”:

(1) One Desktop Microcomputer or One Laptop Microcomputer
(2) One Integrated Printer/Scanner/Copier/Fax Unit
(3) Contractor-Furnished Software
(4) Hardware

Submit to the Engineer for approval the project locations for all Portland Cement concrete washout areas prior to starting any concrete work.

Fiber Reinforced Concrete is not permitted.

ITEM 432: Riprap
Provide Class “A” concrete minimum for riprap aprons placed around all box culvert and pipe safety end treatments. Provide ¼-inch thick dummy joints at least every 15-ft for riprap aprons placed around box and pipe culverts.

Do not use fiber reinforced concrete RIPRAP on side slopes equal to or steeper than 6:1 unless approved by the Engineer.

ITEM 502: Barricades, Signs and Traffic Handling
Shadow vehicles equipped with Truck-Mounted Attenuators are required for traffic handling. See notes for Item 6185: Truck Mounted Attenuator/Trailer Attenuator, for additional references pertaining to the TMAs.

A pilot car and radio equipped flaggers shall be required for all undivided roadway locations as directed by the Engineer. The pilot car with necessary flaggers and/or radio equipped flaggers and all signs, equipment, labor, and incidentals required for this method of traffic control will not be paid for directly but shall be considered subsidiary to Item 502.

Replace/relocate all regulatory signs removed due to construction operations with the same sign on fixed support(s) immediately upon its removal. First obtain Project Engineer approval before removing any regulatory roadway sign. Required flaggers are to be available to direct traffic during sign intermediate down time.

Relocate any Directional Sign Assemblies removed during construction operations immediately upon their removal.

These signs shall be relocated to a location in accordance with the Latest Version of the "Texas Manual on Uniform Traffic Control Devices". In no case will a sign be removed without a replacement sign and support(s) being readily available and a location established. Removal and relocation of these signs required for traffic control will not be paid for directly but shall be considered subsidiary to Item 502.

From the beginning to the end of the project, all traffic control devices need to be in acceptable condition as per the Texas Quality Guidelines for Work Zone Traffic Control Devices.

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 "Safety Contingency" is not intended to be used in lieu of bid Items established by the contract.

Remove and dispose of all litter, debris, objectionable material, excess materials that accumulate at the base of all traffic control devices as directed by the Engineer.

ITEM 504: Field Office and Laboratory
For this project a field office will not be required at the project site.

The Contractor will furnish a Type D Structure (Asphalt Mix Laboratory) modified by the following.

Laboratory room:

Project Number:

County: Cameron **Control:** 1137-02-042, Etc.

Highway: SL 499, Etc.

The other room of this building will be used as a laboratory and will include access to a bathroom facility from the interior. The laboratory and bathroom facility will have the walls, ceiling and floor insulated such that the air temperature can always be maintained at 76 degrees Fahrenheit.

Furnish for the Department's use in the asphalt laboratory one (1) desktop computer.

ITEM 506: Temporary Erosion, Sedimentation, and Environmental Controls
Due to the nature of this project, it is unlikely a significant amount of soil will be disturbed. However, if erosion control logs are needed; it shall be placed as directed by the Engineer.

Before starting each phase of construction, review with the Engineer the SW3P used for temporary erosion control as outlined on the plans. Before construction, place the temporary erosion and sedimentation control features as shown on the SW3P. Location of Construction Exits are to be approved by the Engineer. After completing earthwork operations, restore and reseed the disturbed areas in accordance with the Department's specifications for permanent or temporary erosion control. Before starting grading operations and during the project duration, place the temporary or permanent erosion control measures to prevent sediment from leaving the right of way.

The Contractor Force Account "Erosion Control Maintenance" that has been established for this project is intended to be utilized for work zone Best Management Practice (BMP) maintenance, to improve the effectiveness of the Environmental Controls that may need maintenance attention and/or require replacement while the project is still under the construction stage. These procedures will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent BMP management reviews on the project. The "Erosion Control Maintenance" is not intended to be used in lieu of bid Items established by the contract.

ITEM 540: Metal Beam Guard Fence
The optional terminal anchor post with the terminal connector will be required as shown on the Metal Beam Guard Fence Standard.

Galvanize the rail elements supplied for this project using a Type II Zinc Coating.

ITEM 542: Removing Metal Beam Guard Fence
Dispose all metal beam guard fence materials unless shown otherwise in the plans. The removal of delineators mounted to the metal beam guard fence or posts will be subsidiary to Item 542.

ITEM 544: Guardrail End Treatments
Label "end treatment type" on backside of unit at time of installation.

ITEM 585: Ride Quality for Pavement Surfaces
Use surface test Type B for service roads and ramps.

Quality control results shall be submitted to TxDOT the next working day after each day's paving.

Pavement areas with public turnout intersections that carry major traffic volumes will not be subjected to inertial profiler testing. These areas shall be evaluated using the 10-ft. straightedge.

Diamond grinding shall be used to remove localized roughness.

Use Surface Test Type B pay adjustment schedule 3 to evaluate ride quality of the travel lanes in accordance with Item 585, "Ride Quality for Pavement Surfaces." This includes ramps and service road travel lanes.

ITEM 658: Delineator and Object Marker Assemblies
Delineator assemblies shall be installed 8 feet from the edge of the shoulder unless restricted by some obstruction, in which case, the delineator assembly shall be placed between 2 and 8 feet from the edge of the shoulder.

Bi-directional object markers shall be in accordance with the D&OM standard sheets. The Contractor is directed to the standards when instructed where and how to install the object markers.

ITEMS 662 and 666: Work Zone Pavement Markings and Reflectorized Pavement Markings
All permanent pavement markings and work zone pavement markings for this project under these Items shall be 0.100 inches (100 mil) thick thermoplastic.

Any permanent pavement markings or non-removal work zone pavement markings lacking reflectivity in accordance with the requirements of Tex 828-B, or that fail to meet minimum retro reflectivity requirements for longitudinal pavement markings when required, will be addressed per the requirements of the specification. The roadway will be re-striped at no additional compensation.

Pavement surface preparation for markings and markers will not be paid for directly but shall be considered subsidiary to Item 666.

Prior to any striping operations, an on-site coordination meeting between all the parties involved will be required to review striping details and requirements to ensure quality work.

The beads used on this project shall meet the requirements of Departmental Materials Specification DMS-8290, Glass Traffic Beads Texas Type II & III. Use a 50% Type II/ 50% Type III mix utilizing a double drop system with Type III beads dropped first.

For expressway projects, provide channelizing devices at the ramp connections when temporary pavement marking tabs are placed. These channelizing devices will be subsidiary to Item 502.

Project Number:

County: Cameron **Control:** 1137-02-042, Etc.

Highway: SL 499, Etc.

ITEM 677: Eliminating Existing Pavement Markings and Markers
Asphalt and aggregate types and grades shall be as approved in writing when a surface treatment is used to eliminate existing pavement markings.

ITEM 688: Pedestrian Detectors and Vehicle Loop Detectors
Loop detectors shall be installed to replace those damaged or destroyed due to construction operations. Before milling operations begin, all existing loop detector locations shall be marked, and their configuration and orientation obtained for replacement with same size loop detectors. After milling operations and before final overlay lift placement, all loop detectors shall be installed into existing flexible pavement structure.

Any deviation of location for proposed loop detector work shall be as approved. Install loop vehicle detectors in accordance with plan Standard Sheet LD1-03 (Loop Detector Installation Details). All loop detectors shall be rectangular.

Use 2/c #14 AWG shielded for loop lead-ins and #14 AWG for loop wire in pavement.

Splices for loop wire will be permitted only at ground boxes or pole base with approved weatherproof splice kits.

A minimum length of 2 feet for each cable shall be left in each ground box.

All wiring not covered by the plans and specifications shall be in accordance with the latest edition of the National Electrical Code.

Handling of traffic

Roads and streets shall always be kept open to traffic. The setting of loop detectors shall be arranged so as to close only one lane of a roadway at a time and to permit the continuous movement of traffic in both directions at all times. All traffic control devices used for this operation will be subsidiary to Item 688.

ITEM 3077: Superpave Mixtures
The Contractor shall exercise diligence in the application of "Bonding Course" by the use of flagging and rolling procedures to keep from spraying or splattering the traveling public with asphaltic material.

Blading (not to exceed more than 3-ft from the pavement edge) may also be necessary to clean dirt and grass from pavement edges and turnout areas as work under this bid Item. The cost of this blading will not be paid for directly but shall be considered subsidiary to this bid Item.

A portion of RAP generated from this project will remain the property of the State. This quantity can be found on the Estimate and Quantity Tables under Item 354.

Project Number:

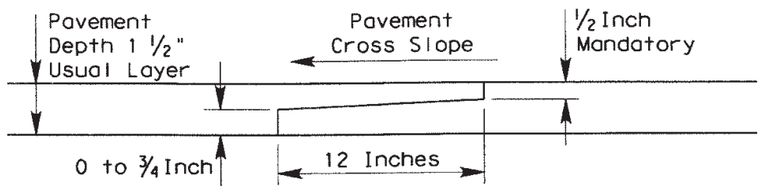
County: Cameron **Control:** 1137-02-042, Etc.

Highway: SL 499, Etc.

Level-up will be placed before the surface course. An asphaltic concrete spreading and finishing machine and/or motor graders; when approved by the Engineer may be used to place the ACP level-up.

Aggregates used on shoulders and ramps are required to meet SAC requirements.

All unconfined longitudinal joints shall be constructed with a joint maker providing a maximum ½-inch vertical edge and a minimum 6:1 edge taper or as approved by the Engineer. The Engineer may waive this requirement when no impacts to the traveling public are foreseen.



NOTCHED WEDGE JOINT

The engineer may allow for variances to the dimensions shown.

Public and private driveways need to have a smooth vertical transition between the edge of pavement and the existing driveways. The Contractor is to add a vertical taper if needed which will be subsidiary to Item 3077.

For Location 1, 2, and 3, the use of RAP and RAS (recycled asphalt shingles) will not be allowed as part of the mix design for the final riding surface.

Use a release agent from the Department's MPL to clean and to coat the inside of truck beds for hauling equipment. Hauling equipment shall be cleaned prior to hauling material to job site. Submit a copy of the bill of lading to the Engineer as part of the QCP. Ensure the pavement is free from any spillage of hydraulic oil or diesel from construction equipment. The Department may reject trucks that contain any foreign material and suspend production if the pavement is contaminated by any pollutants mentioned above.

SAC B aggregate must have material properties that require 10 or less on the magnesium sulfate soundness test and 20 or less on the Micro-Deval test.

ITEM 3080: Stone-Matrix Asphalt

The Contractor shall exercise diligence in the application of "Bonding Course" by the use of flagging and rolling procedures to keep from spraying or splattering the traveling public with asphaltic material.

Project Number:

County: Cameron **Control:** 1137-02-042, Etc.

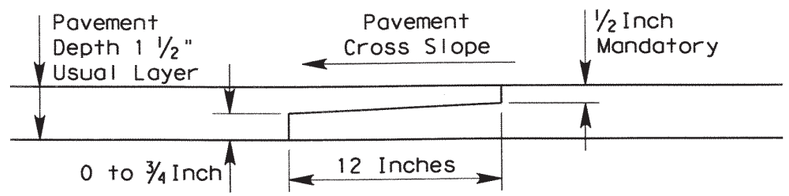
Highway: SL 499, Etc.

Blading (not to exceed more than 3-ft from the pavement edge) may also be necessary to clean dirt and grass from pavement edges and turnout areas as work under this bid Item. The cost of this blading will not be paid for directly but shall be considered subsidiary to this bid Item.

All surplus RAP from this project will remain the property of the Contractor.
Level-up will be placed before the surface course. An asphaltic concrete spreading and finishing machine and/or motor graders; when approved by the Engineer may be used to place the ACP level-up.

Aggregates used on shoulders and ramps are required to meet SAC requirements.

All unconfined longitudinal joints shall be constructed with a joint maker providing a maximum ½-inch vertical edge and a minimum 6:1 edge taper or as approved by the Engineer. The Engineer may waive this requirement when no impacts to the traveling public are foreseen.



NOTCHED WEDGE JOINT

The engineer may allow for variances to the dimensions shown.

Public and private driveways need to have a smooth vertical transition between the edge of pavement and the existing driveways. The Contractor is to add a vertical taper if needed which will be subsidiary to Item 3080.

The use of RAP and RAS (recycled asphalt shingles) will not be allowed as part of the mix design for the final riding surface.

Use a release agent from the Department's MPL to clean and to coat the inside of truck beds for hauling equipment. Hauling equipment shall be cleaned prior to hauling material to job site. Submit a copy of the bill of lading to the Engineer as part of the QCP. Ensure the pavement is free from any spillage of hydraulic oil or diesel from construction equipment. The Department may reject trucks that contain any foreign material and suspend production if the pavement is contaminated by any pollutants mentioned above.

The percentage of RAS used in the total mix shall not exceed 3% when allowed.
SAC B aggregate must have material properties that require 10 or less on the magnesium sulfate soundness test and 20 or less on the Micro-Deval test.

ITEM 3084 – Bonding Course
The minimum application rates are listed in Table BC.

The target shear bond strengths are listed in Table BCS. The informational test cores shall be taken once a shift for first 5 lots of placement or a change to placement method of bonding course, bonding material, or hot mix material. The remaining informational test cores shall be taken once every 3 lots for surface mix. Informational tests are not required for non-surface mix beyond the first 5 lots unless there is a change to placement method of bonding course, bonding material, or hot mix material. Results from these informational tests will not be used for specification compliance.

Table BC

Material	Minimum Application Rate (gal. per square yard)
TRAIL – Emulsified Asphalt	0.06
TRAIL – Hot Asphalt	0.12
Spray Applied Underseal Membrane	0.10

Table BCS (For Informational Tests)

Material	Target Shear Bond Strength (Tex-249-F psi)
SMA – Stone-Matrix Asphalt	60.0
All Other Materials	40.0

ITEM 6185: Truck Mounted Attenuator/Trailer Attenuator
In addition to the shadow vehicles with truck mounted attenuator (TMA) that are specified as being required on the traffic control plan for the project, provide 1 additional shadow vehicle(s) with TMA as per TCP (1-1) -18 as detailed on General Note 5 of this standard sheet;
or as per TCP (1-3) -18 as detailed on General Note 7 of this standard sheet;
or as per TCP (1-4) -18 as detailed on General Note 5 of this standard sheet;
or as per TCP (2-1) -18 as detailed on General Note 5 of this standard sheet;
or as per TCP (2-3) -23 as detailed on General Note 8 of this standard sheet.
or as per TCP (2-4) -18 as detailed on General Note 6 of this standard sheet.

Therefore, 2 total shadow vehicles with TMA will be required on this project for the type of work as shown on the plans. The Contractor will be responsible for determining if one or more of his construction operations will be ongoing at the same time and thus determine the total number of TMAs needed for the project.

Project Number:

County: Cameron **Control:** 1137-02-042, Etc.

Highway: SL 499, Etc.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1137-02-042 **DISTRICT** Pharr **COUNTY** Cameron
HIGHWAY PR 100, SH 100, SL 499

													TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0331-02-059**		**0331-04-073**		**1137-01-032**		**1137-02-042**				
		PROJECT ID		**A00129713**		**A00134757**		**A00134756**		**A00134755**				
		COUNTY		**Cameron**		**Cameron**		**Cameron**		**Cameron**				
		HIGHWAY		**SH 100**		**PR 100**		**SL 499**		**SL 499**				
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL			
	104-6009	REMOVING CONC (RIPRAP)	SY							95.000			95.000	
	134-6001	BACKFILL (TY A)	STA							50.000			50.000	
	351-6008	FLEXIBLE PAVEMENT STRUCTURE REPAIR(12")	SY	5,500.000		2,074.000							7,574.000	
	354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY	18,697.000				15,565.000		18,281.000			52,543.000	
	354-6045	PLANE ASPH CONC PAV (2")	SY	23,541.000		244,668.000							268,209.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY							42.000			42.000	
	500-6001	MOBILIZATION	LS							1.000			1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO							7.000			7.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	415.000		840.000		260.000		410.000			1,925.000	
	506-6045	BIODEG EROSN CONT LOGS (INSTL) (6")	LF	415.000		840.000		260.000		410.000			1,925.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF							200.000			200.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)	LF							425.000			425.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA							4.000			4.000	
	540-6038	CONNECTOR PLATE FOR THRIE BEAM	EA							4.000			4.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF							749.000			749.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA							2.000			2.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA							4.000			4.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA							2.000			2.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA							11.000			11.000	
	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	EA							16.000			16.000	
	658-6083	INSTL DEL ASSM (D-SW)SZ 1(WFLX)SRF	EA			62.000							62.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	4,596.000		4,804.000		4,226.000		4,225.000			17,851.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	2,730.000		1,323.000		2,713.000		2,743.000			9,509.000	
	666-6030	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF							75.000			75.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	2,856.000		11,822.000				1,891.000			16,569.000	
	666-6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	24.000		9,340.000							9,364.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	3,337.000		5,531.000		745.000		999.000			10,612.000	
	666-6138	REFL PAV MRK TY I (Y)8"(SLD)(100MIL)	LF					1,901.000					1,901.000	
	666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	381.000		1,165.000		191.000		231.000			1,968.000	
	666-6171	REFL PAV MRK TY II (W) 6" (BRK)	LF	472.000		6,317.000							6,789.000	
	666-6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	182.000		2,660.000							2,842.000	
	666-6208	REFL PAV MRK TY II (Y) 6" (BRK)	LF			234.000							234.000	
	666-6210	REFL PAV MRK TY II (Y) 6" (SLD)	LF	315.000		1,177.000							1,492.000	
	666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	3,711.000		14,037.000		4,305.000		2,921.000			24,974.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF			82,288.000				8,662.000			90,950.000	
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	1,730.000		521.000		1,831.000		1,709.000			5,791.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	12,301.000		20,965.000		9,918.000		11,282.000			54,466.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1137-02-042 **DISTRICT** Pharr **COUNTY** Cameron
HIGHWAY PR 100, SH 100, SL 499

				0331-02-059		0331-04-073		1137-01-032		1137-02-042		TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB											
		PROJECT ID		**A00129713**		**A00134757**		**A00134756**		**A00134755**			
		COUNTY		**Cameron**		**Cameron**		**Cameron**		**Cameron**			
		HIGHWAY		**SH 100**		**PR 100**		**SL 499**		**SL 499**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	668-6010	PREFAB PAV MRK TY B (W)(6")(BRK)CNTST	LF							521.000		521.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	41.000		139.000		14.000		21.000		215.000	
	668-6078	PREFAB PAV MRK TY C (W) (DBL ARROW)	EA	2.000		9.000		2.000				13.000	
	668-6079	PREFAB PAV MRK TY C (W) (TPL ARROW)	EA			2.000						2.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	26.000		127.000		4.000		15.000		172.000	
	668-6089	PREFAB PAV MRK TY C (W) (RR XING)	EA					6.000				6.000	
	668-6091	PREFAB PAV MRK TY C (W) (18")(YLD TRI)	EA			72.000						72.000	
	668-6092	PREFAB PAV MRK TY C (W) (36")(YLD TRI)	EA	65.000								65.000	
	668-6094	PREFAB PAV MRK TY C (W)(BIKE ARROW)	EA			121.000						121.000	
	668-6096	PREFAB PAV MRK TY C (W)(BIKE SYMBOL)	EA			121.000						121.000	
	672-6007	REFL PAV MRKR TY I-C	EA	250.000		211.000		429.000		298.000		1,188.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	537.000		398.000				570.000		1,505.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	118.000		1,350.000						1,468.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	1,308.000						4,684.000		5,992.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	449.000								449.000	
	677-6005	ELIM EXT PAV MRK & MRKS (12")	LF	228.000								228.000	
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	170.000								170.000	
	688-6004	VEH LP DETECT (SAWCUT)	LF	4,587.000		6,112.000		184.000		460.000		11,343.000	
	3074-6002	SP-D BALANCED MIX DESIGN	TON					5,439.000				5,439.000	
	3077-6065	SP MIXES SP-D SAC-A PG76-22	TON			27,925.000				5,879.000		33,804.000	
	3080-6013	STONE-MTRX-ASPH SMA-F SAC-A PG76-22	TON	8,491.000								8,491.000	
	3084-6001	BONDING COURSE	GAL	5,214.000		17,147.000		3,340.000		3,610.000		29,311.000	
	6038-6004	MULTIPOLYMER PAV MRK (W)(6")(SLD)	LF							2,082.000		2,082.000	
	6038-6005	MULTIPOLYMER PAV MRK (W)(6")(BRK)	LF							521.000		521.000	
	6038-6017	MULTIPOLYMER PAV MRK (Y)(6")(SLD)	LF							2,081.000		2,081.000	
	6185-6002	TMA (STATIONARY)	DAY							120.000		120.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY							90.000		90.000	
	02	RAILROAD FLAGGING: RAILROAD FORCE ACCOUNT WORK (NON PARTICIPATING)	LS							1.000		1.000	
	08	CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS							1.000		1.000	
		CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS							1.000		1.000	

BASIS OF ESTIMATE
LOCATION 1

CONTROL: 1137-02-042, ETC.
PROJECT: 1137-02-042

COUNTY: CAMERON
HIGHWAY: SL 499

TYPE: OVERLAY
LIMITS: FROM: FM 106
TO: BU 77X

STATION LIMITS: 154+77. TO 225+05. = 7,028.00 Ft. = 1.331 Mi.

EXCEPTIO NONE
EQUATIO NONE

SL 499

STA	TO	STA	WIDTH(FT)	LENGTH	AREA(SY)*
154+77		160+80	74	603	4,958
160+80	†	164+60	79.6	380	3,361
164+60		169+00	83	440	4,058
169+00	†	169+75	78.3	75	653
169+75		187+40	79	1,765	15,493
187+40	†	192+09	60.1	469	3,132
192+09	**CONCRETE BRIDGE**	202+50		1,041	
202+50	†	206+60	65.1	410	2,966
206+60		221+64	82	1,504	13,703
221+64	**INTERSECTION**	225+05	87.9	341	3,330
	† AVG WIDTH		**TOTAL =**	7,028	51,654

104	6009	REMOVING CONCRETE(RIPRAP)	=	95	SY
134	6001	BACKFILL (TY A)	=	50	STA
354	6021	PLANE ASPH CONC PAV (0" TO 2")	=	18,281	SY
432	6045	RIPRAP (MOW STRIP) (4 IN)	=	42	CY
500	6001	MOBILIZATION	=	1	LS
502	6001	BARRICADES, SIGNS, AND TRAFF HANDLE	=	7	MO
506	6043	BIODEG EROSN CONT LOGS(REMOVE)	=	410	LF
506	6045	BIODEG EROSN CONT LOGS(INSTL)(6")	=	410	LF
540	6001	MTL W-BEAM GD FEN TIM POST	=	200	LF
540	6002	MTL W-BEAM GD FEN STEEL POST	=	425	LF
540	6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	=	4	EA
540	6038	CONNECTOR PLATE FOR THRIE BEAM	=	4	EA
542	6001	REMOVE METAL BEAM GUARD FENCE	=	749	LF
542	6002	REMOVE TERMINAL ANCHOR SECTION	=	2	EA
544	6001	GUARDRAIL END TREATMENT (INSTALL)	=	4	EA
544	6003	GUARDRAIL END TREATMENT (REMOVE)	=	2	EA
658	6060	REMOVE DELIN & OBJECT MARKER ASSMS	=	11	EA
658	6061	INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2	=	16	EA
662	6109	WK ZN PAV MRK SHT TERM (TAB) TY W	=	4,225	EA
662	6111	WK ZN PAV MRK SHT TERM (TAB) TY Y-2	=	2,743	EA
666	6030	REFL PAV MRK TY I (W) 8" (DOT)(100MIL)	=	75	LF
666	6036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	=	1,891	LF
666	6048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	=	999	LF
666	6141	REFL PAV MRK TY I (Y) 12"(SLD)(100MIL)	=	231	LF
666	6306	RE PM W/RET REQ TY I (W) 6" (BRK)(100MIL)	=	2,921	LF
666	6309	RE PM W/RET REQ TY I (W) 6" (SLD)(100MIL)	=	8,662	LF
666	6318	RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)	=	1,709	LF
666	6321	RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)	=	11,282	LF
668	6010	PREFAB PAV MRK TY B (W)(6")(BRK)CNTST	=	521	LF
668	6077	PREFAB PAV MRK TY C (W) (ARROW)	=	21	EA
668	6085	PREFAB PAV MRK TY C (W) (WORD)	=	15	EA
672	6007	REFL PAV MRKR TY I-C	=	298	EA
672	6009	REFL PAV MRKR TY II A-A	=	570	EA
677	6001	ELIM EXT PAV MRK & MRKS(4")	=	4,684	LF
* 684		1/C #14 AWG LOOP WIRE (XHHW)	=	920	LF
688	6004	VEH LP DETECT (SAWCUT)	=	460	LF
3077	6065	SP MIXES SP-D SAC-A PG76-22	=	5,879	TON
3084	6001	BONDING COURSE	=	3,610	GAL
6038	6004	MULTIPOLYMER PAV MRK (W)(6")(SLD)	=	2,082	LF
6038	6005	MULTIPOLYMER PAV MRK (W)(6")(BRK)	=	521	LF
6038	6017	MULTIPOLYMER PAV MRK (Y)(6")(SLD)	=	2,081	LF
6185	6002	TMA (STATIONARY)	=	120	DAY
6185	6005	TMA (MOBILE OPERATION)	=	90	DAY

*ELEC. CONDR. (NO. 14) INSULATED WIRE TO BE INSTALLED. SUBSIDIARY TO ITEM 688.

*FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

BASIS OF ESTIMATE
LOCATION 1

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		16

CK
DW
CK
DW

BASIS OF ESTIMATE
LOCATION 2

CONTROL: 1137-02-042, ETC.
PROJECT: 0331-02-059

COUNTY: CAMERON
HIGHWAY: SH 100

TYPE: OVERLAY
LIMITS: FROM: SH 48
TO: Queen Isabella Causeway

STATION LIMITS: 100+00. TO 180+46. = 8,046.00 Ft. = 1.524 Mi.

EXCEPTIONS: NONE
EQUATIONS: NONE

SH 100

STA	TO	STA	WIDTH(FT)	LENGTH	AREA(SY)*
100+00	**INTERSECTION**	104+50	89	450	4,450
104+50		125+00	86	2,050	19,589
125+00	†	131+50	77.5	650	5,597
131+50		147+10	72	1,560	12,480
147+10	**BRIDGE**	148+25	72	115	920
148+25		155+80	72	755	6,040
155+80	†	157+82	90	202	2,020
159+80	**Crossover**	160+40	138	60	920
163+38	**Crossover**	163+95	145	57	918
167+00	**Crossover**	167+53	142	53	836
170+60	**Crossover**	171+10	150	50	833
174+20	**Crossover**	174+70	155	50	861
177+80	**Crossover**	178+40	135	60	900
	† AVG WIDTH		**TOTAL =**	6,112	56,364

WESTBOUND

STA	TO	STA	WIDTH(FT)	LENGTH	AREA(SY)*
157+82	†	159+80	31	198	682
160+40	†	162+00	46.5	160	827
162+00		163+38	34.5	138	529
163+95	†	166+00	44.6	205	1,016
166+00		167+00	34.5	100	383
167+53	†	169+20	46.5	167	863
169+20		170+60	34.5	140	537
171+10	†	172+90	46	180	920
172+90		174+20	34.5	130	498
174+70	†	176+50	46	180	920
176+50		177+80	34.5	130	498
178+40	†	180+46	36.5	206	835
	† AVG WIDTH		**TOTAL =**	1,934	8,508

EASTBOUND

STA	TO	STA	WIDTH(FT)	LENGTH	AREA(SY)*
157+82	†	159+80	45.5	198	1,001
160+40		161+60	34.5	120	460
161+60	†	163+38	52	178	1,028
163+95		165+20	34.5	125	479
165+20	†	167+00	46	180	920
167+53		168+84	34.5	131	502
168+84	†	170+60	45	176	880
171+10		172+40	34.5	130	498
172+40	†	174+20	46	180	920
174+70		176+10	34.5	140	537
176+10	†	177+80	49	170	926
178+40	†	180+46	35.5	206	813
	AVG WIDTH		**TOTAL =**	1,934	8,964

351	6008	FLEXIBLE PAVEMENT STRUCTURE REPAIR(12")	=	5,500	SY
354	6021	PLANE ASPH CONC PAV (0" TO 2")	=	18,697	SY
354	6045	PLANE ASPH CONC PAV (2")	=	23,541	SY
506	6043	BIODEG EROSN CONT LOGS(REMOVE)	=	415	LF
506	6045	BIODEG EROSN CONT LOGS(INSTL)(6")	=	415	LF
662	6109	WK ZN PAV MRK SHT TERM (TAB) TY W	=	4,596	EA
662	6111	WK ZN PAV MRK SHT TERM (TAB) TY Y-2	=	2,730	EA
666	6036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	=	2,856	LF
666	6042	REFL PAV MRK TY I (W) 12"(SLD)(100MIL)	=	24	LF
666	6048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	=	3,337	LF
666	6141	REFL PAV MRK TY I (Y) 12"(SLD)(100MIL)	=	381	LF
666	6171	REFL PAV MRK TY II (W) 6" (BRK)	=	472	LF
666	6178	REFL PAV MRK TY II (W) 8" (SLD)	=	182	LF
666	6210	REFL PAV MRK TY II (Y) 6" (SLD)	=	315	LF
666	6306	RE PM W/RET REQ TY I (W) 6" (BRK)(100MIL)	=	3,711	LF
666	6318	RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)	=	1,730	LF
666	6321	RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)	=	12,301	LF
668	6077	PREFAB PAV MRK TY C (W) (ARROW)	=	41	EA
668	6078	PREFAB PAV MRK TY C (W) (DBL ARROW)	=	2	EA
668	6085	PREFAB PAV MRK TY C (W) (WORD)	=	26	EA
668	6092	PREFAB PAV MRK TY C (W) (36")(YLD TRI)	=	65	EA
672	6007	REFL PAV MRKR TY I-C	=	250	EA
672	6009	REFL PAV MRKR TY II A-A	=	537	EA
672	6010	REFL PAV MRKR TY II C-R	=	118	EA
677	6001	ELIM EXT PAV MRK & MRKS(4")	=	1,308	LF
677	6003	ELIM EXT PAV MRK & MRKS(8")	=	449	LF
677	6005	ELIM EXT PAV MRK & MRKS(12")	=	228	LF
677	6007	ELIM EXT PAV MRK & MRKS(24")	=	170	LF
* 684		1/C #14 AWG LOOP WIRE (XHHW)	=	9,168	LF
688	6004	VEH LP DETECT (SAWCUT)	=	4,587	LF
3080	6013	STONE-MTRX-ASPH SMA-F SAC-A PG76-22	=	8,491	TON
3084	6001	BONDING COURSE		5,214	GAL

*ELEC. CONDR. (NO. 14) INSULATED WIRE TO BE INSTALLED. SUBSIDIARY TO ITEM 688.

*FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

BASIS OF ESTIMATE
LOCATION 2

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		17

BASIS OF ESTIMATE
LOCATION 3

CONTROL: 1137-02-042, ETC.
PROJECT: 0331-04-073

COUNTY: CAMERON
HIGHWAY: PR 100

TYPE: OVERLAY
LIMITS: FROM: Orca Circle
TO: Queen Isabella Causeway

STATION LIMITS: 200+00. TO 430+54. = 23,054.00 Ft. = 4.366 Mi.

EXCEPTIONS: NONE
EQUATIONS: NONE

PR 100

STA	TO	STA	WIDTH(FT)	LENGTH	AREA(SY)*
200+00	†	202+60	78	260	2,253
202+60		208+60	86	600	5,733
232+00	CROSSOVER	232+60	178	60	1,187
237+40	†	241+50	92.3	410	4,205
259+78	INTERSECTION	260+60	79	82	720
267+54	INTERSECTION	268+26	79.5	72	636
281+83	INTERSECTION	282+83	79.6	100	884
289+65	INTERSECTION	290+67	80	102	907
297+50	INTERSECTION	298+16	79.2	66	581
305+31		305+90	79	59	518
311+29		311+91	79	62	544
317+17		317+95	79	78	685
326+25	†	326+85	79.7	60	531
332+16		333+00	79	84	737
338+10	INTERSECTION	338+94	79	84	737
344+20		345+03	79	83	729
350+27		350+88	80	61	542
356+17		356+95	80	78	693
362+25		362+86	79	61	535
368+17		368+97	80	80	711
377+00	INTERSECTION	377+95	80	95	844
383+20		386+15	79	295	2,589
391+54		392+20	79	66	579
396+83	†	398+13	79.2	130	1,144
401+96		402+50	80	54	480
413+64	INTERSECTION	414+53	79.4	89	785
416+60	†	417+48	79.6	88	778
427+50		429+50	80	200	1,778
429+50	†	430+54	78	104	901
	† AVG WIDTH		TOTAL =	3,663	33,946

PADRE BLVD LOOP

STA	TO	STA	WIDTH(FT)	LENGTH	AREA(SY)*
10+00	†	10+95	49	95	517
10+95		49+80	50	3,885	21,583
49+80	†	50+54	52	74	428
	† AVG WIDTH		TOTAL =	4,054	22,528

PR 100 (QUEEN ISABELLA CAUSEWAY) WESTBOUND

STA	TO	STA	WIDTH(FT)	LENGTH	AREA(SY)*
100+00	†	101+50	33.79	150	563
101+50		103+60	45	210	1,050
103+60	†	109+00	56.79	540	3,407
109+00	CROSSOVER	110+00	122.17	100	1,357
110+00		114+85	88	485	4,742
	† AVG WIDTH		TOTAL =	1,485	11,119

PR 100 (QUEEN ISABELLA CAUSEWAY) EASTBOUND

STA	TO	STA	WIDTH(FT)	LENGTH	AREA(SY)*
100+00	†	101+50	35	150	583
101+50		103+60	45	210	1,050
103+60	†	105+50	58.36	190	1,232
105+50		109+00	45	350	1,750
109+00	CROSSOVER	110+00	108.23	100	1,203
110+00		112+80	45	280	1,400
112+80	†	114+85	72.94	205	1,661
	† AVG WIDTH		TOTAL =	1,485	8,879

Texas Department of Transportation

BASIS OF ESTIMATE
LOCATION 3

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		18

CK
DW
CK
DW

PR 100 SOUTHBOUND

STA	TO	STA	WIDTH(FT)	LENGTH	AREA(SY)*
208+60		217+00	45	840	4,200
217+00	†	218+96	56.6	196	1,233
218+96	INTERSECTION	225+53	75.2	657	5,490
225+53	†	232+00	57.6	647	4,141
232+60	†	234+80	54	220	1,320
234+80		237+40	45	260	1,300
241+50	†	259+78	35.8	1,828	7,271
260+60	†	267+54	34	694	2,622
268+26	†	281+83	35.7	1,357	5,383
282+83	†	289+65	34.6	682	2,622
290+67	†	297+50	35.9	683	2,724
298+16	†	305+31	35.8	715	2,844
305+90	†	311+29	35.4	539	2,120
311+91	†	317+17	36	526	2,104
317+95	†	326+25	35.6	830	3,283
326+85	†	332+16	37	531	2,183
333+00	†	338+10	37.4	510	2,119
338+94	†	344+20	37.3	526	2,180
345+03	†	350+27	37.3	524	2,172
350+88	†	356+17	37.3	529	2,192
356+95	†	362+25	36.7	530	2,161
362+86	†	368+17	37.3	531	2,201
368+97	†	377+00	36.5	803	3,257
377+95	†	383+20	36.9	525	2,153
386+15	†	391+54	32.5	539	1,946
392+20	†	396+83	37.8	463	1,945
398+13	†	401+96	37.7	383	1,604
402+50	†	413+64	39.6	1,114	4,902
414+53	†	416+60	37.7	207	867
417+48	†	427+50	34.2	1,002	3,808
	† AVG WIDTH		TOTAL =	19,391	84,347

PR 100 NORTHBOUND

STA	TO	STA	WIDTH(FT)	LENGTH	AREA(SY)*
208+60		210+60	39	200	867
210+60	†	218+96	50	836	4,644
218+96	INTERSECTION	225+53	99	657	7,227
225+53		232+00	39	647	2,804
232+60		237+40	39	480	2,080
241+50	†	259+78	35.3	1,828	7,170
260+60	†	267+54	37.4	694	2,884
268+26	†	281+83	35.8	1,357	5,398
282+83	†	289+65	35.8	682	2,713
290+67	†	297+50	35.3	683	2,679
298+16	†	305+31	34.9	715	2,773
305+90	†	311+29	35.6	539	2,132
311+91	†	317+17	35.4	526	2,069
317+95	†	326+25	35.6	830	3,283
326+85	†	332+16	37.2	531	2,195
333+00	†	338+10	36.7	510	2,080
338+94	†	344+20	37.3	526	2,180
345+03	†	350+27	37.4	524	2,178
350+88	†	356+17	37.4	529	2,198
356+95	†	362+25	36.9	530	2,173
362+86	†	368+17	37.2	531	2,195
368+97	†	377+00	37.6	803	3,355
377+95	†	383+20	31.4	525	1,832
386+15	†	391+54	37.2	539	2,228
392+20	†	396+83	37.3	463	1,919
398+13	†	401+96	37.9	383	1,613
402+50	†	413+64	33.8	1,114	4,184
414+53	†	416+60	37.5	207	863
417+48	†	427+50	37.9	1,002	4,220
	† AVG WIDTH		TOTAL =	19,391	84,136

351	6008	FLEXIBLE PAVEMENT STRUCTURE REPAIR(12")	=	2,074	SY
354	6045	PLANE ASPH CONC PAV (2")	=	244,668	SY
506	6043	BIODEG EROSN CONT LOGS(REMOVE)	=	840	LF
506	6045	BIODEG EROSN CONT LOGS(INSTL)(6")	=	840	LF
658	6083	INSTL DEL ASSM (D-SW) SZ 1 (WFLX) SRF	=	62	EA
662	6109	WK ZN PAV MRK SHT TERM (TAB) TY W	=	4,804	EA
662	6111	WK ZN PAV MRK SHT TERM (TAB) TY Y-2	=	1,323	EA
666	6036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	=	11,822	LF
666	6042	REFL PAV MRK TY I (W) 12"(SLD)(100MIL)	=	9,340	LF
666	6048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	=	5,531	LF
666	6141	REFL PAV MRK TY I (Y) 12"(SLD)(100MIL)	=	1,165	LF
666	6171	REFL PAV MRK TY II (W) 6" (BRK)	=	6,317	LF
666	6178	REFL PAV MRK TY II (W) 8" (SLD)	=	2,660	LF
666	6208	REFL PAV MRK TY II (Y) 6" (BRK)	=	234	LF
666	6210	REFL PAV MRK TY II (Y) 6" (SLD)	=	1,177	LF
666	6306	RE PM W/RET REQ TY I (W) 6" (BRK)(100MIL)	=	14,037	LF
666	6309	RE PM W/RET REQ TY I (W) 6" (SLD)(100MIL)	=	82,288	LF
666	6318	RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)	=	521	LF
666	6321	RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)	=	20,965	LF
668	6077	PREFAB PAV MRK TY C (W) (ARROW)	=	139	EA
668	6078	PREFAB PAV MRK TY C (W) (DBL ARROW)	=	9	EA
668	6079	PREFAB PAV MRK TY C (W) (TPL ARROW)	=	2	EA
668	6085	PREFAB PAV MRK TY C (W) (WORD)	=	127	EA
668	6091	PREFAB PAV MRK TY C (W) (18")(YLD TRI)	=	72	EA
668	6094	PREFAB PAV MRK TY C (W) (BIKE ARROW)	=	121	EA
668	6096	PREFAB PAV MRK TY C (W) (BIKE SYMBOL)	=	121	EA
672	6007	REFL PAV MRKR TY I-C	=	211	EA
672	6009	REFL PAV MRKR TY II A-A	=	398	EA
672	6010	REFL PAV MRKR TY II C-R	=	1,350	EA
* 684		1/C #14 AWG LOOP WIRE (XHHW)	=	12,224	LF
688	6004	VEH LP DETECT (SAWCUT)	=	6,112	LF
3077	6065	SP MIXES SP-D SAC-A PG76-22	=	27,925	TON
3084	6001	BONDING COURSE	=	17,147	GAL

*ELEC. CONDR. (NO. 14) INSULATED WIRE TO BE INSTALLED. SUBSIDIARY TO ITEM 688.

*FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

BASIS OF ESTIMATE
LOCATION 3

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		19

BASIS OF ESTIMATE
LOCATION 4

CONTROL: 1137-02-042, ETC.
PROJECT: 1137-01-032

COUNTY: CAMERON
HIGHWAY: SL 499

TYPE: OVERLAY
LIMITS: FROM: BU 77X
TO: IH 69E

STATION LIMITS: 100+00. TO 150+06. = 5,006.00Ft. = 0.948 Mi.

EXCEPTIONS: NONE
EQUATIONS: NONE

SL 499

STA	TO	STA	WIDTH(FT)	LENGTH	AREA(SY)*
100+00	†	101+50	93	150	1,550
101+50		141+20	86	3,970	37,936
141+20	**Railroad**	141+40		20	
141+40		150+06	86	866	8,275
		† AVG WIDTH	**TOTAL =**	5,006	47,761

354	6021	PLANE ASPH CONC PAV (0" TO 2")	=	15,565	SY
506	6043	BIODEG EROSN CONT LOGS(REMOVE)	=	260	LF
506	6045	BIODEG EROSN CONT LOGS(INSTL)(6")	=	260	LF
662	6109	WK ZN PAV MRK SHT TERM (TAB) TY W	=	4,226	EA
662	6111	WK ZN PAV MRK SHT TERM (TAB) TY Y-2	=	2,713	EA
666	6048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	=	745	LF
666	6138	REFL PAV MRK TY I (Y) 8" (SLD)(100MIL)	=	1,901	LF
666	6141	REFL PAV MRK TY I (Y) 12"(SLD)(100MIL)	=	191	LF
666	6306	RE PM W/RET REQ TY I (W) 6" (BRK)(100MIL)	=	4,305	LF
666	6318	RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)	=	1,831	LF
666	6321	RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)	=	9,918	LF
668	6077	PREFAB PAV MRK TY C (W) (ARROW)	=	14	EA
668	6078	PREFAB PAV MRK TY C (W) (DBL ARROW)	=	2	EA
668	6085	PREFAB PAV MRK TY C (W) (WORD)	=	4	EA
668	6089	PREFAB PAV MRK TY C (W) (RR XING)	=	6	EA
672	6007	REFL PAV MRKR TY I-C	=	429	EA
* 684		1/C #14 AWG LOOP WIRE (XHHW)	=	368	LF
688	6004	VEH LP DETECT (SAWCUT)	=	184	LF
3074	6002	SP-D BALANCED MIX DESIGN	=	5,439	TON
3084	6001	BONDING COURSE	=	3,340	GAL

*ELEC. CONDR. (NO. 14) INSULATED WIRE TO BE INSTALLED. SUBSIDIARY TO ITEM 688.

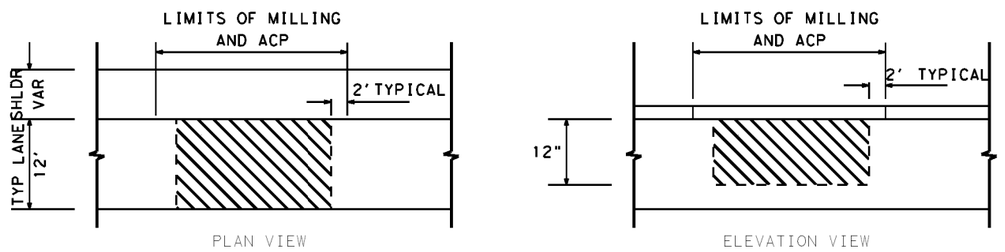
*FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

BASIS OF ESTIMATE
LOCATION 4

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		20

PROJECT LOCATION	MNT SECTION	HIGHWAY	Limits		RM	LANE	ITEM 351-6008		
							FLEXIBLE PAVEMENT STRUCTURE REPAIR (12")		
			From	To			WIDTH (FT)	LENGTH (FT)	AREA (SY)
#2	Brownsville	SH100	220 ft West before Port Rd Intersection	East to Champion Ave	576-578	Right Lane	11	1,840	2,249
	Brownsville	SH100	East bound Bridge St	East bound to Gomez St	576-578	Right Lane	11	700	856
	Brownsville	SH100	West bound Queen Isabella Causeway conctrete departure	Garcia St	578	Right Lane	12	220	293
	Brownsville	SH100	West bound Queen Isabella Causeway conctrete departure	Garcia St	578	Left Lane	12	220	293
	Brownsville	SH100	140 ft west of Gomez St	1,620 ft West of Gomes St	576-578	Right Lane	11	1,480	1,809
#3	Brownsville	PR100	East bound Queen Isabella Causeway concrete departure	200 ft East of Queen Isabella Causeway concrete departure	728-730	Right Lane	12	200	267
	Brownsville	PR100	East bound Queen Isabella Causeway concrete departure	200 ft East of Queen Isabella Causeway concrete departure	728-730	Left Lane	12	200	267
	Brownsville	PR100	275 ft South of Orca Circle	615 ft South of Orca Circle	724-726	Right Lane	12	340	453
	Brownsville	PR100	615 ft South of Orca Circle (bike lane)	805 ft South of Orca Circle (bike Lane)	724-726	shoulder	6	190	127
	Brownsville	PR100	360 ft before Queen Isabella Causeway concrete approach West bound	Queen Isabella Causeway concrete approach	728-730	Right Lane	12	360	480
	Brownsville	PR100	360 ft before Queen Isabella Causeway concrete approach West bound	Queen Isabella Causeway concrete approach	728-730	Left Lane	12	360	480
								TOTAL	7,574



LIMITS OF ITEM 351

NOTES:
1. ADDITIONAL REPAIR AREAS SHALL BE APPROVED BY THE ENGINEER.
2. SURFACE LAYER OF ACP SHALL BE REMOVED USING ITEM 354 AND REPLACED WITH ITEM 3077 or 3080.
3. REMAINING 12" OF EXISTING PAVEMENT STRUCTURE SHALL BE SCARIFIED, PULVERIZED, MIXED, AND TREATED WITH CEMENT (3% BY WEIGHT) (FLEX BASE UNIT WEIGHT, 3375 LB/CY) UNDER ITEM 351.
4. MATCH EXISTING ACP DEPTH, ROADWAY ELEVATION, AND CROSS SLOPE. ACP NEEDED TO MATCH EXISTING DEPTH SHALL BE SUBSIDIARY TO ITEM 351.
5. APPLY PRIMECOAT AT A RATE OF 0.20 GAL/SY TO RESHAPED BASE MATERIAL PRIOR TO ITEM 3077 or 3080 PLACEMENT.
6. EXCESS MATERIAL SHALL BECOME PROPERTY OF THE CONTRACTOR.

FLEXIBLE PAVEMENT STRUCTURE REPAIR TYPICAL DETAIL

Texas Department of Transportation

PAVEMENT STRUCTURE REPAIR SUMMARY

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		21

DATE:
FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

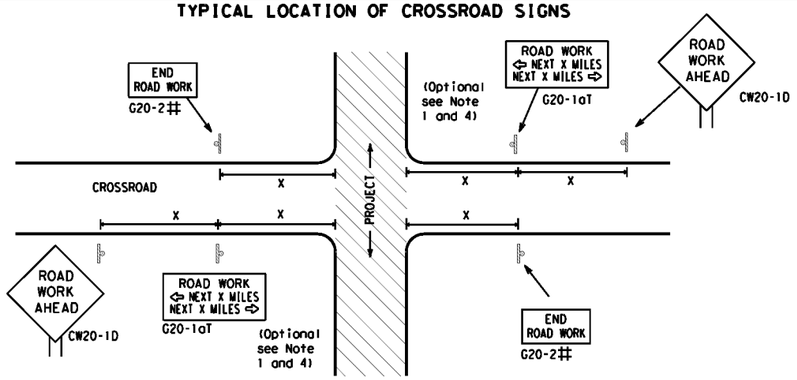
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1137	02	042,ETC.	SL 499,ETC.
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	PHR	CAMERON		22
5-10 5-21				

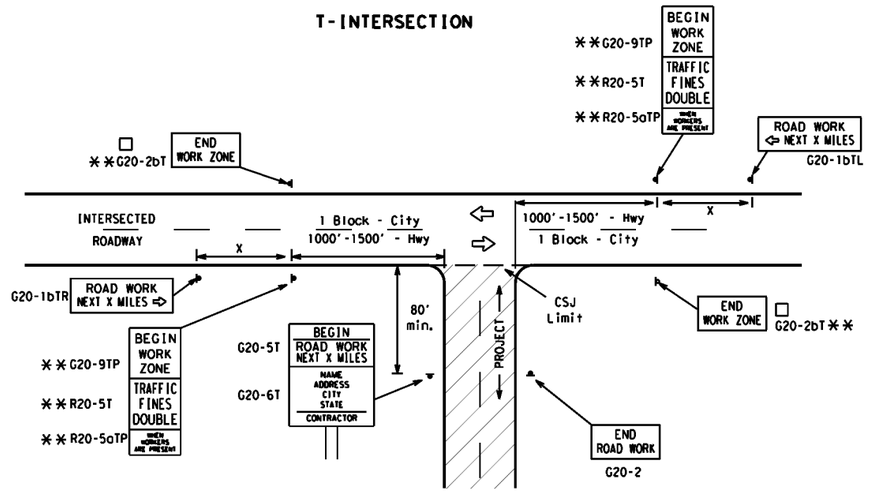
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

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

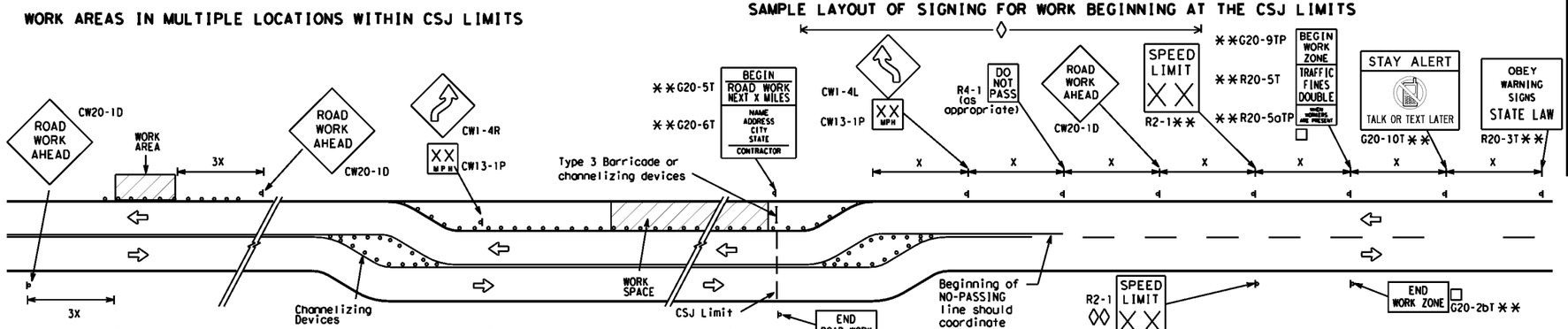
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

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

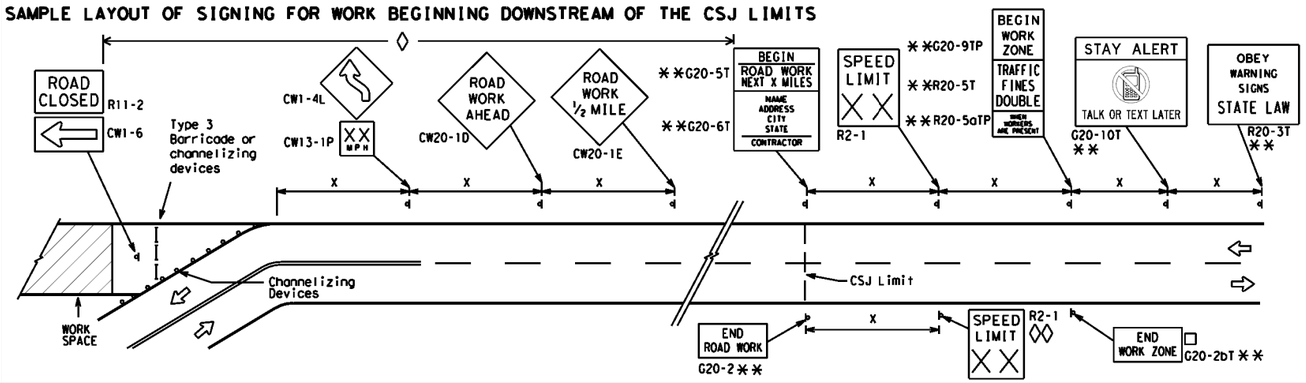
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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

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



NOTES

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

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

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

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

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1137	02	042,ETC.	SL 499,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	CAMERON		23

DATE:
FILE:

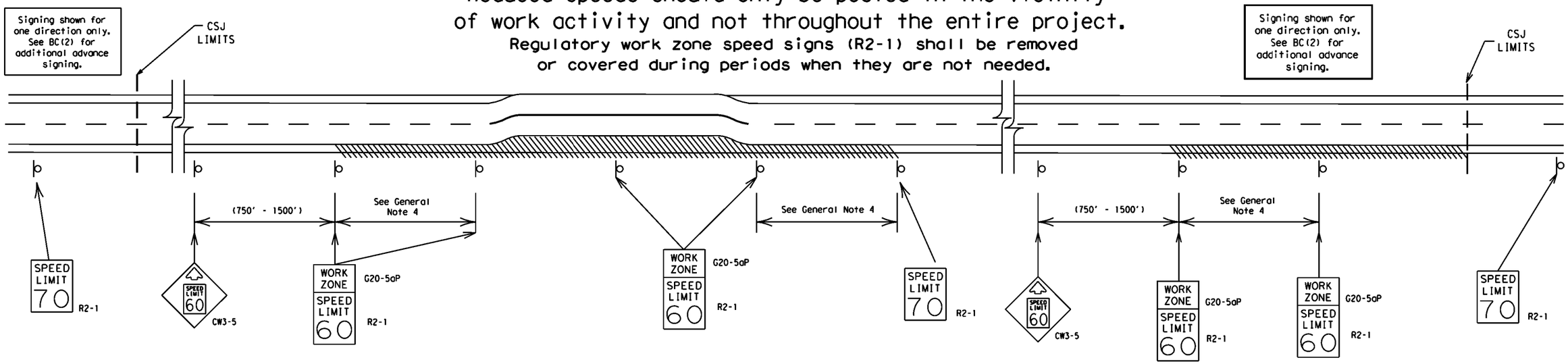
DATE:
FILE:

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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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DATE:
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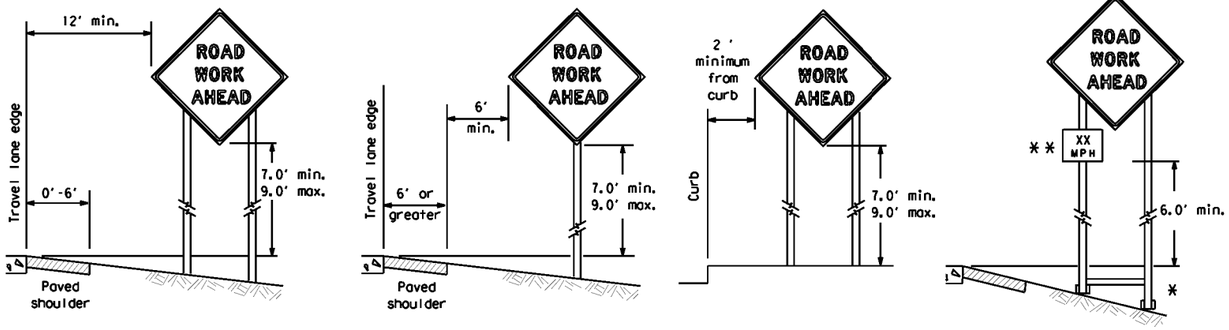
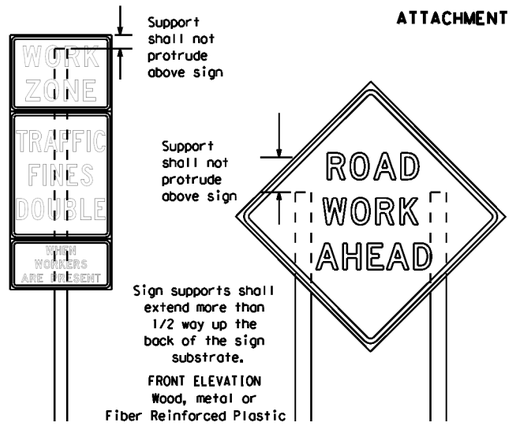
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

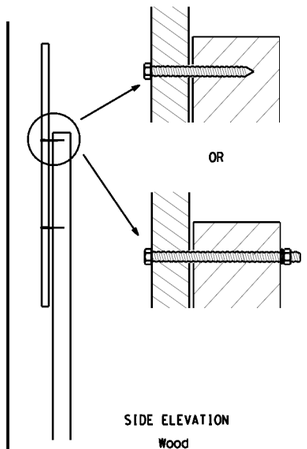


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





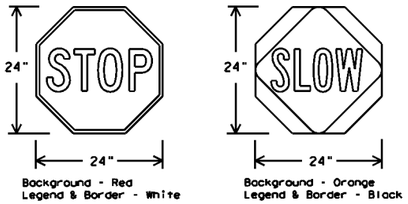
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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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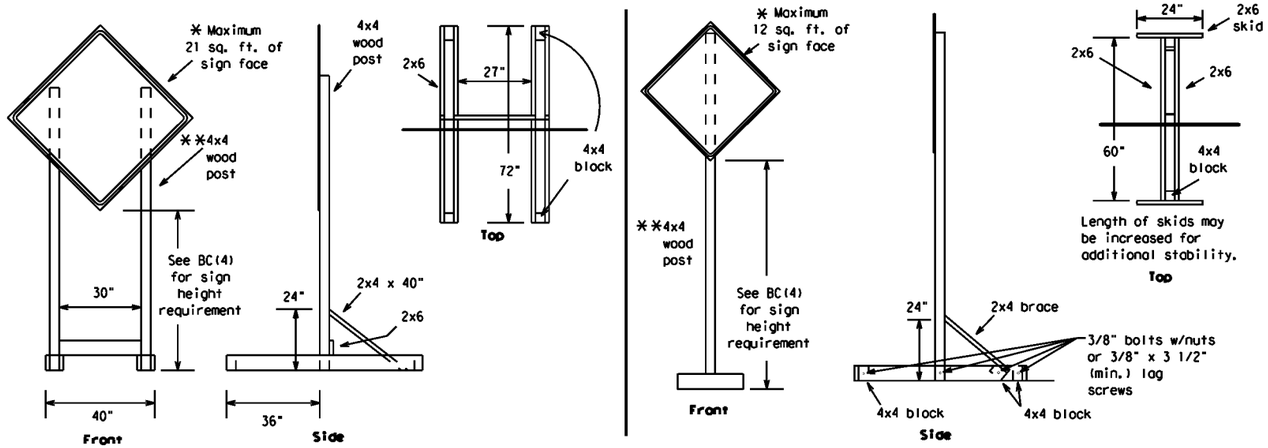
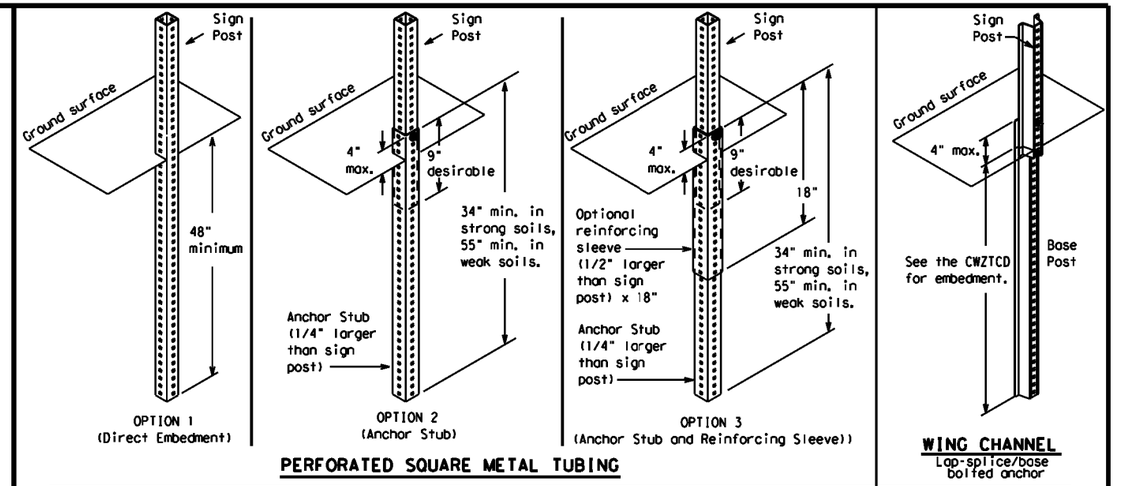


SKID MOUNTED WOOD SIGN SUPPORTS

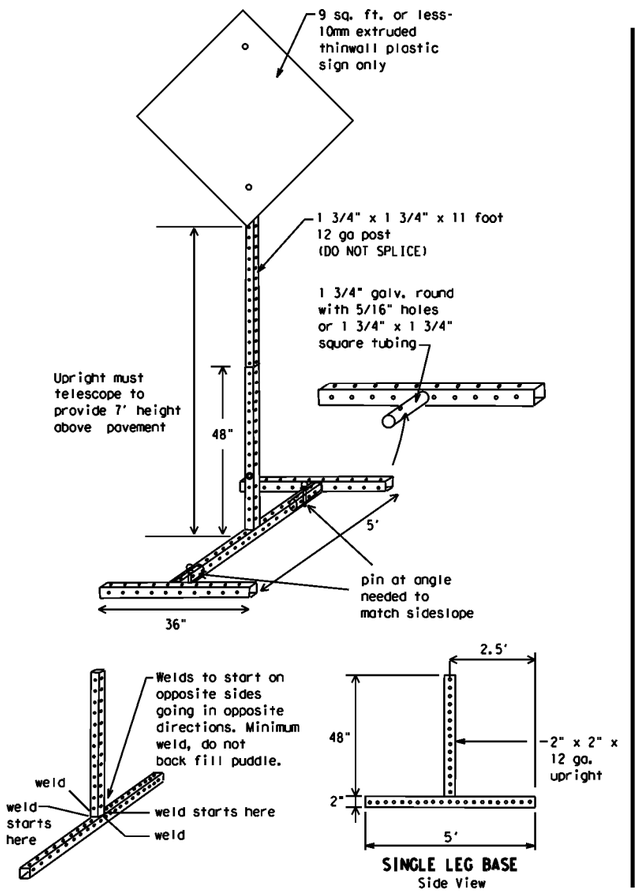
*** LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS**

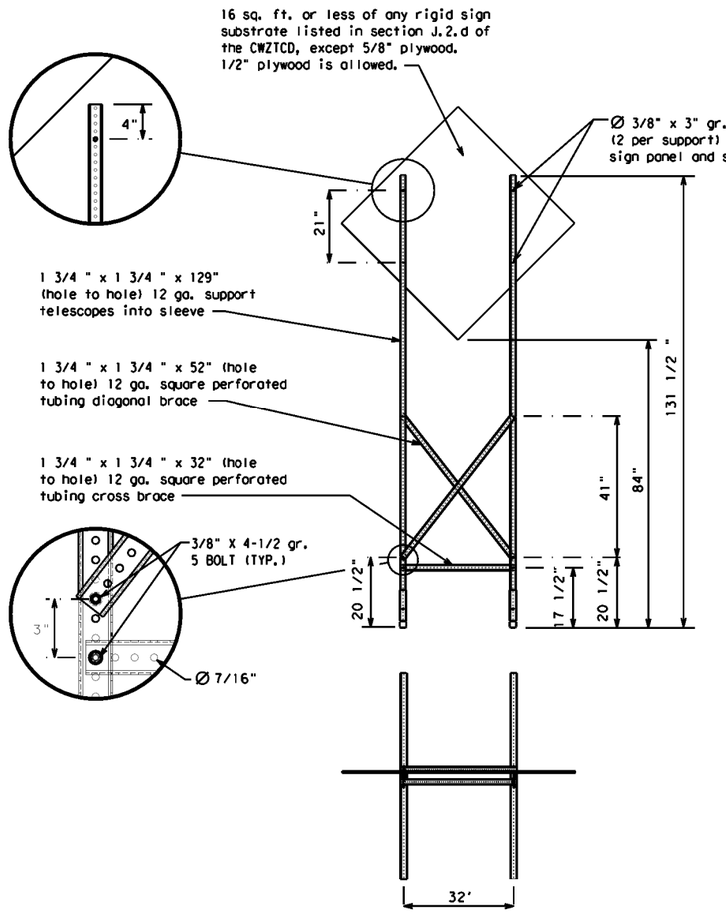


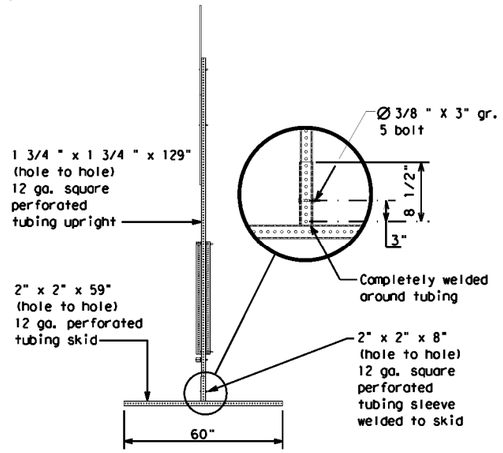
PERFORATED SQUARE METAL TUBING

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.

SHEET 5 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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

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
REVISIONS		1137	02	042,ETC.	SL 499,ETC.
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		PHR	CAMERON		27

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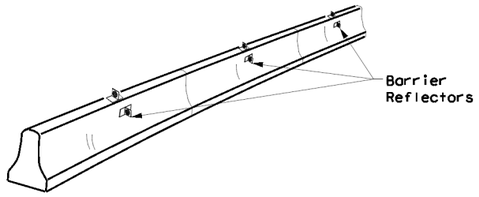
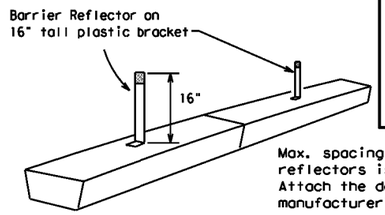
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



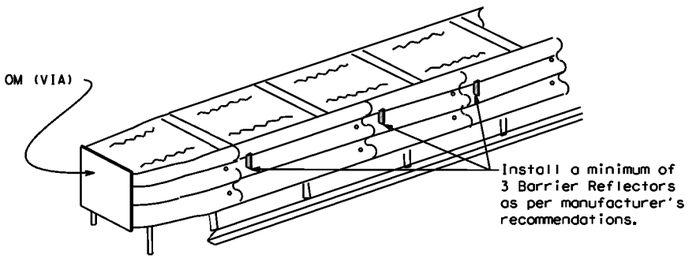
CONCRETE TRAFFIC BARRIER (CTB)

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)



DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

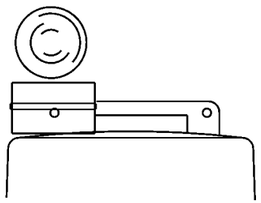
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

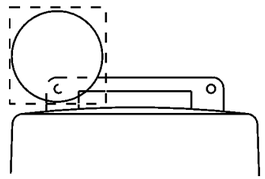
1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this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



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

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.



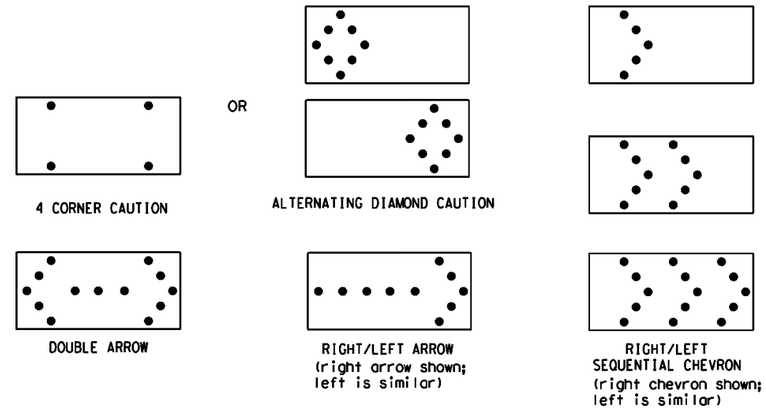
Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

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 on extended distance from the TMA.

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1137	02	042,ETC.	SL 499,ETC.
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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:

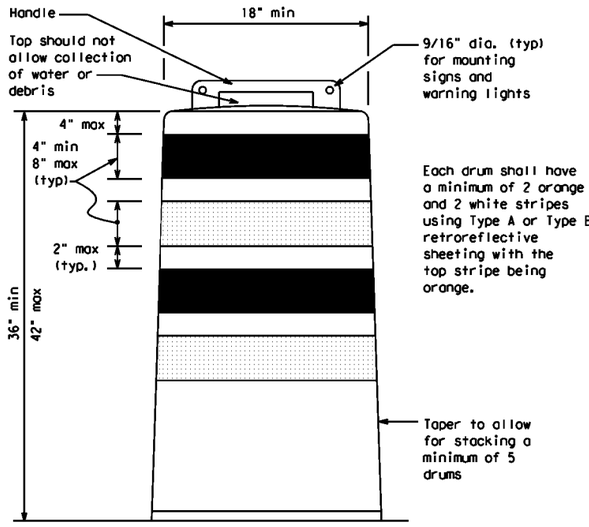
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents 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.

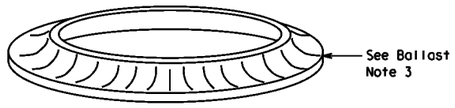
RETROREFLECTIVE SHEETING

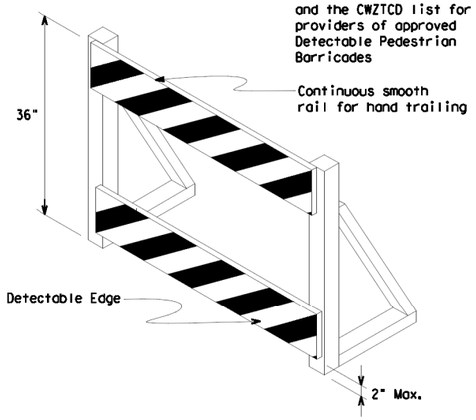
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall 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.

