INDEX OF SHEETS

SHEET	DESCRIPTION
SEE SHEET 2	

REGISTERED ACCESSIBILITY SPECIALIST (RAS) INSPECTION REQUIRED -

TDLR No. TABS2023016258

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENTS

PROJECT No. F 2B23(147)

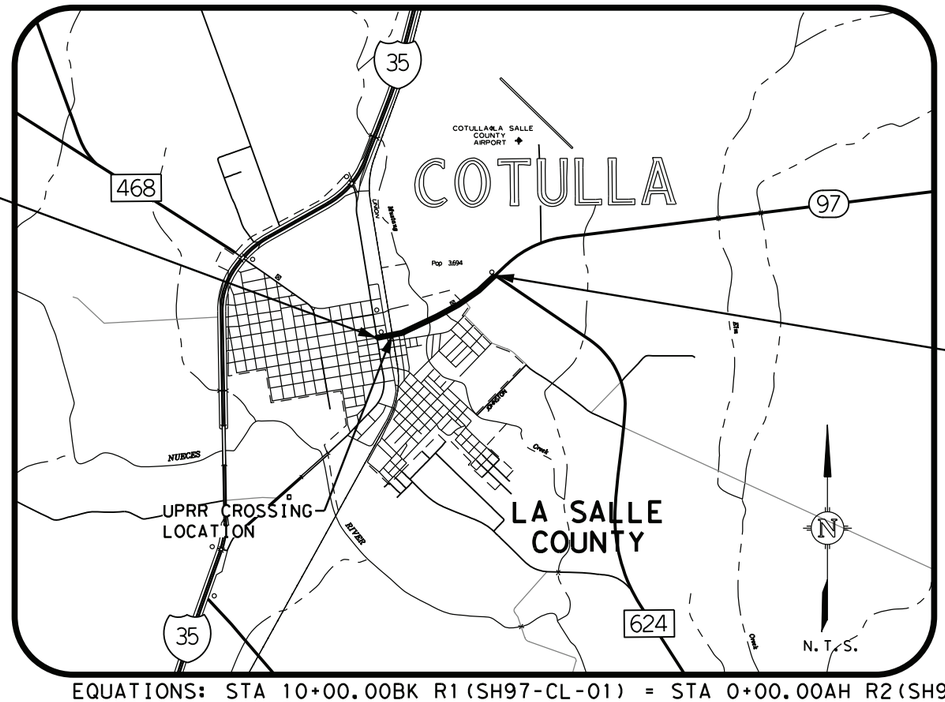
SH 97
LA SALLE COUNTY
CSJ:0483-01-052

NET LENGTH OF PROJECT : RDWY 4,305.67 FT. = 0.816 MI.
BRGS 182.33 FT. = 0.034 MI.
TOTAL 4,488.00 FT. = 0.850 MI.

LIMITS: FROM: BI-35C
TO: FM 624 INTERSECTION

FOR THE CONSTRUCTION OF REHABILITATION OF EXISTING ROADWAY CONSISTING OF BASE, ACP, SIGNING & PAVEMENT MARKINGS

STA: 6+22.23 R1
BEGIN PROJECT
CSJ: 0483-01-052
REF. MRK: 446-0.036
LAT: 28.4368363°
LONG: -099.2351598°



STA: 37+55.03 R2
END PROJECT
CSJ: 0483-01-052
REF. MRK: 446+0.814
LAT: 28.4424097°
LONG: -099.2229571°

EQUATIONS: STA 10+00.00BK R1(SH97-CL-01) = STA 0+00.00AH R2(SH97-CL-01)= +1,000.00 FT
EXCEPTIONS: NONE
RAILROAD CROSSINGS: UP RR
12.93 FT.= 0.002 MI.
DOT# 448996Y
RRMP= 0345.22

FEDROAD DIV.NO	STATE	STATE PROJECT NO.	SHEET NO.
6	TEXAS	F 2B23(147)	1
STATE DIST.NO	COUNTY	STATE CONTROL NO.	HIGHWAY NO.
22	LA SALLE	0483-01-052	SH 97

DESIGN CRITERIA: 3R
ADT (2017): 7,800
ADT (2037): 14,100
% TRUCK IN ADT: 30.2
FUNCTIONAL CLASS: MAJOR COLLECTOR (URBAN)
DESIGN SPEED: 30 M.P.H.

FINAL PLANS

LETTING DATE:
DATE CONTRACTOR BEGAN WORK:
DATE WORK WAS ACCEPTED:
CONTRACTOR:
TOTAL CONTRACTOR COST:

THE CONSTRUCTION WAS PERFORMED UNDER MY SUPERVISION IN ACCORDANCE WITH THE PLANS AND CONTRACT

AREA ENGINEER

DATE

SUBMITTED FOR LETTING: 5/11/2023
Erin N. Gonzales
TRANSPORTATION ENGINEER

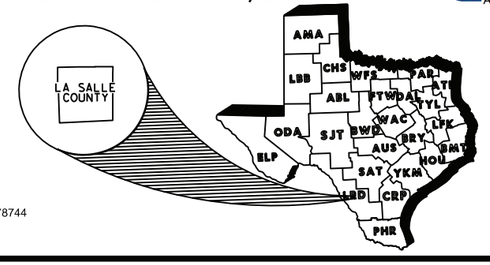
RECOMMENDED FOR LETTI 5/25/2023
DocuSigned by:
FB902A547110416...

RECOMMENDED FOR LETTING: 5/26/2023
DocuSigned by:
Roberto Rodriguez III
B6BEDC41D58848E...
DIRE
PLANNING, & DEVELOPMENT

APPROVED FOR L 5/26/2023
DocuSigned by:
A5A9883ECD1E4F7...

STATE OF TEXAS
ERIN N. GONZALES
102407
LICENSED
PROFESSIONAL ENGINEER
Erin N. Gonzales
5/11/2023

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION ON NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, JULY 5, 2022)



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5/11/2023 SH97-NEW G:\TXC\Projects\TxDOT\4258-01 SH 97\03*CADD\00-GEN\SH97-TTL*PKG01.dgn

INDEX OF SHEETS

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

Erin N. Gonzales

ERIN N GONZALES, P.E. 6/28/2023

DATE

STATE OF TEXAS
ERIN N. GONZALES
102407
LICENSED
PROFESSIONAL ENGINEER

Erin N. Gonzales

6/28/2023

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SH 97

INDEX OF SHEETS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			2
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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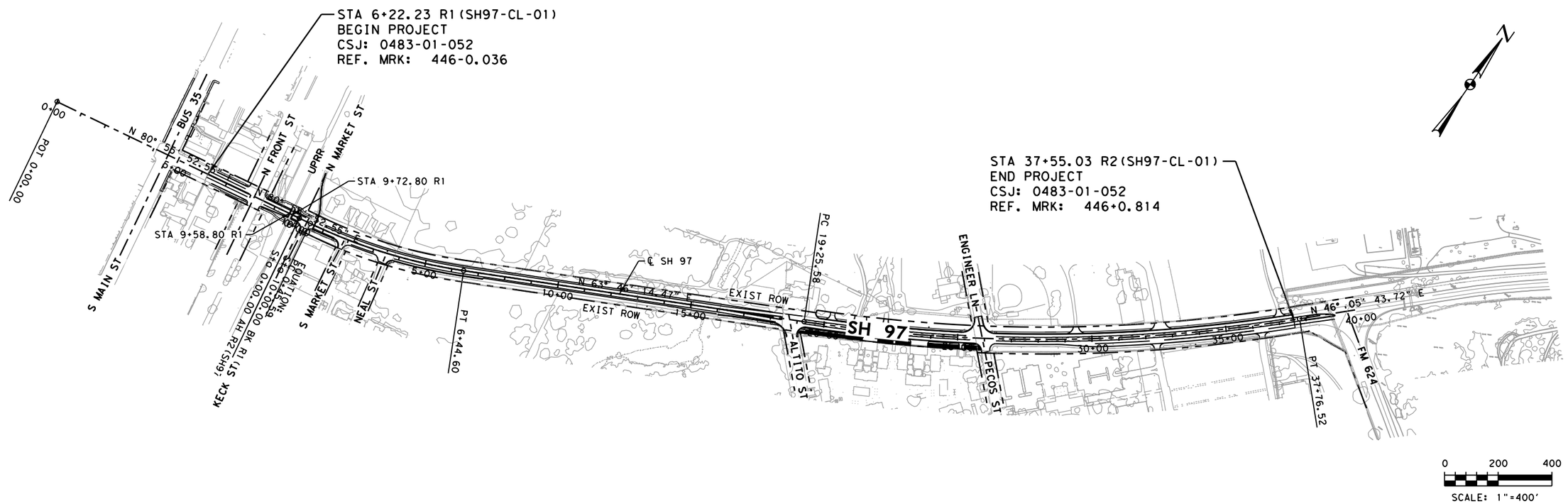

4/20/2023

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SH 97

PROJECT LAYOUT

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			3
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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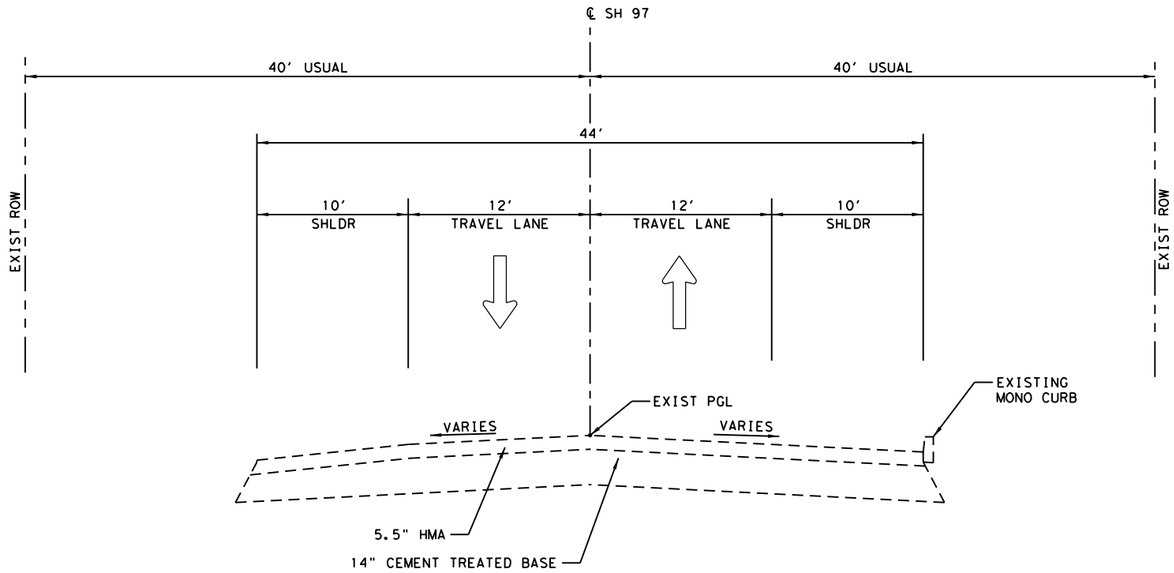
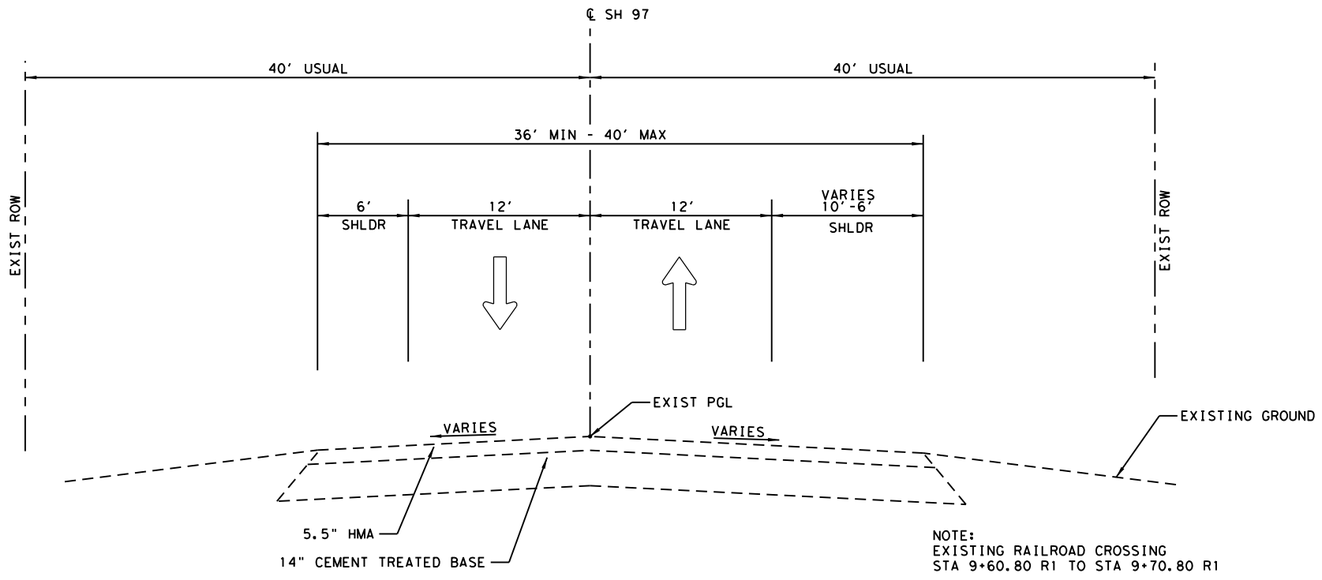


EXISTING TYPICAL SECTION

STA 6+22.23 R1 TO STA 7+99.99 R1



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STA 7+99.99 R1 TO STA 9+60.80 R1
STA 9+70.80 R1 TO STA 0+98.42 R2

0 5 10
SCALE: 1"=10' H
1"=5' V

4/20/2023

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EXISTING TYPICAL SECTION

SHEET 1 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			4
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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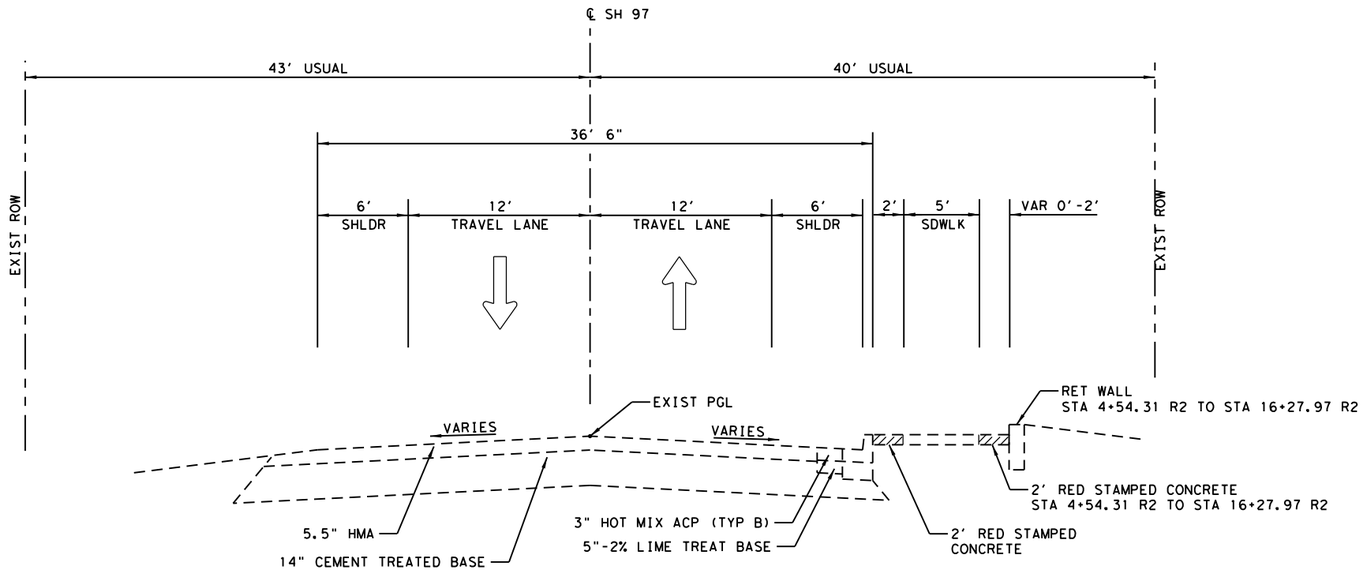
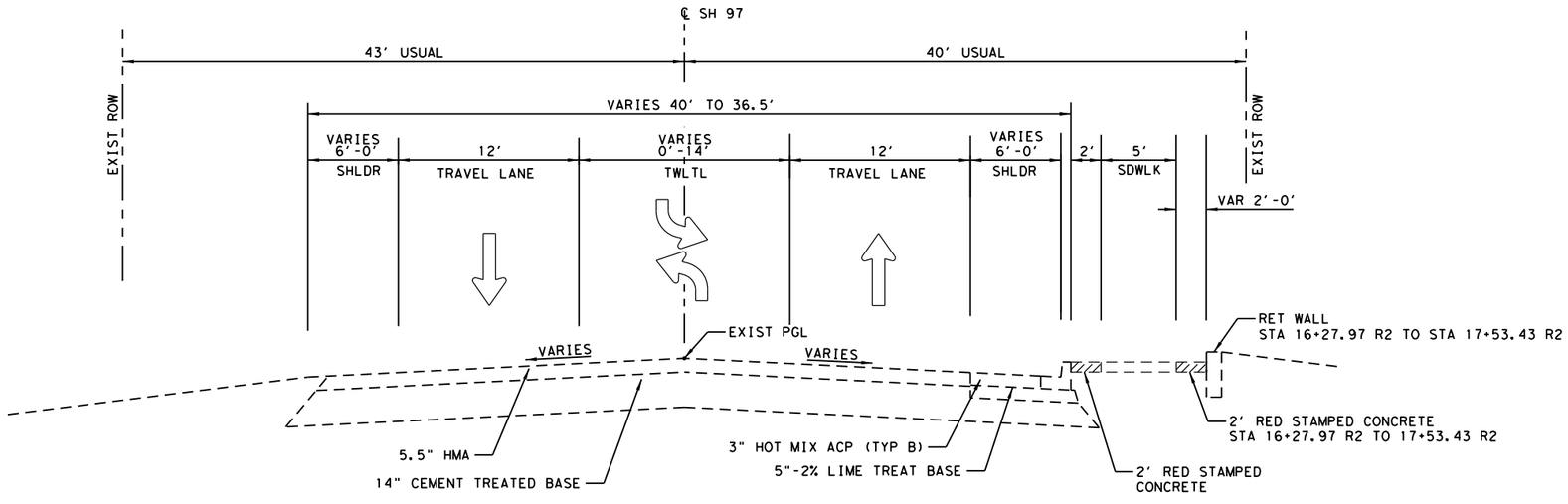


EXISTING TYPICAL SECTION

STA 0+98.42 R2 TO STA 15+08.57 R2
STA 15+99.57 R2 TO STA 16+27.97 R2

NOTE:
EXISTING BRIDGE STRUCTURE
STA 15+08.57 R2 TO STA 15+99.57 R2

0 5 10
SCALE: 1"=10' H
1"=5' V



EXISTING TYPICAL SECTION

STA 16+27.97 R2 TO STA 19+05.26 R2

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EXISTING TYPICAL SECTION

SHEET 2 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			5
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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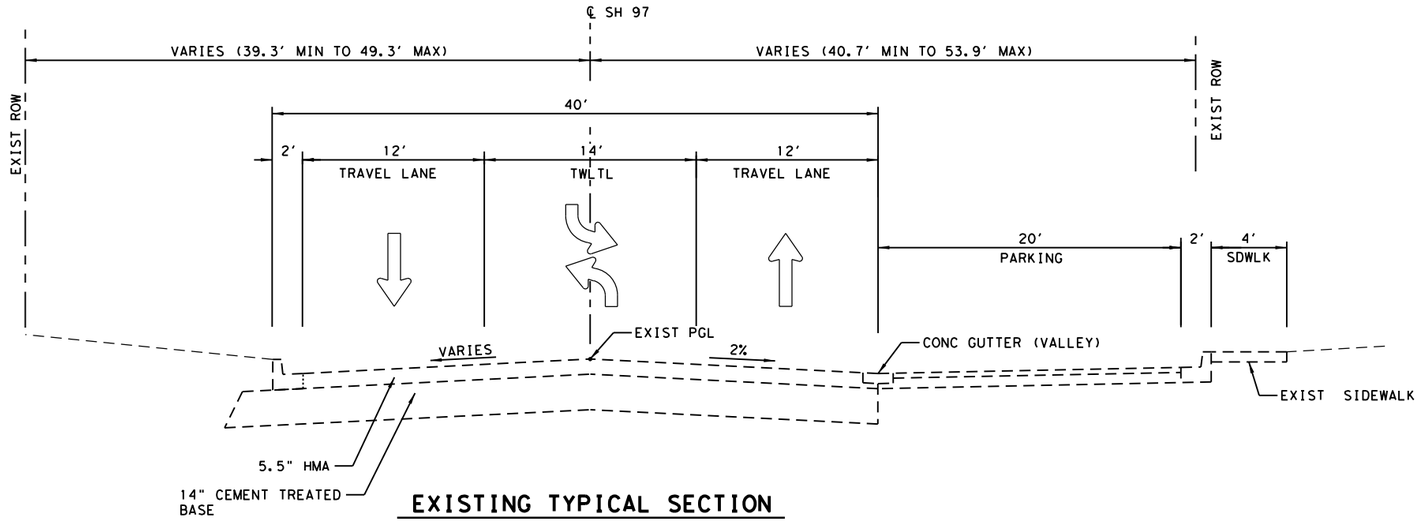

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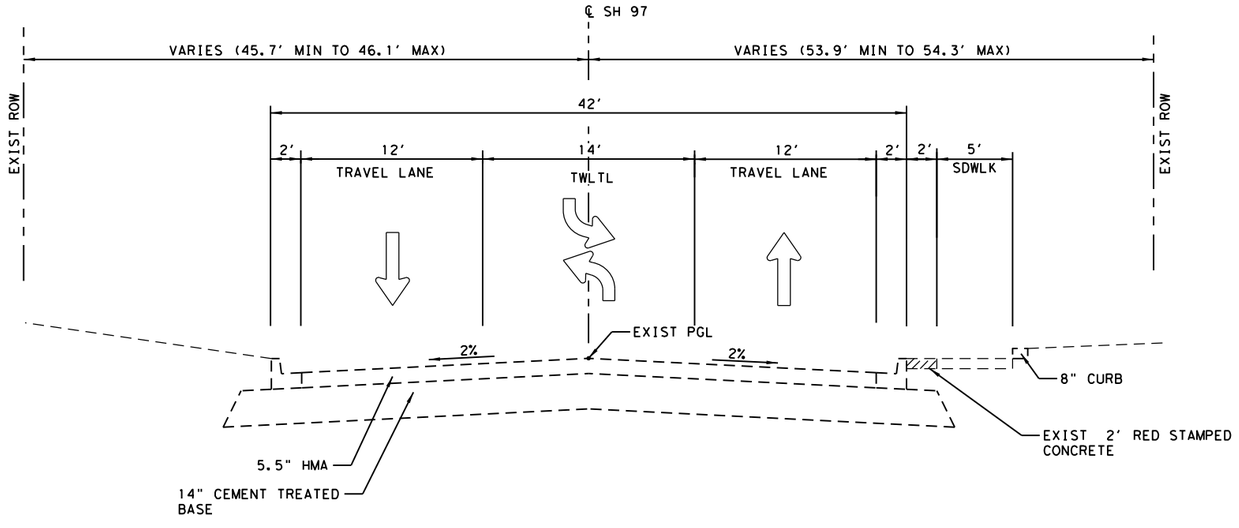
STA 19+05.26 R2 TO STA 25+88.92 R2



EXISTING TYPICAL SECTION

STA 25+88.92 R2 TO STA 28+77.94 R2

0 5 10

SCALE: 1"=10' H
1"=5' V

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

Elena Ramon

4/20/2023

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EXISTING TYPICAL SECTION

SHEET 3 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			6
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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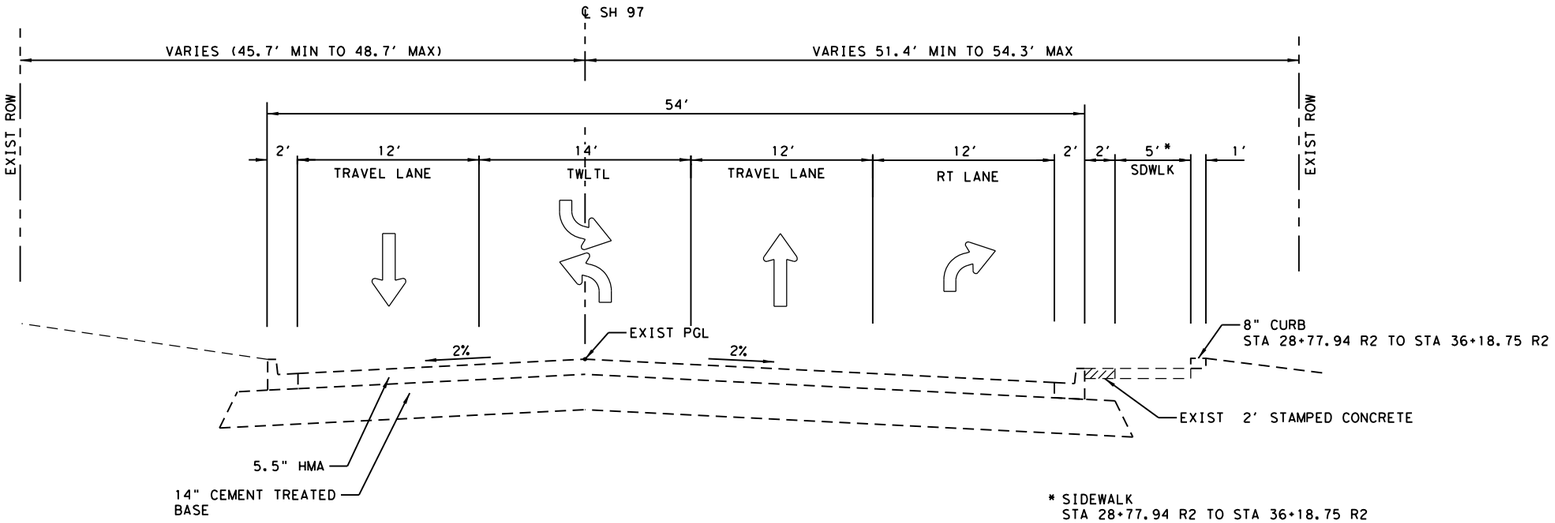

0 5 10
SCALE: 1"=10' H
1"=5' V

EXISTING TYPICAL SECTION

STA 28+77.94 R2 TO STA 37+55.03 R2

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EXISTING
TYPICAL SECTION

SHEET 4 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			7
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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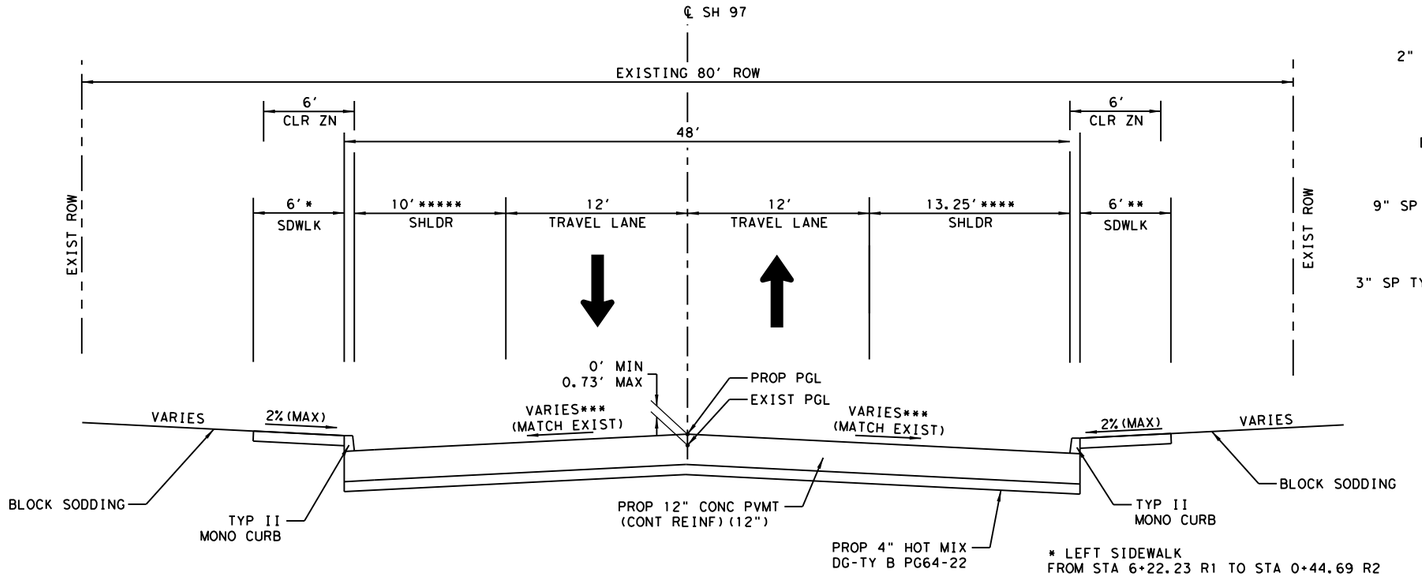
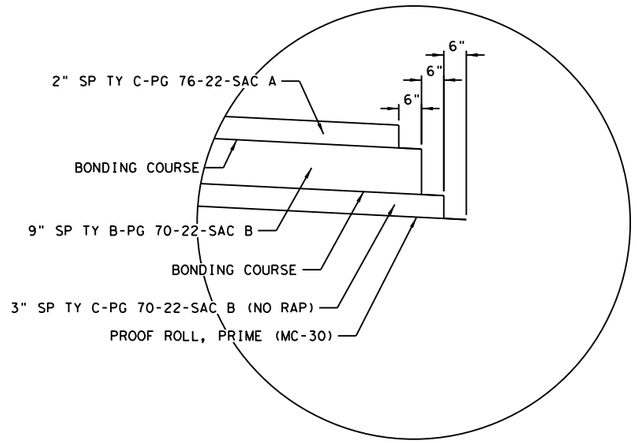


PROPOSED TYPICAL SECTION

STA 6+22.23 R1 TO STA 0+98.60 R2



DETAIL "A"

* LEFT SIDEWALK
FROM STA 6+22.23 R1 TO STA 0+44.69 R2

** RIGHT SIDEWALK
FROM STA 6+22.23 R1 TO STA 0+98.60 R2

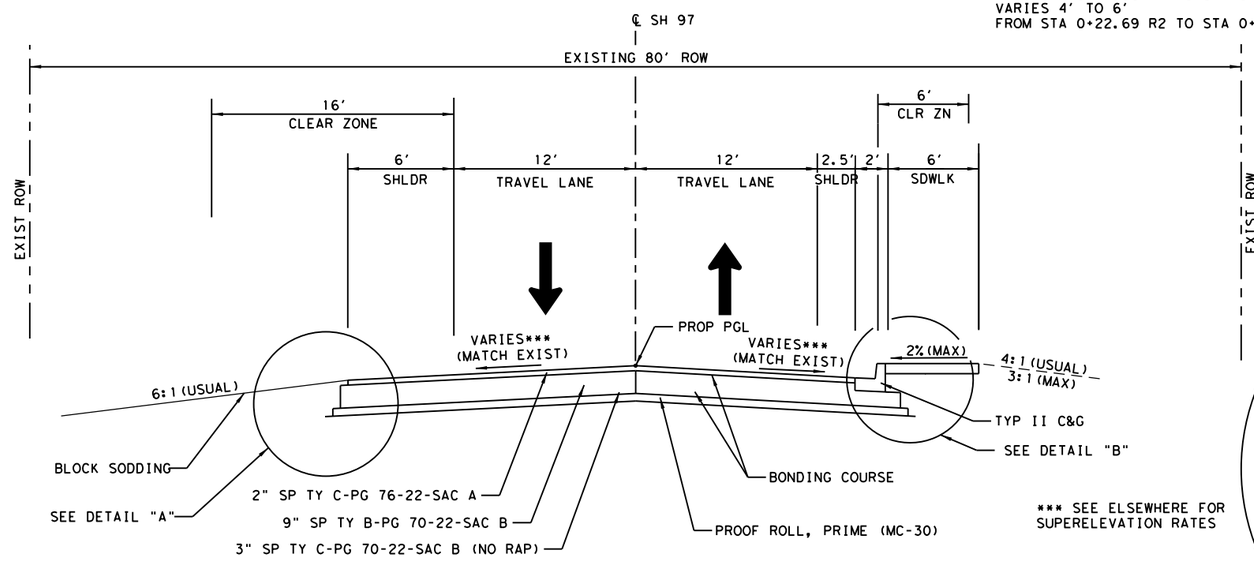
*** 2% FROM STA 6+50.00 R1 TO
STA 7+50.00 R1

**** VARIES 13.25' TO 4'
STA 8+49.64 R1 TO STA 0+98.60 R2

RAILROAD CONCRETE GRADE
CROSSING SYSTEM
STA 9+58.80 R1 TO STA 9+72.80 R1
(SEE MISC DETAILS FOR CONCRETE PLANKING DETAIL)

***** 4' SHLDR
FROM STA 8+14.96 R1 TO STA 0+22.69 R2
VARIES 4' TO 6'
FROM STA 0+22.69 R2 TO STA 0+98.60 R2

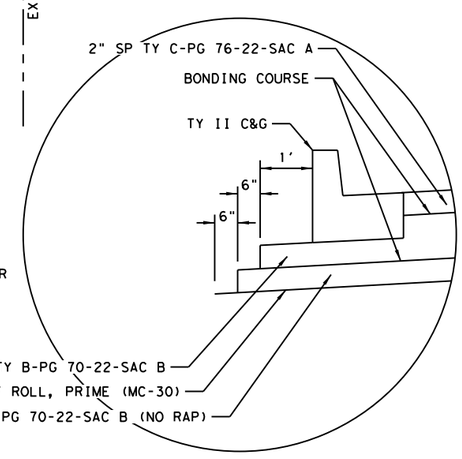
0 5 10
SCALE: 1"=10' H
1"=5' V



PROPOSED TYPICAL SECTION

STA 0+98.60 R2 TO STA 1+87.13 R2

*** SEE ELSEWHERE FOR SUPERELEVATION RATES



DETAIL "B"

RATES OF APPLICATION:

SP TY C-PG 76-22-SAC A=
115 LB/SY/IN

SP TY B-PG 70-22-SAC B=
120 LB/SY/IN

SP TY C-PG 70-22-SAC B=
115 LB/SY/IN

PRIME (MC-30) = 0.20 GAL/SY

BONDING COURSE (TRIAL) =
0.20 GAL/SY

D-GR HMA TY-B PG64-22 =
120 LB/SY/IN

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PROPOSED TYPICAL SECTION

SHEET 1 OF 5

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			8
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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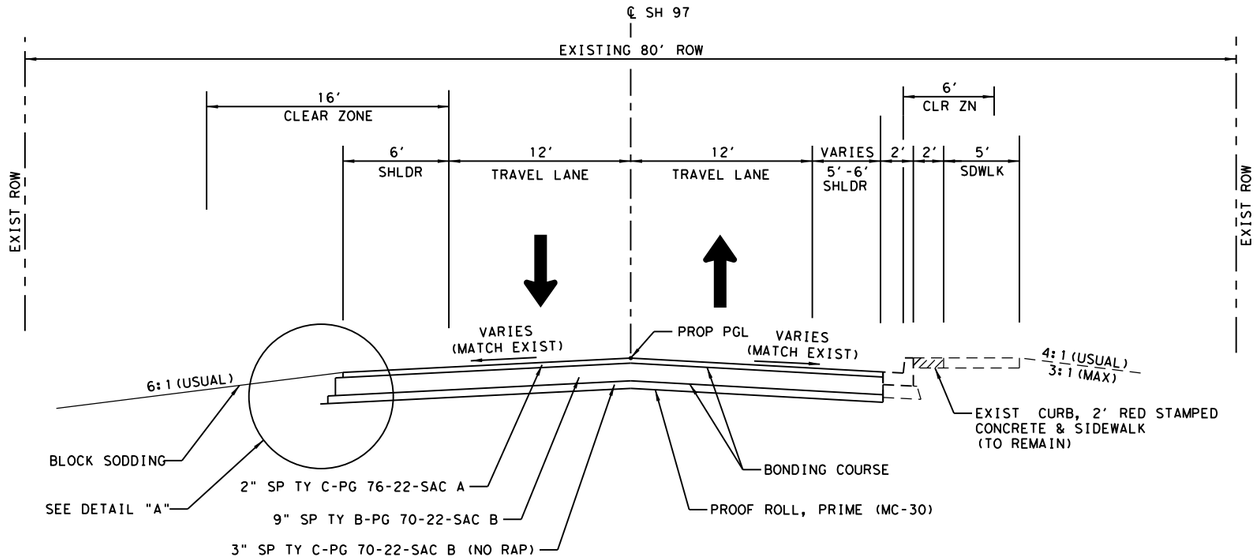
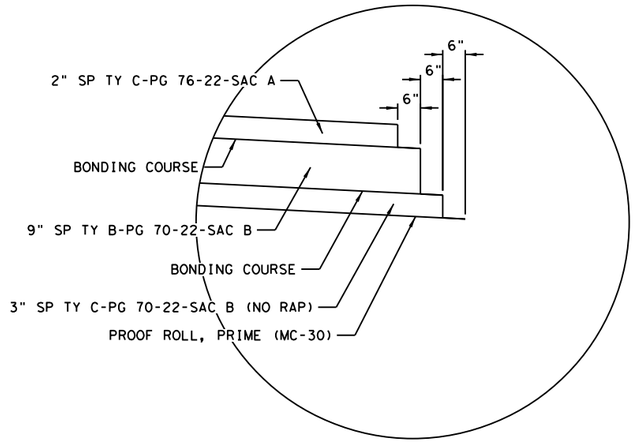


PROPOSED TYPICAL SECTION

STA 1+87.13 R2 TO STA 3+57.19 R2



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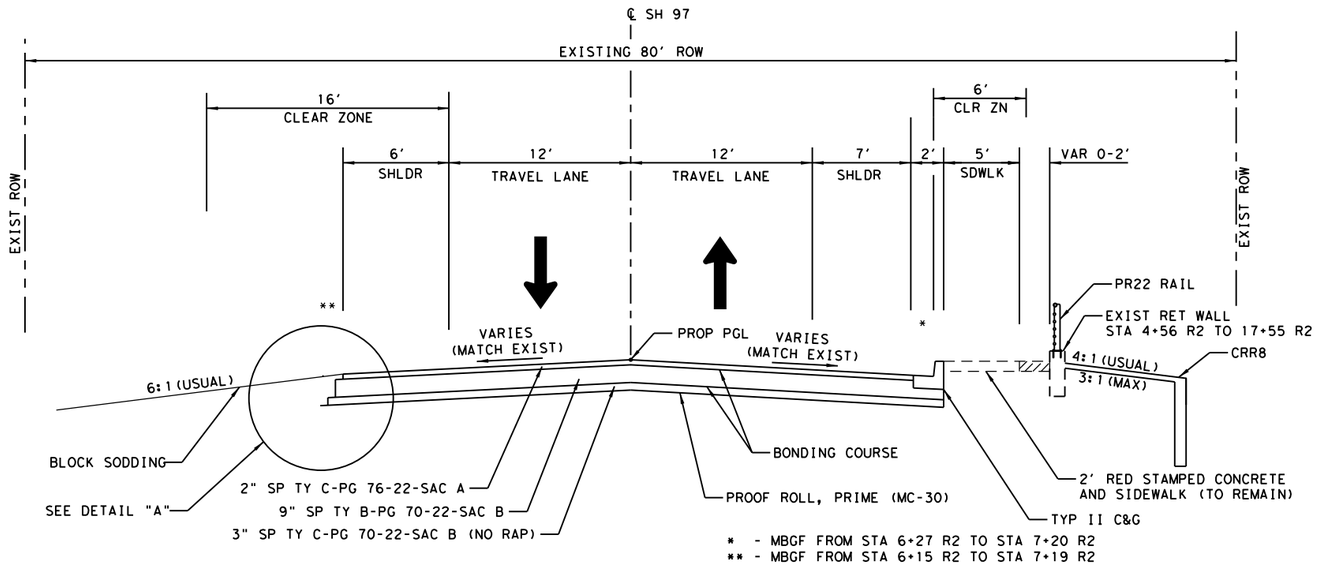
1"=5' V



* - MBGF FROM STA 6+27 R2 TO STA 7+20 R2
** - MBGF FROM STA 6+15 R2 TO STA 7+19 R2

PROPOSED TYPICAL SECTION

STA 3+57.19 R2 TO STA 7+19.63 R2
STA 15+99.57 R2 TO STA 16+27.97 R2

RATES OF APPLICATION:

SP TY C-PG 76-22-SAC A=
115 LB/SY/IN

SP TY B-PG 70-22-SAC B=
120 LB/SY/IN

SP TY C-PG 70-22-SAC B=
115 LB/SY/IN

PRIME (MC-30) = 0.20 GAL/SY

BONDING COURSE (TRIAL) =
0.20 GAL/SY

4/20/2023

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PROPOSED TYPICAL SECTION

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			9
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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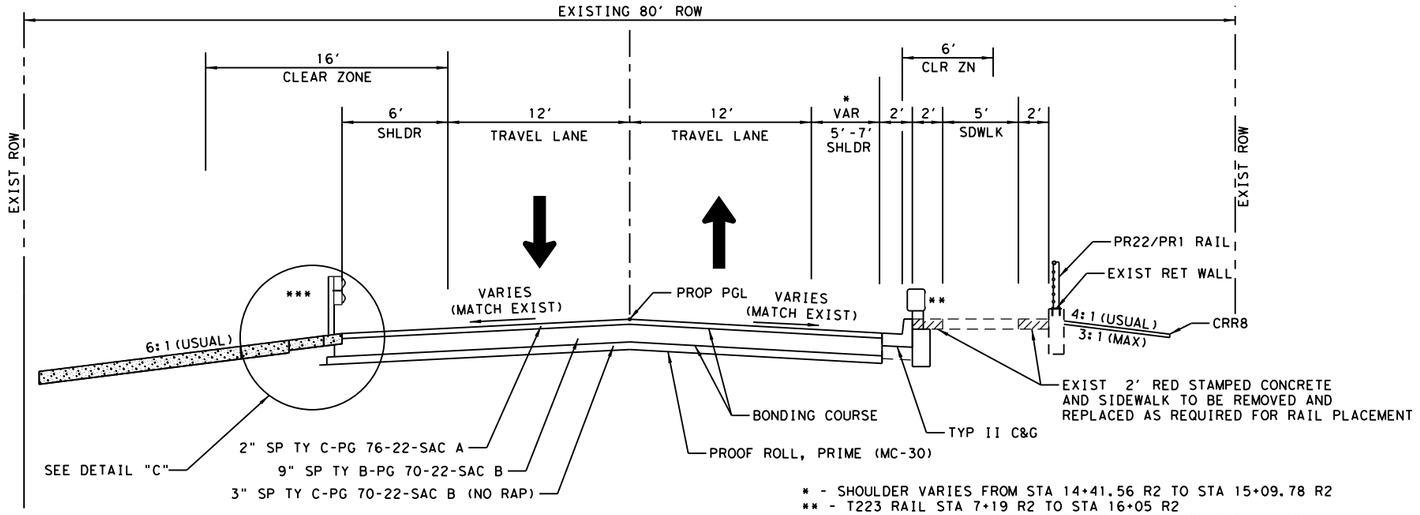
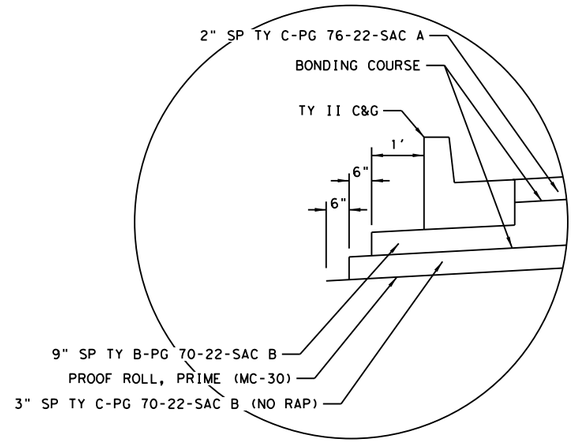


* - SHOULDER VARIES FROM STA 14+41.56 R2 TO STA 15+09.78 R2
** - T223 RAIL STA 7+19 R2 TO STA 16+05 R2
*** - MBGF STA 7+87 R2 TO 12+06 R2, 12+30 R2 TO 15+04 R2
T223 RAIL STA 7+19 R2 TO 7+87 R2, STA 12+06 R2 TO 12+30 R2,
STA 15+04 R2 TO 16+04 R2

NOTE:
EXISTING BRIDGE STRUCTURE
STA 15+08.57 R2 TO STA 15+99.57 R2

PROPOSED TYPICAL SECTION

STA 7+19.63 R2 TO STA 15+99.57 R2



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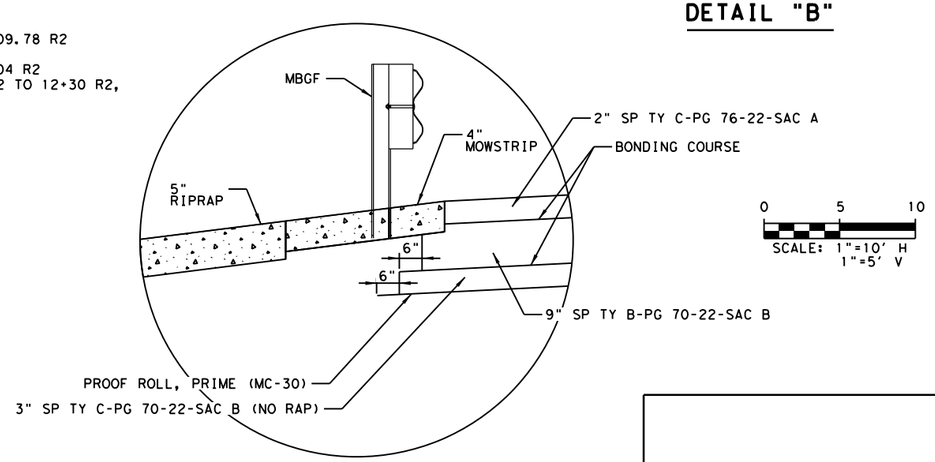

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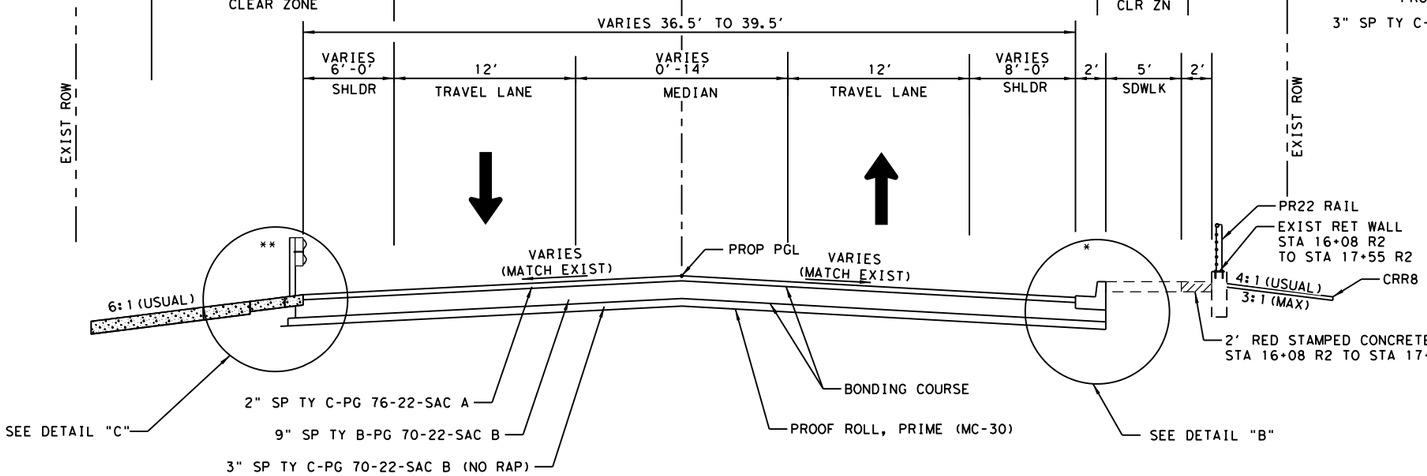
SCALE: 1"=10' H
1"=5' V

DETAIL "C"



* - MBGF FROM STA 16+05 R2 TO STA 16+82 R2
** - MBGF FROM STA 16+04 R2 TO STA 17+20 R2

PROPOSED TYPICAL SECTION

STA 16+27.97 R2 TO STA 19+05.26 R2

RATES OF APPLICATION:

SP TY C-PG 76-22-SAC A=
115 LB/SY/IN

SP TY B-PG 70-22-SAC B=
120 LB/SY/IN

SP TY C-PG 70-22-SAC B=
115 LB/SY/IN

PRIME (MC-30) = 0.20 GAL/SY

BONDING COURSE (TRIAL) =
0.20 GAL/SY

4/20/2023

Texas Department of Transportation

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TBPE Registration No. F-1046

SH 97

PROPOSED TYPICAL SECTION

SHEET 3 OF 5

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			10
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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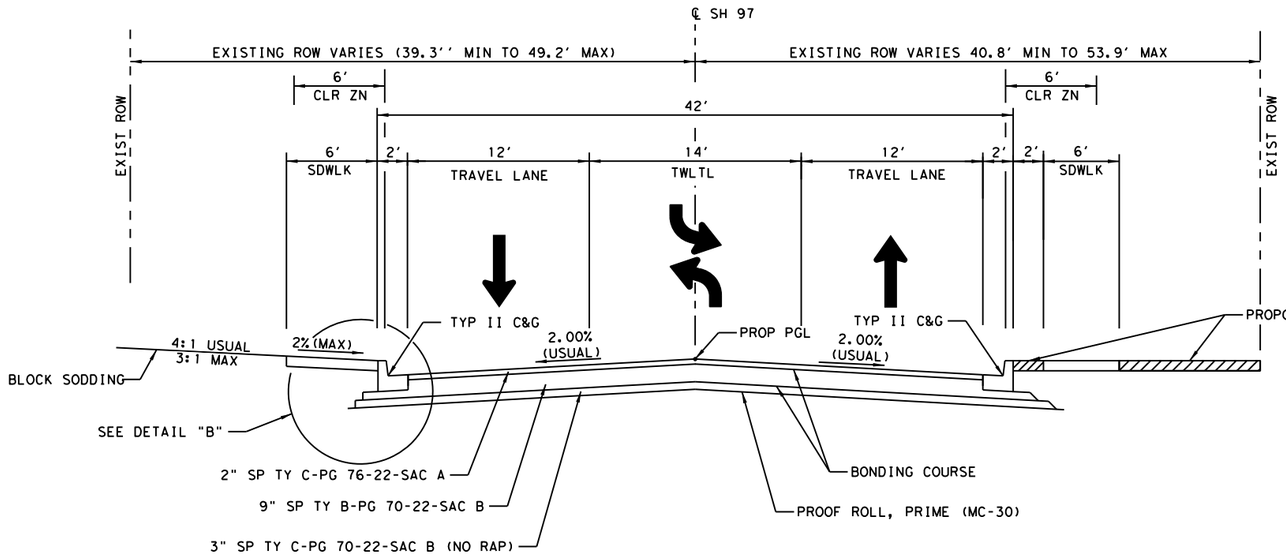
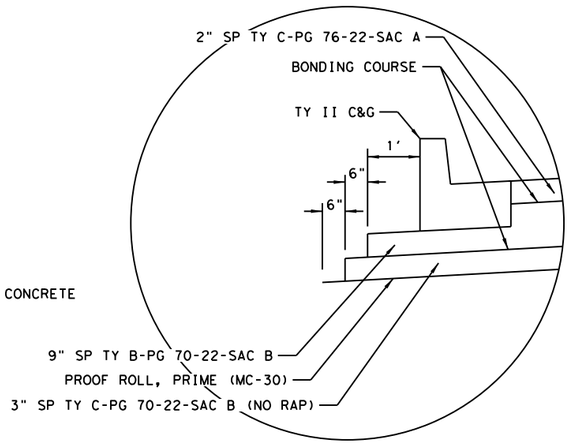


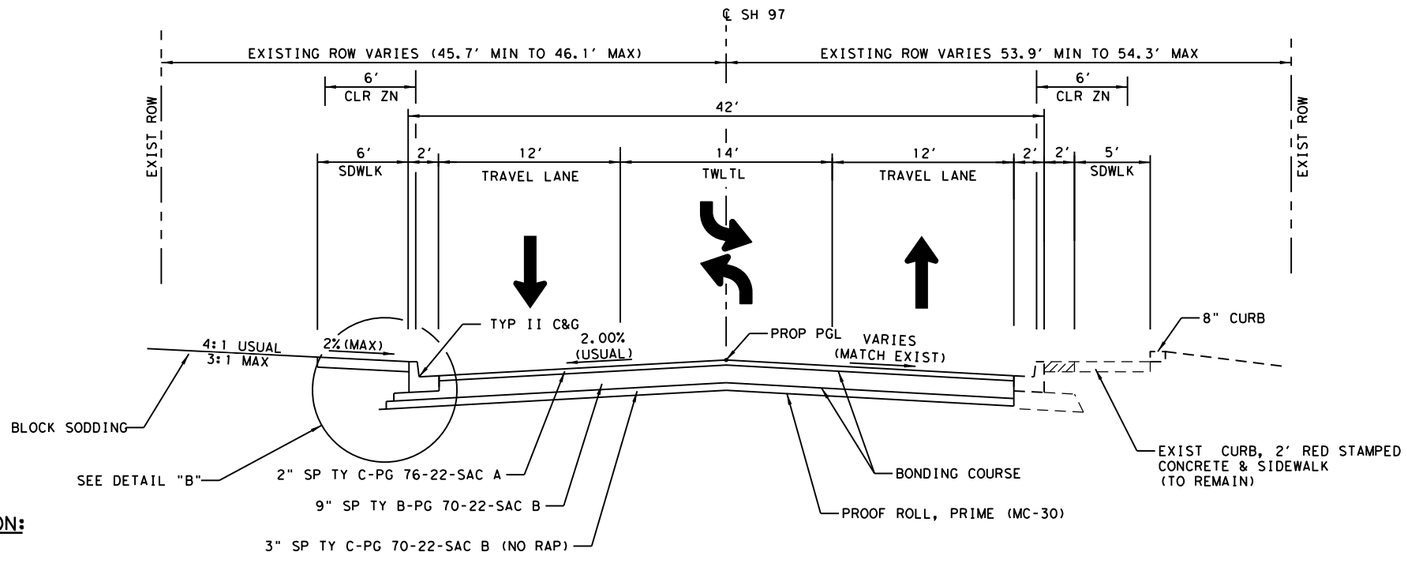


DETAIL "B"

PROPOSED TYPICAL SECTION

STA 19+05.26 R2 TO STA 25+88.92 R2

0 5 10
SCALE: 1"=10' H
1"=5' V



PROPOSED TYPICAL SECTION

STA 25+88.92 R2 TO STA 28+59.67 R2

RATES OF APPLICATION:

SP TY C-PG 76-22-SAC A=
115 LB/SY/IN

SP TY B-PG 70-22-SAC B=
120 LB/SY/IN

SP TY C-PG 70-22-SAC B=
115 LB/SY/IN

PRIME (MC-30) = 0.20 GAL/SY

BONDING COURSE (TRIAL) =
0.20 GAL/SY

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SH 97

PROPOSED
TYPICAL SECTION

SHEET 4 OF 5

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6			11
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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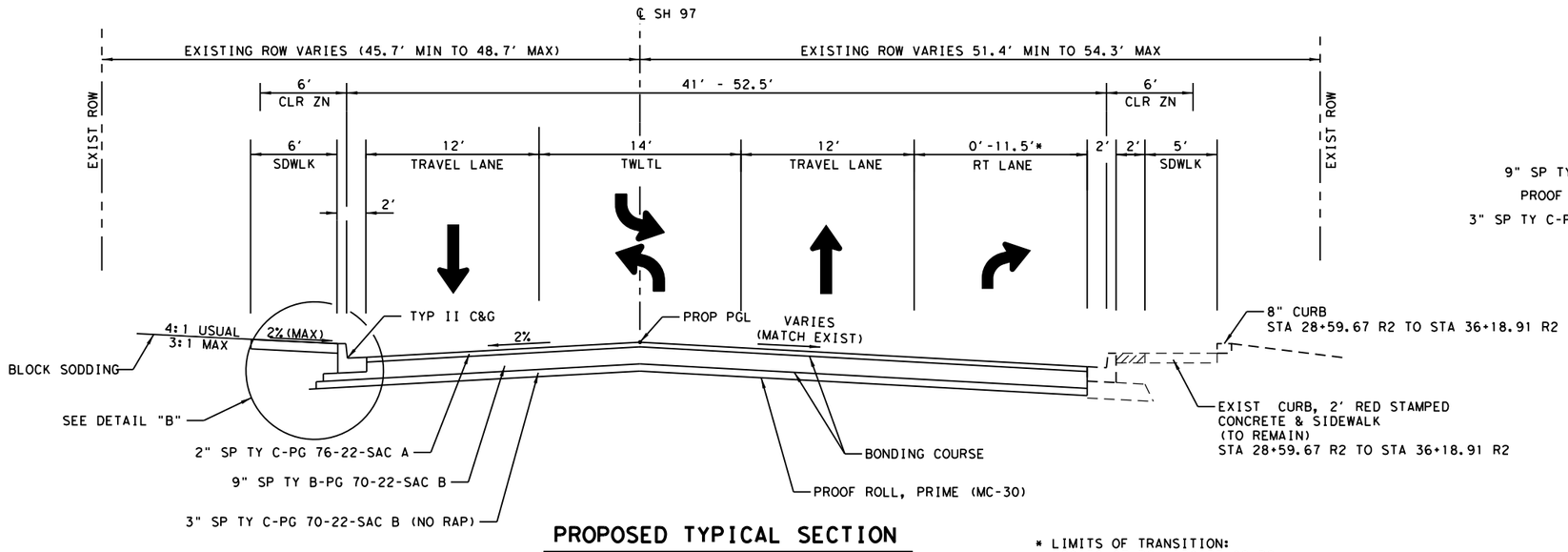
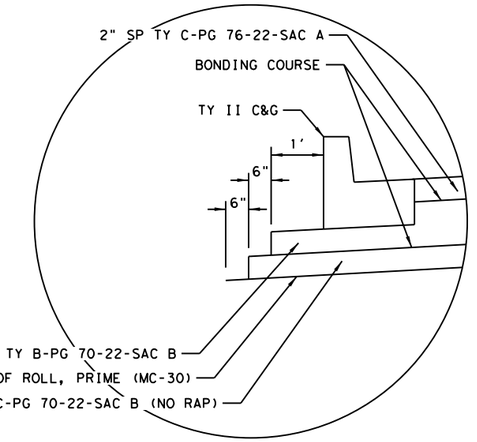


PROPOSED TYPICAL SECTION

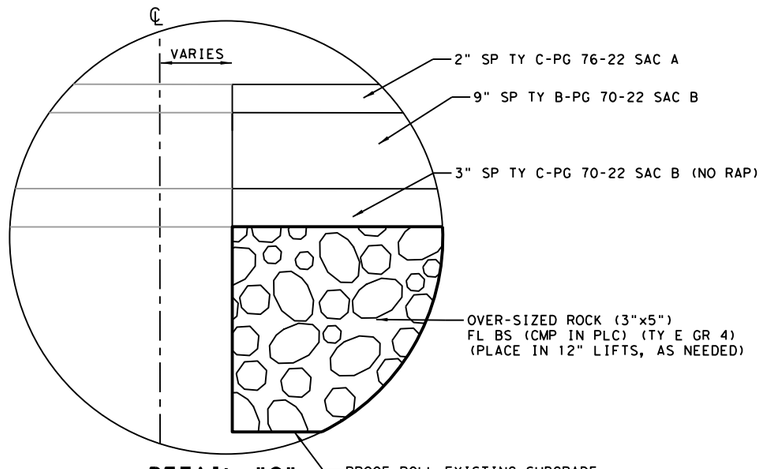
STA 28+59.67 R2 TO STA 37+55.03 R2

* LIMITS OF TRANSITION:
28+59.67 R2 - 30+33.02 R2



DETAIL "B"

0 5 10
SCALE: 1"=10' H
1"=5' V



DETAIL "C"

RATES OF APPLICATION:

SP TY C-PG 76-22-SAC A=
115 LB/SY/IN

SP TY B-PG 70-22-SAC B=
120 LB/SY/IN

SP TY C-PG 70-22-SAC B=
115 LB/SY/IN

PRIME (MC-30) = 0.20 GAL/SY

BONDING COURSE (TRIAL) =
0.20 GAL/SY

USAGE OF DETAIL "C"

WHEN SOFT SPOTS ARE ENCOUNTERED AND ADDITIONAL DEPTH REQUIRES REPAIR AND APPROVED BY MAINTENANCE SUPERVISOR. THIS WORK WILL BE PAID UNDER ITEM 351.

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PROPOSED TYPICAL SECTION

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TEXAS	LRD	LA SALLE	
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GENERAL NOTES:

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

Dennice Garza – Dennice.Garza@txdot.gov

Angel Martinez – Angel.Martinez@txdot.gov

Questions may 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 webpage for each project can be accessed by using the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.

Item 5 - Control of the Work

The Contractor shall maintain and preserve the integrity of all "existing survey markers" by avoiding the disturbance of such markers, which include all control points (horizontal and/or vertical), stakes, marks, and right-of-way markers. The Department will repair all Contractor disturbed control points, stakes, marks, and right-of-way markers. The cost for any and all repairs to the "existing survey markers" will be deducted from money due or to become due to the Contractor.

Contact the Laredo District Signal Section (956-712-7770) for coordination with TxDOT underground lines and/or facilities.

Prior to construction the Contractor must call 811 to verify any utilities located within project limits. Contractor will also coordinate with utility owners listed below for any adjustments needed to sanitary sewer manholes, water valves, gas valve, telecommunication, television manhole located within project limits. The utility company is responsible for any adjustment when necessary. The work

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should be performed in a manner as to not delay construction contractor work activity.

Contractor will make necessary arrangements with the utility owner(s) when utility adjustments are required, as a result of construction activities.

Utility Owner	Phone Number	City/County
AEP Texas	361-881-5707	La Salle
AT&T	956-815-4210	La Salle
City of Cotulla Water and Sewer	830-879-5772	Cotulla
City of Cotulla Gas Department	830-879-5803	Cotulla
Stockmens National Bank	830-879-2331	Cotulla

The Contractor will coordinate with the utility owners to have the following height adjustments completed during construction:

BU 35: STA 107+08 LT	WW Clean Out	City of Cotulla
SH 97: STA 7+66 R1 RT	Electric Handhole	AEP Texas
SH 97: STA 8+51 R1 LT	Telephone Manhole	AT&T
SH 97: STA 9+27 R1 LT	Guy Wire	AEP Texas

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design.
Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

Item 6 - Control of Materials

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

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GENERAL NOTES

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

The Buy America Material Classification Sheet is located at the below link:

https://www.txdot.gov/business/resources/materials/buy-america-materials-classification-sheet.html for clarification on material categorization.

Item 7 - Legal Relations and Responsibilities

No significant traffic generator events identified.

Jurisdictional Waters of the United States and Project Specific Locations (PSL) Coordination - This project requires permit(s) with environmental resource agencies. There is a high probability that environmentally sensitive areas will be encountered on contractor designated project specific locations (PSLS) for the project (including but not limited to haul roads, equipment staging areas, parking areas, etc.).
Requirements for Work within Jurisdictional Waters of the United States:
The department has been authorized to perform work within designated areas of the project under U.S. Army Corps of Engineers (USACE) nationwide permit (NWP) #14 and/or #3a and/or #3b.

The contractor will not initiate activities in a project specific location (PSL) associated with a U.S. Army Corps of Engineers (USACE) permit area (i.e. an area where the USACE has jurisdiction) that has not been previously evaluated by the USACE as part of the permitting for this project. Such activities include, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Associated defined here includes materials delivered to or from the PSL. The permit area includes all waters of the U.S. and their associated wetlands affected by activities associated with this project. Special restrictions may be required for such work in these USACE jurisdictional areas. The contractor will be responsible for any and all consultations with the USACE regarding activities, including PSLs, which have not been previously evaluated by the USACE. The Contractor will provide the department with a copy of all consultation(s) or approval(s) from the USACE prior to initiating activities.

The contractor may proceed with activities in PSLs that do not affect a USACE permit area if a self-determination has been made that the PSL is non-jurisdictional or proper USACE clearances have been obtained in jurisdictional areas or have been previously evaluated by the USACE as part of the permit review of this project. The contractor is solely responsible for

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documenting any determination(s) that their activities do not affect a USACE permit area. The contractor will maintain copies of their determination(s) for review by the department and/or any regulatory agency.

The disturbed area for all project locations in the Contract, and the Contractor project specific locations (PSLs) within **1** mile of the project limits for the Contract, will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain required authorization from the TCEQ for Contractor PSLs for construction support activities on or off the ROW. When the total area disturbed in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, the Contractor shall provide a copy of the Contractor Notice of Intent (NOI) for the PSLs to the Engineer and to the local government operating a municipal separate storm sewer system (MS4) if applicable. If the total area of project disturbed areas and PSLs total between 1-acre but less than 5-acres, the Contractor shall post the appropriate Contractor Construction Site Notice for all Contractor PSLs to be in compliance with TCEQ storm water regulations.

In order to expedite the approval process for PSLs or to eliminate or minimize potential impacts to project progress, initiate coordination efforts with the U.S.A.C.E. within 30 days from the date of "authorization to begin work" for all PSLs that are in areas where the USACE has jurisdiction (i.e. USACE permit areas). If this is not done, the contractor waives the right to request any contract time considerations if project progress is impacted and PSL'S approval is still pending.

Requests submitted to the area engineer will be evaluated on this basis and will require documentation showing substantial early coordination efforts to expedite the approval process as herein stated. The request will include a detailed chronological summary status with dates of coordination activities with the resource agencies, including those occurring after the initial coordination, to be reviewed and confirmed by the district's environmental section.

For PSLs that fall within USACE permit areas, the Contractor must document and coordinate with the USACE, if required, before any excavation hauled from or embankment hauled into a USACE permit area by either (1) or (2) below.

1. Restricted Use of Materials for Previously Evaluated Permit Areas. The Contractor will document both the project specific location (PSL) and their authorization, and the Contractor will maintain copies for review by the

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SH 97

GENERAL NOTES

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Department and/or any regulatory agency. When an area within the project limits has been evaluated by the USACE as part of the permit process for this project, then:

a. Suitable excavation of required material in the areas shown on the plans and cross sections as specified in Item 110 is used for permanent or
b. temporary fill (Item 132, Embankment) within a USACE permit area may be restricted.
c. Suitable embankment (Item 132) from within the USACE permit area is used as fill within a USACE evaluated area may be restricted; and,
d. Unsuitable excavation or excess excavation ["Waste"] (Item 110) that is disposed of at an approved location within a USACE evaluated area may be restricted.

2. Contractor Materials from Areas Other than Previously Evaluated Areas. The Contractor will provide the Department with a copy of all USACE coordination or approvals before initiating any activities for an area within the project limits that has not been evaluated by the USACE or for any off-right-of-way locations used for the following, but not limited to, haul roads, equipment staging areas, borrow and disposal sites, including:
   a. Item 132, Embankment, used for temporary or permanent fill within a USACE permit area; and,
   b. Unsuitable excavation or excess excavation ["Waste"] (Item 110, Excavation) that is disposed of outside a USACE evaluated area.

Storm Water Regulations Requirements:
The Contractor shall be responsible for (off ROW) PSLs applicable to the TCEQ Construction General Permit (CGP) requirements and will notify the Engineer of the disturbed acreage within one (1) mile of the project limits. The Contractor shall obtain any required authorization form the TCEQ for any Contractor PSLs for construction support activities on or off ROW.

The total area disturbed for this project is 8.3 acres. The disturbed area in this project, all project locations in the Contract, and the Contractor project specific locations (PSLs), within 1 mile of the project limits, for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain required authorization from the TCEQ for Contractor PSLs for construction support activities on or off the ROW. When the total area disturbed in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, the Contractor shall provide a copy of the Contractor NOI for PSLs on the ROW to the Engineer and to the local

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government that operates a municipal separate storm sewer system (MS4), if applicable.

Item 8 - Prosecution and Progress

Before starting work, provide a sequence of work and estimated progress schedule meeting the requirements of Section 8.5.2, "Progress Schedule."

No lane closures other than the detour will be allowed on the weekends which include the following holidays: December 21 through January 1, the last Monday in May, July 4, the first Monday in September, the fourth Thursday in November, and Easter weekend.

No lane closures or detours will be allowed during the La Salle County Fair from March 7-10, 2024.

The road-user cost liquidated damages for Milestone 1 is $35,000 per day.

Substantially complete Milestone 1 in 83 working days.

The time charges for Milestone 1 will begin upon the day the detour is set up. The time charges for Milestone 1 will end upon the day the detour is removed.

This project has a delayed start date. Refer to special provision 008-003 for additional information.

Item 9 - Measurement and Payment

Coordinate and provide off-duty law enforcement officers with officially marked vehicles (if patrol cruisers are available from the enforcement agency involved) during the following operations: transitioning to a new sequence of construction, traffic signal upgrades, lane closures, *and/or* during a one-way traffic control situation. For payment through TxDOT state force account method, complete the weekly tracking forms provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided.

Submit Material on hand (MOH) payment requests at least 5 working days prior to the end of the month for payment on that month's estimate. For out-of-town MOH submit requests at least 10 working days prior to the end of the month.

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GENERAL NOTES

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Item 100 - Preparing Right of Way

Burning of brush will not be permitted.

Do not begin any clearing operations until the trees and areas of vegetation that should not be removed or disturbed by construction activities have been identified. To ensure that these areas are not disturbed, place protection fencing as shown in the plans or as directed/approved by the Engineer.

All right of way clearing operations will be coordinated with the project's SW3P and as directed/approved by the Engineer.

Item 160 - Topsoil

Salvage approximately 6 inches of topsoil from all disturbed areas.

Item 162 - Sodding for Erosion Control

Furnish and place Bermuda grass sod.

Item 166 - Fertilizer

Fertilize all areas of project to be sodded.

Item 168 - Vegetative Watering

Water all areas of project to be seeded or sodded at a rate of 1000 gallons per acre.

Maintain the seed bed in a condition favorable for the growth of grass. Watering can be postponed immediately after a rainfall on the site of ½ in. or greater, but will be resumed before the soil dries out. Watering will continue until final acceptance.

Obtain water at a source that is metered or furnish the manufacturer's specifications showing the tank capacity for each truck used. Notify the Engineer before watering so meter readings or truck counts may be verified.

Establish 70% uniform vegetative coverage during this period in order to comply with stabilization requirements. Operate and meter water equipment under pumping pressure in order to deliver the required quantities of water necessary.

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During periods of adequate moisture, as determined by the Engineer, mechanical watering may not be required. In addition to metering the water equipment, provide a log book showing daily water usage and receipts of water applied upon request of the Engineer.
Upon establishment of 70% vegetative coverage as determined by the Engineer, the Engineer has the option to require the Contractor to continue watering as specified for a period not to exceed 30 days.

Item 310 - Prime Coat

Remove all loose and scabbed material from the surface prior to prime coat application. Allow the prime coat to cure for a minimum of 48-72 hours before placing any successive layers, unless otherwise approved by the Engineer. In winter weather, allow the prime to cure for a minimum of 72 hours.

Do not allow any type of traffic including construction vehicles to drive on the curing prime coat. Make necessary adjustments for driveways and accesses that need to be maintained during construction, as approved by the Engineer.

When a prime coat is left open to traffic for more than 14 days or when the application is visually inconsistent such as but not limited to streaking and tracking, then the surface shall be re-primed as directed by the Engineer at no additional cost to the Department.

Item 320 – Equipment for Hot Mix Asphalt Materials

For staged construction, all longitudinal ACP joints shall be constructed with a 3:1 to 6:1 taper. For placement of 2 inches or more, the device will provide a maximum ½ inch vertical edge. Outside edges (next to the grass/earth) will also have a taper or will be backfilled the same day.

Final Surface course: all longitudinal ACP joints for the final Hot Mix surface course shall be in widths equal to travel lane widths so that all final course ACP joints will match the proposed lane striping (pavement markings), unless otherwise directed by the engineer.

Item 351 - Flexible Pavement Structure Repair

The section of roadway where the repair is to be made will be the entire width of the lane and a minimum length of 50 feet, unless otherwise directed by the Engineer.

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GENERAL NOTES

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Item 354 - Planing and Texturing Pavement

Contractor to retain ownership of planed materials.

Pavement sections to be planed and overlaid are planed no more than one week prior to placing overlay.

The contractor will be responsible for verifying the existing asphalt depth at the bridge before beginning planing operations. The contractor will be responsible for any needed repairs to the armor joint(s) and/or deck(s) as a result of the planing operations. The repairs will be conducted to the satisfaction of the Engineer. The Contractor will be responsible for all costs incurred for the repairs, including but not limited to materials, labor, equipment, and pertinent incidentals.

Item 416 - Drilled Shaft Foundations

After drill shaft installation plan is approved by the Engineer, a pre-placement meeting shall be held at least 48 hours before beginning excavation operations.

Place the grounding rods for the traffic signal poles at the nearest ground box. The ground rod will be 5/8" x 10 feet. A continuous bare or green insulated copper wire (no. 6) will be installed from the ground rod to the base of the traffic signal.

Item 420 - Concrete Substructures

Sulfate resistant concrete shall be used in all situations for concrete structures in contact with the natural ground.

Item 438 – Cleaning and Sealing Joints and Cracks

The contractor will advise the Engineer of any loose or damaged seal joint areas Not noted in the plans. Upon approval from the Engineer, these areas will be Addressed and the Contractor compensated for such additional work.

After cleaning and sealing of joints, care will be taken to assure that the bent Caps and abutment seats are clean of all debris. Cleaning and removal of this Excess material will not be paid for directly but will be subsidiary to this item.

Class 3 – hot poured rubber sealant shall be used with ACP overlay.
Class 4 -low modulus silicone, nonsag shall be used on vertical faces on bridge Elements.

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Class 7 -low modulus silicone, rapid curing, self-leveling shall be used without ACP overlay and existing armor joints.
Refer to the 2014 Standard Specification for additional information.

Item 496 - Removing Structures

The structure(s) to be removed have surface coatings which may contain hazardous materials. Provide for the safety and health of employees and abide by all OSHA Standards and Regulations.

Item 500 - Mobilization

"Materials-on-Hand" payments will not be considered in determining percentages used to compute mobilization payments.

Item 502 - Barricades, Signs, and Traffic Handling

Designate, as the Contractor Responsible Person (CRP), an English-speaking employee on-call nights and weekends (or any other time that work is not in progress) with a local address and telephone number for maintenance of signs and barricades. This employee will be located within one (1) hour of traveling time to the project site. Notify the Engineer in writing of the name, address and telephone number of this employee. Furnish this information to local law enforcement officials.

When advanced warning flashing arrow panel(s) is/are specified, maintain one standby unit in good condition at the job site ready for immediate use is required.

Notify the Engineer *(956-712-7700)* at least two weeks prior to a proposed traffic pattern change(s) that will require a revision to traffic signals or flashing beacons. This is required to provide the State/City time to perform a traffic study, determine the new signal timing and phasing settings that need to be implemented with the traffic change.

Traffic signals in new locations require:

1. The contractor to place the signals in flashing mode two weeks prior to activation.
2. The contractor to post variable message boards major (previous through) approaches announcing signal activation in two weeks.

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GENERAL NOTES

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Provide two-way radios in areas where flagmen do not have visual contact with one another or cannot communicate with one another.

Limit lane closures to a maximum of 2 miles. If more than one lane closure location is desired, provide a minimum of a 2 mile passing zone between locations. Provide a separate sign set up for each location.

Ensure equipment not in use, stockpile aggregate, and other working materials are:
A minimum of 30 feet from the edge of the travel lane;
Do not obstruct traffic or sight distance;
Do not interfere with the access from abutting property; or
Do not interfere with roadway drainage.

Erect signs in locations not obstructing the traveling public's view of the normal roadway signing or necessary sight distance at intersections and curves.

During the holiday time frame of December 21st through January 1st, every effort should be taken to ensure that all travel lanes remain open where possible.

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

Item 504 - Field Office and Laboratory

Provide a Type C Structure with internet access.

Provide a Type D Structure and Asphalt Content by Ignition Method for TxDOT Quality Assurance Testing. Contractor's quality control testing shall be performed in a separate space or facility. If a separate space is utilized within a shared facility, partition the space with a floor to ceiling wall with a door access for indoor use that is lockable with a key. Each separate space shall have an exterior door access.

Ensure that the field lab has an office for TxDOT use along with lockable file cabinet, desk and chair.

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The floor and landing of the facility shall support the weight of all equipment and personnel providing a stable, essentially zero deflection during testing operations, acceptable to the Engineer.

Contractor is responsible to transport to and from the field lab TxDOT owned testing equipment required for hot mix operations. Contractor will pick up, deliver, install and set up TxDOT owned equipment required in the field lab. TxDOT owned equipment required in the field lab will be picked up at LRD DST LAB or as determined by the LRD DST LAB Supervisor.

Pick up and deliver TxDOT owned equipment under the supervision of a TxDOT lab technician. A TxDOT lab technician will verify the installation and set-up of the equipment at least 48 hours prior to beginning of hot mix operations (trial batch included).

All equipment will be returned by the Contractor in the same manner and location as it was picked up. Contractor is responsible for any damages incurred to TxDOT equipment.

Item 506 - Temporary Erosion, Sedimentation, and Environmental Controls

The Department will take over responsibility for the establishment of 70% vegetative cover, based on adjacent undisturbed vegetation, upon the completion of all other work in accordance with the contract and final acceptance.

Concrete washout area(s) shall be installed prior to concrete placement on site. The concrete washout area(s) shall be entirely self-contained. Location must be Approved by the Engineer. Concrete washout area(s) are subsidiary to pertinent Items.

Item 528 – Colored Textured Concrete and Landscape Pavers

Contractor to provide Type and Material use as release agent for textured Concrete. Pre-placement meeting for both color texture and brick paver.

Item 531 – Sidewalks

Include subsidiary information, dowel cap or dowel gap for expansion space for Expansion joints. Expansion Joints to be placed at 30' Max. spacing to avoid Extreme Heat Buckling.

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PROFESSIONAL ENGINEER

5/16/2023

Texas Department of Transportation

BGE, Inc.
1701 Directors Blvd., Suite 1000, Austin, TX 78744
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

SH 97

GENERAL NOTES

SHEET 6 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			13E
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Item 540 – Metal Beam Guard Fence

Install cast-in place concrete curb Type II in the metal beam guard fence transition (Thrie-Beam Transition). Pre-cast concrete curb will not be allowed.

Item 585 - Ride Quality for Pavement Surfaces

Use pay adjustment schedule 1.

Measure ride quality of the ACP intermediate layer SP-B before placement of the surface course, unless otherwise approved. Use a certified profiler operator from the Department's MPL. When requested, furnish the Engineer documentation for the person certified to operate the profiler.

Provide all profile measurements to the Engineer in electronic data files within 3 days after placement of the prime coat using the format specified in Tex-1001-S. The Engineer will use Department software to evaluate longitudinal profiles to determine areas requiring corrective action. Correct 0.1-mi. sections having an average international roughness index (IRI) value greater than 125.0 in. per mile to an IRI value of 125.0 in. per mile or less for each wheel path, unless otherwise shown on the plans.

Re-profile and correct sections that fail to maintain ride quality until placement of the next course, as directed. Correct re-profiled sections until specification requirements are met, as approved. Perform this work at no additional expense to the Department.

Item 618 - Conduit

Place conduit in an area not exceeding 2 feet in any direction from a straight line and the depth of the conduit will be 2 feet, except when crossing a roadway, where the depth will not be more than 3 feet or less than 1 foot below the bottom of the base material in the roadway when placed by the jacking or boring method.

Item 624 - Ground Boxes

Do not place ground boxes in driveways or wheelchair ramps. Alternate ground box locations will be as directed. Ground box aprons will have a 2% slope.

Match concrete aprons to proposed rip rap elevations shown on plans.

Item 644 - Small Roadside Sign Assemblies

Project Number: F 2B23(147) **Sheet**

County: La Salle **Control:** 0483-01-052

Highway: SH 97

Salvage and deliver all aluminum sign faces to the local TxDOT maintenance office.

Item 658 – Delineator and Object Marker Assemblies

Proposed delineators for this project will consist of oval shape tube flexible post with a quick release embedded anchor insert stub only, such as Flexstake Inc. – 650 series or Shur-Tite – SD series or equal flexible driveable delineators.

Provide and place delineator Type 1, 2, 3, 4, object markers/chevrons and large arrows signs project 4' or 7' above the pavement surface and not the ground line. (Provide adequate length for proper anchor and projection above ground line).

Item 666 – Reflectorized Pavement Markings

Reflectivity requirements for Type I will be as per Item 666.

Payment on Type I markings requiring retroreflective testing will be made at a 75% rate until passing test results are received.

Item 680 - Highway Traffic Signals

All workers installing electrical materials, including conduit in trenches, services poles and all others system electrical apparatus, will be directly supervised by persons who have completed a TxDOT approved course in electrical underground installations. Furnish evidence of satisfactory completion of the underground electrical installation for roadway illumination and signal control course for all personnel responsible for direct supervision of electrical installation work.

The signal installation will be wired to operate in accordance with the wiring diagram shown in the plans. The contractor will ensure that the timing and phasing are the same as shown in the plans. All timing and phasing will be approved and/or provided by the Transportation Operations Engineer prior to downloading to the controller.

On the terminal block, use the left side for the home runs and the right side for the signal heads. This pattern will be used in all signal installations.
For grounding and bonding install a green insulated copper wire no. 6.

STATE OF TEXAS
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SH 97

GENERAL NOTES

SHEET 7 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			13F
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

Item 682 - Vehicle and Pedestrian Signal Heads

All new signal heads will be covered with burlap from the time of installation until the signal is placed in operation. Position all vehicle signal section heads and pedestrian signal heads to provide the best view for motorists and pedestrians.

Item 684 - Traffic Signal Cables

For each traffic signal installation where signal cable is required, provide a minimum length of 5 feet for each conductor terminating in the controller.

Label all traffic signal cables, vehicle detector cables, and pedestrian signal cables terminating in the controller with marker ties and permanent markers.

Item 3076 - Dense-Graded Hot-Mix Asphalt

Use aggregate that meets the SAC-A, only for the final riding surface.

Apply the Bonding Course in accordance with Item 3084.

Substitute Binders (grade dumping) will not be allowed on the final riding surface.

Refer to item 585 for ride quality requirements.

The use of RAP or RAS will not be allowed on the final riding surface.

RAP 20% is allowed for TY B mixes, but RAS will not be allowed. Substitute Binders in the intermediate layer (grade dumping) may be allowed when the surface HMA layer is placed not more than 6 months after the intermediate layer is complete or as approved by the engineer.

Item 3077 – Superpave Mixtures

Use aggregate that meets the SAC-A only for final riding surface.

Excess RAP will be retained by the contractor.

Apply the Bonding Course in accordance with item 3084.

Refer to item 585 for ride quality requirements.

The use of RAP, RAS, and/or Substitute Binders will not be allowed on the final riding surface.

RAP 20% is allowed for Ty B mixes, but RAS will not be allowed. Substitute Binders in the intermediate layer (grade dumping) may be allowed when the surface HMA layer is placed not more than 6 months after the intermediate layer is complete or as approved by the Engineer.

Mixture Property	Test Method	Surface Mixtures
Critical Fracture Energy (CFE), in.-lb/in.^{2}, Min	Tex-248-F[1]	1.0
Crack Progression Rate (CPR), Max		0.45

1. For JMF 2 and greater, Tex-250-F and the IDEAL CT correlation developed during the trial batch may be used to monitor cracking performance. If at any time the minimum correlation limit is not met, use Tex-248-F and the limits above to determine specification compliance.

Methylene Blue (AASHTO T 330.07) will be tested for informational purposes only.

- Asphalt content will be determined by nuclear gauge.

Item 3084 – Bonding Course

An average rate of 0.20 GAL/SY was used for estimation purposes. Contractor shall choose an option shown below and bid accordingly.

OPTIONS:

MATERIAL	MINIMUM TYPICAL APPLICATION RATE (GAL/SY)
TRAIL – Emulsified Asphalt	#
TRAIL – Hot Applied	#
Spray Applied Underseal Membrane	#

Typical Application Rate may vary from 0.07 to 0.20 GAL/SY depending on option.

Apply bonding course at every intermediate layer, unless otherwise directed. The type of tack coat must be approved by the Engineer.

The Engineer may adjust the application rates as per field conditions.

Shear Bond Strength Test will be performed for informational purposes, and will not be used for specification compliance. The target shear bond strength is a minimum of 40 psi and for final surface layer a minimum of 50 psi.

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SH 97

GENERAL NOTES

SHEET 8 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			13G
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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Project Number: F 2B23(147)

Sheet

County: La Salle

Control: 0483-01-052

Highway: SH 97

Package 1

Item 6001 - Portable Changeable Message Sign

Provide eight (8) electronic portable changeable message signs as required by the Engineer. Provide backups and keep operational and available on the jobsite at all times during traffic control operations. The electronic portable changeable message signs will be made available for utilization for the entire duration of the project, including all alternative locations.

Item 6185 – Truck Mounted Attenuator (TMA) and Trailer

Provide Truck Mounted Attenuator(s) as required by the Engineer. Provide backup and keep operational and available on the jobsite at all times during traffic control operations. The Truck Mounted Attenuator will be made available for utilization for the entire duration of the project, including all alternative locations.

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SH 97

GENERAL NOTES

SHEET 9 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			13H
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0483-01-052 **DISTRICT** Laredo **COUNTY** La Salle
HIGHWAY SH 97

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0483-01-052**			
		PROJECT ID		**A00091339**			
		COUNTY		**La Salle**			
		HIGHWAY		**SH 97**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	41.320		41.320	
	104-6015	REMOVING CONC (SIDEWALKS)	SY	195.000		195.000	
	104-6021	REMOVING CONC (CURB)	LF	25.000		25.000	
	104-6022	REMOVING CONC (CURB AND GUTTER)	LF	4,088.000		4,088.000	
	104-6026	REMOVE CONC (GUTTER)	LF	681.000		681.000	
	104-6028	REMOVING CONC (MISC)	SY	336.000		336.000	
	105-6071	REMOVING STAB BASE & ASPH PAV (5" - 6")	SY	1,666.000		1,666.000	
	110-6001	EXCAVATION (ROADWAY)	CY	8,858.000		8,858.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	408.000		408.000	
	162-6002	BLOCK SODDING	SY	1,513.000		1,513.000	
	168-6001	VEGETATIVE WATERING	MG	24.000		24.000	
	216-6001	PROOF ROLLING	HR	100.000		100.000	
	310-6009	PRIME COAT (MC-30)	GAL	3,503.000		3,503.000	
	351-6008	FLEXIBLE PAVEMENT STRUCTURE REPAIR(12")	SY	3,300.000		3,300.000	
	354-6042	PLANE ASPH CONC PAV (8")	SY	431.000		431.000	
	360-6044	CONC PVMT (CONT REINF)(FAST TRK)(12")	SY	2,210.000		2,210.000	
	416-6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	10.300		10.300	
	420-6066	CL C CONC (RAIL FOUNDATION)	CY	94.000		94.000	
	420-6071	CL C CONC (COLLAR)	EA	1.000		1.000	
	420-6136	CL C CONC (RAC-R)	CY	27.390		27.390	
	432-6002	RIPRAP (CONC)(5 IN)	CY	752.000		752.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	49.000		49.000	
	438-6001	CLEANING AND SEALING EXISTING JOINTS	LF	172.000		172.000	
	442-6007	STR STEEL (MISC NON - BRIDGE)	LB	288.000		288.000	
	450-6006	RAIL (TY T223)	LF	875.000		875.000	
	450-6104	RAIL (TY PR22)	LF	1,103.000		1,103.000	
	451-6007	RETROFIT RAIL (TY T223)	LF	202.000		202.000	
	451-6043	RETROFIT RAIL (TY PR1)	LF	8.000		8.000	
	464-6003	RC PIPE (CL III)(18 IN)	LF	410.000		410.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF	15.000		15.000	
	465-6013	INLET (COMPL)(PCO)(3FT)(NONE)	EA	2.000		2.000	
	465-6014	INLET (COMPL)(PCO)(3FT)(LEFT)	EA	1.000		1.000	
	467-6358	SET (TY II) (18 IN) (RCP) (4: 1) (C)	EA	4.000		4.000	
	496-6002	REMOV STR (INLET)	EA	1.000		1.000	
	496-6016	REMOV STR (PIPE)	EA	1.000		1.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	10.000		10.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0483-01-052 **DISTRICT** Laredo **COUNTY** La Salle
HIGHWAY SH 97

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0483-01-052**			
		PROJECT ID		**A00091339**			
		COUNTY		**La Salle**			
		HIGHWAY		**SH 97**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	156.000		156.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	156.000		156.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	2,210.000		2,210.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	2,210.000		2,210.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	83.000		83.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	83.000		83.000	
	508-6001	CONSTRUCTING DETOURS	SY	374.000		374.000	
	528-6008	COLORED TEXTURED CONC (5")	SY	894.000		894.000	
	529-6002	CONC CURB (TY II)	LF	786.000		786.000	
	529-6008	CONC CURB & GUTTER (TY II)	LF	4,053.000		4,053.000	
	530-6001	INTERSECTIONS (CONC)	SY	380.000		380.000	
	530-6002	INTERSECTIONS (ACP)	SY	878.000		878.000	
	530-6004	DRIVEWAYS (CONC)	SY	552.000		552.000	
	530-6005	DRIVEWAYS (ACP)	SY	947.000		947.000	
	531-6002	CONC SIDEWALKS (5")	SY	2,125.000		2,125.000	
	531-6004	CURB RAMPS (TY 1)	EA	4.000		4.000	
	531-6005	CURB RAMPS (TY 2)	EA	1.000		1.000	
	531-6008	CURB RAMPS (TY 5)	EA	1.000		1.000	
	531-6010	CURB RAMPS (TY 7)	EA	3.000		3.000	
	531-6013	CURB RAMPS (TY 10)	EA	10.000		10.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	668.000		668.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	8.000		8.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	787.000		787.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	6.000		6.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	6.000		6.000	
	618-6016	CONDT (PVC) (SCH 40) (1")	LF	34.000		34.000	
	618-6023	CONDT (PVC) (SCH 40) (2")	LF	32.000		32.000	
	618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	399.000		399.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF	465.000		465.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF	64.000		64.000	
	624-6008	GROUND BOX TY C (162911)W/APRON	EA	6.000		6.000	
	628-6298	ELC SRV TY T 120/240 000(NS)GS(L)SP(O)	EA	1.000		1.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	32.000		32.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2.000		2.000	
	644-6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA	1.000		1.000	
	644-6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	1.000		1.000	
	644-6034	IN SM RD SN SUP&AM TYS80(1)SA(U-1EXT)	EA	1.000		1.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0483-01-052 **DISTRICT** Laredo **COUNTY** La Salle
HIGHWAY SH 97

			CONTROL SECTION JOB		**0483-01-052**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00091339**		
			COUNTY		**La Salle**		
			HIGHWAY		**SH 97**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	644-6035	IN SM RD SN SUP&AM TYS80(1)SA(U-2EXT)	EA	1.000		1.000	
	644-6037	IN SM RD SN SUP&AM TYS80(1)SA(U-WC)	EA	3.000		3.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	29.000		29.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	17.000		17.000	
	658-6071	INSTL DEL ASSM (D-SY)SZ (BRF)CTB (BI)	EA	11.000		11.000	
	662-6067	WK ZN PAV MRK REMOV (W)6"(SLD)	LF	9,550.000		9,550.000	
	662-6071	WK ZN PAV MRK REMOV (W)8"(SLD)	LF	850.000		850.000	
	662-6096	WK ZN PAV MRK REMOV (Y)6"(BRK)	LF	745.000		745.000	
	662-6098	WK ZN PAV MRK REMOV (Y)6"(SLD)	LF	9,550.000		9,550.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	90.000		90.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	1,179.000		1,179.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	939.000		939.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	4,346.000		4,346.000	
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	935.000		935.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	8,948.000		8,948.000	
	668-6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	137.000		137.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	10.000		10.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	2.000		2.000	
	668-6089	PREFAB PAV MRK TY C (W) (RR XING)	EA	2.000		2.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	136.000		136.000	
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF	260.000		260.000	
	680-6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1.000		1.000	
	682-6001	VEH SIG SEC (12")LED(GRN)	EA	2.000		2.000	
	682-6003	VEH SIG SEC (12")LED(YEL)	EA	2.000		2.000	
	682-6005	VEH SIG SEC (12")LED(RED)	EA	2.000		2.000	
	682-6060	BACKPLATE W/REFL BRDR(3 SEC)	EA	2.000		2.000	
	684-6010	TRF SIG CBL (TY A)(12 AWG)(5 CONDR)	LF	100.000		100.000	
	684-6012	TRF SIG CBL (TY A)(12 AWG)(7 CONDR)	LF	419.000		419.000	
	684-6014	TRF SIG CBL (TY A)(12 AWG)(9 CONDR)	LF	80.000		80.000	
	684-6082	TRF SIG CBL (TY C)(18 AWG)(2 CONDR)	LF	120.000		120.000	
	686-6029	INS TRF SIG PL AM (S)1 ARM(28')	EA	1.000		1.000	
	688-6004	VEH LP DETECT (SAWCUT)	LF	54.000		54.000	
	3076-6003	D-GR HMA TY-B PG64-22 (EXEMPT)	TON	530.000		530.000	
	3077-6007	SP MIXESSP-BSAC-B PG70-22	TON	6,747.000		6,747.000	
	3077-6023	SP MIXESSP-CSAC-B PG70-22	TON	2,909.000		2,909.000	
	3077-6033	SP MIXESSP-CSAC-A PG76-22	TON	1,825.000		1,825.000	
	3084-6001	BONDING COURSE	GAL	6,489.000		6,489.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0483-01-052 **DISTRICT** Laredo **COUNTY** La Salle
HIGHWAY SH 97

			CONTROL SECTION JOB		**0483-01-052**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00091339**		
			COUNTY		**La Salle**		
			HIGHWAY		**SH 97**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	8.000		8.000	
	6058-6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA	1.000		1.000	
	6185-6002	TMA (STATIONARY)	DAY	15.000		15.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	10.000		10.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		RAILROAD FLAGGING: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

SUMMARY OF ROADWAY ITEMS

LOCATION	100 6002 PREPARING ROW	110 6001 EXCAVATION (ROADWAY)	132 6003 EMBANKMENT (FINAL) (ORD COMP) (TY B)	162 6002 BLOCK SODDING	168 6001 VEGETATIVE WATERING	216 6001 PROOF ROLLING	310 6009 PRIME COAT (MC-30)	351 6008 FLEXIBLE PAVEMENT STRUCTURE REPAIR(12")	354 6042 PLANE ASPH CONC PAV (8")	360 6044 CONC PVMT (CONT REINF) (FAST TRK) (12")	420 6066 CL C CONC (RAIL FOUNDATION)	420 6136 CL C CONC (RAC-R)	432 6002 RIPRAP (CONC) (5 IN)	432 6045 RIPRAP (MOW STRIP) (4 IN)	438 6001 CLEANING AND SEALING EXISTING JOINTS	442 6007 STR STEEL (MISC NON - BRIDGE)	450 6006 RAIL (TY T223)	450 6104 RAIL (TY PR22)
	STA	CY	CY	SY	MG	HR	GAL	SY	SY	SY	CY	CY	CY	CY	LF	LB	LF	LF
PP 01	0.77	184	6	63						417								
PP 02	5.50	1092	190	343			126			1793						288		
PP 03	5.50	985	37	74			496						103	9				
PP 04	5.50	1112	74				464						387	24				
PP 05	5.50	1159	51	20			419		431				262	16	172			
PP 06	5.50	1248	41	278			544											
PP 07	5.50	1210	9	328			540											
PP 08	5.50	1417		290			666											
PP 09	2.05	451		117			248											
BUS 35 SW																		
RAIL LAYOUT 1												5.28					62	265
RAIL LAYOUT 2											67	10.53					610	490
RAIL LAYOUT 3											27	11.58					203	348
PROJECT					24	100		3300										
PROJECT TOTALS	41.32	8858	408	1513	24	100	3503	3300	431	2210	94	27.39	752	49	172	288	875	1103

SUMMARY OF ROADWAY ITEMS (CONT.)

LOCATION	451 6007 RETROFIT RAIL (TY T223)	451 6043 RETROFIT RAIL (TY PR1)	465 6013 INLET (COMPL) (PCO) (3FT) (NONE)	528 6008 COLORED TEXTURED CONC (5")	529 6002 CONC CURB (TY II)	529 6008 CONC CURB & GUTTER (TY II)	530 6001 INTERSECTIONS (CONC)	530 6002 INTERSECTIONS (ACP)	530 6004 DRIVEWAYS (CONC)	530 6005 DRIVEWAYS (ACP)	531 6002 CONC SIDEWALKS (5")	531 6004 CURB RAMPS (TY 1)	531 6005 CURB RAMPS (TY 2)	531 6008 CURB RAMPS (TY 5)	531 6010 CURB RAMPS (TY 7)	531 6013 CURB RAMPS (TY 10)	540 6001 MTL W-BEAM GD FEN (TIM POST)	540 6006 MTL BEAM GD FEN TRANS (THRIE-BEAM)
	LF	LF	EA	SY	LF	LF	SY	SY	SY	SY	SY	EA	EA	EA	EA	EA	LF	EA
PP 01					101	18				60	77							
PP 02					600	65	380	77			361	4			1	7		
PP 03						358		98			10		1				75	3
PP 04						550					17						364	2
PP 05			1			401		272		65	8					1	229	3
PP 06				680		1105			343	371	507				1			
PP 07				214		801		431	54	92	296				1	2		
PP 08						550				219	329							
PP 09						205				140	96							
BUS 35 SW					85				155		424			1				
RAIL LAYOUT 1		4																
RAIL LAYOUT 2		4																
RAIL LAYOUT 3	202																	
PROJECT																		
PROJECT TOTALS	202	8	1	894	786	4053	380	878	552	947	2125	4	1	1	3	10	668	8

SUMMARY OF ROADWAY ITEMS (CONT.)

LOCATION	544 6001 GUARDRAIL END TREATMENT (INSTALL)	3076 6003 D-GR HMA TY-B PG64-22 (EXEMPT)	3077 6007 SP MIXES SP-B SAC-B PG70-22	3077 6023 SP MIXES SP-C SAC-B PG70-22	3077 6033 SP MIXES SP-C SAC-A PG76-22	3084 6001 BONDING COURSE
	EA	TON	TON	TON	TON	GAL
PP 01		100				
PP 02		430	327	107	71	239
PP 03	2		1087	355	226	796
PP 04	2		1188	389	247	869
PP 05	2		1195	340	266	934
PP 06			776	482	265	961
PP 07			792	462	272	971
PP 08			1007	564	348	1260
PP 09			375	210	130	459
PROJECT TOTALS	6	530	6747	2909	1825	6489

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SUMMARY OF ROADWAY QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			15
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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Package 1

SUMMARY OF DRAINAGE ITEMS

LOCATION	420 6071	464 6003	464 6005	465 6013	465 6014	467 6358
	CL C CONC (COLLAR)	RC PIPE (CL III) (18 IN)	RC PIPE (CL III) (24 IN)	INLET (COMPL) (PCO) (3FT) (NONE)	INLET (COMPL) (PCO) (3FT) (LEFT)	SET (TY II) (18 IN) (RCP) (4: 1) (C)
	EA	LF	LF	EA	EA	EA
CULVERT 01		174				4
STORM SEWER SHEET 1		236			1	
STORM SEWER SHEET 3	1		15	1		
PROJECT TOTALS	1	410	15	1	1	4

SUMMARY OF REMOVAL ITEMS

LOCATION	105 6071	104 6015	104 6021	104 6022	104 6026	104 6028	496 6002	496 6016	542 6001	544 6003	677 6002
	REMOVING STAB BASE & ASPH PAV (5" - 6")	REMOVING CONC (SIDEWALKS)	REMOVING CONC (CURB)	REMOVING CONC (CURB AND GUTTER)	REMOVE CONC (GUTTER)	REMOVING CONC (MISC)	REMOV STR (INLET)	REMOV STR (PIPE)	REMOVE METAL BEAM GUARD FENCE	GUARDRAIL END TREATMENT (REMOVE)	ELIM EXT PAV MRK & MRKS (6")
	SY	SY	LF	LF	LF	SY	EA	EA	LF	EA	LF
REMOVAL 1		146		1272		239	1	1	525	3	
REMOVAL 2	1666	31		2593	681	97			262	3	
REMOVAL 3				223							260
BUS 35 SW		18	25								
PROJECT TOTALS	1666	195	25	4088	681	336	1	1	787	6	260

SUMMARY OF PAVEMENT MARKING ITEMS

LOCATION	658 6062	658 6071	666 6036	666 6309	666 6318	666 6321	668 6076	668 6077	668 6085	668 6089	672 6009
	INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)	INSTL DEL ASSM (D-SY) SZ (B RF) CTB (BI)	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	RE PM W/RET REQ TY I (W) 6" (SLD) (100MIL)	RE PM W/RET REQ TY I (Y) 6" (BRK) (100MIL)	RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)	PREFAB PAV MRK TY C (W) (24") (SLD)	PREFAB PAV MRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (WORD)	PREFAB PAV MRK TY C (W) (RR XING)	REFL PAV MRKR TY II-A-A
	EA	EA	LF	LF	LF	LF	LF	EA	EA	EA	EA
SHEET 1 OF 3	10	8		3016		4374	66			2	
SHEET 2 OF 3	7	3	486	964	760	4474	71	8	2		118
SHEET 3 OF 3			453	366	175	100		2			18
PROJECT TOTALS	17	11	939	4346	935	8948	137	10	2	2	136

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	506 6020	506 6024	506 6038	506 6039	506 6040	506 6043
	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTIO N EXITS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (8")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	LF	LF	LF	LF
STA 6+22.23 R1 TO STA 7+00.00 R1	156	156			9	9
STA 7+00.00 R1 TO STA 2+50.00 R2					24	24
STA 2+50.00 R2 TO STA 8+00.00 R2			429	429	10	10
STA 8+00.00 R2 TO STA 13+50.00 R2			1033	1033	20	20
STA 13+50.00 R2 TO STA 19+00.00 R2			748	748	20	20
STA 19+00.00 R2 TO STA 24+50.00 R2						
STA 24+50.00 R2 TO STA 30+00.00 R2						
STA 30+00.00 R2 TO STA 35+50.00 R2						
STA 35+50.00 R2 TO STA 37+55.03 R2						
PROJECT TOTALS	156	156	2210	2210	83	83

SUMMARY OF SIGNING ITEMS

LOCATION	644 6001	644 6004	644 6030	644 6033	644 6034	644 6035	644 6037	644 6076
	IN SM RD SN SUP&AM TY10BWG(1) SA(P)	IN SM RD SN SUP&AM TY10BWG(1) SA(T)	IN SM RD SN SUP&AM TYS80(1)SA (T)	IN SM RD SN SUP&AM TYS80(1)SA (U)	IN SM RD SN SUP&AM TYS80(1)SA (U-1EXT)	IN SM RD SN SUP&AM TYS80(1)SA (U-2EXT)	IN SM RD SN SUP&AM TYS80(1)SA (U-WC)	REMOVE SM RD SN SUP&AM
	EA	EA	EA	EA	EA	EA	EA	EA
SHEET 1 OF 4	18	2				1	1	17
SHEET 2 OF 4	9		1				2	11
SHEET 3 OF 4	1			1				1
SHEET 4 OF 4	4				1			
PROJECT TOTALS	32	2	1	1	1	1	3	29

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	502 6001	508 6001	662 6067	662 6071	662 6096	662 6098	662 6109	662 6111	6001 6002	6185 6002	6185 6005
	BARRICADES, SIGNS AND TRAFFIC HANDLING	CONSTRUCTING DETOURS	WK ZN PAV MRK REMOV (W) 6" (SLD)	WK ZN PAV MRK REMOV (W) 8" (SLD)	WK ZN PAV MRK REMOV (Y) 6" (BRK)	WK ZN PAV MRK REMOV (Y) 6" (SLD)	WK ZN PAV MRK SHT TERM (TAB) TY W	WK ZN PAV MRK SHT TERM (TAB) TY Y-2	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONAR Y)	TMA (MOBILE OPERATION)
	MO	SY	LF	LF	LF	LF	EA	EA	EA	DAY	DAY
PRIOR TO PHASE 2 - STEP 1		374									
PHASE 2 - STEP 1			3250			3250		325			
PHASE 2 - STEP 2			3320			3320		166			
PHASE 2 - END OF STEP 2			2980	850	745	2980		373			
PHASE 3							90	315			
PROJECT TOTALS	**10**	**374**	**9550**	**850**	**745**	**9550**	**90**	**1179**	**8**	**15**	**10**

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SH 97

SUMMARY OF PROJECT QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			16
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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Package 1

SUMMARY OF QUEUE CUTTER ITEMS

ITEM NO.	DESC NO.	DESCRIPTION	UNIT	QTY
416	6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	10.3
618	6016	CONDT (PVC) (SCH 40) (1")	LF	34
618	6023	CONDT (PVC) (SCH 40) (2")	LF	32
618	6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	399
620	6009	ELEC CONDR (NO. 6) BARE	LF	465
620	6010	ELEC CONDR (NO. 6) INSULATED	LF	64
624	6008	GROUND BOX TY C (162911)W/APRON	EA	6
628	6298	ELC SRV TY T 120/240 000(NS)GS(L)SP(O)	EA	1
680	6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1
	**	TRAFFIC SIGNAL CABINET AND CONTROLLER	EA	1
	**	TRAFFIC SIGNAL FOUNDATION (CONCRETE)	EA	1
	**	LOOP DETECTOR CARD	EA	1
	**	GROUND ROD (58"X10')	EA	2
	**	LED BLANKOUT SIGNS (DO NOT STOP ON TRACKS)	EA	1
682	6001	VEH SIG SEC (12")LED(GRN)	EA	2
682	6003	VEH SIG SEC (12")LED(YEL)	EA	2
682	6005	VEH SIG SEC (12")LED(RED)	EA	2
682	6060	BACKPLATE W/REFL BRDR(3 SEC)	EA	2
684	6010	TRF SIG CBL (TY A)(12 AWG)(5 CONDR)	LF	100
684	6012	TRF SIG CBL (TY A)(12 AWG)(7 CONDR)	LF	419
684	6014	TRF SIG CBL (TY A)(12 AWG)(9 CONDR)	LF	80
684	6082	TRF SIG CBL (TY C)(18 AWG)(2 CONDR)	LF	120
686	6029	INS TRF SIG PL AM (S)1 ARM(28')	EA	1
688	6004	VEH LP DETECT (SAWCUT)	LF	54
6058	6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA	1

** FOR CONTRACTOR'S INFORMATION ONLY. ITEMS SHALL BE PAID FOR UNDER ITEM 680.

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SH 97 SUMMARY OF QUEUE CUTTER QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			17
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

SHT	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	TYPE S
1	1	M4-5B	TO	24 X 12	X		S80	1	SA	U	2 EXT		
		M3-3B	SOUTH	24 X 12	X								
		M1-1T	INTERSTATE 35	24 X 24	X								
		M6-1B	←	21 X 15	X								
		M4-5B	TO	24 X 12	X								
		M3-1B	NORTH	24 X 12	X								
		M1-1T	INTERSTATE 35	24 X 24	X								
		M6-1B	→	21 X 15	X								
1	2	R8-3aTDBL	NO PARKING	24 X 30	X		10 BWG	1	SA	P			
			↔										
1	3	M3-2	EAST	24 X 12	X		10 BWG	1	SA	P			
		M1-6T	97 TEXAS	24 X 24	X								
		R8-3a	NO PARKING	24 X 30	X								
1	4	R8-3a	NO PARKING	24 X 30	X		10 BWG	1	SA	P			
1	5	D2-1	JOURDANTON 66	96 X 18	X		10BWG	1	SA	T			
1	6	R5-2	(NO TRUCKS)	24 X 24	X		10 BWG	1	SA	P			
1	7	R1-1	STOP	30 X 30	X		10 BWG	1	SA	P			
1	8	D1-2	← LAREDO PEARSALL →	78 X 30	X		S80	1	SA	U	WC		
1	9	W10-1	RR	30 DIA	X		10 BWG	1	SA	P			
1	10	R15-8	LOOK	18 X 9	X		10 BWG	1	SA	P			
1	11	R15-8	LOOK	18 X 9	X		10 BWG	1	SA	P			
1	12	R15-8	LOOK	18 X 9	X		10 BWG	1	SA	P			
1	13	R15-8	LOOK	18 X 9	X		10 BWG	1	SA	P			
1	14	R10-6L	STOP HERE ON RED	24 X 36	X		10 BWG	1	SA	P			
1	15	R1-1	STOP	30 X 30	X		10 BWG	1	SA	P			
1	16	W10-1	RR	30 DIA	X		10 BWG	1	SA	P			
1	17	R1-1	STOP	30 X 30	X		10 BWG	1	SA	P			
1	18	D14-4T	ADOPT A HIGHWAY NEXT 2 MILES	48 X 24	X		10 BWG	1	SA	T			
1	19	R1-1	STOP	30 X 30	X		10 BWG	1	SA	P			
1	20	R2-1	SPEED LIMIT 35	30 X 36	X		10 BWG	1	SA	P			
1	21	R2-1	SPEED LIMIT 45	30 X 36	X		10 BWG	1	SA	P			
1	22	M2-1G	JCT	21 X 15	X		10 BWG	1	SA	P			
		M1-2	BUISNESS LOOP 35	24 X 24	X								

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 1 OF 2

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		18

18

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SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

SHT	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
2	23	W2-2R	(T INTERSECTION)	24 X 24	X		10 BWG	1	SA	P			
2	24	S5-2	END SCHOOL ZONE	24 X 30	X		10BWG	1	SA	P			
		R2-1	SPEED LIMIT 45	30 X 36	X								
2	26	R1-1	STOP	30 X 30	X		10 BWG	1	SA	P			
2	27	R3-9B	CENTER LANE ONLY	24 X 36	X		10 BWG	1	SA	P			
2	28	M2-1	JCT	21 X 15	X		10 BWG	1	SA	P			
		M1-6F	FARM ROAD 624	24 X 24	X								
2	29	R1-1	STOP	30 X 30	X		10 BWG	1	SA	P			
2	30	R1-5B	STOP HERE FOR (PED WALKING)	36 X 36	X		10BWG	1	SA	P			
2	31	R1-1	STOP	30 X 30	X		10 BWG	1	SA	P			
2	32	R1-5B	STOP HERE FOR (PED WALKING)	36 X 36	X		10BWG	1	SA	P			
2	33	D1-2	MYERS MEMORIAL STADIUM →	108 X 30	X		S80	1	SA	U	WC		
2	34	D1-2	MYERS MEMORIAL STADIUM ←	108 X 30	X		S80	1	SA	U	WC		
2	35		TEXAS DEPT OF CRIMINAL JUSTICE →	96 X 24	X		S80	1	SA	T			
3	36	M3-2	EAST	24 X 12	X		S80	1	SA	U			
		M1-6T	97 TEXAS	24 X 24	X								
		M6-3	↑	21 X 15	X								
		M3-2	EAST	24 X 12	X								
		M1-6F	FARM ROAD 624	24 X 24	X								
		M6-1	→	21 X 15	X								
3	37	R3-9B	CENTER LANE ONLY	24 X 36	X		10 BWG	1	SA	P			
4	1	R14-1	TRUCK ROUTE	24 X 18	X		10 BWG	1	SA	P			
	2	M2-1	JCT	21 X 15	X		10 BWG	1	SA	P			
		M1-6F	FARM ROAD 468	24 X 24	X								
	3	R3-8MK	(LANE USE)	36 X 30	X		10 BWG	1	SA	P			
	4	I-5	(AIRPLANE)	24 X 24	X		10 BWG	1	SA	P			
		I-ARW	←	24 X 6	X								
	5	M3-3	SOUTH	24 X 12	X		S80	1	SA	U	1-EXT		
		M1-2	BUSINESS 35	24 X 24	X								
		M6-3	↑	21 X 15	X								
		M1-6T	97 TEXAS	24 X 24	X								
		M6-1	←	21 X 15	X								
		M4-5	TO	24 X 12	X								
		M1-6F	FARM ROAD 624	24 X 24	X								
		M6-1	←	21 X 15	X								

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 2 OF 2

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		19

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Package 1

SUMMARY OF EARTHWORK

ITEM		110	132	ACCUM EXCAVATION	ACCUM EMBANKMNET	MASS ORDINATE
BID CODE		6001	6003			
DESCRIPTION		EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)			
STATION	**REGION**	**CY**	**CY**	**CY**	**CY**	**CY**
6+22.23	R1	0	0	0	0	0
7+00.00	R1	184	6	184	6	178
8+00.00	R1	293	4	477	10	467
9+00.00	R1	256	33	733	43	690
0+00.00	R2	159	85	892	128	764
1+00.00	R2	154	56	1,046	184	862
2+00.00	R2	152	9	1,198	193	1,005
2+50.00	R2	78	3	1,276	196	1,080
3+00.00	R2	19	3	1,295	199	1,096
4+00.00	R2	165	0	1,460	199	1,261
5+00.00	R2	193	0	1,653	199	1,454
6+00.00	R2	206	6	1,859	205	1,654
7+00.00	R2	202	6	2,061	211	1,850
8+00.00	R2	200	22	2,261	233	2,028
9+00.00	R2	207	24	2,468	257	2,211
10+00.00	R2	209	9	2,677	266	2,411
11+00.00	R2	204	13	2,881	279	2,602
12+00.00	R2	202	9	3,083	288	2,795
13+00.00	R2	194	11	3,277	299	2,978
13+50.00	R2	96	8	3,373	307	3,066
14+00.00	R2	97	9	3,470	316	3,154
15+00.00	R2	196	17	3,666	333	3,333
16+00.00	R2	176	7	3,842	340	3,502
17+00.00	R2	183	9	4,025	349	3,676
18+00.00	R2	222	9	4,247	358	3,889
19+00.00	R2	285	0	4,532	358	4,174
20+00.00	R2	261	15	4,793	373	4,420
21+00.00	R2	200	17	4,993	390	4,603
22+00.00	R2	243	2	5,236	392	4,844
23+00.00	R2	241	0	5,477	392	5,085
24+00.00	R2	207	4	5,684	396	5,288
24+50.00	R2	96	3	5,780	399	5,381
25+00.00	R2	97	3	5,877	402	5,475
26+00.00	R2	261	4	6,138	406	5,732
27+00.00	R2	259	2	6,397	408	5,989
28+00.00	R2	178	0	6,575	408	6,167
29+00.00	R2	185	0	6,760	408	6,352
30+00.00	R2	230	0	6,990	408	6,582
31+00.00	R2	259	0	7,249	408	6,841
32+00.00	R2	269	0	7,518	408	7,110
33+00.00	R2	270	0	7,788	408	7,380
34+00.00	R2	259	0	8,047	408	7,639
35+00.00	R2	244	0	8,291	408	7,883
35+50.00	R2	116	0	8,407	408	7,999
36+00.00	R2	117	0	8,524	408	8,116
37+00.00	R2	228	0	8,752	408	8,344
37+55.03	R2	106	0	8,858	408	8,450

PROJECT TOTAL	CY	CY
	8,858	408

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SH 97

SUMMARY OF EARTHWORK QUANTITIES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			20
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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Package 1

1. THIS IS A SUGGESTED TRAFFIC CONTROL PLAN (TCP). THE CONTRACTOR MAY SUBMIT AN ALTERNATE TRAFFIC CONTROL PLAN, SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER IN TEXAS, FOR APPROVAL BY THE ENGINEER. WHEN MUTUALLY BENEFICIAL CHANGES ARE PROPOSED TO THE EXISTING TRAFFIC CONTROL PLAN AND ARE AGREED UPON BY THE CONTRACTOR AND THE DEPARTMENT, THE PLAN SHEETS MAY BE DEVELOPED AND SIGNED AND SEALED BY THE ENGINEER.

2. REFER TO ITEM 8 "PROSECUTION AND PROGRESS" AND PROJECT GENERAL NOTES FOR ADDITIONAL INFORMATION REGARDING THE TRAFFIC CONTROL PLAN.

3. FURNISH AND INSTALL ALL TRAFFIC CONTROL PLANS DEVICES, INCLUDING BUT NOT LIMITED TO BARRICADES, SIGNS, AND WORK ZONE MARKINGS, IN COMPLIANCE WITH THE LATEST VERSION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TXMUTCD), THE STATE STANDARD TRAFFIC CONTROL PLANS (TCP) SHEETS, AND THE BARRICADES AND CONSTRUCTION (BC) SHEETS. REFER TO THE PROJECT GENERAL NOTES FOR ADDITIONAL INFORMATION REGARDING THE TRAFFIC CONTROL PLAN.

4. LIMIT THE LENGTH OF LANE CLOSURES AS NOTED ON SEQUENCE OF WORK. ALLOW FOR ALL LANES OPEN TO TRAFFIC DURING NON-WORKING HOURS UNLESS OTHERWISE SPECIFIED IN THE SEQUENCE OF WORK. ANY ADDITIONAL OVERNIGHT LANE CLOSURES NOT SPECIFIED IN THE SEQUENCE OF WORK WILL REQUIRE APPROVAL BY THE ENGINEER.

5. VERIFY THE LOCATION AND SPACING OF SIGNS, BARRICADES, AND CHANNELIZING DEVICES PRIOR TO THEIR PLACEMENT ALONG VERTICAL CURVES, HORIZONTAL CURVES, AND OTHER GEOMETRIC CONSTRAINTS TO ASSURE VISIBILITY TO ALL MOTORISTS.

6. PLACE THE TRAFFIC CONTROL DEVICES ONLY WHILE WORK IS ACTUALLY IN PROGRESS OR A DEFINITE NEED EXISTS. ALWAYS HAVE ENOUGH BARRICADES, CHANNELIZING DEVICES, AND SIGNS AT ALL TIMES TO REPLACE THOSE DAMAGED.

7. COVER ALL EXISTING SIGNS THAT CONFLICT WITH THE TRAFFIC CONTROL PLAN AND UNCOVER DURING NON-WORKING HOURS OR AS DIRECTED BY THE ENGINEER. PARTIAL COVERAGE OF THE SIGN OR COVERAGE BY MATERIAL THAT WILL NOT COVER THE ENTIRE SIGN ALL THE TIME IS NOT PERMITTED.

8. VARY THE SPACING OF SIGNS TO MEET TRAFFIC CONDITIONS OR AS DIRECTED BY THE ENGINEER AND ASSURE THAT ALL TRAFFIC CONTROL DEVICES AND WORK ZONE PAVEMENT MARKINGS ARE KEPT IN A HIGHLY VISIBLE CONDITION (CLEAN, UPRIGHT AND AT PROPER LOCATION).

9. MAINTAIN THE ROADWAY SURFACE AND WORK ZONE STRIPING WITHIN THE PROJECT WHILE THE TRAFFIC CONTROL PLAN IS IN EFFECT. PLACE AND BE RESPONSIBLE FOR ALL WORK ZONE PAVEMENT MARKINGS IN ACCORDANCE WITH STANDARD SHEETS WZ(STPM)-23, BC (11), BC (12) AND THE TXMUTCD.

10. CONDUCT CONSTRUCTION OPERATIONS SO AS TO PROVIDE THE LEAST POSSIBLE INTERFERENCE TO TRAFFIC AND TO PERMIT THE CONTINUOUS MOVEMENT OF TRAFFIC IN ALL ALLOWABLE DIRECTIONS AT ALL TIMES OR AS PERMITTED BY THE SEQUENCE OF CONSTRUCTION. PROVIDE FOR SAFE AND CONVENIENT ACCESS TO ABUTTING PROPERTY, HIGHWAYS, PUBLIC ROADS, AND STREET CROSSINGS EXCEPT AS OTHERWISE SHOWN ON THE SEQUENCE OF WORK. THE CONTRACTOR WILL MAINTAIN AT ALL TIMES TWO-WAY TRAFFIC OR A MINIMUM OF ONE LANE USING A PILOT VEHICLE AND FLAGGERS.

11. PLACE ALL STOCKPILED MATERIAL, WASTE MATERIAL, SIGNS, BARRICADES, CHANNELIZING DEVICES AND WORK VEHICLES NOT IN USE, AT A MINIMUM OF 30 FEET FROM THE OUTER EDGE OF THE NEAREST TRAVEL LANE.

12. MAINTAIN ALL EXISTING DRAINAGE CONDITIONS DURING ALL CONSTRUCTION PHASES UNTIL THE PERMANENT DRAINAGE FACILITIES ARE CONSTRUCTED AND READY TO USE. HANDLE EXCAVATED AND STOCKPILED MATERIAL IN SUCH A WAY THAT IT WILL NOT BLOCK DRAINAGE.

13. REGULATE ALL CONSTRUCTION TRAFFIC SO AS TO CAUSE A MINIMAL INCONVENIENCE TO THE TRAVELING PUBLIC. AT THE TIMES WHEN IT IS NECESSARY FOR TRUCKS TO STOP, UNLOAD OR CROSS ROADWAYS UNDER TRAFFIC, PROVIDE WARNING SIGNS AND FLAGGERS AS NEEDED TO ADEQUATELY PROTECT THE TRAVELING PUBLIC.

14. DURING NON-WORKING HOURS, ALL DROP-OFFS ARE TO BE FILLED. REFER TO STANDARD WZ(UL)-13 FOR DROP-OFFS AND TO DETAILS SHOWN IN PLANS FOR LONGITUDINAL DROP-OFFS OR AS DIRECTED BY THE ENGINEER.

15. NOTIFY THE ENGINEER IN WRITING TWO WEEKS PRIOR TO SHIFTING OF TRAFFIC WITHIN EACH PHASE OF THE TRAFFIC CONTROL PLAN.

16. DURING THE HOLIDAY TIME FRAME OF DECEMBER 21ST THROUGH JANUARY 1ST, EVERY EFFORT SHOULD BE TAKEN TO ENSURE THAT ALL TRAVEL LANES REMAIN OPEN WHERE POSSIBLE.

17. REMOVE FROM THE WORK AREA ALL LOOSE MATERIALS AND DEBRIS RESULTING FROM CONSTRUCTION OPERATIONS AT THE END OF EACH WORK DAY.

18. MAINTAIN A MINIMUM OF ONE THROUGH LANE OPEN IN EACH DIRECTION DURING WORKING HOURS EXCEPT AS DIRECTED BY THE ENGINEER.

19. IMPLEMENT ALL REQUIRED EROSION CONTROL MEASURES AS SHOWN IN THE PLANS DURING THE VARIOUS STAGES OF CONSTRUCTION.

20. MOVING AN EXISTING SIGN TO A TEMPORARY LOCATION IS SUBSIDIARY. INSTALLATIONS WITH PERMANENT SUPPORTS AT PERMANENT LOCATIONS WILL BE PAID FOR UNDER THE APPLICABLE BID ITEM(S).

21. USE OF PORTABLE CHANGEABLE MESSAGE SIGN AS ADVANCE NOTICE OF LANE CLOSURES WILL BE REQUIRED, AS DIRECTED BY THE ENGINEER. FOR LOCATIONS THAT ARE ADJACENT TO EACH OTHER, A SINGLE SIGN IN ADVANCE OF THE ENTIRE WORK AREA IS ACCEPTABLE.

22. PLACE PORTABLE CHANGEABLE MESSAGE SIGNS AT LOCATIONS REQUIRING LANE CLOSURES FOR ONE WEEK BEFORE THE CLOSURES OR AS DIRECTED BY THE ENGINEER.

23. ADDITIONAL SIGNS, BARRICADES AND CHANNELIZING DEVICES MAY BE REQUIRED TO MAINTAIN TRAFFIC DURING CONSTRUCTION, AS SHOWN ON TCP STANDARDS. ADDITIONAL SIGNS, BARRICADES, ETC. (IF ANY), WILL BE SUBSIDIARY TO ITEM 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING".

24. REFER TO BC(6)-21 PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) STANDARDS FOR A LISTING OF ABBREVIATED WORDS AND TWO-WORD PHRASES THAT ARE ACCEPTABLE FOR USE ON PCMS. SUBMIT THE SUGGESTED MESSAGE FOR THE SIGN TO THE ENGINEER FOR APPROVAL.

25. USE PLASTIC DRUMS TO CHANNELIZE TRAFFIC WHEN EXISTING PAVEMENT MARKINGS HAVE BEEN OBLITERATED.

26. A PILOT CAR AND RADIO EQUIPPED FLAGGERS ARE REQUIRED TO LEAD TRAFFIC THROUGH THE WORK SPACE WITH OR WITHOUT CHANNELIZING DEVICES ON THE CENTER LINE UNLESS OTHERWISE APPROVED.

4/20/2023

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SH 97

TCP GENERAL NOTES

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			21
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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Package 1

SEQUENCE OF WORK:

GENERAL:

COORDINATE WORK AND ANY CLOSURES TO MINIMIZE IMPACTS TO MYERS MEMORIAL STADIUM OPERATIONS. ANY CLOSURES AFFECTING OPERATIONS SHALL BE LIMITED. CLOSURES TO BE APPROVED BY THE ENGINEER.

IT IS THE CONTRACTOR'S RESPONSIBILTY TO DETERMINE EXACT LOCATION OF UTILITIES PRIOR TO STARTING CONSTRUCTION WITHIN A WORK AREA.

CONTRACTOR WILL MAINTAIN ACCESS TO DRIVEWAYS AND SIDE STREETS AT ALL TIMES UNLESS APPROVED BY THE ENGINEER OR SHOWN OTHERWISE IN THE PLANS. THE CONTRACTOR WILL CONSTRUCT TEMPORARY PAVEMENT TO TRANSITION FROM PROPOSED GRADE TO EXISTING DRIVEWAYS AND SIDE STREETS WHEN REQUIRED TO MAINTAIN ACCESS. THIS WORK WILL BE SUBSIDIARY TO BID ITEM 530.

CONTRACTOR WILL MAINTAIN DRAINAGE THROUGHOUT THE PROJECT.

THE FOLLOWING TRAFFIC CONTROL PHASES COULD BE COMBINED OR REORDERED AS APPROVED BY THE ENGINEER.

TWO WEEKS PRIOR TO CONSTRUCTION, PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE PLACED ON BOTH ENDS OF THE PROJECT.
BEFORE BEGINNING WORK, PLACE APPLICABLE BARRICADES IN ACCORDANCE WITH TXDOT STANDARDS BC (1-12)-21 AND PLACE EROSION CONTROL MEASURES.

CONTRACTOR WILL NOT BE ALLOWED ON RAILROAD RIGHT OF WAY UNTIL RAILROAD AGREEMENT IS COMPLETELY EXECUTED.

NO LANE CLOSURES OR DETOURS WILL BE ALLOWED DURING THE LA SALLE COUNTY FAIR FROM MARCH 7 - 10, 2024.

PHASE 1A: ROADWAY RECONSTRUCTION STA 0+98.60 R2 TO 26+00.00 R2

PHASE 1A WILL BE CONSTRUCTED WITH SH 97 CLOSED TO TRAFFIC FROM BUS 35 TO PECOS ST.
SEE DETOUR LAYOUTS FOR SET-UP & ADDITIONAL INFORMATION. USE ALTERNATE DETOUR IF IH 35 FRONTAGE ROAD PROJECT (CSJ:0017-08-096) IS IN PHASE 3 / DETOUR 3.

EXISTING SIDEWALKS TO REMAIN OPEN AT ALL TIMES FOR PEDESTRIAN TRAFFIC. INSTALL PLASTIC DRUMS & ORANGE PLASTIC SAFETY FENCING TO SEPARATE PEDESTRIANS FROM WORK ZONE AREAS. SEE WZ(BTS-2)-13 STANDARD FOR ADDITIONAL INFORMATION AND DETAILS. THIS WORK AND MATERIALS WILL BE SUBSIDIARY TO ITEM 502.

REMOVE 14" OF EXISTING MATERIALS. COMPACT AND PROOF ROLL AS REQUIRED & PLACE PRIME COAT. THEN CONSTRUCT 3" SP TY C, BONDING COURSE AND 9" SP TY B. RETROFIT BRIDGE RAIL AND INSTALL CONNECTING MBGF & SGT. RECONSTRUCT ROADWAY AS SHOWN IN THE PLANS FROM STA 0+98.60 R2 TO 26+00.00 R2. CONSTRUCT BONDING COURSE & 2" SP TY C FINAL SURFACE FROM STA 0+98.60 R2 TO STA 23+40.00 R2.

AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP ACP GRADE TO EXISTING GRADE USING ACP OR AS DIRECTED BY THE ENGINEER FOR APPROXIMATELY 100 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

CONSTRUCT PROPOSED SIDEWALK AND BLOCK SODDING FROM STA 0+98.60 R2 TO 26+00.00 R2 IN PHASE 2 CONSTRUCTION.

AFTER COMPLETION OF PHASE 1A, PROCEED TO PHASE 1B.

PHASE 1B: ROADWAY RECONSTRUCTION STA 6+22.23 R1 TO 0+98.60 R2

PHASE 1B WILL BE CONSTRUCTED WITH SH 97 CLOSED TO TRAFFIC FROM BUS 35 TO PECOS ST.
SEE DETOUR LAYOUTS FOR SET-UP & ADDITIONAL INFORMATION. USE ALTERNATE DETOUR IF IH 35 FRONTAGE ROAD PROJECT (CSJ:0017-08-096) IS IN PHASE 3 / DETOUR 3.

EXISTING SIDEWALKS TO REMAIN OPEN AT ALL TIMES FOR PEDESTRIAN TRAFFIC. INSTALL PLASTIC DRUMS & ORANGE PLASTIC SAFETY FENCING TO SEPARATE PEDESTRIANS FROM WORK ZONE AREAS. SEE WZ(BTS-2)-13 STANDARD FOR ADDITIONAL INFORMATION AND DETAILS. THIS WORK AND MATERIALS WILL BE SUBSIDIARY TO ITEM 502.

PROPOSED CONCRETE PAVEMENT TO END 2' BEFORE AND BEGIN 2'AFTER RAILROAD PLANKING SYSTEM. PLACE ACP IN THE 2' WIDE AREA BEFORE AND AFTER THE RAILROAD PLANKING SYSTEM. RAILROAD FLAGGERS WILL BE REQUIRED FOR PROJECT.

REMOVE 16" OF EXISTING MATERIALS. COMPACT AND PROOF ROLL SUBGRADE AS REQUIRED. CONSTRUCT 4" ACP & 12" CONCRETE PAVEMENT WITH MONO CURB FROM STA 6+22.23 R1 TO 0+98.60 R2.

AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP ACP GRADE TO EXISTING GRADE USING ACP OR AS DIRECTED BY THE ENGINEER FOR APPROXIMATELY 100 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

CONSTRUCT PROPOSED SIDEWALK AND BLOCK SODDING FROM STA 6+22.23 R1 TO 0+98.60 R2 IN PHASE 2 CONSTRUCTION.

AFTER COMPLETION OF PHASE 1B, PLACE FINAL PAVEMENT MARKINGS FROM STA 6+22.23 R1 TO STA 23+40.00 R2. THEN REMOVE DETOUR AND OPEN ALL LANES TO TRAFFIC. PROCEED TO PHASE 2.

PHASE 2: ROADWAY RECONSTRUCTION STA 26+00.00 R2 TO STA 37+55.03 R2

PRIOR TO BEGINNING PHASE 2 STEP 1, REMOVE EXISTING CURB & GUTTER AND EXISTING MATERIAL BEHIND THE CURB FROM STA 26+10 TO 30+20 LEFT SIDE AND CONSTRUCT 8" TY B-PG 70-22-SAC B IN ACCORDANCE WITH ITEM 508, USING TCP(2-2)-18 STANDARD ONE LANE-TWO DIRECTION TRAFFIC CONTROL AND FLAGGERS FOR DAILY LANE CLOSURES.

THEN CONSTRUCT EASTBOUND LANES FROM STA 26+00.00 TO 27+00.00 RIGHT SIDE. (TO ALLOW TRAFFIC ACCESS TO PECOS ST). REMOVE 14" OF EXISTING MATERIALS. COMPACT AND PROOF ROLL AS REQUIRED & PLACE PRIME COAT. CONSTRUCT 3" TYP C ACP, BONDING COURSE & 9" TY B ACP. EXISTING CURB & GUTTER TO REMAIN. USE TCP(2-2)-18 STANDARD FOR ONE LANE-TWO DIRECTION TRAFFIC CONTROL AND FLAGGERS FOR DAILY LANE CLOSURES.

-STEP 1: STA 27+00.00 TO 37+55.03

CONSTRUCT PROPOSED SIDEWALK AND BLOCK SODDING (PHASE 1 LIMITS) FROM STA 6+22.23 R1 TO 26+00.00 R2. FOR CONCRETE POURS USE STANDARDS TCP(2-1)-18 AND TCP(2-2)-18 FOR DALIY SHOULDER & LANE CLOSURES.

AFTER COMPLETION OF EASTBOUND LANES FROM STA 26+00.00 TO 27+00.00, PLACE REMOVABLE WORK ZONE PAVEMENT MARKINGS FOR PHASE 2 STEP 1. SEE LAYOUTS FOR LOCATIONS.

REMOVE 14" OF EXISTING MATERIALS. COMPACT AND PROOF ROLL AS REQUIRED & PLACE PRIME COAT. CONSTRUCT 3" SP TY C, BONDING COURSE & 9" SP TY B, AND SIDEWALK ON EASTBOUND LANE. FINAL SURFACE CONSTRUCTED IN PHASE 3. RECONSTRUCT ROADWAY AS SHOWN IN THE PLANS.

AFTER COMPLETION OF STEP 1, PLACE REMOVABLE WORK ZONE PAVEMENT MARKINGS FOR PHASE 2 STEP 2. SEE LAYOUT FOR LOCATIONS.

-STEP 2: STA 26+00.00 TO 37+55.03

REMOVE 14" OF EXISTING MATERIALS. COMPACT AND PROOF ROLL AS REQUIRED & PLACE PRIME COAT. CONSTRUCT 3" SP TY C, BONDING COURSE, 9" SP TY B, CURB & GUTTER AND SIDEWALK ON WESTBOUND LANE. FINAL SURFACE CONSTRUCTED IN PHASE 3. RECONSTRUCT ROADWAY AS SHOWN IN THE PLANS.

AFTER COMPLETION OF STEP 2, PLACE WORK ZONE PAVEMENT MARKINGS SHORT TERM (TABS) FROM STA 23+40.00 R2 TO STA 37+55.03 R2 IN ACCORDANCE WITH FINAL LANE CONFIGURATION.

AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP ACP GRADE TO EXISTING GRADE USING ACP OR AS DIRECTED BY THE ENGINEER FOR APPROXIMATELY 100 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

PHASE 3: ROADWAY ACP FINAL SURFACE STA 23+40.00 R2 TO STA 37+55.03 R2.

CONSTRUCT BONDING COURSE & 2" SP TY C FINAL SURFACE FROM STA 23+40.00 R2 TO STA 37+55.03 R2 WITH DAILY LANE CLOSURES USING TCP(2-2)-18 STANDARD WITH FLAGGERS AND PILOT CAR.

PLACE WORK ZONE TABS AT THE END OF EACH WORK DAY PRIOR TO OPENING TRAFFIC TO FINAL CONFIGURATION.

USING TCP(3-3)-14 INSTALL PERMANENT PAVEMENT MARKINGS.

PLACE ALL SIGNS, ESTABLISH VEGETATION AND FINAL CLEAN UP.

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

6/7/2023

Texas Department of Transportation

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SH 97

TCP
SEQUENCE OF WORK

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			22
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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Package 1

SH 97
CLOSED AT
BUS 35

PCMS
PHASE 1 MESSAGE

USE
EXIT 69
FOR DETOUR

PCMS
PHASE 2 MESSAGE

PLACED 1 MILE IN ADVANCE OF
IH 35 BUSINESS EXIT (EXIT #69)

SH 97
CLOSED AT
BUS 35

PCMS
PHASE 1 MESSAGE

FOLLOW
DETOUR

PCMS
PHASE 2 MESSAGE

SH 97
CLOSED AT
BUS 35

PCMS
PHASE 1 MESSAGE

FOLLOW
DETOUR

PCMS
PHASE 2 MESSAGE

PCMS PHASE 1 MESSAGE	PCMS PHASE 2 MESSAGE
SH 97	USE
CLOSED AT	EXIT 68
BUS 35	FOR DETOUR

PLACED 1 MILE IN ADVANCE OF
IH 35 BUSINESS EXIT (EXIT #65)

PCMS PHASE 1 MESSAGE	PCMS PHASE 2 MESSAGE
ROAD	USE
CLOSED AT	LOOP
PECOS ST	FOR DETOUR

PLACED 1 MILE IN ADVANCE OF SH 97

PCMS PHASE 1 MESSAGE	PCMS PHASE 2 MESSAGE
ROAD	USE
CLOSED AT	LOOP
PECOS ST	FOR DETOUR

PLACED 1 MILE IN ADVANCE OF
JOEL RODIGUEZ JR LOOP

SEE STREET DETOUR LAYOUT FOR LOCATION OF SIGNS ON CITY STREETS.

COTULLA

IH 35 FRONTAGE ROAD

EXIT 69

EXIT 68

JOEL RODRIGUEZ JR LOOP

UP RAILROAD

MAIN ST

FRONT ST

ALTITO ST

PECOS

GUADALUPE ST

ROAD CLOSED
R11-2
48"x30"

R11-3A
60" x 30"
ROAD CLOSED
0.5 MILE AHEAD
LOCAL TRAFFIC ONLY

M4-10R
48" x 18"

M4-10a
(24"X18")

CW20-2D
36" x 36"
DETOUR AHEAD

CW20-3F
36" x 36"
ROAD CLOSED 1 MILE

END DETOUR

NOT TO SCALE

LEGEND:

- PHASE 1 CONSTRUCTION (CLOSED ROADWAY)
- TYPE III BARRICADE
- SIGN
- DIRECTION OF TRAFFIC FOR DETOUR
- PORTABLE CHANGEABLE MESSAGE SIGN

NOTES:

1. DETOUR SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNS.
2. SIGNS AND BARRICADES SHOWN SHALL BE SUBSIDIARY TO ITEM 502 AND IN ACCORDANCE WITH THE MUTCD AND TXDOT STANADARDS.
3. COMPLETELY COVER SIGNS THAT CONFLICT WITH THE DETOUR. THESE SIGNS SHALL REMAIN COMPLETELY COVERED UNTIL THE SIGNS ARE APPLICABLE. THIS WORK WILL BE SUBSIDIARY TO ITEM 502.
4. THE LOCATION OF SIGNS SHOWN ON THE PLAN SHEET ARE APPROXIMATE AND CAN BE ADJUSTED TO BEST FIT FIELD CONDITIONS. EXACT LOCATION TO BE APPROVED BY THE ENGINEER IN THE FIELD.

CONTRACTOR TO FURNISH, OPERATE AND MAINTAIN PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS). PCMS TO BE PLACED 1 MILE IN ADVANCE OF EXITS ON IH 35 ON SOUTHBOUND LANES (NORTH OF COTULLA), NORTHBOUND LANES (SOUTH OF COTULLA) AND ON SH 97 1 MILE IN ADVANCE OF JOEL RODIGUEZ JR LOOP. THE PCMS SHALL INFORM ALL TRAFFIC ABOUT SH 97 CLOSURE.

4/20/2023

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SH 97

PHASE 1
SH 97 DETOUR LAYOUT

SHEET 1 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			23
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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Package 1

SH 97 CLOSED AT BUS 35
PCMS PHASE 1 MESSAGE

USE EXIT 69 FOR DETOUR
PCMS PHASE 2 MESSAGE

PLACED 1 MILE IN ADVANCE OF IH 35 BUSINESS EXIT (EXIT #69)

SH 97 CLOSED AT BUS 35
PCMS PHASE 1 MESSAGE

FOLLOW DETOUR
PCMS PHASE 2 MESSAGE

SH 97 CLOSED AT BUS 35
PCMS PHASE 1 MESSAGE

FOLLOW DETOUR
PCMS PHASE 2 MESSAGE

EXIT 69
IH 35 FRONTAGE ROAD
EXIT 68
JOEL RODRIGUEZ JR LOOP
UP RAILROAD
MAIN ST
FRONT ST
PECOS
ALTITO ST
GUADALUPE ST
COTULLA

SEE STREET DETOUR LAYOUT FOR LOCATION OF SIGNS ON CITY STREETS.

R11-3A 60" x 30"
ROAD CLOSED 0.5 MILE AHEAD LOCAL TRAFFIC ONLY
DETOUR
M4-10R 48" x 18"

ROAD CLOSED
R11-2 48"x30"

END DETOUR
M4-8a (24"X18")

CW20-2D 36" x 36"
DETOUR AHEAD

CW20-3F 36" x 36"
ROAD CLOSED 1 MILE

PCMS PHASE 1 MESSAGE: ROAD / CLOSED AT / PECOS ST
PCMS PHASE 2 MESSAGE: USE / LOOP / FOR DETOUR
PLACED 1 MILE IN ADVANCE OF JOEL RODIGUEZ JR LOOP

PCMS PHASE 1 MESSAGE: ROAD / CLOSED AT / PECOS ST
PCMS PHASE 2 MESSAGE: USE / LOOP / FOR DETOUR
PLACED 1 MILE IN ADVANCE OF SH 97

PCMS PHASE 1 MESSAGE: SH 97 / CLOSED AT / BUS 35
PCMS PHASE 2 MESSAGE: USE / EXIT 68 / FOR DETOUR
PLACED 1 MILE IN ADVANCE OF IH 35 BUSINESS EXIT (EXIT #65)

USE ALTERNATE DETOUR
IF IH 35 EAST FRONTAGE ROAD
PROJECT (CSJ:0017-08-096)
IS IN PHASE 3 / DETOUR 3.

NOT TO SCALE

LEGEND:
- PHASE 1 CONSTRUCTION (CLOSED ROADWAY)
- TYPE III BARRICADE
- SIGN
- DIRECTION OF TRAFFIC FOR DETOUR
- PORTABLE CHANGEABLE MESSAGE SIGN

NOTES:

1. DETOUR SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNS.
2. SIGNS AND BARRICADES SHOWN SHALL BE SUBSIDIARY TO ITEM 502 AND IN ACCORDANCE WITH THE MUTCD AND TXDOT STANADARDS.
3. COMPLETELY COVER SIGNS THAT CONFLICT WITH THE DETOUR. THESE SIGNS SHALL REMAIN COMPLETELY COVERED UNTIL THE SIGNS ARE APPLICABLE. THIS WORK WILL BE SUBSIDIARY TO ITEM 502.
4. THE LOCATION OF SIGNS SHOWN ON THE PLAN SHEET ARE APPROXIMATE AND CAN BE ADJUSTED TO BEST FIT FIELD CONDITIONS. EXACT LOCATION TO BE APPROVED BY THE ENGINEER IN THE FIELD.

CONTRACTOR TO FURNISH, OPERATE AND MAINTAIN PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS). PCMS TO BE PLACED 1 MILE IN ADVANCE OF EXITS ON IH 35 ON SOUTHBOUND LANES (NORTH OF COTULLA), NORTHBOUND LANES (SOUTH OF COTULLA) AND ON SH 97 1 MILE IN ADVANCE OF JOEL RODIGUEZ JR LOOP. THE PCMS SHALL INFORM ALL TRAFFIC ABOUT SH 97 CLOSURE.

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SH 97 PHASE 1 SH 97 DETOUR LAYOUT ALTERNATE

SHEET 2 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			24
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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COTULLA

PCMS PHASE 1 MESSAGE	PCMS PHASE 2 MESSAGE
SH 97	FOLLOW
CLOSED AT	DETOUR
BUS 35	

LEGEND:
- PHASE 1 CONSTRUCTION (CLOSED ROADWAY)
- TYPE III BARRICADE
- SIGN
- DIRECTION OF TRAFFIC FOR DETOUR
- PORTABLE CHANGEABLE MESSAGE SIGN

CONTRACTOR TO ALLOW ACCESS AT ALL TIMES FOR N. MARKET ST. DURING PHASE 1 CONSTRUCTION.

PHASE 1 CONSTRUCTION

BUS 35 · SH 97 · FM 468 · LEONA ST · FRIO ST · CENTER ST · CARRIZO ST · S MAIN ST · N FRONT ST · S FRONT ST · RAILROAD · N. MARKET ST · ZAMORA ST · KECK ST. · S. MARKET ST. · NEAL ST. · EARNEST ST. · PECOS ST. · ENGINEER LN. · ALTITO ST.

NOTES:

1. DETOUR SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNS.
2. SIGNS AND BARRICADES SHOWN SHALL BE SUBSIDIARY TO ITEM 502.
3. COMPLETELY COVER SIGNS THAT CONFLICT WITH THE DETOUR. THESE SIGNS SHALL REMAIN COMPLETELY COVERED UNTIL THE SIGNS ARE APPLICABLE. THIS WORK WILL BE SUBSIDIARY TO ITEM 502.
4. REFER TO WORK ZONE ROAD CLOSURE DETAILS STANDARD FOR MINIMUM SIGN SPACING DISTANCE.

SCALE: 1"=100'

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SH 97

CITY STREET DETOUR LAYOUT

SHEET 3 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			25
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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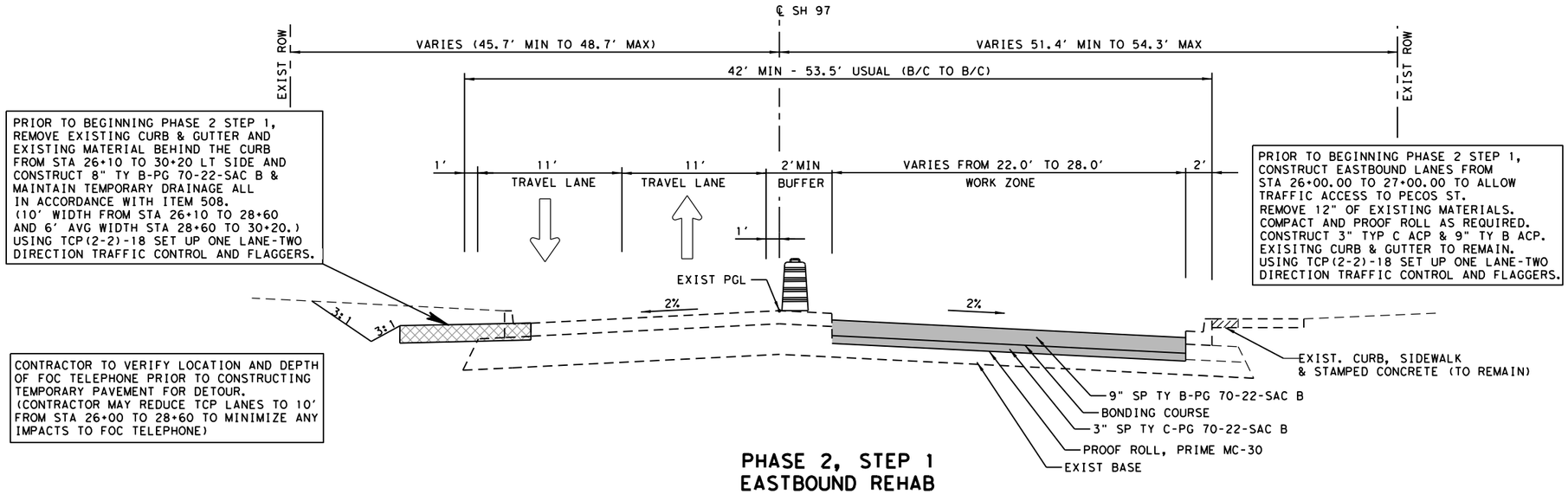
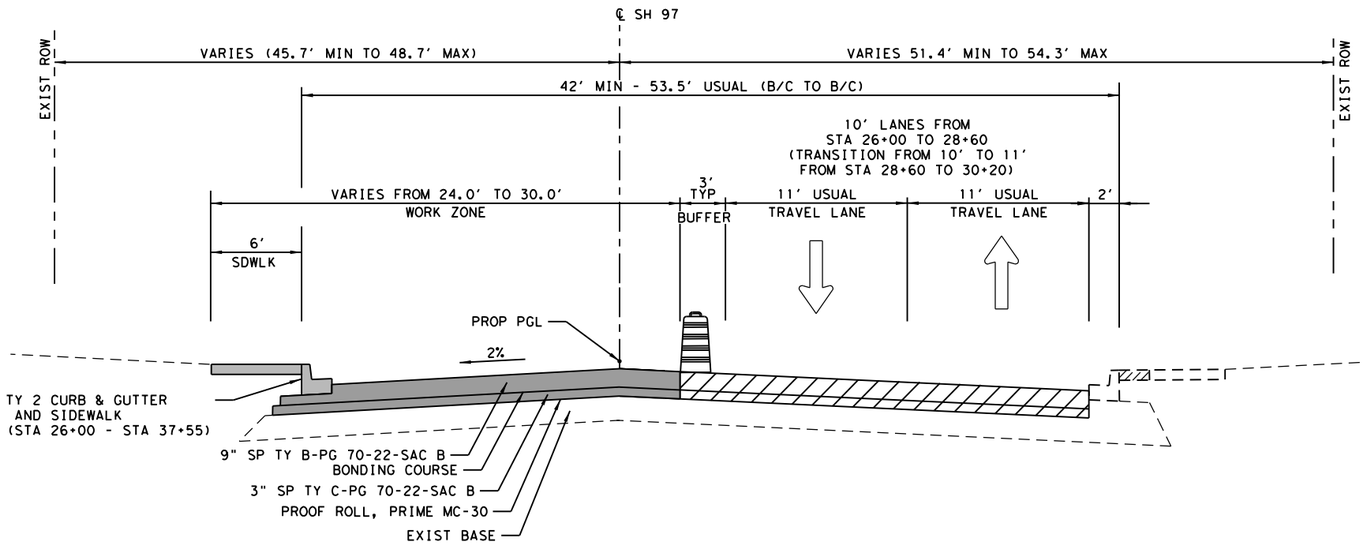


PHASE 2, STEP 1
EASTBOUND REHAB

STA 26+00.00 R2 TO STA 37+55.03 R2



PHASE 2, STEP 2
WESTBOUND REHAB

STA 26+00.00 R2 TO STA 37+55.03 R2

LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT CONSTRUCTION
- BUILT PREVIOUSLY

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIME UNLESS OTHERWISE NOTED.
2. SEE CONSTRUCTION SEQUENCE NARRATIVE.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

0 5 10
SCALE: 1"=10' H
1"=5' V

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SH 97

TCP TYPICAL PHASE 2

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			26
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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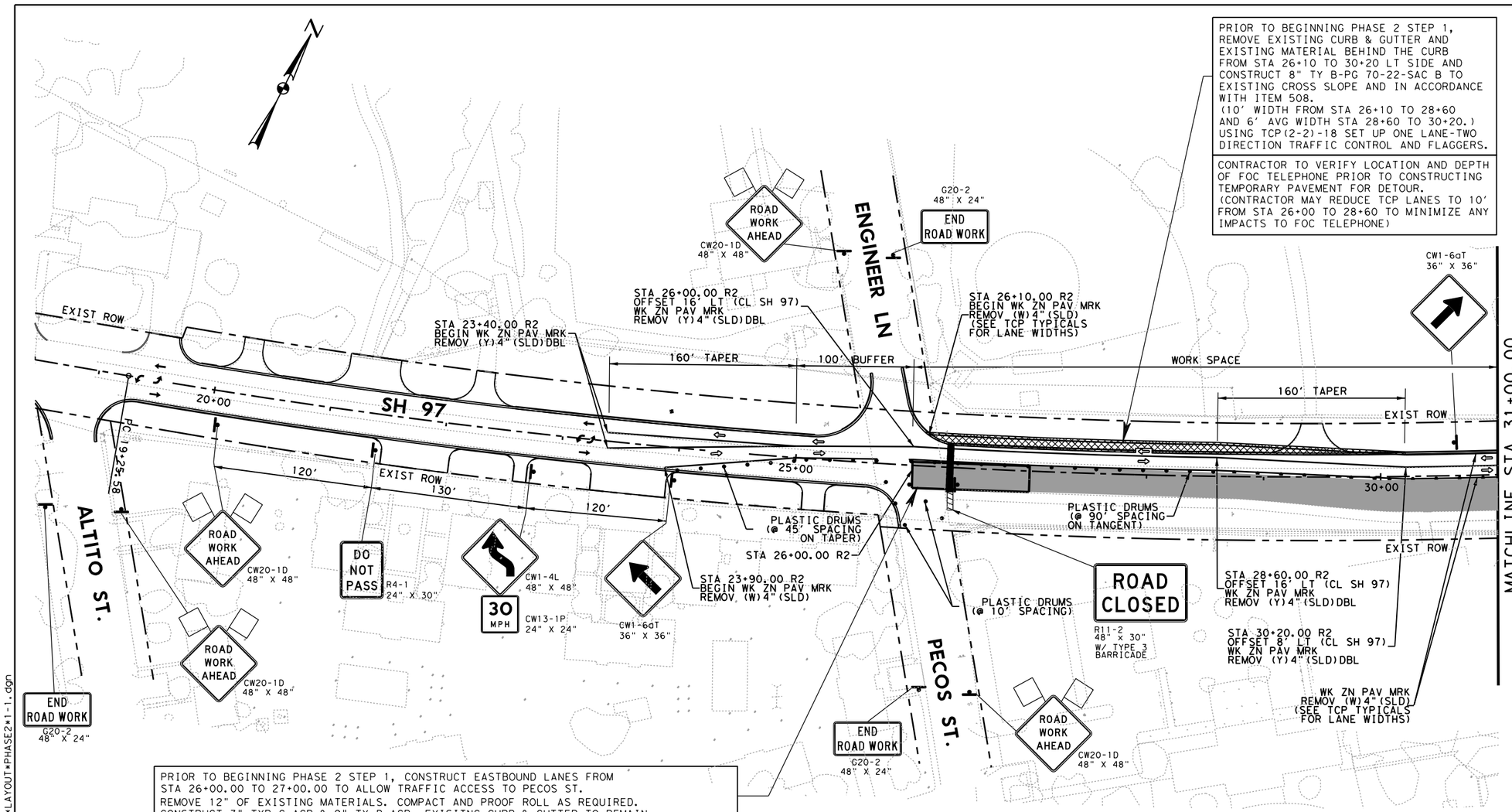

PRIOR TO BEGINNING PHASE 2 STEP 1, REMOVE EXISTING CURB & GUTTER AND EXISTING MATERIAL BEHIND THE CURB FROM STA 26+10 TO 30+20 LT SIDE AND CONSTRUCT 8" TY B-PG 70-22-SAC B TO EXISTING CROSS SLOPE AND IN ACCORDANCE WITH ITEM 508.
(10' WIDTH FROM STA 26+10 TO 28+60 AND 6' AVG WIDTH STA 28+60 TO 30+20.)
USING TCP(2-2)-18 SET UP ONE LANE-TWO DIRECTION TRAFFIC CONTROL AND FLAGGERS.

CONTRACTOR TO VERIFY LOCATION AND DEPTH OF FOC TELEPHONE PRIOR TO CONSTRUCTING TEMPORARY PAVEMENT FOR DETOUR.
(CONTRACTOR MAY REDUCE TCP LANES TO 10' FROM STA 26+00 TO 28+60 TO MINIMIZE ANY IMPACTS TO FOC TELEPHONE)

PRIOR TO BEGINNING PHASE 2 STEP 1, CONSTRUCT EASTBOUND LANES FROM STA 26+00.00 TO 27+00.00 TO ALLOW TRAFFIC ACCESS TO PECOS ST.
REMOVE 12" OF EXISTING MATERIALS. COMPACT AND PROOF ROLL AS REQUIRED.
CONSTRUCT 3" TYP C ACP & 9" TY B ACP. EXISITNG CURB & GUTTER TO REMAIN.
USING TCP(2-2)-18 SET UP ONE LANE-TWO DIRECTION TRAFFIC CONTROL AND FLAGGERS.

LEGEND

- EXIST DIRECTION OF TRAFFIC
- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMP PAVEMENT CONSTRUCTION

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIME UNLESS OTHERWISE NOTED.
2. SEE CONSTRUCTION SEQUENCE NARRATIVE.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

0 50 100
HORIZONTAL SCALE: 1"=100'

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SH 97

TCP LAYOUT PHASE 2 - STEP 1

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			27
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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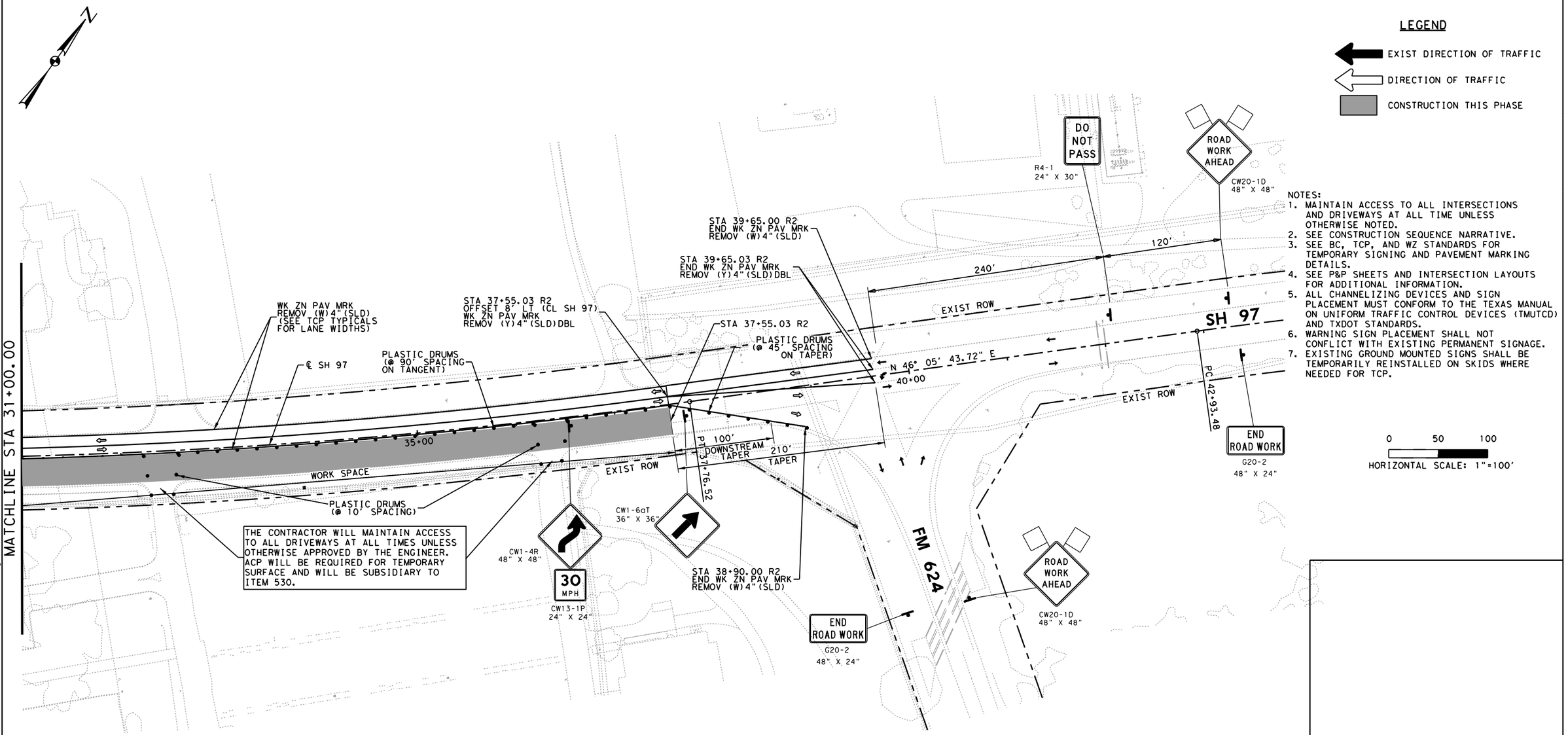

THE CONTRACTOR WILL MAINTAIN ACCESS TO ALL DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE APPROVED BY THE ENGINEER. ACP WILL BE REQUIRED FOR TEMPORARY SURFACE AND WILL BE SUBSIDIARY TO ITEM 530.

LEGEND

- EXIST DIRECTION OF TRAFFIC
- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE

NOTES:

1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIME UNLESS OTHERWISE NOTED.
2. SEE CONSTRUCTION SEQUENCE NARRATIVE.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

0 50 100
HORIZONTAL SCALE: 1"=100'

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SH 97

TCP LAYOUT
PHASE 2 - STEP 1

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			28
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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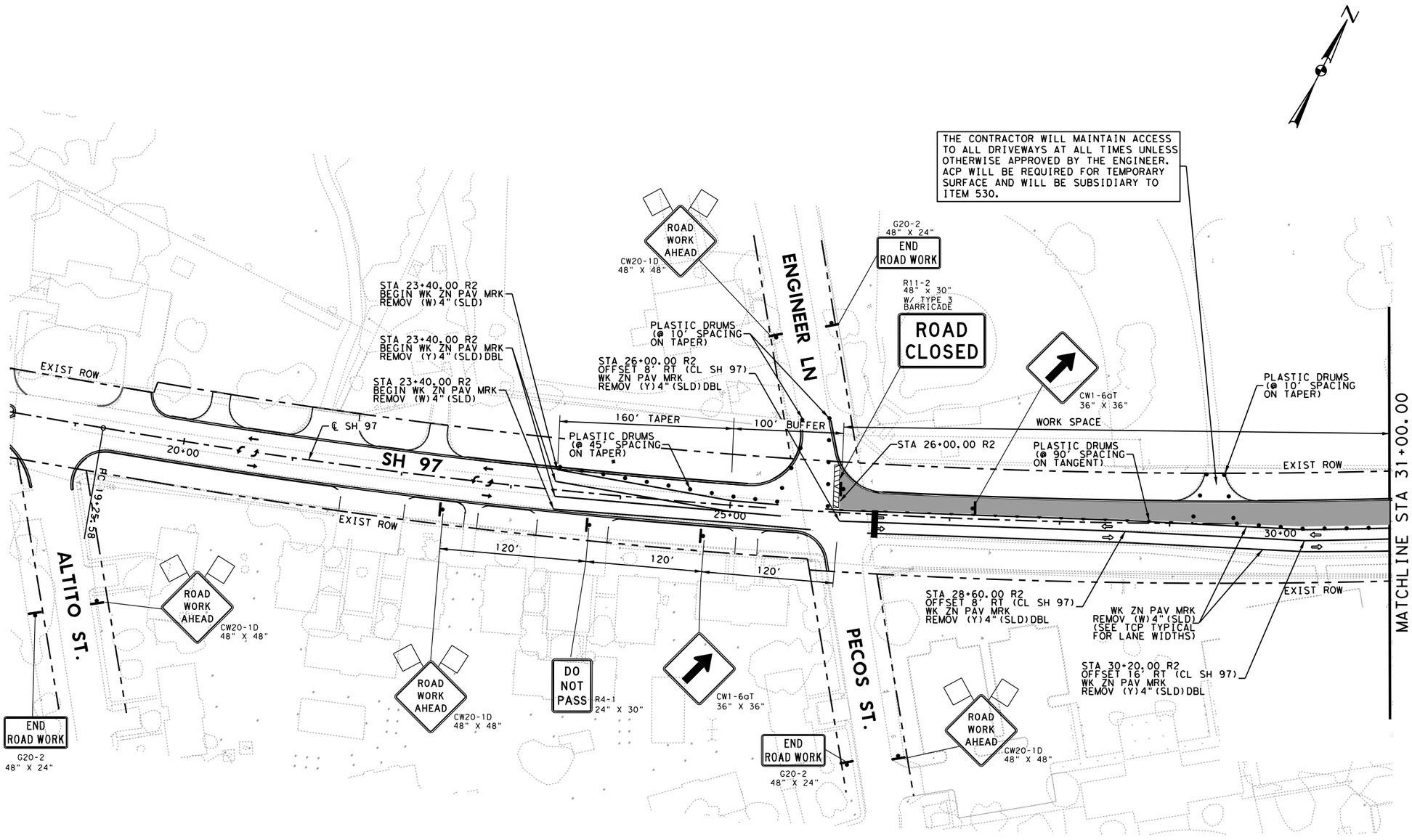

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SH 97

TCP LAYOUT PHASE 2 - STEP 2

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			29
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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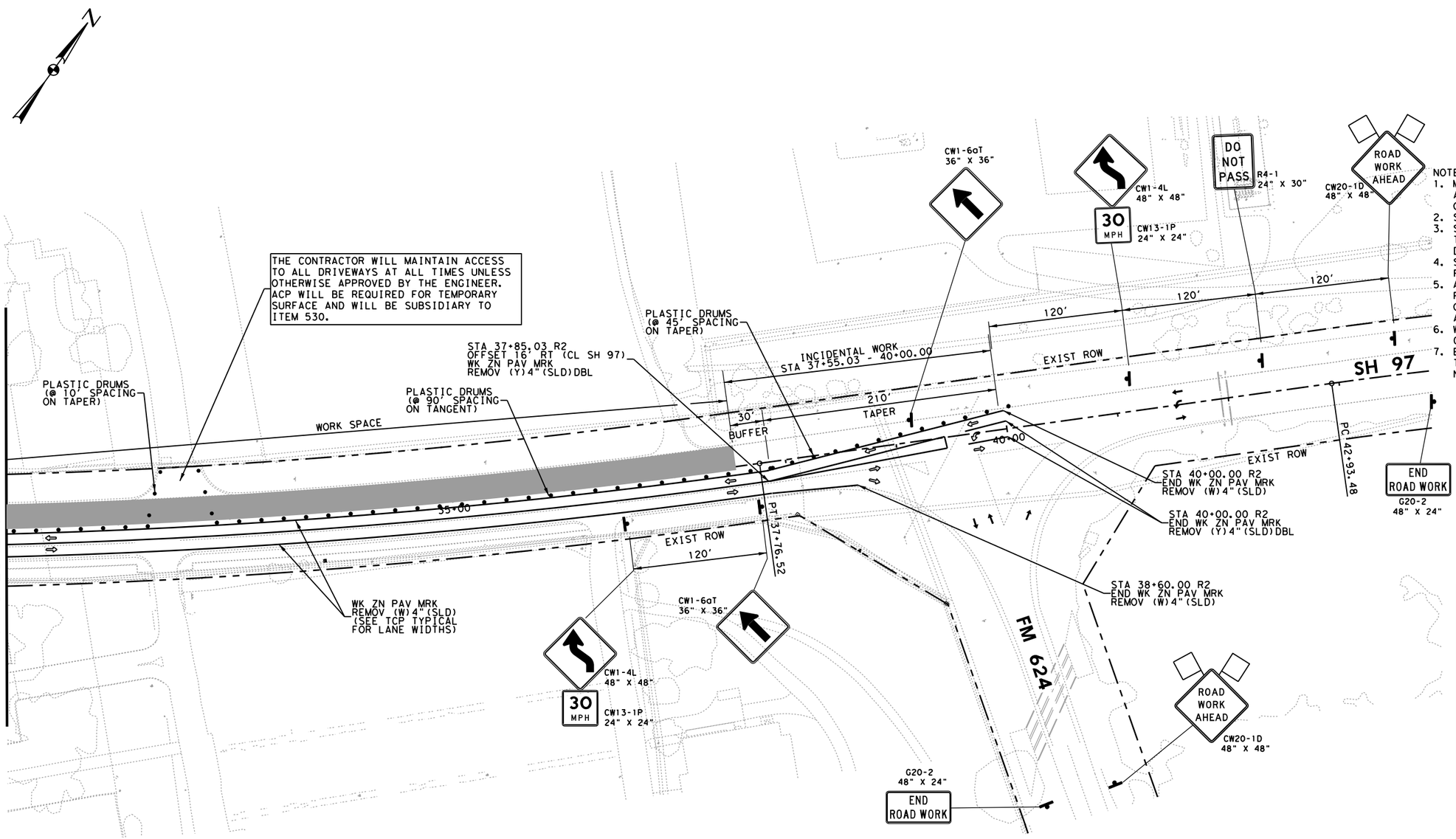

LEGEND

- EXIST DIRECTION OF TRAFFIC
- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMP CONSTRUCTION THIS PHASE
- BUILT PREVIOUSLY

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIME UNLESS OTHERWISE NOTED.
2. SEE CONSTRUCTION SEQUENCE NARRATIVE.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

0 50 100
HORIZONTAL SCALE: 1"=100'

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SH 97

TCP LAYOUT PHASE 2 - STEP 2

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			30
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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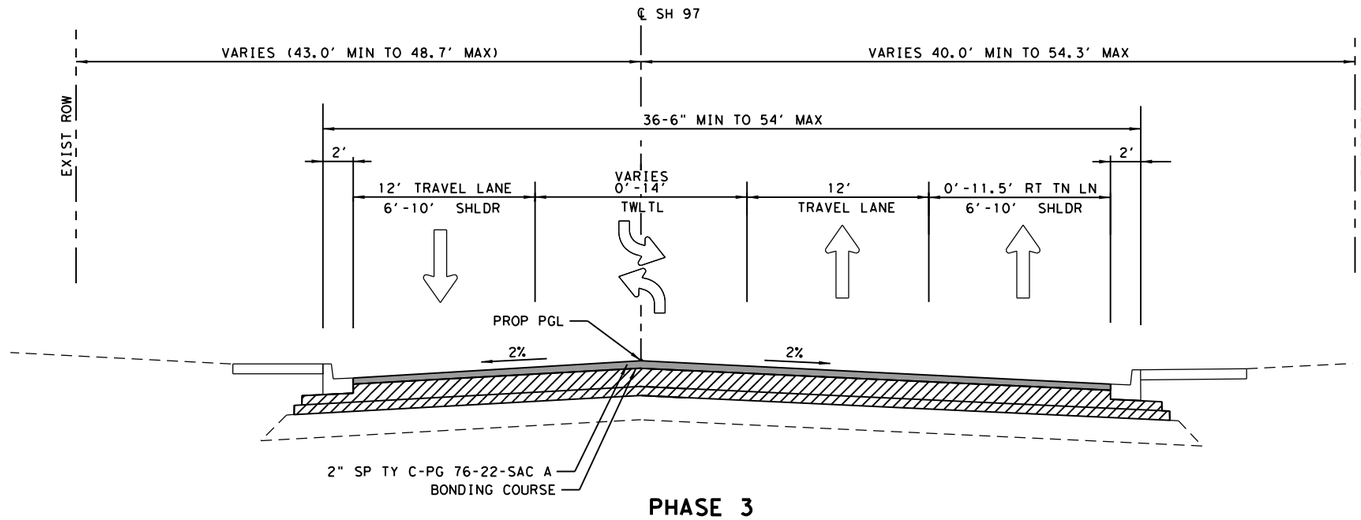

PHASE 3
EAST & WESTBOUND ACP FINAL SURFACE

STA 23+40.00 R2 TO STA 37+55.03 R2

NOTE: PLACE 2" ACP FINAL SURFACE FROM STA 23+40.00 R2 TO STA 37+55.03 R2 WITH DAILY LANE CLOSURES USING TCP(2-2)-18 STANDARD WITH FLAGGERS AND PILOT CAR.

LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT CONSTRUCTION
- BUILT PREVIOUSLY

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIME UNLESS OTHERWISE NOTED.
2. SEE CONSTRUCTION SEQUENCE NARRATIVE.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

0 5 10
SCALE: 1"=10' H
1"=5' V

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SH 97

TCP TYPICAL
PHASE 3

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			31
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		32

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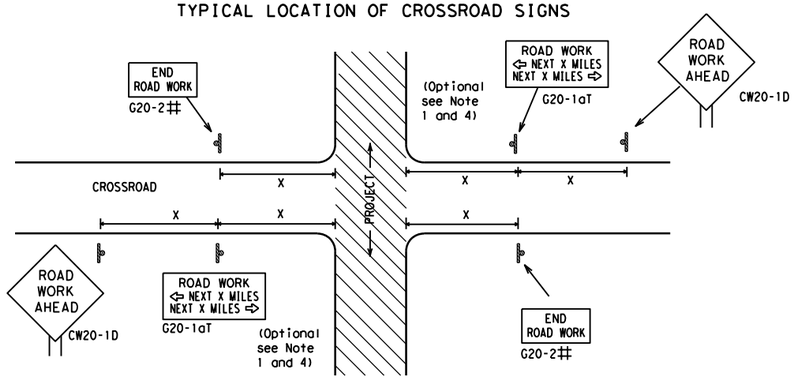
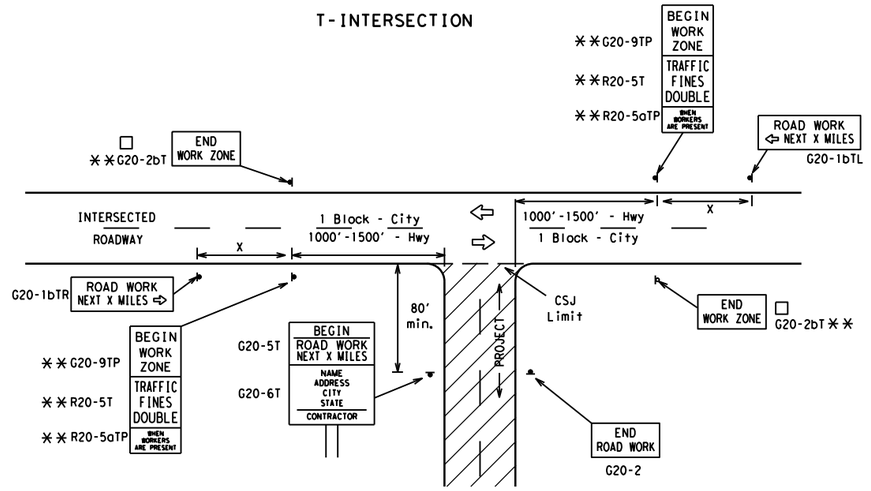
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

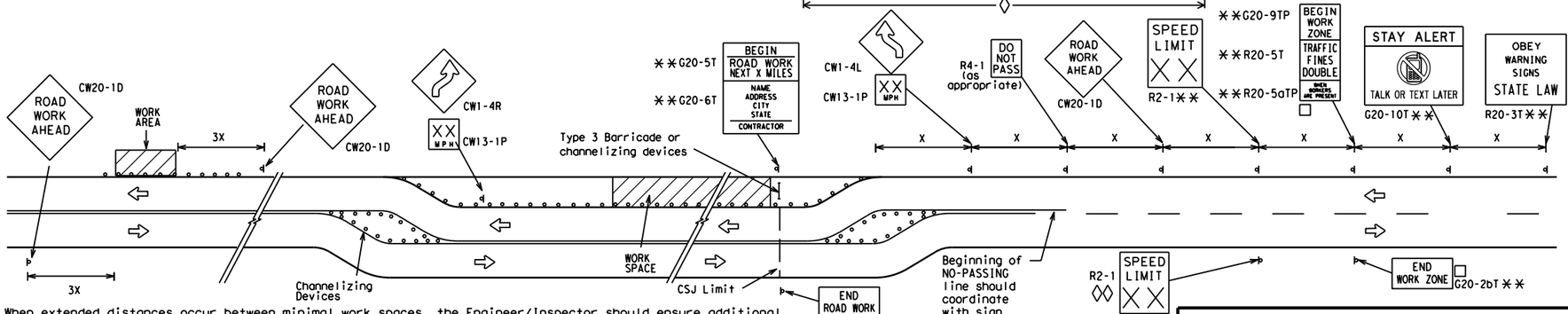
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

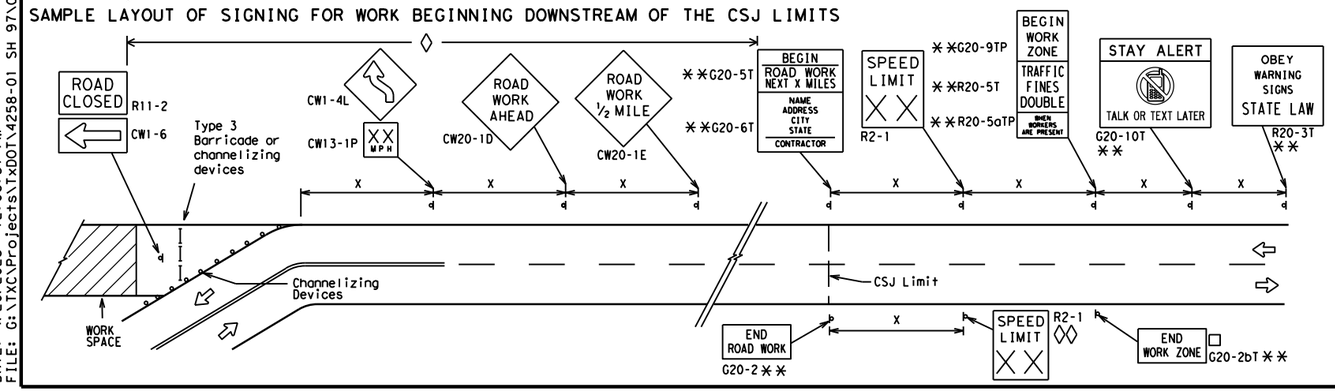
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	LRD	LA SALLE		33

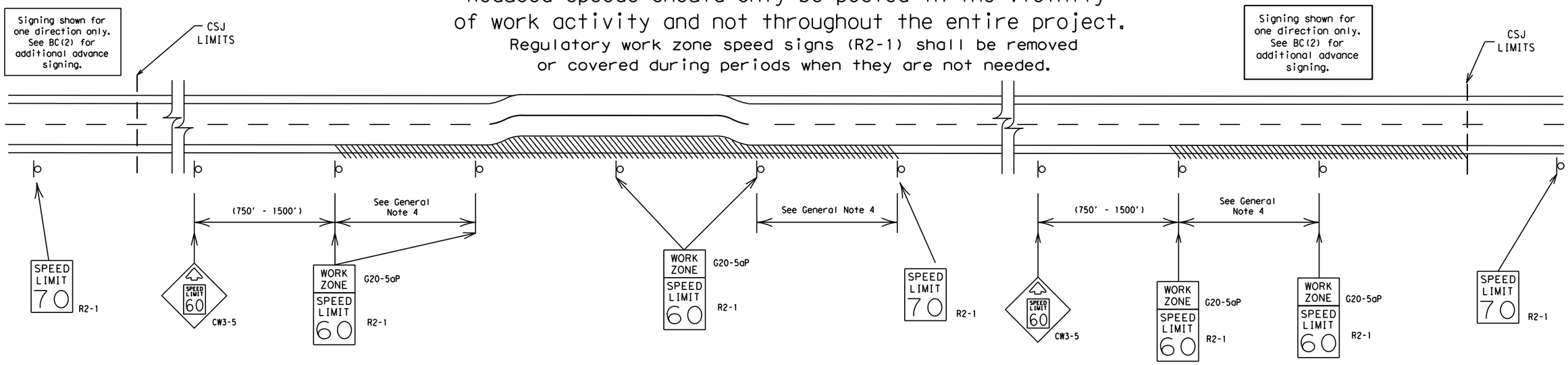
DATE: 4/20/2023 12:06:57 PM
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\02-TCP\Stds-01\bc-21.dgn

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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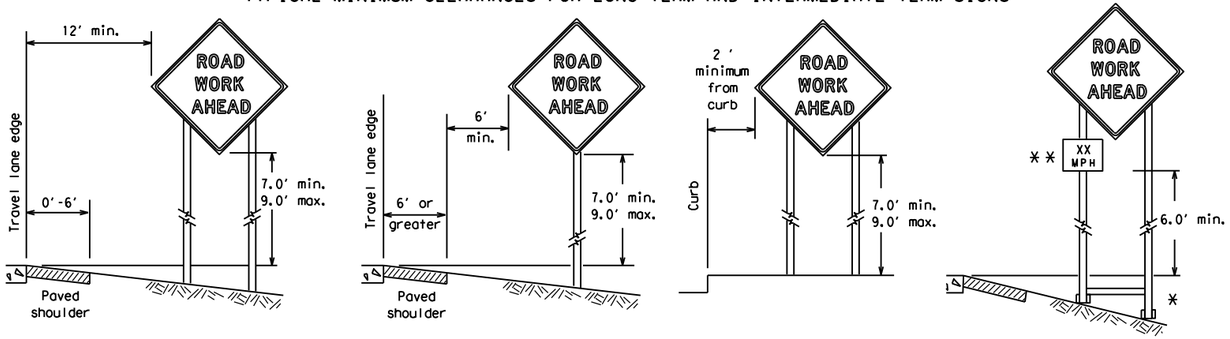
REVISIONS 9-07 8-14 7-13 5-21	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		34

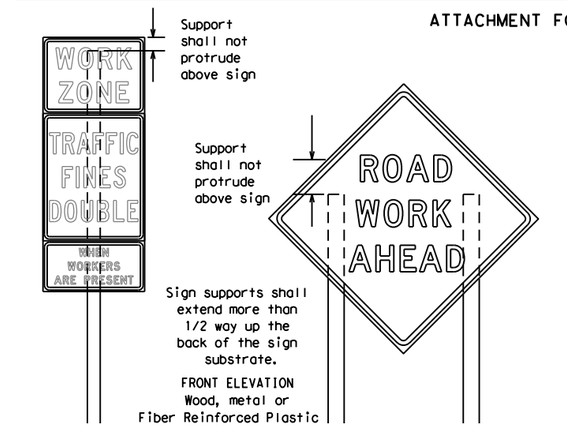
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

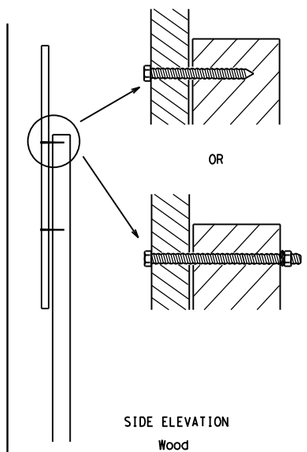


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





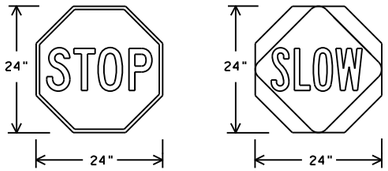
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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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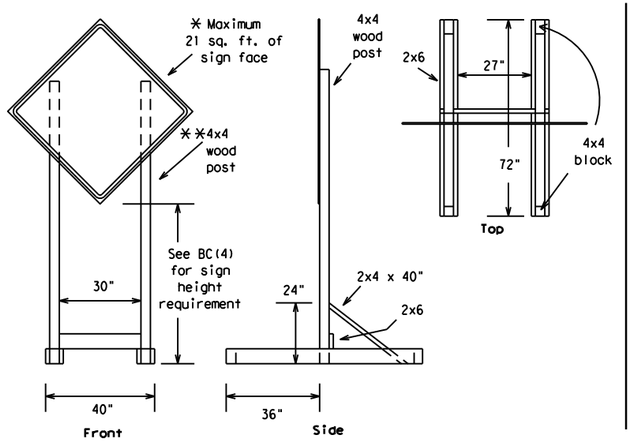
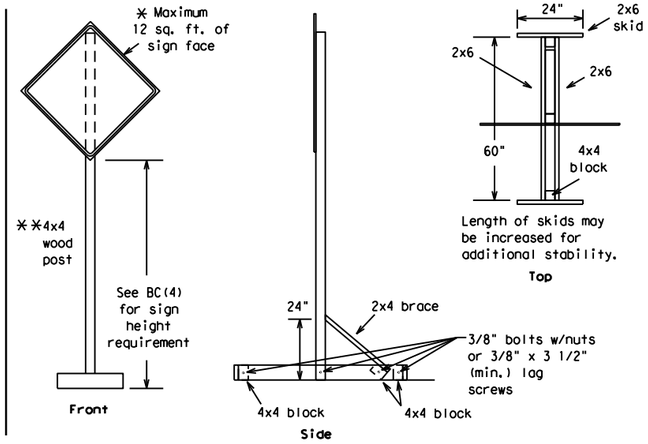
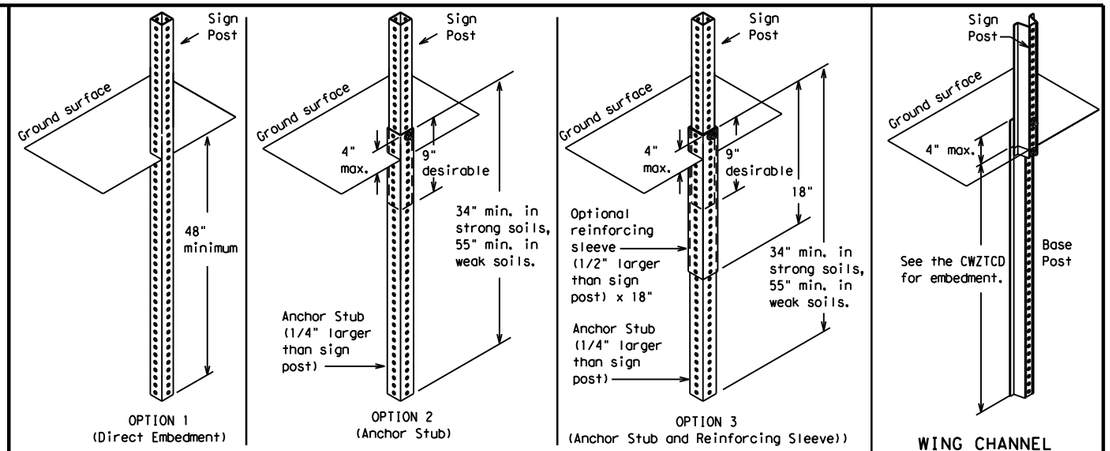




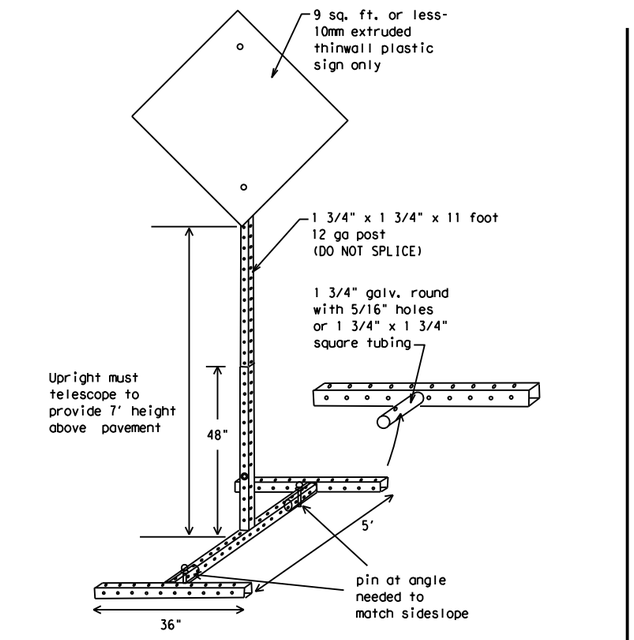
SKID MOUNTED WOOD SIGN SUPPORTS

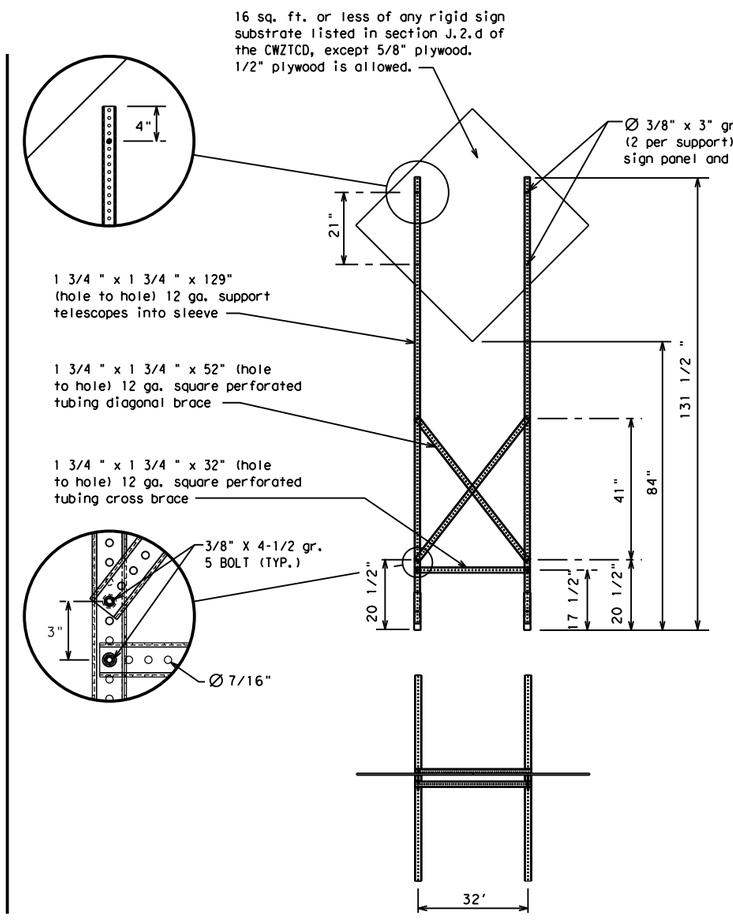
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

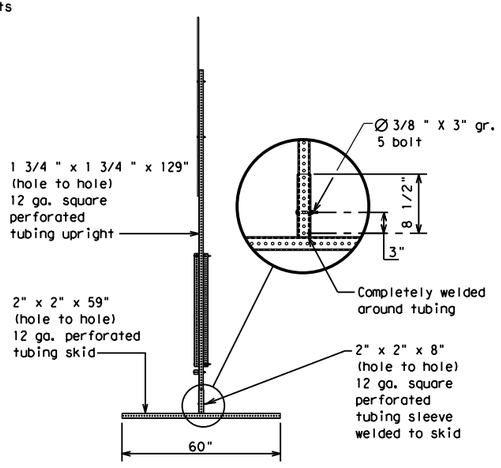


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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9-07 8-14	DIST	COUNTY		SHEET NO.
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DATE: 4/20/2023 12:06:58 PM
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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

** 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

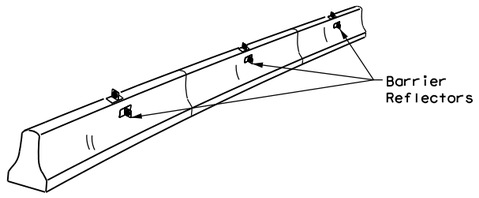
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	LRD	LA SALLE		37

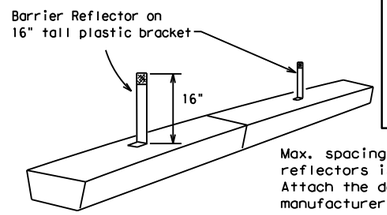
DATE: 4/20/2023 12:06:59 PM
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\02-TCP\Stds-01\bc-21.dgn

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.



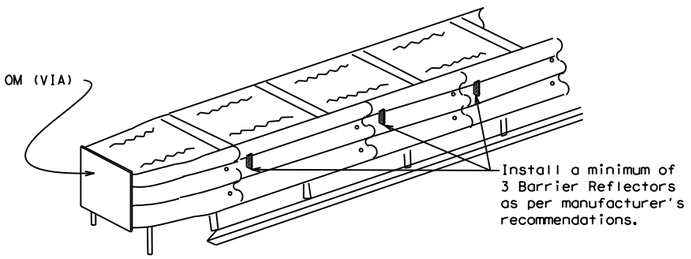
CONCRETE TRAFFIC BARRIER (CTB)

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

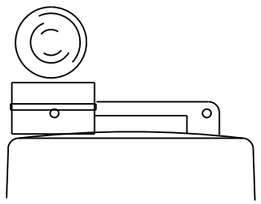
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

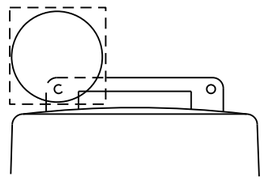
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

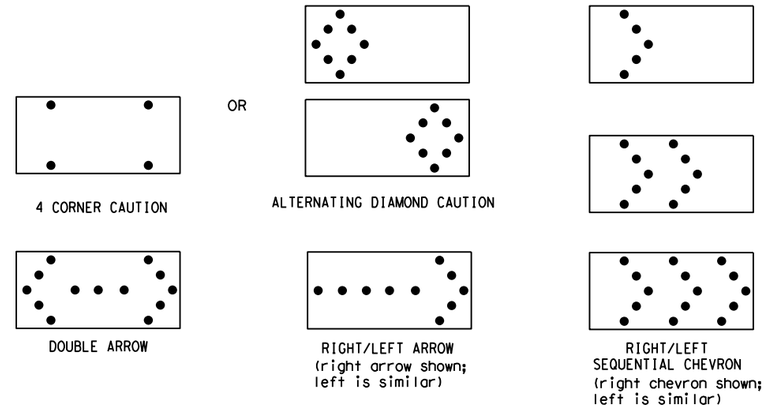
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

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	0483	01	052	SH 97
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	LRD	LA SALLE		38

101

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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:

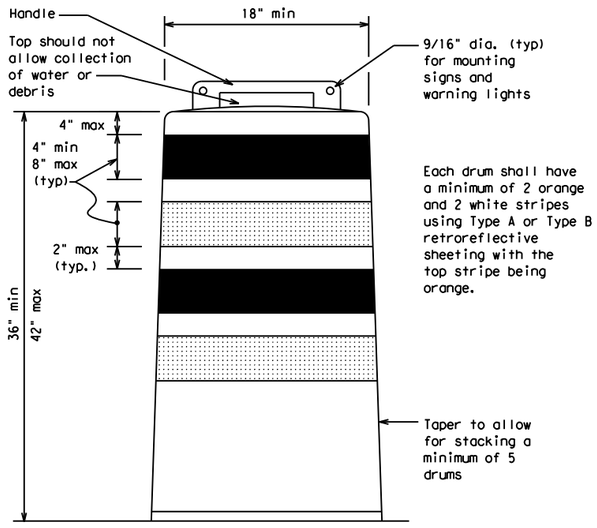
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

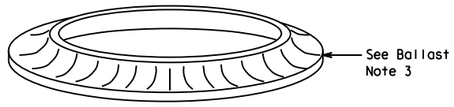
RETROREFLECTIVE SHEETING

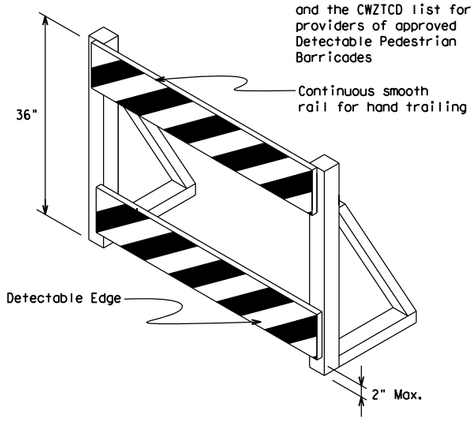
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

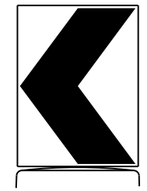




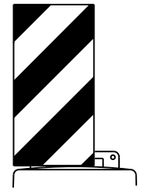


DETECTABLE PEDESTRIAN BARRICADES

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
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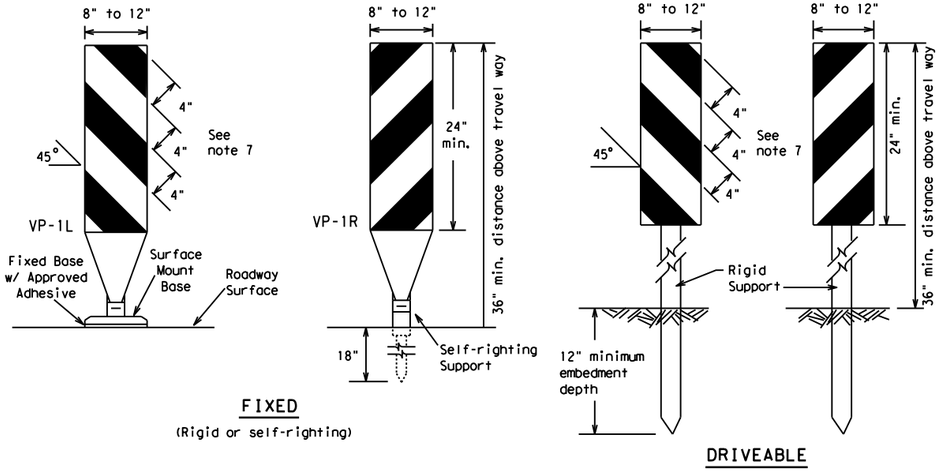
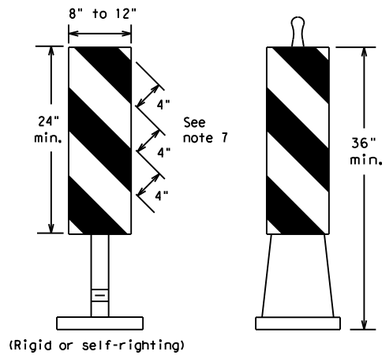


FIXED
(Rigid or self-righting)

DRIVEABLE

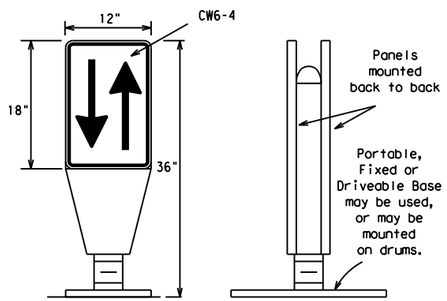


(Rigid or self-righting)

PORTABLE

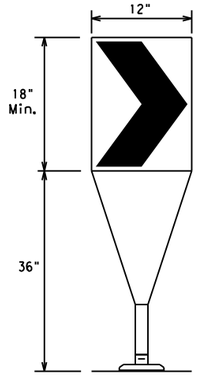
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



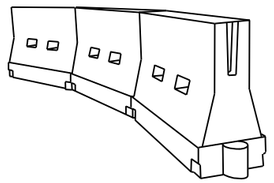
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

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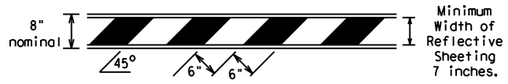
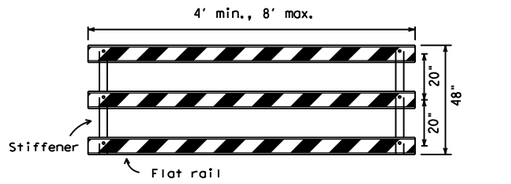
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



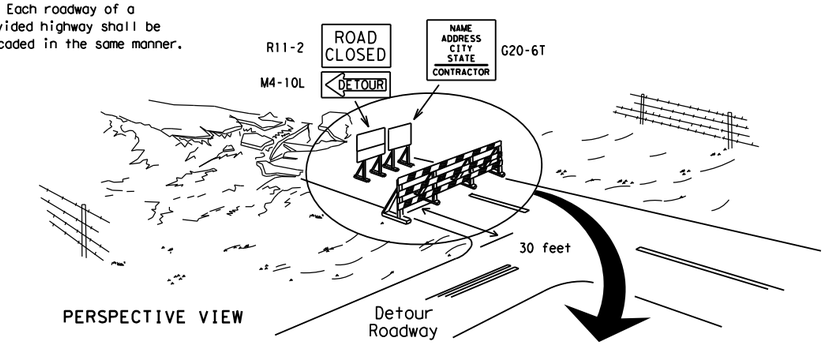
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

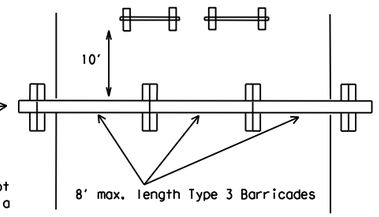
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

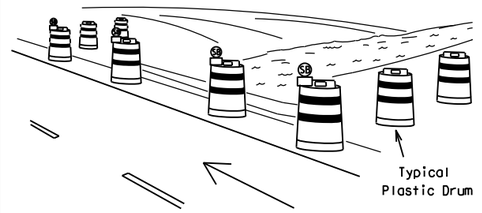
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

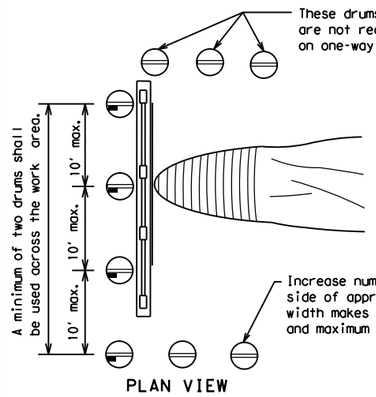
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

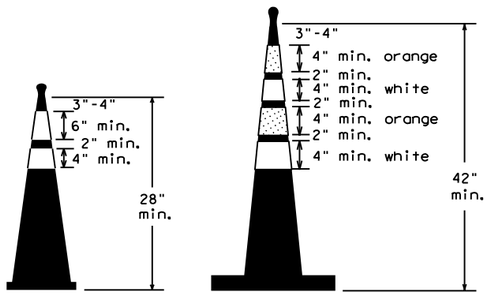
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



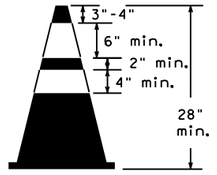
PLAN VIEW

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

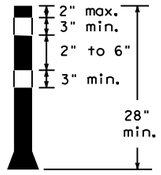
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

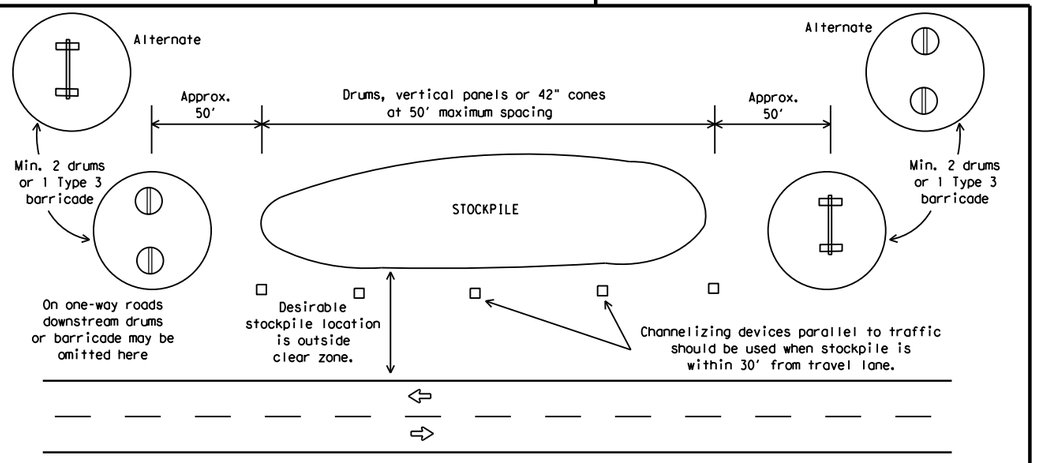


Tubular Marker

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

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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.

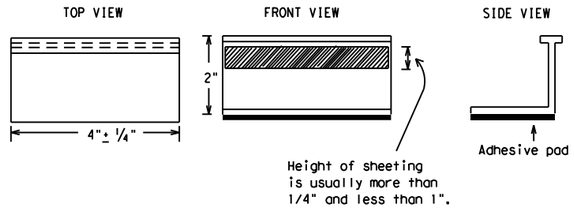
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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).

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BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

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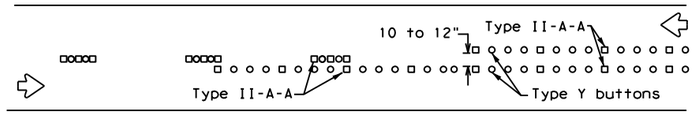
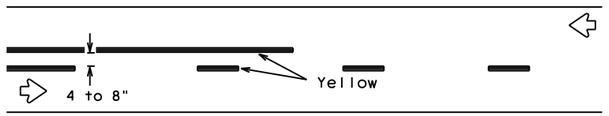
PAVEMENT MARKING PATTERNS

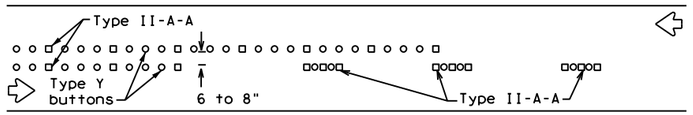
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



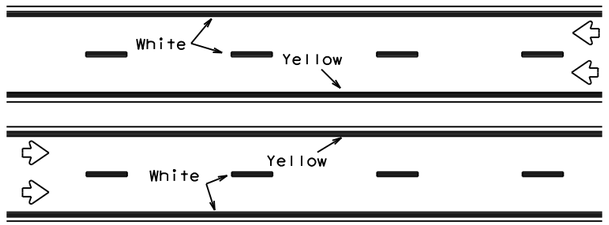
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



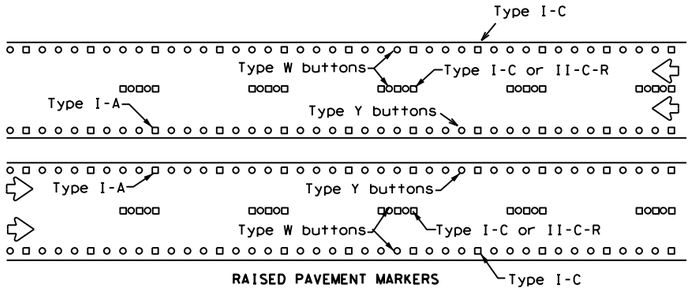
RAISED PAVEMENT MARKERS - PATTERN B

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

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



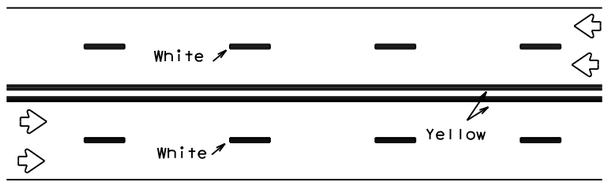
REFLECTORIZED PAVEMENT MARKINGS



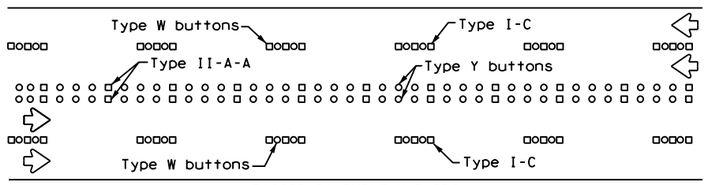
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



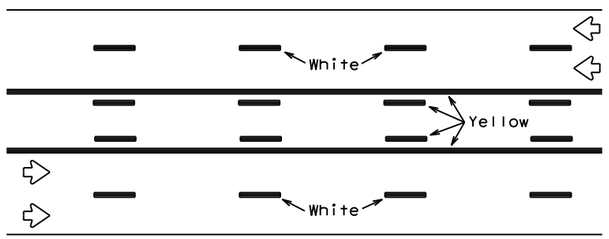
REFLECTORIZED PAVEMENT MARKINGS



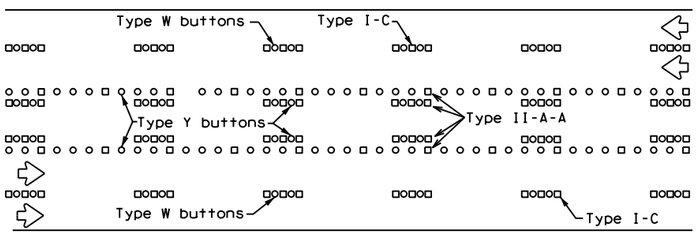
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

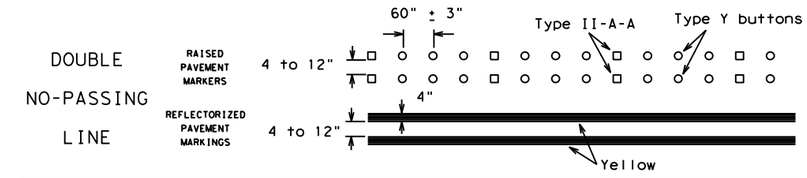
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

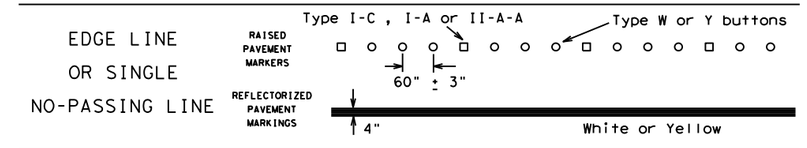
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

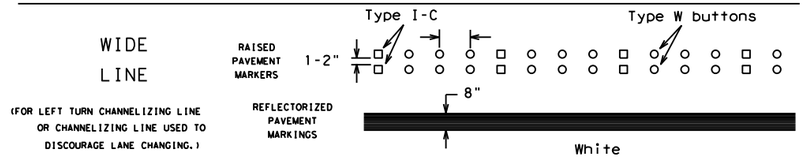


EDGE LINE OR SINGLE NO-PASSING LINE



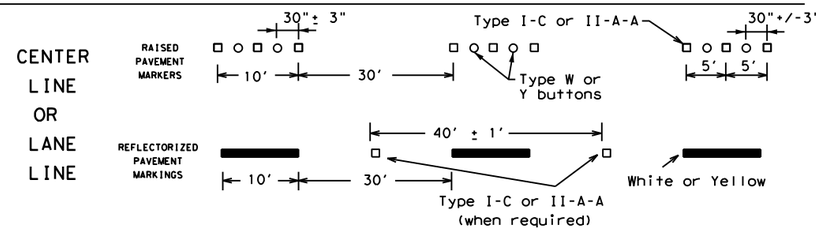
WIDE LINE

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

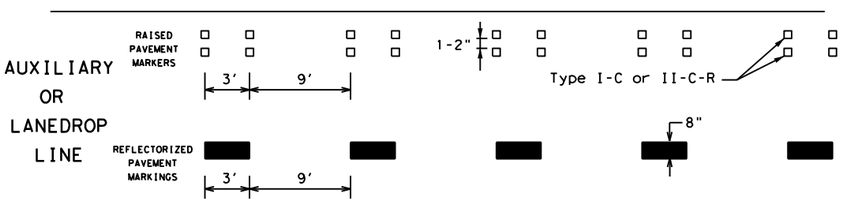


BROKEN LINES

CENTER LINE OR LANE LINE

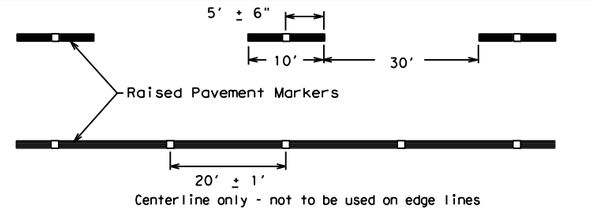


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		43

DATE: 4/20/2023 12:07:02 PM
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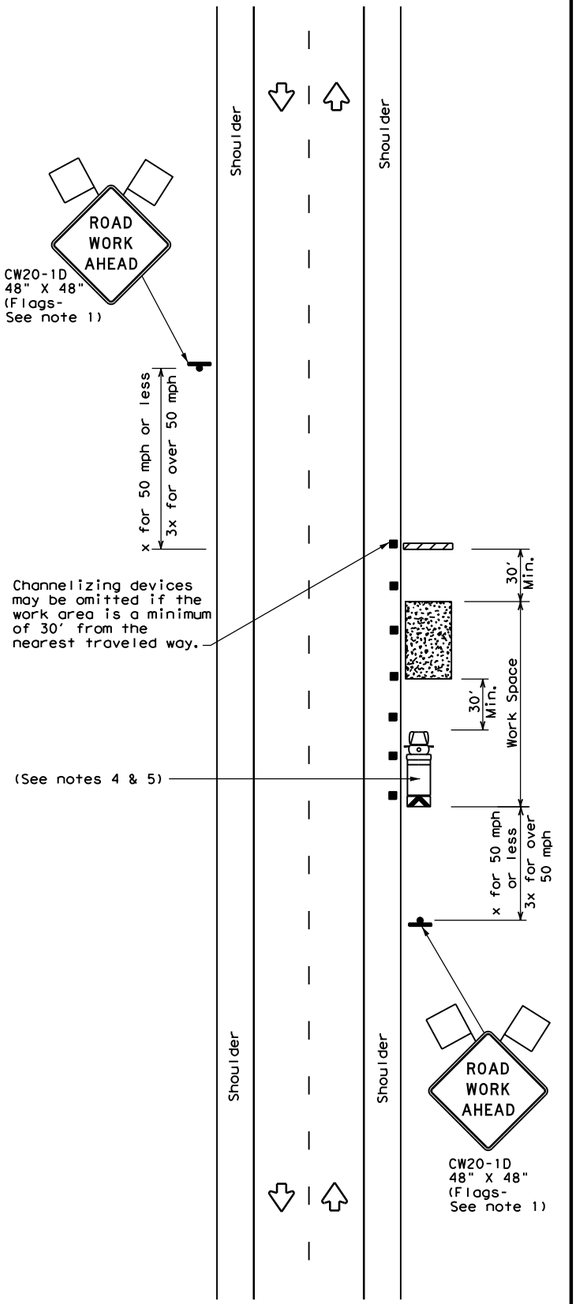
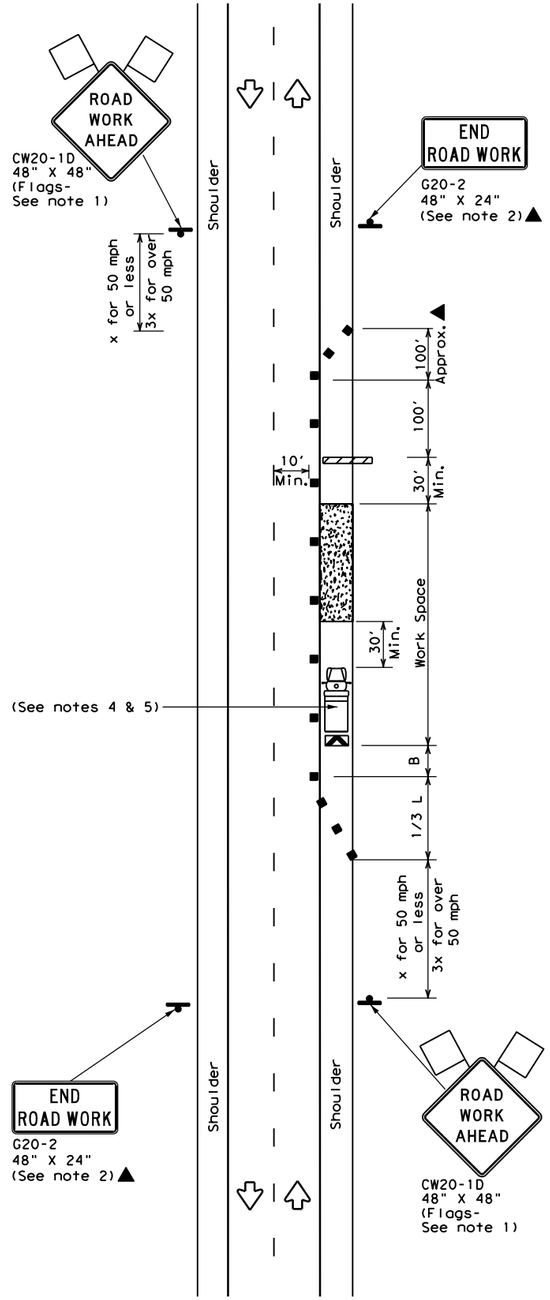


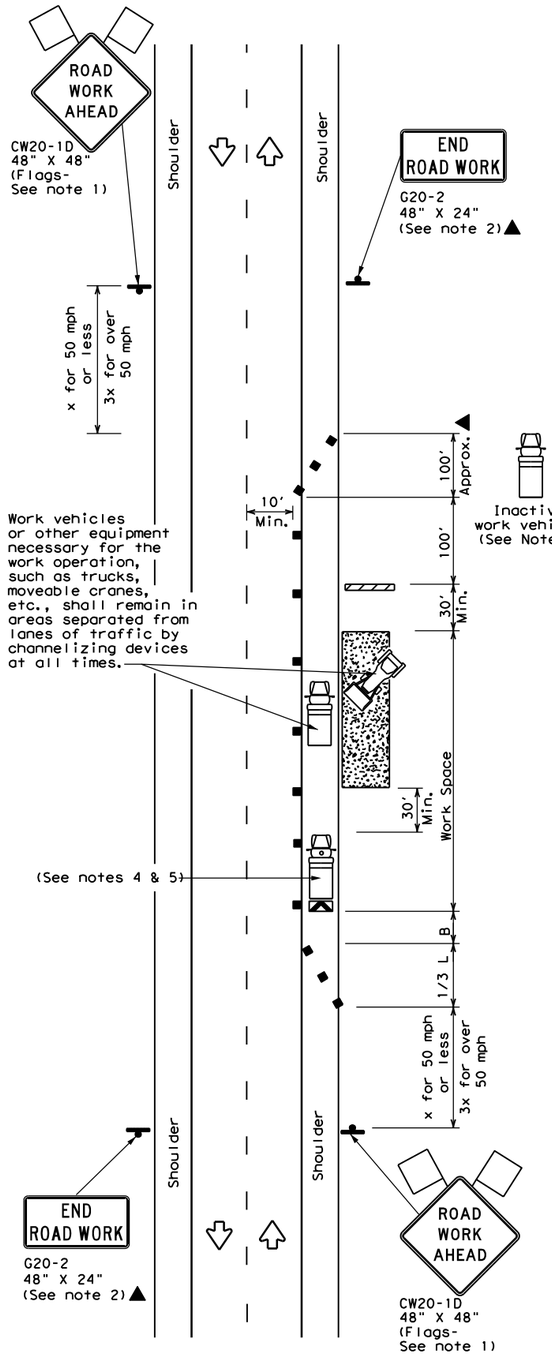
TCP (2-1a)

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 CW21-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

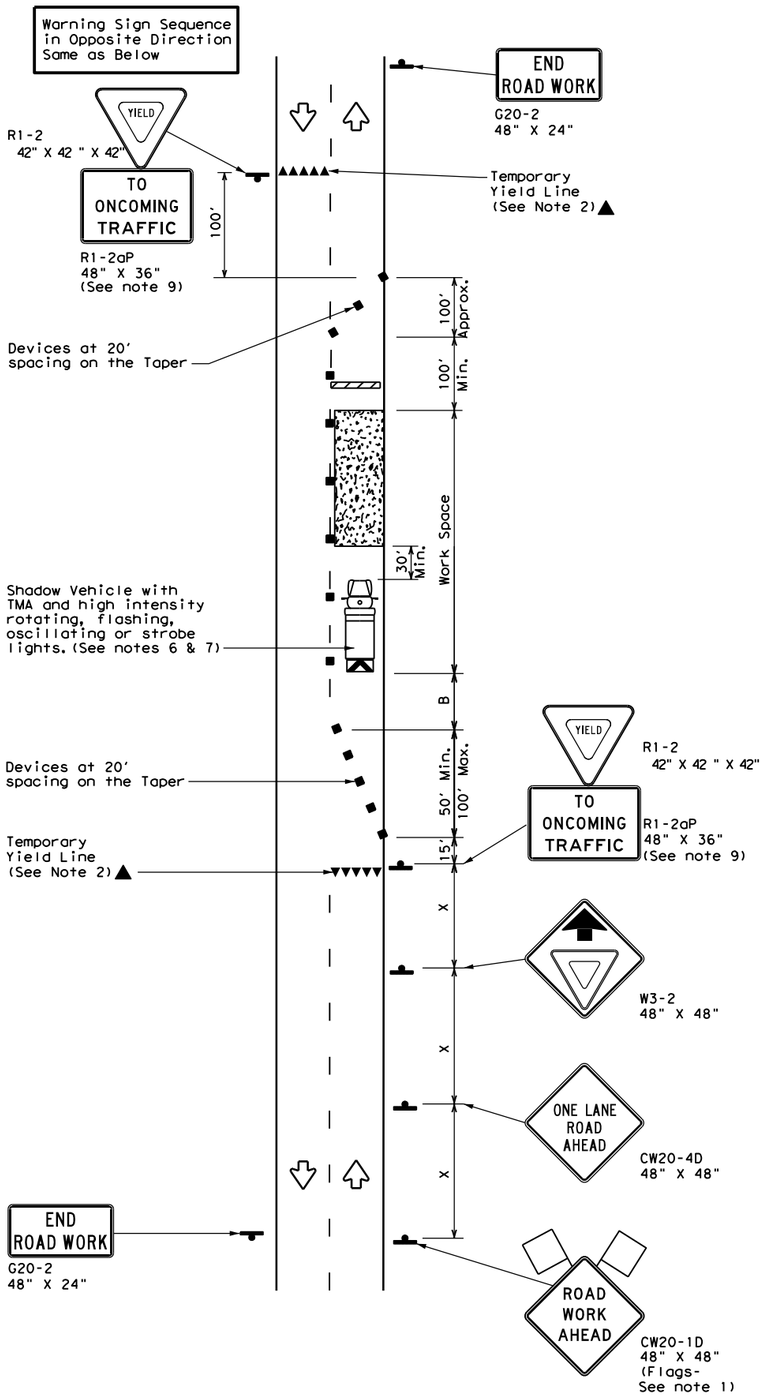
Texas Department of Transportation

Traffic Operations Division Standard

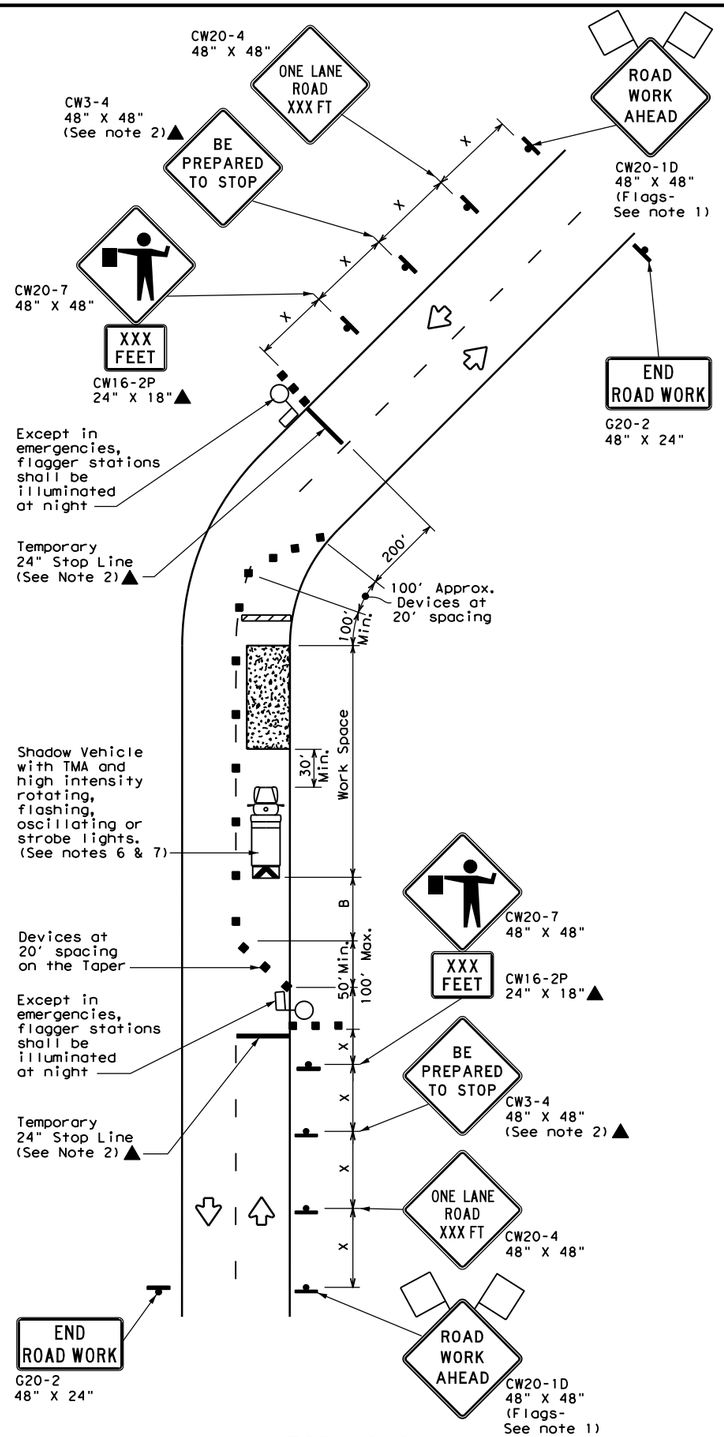
TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	LRD	LA SALLE		44
1-97 2-18				



TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

TCP (2-2a)

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

TCP (2-2b)

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		45

DATE: 4/20/2023 12:07:03 PM
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DATE: 4/20/2023 12:07:04 PM
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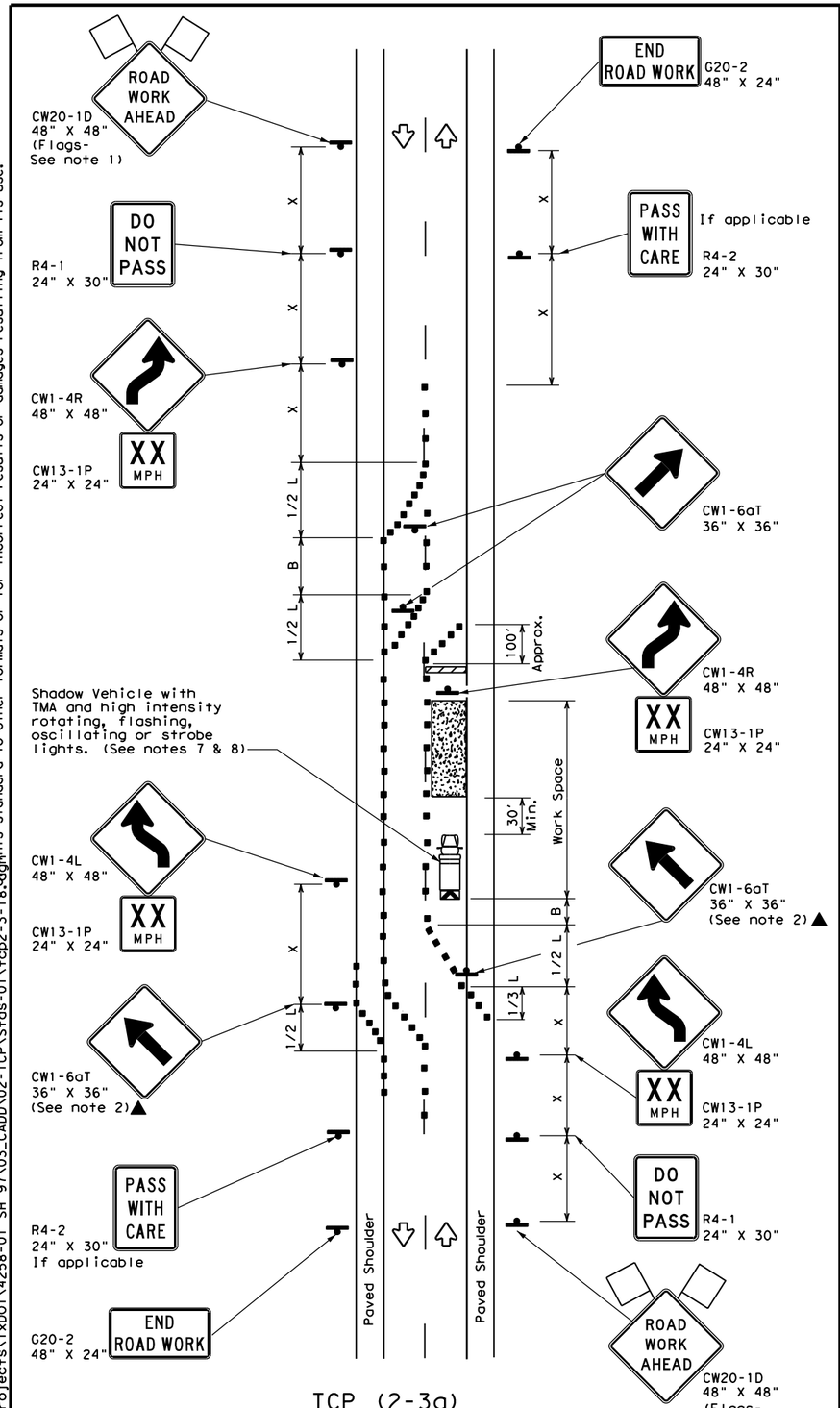
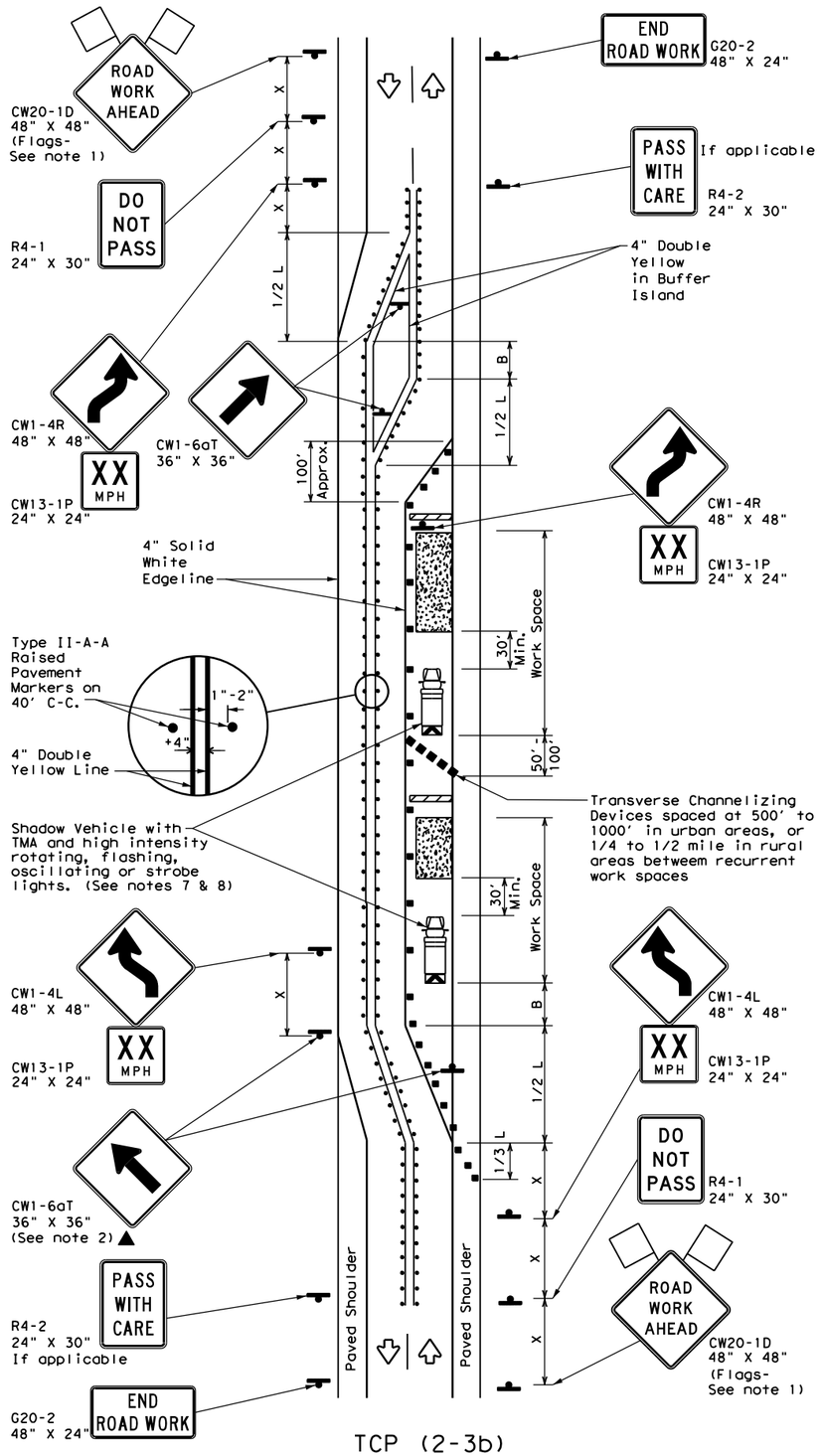


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



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

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-3a)

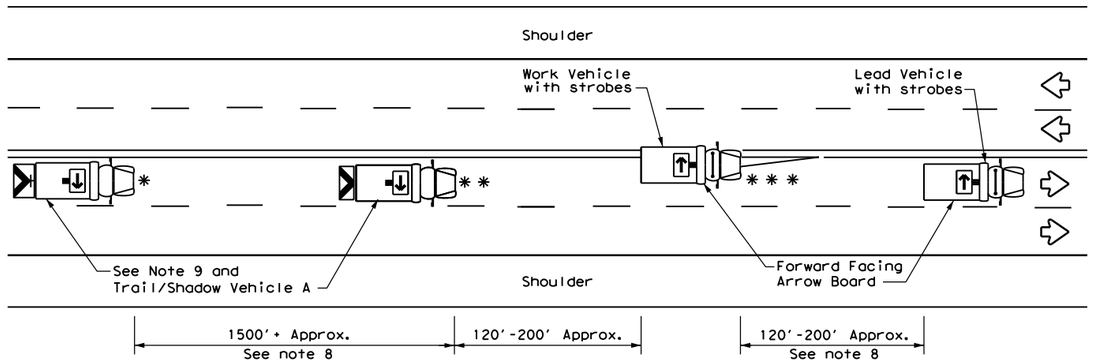
9. Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections,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

Texas Department of Transportation — *Traffic Operations Division Standard*

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

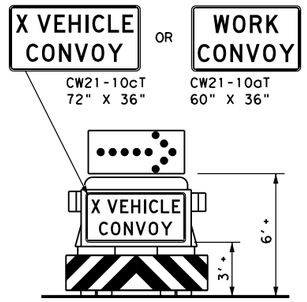
TCP(2-3)-18

FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	LRD	LA SALLE		46
4-98 2-18				



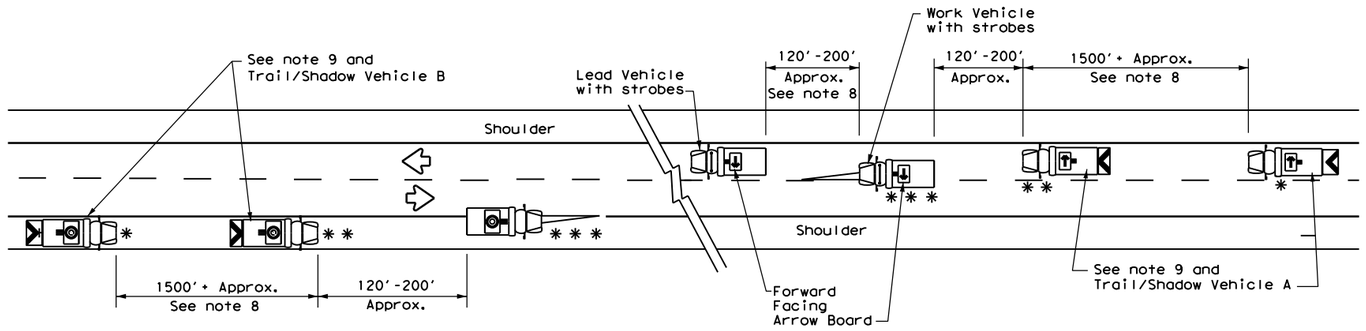
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

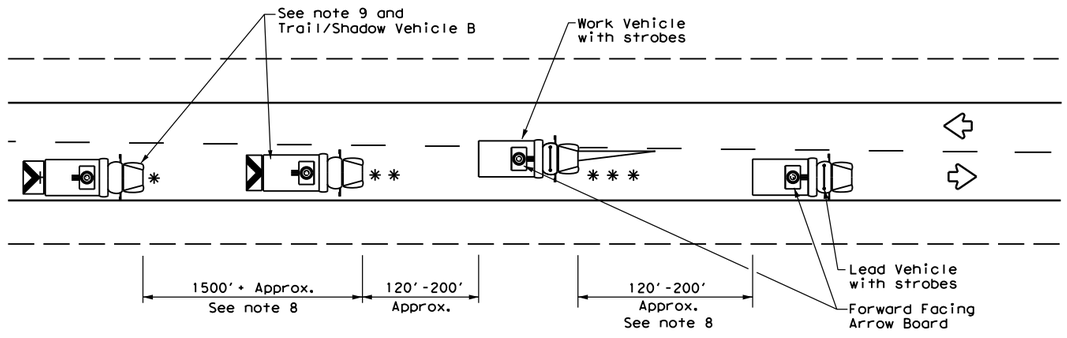


WORK ON SHOULDER

WORK ON TRAVEL LANE

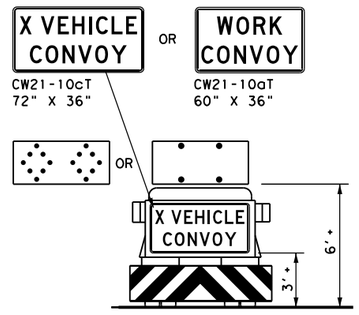
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

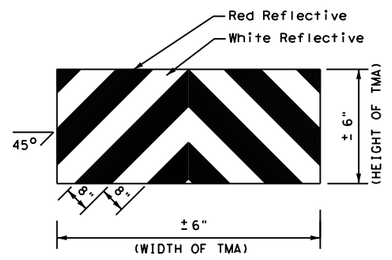
with Flashing Arrow Board in CAUTION display

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0483	01	052	SH 97
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	LRD	LA SALLE		47

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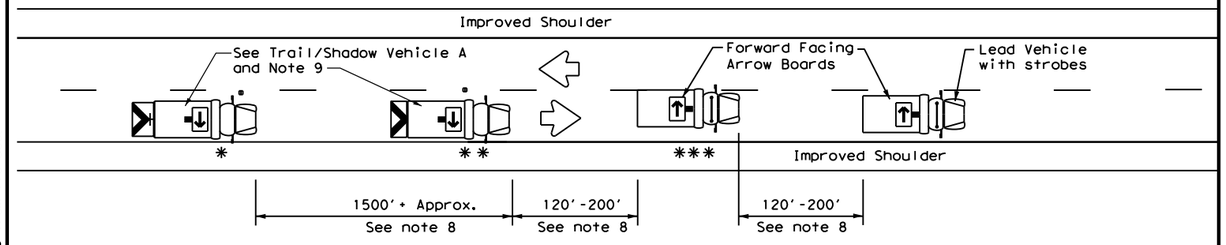
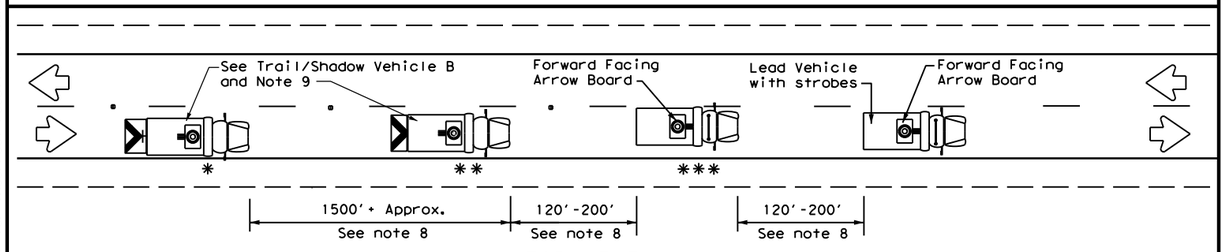


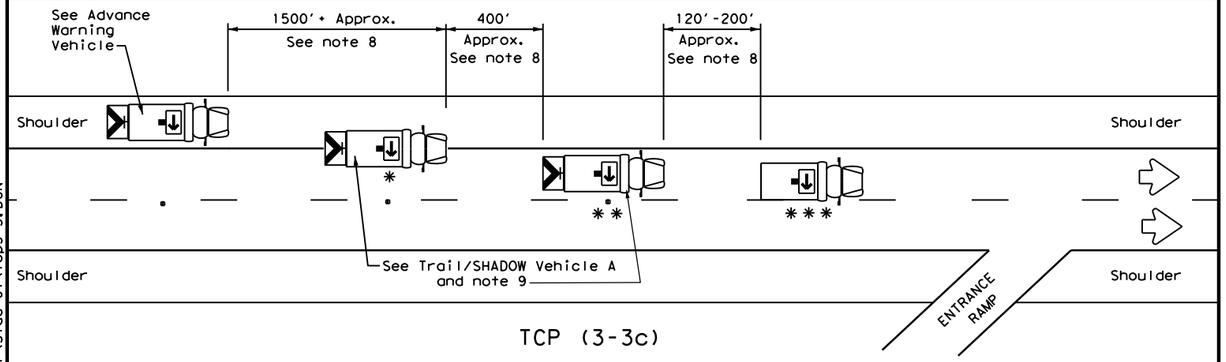
TCP (3-3a)

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



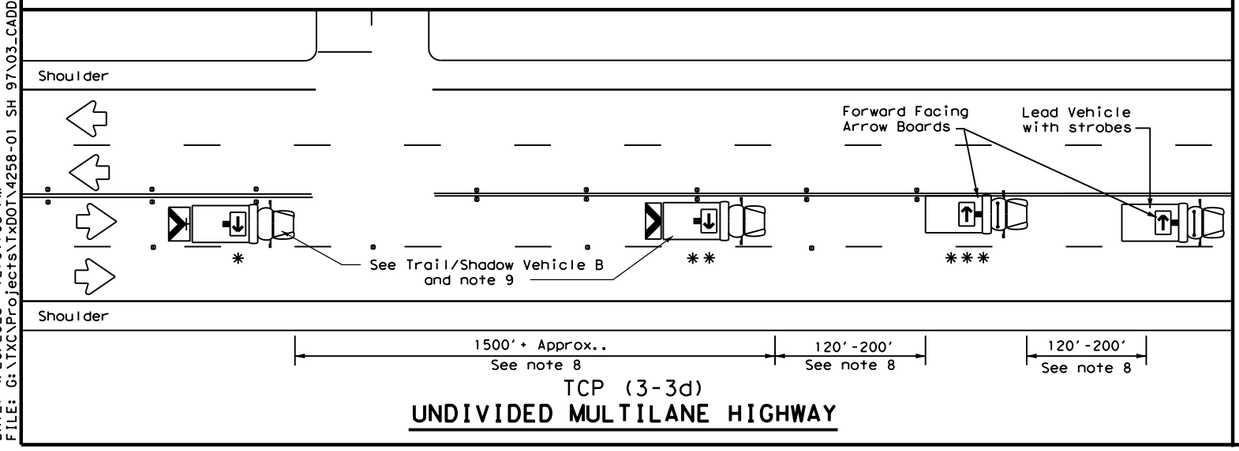
TCP (3-3b)

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



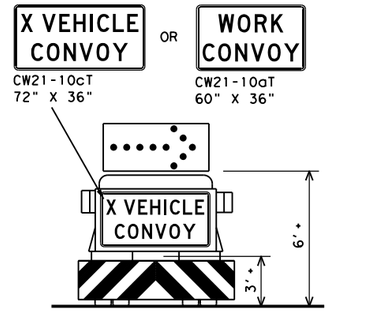
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



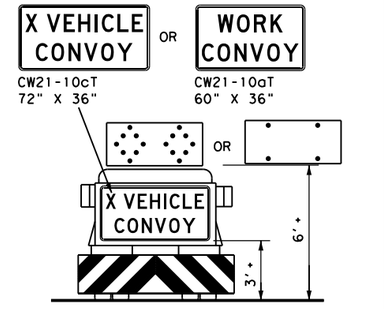
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



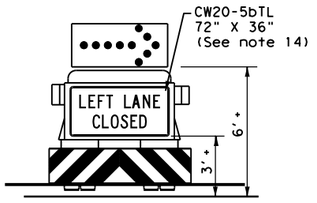
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

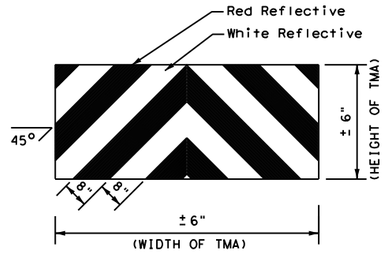


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

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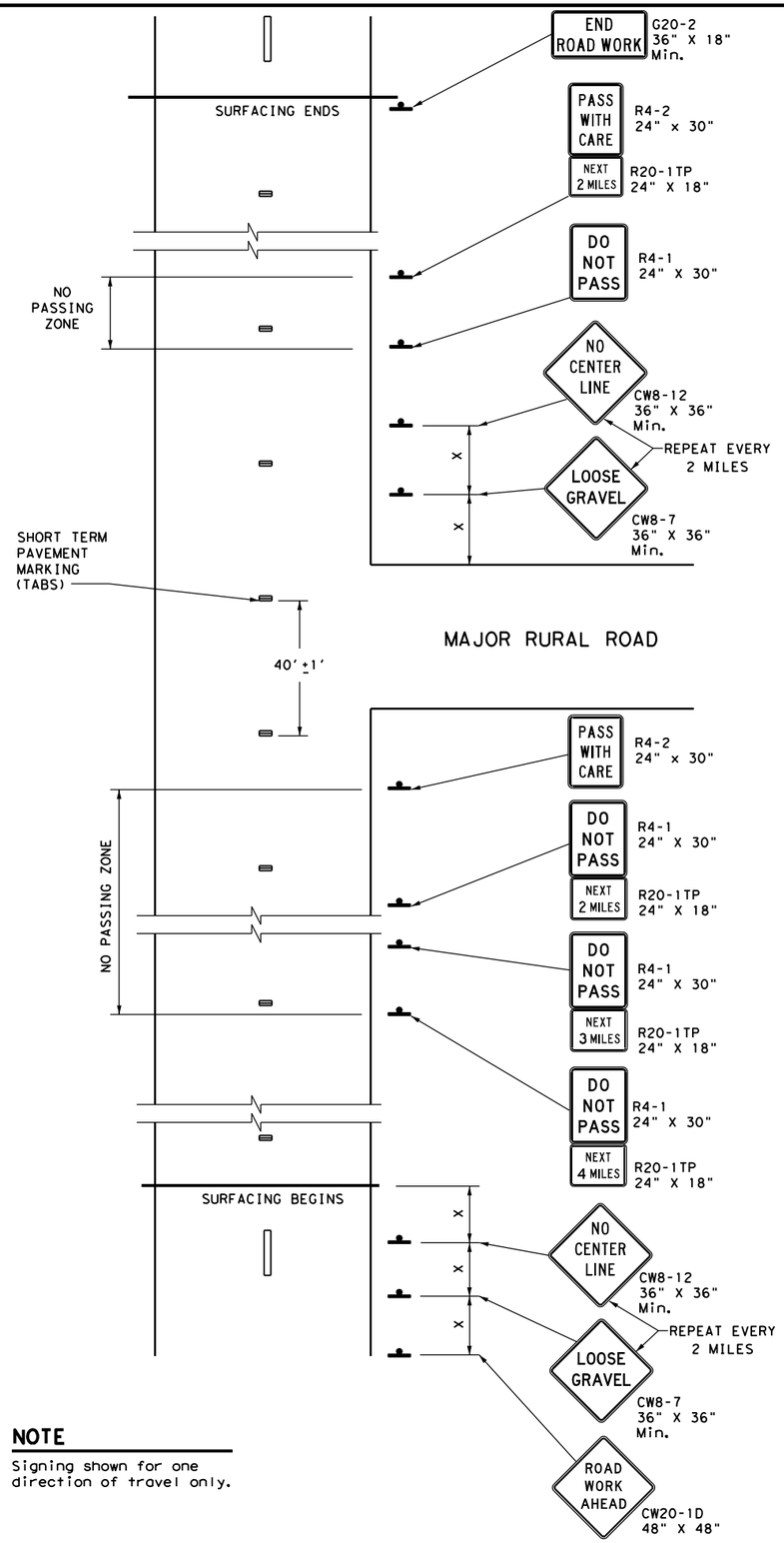
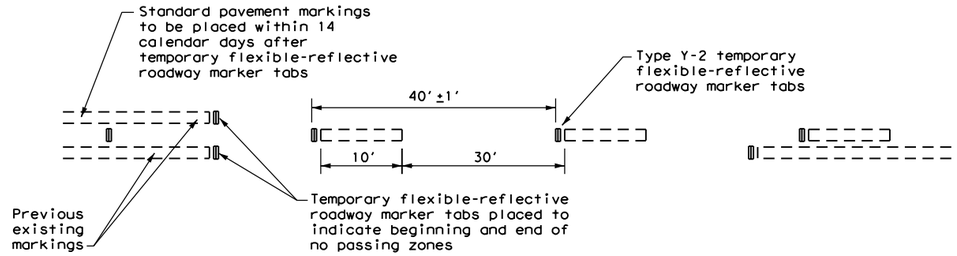


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.

C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with the existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.

D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

"NO CENTER LINE" SIGN (CW8-12)

A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.

B. At the time construction activity obliterates the existing center line markings(low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.

C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

"LOOSE GRAVEL" SIGN (CW8-7)

A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

PAVEMENT MARKINGS

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement
no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

B. Tabs shall not be used to simulate edge lines.

C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

COORDINATION OF SIGN LOCATIONS

A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.