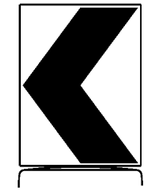




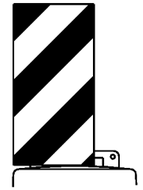


DETECTABLE PEDESTRIAN BARRICADES

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	1137	02	042,ETC.	SL 499,ETC.
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	PHR	CAMERON		29
7-13				

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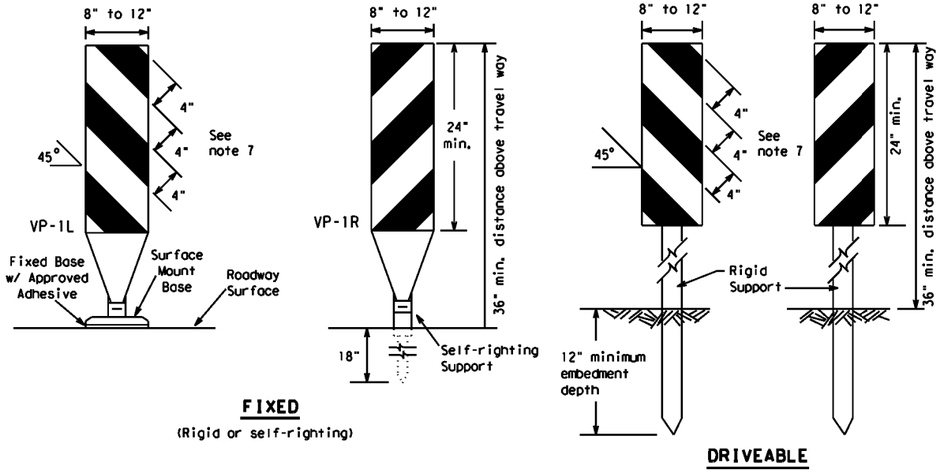
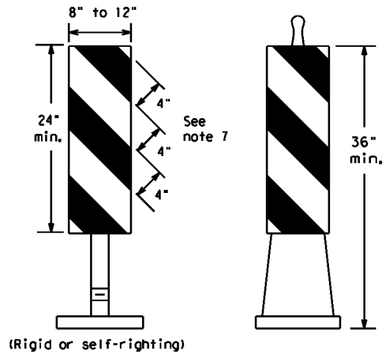


FIXED
(Rigid or self-righting)

DRIVEABLE

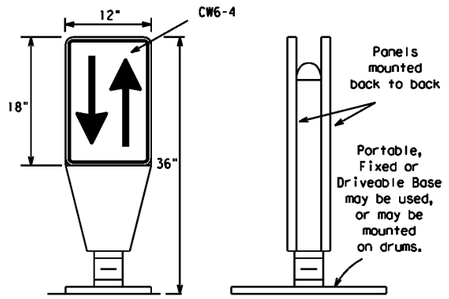


(Rigid or self-righting)

PORTABLE

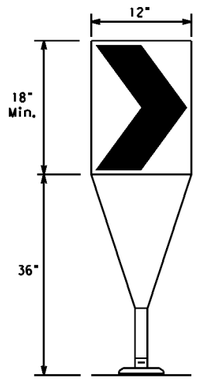
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



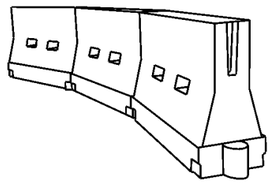
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

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
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REVISIONS	1137	02	042,ETC.	SL 499,ETC.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	CAMERON		30

DATE:
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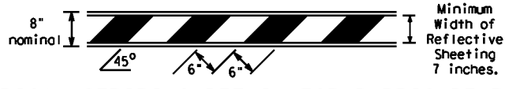
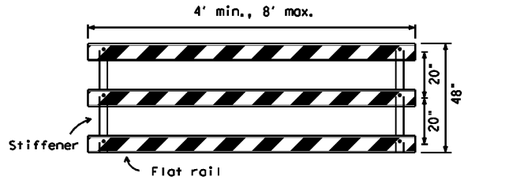
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



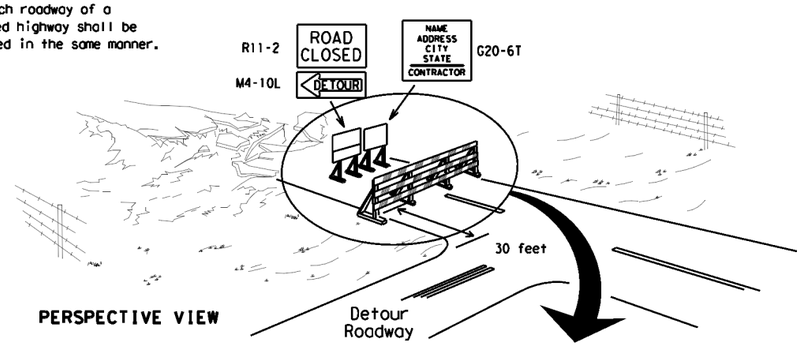
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

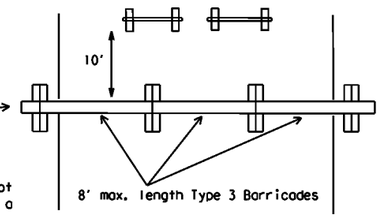
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

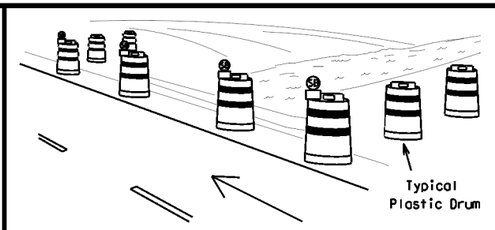
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

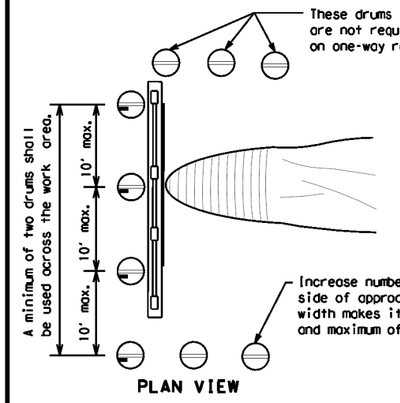
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

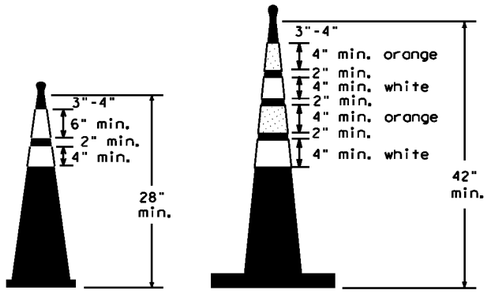
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



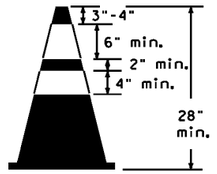
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

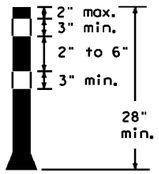
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

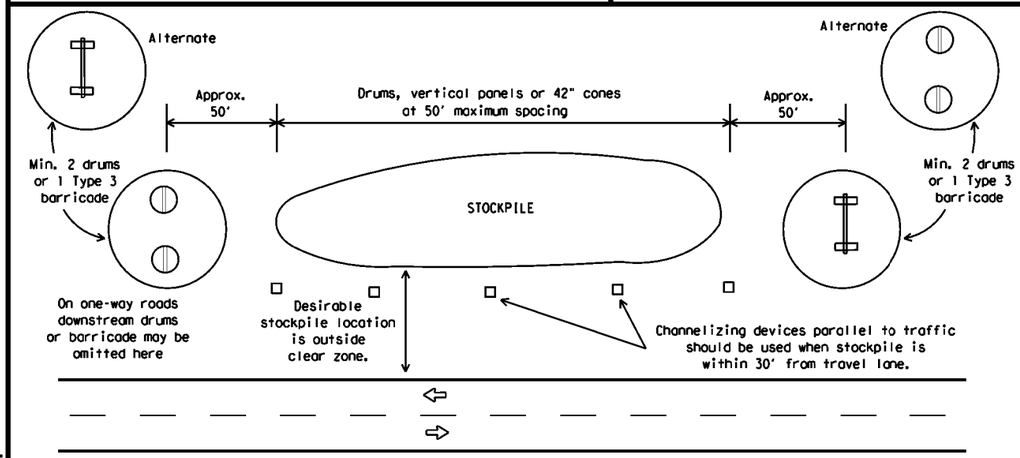


Tubular Marker

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
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	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		31

DATE:
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104

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

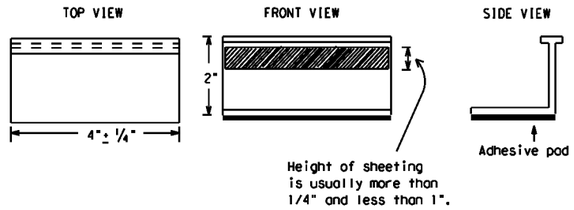
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		32

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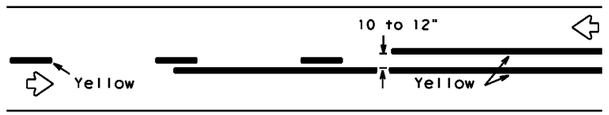
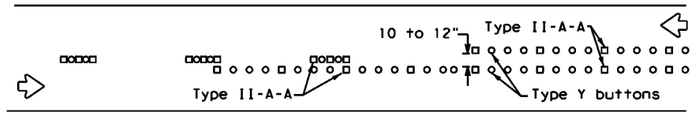
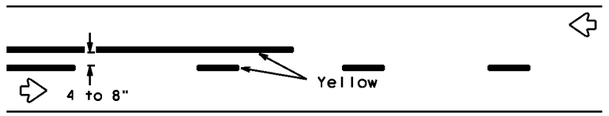
PAVEMENT MARKING PATTERNS



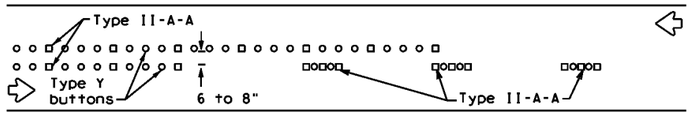
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



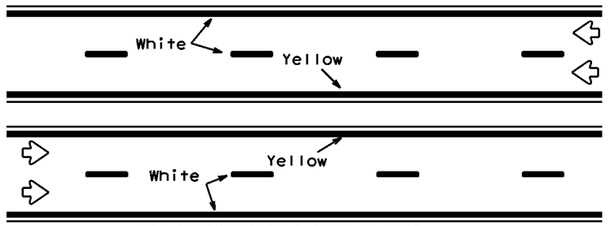
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



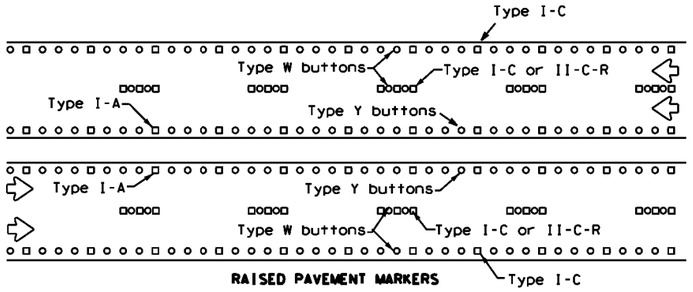
RAISED PAVEMENT MARKERS - PATTERN B

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

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



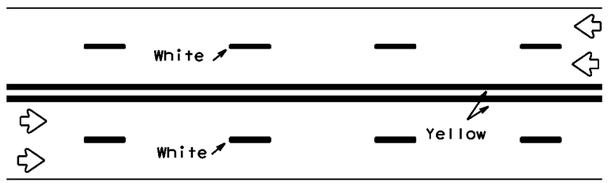
REFLECTORIZED PAVEMENT MARKINGS



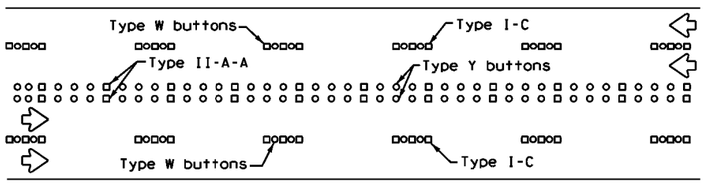
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



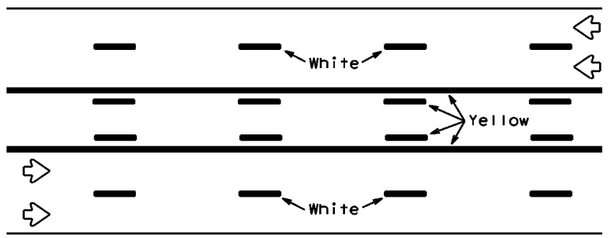
REFLECTORIZED PAVEMENT MARKINGS



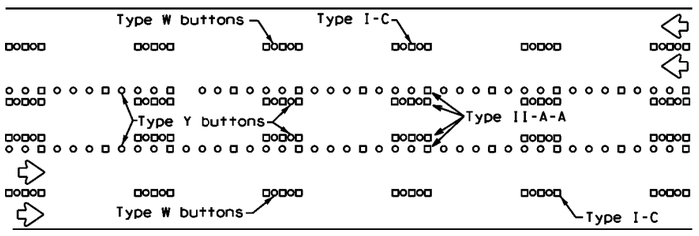
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

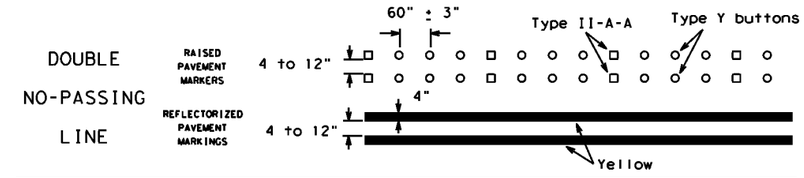
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

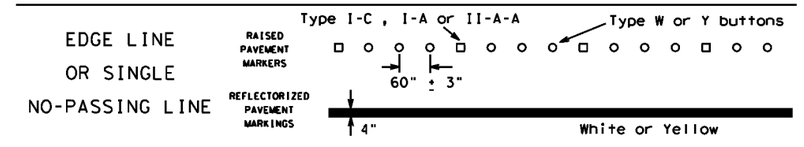
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

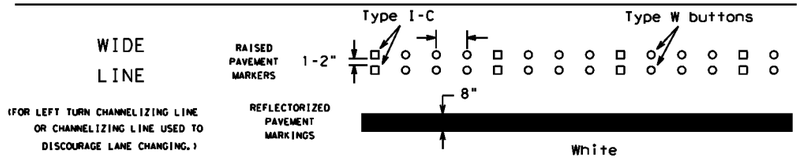


EDGE LINE OR SINGLE NO-PASSING LINE



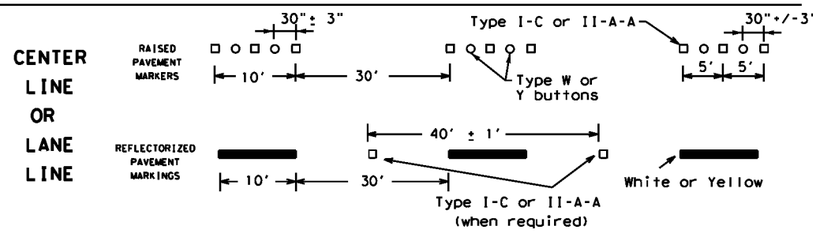
WIDE LINE

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

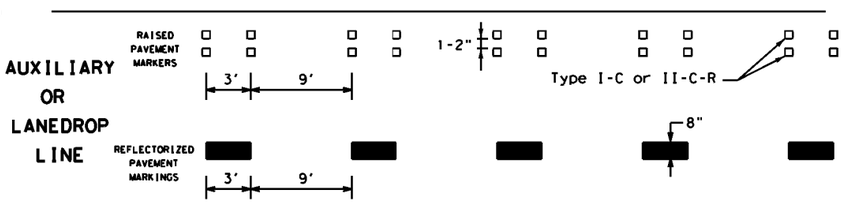


BROKEN LINES

CENTER LINE OR LANE LINE

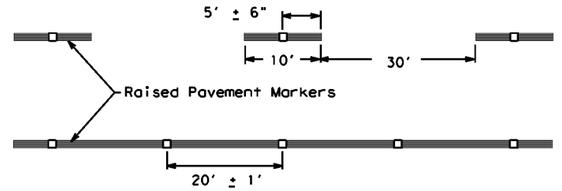


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

SHEET 12 OF 12

Texas Department of Transportation

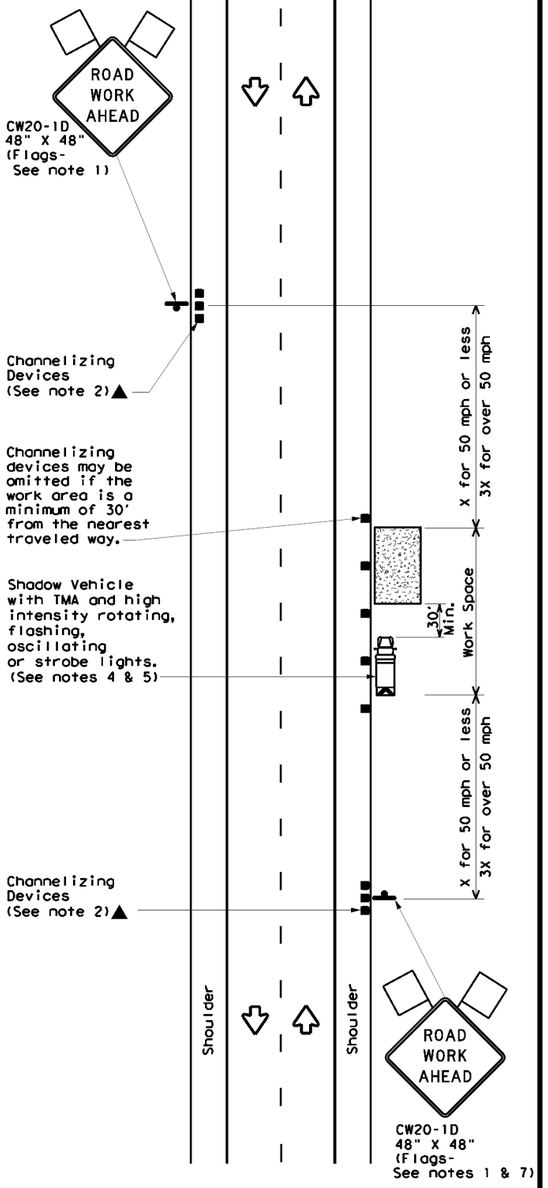
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

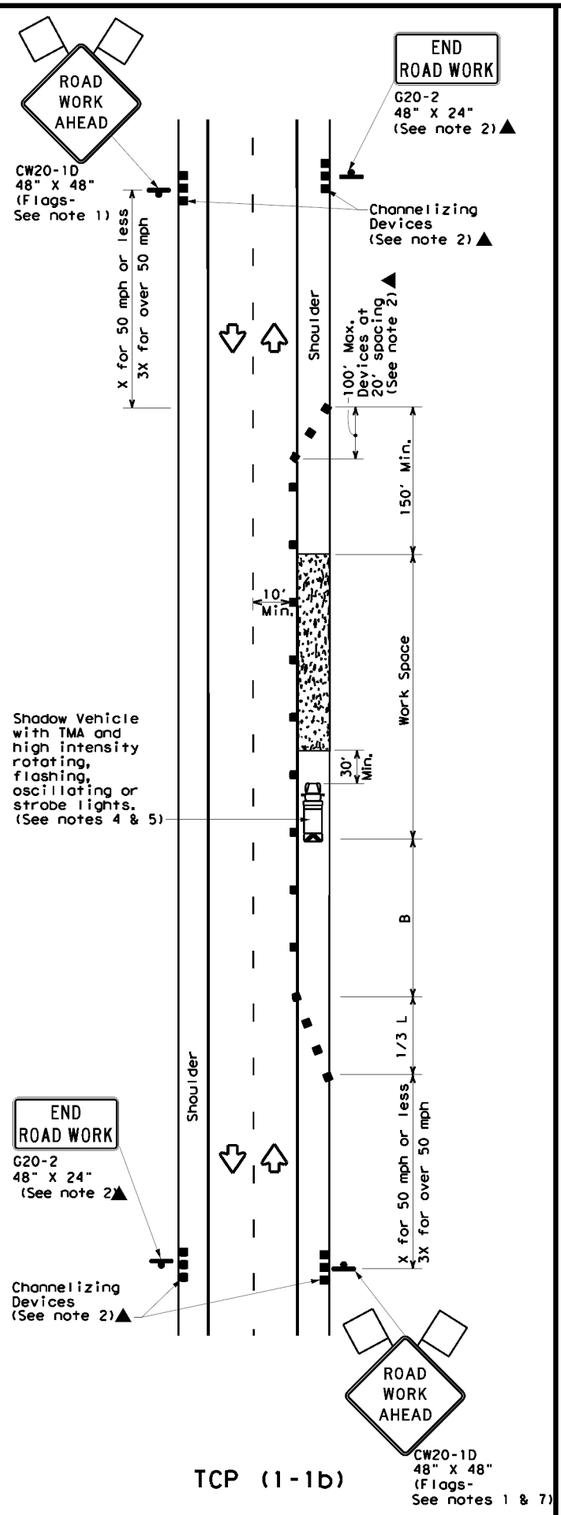
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	1137	02	042,ETC.	SL 499,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		33

DATE:
FILE:



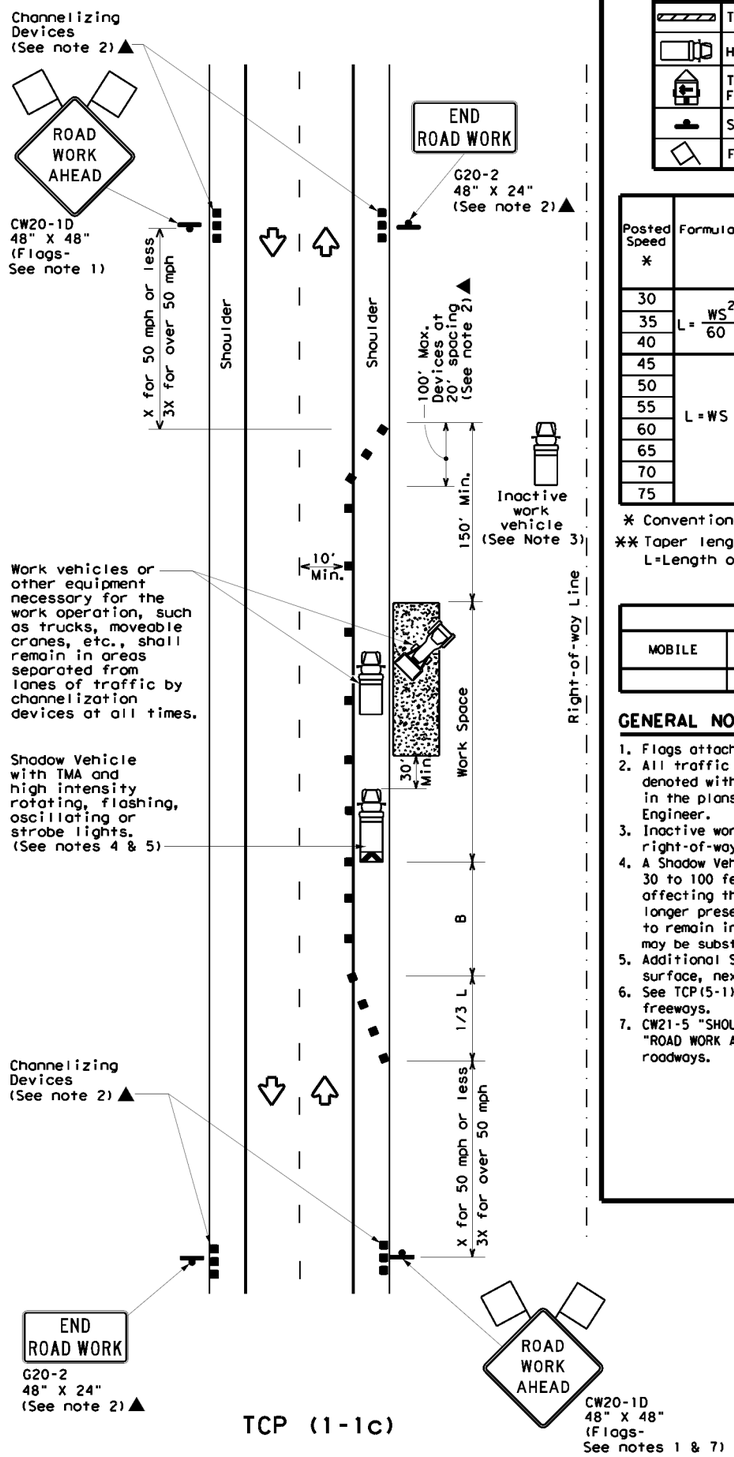
TCP (1-1a)

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

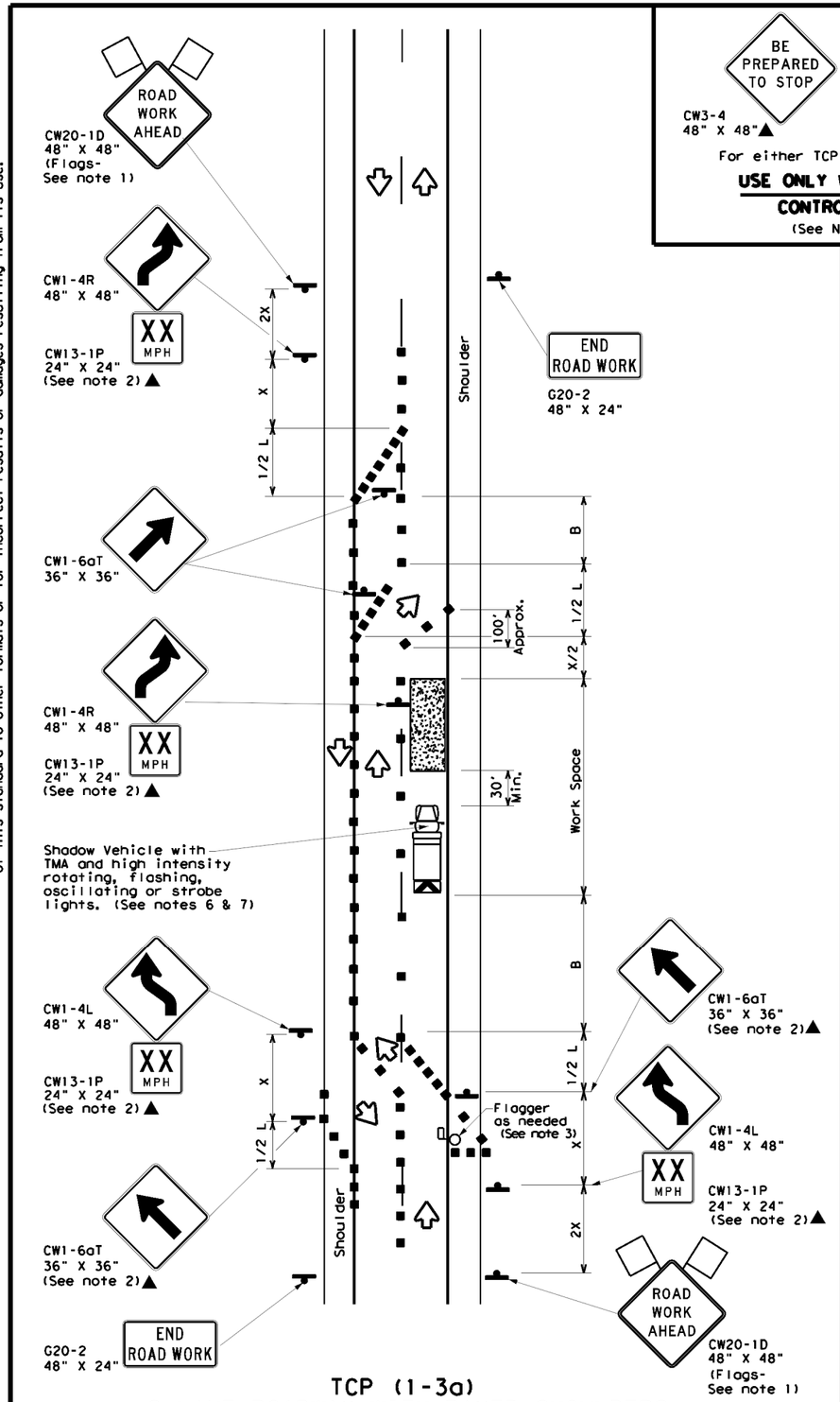
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

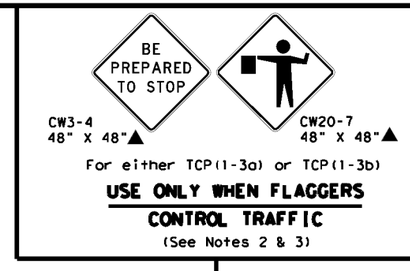
FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98	1137	02	042,ETC.	SL 499,ETC
8-95 2-12	DIST	COUNTY		SHEET NO.
1-97 2-18	PHR	CAMERON		34

DATE:
FILE:



TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

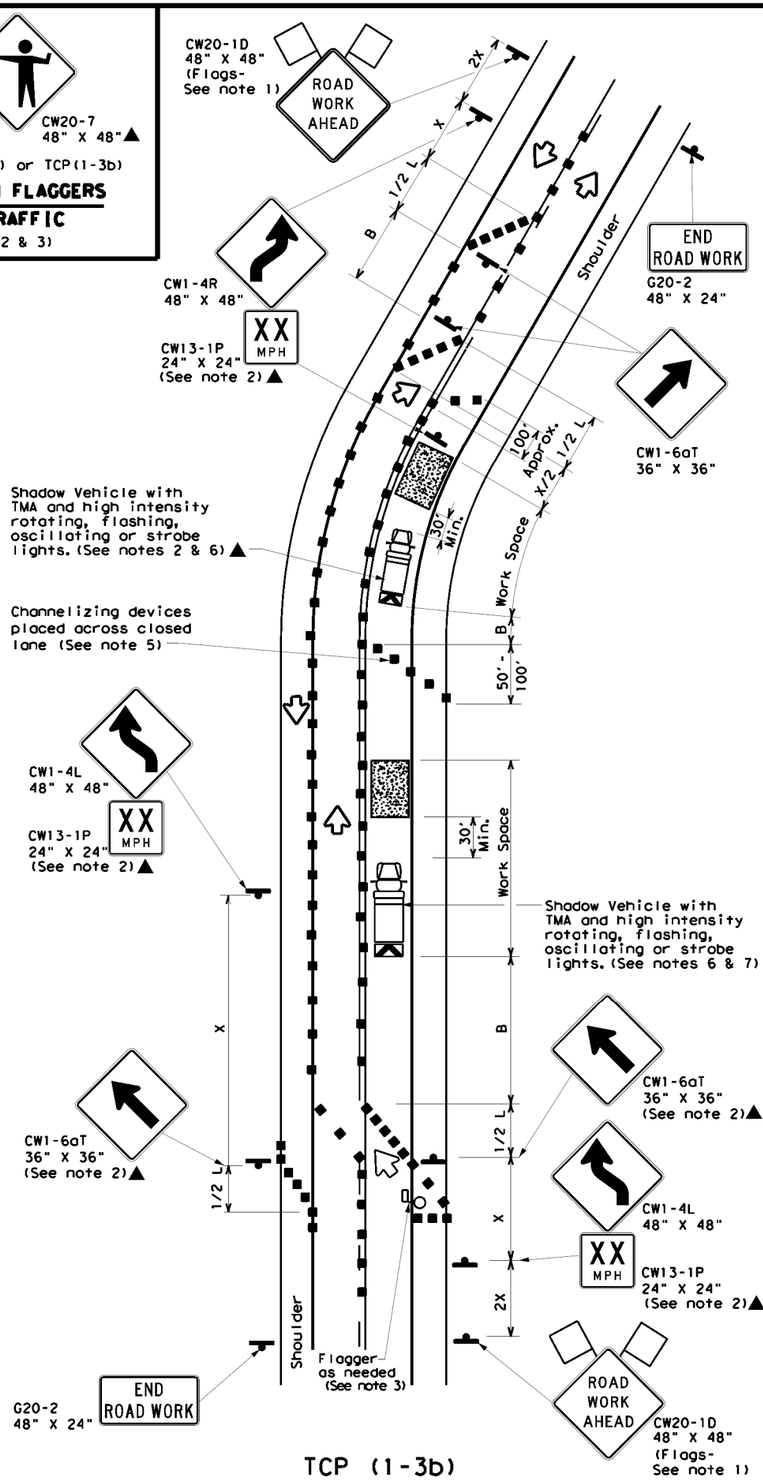
ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



For either TCP(1-3a) or TCP(1-3b)

USE ONLY WHEN FLAGGERS CONTROL TRAFFIC

(See Notes 2 & 3)



TCP (1-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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

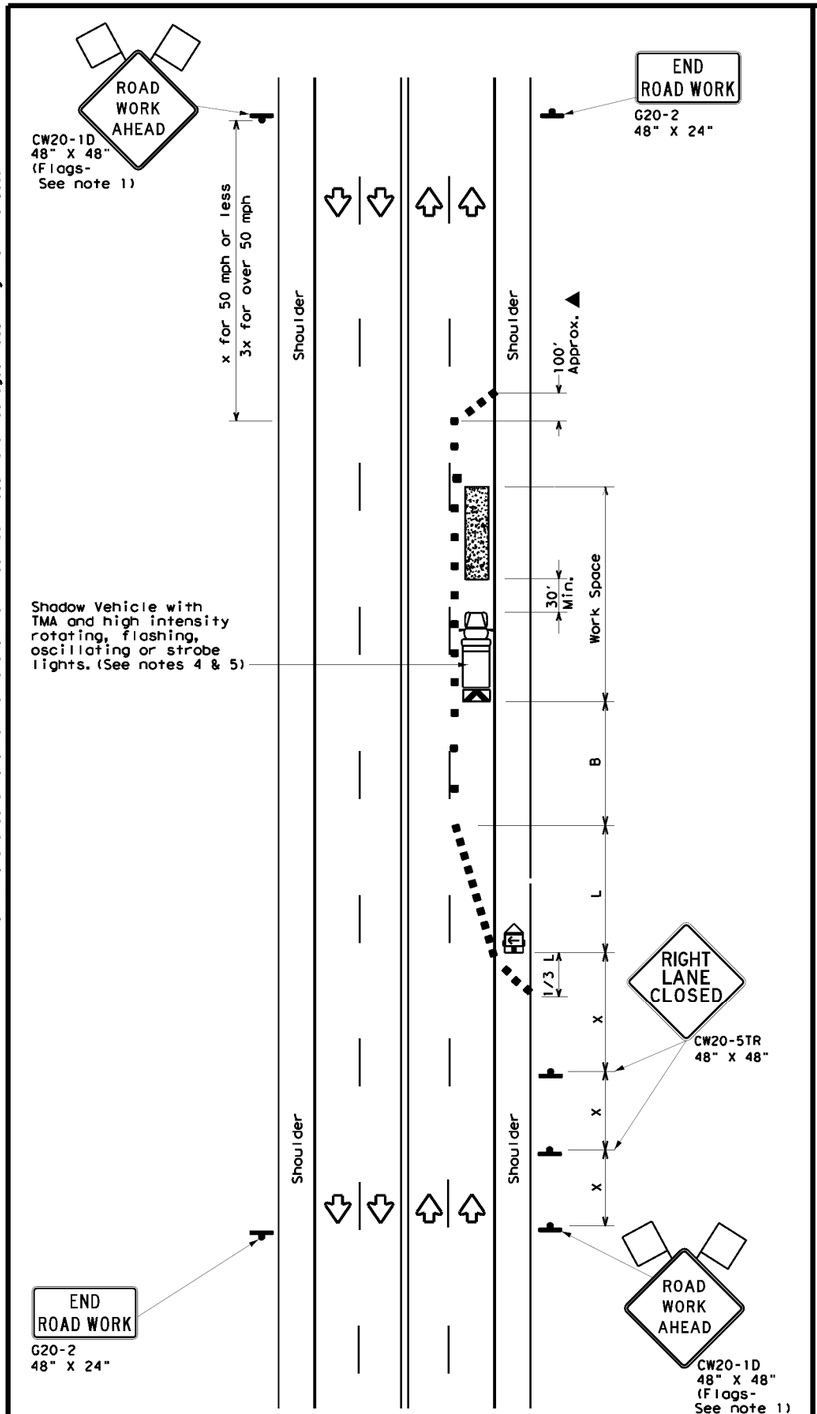
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON TWO LANE ROADS
TCP(1-3)-18

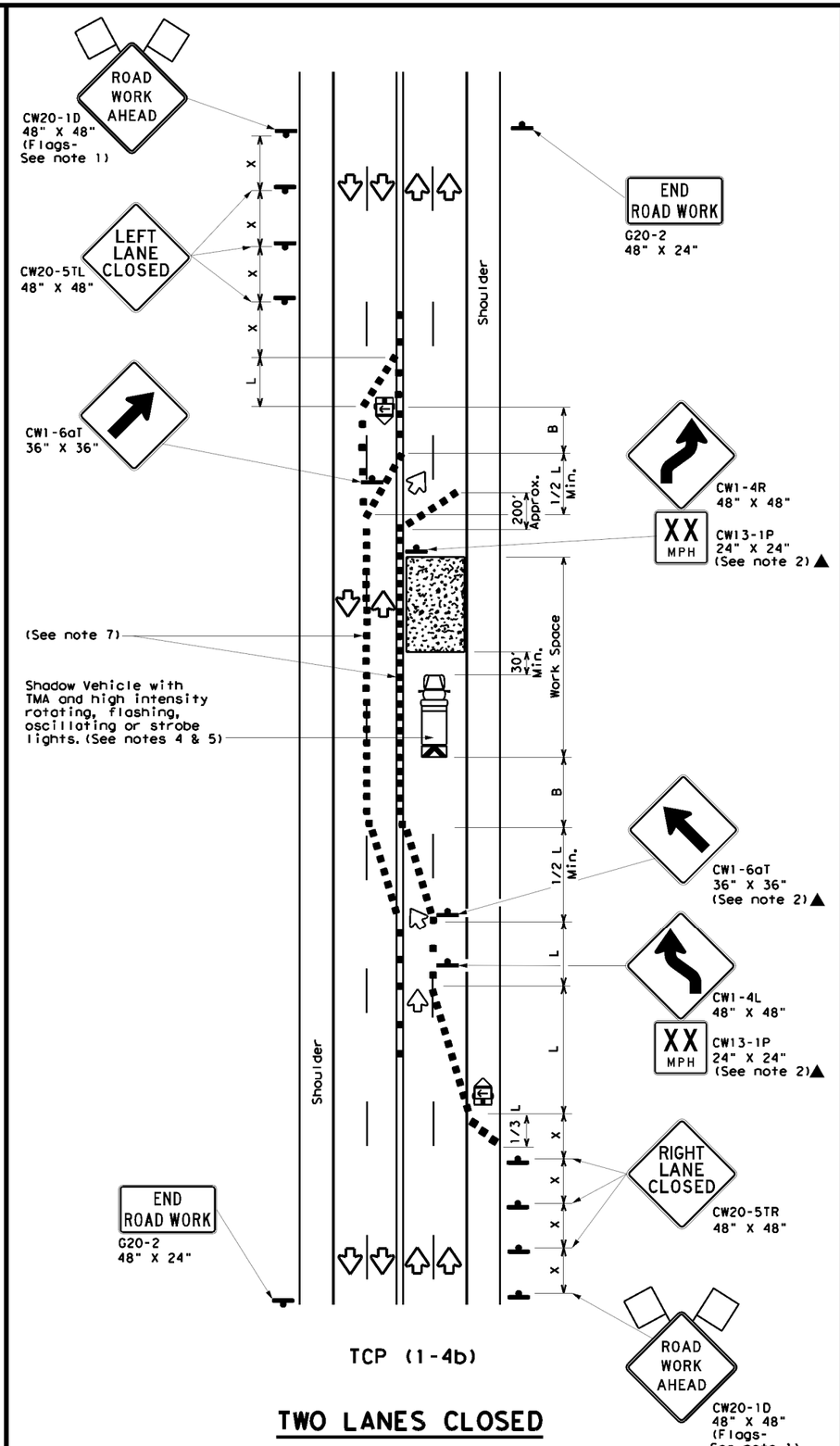
FILE: tcp1-3-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1137	02	042,ETC.	SL 499,ETC.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	PHR	CAMERON		35
1-97 2-18				

DATE:
FILE:



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

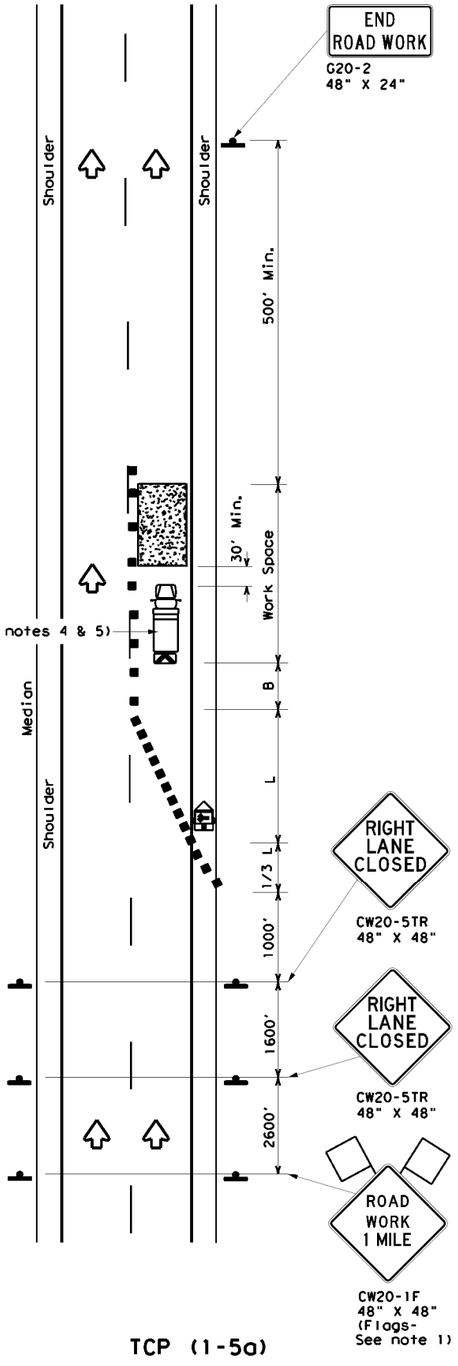
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

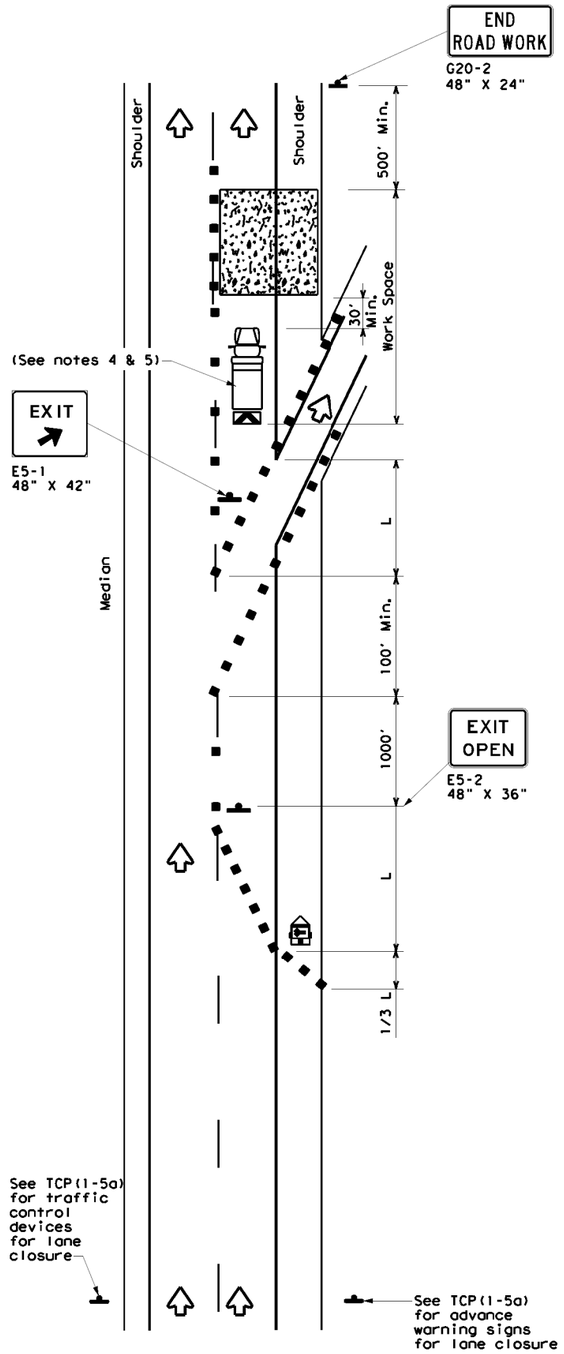
FILE: tcp1-4-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	1137	02	042,ETC.	SL 499,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		36

DATE:
FILE:



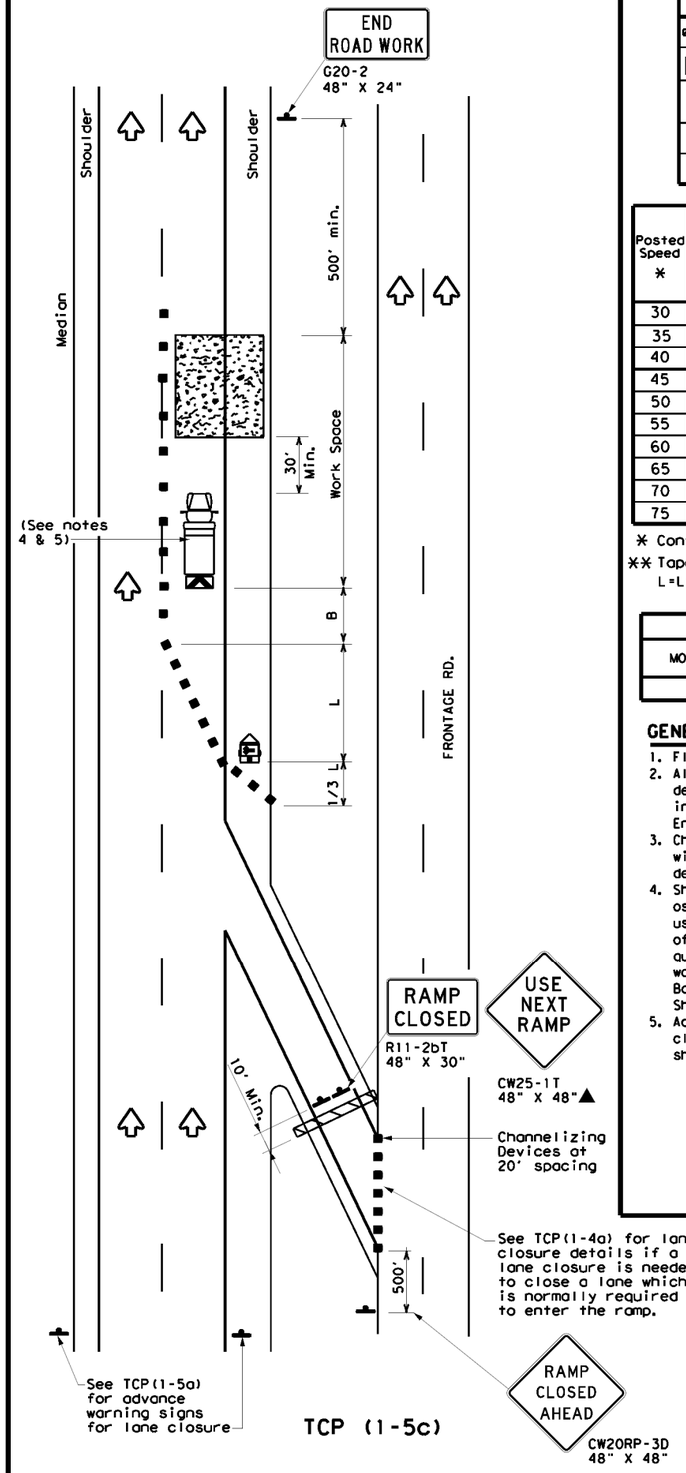
TCP (1-5a)

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

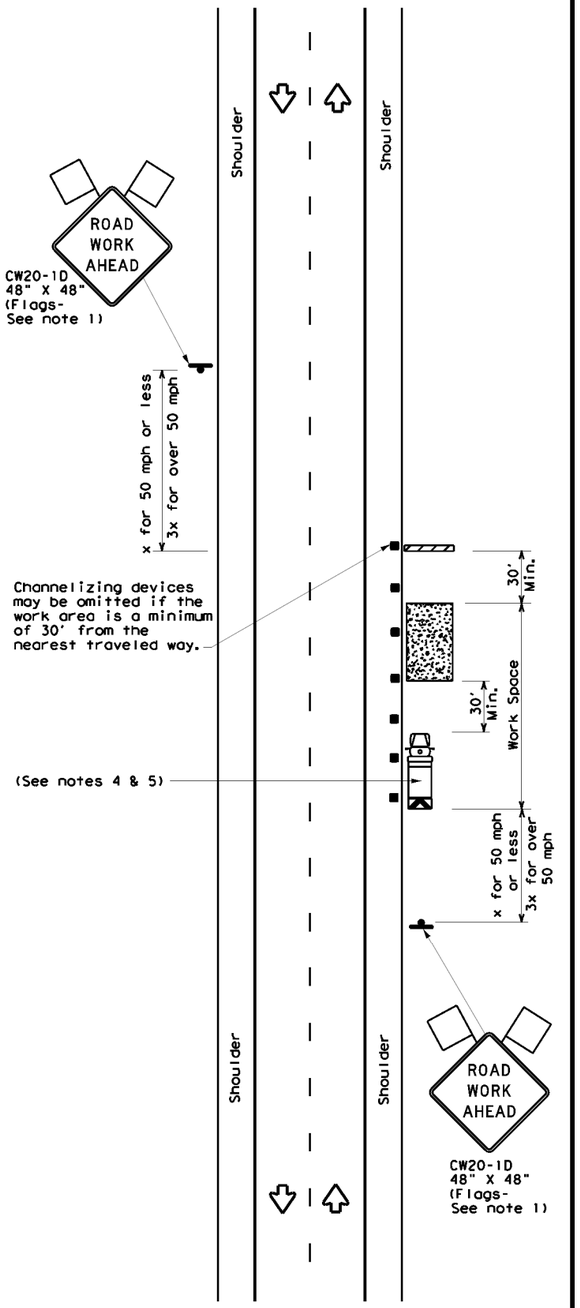
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

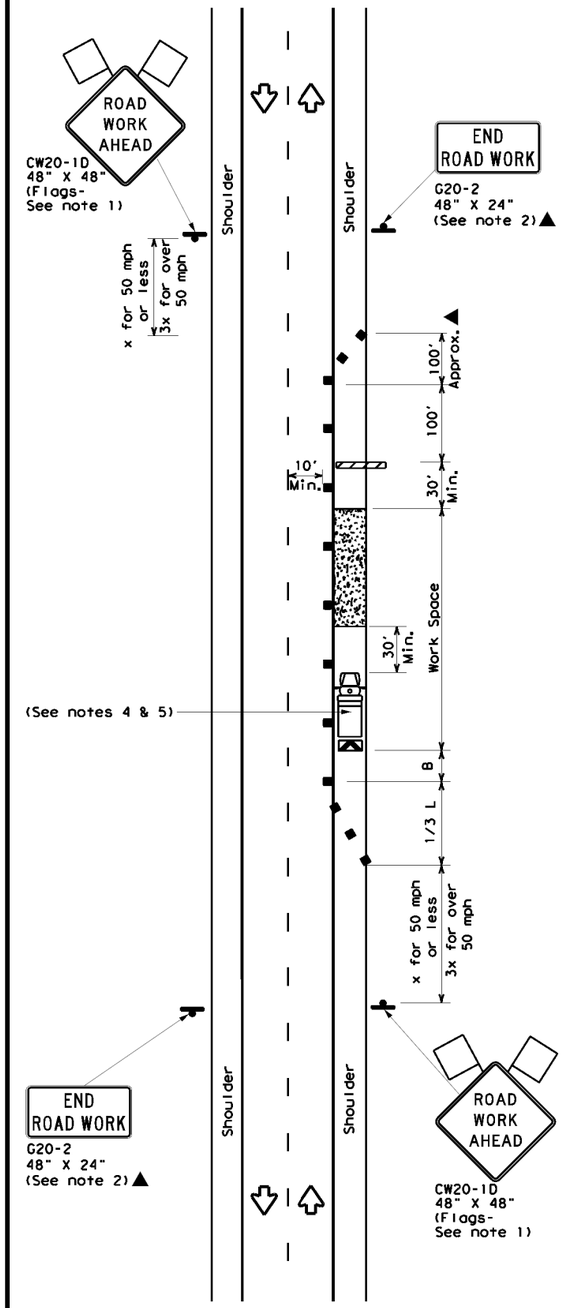
FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	1137	02	042,ETC.	SL 499,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		37

DATE:
FILE:



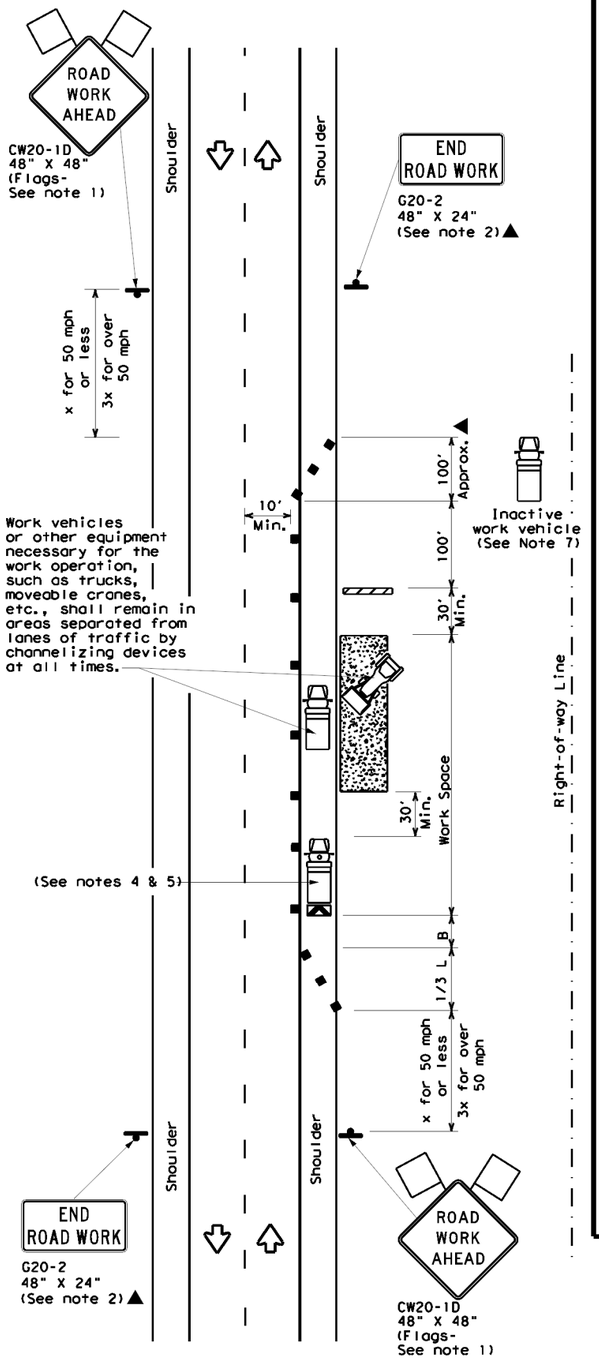
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

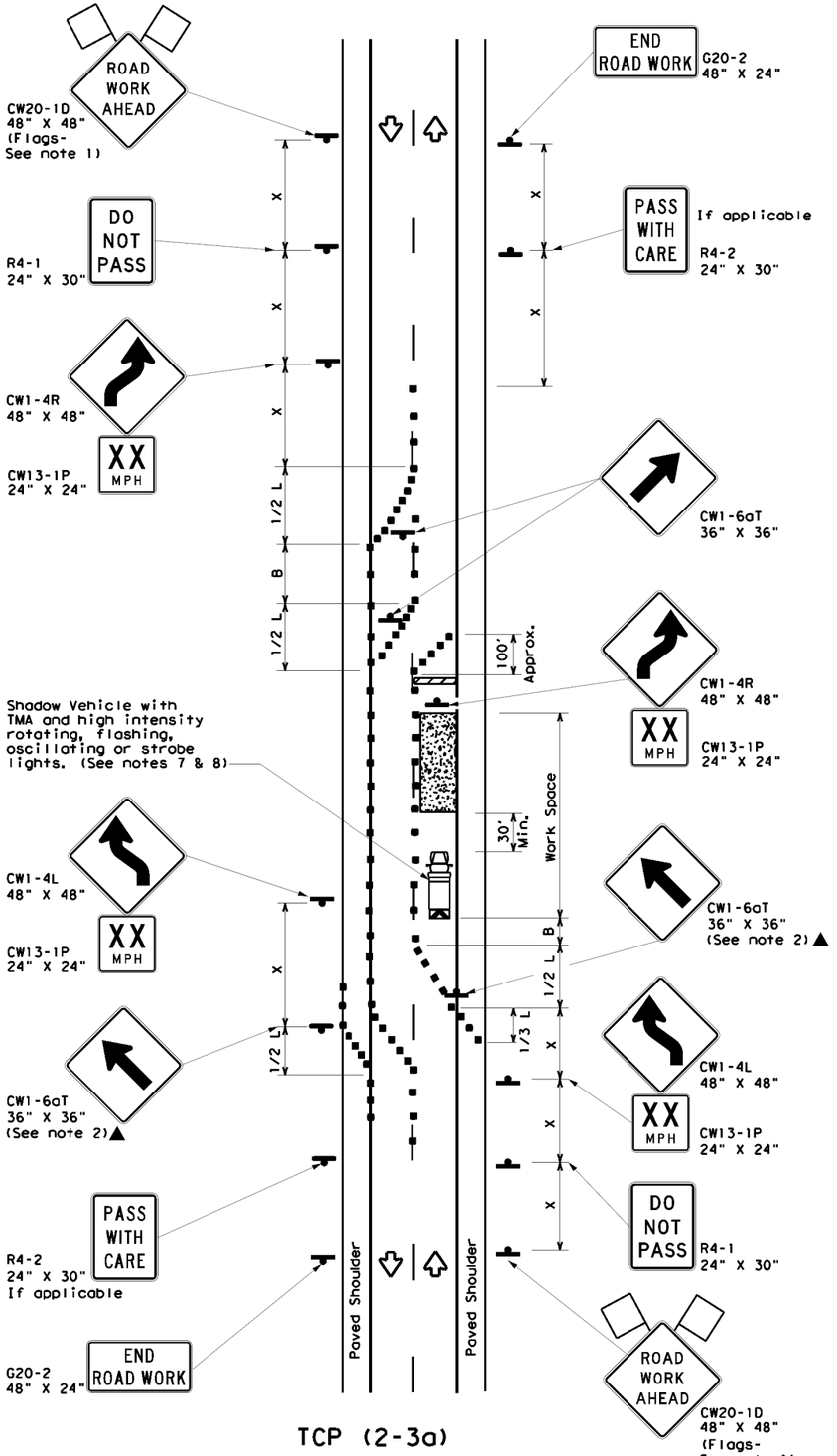
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

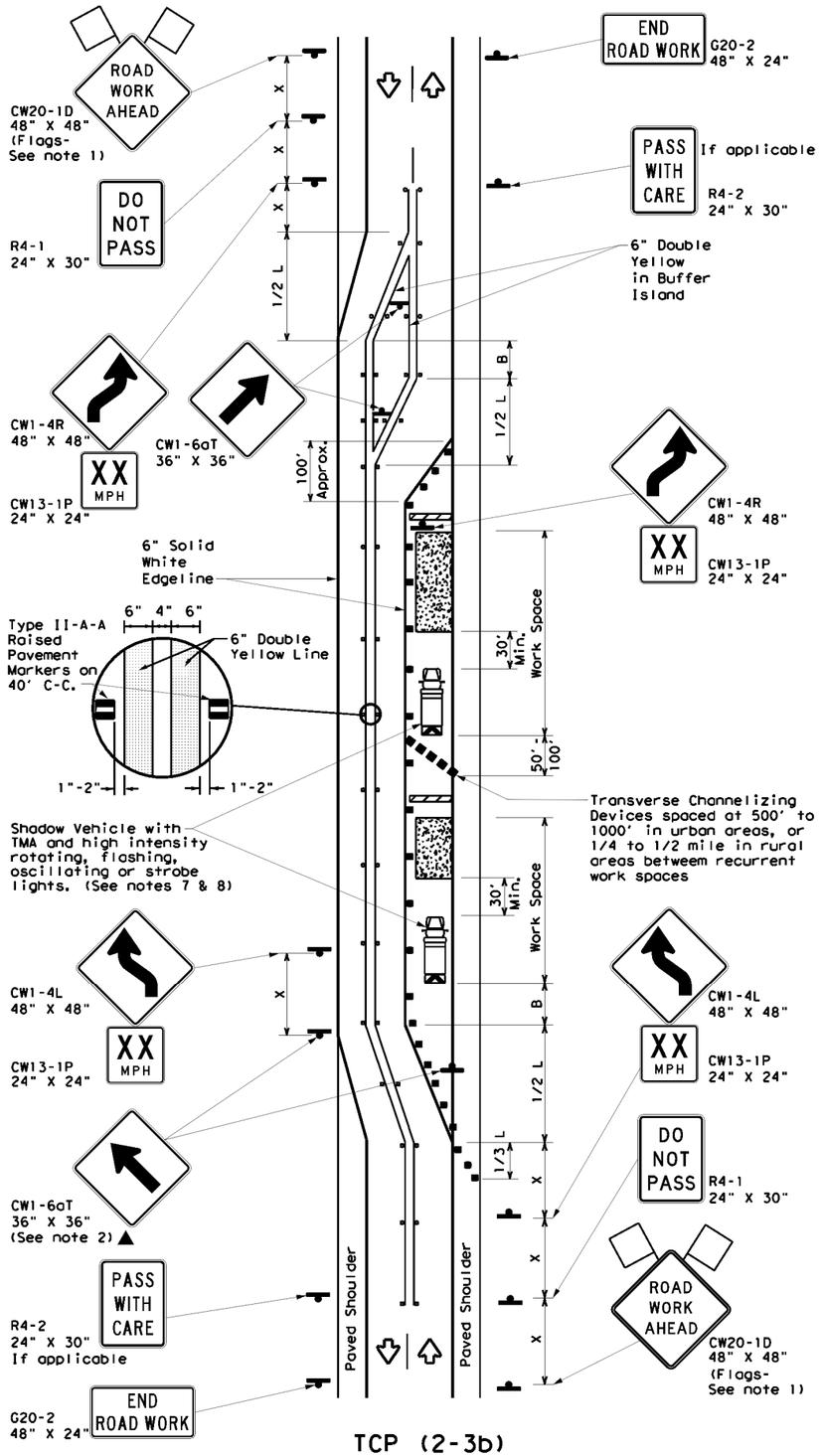
FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1137	02	042,ETC.	SL 499,ETC.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	PHR	CAMERON		38
1-97 2-18				

DATE:
FILE:



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

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



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

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-3a)

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

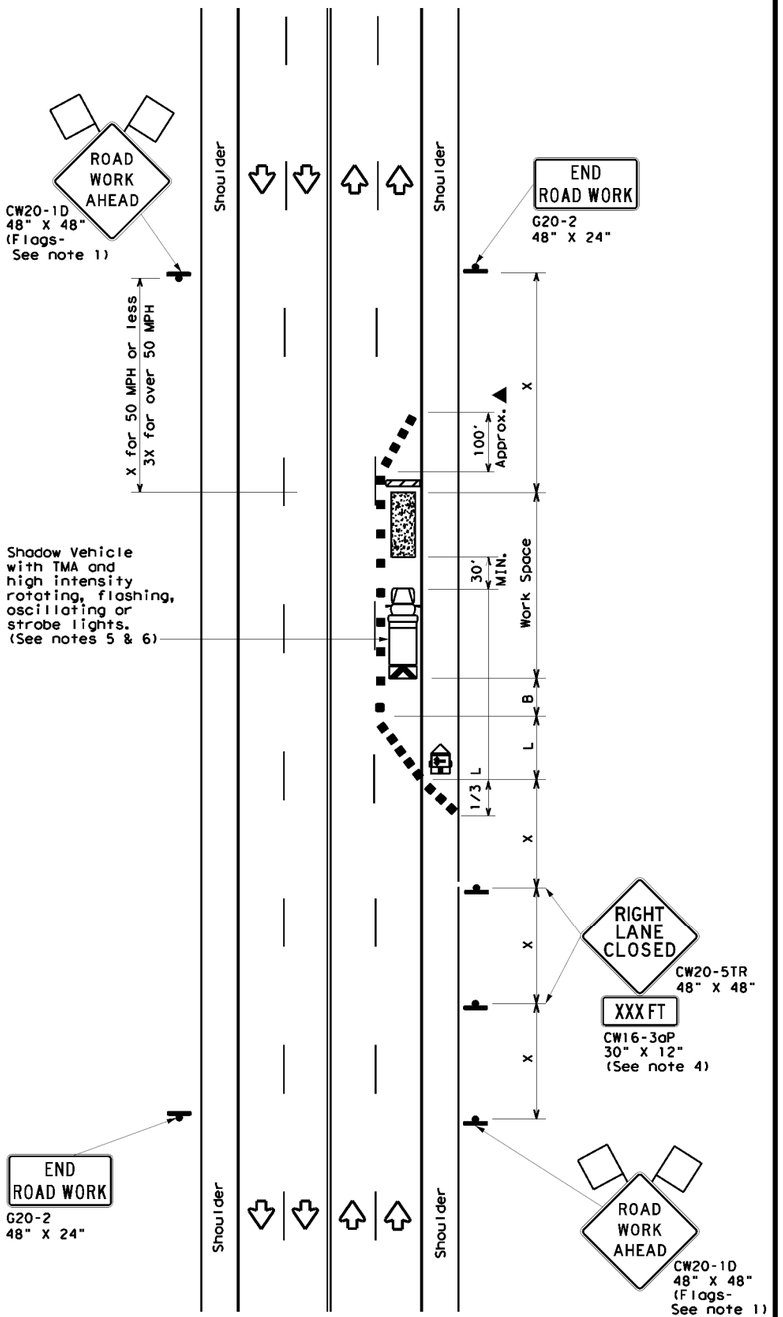
Texas Department of Transportation — *Traffic Safety Division Standard*

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-23

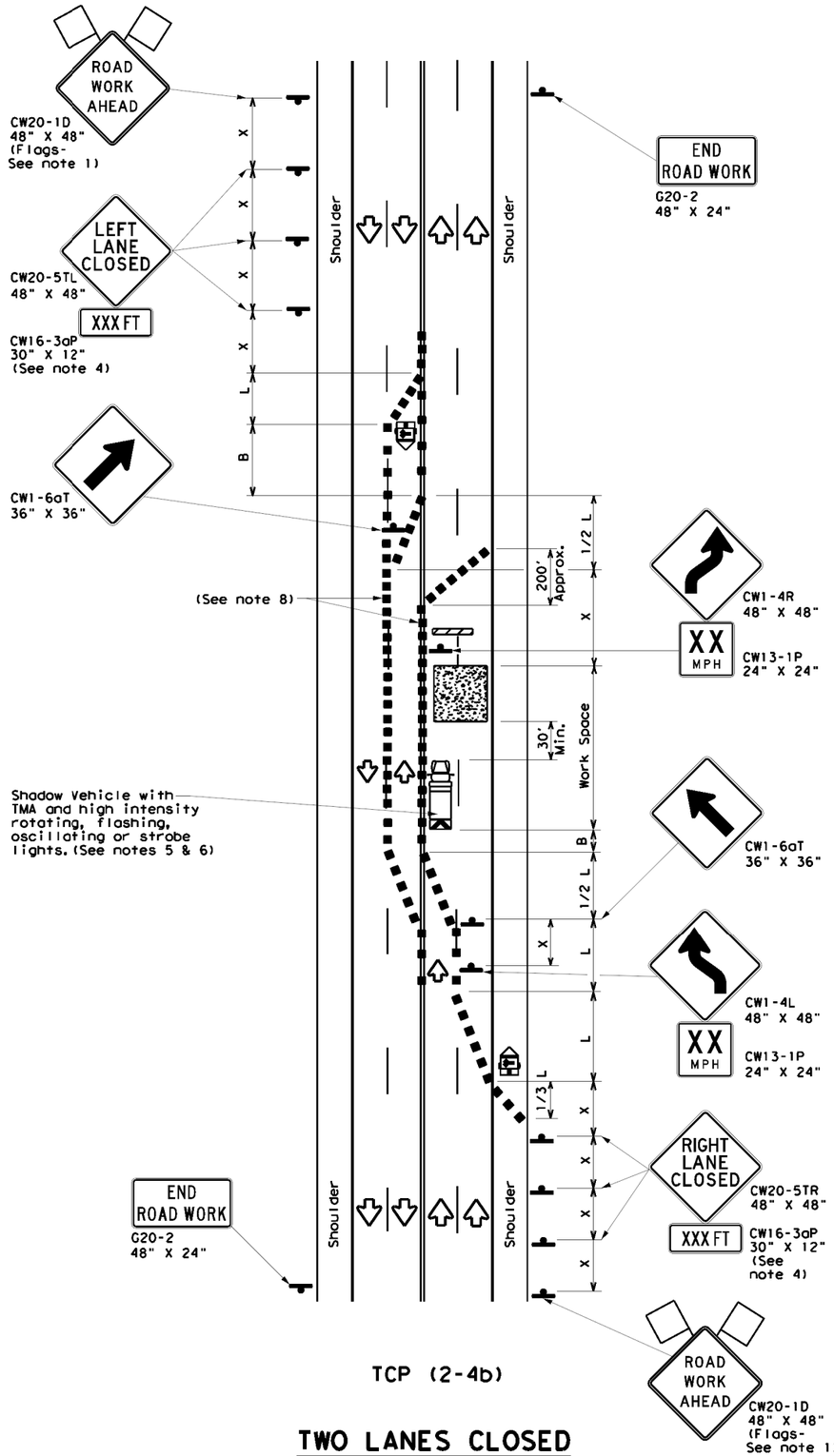
FILE: tcp(2-3)-23.dgn	DN:	CK:	DW:	CK:
© TxDOT April 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-85 4-98 2-18 8-95 3-03 4-23 1-97 2-12	113702	042,ETC,	SL 499,ETC.	
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		39

DATE:
FILE:



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

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	1137	02	042,ETC.	SL 499,ETC.
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	PHR	CAMERON		40

DATE:
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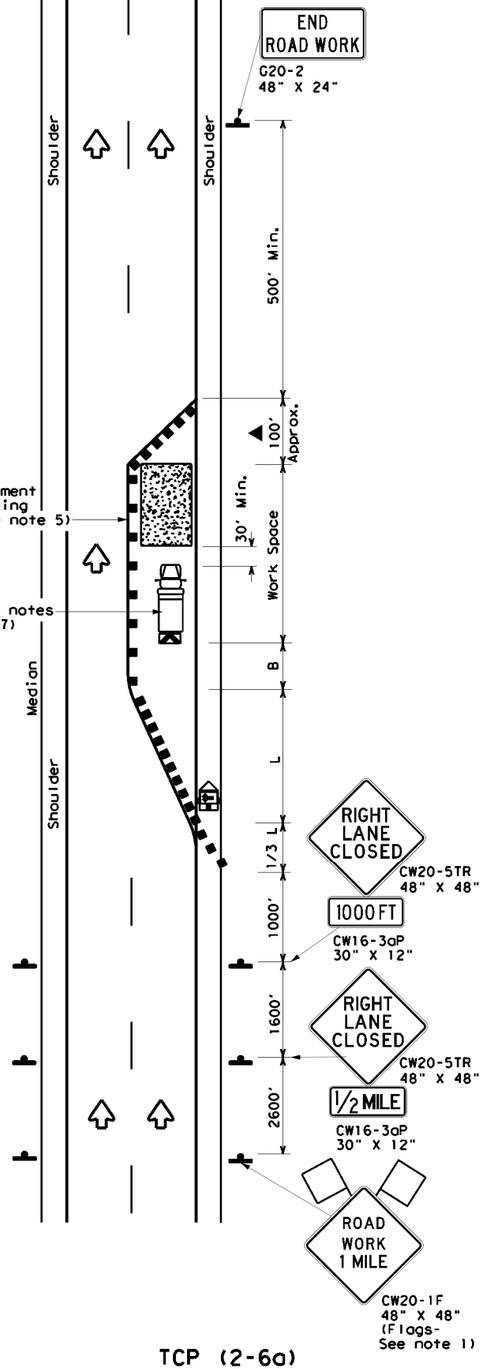
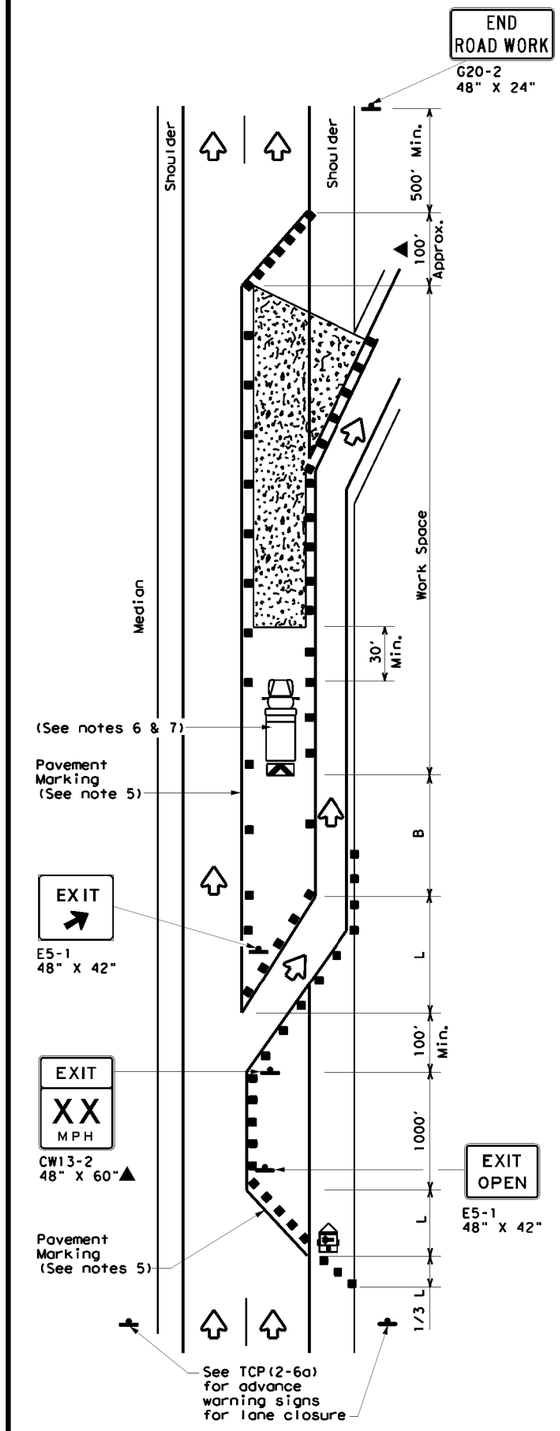


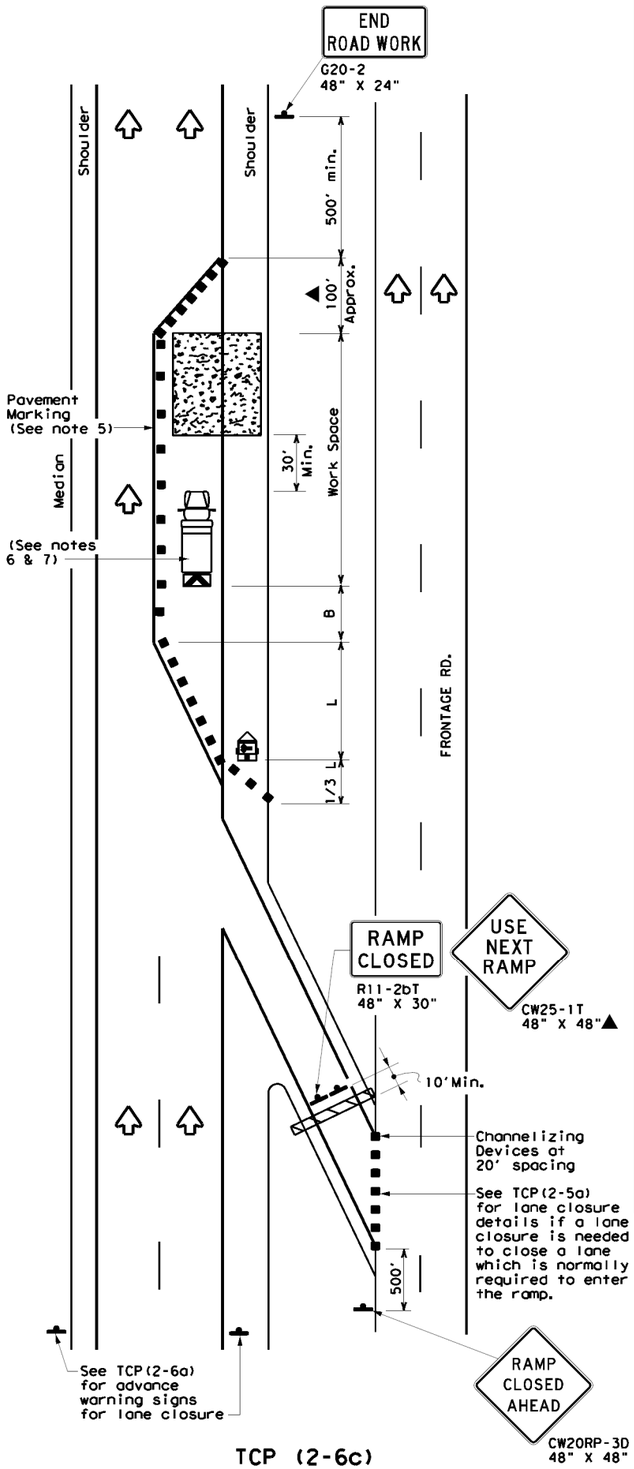
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

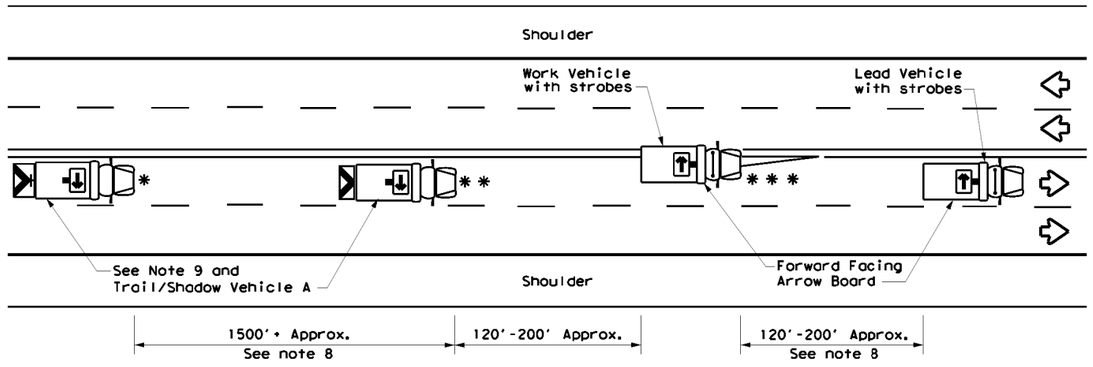
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

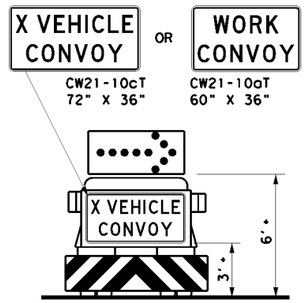
TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	1137	02	042,ETC.	SL 499,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		41



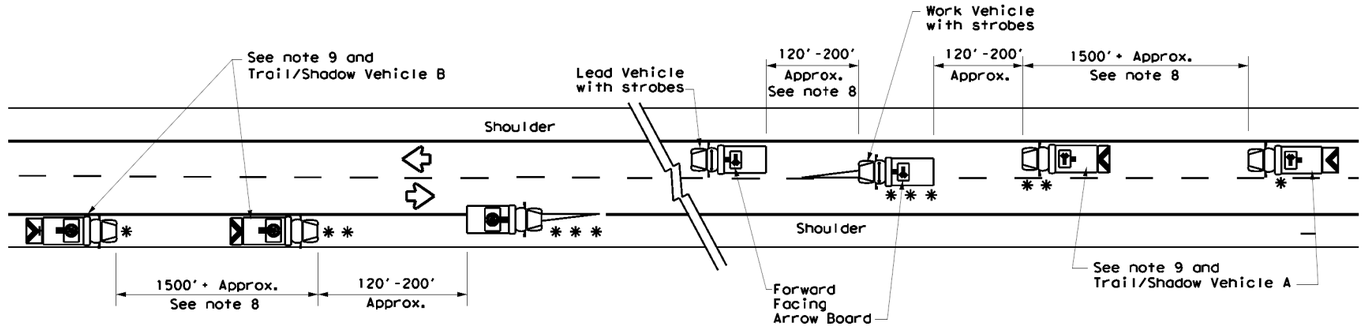
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

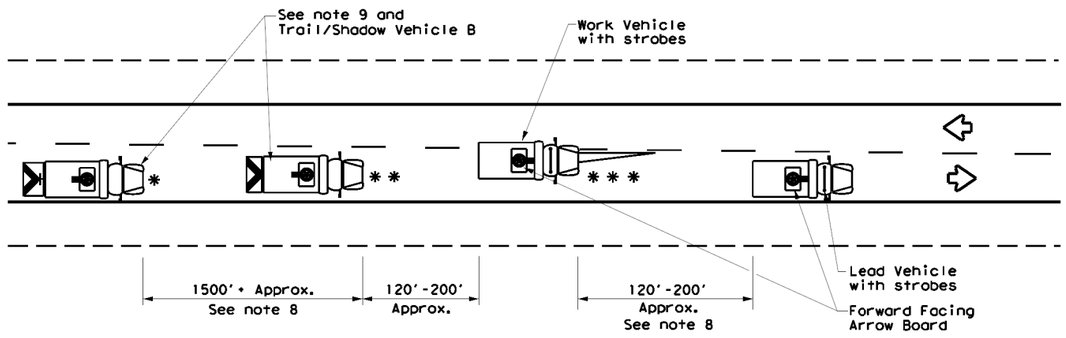


WORK ON SHOULDER

WORK ON TRAVEL LANE

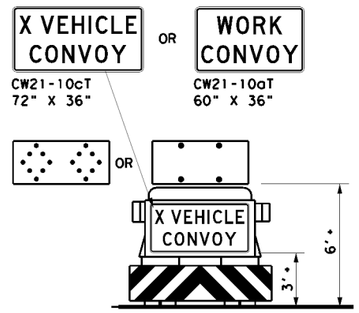
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

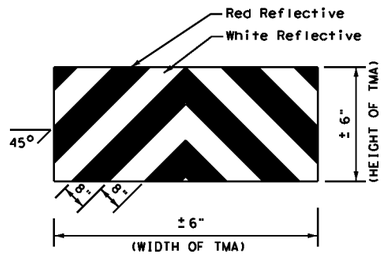
with Flashing Arrow Board in CAUTION display

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

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	1137	02	042,ETC.	SL 499,ETC.
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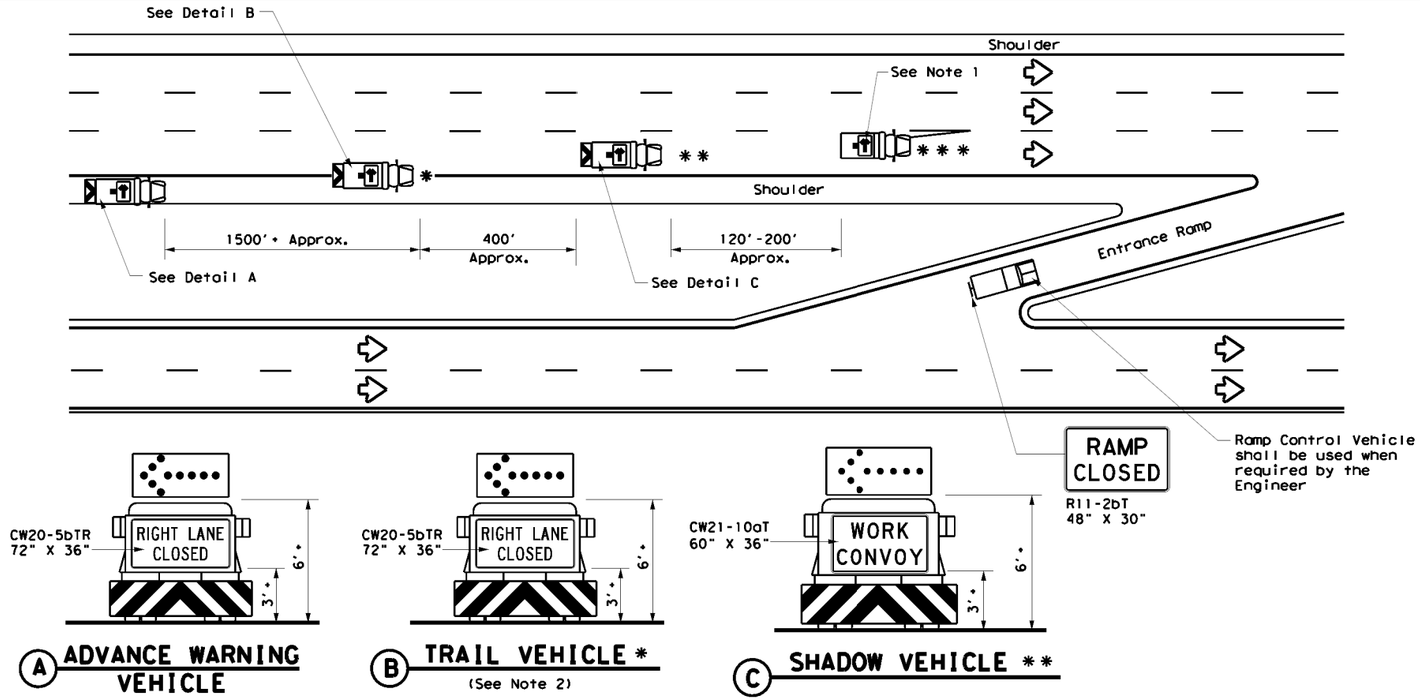
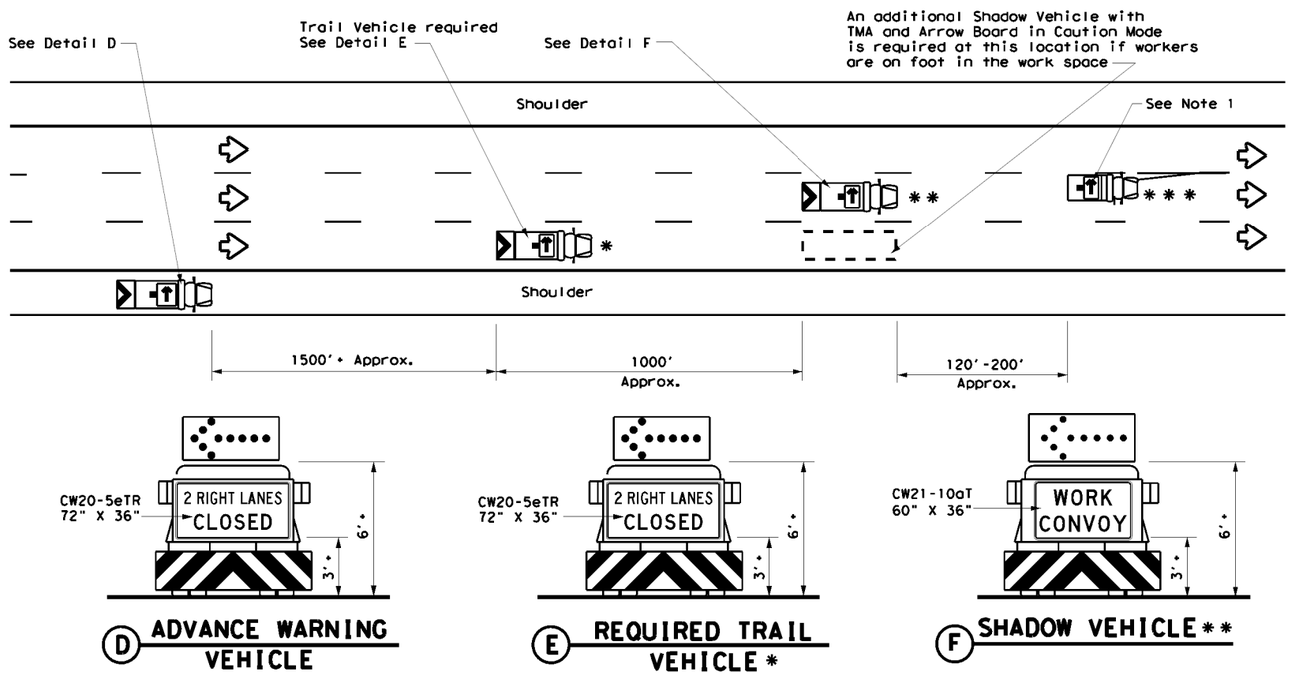


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



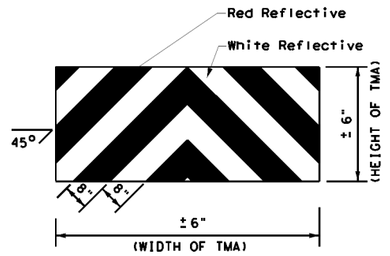
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

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



STRIPING FOR TMA

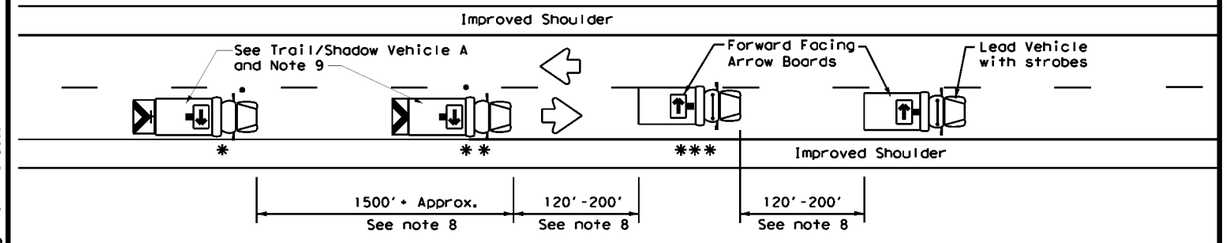
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

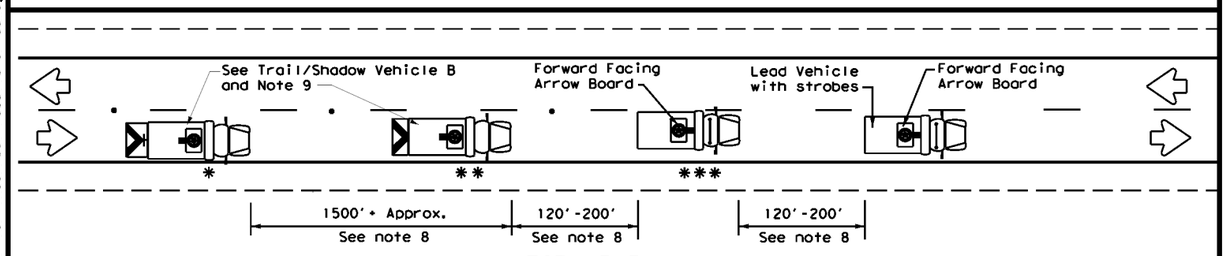
TCP(3-2)-13

FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1137	02	042,ETC.	SL 499,ETC.
2-94 4-98 8-95 7-13 1-97	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		43



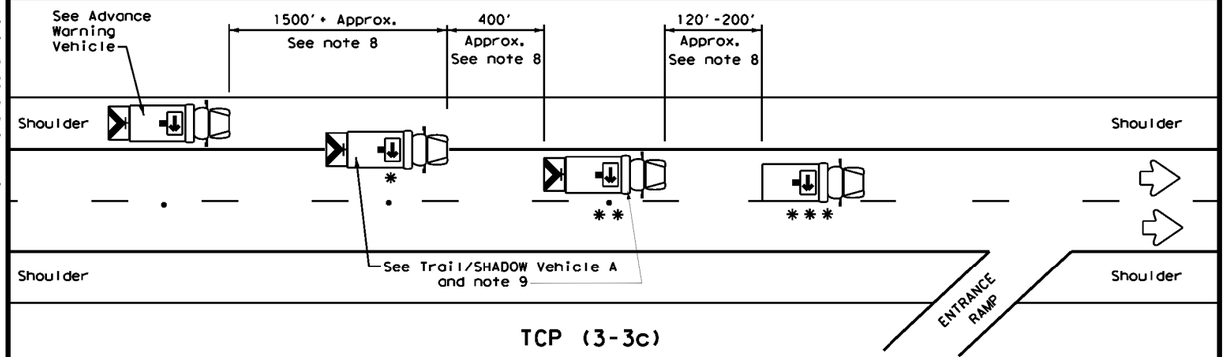
TCP (3-3a)

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



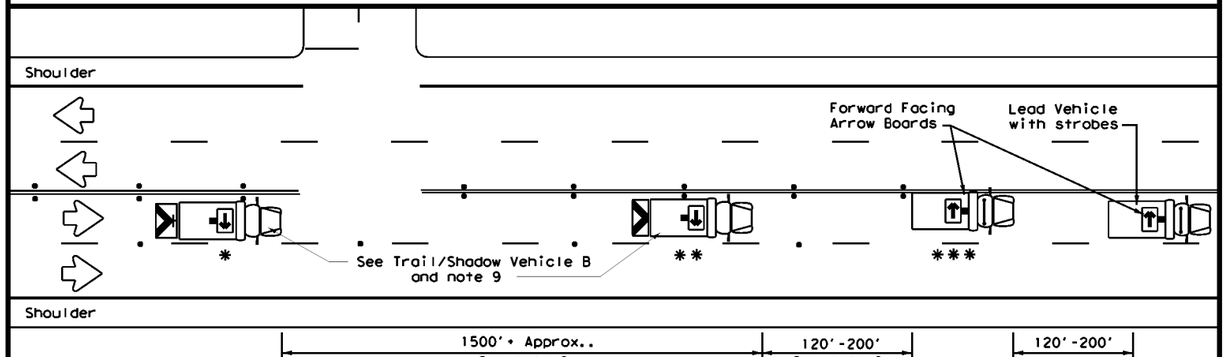
TCP (3-3b)

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



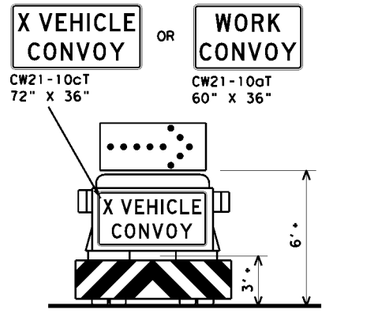
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



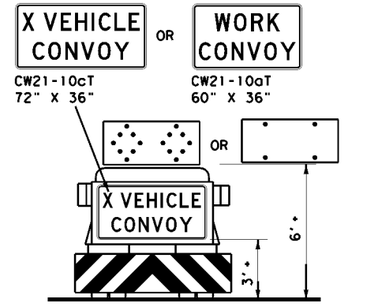
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



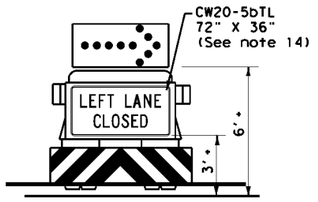
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

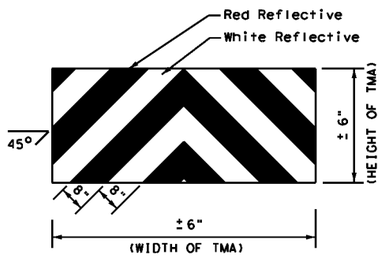


TRAIL/SHADOW VEHICLE B

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.

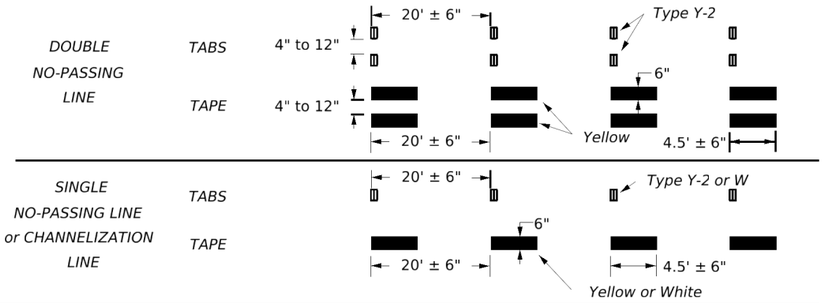
Texas Department of Transportation

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
REVISIONS	1137	02	042,ETC.	SL 499,ETC.
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	PHR	CAMERON		44
1-97 7-14				

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



NOTES:

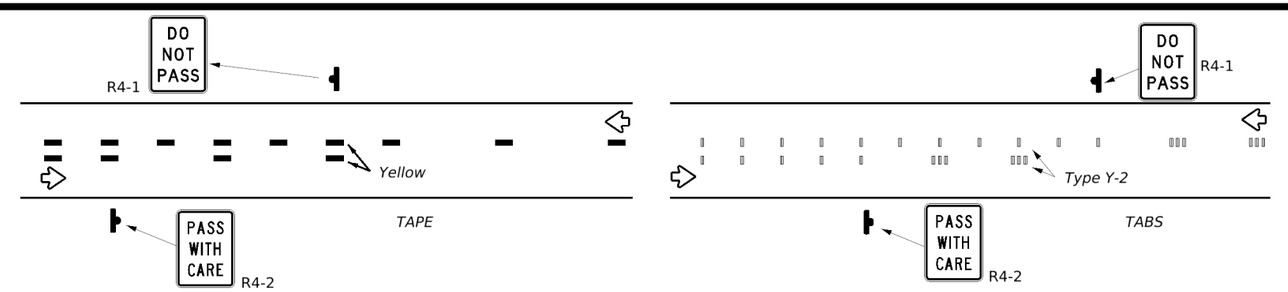
1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical 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)

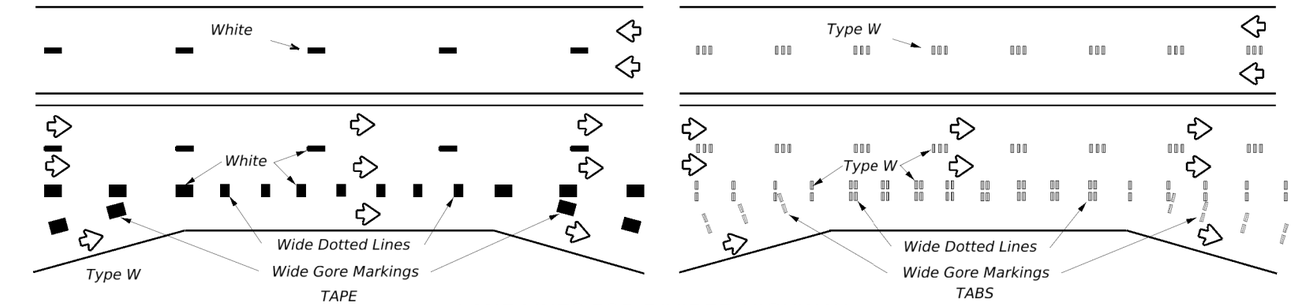
1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may 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.

DATE:
FILE:

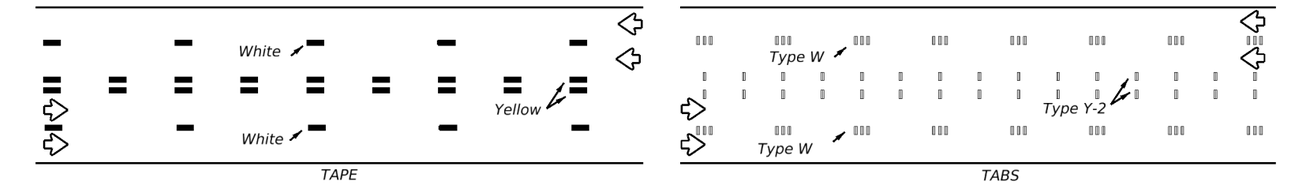
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



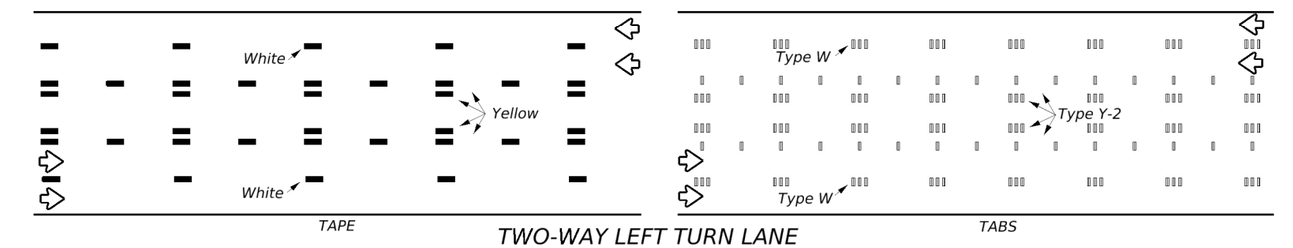
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



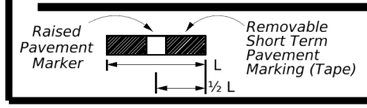
LANE LINES FOR DIVIDED HIGHWAY



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
REVISIONS	1137	02	042,ETC.	SL 499,ETC.
4-92 7-13	DIST	COUNTY		SHEET NO.
1-97 2-23	PHR	CAMERON		45
3-03				

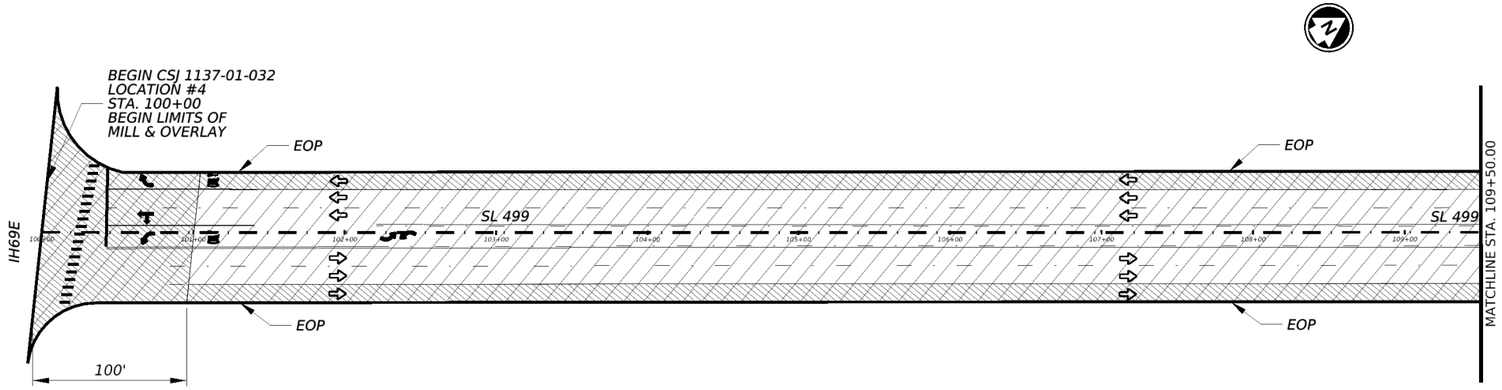
LEGEND

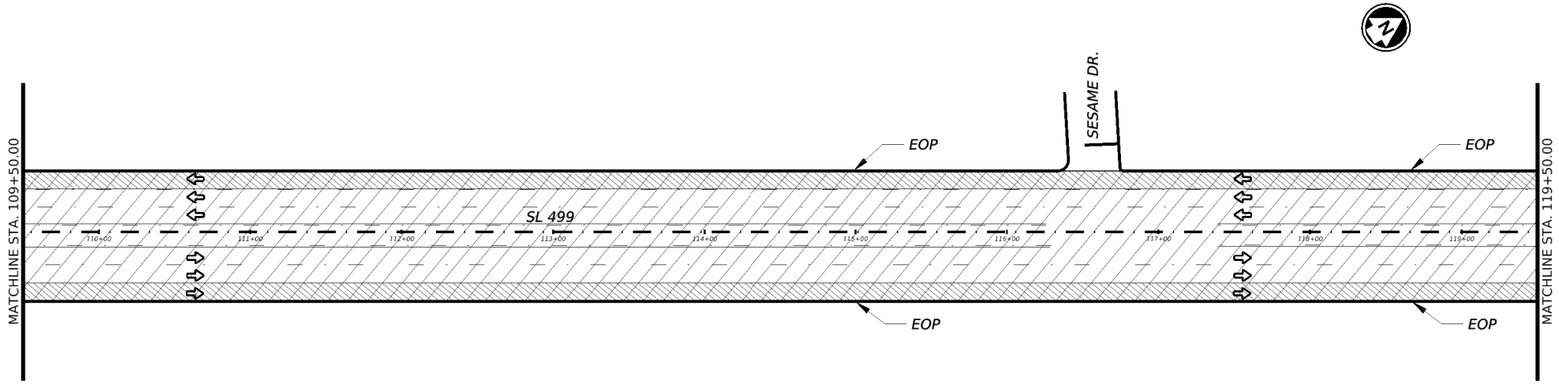
EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

▨ - PROPOSED MILLING (0-2.0")

▨ - PROPOSED OVERLAY (2.0")





STATE OF TEXAS
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11/6/2023

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SL 499 LOCATION 4
PAVING PLAN LAYOUT

SHEET 1 OF 7

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		46

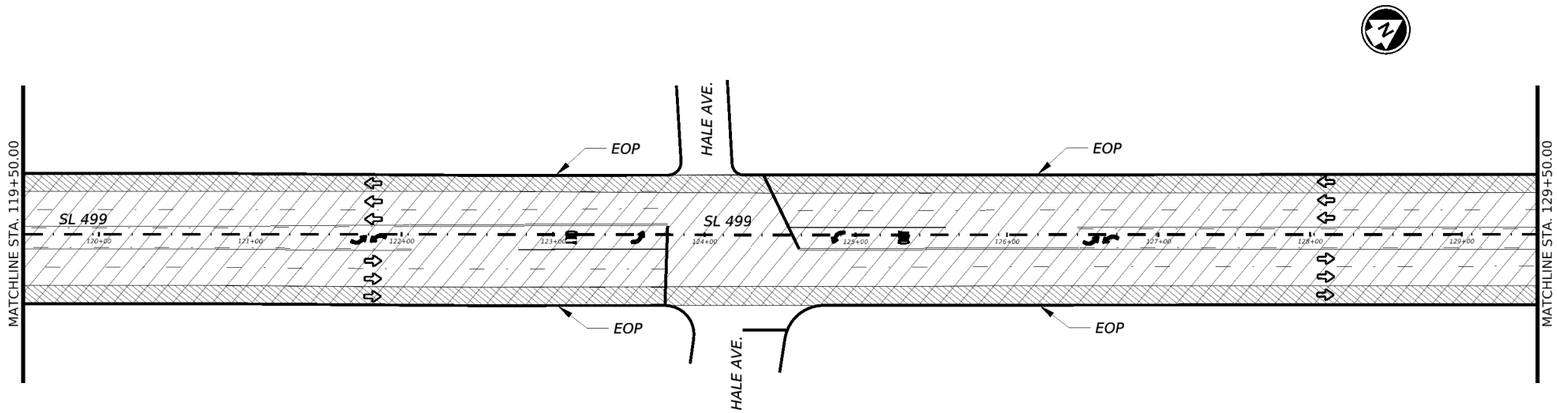
LEGEND

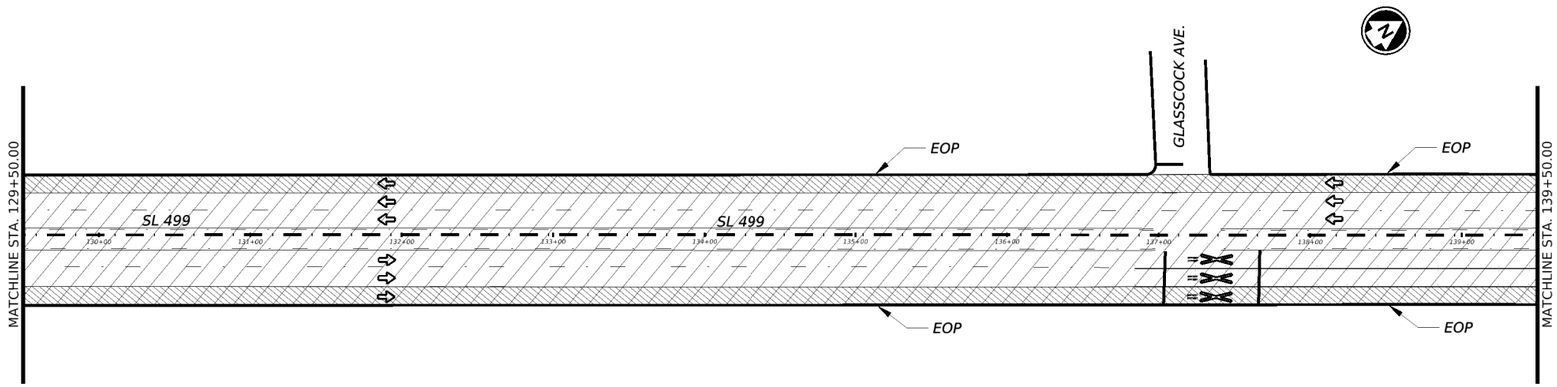
EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

▨ - PROPOSED MILLING (0-2.0")

▨ - PROPOSED OVERLAY (2.0")





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SL 499 LOCATION 4
PAVING PLAN LAYOUT

SHEET 2 OF 7

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		47

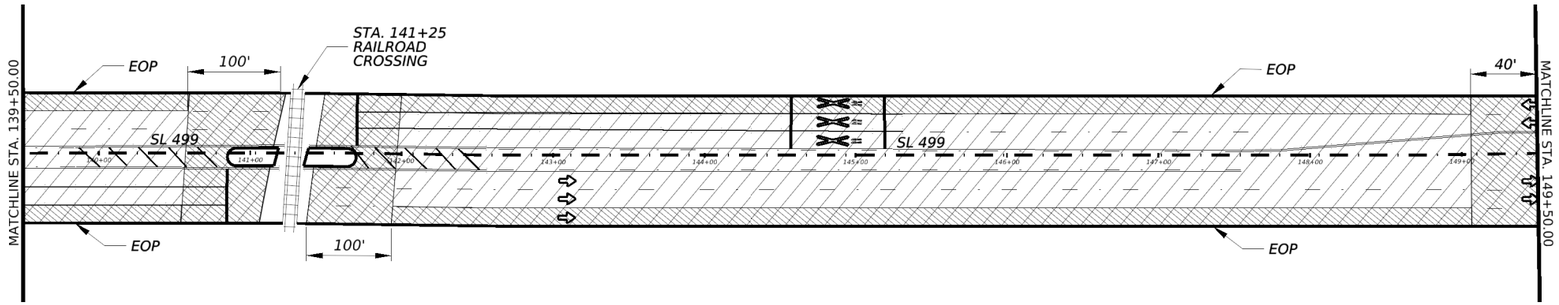
LEGEND

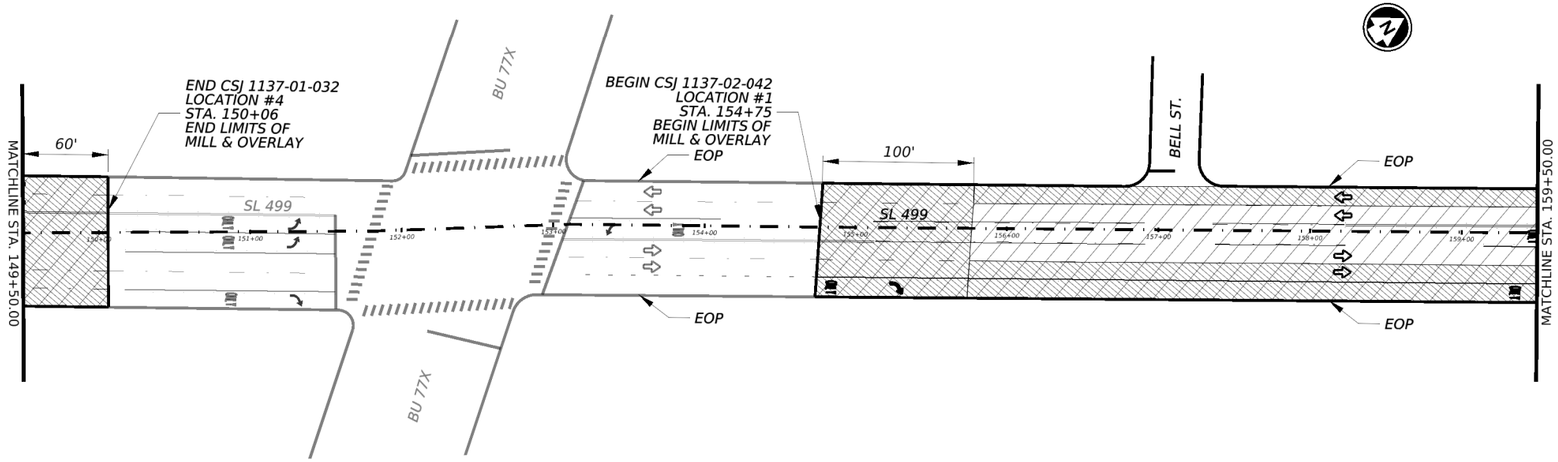
EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

- PROPOSED MILLING (0-2.0")

- PROPOSED OVERLAY (2.0")





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SL 499 LOCATION 1 & 4 PAVING PLAN LAYOUT

SHEET 3 OF 7

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		48

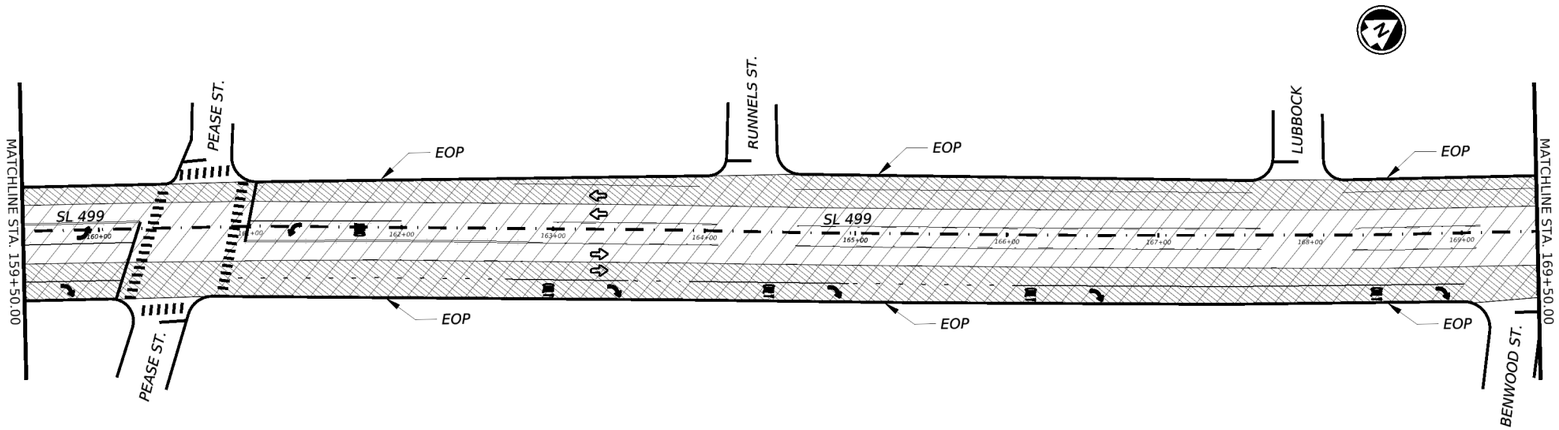
LEGEND

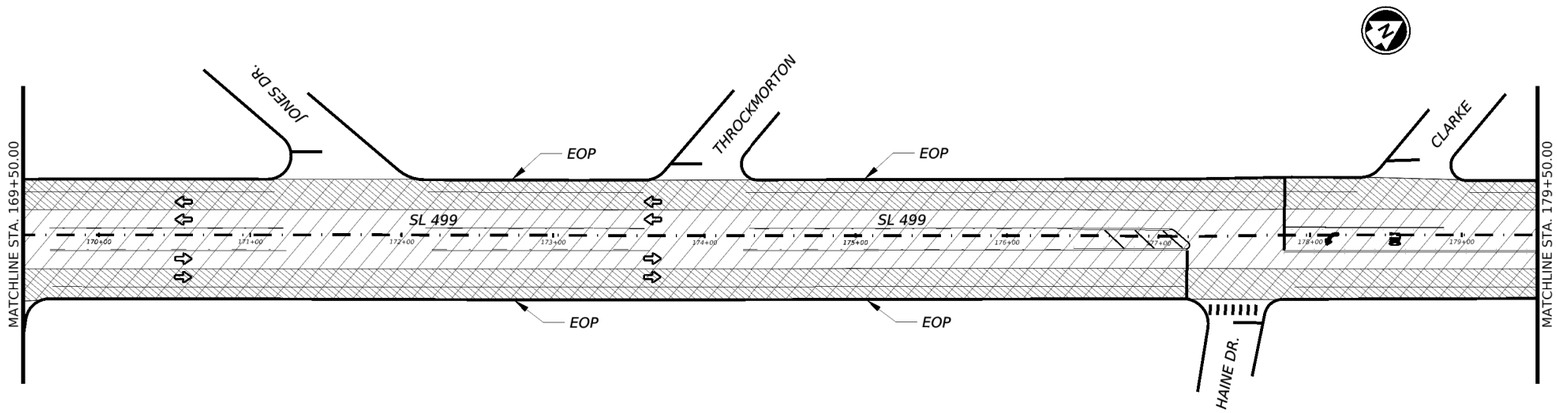
EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

▨ - PROPOSED MILLING (0-2.0")

▨ - PROPOSED OVERLAY (2.0")





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SL 499 LOCATION 1
PAVING PLAN LAYOUT

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		49

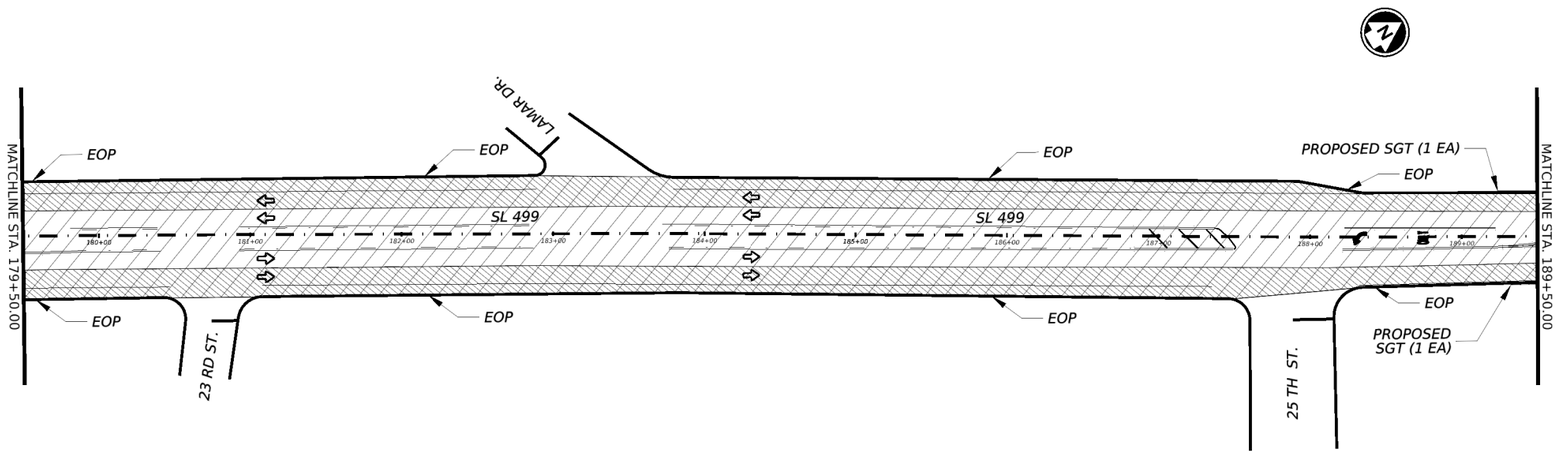
LEGEND

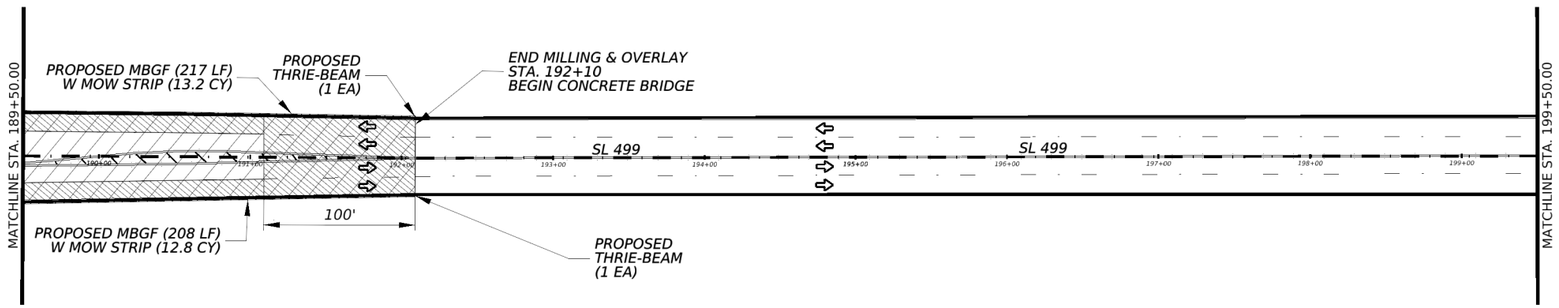
EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

- PROPOSED MILLING (0-2.0")

- PROPOSED OVERLAY (2.0")





SHEET TOTALS				
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432	6045	26	CY	RIPRAP (MOW STRIP) (4 IN)
540	6002	425	LF	MTL W-BEAM GD FEN STEEL POST
544	6001	2	EA	GUARDRAIL END TREATMENT (INSTALL)
658	6061	8	EA	INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2
540	6006	1	EA	MTL BEAM GD FEN TRANS (THRIE-BEAM)

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SL 499 LOCATION 1
PAVING PLAN LAYOUT

SHEET 5 OF 7

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		50

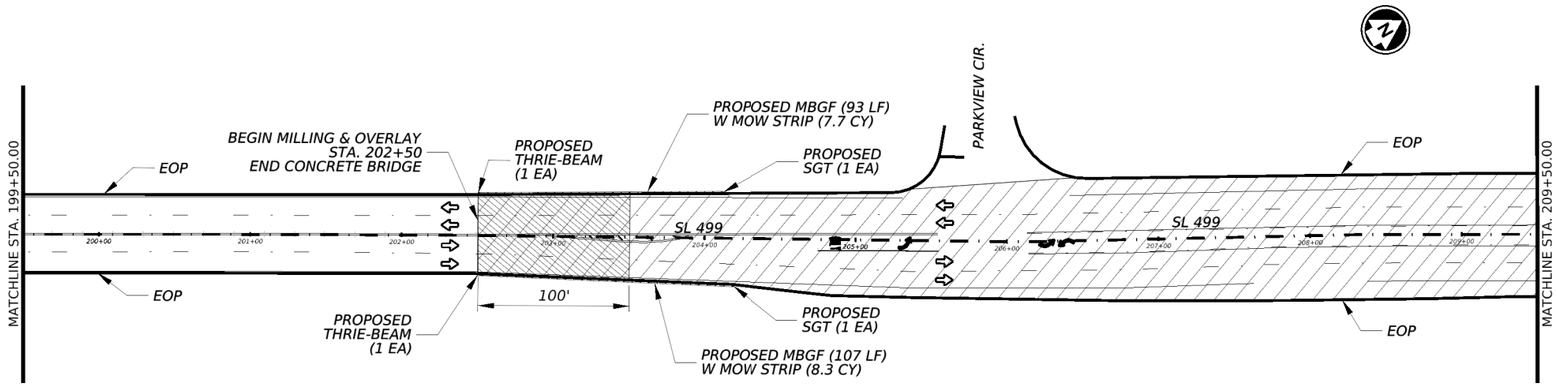
LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

▨ - PROPOSED MILLING (0-2.0")

▨ - PROPOSED OVERLAY (2.0")



SHEET TOTALS				
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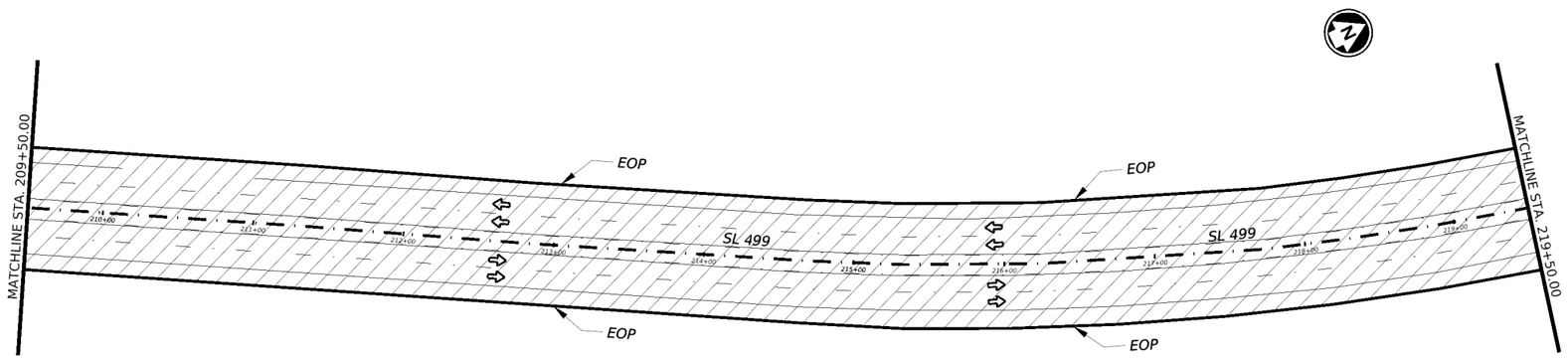
432	6045	16	CY	RIPRAP (MOW STRIP) (4 IN)
540	6001	200	LF	MTL W-BEAM GD FEN TIM POST
544	6001	2	EA	GUARDRAIL END TREATMENT (INSTALL)
658	6061	8	EA	INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2
540	6006	1	EA	MTL BEAM GD FEN TRANS (THRIE-BEAM)



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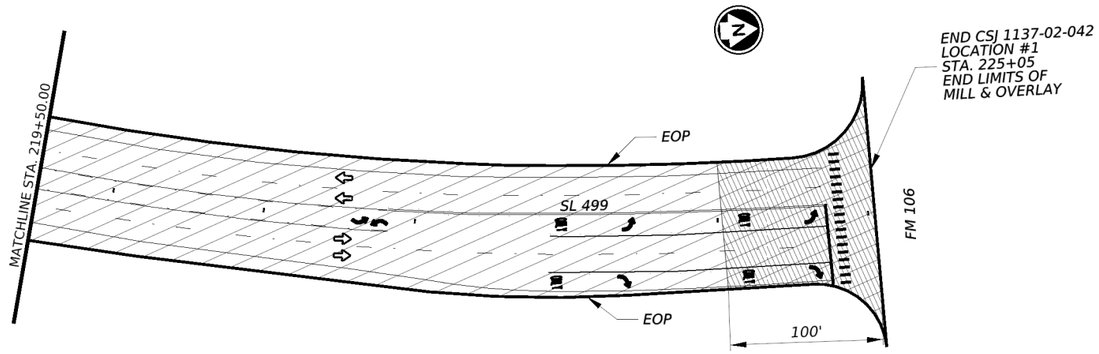
SL 499 LOCATION 1
PAVING PLAN LAYOUT

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		51



LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

- PROPOSED MILLING (0-2.0")

- PROPOSED OVERLAY (2.0")

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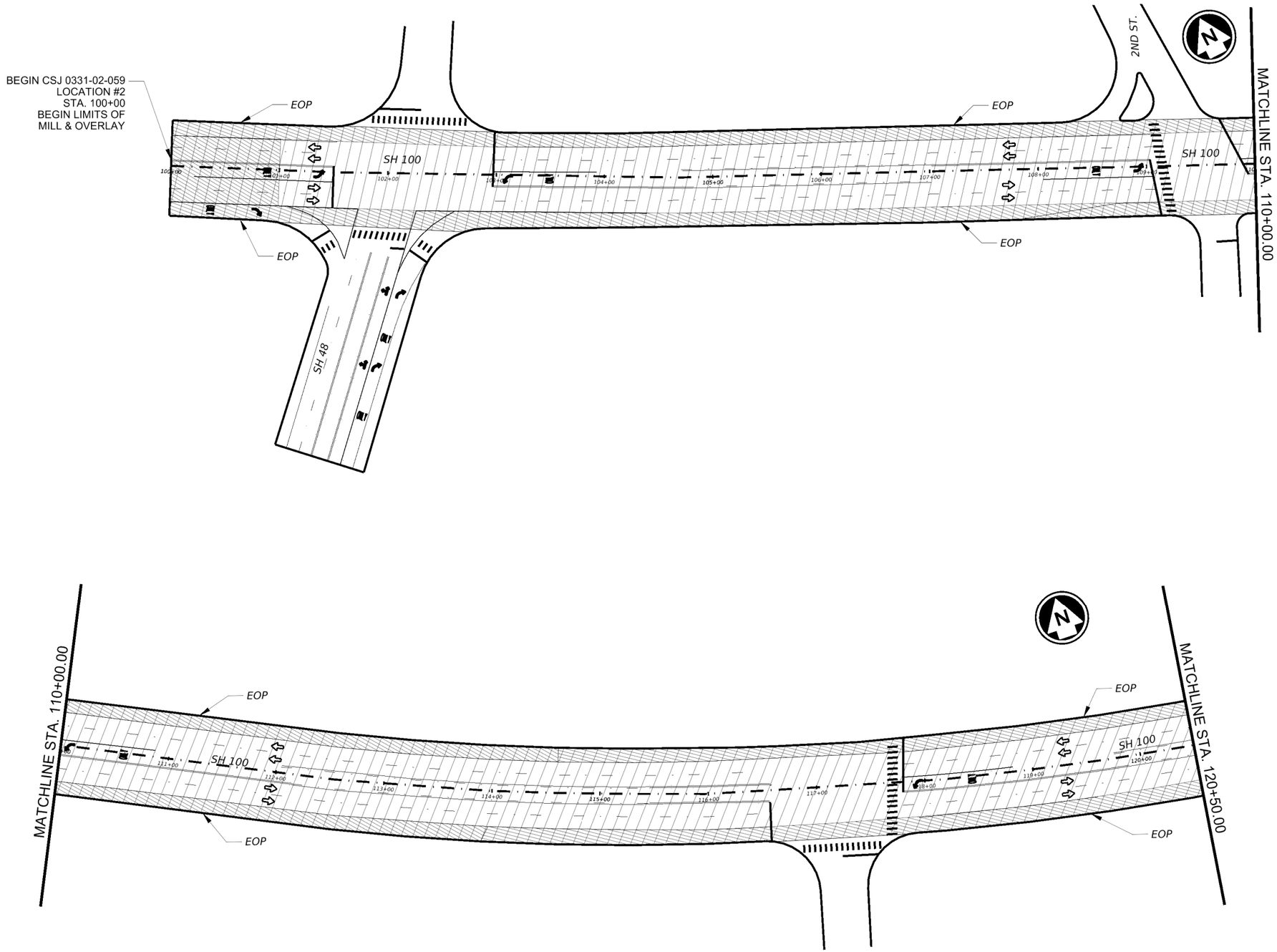
SL 499 LOCATION 1
PAVING PLAN LAYOUT

SHEET 7 OF 7

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		52



LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

- PROPOSED MILLING (0-2.0")
- PROPOSED MILLING (2.0")
- PROPOSED OVERLAY (2.0")

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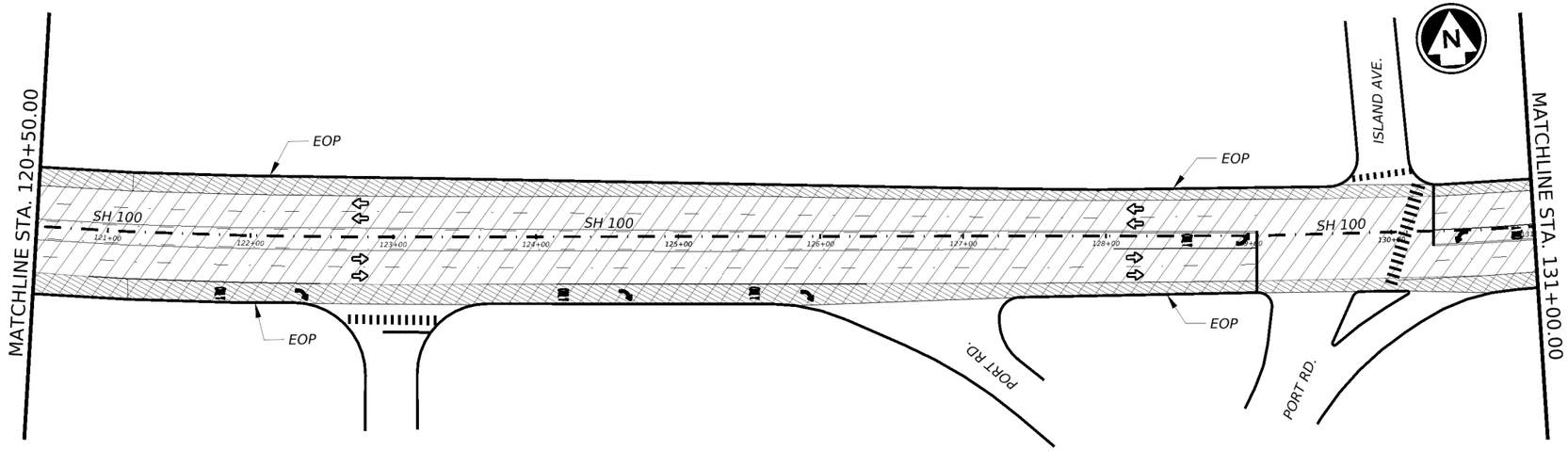
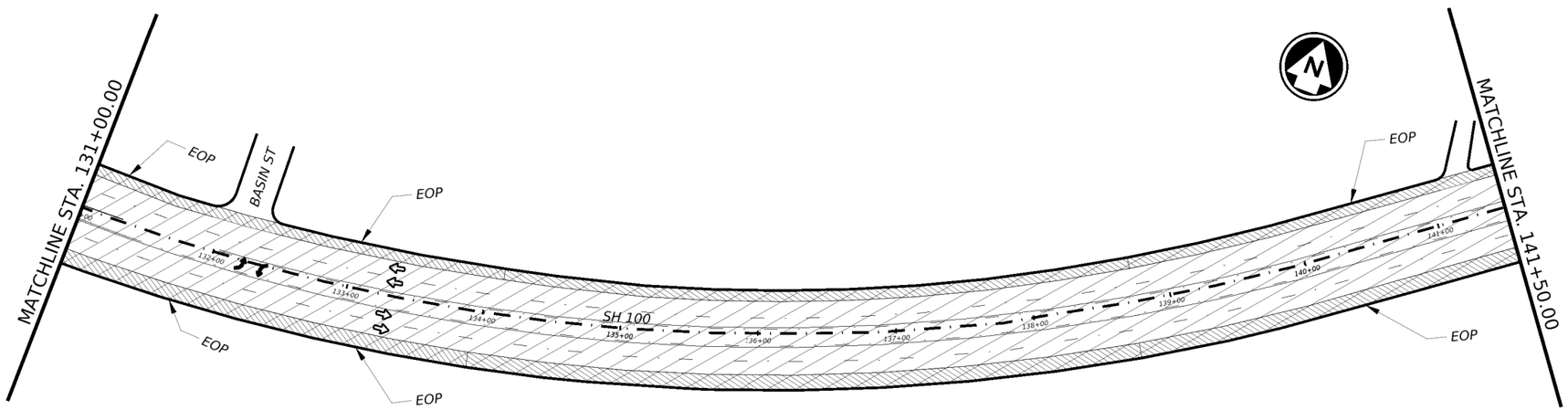
SH 100 LOCATION 2
PAVING PLAN LAYOUT

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		53





LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

- PROPOSED MILLING (0-2.0")
- PROPOSED MILLING (2.0")
- PROPOSED OVERLAY (2.0")

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11/6/2023

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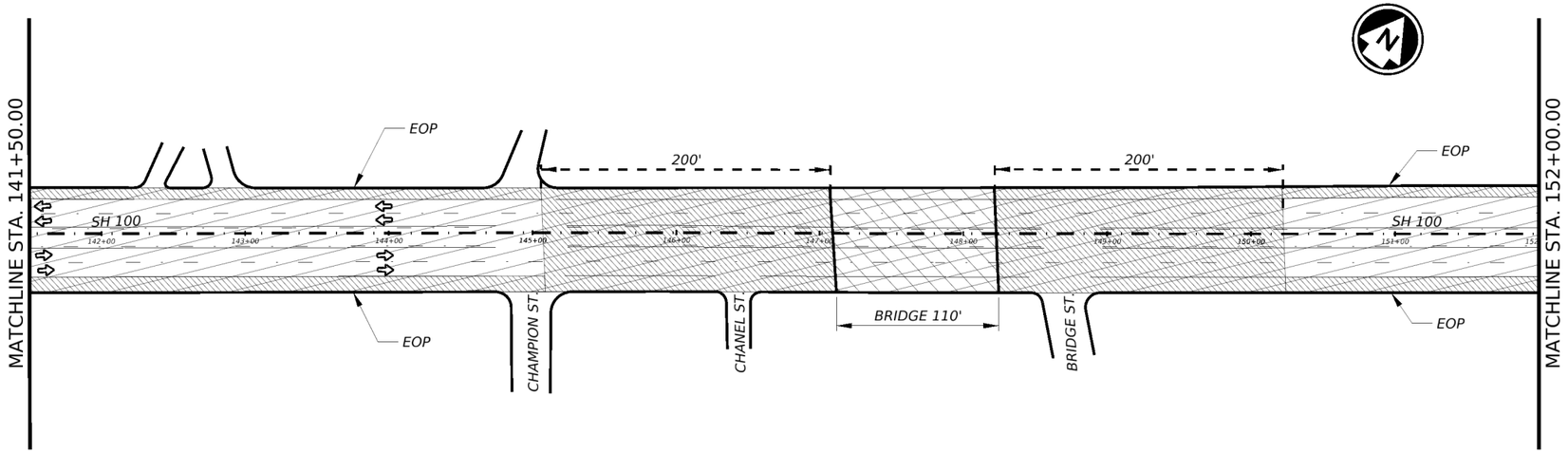
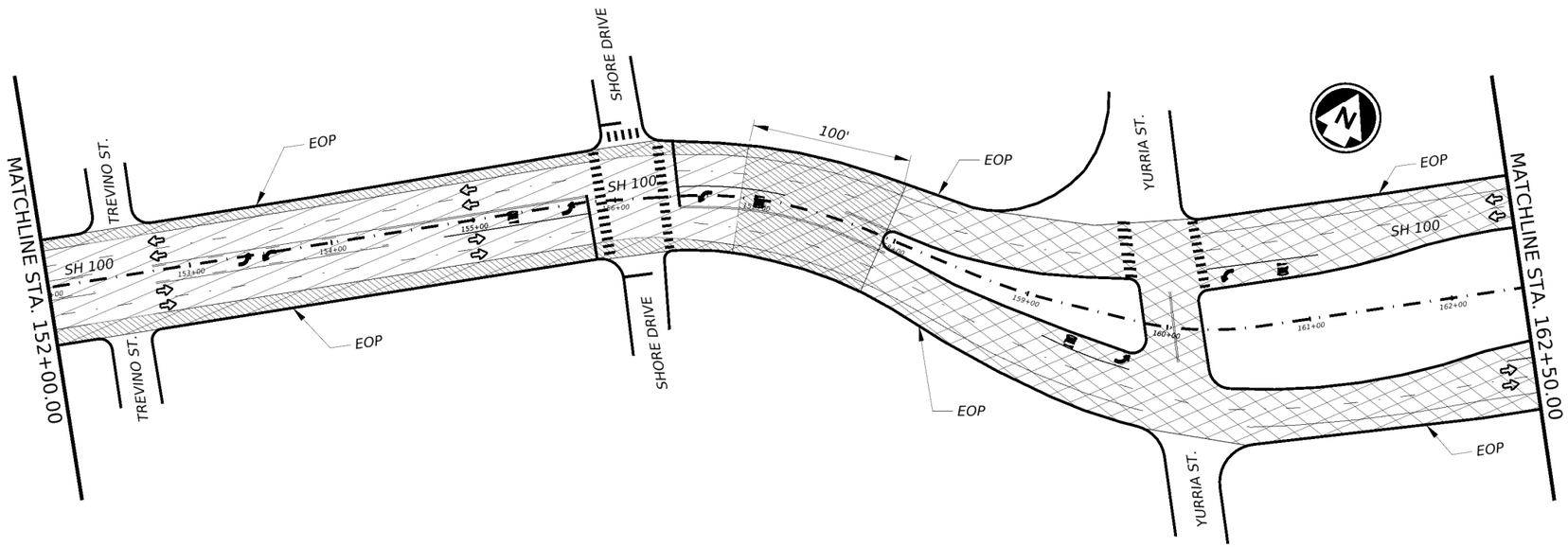
SH 100 LOCATION 2
PAVING PLAN LAYOUT

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		54





LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

- PROPOSED MILLING (0-2.0")
- PROPOSED MILLING (2.0")
- PROPOSED OVERLAY (2.0")

STATE OF TEXAS
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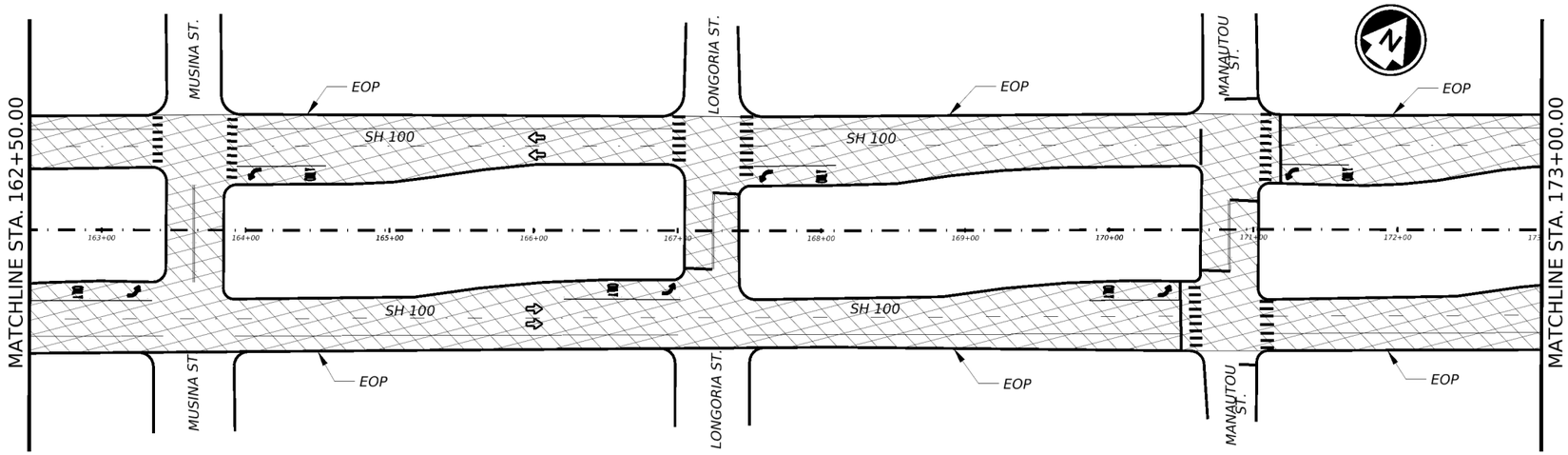
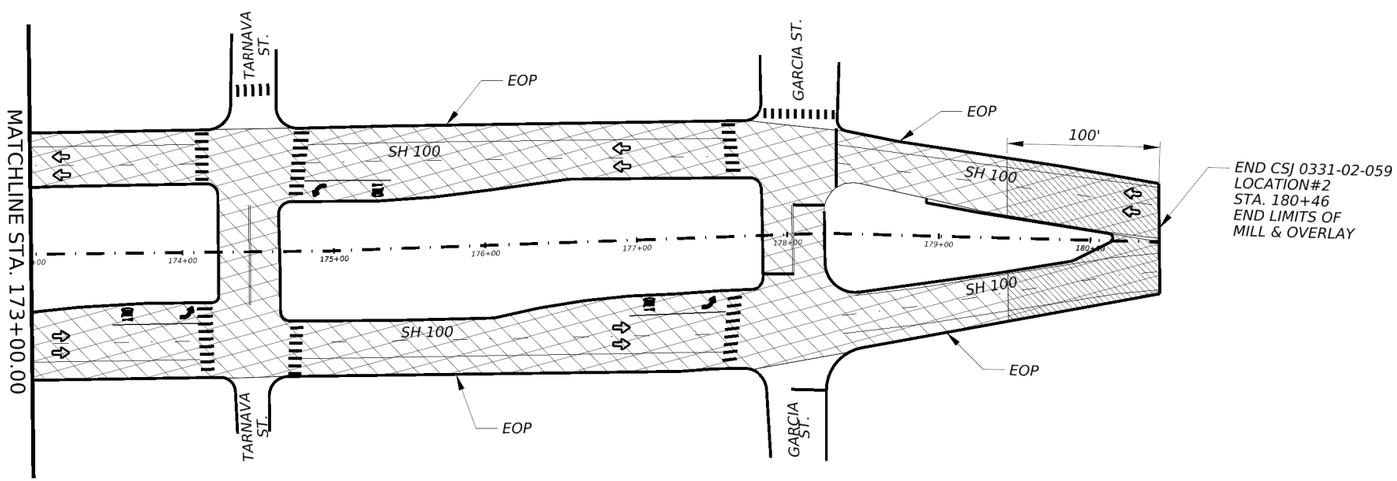
SH 100 LOCATION 2
PAVING PLAN LAYOUT