B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T)sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

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

* Conventional Roads Only

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

GENERAL NOTES

1. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.
2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.
3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.
4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
5. Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

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©TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
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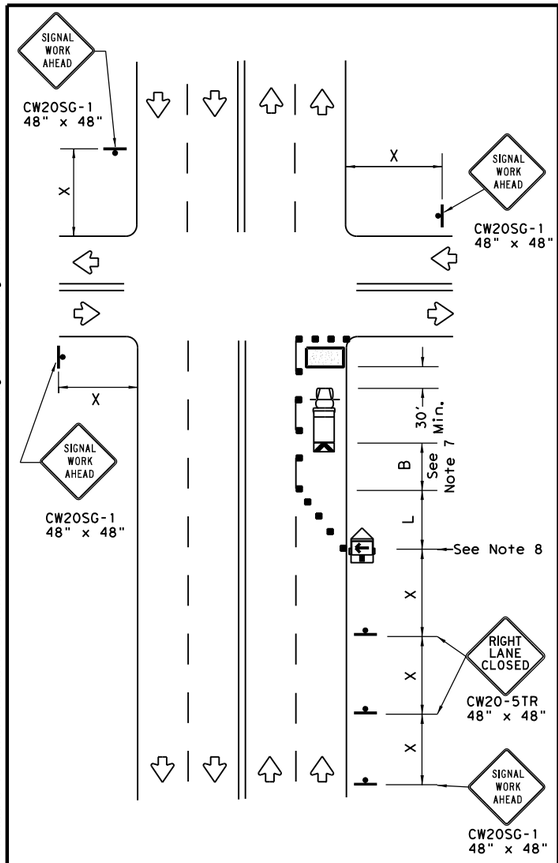
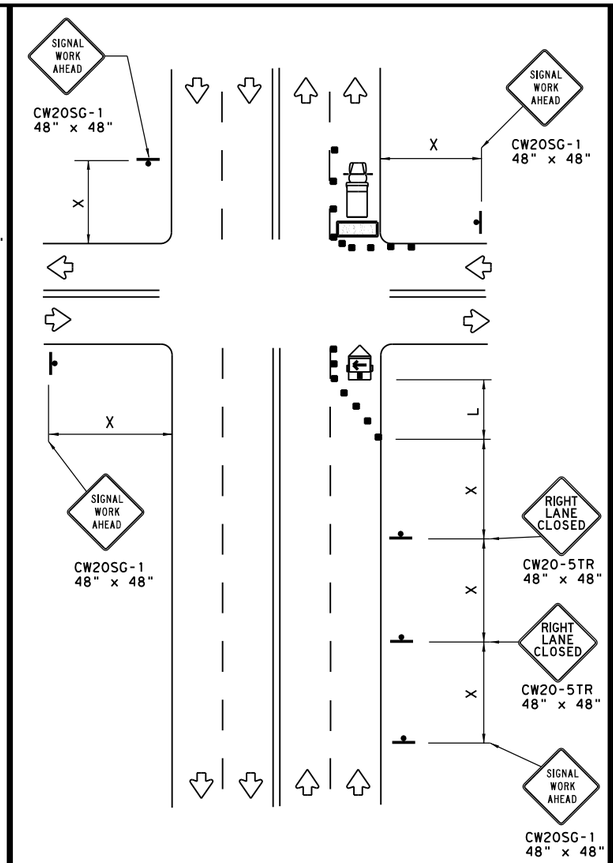
210



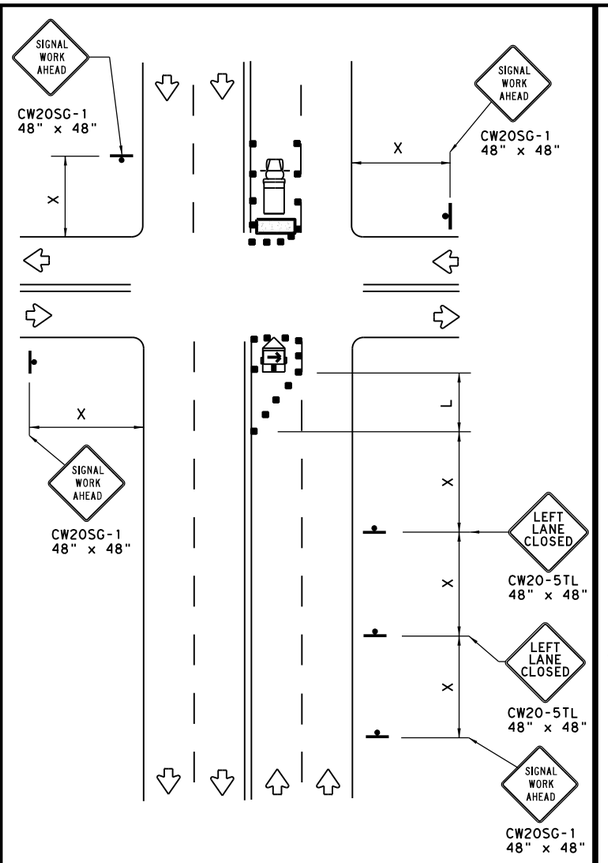
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



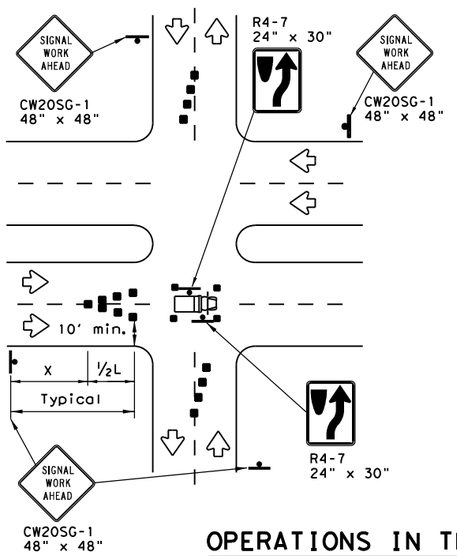
FAR SIDE RIGHT LANE CLOSURE

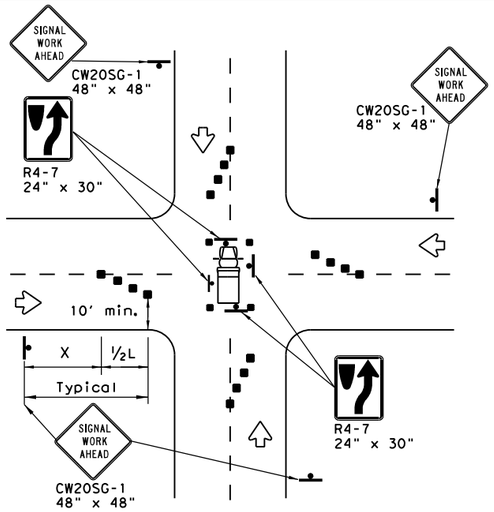
SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY





OPERATIONS IN THE INTERSECTION

SHORT DURATION

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

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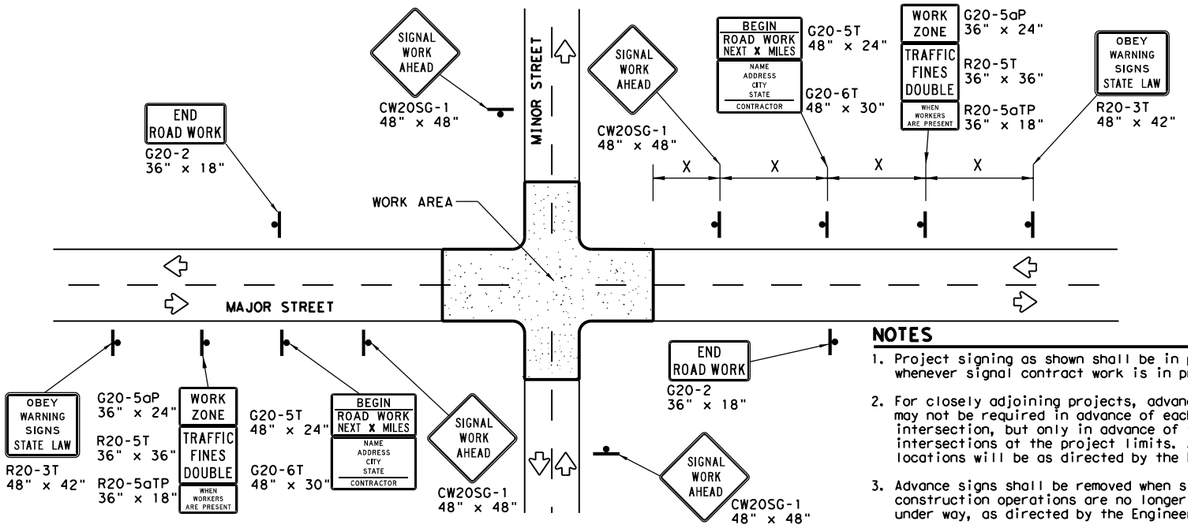


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

DURATION OF WORK

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

SIGN MOUNTING HEIGHT

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

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night without damaging the sign sheeting. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

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

SIGN SUPPORT WEIGHTS

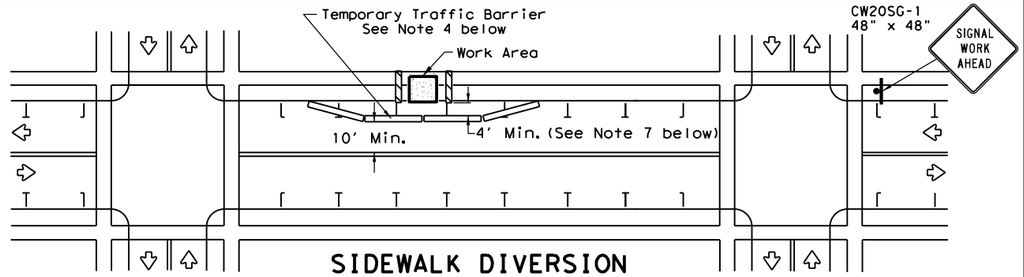
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

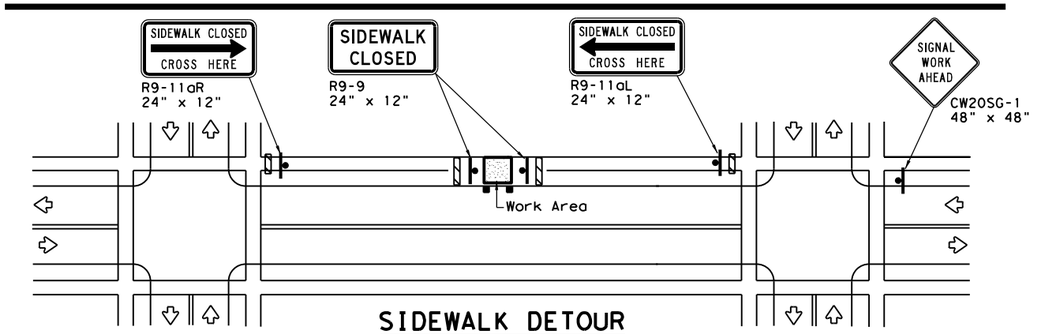
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

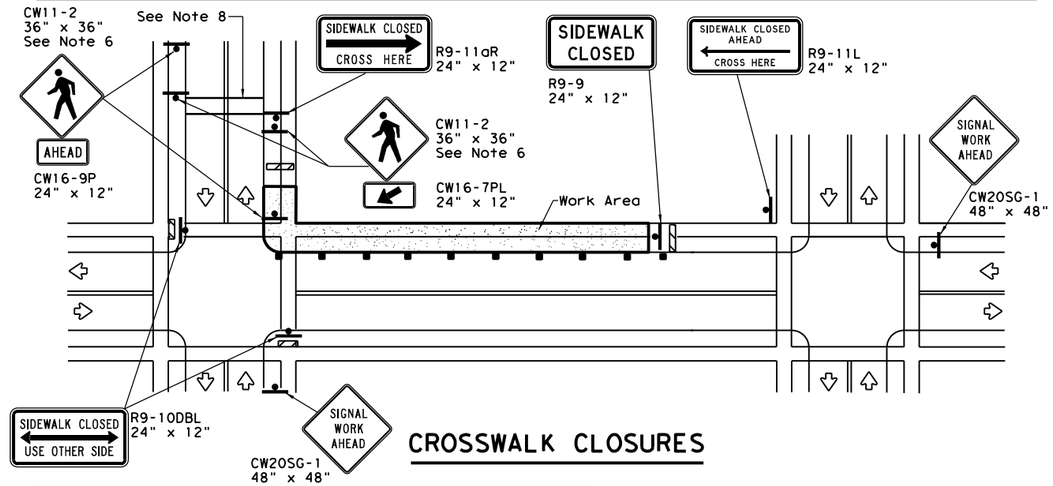
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

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

Texas Department of Transportation

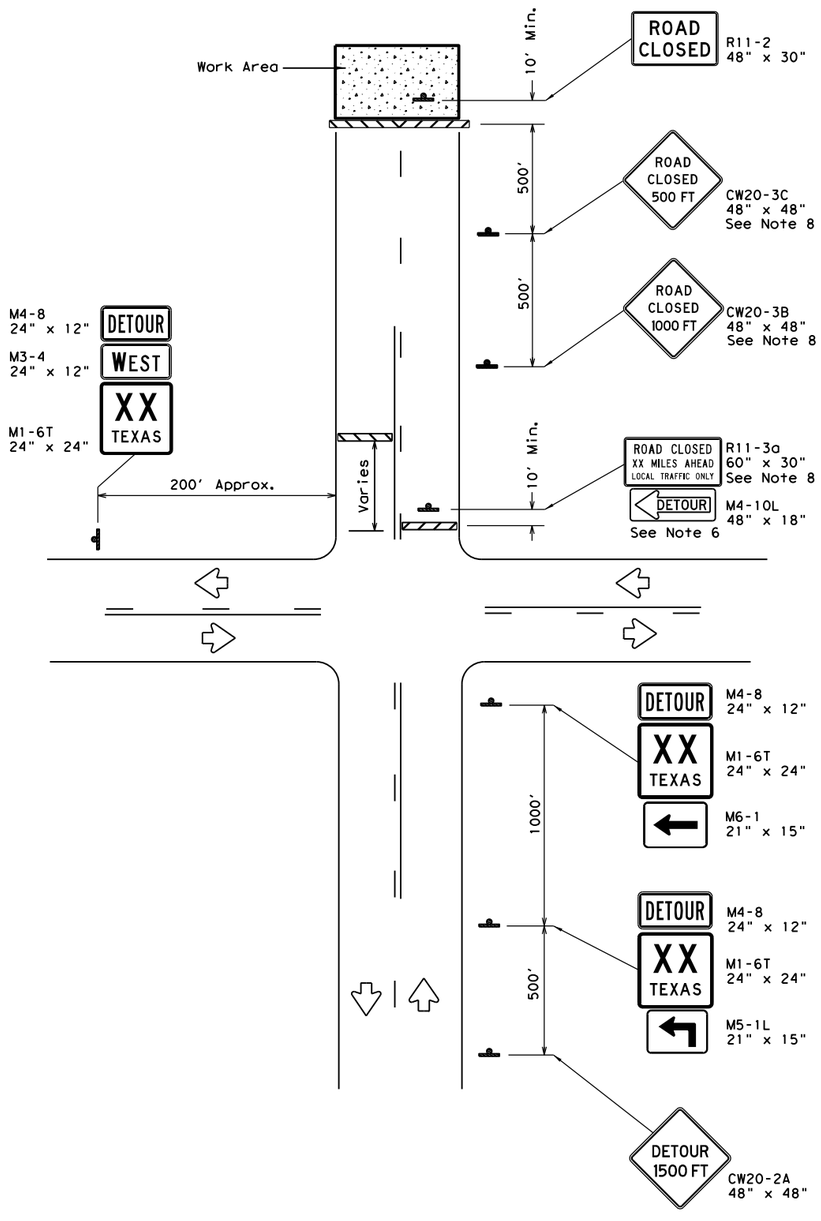
Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

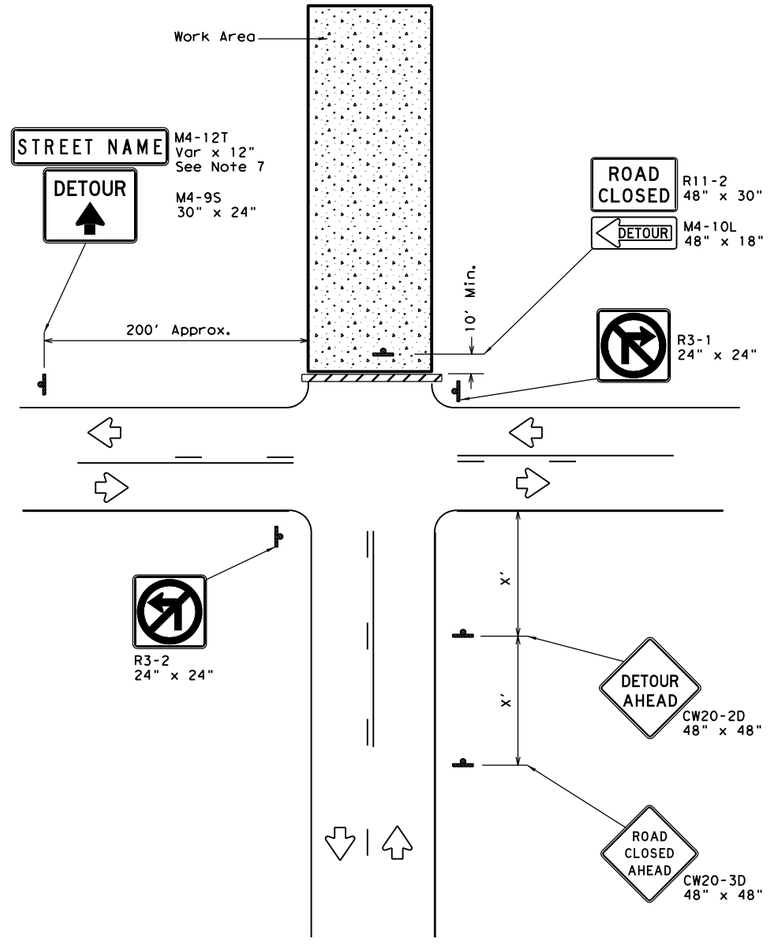
FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	LRD	LA SALLE		51

DATE: 4/20/2023 12:07:08 PM
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\02-TCP\Stds-01\wzrcd-13.dgn



ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

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

LEGEND	
	Type 3 Barricade
	Sign

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

* Conventional Roads Only

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

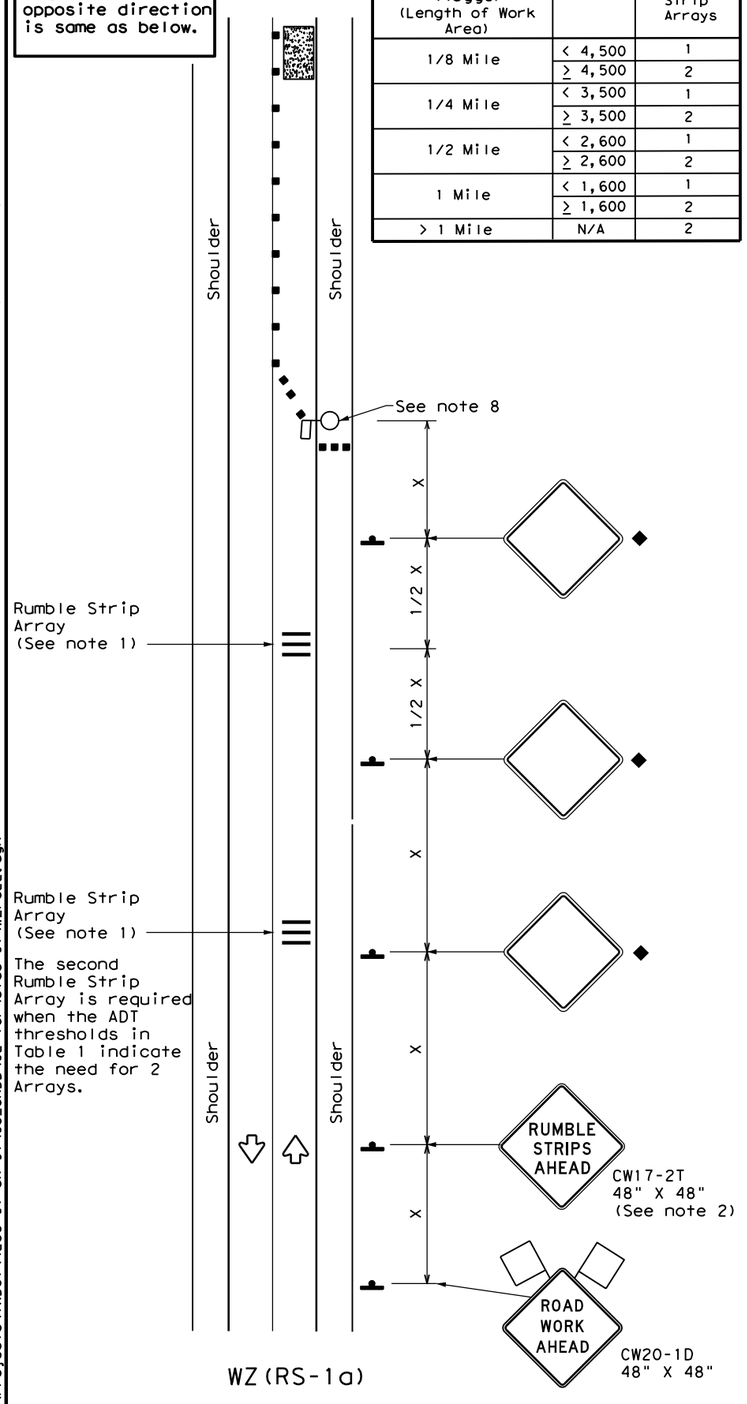
WZ(RCD)-13

FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
1-97 4-98 7-13	DIST	COUNTY		SHEET NO.
2-98 3-03	LRD	LA SALLE		52

DATE: 4/20/2023 12:07:09 PM
FILE: G:\TxDOT\Projects\TxDOT\4258-01 SH 97\03_CADD\02-TCP\Stds-01\wzrs22.dgn

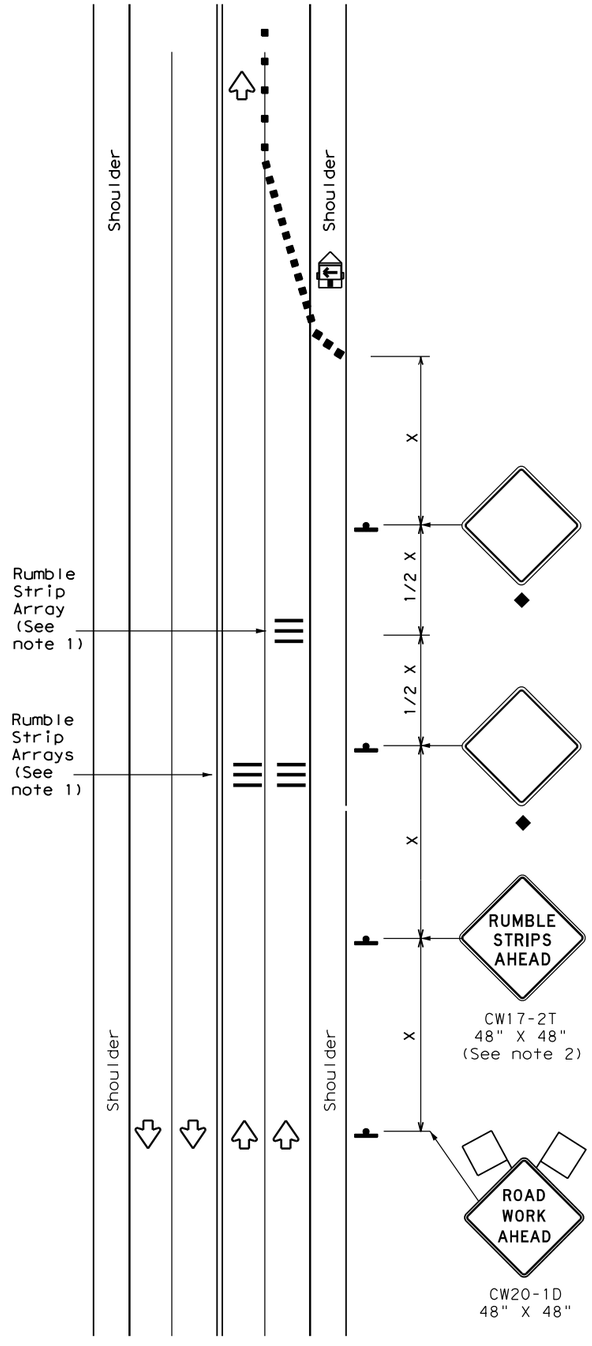
Warning sign and rumble strip sequence in opposite direction is same as below.

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



WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

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

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

* Conventional Roads Only

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

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

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

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

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

Texas Department of Transportation

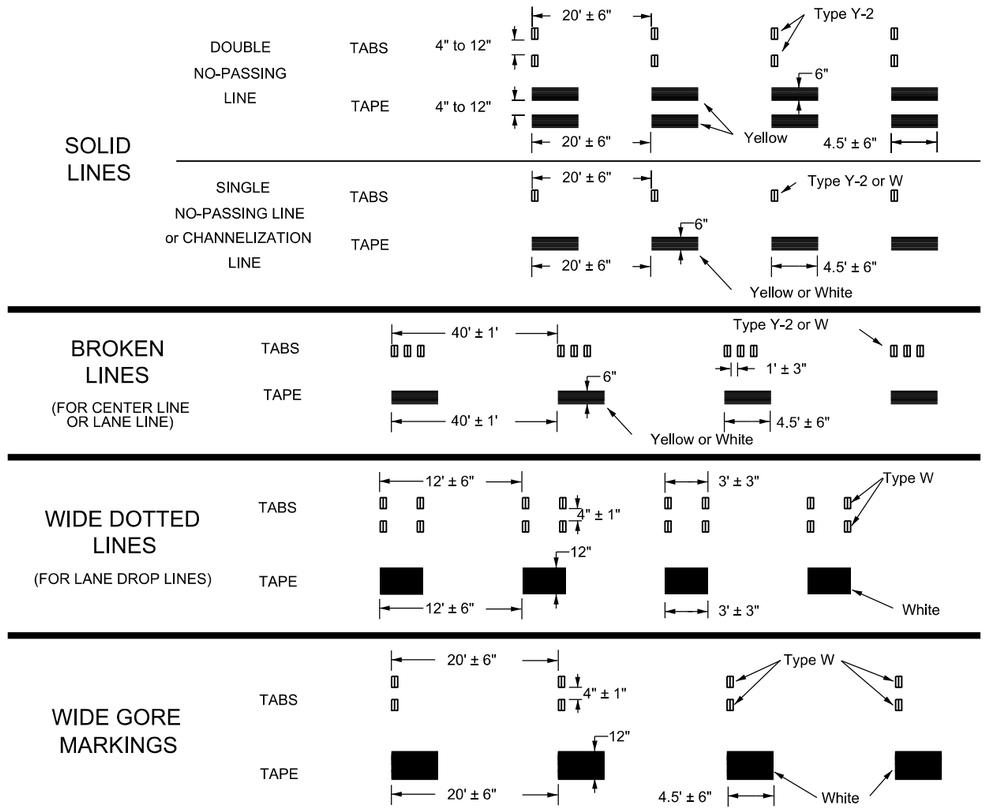
Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-14 1-22 4-16	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		53

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



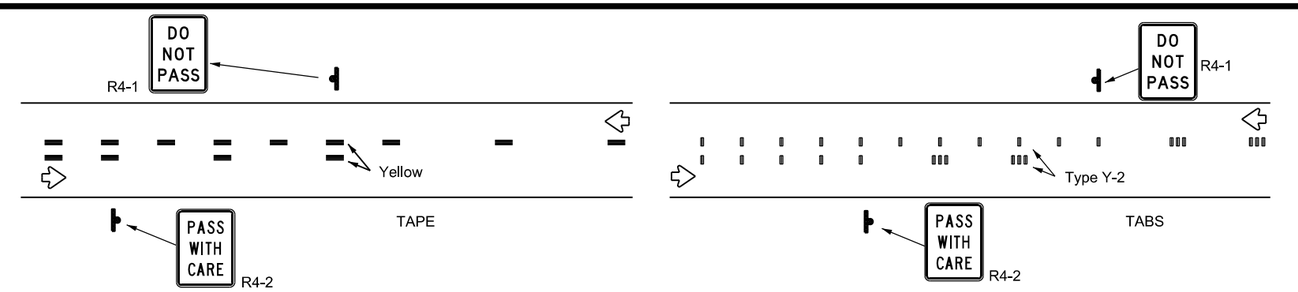
NOTES:

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

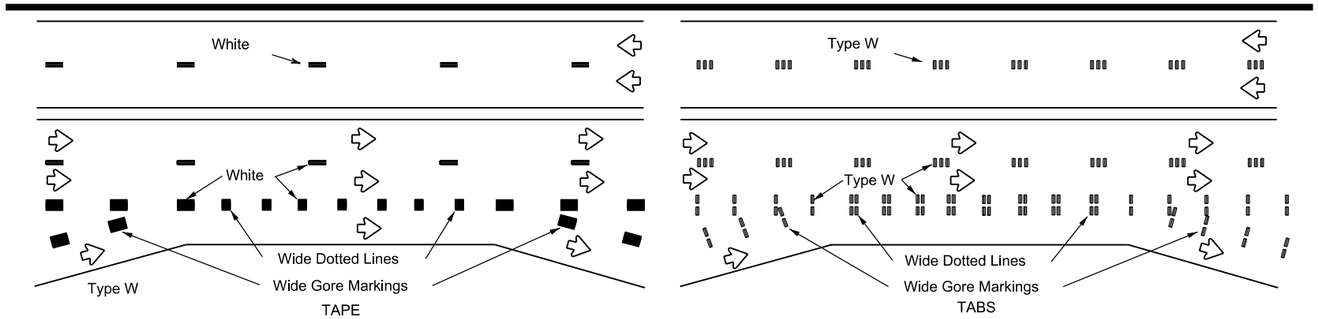
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

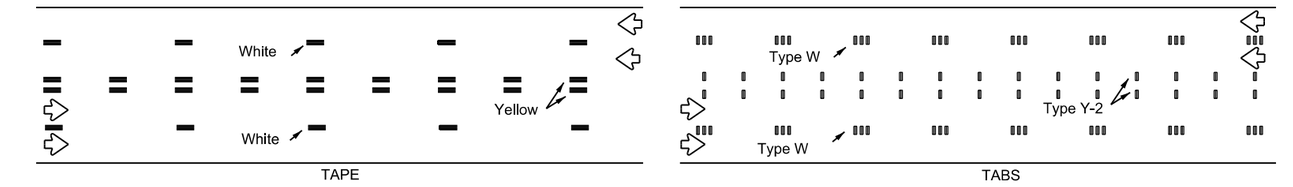
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



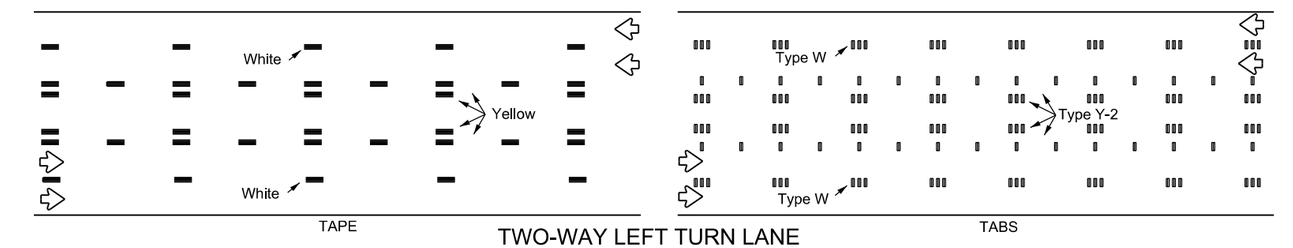
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



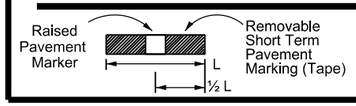
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:

http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

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© TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 7-13 1-97 2-23 3-03	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		54

111

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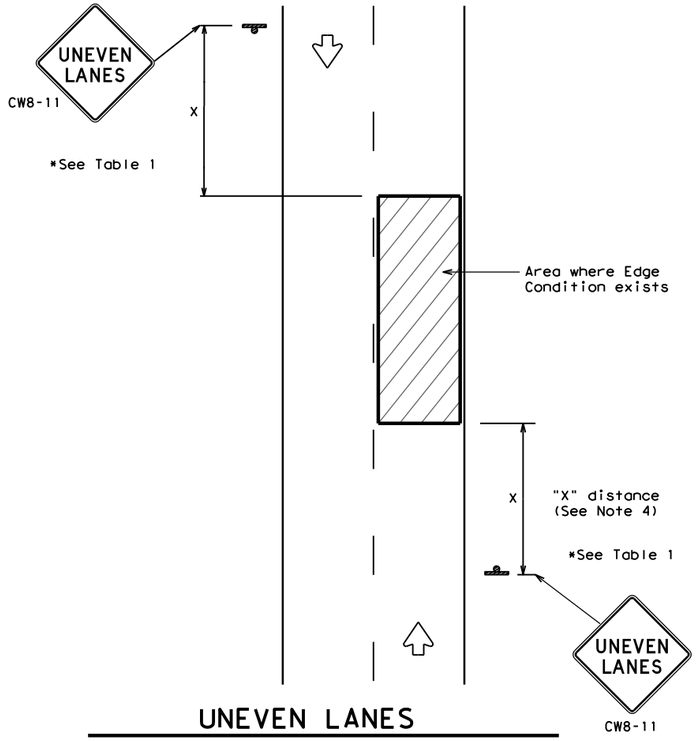
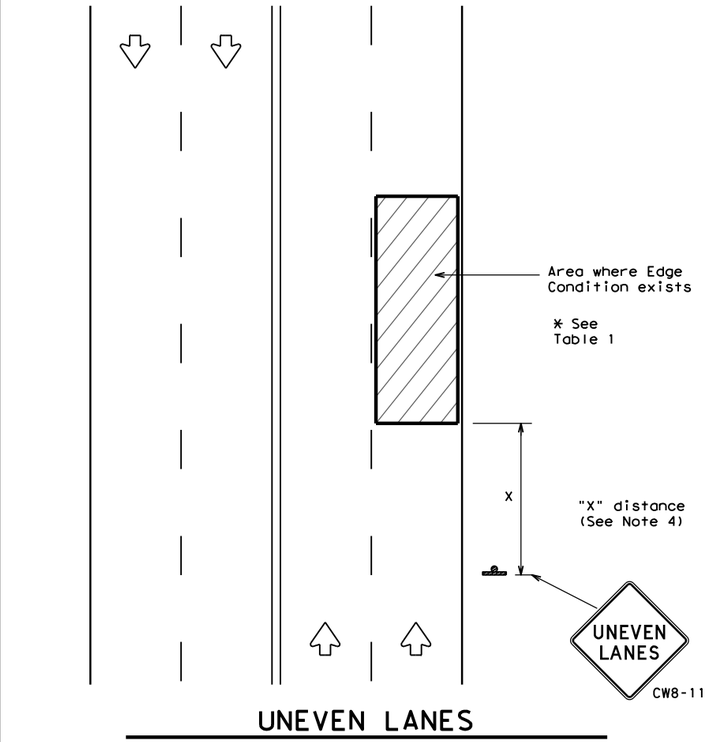
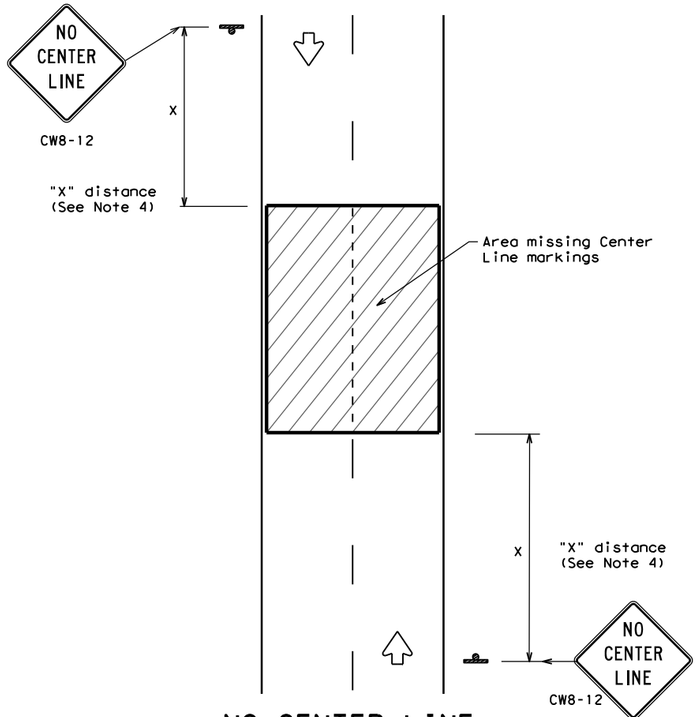


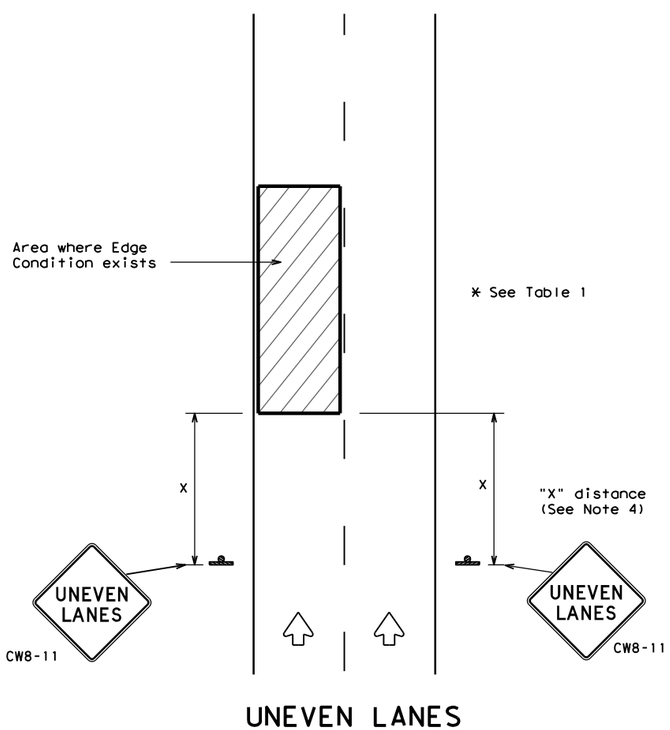
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

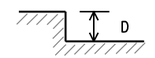
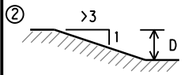
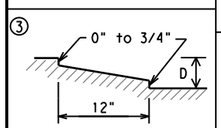
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

TABLE 1

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
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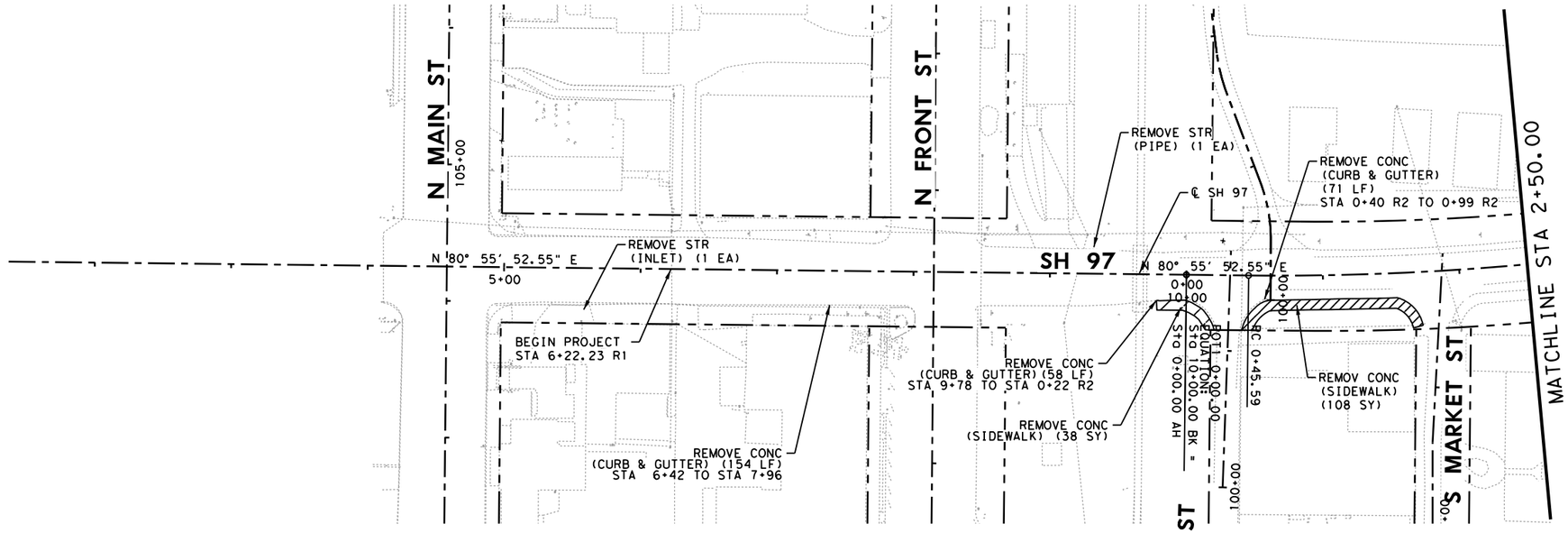
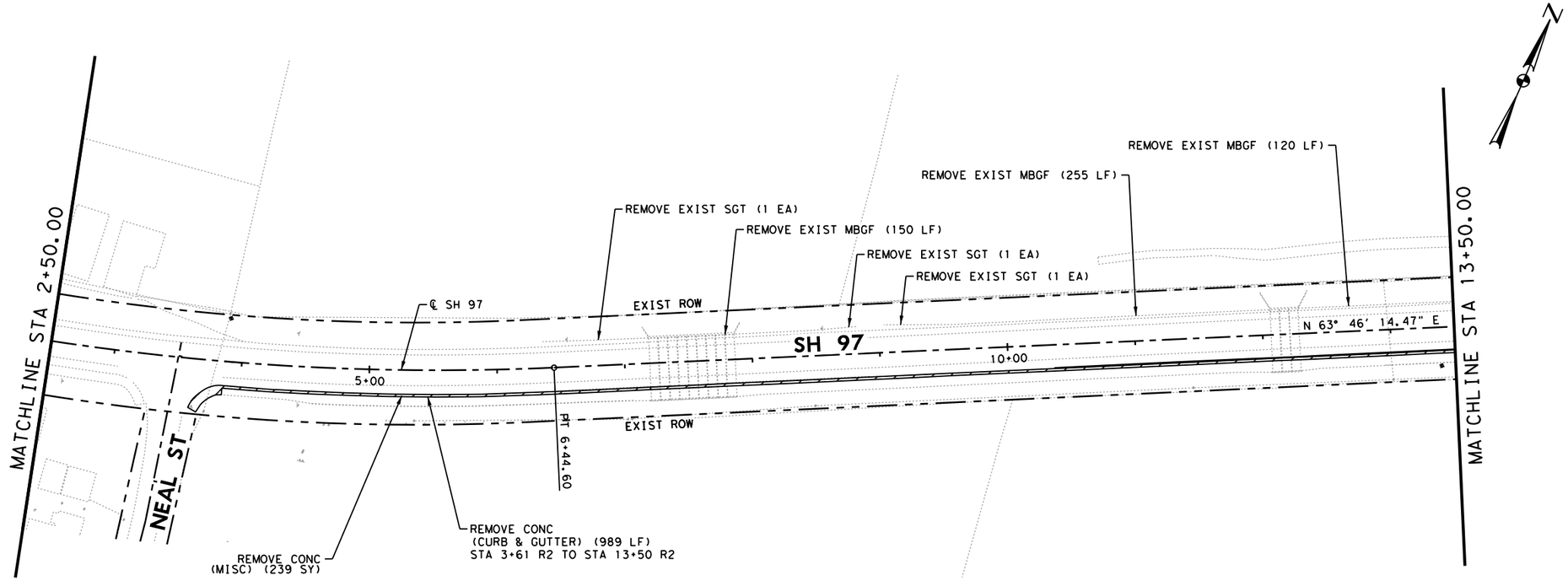
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	LRD	LA SALLE		55





LEGEND:

REMOVAL

0 50 100

SCALE: 1"=100'

4/20/2023

Texas Department of Transportation

BGE, Inc.
1701 Directors Blvd., Suite 1000, Austin, TX 78744
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

SH 97

REMOVAL PLAN

SHEET 1 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			56
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

4/20/2023 12:07:14 PM pdf.pltcfg
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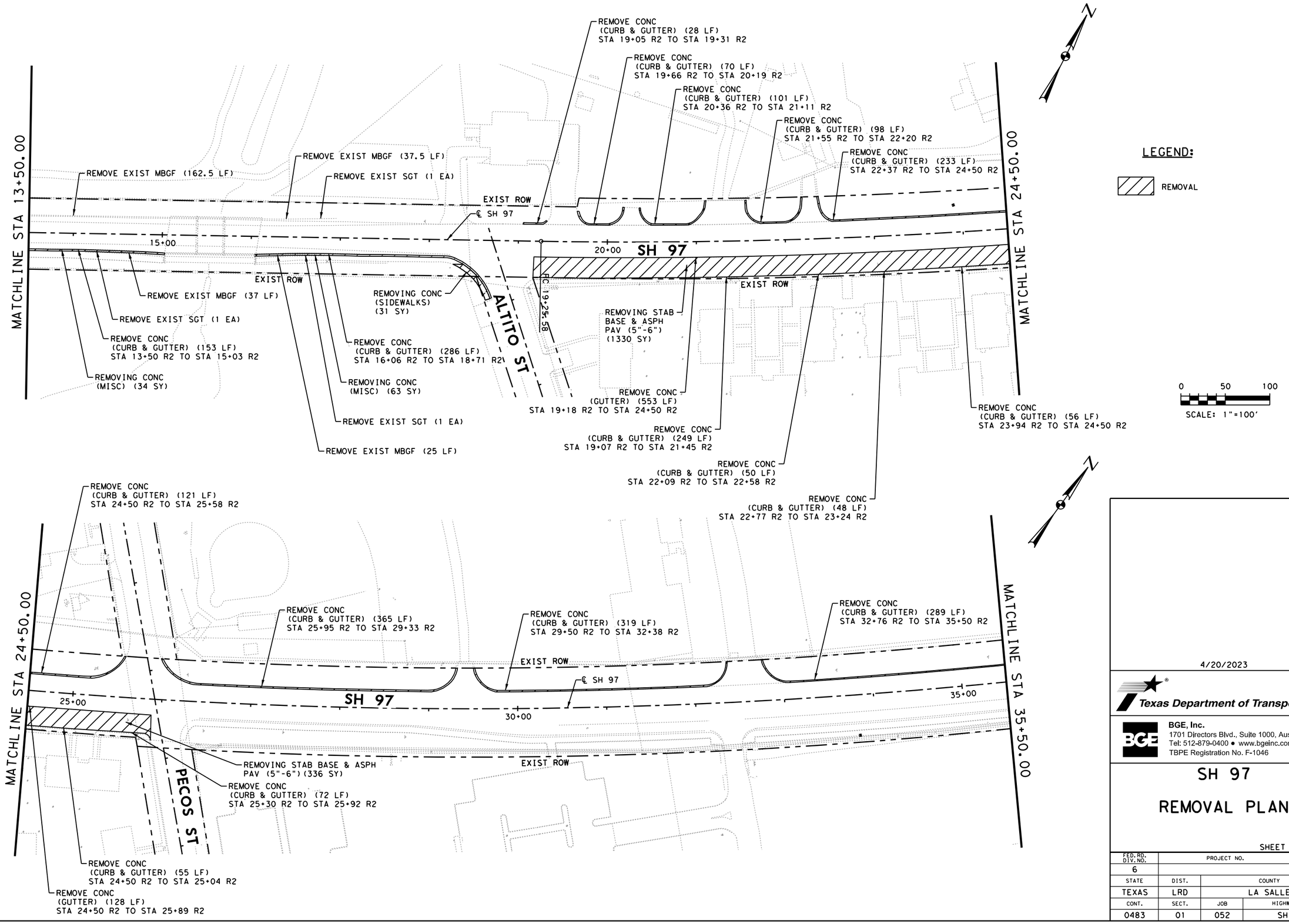

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SH 97

REMOVAL PLAN

SHEET 2 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			57
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

4/20/2023 12:07:15 PM pdf.pltcfg
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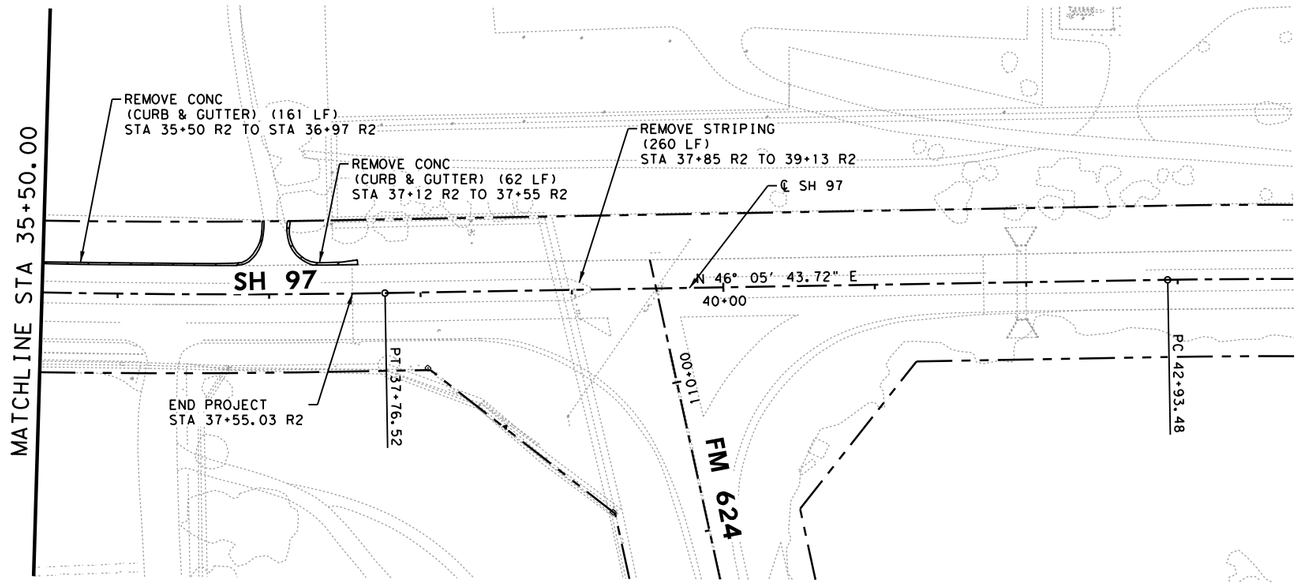

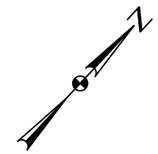

0 50 100

SCALE: 1"=100'

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SH 97

REMOVAL PLAN

SHEET 3 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			58
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

4/20/2023 12:07:17 PM pdf.pltcfg
G:\TXC\Projects\TxDOT\4258-01 SH 97\03*CADD\03-RDWY\RDWY-01\SH97*RMV-01*03.dgn

HORIZONTAL ALIGNMENT DATA

SH 97

```
*        1   DESCRIBE CHAIN SH97-CL-01

Chain SH97-CL-01 contains:
CL23 999 CUR SH97-CL-01-1 CUR SH97-CL-01-2

Beginning chain SH97-CL-01 description
================================================================================

Point CL23            X     1,892,469.03 Y    13,342,788.22 Sta       0+00.00

Course from CL23 to 999 N 80° 55' 52.55" E Dist 1,000.00

                                                              End   Region 1
Equation: Sta 10+00.00 (BK) = Sta 0+00.00 (AH)                ----------------
                                                              Begin Region 2

Point 999             X     1,893,456.53 Y    13,342,945.84 Sta       0+00.00

Course from 999 to PC SH97-CL-01-1 N 80° 55' 52.55" E Dist 45.59

                                  Curve Data
                                 *----------*
Curve SH97-CL-01-1
P.I.  Station            3+47.35  X        1,893,799.54  Y       13,343,000.59
Delta        =      17° 09' 38.08" (LT)
Degree       =       2° 51' 53.24"
Tangent      =              301.77
Length       =              599.02
Radius       =            2,000.00
External     =               22.64
Long Chord   =              596.78
Mid. Ord.    =               22.38
P.C.  Station            0+45.59  X        1,893,501.55  Y       13,342,953.02
P.T.  Station            6+44.60  X        1,894,070.24  Y       13,343,133.96
C.C.                              X        1,893,186.31  Y       13,344,928.02
Back         = N  80° 55' 52.55" E
Ahead        = N  63° 46' 14.47" E
Chord Bear   = N  72° 21' 03.51" E

Course from PT SH97-CL-01-1 to PC SH97-CL-01-2 N 63° 46' 14.47" E Dist 1,280.98

                                  Curve Data
                                 *----------*
Curve SH97-CL-01-2
P.I.  Station           28+58.46  X        1,896,056.14  Y       13,344,112.40
Delta        =      17° 40' 30.75" (LT)
Degree       =       0° 57' 17.75"
Tangent      =              932.88
Length       =            1,850.94
Radius       =            6,000.00
External     =               72.09
Long Chord   =            1,843.61
Mid. Ord.    =               71.23
P.C.  Station           19+25.58  X        1,895,219.31  Y       13,343,700.10
P.T.  Station           37+76.52  X        1,896,728.28  Y       13,344,759.32
C.C.                              X        1,892,567.53  Y       13,349,082.30
Back         = N  63° 46' 14.47" E
Ahead        = N  46° 05' 43.72" E
Chord Bear   = N  54° 55' 59.09" E

Course from PT SH97-CL-01-2 to PC SH97-CL-01-3 N 46° 05' 43.72" E Dist 516.95

================================================================================
Ending chain SH97-CL-01 description
```

S. MAIN ST

```
*        1   DESCRIBE CHAIN SMAIN

Chain SMAIN contains:
 BL100 BL101

Beginning chain SMAIN description
================================================================================

Point BL100           X     1,892,988.91 Y    13,342,440.58 Sta     100+00.00

Course from BL100 to BL101 N 9° 08' 55.49" W Dist 770.27

Point BL101           X     1,892,866.44 Y    13,343,201.05 Sta     107+70.27

================================================================================
Ending chain SMAIN description
```

N. FRONT ST

```
*        1   DESCRIBE CHAIN NFRONT

Chain NFRONT contains:
 BL110 BL111

Beginning chain NFRONT description
================================================================================

Point BL110           X     1,893,312.11 Y    13,342,679.65 Sta     100+00.00

Course from BL110 to BL111 N 9° 10' 52.23" W Dist 479.99

Point BL111           X     1,893,235.52 Y    13,343,153.50 Sta     104+79.99

================================================================================
Ending chain NFRONT description
```

KECK ST

```
*        1   DESCRIBE CHAIN KECK

Chain KECK contains:
 BL120 BL121

Beginning chain KECK description
================================================================================

Point BL120           X     1,893,508.98 Y    13,342,796.87 Sta     100+00.00

Course from BL120 to BL121 N 7° 42' 46.35" W Dist 173.44

Point BL121           X     1,893,485.70 Y    13,342,968.74 Sta     101+73.44

================================================================================
Ending chain KECK description
```

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SH 97

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			59
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

4/20/2023 12:07:17 PM pdf.pltcfg
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HORIZONTAL ALIGNMENT DATA

N. MARKET ST

```
*        1   DESCRIBE CHAIN NMARKET

Chain NMARKET contains:
 INT10 CUR NMARKET-1 CUR NMARKET-2 INT11

Beginning chain NMARKET description
================================================================================

Point INT10           X     1,893,520.58 Y    13,342,937.89 Sta     100+00.00

Course from INT10 to PC NMARKET-1 N 9° 32' 04.44" W Dist 43.56

                                  Curve Data
                                 *----------*
Curve NMARKET-1
P.I.  Station          100+65.65  X        1,893,509.70  Y       13,343,002.63
Delta        =      20° 51' 23.72" (LT)
Degree       =      47° 44' 47.34"
Tangent      =               22.09
Length       =               43.68
Radius       =              120.00
External     =                2.02
Long Chord   =               43.44
Mid. Ord.    =                1.98
P.C.  Station          100+43.56  X        1,893,513.36  Y       13,342,980.85
P.T.  Station          100+87.25  X        1,893,498.53  Y       13,343,021.68
C.C.                              X        1,893,395.02  Y       13,342,960.97
Back         = N   9° 32' 04.44" W
Ahead        = N  30° 23' 28.16" W
Chord Bear   = N  19° 57' 46.30" W

Course from PT NMARKET-1 to PC NMARKET-2 N 30° 23' 28.16" W Dist 69.50

                                  Curve Data
                                 *----------*
Curve NMARKET-2
P.I.  Station          101+72.08  X        1,893,455.61  Y       13,343,094.86
Delta        =      13° 29' 30.62" (RT)
Degree       =      44° 12' 17.19"
Tangent      =               15.33
Length       =               30.52
Radius       =              129.61
External     =                0.90
Long Chord   =               30.45
Mid. Ord.    =                0.90
P.C.  Station          101+56.75  X        1,893,463.37  Y       13,343,081.63
P.T.  Station          101+87.27  X        1,893,451.16  Y       13,343,109.52
C.C.                              X        1,893,575.17  Y       13,343,147.20
Back         = N  30° 23' 28.16" W
Ahead        = N  16° 53' 57.54" W
Chord Bear   = N  23° 38' 42.85" W

Course from PT NMARKET-2 to INT11 N 16° 53' 57.54" W Dist 31.64

Point INT11           X     1,893,441.96 Y    13,343,139.80 Sta     102+18.91

================================================================================
Ending chain NMARKET description
```

S. MARKET ST

```
*        1   DESCRIBE CHAIN SMARKET

Chain SMARKET contains:
 BL130 BL131 BL132

Beginning chain SMARKET description
================================================================================

Point BL130           X     1,893,665.11 Y    13,342,796.51 Sta     100+00.00

Course from BL130 to BL131 N 9° 42' 10.45" W Dist 59.69

Point BL131           X     1,893,655.05 Y    13,342,855.35 Sta     100+59.69

Course from BL131 to BL132 N 6° 40' 46.77" W Dist 138.59

Point BL132           X     1,893,638.93 Y    13,342,993.00 Sta     101+98.28

================================================================================
Ending chain SMARKET description
```

NEAL ST

```
*        1   DESCRIBE CHAIN NEAL

Chain NEAL contains:
 BL140 BL141 BL142

Beginning chain NEAL description
================================================================================

Point BL140           X     1,893,836.49 Y    13,342,828.58 Sta     100+00.00

Course from BL140 to BL141 N 9° 31' 00.80" W Dist 68.19

Point BL141           X     1,893,825.22 Y    13,342,895.83 Sta     100+68.19

Course from BL141 to BL142 N 12° 14' 12.37" W Dist 142.76

Point BL142           X     1,893,794.96 Y    13,343,035.35 Sta     102+10.95

================================================================================
Ending chain NEAL description
```

ALTITO ST

```
*        1   DESCRIBE CHAIN ALTITO

Chain ALTITO contains:
 BL150 BL151

Beginning chain ALTITO description
================================================================================

Point BL150           X     1,895,361.36 Y    13,343,484.43 Sta     100+00.00

Course from BL150 to BL151 N 44° 55' 27.25" W Dist 289.95

Point BL151           X     1,895,156.60 Y    13,343,689.73 Sta     102+89.95

================================================================================
Ending chain ALTITO description
```

PECOS ST \ ENGINEER LN

```
*        1   DESCRIBE CHAIN PECOS

Chain PECOS contains:
 BL160 BL161

Beginning chain PECOS description
================================================================================

Point BL160           X     1,895,992.08 Y    13,343,841.58 Sta     100+00.00

Course from BL160 to BL161 N 46° 01' 26.74" W Dist 527.37

Point BL161           X     1,895,612.57 Y    13,344,207.76 Sta     105+27.37

================================================================================
Ending chain PECOS description
```

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SH 97

HORIZONTAL ALIGNMENT DATA

SHEET 2 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			60
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

4/20/2023 12:07:18 PM pdf.pltcfg
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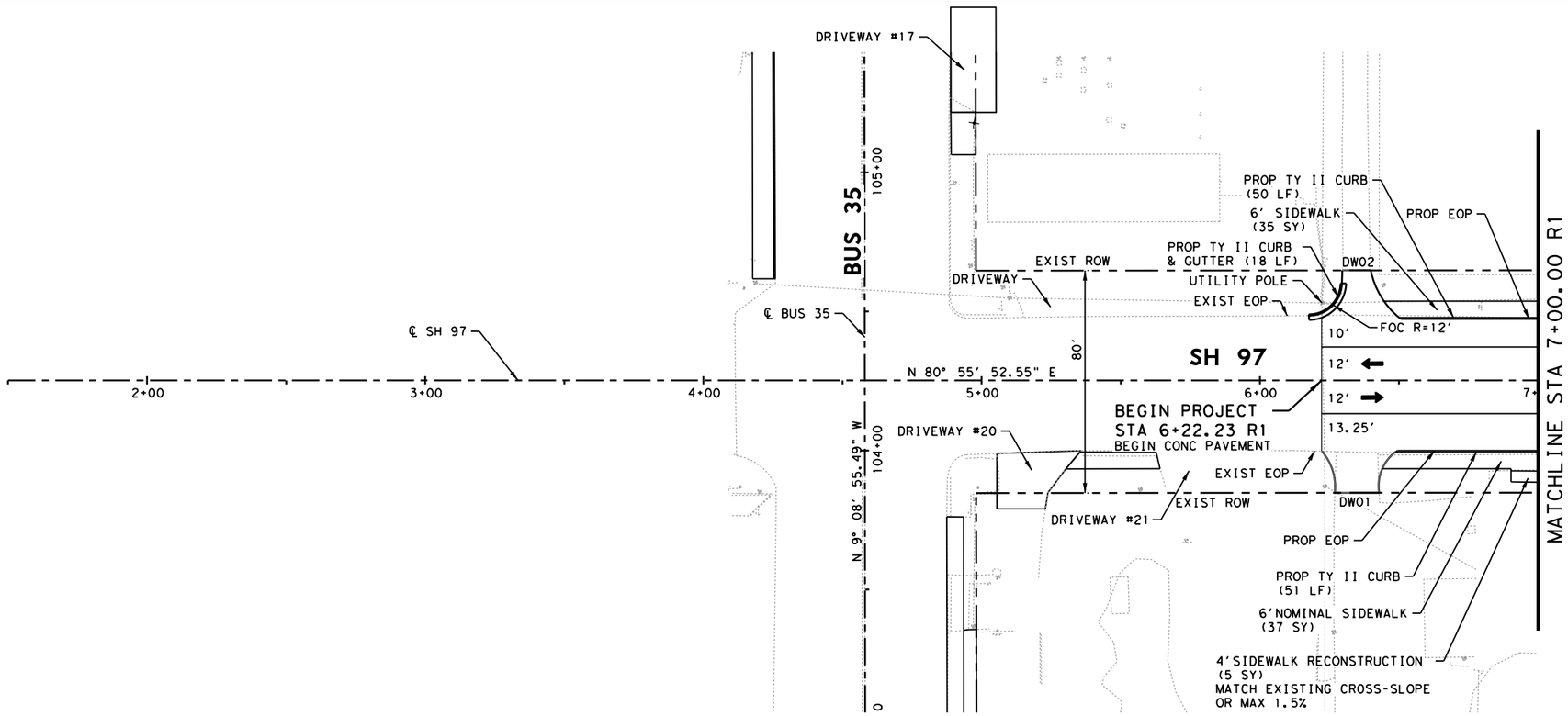
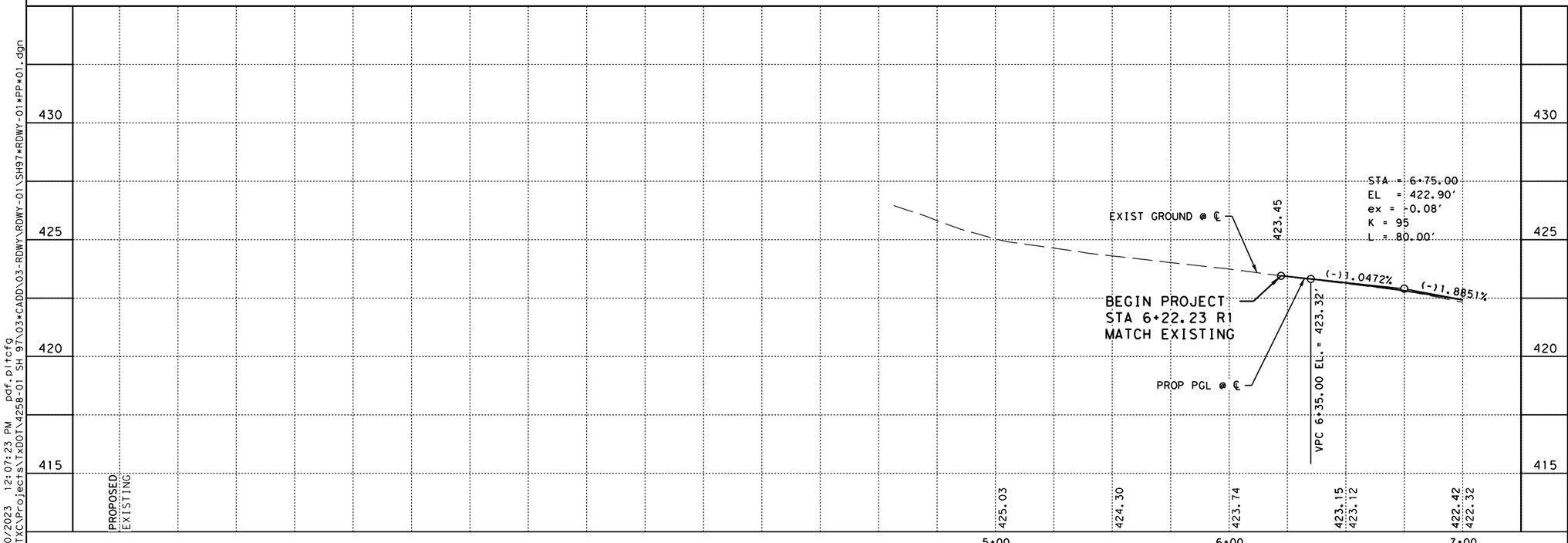


LEGEND:

- EXISTING SIGN
- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- (CURVE #) ALIGNMENT CURVE NUMBER
- FLOW DIRECTION

NOTE:
SEE BUS 35 SIDEWALK IMPROVEMENTS SHEET FOR ADDITIONAL INFORMATION.

0 25 50
SCALE: 1"=50' H
1"=5' V



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SH 97
ROADWAY
PLAN & PROFILE

BEGIN PROJECT TO STA 7+00 R1

SHEET 1 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			61
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

4/20/2023 12:07:23 PM pdf.pltcfg
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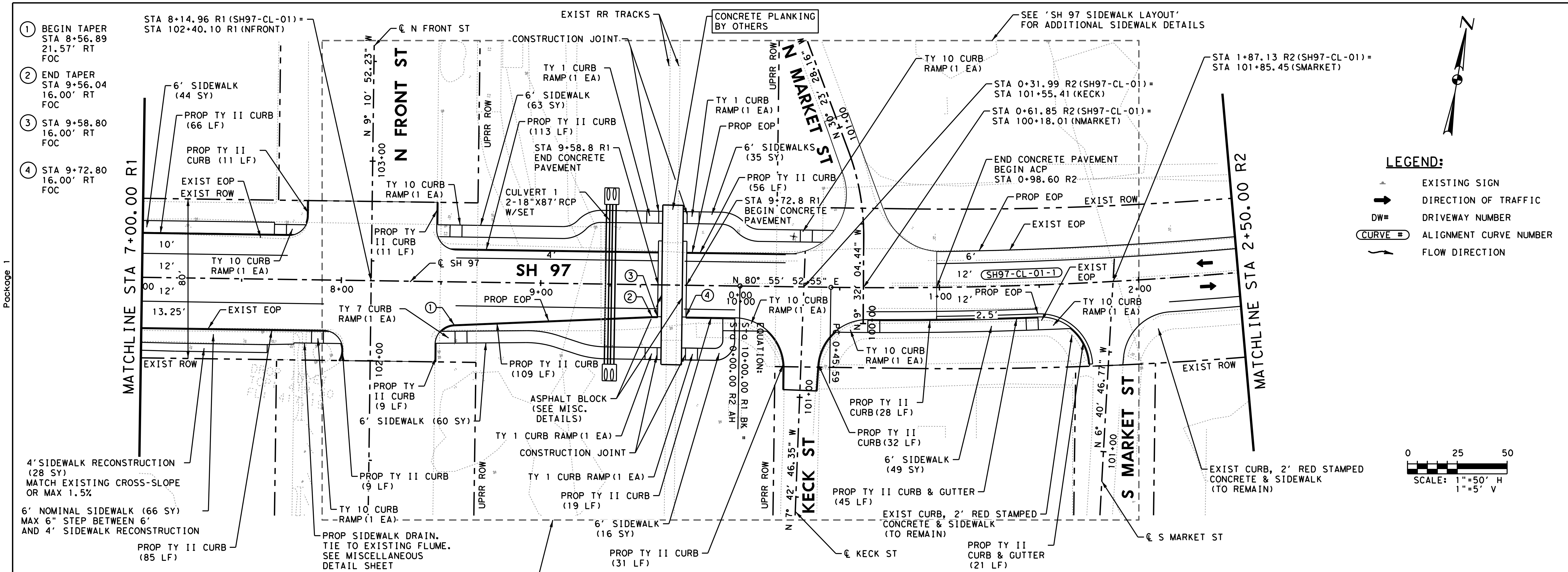
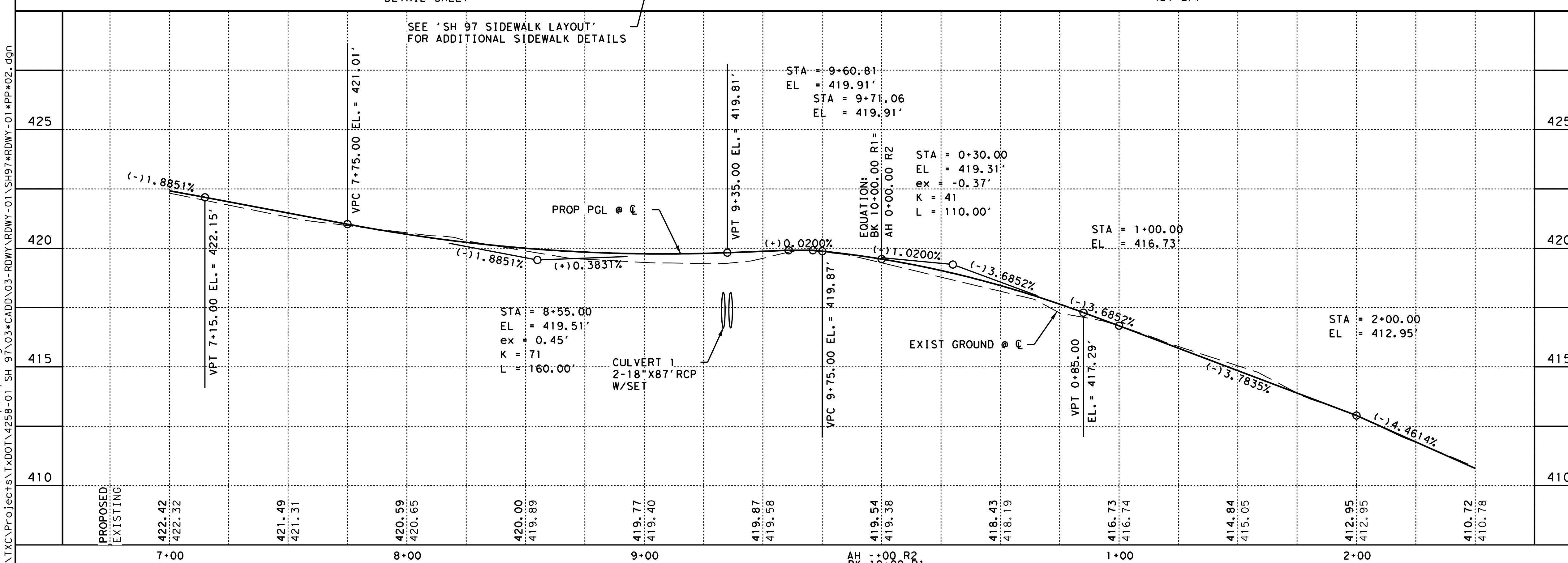


1 BEGIN TAPER STA 8+56.89 21.57' RT FOC
2 END TAPER STA 9+56.04 16.00' RT FOC
3 STA 9+58.80 16.00' RT FOC
4 STA 9+72.80 16.00' RT FOC
STA 8+14.96 R1(SH97-CL-01)= STA 102+40.10 R1(NFRONT)
℄ N FRONT ST
N FRONT ST
N 9° 10' 52.23" W
EXIST RR TRACKS
CONSTRUCTION JOINT
CONCRETE PLANKING BY OTHERS
SEE 'SH 97 SIDEWALK LAYOUT' FOR ADDITIONAL SIDEWALK DETAILS
TY 10 CURB RAMP(1 EA)
STA 0+31.99 R2(SH97-CL-01)= STA 101+55.41(KECK)
STA 0+61.85 R2(SH97-CL-01)= STA 100+18.01(NMARKET)
STA 1+87.13 R2(SH97-CL-01)= STA 101+85.45(SMARKET)
N MARKET ST
N 30° 23' 28.16" W
6' SIDEWALK (44 SY)
PROP TY II CURB (66 LF)
PROP TY II CURB (11 LF)
EXIST EOP
EXIST ROW
TY 1 CURB RAMP(1 EA)
6' SIDEWALK (63 SY)
PROP TY II CURB (113 LF)
STA 9+58.8 R1 END CONCRETE PAVEMENT
TY 10 CURB RAMP(1 EA)
CULVERT 1 2-18"X87' RCP W/SET
TY 1 CURB RAMP(1 EA)
PROP EOP
6' SIDEWALKS (35 SY)
PROP TY II CURB (56 LF)
STA 9+72.8 R1 BEGIN CONCRETE PAVEMENT
END CONCRETE PAVEMENT BEGIN ACP STA 0+98.60 R2
PROP EOP
EXIST ROW
EXIST EOP
MATCHLINE STA 7+00.00 R1
MATCHLINE STA 2+50.00 R2
UPRR ROW
PROP TY II CURB (11 LF)
TY 10 CURB RAMP(1 EA)
℄ SH 97
SH 97
N 80° 55' 52.55" E
SH97-CL-01-1
EXIST EOP
PROP EOP
TY 7 CURB RAMP(1 EA)
TY 10 CURB RAMP(1 EA)
TY 10 CURB RAMP(1 EA)
TY 10 CURB RAMP(1 EA)
EQUATION: STA 10+00.00 R1 BK = STA 0+00.00 R2 AH
PROP TY II CURB (109 LF)
PROP TY II CURB (9 LF)
6' SIDEWALK (60 SY)
ASPHALT BLOCK (SEE MISC. DETAILS)
TY 1 CURB RAMP(1 EA)
CONSTRUCTION JOINT
TY 1 CURB RAMP(1 EA)
PROP TY II CURB (19 LF)
6' SIDEWALK (16 SY)
PROP TY II CURB (31 LF)
KECK ST
N 7° 42' 46.35" W
PROP TY II CURB(28 LF)
PROP TY II CURB(32 LF)
6' SIDEWALK (49 SY)
PROP TY II CURB & GUTTER (45 LF)
EXIST CURB, 2' RED STAMPED CONCRETE & SIDEWALK (TO REMAIN)
PROP TY II CURB & GUTTER (21 LF)
℄ KECK ST
℄ S MARKET ST
S MARKET ST
N 6° 40' 46.77" W
EXIST ROW
EXIST CURB, 2' RED STAMPED CONCRETE & SIDEWALK (TO REMAIN)
4'SIDEWALK RECONSTRUCTION (28 SY) MATCH EXISTING CROSS-SLOPE OR MAX 1.5%
6' NOMINAL SIDEWALK (66 SY) MAX 6" STEP BETWEEN 6' AND 4' SIDEWALK RECONSTRUCTION
PROP TY II CURB (85 LF)
PROP TY II CURB (9 LF)
TY 10 CURB RAMP(1 EA)
PROP SIDEWALK DRAIN. TIE TO EXISTING FLUME. SEE MISCELLANEOUS DETAIL SHEET
SEE 'SH 97 SIDEWALK LAYOUT' FOR ADDITIONAL SIDEWALK DETAILS
LEGEND:
EXISTING SIGN
DIRECTION OF TRAFFIC
DW# DRIVEWAY NUMBER
CURVE # ALIGNMENT CURVE NUMBER
FLOW DIRECTION
SCALE: 1"=50' H 1"=5' V
0 25 50
N



425
420
415
410
(-)1.8851%
VPT 7+15.00 EL.= 422.15'
VPC 7+75.00 EL.= 421.01'
PROP PGL @ ℄
VPT 9+35.00 EL.= 419.81'
STA = 9+60.81 EL = 419.91'
STA = 9+71.06 EL = 419.91'
EQUATION: BK 10+00.00 R1= AH 0+00.00 R2
STA = 0+30.00 EL = 419.31' ex = -0.37' K = 41 L = 110.00'
STA = 1+00.00 EL = 416.73'
(-)1.8851%
(+)0.3831%
(+)0.0200%
(+)0.0200%
(-)3.6852%
(-)3.6852%
(-)3.7835%
(-)4.4614%
STA = 8+55.00 EL = 419.51' ex = 0.45' K = 71 L = 160.00'
CULVERT 1 2-18"X87'RCP W/SET
VPC 9+75.00 EL.= 419.87'
EXIST GROUND @ ℄
VPT 0+85.00 EL.= 417.29'
STA = 2+00.00 EL = 412.95'
PROPOSED
EXISTING
422.42 422.32
421.49 421.31
420.59 420.65
420.00 419.89
419.77 419.40
419.87 419.58
419.54 419.38
418.43 418.19
416.73 416.74
414.84 415.05
412.95 412.95
410.72 410.78
7+00
8+00
9+00
AH 0+00 R2 BK 10+00 R1
1+00
2+00

Package 1

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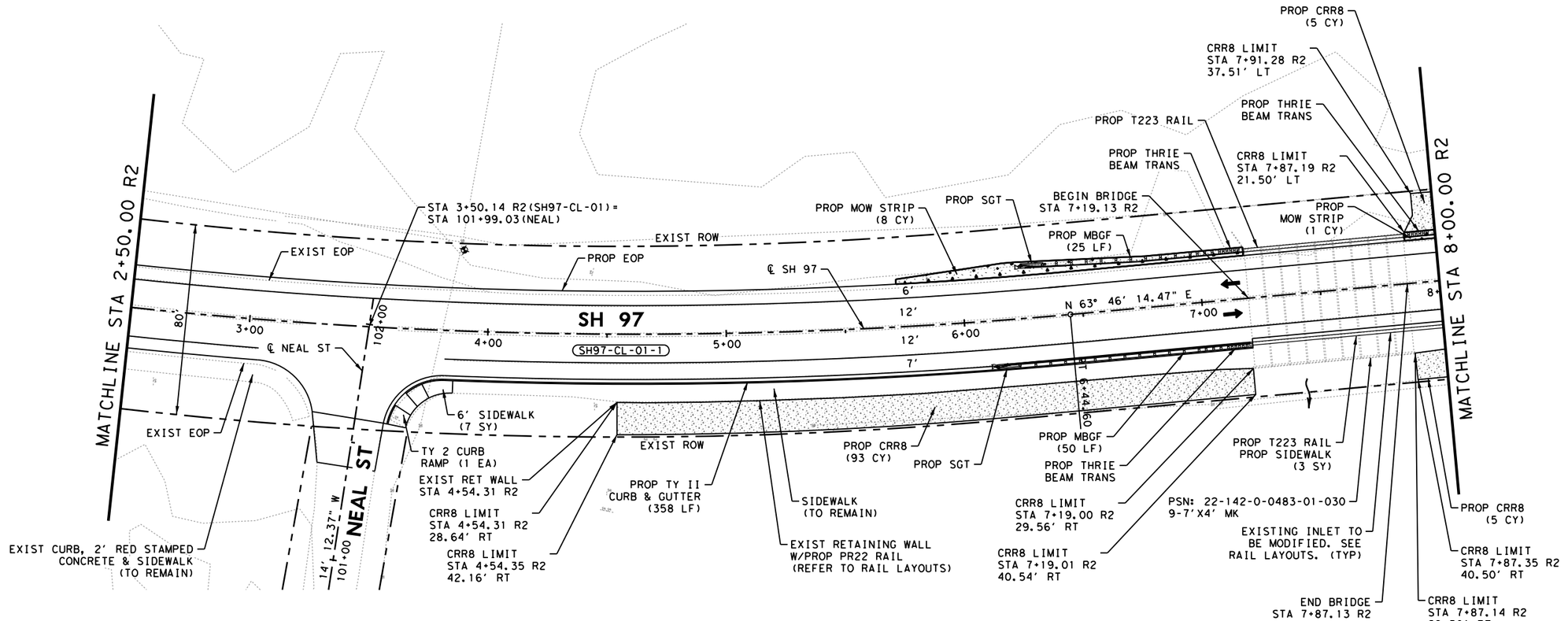
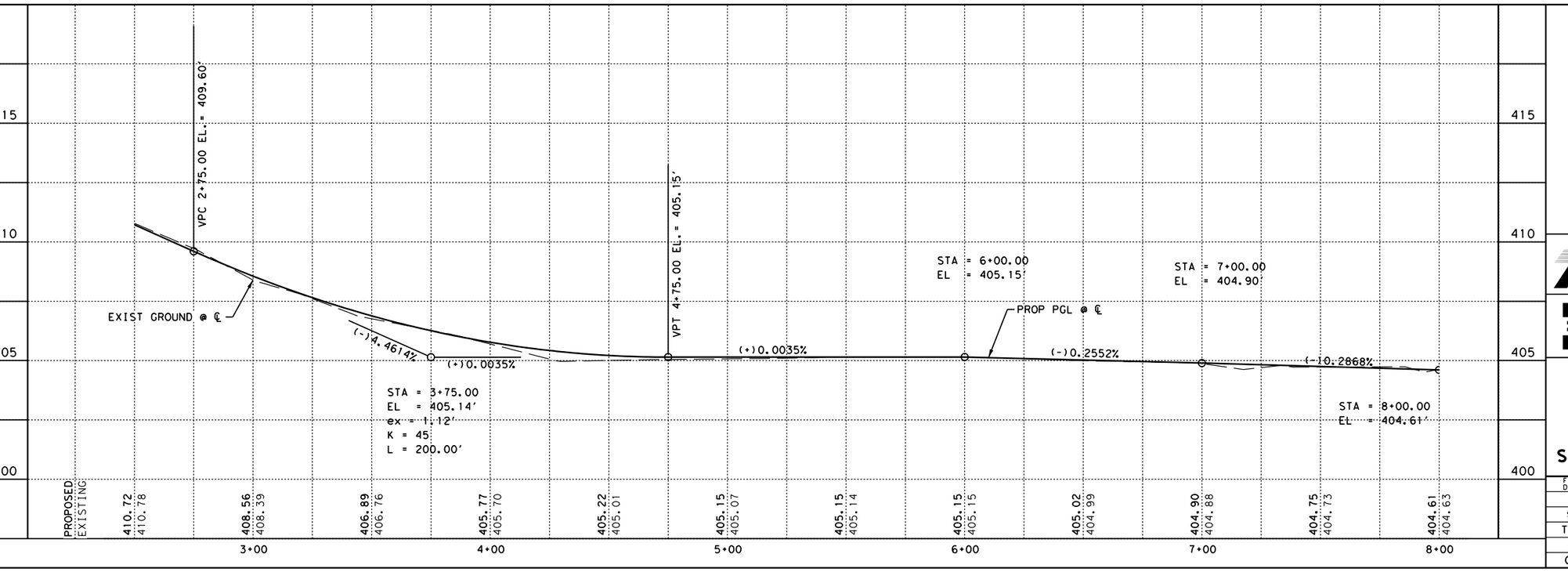
SH 97 ROADWAY PLAN & PROFILE

STA 7+00 R1 TO STA 2+50 R2

SHEET 2 OF 9

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			62
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97





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SH 97 ROADWAY PLAN & PROFILE

STA 2+50 R2 TO STA 8+00 R2

SHEET 3 OF 9

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		63

STATE	DIST.	COUNTY
TEXAS	LRD	LA SALLE

CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

4/20/2023 12:07:26 PM
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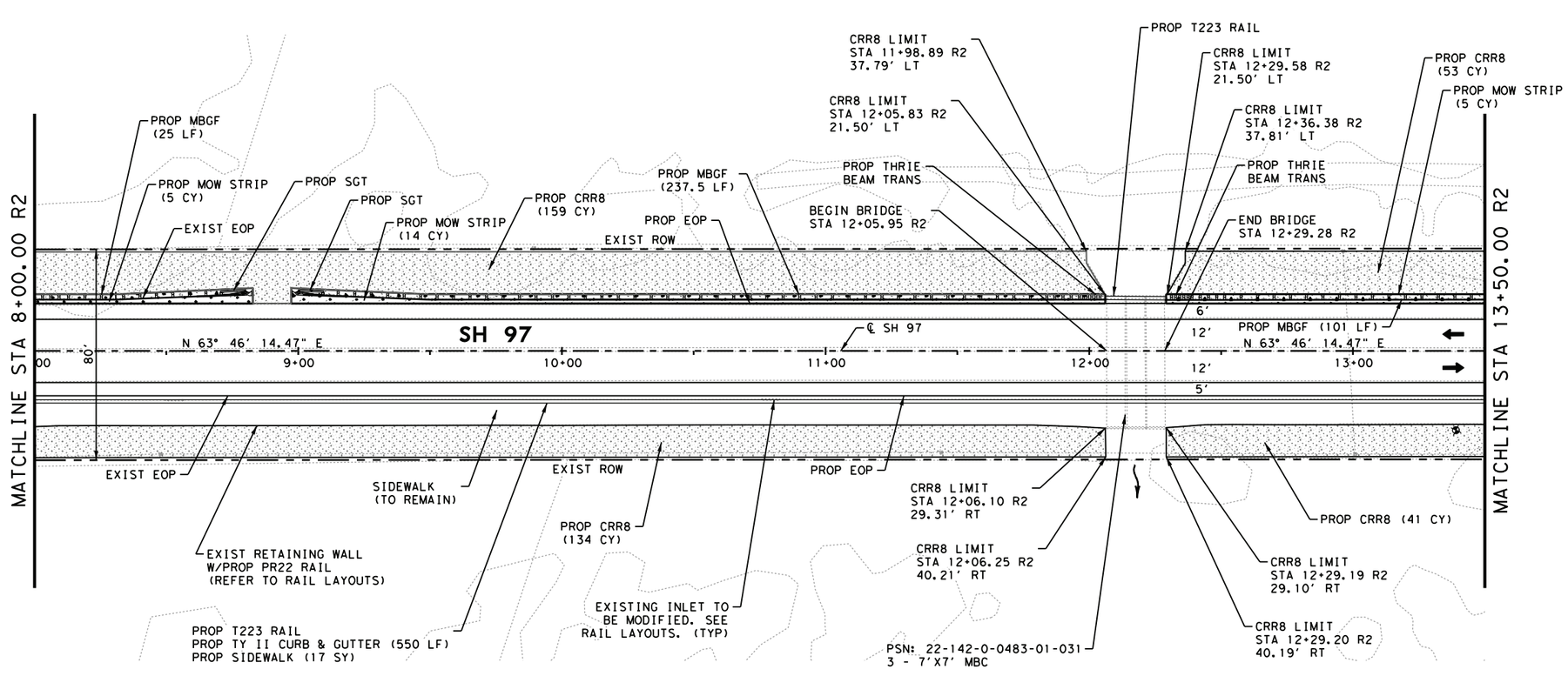


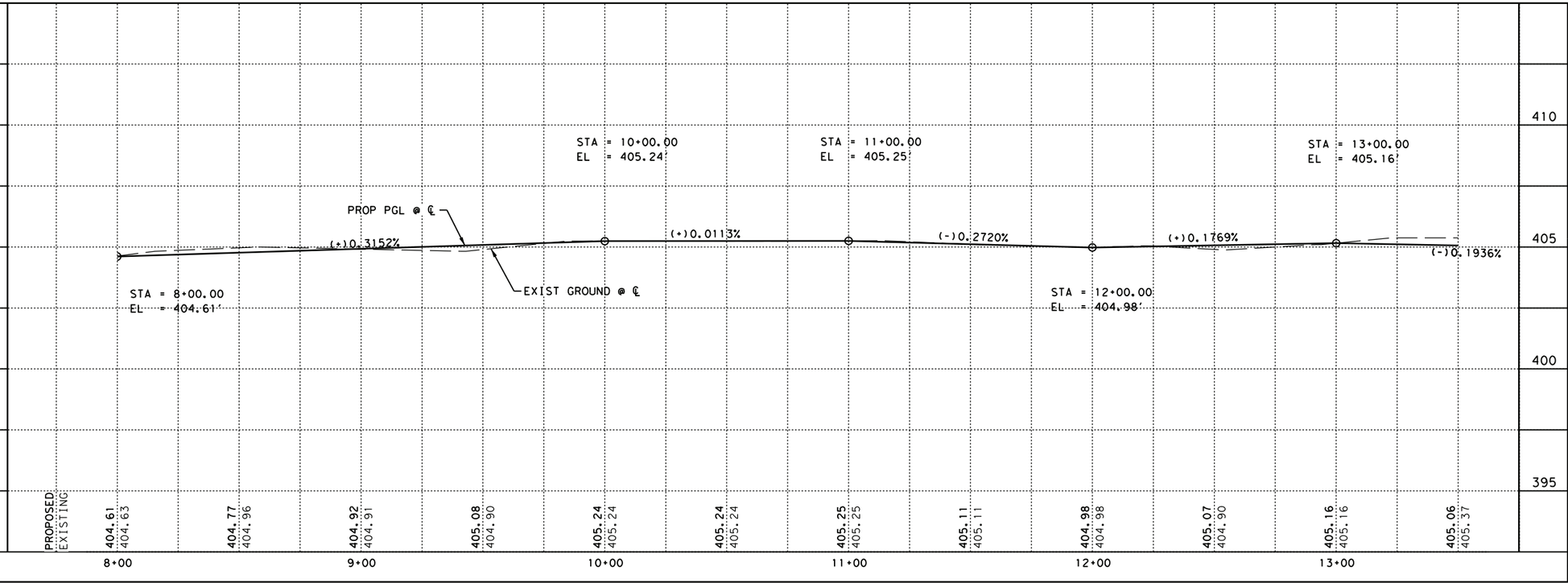
LEGEND:

- EXISTING SIGN
- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- (CURVE #) ALIGNMENT CURVE NUMBER
- FLOW DIRECTION

NOTE:
FOR PROP T223 RAIL QUANTITIES SEE RAIL LAYOUT SHEETS.

USE CAUTION WHEN INSTALLING RIPRAP TO AVOID EXISTING BURIED UTILITIES AND INSTALL AROUND EXISTING ABOVE GROUND UTILITY FACILITIES.

0 25 50
SCALE: 1"=50' H
1"=5' V



STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

Elena Ramon

5/24/2023

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TBPE Registration No. F-1046

SH 97
ROADWAY
PLAN & PROFILE

STA 8+00 R2 TO STA 13+50 R2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			64
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1
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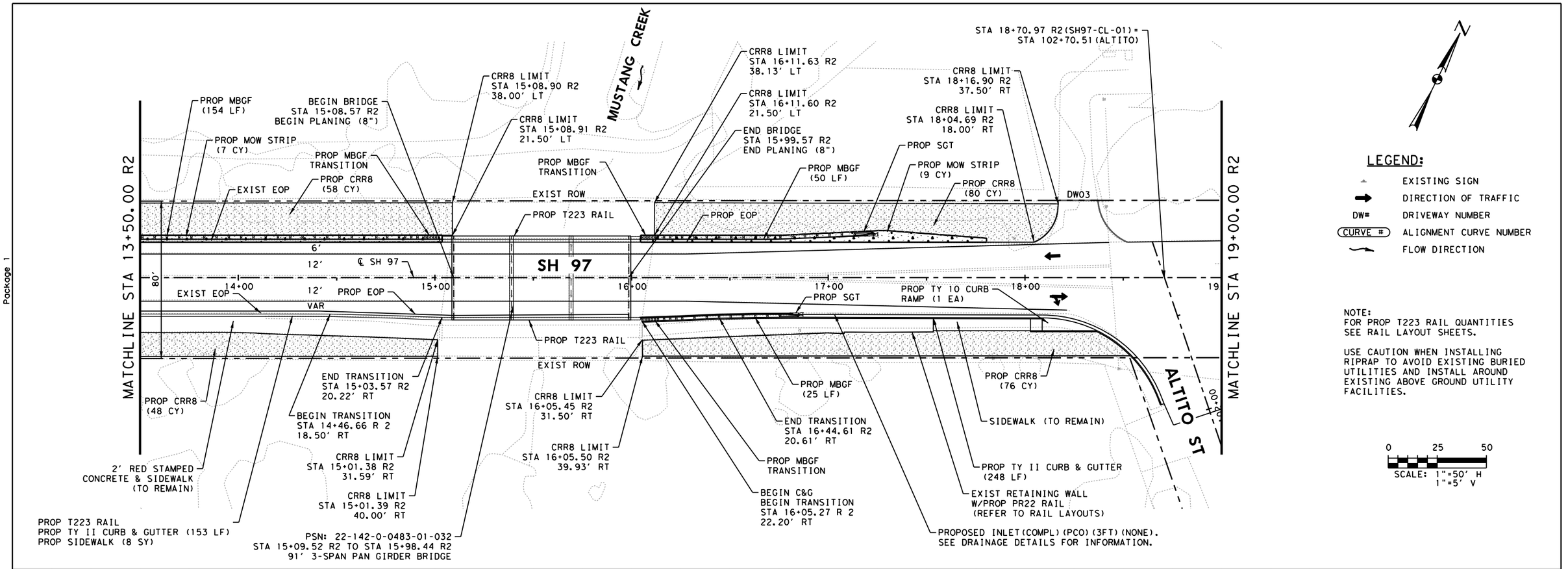


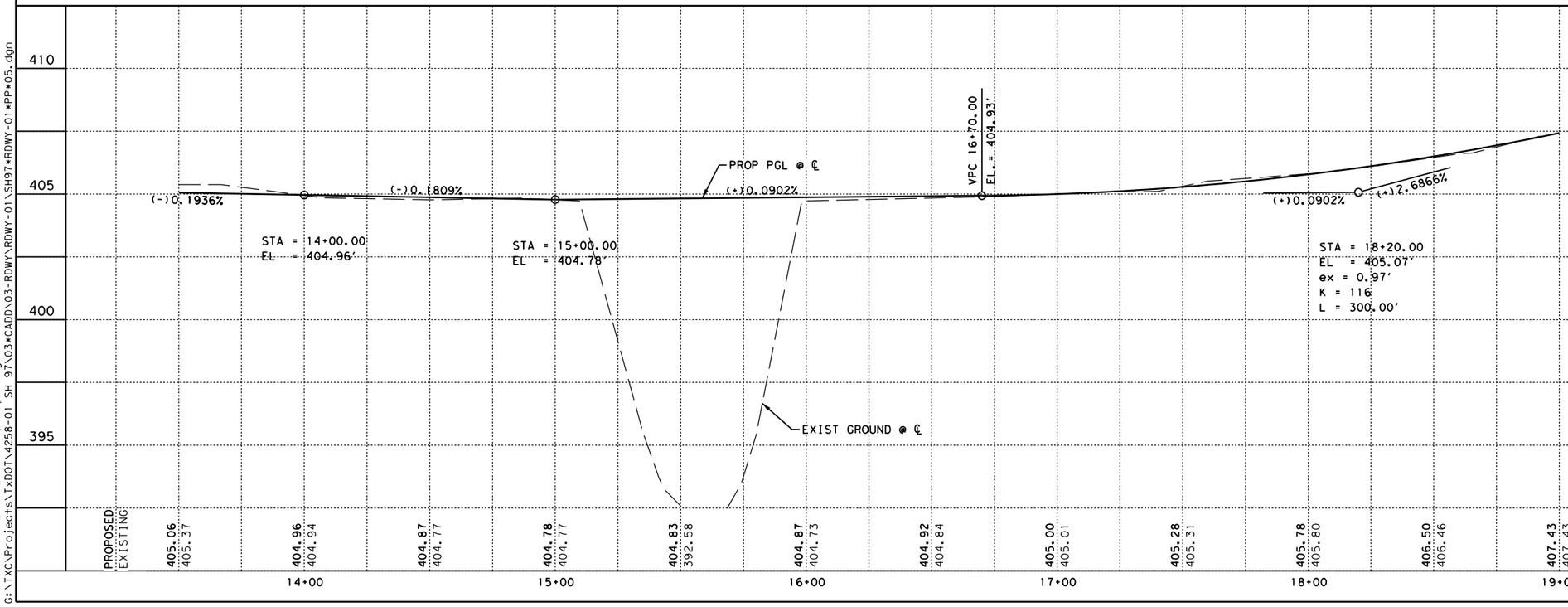
LEGEND:

- EXISTING SIGN
- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CURVE # ALIGNMENT CURVE NUMBER
- FLOW DIRECTION

NOTE:
FOR PROP T223 RAIL QUANTITIES SEE RAIL LAYOUT SHEETS.

USE CAUTION WHEN INSTALLING RIPRAP TO AVOID EXISTING BURIED UTILITIES AND INSTALL AROUND EXISTING ABOVE GROUND UTILITY FACILITIES.

0 25 50
SCALE: 1"=50' H
1"=5' V



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SH 97 ROADWAY PLAN & PROFILE

STA 13+50 R2 TO STA 19+00 R2

SHEET 5 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			65
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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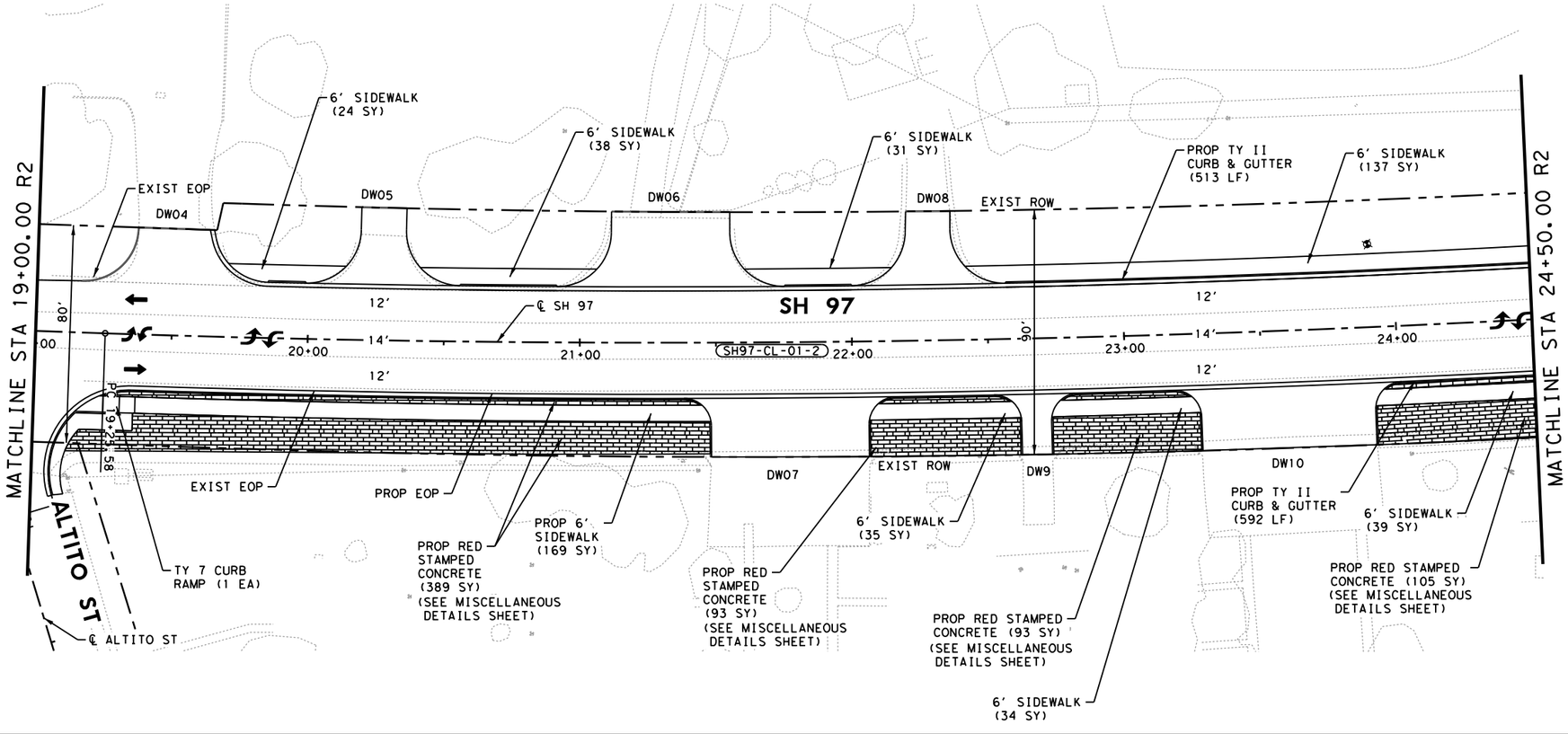

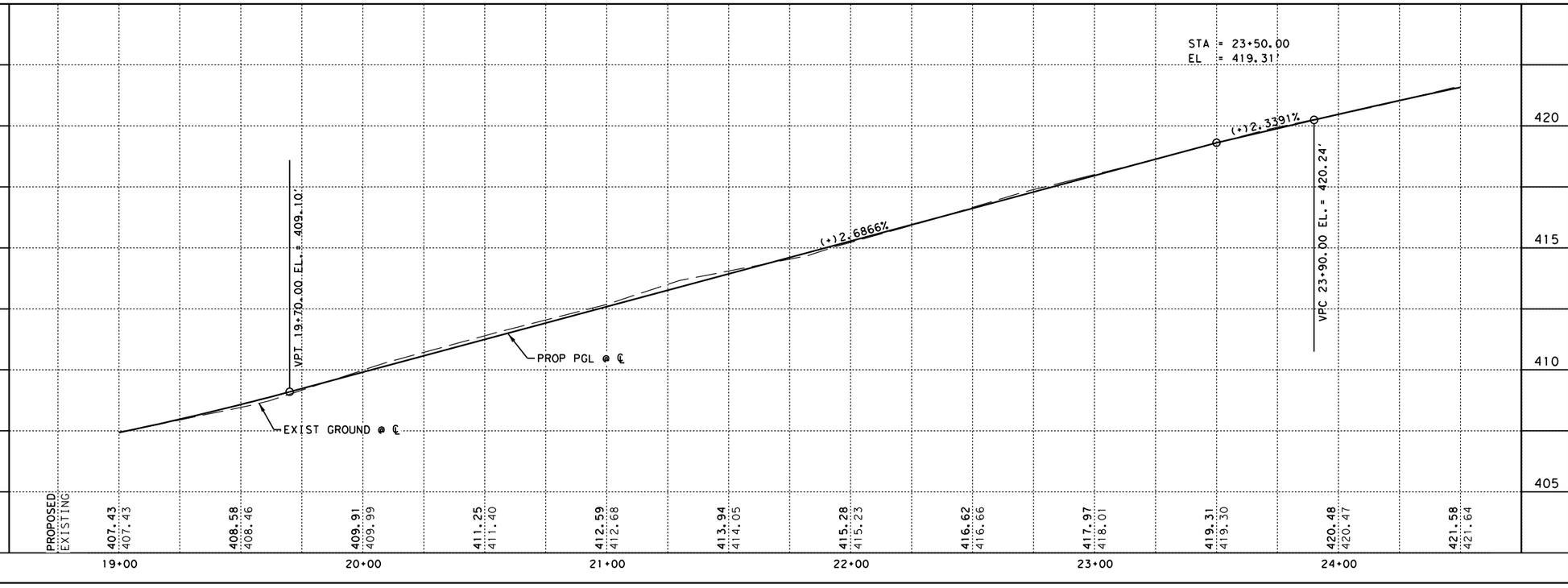

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SH 97 ROADWAY PLAN & PROFILE

STA 19+00 R2 TO STA 24+50 R2

SHEET 6 OF 9

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		66

STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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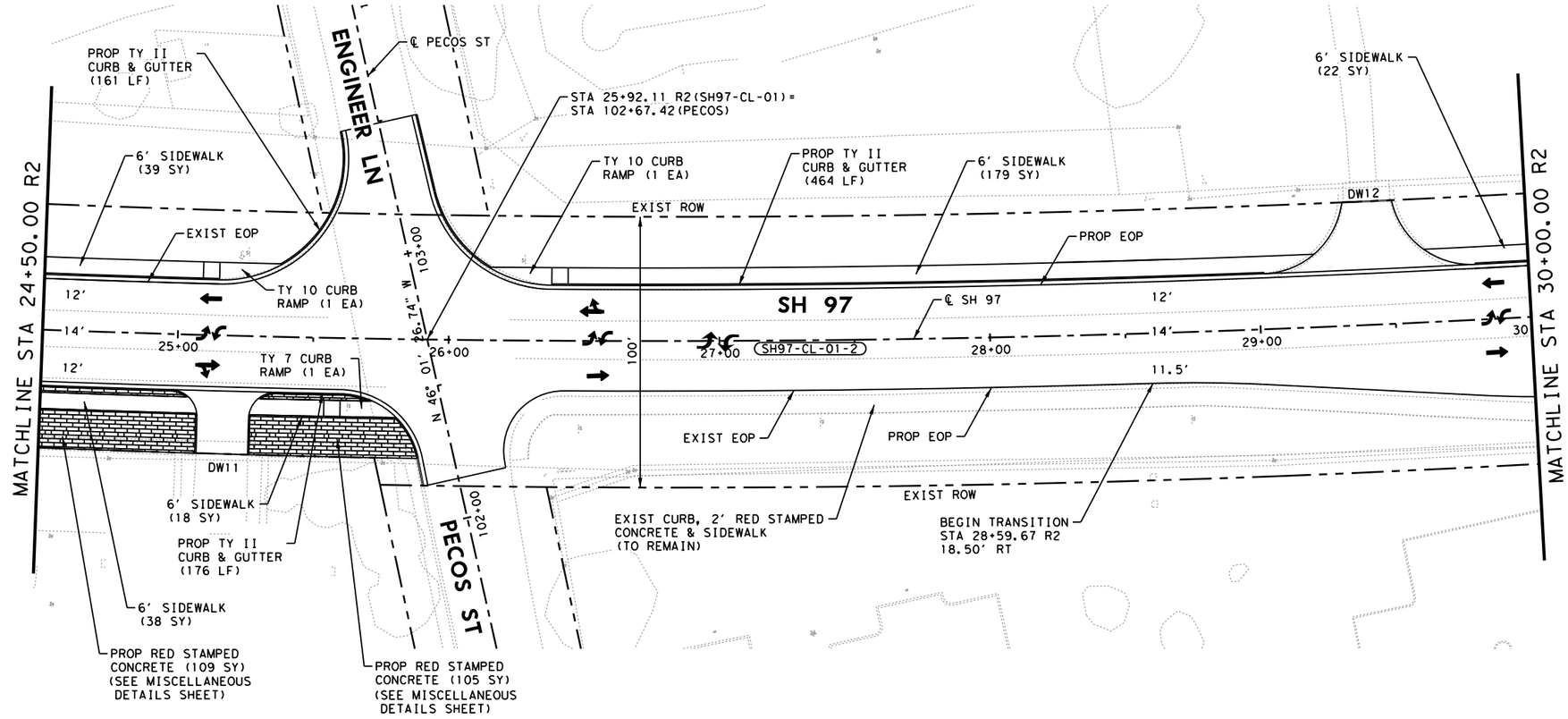

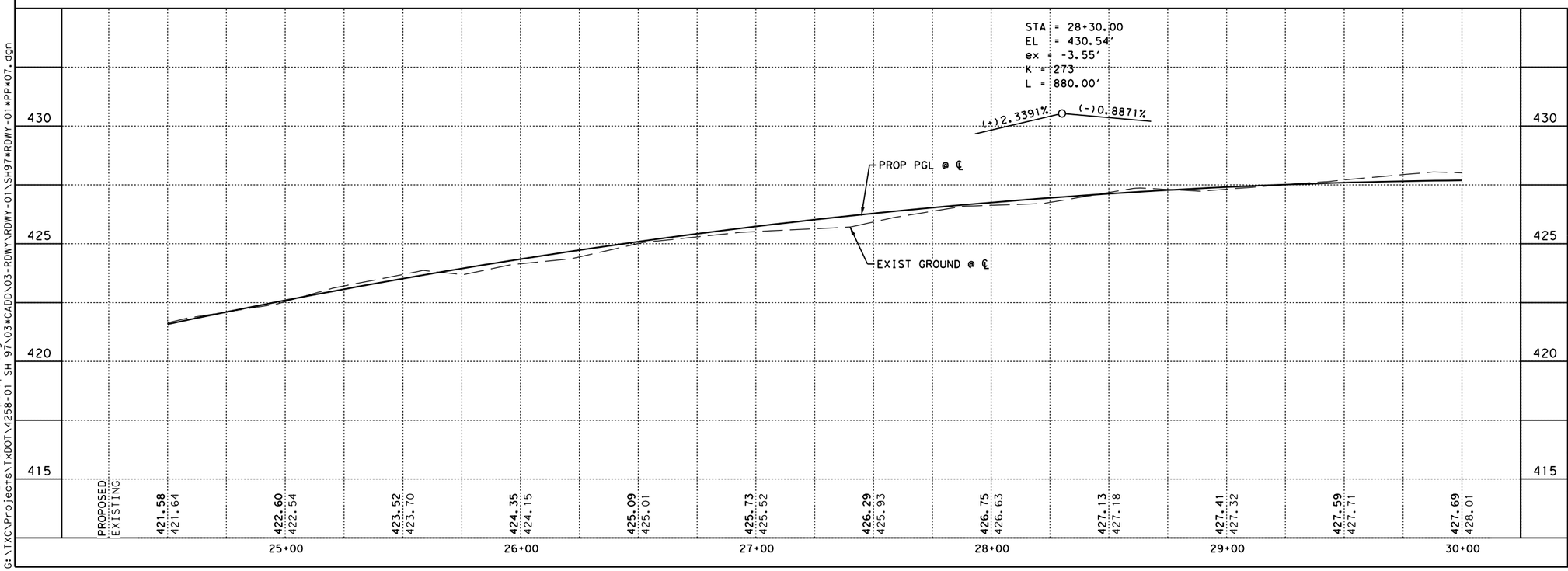

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SH 97 ROADWAY PLAN & PROFILE

STA 24+50 R2 TO STA 30+00 R2

SHEET 7 OF 9

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		67

STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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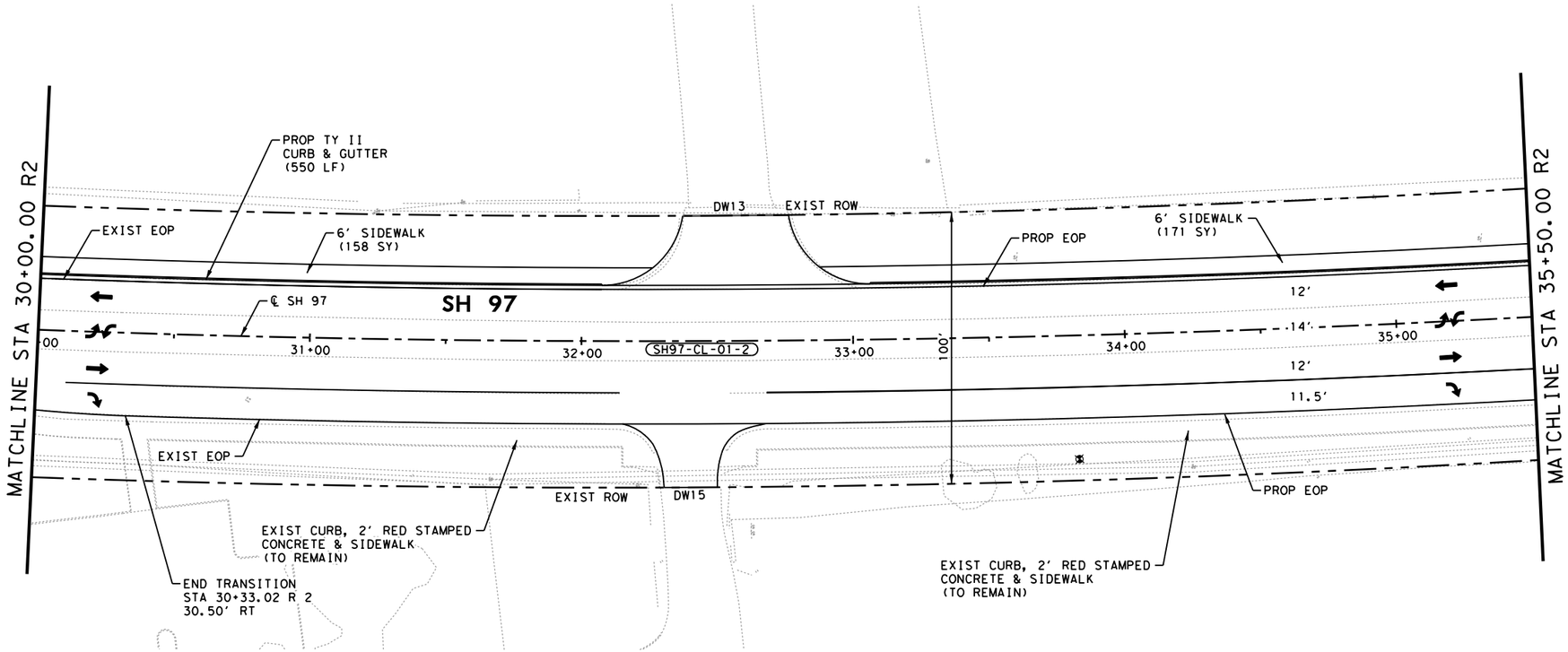
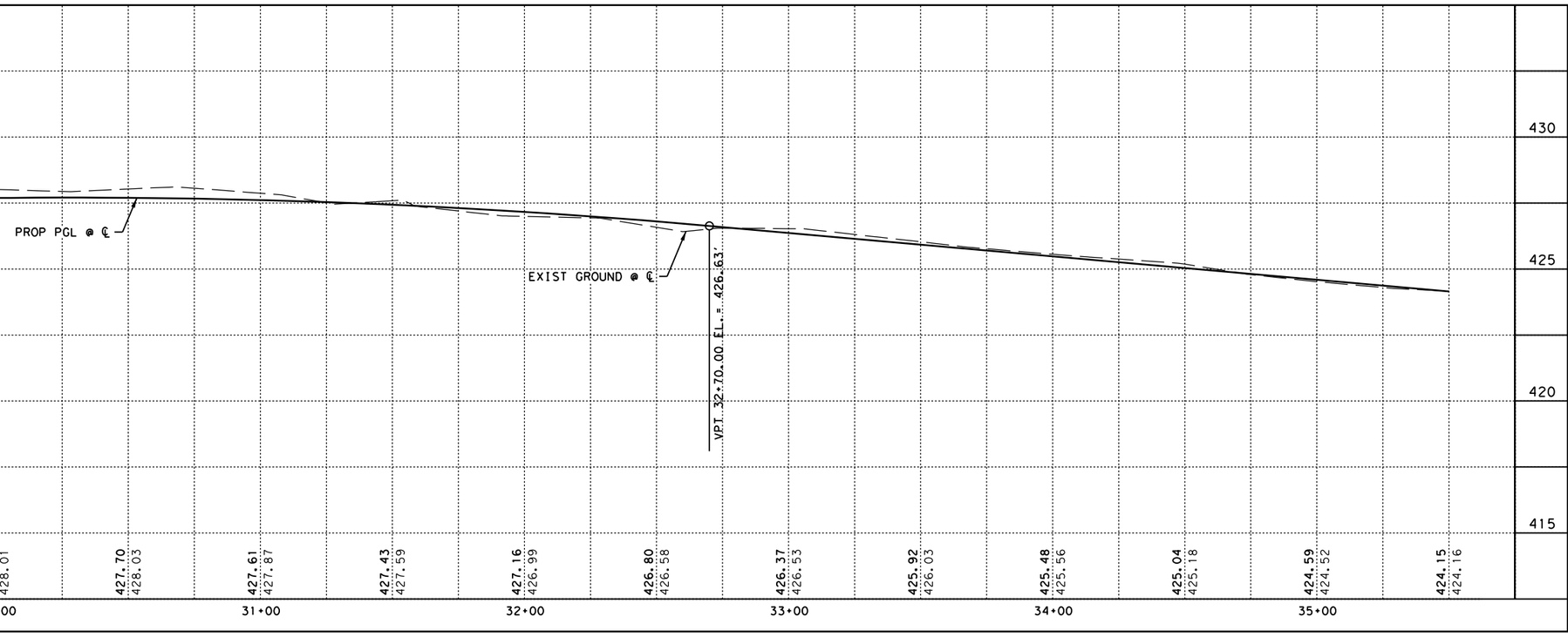


LEGEND:

- EXISTING SIGN
- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- (CURVE #) ALIGNMENT CURVE NUMBER
- FLOW DIRECTION

0 25 50

SCALE: 1"=50' H
1"=5' V



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SH 97
ROADWAY
PLAN & PROFILE

STA 30+00 R2 TO STA 35+50 R2

SHEET 8 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			68
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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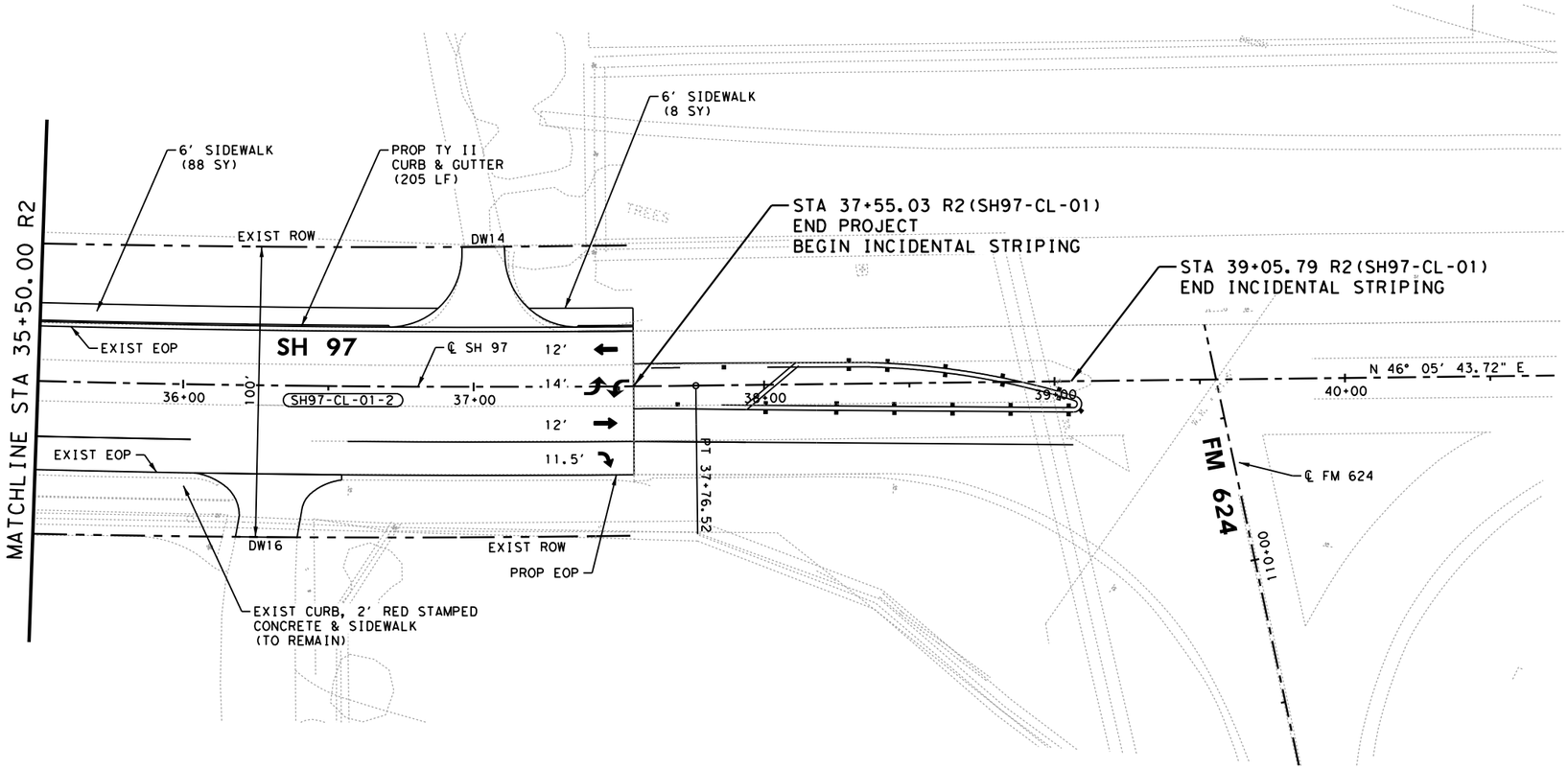
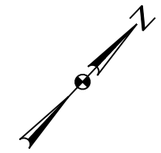


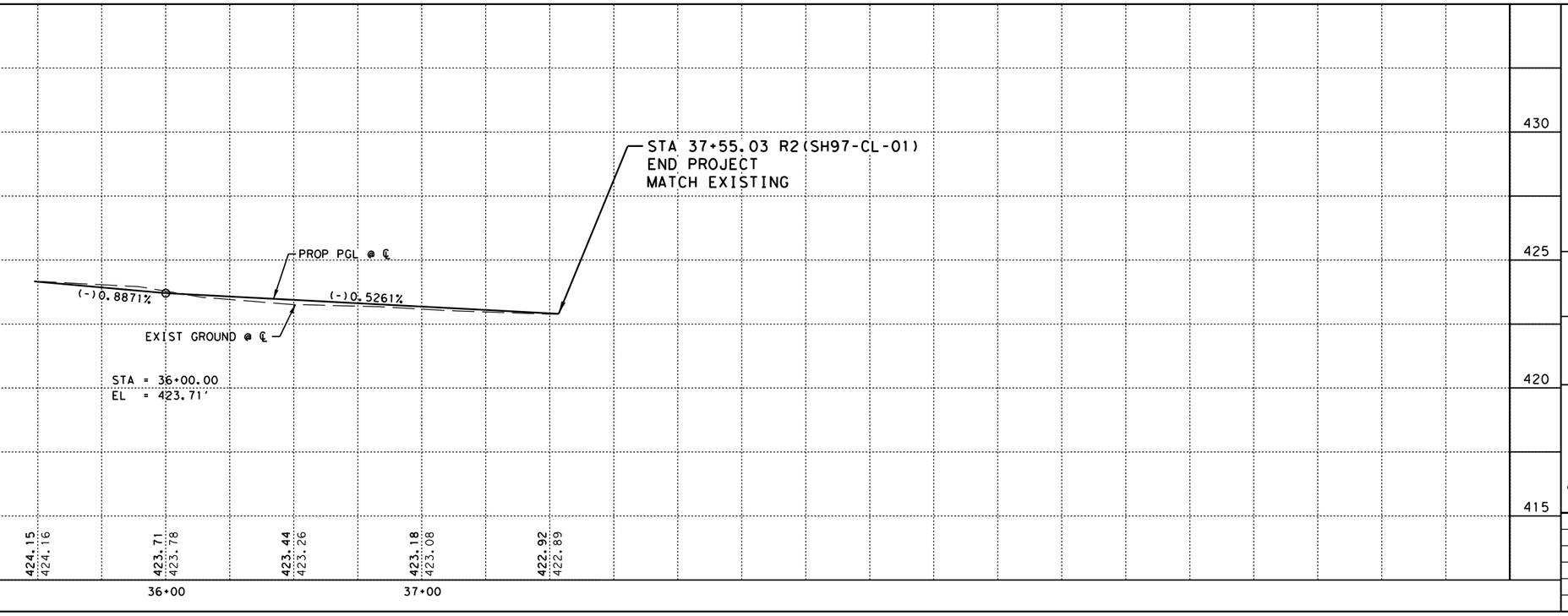


LEGEND:

- EXISTING SIGN
- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- (CURVE #) ALIGNMENT CURVE NUMBER
- FLOW DIRECTION

0 25 50

SCALE: 1"=50' H
1"=5' V



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SH 97
ROADWAY
PLAN & PROFILE

STA 35+50 R2 TO END PROJECT

SHEET 9 OF 9

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			69
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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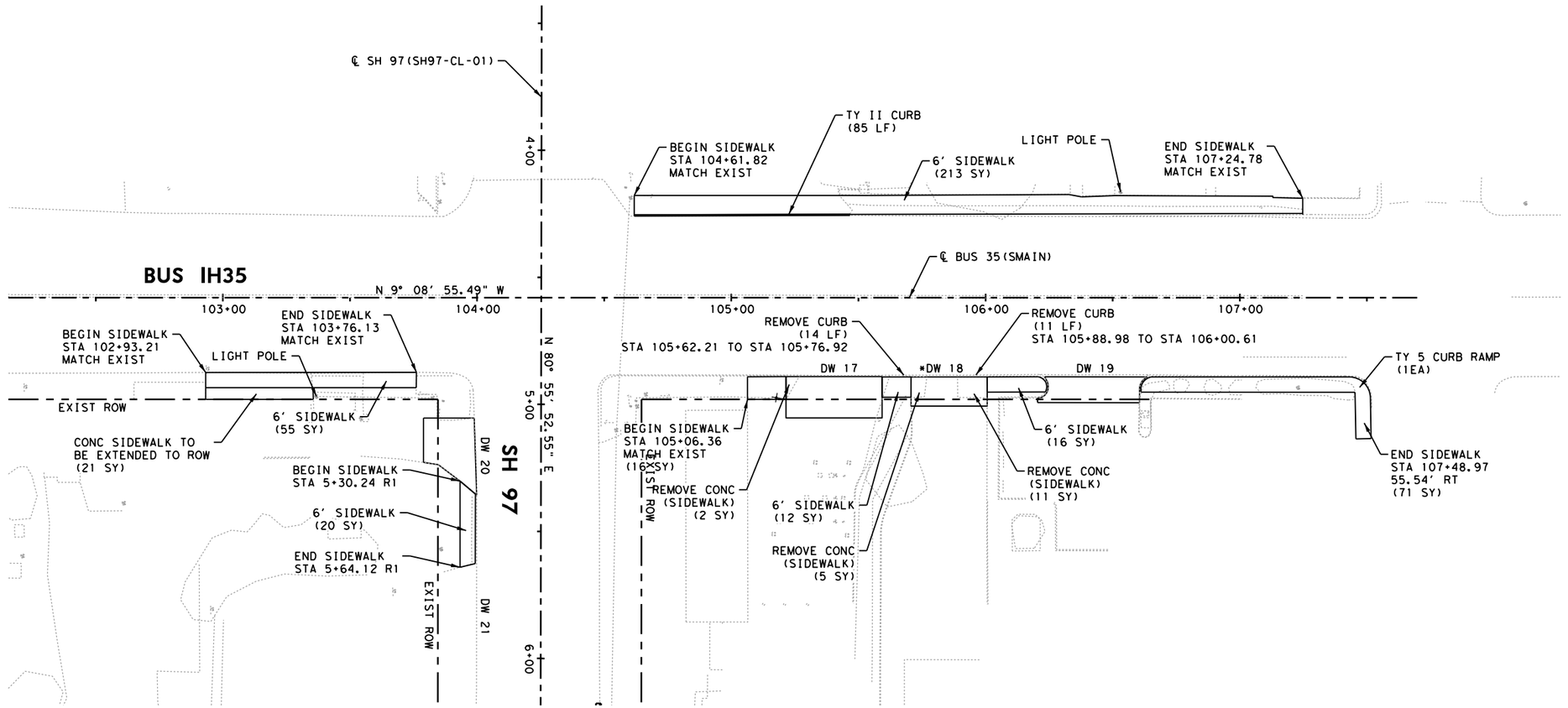

LEGEND:

REMOVAL

PROPOSED DRIVEWAY

NOTE:
ALL WORK ALONG
BUS 35 TO BE
CONSIDERED INCIDENTAL
TO SH 97 PROJECT LIMITS.