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		55





LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

- PROPOSED MILLING (0-2.0")
- PROPOSED MILLING (2.0")
- PROPOSED OVERLAY (2.0")

STATE OF TEXAS
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SH 100 LOCAITON 2
PAVING PLAN LAYOUT

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		56

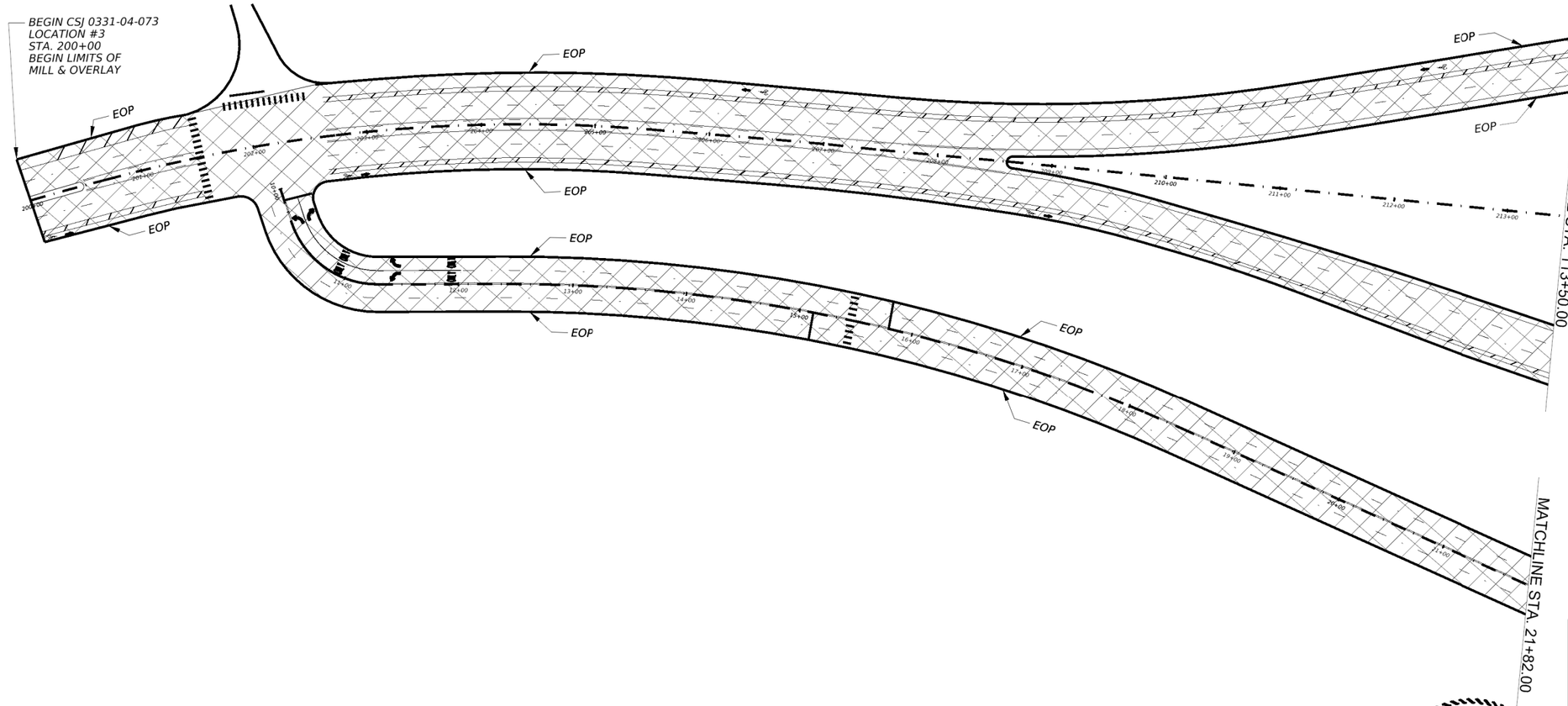
LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

▨ - PROPOSED MILLING (2.0")

▨ - PROPOSED OVERLAY (2.0")



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PR 100
PAVING PLAN LAYOUT

STATE OF TEXAS
EUGENE PALACIOS
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Eugene Palacios 11/6/2023

SHEET 1 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		57

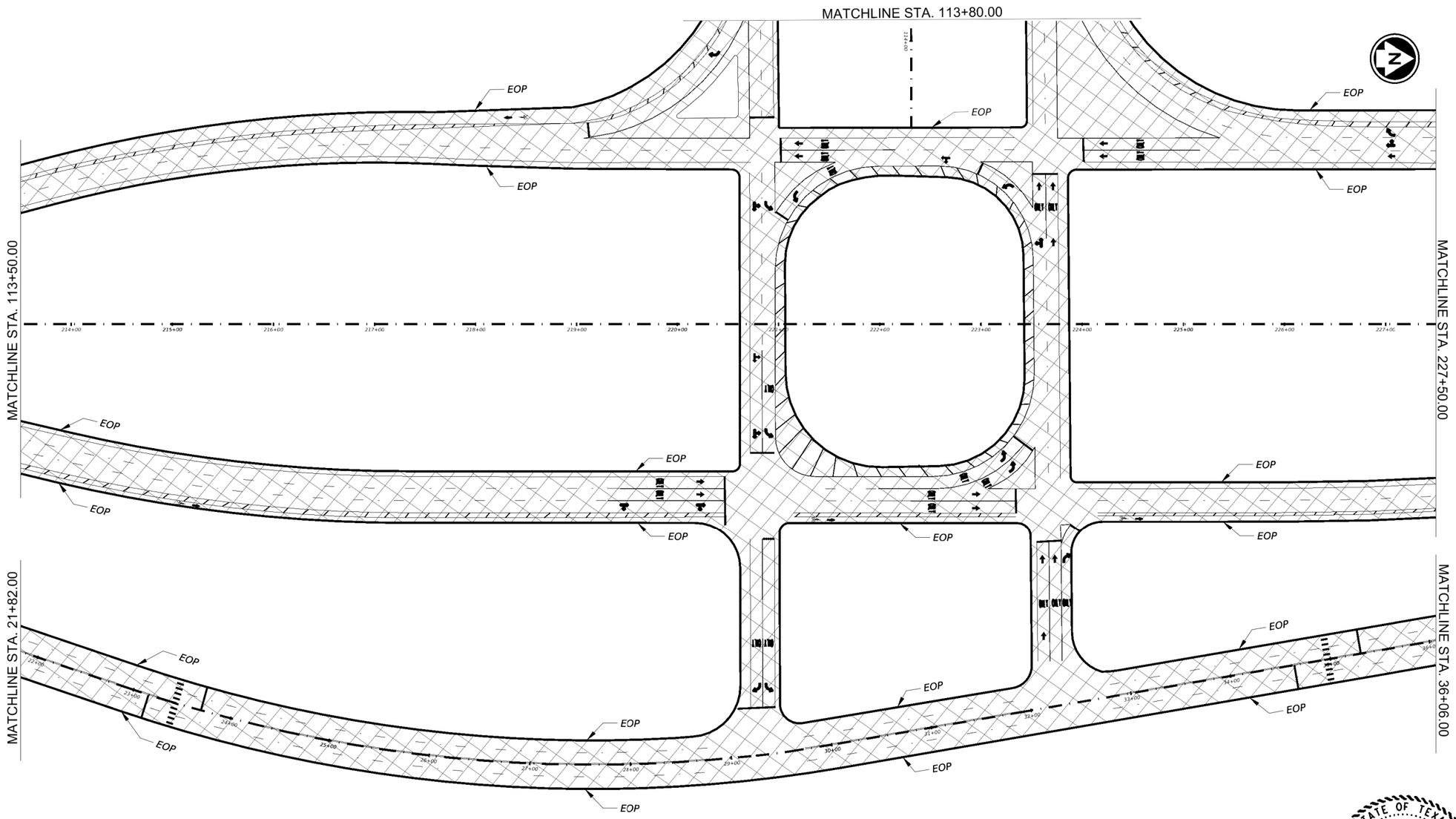
LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

▨ - PROPOSED MILLING (2.0")

▨ - PROPOSED OVERLAY (2.0")



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PR 100
PAVING PLAN LAYOUT

SHEET 2 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		58

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED
PROFESSIONAL ENGINEER

Eugene Palacios 11/6/2023

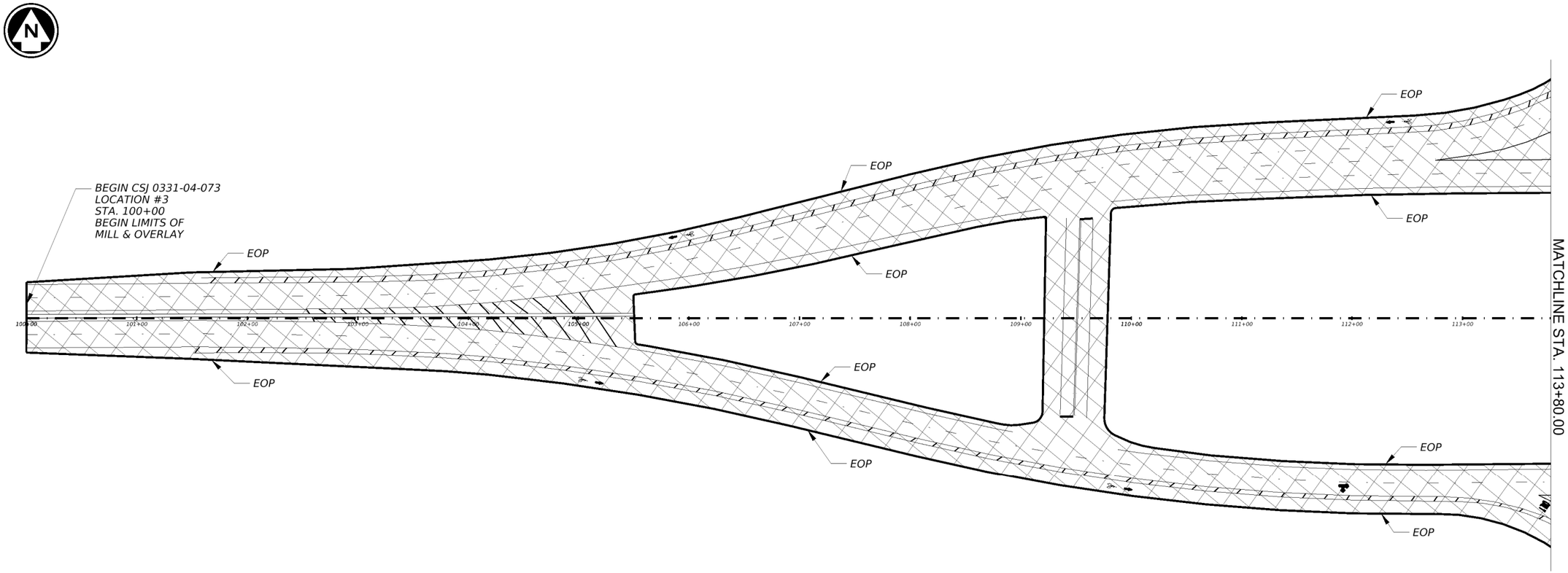
LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

▨ - PROPOSED MILLING (2.0")

▨ - PROPOSED OVERLAY (2.0")



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PR 100
PAVING PLAN LAYOUT

STATE OF TEXAS
EUGENE PALACIOS
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Eugene Palacios 11/6/2023

SHEET 3 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		59

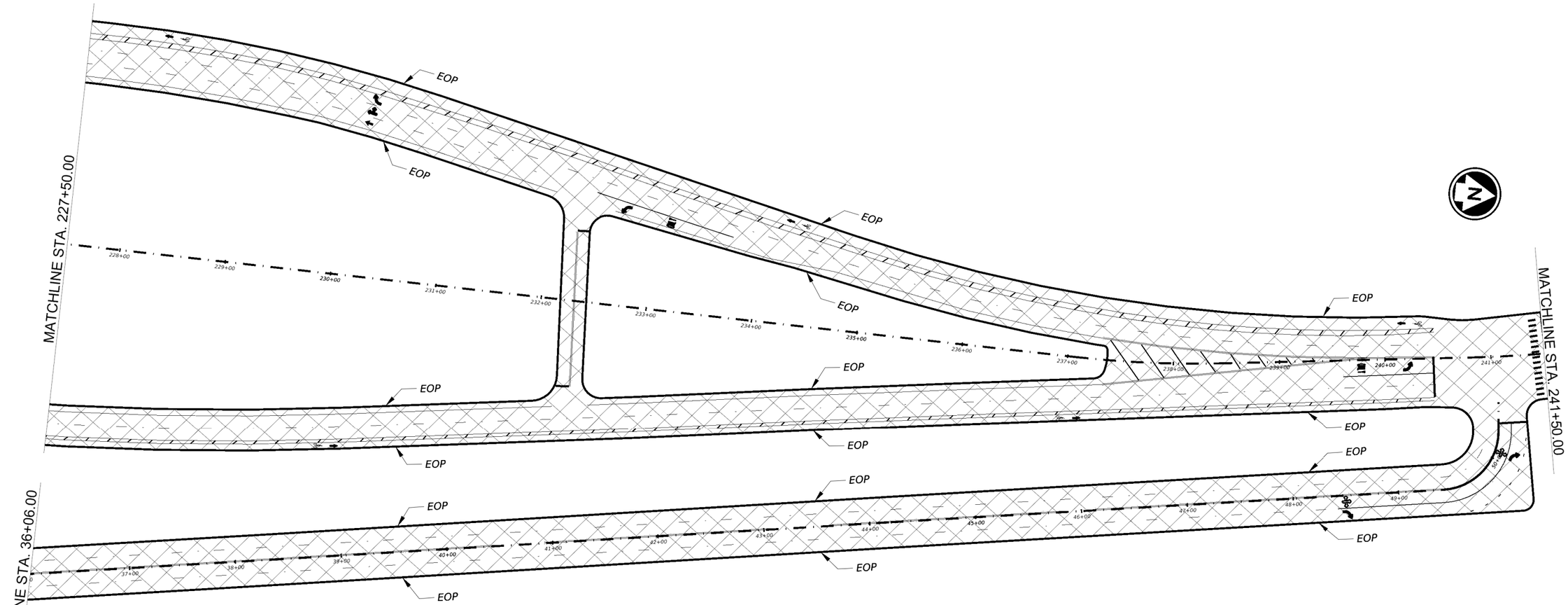
LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

▨ - PROPOSED MILLING (2.0")

▨ - PROPOSED OVERLAY (2.0")



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PR 100
PAVING PLAN LAYOUT

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED PROFESSIONAL ENGINEER

Eugene Palacios 11/6/2023

SHEET 4 OF 13

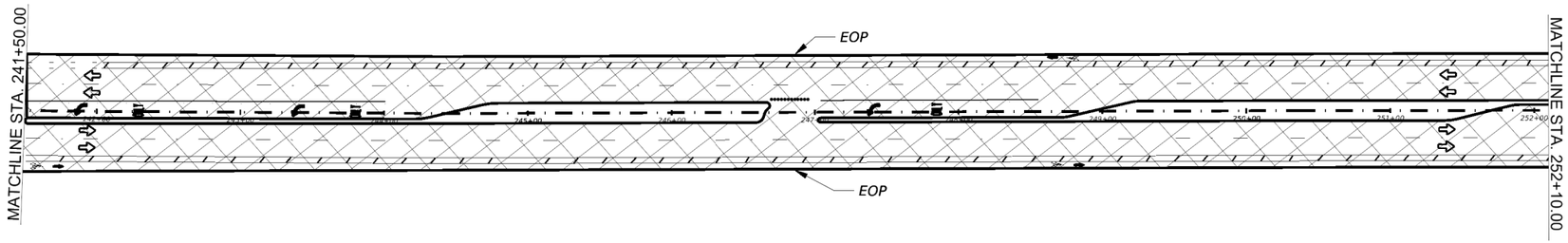
CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		60

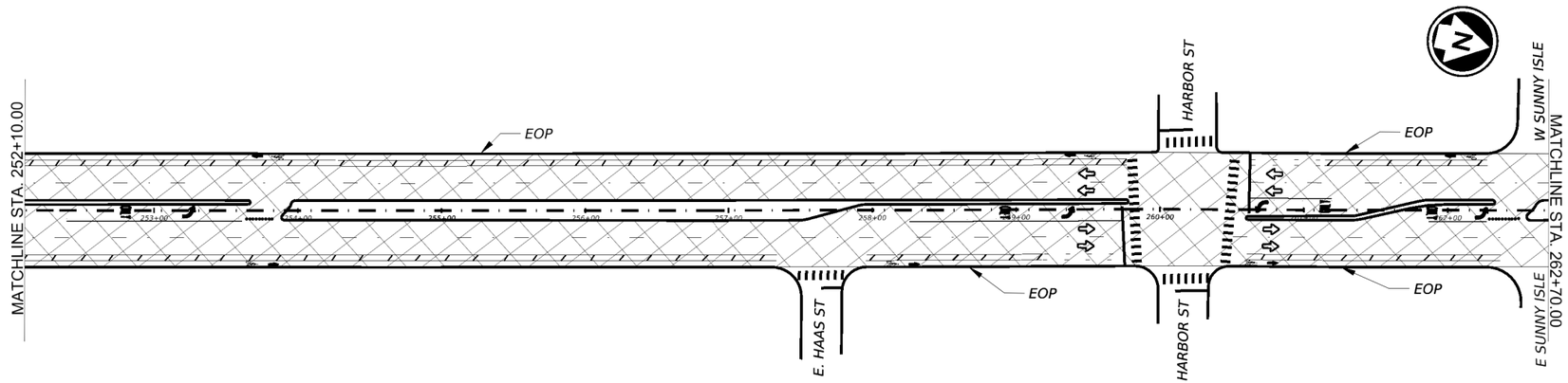
LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

- PROPOSED MILLING (0-2.0")
- PROPOSED MILLING (2.0")
- PROPOSED OVERLAY (2.0")





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11/6/2023

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PR 100
PAVING PLAN LAYOUT

SHEET 5 OF 13

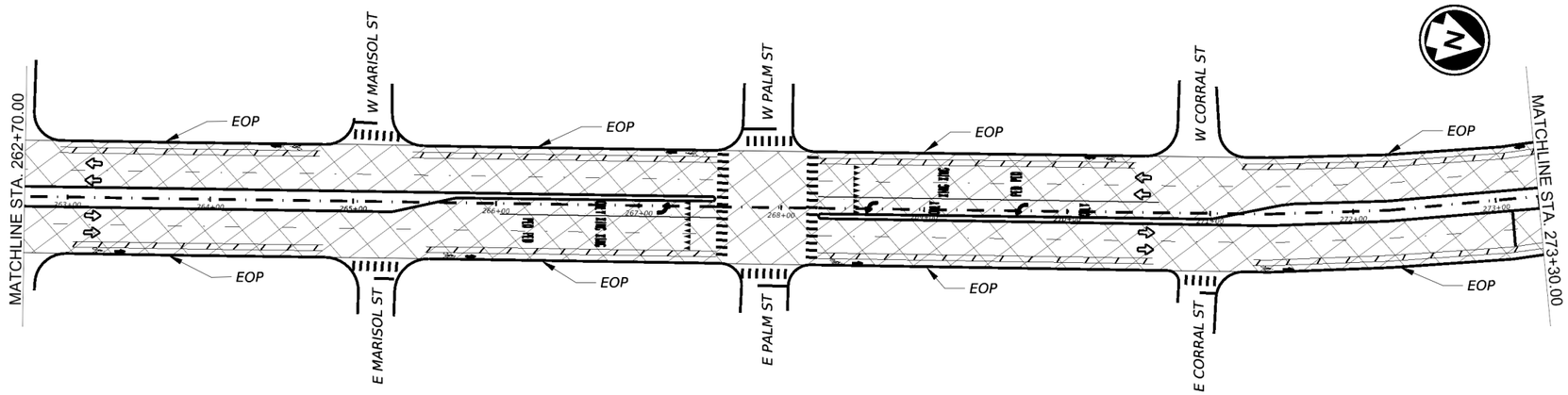
CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		61

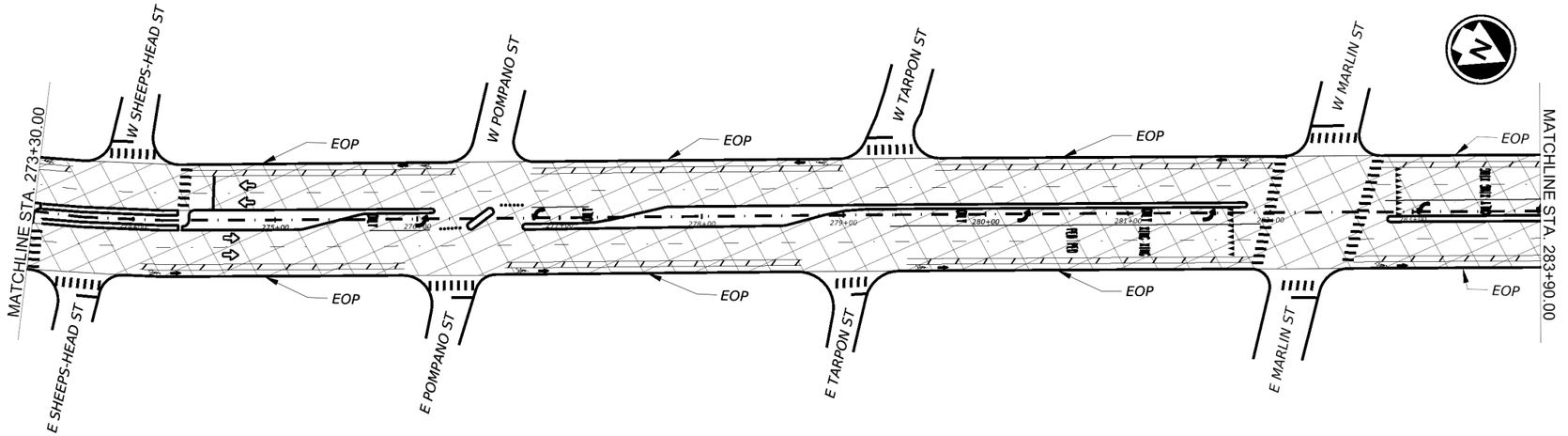
LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

- PROPOSED MILLING (0-2.0")
- PROPOSED MILLING (2.0")
- PROPOSED OVERLAY (2.0")





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11/6/2023

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PR 100
PAVING PLAN LAYOUT

SHEET 6 OF 13

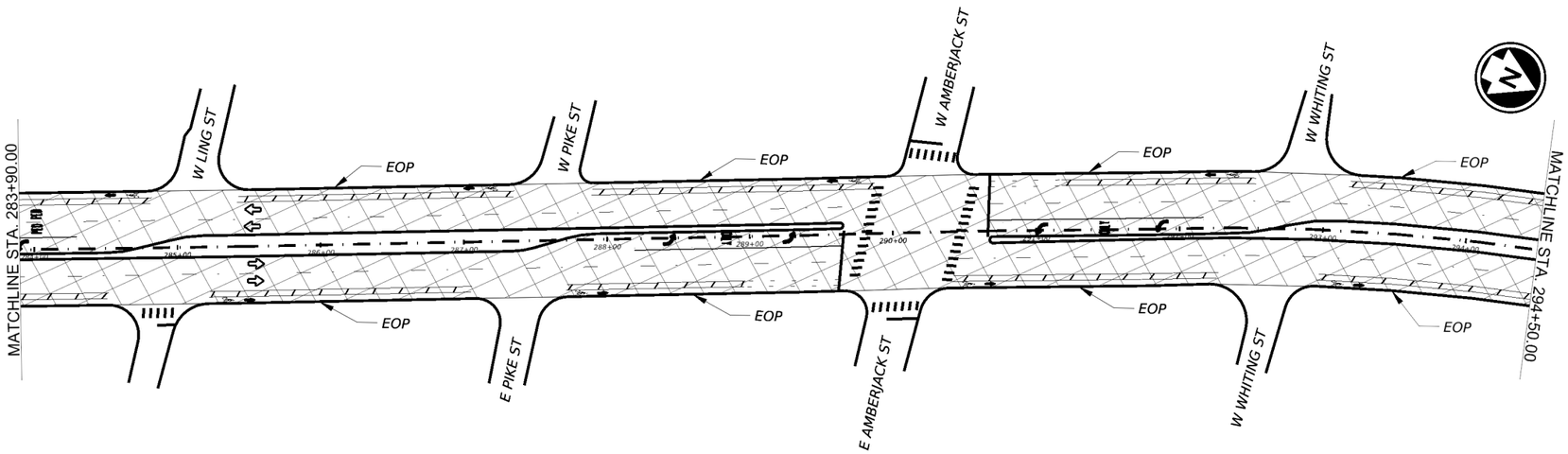
CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		62

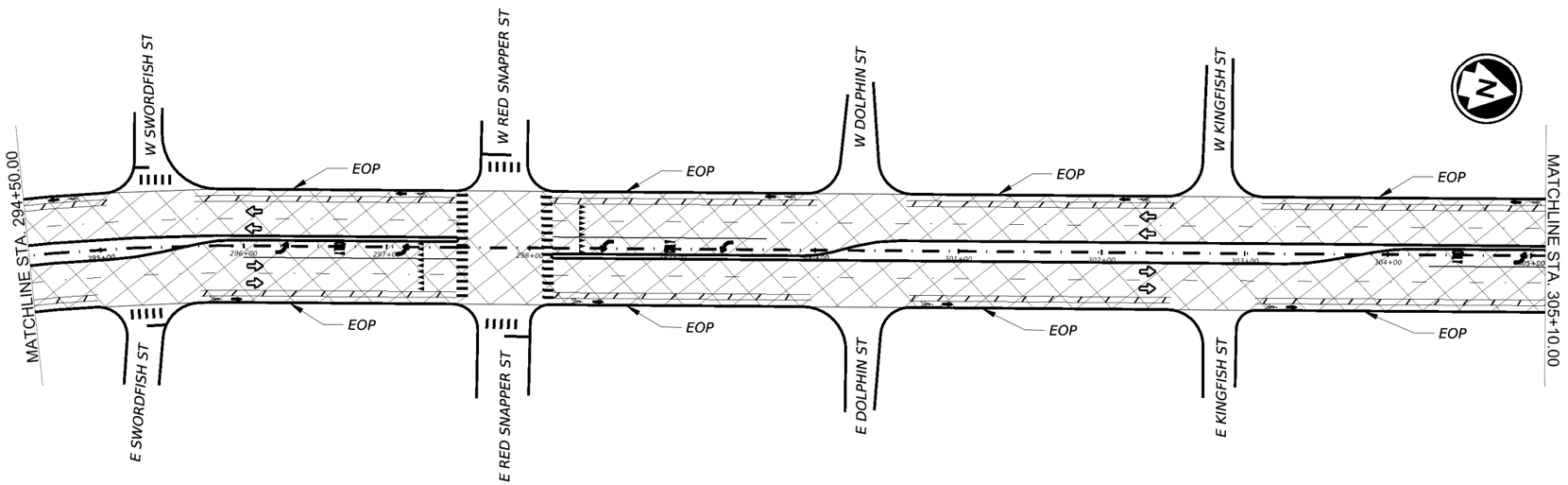
LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

- PROPOSED MILLING (0-2.0")
- PROPOSED MILLING (2.0")
- PROPOSED OVERLAY (2.0")





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11/6/2023

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Texas Department of Transportation

PR 100
PAVING PLAN LAYOUT

SHEET 7 OF 13

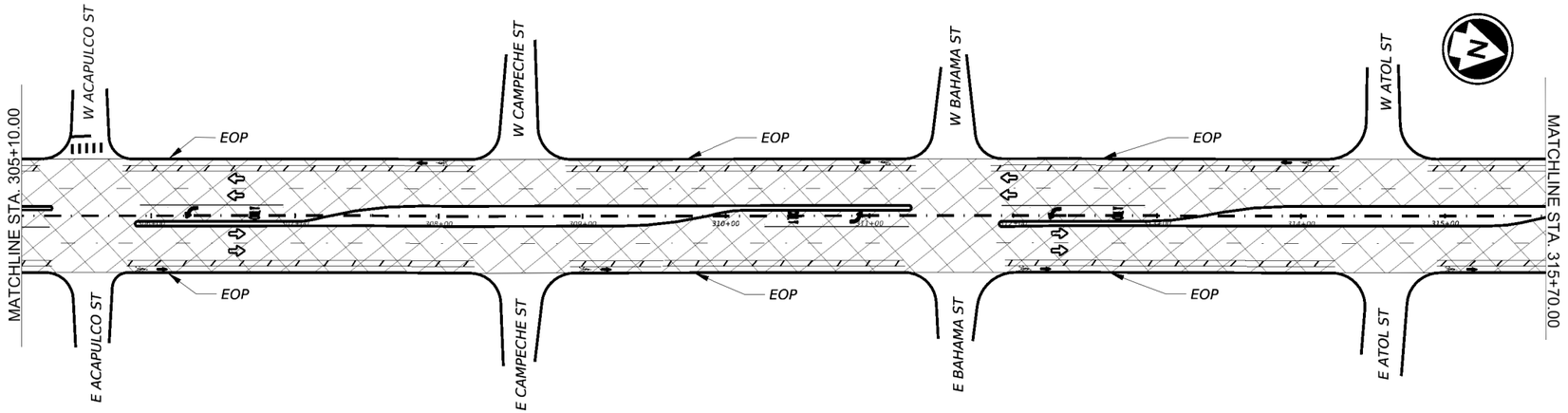
CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		63

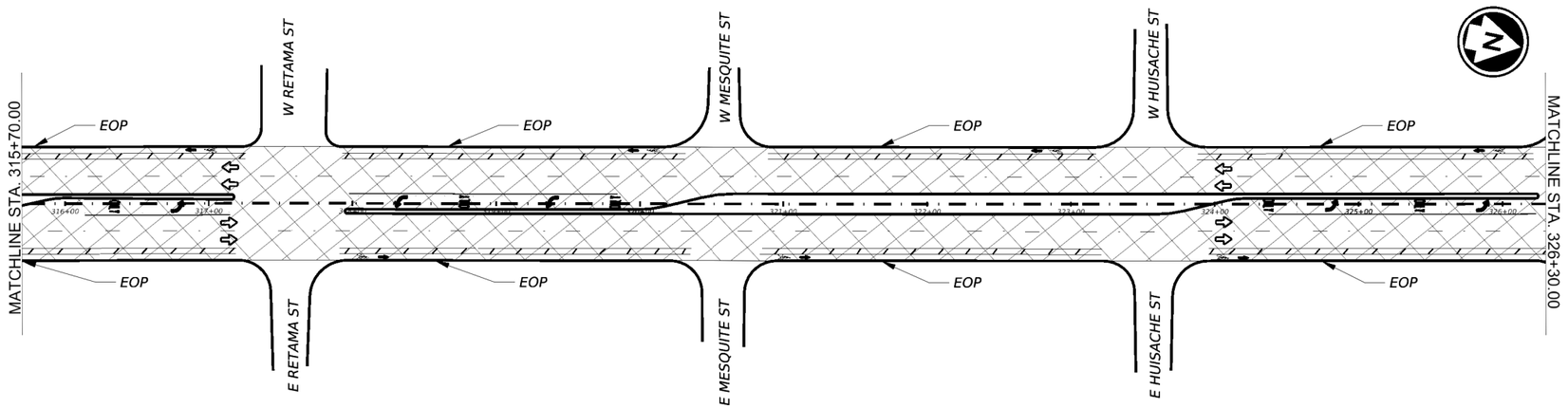
LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

- PROPOSED MILLING (0-2.0")
- PROPOSED MILLING (2.0")
- PROPOSED OVERLAY (2.0")





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11/6/2023

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PR 100
PAVING PLAN LAYOUT

SHEET 8 OF 13

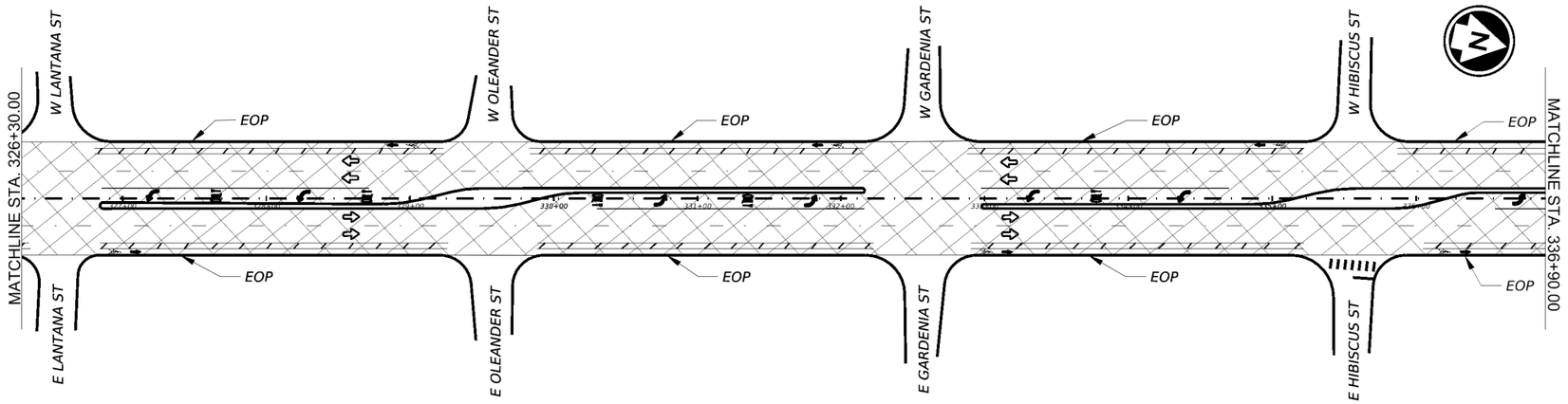
CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		64

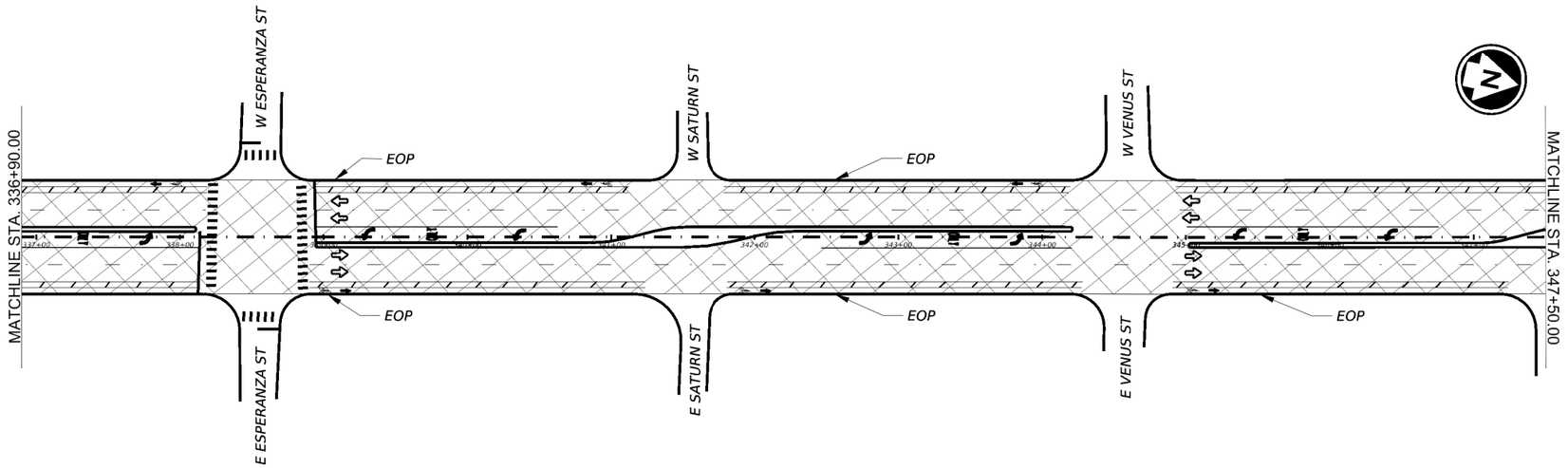
LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

- PROPOSED MILLING (0-2.0")
- PROPOSED MILLING (2.0")
- PROPOSED OVERLAY (2.0")





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LICENSED PROFESSIONAL ENGINEER

11/6/2023

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Texas Department of Transportation

PR 100
PAVING PLAN LAYOUT

SHEET 9 OF 13

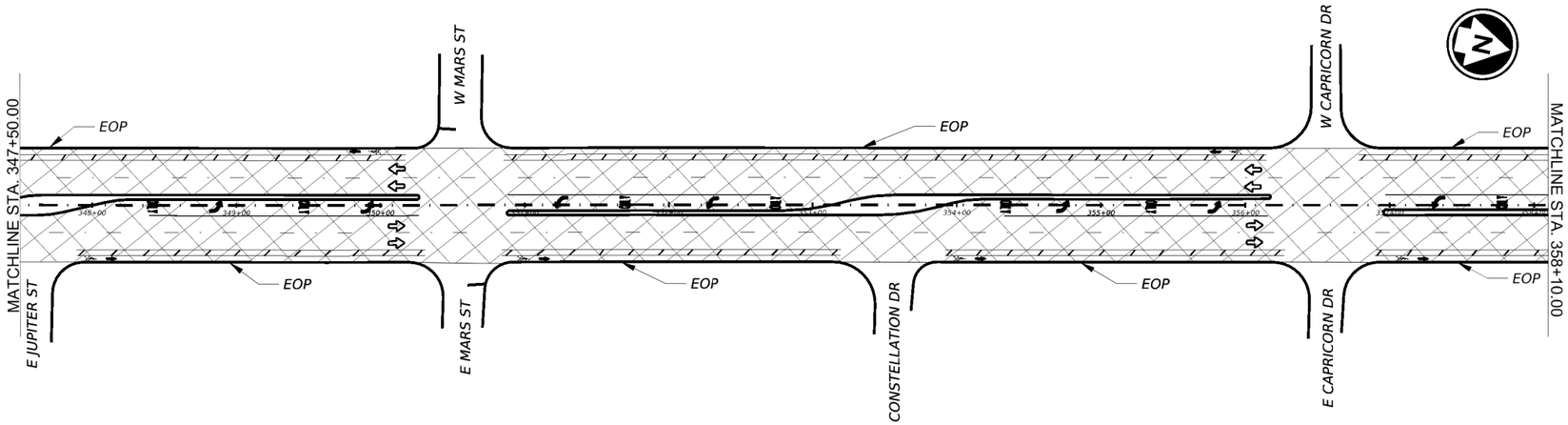
CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		65

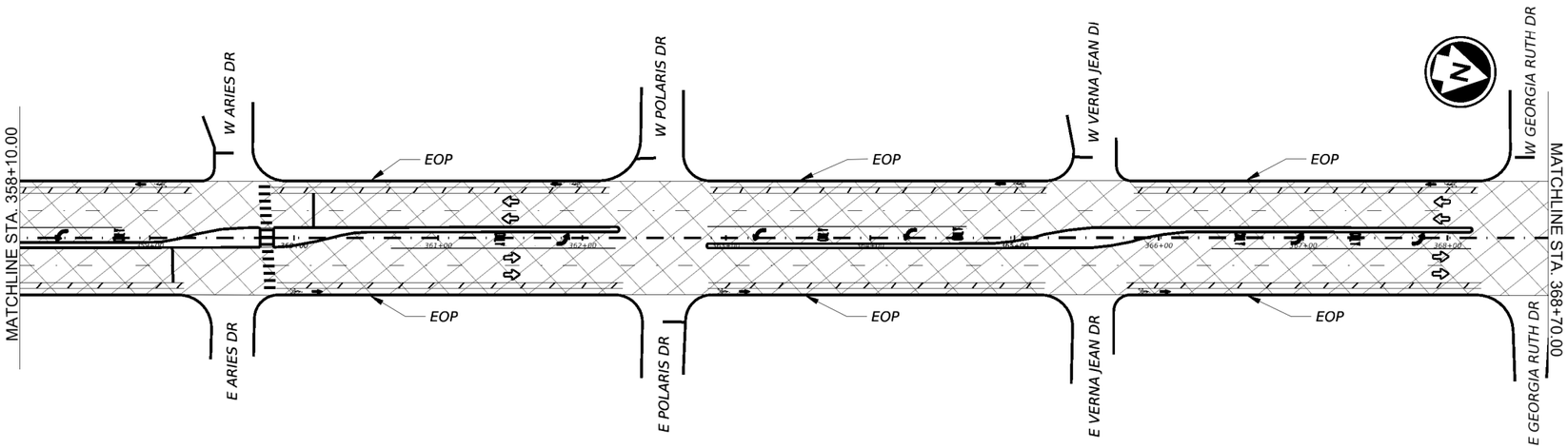
LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

- PROPOSED MILLING (0-2.0")
- PROPOSED MILLING (2.0")
- PROPOSED OVERLAY (2.0")





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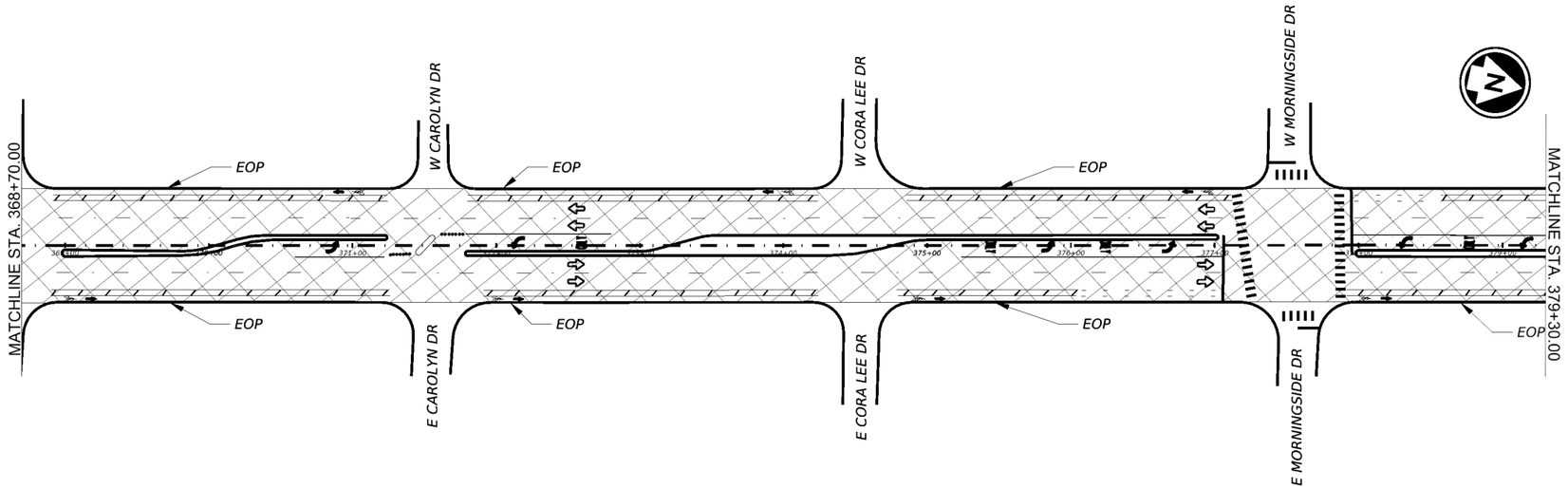
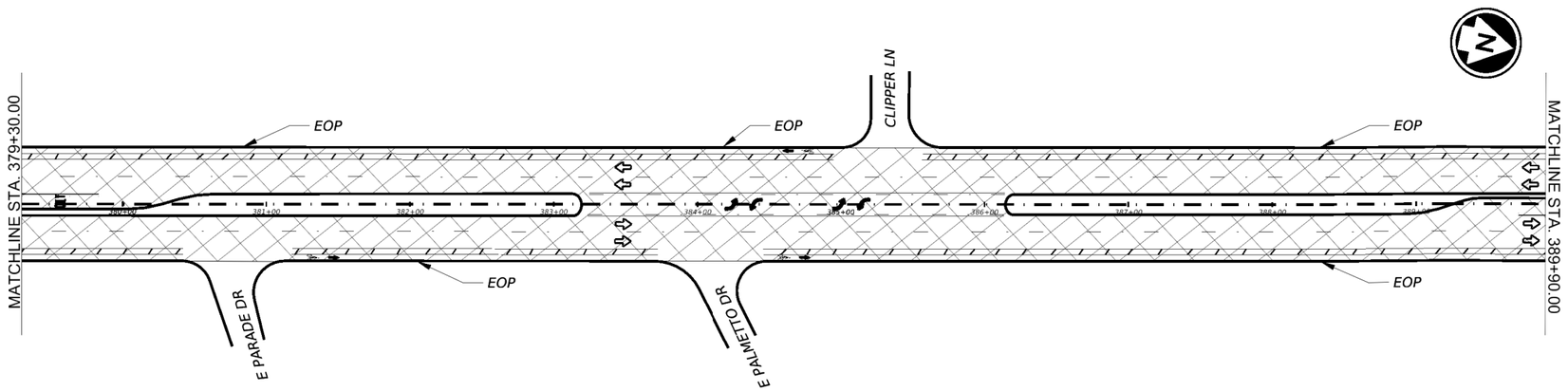
PR 100
PAVING PLAN LAYOUT

SHEET10 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		66





LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

- PROPOSED MILLING (0-2.0")
- PROPOSED MILLING (2.0")
- PROPOSED OVERLAY (2.0")

STATE OF TEXAS
EUGENE PALACIOS
105110
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11/6/2023

Eugene Palacios

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Texas Department of Transportation

PR 100
PAVING PLAN LAYOUT

SHEET 11 OF 13

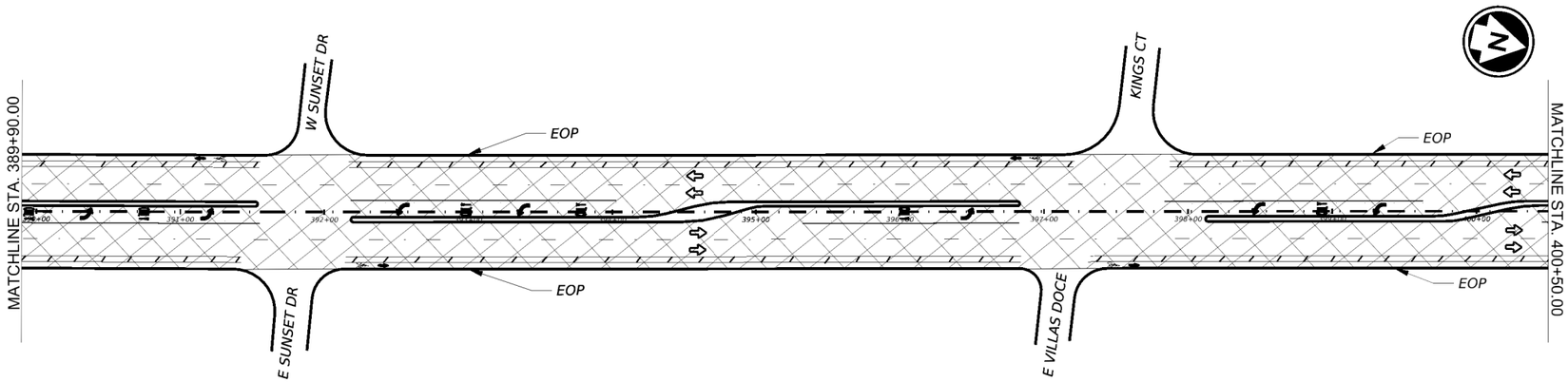
CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		67

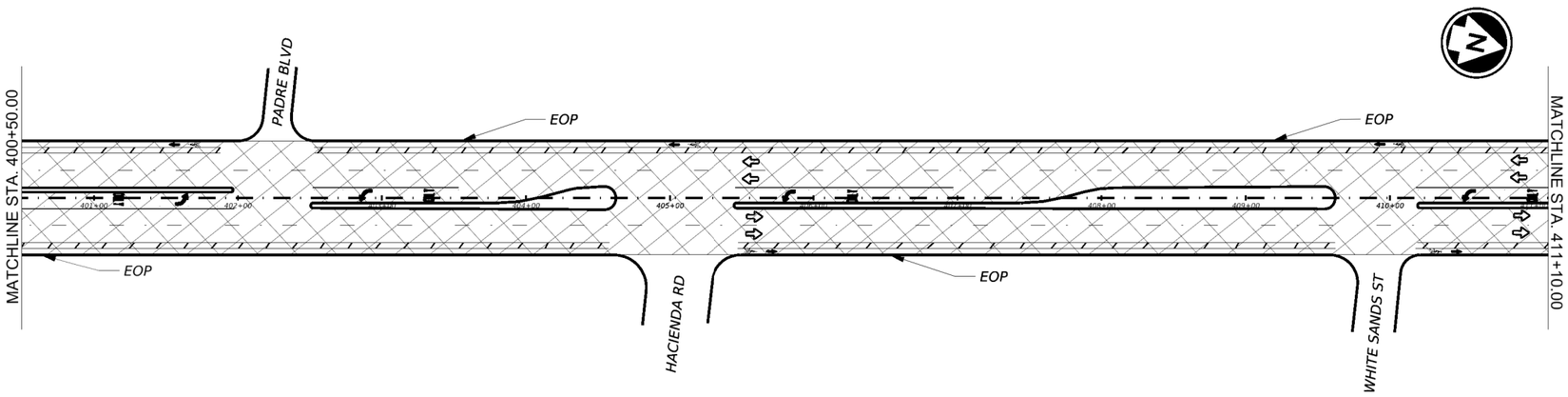
LEGEND

EOP - EXISTING EDGE OF PAVEMENT

⇨ - TRAFFIC FLOW

- PROPOSED MILLING (0-2.0")
- PROPOSED MILLING (2.0")
- PROPOSED OVERLAY (2.0")





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11/6/2023

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PR 100
PAVING PLAN LAYOUT

SHEET12 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		68

LEGEND

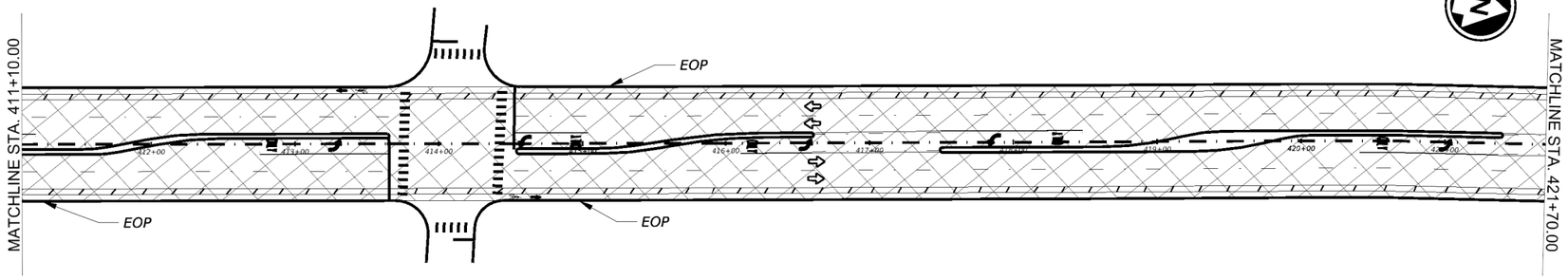
EOP - EXISTING EDGE OF PAVEMENT

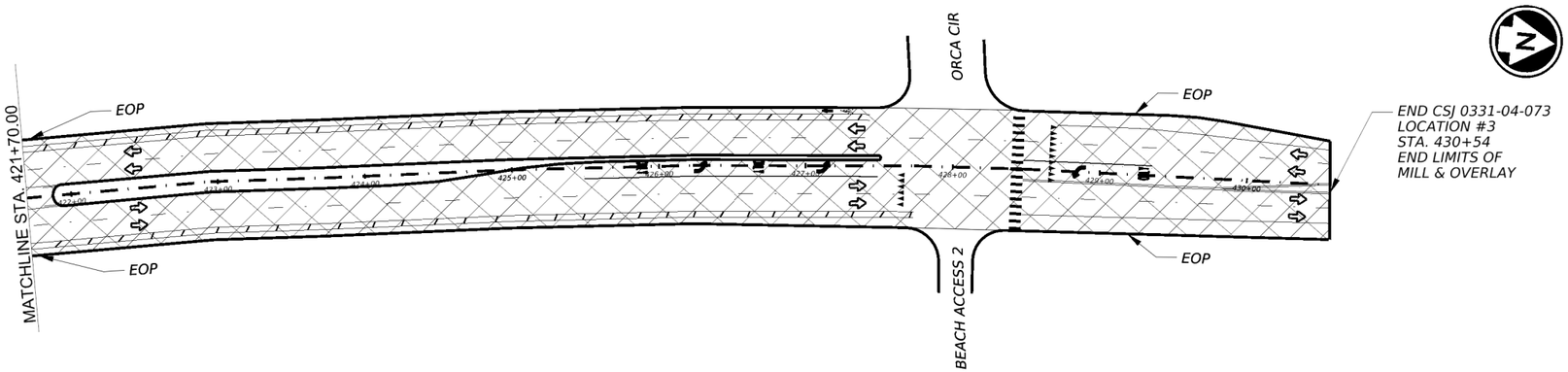
⇨ - TRAFFIC FLOW

▨ - PROPOSED MILLING (0-2.0")

▨ - PROPOSED MILLING (2.0")

▨ - PROPOSED OVERLAY (2.0")





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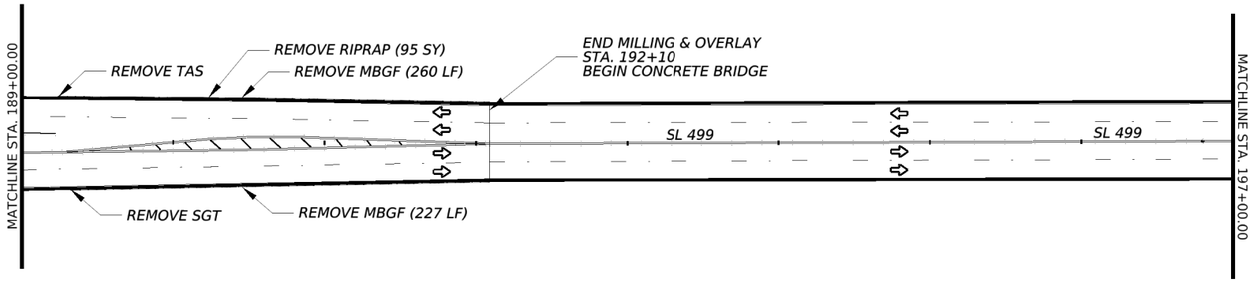
PR 100
PAVING PLAN LAYOUT

SHEET13 OF 13

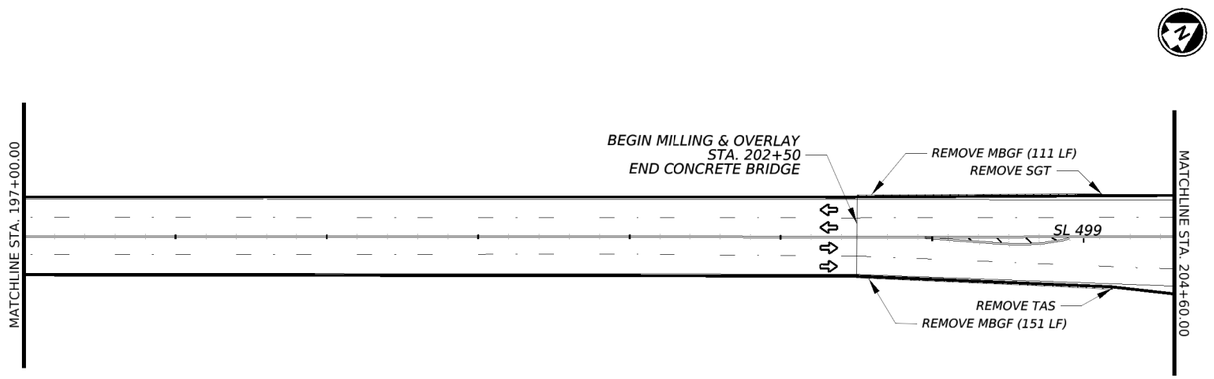
CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		69

LEGEND

MBGF - METAL BEAM GUARD FENCE
SGT - SINGLE GUARDRAIL TREATMENT
TAS - TERMINAL ANCHOR SECTION
EOP - EDGE OF PAVEMENT
⇨ - TRAFFIC FLOW



SHEET TOTALS				
ITEM	DES CODE	EST.	UNIT	DESCRIPTION
104	6009	95	SY	REMOVING CONCRETE(RIPRAP)
542	6001	749	LF	REMOVE METAL BEAM GUARD FENCE
542	6002	2	EA	REMOVE TERMINAL ANCHOR SECTION
544	6003	2	EA	GUARDRAIL END TREATMENT (REMOVE)



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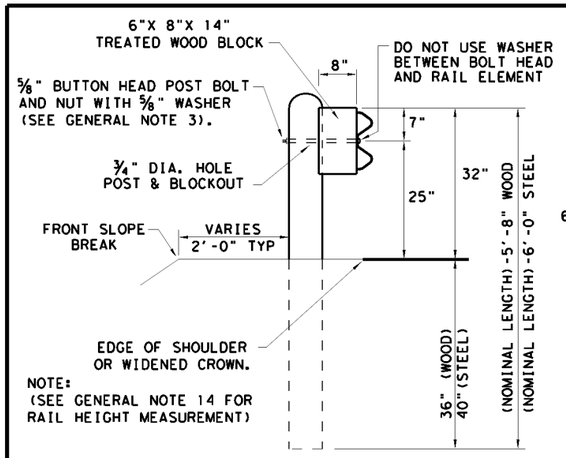
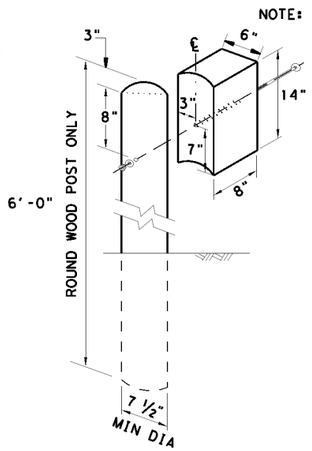
SL 499 LOCATION 1
METAL BEAM GUARD FENCE REMOVAL PLAN

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		70

DATE:
FILE:

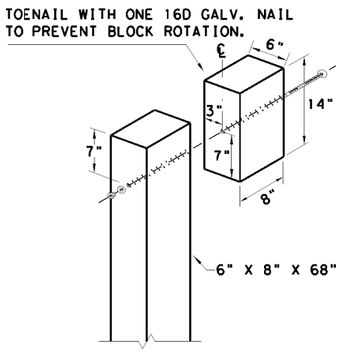


TYPICAL POST PLACEMENT

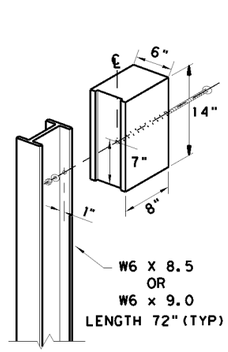


WOOD BLOCK TO ROUND WOOD POST

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

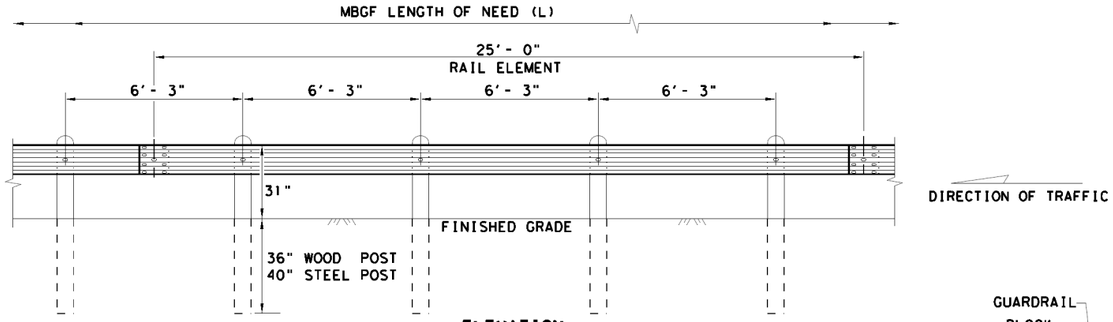


WOOD BLOCK TO RECTANGULAR WOOD POST



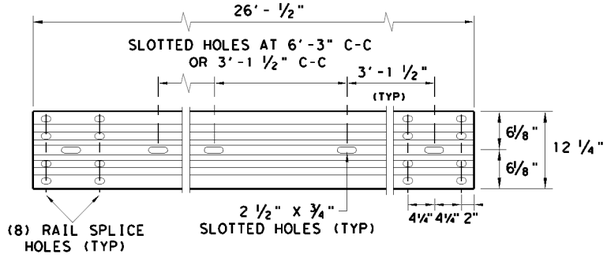
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



ELEVATION MID-SPAN RAIL SPLICE

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



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

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

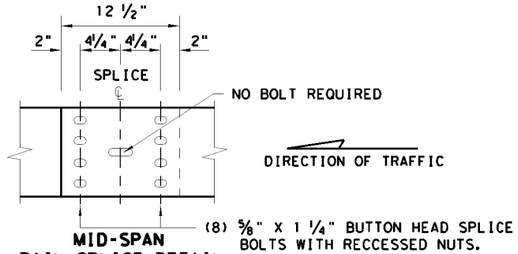
NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECCESSED NUT.

SPLICE BOLT LENGTH — VARIES
FBB01 = 1 ¼"
FBB02 = 2"
⅝"

POST & BLOCK LENGTH
FBB03 = 10"
FBB04 = 18"

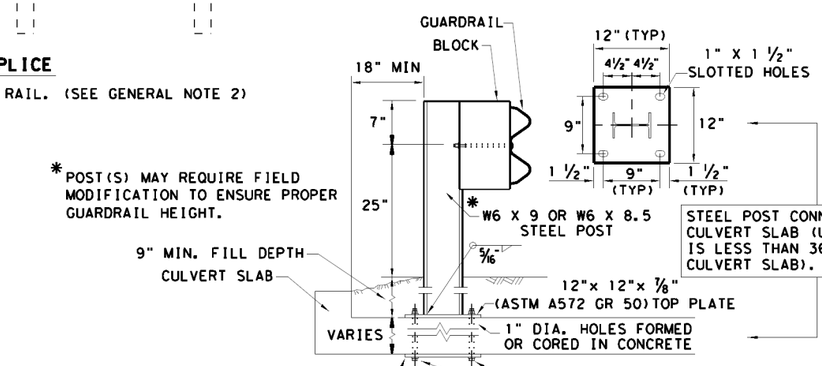
BUTTON HEAD BOLT

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.



12" X 12" X ¼" (ASTM A36) STEEL BOTTOM PLATE WITH 1" DIA. HOLES REQUIRED WITH BOLT-THROUGH INSTALLATION.

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. 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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	1137	02	042,ETC.	SL 499,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		71

DATE:
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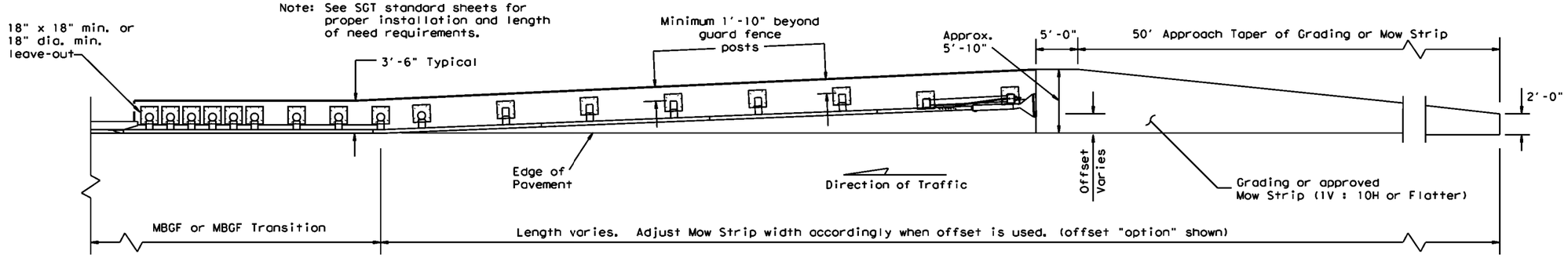
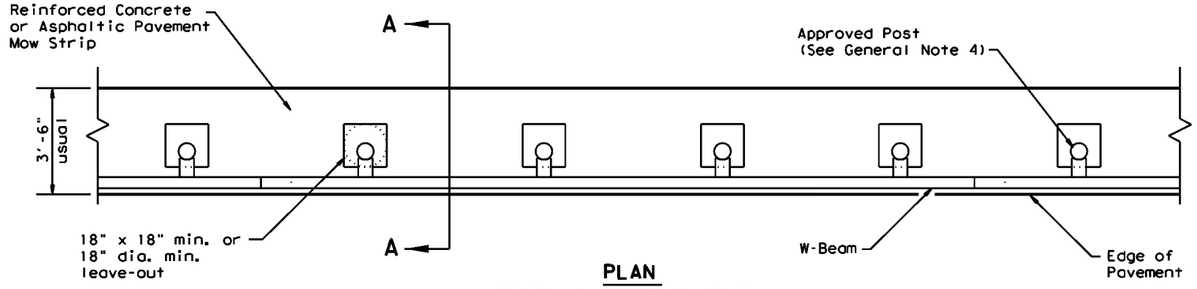
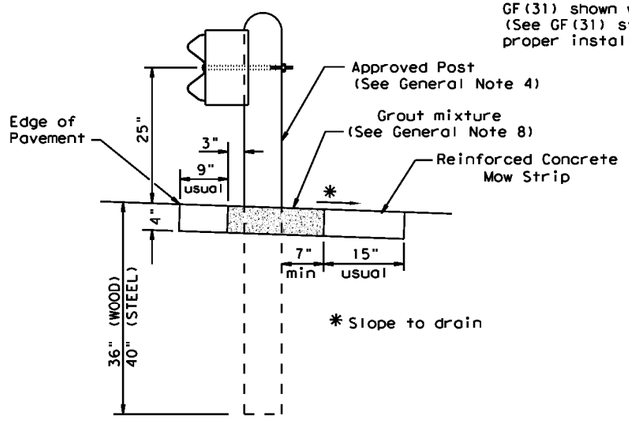


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



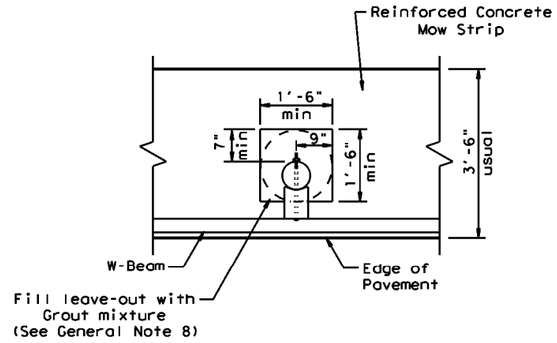
PLAN

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



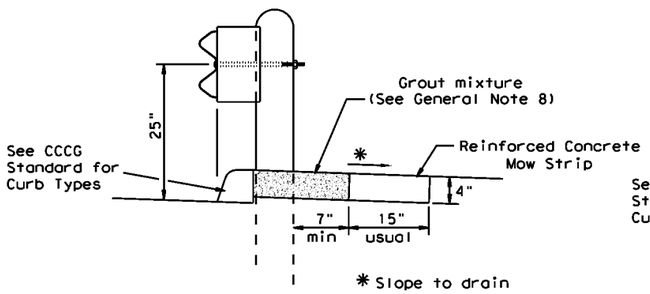
SECTION A-A

Typical



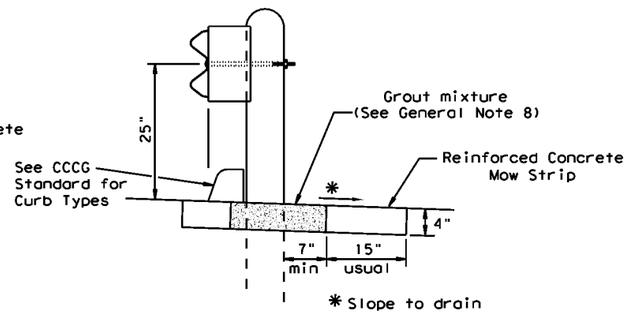
MOW STRIP DETAIL

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



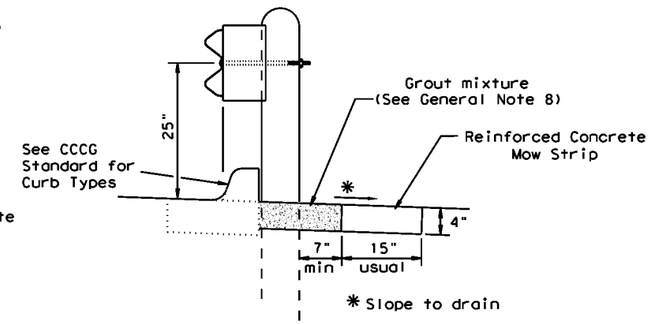
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or 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.

Texas Department of Transportation

Design Division Standard

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

GF(31)MS-19

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	PHR	CAMERON			72	

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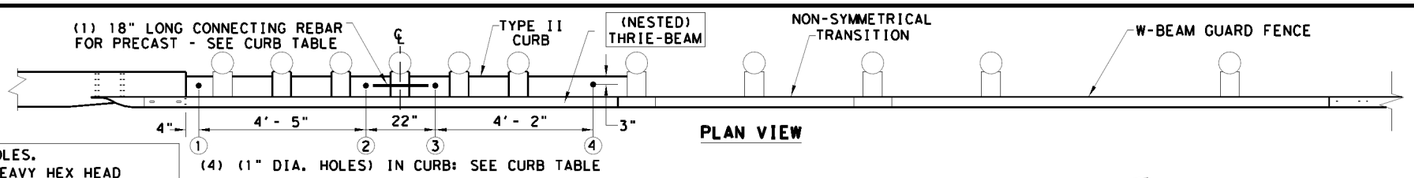


PLAN VIEW

(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

END PAYMENT FOR THRIE-BEAM TRANSITION.