*SEE DW DETAIL

0 25 50

SCALE: 1"=50'

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SH 97
ROADWAY
BUS 35 SIDEWALK
IMPROVEMENTS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			70
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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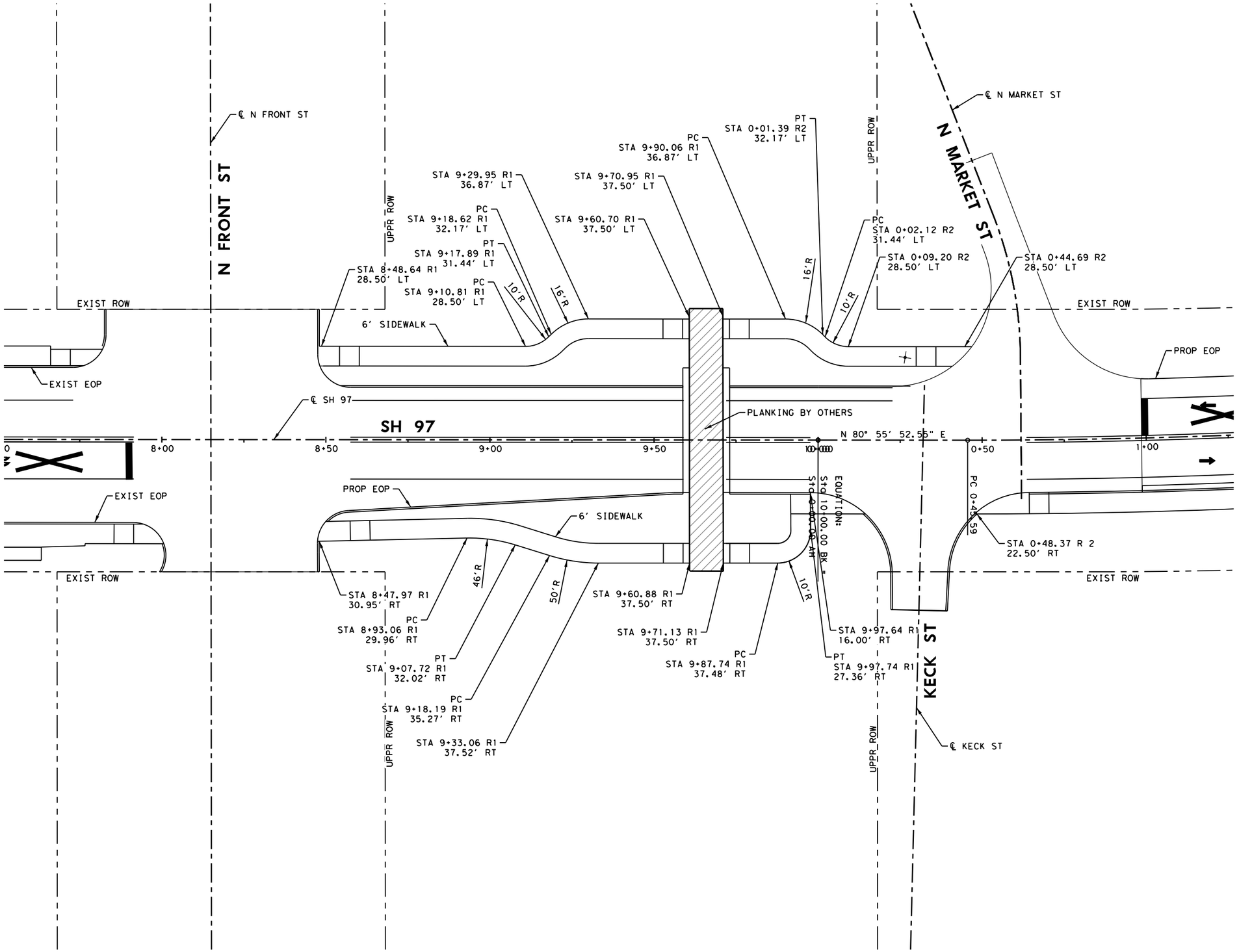
Package 1



0 15 30
SCALE: 1"=30'

NOTE: SEE RCD(1)-22 FOR ADDITIONAL DETECTABLE WARNING SURFACE PLACEMENT

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SH 97
ROADWAY
SH 97 SIDEWALK
LAYOUT

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			71
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

4/20/2023 12:07:34 PM pdf.pltcfg
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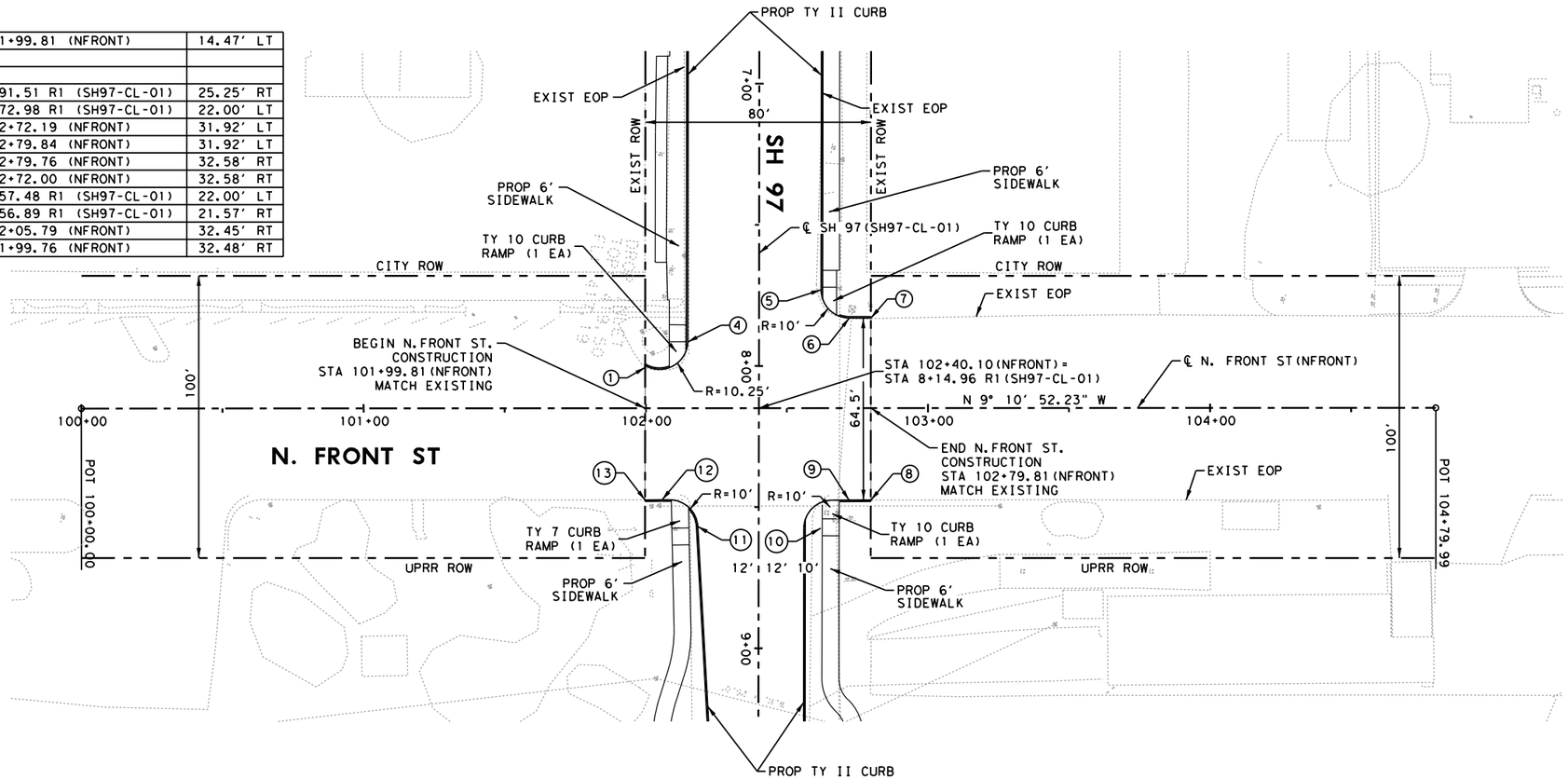
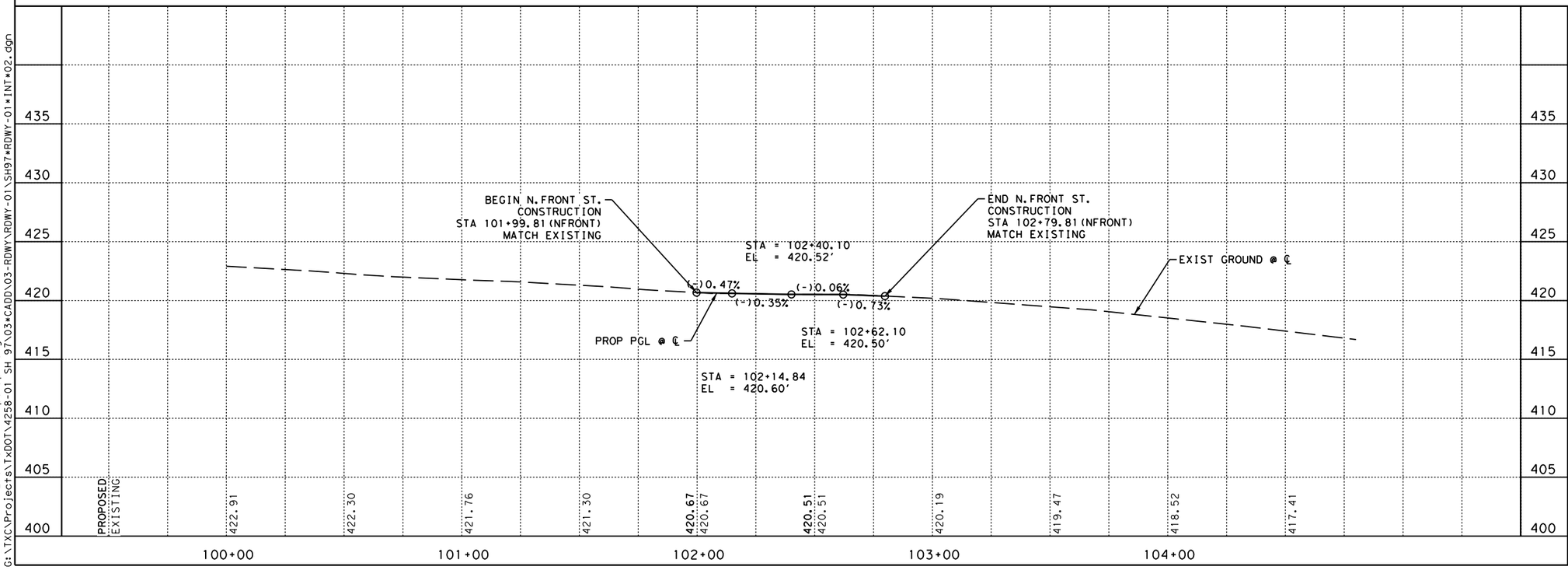
1	PT	STA 101+99.81 (NFRONT)	14.47' LT
2			
3			
4	PC	STA 7+91.51 R1 (SH97-CL-01)	25.25' RT
5	PC	STA 7+72.98 R1 (SH97-CL-01)	22.00' LT
6	PT	STA 102+72.19 (NFRONT)	31.92' LT
7		STA 102+79.84 (NFRONT)	31.92' LT
8		STA 102+79.76 (NFRONT)	32.58' RT
9	PC	STA 102+72.00 (NFRONT)	32.58' RT
10	PT	STA 8+57.48 R1 (SH97-CL-01)	22.00' LT
11	PT	STA 8+56.89 R1 (SH97-CL-01)	21.57' RT
12	PC	STA 102+05.79 (NFRONT)	32.45' RT
13		STA 101+99.76 (NFRONT)	32.48' RT



0 25 50
HORIZONTAL SCALE: 1"=50'
VERTICAL SCALE: 1"=10'



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SH 97 ROADWAY INTERSECTION LAYOUT N. FRONT ST. AT SH 97

SHEET 1 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			72
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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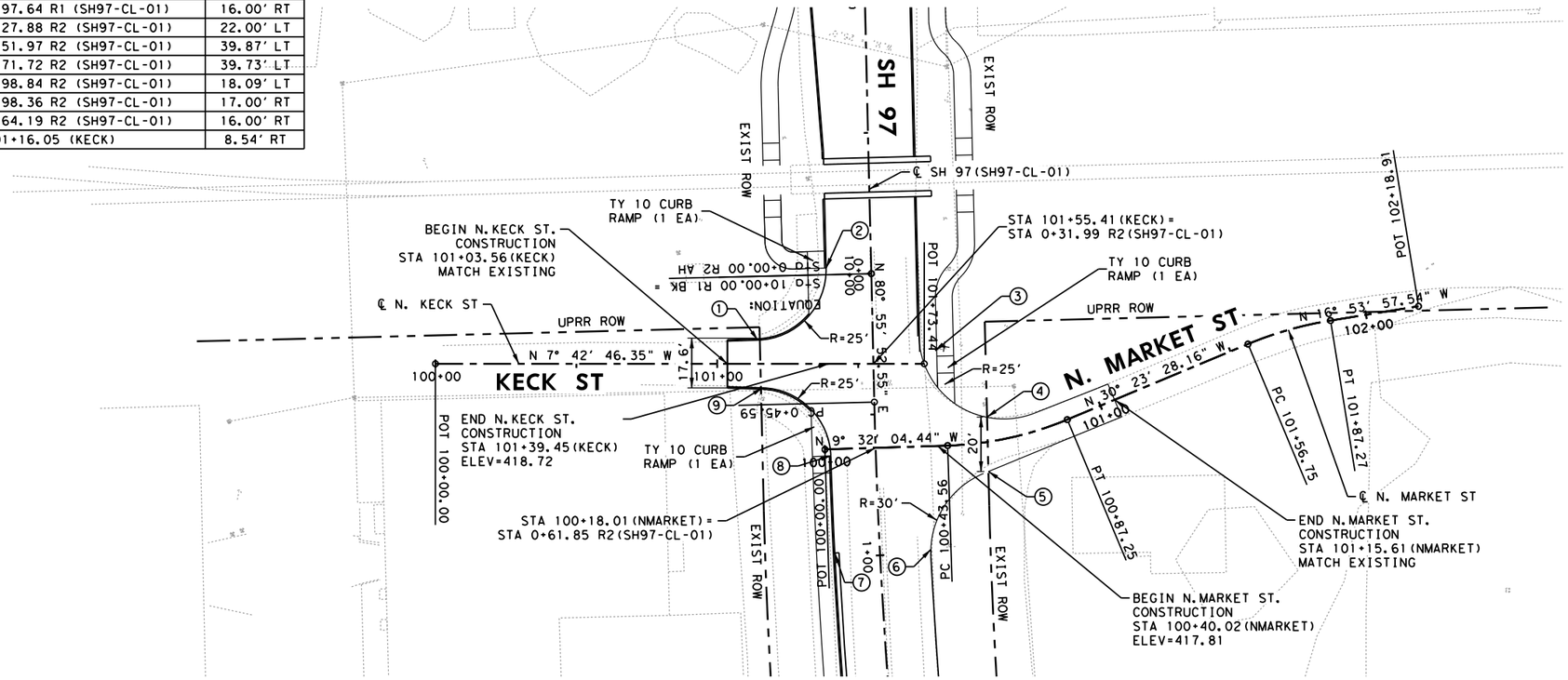
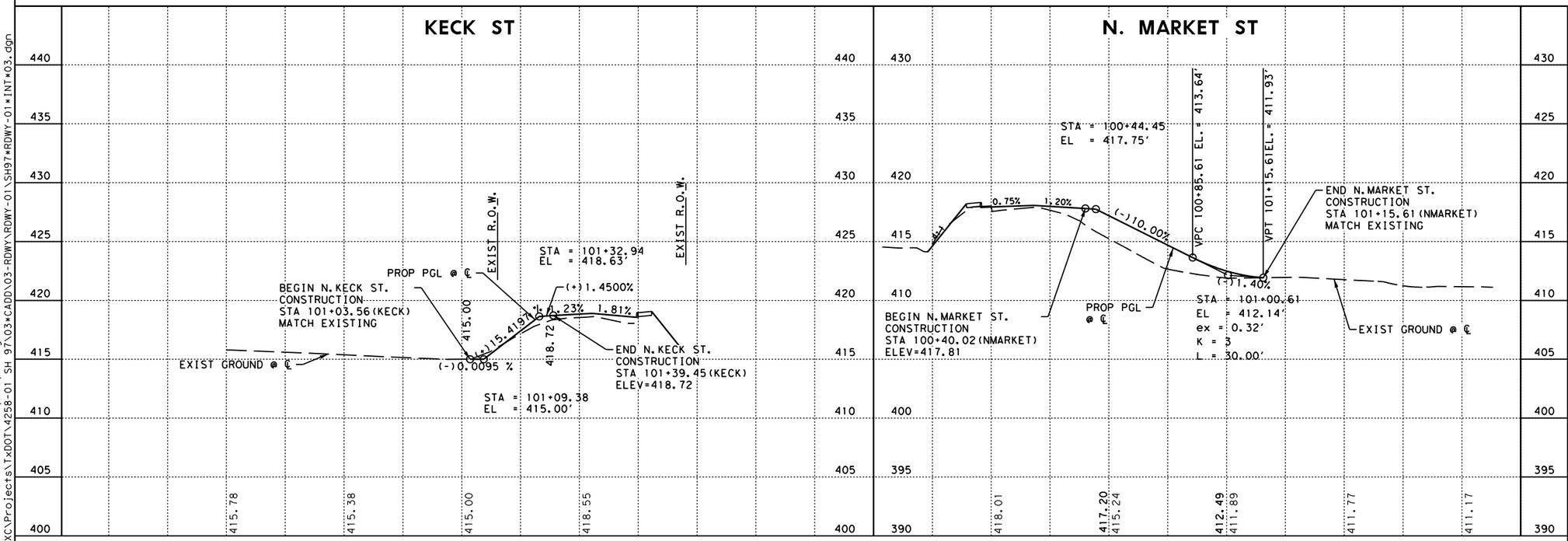
1	PT	STA 101+14.37 (KECK)	8.39' LT
2	PC	STA 9+97.64 R1 (SH97-CL-01)	16.00' RT
3	PC	STA 0+27.88 R2 (SH97-CL-01)	22.00' LT
4	PT	STA 0+51.97 R2 (SH97-CL-01)	39.87' LT
5	PC	STA 0+71.72 R2 (SH97-CL-01)	39.73' LT
6	PT	STA 0+98.84 R2 (SH97-CL-01)	18.09' LT
7		STA 0+98.36 R2 (SH97-CL-01)	17.00' RT
8	PT	STA 0+64.19 R2 (SH97-CL-01)	16.00' RT
9	PC	STA 101+16.05 (KECK)	8.54' RT





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SH 97 ROADWAY INTERSECTION LAYOUT KECK ST / N. MARKET ST AT SH 97

SHEET 2 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			73
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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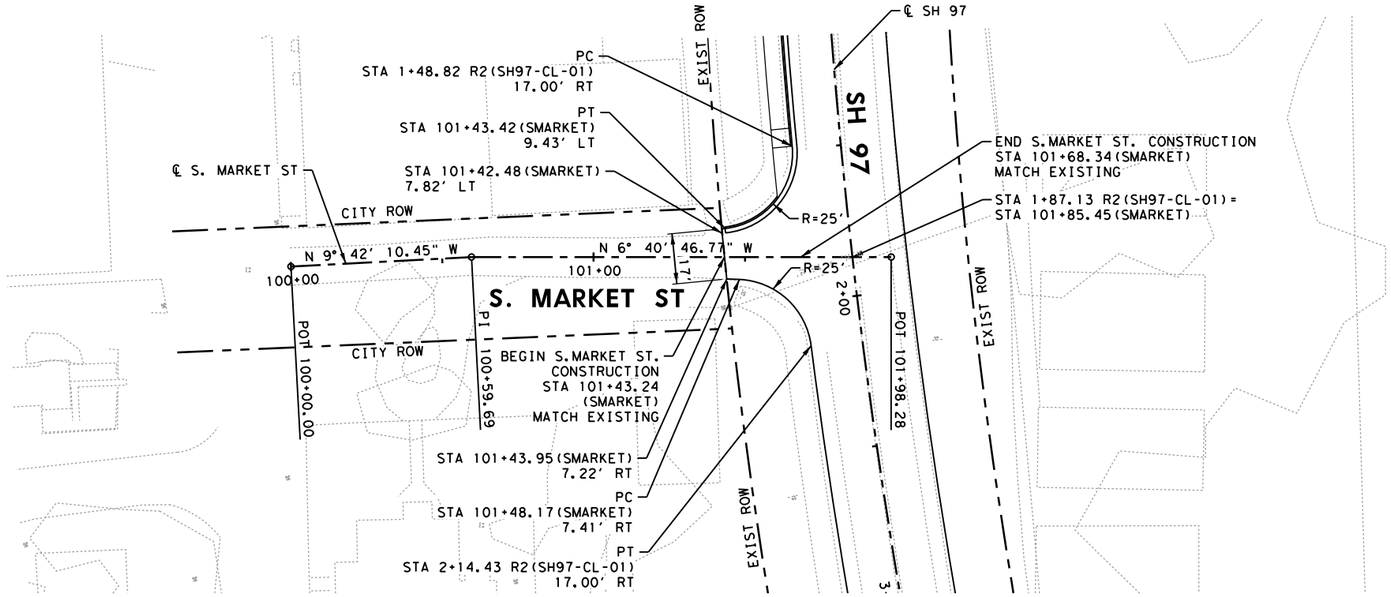

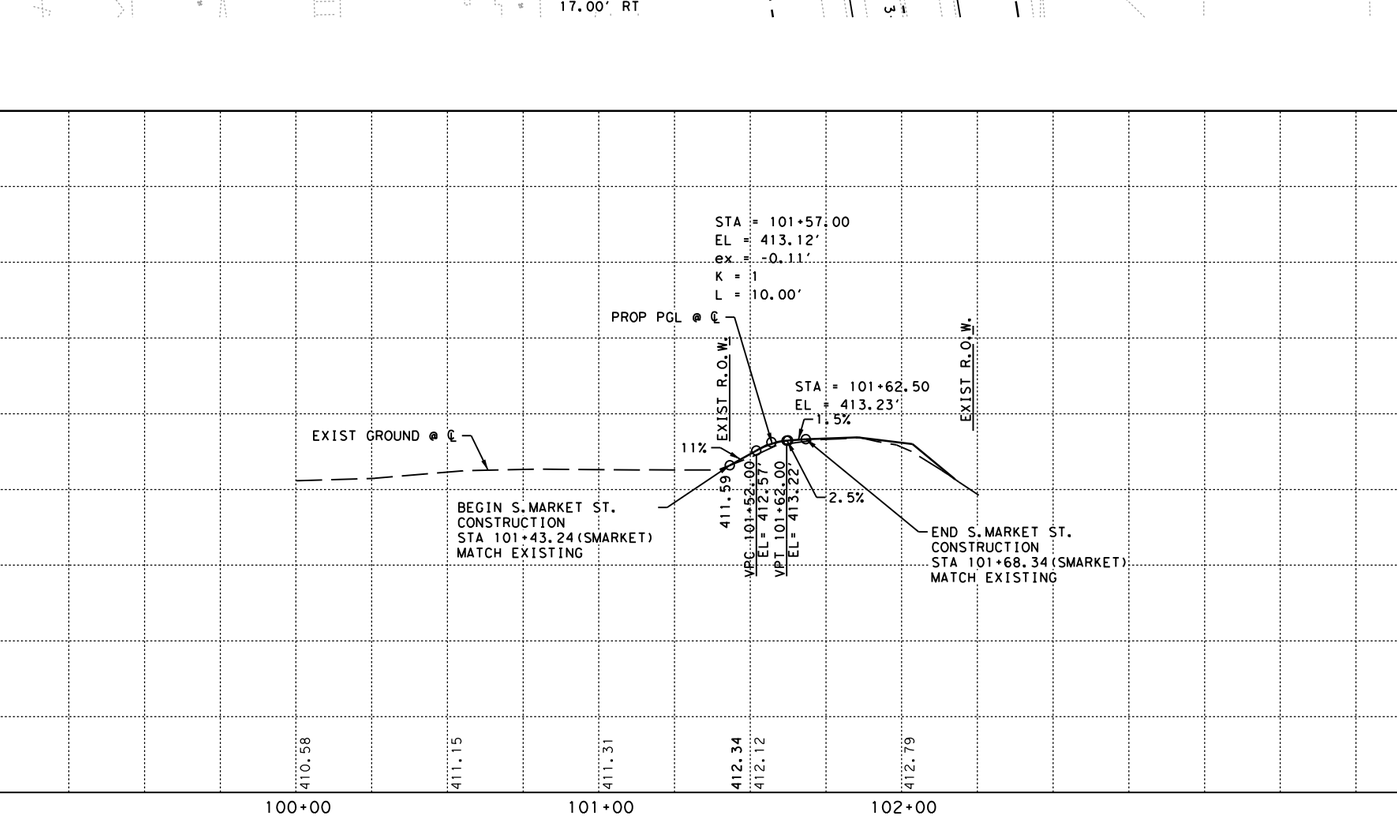

0 25 50
HORIZONTAL SCALE: 1"=50'
VERTICAL SCALE: 1"=10'

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SH 97 ROADWAY INTERSECTION LAYOUT S MARKET ST. AT SH 97

SHEET 3 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			74
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

4/20/2023 12:07:39 PM pdf.pltcfg
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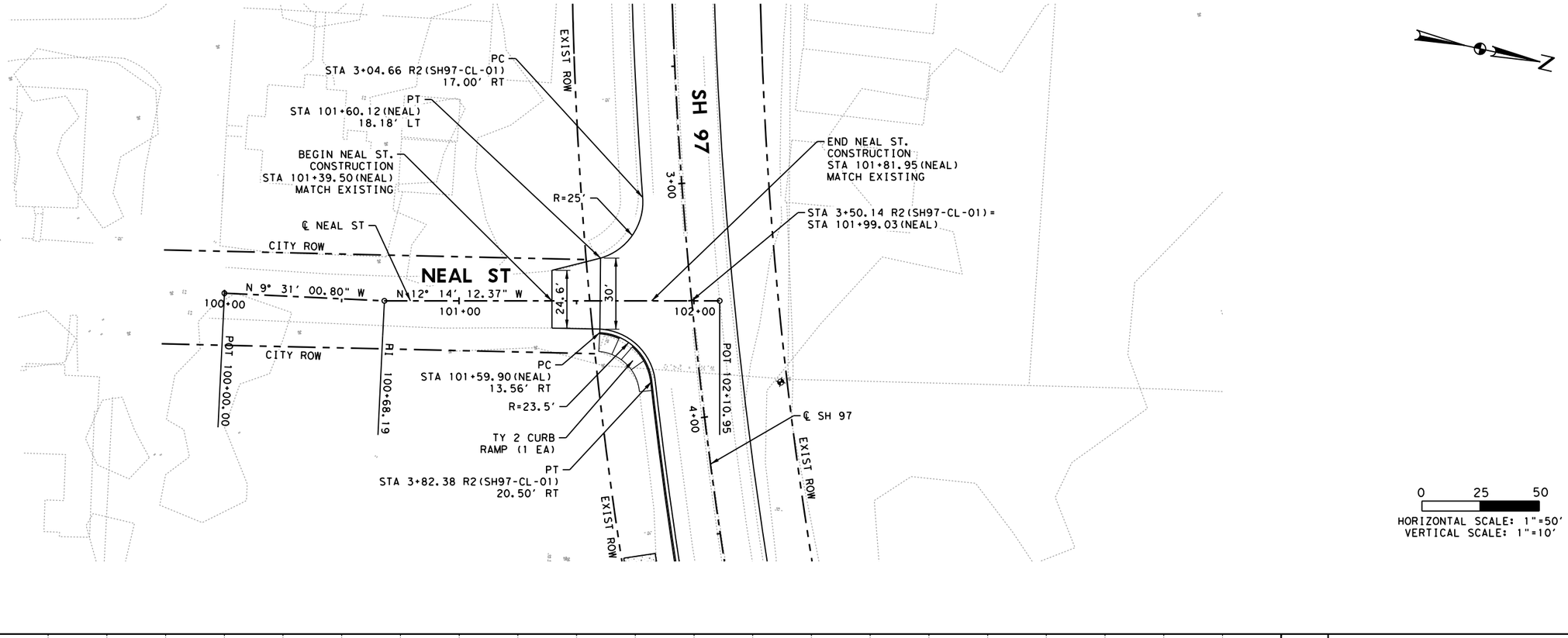

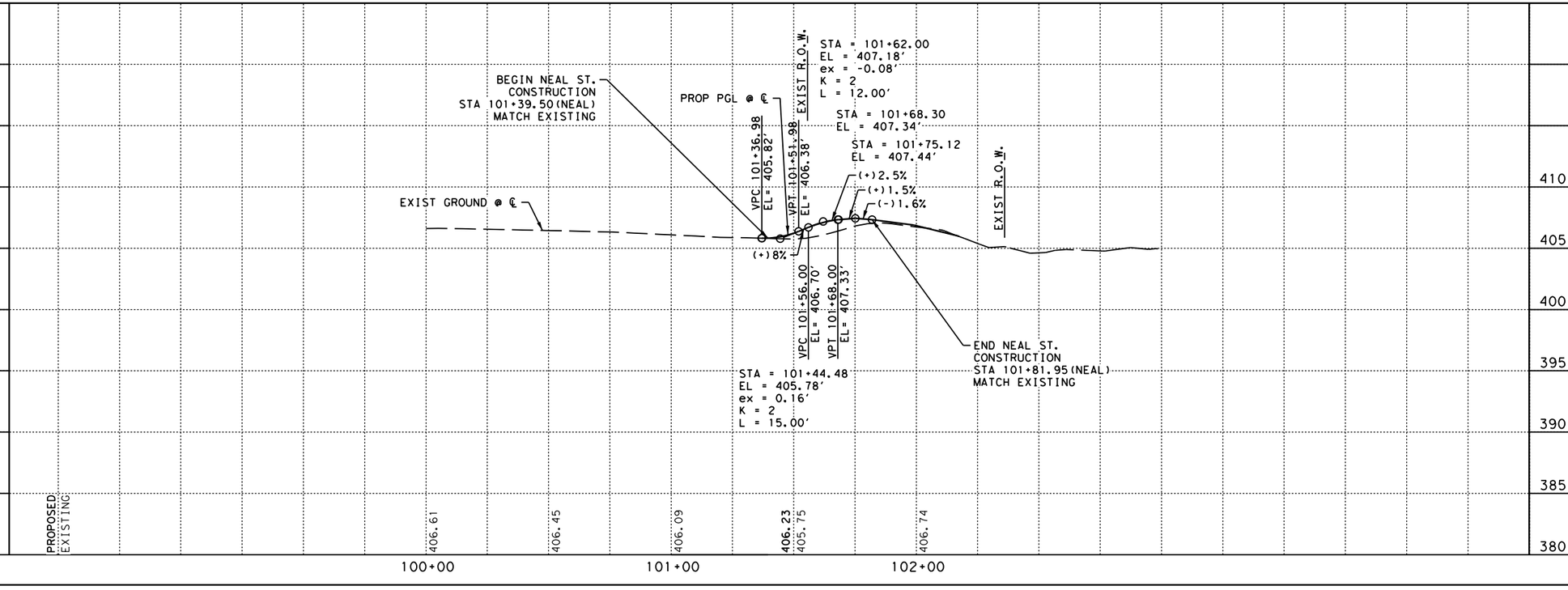

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SH 97
ROADWAY
INTERSECTION LAYOUT
NEAL ST. AT SH 97

SHEET 4 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			75
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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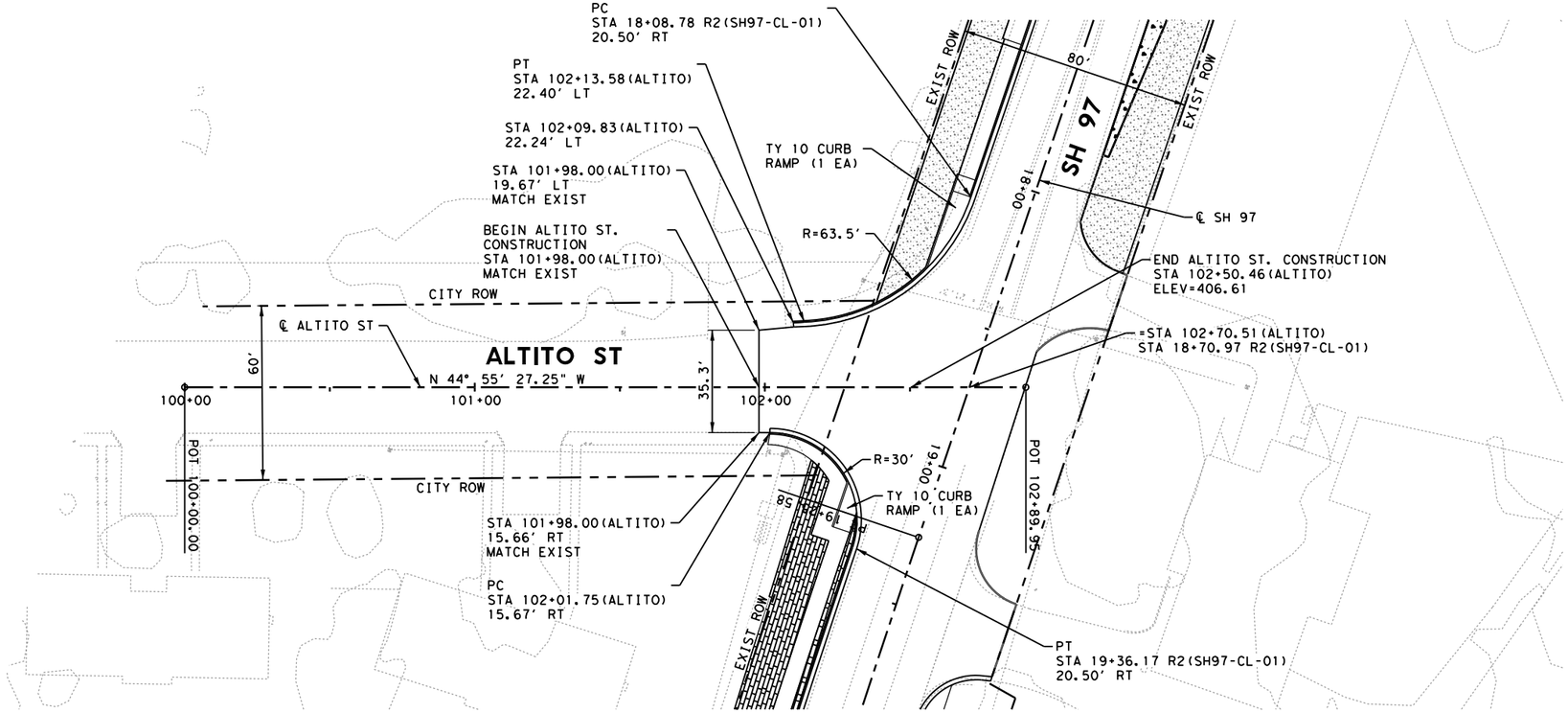

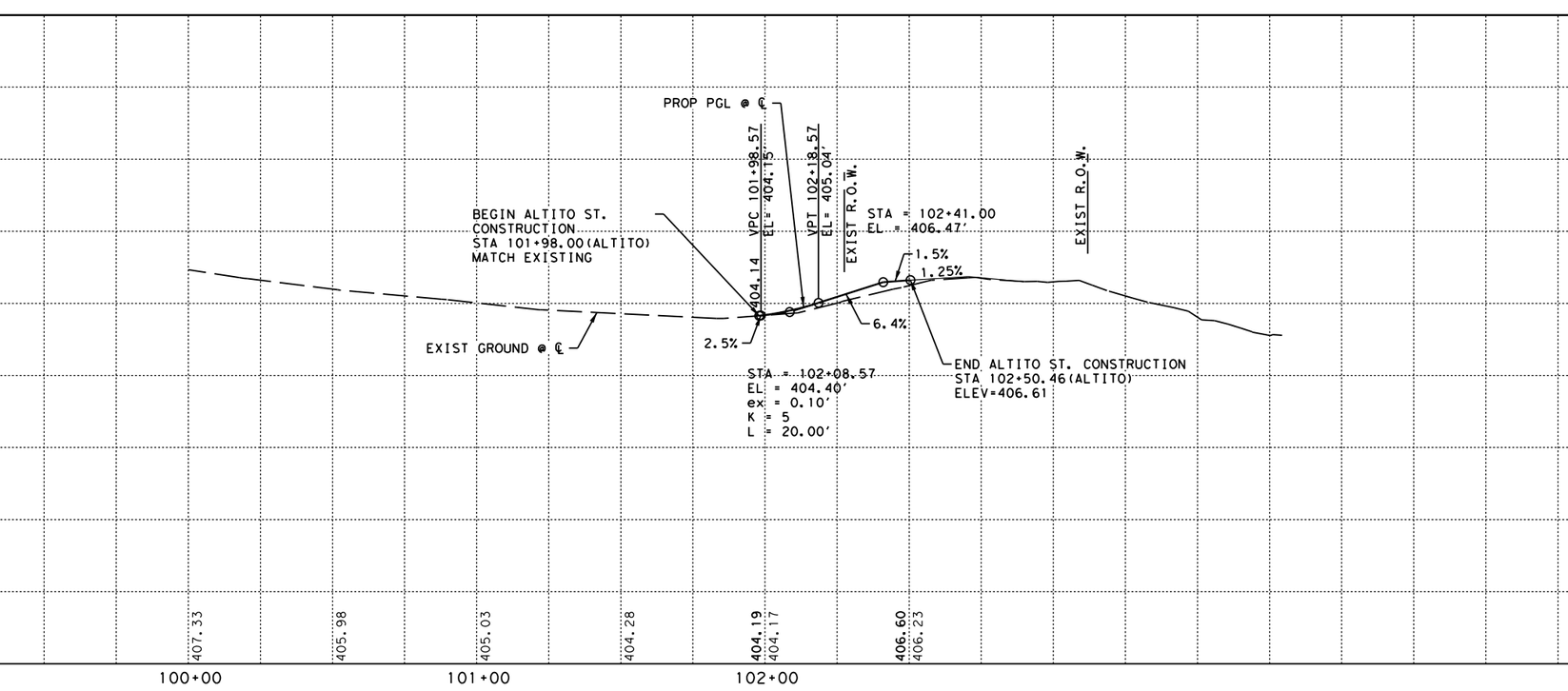

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SH 97
ROADWAY
INTERSECTION LAYOUT
ALTITO ST. AT SH 97

SHEET 5 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			76
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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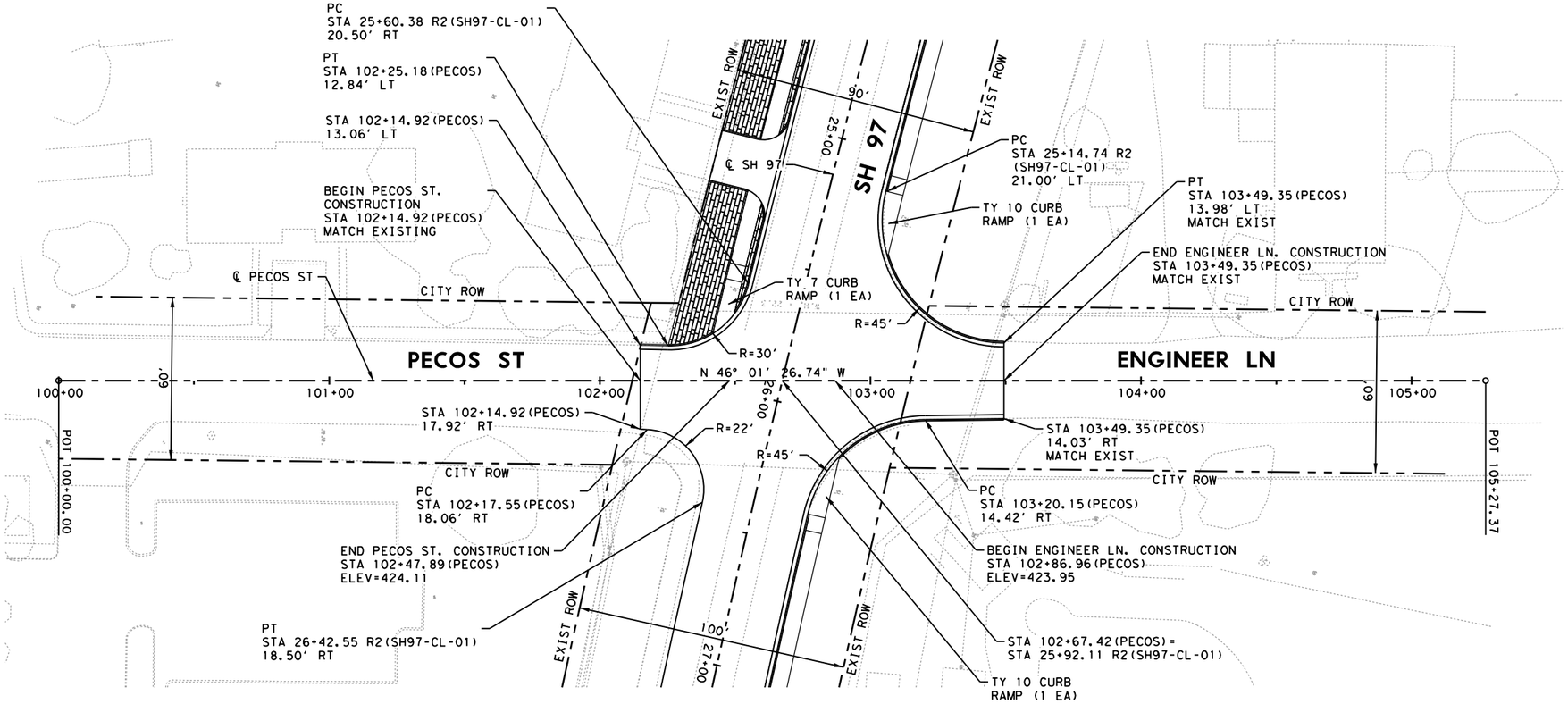

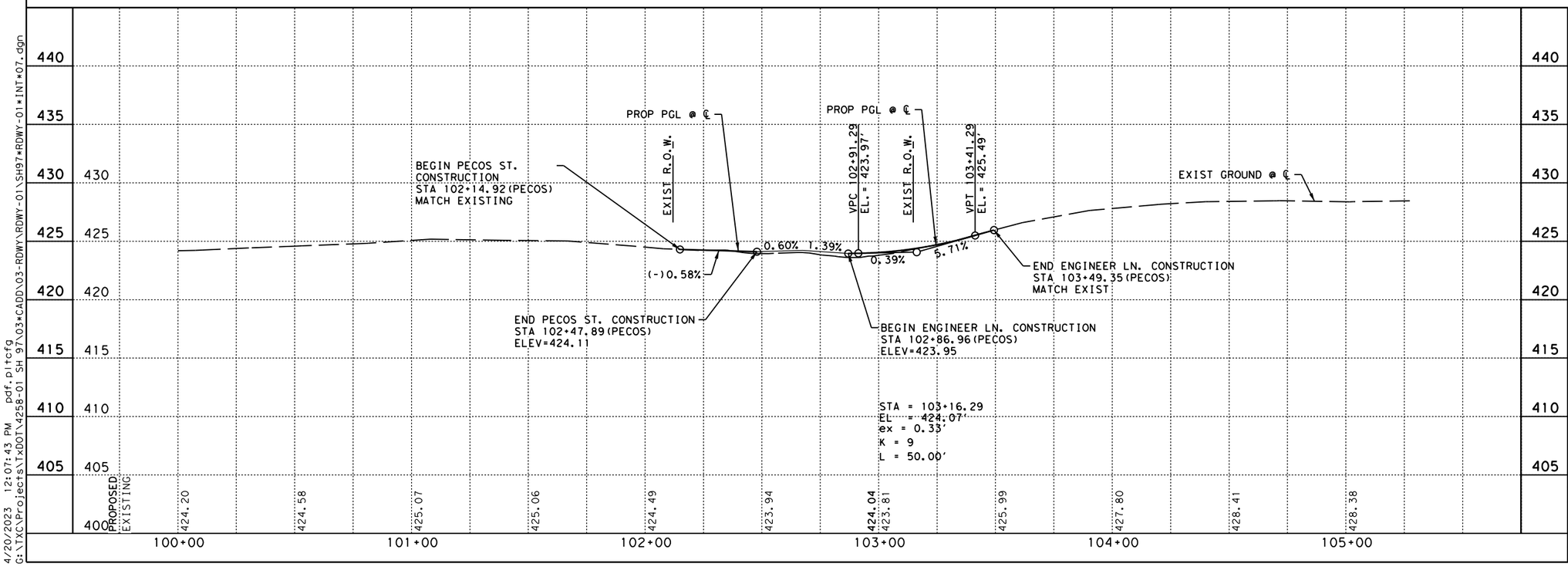

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SH 97
ROADWAY
INTERSECTION LAYOUT
PECOS ST/ENGINEER LN
AT SH 97

SHEET 6 OF 6

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			77
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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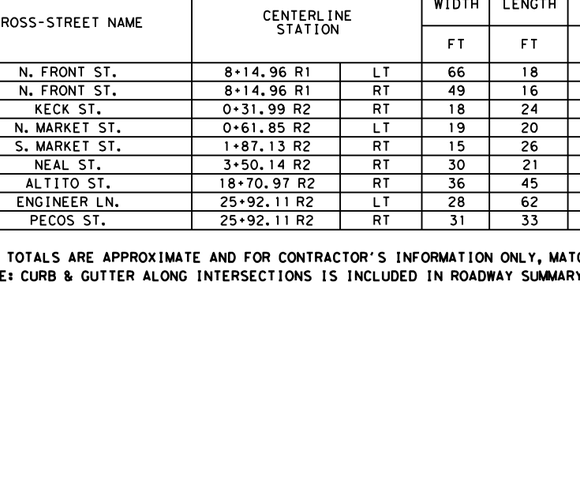
SUMMARY OF INTERSECTIONS

CROSS-STREET NAME	CENTERLINE STATION		WIDTH	LENGTH	R1	R2	AREA	*CONC	*TY-B PG 64-22	*SP TY-C PG 76-22	*SP TY-B PG 70-22	EXIST PIPE
			FT	FT	FT	FT	SY	SY	TON	TON	TON	
N. FRONT ST.	8+14.96 R1	LT	66	18	10	10	134	134	29	-	-	N/A
N. FRONT ST.	8+14.96 R1	RT	49	16	10	10	94	94	21	-	-	N/A
KECK ST.	0+31.99 R2	RT	18	24	25	25	80	80	18	-	-	N/A
N. MARKET ST.	0+61.85 R2	LT	19	20	25	30	72	72	16	-	-	N/A
S. MARKET ST.	1+87.13 R2	RT	15	26	25	25	77	-	-	8	17	N/A
NEAL ST.	3+50.14 R2	RT	30	21	25	25	98	-	-	11	22	N/A
ALTITO ST.	18+70.97 R2	RT	36	45	31.5	65	272	-	-	30	60	N/A
ENGINEER LN.	25+92.11 R2	LT	28	62	46.5	46.5	292	-	-	32	64	N/A
PECOS ST.	25+92.11 R2	RT	31	33	22	31.5	139	-	-	15	31	N/A

* TOTALS ARE APPROXIMATE AND FOR CONTRACTOR'S INFORMATION ONLY, MATCH EXISTING ROADWAY MATERIAL TYPES
NOTE: CURB & GUTTER ALONG INTERSECTIONS IS INCLUDED IN ROADWAY SUMMARY QUANTITIES

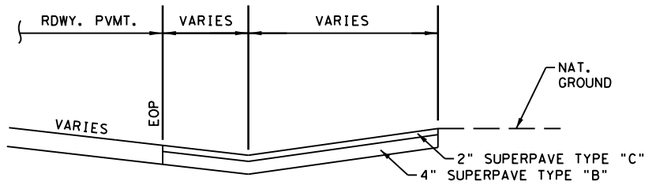


INTERSECTIONS

NTS

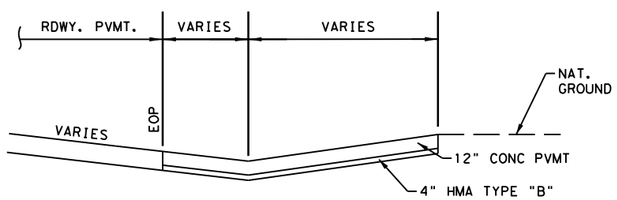
① SEE SUMMARY OF DRIVEWAYS AND SUMMARY OF INTERSECTIONS FOR ADDITIONAL DETAILS, DIMENSIONS AND QUANTITIES

② LIMITS OF PAY VARY FOR INTERSECTION AS SHOWN ON PLAN SHEETS AND ON SUMMARY OF DRIVEWAYS, SUMMARY OF DRIVEWAY CULVERTS OR SUMMARY OF INTERSECTIONS



SECTION A-A

INTERSECTIONS (ACP)
NTS



SECTION A-A

INTERSECTIONS (CONC) (FAST TRACK)
NTS

NOTES:

1. RATE OF APPLICATION:
   HMA = 110 LB/SY/IN

4/20/2023

Texas Department of Transportation

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TBPE Registration No. F-1046

SH 97
ROADWAY

INTERSECTION DETAILS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			78
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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Package 1

SUMMARY OF DRIVEWAYS																			
DRIVEWAY NUMBER	P&P SHEET NUMBER	CENTERLINE STATION		HWY	EXISTING SURFACE	PROPOSED SURFACE	R1 (FT)	R2 (FT)	WIDTH	AREA	LENGTHS			GRADES			DRIVEWAY TYPE	ELEV AT PROP EOP	ELEV AT TIE IN	EXIST PIPE
									FT	SY	(L1) FT	(L2) FT	(L3) FT	(G1) %	(G2) %	(G3) %				
DW# 01	1	6+34.90 R1	RT	SH 97	ASPHALT	ASPHALT	15	20	16	30	6.50	8.68		1.50	7.46		COMMERCIAL	422.89	423.61	N/A
DW# 02	1	6+34.90 R1	LT	SH 97	ASPHALT	ASPHALT	12	30	10	30	6.50	10.57		-1.50	-1.67		COMMERCIAL	422.78	422.60	N/A
DW# 03	5	18+27.09 R2	LT	SH 97	ASPHALT	ASPHALT	20	25	20	65	7.17	14.05		-2.00	-4.47		COMMERCIAL	405.78	405.65	N/A
DW# 04	6	19+50.72 R2	LT	SH 97	ASPHALT	ASPHALT	20	22	26	80	6.50	13.75		-1.50	-2.93		COMMERCIAL	408.11	407.61	N/A
DW# 05	6	20+27.05 R2	LT	SH 97	ASPHALT	ASPHALT	20	20	17	71	1.50	6.50	21.74	-2.00	-1.50	1.57	COMMERCIAL	410.26	410.13	N/A
DW# 06	6	21+33.13 R2	LT	SH 97	ASPHALT	ASPHALT	20	20	44	152	1.50	6.50	21.05	-2.00	1.50	3.08	COMMERCIAL	413.11	413.38	N/A
DW# 07	6	21+77.32 R2	RT	SH 97	CONCRETE	CONCRETE	10	10	58	145	1.50	8.50	13.21	-2.00	1.50	5.69	COMMERCIAL	414.28	415.13	N/A
DW# 08	6	22+28.64 R2	LT	SH 97	ASPHALT	ASPHALT	20	20	16	68	1.50	6.50	20.50	-2.00	1.50	13.57	COMMERCIAL	415.67	420.74	N/A
DW# 09	6	22+67.45 R2	RT	SH 97	CONCRETE	CONCRETE	10	10	11	32	1.50	8.50	13.71	-2.00	1.50	7.92	RESIDENTIAL	416.70	417.89	N/A
DW# 10	6	23+59.59 R2	RT	SH 97	CONCRETE	CONCRETE	10	10	64	166	1.50	8.50	14.14	-2.00	1.50	4.69	COMMERCIAL	419.15	420.11	N/A
DW# 11	7	25+17.49 R2	RT	SH 97	CONCRETE	CONCRETE	10	10	19	54	1.50	8.50	14.73	-2.00	1.50	7.54	COMMERCIAL	422.55	423.42	N/A
DW# 12	7	29+41.49 R2	LT	SH 97	ASPHALT	ASPHALT	30	30	18	92	1.50	6.50	18.67	-2.00	1.50	8.00	COMMERCIAL	427.19	430.30	N/A
DW# 13	8	32+57.13 R2	LT	SH 97	ASPHALT	ASPHALT	30	30	39	151	1.50	6.50	19.41	-2.00	1.50	7.54	COMMERCIAL	426.37	427.88	N/A
DW# 14	9	37+03.58 R2	LT	SH 97	ASPHALT	ASPHALT	25	25	15	75	1.50	6.50	21.19	-2.00	-1.50	-2.22	COMMERCIAL	422.78	422.20	N/A
DW# 15	8	32+40.07 R2	RT	SH 97	ASPHALT	ASPHALT	14	17	20	68	SEE BELOW			SEE BELOW			COMMERCIAL	426.33	428.28	N/A
DW# 16	9	36+29.25 R2	RT	SH 97	ASPHALT	ASPHALT	15	16	21	65	9.25	12.72		-1.42	-6.28		COMMERCIAL	423.12	422.20	N/A
**DW# 17	SDW01	105+40.58	RT	BUS 35	CONCRETE	CONCRETE	N/A		38	34	9.00	7.13		1.50	8.00		COMMERCIAL	423.47	424.17	N/A
**DW# 18	SDW01	105+82.58	RT	BUS 35	CONCRETE	CONCRETE	N/A		30	28	9.00	2.57		1.50	8.00		COMMERCIAL	422.74	423.08	N/A
**DW# 19	SDW01	106+42.52	RT	BUS 35	CONCRETE	CONCRETE	5	5	40	43	10.17			1.50			COMMERCIAL	421.91	422.06	N/A
**DW# 20	SDW01	5+18.51 R1	RT	SH 97	CONCRETE	CONCRETE	N/A		17	50	7.00	13.48		1.50	8.00		COMMERCIAL	424.74	425.92	N/A
DW# 21	SDW01	5+97.01 R1	RT	SH 97	CONCRETE	TO REMAIN	N/A										COMMERCIAL	N/A		N/A

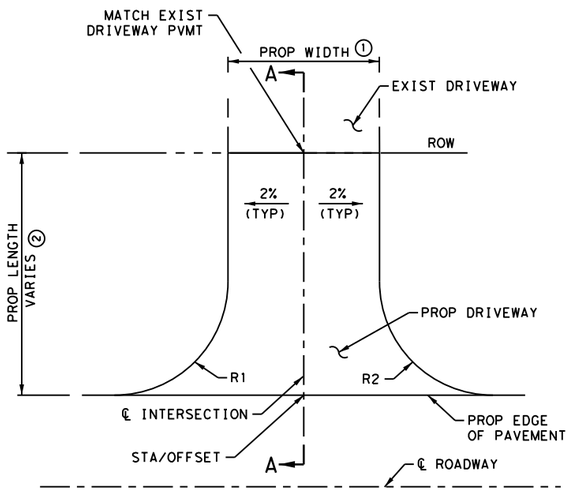
DW#15 L1=2.50, L2=2.50, L3=5.00, L4=6.00, L5=17.59, G1=-1.82, G2=5.00, G3=8.00, G4=1.50, G5=8.00

* TOTALS ARE APPROXIMATE AND FOR CONTRACTOR'S INFORMATION ONLY

** COORDINATION WITH PROPERTY OWNERS IS REQUIRED

NOTES:

1. RATE OF APPLICATION:
   HMA = 110 LB/SY/IN

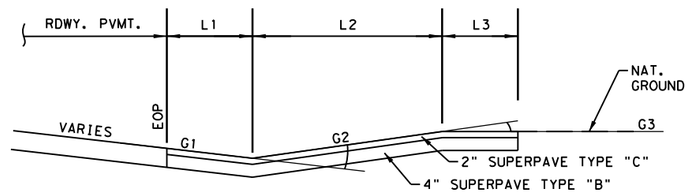


DRIVEWAYS

NTS

① SEE SUMMARY OF DRIVEWAYS AND SUMMARY OF INTERSECTIONS FOR ADDITIONAL DETAILS, DIMENSIONS AND QUANTITIES

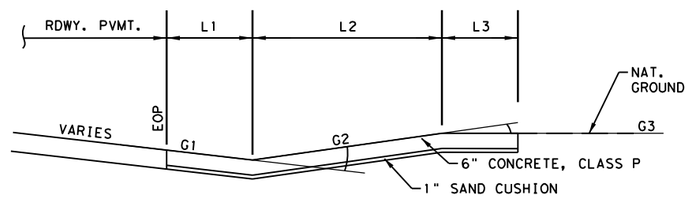
② LIMITS OF PAY VARY FOR DRIVEWAY AS SHOWN ON PLAN SHEETS AND ON SUMMARY OF DRIVEWAYS, SUMMARY OF DRAINAGE ITEMS OR SUMMARY OF INTERSECTIONS



SECTION A-A

DRIVEWAYS (ACP)

NTS



SECTION A-A

DRIVEWAYS (CONC)

NTS

G = INTERSECTION GRADE (%)
L = HORIZONTAL LENGTH TO THE GRADE BREAK

4/20/2023

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SH 97 ROADWAY

DRIVEWAY DETAILS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			79
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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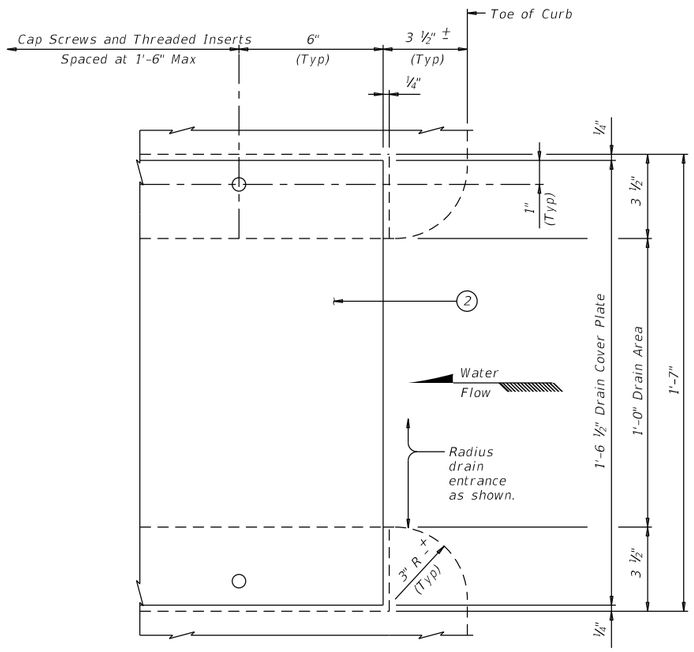
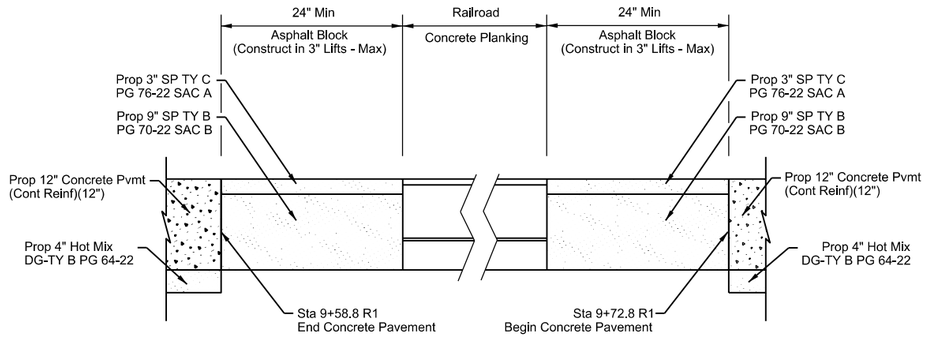
Package 1



PARTIAL PLAN SIDEWALK DRAIN



Note:
Roadway asphalt to be constructed with asphalt paver with 3" maximum lifts and laid parallel to crossing to minimize approach settlements.

ASPHALT DETAIL AT RAILROAD CONCRETE PLANKING

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

Submittal and approval of drain cover plate shop drawings is not required if fabrication is accordance with these details.

Payment for drain cover plates will be by the pound of "Structural Steel (Misc Non-Bridge)" as per Item 442, "Metal for Structures". Weight of one drain cover plate is 48 plf.

DESIGNER NOTES:

These details do not apply for longitudinal grades exceeding 5 percent.

Cover dimensions are clear dimensions, unless noted otherwise.

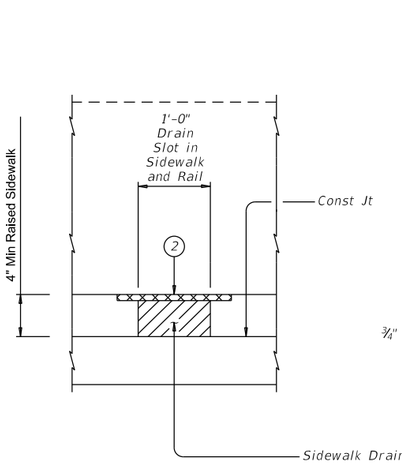
Reinforcing bar dimensions shown are out-to-out of bar.

(1) Provide sidewalk drains where shown elsewhere on the plans or as directed by the Engineer. Place Drain and Cover Plate perpendicular to toe of rail.

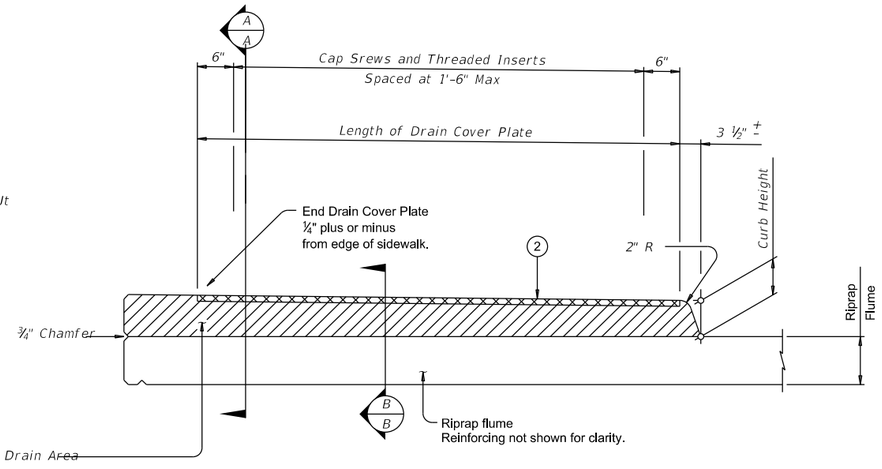
(2) Drain Cover Plate (PL ¾ x 18 ½ Slip Resistant Steel Plate). Install flush with top of sidewalk.

APPROVED SLIP RESISTANT PLATE	
Product	Manufacturer Website
Meba® #3, Steel	www.harscoikg.com
Algrip® , Steel	www.algrip.com
SlipNOT® Grade 2, Steel	www.slipnot.com

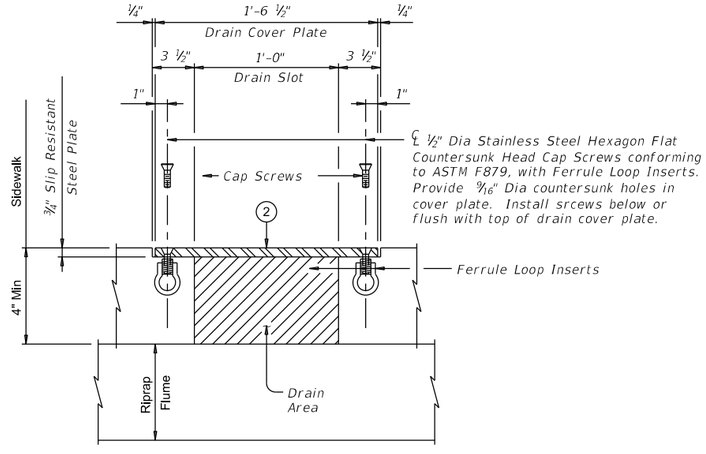
Drain cover plates must be fabricated with a product from this list. No exceptions are permitted.



SECTION A-A



SHOWING RAISED SIDEWALK WITH DRAIN SLOT



SECTION B-B

Reinforcing not shown for clarity.

OPTIONAL DRAIN DETAILS (1)

4/20/2023

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SH 97

MISCELLANEOUS DETAILS

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			80
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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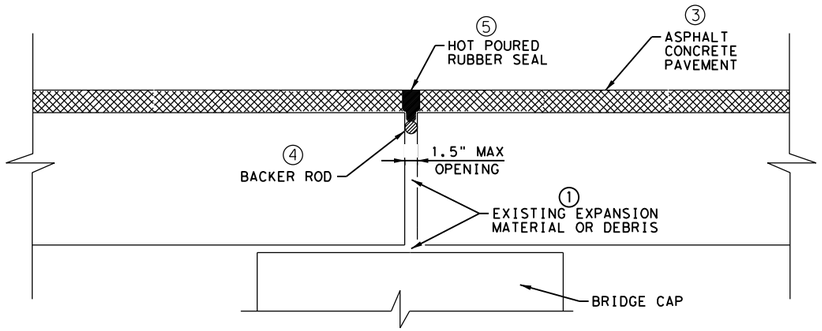
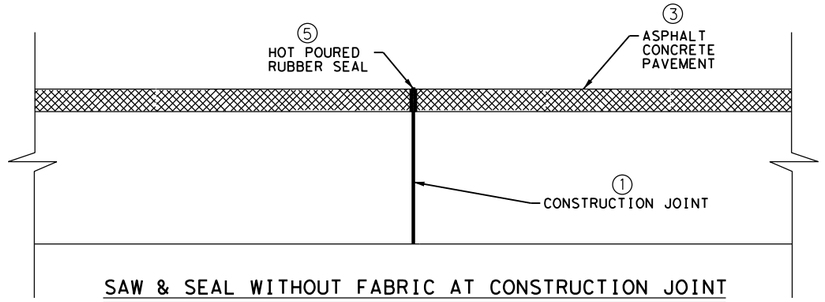


SAW & SEAL WITHOUT FABRIC AT EXPANSION JOINT



SAW & SEAL WITHOUT FABRIC AT CONSTRUCTION JOINT

NOTES:

EXPANSION AND CONSTRUCTION JOINTS

① CLEAN JOINTS OF ALL BITUMINOUS MATERIALS, DIRT, GREASE AND ALL OTHER DELETERIOUS MATERIALS. JOINT OPENINGS WILL BE ACCORDANCE WITH ITEM 438, "CLEANING AND SEALING JOINTS AND CRACKS."

② REPAIR ANY SIGNIFICANT SPALLED OR CRACKED AREAS, AS DETERMINED BY THE ENGINEER, WITH AN APPROVED CONCRETE REPAIR MATERIAL.

③ A TACK COAT IS REQUIRED ON THE SURFACE OF DECK THAT HAS BEEN MILLED.

EXPANSION JOINTS

④ INSTALL BACKER ROD BEFORE PLACING TACK COAT. THE BACKER ROD WILL BE 25% LARGER THAN THE OPENING AND PLACED 1" BELOW THE CONCRETE SURFACE.

⑤ AFTER THE ASPHALTIC CONCRETE PAVEMENT OPERATIONS ARE COMPLETE, SAW CUT THROUGH THE ASPHALT AT CENTERLINE OF JOINT. MAKE MULTIPLE SAW CUTS TO CREATE A 1/2 " MINIMUM JOINT OPENING OR MATCH THE EXISTING OPENING, WHICHEVER IS GREATER, NOT TO EXCEED 1". SEAL THE JOINT OPENING WITH HOT POURED RUBBER FLUSH WITH THE TOP OF THE ASPHALTIC CONCRETE PAVEMENT.

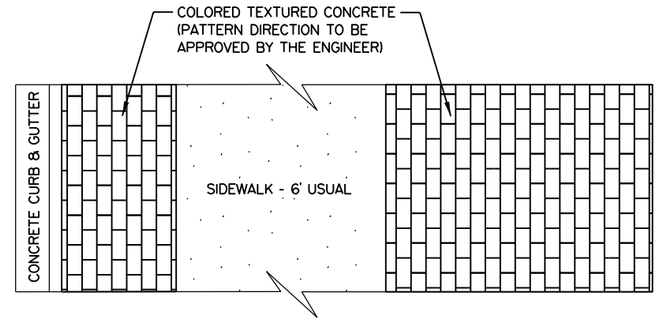
GENERAL NOTES FOR BRIDGE JOINTS:

CONCRETE REPAIR MATERIAL WILL BE IN ACCORDANCE WITH DMS 4655 "CONCRETE REPAIR MATERIALS" OR AS APPROVED BY THE ENGINEER

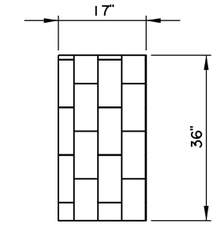
CLASS 3 SEALANT, HOT POURED RUBBER, WILL BE IN ACCORDANCE WITH DMS-6310, "JOINT SEALANTS AND FILLERS."

OBTAIN APPROVAL FOR ALL TOOLS, EQUIPMENT, MATERIALS AND TECHNIQUES PROPOSED FOR USE IN CONSTRUCTION OF THE JOINT.

ALL WORK ASSOCIATED WITH CLEANING AND SEALING BRIDGE JOINTS WILL BE PAID FOR BY ITEM 438 "CLEANING AND SEALING JOINTS AND CRACKS", MEASURED BY THE LINEAR FOOT OF JOINT UNLESS SHOWN OTHERWISE IN THE PLANS. ALL WORK ASSOCIATED WITH CLEANING OF CONSTRUCTION JOINTS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY.

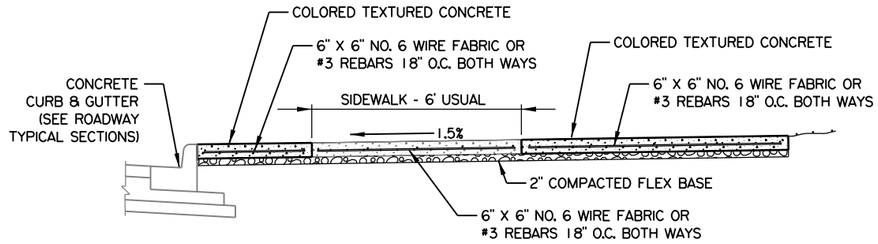


SIDEWALK & COLORED TEXTURED CONCRETE - PLAN VIEW



STAMP PATTERN SIZE

NOTE:
STAMP PATTERN SIZE MAY VARY AS APPROVED BY THE ENGINEER.



SIDEWALK & COLORED TEXTURED CONCRETE - SECTION VIEW

SIDEWALK & COLORED TEXTURED CONCRETE NOTES:

① A PRE-PLACEMENT MEETING WILL BE HELD TO DETERMINE COLOR AND DIRECTION OF THE COLORED TEXTURED CONCRETE.

② GROOVED JOINTS IN THE SIDEWALK SHALL BE AT A MAX. SPACING OF 10 FT. AND SHALL HAVE ¾" EXPANSION JOINTS AT A MAX. SPACING OF 30' AND TO COINCIDE WITH CURB EXPANSION JOINTS.

③ USE RUNNING BOND BRICK CONCRETE STAMP PATTERN OR AS APPROVED BY THE ENGINEER.

④ CONTRACTOR TO PROVIDE TYPE AND MATERIAL TO BE USED AS A RELEASE AGENT FOR THE COLORED TEXTURED CONCRETE.

⑤ PATTERNS AND COLORANTS SHOWN ARE USED FOR EXAMPLES ONLY. PATTERN DIRECTION AND COLOR TO BE APPROVED BY THE ENGINEER.

⑥ PROTECT ADJACENT CONCRETE SURFACES FROM COLORANTS.

⑦ FLEX BASE UNDER SIDEWALK AND COLORED TEXTURED CONCRETE WILL BE SUBSIDIARY TO ITEMS 528 AND 531.

NOT TO SCALE

4/20/2023

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TBPE Registration No. F-1046

SH 97

MISCELLANEOUS DETAILS

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			81
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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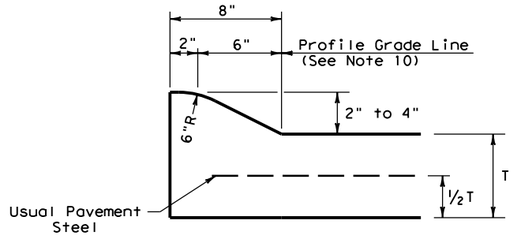
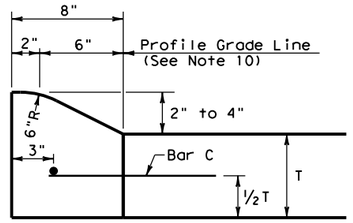
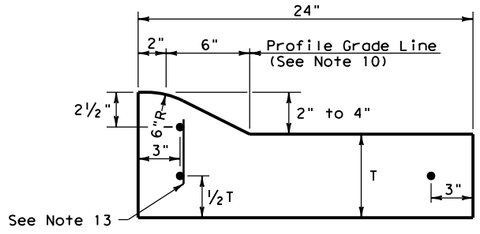


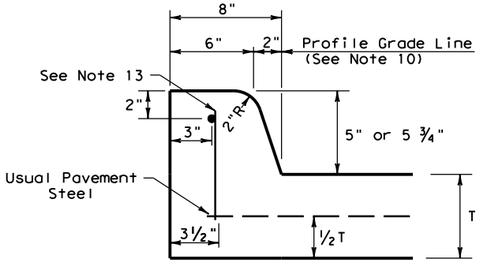
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



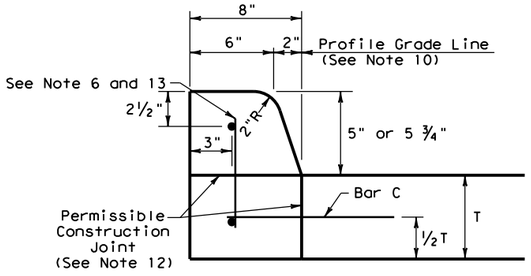
TYPE I CURB
2" - 4" HEIGHT



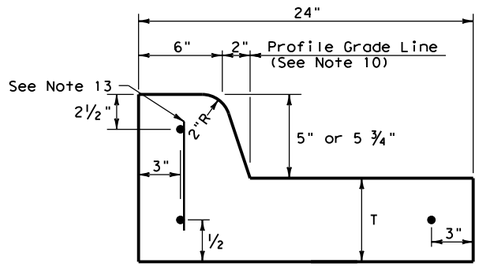
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



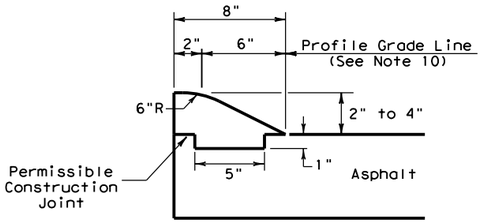
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



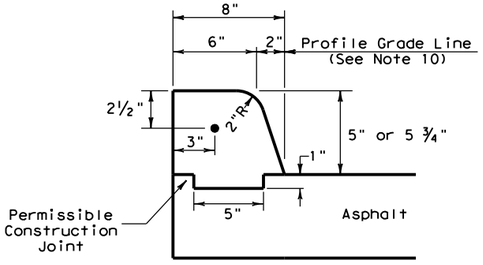
TYPE II CURB
5" - 5 ¾" HEIGHT



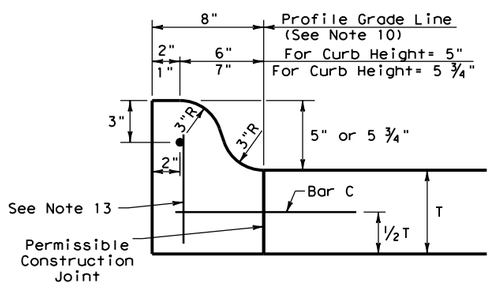
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



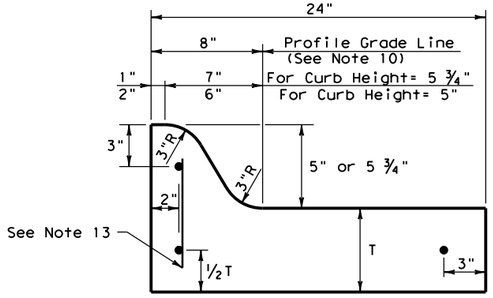
TYPE III CURB (KEYED)
2" - 4" HEIGHT



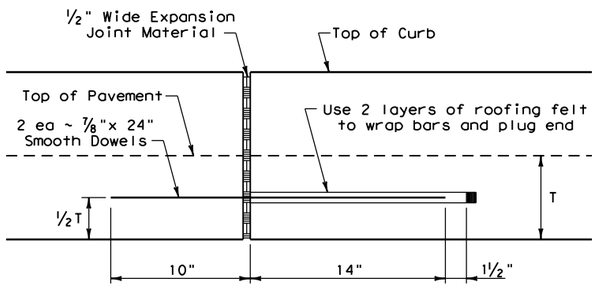
TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



TYPE IIa CURB
5" - 5 ¾" HEIGHT

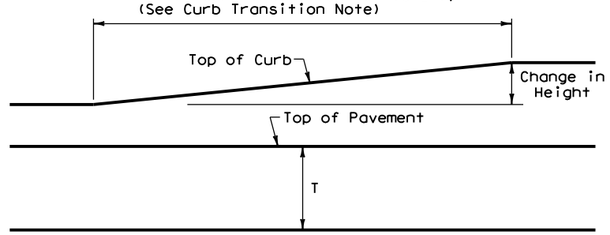


TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

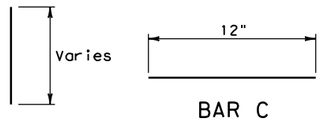
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B placement as needed (typically at four ft. C-C) to support curb reinforcing steel during concrete placement.



BAR B

BAR C

Texas Department of Transportation

Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

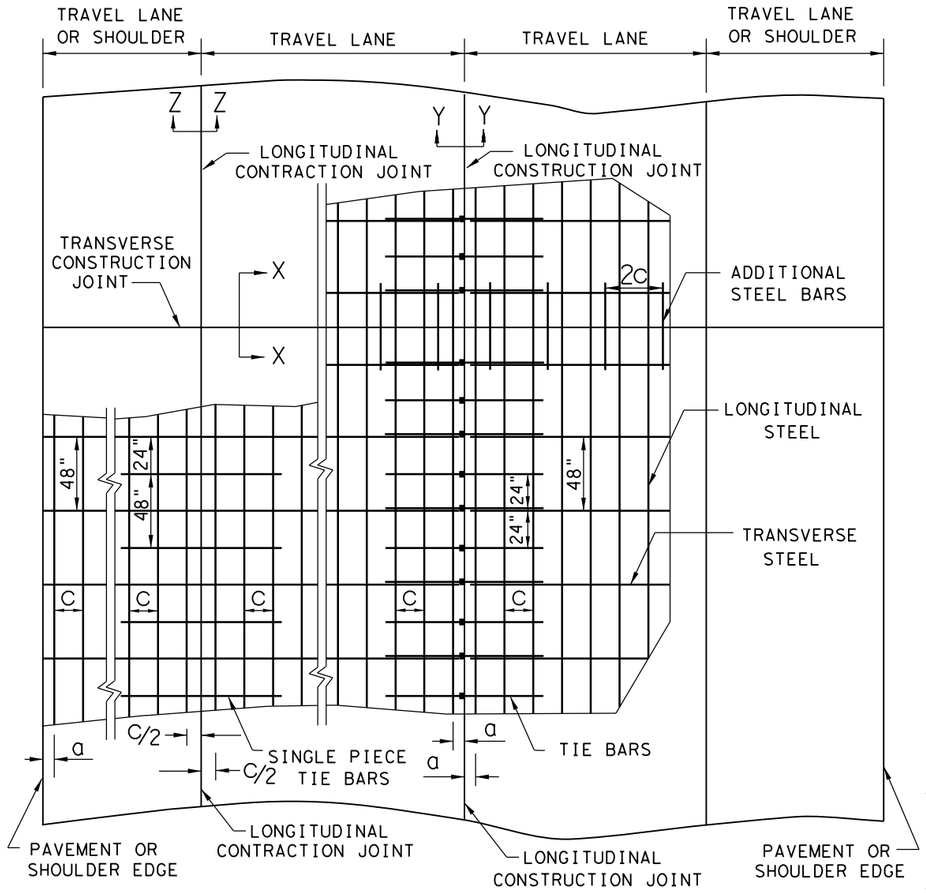
CCCG-22

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: CS	CK: KM
© TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		82

DATE: 4/20/2023 12:07:49 PM
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\03-RDWY\Stds-01\crcp120.dgn

TABLE NO. 1 LONGITUDINAL STEEL					
SLAB THICKNESS AND BAR SIZE		REGULAR STEEL BARS	FIRST SPACING AT EDGE OR JOINT	ADDITIONAL STEEL BARS AT TRANSVERSE CONSTRUCTION JOINT (SECTION X-X)	
T (IN.)	BAR SIZE	SPACING C (IN.)	SPACING a (IN.)	SPACING 2 X C (IN.)	LENGTH L (IN.)
7.0	#5	6.5	3 TO 4	13	50
7.5	#5	6.0	3 TO 4	12	50
8.0	#6	9.0	3 TO 4	18	50
8.5	#6	8.5	3 TO 4	17	50
9.0	#6	8.0	3 TO 4	16	50
9.5	#6	7.5	3 TO 4	15	50
10.0	#6	7.0	3 TO 4	14	50
10.5	#6	6.75	3 TO 4	13.5	50
11.0	#6	6.5	3 TO 4	13	50
11.5	#6	6.25	3 TO 4	12.5	50
12.0	#6	6.0	3 TO 4	12	50
12.5	#6	5.75	3 TO 4	11.5	50
13.0	#6	5.5	3 TO 4	11	50

TABLE NO. 2 TRANSVERSE STEEL AND TIE BARS						
SLAB THICKNESS (IN.)	TRANSVERSE STEEL		TIE BARS AT LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z)		TIE BARS AT LONGITUDINAL CONSTRUCTION JOINT (SECTION Y-Y)	
	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)
7.0 - 7.5	#5	48	#5	48	#5	24
8.0 - 13.0	#5	48	#6	48	#6	24

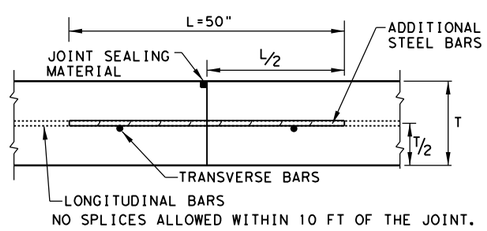


TYPICAL PAVEMENT LAYOUT

PLAN VIEW (NOT TO SCALE)

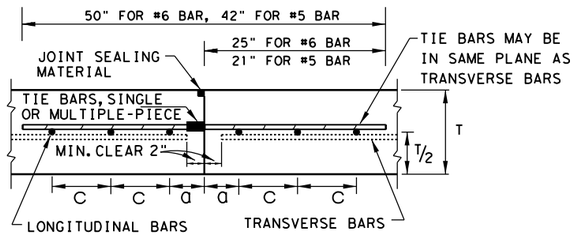
GENERAL NOTES

1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT ARE NOT COVERED BY THIS STANDARD.
2. USE COARSE AGGREGATES WITH A RATED COEFFICIENT OF THERMAL EXPANSION (CoTE) OF NOT MORE THAN 5.5 X 10^{-6} IN/IN/ °F AS LISTED IN THE CONCRETE RATED SOURCE QUALITY CATALOG (CRSQC).
3. ALL THE REINFORCING STEEL AND TIE BARS SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A 615 (GRADE 60) OR ASTM A 996 (GRADE 60) OR ABOVE. STEEL BAR SIZES AND SPACINGS SHALL CONFORM TO TABLE NO.1 AND TABLE NO.2.
4. STEEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1 IN. HORIZONTALLY AND +/- 0.5 IN. VERTICALLY. CALCULATED AVERAGE BAR SPACING (CONCRETE PLACEMENT WIDTH / NUMBER OF LONGITUDINAL BARS) SHALL CONFORM TO TABLE NO.1
5. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
6. THE SAW CUT DEPTH FOR THE LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z) SHALL BE ONE THIRD OF THE SLAB THICKNESS (T/3).
7. WHEN TYING CONCRETE GUTTER AT A LONGITUDINAL JOINT, THE TIE BAR LENGTH OR POSITION MAY BE ADJUSTED. PROVIDE 3 IN. OF CONCRETE COVER FROM THE BACK OF GUTTER TO THE END OF TIE BAR.
8. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN.10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
9. OMIT TIE BARS LOCATED WITHIN 18-IN. OF THE TRANSVERSE CONSTRUCTION JOINTS (SECTION X-X). USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL FORMED JOINTS.
10. LONGITUDINAL REINFORCING STEEL SPLICES SHALL BE A MINIMUM OF 25 IN. STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT.
11. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



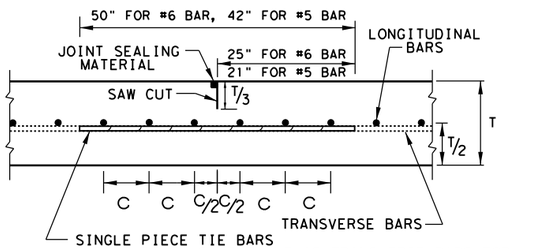
TRANSVERSE CONSTRUCTION JOINT

SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT

SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT

SECTION Z - Z

SHEET 1 OF 2

Texas Department of Transportation

Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT T - 7 to 13 INCHES

CRCP(1)-20

FILE: crcp120.dgn	DN: TxDOT	CK:KM	DW: AN	CK:VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 10/10/2011 ADD GN #12 04/09/2013 REMOVE 6" AND 6.5" ADD CTE REQUIREMENTS 05/05/2017 CoTE AS RATED 4.3	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		83

DATE: 4/20/2023 12:07:50 PM
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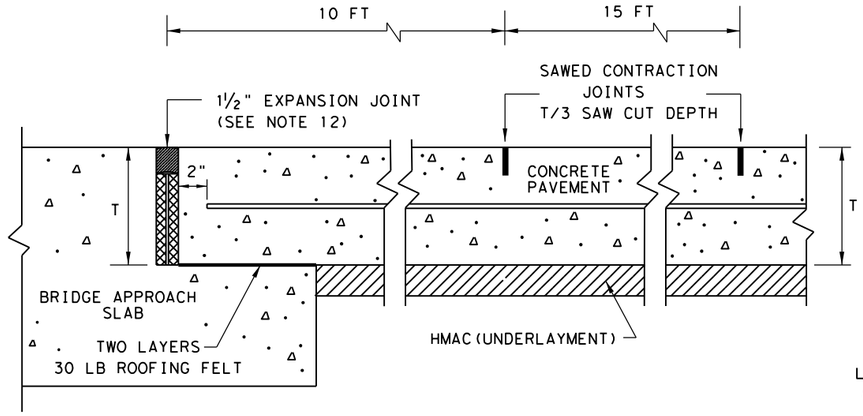
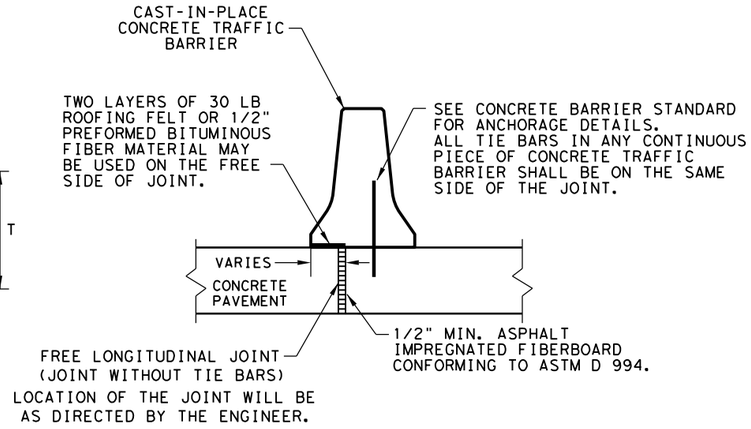
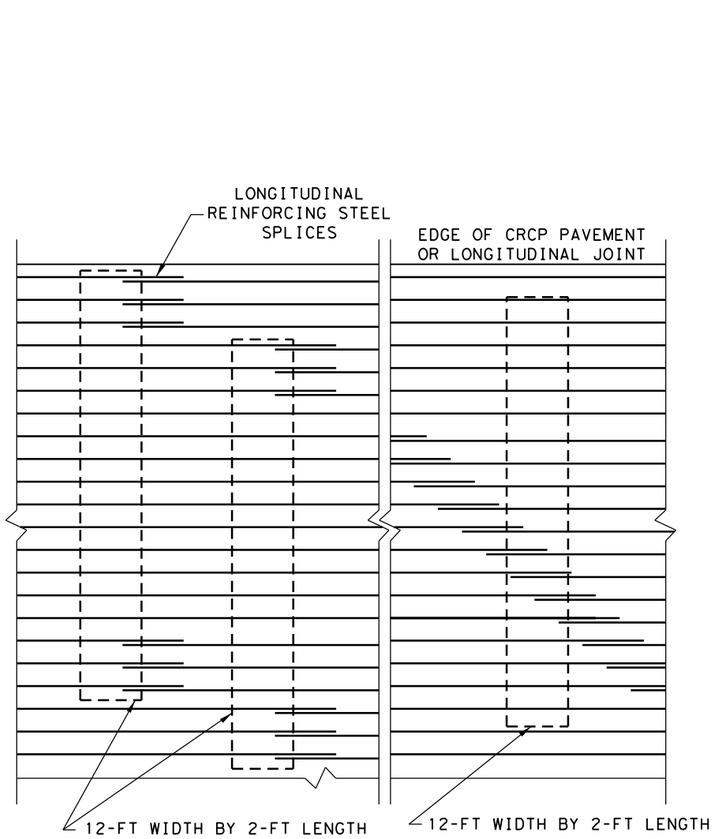


TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH

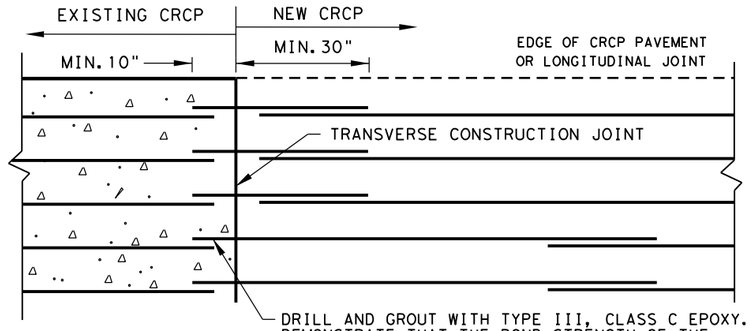


FREE LONGITUDINAL JOINT DETAIL

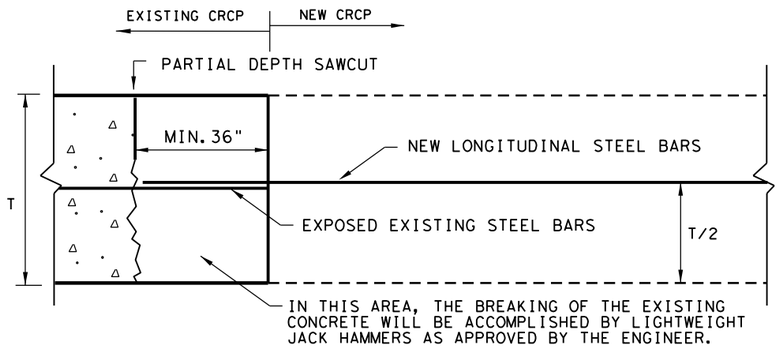


STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT. ANY OTHER LAP CONFIGURATION MEETING THIS REQUIREMENT WILL BE ALLOWED.

EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)

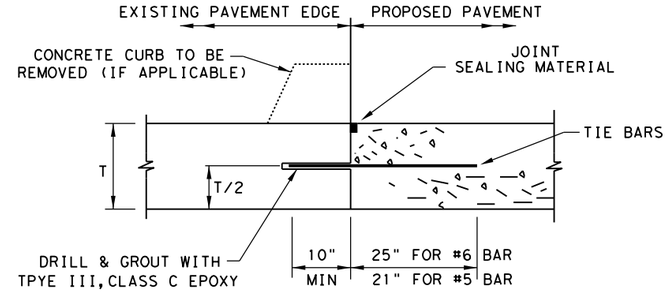


OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)



OPTION B: BREAKBACK AND LAP

TRANSVERSE TIE JOINT DETAIL
EXISTING CRCP TO NEW CRCP



1. BEFORE WIDENING WORK, DEMONSTRATE THAT THE BOND STRENGTH OF THE EPOXY-GROUTED TIE BARS MEETS THE REQUIRMENTS OF PULL-OUT TEST SPECIFIED IN ITEM 361.
2. SPACE TIE BARS AT 24" SPACING. USE #6 TIE BARS FOR 8" AND THICKER SLABS, USE #5 TIE BARS FOR LESS THAN 8" THICK SLABS.

LONGITUDINAL WIDENING JOINT DETAIL

Texas Department of Transportation | Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

CRCP(1)-20

FILE: crcp120.dgn	DN: TxDOT	CK: KM	DW: AN	CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 03/16/2020 REMOVED TABLE 1A	0483	01	052	SH 97
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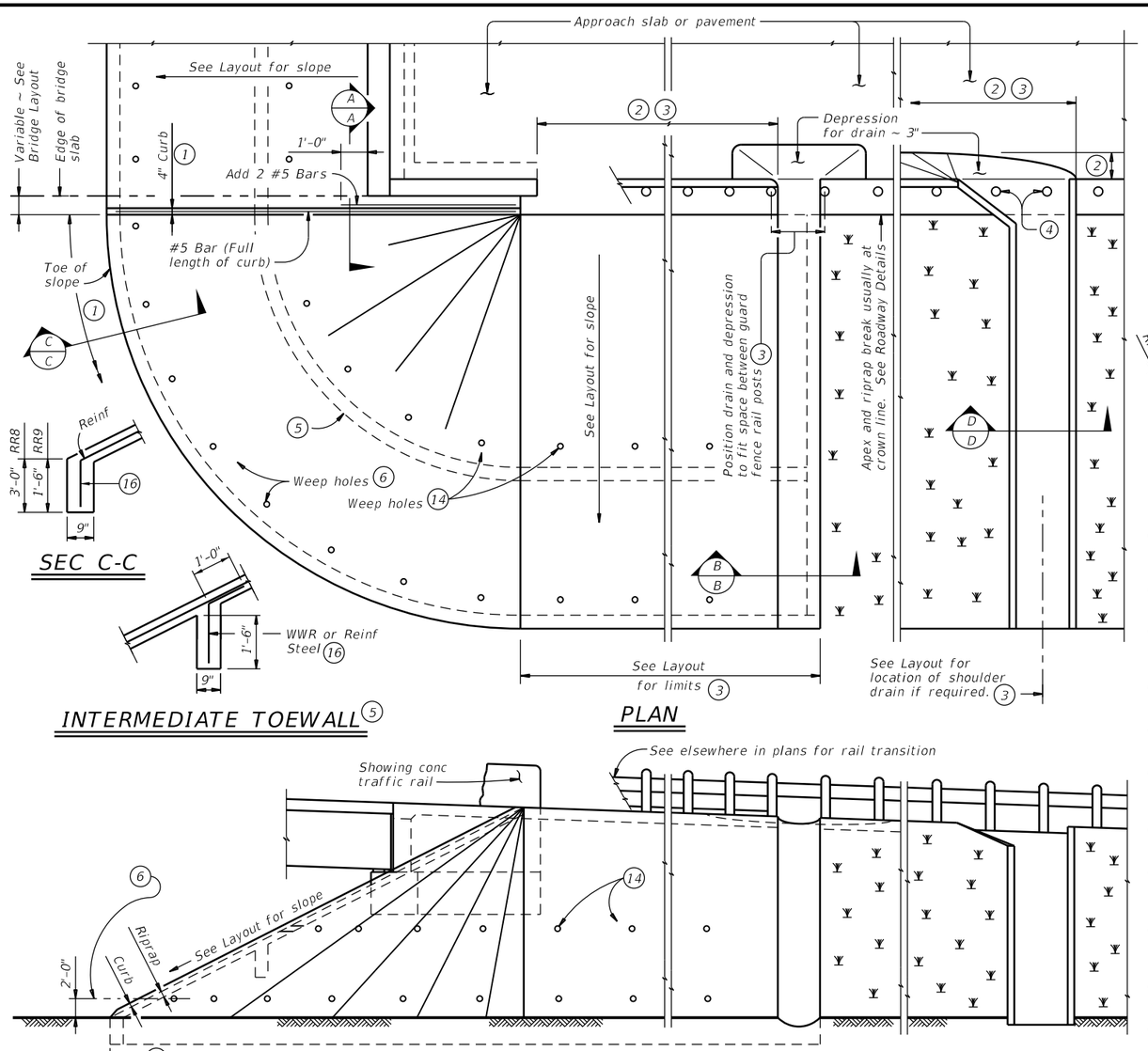
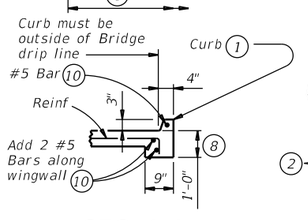
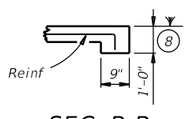
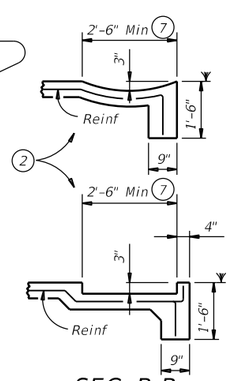
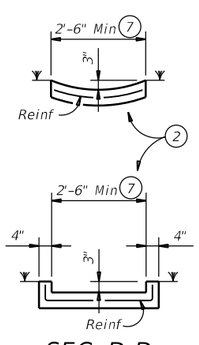
	LRD	LA SALLE		84

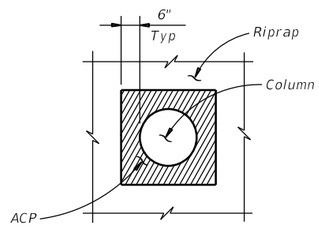


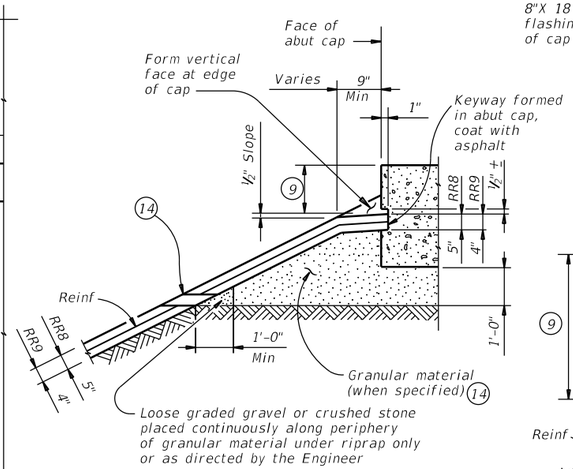


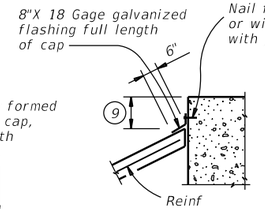


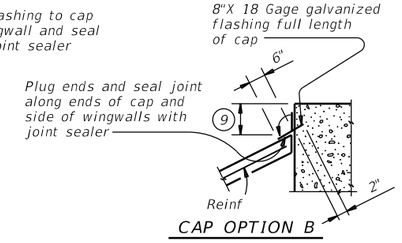


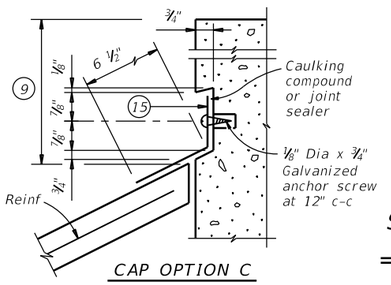


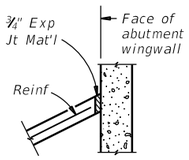




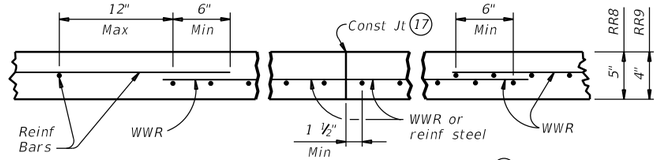








SECTIONS THRU RIPRAP AT CAP (11)



1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic fiber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage Galv Sheet Metal
16. Provide WWR or #3 bars, with 1'-0" extension into slope.
17. WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

CRR

FILE: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		85

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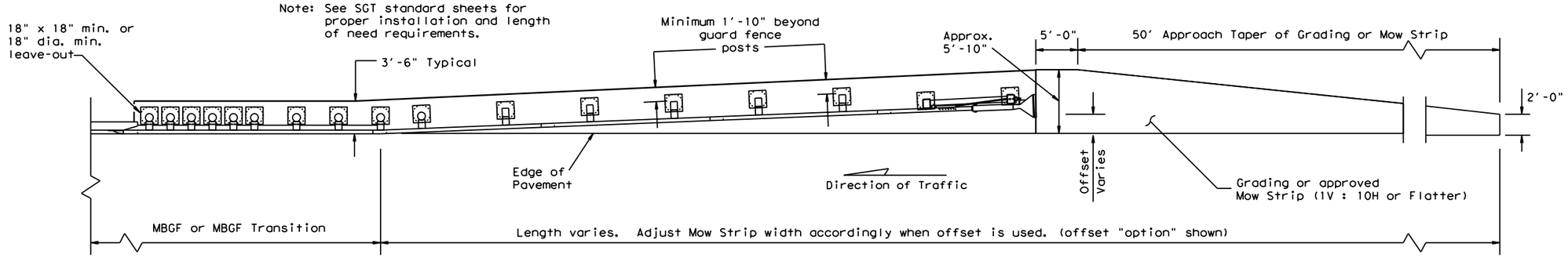
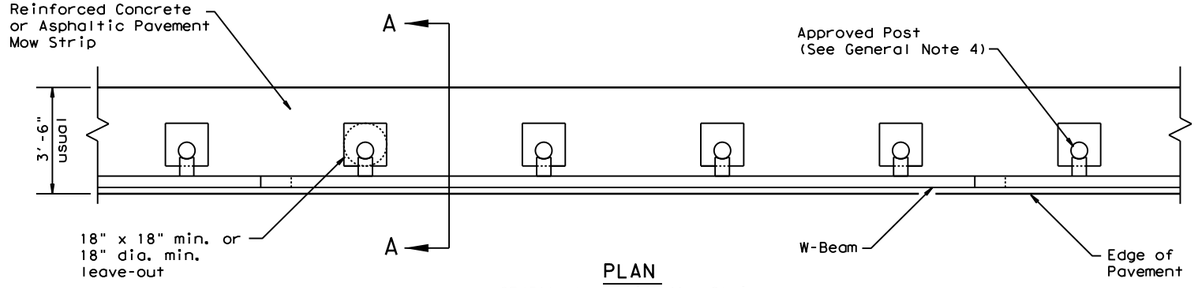
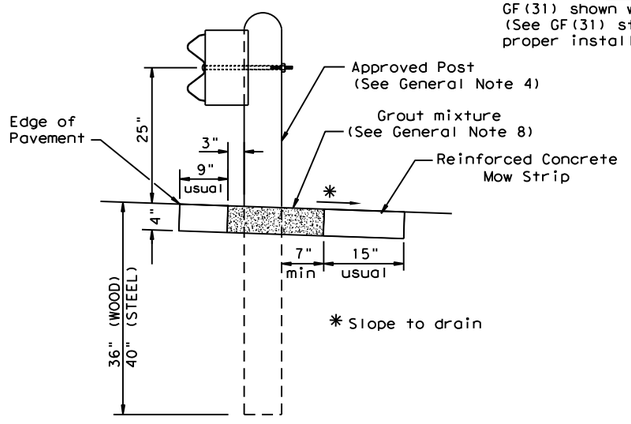


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



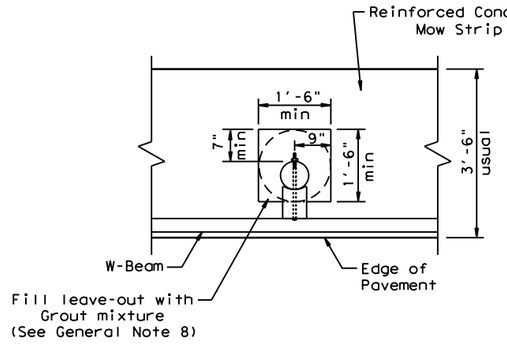
PLAN

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.

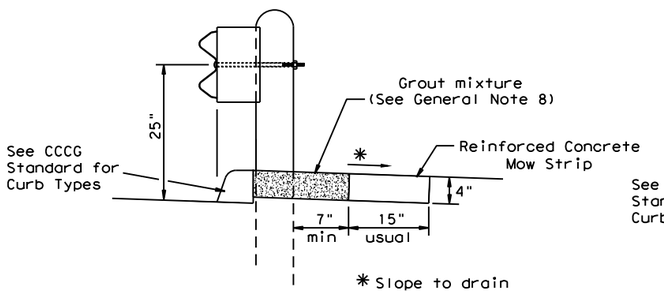
Note: Site Condition(s)

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.

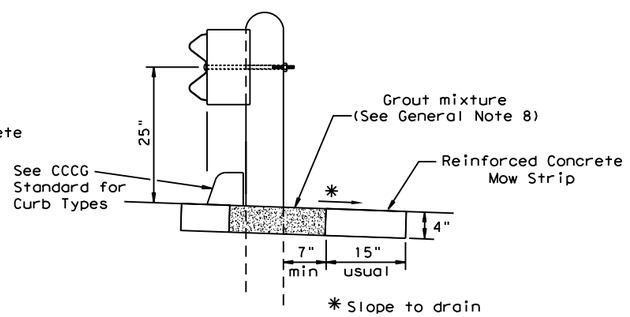
GENERAL NOTES

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.



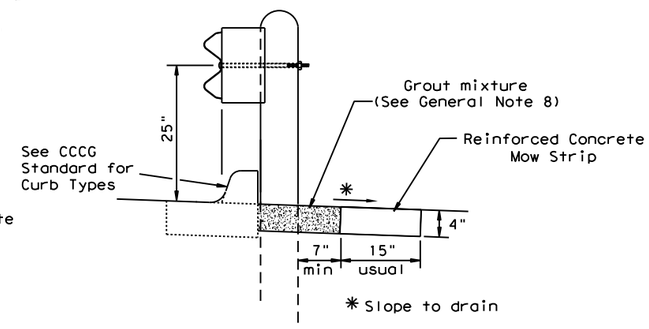
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Texas Department of Transportation

Design Division Standard

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

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		86

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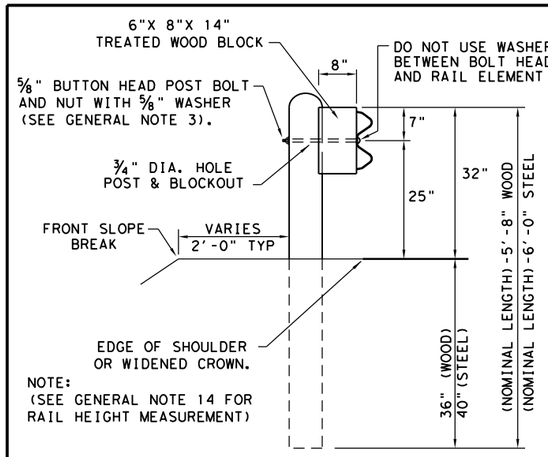
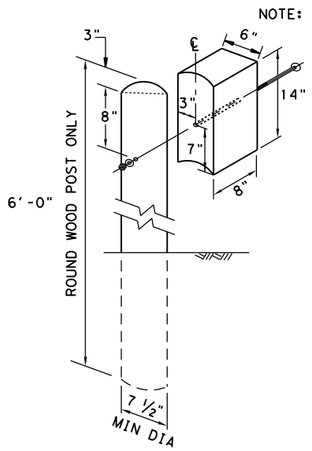
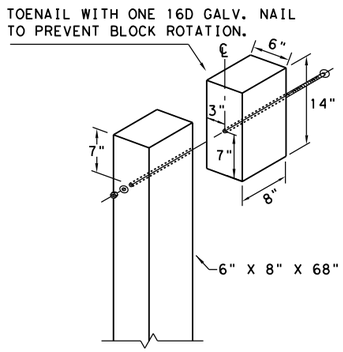


TYPICAL POST PLACEMENT

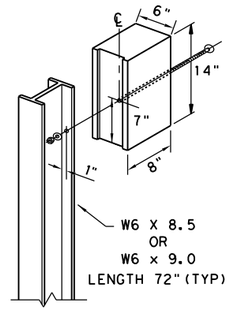


WOOD BLOCK TO
ROUND WOOD POST

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

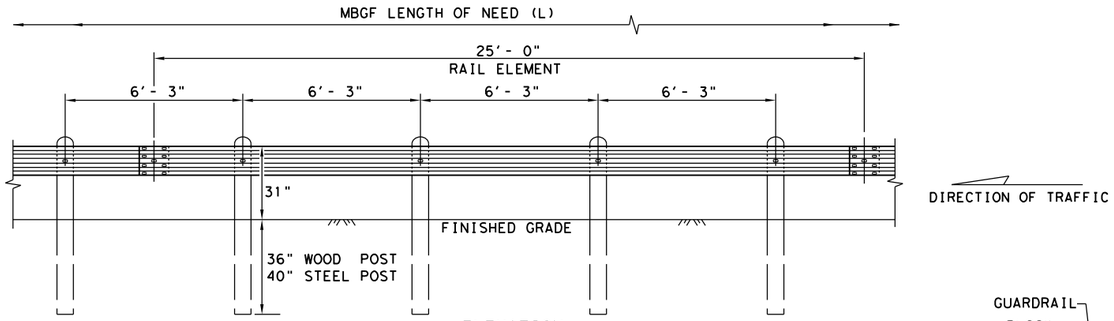


WOOD BLOCK TO
RECTANGULAR WOOD POST



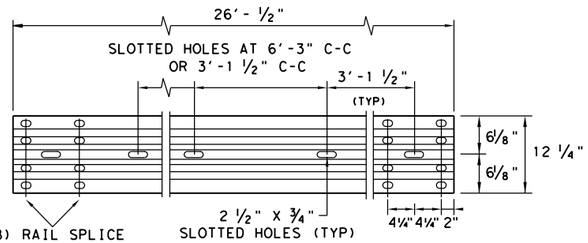
ROUTED WOOD BLOCK
TO I-BEAM STEEL POST

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



ELEVATION
MID-SPAN RAIL SPLICE

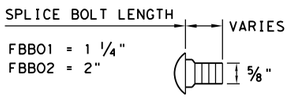
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



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

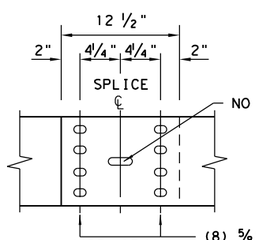
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

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



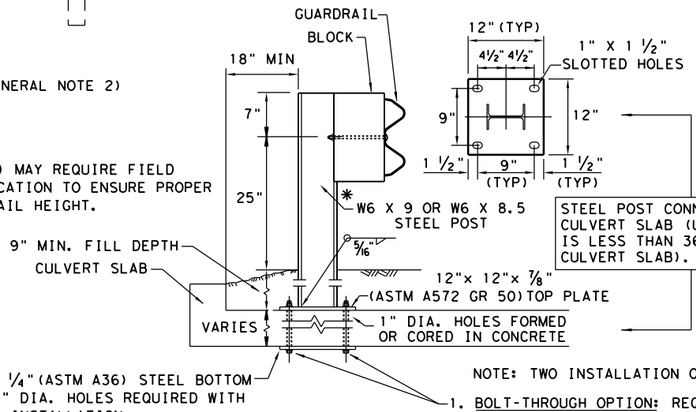
BUTTON HEAD BOLT

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



MID-SPAN
RAIL SPLICE DETAIL

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



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

STEEL POST CONNECTION TO CULVERT SLAB (USE WHEN THERE IS LESS THAN 36" COVER OVER CULVERT SLAB).

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.

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

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

Texas Department of Transportation

Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
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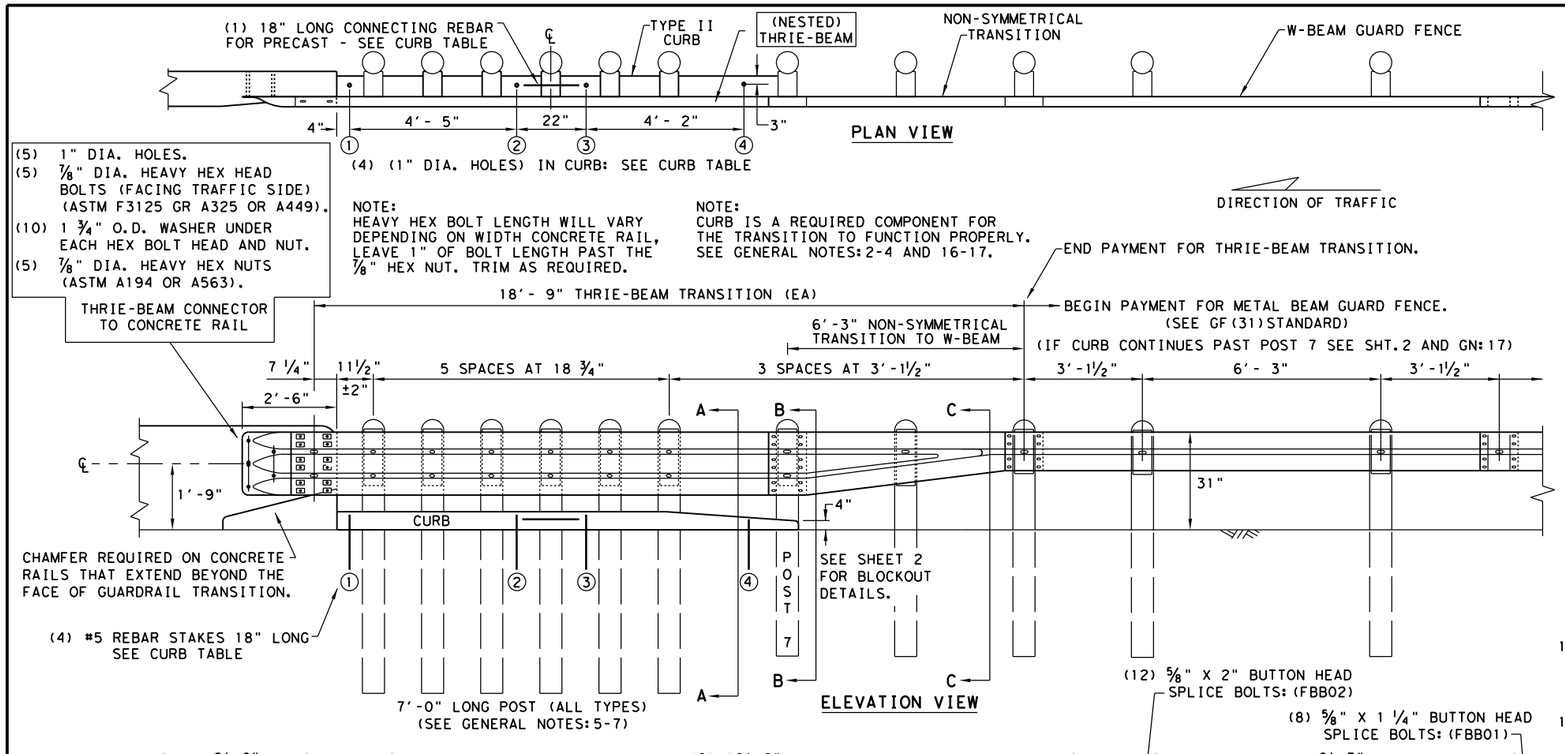


GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- 3/4" HEIGHT); SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE: 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 1/2" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST 5/8" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TXDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED)(TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED)(STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

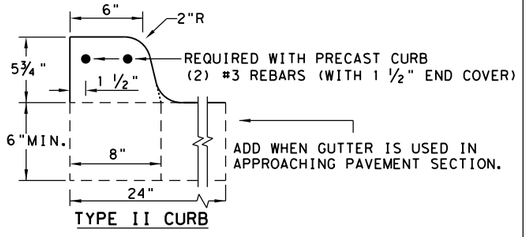
THRIE-BEAM TERMINAL - CURB TABLE

PRECAST CURB FULL LENGTH EQUALS 12'- 2"
THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.

CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7

CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END. USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.

SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND 1/2" BELOW TOP OF CURB.
FILL HOLES WITH APPROVED GROUT MIXTURE.



TYPE II CURB

NOTE: OPTIONS FOR TYPE II CURB:
1. PRECAST
2. CAST-IN-PLACE

* NOTES: NOT NEEDED FOR CAST-IN-PLACE.
SEE TYPE II CURB DETAIL FOR REBAR AND COVER REQUIREMENTS.
PERCUSSION DRILLING IS NOT PERMITTED WITH:
TYPE II CURB, BRIDGE RAIL OR CONCRETE TRAFFIC RAIL.

TYPE II CURB DETAILS

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation | Design Division Standard

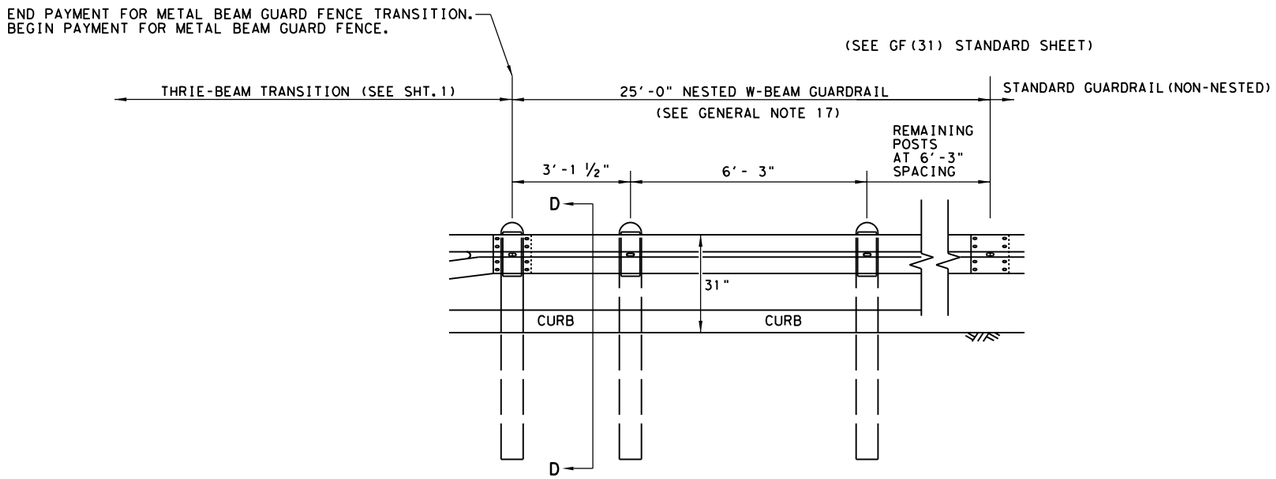
METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

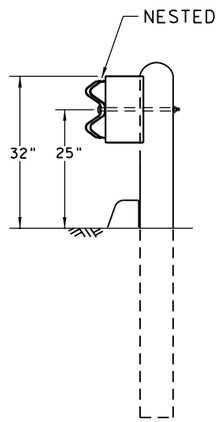
FILE: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		88

DATE: 4/20/2023
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\03-RDWY\Stds-01\gf31trt1320.dgn

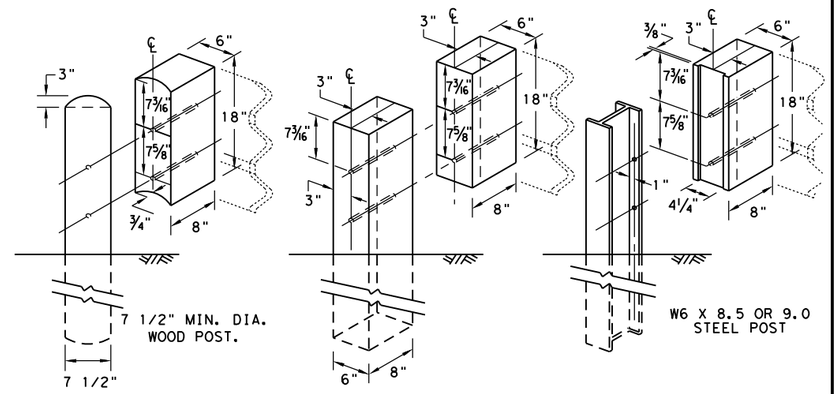
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

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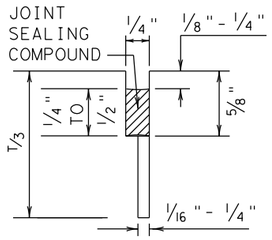
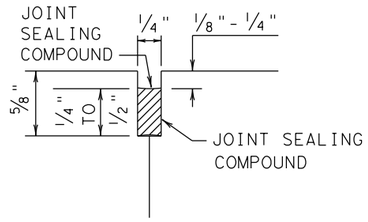
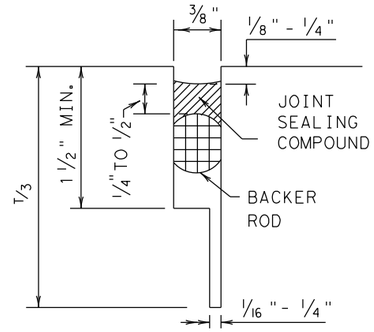
METHOD B: JOINT SEALING COMPOUND



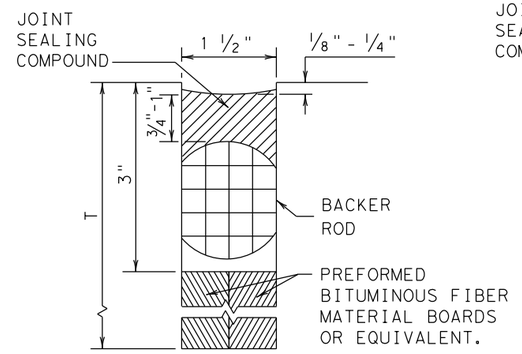
LONGITUDINAL SAWED
CONTRACTION JOINT



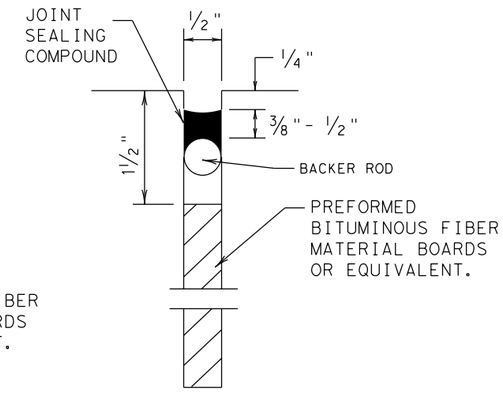
LONGITUDINAL OR TRANSVERSE
CONSTRUCTION JOINT



TRANSVERSE SAWED
CONTRACTION JOINT

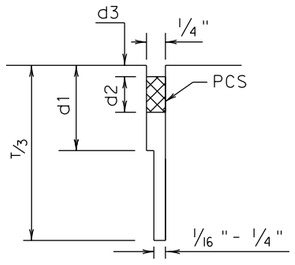


TRANSVERSE FORMED
EXPANSION JOINT

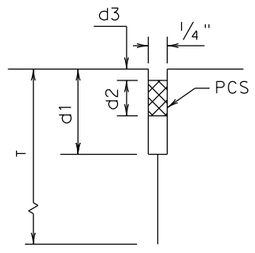


FORMED
ISOLATION JOINT

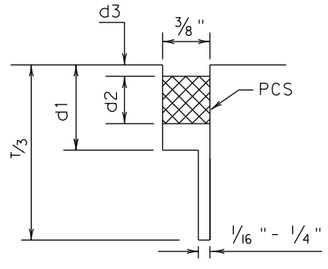
METHOD A: PREFORMED COMPRESSION SEALS (PCS)(DMS-6310 CLASS 6)



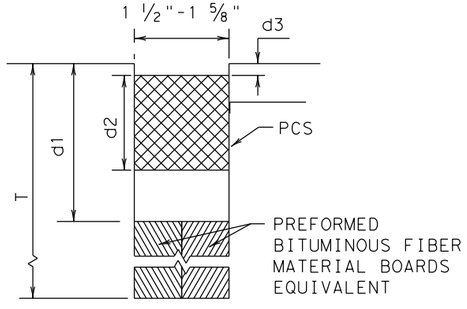
LONGITUDINAL SAWED
CONTRACTION JOINT



LONGITUDINAL
CONSTRUCTION JOINT



TRANSVERSE SAWED
CONTRACTION JOINT



TRANSVERSE FORMED
EXPANSION JOINT

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
2. THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
3. THE JOINT RESERVOIR FOR SEALANT OR PCS SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION JOINTS AND THE SAWED JOINTS.
4. DIMENSIONS d1, d2, AND d3 SHOWN IN METHOD A SHALL BE IN ACCORDANCE WITH THE PREFORMED COMPRESSION SEAL MANUFACTURER'S RECOMMENDATION.
5. REFER TO DMS-6310 "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
6. FOR SAWED LONGITUDINAL JOINT, LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT, USE JOINT SEALANT CLASS 5 OR 8 UNLESS OTHERWISE SHOWN ON THE PLAN OR APPROVED.
7. FOR TRANSVERSE SAWED CONTRACTION, TRANSVERSE FORMED EXPANSION JOINT, AND ISOLATION JOINT USE JOINT SEALANT CLASS 5 OR 8 AT NEW JOINTS. USE JOINT SEALANT CLASS 4,5,7,OR 8 FOR MAINTAINING EXISTING JOINTS.
8. THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 "CLEANING AND SEALING JOINTS" OR ITEM 713 "CLEANING AND SEALING JOINTS AND CRACKS (CONCRETE PAVEMENT)".
9. ISOLATION JOINTS ACCOMMODATE HORIZONTAL AND VERTICAL MOVEMENTS THAT OCCUR BETWEEN A PAVEMENT AND A STRUCTURE. ISOLATION JOINTS MAY BE USED FOR BRIDGE ABUTMENTS, INTERSECTIONS, CURB AND GUTTER, OLD AND NEW PAVEMENTS, OR AROUND DRAINAGE INLETS, MANHOLES, FOOTINGS AND LIGHTING STRUCTURES.

Texas Department of Transportation — Design Division Standard

CONCRETE PAVING DETAILS

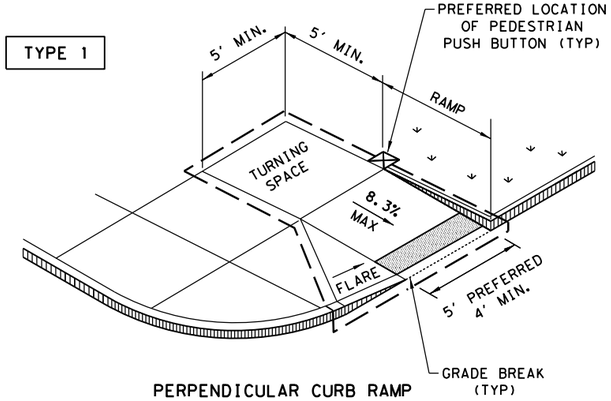
JOINT SEALS

JS-14

FILE: js14.dgn	DN: TxDOT	DN: HC	DW: HC	CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		90

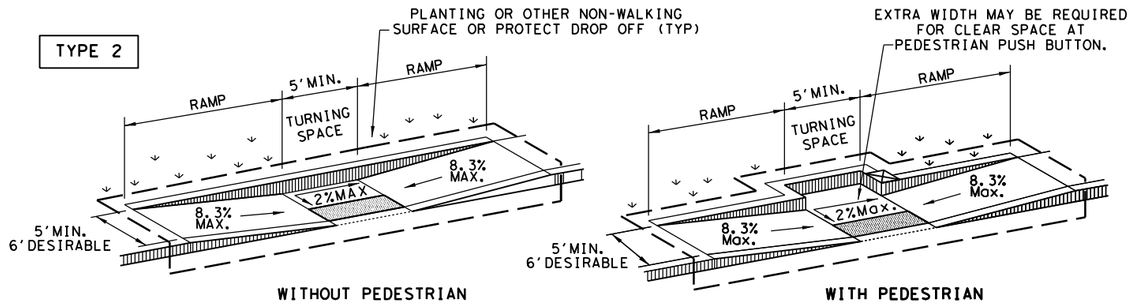
DATE: 4/20/2023
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\03-RDWY\Stds-01\ped18.dgn

TYPE 1



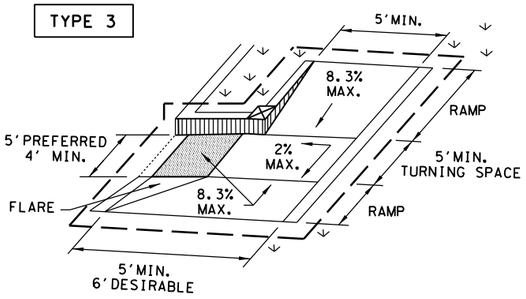
PERPENDICULAR CURB RAMP

TYPE 2

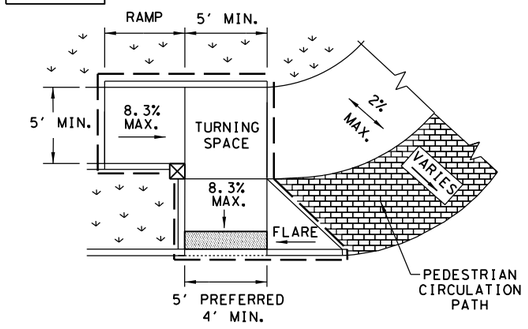


PARALLEL CURB RAMP

TYPE 3

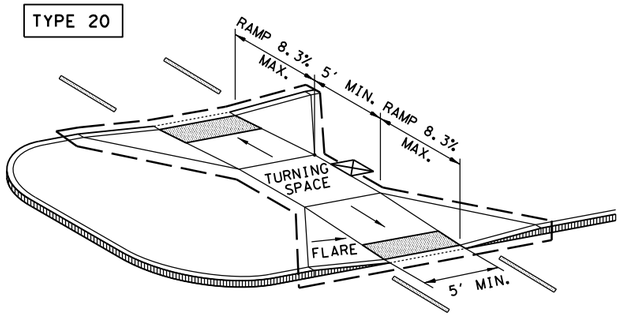


TYPE 6



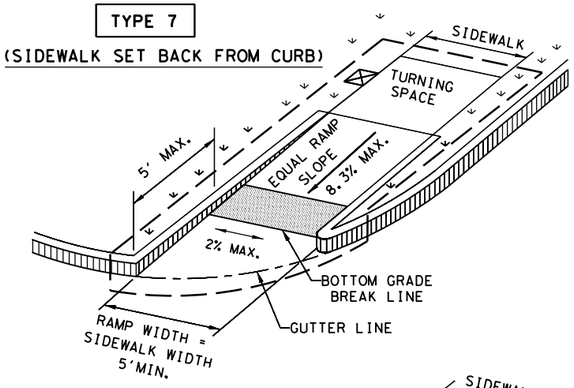
COMBINATION CURB RAMPS

TYPE 20

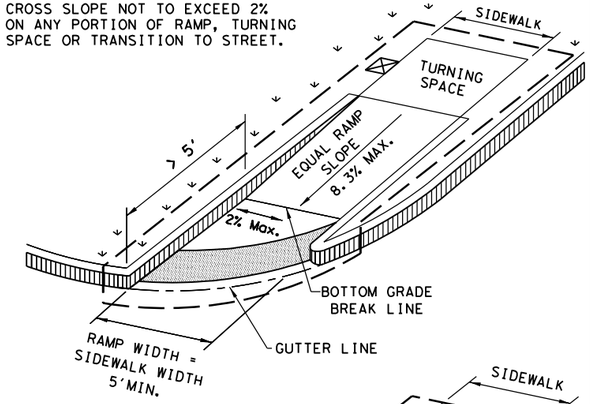


CURB RAMPS AT MEDIAN ISLANDS

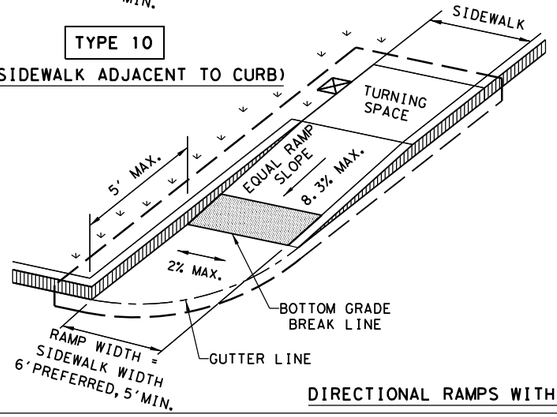
TYPE 7
(SIDEWALK SET BACK FROM CURB)



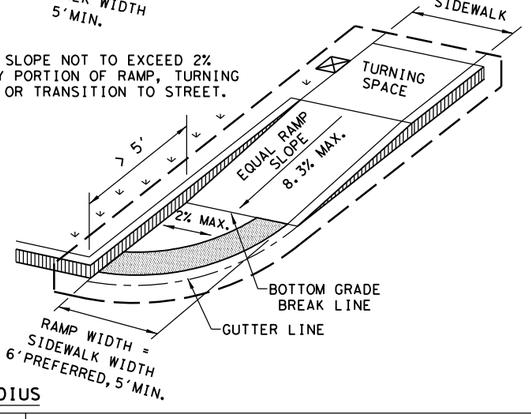
CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



TYPE 10
(SIDEWALK ADJACENT TO CURB)

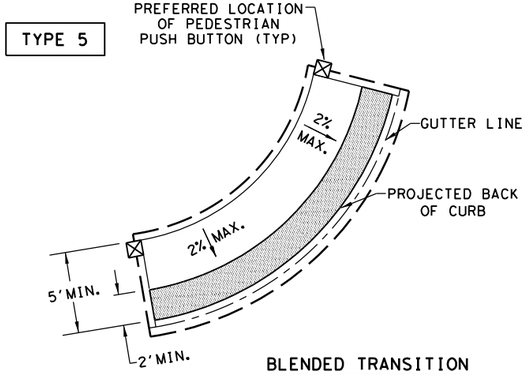


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

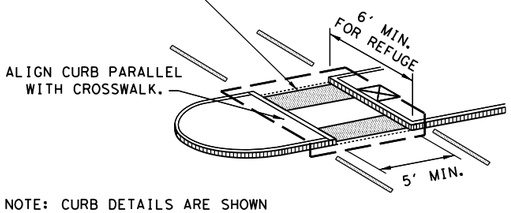
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

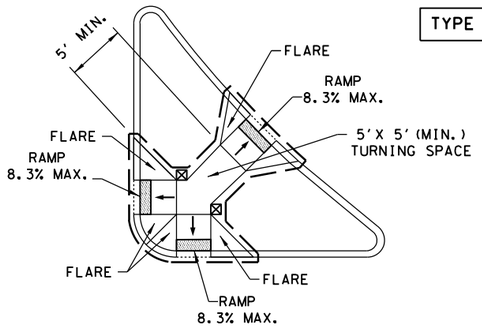
TYPE 21

INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.

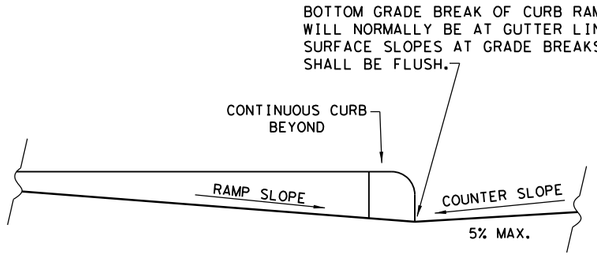


NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		91

DATE: 4/20/2023
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\03-RDWY\Srds-01\ped18.dgn

GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
5. Turning Spaces shall be 5'x 5' minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicalble standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

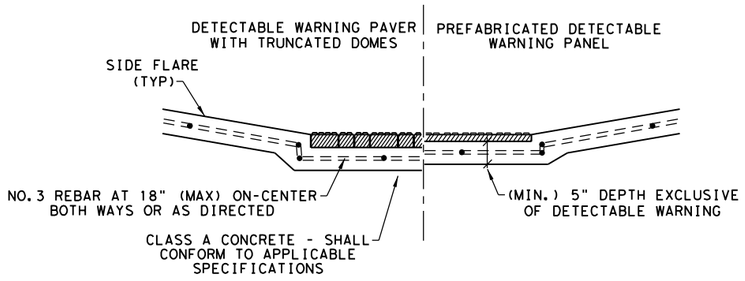
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

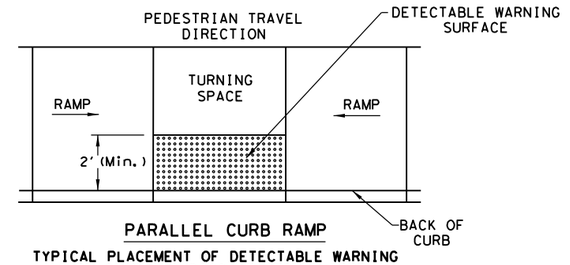
SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.



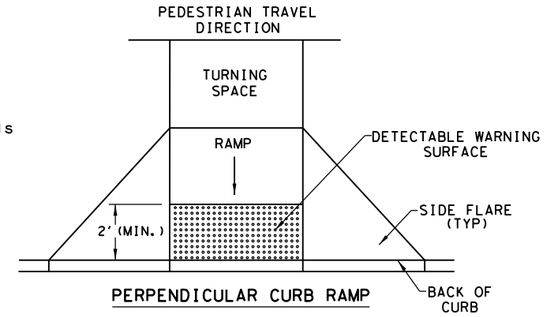
SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

DETECTABLE WARNING SURFACE DETAILS



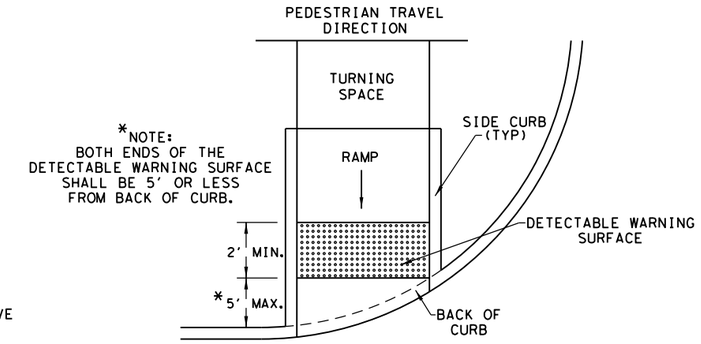
PARALLEL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.



PERPENDICULAR CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation | Design Division Standard

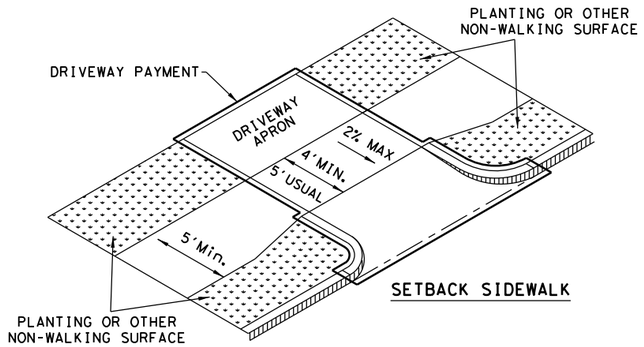
PEDESTRIAN FACILITIES
CURB RAMPS

PED-18

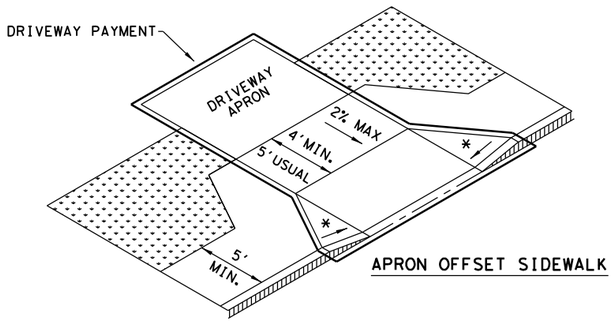
FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0483	01	052		SH 97
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY			SHEET NO.
	LRD	LA SALLE			92

DATE: 4/20/2023
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\03-RDWY\Srds-01\ped18.dgn

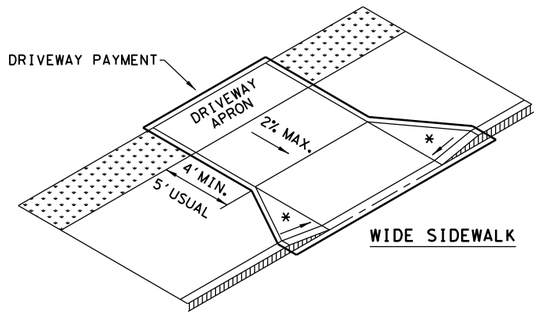
SIDEWALK TREATMENT AT DRIVEWAYS



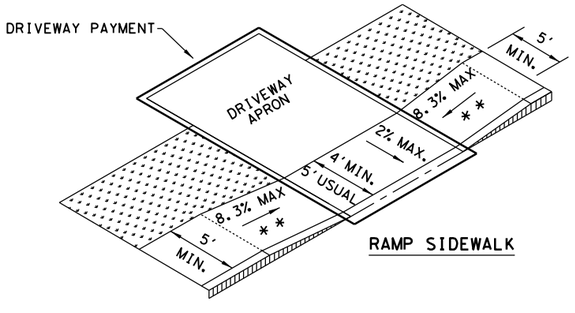
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

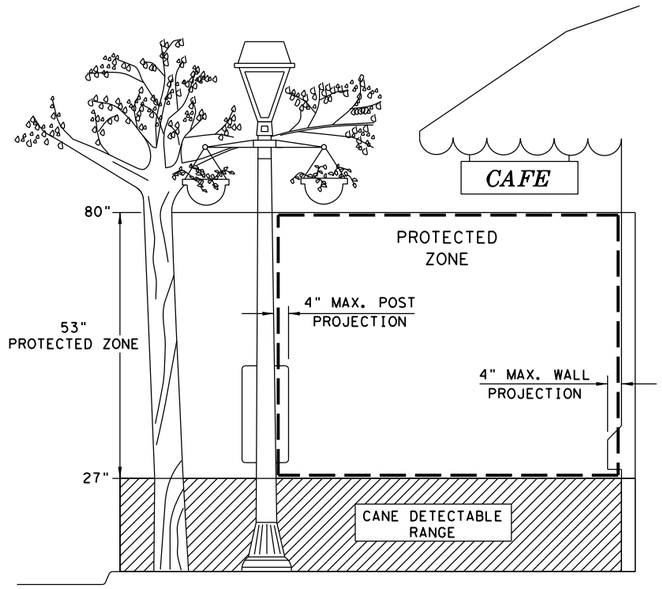


RAMP SIDEWALK

NOTES:

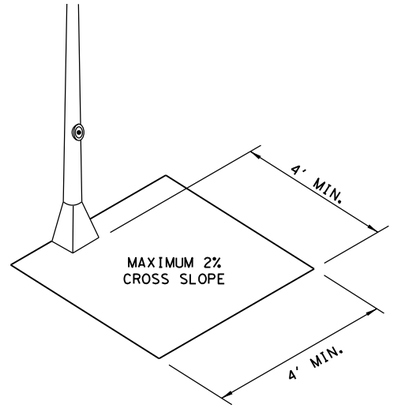
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

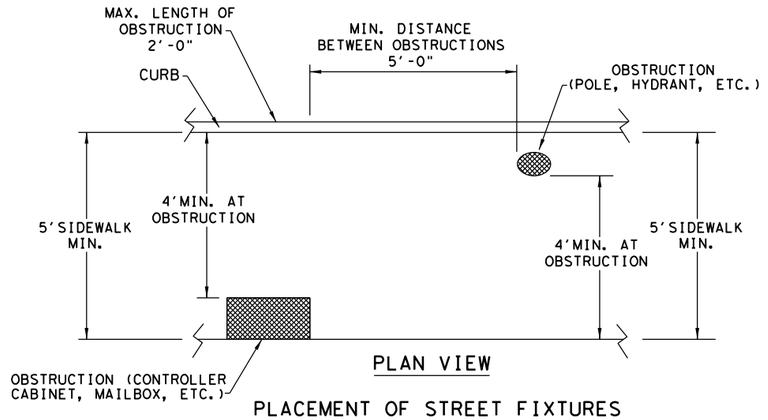


PROTECTED ZONE

NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



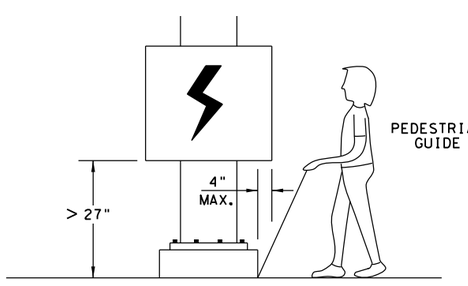
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



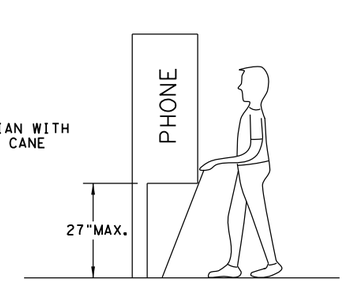
PLAN VIEW

PLACEMENT OF STREET FIXTURES

NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.



PROTRUDING OBJECTS OF A HEIGHT ≤ 27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation

Design Division Standard

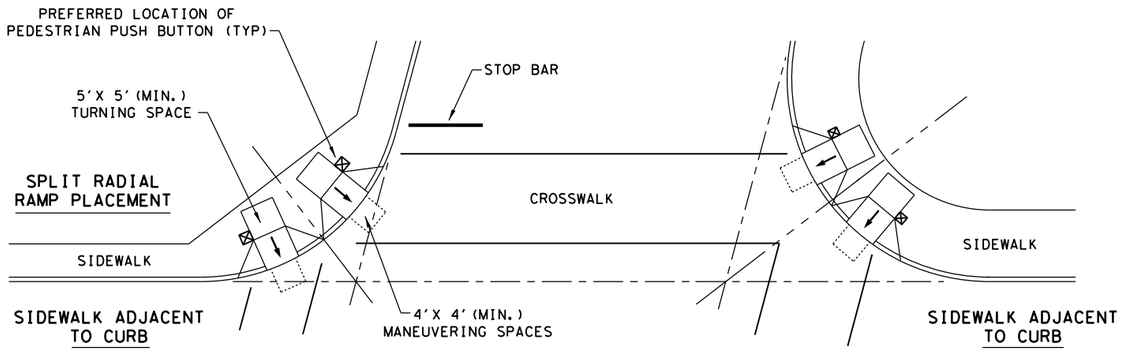
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

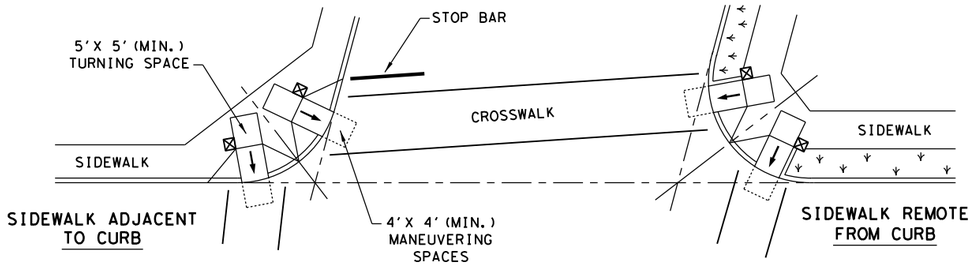
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		93

DATE: 4/20/2023
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\03-RDWY\Stds-01\ped18.dgn

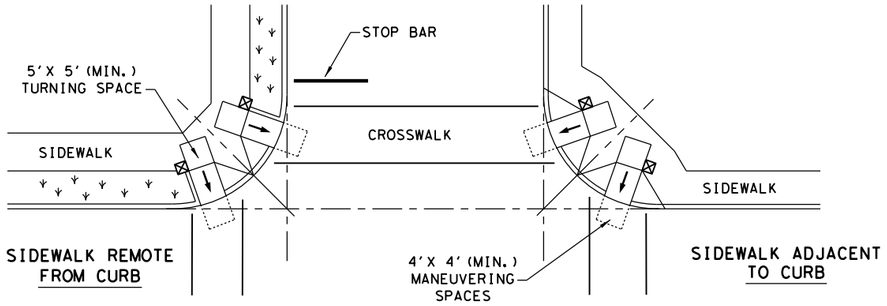
TYPICAL CROSSING LAYOUTS
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



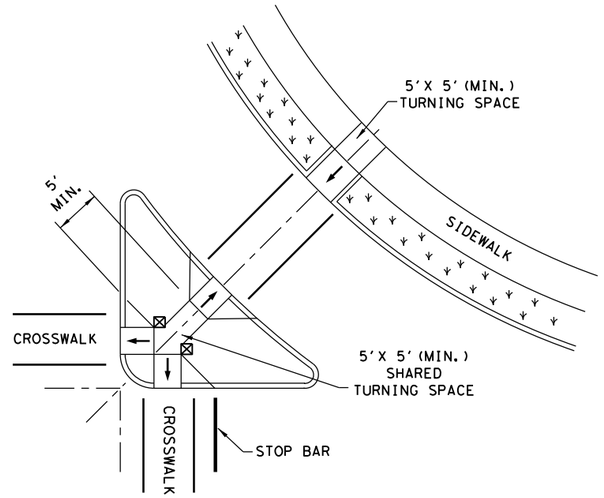
SKEWED INTERSECTION WITH "LARGE" RADIUS



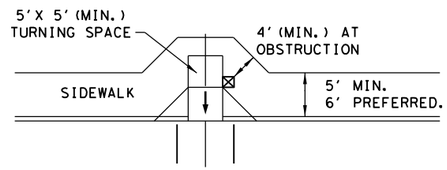
SKEWED INTERSECTION WITH "SMALL" RADIUS

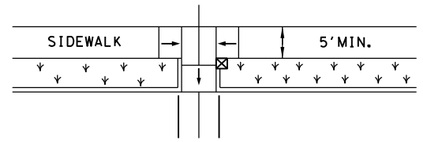


NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND





MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ⊠

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES
CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0483	01	052		SH 97
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY			SHEET NO.
	LRD	LA SALLE			94

DATE: 4/20/2023
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\03-ROW\Stds-01\sgt10s3116.dgn

NOTE: STEEL I-BEAM POST W6 X 8.5 (6'-0") PN: 533G
STANDARD WOOD BLOCKOUTS (6"X8"X14") PN: 4076B
AT (POSTS 2 THRU 8)

⅝" X 10" HGR BOLT PN: 3500G
⅝" HGR NUT PN: 3340G

LINE AT THE BACK OF POST #2 THRU #8

FROM THE CENTERLINE OF POST(1) & POST(0)

ANCHOR PADDLE PN: 15204A

ANGLE STRUT PN: 15202G

16"

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3) POST(2) POST(1) POST(0)

PLAN VIEW

MASH TEST LEVEL 3 (TL-3) LENGTH OF SoftStop TERMINAL (50'-9 ½")

BEGIN LENGTH OF NEED

DO NOT BOLT ANCHOR RAIL TO - POST (2)

SEE DETAIL 1

TRAFFIC FLOW

50'-9 ½" STANDARD INSTALLATION LENGTH (MASH TL-3 SoftStop)

BEGIN STANDARD MBGF

END PAYMENT FOR SGT

6¼" 3'-1 ½" 6'-3" 6'-3"

ANCHOR RAIL WITH SLOTS - (THREADED THRU HEAD)
SEE SoftStop MANUAL FOR COMPLETE DETAILS

MIDDLE SLOT CUTOUT (1) 1 ¾" X 6'-10 ¼"

OUTSIDE SLOTS CUTOUT (2) ½" X 6'-9 ⅝"

SoftStop FACE SEE GN(3) & NOTE: B

MBGF LAPPED IN DIRECTION OF TRAFFIC FLOW

25'-0" DOWNSTREAM W-BEAM GUARDRAIL PN: 61G

SoftStop ANCHOR RAIL (12GA) PN: 15215G

3'-1 ½" (+/-) 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 5'-8" 4'-7"

ANCHOR PADDLE PN: 15204A

END OF ANCHOR RAIL PN: 15215G

SEE NOTE: A

SEE NOTE: C

POST 32" HEIGHT

31" RAIL HEIGHT

RAIL 25'-0" PN: 61G

RAIL 25'-0" PN: 15215G

(8) ⅝"x 1- ¼" GR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

(8) ⅝"x 1- ¼" HGR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

POST 40" DEPTH (TYP 1-8)

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

13/16" DIA. YIELDING HOLES

SEE DETAIL 3

6'-1⅜"

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3) POST(2) 6'-0" (SYTP) PN: 15000G POST(1) 4'-9 ½" SYTP PN: 15203G POST(0) 6'-5 ⅜" PN: 15205A

ELEVATION VIEW

HARDWARE FOR POST(2) THRU POST(8)
(1) ⅝"x 10" HGR BOLT PN: 3500G
(1) ⅝" HGR HEX NUT PN: 3340G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

ALTERNATE BLOCKOUT SEE GENERAL NOTE: 6

4" X 7 ½" X 14" BLOCKOUT COMPOSITE PN: 6777B

6" X 8" X 14" BLOCKOUT WOOD PN: 4076B

NOTE: DO NOT BOLT ANCHOR RAIL TO POST(2)

8" 6" 14"

⅝" HGR NUT PN: 3340G

⅝" X 10" HGR POST BOLT PN: 3500G

13/16" DIAMETER YIELDING HOLES LOCATED IN FLANGES

FINISHED GRADE

(HOLES APROXIMATELY CENTERED AT FINISHED GRADE)

ISOMETRIC VIEW POST(1 & 2)

W6 X 8.5 I-BEAM POST SHOWING STANDARD WOOD BLOCKOUT

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

(1) ⅝" X 1 ¾" HEX HD BOLT PN 3391G

ANGLE STRUT PN: 15202G

(2) ⅝" WASHERS PN 4372G

(1) ⅝" HGR HEX NUT PN 3340G

DETAIL 1

SHOWN AT POST(1) NEAR GROUND

(1) ⅝" HEX NUT

(1) ⅝" X 1- ½" HEX HD BOLT-GR-5 PN: 105286

(2) ⅝" ROUND WASHERS PN: 3240G

DETAIL 2

SHOWN AT POST(1)

ANCHOR KEEPER PLATE (24 GA) PN: 15207G

ANCHOR PLATE WASHER ½" THICK PN: 15206G

1" ROUND WASHER F463 PN: 4902G

(2) ⅝" X 2 ½" HEX HD BOLT GR-5 PN: 105285G

ALTERNATE BLOCKOUT SEE GENERAL NOTE: 6

(2) ⅝" ROUND WASHER (WIDE) PN: 3240G

ANCHOR PADDLE PN: 15204A

(2) ⅝" HEX NUT A563 GR.DH PN: 3245G

1" NUT PN: 3908G SHALL BE SECURELY TIGHTENED AFTER FINAL ASSEMBLY, BUT NOT DEFORMING THE KEEPER PLATE.

W-BEAM FLATTENED (4 PLIES)

ANGLE STRUT PN: 15202G

SEE NOTE: A

(2) ¾" X 2 ½" HEX BOLT (TYP) PN: 3717G

(4) ¾" FLAT WASHER (TYP) PN: 3701G

(2) ¾" HEX NUT (TYP) PN: 3704G

6'-1 ⅜" POST DEPTH

(2) ANCHOR POST ANGLE PN: 15201G

DETAIL 3 AT POST(0)

6'-5 ⅜" (W6 X 15) I-BEAM POST PN: 15205A

TRAFFIC FLOW

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

FINISHED GRADE

LINE POST (3, 4, 5, 6, 7 & 8)

SECTION VIEW B-B

6'-0" (W6 X 8.5)
I-BEAM POST PN: 533G

POST(2)

SECTION VIEW A-A

6'-0" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15000G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

POST 17"- ½" HEIGHT

4'-9 ½"

13/16" DIA. YIELDING HOLES

40"

POST(1)

FRONT VIEW POST(1)

4'-9 ½" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15203G

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

APPROX 5'-10"

5'-0"

50' APPROACH GRADING

2'-0"

STANDARD MBGF

EDGE OF PAVEMENT

NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

2'-0" MAX. RAIL OFFSET

APPROACH GRADING (1V:10H OR FLATTER) SEE PRODUCT ASSEMBLY MANUAL FOR ADDITIONAL GUIDANCE.

APPROACH GRADING AT GUARDRAIL END TREATMENTS

GENERAL NOTES

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

NOTE: A	THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-¾" MIN. TO 4" MAX. ABOVE FINISHED GRADE.
NOTE: B	PART PN: 5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING) PART PN: 5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)
NOTE: C	W-BEAM SPLICE LOCATED BETWEEN LINE POST(4) AND LINE POST(5) GUARDRAIL PANEL 25'-0" PN: 61G ANCHOR RAIL 25'-0" PN: 15215G LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW.

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0")
15205A	1	POST #0 - ANCHOR POST (6'- 5 ⅞")
15203G	1	POST #1 - (SYTP) (4'- 9 ½")
15000G	1	POST #2 - (SYTP) (6'- 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")
6777B	7	BLOCKOUT - COMPOSITE (4" x 7 ½" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (½" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
		HARDWARE
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR.DH
3717G	2	¾" x 2 ½" HEX BOLT A325
3701G	4	¾" ROUND WASHER F436
3704G	2	¾" HEAVY HEX NUT A563 GR.DH
3360G	16	⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	⅝" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	⅝" x 10" HGR POST BOLT A307
3391G	1	⅝" x 1 ¾" HEX HD BOLT A325
4489G	1	⅝" x 9" HEX HD BOLT A325
4372G	4	⅝" WASHER F436
105285G	2	⅝" x 2 ½" HEX HD BOLT GR-5
105286G	1	⅝" x 1 ½" HEX HD BOLT GR-5
3240G	6	⅝" ROUND WASHER (WIDE)
3245G	3	⅝" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE: B

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

Texas Department of Transportation

Design Division Standard

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

FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP		
©TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0483	01	052		SH 97	
	DIST	COUNTY			SHEET NO.	
	LRD	LA SALLE			95	

DATE: 4/20/2023
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\03-ROWY\Stds-01\sgt11s3118.dgn

(SEE GN NOTE 15)
STANDARD 31" MBGF

ITEM (6)
INNER SIDE SLIDER
(ISS) PANEL FOR RAIL 3

FIELD-SIDE
(RAIL 3)

NOTE:
RECESSED HEX NUTS FACING
TRAFFIC-SIDE SEE DETAIL (C)

REFERENCE LINE USED TO INSTALL
LINE POST(9) THRU POST(2)

POST 1 OFFSET DISTANCE MEASURED
7-⅝" FROM REFERENCE LINE

POST 9 POST 8 POST 7 POST 6 POST 5 POST 4 POST 3 POST 2

ITEM (10)
CABLE ASSEMBLY

ITEM (2)
GROUNDSTRUT

NO BLOCKOUT
AT (POST 1)

RAIL 4 RAIL 3 RAIL 2 RAIL 1

CABLES

ITEM (5)
TRAFFIC SIDE SLIDER
(TSS) PANEL FOR RAIL 2

NOTE: SECURE THE (TSS) PANEL TO OUTSIDE
OF RAIL 2 WITH THE PANEL ARROWS
POINTING TOWARDS THE HEAD.

NOTES:
1. ITEM (12) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST(9) THRU LINE POST(2).
2. DO NOT INSTALL A BLOCKOUT AT LINE POST(1).

PLAN VIEW

MBGF RAIL 2
INSTALL GUARD FENCE RECESSED HEX NUTS ON TRAFFIC-SIDE
MBGF RAIL 1

DETAIL (C)

TRAFFIC FLOW

ITEM (25)
MAX-TENSION HEAD
SEE DETAIL (A)

END PAYMENT (SGT) BY EACH

DO NOT BOLT
RAIL TO POST 6

BEGIN LENGTH OF NEED

INSTALLATION LENGTH 55'- ½"

49'-8 ⅝"

6'-3" 6'-3" 6'-3" 6'- ¾" 6'-3" 6'-3" 6'-3" 37 ½" 5'-3 ⅜"

RAIL HEIGHT 31"

ARROWS

DETAIL (D)

RAIL HEIGHT 31"

HEAD HEIGHT

DETAIL (B)

A

32-¼"

68-⅛"

ITEM (13) RAIL 4 ITEM (13) RAIL 3 ITEM (13) RAIL 2 ITEM (13) RAIL 1

FINISHED GRADE

CABLES

FINISHED GRADE

ITEM (10)
CABLE ASSEMBLY

ITEM (2)
GROUNDSTRUT

POST 9 POST 8 POST 7 POST 6 POST 5 POST 4 POST 3 POST 2 POST 1

ITEM (4)
I-BEAM
W6 X 9

NO BLOCKOUT
AT (POST 1)

(8) X-LITE LINE POST - ITEM (11)

SOIL
ANCHOR POST
ITEM (1)

ELEVATION VIEW

TSS PANEL
GALVANIZED
ITEM (5)

RSS PLATE
GALVANIZED
ITEM (8)

INSTALL THE TSS AND RSS
WITH THE ARROWS POINTING
TOWARDS THE MAX-HEAD

TSS PANEL AND RSS PLATE

DETAIL (D)

NOTE:
USE THE MASH APPROVED
X-TENSION CABLE ASSEMBLY.

7 ⅝"
2 ⅛"

UPPER CABLE
(BACK SIDE)

LOWER CABLE
(TRAFFIC SIDE)

DETAIL (B)

HEAD HEIGHT
32-¼"
68-⅛"
ANCHOR POST DEPTH

TOP OF POST
31-⅞"
40-⅛"

FINISHED GRADE

ITEM (1)
ANCHOR

ITEM (11)
LINE POSTS
2 THRU 9
(NOTE: ITEM (4) POST 1 (NOT SHOWN),
TO BE INSTALLED AT SAME DEPTH
AS LINE POSTS.)

SOIL ANCHOR, POST 1
& LINE POST 2 THRU 9

SECTION VIEW A-A

CABLE
FRICTION PLATE
HEAD UNIT
ITEM (9)

NOTE:
INSTALL ⅝" RECESSED HEX
NUTS ON TRAFFIC SIDE.

ITEM (24)
ITEM (21)

ITEM (20)
8X

ITEM (17)
8X

ITEM (23)
6X
3 SCREWS
EACH SIDE

(RAIL 1)

ITEM (22)
BRACKET
SHIPPED FLAT

ITEM (3)

ITEM (16)
4X

* ITEM (25)
HIGH INTENSITY
REFLECTIVE SHEETING

NOTE: DELINEATION MARKER IN
ACCORDANCE WITH TEXAS MUTCD.

SPLICE FOR IMPACT-HEAD
TO GUARD FENCE (RAIL1)

DETAIL (A)

GENERAL NOTES

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

ITEM #	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	⅝" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	¾" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	⅝" X 1 ¼" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	⅝" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	⅝" WASHER F436 STRUCTURAL MGAL	2
20	4001116	⅝" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	⅝" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	¼" X ¾" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	1
* 25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
** 26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
** 27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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

APPROX 5'-10"
5'-0"
50' APPROACH GRADING
STANDARD MBGF
2'-0"
EDGE OF PAVEMENT
NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)
2'-0" MAX. RAIL OFFSET
APPROACH GRADING
(1V:10H OR FLATTER)
SEE PRODUCT ASSEMBLY MANUAL
FOR ADDITIONAL GUIDANCE.

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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

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

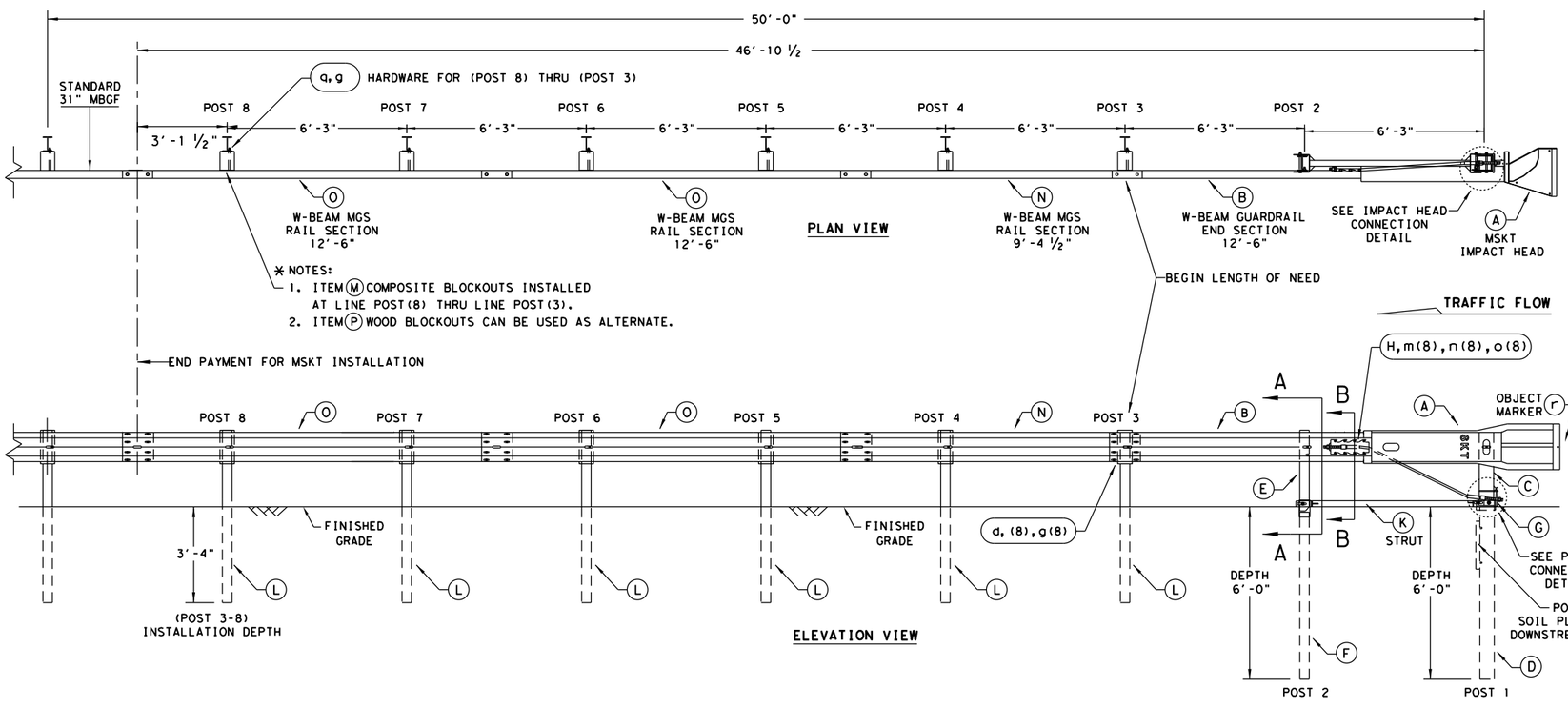
Texas Department of Transportation

Design Division Standard

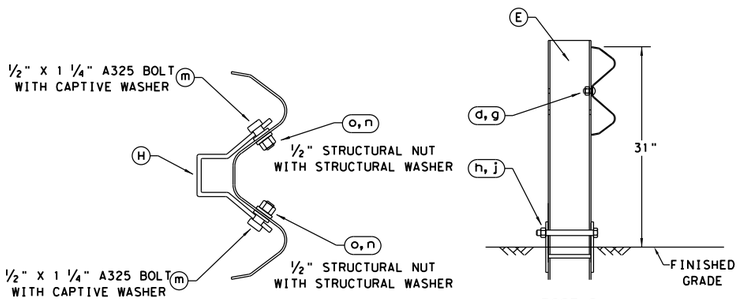
MAX-TENSION END TERMINAL
MASH - TL-3
SGT(11S)31-18

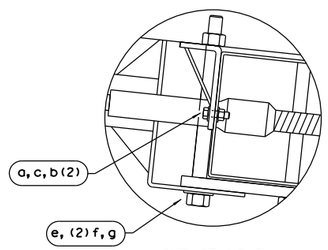
FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		96

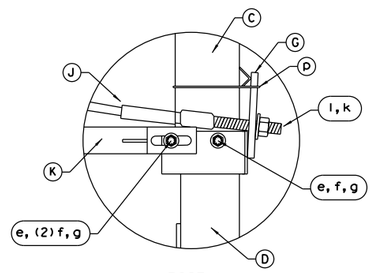
DATE: 4/20/2023
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\03-RDWY\Srds-01\sgt12s3118.dgn

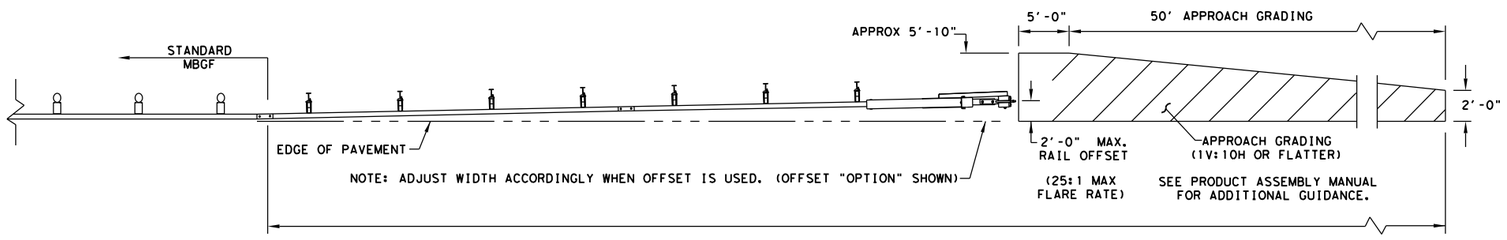


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.









NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

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: *

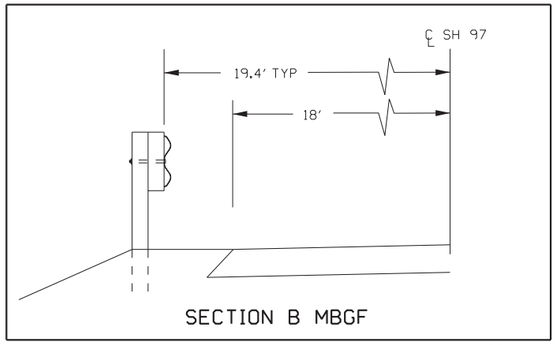
ALTERNATIVE ITEMS NOT SHOWN. * *
* ITEM(P) 8" WOOD-BLOCKOUT
* * ITEM(Q) 25'GUARD FENCE PANEL

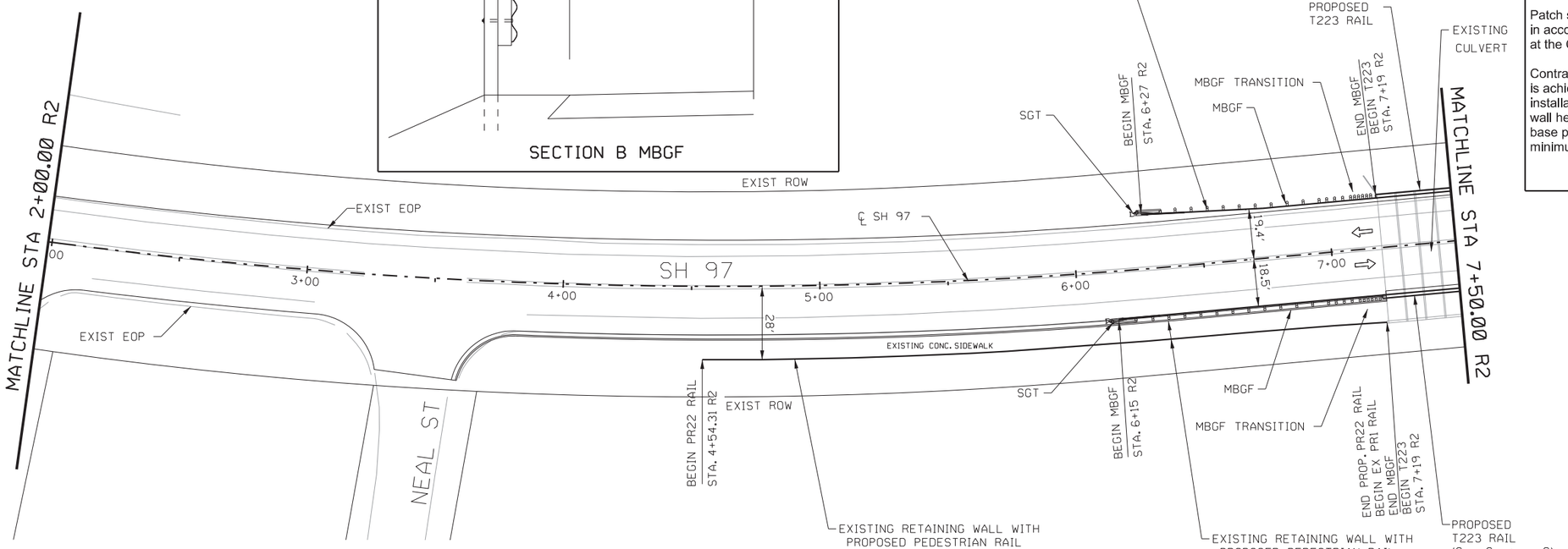
Texas Department of Transportation

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	0483	01	052	SH 97	
	DIST	COUNTY		SHEET NO.	
	LRD	LA SALLE		97	





Use 5/8" Anchor Bolts as shown in PR22.

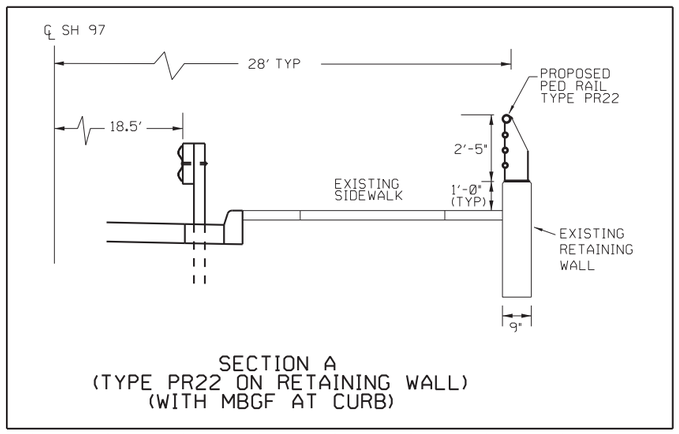
Core drill and grout 5/8"anchor bolts per construction and material notes on Type PR22 standard.

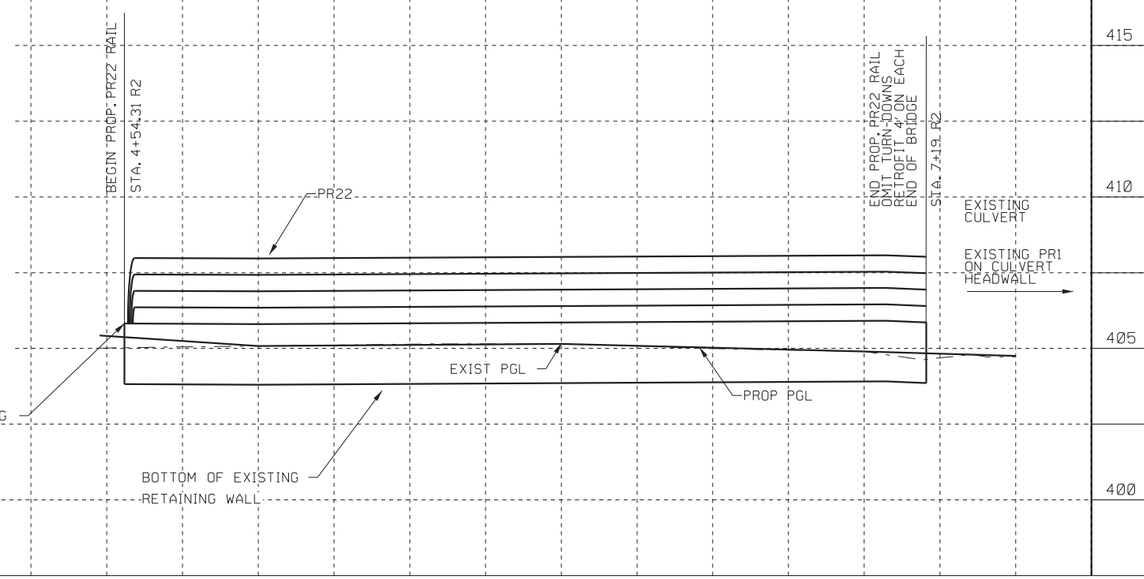
Percussion drilling is not permitted.

Patch spalls, when directed by the Engineer, in accordance with Item 429, "Concrete Structure Repair", at the Contractor's expense.

Contractor to ensure minimum top rail mounting height of 34" is achieved measured from top of sidewalk to top of rail prior to installation along length of retaining wall. If existing retaining wall height falls below 11", contractor to recommend additional base plate spacer and longer Anchor Bolts as necessary for minimum 34" installation height.

PR22
Post Mounting Notes





$PLTDRV$$
$TIME$$
$DATE$$
$FILE$$

STATE OF TEXAS
JAMES G. COWART
83899
LICENSED
PROFESSIONAL ENGINEER
6/1/2021

FIRM REGISTRATION NO. F-12460
CW ENGINEERING, LLC

Texas Department of Transportation

BGE, Inc.
7000 North Mopac, Suite 330, Austin, TX 78731
Tel: 512-879-0400 • www.browngay.com
TBPE Registration No. F-1046

SH 97

RAIL LAYOUTS

STA 2+00 R2 TO STA 7+50 R2

SHEET 1 OF 3

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		98

STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

TYPE T223 RAIL (SECTION D)

END T223 RAIL BEGIN MBGF STA. 7+87.13 R2

MBGF TRANSITION

MATCHLINE STA 7+50.00 R2

MBGF

EXIST ROW

℄ SH 97

SH 97

8+00 9+00 10+00 11+00 12+00

19.4′ 18.5′ 19.5′ 18.5′ 19.4′ 18.5′

28′

EXISTING CONC. SIDEWALK

T223 RAIL

PR22 RAIL

EXIST ROW

TYPE T223 AT CURB (SEE SECTION C)

END PROP. PR22 RAIL OMIT TURN-DOWN BEGIN EXS. PR1 RAIL STA. 12+05.95 R2

END EXS. PR1 RAIL BEGIN PROP. PR22 RAIL OMIT TURN-DOWN STA. 12+29.28 R2

EXISTING CULVERT

EXISTING HEADWALL WITH EXISTING PEDESTRIAN RAIL

EXISTING RETAINING WALL WITH PROPOSED PEDESTRIAN RAIL WITH TYPE T223 AT CURB (SEE SECTION E)

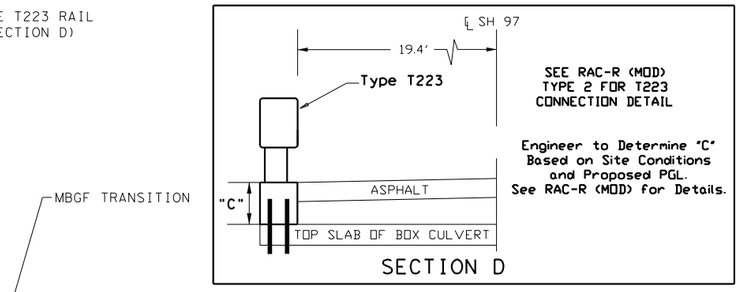
MATCHLINE STA 13+00.00 R2

REPLACE PORTION OF CULVERT TOP SLAB - SEE DETAIL THIS SHEET. WORK TO BE SUBSIDIARY TO ITEM 420.

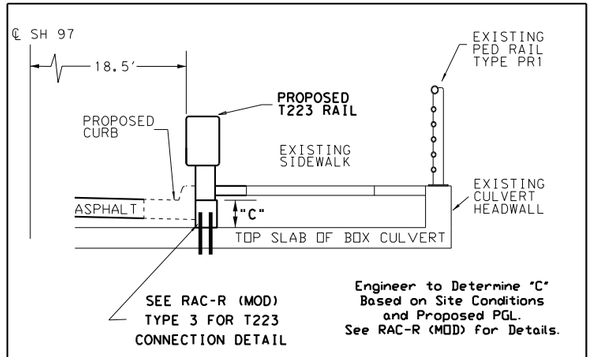
EXISTING HEADWALL WITH EXISTING PEDESTRIAN RAIL WITH TYPE T223 AT CURB (SEE SECTION C)

END EXS. PR1 RAIL BEGIN PROP. PR22 RAIL OMIT TURN-DOWN STA. 7+87.13 R2

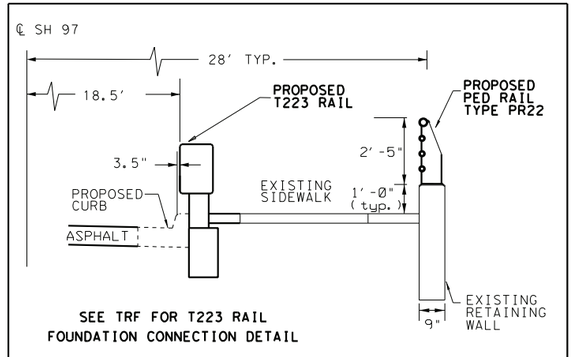
EXISTING RETAINING WALL WITH PROPOSED PEDESTRIAN RAIL WITH TYPE T223 AT CURB (SEE SECTION E)



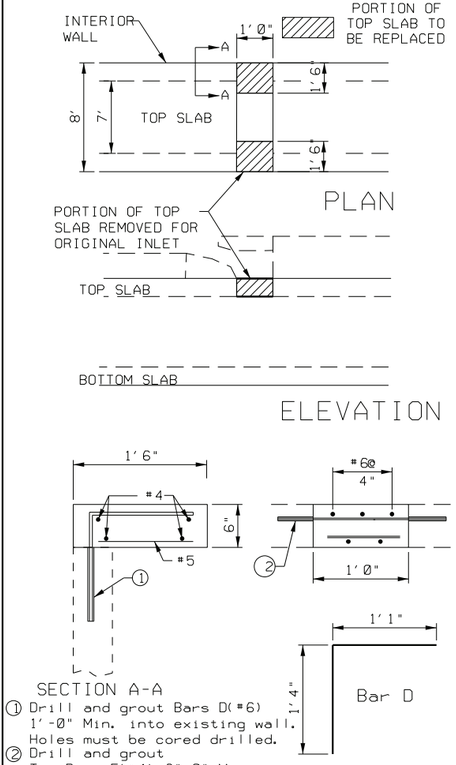
SECTION D



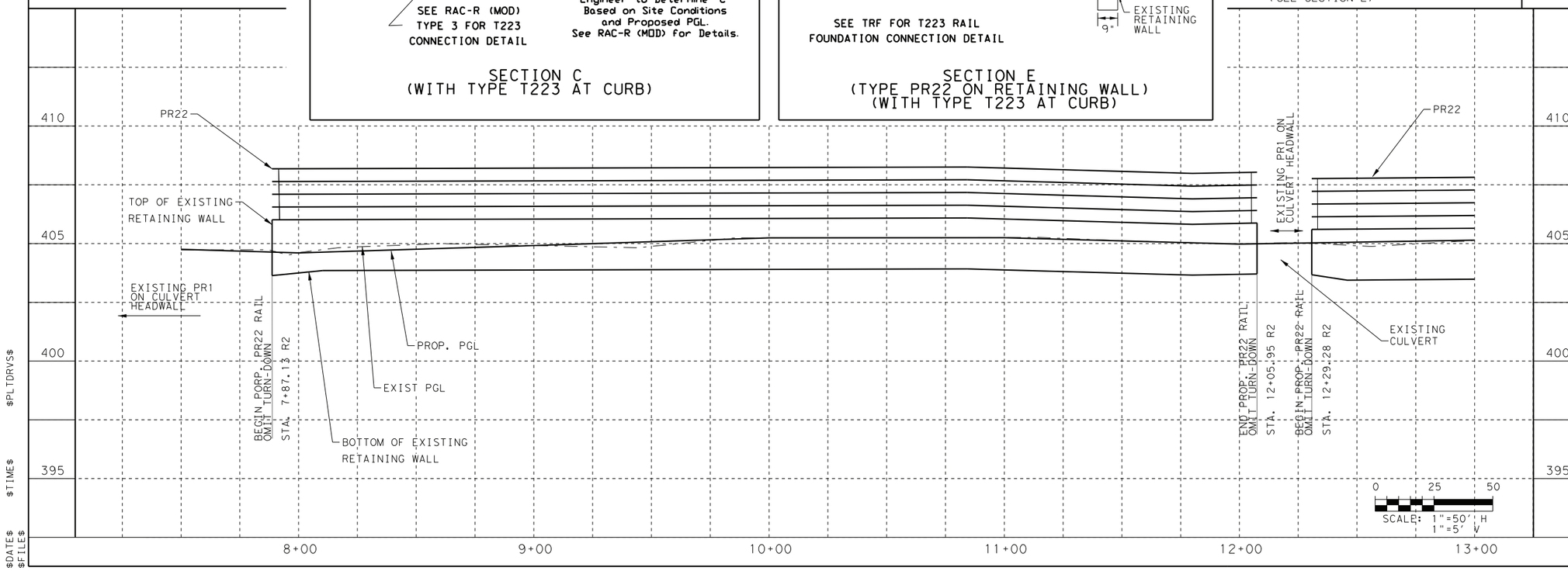
SECTION C
(WITH TYPE T223 AT CURB)



SECTION E
(TYPE PR22 ON RETAINING WALL)
(WITH TYPE T223 AT CURB)



CULVERT TOP SLAB REPAIR
STATION 7+50 RT



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STATE OF TEXAS
JAMES G. COWART
83899
LICENSED PROFESSIONAL ENGINEER
5-25-23

FIRM REGISTRATION NO. F-12460

CW ENGINEERING, LLC

Texas Department of Transportation

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7000 North Mopac, Suite 330, Austin, TX 78731
Tel: 512-879-0400 • www.browngay.com
TBPE Registration No. F-1046

SH 97

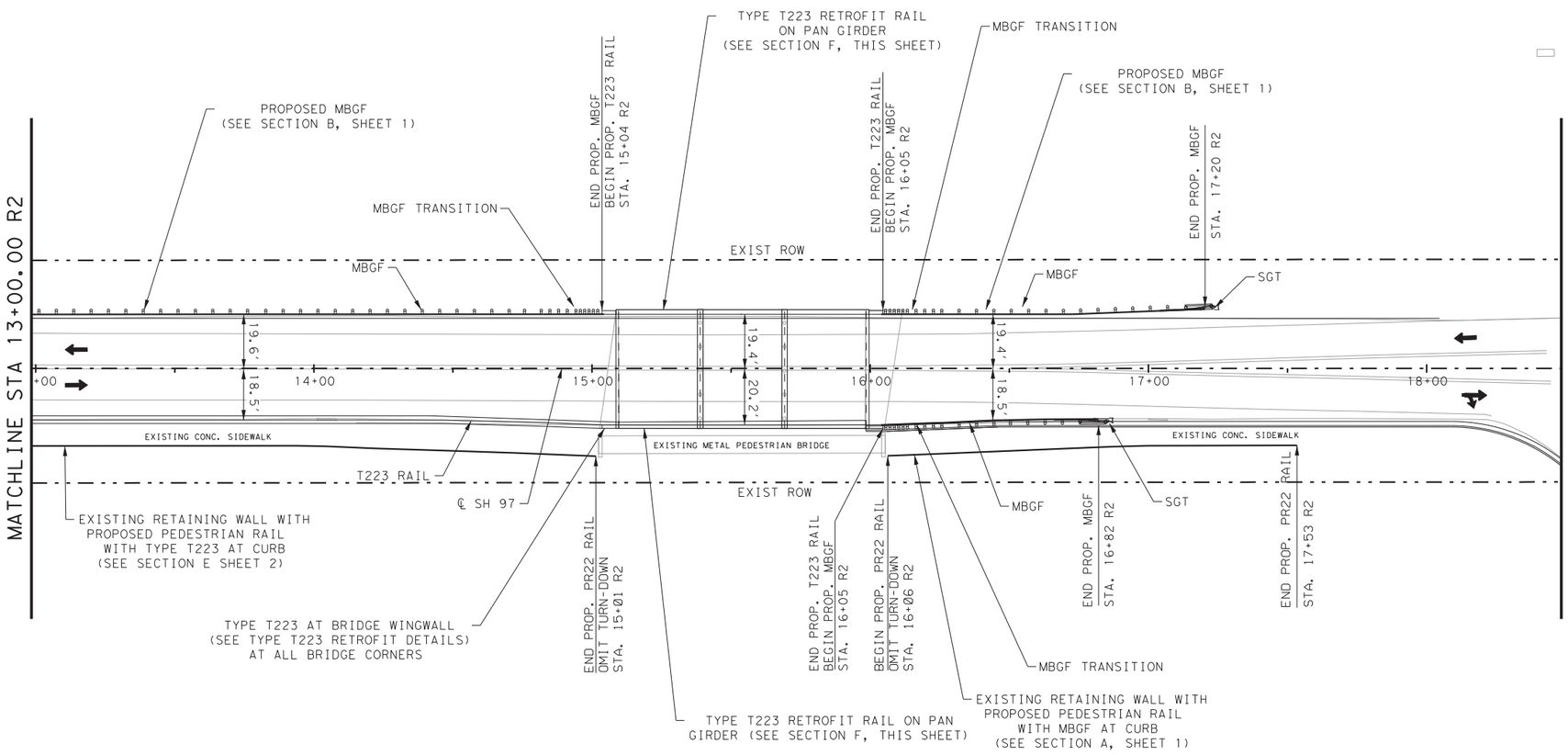
RAIL LAYOUTS

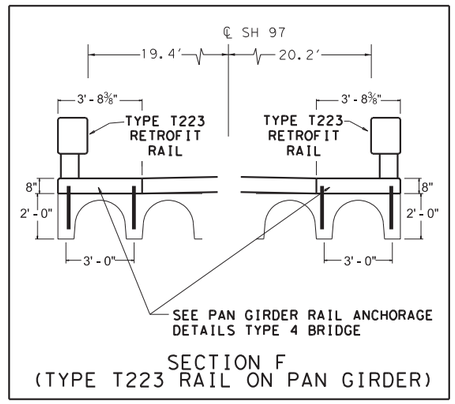
STA 7+50 R2 TO STA 13+00 R2

SHEET 2 OF 3

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		99

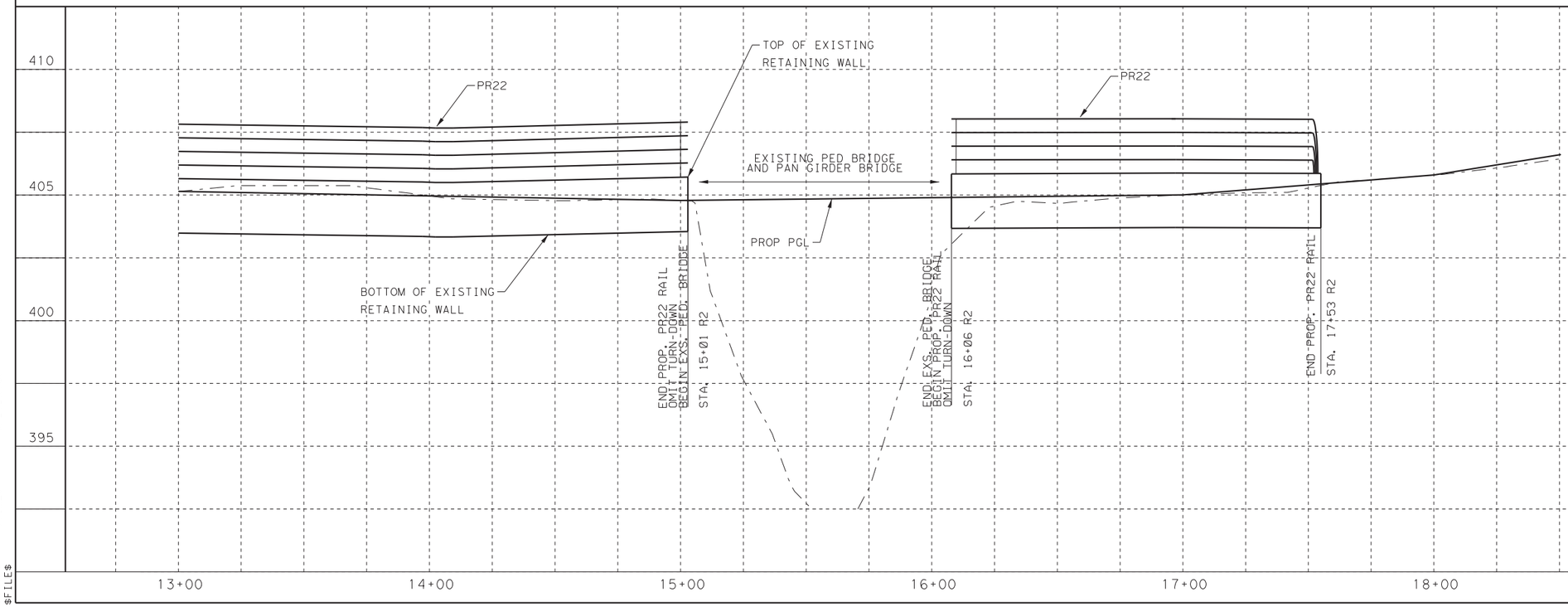
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97





SECTION F
(TYPE T223 RAIL ON PAN GIRDER)

0 25 50
SCALE: 1"=50' H
1"=5' V



$PLTDRVS$
$TIME$
$DATE$
$FILE$

STATE OF TEXAS
JAMES G. COWART
83899
LICENSED
PROFESSIONAL ENGINEER
6/1/2021

FIRM REGISTRATION NO. F-12460

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SH 97

RAIL LAYOUTS

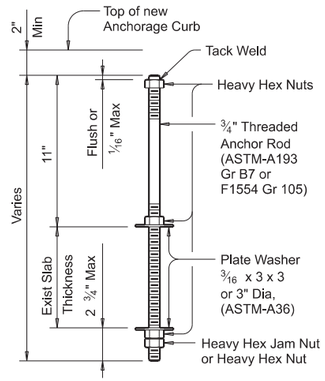
STA 13+00 R2 TO STA 18+50 R2

SHEET 3 OF 3

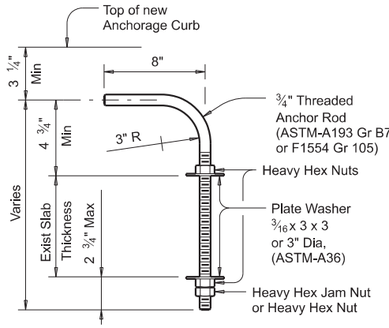
FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		100

STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

DATE:
FILE:

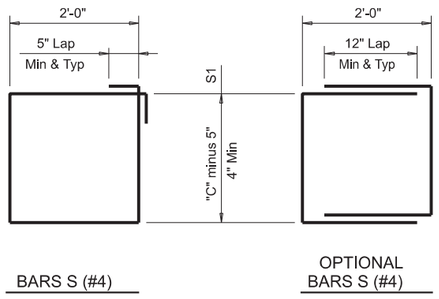


STRAIGHT ANCHOR (9)



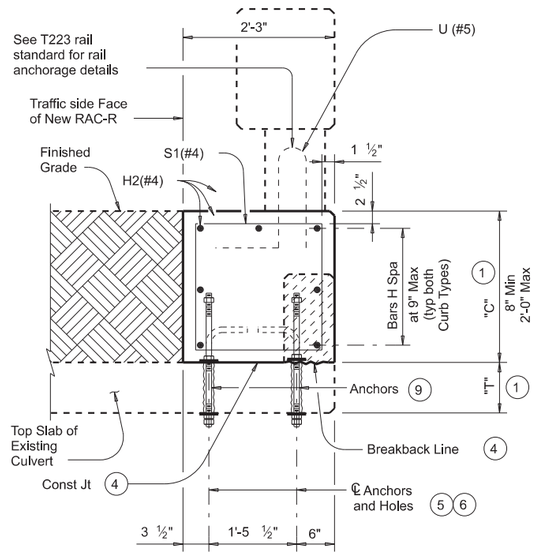
HOOKED ANCHOR (9)

ANCHOR DETAILS



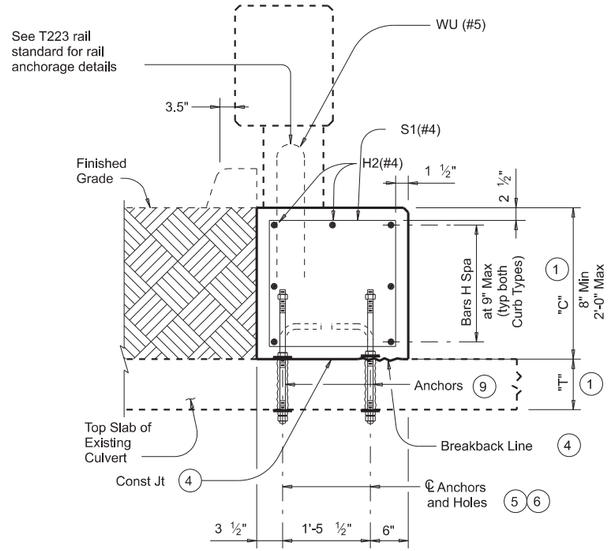
BARS S (#4)

OPTIONAL BARS S (#4)



TYPICAL SECTION ~ TYPE 2

Showing T223 Rail. (Bars L(#5) on T223 and C223 Rails are not used for this structure).



TYPICAL SECTION ~ TYPE 3

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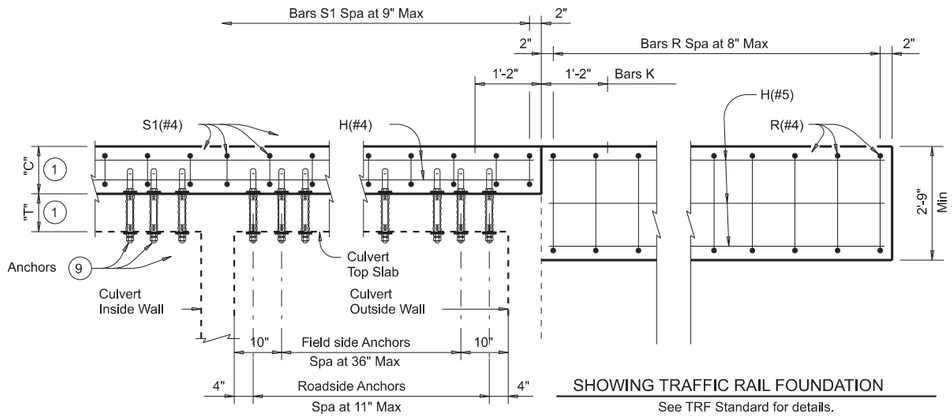


SHOWING CULVERT ANCHORAGE CURB

Showing Anchorage Curb Type 2. Anchor and Bars S spacing are the same for Anchorage Type 3.

SHOWING TRAFFIC RAIL FOUNDATION

See TRF Standard for details.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

The rail anchorage curb details have sufficient strength for use with all standard rail types.

See appropriate rail standard for approved speed restrictions, notes and details not shown.

For vehicle safety, the top of the new curb must be flush with the finished grade. These details are for use with curbs with a maximum height of 2'-0" only. Curb heights greater than 2'-0" will require special design.

Payment for rail anchorage curb (including wingwall curb slab) will be by CY of Class "C" or Class "C"(HPC) concrete.

Not all possible combinations of existing box culverts, curbs, wingwalls etc. have been shown on this sheet. Other combinations and reinforcement arrangements are permissible if they meet the same strength requirements as indicated on this sheet.

MATERIAL NOTES:

Provide Class "C" concrete (f'c=3,600 psi). Provide Class "C" (HPC) concrete if shown elsewhere in the plans.

Chamfer all exposed corners ¾" unless shown otherwise.

Provide Grade 60 reinforcing steel.

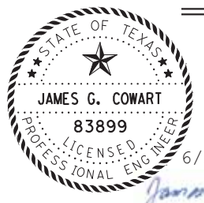
Galvanize all steel components except reinforcing bars, unless otherwise shown on plans.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

1. "T" is equal to the existing culvert top slab thickness. "C" is equal to the Retrofit Rail Anchorage Curb thickness.
2. Note Not Used.
3. Remove shaded portion of existing concrete to Breakback Line shown. Care must be taken so as to not damage existing reinforcing. Replace damaged reinforcing with new, like reinforcing. Clean existing reinforcing and incorporate into new concrete construction.
4. Saw cut (score) 1" deep flush with top of existing culvert slab, on the field side face of existing curb, if present. After scoring, remove shaded portion of existing concrete to Breakback Line shown. Do not damage existing reinforcing. Clean, bend and incorporate existing reinforcing into new concrete construction. Note that new anchors, as shown in the detail, are required even when existing reinforcing remains in use. Remove existing overlay and/or base material to flush with top of culvert in areas of new construction. Care must be taken to not damage the existing slab. In order to prevent existing asphalt remnants from acting as a bond breaker between the exposed, existing concrete and the retrofitted concrete curb, clean the newly exposed concrete with abrasive blasting or shot blasting. Remove all loose debris prior to placing new anchorage curb.
5. Core drill 1" diameter holes through existing slab. Percussion drilling is not permitted. Patch spalls, when directed by the Engineer, in accordance with Item 429, "Concrete Structure Repair", at the Contractor's expense. Tighten nuts snug tight.
6. Space field side anchors at 36" maximum. Space traffic side anchors at 11" maximum. Do not align field side and traffic side anchors transversely.
7. Note Not Used.
8. Note Not Used.
9. Use straight anchors if retrofit anchorage curb is 1'-2" or greater in thickness. Use hooked anchors for retrofit anchorage curb less than 1'-2" thick.

TYPICAL ELEVATIONS OF INSTALLATION

Type 2 and Type 3 RAC-R (MOD)



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SHEET 1 OF 1

Texas Department of Transportation

Bridge Division Standard

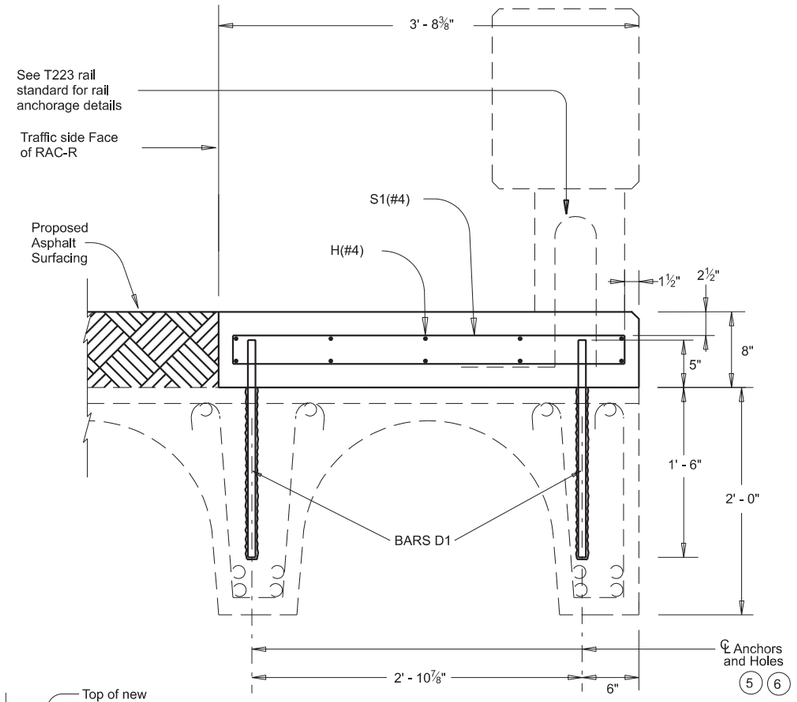
RAIL ANCHORAGE CURB RETROFIT GUIDE

RAIL MOUNTING DETAILS

RAC-R (MOD)

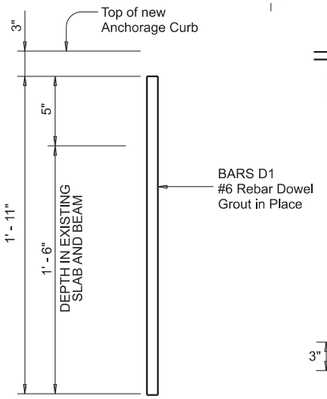
FILE: racsts02.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS 05-11: Gen Notes, T101 Anchor PL. 07-12: Width. 02-15: Payment note. 03-16: Notes and Typ Curb Plans.	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		101

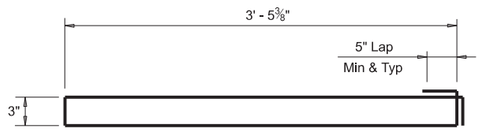
DATE:
FILE:



TYPE 4 BRIDGE

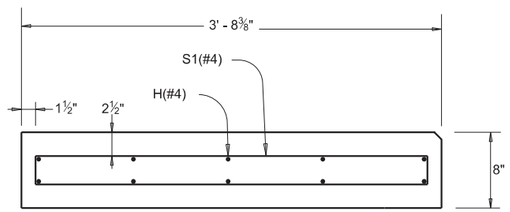
Showing T223 Rail. (Bars L(#5) on T223 Rail are not used for this structure).





BARS S1 (#4)

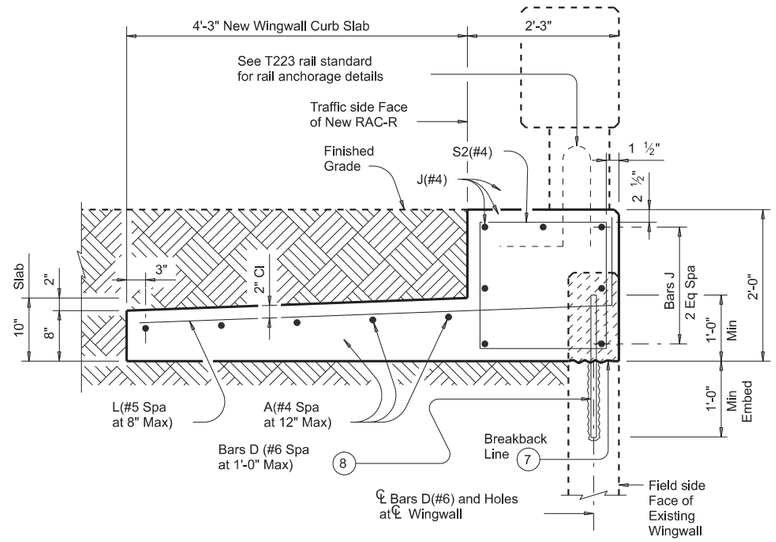
ANCHOR DETAILS



CURB DETAILS

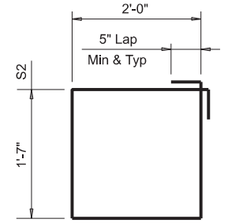
H (#4) bars placed 10" C - C.

1. Note Not Used.
2. Note Not Used.
3. Note Not Used.
4. Note Not Used.
5. Core drill and grout Bars D1 (#6) 1" diameter holes into existing slab. Percussion drilling is not permitted. Patch spalls, when directed by the Engineer, in accordance with Item 429, "Concrete Structure Repair", at the Contractor's expense.
6. Space field side anchors at 36" maximum. Space traffic side anchors at 11" maximum. Do not align field side and traffic side anchors transversely.
7. Retrofit Wingwall Anchorage Curb must always be 2'-0" in height. Breakback existing wingwall as needed in order to properly align the wingwall Anchorage Curb with that placed on the existing bridge. Saw cut (score) 1" deep on field side face of the existing wingwall prior to breakback. Care must be taken so as to not damage existing reinforcing. Clean and extend existing reinforcing into new construction. Note that new Bars D(#6), as shown in the detail, are required even when existing reinforcing remains in use.
8. Drill and grout Bars D(#6) 1'-0" Min into existing wingwall. If existing wingwall thickness is less than 8", a special design will be required. Holes must be core drilled. Percussion drilling is not permitted.

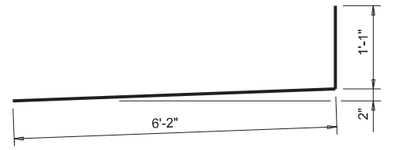


TYPE 4 BRIDGE WINGWALL

Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure).



BARS S2 (#4)



BARS L (#5)

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
The rail anchorage curb details have sufficient strength for use with all standard rail types.
See appropriate rail standard for approved speed restrictions, notes and details not shown.
For vehicle safety, the top of the new curb must be flush with the finished grade.
Payment for rail anchorage curb (including wingwall curb slab) will be by CY of Class "C" or Class "C"(HPC) concrete.

MATERIAL NOTES:

Provide Class "C" concrete (f'c=3,600 psi). Provide Class "C" (HPC) concrete if shown elsewhere in the plans.
Chamfer all exposed corners ¾" unless shown otherwise.
Provide Grade 60 reinforcing steel.
Galvanize all steel components except reinforcing bars, unless otherwise shown on plans.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

STATE OF TEXAS
JAMES G. COWART
83899
LICENSED PROFESSIONAL ENGINEER
6/1/2021

FIRM REGISTRATION NO. F-12460
CW ENGINEERING, LLC

Texas Department of Transportation

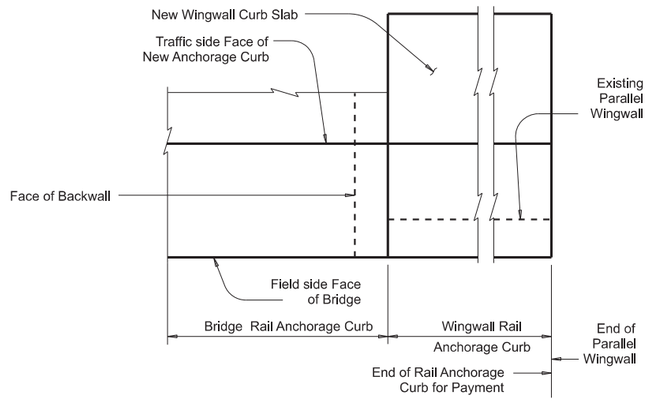
BGE, Inc.
7000 North Mopac, Suite 330, Austin, TX 78731
Tel: 512-879-0400 ● www.browngay.com
TBPE Registration No. F-1046

SH 97

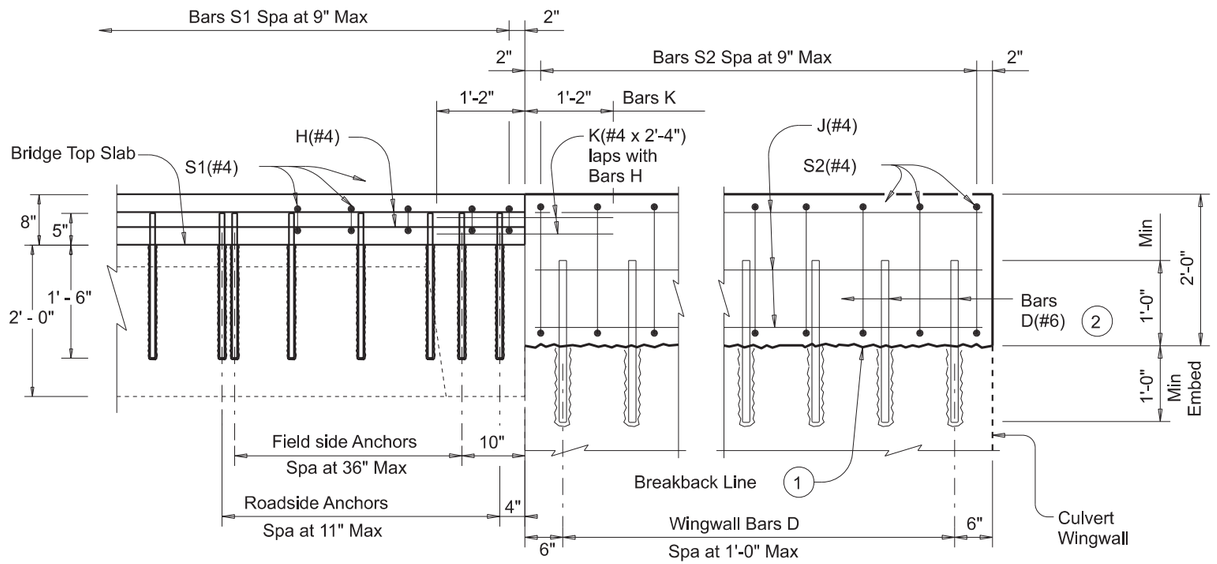
PAN GIRDER RAIL ANCHORAGE DETAILS

SHEET 1 OF 2

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			102
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97



CURB PLAN - WINGWALL



SHOWING TYPE 4 BRIDGE RAC-R CURB

SHOWING TYPE 4 WINGWALL ANCHORAGE CURB

Curb Slab and Slab reinforcing
not shown for clarity.

ELEVATION OF INSTALLATIONS

(1) Retrofit Wingwall Anchorage Curb must always be 2'-0" in height. Breakback existing wingwall as needed in order to properly align the wingwall Anchorage Curb with that placed on the existing culvert. Saw cut (score) 1" deep on field side face of the existing wingwall prior to breakback. Care must be taken so as to not damage existing reinforcing. Clean and extend existing reinforcing into new construction. Note that new Bars D(#6), as shown in the detail, are required even when existing reinforcing remains in use.

(2) Drill and grout Bars D(#6) 1'-0" Min into existing wingwall. If existing parallel wingwall thickness is less than 8", a special design will be required. Holes must be core drilled. Percussion drilling is not permitted.

DATE:
FILE:

STATE OF TEXAS
JAMES G. COWART
83899
LICENSED
PROFESSIONAL ENGINEER
6/1/2021

FIRM REGISTRATION NO. F-12460
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TBPE Registration No. F-1046

SH 97

PAN GIRDER RAIL ANCHORAGE DETAILS

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			103
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

DATE: 4/20/2023 12:08:06 PM
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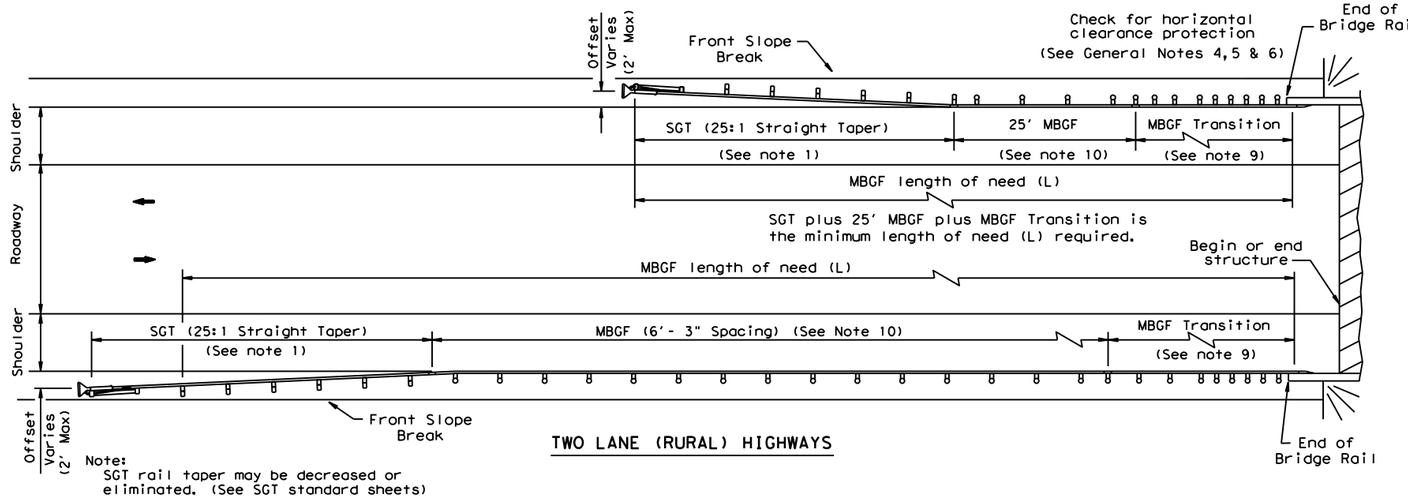
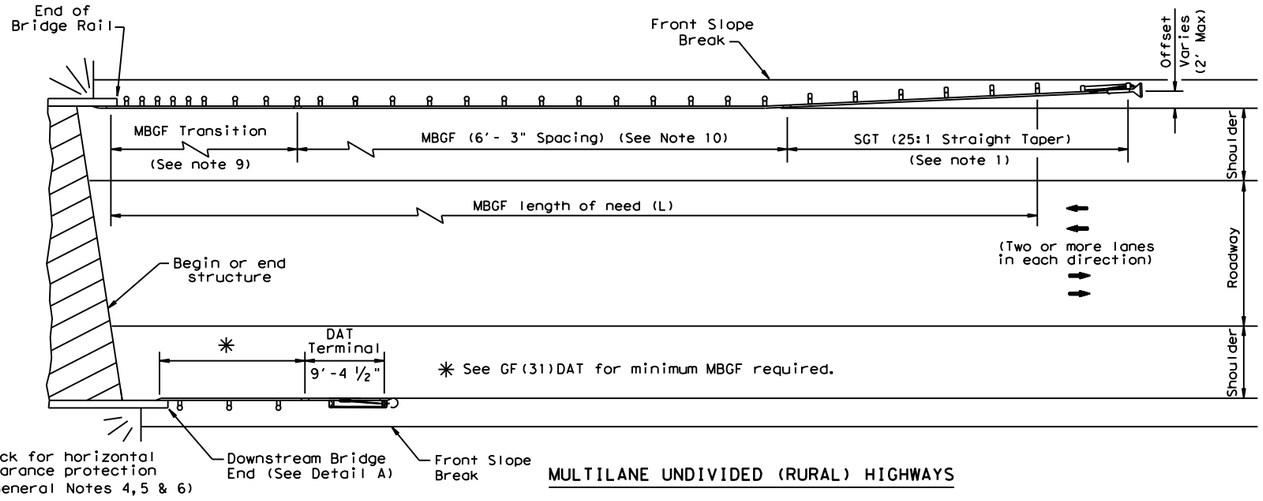
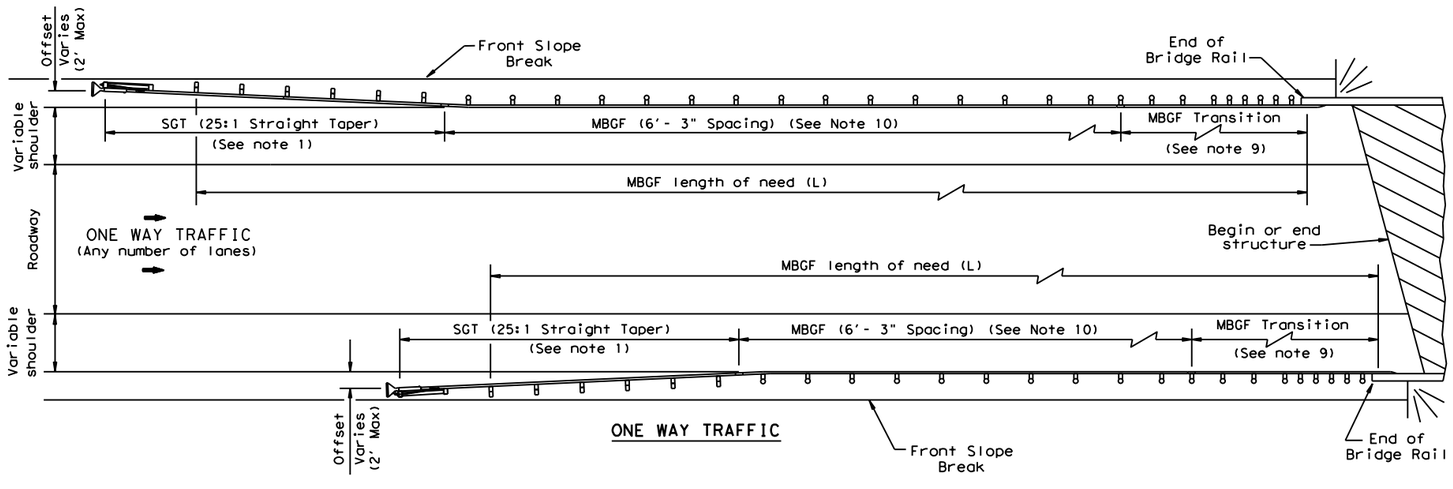


TWO LANE (RURAL) HIGHWAYS

Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)



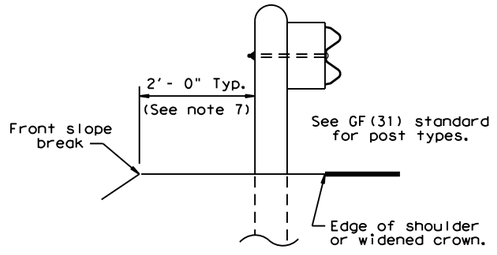
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



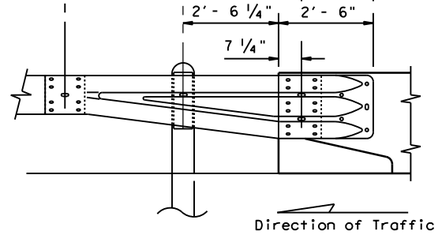
ONE WAY TRAFFIC

GENERAL NOTES

1. For more detail: See GF(31), SGT( )31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'- 0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. For restrictive bridge widths: The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft. "maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.



TYPICAL CROSS SECTION AT MBGF



Note:
All rail elements shall be lapped in the direction of adjacent traffic.

DETAIL A
Showing Downstream Rail Attachment

Texas Department of Transportation | Design Division Standard

BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		104

DATE: 4/20/2023 12:08:06 PM
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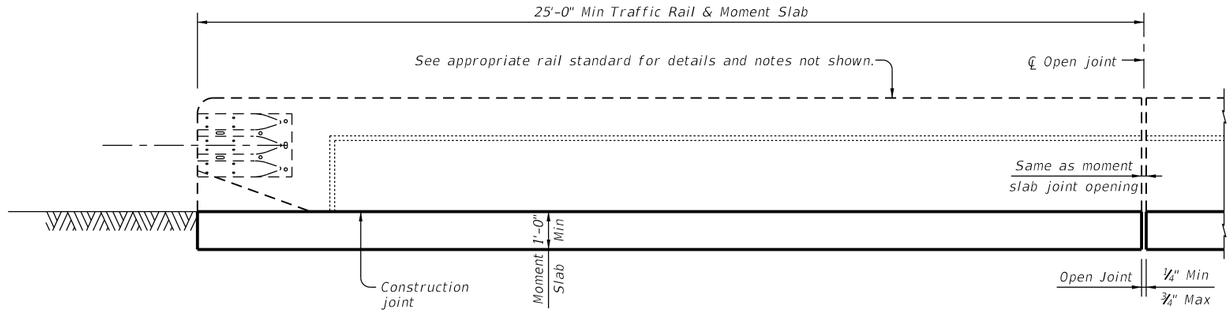
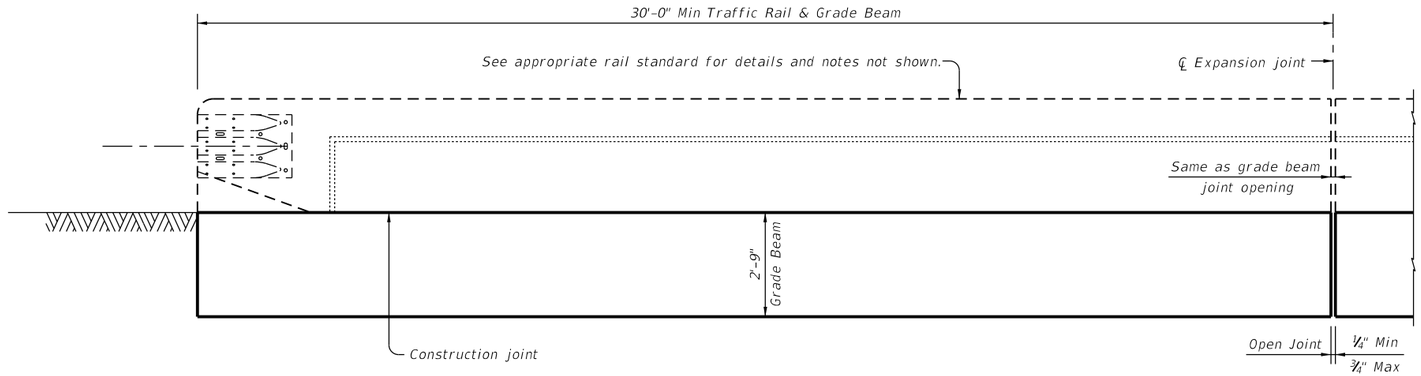


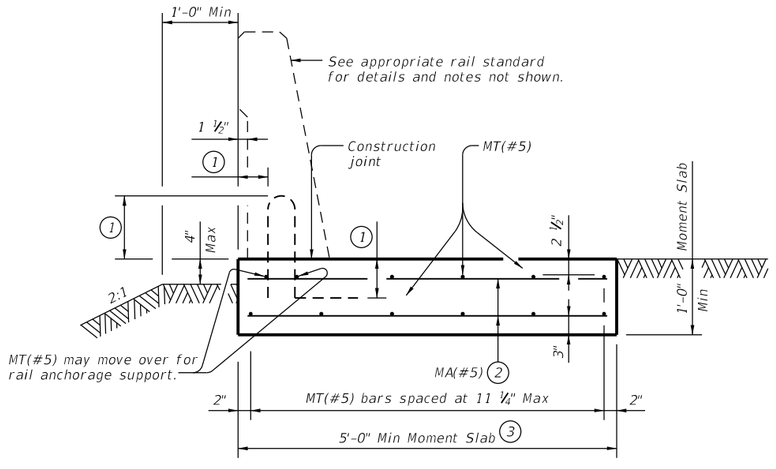
ROADWAY ELEVATION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



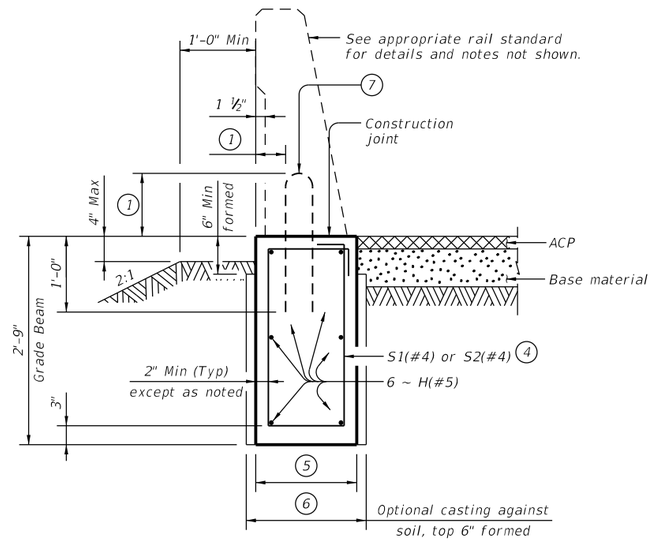
ROADWAY ELEVATION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



SECTION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar.)



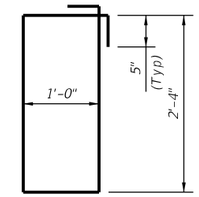
SECTION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar.)

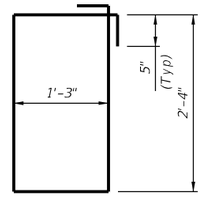
1. See applicable bridge rail standard.
2. MA(#5) space longitudinally along moment slab at 12" Max. (Spaced 2 ½" longitudinally from outside edge of moment slab).
3. Approximate moment slab concrete = 0.19 CY/LF and reinforcement = 22.4 LB/LF.
4. S1(#4) or S2(#4) spaced longitudinally along grade beam at 8" Max. (Spaced 2 ½" longitudinally from outside edge of grade beam).
5. Use bar S1(#4) with 1'-4" grade beam width and bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS. Approximate grade beam concrete = 0.14 CY/LF and reinforcement = 13.8 LB/LF.

   Use bar S2(#4) with 1'-7" grade beam width and bridge rail types: T66 and C66. Approximate grade beam concrete = 0.16 CY/LF and reinforcement = 14.2 LB/LF.
6. 1'-6" for bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.

   1'-9" bridge rail types: T66 and C66.
7. Modify reinforcing on standard bridge rail anchorage if necessary by extending rail anchorage 12" Min, vertically into traffic rail



BARS S1(#4)



BARS S2(#4)

CONSTRUCTION NOTES:

Align moment slab (TRF-MS) or grade beam (TRF-GB) open joints with rail open joints maintaining no less than minimum rail length. Provide moment slab (TRF-MS) or grade beam (TRF-GB) with open joints at no greater than 100' spacing unless otherwise shown on the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if required elsewhere.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for bars S1(#4), S2(#4) and H(#5) unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-4"
Epoxy coated ~ #5 = 3'-6"

GENERAL NOTES:

Use of these details will result in a moment slab (TRF-MS) or grade beam (TRF-GB) foundation that is acceptable for traffic rails which are MASH TL-2, TL-3, or TL-4 compliant.

See elsewhere in the plans for selected options between moment slab (TRF-MS) and/or grade beam (TRF-GB).

The foundation design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper and/or wider foundations.

See appropriate rail standard for details and notes not shown.

This detail is intended for use as a guide to unusual railing anchorage situations but may be included in the plans, modified as necessary to apply to specific installations required on the project.

Payment for moment slab (TRF-MS) and/or grade beam (TRF-GB) will be by Class "C" concrete or Class "C" (HPC) concrete for rail foundations.

The associated bridge railing will be paid for by the linear foot which includes the concrete and reinforcement.

Excavation will be subsidiary to other Items.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL FOUNDATIONS

FOR MASH TL-2, TL-3 & TL-4 BRIDGE RAILS

TRF

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©TxDOT	September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS		0483	01	052	SH 97
07-20: Added moment slab with rail foundation lengths.		DIST	COUNTY		SHEET NO.
		LRD	LA SALLE		105

DATE: 4/20/2023 12:08:08 PM
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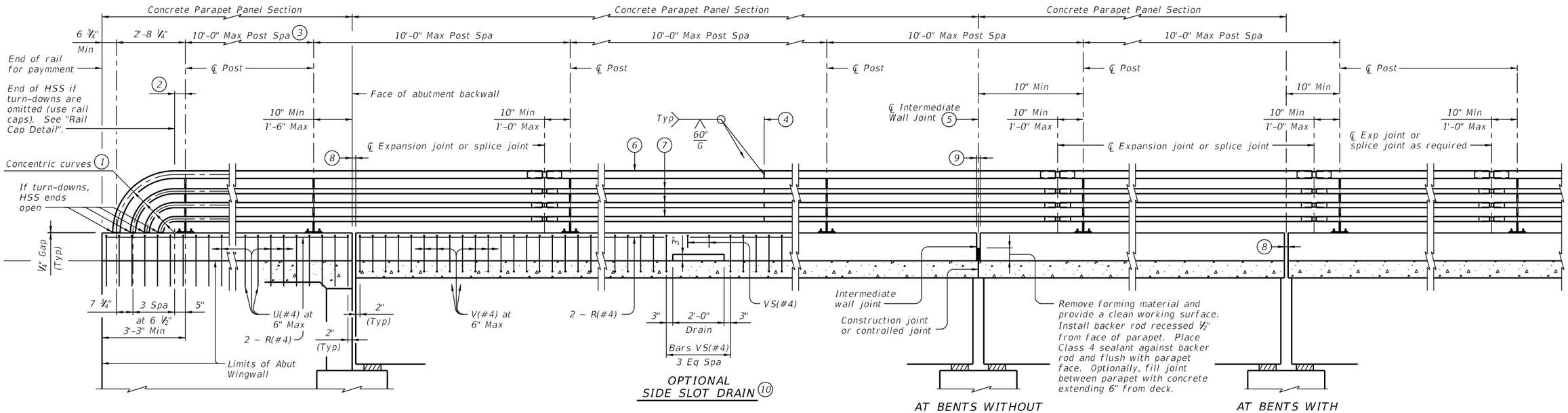
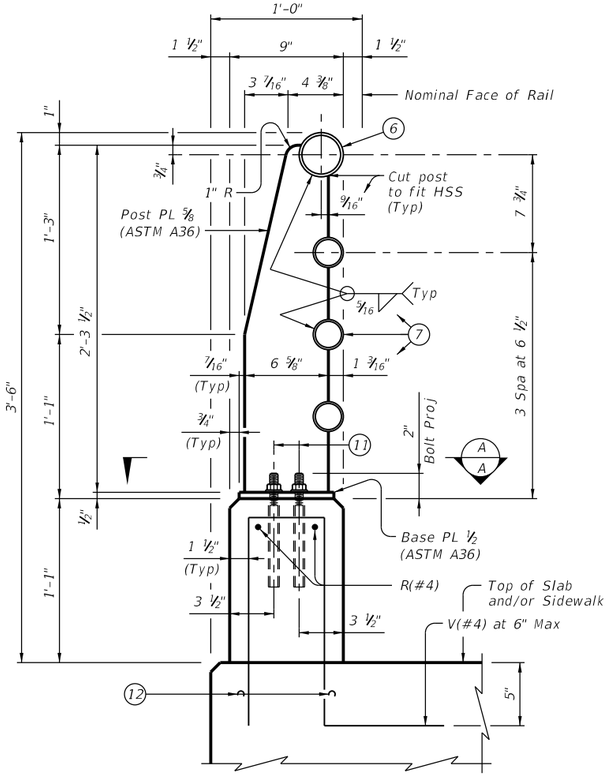
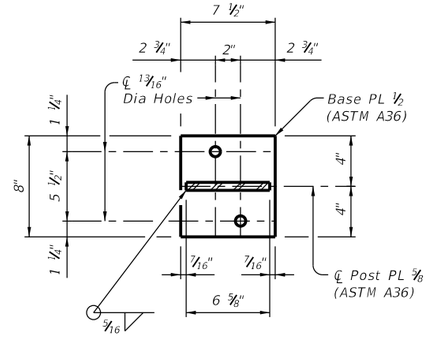


ROADWAY ELEVATION OF RAIL



SECTIONS THRU RAIL

1. Portion of railing with turn-downs to be used or omitted as indicated on Bridge Layout.
2. 10" Min ~ 1'-6" Max if turn-downs are omitted.
3. Min of 2 posts required on wingwall.
4. One shop splice per panel is permitted (with minimum 85 percent penetration). The weld may be square groove or single vee groove. Grind smooth.
5. Provide at all interior bents without slab expansion joints.
6. HSS 3.500 x 0.216 (Rail Member)
7. HSS 2.375 x 0.154 (Rail Member)
8. Same as slab joint opening. (5" Max Expansion Joint)
9. Opening ¼" Min, ¾" Max.
10. Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. When side slot drains are used, provide 3'-0" Min clear spacing between drains slots and ℄ bents or joint locations with a 8'-0" Min clear spacing between drain slots.
11. ℄ anchor bolts. See "Material Notes" for anchor bolt information.
12. Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.



SECTION A-A

Showing base plate detail.

Texas Department of Transportation

Bridge Division Standard

PEDESTRIAN RAIL

TYPE PR22

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©TxDOT	September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS		0483	01	052	SH 97
		DIST	COUNTY		SHEET NO.
		LRD	LA SALLE		106

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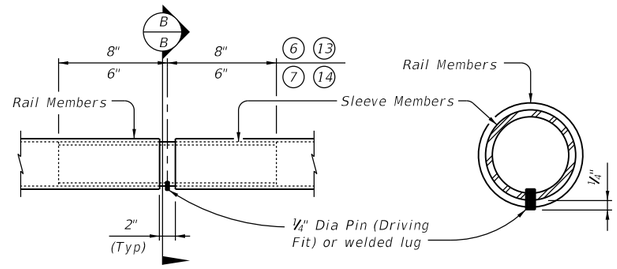
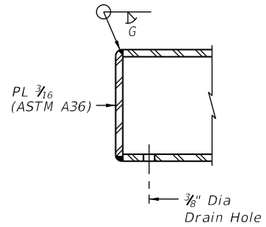


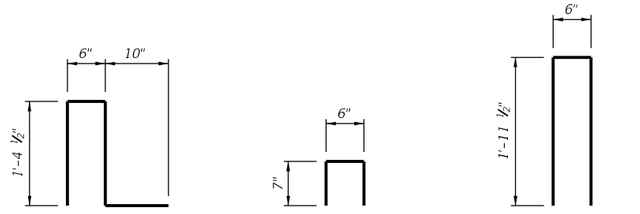
AT SPLICES OR EXP JTS SECTION B-B

PIPE SPLICE DETAIL

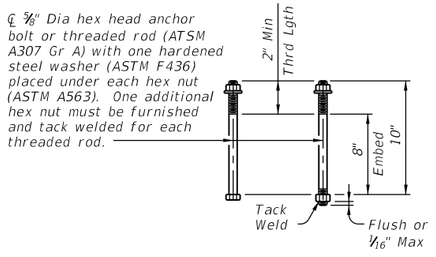


RAIL CAP DETAIL

(6) HSS 3.500 x 0.216 (Rail Member)
(7) HSS 2.375 x 0.154 (Rail Member)
(13) HSS 2.875 x 0.203 (Sleeve Member)
(14) HSS 1.900 x 0.145 (Sleeve Member)



BARS V (#4) BARS VS (#4) BARS U (#4)



CAST-IN-PLACE ANCHOR BOLT OPTIONS

CONSTRUCTION NOTES:

This rail may be slip-formed if approved by the Engineer when epoxy adhesive anchor bolts are used.

Slip-forming parapet is not allowed if anchor bolts are cast with parapet wall.

If rail is slip-formed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a ⅜" width x ¼" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

At the Contractor's option anchor bolts may be cast with the parapet. See "Material Notes".

Panel lengths of railing must be attached to a minimum of three posts except on abutment wingwalls.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

Face of rail, posts and parapet must be vertical transversely unless otherwise approved. Rail posts must be perpendicular to top of adjacent concrete parapet grade. Use Type VIII epoxy mortar under post base plates if gaps larger than 1/16" exist.

For curved railing applications, fabricate the HSS rail to the radius when the radius is 600' or less. Submit shop drawings for approval when tubes are required to be fabricated to a radius. Shop drawings must be submitted to the Engineer for approval.

Round or chamfer all exposed edges of steel components 1/16" by grinding prior to galvanizing.

Chamfer all exposed concrete corners.

MATERIAL NOTES:

Provide ASTM A500 Gr B, A1085 or A53 Gr B for all HSS.

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over galvanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel". Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.

Anchor bolts must be ⅝" Dia ASTM A307 Gr A fully threaded rods with one hex nut and one hardened steel washer (ASTM F436). Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 7". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, 8.5 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

Optional cast-in-place anchor bolts must be ⅝" Dia ASTM A307 Gr A with one hardened steel washer (ASTM F436) placed under each hex nut or ASTM A307 Gr A threaded rods with one tack welded hex nut each and with one hex nut with one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements.

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Epoxy coat or galvanize all reinforcing if slab bars are epoxy coated or galvanized.

Provide Grade 60 reinforcing steel.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U, and V unless noted otherwise.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

For all rails, submit erection drawings showing section lengths, splice locations, rail post spacing and anchor bolt setting for approval.

Average weight of railing: 146 plf ~ total
122 plf ~ Conc (with no Overlay)
24 plf ~ Steel

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation | Bridge Division Standard

PEDESTRIAN RAIL

TYPE PR22

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©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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	LRD	LA SALLE		107

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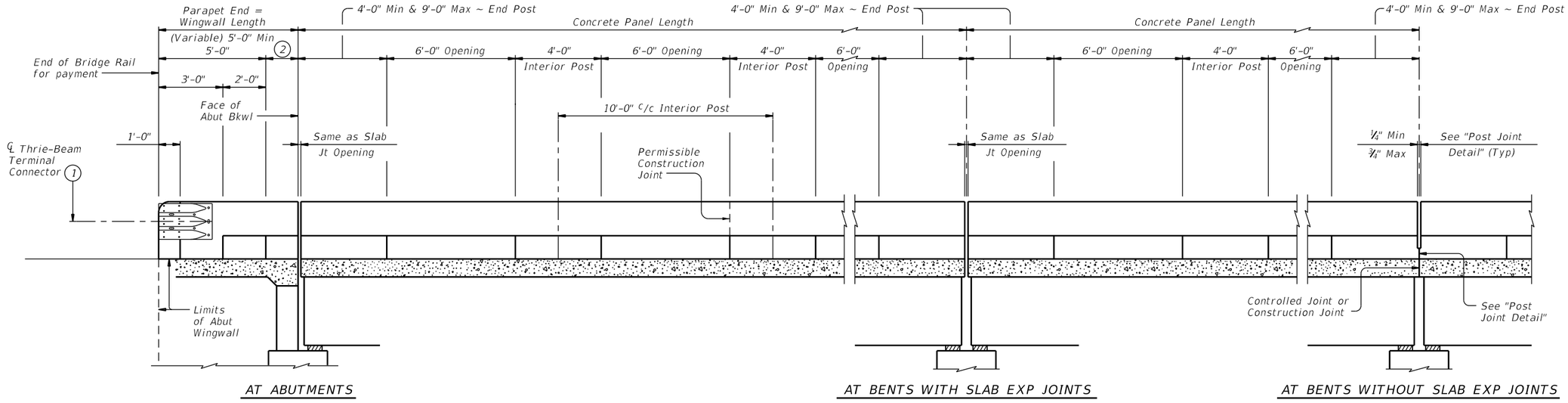
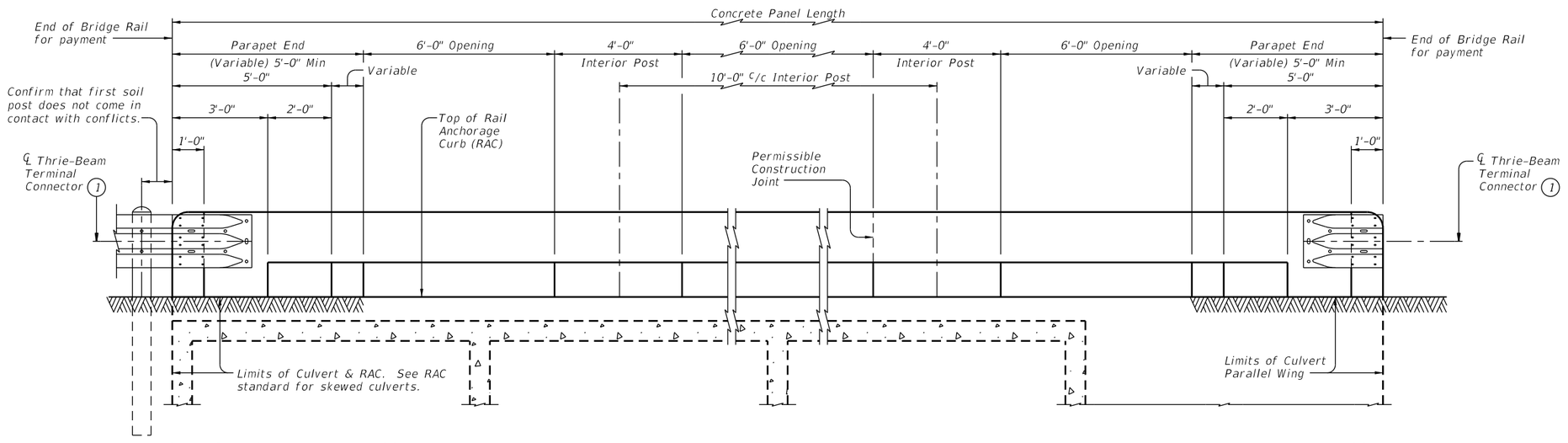


ROADWAY ELEVATION OF RAIL ON BRIDGE



ROADWAY ELEVATION OF RAIL ON BOX CULVERTS

Showing 0° skew culvert. Skewed culverts similar. See RAC standard for details not shown. Vertical joints in concrete rail are not required, unless shown elsewhere.

(1) Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.

(2) Wingwall Length minus 5'-0" (Varies)

Texas Department of Transportation

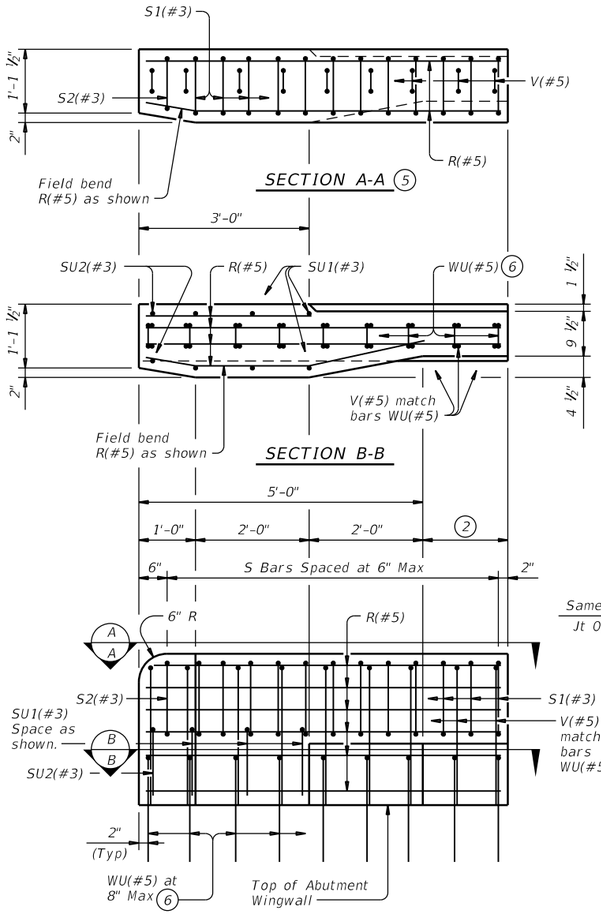
Bridge Division Standard

TRAFFIC RAIL

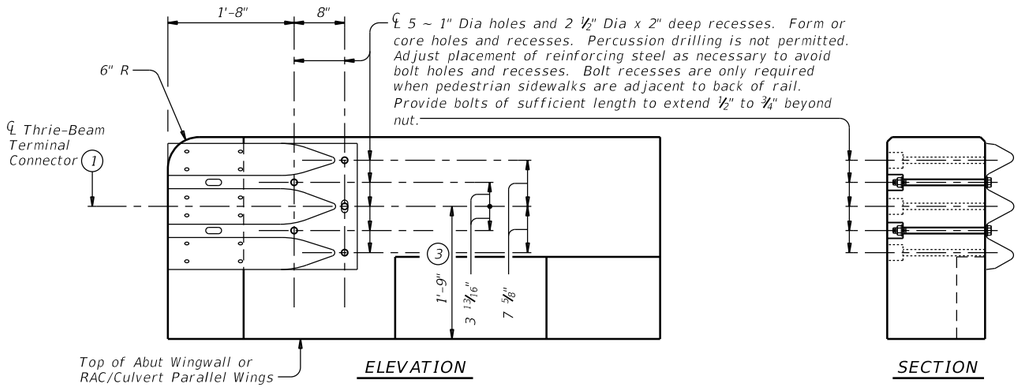
TYPE T223

FILE: rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		108

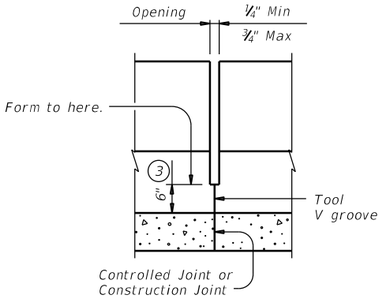
DATE: 4/20/2023 12:08:10 PM
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\07-BRDG\Stds\STD P-1\T223.dgn



PARAPET END AT ABUT WINGWALL (6)

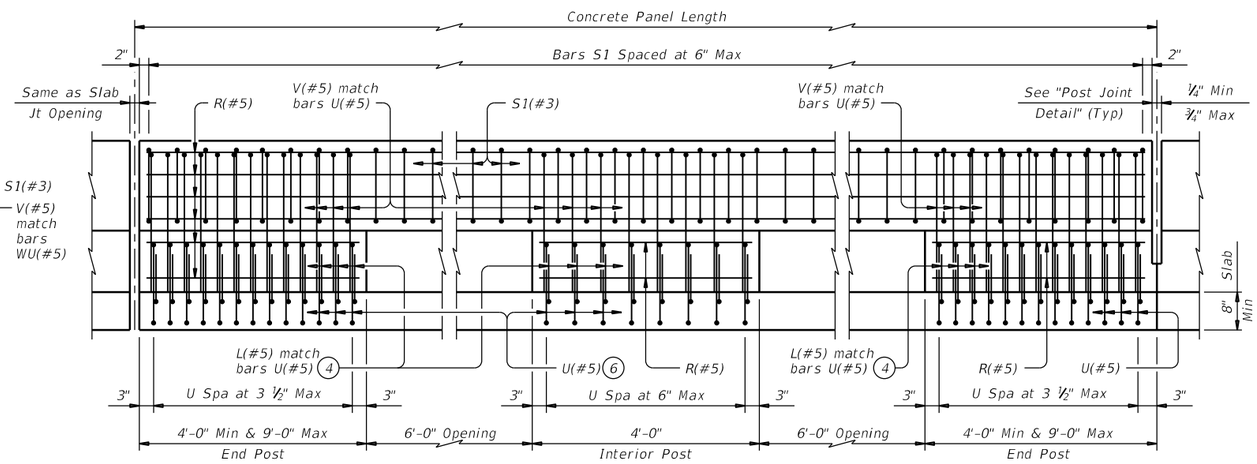


TERMINAL CONNECTION DETAILS



POST JOINT DETAIL

Provide at all interior bents without slab expansion joints.



AT SLAB EXPANSION JOINTS

AT 4' INTERIOR POST

AT BENTS WITHOUT SLAB EXPANSION JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

Showing rail on slab. Rail on box culvert similar.

(1) Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.

(2) Wingwall Length minus 5'-0" (Varies)

(3) Increase 2" for structures with overlay.

(4) Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.

(5) Bars SU1(#3), SU2(#3) and WU(#5) not shown for clarity.

(6) Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on achorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T223

FILE:	rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT	September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS		0483	01	052	SH 97
		DIST	COUNTY		SHEET NO.
		LRD	LA SALLE		109

DATE: 4/20/2023 12:08:10 PM
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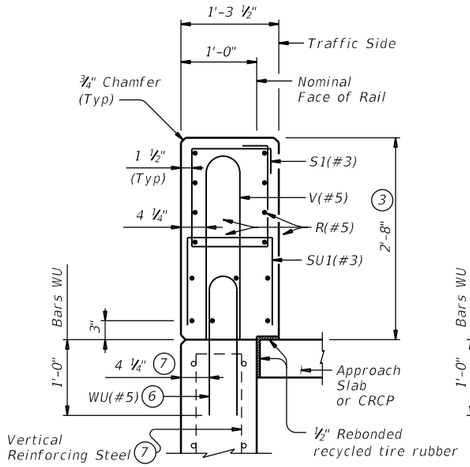
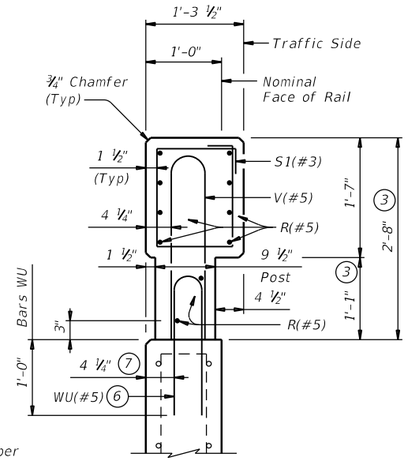
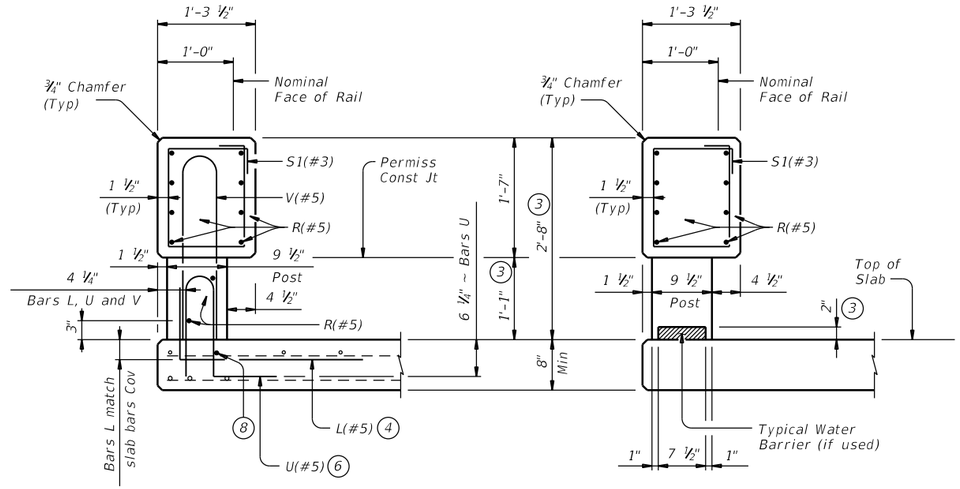


SECTION C-C
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS



SECTION D-D
ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS

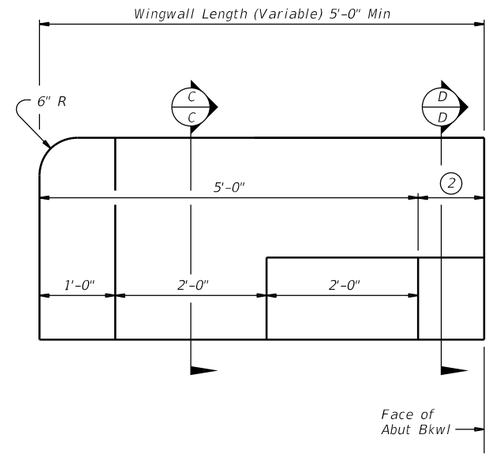


AT POST
ON BRIDGE SLAB

AT OPENING
ON BRIDGE SLAB

SECTIONS THRU RAIL

Sections on box culverts similar.



ELEVATION AT ABUTMENT WINGWALL

Box culvert parallel wings or rail anchorage curb similar.

CONSTRUCTION NOTES:

Face of rail and parapet must be vertical transversely unless otherwise shown in the plans or approved by the Engineer.

Provide water barriers at openings draining onto undercrossing roadways and sidewalks. They may be cast-in-place or precast in convenient lengths and bonded to the bridge deck with an approved epoxy cement.

Chamfer all exposed corners.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Deformed Welded Wire Reinforcing (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U, V, and WU unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-0"

Epoxy coated ~ #5 = 3'-0"

GENERAL NOTES:

This rail has been evaluated by full-scale crash test to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings are not required for this rail.

Average weight of railing with no overlay is 358 plf.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.

(2) Wingwall Length minus 5'-0" (Varies)

(3) Increase 2" for structures with overlay.

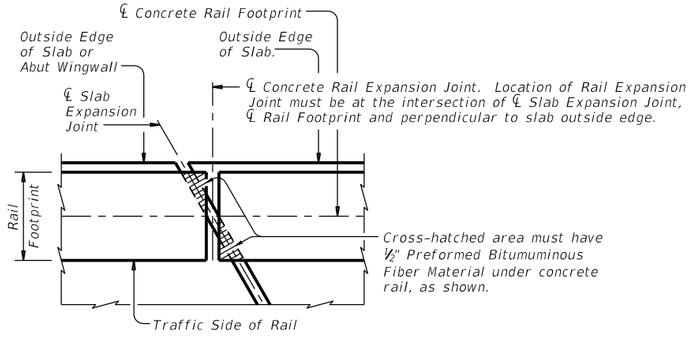
(4) Bars L(#5) are part of rail reinforcing and are included in unit price bid for railing. Space with Bars U. Bars L match slab bar cover. Bars L may be bundled with top slab reinforcing if spacing is equivalent.

(6) Substitute Bars U(#5) for Bars WU(#5) when parapet end is located on anchorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.

(7) When vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls on traffic side of wall, move the horizontal wingwall/retaining wall reinforcing to the inside of Bars WU where bars conflict.

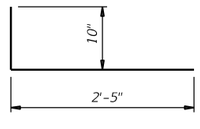
(8) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(9) At the Contractor's option, Bars V may be replaced by extending Bars U to 2'-5 ¼" above the roadway surface without overlay.

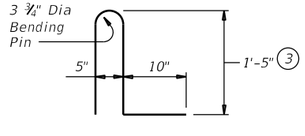


PLAN OF RAIL AT EXPANSION JOINTS

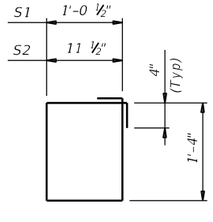
Example showing Slab Expansion Joints without breakbacks.



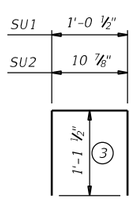
BARS L (#5)



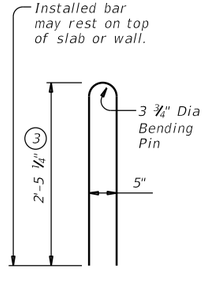
BARS U (#5) (9)



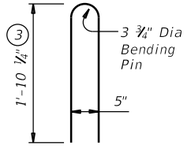
BARS S (#3)



BARS SU (#3)



BARS V (#5) (9)



BARS WU (#5)

SHEET 3 OF 3

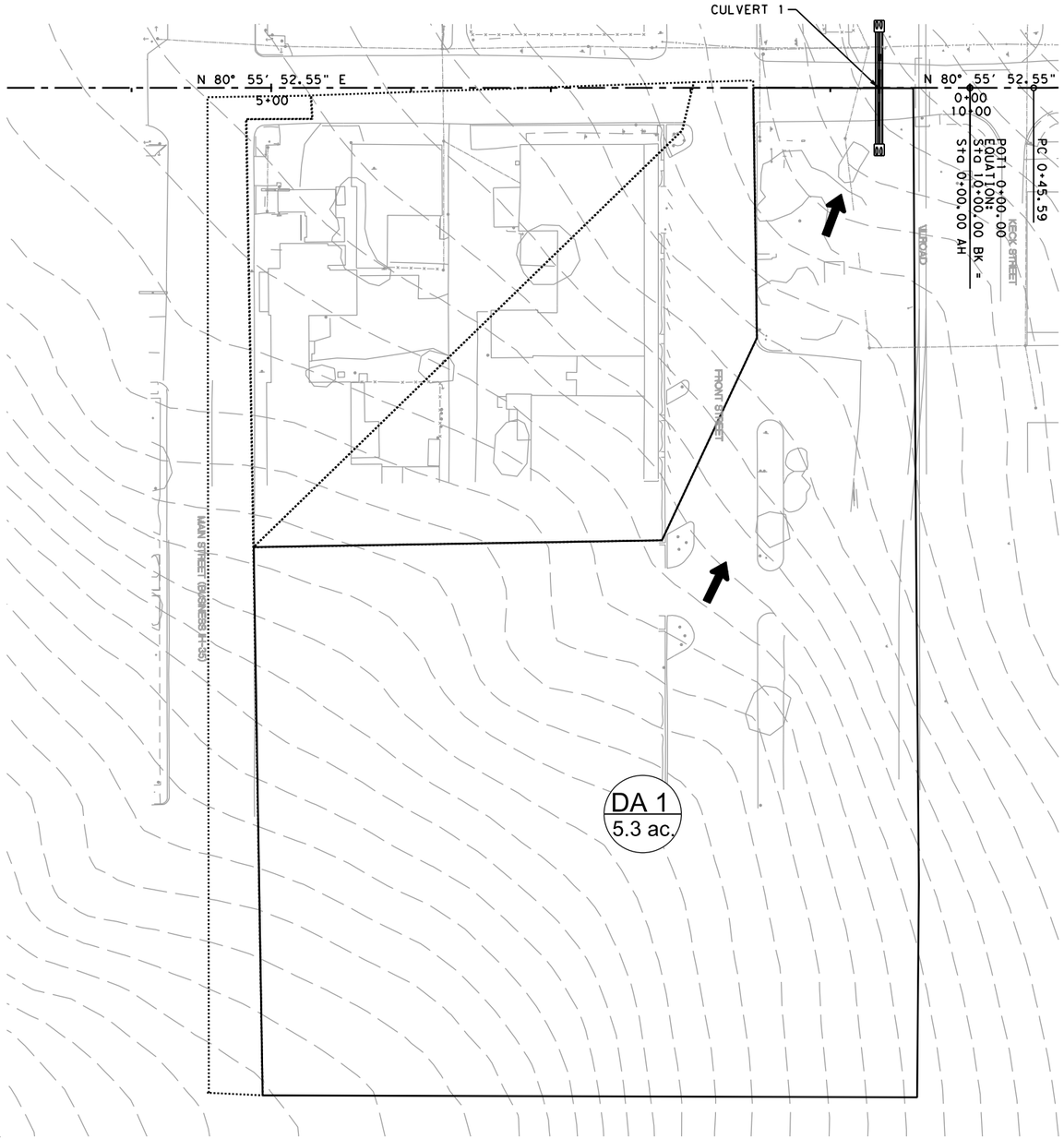
Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T223

FILE: rlstd005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		110



LEGEND

DA ##.### — AREA ID / DRAINAGE AREA (ACRES)

DRAINAGE AREA BOUNDARY

STORM SEWER AREA BOUNDARY

FLOW DIRECTION

0 50 100

HORIZONTAL SCALE: 1"=100'

T.o.C. Calculations

Drainage Area Number	Structure No.	Structure Type	CL Station	Overland Flow Travel Times			Channel Flow Travel Times			Total T.o.C.
				Length (ft)	Slope (ft/ft)	Time (min)	Length (ft)	Slope (ft/ft)	Time (min)	Time (min
1	Culvert 1	2-18" RCP	9+31 R1	453	0.035	12	637	0.040	4	16

Rational Method Calculations

Drainage Area	Area(ac)	C*	Intensities* (in/hr)				T.o.C. (min)	Design Flow (cfs)				
			I10	I25	I50	I100		Q5	Q10	Q25	Q50	Q100
1	5.3	0.63	6.28	7.33	8.40	9.49	16	17.70	20.80	24.28	27.82	31.43

* Values shown on the chart are truncated values from Excel formulas, slight rounding errors will be noted if direct calculations are performed.