18'- 9" THRIE-BEAM TRANSITION (EA)

BEGIN PAYMENT FOR METAL BEAM GUARD FENCE. (SEE GF(31)STANDARD)

6'-3" NON-SYMMETRICAL TRANSITION TO W-BEAM

(IF CURB CONTINUES PAST POST 7 SEE SHT. 2 AND GN: 17)

THRIE-BEAM CONNECTOR TO CONCRETE RAIL

7 ¼" 11½" ±2" 5 SPACES AT 18 ¾" 3 SPACES AT 3'-1½" 3'-1½" 6'- 3" 3'-1½"

2'-6"

A B C

℄

1'-9"

CURB

4"

31"

CHAMFER REQUIRED ON CONCRETE RAILS THAT EXTEND BEYOND THE FACE OF GUARDRAIL TRANSITION.

(4) #5 REBAR STAKES 18" LONG SEE CURB TABLE

1 2 3 4

POST 7

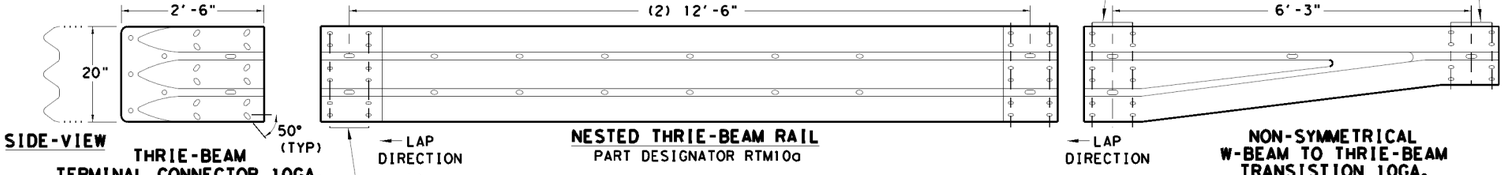
SEE SHEET 2 FOR BLOCKOUT DETAILS.

7'-0" LONG POST (ALL TYPES) (SEE GENERAL NOTES: 5-7)

ELEVATION VIEW

(12) ⅝" X 2" BUTTON HEAD SPLICE BOLTS: (FBB02)

(8) ⅝" X 1 ¼" BUTTON HEAD SPLICE BOLTS: (FBB01)



SIDE-VIEW

THRIE-BEAM TERMINAL CONNECTOR 10GA.
PART DESIGNATOR RTE01b
NOTE: SEE GENERAL NOTE: 9

LAP DIRECTION

NESTED THRIE-BEAM RAIL
PART DESIGNATOR RTM10a

LAP DIRECTION

NON-SYMMETRICAL W-BEAM TO THRIE-BEAM TRANSITION 10GA.
PART DESIGNATOR
RWT02a OR RWT02b

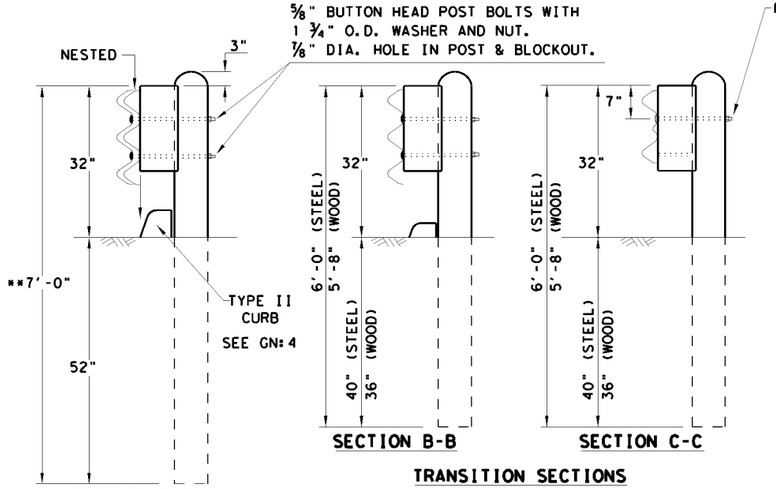
(12) ⅝" X 2" BUTTON HEAD SPLICE BOLTS WITH RECESSED NUTS: (FBB02)
(12) RECTANGULAR GUARDRAIL PLATE WASHERS: (FWR03)

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.

⅝" BUTTON HEAD POST BOLTS WITH 1 ¾" O.D. WASHER AND NUT. ⅞" DIA. HOLE IN POST & BLOCKOUT.

NOTE: ONLY (1) ⅝" BOLT REQUIRED AT THIS POST LOCATION.



SECTION A-A

SECTION B-B

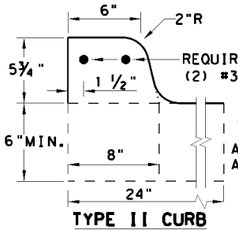
SECTION C-C

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 (FWC16g) 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-tl320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
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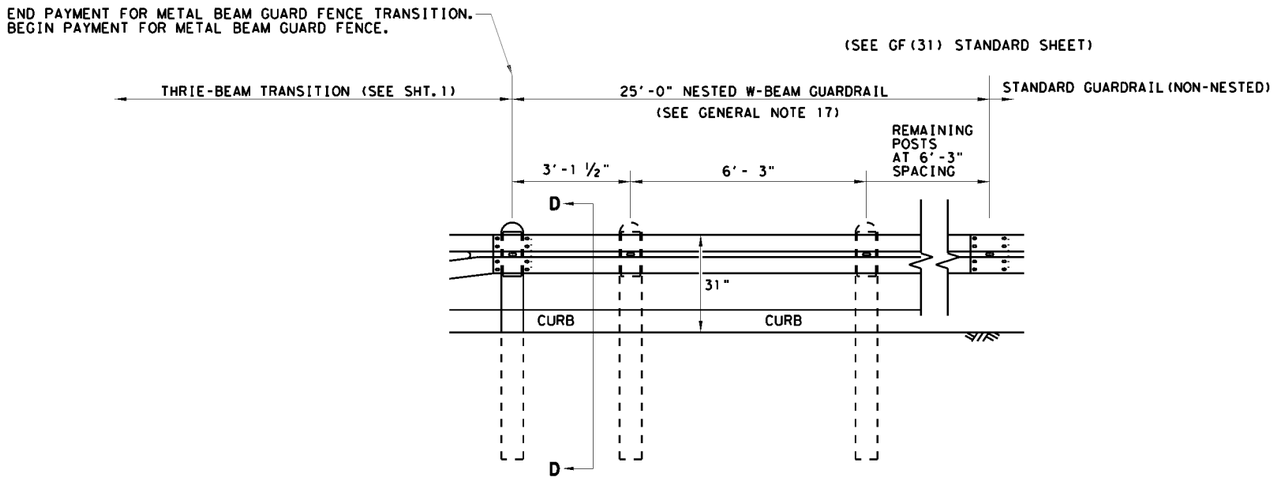
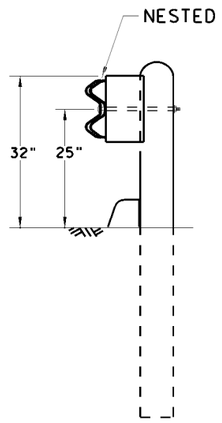
REVISIONS	1137	02	042,ETC.	SL 499,ETC.	
	DIST	COUNTY		SHEET NO.	
	PHR	CAMERON		73	

DATE:
FILE:

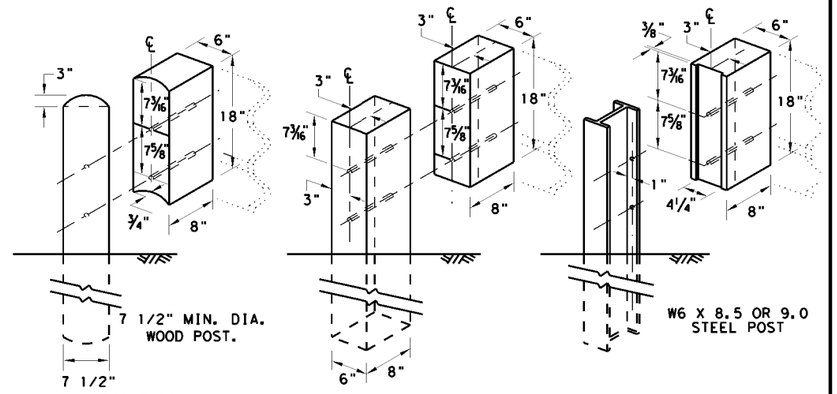
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



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: gf31tr1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1137	02	042,ETC.	SL 499,ETC.	
	DIST	COUNTY		SHEET NO.	
	PHR	CAMERON		74	

DATE:
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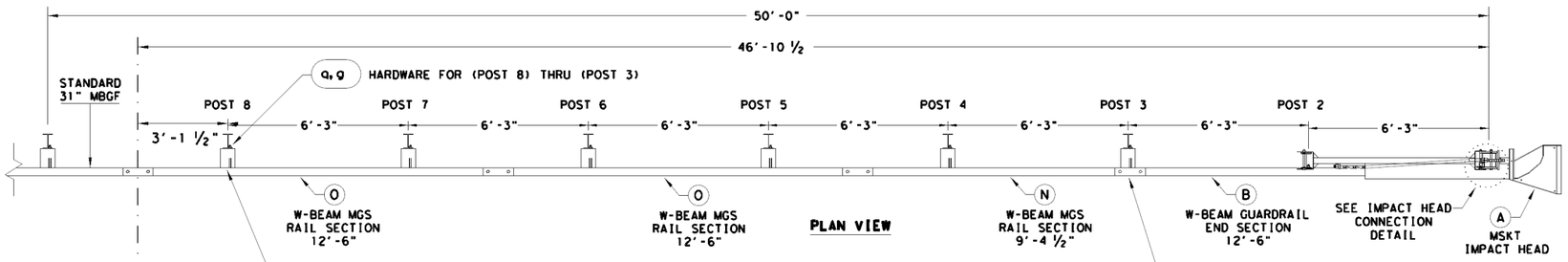
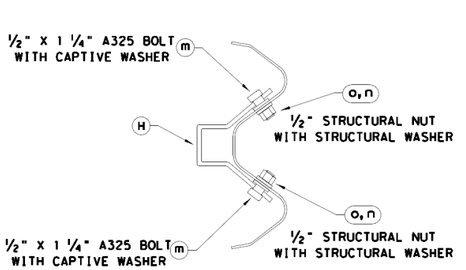
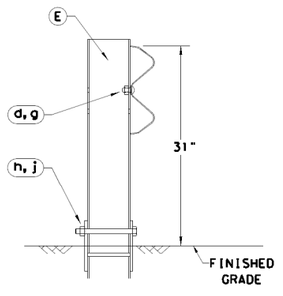


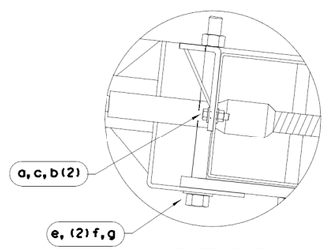
NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.



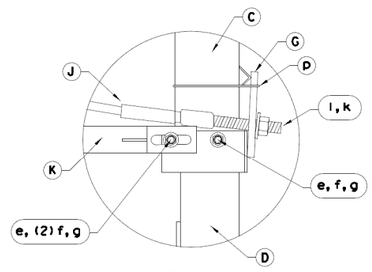
SECTION B-B
ANCHOR BRACKET



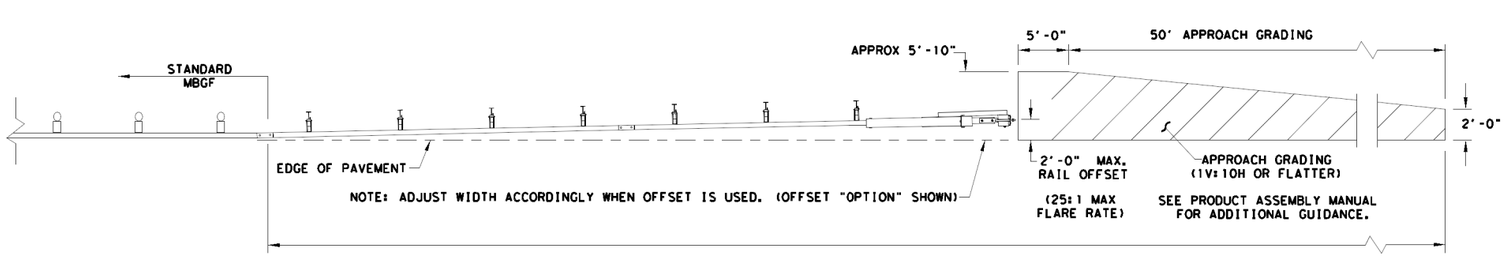
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

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

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

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 ⅜" 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

SEE NOTES: *

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

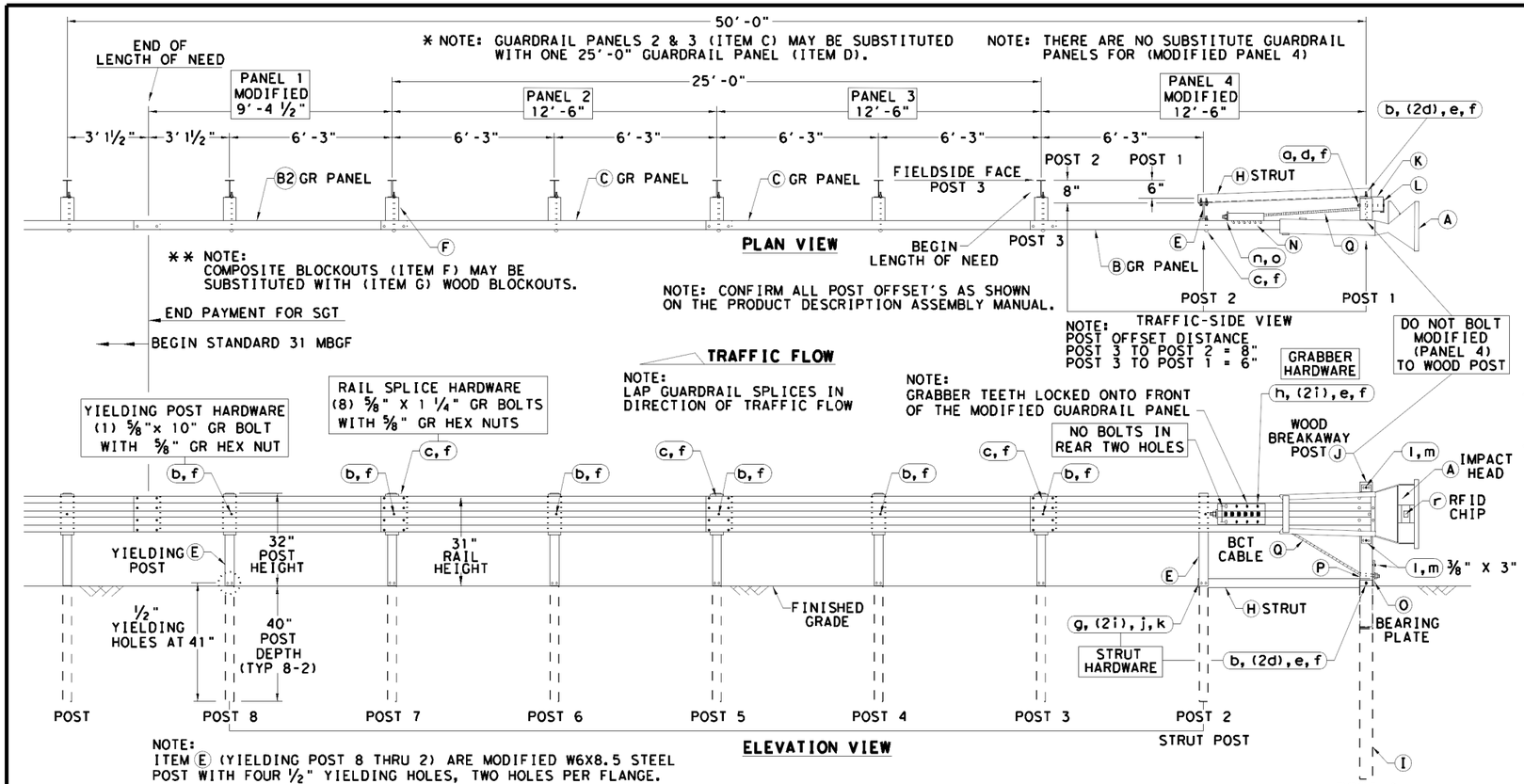
Texas Department of Transportation

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	1137	02	042, ETC.	SL 499, ETC.	
	DIST	COUNTY		SHEET NO.	
	PHR	CAMERON		75	

DATE:
FILE:

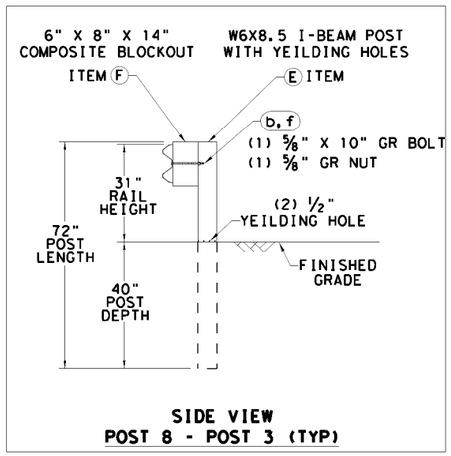


GENERAL NOTES

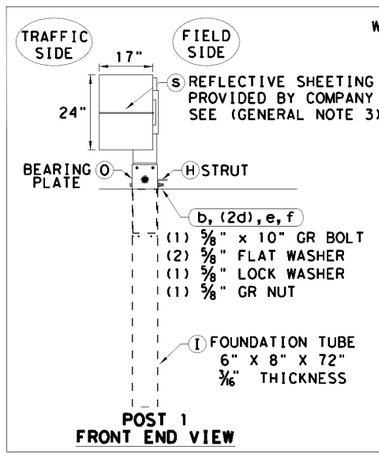
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY 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

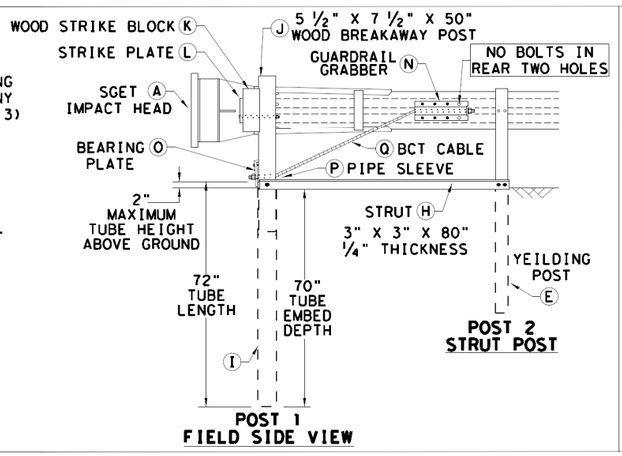
* ALTERNATIVE ITEMS
** NOTE: SEE PLAN VIEW



SIDE VIEW
POST 8 - POST 3 (TYP)

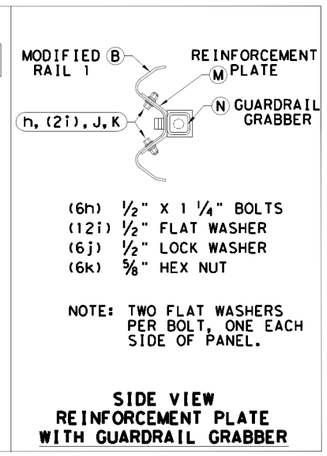


POST 1
FRONT END VIEW

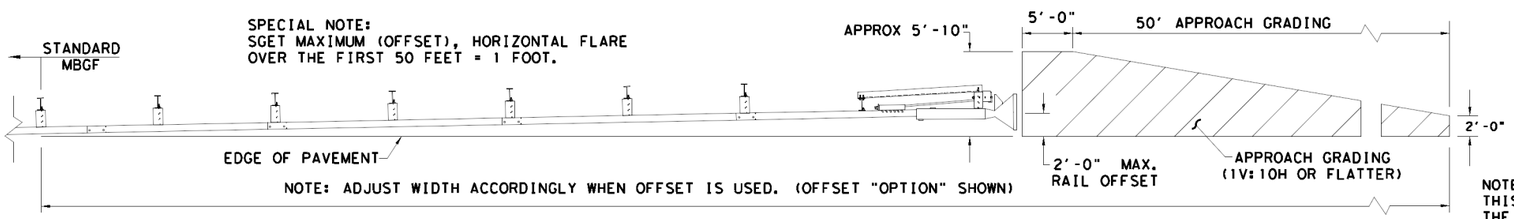


POST 1
FIELD SIDE VIEW

POST 2
STRUT POST



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
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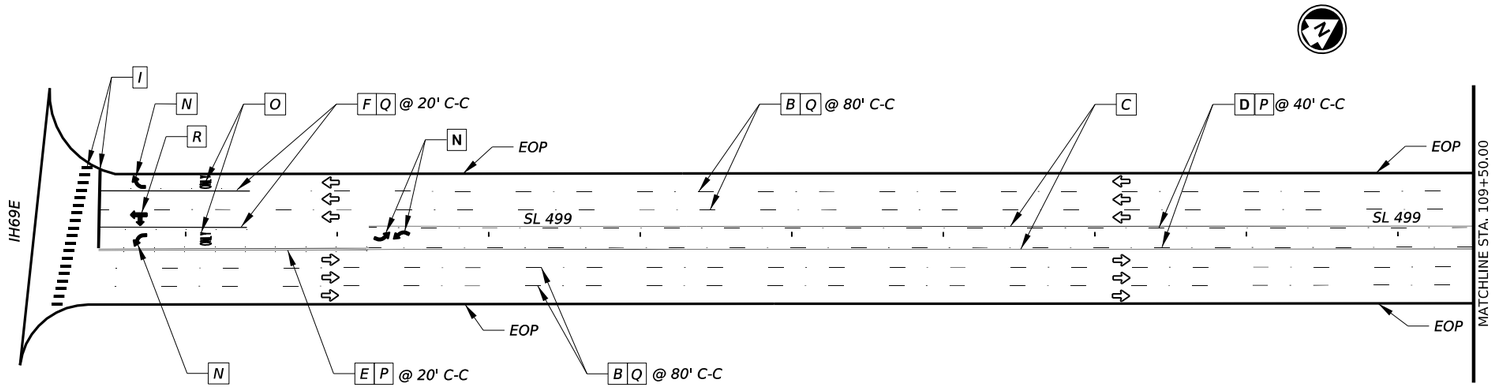
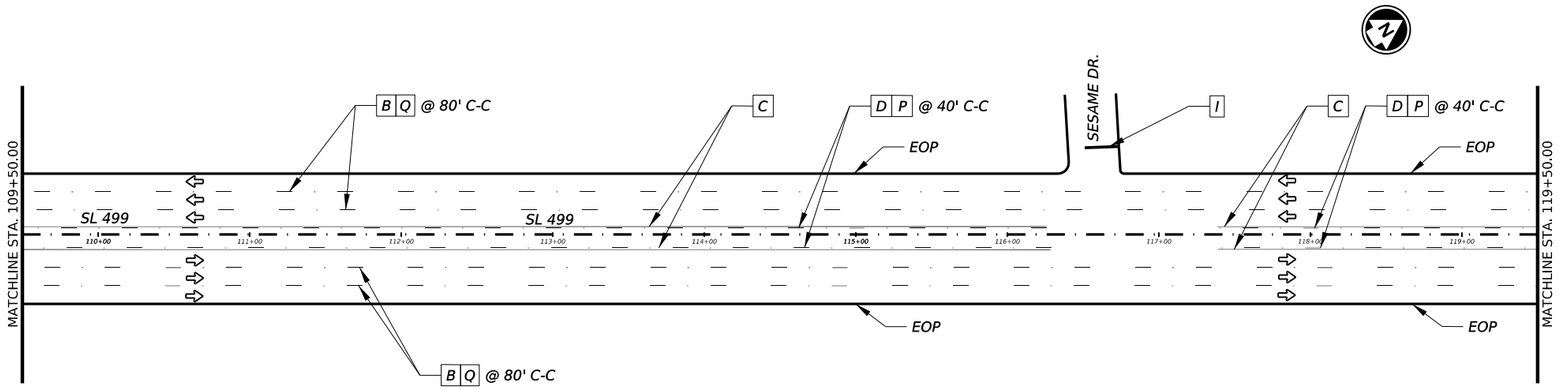
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		76





LEGEND

- A - PROP. 6" SLD WHITE LINE
- B - PROP. 6" BKN WHITE LINE
- C - PROP. 6" SLD YELLOW LINE
- D - PROP. 6" BRK YELLOW LINE
- E - PROP. 6" DBL YELLOW LINE
- F - PROP. 8" SLD WHITE LINE
- G - PROP. 8" DOT WHITE LINE
- H - PROP. 12" SLD YELLOW LINE
- I - PROP. 24" SLD WHITE LINE
- K - PROP. MULTIPOLYMER PAV MRK (W)(6")(SLD)
- L - PROP. MULTIPOLYMER PAV MRK (W)(6")(BRK)
- M - PROP. MULTIPOLYMER PAV MRK (Y)(6")(DBL)
- N - PROP. PREFABRICATED SINGLE DIRECTIONAL ARROW TY-C
- O - PROP. PREFABRICATED WORD TY-C
- P - PROP. PAV MRKR II-A-A
- Q - PROP. PAV MRKR TY I-C
- R - PROP. PREFABRICATED DOUBLE DIRECTIONAL ARROW TY-C
- S - PROP. PREFABRICATED RR SYMBOL TY-C

EOP - EXISTING EDGE OF PAVEMENT
- TRAFFIC FLOW
PROP. - PROPOSED
SLD - SOLID
BRK - BROKEN
PAV - PAVEMENT
DBL - DOUBLE
⇨ - TRAFFIC FLOW

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED
PROFESSIONAL ENGINEER

11/6/2023

Eugene Palacios

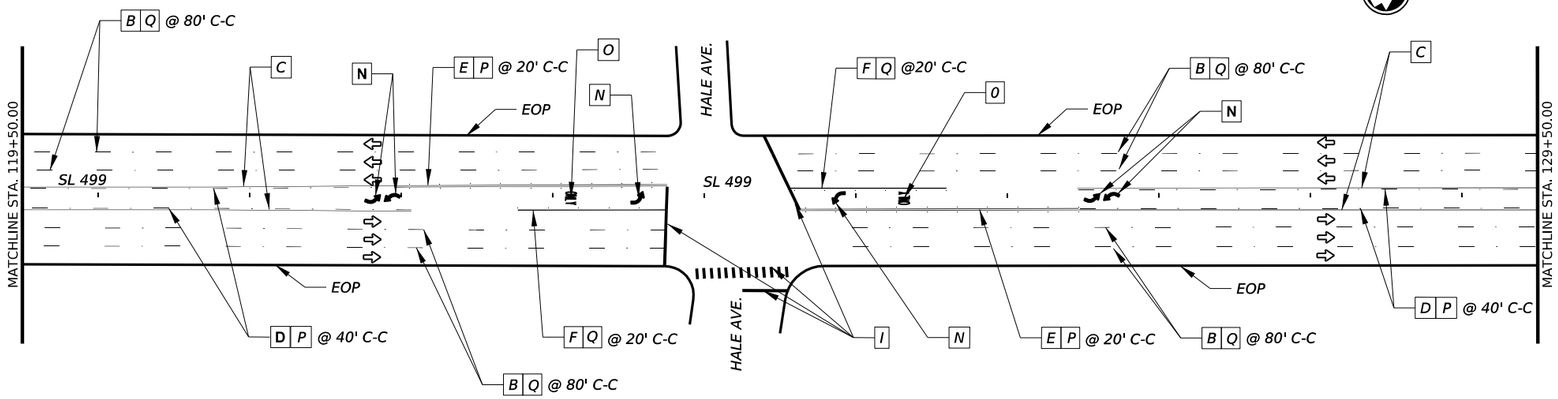
N.T.S.

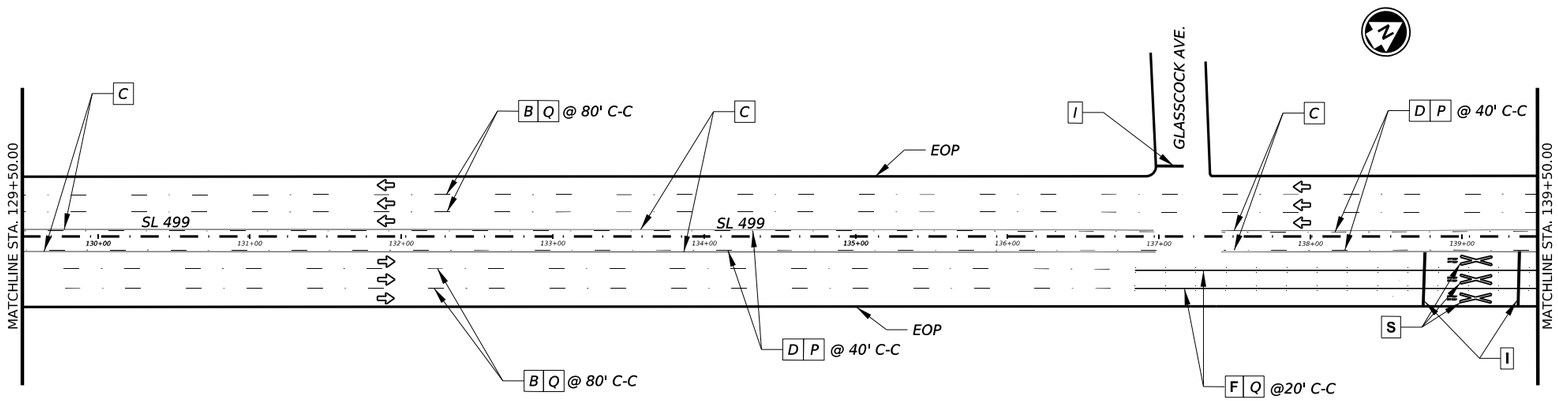
Texas Department of Transportation

SL 499 LOCATION 4
PAVEMENT MARKING LAYOUT

SHEET 1 OF 7

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		77





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STATE OF TEXAS
EUGENE PALACIOS
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PROFESSIONAL ENGINEER

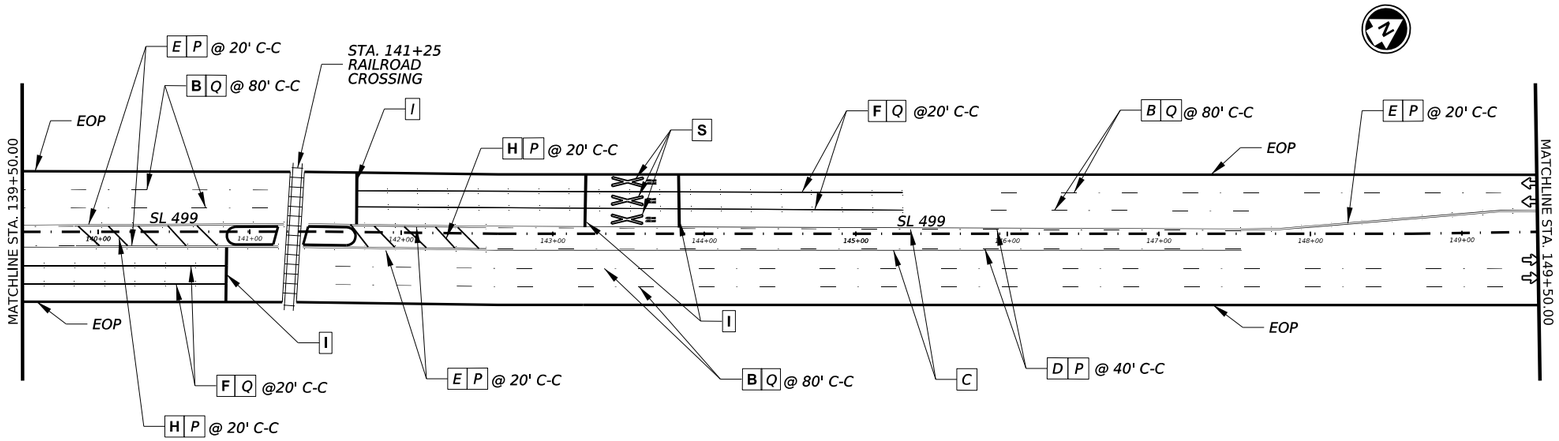
11/6/2023

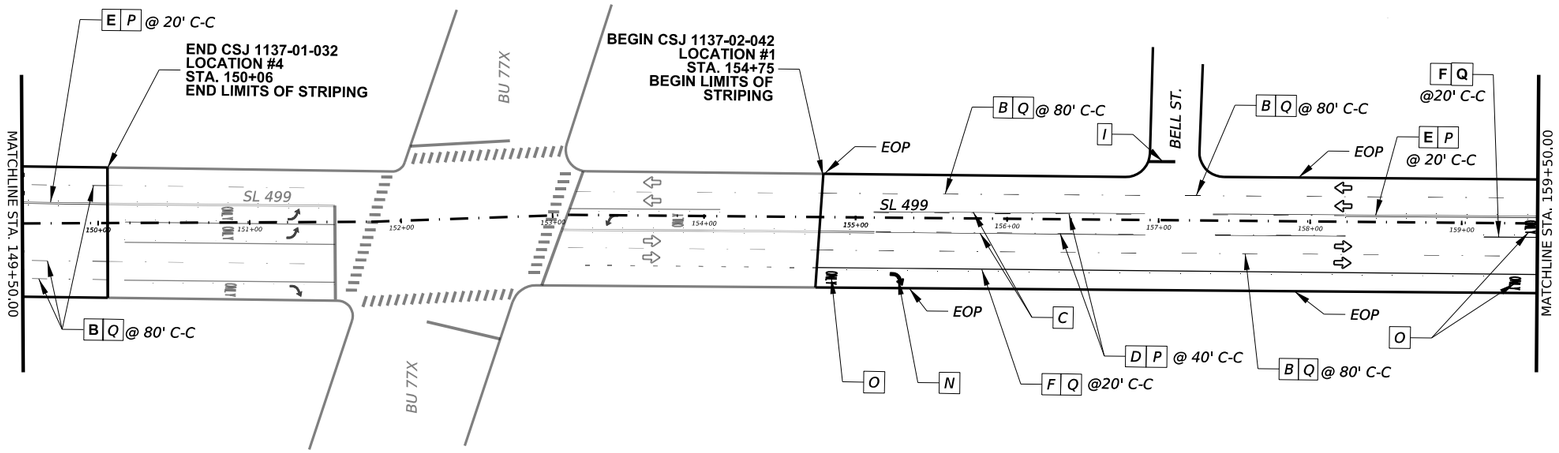
N.T.S.

Texas Department of Transportation

SL 499 LOCATION 4
PAVEMENT MARKING LAYOUT

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		78





LEGEND

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- S - PROP. PREFABRICATED RR SYMBOL TY-C

EOP - EXISTING EDGE OF PAVEMENT
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105110
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PROFESSIONAL ENGINEER

11/6/2023

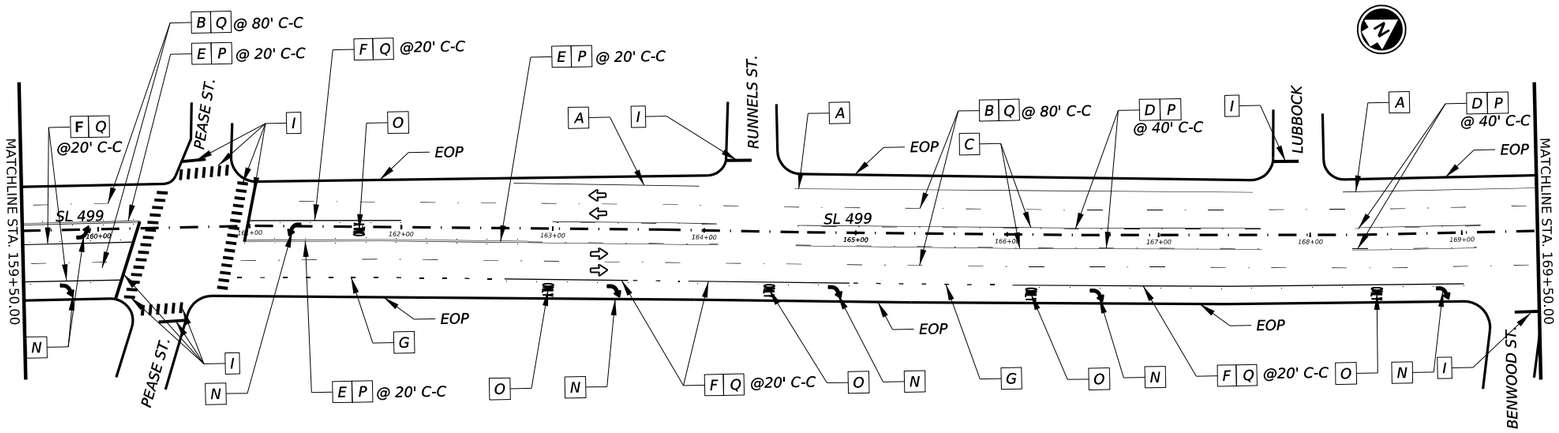
N.T.S.

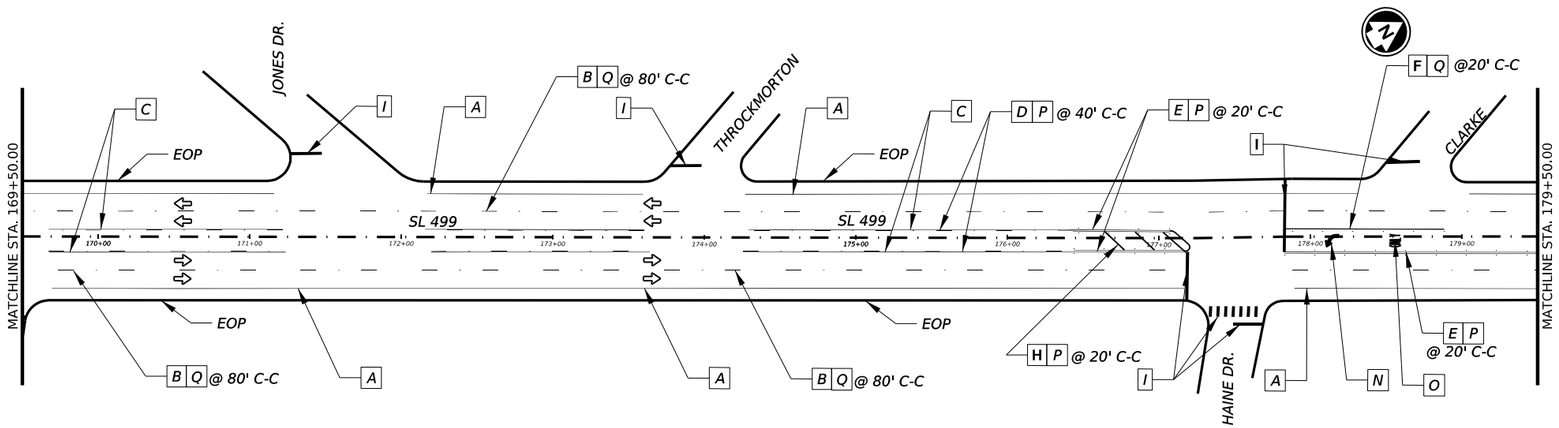
Texas Department of Transportation

SL 499 LOCATION 1 & 4 PAVEMENT MARKING LAYOUT

SHEET 3 OF 7

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		79





LEGEND

- A - PROP. 6" SLD WHITE LINE
- B - PROP. 6" BKN WHITE LINE
- C - PROP. 6" SLD YELLOW LINE
- D - PROP. 6" BRK YELLOW LINE
- E - PROP. 6" DBL YELLOW LINE
- F - PROP. 8" SLD WHITE LINE
- G - PROP. 8" DOT WHITE LINE
- H - PROP. 12" SLD YELLOW LINE
- I - PROP. 24" SLD WHITE LINE
- K - PROP. MULTIPOLYMER PAV MRK (W)(6")(SLD)
- L - PROP. MULTIPOLYMER PAV MRK (W)(6")(BRK)
- M - PROP. MULTIPOLYMER PAV MRK (Y)(6")(DBL)
- N - PROP. PREFABRICATED SINGLE DIRECTIONAL ARROW TY-C
- O - PROP. PREFABRICATED WORD TY-C
- P - PROP. PAV MRKR II-A-A
- Q - PROP. PAV MRKR TY I-C
- R - PROP. PREFABRICATED DOUBLE DIRECTIONAL ARROW TY-C
- S - PROP. PREFABRICATED RR SYMBOL TY-C

EOP - EXISTING EDGE OF PAVEMENT
- - TRAFFIC FLOW
PROP. - PROPOSED
SLD - SOLID
BRK - BROKEN
PAV - PAVEMENT
DBL - DOUBLE
⇨ - TRAFFIC FLOW

STATE OF TEXAS
EUGENE PALACIOS
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PROFESSIONAL ENGINEER

11/6/2023

Eugene Palacios

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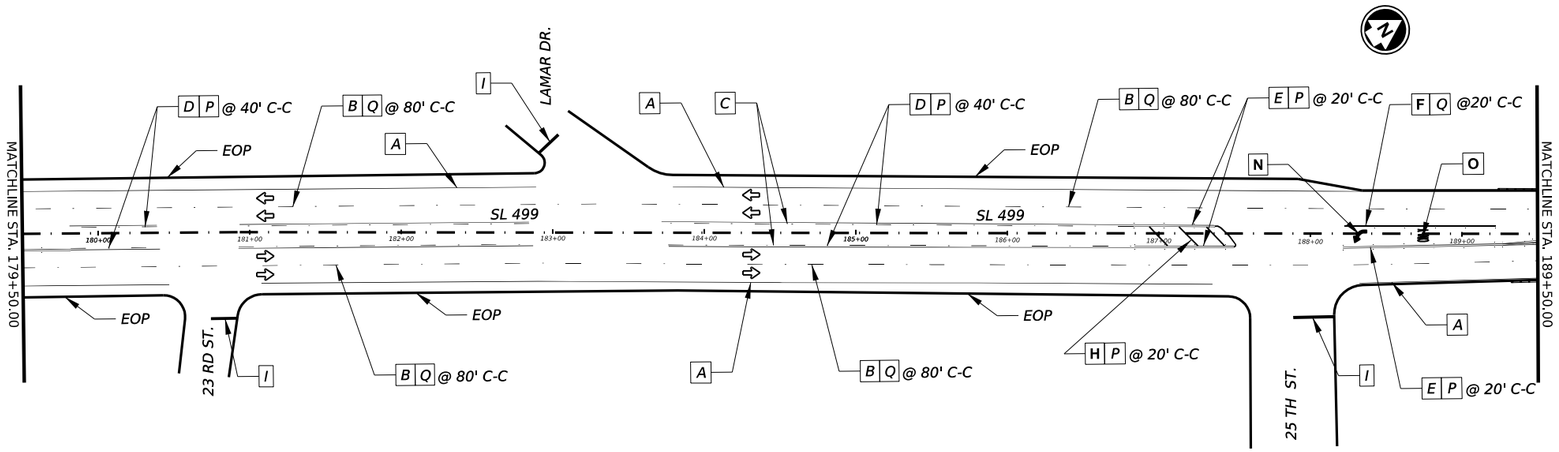
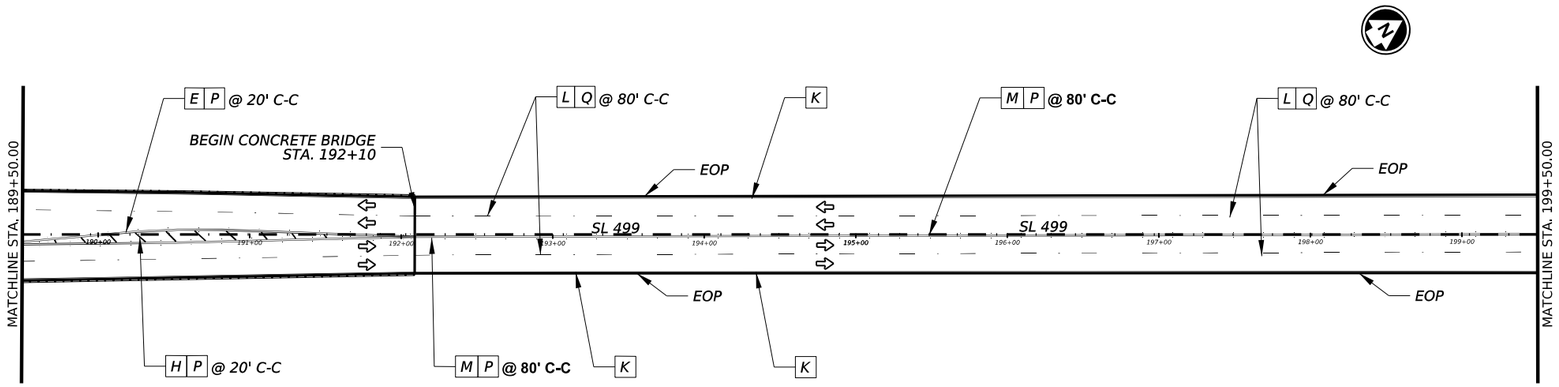
Texas Department of Transportation

SL 499 LOCATION 1
PAVEMENT MARKING LAYOUT

SHEET 4 OF 7

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		80





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- Q - PROP. PAV MRKR TY I-C
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- S - PROP. PREFABRICATED RR SYMBOL TY-C

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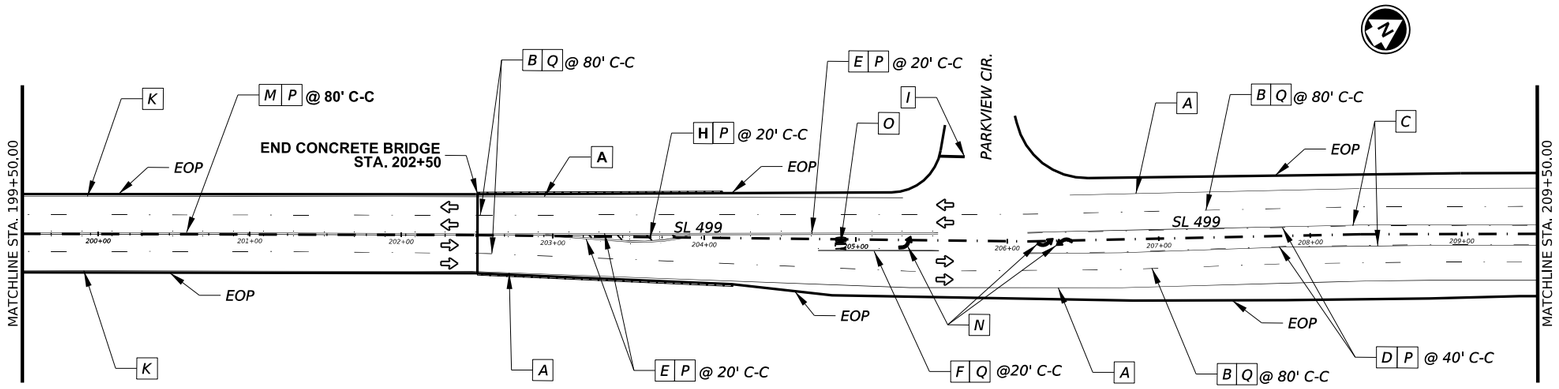
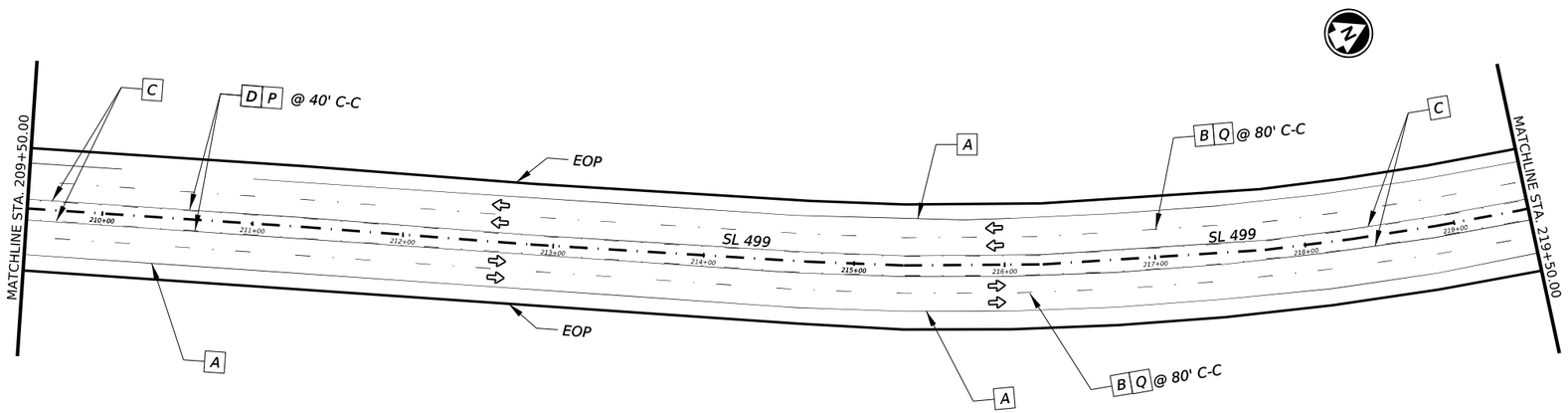
SL 499 LOCATION 1
PAVEMENT MARKING LAYOUT

SHEET 5 OF 7

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		81

CK:
DW:
CK:
DW:





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- S - PROP. PREFABRICATED RR SYMBOL TY-C

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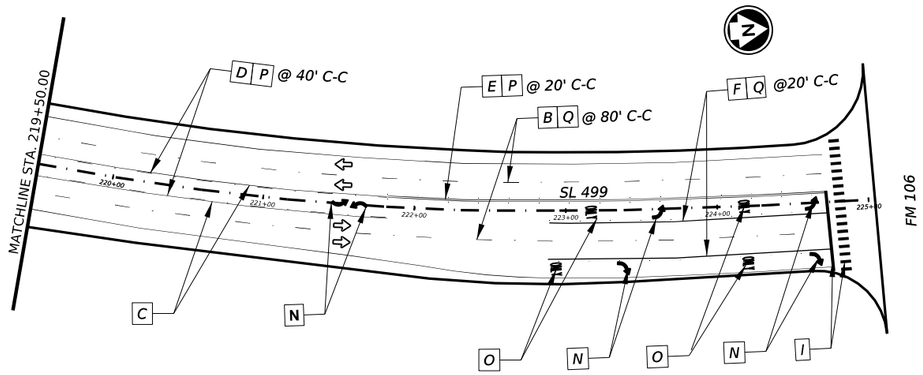
SL 499 LOCATION 1
PAVEMENT MARKING LAYOUT

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		82

CK:
DW:
CK:
DW:



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- P - PROP. PAV MRKR II-A-A
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EOP - EXISTING EDGE OF PAVEMENT
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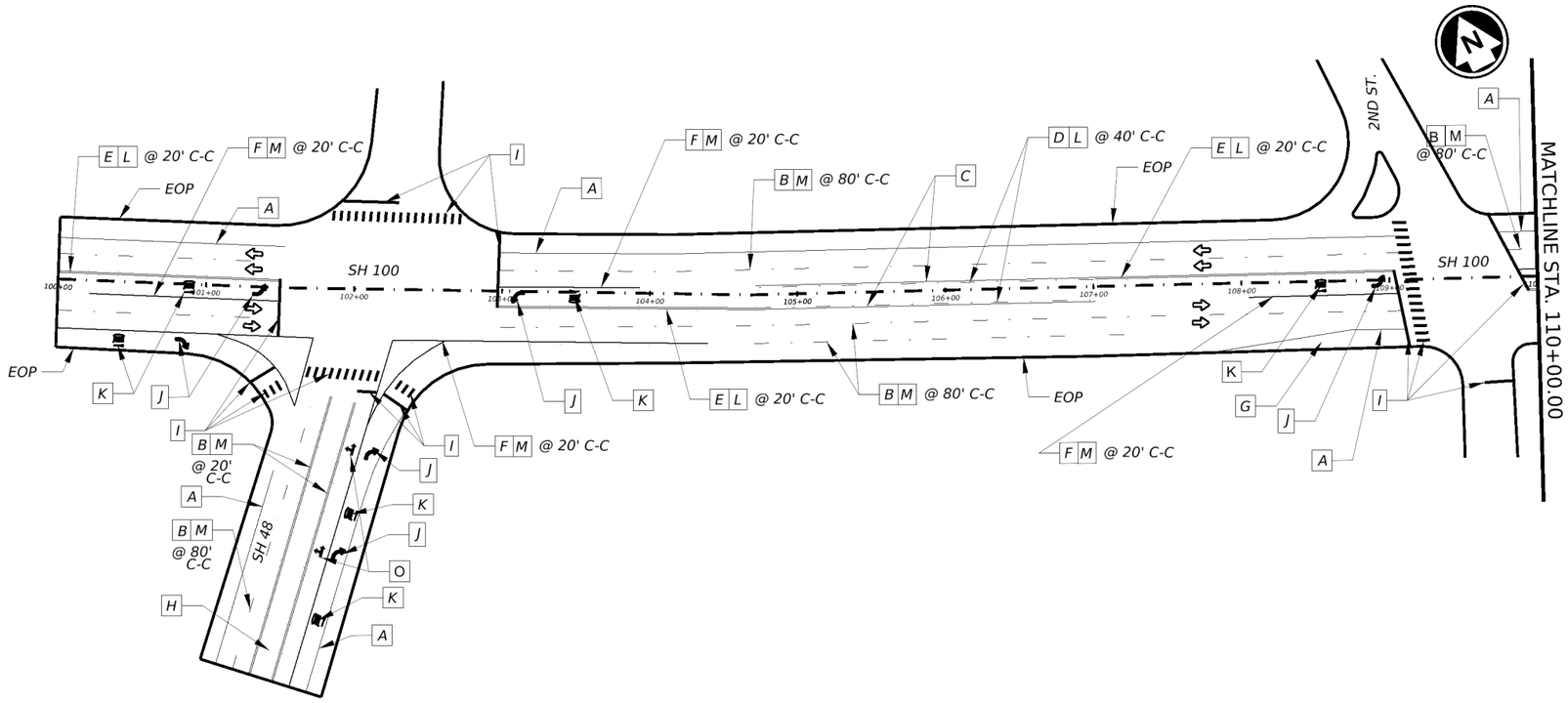
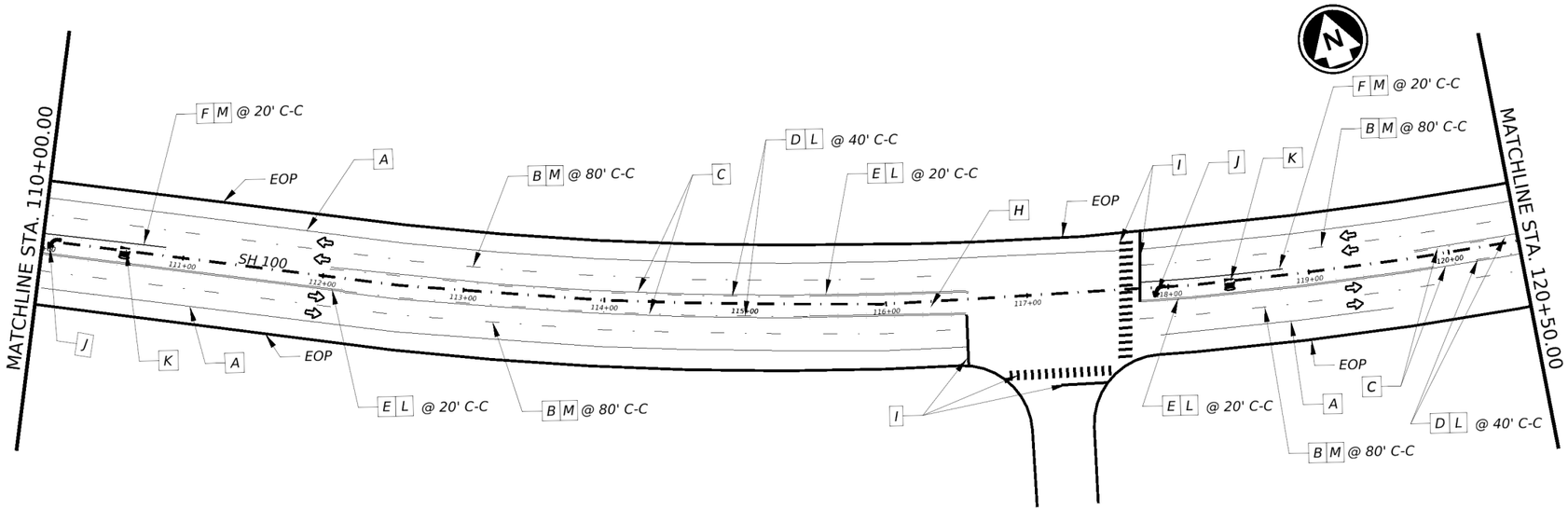
SL 499 LOCATION 1
PAVEMENT MARKING LAYOUT

SHEET 7 OF 7

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		83





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- J - PROP. PREFABRICATED SINGLE DIRECTIONAL ARROW TY-C
- K - PROP. PREFABRICATED WORD TY-C
- L - PROP. PAV MRKR II-A-A
- M - PROP. PAV MRKR TY I-C
- N - PROP. PAV MRKR TY II-C-R
- O - PROP. PREFABRICATED DOUBLE DIRECTIONAL ARROW TY-C

EOP - EXISTING EDGE OF PAVEMENT
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DBL - DOUBLE

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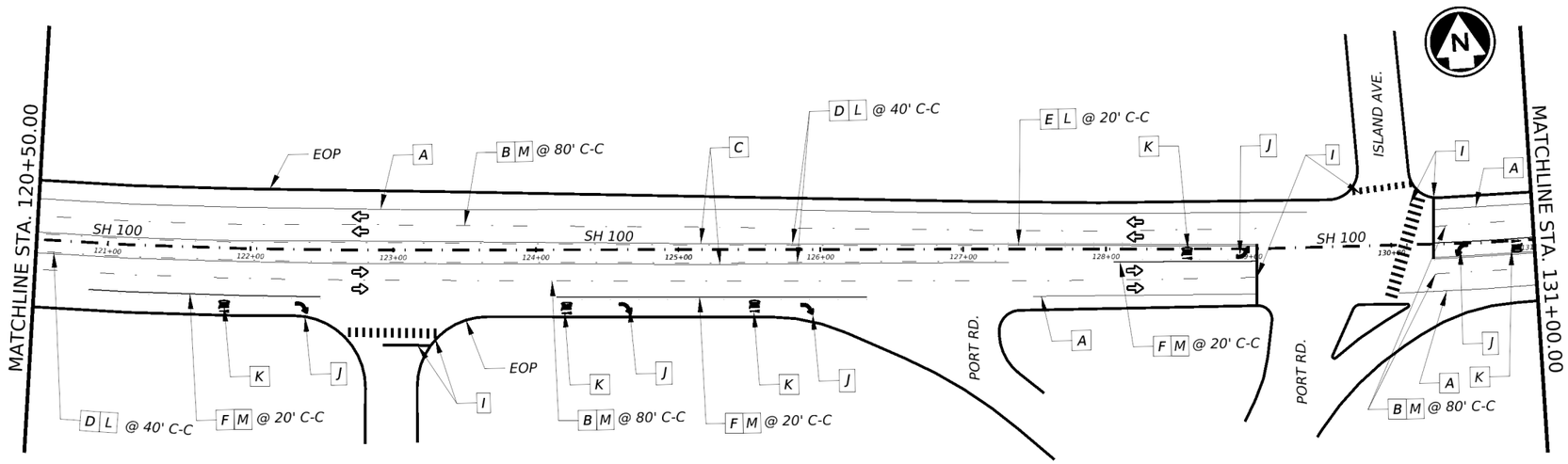
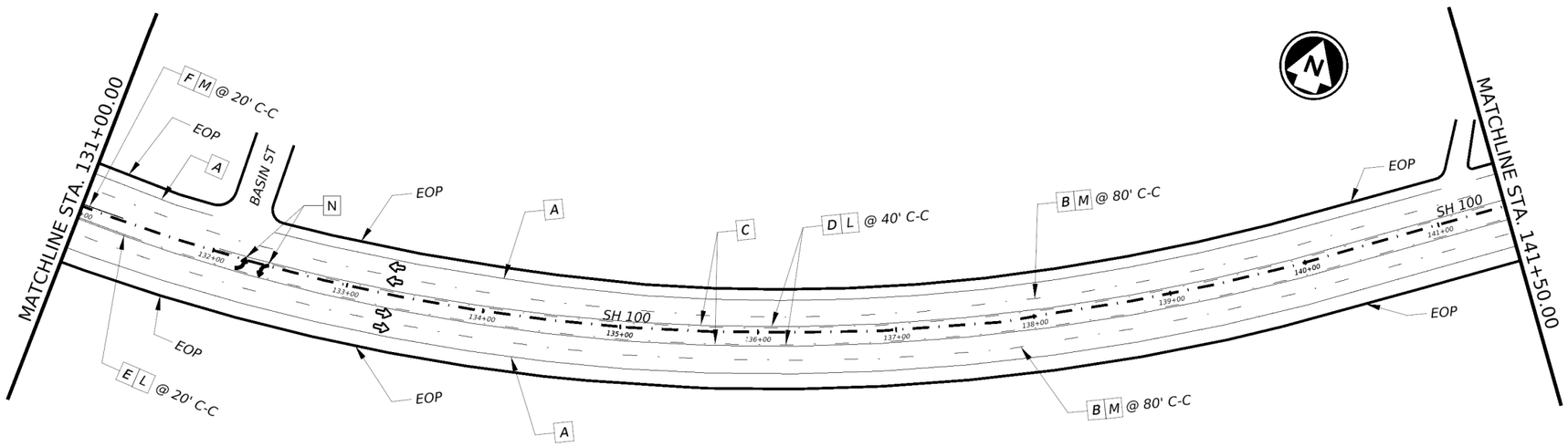
SH 100 LOCATION 2 PAVEMENT MARKING LAYOUT

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		84





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- H - PROP. 12" SLD YELLOW LINE
- ☐ - PROP. 24" SLD WHITE LINE
- J - PROP. PREFABRICATED SINGLE DIRECTIONAL ARROW TY-C
- K - PROP. PREFABRICATED WORD TY-C
- L - PROP. PAV MRKR II-A-A
- M - PROP. PAV MRKR TY I-C
- N - PROP. PAV MRKR TY II-C-R
- O - PROP. PREFABRICATED DOUBLE DIRECTIONAL ARROW TY-C

EOP - EXISTING EDGE OF PAVEMENT
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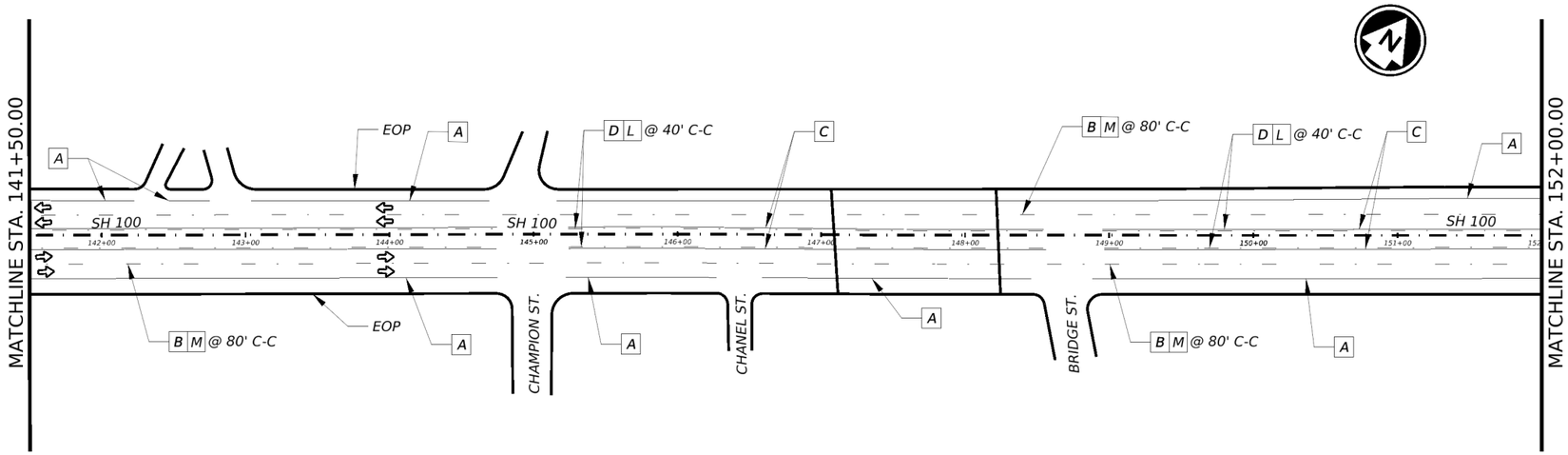
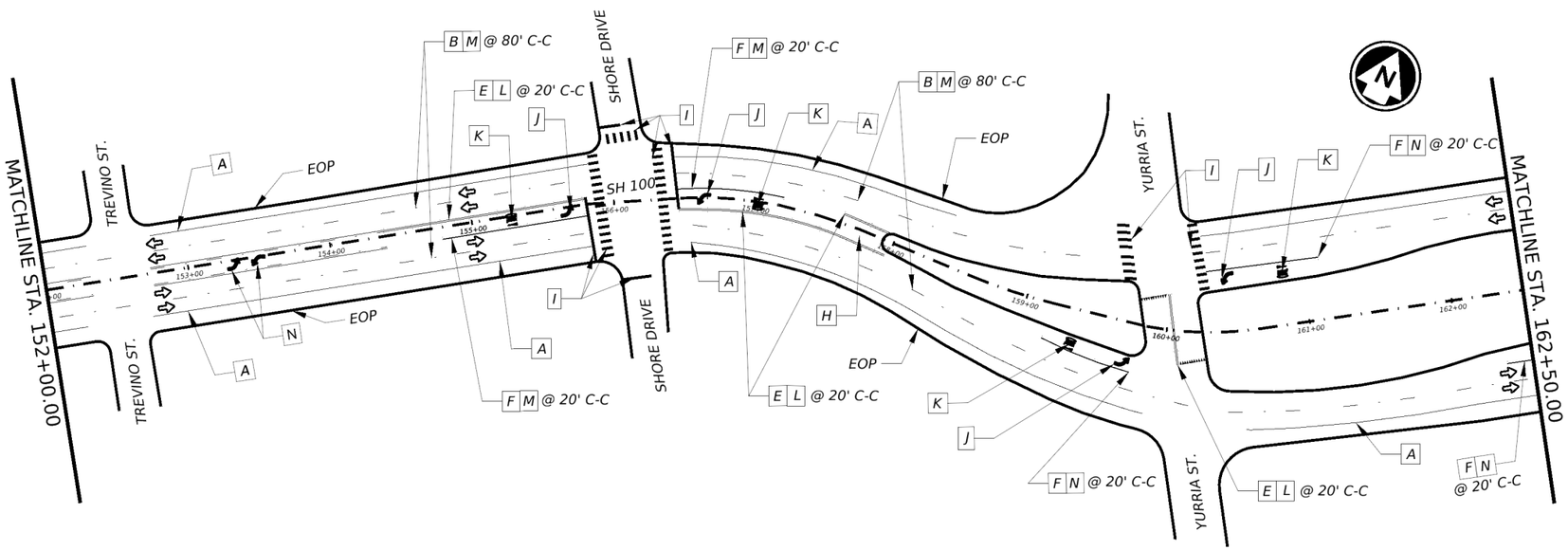
SH 100 LOCATION 2 PAVEMENT MARKING LAYOUT

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		85





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- K - PROP. PREFABRICATED WORD TY-C
- L - PROP. PAV MRKR II-A-A
- M - PROP. PAV MRKR TY I-C
- N - PROP. PAV MRKR TY II-C-R
- O - PROP. PREFABRICATED DOUBLE DIRECTIONAL ARROW TY-C

EOP - EXISTING EDGE OF PAVEMENT
⇨ - TRAFFIC FLOW
PROP. - PROPOSED
SLD - SOLID
BRK - BROKEN
DBL - DOUBLE

STATE OF TEXAS
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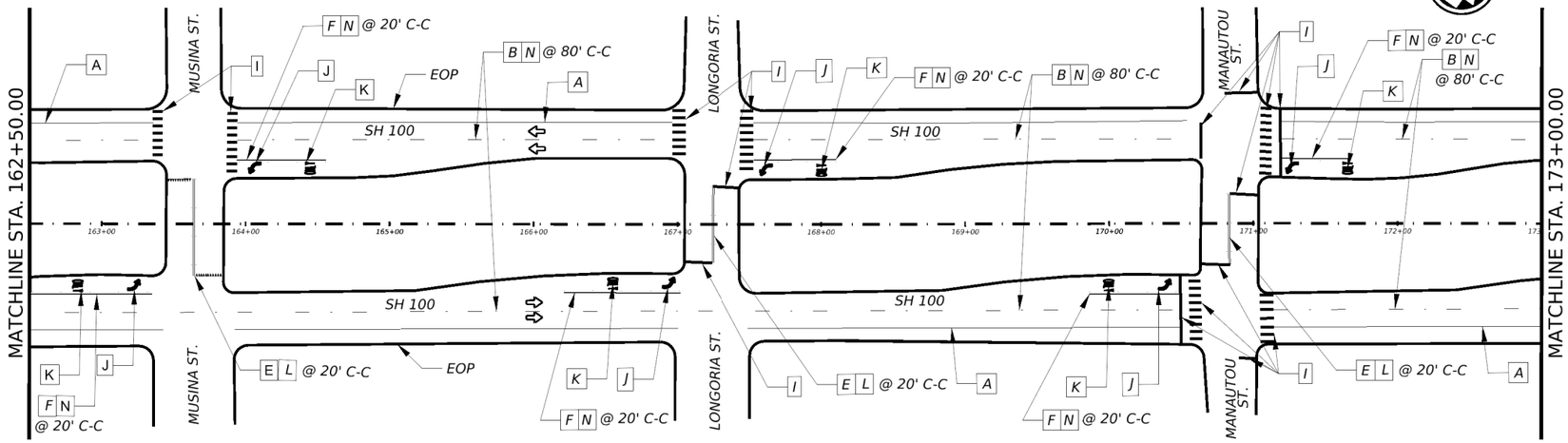
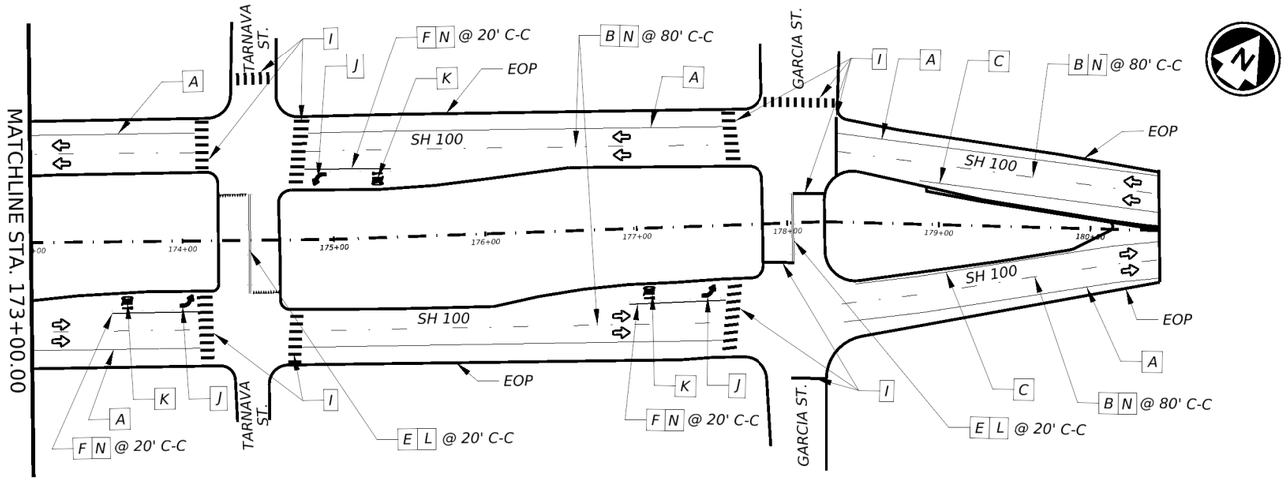
SH 100 LOCATION 2 PAVEMENT MARKING LAYOUT

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		86





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- J - PROP. PREFABRICATED SINGLE DIRECTIONAL ARROW TY-C
- K - PROP. PREFABRICATED WORD TY-C
- L - PROP. PAV MRKR II-A-A
- M - PROP. PAV MRKR TY I-C
- N - PROP. PAV MRKR TY II-C-R
- O - PROP. PREFABRICATED DOUBLE DIRECTIONAL ARROW TY-C

EOP - EXISTING EDGE OF PAVEMENT
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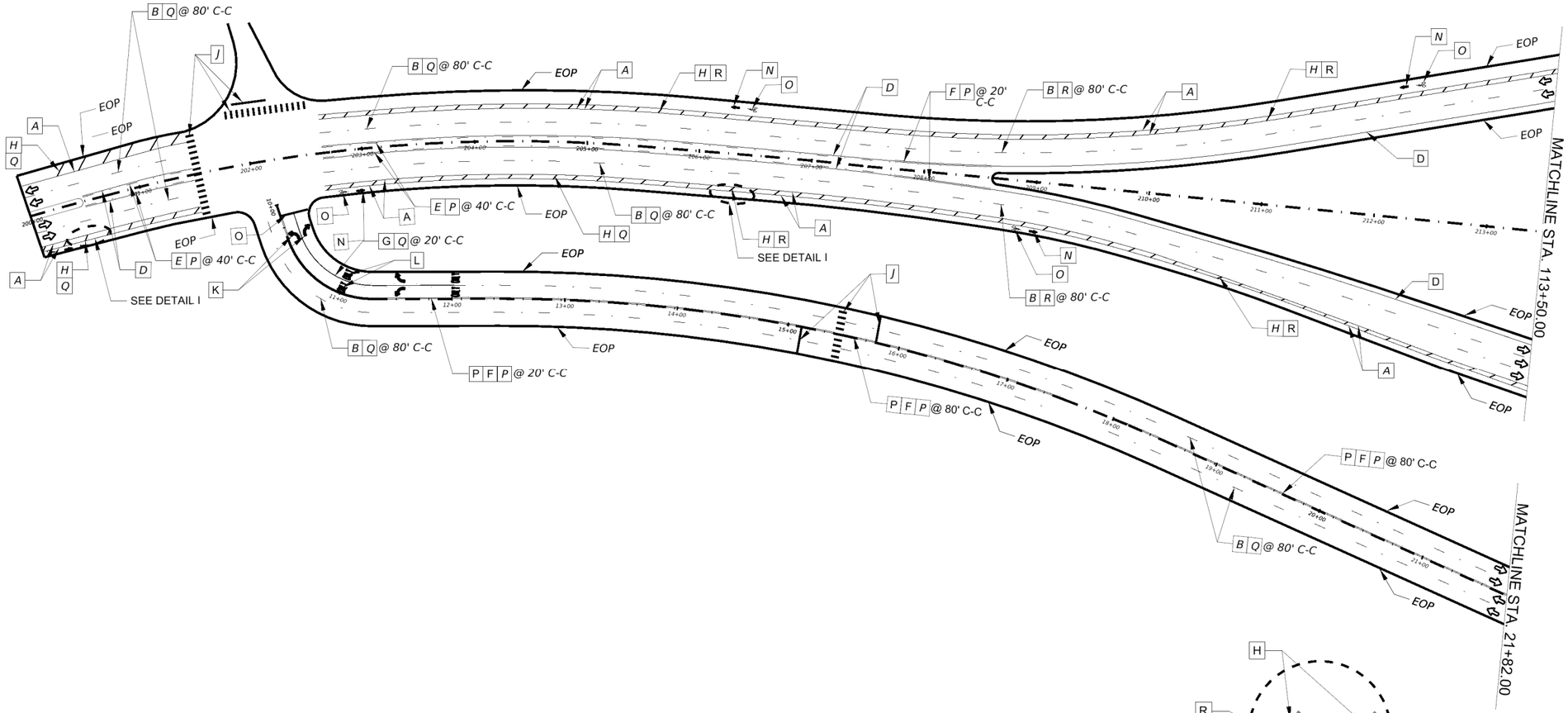
SH 100 LOCATION 2
PAVEMENT MARKING LAYOUT

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		87



LEGEND

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- L - PROP. PREFABRICATED WORD TY-C
- M - PROP. PREFABRICATED DOUBLE DIRECTIONAL ARROW TY-C
- N - REFL PAV MRK TY I(W)(BIKE ARW)
- O - PROP. BIKE SYMBOL
- P - PROP. PAV MRKR II-A-A
- Q - PROP. PAV MRKR TY I-C
- R - PROP. PAV MRKR TY II-C-R
- S - PROP. PREFABRICATED TRIPPLE DIRECTIONAL ARROW TY-C
- T - PROP. 18" YIELD LINES
- U - PROP. SRF DELINEATOR

EOP - EXISTING EDGE OF PAVEMENT
⇨ - TRAFFIC FLOW
PROP. - PROPOSED
SLD - SOLID
BRK - BROKEN
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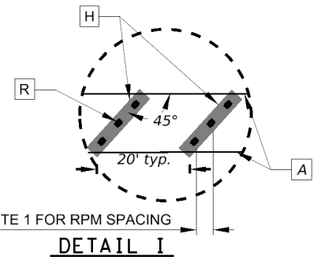
NOTES:
1. BIKE LANE BUFFER HATCHING SHALL CONTAIN THREE TYII-C-R RAISED PAVEMENT MARKERS SPACED EVENLY THROUGHOUT PROJECT LIMITS.