4/20/2023

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TBPE Registration No. F-1046

SH 97

DRAINAGE AREA MAP

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		111

STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

4/20/2023 12:08:18 PM pdf.pltcfg
G:\TXC\Projects\TxDOT\4258-01 SH 97\03*CADD\06-DRNG\DRNG-01\SH97*PKG1DAMap.dgn

Package 1

EXISTING

SITE DATA - EX CULV 9+31 R1

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 416.94 FT
OUTLET STATION: 49.00 FT
OUTLET ELEVATION: 416.16 FT
NUMBER OF BARRELS: 1

CULVERT DATA SUMMARY - EX CULV 9+31 R1

BARREL SHAPE: CIRCULAR
BARREL DIAMETER: 1.33 FT
BARREL MATERIAL: CORRUGATED STEEL
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0240
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: MITERED TO CONFORM TO SLOPE
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: EX CULV 9+31 R1

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 419.81 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 46.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: EX CULV 9+31 R1

TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
17.70	7.12	419.92	2.154	2.978	4-FFF	1.330	1.058	1.330	0.612	5.124	2.273
19.07	7.11	419.93	2.149	2.987	4-FFF	1.330	1.057	1.330	0.629	5.115	2.315
20.45	7.09	419.94	2.144	2.996	4-FFF	1.330	1.056	1.330	0.646	5.105	2.356
21.82	7.08	419.95	2.139	3.005	4-FFF	1.330	1.055	1.330	0.662	5.097	2.395
23.19	7.07	419.95	2.135	3.013	4-FFF	1.330	1.054	1.330	0.677	5.088	2.431
24.56	7.06	419.96	2.130	3.020	4-FFF	1.330	1.053	1.330	0.692	5.079	2.467
25.94	7.05	419.97	2.127	3.029	4-FFF	1.330	1.053	1.330	0.706	5.072	2.500
27.31	7.04	419.98	2.122	3.036	4-FFF	1.330	1.052	1.330	0.720	5.064	2.533
28.68	7.03	419.98	2.119	3.044	4-FFF	1.330	1.051	1.330	0.734	5.058	2.564
30.06	7.02	419.99	2.115	3.051	4-FFF	1.330	1.051	1.330	0.747	5.050	2.594
31.43	7.01	420.00	2.112	3.058	4-FFF	1.330	1.050	1.330	0.759	5.043	2.623

TAILWATER CHANNEL DATA - EX CULV 9+31 R1

TAILWATER CHANNEL OPTION: IRREGULAR CHANNEL			
CHANNEL SLOPE: 0.023			
USER DEFINED CHANNEL CROSS-SECTION:			
COORD NO.	STATION (FT)	ELEVATION	MANNING'S N
1	0	418	0.045
2	19.4	417.16	0.045
3	38.4	418.2	0

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: EX CULV 9+31 R1)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
17.70	417.78	0.61	2.27	0.88	0.72
19.07	417.79	0.63	2.32	0.90	0.73
20.45	417.81	0.65	2.36	0.93	0.73
21.82	417.83	0.66	2.39	0.95	0.73
23.19	417.84	0.68	2.43	0.97	0.74
24.56	417.86	0.69	2.47	0.99	0.74
25.94	417.87	0.71	2.50	1.01	0.74
27.31	417.88	0.72	2.53	1.03	0.74
28.68	417.90	0.73	2.56	1.05	0.75
30.06	417.91	0.75	2.59	1.07	0.75
31.43	417.92	0.76	2.62	1.09	0.75

PROPOSED

SITE DATA - PROP CULV 9+31 R1

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 416.79 FT
OUTLET STATION: 86.90 FT
OUTLET ELEVATION: 416.49 FT
NUMBER OF BARRELS: 2

CULVERT DATA SUMMARY - PROP CULV 9+31 R1

BARREL SHAPE: CIRCULAR
BARRELL DIAMETER: 1.50 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: MITERED TO CONFORM TO SLOPE
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: PROP CULV 9+31 R1

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 419.81 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 46.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: PROP CULV 9+31 R1

	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
*	17.70	17.70	418.99	2.183	2.203	7-M2T	1.500	1.147	1.286	0.612	5.488	2.273
	19.07	19.07	419.22	2.391	2.431	7-M2T	1.500	1.191	1.303	0.629	5.849	2.315
	20.45	20.45	419.45	2.614	2.660	7-M2T	1.500	1.230	1.320	0.646	6.207	2.356
	21.82	21.82	419.69	2.851	2.895	7-M2T	1.500	1.265	1.336	0.662	6.563	2.395
	23.19	22.58	419.82	2.989	3.034	7-M2T	1.500	1.283	1.351	0.677	6.735	2.431
	24.56	22.66	419.84	3.003	3.054	7-M2T	1.500	1.285	1.366	0.692	6.707	2.467
	25.94	22.72	419.86	3.014	3.069	7-M2T	1.500	1.286	1.380	0.706	6.676	2.500
	27.31	22.75	419.87	3.020	3.082	7-M2T	1.500	1.287	1.394	0.720	6.645	2.533
	28.68	22.78	419.88	3.025	3.093	7-M2T	1.500	1.288	1.408	0.734	6.614	2.564
	30.06	22.79	419.89	3.028	3.105	7-M2T	1.500	1.288	1.421	0.747	6.583	2.594
**	31.43	22.81	419.90	3.030	3.115	7-M2T	1.500	1.288	1.433	0.759	6.556	2.623

* DESIGN FLOW IS 5-YEAR EVENT.
** CHECK FLOW IS 100-YEAR EVENT.

TAILWATER CHANNEL DATA - PROP CULV 9+31 R1

TAILWATER CHANNEL OPTION: IRREGULAR CHANNEL			
CHANNEL SLOPE: 0.023			
USER DEFINED CHANNEL CROSS-SECTION:			
COORD NO.	STATION (FT)	ELEVATION	MANNING'S N
1	0	418	0.045
2	19.4	417.16	0.045
3	38.4	418.2	0

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: PROP CULV 9+31 R1)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
17.70	417.78	0.61	2.27	0.88	0.72
19.07	417.79	0.63	2.32	0.90	0.73
20.45	417.81	0.65	2.36	0.93	0.73
21.82	417.83	0.66	2.39	0.95	0.73
23.19	417.84	0.68	2.43	0.97	0.74
24.56	417.86	0.69	2.47	0.99	0.74
25.94	417.87	0.71	2.50	1.01	0.74
27.31	417.88	0.72	2.53	1.03	0.74
28.68	417.90	0.73	2.56	1.05	0.75
30.06	417.91	0.75	2.59	1.07	0.75
31.43	417.92	0.76	2.62	1.09	0.75

NOTE: PROGRAM USED TO EVALUATE STRUCTURES WAS HY-8 VERSION 7.30

4/20/2023

Texas Department of Transportation

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Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

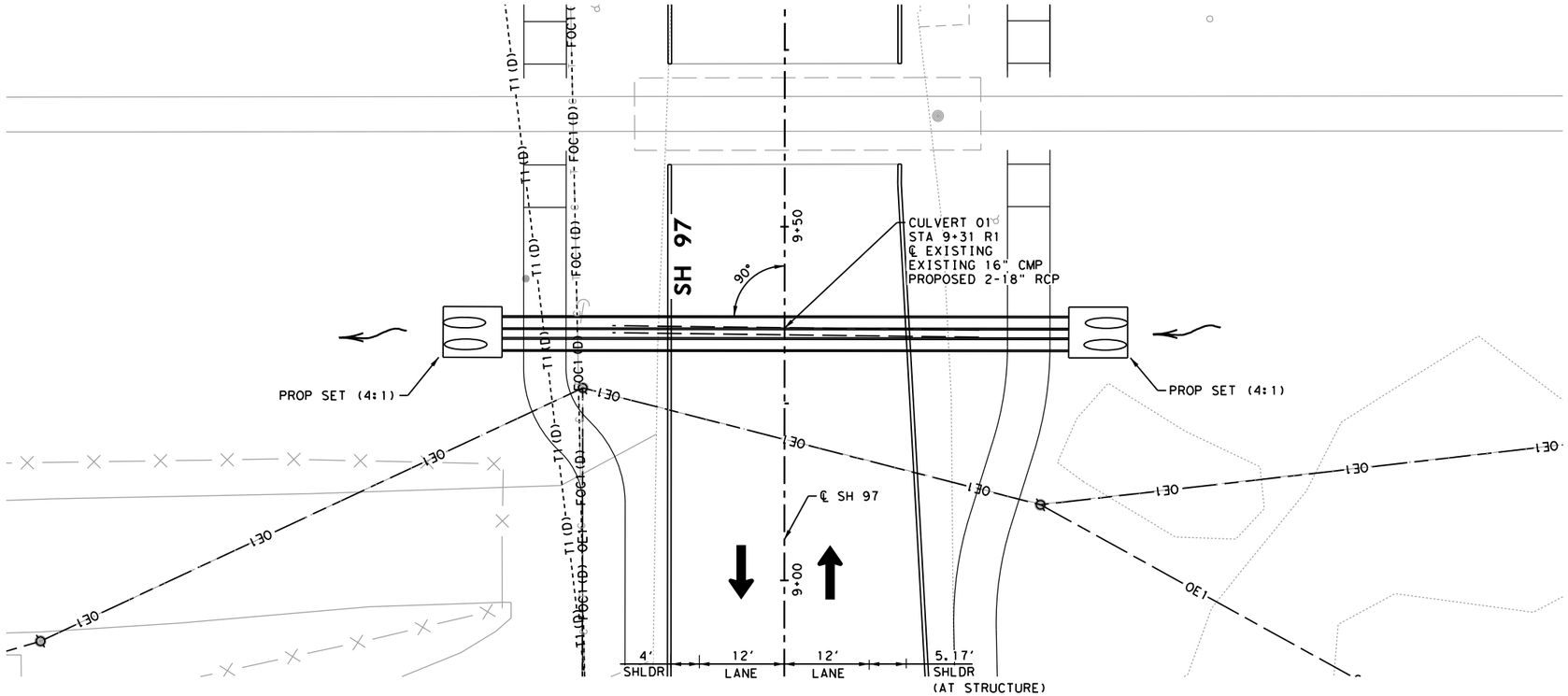
SH 97

CULVERT 01 HYDRAULIC DATA

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			112
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1



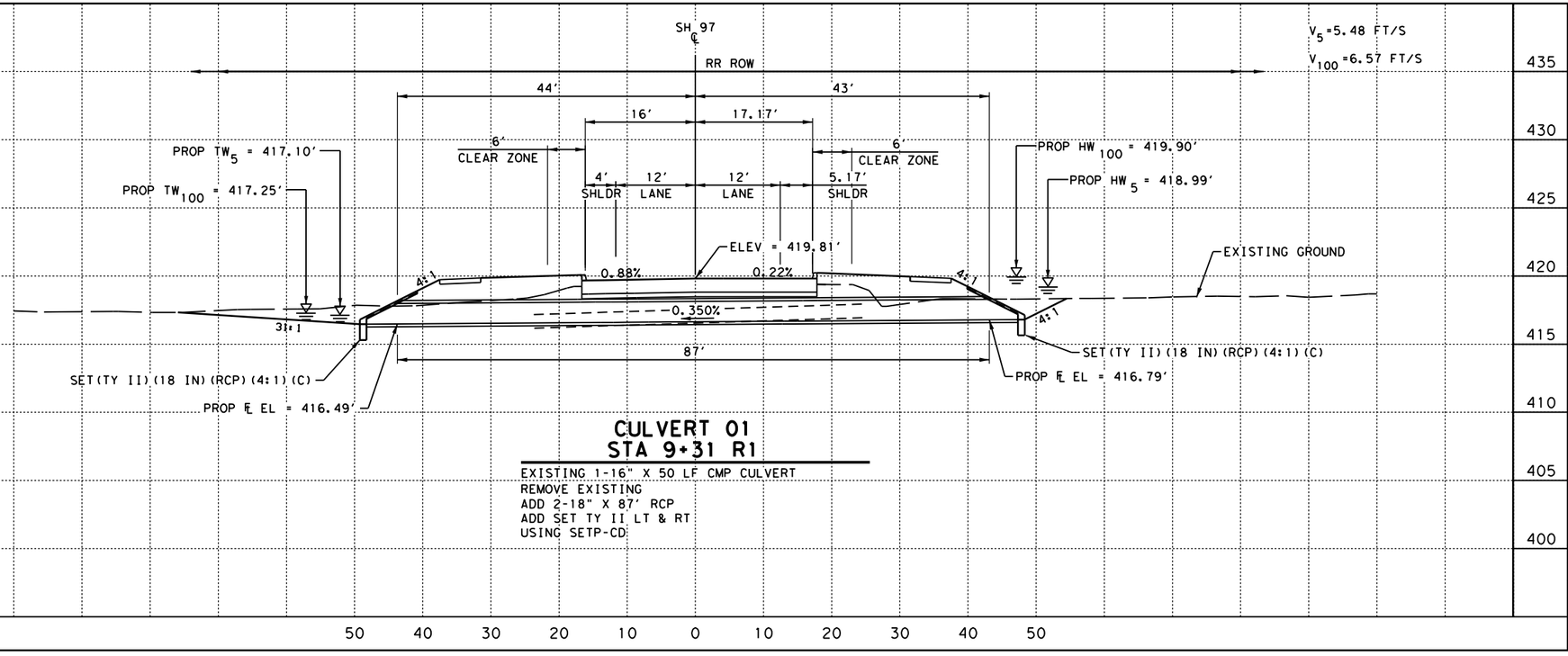
LEGEND:

DIRECTION OF TRAFFIC

FLOW DIRECTION

0 10 20

SCALE: 1"=20' H
1"=10' V



CULVERT 01
STA 9+31 R1

EXISTING 1-16" X 50 LF CMP CULVERT
REMOVE EXISTING
ADD 2-18" X 87' RCP
ADD SET TY II LT & RT
USING SETP-CD

4/20/2023

Texas Department of Transportation

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TBPE Registration No. F-1046

SH 97

CULVERT 01 LAYOUT
STA 9+31 R1

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			113
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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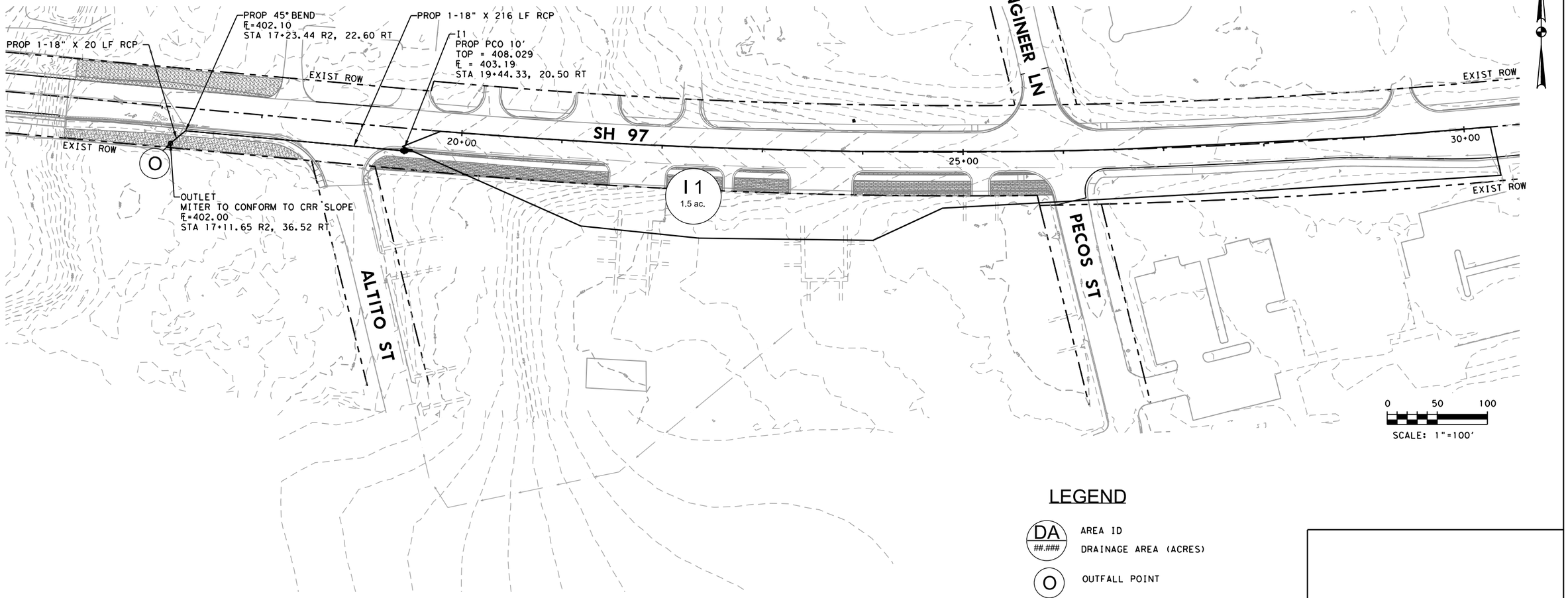

LEGEND

- DA / ##.### — AREA ID / DRAINAGE AREA (ACRES)
- O — OUTFALL POINT
- FLOW PATH
- DRAINAGE AREA BOUNDARY

RUNOFF COMPUTATIONS - 5-YR DESIGN					
Area ID	C Value (Weighted)	Area (acre)	Tc (min)	Intensity (in/hr)	Discharge (cfs)
I1	0.50	1.5	18	5.03	3.77

RUNOFF COMPUTATIONS - 100-YR					
Area ID	C Value (Weighted)	Area (acre)	Tc (min)	Intensity (in/hr)	Discharge (cfs)
I1	0.50	1.5	18	9.02	6.77

INLET COMPUTATIONS - ON GRADE INLETS - 5-YR DESIGN													
Inlet ID	Inlet Type	Curb Length	Slopes		Manning's N	Curb Depression	Ponded Width	Max Ponded Width	Ponded Depth	Max Ponded Depth	Discharge	By Pass Flow	By Pass Node ID
			Long	Trans									
		(ft)	(%)	(ft/ft)		(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	
I1	Curb	10	0.80	0.02	0.015	0.25	12.1	14	0.2	0.5	3.77	0.5	Outlet

INLET COMPUTATIONS - ON GRADE INLETS - 100-YR													
Inlet ID	Inlet Type	Curb Length	Slopes		Manning's N	Curb Depression	Computed Ponded Width	Max Ponded Width	Computed Ponded Depth	Max Ponded Depth	Discharge	By Pass Flow	By Pass Node ID
			Long	Trans									
		(ft)	(%)	(ft/ft)		(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	
I1	Curb	10	0.80	0.02	0.015	0.25	15.1	14	0.3	0.5	6.77	2.1	Outlet

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SH 97

STORM SEWER LAYOUTS

SHEET 1 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			114
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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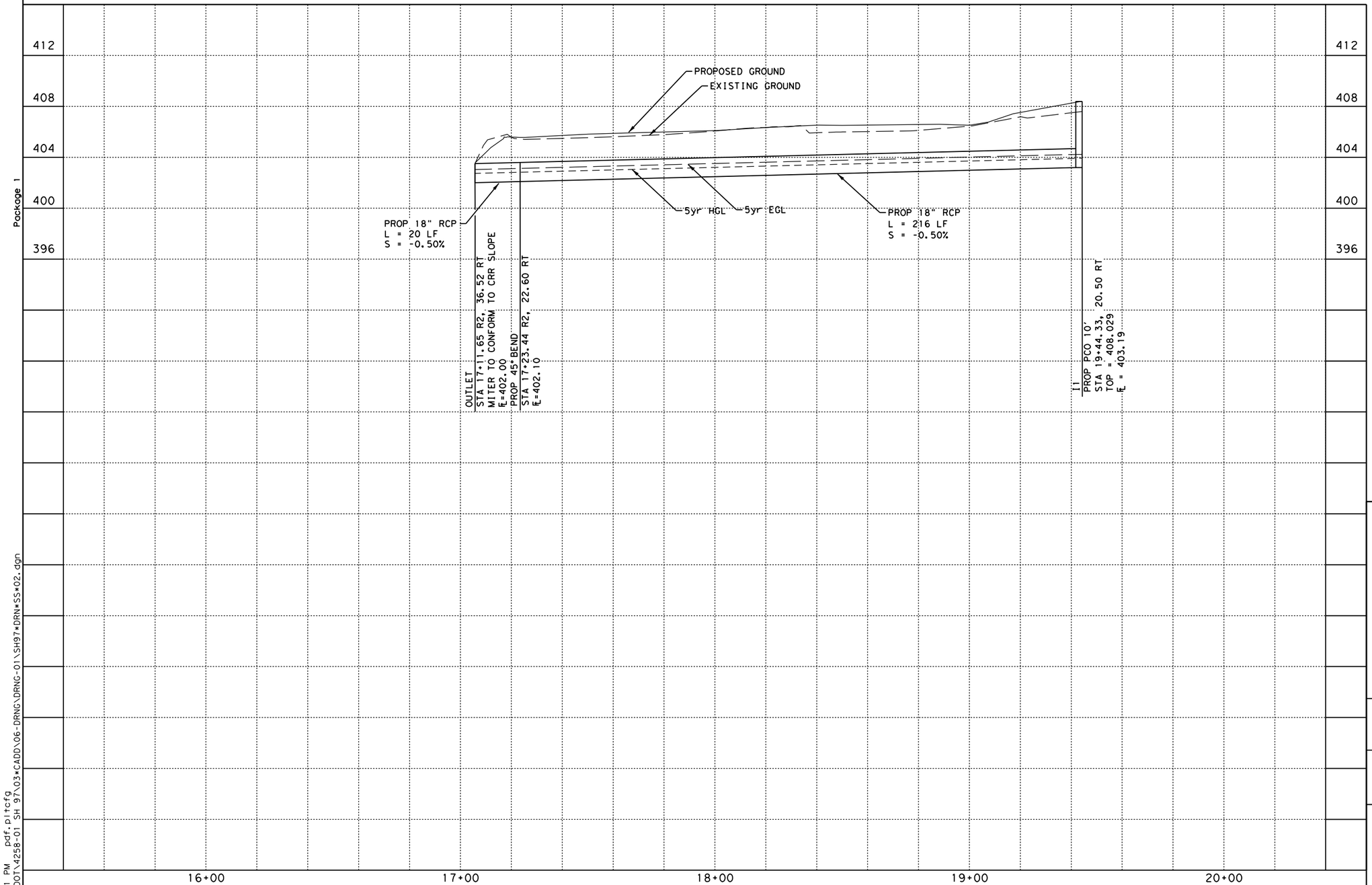

0 20 40
SCALE: 1"=40' H
1"=8' V

4/20/2023

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SH 97

STORM SEWER LAYOUTS

SHEET 2 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			115
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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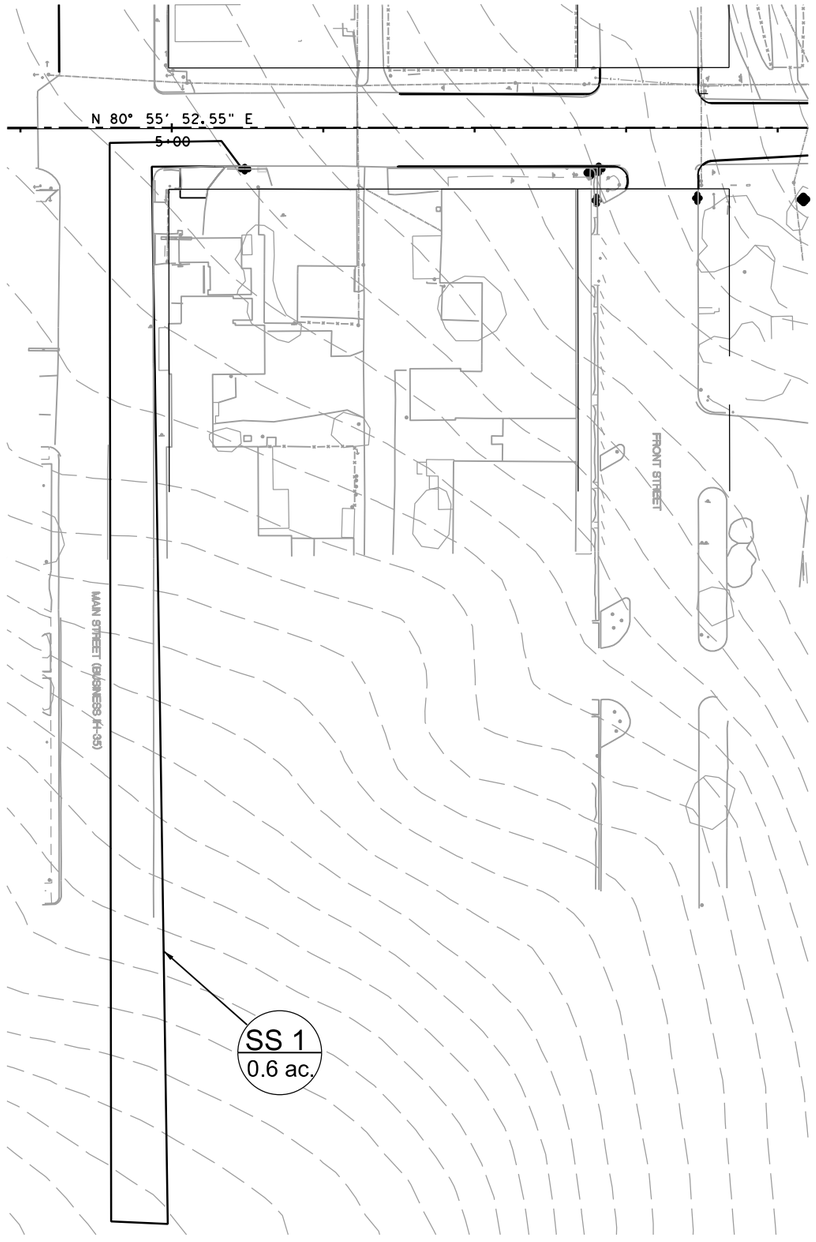

EXISTING - RUNOFF COMPUTATIONS - 5-YR DESIGN						
Area ID	C Value (Weighted)	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Discharge (cfs)
SS 1	0.90	0.555	5	10	6.54	3.27

EXISTING - RUNOFF COMPUTATIONS - 100-YR DESIGN						
Area ID	C Value (Weighted)	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Discharge (cfs)
SS 1	0.90	0.555	5	10	11.18	5.59

N

LEGEND

DA ##.#### — AREA ID / DRAINAGE AREA (ACRES)

DRAINAGE AREA BOUNDARY

0 50 100

SCALE: 1"=100'

4/20/2023

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SH 97

STORM SEWER LAYOUTS

SHEET 3 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			116
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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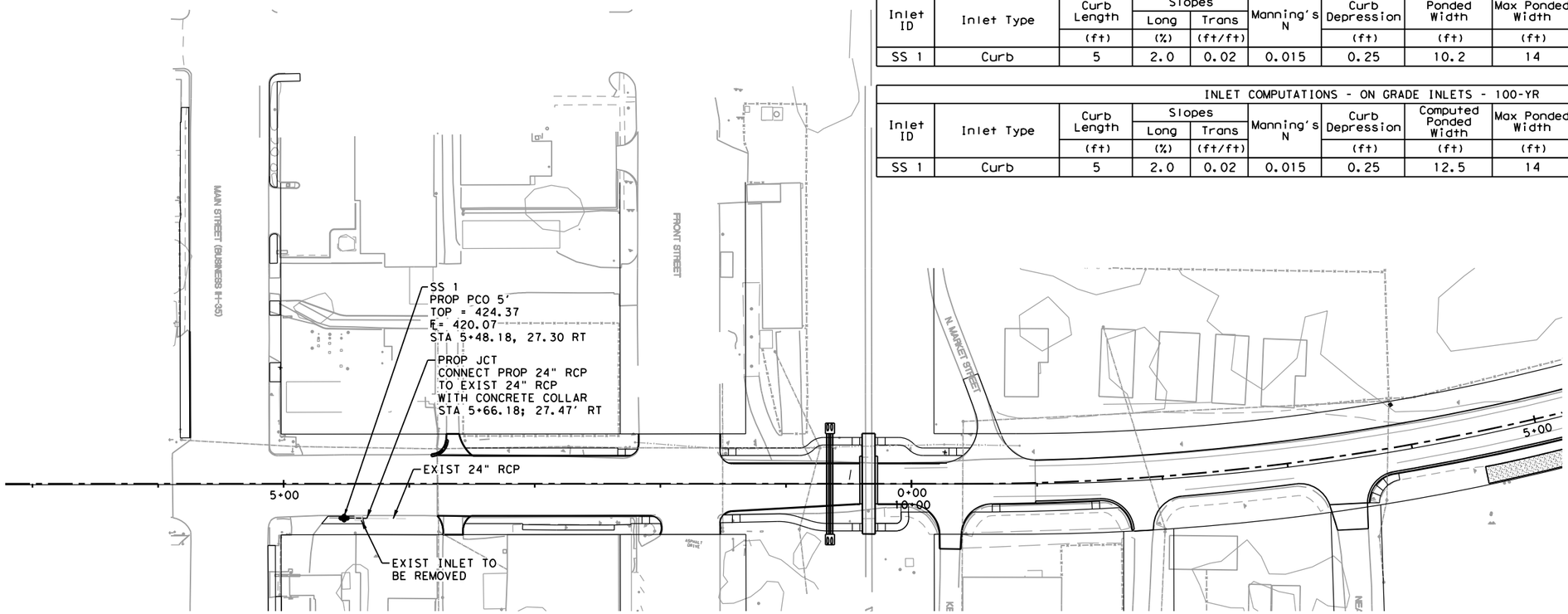
Package 1

INLET COMPUTATIONS - ON GRADE INLETS - 5-YR DESIGN												
Inlet ID	Inlet Type	Curb Length	Slopes		Manning's N	Curb Depression	Ponded Width	Max Ponded Width	Ponded Depth	Max Ponded Depth	Discharge	By Pass Flow
			Long	Trans								
		(ft)	(%)	(ft/ft)		(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)
SS 1	Curb	5	2.0	0.02	0.015	0.25	10.2	14	0.2	0.5	3.27	1.7

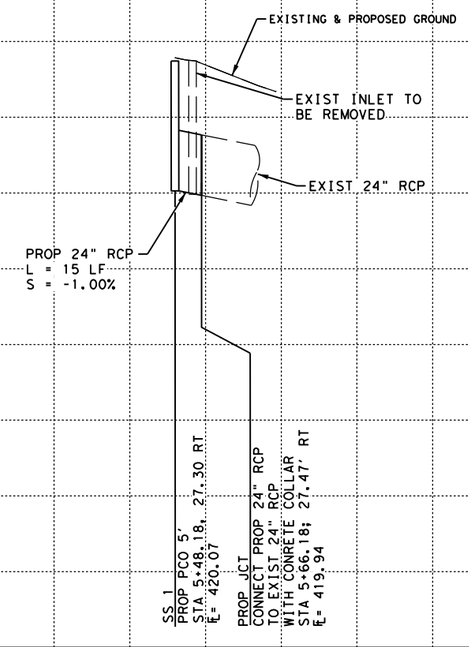
INLET COMPUTATIONS - ON GRADE INLETS - 100-YR												
Inlet ID	Inlet Type	Curb Length	Slopes		Manning's N	Curb Depression	Computed Ponded Width	Max Ponded Width	Computed Ponded Depth	Max Ponded Depth	Discharge	By Pass Flow
			Long	Trans								
		(ft)	(%)	(ft/ft)		(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)
SS 1	Curb	5	2.0	0.02	0.015	0.25	12.5	14	0.2	0.5	5.59	3.5

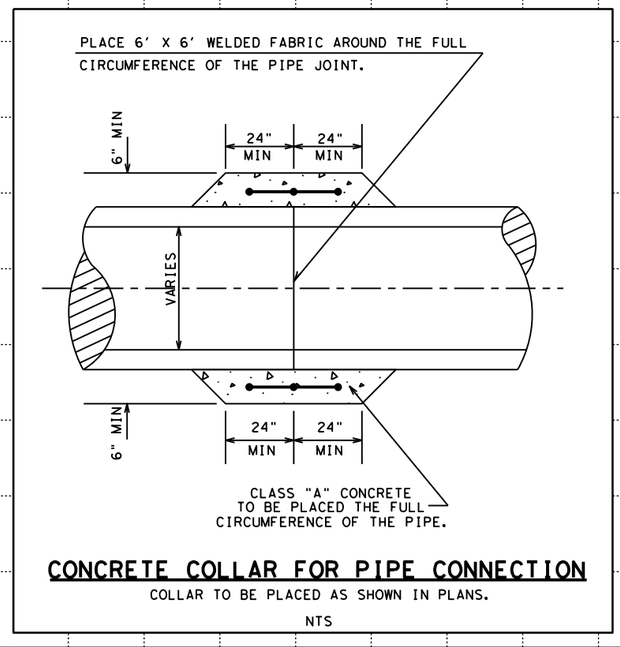


N

0 50 100

SCALE: 1"=100' H
1"=5' V





CONCRETE COLLAR FOR PIPE CONNECTION

COLLAR TO BE PLACED AS SHOWN IN PLANS.

NTS

4/20/2023

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SH 97

STORM SEWER LAYOUTS

SHEET 4 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			117
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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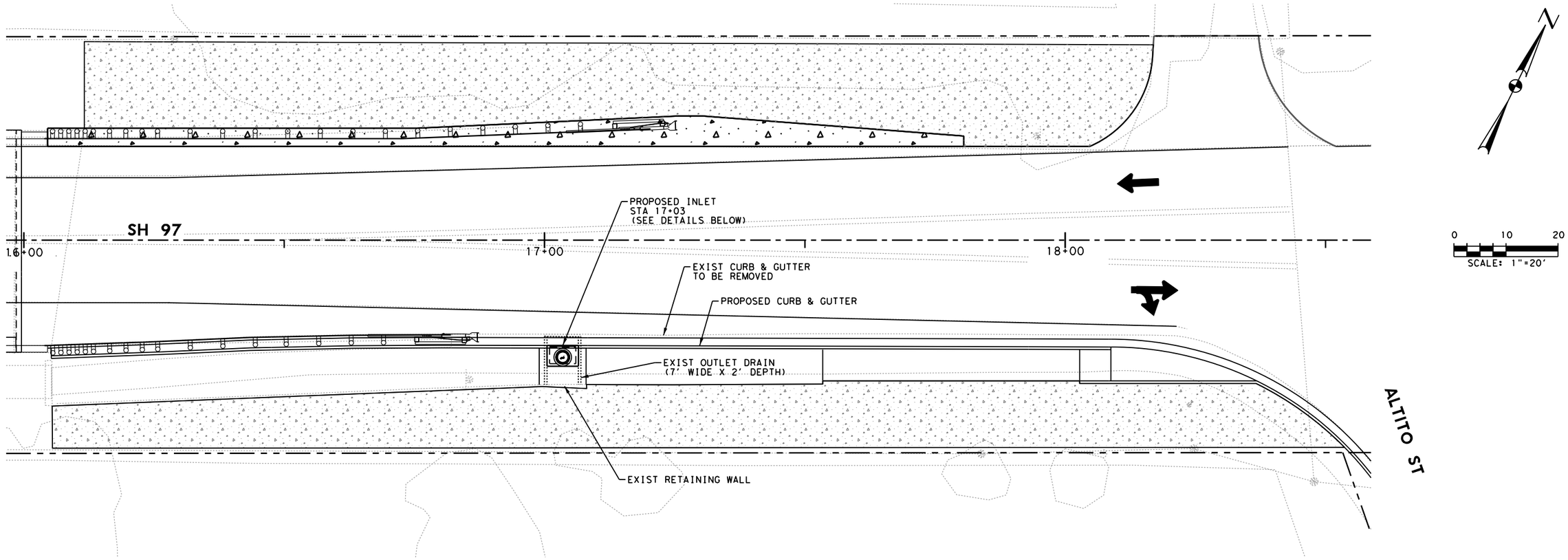
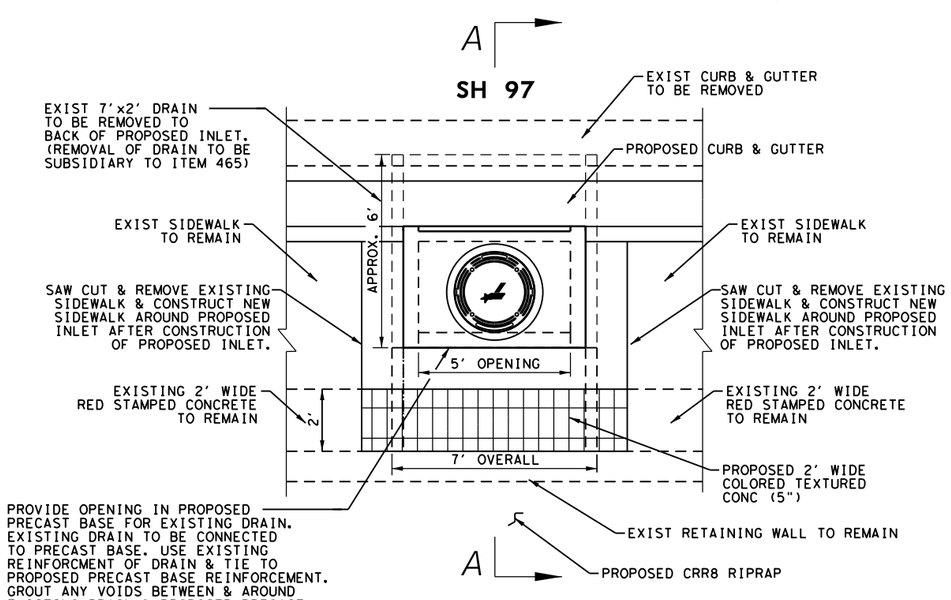
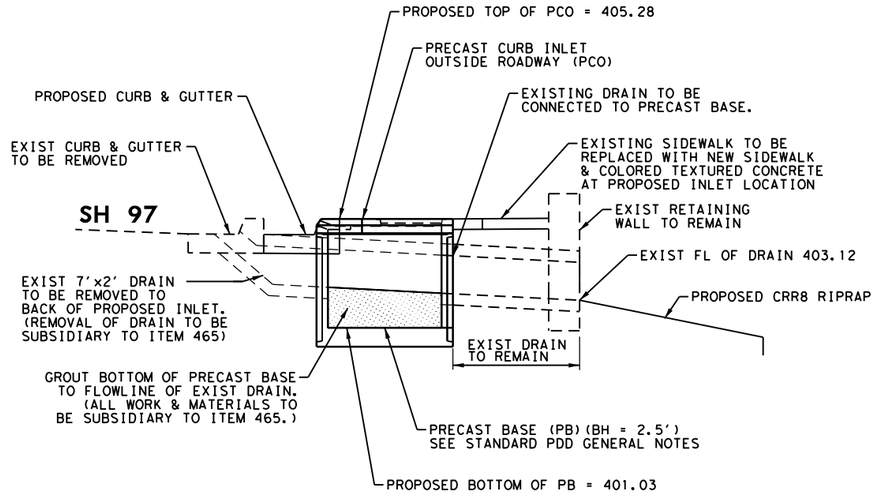




PLAN VIEW
PROPOSED INLET
(STA 17+03)



SECTION A-A
PROPOSED INLET
(STA 17+03)

4/20/2023

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SH 97

DRAINAGE DETAILS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			118
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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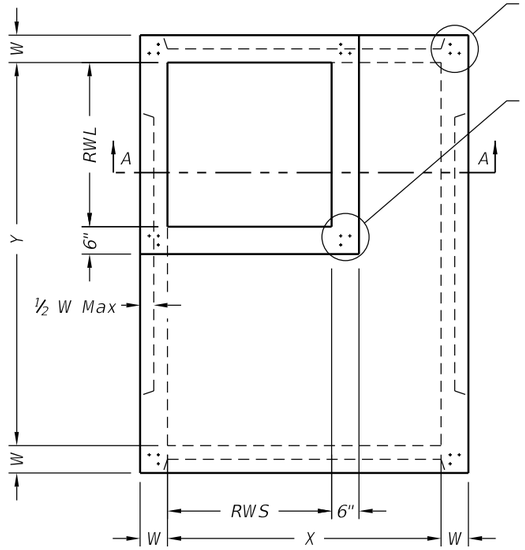
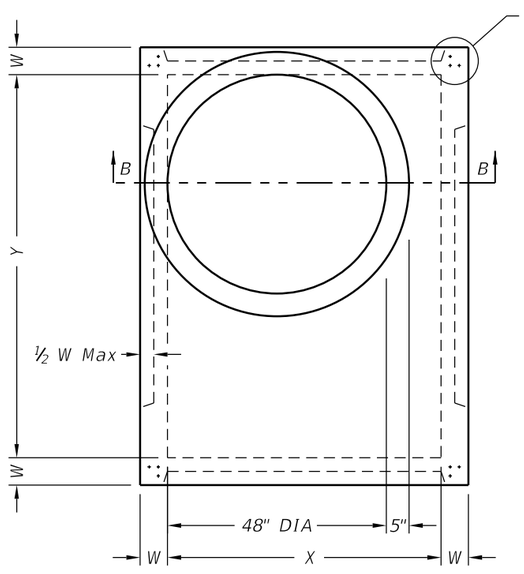


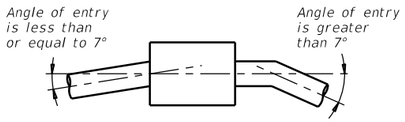
PLAN VIEW "A"

SQUARE REDUCED RISER OPTION



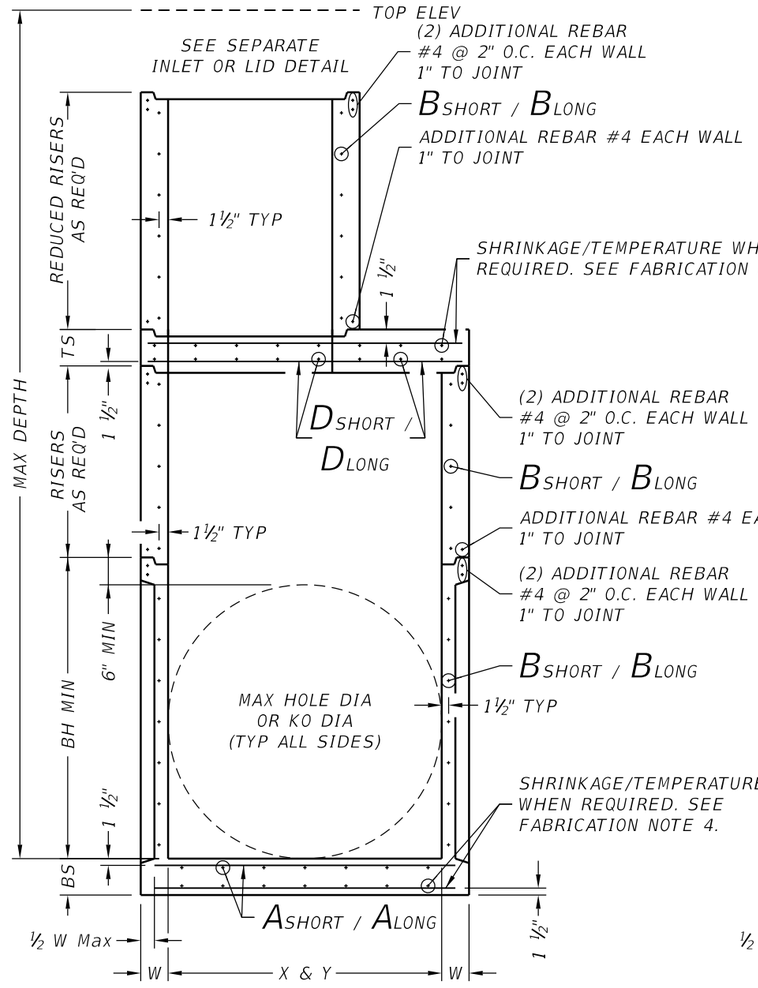
PLAN VIEW "B"

ROUND REDUCED RISER OPTION



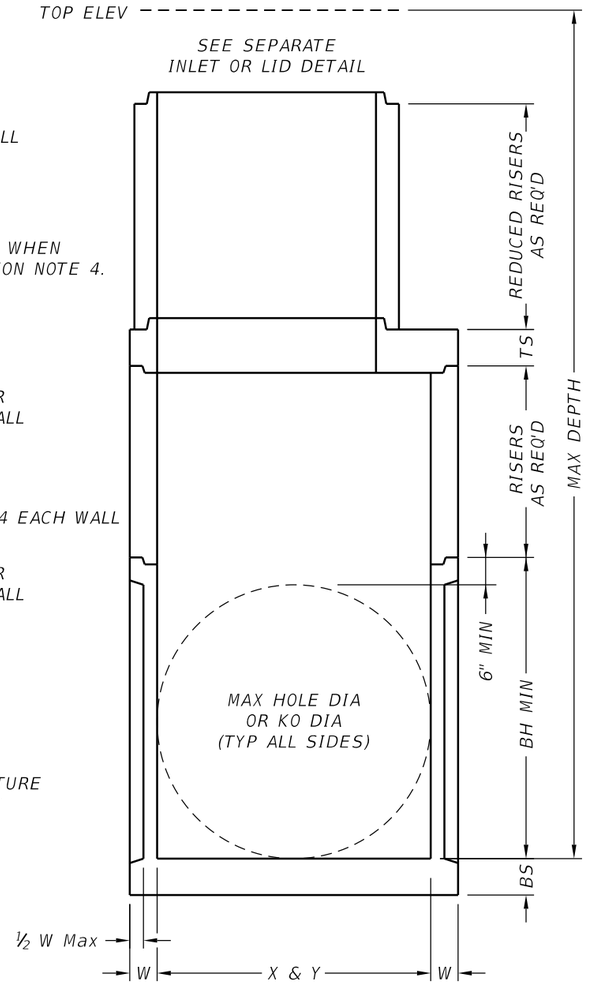
PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PB wall.
If necessary, use pipe elbow or curved
approach alignment to stay within this limit.



SECTION A-A

SQUARE REDUCED RISER OPTION



SECTION B-B

ROUND REDUCED RISER OPTION

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in^2/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

INSTALLATION NOTES:

1. If required elsewhere. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to specified inlet or manhole.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for precast base is subsidiary to the specified inlet, per Item 465, "Junction Boxes, Manholes, and Inlets."

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

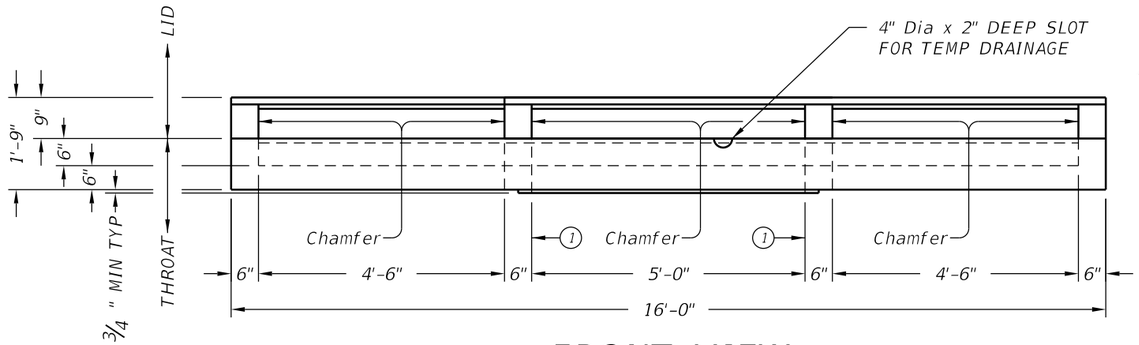
Texas Department of Transportation

Bridge Division Standard

PRECAST BASE

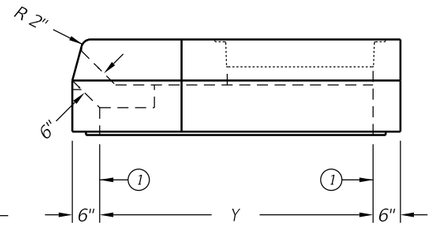
PB

FILE: prestd01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		119

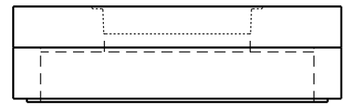


FRONT VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)

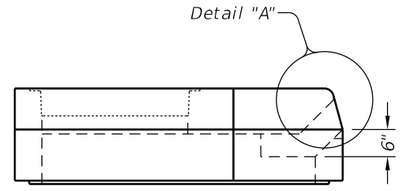


RIGHT VIEW



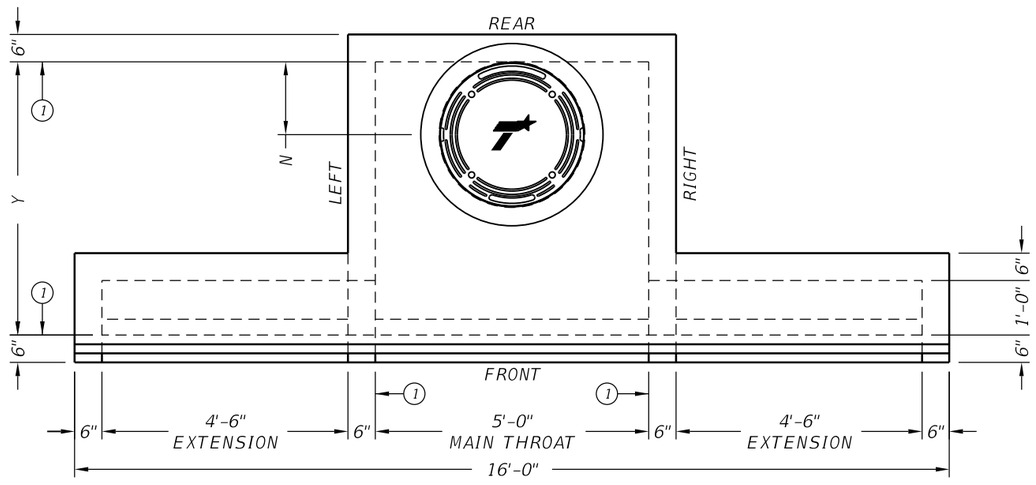
REAR VIEW

(EXTENSIONS NOT SHOWN)



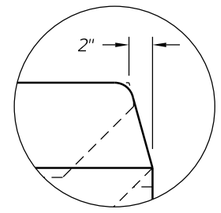
LEFT VIEW

(1) Matches inside face of wall of precast base or riser below inlet.



PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



DETAIL "A"

HS20 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET OUTSIDE ROADWAY

PCO

FILE: prestd03-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		120

DATE: 4/20/2023 12:08:42 PM
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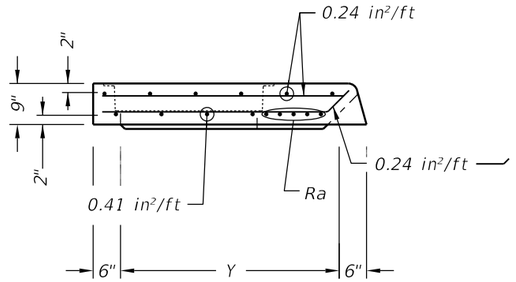
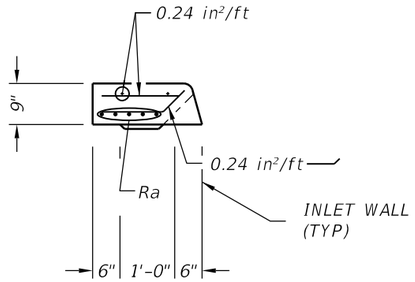
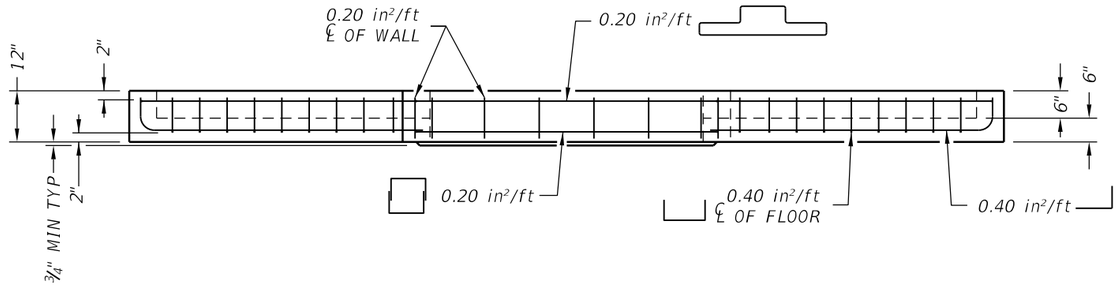


LID SECTION A-A

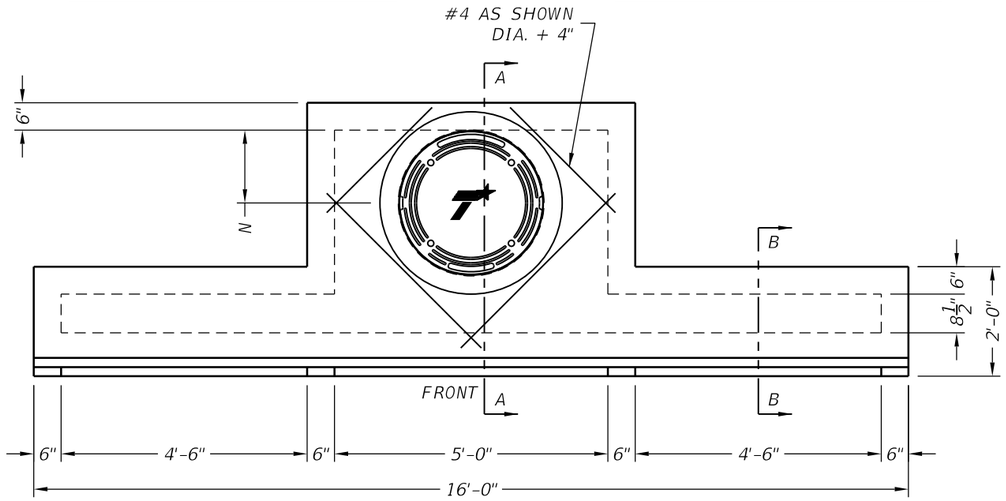


LID SECTION B-B



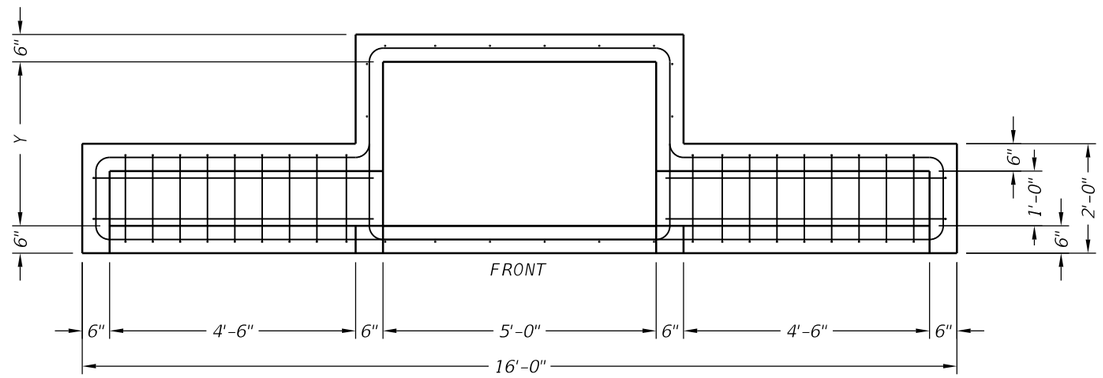
THROAT ELEVATION VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



LID PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



THROAT PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)

SIZE(Y)	N	MH DIA✱	Ra
3'	9"	18"	(4) #5 Additional
4'	16"	32"	(4) #5 Additional
5'	16"	32"	(4) #5 Additional
6'	16"	32"	(4) #5 Additional

✱ Nominal ring and cover size.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Extensions may be right, left, both or none. Provide extensions as specified elsewhere in the plans.
4. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾". Lid may employ a butt joint with dowels at the Contractor's option.
5. Provide lifting devices in conformance with Manufacturer's recommendations.
6. Provide cast iron solid cover, unless noted otherwise elsewhere in the plans.
7. Chamfer vertical edges of inlet lid ¾" as shown in Front View, sheet 1.

INSTALLATION NOTES:

1. Inlet throat and lid are not intended for direct traffic. Do not place in roadway.
2. Seal tongue and groove joints and butt joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Open area of main throat = 360 sq in. Open area of one extension throat = 324 sq in.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, size, and extension placement. Extensions are subsidiary to inlet.

Cover dimensions are clear dimensions, unless noted otherwise.

HS20 LOADING SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

PRECAST CURB INLET OUTSIDE ROADWAY

PCO

FILE: prestd03-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		121

	Size	MAX DEPTH = 15 ft. to top of BASE SLAB										MAX DEPTH = 25 ft. to top of BASE SLAB										Min Height (See Gen Note 3)	Max HOLE DIA (See Fab Note 2)	Max KO DIA (See Fab Note 2)
		Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)				Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)						
		Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness			
	X x Y	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	BH MIN	HOLE DIA	KO DIA
	ft.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	ft.	in.	in.
Precast Junction Box (PJB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	0.37	0.37	9	0.29	0.29	6	0.24	0.24	6	N/A	0.37	0.37	9	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	0.41	0.41	9	0.47	0.47	6	0.38	0.38	6	N/A	0.41	0.41	9	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	N/A	0.48	0.48	9	0.39	0.18	6	0.23	0.59	6	N/A	0.48	0.48	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	N/A	0.42	0.42	9	0.53	0.26	6	0.39	0.59	6	N/A	0.42	0.42	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	N/A	0.43	0.43	9	0.62	0.62	6	0.59	0.59	6	N/A	0.43	0.43	9	5.5	60	60
	5x6	0.27	0.27	9	0.34	0.45	6	N/A	0.48	0.48	9	0.47	0.45	9	0.38	0.54	8	N/A	0.48	0.48	9	5.5	60/72	60/72
	6x6	0.27	0.27	9	0.45	0.45	6	N/A	0.56	0.56	9	0.52	0.52	9	0.54	0.54	8	N/A	0.56	0.56	9	6.5	72	72
	8x8	0.46	0.46	9	0.51	0.51	8	N/A	0.45	0.45	12	0.87	0.87	9	0.59	0.59	10	N/A	0.45	0.45	12	8.5	96	72
Precast Base (PB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	N/A	N/A	N/A	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	0.47	0.47	6	0.38	0.38	6	N/A	N/A	N/A	N/A	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	3x3	0.30	0.34	9	0.39	0.18	6	0.23	0.59	6	3x3	0.40	0.40	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x3	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	3x3	0.46	0.37	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	4x4	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	4x4	0.39	0.39	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	48"	0.39	0.39	9	0.53	0.26	6	0.39	0.59	6	48"	0.47	0.47	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x5	0.33	0.40	9	0.53	0.26	6	0.39	0.59	6	3x5	0.48	0.48	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	3x3	0.34	0.34	9	0.62	0.62	6	0.59	0.59	6	3x3	0.53	0.53	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	4x4	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	4x4	0.64	0.64	9	5.5	60	60
	5x5	0.38	0.38	6	0.34	0.34	6	48"	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	48"	0.64	0.64	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	3x5	0.34	0.40	9	0.62	0.62	6	0.59	0.59	6	3x5	0.53	0.53	9	5.5	60	60
	5x6	0.31	0.31	9	0.34	0.45	6	3x3	0.34	0.34	9	0.47	0.45	9	0.38	0.54	8	3x3	0.61	0.50	9	5.5	60/72	60/72
	5x6	0.27	0.27	9	0.34	0.45	6	4x4	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	4x4	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	48"	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	48"	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	3x5	0.45	0.45	9	0.47	0.45	9	0.38	0.54	8	3x5	0.61	0.61	9	5.5	60/72	60/72
	6x6	0.29	0.29	9	0.45	0.45	6	3x3	0.41	0.41	9	0.52	0.52	9	0.54	0.54	8	3x3	0.74	0.74	9	6.5	72	72
	6x6	0.27	0.27	9	0.45	0.45	6	4x4	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	4x4	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	48"	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	48"	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	3x5	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	3x5	0.87	0.87	9	6.5	72	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x3	0.61	0.61	12	0.91	0.91	9	0.70	0.70	10	3x3	0.85	0.85	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	4x4	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	4x4	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	48"	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	48"	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x5	0.70	0.85	12	0.87	0.87	9	0.70	0.70	10	3x5	1.01	1.01	12	8.5	96	72

** Unless otherwise indicated.

FABRICATION NOTES:
1. Maximum spacing of reinforcement is 8".
2. At manufacturer's option, provide cast or cored holes or thin wall panels (KO) to the maximum diameter shown for each. When no penetration is required, it is acceptable to provide a wall with no sectional reduction.

GENERAL NOTES:
1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PJB for details.
2. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PB for details.
3. Min Height shown is for stock base units. Use stock base units whenever practical. Smaller height base units can be used in special installation circumstances, when noted elsewhere in the plans. Absolute minimum height of base units is 2'-6".

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DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX

PDD

FILE: prestd10-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		122

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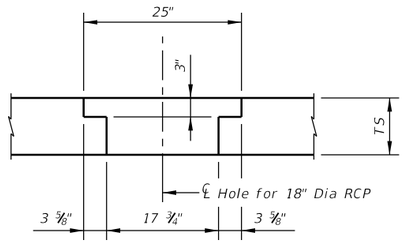
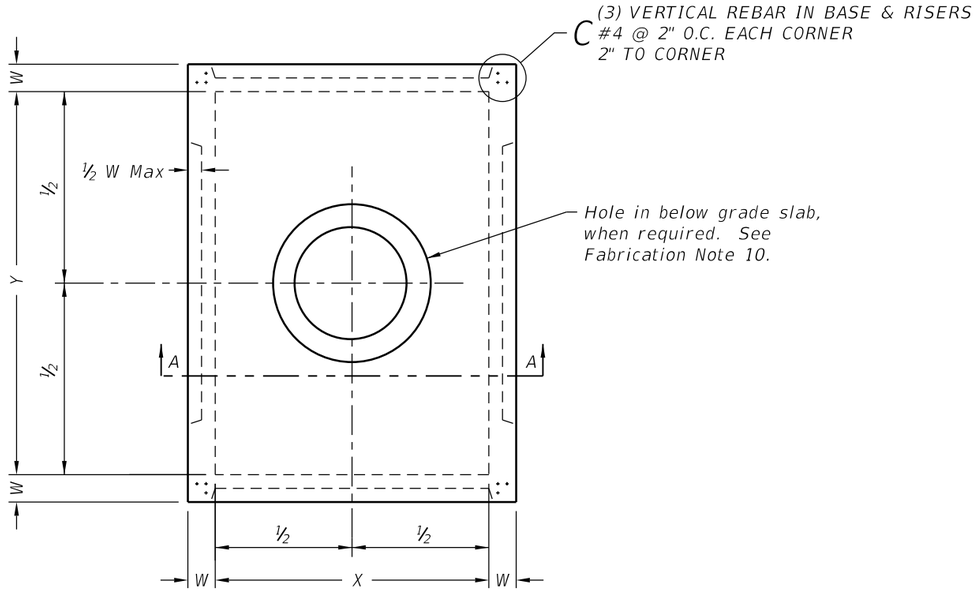
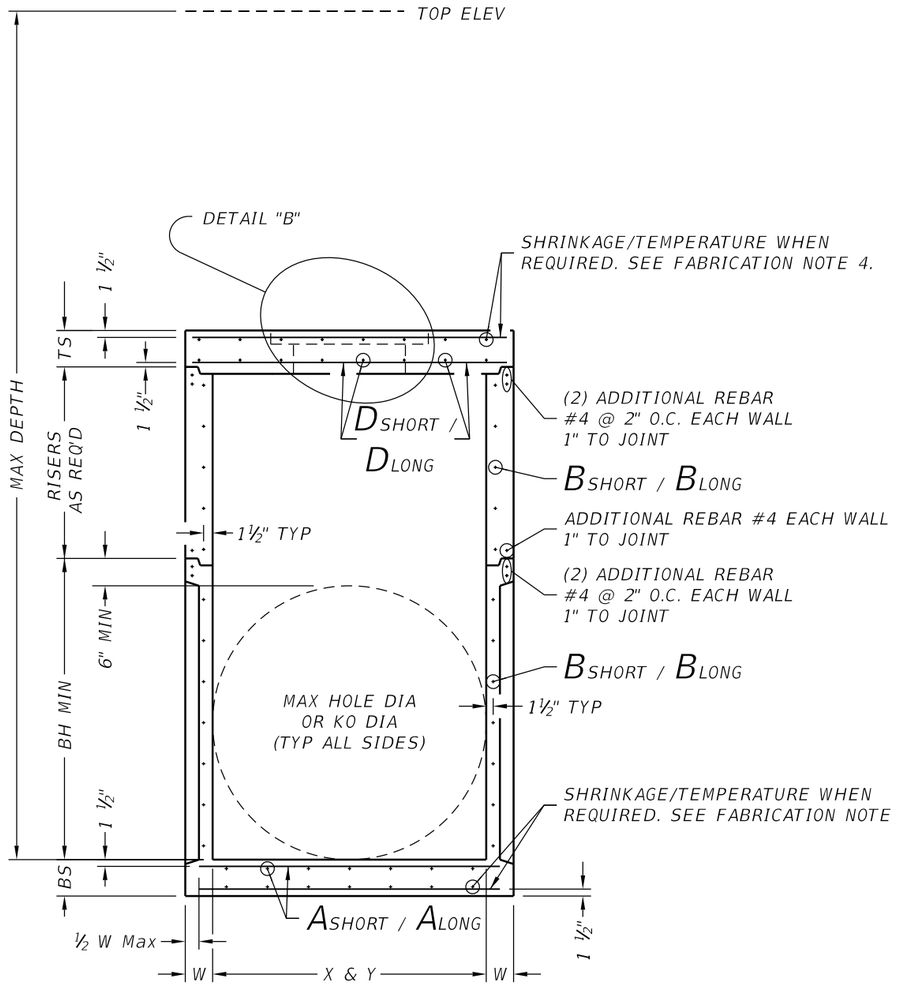


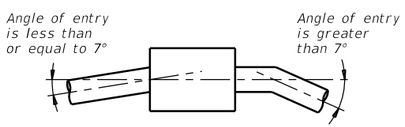
DETAIL "B"



PLAN VIEW



SECTION A-A



PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PJB wall.
If necessary, use pipe elbow or curved approach
alignment to stay within this limit.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.
10. Provide hole in below grade slab only when PJB is installed with inlet type POD.

INSTALLATION NOTES:

1. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to junction box.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for junction box is per Item 465 "Junction Boxes, Manholes, and Inlets" by type and size.

Cover dimensions are clear dimensions, unless noted otherwise.

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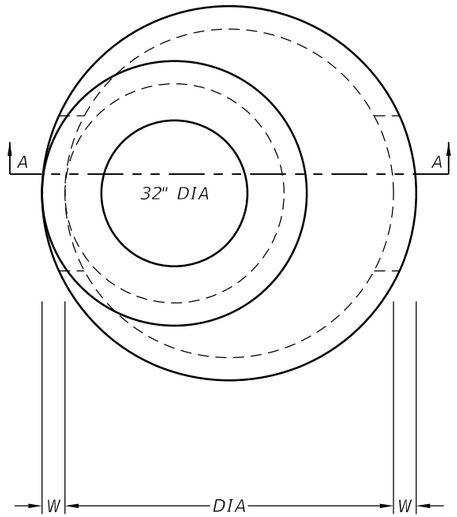
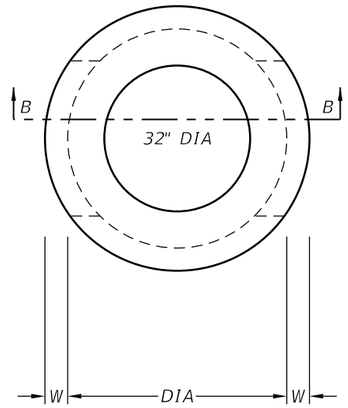
PRECAST JUNCTION BOX

PJB

FILE: prestd09-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		123



PLAN VIEW "A"



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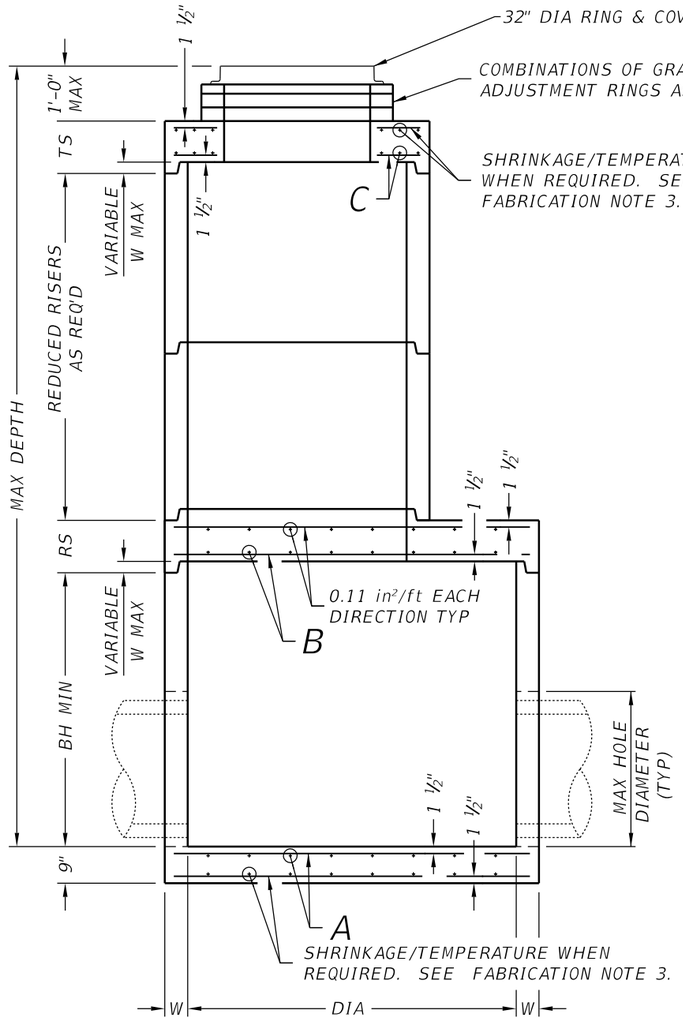
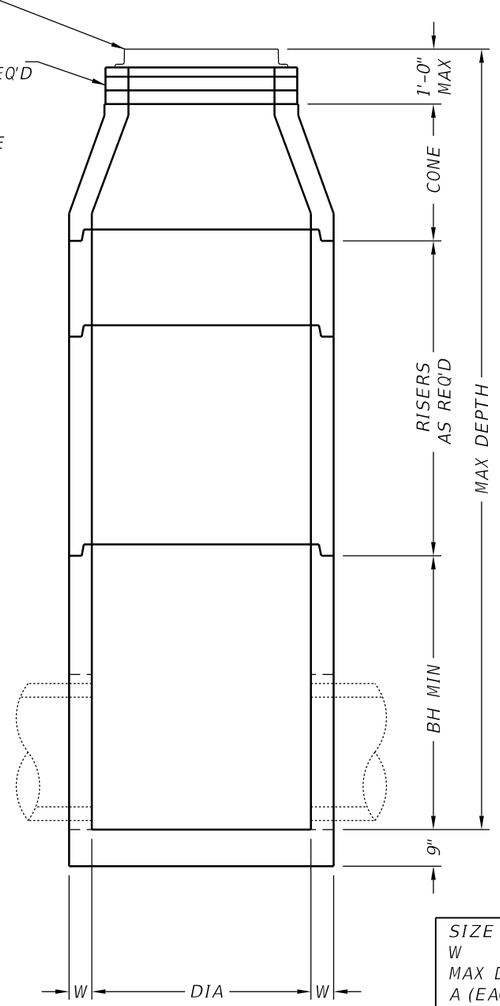


SECTION A-A

ROUND REDUCED RISER OPTION
SHOWING FLAT SLAB TOP



SECTION B-B

ROUND RISER OPTION
SHOWING CONE

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR. Provide circumferential reinforcing steel in vertical walls of base, riser and cone in accordance with ASTM C478.
3. Slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
4. Manufacture base and risers to nearest 3" increment.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is $\frac{3}{4}$".
6. Provide lifting devices in conformance with Manufacturer's recommendations.
7. Provide cast iron solid cover, unless noted otherwise elsewhere in the plans.

INSTALLATION NOTES:

1. Cones may be concentric or eccentric. Reduction cones are acceptable. See Manufacturer for cone dimensions.
2. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to this item.
3. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or $\frac{1}{2}$ the joint depth, whichever is greater.
4. Do not grout rubber gasket joints without Manufacturer's recommendation.
5. Initial installation of grade adjustment rings is limited to 1'-0" Max as shown.
6. Grade adjustment rings may be increased to 2'-0" Max when future construction affects final grade of structure. Make adjustments greater than 2'-0" with additional risers. Adjustments may be made up to the Max depth shown. Structure must be evaluated if Max depth will be exceeded.

GENERAL NOTES:

1. Designed according to ASTM C478.
2. Payment for manhole is per Item 465, "Junction Boxes, Manholes, and Inlets" by type and size.
3. Pipe OD + placement tolerance must be equal or less than Max hole diameter. For rigid pipe, placement tolerance is 4" Max, 2" Min. For flexible pipe, consult boot/seal manufacturer's specification for placement tolerance.

Cover dimensions are clear dimensions, unless noted otherwise.

SIZE (DIA)	48 in	60 in	72 in
W	5 in	6 in	7 in
MAX DEPTH	25 ft	25 ft	25 ft
A (EACH WAY)	0.22 in²/ft	0.30 in²/ft	0.45 in²/ft
B (EACH WAY)	N/A	0.37 in²/ft	0.62 in²/ft
C (EACH WAY)	0.24 in²/ft	0.46 in²/ft	0.46 in²/ft
BH MIN	12 in	36 in	36 in
TS	9 in	9 in	9 in
RS	N/A	9 in	12 in
REDUCED RISER DIA	N/A	48 in	48/60 in
MAX HOLE DIA	32 in	40 in	54 in

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PRECAST ROUND MANHOLE

PRM

FILE: prestd02-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	LRD	LA SALLE		124

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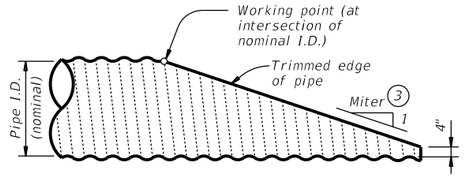
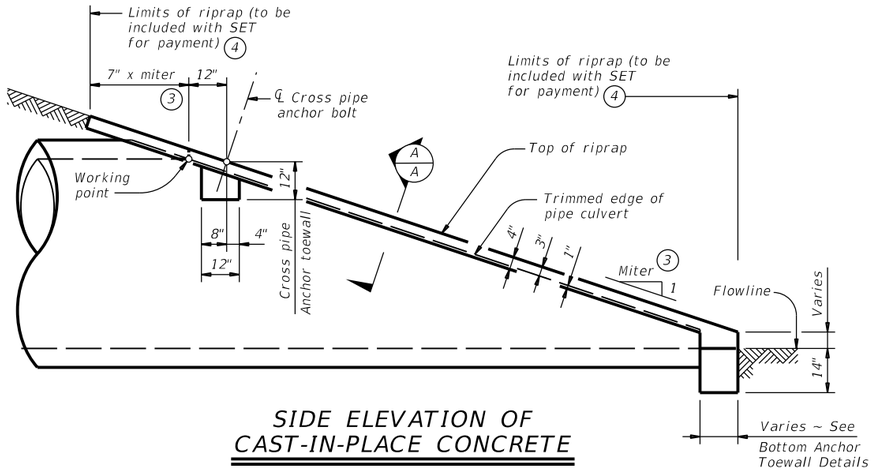


NOTE: All pipe runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

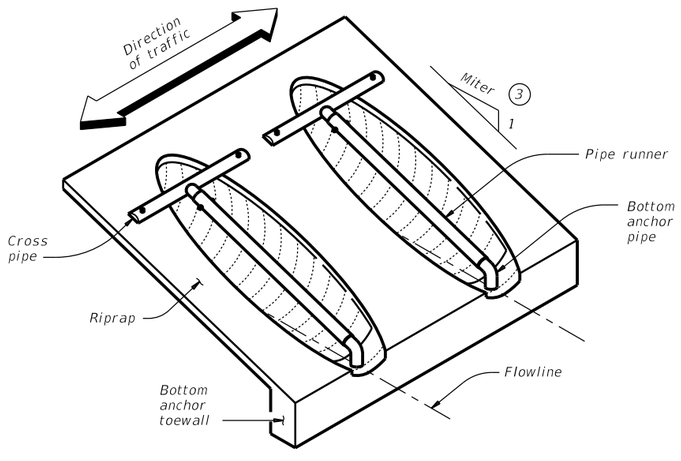
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert.
Details of reinforced concrete pipe (RCP) culvert are similar.)



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert.
Details of corrugated metal pipe (CMP) culvert
are similar. Pipe runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS (1)(2)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' – 7"	3' – 5"	N/A	N/A	N/A	5' – 10"	N/A	N/A	N/A	8' – 1"	N/A	N/A	N/A	12' – 9"
27"	1' – 8"	3' – 8"	N/A	N/A	5' – 5"	6' – 11"	N/A	N/A	7' – 7"	9' – 7"	N/A	N/A	11' – 11"	14' – 11"
30"	1' – 10"	3' – 11"	N/A	N/A	6' – 4"	8' – 0"	N/A	N/A	8' – 9"	11' – 0"	N/A	N/A	13' – 8"	17' – 0"
33"	1' – 11"	4' – 2"	6' – 2"	6' – 5"	7' – 3"	9' – 1"	8' – 6"	8' – 10"	10' – 0"	12' – 5"	13' – 3"	13' – 9"	15' – 5"	19' – 2"
36"	2' – 1"	4' – 5"	6' – 11"	7' – 3"	8' – 2"	10' – 2"	9' – 6"	9' – 11"	11' – 2"	13' – 10"	14' – 9"	15' – 3"	17' – 2"	21' – 3"
42"	2' – 4"	4' – 11"	8' – 6"	8' – 10"	9' – 11"	12' – 4"	11' – 7"	12' – 0"	13' – 6"	16' – 8"	17' – 9"	18' – 5"	20' – 8"	25' – 7"
48"	2' – 7"	5' – 5"	10' – 1"	10' – 5"	11' – 9"	N/A	13' – 7"	14' – 2"	15' – 10"	N/A	20' – 9"	21' – 6"	24' – 2"	N/A
54"	3' – 0"	5' – 11"	11' – 8"	12' – 1"	N/A	N/A	15' – 8"	16' – 3"	N/A	N/A	23' – 10"	24' – 8"	N/A	N/A
60"	3' – 3"	6' – 5"	13' – 3"	N/A	N/A	N/A	17' – 9"	N/A	N/A	N/A	26' – 10"	N/A	N/A	N/A

TYPICAL PIPE CULVERT MITERS (3)

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS (1)

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10' – 0"
4" STD	4.500"	4.026"	19' – 8"
5" STD	5.563"	5.047"	34' – 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

(1) Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.

(2) This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT Roadway Design Manual.

(3) Miter = slope of mitered end of pipe culvert.

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(5) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

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SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		125

DATE: 4/20/2023 12:08:46 PM
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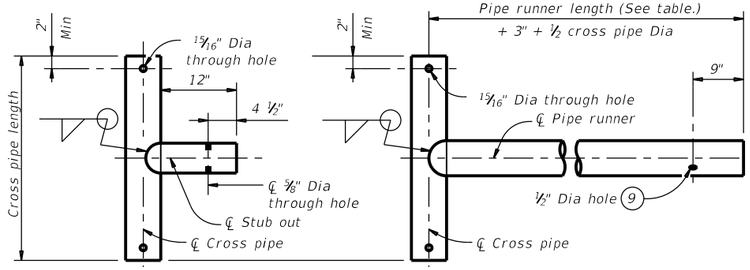
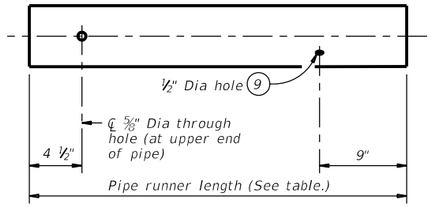


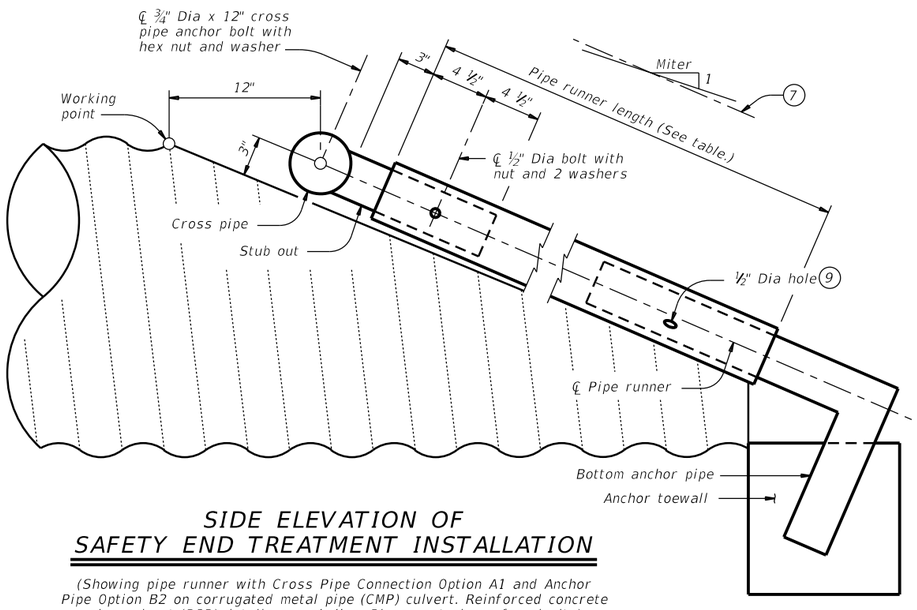
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



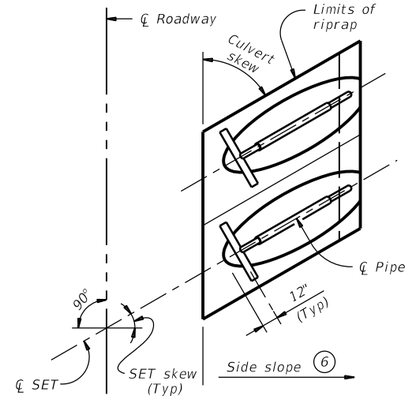
NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

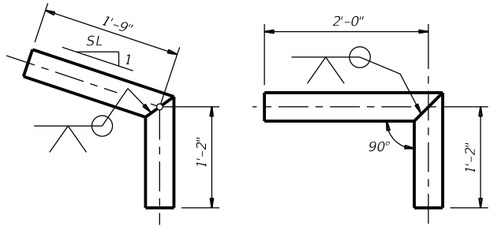


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity)

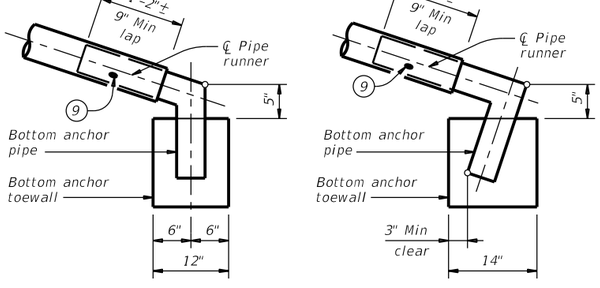


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

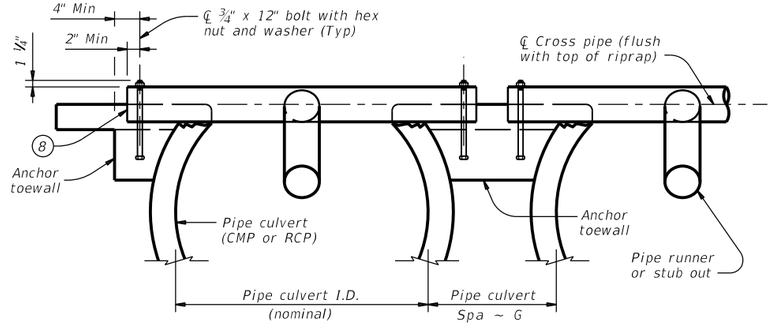
BOTTOM ANCHOR PIPE DETAILS (10)



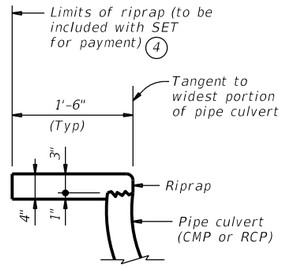
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)



SHOWING CROSS PIPE AND ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SECTION A-A

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Recommended values of side slope are 3:1, 4:1, and 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

(7) Note that actual slope of pipe runner may vary slightly from side slope of riprap and trimmed culvert pipe edge.

(8) Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, inspect the 1/2" hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide pipe runners, cross pipes, and anchor pipes conforming to the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

Payment for riprap and toewall is included in the price bid for each safety end treatment.

Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		126

1 STA 6+22.23 R1
12.00' LT & RT
BEGIN (B)
0.00' LT
BEGIN (H) DBL

2 STA 7+72.98 R1
12.00' LT
END (B)

3 STA 7+91.45 R1
12.00' RT
END (B)
0.00' LT
END (H) DBL

4 STA 8+57.45 R1
12.00' LT & RT
BEGIN (B)
0.00' LT
BEGIN (H) DBL

5 STA 9+59.04 R1
12.00' LT & RT
END (B)
0.00' LT
END (H) DBL

6 STA 9+71.97 R1
12.00' LT & RT
BEGIN (B)
0.00' LT
BEGIN (H) DBL

7 STA 9+97.68
12.00' RT
END (B)
0.00' LT
END (H) DBL

8 STA 0+27.88 R2
12.00' LT
END (B)

9 STA 0+63.50 R2
12.00' RT
BEGIN (B)
0.00' LT
BEGIN (H) DBL

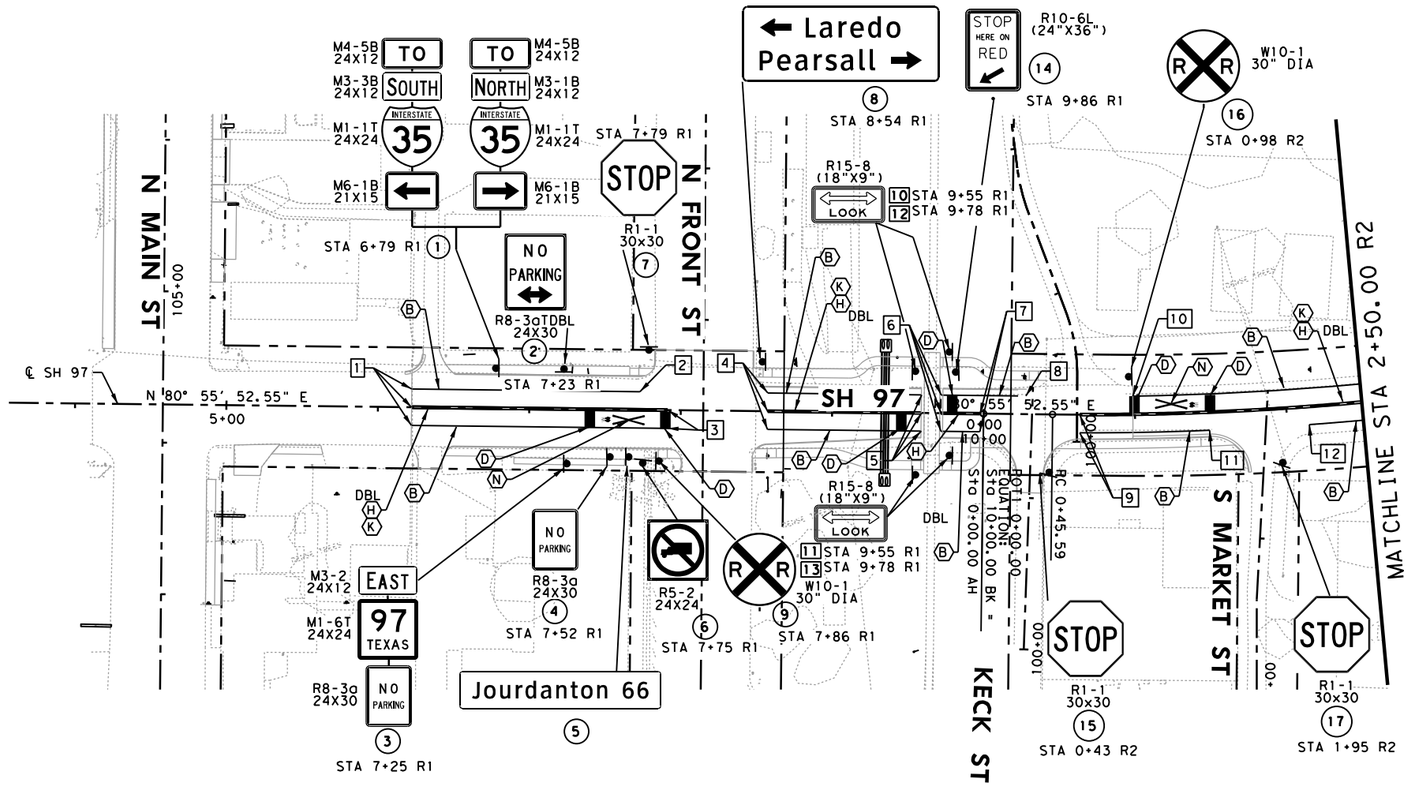
10 STA 0+98.76 R2
12.00' LT
BEGIN (B)

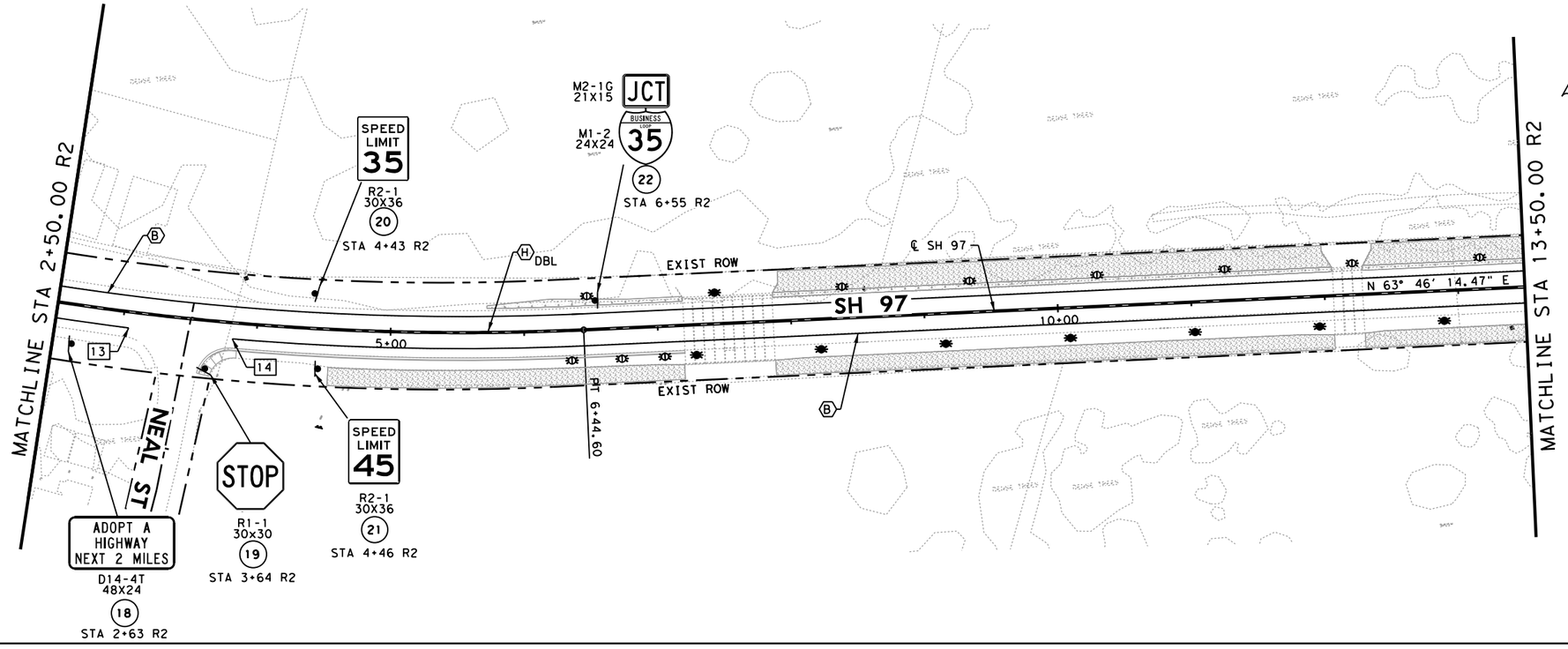
11 STA 1+48.84 R2
12.00' RT
END (B)

12 STA 2+14.43 R2
12.00' RT
BEGIN (B)

13 STA 3+04.66 R2
12.00' RT
END (B)

14 STA 3+82.29 R2
12.00' RT
BEGIN (B)





LEGEND

(A)	W 6" BRK
(B)	W 6" SOLID
(C)	W 8" SOLID
(D)	W 24" SOLID
(E)	W ARROW
(F)	W WORD
(G)	Y 6" BRK
(H)	Y 6" SOLID
(I)	Y 12" SOLID
(J)	TY I-C
(K)	TY II-A-A
(L)	Y 24" SOLID
(M)	W DBL ARROW
(N)	RR XING
(O)	LNDP ARROW

- REMOVE AND INSTALL NEW SIGN
- RELOCATE EXIST SIGN
- INSTALL NEW SIGN
- PROPOSED SIGN POST
- OBJECT MARKER (OM-2X) (WC) (GND)
- DELINEATOR (D-SW) (SZ1) (BRF) (GF2) (BI)
- DELINEATOR (D-SW) (SZ) (BRF) (CTB) (BI)
- DIRECTION OF TRAFFIC

0 50 100
SCALE: 1"=100'

4/20/2023

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SH 97

SIGNING AND PAVEMENT MARKING

SHEET 1 OF 4

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		127

STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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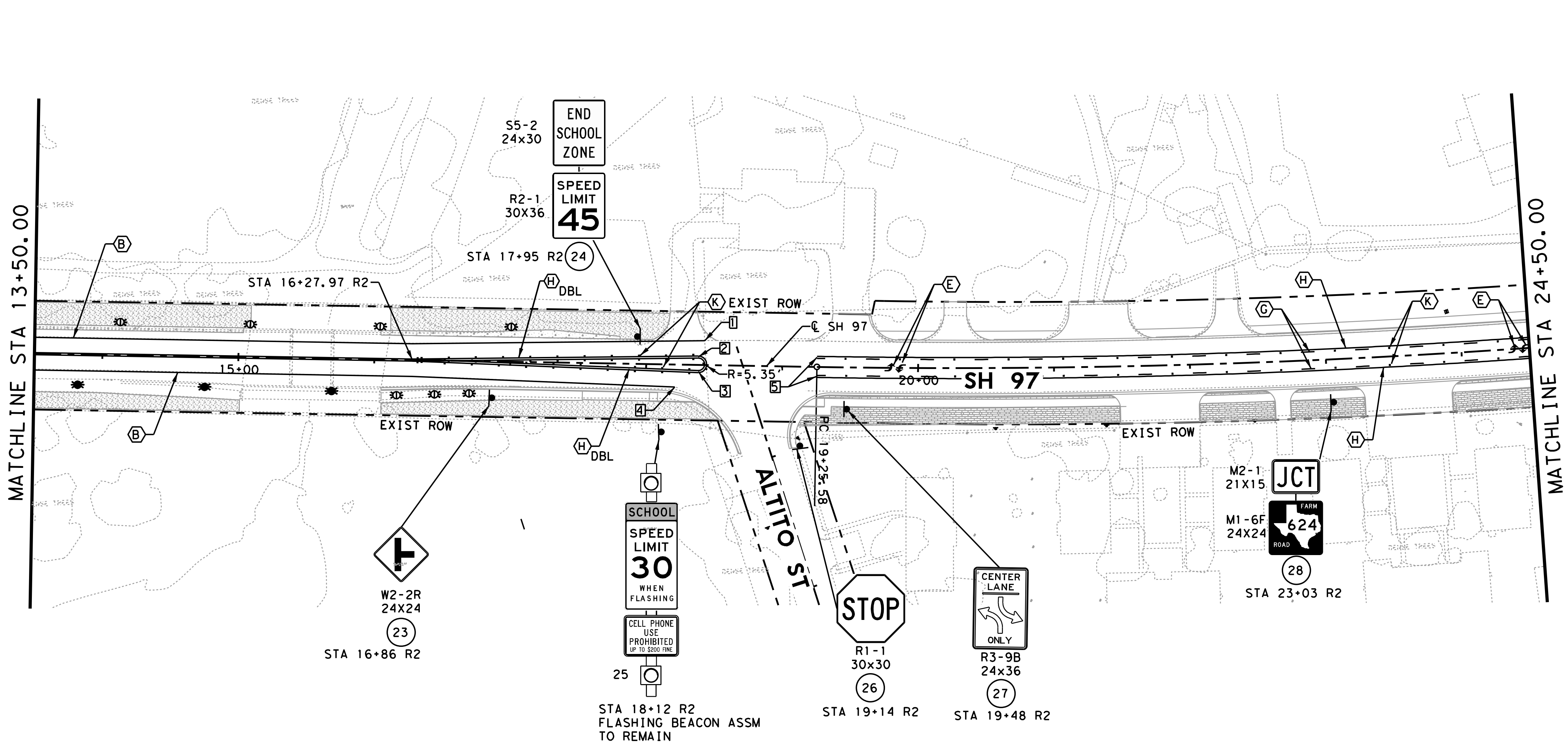


1 STA 18+42.83 R2
17.91' LT
END (B)

2 PC
STA 18+38.22 R2
5.78' LT

3 PT
STA 18+38.52 R2
4.93' RT

4 STA 18+21.37 R2
16.53' RT
END (B)

5 STA 19+25.58 R2
7.00' LT & RT
BEGIN (G)(H)

6 STA 25+32.21 R2
7.00' LT
END (G)(H)

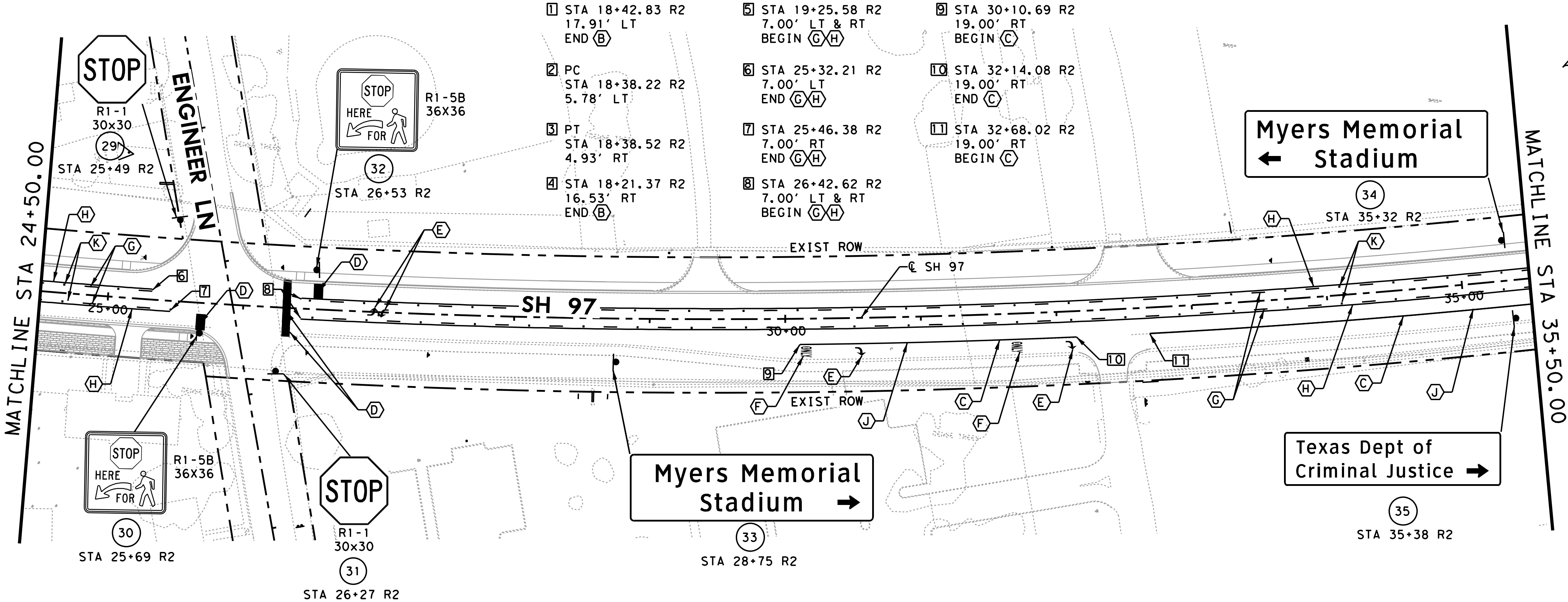
7 STA 25+46.38 R2
7.00' RT
END (G)(H)

8 STA 26+42.62 R2
7.00' LT & RT
BEGIN (G)(H)

9 STA 30+10.69 R2
19.00' RT
BEGIN (C)

10 STA 32+14.08 R2
19.00' RT
END (C)

11 STA 32+68.02 R2
19.00' RT
BEGIN (C)



LEGEND

(A)	W 6" BRK
(B)	W 6" SOLID
(C)	W 8" SOLID
(D)	W 24" SOLID
(E)	W ARROW
(F)	W WORD
(G)	Y 6" BRK
(H)	Y 6" SOLID
(I)	Y 12" SOLID
(J)	TY I-C
(K)	TY II-A-A
(L)	Y 24" SOLID
(M)	W DBL ARROW
(N)	RR XING
(O)	LNDP ARROW

REMOVE AND INSTALL NEW SIGN
RELOCATE EXIST SIGN
INSTALL NEW SIGN
PROPOSED SIGN POST
OBJECT MARKER (OM-2X) (WC) (GND)
DELINEATOR (D-SW) (SZ1) (BRF) (GF2) (BI)
DELINEATOR (D-SW) (SZ) (BRF) (CTB) (BI)
DIRECTION OF TRAFFIC

0 50 100
SCALE: 1"=100'

4/20/2023

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SH 97

SIGNING AND PAVEMENT MARKING

SHEET 2 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			128
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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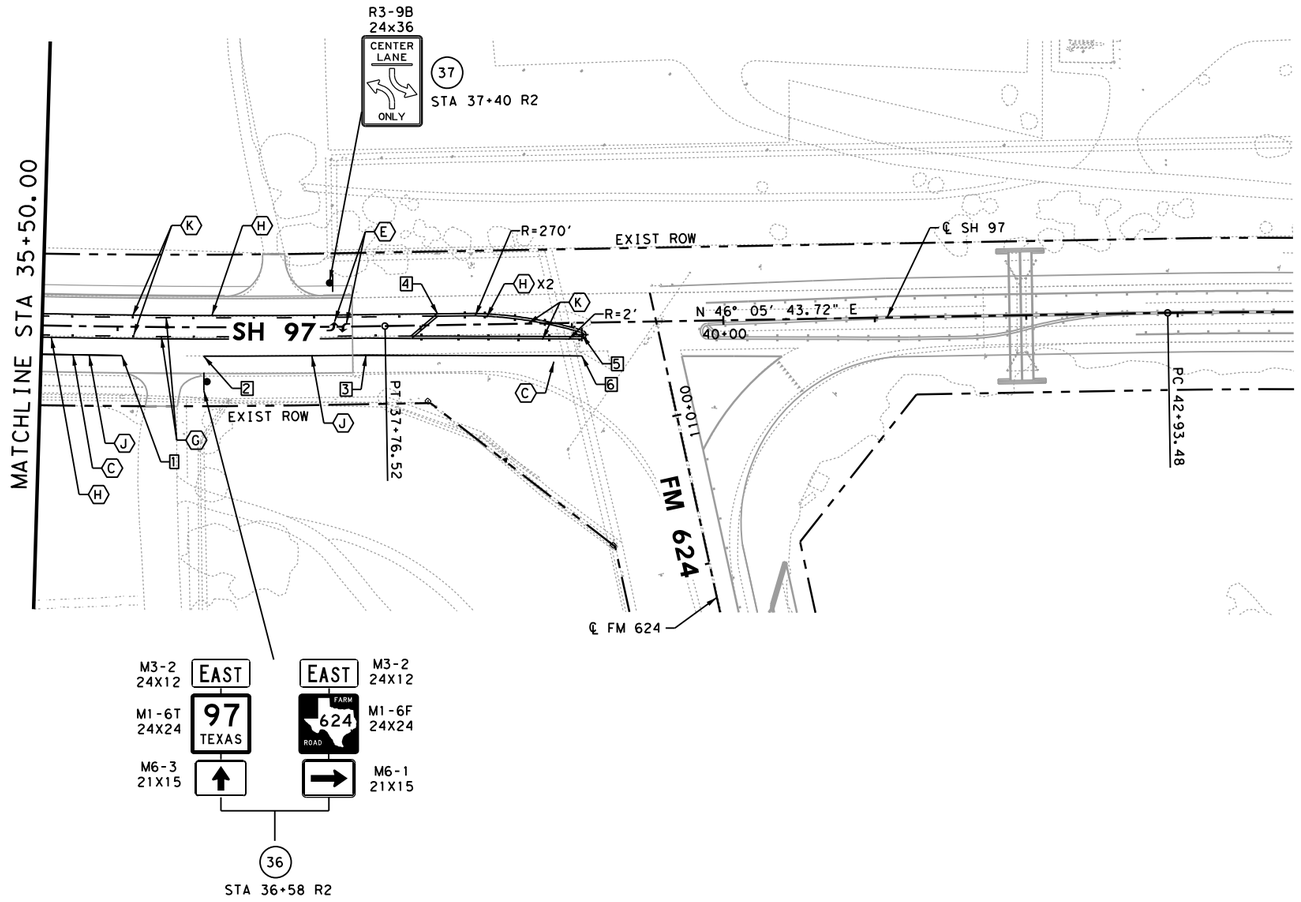

1 STA 36+02.89 R2
19.00' RT
END Ⓒ

2 STA 36+56.71 R2
19.00' RT
BEGIN Ⓒ

3 STA 37+63.69 R2
19.00' RT

4 STA 38+11.52 R2
7.00' LT

5 STA 39+06.48 R2
7.86' RT

6 STA 39+06.21 R2
21.86' RT
END Ⓒ

LEGEND

Ⓐ	W 6" BRK
Ⓑ	W 6" SOLID
Ⓒ	W 8" SOLID
Ⓓ	W 24" SOLID
Ⓔ	W ARROW
Ⓕ	W WORD
Ⓖ	Y 6" BRK
Ⓗ	Y 6" SOLID
Ⓘ	Y 12" SOLID
Ⓙ	TY I-C
Ⓚ	TY II-A-A
Ⓛ	Y 24" SOLID
Ⓜ	W DBL ARROW
Ⓝ	RR XING
Ⓞ	LNDP ARROW

- ◯ REMOVE AND INSTALL NEW SIGN
- ⬠ RELOCATE EXIST SIGN
- ☐ INSTALL NEW SIGN
- PROPOSED SIGN POST
- OBJECT MARKER (OM-2X)(WC)(GND)
- DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)
- DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)
- DIRECTION OF TRAFFIC

0 50 100

SCALE: 1"=100'

4/20/2023

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SH 97

SIGNING AND PAVEMENT MARKING

SHEET 3 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			129
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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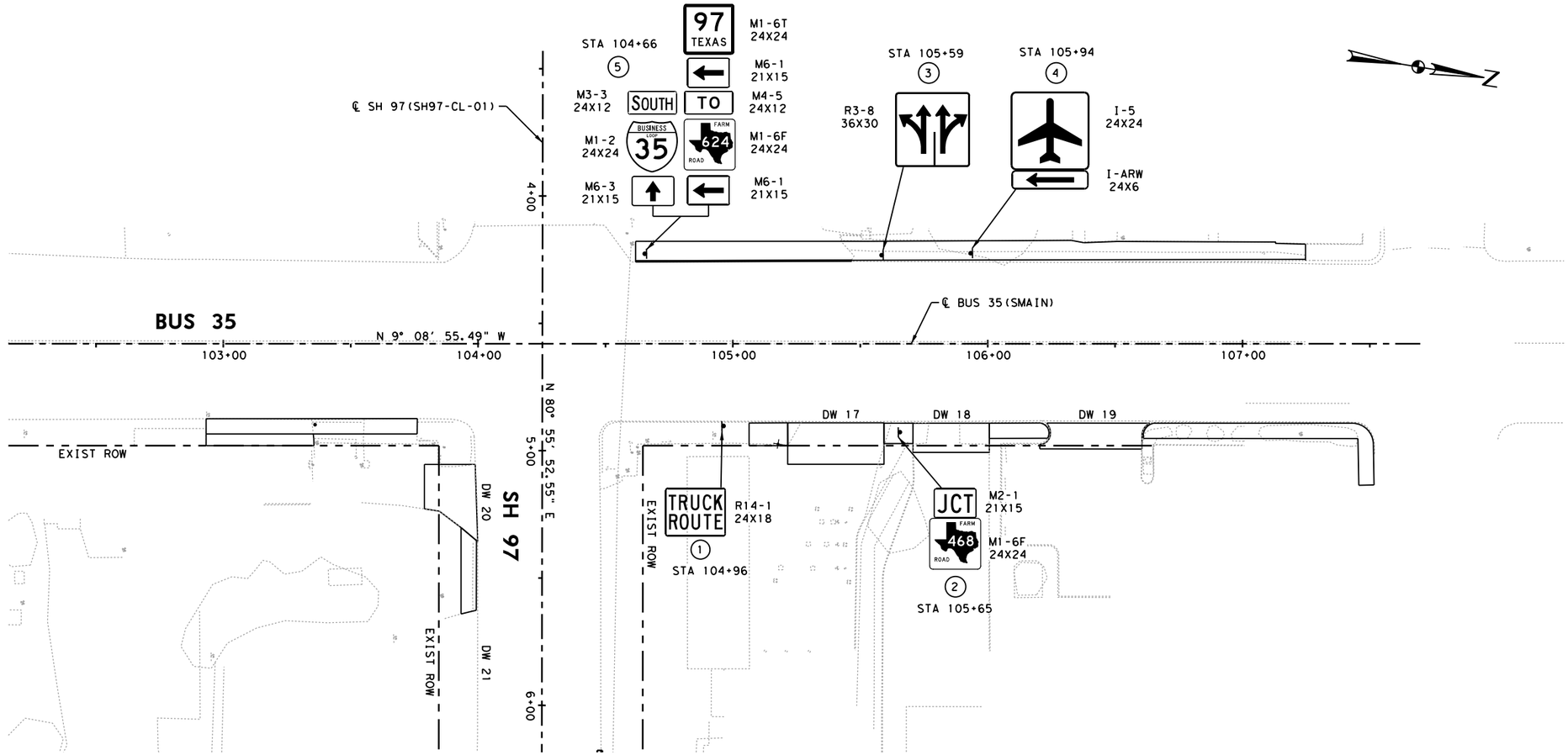

LEGEND

A	W 6" BRK
B	W 6" SOLID
C	W 8" SOLID
D	W 24" SOLID
E	W ARROW
F	W WORD
G	Y 6" BRK
H	Y 6" SOLID
I	Y 12" SOLID
J	TY I-C
K	TY II-A-A
L	Y 24" SOLID
M	W DBL ARROW
N	RR XING
O	LNDP ARROW

- REMOVE AND INSTALL NEW SIGN
- RELOCATE EXIST SIGN
- INSTALL NEW SIGN
- PROPOSED SIGN POST
- OBJECT MARKER (OM-2X)(WC)(GND)
- DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)
- DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)
- DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

Package 1

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SH 97

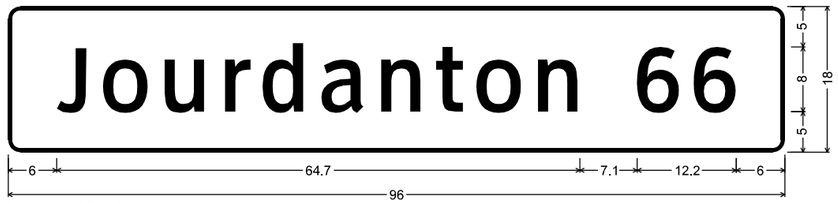
SIGNING AND PAVEMENT MARKING

SHEET 4 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			130
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

SIGN 5



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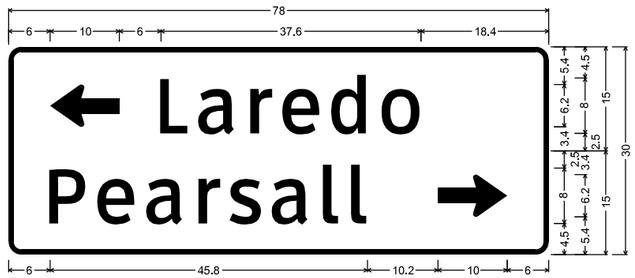
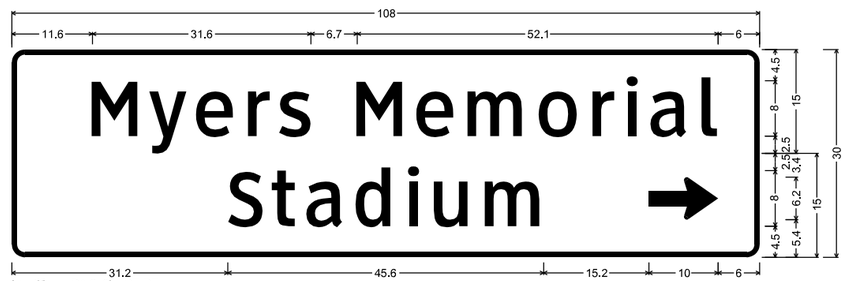
[Jourdanton] ClearviewHwy-3-W; [66] ClearviewHwy-3-W;

SIGN 8



Identifier : D1-2 8in LT-RT;
1.9" Radius, 0.8" Border, White on Green;
Standard Arrow Custom 10.0" X 6.1" 180°; [Laredo] ClearviewHwy-3-W;
1.9" Radius, 0.8" Border, White on Green;
[Pearsall] ClearviewHwy-3-W; Standard Arrow Custom 10.0" X 6.1" 0°;

SIGN 27



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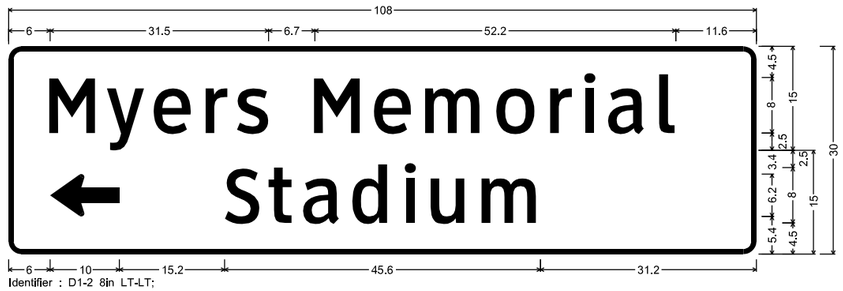
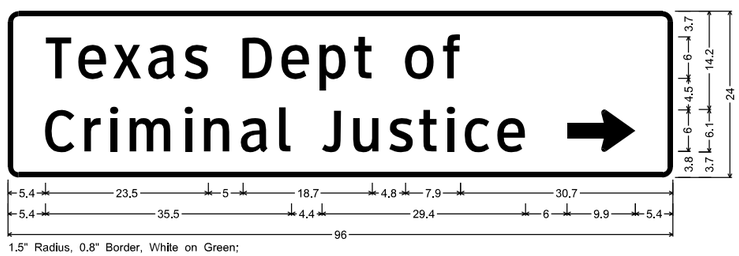
[Myers Memorial] ClearviewHwy-3-W;
1.9" Radius, 0.8" Border, White on Green;
[Stadium] ClearviewHwy-3-W; Standard Arrow Custom 10.0" X 6.1" 0°;

SIGN 28



Identifier : D1-2 8in LT-LT;
1.9" Radius, 0.8" Border, White on Green;
[Myers Memorial] ClearviewHwy-3-W;
1.9" Radius, 0.8" Border, White on Green;
Standard Arrow Custom 10.0" X 6.1" 180°; [Stadium] ClearviewHwy-3-W;

SIGN 29



1.5" Radius, 0.8" Border, White on Green;
[Texas Dept of] ClearviewHwy-3-W; [Criminal Justice] ClearviewHwy-3-W; Standard Arrow Custom 9.9" X 6.1" 0°;

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SH 97

SIGN DETAILS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			131
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

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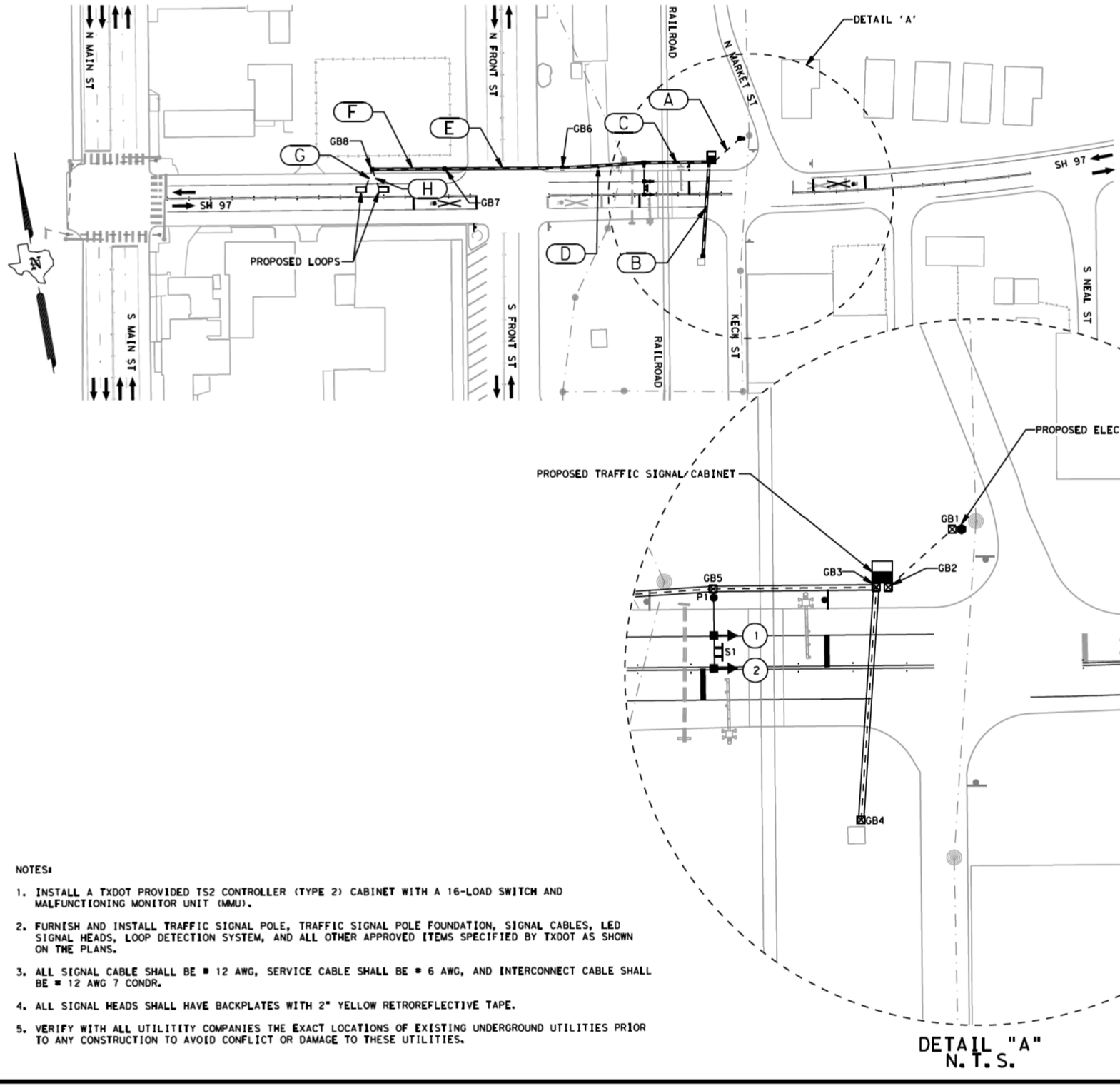
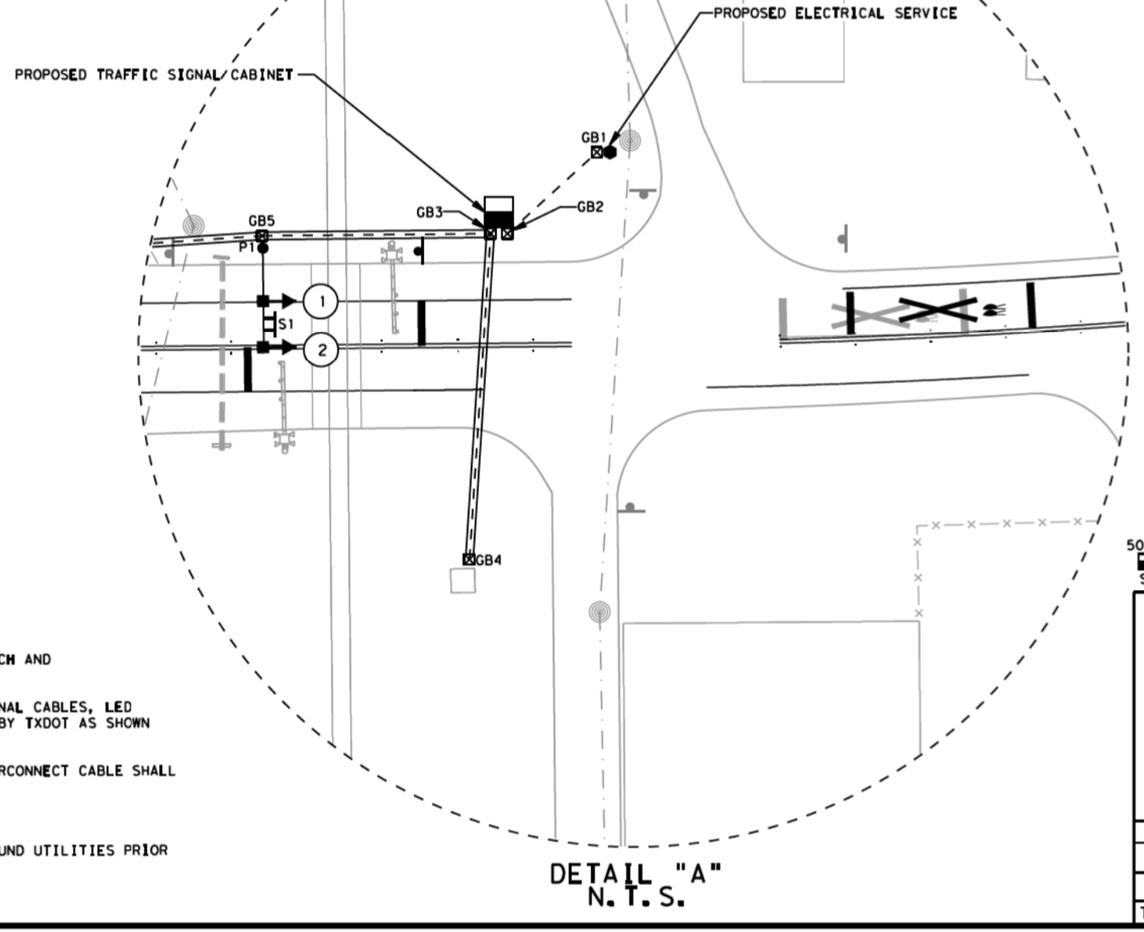




DETAIL "A"
N.T.S.

LEGEND

- PROPOSED TRAFFIC SIGNAL POLE
- PROPOSED TRAFFIC SIGNAL HEAD
- PROPOSED LOOP DETECTOR
- PROPOSED TRAFFIC SIGNAL CABINET
- PROPOSED ELECTRICAL SERVICE
- PROPOSED GROUND BOX TY C
- TT PROPOSED SIGN
- PROPOSED CONDUIT (TRENCH)
- PROPOSED CONDUIT (BORE)
- DIRECTION OF TRAFFIC FLOW

NOTES:

1. INSTALL A TXDOT PROVIDED TS2 CONTROLLER (TYPE 2) CABINET WITH A 16-LOAD SWITCH AND MALFUNCTIONING MONITOR UNIT (MMU).
2. FURNISH AND INSTALL TRAFFIC SIGNAL POLE, TRAFFIC SIGNAL POLE FOUNDATION, SIGNAL CABLES, LED SIGNAL HEADS, LOOP DETECTION SYSTEM, AND ALL OTHER APPROVED ITEMS SPECIFIED BY TXDOT AS SHOWN ON THE PLANS.
3. ALL SIGNAL CABLE SHALL BE # 12 AWG, SERVICE CABLE SHALL BE # 6 AWG, AND INTERCONNECT CABLE SHALL BE # 12 AWG 7 CONDR.
4. ALL SIGNAL HEADS SHALL HAVE BACKPLATES WITH 2" YELLOW RETROREFLECTIVE TAPE.
5. VERIFY WITH ALL UTILITITY COMPANIES THE EXACT LOCATIONS OF EXISTING UNDERGROUND UTILITIES PRIOR TO ANY CONSTRUCTION TO AVOID CONFLICT OR DAMAGE TO THESE UTILITIES.

STATE OF TEXAS
RAFAEL GUZMAN
106025
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RAFAEL GUZMAN, P.E. 106025.
ON 8/16/2021 2021

DocuSigned by:
Rafael Guzman

50 0 50
SCALE: 1" = 100'

TEXAS DEPARTMENT OF TRANSPORTATION ®

SH 97 AT KECK ST
PROPOSED RR QUEUE CUTTER

DN: AA	DW: AA
CK: RG	CK: RG

FED.RD. DIV.NO.	FEDERAL PROJECT NO.	SHEET NUMBER	SHEET NO.
6			132

STATE	STATE DIST. NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
TEXAS	22	LA SALLE	0483	01	052	SH 97

DATE: $DATE$ $TIME$
FILE: $FILE$

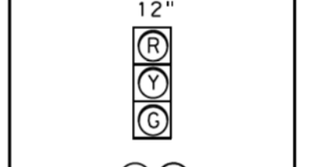
ELECTRICAL SCHEDULE TABLE											
DESCRIPTION	RUN NUMBER	A	B	C	D	E	F	G	H	P1	TOTAL QTY
	RUN LENGTH (LF)	32	87	60	76	109	67	17	17	40	
POWER	ELEC CONDR (NO. 6) INSULATED	2									* 64
	ELEC CONDR (NO. 6) BARE	1	1	1	1	1	1	1	1		* 465
SIGNAL CABLE	VEH LP DETECTOR (SAWCUT)							1	1		* 54
	TRF SIG CBL (TY A) (12 AWG) (5 CONDR)									2	* 100
	TRF SIG CBL (TY A) (12 AWG) (7 CONDR)		1	1	1	1	1				* 419
	TRF SIG CBL (TY A) (12 AWG) (9 CONDR)			1							* 80
	TRF SIG CBL (TY C) (18 AWG) (2 CONDR)			1						1	* 120
CONDUIT	CONDT (PVC) (SCHD 40) (1")							1	1		34
	CONDT (PVC) (SCHD 40) (2")	1									32
	CONDT (PVC) (SCHD 80) (2") (BORE)		1	1	1	1	1				399

* QUANTITIES INCLUDE CABLE IN CABINET,GROUND BOXES, MAST ARMS, AND POLE HEIGHTS.
** FOR CONTRACTORS INFORMATION ONLY.