SEE NOTE 1 FOR RPM SPACING

DETAIL I

STATE OF TEXAS
EUGENE PALACIOS
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LICENSED PROFESSIONAL ENGINEER

11/6/2023

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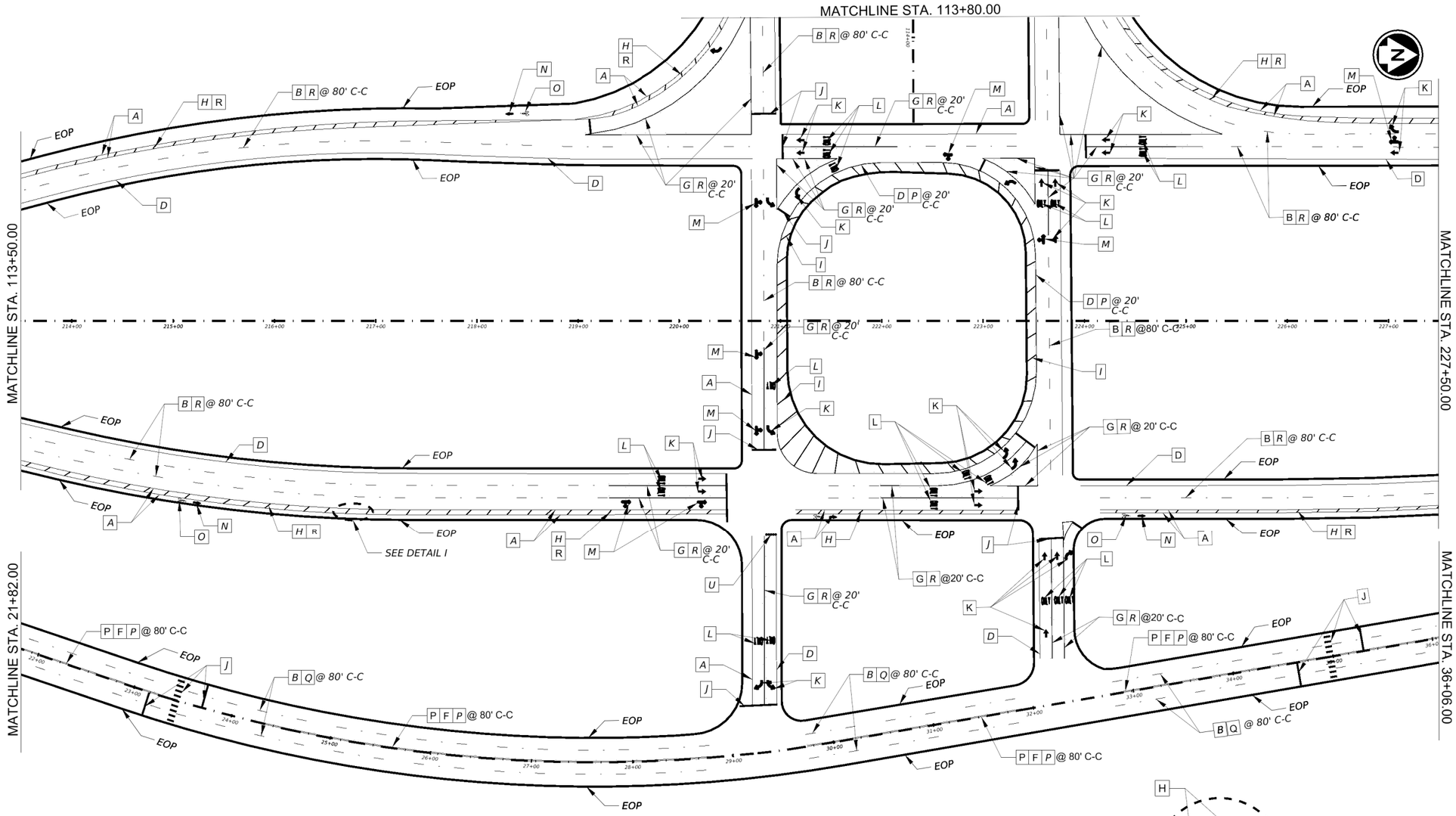
PR 100
PAVEMENT MARKING LAYOUT

SHEET 1 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		88



LEGEND

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- N - REFL PAV MRK TY I(W)(BIKE ARW)
- O - PROP. BIKE SYMBOL
- P - PROP. PAV MRKR II-A-A
- Q - PROP. PAV MRKR TY I-C
- R - PROP. PAV MRKR TY II-C-R
- S - PROP. PREFABRICATED TRIPPLE DIRECTIONAL ARROW TY-C
- T - PROP. 18" YIELD LINES
- U - PROP. SRF DELINEATOR

EOP - EXISTING EDGE OF PAVEMENT
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NOTES:
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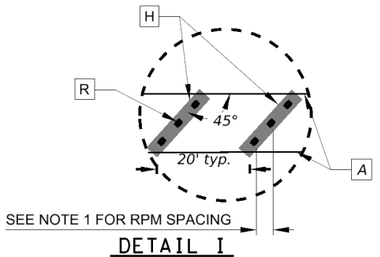

DETAIL I

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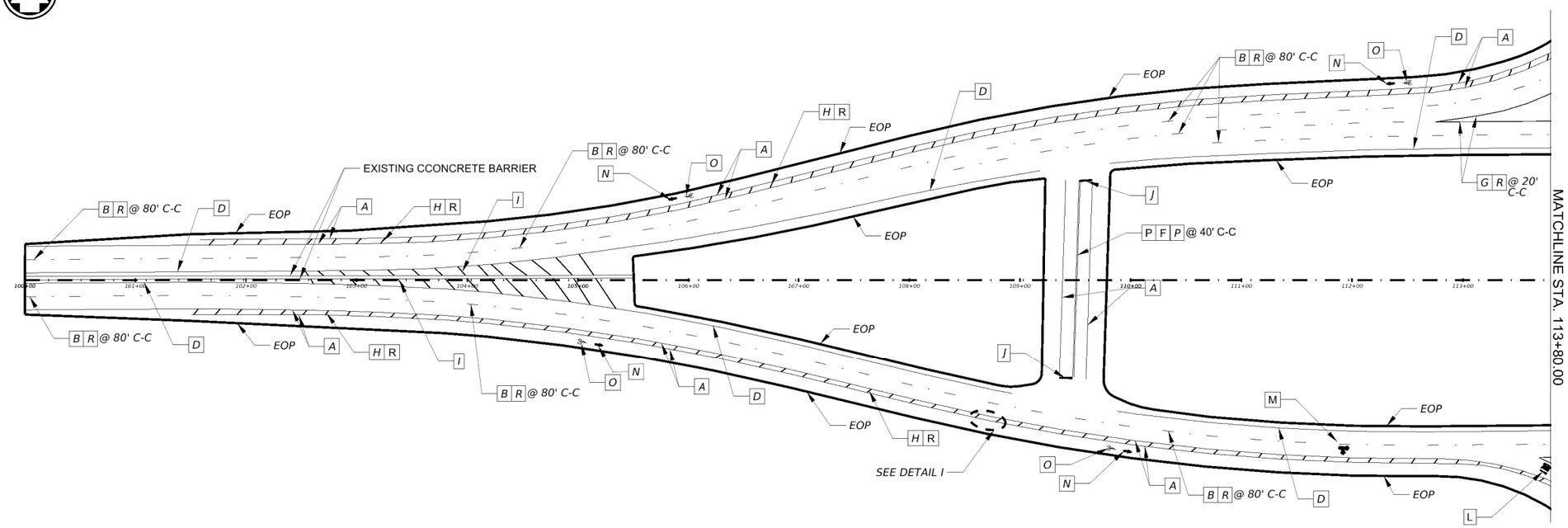
PR 100
PAVEMENT MARKING LAYOUT

SHEET 2 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		89



LEGEND

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- N - REFL PAV MRK TY I(W)(BIKE ARW)
- O - PROP. BIKE SYMBOL
- P - PROP. PAV MRKR II-A-A
- Q - PROP. PAV MRKR TY I-C
- R - PROP. PAV MRKR TY II-C-R
- S - PROP. PREFABRICATED TRIPPLE DIRECTIONAL ARROW TY-C
- T - PROP. 18" YIELD LINES
- U - PROP. SRF DELINEATOR

EOP - EXISTING EDGE OF PAVEMENT
⇨ - TRAFFIC FLOW
PROP. - PROPOSED
SLD - SOLID
BRK - BROKEN
PAV - PAVEMENT
DBL - DOUBLE

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED PROFESSIONAL ENGINEER
11/6/2023

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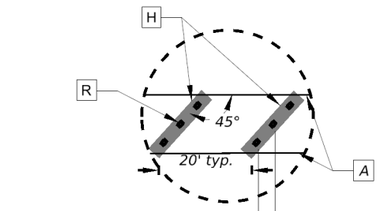
NOTES:
1. BIKE LANE BUFFER HATCHING SHALL CONTAIN THREE TYII-C-R RAISED PAVEMENT MARKERS SPACED EVENLY THROUGHOUT PROJECT LIMITS.



SEE NOTE 1 FOR RPM SPACING

DETAIL I

Texas Department of Transportation

PR 100
PAVEMENT MARKING LAYOUT

SHEET 3 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		90

LEGEND

- A - PROP. 6" SLD WHITE LINE
- B - PROP. 6" BKN WHITE LINE
- C - PROP. 6" DOT WHITE LINE
- D - PROP. 6" SLD YELLOW LINE
- E - PROP. 6" BRK YELLOW LINE
- F - PROP. 6" DBL YELLOW LINE
- G - PROP. 8" SLD WHITE LINE
- H - PROP. 12" SLD WHITE LINE
- I - PROP. 12" SLD YELLOW LINE
- J - PROP. 24" SLD WHITE LINE
- K - PROP. PREFABRICATED SINGLE DIRECTIONAL ARROW TY-C
- L - PROP. PREFABRICATED WORD TY-C
- M - PROP. PREFABRICATED DOUBLE DIRECTIONAL ARROW TY-C
- N - REFL PAV MRK TY I(W)(BIKE ARW)
- O - PROP. BIKE SYMBOL
- P - PROP. PAV MRKR II-A-A
- Q - PROP. PAV MRKR TY I-C
- R - PROP. PAV MRKR TY II-C-R
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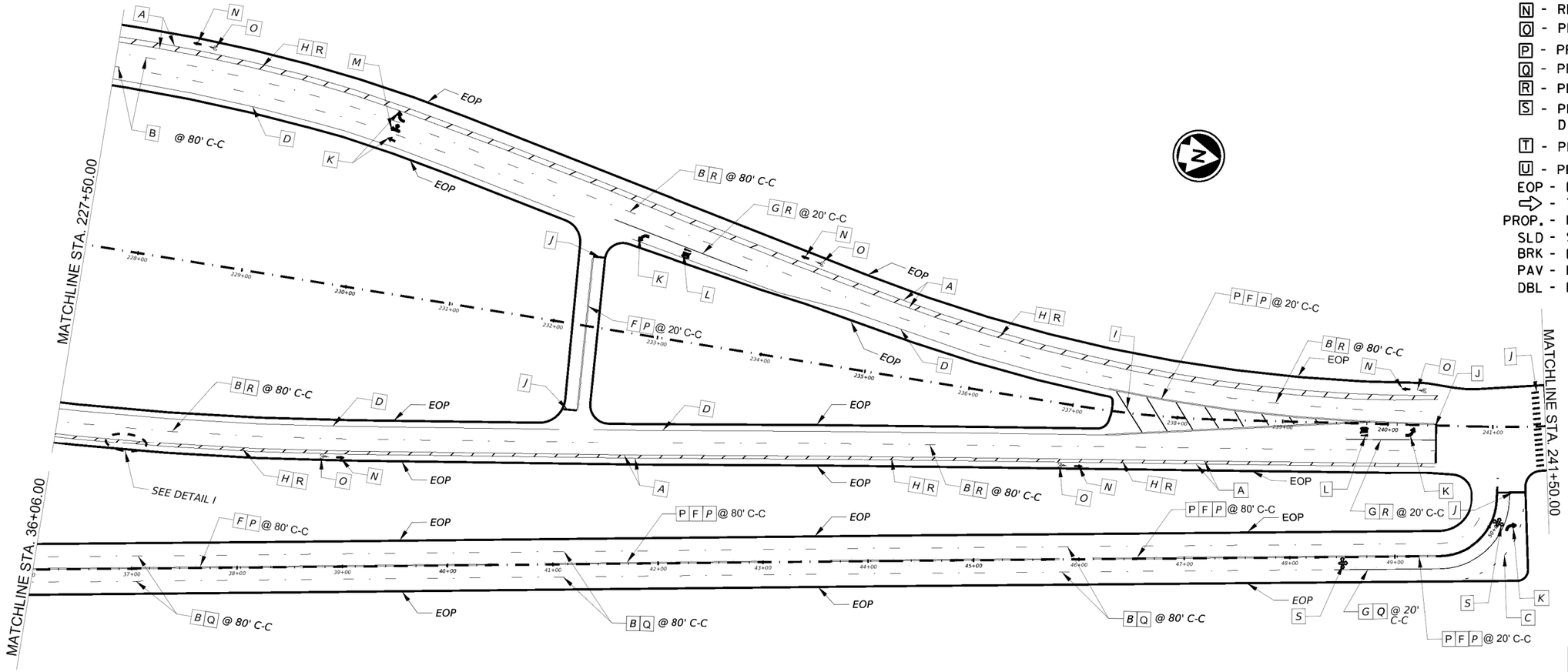

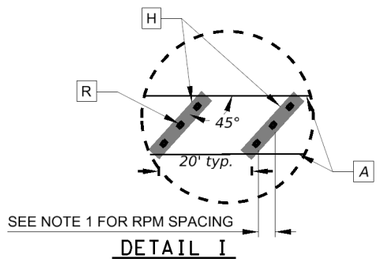

DETAIL I

NOTES:
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STATE OF TEXAS
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11/6/2023

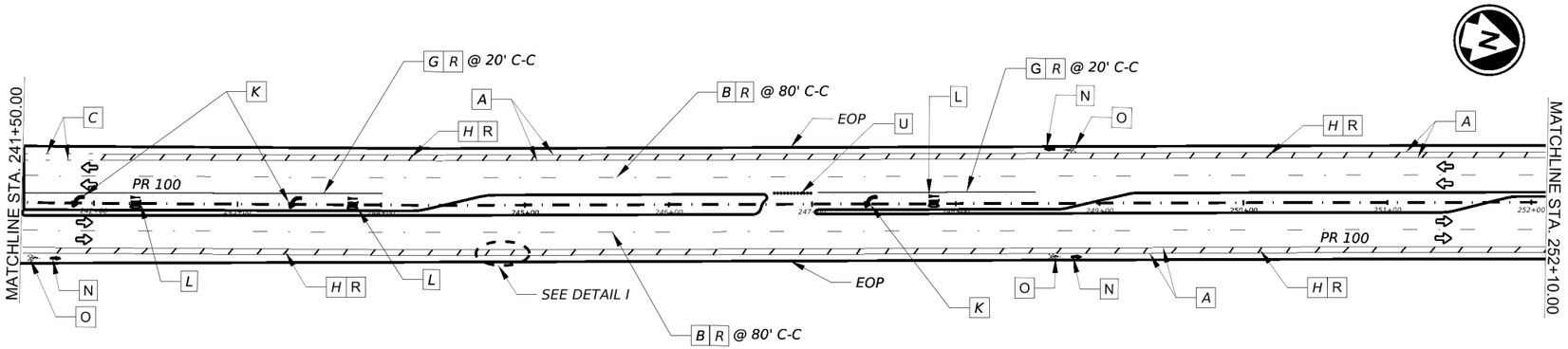
N.T.S.

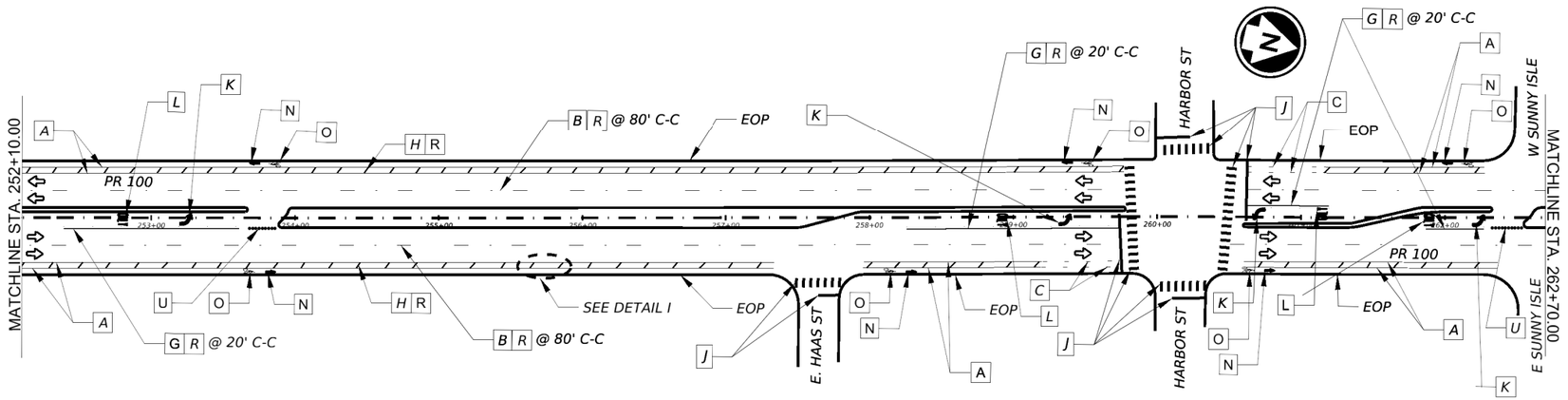
Texas Department of Transportation

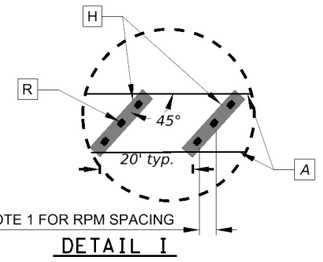
PR 100
PAVEMENT MARKING LAYOUT

SHEET 4 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		91







DETAIL I

LEGEND

- A - PROP. 6" SLD WHITE LINE
- B - PROP. 6" BKN WHITE LINE
- C - PROP. 6" DOT WHITE LINE
- D - PROP. 6" SLD YELLOW LINE
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EOP - EXISTING EDGE OF PAVEMENT
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11/6/2023

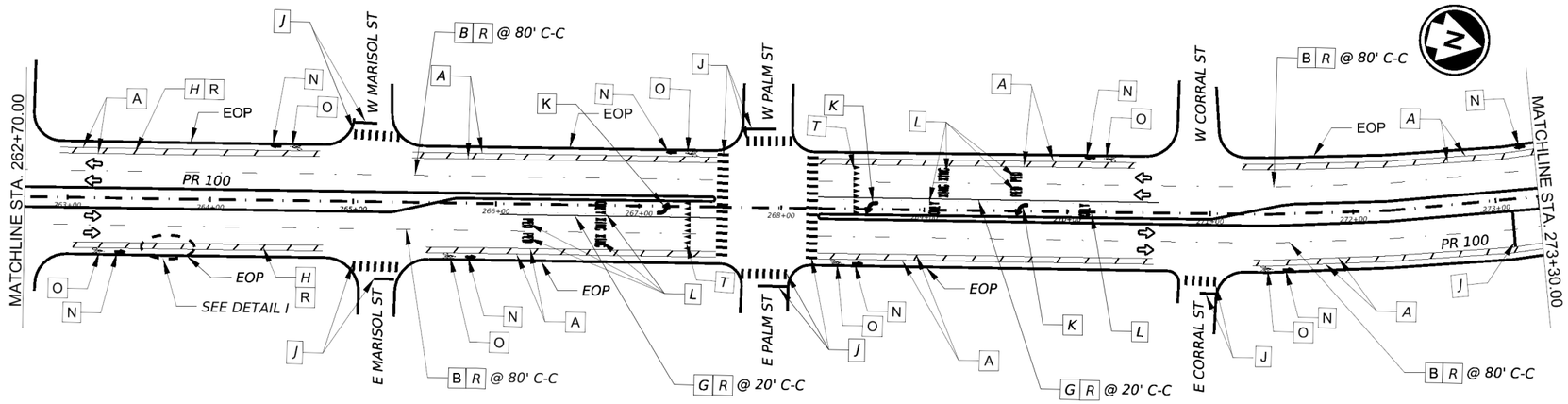
N.T.S.

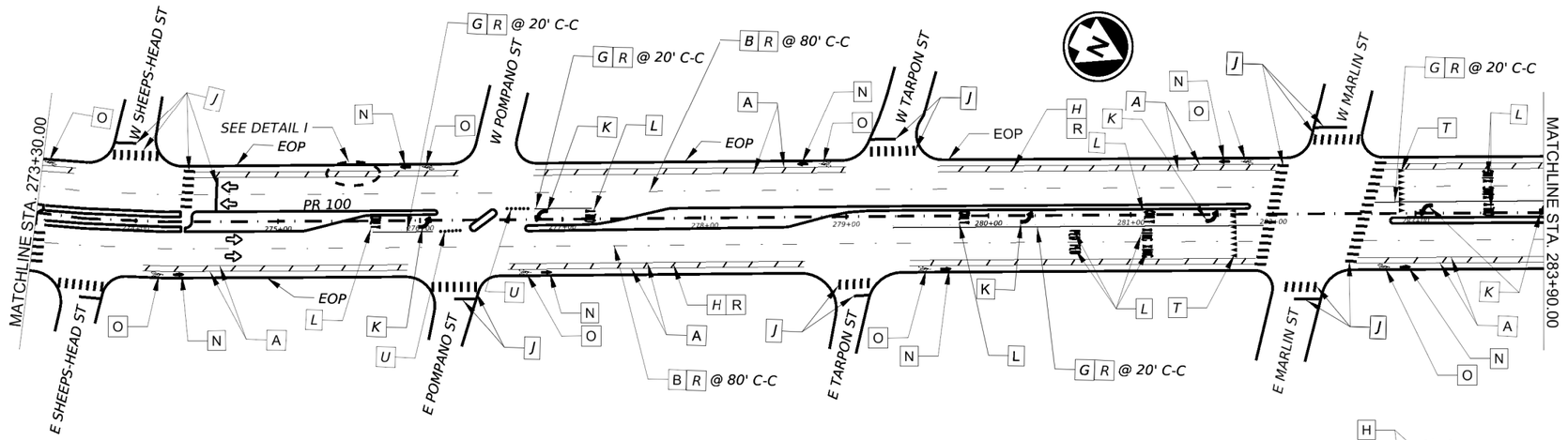
Texas Department of Transportation

PR 100
PAVEMENT MARKING LAYOUT

SHEET 5 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		92





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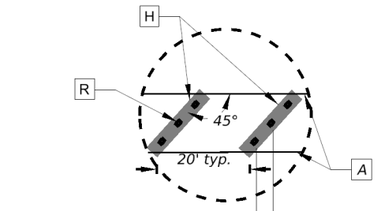


DETAIL I

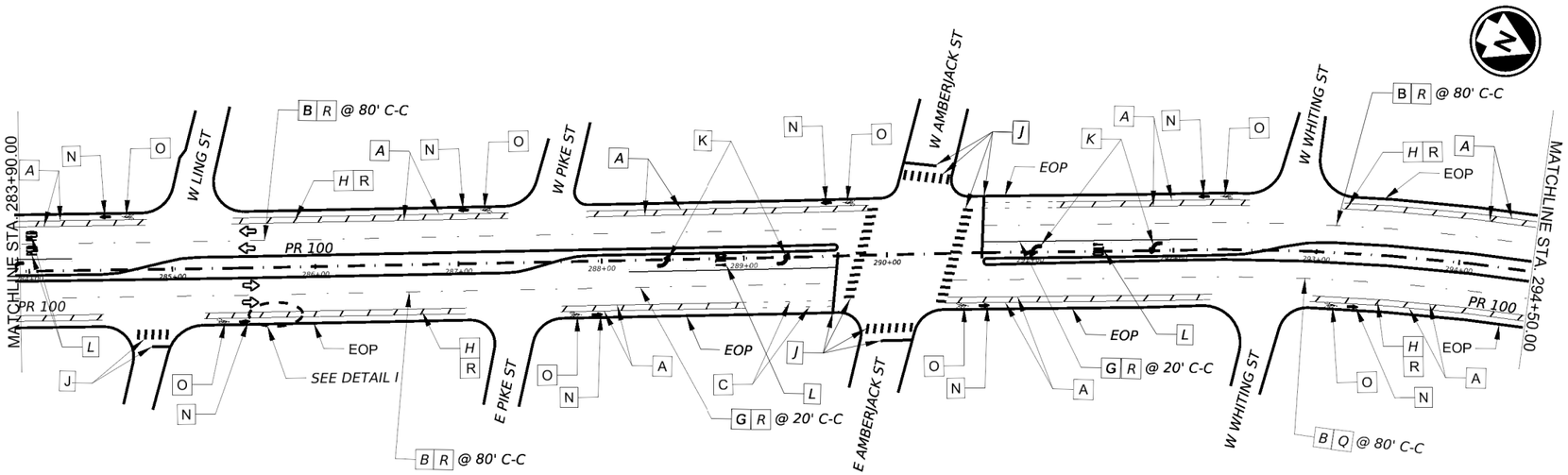
N.T.S.

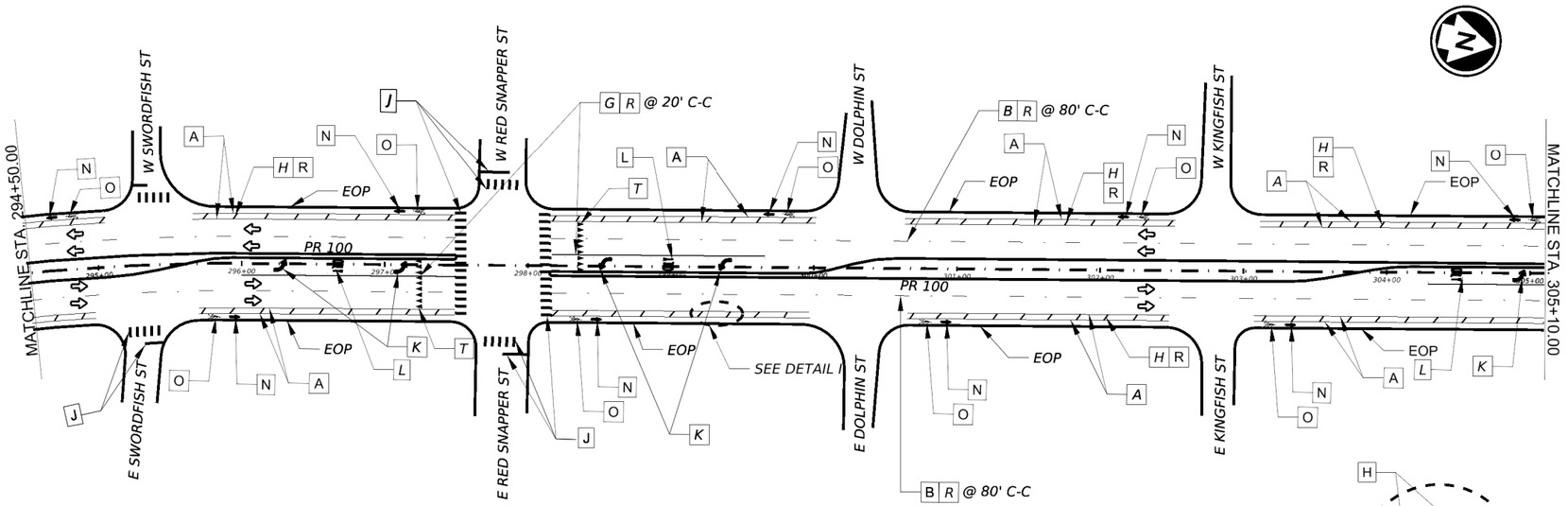
Texas Department of Transportation

PR 100
PAVEMENT MARKING LAYOUT

SHEET 6 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		93





LEGEND

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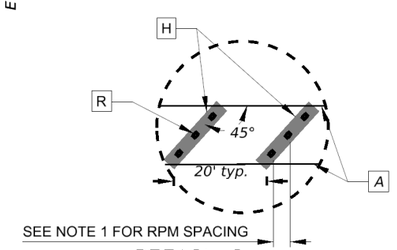

DETAIL I

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LICENSED PROFESSIONAL ENGINEER
11/6/2023

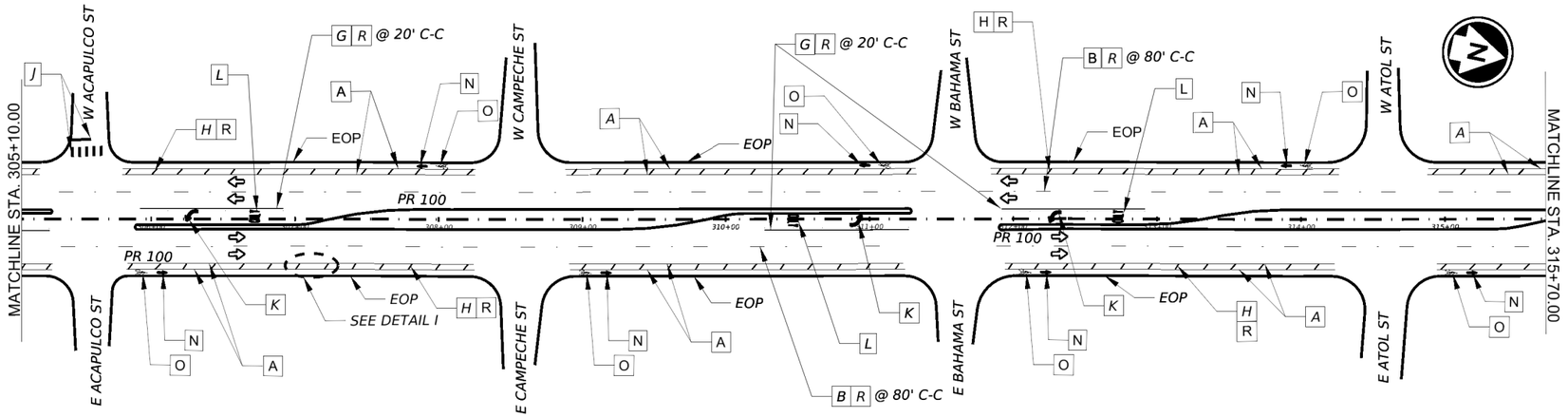
N.T.S.

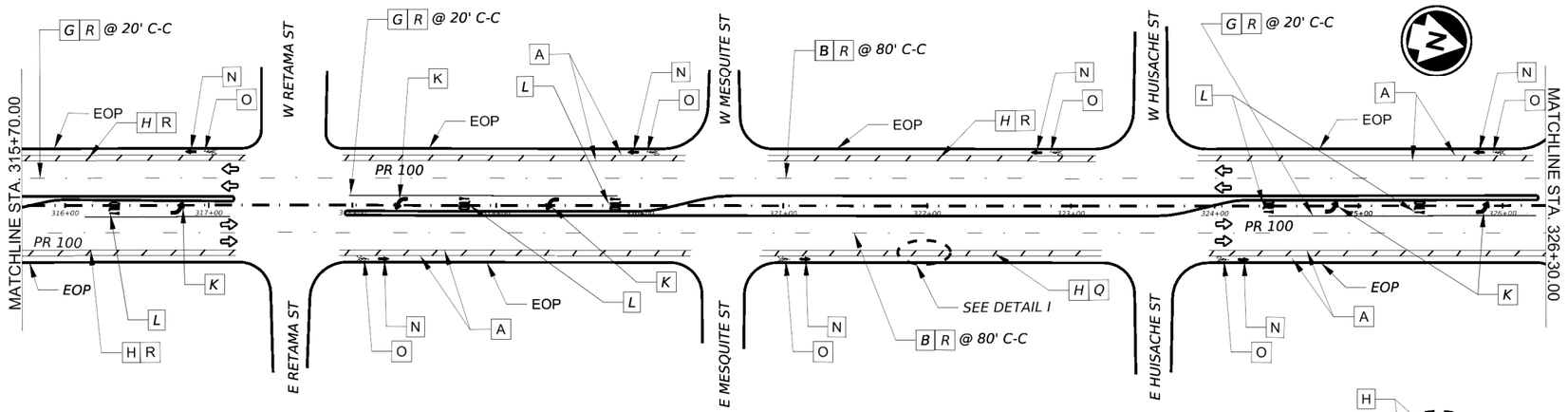
Texas Department of Transportation

PR 100
PAVEMENT MARKING LAYOUT

SHEET 7 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		94





LEGEND

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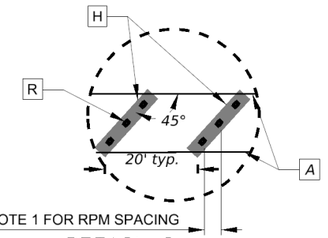

SEE NOTE 1 FOR RPM SPACING

DETAIL I

STATE OF TEXAS
EUGENE PALACIOS
105110
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PROFESSIONAL ENGINEER

11/6/2023

Eugene Palacios

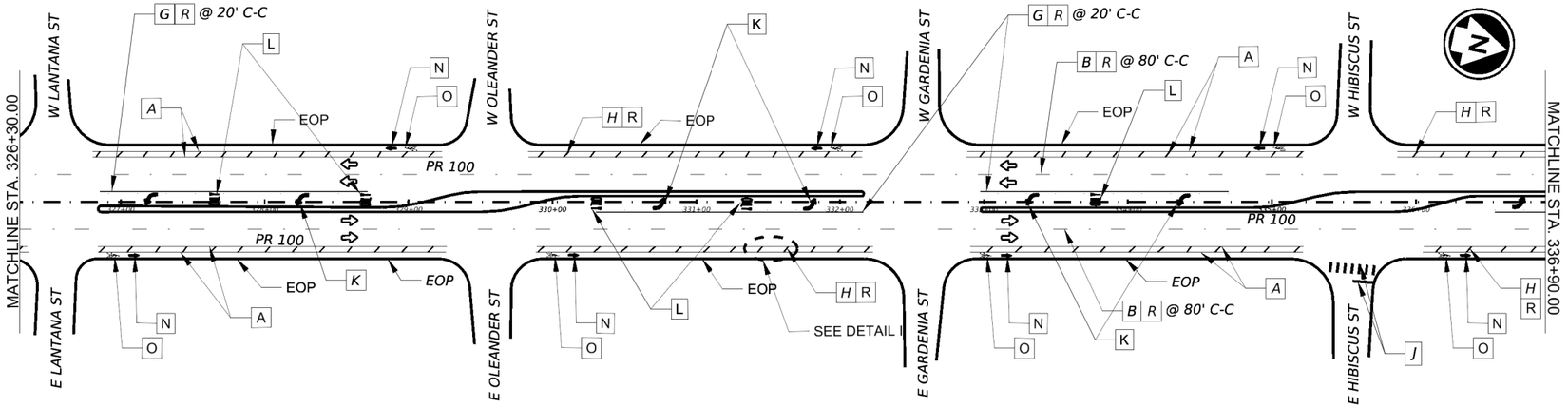
N.T.S.

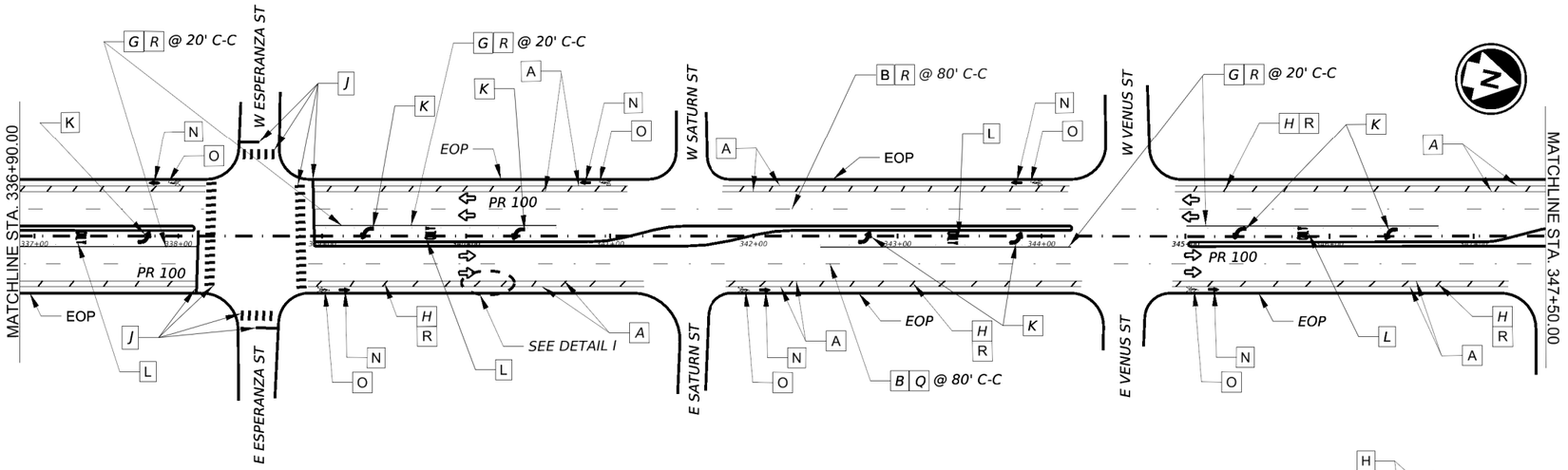
Texas Department of Transportation

PR 100
PAVEMENT MARKING LAYOUT

SHEET 8 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		95





LEGEND

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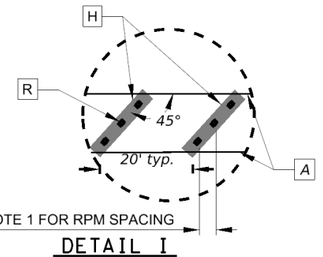

DETAIL I

STATE OF TEXAS
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11/6/2023

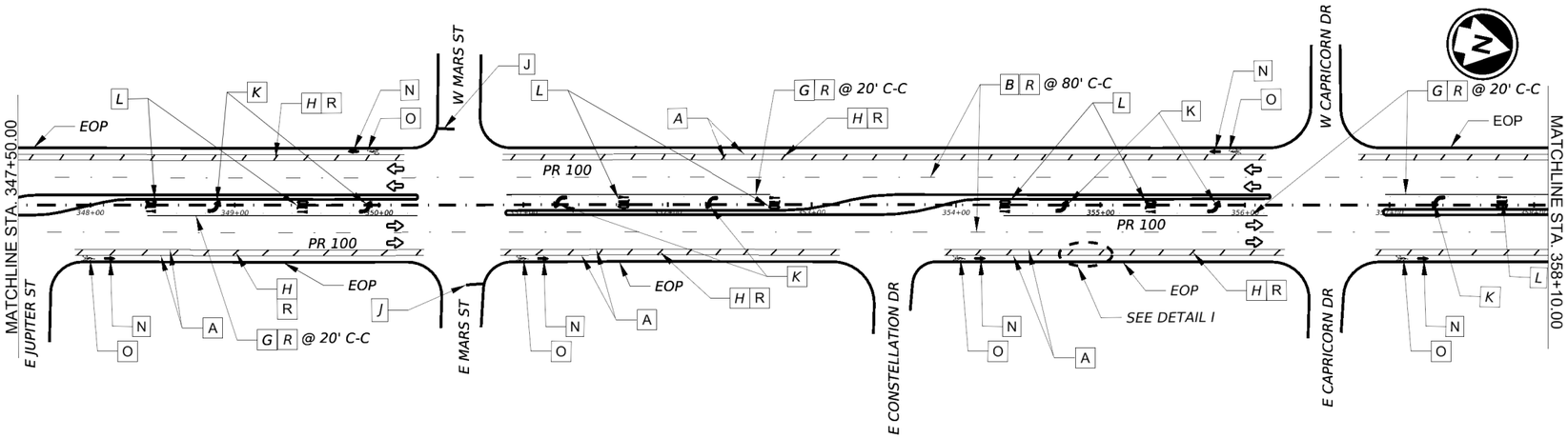
N.T.S.

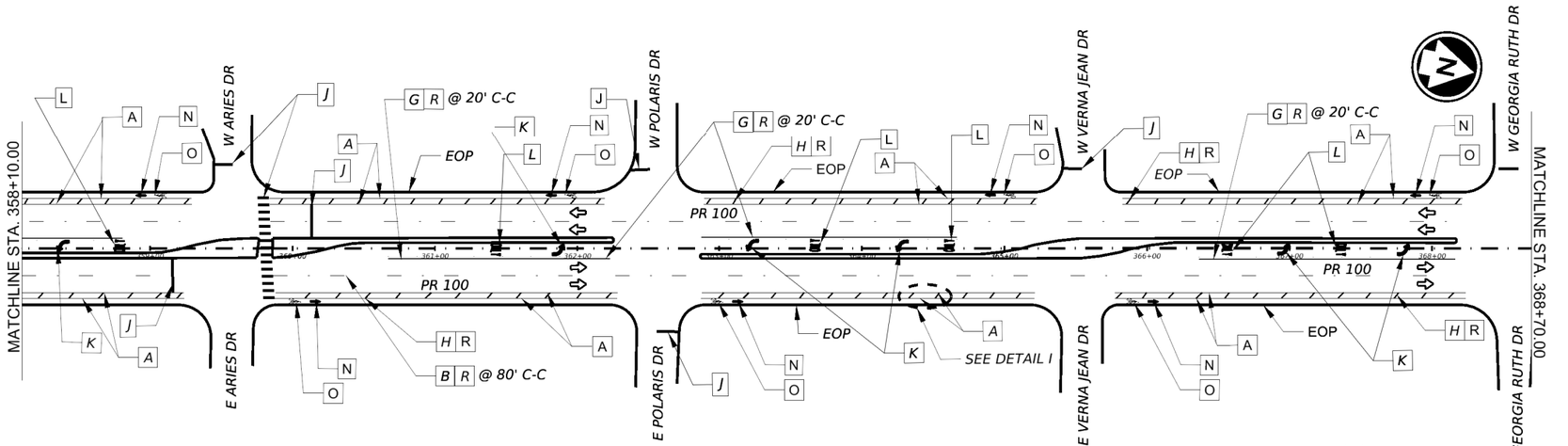
Texas Department of Transportation

PR 100
PAVEMENT MARKING LAYOUT

SHEET 9 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		96





LEGEND

- A - PROP. 6" SLD WHITE LINE
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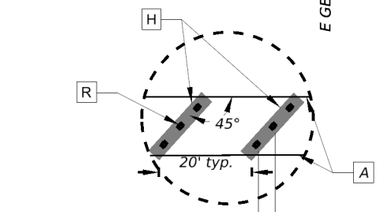

DETAIL I

STATE OF TEXAS
EUGENE PALACIOS
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11/6/2023

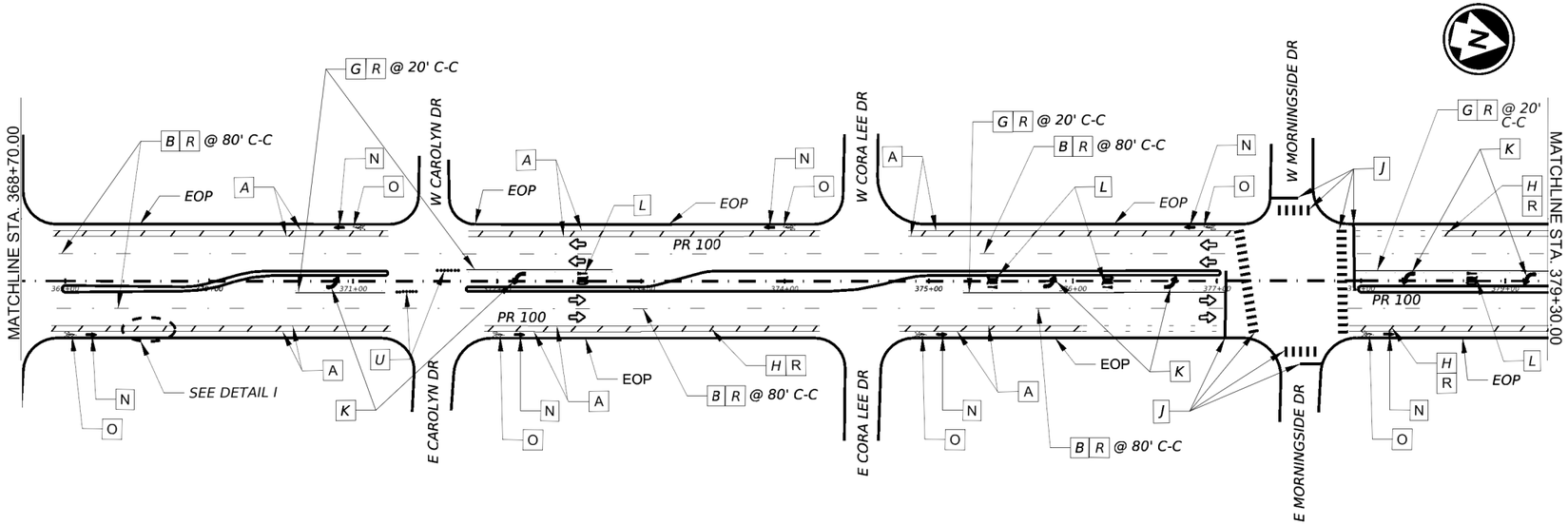
N.T.S.

Texas Department of Transportation

PR 100
PAVEMENT MARKING LAYOUT

SHEET10 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		97



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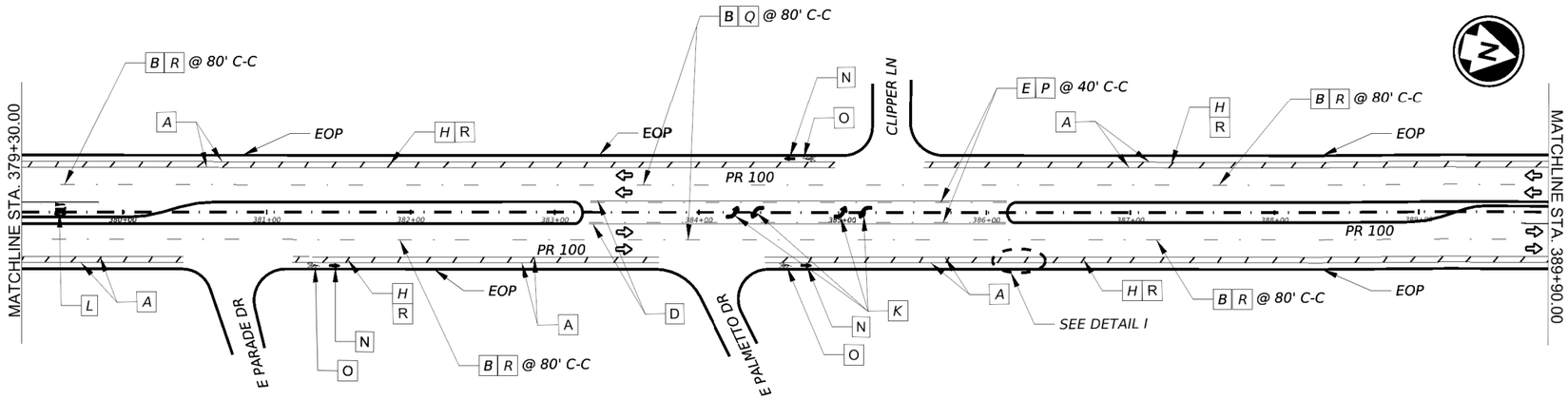

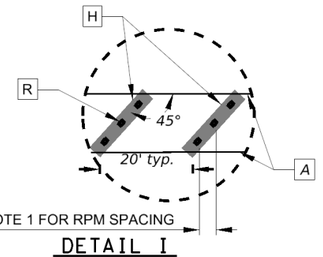

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STATE OF TEXAS
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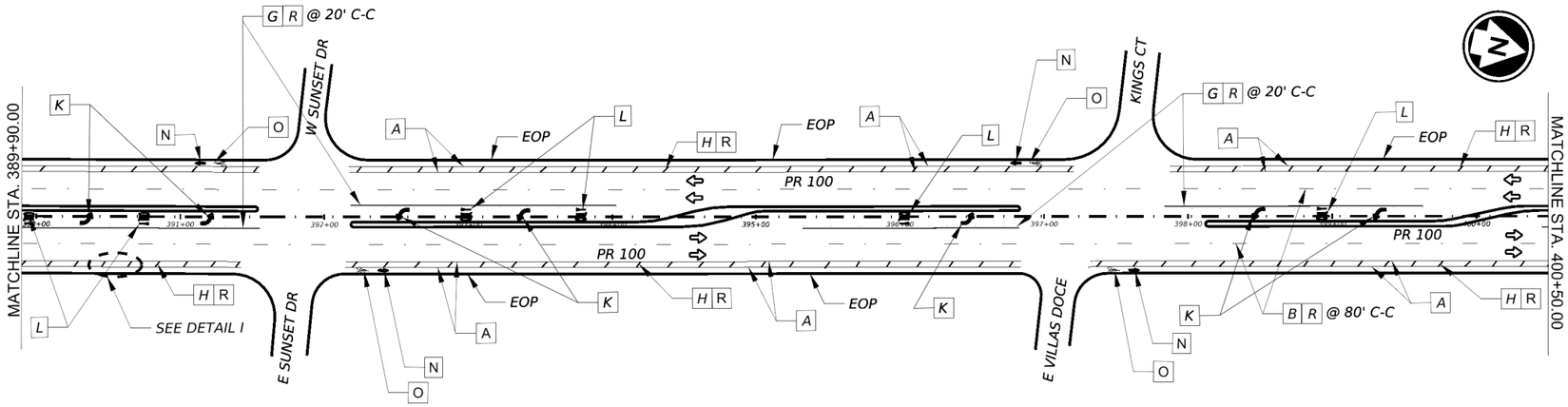
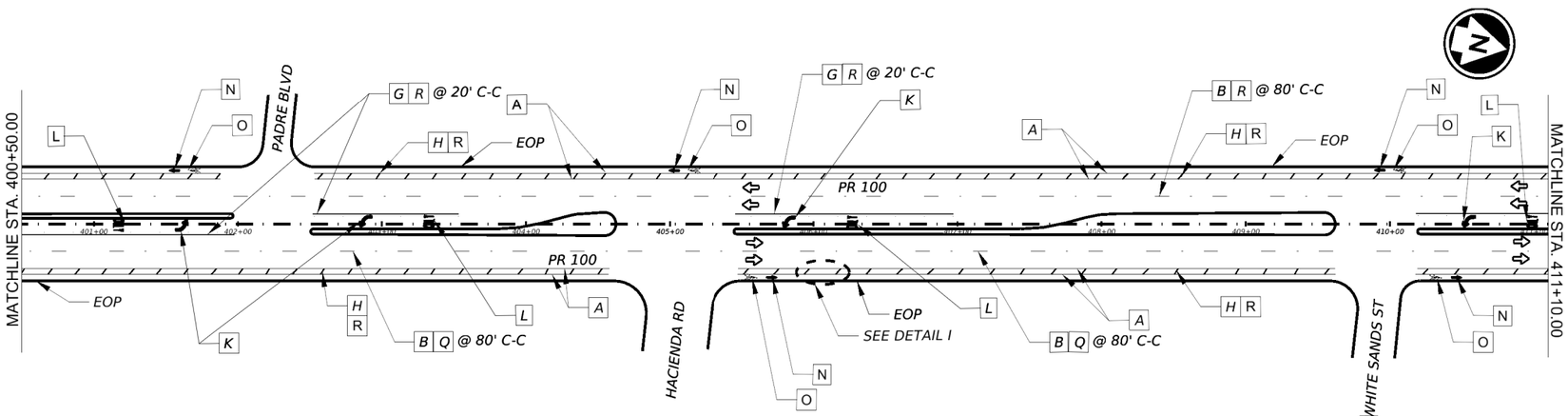
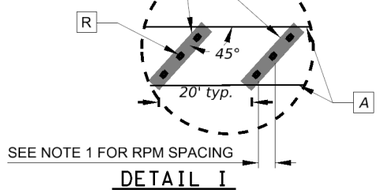
PR 100
PAVEMENT MARKING LAYOUT

SHEET 11 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		98







DETAIL I

LEGEND

- A - PROP. 6" SLD WHITE LINE
- B - PROP. 6" BKN WHITE LINE
- C - PROP. 6" DOT WHITE LINE
- D - PROP. 6" SLD YELLOW LINE
- E - PROP. 6" BRK YELLOW LINE
- F - PROP. 6" DBL YELLOW LINE
- G - PROP. 8" SLD WHITE LINE
- H - PROP. 12" SLD WHITE LINE
- I - PROP. 12" SLD YELLOW LINE
- J - PROP. 24" SLD WHITE LINE
- K - PROP. PREFABRICATED SINGLE DIRECTIONAL ARROW TY-C
- L - PROP. PREFABRICATED WORD TY-C
- M - PROP. PREFABRICATED DOUBLE DIRECTIONAL ARROW TY-C
- N - REFL PAV MRK TY I(W)(BIKE ARW)
- O - PROP. BIKE SYMBOL
- P - PROP. PAV MRKR II-A-A
- Q - PROP. PAV MRKR TY I-C
- R - PROP. PAV MRKR TY II-C-R
- S - PROP. PREFABRICATED TRIPPLE DIRECTIONAL ARROW TY-C
- T - PROP. 18" YIELD LINES
- U - PROP. SRF DELINEATOR

EOP - EXISTING EDGE OF PAVEMENT
⇨ - TRAFFIC FLOW
PROP. - PROPOSED
SLD - SOLID
BRK - BROKEN
PAV - PAVEMENT
DBL - DOUBLE

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED PROFESSIONAL ENGINEER
11/6/2023

NOTES:
1. BIKE LANE BUFFER HATCHING SHALL CONTAIN THREE TYII-C-R RAISED PAVEMENT MARKERS SPACED EVENLY THROUGHOUT PROJECT LIMITS.

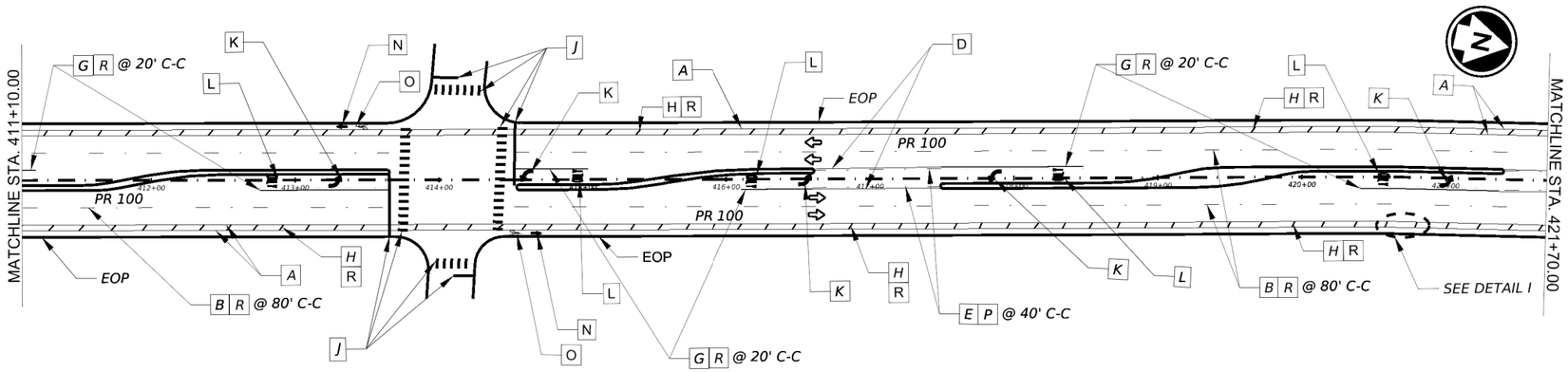
N.T.S.

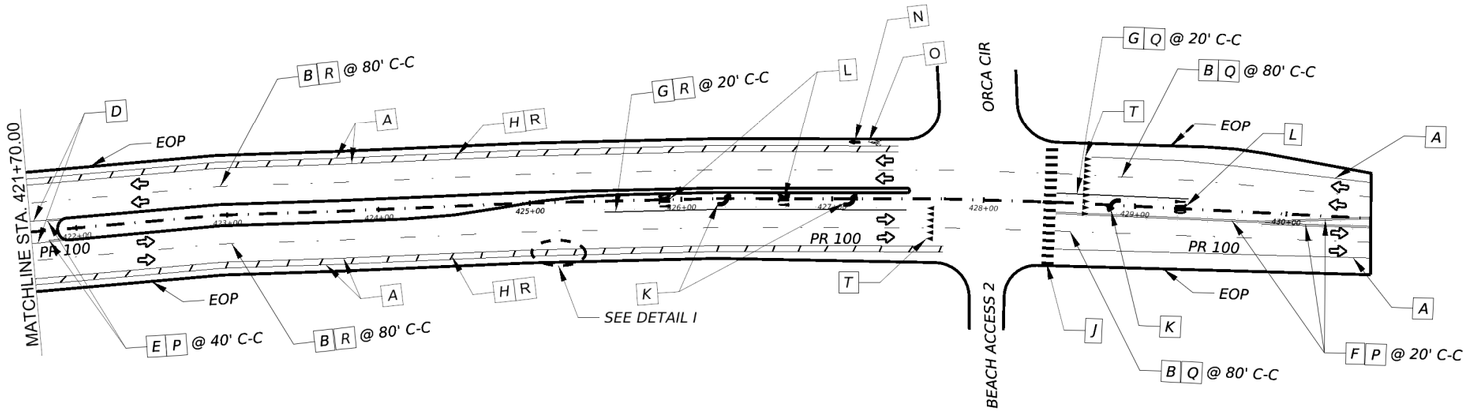
Texas Department of Transportation

PR 100
PAVEMENT MARKING LAYOUT

SHEET12 OF 13

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		99





LEGEND

- A - PROP. 6" SLD WHITE LINE
- B - PROP. 6" BKN WHITE LINE
- C - PROP. 6" DOT WHITE LINE
- D - PROP. 6" SLD YELLOW LINE
- E - PROP. 6" BRK YELLOW LINE
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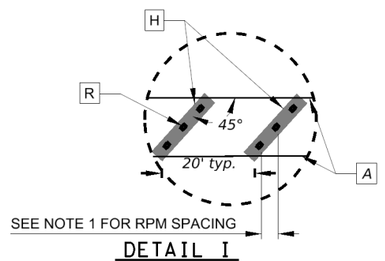
- H - PROP. 12" SLD WHITE LINE
- I - PROP. 12" SLD YELLOW LINE
- J - PROP. 24" SLD WHITE LINE
- K - PROP. PREFABRICATED SINGLE DIRECTIONAL ARROW TY-C
- L - PROP. PREFABRICATED WORD TY-C
- M - PROP. PREFABRICATED DOUBLE DIRECTIONAL ARROW TY-C
- N - REFL PAV MRK TY I(W)(BIKE ARW)
- O - PROP. BIKE SYMBOL
- P - PROP. PAV MRKR II-A-A
- Q - PROP. PAV MRKR TY I-C
- R - PROP. PAV MRKR TY II-C-R
- S - PROP. PREFABRICATED TRIPPLE DIRECTIONAL ARROW TY-C
- T - PROP. 18" YIELD LINES
- U - PROP. SRF DELINEATOR

EOP - EXISTING EDGE OF PAVEMENT
⇨ - TRAFFIC FLOW
PROP. - PROPOSED
SLD - SOLID
BRK - BROKEN
PAV - PAVEMENT
DBL - DOUBLE



DETAIL I

NOTES:
1. BIKE LANE BUFFER HATCHING SHALL CONTAIN THREE TYII-C-R RAISED PAVEMENT MARKERS SPACED EVENLY THROUGHOUT PROJECT LIMITS.

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STATE OF TEXAS
11/6/2023

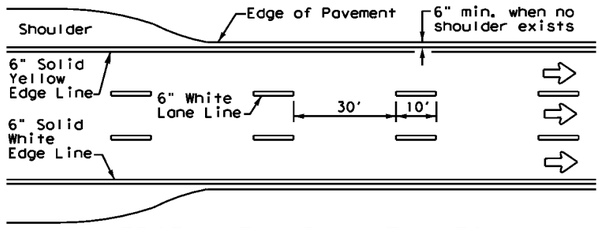
N.T.S.

Texas Department of Transportation

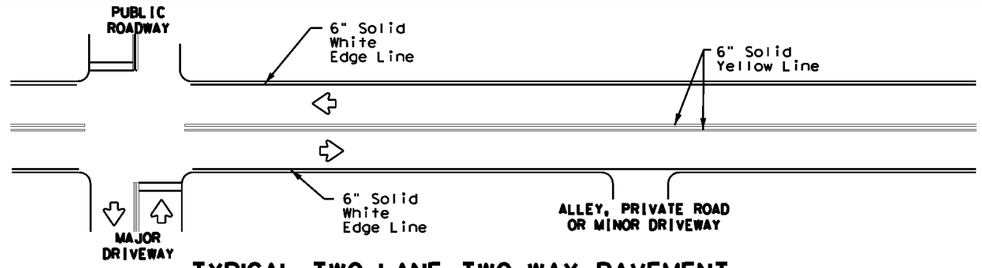
PR 100
PAVEMENT MARKING LAYOUT

SHEET13 OF 13

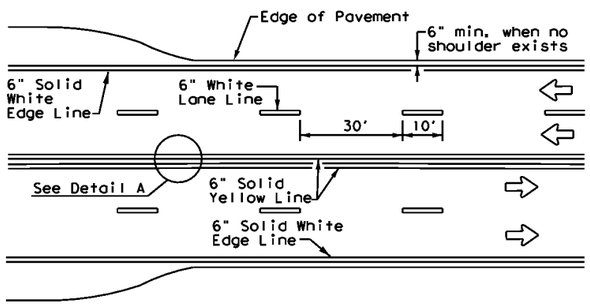
CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		100

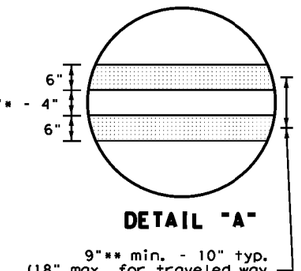


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

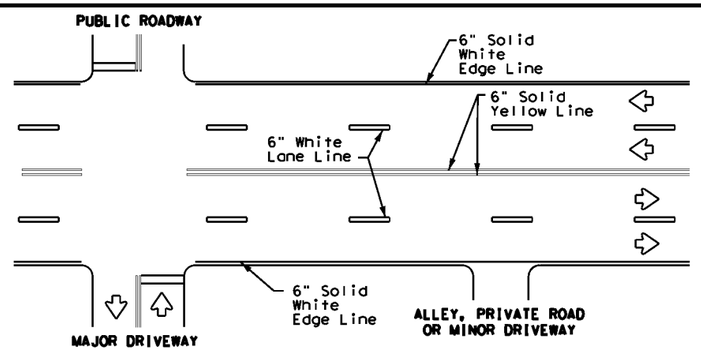




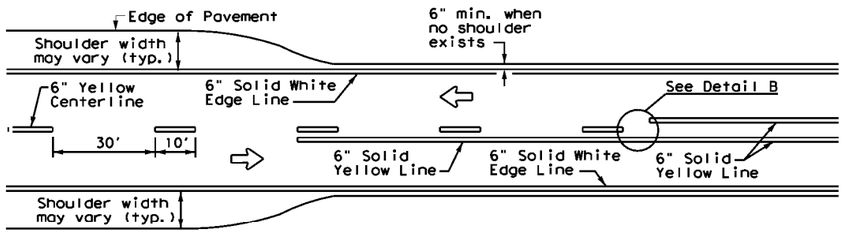
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

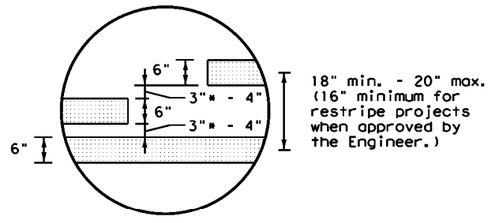
** 8" minimum for restripe projects when approved by the Engineer.



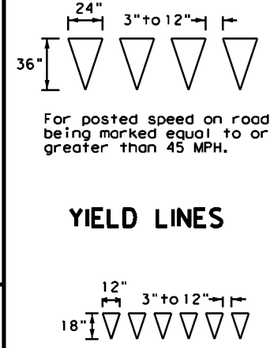
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

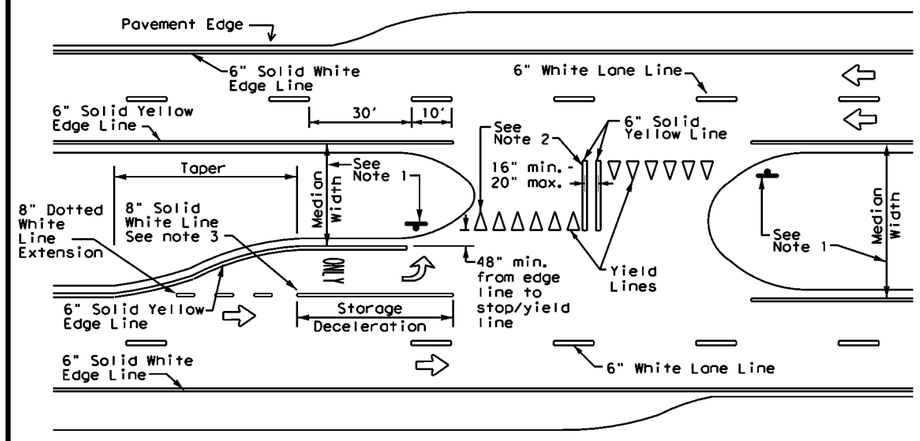


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



* 2" minimum for restripe projects when approved by the Engineer.





FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

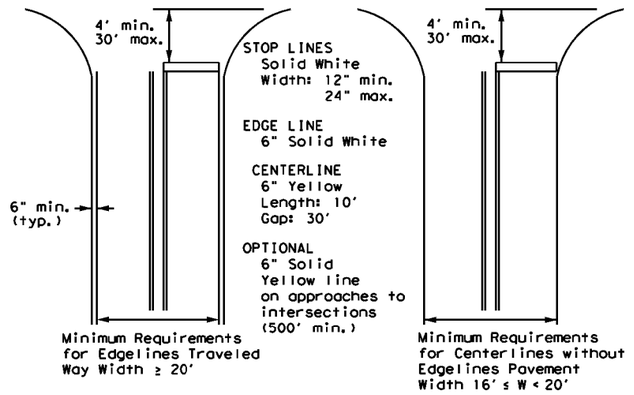
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling 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.

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

Texas Department of Transportation

Traffic Safety Division Standard

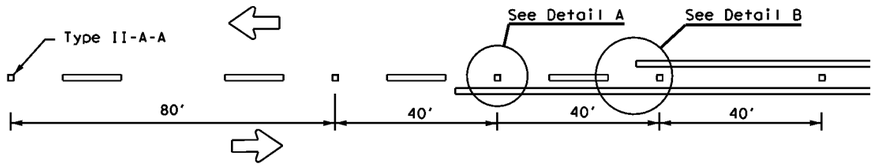
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

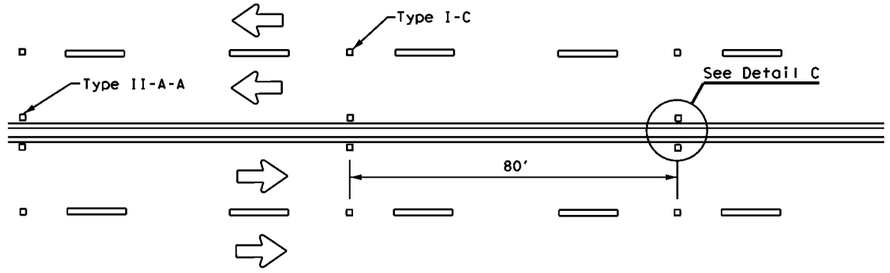
FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20 8-95 3-03 12-22 5-00 2-12	1137	02	042,ETC.	SL 499,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		101

22A

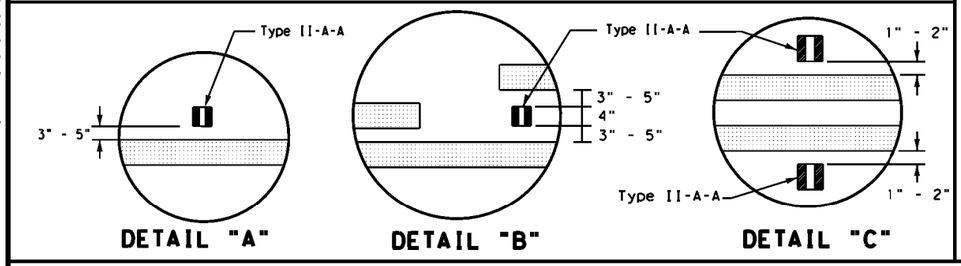
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

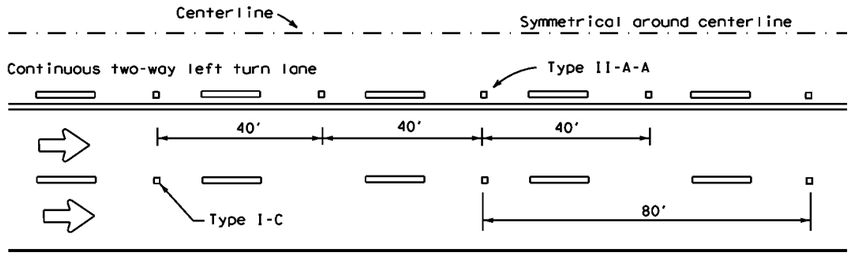


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

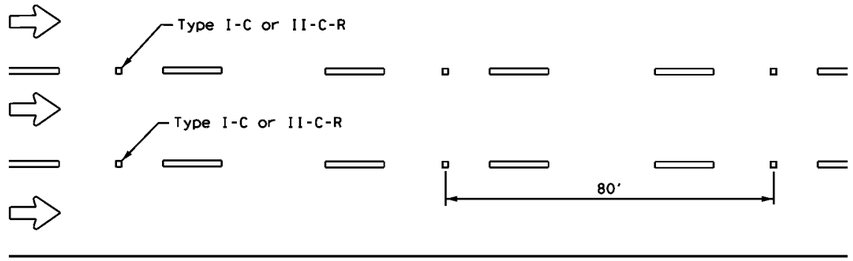


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



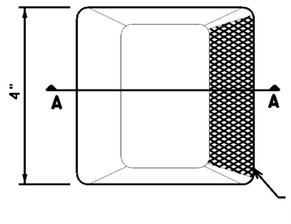
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

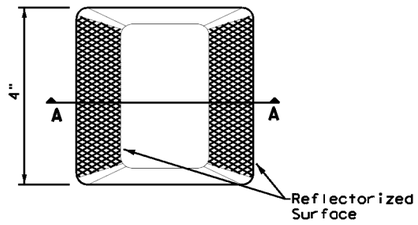
See Note 3.

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

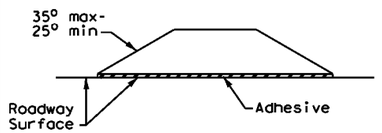
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

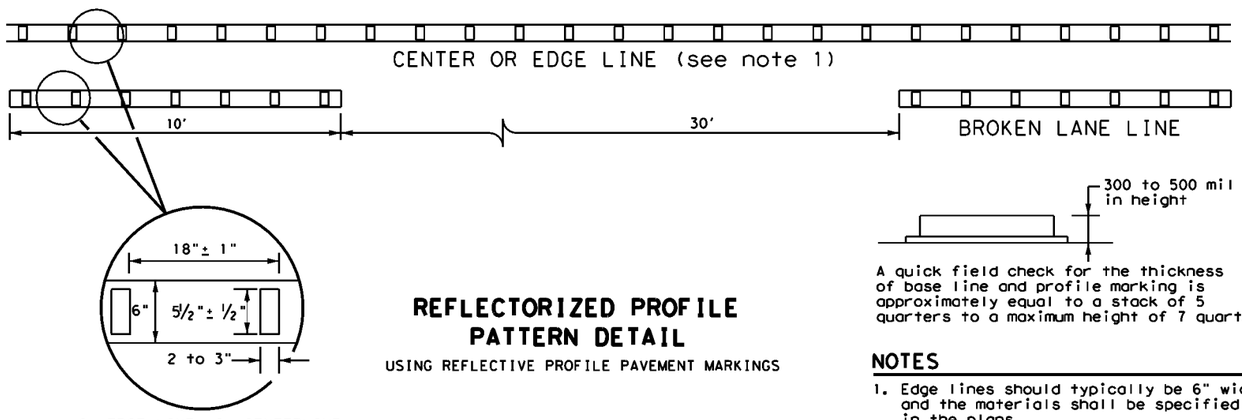


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



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 RELECTORIZED 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	1137	02	042,ETC.	SL 499,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		102

22B

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DATE:
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DATE:
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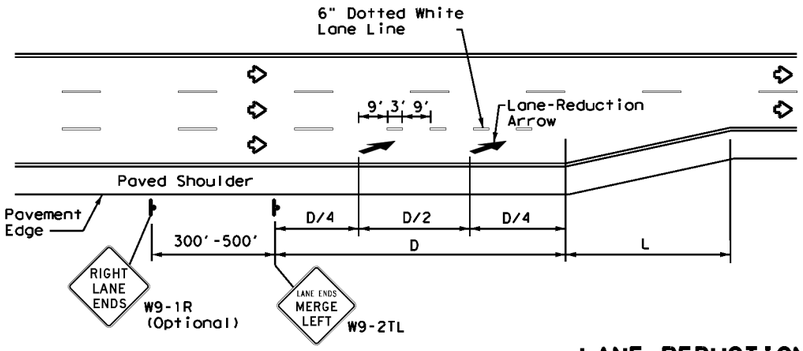
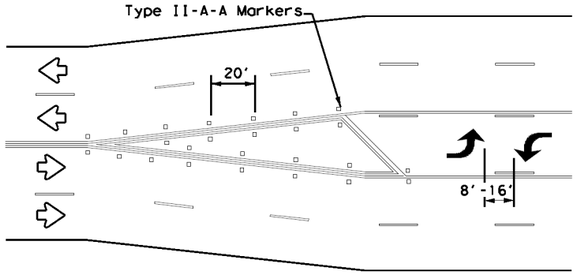


LANE REDUCTION

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	



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.

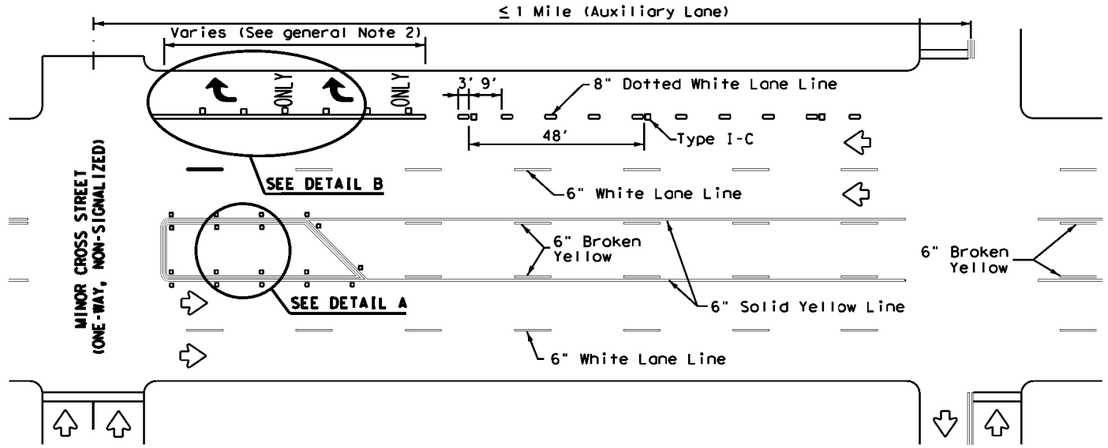
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

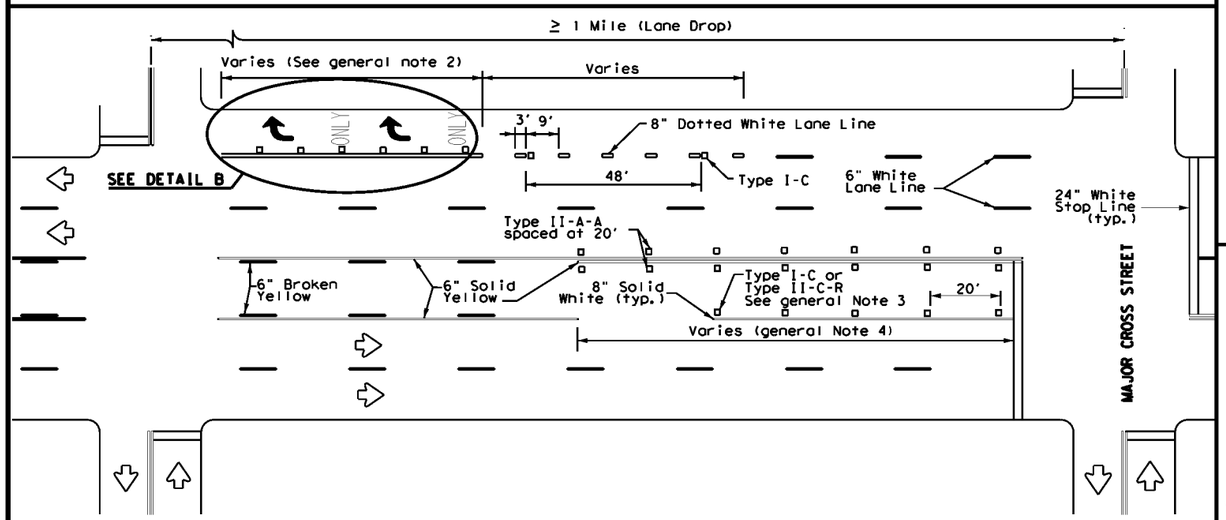
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn 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

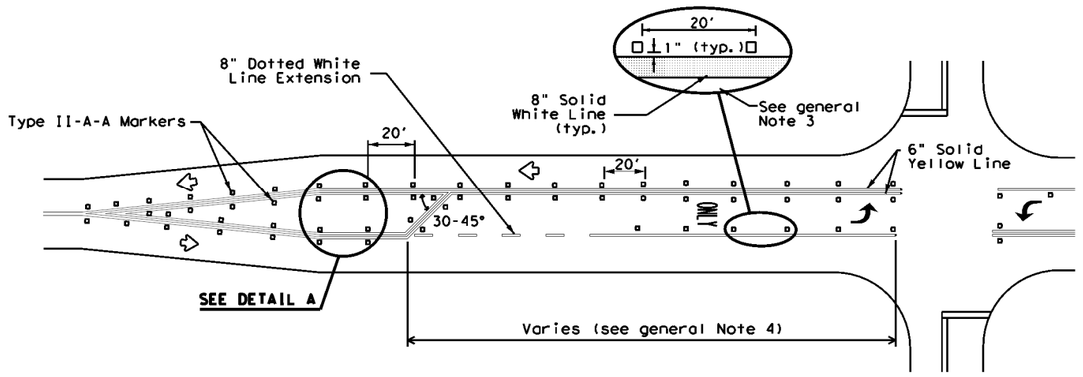
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



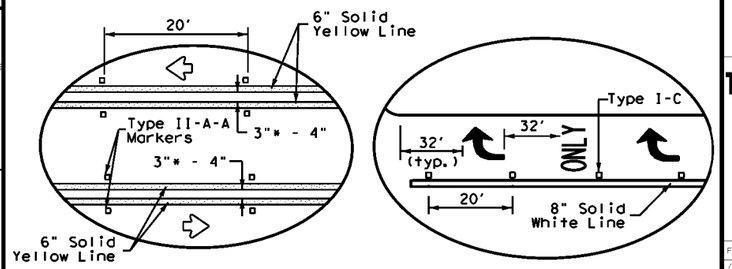
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE 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

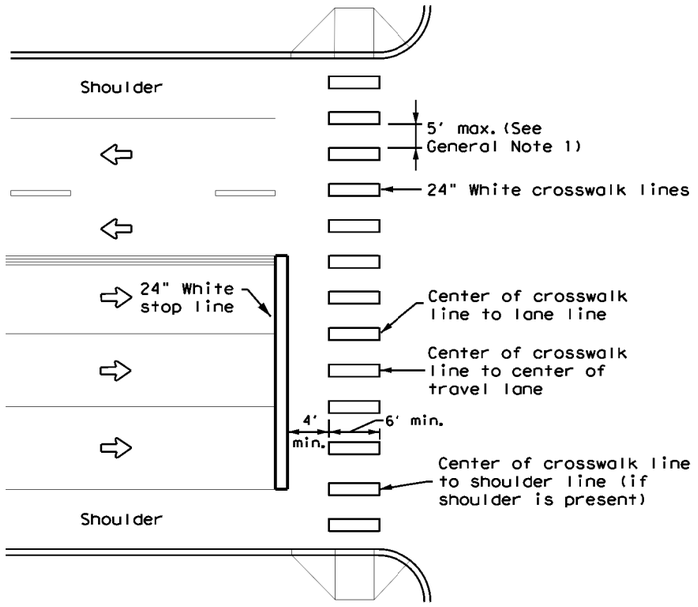
TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

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	1137	02	042,ETC.	SL 499,ETC.
	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		103

22C

DATE:
FILE:



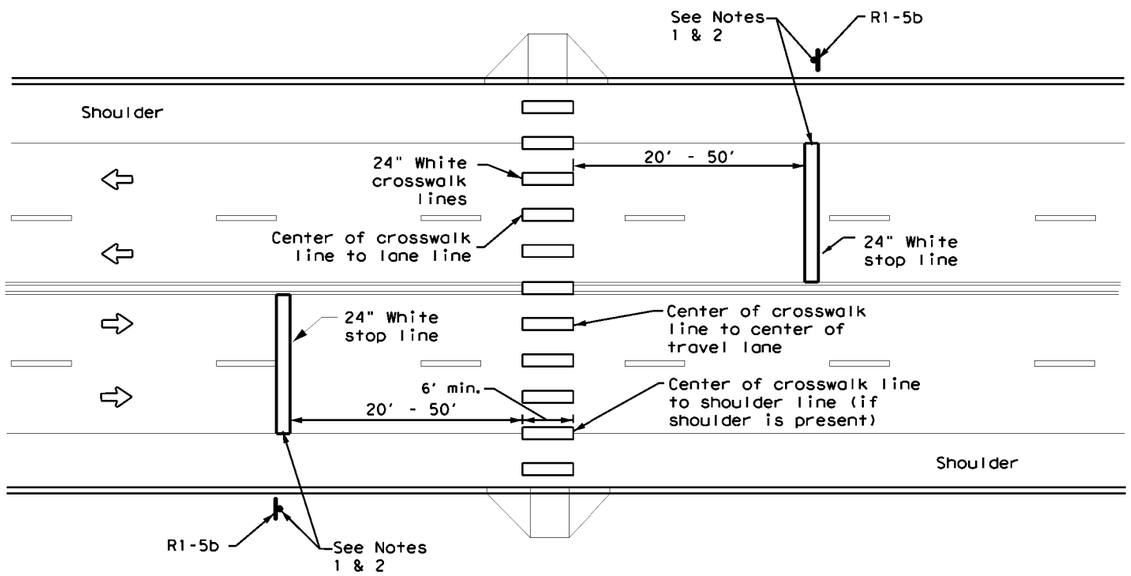
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



UNSIGNALIZED MIDBLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES:

1. Use stop bars with Stop Here For Pedestrians (R1-5b) signs at unsignalized midblock cross walks.
2. Use stop bars with STOP HERE ON RED (R10-6 or R10-6a) signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation

Traffic Safety Division Standard

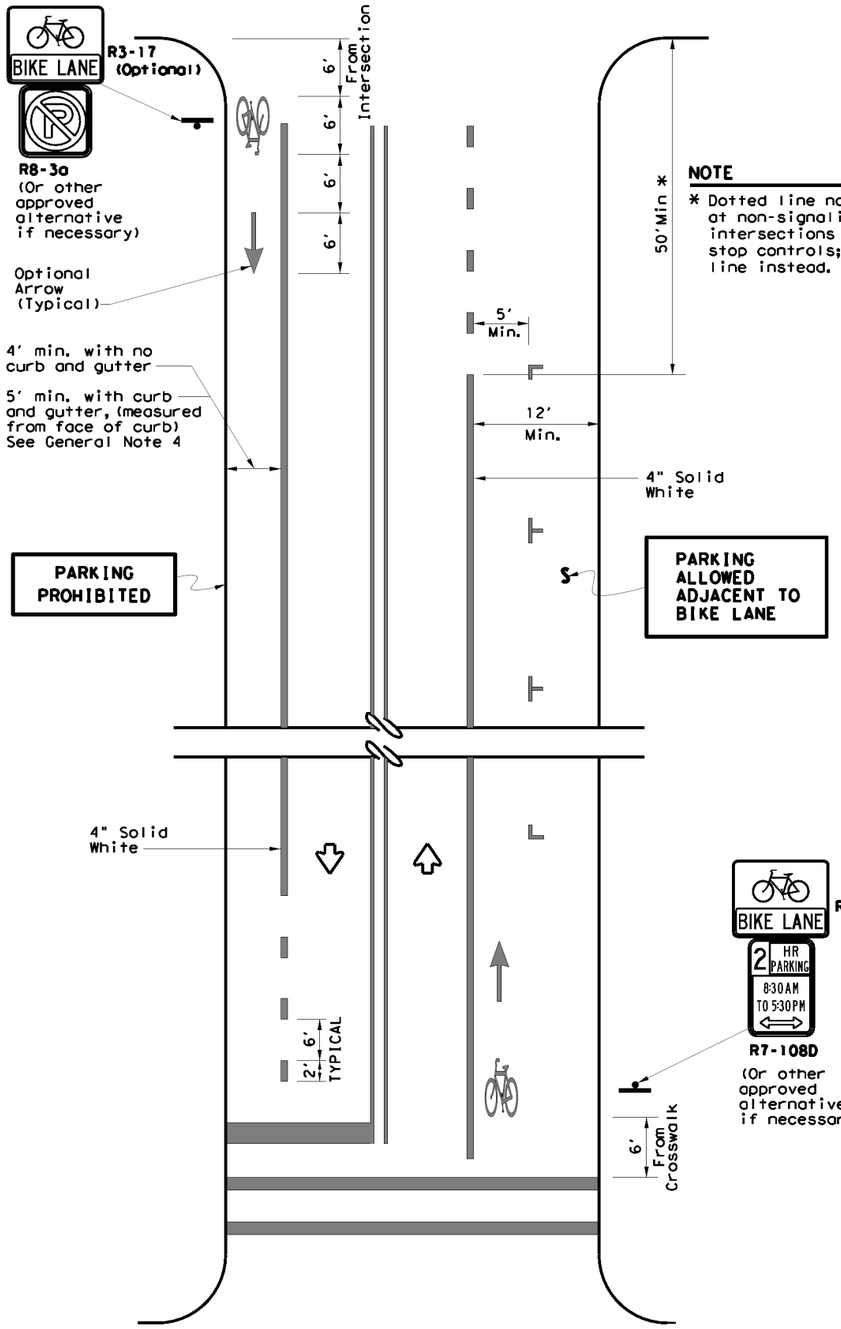
CROSSWALK PAVEMENT MARKINGS

PM(4)-22A

FILE: pm4-22a.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	1137	02	042,ETC.	SL 499,ETC.
6-20	DIST	COUNTY		SHEET NO.
6-22	PHR	CAMERON		104
12-22				

22D

DATE:
FILE:



NOTE

* Dotted line not necessary at non-signalized minor intersections with no stop controls; Use solid line instead.

NOTES

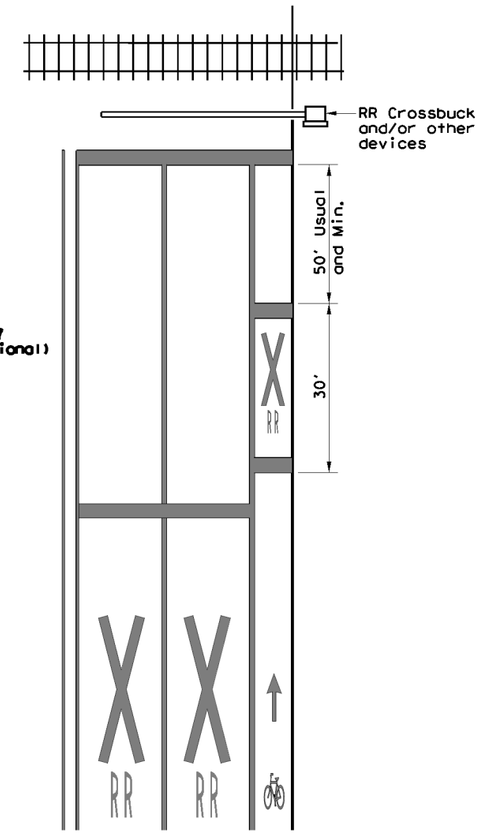
1. Bicycle lane pavement markings typically repeated after each intersection or signalized driveway.
2. On uninterrupted sections of roadway, bicycle lane pavement markings typically repeated as follows:

   -1200' for 45 MPH or less roads
   -2500' for 50 MPH and greater roads.

TWO-WAY STREET

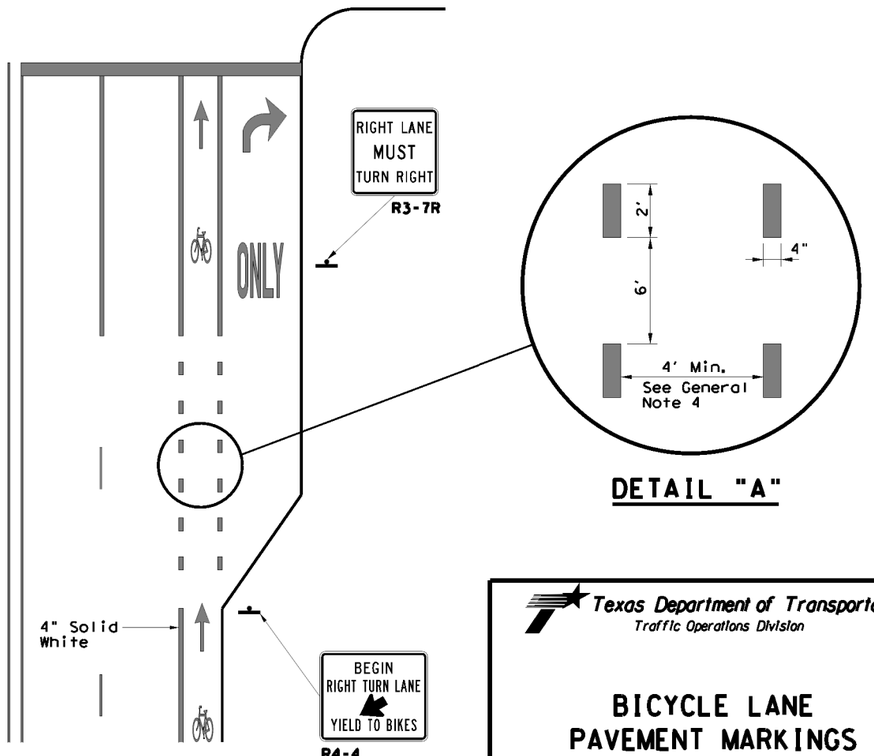
GENERAL NOTES

1. All bicycle lane pavement markings shall be white unless otherwise noted.
2. All pavement marking materials shall meet the required Department Material Specifications as specified by the plans.
3. Exact sign placement and details are shown elsewhere in the plans.
4. The current edition of AASHTO'S Guide for the Development of Bicycle Facilities should be referenced for variations in design, other geometric conditions, and lane width options.
5. Other bicycle lane symbol or word markings as shown in the Texas Manual on Uniform Traffic Control Devices may be used. Details for words, arrows and symbols as shown in the Standard Highway Sign Designs for Texas.
6. The "BIKE LANE" (R3-17) sign with the "AHEAD" (R3-17a) sign mounted directly below should be installed in advance of the beginning of a marked bike lane.
7. The "BIKE LANE" (R3-17) sign with the "END" (R3-17b) sign mounted directly below should be installed at the end of marked bicycle lane.



(See RCPM Standard for travel lane details)

RAILROAD CROSSING APPROACH



RIGHT TURN ONLY LANE

DETAIL "A"

LEGEND	
	Sign
	Traffic Flow

SPECIFICATION REFERENCE TABLE	
Traffic Paint	DMS-8200
Hot Applied Thermoplastic	DMS-8220
Permanent Prefabricated Pavement Markings	DMS-8240
Glass Traffic Beads	DMS-8290

Texas Department of Transportation
Traffic Operations Division

BICYCLE LANE PAVEMENT MARKINGS

BLPM-10

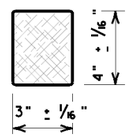
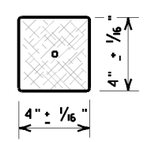
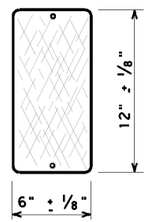
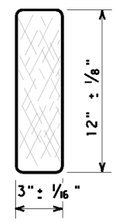
REVISIONS

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

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		105

DATE:
FILE:

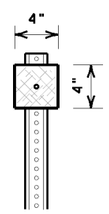
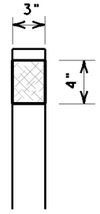
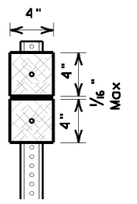
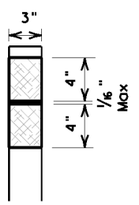
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			

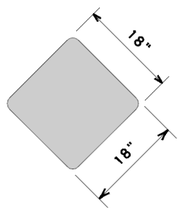
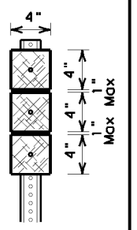
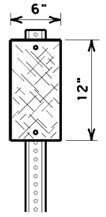
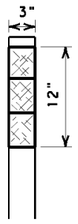
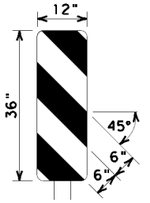
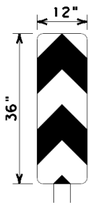
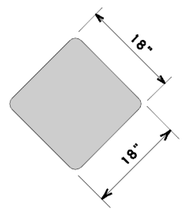
NOTE

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.

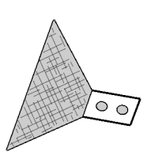
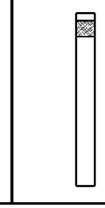
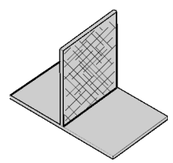
DELINEATORS

	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

OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

BARRIER REFLECTORS (BRF)

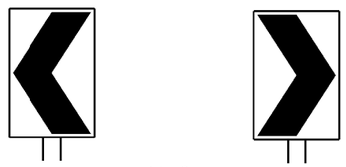
	GF1	GF2	CTB
DEVICE			

1. Barrier reflectors shall meet the requirements of DMS 8600.
2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.

SHEETING	Yellow, White, Red
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.

CHEVRONS

DEVICE



W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

NOTE

1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE

W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

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

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

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

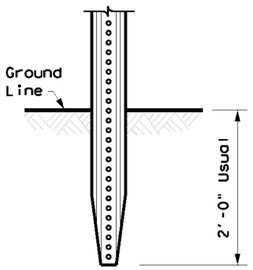
D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1137	02	042,ETC.	SL 499,ETC.
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	PHR	CAMERON		106

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

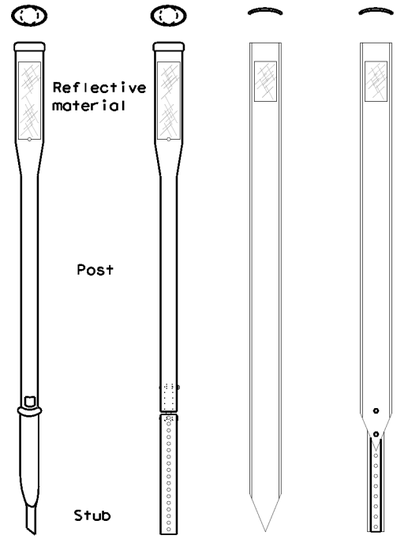


NOTES

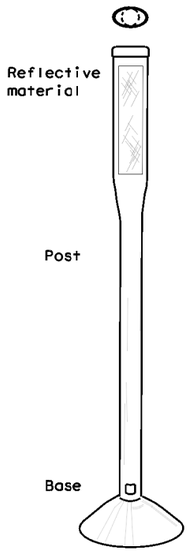
1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

FLEXIBLE POSTS (YFLX, WFLX)

GND



SRF



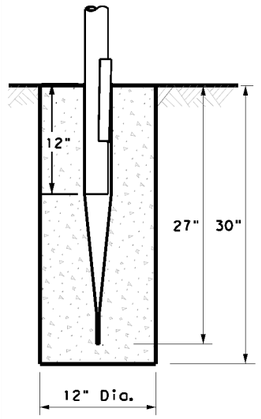
EMBEDDED | SURFACE MOUNT

NOTES

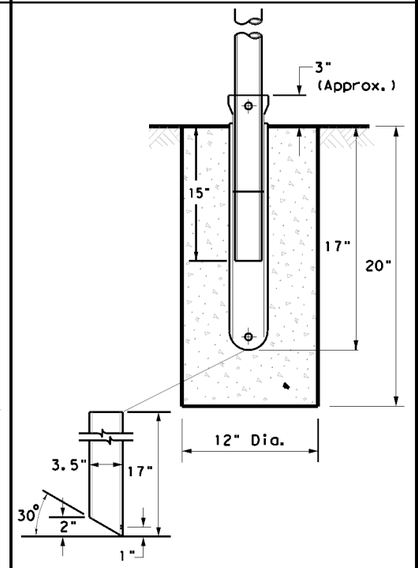
1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

WEDGE ANCHOR SYSTEMS

WAS



WAP



STEEL | PLASTIC

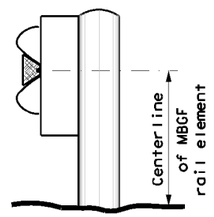
NOTE

1. Install per manufacturer's recommendations.

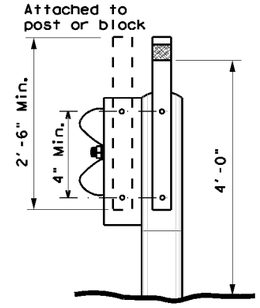
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

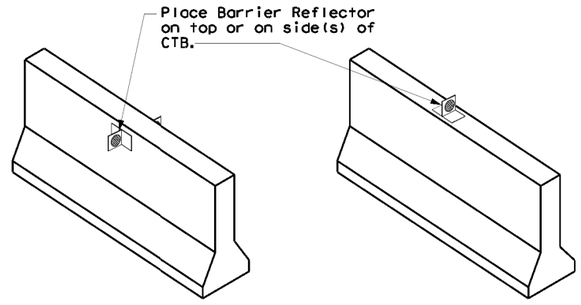
GF1



GF2



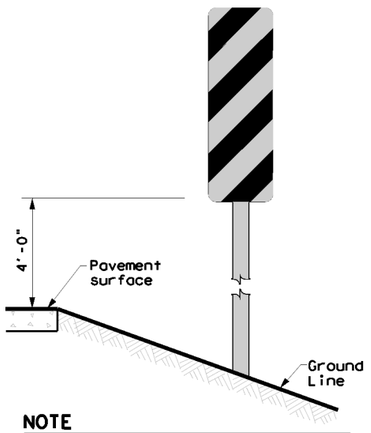
CONCRETE TRAFFIC BARRIER (CTB)



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.

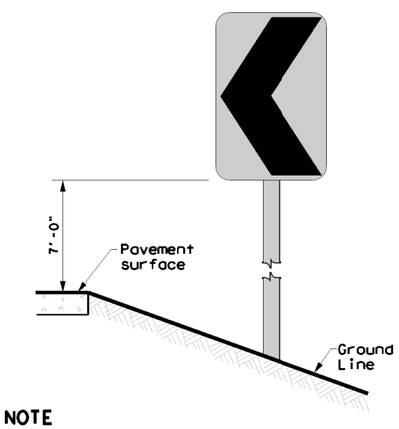
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

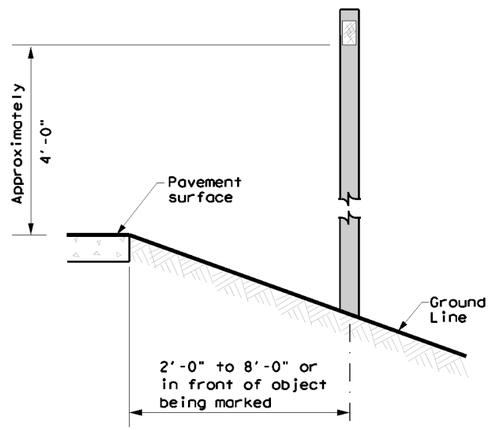
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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

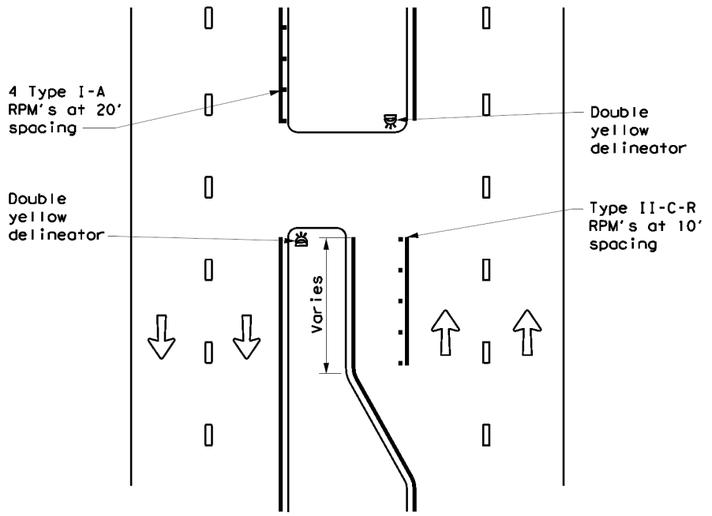
D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1137	02	042, ETC.	SL 499, ETC.
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	PHR	CAMERON		107

208

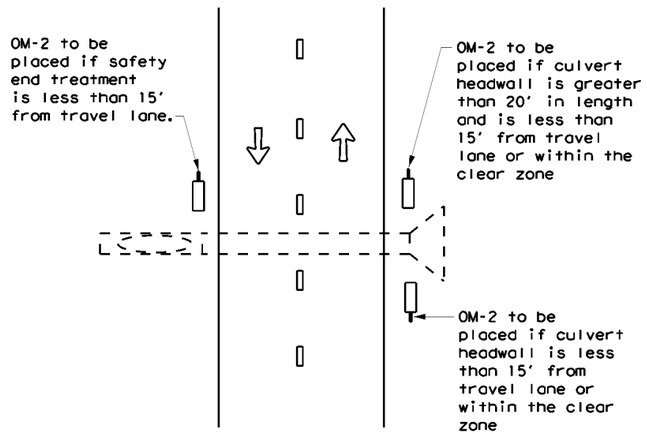
DATE:
FILE:

CROSSOVERS



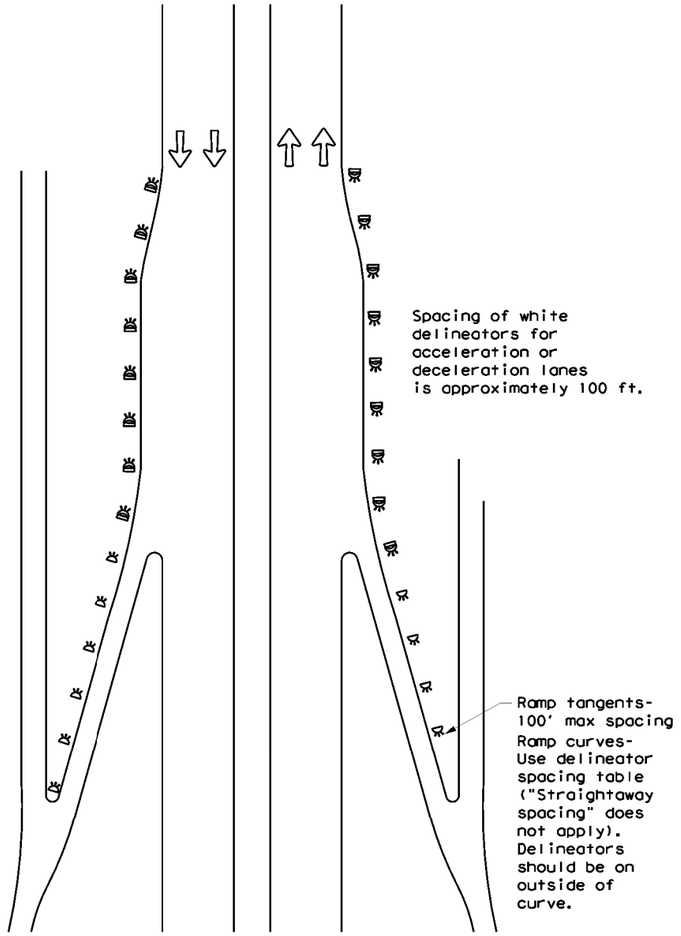
DETAIL 1

FOR CULVERTS WITHOUT MBGF



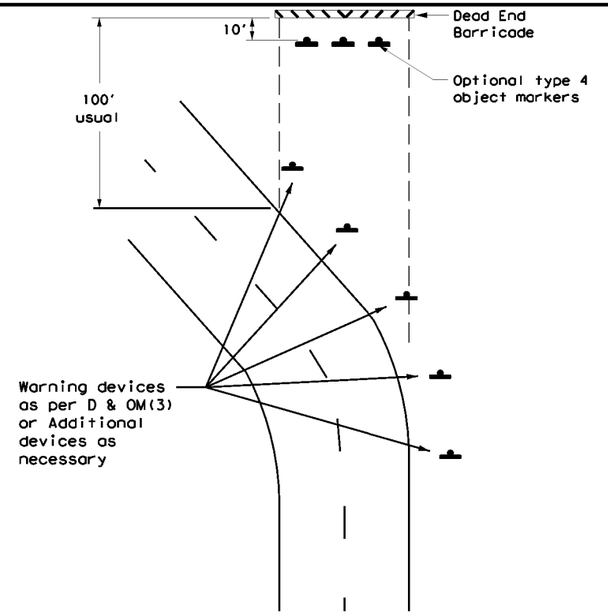
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



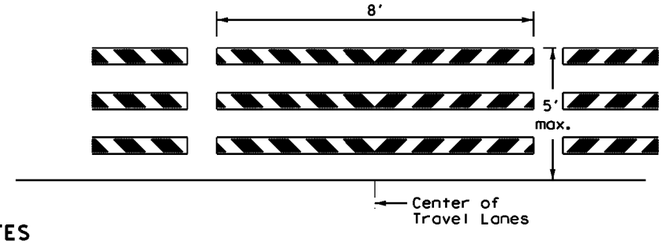
DETAIL 3

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	1137	02	042, ETC.	SL 499, ETC
3-15	DIST	COUNTY		SHEET NO.
7-20	PHR	CAMERON		108

DATE:
FILE:

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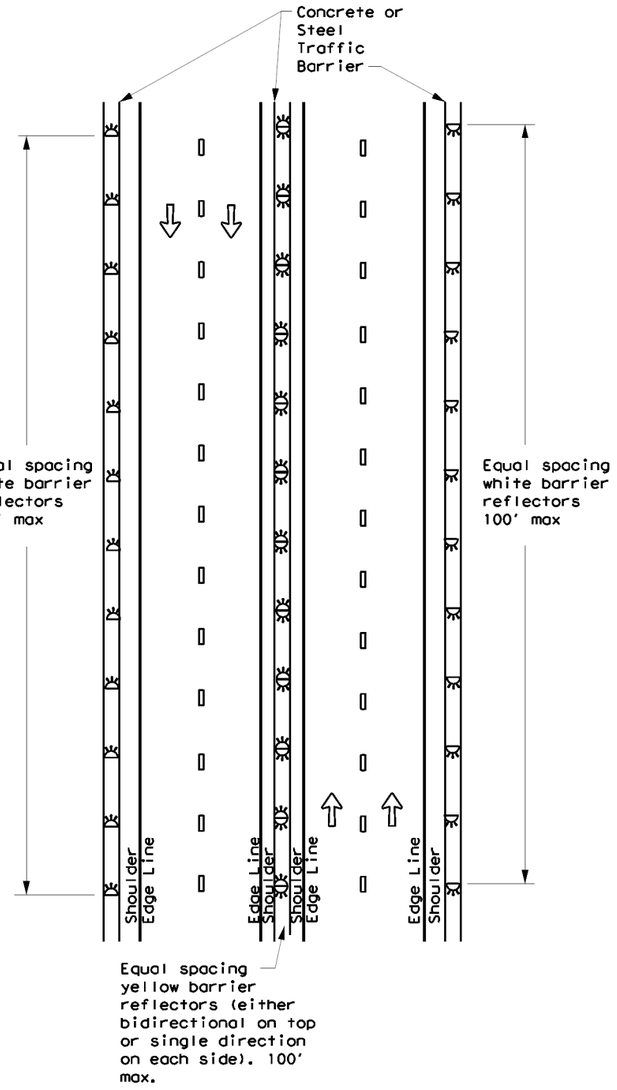
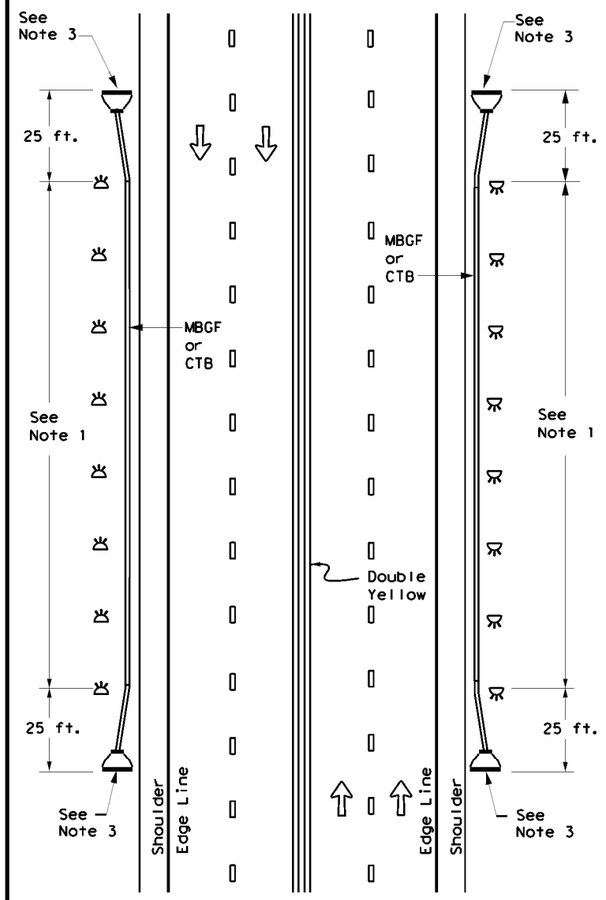
DATE:
FILE:

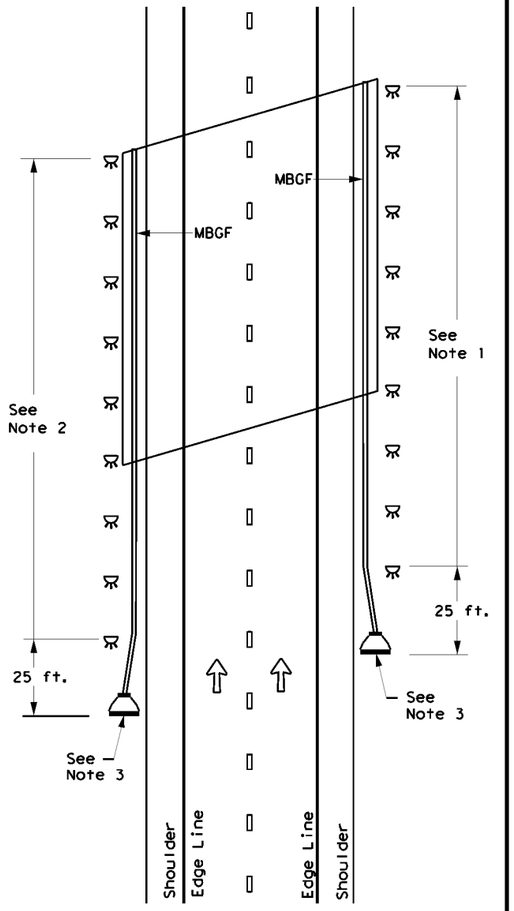
CONTINUOUS CONCRETE OR STEEL BARRIER



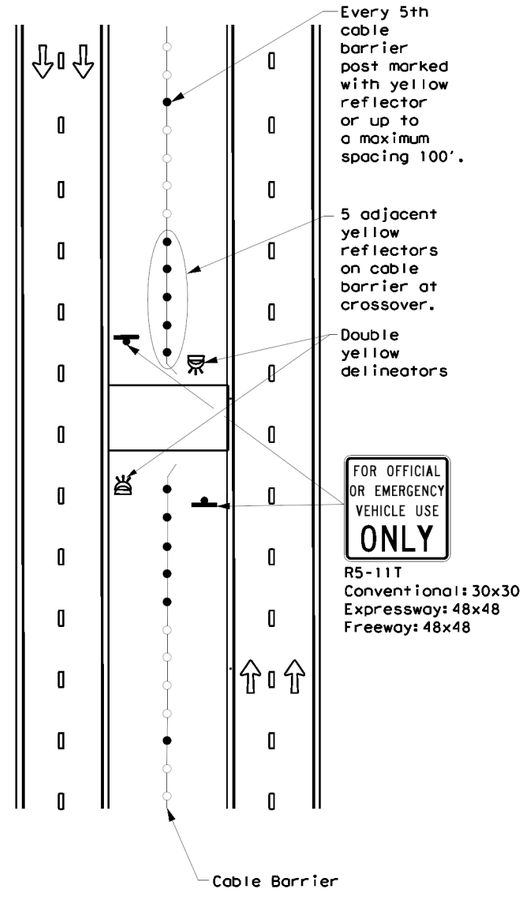
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100' max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100' max.)
2. Equal spacing (100' max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3)in front of the terminal end.

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

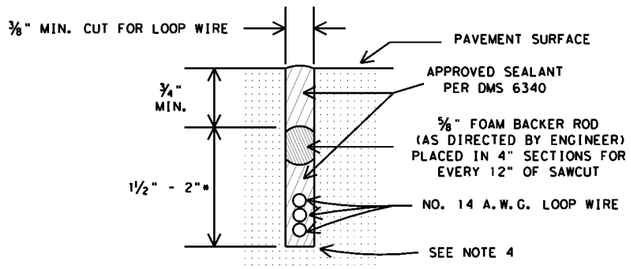
Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

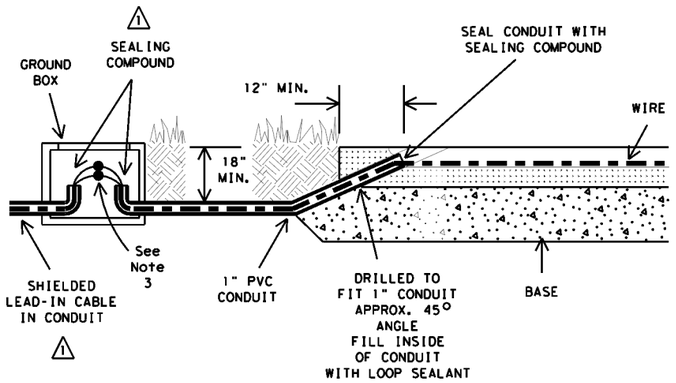
FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	1137	02	042,ETC.	SL 499,ETC.
7-20	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		109

20F

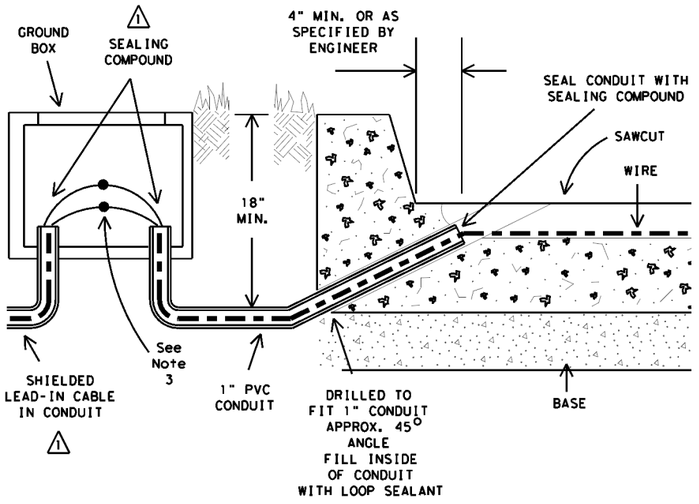


LOOP SAW CUT CROSS-SECTION

* SAWCUTS IN BRIDGE DECKS ARE TYPICALLY 1" DEPTH MAXIMUM
SAWCUTS IN BRIDGE DECKS AND ACROSS EXPANSION JOINTS
SHALL BE AS APPROVED BY ENGINEER



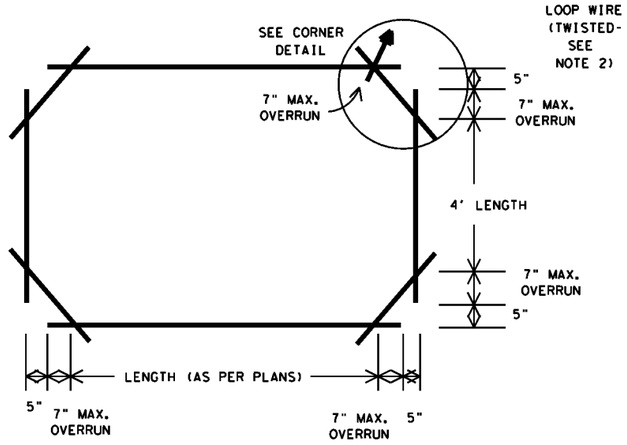
TYPICAL LEAD IN CONFIGURATION (WITHOUT CURBING)



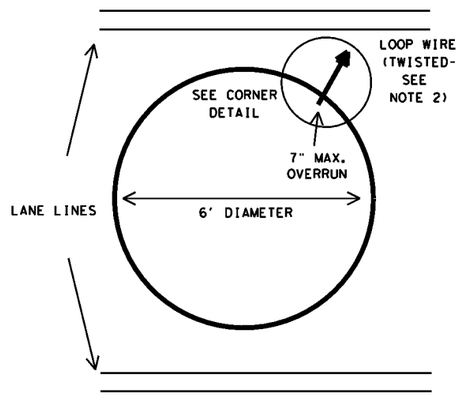
TYPICAL LEAD IN CONFIGURATION (WITH CURBING)

TYPICAL LOOP DETECTOR LAYOUTS

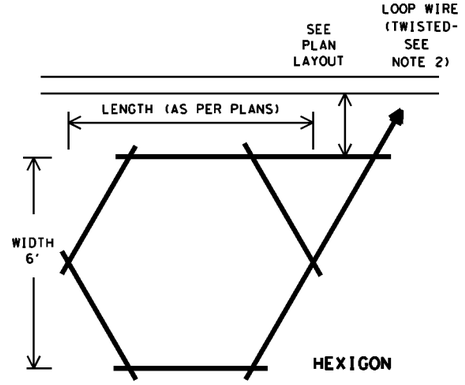
(AS SPECIFIED IN PLANS)



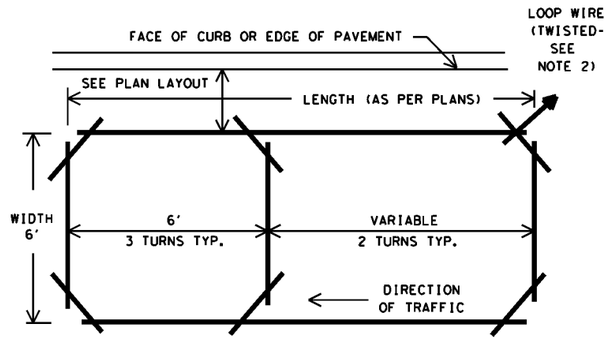
RECTANGULAR



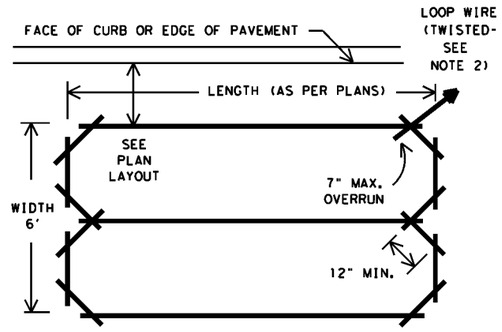
CIRCULAR



HEXIGON



POWER HEADER



QUADRAPOLE

GENERAL NOTES:

1. The pavement cut is to be made with a concrete saw to neat lines and loose material removed. The cut shall be clean and dry when the wire and sealing compound is placed.
2. Loop wire shall be 14 AWG Stranded Type XHHW. Wire from the loop to the ground box shall be twisted a minimum of 5 turns per foot. No splices shall be permitted in the loop or in the run to the ground box.
3. The home run cable from the pull box to the controller shall be IMSA 50-2 shielded cable and shall be soldered to the loop wire. The solder joints shall be sealed with Scotchcast or other method acceptable to the Engineer. The shield shall be grounded only at the controller end. Loop home run cable shall be two conductor 14 AWG shielded, Type XHHW.
4. All wire placed in the saw cut shall be sealed by fully encapsulating it in a sealant acceptable to the Engineer. Sealing compound shall be in accordance with DMS 6340.
5. The loop location, confirguration and number of turns shall be as indicated on the plans or as directed by the Engineer.

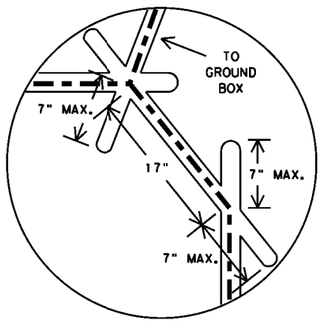
Recommended Number of Turns for Loop Detectors

LOOP PERIMETER SIZE (FT.)	NUMBER OF TURNS	APPROXIMATE LOOP SIZES INCLUDED
24' or Less	3 or 4	5' x 5', 6' x 6'
25' - 110'	2 or 3	6' x 10', 6' x 45'
110' or More	1 or 2	6' x 50' or Longer

6. A separate saw cut shall be made from each loop to the edge of pavement or as specified by the Engineer.
7. Splices between the loop lead-in cable and loop detector shall be made only in the ground box near the loop it is serving.
8. Circular loops may use prewound loops encased in continuous pvc tubing. Sawcut width may be adjusted to accommodate tubing.
9. The lead-in wire in the circular loop shall be coiled at the 3 inch drilled corner to reduce bending stress.
10. Loop duct may be used as specified by Engineer.

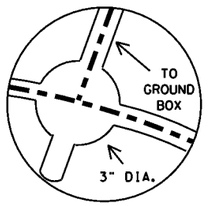
For additionhal information refer to "Texas Traffic Signal Detector" manual, TTI Report 1163-1.

TYPICAL CORNER DETAILS

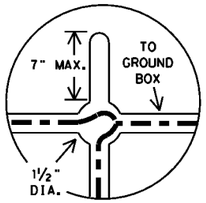


RECTANGULAR & HEXIGON LOOP
SAWCUT CORNER DETAIL

7" OVERRUN BASED ON 24" DIAMETER SAW BLADE



CIRCULAR LOOP
DRILLED CORNER DETAIL



RECTANGULAR & HEXIGON LOOP (ALT.)
DRILLED CORNER DETAIL

Texas Department of Transportation
Traffic Operations Division

LOOP DETECTOR INSTALLATION DETAILS

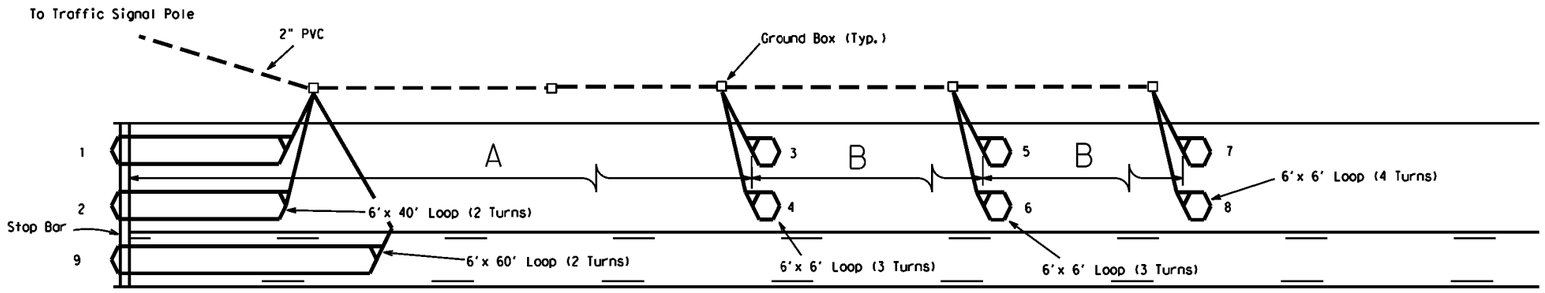
LD(1)-03

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

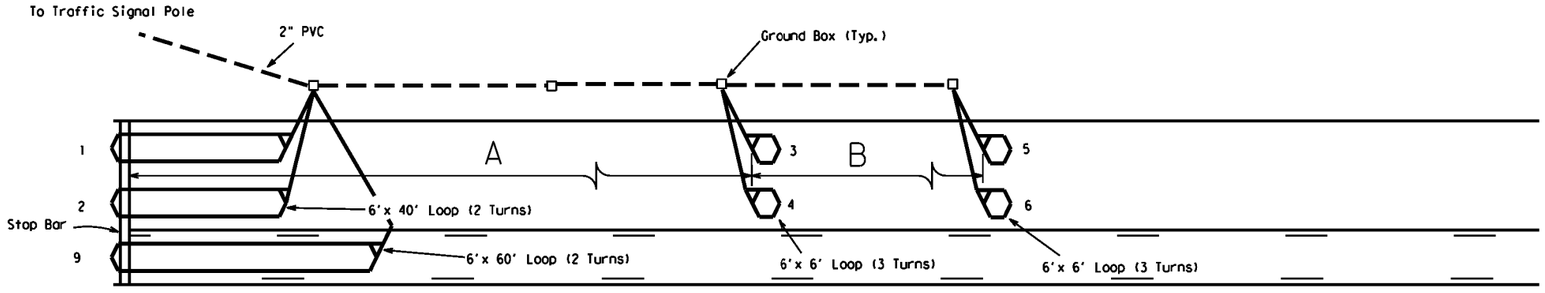
REVISIONS
2-99
1-03

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		110

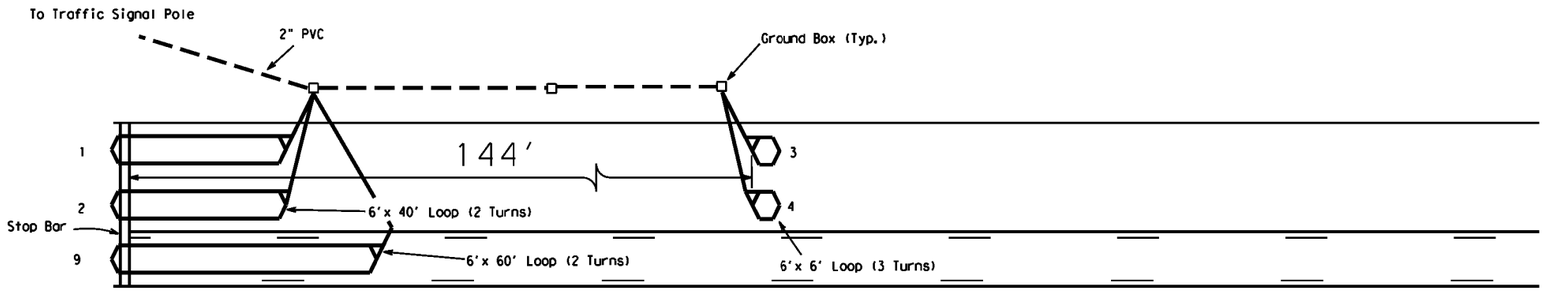
DATE:
FILE:



55 MPH (A=225', B=95') 60 MPH (A=275', B=100')
65 MPH (A=320', B=110') 70 MPH (A=350', B=125')



35 MPH (A=90', B=100') 40 MPH (A=110', B=130')
45 MPH (A=175', B=115') 50 MPH (A=220', B=130')



30 MPH

GENERAL NOTES:

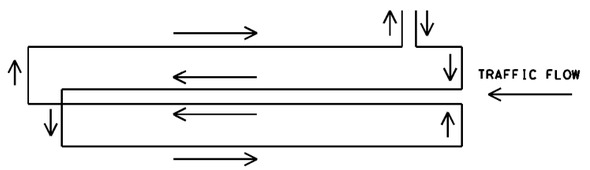
Loops 1 and 2 shall be connected to the controller cabinet by means of the same loop lead-in (2/C #14 AWG).

Loops 3 thru 6 shall be connected to the controller cabinet by means of the same loop lead-in (2/C #14 AWG).

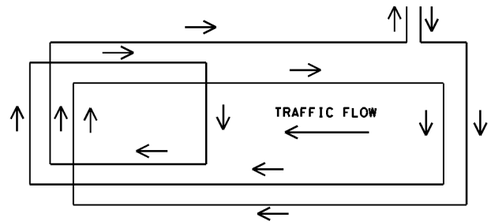
Loops 7 and 8 shall be connected to the controller cabinet by means of the same loop lead-in (2/C #14 AWG).

Loop 9 shall be connected to the controller cabinet by means of a loop lead-in (2/C #14 AWG). Loop 9 shall be placed only when a left turn lane exists.

LOOP WINDING DETAILS



QUADRAPOLE LOOP



POWER HEADER LOOP

DATE:
FILE:

Texas Department of Transportation
Traffic Operations Division

LOOP DETECTOR PLACEMENT DETAILS

LD(2)-03

REVISIONS

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

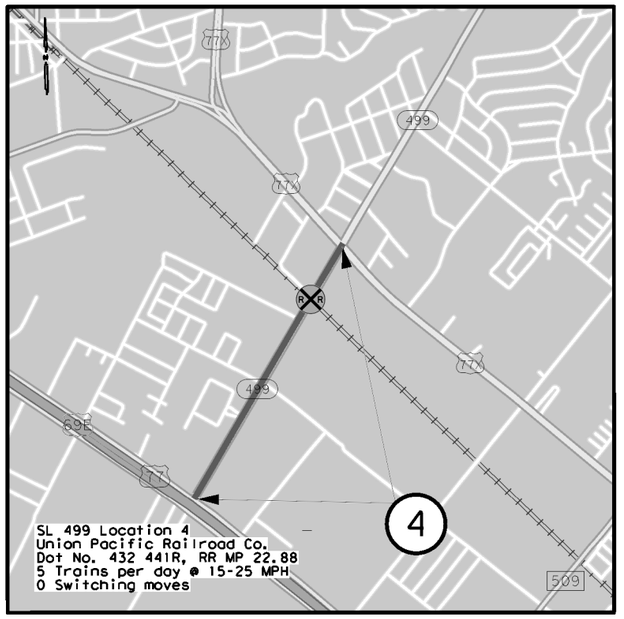
CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		111

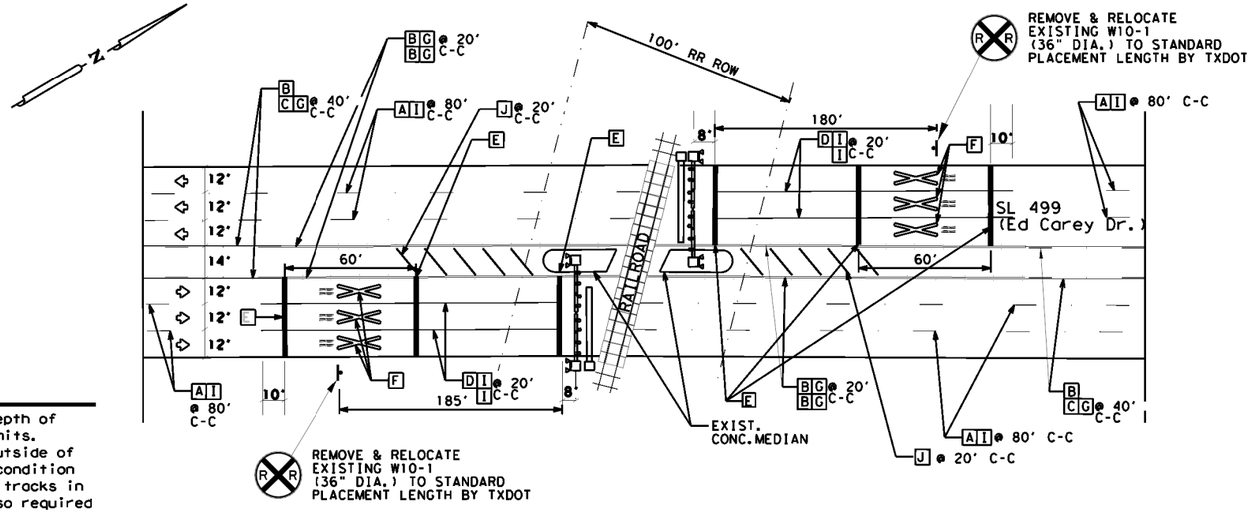
79B

LOCATION 4
SL 499 RAILROAD
CAMERON COUNTY
CROSSING LOCATION MAP

LEGEND

- [A] - PROP. 6" BKN WHITE LINE
- [B] - PROP. 6" SLD YELLOW LINE
- [C] - PROP. 6" BRK YELLOW LINE
- [D] - PROP. 8" SLD WHITE LINE
- [E] - PROP. 24" SLD WHITE LINE
- [F] - PROP. PREFABRICATED RR SYMBOL TY-C
- [G] - PROP. PAV MRKR TY II-A-A
- [H] - PROP. PAV MRKR TY II-C-R
- [I] - PROP. PAV MRKR TY I-C
- [J] - PROP. 12" SLD YELLOW LINE





NOTES

1. Construction will consist of planing at a depth of 2" and overlay of 2" throughout project limits.
2. If contractor performs overlay operations outside of RR ROW, but creates a traffic contra-flow condition that causes vehicles to cross the railroad tracks in an opposing lane, a railroad flagger is also required to be on-site for the duration of the contra-flow traffic control plan within UPRR ROW.
3. See RCD(1)-22 Standard for desirable placement lengths.

Texas Department of Transportation

UNION PACIFIC RAILROAD
LOCATION 4
CROSSING MAP
EXHIBIT A

N. T. S.

CONT	SECT	JOB	HIGHWAY
1137	02	042,ETC.	SL 499,ETC.
DIST	COUNTY		SHEET NO.
PHR	CAMERON		112

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.: 432 441R
Crossing Type: AT GRADE
RR Company Operating Track at Crossing: UNION PACIFIC RAILROAD CO.
RR Company Owning Track at Crossing: UNION PACIFIC RAILROAD CO.
RR MP: 22.88
RR Subdivision: BROWNSVILLE
City: HARLINGEN
County: CAMERON
CSJ at this Crossing: 1137-01-032
Latitude: 26.1705430
Longitude: -97.6752605

Scope of Work, including any TCP, to be performed by State Contractor:

OVERLAY MAINTENANCE: CONSISTING OF INSTALLING & MIANTAINING TRAFFIC CONTROL DEVICES, AS WELL AS MILLING AND PLACING 2" OF HOT MIX ASPHALT PAVING AND TRAFFIC PAVEMENT MARKINGS THROUGHOUT THE PROJECT LIMITS. IF CONTRACTOR PERFORMS OVERLAY OPERATIONS OUTSIDE OF RR ROW, BUT CREATES A TRAFFIC CONTRA-FLOW CONDITION THAT CAUSES VEHICLES TO CROSS THE RAILROAD TRACKS IN AN OPPOSING LANE, A RAILROAD FLAGGER IS ALSO REQUIRED TO BE ON-SITE FOR THE DURATION OF THE CONTRA-FLOW TRAFFIC CONTROL PLAN WITHIN UPRR ROW. INCLUDES RELOCATION OF EXISTING SIGNING.

Scope of Work to be performed by Railroad Company:

None

II. FLAGGING & INSPECTION

No. of Days of Railroad Flagging Expected: 3

On this project, night or weekend flagging is:

☑ Expected
☐ Not Expected

Flagging services will be provided by:

☐ Railroad Company: 1) Txdot will pay flagging invoices. Flagging Agreement with railroad will be needed or, 2) Permitted crossing. Railroad company to provide flagging.
☑ 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 877-984-6777

☐ **BNSF** BNSFinfo@railprosfs.com
Call Center 877-315-0513, Select #1 for flagging

☐ **CPKCR** 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 railroad construction inspection into anticipated construction schedule.

☑ Not Required
☐ Required. Contact Information for Construction Inspection:

III. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

☐ Required.
☑ Not Required
Railroad Point of Contact: _____

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
- ☐ CPKCR
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, CPKCR 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: UNION PACIFIC RAILROAD CO.
Railroad Emergency Line at: (888)-877-7267
Location: DOT 432 441R
RR Milepost: 22.88
Subdivision: BROWNSVILLE

RRD Review Only
Initials: _____
Date: 11/06/2023

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	1137	02	042, ETC.		SL 499, ETC.
6/2023	DIST	COUNTY			SHEET NO.
	21	CAMERON			113

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
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REVISIONS March 2020	1137	02	042,ETC.	SL 499,ETC.
	DIST	COUNTY		SHEET NO.
	21	CAMERON		114

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 $\frac{1}{4}$ 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).

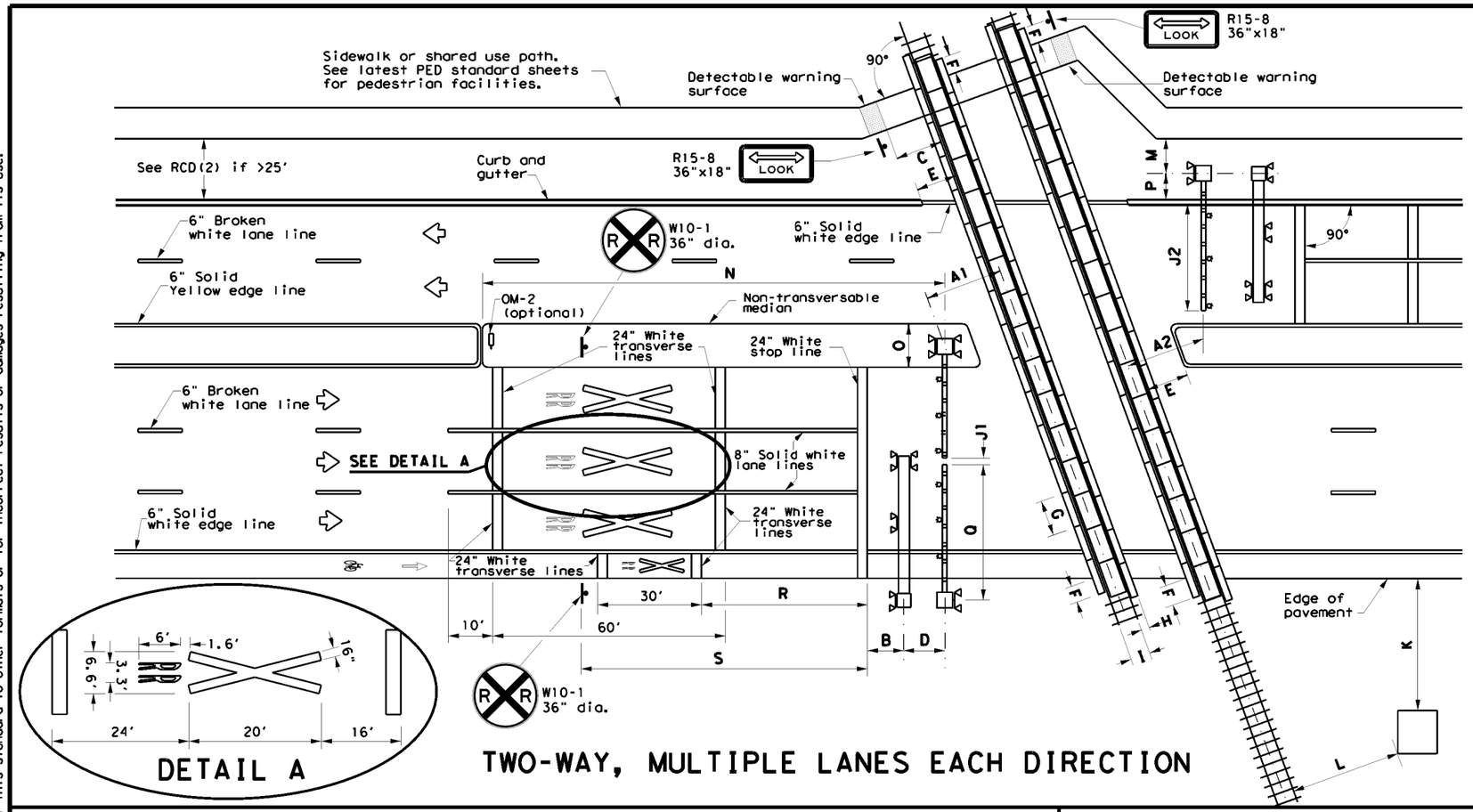
3.16 CLEANING OF RIGHT-OF-WAY

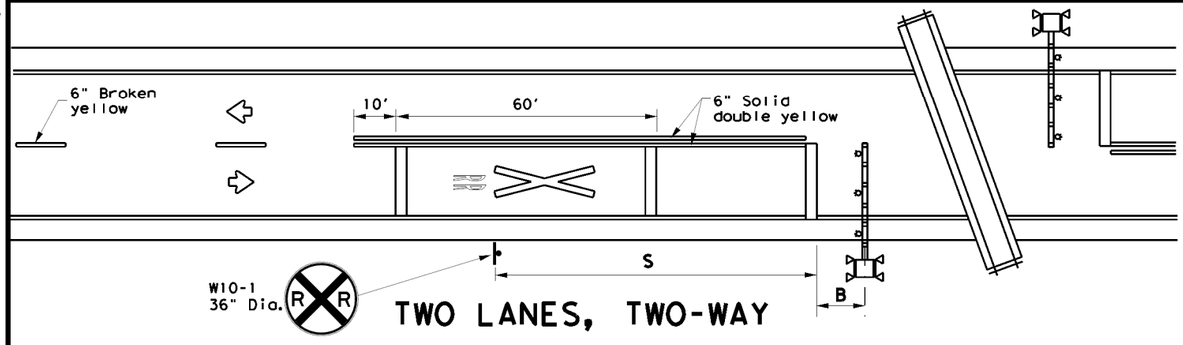
When work is complete, remove all tools, implements, and other materials brought into Railroad Right of Way and leave the right of Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

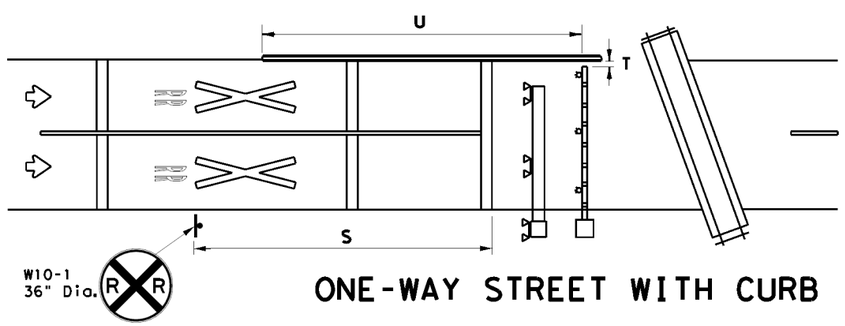
Texas Department of Transportation — Rail Division

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	1137	02	042,ETC.	SL 499,ETC.
	DIST	COUNTY		SHEET NO.
	21	CAMERON		115







NOTES

T: Tip of gate to edge of curb: 1' maximum for Quiet Zone SSM, 90% of traveled way covered by gates for all other locations.

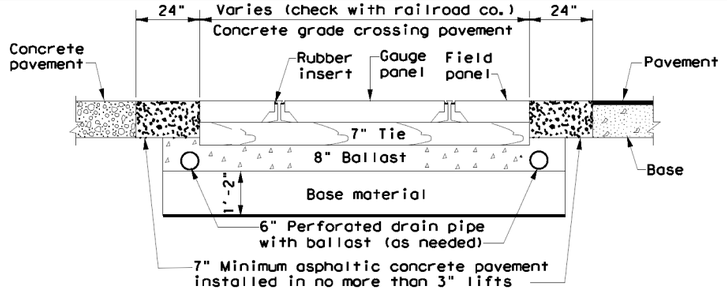
U: Non-traversable curb length from gate: 100' minimum for a Quiet Zone SSM, 10' minimum for all other locations.

TABLE 1	
Approach Speed (mph)	Desirable Placement (feet)
20	100
25	100
30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550
75	650

LEGEND	
	Sign
	Object Marker
	Traffic Flow
	Cantilever
	Gate Assembly
	Mast Flasher Pair

GENERAL NOTES

1. Medians and curbs must be non-traversable to qualify as a Quiet Zone Supplementary Safety Measure (SSM). Non-traversable curbs in Quiet Zones are 6" tall minimum and used on roadways where speed does not exceed 40 mph.
2. Raised pavement markers may be used to supplement striping. See PM(2) and PM(3) standard sheets.
3. Medians preferred whenever possible to prevent vehicles from driving around gates.
4. Longitudinal edge striping may be continued thru crossing as needed. Illumination may also be considered for nighttime visibility.
5. See SMD standard sheets for sign mounting details.
6. See the Standard Highway Sign Design for Texas (SHSD) manual for sign and pavement marking details.



NOTES

A1: Center of RR mast to center of rail: 12' minimum, 15' typical.

A2: Tip of gate to center of rail: 12' minimum, 15' typical.

B: Center of mast (cantilever, gate, or mast flasher) of nearest active traffic control device to stop line: 8' (NOTE: Stop line may be moved as needed, but should be at least 8' back from gates, if present).

C: Near edge of detectable warning surface to nearest rail: 12' minimum.

D: Center of gate mast to center of cantilever mast: 6' typical. NOTE: Cantilever may be located in front or behind gates.

E: Edge of median or curb to nearest rail: 10' typical. NOTE: Design median edge to be parallel with rail.

F: Edge of planking panel from edge of pavement or sidewalk: 3' minimum. NOTE: Field panels need not be in line with gauge panels.

G: Length of panels along rail: 8' typical.

H: Width of field panel: 2' typical (check with railroad company).

I: Distance between rails: 4'- 8'1/2".

J1: Tip of gate to tip of gate: 2' maximum.

J2: 90% of traveled roadway to be covered by gate.

K: Nearest edge of RR cabinet from edge of pavement: 30' typical. NOTE: Cabinet not required to be parallel to edge of pavement.

L: Nearest edge of RR cabinet from nearest rail: 25' typical.

M: Center of RR mast to edge of sidewalk: 6' minimum.

N: Center of gate mast to leading edge of non-traversable median: 100' minimum to qualify as a Quiet Zone SSM. NOTE: 60'will suffice if there is a street intersection within the 100' and all street intersections within 60' are closed.

O: Width of median for RR gate assembly: 8'-6" minimum, 10' typical when using median gates. NOTE: Center of gate mast minimum 4'-3" from face of curb.

P: Center of RR mast to face of curb: 5'-3" minimum.
Center of RR mast to edge of pavement (with shoulder): 7' minimum.
Center of RR mast to edge of pavement (no shoulder): 9'-3" minimum.
NOTE: Final location determined by the railroad company.

Q: Gate length: 28' or less typical, but railroad company may allow up to 32' under special circumstances.

R: Stop line to first RR Crossing transverse line (bike lane): 50' typical.

S: Stop line to GRADE CROSSING ADVANCE WARNING (W10-1) sign and adjacent RR Crossing pavement markings. See Table 1. See RCD(2) for other signs.

Texas Department of Transportation

Traffic Safety Division Standard

RAILROAD CROSSING DETAILS SIGNING, STRIPING, AND DEVICE PLACEMENT RCD(1)-22

FILE: rcd1-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	1137	02	042,ETC.	SL 499,ETC.
2-16	DIST	COUNTY		SHEET NO.
11-22	PHR	CAMERON		116

DATE:
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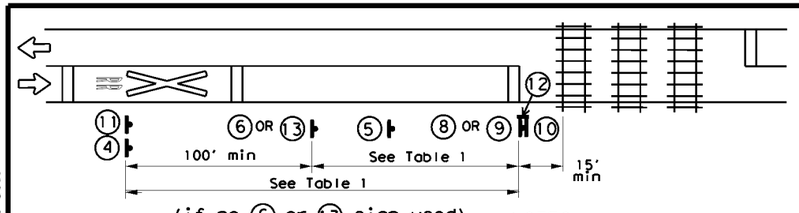
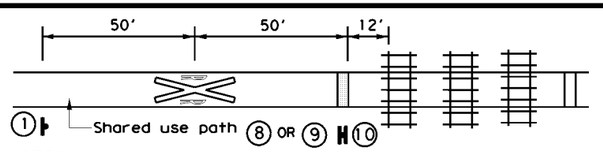


(if no (6) or (13) sign used)

PASSIVE CROSSING

NOTES

1. STOP or YIELD sign may also be installed to the left of the crossbuck sign, rather than below it.
2. A 2" white retroreflective strip shall be installed on front and back of crossbuck sign post.
3. See the Crossbuck Assemblies with YIELD or STOP Signs at Passive Grade Crossings section of the TMUTCD for further details about sign mounting arrangements.



NOTES

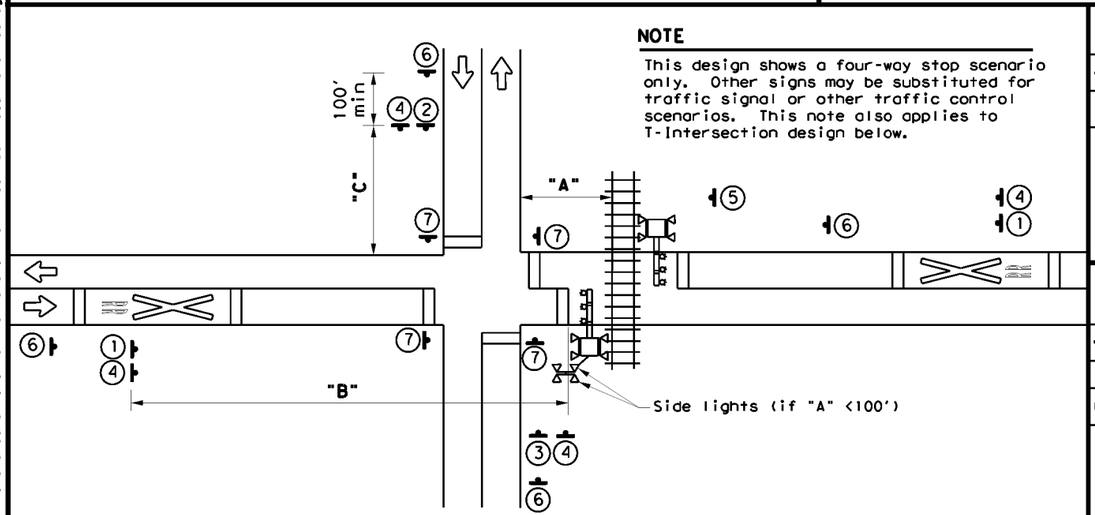
1. A shared use path is considered a separate pathway crossing when more than 25' from traveled way of adjacent roadway.
2. Detectable warning used at stop bar.
3. Smaller signs preferred. See the Design of Bicycle Signs section within the TMUTCD for sizing details.

PATHWAY CROSSING

TABLE 1	
Approach Speed (mph)	Desirable Placement (feet)
20	100
25	100
30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550
75	650

GENERAL NOTES

1. Railroad company to provide active traffic control devices, CROSSBUCK (R15-1), NUMBER OF TRACKS (R15-2P) plaque (if more than 1 track), and EMERGENCY NOTIFICATION (I-13) signs.
2. LOW GROUND CLEARANCE (W10-5) signs may be relocated further upstream of crossing to provide advance warning of alternate route.
3. GRADE CROSSING AND INTERSECTION ADVANCE WARNING (W10-2) signs may be modified as needed to fit roadway geometry.
4. Table 1 placement distances may vary per the Placement of Warning Signs section of the TMUTCD.
5. See Table 1 to determine placement of STOP AHEAD (W3-1) and YIELD AHEAD (W3-2) signs unless shown otherwise.
6. DO NOT STOP ON TRACKS (R8-8) signs installed when potential for vehicles stopping on tracks is significant as determined by sealing engineer. Install so sign does not block view of RR mast.
7. See the Standard Highway Sign Design for Texas (SHSD) manual for sign and pavement marking details.

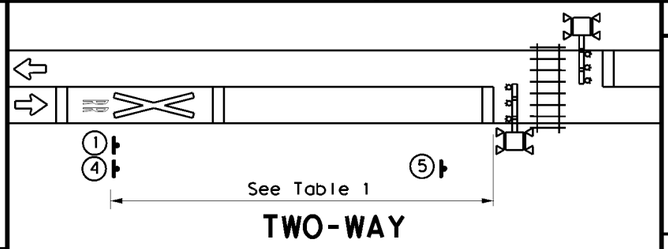


NOTE

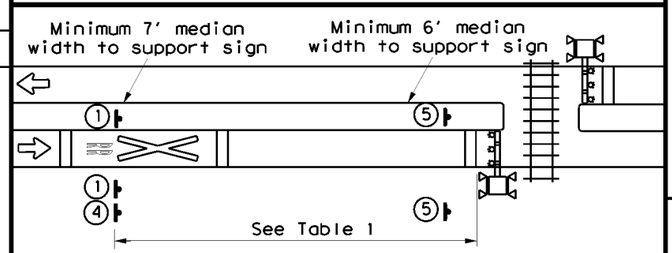
This design shows a four-way stop scenario only. Other signs may be substituted for traffic signal or other traffic control scenarios. This note also applies to T-Intersection design below.

	"A" <100'	"A" ≥100'
"B"	See Table 1. Place pavement markings and signs on opposite side of intersection from rail if spacing from Table 1 would put markings within intersection.	See Table 1. Place pavement markings and signs between rail and intersection if spacing from Table 1 would put markings within intersection.
"C"	See Table 1.	GRADE CROSSING AND INTERSECTION ADVANCE WARNING (W10-2, W10-3, W10-4) signs should only be installed if W10-1 sign is not between intersection and railroad crossing. If needed, see Table 1.

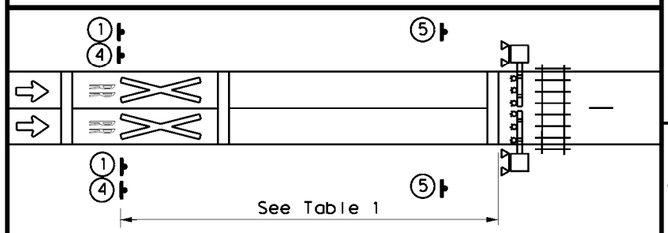
GRADE CROSSING NEAR A PARALLEL STREET



TWO-WAY

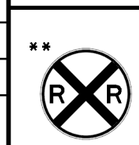


TWO-WAY WITH MEDIAN



ONE-WAY

SIGNS



1 W10-1 36" Dia.

2 W10-2L 36" X 36"

3 W10-2R 36" X 36"

IF NEEDED

4 W10-5 36" X 36"

LOW GROUND CLEARANCE W10-5P 30" X 24"

IF NEEDED

DO NOT STOP ON TRACKS

5 R8-8 24" X 30"

IF NEEDED

6 W3-1 30" X 30"

STOP R1-1 36" X 36"

ALL WAY R1-3P 18" X 6"

7

RAIL CROSSING ROAD 3 TRACKS R15-1 48" X 9" R15-2P 27" X 18"

STOP R1-1 36" X 36"

8

RAIL CROSSING ROAD 3 TRACKS R15-1 48" X 9" R15-2P 27" X 18"

YIELD R1-2 48" X 48" X 48"

9

RAIL CROSSING ROAD 3 TRACKS R15-1 48" X 9" R15-2P 27" X 18"

10

R W10-1 36" Dia.

NO GATES OR LIGHTS W10-13P 30" X 24"

11 **

REPORT EMERGENCY OR PROBLEM 1-800-555-5555 CROSSING 836 597 H

Sign may be placed perpend. to travel lanes.

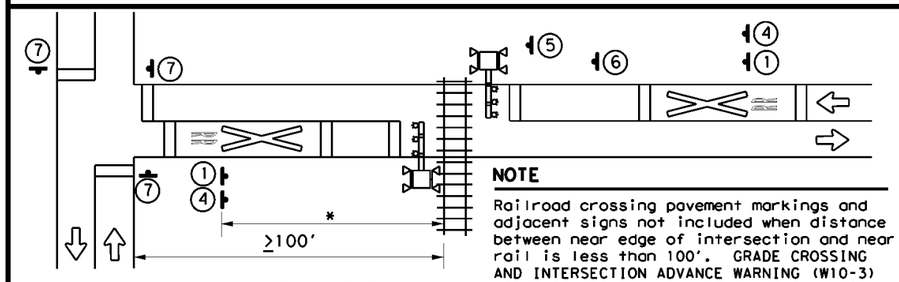
12 I-13 15" X 9"

IF NEEDED

13 W3-2 30" X 30"

** Includes a NO TRAIN HORN (W10-9P) plaque if crossing is in a Quiet Zone. If needed, is mounted below W10-2/W10-3/W10-4 signs.

NO TRAIN HORN W10-9P 30" X 24"

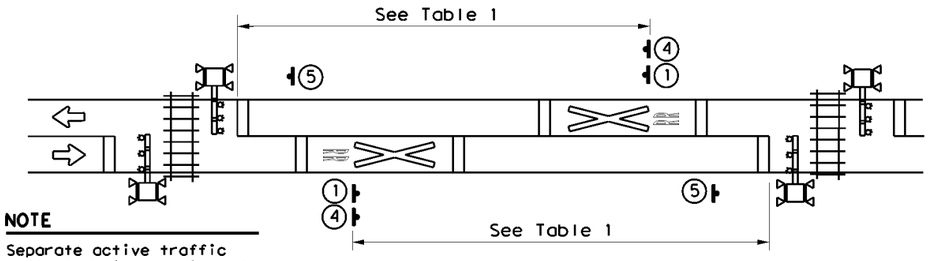


*Use Table 1 if sufficient space exists.

NOTE

Railroad crossing pavement markings and adjacent signs not included when distance between near edge of intersection and near rail is less than 100'. GRADE CROSSING AND INTERSECTION ADVANCE WARNING (W10-3) signs installed on roadway parallel with rail in this case.

T-INTERSECTION



NOTE

Separate active traffic control devices, railroad crossing pavement markings, and adjacent signs required when tracks are more than 100' apart.

TWO ADJACENT CROSSINGS

Texas Department of Transportation

Traffic Safety Division Standard

RAILROAD CROSSING DETAILS SIGNING & STRIPING

RCD(2)-22

FILE: rcd2-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	1137	02	042,ETC.	SL 499,ETC.
2-16 11-22	DIST	COUNTY		SHEET NO.
	PHR	CAMERON		117

DATE:
FILE:

During the planning phase of project development, the following Environmental Permits, Issues and Commitments have been developed during coordination with resource agencies, local governmental entities and the general public. Any change orders and/or deviations from the final design must be reported to the Engineer prior to the commencement of construction activities as additional environmental clearances may be required.

I. Clean Water Act, Section 402; Stormwater Pollution Prevention

Action Items Required : ☐ No Action Required

1. ☒ The contractor must implement the SW3P by installing Best Management Practices (BMPs) as indicated in the construction plans and maintained appropriately throughout construction. BMPs must be in place prior to the start of construction. The SW3P may need to be revised as necessary as construction progresses.

2. ☒ For all construction PSL's off the ROW, the contractor must certify compliance with all applicable laws, rules and regulations pertaining to the preservation of cultural resources, natural resources and the environment.

3. ☒ Based on the acreage of impact, select the appropriate box below:

   ☒ This project will disturb less than 1 acre of soil and is not part of a larger common plan of development; therefore, a NOI and TPDES Site Notice are not required for this project.

   or

   ☐ This project will disturb equal to or more than 1 acre of soil but less than 5 acres; therefore a NOI is not required but a TPDES Site Notice is required. The Construction Site Notice (CSN) is required to be posted at the construction site in a publicly accessible location for review by the public, TCEQ, EPA and other Inspectors.

   or

   ☐ This project will disturb equal to or more than 5 acres of soil and will require a NOI and TPDES Site Notice. The NOI and Site Notice are required to be posted at the construction site in a publicly accessible location.

4. ☒ Need to address MS4 requirements (Cameron & Hidalgo Counties only) ☐ MS4 requirements not needed

II. Clean Water Act, Sections 401 and 404 Compliance

Action Items Rquired : ☐ No Action Required

1. ☒ Filling, dredging or excavating in any water bodies, rivers, creeks, streams, wetlands or wet areas is prohibited unless specified in the USACE permit and approved by the Engineer. The contractor shall adhere to all agreements, mitigation plans, and BMPs required by the NWP as regulated by the USACE.

   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 (1/10th to <1/2 acre, 1/3 in tidal waters)

   ☐ Individual 404 Permit Required

   ☐ Other Nationwide Permit Required: NWP#_____

2. ☐ The contractor is responsible for obtaining new or revised Section 404 permit(s) for Contractor initiated changes in construction methods that change Impacts To Waters Of The U.S., including wetlands. The Contractor will ensure that the water quality of the State will be maintained and not degraded.

3. ☒ Best Management Practices for applicable Section 401 General Conditions:

General Condition 12 - Categories I and II BMPs required

Category I (Erosion Control)

☐ Temporary Vegetation	☐ Interceptor Swale	☒ Mulch Filter Berms and/or Socks
☐ Blankets, Matting	☐ Diversion Dike	☒ Compost Filter Berms and/or Socks
☐ Mulch	☐ Erosion Control Compost	☐ Compost Blankets
☐ Sodding		

Category II (Sedimentation Control)

☐ Silt Fence	☐ Hay (Straw) Bale Dike	☒ Mulch Filter Berms and/or Socks
☐ Rock Berm	☐ Brush Berms	☒ Compost Filter Berms and/or Socks
☐ Triangular Filter Dike	☐ Sediment Basins	☐ Stone Outlet Sediment Traps
☐ Sand Bag Berm	☐ Erosion Control Compost	

General Condition 21 - Category III BMPs required

Category III (Post-Construction TSS Control)

☐ Vegetative Filter Strips	☐ Wet Basins	☐ Mulch Filter Berms and/or Socks
☐ Retention/Irrigation	☐ Grassy Swales	☐ Compost Filter Berms and/or Socks
☐ Extended Detention Basin	☐ Vegetation-Lined Ditches	☐ Sand Filter Systems
☐ Constructed Wetlands	☐ Erosion Control Compost	☐ Sedimentation Chambers

II. Clean Water Act, Sections 401 and 404 Compliance - Continued:

4. ☐ The Contractor's designated and qualified Contractor Responsible Person Environmental (CRPe) will monitor the project site daily to ensue compliance with SW3P and TPDES General Permit TXR 150000. Daily Monitoring Reports shall be provided to TxDOT within 48 hours, in accordance with Item 506.3.1.

5. ☒ Other Project Specific Actions:

   1. Contractor must sweep roadway & remove loose aggregate along C&G upon completed daily operations.
   2. Contractor shall not place removed aggregate along adjacent grass areas.
   3. The project locations and limits are near or crosses FEMA Flood Plains. No PSL are allowed in the waters of the U.S. of Floodplain areas.

III. Cultural Resources

Action Items Required : ☐ No Action Required

1. ☒ Refer to the 2014 TxDOT Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges, Item 7.7.1., 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.

2. ☐ Other Project Specific Actions:

IV. Vegetation Resources

Action Items Required : ☐ No Action Required

1. ☒ In accordance with the 2014 TxDOT Standard Specifications; Item 164 - Seeding For Erosion Control; provide and install temporary or permanent seeding for erosion control as shown on the plans or as directed by the Engineer for all seeding and replanting of right of way where possible. (Required for Urban Settings)

2. ☐ In accordance with Executive Order 13112 on invasive species and the Executive Memorandum on Beneficial Landscaping, native species of plants shall be used for all seeding and replanting of right of way where possible for rural roadways. (Required for Rural Settings)

3. ☒ Preserve vegetation where possible throughout the project and minimize clearing, grubbing and excavation within stream banks, bed and approach sections.

4. ☒ Other Project Specific Actions:

   1. Minimize loose aggregate or paving material along grassy areas.

Pharr District Contact No. 956-702-6100 Revised 01/30/2017

List of Abbreviations

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MOA: Memorandum of Agreement	THC: Texas Historical Commission
MOU: Memorandum of Understanding	TPDES: Texas Pollutant Discharge Elimination System
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MSAT: Mobile Source Air Toxic	TxDOT: Texas Department of Transportation
MBTA: Migratory Bird Treaty Act	T&E: Threatened and Endangered Species
NOI: Notice of Intent	USACE: U.S. Army Corp of Engineers
NOT: Notice of Termination	USFWS: U.S. Fish and Wildlife Service

Texas Department of Transportation

PHARR DISTRICT

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6	1137-2-42, ETC		SL 499, ETC.
STATE	DISTRICT	COUNTY	
TEXAS	PHR	CAMERON	
CONTROL	SECTION	JOB	SHEET NO.
1137	02	042, ETC.	118

V. Federal Listed, and Proposed Threatened and Endangered Species, Critical Habitat, State Listed Species, Candidate Species and Migratory Birds

Action Items Required : ☐ No Action Required

1. ☒ Under the Migratory Bird Treaty Act (MBTA) of 1918, codified at 16 U.S.C. § 703-712 and as enforced by the USFWS, the proposed construction work will not remove active nests from bridges, trees, ground and other structures during migratory bird nesting season, (February 1st. through October 1st.). If the Contractor needs to perform work within the right of way during nesting season, a qualified Biologist shall conduct a survey to determine if active nests are present. If present, the Contractor shall maintain a buffer zone around the nest(s) as directed by the Biologist. The buffer zone will be protected from clearing and disturbance until such time as the Biologist has determined that the nest(s) is no longer active. Prior to the nesting season, existing bridges and culverts should be treated against migratory bird nesting by utilizing Bird Exclusion Methods. Bird Exclusion Methods should be monitored and maintained throughout the nesting season. Refer to Standard Bird Exclusion Details.

2. ☒ There is the potential for the presence of state-listed species & species of concern in the project area and state law prohibits the taking (incidental or otherwise) of state-listed species. Taking is defined as the collection, hooking, hunting, netting, shooting, or share by any means or devices. If any listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately.

3. ☒ Other Project Specific Actions:

1. FEDERAL AND STATE LISTED SPECIES:
TEXAS HORNED LIZARD (PHRYNOSOMA CORCUTUM)
TEXAS INDIGO SNAKE ((DRYMARCHON MELANURUS EREBENNUS)
TEXAS TORTOISE (GOPHERUS BERIANDIERI)
BLACK-SPOTTED NEWT (NOTOPHTHTALMUS MERIDIONALIS)
WHITE-LIPPED FROG (LEPTODACTYLUS FRAGILIS)
MEXICAN TREE FROG (SMILISCA BAUDINII)
SHEEP FROG (HYPOPACHUS VARIOLOUS)

2. NO WORK SHALL BE PERFORMED BETWEEN SUNSET AND SUNRISE. CONSTRUCTION AND MAINTENANCE ACTIVITIES SHALL BE CONDUCTED DURING DAYLIGHT HOURS ONLY.

3. SEE EPIC SHEET SUPPLEMENTALS FOR TWPD BPMS FOR LISTED SPECIES.

VI. Hazardous Materials on Contamination Issues

Action Items Required : ☐ No Action Required

General (applies to all projects):

Comply with the Hazard Communication Act (HCA) 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 HCA.

Maintain an adequate supply of on-site spill response materials as indicated in the MSDS. In the event of a spill, take immediate action to mitigate the spill as indicated in the MSDS and in accordance with safe work practices. Contact the TxDOT Pharr 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 (identified as not normal)
- Trash piles, drums, canisters, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of contaminant substances

Any other evidence indicating possible hazardous materials or contamination discovered on site.

1. ☒ If potentially hazardous material and/or contaminated media (i.e.: soil, groundwater, surface water, sediment, building materials) are unexpectedly encountered during construction, assure that such materials and contamination are handled according to applicable federal and state regulations, cease work in the immediate area and contact the Engineer immediately.

VI. Hazardous Materials on Contamination Issues - Continued:

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

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

☐ Yes ☐ No

If "Yes", then TxDOT must retain a Texas Department of State Heal-h Services (DSHS) licensed asbestos consultant to assist with the notification, develop abatement/mit'gation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled abatement activities and/or demolition.

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

4. ☐ The Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and an Asbestos Consultant in order to minimize construction delays and subsequent claims.

VII. Other Environmental Issues

Action Items Required : ☐ No Action Required

1. ☒ Noise

Contractor shall make every reasonable effort to minimize construction noise through abatement measures such as work hour controls and proper maintenance of equipment mufflers.

2. ☒ Air

Contractor shall practice common dust control techniques such as surface chemical treatment or watering of unpaved road surfaces and vehicle speed reduction shall be implemented to minimize and prevent airborne dust during construction.

Contractor should minimize MSAT by utilizing measures to encourage use of EPA required cleaner diesel fuels, limits on idling, increase use of cleaner burning diesel engines, and other emission limitation techniques, as appropriate.

Pharr District Contact No. 956-702-6100 Revised 01/30/2017

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Texas Department of Transportation

PHARR DISTRICT

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	1137-2-42, ETC		SL 499, ETC.
STATE	DISTRICT	COUNTY	
TEXAS	PHR	CAMERON	SHEET NO.
CONTROL	SECTION	JOB	
1137	02	042, ETC.	119

TPWD BMPs

Under Section 12.0011 of the Texas Parks and Wildlife Code, Texas Parks and Wildlife Department (TPWD) is charged with "providing recommendations that will protect fish and wildlife resources to local, state, and federal agencies that approve, permit, license, or construct developmental projects" and "providing information on fish and wildlife resources to any local, state, and federal agencies or private organizations that make decisions affecting those resources."

The purpose of this section is to provide beneficial management practices (BMP) that should be implemented during construction, and maintenance activities statewide for transportation projects with the goal of avoidance and minimization of impacts to natural resources. Statewide Standard BMP pertain to all fish and wildlife species, including state-listed species and other Species of Greatest Conservation Need (SGCN). Implementing the recommendations as outlined below will improve conservation of species and their habitat.

☒ General Design/Construction BMPs

- ☒ Prior to start of construction, information will be provided to personnel of the potential for all state-listed threatened species or other SGCN to occur within the project area and should be advised of relevant rules and regulations to protect plants, fish, and wildlife.
- ☒ Contractor should avoid harming all wildlife species if encountered and allow them to safely leave the project site. Due diligence should be used to avoid killing or harming any wildlife species in the implementation of transportation projects.
- ☐ Contractors should install wildlife exclusion fencing and should examine the inside of the exclusion area daily to determine if any wildlife species have been trapped inside the area of impact and provide safe egress opportunities prior to initiation of construction activities.
- ☐ Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas around wetlands and in riparian areas.
- ☐ Contractor should use woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided.
- ☒ Project staging areas, stockpiles, temporary construction easements, and other project related sites should be situated in previously disturbed areas to avoid or minimize impacts to sensitive or unique habitats including intact native vegetation, floodplains, riparian corridors, wetlands, playa lakes, and habitat for wildlife species.
- ☐ When lighting is added, consider wildlife impacts from light pollution and incorporating dark-sky practices into design strategies. Minimize sky glow by focusing light downward, with full cutoff luminaries to avoid light emitting above the horizontal. The minimum amount of night-time lighting needed for safety and security should be used.

☒ Vegetation BMPs

- ☒ Minimize the amount of vegetation cleared. Removal of native vegetation, particularly mature native trees and shrubs should be avoided. Impacted vegetation should be replaced with in-kind on- site replacement /restoration of native vegetation.
- ☐ It is strongly recommended that trees greater than 12 inches in diameter at breast height (DBH) that are removed be replaced. TPWD 5/32 s experience indicates that for ecologically effective replacement, a ratio of three trees for every one (3:1) lost should be provided to either on-site or off-site. Trees less than 12 inches DBH should be replaced at a 1:1 ratio.
- ☐ The use of any non-native vegetation in landscaping and revegetation is discouraged. Locally adapted native species should be used.
- ☐ The use of seed mix that contains seeds from only regional ecotype native species is recommended

☐ Invasive Species BMPs

- ☐ For all work in water bodies designated as 3/32 infested 5/32 or 3/32 positive 5/32 for invasive zebra (Dreissena polymorpha) OR quagga mussels (Dreissena bugensis) as well as waters downstream of these lakes, all machinery, equipment, vessels, or vehicles coming in contact with such waters should be cleaned prior to leaving the site to remove any mud, plants, organisms, or debris, water drained (if applicable), and dried completely before use in another water body to prevent the potential spread of invasive mussels.
- ☐ Care should be taken to prevent the spread of aquatic and terrestrial invasive plants during construction activities.
- ☐ Care should be taken to avoid the spread of aquatic invasive plants such as giant Salvinia (Salvinia molesta), common salvinia (Salvinia minima), hydrilla (Hydrilla verticillata), water hyacinth (Eichhornia spp.), Eurasian watermilfoil (Myriophyllum spicatum), water lettuce (Pistia stratiotes), and alligatorweed (Alternanthera philoxeroides) from infested water bodies into areas not currently infested. All machinery, equipment, vessels, boat trailers, or vehicles coming in contact with waters containing aquatic invasive plant species should be cleaned prior to leaving the site to remove all aquatic plant material and dried completely before use on another water body to prevent the potential spread of invasive plants. Removed plants should be transported for disposal in a secure manner to prevent dispersal.
- ☐ Only native or non-invasive plants should be planted. Care should be taken to avoid mowing invasive giant reed (Arundo donax), which spreads by fragmentation, and to clean equipment if inadvertently mowed to prevent spread. If using hay bales for sediment control, use locally grown weed-free hay to prevent the spread of invasive species. Leave the hay bales in place and allow them to break down, as this acts as mulch assisting in revegetation.

☐ Stream Crossings BMPs

- ☐ Riparian buffer zones should remain undisturbed.

☐ Dewatering BMPs

- ☐ Impact avoidance measures for aquatic organisms, including all native fish and freshwater mussel species, regardless of state-listing status, should be considered during project planning and construction activities.

☐ Wildlife Crossing BMPs

- ☐ Incorporate wildlife crossings with fencing, particularly in areas that bisect wildlife travel corridors or seasonal movement routes to avoid further habitat fragmentation and minimize wildlife-vehicle interactions.

☐ Rare Plant BMPs

- ☐ Avoid impacts and minimize unavoidable impacts. Plant locations should be protected with temporary barrier fencing and contractors should be instructed to avoid protected areas. Conducting construction outside of the growing season or after a plant has produced mature fruit is the preferred way to avoid/minimize impacts to SGCN plant populations. Staging areas, stockpiles, and other project related sites on TxDOT ROW should not impact SGCN plant populations. After construction begins, minimize herbicide use near SGCN plant populations (if possible, use hand-held spot sprayers, several meters from rare plants, on still or days with little wind).

Pharr District Contact No. 956-702-6100

☐ Rare Plants BMPs (Continued)

- ☐ If there are unintended impacts to SGCN populations, these impacts should be reported to TPWD Transportation Staff.
- ☐ During project period, conduct work during times of the year when plants are dormant and/or conditions minimize disturbance of the habitat.

☒ Bird BMPs

- ☐ Avoid vegetation clearing activities during the general bird nesting season, February 15th to October 1st to minimize adverse impacts to birds.
- ☒ Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.
- ☐ Minimize extended human presence near nesting birds during construction and maintenance activities. Protect sensitive habitat areas with temporary barriers or fencing to limit human foot- traffic and off-road vehicle use to alert and discourage contractors from causing any unintentional impacts.
- ☒ Minimize construction noise above ambient levels during general bird nesting season to minimize adverse impacts on birds.
- ☒ Minimize construction lighting during the general bird nesting season by scheduling work activities between dawn and dusk.

☐ Rookeries BMPs

- ☐ In general, nesting dates for herons and egrets range from early February to late August in Texas, depending on the species. Great blue herons (GBHE) (Ardea herodis) are usually the first to nest. When GBHE get disrupted from the nest and abandon nesting, then the other species of herons and egrets may not attempt to nest at the colony that year.
- ☐ If rookeries are enccuntered, avoid and minimize disturbance during nesting to protect rookery species and their habitat.
- ☐ Vegetation clearing in a primary buffer area of 300 meters (984 feet) from a rockery or heronry periphery should be avoided. Utilizing areas that have already been cleared within this buffer area may be acceptable depending on site-specific characteristics. Additionally, human foot-traffic or machinery use should not occur within this buffer area during the nesting season.
- ☐ Clearing activities cr construction using heavy machinery in a secondary buffer area of 1000 meters (3281 feet) from the heronry periphery should be avoided during the breeding season (courting and nesting).

Revised 02/24/2022

List of Abbreviations

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MS4: Municipal Separate Stormwater Sewer System	SW3P: Storm Water Pollution Prevention Plan	

Texas Department of Transportation

PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

SHEET 1 OF 3

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6	1137-2-42, ETC		SL 499, ETC.
STATE	DISTRICT	COUNTY	
TEXAS	PHR	CAMERON	SHEET NO.
CONTROL	SECTION	JOB	
1137	02	042, ETC.	120

☐ Fish BMPs

- ☐ The following Fish BMP apply to projects for all fish species in waters of the state to minimize impacts to water quality and aquatic passage from transportation projects.
- ☐ For projects in waters of the state and work is adjacent to water: follow Water Quality and Stream Crossing BMPs.
- ☐ For projects in waters of the state and work is in the water: follow Water Quality, Stream Crossing, and Dewatering BMP.

☐ Aquatic Invertebrate BMPs

- ☐ For projects within the range of a SGCN or state-listed species and work is adjacent to water: Water Quality and Stream Crossing BMP
- ☐ For projects within the range of a SGCN or state-listed species and work is in the water: Water Quality, Stream Crossing, and Dewatering BMP.
- ☐ For spring-seep associated caddisflies (Cheumatopsyche morsei, Chimarra holzenthali, and Hydroptila ouachita): Avoid or minimize impacts to the natural riparian buffer along stream channel including native shrubs and trees.

☐ Crayfish BMP

- ☐ For projects within the range of a SGCN or state-listed species and work is adjacent to water: Water Quality and Stream Crossing BMP.
- ☐ For projects within the range of a SGCN or state-listed species and work is in the water: Water Quality, Stream Crossing, and Dewatering BMP.
- ☐ Avoid or minimize impacts to the natural riparian buffer that provides terrestrial and aquatic plant matter for the diet of most crayfish species.

☐ Freshwater Mussel BMP

- ☐ In addition to Water Quality and Stream Crossing BMP, follow the most recent, $^{7}/_{32}$ TPWD$^{9}/_{32}$ TxDOT Annual Work Plan for Pre-Construction Surveys, Aquatic Resources Relocations, and Other Best Management Practices to Avoid, Minimize, and Mitigate Impacts to Freshwater Resources.$^{9}/_{32}$
- ☐ When work is adjacent to the water: Water Quality BMP implemented as part of the Texas Commission on Environmental Quality (TCEQ) Stormwater Pollution Prevention Plan (SWPPP) for a construction general permit or any conditions of the 401 Water Quality Certification for the project will be implemented.

☒ Insect Pollinator BMP

- ☐ Deep soil disturbances, such as, tilling or deep disking in areas that host aggregations of ground- nesting bees should be avoided. Tilling and disking also may promote the invasion or germination of non-native plants. Different species of native ground-nesting bees prefer different soil conditions, although research suggests that many ground nesting bees prefer sandy, loamy sand or sandy loam soils. In areas with these soil types consider leaving open patches of soil.
- ☒ Allow dead trees to stand (so long as they do not pose a risk to property or people) and protect shrubs and herbaceous plants with pithy or hollow stems (e.g., cane fruits, sumac, elderberry), as these provide nesting habitat for tunnel-nesting native bees.
  Retain dead or dying branches whenever it is safe and practical at the edges of the ROW. Wood- boring beetle larvae often fill dead trees and branches with narrow tunnels into which tunnel- nesting bees will establish nests. Additionally, bumble bees may choose to nest in wood piles.
- ☒ Retain rotting logs at edges of the ROW where some bee species may burrow tunnels in which to nest.

☒ Insect Pollinator BMP (Continued)

- ☒ Protect sloped or well-drained ground sites where plants are sparse and direct access to soil is available. These are the areas where ground-nesting bees may dig nests. Turning the soil destroys all ground nests that are present at that depth and hinders the emergence of bees that are nesting deeper in the ground.
- ☒ Protect grassy thickets, or other areas of dense, low cover from mowing or other disturbance. These are the sites where bumble bees might find the nest cavities they need, as well as annual and perennial wildflowers that can provide important food resources.
- ☐ Where available and economical, native plants and seed should be procured from local eco-type providers. Seed mixes should be diverse and include as many ecoregion natives as possible ensuring full season floral resources. Species by Texas ecoregion can be found in the Texas Management Recommendations for Native Insect Pollinators in Texas document: https://tpwd.texas.gov/publications/pwdpubs/media/pwd*bk*w7000*1813.pdf
- ☐ Planting at least three different native flowering plants within each of three blooming periods are recommended (spring, summer, early fall) in high rainfall regions of Texas. In drier regions of the state, a target of three native flowering plants within each of two blooming periods can be used.

☐ Small Mammal BMP

For Coues' rice rat (Oryzomys couesi aquaticus):

- ☐ Minimize impacts to wetland, resaca, oxbow Conversion of property containing cave or cliff features to transportation purposes should be avoided.lake, and marsh habitats
- ☐ Water Quality BMP

☐ Fossorial Mammal BMP

- ☐ When a construction zone is adjacent to active BTPD burrows or pocket gopher mounds, erect barriers to discourage individuals moving through or into the construction area.
- ☐ When seeding or revegetation is planned in an area adjacent to BTPD burrows or pocket gopher mounds, a vegetative barrier should be considered in the planting to discourage dispersal into the ROW.

☐ Bat BMP

- ☐ For activities that have the potential to impact structures, cliffs or caves, or trees; a qualified biologist will perform a habitat assessment and occupancy survey of the feature(s) with roost potential as early in the planning process as possible or within one year before project letting.
- ☐ For roosts where occupancy is strongly suspected but unconfirmed during the initial survey, revisit feature(s) at most four weeks prior to scheduled disturbance to confirm absence of bats.
- ☐ If bats are present or recent signs of occupation (i.e., piles of guano, distinct musky odor, or staining and rub marks at potential entry points) are observed, take appropriate measures to ensure that bats are not harmed, such as implementing non-lethal exclusion activities or timing or phasing of construction.
- ☐ Exclusion devices can be installed by a qualified individual between September 1 and March 31. Exclusion devices should be used for a minimum of seven days when minimum nighttime temperatures are above 50°F AND minimum daytime temperatures are above 70°F. Prior to exclusion, ensure that alternate roosting habitat is available in the immediate area. If no suitable roosting habitat is available, installation of alternate roosts is recommended to replace the loss of an occupied roost. If alternate roost sites are not provided, bats may seek shelter in other inappropriate sites, such as buildings, in the surrounding area.

Pharr District Contact No. 956-702-6100

☐ Bat BMP (Continued)

- ☐ If feature(s) used by bats are removed as a result of construction, replacement structures should incorporate bat-friendly design or artificial roosts should be constructed to replace these features.
- ☐ Avoid unnecessary removal of dead fronds on native and ornamental palm trees in south Texas (Cameron, Hidalgo, Willacy, Kenedy, Brooks, Kleberg, Nueces, and San Patricio counties) from April 1 through October 31. If removal of dead fronds is necessary at other times of the year, limit frond removal to extended warms periods (nighttime temperatures = 55°F for at least two consecutive nights), so bats can move away from the disturbance and find new roosts.
- ☐ Large hollow trees, snags (dead standing trees), and trees with shaggy bark should be surveyed for colonies and, if found, should not be disturbed until the bats are no longer occupying these features. Post-occupancy surveys should be conducted by a qualified biologist prior to tree removal from the landscape.
- ☐ Retain mature, large diameter hardwood forest species and native/ornamental palm trees.
- ☐ In all instances, avoid harm or death to bats. Bats should only be handled as a last resort and after communication with TPWD.

☒ Aquatic Amphibian and Reptile BMP

For projects within existing right-of-way (ROW) when work is in water or will permanently impact a water feature and potential habitat exists for the target species complete the following:

- ☒ Minimize impacts to wetlands, temporary and permanent open water features, including depressions, and riverine habitats.
- ☐ Maintain the existing hydrologic regime and any connections between wetlands and other aquatic features.
- ☒ Use barrier fencing to direct animal movements away from construction activities and areas of potential wildlife-vehicle collisions in construction areas directly adjacent, or that may directly impact, potential habitat for the target species.
- ☐ Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas around wetlands and in riparian areas. If erosion control blankets or mats will be used, the product should not contain netting, but should only contain loosely woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided.
- ☒ Project specific locations (PSLs) proposed within state-owned ROW should be located in uplands away from aquatic features.
- ☐ When work is directly adjacent to the water, minimize impacts to shoreline basking sites (e.g., downed trees, sand bars, exposed bedrock) and refugia/overwinter sites (e.g., brush and debris piles, crayfish burrows, aquatic logjams, and leaf packs).

Revised 02/24/2022

List of Abbreviations

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

Texas Department of Transportation

PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6	1137-2-42, ETC		SL 499, ETC.
STATE	DISTRICT	COUNTY	
TEXAS	PHR	CAMERON	
CONTROL	SECTION	JOB	SHEET NO.
1137	02	042, ETC.	121

☐ Aquatic Amphibian and Reptile BMP (Continued)

- ☐ If gutters and curbs are part of the roadway design, install gutters that do not include the side box inlet and include sloped (i.e., mountable) curbs to allow small animals to leave roadway. If this modification to the entire curb system is not possible, install sections of sloped curb on either side of the storm water drain for several feet to allow small animals to leave the roadway. Priority areas for these design recommendations are those with nearby wetlands or other aquatic features.

For projects that require acquisition of additional ROW and work within that new ROW is in water or will permanently impact a water feature, implement BMP for projects within existing ROW above plus those below:

- ☐ For sections of roadway adjacent to wetlands or other aquatic features, install wildlife barriers that prevent climbing. Barriers should terminate at culvert openings in order to funnel animals under the road. The barriers should be of the same length as the adjacent feature or 80 feet long in each direction, or whichever is the lesser of the two.
- ☐ For culvert extensions and culvert replacement/installation, incorporate measures to funnel animals toward culverts such as concrete wingwalls and barrier walls with overhangs.
- ☐ When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of terrestrial or aquatic wildlife through the water feature. Biotechnical streambank stabilization methods using live native vegetation, or a combination of vegetative and structural materials should be used.

☒ Terrestrial Amphibian and Reptile BMP

- ☐ For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left uncovered. Visually inspect excavation areas for trapped wildlife prior to backfilling
- ☒ Avoid or minimize disturbing or removing cover objects, such as downed trees, rotting stumps, brush piles, and leaf litter. If avoidance or minimization is not practicable, consider removing cover objects prior to the start of the project and replace them at project completion.
- ☒ Examine heavy equipment stored on site before use, particularly after rain events when reptile and amphibian movements occur more often, to ensure use will not harm individuals that might be seeking temporary refuge.
- ☐ Due to increased activity (mating) of reptiles and amphibian during the spring, construction activities like clearing or grading should attempt to be scheduled outside of the spring (March-May) season.
  Also, timing ground disturbing activities before October when reptiles and amphibians become less active and may be using burrows in the project area is also encouraged.
- ☒ If Texas tortoises (Gopherus berlandieri) or box turtles (Terrepene spp.) are present in a project area, they should be removed from the area and relocated between 100 and 200 meters from the project area. After removal of the individuals, the area that will be disturbed during active construction and project specific locations should be fenced off to exclude reentry by turtles, tortoises, and other reptiles. The exclusion fence should be constructed and maintained as follows:
  - The exclusion fence should be constructed with metal flashing or drift fence material.
  - Rolled erosion control mesh material should not be used.
  - The exclusion fence should be buried at least 6 inches deep and be at least 24 inches high.
  - The exclusion fence should be maintained for the life of the project and only removed after the construction is completed and the disturbed site has been revegetated.

☐ Terrestrial Amphibian and Reptile BMP (Continued)

- ☐ After project is complete, revegetate disturbed areas with an appropriate locally sourced native seed mix. If erosion control blankets or mats will be used, the product should not contain nylon netting, but should only contain loosely woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided.

☒ Black-spotted newt/Mexican Burrowing toad/ Mexican treefrog/ Strecker's chorus frog/White-lipped frog/Woodhouse's toad

- ☒ Aquatic Amphibian and Reptile BMP
- ☒ Terrestrial Amphibian and Reptile BMP
- ☒ Water Quality BMP
- ☒ Vegetation BMP

☒ Sheep Frog

- ☒ Minimize disturbance to burrows or downed woody debris
- ☒ Aquatic Amphibian and Reptile BMP
- ☒ Terrestrial Amphibian and Reptile BMP
- ☒ Water Quality BMP
- ☒ Vegetation BMP

☐ South Texas Siren (Large Form)

- ☐ Minimize impacts to warm, shallow waters with vegetative cover such as ponds and ditches
- ☐ Aquatic Amphibian and Reptile BMP
- ☐ Water Quality BMP

Black-striped snake/ Eastern box turtle/Northern cat-eyed snake/Plateau spot-tailed earless lizard/ Reticulate collared lizard/ Slender glass lizard/ Speckler racer/Tamaulipan spot-tailed earless lizard/ Texas Indigo snake/ Western box turtle/Western hognose

☒ snake/Western massasauga

- ☒ Terrestrial Amphibian and Reptile BMP
- ☒ Vegetation BMP

☐ Rio Grande River Cooter

- ☐ Aquatic Amphibian and Reptile BMP
- ☐ Water Quality BMP

☒ Texas Horned Lizard

- ☒ Avoid harvester ant mounds in the selection of Project Specific Locations (PSLs).
- ☒ Terrestrial Amphibian and Reptile BMP
- ☒ Vegetation BMP

☒ Texas Tortoise

- ☒ Utility trenches should be covered overnight or visually inspected before filling to avoid burial of the species
- ☒ Terrestrial Amphibian and Reptile BMP
- ☒ Vegetation BMP

Pharr District Contact No. 956-702-6100

OTHER PERTINENT INFORMATION

☐ Trifold Available

- ☐ Ocelot information
- ☐ Pelican information
- ☐ Ashy dogweed

☐ Stockcards Available

- ☐ Mitigatory Bird Treaty Act
- ☐ Texas Tortoise
- ☐ Harvester Ants and Horn Lizards

Revised 02/24/2022

List of Abbreviations

BMP: Best Management Practice	MSAT: Mobile Source Air Toxic	TCEQ: Texas Commission on Environmental Quality
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MS4: Municipal Separate Stormwater Sewer System	SW3P: Storm Water Pollution Prevention Plan	

Texas Department of Transportation

PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6	1137-2-42, ETC		SL 499, ETC.
STATE	DISTRICT	COUNTY	
TEXAS	PHR	CAMERON	SHEET NO.
CONTROL	SECTION	JOB	
1137	02	042, ETC.	122

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

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

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

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):

_1137-02-032, ETC._____

1.2 PROJECT LIMITS:

From: Various Limits

To: Various Limits

1.3 PROJECT COORDINATES:

BEGIN: (Lat)_____,(Long)_____

END: (Lat)_____,(Long)_____

1.4 TOTAL PROJECT AREA (Acres): XXXX Acres

1.5 TOTAL AREA TO BE DISTURBED (Acres): N/A

1.6 NATURE OF CONSTRUCTION ACTIVITY: Overlay

_____

_____

_____

1.7 MAJOR SOIL TYPES:

Soil Type	Description
See EPIC Sheet	

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

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

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

Type	Sheet #s

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

1.9 CONSTRUCTION ACTIVITIES:

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

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

1.10 POTENTIAL POLLUTANTS AND SOURCES:

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

☐ Other: _____
_____
☐ Other: _____
_____
☐ Other: _____
_____

1.11 RECEIVING WATERS:

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

Tributaries	Classified Waterbody

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

X Development of plans and specifications
X Perform SWP3 inspections
X Maintain SWP3 records and update to reflect daily operations
☐ Other: _____
_____
☐ Other: _____
_____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

X Day To Day Operational Control
X Maintain schedule of major construction activities
X Install, maintain and modify BMPs
☐ Other: _____
_____
☐ Other: _____
_____
☐ Other: _____
_____

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED
PROFESSIONAL ENGINEER

11/6/2023

Eugene Palacios

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

July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		123

STATE	STATE DIST.	COUNTY	
TEXAS	PHARR	CAMERON	
CONT.	SECT.	JOB	HIGHWAY NO.
1137	02	042, ETC.	SL 499, ETC.

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

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

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

2.1 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

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

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: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED
PROFESSIONAL ENGINEER

11/6/2023

Eugene Palacios

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☐ Concrete and Materials Waste Management
- ☐ Debris and Trash Management
- ☐ Dust Control
- ☐ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

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

Type	Stationing	
	From	To

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.

2.8 DEWATERING:

2.9 INSPECTIONS:

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

2.10 MAINTENANCE:

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

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

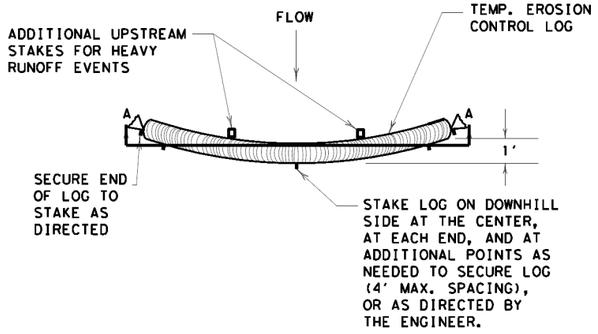
July 2023 Sheet 2 of 2

Texas Department of Transportation

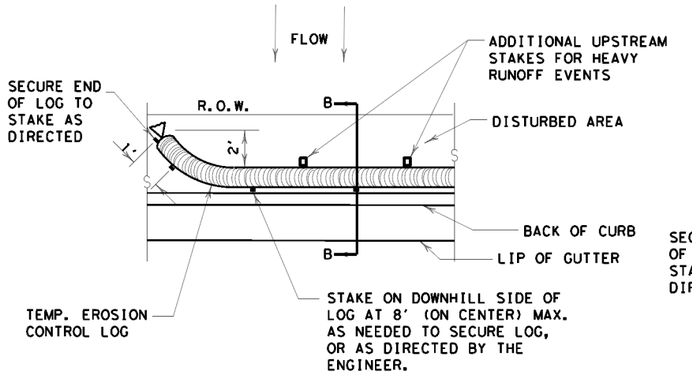
FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		124

STATE	STATE DIST.	COUNTY	
TEXAS	PHARR	CAMERON	
CONT.	SECT.	JOB	HIGHWAY NO.
1137	02	042, ETC.	SL 499, ETC.

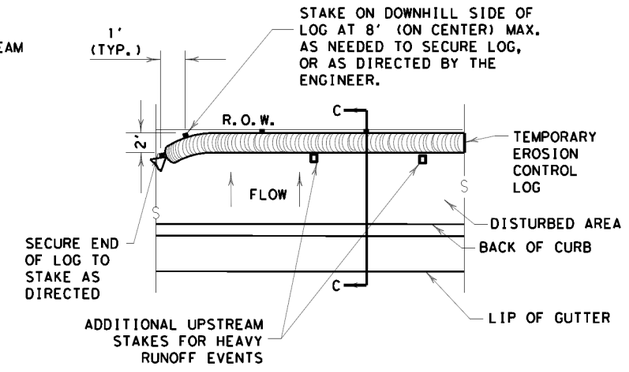
DATE:
FILE:



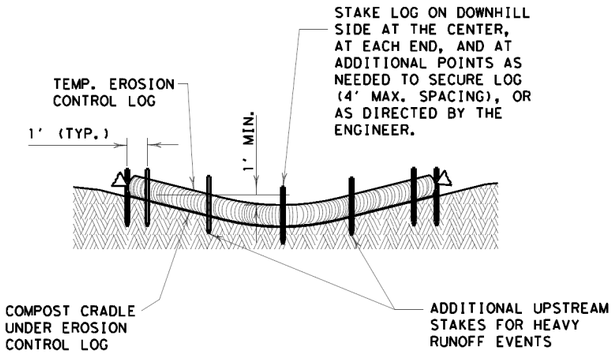
PLAN VIEW



PLAN VIEW



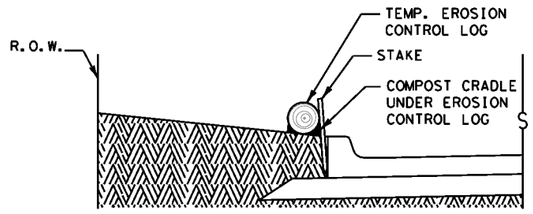
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

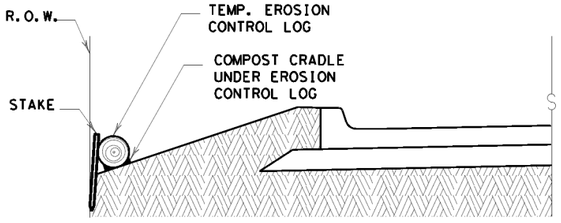
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

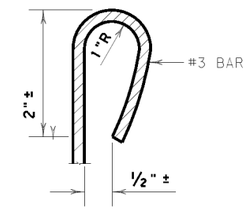
CL-ROW

GENERAL NOTES:

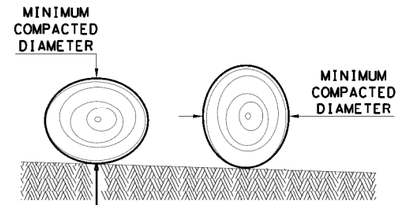
1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE 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.

LEGEND

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



REBAR STAKE DETAIL



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

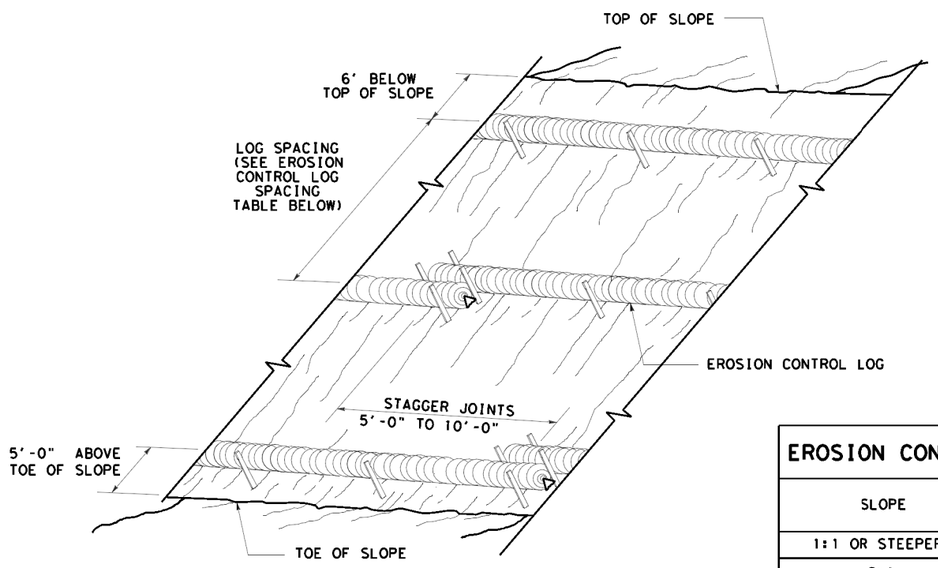
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

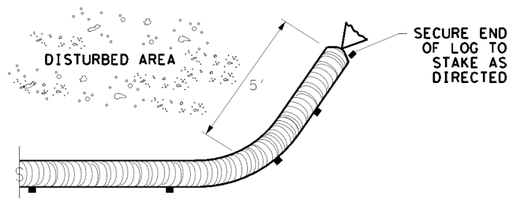
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	RMC		HIGHWAY	
REVISIONS	1137	02 042,ETC.	SL 499,ETC.	
	DIST	COUNTY	SHEET NO.	
	PHR	CAMERON	125	

DATE:
FILE:



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

CL-SST

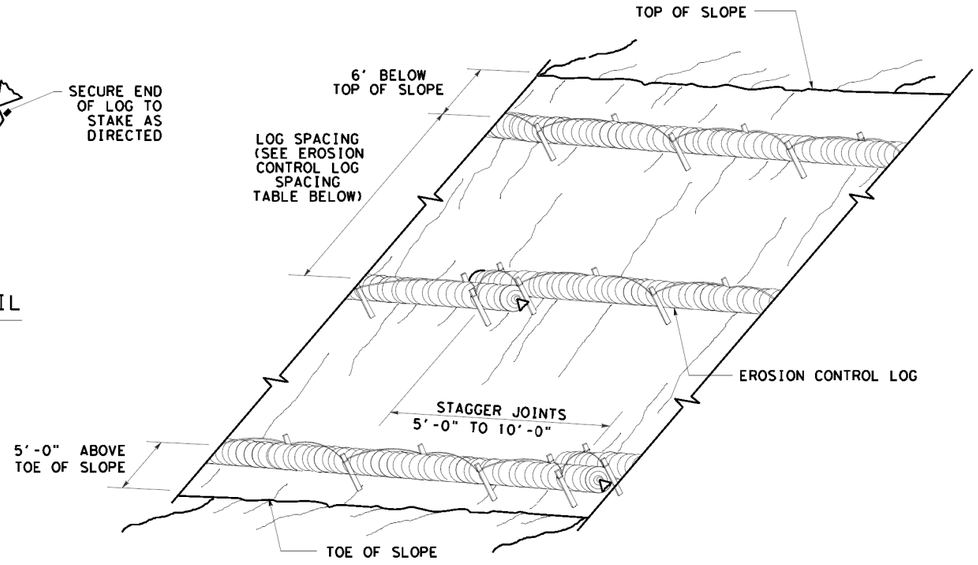


END SECTION RAP DETAIL

EROSION CONTROL LOG SPACING TABLE

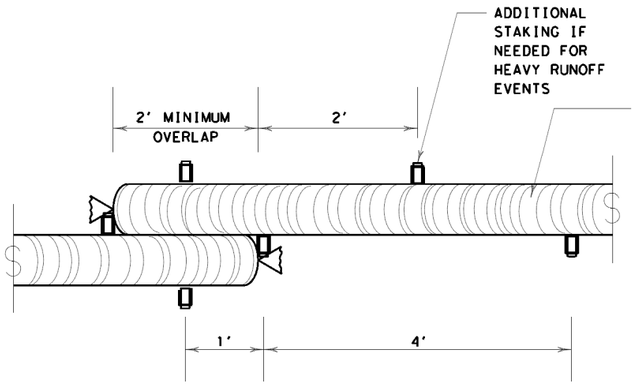
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

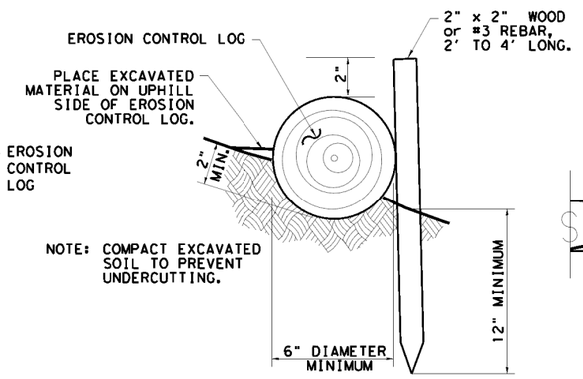
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL



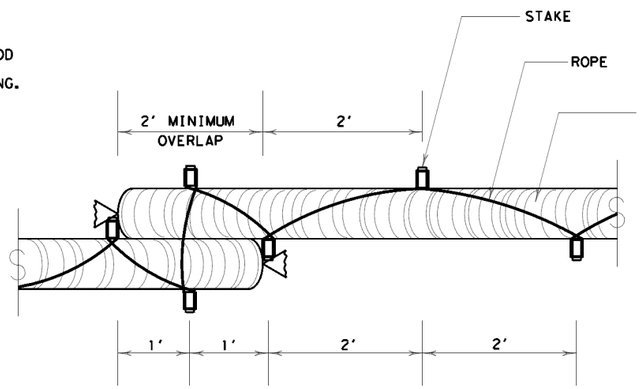


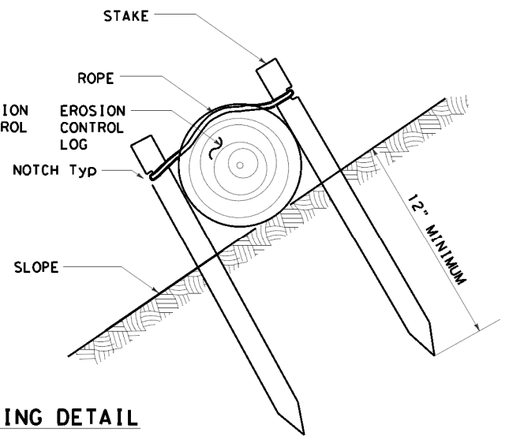
STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

TRENCH DEPTH TABLE

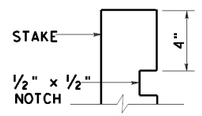
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

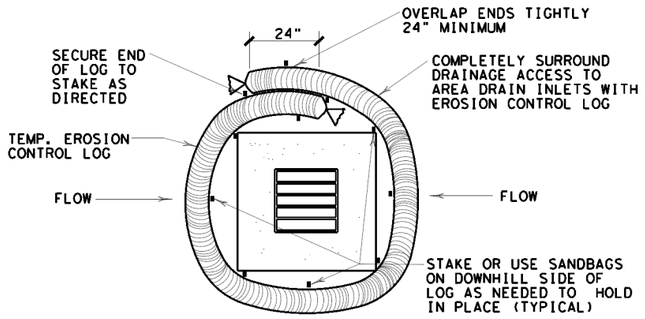
Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

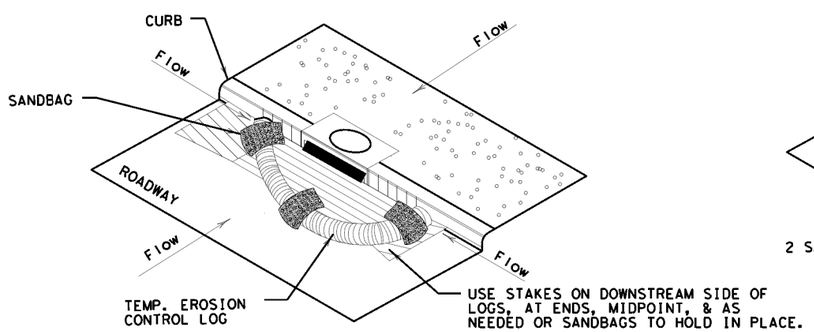
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT CK: LS
© TxDOT: JULY 2016	RMC		HIGHWAY
REVISIONS	1137 02 042,ETC.		SL 499,ETC.
	DIST	COUNTY	SHEET NO.
	PHR	CAMERON	126

DATE:
FILE:



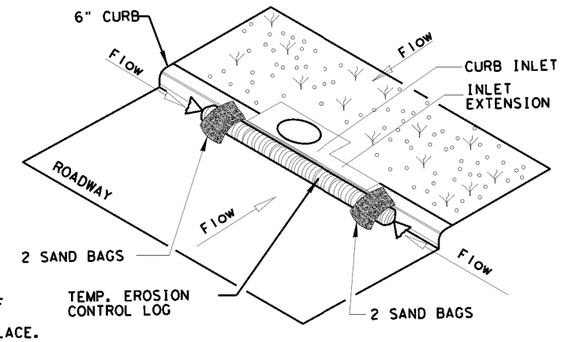
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

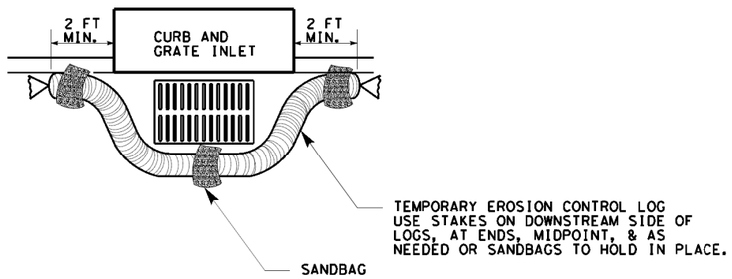
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

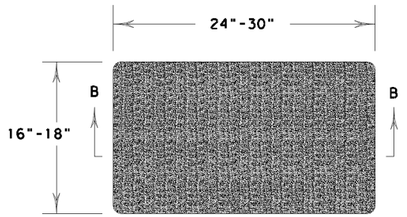
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS	
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REVISIONS	1137	02 042,ETC.	SL 499,ETC.		
	DIST	COUNTY	SHEET NO.		
	PHR	CAMERON	127		