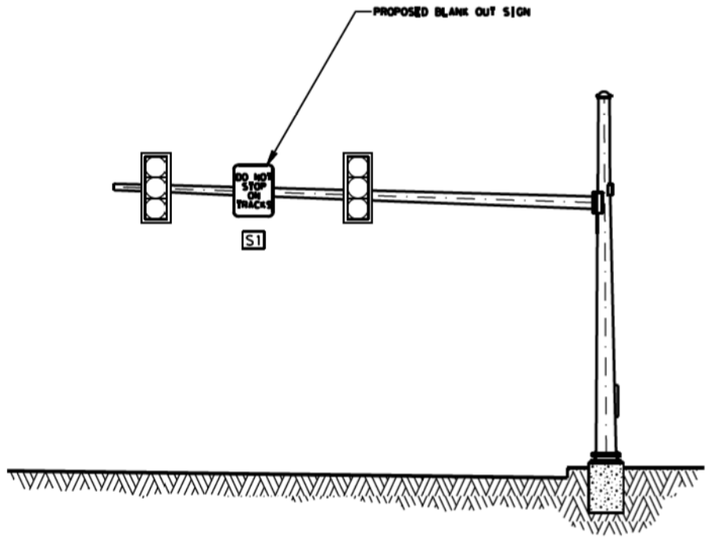
TRAFFIC SIGNAL POLES				
POLE NO.	SIGNAL POLE DESIGN	MAST ARM DESIGN	FOUNDATION TYPE/DEPTH	POLE HEIGHT
P1	28' -80	28 II 80	30 -A/10.3	19

SIGN SCHEDULE
PROPOSED

TRAFFIC SIGNAL HEAD SCHEDULE
PROPOSED



1. ALL SIGNAL INDICATIONS SHALL BE LEDs.
2. INSTALL BACK PLATES FOR ALL SIGNAL HEADS.



TYPICAL SIGNAL INSTALLATION

PROPOSED ELECTRICAL SERVICE DATA												
SERVICE POLE NO.	SERVICE POLE DESCRIPTION	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT		TWO-POLE CONTRACTOR AMPS	PANELBD./ LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BKR POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
					SWITCH AMP/FUSE	CKT. BKR. POLE/AMP						
1	TY D 120/240 060 (NS) GS (L) SP (O)	1 1/2"	3/#4 AWG	N/A	N/A	60	30	100	TRAFFIC SIGNAL	1P/50	20	2.74

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SCALE: 1" = 100'

TEXAS DEPARTMENT OF TRANSPORTATION ®

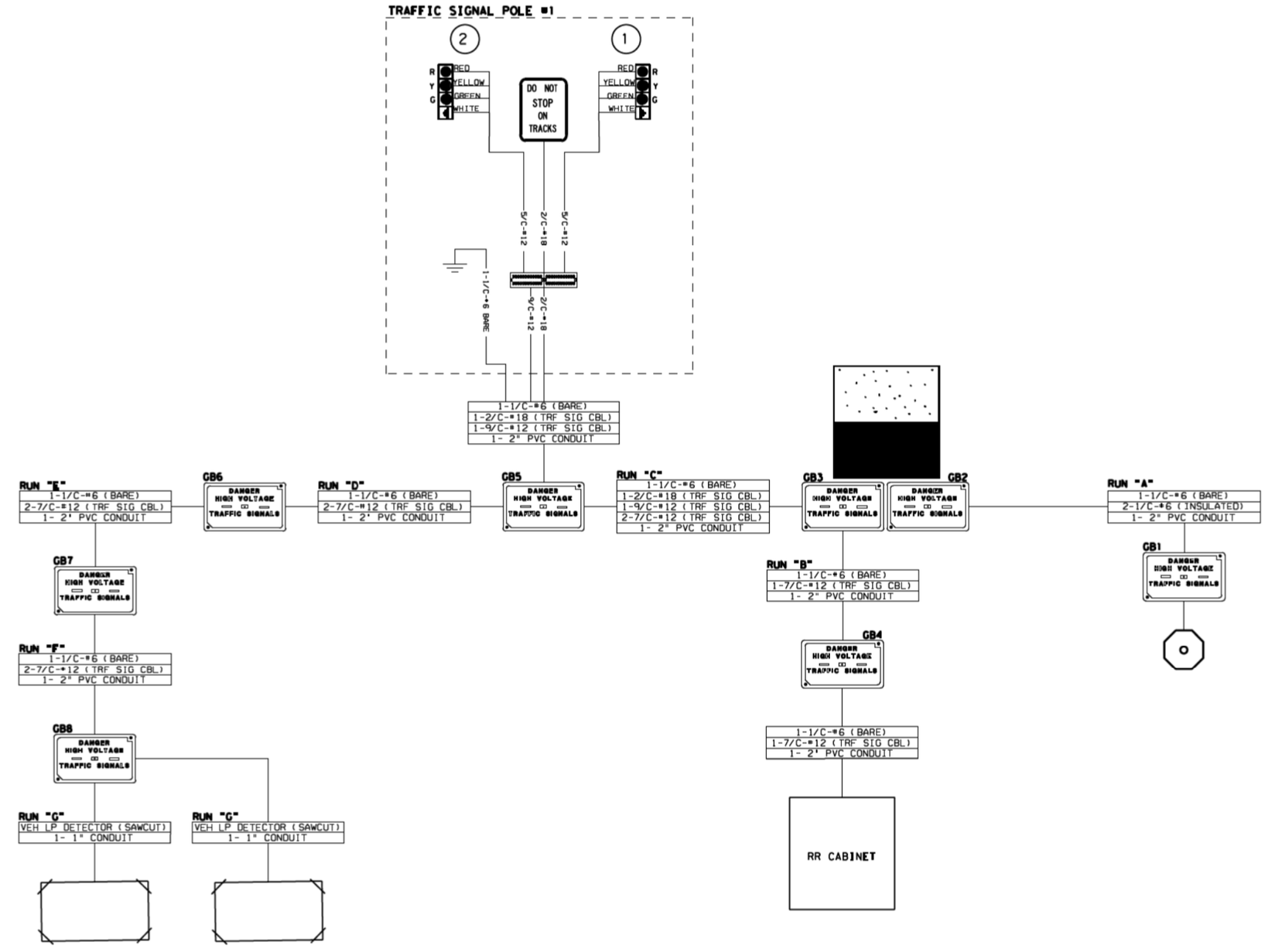
SH 97 AT KECK ST
ELECTRICAL DETAIL

DN: AA DW: AA
CK: RG CK: RG

FED.RD. DIV.NO.	FEDERAL PROJECT NO.	SHEET NUMBER	SHEET NO.
6			133

STATE	STATE DIST. NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
TEXAS	22	LA SALLE	0483	01	052	SH 97

DATE: $DATE$ $TIME$
FILE: $FILE$



LEGEND

- SIGNAL HEAD
- LUMINAIRE
- RADAR DETECTION
- GROUND BOX (DANGER HIGH VOLTAGE TRAFFIC SIGNALS)
- CONTROLLER
- RR CABINET
- TERMINAL BLOCK
- QUEUE LOOPS
- ELECTRICAL SERVICE
- GROUND

STATE OF TEXAS
RAFAEL GUZMAN
106025
LICENSED
PROFESSIONAL ENGINEER

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ON 8/16/2021 2021

DocuSigned by:
Rafael Guzman
9CB9C1491FA542A...

TEXAS DEPARTMENT OF TRANSPORTATION ®

SH 97 AT KECK ST
WIRING DIAGRAM

DN: AA	DW: AA
CK: RG	CK: RG

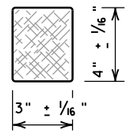
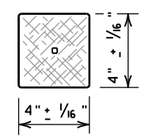
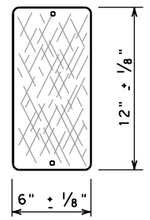
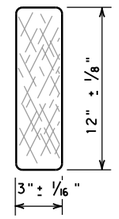
FED. RD. DIV. NO.	FEDERAL PROJECT NO.	SHEET NUMBER	SHEET NO.
6			134

STATE	STATE DIST. NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
TEXAS	22	LA SALLE	0483	01	052	SH 97

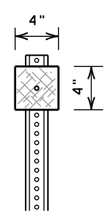
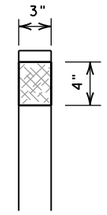
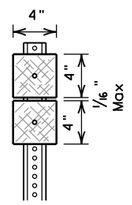
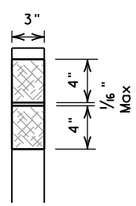
DATE: $DATE$ $TIME$
FILE: $FILE$

DATE: 4/20/2023 12:09:10 PM
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\08-SPMD\Stds-01\dom1-20.dgn

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE	 1-Size 2 reflector unit	 1-Size 1 reflector unit	 2-Size 2 reflector units	 2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

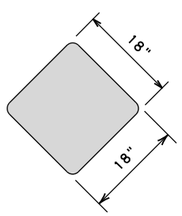
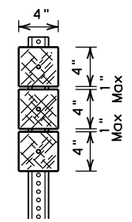
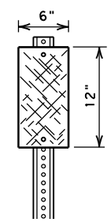
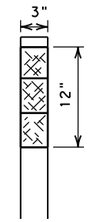
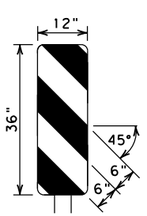
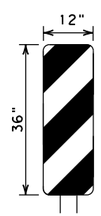
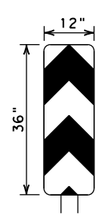
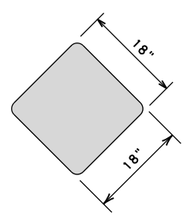
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

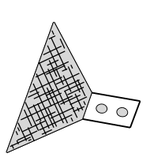
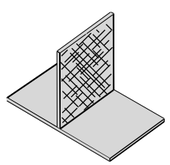
OBJECT MARKERS

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

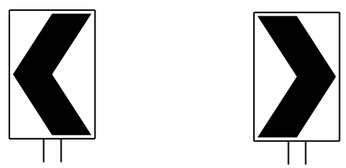
DEPARTMENTAL MATERIAL SPECIFICATIONS

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

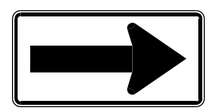
BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE	 W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	
NOTE	1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).			

ONE DIRECTION LARGE ARROW

DEVICE	 W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE:

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	LRD	LA SALLE		135

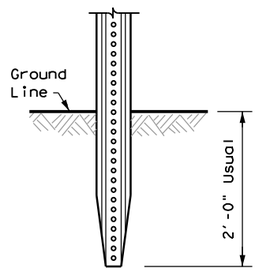
20A

DATE: 4/20/2023 12:09:11 PM
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\08-SPMD\Stds-01\dom2-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

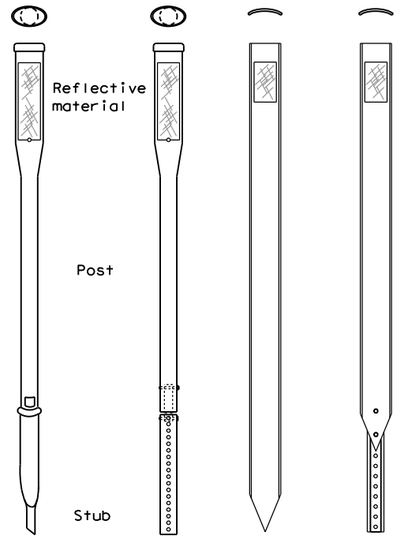


NOTES

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

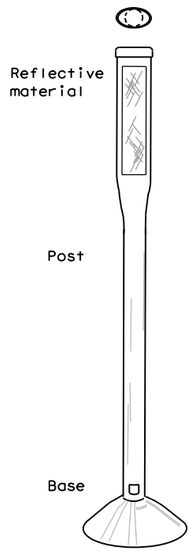
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



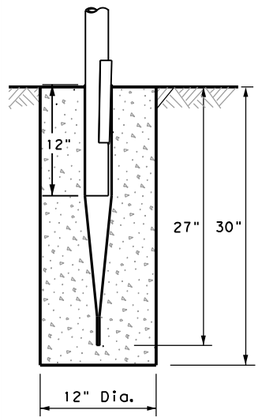
SURFACE MOUNT

NOTES

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

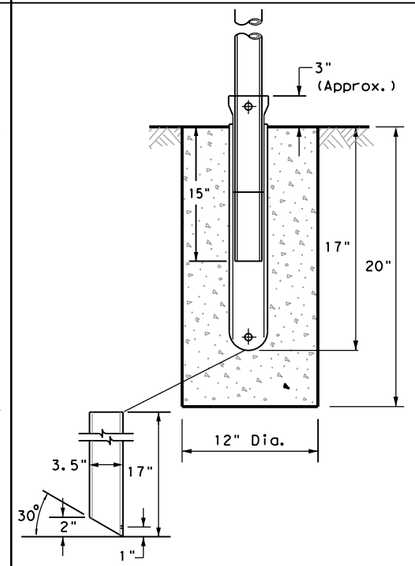
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

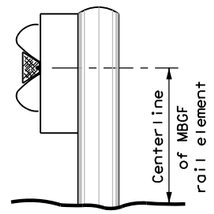
NOTE

1. Install per manufacturer's recommendations.

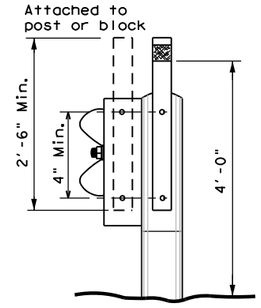
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

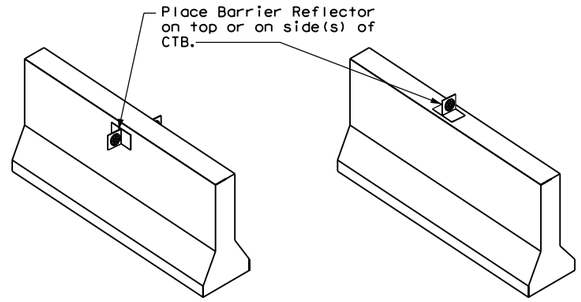
GF1



GF2



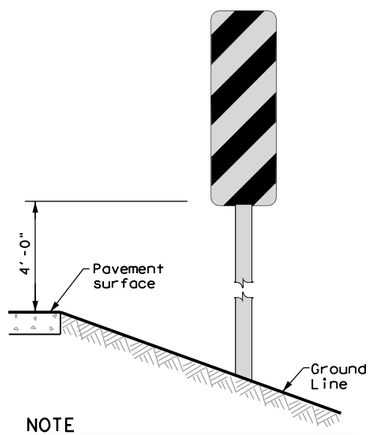
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

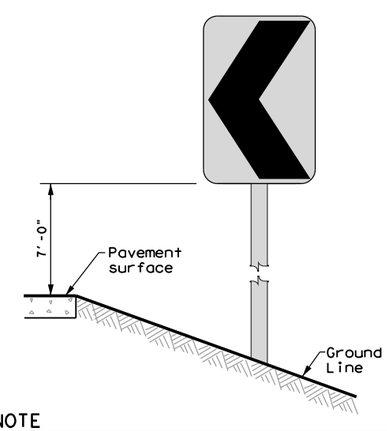
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

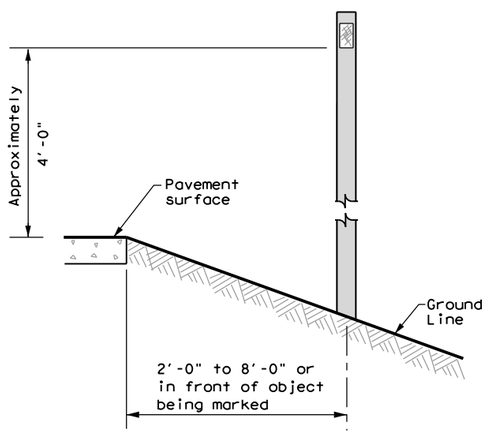
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

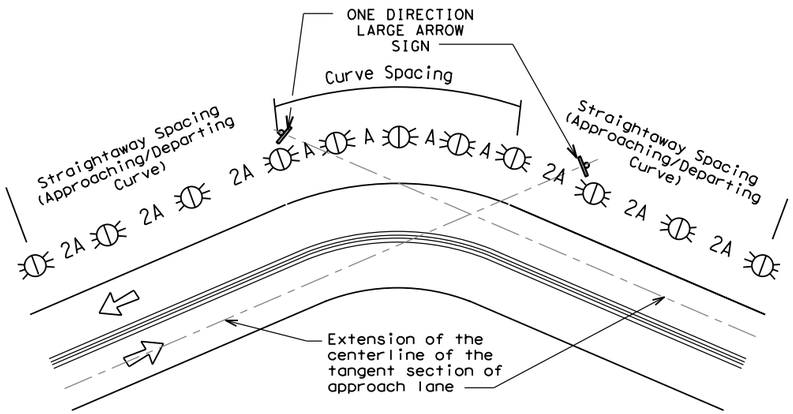
FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	LRD	LA SALLE		136

20B

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

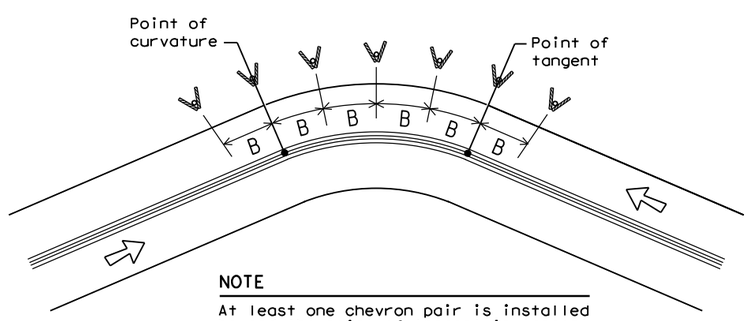
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

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

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
3-15 8-15 8-15 7-20	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		137

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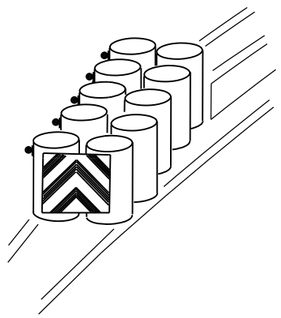
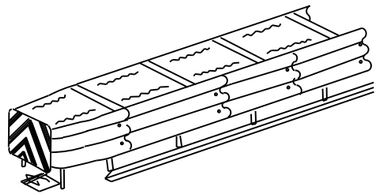
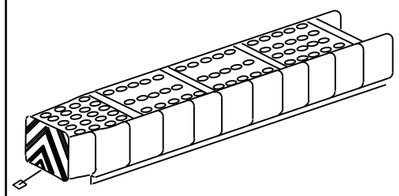
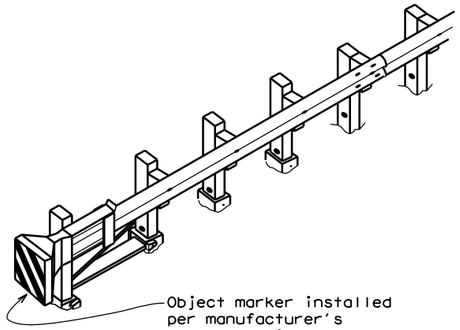
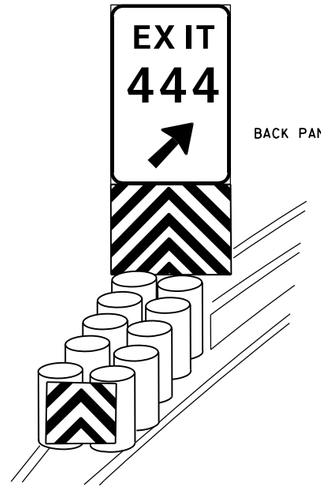
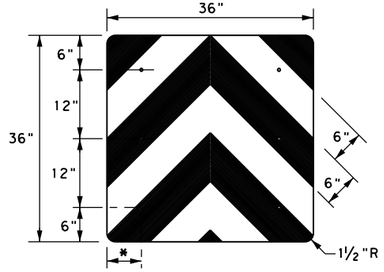


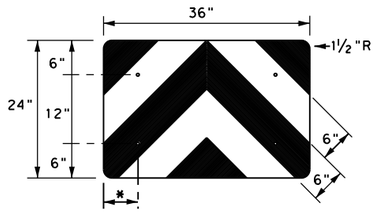




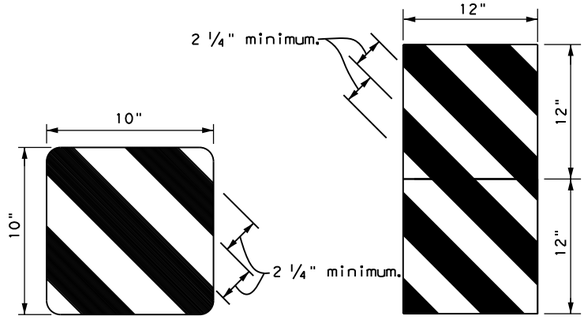




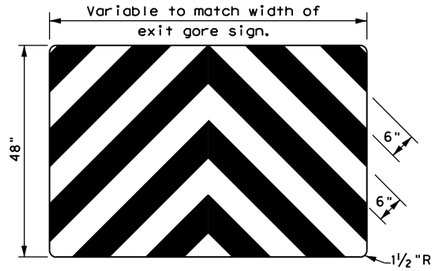


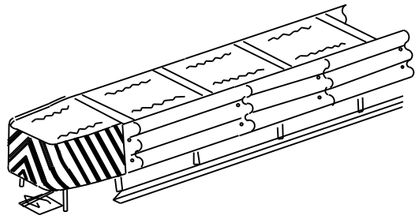


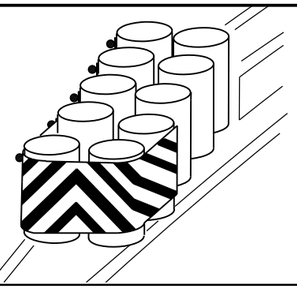
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

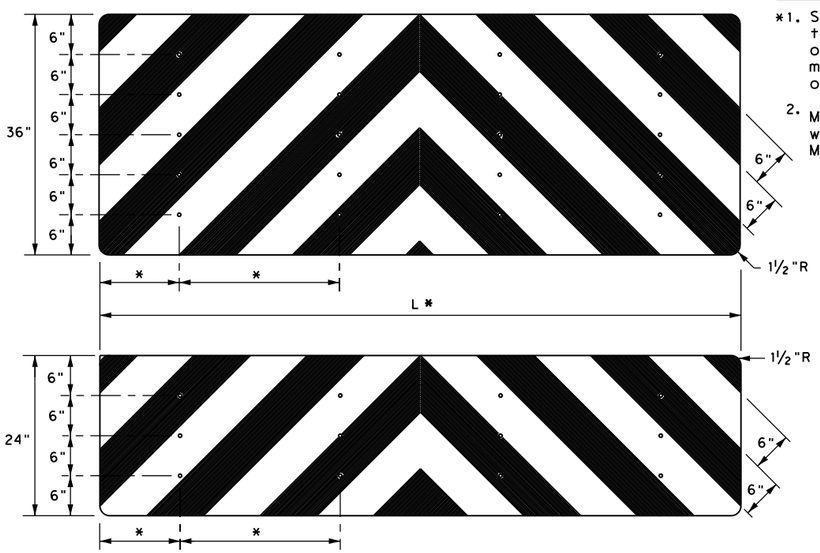


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

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

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

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©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
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4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	LRD	LA SALLE		138
4-98 7-20				
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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

FILE:	ed1-14.dgn	DN:	CK:	DW:	CK:
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0483	01	052	SH 97
		DIST	COUNTY		SHEET NO.
		LRD	LA SALLE		139

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ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.

2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.

3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.

4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.

2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.

3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.

4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.

5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.

6. Support conductors in illumination poles with a J-hook at the top of the pole.

7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.

8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.

9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.

10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.

11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.

2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.

3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.

4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.

5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.

2. Do not place ground rods in the same drilled hole as a timber pole.

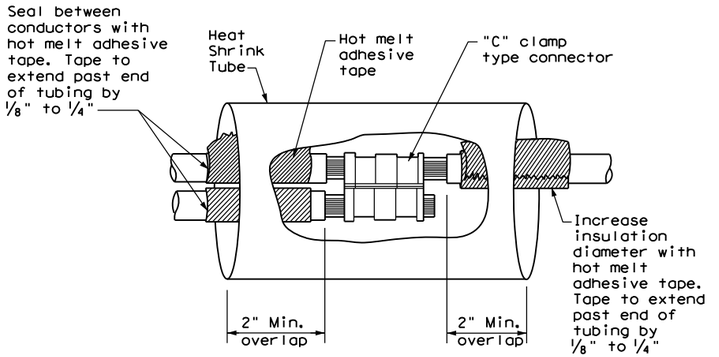
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

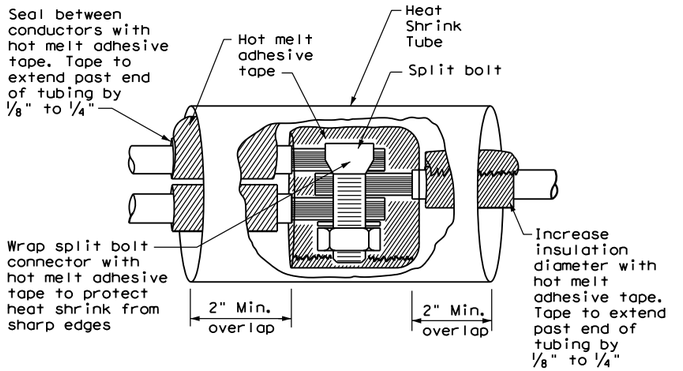
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

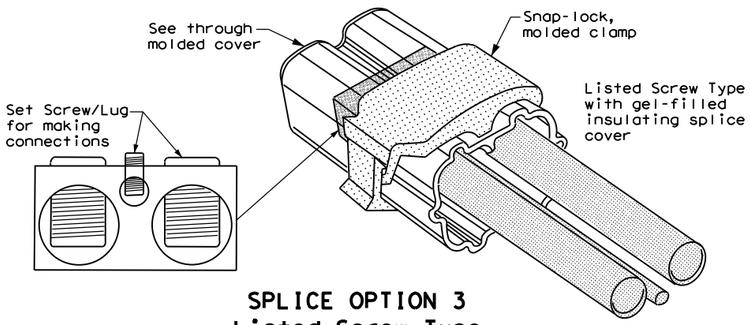
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation
Traffic Operations Division Standard

ELECTRICAL DETAILS
CONDUCTORS

ED(3)-14

FILE: ed3-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		140

71C

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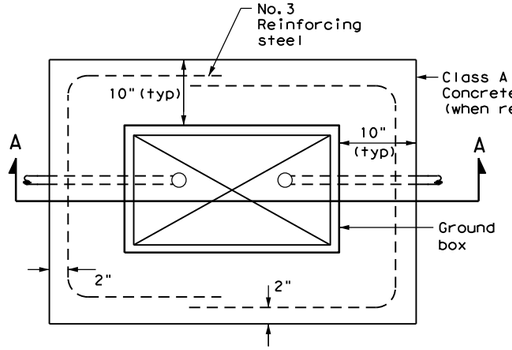
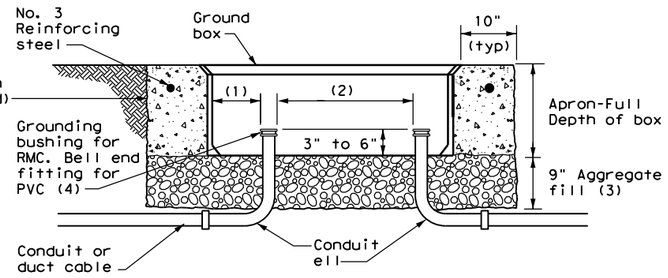


PLAN VIEW



SECTION A - A

APRON FOR GROUND BOX

(1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.

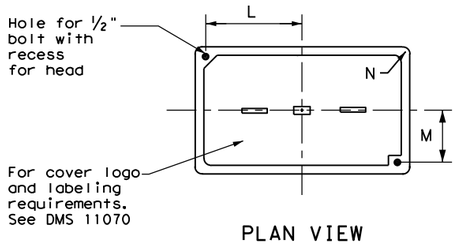
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

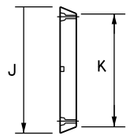
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



PLAN VIEW



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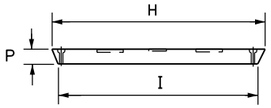

SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS GROUND BOXES

ED(4)-14

FILE: ed4-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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71D

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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.

2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services,"DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.

3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.

4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.

5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.

6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.

7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.

8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.

9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.

10. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.

11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.

12. Ensure all mounting hardware and installation details of services conform to utility company specifications.

13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.

14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.

15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.

2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.

3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.

4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.

2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

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

*ELECTRICAL SERVICE DATA

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National ELectrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

Schematic Type

Service Voltage V / V

Disconnect Amp Rating
000 indicates main lug only/
Typically Type T

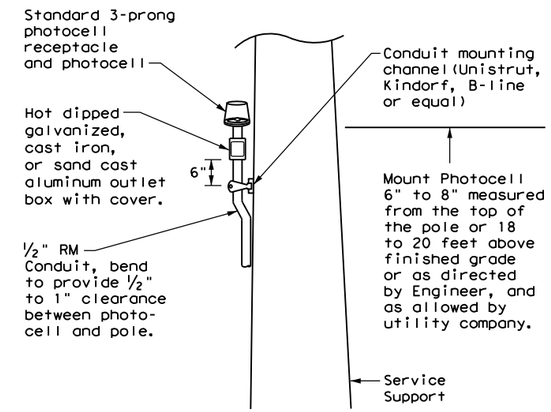
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

Enclosure Type
GS= Galvanized steel("off the shelf")
SS= Stainless steel(Custom Enclosure)See MPL
AL= Aluminum (Custom Enclosure)See MPL

Photocell Mounting Location
(E)= Inside Service/Enclosure Mounted
(T)= Top of pole
(L)= Luminaire mounted
(N)= None/No Photocell or Lighting Contactor Required

Service Support Type
GC= Granite concrete
OC= Other concrete
TP= Timber pole
SP= Steel pole
SF= Steel frame
OT= Pole by others or paid for separately
EX= Existing pole
TS= Service on traffic signal pole
PS= Pedestal Service

O= Overhead Service Feed from Utility
U= Underground Service Feed from Utility



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

ED(5)-14

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©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
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	LRD	LA SALLE		142

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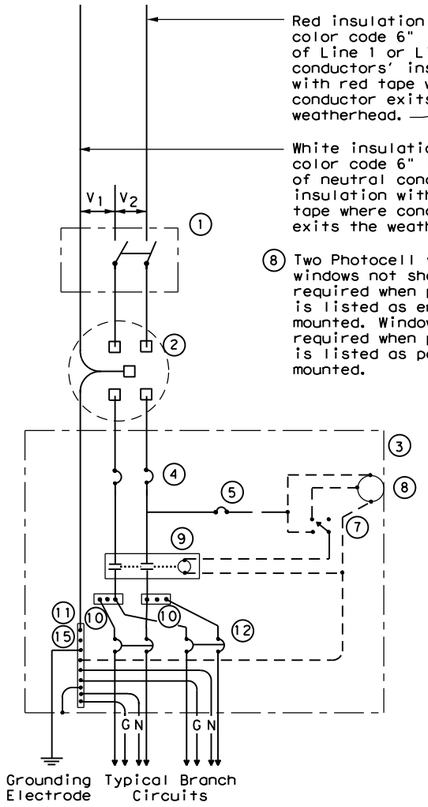
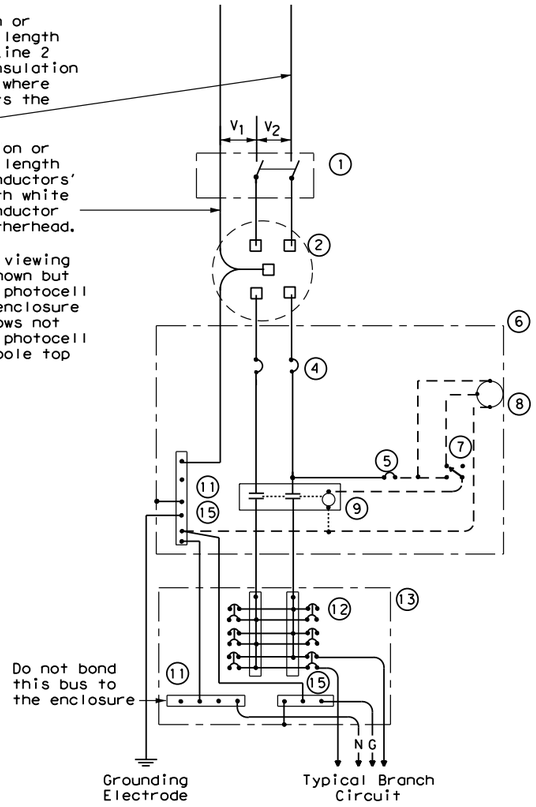
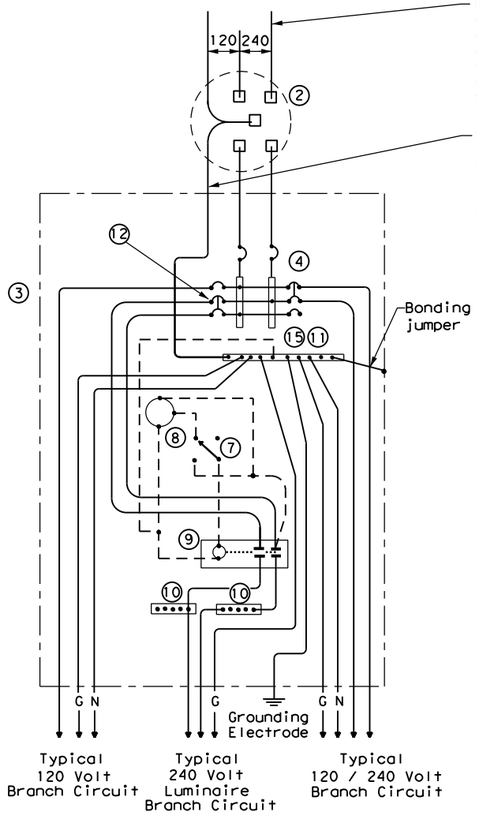


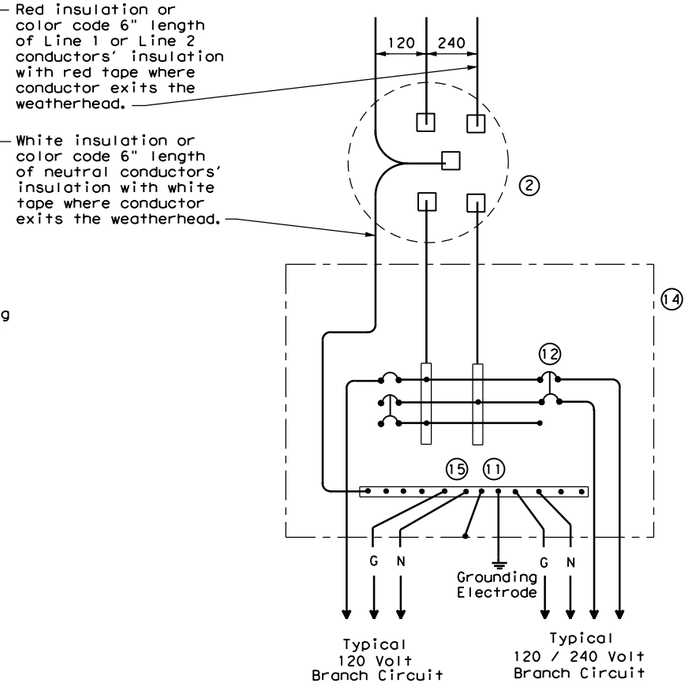
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



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



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
———	Power Wiring
– – – –	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		143

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SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS)11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ¾ in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.

2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.

3. Provide and install galvanized ¾ in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized ¾ in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 ¼ in. to 3 ½ in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.

4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.

5. Furnish and install rigid metallic ells in all steel pole and steel frame foundations for all conduits entering the service from underground.

6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.

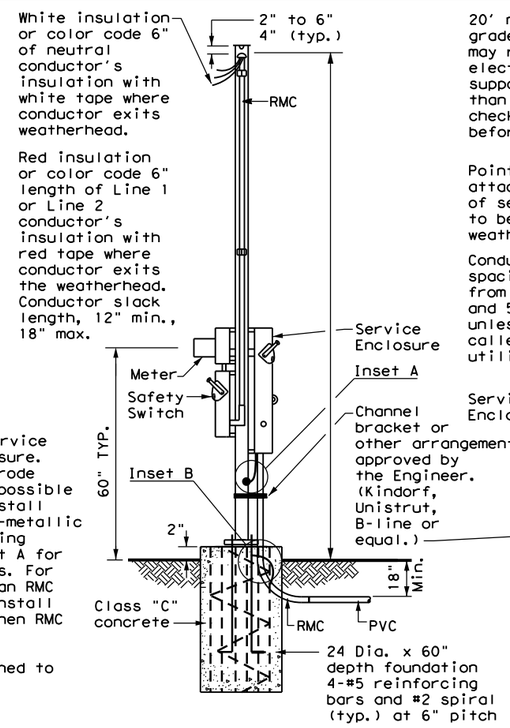
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.

8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.

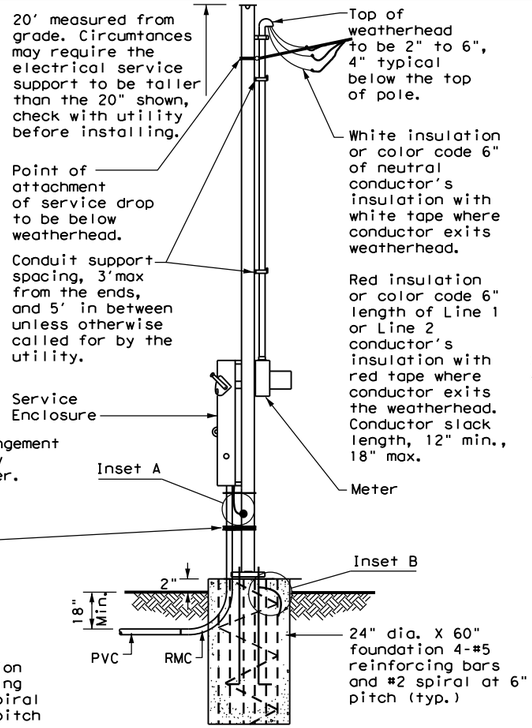
9. Provide ¼" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.

10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.

11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.

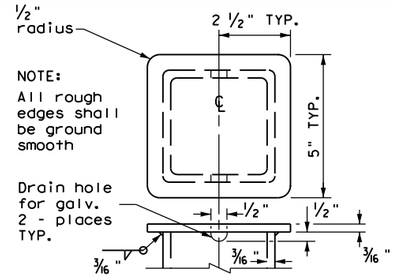


WITH SAFETY SWITCH

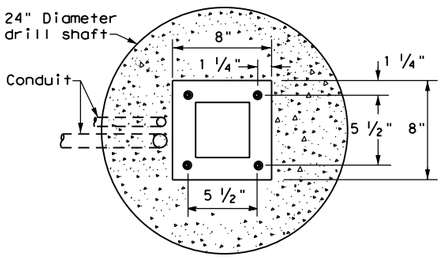


WITHOUT SAFETY SWITCH

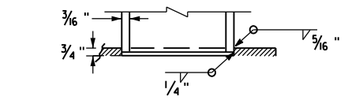
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



POLE TOP PLATE

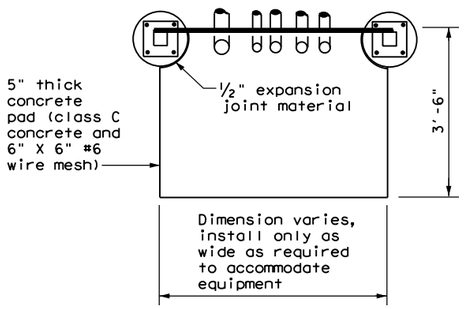


BASE PLATE DETAIL



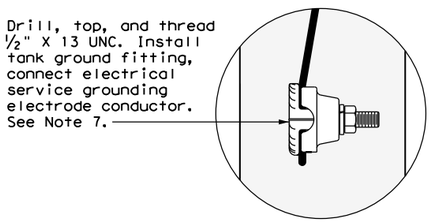
BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



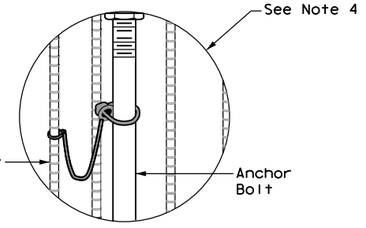
TOP VIEW

SERVICE SUPPORT TY SF (O) & SF (U)

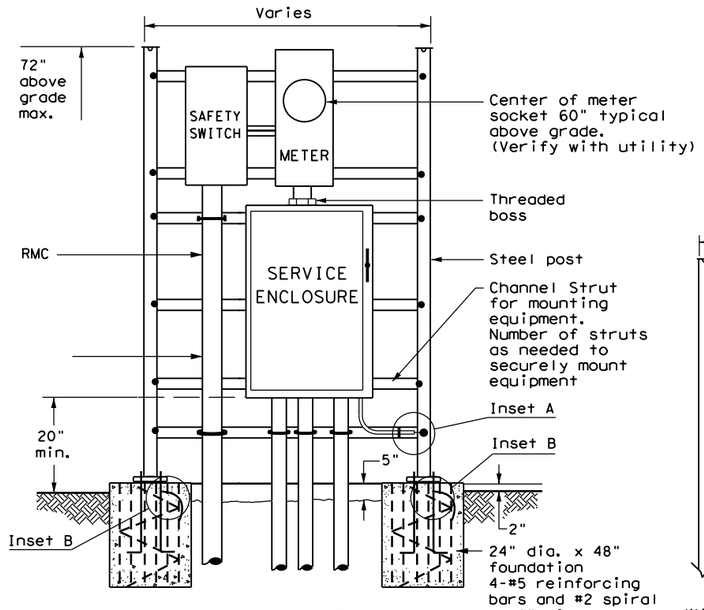


FRONT VIEW

INSET A

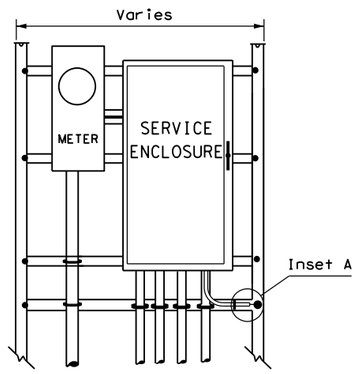


INSET B

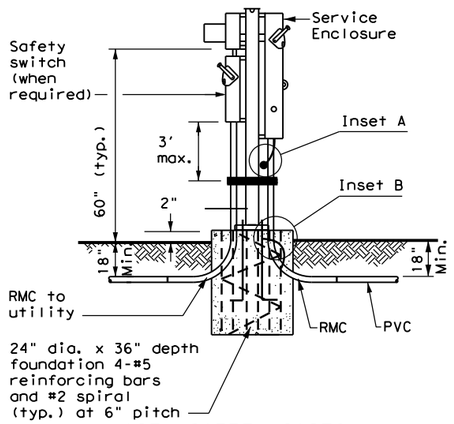


WITH SAFETY SWITCH

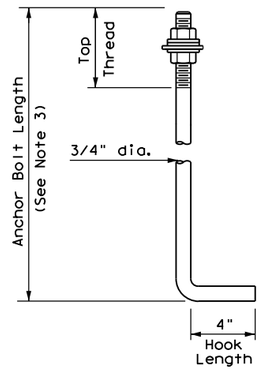
FRONT VIEW



WITHOUT SAFETY SWITCH



WITH SAFETY SWITCH



HOOKED ANCHOR DETAIL

SERVICE SUPPORT TYPE SF(U) - UNDERGROUND SERVICE

SERVICE SUPPORT TYPE SP(U) - UNDERGROUND SERVICE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP

ED(7)-14

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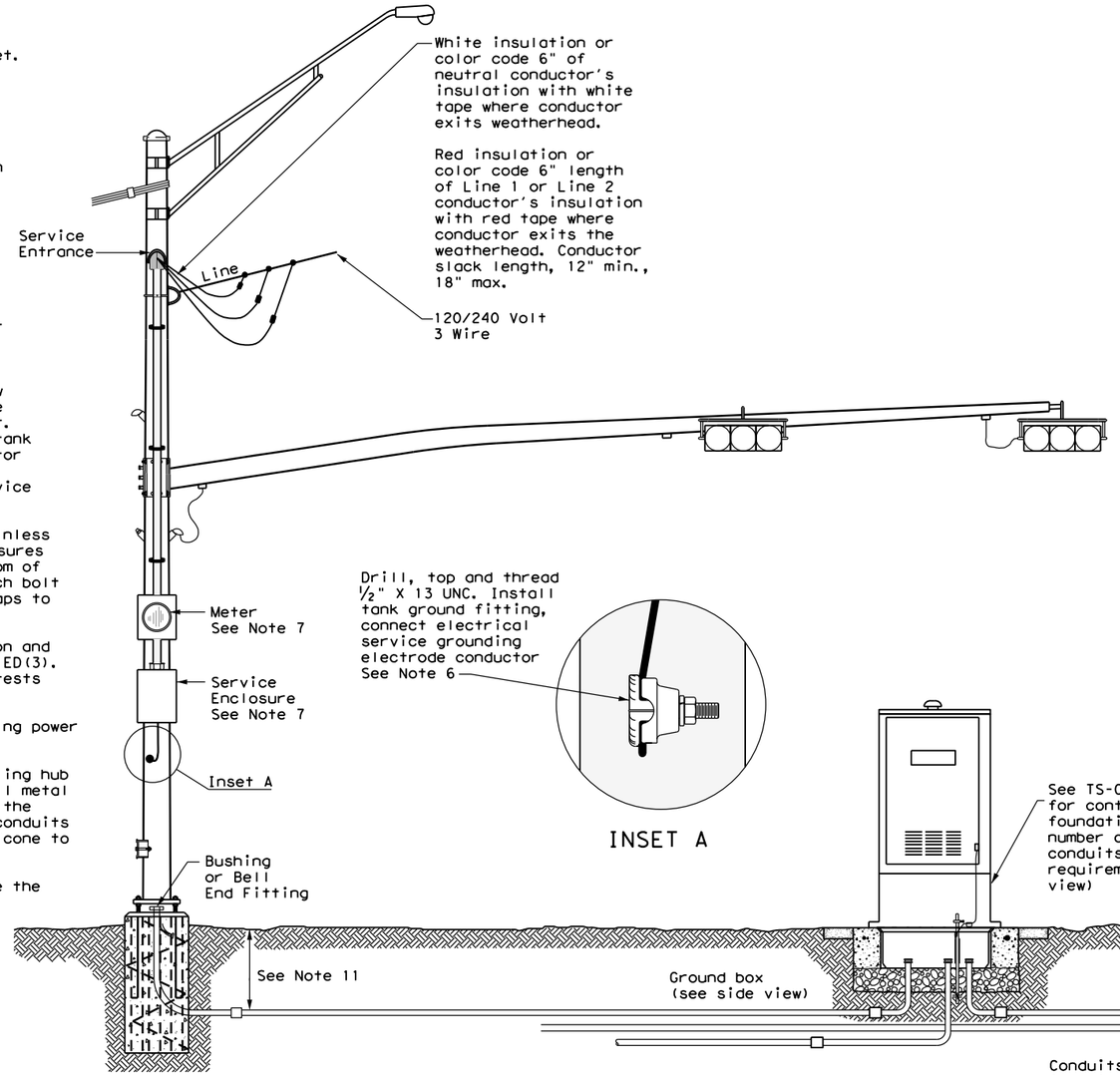
TRAFFIC SIGNAL NOTES

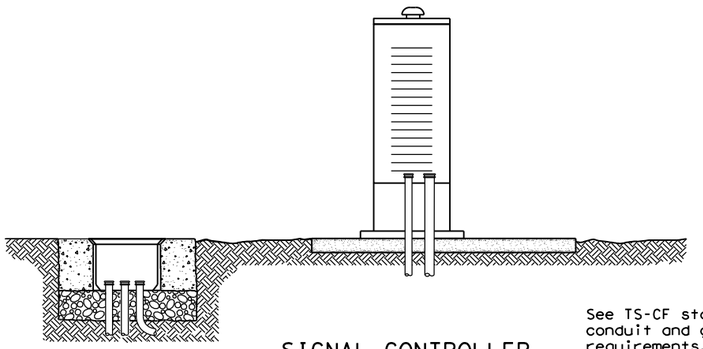
1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TXDOT standard TS-FD for further details.
6. Drill and tap signal poles for ½ in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of ¾ in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".



SIGNAL POLE WITH SERVICE

Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

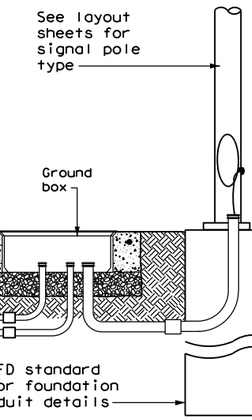
INSET A



SIGNAL CONTROLLER SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.

SIGNAL CONTROLLER FRONT VIEW



SIGNAL POLE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

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PEDESTAL SERVICE NOTES

1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS)11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services. "Provide pedestal electrical services as listed on the Material Producers list (MPL) on the Department's web site under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.

2. When a meter socket is required, provide a socket with a minimum 100 amp rating that complies with local utility requirements.

3. Provide Class A or C concrete for pedestal service foundations in accordance with Item 420, "Concrete Substructures," except that concrete will not be paid for directly but is considered subsidiary to Item 628.

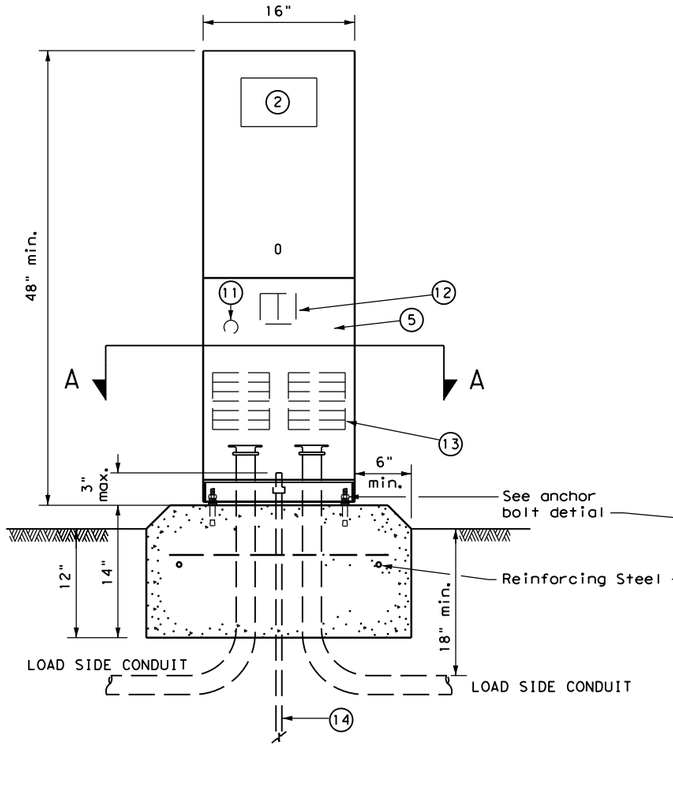
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

5. Install ½ in. X 2 1/16 in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a ½ in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.

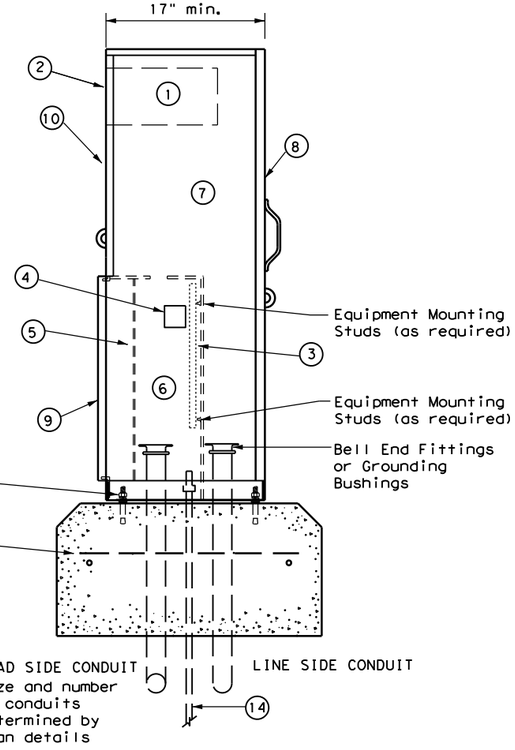
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within ¼ in. Repair rocking or movement of the service enclosure at no additional cost to the department.

7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal type services.

8. Ensure all elbows in the foundation are sized as per utility provider's conduit requirements for underground conduit and feeders. PVC extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a bonding jumper properly terminated.

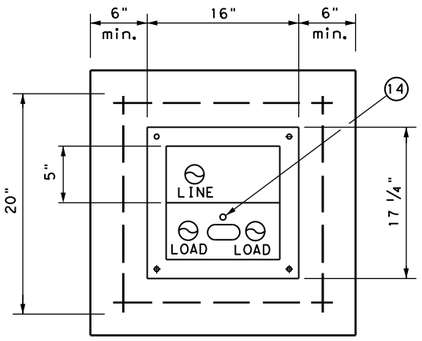


FRONT VIEW

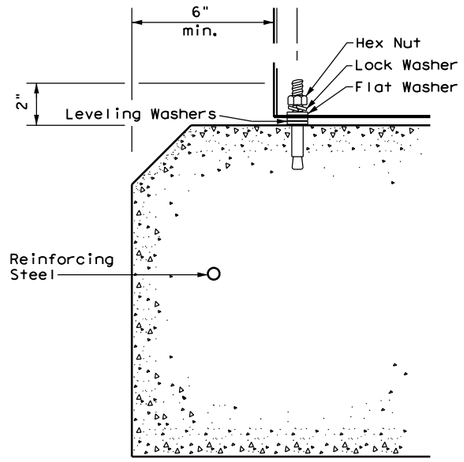


SIDE VIEW

TYPE C shown, TYPE A similar except that TYPE A shall have individual circuit breakers (CB) mounted on an equipment mounting panel. CB Handles shall protrude through hinged deadfront trim.



SECTION A-A



ANCHOR BOLT DETAIL

LEGEND	
1	Meter Socket, (when required)
2	Meter Socket Window, (when required)
3	Equipment Mounting Panel
4	Photo Electric Control Window, (When required)
5	Hinged Deadfront Trim
6	Load Side Conduit Trim
7	Line Side Conduit Area
8	Utility Access Door, with handle
9	Pedestal Door
10	Hinged Meter Access
11	Control Station (H-O-A Switch)
12	Main Disconnect
13	Branch Circuit Breakers
14	Copper Clad Ground Rod - 5/8" X 10'

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
ELECTRICAL SERVICE SUPPORT
PEDESTAL SERVICE TYPE PS

ED(9)-14

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DUCT CABLE & HDPE CONDUIT NOTES

1. Provide duct cable in accordance with Departmental Material Specification (DMS) 11060 "Duct Cable" and Item 622 "Duct Cable." Provide duct cable as listed on the Material Producer List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 622.

2. Provide High-Density Polyethylene (HDPE) conduit in accordance with DMS 11060 and Item 618, "Conduit." Provide HDPE as listed on the MPL on the Department web site under "Roadway Illumination and Electrical Supplies," Item 618.

3. Supply duct cable with a minimum 2 in. diameter, unless otherwise shown in the plans. Provide duct cable and HDPE conduit as shown by descriptive code or on the plans. Bend duct cable and HDPE conduit as recommended by the manufacturer, with a minimum bending radius of 26 in. for 2 in. duct. Follow manufacturers' recommendations when handling duct cable and HDPE conduit reels and during installation of duct cable and HDPE conduit.

4. Do not splice conductors within duct cable or HDPE conduit. Couple duct cable and HDPE entering a ground box or foundation to a PVC elbow. When galvanized steel RMC elbows are called for in the plans and any portion of the RMC elbow is buried less than 18" from possible contact, ground the RMC elbow.

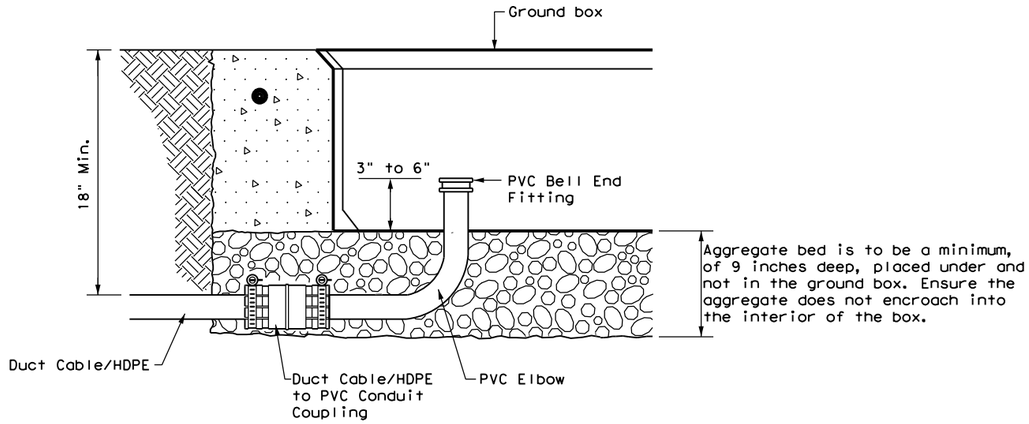
5. Furnish and install duct cable with factory installed conductors, sized as shown in the plans and as required by the National Electrical Code (NEC). The NEC contains specific requirements for duct cable in Article, "Nonmetallic Underground Conduit with Conductors: Type NUCC."

6. When conduit casing is called for in the plans, extend duct cable or HDPE conduit through the conduit casing in one continuous length without connection to the casing.

7. Seal the ends of duct cable or HDPE conduit with duct seal, expandable foam, or other approved method after completing the pull tests required by Item 622.

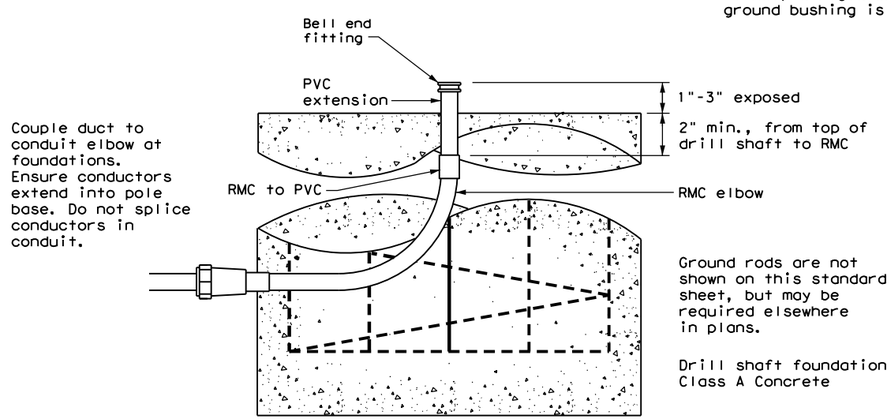
8. Provide minimum cover of 24 in. under roadways, 18 in. in other locations, or as shown on the plans.

9. Furnish and install listed fittings to couple duct cable or HDPE conduit to other types of conduit. Duct cable and HDPE conduit may be field-threaded and spliced with PVC or RMC threaded couplings; connected with listed tie-wrap fittings; connected using listed coupling made of HDPE with stainless steel external banding clamps and locking rings; connected with approved electrofusion conduit couplings; or connected using an approved chemical fusion method using an epoxy or adhesive specifically designed for HDPE couplings and connectors all installed in accordance with their manufacturer's instructions. Do not use PVC glue on HDPE. Do not use water pipe fittings, or connect conduit with heat shrink tubing.

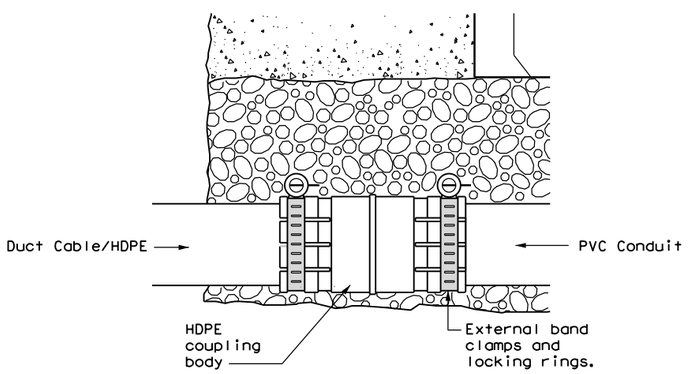


DUCT CABLE/HDPE AT GROUND BOX

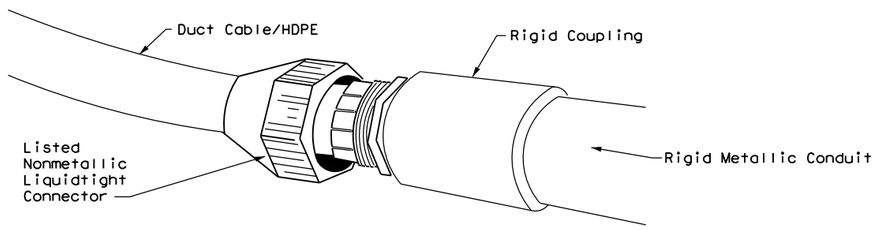
When the upper end of an RMC Ell does not enter the ground box, it may be extended with a SCH-40 PVC conduit nipple and bell end, provided there is a minimum of 18" of cover over all parts of the elbow. If not, a rigid extension and ground bushing is required.



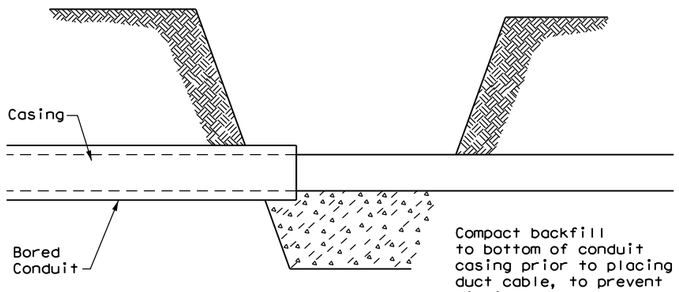
DUCT CABLE / HDPE AT FOUNDATION



DUCT CABLE/HDPE TO PVC



DUCT CABLE/HDPE TO RMC



BORE PIT DETAIL

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
DUCT CABLE/ HDPE CONDUIT

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BATTERY BOX GROUND BOXES NOTES

A. MATERIALS

1. Provide polymer concrete or fiberglass reinforced plastic (FRP) battery box ground box and cover in accordance with Departmental Material Specification (DMS) 11071 "Battery Box Ground Boxes." Battery box will accommodate up to 4 batteries, each measuring 8 in. x 13.5 in. x 10 in. (W x L x D). Label battery box ground box cover in accordance with DMS 11071.

2. Supply a marine grade batteries with covers. Secure the marine grade batteries with covers to the stainless steel rack in the bottom of the ground box with tie down straps.

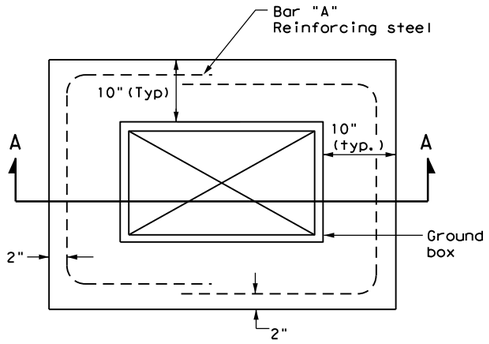
B. CONSTRUCTION METHODS

1. Ensure conduit entry will not interfere with placement of the batteries in the battery box ground box.

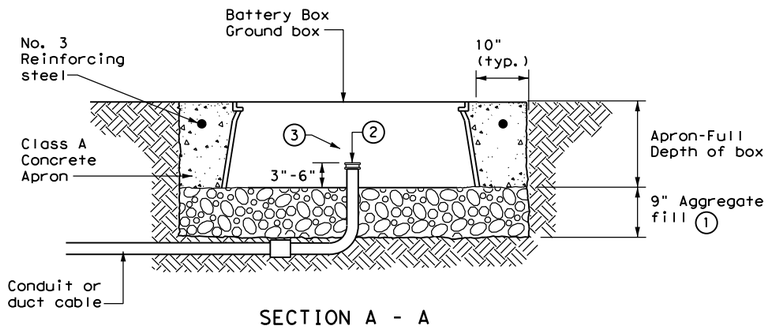
2. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting battery box ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure the aggregate bed is in place and is a minimum of 9 in. deep prior to setting the box. Install battery box ground box on top of aggregate.

3. Cast battery box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Battery box ground box aprons, including concrete and reinforcing steel, are subsidiary to battery box ground boxes when called for by descriptive code.

4. Bolt covers down when not working in battery box ground boxes. Keep bolt holes in the box clear of dirt.



PLAN VIEW



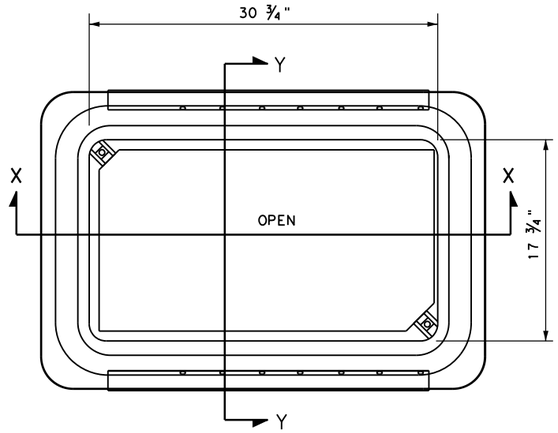
SECTION A - A

APRON FOR BATTERY BOX GROUND BOXES

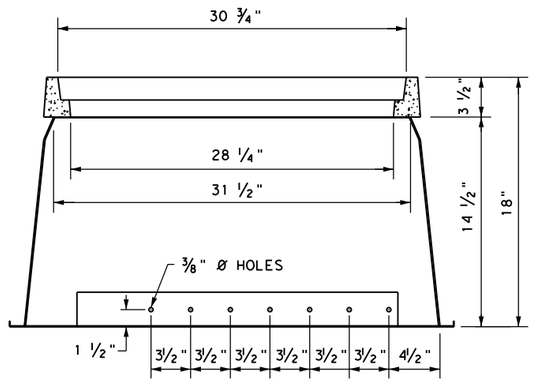
(1) Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.

(2) Install bushing or bell end fitting on the upper end of all ells.

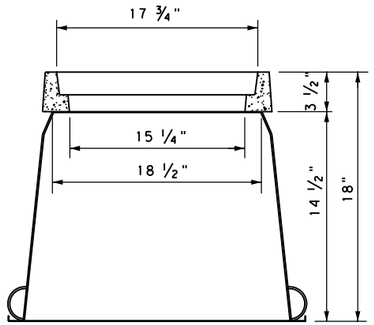
(3) Install all conduits in a neat and workmanlike manner.



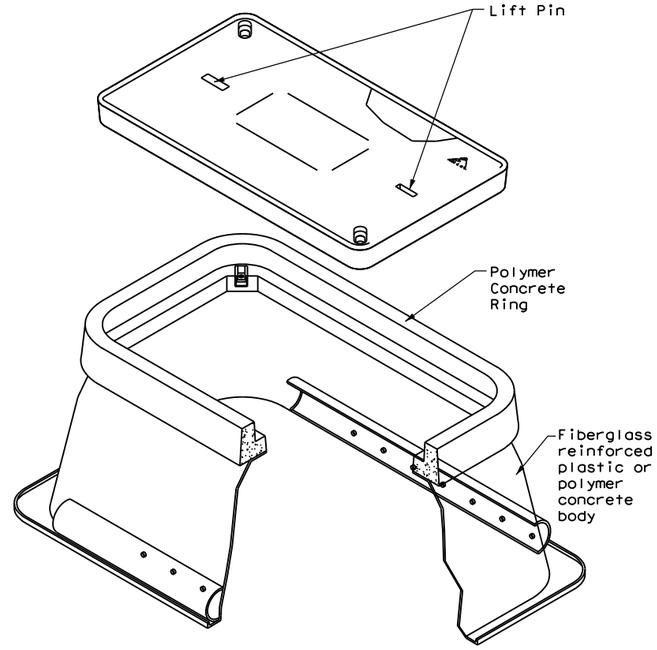
BATTERY BOX TOP VIEW



SECTION X-X



SECTION Y-Y



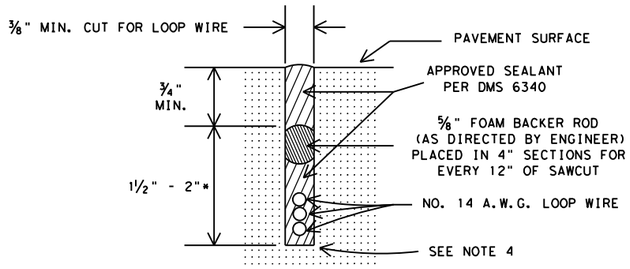
Texas Department of Transportation | Traffic Operations Division Standard

ELECTRICAL DETAILS
BATTERY BOX
GROUND BOXES

ED(12)-14

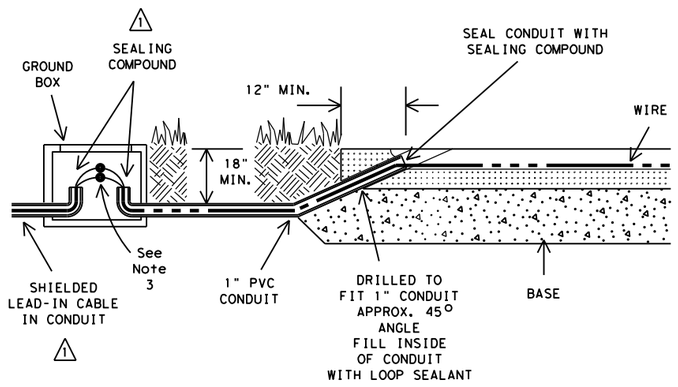
FILE: ed12-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		148

71M

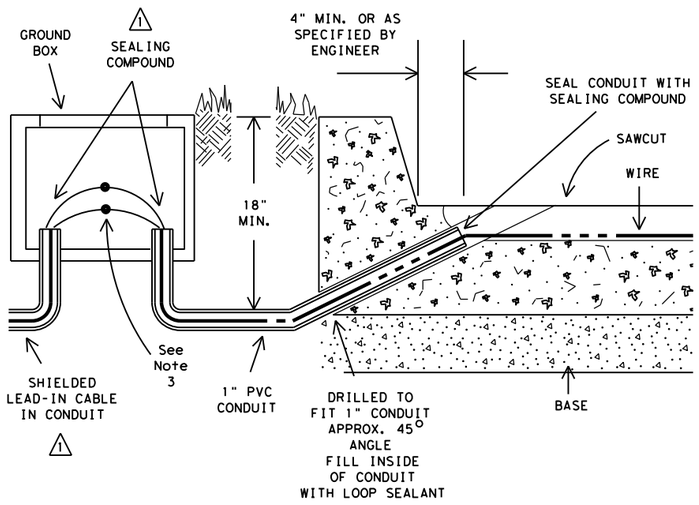


LOOP SAW CUT CROSS-SECTION

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



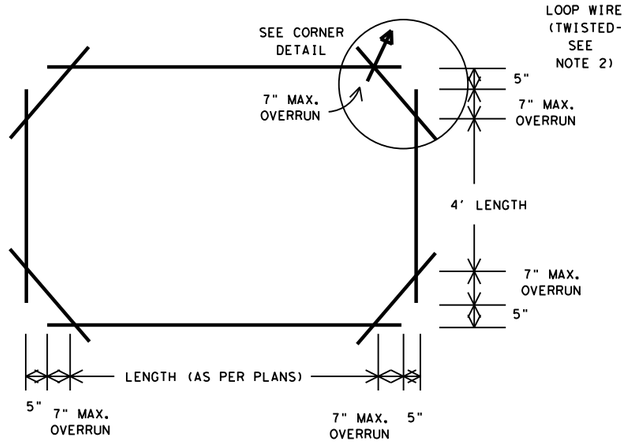
TYPICAL LEAD IN CONFIGURATION (WITHOUT CURBING)



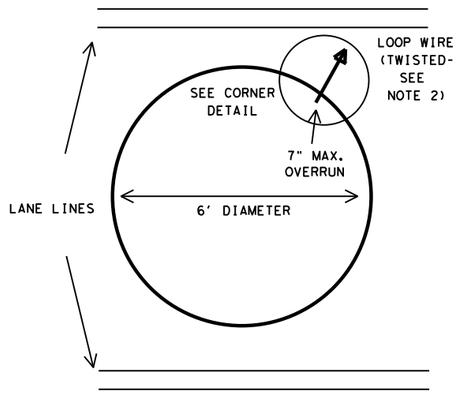
TYPICAL LEAD IN CONFIGURATION (WITH CURBING)

TYPICAL LOOP DETECTOR LAYOUTS

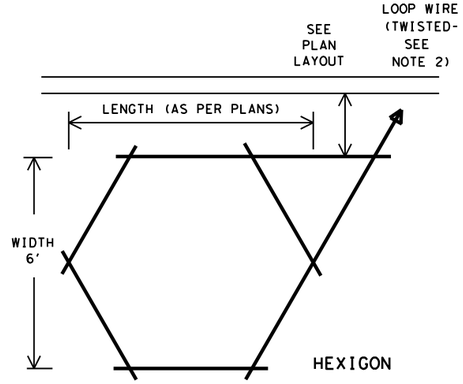
(AS SPECIFIED IN PLANS)



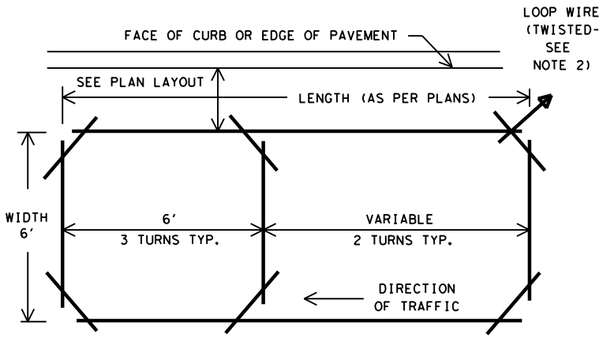
RECTANGULAR



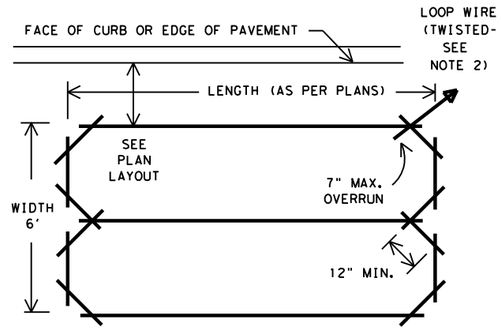
CIRCULAR



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.

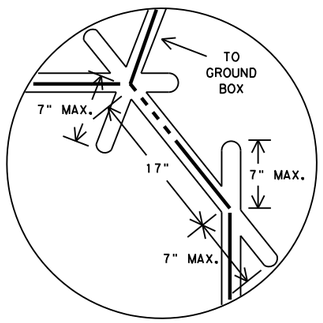
Recommended Number of Turns for Loop Detectors

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.

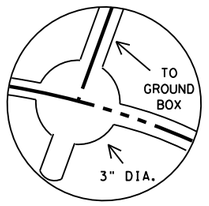
For additionnal information refer to "Texas Traffic Signal Detector" manual, TTI Report 1163-1.

TYPICAL CORNER DETAILS

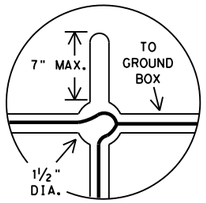


RECTANGULAR & HEXIGON LOOP
SAWCUT CORNER DETAIL

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
0483	01	052	SH 97
DIST	COUNTY		SHEET NO.
LRD	LA SALLE		149

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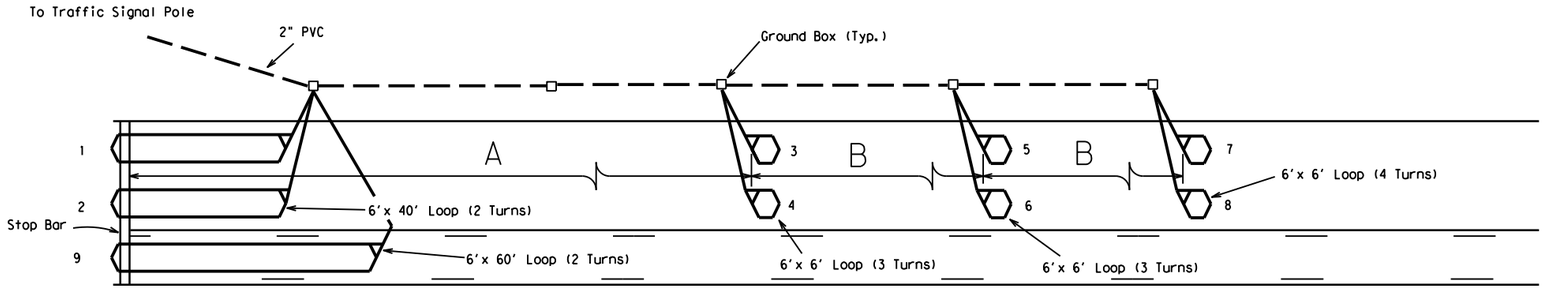
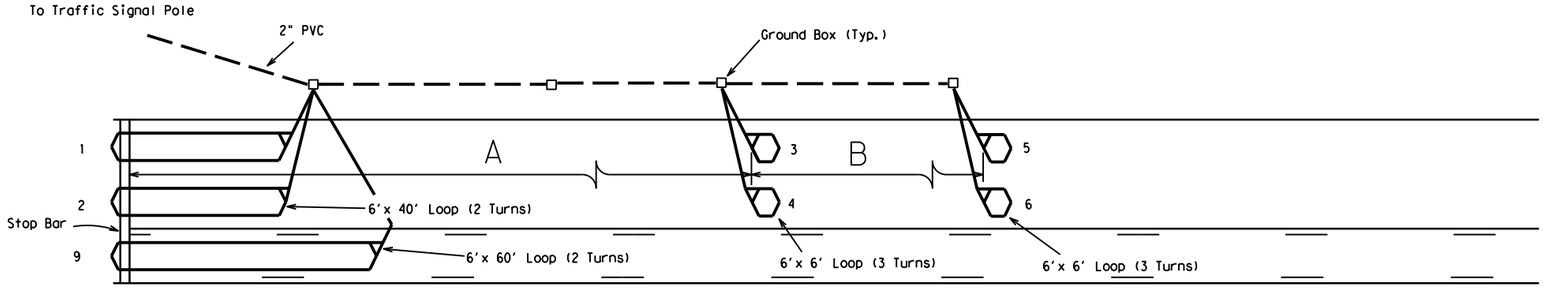
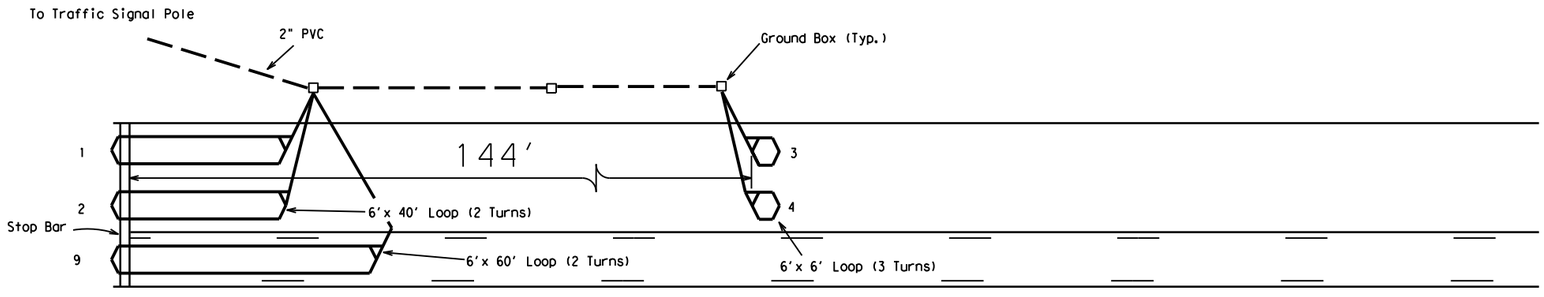


55 MPH (A=225', B=95') 60 MPH (A=275', B=100')
65 MPH (A=320', B=110') 70 MPH (A=350', B=125')



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:

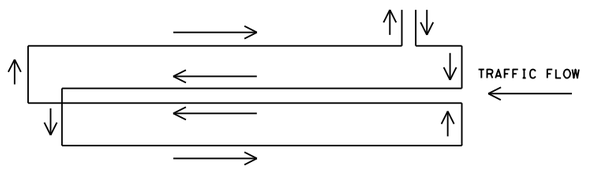
Loops 1 and 2 shall be connected to the controller cabinet by means of the same loop lead-in (2/C #14 AWG).

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

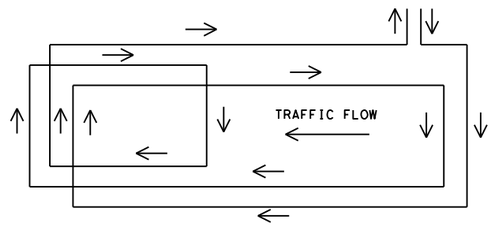
Loops 7 and 8 shall be connected to the controller cabinet by means of the same loop lead-in (2/C #14 AWG).

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

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
0483	01	052	SH 97
DIST	COUNTY		SHEET NO.
LRD	LA SALLE		150

79B

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DATE: 4/20/2023 12:09:24 PM
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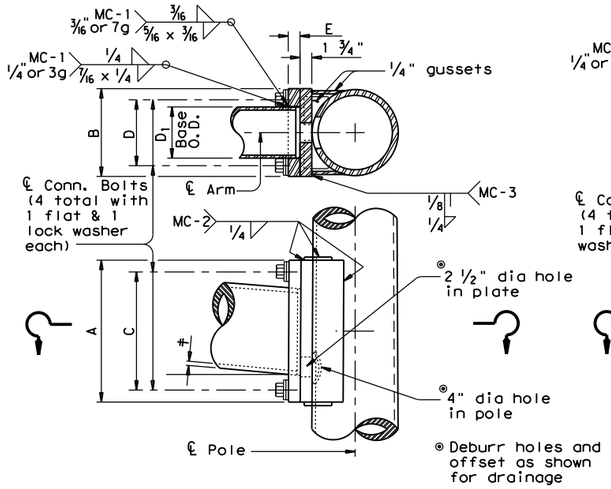
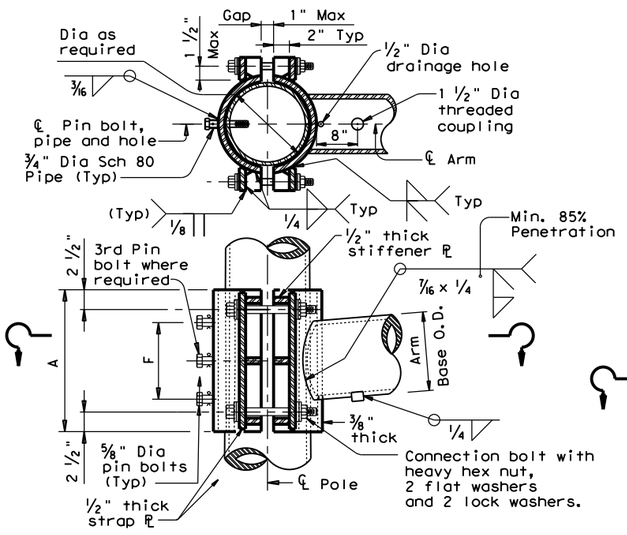
ARM SIZE D_1 in.	ARM SIZE ϕ in.	A in.	B in.	C in.	D in.	E in.	CONN BOLT DIA in.
6.5	.179	12	9	9	6	1 3/4	1
7.5	.179	13	9	10	6	1 3/4	1
8.0	.179	14	10	11	7	2	1 1/4
9.0	.179	16	11	13	8	2	1 1/4
9.5	.179	17	12	14	9	2	1 1/4
9.5	.239	18	12	15	9	2	1 1/4
10.0	.239	18	12	15	9	2	1 1/4
10.5	.239	18	13	15	10	3	1 1/2
11.0	.239	18	13	15	10	3	1 1/2



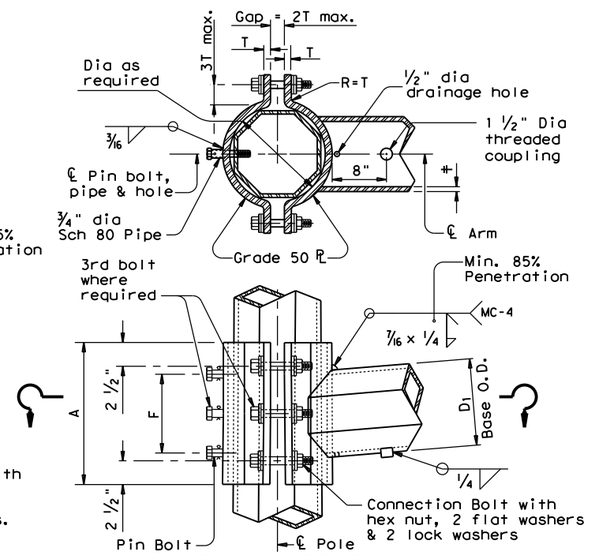
FIXED MOUNT DETAIL 1

ARM SIZE D_1 in.	ARM SIZE ϕ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	4	1 1/4	3	5/8
9.5	.239	18	12	4	1 1/4	3	5/8
10.0	.239	18	12	4	1 1/4	3	5/8



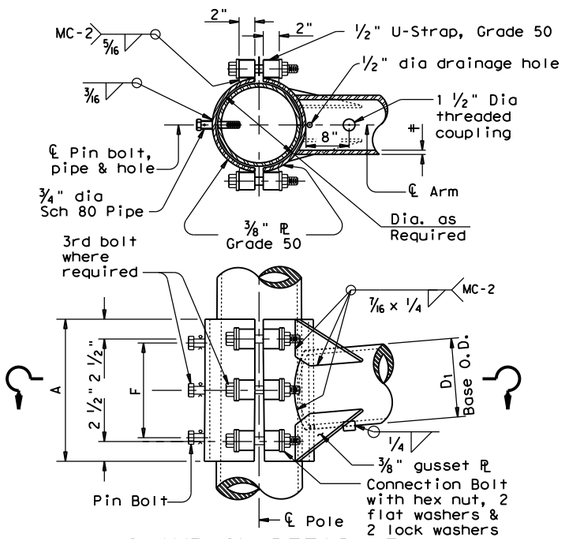
CLAMP-ON DETAIL 1

ARM SIZE D_1 in.	ARM SIZE ϕ in.	A in.	F in.	T in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
7.0	.179	12	6	3/4	4	3/4	2	5/8
7.5	.179	14	8	3/4	4	3/4	2	5/8
8.0	.179	14	8	3/4	4	3/4	2	5/8
9.0	.179	16	10	7/8	4	1	2	5/8
10.0	.179	18	10	7/8	4	1	2	5/8
9.5	.239	18	10	1	6	1	3	5/8
10.0	.239	18	10	1	6	1	3	5/8

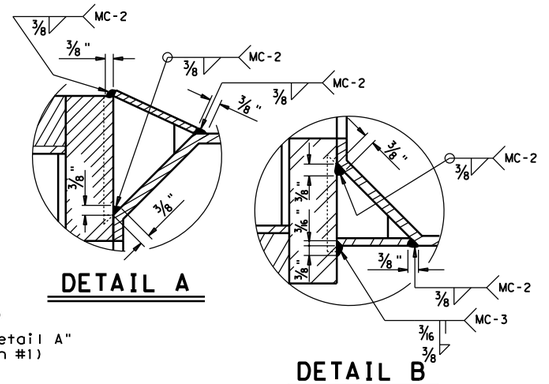


CLAMP-ON DETAIL 2

ARM SIZE D_1 in.	ARM SIZE ϕ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8

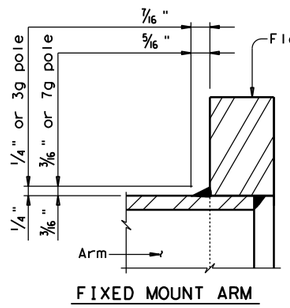


CLAMP-ON DETAIL 3

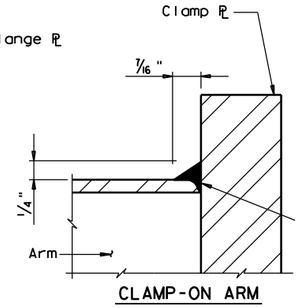


DETAIL A

DETAIL B



FIXED MOUNT ARM



CLAMP-ON ARM

ARM BASE WELD DETAILS

ARM SIZE D_1 in.	ARM SIZE ϕ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8

MATERIALS	
Round Shafts or Polygonal Shafts ①	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ②
Plates ①	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe ①	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

① ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

② ASTM A1011 SS Gr.50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 1/2" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and 3/4" dia pipe shall have 3/16" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a 3/4" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST ARM CONNECTIONS

MA-C-12

DN: MS	CK: JSY	DW: MMF	CK: JSY
REVISIONS	CONT	SECT	JOB	HIGHWAY
5-96	0483	01	052	SH 97
5-09	DIST	COUNTY		SHEET NO.
1-12	LRD	LA SALLE		151

126A

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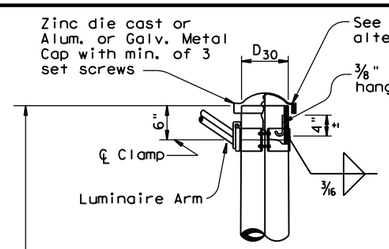
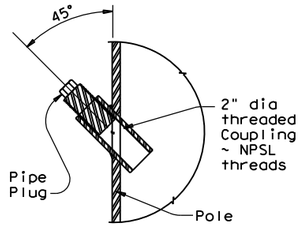
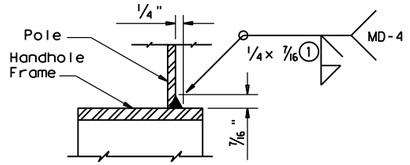


DETAIL A

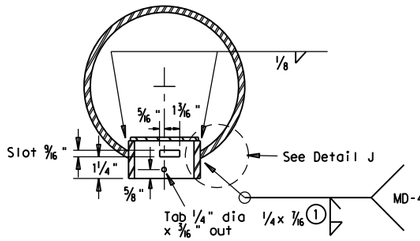
(for pole with luminaire)



POLE COUPLING DETAIL

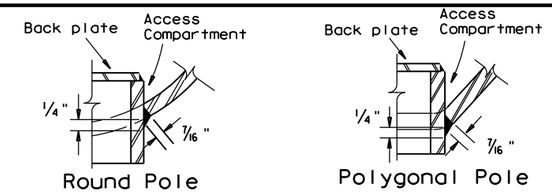


DETAIL G

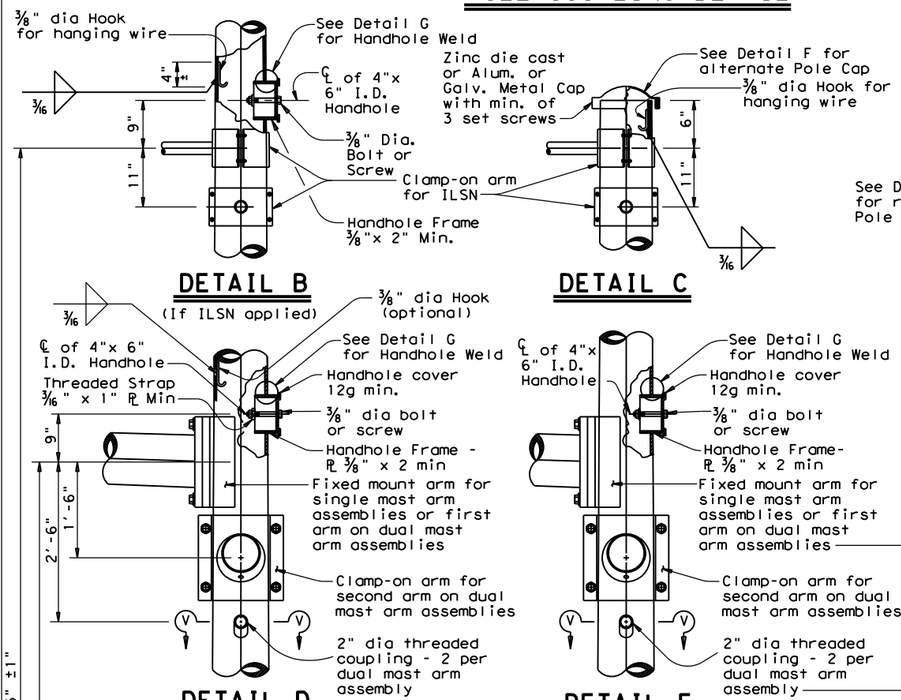


SECTION X-X

Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.



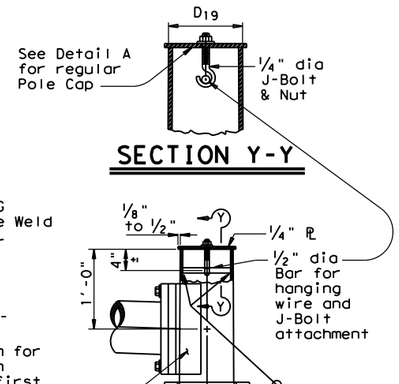
DETAIL J



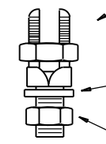
DETAIL B

(If ILSN applied)

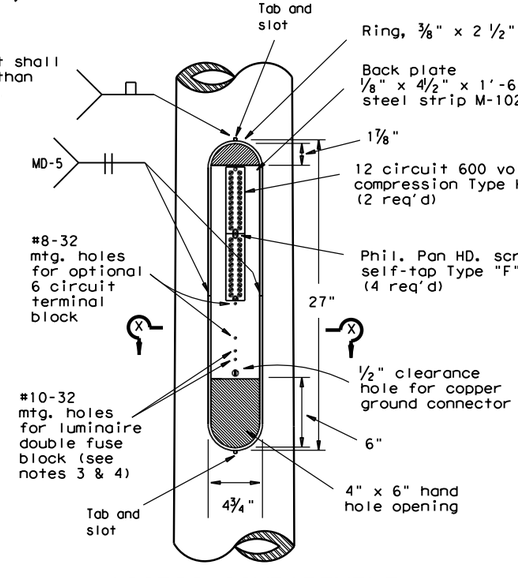
DETAIL C



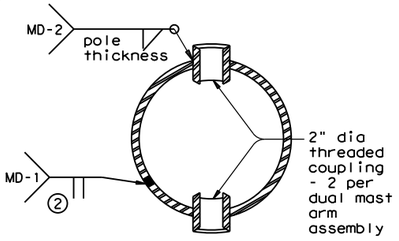
SECTION Y-Y



COPPER GROUND CONNECTOR



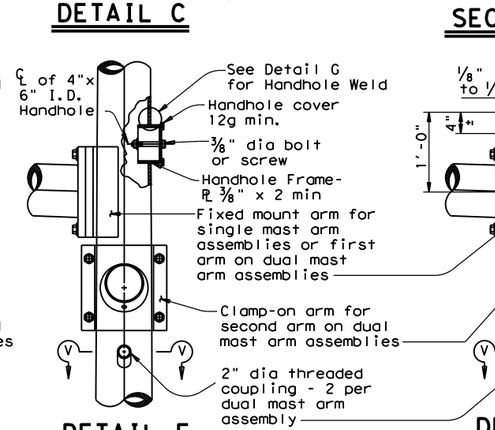
ACCESS COMPARTMENT



SECTION V-V

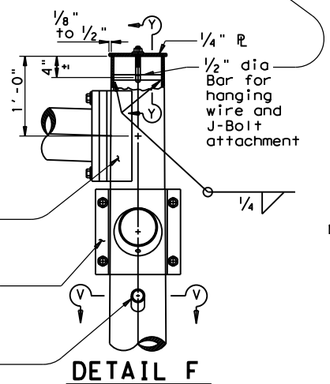
DETAIL D

(for 30' pole with luminaire and ILSN sign)



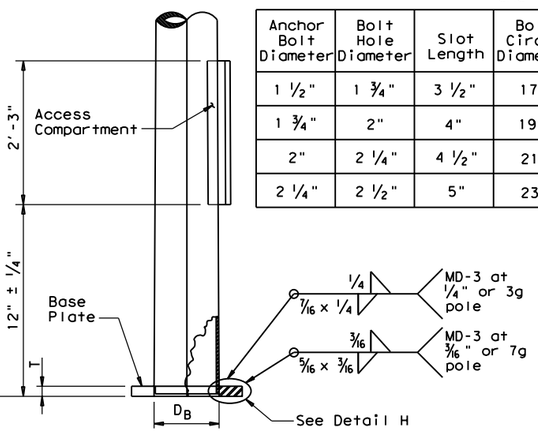
DETAIL E

(for 24' pole with ILSN sign and no luminaire)



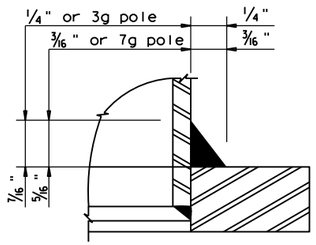
DETAIL F

(for 19' pole with no ILSN sign and no luminaire)

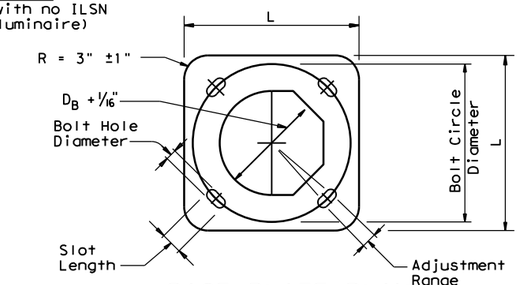


POLE ELEVATION

Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base PL Dim. L x T	Adjust. Range
1 1/2"	1 3/4"	3 1/2"	17"	18" x 1 1/2"	13.4°
1 3/4"	2"	4"	19"	20" x 1 3/4"	13.5°
2"	2 1/4"	4 1/2"	21"	22" x 2"	13.6°
2 1/4"	2 1/2"	5"	23"	24" x 2 1/4"	13.7°



DETAIL H



BASE PLATE PLAN

① 85% Min. penetration

② 60% Min. penetration 100% pemetration within 6" of circumferential base welds.

NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12

DN: MS	CK: JSY	DW: FDN	CK: CAL

REVISIONS
8-99
1-12

CONT	SECT	JOB	HIGHWAY
0483	01	052	SH 97
DIST	COUNTY		SHEET NO.
LRD	LA SALLE		152

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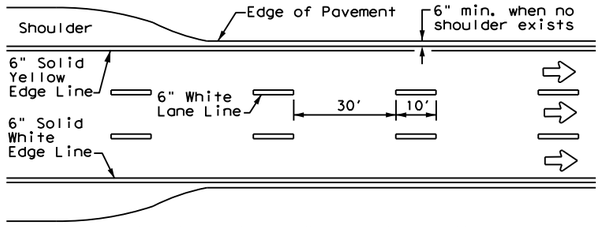
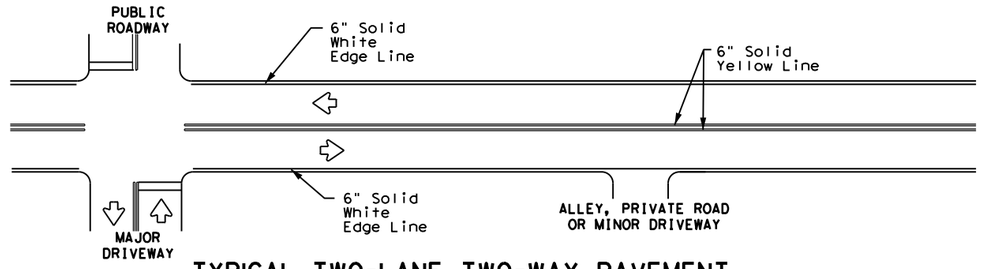
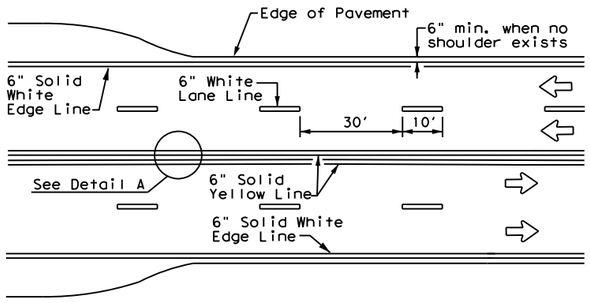
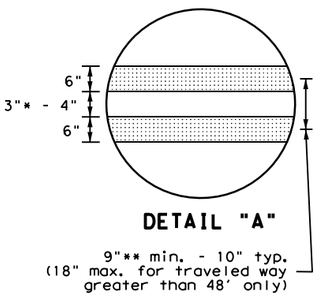


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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

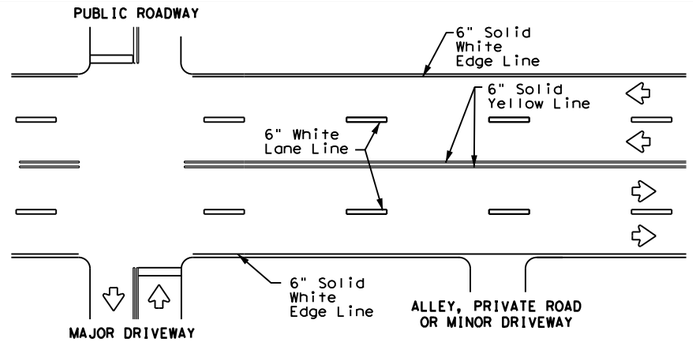




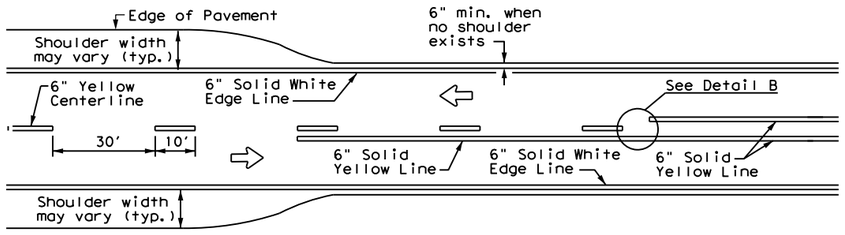
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

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

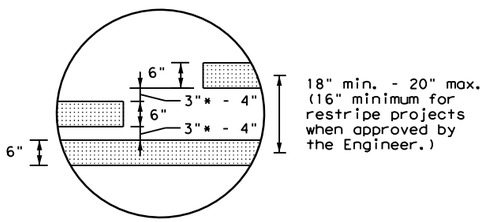
** 8" minimum for restripe projects when approved by the Engineer.



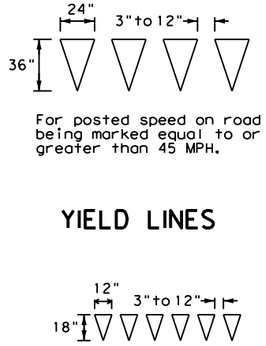
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

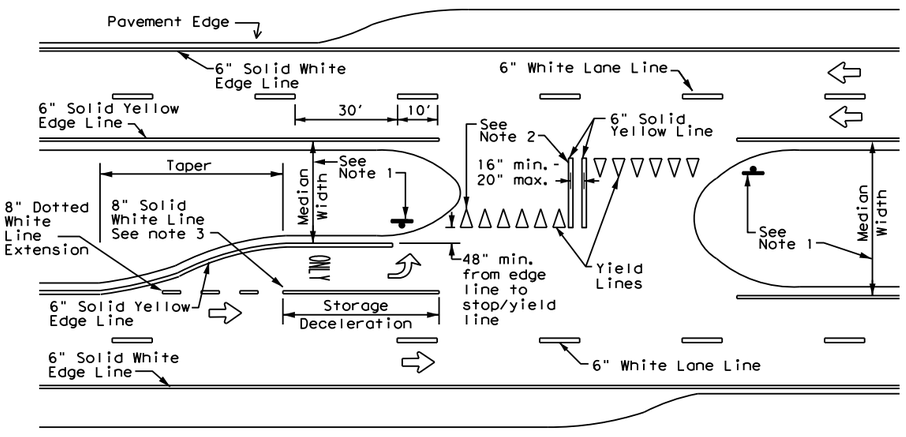


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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





FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

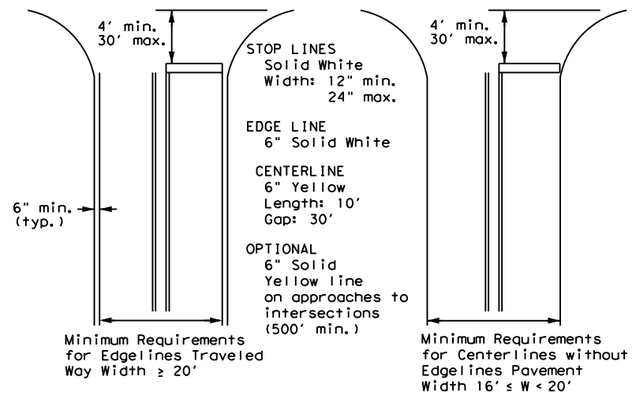
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling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

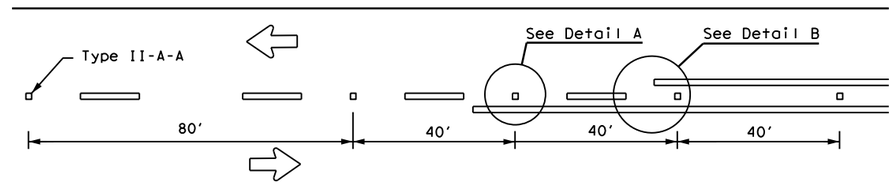
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

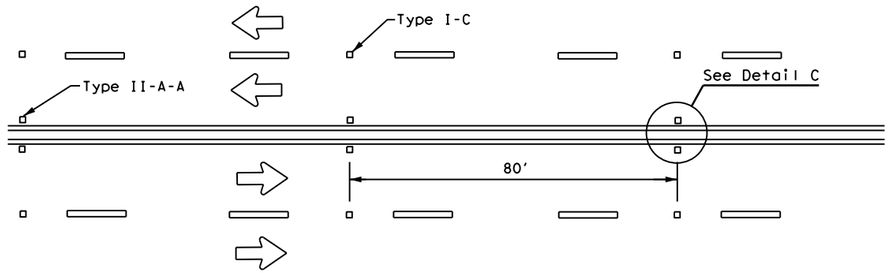
FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20 / 8-95 3-03 12-22 / 5-00 2-12	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		153

22A

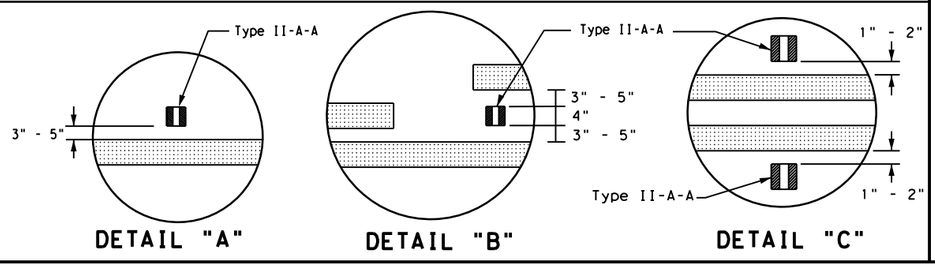
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

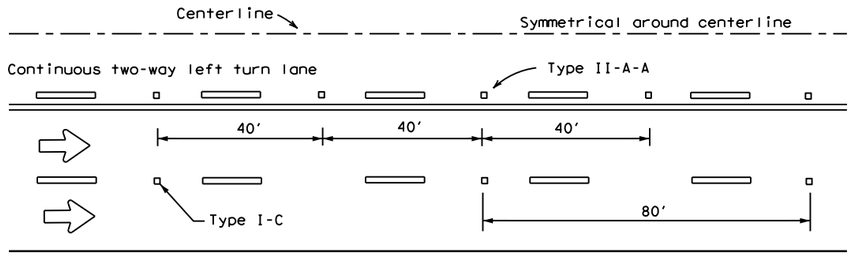


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

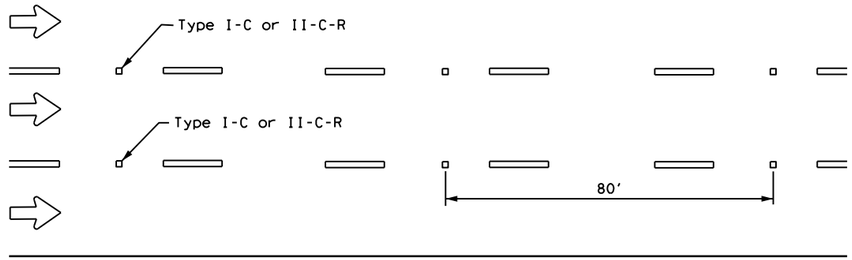


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



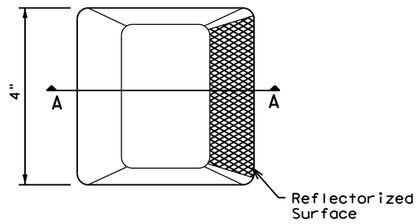
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

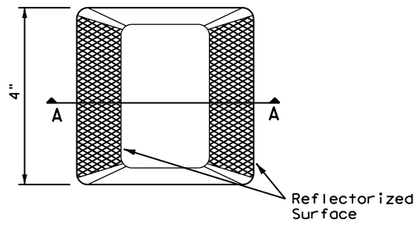
See Note 3.

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

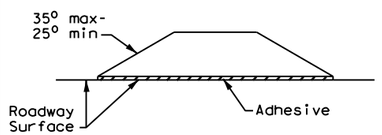
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

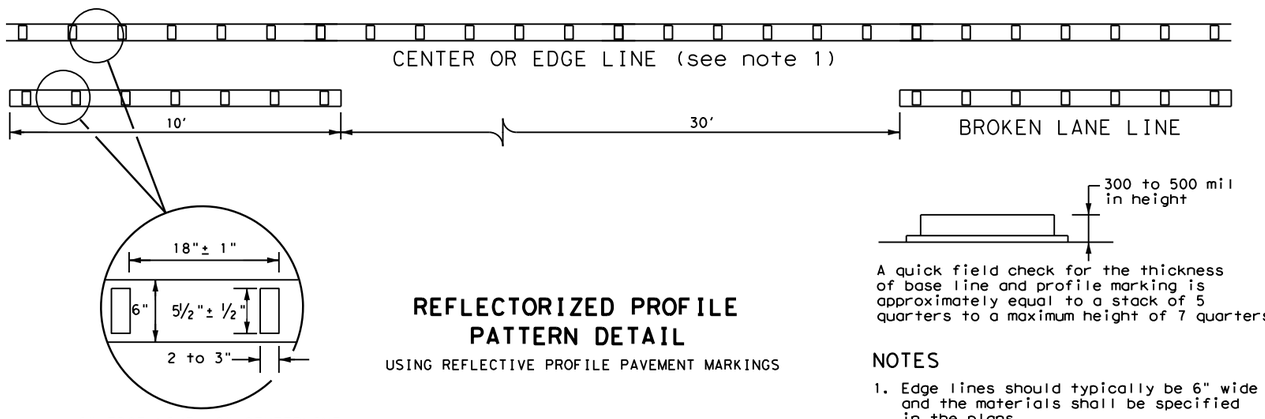


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

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
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	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		154

22B

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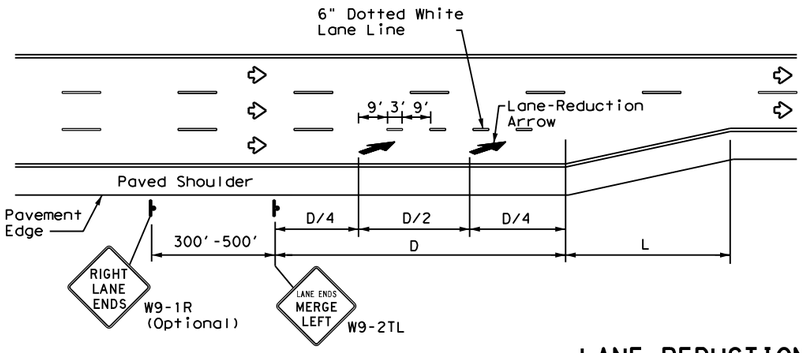


LANE REDUCTION

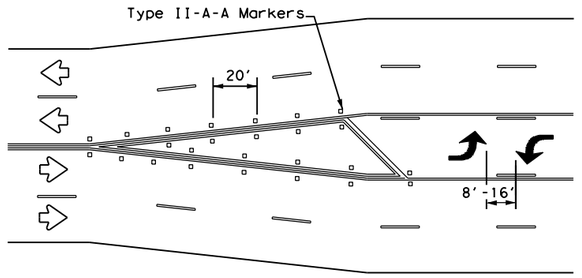
NOTES

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	

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.

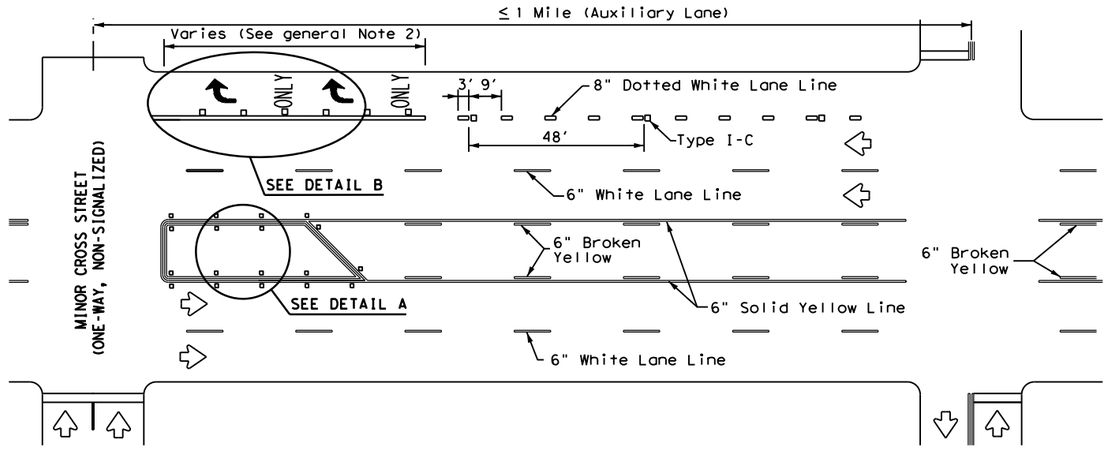


A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

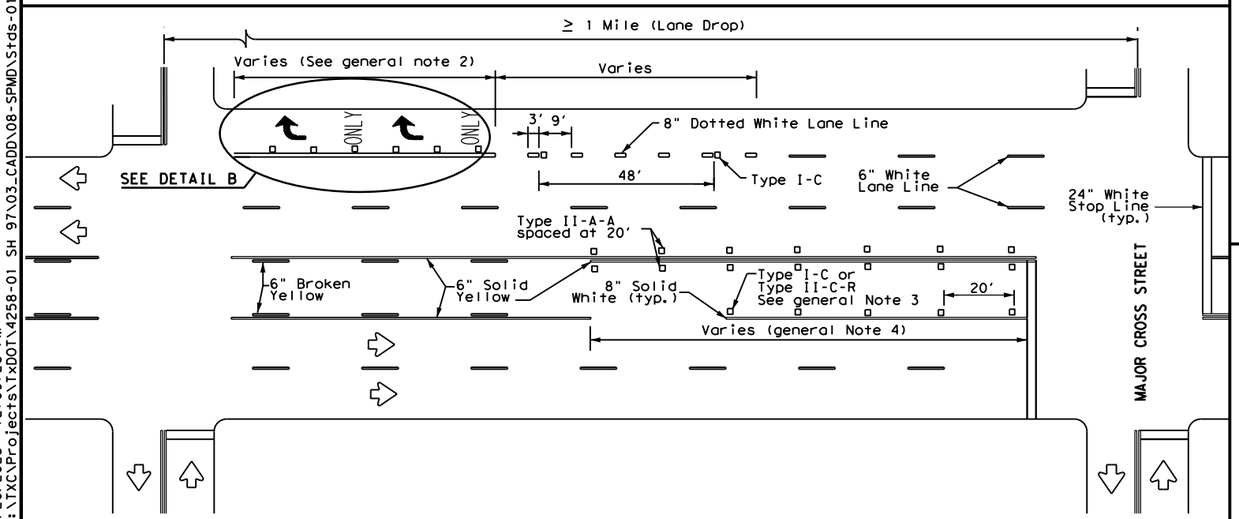
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

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

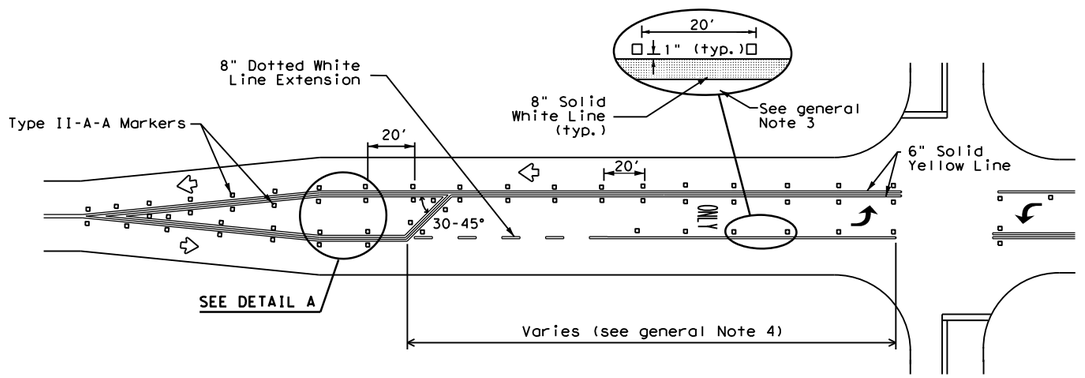
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



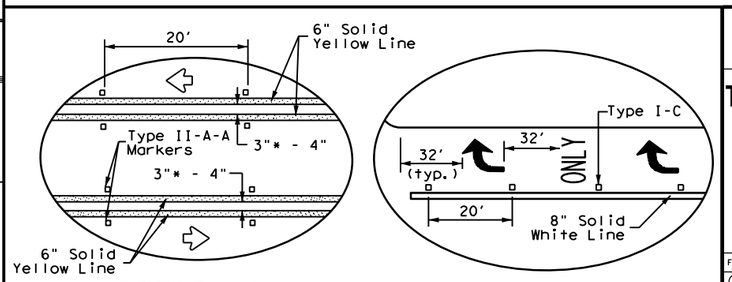
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



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

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© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
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	LRD	LA SALLE		155

22C

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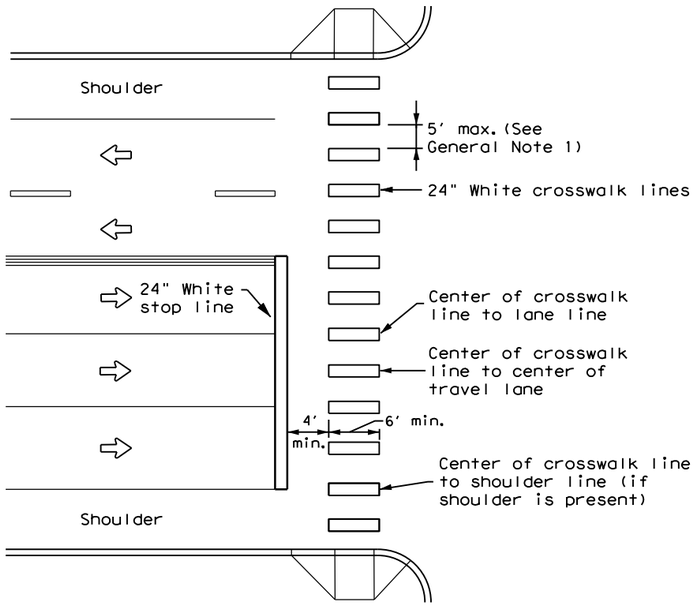


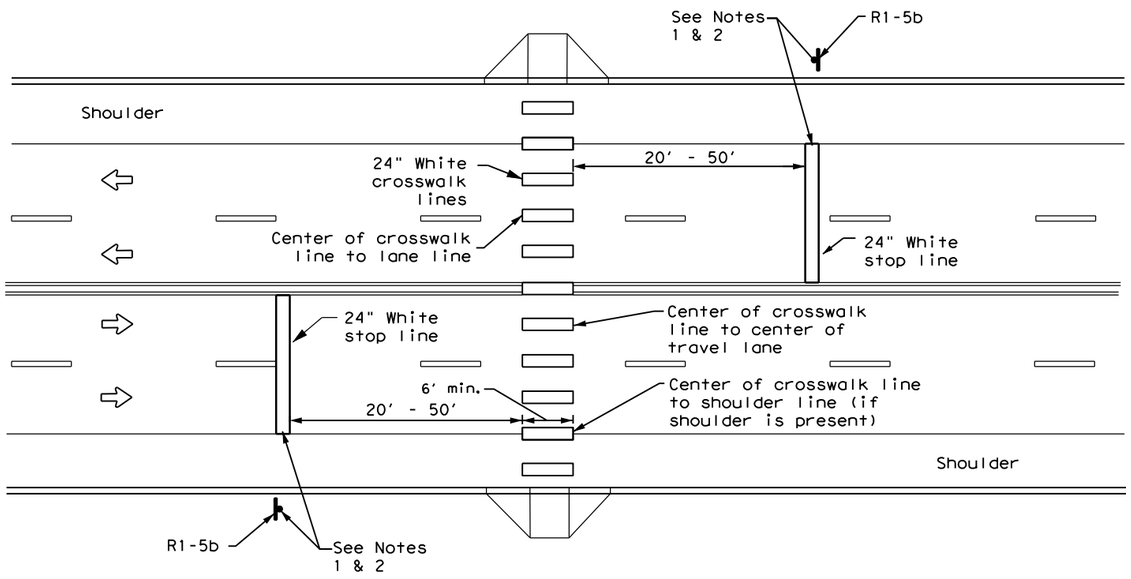
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

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

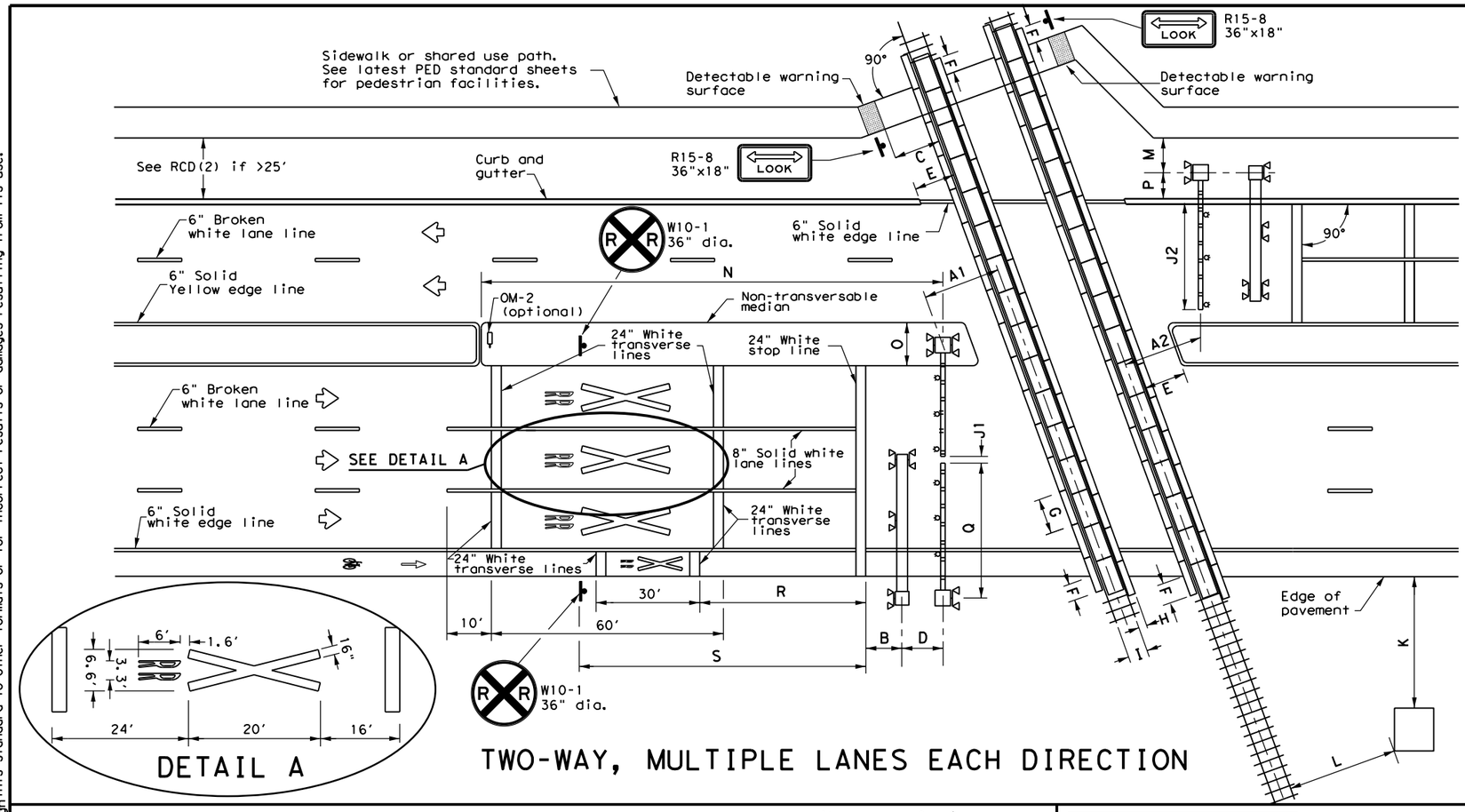
Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-22A

FILE: pm4-22a.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
6-20	DIST	COUNTY		SHEET NO.
6-22	LRD	LA SALLE		156
12-22				

220



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.

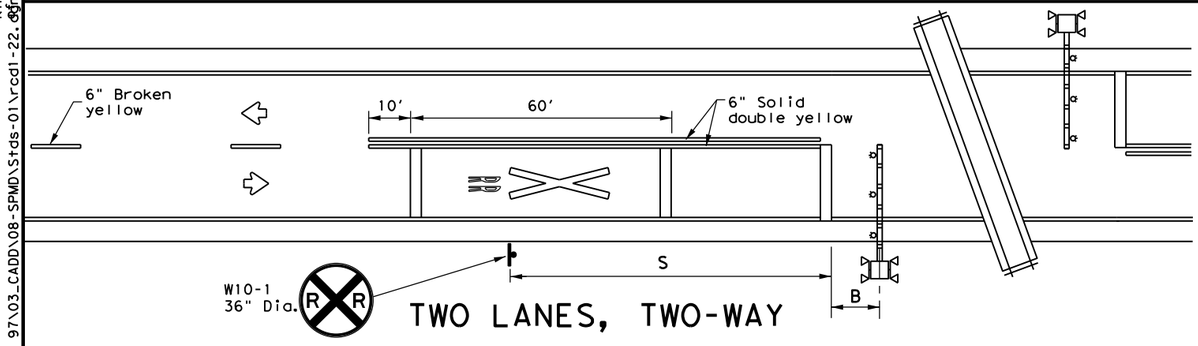
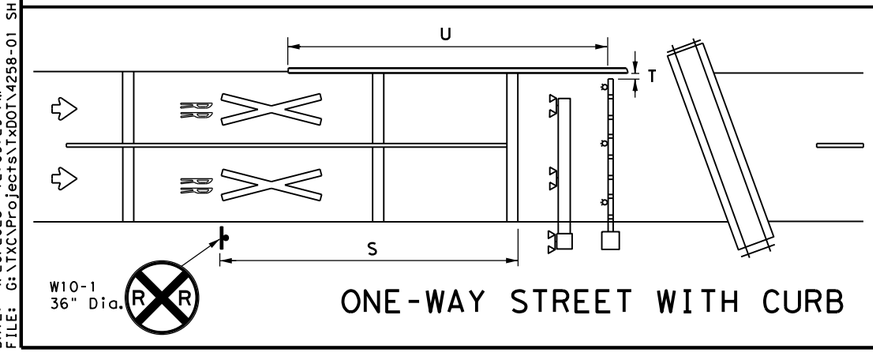


TABLE 1	
Approach Speed (mph)	Desirable Placement (feet)
20	100
25	100
30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550
75	650

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

GENERAL NOTES

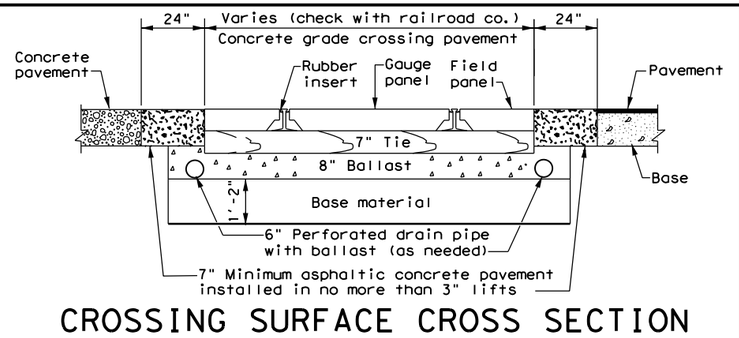
1. Medians and curbs must be non-traversable to qualify as a Quiet Zone Supplementary Safety Measure (SSM). Non-traversable curbs in Quiet Zones are 6" tall minimum and used on roadways where speed does not exceed 40 mph.
2. Raised pavement markers may be used to supplement striping. See PM(2) and PM(3) 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

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.



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
©TxDOT November 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
2-16	DIST	COUNTY		SHEET NO.
11-22	LRD	LA SALLE		157

DATE: 4/20/2023 12:09:29 PM
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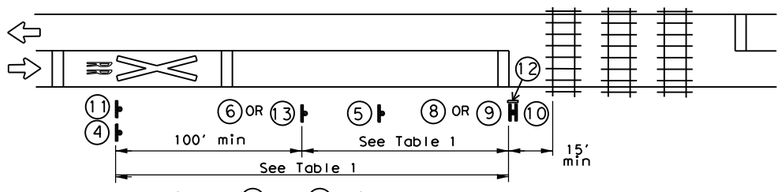
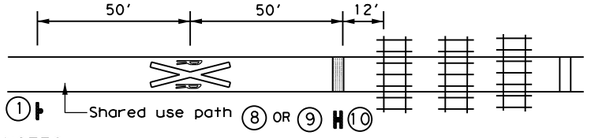


(if no (6) or (13) sign used)

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

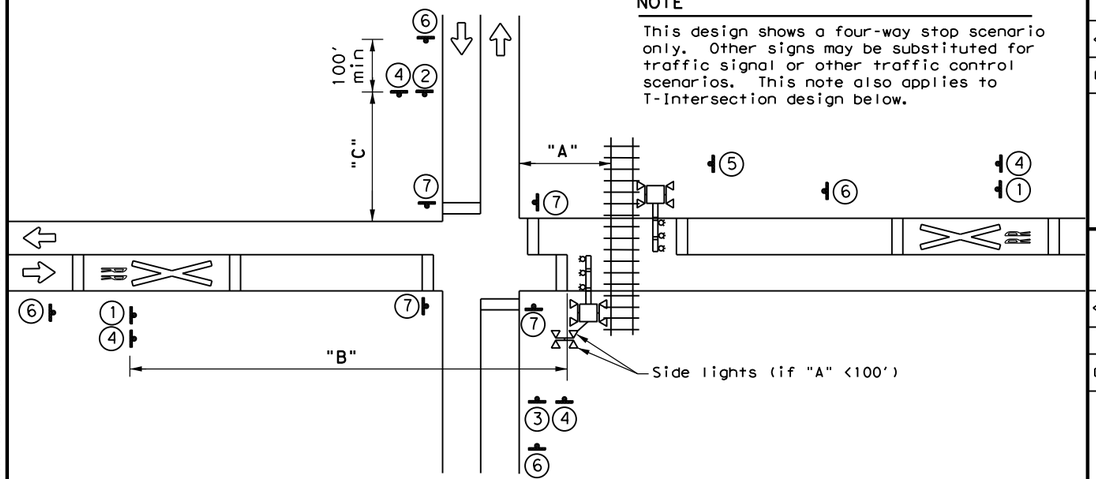
1. A shared use path is considered a separate pathway crossing when more than 25' from traveled way of adjacent roadway.
2. Detectable warning used at stop bar.
3. Smaller signs preferred. See the Design of Bicycle Signs section within the TMUTCD for sizing details.

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.

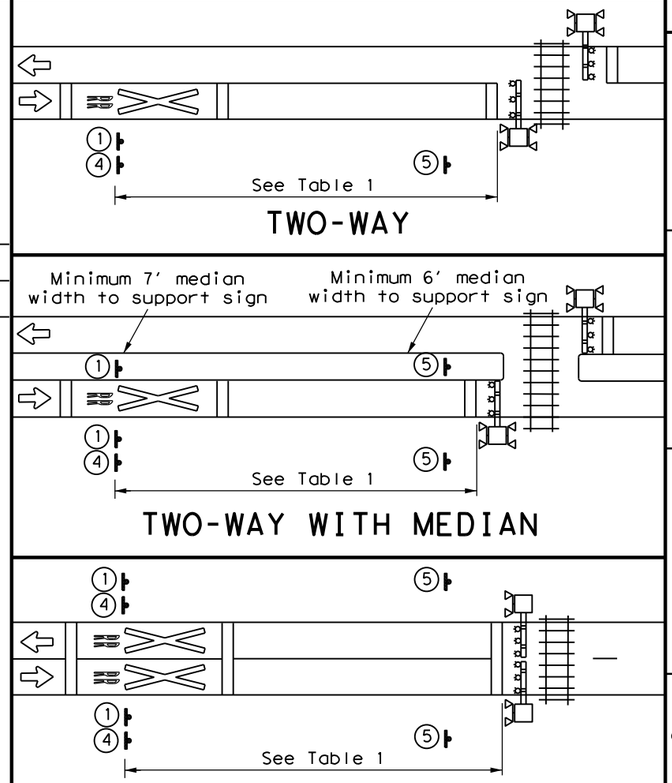


NOTE

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

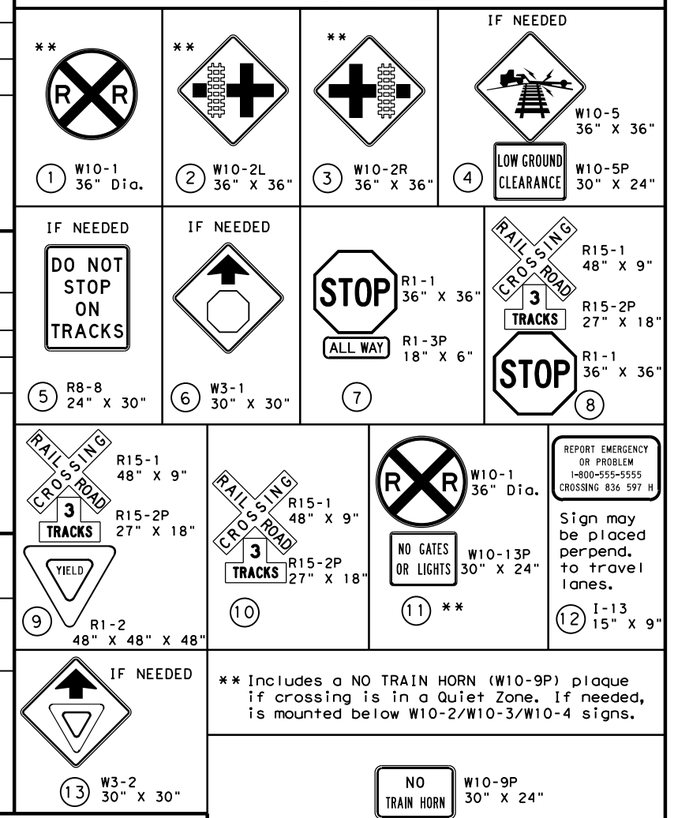


TWO-WAY

TWO-WAY WITH MEDIAN

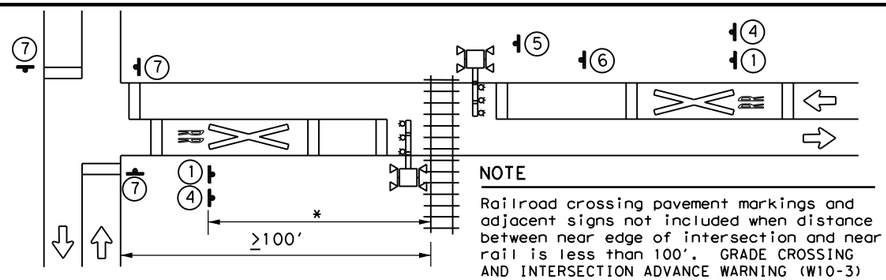
ONE-WAY

SIGNS



** 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"

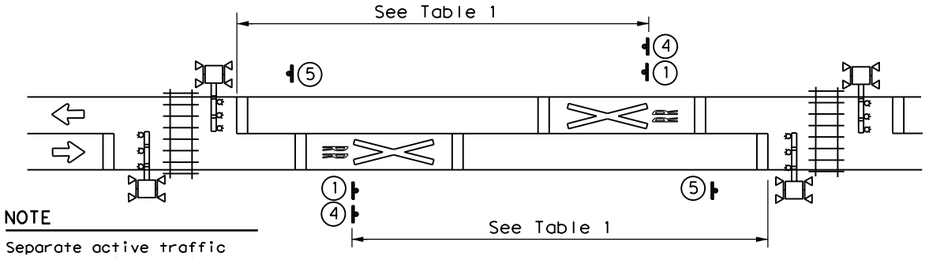


*Use Table 1 if sufficient space exists.

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	0483	01	052	SH 97
2-16 11-22	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		158

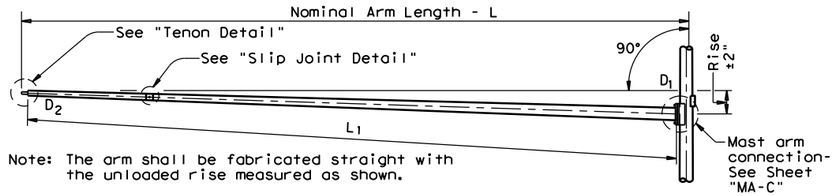
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
44	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	① thk	Rise	L_1	D_1	② D_2	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"
48	47.0	10.5	4.1	.239	3'-4"	47.0	11.0	3.5	.239	2'-9"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

① Thickness shown are minimums, thicker materials may be used.

② D_2 may be increased by up to 1" for polygonal arms.



Note: The arm shall be fabricated straight with the unloaded rise measured as shown.

TRAFFIC SIGNAL ARM

(Fixed Mount)

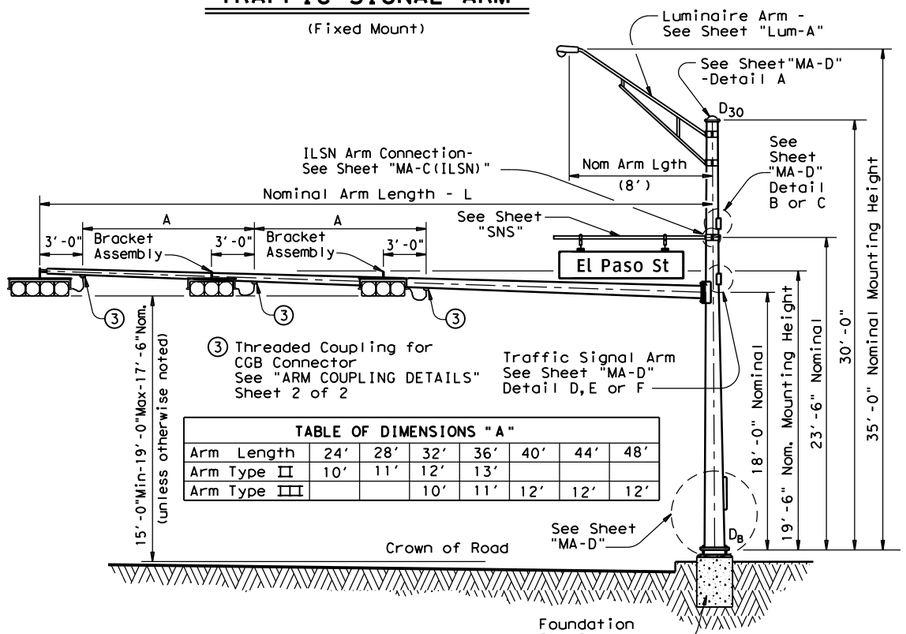


TABLE OF DIMENSIONS "A"							
Arm Length	24'	28'	32'	36'	40'	44'	48'
Arm Type II	10'	11'	12'	13'			
Arm Type III			10'	11'	12'	12'	12'

STRUCTURE ASSEMBLY

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30' Poles With Luminaire		24' Poles With ILSN		19' Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	
24	24L-80		24S-80		24-80	
28	28L-80		28S-80		28-80	1
32	32L-80		32S-80		32-80	
36	36L-80		36S-80		36-80	
40	40L-80		40S-80		40-80	
44	44L-80		44S-80		44-80	
48	48L-80		48S-80		48-80	

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80	1		
32			32II-80		32III-80	
36			36II-80		36III-80	
40					40III-80	
44					44III-80	
48					48III-80	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ½"	3'-4"	
1 ¾"	3'-10"	

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(1)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
11-99
1-12

CONT	SECT	JOB	HIGHWAY
0483	01	052	SH 97
DIST	COUNTY		SHEET NO.
LRD	LA SALLE		159

122A

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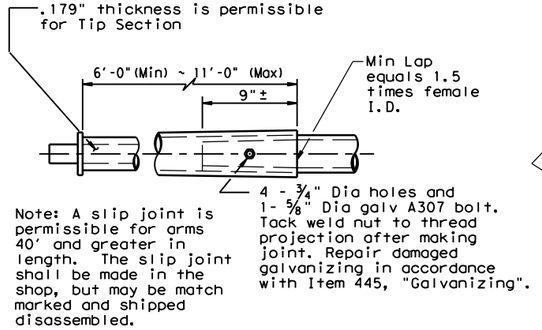
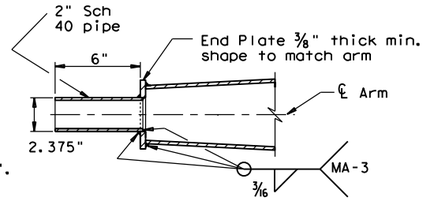


SLIP JOINT DETAIL



TENON DETAIL

VIBRATION WARNING

Mast Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backpates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor.

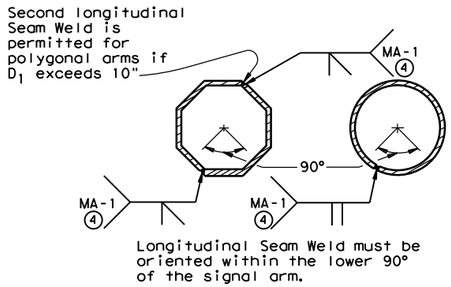
Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

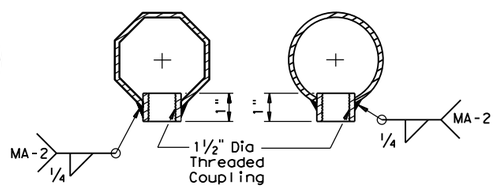
Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.



ARM WELD DETAIL

④ 60% Min. penetration 100% pemetration within 6" of circumferential base welds.



ARM COUPLING DETAILS

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(2)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
0483	01	052	SH 97
DIST	COUNTY		SHEET NO.
LRD	LA SALLE		160

122B

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

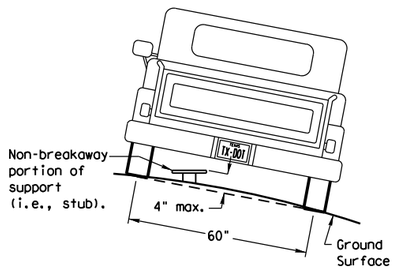
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1) to (SLIP-3))

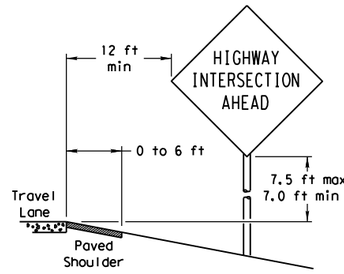
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

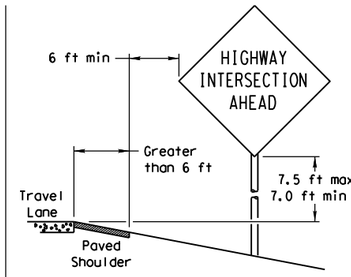
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

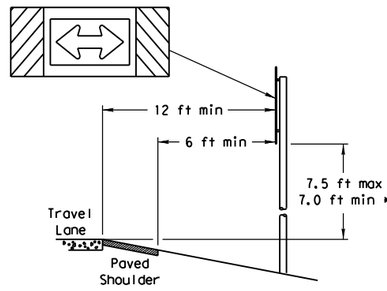
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



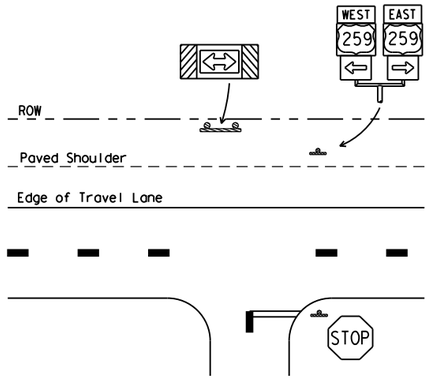
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

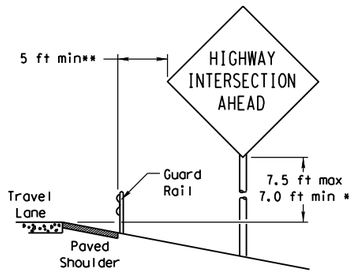
T-INTERSECTION



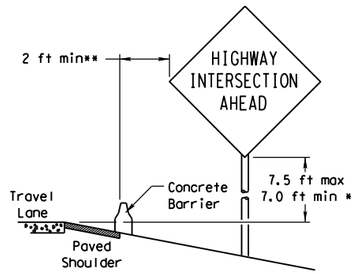
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

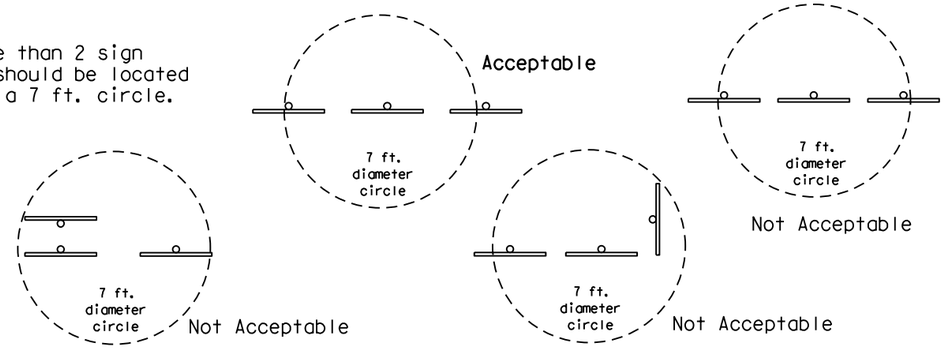
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

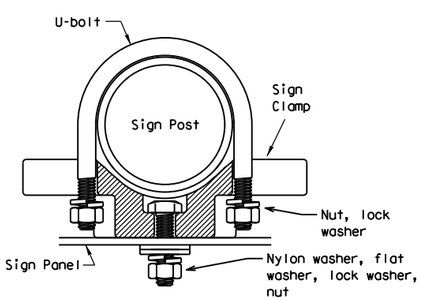
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

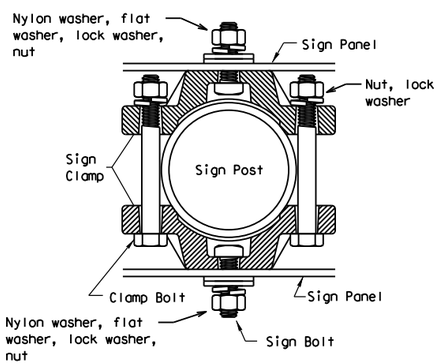


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

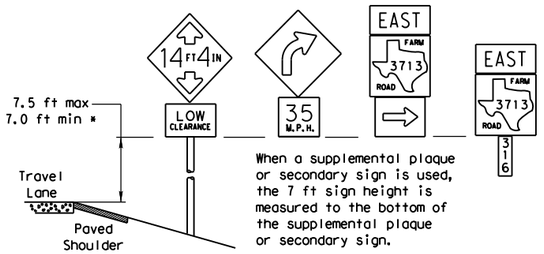
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



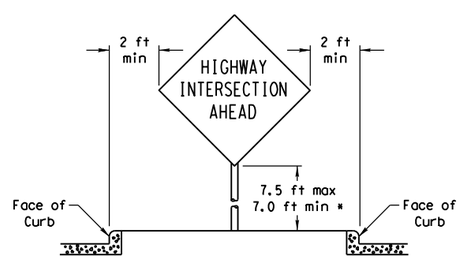
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



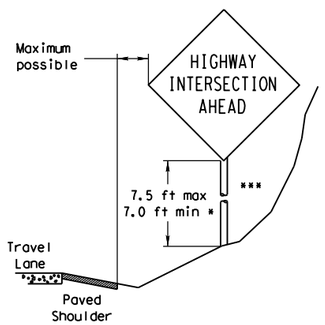
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

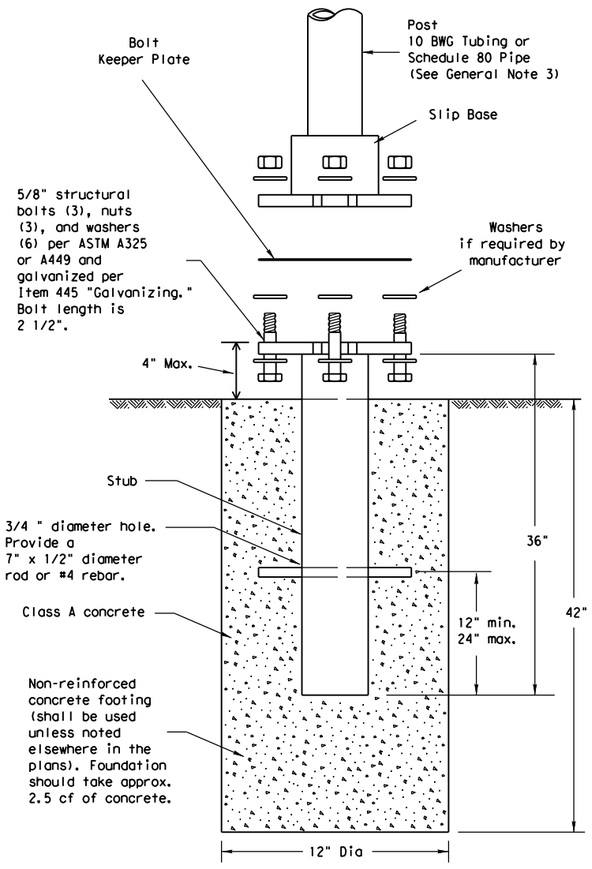
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		161

DATE: 4/20/2023 12:09:31 PM
FILE: G:\TxCVProjects\TxDOT\4258-01 SH 97\03*CADD\08-SPMD\Stds-01\smdgen.dgn

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

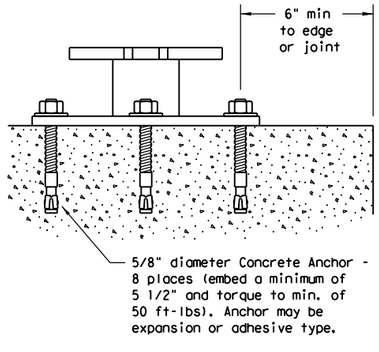
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08 REVISIONS			

CONT	SECT	JOB	HIGHWAY
0483	01	052	SH 97
DIST	COUNTY		SHEET NO.
LRD	LA SALLE		162

DATE: 4/20/2023 12:09:32 PM
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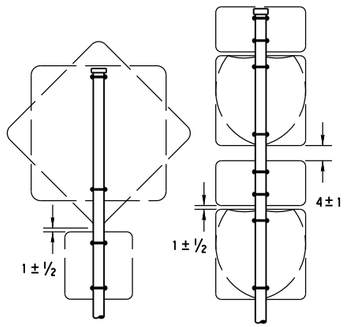
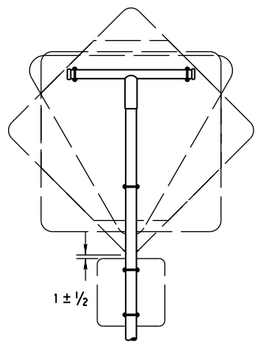
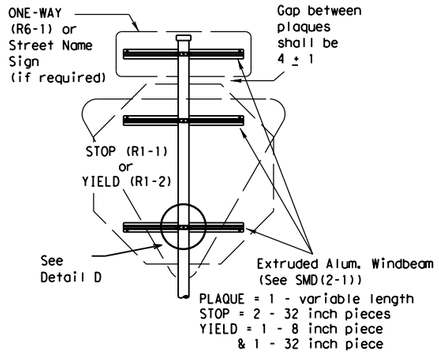


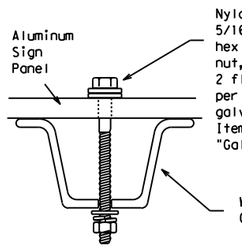
SM RD SGN ASSM TY XXXXX(1)XX(P)



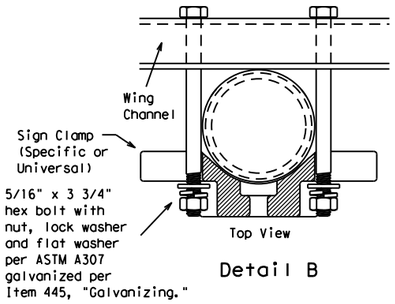
SM RD SGN ASSM TY XXXXX(1)XX(T)



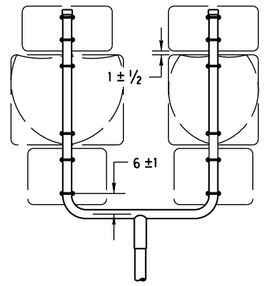
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



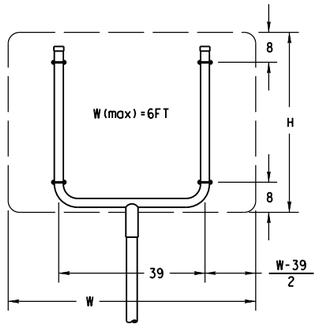
Detail A



Detail B



SM RD SGN ASSM TY XXXXX(1)XX(U)



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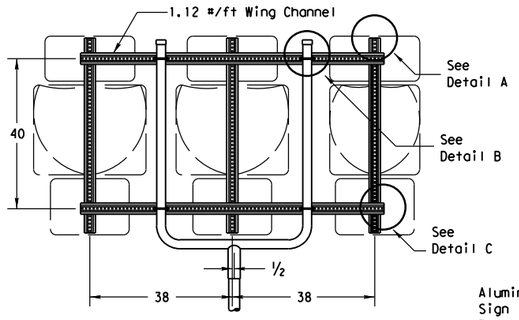
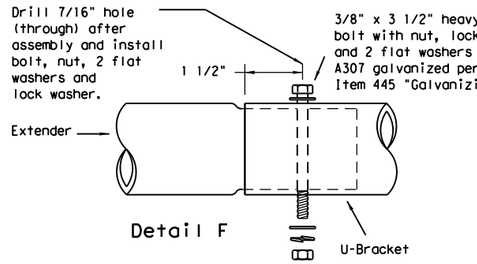
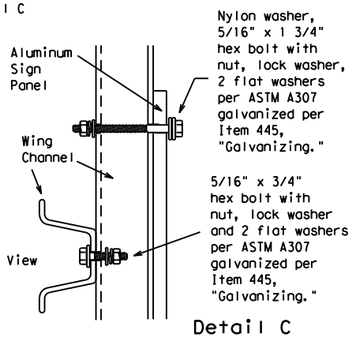


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

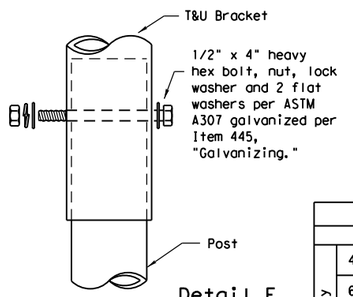


Detail F

Splices shall only be allowed behind the sign substrate.



Detail C



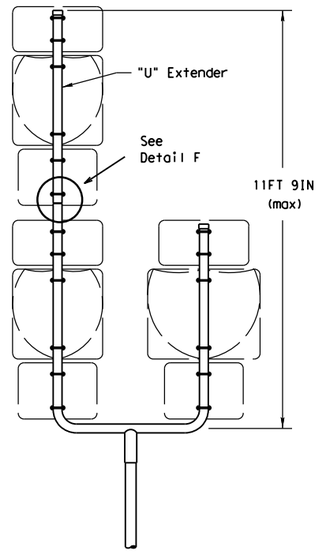
Detail E

GENERAL NOTES:

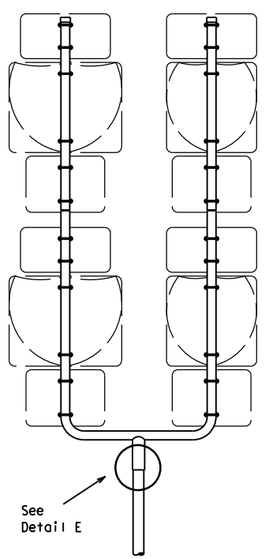
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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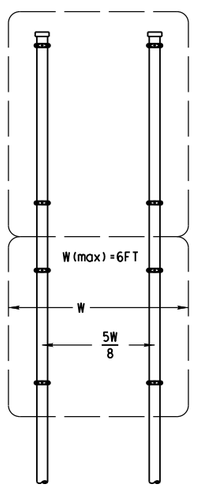
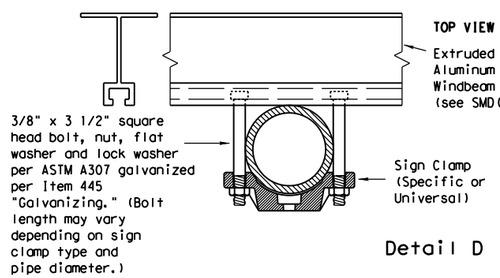
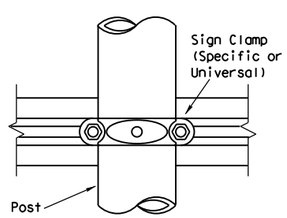


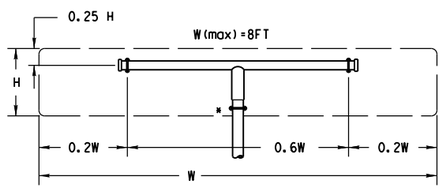
SM RD SGN ASSYM TY XXXXX(2)XX(P)



Detail D



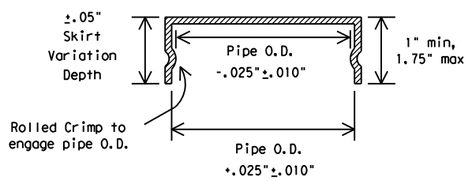
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

REVISIONS							
9-08							

TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
0483	01	052	SH 97
DIST	COUNTY		SHEET NO.
LRD	LA SALLE		163

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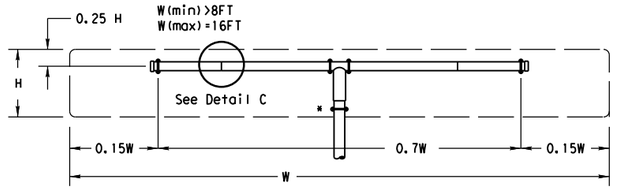
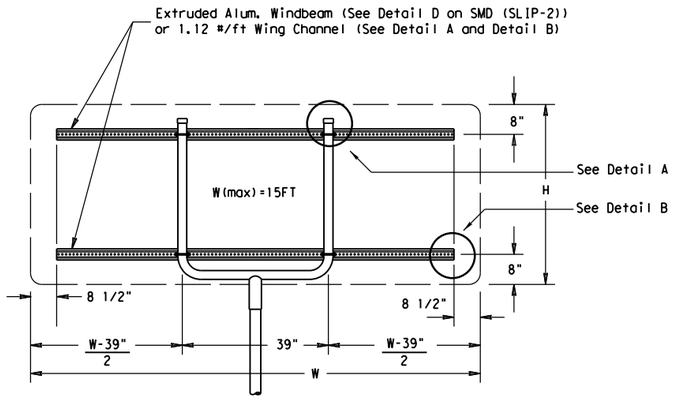


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



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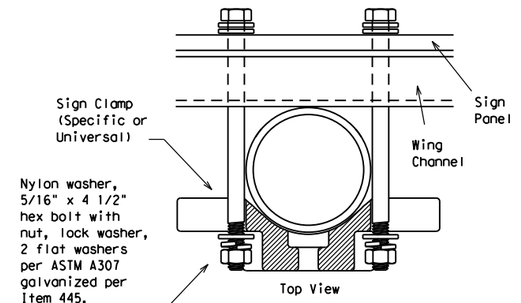
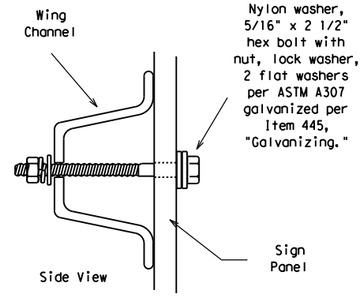
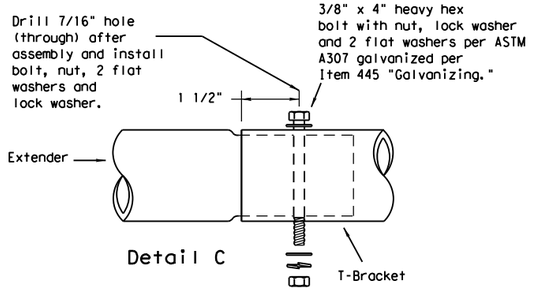


Top View

Detail A

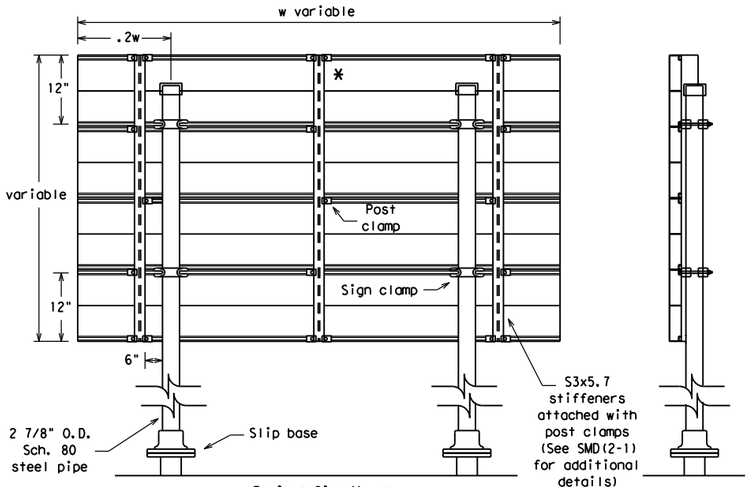


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

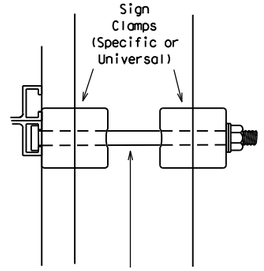


Typical Sign Mount

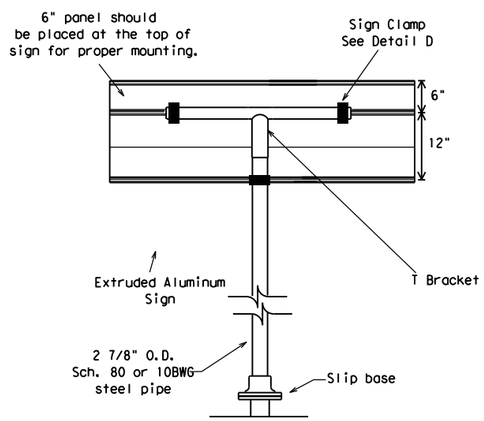
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

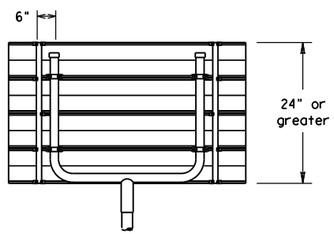
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. See table above.
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

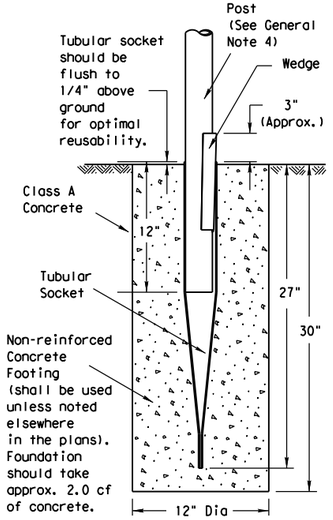
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

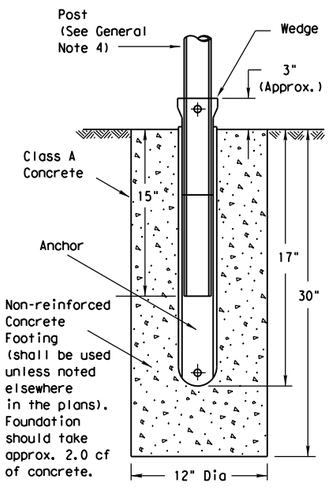
REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		164

Wedge Anchor Steel System



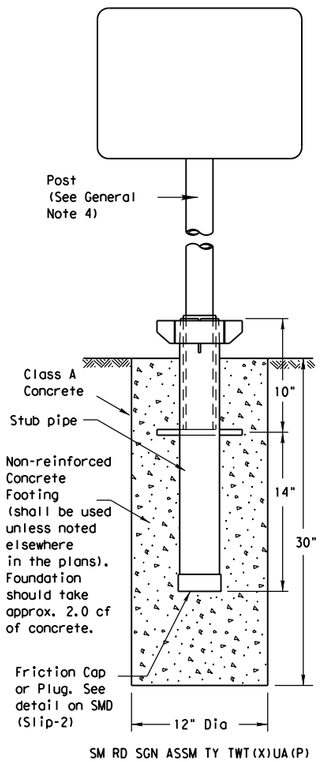
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

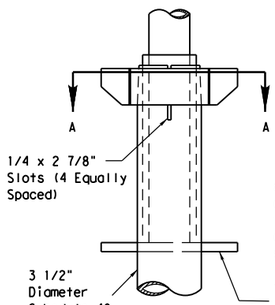


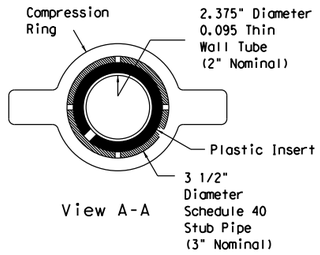
SMD RD SGN ASSM TY TWT(X)WP(X)

Universal Anchor System with Thin-Walled Tubing Post



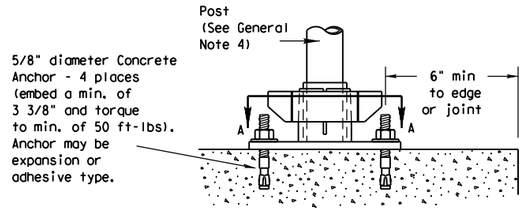
SM RD SGN ASSM TY TWT(X)UA(P)



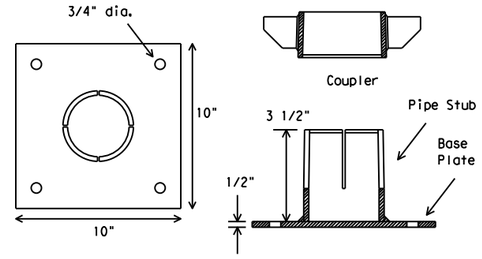


View A-A

Plastic insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The insert should be cut to approx. 4 1/2" when used with the Bolt Down Universal Anchor System.

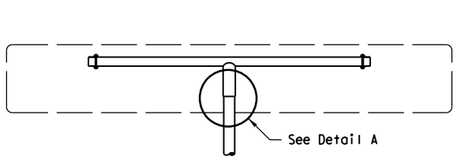


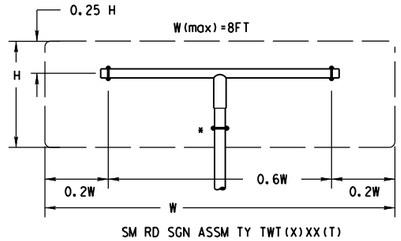
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.



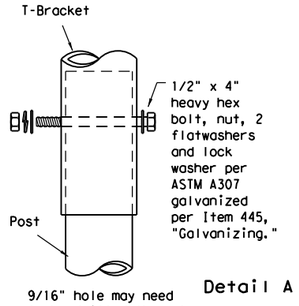
SM RD SGN ASSM TY TWT(X)UB(P)

Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





SM RD SGN ASSM TY TWT(X)XX(T)
(* - See General Note 6)



Detail A

9/16" hole may need to be drilled through post to accommodate bolt.

NOTE

The devices shall be installed per manufacturer's recommendations.
Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: http://www.txdot.gov/business/producer list.htm
4. Material used as post with this system shall conform to the following specifications:
   13 BWG Tubing (2.375" outside diameter) (TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the following:
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   18% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of .083" to .099"
   Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Place concrete into hole until it is approximately flush with the ground. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximaely 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer..
5. Attach the sign to the sign post.
6. Insert the sign post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. Insert base post in hole to depths shown and backfill hole with concrete.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain above the top of the concrete foundation.
4. Attach the sign to the sign post.
5. Install plastic insert around bottom of post.
6. Insert sign post into base post. Lower until the post comes to rest on steel rod.
7. Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
8. Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST

SMD(TWT)-08

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

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
0483	01	052	SH 97

DIST	COUNTY	SHEET NO.
LRD	LA SALLE	165

26E

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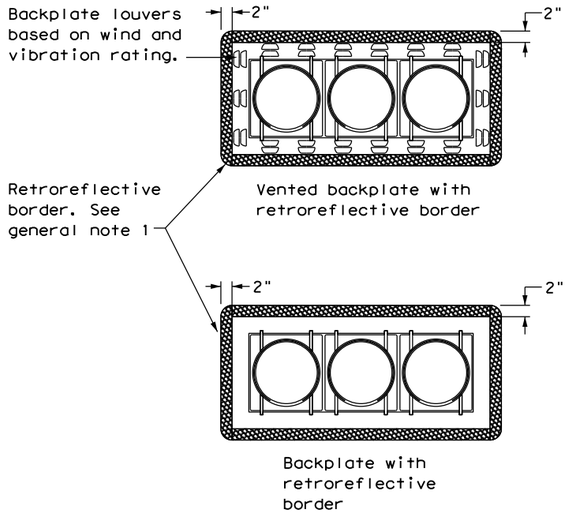
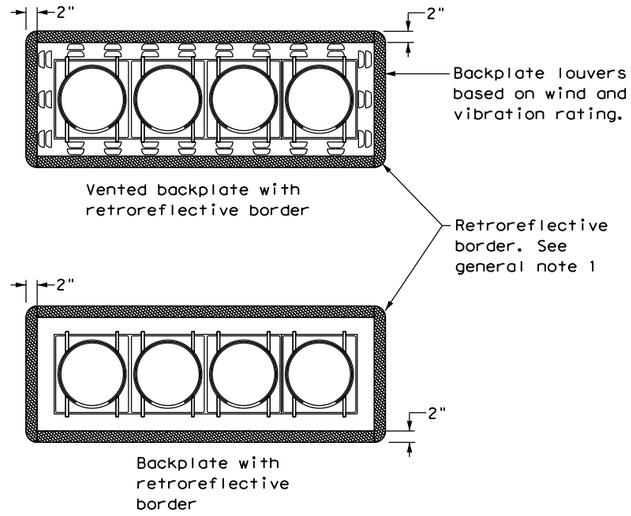


THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



FOUR-SECTION HEAD
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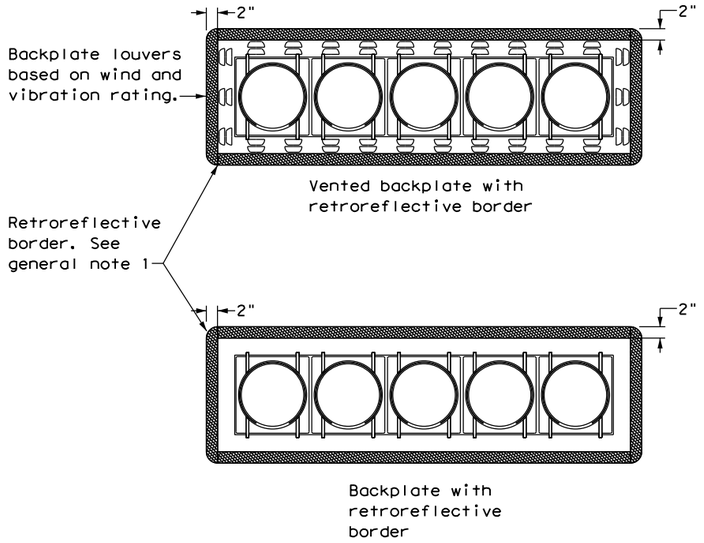
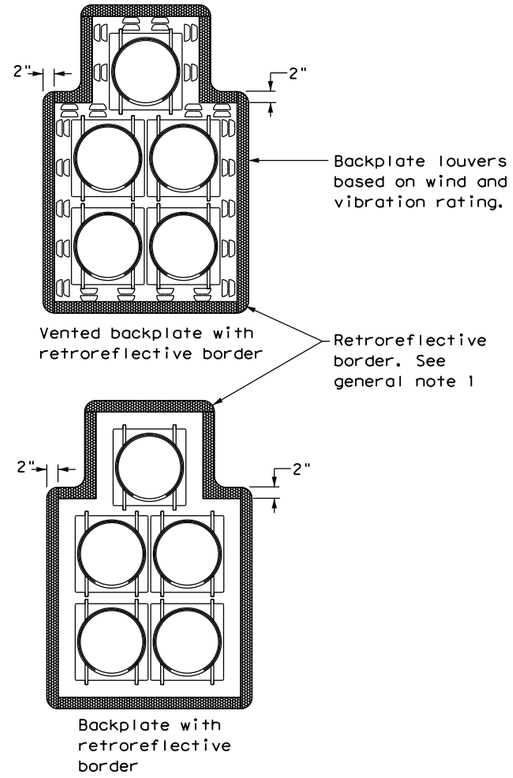
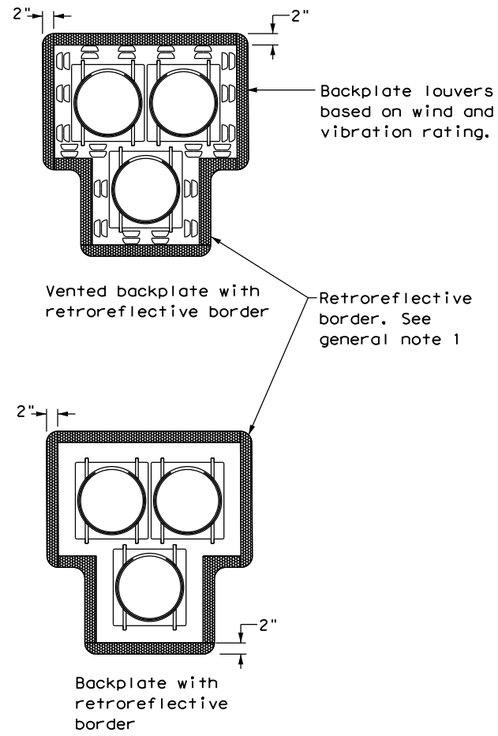


FIVE-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
CLUSTER



PEDESTRIAN HYBRID
BEACON

GENERAL NOTES:

1. Backplates are optional for traffic signals and pedestrian hybrid beacons. When backplates are used, a 2-inch wide fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 is required. Place on all approaches when used.
2. Signal head and backplate compatability must be verified by the contractor prior to installation.
3. When using backplates on signal heads, venting is preferred to reduce cyclic vibration stress.
4. When a vented backplate is used, the retroreflective border must not be placed over the louvers.
5. This standard sheet applies to all signal heads with backplates, including but not limited to:
   - Pole mounted
   - Overhead mounted
   - Span wire mounted
   - Mast arm mounted
   - Vertical signal heads
   - Horizontal signal heads
   - Clustered signal heads
   - Pedestrian hybrid beacons

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL HEAD WITH BACKPLATE

TS-BP-20

FILE: ts-bp-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		166

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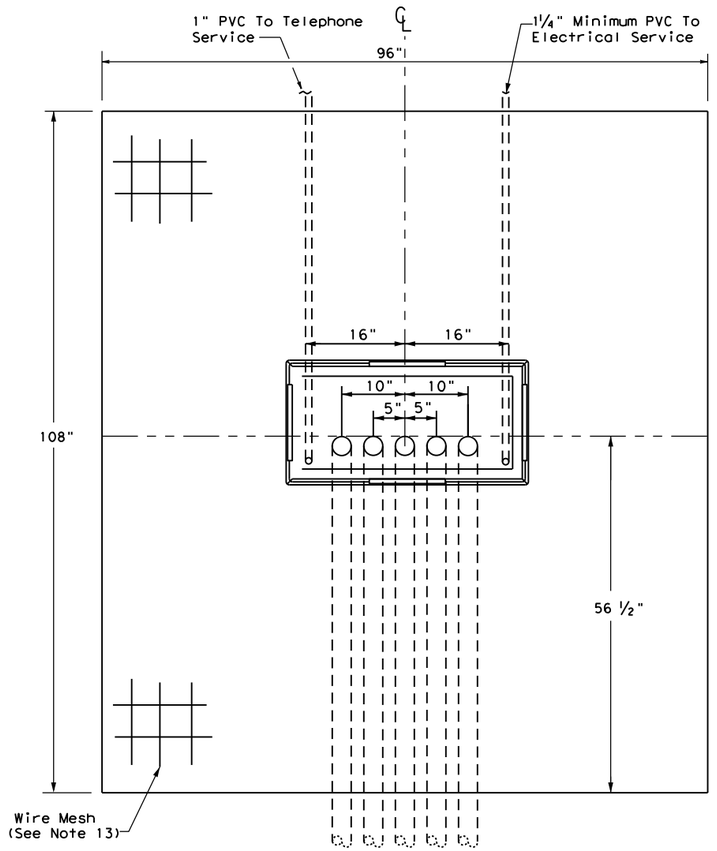
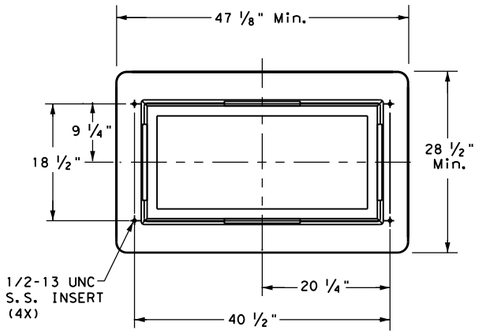
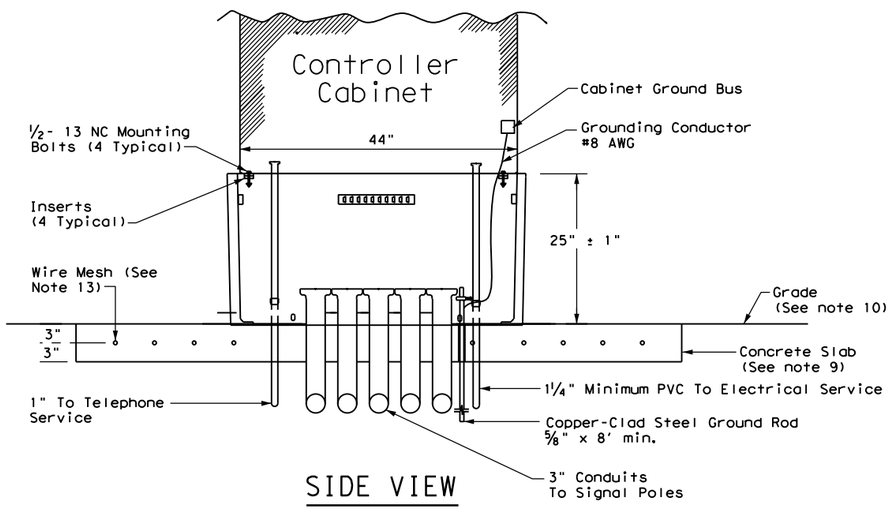


TOP VIEW



CABINET BASE



SIDE VIEW

TRAFFIC SIGNAL CONTROLLER BASE:

1. Provide a traffic signal controller base (cabinet base) manufactured of polymer concrete material consisting of calcareous and siliceous stone; glass fibers and thermoset polyester resin. The polymer concrete cabinet base must be reinforced on the inside of the cabinet base with fiberglass matting. Provide one of the following bases: Armorcast Part # A6001848X24, Quazite Model # PG3048Z709, or other as approved by TxDOT Traffic Safety Division.
2. The polymer concrete material must have a minimum compressive strength of 10,300 pounds per square inch (psi), minimum flexural strength of 3600 psi, and minimum shear strength of 3600 psi.
3. The polymer concrete cabinet base must conform to the dimensions shown and must accommodate a standard TxDOT basemount cabinet.
4. Supply the cabinet base with four 1#2"-13 UNC stainless steel inserts for attachment of the cabinet to the base. Inserts must withstand a minimum torque of 50 ft-lb and a minimum straight pull out strength of 750 lbs.
5. Provide the cabinet base with 4 cable racks mounted one on each side of the base 2" to 7 " from the top edge of the base. Unless approved otherwise, cable racks must be 1-1/2 x 9#16x 3#16inch steel channel with eight T-slots spaced at 1-1/2 inches. The cable racks must easily accommodate the insertion of tie wraps to attach field wiring to the racks to serve as strain relief. Secure cable racks to the base using 1#2"-13 UNC stainless steel screws and inserts.
6. The cabinet base, when secured to the concrete slab with controller cabinet attached, must withstand a minimum wind load of 125 mph or a 850 lb force applied at 49" above the bottom of the base without causing the base or cabinet to come out of their anchored position or cause any permanent deformation. The manufacturer must supply certification by an independent testing laboratory or sealed by a Texas Licensed Professional Engineer. Provide the cabinet base with hardware for attachment to a concrete slab.
7. The traffic signal base must be permanently marked either by impress or by permanent ink with the manufacturer's model number and name or logo.
8. Seal the base to the concrete with a silicone caulk bead and fastened to the slab per manufacturer's instructions.

CONCRETE SLAB:

9. Traffic signal controller pad must be a portland cement concrete slab poured in place, must conform to the dimensions shown, and must be level.
10. Grade earthwork such that it is flush with the concrete pad on all four sides, unless otherwise shown on the plans. Subsidiary to ITEM 680, four inch rip rap may be used in lieu of earthwork. Slopes shall gradually contour to match plans.
11. Bond a #8 AWG copper ground wire and an 8 ft ground rod bonded to the reinforcing mesh by a suitable UL Listed clamp and terminated to the cabinet grounding bus for the purpose of providing a local ground for the electrical grounding conductor. The electrical grounding conductor specified in Item 680-3.A.4 is required and must be terminated to the cabinet ground bus.
12. Install a PVC sleeve to prevent the ground rod from direct embedment in the slab.
13. Provide welded wire mesh 6X6-W2.9 X W2.9 for reinforcement. Provide joints and splices in the mesh with a minimum 6-inch overlap. Center the mesh between top and bottom and provide a minimum 3 inch cover on the edges.
14. Provide Class B concrete minimum for the slab in accordance with Item 421. Construct the slab in accordance with Item 531.

CONDUITS:

15. Stub up and run 3-inch conduits through the slab to the various traffic signal poles and ground boxes as shown on the layouts. Install the number of conduits as shown on layouts plus two additional 3 inch conduits for future use. Terminate the conduits with a bushing between 2 and 4-inches above the slab.
16. Extend conduits for future use at least 18-inches from the edge of the slab, terminate underground with a coupling, and cap and seal so that the seal can be removed without damaging the coupling. This must also apply to unused telephone conduit.
17. Stub up two separate conduits through the slab from the electrical and telephone services. Run the conduit for the electrical feed directly to the electrical service enclosure. Run the conduit for the telephone line directly to the telephone service, usually located on the same pole as the electrical service. Telephone must not under any circumstance share a conduit with any other function.
18. Terminate electric and telephone conduits above the slab with a coupling. After the base is installed, extend the conduits above the top of the base and secure to the base using a steel one-hole strap or similar suitable substitute.

CONTROLLER CABINET:

19. Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.
20. The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:

21. Bid TS-CF as subsidiary to Item 680.

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD
TS-CF-21

FILE: ts-cf-21.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2000	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-04 2-21	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		167

FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft ④, ⑤, ⑥			ANCHOR BOLT DESIGN ①				FOUNDATION DESIGN LOAD ②		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
				10	15	40							
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

NOTES:

① Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

② Foundation Design Loads are the allowable moments and shears at the base of the structure.

③ Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

④ Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

⑤ If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

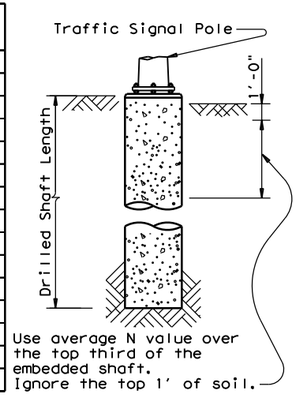
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET)				
				24-A	30-A	36-A	36-B	42-A
TS Pole	15	30-A	P1		10.3			
TOTAL DRILLED SHAFT LENGTHS								

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'



Use average N value over the top third of the embedded shaft. Ignore the top 1' of soil.

ANCHOR BOLT & TEMPLATE SIZES

BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and interim revisions thereto.

Reinforcing steel shall conform to Item 440, "Reinforcing Steel".

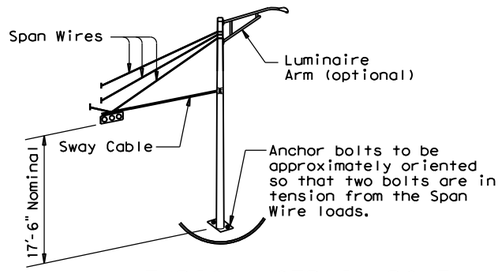
Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of 8UN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

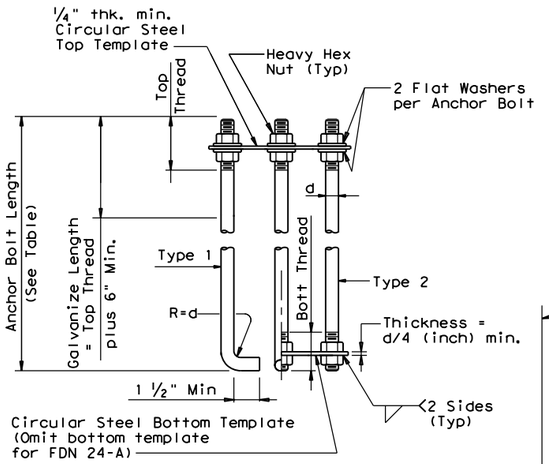
Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".

EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



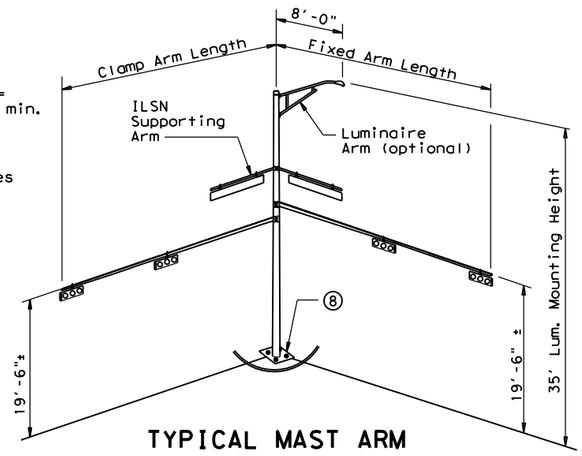
TYPICAL STRAIN POLE ASSEMBLY



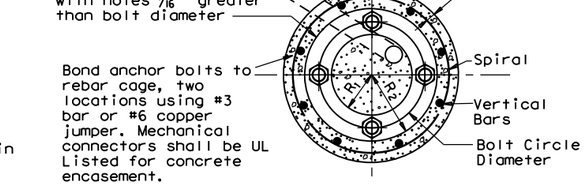
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

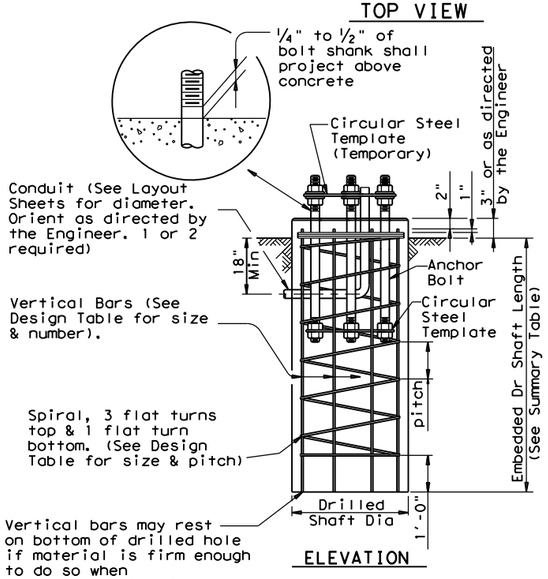
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



TYPICAL MAST ARM ASSEMBLY



TOP VIEW



ELEVATION

FOUNDATION DETAILS

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB

REVISIONS: 5-96, 11-99, 1-12

CONT	SECT	JOB	HIGHWAY
0483	01	052	SH 97
DIST	COUNTY		SHEET NO.
LRD	LA SALLE		168

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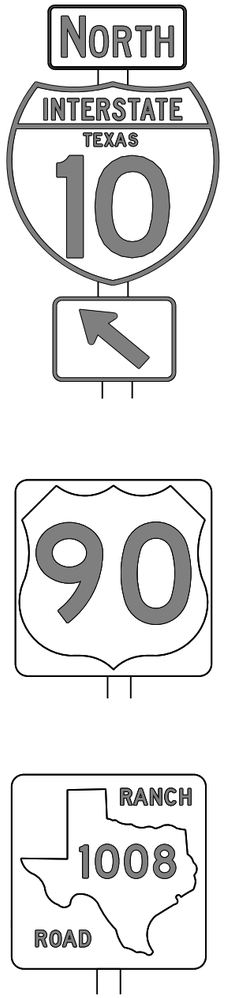
REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

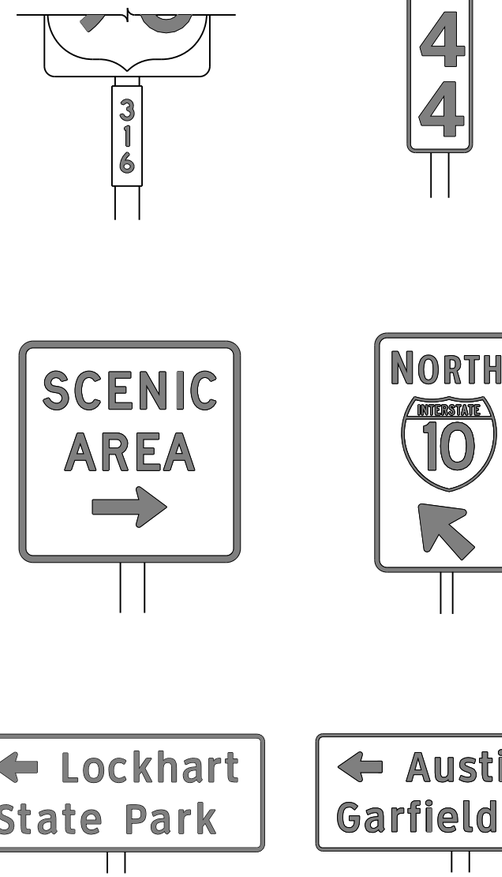
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	LRD	LA SALLE		169

DATE: 4/20/2023 12:09:39 PM
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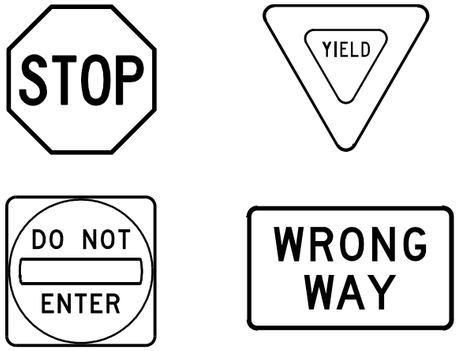
REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

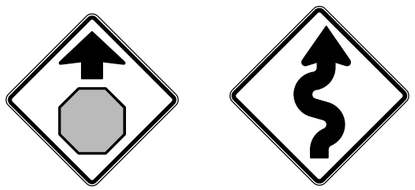
ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn		CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		170

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NOTE: Structures north of ice line to be designed for ice.

ZONE 2
(90 MPH WIND)

ZONE 3
(80 MPH WIND)

ZONE 4
(70 MPH WIND)

ICE LINE

ZONE 4
(70 MPH WIND)

ICE LINE

ZONE 3
(80 MPH WIND)

ZONE 1
(100 MPH WIND)

LEGEND

ZONE 1 - = (100 MPH WIND)
ZONE 2 - = (90 MPH WIND)
ZONE 3 - = (80 MPH WIND)
ZONE 4 - = (70 MPH WIND)
= (ICE LINE)
= (DISTRICT LINES)

APPLICABLE STANDARDS SHEETS

OVERHEAD SIGN BRIDGE STANDARDS:

OSB-SE
OSB-Z#
OSB-Z#1
HOSB-Z#
HOSB-Z1L
HOSB-Z#1
OSBT
OSBC
OSBC-SC-Z#
OSBS-SC
OSB-FD
OSB-FD-SC

CANTILEVER OVERHEAD SIGN SUPPORT STANDARDS:

COSS-SE
COSS-Z#-10
HCOSS-Z#-10
COSS-Z21-10
COSS-Z#&Z#1-10
COSSD
COSSF
COSS-FD

Note: # = Wind Zone number 1, 2, 3 or 4

HIGH MAST ILLUMINATION POLE STANDARDS:

HMIP-98
HMIF-98

WALKWAYS AND BRACKETS STANDARDS:

SWW
SB(SWL-1)

TRAFFIC SIGNAL POLE STANDARDS:

SP-80
SP-100
SMA-80
SMA-100
DMA-80
DMA-100
MA-C
MAC(ILSN)
MAD-D
TS-FD
LUM-A
CFA
LMA
TS-C
MA-DPD

FOR HARRIS CO. ONLY
Zone line is just North of US 90, around on the North, West and South sides of IH 610 and down the West side of SH 288.

FOR JACKSON CO. ONLY
Zone line is just North of SH 616.

WIND VELOCITY & ICE ZONES FOR APPLICABLE OVERHEAD SIGN SUPPORTS, HIGH MAST POLES, AND TRAFFIC SIGNAL POLES

Based on 50 Year Mean Recurrence Interval of Fastest Mile Wind Velocity at 33 feet height.

THIS SHEET TO BE INCLUDED IN ALL P.S.&E. PACKAGES CONTAINING ONE OR MORE OF THE APPLICABLE STANDARD SHEETS LISTED HEREON

Texas Department of Transportation

Traffic Operations Division Standard

WIND VELOCITY AND ICE ZONES

WV & IZ-14

FILE: windice.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1996	CONT	SECT	JOB	HIGHWAY
REVISIONS	0483	01	052	SH 97
8-14-Added list of applicable standards, restricting use to structures designed for Fastest Mile wind speeds.	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		171

A. GENERAL SITE DATA

1. PROJECT LIMITS: *FROM BI-35C TO FM 624 INTERSECTION*

2. PROJECT SITE MAPS:

- *Project Location Map: Shown on Title Sheet*
- *Drainage Patterns: Shown on Drainage Area Maps Patterns will remain as existing.*
- *Approx. Slopes Anticipated After Major Gradings and Areas of Soil Disturbance: Shown on Typical Sections Maximum 3:1*
- *Major Controls and Locations of Stabilization Practices: Shown on Summary of SW3P Sheets*
- *Project Specific Locations: Off-site waste, borrow, or storage areas are not part of this SW3P.*
- *Surface Waters and Discharge Locations: Shown on Drainage and Culvert Layout Sheets MUSTANG CREEK*

BEG LAT 28.4369206 *BEG LONG* -099.2346542

END LAT 28.4424427 *END LONG* -099.2229209

3. PROJECT DESCRIPTION:

FOR THE CONSTRUCTION OF THE WIDENING OF PAVEMENT CONSISTING OF BASE, GRADING, ACP, STRUCTURES, MBGF, SIGNING & PAVEMENT MARKINGS

Non-Joint Bid Utilities are not part of this SW3P.

4. FOR MAJOR SOIL DISTURBING ACTIVITIES SEQUENCE OF EVENTS:

1. *Install controls down-slope of work area and initiate inspection.*
2. *Begin phased construction with interim stabilization practices. Adjust erosion and sedimentation controls during construction to meet requirements and changing conditions and as directed/approved by the Engineer.*
3. *Major soil disturbing activities may include but are not limited to: right-of-way preparation, cut and/or fill to improve roadway profile, final grading and placement of topsoil and the following (if marked):*

- [X] *Placement of road base*
- [X] *Extensive ditch grading*
- [X] *Upgrading or replacing culverts or bridges*
- [ ] *Temporary detour road(s)*
- [ ] *Other:* _____

5. EXISTING AND PROPOSED CONDITIONS:

Description of existing vegetative cover: The existing vegetation includes grassed slopes.

Percentage of existing vegetative cover: Existing coverage is 80%.

Existing vegetative cover: (mark one)

- [X] *Thick or uniformly established*
- [ ] *Thin and Patchy*
- [ ] *None or minimal cover*

Site Acreage: 8.3 *Acreage disturbed:* 8.3

Site runoff coefficient (pre-construction): 0.55 *Site runoff coefficient (post-construction):* 0.58

6. RECEIVING WATERS: *(Mark all that apply)*

- [X] *A classified stream does not pass through project.*
- [ ] *A classified stream passes through project. Name* _____ *Segment Number* _____

Name of receiving waters that will receive discharges from disturbed areas of the project: Mustang Creek

Site is in a Municipal Seperate Storm Sewer System (MS4).

MS4 Operator (name): _____

Description of soils: Clays including Cochina, Zavco, Maverick, Cotulla, Chacon.

B. BEST MANAGEMENT PRACTICES

General timing or sequence for implementation of BMPs shall be as required and/or as directed/approved by the Engineer to provide adequate controls. BMPs shown on plan sheets are to be considered "proposed" unless/until install date is shown. BMPs are to reduce sediments from road construction activities.

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

- [ ] SEEDING
- [ ] MULCHING (Hay or Straw)
- [ ] BUFFER ZONES
- [ ] PLANTING
- [ ] COMPOST/MULCH FILTER BERM
- [P] SODDING
- [P] PRESERVATION OF NATURAL RESOURCES
- [ ] FLEXIBLE CHANNEL LINER
- [ ] RIGID CHANNEL LINER
- [ ] SOIL RETENTION BLANKET
- [ ] COMPOST MANUFACTURED TOPSOIL
- [ ] OTHER: (Specify Practice)

2. STRUCTURAL PARACTICES: (Select T = Temporary or P = Permanent, as applicable)

- [T] SILT FENCES
- [ ] HAY BALES
- [ ] ROCK FILTER DAMS
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- [ ] DIVERSION DIKE AND SWALE COMBINATIONS
- [ ] PIPE SLOPE DRAINS
- [ ] PAVED FLUMES
- [T] ROCK BEDDING AT CONSTRUCTION EXIT
- [ ] TIMBER MATTING AT CONSTRUCTION EXIT
- [ ] CHANNEL LINERS
- [ ] SEDIMENT TRAPS
- [ ] SEDIMENT BASINS
- [ ] STORM INLET SEDIMENT TRAP
- [ ] STONE OUTLET STRUCTURES
- [ ] CURBS AND GUTTERS
- [ ] STORM SEWERS
- [ ] VELOCITY CONTROL DEVICES
- [T] OTHER: *Erosion Control Logs*

3. STORM WATER MANAGEMENT:

The proposed facility was designed in consideration of hydraulic design standards to convey stormwater in a manner that is protective of public safety and property. The control of erosion from the facility is inherent to the design. Additional factors affecting post-construction stormwater at the project location include: (mark all that apply)

- [X] *Existing or new vegetation provides natural filtration.*
- [ ] *The design includes provisions for permanent erosion controls provided by strategically placed pervious and impervious surfaces.*
- [ ] *Project includes permanent sedimentation controls (other than grass).*
- [ ] *Velocities do not require dissipation devices.*
- [X] *Velocity-dissipation devices included in the design.*
- [ ] *Other :* _____

4. NON-STORM WATER DISCHARGES:

Off-site discharges are prohibited except as follows:

1. *Discharges from fire fighting activities and/or fire hydrant flushings.*
2. *Vehicle, external building, and pavement wash water where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed).*
3. *Plain water used to control dust.*
4. *Plain water originating from potable water sources.*
5. *Uncontaminated groundwater, spring water or accumulated stormwater.*
6. *Foundation or footing drains where flows are not contaminated with process materials such as solvents.*
7. *Other:* _____

Concrete truck wash water discharges on the site should be prohibited or minimized. If allowed by the Engineer, they must be managed in a manner so as not to contaminate surface water. They must not be located in areas of concentrated flow. Concrete truck wash-out locations must be shown on the SW3P Layout and included in the inspections.

Hazardous material spill/leak shall be prevented or minimized. At a minimum, this includes asphalt products, fuels, oils, lubricants, solvents, paints, acids, concrete curing compounds and chemical additives for soil stabilization. BMPs shall be implemented to the storage areas of these products. All spills must be cleaned and disposed properly and reported to the Engineer. Report any release at or above the reportable quantity during a 24 hour period to the National Response Center at 1-800-424-8802.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:

All erosion and sediment controls shall be maintained in good working order. If a repair is necessary, it shall be performed before the next anticipated storm event but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from equipment. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable. Disturbed areas on which construction activities have ceased, temporarily or permanently, shall be stabilized within 14 calendar days unless they are scheduled to and do resume within 21 calendar days. The areas adjacent to creeks and drainageways shall have priority followed by protecting storm sewer inlets.

2. INSPECTION:

For areas of the construction site that have not been finally stabilized, areas used for storage of materials, structural control measures, and locations where vehicles enter or exit the site, personnel provided by the permittee and familiar with the SW3P must inspect disturbed areas at least once every fourteen (14) calendar days and within twenty four (24) hours of the end of a storm of 0.5 inches or greater As an alternative to the above-described inspection schedule of once every fourteen (14) calendar days and within twenty four (24) hours of a storm of 0.5 inches or greater, the SW3P may be developed to require that these inspections will occur at least once every seven (7) calendar days. If this alternative schedule is developed, the inspection must occur on a specifically defined day, regardless of whether or not there has been rainfall since the previous inspection An inspection and Maintenance Report shall be prepared for each inspection and the controls shall be revised on the SW3P within seven (7) calendar days following the inspection.

3. WASTE MATERIALS:

All non-hazardous municipal waste materials such as litter, rubbish, trash and garbage located on or originating from the project shall be collected and stored in a securely lidded metal dumpster, provided by the Contractor. The dumpster shall be emptied as necessary or as required by local regulation and the trash shall be hauled to a permitted disposal facility. The burying of non-hazardous municipal waste on the project shall not be permitted. Construction material waste sites, stockpiles and haul roads shall be constructed to minimize and control the amount of sediment that may enter receiving waters. Construction material waste sites shall not be located in any wetland, water body or stream bed. Construction staging areas and vehicle maintenance areas shall be constructed in a manner to minimize the runoff of pollutants.

4. OFFSITE VEHICLE TRACKING:

Off-site vehicle tracking of sediments and the generation of dust must be minimized. Excess sediments on road shall be removed on a regular basis as directed/approved by the Engineer.

5. OTHER:

See the EPIC sheet for additional environmental information.

STATE OF TEXAS
ELENA RAMON
141765
LICENSED
PROFESSIONAL ENGINEER

Elena Ramon

4/20/2023

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TBPE Registration No. F-1046

SH 97 STORM WATER POLLUTION PREVENTION PLAN (SW3P)

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			SH 97
STATE	DISTRICT	COUNTY	
TEXAS	22	LA SALLE	
CONTROL	SECTION	JOB	SHEET NO.
0483	01	052	172

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

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

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

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

☒ No Permit Required

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

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

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

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

1.

2.

3.

4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☐ No Action Required ☒ Required Action

Action No.

1. Both sidewalks located immediately adjacent to the historic building located on the southwest corner of SH 97 (Tilden St.) and N. Front St. should not be removed or disturbed. If additional information is needed, please contact TXDOT Laredo District Environmental staff.
2. Granite monument located on the southeast corner of SH 97 (Tilden St.) and N. Front St. should not be removed or disturbed. If additional information is needed, please contact TXDOT environmental staff.

IV. VEGETATION RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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

☐ No Action Required ☒ Required Action

Action No.

1. Texas Horned Lizard - The Contractor will avoid harvester ant mound in the selection of PSLs where feasible.
2. Texas Tortoise -The Contractor should cover utility trenches overnight, and should visually inspect all trenches before filling.
3. Reticulated Collared Lizard - This lizard may potentially occur in the project area. The Contractor shall avoid harming or handling this species.
4. Texas Indigo Snake - This snake may potentially occur in the project area. The Contractor shall avoid harming or handling this species.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:

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

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

☐ Yes ☒ No

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

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

☐ Yes ☒ No

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

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

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

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

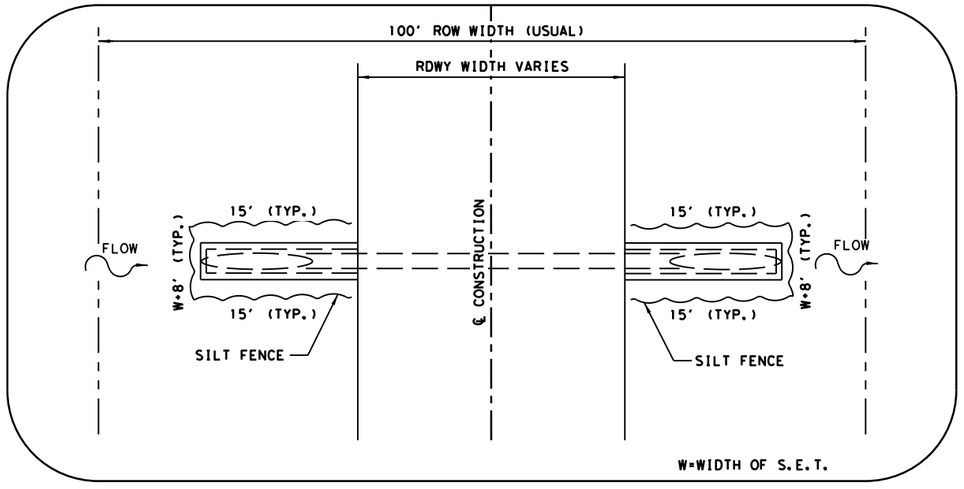
3.

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS)	0483	01	052	SH 97
05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	DIST	COUNTY		SHEET NO.
	22	LA SALLE		173



SILT FENCE DETAIL FOR PIPES
ROADWAY
N.T.S.

EROSION CONTROL LOGS WILL BE AT AND AROUND INLETS.

SYMBOL LEGEND

SILT FENCE

0 25 50
SCALE: 1"=50'

4/20/2023

Texas Department of Transportation

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TBPE Registration No. F-1046

SH 97

SW3P DETAIL

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			174
STATE	DIST.	COUNTY	
TEXAS	LRD	LA SALLE	
CONT.	SECT.	JOB	HIGHWAY NO.
0483	01	052	SH 97

Package 1

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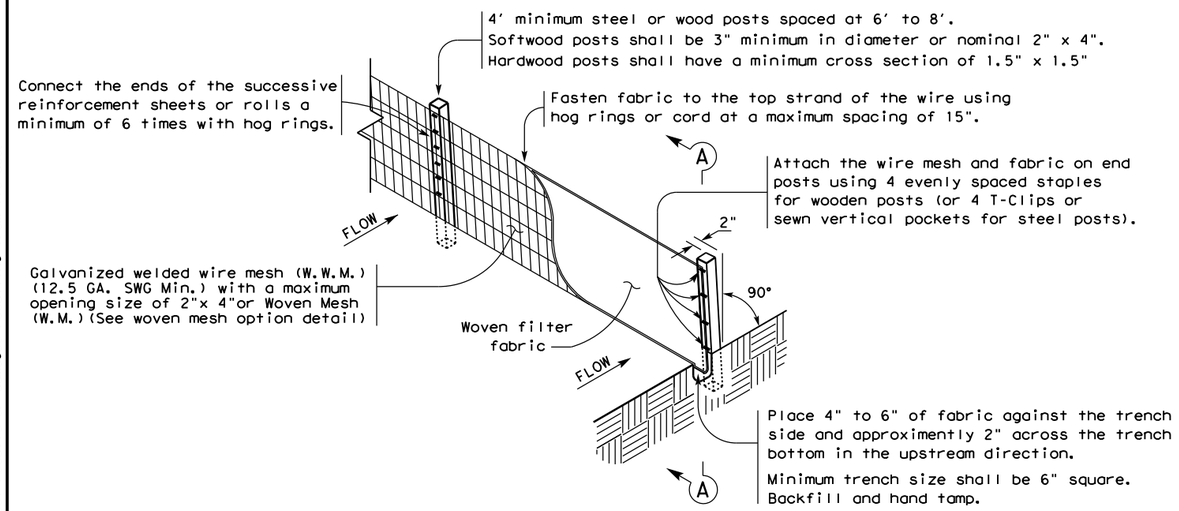
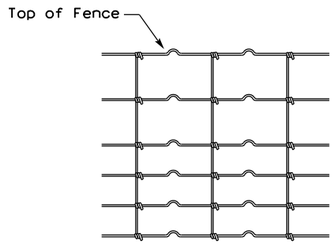
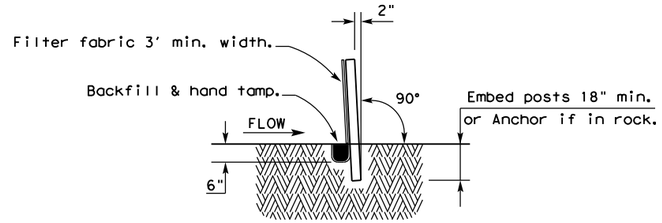


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

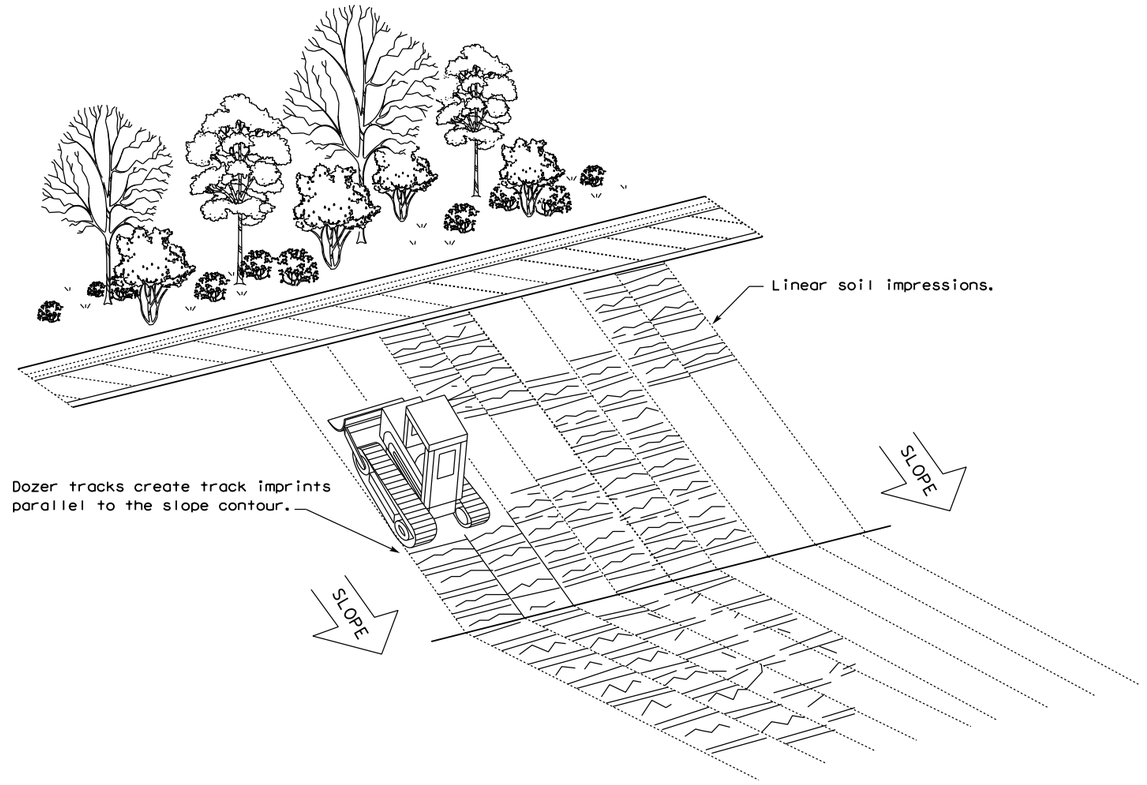
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0483	01	052		SH 97		
	DIST	COUNTY			SHEET NO.		
	LRD	LA SALLE			175		

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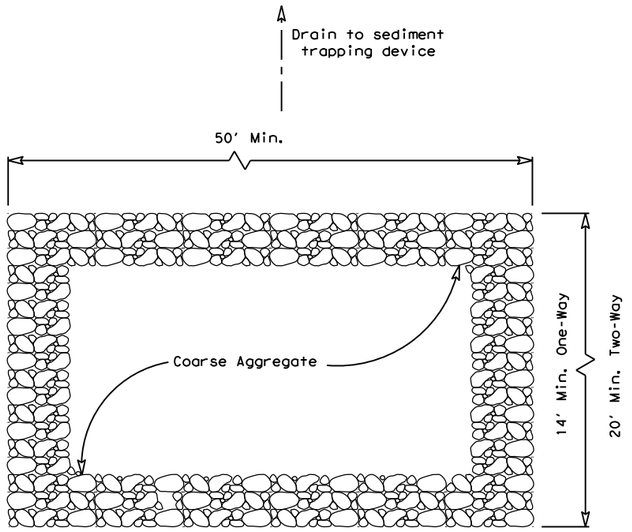

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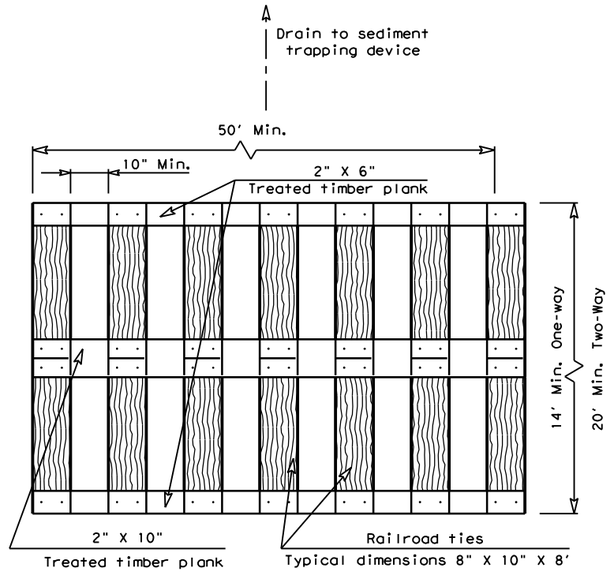

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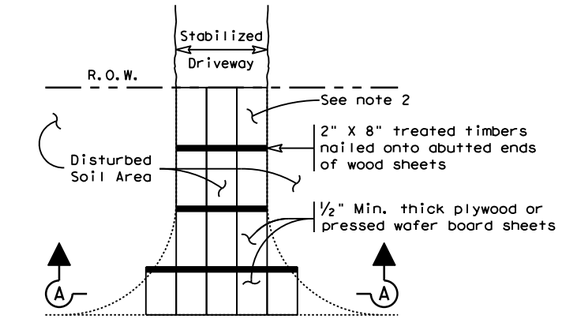

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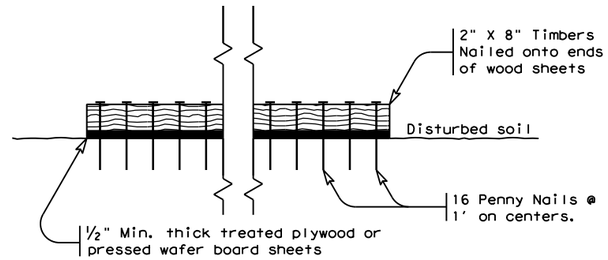
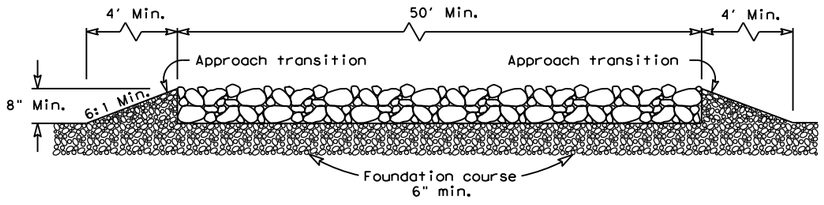


SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

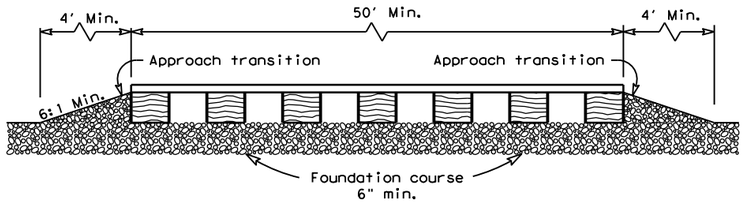
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
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REVISIONS	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		176

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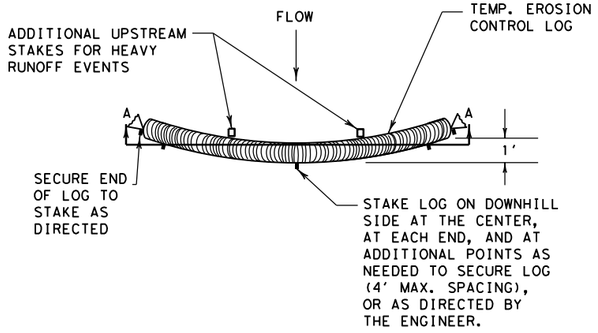
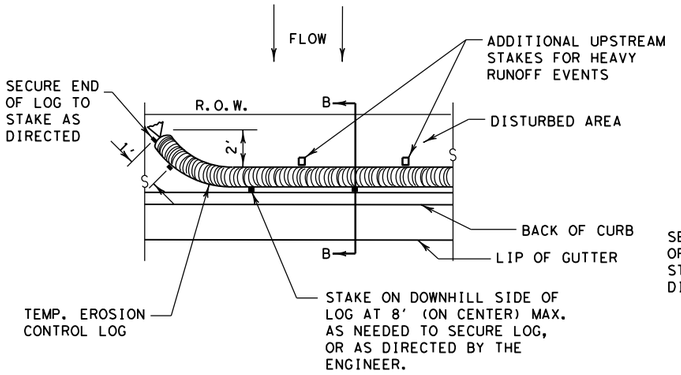


PLAN VIEW



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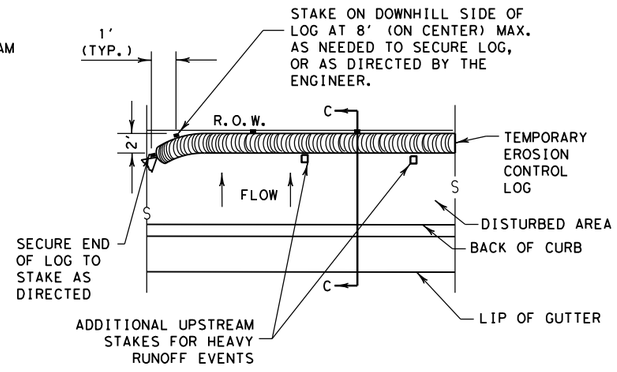

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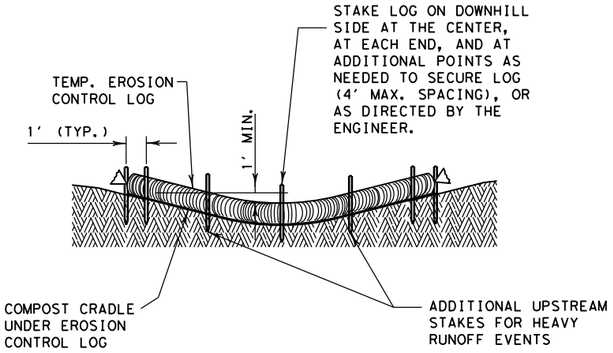
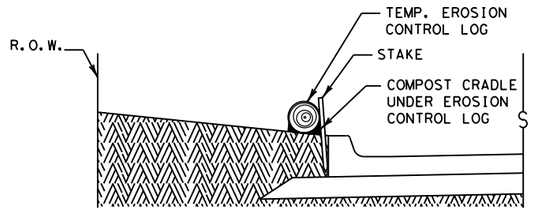


SECTION A-A

EROSION CONTROL LOG DAM

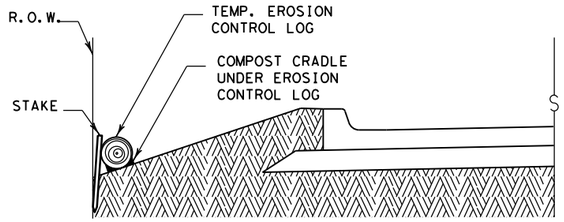
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

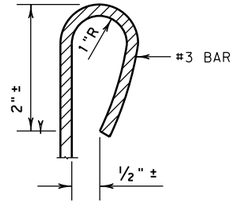
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

LEGEND

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

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

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.

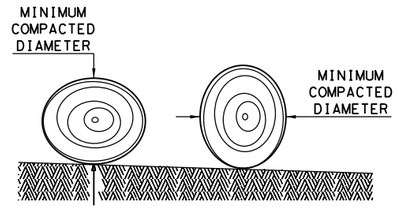
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

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.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation

Design Division Standard

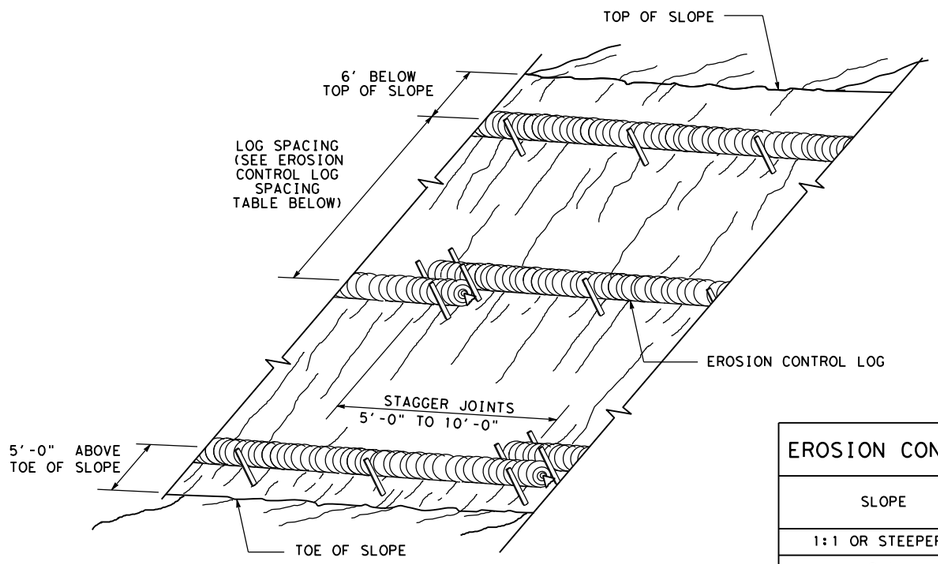
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

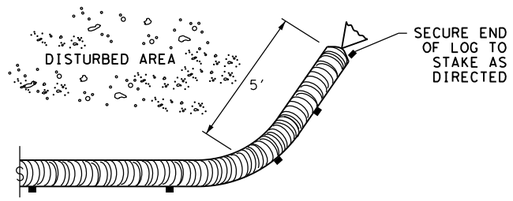
FILE: ec916		DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0483	01	052		SH 97		
	DIST	COUNTY				SHEET NO.	
	LRD	LA SALLE				177	

DATE: 4/20/2023
FILE: G:\TXCV\Projects\TxDOT\4258-01 SH 97\03_CADD\14-ENV\Stds-01\ec916.dgn



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

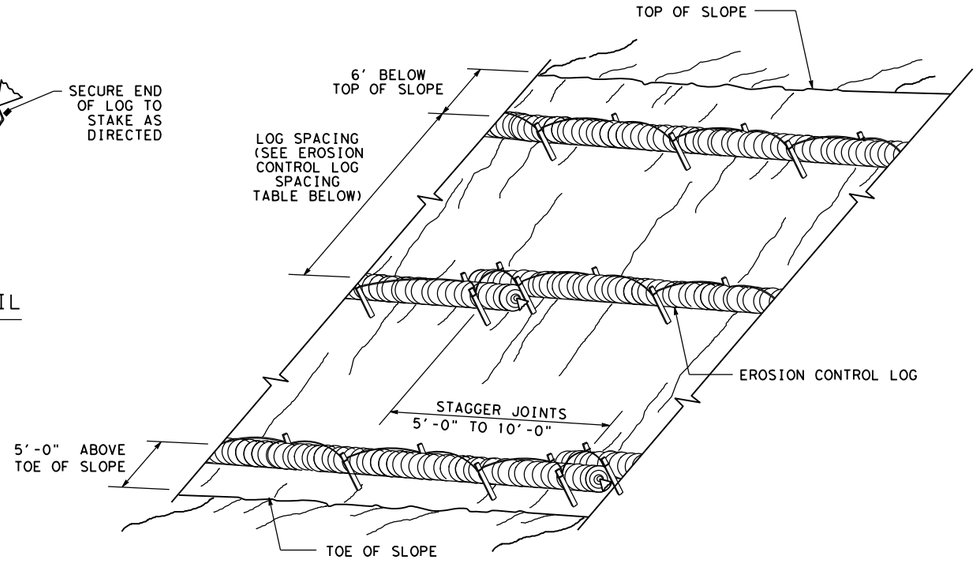
CL-SST



END SECTION RAP DETAIL

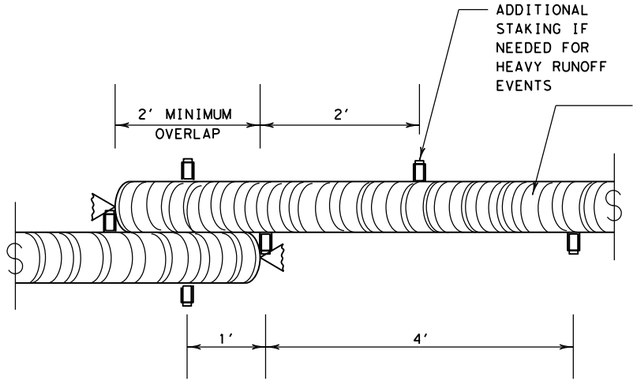
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

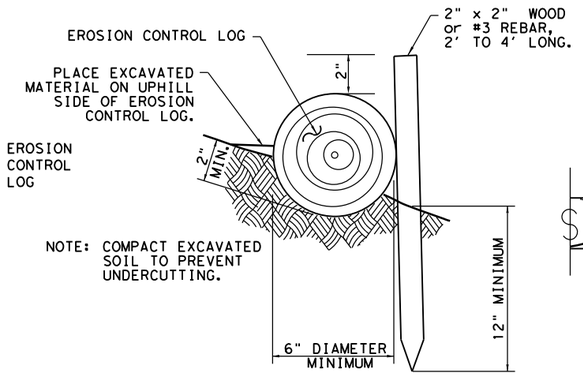
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

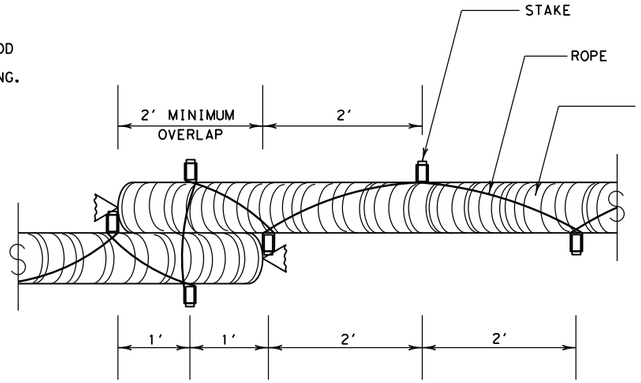


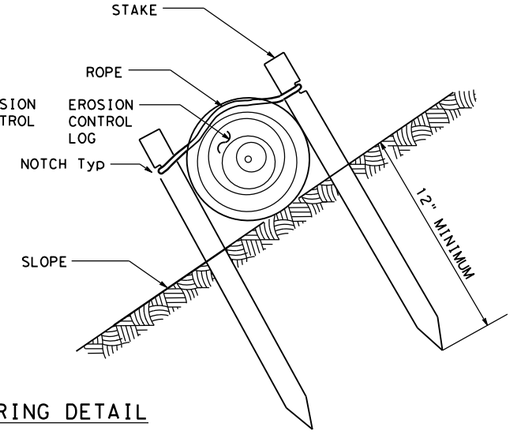


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

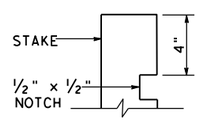
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

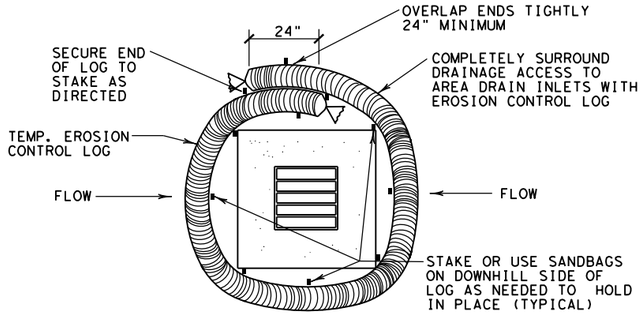
Texas Department of Transportation

Design Division Standard

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

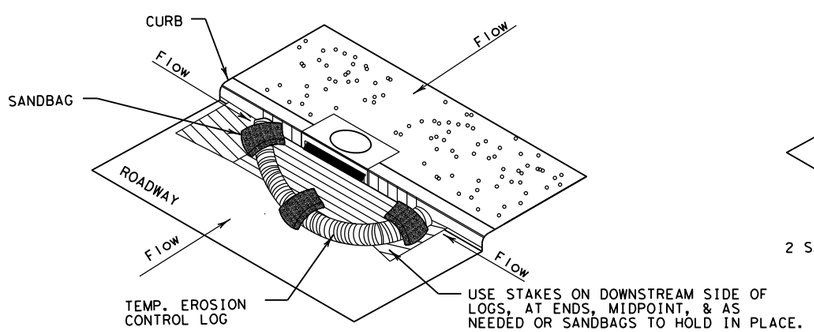
FILE: ec116	DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0483	01	052		SH 97	
	DIST	COUNTY			SHEET NO.	
	LRD	LA SALLE			178	

DATE: 4/20/2023
FILE: G:\TXC\Projects\TxDOT\4258-01 SH 97\03_CADD\14-ENV\Stds-01\ec916.dgn



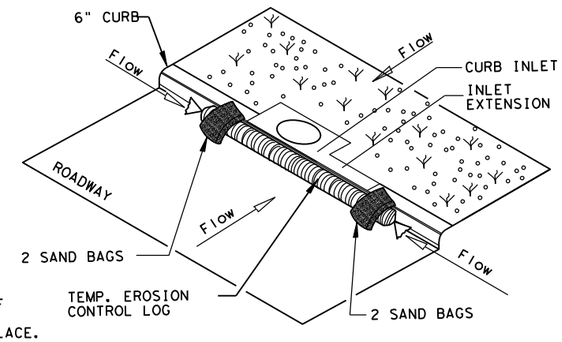
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

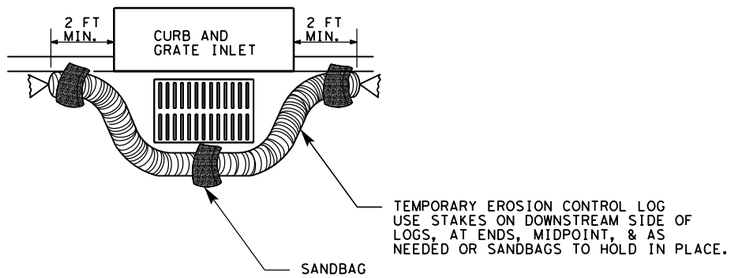
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

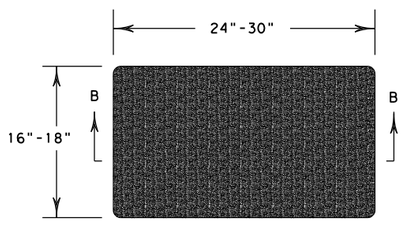
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0483	01	052		SH 97	
	DIST	COUNTY				SHEET NO.
	LRD	LA SALLE				179

DRILL SEEDING WITH STRAW/HAY MULCH

PREFERRED RURAL/SMALL URBAN SEEDING METHOD

RECOMMENDED USES:
- PERMANENT SEEDING (BARE SOIL) (YEAR-ROUND)

REQUIRED BID ITEMS:

164 6001 DRILL SEEDING (PERM) (RURAL) (SANDY)
OR
164 6003 DRILL SEEDING (PERM) (RURAL) (CLAY)
OR
164 6005 DRILL SEEDING (PERM) (URBAN) (SANDY)
OR
164 6007 DRILL SEEDING (PERM) (URBAN) (CLAY)
AND
164 6045 STRAW OR HAY MULCHING
AND

CONSTRUCTION SEQUENCE:

- ■ Refer to Items 162 & 164 of the Texas Standard Specifications for Construction of Highways, Streets, and Bridges 2004 for specifications, dimensions, volumes and measurements that have been modified or not shown.

1. Distribute topsoil

   Refer to Item 160 for instructions and requirements. Uniformly distribute topsoil at a thickness of 6 inches unless otherwise specified in the plans.

2. Prepare seed bed

   Refer to section 164.3 for instructions.

3. Apply seed mixture

   Refer to Item 164 for instructions. Refer to "Seed Mix" shown on sheet 2 of 2 for a list of species and rates.

4. Apply fertilizer

   Refer to Item 166 for instructions.

5. Apply straw/hay mulch & emulsion

   Refer to section 164.3.E for instructions.
   Anchor mulch with emulsion (SS-1, CSS-1, MS-2, CMS-2); undiluted, at the following rates:
   Hay - 0.15 gallons/sy
   Straw - 0.30 gallons/sy

   *Vegetative watering is not required unless otherwise specified in the general notes under Item 168.

STRAW/HAY MULCH SEEDING

PREFERRED RURAL/SMALL URBAN SEEDING METHOD

RECOMMENDED USES:
- PERMANENT SEEDING (BARE SOIL)(YEAR-ROUND)
- TEMPORARY SEEDING (BARE SOIL)(YEAR-ROUND)

REQUIRED BID ITEMS:

164 6013 STRAW / HAY MLCH SEED (PERM) (RURAL) (SANDY)
OR
164 6015 STRAW / HAY MLCH SEED (PERM) (RURAL) (CLAY)
OR
164 6017 STRAW / HAY MLCH SEED (PERM) (URBAN) (SANDY)
OR
164 6019 STRAW / HAY MLCH SEED (PERM) (URBAN) (CLAY)
OR
164 6029 STRAW / HAY MLCH SEED (TEMP) (WARM)
OR
164 6031 STRAW / HAY MLCH SEED (TEMP) (COOL)
AND

CONSTRUCTION SEQUENCE:

- ■ Refer to Items 162 & 164 of the Texas Standard Specifications for Construction of Highways, Streets, and Bridges 2004 for specifications, dimensions, volumes and measurements that have been modified or not shown.

1. Distribute topsoil

   Refer to Item 160 for instructions and requirements. Uniformly distribute topsoil at a thickness of 6 inches unless otherwise specified in the plans.

2. Prepare seed bed

   Refer to section 164.3 for instructions.

3. Apply seed mixture

   Refer to Item 164 for instructions. Refer to "Seed Mix" shown on sheet 2 of 2 for a list of species and rates.

4. Apply fertilizer

   Refer to Item 166 for instructions.

5. Apply straw/hay mulch & emulsion

   Refer to section 164.3.B for instructions.
   Anchor mulch with emulsion (SS-1, CSS-1, MS-2, CMS-2); undiluted, at the following rates:
   Hay - 0.15 gallons/sy
   Straw - 0.30 gallons/sy

   *Vegetative watering is not required unless otherwise specified in the general notes under Item 168.

CELLULOSE FIBER MULCH SEEDING

PREFERRED LARGE URBAN SEEDING METHOD

RECOMMENDED USES:
- TEMPORARY SEEDING (BARE SOIL)(COOL ONLY)
- OVERSEEDING PERMANENT GRASSES INTO TEMP GRASSES (YEAR-ROUND)

REQUIRED BID ITEMS:

164 6031 CELL FBR MLCH SEED (TEMP) (COOL)
OR
164 6021 CELL FBR MLCH SEED (PERM) (RURAL) (SANDY)
OR
164 6023 CELL FBR MLCH SEED (PERM) (RURAL) (CLAY)
OR
164 6025 CELL FBR MLCH SEED (PERM) (URBAN) (SANDY)
OR
164 6027 CELL FBR MLCH SEED (PERM) (URBAN) (CLAY)

CONSTRUCTION SEQUENCE:

- ■ Refer to Items 162 & 164 of the Texas Standard Specifications for Construction of Highways, Streets, and Bridges 2004 for specifications, dimensions, volumes and measurements that have been modified or not shown.

1. Distribute topsoil

   Refer to Item 160 for instructions and requirements. Uniformly distribute topsoil at a thickness of 6 inches unless otherwise specified in the plans.

2. Prepare seed bed

   Refer to section 164.3 for instructions.
   Prior to seeding:
   - If seeding into bare ground - till soil to a 4 inch depth.
   - If seeding into temporary vegetation cover - mow at a height range of 4-7 inches.

3. Apply seed, fertilizer, mulch mixture, & emulsion

   Refer to Items 164 and 166 for instructions.
   Refer to "Seed Mix" shown on sheet 2 of 2 for a list of species and rates.

   Use the 2-step method in which the seed and less than 10% of the required mulch is applied in the first application. The remainder of the mulch and is then applied in the subsequent applications.

4. Begin Vegetative Watering

   Initiate vegetative watering as follows:
   Cool temporary vegetation - within 5 days of placing the seed.
   Permanent vegetation - delay watering until after next rainfall of 1/2" or greater or as directed by the Area Engineer.

BROADCAST SEEDING

RECOMMENDED USES:
- TEMPORARY SEEDING (BARE SOIL)(COOL ONLY)
- OVERSEEDING PERMANENT GRASSES INTO TEMP GRASSES (YEAR-ROUND)

REQUIRED BID ITEMS:

164 6011 BROADCAST SEED (TEMP) (COOL)
OR
164 6001 BROADCAST SEED (PERM) (RURAL) (SANDY)
OR
164 6003 BROADCAST SEED (PERM) (RURAL) (CLAY)
OR
164 6005 BROADCAST SEED (PERM) (URBAN) (SANDY)
OR
164 6007 BROADCAST SEED (PERM) (URBAN) (CLAY)

CONSTRUCTION SEQUENCE:

- ■ Refer to Items 162 & 164 of the Texas Standard Specifications for Construction of Highways, Streets, and Bridges 2004 for specifications, dimensions, volumes and measurements that have been modified or not shown.

1. Distribute topsoil

   Refer to Item 160 for instructions and requirements. Uniformly distribute topsoil at a thickness of 6 inches unless otherwise specified in the plans.

2. Prepare seed bed

   Refer to section 164.3 for instructions.
   Prior to seeding:
   If seeding into bare ground - till soil to a 4 inch depth.
   If seeding into temporary vegetation cover - mow at a height range of 4-7 inches.

3. Apply seed mixture

   Refer to Items 164 and 166 for instructions.
   Refer to "Seed Mix" shown on sheet 2 of 2 for a list of species and rates.

4. Apply fertilizer

   Refer to Item 166 for instructions.

5. Begin Vegetative Watering

   Initiate vegetative watering as follows:
   Cool temporary vegetation - within 5 days of placing the seed.
   Permanent vegetation - delay watering until after next rainfall of 1/2" or greater or as directed by the Area Engineer.

DRILL SEEDING

PREFERRED RURAL/URBAN OVER-SEEDING METHOD

RECOMMENDED USES:
- OVERSEEDING PERMANENT GRASSES INTO TEMP GRASSES (YEAR-ROUND)

REQUIRED BID ITEMS:

164 6033 DRILL SEEDING (PERM) (RURAL) (SANDY)
OR
164 6035 DRILL SEEDING (PERM) (RURAL) (CLAY)
OR
164 6037 DRILL SEEDING (PERM) (URBAN) (SANDY)
OR
164 6039 DRILL SEEDING (PERM) (URBAN) (CLAY)

CONSTRUCTION SEQUENCE:

- ■ Refer to Items 162 & 164 of the Texas Standard Specifications for Construction of Highways, Streets, and Bridges 2004 for specifications, dimensions, volumes and measurements that have been modified or not shown.

1. Distribute topsoil

   Refer to Item 160 for instructions and requirements. Uniformly distribute topsoil at a thickness of 6 inches unless otherwise specified in the plans.

2. Prepare seed bed

   Refer to section 164.3 for instructions.
   Prior to seeding:
   If seeding into bare ground - till soil to a 4 inch depth.
   If seeding into temporary vegetation cover - mow at a height range of 4-7 inches.

3. Apply seed mixture

   Refer to Items 164 and 166 for instructions.
   Refer to "Seed Mix" shown on sheet 2 of 2 for a list of species and rates.

4. Apply fertilizer

   Refer to Item 166 for instructions.

5. Begin Vegetative Watering

   Initiate vegetative watering as follows:
   Cool temporary vegetation - within 5 days of placing the seed.
   Permanent vegetation - delay watering until after next rainfall of 1/2" or greater.

TEXAS DEPARTMENT OF TRANSPORTATION
LAREDO DISTRICT

SHEET 1 OF 2

REVEGETATION
NOTES AND SPECIFICATIONS

DN: -	CK: -	DW: -	CK: -

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
	22	6				180
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	LA SALLE		0483	01	056	SH 97

DN:
CK:
DW:
CK:
DATE:
ACC:
FILE:

LEVELS DISPLAYED

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62		

030F.DGN

PERMANENT SOIL STABILIZATION

PERMANENT SEED MIX

January 15 thru April 30

RURAL

■ Clay Soils	*
Green Sprangletop (Van Horn)	1.0
Sideoats Grama (South Texas)	1.0
Texas Grama	1.0
Slender Grama (Dilley)	1.0
Shortspike Windmillgrass (Welder)	0.2
Pink Pappusgrass (Maverick)	0.6
Halls Panicum (Oso)	0.2
Plains Bristlegrass (Catarina Blend)	0.2
False Rhodes Grass (Kinney)	0.1
Hooded Windmillgrass (Mariah)	0.2
Arizona Cottontop (La Salle)	0.2

■ Sandy Soils	*
Green Sprangletop (Van Horn)	1.0
Slender Grama (Dilley)	1.0
Shortspike Windmillgrass (Welder)	0.2
Pink Pappusgrass (Maverick)	0.6
Halls Panicum (Oso)	0.2
Plains Bristlegrass (Catarina Blend)	0.2
False Rhodes Grass (Kinney)	0.1
Hooded Windmillgrass (Mariah)	0.2
Arizona Cottontop (La Salle)	0.2

URBAN

■ Clay Soils	*
Green Sprangletop	0.3
Sideoats Grams (Haskell)	4.5
Buffalograss (Texoka)	1.6
Bermudagrass	1.8

■ Sandy Soils	*
Green Sprangletop	0.3
Bermudagrass	1.0
Buffalograss	3.2
Sand Dropseed	0.3

May 1 thru August 31

RURAL

■ Clay Soils	*
Green Sprangletop	0.3
Sideoats Grams (Haskell)	3.6
Plains Bristlegrass	1.2
Buffalograss (Texoka)	1.6
Bermudagrass	1.2
Illinois Bundleflower	1.0
Foxtail Millet	3.0
Browntop Millet	6.0

■ Sandy Soils	*
Green Sprangletop	0.3
Bermudagrass	0.6
Sand Dropseed	0.2
Lehmans Lovegrass	0.2
Purple Prairieclover	0.5
Foxtail Millet	3.0
Browntop Millet	6.0

URBAN

■ Clay Soils	*
Green Sprangletop	0.3
Sideoats Grams (Haskell)	4.5
Buffalograss (Texoka)	1.6
Bermudagrass	1.2
Foxtail Millet	3.0
Browntop Millet	6.0

■ Sandy Soils	*
Green Sprangletop	0.3
Bermudagrass	0.8
Buffalograss	3.2
Sand Dropseed	0.3
Foxtail Millet	3.0
Browntop Millet	6.0

September 1 thru January 14

RURAL

■ Clay Soils	*
Green Sprangletop	0.3
Sideoats Grams (Haskell)	3.6
Plains Bristlegrass	1.2
Buffalograss (Texoka)	1.6
Bermudagrass	1.2
Illinois Bundleflower	1.0
Oats	40.0

■ Sandy Soils	*
Green Sprangletop	0.3
Bermudagrass	0.6
Sand Dropseed	0.2
Lehmans Lovegrass	0.2
Purple Prairieclover	0.5
Oats	40.0

URBAN

■ Clay Soils	*
Green Sprangletop	0.3
Sideoats Grams (Haskell)	4.5
Buffalograss (Texoka)	1.6
Bermudagrass	1.8
Oats	40.0

■ Sandy Soils	*
Green Sprangletop	0.3
Bermudagrass	0.8
Buffalograss	3.2
Sand Dropseed	0.3
Oats	40.0

* SEED QUANTITIES ARE POUNDS PURE LIVE SEED (PLS) PER ACRE.

TEMPORARY SOIL STABILIZATION

TEMPORARY SEED MIX

February 15 thru September 31

WARM SEASON

Foxtail Millet	34.0 Lbs PLS/Acre

October 1 thru February 14

COOL SEASON

Oats	72.0

VEGETATIVE WATERING FOR SEED AND SOD

ITEM 168---VEGETATIVE WATERING

RURAL---NO VEGETATIVE WATERING

URBAN---TEMPORARY IRRIGATION---REFER TO IRRIGATION PLAN SHEETS FOR ZONE TIMES.

URBAN---TRUCK IRRIGATION---REFER TO WATERING SCHEDULE BELOW:

WATERING SCHEDULE

	DAYS 1-14	DAYS 15-28	DAYS 29-42	TOTAL CYCLES
Seeded Sites	Twice per day	Twice per day	Once per day	70
Sodded Sites	Twice per day	Once per day	———	42

Standard watering rate is 1/4 inch per cycle. However, rate and frequency may be adjusted, with the approval of the engineer, to meet site conditions.

SEEDING NOTES:

1. All seed shall meet labeling, delivery, analysis, and testing requirements as described in Item 164.2.
2. All drill seeding shall be accomplished using a pasture or rangeland type drill seeder. Grain drills or Brillion seeders are not acceptable. Seedbed prep is required, even for no-till drill seeders, when seeding into bare soil.
3. All seed shall be drilled to a depth of 1/4 inch to 1/3 inch.
4. Seeding with compost:
   - Prior to seeding, one inch of compost shall be applied to the soil followed by an application of fertilizer. Refer to Item 166 Fertilizer for specifications and application rate.
   - Compost/fertilizer shall be tilled into the soil to a depth of four inches. Seed into prepared seedbed.
5. Where drill seeding is specified, and site conditions prevent it, broadcast seeding is permitted as approved by the engineer.
6. CELL FIBER MULCH SEEDING shall only be used where site conditions prevent drill seeding (refer to plan sheets for type of seeding). Seeding shall be a two-step process as detailed above.
7. Vegetative watering shall be paid for under Item 168. Watering rate and specifications shall be as shown on sheet 2 of 2 under Item 168.

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62

DN: CK: DW: CK:
DATE:
ACC:
FILE:

030F.DGN

TEXAS DEPARTMENT OF TRANSPORTATION
LAREDO DISTRICT
SHEET 2 OF 2

REVEGETATION
NOTES AND SPECIFICATIONS

REVISIONS	DN: -	CK: -	DW: -	CK: -

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
22	6		181

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
LA SALLE	0483	01	056	SH 97

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
	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		182

DATE:
FILE:

3.09 MAINTENANCE OF RAILROAD FACILITIES

A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right of Way and repair any other damage to the property of the Railroad, or its tenants.

B. Perform all such maintenance and repair of damages due to the Contractors's operations at Contractor's expense.

C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the project site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
   1. Pre-construction meetings.
   2. Pile driving/drilling of caissons or drilled shafts.
   3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
   4. Erection of precast concrete or steel bridge superstructure.
   5. Placement of waterproofing (prior to placing ballast on bridge deck).
   6. Completion of the bridge structure.

B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.

C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.11 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad at expense of TxDOT to protect Railroad facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.

B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other railroad facilities may be subject to settlement or movement.

C. During any clearing, grubbing, excavation or grading in proximity to railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger railroad facilities or operations.

D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.

E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.12 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOT. This work by the Railroad will be done by its own forces and it is not a part of the Work under this Contract.

3.13 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around railroad facilities with the Railroad Designated Representative.

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".

B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

   UPRR 1-800-336-9193
   7:00 AM to 9:00 PM CST Monday-Friday except holidays,
   staffed 24 hrs/day for emergencies
   48 hrs notice required

   BNSF 1-800-533-2891
   24 hour number
   5 working days notice required

   KCS 1-800-344-8377
   Texas One Call, a 24 hour number
   48 hrs notice required, excluding weekends and holidays

   If a telecommunications system is buried anywhere on or near railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near railroad property. Refer to the project General Notes for additional information.

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of 1/4 inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.15 RAILROAD FLAGGING

Per the Right of Entry Agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor's work and at least 30 working days in advance of any Contractor's work in which any person or equipment will be within 25 feet of nearest rail or as specified in the Contractor Right of Entry (CROE).

3.16 CLEANING OF RIGHT-OF-WAY

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

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0483	01	052	SH 97
	DIST	COUNTY		SHEET NO.
	LRD	LA SALLE		183

DATE:
FILE:

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

DOT #: 448 996Y
Crossing Type: AT GRADE
RR Company Owning Track at Crossing: UNION PACIFIC RAILROAD COMPANY (UPRR)
Operating RR Company at Track: UNION PACIFIC RAILROAD
RR MP: 345.22
RR Subdivision: LAREDO
City: COTULLA
County: LA SALLE
CSJ at this Crossing: 0483-01-052
Highway/Roadway name crossing the railroad: SH 97
# of regularly scheduled trains per day at this crossing: 18
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: 3%

Scope of Work at this Crossing to Be Performed by State Contractor:
CSJ: 0483-01-052
THE WORK TO BE PERFORMED AT THE RAILROAD CROSSING CONSISTS OF CONSTRUCTING ROADWAY ASPHALT BETWEEN PROPOSED CONCRETE PAVEMENT AND RAILROAD CONCRETE PLANKING.

Scope of Work at this Crossing to Be Performed by Railroad Company:
PROVIDE FLAGGERS FOR CONSTRUCTION WITHIN 25 FEET OF THE RAIL OR WHILE EQUIPMENT THAT COULD TIP ONTO THE RAILROAD TRACKS IS IN USE. EXTEND CONCRETE PLANKING.

** Choose: Highway Overpass, Highway Underpass, At Grade, Pedestrian, or Closed/Abandoned

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

OTHER WORK WILL INCLUDE CONSTRUCTING NEW CULVERT, REGRADE DITCHES, CURB AND GUTTER, SIDEWALK AND PAVEMENT MARKINGS.

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 30

On this project, night or weekend flagging is:

☐ Expected
☒ Not Expected

Flagging services will be provided by:

☒ Railroad Company: TxDOT will pay flagging invoices
☐ 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

☐ BNSF - BNSF.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging

☐ KCS - KCS.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
- Bottom Line On-Track Safety Services
bottomline076@aol.com, 903-767-7630

☐ OTHERS _____

Contractor must incorporate Construction Inspection into anticipated construction schedule.

☐ Not Required

☒ Required: Contact Information for Construction Inspection:

CARRIZO SPRINGS AREA ENGINEER OFFICE
2001 N. FIRST ST.
CARRIZO SPRINGS, TEXAS 78834
830-876-2535

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

On this project, construction work to be performed by a railroad company is:

☒ Required
☐ Not Required

Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.

V. RAILROAD INSURANCE REQUIREMENTS

Railroad reference number shall be provided by TxDOT CST or DO.

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies must be issued for and on behalf of the Railroad. Where more than one Railroad Company is operating on the same right of way or where several Railroad Companies are involved and operate on their own separate rights of way, provide separate insurance policies in the name of each Railroad Company.

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.

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 combined single limit
Railroad Protective Liability	
☐ Not Required	
☒ Non - Bridge Projects	$2,000,000 / $6,000,000
☐ Bridge Projects	$5,000,000 / $10,000,000
☐ Other	

VI. CONTRACTOR'S RIGHT OF ENTRY (ROE) AGREEMENT

On this project, an ROE agreement is:

☐ Not Required
☒ Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)
☐ Required: UPPR Maintenance Consent Letter. TxDOT CST to assist.
☐ Required: Contractor to obtain (see Item 5, Article 8.4)
With the following railroad companies: UNION PACIFIC RAILROAD

To view previously approved ROE Agreement templates agreed upon between the State and Railroad, see:

http://www.txdot.gov/inside-txdot/division/rail/samples.html

Approved ROE Agreement 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 ROE agreement between the Contractor and the Railroad if required on project.

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

☒ Not Required
☐ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are required to maintain the same insurance coverage as required of the Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call Union Pacific Railroad Emergency Line
Railroad Emergency Line at 888-877-7267
Location: DOT 448 996Y
RR Milepost 345.22
Laredo Subdivision

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:		
©TxDOT June 2014	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0483	01	052	SH 97		
9/2021	DIST	COUNTY		SHEET NO.		
	LRD	LA SALLE		184		

DATE:
FILE: