

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	STP 2023(528)HES, ETC		1
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	MEDINA	
CONT.	SECT.	JOB	HIGHWAY NO.
2520	01	016, ETC	FM 2200

STATE OF TEXAS

DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NO. STP 2023(528)HES, Etc.

CCSJ: 2520-01-016, ETC.

MEDINA COUNTY FM 2200

CSJ: 2520-01-016
LIMITS FROM: VIRGINIA DR
TO: CR 764 (HUNTZER LN)
NET LENGTH OF ROADWAY = 11190.00 FT = 2.119 MI
NET LENGTH OF BRIDGE = 0.00 FT = 0.000 MI
NET LENGTH OF PROJECT = 11190.00 FT = 2.119 MI

CSJ: 2520-01-015
AT FRANCISCO PEREZ CREEK
NET LENGTH OF ROADWAY = 640.00 FT = 0.121 MI
NET LENGTH OF BRIDGE = 100.00 FT = 0.019 MI
NET LENGTH OF PROJECT = 740.00 FT = 0.140 MI

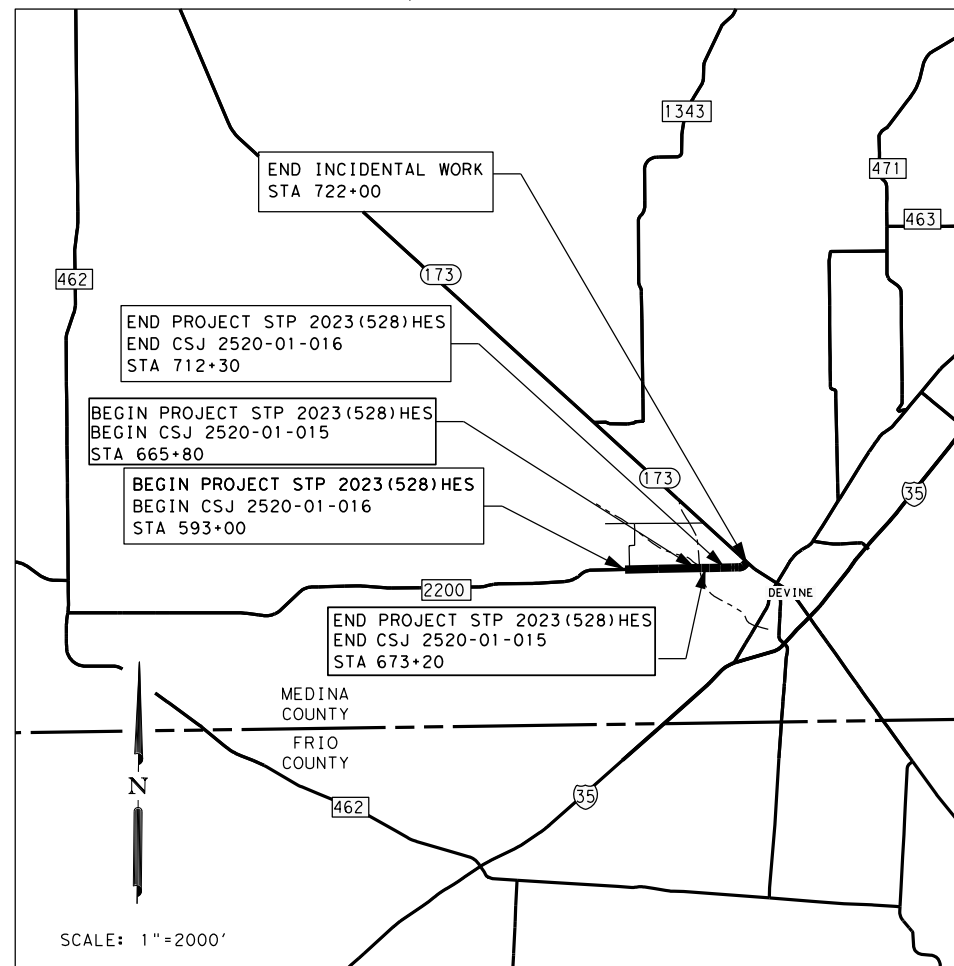
DESIGN SPEED = 40 MPH
AREA OF DISTURBED SOIL = 25.6 ACRES
ADT: 1300 AADT (2023)
1800 AADT (2043)

REGISTERED ACCESSIBILITY SPECIALIST (RAS)
INSPECTION REQUIRED

TDLR NO. TABS2023009734

INDEX OF SHEETS
SEE SHEET 2 FOR INDEX OF SHEETS

FOR WORK CONSISTING OF WIDENING LANES, CONSTRUCTING PAVED SHOULDERS, CONSTRUCTING
SIDEWALK, AND REPLACEMENT OF BRIDGE AND APPROACHES



FINAL PLANS

LETTING DATE: _____
DATE CONTRACTOR BEGAN WORK: _____
DATE WORK WAS ACCEPTED: _____
FINAL CONTRACT COST: \$ _____
CONTRACTOR: _____

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS.

P. E. _____
DATE _____

AREA ENGINEER _____

TEXAS DEPARTMENT OF TRANSPORTATION



SUBMITTED FOR LETTING 1/2/2023

DocuSigned by:
Roger J. Callant, P.E.
TRANSPORTATION ENGINEER SUPERVISOR

RECOMMENDED FOR LETTING 1/2/2023

DocuSigned by:
D. Rogov, P.E.
TRANSPORTATION ENGINEER SUPERVISOR

RECOMMENDED FOR LETTING 1/2/2023

DocuSigned by:
Clayton Kipps, P.E.
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

APPROVED FOR LETTING 1/2/2023

DocuSigned by:
Gina Gallegos
DISTRICT ENGINEER

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

EXCEPTIONS: NONE
EQUATIONS: NONE
R. R. CROSSINGS: NONE

FILE LOCATION
http://www.txdot.gov/inside-txdot/district/san-antonio/specinfo.html

LEVELS DISPLAYED	
1	

COUNTY _____ PROJ. NO. _____
HWY. NO. _____ LETTING DATE _____
DATE ACCEPTED _____

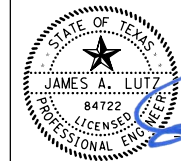
SHEET NO. DESCRIPTION

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SHEET NO. DESCRIPTION

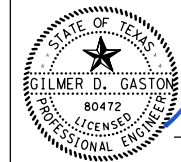
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THE STANDARD SHEETS SPECIFICALLY SHOWN WITH PRECEDING (*), HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.



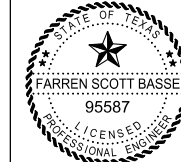
James A. Lutz
 JAMES A. LUTZ, P.E.
 12/20/2022
 DATE

THE STANDARD SHEETS SPECIFICALLY SHOWN WITH PRECEDING (**), HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.



Gilmer D. Gaston
 GILMER D. GASTON, P.E.
 12/20/2022
 DATE

THE STANDARD SHEETS SPECIFICALLY SHOWN WITH PRECEDING (#), HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.



Farren Scott Basse
 FARREN SCOTT BASSE, P.E.
 TEXAS REG. ENGINEERING FIRM F-199
 12/21/2022
 DATE

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200

INDEX OF SHEETS

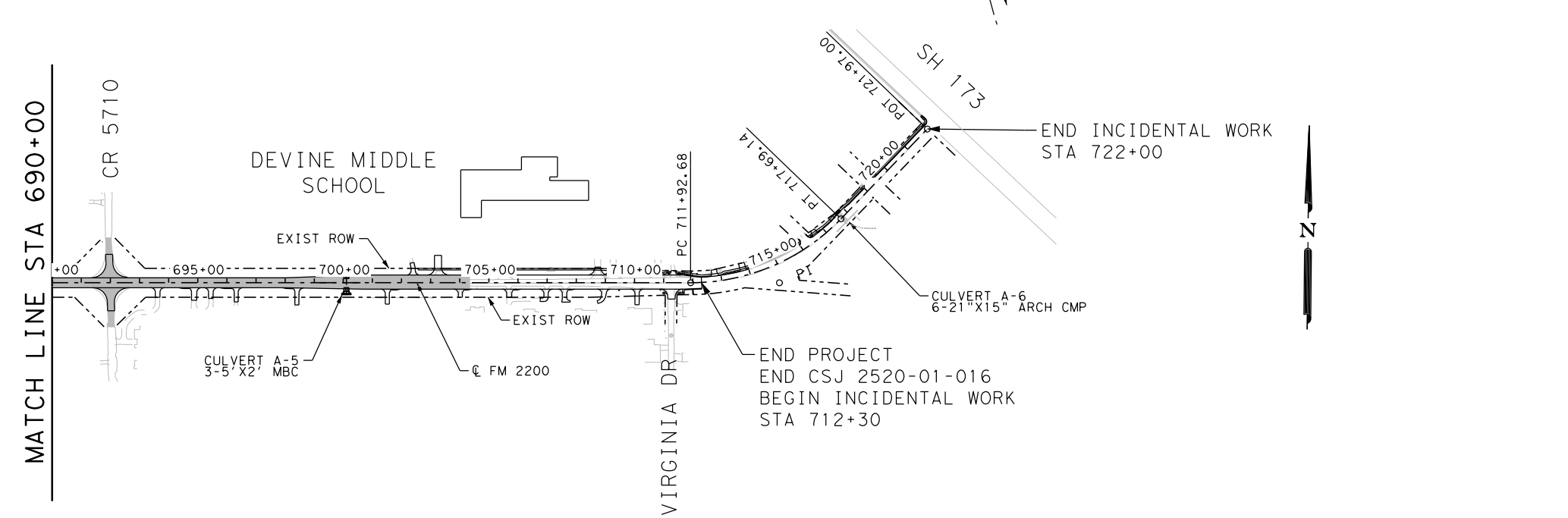
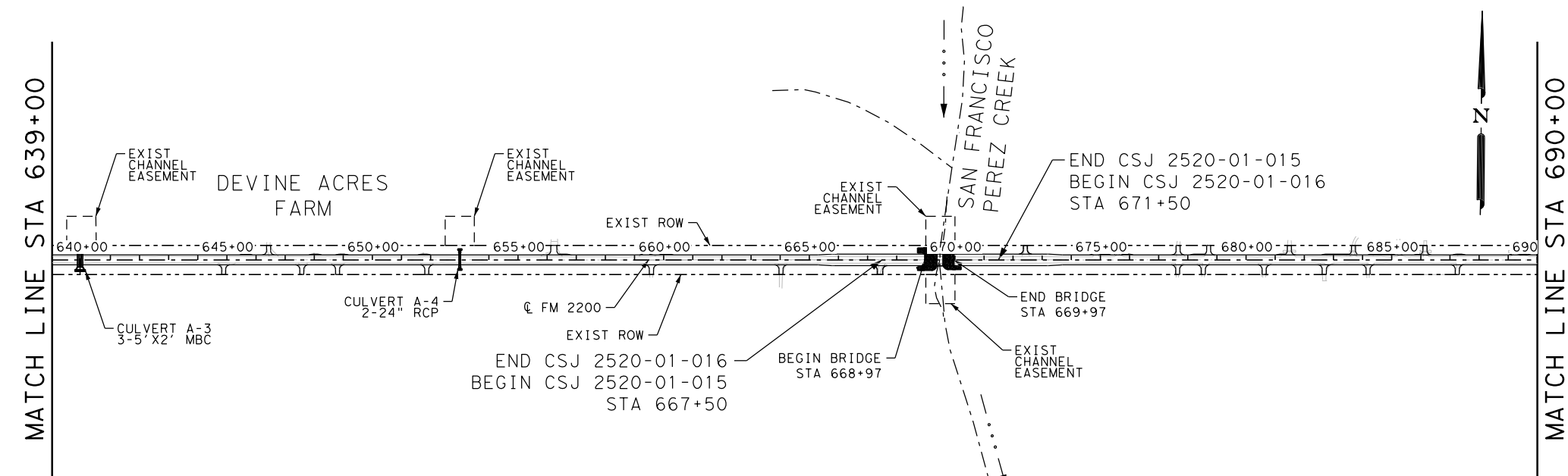
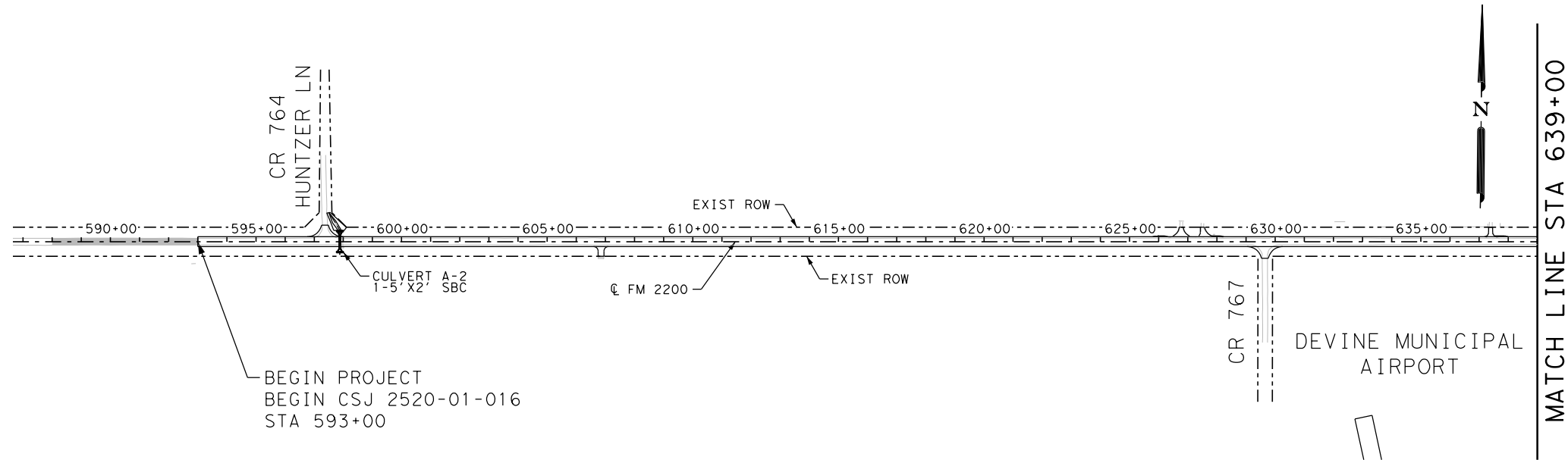
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DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	2

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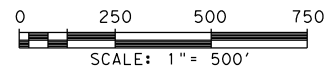
DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER

APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER

1/12/2023 DATE



REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

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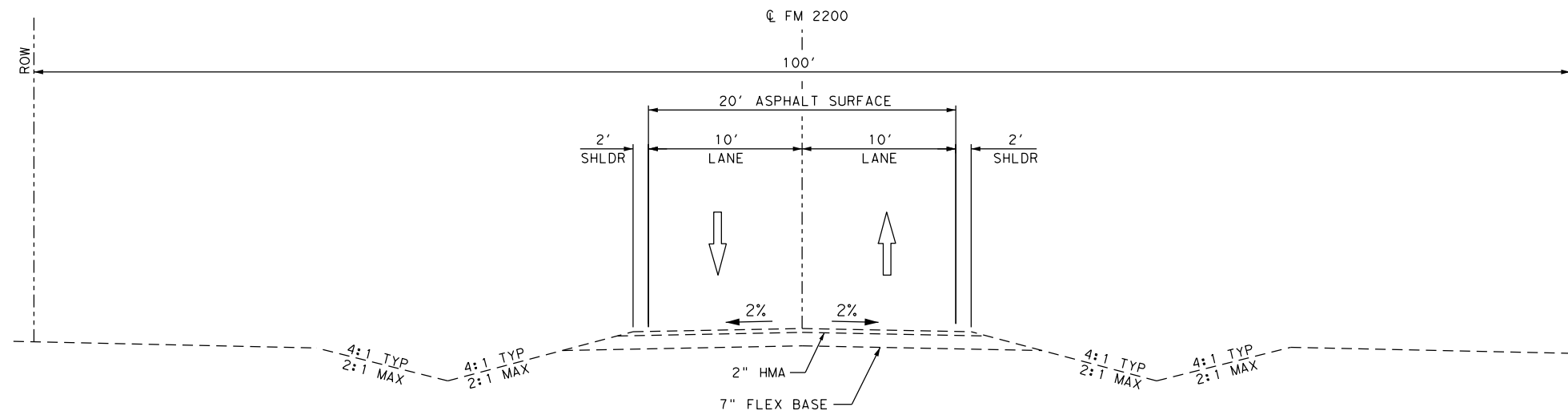
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PROJECT LAYOUT

SHEET 1 OF 1

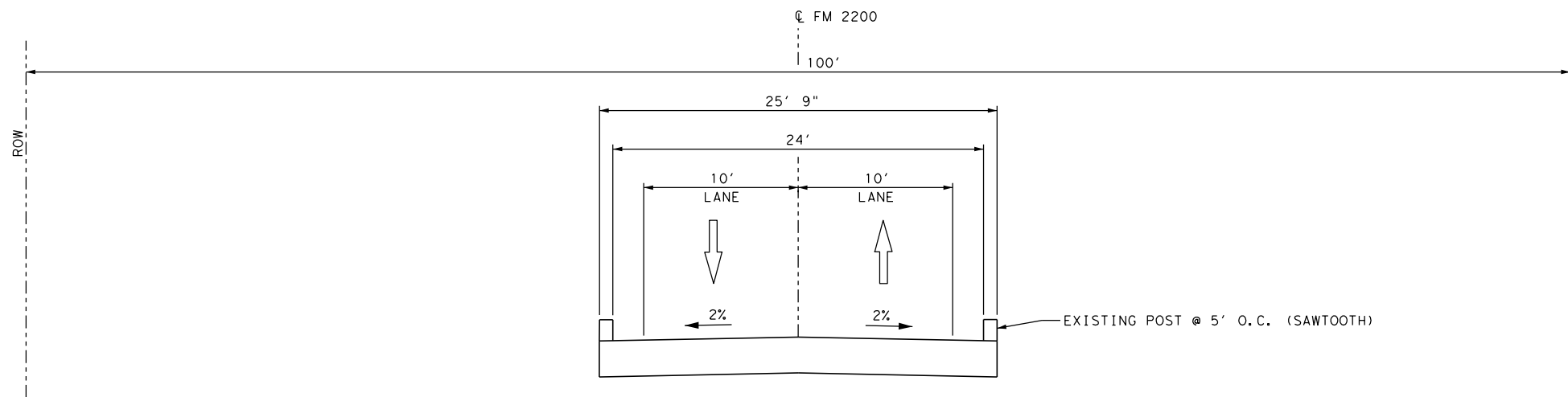
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Plotted on: 12/20/2022

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EXISTING TYPICAL SECTION
N. T. S.
BEGIN PROJECT TO STA 669+09



EXISTING BRIDGE TYPICAL SECTION
N. T. S.
STA 669+09 TO STA 669+84

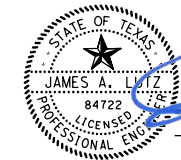
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Handwritten Signature
LUKE REED, P. E.

12/20/2022
DATE

APPROVAL



Handwritten Signature
JAMES A. LUTZ, P. E.

12/20/2022
DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY



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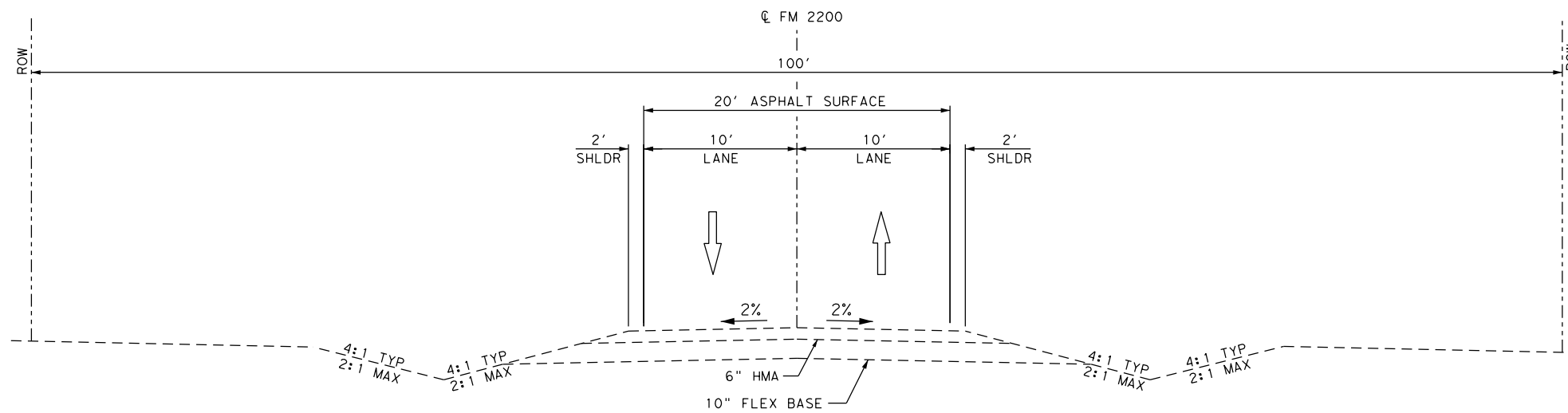
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EXISTING TYPICAL SECTIONS

SHEET 1 OF 2

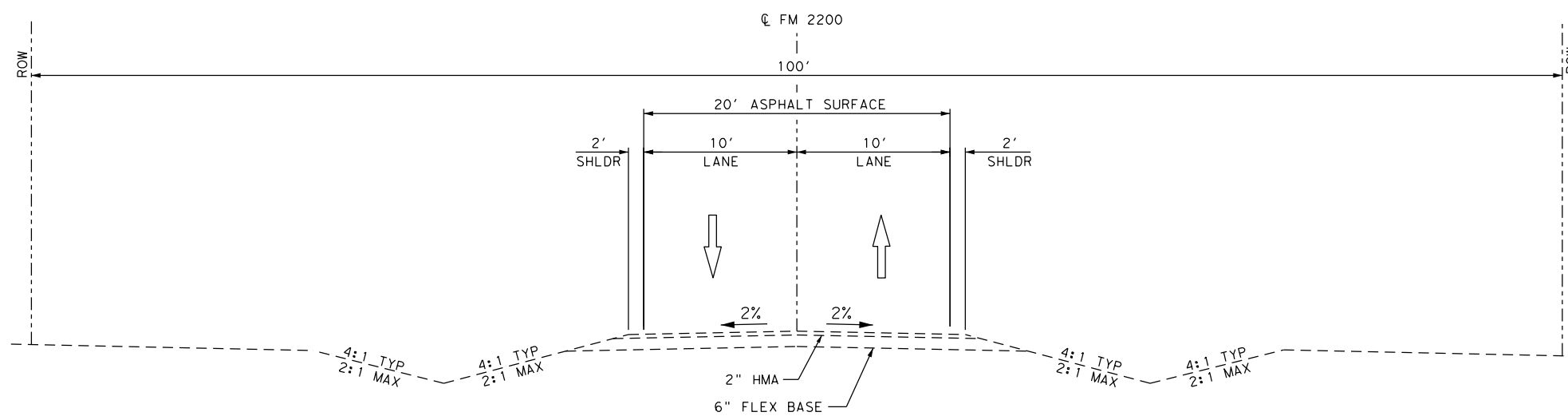
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CHK DWG:	SAT	MEDINA	2520	01	016, ETC	4

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EXISTING TYPICAL SECTION
N. T. S.
669+84 TO STA 691+00



EXISTING TYPICAL SECTION
N. T. S.
STA 691+00 TO END PROJECT

DESIGN



Luke Reed
LUKE REED, P.E.
DATE

12/20/2022

APPROVAL



James A. Lutz
JAMES A. LUTZ, P.E.
DATE

12/20/2022

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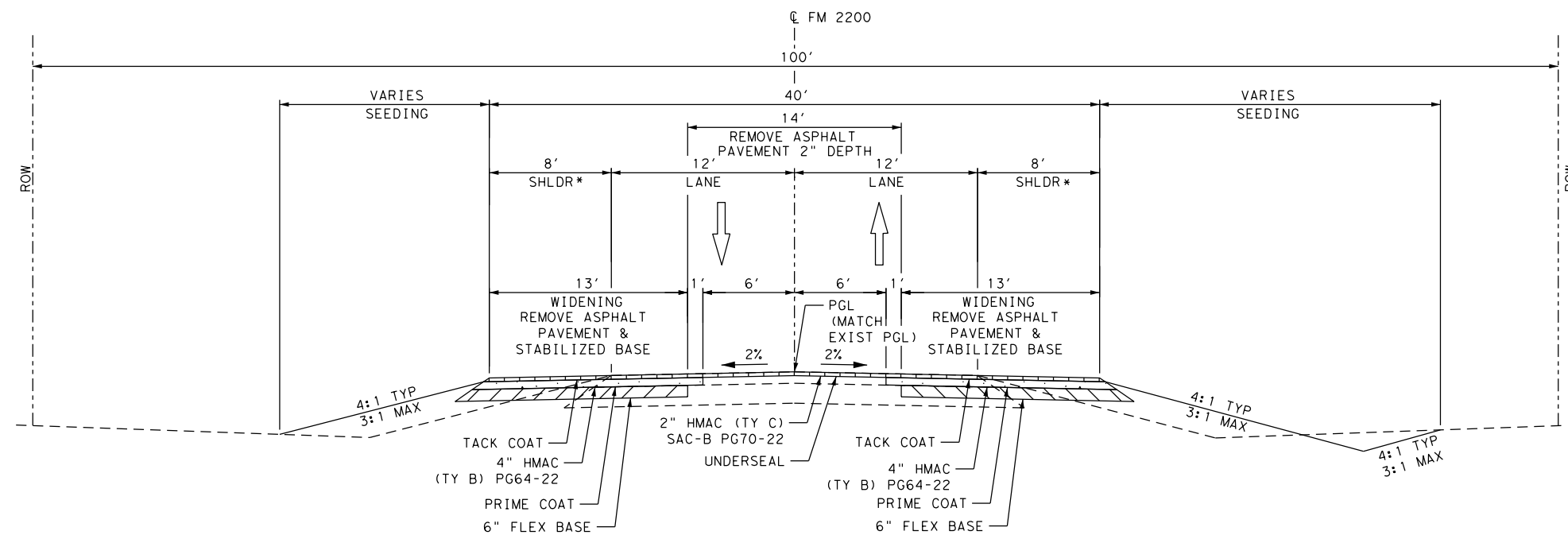
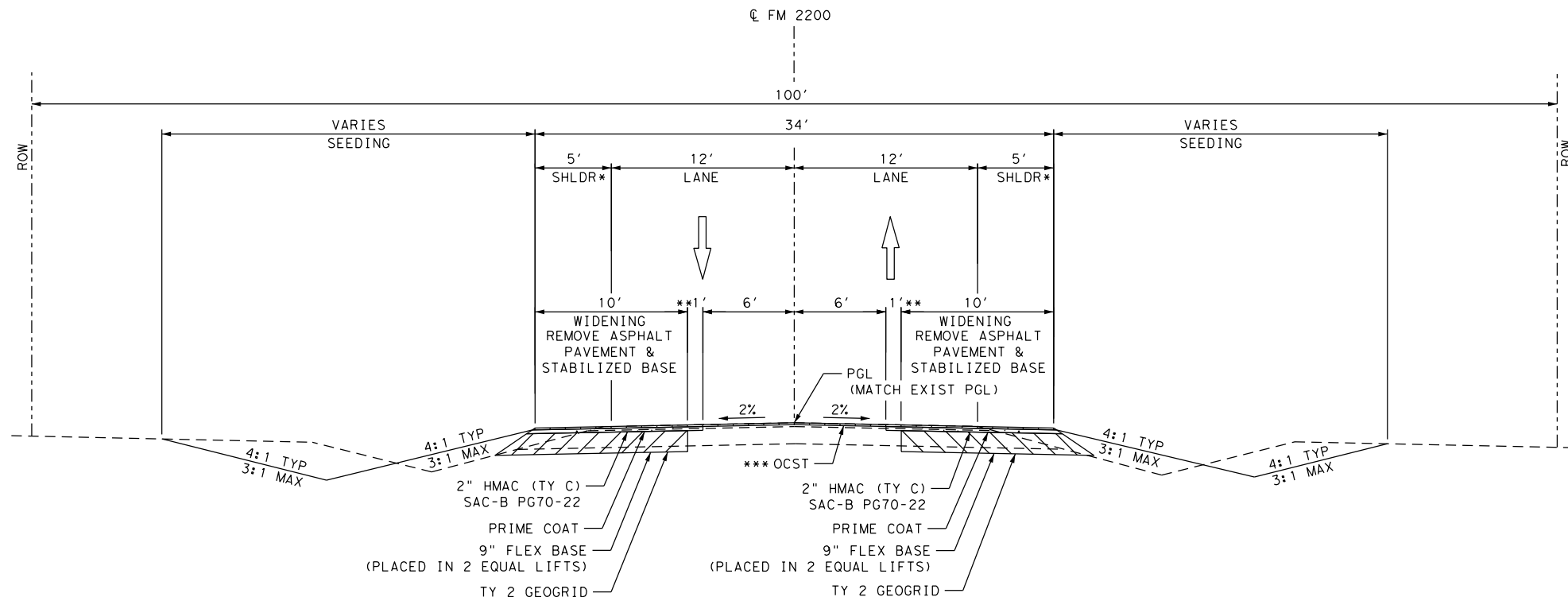
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EXISTING
TYPICAL SECTIONS

SHEET 2 OF 2

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DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	5

Plotted on: 1/12/2023

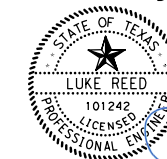
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NOTES

1. REMOVAL OF EXISTING ASPHALT PAVEMENT & STABILIZED BASE TO BE PAID FOR UNDER ITEM 105.

DESIGN



Luke Reed
LUKE REED, P.E.
DATE 1/12/2023

APPROVAL



James A. Lutz
JAMES A. LUTZ, P.E.
DATE 1/12/2023

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REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson ENGINEERS

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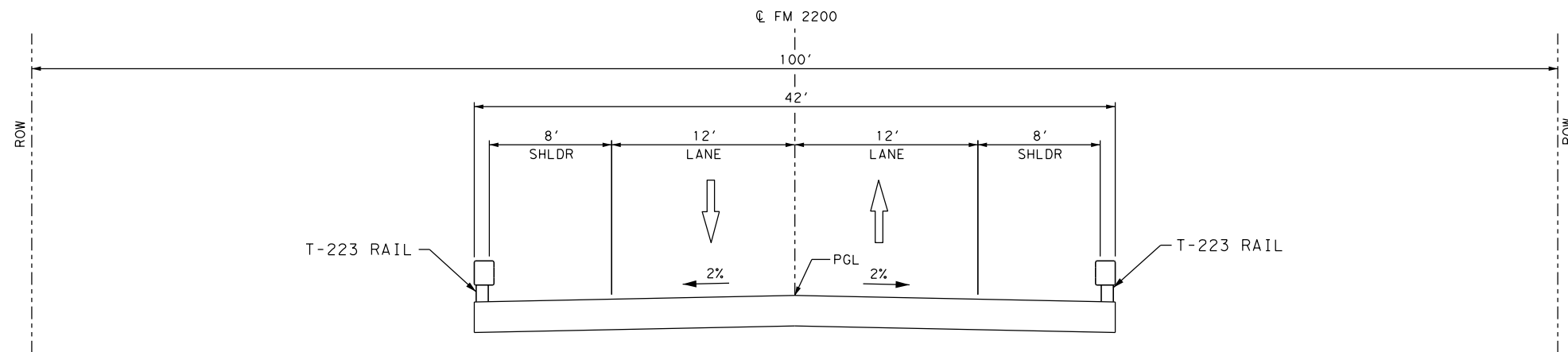
FM 2200
PROPOSED
TYPICAL SECTIONS

SHEET 1 OF 5

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
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DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
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Plotted on: 12/20/2022

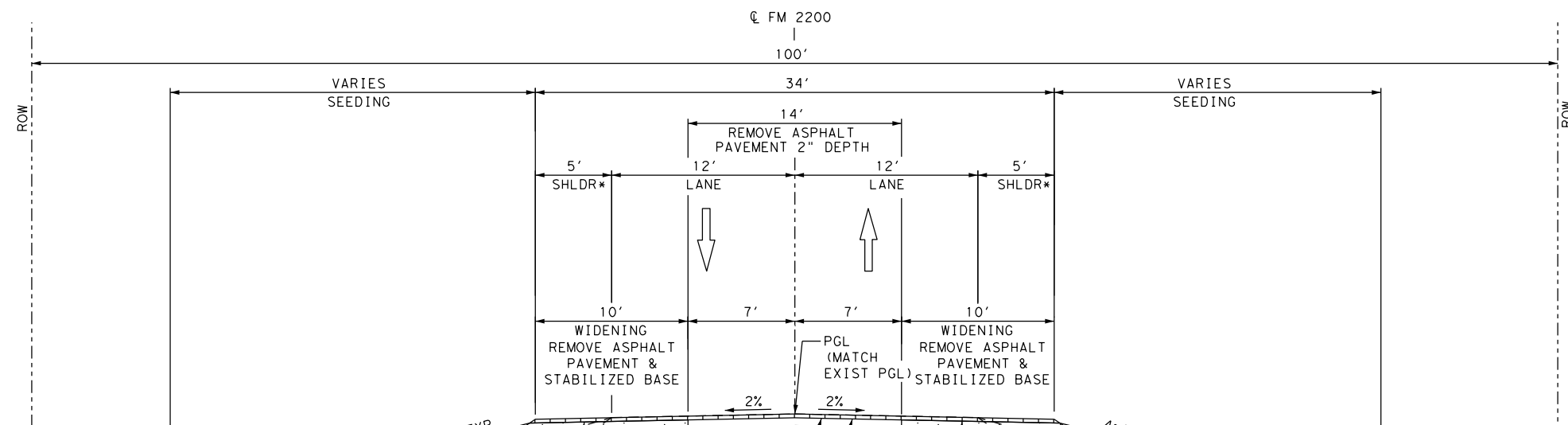
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PROPOSED BRIDGE TYPICAL SECTION

N. T. S.

STA 668+97 TO STA 669+97
BRIDGE CSJ: 2520-01-015



PROPOSED TYPICAL SECTION

N. T. S.

STA 673+20 TO STA 690+00
*SHOULDERS TRANSITION FROM 8' TO 5'
FROM STA 673+20 TO STA 673+70

NOTES

1. REMOVAL OF EXISTING ASPHALT PAVEMENT & STABILIZED BASE TO BE PAID FOR UNDER ITEM 105.

DESIGN



Handwritten signature of Luke Reed
LUKE REED, P.E.
DATE 12/20/2022

APPROVAL



Handwritten signature of James A. Lutz
JAMES A. LUTZ, P.E.
DATE 12/20/2022

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



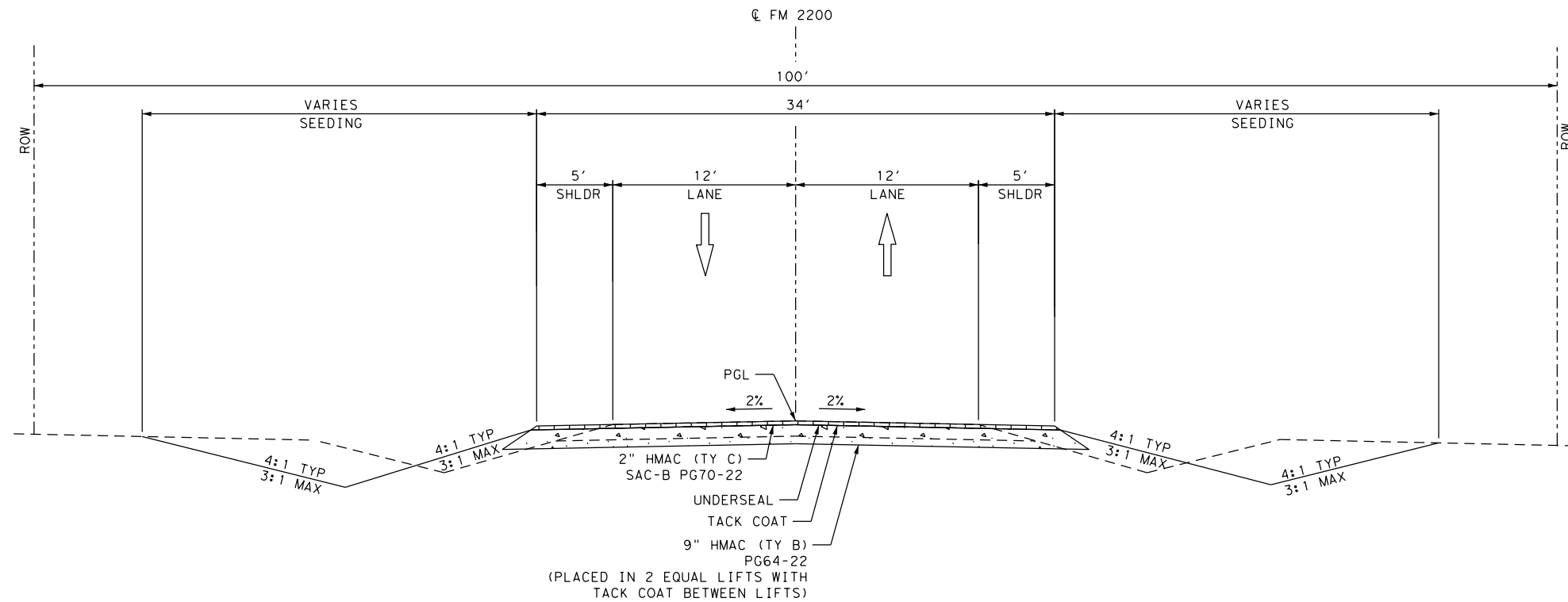
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PROPOSED TYPICAL SECTIONS

SHEET 2 OF 5

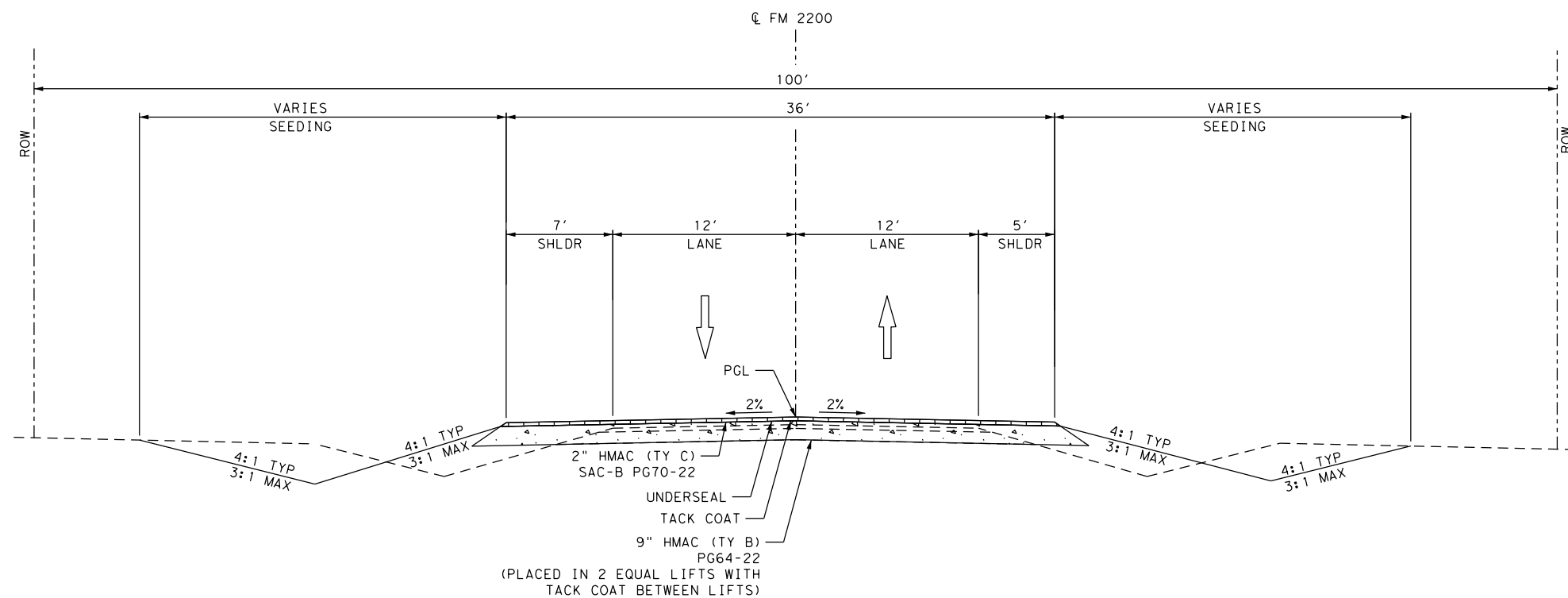
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Plotted on: 12/20/2022

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PROPOSED TYPICAL SECTION
N. T. S.
STA 690+00 TO STA 692+00



PROPOSED TYPICAL SECTION
N. T. S.
STA 692+00 TO STA 698+00

NOTES

- REMOVAL OF EXISTING ASPHALT PAVEMENT & STABILIZED BASE TO BE PAID FOR UNDER ITEM 105.

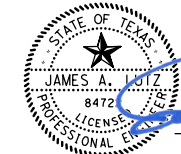
DESIGN



Luke Reed
LUKE REED, P.E.
DATE

12/20/2022

APPROVAL



James A. Lutz
JAMES A. LUTZ, P.E.
DATE

12/20/2022

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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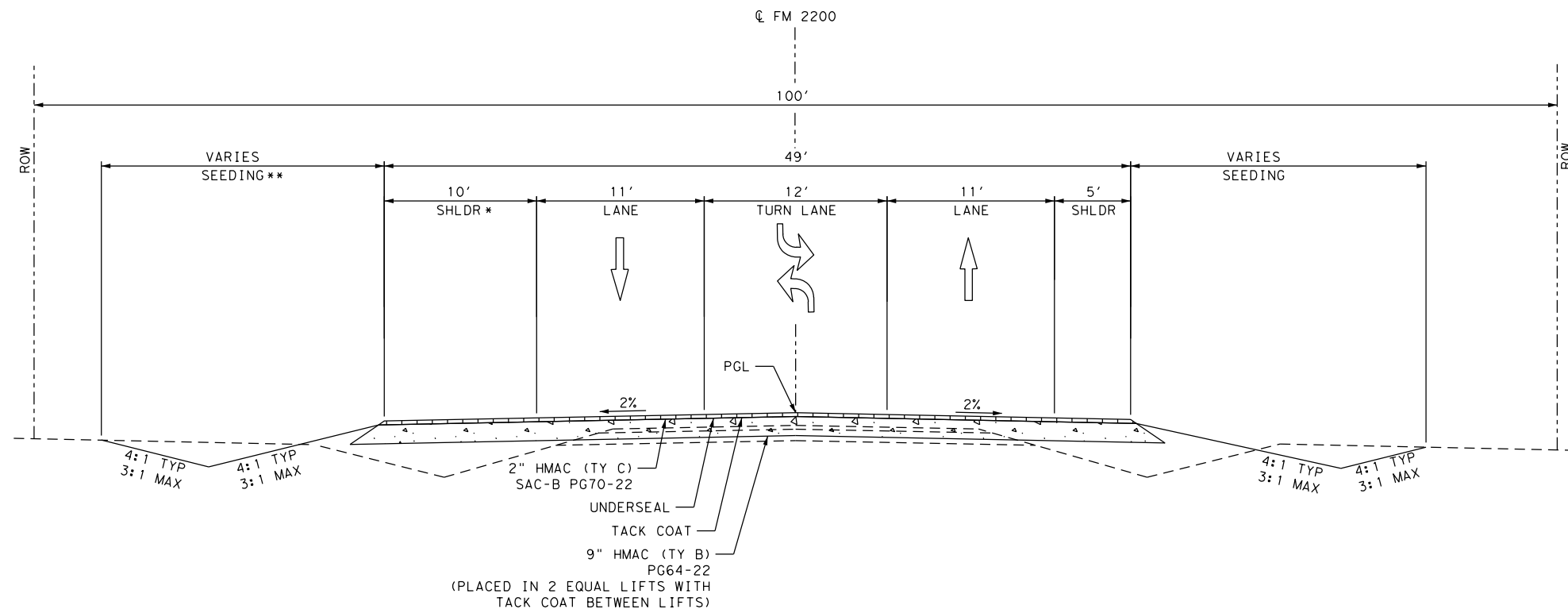
FM 2200
PROPOSED
TYPICAL SECTIONS

SHEET 3 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	8

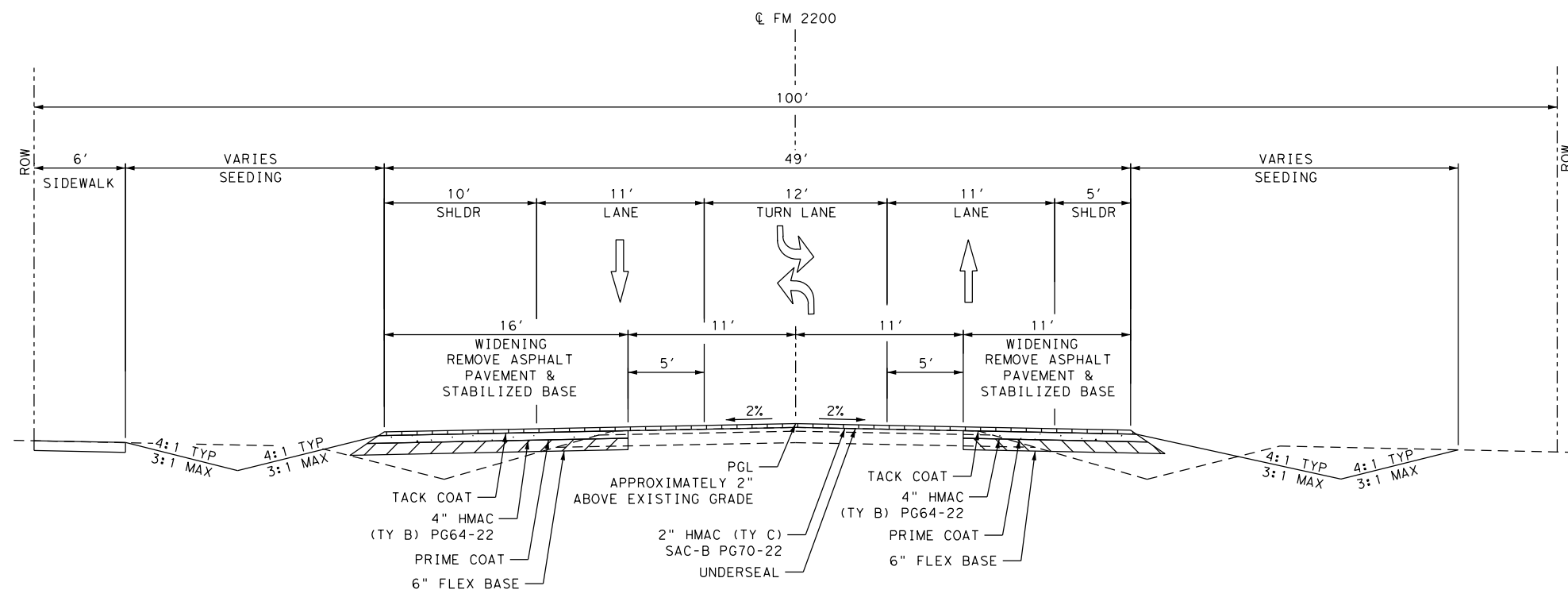
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PROPOSED TYPICAL SECTION
N. T. S.

STA 698+00 TO STA 704+35
*SHOULDER TRANSITIONS FROM 7' TO 10'
FROM STA 698+00 TO STA 700+70
** SIDEWALK BEGINS AT STA 702+57
AND ENDS AT STA 722+00



PROPOSED TYPICAL SECTION
N. T. S.

STA 704+35 TO STA 711+50

NOTES

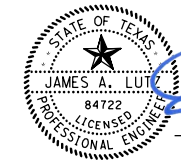
1. REMOVAL OF EXISTING ASPHALT PAVEMENT & STABILIZED BASE TO BE PAID FOR UNDER ITEM 105.

DESIGN



Luke Reed
LUKE REED, P.E.
DATE 12/20/2022

APPROVAL



James A. Lutz
JAMES A. LUTZ, P.E.
DATE 12/20/2022

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



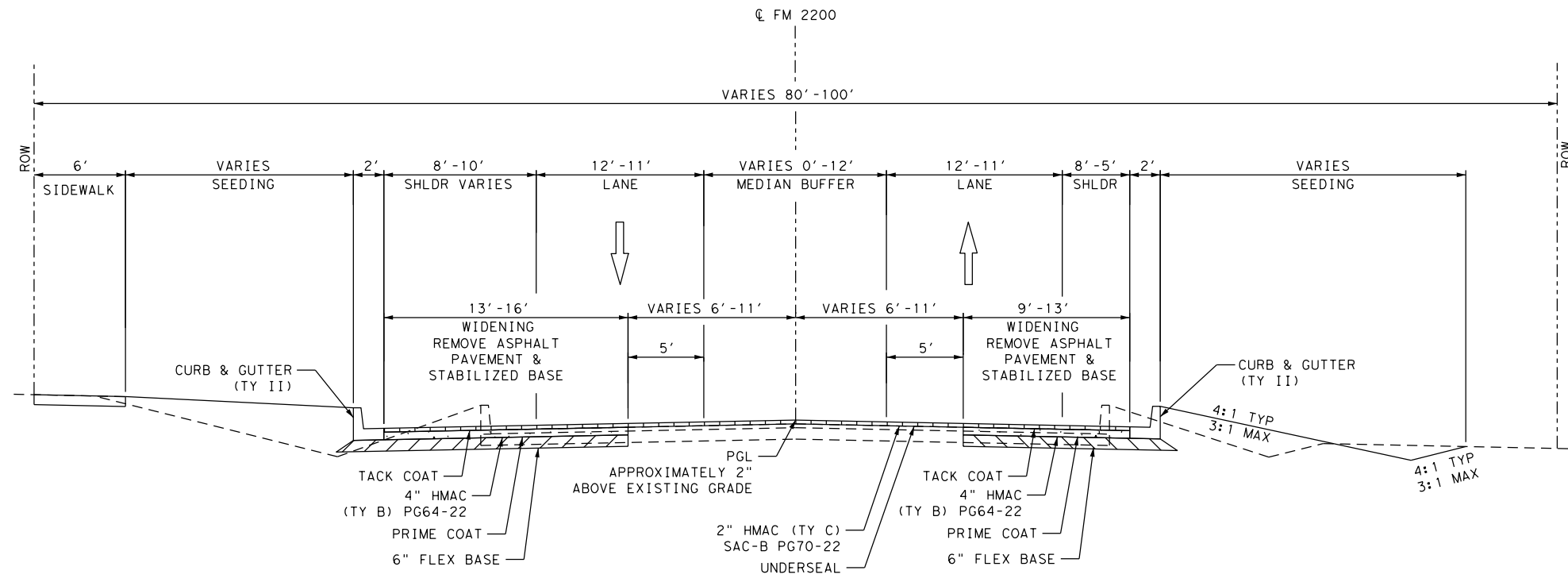
FM 2200
PROPOSED TYPICAL SECTIONS

SHEET 4 OF 5

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 9

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Des\ign\Civil\General\1179904_TYP_01.dgn



PROPOSED TYPICAL SECTION
N. T. S.
STA 711+50 TO STA 712+30

NOTES

- REMOVAL OF EXISTING ASPHALT PAVEMENT & STABILIZED BASE TO BE PAID FOR UNDER ITEM 105.

DESIGN



[Signature]
LUKE REED, P.E. 12/20/2022
DATE

APPROVAL



[Signature]
JAMES A. LUTZ, P.E. 12/20/2022
DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
PROPOSED
TYPICAL SECTIONS

SHEET 5 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	10

*****GENERAL NOTES*****
 2014 Specification Book (Revised August 4, 2022)

=====**Basis of Estimate**=====

Item	Description	Depth	Area	Quant-CY
0247-6475	Flex Base TY D GR 1-2 or 5	9"	18144 SY	4536 CY
0247-6475	Flex Base TY D GR 1-2 or 5	6"	9054 SY	1509 CY

=====**Asphalt Concrete Pavement**=====

Type	Location	Depth/Rate/Area	Quant-TON
D-GR HMA TY-B PG64-22	Main Rdwy	4"/115 lbs/SY/IN/9727 SY	2237 TON
D-GR HMA TY-B PG64-22	Main Rdwy	9"/115 lbs/SY/IN/8035 SY	4158 TON
D-GR HMA TY-C SAC-B	Main Rdwy	2"/115 lbs/SY/IN/39296 SY	4519 TON

=====**Surface Treatment Data**=====

Item	Description	Rate/Area	Quant
0310-6027	PRIME COAT MC-30 or AE-P	0.2 GAL/SY/25875 SY	5175 GAL
0316-6240	AGGR(TY-PD GR-4 SAC-B)	120 SY/CY/53520 SY	446 CY
0316-6419	ASPH(AC-15P, AC-20-5TR OR AC-20XP)	0.3 GAL/SY/29540 SY	8862 GAL
3077-6075	TACK COAT	0.2 GAL/SY/23785 SY	4757 GAL
3085-6001	UNDERSEAL COURSE	0.3 GAL/SY/20904 SY	6271 GAL

--General--

The following State, District, Local and/or Utility Standards have been modified: DRIVEWAY DETAILS (SAT DISTRICT).

Any sign panels that are adjusted or removed and replaced, shall be done the same workday unless otherwise approved. This work shall be considered subsidiary to Item 502.

Hurricane Evacuation

Hurricane Season is from June 1 thru November 30. As the closest metropolitan city inland from the Texas Coast, the City of San Antonio is a major shelter destination during mandatory hurricane evacuations. As such, planned work zone lane or road closures may be restricted and/or suspended during mandatory hurricane evacuation operations. The District will coordinate these restrictions at a minimum H-120 from any projected impact to the Texas Coast.

No time charges will be made if the Engineer determines that work on the project was impacted by the hurricane.

The Engineer may order changes in the Traffic Control Plan to accommodate evacuation traffic, and may suspend the work, all or in part, to ensure timely completion of this work. All work to implement changes in the Traffic Control Plan will be paid through existing bid prices or through Item 9.5, Force Account. However, the Department will not entertain any request for delay damages, loss of efficiency that may be attributed to the restriction or suspension of road or lane closures, or to changes in the Traffic Control Plan.

In accordance with the Underground Facility Damage Prevention Act (One Call Bill) the phone number for a utility locator is 811. It is the Contractor's responsibility to plan for utility locators as needed.

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way. Call or email the TxDOT offices listed below for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages incurred to the above-mentioned utilities when working without having the utilities located prior to excavation.

For signal and ITS locates call TransGuide at 210-731-5136 or email sat_its_locates@txdot.gov for ITS locates and [signal.request@txdot.gov](mailto:sat_its_locates@txdot.gov) for signal locates.

Contractor questions on this project are to be addressed to the following individual(s):
 Area Engineer Christen Longoria – christen.longoria@txdot.gov – (830)741-6607
 Assistant Area Engineer, Frances Merecka – frances.merecka@txdot.gov – (830) 569-2584

Questions may also be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address: <https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors> All contractor questions will be reviewed by the Engineer. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page.

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

--Item 5--

Taper ACP placed at curb inlets, traffic inlets and slotted drains.

Prevention of Migratory Bird Nesting

County: Medina

Highway: FM 2200

It is anticipated that migratory birds, a protected group of species, may try to nest on bridges, culverts, vegetation, or gravel substrate, at any time of the year. The preferred nesting season for migratory birds is from February 15 through October 1. When practicable, schedule construction operations outside of the preferred nesting season. Otherwise, nests containing migratory birds must be avoided and no work will be performed in the nesting areas until the young birds have fledged.

Structures

Bridge and culvert construction operations cannot begin until swallow nesting prevention is implemented, until after October 1 if it's determined that swallow nesting is actively occurring, or until it's determined swallow nests have been abandoned. If the State installed nesting deterrent on the bridges and culverts, maintain the existing nesting deterrent to prevent swallow nesting until October 1 or completion of the bridge and culvert work, whichever occurs earlier. If new nests are built and occupied after the beginning of the work, do not perform work that can interfere with or discourage swallows from returning to their nests. Prevention of swallow nesting can be performed by one of the following methods:

1. By February 15 begin the removal of any existing mud nests and all other mud placed by swallows for the construction of nests on any portion of the bridge and culverts. The Engineer will inspect the bridges and culverts for nest building activity. If swallows begin nest building, scrape, or wash down all nest sites. Perform these activities daily unless the Engineer determines the need to do this work more frequently. Remove nests and mud through October 1 or until bridge and culvert construction operations are completed.
2. By February 15 place a nesting deterrent (which prevents access to the bridge and culvert by swallows) on the entire bridge (except deck and railing) and culverts. This work is subsidiary to the various bid items.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by nesting swallows.

Provide a non-intrusive back-up alarm system on all heavy equipment used in close proximity to residential areas. This item is subsidiary to various bid items.

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.

County: Medina

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--Item 6--

Show the stockpile lot and/or sub lot numbers on all tickets for all materials.

To comply with the latest provisions of Build America, Buy 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.

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

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

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

--Item 7--

The project's total disturbed area is 25.6. The disturbed area in all project locations and Contractor project specific locations (PSL's), within 1/4 mile of the project limits, 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. Obtain any required authorization from the TCEQ for any PSL's on or off the ROW. When the total area disturbed on the project and PSL's within 1/4 mile of the project exceeds 5 acres, provide a copy of the Contractor NOI for PSL's to the Engineer (to the appropriate MS4 operator when the project is on an off-state system route).

Notify the Engineer of the disturbed acreage within one (1) mile of the project limits. Obtain authorization from the TCEQ for Contractor PSL's for construction support activities on or off ROW.

No significant traffic generators events identified.

--Item 8--

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

A Special Provision to Item 8 for a delayed authorized date to begin work has been included in the contract. The reason for including the Special Provision is for material processing or contractor mobilization.

Create and maintain a Critical Path Method schedule.

The CPM schedule shall be created and maintained using software fully compatible with Primavera Project Planner version P6 Professional R15.2.

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County: Medina

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Incentive using road-user cost or contract administration liquidated damage values and disincentive using road-user cost will be paid in accordance with special provision 008---006.

Notes for Milestones

Substantial Completion of Work is defined in Special Provision to Item 8.

Milestone 1

See the traffic control plans (TCP) for a detailed description of the work included in Milestone 1.

The daily road-user cost for disincentive for Milestone 1 will be \$5,000 per day.

The contractor will have 107 working days for Substantial Completion of Work for Milestone 1.

Working day time charges for Milestone 1 will be computed and charged in accordance with Article 8.3.1.1:Five-Day.

The time charges for the purpose of computing disincentive for Milestone 1 will begin when the road closure and detour are put in place as shown in the TCP for Milestone 1. Contractor may not begin on these efforts until after January 1st, 2024

The time charges for the purpose of computing disincentive for Milestone 1 will end when the replacement of FM 2200 bridge at Fransico Perez Creek and proposed roadway with MBGF from STA 665+80 to STA 673+20 is complete including opening the bridge to traffic and removing FM 2200 detour for Milestone 1. Opening all traffic prior to June 1st, 2024 is required.

Failure of Substantial Completion of Work for Milestone 1 within the established number of working days shown above will result in the assessment of disincentives using the daily road-user costs shown above for each working day more than those allowed for Milestone 1.

Milestone 2

See the traffic control plans (TCP) for a detailed description of the work included in Milestone 2.

The daily road-user cost for disincentive for Milestone 2 will be \$5,000 per day.

The contractor will have 10 working days for Substantial Completion of Work for Milestone 2.

Working day time charges for Milestone 2 will be computed and charged in accordance with Article 8.3.1.1:Five-Day.

The time charges for the purpose of computing disincentive for Milestone 2 will begin when the road is closed and traffic is detoured for the construction of the roadway from STA 693+10 to

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Sheet 11B

County: Medina

Highway: FM 2200

STA 704+35 as shown in the TCP for Milestone 2. Contractor may not begin on these efforts until after June 2nd.

The time charges for the purpose of computing disincentive for Milestone 2 will end when the proposed roadway is complete from STA 693+12 to STA 704+35, FM 2200 detour is removed and all vehicular traffic is placed in its preconstruction configuration. Contractor must open all traffic prior to June 15th.

Failure of Substantial Completion of Work for Milestone 2 within the established number of working days shown above will result in the assessment of disincentives using the daily road-user costs shown above for each working day more than those allowed for Milestone 2.

Milestone 3

See the traffic control plans (TCP) for a detailed description of the work included in Milestone 3.

The daily road-user cost for disincentive for Milestone 3 will be \$5,000 per day.

The contractor will have 34 working days for Substantial Completion of Work for Milestone 3.

Working day time charges for Milestone 3 will be computed and charged in accordance with Article 8.3.1.1:Five-Day.

The time charges for the purpose of computing disincentive for Milestone 3 will begin when the one lane two way traffic configuration is implemented as shown in the TCP for Milestone 3. Contractor may not begin on these efforts until after June 2nd.

The time charges for the purpose of computing disincentive for Milestone 3 will end when FM 2200 is open for a two-way traffic control configuration for Phase 4 Step 3. Contractor must open all traffic prior to August 3rd .

Failure of Substantial Completion of Work for Milestone 3 within the established number of working days shown above will result in the assessment of disincentives using the daily road-user costs shown above for each working day more than those allowed for Milestone 3.

--Item 9--

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

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

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County: Medina

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

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

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

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

--Item 100--

Trim and remove brush and trees within the stations noted in the plans and as needed for construction operations. Unless shown otherwise in the plans or a designated non-mow area, perform trimming or removal for areas to the ROW limits. Trim or remove to provide minimum of 5 ft. of horizontal clearance and 7 ft. of vertical clearance for the following: sidewalks, paths, guard fence, rails, signs, object markers, and structures. Trim to provide a minimum of 12 ft. vertical clearance under all trees.

Obtain approval for proposed method of tree and brush trimming and removal. Vertical flailing equipment is not allowed. Treat damaged or cut branches, roots and/or stumps of all oak trees with a commercial tree wound dressing. Disinfect all pruning tools with a solution of 70% alcohol before moving from one tree to another. Unless otherwise approved remove all resulting vegetative debris from the ROW within 24 hours. The Engineer can stop all construction operations if the dressing, cut and removal requirements are not followed.

--Item 132--

All fill material required for the construction of the embankment should meet the requirements outlined in TxDOT Standard Specification Item 132, Type C. The typical properties are that Type C shall consist of suitable earth material that will form a suitable embankment. It is recommended that the material be density controlled and greater than the optimum moisture content as determined by Tex 114E.

	Percent Passing	Particle Size	Dry Density	Dry Density	PI	PI
Description	#200 Sieve	MAX	MAX	MIN	MAX	MIN
Embankment (TY C)	< 30%	2"	102%	98%	25	6

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Sheet 11C

County: Medina

Highway: FM 2200

Prior to placement of embankment fill, proof rolling in accordance with TxDOT Standard Specification Item 216 "Proof Rolling" should be conducted. All weak or soft areas observed during the proof roll should be removed prior to placement of fill.

--Item 162--

Furnish and place Bermuda grass sod.

--Item 164--

Drill seeding of permanent grasses requires the use of approved grass seeding equipment capable of properly storing and metering the release of small seeds (such as Bermuda grass) separately from fluffy type seeds (such as bluestems). Equipment manufactured for planting grain crops is acceptable for planting temporary cool season seeds, but not for planting the permanent seed mix.

If performing a permanent seeding in an area with established temporary grass cover and mowing is performed instead of tilling, seed and fertilizer may be distributed simultaneously during "Broadcast Seeding" operations, provided each component is applied at the specified rate.

--Item 166--

Use a fertilizer with an analysis of 13-13-13 (50% of the total N must be sulfur coated urea) to apply 60 lbs of actual N per acre. This requires 460 lbs of 13-13-13 per acre or .095 lbs per SY of area.

--Item 168--

Apply vegetative watering as needed to supplement natural rainfall during the vegetation establishment period. Plan quantity of irrigation water is based on the application of a total of 1.3 gal of water each week for each sq. yd. of area that is sodded or seeded. Establishment time is estimated to be 12 weeks for both sod and permanent seed mixes. Temporary seeding will require less time for establishment. Provide a schedule and coordinate watering cycles and rates per cycle with the Engineer. Obtain approval if the quantity of water to be applied is expected to exceed the plan quantity. Adjust the amount of water applied with each cycle and the number of cycles each wk. according to actual site conditions. Drought or other conditions, as determined by the Engineer, may require the application of supplemental irrigation during hours other than normal working hours.

--Item 247--

There is no minimum PI requirement for this project.

--Item 316--

Asphalt season will be year-round but meet temperature limitations specified in the standard specifications for Item 316.

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County: Medina

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Ensure that the asphalt for precoating the aggregate and the asphalt used for the surface treatment will not result in a reaction that may adversely affect the bonding of the aggregate and asphalt during the surface treatment operation.

Do not add bag house fines in the production of precoated material.
Clean all concrete curbs, islands, medians, etc. that get coated with asphalt.

--Item 320--

Construct all longitudinal ACP joints adjacent to a travel lane with a joint maker device that will create a 3:1 to 6:1 taper. For placement of 2 inches or more, the device shall provide a maximum ½ inch vertical edge. Taper outside edges (next to the grass) or backfill (shoulder-up) the same day.

Provide a material transfer device capable of providing a continuous flow of material to the paver. The material transfer device will consist of a windrow elevator or better.

When placing Item 346 mixtures, use a self-propelled wheel mounted MTV capable of receiving mix from the haul trucks, separate from the paver. It shall have a minimum storage capacity of approximately 25 tons. It shall be equipped with a pivoting discharge conveyor and shall completely and thoroughly remix the material prior to placement. The effectiveness of the MTV's remixing ability is subject to the approval of the Engineer. In addition, the paver shall have a surge storage insert with a minimum capacity of 20 tons.

--Item 420--

Mass concrete will be measured in place.

Pier and Bent Concrete will be paid for as "Plans Quantity".

--Item 422--

For construction of approach slabs, longitudinal joints shall be placed on lane lines. Joints may be either a saw-cut crack control joint or a construction joint. Saw cut joints shall terminate 1'-0" before reaching the edge of the slab, must be saw cut as soon as possible after placement of concrete, and will be cut within 12 hours of concrete placement. Once sawing begins, it should be a continuous operation and should only be stopped if raveling occurs. Saw cut will be to a depth of 1.5" and filled with approved joint sealant.

--Item 462--

The following structures shall be cast-in-place:
Culvert A-5.

The following structures shall be pre-cast:
Culverts A-2 and A-3.

Control: 2520-01-016, ETC.

Sheet 11D

County: Medina

Highway: FM 2200

--Item 496--

The Contractor will submit a demolition plan for all structures to be replaced and/or removed in accordance with Item 496.

--Item 500--

"Materials on Hand" payments will not be considered in determining percentages for mobilization payments.

--Item 502--

General

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 2 hours or within a reasonable time frame as specified by the Engineer.

Treat the pavement drop-offs as shown in the TCP.

Avoid placing stockpiles, equipment, and other construction materials within the roadway's horizontal clear zone or at any location that will constitute a hazard and will endanger traffic. If a stockpile is placed within the clear zone, address in accordance with the TMUTCD.

If Nighttime work is required and work is not behind positive barrier then full TY 3 reflective gear is required to be worn by all workers, hard hat halos are required to be worn by the flaggers at flagging stations, TY III barricades are required to be spaced at 500 ft, and a mandatory night work meeting is required.

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.

Mounting and moving the mailbox as needed for the various construction phases is subsidiary to Item 502.

Access to adjoining property must be maintained at all times.

Barricades, Signs, and Traffic Control Devices

Control: 2520-01-016, ETC.

County: Medina

Highway: FM 2200

When advanced warning flashing arrow panels and/or changeable message sign is specified, have one standby unit in good condition at the job site. Standby time shall be considered subsidiary to the bid item.

After written notification, the time frame is provided on the Form 599 to provide properly maintained signs and barricades before considered in non-compliance with this item.

Temporary Rumble Strips are to be used according to WZ (RS)-16.

Use 1 number of rumble strip arrays.

Moving an existing sign to a temporary location is subsidiary to Item 502. Installations with permanent supports at permanent locations will be paid for under the applicable bid item(s).

Cover permanent signs if not used. This is subsidiary to Item 502.

Lane and Ramp Closures and Detours

Notify the Engineer in writing 10 business days in advance of any temporary or permanent lane, ramp, connector, etc. closures/detours, restrictions to lane widths, alterations to vertical clearances, or modifications to radii. Any other modifications to the roadway that may adversely affect the mobility of oversized/overweight trucks also require 10 business days advance written notice to the Engineer. At least one lane must always remain open.

At no time shall two consecutive intersecting roadways be closed at one time during construction.

Unless otherwise noted in the plans and/or as directed by the Engineer, daily lane closures shall be limited according to the following restrictions:

No lane closures will be permitted for the following dates and/or special events:

Between December 15 and January 1

Fiesta Week and Sales Tax Holidays (Bexar County Only)

Wednesday before Thanksgiving thru the Sunday after Thanksgiving

Saturday and Sunday before Memorial Day and Labor Day

Saturday or Sunday when July 4 falls on a Friday or Monday

Election days (Bexar County Only)

Saturday March 30, 2024 and Saturday March 31, 2024

Hauling

The use of rubber-tired equipment will be required for moving dirt or other materials along or across pavement surfaces. Where the contractor desires to move any equipment not licensed for

Control: 2520-01-016, ETC.

Sheet 11E

County: Medina

Highway: FM 2200

operation on public highways, on or across pavement, they shall protect the pavement from damage as directed/approved by the Engineer.

Throughout construction operations, the Contractor will be required to conduct their hauling operations in a manner such that vehicles will not haul over previously recompacted subgrade or compacted base material, except in short sections for dumping manipulations.

The Contractor shall keep the roadway clean and free of dirt or other materials during hauling operations. If the Contractor does not maintain a clean roadway, they shall cease all construction operations, when directed by the Engineer, to clean the roadway to the satisfaction of the Engineer.

Provide a Type E Structure for a Concrete Field Laboratory with at least 200 sq. ft. of gross floor area in a room 8 ft. high, furnished with an exterior door and at least 2 windows. Provide required equipment for testing (moist cabinet, moist room, or water storage tank in accordance with Tex-498-A, Table 32 and Concrete Compression Testing Machine in accordance with Tex-498-A, Table 18). Provide associated calibration documents, as outlined in Tex-498-A, for all contractor provided testing equipment.

A Type D Structure (Asphalt Mix Control Laboratory) is required for all projects that do not have a previously approved laboratory structure for TxDOT's exclusive use. The structure will include high speed internet service with WIFI signal, one desk, two chairs, and one file cabinet.

All labs and offices will include cleaning at least once a week. The cleaning will include sweeping and mopping of floors, cleaning the toilet and lavatory, and emptying wastebaskets. Space heaters are not considered adequate heating.

--Item 506--

An Inspector will perform a regularly scheduled SWP3 inspection every 7 calendar days.

Failure to address items noted on the SW3P inspection report within two report cycles may result in the Department stopping all construction operations, exclusive of time charges, or withholding that month's estimate until the SW3P deficiencies are corrected unless the Engineer determines that the area is too wet to correct SW3P deficiencies.

Failure to correctly maintain daily monitoring reports and submitting to TxDOT on a daily/weekly basis may result in the monthly estimate being withheld.

--Item 510--

The length of the one-way traffic control section is limited to ¼ miles.

--Item 529--

Curb inlets and extensions are based on an exposed curb height of 7 inches. The roadway curb height and shape will be transitioned to the inlet's curb with a 40: 1 taper.

Control: 2520-01-016, ETC.

County: Medina

Highway: FM 2200

--Item 531--

The curb ramp locations shown in the plans have considered the geometric features of the intersection, traffic signals, and the pavement markings. If anything changes during construction, the location of curb ramps must be adjusted to ensure they meet TAS requirements.

--Item 540--

Guard fence posts placed in proposed and/or existing areas of riprap, sidewalks or other concrete shall have an 18 inch +/- (square or round) leave-out in the concrete as shown in the state standard for MBGF Mow Strip. After the posts are installed, fill the leave-outs with a Grout mixture as shown in the state standard for MBGF Mow Strip.

When connecting a Thrie-Beam to a concrete wingwall, bridge rail, CTB, etc., drill the holes for bolt placement using rotary or core type equipment. Use a core type drill when reinforcing steel is encountered. Do not use percussion or impact drilling. Repair damage to the concrete and spalls exceeding 1/2" from the edge of the hole.

--Item 628--

Make all arrangements for electrical service, and compliance with local standards and practices for proper installations.

--Item 644--

The wedge anchor system shown on State Standard Sheet SMD (TWT) is not allowed.

Triangular Slipbase Systems with set screws are not allowed.

--Item 666--

Use TY II markings (vs. an acrylic or epoxy) on asphalt surfaces as the sealer for the TY I markings, unless otherwise approved by the Engineer.

--Item 672--

Place all adhesive material directly from the heated dispenser to the pavement. Do not use portable or non-heated containers. Use adhesive of sufficient thickness so that when the marker is pressed into the adhesive, 1/8" or more adhesive will remain under 100% of the marker. The adhesive should extend not less than 1/2" but not more than 1 1/2" beyond the perimeter of the marker.

--Item 677--

Obtain approval before using the mechanical method for the elimination of existing thermoplastic pavement markings.

--Item 680--

Furnish and install all required materials and equipment necessary for the complete and operating pedestrian crossing flashing beacon assembly installation at the following intersection: FM 2200 and Virginia Dr_____.

Control: 2520-01-016, ETC.

Sheet 11F

County: Medina

Highway: FM 2200

The locations shown on the plans for signal pole foundations, conduit and other items may be adjusted to better fit field conditions as approved.

Demonstrate that the field wiring is properly installed. Install the electrical equipment in a neat and workmanlike manner.

Field verify the depths of the drill shafts to meet the minimum clearances specified in the plans before ordering materials.

--Item 682--

Cover all signal faces until placed in operation. This work is subsidiary to various bid items.

All mounting attachments shall be constructed of steel pipe and mounted as shown on the plans.

--Item 684--

Provide an extra 10' for each cable terminating in the controller cabinet. All cables must be continuous without splices from terminal point to terminal point. All proposed signal cable must be #12 AWG stranded copper.

--Item 686 & 687--

Provide all signal poles from the same manufacturer. Pedestrian poles may be from a different manufacturer.

--Item 688--

The button placement must be coordinated with the concrete pad to access the button according to ADA and TAS. If any mounting modifications are needed (extensions, brackets, etc.) to meet ADA and TAS requirements the adjustment will be subsidiary to Item 688. The concrete pad (if required) will be paid separately.

Furnish and install new push buttons and controller which is compatible with the flashing beacon unit supplied for the pedestrian crossing. The push buttons must have a locator tone and be capable of providing a voice message. The voice message should say "yellow lights are flashing" spoken twice once the flashing beacon is activated by the push button.

--Item 730--

Mow full-width and hand trim the right of way, including newly seeded or sodded areas, when vegetation reaches a height of 16" or when directed. Removal of brush sprouts growing within guardrail, concrete barriers or at other locations where mowing or hand trimming is done within the limits of construction is required and subsidiary to this item. Mowing may be required more often in newly sodded or seeded areas than in other parts of the project because of the supplemental irrigation these areas receive and the resulting weed growth. Coordinate mowing to avoid rutting or compaction of the soil when mowing where supplemental irrigation is being used. Use mowing equipment that will not adversely affect soil retention blankets or mulches

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that have been applied. Work performed under this item does not replace the mowing required when placing permanent seeding in an area that has established temporary seeding as described in Article 164.3, Construction.

--Item 734--

Perform Litter Removal once a month or as directed by the Engineer.

--Item 3076, 3077, 3079, 3080, 3081, & 3082 --

1. Table 10 in Item 3076 and Table 11 in Item 3077, Hamburg Wheel Test Requirements tested in accordance with Tex-242-F are changed for PG 64-22 or lower and PG 70-22. Minimum number of passes at 12.55 mm Rut Depth, Tested at 50 degrees C will be 5,000 and 10,000 respectively.
2. Submit a copy of the Tex 233-F production charts on a weekly basis. At the end of the ACP work, provide all originals.
3. Crushing of aggregate for hot mix and immediate use for production of the mix is not allowed. Stockpile the aggregate until enough material is available for five days of production unless prior approval is provided
4. Hold a pre-paving meeting one month prior to the placement of the hot mix. The date and time of pre-paving meeting should be coordinated with the Engineer prior to scheduling.
5. Do not use diesel or solvents as asphalt release agents in production, transportation, or construction. A list of approved asphalt release agents is available from the District Laboratory.
6. No more than one hot mix lot will be open for any specific type of hot mix, unless authorized. After a lot is open and the Contractor gets approval to change plants, the previous lot will be closed, and a new lot will be opened. The numbering for the lots produced at the new plant will start with No. 1. If allowed to switch back to the original or previous plant, the next lot from that plant will resume numbering sequentially from the last lot produced by that plant.
7. The minimum application rates are listed in Table UC. The Engineer may adjust the application rates taking into consideration the existing pavement surface conditions.

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Table UC

Material	Minimum Application Rate (gal. per square yard)
TRAIL – Hot Asphalt	0.15
Spray Applied Underseal Membrane	0.20
Seal Coat – Emulsion (CHFRS-2P, CRS-2P)	0.25
Seal Coat – Asphalt (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	0.23
Aggregate for Seal Coat Options TY PB GR 4(AC) or TY B GR 4(Emulsion)	1 CY:120 SY

--Item 4171--

Install bridge identification numbers shown below for each of the following listed bridges in accordance with the special specification and San Antonio District Standard. Install the bridge identification number on two locations as shown on the plans, or as directed. For bridges in a two-way condition, install the bridge identification number on each outside beam on the upstream side of traffic. For bridges in a one-way condition, install the bridge identification number on each side, opposite corners on each outside beam. For culverts less than 5 ft. in height, install the bridge identification number on the headwall on upstream and downstream location. For culverts greater than 5 ft. in height, install the bridge identification number inside the first barrel on the upstream side of traffic and inside the last barrel on the opposite corner in the direction of traffic.

FM 2200 at Francisco Perez Creek – NBI # 15-163-0-2520-01-005



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 2520-01-016

DISTRICT San Antonio
HIGHWAY FM 2200

COUNTY Medina

CONTROL SECTION JOB				2520-01-015		2520-01-016		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00131341		A00177362			
COUNTY				Medina		Medina			
HIGHWAY				FM 2200		FM 2200			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW	STA	4.000		125.000		129.000	
	100-6011	PREPARING ROW(TREE)(24" TO 36" DIA.)	EA			1.000		1.000	
	104-6015	REMOVING CONC (SIDEWALKS)	SY			2.000		2.000	
	104-6017	REMOVING CONC (DRIVEWAYS)	SY			160.000		160.000	
	104-6022	REMOVING CONC (CURB AND GUTTER)	LF			256.000		256.000	
	104-6036	REMOVING CONC (SIDEWALK OR RAMP)	SY			21.000		21.000	
	105-6002	REMOVING STAB BASE AND ASPH PAV (2")	SY	850.000		4,239.000		5,089.000	
	105-6013	REMOVING STAB BASE & ASPH PAV (9")	SY	2,040.000		7,123.000		9,163.000	
	105-6016	REMOVING STAB BASE & ASPH PAV(16")	SY			1,667.000		1,667.000	
	105-6041	REMOVING STAB BASE AND ASPH PAV(8")	SY			2,482.000		2,482.000	
	110-6001	EXCAVATION (ROADWAY)	CY	1,254.000		22,275.000		23,529.000	
	110-6002	EXCAVATION (CHANNEL)	CY	2,500.000				2,500.000	
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	960.000		6,190.000		7,150.000	
	150-6002	BLADING	HR	16.000		240.000		256.000	
	160-6005	FURNISHING AND PLACING TOPSOIL	CY	62.000				62.000	
	161-6017	COMPOST MANUF TOPSOIL (4")	SY			1,106.000		1,106.000	
	162-6002	BLOCK SODDING	SY			1,106.000		1,106.000	
	164-6021	CELL FBR MLCH SEED(PERM)(RURAL)(SANDY)	SY	3,239.000		74,801.000		78,040.000	
	164-6029	CELL FBR MLCH SEED(TEMP)(WARM)	SY	809.750		18,700.250		19,510.000	
	164-6031	CELL FBR MLCH SEED(TEMP)(COOL)	SY	809.750		18,700.250		19,510.000	
	168-6001	VEGETATIVE WATERING	MG	50.000		1,186.000		1,236.000	
	169-6005	SOIL RETENTION BLANKETS (CL 2) (TY E)	SY			5,929.000		5,929.000	
	169-6006	SOIL RETENTION BLANKETS (CL 2) (TY F)	SY	1,283.000				1,283.000	
	247-6475	FL BS (CIP)(TY D GR 1-2, OR 5)FINAL POS	CY	176.000		5,869.000		6,045.000	
	310-6027	PRIME COAT(MC-30 OR AE-P)	GAL	199.000		4,977.000		5,176.000	
	316-6240	AGGR(TY-PD GR-4 SAC-B)	CY			454.000		454.000	
	316-6419	ASPH (AC-15P, AC-20-5TR OR AC-20XP)	GAL			8,862.000		8,862.000	
	400-6006	CUT & RESTORING PAV	SY			230.000		230.000	
	416-6002	DRILL SHAFT (24 IN)	LF	628.000				628.000	
	420-6013	CL C CONC (ABUT)	CY	25.800				25.800	
	420-6029	CL C CONC (CAP)	CY	20.800				20.800	
	420-6037	CL C CONC (COLUMN)	CY	9.800				9.800	
	420-6074	CL C CONC (MISC)	CY			4.000		4.000	
	422-6007	REINF CONC SLAB (SLAB BEAM)	SF	4,207.000				4,207.000	
	422-6015	APPROACH SLAB	CY	64.200				64.200	
	425-6009	PRESTR CONC SLAB BEAM (4SB12)	LF	394.000				394.000	
	425-6010	PRESTR CONC SLAB BEAM (5SB12)	LF	492.500				492.500	



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 2520-01-016

DISTRICT San Antonio
HIGHWAY FM 2200

COUNTY Medina

CONTROL SECTION JOB				2520-01-015		2520-01-016		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00131341		A00177362			
COUNTY				Medina		Medina			
HIGHWAY				FM 2200		FM 2200			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL		
	432-6002	RIPRAP (CONC)(5 IN)	CY	67.500		9.000		76.500	
	432-6033	RIPRAP (STONE PROTECTION)(18 IN)	CY	861.000				861.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	39.900				39.900	
	450-6006	RAIL (TY T223)	LF	224.000				224.000	
	450-6052	RAIL (HANDRAIL)(TY F)	LF			42.000		42.000	
	454-6004	ARMOR JOINT (SEALED)	LF	76.000				76.000	
	459-6002	GABION MATTRESSES (GALV)	CY			58.000		58.000	
	462-6006	CONC BOX CULV (5 FT X 2 FT)	LF			200.000		200.000	
	462-6050	CONC BOX CULV (5 FT X 2 FT)(EXTEND)	LF			90.000		90.000	
	464-6032	RC PIPE (ARCH)(CL III)(DES 3)	LF			586.000		586.000	
	467-6171	SET (TY I)(S= 5 FT)(HW= 3 FT)(3:1) (C)	EA			6.000		6.000	
	467-6172	SET (TY I)(S= 5 FT)(HW= 3 FT)(4:1) (C)	EA			8.000		8.000	
	467-6545	SET (TY II) (DES 3) (RCP) (6: 1) (P)	EA			32.000		32.000	
	471-6003	GRATE & FRAME	EA			18.000		18.000	
	480-6001	CLEAN EXIST CULVERTS	EA			6.000		6.000	
	496-6004	REMOV STR (SET)	EA			28.000		28.000	
	496-6007	REMOV STR (PIPE)	LF			597.000		597.000	
	496-6008	REMOV STR (BOX CULVERT)	LF			12.000		12.000	
	496-6009	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	EA	1.000				1.000	
	500-6001	MOBILIZATION	LS			1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO			20.000		20.000	
	506-6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF	90.000				90.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	90.000				90.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY			224.000		224.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY			224.000		224.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1,185.000		2,176.000		3,361.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1,185.000		2,176.000		3,361.000	
	508-6001	CONSTRUCTING DETOURS	SY			1,062.000		1,062.000	
	510-6003	ONE-WAY TRAF CONT (PORT TRAF SIG)	MO			14.000		14.000	
	529-6008	CONC CURB & GUTTER (TY II)	LF			736.000		736.000	
	529-6016	CONC CURB (TY F1)	LF			21.000		21.000	
	530-6004	DRIVEWAYS (CONC)	SY			3,585.000		3,585.000	
	530-6008	TURNOUTS (ACP)	SY			368.000		368.000	
	531-6001	CONC SIDEWALKS (4")	SY			1,056.000		1,056.000	
	531-6004	CURB RAMPS (TY 1)	EA			2.000		2.000	
	531-6005	CURB RAMPS (TY 2)	EA			1.000		1.000	
	531-6010	CURB RAMPS (TY 7)	EA			6.000		6.000	



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 2520-01-016

DISTRICT San Antonio
HIGHWAY FM 2200

COUNTY Medina

CONTROL SECTION JOB				2520-01-015		2520-01-016		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00131341		A00177362			
COUNTY				Medina		Medina			
HIGHWAY				FM 2200		FM 2200			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL		
	531-6013	CURB RAMPS (TY 10)	EA			2.000		2.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	400.000				400.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	4.000				4.000	
	540-6014	SHORT RADIUS	LF	34.000				34.000	
	540-6015	DRIVEWAY TERMINAL ANCHOR SECTION	EA	1.000				1.000	
	540-6039	MTL BM GD FEN TRANS (31"-28")(25')	EA	1.000				1.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	3.000				3.000	
	560-6011	MAILBOX INSTALL-S (TWW-POST) TY 4	EA	1.000				1.000	
	560-6025	RELOCATE EXISTING MAILBOX	EA			33.000		33.000	
	618-6046	CONDT (PVC) (SCH 80) (2")	LF			44.000		44.000	
	618-6053	CONDT (PVC) (SCH 80) (3")	LF			50.000		50.000	
	618-6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF			105.000		105.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF			222.000		222.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF			176.000		176.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA			3.000		3.000	
	628-6120	ELC SRV TY D 120/240 060(NS)AL(N)PS(U)	EA			1.000		1.000	
	636-6001	ALUMINUM SIGNS (TY A)	SF			65.000		65.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	2.000		26.000		28.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA			8.000		8.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	2.000		33.000		35.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	10.000				10.000	
	658-6047	INSTL OM ASSM (OM-2Y)(WC)GND	EA			8.000		8.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	30.000				30.000	
	662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF			22,166.000		22,166.000	
	662-6016	WK ZN PAV MRK NON-REMOV (W)24"(SLD)	LF			30.000		30.000	
	662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF			4,140.000		4,140.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF			140.000		140.000	
	666-6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF			200.000		200.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF			572.000		572.000	
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA			2.000		2.000	
	666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA			2.000		2.000	
	666-6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF			272.000		272.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF			106.000		106.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	800.000				800.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF			2,424.000		2,424.000	
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	100.000				100.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	660.000				660.000	



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DISTRICT San Antonio
HIGHWAY FM 2200

COUNTY Medina

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CONTROL SECTION JOB				2520-01-015		2520-01-016		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00131341		A00177362			
COUNTY				Medina		Medina			
HIGHWAY				FM 2200		FM 2200			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL		
	666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF			23,184.000		23,184.000	
	666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)	LF			3,030.000		3,030.000	
	666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF			5,998.000		5,998.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA			240.000		240.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA			14.000		14.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF			2,730.000		2,730.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF			140.000		140.000	
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF			323.000		323.000	
	677-6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA			2.000		2.000	
	677-6012	ELIM EXT PAV MRK & MRKS (WORD)	EA			2.000		2.000	
	680-6001	INSTALL HWY TRF SIG (FLASH BEACON)	EA			1.000		1.000	
	682-6003	VEH SIG SEC (12")LED(YEL)	EA			11.000		11.000	
	684-6012	TRF SIG CBL (TY A)(12 AWG)(7 CONDR)	LF			176.000		176.000	
	684-6080	TRF SIG CBL (TY C)(14 AWG)(2 CONDR)	LF			88.000		88.000	
	685-6001	INSTALL RDSB FLASH BEACON ASSEMBLY	EA			2.000		2.000	
	685-6004	INSTL RDSB FLSH BCN ASSM (SOLAR PWRD)	EA			1.000		1.000	
	685-6006	REMOV RDSB FLSH BCN AM (SOLAR PWRD)	EA			1.000		1.000	
	688-6001	PED DETECT PUSH BUTTON (APS)	EA			2.000		2.000	
	688-6003	PED DETECTOR CONTROLLER UNIT	EA			1.000		1.000	
	730-6106	STRIP MOWING	CYC	2.000		7.000		9.000	
	734-6002	LITTER REMOVAL	CYC	6.000		20.000		26.000	
	3076-6001	D-GR HMA TY-B PG64-22	TON	251.000		6,144.000		6,395.000	
	3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	146.000		4,365.000		4,511.000	
	3077-6075	TACK COAT	GAL	219.000		4,538.000		4,757.000	
	3085-6001	UNDERSEAL COURSE	GAL	414.000		5,858.000		6,272.000	
	5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY			18,114.000		18,114.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000				2.000	
	6480-6001	DRIVEWAY ASSISTANCE DEVICE(DAD) SYSTEM	MO			14.000		14.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000		2.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000		2.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000		2.000	
1	400-6005	CEM STABIL BKFL	CY	38.000		181.000		219.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF			998.000		998.000	
	464-6018	RC PIPE (CL IV)(24 IN)	LF			100.000		100.000	
	467-6390	SET (TY II) (24 IN) (RCP) (4: 1) (C)	EA			4.000		4.000	

DISTRICT	COUNTY	CCSJ	SHEET
San Antonio	Medina	2520-01-016	12C



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 2520-01-016

DISTRICT San Antonio

COUNTY Medina

HIGHWAY FM 2200

CONTROL SECTION JOB				2520-01-015		2520-01-016		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00131341		A00177362			
COUNTY				Medina		Medina			
HIGHWAY				FM 2200		FM 2200			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL		
1	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA			64.000		64.000	
1A	400-6005	CEM STABIL BKFL	CY	38.000		321.000		359.000	
	467-6609	SET (TY II) (24 IN) (PP) (6: 1) (P)	EA			64.000		64.000	
	467-6610	SET (TY II) (24 IN) (PP) (4: 1) (C)	EA			4.000		4.000	
	4122-6024	THERMO PIPE(24")(PP)(TY S)(TY II)	LF			1,098.000		1,098.000	

TCP SUMMARY

Plotted on: 1/30/2023



ITEM		0400-6006	0502-6001	0508-6001	0510-6003	0662-6004	0662-6016	0662-6034
TRAFFIC CONTROL PLAN		CUT & RESTORING PAV	BARRICADES, SIGNS AND TRAFFIC HANDLING	CONSTRUCTING DETOURS	ONE-WAY TRAF CONT (PORT TRAF SIG)	WK ZN PAV MRK NON-REMOV (W) 4" (SLD)	WK ZN PAV MRK NON-REMOV (W) 24" (SLD)	WK ZN PAV MRK NON-REMOV (Y) 4" (SLD)
SHT NO		SY	MO	SY	MO	LF	LF	LF
1	CSJ 2520-01-016		20		14			
39	TCP PHASE 1 TEMPORARY WIDENING DETAIL	230		1062				
40	TCP PHASE 4 STEP 2					2344	12	2468
41	TCP PHASE 4 STEP 2					100	18	
42	TCP PHASE 4 STEP 3					672		672
43	TCP PHASE 4 STEP 3					930		1000
NONE	TCP PHASE 2					18120		
	TOTALS	230	20	1062	14	22166	30	4140

ITEM		0672-6009	0677-6001	0730-6106	0734-6002	6480-6001
TRAFFIC CONTROL PLAN		REFL PAV MRKR TY II-A-A	ELIM EXT PAV MRK & MRKS (4")	STRIP MOWING	LITTER REMOVAL	DRIVEWAY ASSISTANCE DEVICE (DAD) SYSTEM
SHT NO		EA	LF	CYC	CYC	MO
1	CSJ 2520-01-016			7	20	14
39	TCP PHASE 1 TEMPORARY WIDENING DETAIL					
40	TCP PHASE 4 STEP 2	124				
41	TCP PHASE 4 STEP 2		200			
42	TCP PHASE 4 STEP 3	34				
43	TCP PHASE 4 STEP 3	50				
NONE	TCP PHASE 2					
	TOTALS	208	200	7	20	14

6480-6001 DRIVEWAY ASSISTANCE DEVICE (DAD) SYSTEM					
DW NO	STATION	SIDE	WIDTH FT	TCP PHASE/ STEP/ SEGMENT	PHASE DURATION
1	606+85	RT	20	PHASE 2 STEP 1 & 2 SEGMENT 4	2 MONTHS
2	626+77	LT	14	PHASE 2 STEPS 1 & 2 SEGMENT 5	2 MONTHS
3	627+50	LT	14		
4	637+40	LT	14	PHASE 2 STEPS 1 & 2 SEGMENT 6	1.75 MONTHS
5	644+89	RT	14		
6	646+43	LT	14		
7	647+57	RT	14		
8	648+80	RT	14		
9	651+87	RT	14	PHASE 2 STEPS 1 & 2 SEGMENT 7	2 MONTHS
10	656+23	LT	21		
11	659+40	LT	14		
12	659+58	RT	14	PHASE 2 STEP 1 & 2 SEGMENT 1	2 MONTHS
13	664+03	RT	14		
16	674+84	LT	14		
17	675+61	LT	14		
18	677+65	RT	14		
19	677+66	LT	14	PHASE 2 STEP 1 & 2 SEGMENT 2	2 MONTHS
20	678+53	RT	14		
21	678+71	LT	14		
22	680+62	RT	14		
23	681+49	LT	14		
24	682+68	RT	14		
25	683+69	LT	14		
26	684+19	RT	14		
27	685+23	LT	14		
28	686+14	LT	14		
29	687+25	RT	14		
30	689+24	LT	14		

6480-6001 DRIVEWAY ASSISTANCE DEVICE (DAD) SYSTEM					
DW NO	STATION	SIDE	WIDTH FT	TCP PHASE/ STEP/ SEGMENT	PHASE DURATION
40	705+56	LT	18	PHASE 4 STEP 2	1.5 MONTHS
41	705+70	RT	17		
42	706+96	RT	15		
43	707+60	RT	15		
44	708+74	LT	20		
45	708+95	RT	15		
46	709+26	LT	24		
47	710+09	RT	14		
48	710+79	LT	22		
49	711-33	LT	14		

Design File name: P:\117\99\04\Design\Civil\Summaries\1179904_SUMMARY_TCP.dgn

REV. NO.	DATE	DESCRIPTION	BY
 <p>PAPE-DAWSON ENGINEERS</p> <p>SAN ANTONIO AUSTIN HOUSTON FORT WORTH DALLAS 2000 NW LOOP 410 SAN ANTONIO, TX 78213 210.375.9000 TEXAS ENGINEERING FIRM #470 TEXAS SURVEYING FIRM #10028800</p>			
 <p>Texas Department of Transportation © 2023</p>			
FM 2200 SUMMARY OF TCP QUANTITIES CSJ: 2520-01-016			
DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO. JOB NO. SHEET NO.
CHK DWG:	SAT	MEDINA	2520 01 016, ETC 13

ROADWAY SUMMARY

ITEM	0100-6002	0100-6011	0104-6015	0104-6017	0104-6022	0104-6036	0105-6002
ROADWAY	PREPARING ROW	PREPARING ROW (TREE) (24" TO 36" DIA.)	REMOVING CONC (SIDEWALKS)	REMOVING CONC (DRIVEWAYS)	REMOVING CONC (CURB AND GUTTER)	REMOVING CONC (SIDEWALK OR RAMP)	REMOVING STAB BASE AND ASPH PAV (2")
SHT NO	STA	EA	SY	SY	LF	SY	SY
84	BEGIN PROJECT TO STA 598+00	5.0					112
85	STA 598+00 TO STA 608+00	10.0					223
86	STA 608+00 TO STA 618+00	10.0					223
87	STA 618+00 TO STA 628+00	10.0					223
88	STA 628+00 TO STA 638+00	10.0					223
89	STA 638+00 TO STA 648+00	10.0					223
90	STA 648+00 TO STA 658+00	10.0					223
91	STA 658+00 TO STA 668+00	9.5					174
92	STA 668+00 TO STA 678+00	6.5					747
93	STA 678+00 TO STA 688+00	10.0					1556
94	STA 688+00 TO STA 698+00	10.0					312
95	STA 698+00 TO STA 708+00	10.0					
96	STA 708+00 TO STA 712+30	4.3					
97	SIDEWALK STA 702+00 TO STA 704+00						
98	SIDEWALK STA 704+00 TO STA 706+00						
99	SIDEWALK STA 706+00 TO STA 708+00						
100	SIDEWALK STA 708+00 TO STA 710+00						
101	SIDEWALK STA 710+00 TO STA 712+00		1	2			
102	SIDEWALK STA 712+00 TO STA 714+00	1.7			105	117	
103	SIDEWALK STA 714+00 TO STA 716+00	2.0				16	
104	SIDEWALK STA 716+00 TO STA 718+00	2.0			55	95	2
105	SIDEWALK STA 718+00 TO STA 720+00	2.0				23	18
106	SIDEWALK STA 720+00 TO STA 721+80	1.8					
107	SIDEWALK STA 721+80 TO END PROJECT	0.2				5	
TOTALS		125.0	1	2	160	256	4239



ITEM	0105-6013	0105-6016	0105-6041	0110-6001	0132-6005	0247-6475	0310-6027
ROADWAY	REMOVING STAB BASE & ASPH PAV (9")	REMOVING STAB BASE & ASPH PAV (16")	REMOVING STAB BASE AND ASPH PAV (8")	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY C)	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	PRIME COAT (MC-30 OR AE-P)
SHT NO	SY	SY	SY	CY	CY	CY	GAL
84	BEGIN PROJECT TO STA 598+00	503			360	969	272
85	STA 598+00 TO STA 608+00	1046			791	2097	458
86	STA 608+00 TO STA 618+00	1029			1317	17	458
87	STA 618+00 TO STA 628+00	1048			2751	32	458
88	STA 628+00 TO STA 638+00	974			3192	25	501
89	STA 638+00 TO STA 648+00	870			2607	52	458
90	STA 648+00 TO STA 658+00	916			1577	94	458
91	STA 658+00 TO STA 668+00	737			2534	13	462
92	STA 668+00 TO STA 678+00		418		1178	34	337
93	STA 678+00 TO STA 688+00		906		2187	500	484
94	STA 688+00 TO STA 698+00		343	1043	1576	760	97
95	STA 698+00 TO STA 708+00			903	1194	1505	228
96	STA 708+00 TO STA 712+30			536	1011	92	306
97	SIDEWALK STA 702+00 TO STA 704+00						
98	SIDEWALK STA 704+00 TO STA 706+00						
99	SIDEWALK STA 706+00 TO STA 708+00						
100	SIDEWALK STA 708+00 TO STA 710+00						
101	SIDEWALK STA 710+00 TO STA 712+00						
102	SIDEWALK STA 712+00 TO STA 714+00						
103	SIDEWALK STA 714+00 TO STA 716+00						
104	SIDEWALK STA 716+00 TO STA 718+00						
105	SIDEWALK STA 718+00 TO STA 720+00						
106	SIDEWALK STA 720+00 TO STA 721+80						
107	SIDEWALK STA 721+80 TO END PROJECT						
TOTALS	7123	1667	2482	22275	6190	5869	4977

ITEM	0316-6240	0316-6419	0420-6074	0450-6052	0464-6005	0464-6032	0467-6395
ROADWAY	AGGR (TY-PD GR-4 SAC-B)	ASPH (AC-15P, AC-20-STR OR AC-20XP)	CL C CONC (MISC)	RAIL (HANDRAIL) (TY F)	RC PIPE (CL III) (24 IN)	RC PIPE (ARCH) (CL III) (DES 3)	SET (TY II) (24 IN) (RCP) (6: 1) (P)
SHT NO	CY	GAL	CY	LF	LF	LF	EA
84	BEGIN PROJECT TO STA 598+00	40	1024				
85	STA 598+00 TO STA 608+00	51	1134				
86	STA 608+00 TO STA 618+00	51	1134			30	
87	STA 618+00 TO STA 628+00	51	1134				4
88	STA 628+00 TO STA 638+00	54	1199			60	2
89	STA 638+00 TO STA 648+00	51	1134			30	4
90	STA 648+00 TO STA 658+00	51	1134			60	4
91	STA 658+00 TO STA 668+00	44	889			169	8
92	STA 668+00 TO STA 678+00	14				120	8
93	STA 678+00 TO STA 688+00	20				270	18
94	STA 688+00 TO STA 698+00	6	80			145	10
95	STA 698+00 TO STA 708+00	10				84	6
96	STA 708+00 TO STA 712+30	13					166
97	SIDEWALK STA 702+00 TO STA 704+00						
98	SIDEWALK STA 704+00 TO STA 706+00						
99	SIDEWALK STA 706+00 TO STA 708+00						
100	SIDEWALK STA 708+00 TO STA 710+00						
101	SIDEWALK STA 710+00 TO STA 712+00						
102	SIDEWALK STA 712+00 TO STA 714+00						
103	SIDEWALK STA 714+00 TO STA 716+00						
104	SIDEWALK STA 716+00 TO STA 718+00			4	42		
105	SIDEWALK STA 718+00 TO STA 720+00						
106	SIDEWALK STA 720+00 TO STA 721+80						
107	SIDEWALK STA 721+80 TO END PROJECT						
TOTALS	454	8862	4	42	998	586	64

ALTERNATE BID ITEMS

ITEM	0467-6609#	4122-6024	0400-6005
	SET (TY II) (24 IN) (PP) (6: 1) (P)	THERMO PIPE (24") (PP) (TY S) (TY II)	CEM STABIL BKFL
	EA	LF	CY
TOTALS	64	998	140

NOTE:
 0467-6609 REPLACES 0467-6395
 4122-6024 REPLACES 0464-6005
 0400-6005 IS ADDED TO BASE BID ITEM
 * - SET UNIT IS TO BE CONCRETE AS DETAILED IN PBGC STANDARD (SEE SHEET 248)

REV. NO.	DATE	DESCRIPTION	BY
 SAN ANTONIO AUSTIN HOUSTON FORT WORTH DALLAS 2000 NW LOOP 410 SAN ANTONIO, TX 78213 210.375.9000 TEXAS ENGINEERING FIRM #470 TEXAS SURVEYING FIRM #10028800			
 ©2023			
FM 2200 SUMMARY OF ROADWAY QUANTITIES CSJ: 2520-01-016			
SHEET 1 OF 2			
CHK DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:
DWG:	6	TEXAS	SEE TITLE SHEET
CHK DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO. JOB NO. SHEET NO.:
	SAT	MEDINA	2520 01 016, ETC 14

Plotted on: 2/7/2023

Design File name: P:\117\99\04\Des\ign\Civil\Summary\1179904_SUMM_RDWY.dgn


ROADWAY SUMMARY CONTINUED

ITEM		0467-6545	0471-6003	0496-6004	0496-6007	0529-6008	0530-6004	0530-6008
ROADWAY		SET (TY II) (DES 3) (RCP) (6: 1) (P)	GRATE & FRAME	REMOV STR (SET)	REMOV STR (PIPE)	CONC CURB & GUTTER (TY II)	DRIVEWAYS (CONC)	TURNOUTS (ACP)
SHT NO		EA	EA	EA	LF	LF	SY	SY
84	BEGIN PROJECT TO STA 598+00							
85	STA 598+00 TO STA 608+00	2					85	
86	STA 608+00 TO STA 618+00							
87	STA 618+00 TO STA 628+00						166	70
88	STA 628+00 TO STA 638+00						56	20
89	STA 638+00 TO STA 648+00						187	15
90	STA 648+00 TO STA 658+00						204	40
91	STA 658+00 TO STA 668+00	2					261	13
92	STA 668+00 TO STA 678+00	8					288	28
93	STA 678+00 TO STA 688+00	2		4	211		580	110
94	STA 688+00 TO STA 698+00			2	46		315	36
95	STA 698+00 TO STA 708+00	12		2	53		822	36
96	STA 708+00 TO STA 712+30	6				136	447	
97	SIDEWALK STA 702+00 TO STA 704+00							
98	SIDEWALK STA 704+00 TO STA 706+00							
99	SIDEWALK STA 706+00 TO STA 708+00							
100	SIDEWALK STA 708+00 TO STA 710+00							
101	SIDEWALK STA 710+00 TO STA 712+00							
102	SIDEWALK STA 712+00 TO STA 714+00					117	110	
103	SIDEWALK STA 714+00 TO STA 716+00					16		
104	SIDEWALK STA 716+00 TO STA 718+00		18			95	64	
105	SIDEWALK STA 718+00 TO STA 720+00					155		
106	SIDEWALK STA 720+00 TO STA 721+80					200		
107	SIDEWALK STA 721+80 TO END PROJECT					17		
	TOTALS	32	18	8	310	736	3585	368


ITEM		0531-6001	0531-6004	0531-6005	0531-6010	0531-6013	0560-6025	3076-6001
ROADWAY		CONC SIDEWALKS (4")	CURB RAMPS (TY 1)	CURB RAMPS (TY 2)	CURB RAMPS (TY 7)	CURB RAMPS (TY 10)	RELOCATE EXISTING MAILBOX	D-GR HMA TY-B PG64-22
SHT NO		SY	EA	EA	EA	EA	EA	TON
84	BEGIN PROJECT TO STA 598+00							
85	STA 598+00 TO STA 608+00							
86	STA 608+00 TO STA 618+00							
87	STA 618+00 TO STA 628+00						4	
88	STA 628+00 TO STA 638+00						1	
89	STA 638+00 TO STA 648+00						2	
90	STA 648+00 TO STA 658+00						3	
91	STA 658+00 TO STA 668+00						1	116
92	STA 668+00 TO STA 678+00						2	374
93	STA 678+00 TO STA 688+00						8	529
94	STA 688+00 TO STA 698+00						3	2170
95	STA 698+00 TO STA 708+00						5	2614
96	STA 708+00 TO STA 712+30						2	341
97	SIDEWALK STA 702+00 TO STA 704+00	80						
98	SIDEWALK STA 704+00 TO STA 706+00	122						
99	SIDEWALK STA 706+00 TO STA 708+00	134						
100	SIDEWALK STA 708+00 TO STA 710+00	104						
101	SIDEWALK STA 710+00 TO STA 712+00	92	2		4			
102	SIDEWALK STA 712+00 TO STA 714+00	108					1	
103	SIDEWALK STA 714+00 TO STA 716+00	139						
104	SIDEWALK STA 716+00 TO STA 718+00	57			2		1	
105	SIDEWALK STA 718+00 TO STA 720+00	89				2		
106	SIDEWALK STA 720+00 TO STA 721+80	120						
107	SIDEWALK STA 721+80 TO END PROJECT	11		1				
	TOTALS	1056	2	1	6	2	33	6144

ITEM		3076-6025	3077-6075	3085-6001	5001-6002
ROADWAY		D-GR HMA TY-C SAC-B PG70-22	TACK COAT	UNDERSEAL COURSE	GEOGRID BASE REINFORCEMENT (TY II)
SHT NO		TON	GAL	GAL	SY
84	BEGIN PROJECT TO STA 598+00	167			1431
85	STA 598+00 TO STA 608+00	284			2426
86	STA 608+00 TO STA 618+00	284			2426
87	STA 618+00 TO STA 628+00	284			2426
88	STA 628+00 TO STA 638+00	309			2644
89	STA 638+00 TO STA 648+00	284			2426
90	STA 648+00 TO STA 658+00	284			2426
91	STA 658+00 TO STA 668+00	311	101	229	1909
92	STA 668+00 TO STA 678+00	299	325	780	
93	STA 678+00 TO STA 688+00	437	460	1139	
94	STA 688+00 TO STA 698+00	530	1660	1383	
95	STA 698+00 TO STA 708+00	607	1695	1585	
96	STA 708+00 TO STA 712+30	285	297	742	
97	SIDEWALK STA 702+00 TO STA 704+00				
98	SIDEWALK STA 704+00 TO STA 706+00				
99	SIDEWALK STA 706+00 TO STA 708+00				
100	SIDEWALK STA 708+00 TO STA 710+00				
101	SIDEWALK STA 710+00 TO STA 712+00				
102	SIDEWALK STA 712+00 TO STA 714+00				
103	SIDEWALK STA 714+00 TO STA 716+00				
104	SIDEWALK STA 716+00 TO STA 718+00				
105	SIDEWALK STA 718+00 TO STA 720+00				
106	SIDEWALK STA 720+00 TO STA 721+80				
107	SIDEWALK STA 721+80 TO END PROJECT				
	TOTALS	4365	4538	5858	18114

REV. NO.	DATE	DESCRIPTION	BY



 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



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FM 2200
**SUMMARY OF
 ROADWAY QUANTITIES**
CSJ: 2520-01-016

SHEET 2 OF 2

DON:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 15

Plotted on: 2/6/2023



Design File name: P:\117\99\04\Design\Civil\Summaries\1179904_SUMM_RDWY.dgn

SIGNING & PAVEMENT MARKINGS SUMMARY

SHT NO	ITEM SIGNING & PAVEMENT MARKINGS	0636-6001	0644-6001	0644-6004	0644-6076	0658-6047	0666-6036	0666-6042
		ALUMINUM SIGNS (TY A)	IN SM RD SN SUP&AM TY10BWG (1) SA (P)	IN SM RD SN SUP&AM TY10BWG (1) SA (T)	REMOVE SM RD SN SUP&AM	INSTL OM ASSM (OM-2Y) (WC) GND	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
84	BEGIN PROJECT TO STA 598+00	SF	EA	EA	EA	EA	LF	LF
85	STA 598+00 TO STA 608+00		1		1	1		
86	STA 608+00 TO STA 618+00		1	1	1			
87	STA 618+00 TO STA 628+00							
88	STA 628+00 TO STA 638+00		4		4			
89	STA 638+00 TO STA 648+00		2		2	2		
90	STA 648+00 TO STA 658+00				1	2		
91	STA 658+00 TO STA 668+00		1		1			
92	STA 668+00 TO STA 678+00							
93	STA 678+00 TO STA 688+00		2		3			
94	STA 688+00 TO STA 698+00		5	1	7			
95	STA 698+00 TO STA 708+00	11	3	2	6	2		
96	STA 708+00 TO STA 712+30		3	1	4			200
100	SIDEWALK STA 708+00 TO STA 710+00			1				
101	SIDEWALK STA 710+00 TO STA 712+00		1					
102	SIDEWALK STA 712+00 TO STA 714+00		1	1				
103	SIDEWALK STA 714+00 TO STA 716+00							
104	SIDEWALK STA 716+00 TO STA 718+00							
105	SIDEWALK STA 718+00 TO STA 720+00	8	1					
106	SIDEWALK STA 720+00 TO STA 721+80		1	1	2			
107	SIDEWALK STA 721+80 TO END PROJECT						140	
	TOTALS	19	26	8	33	8	140	200

SHT NO	ITEM SIGNING & PAVEMENT MARKINGS	0666-6048	0666-6054	0666-6078	0666-6147	0666-6300	0666-6315	0666-6343
		REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	REFL PAV MRK TY I (W) (ARROW) (100MIL)	REFL PAV MRK TY I (W) (WORD) (100MIL)	REFL PAV MRK TY I (Y) 24" (SLD) (100MIL)	RE PM W/RET REQ TY I (W) 4" (BRK) (100MIL)	RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	REF PROF PAV MRK TY I (W) 6" (SLD) (100MIL)
84	BEGIN PROJECT TO STA 598+00	LF	EA	EA	LF	LF	LF	LF
85	STA 598+00 TO STA 608+00	24						1879
86	STA 608+00 TO STA 618+00							2000
87	STA 618+00 TO STA 628+00							2000
88	STA 628+00 TO STA 638+00							2000
89	STA 638+00 TO STA 648+00	32						1879
90	STA 648+00 TO STA 658+00							2000
91	STA 658+00 TO STA 668+00							1900
92	STA 668+00 TO STA 678+00							1300
93	STA 678+00 TO STA 688+00							2000
94	STA 688+00 TO STA 698+00	64						1743
95	STA 698+00 TO STA 708+00	34			219			1953
96	STA 708+00 TO STA 712+30	127			21			530
100	SIDEWALK STA 708+00 TO STA 710+00							
101	SIDEWALK STA 710+00 TO STA 712+00							
102	SIDEWALK STA 712+00 TO STA 714+00						340	
103	SIDEWALK STA 714+00 TO STA 716+00						400	
104	SIDEWALK STA 716+00 TO STA 718+00	12					300	
105	SIDEWALK STA 718+00 TO STA 720+00	68					300	
106	SIDEWALK STA 720+00 TO STA 721+80						400	
107	SIDEWALK STA 721+80 TO END PROJECT	211	2	2	32	106	684	
	TOTALS	572	2	2	272	106	2424	23184

SHT NO	ITEM SIGNING & PAVEMENT MARKINGS	0666-6346	0666-6347	0672-6009	0672-6010	0677-6001	0677-6003	0677-6007
		REF PROF PAV MRK TY I (Y) 6" (BRK) (100MIL)	REF PROF PAV MRK TY I (Y) 6" (SLD) (100MIL)	REFL PAV MRKR TY II-A-A	REFL PAV MRKR TY II-C-R	ELIM EXT PAV MRK & MRKS (4")	ELIM EXT PAV MRK & MRKS (8")	ELIM EXT PAV MRK & MRKS (24")
84	BEGIN PROJECT TO STA 598+00	LF	LF	EA	EA	LF	LF	LF
85	STA 598+00 TO STA 608+00	250						
86	STA 608+00 TO STA 618+00	250						
87	STA 618+00 TO STA 628+00	250						
88	STA 628+00 TO STA 638+00	250						
89	STA 638+00 TO STA 648+00	250	100					
90	STA 648+00 TO STA 658+00	250	1000					
91	STA 658+00 TO STA 668+00	190	1150					
92	STA 668+00 TO STA 678+00	160	250					
93	STA 678+00 TO STA 688+00	250						
94	STA 688+00 TO STA 698+00	218	321					
95	STA 698+00 TO STA 708+00	341	2469					
96	STA 708+00 TO STA 712+30	121	708					
100	SIDEWALK STA 708+00 TO STA 710+00							
101	SIDEWALK STA 710+00 TO STA 712+00							
102	SIDEWALK STA 712+00 TO STA 714+00					340		
103	SIDEWALK STA 714+00 TO STA 716+00					400		
104	SIDEWALK STA 716+00 TO STA 718+00					300		12
105	SIDEWALK STA 718+00 TO STA 720+00					300		68
106	SIDEWALK STA 720+00 TO STA 721+80					400		
107	SIDEWALK STA 721+80 TO END PROJECT			32	14	790	140	243
	TOTALS	3030	5998	32	14	2530	140	323

REV. NO.	DATE	DESCRIPTION						BY	
 <p> PAPE-DAWSON ENGINEERS SAN ANTONIO AUSTIN HOUSTON FORT WORTH DALLAS 2000 NW LOOP 410 SAN ANTONIO, TX 78213 210.375.9000 <small>TEXAS ENGINEERING FIRM #470 TEXAS SURVEYING FIRM #1002800</small> </p>									
 <p> Texas Department of Transportation ©2023 </p>									
FM 2200 SUMMARY OF SIGNING & PAVEMENT MARKING QUANTITIES CSJ: 2520-01-016									
SHEET 1 OF 2									
CHK DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:				HIGHWAY NO.:		
	6	TEXAS	SEE TITLE SHEET				FM 2200		
CHK DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:			
	SAT	MEDINA	2520	01	016, ETC	16			

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SIGNING & PAVEMENT MARKINGS SUMMARY CONTINUED

SHT NO	ITEM SIGNING & PAVEMENT MARKINGS	0677-6008	0677-6012	0682-6003	0685-6004	0685-6006
		ELIM EXT PAV MRK & MRKS (ARROW) EA	ELIM EXT PAV MRK & MRKS (WORD) EA	VEH SIG SEC (12") LED (YEL) EA	INSTL RDS FLSH BCN ASSM (SOLAR PWRD) EA	REMOV RDS FLSH BCN AM (SOLAR PWRD) EA
84	BEGIN PROJECT TO STA 598+00					
85	STA 598+00 TO STA 608+00					
86	STA 608+00 TO STA 618+00					
87	STA 618+00 TO STA 628+00					
88	STA 628+00 TO STA 638+00					
89	STA 638+00 TO STA 648+00					
90	STA 648+00 TO STA 658+00					
91	STA 658+00 TO STA 668+00					
92	STA 668+00 TO STA 678+00					
93	STA 678+00 TO STA 688+00					
94	STA 688+00 TO STA 698+00					
95	STA 698+00 TO STA 708+00			3	1	1
96	STA 708+00 TO STA 712+30					
100	SIDEWALK STA 708+00 TO STA 710+00					
101	SIDEWALK STA 710+00 TO STA 712+00					
102	SIDEWALK STA 712+00 TO STA 714+00					
103	SIDEWALK STA 714+00 TO STA 716+00					
104	SIDEWALK STA 716+00 TO STA 718+00					
105	SIDEWALK STA 718+00 TO STA 720+00					
106	SIDEWALK STA 720+00 TO STA 721+80					
107	SIDEWALK STA 721+80 TO END PROJECT	2	2			
	TOTALS	2	2	3	1	1

Plotted on: 1/12/2023


Design File name: P:\117\99\04\Design\Civil\Summaries\1179904_SUMM_SPM.dgn

REV. NO.	DATE	DESCRIPTION	BY



PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



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FM 2200

**SUMMARY OF
SIGNING & PAVEMENT
MARKING QUANTITIES**

CSJ: 2520-01-016

SHEET 2 OF 2

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 17

PEDESTRIAN SIGNAL SUMMARY

ITEM	* 0416-6030	0618-6046	0618-6053	0618-6054	0620-6009	0620-6010
QUANTITY SUMMARY	DRILL SHAFT (TRF SIG POLE) (24 IN)	CONDT (PVC) (SCH 80) (2")	CONDT (PVC) (SCH 80) (3")	CONDT (PVC) (SCH 80) (3") (BORE)	ELEC CONDR (NO. 6) BARE	ELEC CONDR (NO. 6) INSULATED
SHT NO	LF	LF	LF	LF	LF	LF
178	12	44	50	105	222	176
TOTALS	12	44	50	105	222	176

ITEM	0624-6010	0628-6120	0636-6001	0680-6001	0682-6003	0684-6012
QUANTITY SUMMARY	GROUND BOX TY D (162922) W/APRON	ELC SRV TY D 120/240 060(NS)AL(N)PS(U)	ALUMINUM SIGNS (TY A)	INSTALL HWY TRF SIG (FLASH BEACON)	VEH SIG SEC (12") LED (YEL)	TRF SIG CBL (TY A) (12 AWG) (7 CONDR)
SHT NO	EA	EA	SF	EA	EA	LF
178	3	1	46	1	8	176
TOTALS	3	1	46	1	8	176


ITEM	0684-6080	0685-6001	0688-6001	0688-6003
QUANTITY SUMMARY	TRF SIG CBL (TY C) (14 AWG) (2 CONDR)	INSTALL RDS FLASH BEACON ASSEMBLY	PED DETECT PUSH BUTTON (APS)	PED DETECTOR CONTROLLER UNIT
SHT NO	LF	EA	EA	EA
178	88	2	2	1
TOTALS	88	2	2	1

*FOR CONTRACTOR INFORMATION ONLY. ITEM SUBSIDIARY TO ROADSIDE FLASHING BEACON ASSEMBLY.

Plotted on: 1/4/2023


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REV. NO.	DATE	DESCRIPTION	BY



PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



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FM 2200

SUMMARY OF
PEDESTRIAN SIGNAL
QUANTITIES
CSJ: 2520-01-016

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.
CHK DWG:	SAT	MEDINA	2520	01
			JOB NO.	SHEET NO.
			016, ETC	18

DRAINAGE SUMMARY

SHT NO	ITEM	BASE BID					
		0400-6005 CEM STABIL BKFL	0432-6002 RIPRAP (CONC) (5 IN)	0459-6002 GABION MATTRESSES (GALV)	0462-6006 CONC BOX CULV (5 FT X 2 FT)	0462-6050 CONC BOX CULV (5 FT X 2 FT) (EXTEND)	0464-6018 RC PIPE (CL IV) (24 IN)
209	CULVERT A-2 LAYOUT	23	CY	12	50	LF	EA
210	CULVERT A-3 LAYOUT	33		20	150		
211	CULVERT A-4 LAYOUT	41		10		100	
212	CULVERT A-5 LAYOUT	84		16		90	6
213	CULVERT A-6 LAYOUT		9				
	TOTALS	181	9	58	200	90	6

SHT NO	ITEM	BASE BID					
		0467-6172 SET (TY I) (S= 5 FT) (HW= 3 FT) (4:1) (C)	0467-6390 SET (TY II) (24 IN) (RCP) (4:1) (C)	0480-6001 CLEAN EXIST CULVERTS	0496-6004 REMOV STR (SET)	0496-6007 REMOV STR (PIPE)	0496-6008 REMOV STR (BOX CULVERT)
209	CULVERT A-2 LAYOUT	EA	EA	EA	EA	LF	LF
210	CULVERT A-3 LAYOUT	2			2	41	
211	CULVERT A-4 LAYOUT	6			8	164	
212	CULVERT A-5 LAYOUT		4		4	82	
213	CULVERT A-6 LAYOUT			6	6		12
	TOTALS	8	4	6	20	287	12

ALTERNATE BID ITEMS

ITEM	0467-6610#	4122-6024
	SET (TY II) (24 IN) (PP) (4:1) (C)	THERMO PIPE (24") (PP) (TY S) (TY II)
	EA	LF
TOTALS	4	100


NOTE:
 0467-6610 REPLACES 0467-6390
 4122-6024 REPLACES 0464-6018
 * - SET UNIT IS TO BE CONCRETE AS DETAILED IN PBGC STANDARD (SEE SHEET 248)

SW3P SUMMARY

SHT NO	ITEM	0150-6002	0161-6017	0162-6002	0164-6021	0164-6029	0164-6031	0168-6001
		BLADING	COMPOST MANUF TOPSOIL (BIP) (4")	BLOCK SODDING	CELL FBR MLCH SEED (PERM) (RURAL) (S ANDY)	CELL FBR MLCH SEED (TEMP) (WARM)	CELL FBR MLCH SEED (TEMP) (COOL)	VEGETATIVE WATERING
279	SW3P LAYOUTS BEGIN PROJECT TO STA 608+00	HR	SY	SY	SY	SY	SY	MG
280	SW3P LAYOUTS STA 608+00 TO STA 628+00	30			10593	2648	2648	165
281	SW3P LAYOUTS STA 628+00 TO STA 648+00	40			14394	3599	3599	225
282	SW3P LAYOUTS STA 648+00 TO STA 668+00	40			13973	3493	3493	218
283	SW3P LAYOUTS STA 668+00 TO STA 688+00	36			12409	3102	3102	194
284	SW3P LAYOUTS STA 688+00 TO STA 708+00	30			9522	2381	2381	149
285	SW3P LAYOUTS STA 708+00 TO END PROJECT	40			12918	3230	3230	202
	TOTALS	24	1106	1106	992	248	248	33
	TOTALS	240	1106	1106	74801	18700	18700	1186


SHT NO	ITEM	0169-6005	0506-6020	0506-6024	0506-6038	0506-6039
		SOIL RETENTION BLANKETS (CL 2) (TY E)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
279	SW3P LAYOUTS BEGIN PROJECT TO STA 608+00	SY	SY	SY	LF	LF
280	SW3P LAYOUTS STA 608+00 TO STA 628+00	5495	112	112	618	618
281	SW3P LAYOUTS STA 628+00 TO STA 648+00	184			102	102
282	SW3P LAYOUTS STA 648+00 TO STA 668+00				364	364
283	SW3P LAYOUTS STA 668+00 TO STA 688+00	250			716	716
284	SW3P LAYOUTS STA 688+00 TO STA 708+00				326	326
285	SW3P LAYOUTS STA 708+00 TO END PROJECT		112	112	50	50
	TOTALS	5929	224	224	2176	2176

REV. NO.	DATE	DESCRIPTION	BY



PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



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FM 2200
 SUMMARY OF DRAINAGE & SW3P QUANTITIES
 CSJ: 2520-01-016

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 19

Plotted on: 2/7/2023

Design File name: P:\11799\04\Design\Civil\Summaries\1179904_SUMM_DRN.dgn



EARTHWORK SUMMARY

END AREA VOLUME REPORT				
REPORT CREATED: 12/14/22				
Baseline Station	ITEM 110-6001		ITEM 132-6005	
	EXCAVATION (ROADWAY)	ACCUM	EMBANKMENT	ACCUM
	CY	CY	CY	CY
593+00	0	0	0	0
593+50	92	92	0	0
594+00	91	183	0	0
594+50	79	262	1	1
595+00	54	316	2	3
595+50	25	341	8	11
596+00	8	349	21	32
596+50	4	353	35	67
597+00	4	357	40	107
597+50	2	359	33	140
598+00	1	360	829	969
598+50	1	361	832	1801
599+00	3	364	31	1832
599+50	6	370	596	2428
600+00	6	376	587	3015
600+50	10	386	10	3025
601+00	13	399	10	3035
601+50	14	413	9	3044
602+00	19	432	6	3050
602+50	30	462	4	3054
603+00	45	507	2	3056
603+50	53	560	1	3057
604+00	54	614	1	3058
604+50	57	671	1	3059
605+00	60	731	1	3060
605+50	61	792	1	3061
606+00	65	857	1	3062
606+50	75	932	1	3063
607+00	75	1007	1	3064
607+50	72	1079	1	3065
608+00	72	1151	1	3066
608+50	70	1221	0	3066
609+00	69	1290	1	3067
609+50	69	1359	1	3068
610+00	63	1422	1	3069
610+50	53	1475	2	3071
611+00	50	1525	2	3073
611+50	55	1580	1	3074
612+00	57	1637	1	3075
612+50	57	1694	1	3076
613+00	59	1753	1	3077
613+50	65	1818	1	3078
614+00	71	1889	0	3078
614+50	73	1962	0	3078
615+00	76	2038	0	3078
615+50	80	2118	0	3078
616+00	88	2206	1	3079
616+50	77	2283	1	3080
617+00	60	2343	1	3081
617+50	62	2405	1	3082
618+00	63	2468	1	3083
618+50	64	2532	1	3084
619+00	58	2590	1	3085
619+50	53	2643	2	3087
620+00	50	2693	2	3089
620+50	0	2693	0	3089
621+00	137	2830	2	3091
621+50	137	2967	2	3093
622+00	133	3100	2	3095
622+50	141	3241	2	3097
623+00	152	3393	1	3098
623+50	161	3554	1	3099
624+00	169	3723	1	3100
624+50	172	3895	1	3101
625+00	174	4069	1	3102
625+50	166	4235	1	3103

END AREA VOLUME REPORT				
REPORT CREATED: 12/14/22				
Baseline Station	ITEM 110-6001		ITEM 132-6005	
	EXCAVATION (ROADWAY)	ACCUM	EMBANKMENT	ACCUM
	CY	CY	CY	CY
626+00	154	4389	2	3105
626+50	170	4559	3	3108
627+00	213	4772	3	3111
627+50	228	5000	2	3113
628+00	219	5219	2	3115
628+50	211	5430	1	3116
629+00	180	5610	1	3117
629+50	144	5754	2	3119
630+00	131	5885	3	3122
630+50	133	6018	3	3125
631+00	139	6157	2	3127
631+50	151	6308	1	3128
632+00	164	6472	0	3128
632+50	169	6641	0	3128
633+00	165	6806	0	3128
633+50	158	6964	0	3128
634+00	152	7116	1	3129
634+50	151	7267	1	3130
635+00	148	7415	1	3131
635+50	146	7561	1	3132
636+00	143	7704	1	3133
636+50	163	7867	1	3134
637+00	183	8050	2	3136
637+50	181	8231	2	3138
637+74	88	8319	1	3139
638+00	92	8411	1	3140
638+50	179	8590	1	3141
639+00	183	8773	0	3141
639+50	113	8886	0	3141
640+00	244	9130	7	3148
640+50	248	9378	7	3155
641+00	98	9476	0	3155
641+50	151	9627	0	3155
642+00	0	9627	0	3155
642+50	152	9779	1	3156
643+00	138	9917	2	3158
643+50	130	10047	3	3161
644+00	125	10172	4	3165
644+50	117	10289	4	3169
645+00	119	10408	4	3173
645+50	127	10535	2	3175
645+62	31	10566	0	3175
646+00	87	10653	1	3176
646+50	91	10744	4	3180
647+00	85	10829	5	3185
647+50	94	10923	4	3189
648+00	95	11018	3	3192
648+50	104	11122	2	3194
649+00	131	11253	2	3196
649+50	143	11396	1	3197
650+00	134	11530	1	3198
650+50	124	11654	1	3199
651+00	112	11766	2	3201
651+50	106	11872	3	3204
651+74	50	11922	2	3206
652+00	35	11957	2	3208
652+50	36	11993	4	3212
653+00	30	12023	22	3234
653+50	30	12053	21	3255
654+00	56	12109	3	3258
654+50	64	12173	2	3260
655+00	52	12225	5	3265
655+50	49	12274	6	3271
656+00	45	12319	5	3276
656+50	44	12363	5	3281
657+00	57	12420	3	3284

Plotted on: 12/20/2022

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REV. NO.	DATE	DESCRIPTION	BY		
 <p style="font-size: small;">SAN ANTONIO AUSTIN HOUSTON FORT WORTH DALLAS 2000 NW LOOP 410 SAN ANTONIO, TX 78213 210.375.9000 TEXAS ENGINEERING FIRM #470 TEXAS SURVEYING FIRM #10028800</p>					
 <p>© 2023</p>					
<p>FM 2200</p> <h2 style="margin: 0;">EARTHWORK SUMMARY</h2> <h3 style="margin: 0;">CSJ: 2520-01-016</h3>					
SHEET 1 OF 2					
CHK DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:	
	6	TEXAS	SEE TITLE SHEET	FM 2200	
CHK DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:
	SAT	MEDINA	2520	01	016, ETC
CHK DWG:					20



EARTHWORK SUMMARY CONTINUED

END AREA VOLUME REPORT				
REPORT CREATED: 12/14/22				
Baseline Station	ITEM 110-6001		ITEM 132-6005	
	EXCAVATION (ROADWAY)	ACCUM	EMBANKMENT	ACCUM
	CY	CY	CY	CY
657+50	77	12497	1	3285
658+00	98	12595	1	3286
658+50	118	12713	1	3287
659+00	132	12845	1	3288
659+50	138	12983	1	3289
660+00	204	13187	0	3289
660+50	271	13458	1	3290
661+00	263	13721	1	3291
661+50	215	13936	1	3292
662+00	168	14104	1	3293
662+50	139	14243	1	3294
663+00	110	14353	1	3295
663+50	117	14470	1	3296
664+00	125	14595	1	3297
664+50	147	14742	1	3298
665+00	182	14924	1	3299
665+50	205	15129	0	3299
673+50	0	15129	0	3299
674+00	115	15244	3	3302
674+50	127	15371	3	3305
675+00	144	15515	3	3308
675+50	152	15667	2	3310
676+00	149	15816	3	3313
676+50	139	15955	4	3317
677+00	131	16086	4	3321
677+50	116	16202	6	3327
678+00	105	16307	6	3333
678+50	104	16411	8	3341
679+00	107	16518	9	3350
679+50	107	16625	9	3359
680+00	122	16747	9	3368
680+50	139	16886	10	3378
681+00	147	17033	12	3390
681+21	67	17100	5	3395
681+50	114	17214	3	3398
682+00	183	17397	8	3406
682+50	126	17523	21	3427
683+00	107	17630	34	3461
683+50	99	17729	40	3501
684+00	91	17820	47	3548
684+50	88	17908	54	3602
685+00	94	18002	50	3652
685+50	90	18092	46	3698
686+00	105	18197	25	3723
686+50	91	18288	18	3741
687+00	63	18351	29	3770
687+27	39	18390	16	3786
687+50	34	18424	15	3801
688+00	70	18494	32	3833
688+50	75	18569	30	3863
689+00	76	18645	29	3892
689+50	77	18722	27	3919
690+00	65	18787	19	3938
690+50	51	18838	15	3953
691+00	51	18889	13	3966
691+50	73	18962	5	3971
692+00	120	19082	2	3973
692+50	161	19243	1	3974
693+00	142	19385	3	3977
693+50	112	19497	6	3983
694+00	105	19602	10	3993
694+50	83	19685	19	4012
695+00	71	19756	38	4050
695+50	67	19823	56	4106
696+00	59	19882	79	4185
696+50	55	19937	96	4281

END AREA VOLUME REPORT				
REPORT CREATED: 12/14/22				
Baseline Station	ITEM 110-6001		ITEM 132-6005	
	EXCAVATION (ROADWAY)	ACCUM	EMBANKMENT	ACCUM
	CY	CY	CY	CY
697+00	54	19991	97	4378
697+50	43	20034	103	4481
698+00	36	20070	112	4593
698+17	11	20081	40	4633
698+50	22	20103	80	4713
699+00	17	20120	137	4850
699+50	0	20120	173	5023
700+00	1	20121	218	5241
700+50	1	20122	218	5459
701+00	1	20123	180	5639
701+50	7	20130	151	5790
701+78	8	20138	69	5859
702+00	9	20147	40	5899
702+50	29	20176	53	5952
703+00	48	20224	24	5976
703+50	70	20294	15	5991
704+00	86	20380	15	6006
704+22	41	20421	7	6013
704+50	52	20473	6	6019
705+00	116	20589	9	6028
705+50	123	20712	11	6039
705+92	84	20796	14	6053
706+00	14	20810	3	6056
706+50	93	20903	16	6072
707+00	115	21018	8	6080
707+50	123	21141	8	6088
707+77	68	21209	5	6093
708+00	55	21264	5	6098
708+50	98	21362	11	6109
709+00	101	21463	7	6116
709+50	133	21596	3	6119
710+00	167	21763	0	6119
710+50	183	21946	0	6119
711+00	177	22123	0	6119
711+50	152	22275	71	6190
712+00	0	22275	0	6190
Grand Total:		22275	6190	

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Summaries\1179904_SUMM_EW.dgn

REV. NO.	DATE	DESCRIPTION	BY
 <p>PAPE-DAWSON ENGINEERS</p> <p>SAN ANTONIO AUSTIN HOUSTON FORT WORTH DALLAS 2000 NW LOOP 410 SAN ANTONIO, TX 78213 210.375.9000 TEXAS ENGINEERING FIRM #470 TEXAS SURVEYING FIRM #1002800</p>			
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<p>FM 2200</p> <p>EARTHWORK SUMMARY</p> <p>CSJ: 2520-01-016</p>			
SHEET 2 OF 2			
CHK DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:
	6	TEXAS	SEE TITLE SHEET
CHK DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO. JOB NO. SHEET NO.
	SAT	MEDINA	2520 01 016, ETC 21

MBGF AND DELINEATOR SUMMARY

ITEM	0432-6002	0432-6045	0540-6001	0540-6006	0540-6014	0540-6015	0540-6039	0544-6001	0658-6014
	RIPRAP (CONC) (5 IN)	RIPRAP (MOW STRIP) (4 IN)	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	SHORT RADIUS	DRIVEWAY TERMINAL ANCHOR SECTION	MTL BM GD FEN TRANS (31"-28") (25')	GUARDRAIL END TREATMENT (INSTALL)	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (B1)
	CY	CY	LF	EA	LF	EA	EA	EA	EA
TOTALS	67.5	39.9	400	4	34	1	1	3	10

ITEM	0658-6062
	INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2 (B1)
	EA
TOTALS	30


EARTHWORK SUMMARY

END AREA VOLUME REPORT						
REPORT CREATED: 06/13/22						
Baseline	ITEM 110-6001		ITEM 110-6002		ITEM 132-6005	
Station	EXCAVATION (ROADWAY)	ACCUM	EXCAVATION (CHANNEL)	ACCUM	EMBANKMENT	ACCUM
	CY	CY	CY	CY	CY	CY
665+80	0	0			0	0
666+00	61	61			1	1
666+50	130	191			8	8
667+00	93	284			57	65
667+50	86	370			130	195
668+00	74	444			161	356
668+50	63	507			154	511
668+97	79	586			106	617
669+97	0	586			0	617
670+00	12	598			7	624
670+50	150	748	2500	2500	114	739
671+00	84	832			72	810
671+50	90	923			61	871
672+00	101	1023			43	915
672+50	107	1131			28	943
673+00	93	1224			14	957
673+20	30	1254			3	960
Grand Total:	1254		2500		960	

Plotted on: 12/20/2022


Design File name: P:\117\99\03\Design\Civil\Summaries\1179903SUM01.dgn

REV. NO.	DATE	DESCRIPTION	BY



PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



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FM 2200 AT FRANCISCO
PEREZ CREEK

**SUMMARY OF BRIDGE
QUANTITIES**

CSJ: 2520-01-015

SHEET 1 OF 3

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	015	22

MISCELLANEOUS SUMMARY

ITEM	0150-6002	0160-6005	0164-6021	0164-6029	0164-6031	0168-6001	0169-6006	0506-6001	0506-6011	0506-6038	0506-6039	0560-6011	0644-6001
INTERSECTION	BLADING	FURNISHING AND PLACING TOPSOIL	CELL FBR MLCH SEED (PERM) (RURAL) (SANDY)	CELL FBR MLCH SEED (TEMP) (WARM)	CELL FBR MLCH SEED (TEMP) (COOL)	VEGETATIVE WATERING	SOIL RETENTION BLANKETS (CL 2) (TY F)	ROCK FILTER DAMS (INSTALL) (TY 1)	ROCK FILTER DAMS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	MAILBOX INSTALL-S (TWW-POST) TY 4	IN SM RD SN SUP&AM TY10BWG (1) SA (P)
	HR	CY	SY	SY	SY	MG	SY	LF	LF	LF	LF	EA	EA
TOTALS	16	62	3239	810	810	50	1283	90	90	1185	1185	1	2

ITEM	0644-6076	0730-6106	0734-6002	6001-6002
INTERSECTION	REMOVE SM RD SN SUP&AM	STRIP MOWING	LITTER REMOVAL	PORTABLE CHANGEABLE MESSAGE SIGN
	EA	CYC	CYC	EA
TOTALS	2	2	6	2

Plotted on: 2/9/2023

Design File name: P:\117\99\03\Design\Civil\Summaries\1179903SUM02.dgn

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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 PEREZ CREEK

SUMMARY OF BRIDGE QUANTITIES
 CSJ: 2520-01-015

SHEET 2 OF 3

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	MEDINA	2520	01
			JOB NO.:	SHEET NO.:
			015	23

STRIPING SUMMARY

ITEM	0666-6309	0666-6318	0666-6321
INTERSECTION	RE PM W/RET REQ TY (W) 6" (SLD) (100MIL)	RE PM W/RET REQ TY (Y) 6" (BRK) (100MIL)	RE PM W/RET REQ TY (Y) 6" (SLD) (100MIL)
	LF	LF	LF
TOTALS	800	100	660

RDWY SUMMARY

ITEM	0100-6002	0105-6002	0105-6013	0247-6475	0310-6027	3076-6001	3076-6025	3077-6075	3085-6001
INTERSECTION	PREPARING ROW	REMOVING STAB BASE AND ASPH PAV (2")	REMOVING STAB BASE & ASPH PAV (9")	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	PRIME COAT (MC-30 OR AE-P)	D-GR HMA TY-B PG64-22	D-GR HMA TY-C SAC-B PG70-22	TACK COAT	UNDERSEAL COURSE
	STA	SY	SY	CY	GAL	TON	TON	GAL	GAL
TOTALS	4.0	850	2040	176.0	199	251	146	219	414

Plotted on: 2/6/2023

Design File name: P:\117\99\03\Design\Civil\Summaries\1179903SUM03.dgn

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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FM 2200 AT FRANCISCO
 PEREZ CREEK

**SUMMARY OF BRIDGE
 QUANTITIES**
CSJ : 2520-01-015

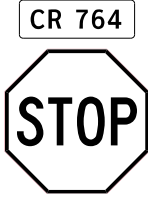



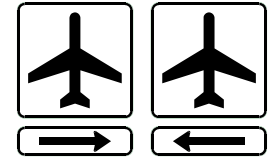
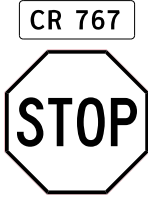


SHEET 3 OF 3

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.
CHK DWG:	SAT	MEDINA	2520	01
			JOB NO.	SHEET NO.
			015	24

SUMMARY OF SMALL SIGNS

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DATE: 12/20/2023 2:23:09 PM
 FILE: P:\11799\04\Des\ign\Civil\Summaries\11799045055.dgn

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
										PREFABRICATED		1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels
84	1-1	D3-1 R1-1		24"x8" 30"x30"	✓	✓		10BWG	1	SA	P	
85	2-1	D14-4T		48"x48"	✓			10BWG	1	SA	T	
86	3-1	M3-2 M1-6FS D10-7aT		24"x12" 24"x24" 3"x10"	✓	✓	✓	10BWG	1	SA	P	
88	5-1	I-2aT		42"x24"	✓			10BWG	1	SA	P	
88	5-2	I-5 I-ARW		24"x24" 24"x6"	✓	✓		10BWG	1	SA	P	
88	5-3	D3-1 R1-1		24"x8" 30"x30"	✓	✓		10BWG	1	SA	P	
88	5-4	W3-5		36"x36"	✓			10BWG	1	SA	P	
89	6-1	R2-1		24"x30"	✓			10BWG	1	SA	P	

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/>

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



SUMMARY OF SMALL SIGNS

CSJ: 2520-01-016









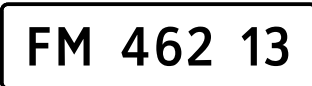
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FILE: slums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
4-16	DIST	COUNTY	SHEET NO.	
8-16	SAT	MEDINA	25	

SUMMARY OF SMALL SIGNS

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 FILE: P:\117\99\04\Des\ign\Civi\Summar\ies\11799045055.dgn

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
										PREFABRICATED		1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels
89	6-2	R2-1		24"x30"	✓		10BWG	1	SA	P		
91	8-1	W8-13aT		36"x36"	✓		10BWG	1	SA	P		
92	9-1	I-3		66"x18"	✓		10BWG	1	SA	T		
92	9-2	I-3		66"x18"	✓		10BWG	1	SA	T		
93	10-1	W8-13aT		36"x36"	✓		10BWG	1	SA	P		
93	10-2	W11-12T		36"x36"	✓		10BWG	1	SA	P		
94	11-1	R2-1		24"x30"	✓		10BWG	1	SA	P		
94	11-2	R2-1		24"x30"	✓		10BWG	1	SA	P		
94	11-3	D2-1		66"x18"	✓		10BWG	1	SA	T		

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

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SUMMARY OF
 SMALL SIGNS
 CSJ: 2520-01-016











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REVISIONS	2520	01	016, ETC	FM 2200
4-16	DIST	COUNTY	SHEET NO.	
8-16	SAT	MEDINA	26	

SUMMARY OF SMALL SIGNS

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 FILE: P:\117\99\04\Des\ign\Civi\Summaries\11799045055.dgn

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
										PREFABRICATED		1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"		TY = TYPE TY N TY S
94	11-4	R1-1		30"x30"	✓			10BWG	1	SA	P	
94	11-5	R1-1		30"x30"	✓			10BWG	1	SA	P	
94	11-6	R2-1		24"x30"	✓			10BWG	1	SA	P	
95	12-1	S5-2aTP		24"x10"	✓							
		R2-1		24"x30"	✓			10BWG	1	SA	P	
95	12-2	S1-1		36"x36"	✓			10BWG	1	SA	T	
		SW16-9P		24"x12"	✓							
95	12-3	M2-1		21"x15"	✓							
		M1-6T		24"x24"	✓			10BWG	1	SA	P	
95	12-4	W11-12T		36"x36"	✓			10BWG	1	SA	P	

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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SUMMARY OF
 SMALL SIGNS
 CSJ: 2520-01-016










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4-16	DIST	COUNTY	SHEET NO.	
8-16	SAT	MEDINA	27	

SUMMARY OF SMALL SIGNS

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DATE: 12/20/2023 2:23:10 PM
 FILE: P:\11799\04\Des\ign\C:\ivi\Summar\ies\11799045055.dgn

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION	
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	PREFABRICATED P = "Plain" T = "T" U = "U"	
95	12-5	D2-1 R19-10aT	 	72"x18" 24"x24"	✓ ✓		10BWG	1	SA	T	
95	12-6	S5-1 S7-1T	 	24"x48" 24"x18"	✓ ✓						ROADSIDE FLASHING BEACON (TO BE RELOCATED)
96	13-1	D14-4T		48"x48"	✓		10BWG	1	SA	T	
96	13-2	M3-4 M1-6FS D10-7aT		24"x12" 24"x24" 3"x10"	✓ ✓ ✓		10BWG	1	SA	P	
96	13-3	R1-1		30"x30"	✓		10BWG	1	SA	P	
96	13-4	D3-1 R1-1	 	36"x8" 42"x8" 30"x30"	✓ ✓		10BWG	1	SA	P	

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
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SUMMARY OF
 SMALL SIGNS
 CSJ: 2520-01-016






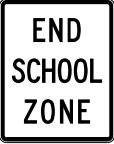

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FILE: slums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
4-16	DIST	COUNTY	SHEET NO.	
8-16	SAT	MEDINA	28	

SUMMARY OF SMALL SIGNS

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DATE: 12/20/2023 2:23:11 PM
 FILE: P:\117\99\04\Des\ign\Civil\Summar\ies\11799045055.dgn

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION	
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	PREFABRICATED P = "Plain" T = "T" U = "U"	
100	14-1	S1-1 SW16-9P		36"x36" 24"x12"	✓		10BWG	1	SA	T	
101	15-1	R1-5b		30"x30"	✓		10BWG	1	SA	P	
102	16-1	R1-5b		30"x30"	✓		10BWG	1	SA	P	
102	16-2	S1-1 SW16-9P		36"x36" 24"x12"	✓		10BWG	1	SA	T	
105	17-1	S5-1		24"x48"	✓					SIGN ONLY	
105	17-2	S5-2		24"x30"	✓		10BWG	1	SA	P	
106	18-1	R2-1		24"x30"	✓		10BWG	1	SA	P	

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



Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

CSJ: 2520-01-016


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REVISIONS	2520	01	016, ETC	FM 2200
4-16	DIST	COUNTY	SHEET NO.	
8-16	SAT	MEDINA	29	

SUMMARY OF SMALL SIGNS

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PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	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
106	18-2	S1-1 SW16-9P		36"x36" 24"x12"	✓	✓		10BWG	1	SA	T	

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.
<http://www.txdot.gov/>

- NOTE:**
- 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.
 - For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
 - For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD (GEN).



Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

CSJ: 2520-01-016

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
4-16	DIST	COUNTY	SHEET NO.	
8-16	SAT	MEDINA	30	

Plotted on: 12/23/2022

Design File name: P:\117\99\04\Design\Civil\TCP\1179904_TCP_NAR01.dgn

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

- (1) THIS PROJECT WILL BE CONSTRUCTED IN (5) PHASES. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER. DAILY LANE CLOSURES WILL BE USED IN ACCORDANCE WITH STATE TCP STANDARDS. DROP OFF CONDITIONS OF GREATER THAN 2" MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS AND SIDE STREETS.
- (2) PREPARING ROW / REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURRING, AS PER THE PHASES NOTED BELOW.
- (3) PLANING, SURFACE TREATMENTS AND OVERLAYS SHALL BE PERFORMED IN THE DIRECTION OF TRAFFIC. BEGIN SURFACE CONSTRUCTION ON HIGH SIDE OF ROAD TO AVOID WATER PONDING ISSUES.
- (4) THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC" AND ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING", OF THE STANDARD SPECIFICATIONS, AND TO THE GENERAL NOTES
- (5) CONTRACTOR IS NOT PERMITTED TO WORK IN AREAS WITH ONGOING UTILITY RELOCATION OR ROW ACQUISITION.
- (6) A BRIEF DESCRIPTION OF THESE PHASES ARE AS FOLLOWS:

PHASE 1 GENERAL - CONSTRUCT CULVERTS

- (1) CULVERT A-2, A-3, A-4, AND A-6 REMOVE EXISTING STRUCTURE AND CONSTRUCT PIPE AND SET.
- (2) CULVERT A-5 BREAK BACK AND EXTEND EXISTING STRUCT AND CONSTRUCT SET.
- (3) PLACE CULVERTS IN 2 CALENDAR DAYS, 1 DAY PER HALF SECTION.
- (4) MAINTAIN TWO-WAY TRAFFIC DURING NIGHTTIME HOURS.
- (5) MATERIAL, (CULVERTS, SET, BACKFILL AND PAVEMENT RESTORE ITEMS), MUST BE ON HAND PRIOR TO BEGINNING CONSTRUCTION.
- (6) COMPLETE CONSTRUCTION OF ONE STRUCTURE BEFORE CONTINUING TO THE NEXT.
- (7) DO NOT PROCEED TO OTHER PHASE UNTIL CROSS CULVERTS ARE COMPLETE.

PHASE 1 STEP 1 - INSTALL TEMP CULVERT EXTENSION AND TEMP PAVEMENT WIDENING ON FM 2200 EB FOR CULVERTS A-2, A-3, AND A-4.

TRAFFIC CONFIGURATION

- (1) REFERENCING TCP (1-2B)-18 ONE-LANE TWO-WAY FLAGGER OPERATIONS INSTALL SIGNS AND CHANNELIZING DEVICES TO PROVIDE LANE CLOSURE OF EXISTING EB LANE.

CONSTRUCTION

- (1) IMPLEMENT ONE-LANE TWO-WAY TRAFFIC CONFIGURATION
- (2) REMOVE EXISTING END TREATMENT AND TEMPORARILY EXTEND CULVERT WITH SETS
- (3) CONSTRUCT TEMPORARY WIDENING PAVEMENT SECTION
- (4) NO TEMPORARY WIDENING FOR CULVERTS A-5 AND A-6

PHASE 1 STEP 2 - CONSTRUCT CULVERT WB HALF-SECTION

TRAFFIC CONFIGURATION

- (1) FOR CULVERTS A2, A3, A4, AND A6 REFERENCING TCP (1-2B)-18 ONE-LANE TWO-WAY FLAGGER OPERATIONS INSTALL SIGNS AND CHANNELIZING DEVICES TO PROVIDE LANE CLOSURE OF EXISTING WB. MOVE TRAFFIC TO TEMPORARY SECTION. USE BC (10-21) BARRICADE LAYOUT UNTIL SET IS COMPLETE.
- (2) FOR CULVERT A5 REFERENCING TCP (2-1A) CLOSE WB SHOULDER TO EXTEND CULVERT A-5.

CONSTRUCTION

- (1) FOR CULVERT A2, A3, A4, AND A6 CONSTRUCT WB CULVERT HALF SECTION WITHOUT SET
 - a. IMPLEMENT ONE-LANE TWO-WAY TRAFFIC CONFIGURATION
 - b. REMOVE EXISTING PAVEMENT
 - c. PLACE STRUCTURE
 - d. PLACE CEMENT STABILIZED BACKFILL
- (2) FOR CULVERT A5 EXTEND CULVERT
 - a. BREAK BACK EXISTING STRUCTURE
 - b. PLACE CULVERT EXTENSION

PHASE 1 STEP 3 - CONSTRUCT CULVERT EB HALF-SECTION

TRAFFIC CONFIGURATION

- (1) FOR CULVERTS A2, A3, A4, AND A6 REFERENCING TCP (1-2B)-18 ONE-LANE TWO-WAY FLAGGER OPERATIONS INSTALL SIGNS AND CHANNELIZING DEVICES TO PROVIDE LANE CLOSURE OF EXISTING EB. MOVE TRAFFIC ONTO EXISTING WB LANE. DURING CONSTRUCTION OF SET, USE BC (10-21) BARRICADE LAYOUT UNTIL SET IS COMPLETE.
- (2) FOR CULVERT A5 REFERENCING TCP (2-1A) CLOSE EB SHOULDER TO EXTEND CULVERT A-5.

CONSTRUCTION

- (1) FOR CULVERTS A2, A3, A4, AND A6 CONSTRUCT REMAINING CULVERT WITHOUT SET.
 - a. IMPLEMENT ONE-LANE TWO-WAY TRAFFIC CONFIGURATION
 - b. REMOVE EXISTING PAVEMENT
 - c. PLACE STRUCTURE
 - d. PLACE CEMENT STABILIZED BACKFILL
- (2) FOR CULVERT A5 EXTEND CULVERT
 - a. BREAK BACK EXISTING STRUCTURE
 - b. PLACE CULVERT EXTENSION

PHASE 2 GENERAL - PAVEMENT WIDENING STA 593+00 TO 665+00 AND 673+00 TO 691+00.

- (1) PHASE 2 AND 4 MAY NOT OCCUR SIMULTANEOUSLY. SEQUENCE WORK PHASING TO NOT INTERFERE WITH PHASES 1 AND 4 TIME CONSTRAINTS.
- (2) PAVEMENT WIDENING OPERATIONS IS LIMITED TO A MAXIMUM OF ¼ MILE SEGMENTS. COMPLETE NORTH AND SOUTH SIDE WIDENING BEFORE MOVING TO NEXT SEGMENT.
 - a. CONSTRUCT ROADWAY WEST OF FRANCISCO PEREZ BRIDGE FROM STA 593+00 TO 665+80 IN 5 EQUALLY SPACED SEGMENTS. DO NOT PROCEED TO THE NEXT SEGMENT UNTIL THE 2" LIFT OF HMAC TYP C IS COMPLETED.
 - a. CONSTRUCT ROADWAY EAST OF FRANCISCO PEREZ BRIDGE FROM STA 672+20 TO 687+00 IN 2 EQUALLY SPACED SEGMENTS. DO NOT PROCEED TO THE NEXT SEGMENT UNTIL THE 4" OF HMAC TYP C IS COMPLETED.
- (3) PRIOR TO IMPLEMENTING SEGMENTS, CONTRACTOR TO PRESENT OVERALL PLAN TO AREA OFFICE FOR APPROVAL.
- (4) NO LANE CLOSURES WILL BE PERMITTED TWO WEEKS BEFORE DECEMBER 25TH.

PHASE 2 STEP 1 - CONSTRUCT PROPOSED PAVEMENT ON FM 2200 WB

TRAFFIC CONFIGURATION

- (1) REFERENCING TCP (2-8B)-18 ONE-LANE TWO-WAY TRAFFIC SIGNAL OPERATIONS, INSTALL SIGNALS, SIGNS, STRIPING AND CHANNELIZING DEVICES FOR LANE CLOSURE OF THE EXISTING FM 2200 WB LANE. ALLOW THE TWO-WAY TRAFFIC ON THE EXISTING FM 2200 EB LANE.
- (2) CONSTRUCT PROPOSED WB PAVEMENT SECTION. 50:1 TEMPORARY ASPHALT TRANSITION AT FRANCISCO PEREZ CREEK. TRANSITION IS INCIDENTAL TO ITEM 502.

CONSTRUCTION

- (1) CONSTRUCT WB PAVEMENT WEST OF FRANCISCO PEREZ BRIDGE FROM STA 593+00 TO 665+80 PER SEGMENT
 - a. ADJUST ADVANCE WARNING SIGNS
 - b. INSTALL SW3P
 - c. IMPLEMENT ONE-LANE TWO-WAY TRAFFIC CONFIGURATION
 - d. REMOVE EXISTING PAVEMENT
 - e. EXCAVATION/EMBANKMENT
 - f. PLACE DRIVEWAY CULVERTS
 - g. CONSTRUCT DRIVEWAYS
 - h. PLACE FLEX BASE
 - i. PLACE PRIME COAT AND CURE
 - j. PLACE 2" LIFT OF HMAC TYP C, DO NOT CONSTRUCT OCST

OR

- (2) CONSTRUCT WB PAVEMENT EAST OF FRANCISCO PEREZ BRIDGE FROM STA 672+20 TO 687+00 PER SEGMENT
 - a. IMPLEMENT ONE-LANE TWO-WAY TRAFFIC CONFIGURATION
 - b. REMOVE EXISTING PAVEMENT
 - c. EXCAVATION/EMBANKMENT
 - d. PLACE DRIVEWAY CULVERTS
 - e. CONSTRUCT DRIVEWAYS
 - f. PLACE FLEX BASE
 - g. PRIME COAT AND CURE
 - h. PLACE 4" HMAC TYP B, DO NOT CONSTRUCT FINAL 2" LIFT OF HMAC TY C

PHASE 2 STEP 2 - CONSTRUCT PROPOSED PAVEMENT ON FM 2200 EB

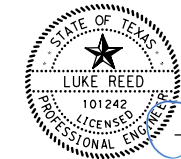
TRAFFIC CONFIGURATION

- (1) REFERENCING TCP (2-8B)-18 ONE-LANE TWO-WAY TRAFFIC SIGNAL OPERATIONS, INSTALL SIGNALS, SIGNS, STRIPING AND CHANNELIZING DEVICES FOR LANE CLOSURE OF THE EXISTING FM 2200 EB LANE. ALLOW THE TWO-WAY TRAFFIC ON THE EXISTING FM 2200 WB.
- (2) CONSTRUCT PROPOSED EB PAVEMENT SECTION. 50:1 TEMPORARY ASPHALT TRANSITION AT FRANCISCO PEREZ CREEK SHALL BE INCIDENTAL TO CONSTRUCTION.

CONSTRUCTION

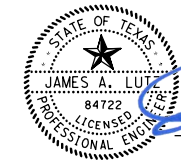
- (1) CONSTRUCT EB PAVEMENT WEST OF FRANCISCO PEREZ BRIDGE FROM STA 593+00 TO 665+80
 - a. ADJUST ADVANCE WARNING SIGNS
 - b. INSTALL SW3P
 - c. IMPLEMENT ONE-LANE TWO-WAY TRAFFIC CONFIGURATION
 - d. REMOVE EXISTING PAVEMENT
 - e. EXCAVATION/EMBANKMENT
 - f. PLACE DRIVEWAY CULVERTS
 - g. CONSTRUCT DRIVEWAYS
 - h. PLACE FLEX BASE
 - i. PLACE PRIME COAT AND CURE

DESIGN



Handwritten Signature of Luke Reed
LUKE REED, P.E.
12/23/2022
DATE

APPROVAL



Handwritten Signature of James A. Lutz
JAMES A. LUTZ, P.E.
12/23/2022
DATE

REV. NO.	DATE	DESCRIPTION	BY
 SAN ANTONIO AUSTIN HOUSTON FORT WORTH DALLAS 2000 NW LOOP 410 SAN ANTONIO, TX 78213 210.375.9000 TEXAS ENGINEERING FIRM #470 TEXAS SURVEYING FIRM #10028800			
 ©2023			
FM 2200			
TRAFFIC CONTROL PLAN SEQUENCE OF WORK			
SHEET 1 OF 2			
DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO. JOB NO. SHEET NO.
CHK DWG:	SAT	MEDINA	2520 01 016, ETC 31

Plotted on: 12/23/2022

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- j. PLACE 2" LIFT OF HMAC TYP C. DO NOT CONSTRUCT FINAL OCST

OR

- (2) CONSTRUCT EB PAVEMENT EAST OF FRANCISCO PEREZ BRIDGE FROM STA 672+20 TO 690+00
 - a. IMPLEMENT ONE-LANE TWO-WAY TRAFFIC CONFIGURATION
 - b. REMOVE EXISTING PAVEMENT
 - c. EXCAVATION/EMBANKMENT
 - d. PLACE DRIVEWAY CULVERTS
 - e. CONSTRUCT DRIVEWAYS
 - f. PLACE FLEX BASE
 - g. PRIME COAT AND CURE
 - h. PLACE 4" HMAC TYP B, DO NOT CONSTRUCT FINAL 2" LIFT OF HMAC TY C

PHASE 3 GENERAL - CONSTRUCT FRANCISCO PEREZ CREEK BRIDGE AND ROADWAY STA 665+80 TO STA 673+20. IMPLEMENT MILESTONE 1

TRAFFIC CONFIGURATION

- (1) REFERENCING WZ(RCD)-13 WORK ZONE ROAD CLOSURE, FM 2200 WILL BE CLOSED AT FRANCISCO PEREZ CREEK UNTIL SUBSTANTIAL COMPLETION REACHED AND APPROVED BY THE ENGINEER.
- (2) PLACE TYPE 3 BARRICADES AS DETAILED AND IN LOCATIONS ALLOWING EGRESS AND INGRESS FOR THE LOCAL PROPERTY OWNERS AS APPROVED BY THE ENGINEER.
- (3) IMPLEMENT DETOUR
- (4) PROVIDE PORTABLE CHANGEABLE MESSAGE SIGN IN YANCEY AT FM 2200 @ FM 462 AND IN DEVINE AT FM 2200 @ SH 173 TWO WEEKS PRIOR TO CLOSURE FOR ADVANCE NOTICE.

CONSTRUCTION

- (1) ADJUST ADVANCED WARNING SIGNS. **BEGIN MILESTONE 1.**
- (2) INSTALL SW3P
- (3) BRIDGE DEMO/REMOVAL
- (4) CONSTRUCT ROADWAY
 - a. 665+80 TO 666+90
 - (1) EXCAVATION/EMBANKMENT
 - (2) PLACE 9" OF FLEX BASE
 - (3) PLACE PRIME COAT AND CURE
 - (4) PLACE 2" LIFT OF HMAC TYP C, DO NOT CONSTRUCT FINAL OCST
 - (5) CONSTRUCT FINAL SURFACE COARSE IN PHASE 5.
 - b. 669+00 TO 673+20
 - (1) PLACE 6" OF FLEX BASE
 - (2) PRIME COAT AND CURE
 - (3) PLACE 4" HMAC TYP B, DO NOT CONSTRUCT FINAL 2" LIFT OF HMAC TY C
 - (4) CONSTRUCT FINAL SURFACE COARSE IN PHASE 5.
- (5) CONSTRUCT BRIDGE AND APPROACHES
 - a. DRILL SHAFT FOUNDATIONS AND CURE
 - b. FORM BRIDGE CAPS AND PLACE CONCRETE
 - c. CEMENT STABILIZED BACKFILL AT ABUTMENTS
 - d. CONSTRUCT ABUTMENTS, BENTS AND CURE
 - e. ERECT GIRDERS
 - f. PLACE CONCRETE BRIDGE DECK AND CURE
 - g. CONSTRUCT BRIDGE RAIL
 - h. CONSTRUCT MBGF/SGTS. **END MILESTONE 1.**

PHASE 4 GENERAL – CONSTRUCT PAVEMENT WIDENING FROM 690+00 TO 722+00. IMPLEMENT MILESTONE 2.

- (1) COORDINATE WITH DEVINE ISD TO MAINTAIN ADEQUATE DRIVEWAY INGRESS AND EGRESS MANEUVERS
- (2) RECONSTRUCT PAVEMENT FROM 693+12 TO 704+35 IN 10 CALENDAR DAYS. CLOSE ROAD USING BRIDGE DETOUR LAYOUT FOR A MAXIMUM OF TEN CONSECUTIVE CALENDAR DAYS.
- (3) CR 5710 INTERSECTION DETOUR AND CLOSURE FOR CONSTRUCTION TO BE COMPLETED IN 4 CALENDAR DAYS. USE CR5710 DETOURS FOR CLOSURE.
- (4) PROVIDE PORTABLE CHANGEABLE MESSAGE SIGN IN YANCEY AT FM 2200 @ FM 462 AND IN DEVINE AT FM 2200 @ SH 173 TWO WEEKS PRIOR TO CLOSURE FOR ADVANCE NOTICE.
- (5) MILESTONE 3 BEGINS WITH IMPLEMENTATION OF PHASE 4 STEP 2 AND END WHEN PHASE 4 STEP 3 IS IMPLEMENTED.
- (6) STEP 1 & 2 MAY OCCUR SIMULTANEOUSLY.

PHASE 4 STEP 1 - CONSTRUCT PROPOSED ROADWAY FROM STA 690+00 TO 704+35, AND CR 5710. BEGIN MILESTONE 2 AND MILESTONE 3.

TRAFFIC CONFIGURATION

- (1) USE DETOUR LAYOUT FOR BRIDGE CLOSURE DURING CONSTRUCTION OF ROADWAY FROM STA 690+00 TO 704+35.
- (2) REFERENCING WZ(RCD)-13 WORK ZONE ROAD CLOSURE AND CR 5710 DETOUR NORTH LAYOUT CLOSE CR 5710 NORTH.
- (3) REFERENCING WZ(RCD)-13 WORK ZONE ROAD CLOSURE AND CR 5710 DETOUR SOUTH LAYOUT CLOSE CR 5710 SOUTH.

CONSTRUCTION

- (1) ADJUST ADVANCED WARNING SIGNS. **BEING MILESTONE 2.**

- (2) INSTALL SW3P
- (3) CONSTRUCT ROADWAY FROM 690+00 TO 704+35.
 - a. EXCAVATION/EMBANKMENT
 - b. PLACE DRIVEWAY CULVERTS
 - c. CONSTRUCT DRIVEWAYS
 - d. PLACE HMAC TYP B, DO NOT CONSTRUCT FINAL 2" LIFT OF HMAC TY C. **END MILESTONE 2**
- (4) CONSTRUCT CR 5710 INTERSECTION NORTH
 - a. REMOVE EXISTING PAVEMENT
 - b. CONSTRUCT HMAC TYP-B, DO NOT CONSTRUCT TOP LIFT OF TYP C THIS PHASE.
- (5) CONSTRUCT CR 5710 INTERSECTION SOUTH
 - a. REMOVE EXISTING PAVEMENT
 - b. CONSTRUCT HMAC TYP-B, DO NOT CONSTRUCT TOP LIFT OF TYP C THIS PHASE.

PHASE 4 STEP 2 - CONSTRUCT WB PAVEMENT WIDENING AND SIDEWALK & RAMPS FROM 704+35 TO 722+00. IMPLEMENT MILESTONE 3.

TRAFFIC CONFIGURATION

- (1) FOR PAVEMENT WIDENING, REFERENCING TCP (2-8B)-18 ONE-LANE TWO-WAY TRAFFIC SIGNAL OPERATIONS INSTALL SIGNAL, SIGNS, STRIPING AND CHANNELIZING DEVICES TO PROVIDE LANE CLOSURE OF THE EXISTING FM 2200 WB LANE AND ALLOW THE TWO-WAY TRAFFIC ON THE EXISTING FM 2200 EB LAN (REFER TO RESTRICTIONS ON WORK ZONE LIMITS UNDER "GENERAL" ABOVE).
- (2) FOR SIDEWALK CONSTRUCTION, REFERENCING TCP(2-1)-18 CONVENTIONAL ROAD SHOULDER WORK CLOSE THE EXISTING FM 2200 WB SHOULDER FROM STA 712+00 TO 722+00

CONSTRUCTION

- (1) ADJUST ADVANCED WARNING SIGNS. **BEGIN MILESTONE 3.**
- (2) INSTALL SW3P
- (3) CONSTRUCT PROPOSED WB PAVEMENT WIDENING SECTION
 - a. REMOVE EXISTING PAVEMENT
 - b. EXCAVATION/EMBANKMENT
 - c. PLACE DRIVEWAY CULVERTS
 - d. CONSTRUCT DRIVEWAYS
 - e. PLACE FLEX BASE
 - f. PRIME COAT AND CURE
 - g. PLACE HMAC TYP B, DO NOT CONSTRUCT FINAL 2" LIFT OF HMAC TY C
- (4) CONSTRUCT SIDEWALKS, RAMPS AND DRAINAGE FEATURES. **END MILESTONE 3.**

PHASE 4 STEP 3 - CONSTRUCT EB PAVEMENT FROM 704+35 TO 722+00

TRAFFIC CONFIGURATION

- (1) OPEN TWO LANES OF TRAFFIC ONTO WIDENED SECTION OF PAVEMENT SECTION PER LAYOUT. ADJUST/RELOCATED EXISTING SIGNING TO ACCOMMODATE NEW LANE CONFIGURATION.


CONSTRUCTION

- (1) ADJUST ADVANCED WARNING SIGNS
- (2) INSTALL SW3P
- (3) CONSTRUCT PROPOSED EB PAVEMENT WIDENING SECTION
 - a. IMPLEMENT TWO-LANE TWO-WAY TRAFFIC CONFIGURATION
 - b. REMOVE EXISTING PAVEMENT
 - c. EXCAVATION/EMBANKMENT
 - d. PLACE DRIVEWAY CULVERTS
 - e. CONSTRUCT DRIVEWAYS
 - f. PLACE FLEX BASE
 - g. PRIME COAT AND CURE
 - h. PLACE HMAC TYP B, DO NOT CONSTRUCT FINAL 2" LIFT OF HMAC TY C

PHASE 5 (FINAL OVERLAY, SIGNING AND PAVEMENT MARKING, SEEDING, AND FINAL CLEANUP)

- (1) WORK IN PHASE 5 CANNOT OCCUR DURING PEAK SCHOOL HOURS IN FRONT OF DEVINE MIDDLE SCHOOL.
- (2) REFERENCING TCP (3-1)-13 CONSTRUCT FINAL DRIVING SURFACE
 - a. WEST OF FRANCISCO PEREZ BRIDGE FROM STA 588+00 TO 666+90
 - i. PLACE ONE COURSE SURFACE TREATMENT
 - b. EAST OF FRANCISCO PEREZ BRIDGE FROM STA 669+00 TO 712+30
 - i. PLACE BONDING COURSE AND FINAL 2" LIFT OF HMAC TYP C
 - c. STA 698+00 TO 701+50, CR 5710, AND VIRGINIA DR
 - i. PLACE BONDING COURSE AND FINAL 2" LIFT OF HMAC TYP C
- (3) REFERENCING TCP (3-3)-14 INSTALL PERMANENT MARKINGS/MARKERS, SIGNS, AND OBJECT MARKERS.
- (4) PERFORM FINAL CLEANUP AND COMPLETE ALL ITEMS IN ENGINEER'S INSPECTION LIST.
- (5) REMOVE SW3P DEVICES.


DESIGN



LUKE REED, P.E.



12/23/2022
DATE

APPROVAL



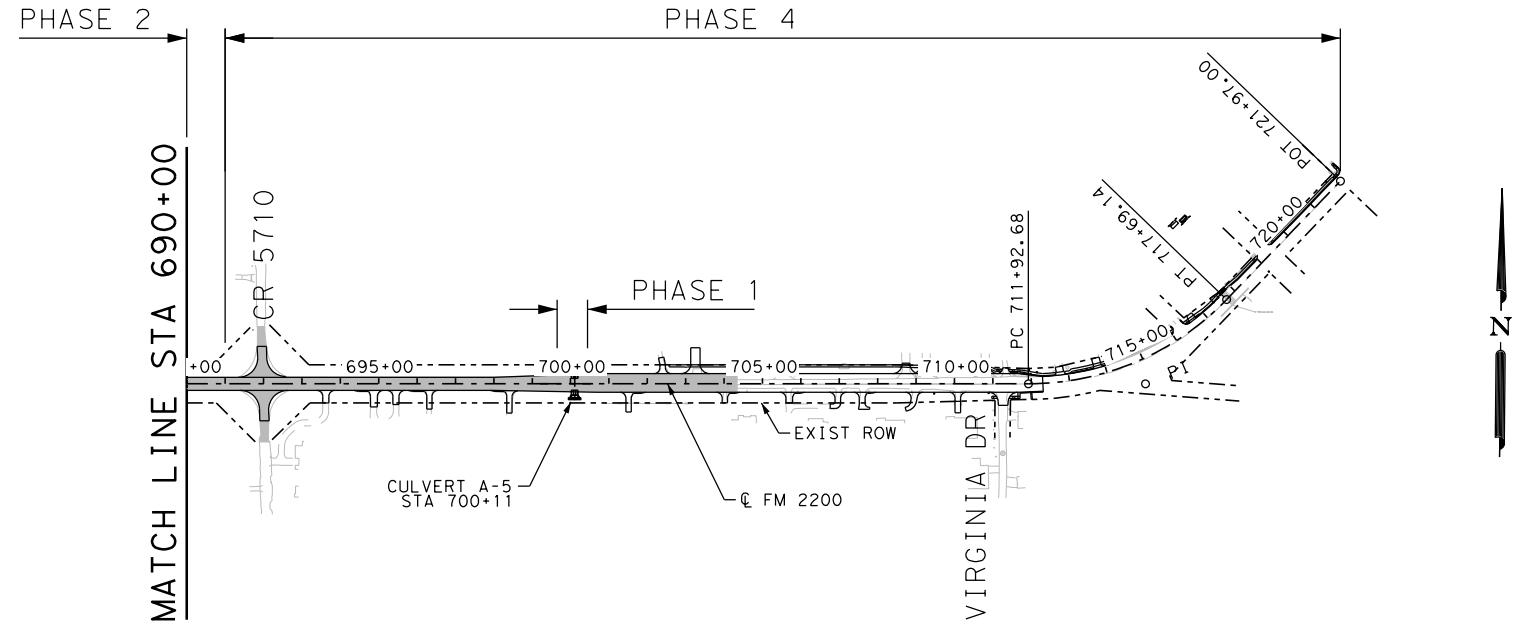
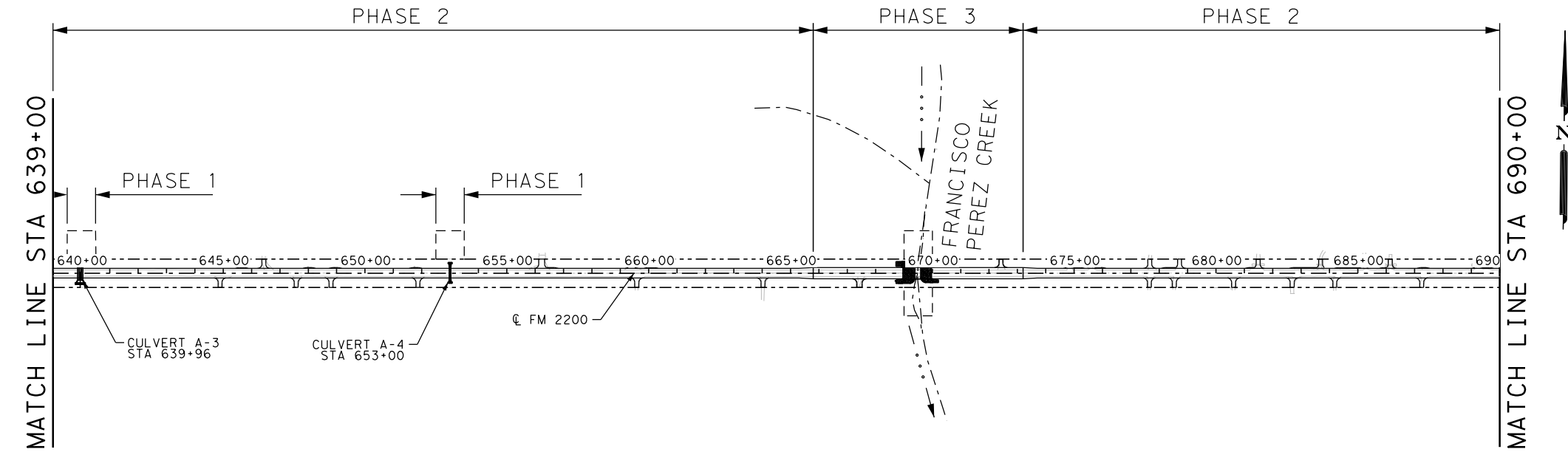
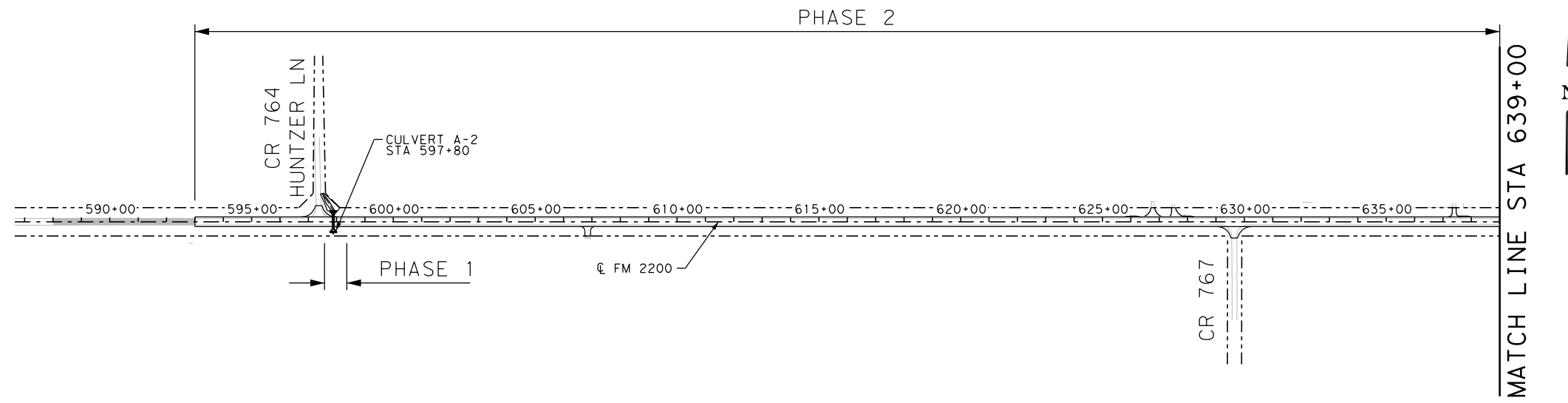
JAMES A. LUTZ, P.E.

12/23/2022
DATE

REV. NO.	DATE	DESCRIPTION	BY
 <p style="font-size: small;">SAN ANTONIO AUSTIN HOUSTON FORT WORTH DALLAS 2000 NW LOOP 410 SAN ANTONIO, TX 78213 210.375.9000 TEXAS ENGINEERING FIRM #470 TEXAS SURVEYING FIRM #10028800</p>			
 <p>©2023</p>			
FM 2200			
<p style="font-size: large; font-weight: bold;">TRAFFIC CONTROL PLAN SEQUENCE OF WORK</p>			
SHEET 2 OF 2			
CHK DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.
DWG:	DIST.	COUNTY	CONT. NO.
CHK DWG:	SAT	MEDINA	2520
			01
			016, ETC
			32

Plotted on: 12/23/2022

Design File name: P:\117\99\04\Design\Civil\TCP\1179904_TCP_PHASE_LAYOUT.dgn

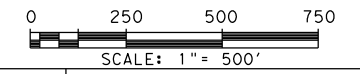


DESIGN

LUKE REED, P.E. 12/23/2022 DATE

APPROVAL

JAMES A. LUTZ, P.E. 12/23/2022 DATE



REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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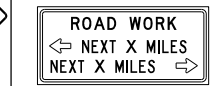
FM 2200
**TRAFFIC CONTROL PLAN
 PHASE LAYOUT**

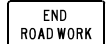
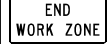
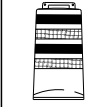


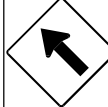

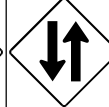
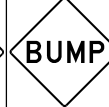



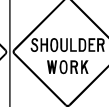

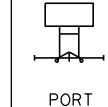
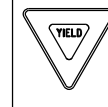
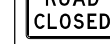
SHEET 1 OF 1

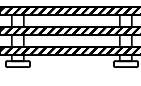







DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 33

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Des\ign\Civil\TCP\1179904_TCP_50B.dgn

TRAFFIC CONTROL DEVICES										
LOCATION	 R20-3T 48" X 32"	 C20-10T 24" X 18"	 G20-9T 36" X 30"	 R20-5T 36" X 36"	 R20-5a-TP 36" X 18"	 CW20-1D 48" X 48"	 G20-5T 48" X 24"	 G20-6T 48" X 30"	 CW21-1T 48" X 48"	 G20-1aT 72" X 36"
1	X	X	X	X	X	X	X	X	X	
2						X				X
3										
4										
5		X	X		X	X	X	X	X	

TRAFFIC CONTROL DEVICES																	
LOCATION	 G20-2 48" X 24"	 G20-2bT 48" X 24"		 CW1-4L 48" X 48"	 CW1-4R 48" X 48"	 CW1-6aT 36" X 36"	 CW3-4 48" X 48"	 CW6-3 36" X 36"	 CW8-1 48" X 48"	 CW16-2P 24" X 18"	 CW20-4 48" X 48"	 CW20-7 48" X 48"	 CW21-5 48" X 48"	 CW24-1cP 30" X 24"		 R1-2 48" X 48"	 R11-2 48" X 30"
1																	
2																	
3	X	X															
4	X																
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

TRAFFIC CONTROL DEVICES								
LOCATION	 TY III BARRICADES	 R11-4 60" X 30"	 G20-5aP 36" X 24"	 R4-2 24" X 30"	 R10-6L 24" X 36"	 CW3-3	 CW13-1P 24" X 24"	 R4-1 24" X 30"
1								
2								
3								
4								
5	X	X	X	X	X	X	X	X

SIGNAGE/BARRICADE LOCATIONS:

LOCATION NO 1: TO BE USED AT THE BEGINNING OF PROJECT.

LOCATION NO 2: TO BE USED AT ENTERING SIDE STREETS.

LOCATION NO 3: TO BE USED AT THE END OF PROJECT

LOCATION NO 4: TO BE USED AT EXITING SIDE STREETS.


LOCATION NO 5: TO BE USED THROUGHOUT THE PROJECT AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

REFER TO ADVANCE WARNING SIGN AND PLAN SHEETS FOR ADDITIONAL INFORMATION.

NOTES:


- CERTAIN SIGNS MUST BE USED IN CONJUNCTION WITH OTHER SIGNS. EXAMPLE: "FLAGGER AHEAD" MUST HAVE A "BE PREPARED TO STOP".
- BARRICADES AND WARNING SIGNS ON THIS SHEET ARE MINIMAL CONSTRUCTION ZONE SIGNING. ADDITIONAL BARRICADES, WARNING SIGNS, ARROW PANELS, CONES, ETC. IN ACCORDANCE WITH CURRENT BC STANDARDS AND THE TEXAS MUTCD MAY BE REQUIRED IN AREAS OF ACTUAL CONSTRUCTION. SIGNS, BARRICADES, AND OTHER WARNING DEVICES WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.
- A DISTANCE PLAQUE IN FEET OR MILES MAY BE REQUIRED FOR USE IN CONJUNCTION WITH WARNING SIGNS.
- IMPLEMENT DETOURS IN ACCORDANCE WITH THE TEXAS MUTCD. USE CHANGEABLE MESSAGE BOARDS TO GUIDE MOTORISTS THROUGH THE DETOUR.
- BARRICADES ARE NOT TO BE USED AS A SIGN SUPPORT. SUPPORTS FOR SIGNS SHALL BE FIXED OR PORTABLE AS DIRECTED BY THE ENGINEER OR IN ACCORDANCE WITH THE "BC" STANDARD SHEETS AND THE TEXAS MUTCD.
- BARRICADES AND SIGNS SHALL BE MAINTAINED ON A DAILY BASIS.

DESIGN

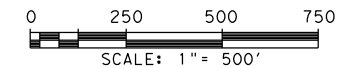


LUKE REED, P.E. 12/20/2022 DATE

APPROVAL



JAMES A. LUTZ, P.E. 12/20/2022 DATE



REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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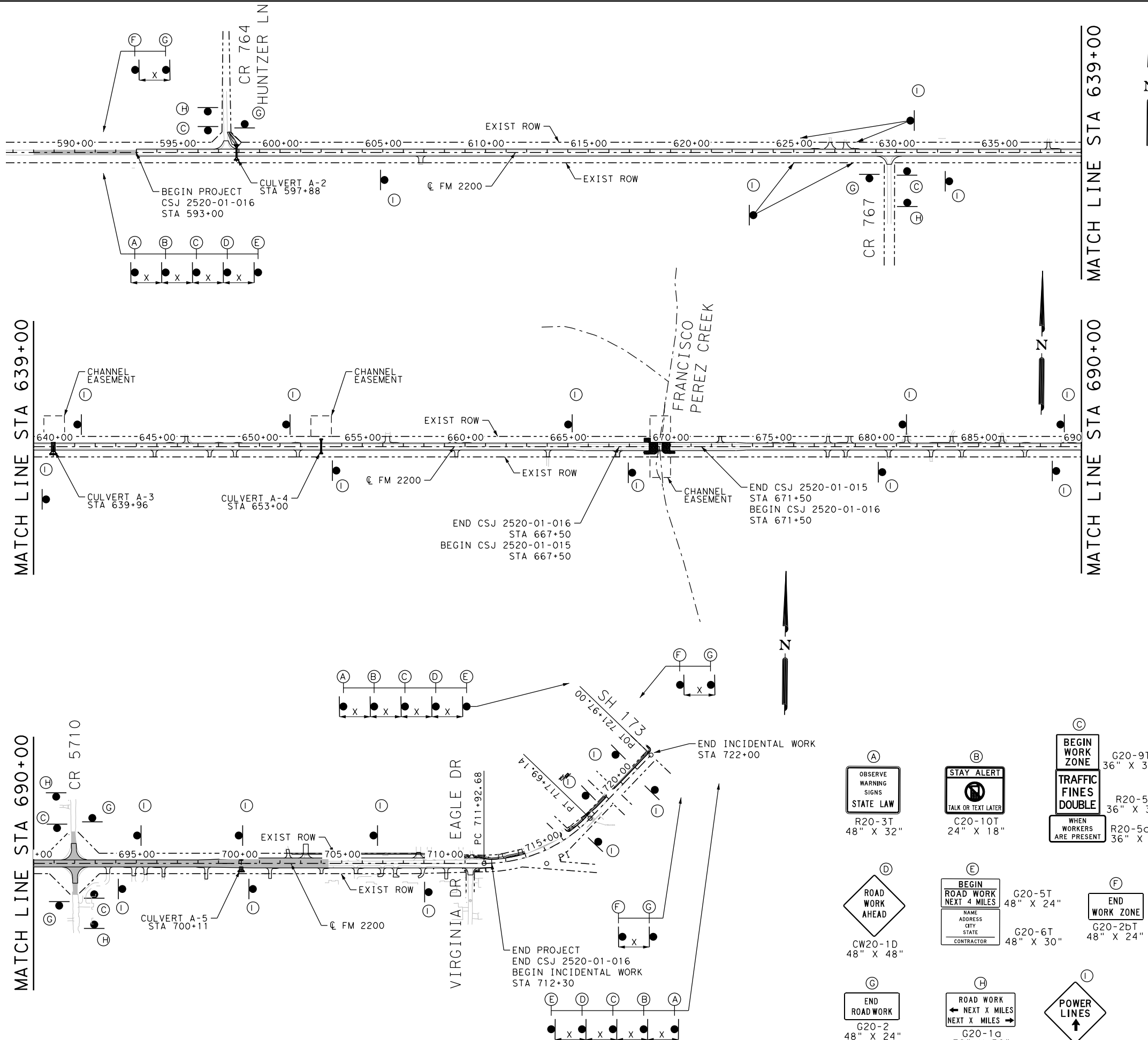
FM 2200
**TRAFFIC CONTROL PLAN
SCHEDULE OF BARRICADES**

SHEET 1 OF 1


DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.
CHK DWG:	SAT	MEDINA	2520	01
			016, ETC	34

Plotted on: 1/12/2023

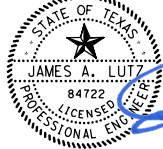
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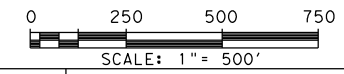


DESIGN


 LUKE REED, P.E. 1/12/2023
 DATE

APPROVAL


 JAMES A. LUTZ, P.E. 1/12/2023
 DATE




- (A) OBSERVE WARNING SIGNS STATE LAW R20-3T 48" X 32"
- (B) STAY ALERT TALK OR TEXT LATER C20-10T 24" X 18"
- (C) BEGIN WORK ZONE G20-9T 36" X 30"
- TRAFFIC FINES DOUBLE R20-5T 36" X 36"
- WHEN WORKERS ARE PRESENT R20-5a-TP 36" X 18"
- (D) ROAD WORK AHEAD CW20-1D 48" X 48"
- (E) BEGIN ROAD WORK NEXT 4 MILES G20-5T 48" X 24"
- (F) END WORK ZONE G20-2bT 48" X 24"
- (G) END ROAD WORK G20-2 48" X 24"
- (H) ROAD WORK NEXT X MILES G20-1a 72" X 36"
- (I) POWER LINES CW28-1T 48" X 48"

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800

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FM 2200
**TRAFFIC CONTROL PLAN
ADVANCE WARNING SIGNS**

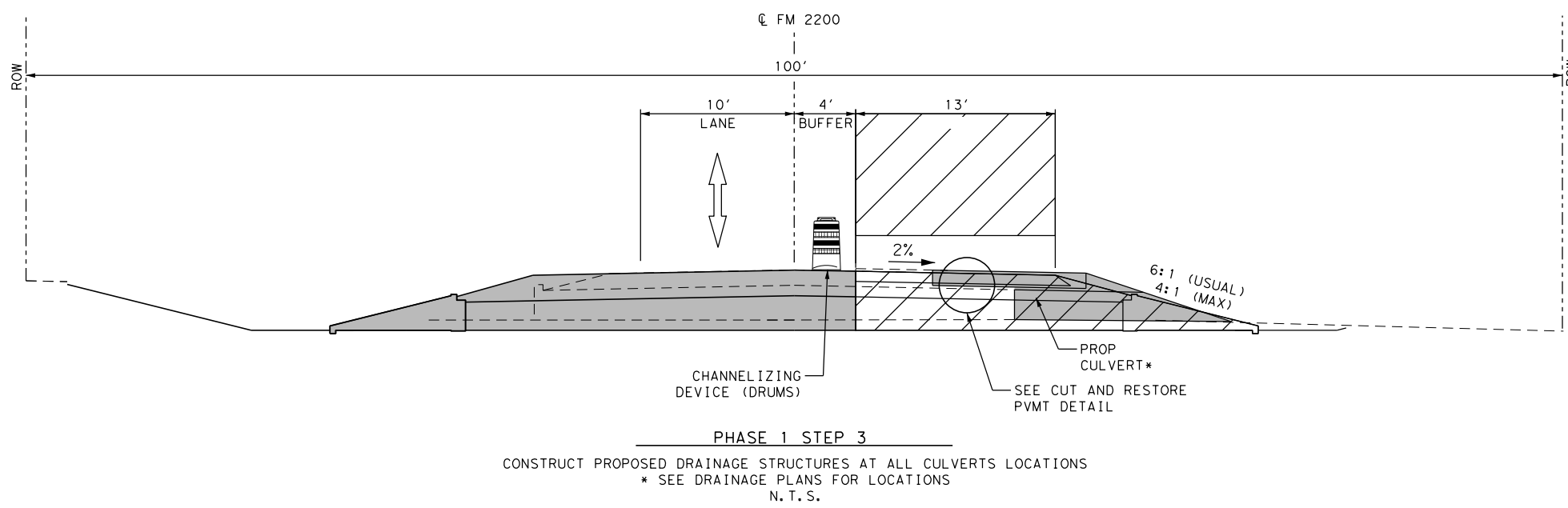
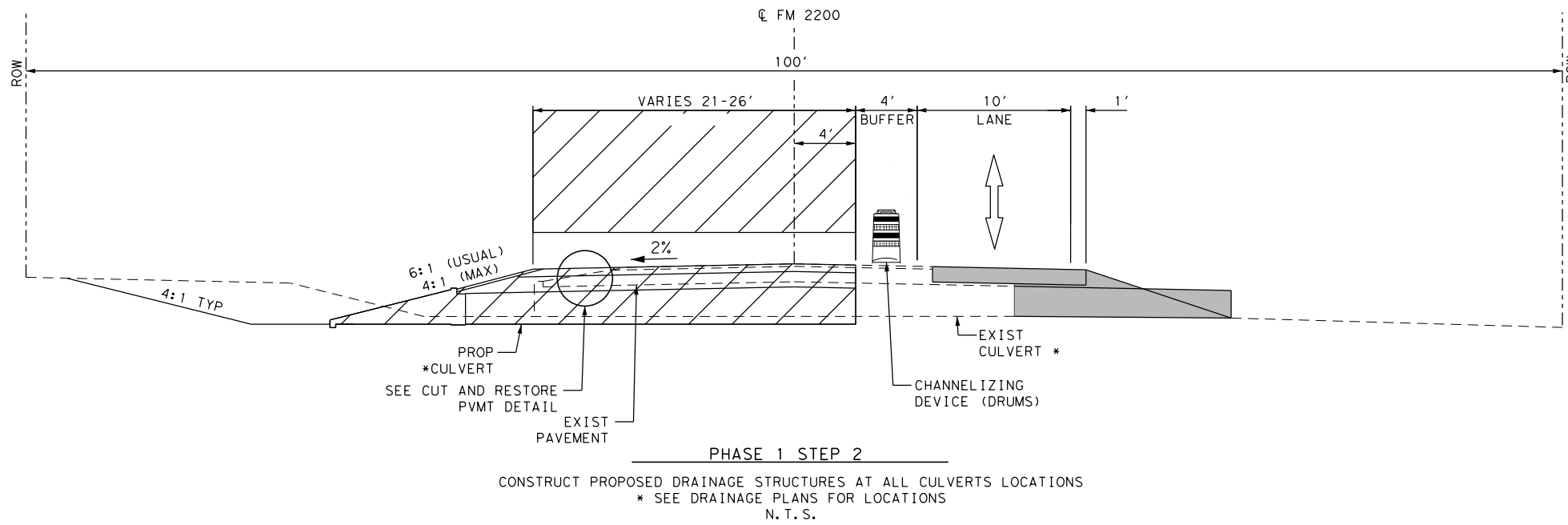
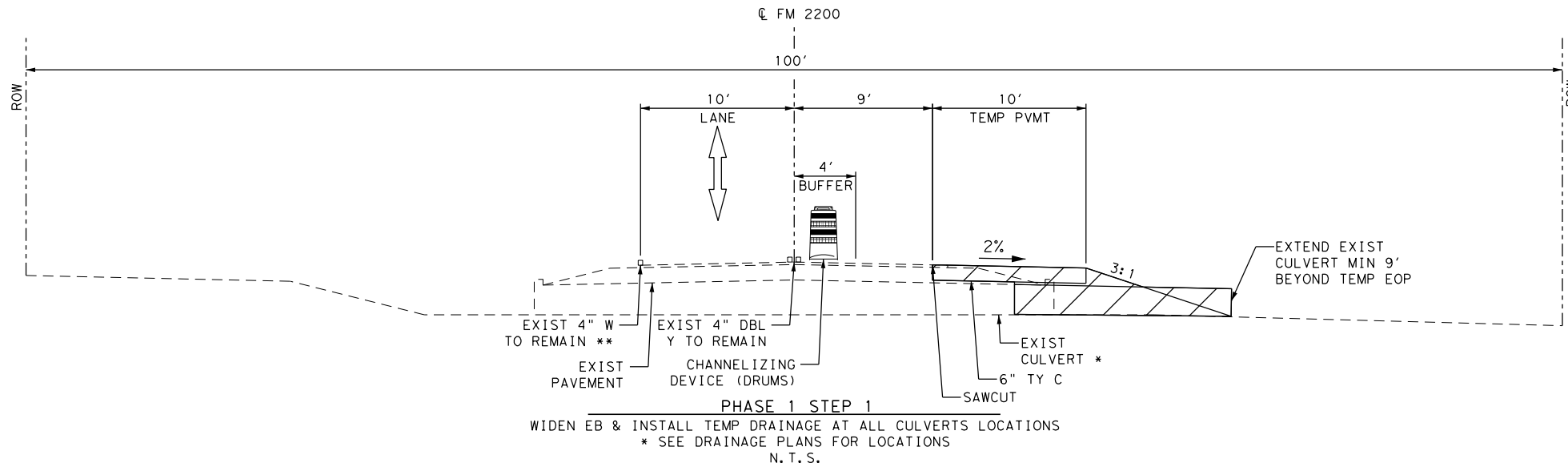
SHEET 1 OF 1

CHK	DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
		6	TEXAS	SEE TITLE SHEET	FM 2200

CHK	DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
		SAT	MEDINA	2520	01	016, ETC	35

Plotted on: 12/20/2022

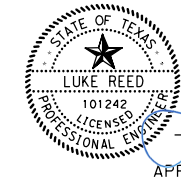
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LEGEND

- PROPOSED PAVEMENT CONSTRUCTION THIS PHASE
- PROPOSED CONSTRUCTION PREVIOUS PHASE
- EXISTING PAVEMENT MARKING
- PROPOSED PAVEMENT MARKING
- TRAFFIC FLOW

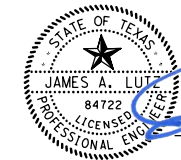
DESIGN



LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 LUKE REED, P.E.

12/20/2022
DATE

APPROVAL



JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER
 JAMES A. LUTZ, P.E.

12/20/2022
DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800



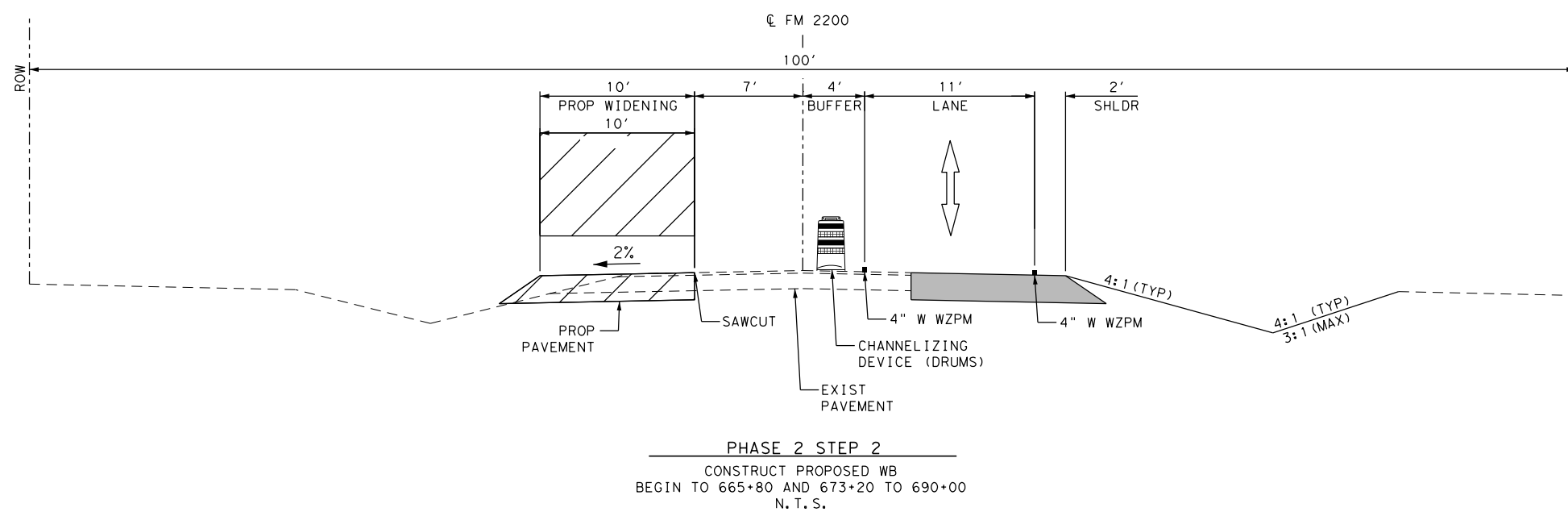
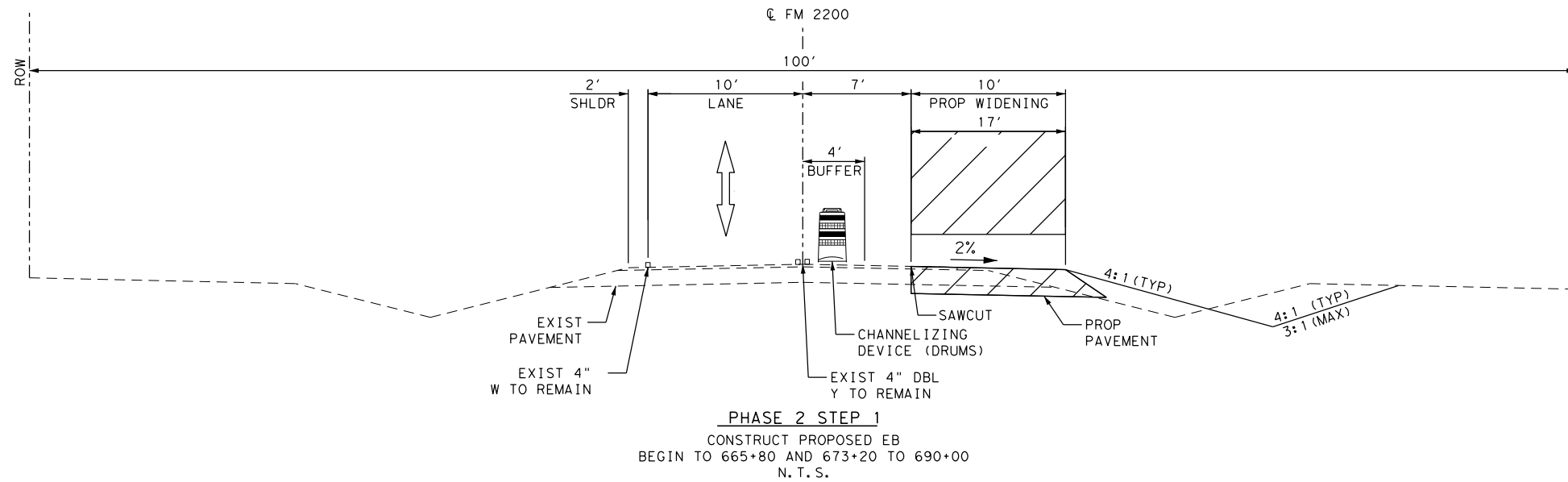
FM 2200
TRAFFIC CONTROL PLAN
 TYPICAL SECTION

SHEET 1 OF 3

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 36

Plotted on: 12/20/2022

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LEGEND

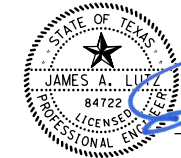
- PROPOSED PAVEMENT CONSTRUCTION THIS PHASE
- PROPOSED CONSTRUCTION PREVIOUS PHASE
- EXISTING PAVEMENT MARKING
- PROPOSED PAVEMENT MARKING
- TRAFFIC FLOW

DESIGN



[Signature]
LUKE REED, P.E. 12/20/2022
DATE

APPROVAL



[Signature]
JAMES A. LUTZ, P.E. 12/20/2022
DATE

REV. NO.	DATE	DESCRIPTION	BY

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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



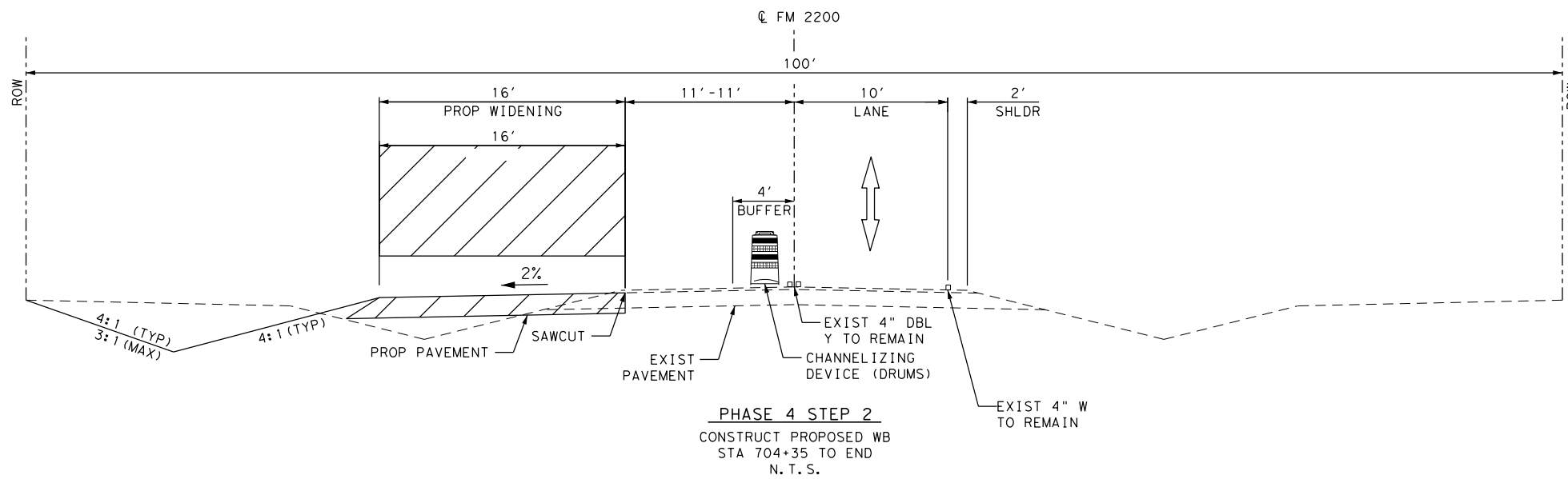
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**TRAFFIC CONTROL PLAN
TYPICAL SECTION**

SHEET 2 OF 3

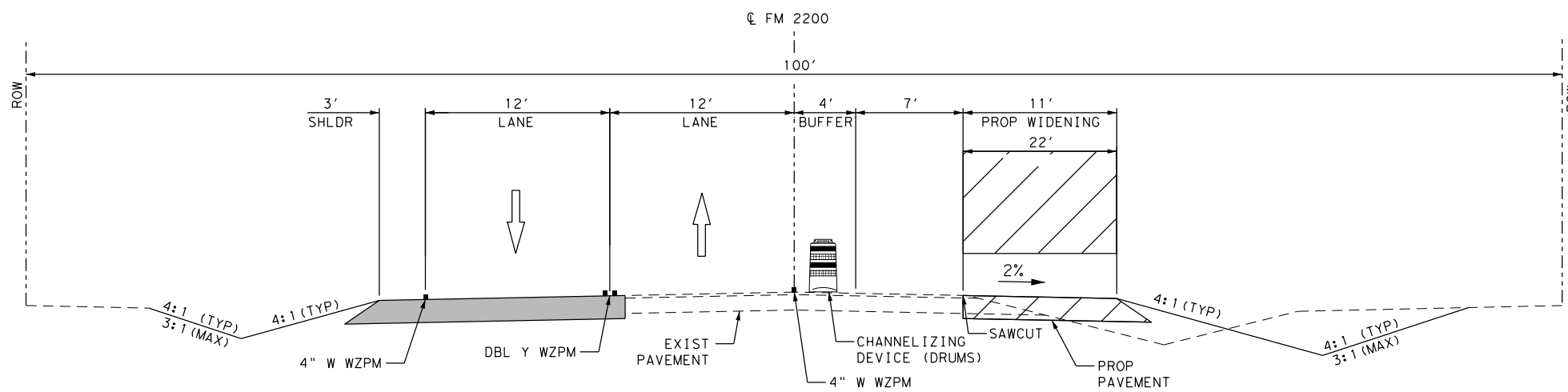
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CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 37

Plotted on: 12/20/2022

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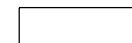






PHASE 4 STEP 2
CONSTRUCT PROPOSED WB
STA 704+35 TO END
N. T. S.



PHASE 4 STEP 3
CONSTRUCT PROPOSED EB
STA 704+35 TO END
N. T. S.

LEGEND

-  PROPOSED PAVEMENT CONSTRUCTION THIS PHASE
-  PROPOSED CONSTRUCTION PREVIOUS PHASE
-  EXISTING PAVEMENT MARKING
-  PROPOSED PAVEMENT MARKING
-  TRAFFIC FLOW

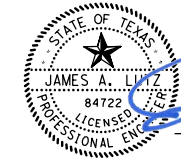
DESIGN



LUKE REED
LUKE REED, P.E.
DATE

12/20/2022

APPROVAL



JAMES A. LUTZ
JAMES A. LUTZ, P.E.
DATE

12/20/2022

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

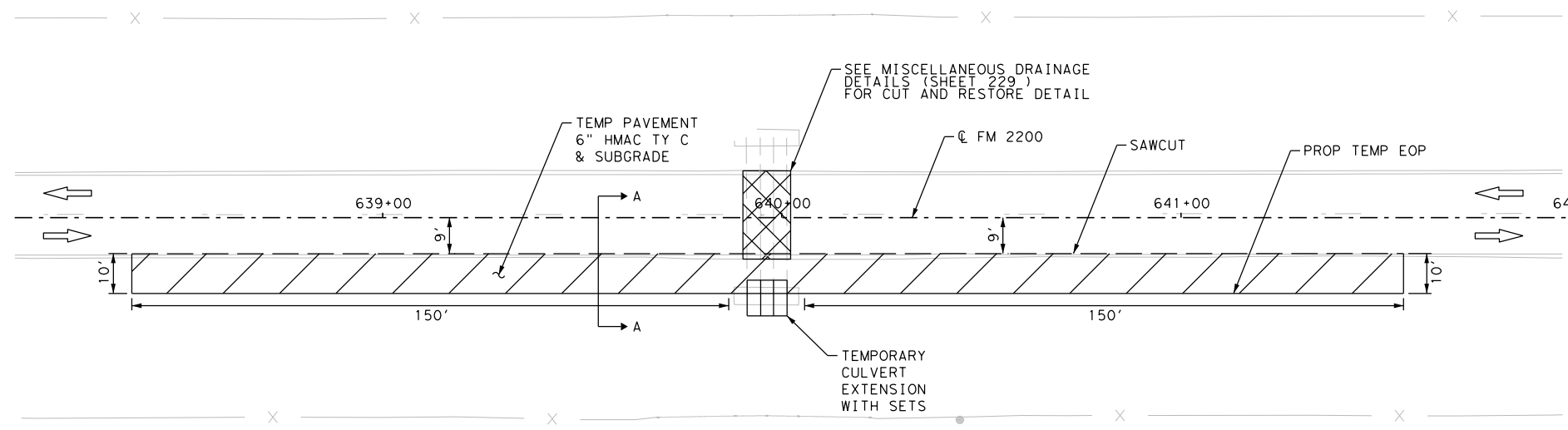


FM 2200
TRAFFIC CONTROL PLAN
TYPICAL SECTION

SHEET 3 OF 3

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	38

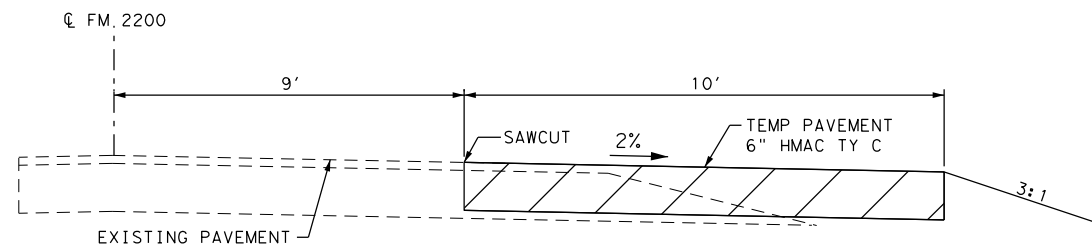
ITEM	DESCRIPTION	UNIT	QTY
0400-6006	CUT & RESTORING PAV	SY	230
0508-6001	CONSTRUCTING DETOURS	SY	1062



TEMPORARY WIDENING DETAIL
FOR CULVERTS A-2, A-3, & A-4

LEGEND

	TRAFFIC FLOW ARROWS
	SAWCUT
	TEMP PAVEMENT
	CUT AND RESTORE PAVEMENT



CROSS SECTION A-A
N. T. S.

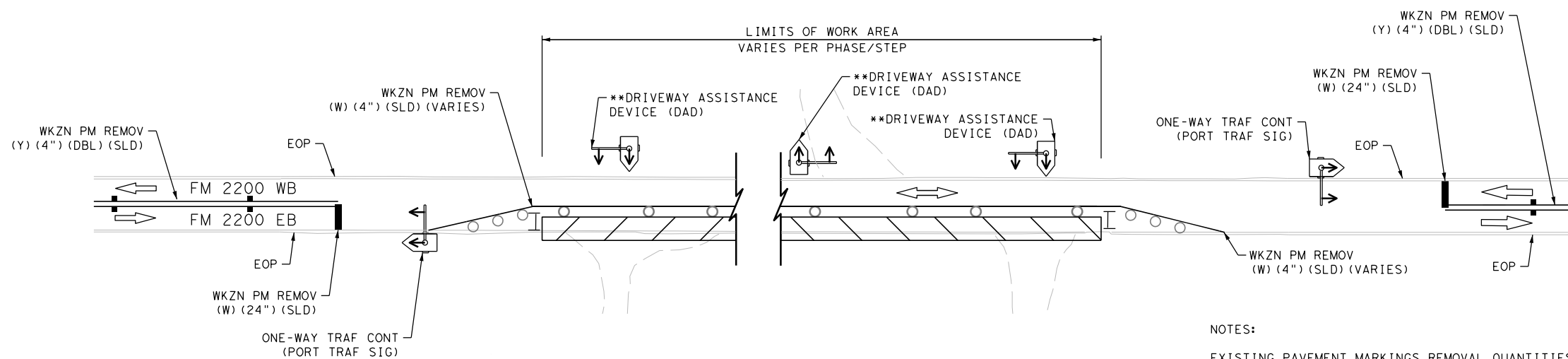
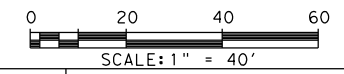
ITEM 0508-6003 CONSTRUCT DETOUR INCLUDES:
TEMP CULV EXTENSION WITH SETS
GRADING
6" HMAC TY C & SUBGRADE
ALL OTHER ITEMS SUBSIDIARY TO ITEM 508 CONSTRUCT DETOURS

DESIGN

LUKE REED, P.E. 1/5/2023 DATE

APPROVAL

JAMES A. LUTZ, P.E. 1/5/2023 DATE



DRIVEWAY ASSISTANCE DEVICE DETAIL

FOR CONCEPT PURPOSES ONLY
SEE TCP SHEET (2-8)-18 ONE LANE TWO WAY TRAFFIC CONTROL WITH TRAFFIC SIGNAL
**SEE "SUMMARY OF TCP QUANTITIES" FOR LOCATIONS OF DRIVEWAY ASSISTANCE DEVICES (DAD)

NOTES:
EXISTING PAVEMENT MARKINGS REMOVAL QUANTITIES VARIES
ALL TCP PAVEMENT MARKINGS QUANTITIES AND ACCOUNTED FOR ON "TCP SUMMARY OF QUANTITIES" SHEET.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
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FM 2200
**TRAFFIC CONTROL PLAN
TEMP WIDENING DETAIL
AND DAD DETAIL**

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	MEDINA	2520	01
			016, ETC	39

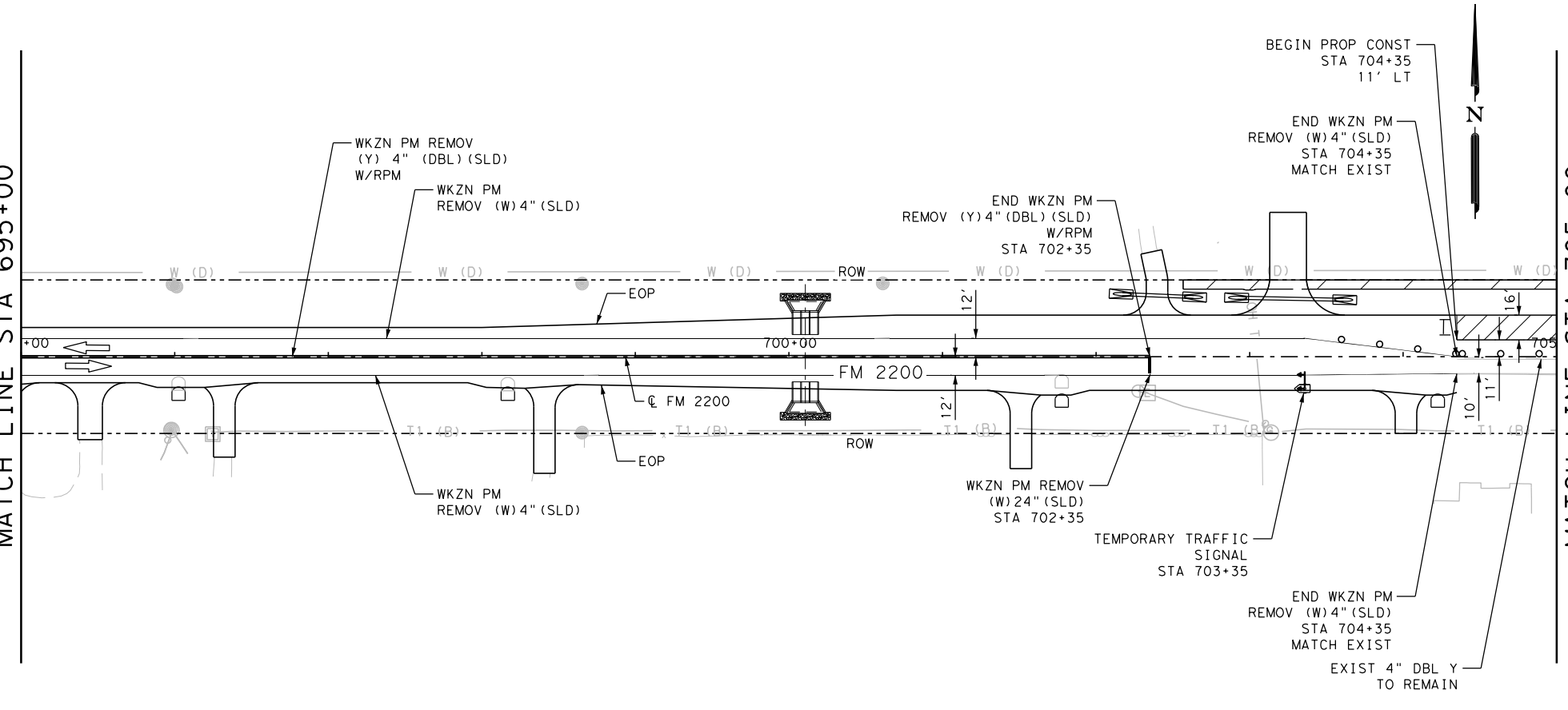
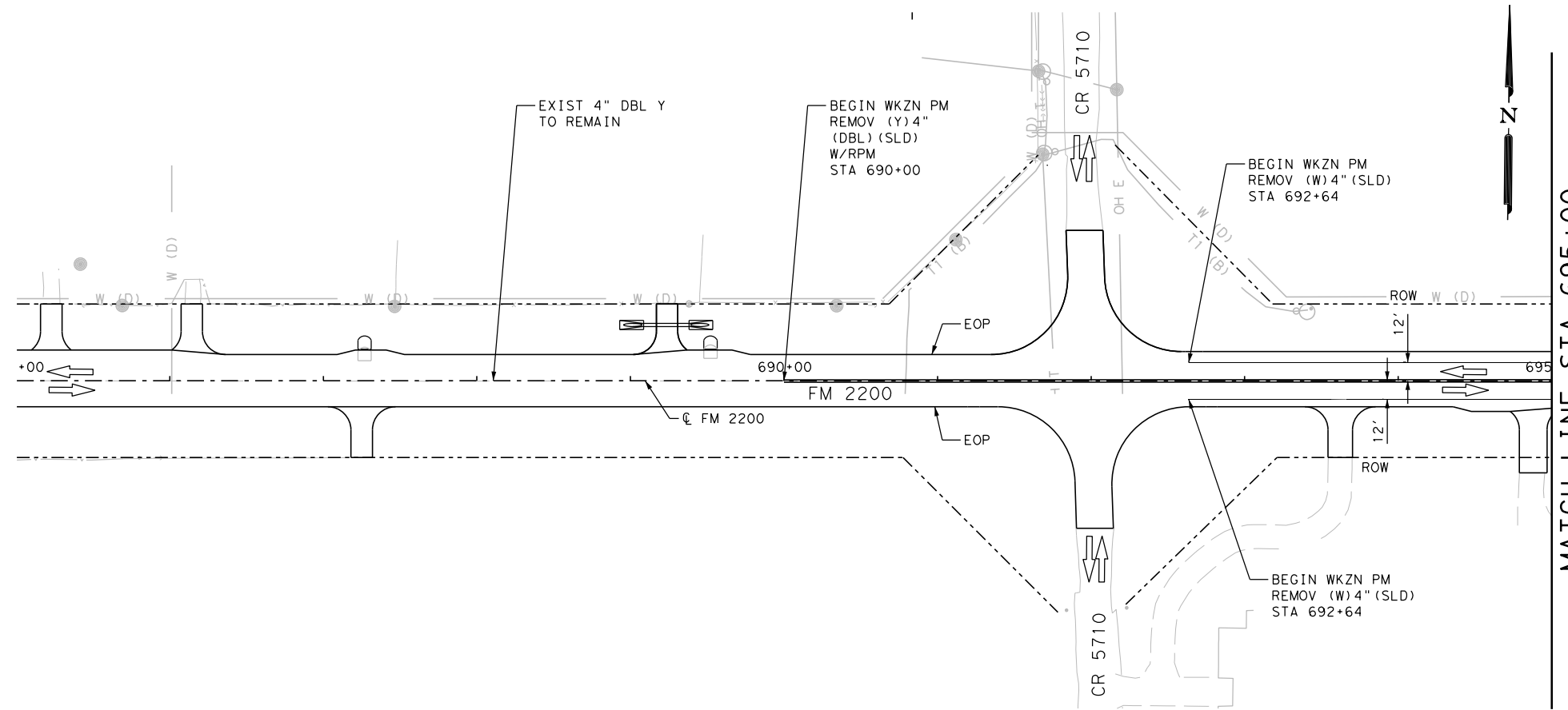
Plotted on: 1/5/2023

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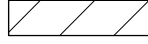





Plotted on: 12/20/2022

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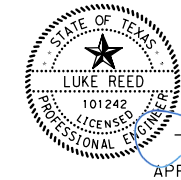
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0662-6016	WK ZN PAV MRK NON-REMOV (W) 24" (SLD)	LF	12
0662-6034	WK ZN PAV MRK NON-REMOV (Y) 4" (SLD)	LF	2468
0672-6009	REFL PAV MRKR TY II-A-A	EA	124



LEGEND

-  CONSTRUCTION AREA
-  TYPE III BARRICADE
-  PLASTIC DRUMS
-  SIGN
-  TRAFFIC FLOW ARROWS
-  WKZN PM REMOV (W) 24" (SLD)

DESIGN

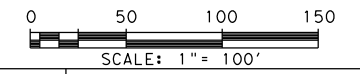


LUKE REED, P.E.
DATE: 12/20/2022

APPROVAL



JAMES A. LUTZ, P.E.
DATE: 12/20/2022



REV. NO.	DATE	DESCRIPTION	BY



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2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
**TRAFFIC CONTROL PLAN
PHASE 4 STEP 2**

STA 685+00 TO STA 705+00

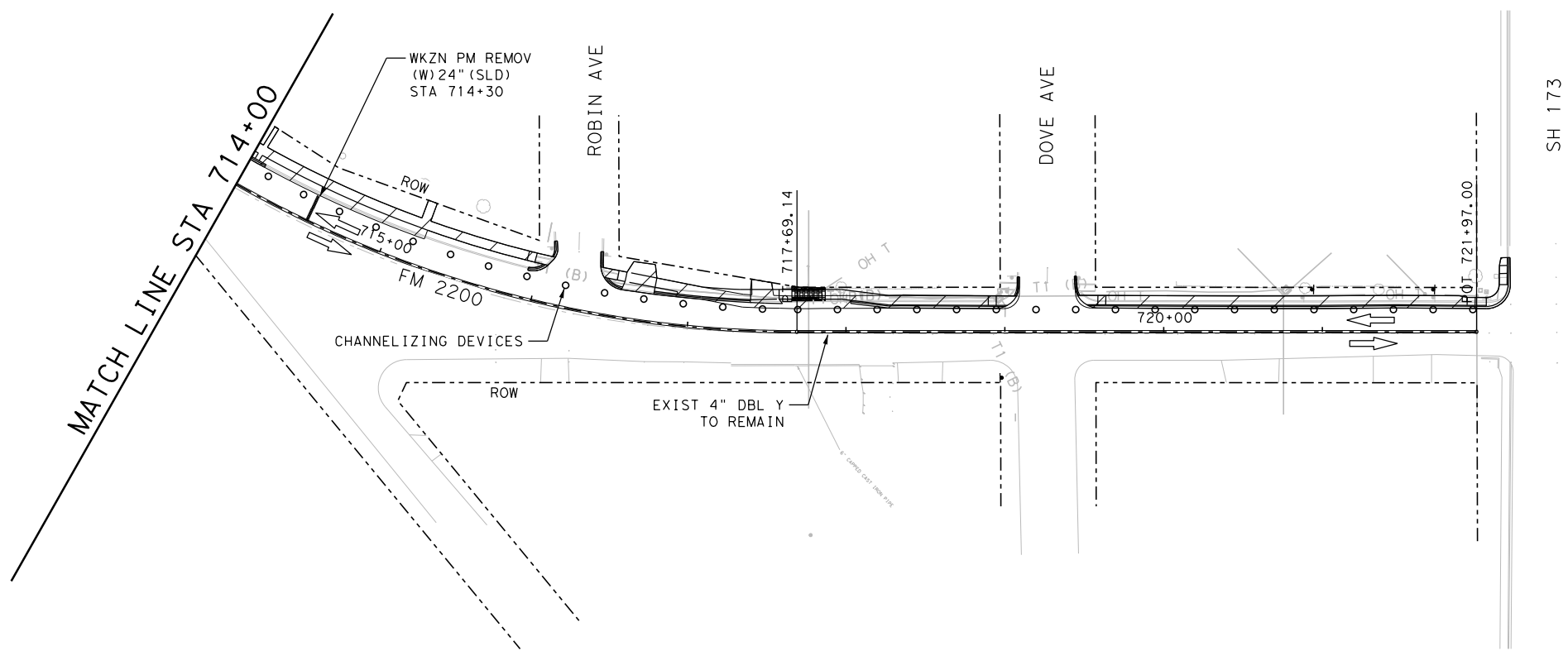
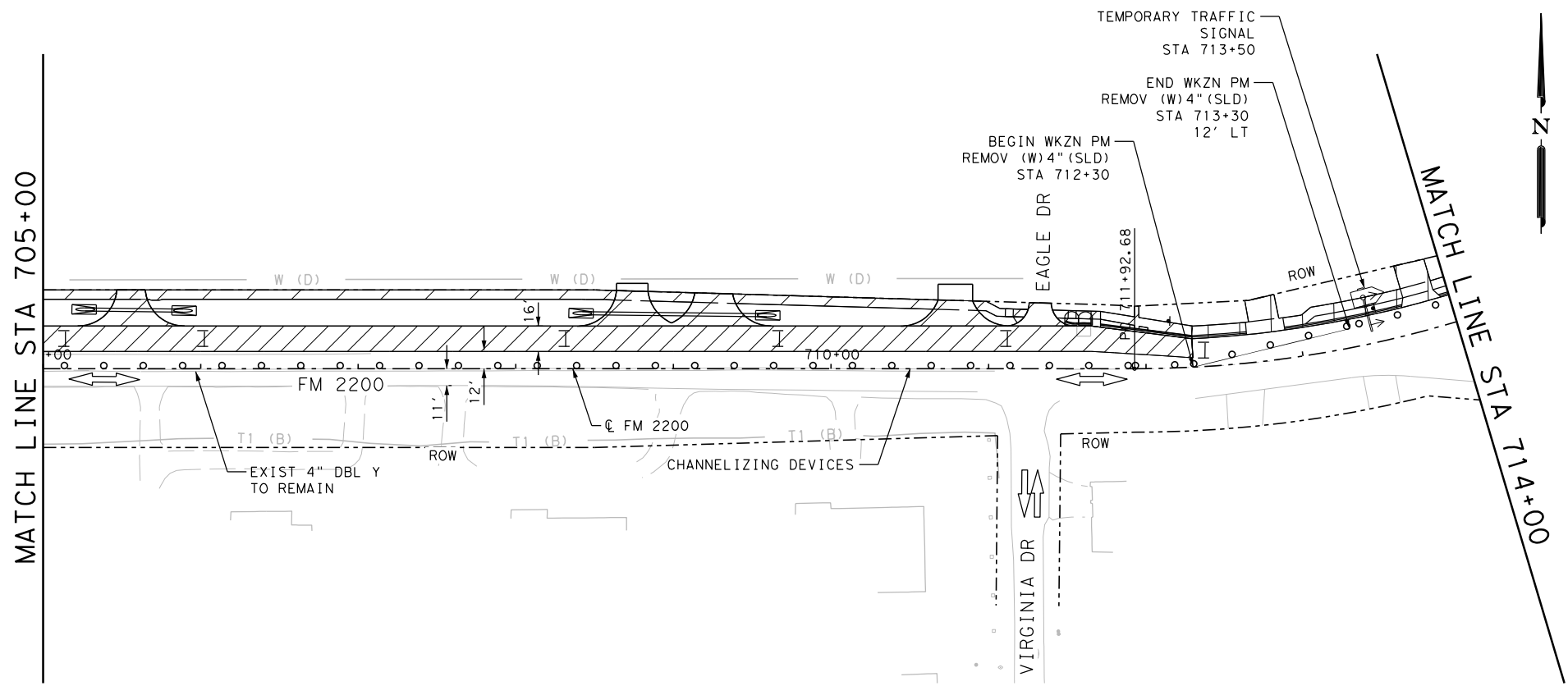
SHEET 1 OF 2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	40

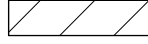





Plotted on: 12/20/2022

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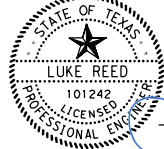
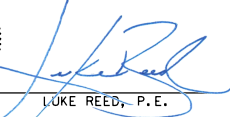
ITEM	DESCRIPTION	UNIT	QTY
0662-6004	WK ZN PAV MRK NON-REMOV (W) 4" (SLD)	LF	100
0662-6016	WK ZN PAV MRK NON-REMOV (W) 24" (SLD)	LF	18
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	200



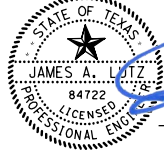
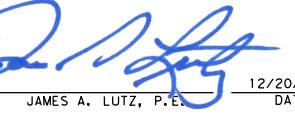
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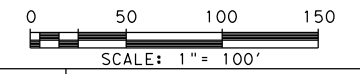
-  CONSTRUCTION AREA
-  TYPE III BARRICADE
-  PLASTIC DRUMS
-  SIGN
-  TRAFFIC FLOW ARROWS
-  WKZN PM REMOV (W) 24" (SLD)

DESIGN



 LUKE REED, P.E. 12/20/2022
 DATE

APPROVAL



 JAMES A. LUTZ, P.E. 12/20/2022
 DATE



REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
 TCP
 PHASE 4 STEP 2

STA 705+00 TO END PROJECT

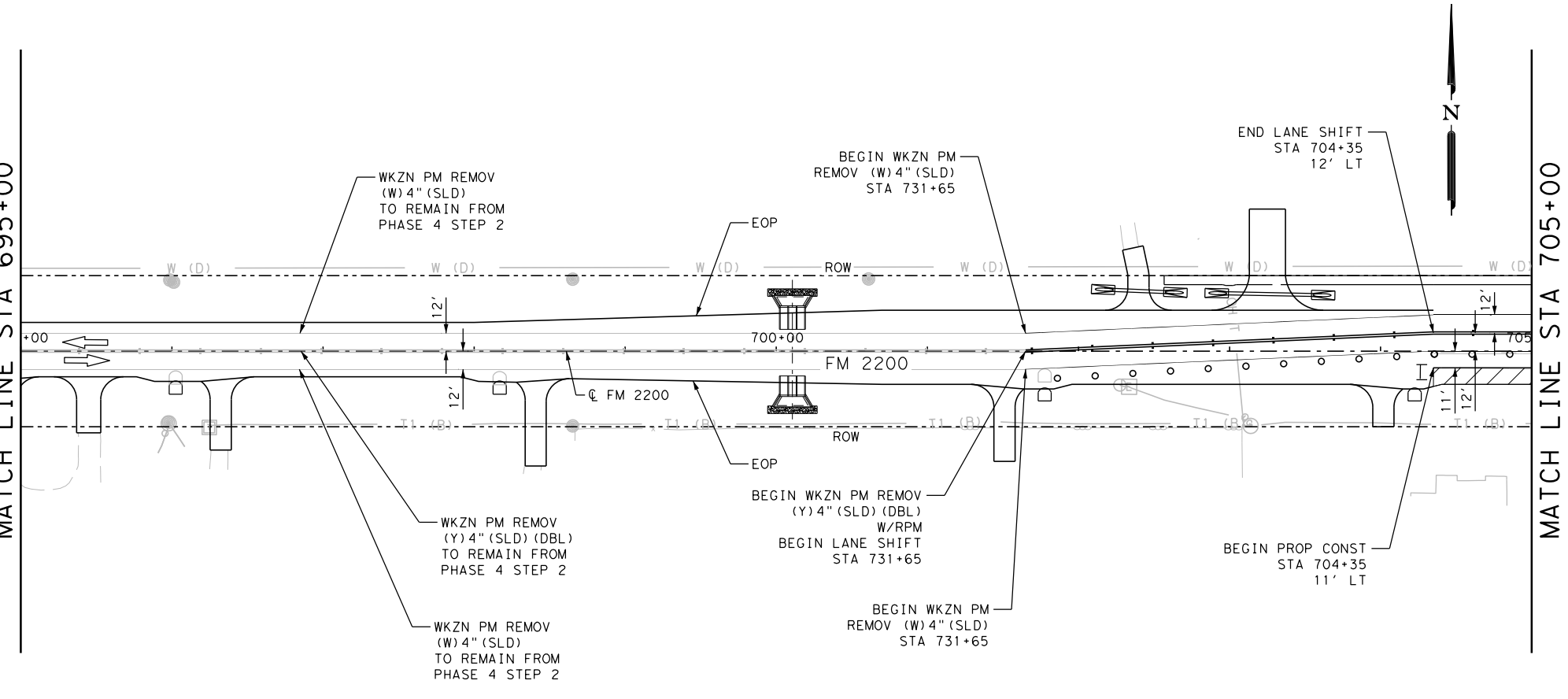
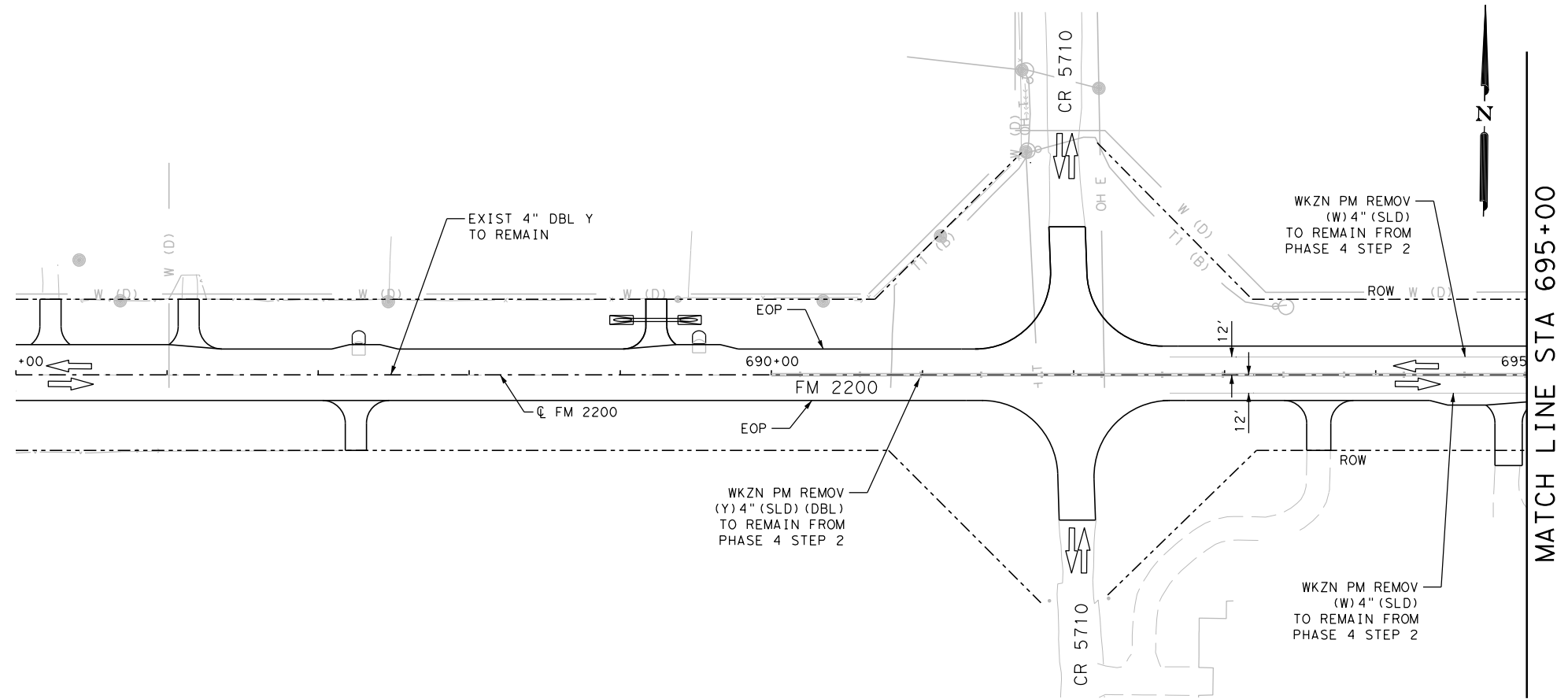
SHEET 2 OF 2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	41

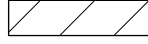





Plotted on: 12/20/2022

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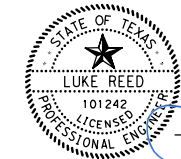
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0662-6034	WK ZN PAV MRK NON-REMOV (Y) 4" (SLD)	LF	672
0672-6009	REFL PAV MRKR TY II-A-A	EA	34



LEGEND

-  CONSTRUCTION AREA
-  TYPE III BARRICADE
-  PLASTIC DRUMS
-  SIGN
-  TRAFFIC FLOW ARROWS
-  WKZN PM REMOV (W) 24" (SLD)

DESIGN

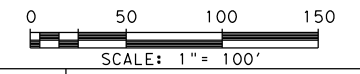


Luke Reed
LUKE REED, P.E.
12/20/2022
DATE

APPROVAL



James A. Lutz
JAMES A. LUTZ, P.E.
12/20/2022
DATE



REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
**TRAFFIC CONTROL PLAN
PHASE 4 STEP 3**

STA 685+00 TO STA 705+00

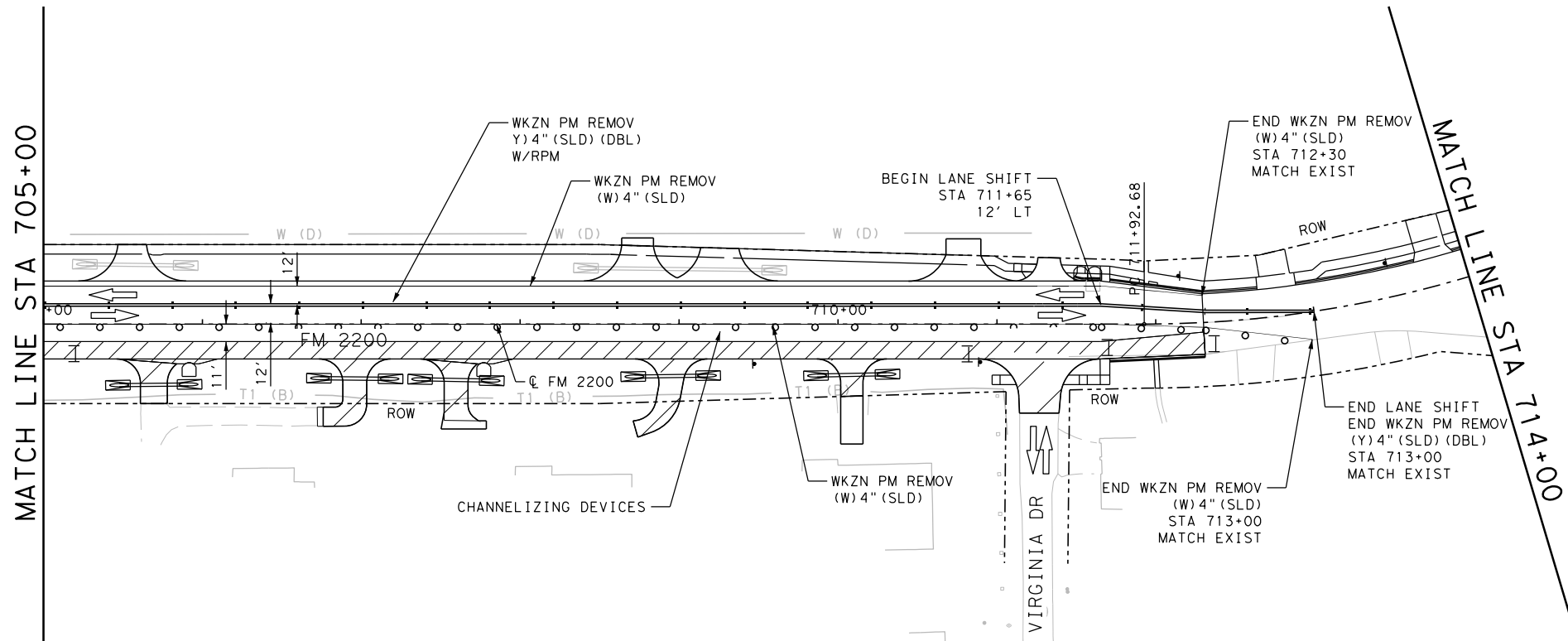
SHEET 1 OF 2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	42

ITEM	DESCRIPTION	UNIT	QTY
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0672-6009	REFL PAV MRKR TY II-A-A	EA	50

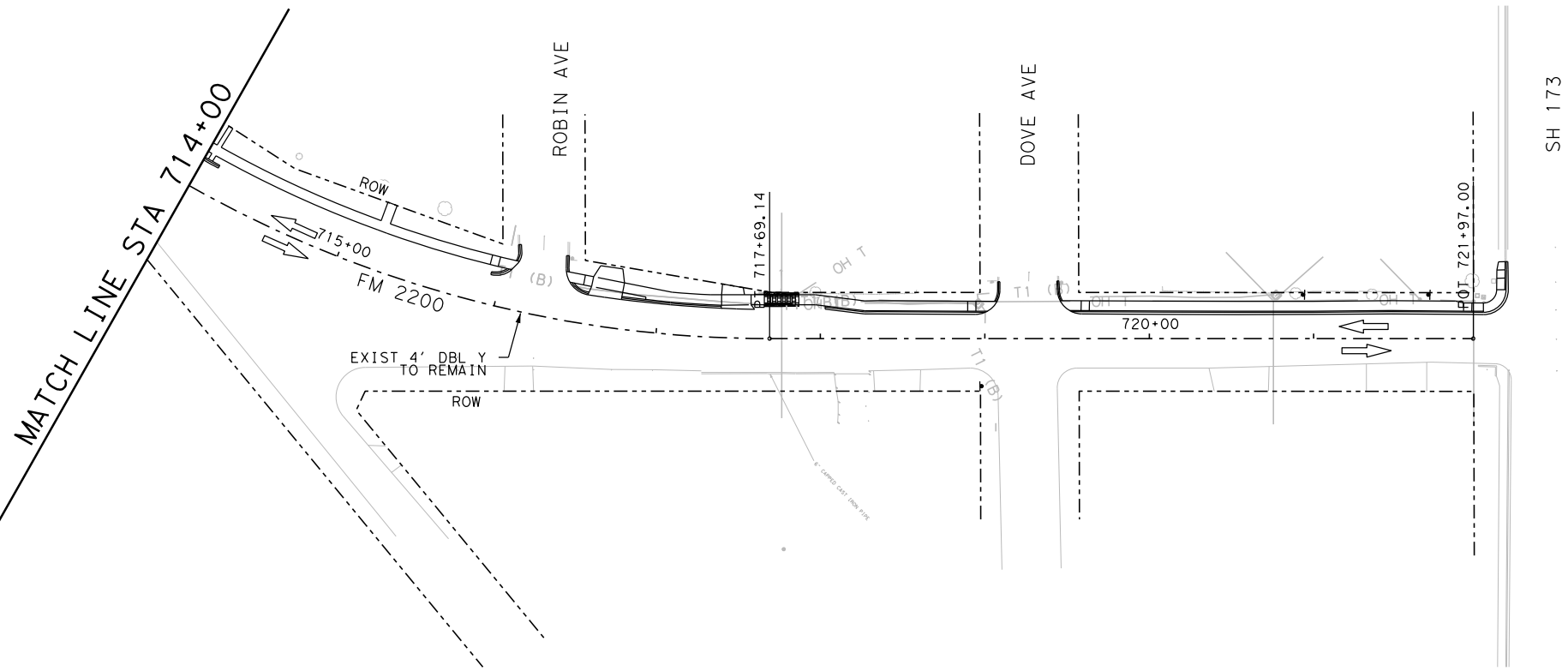
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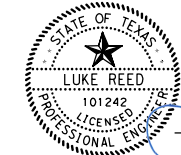


LEGEND

- CONSTRUCTION AREA
- TYPE III BARRICADE
- PLASTIC DRUMS
- SIGN
- TRAFFIC FLOW ARROWS
- WKZN PM REMOV (W) 24" (SLD)

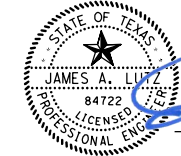


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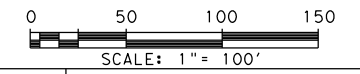


Luke Reed
LUKE REED, P.E. 12/20/2022
DATE

APPROVAL



James A. Lutz
JAMES A. LUTZ, P.E. 12/20/2022
DATE



REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
TCP
PHASE 4 STEP 3

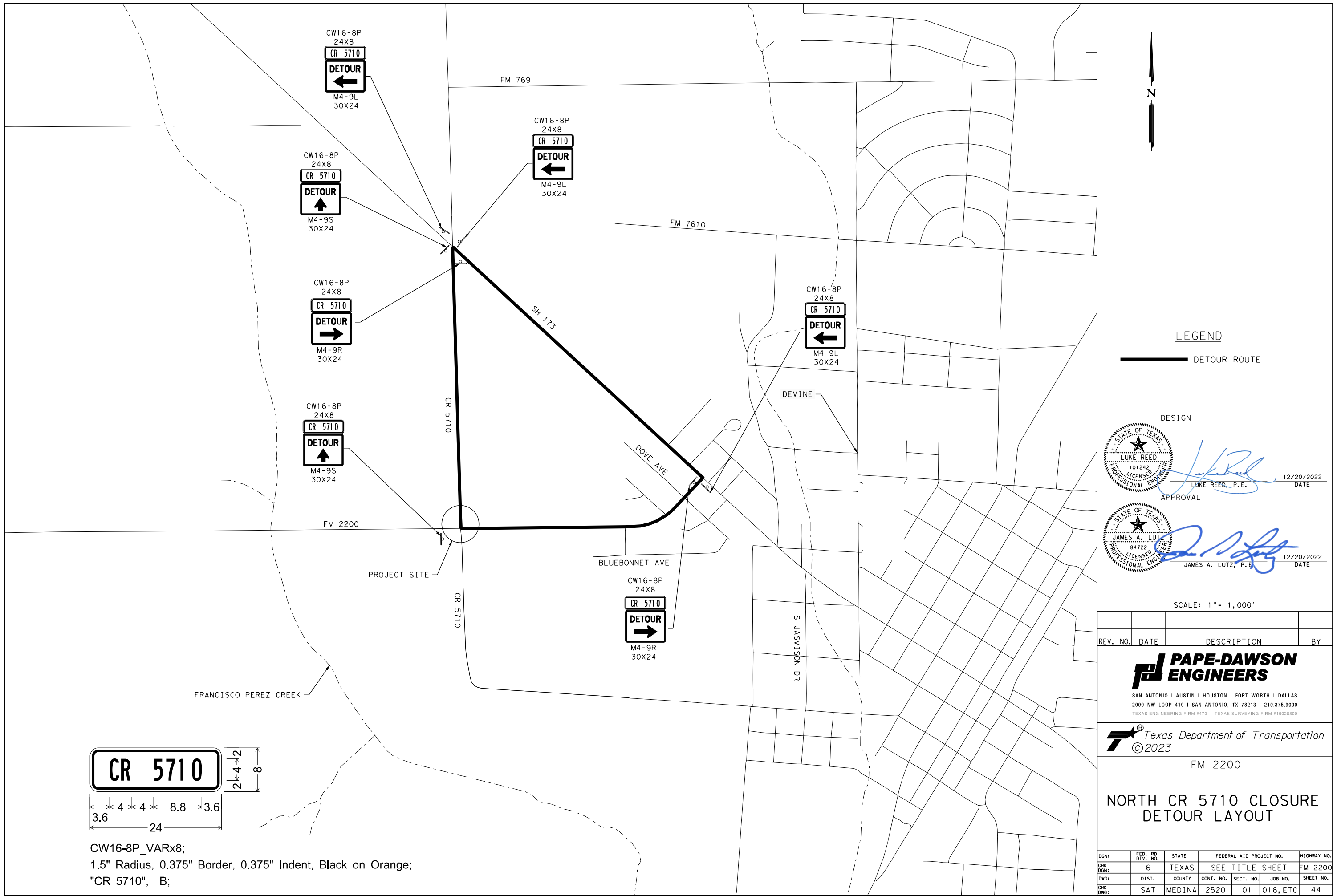
STA 705+00 TO END PROJECT

SHEET 2 OF 2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	43

Plotted on: 12/20/2022

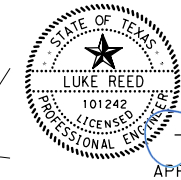
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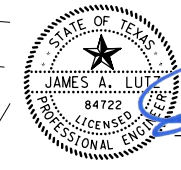
DETOUR ROUTE

DESIGN



Luke Reed
LUKE REED, P.E.
12/20/2022
DATE

APPROVAL



James A. Lutz
JAMES A. LUTZ, P.E.
12/20/2022
DATE

SCALE: 1" = 1,000'

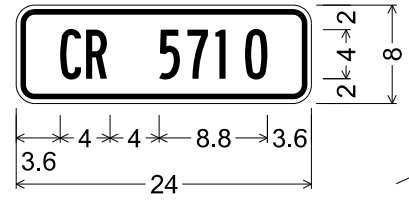
REV. NO.	DATE	DESCRIPTION	BY



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2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800



FM 2200
**NORTH CR 5710 CLOSURE
DETOUR LAYOUT**

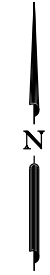


CW16-8P_VARx8;
1.5" Radius, 0.375" Border, 0.375" Indent, Black on Orange;
"CR 5710", B;

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	44

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\TCP\1179904_Detour02.dgn



FM 769

FM 7610

SH 173

CW16-8P
24X8
CR 5710
DETOUR
M4-9S
30X24

CW16-8P
24X8
CR 5710
DETOUR
M4-9S
30X24

FM 2200

CR 5710

CR 5710

PROJECT SITE

BLUEBONNET AVE

CW16-8P
24X8
CR 5710
DETOUR
M4-9R
30X24

DEVINE

SH 173

CW16-8P
24X8
CR 5710
DETOUR
M4-9L
30X24

S JASMISON DR

CW16-8P
24X8
CR 5710
DETOUR
M4-9R
30X24

CW16-8P
24X8
CR 5710
DETOUR
M4-9R
30X24

CW16-8P
24X8
CR 5710
DETOUR
M4-9L
30X24

LEGEND

DETOUR ROUTE

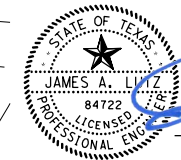
DESIGN



LUKE REED
101242
LICENSED
PROFESSIONAL ENGINEER

12/20/2022
DATE

APPROVAL



JAMES A. LUTZ
84722
LICENSED
PROFESSIONAL ENGINEER

12/20/2022
DATE

SCALE: 1" = 1,000'

REV. NO.	DATE	DESCRIPTION	BY

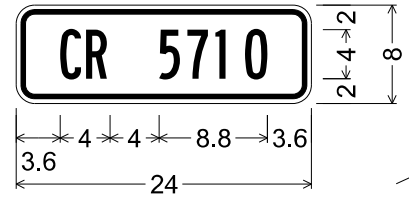
Pape-Dawson ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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FM 2200

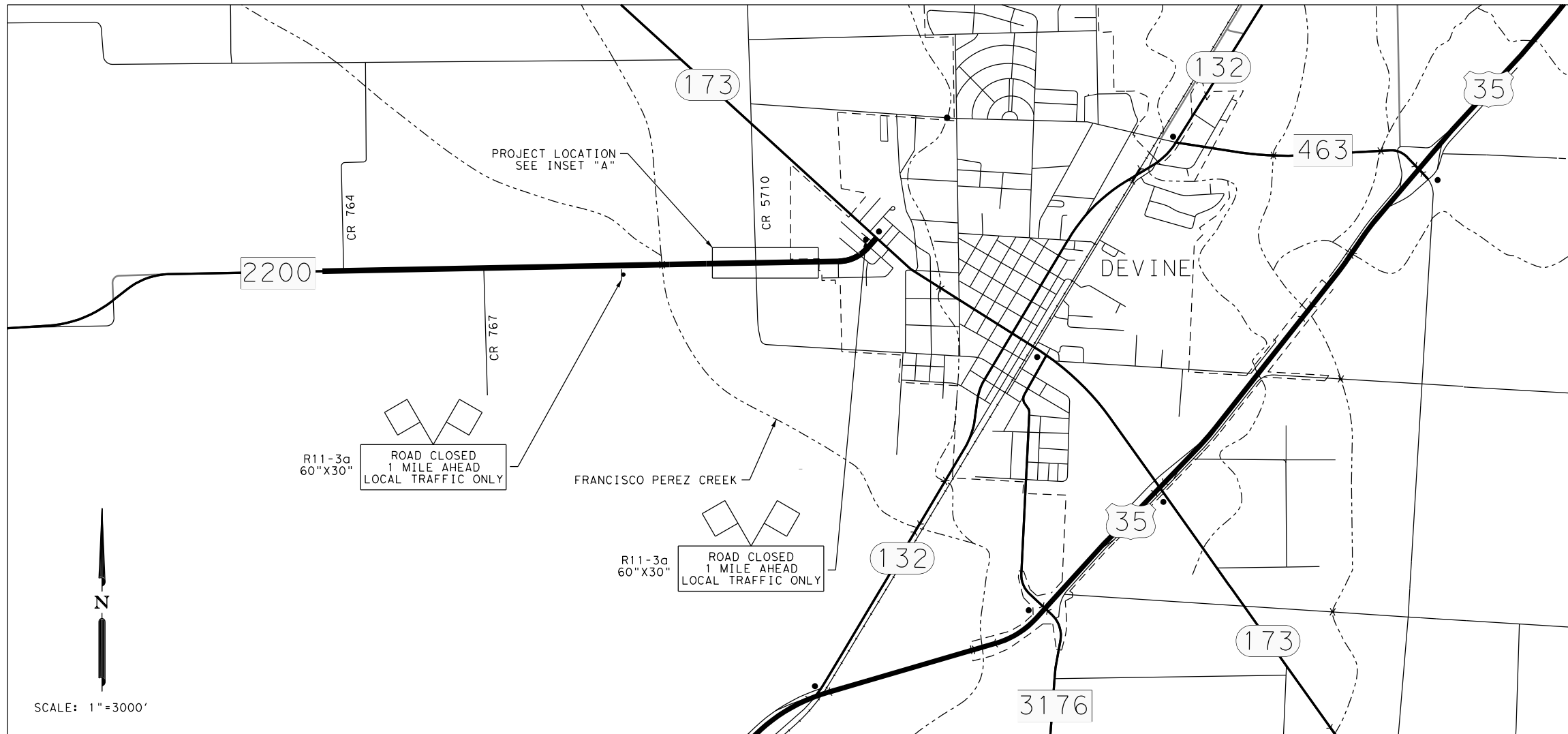
**SOUTH CR 5710 CLOSURE
DETOUR LAYOUT**



CW16-8P_VARx8;
1.5" Radius, 0.375" Border, 0.375" Indent, Black on Orange;
"CR 5710", B;

DON:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	45

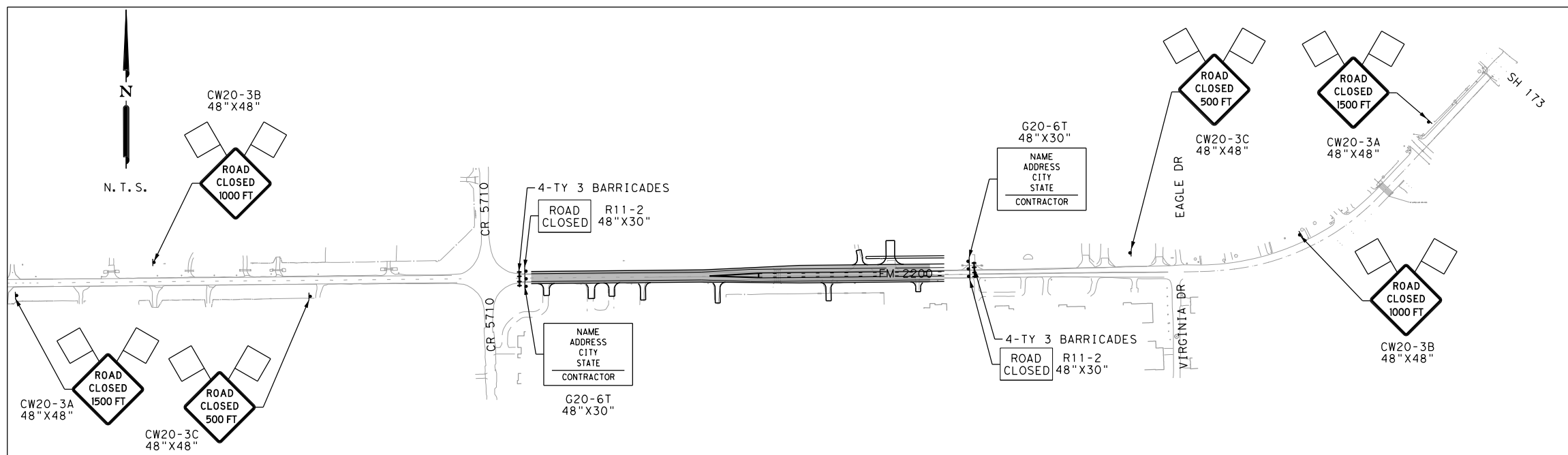
Plotted on: 12/20/2022



LOCATION MAP

DESIGN
 STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 LUKE REED, P.E.
 12/20/2022
 DATE

APPROVAL
 STATE OF TEXAS
 JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER
 JAMES A. LUTZ, P.E.
 12/20/2022
 DATE



CONSTRUCTION SIGNING AT PROJECT LOCATION

INSET "A"

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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FM 2200

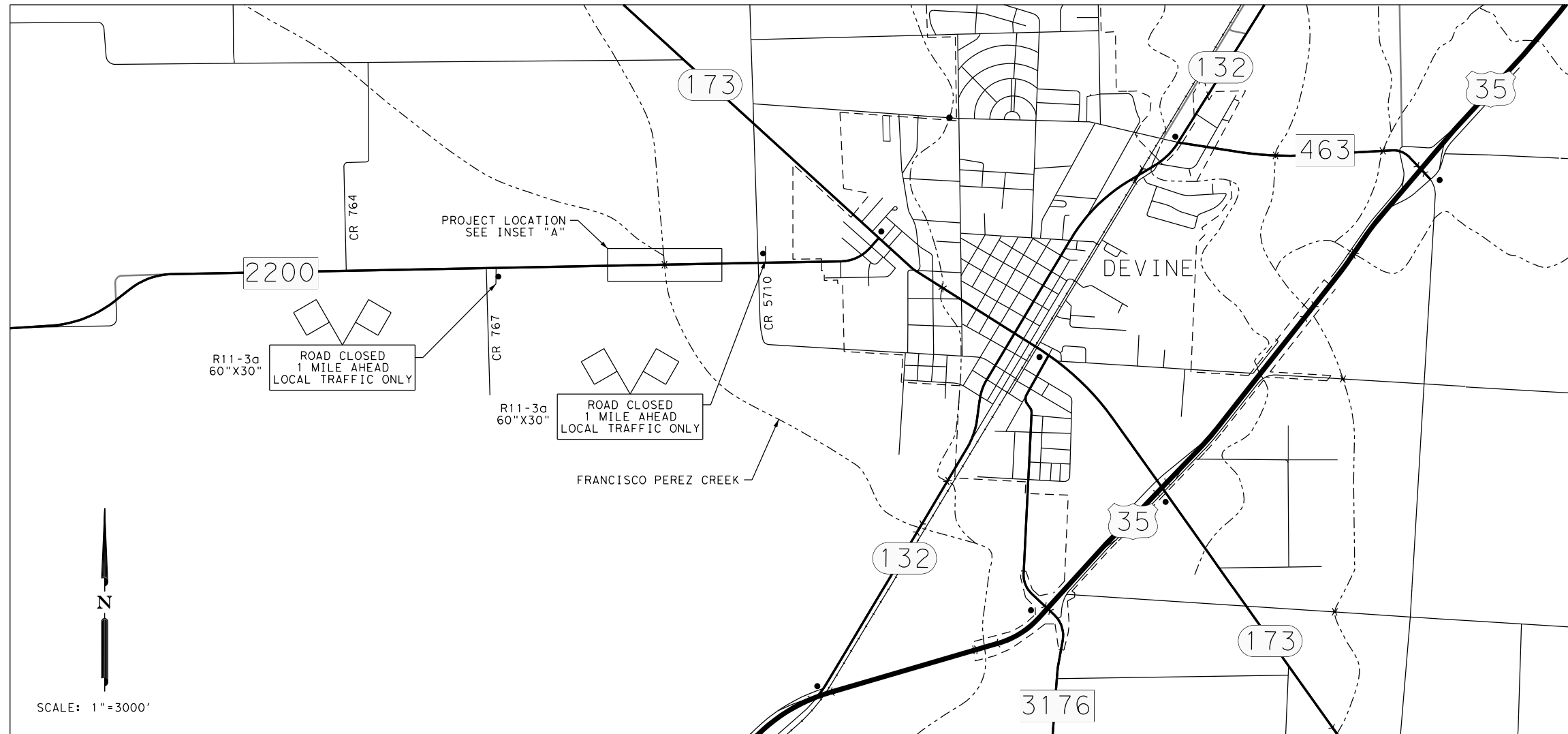
TRAFFIC CONTROL PLAN
 PHASE 4 STEP 1 CLOSURE

SHEET 1 OF 1

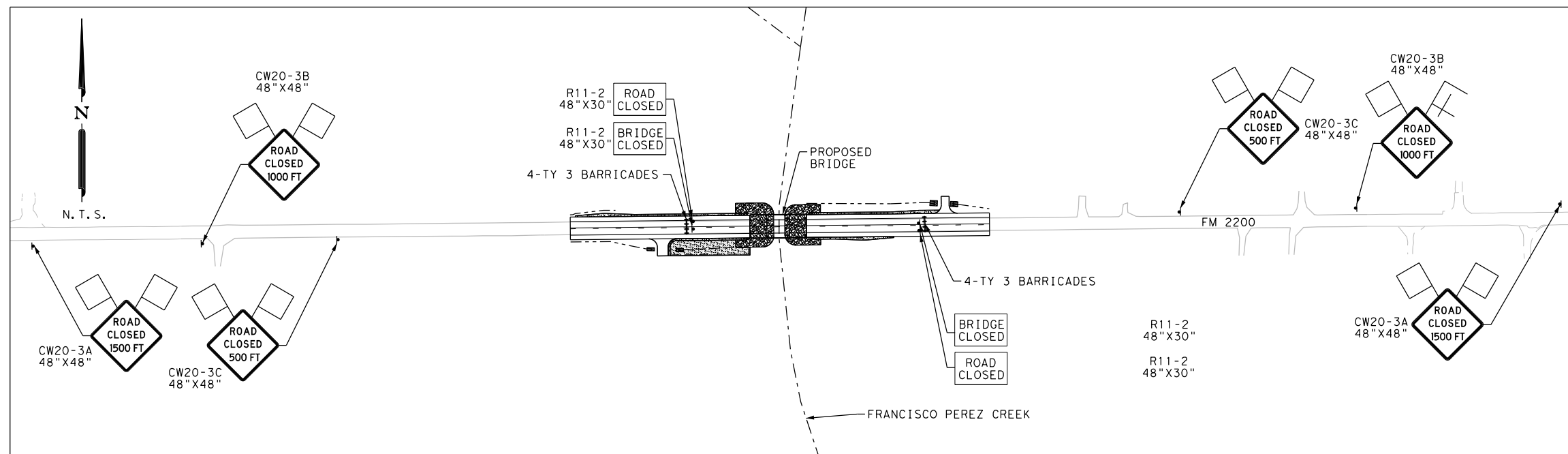
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DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	46

Design File name: P:\117\99\04\Design\Civil\TCP\1179904_TCP_Culvert A-5.dgn

Plotted on: 12/20/2022



LOCATION MAP



CONSTRUCTION SIGNING AT PROJECT LOCATION

INSET "A"

DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 12/20/2022
 DATE

APPROVAL

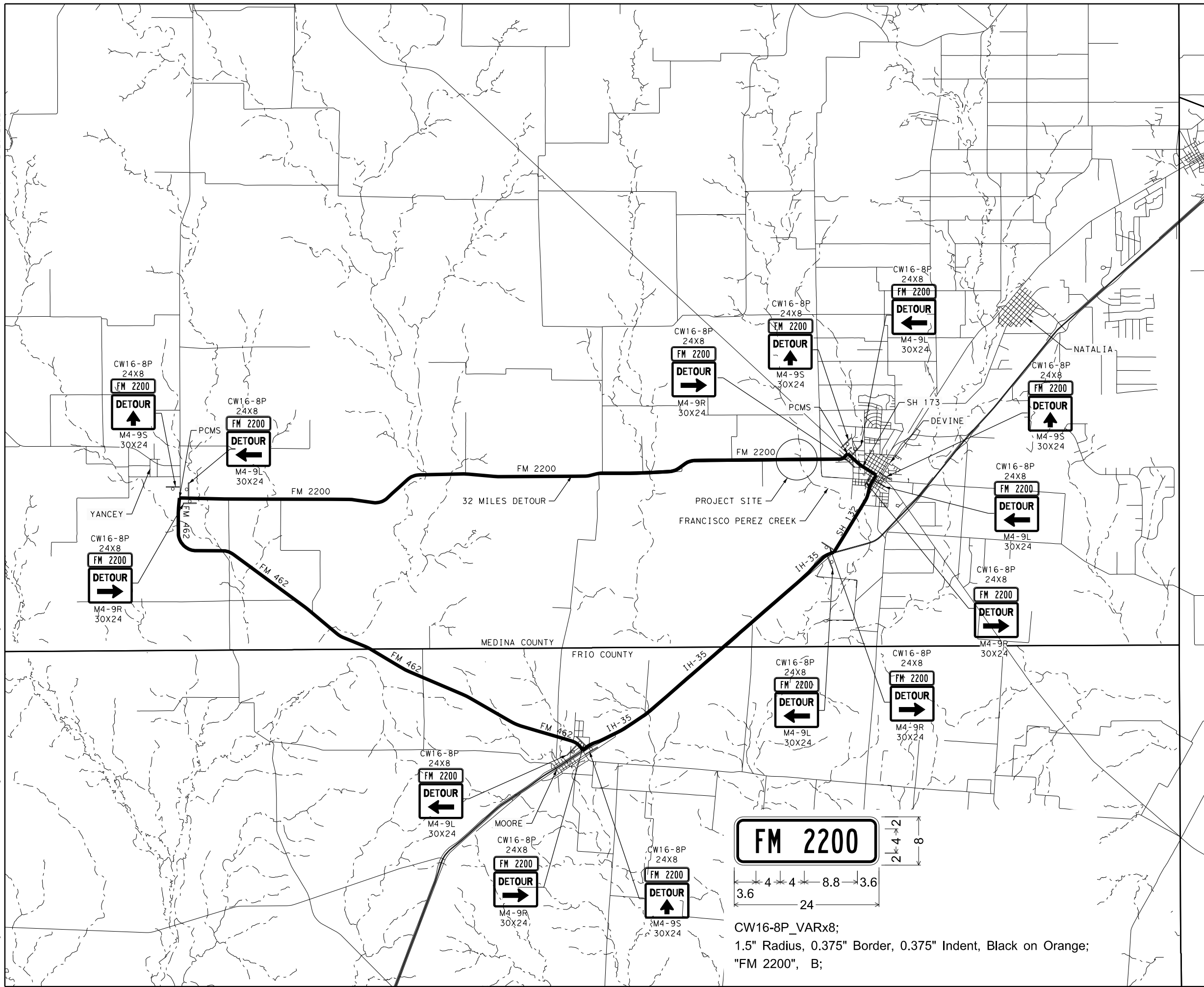
STATE OF TEXAS
 JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER
 12/20/2022
 DATE

REV. NO.	DATE	DESCRIPTION	BY
 SAN ANTONIO AUSTIN HOUSTON FORT WORTH DALLAS 2000 NW LOOP 410 SAN ANTONIO, TX 78213 210.375.9000 TEXAS ENGINEERING FIRM #470 TEXAS SURVEYING FIRM #10028800			
 © 2023 FM 2200 AT FRANCISCO PEREZ CREEK			
TRAFFIC CONTROL PLAN BRIDGE CLOSURE			
SHEET 1 OF 1			
DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:
CHK:	6	TEXAS	SEE TITLE SHEET
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO. JOB NO.:
CHK:	SAT	MEDINA	2520 01 015
DWG:			47

Design File name: P:\117\99\03\Design\Civil\TDCP\1179903TDCP01.dgn

Plotted on: 12/20/2022

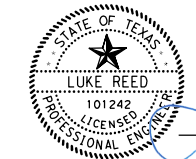
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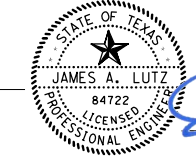
— DETOUR ROUTE

DESIGN



Luke Reed
 LUKE REED, P.E.
 12/20/2022
 DATE

APPROVAL



James A. Lutz
 JAMES A. LUTZ, P.E.
 12/20/2022
 DATE

SCALE: 1" = 10,000'

REV. NO.	DATE	DESCRIPTION	BY

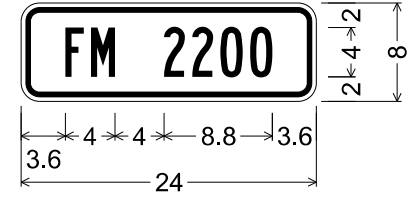
Pape-Dawson
ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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FM 2200 AT FRANCISCO PEREZ CREEK

**BRIDGE CLOSURE
 DETOUR LAYOUT**



CW16-8P_VARx8;
 1.5" Radius, 0.375" Border, 0.375" Indent, Black on Orange;
 "FM 2200", B;

DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
SAT	MEDINA	2520	01	015	48

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DATE: 12/20/2022 3:28:00 PM
 FILE: P:\117\99\04\Des\ign\Civil\Standards\TCP\bc-21.dgn

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.
11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.
12. The Engineer has the final decision on the location of all traffic control devices.
13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:



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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

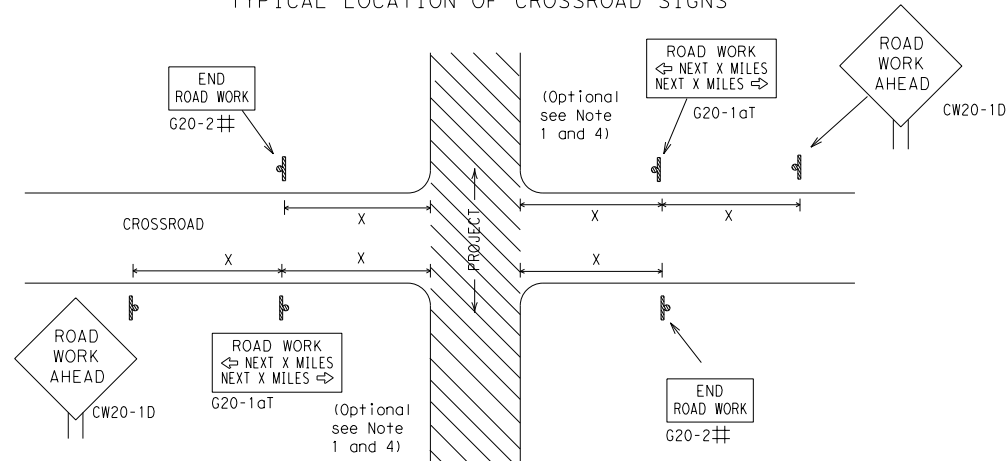
SHEET 1 OF 12

			
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS			
BC (1) - 21			
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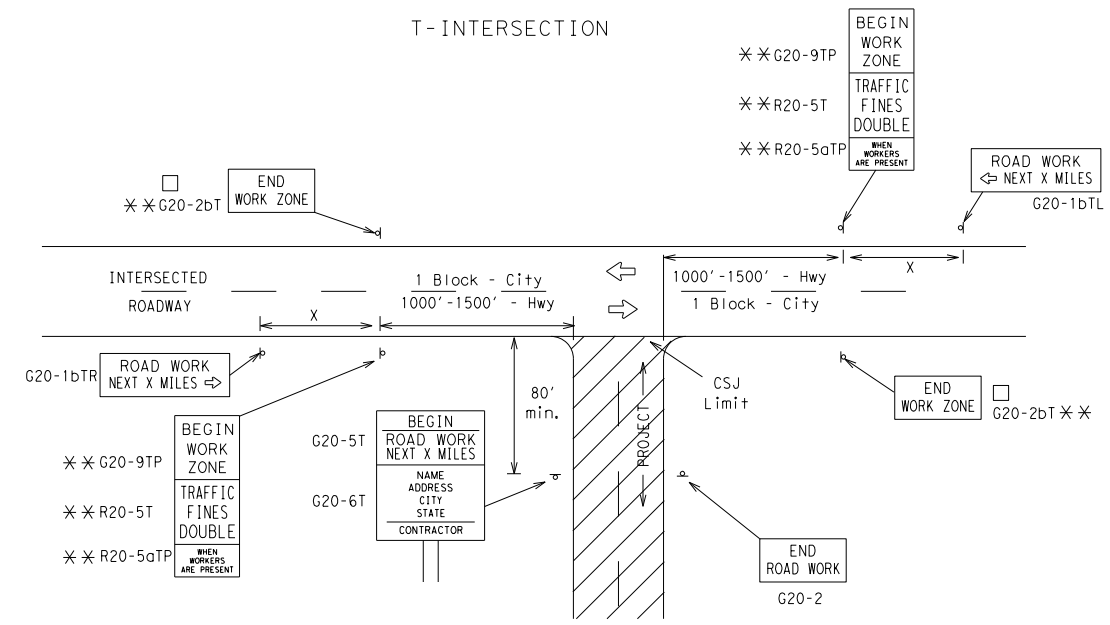
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TYPICAL LOCATION OF CROSSROAD SIGNS



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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

- 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.
- 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}

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Δ Spacing "x" Feet (Apprx.)
CW20 ⁴	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	50	400
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	60	600 ²
			65	700 ²
			70	800 ²
			80	1000 ²
*			*	³

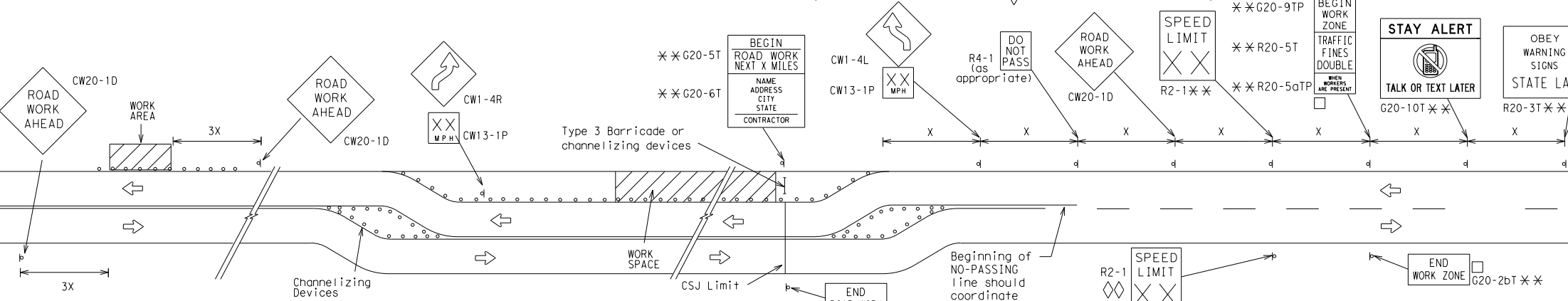
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

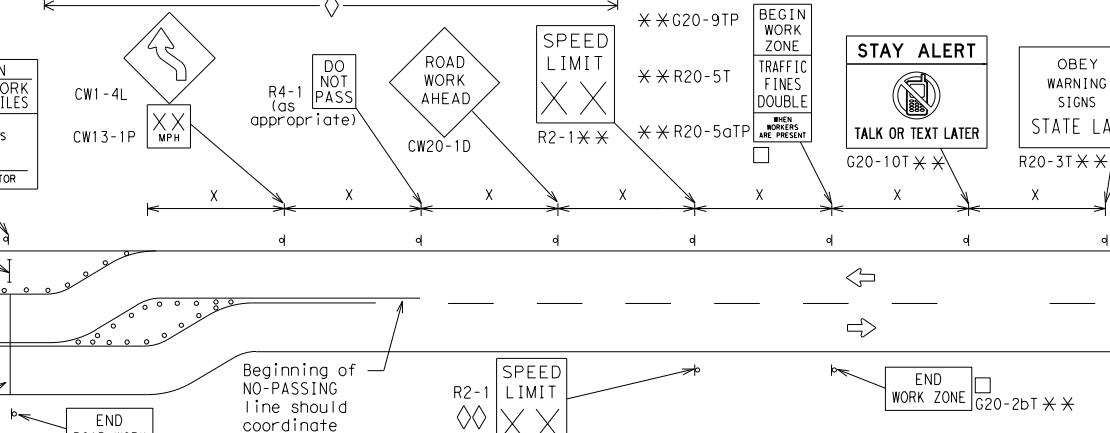
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be 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".
- Only diamond shaped warning sign sizes are indicated.
- See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

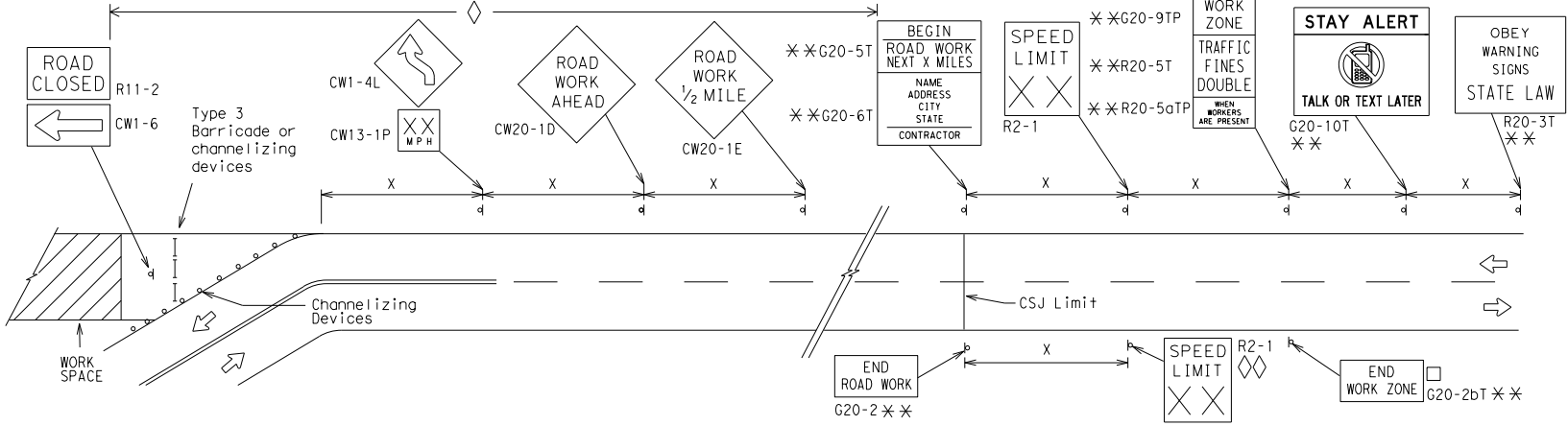


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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BARRICADE AND CONSTRUCTION PROJECT LIMIT

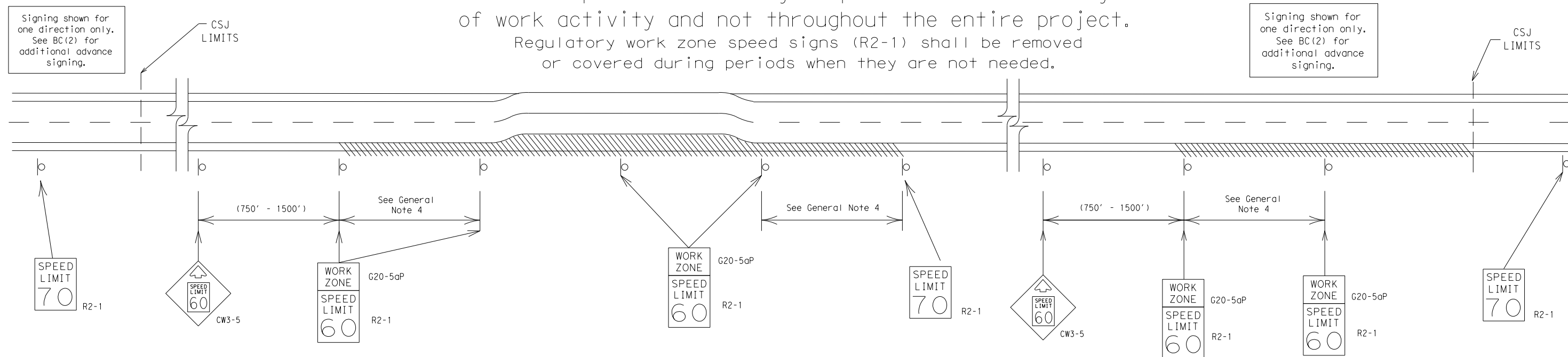
BC (2) - 21

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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:

40 mph and greater	0.2 to 2 miles
35 mph and less	0.2 to 1 mile
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- Fabrication, erection and maintenance of the "ADVANCE SPEED LIMIT" (CW3-5) sign, "WORK ZONE" (G20-5aP) plaque and the "SPEED LIMIT" (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
 - Law enforcement.
 - Flagger stationed next to sign.
 - Portable changeable message sign (PCMS).
 - Low-power (drone) radar transmitter.
 - Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- 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.

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SHEET 3 OF 12



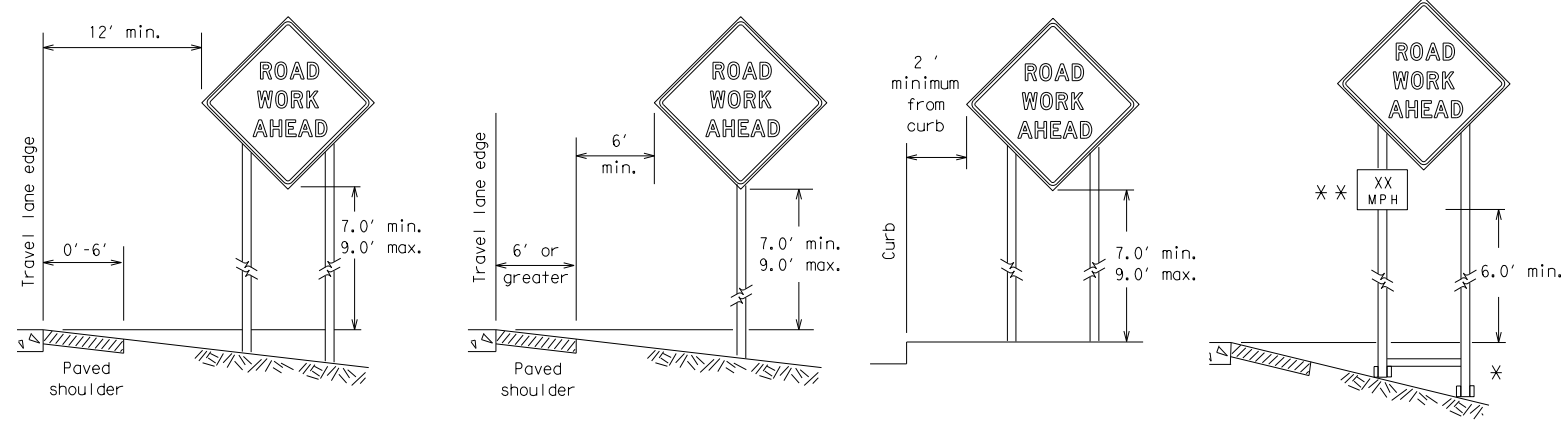
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC (3) - 21

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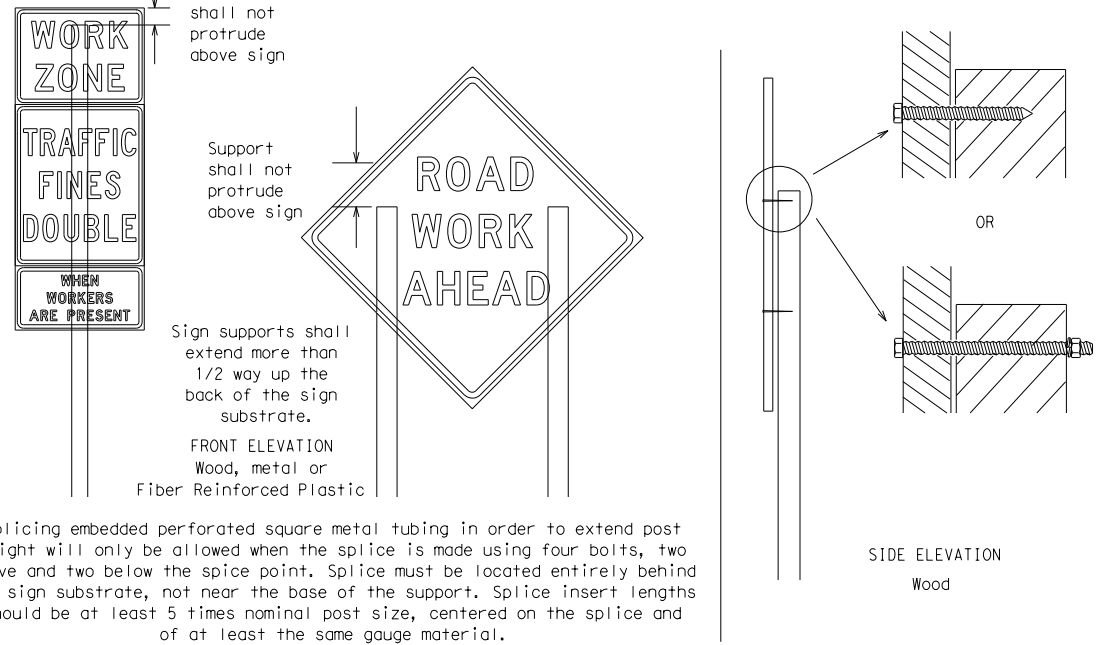
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



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

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

ATTACHMENT FOR SIGN SUPPORTS



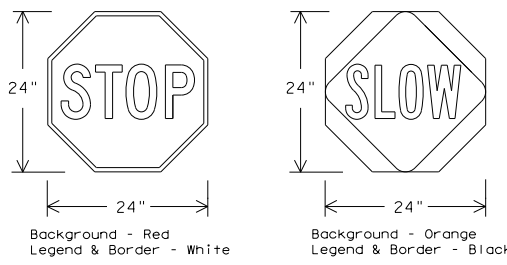
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports.

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

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the splice 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

- STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
- STOP/SLOW paddles shall be retroreflective when used at night.
- STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
- 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

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

- 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.
 - Long-term stationary - work that occupies a location more than 3 days.
 - Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
 - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
 - Short, duration - work that occupies a location up to 1 hour.
 - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

- 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.



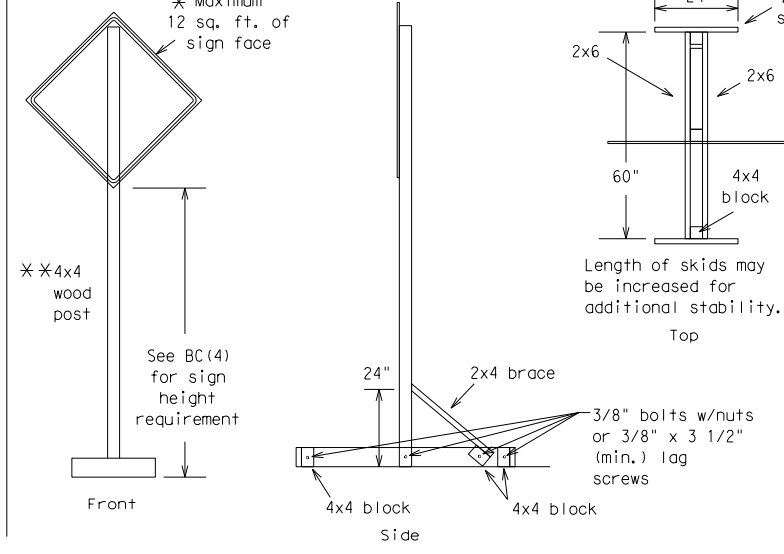
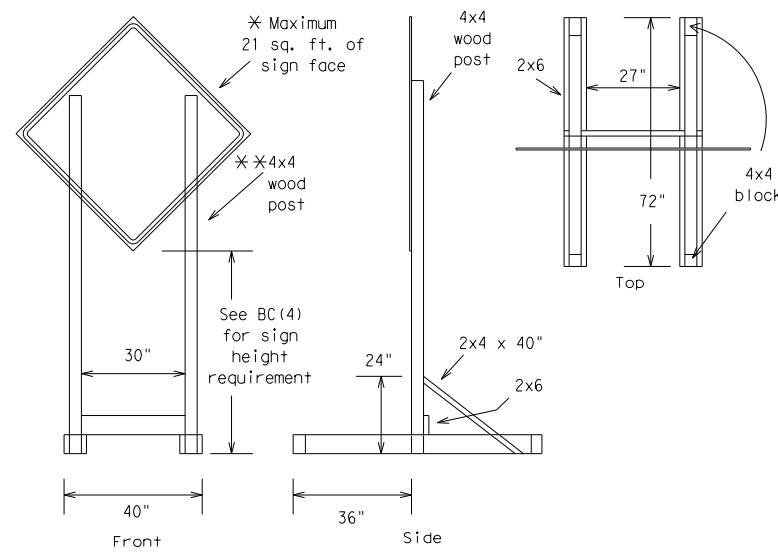
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21

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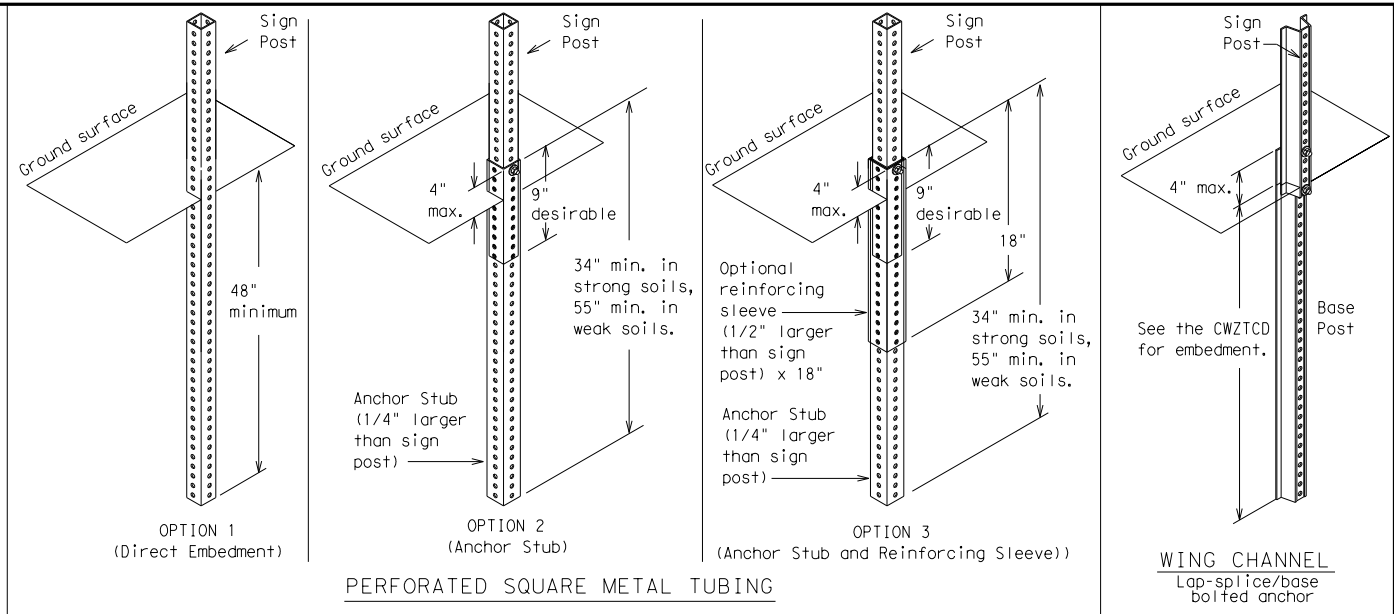
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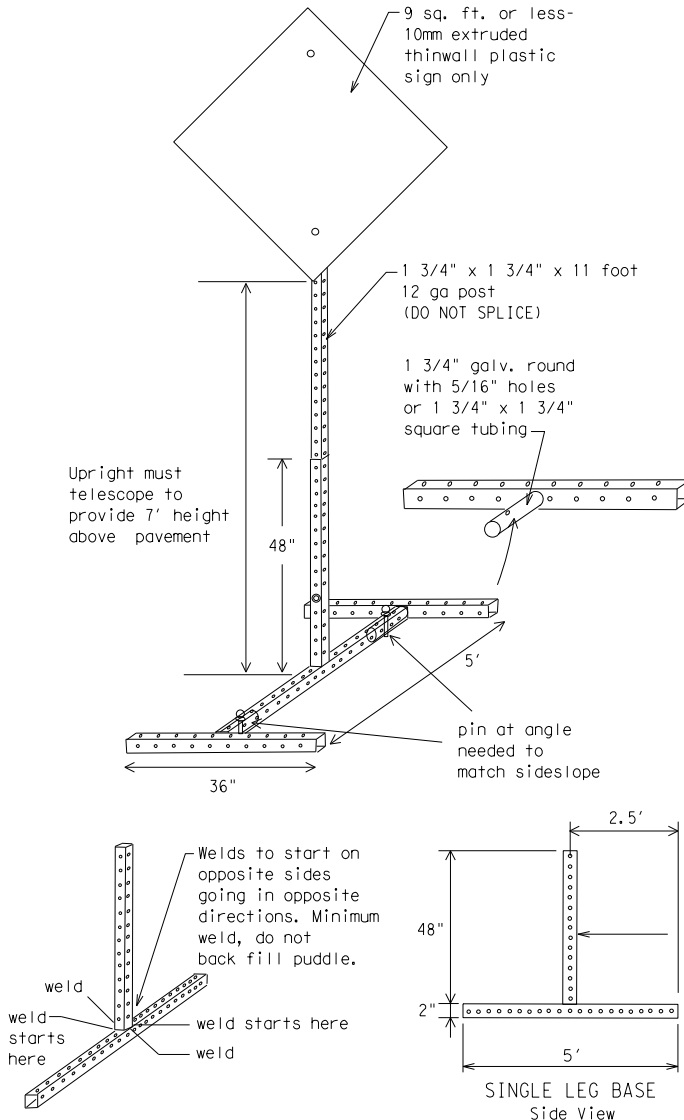
SKID MOUNTED WOOD SIGN SUPPORTS

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



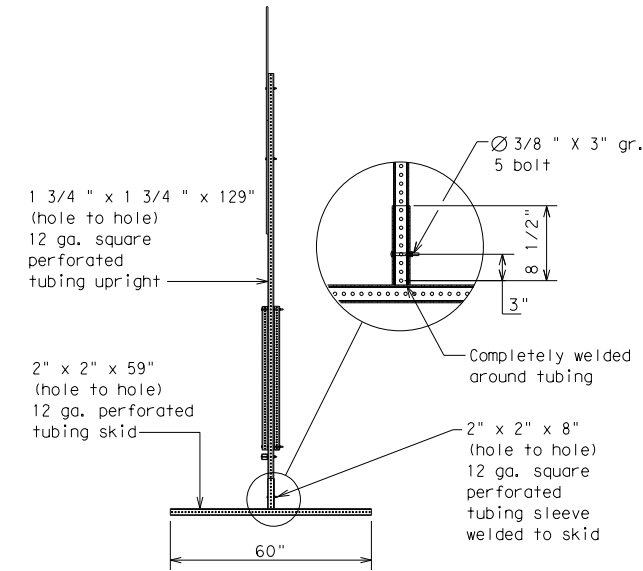
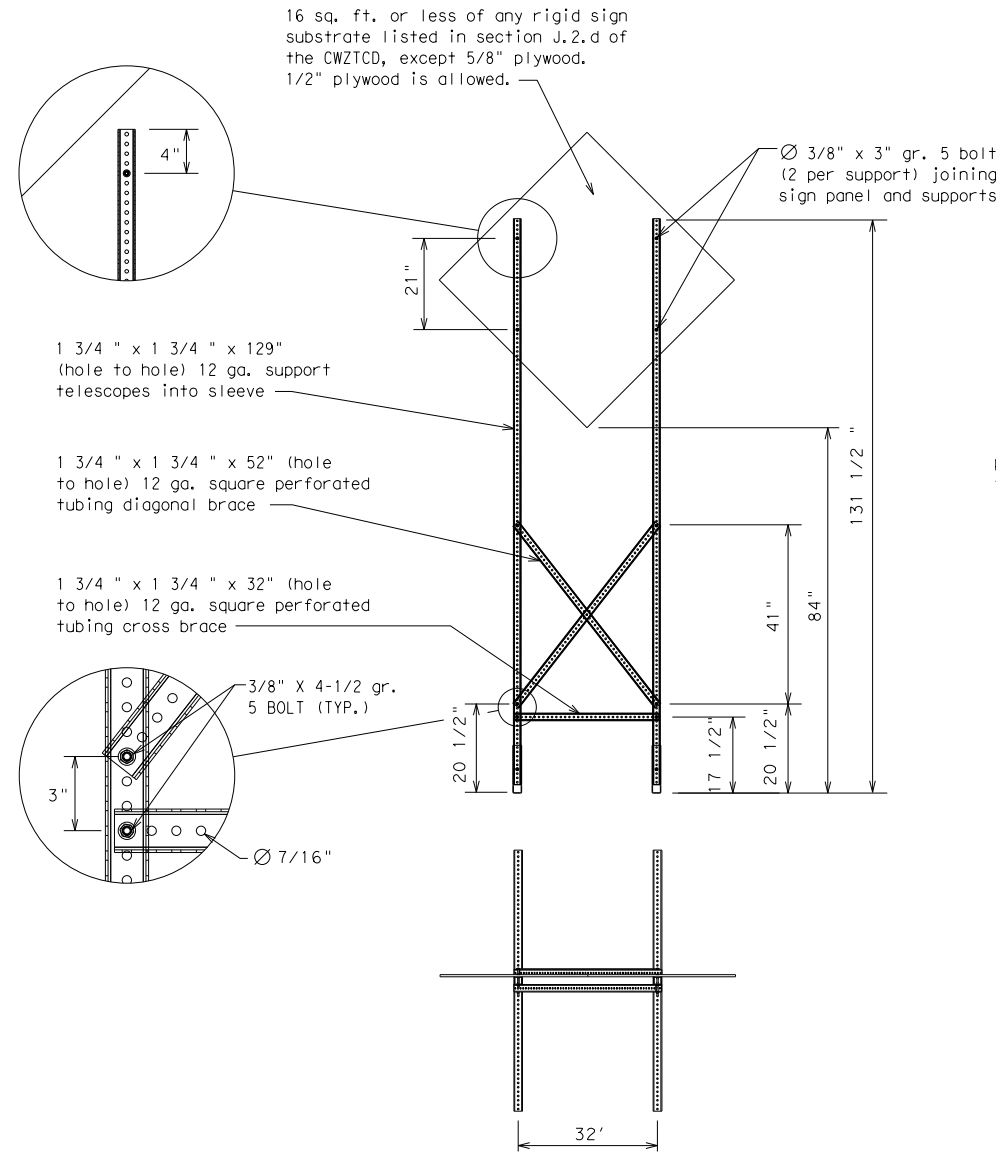
GROUND MOUNTED SIGN SUPPORTS

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

- 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.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
- When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

- * See BC(4) for definition of "Work Duration."
- ** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
- See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

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BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

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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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
- Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- 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.
- 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.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- 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.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- 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.
- 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.
- Each line of text should be centered on the message board rather than left or right justified.
- 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.

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
XXXXXXXXX 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
XXXXXXXXX TO XXXXXXXX
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

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- 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.
- 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

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- 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

- 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.
- When symbol signs, such as the "Flagger Symbol" (CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
- When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
- 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.

WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Canal	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	E	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound	(route) S
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DWNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLR
High-Occupancy Vehicle	HOV	Tuesday	TUES
Highway	HWY	Time Minutes	TIME MIN
Hour(s)	HR, HRS	Upper Level	UPR LEVEL
Information	INFO	Vehicles (s)	VEH, VEHS
It Is	ITS	Warning	WARN
Junction	JCT	Wednesday	WED
Left	LFT	Weight Limit	WT LIMIT
Left Lane	LFT LN	West	W
Lane Closed	LN CLOSED	Westbound	(route) W
Lower Level	LWR LEVEL	Wet Pavement	WET PVMT
Maintenance	MAINT	Will Not	WONT

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

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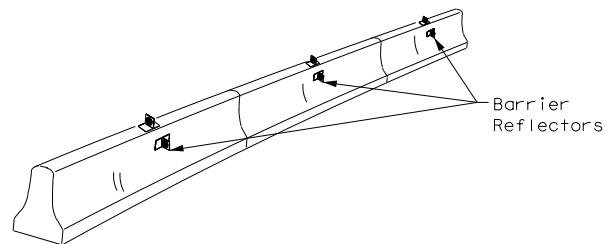
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<h3>BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)</h3>			
<h2>BC (6) - 21</h2>			
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©TxDOT	November 2002	CK:	TxDOT
REVISIONS	2520	OW:	TxDOT
9-07	8-14	JOB	HIGHWAY
7-13	5-21	016, ETC	FM 2200
		DIST	COUNTY
		SAT	MEDINA
			SHEET NO.
			54

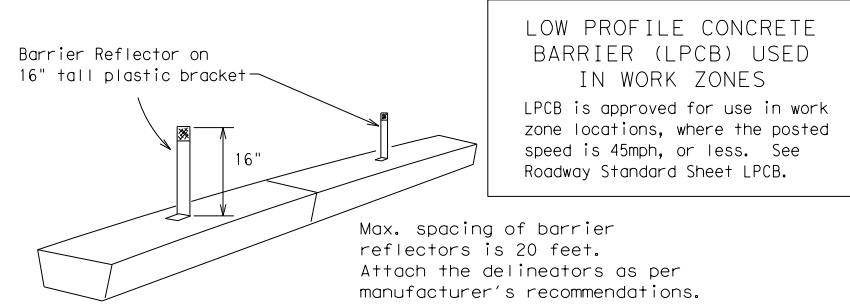
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors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



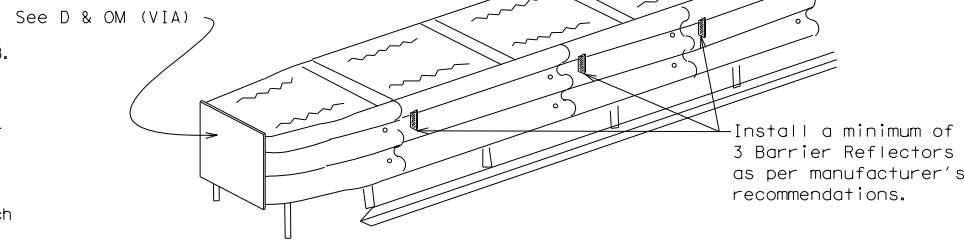
CONCRETE TRAFFIC BARRIER (CTB)



LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES
 LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

LOW PROFILE CONCRETE BARRIER (LPCB)

- 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.
- 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.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.



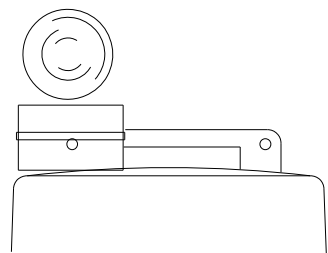
DELINEATION OF END TREATMENTS

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

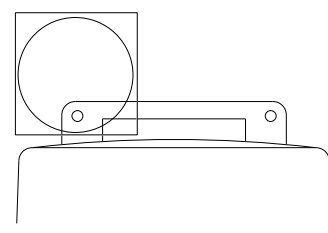
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet 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.
- 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".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- 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.
- 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.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.



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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- 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.
- 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.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.



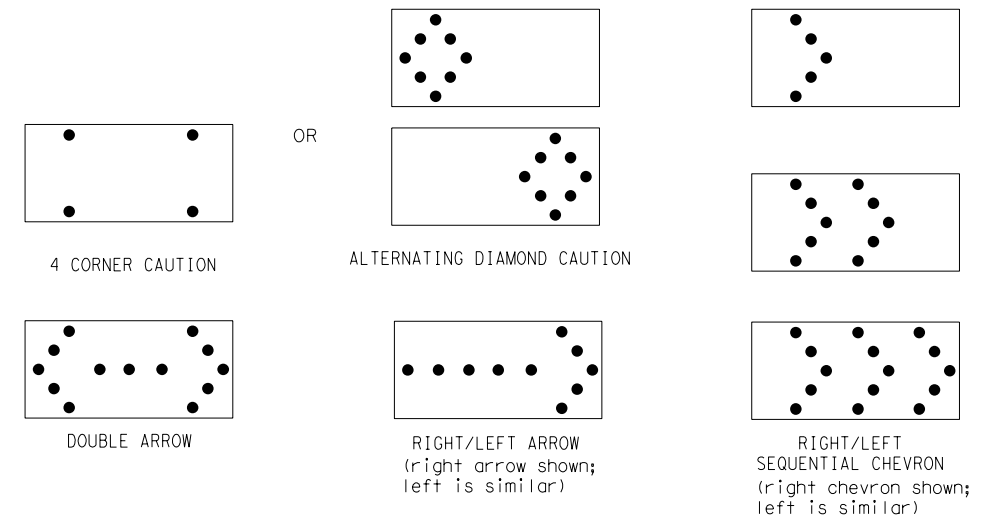
Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

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

- 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.
- 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.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- 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.
- 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.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- 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.

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



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
- Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- 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.
- 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

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

SHEET 7 OF 12

Texas Department of Transportation
 Traffic Safety Division Standard

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

BC(7)-21

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©TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		2520	01	016, ETC	FM 2200				
9-07	8-14	DIST	COUNTY		SHEET NO.				
7-13	5-21	SAT	MEDINA		55				

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GENERAL NOTES

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- 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.
- 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.
- 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).
- Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
- The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

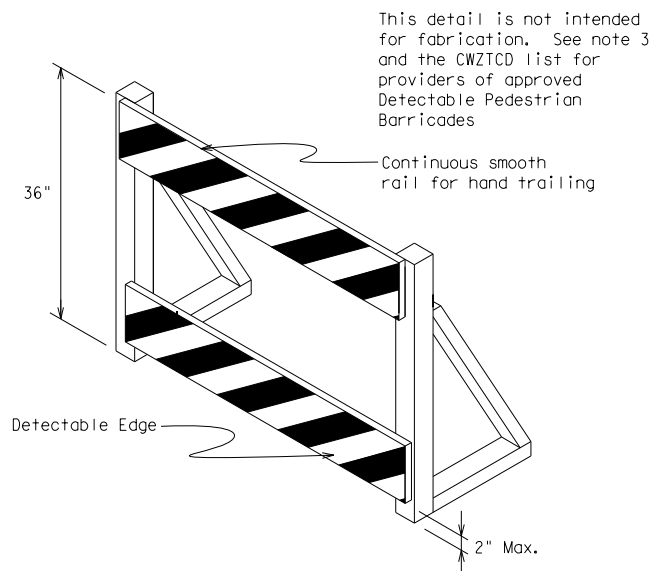
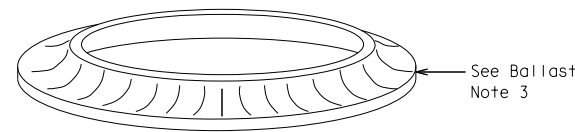
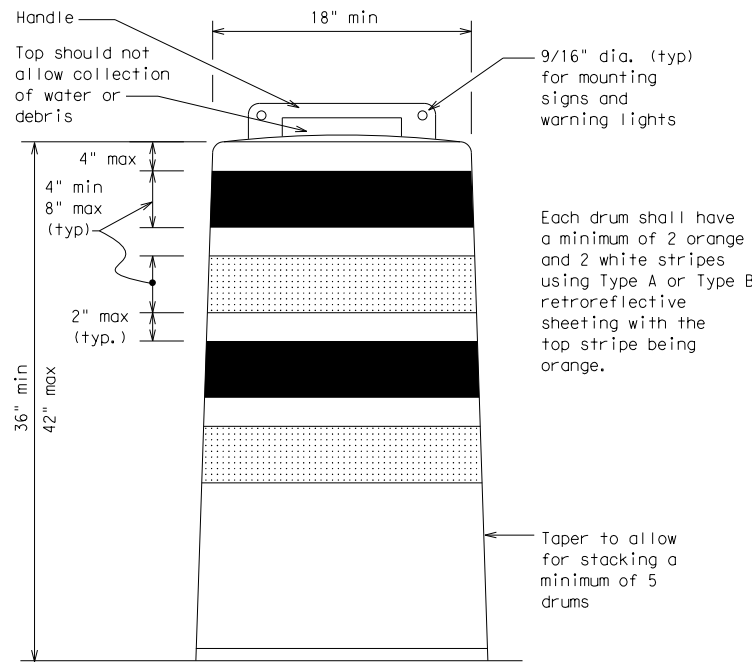
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
- Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
- 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.
- 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.
- The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
- Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
- Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- Drum body shall have a maximum unballasted weight of 11 lbs.
- Drum and base shall be marked with manufacturer's name and model number.

RETROREFLECTIVE SHEETING

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

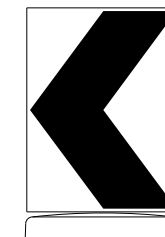
BALLAST

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

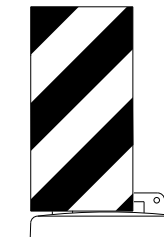


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

SHEET 8 OF 12

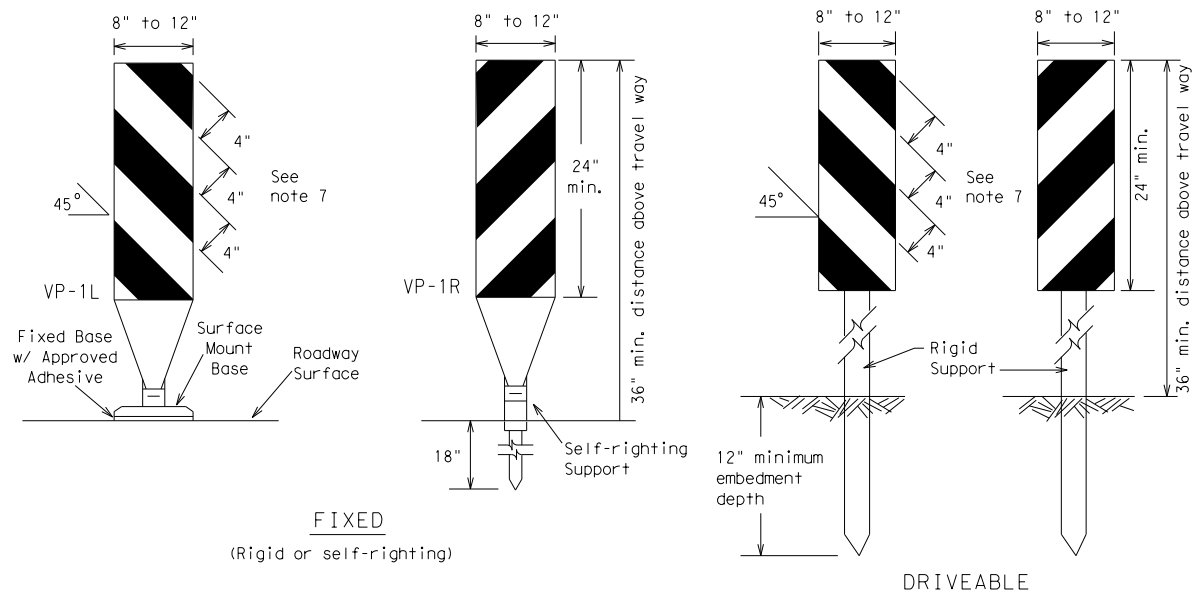


BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (8) - 21

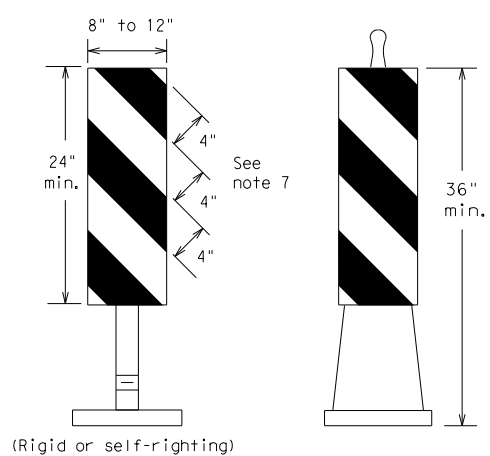
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© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		2520	01	016, ETC		FM 2200			
4-03	8-14	DIST	COUNTY		SHEET NO.				
9-07	5-21	SAT	MEDINA		56				
7-13									

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FIXED
(Rigid or self-righting)

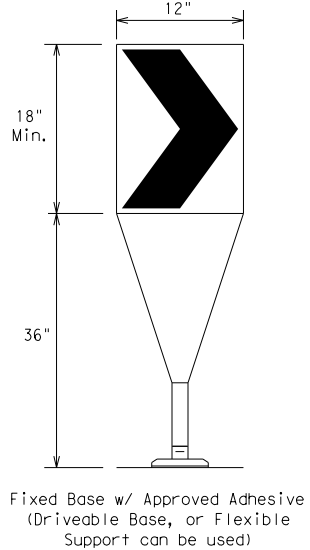
DRIVEABLE



PORTABLE

VERTICAL PANELS (VPs)

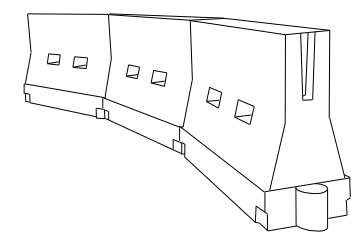
- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



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

- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- 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.
- 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.
- To be effective, the chevron should be visible for at least 500 feet.
- 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.
- 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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

- 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.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

GENERAL NOTES

- Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
- 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).
- The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- 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.
- 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.

Posted Speed	Formula	Minimum Desirable Taper Lengths * X			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = 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'	

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

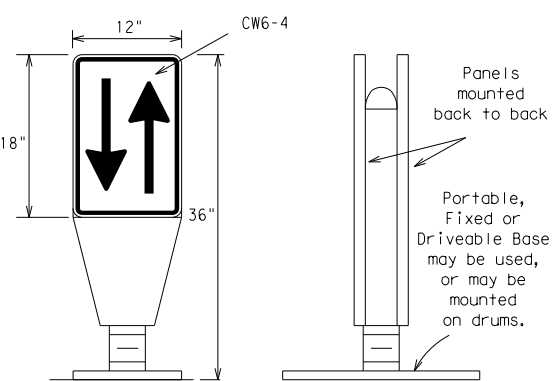


BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (9) - 21

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OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

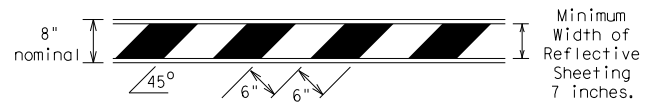
- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
- The OTLD may be used in combination with 42" cones or VPs.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
- 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.

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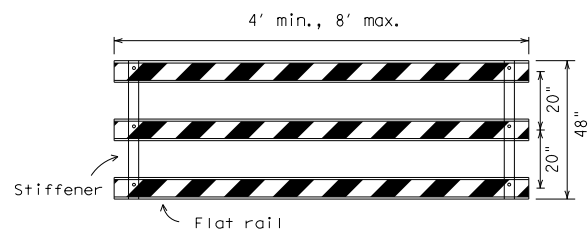
TYPE 3 BARRICADES

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.

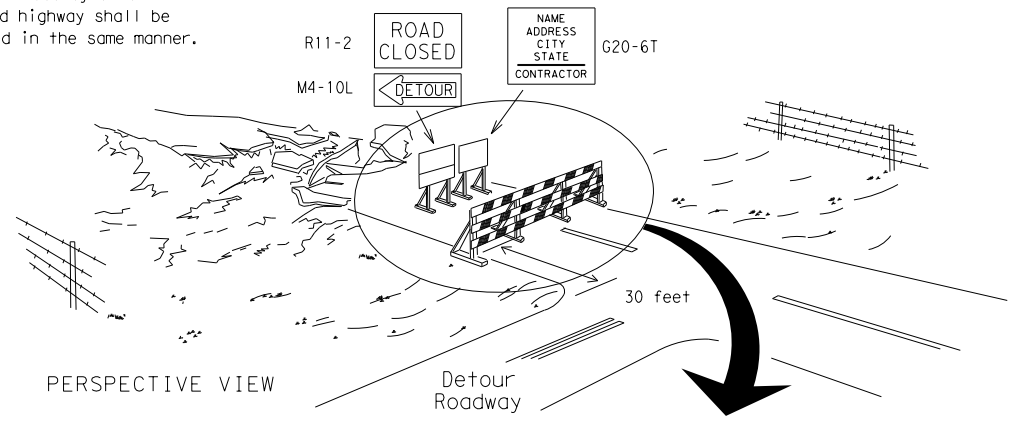


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



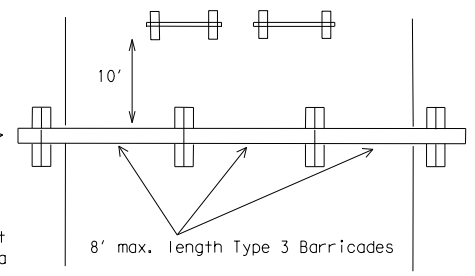
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

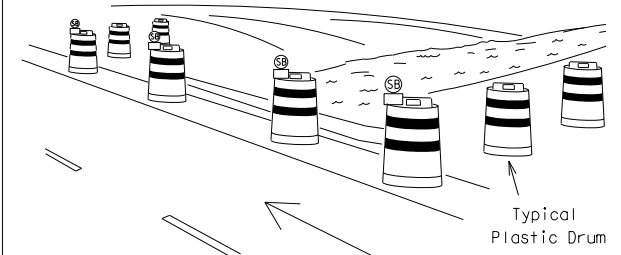
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



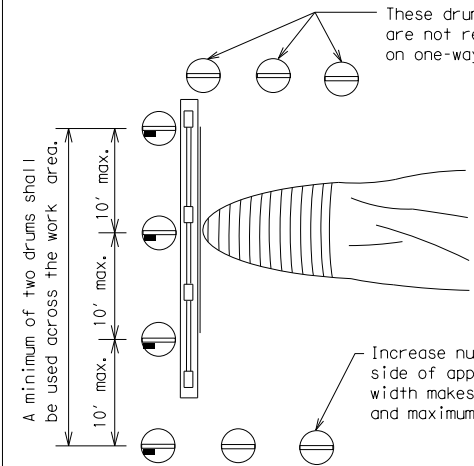
PLAN VIEW

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

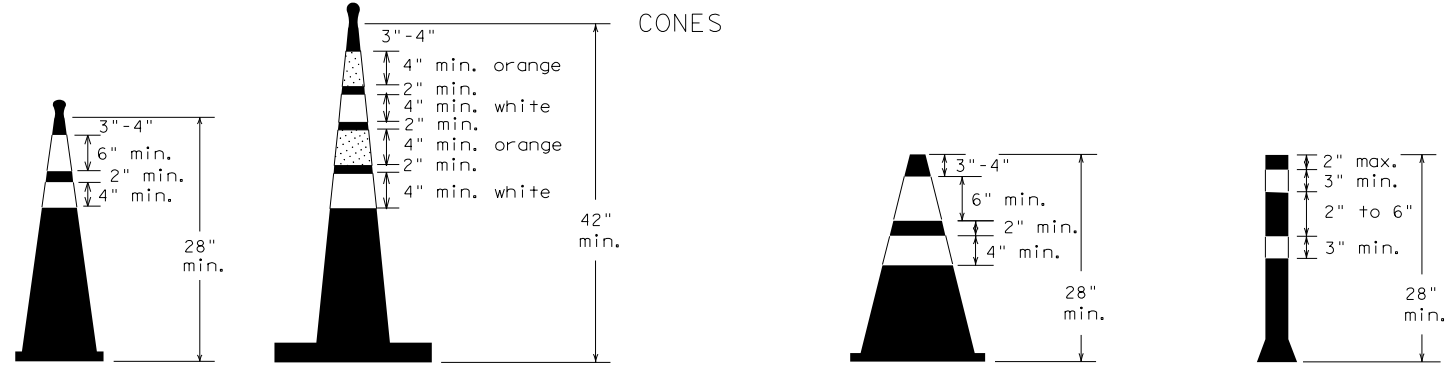


PLAN VIEW

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

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

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



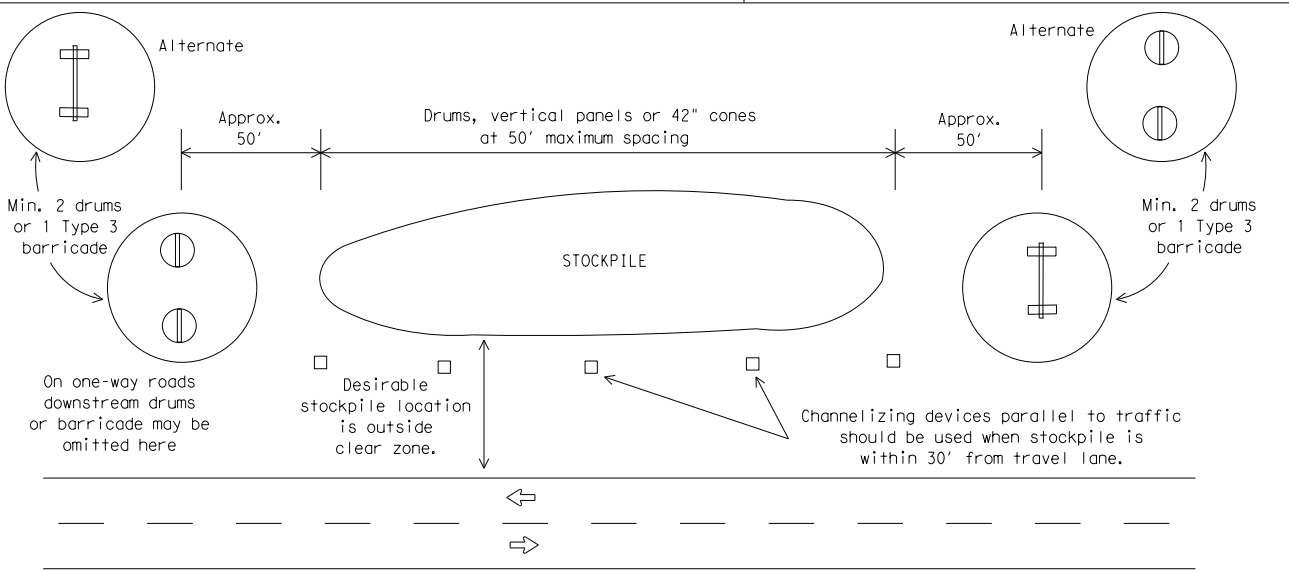
Two-Piece cones

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



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

- The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
- 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.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

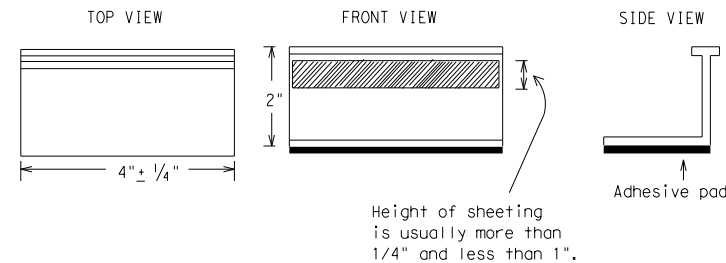
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
- 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.
- 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

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
 - 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.
 - 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.
- Small design variances may be noted between tab manufacturers.
- See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

DEPARTMENTAL MATERIAL 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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SHEET 11 OF 12

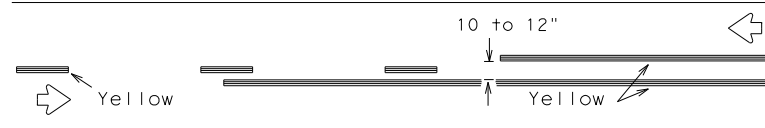


BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

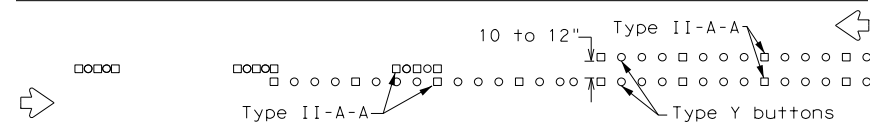
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11-02 8-14				

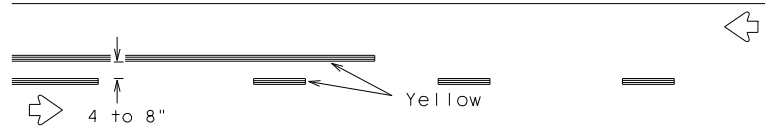
PAVEMENT MARKING PATTERNS



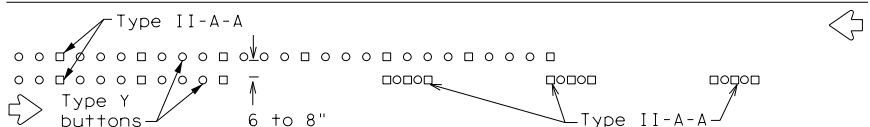
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



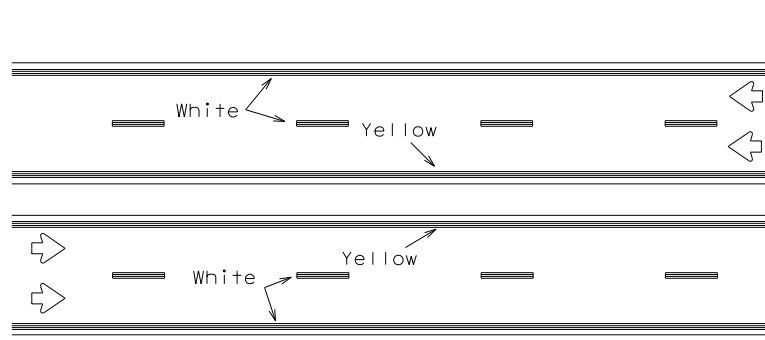
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



RAISED PAVEMENT MARKERS - PATTERN B

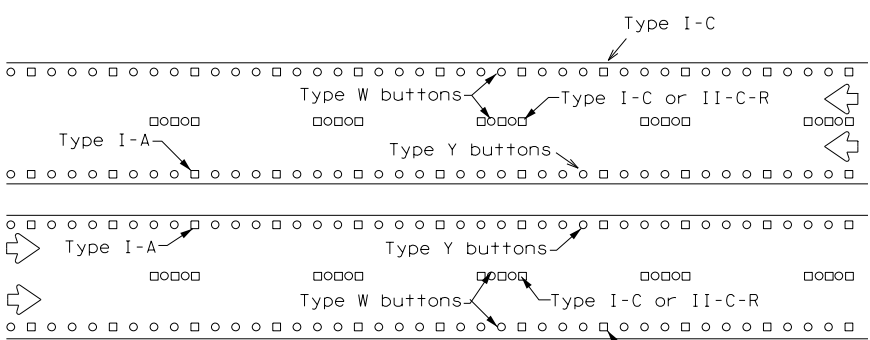
Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectorized pavement markings.

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



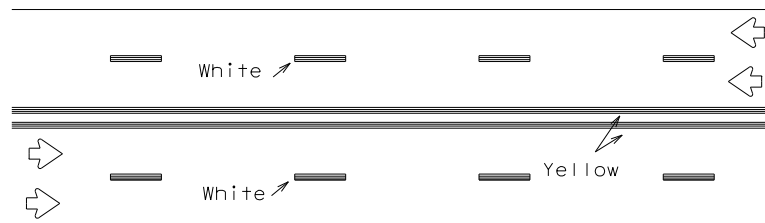
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



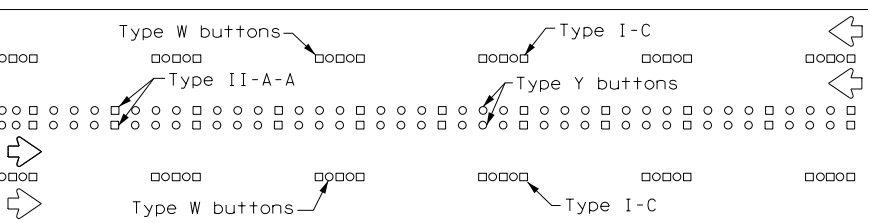
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



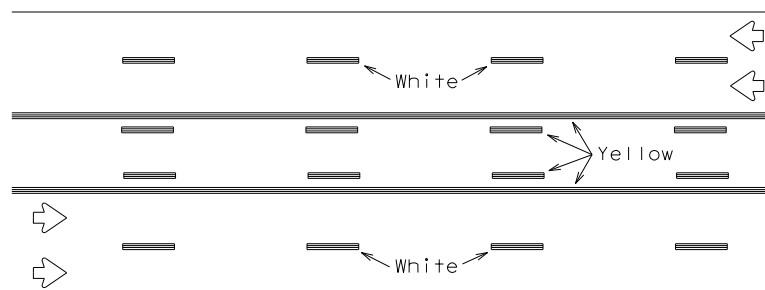
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



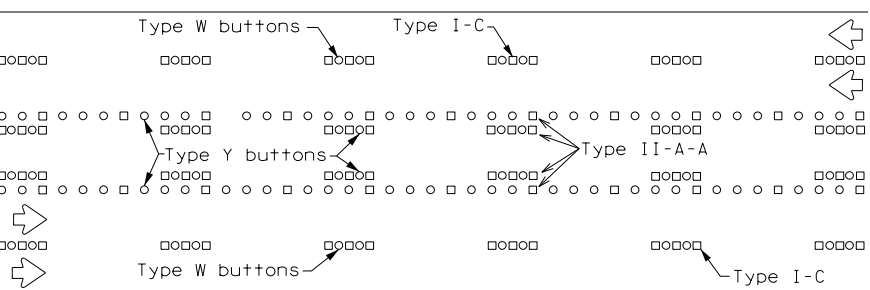
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

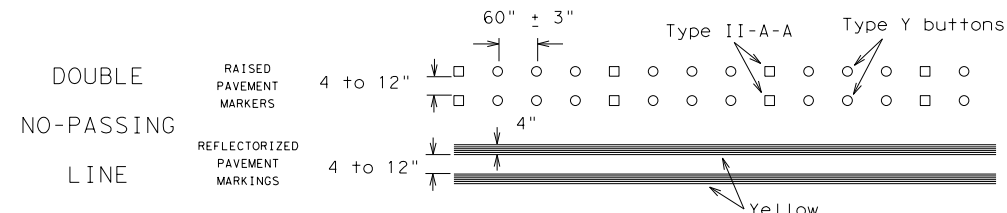
Prefabricated markings may be substituted for reflectorized pavement markings.



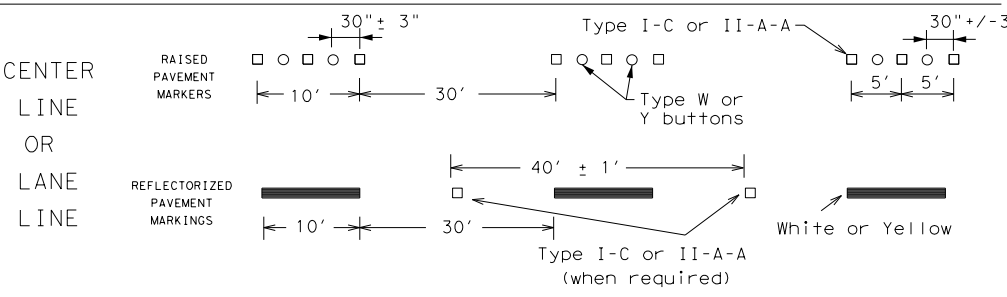
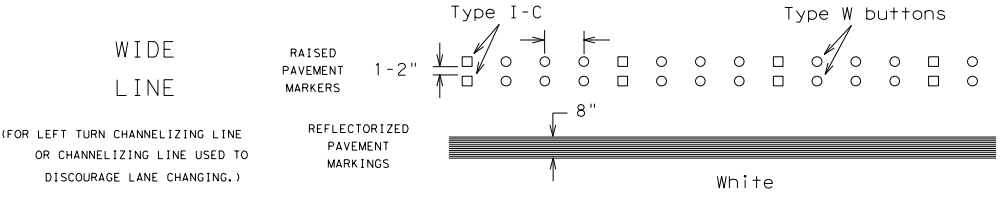
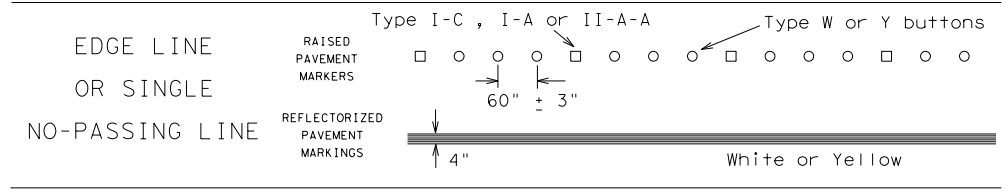
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

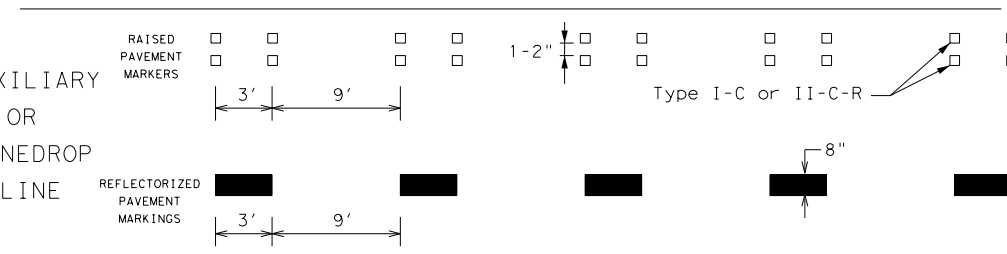
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



SOLID LINES

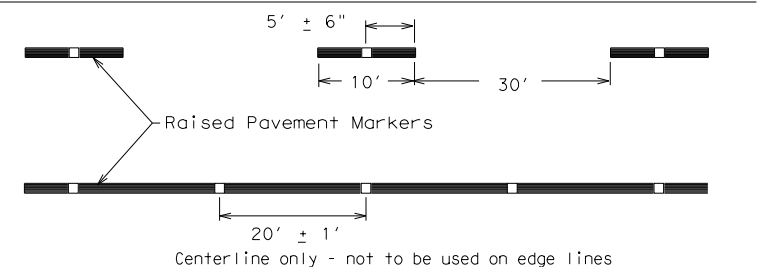


BROKEN LINES



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.



SHEET 12 OF 12

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BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

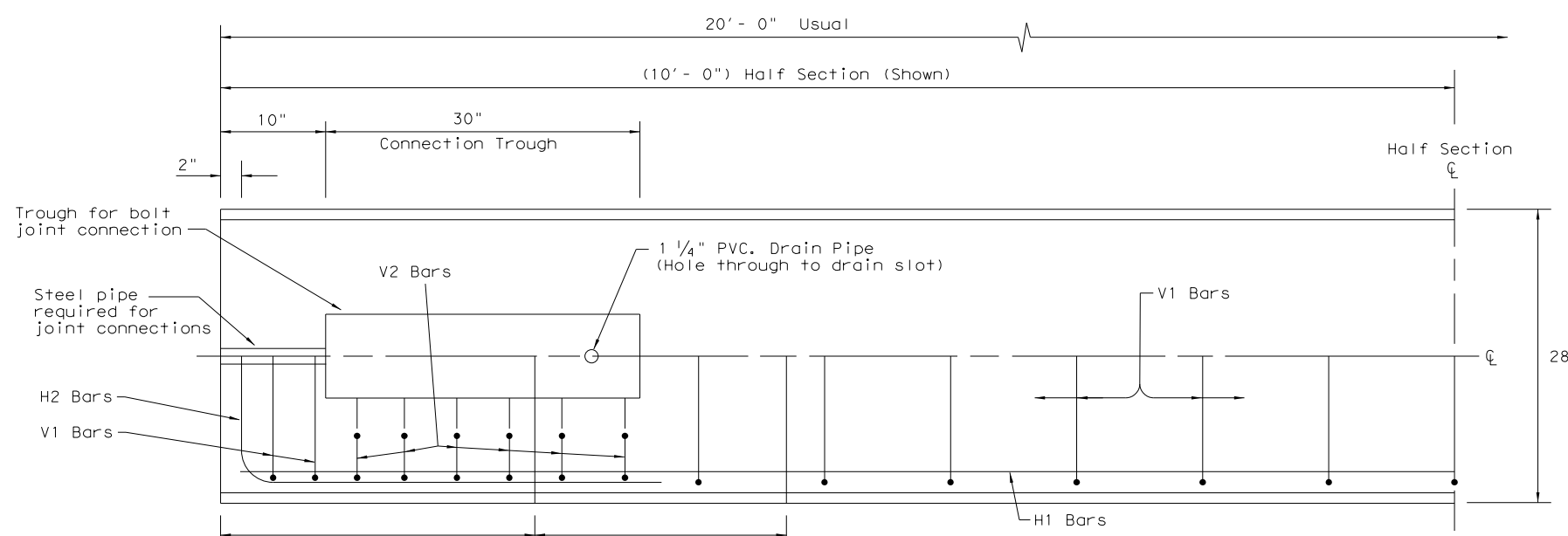
BC (12) - 21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
1-97 9-07 5-21				
2-98 7-13				
11-02 8-14	SAT		COUNTY	SHEET NO.
			MEDINA	60

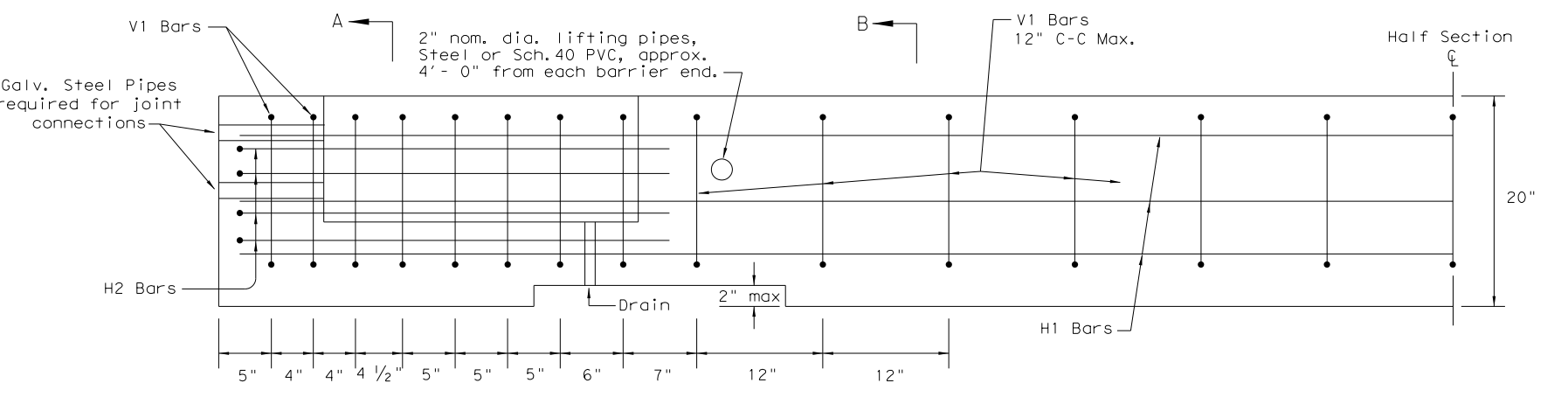
Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

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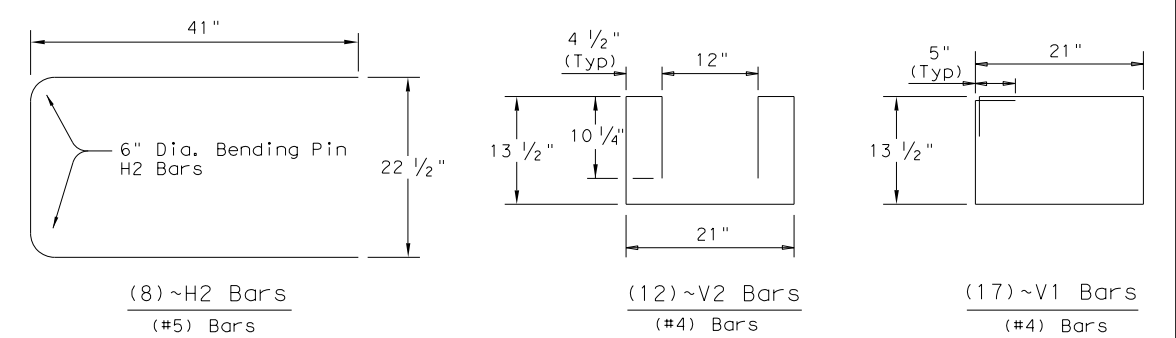
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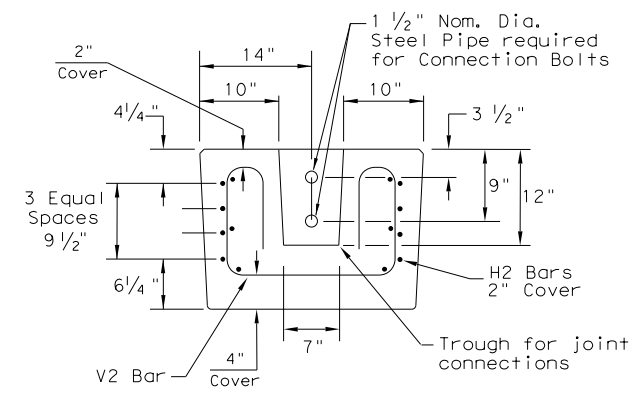
PLAN
 (TYPE 1) BARRIER SEGMENT
 (SYMMETRICAL ABOUT CENTER LINES)



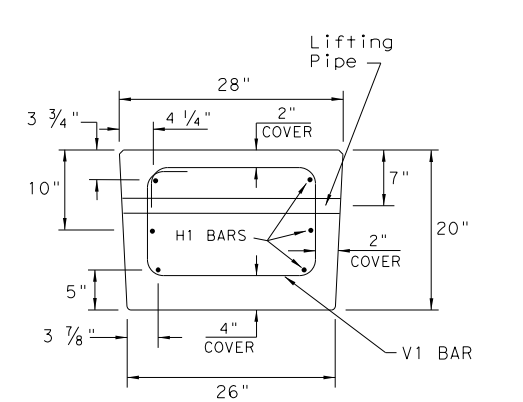
ELEVATION
 (TYPE 1) BARRIER SEGMENT
 (SYMMETRICAL ABOUT CENTER LINES)



REINFORCING STEEL DETAILS
 TYPE 1 - BARRIER SEGMENT
 Note: Use 2" Dia. Bending Pin, unless otherwise shown



SECTION A-A



SECTION B-B

GENERAL NOTES

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

FOR CONTRACTORS INFORMATION ONLY

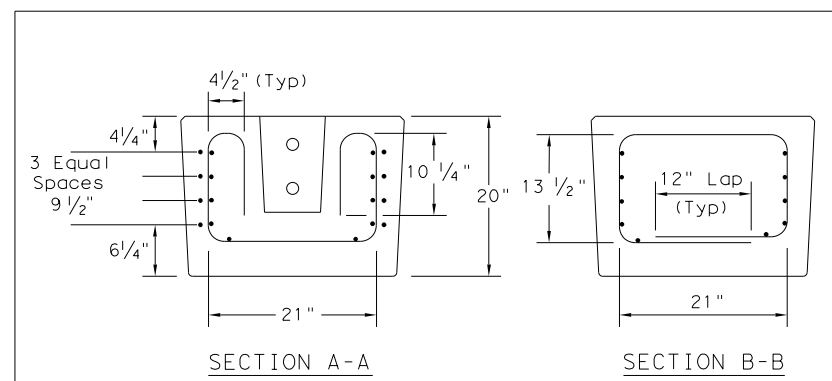
(TYPE 1) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	2.6
REINFORCING STEEL	LBS	330
TOTAL BARRIER WT.	LBS	11000

(WWR) GENERAL NOTES

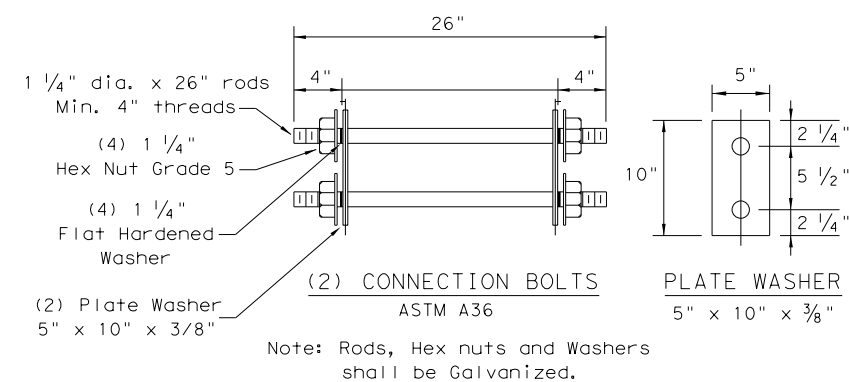
1. Deformed Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded wire cage may be cut or bent, if necessary, but must be approved by the Engineer.
3. Combinations of reinforcing steel and WWR are permitted, as directed by the Engineer. The dimensions from the end of the barrier section to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

REQUIRED (WWR) WIRE DESIGN

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



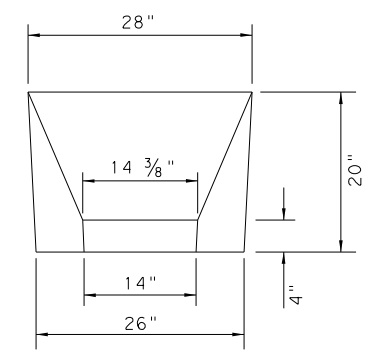
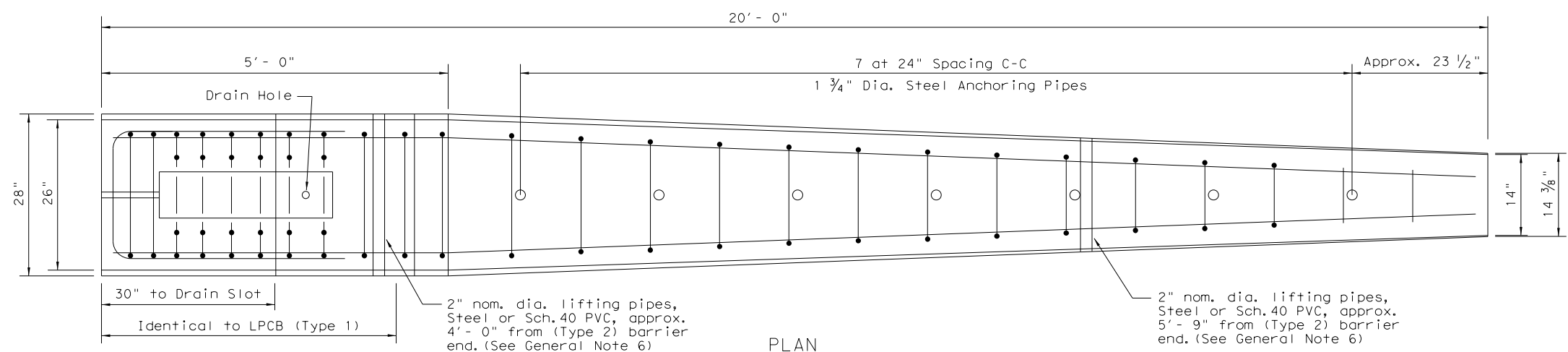
WELDED WIRE REINFORCEMENT (WWR) - OPTIONAL REINFORCING



		Design Division Standard	
<p>LOW PROFILE CONCRETE BARRIER PRECAST BARRIER (TYPE 1) LPCB-13</p>			
FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP
©TxDOT December 2010	CONT SECT	JOB	HIGHWAY
REVISIONS	2520 01	016, ETC	FM 2200
	DIST	COUNTY	SHEET NO.
	SAT	MEDINA	61

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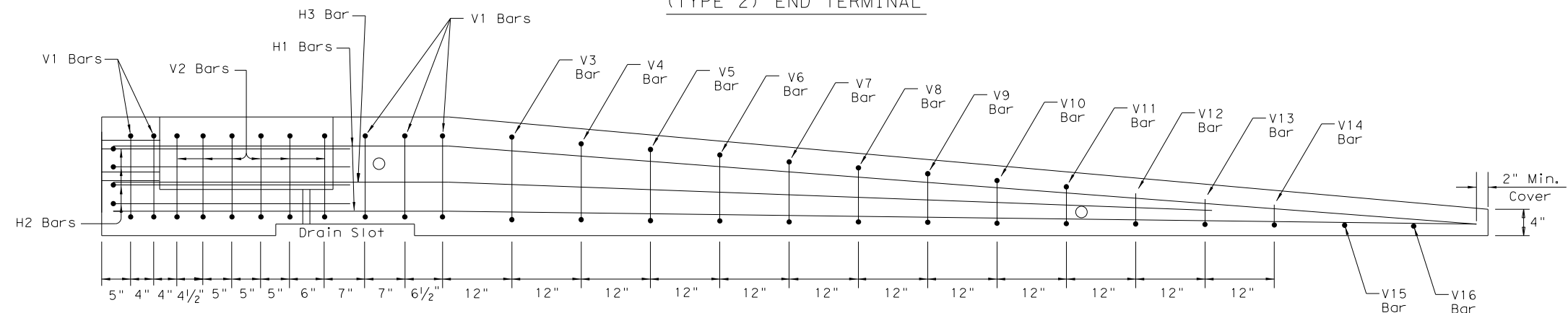
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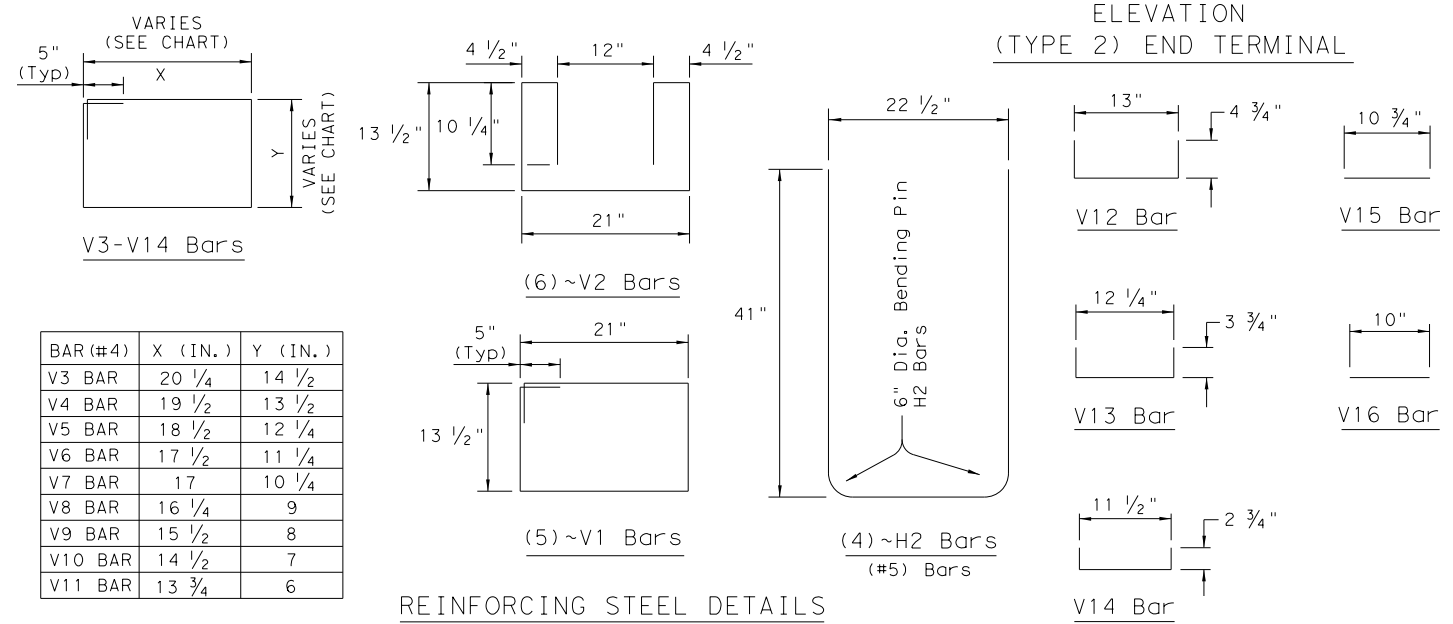
APPROACH VIEW

TYPE 2 - NOTES

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

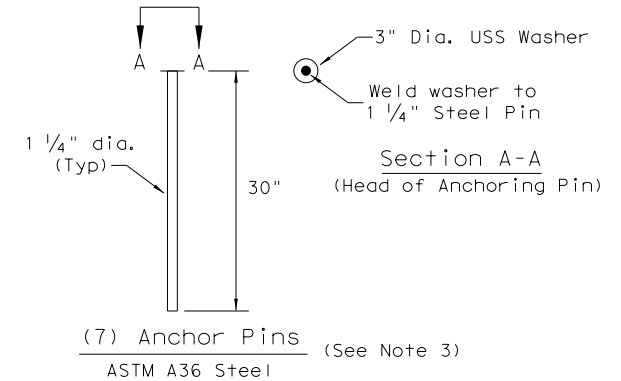


Note: Anchoring pipes not shown in Elevation View

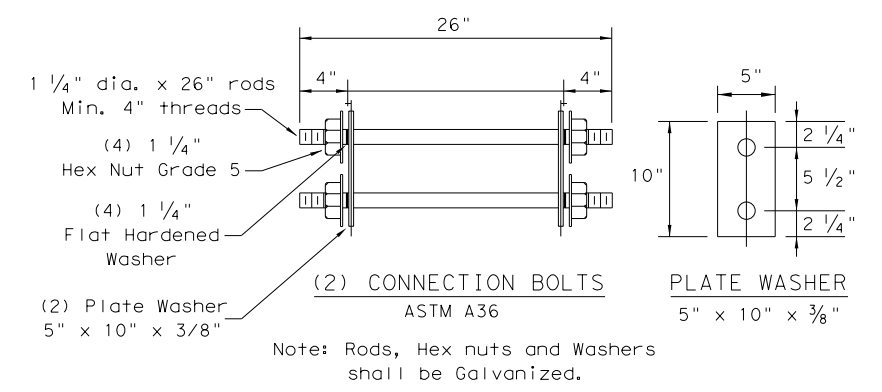


BAR (#4)	X (IN.)	Y (IN.)
V3 BAR	20 1/4	14 1/2
V4 BAR	19 1/2	13 1/2
V5 BAR	18 1/2	12 1/4
V6 BAR	17 1/2	11 1/4
V7 BAR	17	10 1/4
V8 BAR	16 1/4	9
V9 BAR	15 1/2	8
V10 BAR	14 1/2	7
V11 BAR	13 3/4	6

REINFORCING STEEL DETAILS
TYPE 2 - END TERMINAL



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



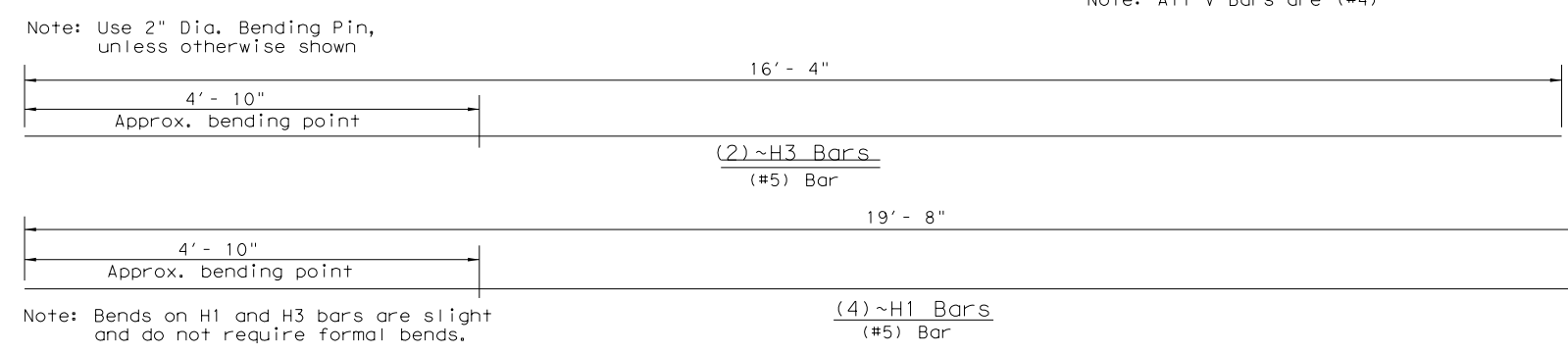
FOR CONTRACTORS INFORMATION ONLY

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



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

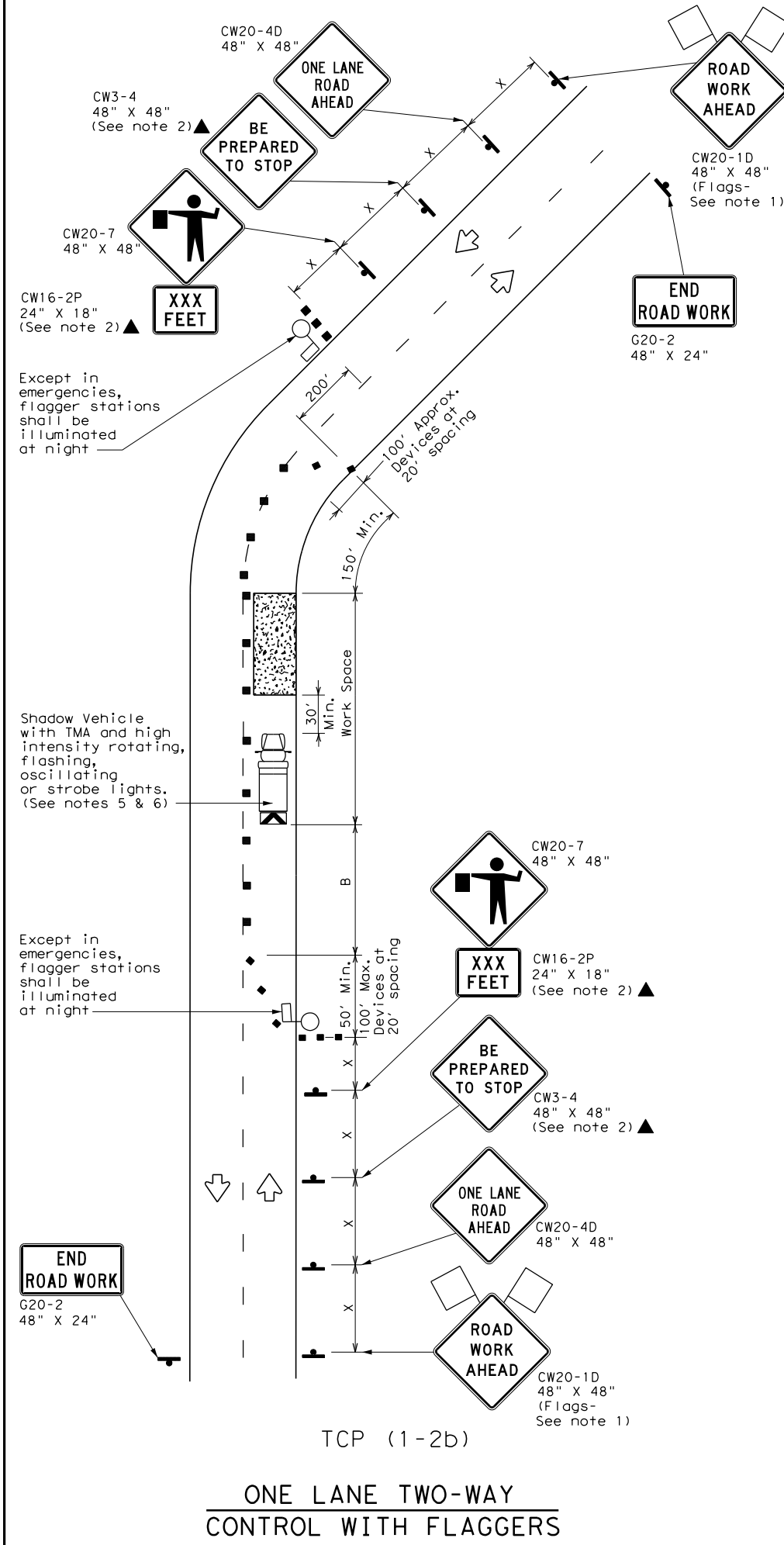
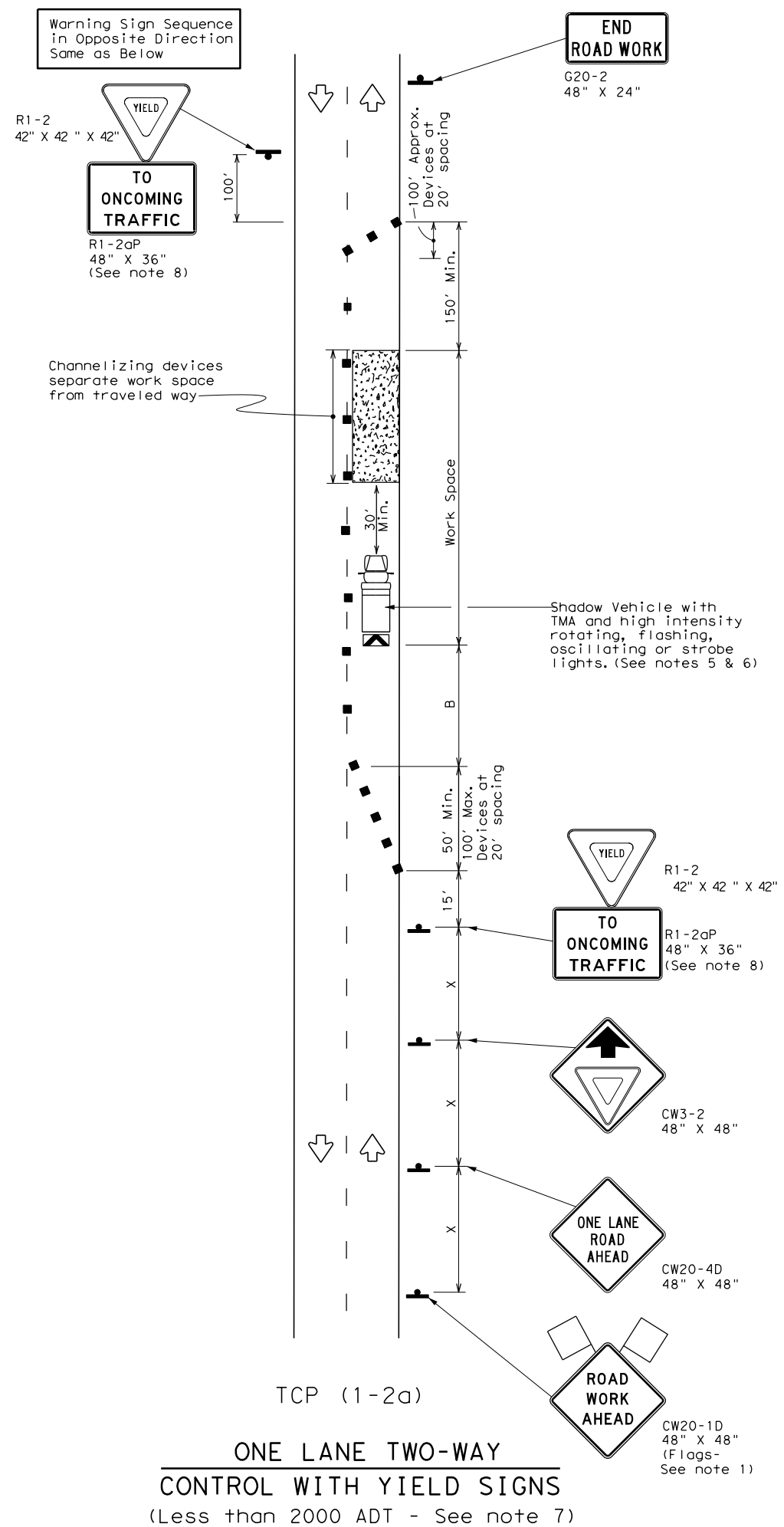
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© TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	62	



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

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

Posted Speed * X	Formula L = WS ² /60	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	L = 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		450'	495'	540'	45'	90'	320'	195'	360'
50	L = WS	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

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

TCP (1-2a)

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

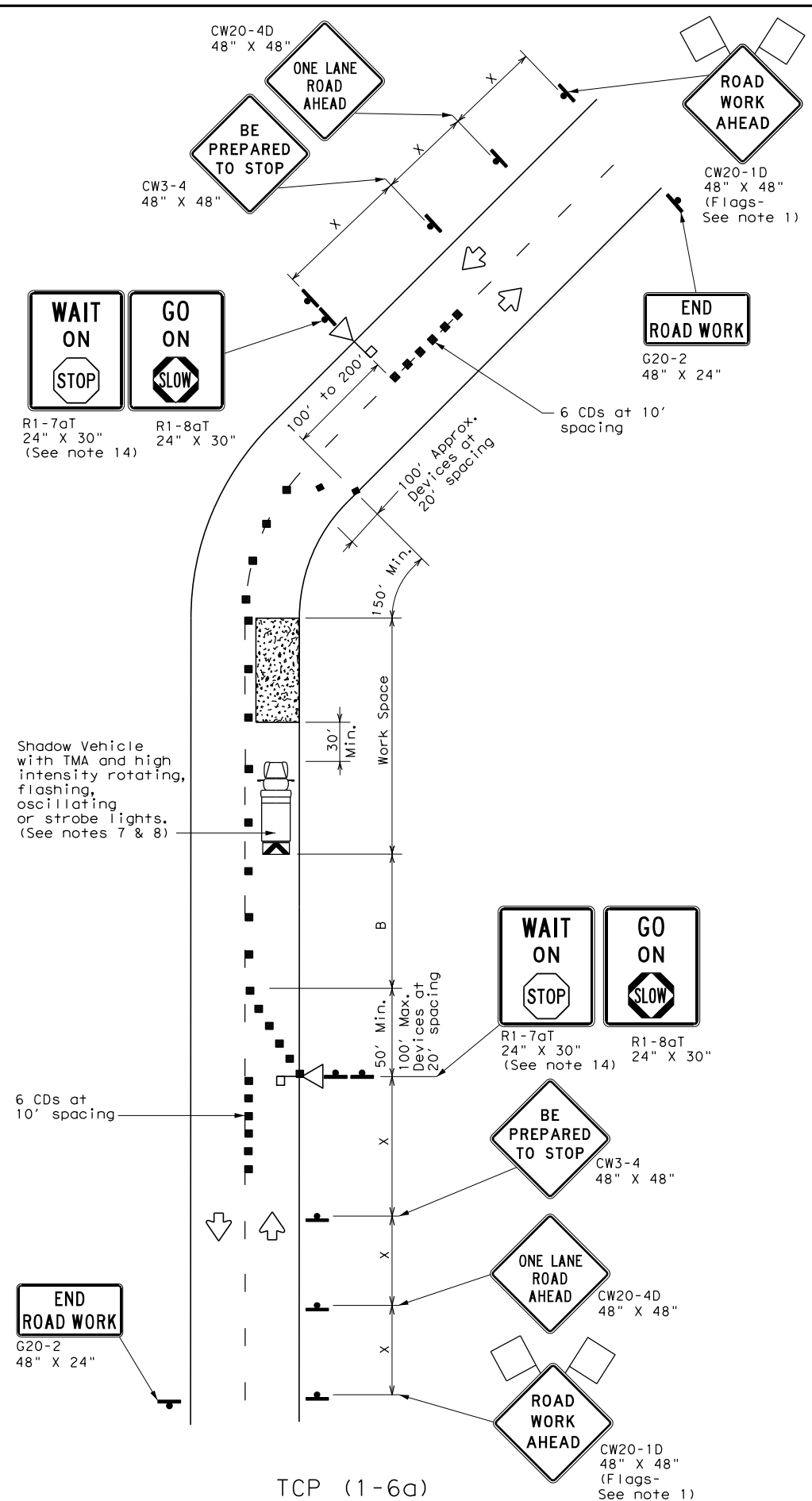
TCP (1-2b)

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

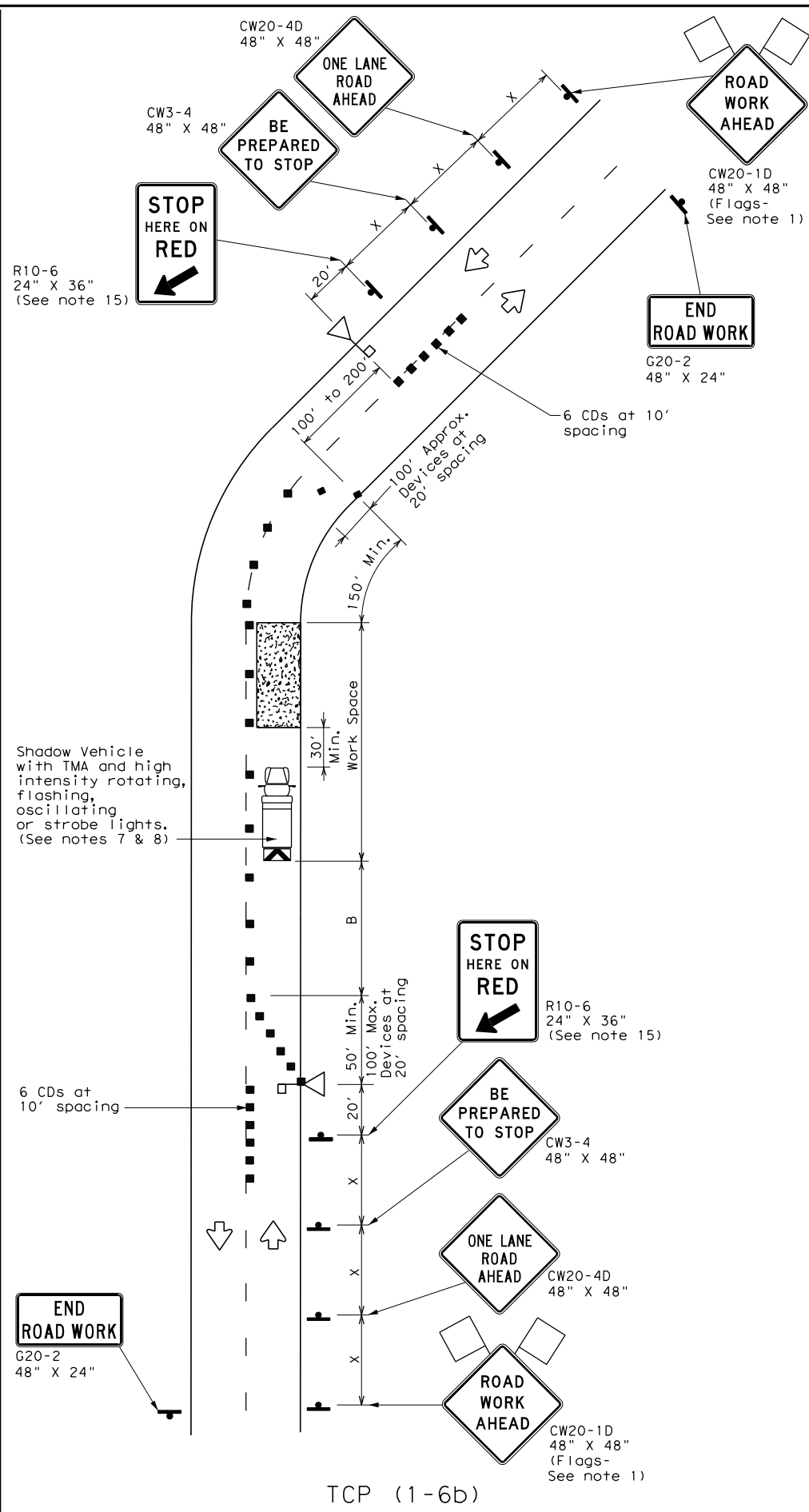
		Traffic Operations Division Standard	
TRAFFIC CONTROL PLAN			
ONE-LANE TWO-WAY			
TRAFFIC CONTROL			
TCP (1-2) - 18			
FILE: tcp1-2-18.dgn	DN:	CK:	DW: CK:
© TxDOT December 1985	CONT	SECT	JOB HIGHWAY
REVISIONS		2520 01	016, ETC FM 2200
4-90 4-98	DIST		COUNTY SHEET NO.
2-94 2-12	SAT		MEDINA 63
1-97 2-18			

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TCP (1-6a)
 ONE LANE TWO-WAY
 CONTROL WITH STOP/SLOW AFADs



TCP (1-6b)
 ONE LANE TWO-WAY CONTROL
 WITH RED/YELLOW LENS AFADs

LEGEND			
	Type 3 Barricade		Channelizing Devices (CDs)
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Automated Flagger Assistance Device (AFAD)		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
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

- Flags attached to signs where shown are REQUIRED.
- AFADs shall only be used in situations where there is one lane of approaching traffic in the direction to be controlled.
- Adequate stopping sight distance must be provided to each AFAD location for approaching traffic. (See table above).
- Each AFAD shall be operated by a qualified/certified flagger. Flaggers operating AFADs shall not leave them unattended while they are in use.
- One flagger may operate two AFADs only when the flagger has an unobstructed view of both AFADs and of the approaching traffic in both directions.
- When pilot cars are used, a flagger controlling traffic shall be located on each approach. AFADs shall not be operated by the pilot car operator.
- All AFADs shall be equipped with gate arms with an orange or fluorescent red-orange flag attached to the end of the gate arm. The flag shall be a minimum of 16" square.
- A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
- Flaggers should use two-way radios or other methods of communication to control traffic.
- Length of work space should be based on the ability of flaggers to communicate.
- 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 AFAD.
- Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
- The R1-7aT "WAIT ON STOP" sign and the R1-8aT "GO ON SLOW" sign shall be installed at the AFAD location on separate supports or they may be fabricated as one 48" x 30" sign. They shall not obscure the face of the STOP/SLOW AFAD.
- The R10-6 "STOP HERE ON RED" arrow sign shall be offset so as not to obscure the lenses of the AFAD.

Texas Department of Transportation
 Traffic Operations Division Standard

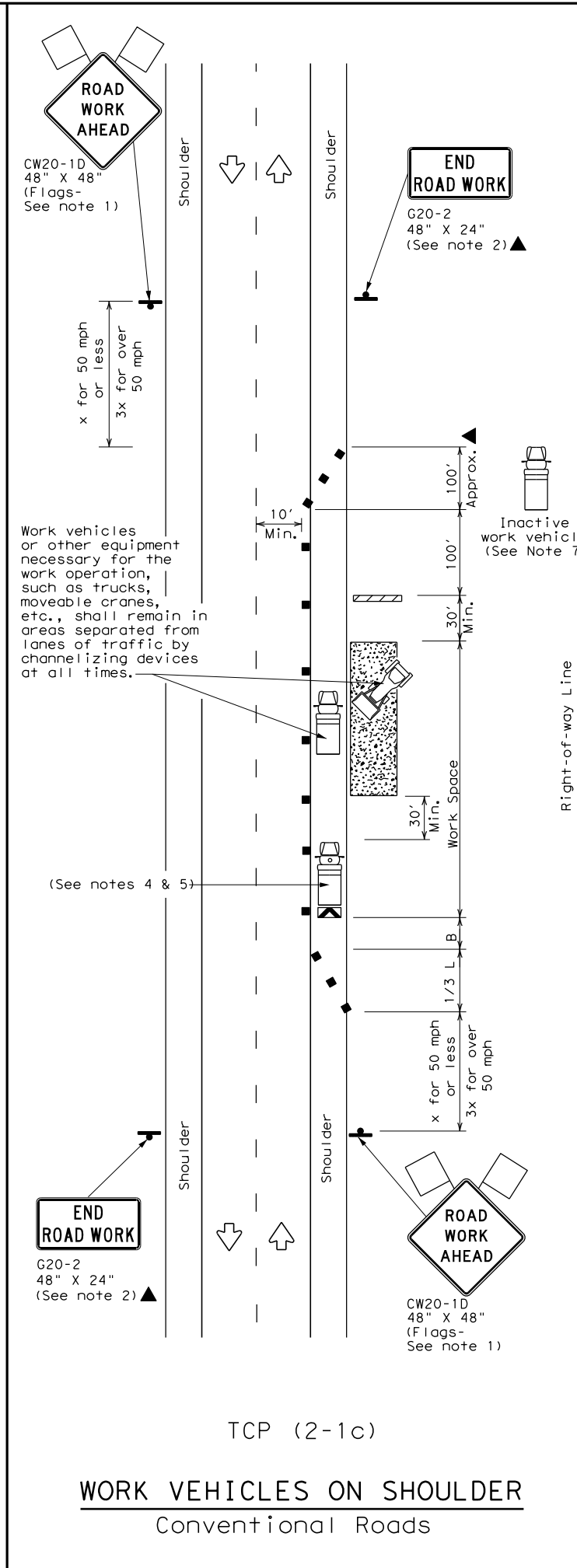
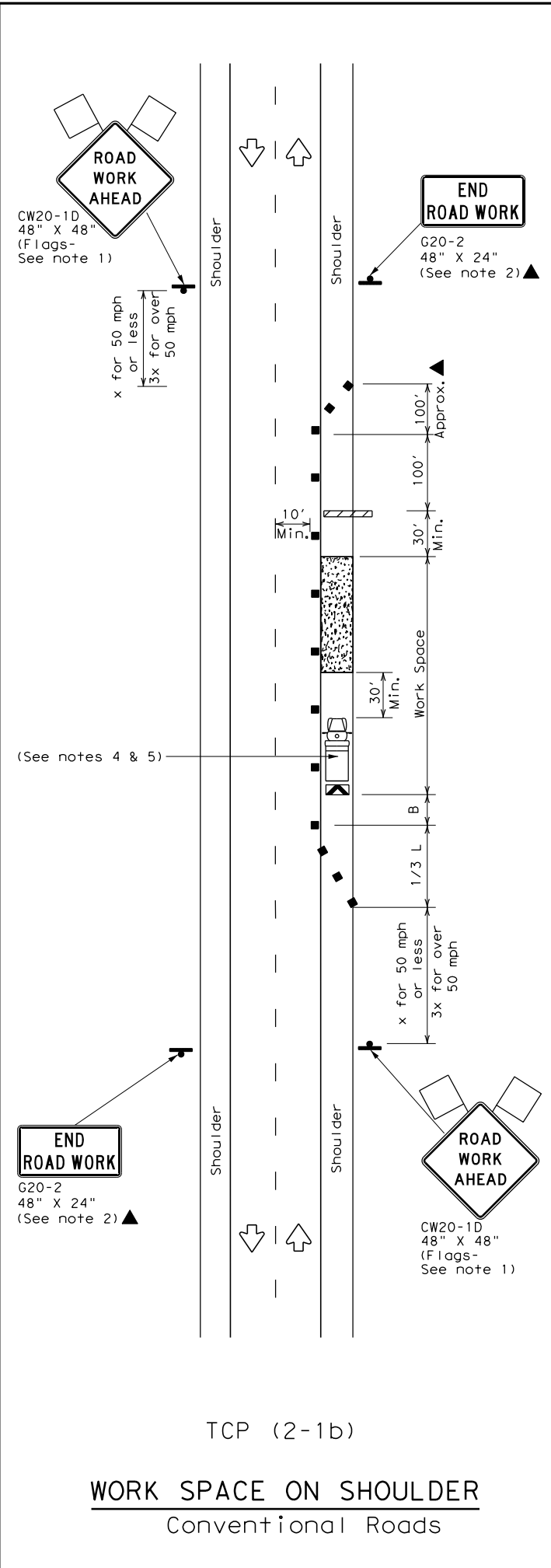
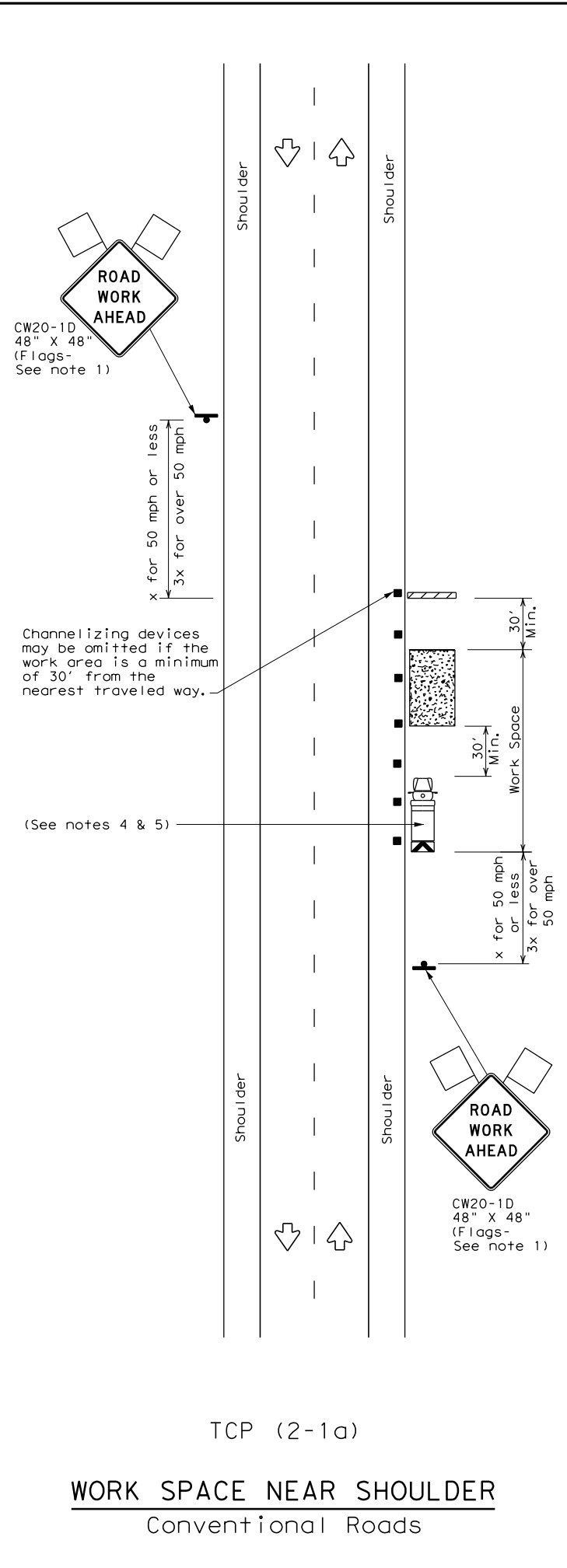
**TRAFFIC CONTROL PLAN
 AUTOMATED FLAGGER ASSISTANCE DEVICES (AFADs)**

TCP (1-6) - 18

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© TxDOT	February 2012	CONT	SECT	JOB	HIGHWAY
2-18	REVISIONS	2520	01	016, ETC	FM 2200
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		SAT	MEDINA		64

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
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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
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
 - Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
 - Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
 - See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
 - Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
 - CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.



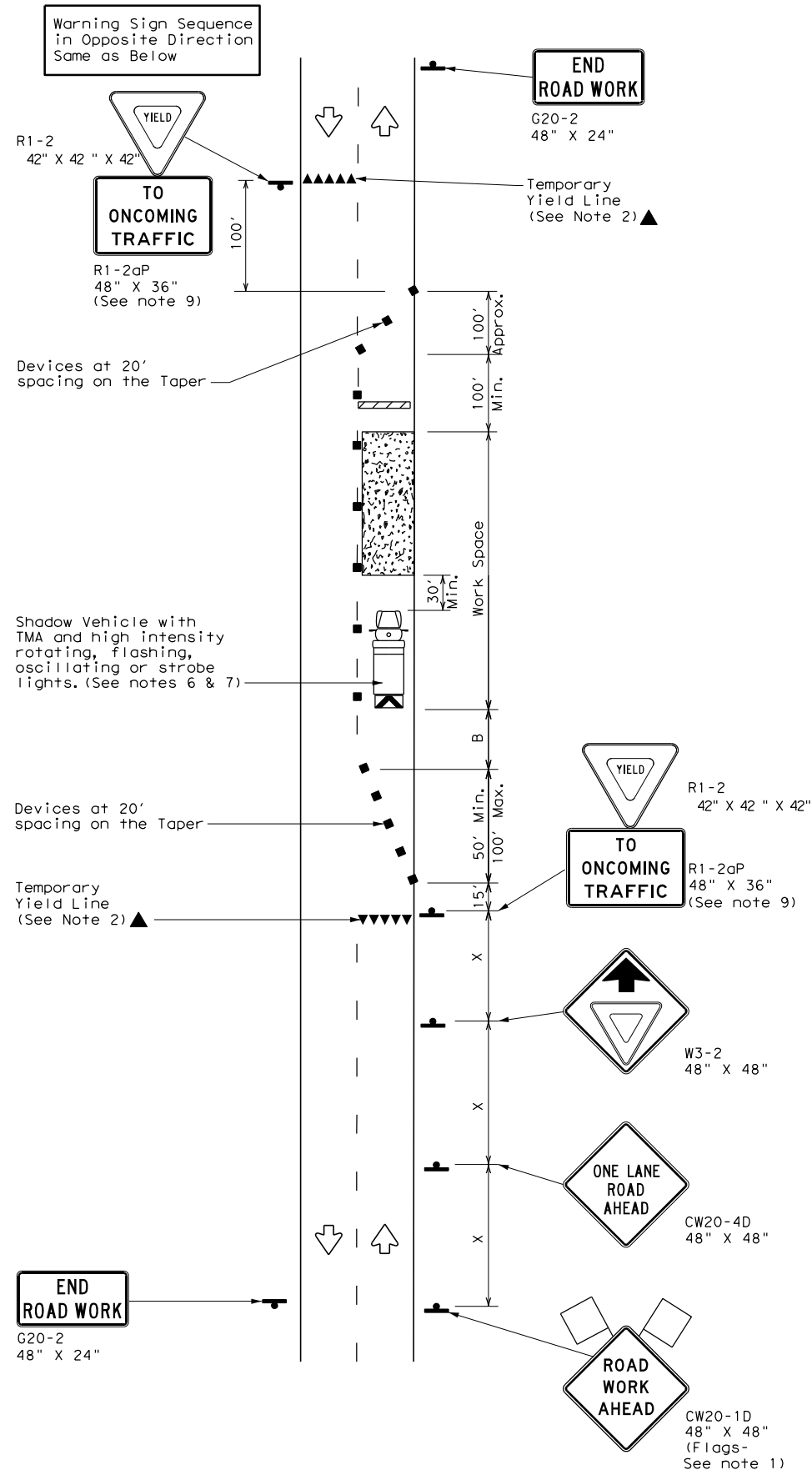
**TRAFFIC CONTROL PLAN
 CONVENTIONAL ROAD
 SHOULDER WORK**

TCP (2-1) - 18

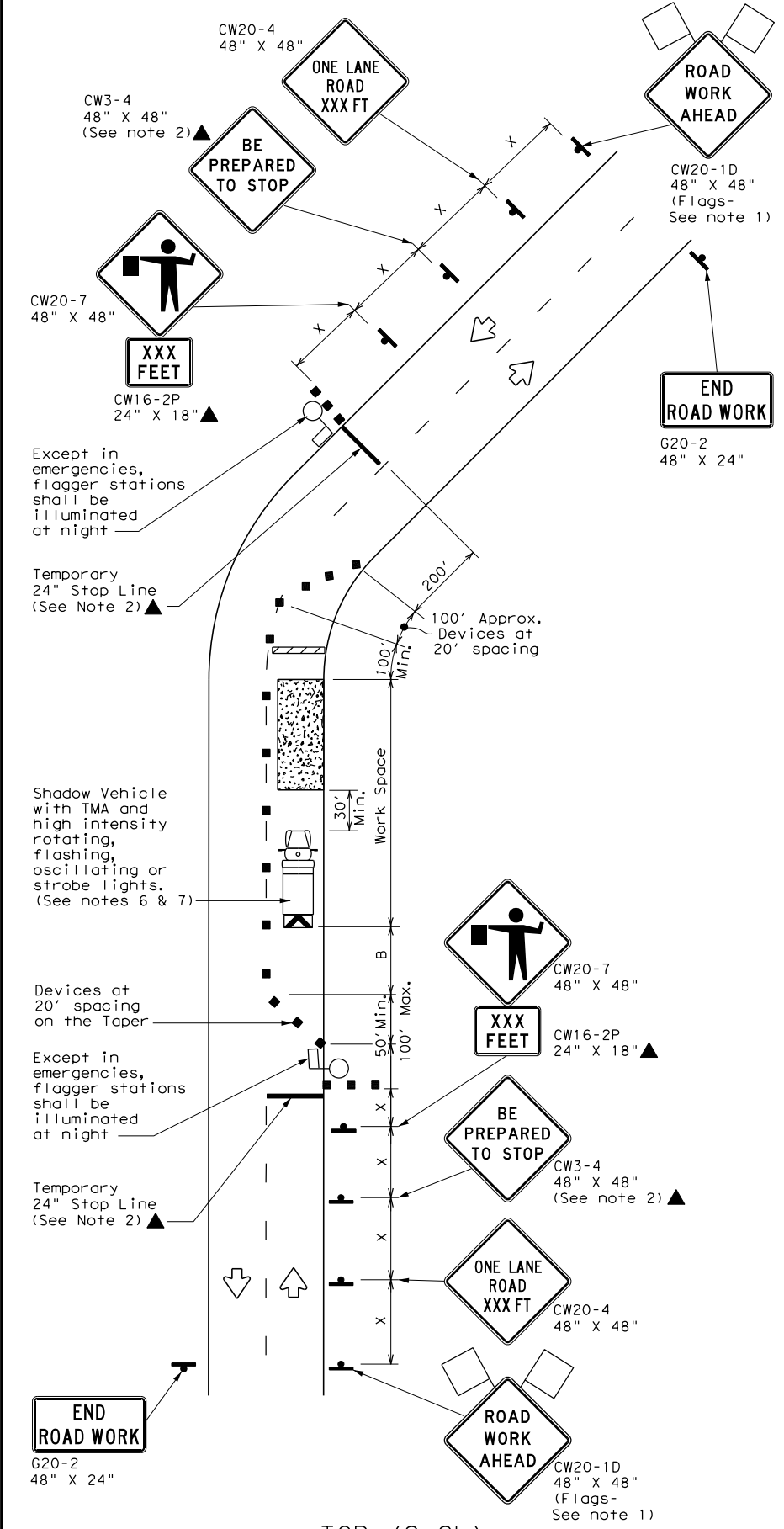
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© TxDOT December 1985	CON:	SECT:	JOB:	HIGHWAY:
REVISIONS	2520	01	016, ETC	FM 2200
2-94 4-98	DIST:	COUNTY:	SHEET NO.:	
8-95 2-12	SAT	MEDINA	65	
1-97 2-18				

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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		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	L = 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'	575'
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

- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
 - Flaggers should use two-way radios or other methods of communication to control traffic.
 - Length of work space should be based on the ability of flaggers to communicate.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- TCP (2-2a)
- 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.
 - The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.
- TCP (2-2b)
- Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
 - 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).
 - Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

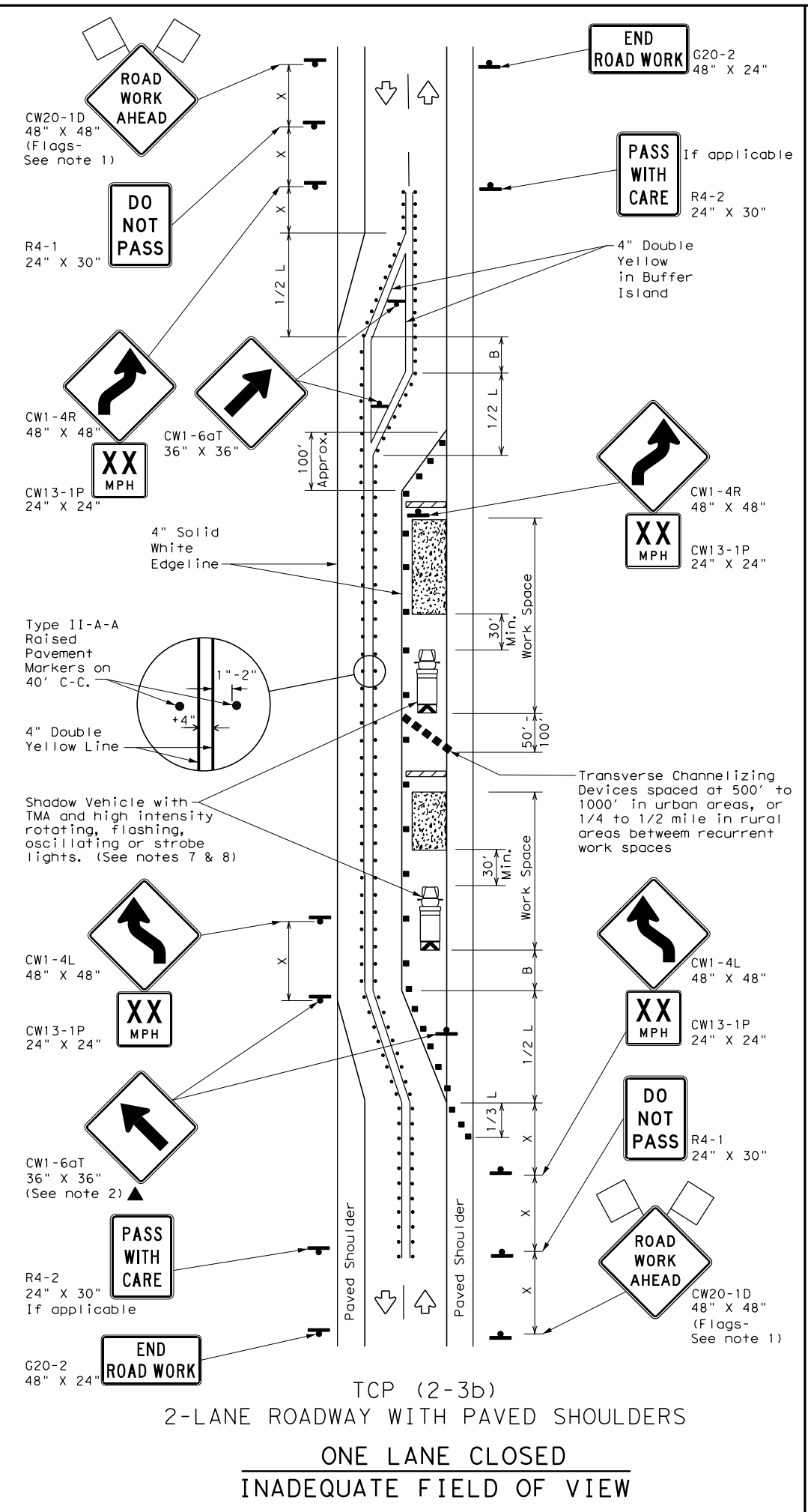
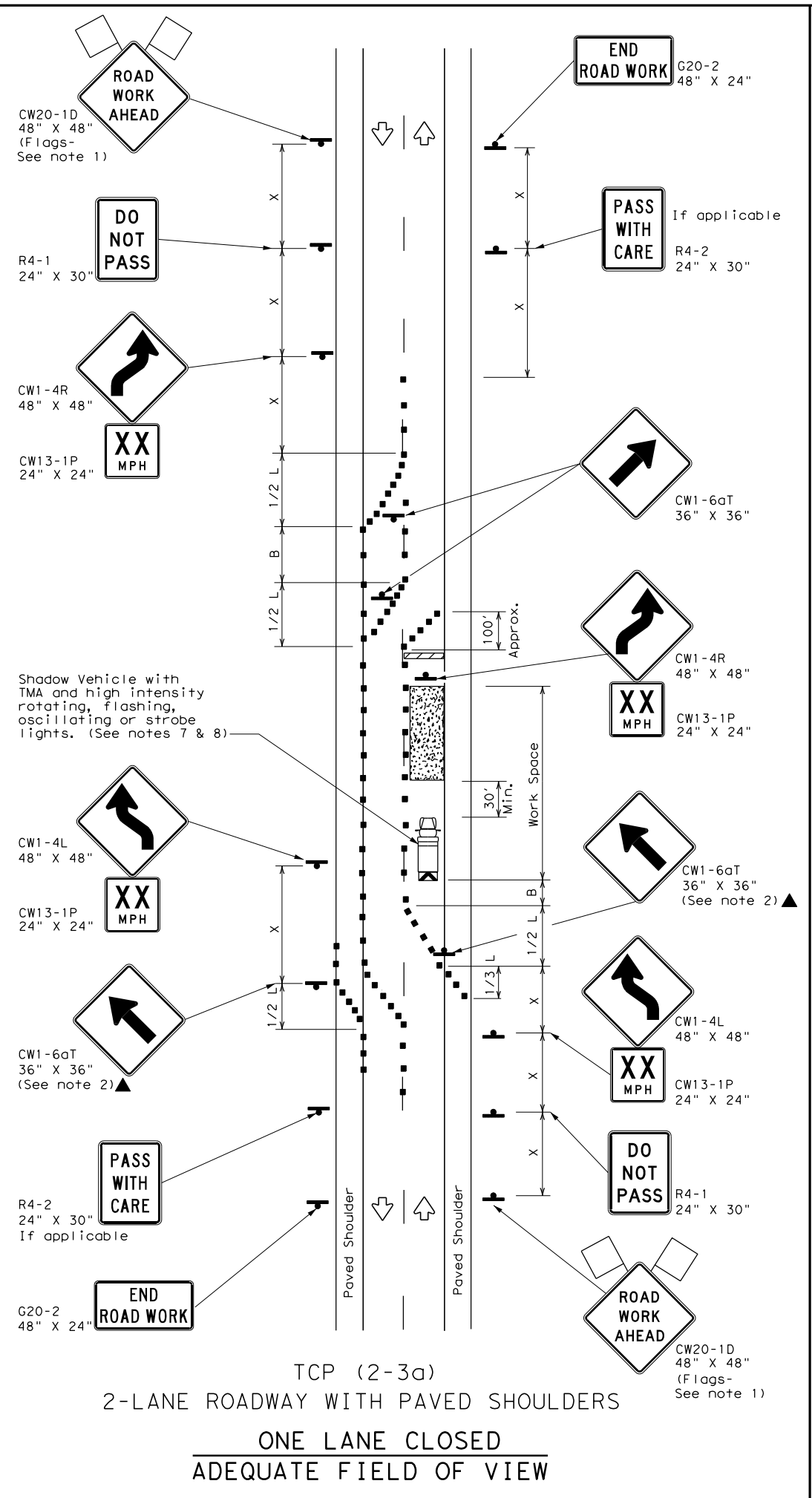
Texas Department of Transportation
 Traffic Operations Division Standard

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	CON:	SECT:	JOB:	HIGHWAY:
REVISIONS		2520 01	016, ETC	FM 2200
8-95 3-03				
1-97 2-12				
4-98 2-18				
	DIST:	COUNTY:	SHEET NO.	
	SAT	MEDINA	66	

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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 **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = 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**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - 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.
 - Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
 - The R4-1 "DO NOT PASS," R4-2 "PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
 - Conflicting pavement marking shall be removed for long term projects.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 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.
 - 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)**
- 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

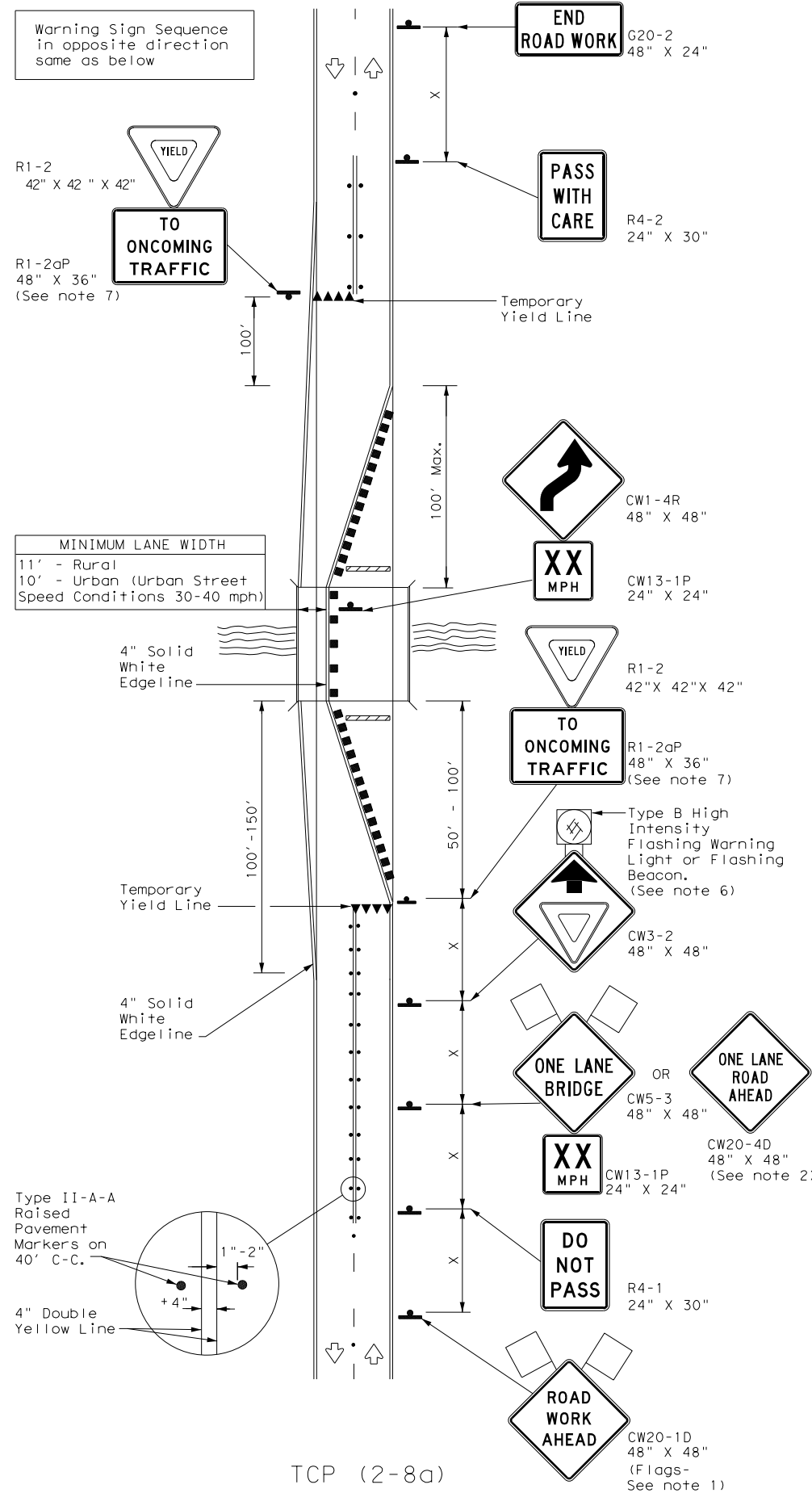
TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON
TWO-LANE ROADS

TCP (2-3) - 18

FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CON:	SECT:	JOB:	HIGHWAY:
REVISIONS	2520	01	016, ETC	FM 2200
8-95 3-03	DIST:	COUNTY:	SHEET NO.:	
1-97 2-12	SAT	MEDINA	67	
4-98 2-18				

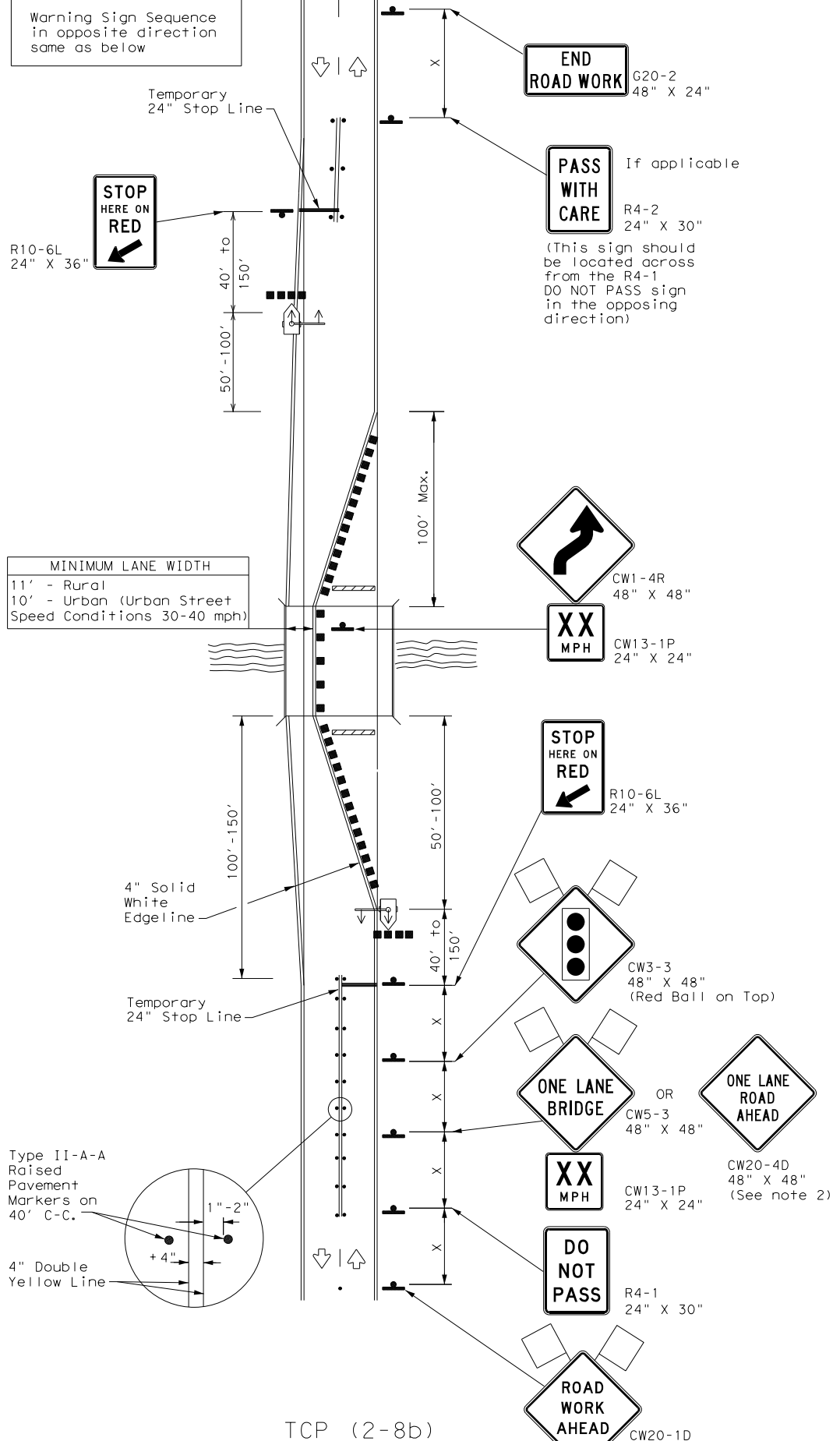
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 FILE: P:\11799\04\Design\Civil\Standards\TCP\tcp2-8-18.dgn



TCP (2-8a)

ONE LANE TWO-WAY
 TRAFFIC CONTROL WITH YIELD SIGNS
 (Less Than 2000 ADT-See Note 5)



TCP (2-8b)

ONE LANE TWO-WAY
 TRAFFIC CONTROL WITH TRAFFIC SIGNAL

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Sign		Traffic Flow
	Flag		Flagger
	Raised Pavement Markers Ty II-AA		Temporary or Portable Traffic Signal

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	L = 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

- Flags attached to signs where shown are REQUIRED.
 - When this TCP is used at a location which does not involve a bridge, a 48" x 48" CW20-4D "ONE LANE ROAD AHEAD" signs should be used in lieu of the CW5-3 "ONE LANE BRIDGE" signs. The CW13-1P Advisory Speed Plaque is required with either warning sign.
 - Raised pavement markers shall be placed 40 feet c-c on centerline between DO NOT PASS signs and stop or yield lines.
 - For intermediate term situations, when it is not feasible to remove and restore pavement markings, the channelization must be made dominant by using a very close spacing. This is especially important in locations of conflicting information, such as where traffic is directed over a double yellow centerline. In such locations a maximum channelizing device spacing of 20 feet is recommended. The 20 foot channelizing device spacing recommendation is intended for the area of conflicting information and not the entire work zone.
- TCP (2-8a)
- Traffic control by CW3-2 "YIELD AHEAD" symbol signs for one lane two-way traffic control operations should be limited to work spaces less than 400 feet long and roadways with less than 2000 ADT. Otherwise, portable traffic signals should be used.
 - If power is available, a flashing beacon should be attached to the CW3-2 "YIELD AHEAD" symbol sign for emphasis.
 - The R1-2 "YIELD" and R1-2aP "TO ONCOMING TRAFFIC" signs and other regulatory signs shall be installed at 7 foot minimum mounting height.
- TCP (2-8b)
- A list of approved Portable Traffic Signals can be found in the "Compliant Work Zone Traffic Control Devices" list.
 - Portable traffic signals should be located to provide adequate stopping sight distance for approaching motorist (See table above).



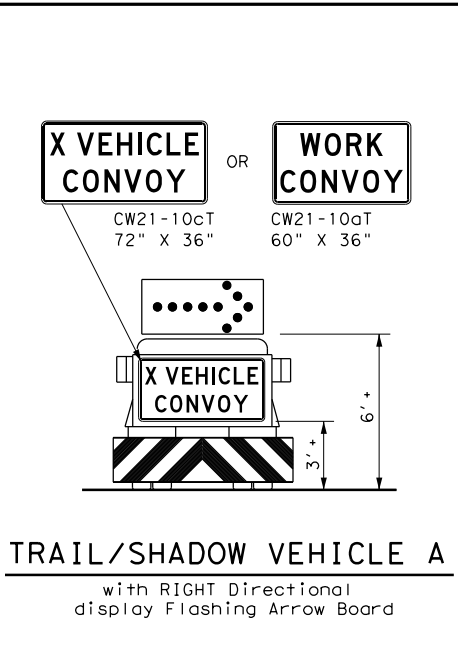
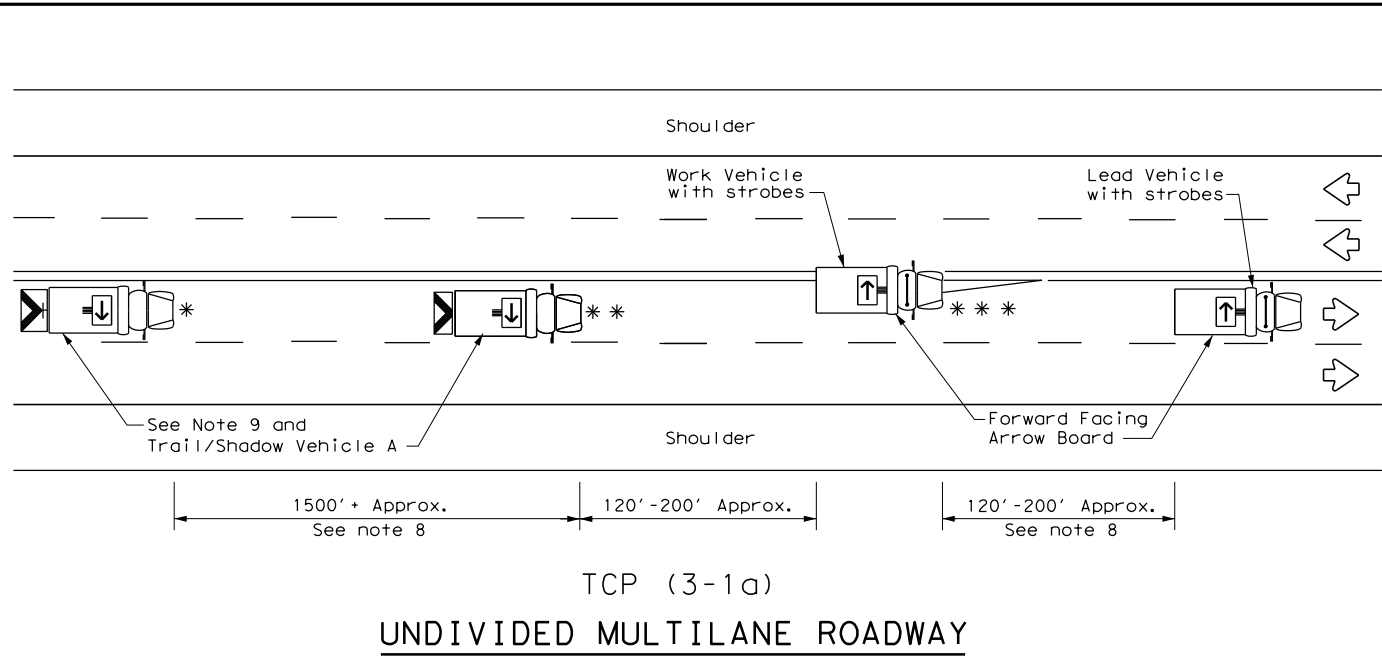
TRAFFIC CONTROL PLAN
 LONG TERM ONE-LANE
 TWO-WAY CONTROL

TCP (2-8) - 18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
8-95 3-03	DIST	COUNTY	SHEET NO.	
1-97 2-12	SAT	MEDINA	68	
4-98 2-18				

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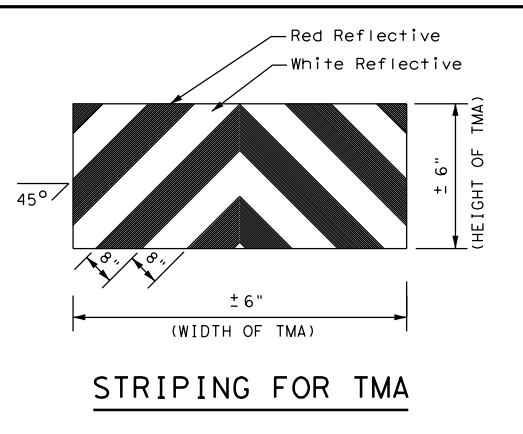
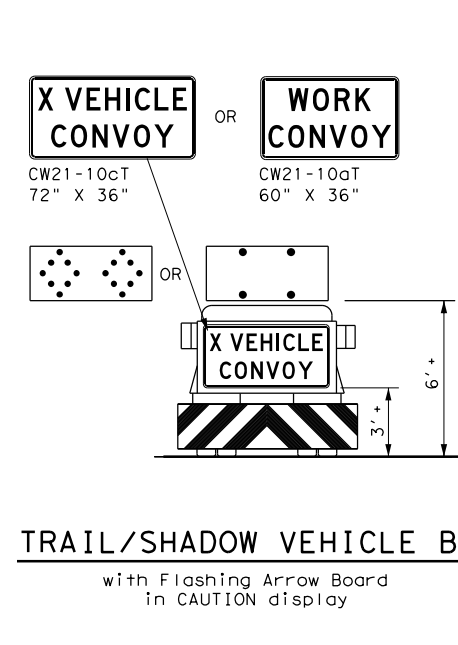
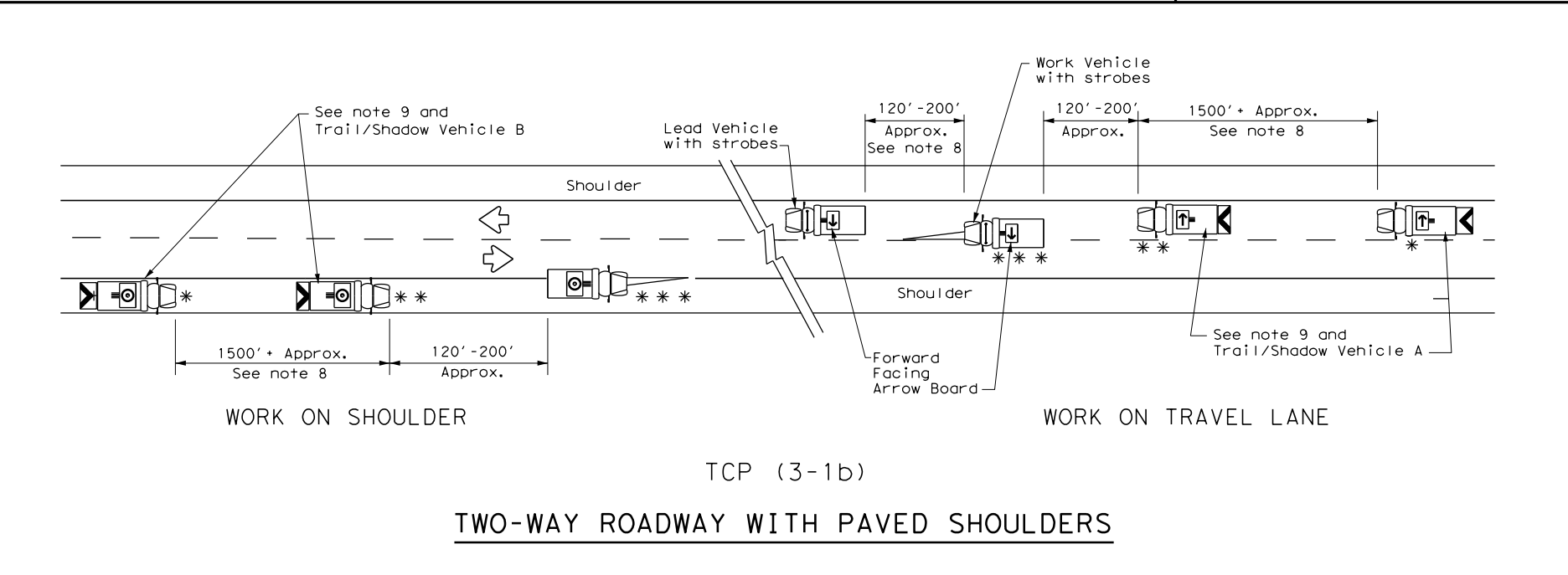


LEGEND				
*	Trail Vehicle	ARROW BOARD DISPLAY		
**	Shadow Vehicle			
***	Work Vehicle		RIGHT Directional	
	Heavy Work Vehicle		LEFT Directional	
	Truck Mounted Attenuator (TMA)		Double Arrow	
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)	

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

GENERAL NOTES

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



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 Traffic Operations Division Standard

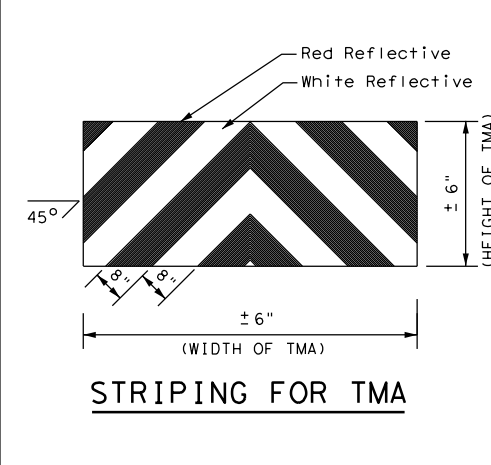
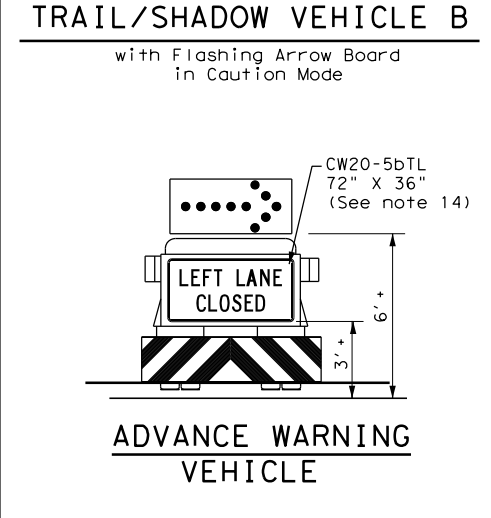
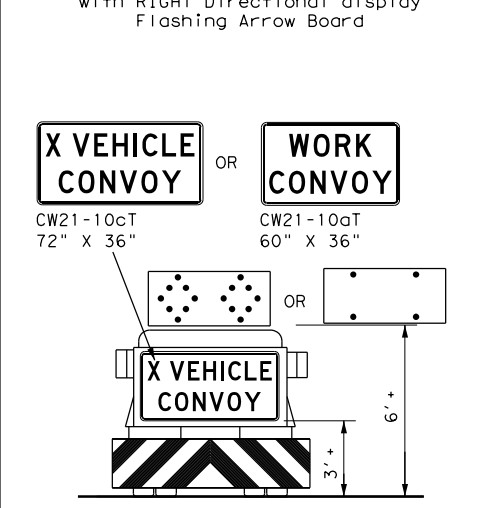
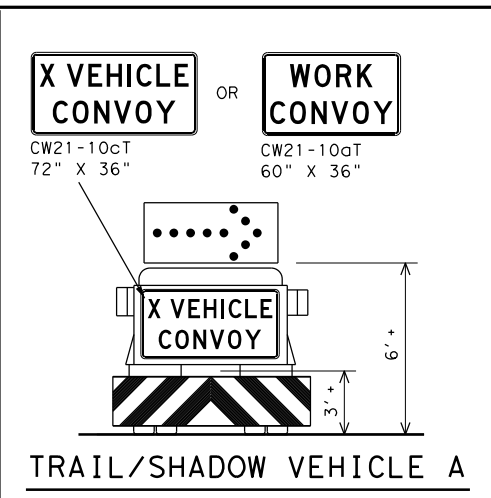
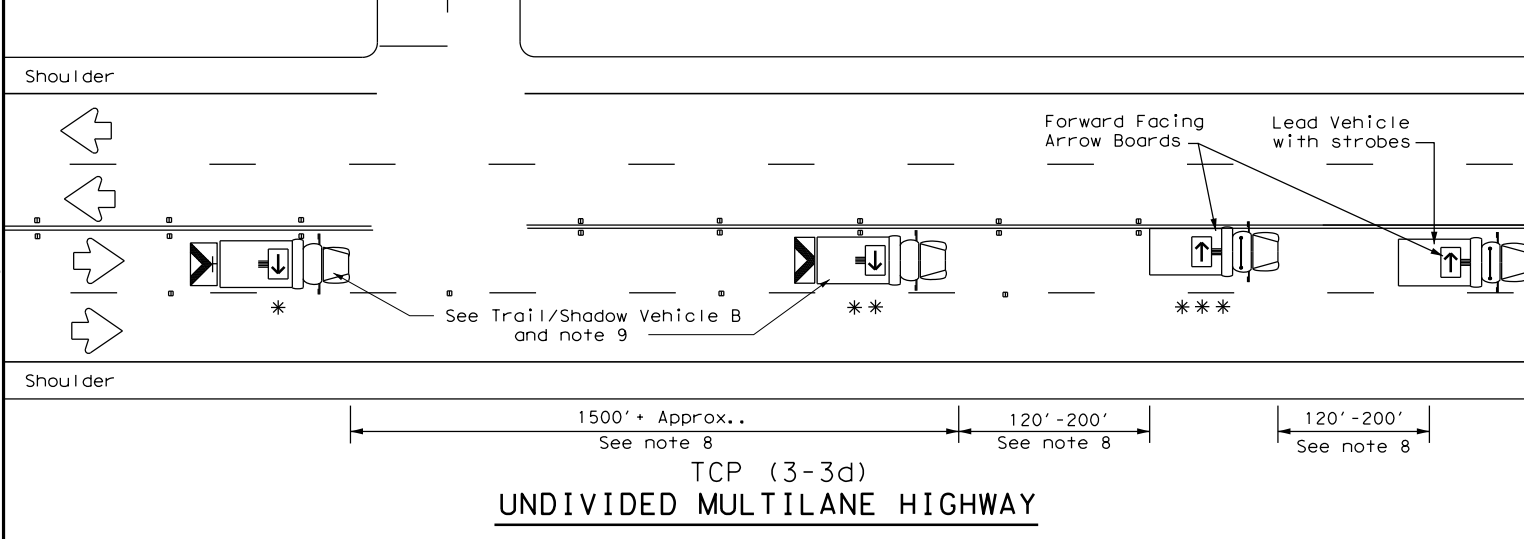
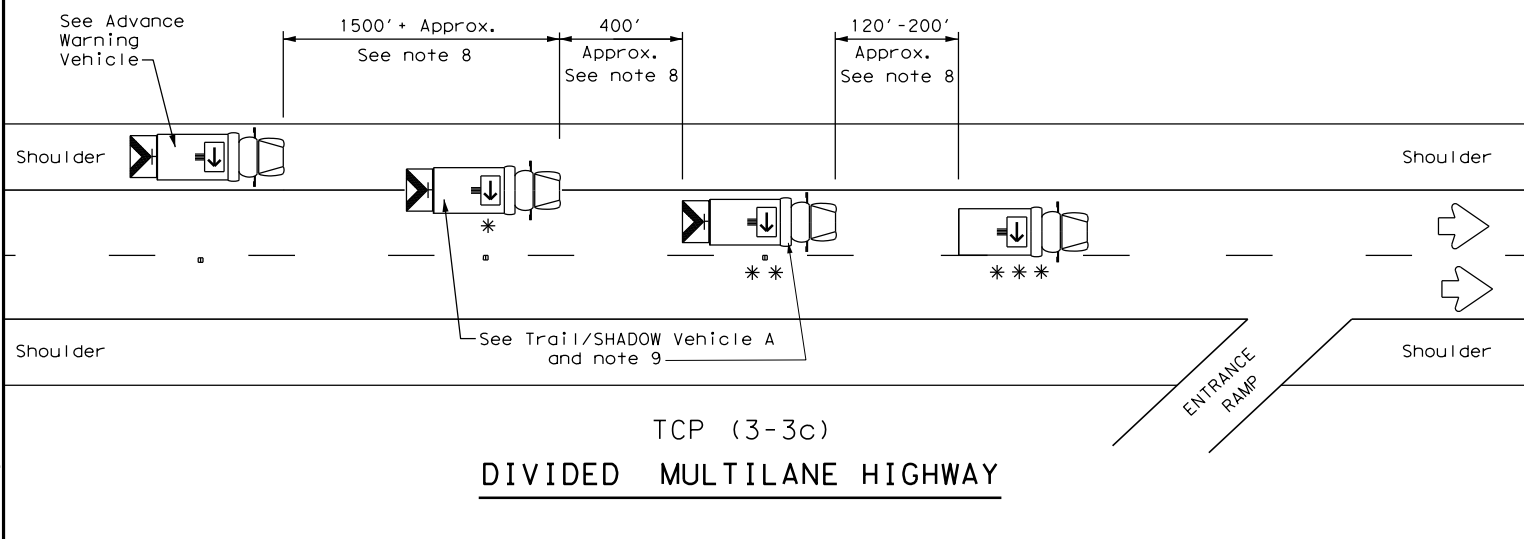
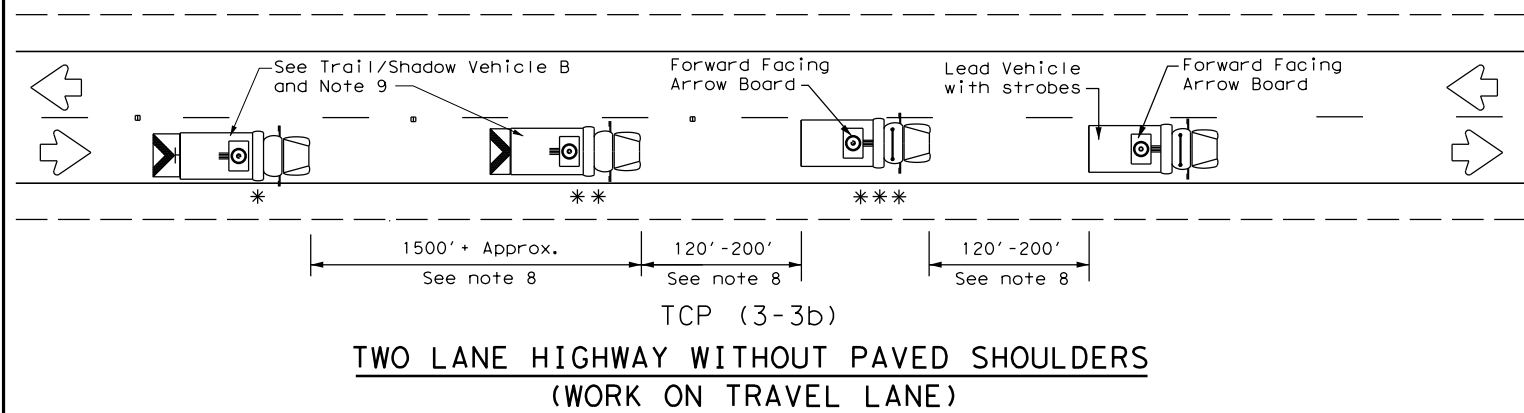
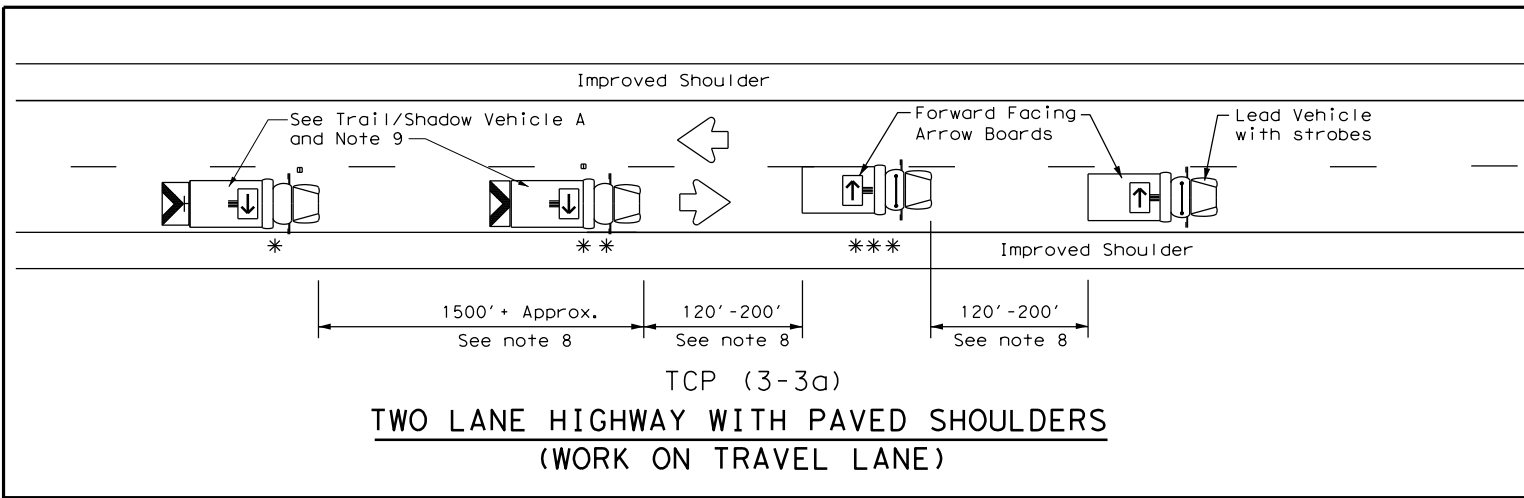
**TRAFFIC CONTROL PLAN
 MOBILE OPERATIONS
 UNDIVIDED HIGHWAYS**

TCP (3-1) - 13

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© TxDOT	December 1985	CONT	SECT	JOB	HIGHWAY				
REVISIONS		2520	01	016, ETC		FM 2200			
2-94	4-98			DIST	COUNTY	SHEET NO.			
8-95	7-13			SAT	MEDINA	69			
1-97									

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

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

GENERAL NOTES

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

Texas Department of Transportation

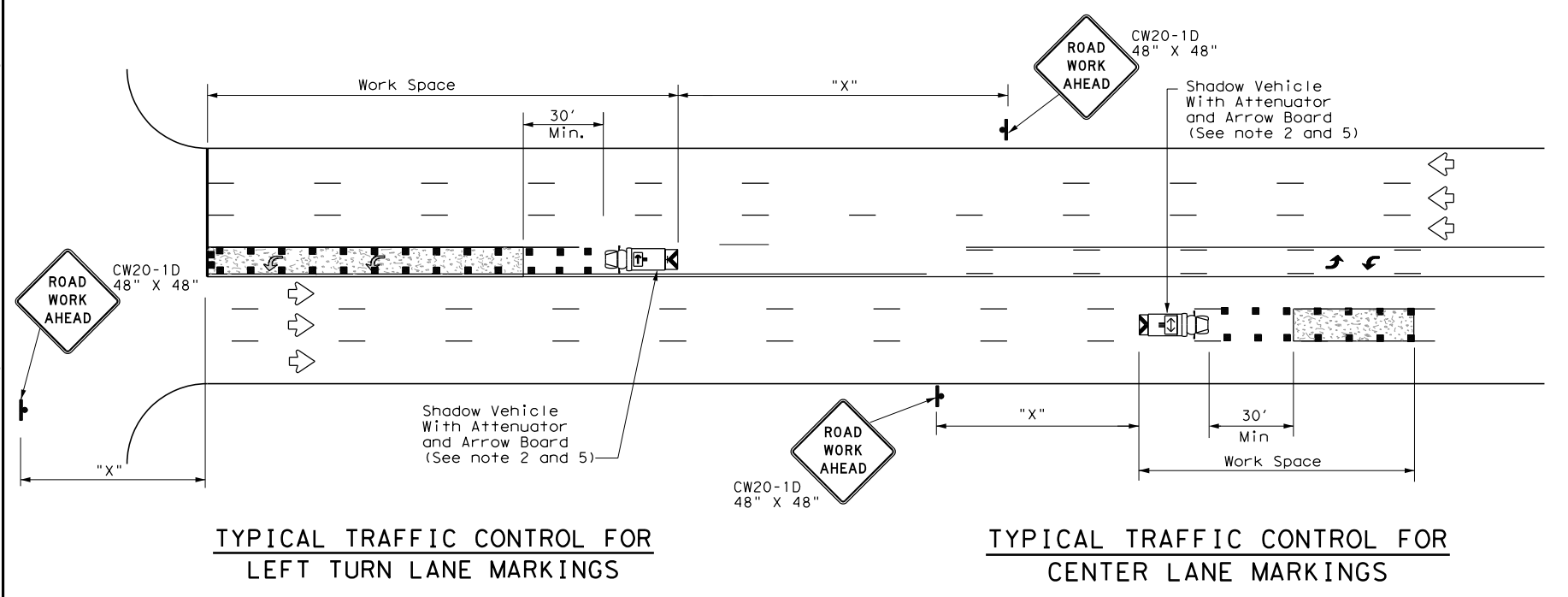
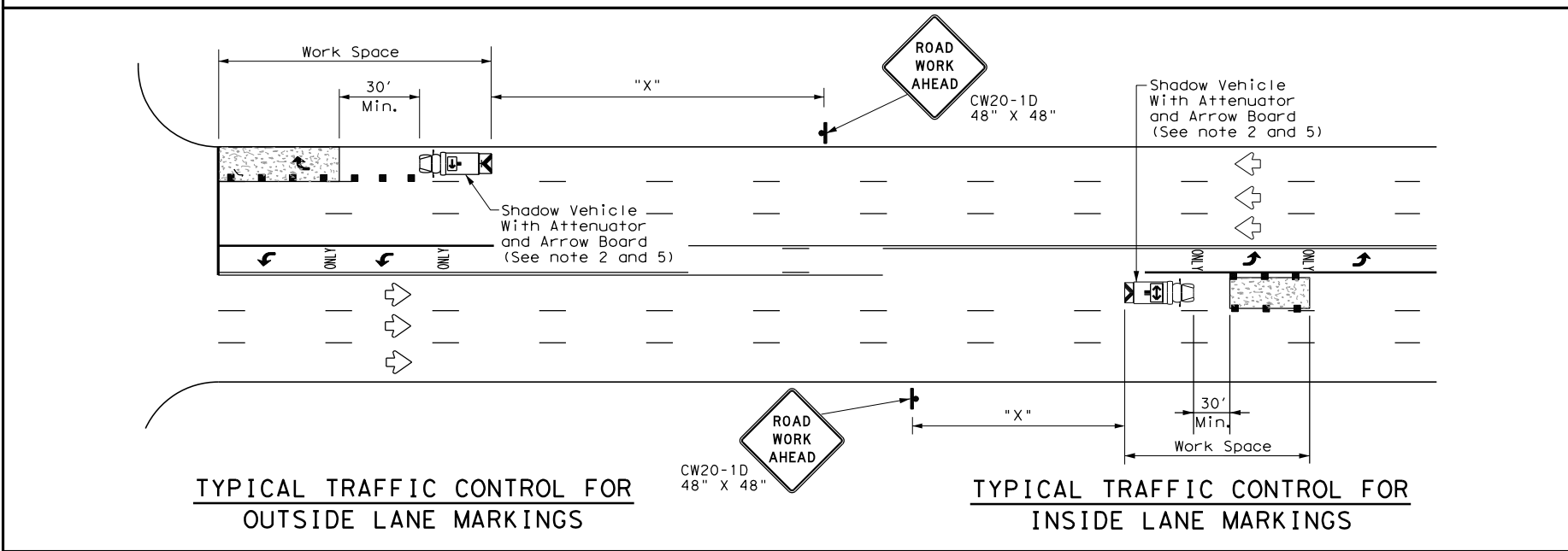
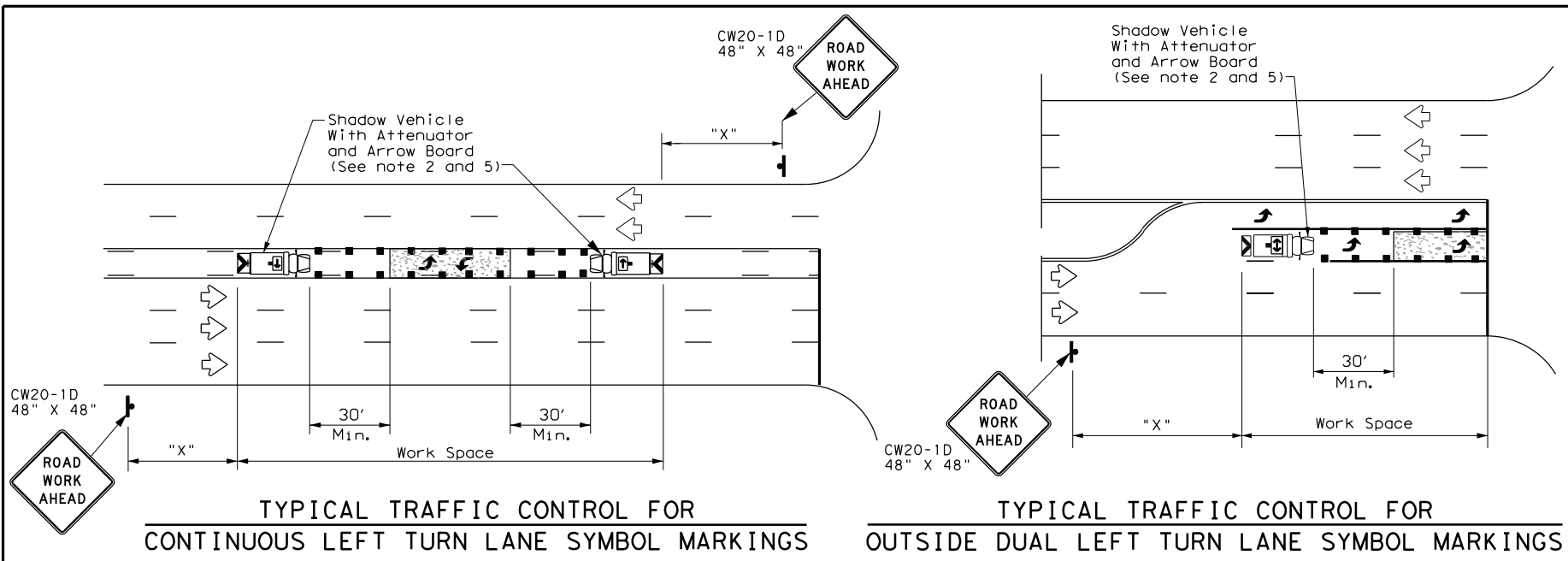
Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN
 MOBILE OPERATIONS
 RAISED PAVEMENT
 MARKER INSTALLATION/
 REMOVAL
 TCP (3-3) - 14**

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 7-13	SAT	MEDINA	70	
1-97 7-14				

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

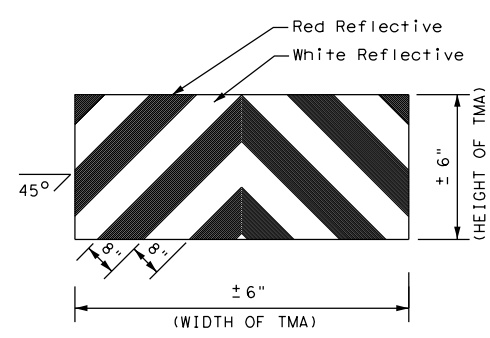
Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS ² / 60	150'	165'	180'	30'	60'	120'	90'
35		205'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

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

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

GENERAL NOTES

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



Texas Department of Transportation Traffic Operations Division Standard

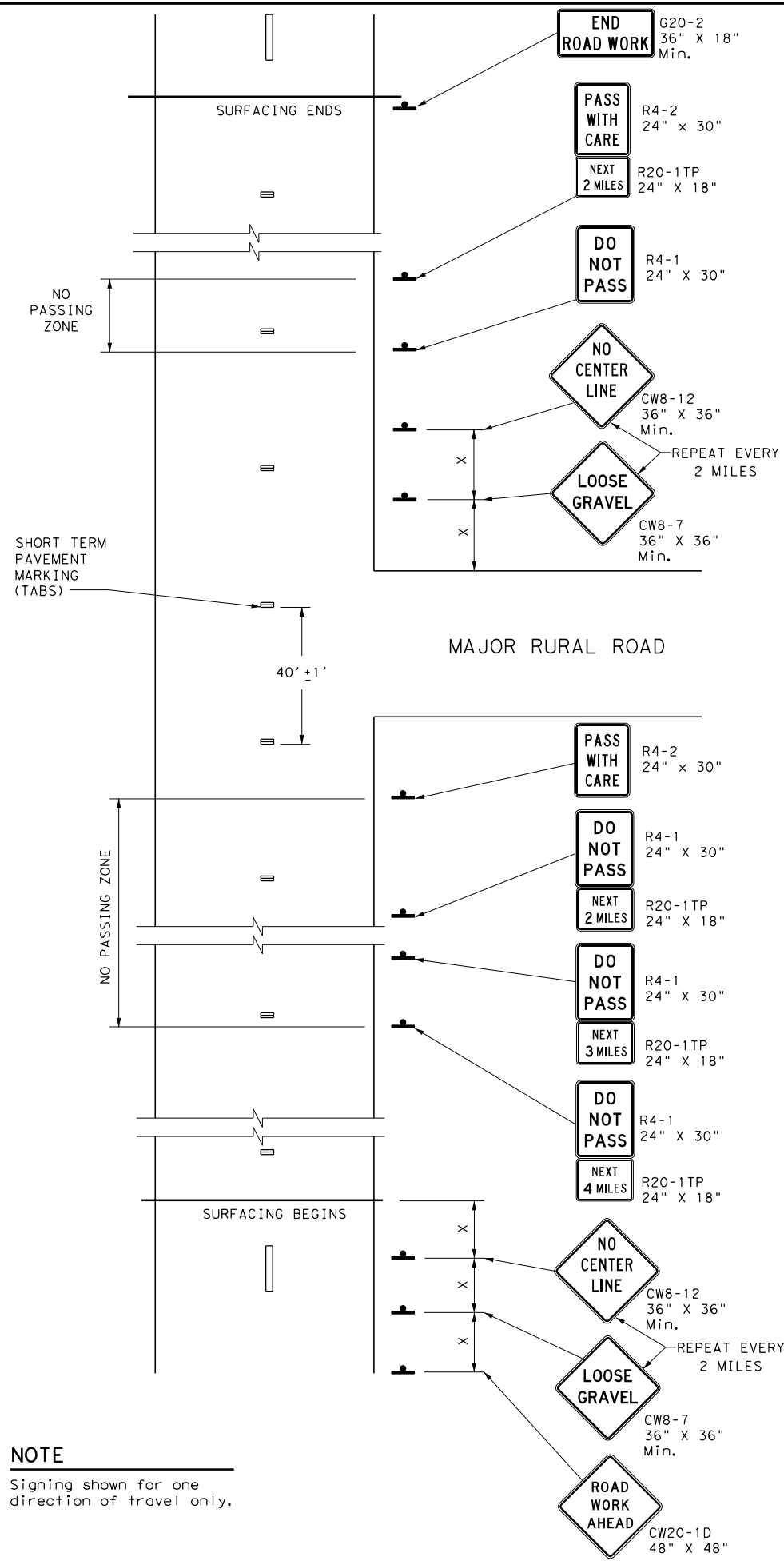
TRAFFIC CONTROL PLAN MOBILE OPERATIONS FOR ISOLATED WORK AREAS UNDIVIDED HIGHWAYS

TCP (3-4) - 13

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© TxDOT July, 2013	CONT: 2520	SECT: 01	JOB: 016, ETC	HIGHWAY: FM 2200
REVISIONS	DIST: SAT	COUNTY: MEDINA	SHEET NO. 71	

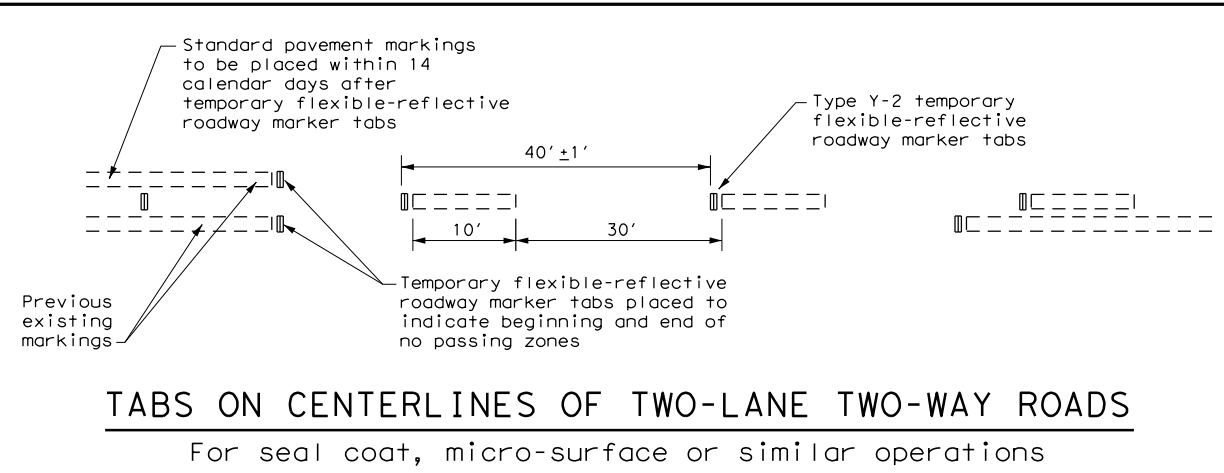
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NOTE
 Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



"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.



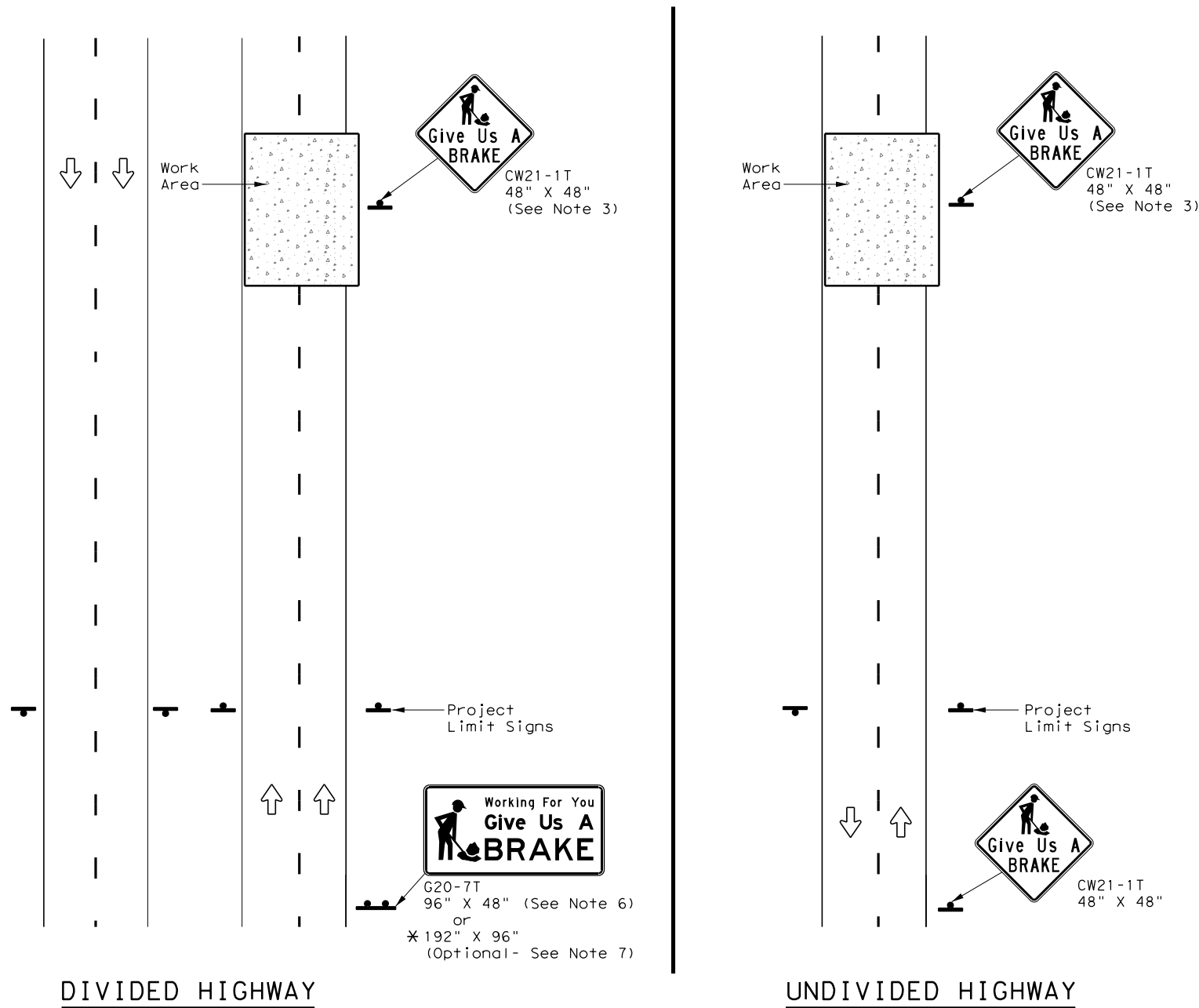
TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP (7-1) - 13

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© TxDOT	March 1991	CONT	SECT	JOB	HIGHWAY				
REVISIONS		2520	01	016, ETC	FM 2200				
4-92	4-98	DIST	COUNTY		SHEET NO.				
1-97	7-13	SAT	MEDINA		72				

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SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL		DRILLED SHAFT
						Size	(LF)	
							① ②	24" DIA. (LF)
Orange	G20-7T		96" X 48"	Type B _{FL} or C _{FL}	32	▲	▲ ▲	▲
Orange	G20-7T		192" X 96"	Type B _{FL} or C _{FL}	128	W8x18	16 17	12

▲ See Note 6 Below

LEGEND

	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS

PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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



WORK ZONE
 "GIVE US A BRAKE"
 SIGNS

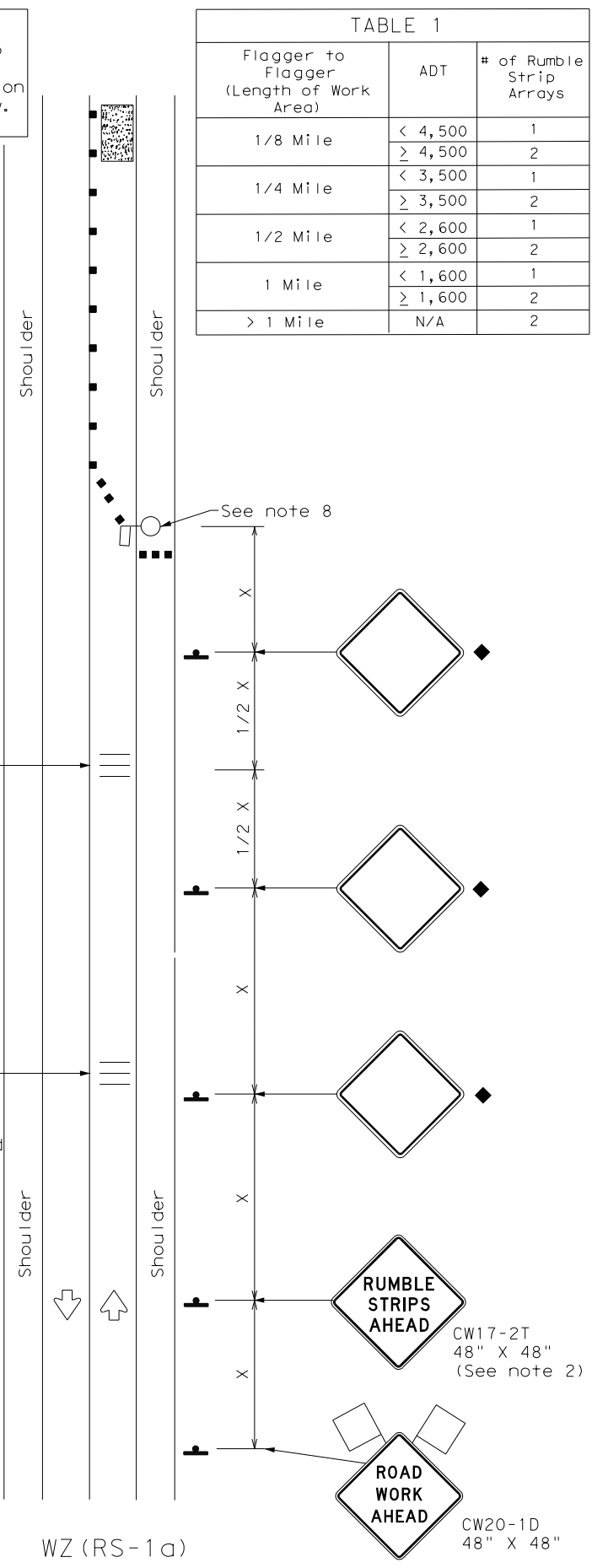
WZ (BRK) - 13

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©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
6-96 5-98 7-13	DIST	COUNTY	SHEET NO.	
8-96 3-03	SAT	MEDINA	73	

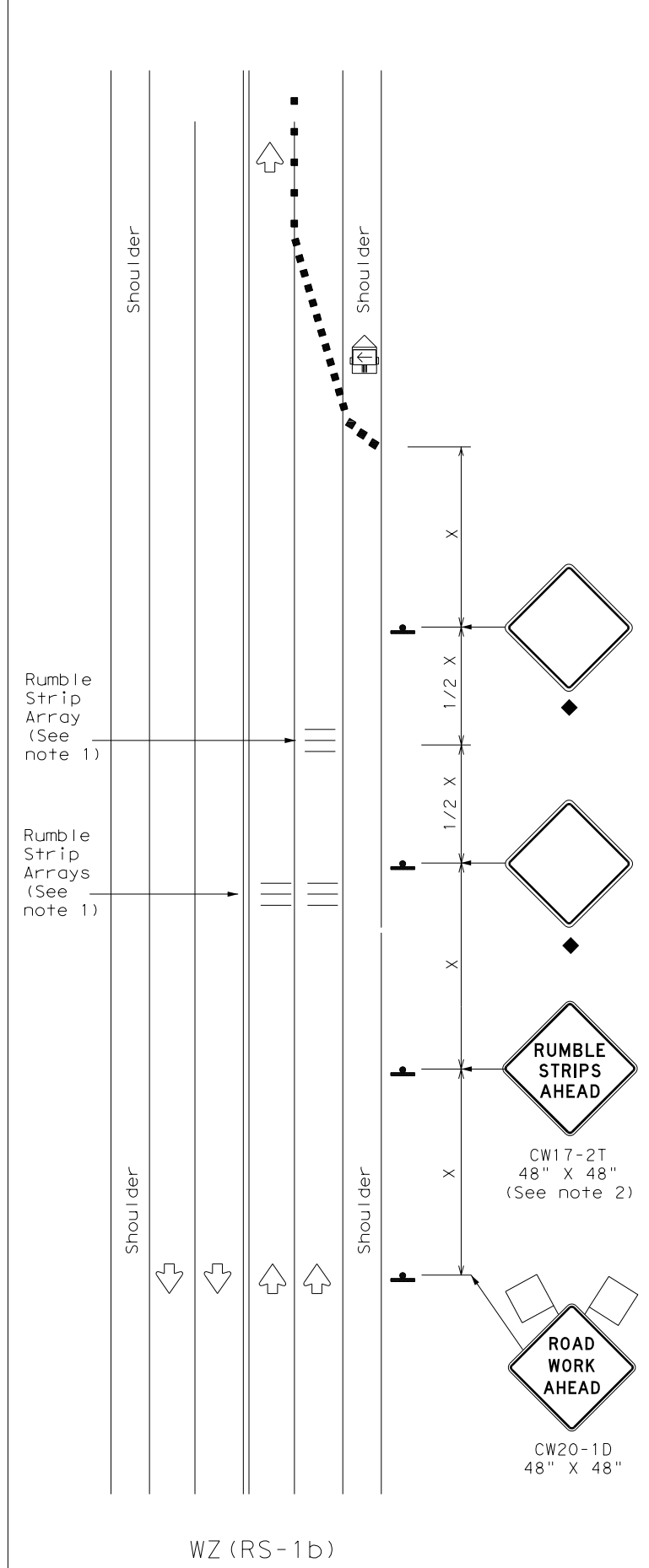
DATE: 12/20/2022 3:28:21 PM
 FILE: P:\117\99\04\Design\Civil\Standards\TCP\wzrs22.dgn

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



RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

- 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.
- 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.
- Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
- Remove Temporary Rumble Strips before removing the advanced warning signs.
- Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
- Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
- This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
- The one-lane two-way application may utilize a flagger, an Automated Flagger Assistance Device (AFAD) or a Portable Traffic Signal (PTS).
- Replace defective Temporary Rumble Strips as directed by the Engineer.
- Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment and written direction from the Engineer.

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

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = 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.

Texas Department of Transportation
 Traffic Safety Division Standard

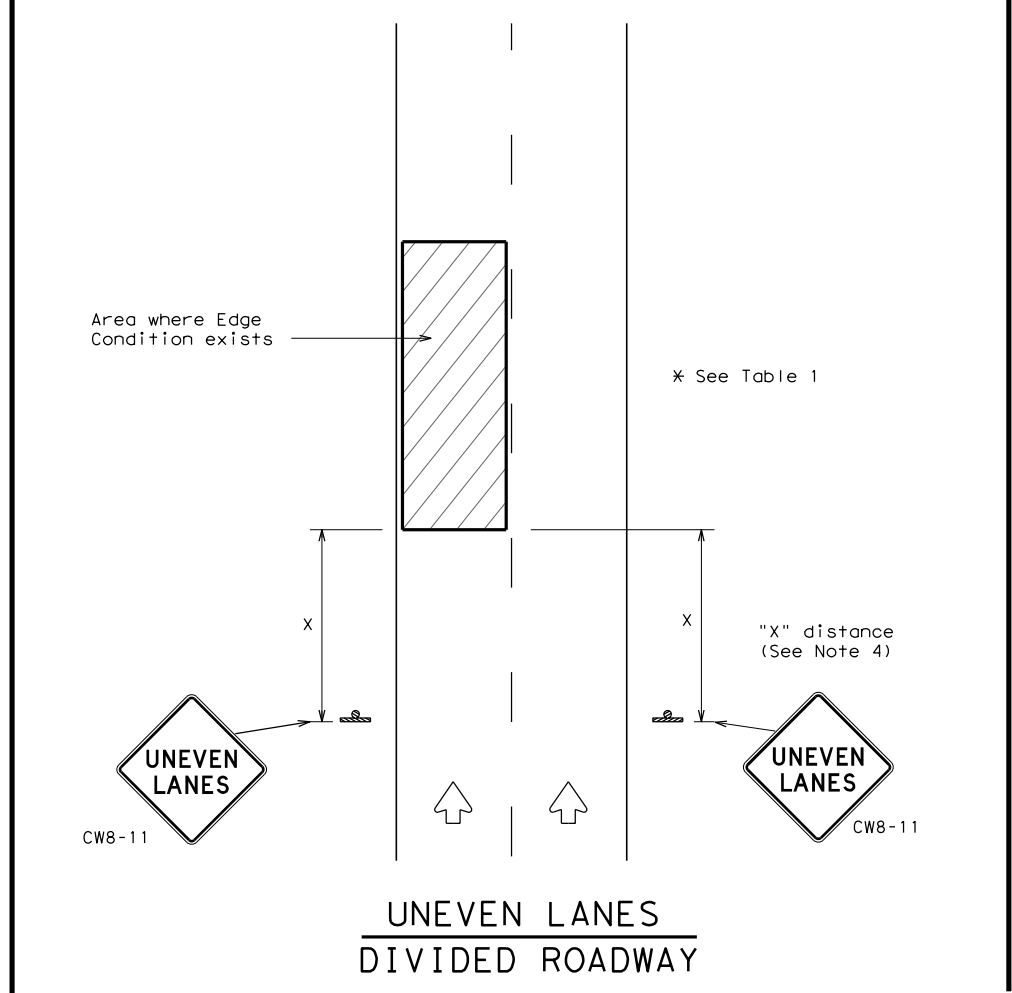
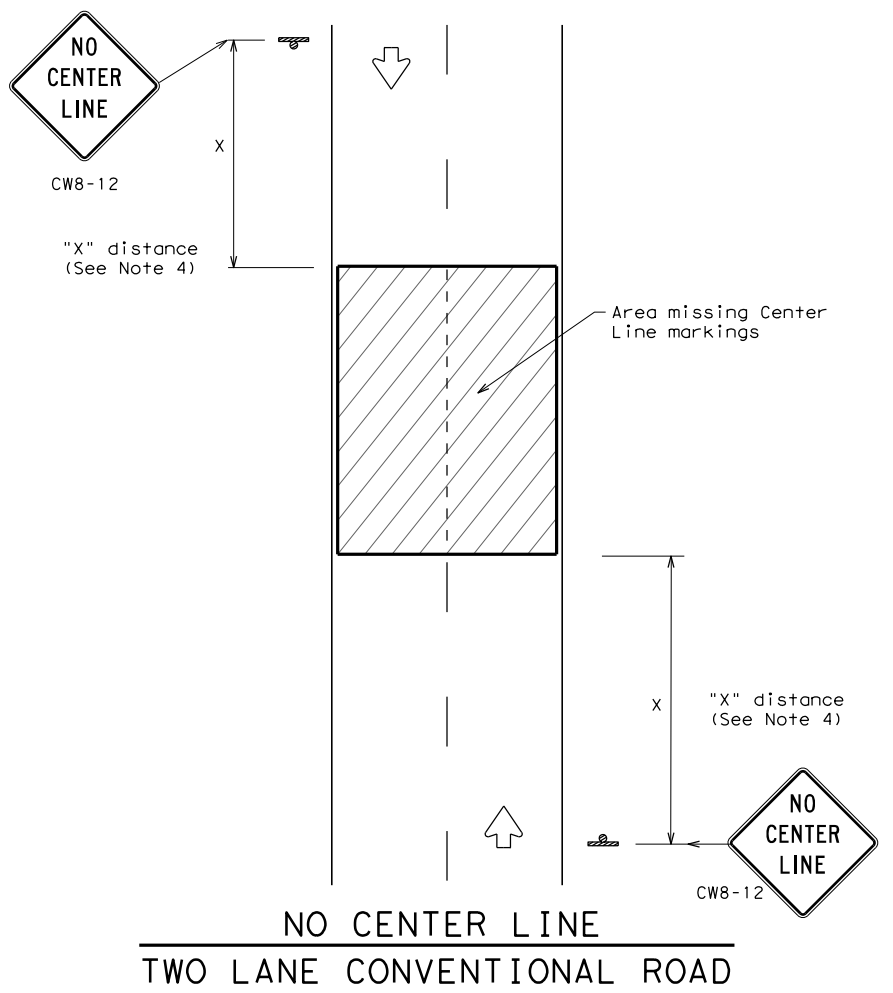
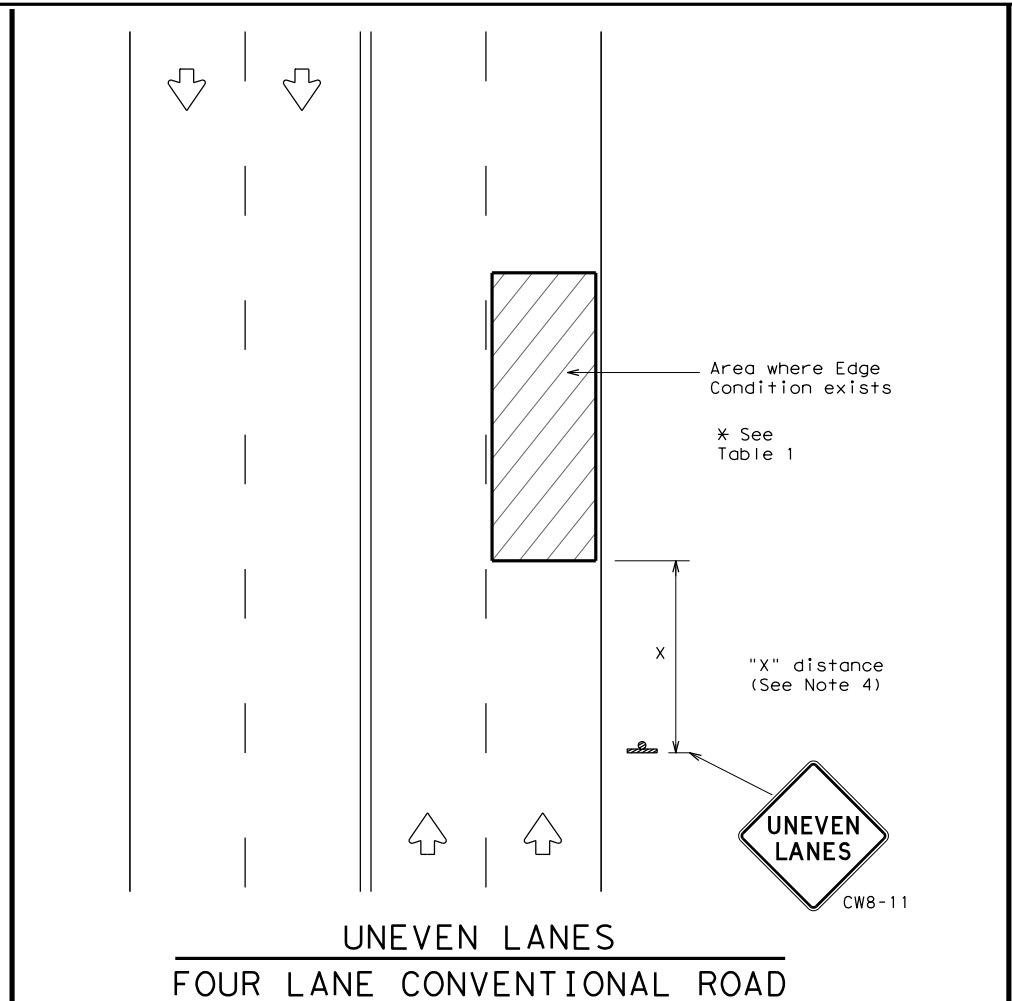
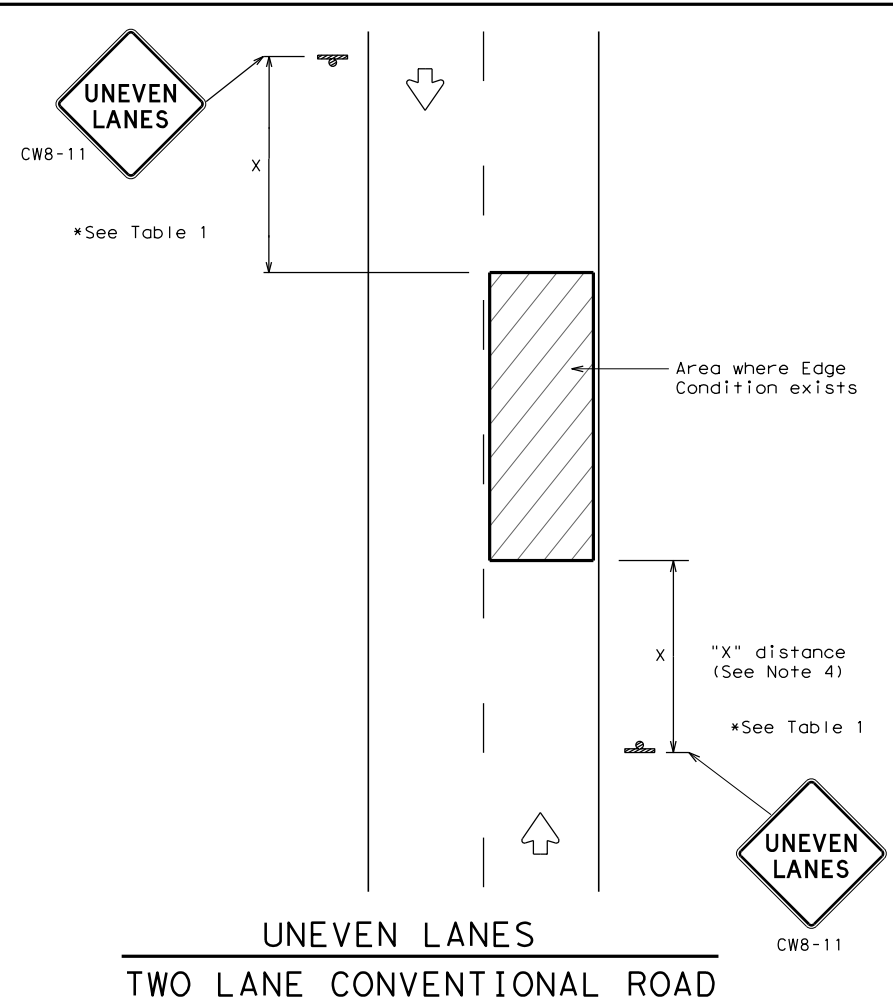
TEMPORARY RUMBLE STRIPS

WZ (RS) - 22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
2-14 1-22	DIST	COUNTY	SHEET NO.	
4-16	SAT	MEDINA	74	

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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

- 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.
- 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.
- 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.
- Signs shall be spaced at the distances recommended as per BC standards.
- 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."
- 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.
- Short term markings shall not be used to simulate edge lines.
- All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

Edge Condition	Edge Height (D)	* Warning Devices
①	Less than or equal to: 1/4" (maximum-planing) 1/2" (typical-overlay)	Sign: CW8-11
②	Less than or equal to 3"	Sign: CW8-11
③	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"

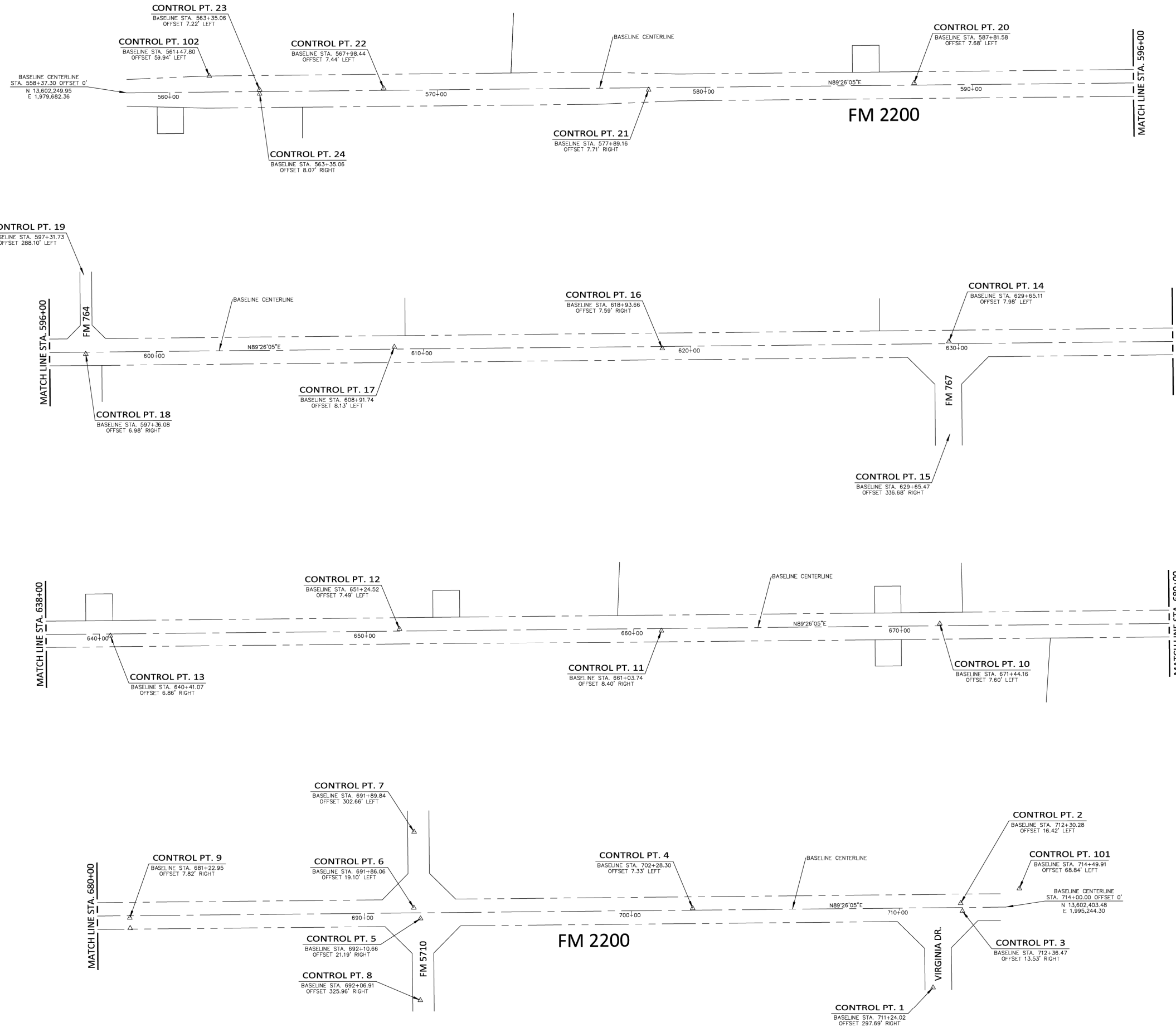


SIGNING FOR UNEVEN LANES

WZ (UL) - 13

FILE: wz11-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
8-95 2-98 7-13	DIST	COUNTY	SHEET NO.	
1-97 3-03	SAT	MEDINA	76	

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NOTES:

HORIZONTAL DATUM:

1. BEARINGS ARE BASED ON NAD83 (2011), TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE (4204). COORDINATES AND DISTANCES ARE IN U.S. SURVEY FEET. COORDINATE VALUES ARE SURFACE VALUES DERIVED BY A GRID TO SURFACE ADJUSTMENT FACTOR OF 1.00016.

2. HORIZONTAL CONTROL COORDINATE VALUES WERE OBTAINED BY GPS/GNSS OBSERVATIONS UTILIZING TXDOT RTN VRS SYSTEM NAD 83 (EPOCH 2010) TO THE FOLLOWING CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS):

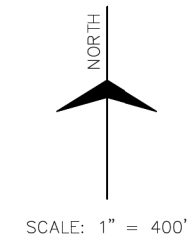
RRP-SAPC-0319

RRP-SCDS-1113

VERTICAL DATUM:

3. ELEVATIONS ARE BASED ON NORTH AMERICAN DATUM 1988 (NAVD), GEOID MODEL 03 (CONIS) AND WERE ESTABLISHED THROUGH DIFFERENTIAL DIGITAL LEVELING METHODS HOLDING THE PUBLISHED ELEVATION OF CONTROL POINT #100 - ELEVATION: 656.30'

DATE ESTABLISHED: 02/11/2022



[Signature]
 VICTOR MENDEZ, JR. R.P.L.S. NO. 6056
 05/19/2022

DATE	BY	REV	REVISION
5/23/22			ADDED CL STA.; REV. VERTICAL DATUM NOTE



5835 CALLAGHAN RD. SUITE 200
 SAN ANTONIO, TEXAS, 78228
 (210) 349-3273 (PH)
 TBPE FIRM REGISTRATION #F-483 / TBPLS FIRM REGISTRATION #100423-00
 (210) 349-4395 (FAX) <http://www.pozcam.com/>



FM 2200
**PLANIMETRIC ALIGNMENT
 HORIZONTAL AND
 VERTICAL CONTROL**

DSN	FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
CHK	6	SEE TITLE SHEET	77
DRN	STATE	DIST.	COUNTY
CHK	TEXAS	SAT	MEDINA
	CONT.	SECT.	JOB
	2520	01	016, ETC
			HIGHWAY NO.
			FM 2200

NOTES:

HORIZONTAL DATUM:

1. BEARINGS ARE BASED ON NAD83 (2011), TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE (4204). COORDINATES AND DISTANCES ARE IN U.S. SURVEY FEET. COORDINATE VALUES ARE SURFACE VALUES DERIVED BY A GRID TO SURFACE ADJUSTMENT FACTOR OF 1.00016.

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RRP-SAPC-0319

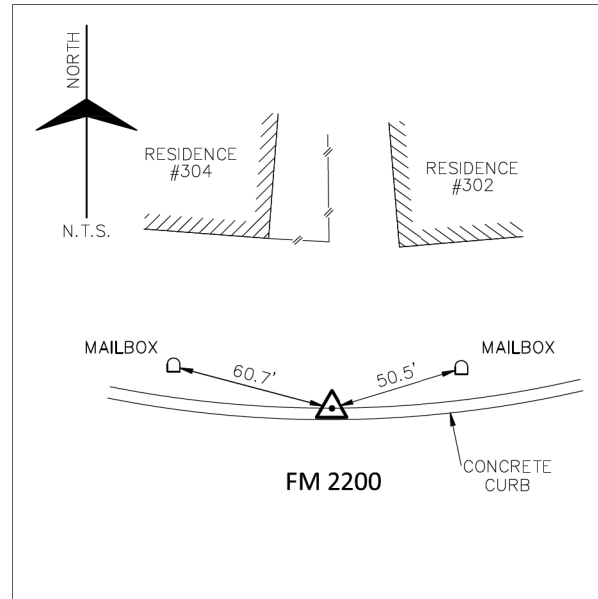
RRP-SCDS-1113

VERTICAL DATUM:

3. ELEVATIONS ARE BASED ON NORTH AMERICAN DATUM 1988 (NAVD), GEOID MODEL 03 (CONIS) AND WERE ESTABLISHED THROUGH DIFFERENTIAL DIGITAL LEVELING METHODS HOLDING THE PUBLISHED ELEVATION OF CONTROL POINT #100 - ELEVATION: 656.30'

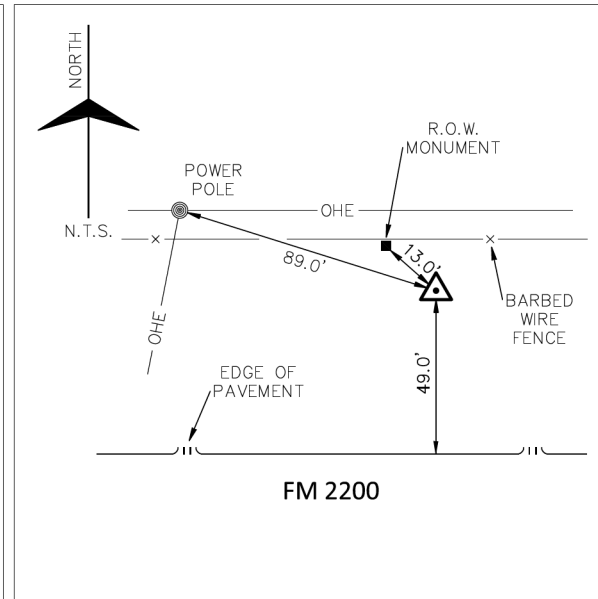
DATE ESTABLISHED: 02/11/2022

P-101

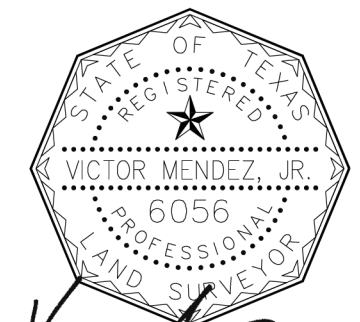


NORTHING - 13,602,472.81
 EASTING - 1,995,293.53
 ELEVATION - 656.93
 DESCRIPTION - TxDOT ALUMINUM CAP;
 ALONG PROJECT BASELINE -
 STA. 714+49.91, OFFSET 68.84' LEFT

P-102



NORTHING - 13,602,312.96
 EASTING - 1,979,992.25
 ELEVATION - 762.54
 DESCRIPTION - TxDOT ALUMINUM CAP;
 ALONG PROJECT BASELINE -
 STA. 561+47.80, OFFSET 59.94' LEFT



[Signature]
 VICTOR MENDEZ, JR. R.P.L.S. NO. 6056
 05/19/2022

DATE	BY	REV	REVISION
5/23/22			ADDED CL STA.; REV. VERTICAL DATUM NOTE

POZNECKI AMARILLO
 5835 CALLAGHAN RD. SUITE 200
 SAN ANTONIO, TEXAS, 78228
 (210) 349-3273 (PH)
 TBPE FIRM REGISTRATION #F-483 / TBPLS FIRM REGISTRATION #100423-00
 (210) 349-4395 (FAX) <http://www.pozcam.com/>



FM 2200
**PRIMARY
 HORIZONTAL AND
 VERTICAL CONTROL**

DSN	FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
		STATE	DIST.	
CHK	6	SEE TITLE SHEET		78
DRN	TEXAS	SAT	MEDINA	
CHK	CONT.	SECT.	JOB	HIGHWAY NO.
	2520	01	016, ETC	FM 2200

NOTES:

HORIZONTAL DATUM:

1. BEARINGS ARE BASED ON NAD83 (2011), TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE (4204). COORDINATES AND DISTANCES ARE IN U.S. SURVEY FEET. COORDINATE VALUES ARE SURFACE VALUES DERIVED BY A GRID TO SURFACE ADJUSTMENT FACTOR OF 1.00016.

2. HORIZONTAL CONTROL COORDINATE VALUES WERE OBTAINED BY GPS/GNSS OBSERVATIONS UTILIZING TXDOT RTN VRS SYSTEM NAD 83 (EPOCH 2010) TO THE FOLLOWING CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS):

RRP-SAPC-0319

RRP-SCDS-1113

VERTICAL DATUM:

3. ELEVATIONS ARE BASED ON NORTH AMERICAN DATUM 1988 (NAVD), GEOID MODEL 03 (CONIS) AND WERE ESTABLISHED THROUGH DIFFERENTIAL DIGITAL LEVELING METHODS HOLDING THE PUBLISHED ELEVATION OF CONTROL POINT #100 - ELEVATION: 656.30'

DATE ESTABLISHED: 02/11/2022



[Signature]
 VICTOR MENDEZ, JR. R.P.L.S. NO. 6056
 05/12/2022

DATE	BY	REV	REVISION
5/19/22			COORDINATES/LOCATION REFERENCE
5/23/22			ADDED CL STA.; REV. VERTICAL DATUM NOTE



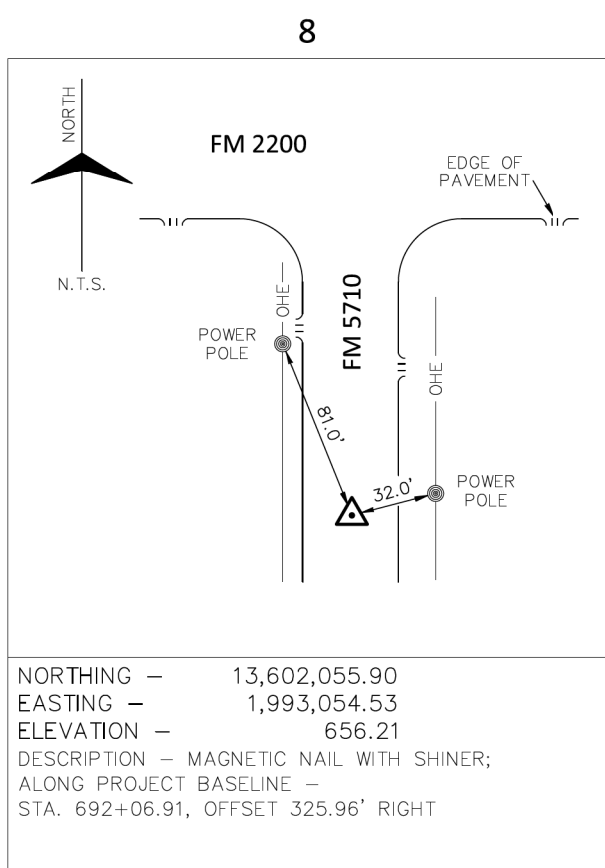
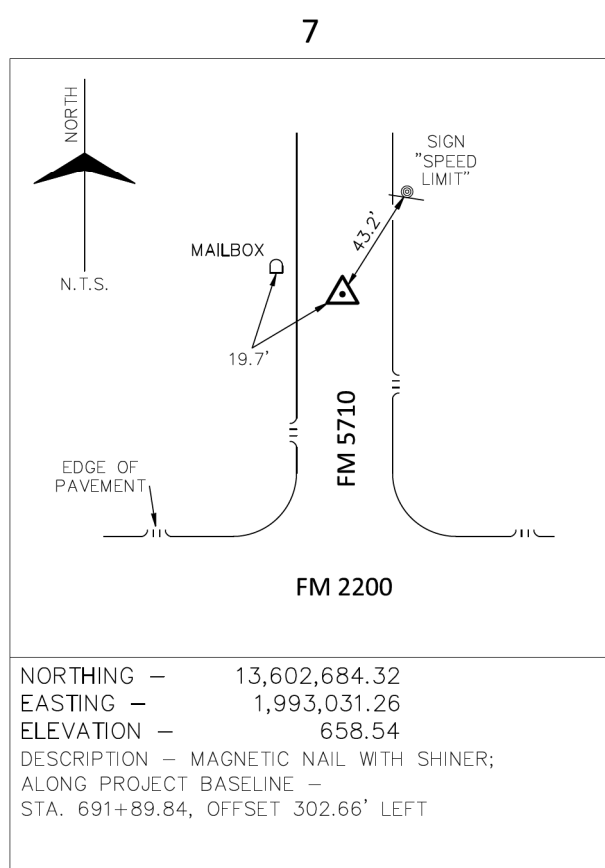
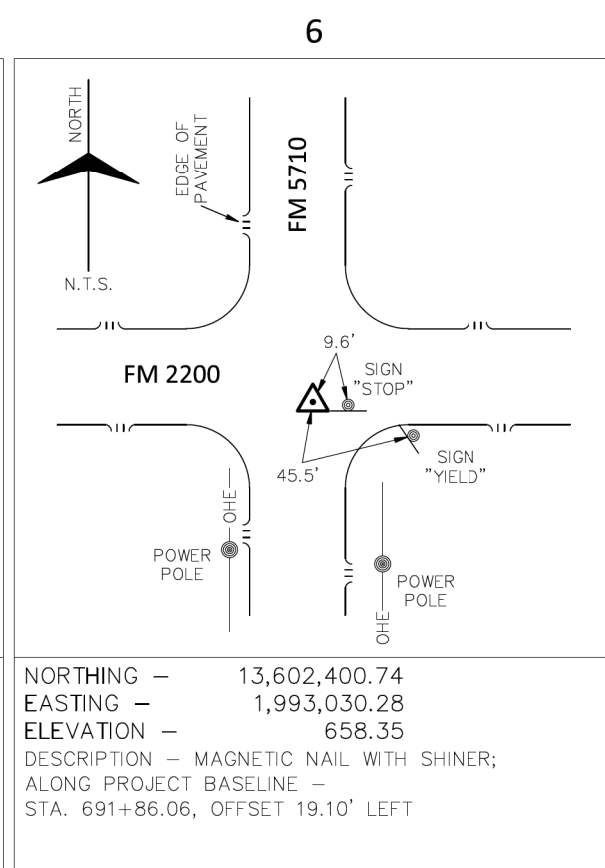
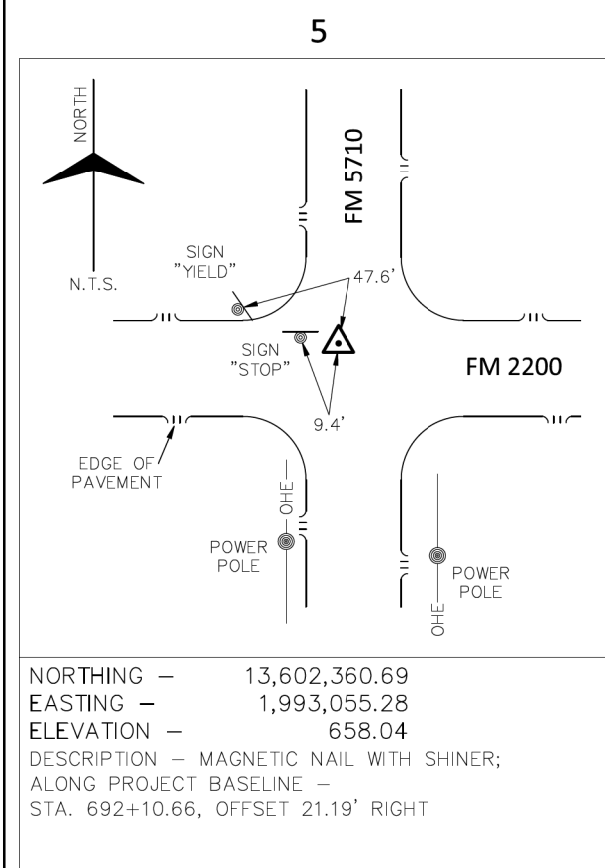
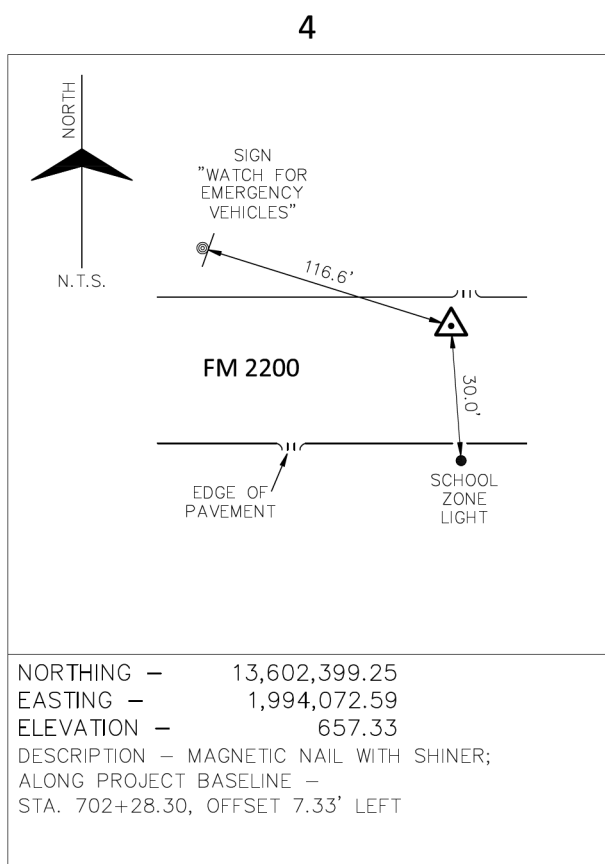
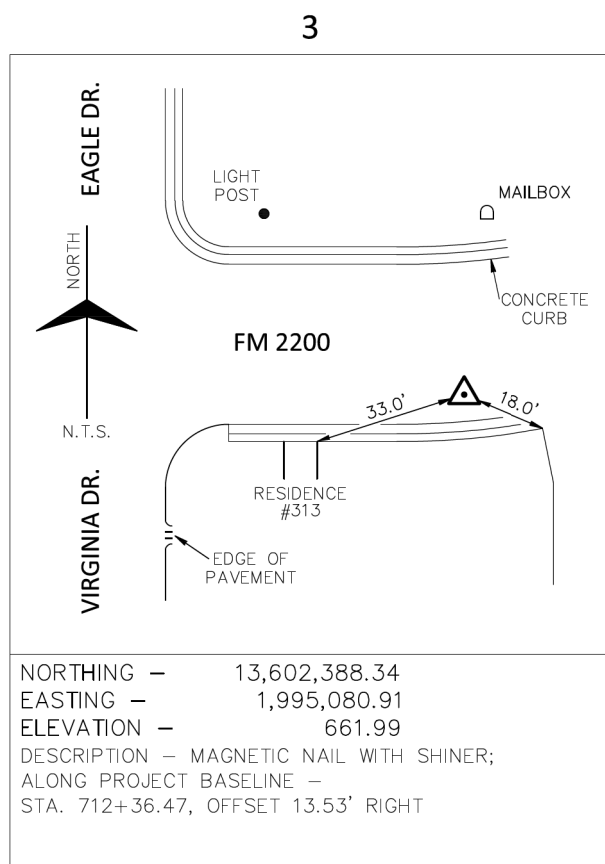
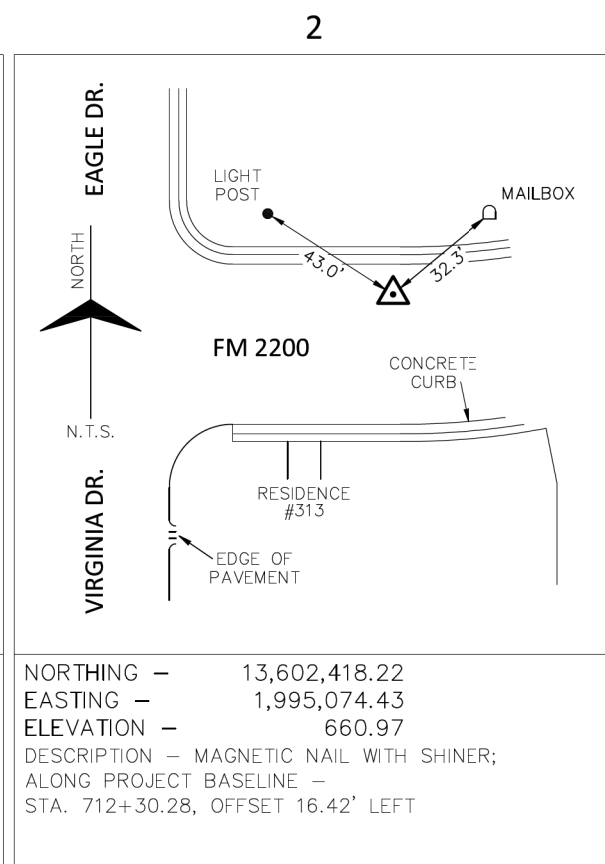
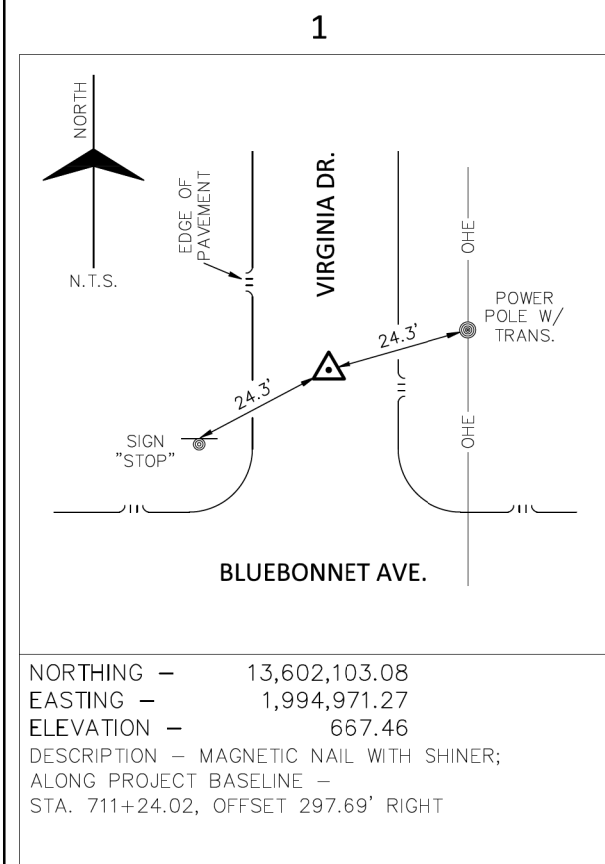
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FM 2200
SECONDARY HORIZONTAL AND VERTICAL CONTROL

DSN	FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
CHK	6	SEE TITLE SHEET	79
DRN	STATE	DIST.	COUNTY
CHK	TEXAS	SAT	MEDINA
	CONT.	SECT.	JOB
	2520	01	016, ETC
			FM 2200

H:\JOBS\18\048-S05\TECHPROD\WA04-FM2200\DESIGN DATA\SURVEY\DRAWINGS\CIVIL 3D\DWG\18048-S05 CONTROL SHEETS.DWG



NOTES:

HORIZONTAL DATUM:

1. BEARINGS ARE BASED ON NAD83 (2011), TEXAS STATE PLANE COORDINATE SYSTEM SOUTH CENTRAL ZONE (4204). COORDINATES AND DISTANCES ARE IN U.S. SURVEY FEET. COORDINATE VALUES ARE SURFACE VALUES DERIVED BY A GRID TO SURFACE ADJUSTMENT FACTOR OF 1.00016.

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RRP-SAPC-0319

RRP-SCDS-1113

VERTICAL DATUM:

3. ELEVATIONS ARE BASED ON NORTH AMERICAN DATUM 1988 (NAVD), GEOID MODEL 03 (CONIS) AND WERE ESTABLISHED THROUGH DIFFERENTIAL DIGITAL LEVELING METHODS HOLDING THE PUBLISHED ELEVATION OF CONTROL POINT #100 - ELEVATION: 656.30'

DATE ESTABLISHED: 02/11/2022



[Signature]
 VICTOR MENDEZ, JR. R.P.L.S. NO. 6056
 05/12/2022

DATE	BY	REV	REVISION
5/19/22			COORDINATES/LOCATION REFERENCE
5/23/22			ADDED CL STA.; REV. VERTICAL DATUM NOTE

POZNECKI AMARILLO
 5835 CALLAGHAN RD. SUITE 200
 SAN ANTONIO, TEXAS, 78228
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FM 2200
SECONDARY HORIZONTAL AND VERTICAL CONTROL

DSN	FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
CHK	6	SEE TITLE SHEET	80
DRN	STATE	DIST.	COUNTY
CHK	TEXAS	SAT	MEDINA
	CONT.	SECT.	JOB
	2520	01	016, ETC
			FM 2200

H:\JOBS\18\048-S05\TECHPROD\WA04-FM2200\DESIGN DATA\SURVEY\DRAWINGS\CIVIL 3D\DWG\18048-S05 CONTROL SHEETS.DWG

9

NORTH
N.T.S.

MAILBOX
23.6'

EDGE OF PAVEMENT

FM 2200

25.3'

SIGN "WATCH FOR EMERGENCY VEHICLES"

NORTHING - 13,602,363.33
 EASTING - 1,991,967.49
 ELEVATION - 658.26
 DESCRIPTION - MAGNETIC NAIL WITH SHINER;
 ALONG PROJECT BASELINE -
 STA. 681+22.95, OFFSET 7.82' RIGHT

10

NORTH
N.T.S.

BARBED WIRE FENCE

SIGN "SAN FRANCISCO PEREZ CREEK"

EDGE OF PAVEMENT

FM 2200

124.0'

38.5'

28" ELM

BARBED WIRE FENCE

NORTHING - 13,602,369.10
 EASTING - 1,990,988.59
 ELEVATION - 648.08
 DESCRIPTION - MAGNETIC NAIL WITH SHINER;
 ALONG PROJECT BASELINE -
 STA. 671+44.16, OFFSET 7.60' LEFT

11

NORTH
N.T.S.

BARBED WIRE FENCE

EDGE OF PAVEMENT

FM 2200

50.3'

36" OAK

60.0'

SIGN "BRIDGE"

PIPE FENCE

BARBED WIRE FENCE

NORTHING - 13,602,342.83
 EASTING - 1,989,948.38
 ELEVATION - 670.89
 DESCRIPTION - MAGNETIC NAIL WITH SHINER;
 ALONG PROJECT BASELINE -
 STA. 661+03.74, OFFSET 8.40' RIGHT

12

NORTH
N.T.S.

POWER POLE

OHE

PIPE FENCE

FM 2200

52.4'

64.7'

MAILBOX

EDGE OF PAVEMENT

BARBED WIRE FENCE

NORTHING - 13,602,349.06
 EASTING - 1,988,969.05
 ELEVATION - 665.08
 DESCRIPTION - MAGNETIC NAIL WITH SHINER;
 ALONG PROJECT BASELINE -
 STA. 651+24.52, OFFSET 7.49' LEFT

13

NORTH
N.T.S.

BARBED WIRE FENCE

EDGE OF PAVEMENT

FM 2200

43.8'

POWER POLE W/ TRANS.

54.0'

SIGN "SPEED LIMIT"

OHE

BARBED WIRE FENCE

NORTHING - 13,602,324.03
 EASTING - 1,987,885.80
 ELEVATION - 666.86
 DESCRIPTION - MAGNETIC NAIL WITH SHINER;
 ALONG PROJECT BASELINE -
 STA. 640+41.07, OFFSET 6.86' RIGHT

14

NORTH
N.T.S.

EDGE OF PAVEMENT

SIGN "AIRPORT"

FM 2200

12.0'

43.2'

SIGN "STOP"

BARBED WIRE FENCE

FM 767

NORTHING - 13,602,328.25
 EASTING - 1,986,809.74
 ELEVATION - 674.90
 DESCRIPTION - MAGNETIC NAIL WITH SHINER;
 ALONG PROJECT BASELINE -
 STA. 629+65.11, OFFSET 7.98' LEFT

15

NORTH
N.T.S.

EDGE OF PAVEMENT

FM 2200

25.6'

24.6'

BARBED WIRE FENCE

FM 767

NORTHING - 13,601,983.61
 EASTING - 1,986,813.50
 ELEVATION - 678.64
 DESCRIPTION - MAGNETIC NAIL WITH SHINER;
 ALONG PROJECT BASELINE -
 STA. 629+65.47, OFFSET 336.68' RIGHT

16

NORTH
N.T.S.

BARBED WIRE FENCE

EDGE OF PAVEMENT

FM 2200

58.5'

43.4'

POWER POLE

OHE

BARBED WIRE FENCE

NORTHING - 13,602,302.11
 EASTING - 1,985,738.50
 ELEVATION - 690.64
 DESCRIPTION - MAGNETIC NAIL WITH SHINER;
 ALONG PROJECT BASELINE -
 STA. 618+93.66, OFFSET 7.59' RIGHT

NOTES:

HORIZONTAL DATUM:

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RRP-SCDS-1113

VERTICAL DATUM:

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[Signature]
 05/12/2022
 VICTOR MENDEZ, JR. R.P.L.S. NO. 6056

DATE	BY	REV	REVISION
5/19/22			COORDINATES/LOCATION REFERENCE
5/23/22			ADDED CL STA.; REV. VERTICAL DATUM NOTE



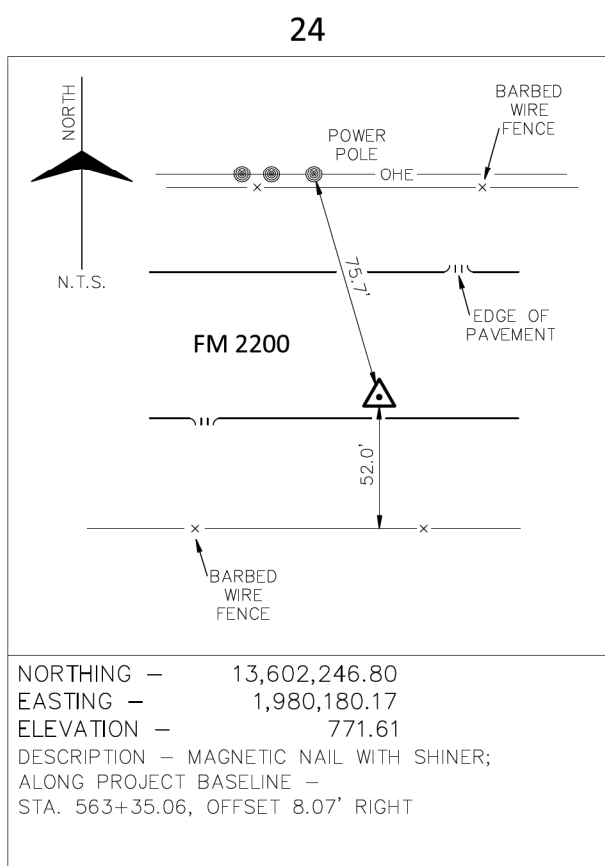
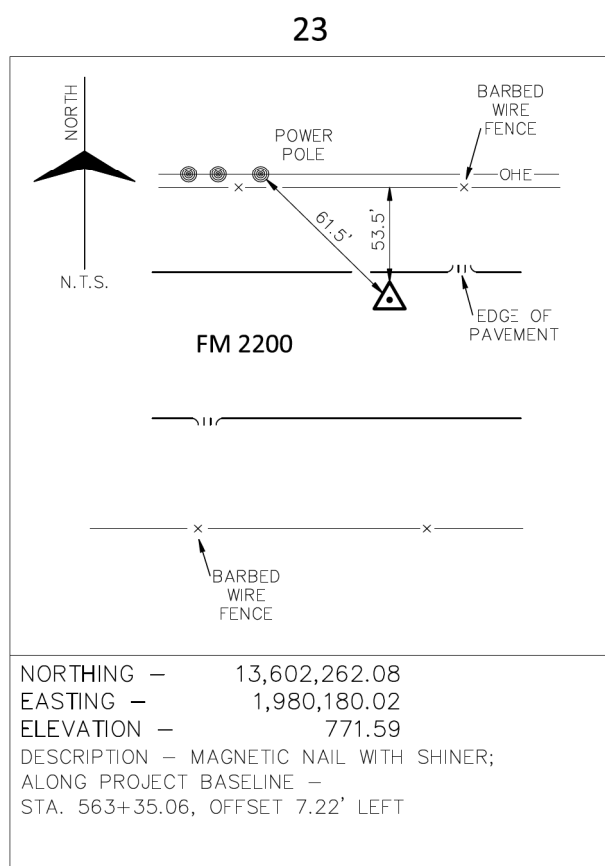
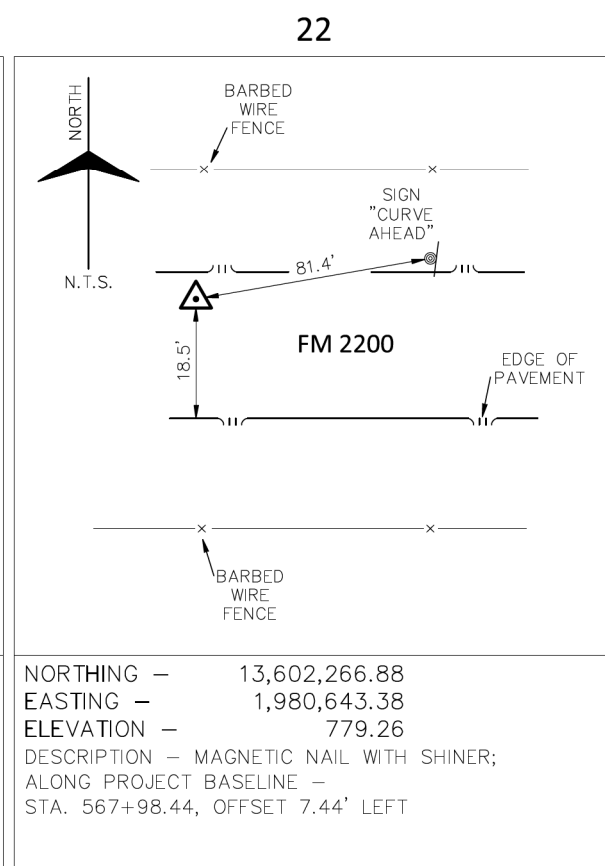
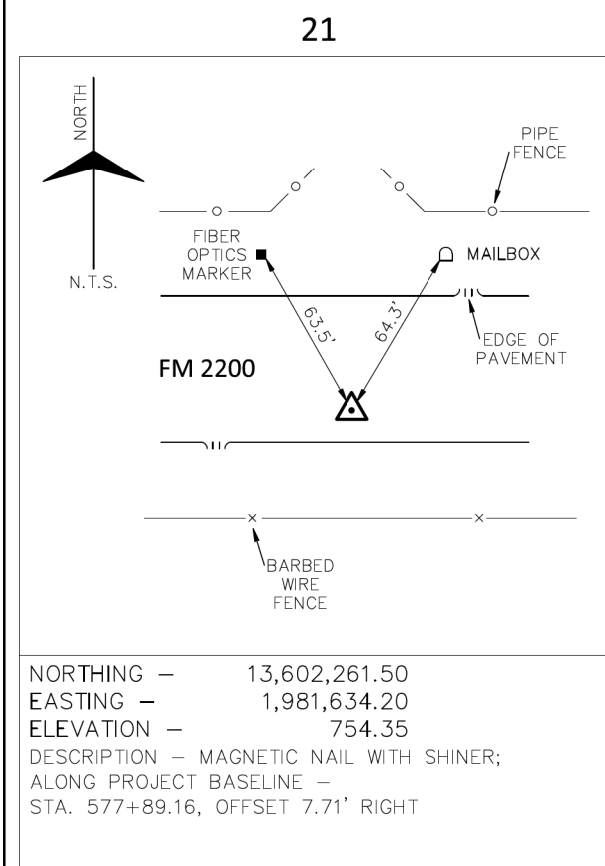
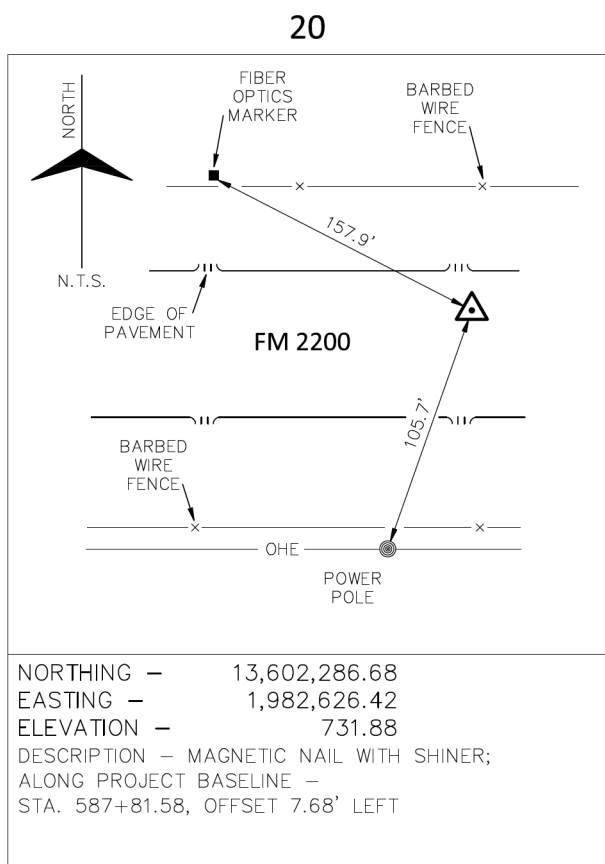
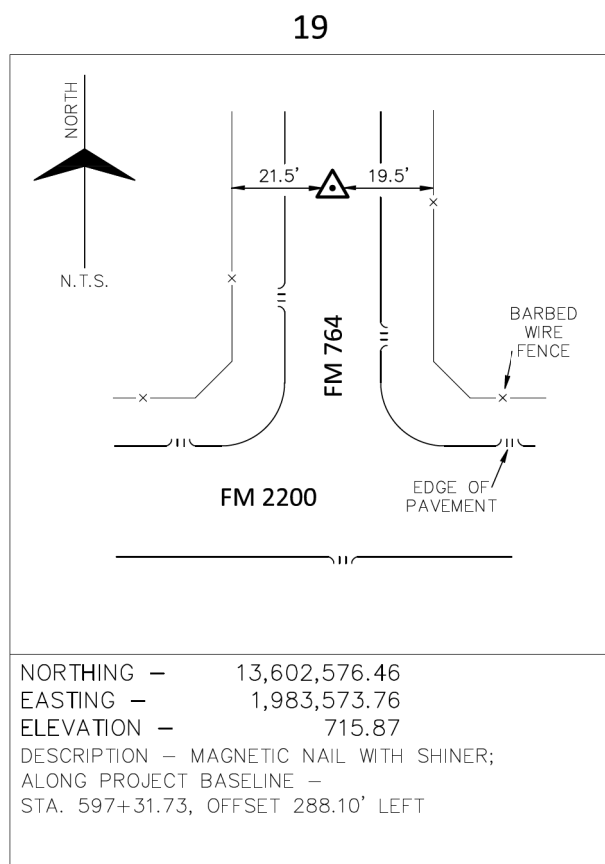
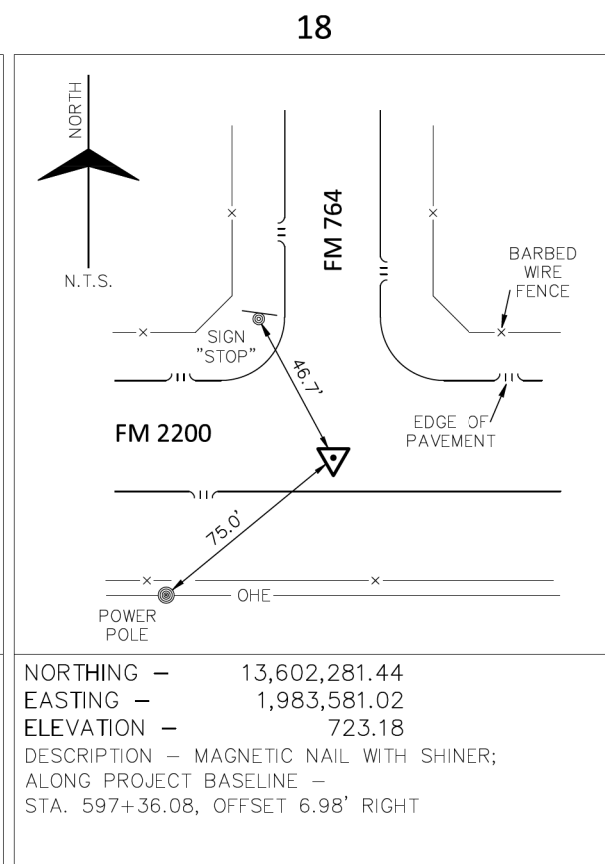
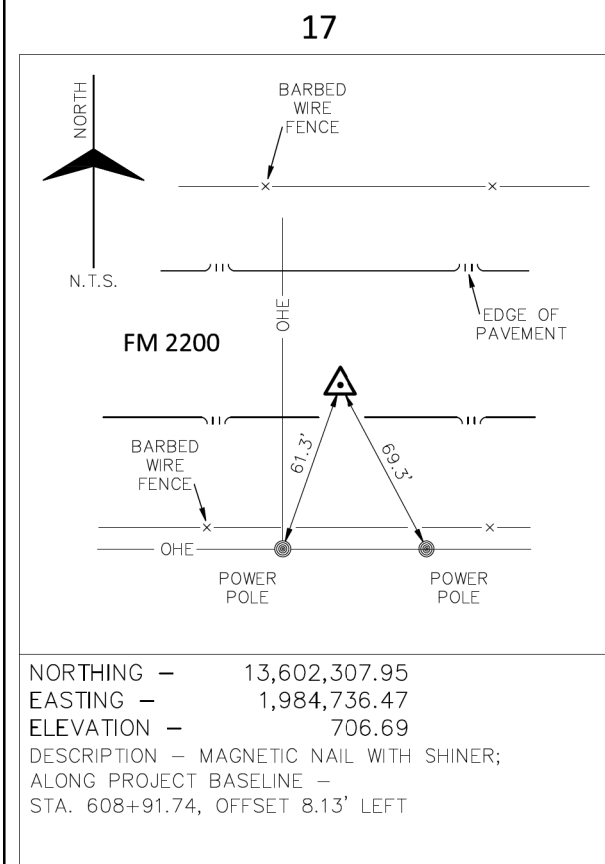
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FM 2200
SECONDARY HORIZONTAL AND VERTICAL CONTROL

DSN	FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
CHK	6	SEE TITLE SHEET	81
DRN	STATE	DIST.	COUNTY
CHK	TEXAS	SAT	MEDINA
	CONT.	SECT.	JOB
	2520	01	016, ETC
			FM 2200

H:\JOBS\18\048-S05\TECHPROD\WA04-FM2200\DESIGN DATA\SURVEY\DRAWINGS\CIVIL 3D\DWG\18048-S05 CONTROL SHEETS.DWG



☑ FM 2200

Beginning chain FM2200_CL description
Feature: Road_Centerline

Point 1 N 13,601,771.49 E 1,978,424.33 Sta 544+64.43

Course from 1 to PC FM2200_CL_3 N 53° 34' 05" E Dist 177.32

Curve Data

Curve FM2200_CL_3
P.I. Station 552+59.84 N 13,602,243.86 E 1,979,064.29
Delta = 35° 52' 00" (RT)
Degree = 3° 00' 00"
Tangent = 618.10
Length = 1,195.56
Radius = 1,909.86
External = 97.53
Long Chord = 1,176.13
Mid. Ord. = 92.79
P.C. Station 546+41.75 N 13,601,876.79 E 1,978,567.00
P.T. Station 558+37.30 N 13,602,249.95 E 1,979,682.36
C.C. N 13,600,340.19 E 1,979,701.20
Back = N 53° 34' 05" E
Ahead = N 89° 26' 05" E
Chord Bear = N 71° 30' 05" E

Course from PT FM2200_CL_3 to PC FM2200_CL_6 N 89° 26' 05" E Dist 15,355.38

Curve Data

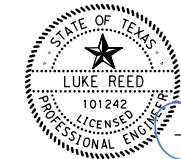
Curve FM2200_CL_6
P.I. Station 714+97.55 N 13,602,404.44 E 1,995,341.84
Delta = 46° 07' 00" (LT)
Degree = 8° 00' 00"
Tangent = 304.87
Length = 576.46
Radius = 716.20
External = 62.19
Long Chord = 561.02
Mid. Ord. = 57.22
P.C. Station 711+92.68 N 13,602,401.43 E 1,995,036.99
P.T. Station 717+69.14 N 13,602,626.25 E 1,995,551.00
C.C. N 13,603,117.60 E 1,995,029.93
Back = N 89° 26' 05" E
Ahead = N 43° 19' 05" E
Chord Bear = N 66° 22' 35" E

Course from PT FM2200_CL_6 to 2 N 43° 19' 05" E Dist 427.86

Point 2 N 13,602,937.54 E 1,995,844.53 Sta 721+97.00

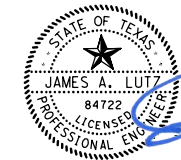
Ending chain FM2200_CL description

DESIGN



Luke Reed
LUKE REED, P.E.
DATE 12/20/2022

APPROVAL



James A. Lutz
JAMES A. LUTZ, P.E.
DATE 12/20/2022

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
HORIZONTAL ALIGNMENT
DATA

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 82

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_HAD01.dgn

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Des\ign\Civil\Roadway\1179904_PP_legend.dgn

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED.
3. CONTRACTOR TO FIELD VERIFY EXISTING UTILITIES PRIOR TO CONSTRUCTION. UTILITIES ARE SHOWN BASED ON LEVEL C/D SUE AND DRAWN WITH BEST RECORDS AVAILABLE DURING DESIGN.
4. FOR ADDITIONAL DETAILS SEE TxDOT TYPICAL STANDARD SHEETS.

ROADWAY LEGEND

- PROPERTY LINE
- - - - - EXIST ROW
- [X] DRIVEWAY #
- [→] DIRECTION OF TRAFFIC
- [X-X] SMALL SIGN DESIGNATION
- FULL DEPTH ASPHALT PAVEMENT SECTION

PAVEMENT MARKINGS LEGEND

- [A] 6" SLD (W) REF PROF PAV MRK
- [B] 24" SLD (W) PAV MRK
- [C] 6" SLD (Y) REF PROF PAV MRK
- [D] 6" BRK (Y) REF PROF PAV MRK
- [E] 6" SLD BRK (Y) REF PROF PAV MRK
- [F] 6" DBL SLD (Y) REF PROF PAV MRK
- [G] 12" SLD (W) PAV MRK
- EXIST SIGN
- PROPOSED SIGN
- PROPOSED MAILBOX
- EXIST MAILBOX
- PROPOSED OM-2 @ SET
- ☁ EXISTING TREE/BUSHES

UTILITIES LEGEND

- OHE 1 — MEDINA ELEC CO-OP
- OHE 2 — AEP
- T1 (X) — AT&T
- OHT 1 —
- OHT 2 — SPECTRUM
- T3 (X) — DEVINE ISD
- W (D) — YANCEY WSC
- SS (C) — CITY OF DEVINE
- G (D) — WEST TEXAS GAS
- UTILITY POLE
- [T] TELEPHONE PEDESTAL


SIDEWALK LEGEND

- PLANAR SLOPE DESIGNATIONS
- F = FLARE (10:1 OR LESS) MEASURED AT FACE OF CURB
 - R = RAMP (CROSS SLOPE NOT TO EXCEED 2 PERCENT; LONGITUDINAL NOT TO EXCEED 8.3 PERCENT)
 - L = LANDING (SHALL NOT EXCEED 2 PERCENT SLOPE IN ANY DIRECTION)
 - ↑ x.x% PROPOSED ROADWAY, SIDEWALK OR DRIVEWAY SLOPE

SIDEWALK NOTES

1. FLARE (F), RAMP (R), AND LANDING (L), DIRECTLY IN CONTACT WITH THE CURB RAMP ARE PAID FOR UNDER ITEM 531 "CURB RAMPS"


DESIGN



LUKE REED
101242
LICENSED PROFESSIONAL ENGINEER

LUKE REED
LUKE REED, P.E. DATE 12/20/2022

APPROVAL



JAMES A. LUTZ
84722
LICENSED PROFESSIONAL ENGINEER

JAMES A. LUTZ
JAMES A. LUTZ, P.E. DATE 12/20/2022

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800

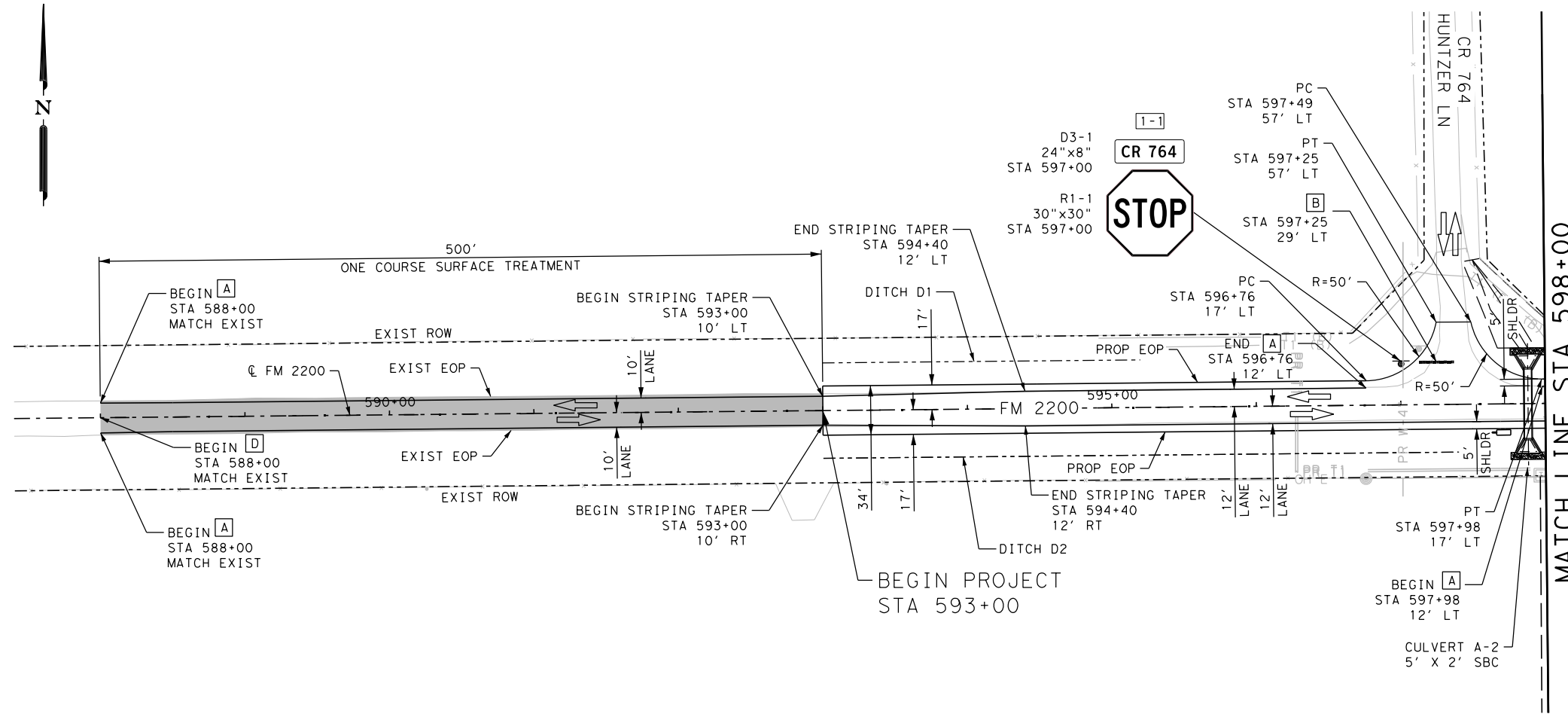
 Texas Department of Transportation
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FM 2200
**PLAN AND PROFILE
LEGEND & NOTES**

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	83

Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_PP01.dgn



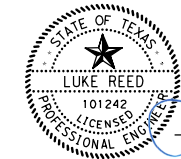
CSJ 2520-01-016 QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	5.0
0105-6002	REMOVING STAB BASE AND ASPH PAV (2")	SY	112
0105-6013	REMOVING STAB BASE & ASPH PAV (9")	SY	503
0110-6001	EXCAVATION (ROADWAY)	CY	360
0132-6005	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CY	969
0247-6475	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	CY	357
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	272
0316-6240	AGGR (TY-PD GR-4 SAC-B)	CY	40
0316-6419	ASPH (AC-15P, AC-20-5TR OR AC-20XP)	GAL	1024
3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	167
5001-6002	GEOGRID BASE REINFORCEMENT (TY I1)	SY	1431
0644-6001	IN SM RD SN SUP&M TY10BWG(1)SA(P)	EA	1
0644-6076	REMOVE SM RD SN SUP&M	EA	1
0658-6047	INSTL OM ASSM (OM-2Y) (WC) GND	EA	1
0666-6048	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	24
0666-6343	REF PROF PAV MRK TY I (W) 6" (SLD) (100MIL)	LF	1879
0666-6346	REF PROF PAV MRK TY I (Y) 6" (BRK) (100MIL)	LF	250

NOTES

- SEE SHEET 83 FOR PLAN AND PROFILE LEGEND AND ADDITIONAL NOTES.

DESIGN



LUKE REED, P.E.
DATE: 2/6/2023

APPROVAL



JAMES A. LUTZ, P.E.
DATE: 2/6/2023



SCALE: PLAN 1" = 100' PROFILE: 1" = 10'

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



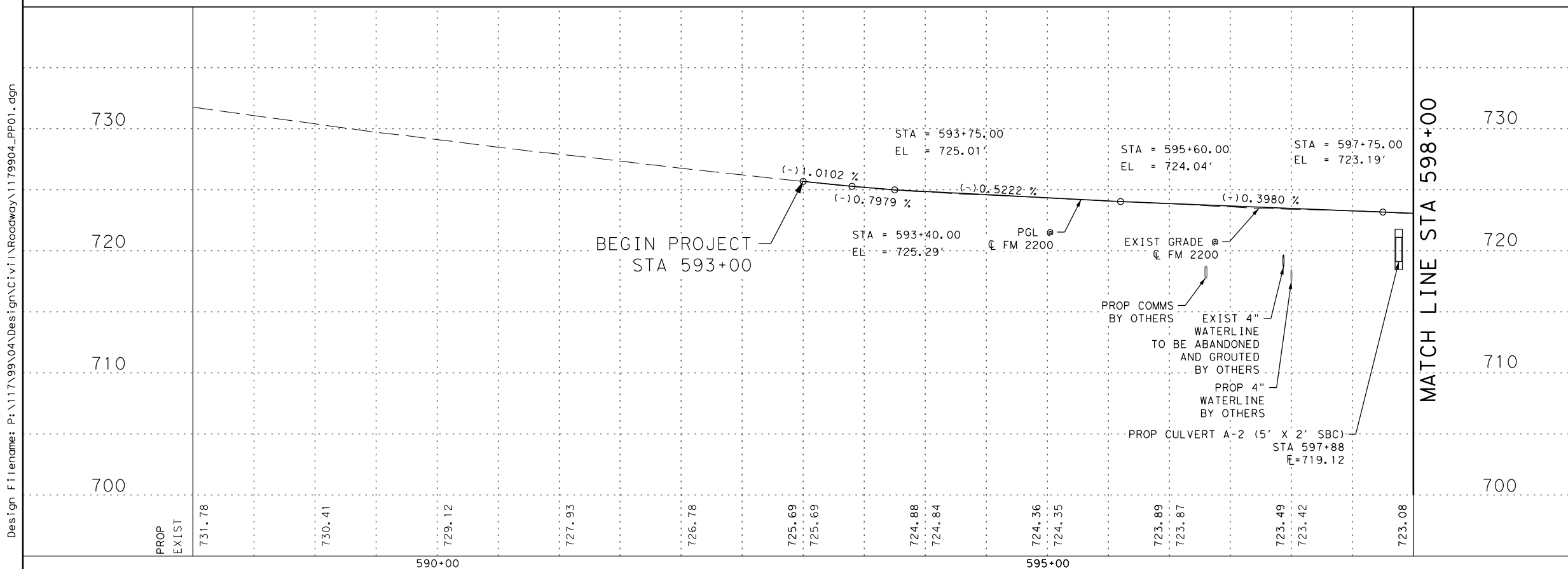
FM 2200

PLAN AND PROFILE

BEGIN PROJECT TO STA 598+00

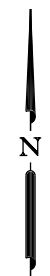
SHEET 1 OF 13

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	84

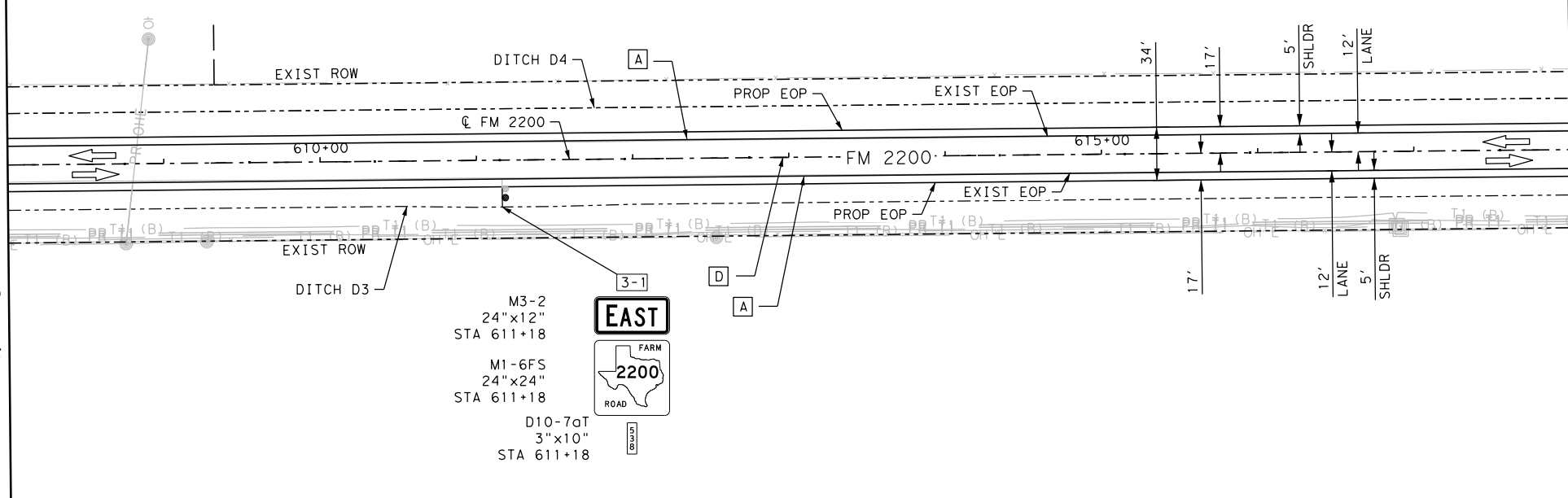


Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_PP03.dgn



MATCH LINE STA 608+00



MATCH LINE STA 618+00

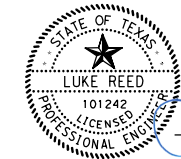
CSJ 2520-01-016 QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	10.0
0105-6002	REMOVING STAB BASE AND ASPH PAV (2")	SY	223
0105-6013	REMOVING STAB BASE & ASPH PAV (9")	SY	1029
0110-6001	EXCAVATION (ROADWAY)	CY	1317
0132-6005	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CY	17
0247-6475	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	CY	608
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	458
0316-6240	AGGR (TY-PD GR-4 SAC-B)	CY	51
0316-6419	ASPH (AC-15P, AC-20-5TR OR AC-20XP)	GAL	1134
3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	284
5001-6002	GEOGRID BASE REINFORCEMENT (TY I1)	SY	2426
0644-6001	IN SM RD SN SUP&M TY10BWG(1)SA(P)	EA	1
0644-6076	REMOVE SM RD SN SUP&M	EA	1
0666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	2000
0666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)	LF	250

NOTES

- SEE SHEET 83 FOR PLAN AND PROFILE LEGEND AND ADDITIONAL NOTES.

DESIGN



LUKE REED, P.E.
DATE: 2/6/2023

APPROVAL

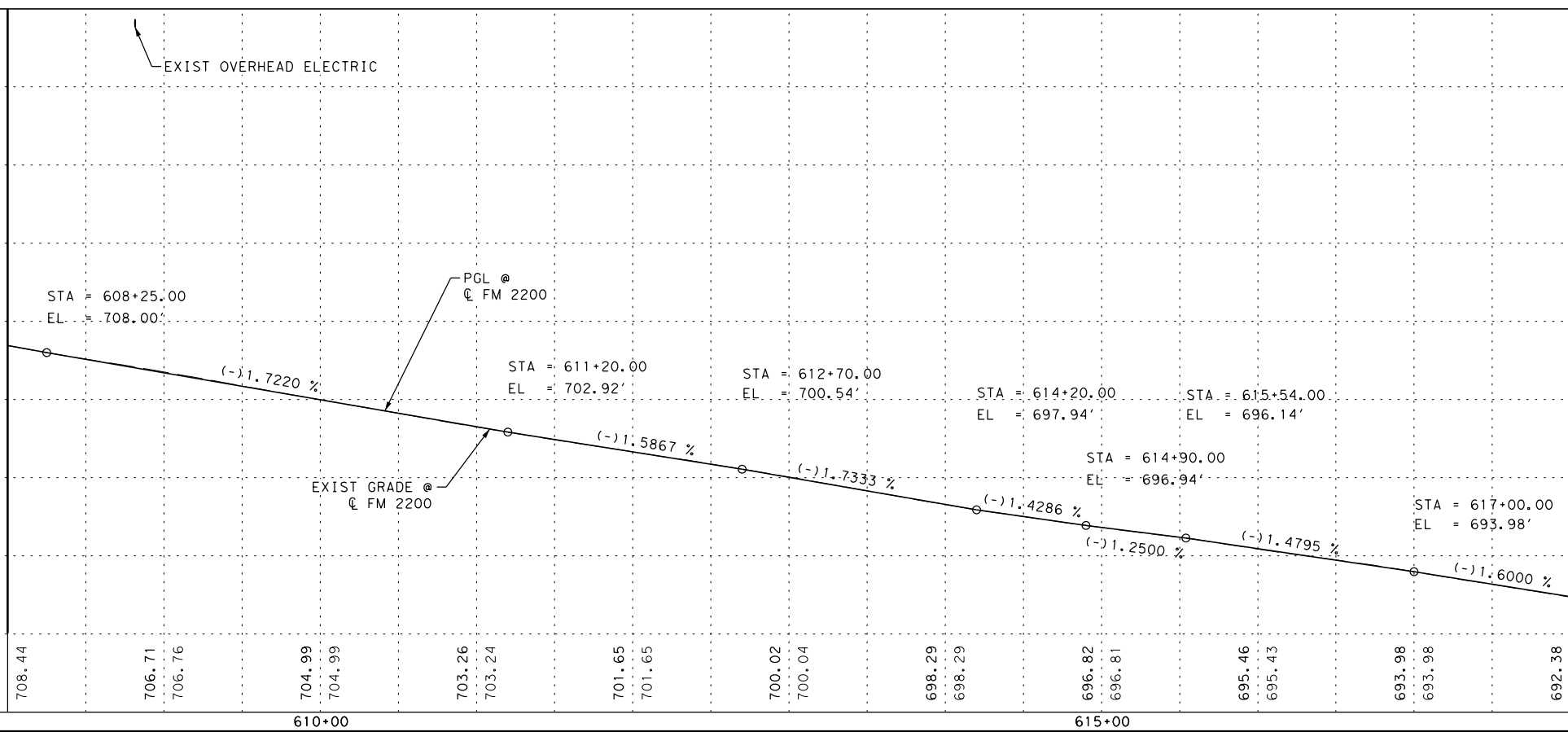


JAMES A. LUTZ, P.E.
DATE: 2/6/2023



SCALE: PLAN 1" = 100' PROFILE: 1" = 10'

MATCH LINE STA 608+00



MATCH LINE STA 618+00

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

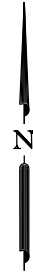
Texas Department of Transportation
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FM 2200
PLAN AND PROFILE
 STA 608+00 TO STA 618+00
 SHEET 3 OF 13

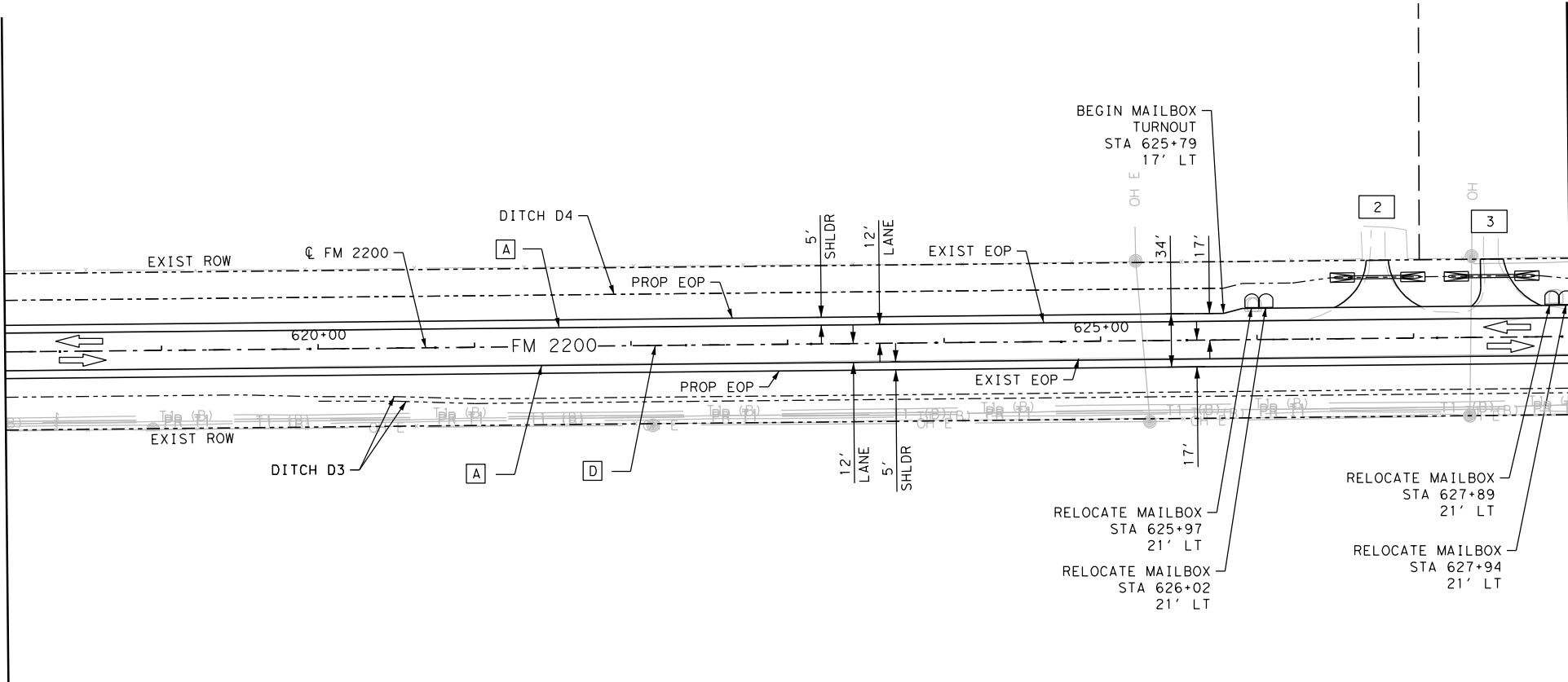
DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	MEDINA	2520	01
			016, ETC	86

Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_PP04.dgn



MATCH LINE STA 618+00



CSJ 2520-01-016 QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	10.0
0105-6002	REMOVING STAB BASE AND ASPH PAV (2")	SY	223
0105-6013	REMOVING STAB BASE & ASPH PAV (9")	SY	1048
0110-6001	EXCAVATION (ROADWAY)	CY	2751
0132-6005	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CY	32
0247-6475	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	CY	608
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	458
0316-6240	AGGR (TY-PD GR-4 SAC-B)	CY	51
0316-6419	ASPH (AC-15P, AC-20-5TR OR AC-20XP)	GAL	1134
0464-6005	RC PIPE (CL III) (24 IN)	LF	60
0467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	4
0530-6004	DRIVEWAYS (CONC)	SY	166
0530-6008	TURNOUTS (ACP)	SY	70
0560-6025	RELOCATE EXISTING MAILBOX	EA	4
3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	284
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2426
0666-6343	REF PROF PAV MRK TY I (W) 6" (SLD) (100MIL)	LF	2000
0666-6346	REF PROF PAV MRK TY I (Y) 6" (BRK) (100MIL)	LF	250

NOTES

- SEE SHEET 83 FOR PLAN AND PROFILE LEGEND AND ADDITIONAL NOTES.

DESIGN



Luke Reed
LUKE REED, P.E.
DATE 2/6/2023

APPROVAL

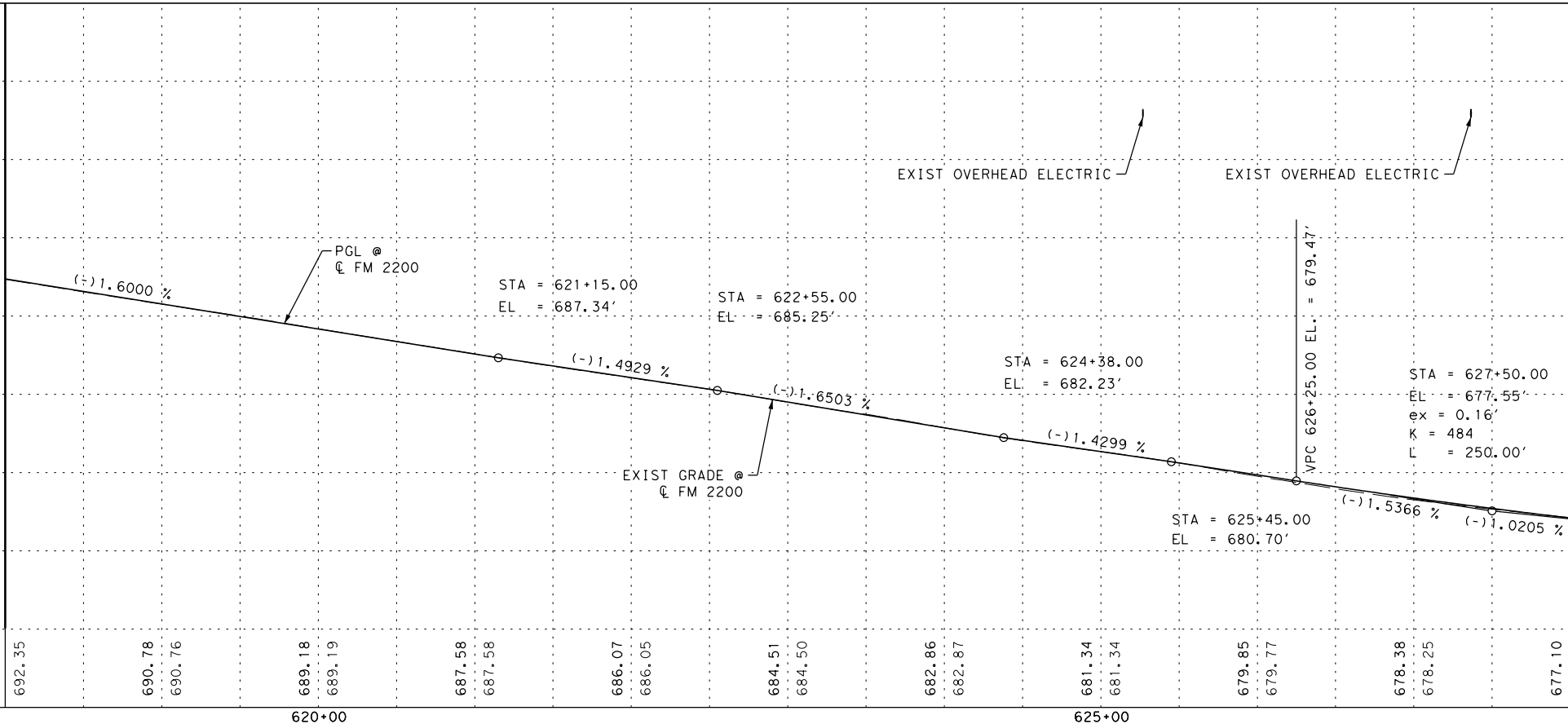


James A. Lutz
JAMES A. LUTZ, P.E.
DATE 2/6/2023



SCALE: PLAN 1" = 100' PROFILE: 1" = 10'

MATCH LINE STA 618+00



MATCH LINE STA 628+00

REV. NO.	DATE	DESCRIPTION	BY

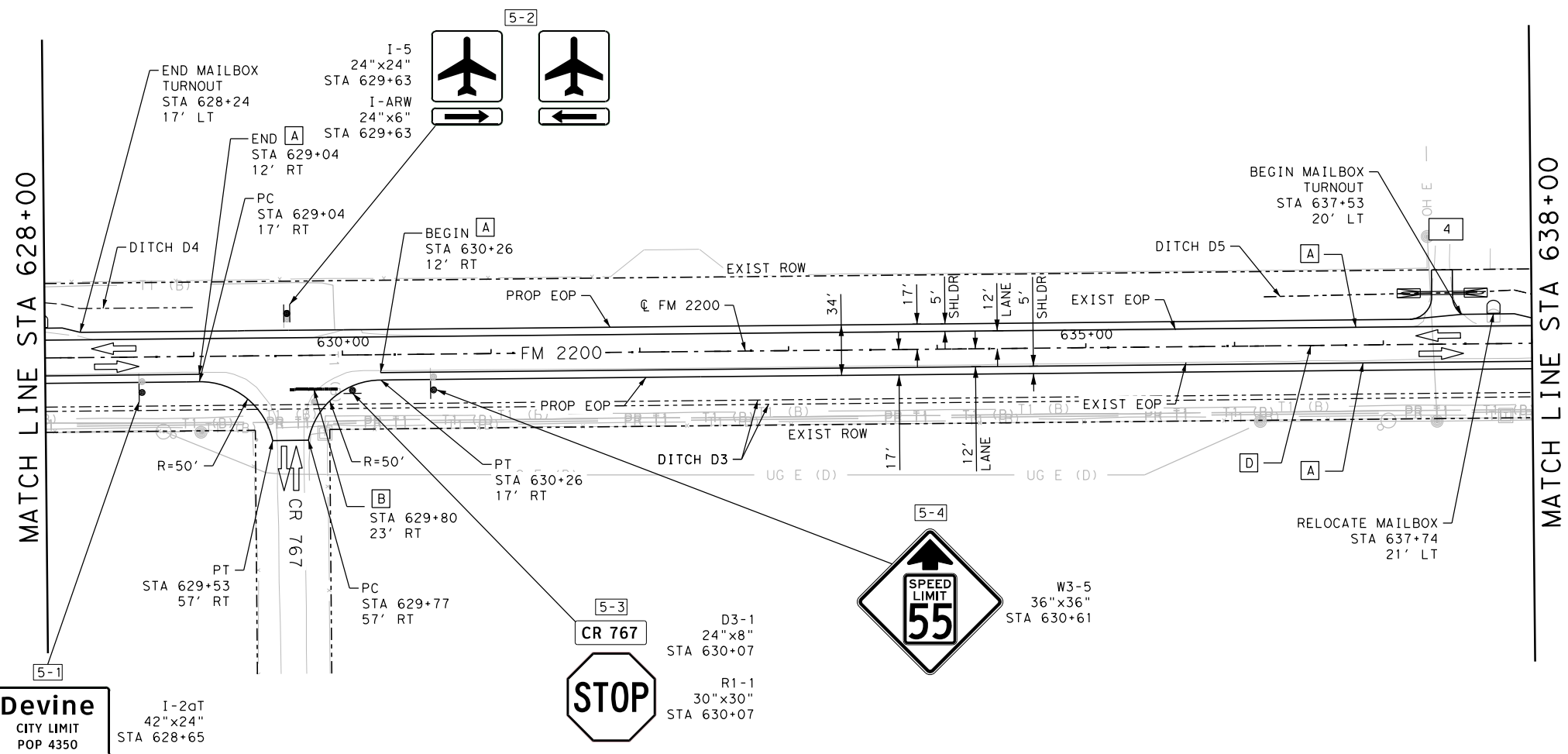
Pape-Dawson Engineers
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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FM 2200
PLAN AND PROFILE
STA 618+00 TO STA 628+00
SHEET 4 OF 13

CHK	DGN	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
		6	TEXAS	SEE TITLE SHEET	FM 2200		
CHK	DGN	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
		SAT	MEDINA	2520	01	016, ETC	87

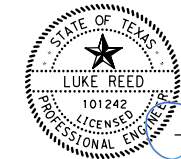
ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	10.0
0105-6002	REMOVING STAB BASE AND ASPH PAV (2")	SY	223
0105-6013	REMOVING STAB BASE & ASPH PAV (9")	SY	974
0110-6001	EXCAVATION (ROADWAY)	CY	3192
0132-6005	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CY	25
0247-6475	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	CY	661
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	501
0316-6240	AGGR (TY-PD GR-4 SAC-B)	CY	54
0316-6419	ASPH (AC-15P, AC-20-5TR OR AC-20XP)	GAL	1199
0464-6005	RC PIPE (CL III) (24 IN)	LF	30
0467-6395	SET (TY II) (24 IN) (RCP) (6:1) (P)	EA	2
0530-6004	DRIVEWAYS (CONC)	SY	56
0530-6008	TURNOUTS (ACP)	SY	20
0560-6025	RELOCATE EXISTING MAILBOX	EA	1
3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	309
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2644
0644-6001	IN SM RD SN SUP&M TY10BWG(1)SA(P)	EA	4
0644-6076	REMOVE SM RD SN SUP&M	EA	4
0666-6048	REFL PAV MRK TY I (W)24" (SLD) (100MIL)	LF	32
0666-6343	REF PROF PAV MRK TY I (W)6" (SLD) (100MIL)	LF	1879
0666-6346	REF PROF PAV MRK TY I (Y)6" (BRK) (100MIL)	LF	250



NOTES

- SEE SHEET 83 FOR PLAN AND PROFILE LEGEND AND ADDITIONAL NOTES.

DESIGN

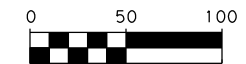


LUKE REED, P.E.
DATE 2/6/2023

APPROVAL



JAMES A. LUTZ, P.E.
DATE 2/6/2023



SCALE: PLAN 1" = 100' PROFILE: 1" = 10'

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200

PLAN AND PROFILE

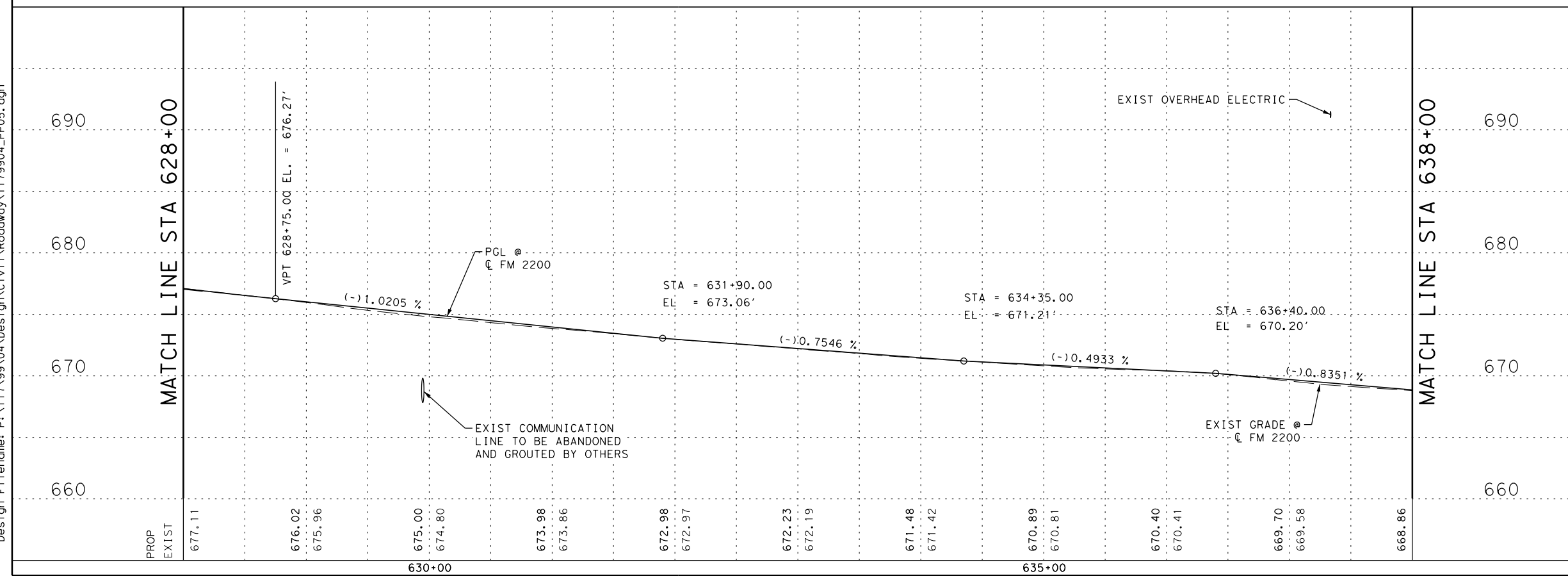
STA 628+00 TO STA 638+00

SHEET 5 OF 13

DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
SAT	MEDINA	2520	01	016, ETC	88

Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_PP05.dgn



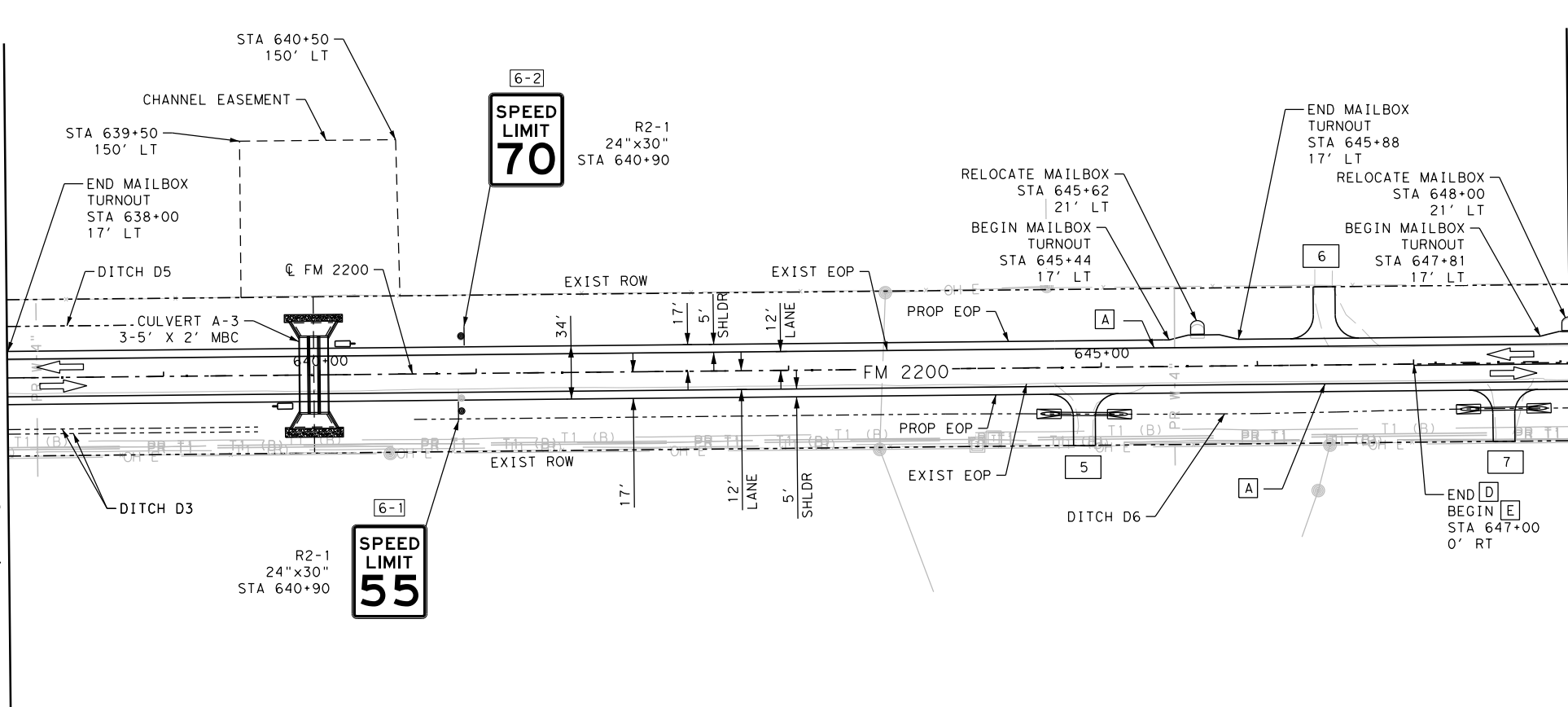
Plotted on: 2/6/2023

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MATCH LINE STA 638+00

MATCH LINE STA 648+00



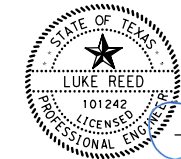
CSJ 2520-01-016 QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	10.0
0105-6002	REMOVING STAB BASE AND ASPH PAV (2")	SY	223
0105-6013	REMOVING STAB BASE & ASPH PAV (9")	SY	870
0110-6001	EXCAVATION (ROADWAY)	CY	2607
0132-6005	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CY	52
0247-6475	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	CY	608
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	458
0316-6240	AGGR (TY-PD GR-4 SAC-B)	CY	51
0316-6419	ASPH (AC-15P, AC-20-5TR OR AC-20XP)	GAL	1134
0464-6005	RC PIPE (CL III) (24 IN)	LF	60
0467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	4
0530-6004	DRIVEWAYS (CONC)	SY	187
0530-6008	TURNOUTS (ACP)	SY	15
0560-6025	RELOCATE EXISTING MAILBOX	EA	2
3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	284
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2426
0644-6001	IN SM RD SN SUP&M TY10BWG(1)SA(P)	EA	2
0644-6076	REMOVE SM RD SN SUP&M	EA	2
0658-6047	INSTL OM ASSM (OM-2Y) (WC) GND	EA	2
0666-6343	REF PROF PAV MRK TY I (Y) 6" (SLD) (100MIL)	LF	2000
0666-6346	REF PROF PAV MRK TY I (Y) 6" (BRK) (100MIL)	LF	250
0666-6347	REF PROF PAV MRK TY I (Y) 6" (SLD) (100MIL)	LF	100

NOTES

- SEE SHEET 83 FOR PLAN AND PROFILE LEGEND AND ADDITIONAL NOTES.

DESIGN



LUKE REED, P.E.
DATE: 2/6/2023

APPROVAL



JAMES A. LUTZ, P.E.
DATE: 2/6/2023



SCALE: PLAN 1" = 100' PROFILE: 1" = 10'

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200

PLAN AND PROFILE

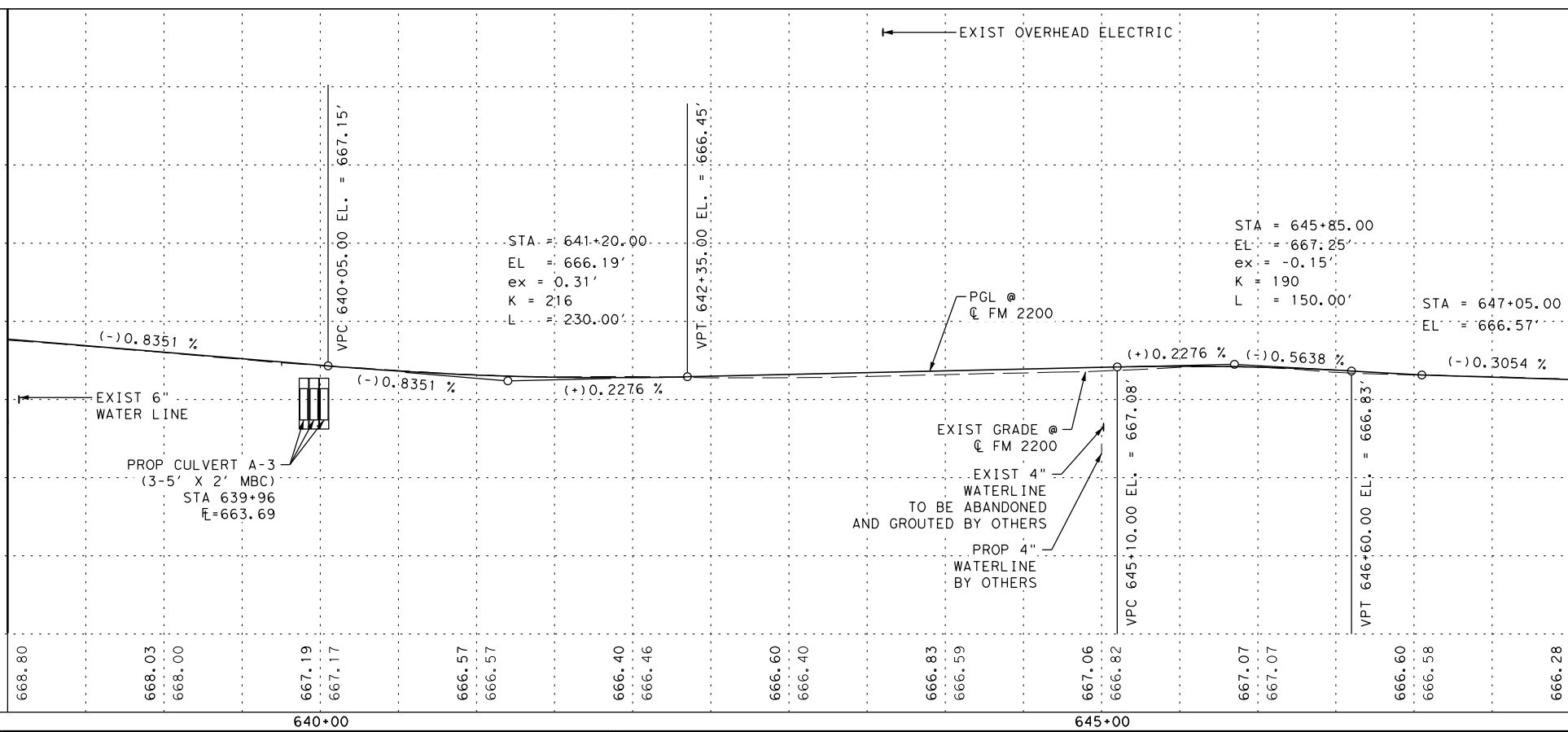
STA 638+00 TO STA 648+00

SHEET 6 OF 13

DWG:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DWG:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	89

MATCH LINE STA 638+00

MATCH LINE STA 648+00

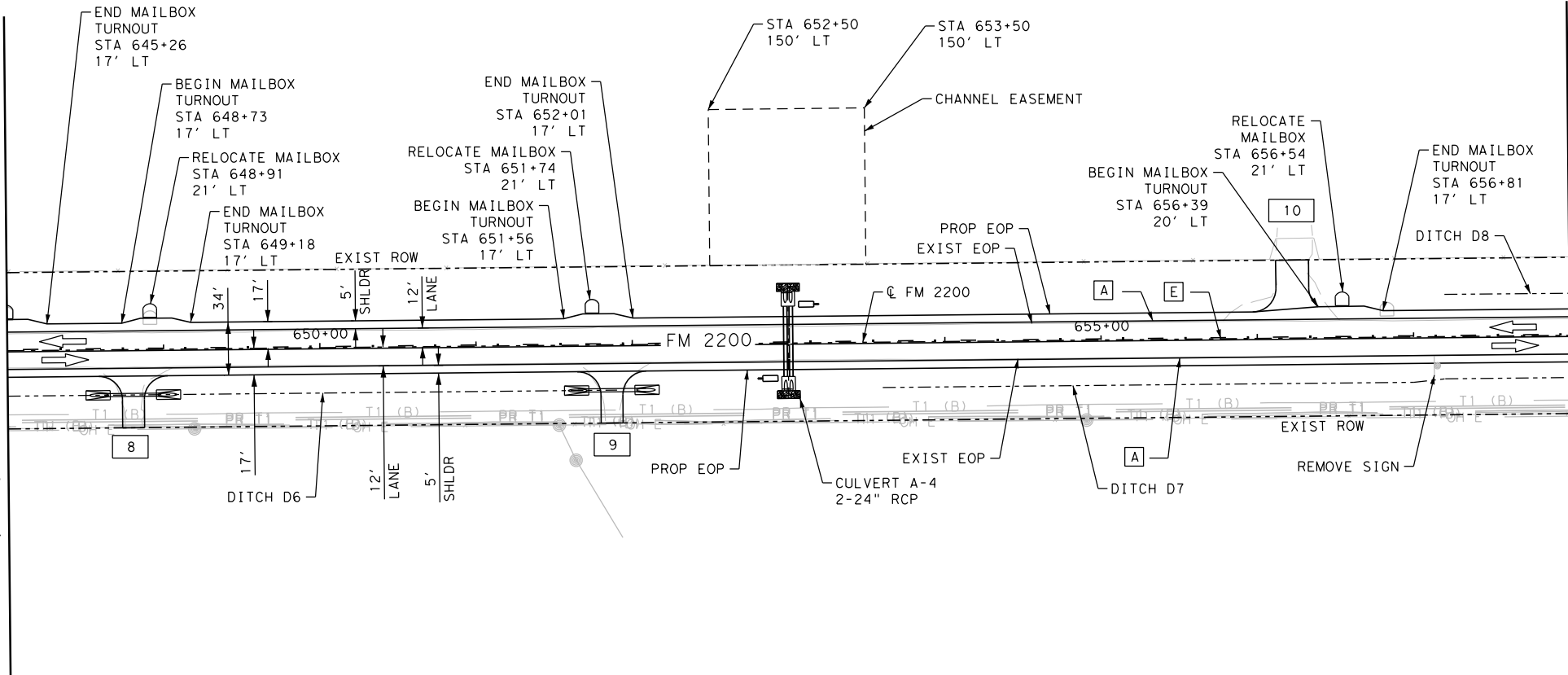


Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_PP07.dgn



MATCH LINE STA 648+00



MATCH LINE STA 658+00

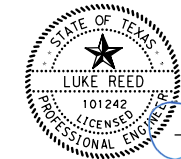
CSJ 2520-01-016 QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	10.0
0105-6002	REMOVING STAB BASE AND ASPH PAV (2")	SY	223
0105-6013	REMOVING STAB BASE & ASPH PAV (9")	SY	916
0110-6001	EXCAVATION (ROADWAY)	CY	1577
0132-6005	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CY	94
0247-6475	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	CY	608
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	458
0316-6240	AGGR (TY-PD GR-4 SAC-B)	CY	51
0316-6419	ASPH (AC-15P, AC-20-5TR OR AC-20XP)	GAL	1134
0464-6005	RC PIPE (CL III) (24 IN)	LF	60
0467-6395	SET (TY II) (24 IN) (RCP) (6:1) (P)	EA	4
0530-6004	DRIVEWAYS (CONC)	SY	204
0530-6008	TURNOUTS (ACP)	SY	40
0560-6025	RELOCATE EXISTING MAILBOX	EA	3
3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	284
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	2426
0644-6076	REMOVE SM RD SN SUP&AM	EA	1
0658-6047	INSTR OM ASSM (OM-2Y) (WC) GND	EA	2
0666-6343	REF PROF PAV MRK TY I (W) 6" (SLD) (100MIL)	LF	2000
0666-6346	REF PROF PAV MRK TY I (Y) 6" (BRK) (100MIL)	LF	250
0666-6347	REF PROF PAV MRK TY I (Y) 6" (SLD) (100MIL)	LF	1000

NOTES

- SEE SHEET 83 FOR PLAN AND PROFILE LEGEND AND ADDITIONAL NOTES.

DESIGN



LUKE REED, P.E.
DATE: 2/6/2023

APPROVAL



JAMES A. LUTZ, P.E.
DATE: 2/6/2023



SCALE: PLAN 1" = 100' PROFILE: 1" = 10'

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200

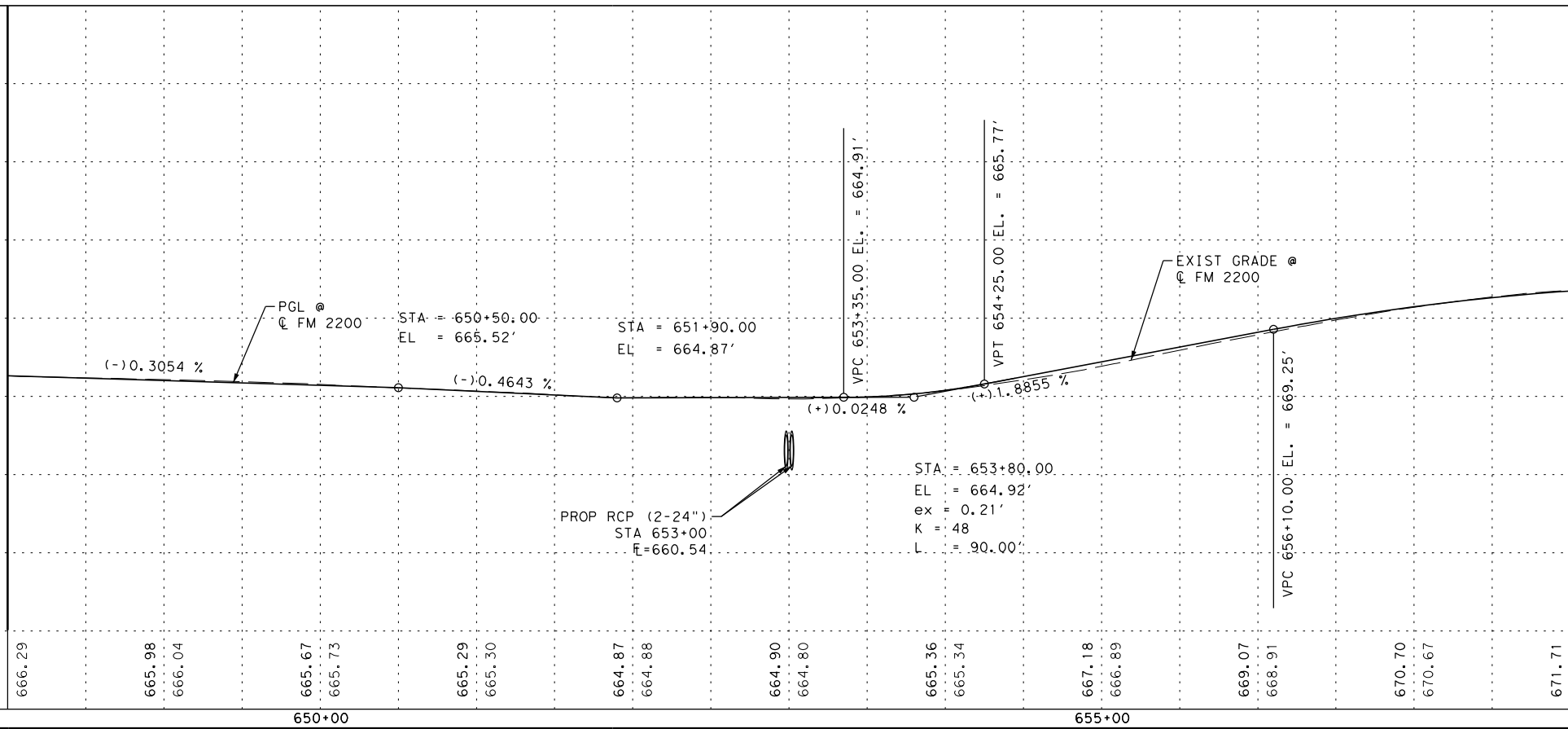
PLAN AND PROFILE

STA 648+00 TO STA 658+00

SHEET 7 OF 13

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	MEDINA	2520	01
			016, ETC	90

MATCH LINE STA 648+00



MATCH LINE STA 658+00

PROF	EXIST	648+00	650+00	655+00	658+00
666.29	665.98	665.67	665.29	664.87	669.07
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					670.70
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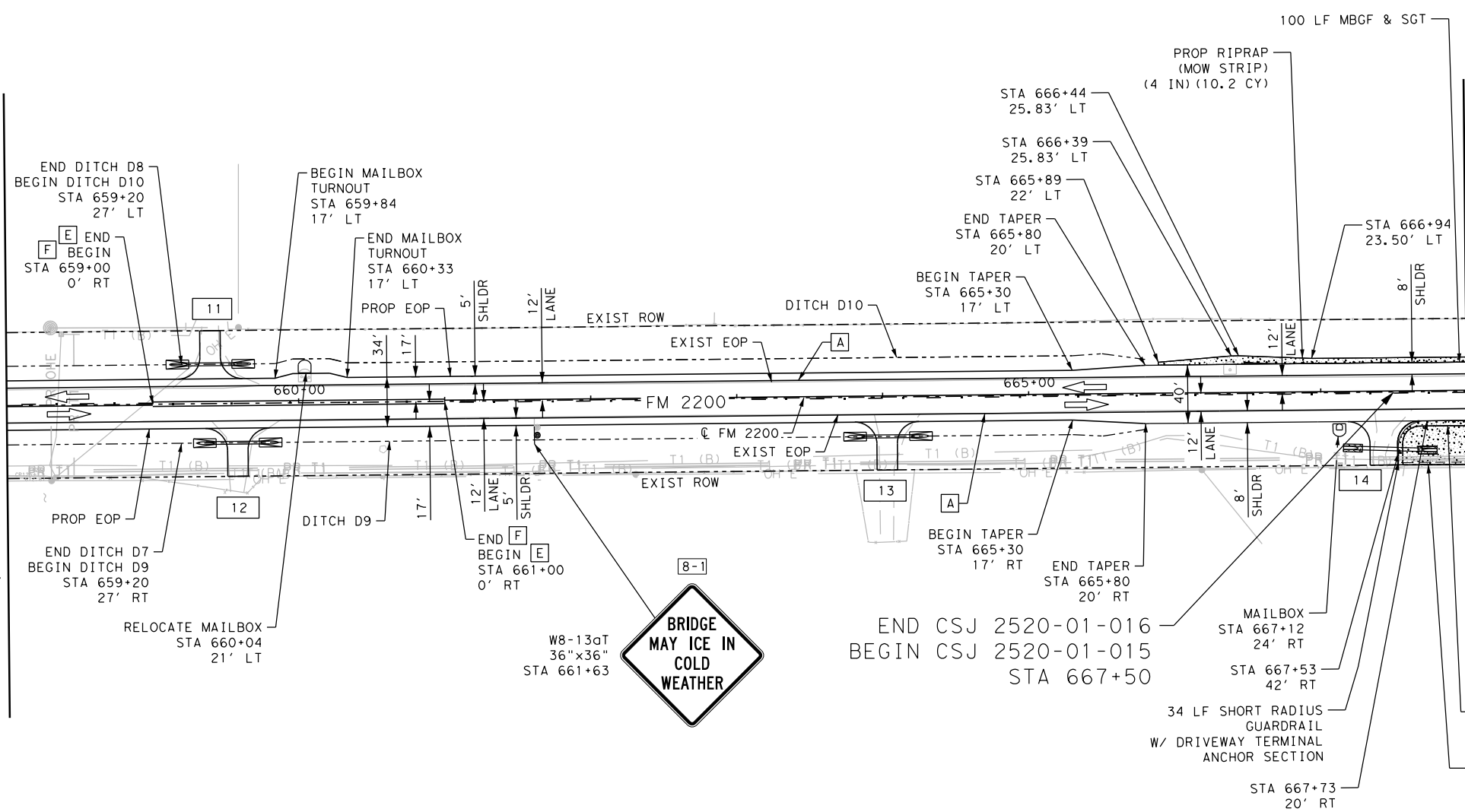
Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_PP08.dgn



MATCH LINE STA 658+00

MATCH LINE STA 668+00



CSJ 2520-01-016 QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	9.5
0105-6002	REMOVING STAB BASE AND ASPH PAV (2")	SY	174
0105-6013	REMOVING STAB BASE & ASPH PAV (9")	SY	737
0110-6001	EXCAVATION (ROADWAY)	CY	2534
0132-6005	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CY	13
0247-6475	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	CY	563
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	462
0316-6240	AGGR (TY-PD GR-4 SAC-B)	CY	44
0316-6419	ASPH (AC-15P, AC-20-5TR OR AC-20XP)	GAL	889
0464-6005	RC PIPE (CL III) (24 IN)	LF	169
0464-6032	RC PIPE (ARCH) (CL III) (DES 3)	LF	30
0467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	8
0467-6545	SET (TY II) (DES 3) (RCP) (6: 1) (P)	EA	2
0530-6004	DRIVEWAYS (CONC)	SY	261
0530-6008	TURNOUTS (ACP)	SY	13
0560-6025	RELOCATE EXISTING MAILBOX	EA	1
3076-6001	D-GR HMA TY-B PG64-22	TON	116
3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	311
3077-6075	TACK COAT	GAL	101
3085-6001	UNDERSEAL COURSE	GAL	229
5001-6002	GEOGRID BASE REINFORCEMENT (TY II)	SY	1909
0644-6001	IN SM RD SN SUP&AM TY10BWG (1) SA (P)	EA	1
0644-6076	REMOVE SM RD SN SUP&AM	EA	1
0666-6343	REF PROF PAV MRK TY I (W) 6" (SLD) (100MIL)	LF	1900
0666-6346	REF PROF PAV MRK TY I (Y) 6" (BRK) (100MIL)	LF	190
0666-6347	REF PROF PAV MRK TY I (Y) 6" (SLD) (100MIL)	LF	1150

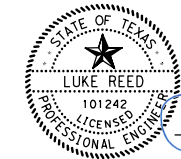
CSJ 2520-01-015 QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	0.5
0105-6002	REMOVING STAB BASE AND ASPH PAV (2")	SY	850
0105-6013	REMOVING STAB BASE & ASPH PAV (9")	SY	2040
0110-6001	EXCAVATION (ROADWAY)	CY	444
0132-6005	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CY	356
0247-6475	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	CY	34
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	37

NOTES

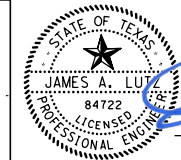
- SEE SHEET 83 FOR PLAN AND PROFILE LEGEND AND ADDITIONAL NOTES.

DESIGN

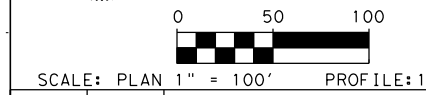


LUKE REED, P.E.
2/6/2023
DATE

APPROVAL

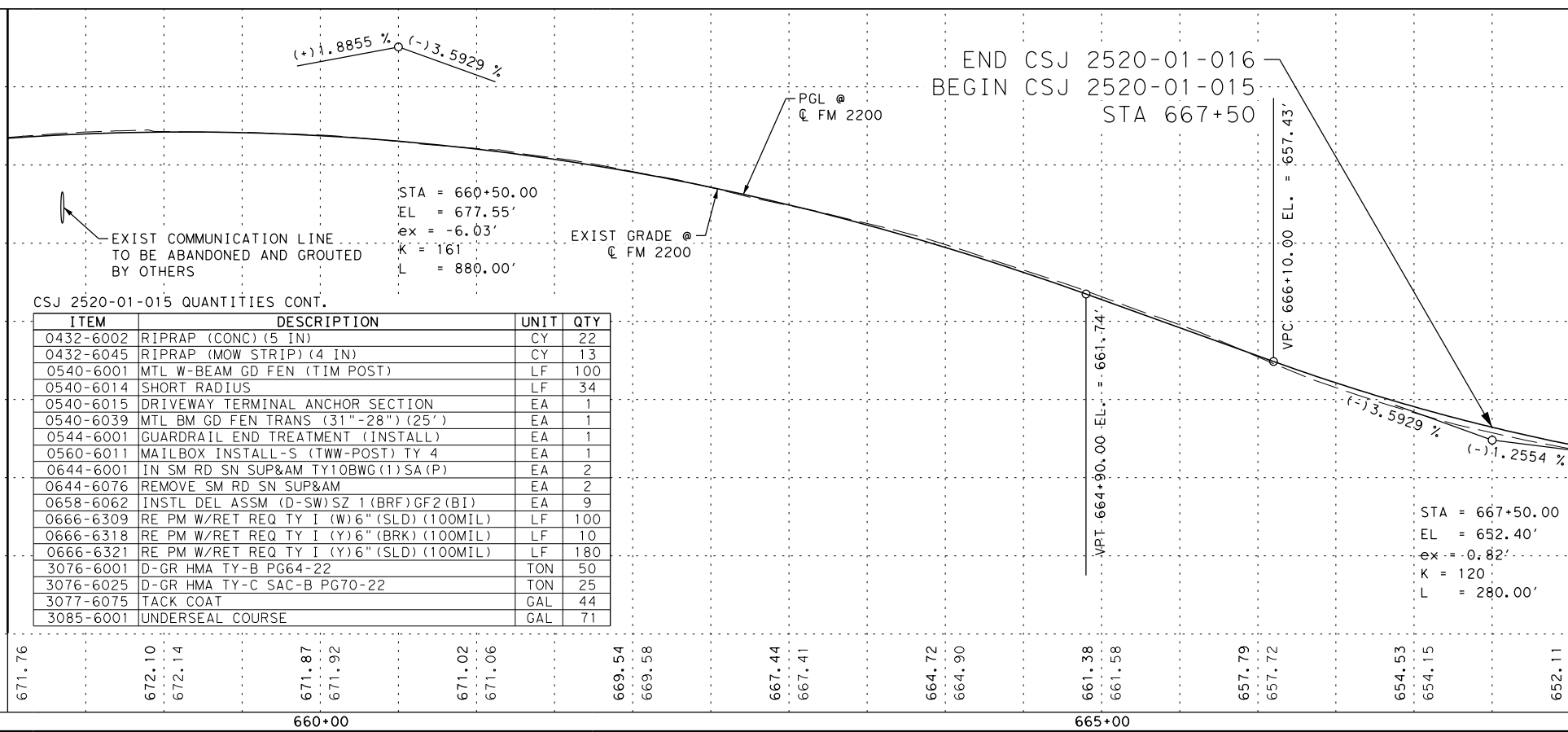


JAMES A. LUTZ, P.E.
2/6/2023
DATE



MATCH LINE STA 658+00

MATCH LINE STA 668+00



CSJ 2520-01-015 QUANTITIES CONT.

ITEM	DESCRIPTION	UNIT	QTY
0432-6002	RIPRAP (CONC) (5 IN)	CY	22
0432-6045	RIPRAP (MOW STRIP) (4 IN)	CY	13
0540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	100
0540-6014	SHORT RADIUS	LF	34
0540-6015	DRIVEWAY TERMINAL ANCHOR SECTION	EA	1
0540-6039	MTL BM GD FEN TRANS (31"-28") (25')	EA	1
0544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	1
0560-6011	MAILBOX INSTALL-S (TWW-POST) TY 4	EA	1
0644-6001	IN SM RD SN SUP&AM TY10BWG (1) SA (P)	EA	2
0644-6076	REMOVE SM RD SN SUP&AM	EA	2
0658-6062	INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)	EA	9
0666-6309	RE PM W/RET REQ TY I (W) 6" (SLD) (100MIL)	LF	100
0666-6318	RE PM W/RET REQ TY I (Y) 6" (BRK) (100MIL)	LF	10
0666-6321	RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)	LF	180
3076-6001	D-GR HMA TY-B PG64-22	TON	50
3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	25
3077-6075	TACK COAT	GAL	44
3085-6001	UNDERSEAL COURSE	GAL	71

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

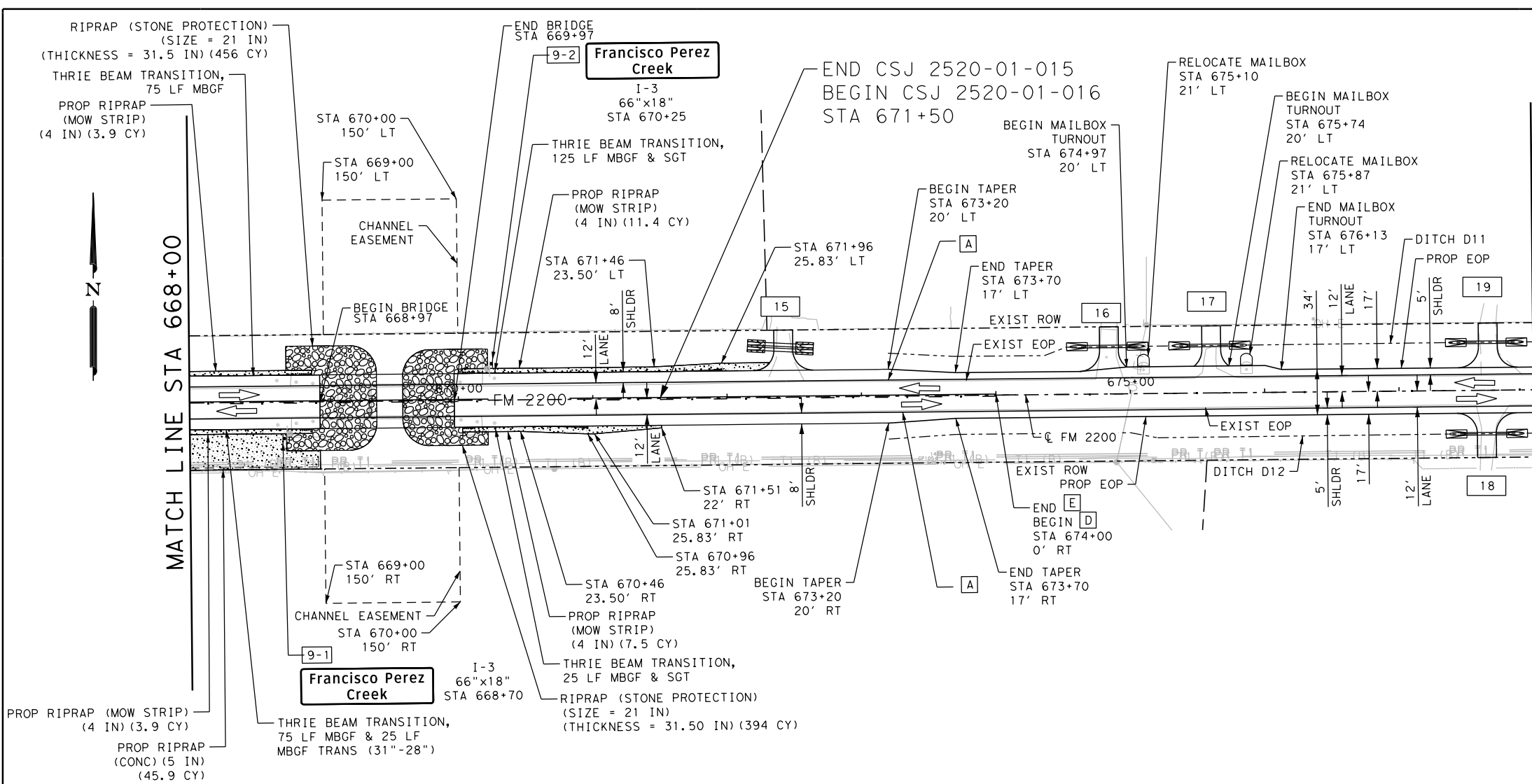
Texas Department of Transportation
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FM 2200
PLAN AND PROFILE
STA 658+00 TO STA 668+00
SHEET 8 OF 13

DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
SAT	MEDINA	2520	01	016, ETC	91

Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_PP09.dgn



CSJ 2520-01-016 QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	6.5
0105-6002	REMOVING STAB BASE AND ASPH PAV (2")	SY	747
0105-6016	REMOVING STAB BASE & ASPH PAV(16")	SY	418
0110-6001	EXCAVATION (ROADWAY)	CY	1178
0132-6005	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CY	34
0247-6475	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	CY	290
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	337
0316-6240	AGGR (TY-PD GR-4 SAC-B)	CY	14
0464-6005	RC PIPE (CL III) (24 IN)	LF	120
0464-6032	RC PIPE (ARCH) (CL III) (DES 3)	LF	104
0467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	8
0467-6545	SET (TY II) (DES 3) (RCP) (6: 1) (P)	EA	8
0530-6004	DRIVEWAYS (CONC)	SY	288
0530-6008	TURNOUTS (ACP)	SY	28
0560-6025	RELOCATE EXISTING MAILBOX	EA	2
3076-6001	D-GR HMA TY-B PG64-22	TON	374
3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	299
3077-6075	TACK COAT	GAL	325
3085-6001	UNDERSEAL COURSE	GAL	780
0666-6343	REF PROF PAV MRK TY I (W) 6" (SLD) (100MIL)	LF	1300
0666-6346	REF PROF PAV MRK TY I (Y) 6" (BRK) (100MIL)	LF	160
0666-6347	REF PROF PAV MRK TY I (Y) 6" (SLD) (100MIL)	LF	250

CSJ 2520-01-015 QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	3.5
0110-6001	EXCAVATION (ROADWAY)	CY	810
0110-6002	EXCAVATION (CHANNEL)	CY	2550
0132-6005	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CY	604
0247-6475	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	CY	142
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	162
0432-6002	RIPRAP (CONC) (5 IN)	CY	46
0432-6045	RIPRAP (MOW STRIP) (4 IN)	CY	27
0540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	300
0540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	4
0544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2

NOTES

- SEE SHEET 83 FOR PLAN AND PROFILE LEGEND AND ADDITIONAL NOTES.

DESIGN

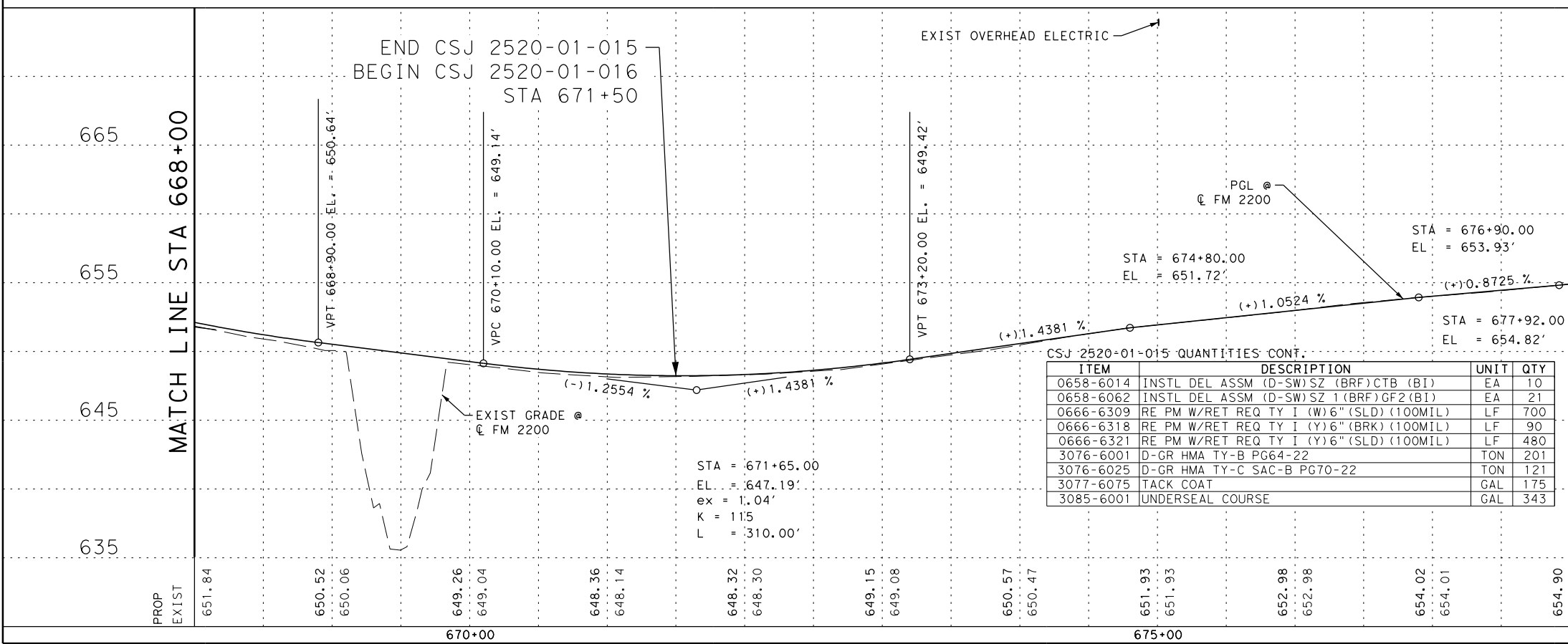
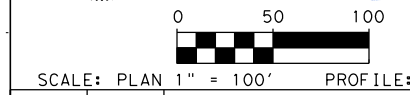


LUKE REED, P.E.
DATE: 2/6/2023

APPROVAL



JAMES A. LUTZ, P.E.
DATE: 2/6/2023



CSJ 2520-01-015 QUANTITIES CONT.

ITEM	DESCRIPTION	UNIT	QTY
0658-6014	INSTR DEL ASSM (D-SW) SZ (BRF) CTB (BI)	EA	10
0658-6062	INSTR DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)	EA	21
0666-6309	RE PM W/RET REQ TY I (W) 6" (SLD) (100MIL)	LF	700
0666-6318	RE PM W/RET REQ TY I (Y) 6" (BRK) (100MIL)	LF	90
0666-6321	RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)	LF	480
3076-6001	D-GR HMA TY-B PG64-22	TON	201
3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	121
3077-6075	TACK COAT	GAL	175
3085-6001	UNDERSEAL COURSE	GAL	343

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FM 2200
PLAN AND PROFILE

STA 668+00 TO STA 678+00

SHEET 9 OF 13

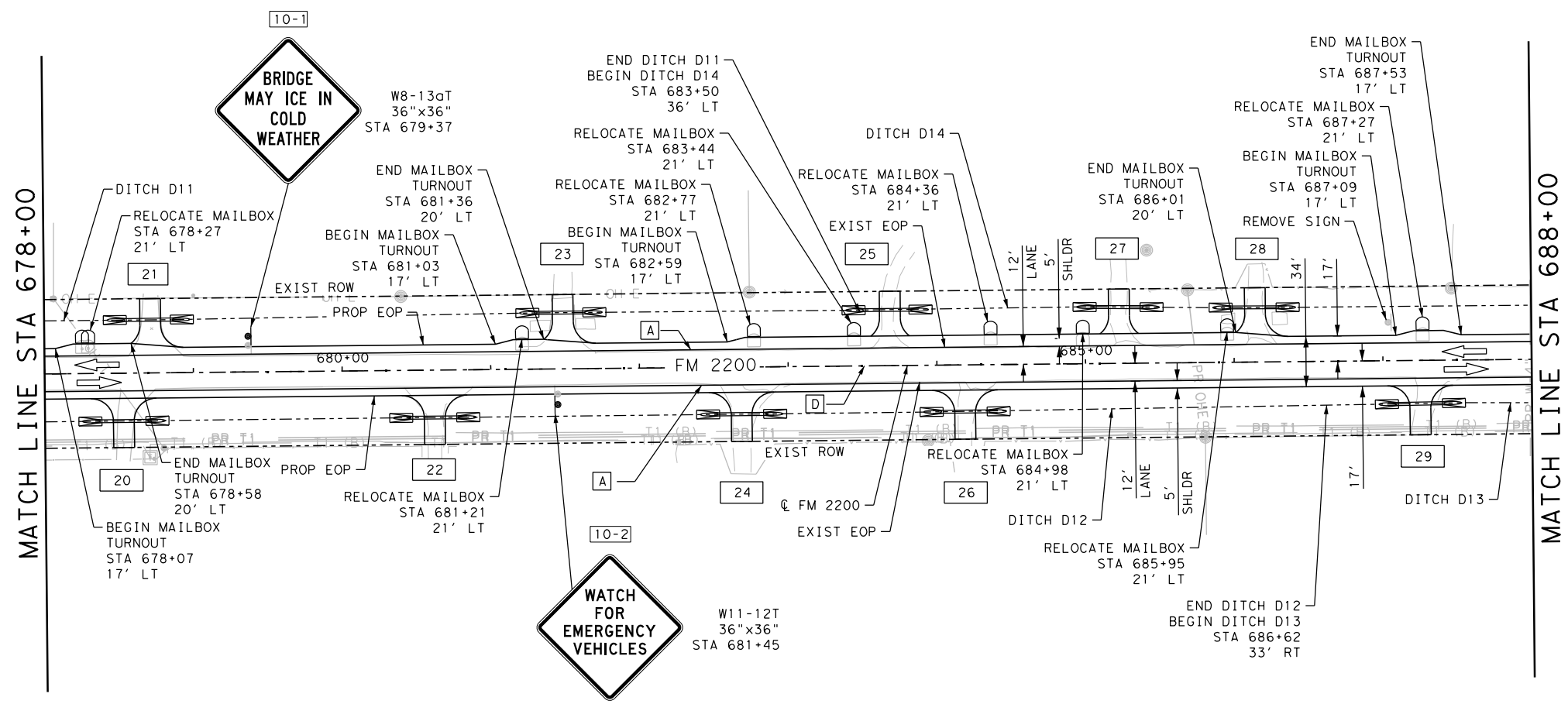
DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	92

Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_PP10.dgn

CSJ 2520-01-016 QUANTITIES

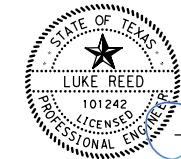
ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	10.0
0105-6002	REMOVING STAB BASE AND ASPH PAV (2")	SY	1556
0105-6016	REMOVING STAB BASE & ASPH PAV (16")	SY	906
0110-6001	EXCAVATION (ROADWAY)	CY	2187
0132-6005	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CY	500
0247-6475	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	CY	419
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	484
0316-6240	AGGR (TY-PD GR-4 SAC-B)	CY	20
0464-6005	RC PIPE (CL III) (24 IN)	LF	270
0464-6032	RC PIPE (ARCH) (CL III) (DES 3)	LF	30
0467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	18
0467-6545	SET (TY II) (DES 3) (RCP) (6: 1) (P)	EA	2
0496-6004	REMOV STR (SET)	EA	4
0496-6007	REMOV STR (PIPE)	LF	211
0530-6004	DRIVEWAYS (CONC)	SY	580
0530-6008	TURNOUTS (ACP)	SY	110
0560-6025	RELOCATE EXISTING MAILBOX	EA	8
3076-6001	D-GR HMA TY-B PG64-22	TON	529
3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	437
3077-6075	TACK COAT	GAL	460
3085-6001	UNDERSEAL COURSE	GAL	1139
0644-6001	IN SM RD SN SUP&AM TY10BWG (1) SA (P)	EA	2
0644-6076	REMOVE SM RD SN SUP&AM	EA	3
0666-6343	REF PROF PAV MRK TY I (W) 6" (SLD) (100MIL)	LF	2000
0666-6346	REF PROF PAV MRK TY I (Y) 6" (BRK) (100MIL)	LF	250



NOTES

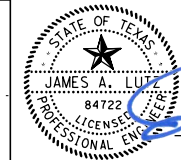
- SEE SHEET 83 FOR PLAN AND PROFILE LEGEND AND ADDITIONAL NOTES.

DESIGN



LUKE REED, P.E.
DATE: 2/6/2023

APPROVAL



JAMES A. LUTE, P.E.
DATE: 2/6/2023



SCALE: PLAN 1" = 100' PROFILE: 1" = 10'

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



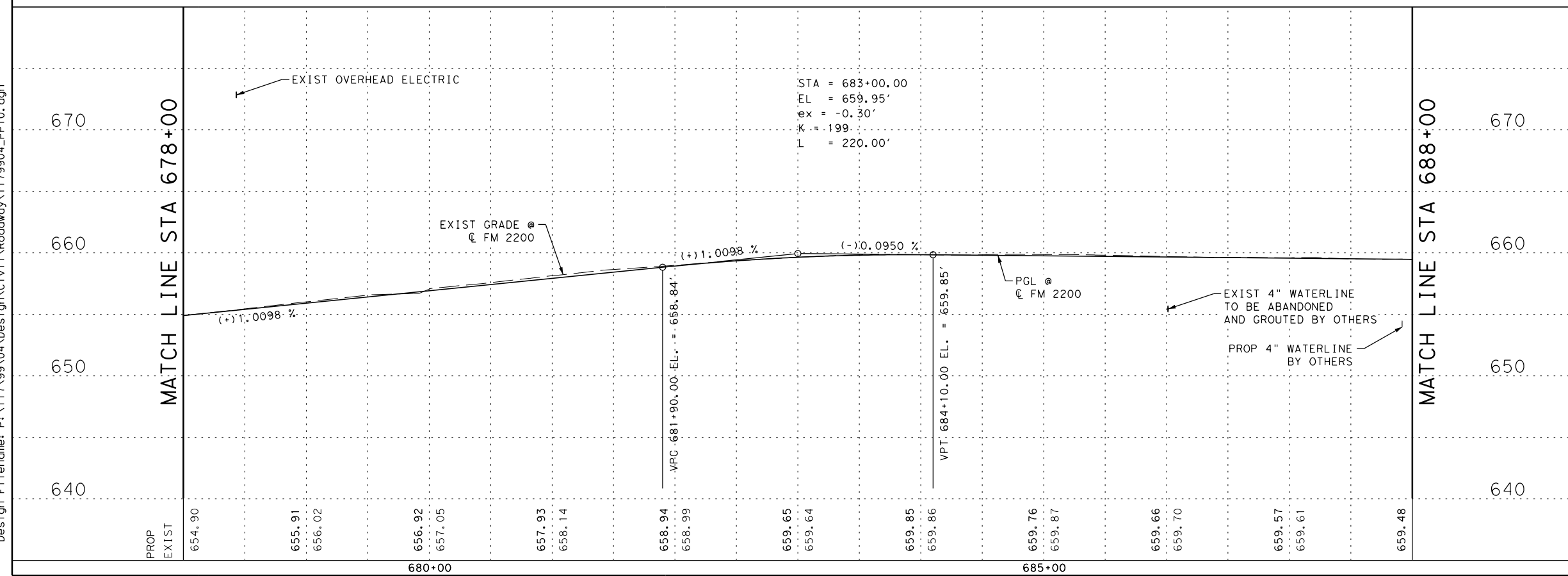
FM 2200

PLAN AND PROFILE

STA 678+00 TO STA 688+00

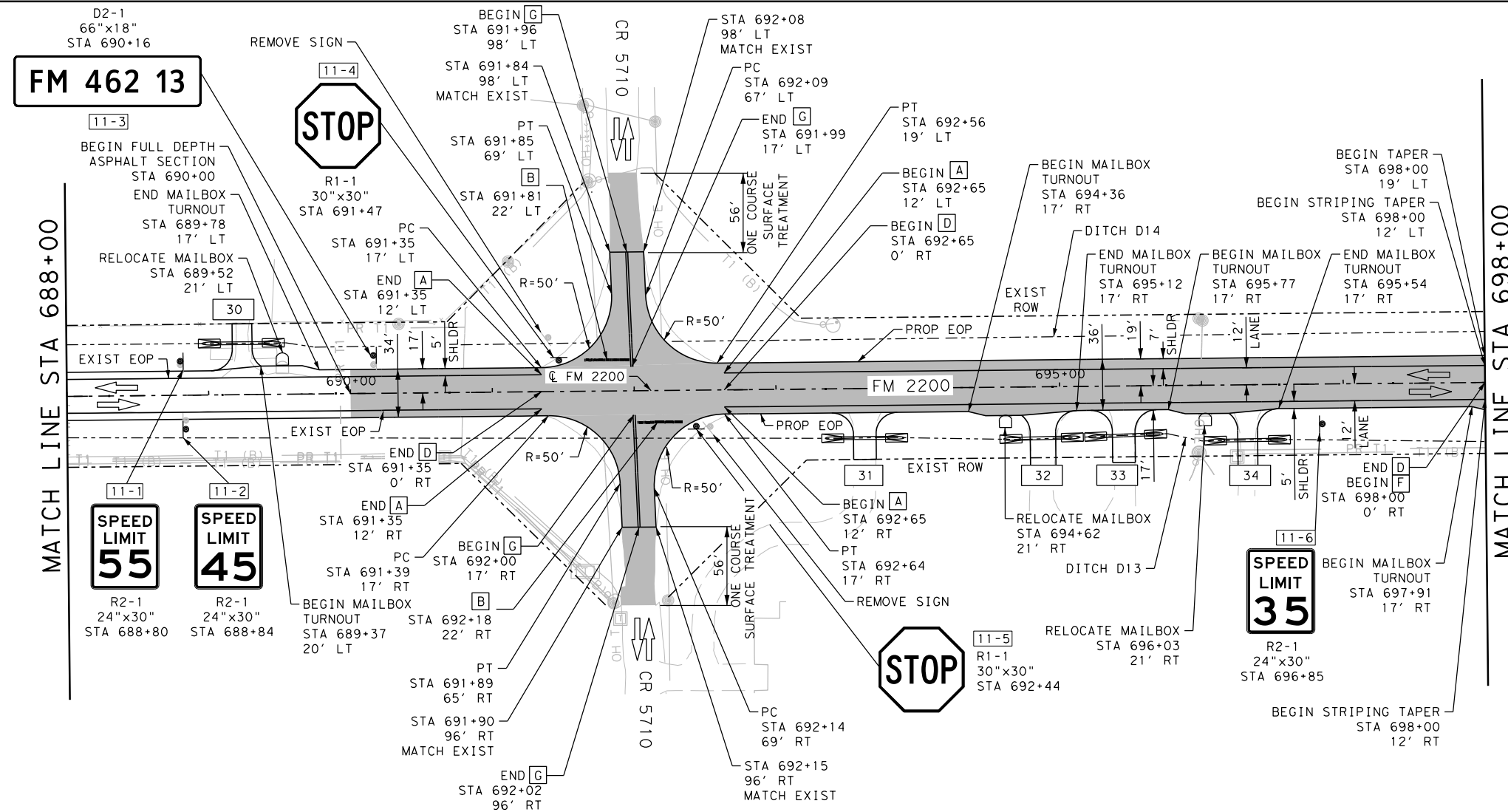
SHEET 10 OF 13

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	MEDINA	2520	01
			016, ETC	93



Plotted on: 2/6/2023

Design File name: P:\11799\04\Design\Civil\Roadway\1179904_PP11.dgn



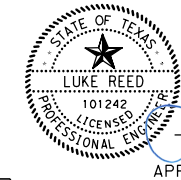
CSJ 2520-01-016 QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	10.0
0105-6002	REMOVING STAB BASE AND ASPH PAV (2")	SY	312
0105-6016	REMOVING STAB BASE & ASPH PAV(16")	SY	343
0105-6041	REMOVING STAB BASE AND ASPH PAV(8")	SY	1043
0110-6001	EXCAVATION (ROADWAY)	CY	1576
0132-6005	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CY	760
0247-6475	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	CY	84
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	97
0316-6240	AGGR (TY-PD GR-4 SAC-B)	CY	6
0316-6419	ASPH (AC-15P, AC-20-5TR OR AC-20XP)	GAL	80
0464-6005	RC PIPE (CL III) (24 IN)	LF	145
0467-6395	SET (TY II) (24 IN) (RCP) (6:1) (P)	EA	10
0496-6004	REMOV STR (SET)	EA	2
0496-6007	REMOV STR (PIPE)	LF	46
0530-6004	DRIVEWAYS (CONC)	SY	315
0530-6008	TURNOUTS (ACP)	SY	36
0560-6025	RELOCATE EXISTING MAILBOX	EA	3
3076-6001	D-GR HMA TY-B PG64-22	TON	2170
3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	530
3077-6075	TACK COAT	GAL	1660
3085-6001	UNDERSEAL COURSE	GAL	1383
0644-6001	IN SM RD SN SUP&M TY10BWG(1)SA(P)	EA	5
0644-6004	IN SM RD SN SUP&M TY10BWG(1)SA(T)	EA	1
0644-6076	REMOVE SM RD SN SUP&M	EA	7
0666-6048	REFL PAV MRK TY I (W)24" (SLD) (100MIL)	LF	64
0666-6343	REF PROF PAV MRK TY I (W)6" (SLD) (100MIL)	LF	1743
0666-6346	REF PROF PAV MRK TY I (Y)6" (BRK) (100MIL)	LF	218
0666-6347	REF PROF PAV MRK TY I (Y)6" (SLD) (100MIL)	LF	321

NOTES

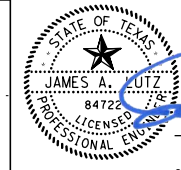
- SEE SHEET 83 FOR PLAN AND PROFILE LEGEND AND ADDITIONAL NOTES.

DESIGN



LUKE REED, P.E. DATE 2/6/2023

APPROVAL



JAMES A. LUTZ, P.E. DATE 2/6/2023



SCALE: PLAN 1" = 100' PROFILE: 1" = 10'

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800



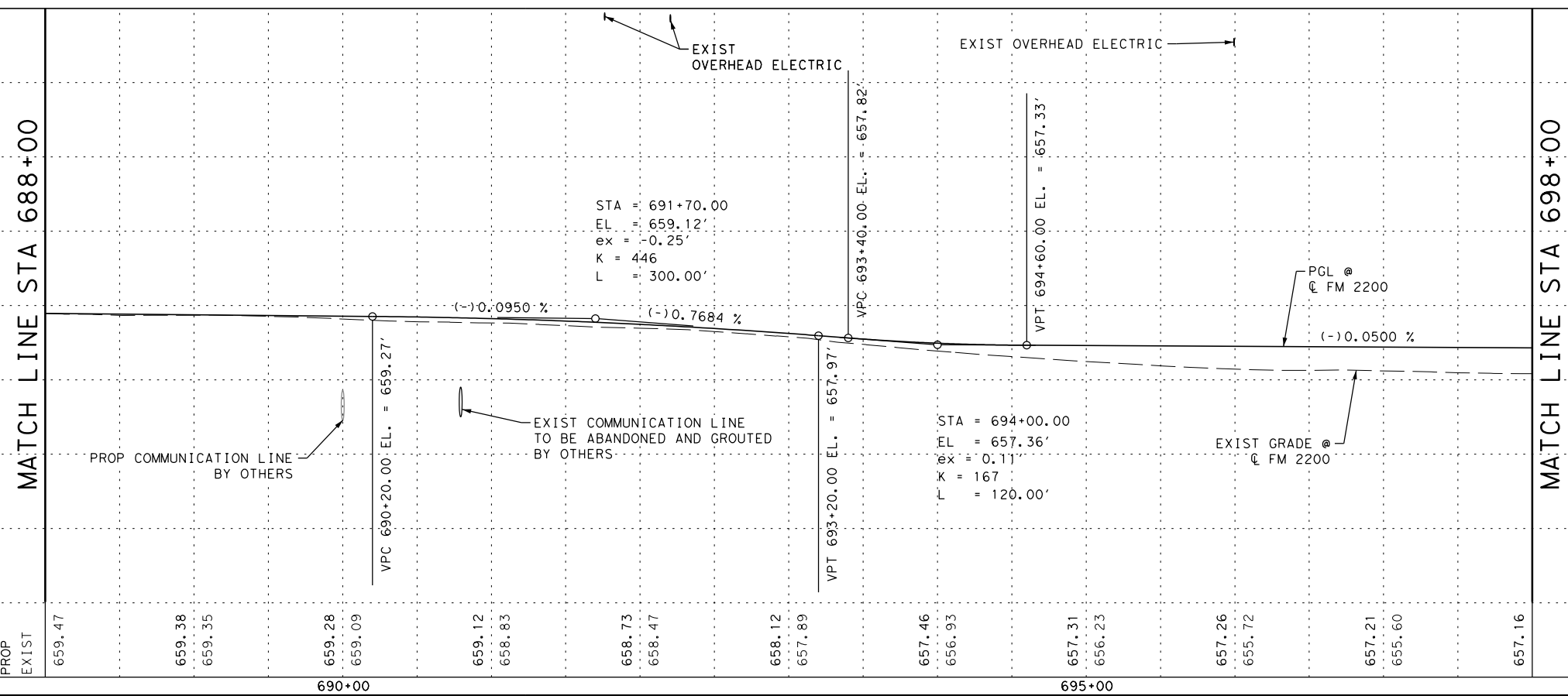
FM 2200

PLAN AND PROFILE

STA 688+00 TO STA 698+00

SHEET 11 OF 13

DWG:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DWG:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	MEDINA	2520	01
			016, ETC	94



PROF	EXIST	689+00	690+00	691+00	692+00	693+00	694+00	695+00	696+00	697+00	698+00										
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Plotted on: 2/6/2023

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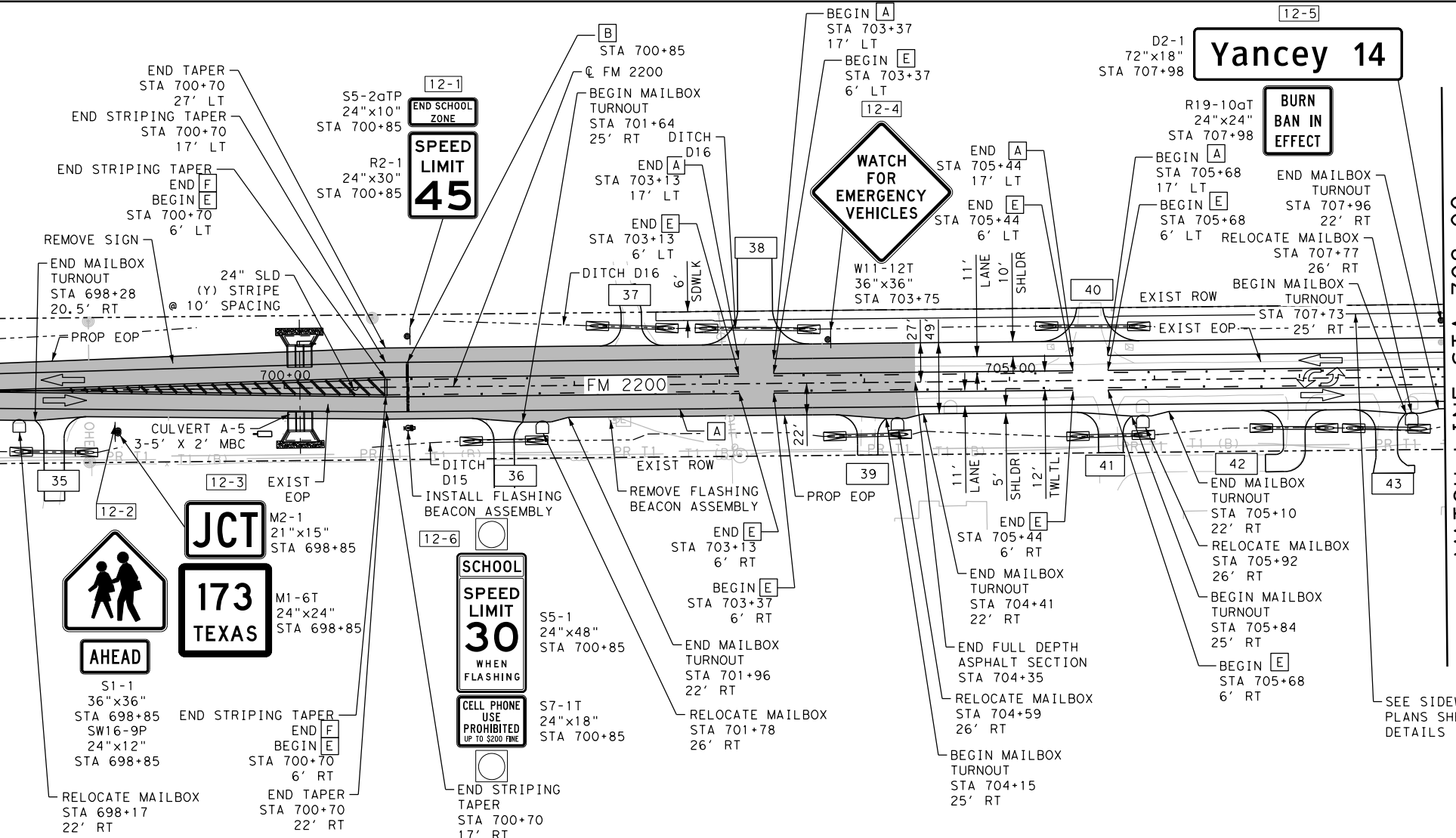


MATCH LINE STA 698+00

MATCH LINE STA 698+00

MATCH LINE STA 708+00

MATCH LINE STA 708+00



CSJ 2520-01-016 QUANTITIES

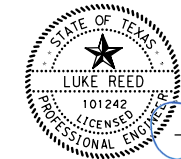
ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	10.0
0105-6041	REMOVING STAB BASE AND ASPH PAV (8")	SY	903
0110-6001	EXCAVATION (ROADWAY)	CY	1194
0132-6005	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CY	1505
0247-6475	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	CY	193
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	228
0316-6240	AGGR (TY-PD GR-4 SAC-B)	CY	10
0464-6005	RC PIPE (CL III) (24 IN)	LF	84
0464-6032	RC PIPE (ARCH) (CL III) (DES 3)	LF	226
0467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	6
0467-6545	SET (TY II) (DES 3) (RCP) (6: 1) (P)	EA	12
0496-6004	REMOV STR (SET)	EA	2
0496-6007	REMOV STR (PIPE)	LF	53
0530-6004	DRIVEWAYS (CONC)	SY	822
0530-6008	TURNOUTS (ACP)	SY	36
0560-6025	RELOCATE EXISTING MAILBOX	EA	5
3076-6001	D-GR HMA TY-B PG64-22	TON	2614
3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	607
3077-6075	TACK COAT	GAL	1695
3085-6001	UNDERSEAL COURSE	GAL	1585
0636-6001	ALUMINUM SIGNS (TY A)	SF	11
0644-6001	IN SM RD SN SUP&M TY10BWG(1)SA(P)	EA	3
0644-6004	IN SM RD SN SUP&M TY10BWG(1)SA(T)	EA	2
0644-6076	REMOVE SM RD SN SUP&M	EA	6
0658-6047	INSTR OM ASSM (OM-2Y) (WC)GND	EA	2
0666-6048	REFL PAV MRK TY I (W)24" (SLD) (100MIL)	LF	34
0666-6147	REFL PAV MRK TY I (Y)24" (SLD) (100MIL)	LF	219
0666-6343	REF PROF PAV MRK TY I (W)6" (SLD) (100MIL)	LF	1953
0666-6346	REF PROF PAV MRK TY I (Y)6" (BRK) (100MIL)	LF	341
0666-6347	REF PROF PAV MRK TY I (Y)6" (SLD) (100MIL)	LF	2469
0682-6003	VEH SIG SEC (12")LED(YEL)	EA	3
0685-6004	INSTR RDSD FLSH BCN ASSM (SOLAR PWRD)	EA	1
0685-6006	REMOV RDSD FLSH BCN AM (SOLAR PWRD)	EA	1

NOTES

- SEE SHEET 83 FOR PLAN AND PROFILE LEGEND AND ADDITIONAL NOTES.

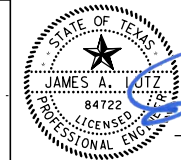
SEE SIDEWALK CONSTRUCTION PLANS SHEETS FOR SIDEWALK DETAILS

DESIGN



LUKE REED, P.E. 2/6/2023
DATE

APPROVAL



JAMES A. LUTZ, P.E. 2/6/2023
DATE



SCALE: PLAN 1" = 100' PROFILE: 1" = 10'

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



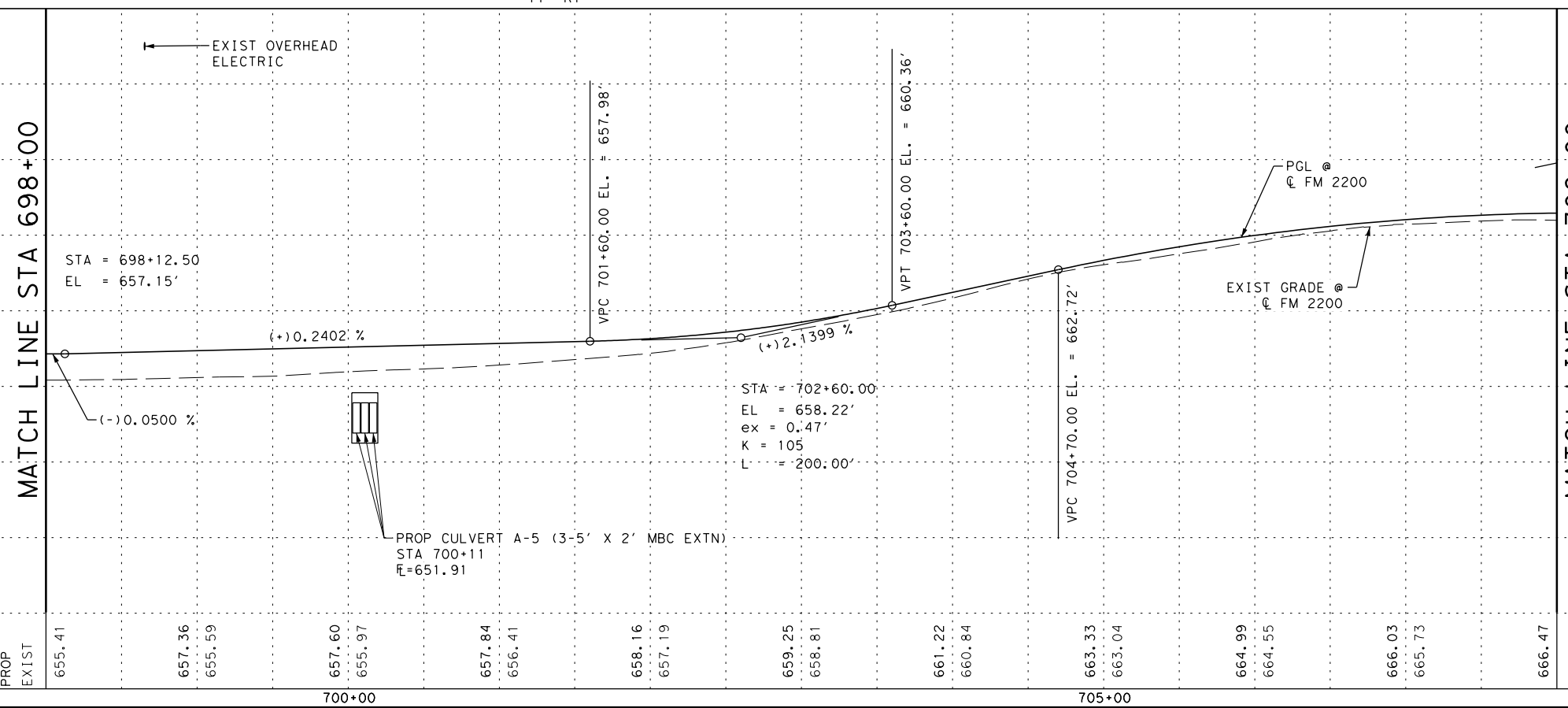
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PLAN AND PROFILE

FM 2200
STA 698+00 TO STA 708+00

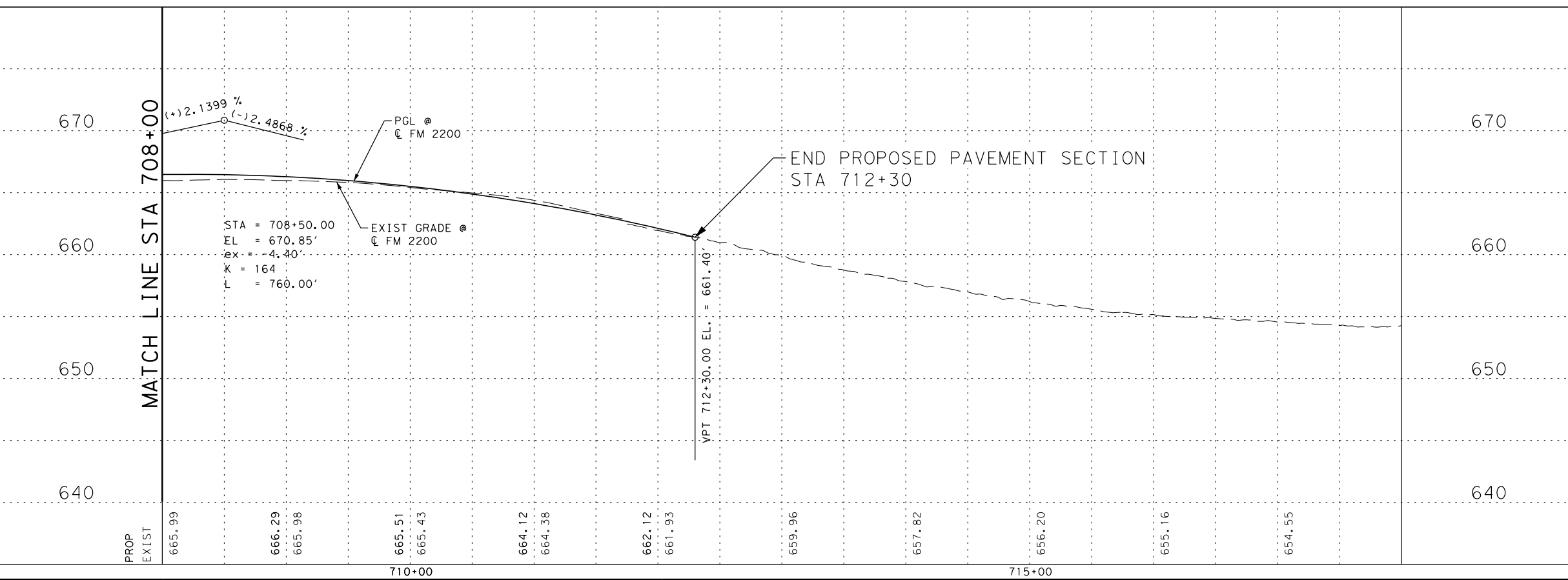
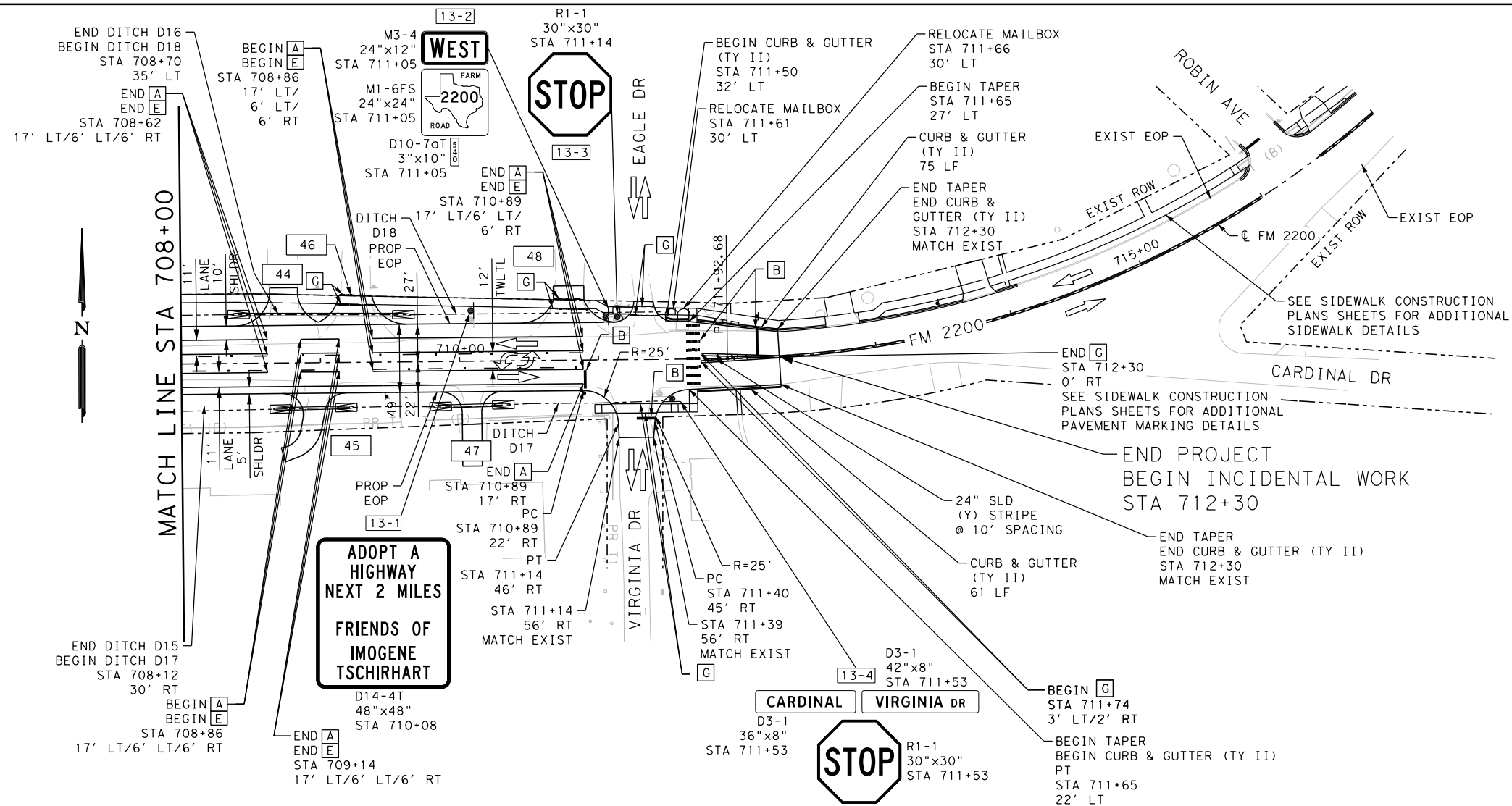
SHEET 12 OF 13

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	MEDINA	2520	01
			016, ETC	95



Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_PP13.dgn



CSJ 2520-01-016 QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	4.3
0105-6041	REMOVING STAB BASE AND ASPH PAV (8")	SY	536
0110-6001	EXCAVATION (ROADWAY)	CY	1011
0132-6005	EMBANKMENT (FINAL) (ORD COMP) (TY C)	CY	92
0247-6475	FL BS (CIP) (TY D GR 1-2, OR 5) FINAL POS	CY	262
0310-6027	PRIME COAT (MC-30 OR AE-P)	GAL	306
0316-6240	AGGR (TY-PD GR-4 SAC-B)	CY	13
0464-6032	RC PIPE (ARCH) (CL III) (DES 3)	LF	166
0467-6545	SET (TY II) (DES 3) (RCP) (6:1) (P)	EA	6
0529-6008	CONC CURB & GUTTER (TY II)	LF	136
0530-6004	DRIVEWAYS (CONC)	SY	447
0560-6025	RELOCATE EXISTING MAILBOX	EA	2
3076-6001	D-GR HMA TY-B PG64-22	TON	341
3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	285
3077-6075	TACK COAT	GAL	297
3085-6001	UNDERSEAL COURSE	GAL	742
0644-6001	IN SM RD SN SUP&M TY10BWG(1)SA(P)	EA	3
0644-6004	IN SM RD SN SUP&M TY10BWG(1)SA(T)	EA	1
0644-6076	REMOVE SM RD SN SUP&M	EA	4
0666-6042	REFL PAV MRK TY I (W)12" (SLD) (100MIL)	LF	200
0666-6048	REFL PAV MRK TY I (W)24" (SLD) (100MIL)	LF	127
0666-6147	REFL PAV MRK TY I (Y)24" (SLD) (100MIL)	LF	21
0666-6343	REF PROF PAV MRK TY I (W)6" (SLD) (100MIL)	LF	530
0666-6346	REF PROF PAV MRK TY I (Y)6" (BRK) (100MIL)	LF	121
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NOTES

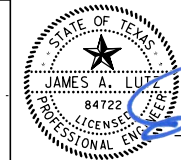
- SEE SHEET 83 FOR PLAN AND PROFILE LEGEND AND ADDITIONAL NOTES.

DESIGN



LUKE REED, P.E.
DATE: 2/6/2023

APPROVAL



JAMES A. LUTE, P.E.
DATE: 2/6/2023



SCALE: PLAN 1" = 100' PROFILE: 1" = 10'

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200

PLAN AND PROFILE

STA 708+00 TO END PROJECT

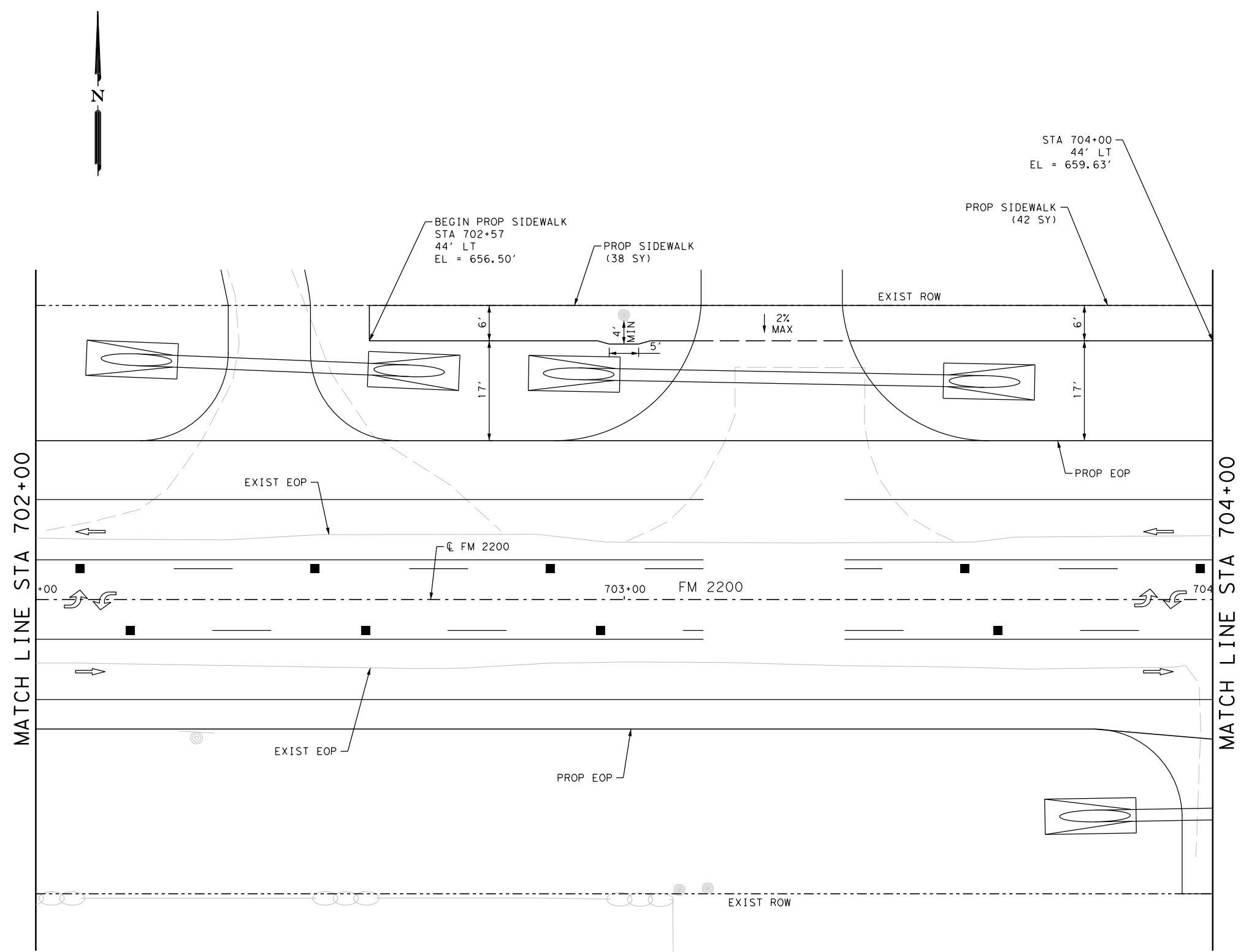
SHEET 13 OF 13

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	96

CSJ 2520-01-016 QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
0531-6001	CONC SIDEWALKS (4")	SY	80

Plotted on: 2/6/2023

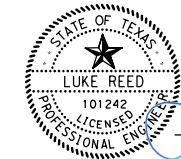
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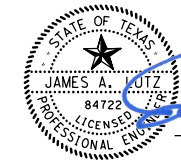
- SEE SHEET 83 FOR SIDEWALK LEGEND AND ADDITIONAL NOTES.

DESIGN

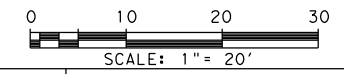


LUKE REED
LUKE REED, P.E.
DATE: 2/6/2023

APPROVAL



JAMES A. LUTZ
JAMES A. LUTZ, P.E.
DATE: 2/6/2023



REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
**SIDEWALK
CONSTRUCTION PLAN**

STA 702+00 TO STA 704+00

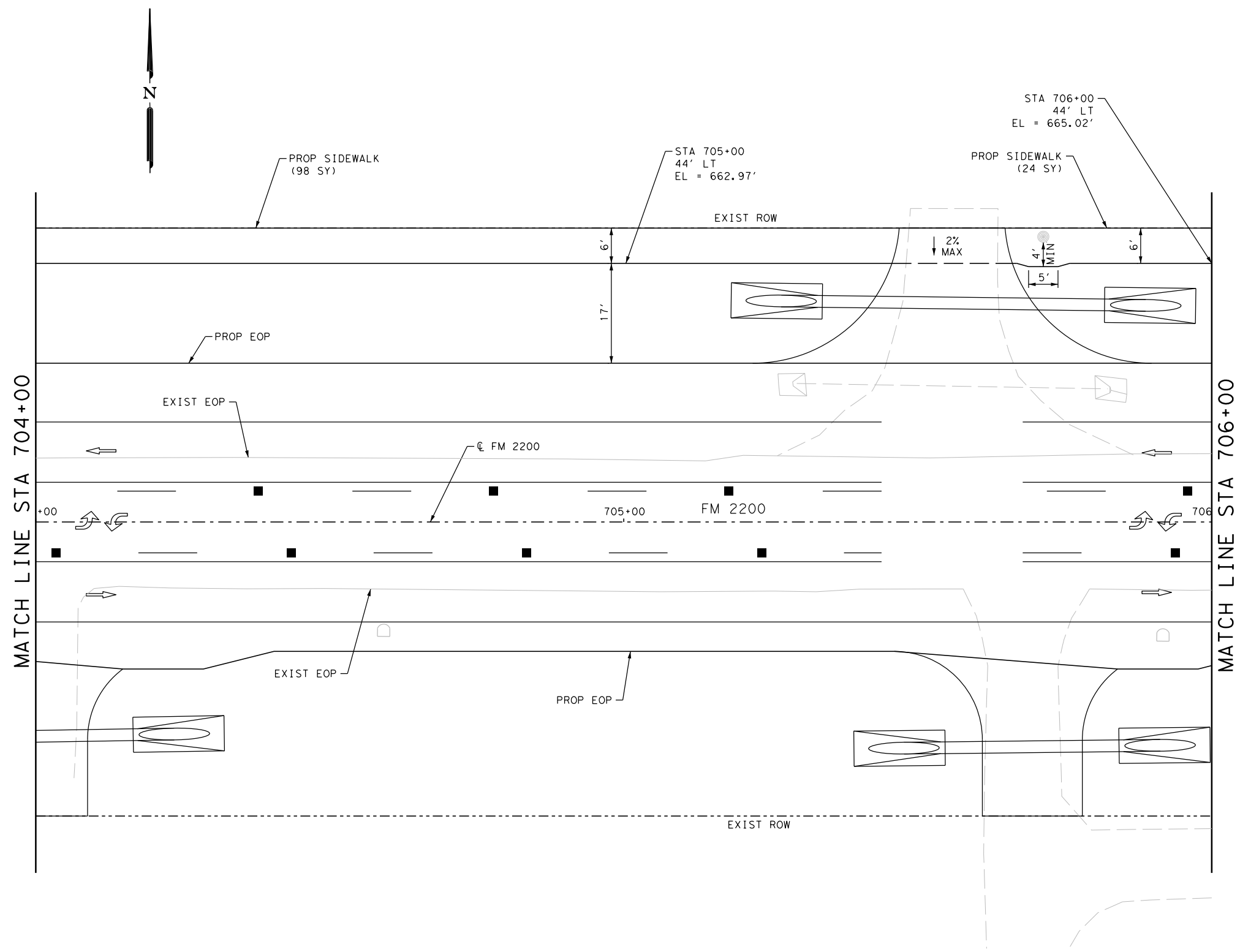
SHEET 1 OF 11

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 97

CSJ 2520-01-016 QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
0531-6001	CONC SIDEWALKS (4")	SY	122

Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_SW02.dgn



NOTES

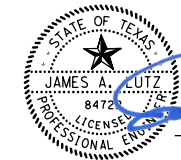
- SEE SHEET 83 FOR SIDEWALK LEGEND AND ADDITIONAL NOTES.

DESIGN

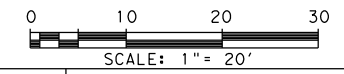


LUKE REED
 2/6/2023
 DATE

APPROVAL



JAMES A. LUTZ
 2/6/2023
 DATE



REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
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 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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FM 2200
SIDEWALK CONSTRUCTION PLAN

STA 704+00 TO STA 706+00

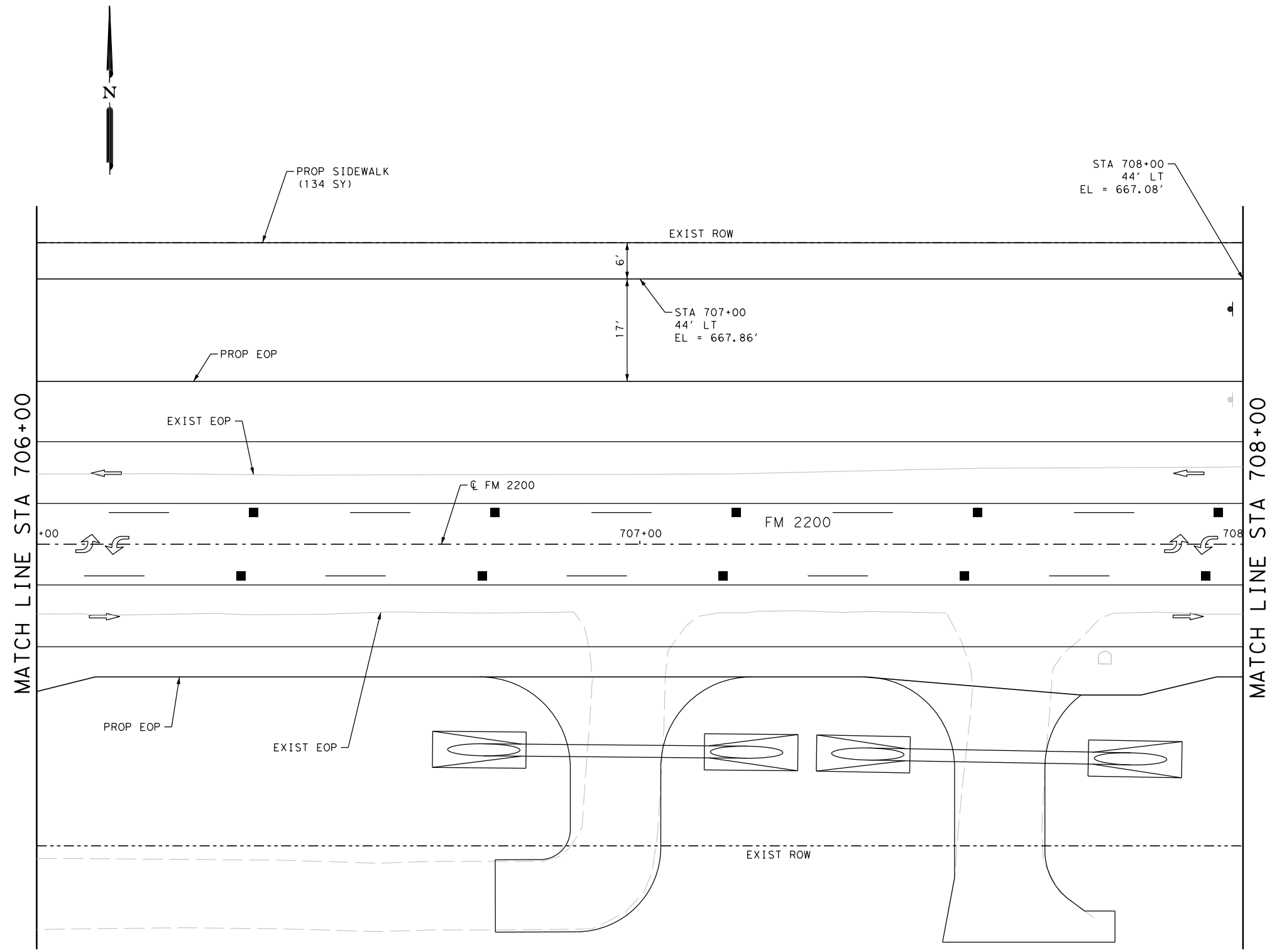
SHEET 2 OF 11

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	98

CSJ 2520-01-016 QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
0531-6001	CONC SIDEWALKS (4")	SY	134

Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_SW03.dgn



NOTES

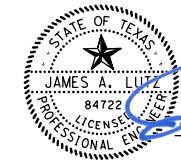
- SEE SHEET 83 FOR SIDEWALK LEGEND AND ADDITIONAL NOTES.

DESIGN

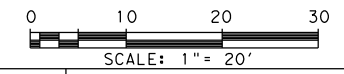


Luke Reed
LUKE REED, P.E.
2/6/2023
DATE

APPROVAL



James A. Lute
JAMES A. LUTE, P.E.
2/6/2023
DATE



REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
**SIDEWALK
CONSTRUCTION PLAN**

STA 706+00 TO STA 708+00

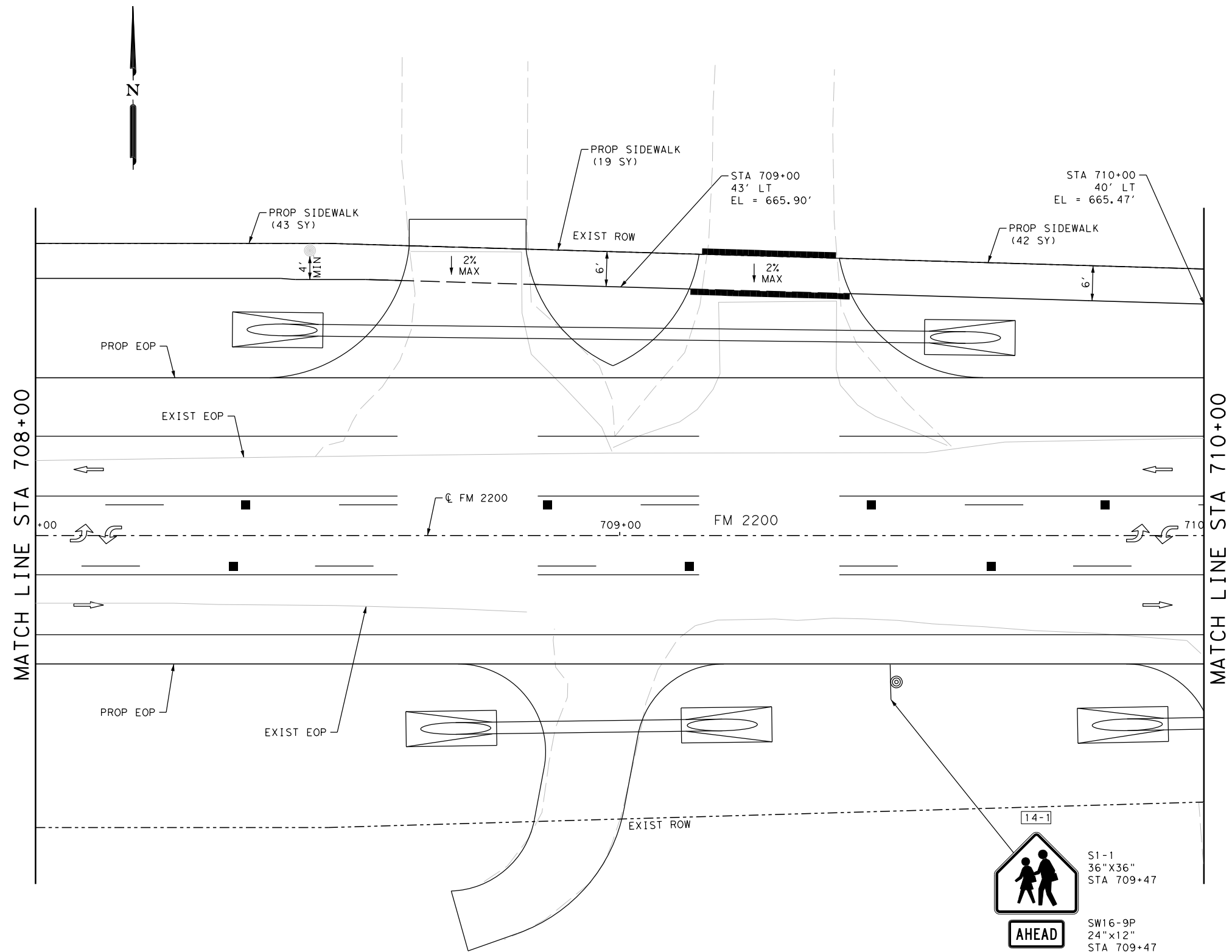
SHEET 3 OF 11

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	99

CSJ 2520-01-016 QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
0531-6001	CONC SIDEWALKS (4")	SY	104
0644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1

Plotted on: 2/6/2023


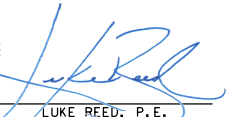
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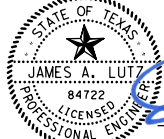
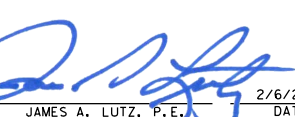
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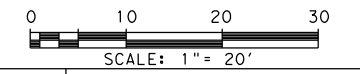
- SEE SHEET 83 FOR SIDEWALK LEGEND AND ADDITIONAL NOTES.

DESIGN



 LUKE REED, P.E. 2/6/2023
 DATE

APPROVAL



 JAMES A. LUTZ, P.E. 2/6/2023
 DATE



REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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FM 2200
SIDEWALK CONSTRUCTION PLAN

STA 708+00 TO STA 710+00

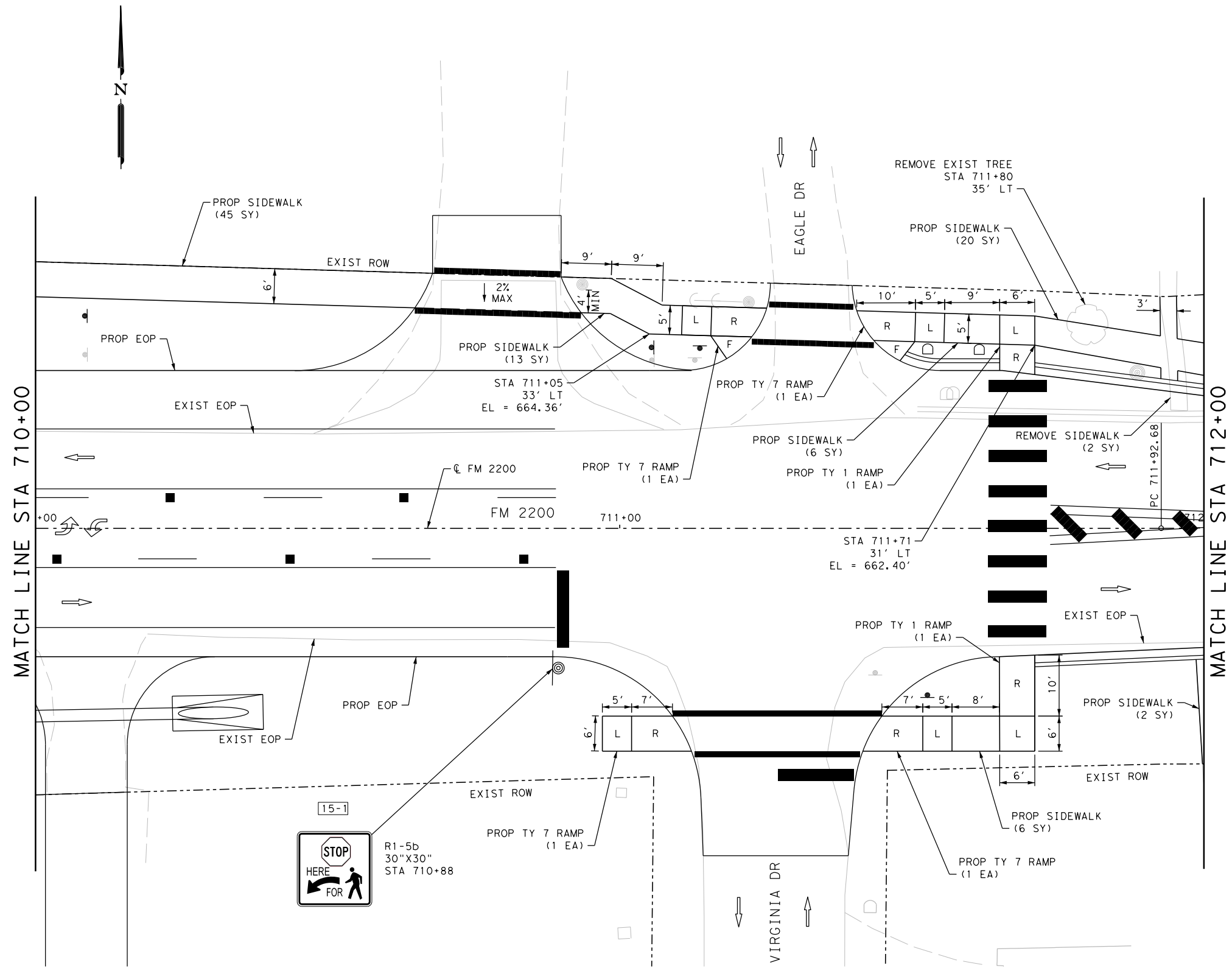
SHEET 4 OF 11

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.
CHK DWG:	SAT	MEDINA	2520	01
			016, ETC	100

CSJ 2520-01-016 QUANTITIES				
ITEM	DESCRIPTION	UNIT	QTY	
0100-6011	PREPARING ROW (TREE) (24" TO 36" DIA.)	EA	1	
0104-6015	REMOVING CONC (SIDEWALKS)	SY	2	
0531-6001	CONC SIDEWALKS (4")	SY	92	
0531-6004	CURB RAMP (TY 1)	EA	2	
0531-6010	CURB RAMP (TY 7)	EA	4	
0644-6001	IN SM RD SN SUP&M TY10BWG(1) SA(P)	EA	1	

Plotted on: 2/6/2023

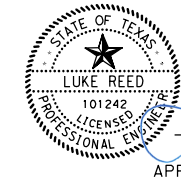
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NOTES

- SEE SHEET 83 FOR SIDEWALK LEGEND AND ADDITIONAL NOTES.

DESIGN

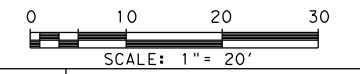


LUKE REED, P.E.
DATE: 2/6/2023

APPROVAL



JAMES A. LUTZ, P.E.
DATE: 2/6/2023



REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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FM 2200
SIDEWALK CONSTRUCTION PLAN

STA 710+00 TO STA 712+00

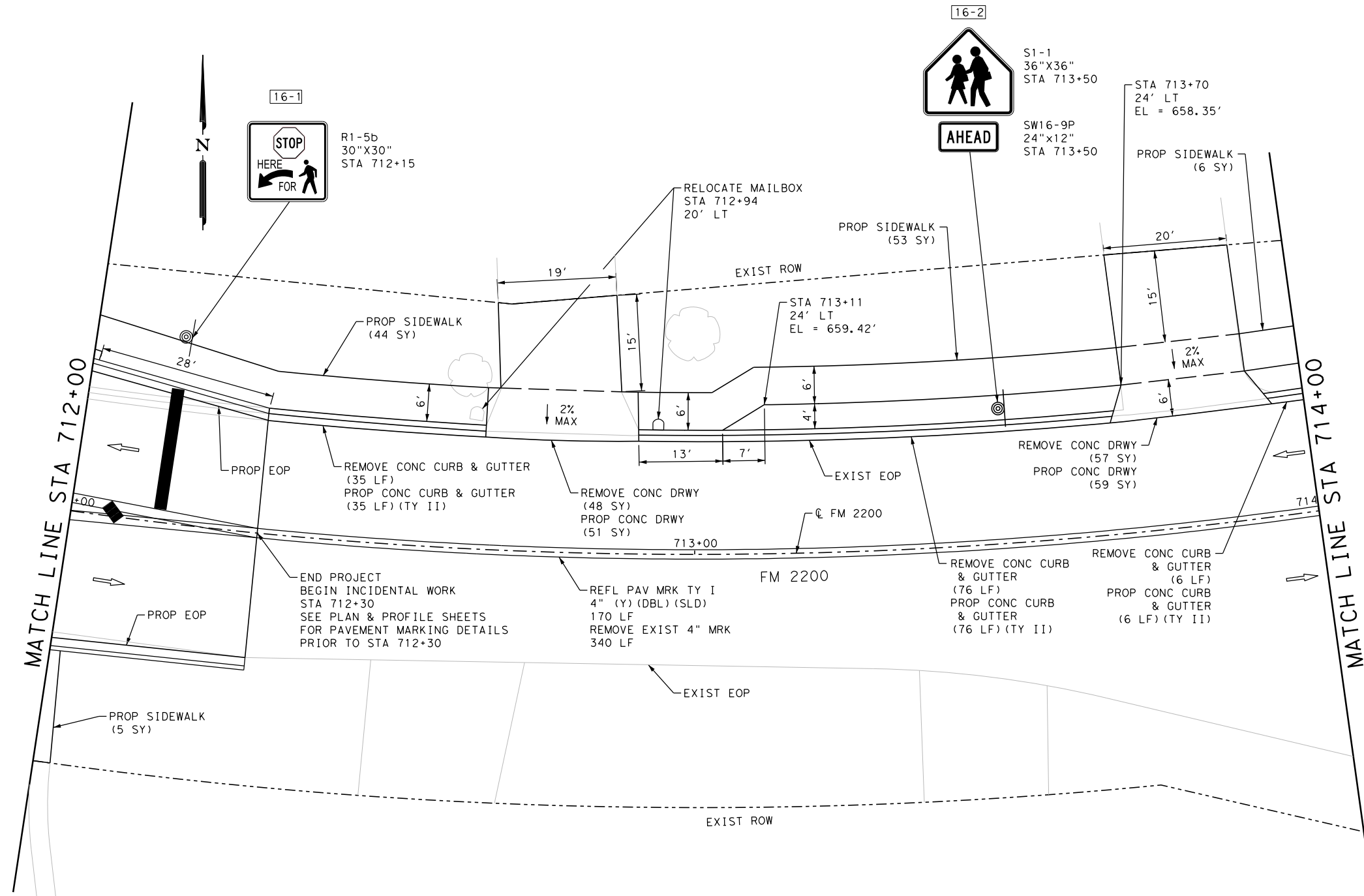
SHEET 5 OF 11

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CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	101

Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_SW06.dgn

CSJ 2520-01-016 QUANTITIES				
ITEM	DESCRIPTION	UNIT	QTY	
0100-6002	PREPARING ROW	STA	1.7	
0104-6017	REMOVING CONC (DRIVEWAYS)	SY	105	
0104-6022	REMOVING CONC (CURB AND GUTTER)	LF	117	
0529-6008	CONC CURB & GUTTER (TY II)	LF	117	
0530-6004	DRIVEWAYS (CONC)	SY	110	
0531-6001	CONC SIDEWALKS (4")	SY	108	
0560-6025	RELOCATE EXISTING MAILBOX	EA	1	
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1	
0644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1	
0666-6315	RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	LF	340	
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	340	



NOTES

- SEE SHEET 83 FOR SIDEWALK LEGEND AND ADDITIONAL NOTES.

DESIGN

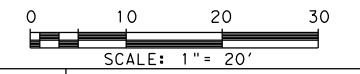


LUKE REED, P.E.
DATE: 2/6/2023

APPROVAL



JAMES A. LUTZ, P.E.
DATE: 2/6/2023



REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
SIDEWALK CONSTRUCTION PLAN

STA 712+00 TO STA 714+00

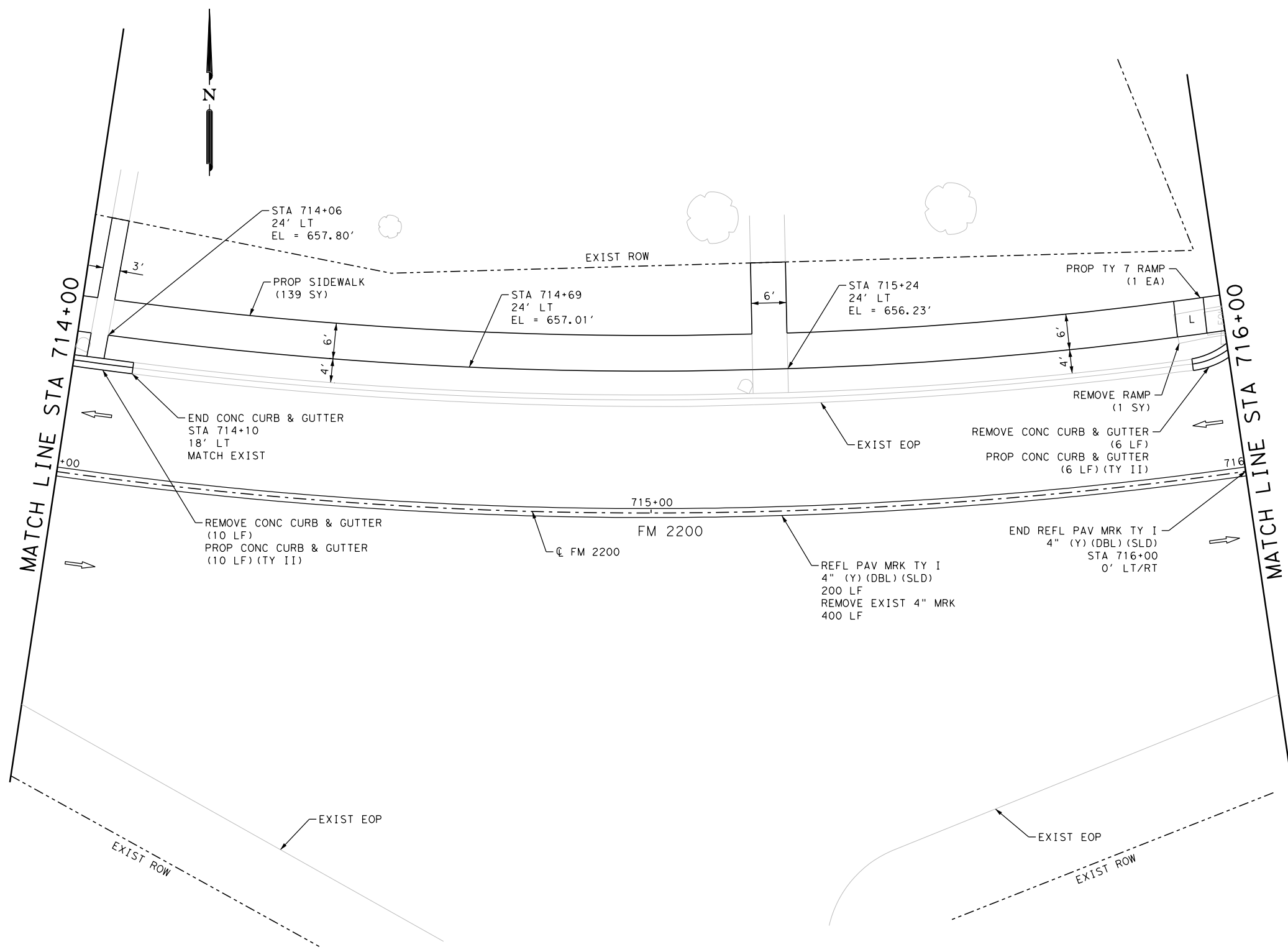
SHEET 6 OF 11

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	102

CSJ 2520-01-016 QUANTITIES				
ITEM	DESCRIPTION	UNIT	QTY	
0100-6002	PREPARING ROW	STA	2.0	
0104-6022	REMOVING CONC (CURB AND GUTTER)	LF	16	
0104-6036	REMOVING CONC (SIDEWALK OR RAMP)	SY	1	
0529-6008	CONC CURB & GUTTER (TY II)	LF	16	
0531-6001	CONC SIDEWALKS (4")	SY	139	
0666-6315	RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	LF	400	
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	400	

Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_SW07.dgn



NOTES

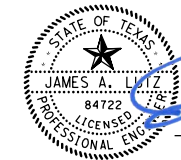
- SEE SHEET 83 FOR SIDEWALK LEGEND AND ADDITIONAL NOTES.

DESIGN

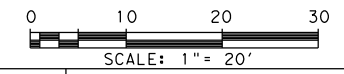


Signature of Luke Reed
 LUKE REED, P.E. 2/6/2023
 DATE

APPROVAL



Signature of James A. Lutz
 JAMES A. LUTZ, P.E. 2/6/2023
 DATE



REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
**SIDEWALK
 CONSTRUCTION PLAN**

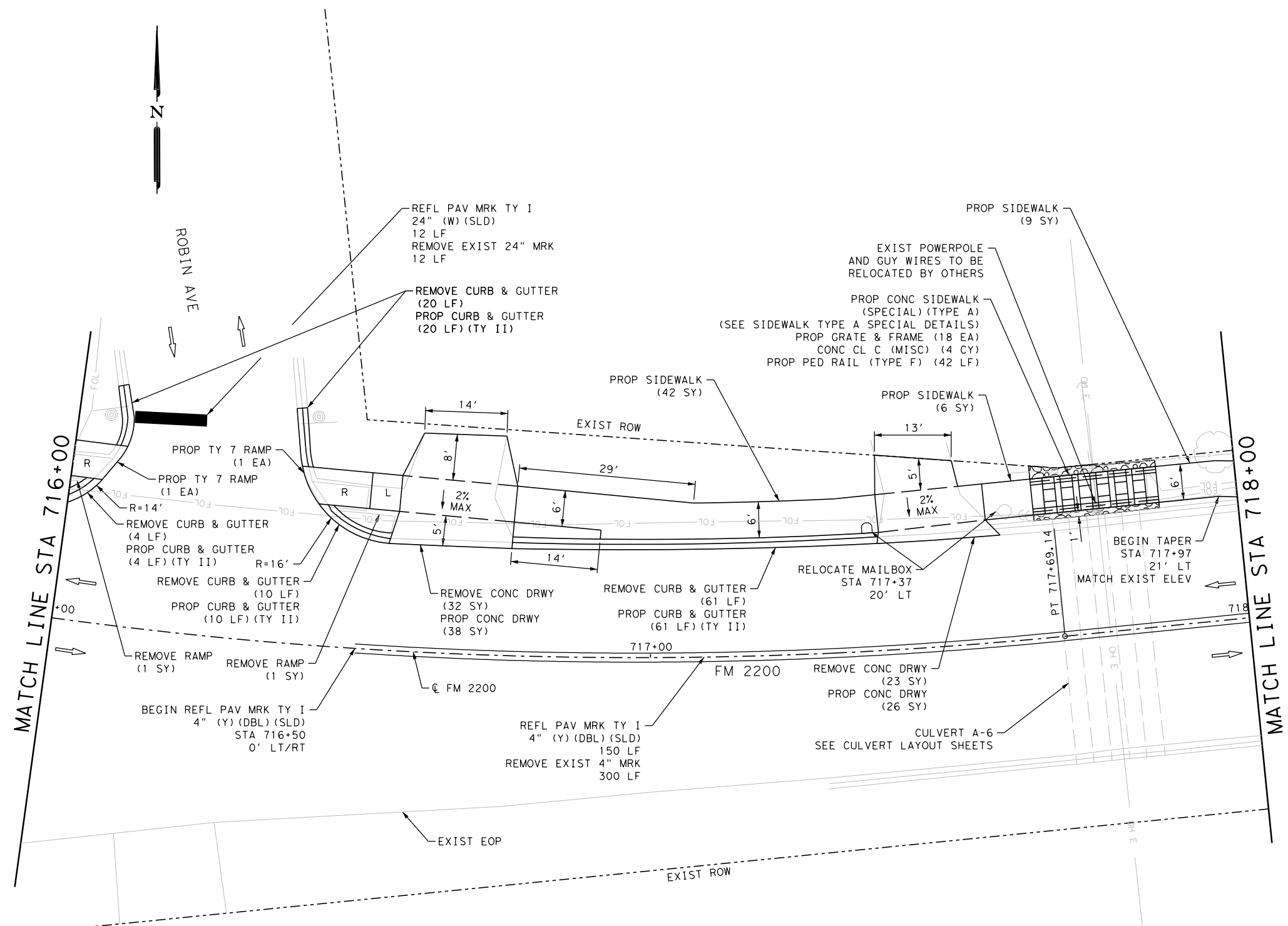
STA 714+00 TO STA 716+00

SHEET 7 OF 11

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	103

Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_SW08.dgn



CSJ 2520-01-016 QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	2.0
0104-6017	REMOVING CONC (DRIVEWAYS)	SY	55
0104-6022	REMOVING CONC (CURB AND GUTTER)	LF	95
0104-6036	REMOVING CONC (SIDEWALK OR RAMP)	SY	2
0420-6074	CL C CONC (MISC)	CY	4
0450-6052	RAIL (HANDRAIL) (TY F)	LF	42
0471-6003	GRATE & FRAME	EA	18
0529-6008	CONC CURB & GUTTER (TY II)	LF	95
0530-6004	DRIVEWAYS (CONC)	SY	64
0531-6001	CONC SIDEWALKS (4")	SY	57
0531-6010	CURB RAMPS (TY 7)	EA	2
0560-6025	RELOCATE EXISTING MAILBOX	EA	1
0666-6048	REFL PAV MRK TY I (W)24" (SLD) (100MIL)	LF	12
0666-6315	RE PM W/RET REQ TY I (Y)4" (SLD) (100MIL)	LF	300
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	300
0677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	12

NOTES

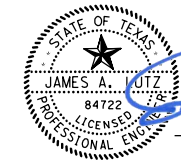
- SEE SHEET 83 FOR SIDEWALK LEGEND AND ADDITIONAL NOTES.

DESIGN

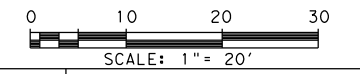


LUKE REED, P.E.
DATE: 2/6/2023

APPROVAL



JAMES A. LUTZ, P.E.
DATE: 2/6/2023



REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
**SIDEWALK
CONSTRUCTION PLAN**

STA 716+00 TO STA 718+00

SHEET 8 OF 11

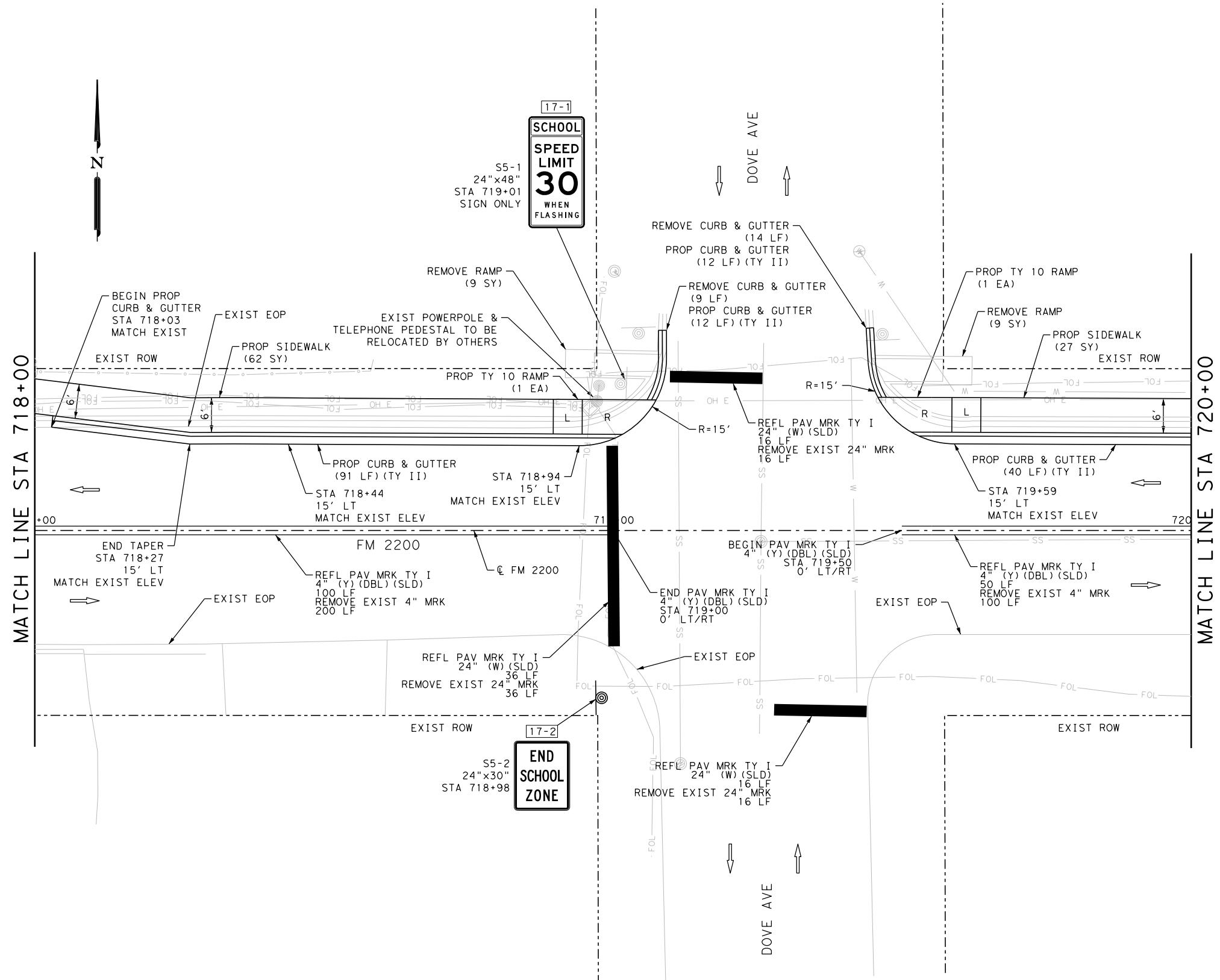
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CHK	DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
CHK	DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK	DWG:	SAT	MEDINA	2520	01	016, ETC	104

Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_SW09.dgn

CSJ 2520-01-016 QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	2.0
0104-6022	REMOVING CONC (CURB AND GUTTER)	LF	23
0104-6036	REMOVING CONC (SIDEWALK OR RAMP)	SY	18
0529-6008	CONC CURB & GUTTER (TY II)	LF	155
0531-6001	CONC SIDEWALKS (4")	SY	89
0531-6013	CURB RAMPS (TY 10)	EA	2
0636-6001	ALUMINUM SIGNS (TY A)	SF	8
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
0666-6048	REFL PAV MRK TY I (W)24" (SLD) (100MIL)	LF	68
0666-6315	RE PM W/RET REQ TY I (Y)4" (SLD) (100MIL)	LF	300
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	300
0677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	68



NOTES

- SEE SHEET 83 FOR SIDEWALK LEGEND AND ADDITIONAL NOTES.

DESIGN

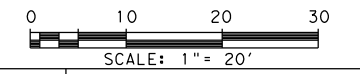


LUKE REED, P.E.
DATE: 2/6/2023

APPROVAL



JAMES A. LUTZ, P.E.
DATE: 2/6/2023



REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
SIDEWALK CONSTRUCTION PLAN

STA 718+00 TO STA 720+00

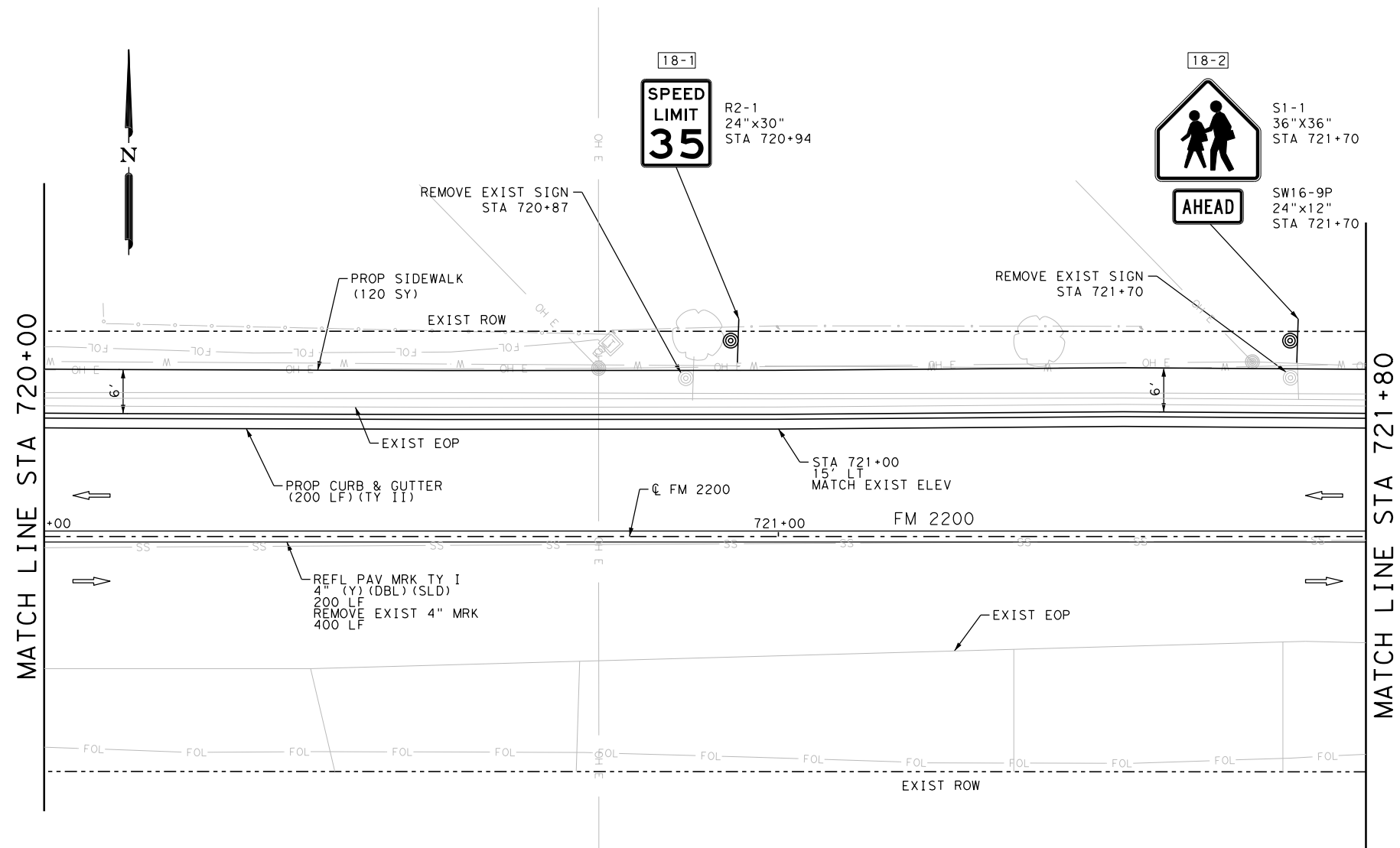
SHEET 9 OF 11

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	105

CSJ 2520-01-016 QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
0100-6002	PREPARING ROW	STA	1.8
0529-6008	CONC CURB & GUTTER (TY II)	LF	200
0531-6001	CONC SIDEWALKS (4")	SY	120
0644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
0644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1
0644-6076	REMOVE SM RD SN SUP&AM	EA	2
0666-6315	RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	LF	400
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	400

Plotted on: 2/6/2023

Design File name: P:\117\99\04\Design\Civil\Roadway\1179904_SW10.dgn



NOTES

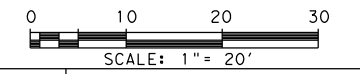
- 1. SEE SHEET 83 FOR SIDEWALK LEGEND AND ADDITIONAL NOTES.

DESIGN

Professional Engineer Seal for Luke Reed, State of Texas, License No. 101242. Signature of Luke Reed, P.E. Date: 2/6/2023.

APPROVAL

Professional Engineer Seal for James A. Lutz, State of Texas, License No. 84722. Signature of James A. Lutz, P.E. Date: 2/6/2023.



REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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FM 2200
SIDEWALK CONSTRUCTION PLAN

STA 720+00 TO STA 722+00

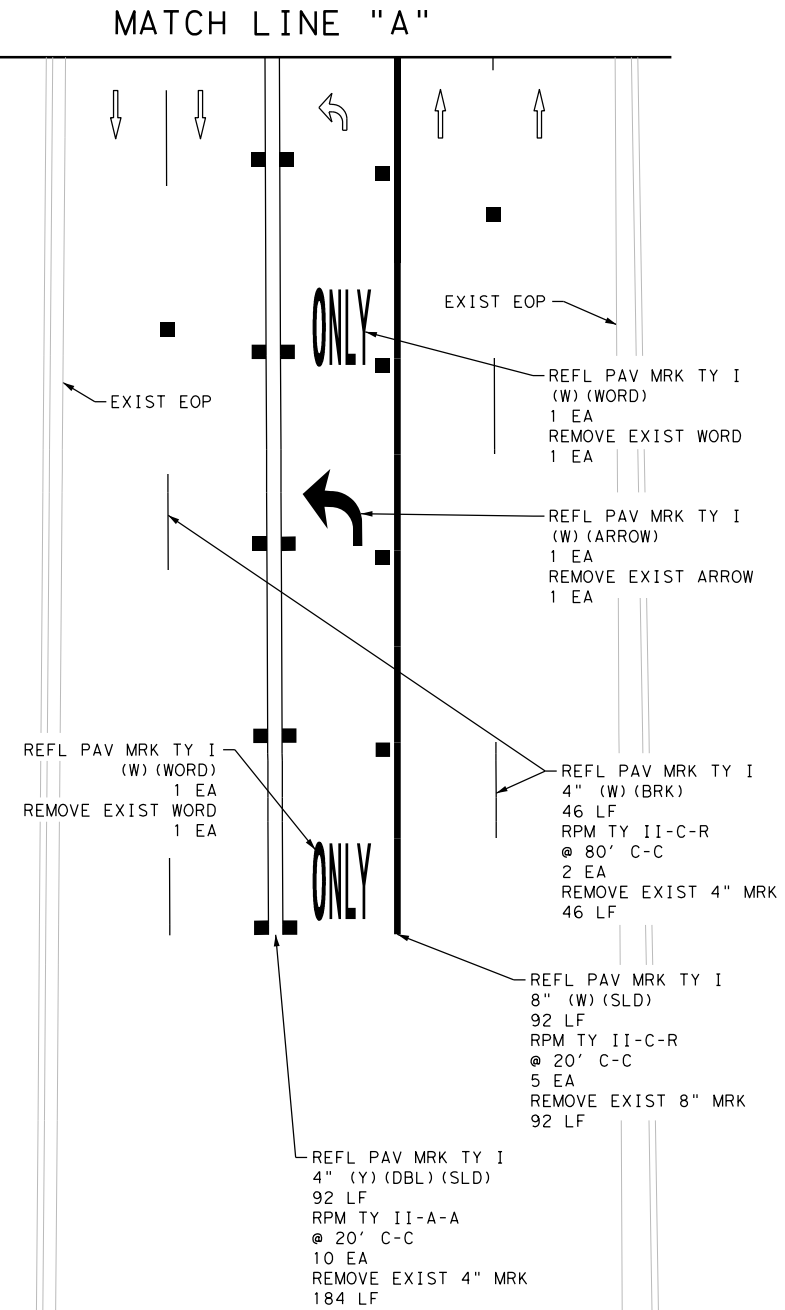
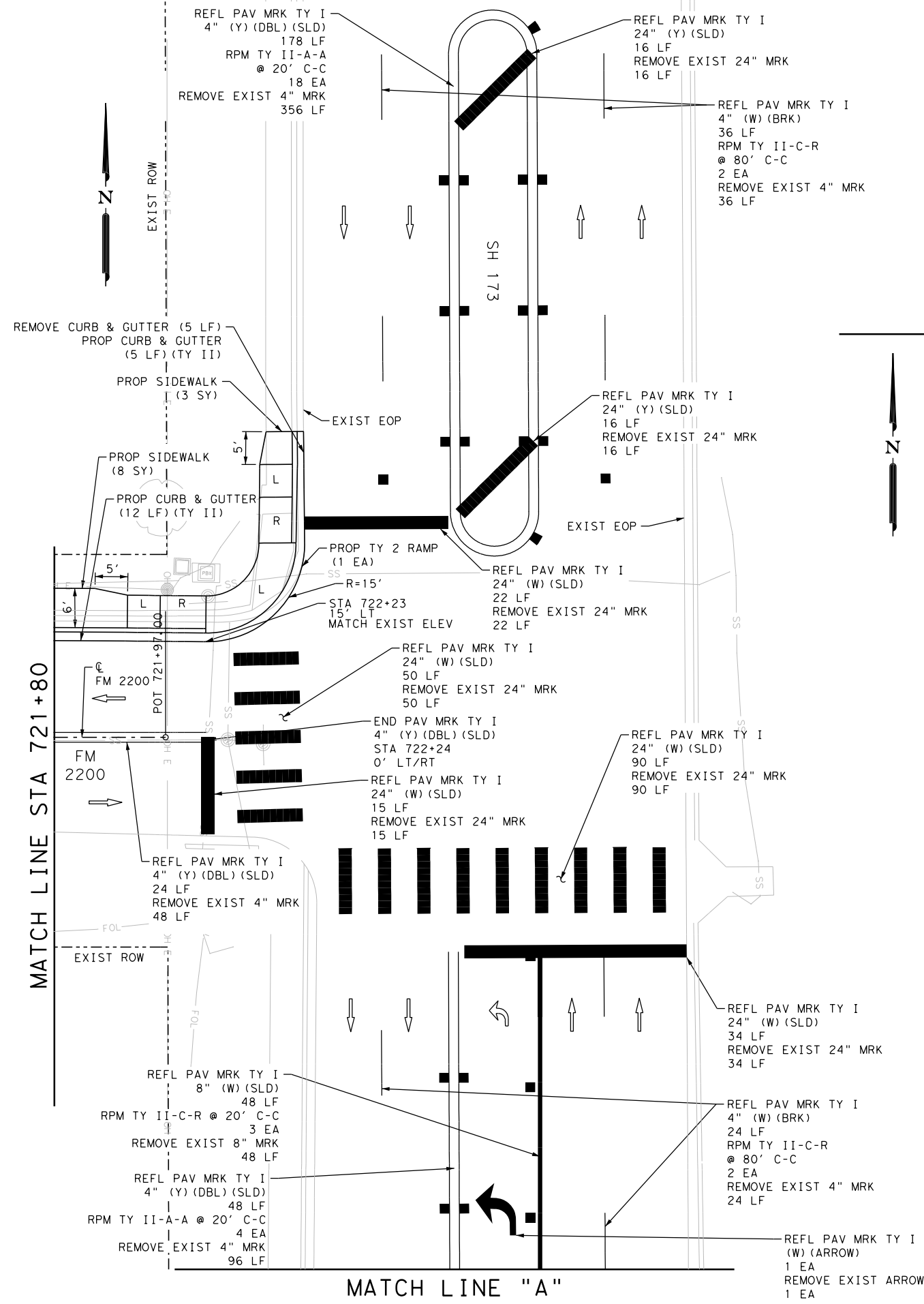
SHEET 10 OF 11

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	106

Plotted on: 2/6/2023

Design File name: P:\11799\04\Design\Civil\Roadway\1179904_SW11.dgn

CSJ 2520-01-016 QUANTITIES				
ITEM	DESCRIPTION	UNIT	QTY	
0100-6002	PREPARING ROW	STA	0.2	
0104-6022	REMOVING CONC (CURB AND GUTTER)	LF	5	
0529-6008	CONC CURB & GUTTER (TY II)	LF	17	
0531-6001	CONC SIDEWALKS (4")	SY	11	
0531-6005	CURB RAMPS (TY 2)	EA	1	
0666-6036	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	140	
0666-6048	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	211	
0666-6054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	2	
0666-6078	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	2	
0666-6147	REFL PAV MRK TY I (Y) 24" (SLD) (100MIL)	LF	32	
0666-6300	RE PM W/RET REQ TY I (W) 4" (BRK) (100MIL)	LF	106	
0666-6315	RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	LF	684	
0672-6009	REFL PAV MRKR TY II-A-A	EA	32	
0672-6010	REFL PAV MRKR TY II-C-R	EA	14	
0677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	790	
0677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	140	
0677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	243	
0677-6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	2	
0677-6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	2	



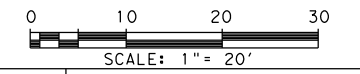
NOTES
 1. SEE SHEET 83 FOR SIDEWALK LEGEND AND ADDITIONAL NOTES.

DESIGN

APPROVAL

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 LUKE REED, P.E.
 2/6/2023
 DATE

STATE OF TEXAS
 JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER
 JAMES A. LUTZ, P.E.
 2/6/2023
 DATE



REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

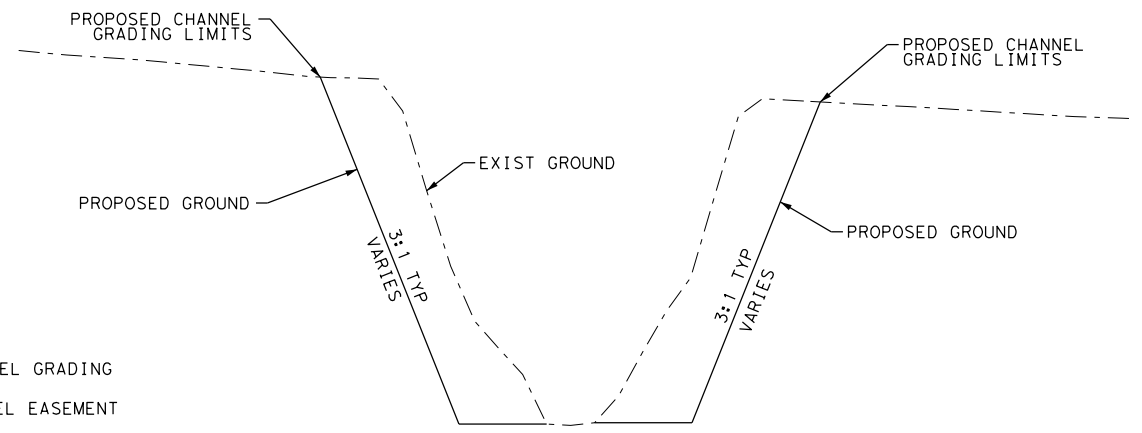
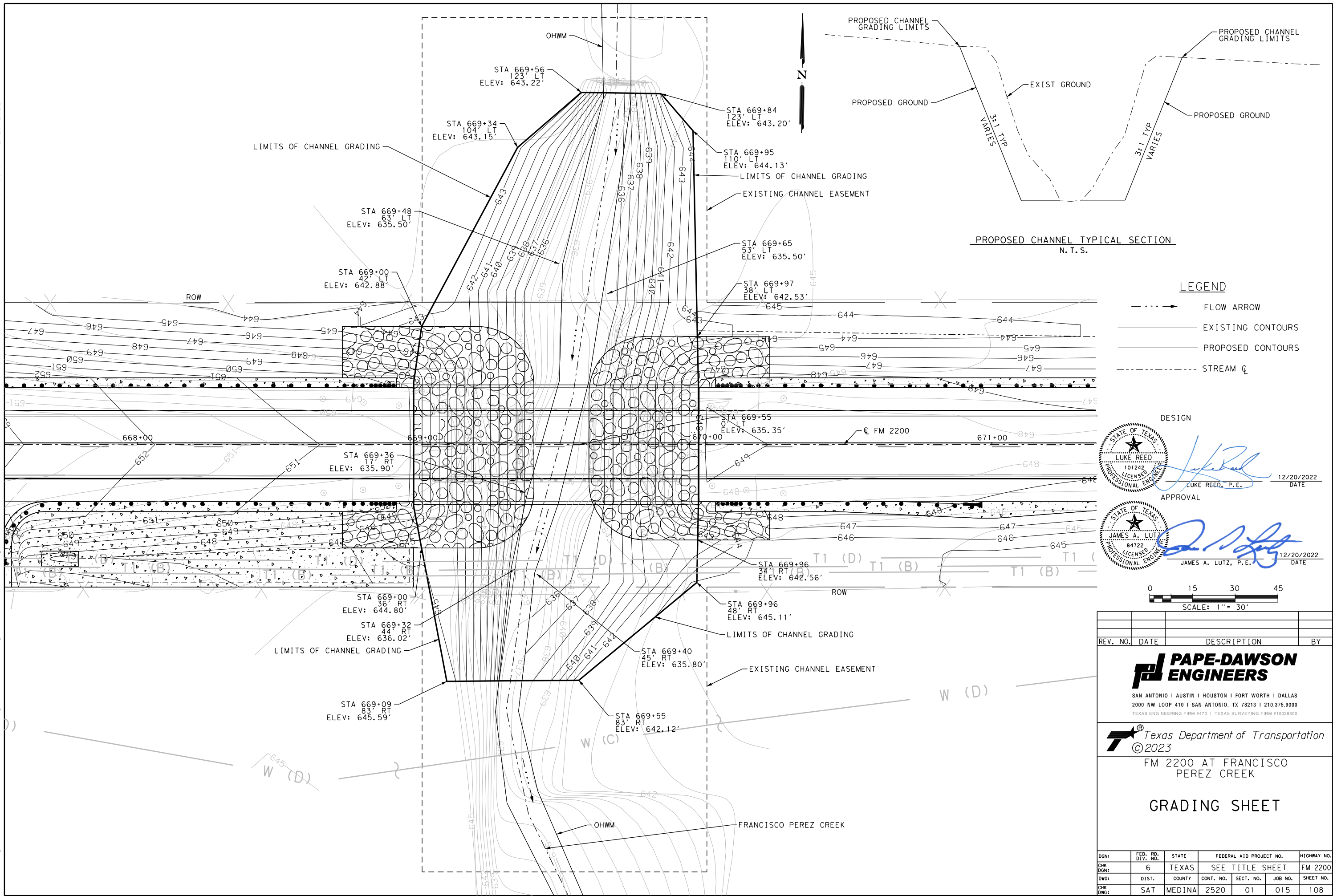
Texas Department of Transportation
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FM 2200
SIDEWALK CONSTRUCTION PLAN
 STA 720+00 TO END PROJECT
 SHEET 11 OF 11

DIST.	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
SAT	6	TEXAS	SEE TITLE SHEET	FM 2200	
DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
SAT	MEDINA	2520	01	016, ETC	107

Plotted on: 12/20/2022

Design File name: P:\117\99\03\Design\Civil\Roadway\1179903GRADING.dgn



LEGEND

- FLOW ARROW
- EXISTING CONTOURS
- PROPOSED CONTOURS
- STREAM C

DESIGN

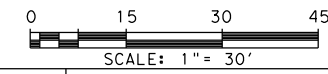
STATE OF TEXAS
LUKE REED
101242
LICENSED PROFESSIONAL ENGINEER

APPROVAL

STATE OF TEXAS
JAMES A. LUTZ
84722
LICENSED PROFESSIONAL ENGINEER

LUKE REED, P.E. 12/20/2022 DATE

JAMES A. LUTZ, P.E. 12/20/2022 DATE



REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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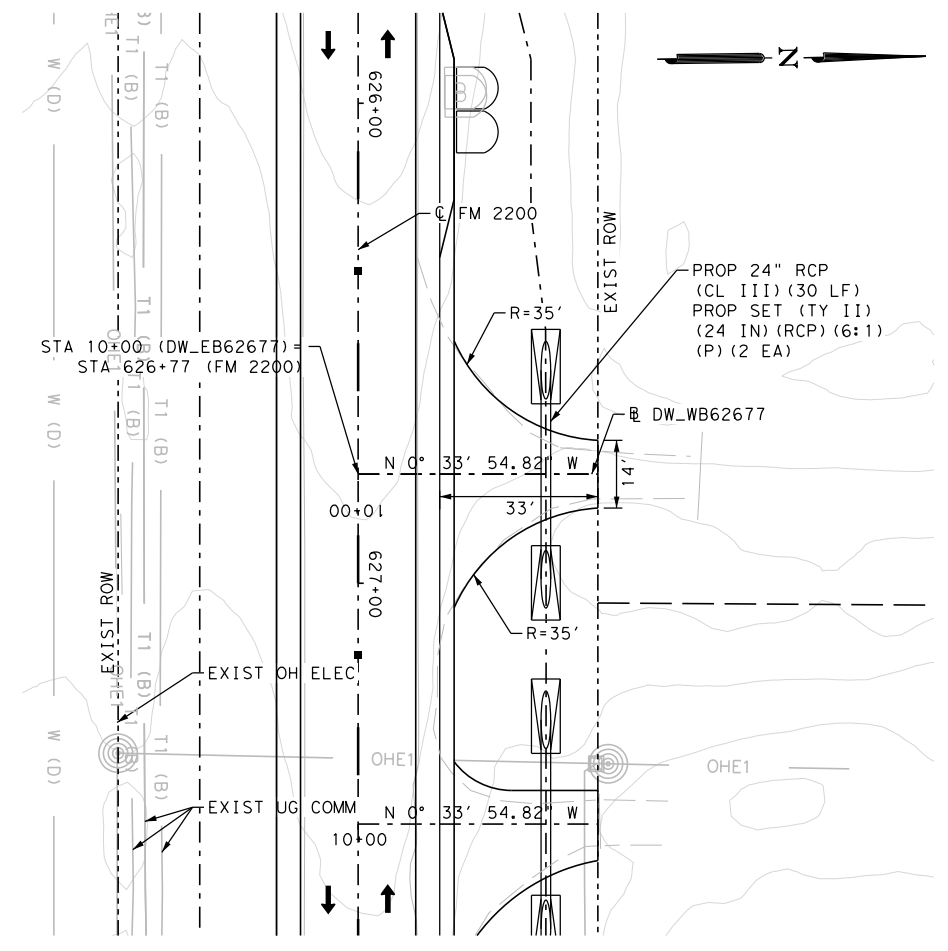
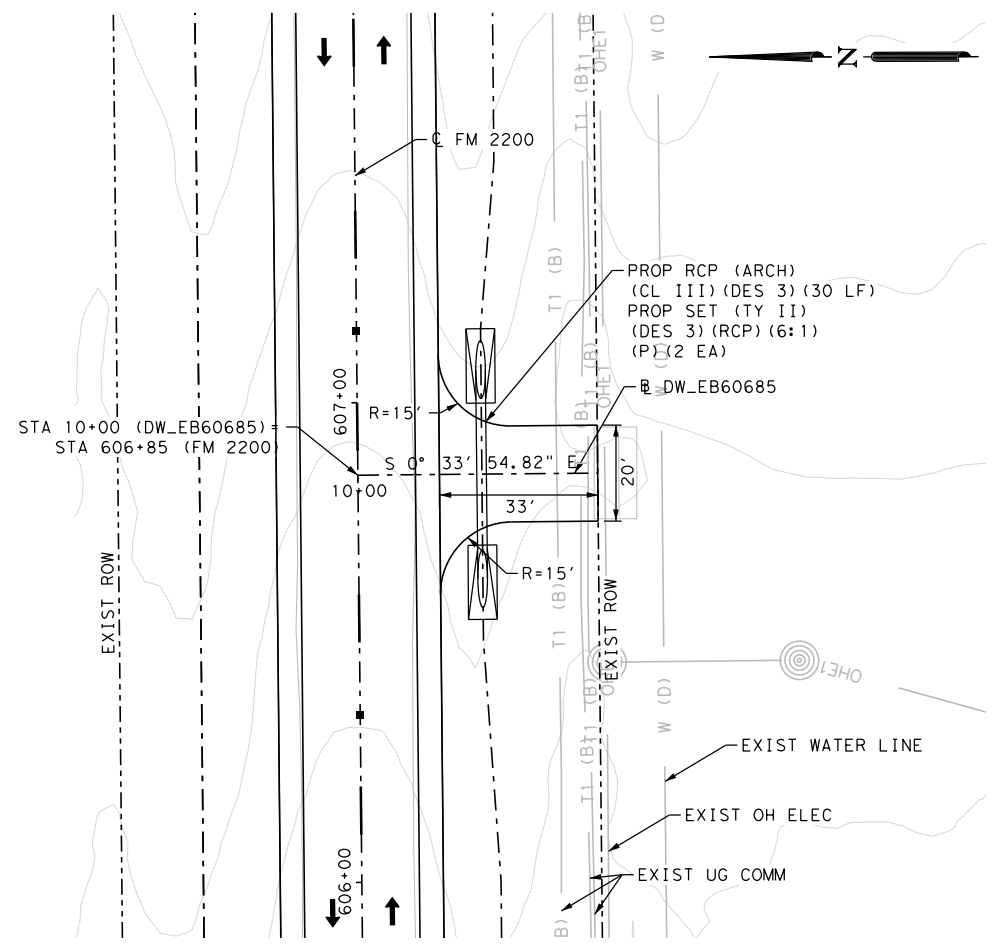
FM 2200 AT FRANCISCO PEREZ CREEK

GRADING SHEET

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	MEDINA	2520	01
				JOB NO.:
				015
				SHEET NO.:
				108

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveway\1179904DRV_PFO1.dgn



- LEGEND**
- EXIST ROW
 - - - PROP PENETRATION
 - - - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - PROP TRAFFIC FLOW
 - - - EXIST CONTOUR
 - - - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - x - EXIST FENCE
 - - - -> FLOW ARROW
 - - - UTILITY IN CONFLICT
 - - - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER

LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 8472
 LICENSED PROFESSIONAL ENGINEER

JAMES A. LUTZ, P.E. 12/20/2022 DATE

SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

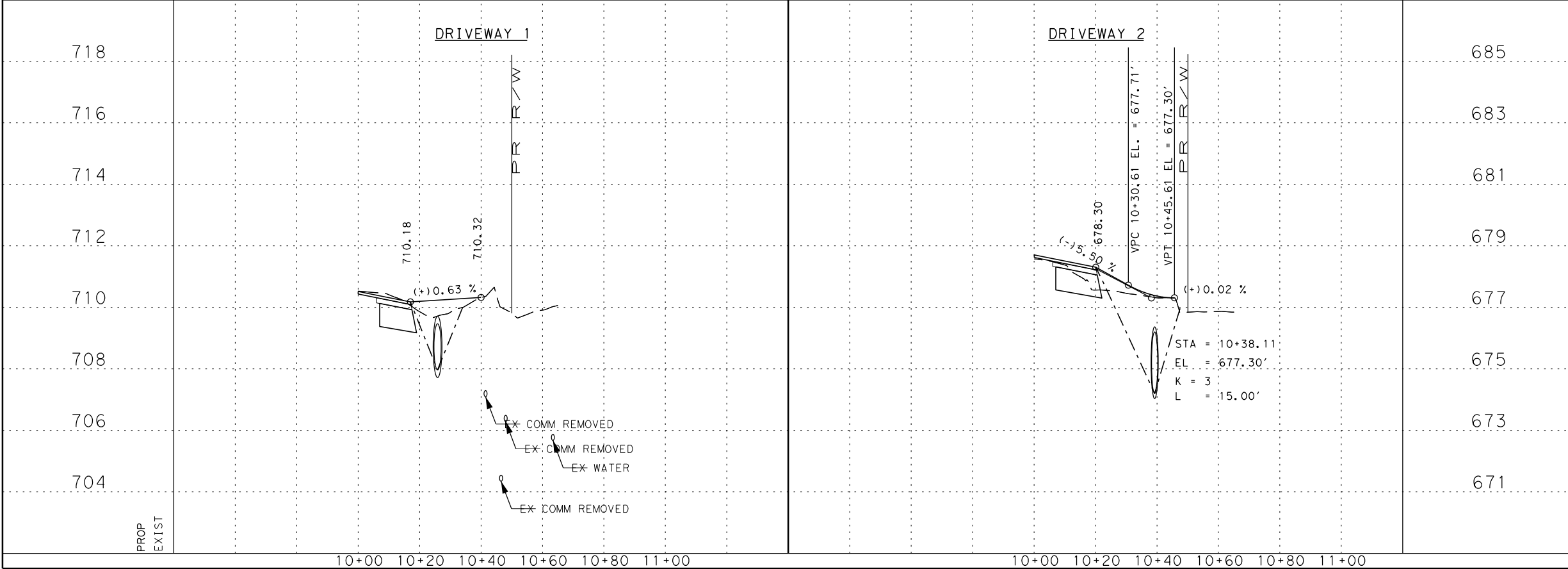
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1028800

Texas Department of Transportation
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FM 2200
**DRIVEWAY
 PLAN & PROFILE**

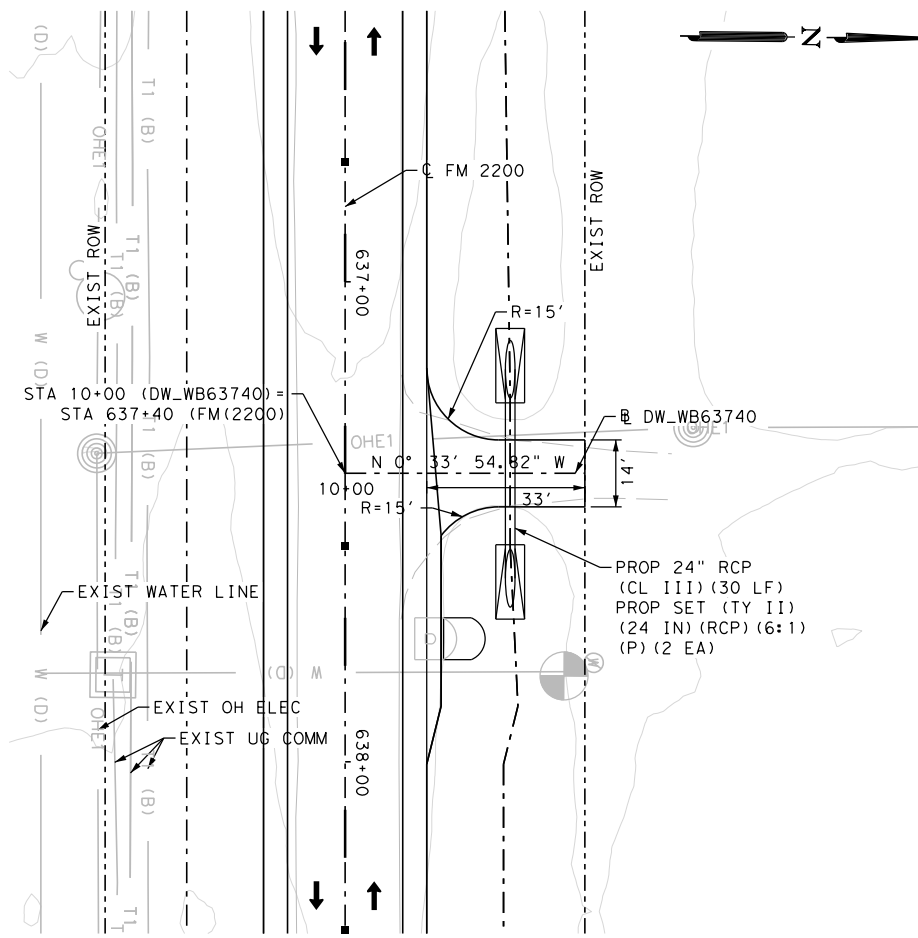
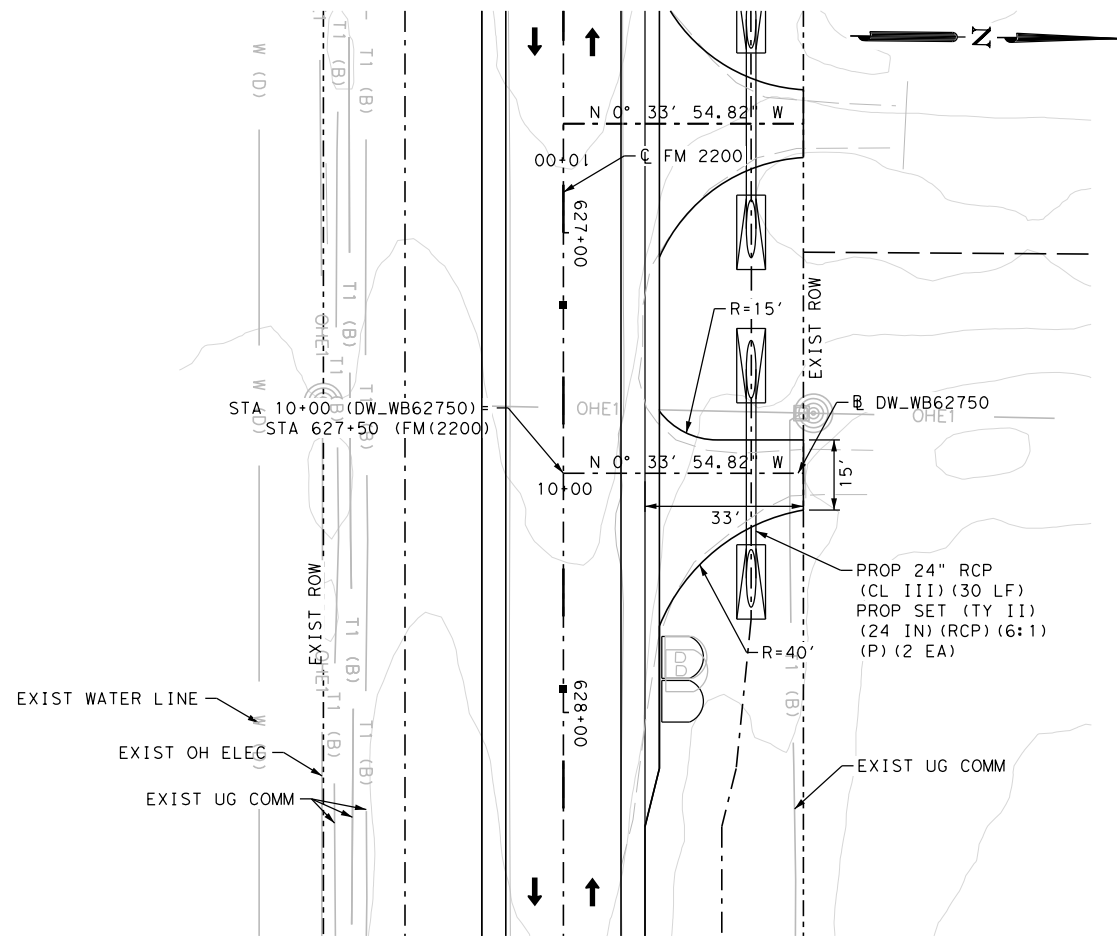
SHEET 1 OF 25

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	109



Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP02.dgn



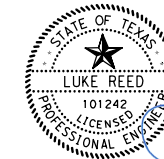
LEGEND

- EXIST ROW
- - - PROP PENETRATION
- WIDEN CONTROL LINE
- ⇐ EXIST TRAFFIC FLOW
- ⇐ PROP TRAFFIC FLOW
- EXIST CONTOUR
- PROP CONTOUR
- UTILITY POLE
- ⊞ TELEPHONE PEDESTAL
- X --- EXIST FENCE
- > FLOW ARROW
- UTILITY IN CONFLICT
- UTILITY CONFLICT RESOLVED
- ⊙ SUE QL-A LOCATION

NOTES:

1. PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

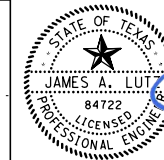
DESIGN



LUKE REED, P.E.

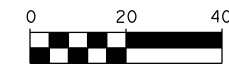
12/20/2022
DATE

APPROVAL



JAMES A. LUTZ, P.E.

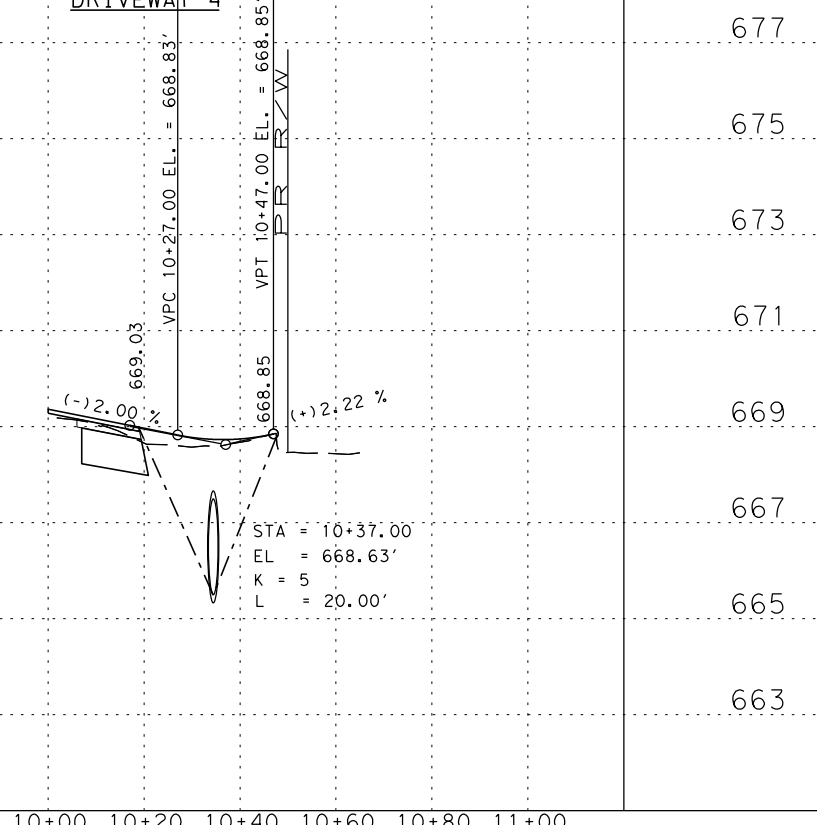
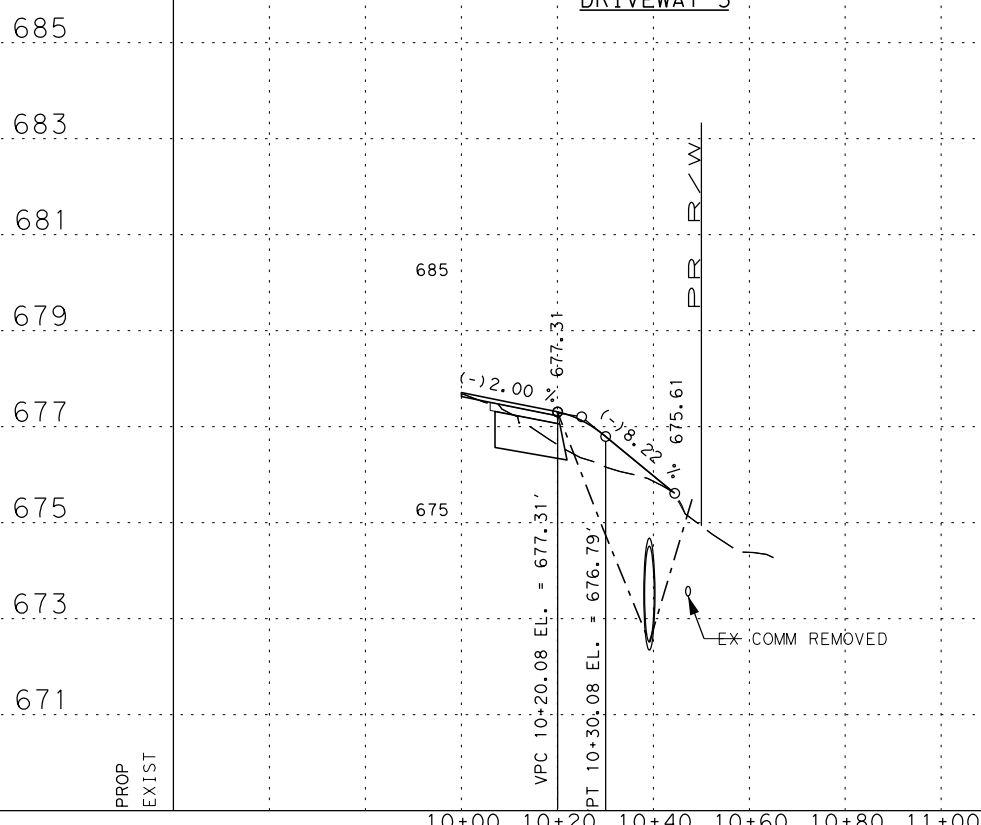
12/20/2022
DATE



SCALE: PLAN 1" = 40' PROFILE 1" = 2'

DRIVEWAY 3

DRIVEWAY 4



REV. NO.	DATE	DESCRIPTION	BY



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2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



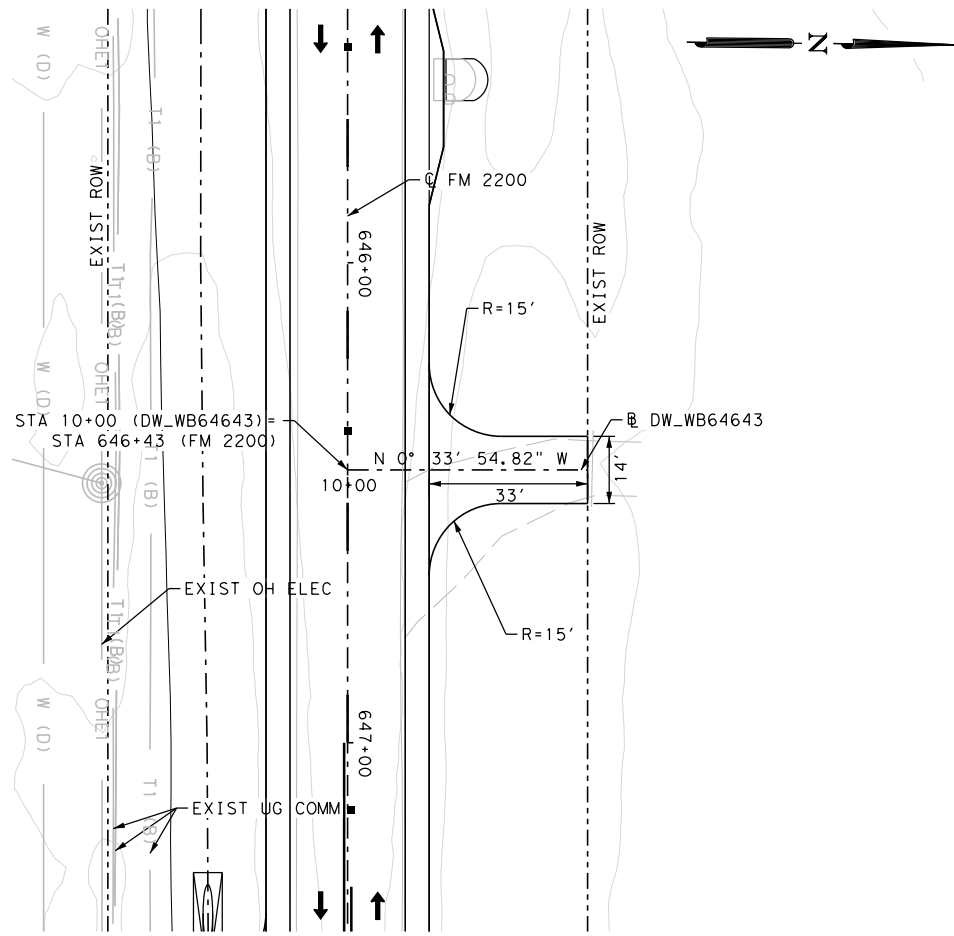
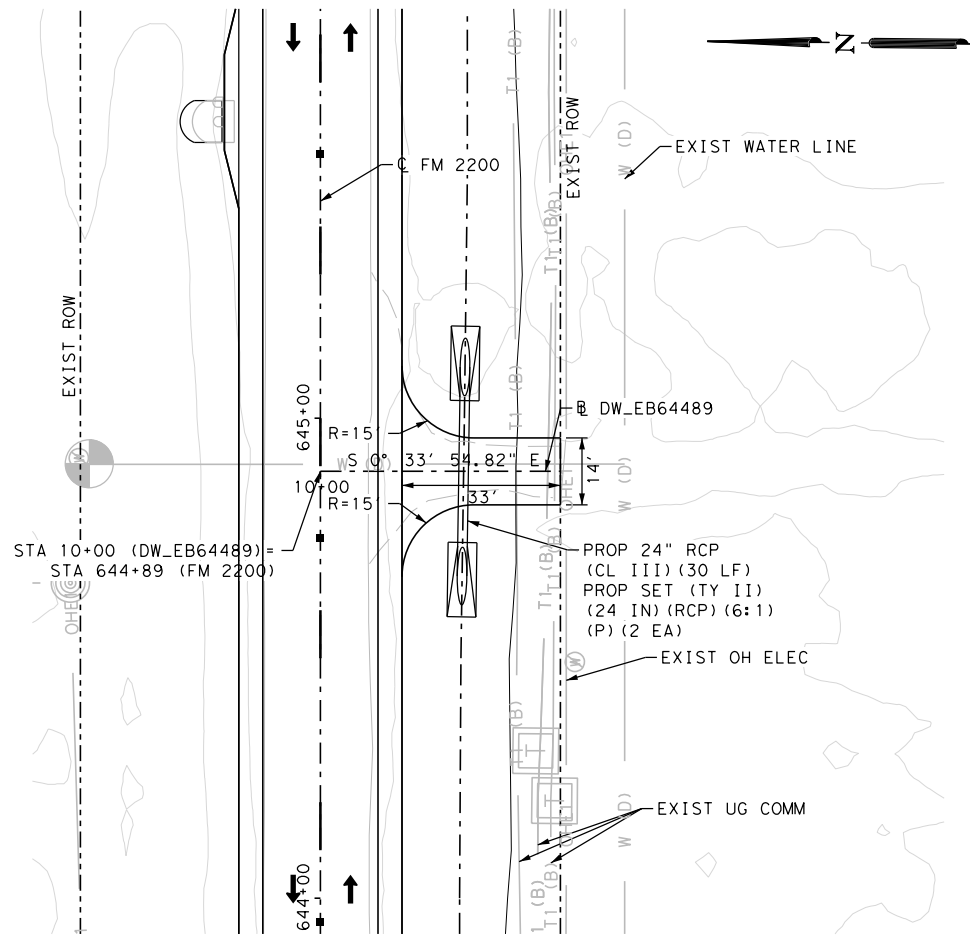
FM 2200
**DRIVEWAY
PLAN & PROFILE**

SHEET 2 OF 25

CHK	DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK	DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
CHK	DGN:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK	DGN:	SAT	MEDINA	2520	01	016, ETC	110

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP03.dgn




- LEGEND**
- EXIST ROW
 - PROP PENETRATION
 - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - ← PROP TRAFFIC FLOW
 - EXIST CONTOUR
 - PROP CONTOUR
 - UTILITY POLE
 - ☐ TELEPHONE PEDESTAL
 - X — EXIST FENCE
 - FLOW ARROW
 - UTILITY IN CONFLICT
 - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN


 LUKE REED, P.E. 12/20/2022 DATE

APPROVAL


 JAMES A. LUTZ, P.E. 12/20/2022 DATE

SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

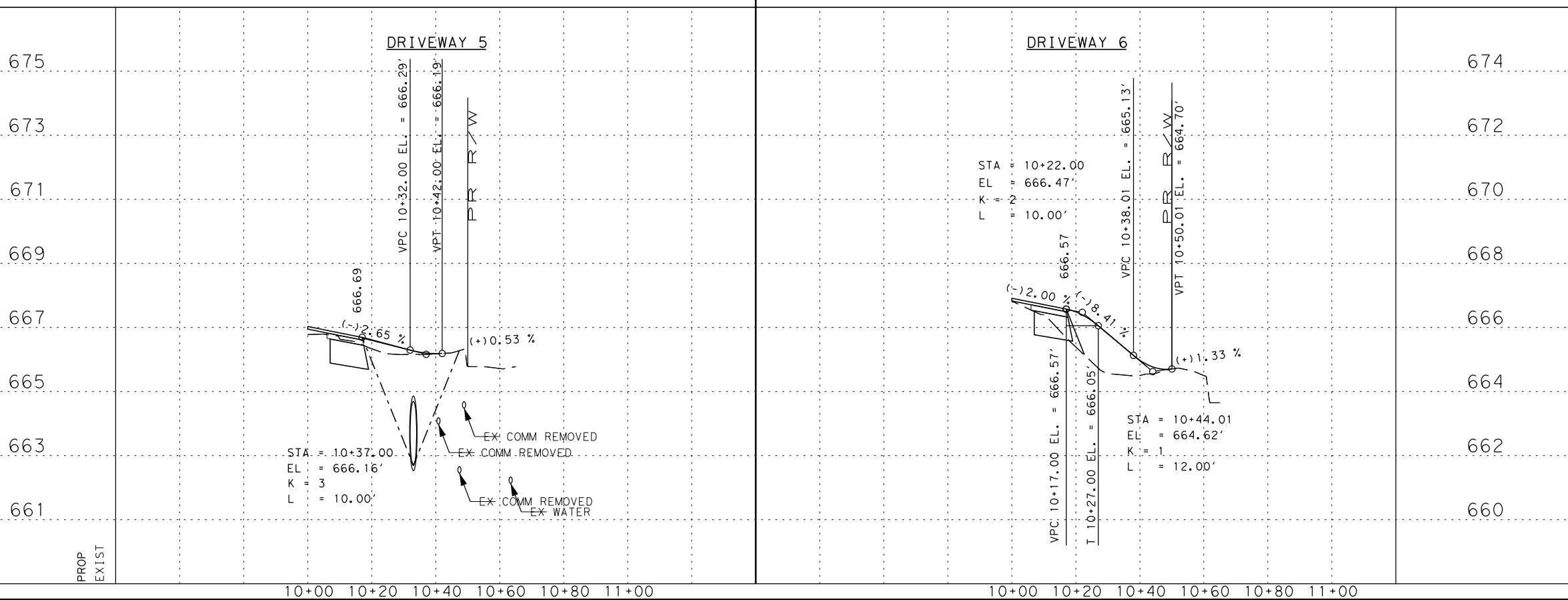
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800

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FM 2200
**DRIVEWAY
 PLAN & PROFILE**

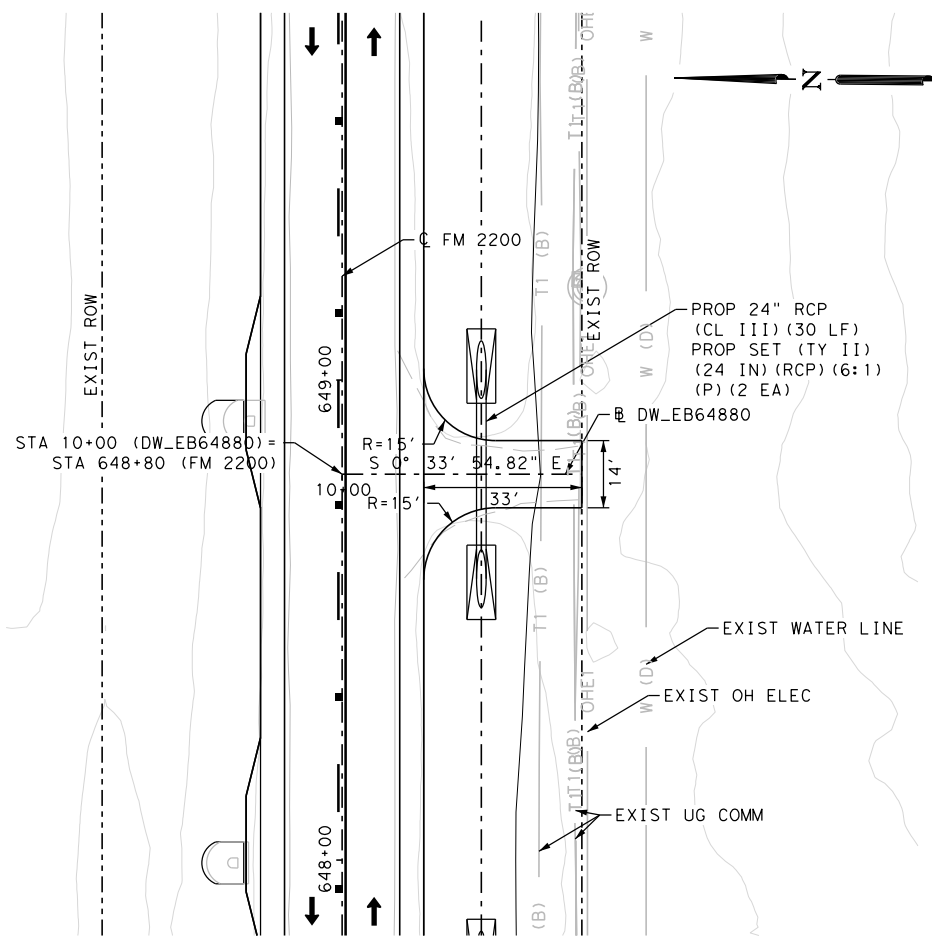
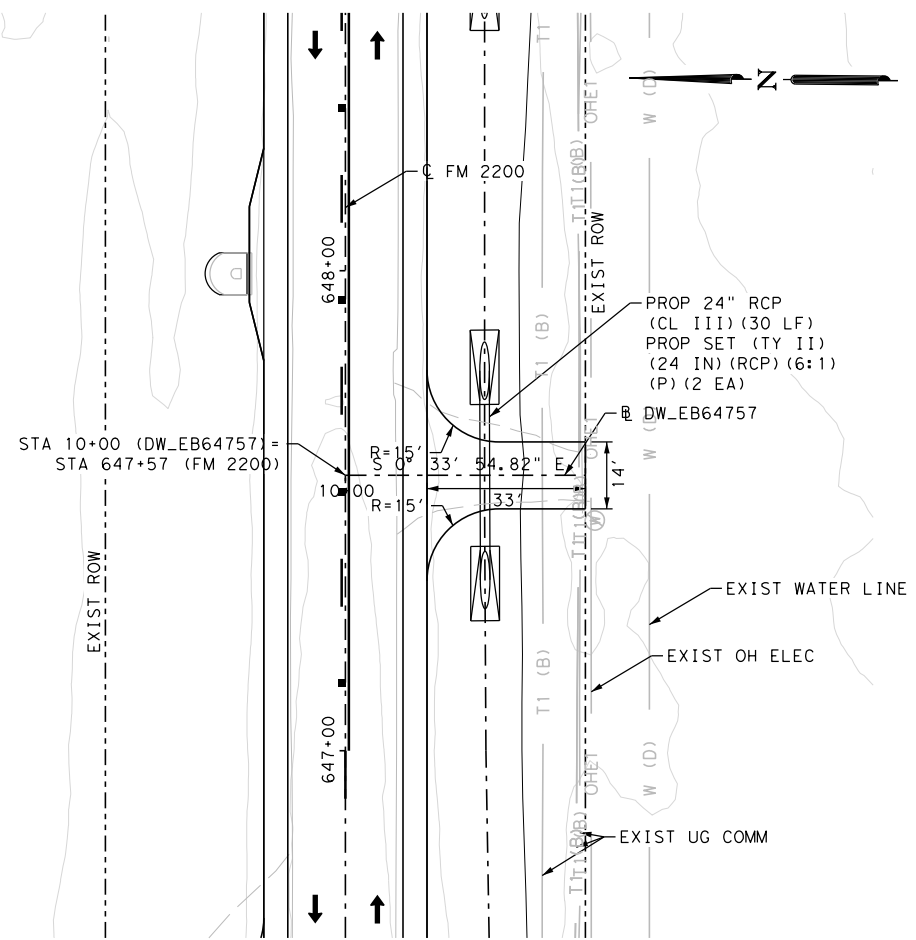
SHEET 3 OF 25

CHK	DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
		6	TEXAS	SEE TITLE SHEET	FM 2200		
CHK	DGN:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
		SAT	MEDINA	2520	01	016, ETC	111



Plotted on: 12/20/2022

Design File name: P:\117.99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP04.dgn



- LEGEND**
- EXIST ROW
 - PROP PENETRATION
 - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - ← PROP TRAFFIC FLOW
 - EXIST CONTOUR
 - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - X — EXIST FENCE
 - FLOW ARROW
 - UTILITY IN CONFLICT
 - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

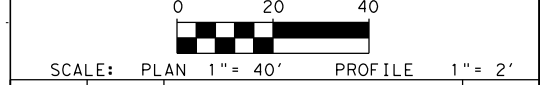
- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

JAMES A. LUTZ, P.E. 12/20/2022 DATE



REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

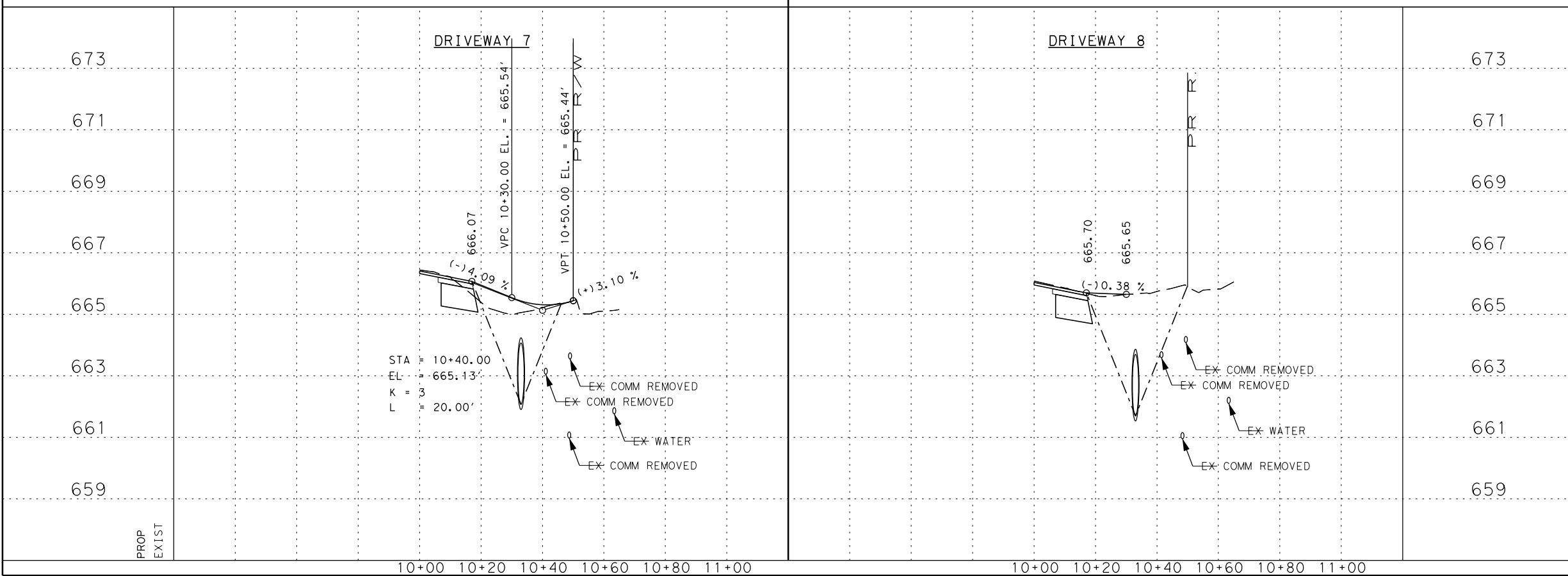
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
DRIVEWAY PLAN & PROFILE

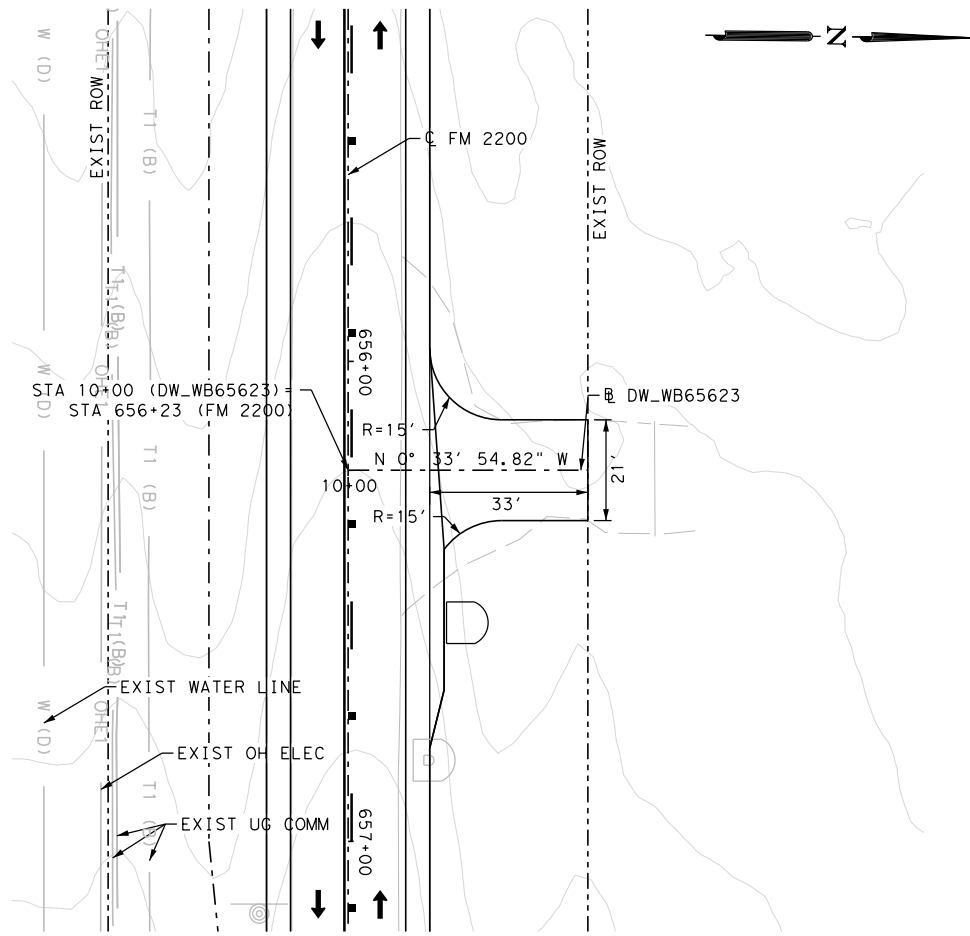
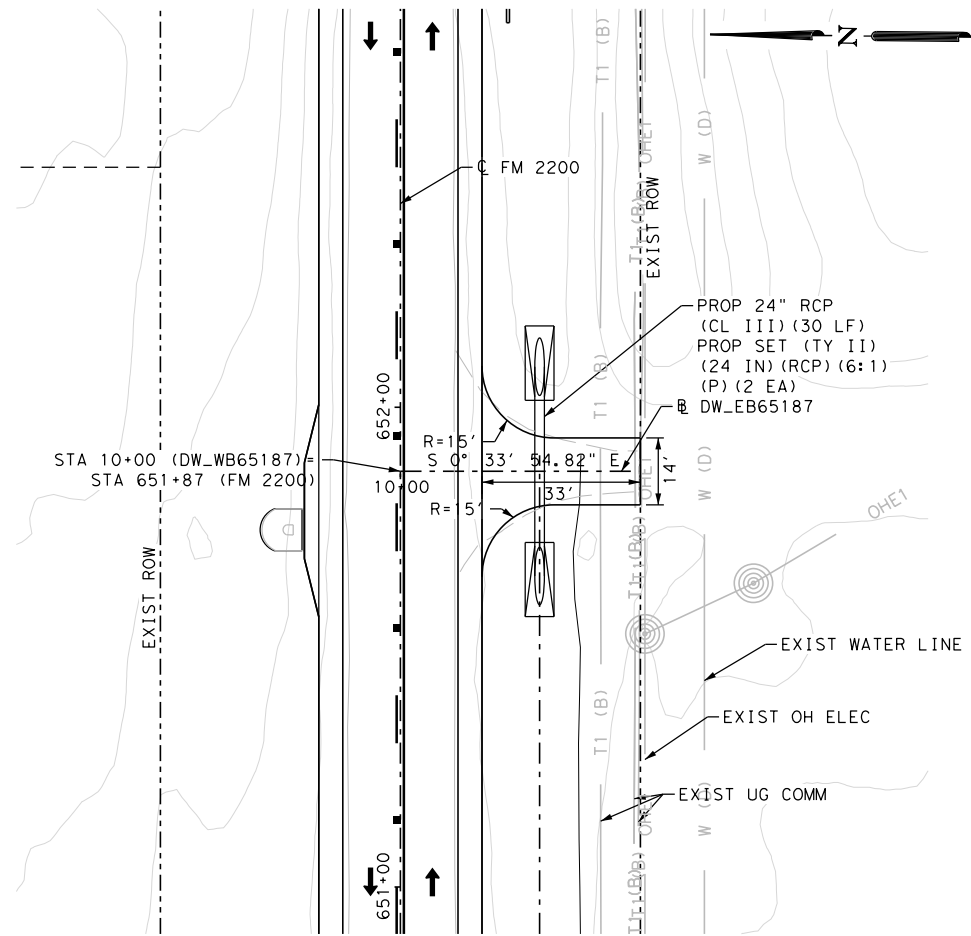
SHEET 4 OF 25

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 112



Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP05.dgn



- LEGEND**
- EXIST ROW
 - PROP PENETRATION
 - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - ← PROP TRAFFIC FLOW
 - EXIST CONTOUR
 - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - X --- EXIST FENCE
 - > FLOW ARROW
 - UTILITY IN CONFLICT
 - UTILITY CONFLICT RESOLVED
 - ⊕ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER
 JAMES A. LUTZ, P.E. 12/20/2022 DATE



REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

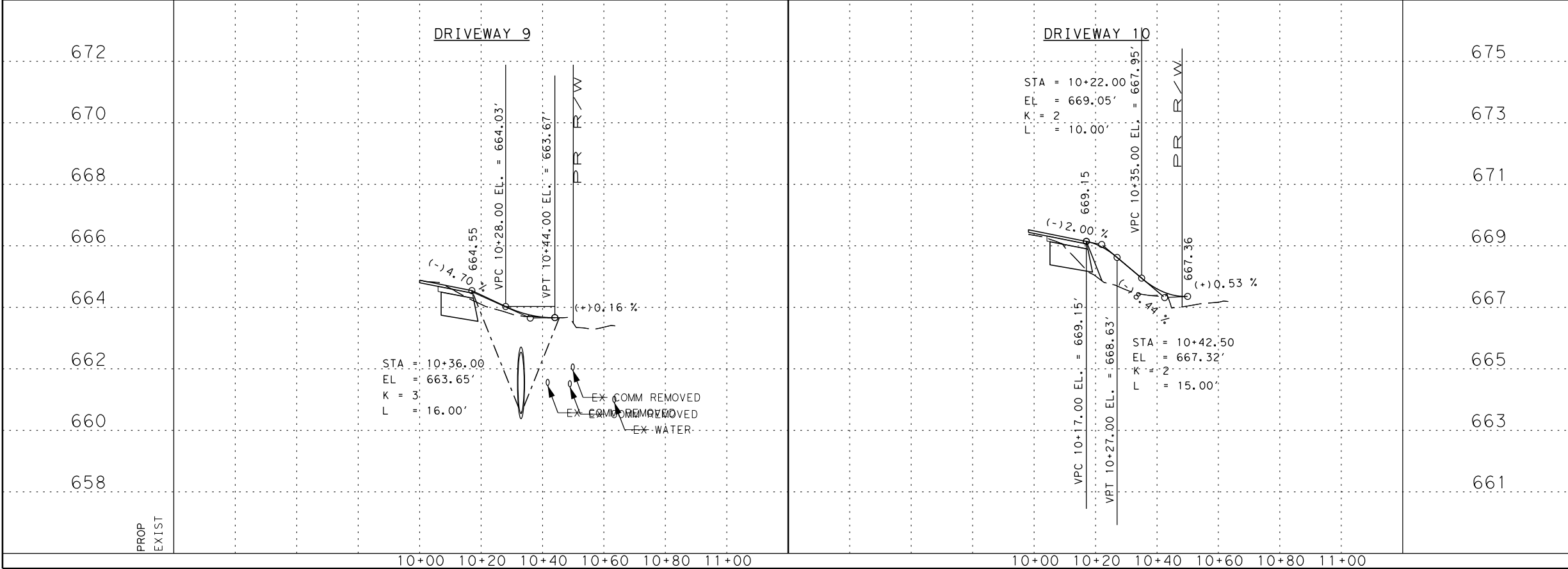
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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FM 2200
**DRIVEWAY
 PLAN & PROFILE**

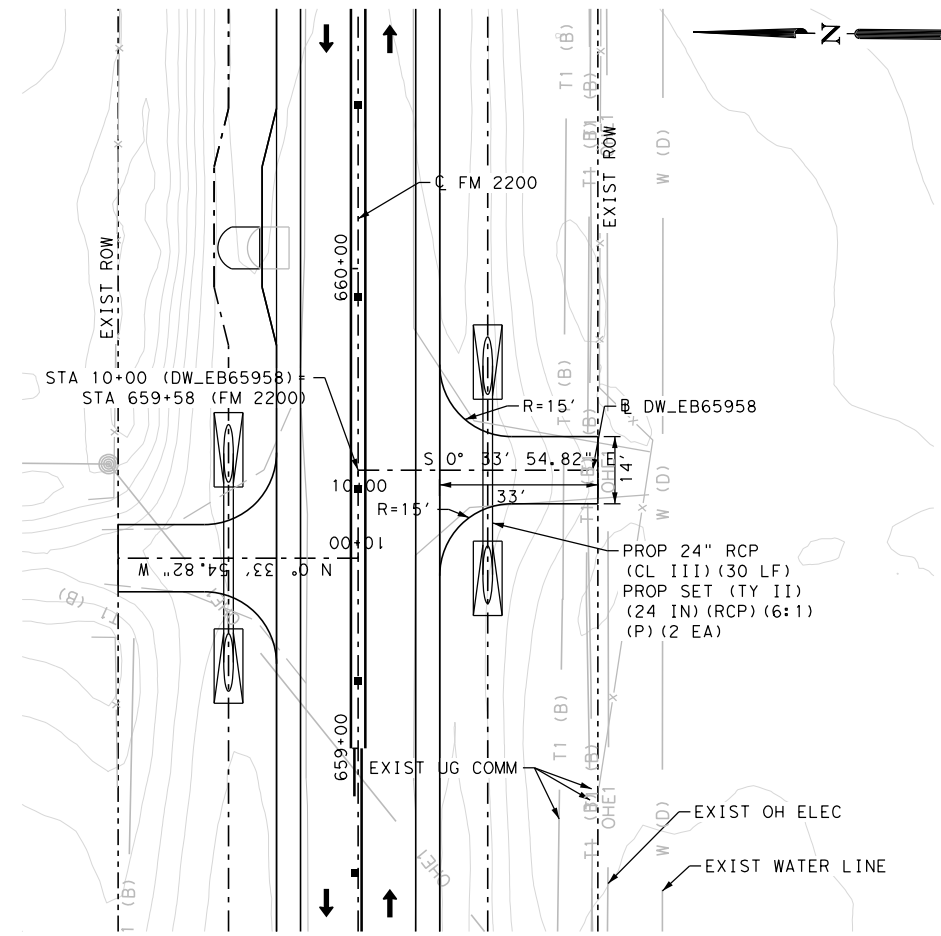
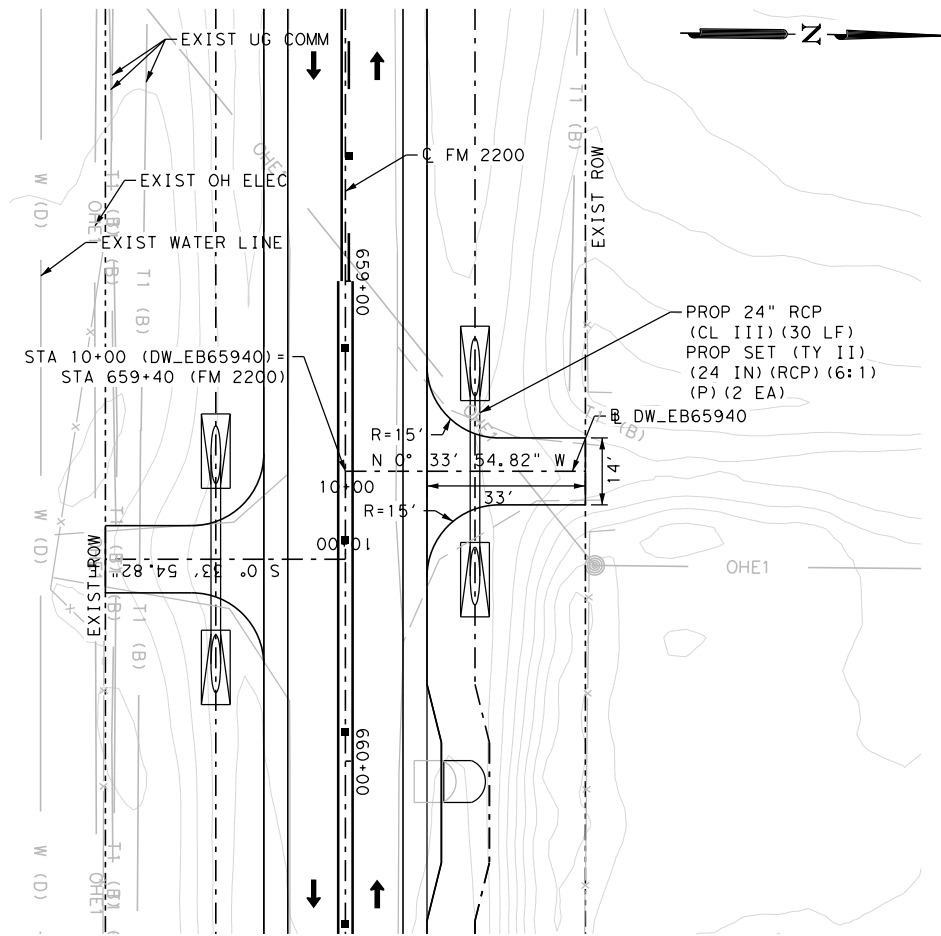
SHEET 5 OF 25

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	113



Plotted on: 12/20/2022

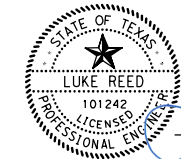
Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP06.dgn



- LEGEND**
- EXIST ROW
 - PROP PENETRATION
 - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - ← PROP TRAFFIC FLOW
 - EXIST CONTOUR
 - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - X --- EXIST FENCE
 - >--- FLOW ARROW
 - UTILITY IN CONFLICT
 - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN



LUKE REED
101242
LICENSED PROFESSIONAL ENGINEER

12/20/2022
DATE

APPROVAL



JAMES A. LUTZ
84722
LICENSED PROFESSIONAL ENGINEER

12/20/2022
DATE



SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY



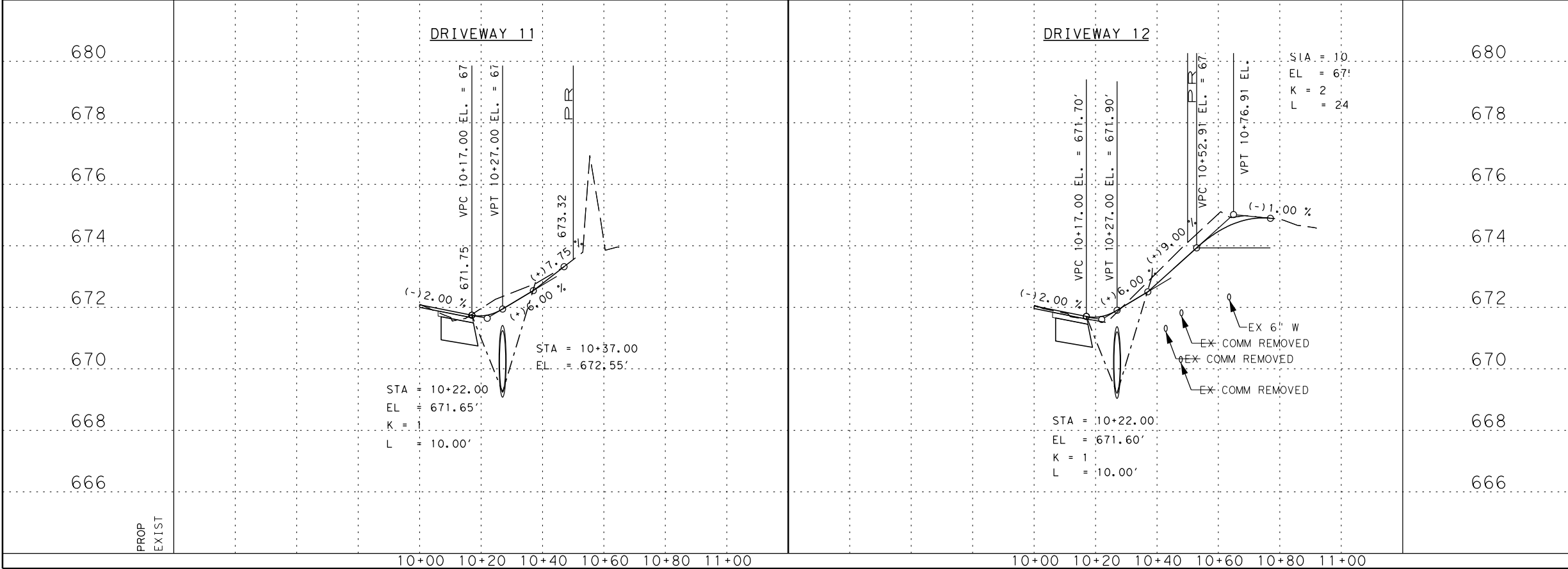
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
**DRIVEWAY
PLAN & PROFILE**

SHEET 6 OF 25

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 114



DRIVEWAY 11

DRIVEWAY 12

SIA = 10
EL = 67'
K = 2
L = 24

STA = 10+22.00
EL = 671.65'
K = 1
L = 10.00'

STA = 10+22.00
EL = 671.60'
K = 1
L = 10.00'

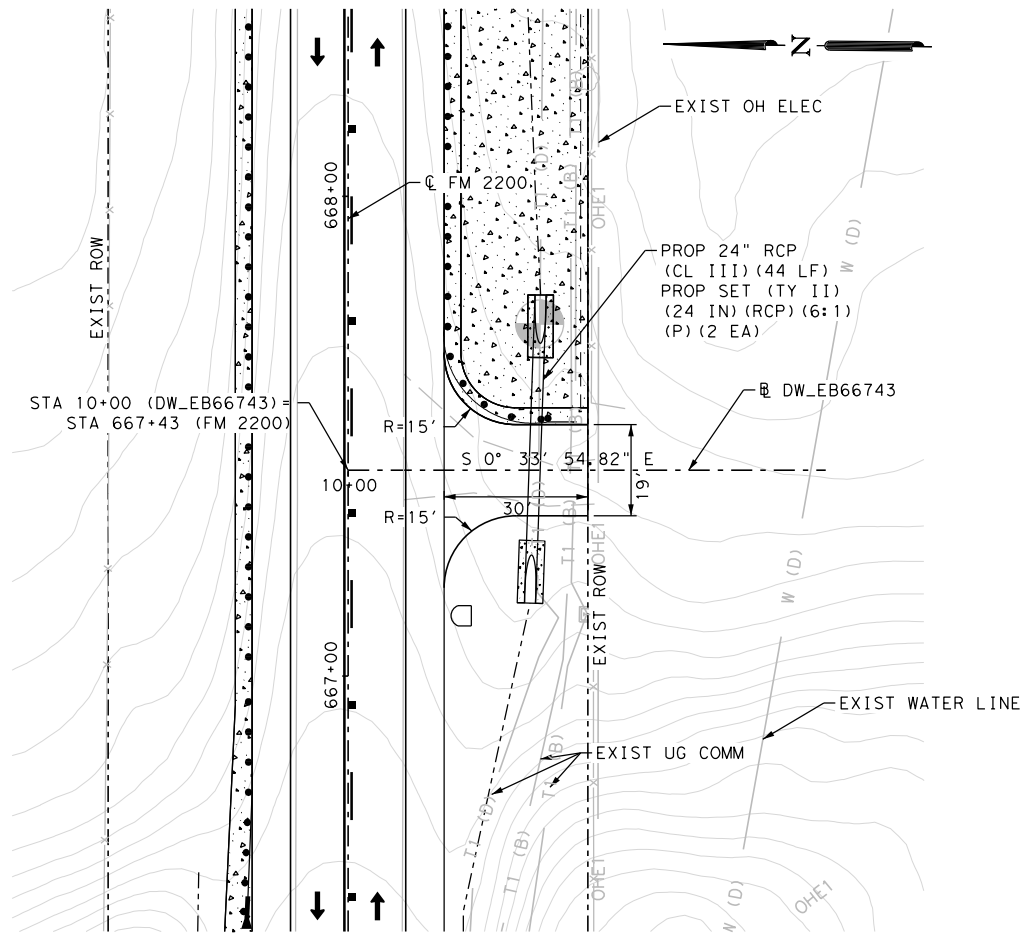
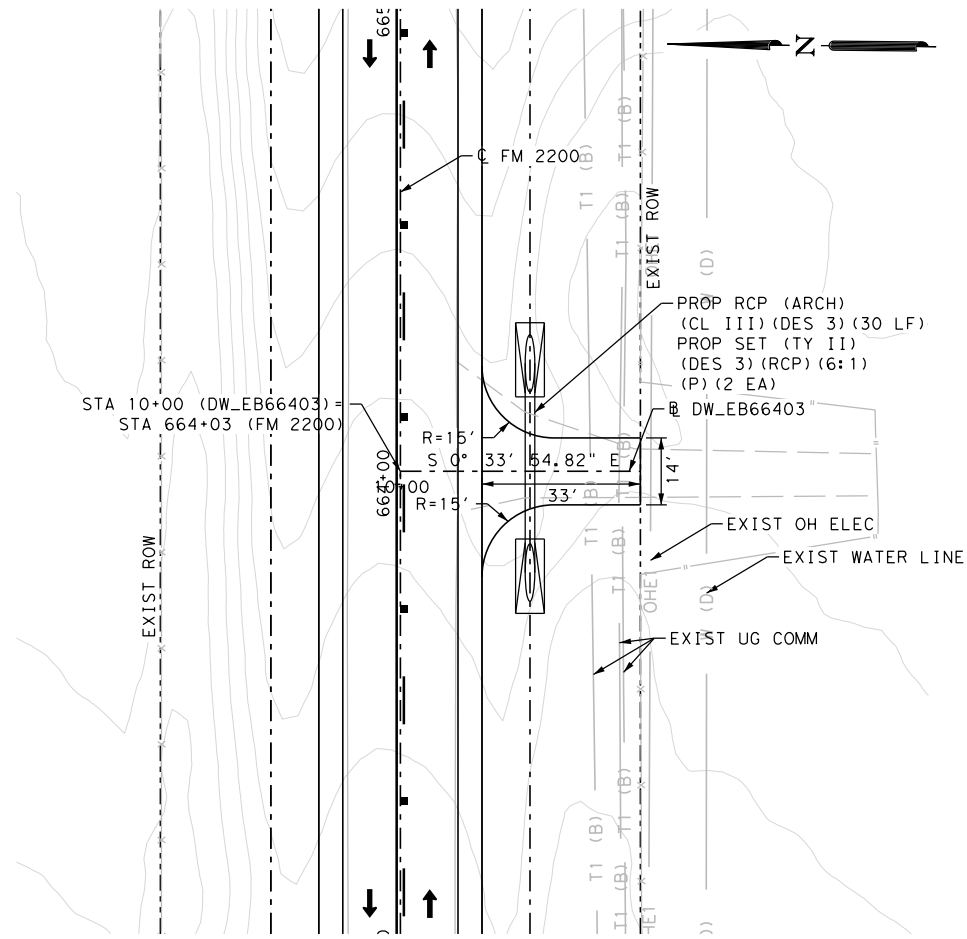
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10+00 10+20 10+40 10+60 10+80 11+00

PROP
EXIST

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP07.dgn



- LEGEND**
- EXIST ROW
 - - - PROP PENETRATION
 - - - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - ← PROP TRAFFIC FLOW
 - - - EXIST CONTOUR
 - - - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - x - EXIST FENCE
 - - - -> FLOW ARROW
 - - - UTILITY IN CONFLICT
 - - - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER
 JAMES A. LUTZ, P.E. 12/20/2022 DATE

SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

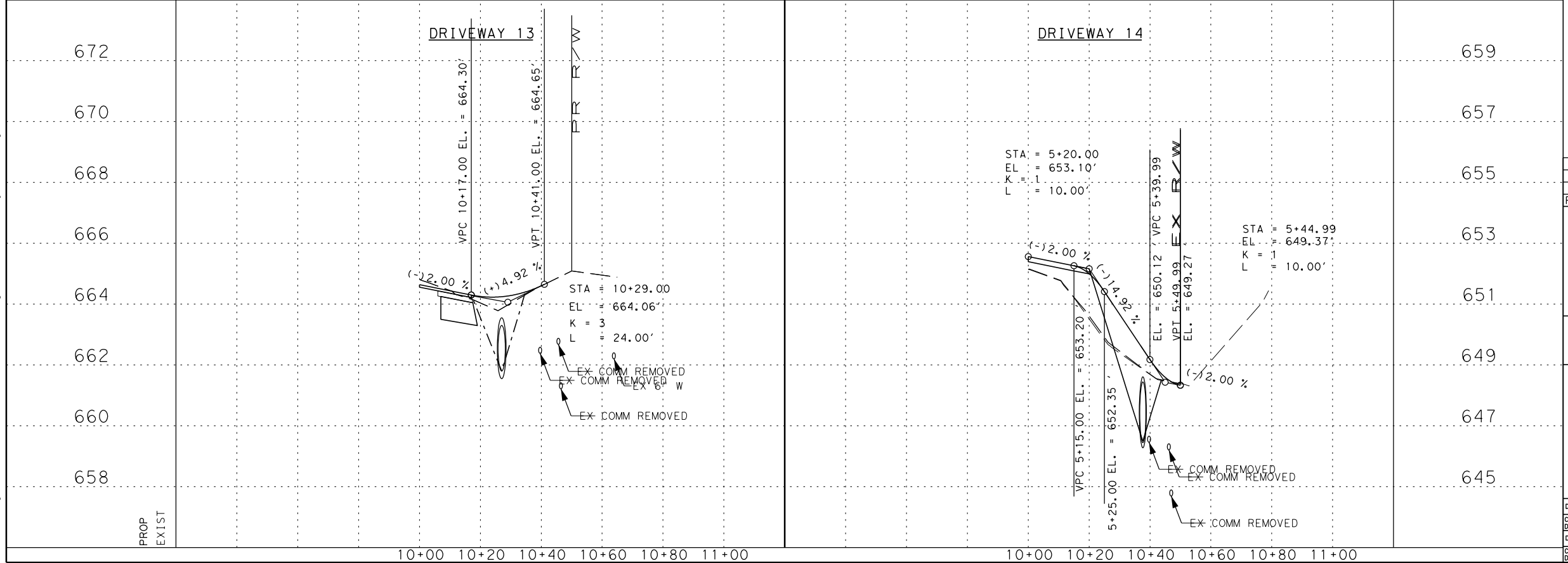
Pape-Dawson Engineers
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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FM 2200
DRIVEWAY PLAN & PROFILE

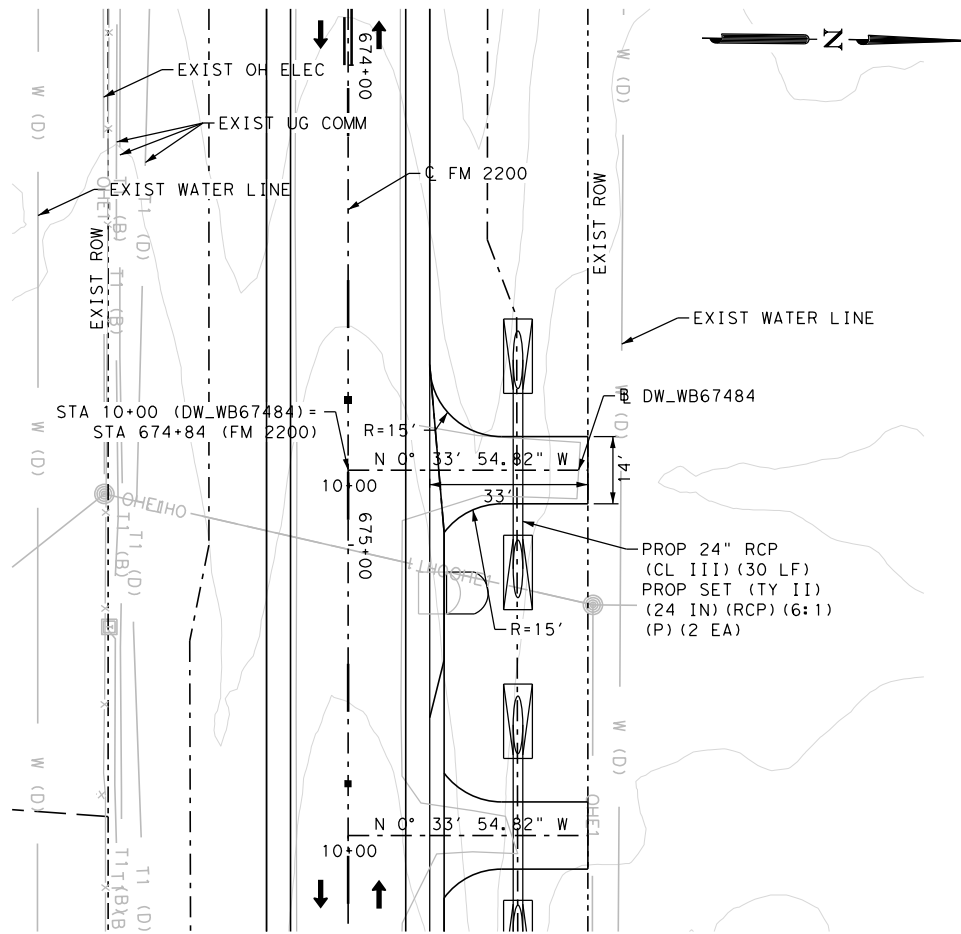
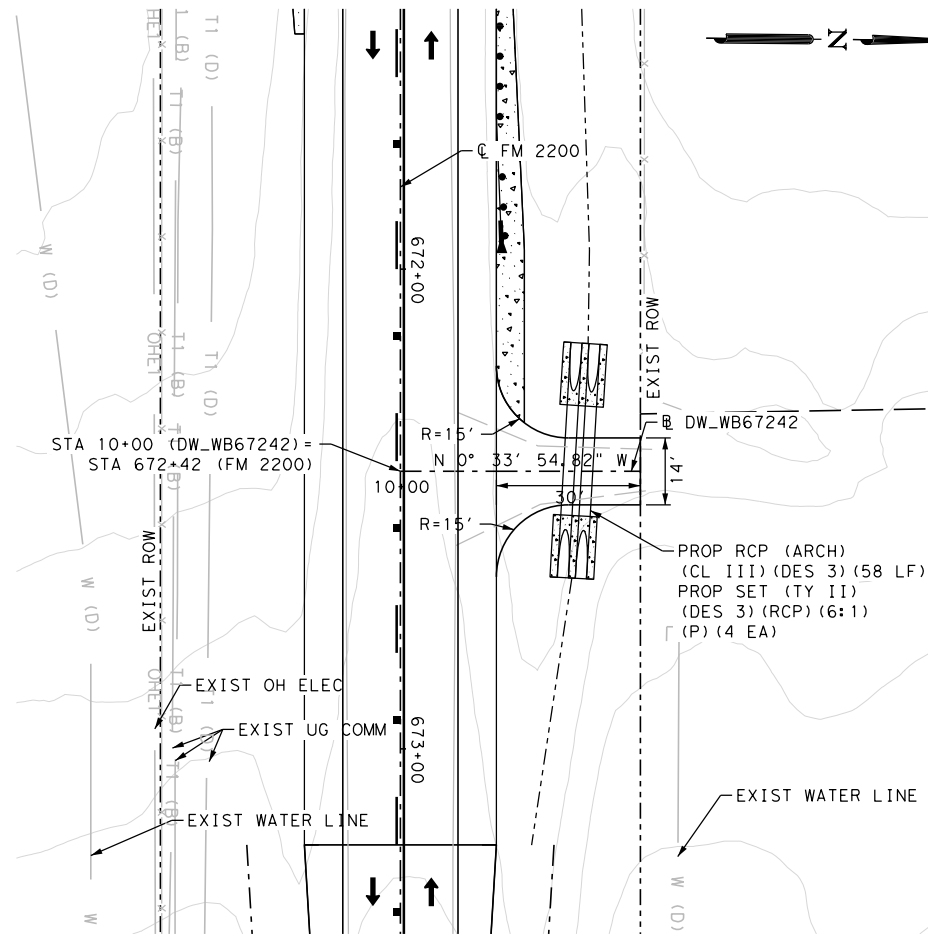
SHEET 7 OF 25

CHK	DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
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CHK	DGN:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
		SAT	MEDINA	2520	01	016, ETC	115



Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP08.dgn



LEGEND

- EXIST ROW
- PROP PENETRATION
- WIDEN CONTROL LINE
- ← EXIST TRAFFIC FLOW
- ← PROP TRAFFIC FLOW
- EXIST CONTOUR
- PROP CONTOUR
- UTILITY POLE
- TELEPHONE PEDESTAL
- X --- EXIST FENCE
- > FLOW ARROW
- UTILITY IN CONFLICT
- UTILITY CONFLICT RESOLVED
- ⊕ SUE QL-A LOCATION

NOTES:

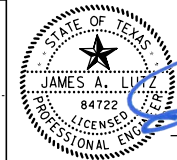
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN



LUKE REED, P.E.
DATE 12/20/2022

APPROVAL



JAMES A. LUTZ, P.E.
DATE 12/20/2022



SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY



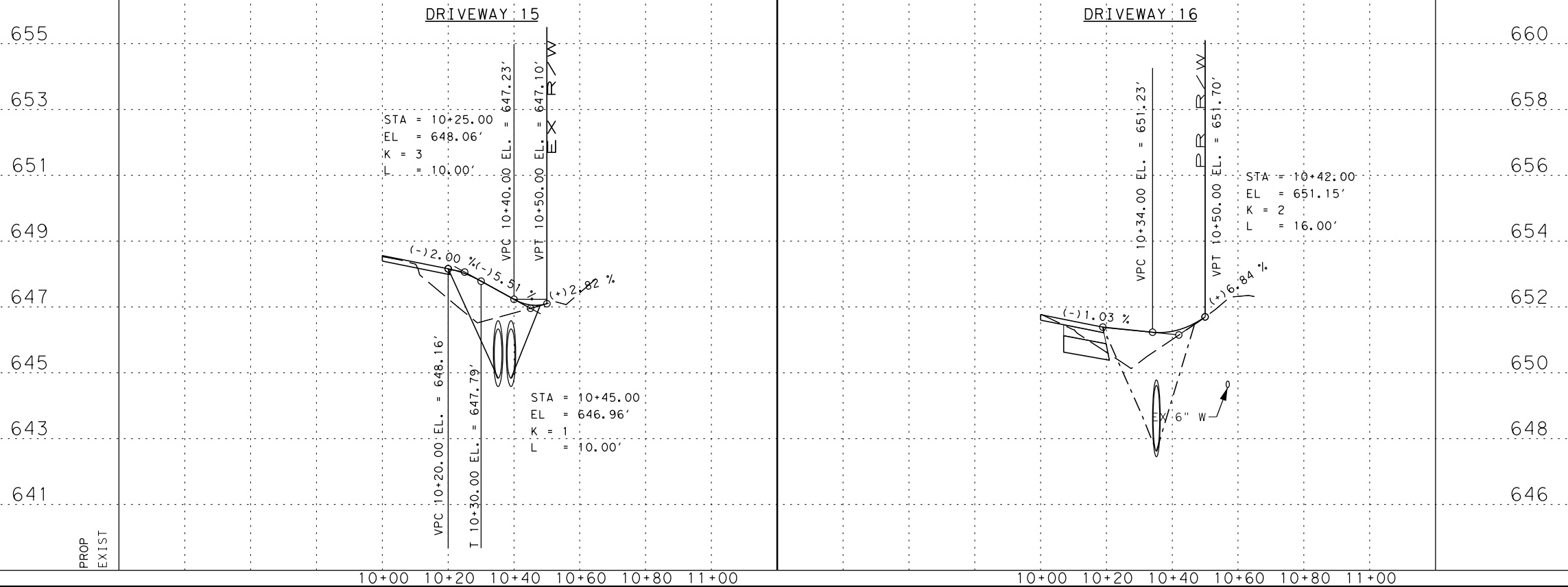
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



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DRIVEWAY
PLAN & PROFILE

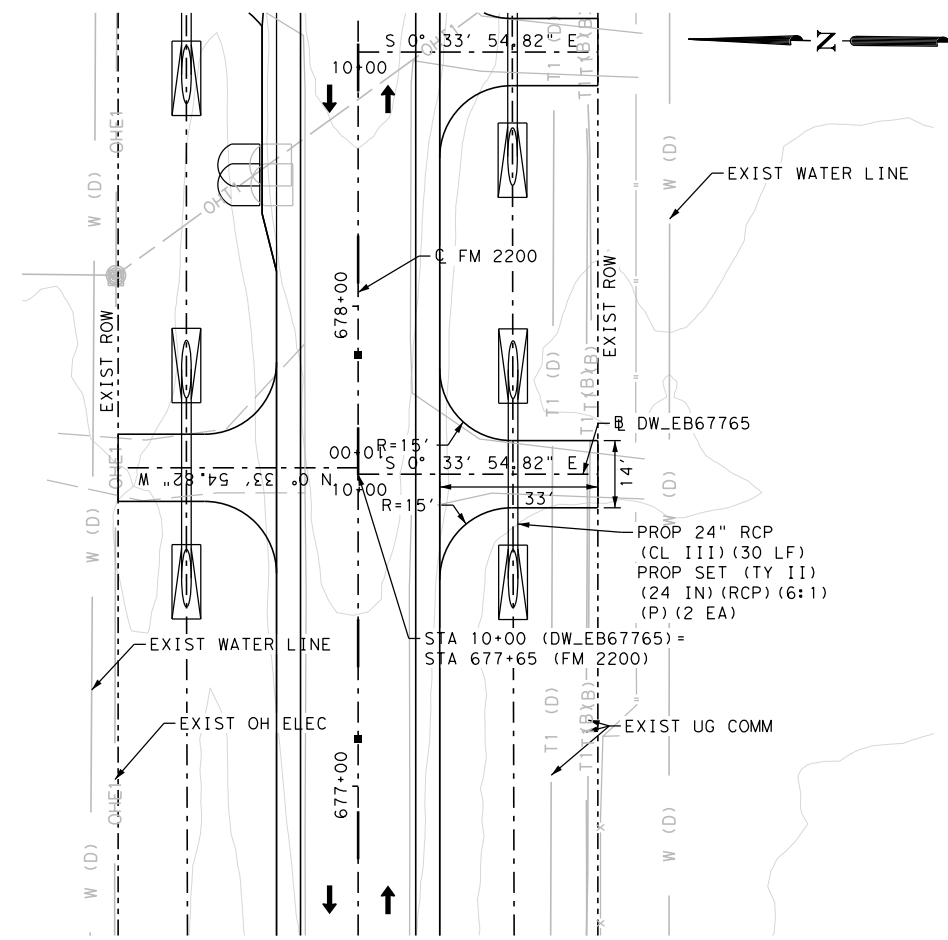
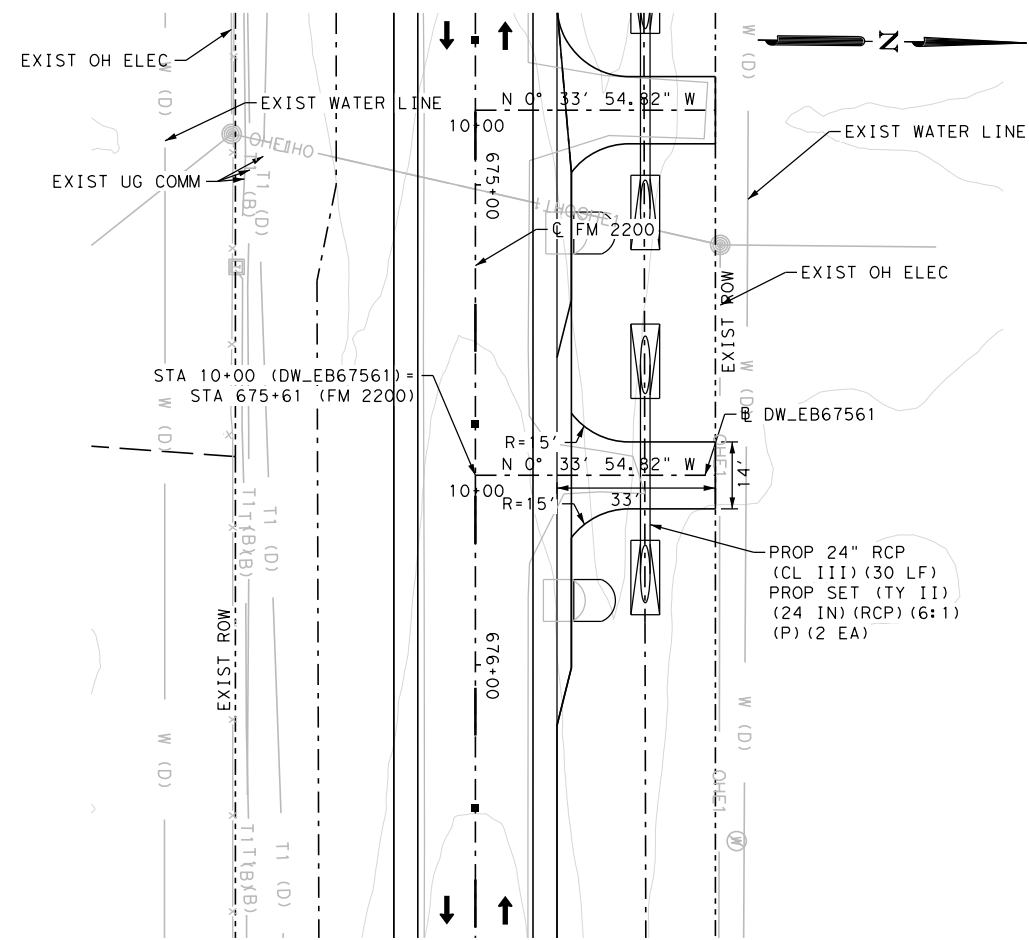
SHEET 8 OF 25

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 116



Plotted on: 12/20/2022

Design File name: P:\117\99\04\Des\ign\Civil\Roadway\Driveways\1179904DRV_PP09.dgn



LEGEND

- EXIST ROW
- PROP PENETRATION
- WIDEN CONTROL LINE
- ← EXIST TRAFFIC FLOW
- ← PROP TRAFFIC FLOW
- EXIST CONTOUR
- PROP CONTOUR
- UTILITY POLE
- ☐ TELEPHONE PEDESTAL
- X — EXIST FENCE
- FLOW ARROW
- UTILITY IN CONFLICT
- UTILITY CONFLICT RESOLVED
- ⊕ SUE QL-A LOCATION

NOTES:

1. PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN



LUKE REED, P.E.
DATE 12/20/2022

APPROVAL



JAMES A. LUTZ, P.E.
DATE 12/20/2022



SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY



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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



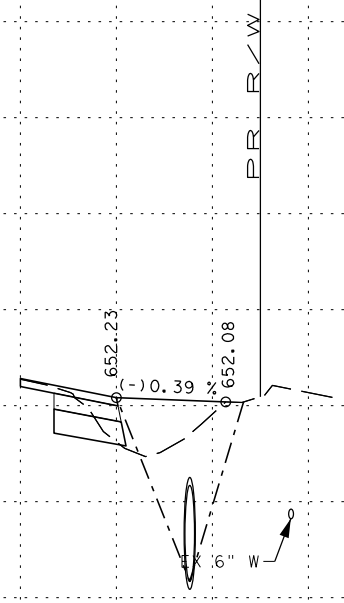
FM 2200
**DRIVEWAY
PLAN & PROFILE**

SHEET 9 OF 25

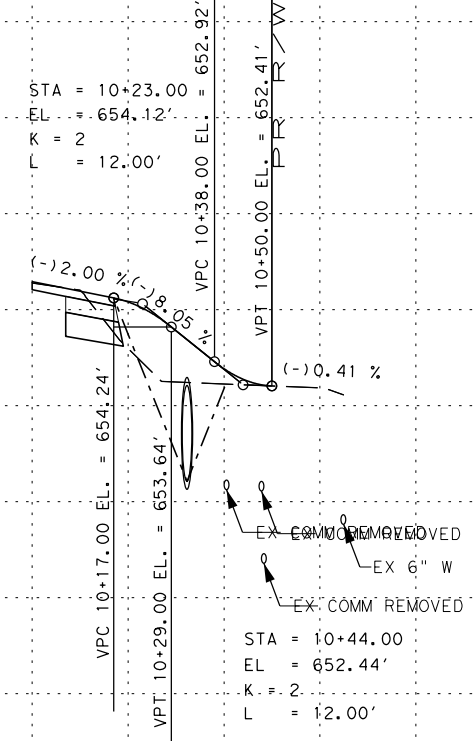
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CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 117

660
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DRIVEWAY 17



DRIVEWAY 18



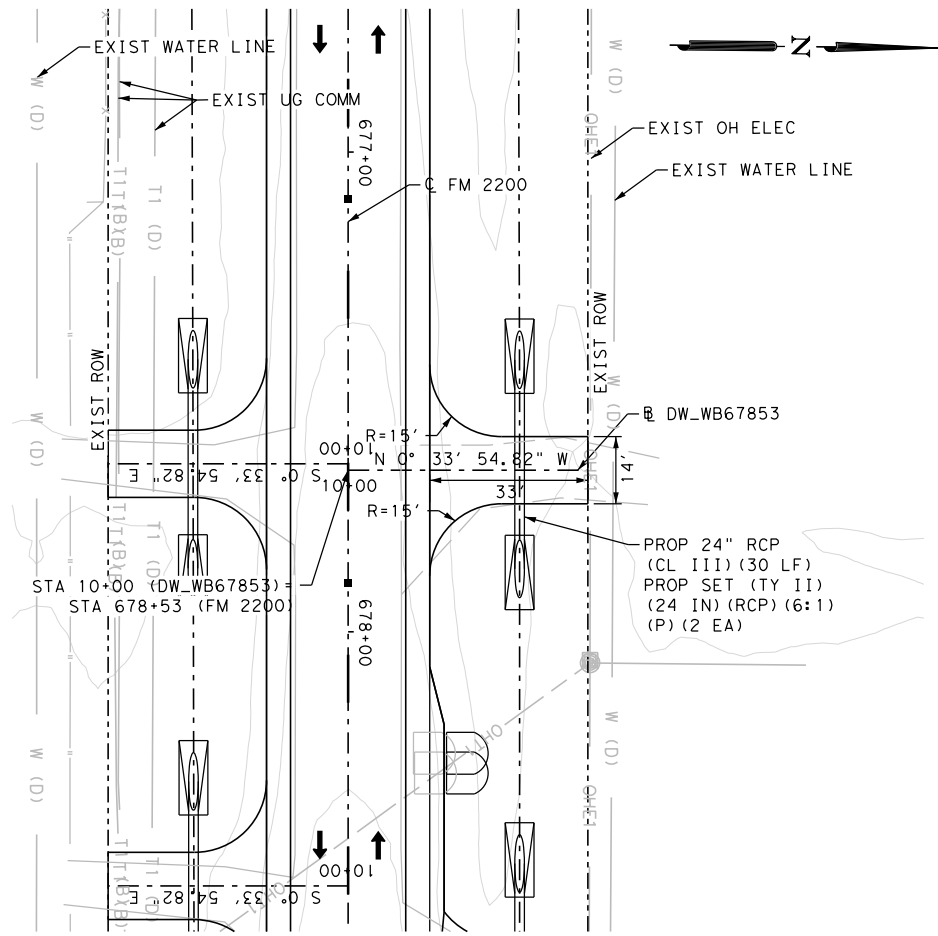
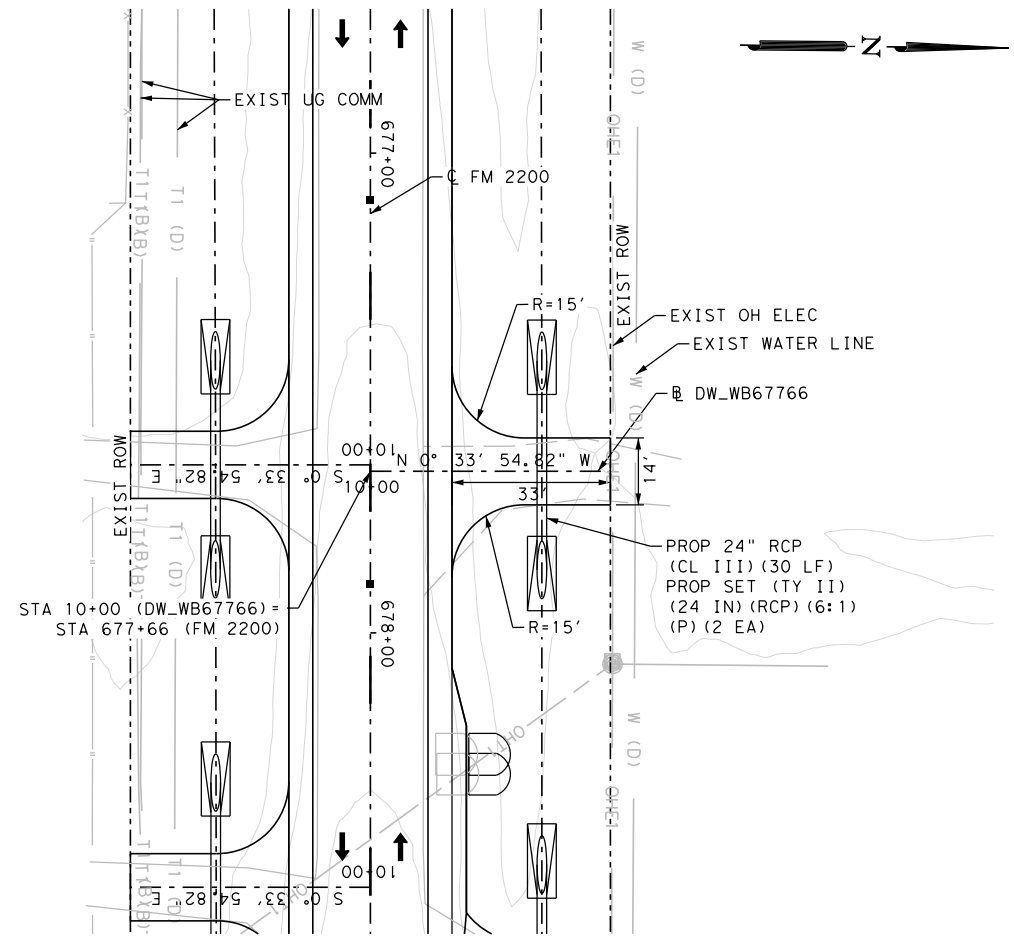
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10+00 10+20 10+40 10+60 10+80 11+00

PROP
EXIST

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP10.dgn



- LEGEND**
- EXIST ROW
 - - - PROP PENETRATION
 - - - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - PROP TRAFFIC FLOW
 - - - EXIST CONTOUR
 - - - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - x - EXIST FENCE
 - - - → FLOW ARROW
 - - - UTILITY IN CONFLICT
 - - - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

STATE OF TEXAS
LUKE REED
101242
LICENSED PROFESSIONAL ENGINEER

LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

STATE OF TEXAS
JAMES A. LUTZ
8472
LICENSED PROFESSIONAL ENGINEER

JAMES A. LUTZ, P.E. 12/20/2022 DATE

SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

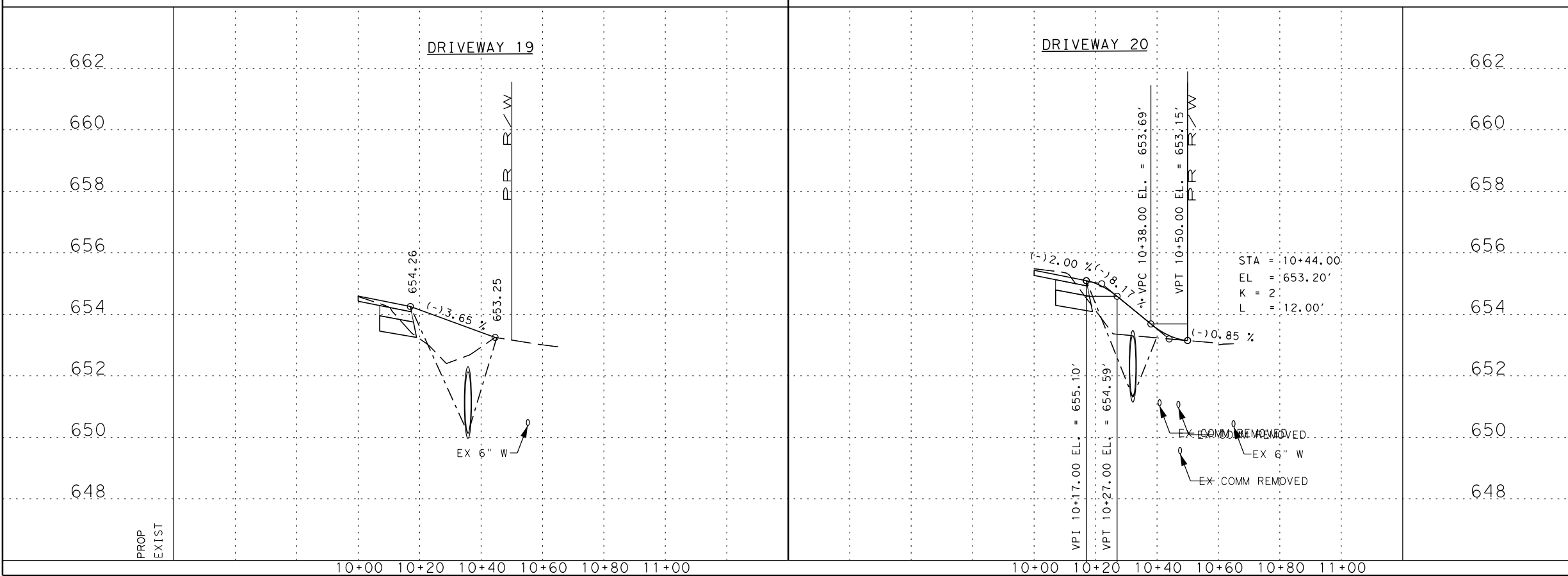
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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DRIVEWAY PLAN & PROFILE

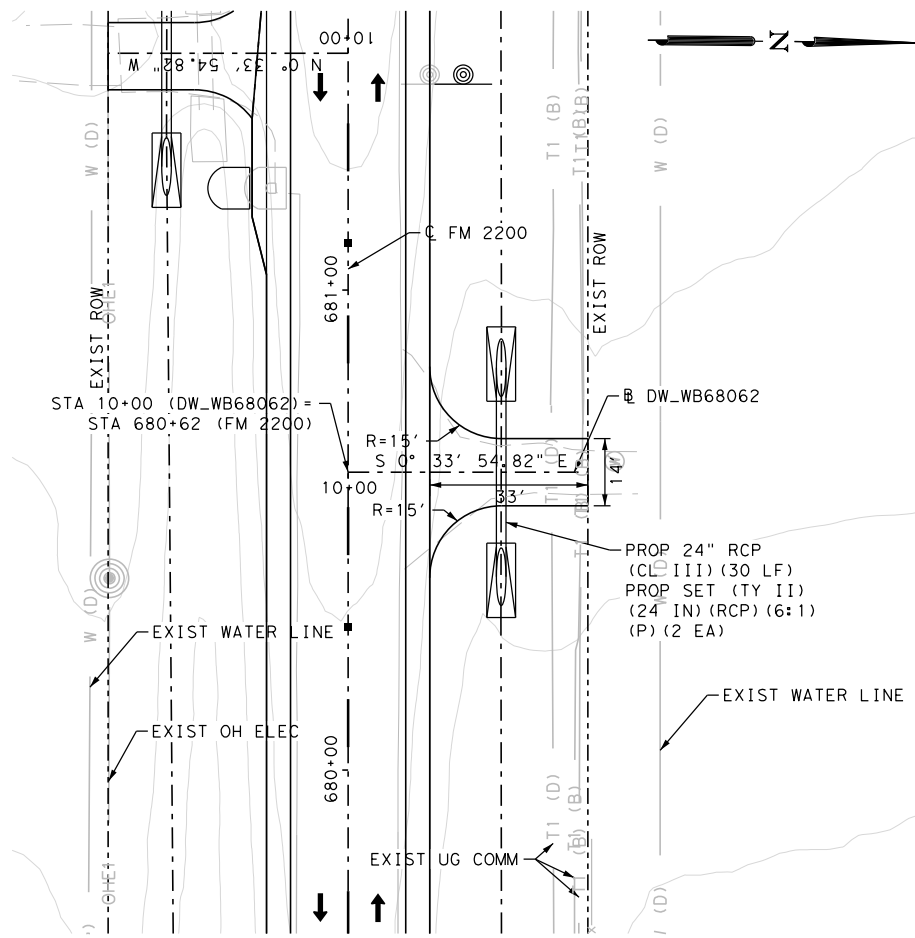
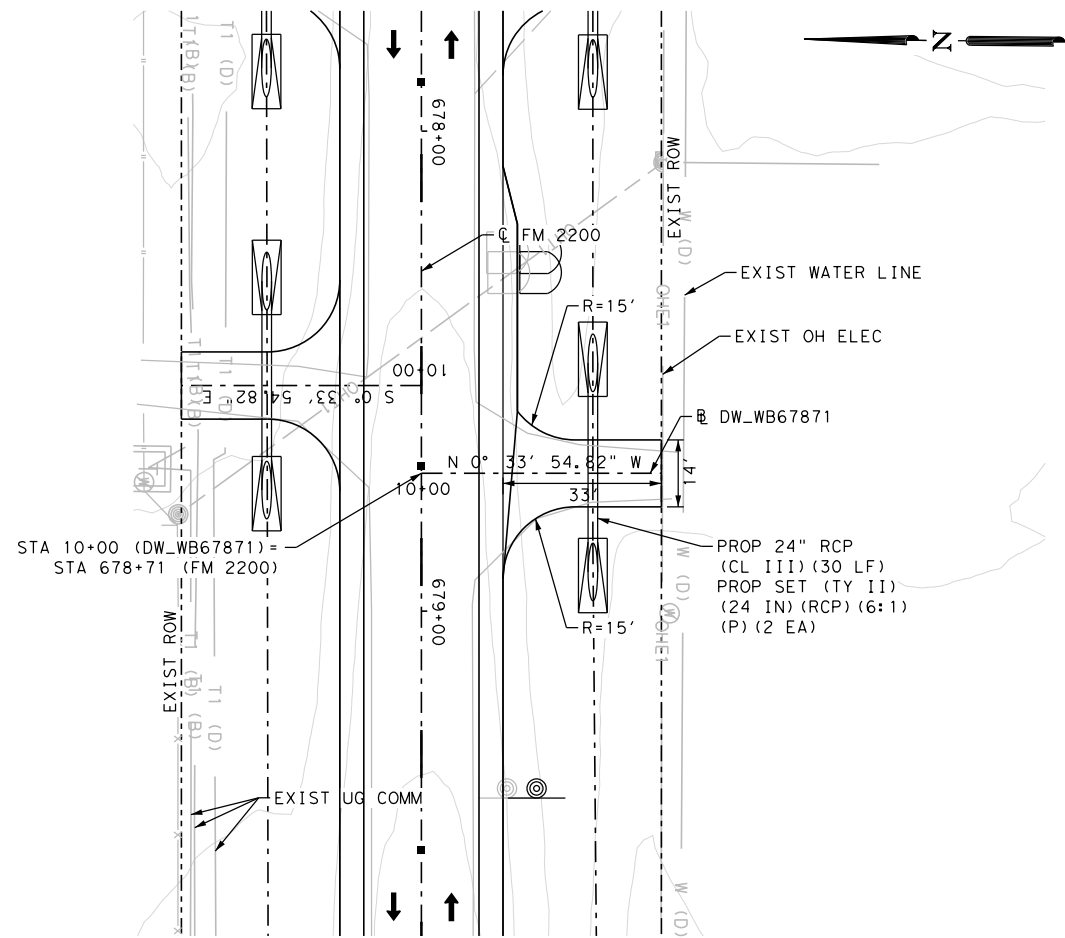
SHEET 10 OF 25

DWG:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DWG:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	118



Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP1.dgn



- LEGEND**
- EXIST ROW
 - - - PROP PENETRATION
 - - - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - PROP TRAFFIC FLOW
 - - - EXIST CONTOUR
 - - - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - x - EXIST FENCE
 - - - -> FLOW ARROW
 - - - UTILITY IN CONFLICT
 - - - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER

LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

STATE OF TEXAS
 JAMES A. LUTE
 84722
 LICENSED PROFESSIONAL ENGINEER

JAMES A. LUTE, P.E. 12/20/2022 DATE

SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

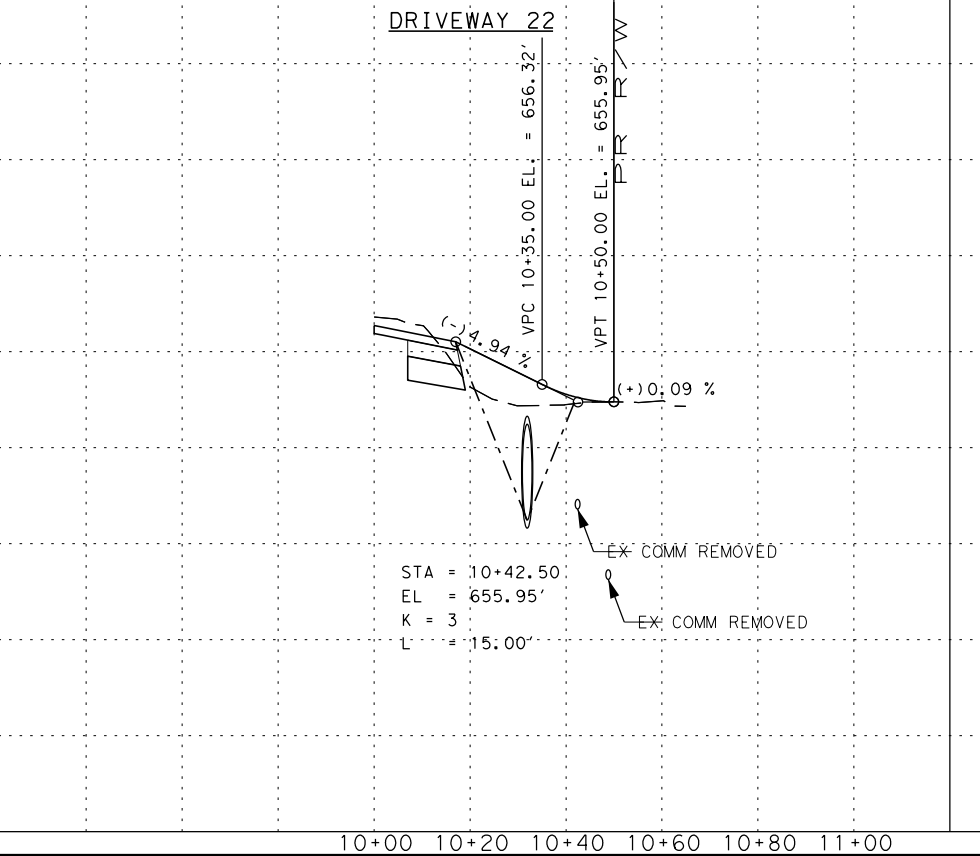
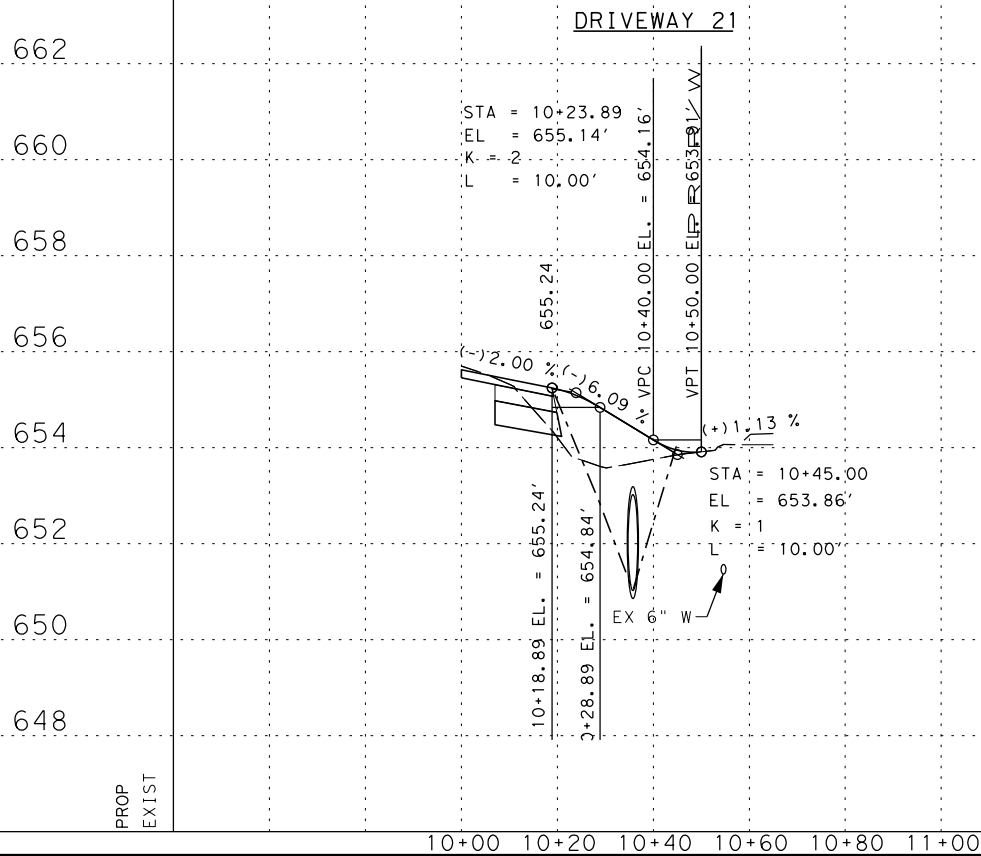
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DRIVEWAY PLAN & PROFILE

SHEET 11 OF 25

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 119



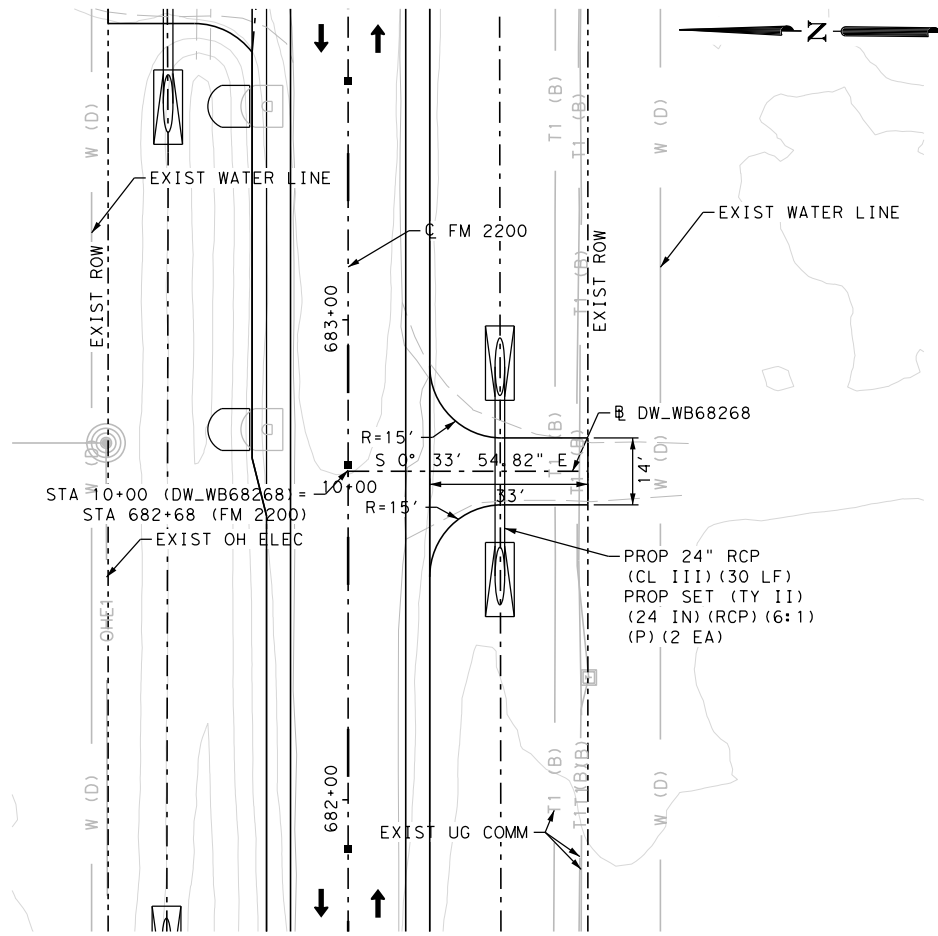
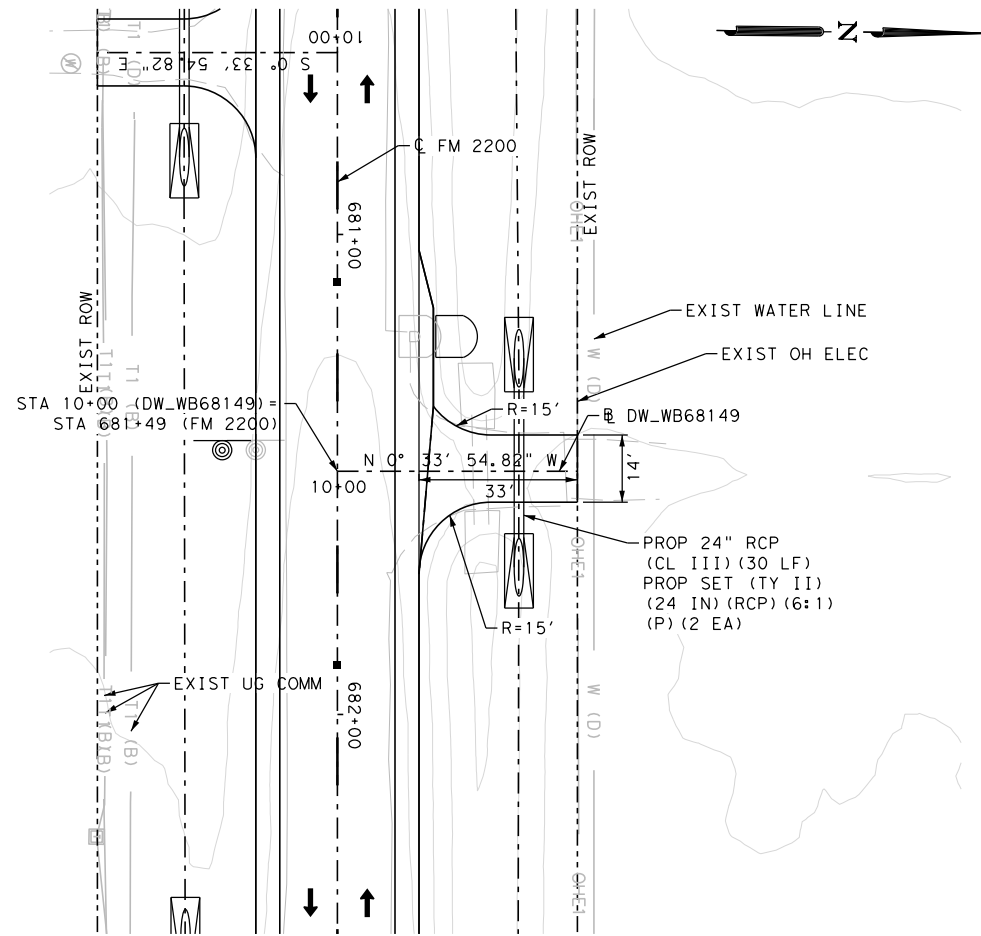
PROP
EXIST

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10+00 10+20 10+40 10+60 10+80 11+00

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP12.dgn



- LEGEND**
- EXIST ROW
 - - - PROP PENETRATION
 - - - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - PROP TRAFFIC FLOW
 - - - EXIST CONTOUR
 - - - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - x - EXIST FENCE
 - - - -> FLOW ARROW
 - - - UTILITY IN CONFLICT
 - - - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

JAMES A. LUTZ, P.E. 12/20/2022 DATE

SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800

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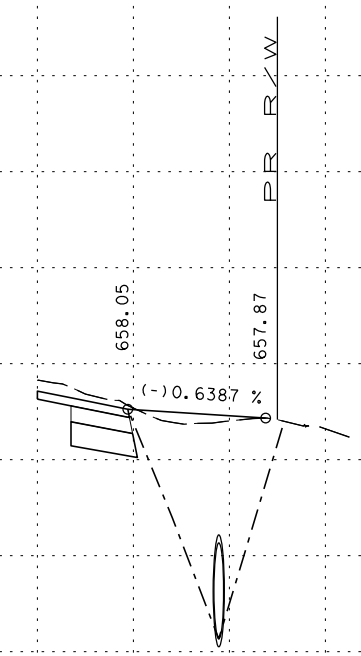
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**DRIVEWAY
 PLAN & PROFILE**

SHEET 12 OF 25

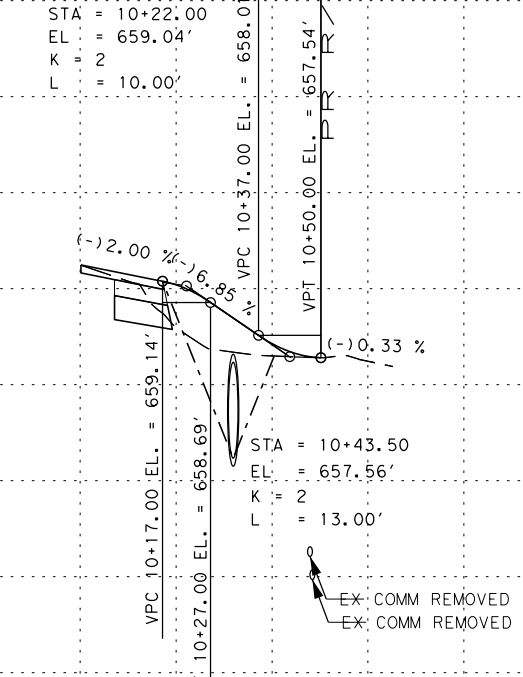
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DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	120

667
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DRIVEWAY 23



DRIVEWAY 24



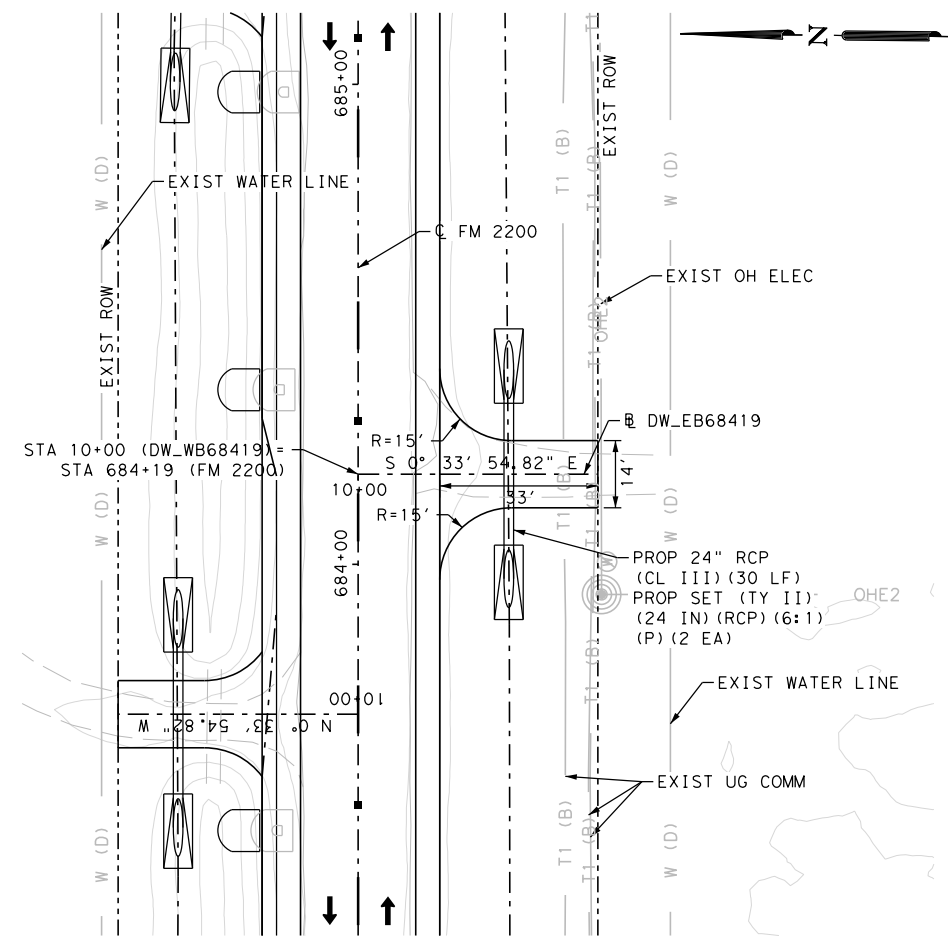
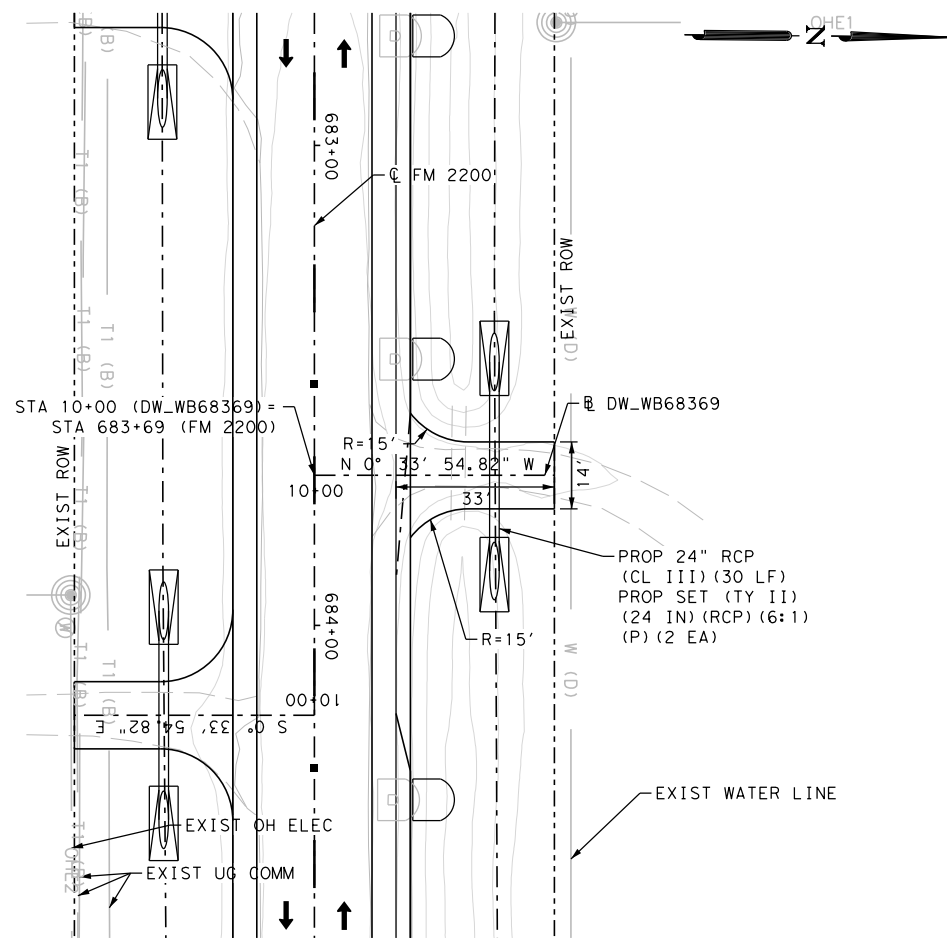
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PROP
EXIST

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP13.dgn



- LEGEND**
- EXIST ROW
 - PROP PENETRATION
 - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - PROP TRAFFIC FLOW
 - EXIST CONTOUR
 - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - X --- EXIST FENCE
 - >--- FLOW ARROW
 - UTILITY IN CONFLICT
 - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

NOTES:

- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.


DESIGN



 LUKE REED, P.E.

12/20/2022 DATE

APPROVAL



 JAMES A. LUTZ, P.E.

12/20/2022 DATE



 SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

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 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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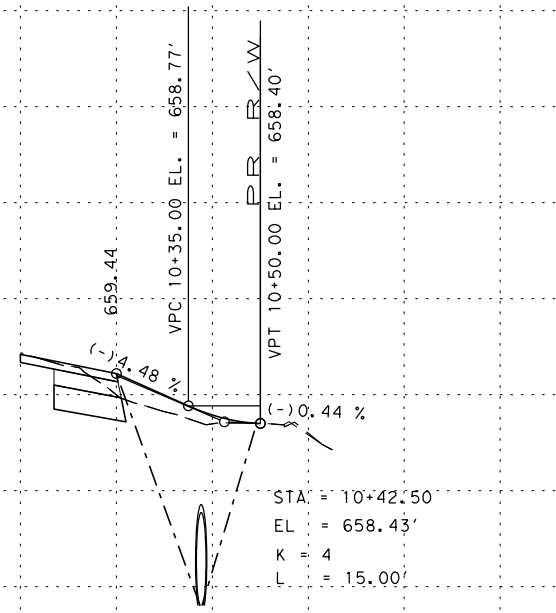
FM 2200
**DRIVEWAY
 PLAN & PROFILE**

SHEET 13 OF 25

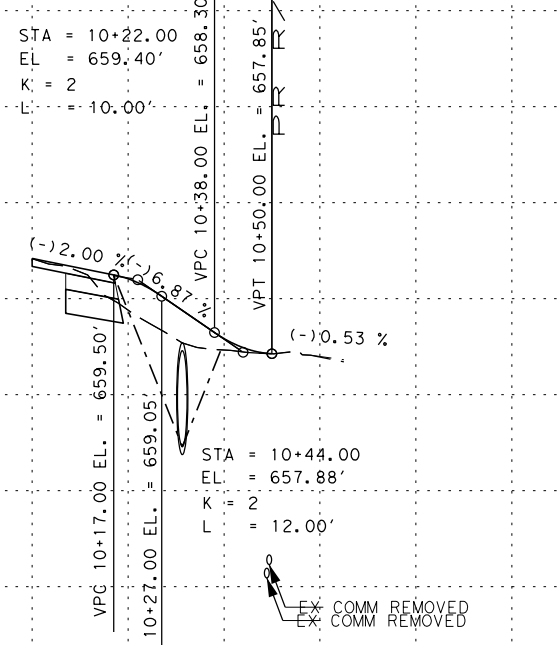
DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	121

667
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DRIVEWAY 25



DRIVEWAY 26



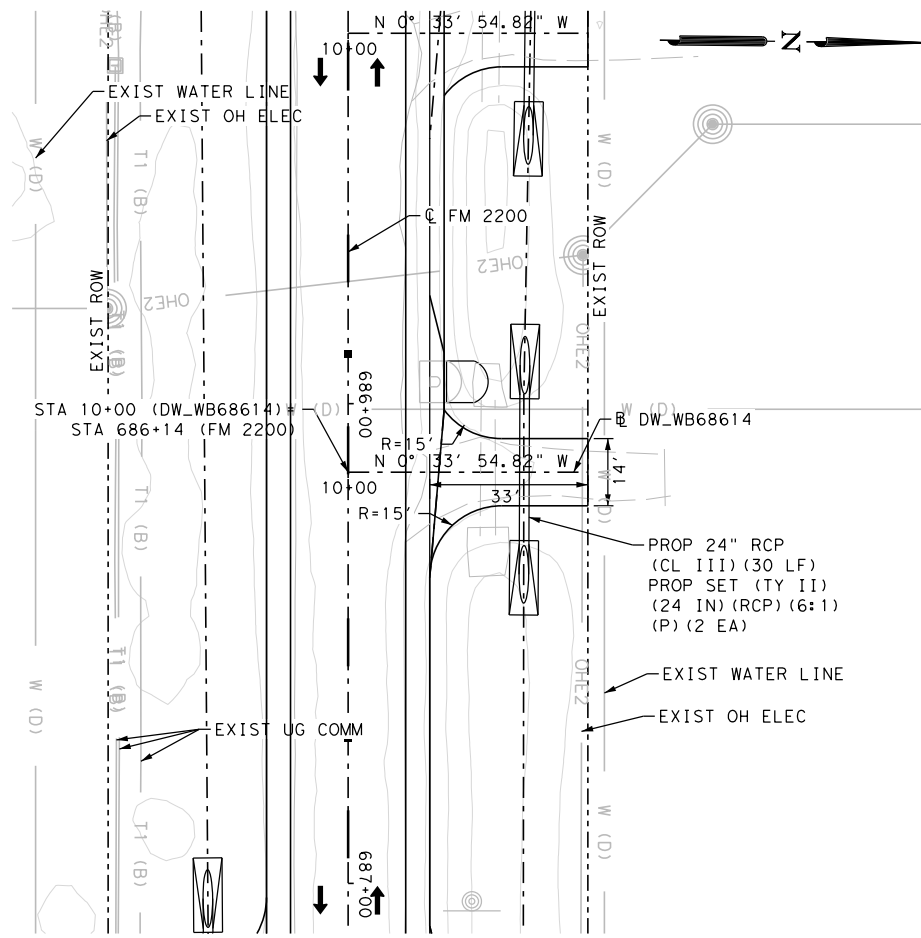
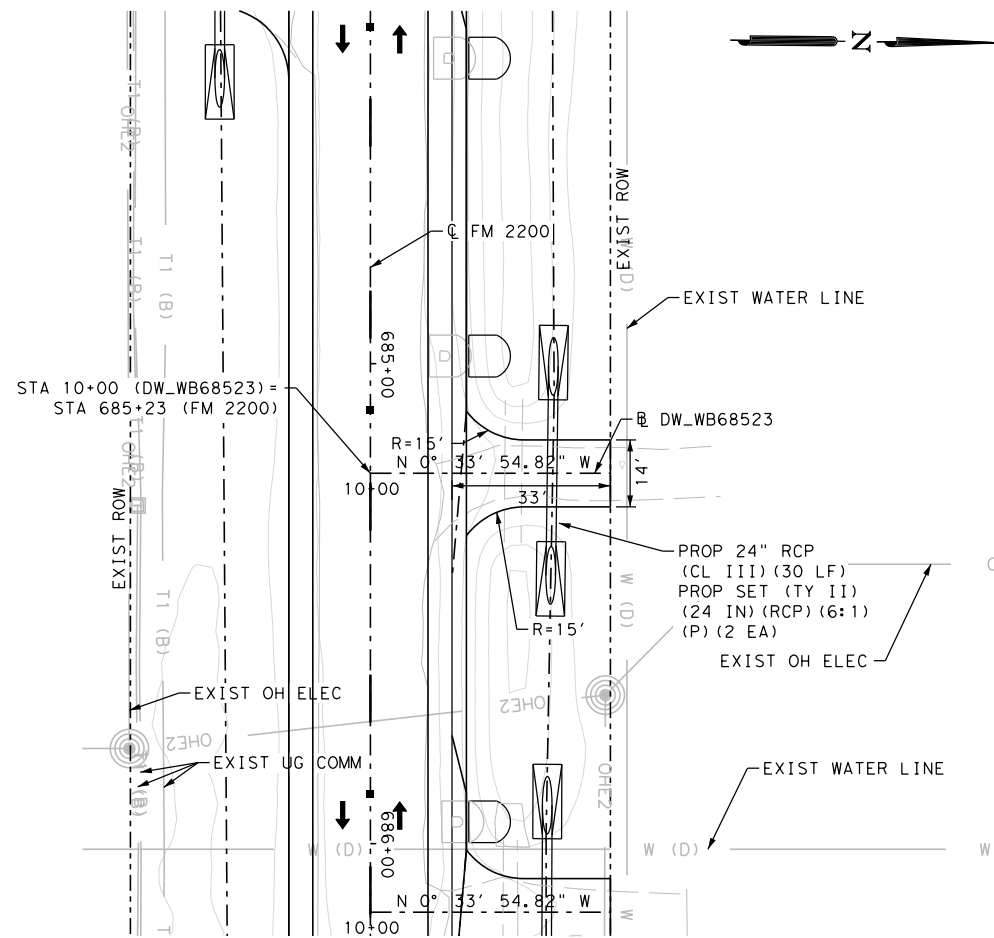
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10+00 10+20 10+40 10+60 10+80 11+00

PROP
EXIST

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP14.dgn



- LEGEND**
- EXIST ROW
 - - - PROP PENETRATION
 - - - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - PROP TRAFFIC FLOW
 - - - EXIST CONTOUR
 - - - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - x - EXIST FENCE
 - . . . → FLOW ARROW
 - - - UTILITY IN CONFLICT
 - - - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER
 JAMES A. LUTZ, P.E. 12/20/2022 DATE



SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

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 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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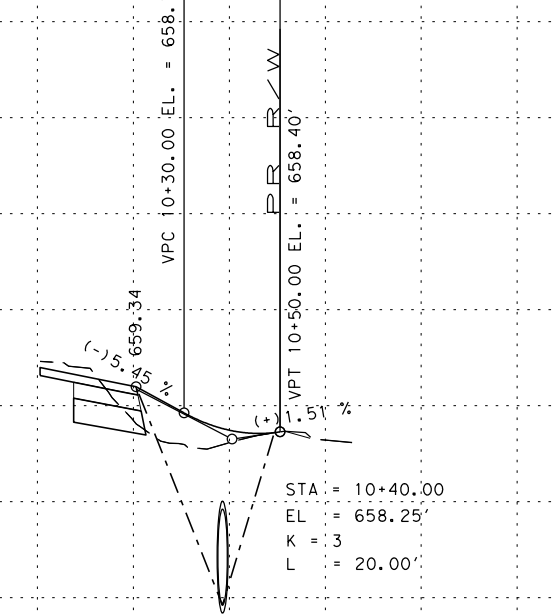
FM 2200
**DRIVEWAY
 PLAN & PROFILE**

SHEET 14 OF 25

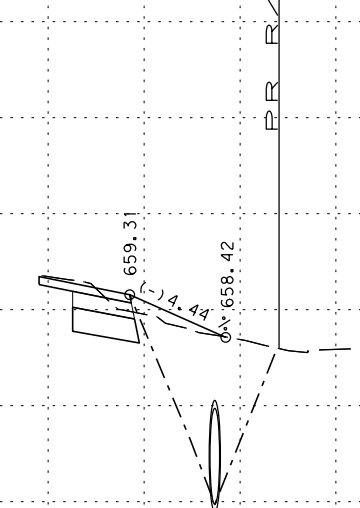
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CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 122

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DRIVEWAY 27



DRIVEWAY 28



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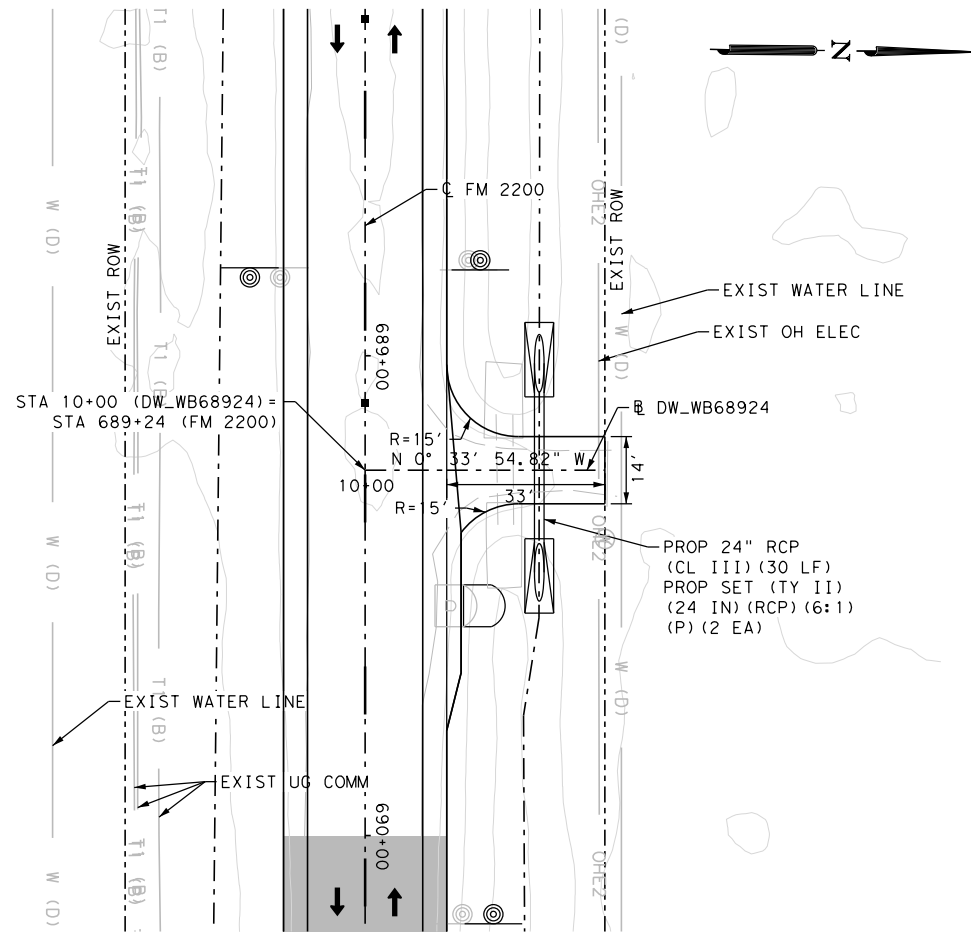
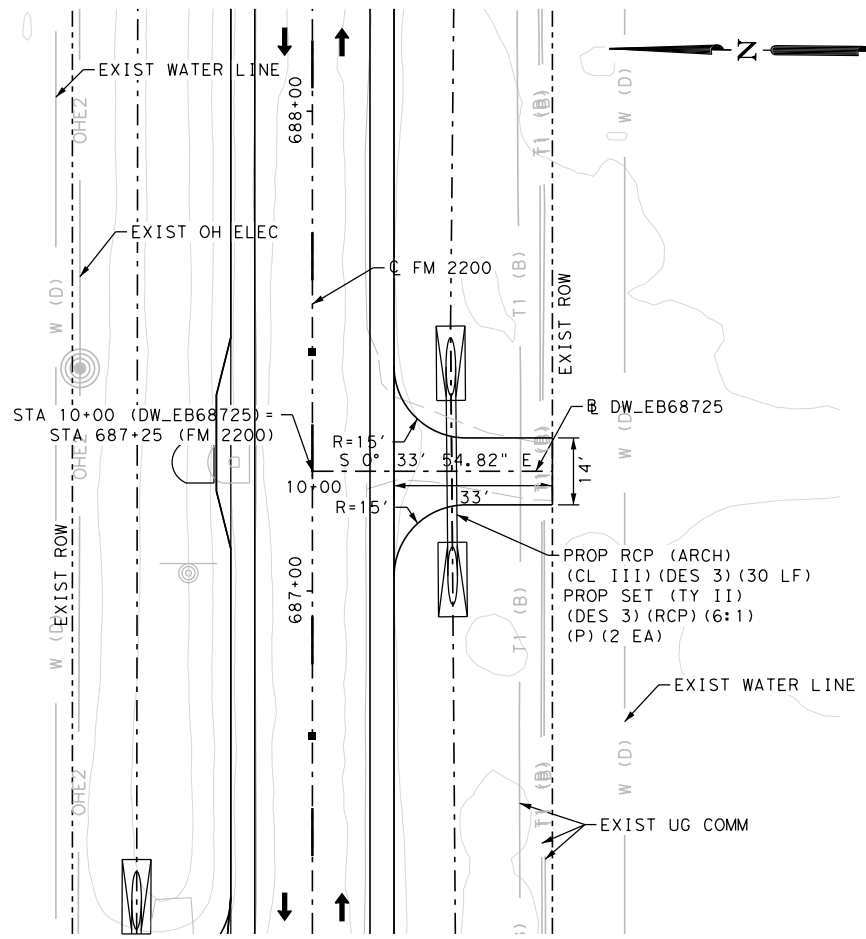
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PROP
EXIST

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP15.dgn



- LEGEND**
- EXIST ROW
 - PROP PENETRATION
 - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - ← PROP TRAFFIC FLOW
 - EXIST CONTOUR
 - PROP CONTOUR
 - UTILITY POLE
 - ☐ TELEPHONE PEDESTAL
 - X --- EXIST FENCE
 - > FLOW ARROW
 - UTILITY IN CONFLICT
 - UTILITY CONFLICT RESOLVED
 - ☉ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER
 JAMES A. LUTZ, P.E. 12/20/2022 DATE



SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

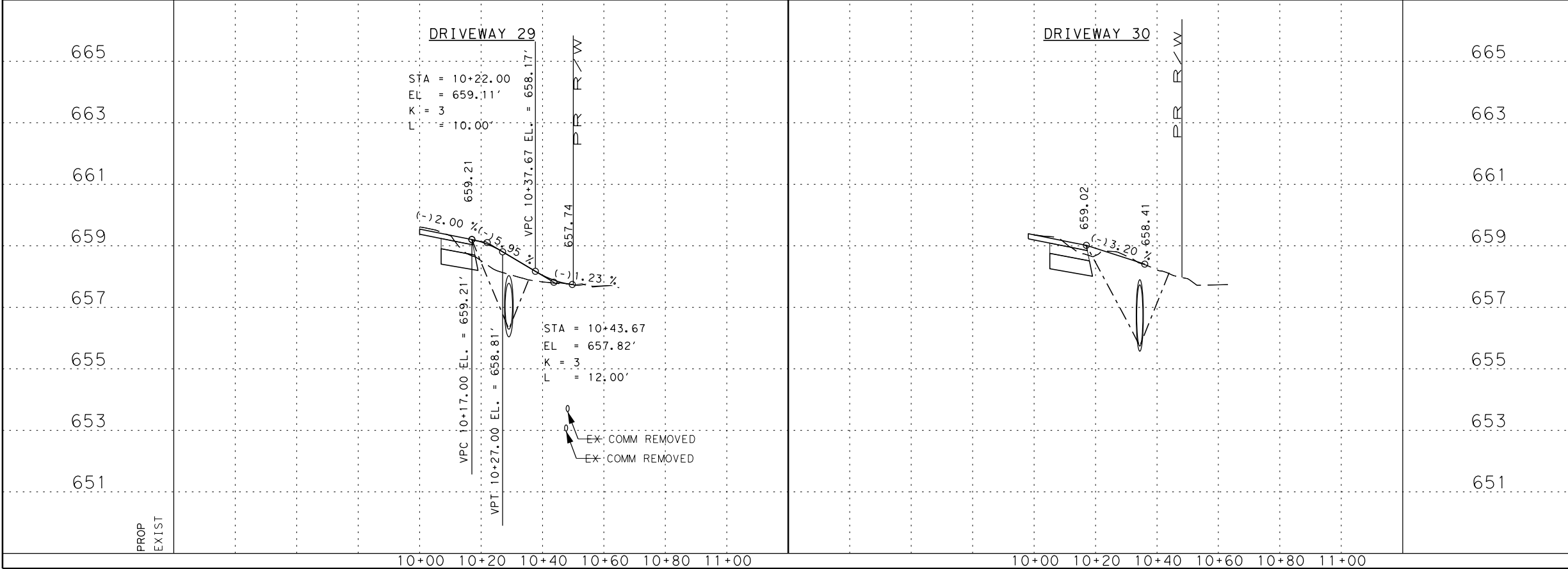
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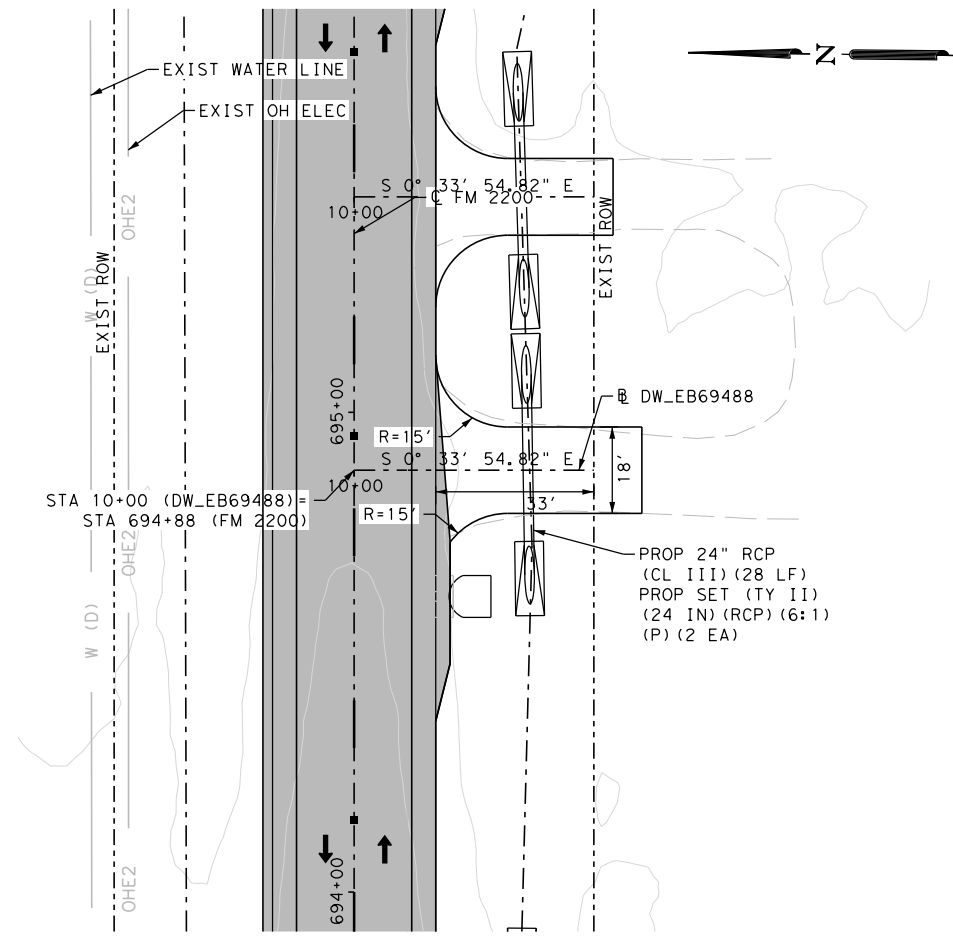
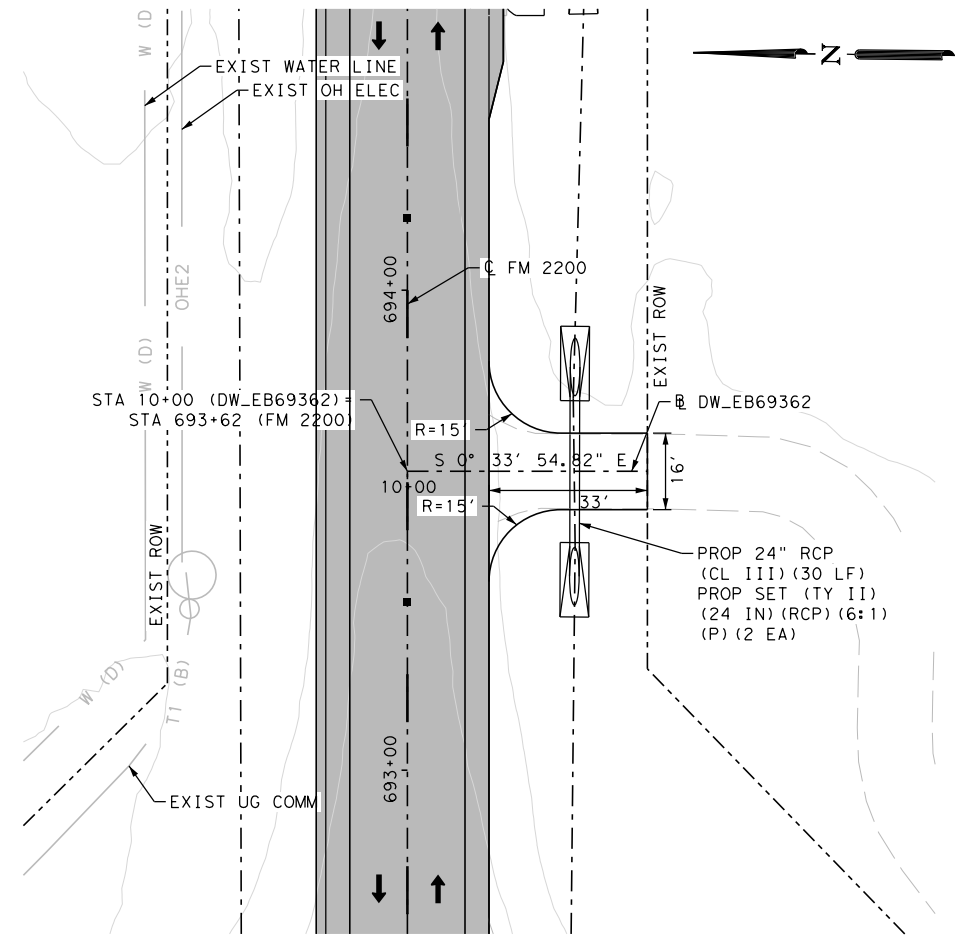
SHEET 15 OF 25

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	123



Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP16.dgn



- LEGEND**
- EXIST ROW
 - - - PROP PENETRATION
 - - - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - ← PROP TRAFFIC FLOW
 - - - EXIST CONTOUR
 - - - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - x - EXIST FENCE
 - . . . → FLOW ARROW
 - - - UTILITY IN CONFLICT
 - - - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

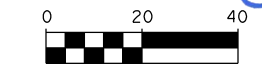
- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 LUKE REED, P.E. 12/20/2022
 DATE

APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER
 JAMES A. LUTZ, P.E. 12/20/2022
 DATE



SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

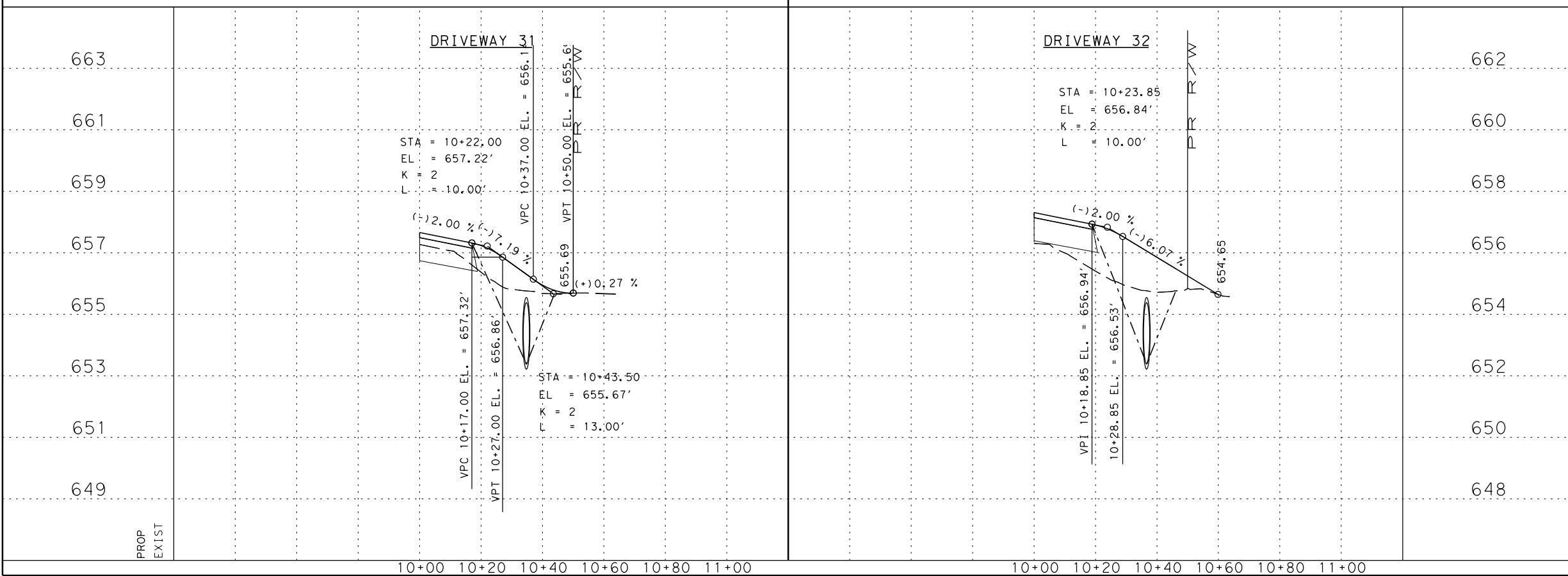
Pape-Dawson Engineers
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 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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 PLAN & PROFILE**

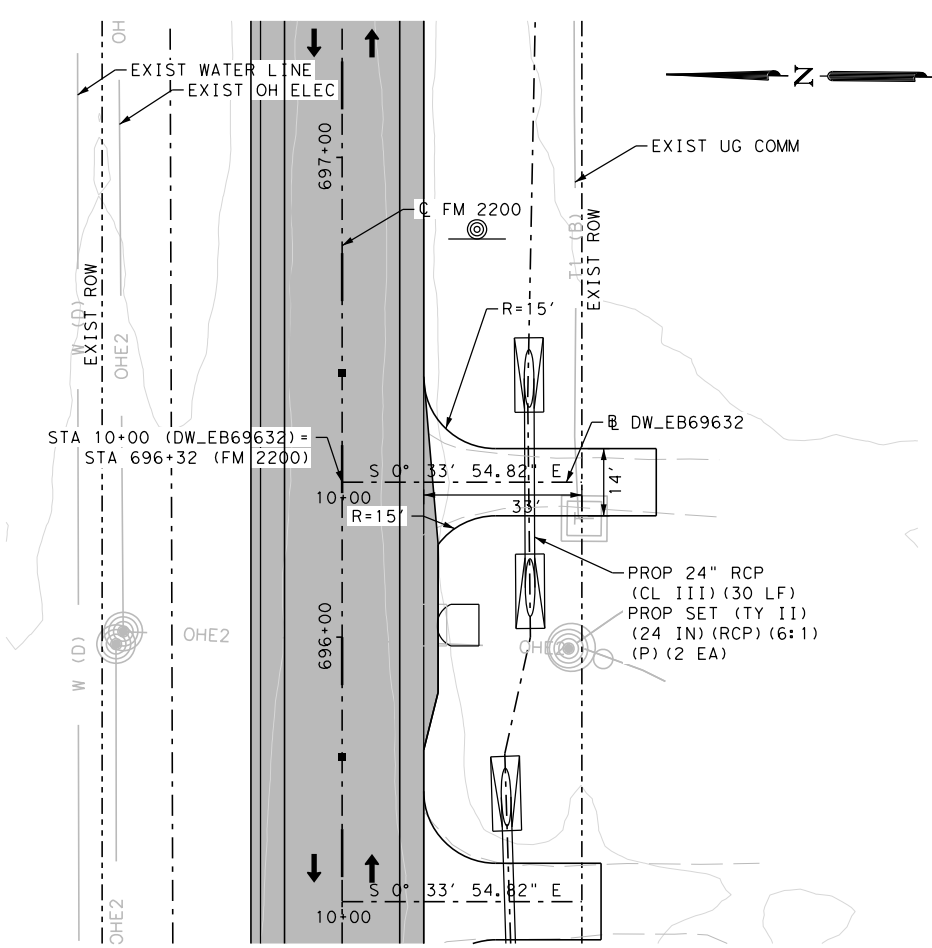
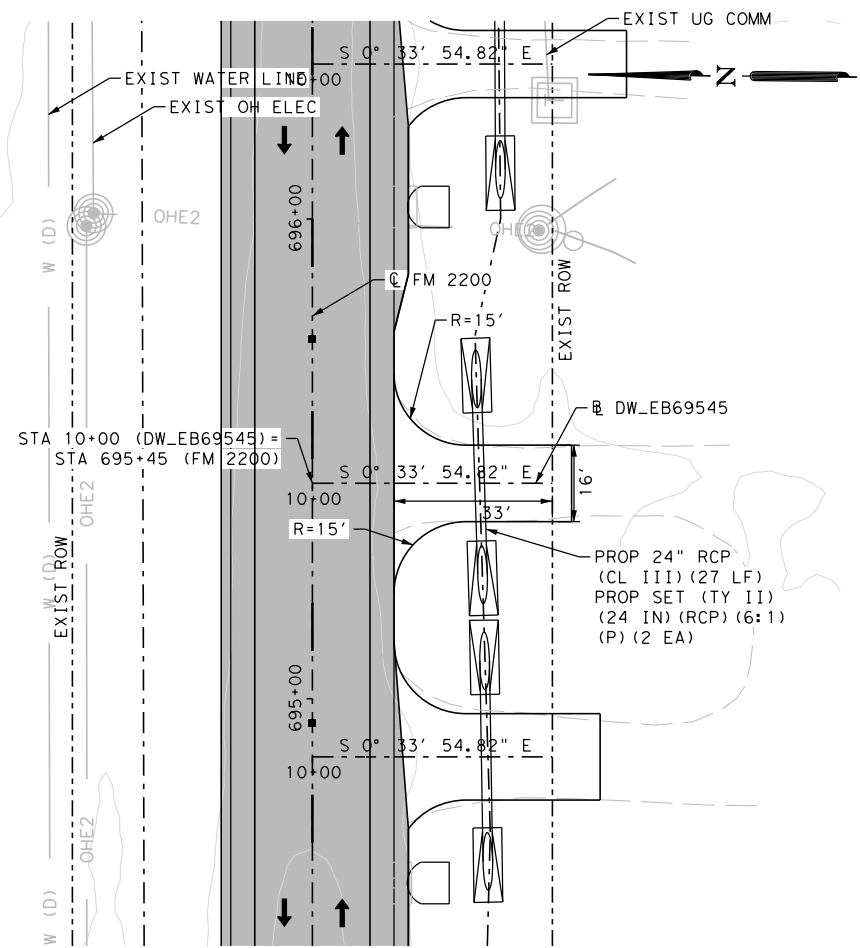
SHEET 16 OF 25

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
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DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	124



Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\DR-1\9904\DRV_PP17.dgn



- LEGEND**
- EXIST ROW
 - PROP PENETRATION
 - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - ← PROP TRAFFIC FLOW
 - EXIST CONTOUR
 - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - X — EXIST FENCE
 - FLOW ARROW
 - UTILITY IN CONFLICT
 - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

JAMES A. LUTZ, P.E. 12/20/2022 DATE

SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

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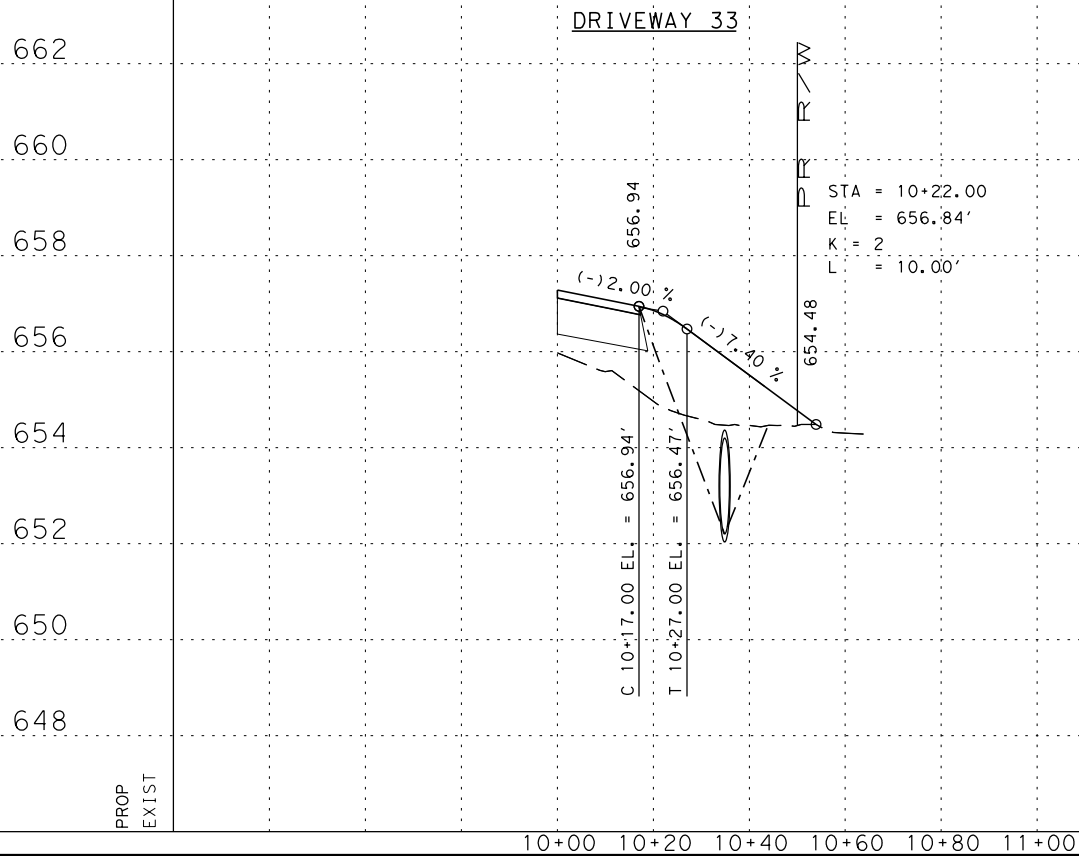
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
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DRIVEWAY PLAN & PROFILE

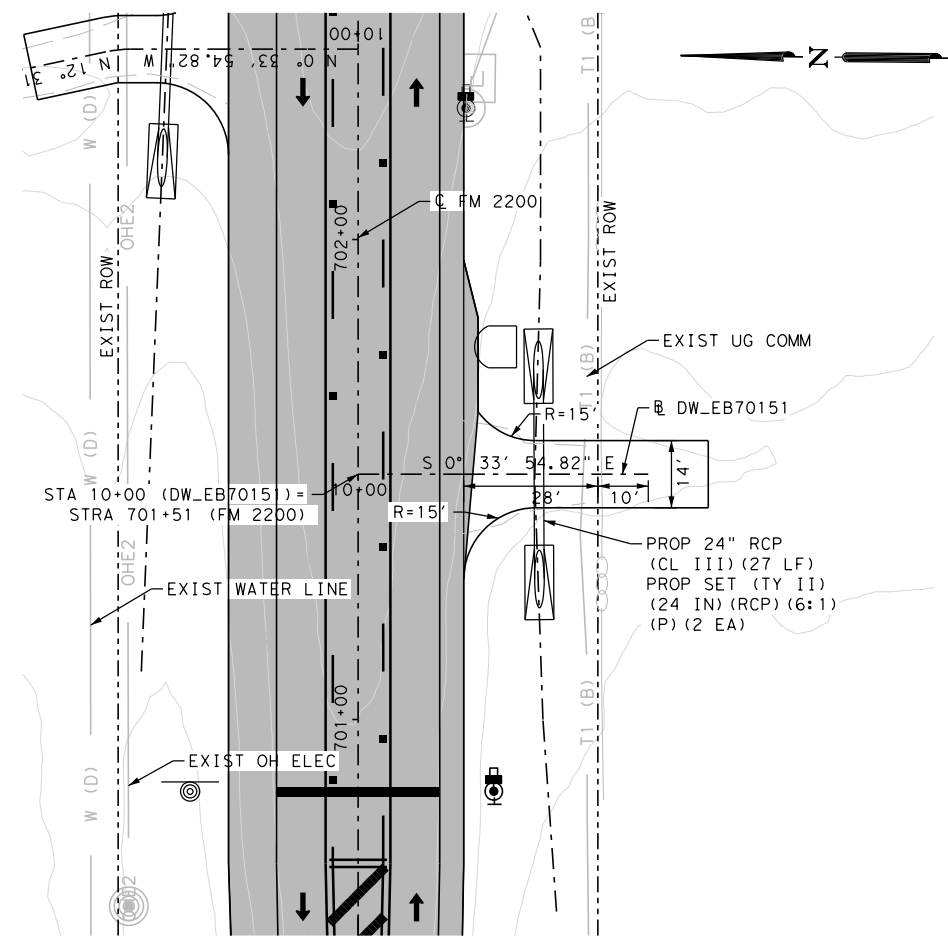
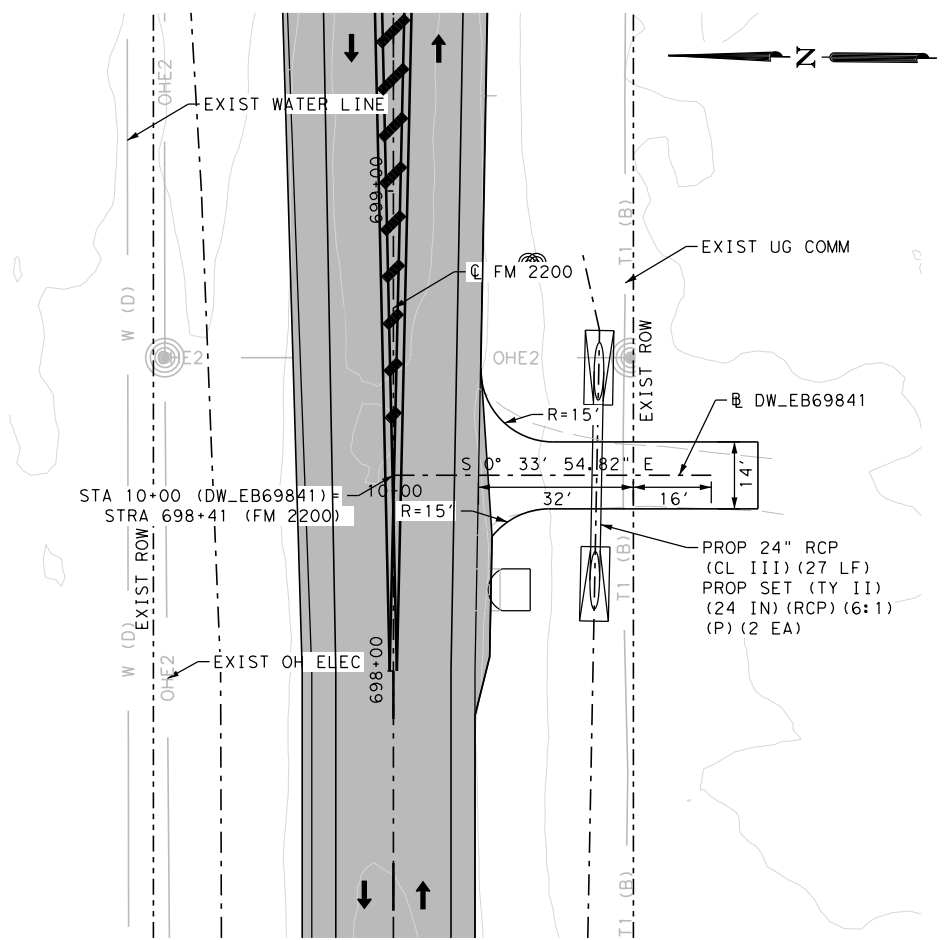
SHEET 17 OF 25

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DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	125



Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP18.dgn



LEGEND

- EXIST ROW
- PROP PENETRATION
- WIDEN CONTROL LINE
- ← EXIST TRAFFIC FLOW
- ← PROP TRAFFIC FLOW
- EXIST CONTOUR
- PROP CONTOUR
- UTILITY POLE
- ☐ TELEPHONE PEDESTAL
- X --- EXIST FENCE
- > FLOW ARROW
- UTILITY IN CONFLICT
- UTILITY CONFLICT RESOLVED
- ☉ SUE QL-A LOCATION

NOTES:

1. PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

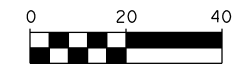


LUKE REED
101242
LICENSED PROFESSIONAL ENGINEER
DATE 12/20/2022

APPROVAL



JAMES A. LUTZ
84722
LICENSED PROFESSIONAL ENGINEER
DATE 12/20/2022



SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY



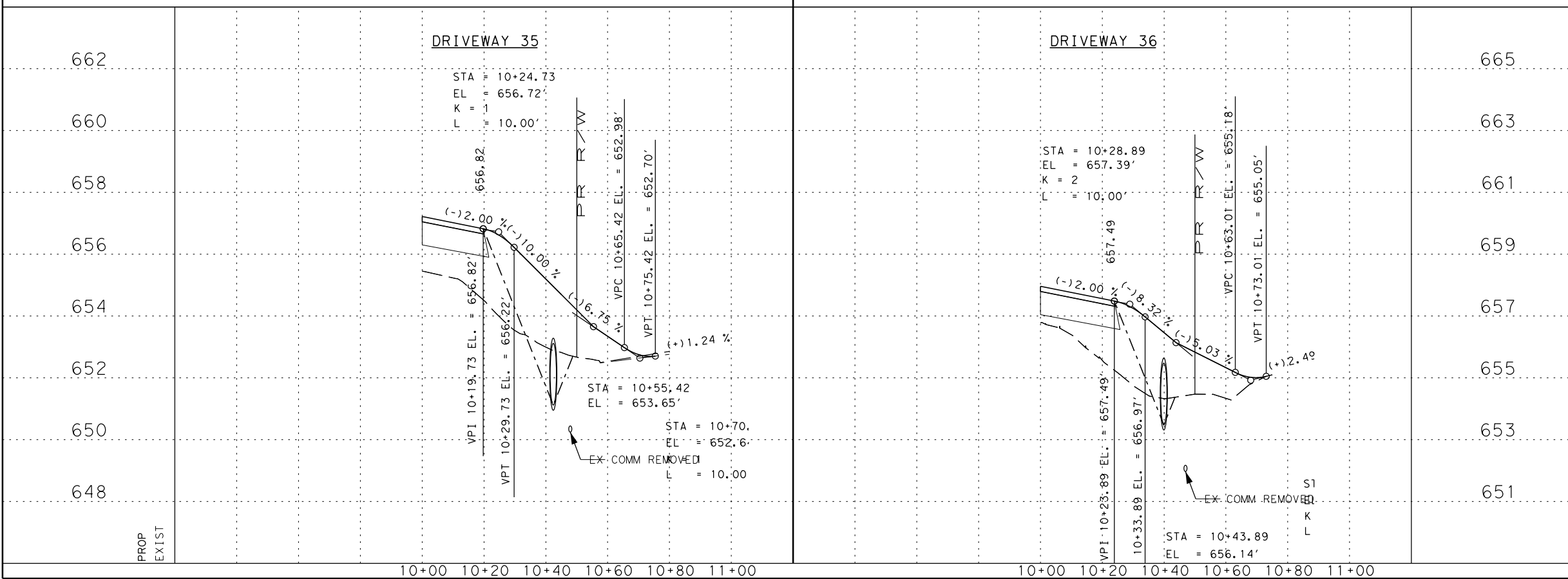
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**DRIVEWAY
PLAN & PROFILE**

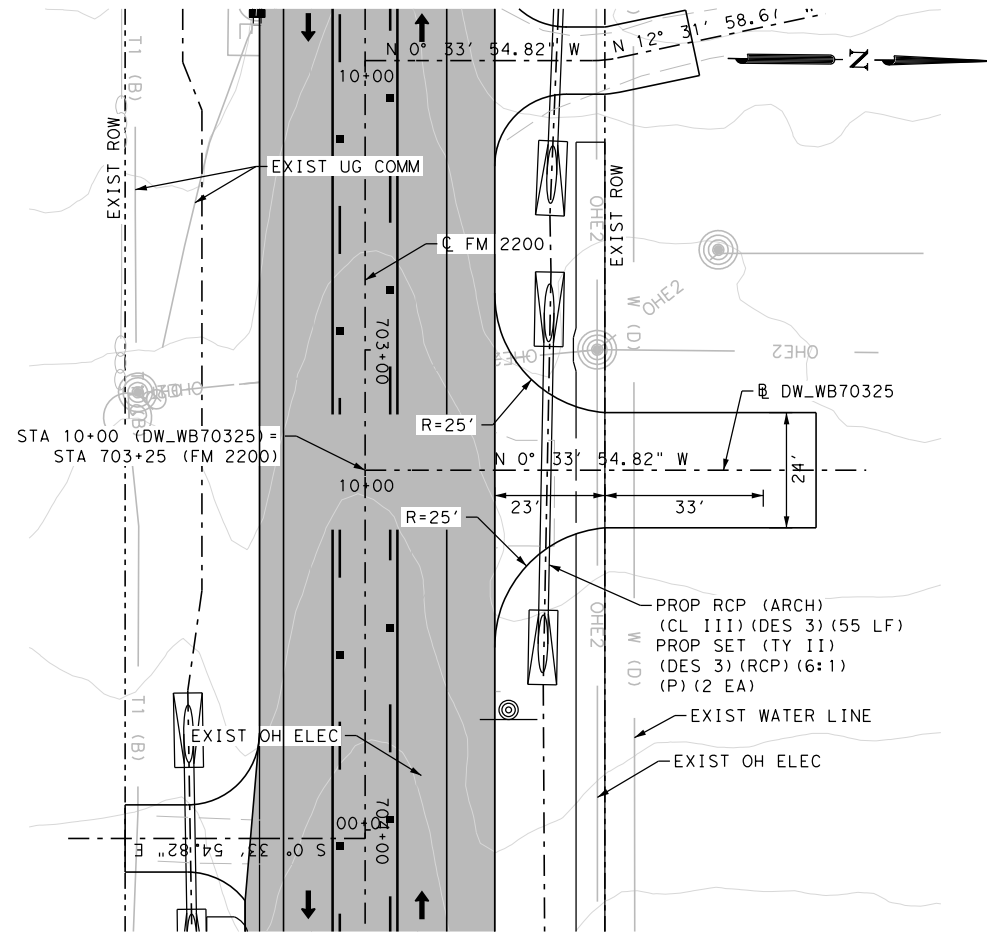
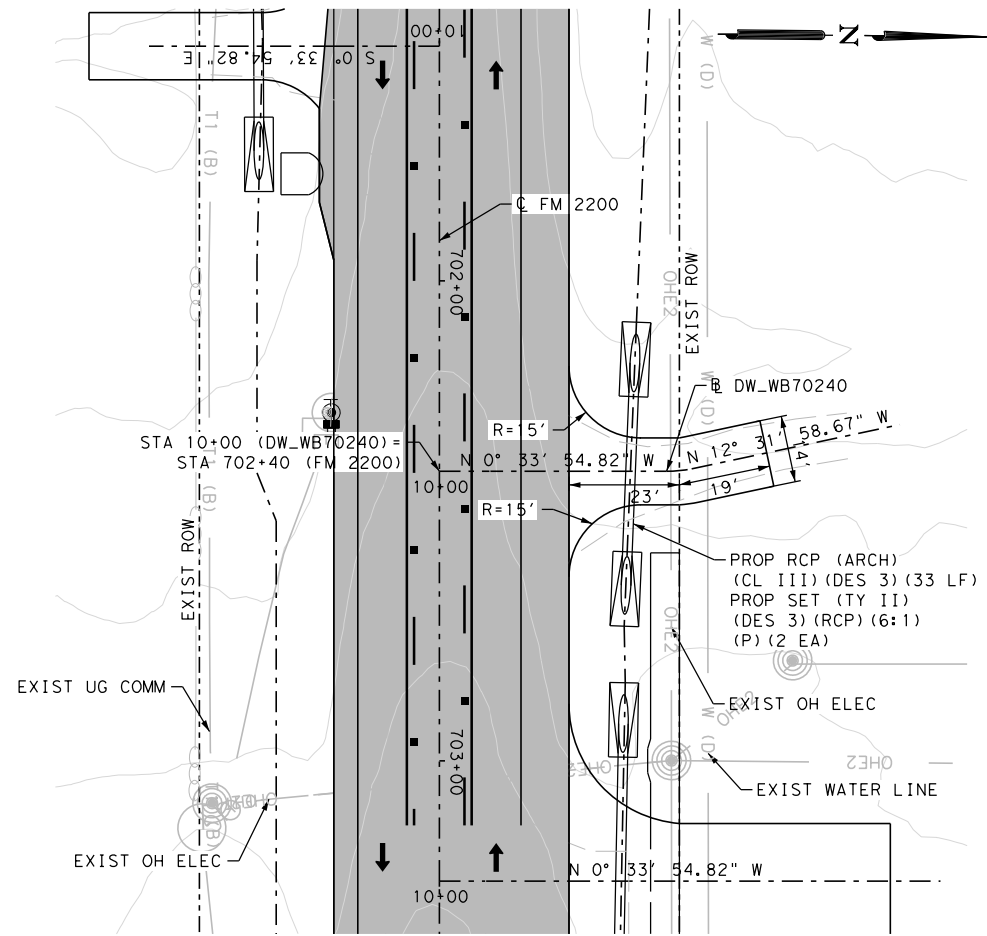
SHEET 18 OF 25

CHK	DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
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CHK	DGN:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
		SAT	MEDINA	2520	01	016, ETC	126



Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP19.dgn



- LEGEND**
- EXIST ROW
 - PROP PENETRATION
 - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - ← PROP TRAFFIC FLOW
 - EXIST CONTOUR
 - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - X — EXIST FENCE
 - · · · — FLOW ARROW
 - — — UTILITY IN CONFLICT
 - — — UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

JAMES A. LUTZ, P.E. 12/20/2022 DATE

SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson ENGINEERS

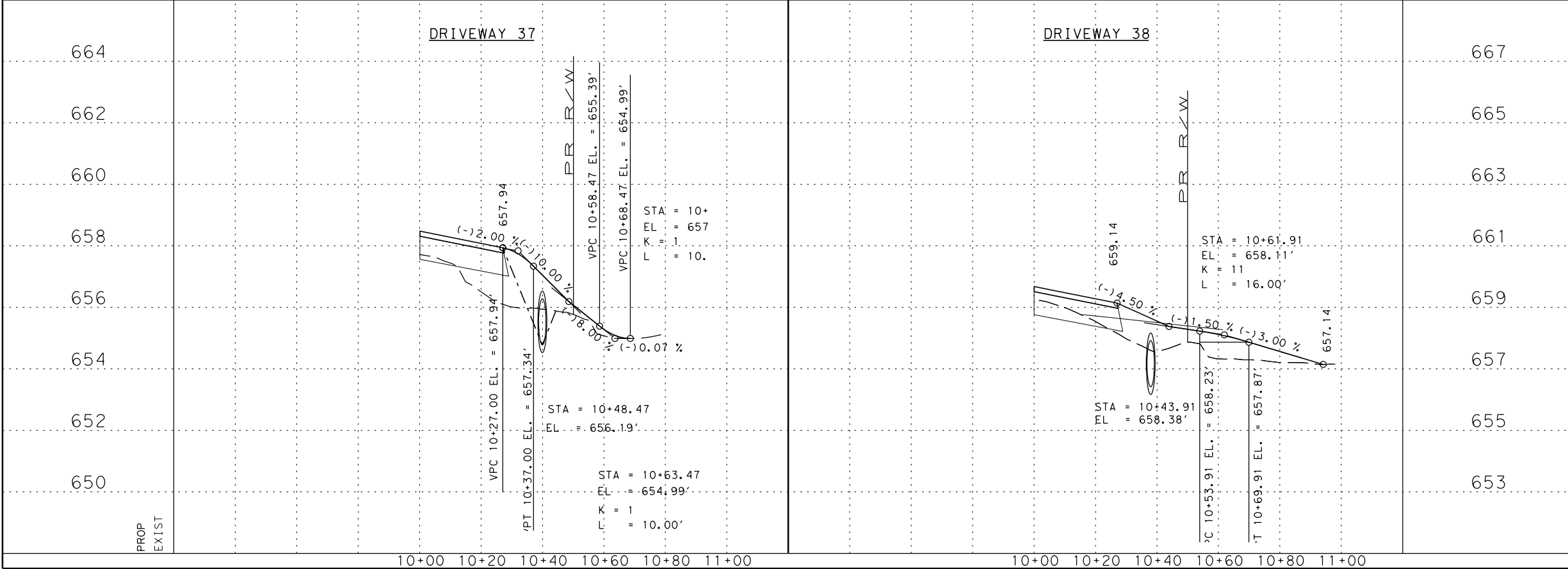
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**DRIVEWAY
 PLAN & PROFILE**

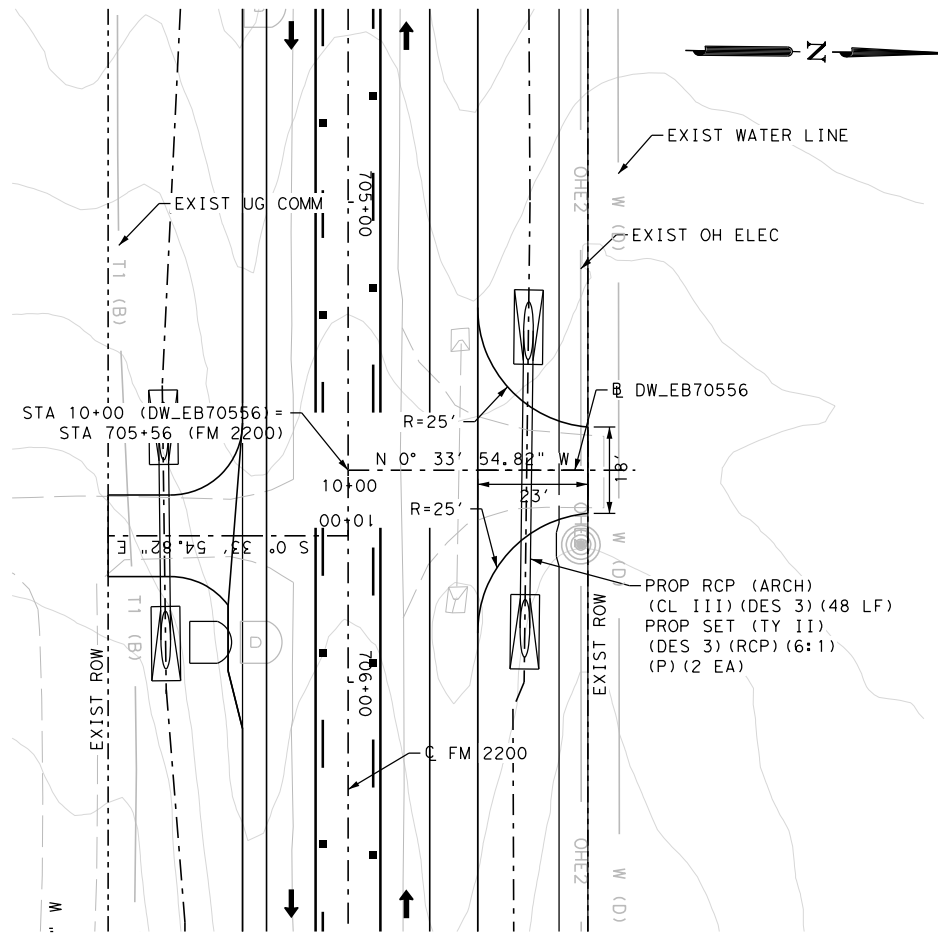
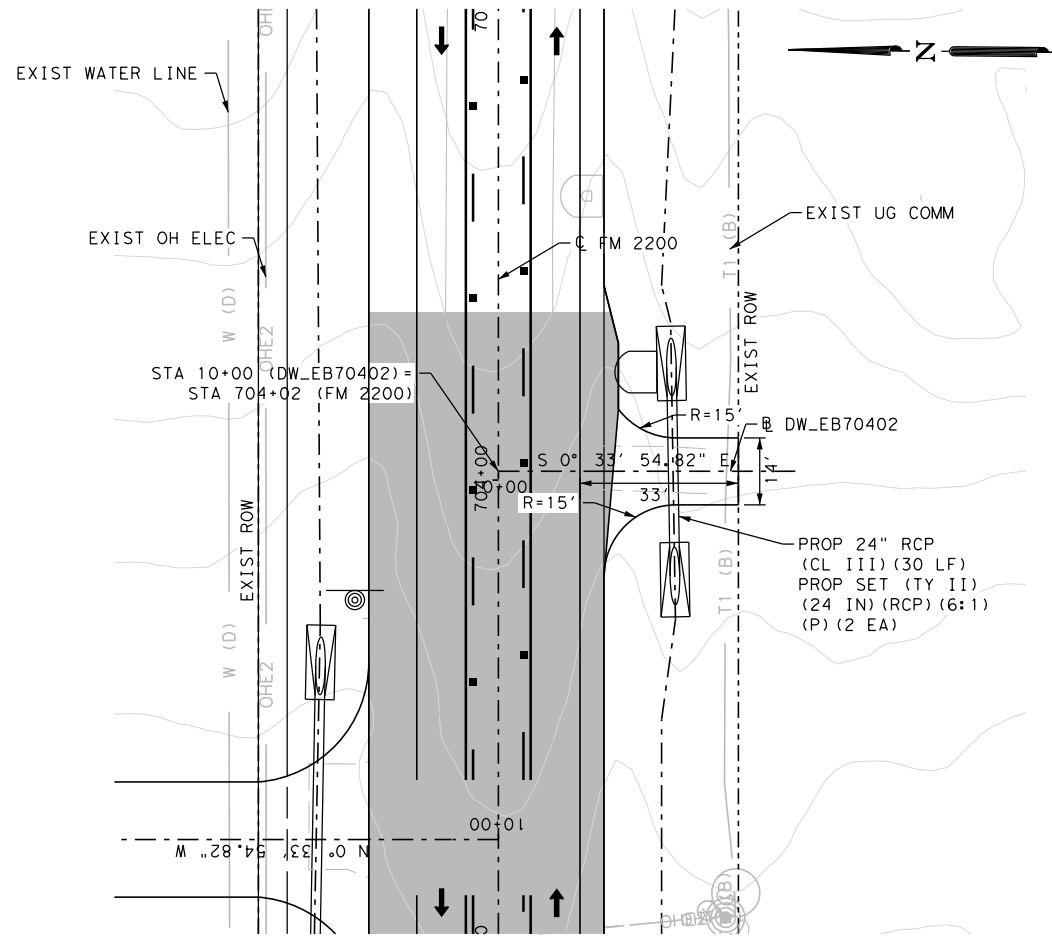
SHEET 19 OF 25

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DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 127



Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP20.dgn



- LEGEND**
- EXIST ROW
 - - - PROP PENETRATION
 - - - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - ← PROP TRAFFIC FLOW
 - - - EXIST CONTOUR
 - - - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - x - EXIST FENCE
 - . . . → FLOW ARROW
 - - - UTILITY IN CONFLICT
 - - - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 LUKE REED, P.E.
 12/20/2022
 DATE

APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER
 JAMES A. LUTZ, P.E.
 12/20/2022
 DATE



SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

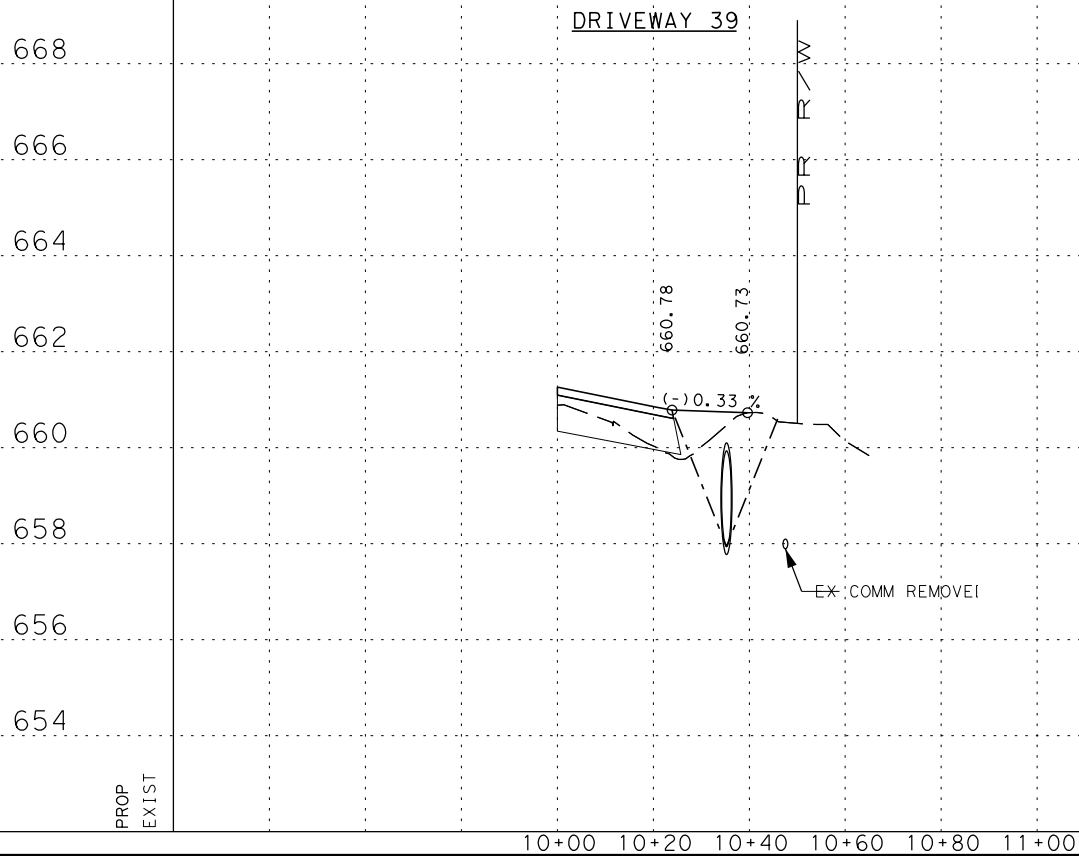
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
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**DRIVEWAY
 PLAN & PROFILE**

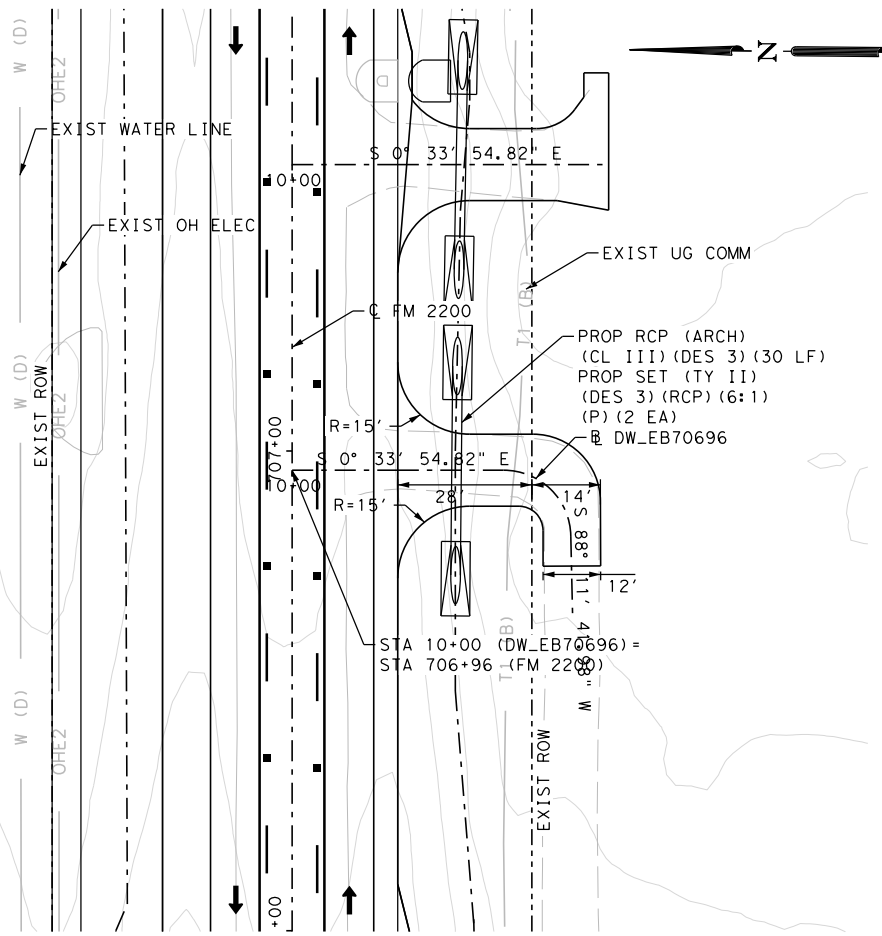
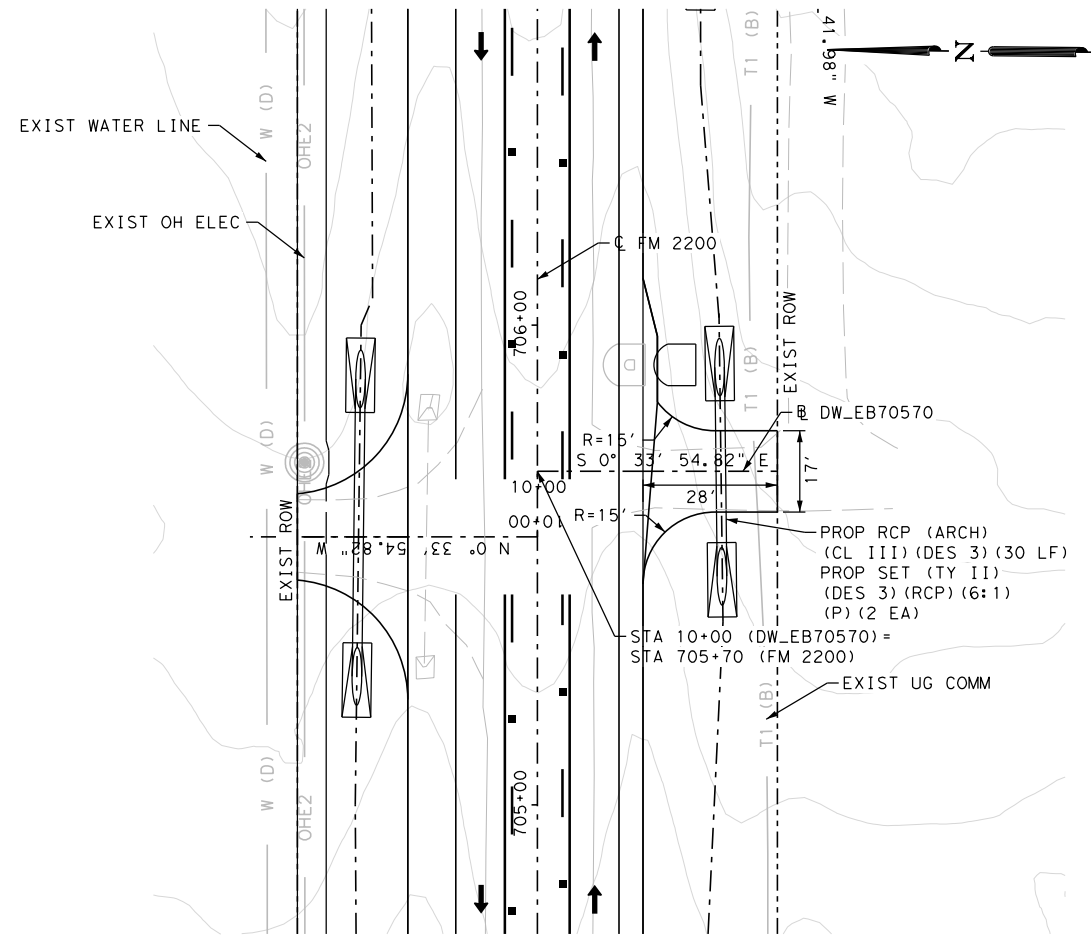
SHEET 20 OF 25

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DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	128



Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP21.dgn



- LEGEND**
- EXIST ROW
 - PROP PENETRATION
 - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - ← PROP TRAFFIC FLOW
 - EXIST CONTOUR
 - PROP CONTOUR
 - UTILITY POLE
 - ☐ TELEPHONE PEDESTAL
 - X — EXIST FENCE
 - · · · — FLOW ARROW
 - — — UTILITY IN CONFLICT
 - — — UTILITY CONFLICT RESOLVED
 - ☉ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

STATE OF TEXAS
LUKE REED
101242
LICENSED PROFESSIONAL ENGINEER
LUKE REED, P.E.
12/20/2022
DATE

APPROVAL

STATE OF TEXAS
JAMES A. LUTE
84722
LICENSED PROFESSIONAL ENGINEER
JAMES A. LUTE, P.E.
12/20/2022
DATE



SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

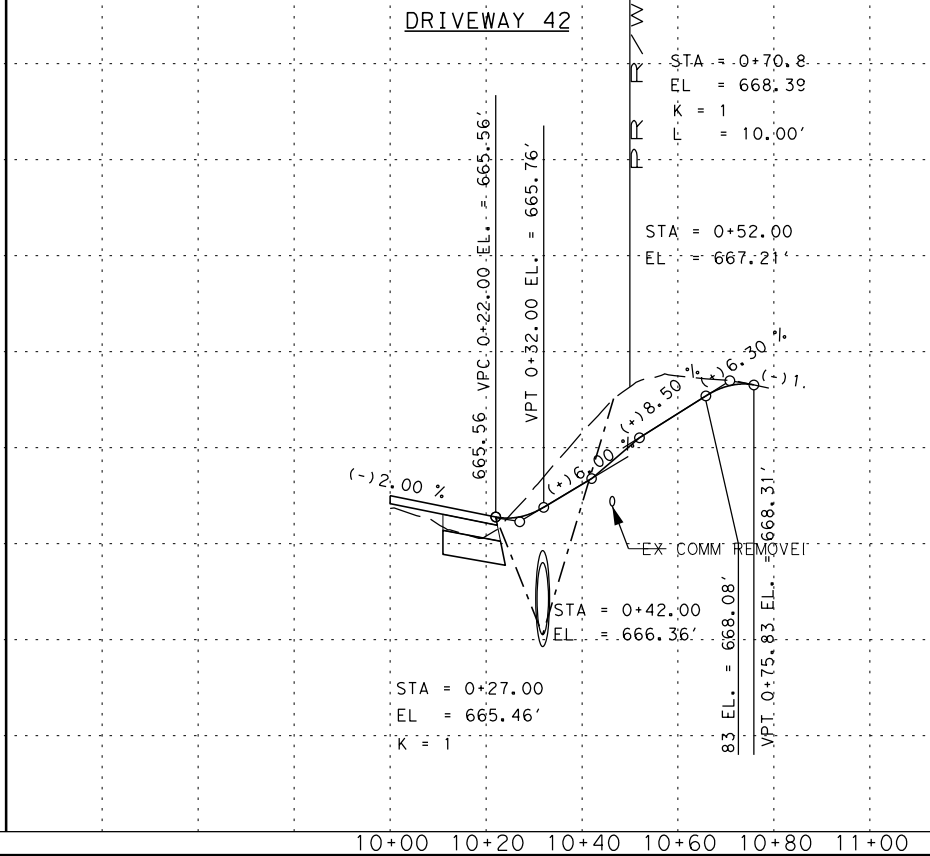
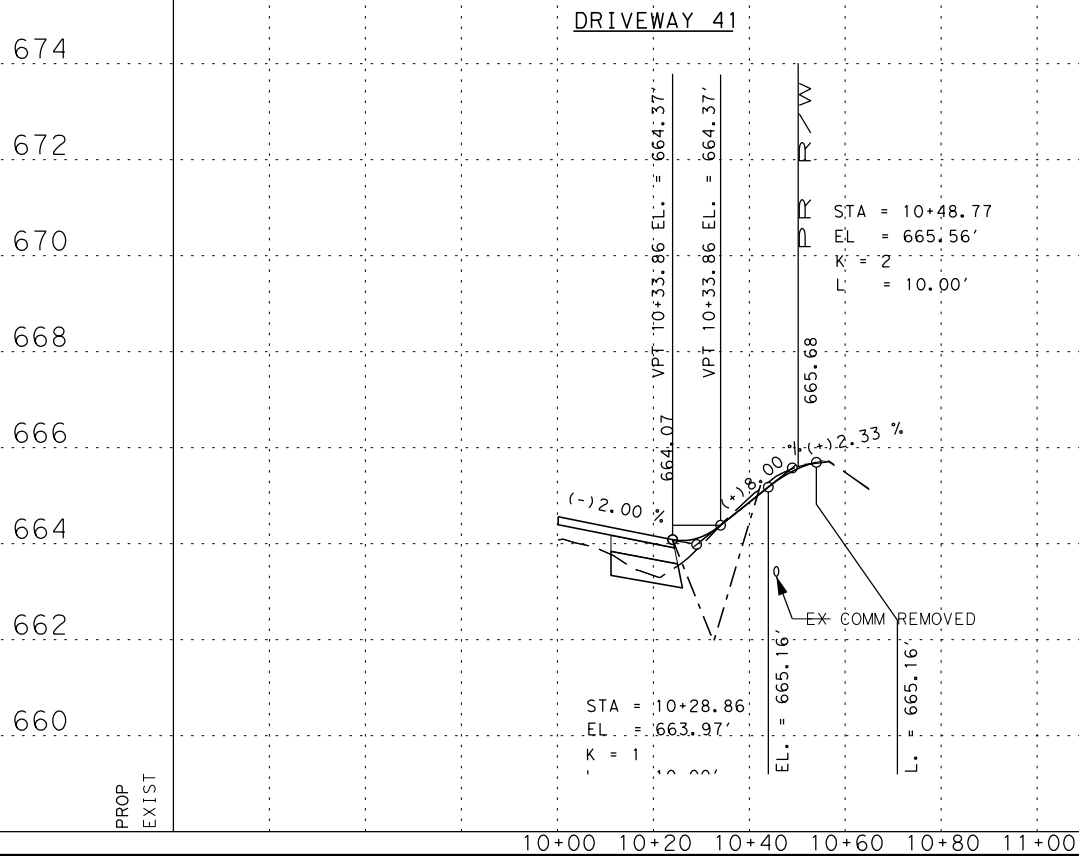
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CHK	DGN	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
		6	TEXAS	SEE TITLE SHEET	FM 2200		
CHK	DGN	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
		SAT	MEDINA	2520	01	016, ETC	129



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668	656
666	654
664	652
662	650
660	648

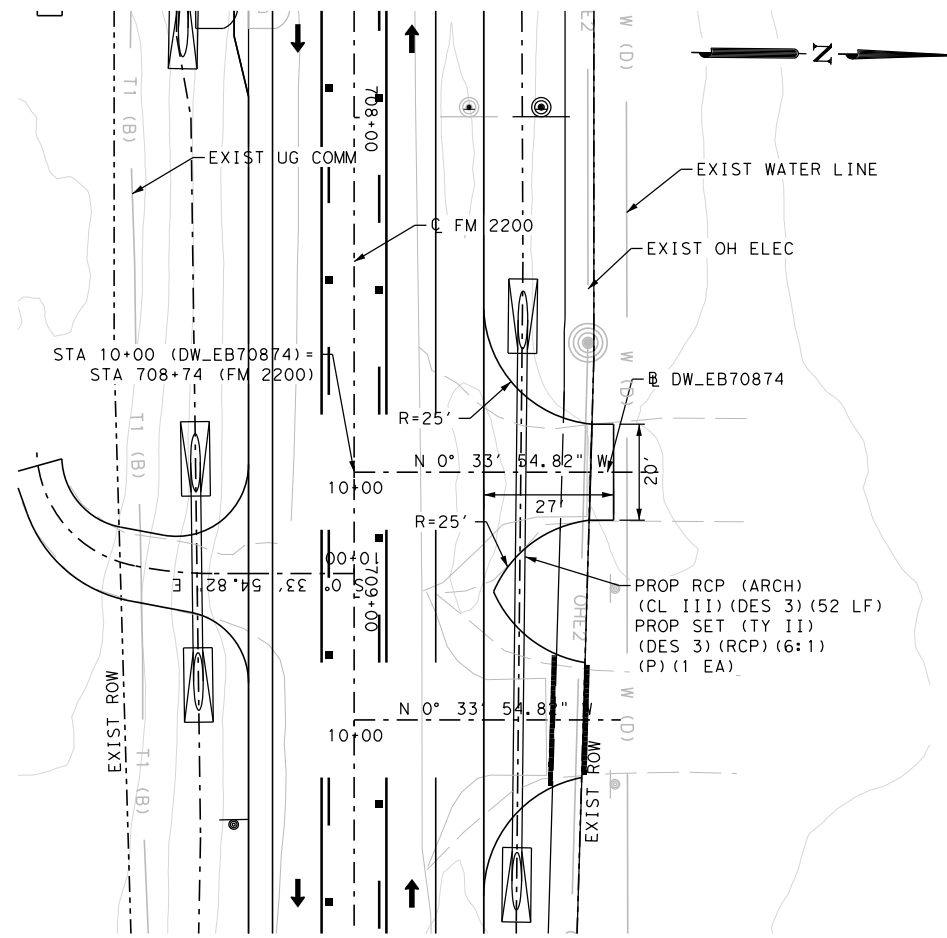
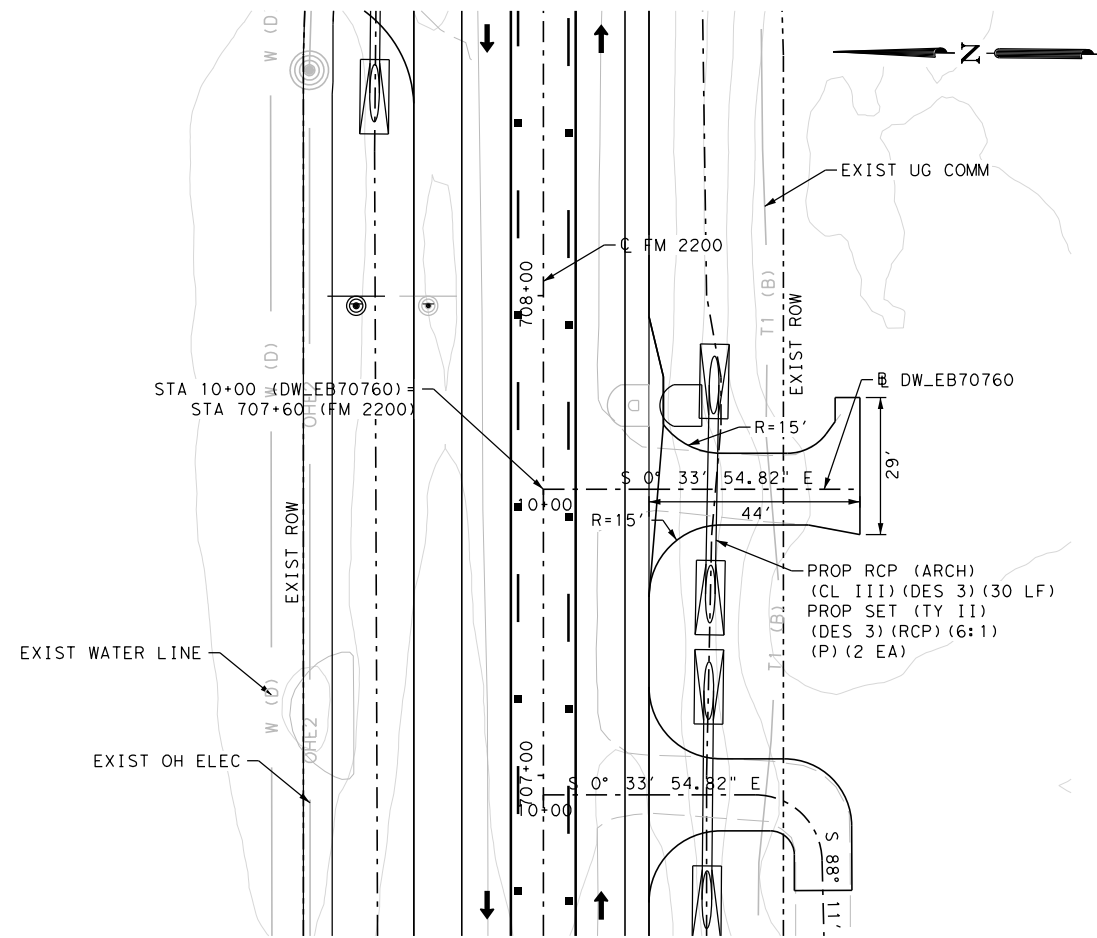
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PROP
EXIST

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP22.dgn



- LEGEND**
- EXIST ROW
 - PROP PENETRATION
 - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - ← PROP TRAFFIC FLOW
 - EXIST CONTOUR
 - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - X — EXIST FENCE
 - FLOW ARROW
 - UTILITY IN CONFLICT
 - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

STATE OF TEXAS
LUKE REED
101242
LICENSED PROFESSIONAL ENGINEER
LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

STATE OF TEXAS
JAMES A. LUTZ
84722
LICENSED PROFESSIONAL ENGINEER
JAMES A. LUTZ, P.E. 12/20/2022 DATE

SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

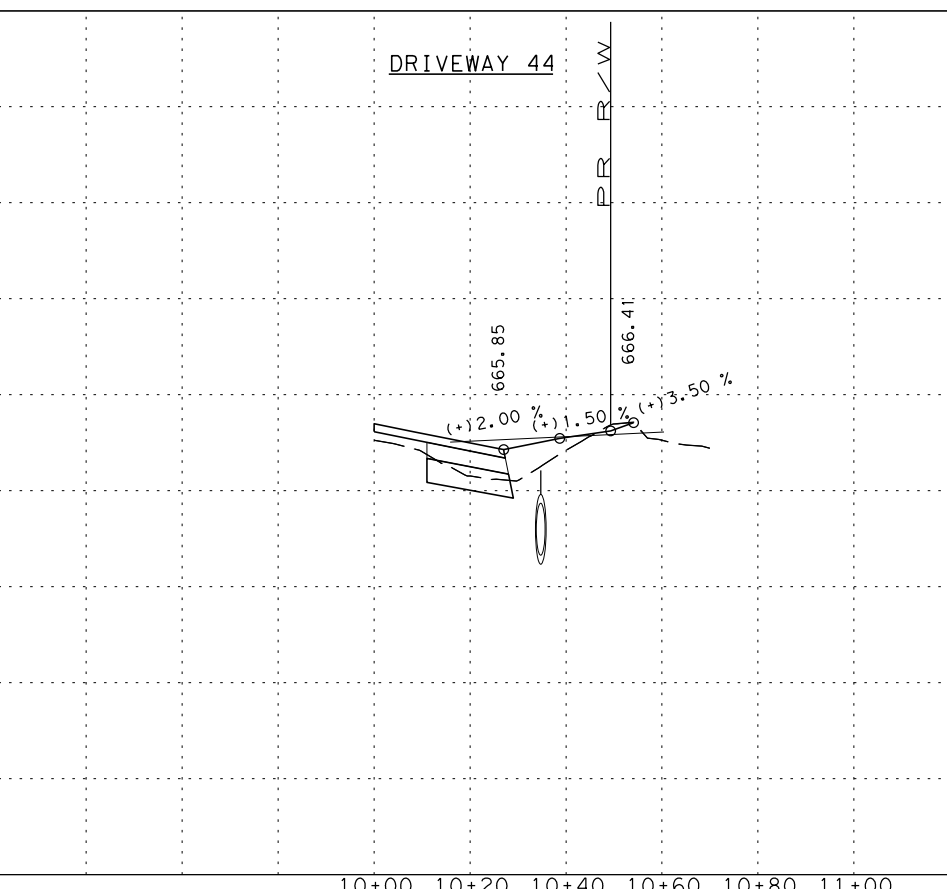
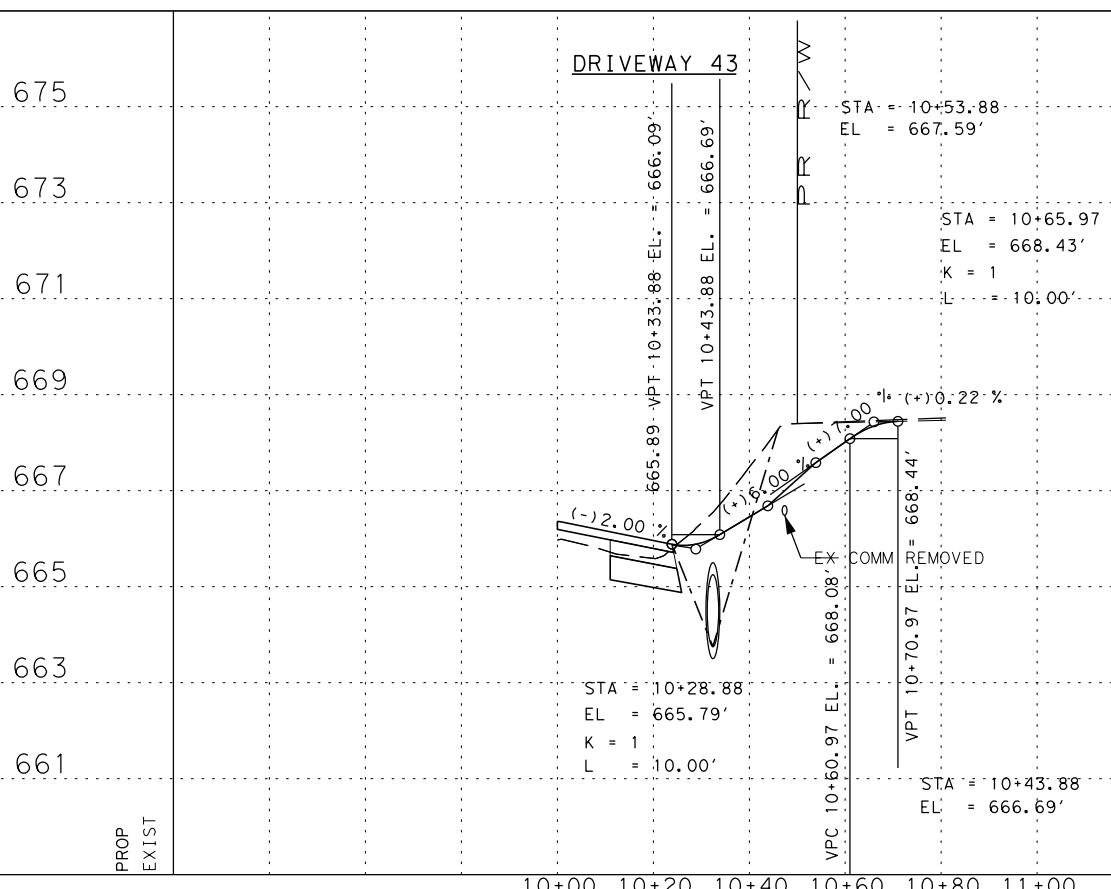
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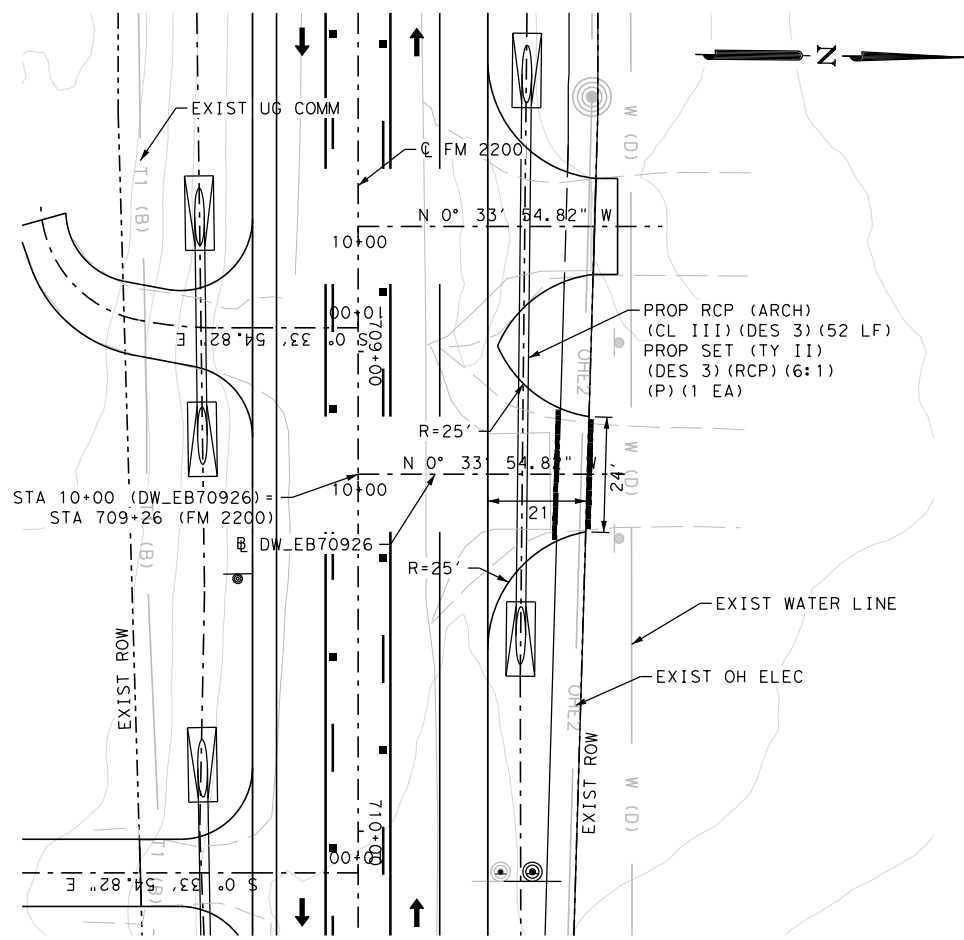
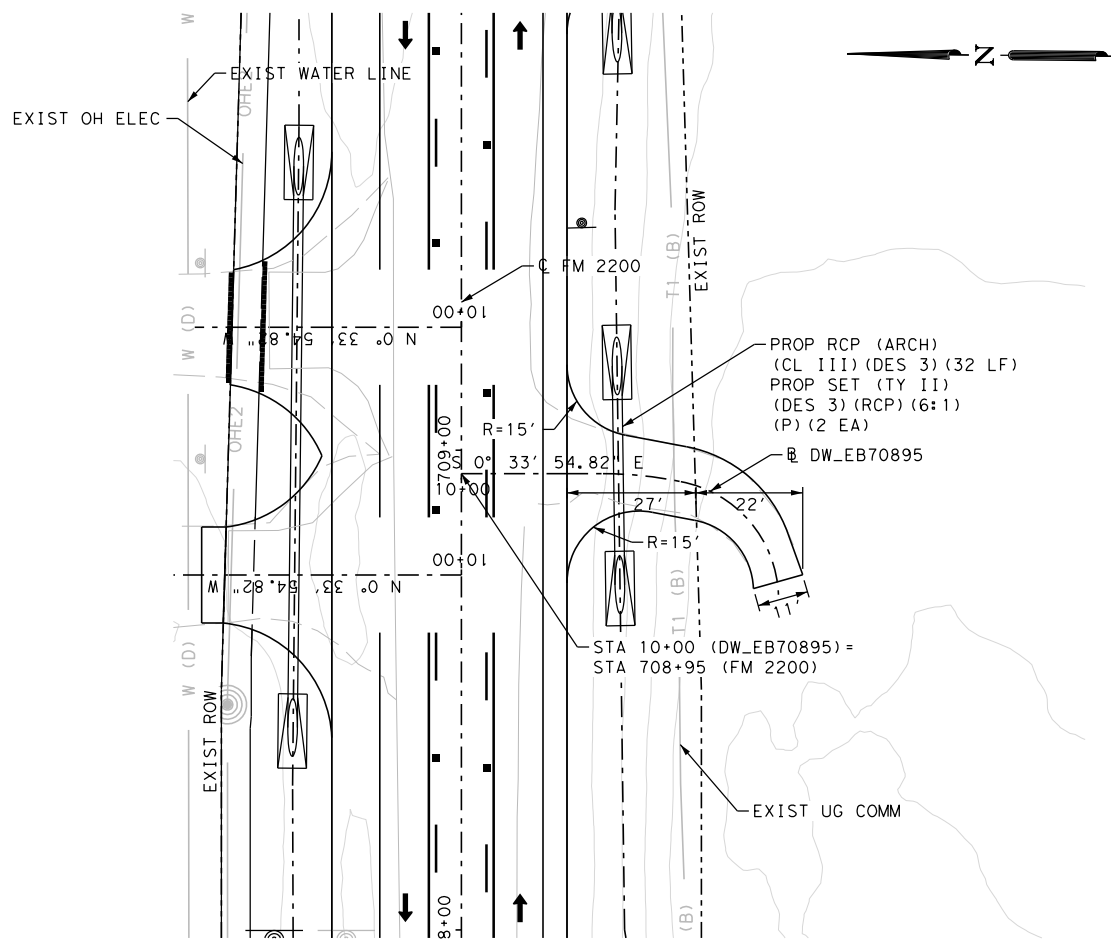
SHEET 22 OF 25

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 130



Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP23.dgn



- LEGEND**
- EXIST ROW
 - - - PROP PENETRATION
 - - - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - PROP TRAFFIC FLOW
 - - - EXIST CONTOUR
 - - - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - x - EXIST FENCE
 - - - → FLOW ARROW
 - - - UTILITY IN CONFLICT
 - - - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

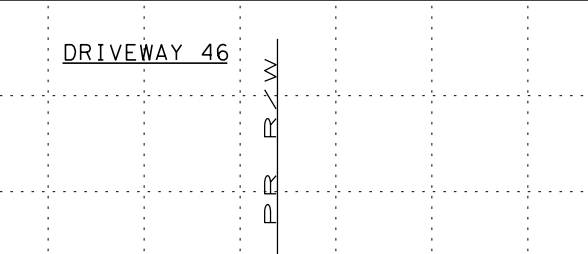
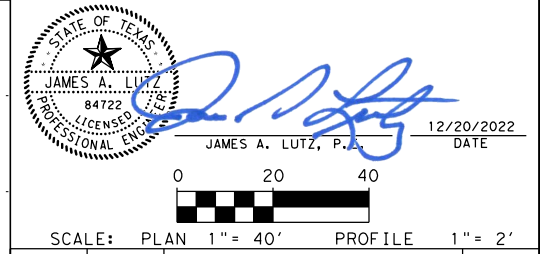
- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

STATE OF TEXAS
LUKE REED
101242
LICENSED PROFESSIONAL ENGINEER
LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

STATE OF TEXAS
JAMES A. LUTZ
84722
LICENSED PROFESSIONAL ENGINEER
JAMES A. LUTZ, P.E. 12/20/2022 DATE



SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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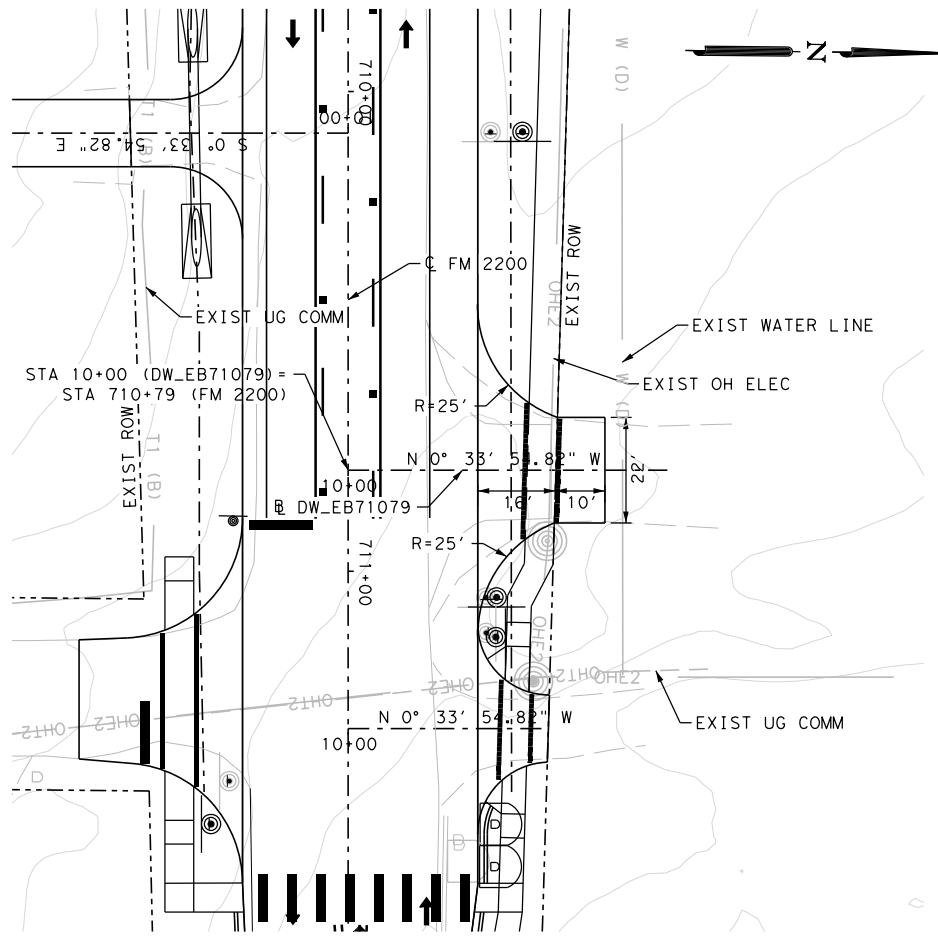
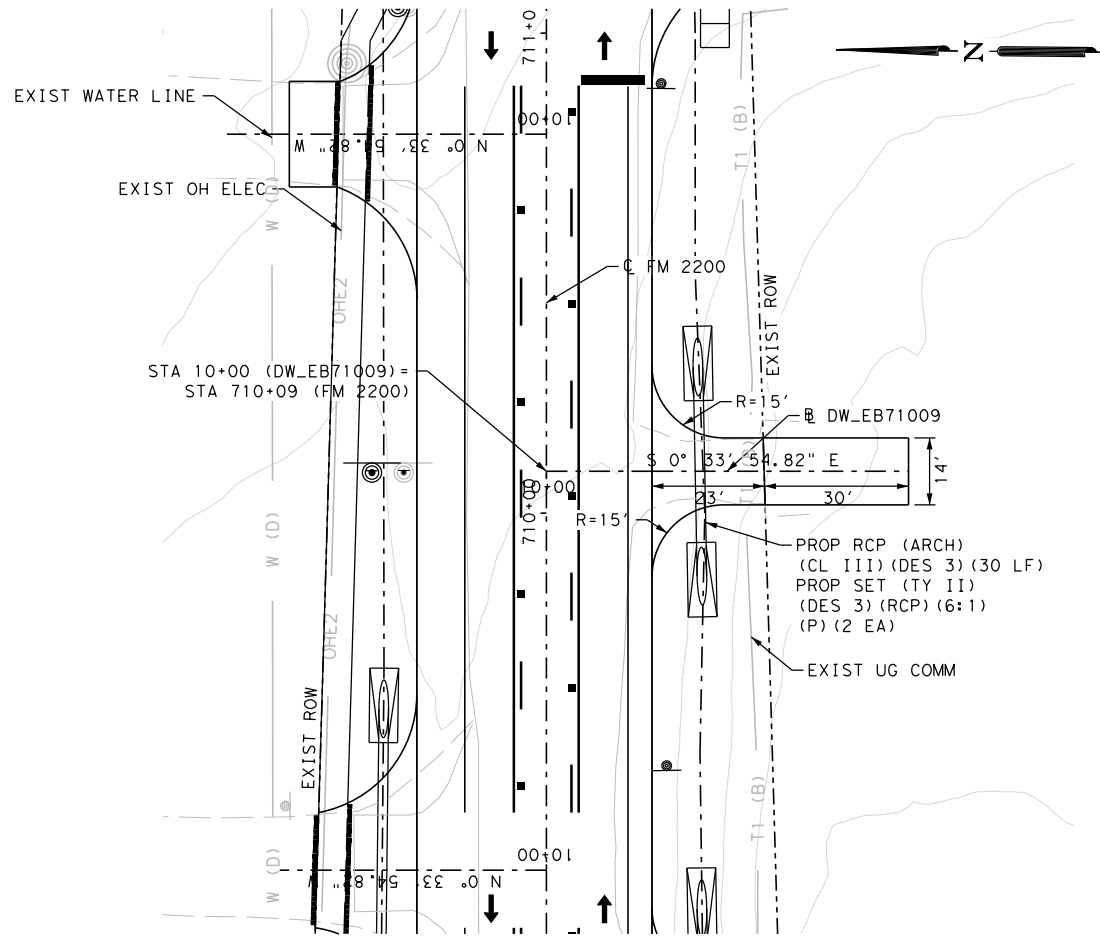
FM 2200
DRIVEWAY PLAN & PROFILE

SHEET 23 OF 25

CHK	DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
		6	TEXAS	SEE TITLE SHEET	FM 2200		
CHK	DGN:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
		SAT	MEDINA	2520	01	016, ETC	131

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Roadway\Driveways\1179904DRV_PP24.dgn



- LEGEND**
- EXIST ROW
 - PROP PENETRATION
 - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - ← PROP TRAFFIC FLOW
 - EXIST CONTOUR
 - PROP CONTOUR
 - UTILITY POLE
 - TELEPHONE PEDESTAL
 - X — EXIST FENCE
 - FLOW ARROW
 - UTILITY IN CONFLICT
 - UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 LUKE REED, P.E.
 12/20/2022
 DATE

APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 84725
 LICENSED PROFESSIONAL ENGINEER
 JAMES A. LUTZ, P.E.
 12/20/2022
 DATE



SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson ENGINEERS

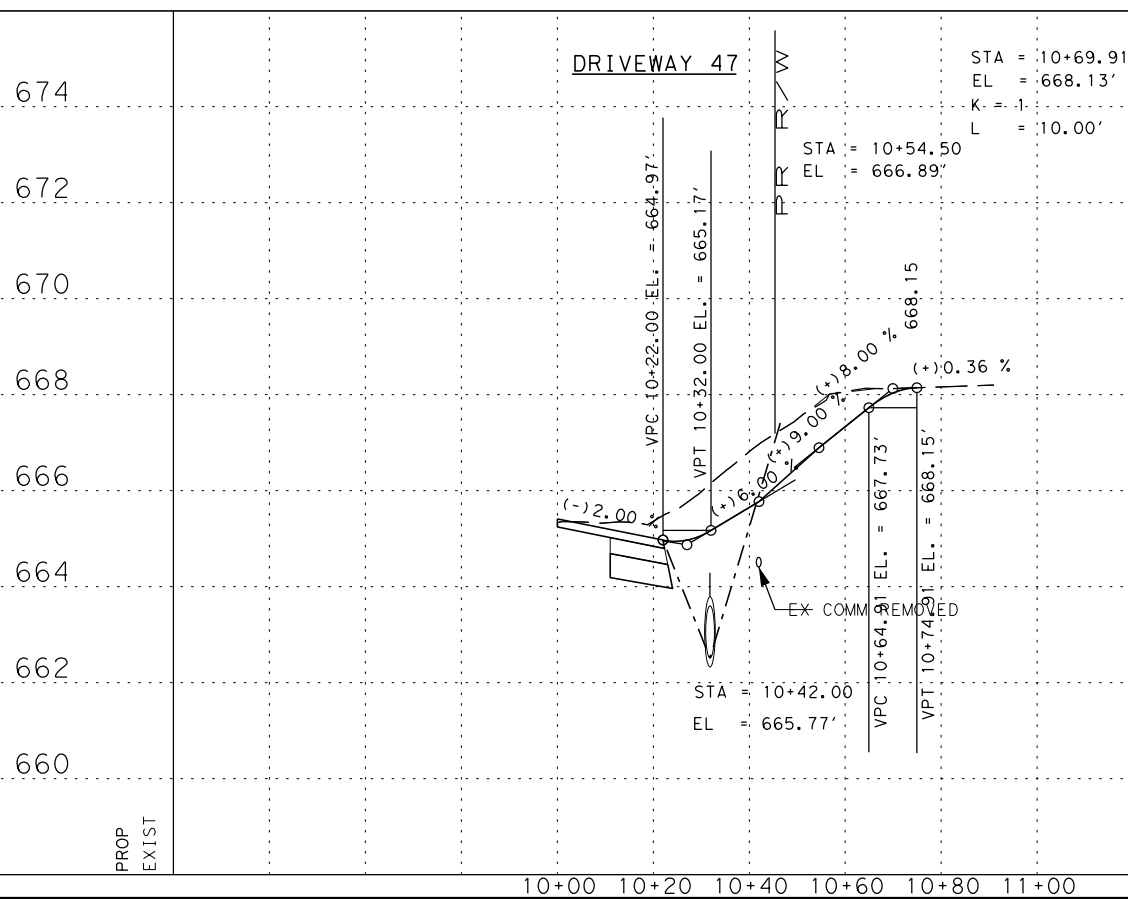
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FM 2200
**DRIVEWAY
 PLAN & PROFILE**

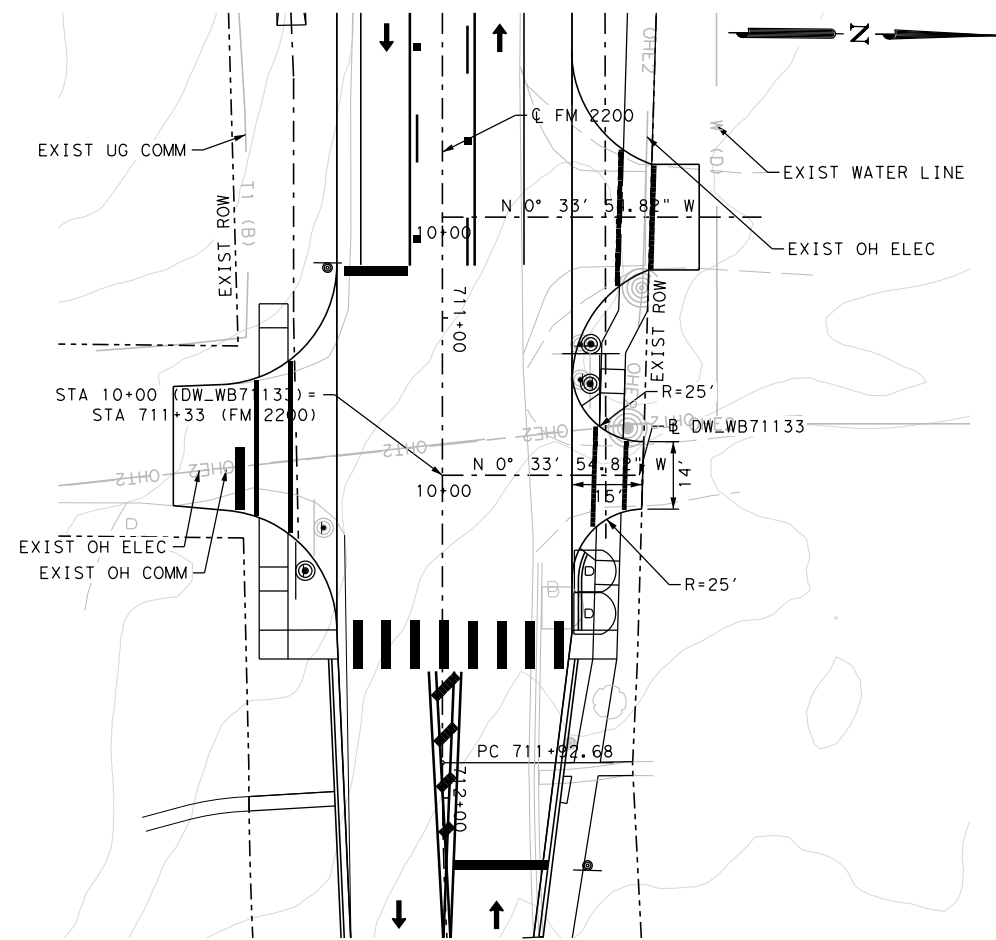
SHEET 24 OF 25

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DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	MEDINA	2520	01
			016, ETC	132



Plotted on: 12/20/2022


Design File name: P:\117\99\04\Des\ign\Civil\Roadway\Driveways\1179904DRV_PP25.dgn



- LEGEND**
- EXIST ROW
 - PROP PENETRATION
 - WIDEN CONTROL LINE
 - ← EXIST TRAFFIC FLOW
 - PROP TRAFFIC FLOW
 - EXIST CONTOUR
 - PROP CONTOUR
 - UTILITY POLE
 - ☐ TELEPHONE PEDESTAL
 - x — EXIST FENCE
 - . . . — FLOW ARROW
 - / — UTILITY IN CONFLICT
 - / — UTILITY CONFLICT RESOLVED
 - ⊙ SUE QL-A LOCATION

- NOTES:**
- PROPOSED DRIVEWAY SHALL BE CONCRETE UP TO EXIST ROW AND MATCH EXIST MATERIAL BEYOND EXIST ROW.

DESIGN

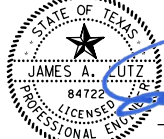


 LUKE REED, P.E.

 12/20/2022

 DATE

APPROVAL



 JAMES A. LUTZ, P.E.

 12/20/2022

 DATE



SCALE: PLAN 1" = 40' PROFILE 1" = 2'

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson ENGINEERS

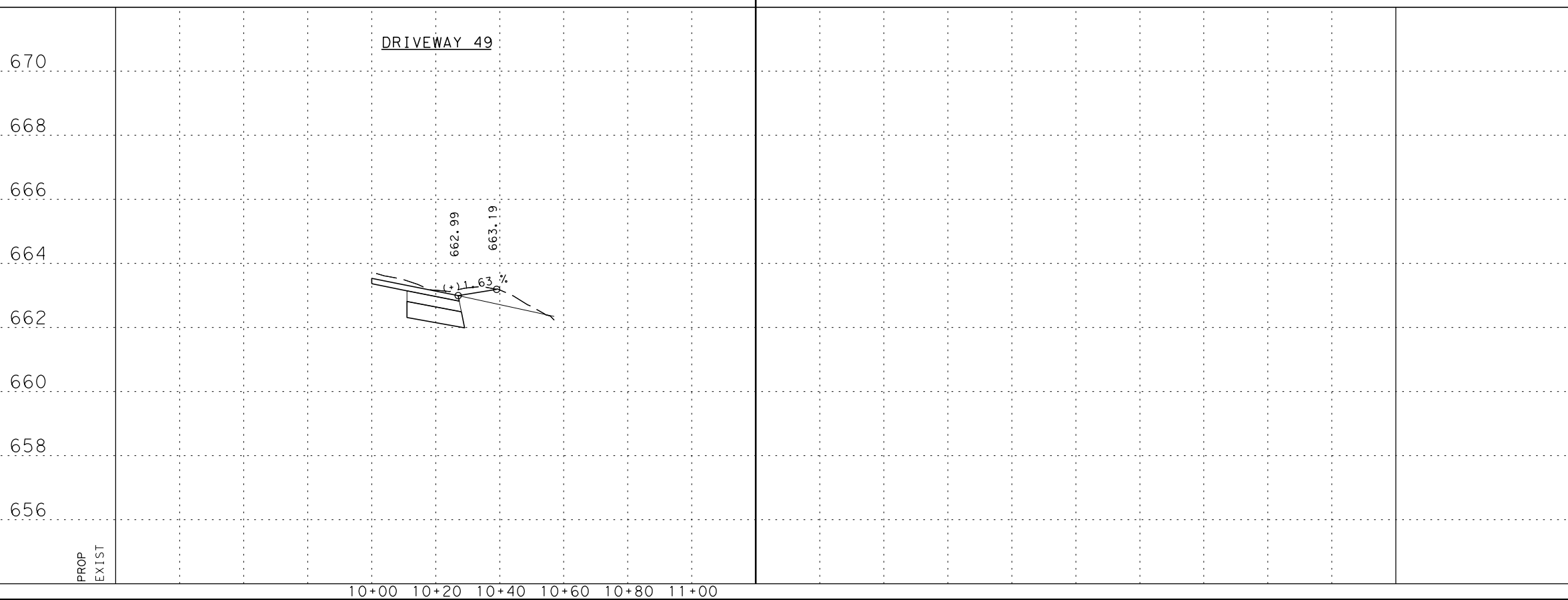
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
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FM 2200
**DRIVEWAY
 PLAN & PROFILE**

SHEET 25 OF 25

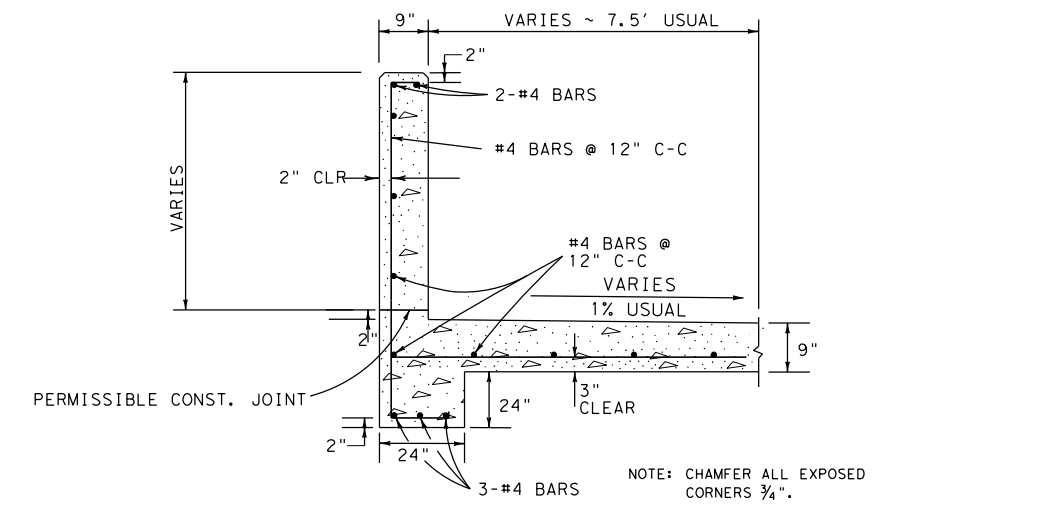
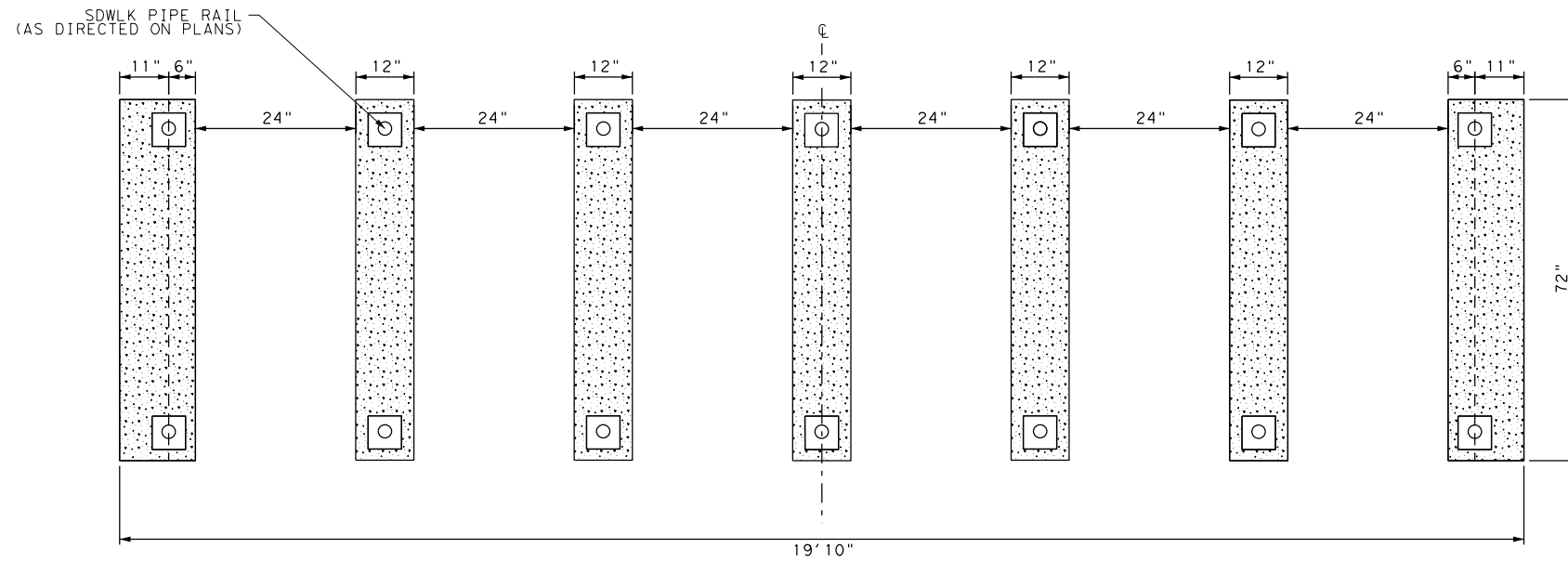
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CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	133



Plotted on: 12/20/2022

SIDEWALK (TYPE A) DETAIL

(SEE NOTE 1)
N. T. S.



CURB MOUNTED TO CONCRETE PAD DETAIL

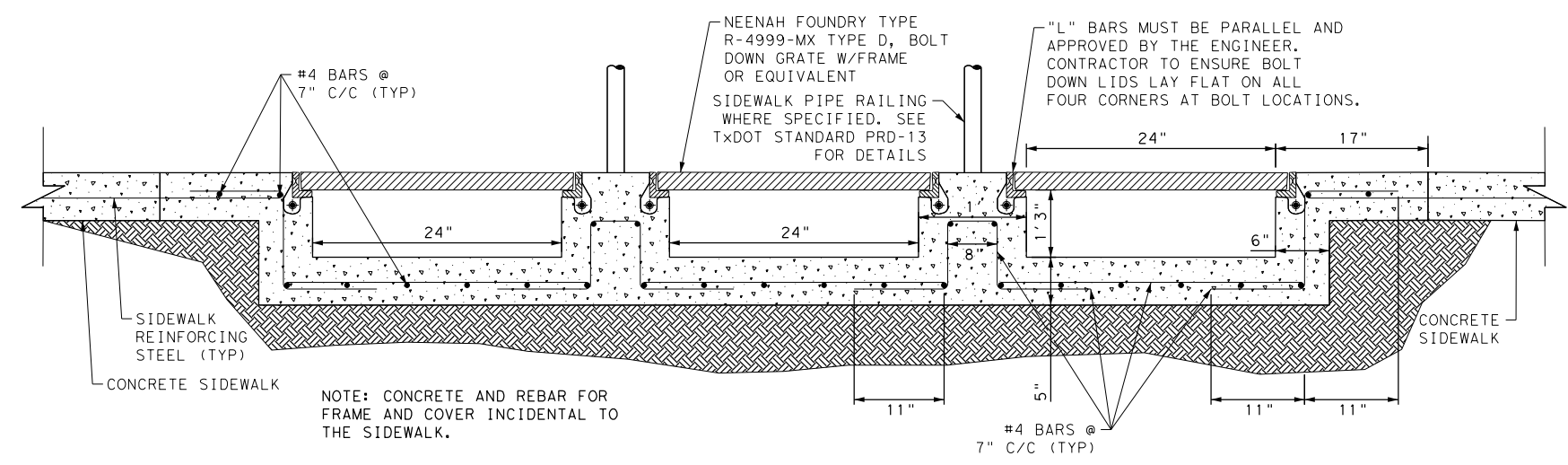
N. T. S.

NOTES

- SIDEWALK (TY A) IS PAID SEPARATELY UNDER THE FOLLOWING PAY ITEMS UNLESS OTHERWISE SHOWN:
 ITEM 0471-6003 GRATE & FRAME
 ITEM 0420-6074 CL C CONC (MISC)
 ITEM 0450-6052 RAIL (HANDRAIL) (TY F)

SIDEWALK (TYPE A) SECTION DETAIL

N. T. S.



DESIGN

LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

JAMES A. LUTZ, P.E. 12/20/2022 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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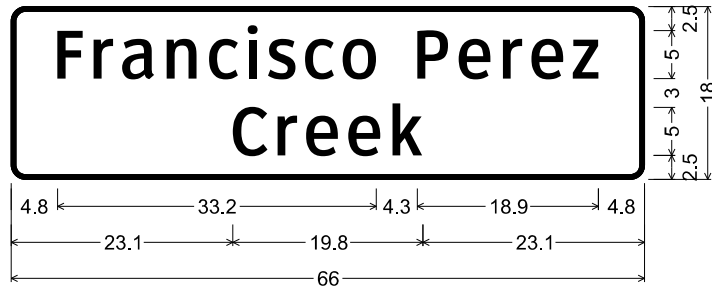
FM 2200
SIDEWALK TYPE A SPECIAL DETAILS

DON:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 134

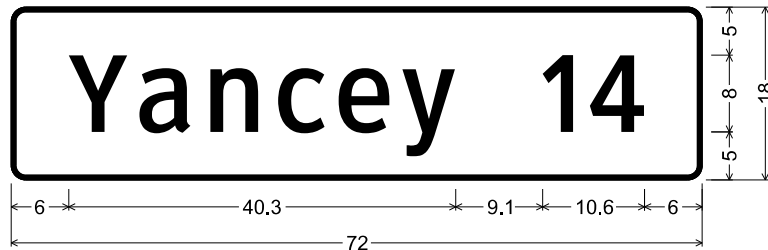
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Plotted on: 12/20/2022

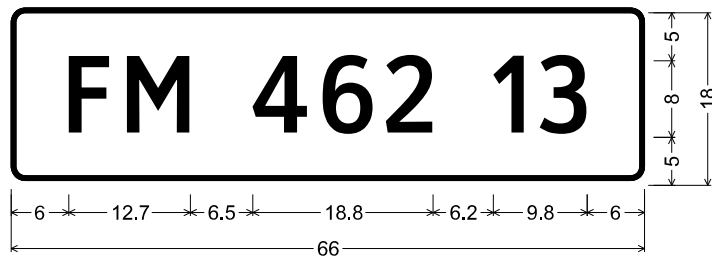
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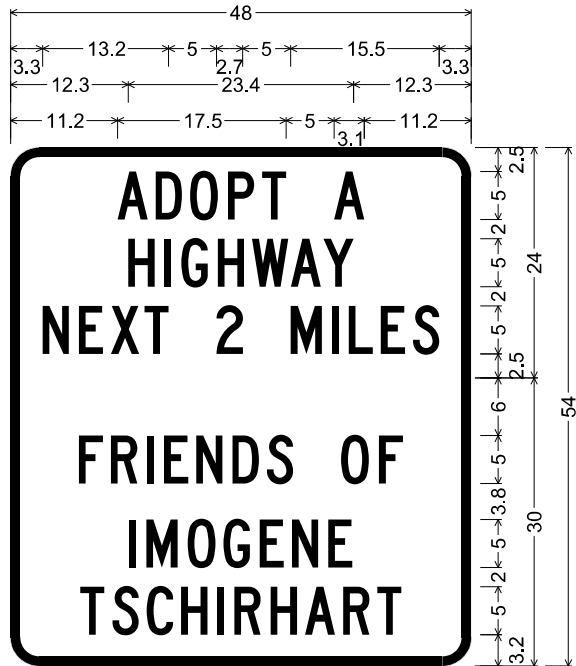
I-3_66x18;
1.5" Radius, 0.5" Border, White on Green;
"Francisco Perez", ClearviewHwy-3-W;
"Creek", ClearviewHwy-3-W;



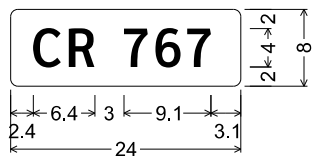
D2-1 8in;
1.5" Radius, 0.5" Border, White on Green;
"Yancey", ClearviewHwy-3-W; "14", ClearviewHwy-3-W;



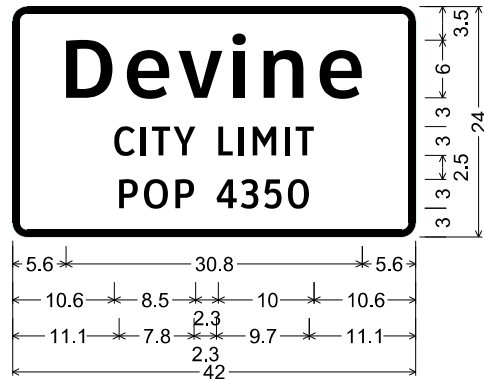
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"FM 462", ClearviewHwy-3-W; "13", ClearviewHwy-3-W;



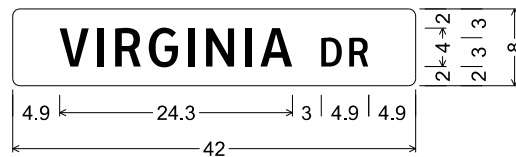
D14-4T-3_48x48;
3.0" Radius, 1.0" Border, White on Blue;
"ADOPT A", C; "HIGHWAY", C;
"NEXT 2 MILES", C;
3.0" Radius, 1.0" Border, White on Blue;
"FRIENDS OF", C; "IMOGENE", C;
"TSCHIRHART", C;



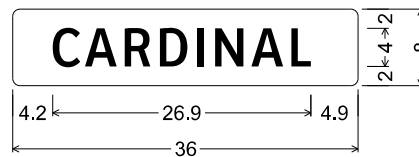
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0.8" Radius, No border, White on Green;
"CR 767", ClearviewHwy-3-W;



I-2aT 6in;
1.5" Radius, 0.8" Border, White on Green;
"Devine", ClearviewHwy-5-W-R;
"CITY LIMIT", ClearviewHwy-3-W;
"POP 4350", ClearviewHwy-3-W;



D3-1G(4) 4in (Principal legend with or without descending strokes);
0.8" Radius, No border, White on Green;
"VIRGINIA", ClearviewHwy-3-W;
"DR", ClearviewHwy-3-W;

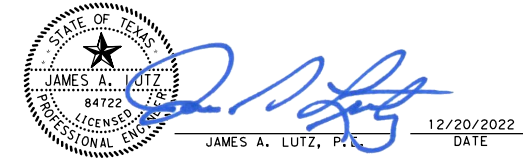


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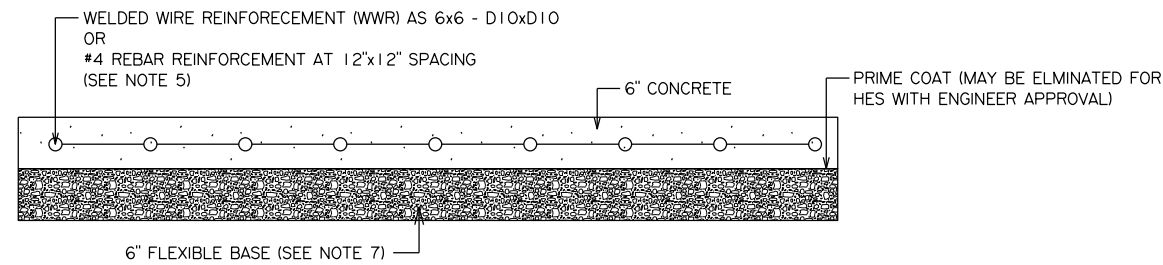
DESIGN



APPROVAL

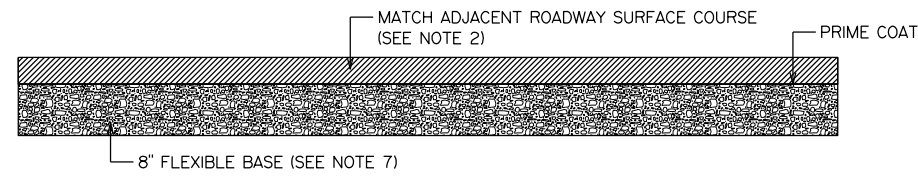


REV. NO.	DATE	DESCRIPTION	BY
 SAN ANTONIO AUSTIN HOUSTON FORT WORTH DALLAS 2000 NW LOOP 410 SAN ANTONIO, TX 78213 210.375.9000 TEXAS ENGINEERING FIRM #470 TEXAS SURVEYING FIRM #10028800			
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FM 2200 SIGN DETAILS			
SHEET 1 OF 1			
DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO. JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01 016, ETC 135



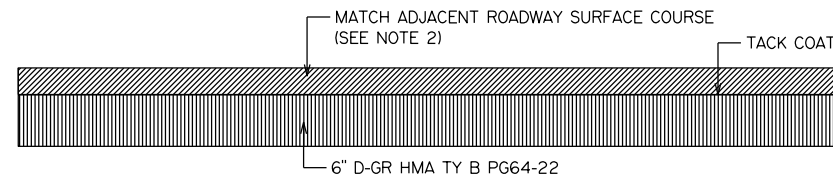
TYPICAL CONCRETE DRIVEWAY

• NOTE: STEEL SHALL BE CENTERED VERTICALLY IN CONCRETE. PAID AS DRIVEWAYS CONC (HES) OR DRIVEWAYS (CONC)



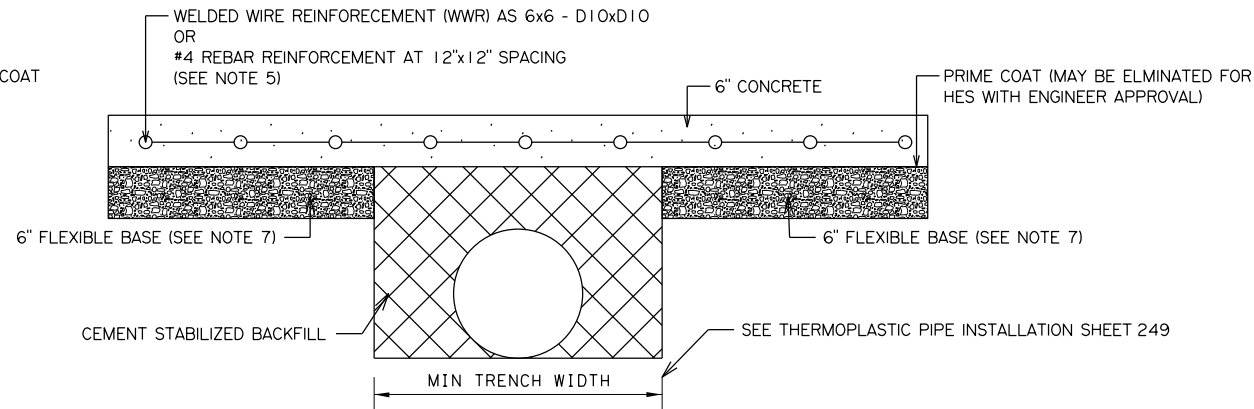
TYPICAL ROADWAY DRIVEWAY (TYPE 1)

PAID AS DRIVEWAYS ACP (TYPE 1)



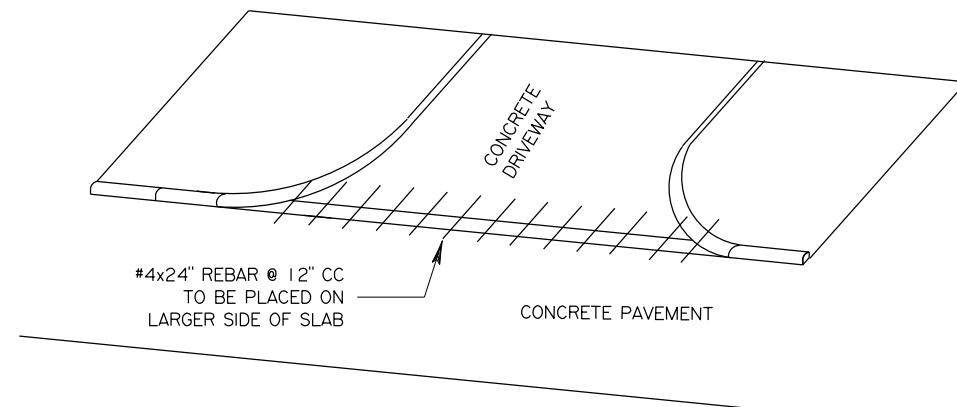
TYPICAL ROADWAY DRIVEWAY (TYPE 2)

PAID AS DRIVEWAYS ACP (TYPE 2)

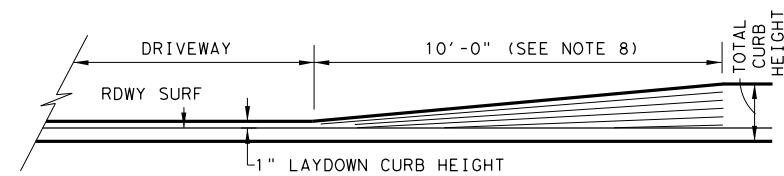


TYPICAL CONCRETE DRIVEWAY WHEN <1' TO PROPOSED DRIVEWAY PIPE

• NOTE: STEEL SHALL BE CENTERED VERTICALLY IN CONCRETE. PAID AS DRIVEWAYS CONC (HES) OR DRIVEWAYS (CONC)



TIE BAR PLACEMENT WITH CRCP



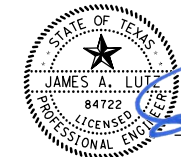
LAYDOWN CURB AT DRIVEWAYS DETAIL

NOTES:

1. USE CLASS A CONCRETE UNLESS OTHERWISE NOTED.
2. DENSE GRADED HMA MAY BE USED WHEN APPROVED BY THE ENGINEER IF THE ROADWAY SURFACE COURSE IS A PERFORMANCE MIX.
3. REFER TO PLAN SHEETS FOR GEOMETRIC DESIGN DETAILS.
4. FOR CONCRETE DRIVEWAYS, PROVIDE EXPANSION JOINT 20 FT C-C FOR WIDTH OR LENGTH OVER 25 FT.
5. FIBER REINFORCEMENT IS NOT ALLOWED.
6. MACHINE LAID HMA IS REQUIRED UNLESS OTHERWISE APPROVED BY THE ENGINEER.
7. FURNISH BASE MEETING THE REQUIREMENTS FOR ANY TYPE OF GRADE IN ACCORDANCE WITH ITEM 247. FLEXIBLE BASE COMPRESSIVE STRENGTHS ARE WAIVED. BASE IS SUBSIDIARY TO THE ITEM.
8. WHERE SIDEWALK IS PRESENT, SLOPE AND LENGTH OF CURB TRANSITION SHOULD MATCH THE SIDEWALK AND MEET ADA REQUIREMENTS.
9. IF ROOTS ARE ENCOUNTERED VERIFY WITH THE ENGINEER PRIOR TO ACCOMODATING OR REMOVING 2 IN. DIAMETER OR LARGER ROOTS. ROOT REMOVAL MUST BE IN ACCORDANCE WITH ITEM 752.4.2. ROOTS MAY REMAIN IN THE BASE. FOR IMPROVEMENTS WITHIN 6 IN. OF A ROOT, THE CONCRETE THICKNESS MAY BE REDUCED BY 1 IN. AND THE BASE INCREASED BY 1 IN. TO MINIMIZE THE IMPACT TO THE ROOTS. ADJUST BASE AND SURFACE PROFILE TO PROVIDE A 1 IN. BASE CUSHION AROUND THE ROOTS. THE SURFACE PROFILE MAY BE ADJUSTED TO THE EXTENT ALLOWED BY ADA. THIS WORK IS SUBSIDIARY.



Signature of Luke Reed
LUKE REED, P. E.
DATE: 1/5/2023



Signature of James A. Lutz
JAMES A. LUTZ, P. E.
DATE: 1/5/2023

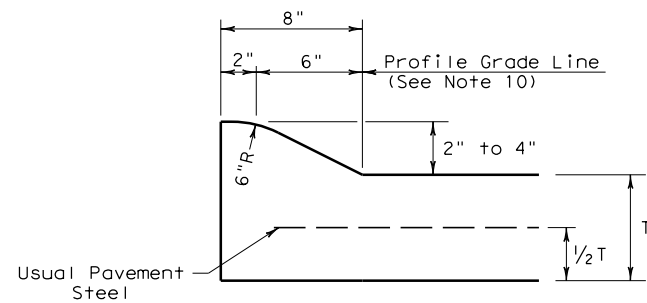
DRIVEWAY DETAILS (MOD)

San Antonio District Standard
Sheet (1 of 1)

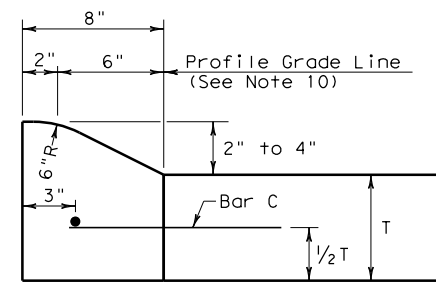
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STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET		
SAT	6	SEE TITLE SHEET	136		
COUNTY	CONTROL SECTION	JOB	HIGHWAY		
MEDINA	2520 01	016, ETC	FM 2200		

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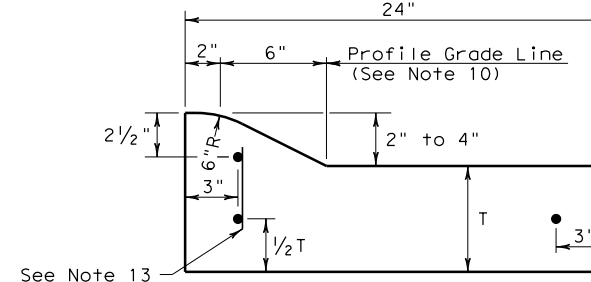
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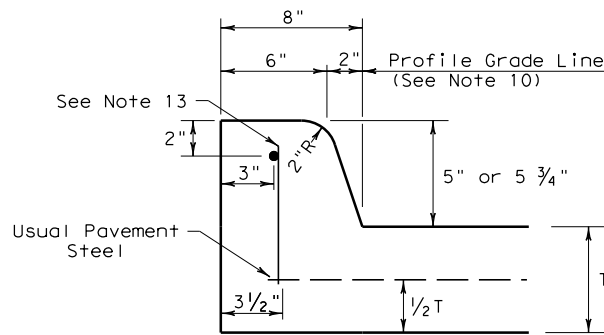
TYPE I CURB (MONOLITHIC)
 2" - 4" HEIGHT



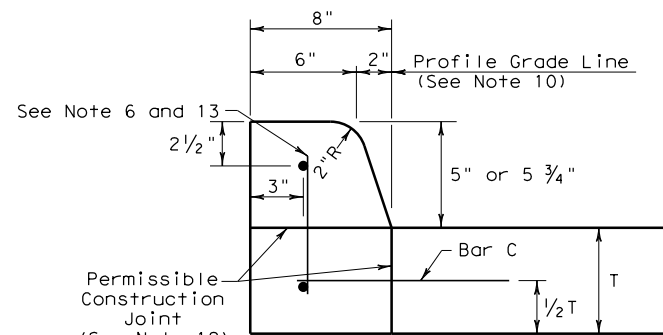
TYPE I CURB
 2" - 4" HEIGHT



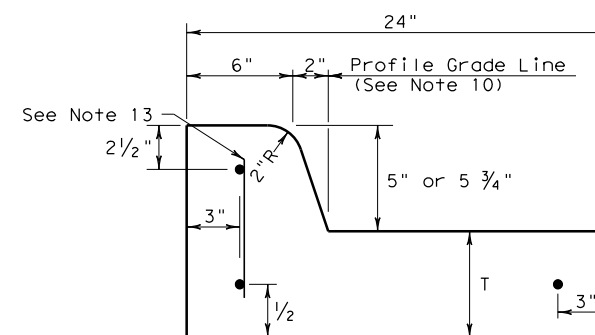
TYPE I CURB AND GUTTER
 2" - 4" HEIGHT



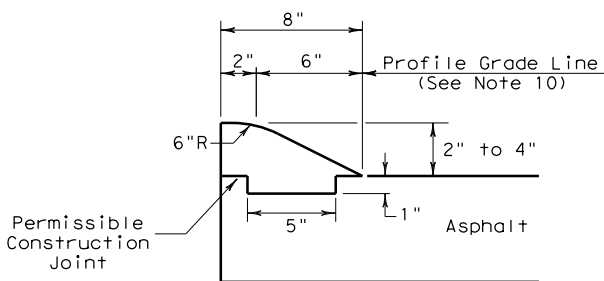
TYPE II CURB (MONOLITHIC)
 5" - 5 3/4" HEIGHT



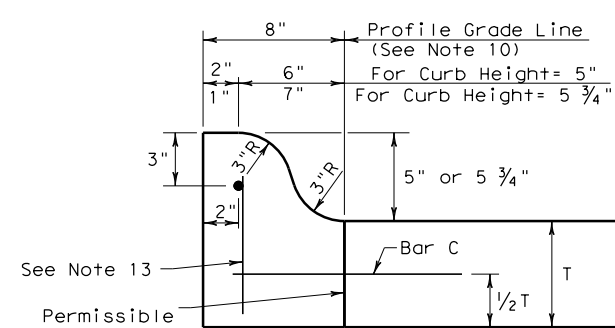
TYPE II CURB
 5" - 5 3/4" HEIGHT



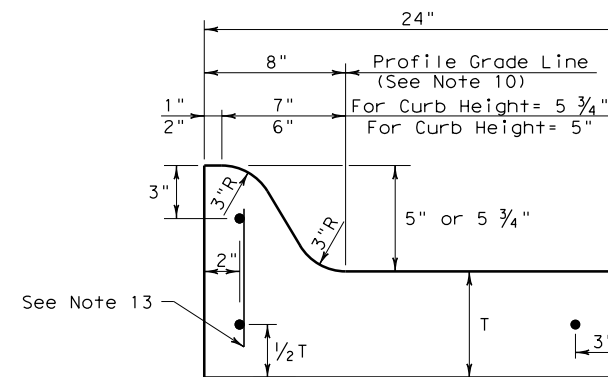
TYPE II CURB AND GUTTER
 5" - 5 3/4" HEIGHT



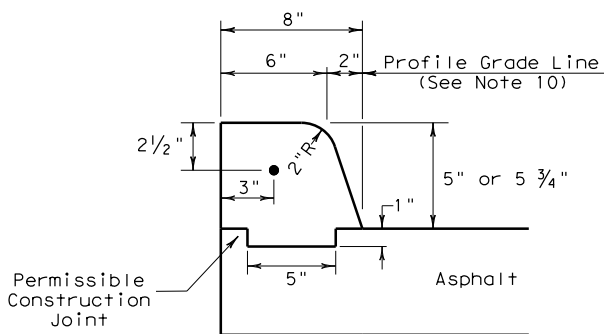
TYPE III CURB (KEYED)
 2" - 4" HEIGHT



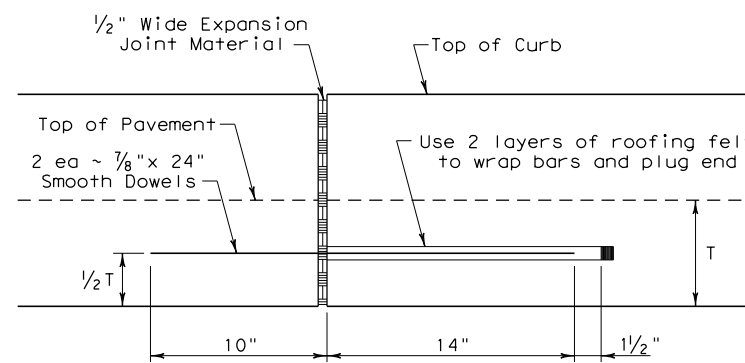
TYPE IIa CURB
 5" - 5 3/4" HEIGHT



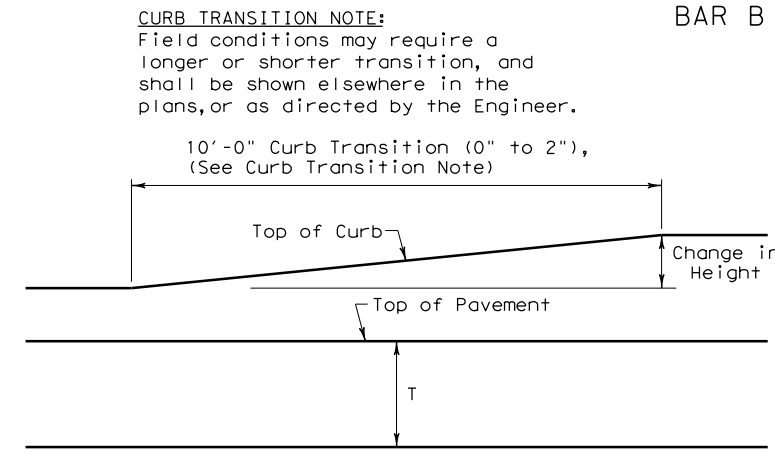
TYPE IIa CURB AND GUTTER
 5" - 5 3/4" HEIGHT



TYPE IV CURB (KEYED)
 5" - 5 3/4" HEIGHT



EXPANSION JOINT DETAIL

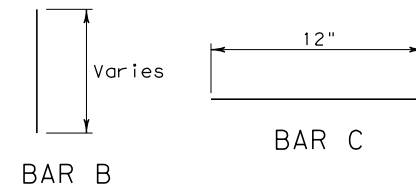


CURB TRANSITION

Note: To be paid for as Highest Curb

GENERAL NOTES

- All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
- Concrete shall be Class A.
- 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."
- Round exposed sharp edges with a rounding tool, to a minimum radius of 1/4 inch.
- All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
- 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.
- 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.
- Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C-C.
- Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
- Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
- One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
- 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.
- Bar B placement as needed (typically at four ft. C-C) to support curb reinforcing steel during concrete placement.



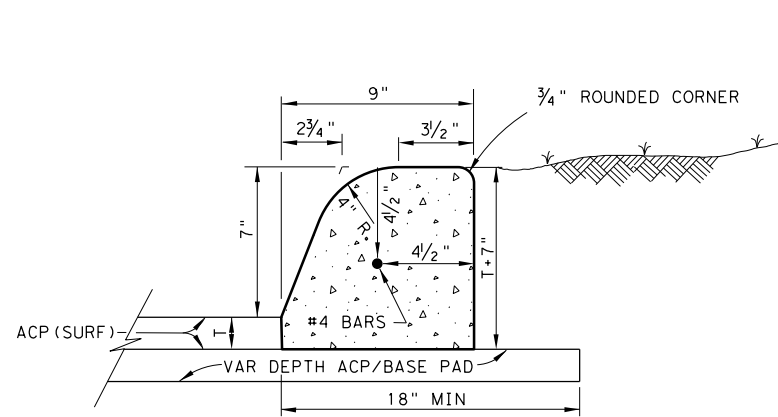
CURB TRANSITION NOTE:
 Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.

				Design Division Standard	
<h2>CONCRETE CURB AND GUTTER</h2> <h3>CCCG-22</h3>					
FILE: cccg21.dgn	DN: TxDOT	CK: AN	DW: CS	CK: KM	
© TxDOT: JUNE 2022	CONT: 2520	SECT: 01	JOB: 016, ETC	HIGHWAY: FM 2200	
REVISIONS	DIST: SAT	COUNTY: MEDINA	SHEET NO.: 137		

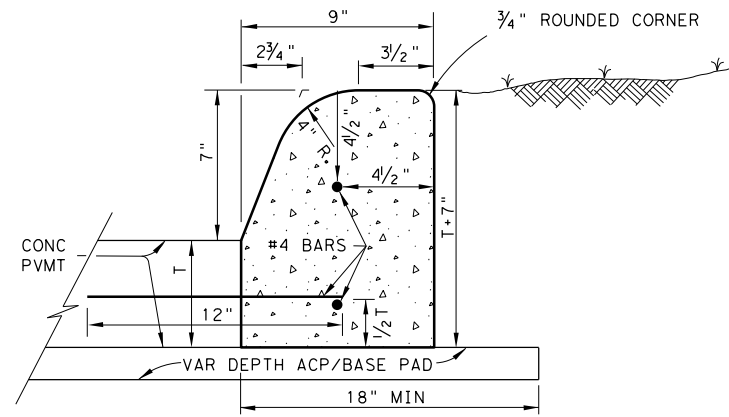
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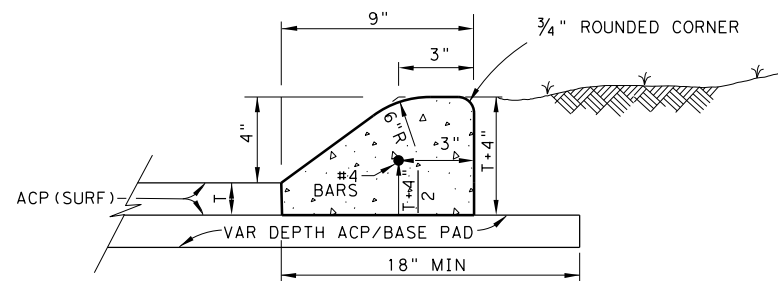
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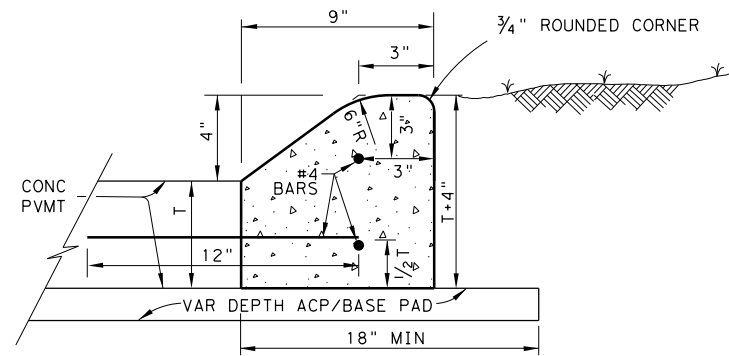
CONCRETE CURB (TYPE 1)
W/ ACP



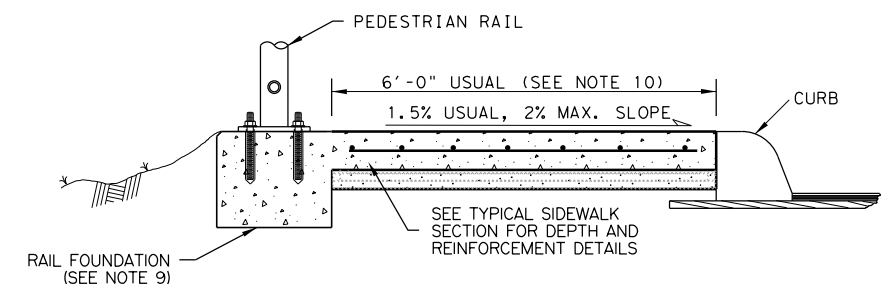
CONCRETE CURB (TYPE 1)
W/ CONC PAVEMENT



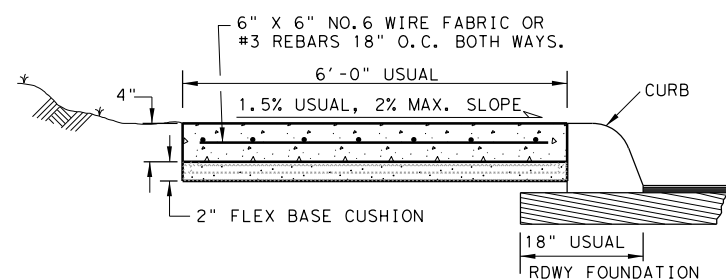
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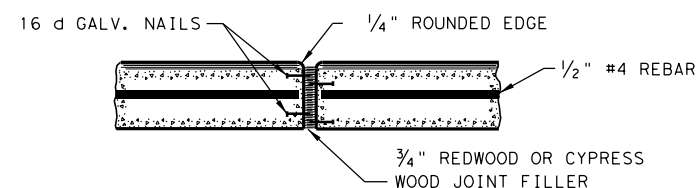
CONCRETE CURB (TYPE 2)
W/ CONC PAVEMENT



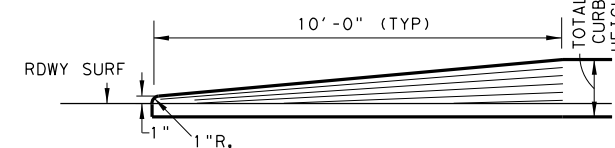
TYPICAL SIDEWALK SECTION
WITH PEDESTRIAN RAIL



TYPICAL SIDEWALK SECTION



TYPICAL CURB EXPANSION JOINT DETAIL



TRANSITION FOR CONCRETE CURB ENDS

SEE CURB DETAIL FOR REINFORCEMENT

GENERAL NOTES:

1. CONCRETE CURB TYPE 1 AND 2 SHOWN SHALL MEET THE MINIMUM SPECIFICATION REQUIREMENTS OF CLASS "A" CONCRETE PER ITEM 529 AND 421.
2. ALL REINFORCING STEEL SHALL BE GRADE 60
3. WHERE CONCRETE CURB IS PLACED ON EXISTING CONCRETE PAVEMENT, THE PAVEMENT SHALL BE DRILLED AND THE REINFORCING BARS GROUTED IN PLACE.
4. 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.
5. VERTICAL AND HORIZONTAL DOWEL BARS AND TRANSVERSE REINFORCING BARS SHALL BE PLACED AT 4 FEET C-C, UNLESS OTHERWISE SHOWN.
6. ONE-HALF INCH EXPANSION JOINT MATERIAL SHALL BE PROVIDED WHERE CURB OR CURB AND GUTTER IS ADJACENT TO SIDEWALK OR RIPRAP. THIS IS SUBSIDIARY TO THE CURB, ITEM 529.
7. LAYDOWN CURB AT DRIVEWAYS WILL BE PAID AS SUBSIDIARY TO ITEM 530.
8. FOR SIDEWALK DETAILS AT DRIVEWAYS, SEE SAN ANTONIO DISTRICT STANDARD "DRIVEWAY DETAILS".
9. SEE PEDESTRIAN HANDRAIL DETAILS STANDARD "PRD" FOR MORE INFORMATION. CONCRETE RAIL FOUNDATION TO BE POURED WITH THE SIDEWALK BUT PAYMENT IS SUBSIDIARY TO ITEM 450 "RAILING".
10. CLEAR SIDEWALK WIDTH EXCLUDING THE PEDESTRIAN RAIL FOUNDATION SHALL BE 6' UNLESS OTHERWISE SPECIFIED IN THE PLANS

GROOVED JOINTS IN THE SIDE WALK SHALL BE AT A MAX. SPACING OF 10 FT. AND SHALL HAVE 3/4" EXPANSION JOINTS AT A MAX. SPACING OF 60' AND TO COINCIDE WITH THE CURB EXP. JOINTS.

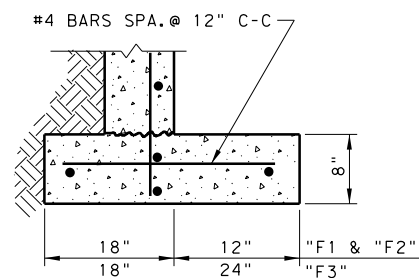
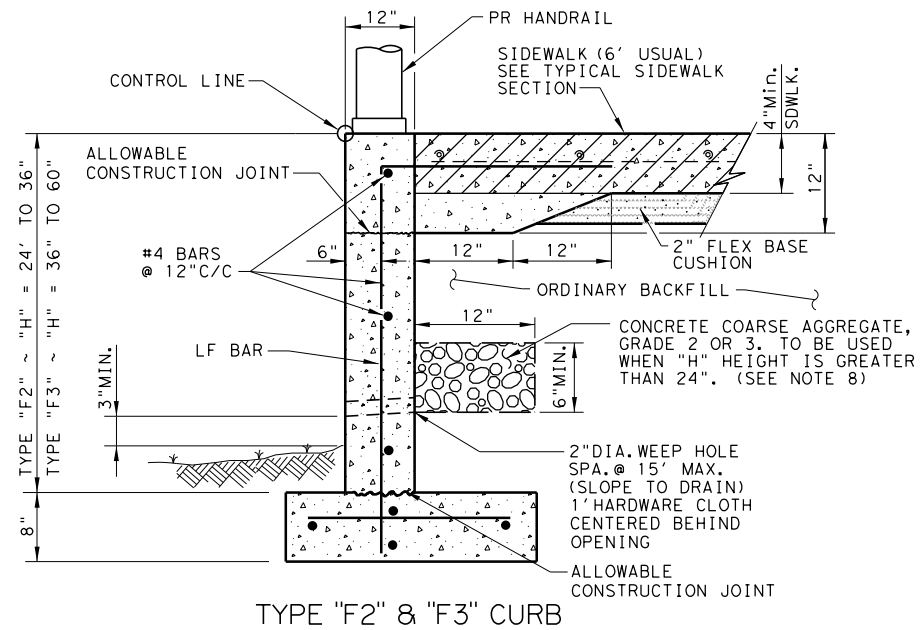
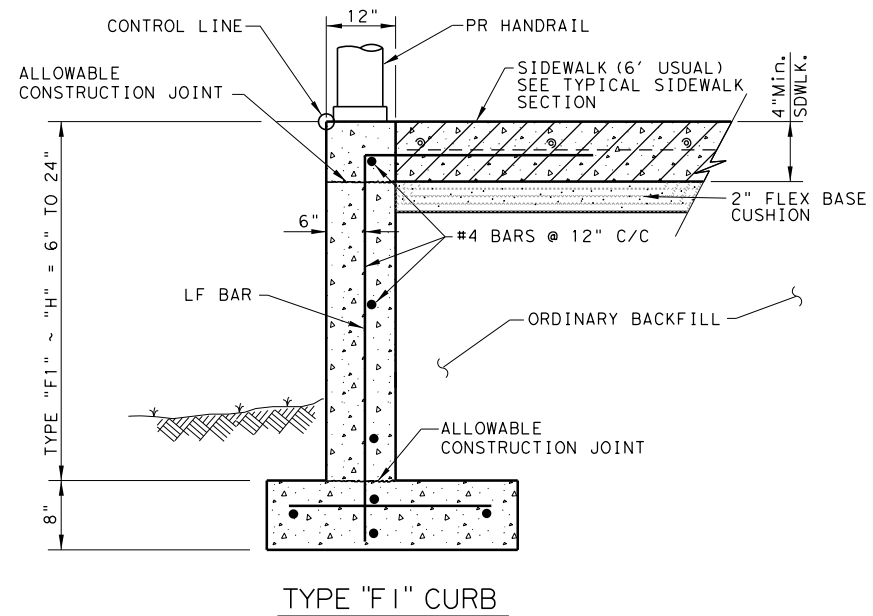
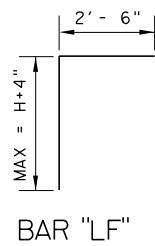
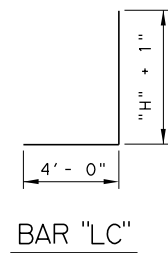
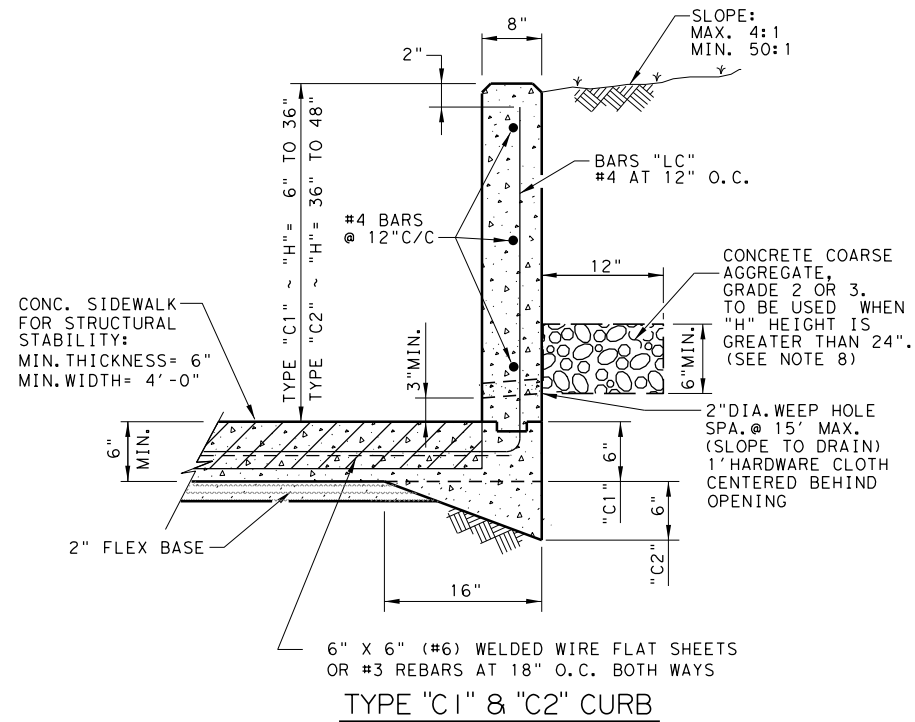
EXPANSION JOINTS TO BE PLACED AT BEGINNING AND END OF CURVES, DRIVEWAYS WHEELCHAIR RAMPS, INLETS, ILLUMINATION/ SIGNAL FOUNDATIONS AND OTHER FIXED OBJECTS.

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San Antonio District

MISCELLANEOUS CURB AND SIDEWALK DETAILS

San Antonio District Standard
Sheet (1 of 2)

T:\Engdata\Standards\MiscCurbdetails.dgn	PREPARED BY AND FOR USE OF TxDOT.			
ORIGINAL DRAWING DATE:	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
09-01-08	SAT	6	SEE TITLE SHEET	138
10-10-17 sidewalk width equals 6' usual	COUNTY	CONTROL	SECTION	JOB
07-22-20 9" curb + curb w/ conc pvmt det.	MEDINA	2520	01	016, ETC
				FM 2200



GENERAL NOTES:

1. CONCRETE FOR CURB TYPE F AND C SHOWN SHALL MEET THE MINIMUM SPECIFICATION REQUIREMENTS OF CLASS "C" CONCRETE PER ITEM 421
2. ALL REINFORCING STEEL SHALL BE GRADE 60
3. 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.
4. VERTICAL AND HORIZONTAL DOWEL BARS AND TRANSVERSE REINFORCING BARS SHALL BE PLACED AT 4 FEET C-C, UNLESS OTHERWISE SHOWN.
5. UNTIL THE SIDEWALK IS COMPLETE, LATERAL SUPPORT FOR THE "F" CURBS WILL BE REQUIRED.
6. IF AGGREGATE IS REQUIRED PER THE DETAIL, IT IS PAID AS SUBSIDIARY TO THE CURB, ITEM 529.

DESIGN SOIL PARAMETERS:
 Soil Unit Wt. = 120 pcf
 Phi = 30 Degrees
 Cohesion = 50 psf
 Min. PI = 15
 Max. PI = 30
 SURCHARGE:
 TYPE F CURB q = 2' Adjacent to sidewalk
 Max. slope behind TYPE C Curb = 4:1
 Min. Factor of Safety against sliding is 1.5.
 Designed in accordance with current AASHTO Standards and Interim Specifications.

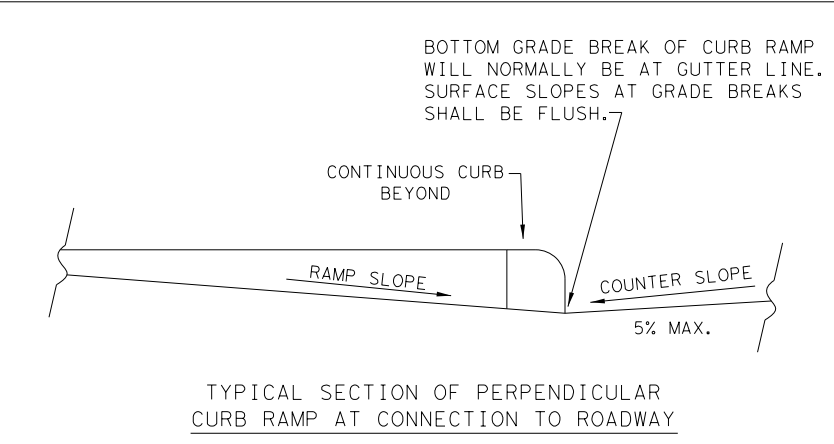
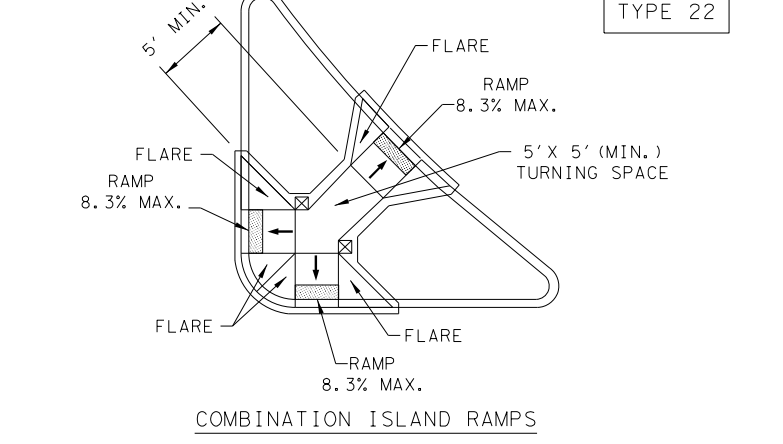
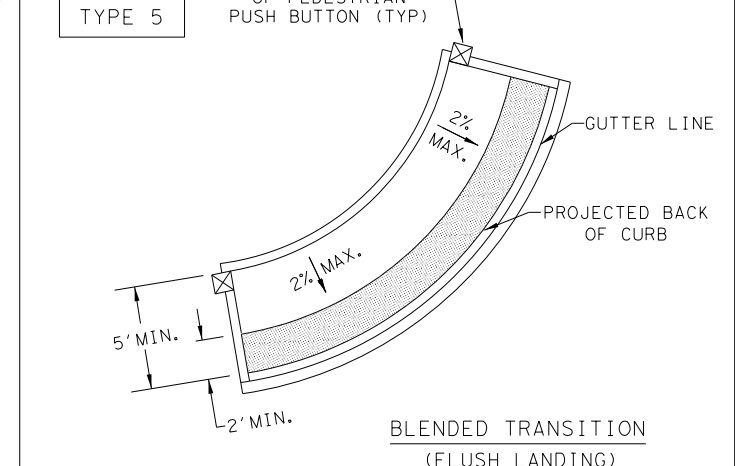
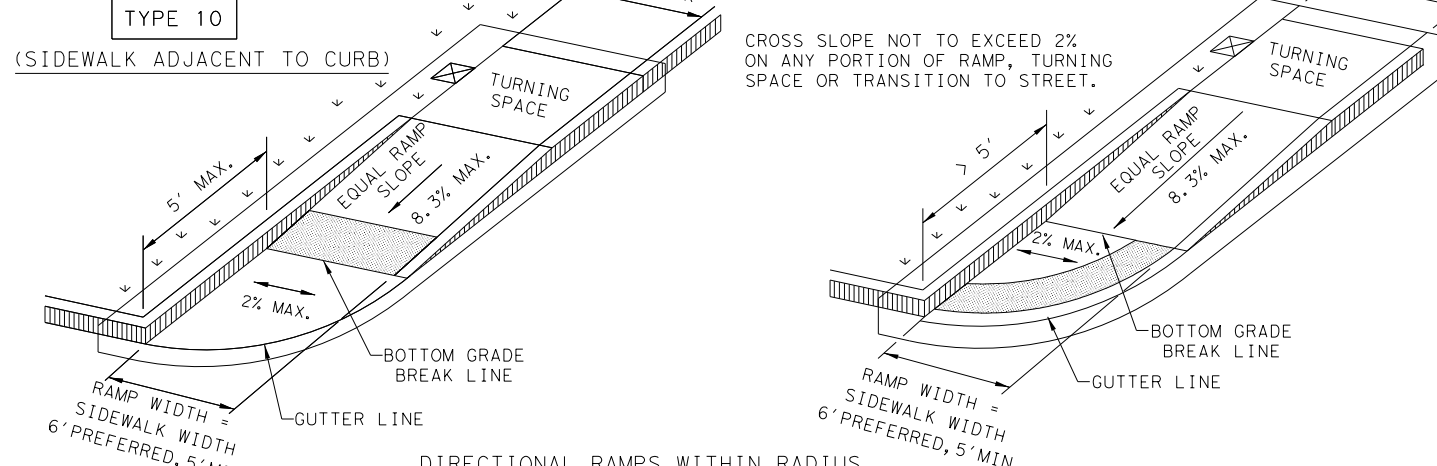
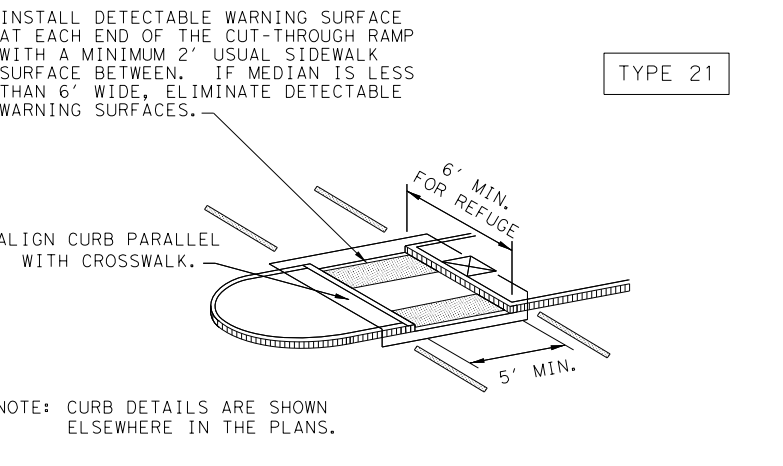
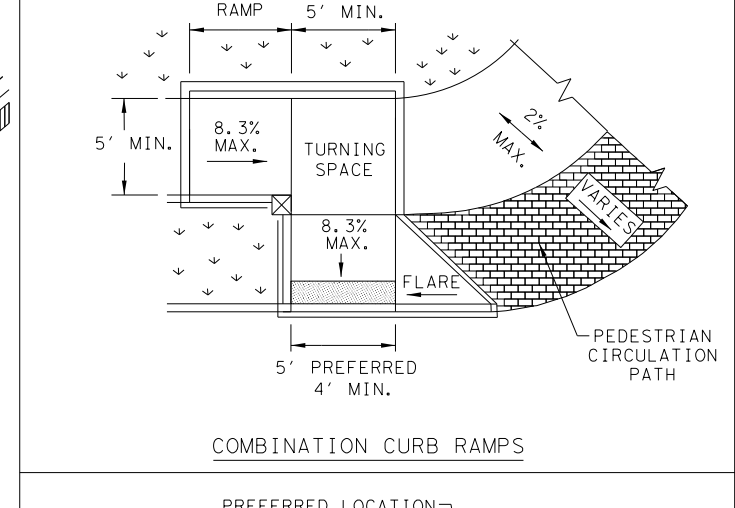
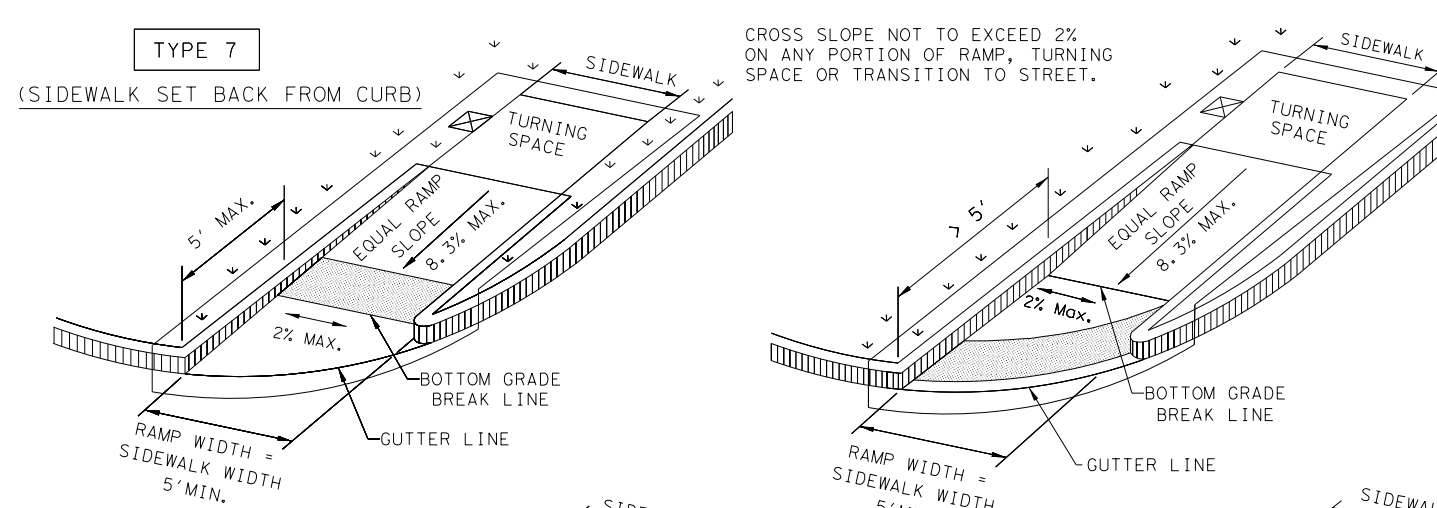
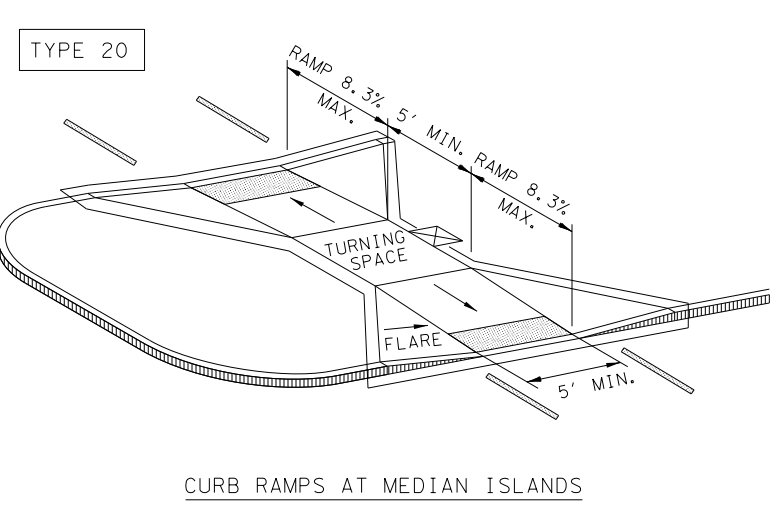
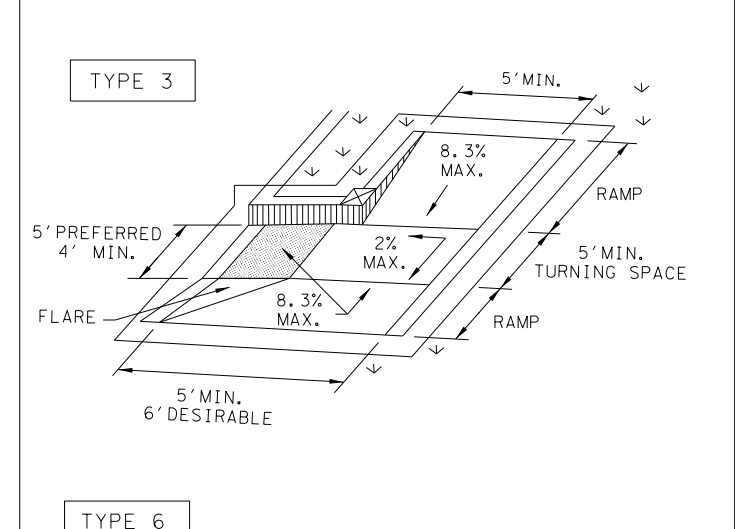
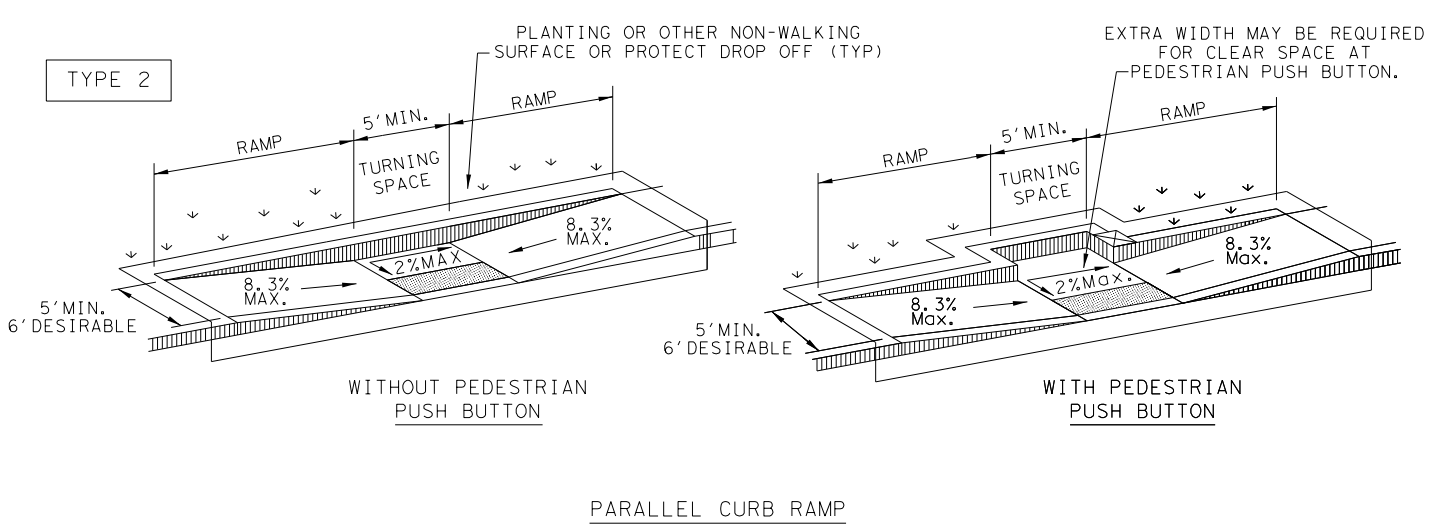
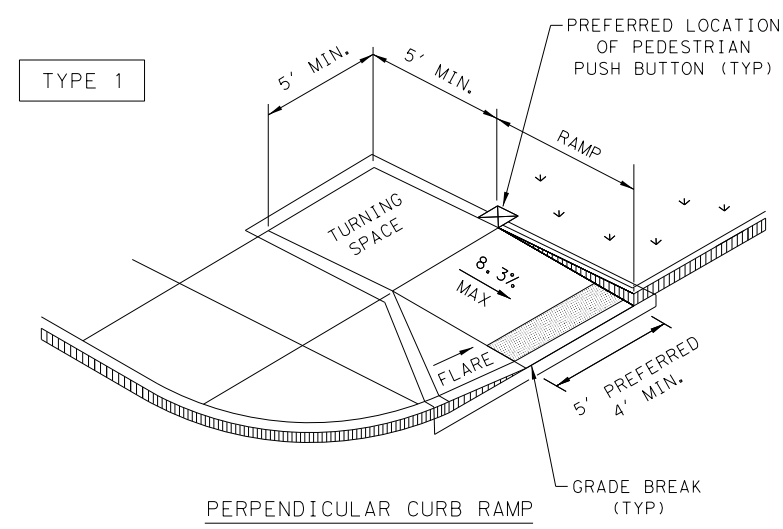
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 San Antonio District

MISCELLANEOUS CURB AND SIDEWALK DETAILS
 San Antonio District Standard
 Sheet (2 of 2)

T:\Engdata\Standards\MiscCurbdetails.dgn	PREPARED BY AND FOR USE OF TxDOT.			
ORIGINAL DRAWING DATE:	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
09-01-08	SAT	6	SEE TITLE SHEET	139
10-10-17 sidewalk width equals 6' usual	COUNTY	CONTROL SECTION	JOB	HIGHWAY
07-22-20 9" curb + curb w/ conc pvmt det.	MEDINA	2520	01	016, ETC FM 2200

CLASS C CONCRETE PAID UNDER ITEM 531, SIDEWALK. (NOTE. ADDITIONAL CONCRETE TO MEET THE THICKENED SECTIONS REQUIRED BY THESE DETAILS IS SUBSIDIARY TO ITEM 531, CURB.)

DATE: 12/20/2022
 FILE: P:\117\99\04\Design\Civil\Standards\Roadway\ped18 (1).dgn
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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.

 DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

 DETECTABLE WARNING SURFACE

 GUTTER LINE

 GRADE BREAK

 RAMP LIMITS OF PAYMENT

SHEET 1 OF 4

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
REVISED 08, 2005	2520	01	016, ETC	FM 2200
REVISED 06, 2012	DIST	COUNTY	SHEET NO.	
REVISED 01, 2018	SAT	MEDINA	140	

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DATE: 12/20/2022
 FILE: P:\117199\04\Design\Civil\Standards\Roadway\ped18 (1).dgn

GENERAL NOTES

CURB RAMP

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 applicable standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

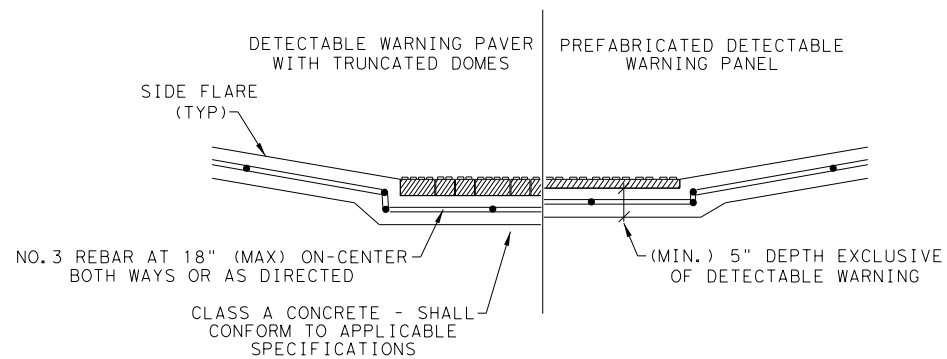
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material 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.

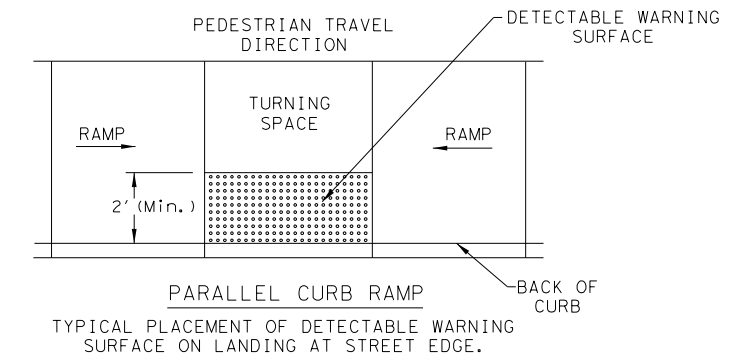
SIDEWALKS

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.

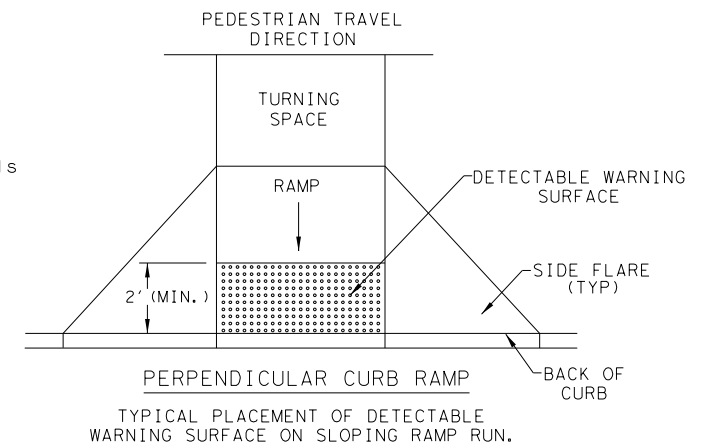


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

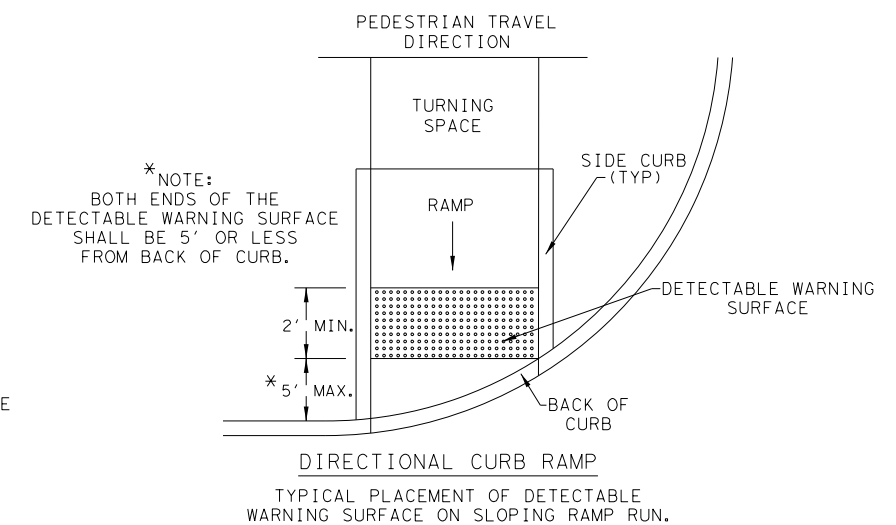
DETECTABLE WARNING SURFACE DETAILS



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.



* NOTE:
BOTH ENDS OF THE
DETECTABLE WARNING SURFACE
SHALL BE 5' OR LESS
FROM BACK OF CURB.

DIRECTIONAL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

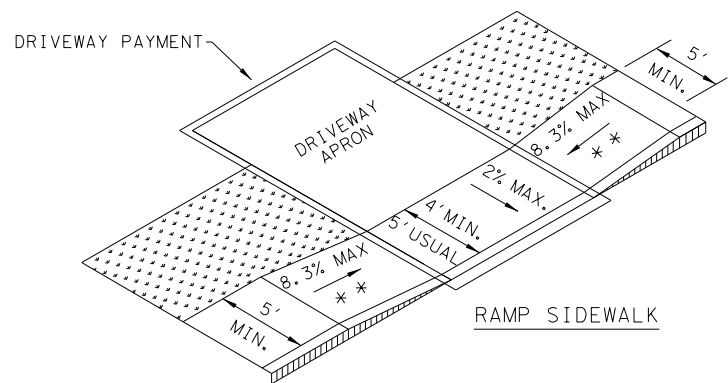
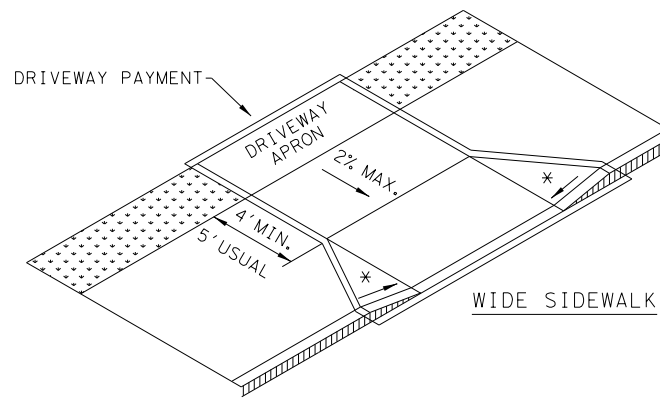
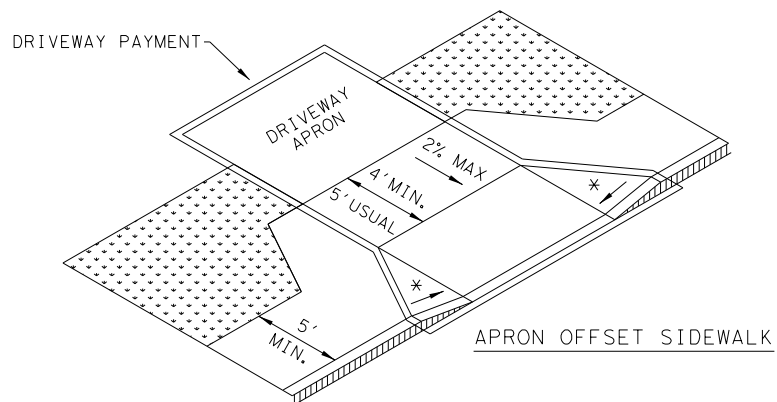
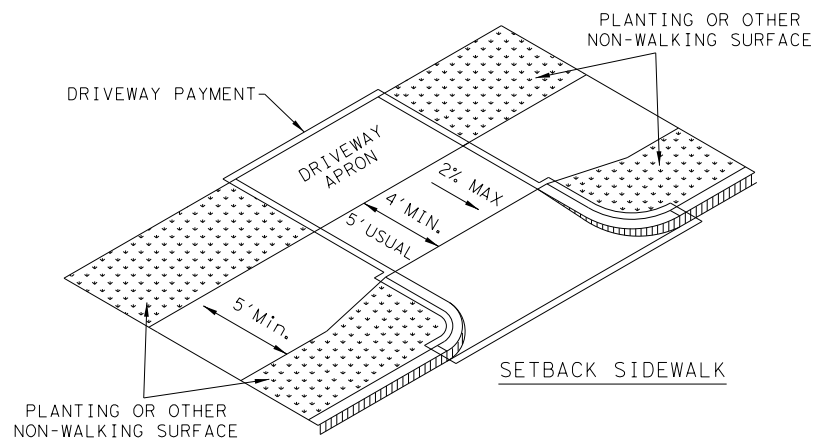
SHEET 2 OF 4

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	2520	01	016, ETC	FM 2200
REVISED 08, 2005	DIST	COUNTY		SHEET NO.
REVISED 06, 2012	SAT	MEDINA		141
REVISED 01, 2018				

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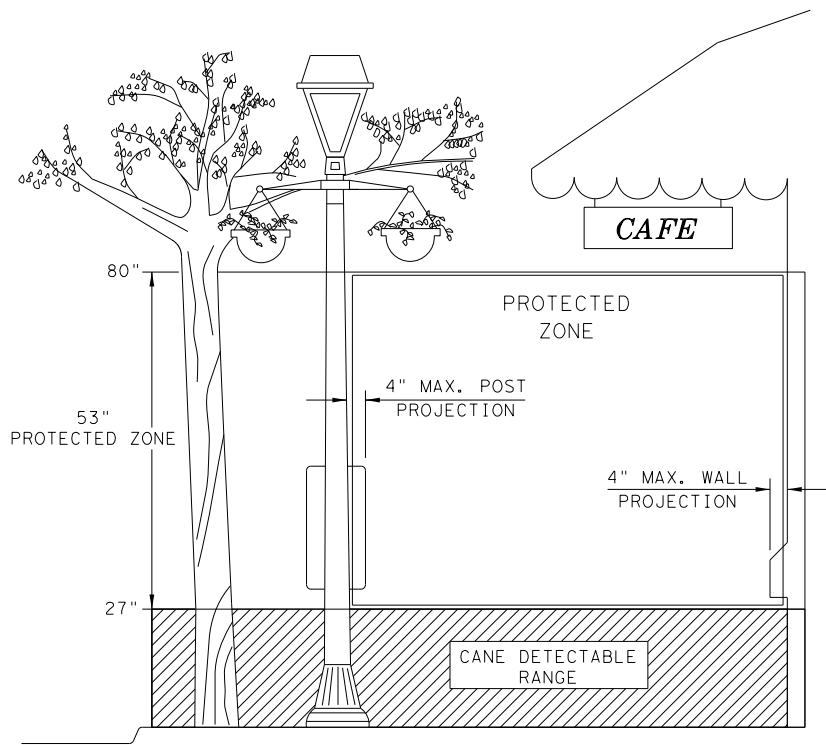
DATE: 12/20/2022
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SIDEWALK TREATMENT AT DRIVEWAYS



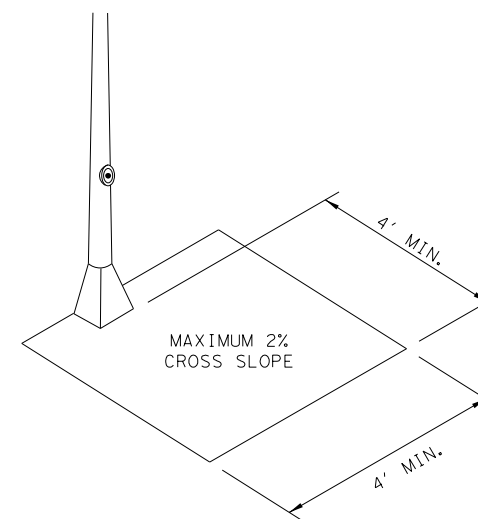
NOTES:

- * 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.

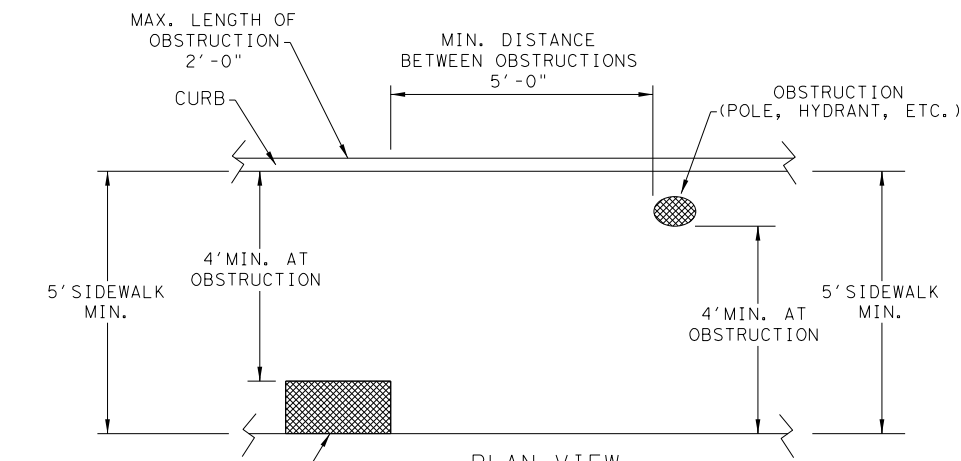


PROTECTED ZONE

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

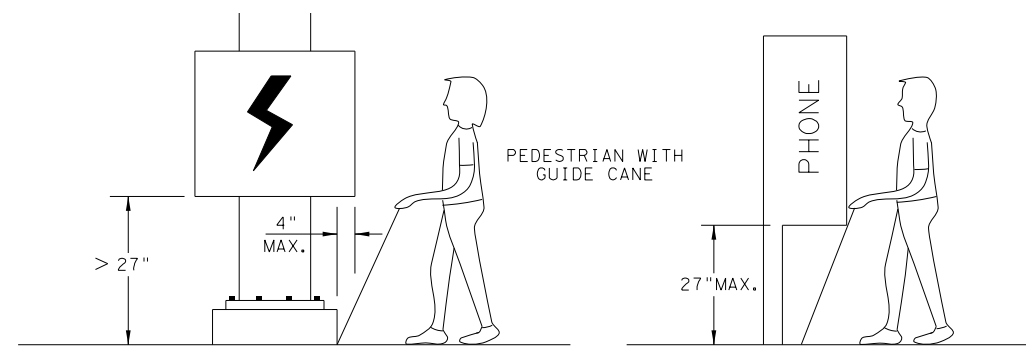


CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



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"

SHEET 3 OF 4



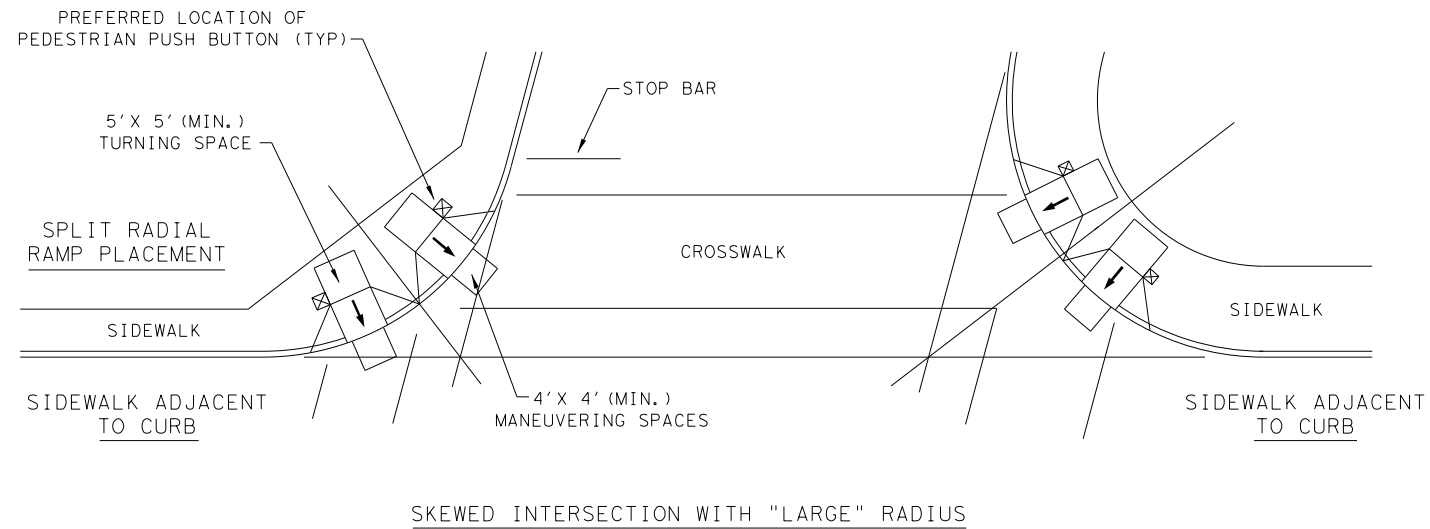
PEDESTRIAN FACILITIES
CURB RAMPS

PED-18

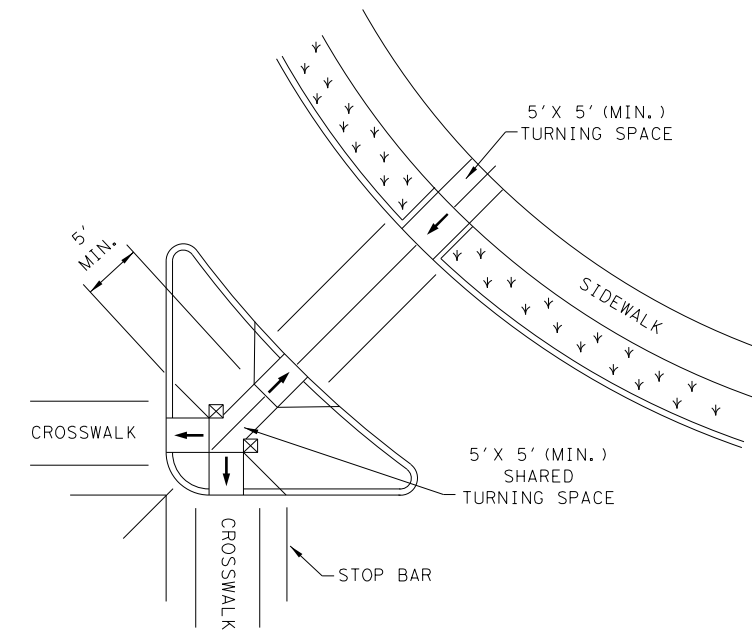
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© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
REVISED 08, 2005	DIST	COUNTY	SHEET NO.	
REVISED 06, 2012	SAT	MEDINA	142	
REVISED 01, 2018				

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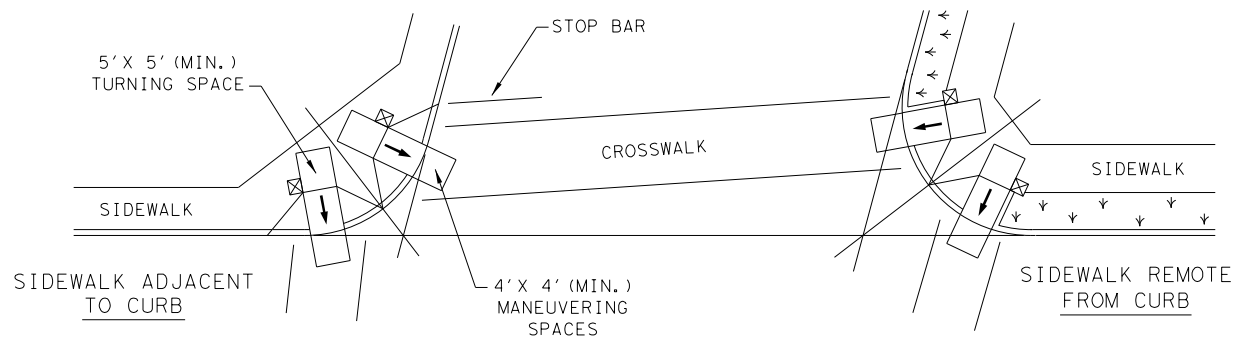
TYPICAL CROSSING LAYOUTS
 SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



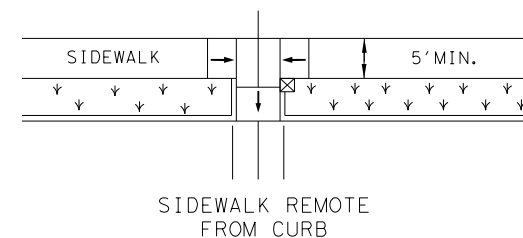
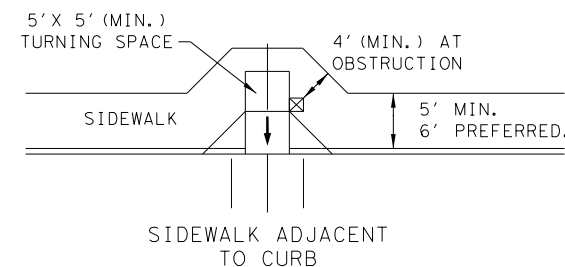
SKEWED INTERSECTION WITH "LARGE" RADIUS



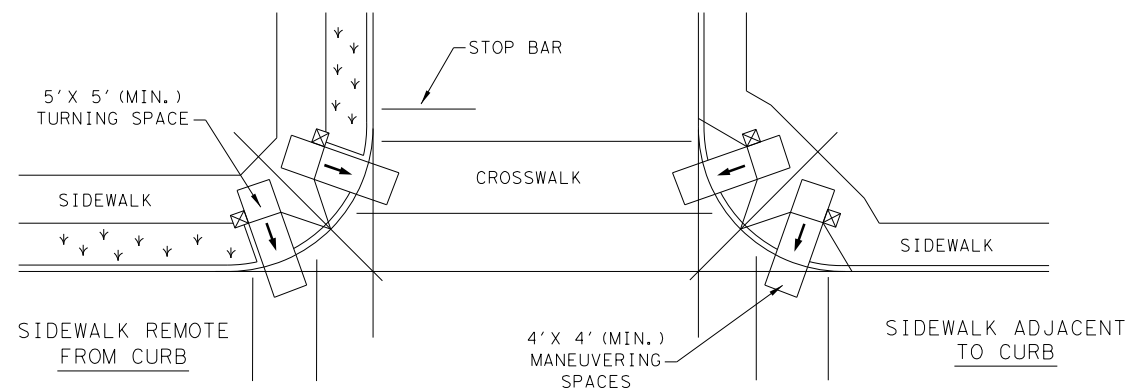
AT INTERSECTION
 W/FREE RIGHT TURN & ISLAND



SKEWED INTERSECTION WITH "SMALL" RADIUS



MID-BLOCK PLACEMENT
 PERPENDICULAR RAMPS



NORMAL INTERSECTION WITH "SMALL" RADIUS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ☒

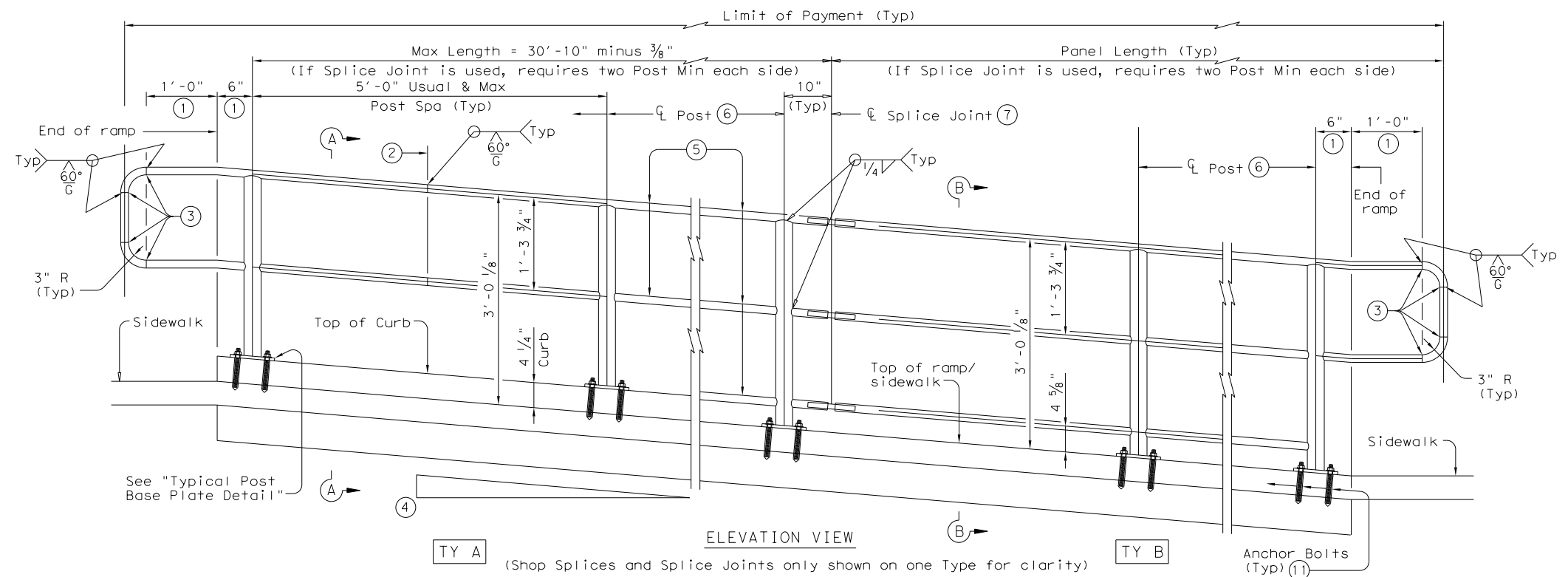
DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH. ↙ ↘

SHEET 4 OF 4

		Design Division Standard	
<h2>PEDESTRIAN FACILITIES</h2> <h3>CURB RAMPS</h3> <h1>PED-18</h1>			
FILE: ped18	DN: TxDOT	DW: VP	CK: KM
© TxDOT: MARCH, 2002	CON: 2520	SECT: 01	JOB: 016, ETC
REVISIONS	DIST: COUNTY		HIGHWAY: FM 2200
REVISED 08, 2005	SAT		SHEET NO. 143
REVISED 06, 2012	MEDINA		
REVISED 01, 2018			

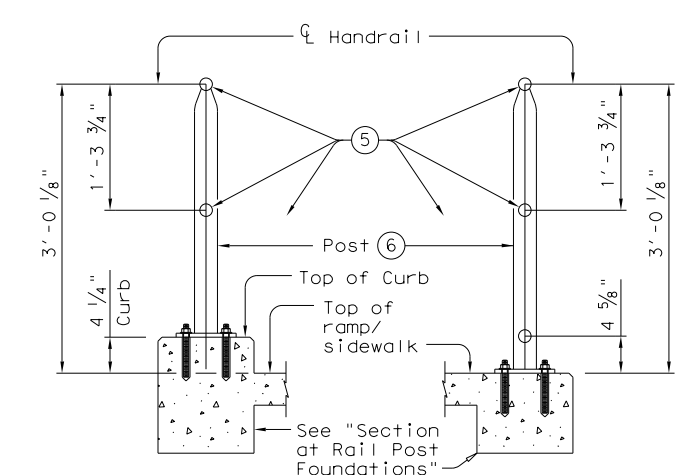
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DATE: 12/20/2022
 FILE: P:\11799\04\Design\Civil\Standards\Roadway\prd13 (1).dgn

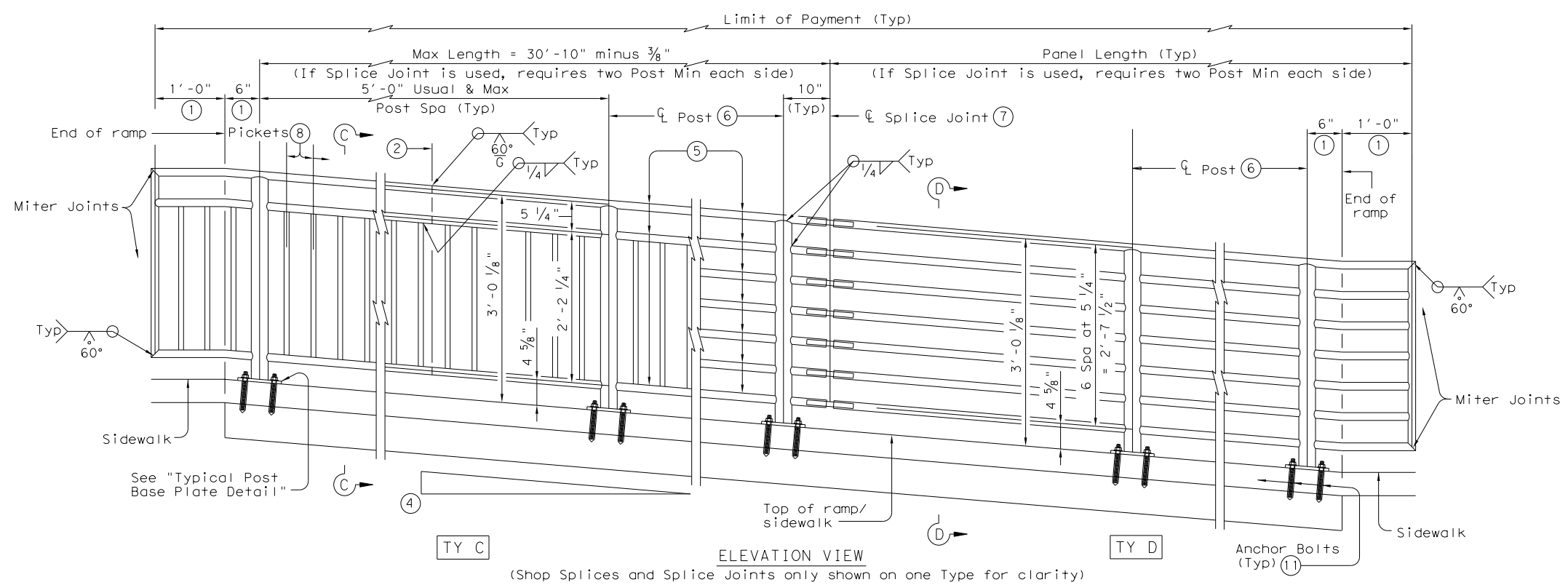


TY A (Shop Splices and Splice Joints only shown on one Type for clarity)

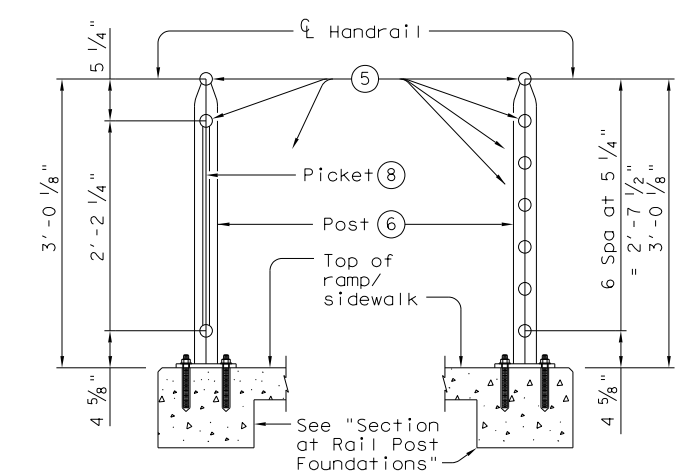
RECOMMENDED USAGE ⑨ ⑩	
Dropoff Height/Condition	Recommended Rail Options
< 30" dropoff	TY A, TY B, TY C, or TY D
≥ 30" dropoff, or along Bike Path	TY E or TY F



SECTION A-A (Showing Handrail TY A) SECTION B-B (Showing Handrail TY B)



TY C (Shop Splices and Splice Joints only shown on one Type for clarity) TY D



SECTION C-C (Showing Handrail TY C) SECTION D-D (Showing Handrail TY D)

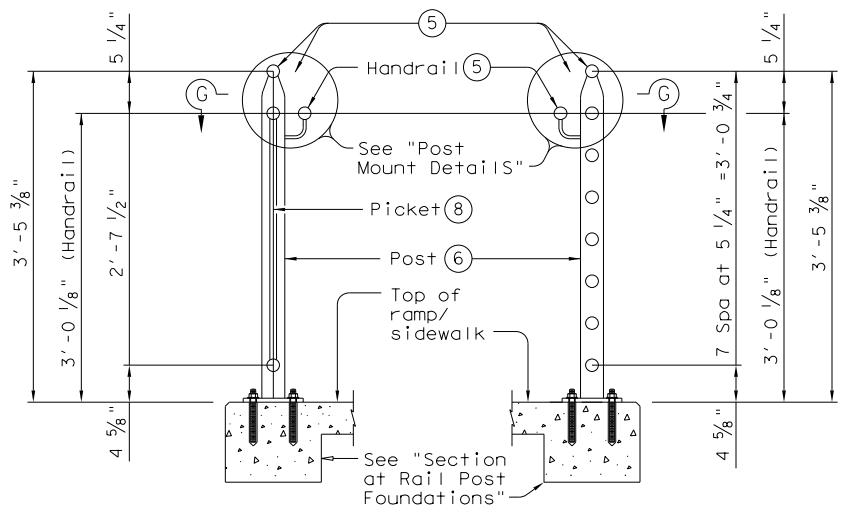
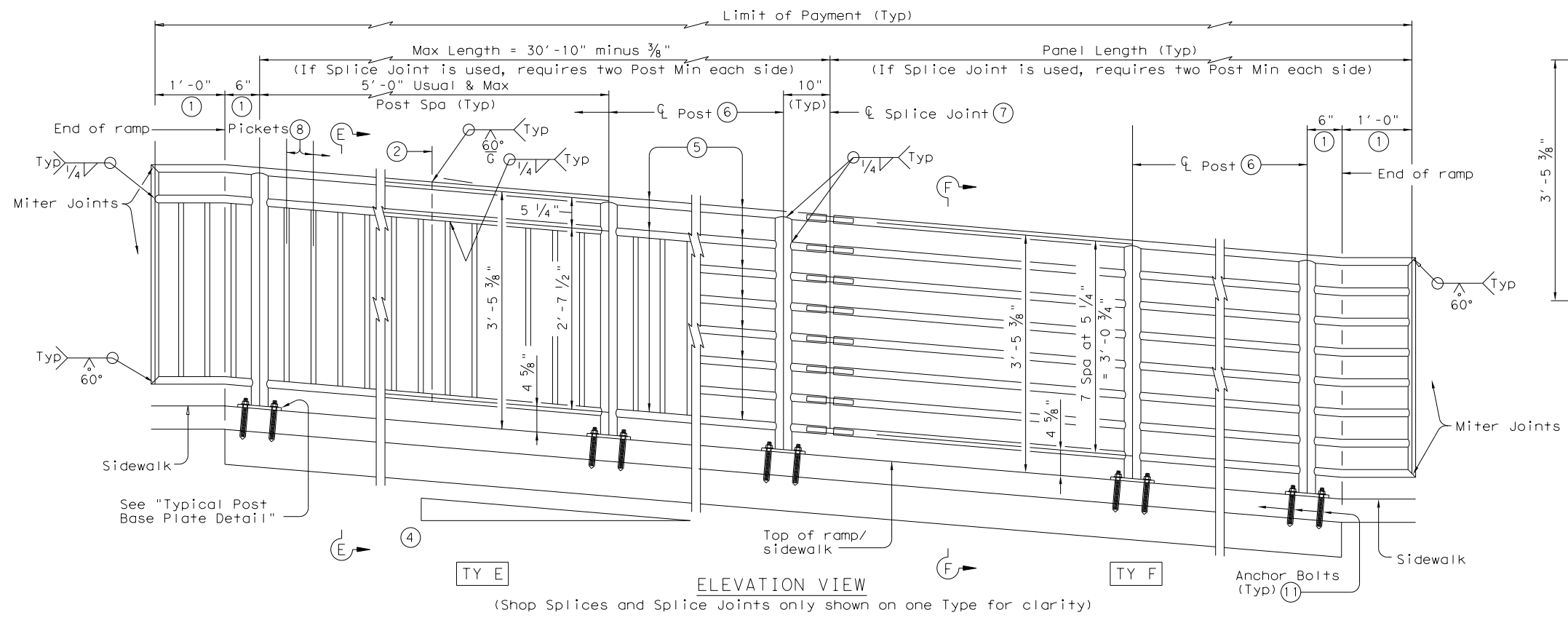
SHEET 1 OF 3

- ① Parallel to ground.
- ② One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
- ③ Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
- ④ See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.
- ⑤ 1 1/2" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 1/2" Dia. pipe for galvanizing drainage and venting.
- ⑥ 2 1/2" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.
- ⑦ See "Handrail Fabrication Details" for Splice Joints.
- ⑧ 5/8" Dia. Round Bar equal spacing at 4 1/2" Max. Plumb all pickets.
- ⑨ When needed for accessibility (grade > 5 percent) or as needed for pedestrian safety.
- ⑩ Not to be used on bridges.
- ⑪ See "General Notes" for anchor bolt information.

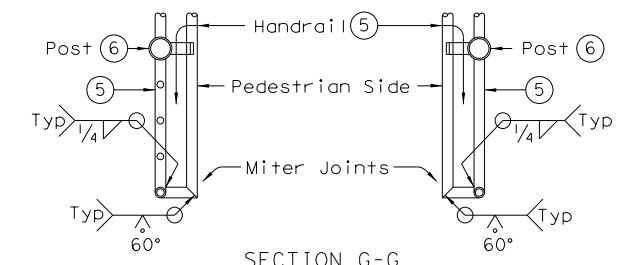
		Design Division Standard	
<h2>PEDESTRIAN HANDRAIL DETAILS</h2> <h3>PRD-13</h3>			
FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR
© TxDOT December 2006	CONT	SECT	JOB
REVISIONS	2520	01	016, ETC
REVISED MAY, 2013 (VP)	DIST	COUNTY	SHEET NO.
	SAT	MEDINA	144

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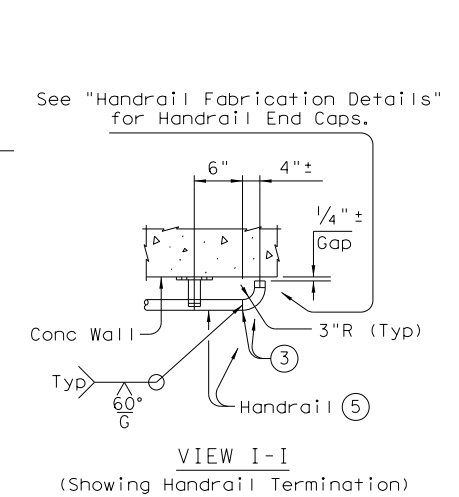
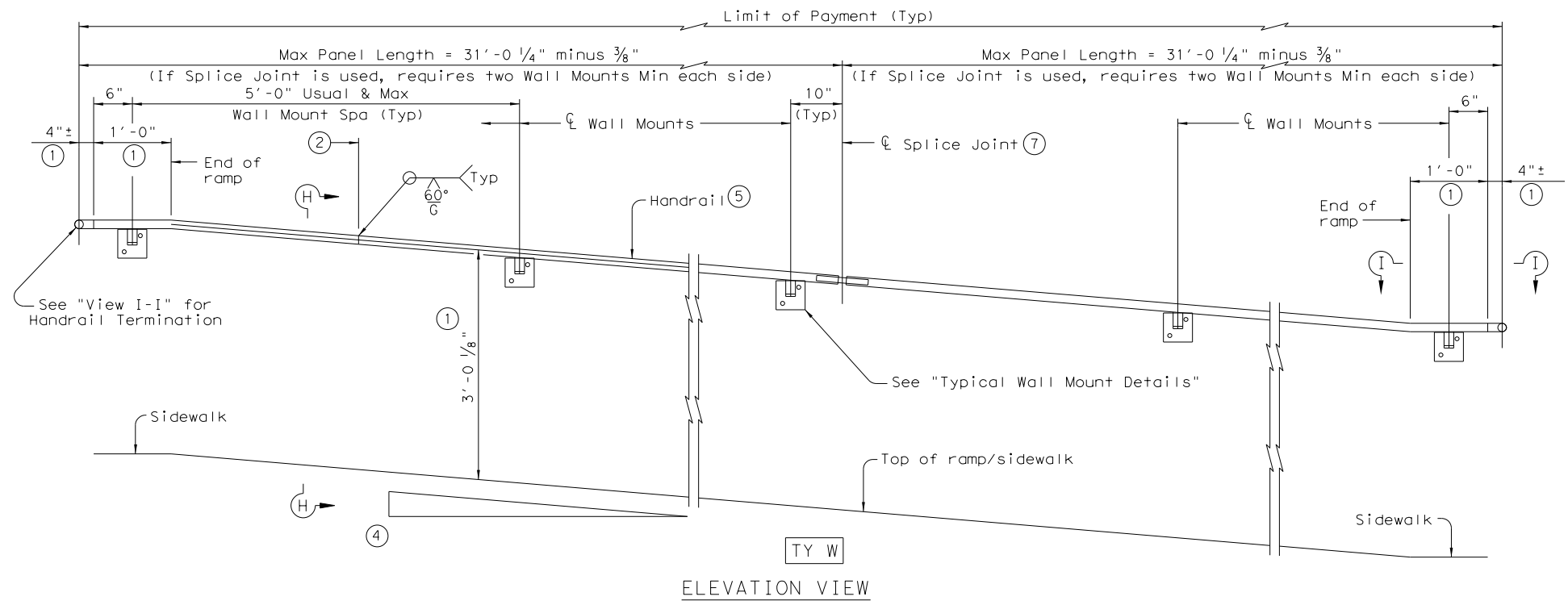
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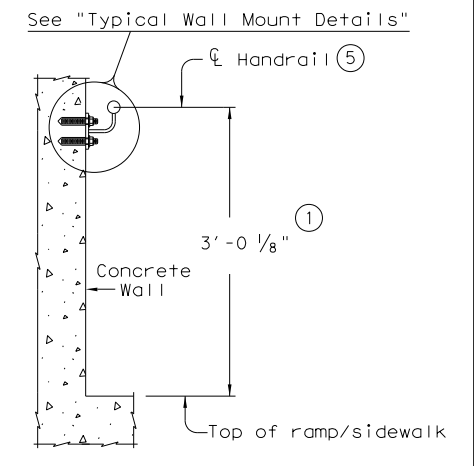
SECTION E-E (Showing Handrail TY E)
SECTION F-F (Showing Handrail TY F)



SECTION G-G (Showing Handrail Termination)



VIEW I-I (Showing Handrail Termination)



SECTION H-H (Showing Handrail TY W)

SHEET 2 OF 3

- ① Parallel to ground.
- ② One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
- ③ Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
- ④ See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.
- ⑤ 1 1/2" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 1/2" Dia. pipe for galvanizing drainage and venting.
- ⑥ 2 1/2" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.
- ⑦ See "Handrail Fabrication Details" for Splice Joints.
- ⑧ 5/8" Dia. Round Bar equal spacing at 4 1/2" Max. Plumb all pickets.
- ⑪ See "General Notes" for anchor bolt information.

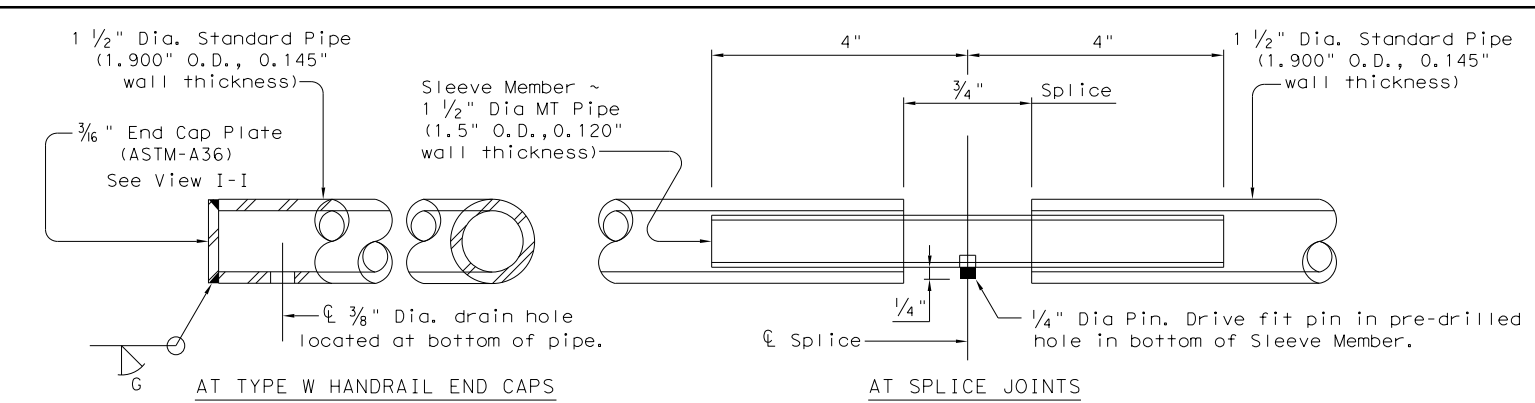


PEDESTRIAN HANDRAIL
DETAILS
PRD-13

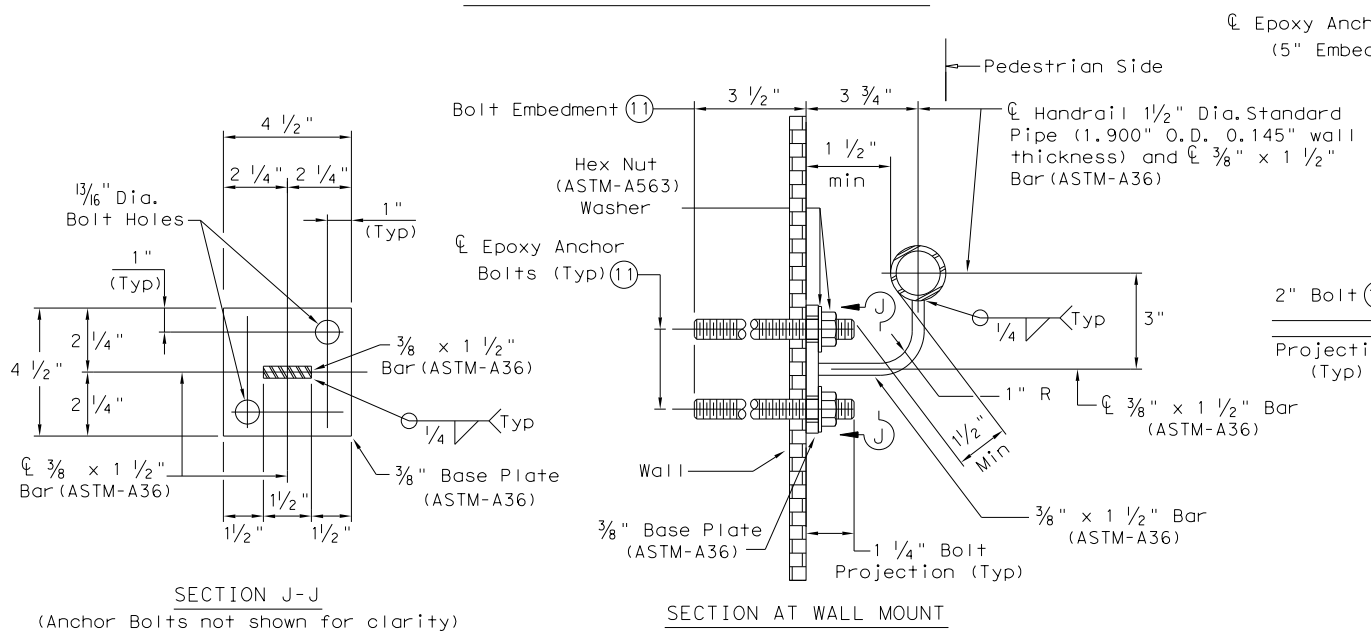
FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR	CK: CGL
© TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
REVISED MAY, 2013 (VP)	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	145	

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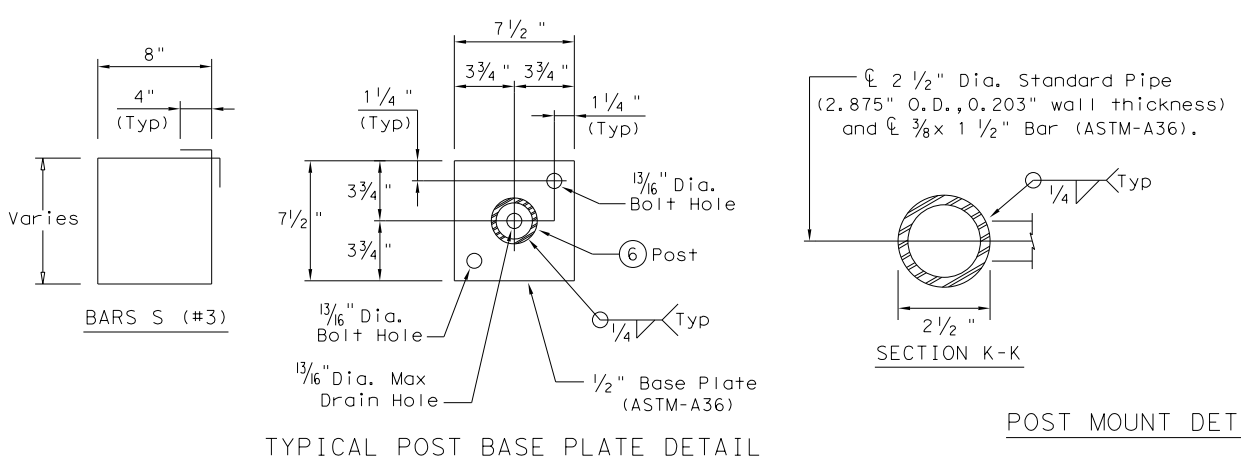


HANDRAIL FABRICATION DETAILS



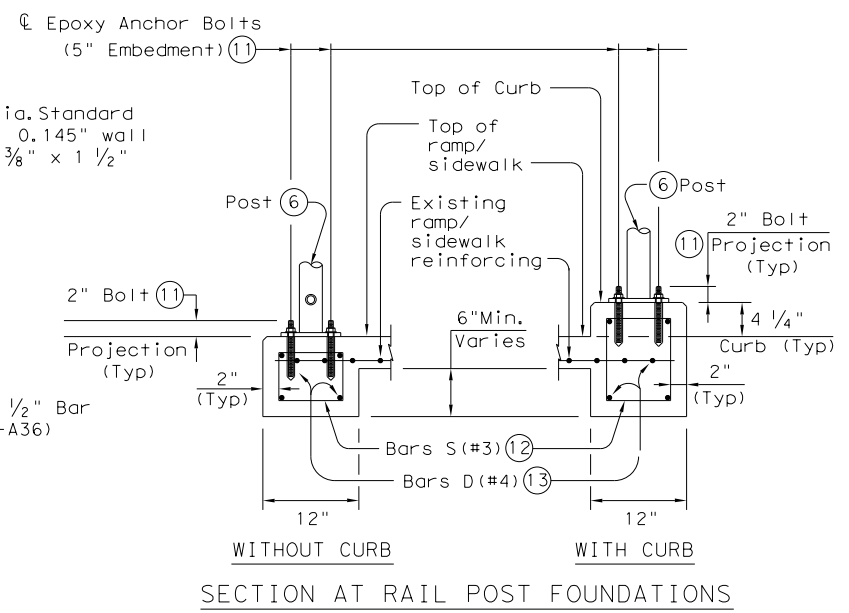
TYPICAL WALL MOUNT DETAILS

- (5) 1 1/2" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp/sidewalk. Provide holes as needed in 1 1/2" Dia. pipe for galvanizing drainage and venting.
- (6) 2 1/2" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). Plumb all posts. See "Post Mount Detail" for crimping and trimming post to fit the diameter of top rail. Provide holes as needed in post for galvanizing drainage and venting.
- (11) See "General Notes" for anchor bolt information.
- (12) Bars S(#3) spaced at 12" Max (Spaced 3" from outside edge of overall length of Ramp/Sidewalk).
- (13) Provide 1 1/2" end cover to Bars D(#4) from outside edge of overall length of Ramp/Sidewalk.

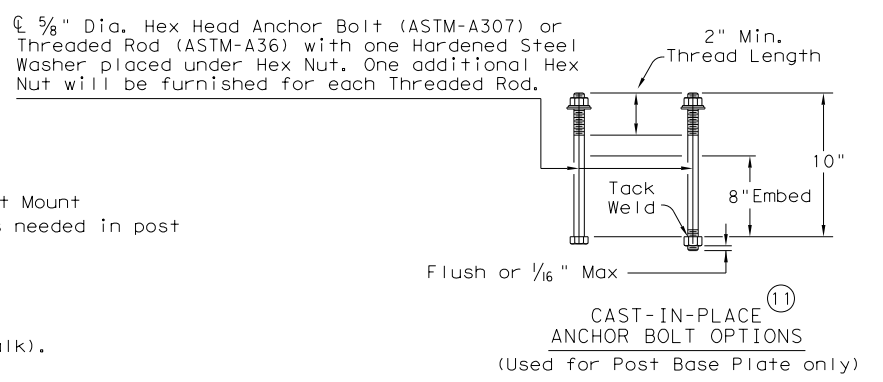


TYPICAL POST BASE PLATE DETAIL

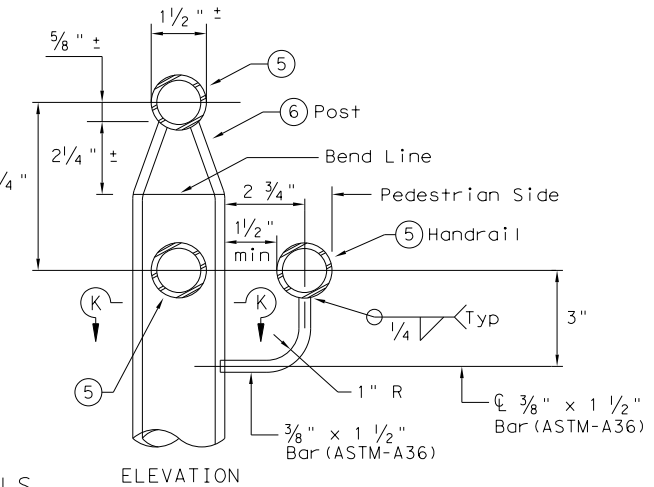
POST MOUNT DETAILS



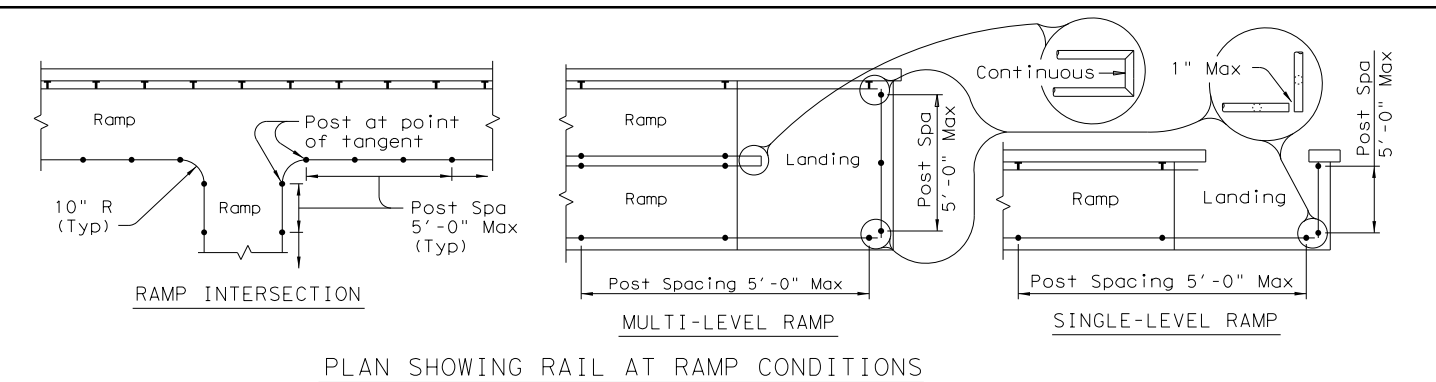
SECTION AT RAIL POST FOUNDATIONS



CAST-IN-PLACE ANCHOR BOLT OPTIONS (Used for Post Base Plate only)



ELEVATION



PLAN SHOWING RAIL AT RAMP CONDITIONS

GENERAL NOTES

Designed according to ADAAG, Texas Accessibility Standards, Uniform Building Code, and AASHTO LRFD Specifications.

Handrail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Pipe will conform to ASTM-A53 Grade B or A500 Grade B. Steel plates and steel bars will conform to ASTM-A36. Mechanical tubing (MT) will conform to ASTM A513 Grade 1015 or higher. Galvanize all steel components except reinforcing steel unless noted otherwise.

Concrete for foundations will be in accordance with Item 531 "Sidewalks". All reinforcing steel must be Grade 60. Bar laps, where required, will be as follows: Uncoated ~ #4 = 1'-5" Epoxy coated ~ #4 = 2'-1"

When the plans require painted steel, follow the requirements for painting galvanized steel in Item 446, "Cleaning and Painting Steel". Sleeve Members will receive galvanization and only get field painted after installation unless directed otherwise by Engineer.

Epoxy Anchor bolts for wall mount and post base plate will be 5/8" Dia. ASTM A36 threaded rods with one hex nut and one hardened steel washer at each bolt. 5/8" Dia. threaded rod embedment depth for wall mounts is 3 1/2" and embedment depth for post base plate is 5".

Embed threaded rods into concrete with a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxy and Adhesives". Mix and dispense adhesive with the manufacturer's static mixing nozzle/dual cartridge system. Core drill holes (percussion drilling not permitted).

At the contractor's option the post base plate anchor bolts may be cast with the Ramp/Sidewalk (See Cast-in-Place Anchor Bolt Options).

Optional cast-in-place anchor bolts will be 5/8" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer at each bolt. Embedment depth of cast-in-place bolt will be 8" for post base plate.

Handrails and any wall or other surface adjacent to them will be free of any sharp or abrasive elements.

Submit shop drawings to the Engineer unless otherwise noted. For curved handrail applications, fabricate the handrail to the curve if radius is less than 600 ft. Shop drawings are required when rail is fabricated to the curve.

For all handrails, erection drawings will be submitted to the Engineer for approval to ensure proper installation.

Drawings will show handrail mount locations with bolts setting, spacing, ramp slope, and/or splice joint locations, and handrail lengths with identification showing where each handrail goes on the layout.

Payment for concrete sidewalks or curb ramps will be paid for in accordance with Item 531 "Sidewalks".

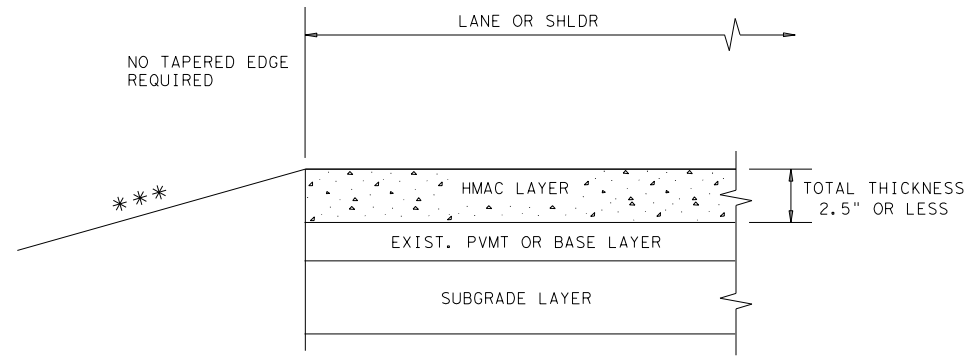
Payment for all items shown is to be included in unit price bid in accordance with Item 450 "Railing" of the type specified.

All exposed edges will be rounded or chamfered to approximately 1/8" by grinding.

		Design Division Standard	
<h2>PEDESTRIAN HANDRAIL DETAILS</h2> <h3>PRD-13</h3>			
FILE: prdl3.dgn	DN: TxDOT	CK: AM	DW: JTR
©TxDOT December 2006	CONT	SECT	JOB
REVISIONS	2520	01	016, ETC
REVISED MAY, 2013 (VP)	DIST	COUNTY	FM 2200
	SAT	MEDINA	SHEET NO. 146

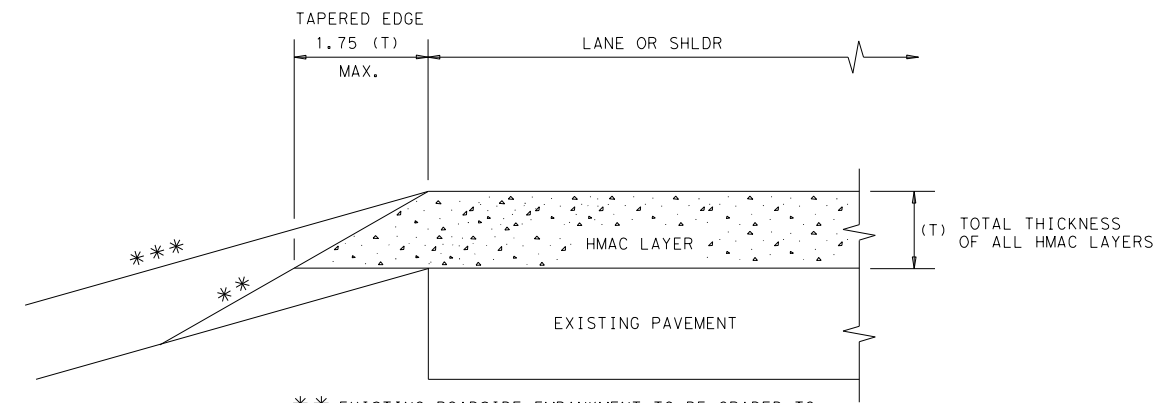
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DATE: 12/20/2022
 FILE: P:\117\99\04\Design\Civil\Standards\Roadway\tehmac11.dgn



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

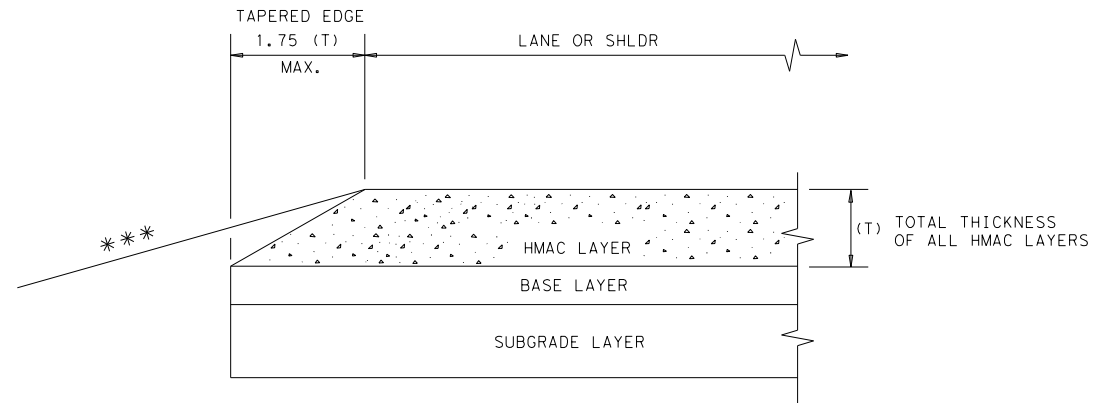
CONDITION - 1
 THIN HMAC SURFACES OR HMAC OVERLAY
 WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

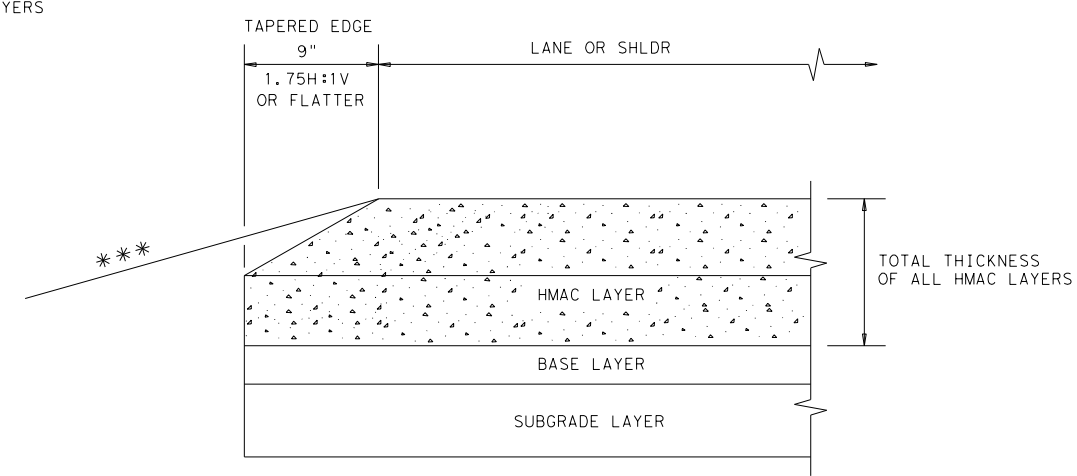
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
 OVERLAY OF EXISTING PAVEMENT
 HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
 NEW OR RECONSTRUCTED PAVEMENT
 HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
 NEW OR RECONSTRUCTED PAVEMENT
 HMAC THICKNESS 5" OR GREATER

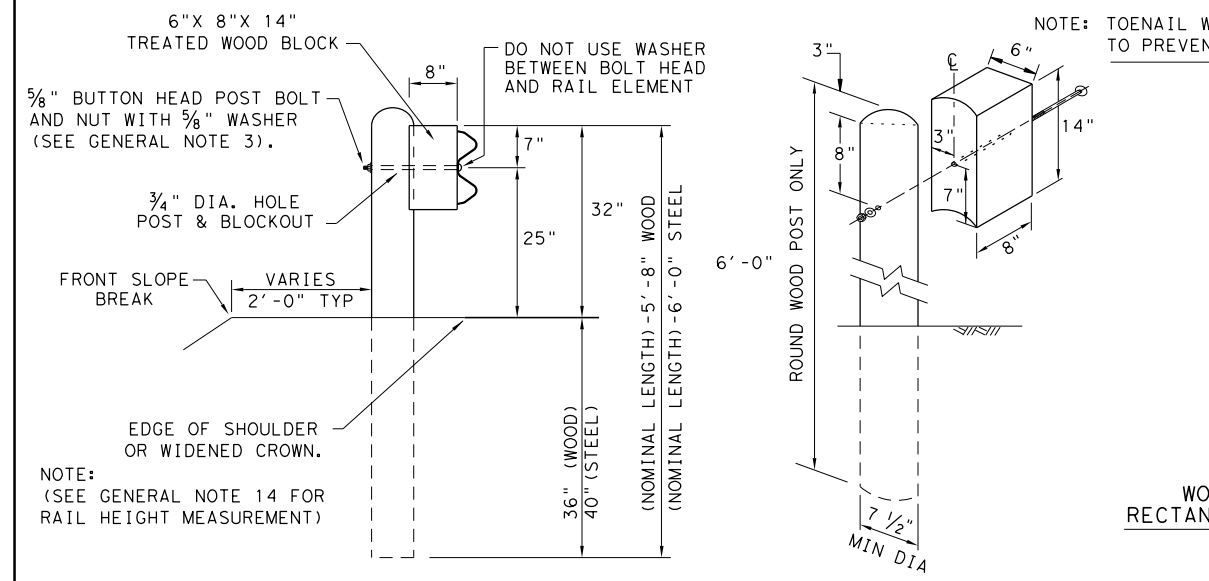
(NOT TO SCALE)

GENERAL NOTES

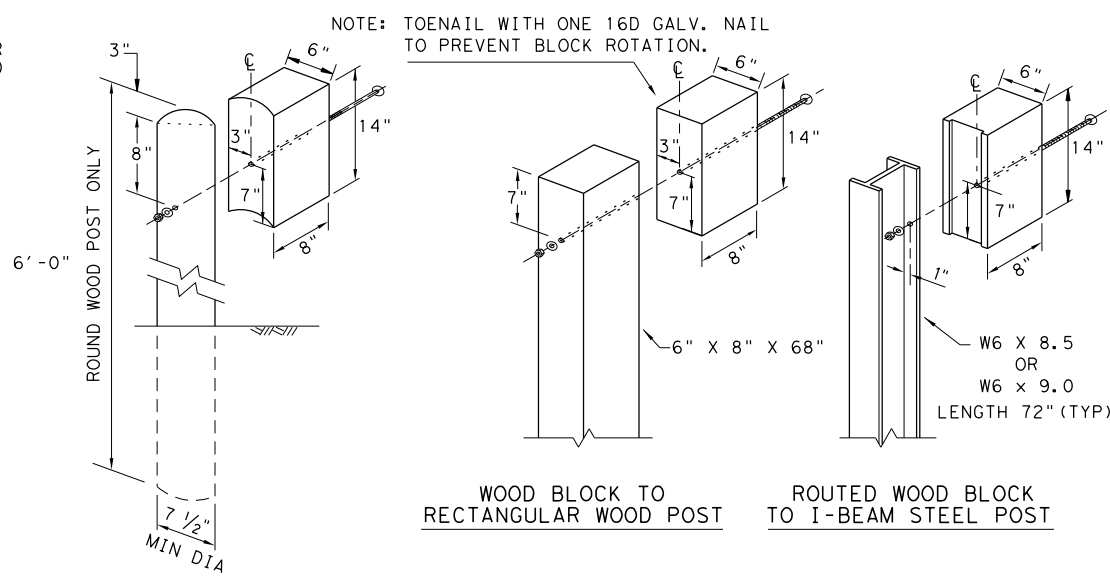
1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

				Design Division Standard	
TAPERED EDGE DETAILS HMAC PAVEMENT					
TE (HMAC) - 11					
FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:	
© TxDOT January 2011	CONT	SECT	JOB	HIGHWAY	
REVISIONS		2520 01	016, ETC	FM 2200	
	DIST	COUNTY		SHEET NO.	
	SAT	MEDINA		147	

DATE: 12/20/2022
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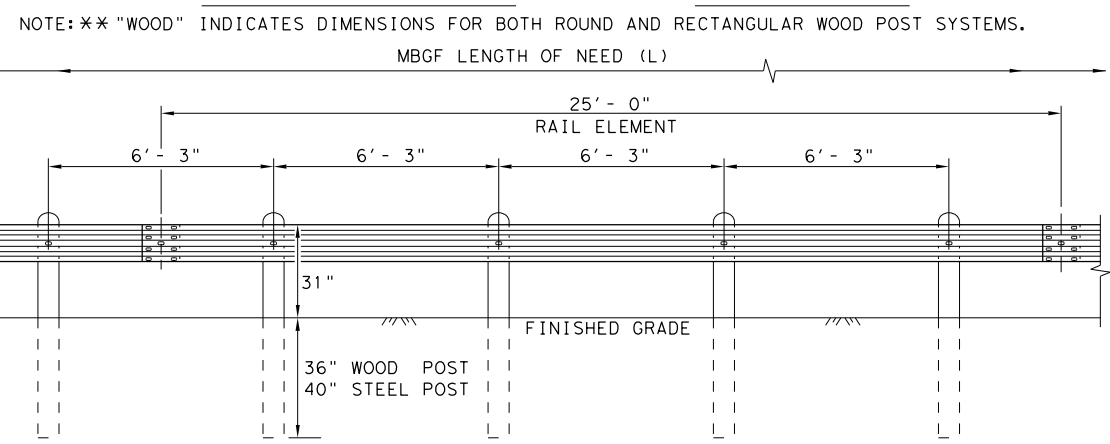


TYPICAL POST PLACEMENT



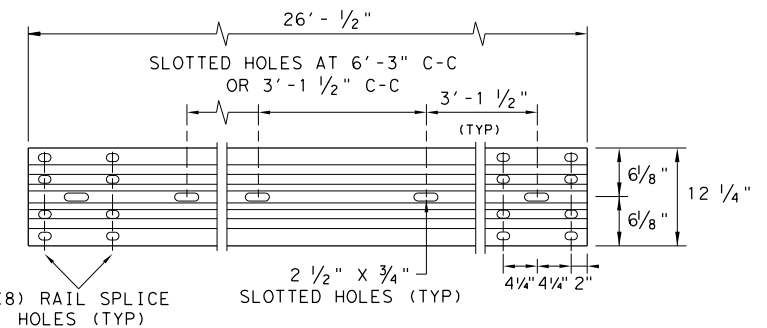
WOOD BLOCK TO ROUND WOOD POST **ROUTED WOOD BLOCK TO I-BEAM STEEL POST**

- 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 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE 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 5/8" WASHER (FWC16G) 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.



ELEVATION MID-SPAN RAIL SPLICE

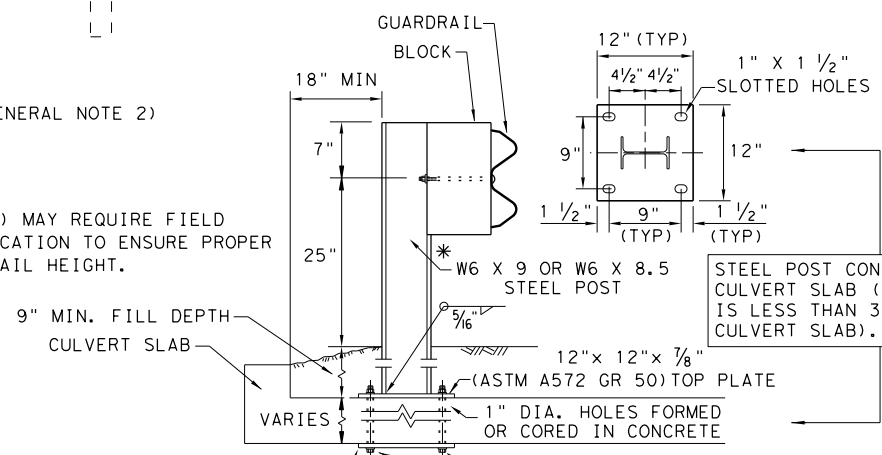
NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



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

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

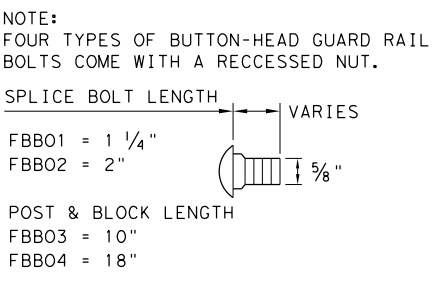
* POST(S) MAY REQUIRE FIELD MODIFICATION TO ENSURE PROPER GUARDRAIL HEIGHT.



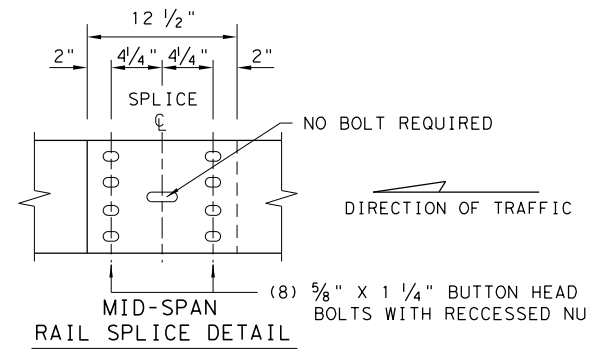
LOW FILL CULVERT POST

1. **BOLT-THROUGH OPTION:** REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS. NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.
2. **EPOXY ANCHOR OPTION:** THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" 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 1/4" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.



BUTTON HEAD BOLT

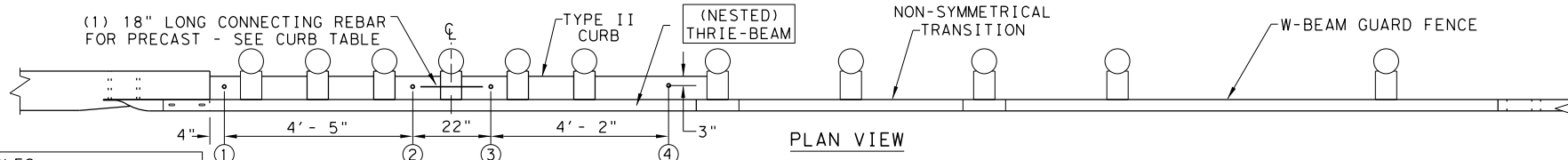


MID-SPAN RAIL SPLICE DETAIL

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

		Design Division Standard		
				METAL BEAM GUARD FENCE TL-3 MASH COMPLIANT GF(31)-19
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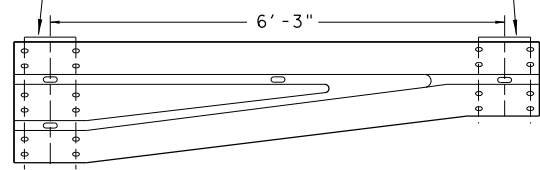
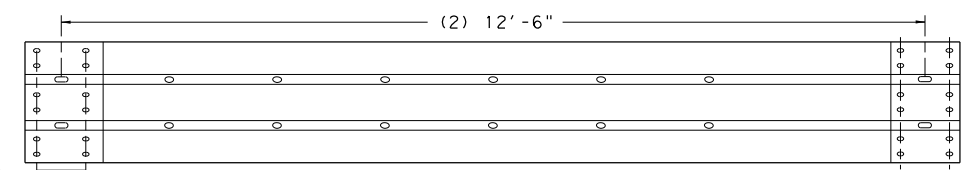
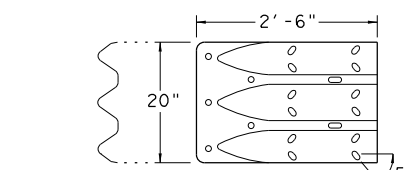
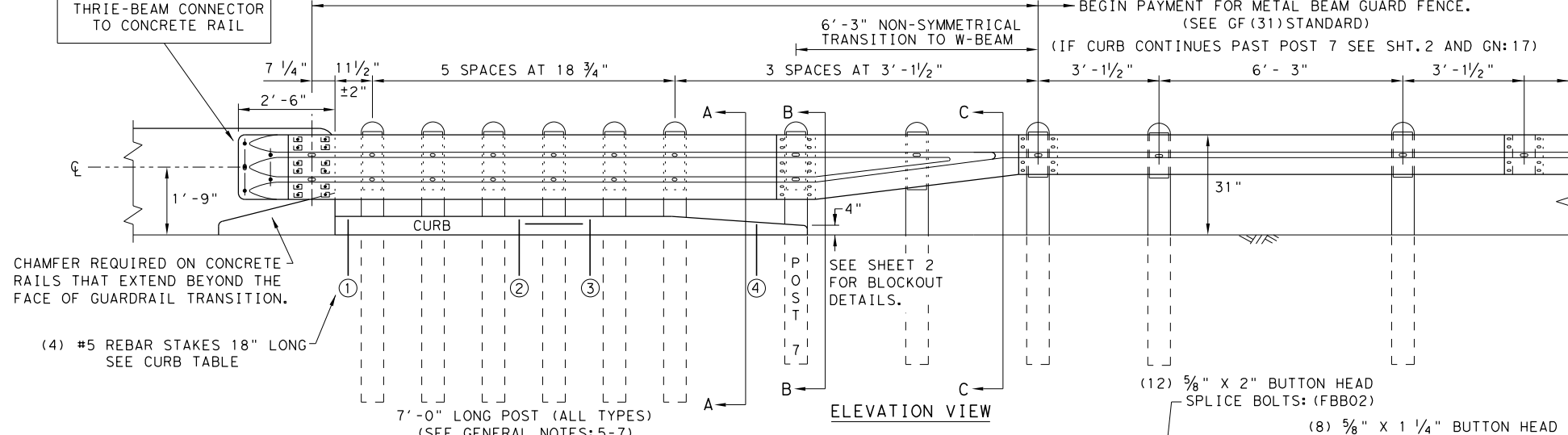
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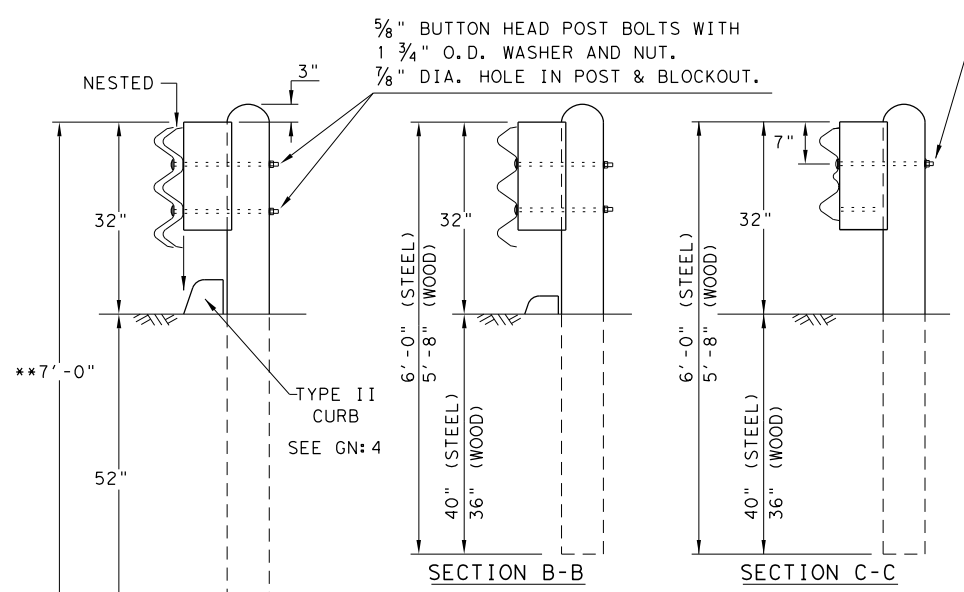
- (5) 1" DIA. HOLES.
- (5) 7/8" DIA. HEAVY HEX HEAD BOLTS (FACING TRAFFIC SIDE) (ASTM F3125 GR A325 OR A449).
- (10) 1 3/4" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.
- (5) 7/8" DIA. HEAVY HEX NUTS (ASTM A194 OR A563).

NOTE:
HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL, LEAVE 1" OF BOLT LENGTH PAST THE 7/8" HEX NUT. TRIM AS REQUIRED.

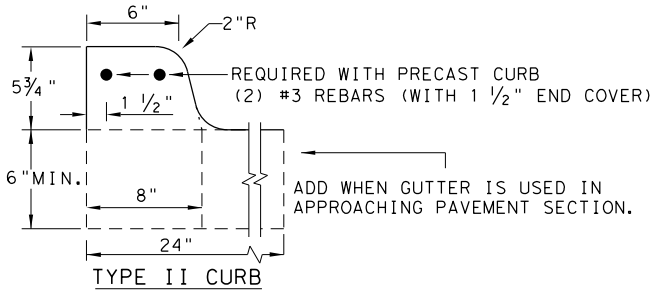
NOTE:
CURB IS A REQUIRED COMPONENT FOR THE TRANSITION TO FUNCTION PROPERLY. SEE GENERAL NOTES: 2-4 AND 16-17.



BRIDGE APPROACH - UPSTREAM: THE NESTED RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.
 BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.



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.	



* 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.

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 CCGG 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.

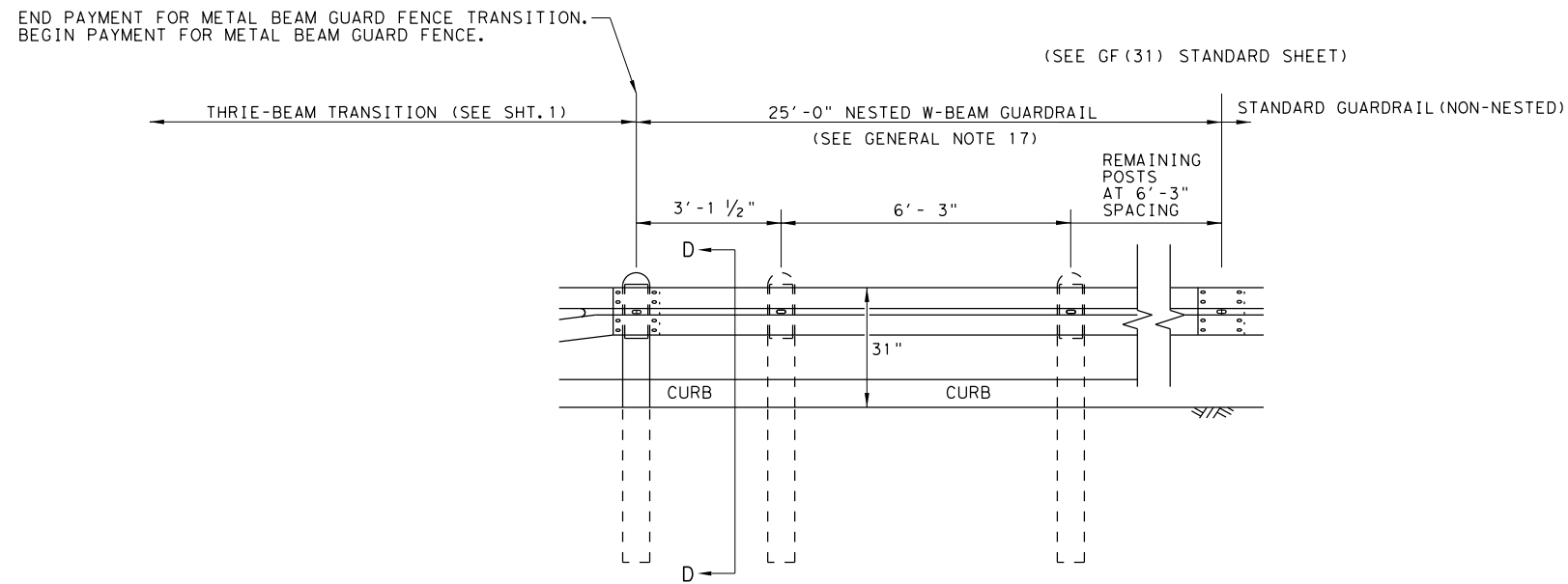
HIGH-SPEED TRANSITION
SHEET 1 OF 2

		Design Division Standard		
		METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT GF(31)TR TL3-20		
FILE: gf31tr+1320.dgn	DN: TXDOT	CK: KM	DW: VP	CK: CGL/AG
© TXDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
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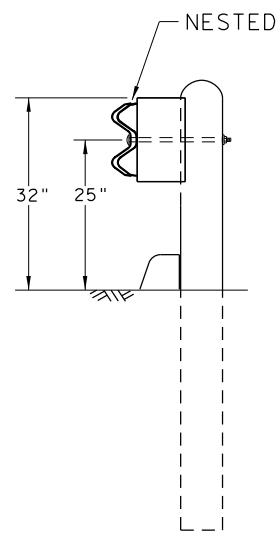
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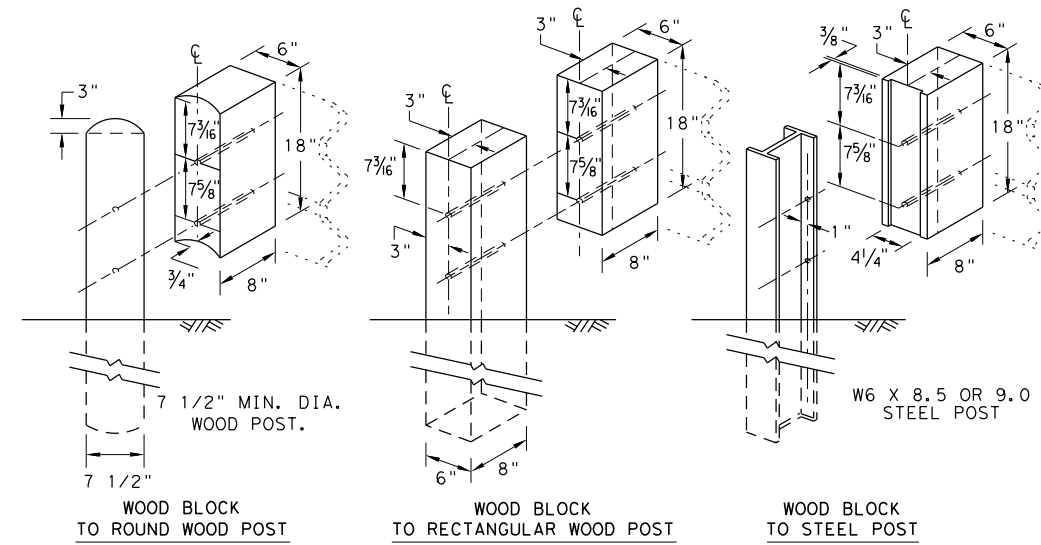
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THREE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

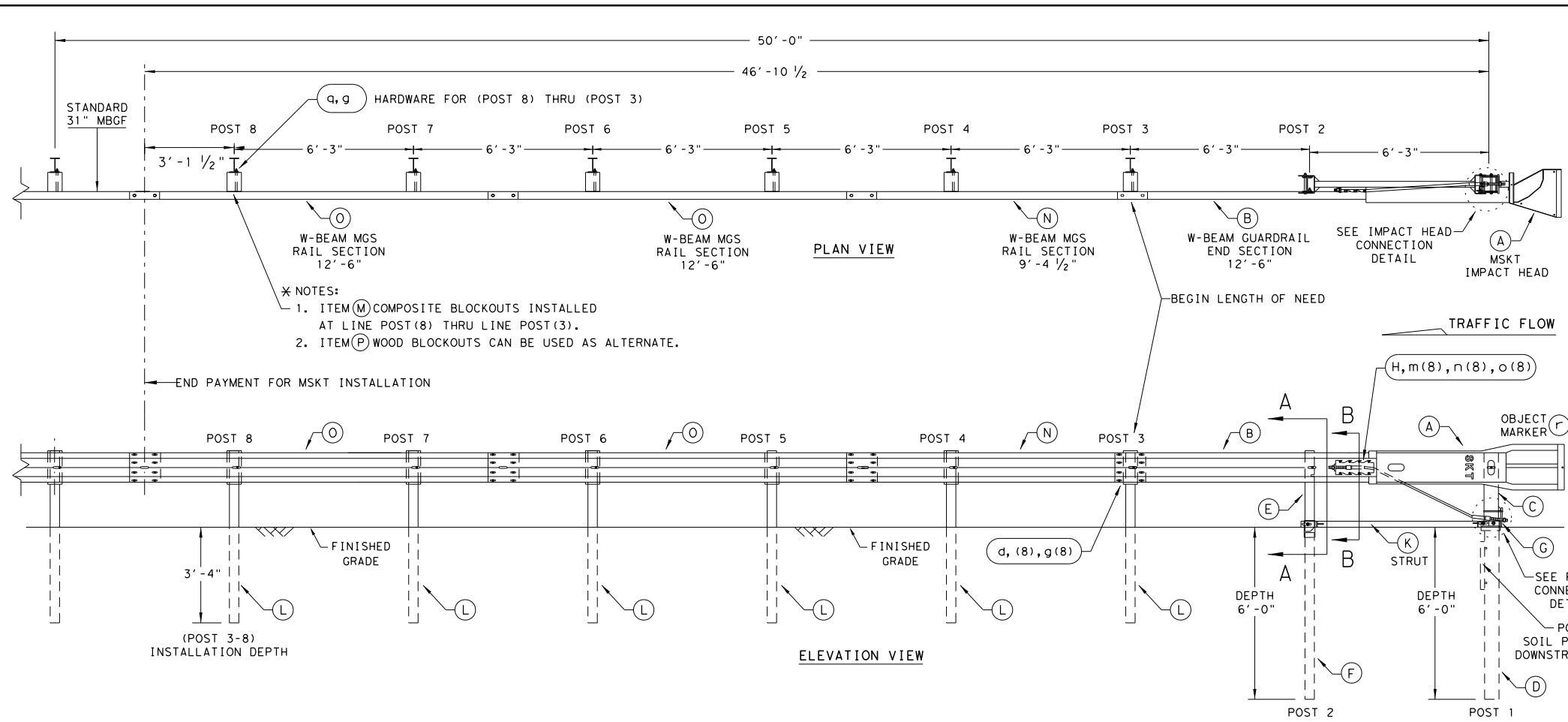
SHEET 2 OF 2



METAL BEAM GUARD FENCE
 THREE-BEAM TRANSITION
 TL-3 MASH COMPLIANT
 GF (31) TR TL3-20

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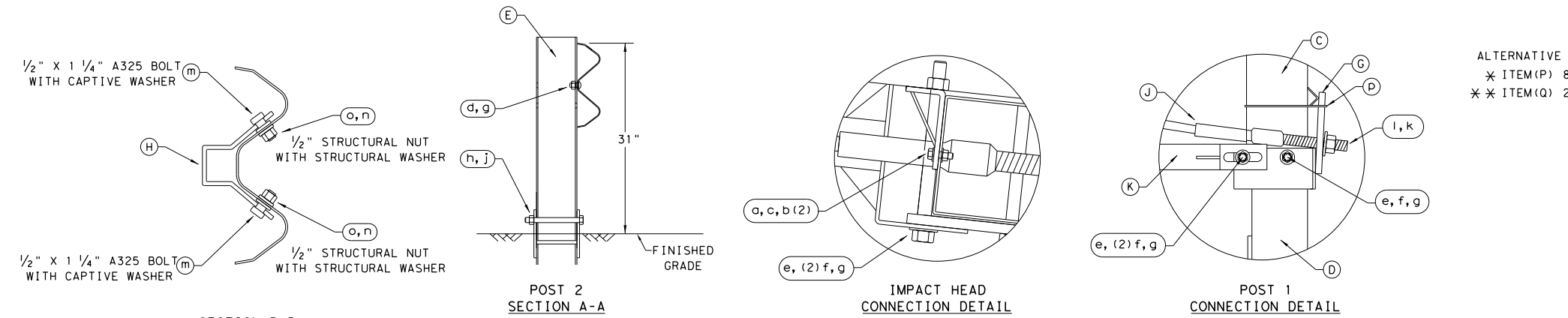
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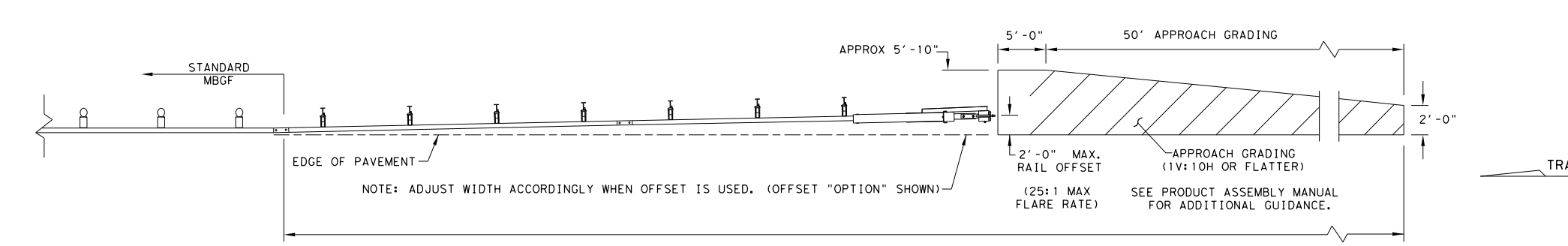
- NOTES:
- ITEM (M) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST (8) THRU LINE POST (3).
 - ITEM (P) WOOD BLOCKOUTS CAN BE USED AS ALTERNATE.

- GENERAL NOTES
- 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
 - FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE: MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION-062717).
 - 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.
 - FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
 - HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
 - SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
 - 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.
 - 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.
 - POSTS SHALL NOT BE SET IN CONCRETE.
 - SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
 - UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
 - A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCRANCHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
 - THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN ITS PLACE.
 - 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 Go.	SF1303
C	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6X9 OR W6X8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
SMALL HARDWARE			
a	2	5/8" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/8" WASHER	W0516
c	2	5/8" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/8" O.D. x 3/8" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151



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



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.

Design Division Standard

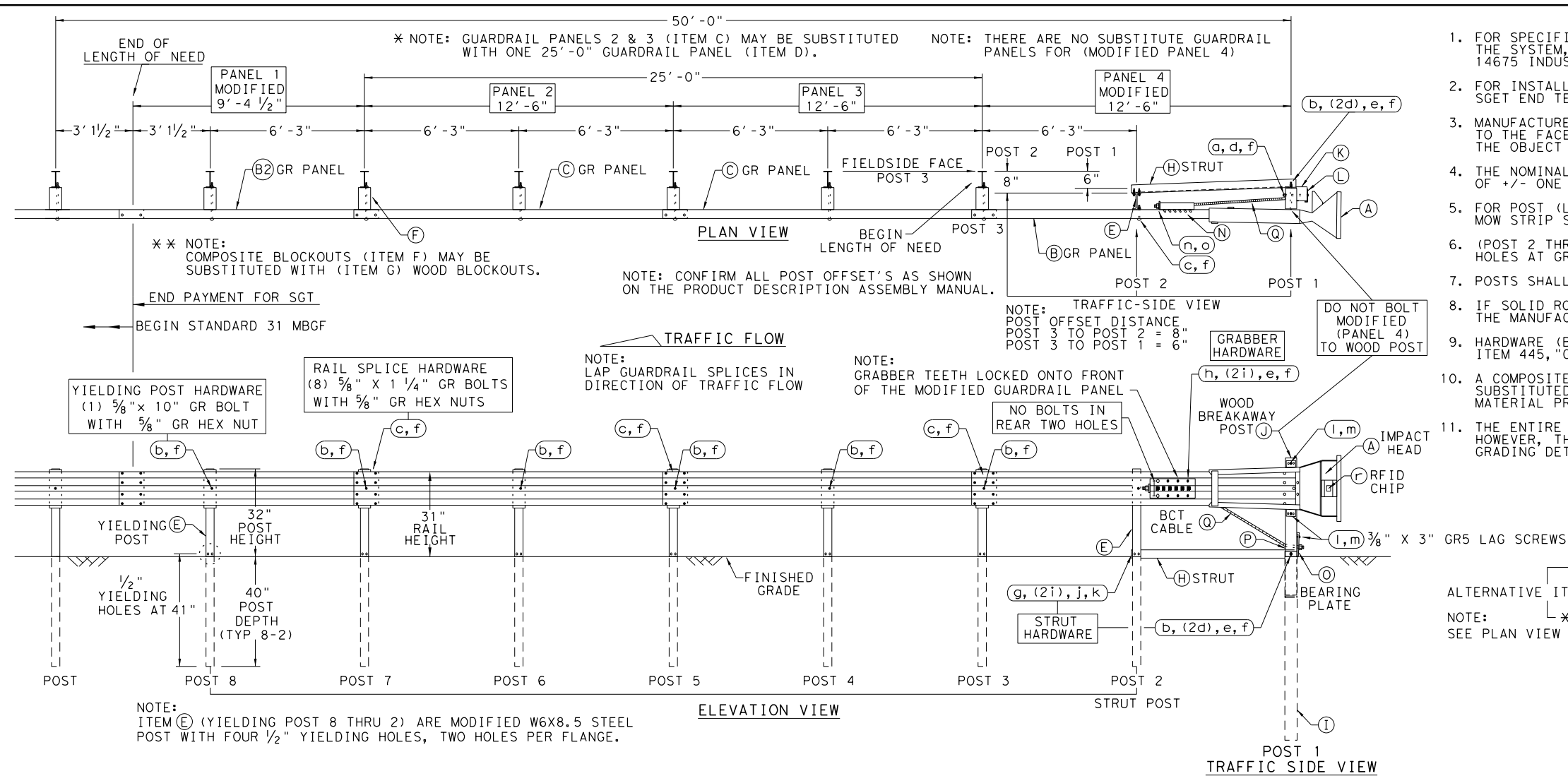
SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

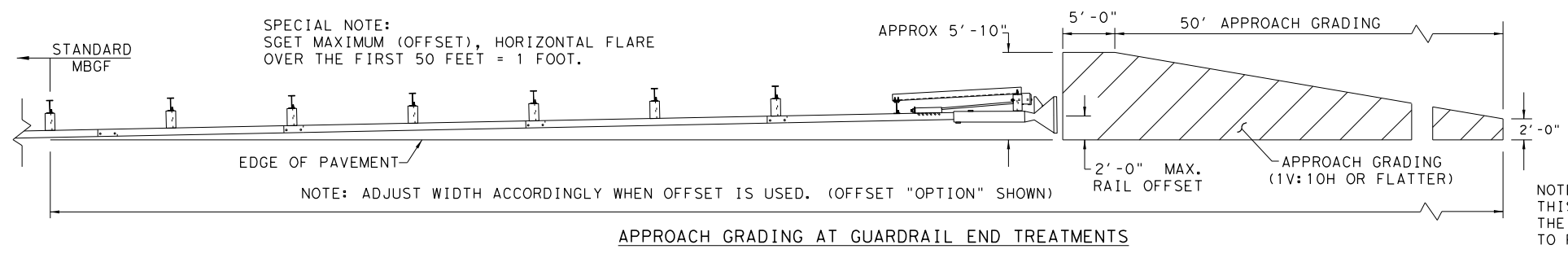
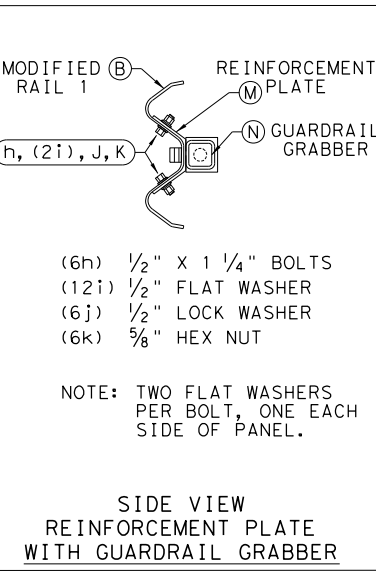
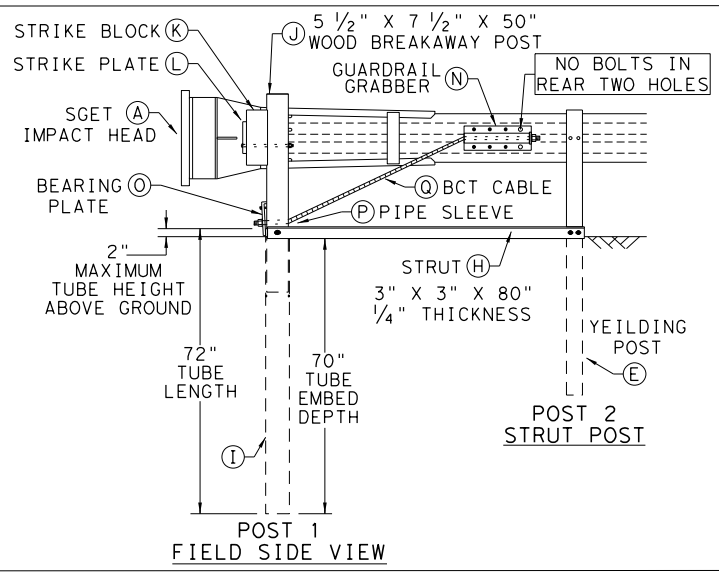
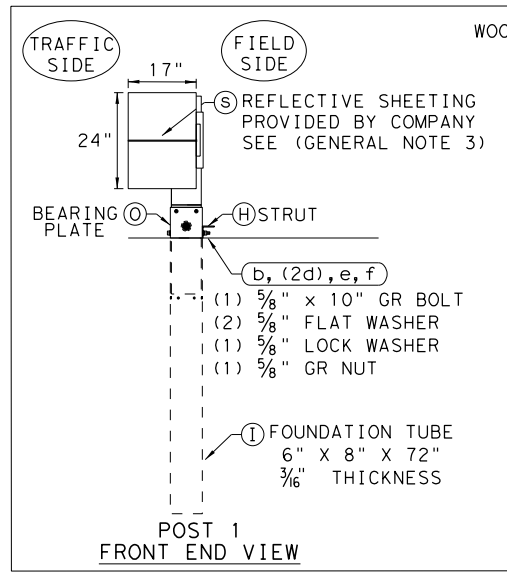
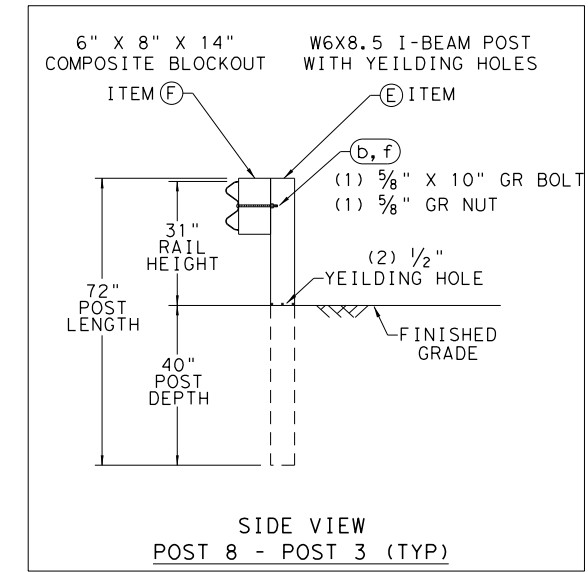
SGT (12S) 31-18

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ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CBO8
G	6	WOOD BLOCKOUT 6" X 8" X 14"	WB08
H	1	STRUT 3" X 3" X 80" X 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" X 3/16"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" X 7 1/2" X 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
SMALL HARDWARE			
a	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563HD HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M



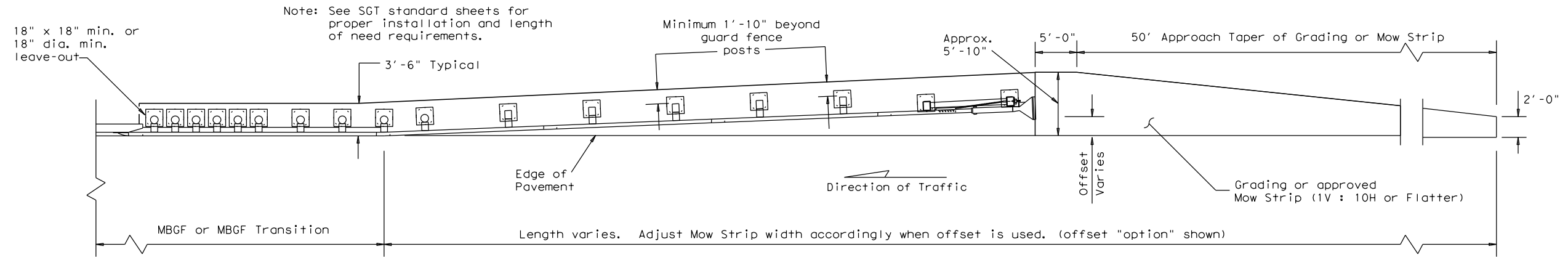
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Design Division Standard

SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT (15) 31-20

FILE: sgt153120.dgn	DN: TXDOT	CK: KM	DW: VP	CK: VP
© TXDOT: APRIL 2020	CONT: 2520	SECT: 01	JOB: 016, ETC	HIGHWAY: FM 2200
REVISIONS	DIST: SAT	COUNTY: MEDINA	SHEET NO. 152	

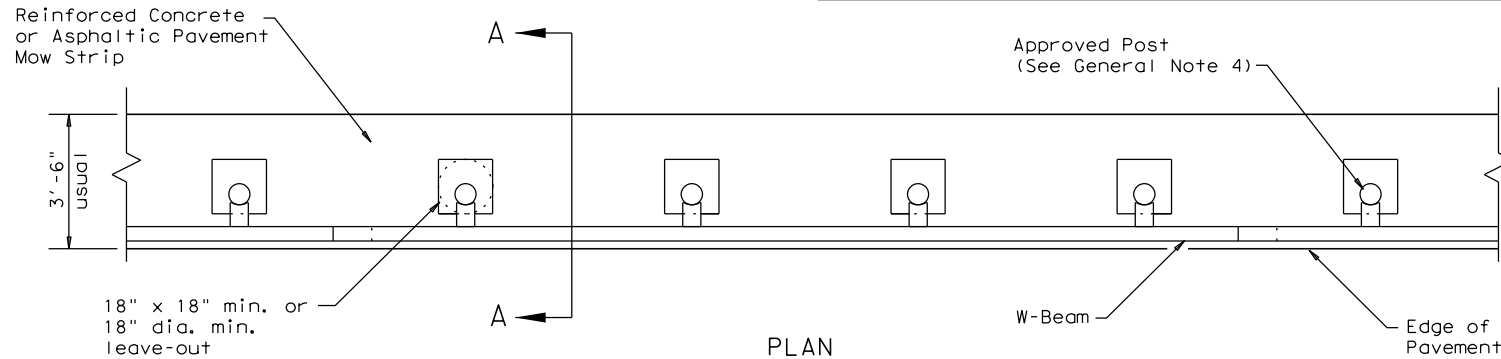
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Note: See SGT standard sheets for proper installation and length of need requirements.

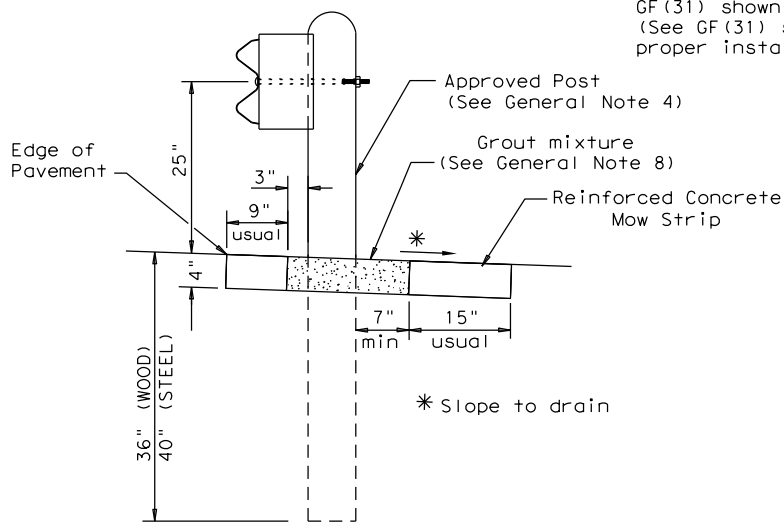
GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS

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.



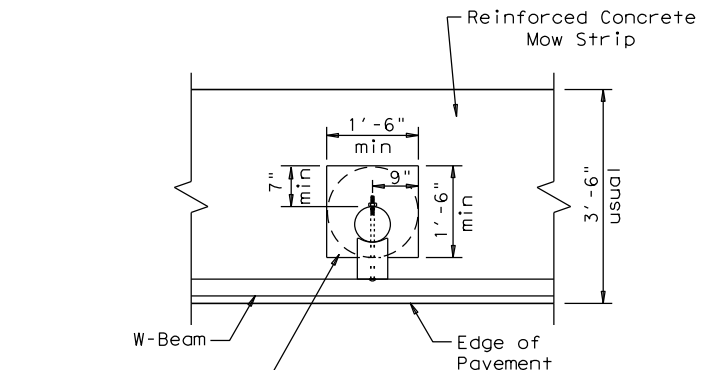
PLAN

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



SECTION A-A

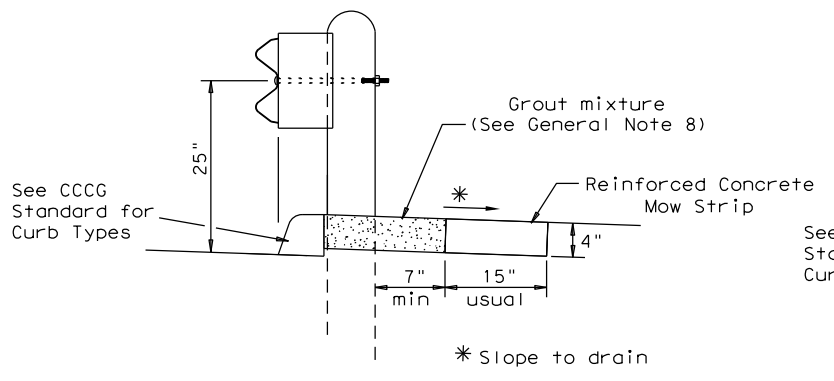
Typical



MOW STRIP DETAIL

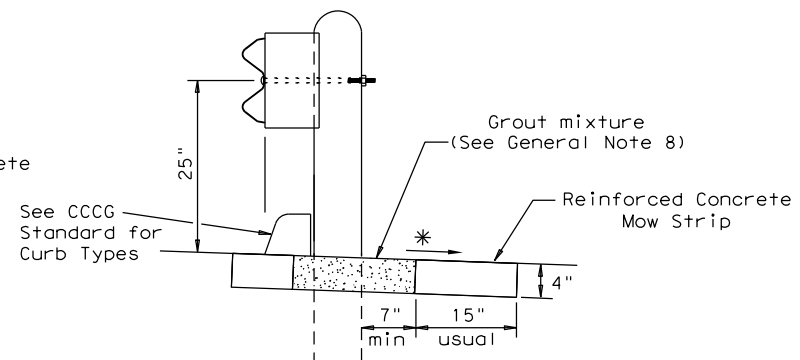
Reinforced Concrete Mow Strip with 18" x 18" Square or 18" Dia. minimum leave-out.

- 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 1/2" 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.



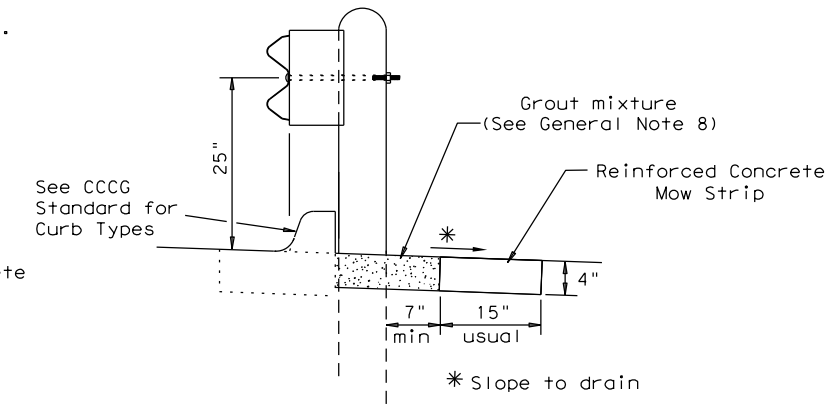
CURB OPTION (1)

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

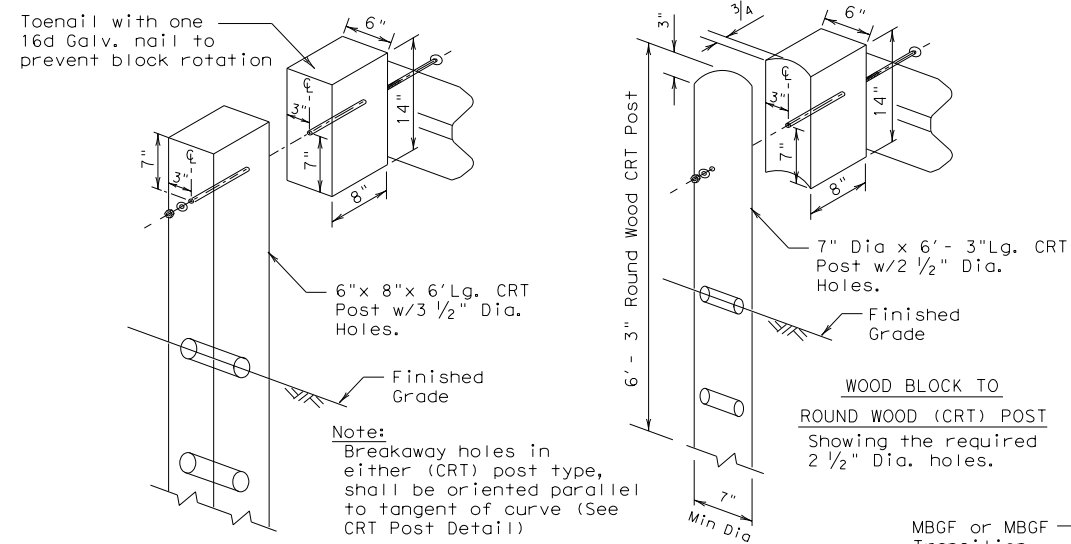
METAL BEAM GUARD FENCE (MOW STRIP)
TL-3 MASH COMPLIANT
GF (31) MS-19

FILE: gf31ms19.dgn	DN: TXDOT	CK: KM	DW: VP	CK: CGL/AG
© TXDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	153	

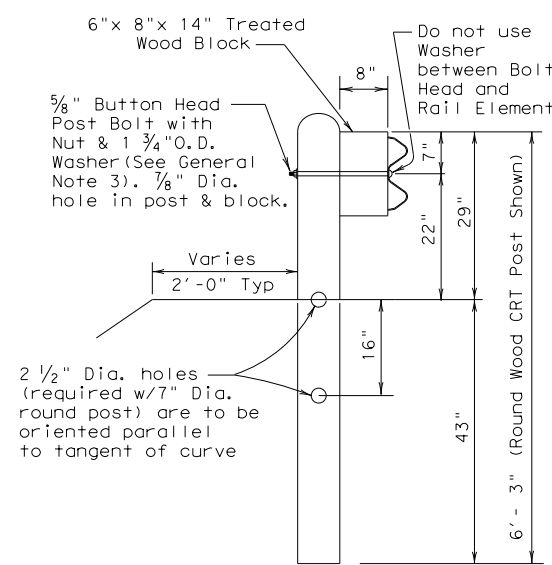
DATE:
FILE:

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DATE: 12/20/2022
 FILE: P:\117\99\03\Design\Civil\Standards\Roadway\mbgfsr19.dgn



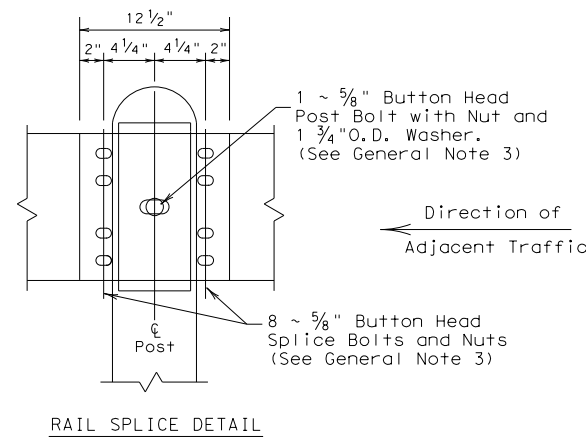
WOOD BLOCK TO RECTANGULAR WOOD (CRT) POST
 Showing the required 3 1/2" Dia. holes.



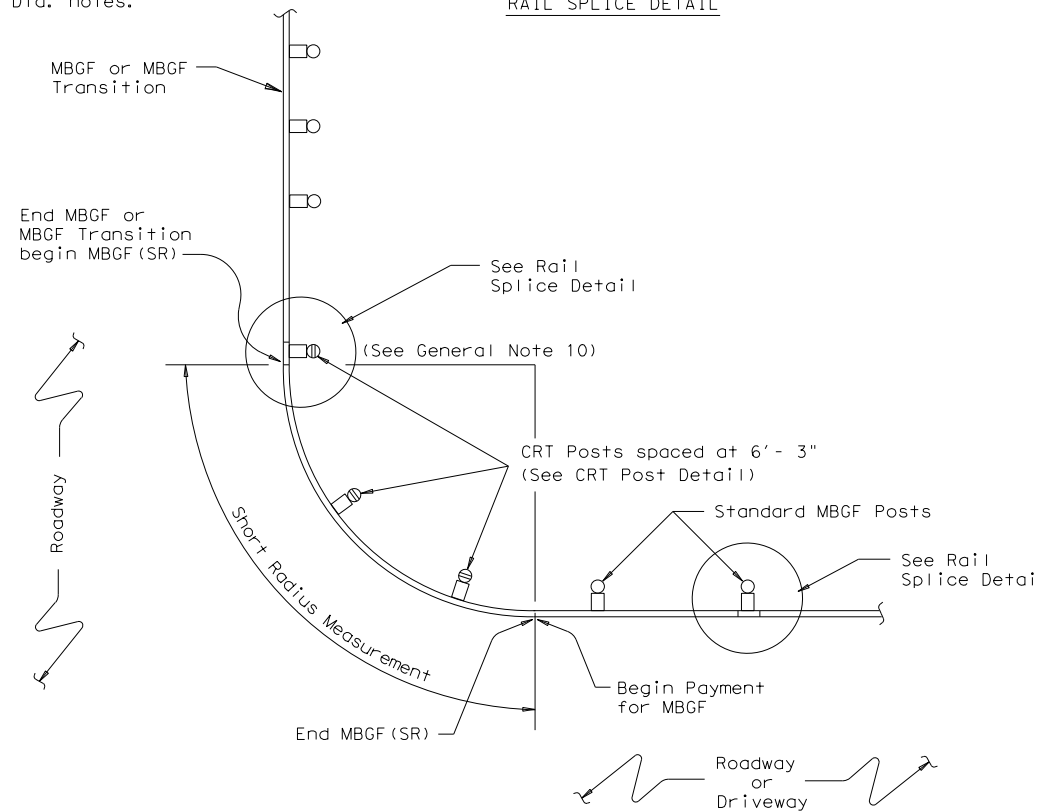
(CRT) POST DETAIL CONTROLLED RELEASE TERMINAL POST

Two or more wood CRT post(s) are required at any radius installation located at intersecting roadways or driveways.

WOOD BLOCK TO ROUND WOOD (CRT) POST
 Showing the required 2 1/2" Dia. holes.



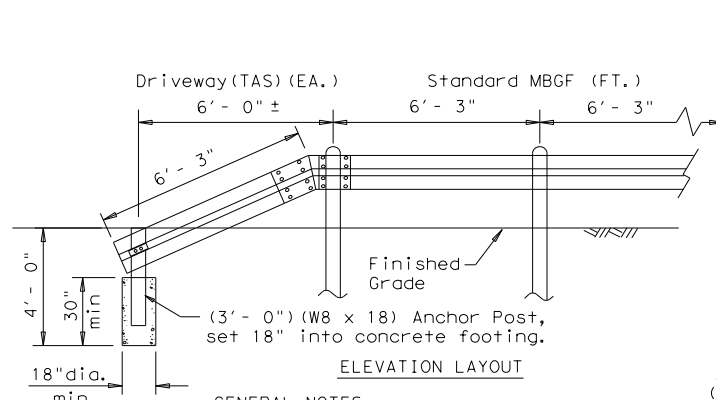
RAIL SPLICE DETAIL



PLAN VIEW SHOWING TYPICAL RADIUS

The required radius is shown elsewhere on the plans.

- GENERAL NOTES**
- The type of (CRT) post (round wood post, or rectangular wood post) will be shown elsewhere in the plans. The exact position of MBGF shall be shown elsewhere in the plans or as directed by the Engineer.
 - Steel posts are not permitted at CRT post positions.
 - Rail element shall meet the requirements of Item 540, "Metal Beam Guard Fence" except as modified on the plans. The Contractor may furnish rail elements of 12 1/2 or 25 foot nominal lengths.
 - Button head "post" bolts (ASTM A307) shall be of sufficient length to extend through the full thickness of the nut (ASTM A563) and Type A (1 3/4" O.D.) washer and not more than 1" beyond it. Button head "splice" bolts (ASTM A307) are 5/8" x 1 1/4" (or 2" long at triple rail splices) with a 3/8" double recessed nut (ASTM A563).
 - Fittings (bolts, nuts, and washers) shall be galvanized in accordance with Item 445, "Galvanizing." Fittings shall be subsidiary to the bid item.
 - Crown shall be widened to accommodate the Metal Beam Guard Fence.
 - The lateral approach to the guard fence, shall have a slope rate of not more than 1V:10H.
 - 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 block. Rail placed over curbs shall be installed so that the post bolt is located approximately 21 inches above the gutter pan or roadway surface.
 - If solid rock is encountered within 0 to 18" of the finished grade, drill a 22" dia. hole, 24" into the rock, or drill two 12" dia. front to back overlapping holes, 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 is less. Any excess post length, after meeting these depths, may be field cut to ensure proper guardrail mounting height. Backfill with a cohesionless material.
 - Guardrail posts shall not be set in concrete, of any depth.
 - Special rail fabrication will be required at installations having a curvature of less than 150 ft. radius. The required radius shall be shown on the plans.
 - The terminal anchor section (TAS) post shall be set in Class A concrete (unless otherwise shown in the plans) in accordance with Item 421, "Hydraulic Cement Concrete." Concrete shall be subsidiary to the bid item requiring construction of the terminal anchor section (TAS). Terminal anchor post to be galvanized in accordance with Item 445, "Galvanizing."
 - Unless otherwise shown in the plans, a composite material post and/or block that meets the requirements of DMS-7210, "Composite Material Posts and Blocks for Metal Beam Guard Fence" may be substituted for posts and/or 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 can furnish composite material posts and/or blocks.



ELEVATION LAYOUT

- GENERAL NOTES**
- The "Driveway" Terminal Anchor Section is ONLY to be used within driveway locations, where the ROW is limited and a standard 25 ft. (TAS) Terminal Anchor Section, is too long.
 - Terminal anchor post shall be set in Class A concrete.
 - All steel shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."

"DRIVEWAY" TERMINAL ANCHOR SECTION

Only for use within driveway locations, where a standard (TAS) Terminal Anchor Section can not be installed.

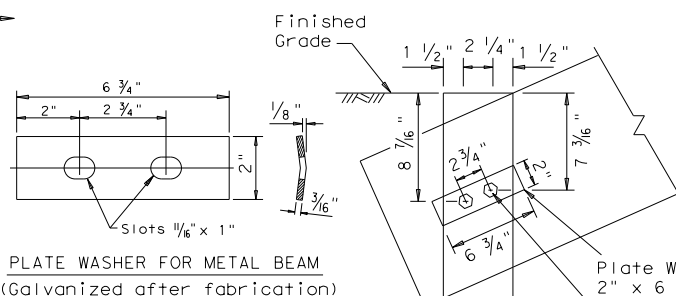
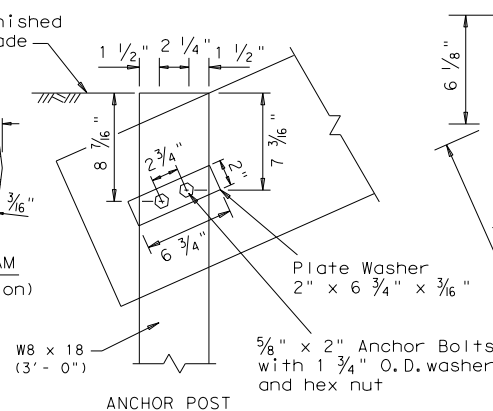
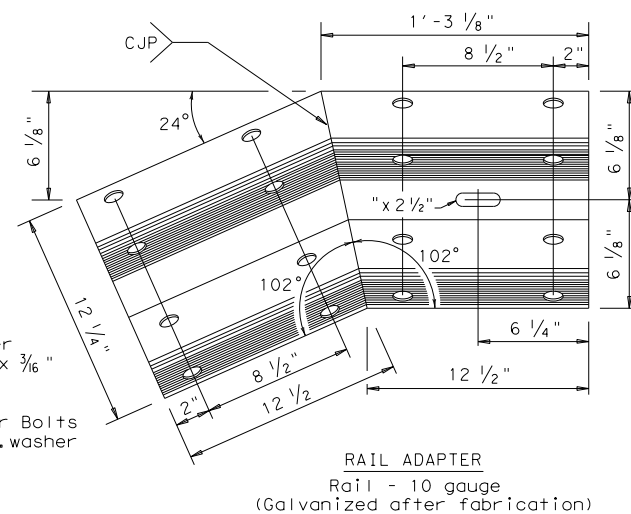


PLATE WASHER FOR METAL BEAM
 (Galvanized after fabrication)



ANCHOR POST



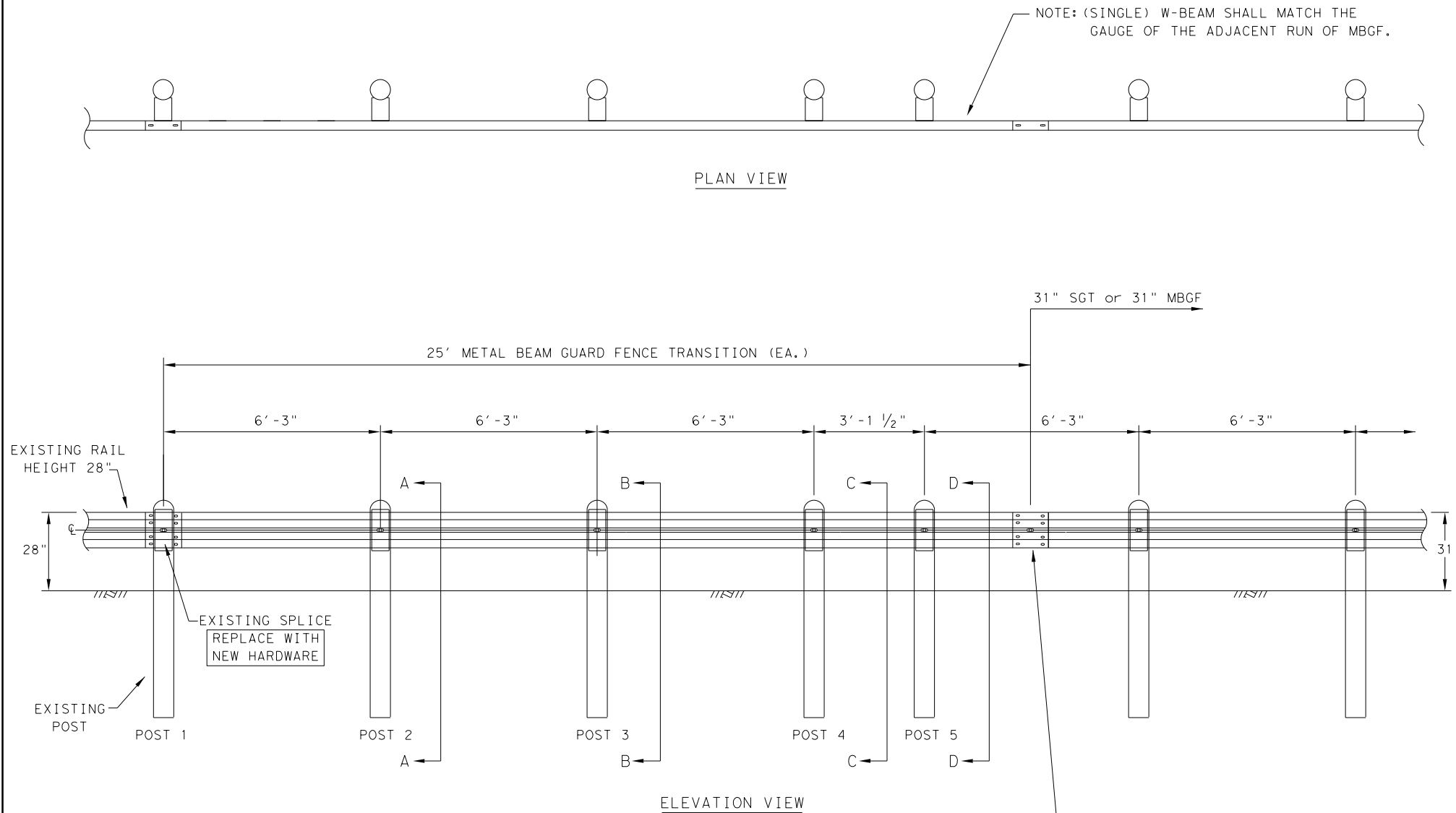
RAIL ADAPTER
 Rail - 10 gauge
 (Galvanized after fabrication)

ONLY FOR USE IN MAINTENANCE REPAIRS OR HIGHLY CONSTRAINED SITE CONDITIONS.

		Design Division Standard	
METAL BEAM GUARD FENCE (SHORT RADIUS) MBGF (SR) - 19			
FILE: mbgfsr19.dgn	DN: TxDOT	CK: KM	DW: BD
© TxDOT NOVEMBER 2019	CONT: 2520	SECT: 01	JOB: 015
REVISIONS			HIGHWAY: FM 2200
	DIST: SAT	COUNTY: MEDINA	SHEET NO.: 154

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 FILE: P:\117\99\03\Design\Civil\Standards\Roadway\raij\adajb19.dgn



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 AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'-0", OR 12'-6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND 5/8" ROUND WASHER (ASTM F436) AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE 5/8" X 1-1/4" WITH 5/8" NUTS (ASTM A563).
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
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. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. SEE GF(31) STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. 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.
11. REFER TO STANDARD GF(31) FOR ADDITIONAL DETAILS.
12. RAIL HEIGHT ADJUSTMENT IS ASSESSED AT TL-3 MASH COMPLIANT FOR STEEL POST HEIGHT TRANSITION TO 28" STEEL POST GUARDRAIL.

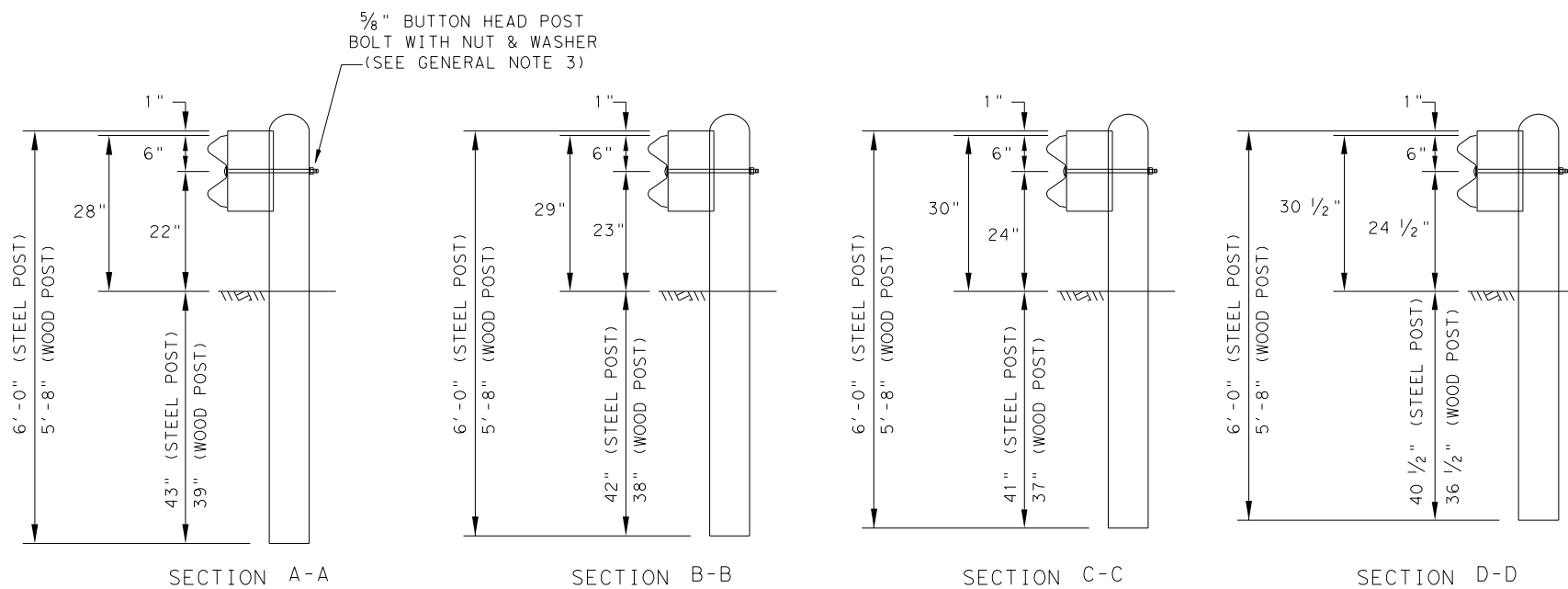
HARDWARE LIST	
QTY	DESCRIPTION
1	25'-0" W-BEAM RAIL ELEMENT 12GA. (TYP)
5	7 1/2" DIA X 6'-0" DOMED ROUND WOOD POSTS (TYP)
5	6" X 8" X 68" RECTANGULAR WOOD POSTS (TYP)
5	W6 X 8.5 OR W6 X 9 X 72" STEEL POSTS (TYP)
5	6" X 8" X 14" WOOD BLOCKS OR COMPOSITE (TYP)
5	5/8" X 18" GUARDRAIL BOLTS AND NUTS (FBB04)
5	5/8" ROUND WASHERS (ASTM F436) (FWC16a)
5	5/8" X 10" GUARDRAIL BOLTS AND NUTS (FBB03)
16	5/8" X 1-1/4" GUARDRAIL SPLICE BOLTS WITH DOUBLE RECESSED NUTS (ASTM A563) (FBB01)

POST AND BLOCK-OUT TYPES AVAILABLE

FOR WOOD POST

FOR STEEL POST

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

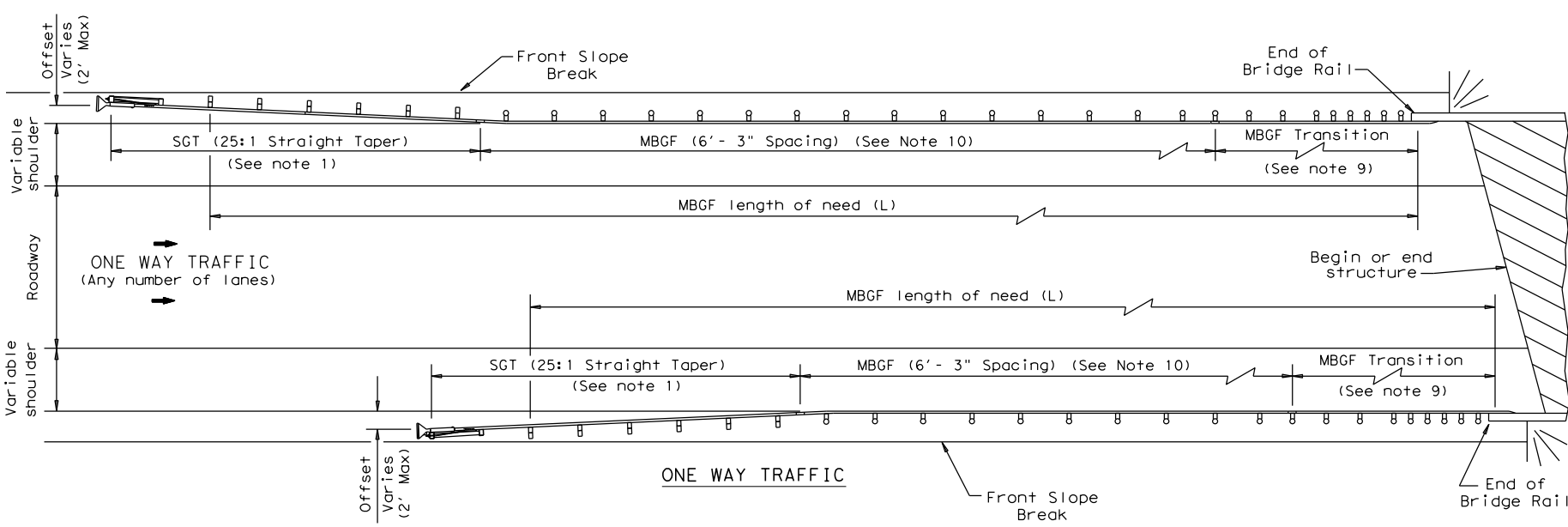
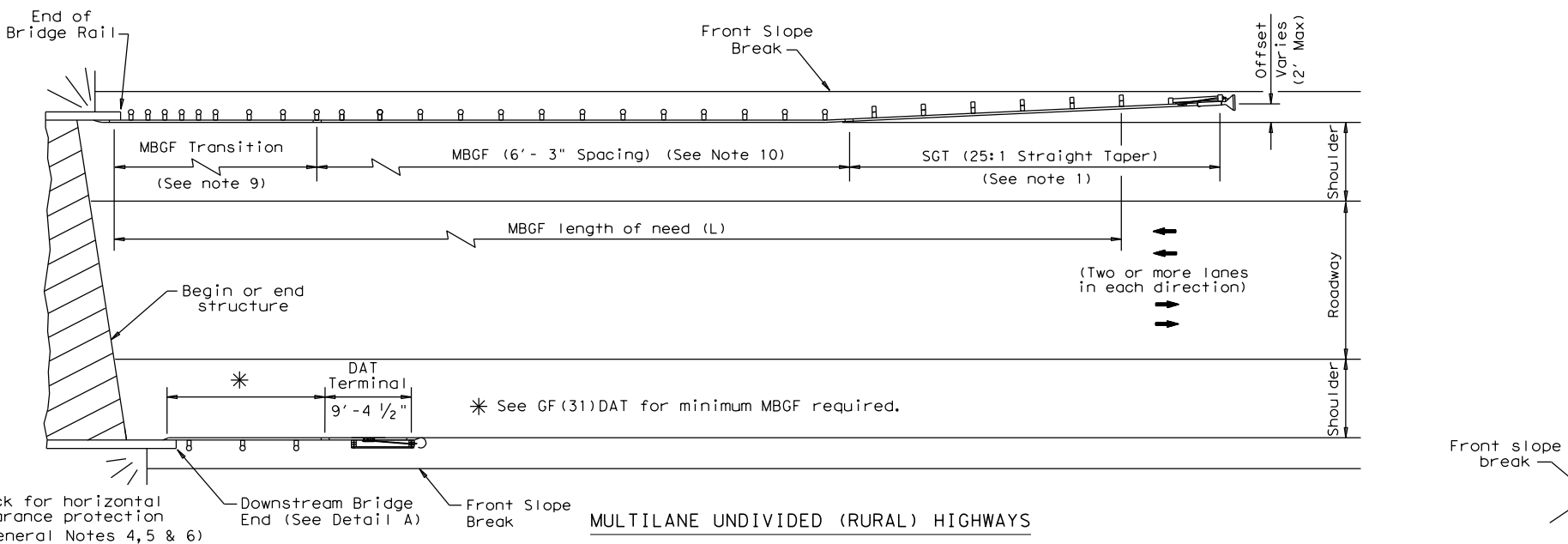
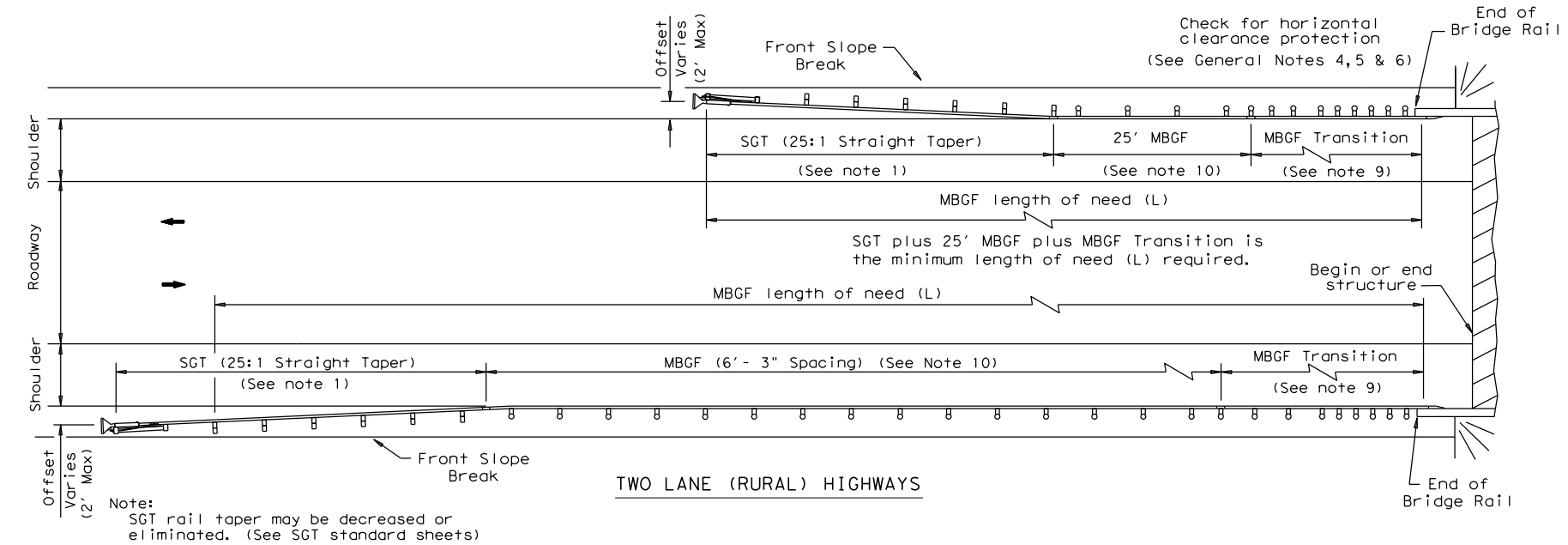


NOTE: HARDWARE SHALL MEET THE FOLLOWING REQUIREMENTS.
 GUARDRAIL POST BOLTS (ASTM A307 GR.A)
 GUARDRAIL ROUND WASHERS (ASTM F436)
 GUARDRAIL DOUBLE RECESSED NUTS (ASTM A563)
 GUARDRAIL SPLICE BOLTS (ASTM A307 GR.A)
 GUARDRAIL SPLICE NUTS (ASTM A563)

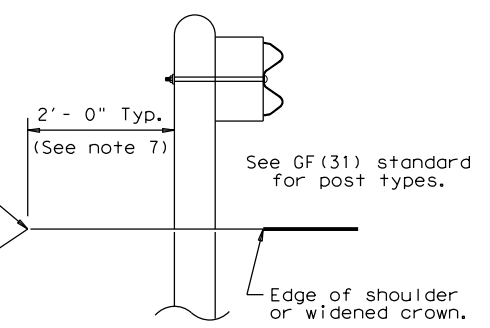
		Design Division Standard	
METAL BEAM GUARD FENCE RAIL HEIGHT ADJUSTMENT (28" TO 31") TL-3 MASH COMPLIANT RAIL-ADJ(B)-19			
FILE: rai\adajb19	DN: TxDOT	CK: KM	DW: VP
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB
REVISIONS		2520	01
DIST	COUNTY	SHEET NO.	
SAT	MEDINA	155	

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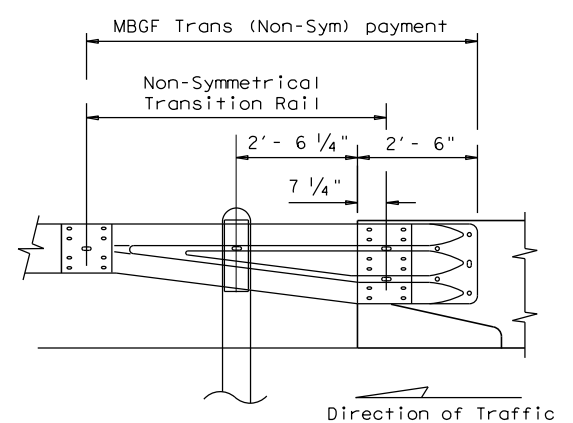
DATE: 12/20/2022 3:36:16 PM
 FILE: P:\11799\03\Design\Civil\Standards\Roadway\bed14.dgn



- ### 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.

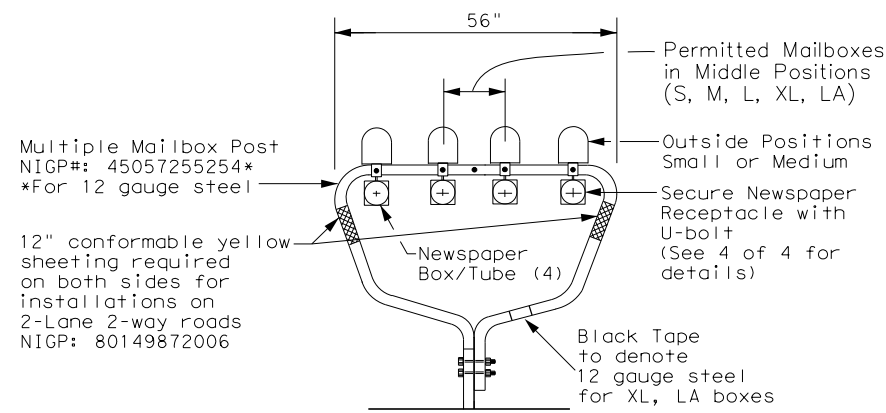
DETAIL A
Showing Downstream Rail Attachment

		Design Division Standard	
<h2>BRIDGE END DETAILS</h2> <h3>(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)</h3> <h1>BED-14</h1>			
FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP
© TxDOT: December 2011	CONT	SECT	JOB
REVISIONS	2520	01	016, ETC
REVISED APRIL 2014 SEE (MEMO 0414)	DIST	COUNTY	FM 2200
	SAT	MEDINA	SHEET NO. 156

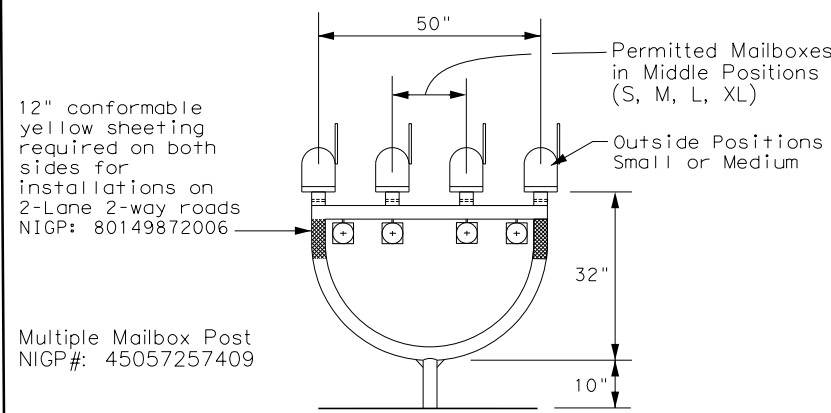
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TYPE 1 - MULTIPLE



TYPE 4 - MULTIPLE



MAILBOX SIZES

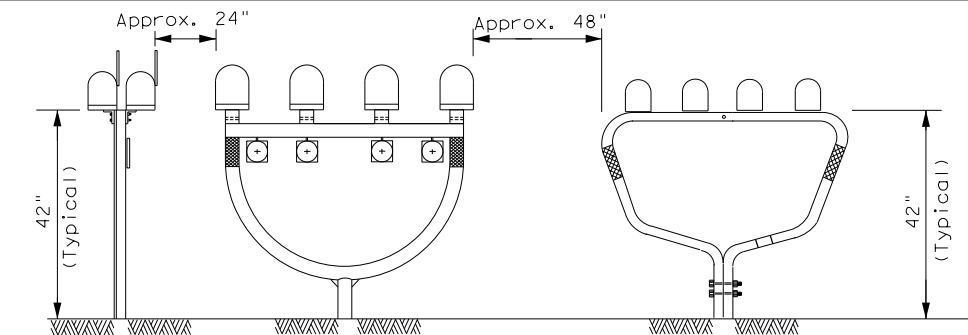
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX **
	LENGTH	WIDTH	HEIGHT	WEIGHT
SMALL	19 1/2"	6"	7"	6 LBS
MEDIUM	22 1/2" *	8" *	11 1/2" *	8 LBS
LARGE	23 1/2"	11 1/2"	13 1/2"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 1/2"	15"	23 LBS

GENERAL NOTES:

- Dimensions shown (length, width, and height) are typical, not maximums. However, anytime a medium size mailbox is mounted on a single/double mount or on the outside position on a multi mount, the dimensions shown are maximums.
- Mailboxes shall be made of light weight sheet metal or light weight plastic. Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.

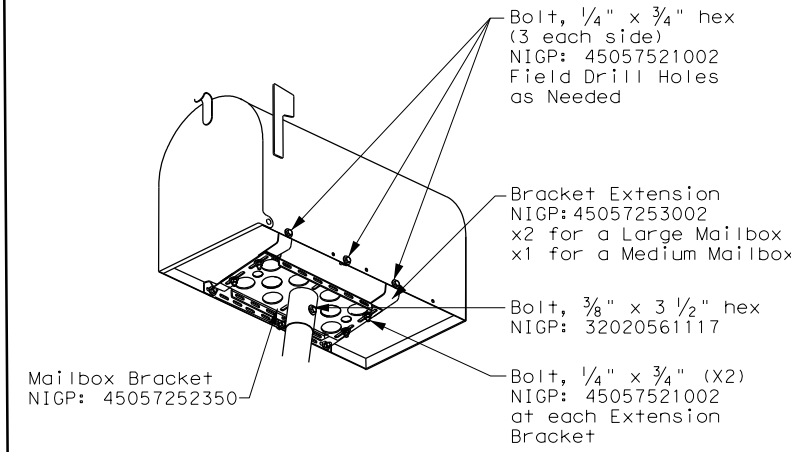
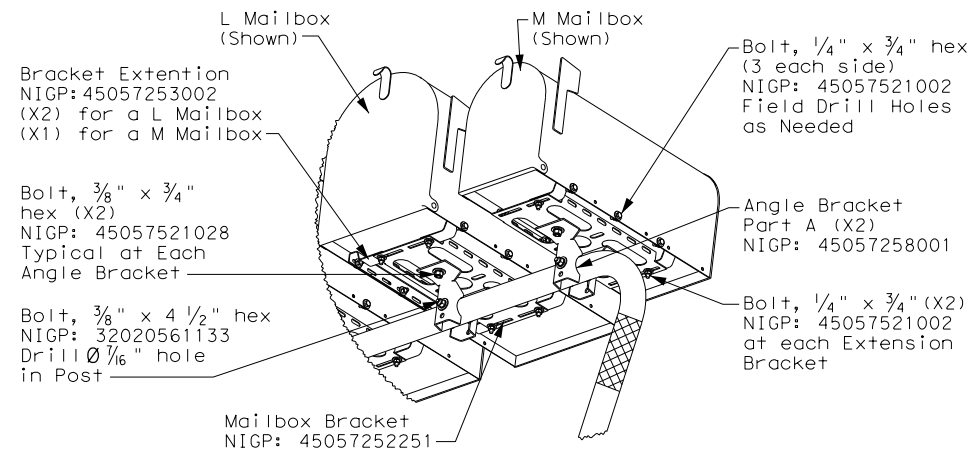
* See Note 1.
 ** Excluding Molded Plastic on 4 X 4 Post

TYPICAL INSTALLATION MEASUREMENTS

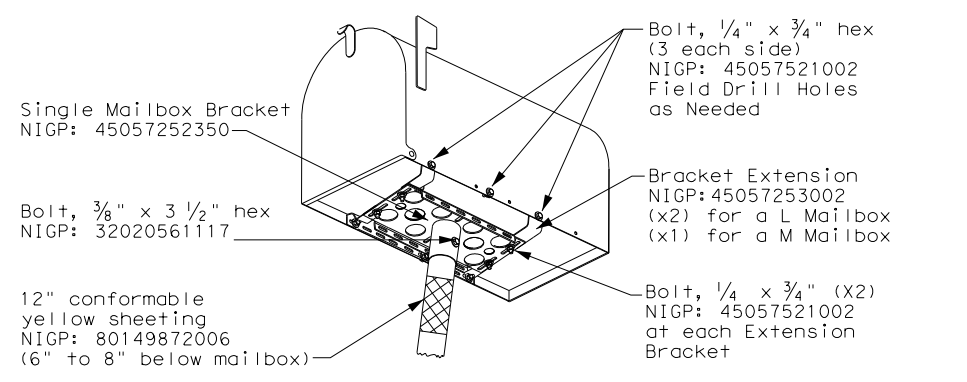


NOTE:

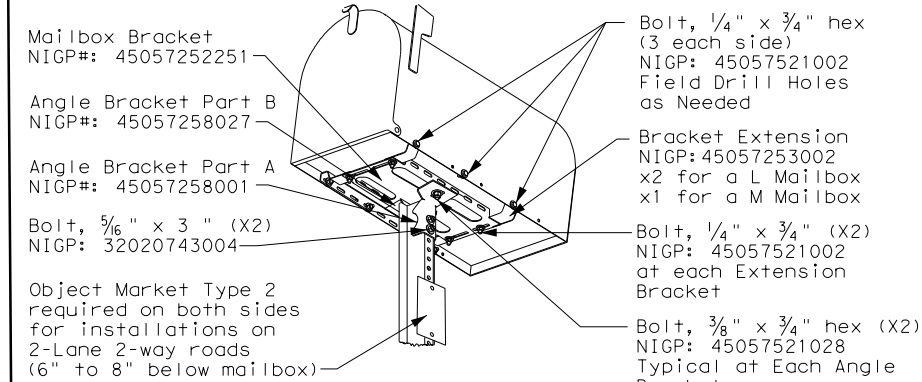
Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Design Standard sheets PED-Pedestrian Facilities Curb Ramps.



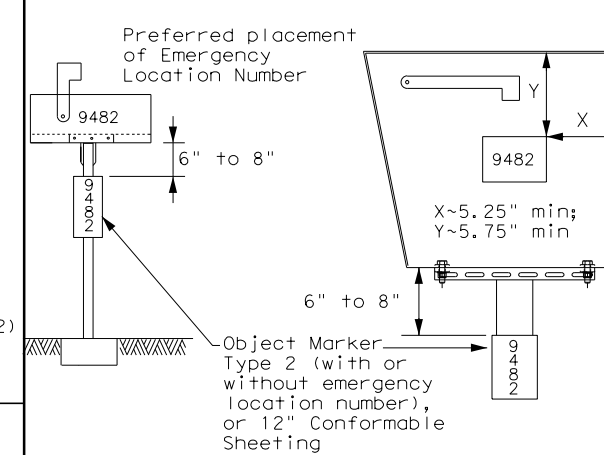
TYPE 2 and 4 - SINGLE/DOUBLE



TYPE 3 - SINGLE/DOUBLE

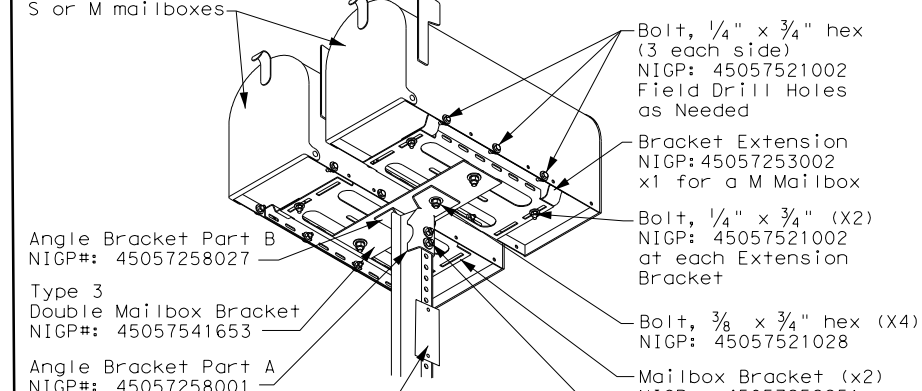
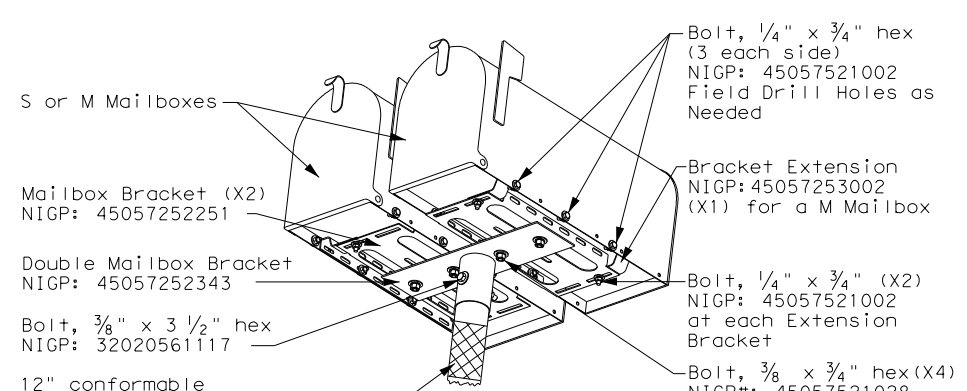


PLACEMENT OF EMERGENCY LOCATION NUMBER

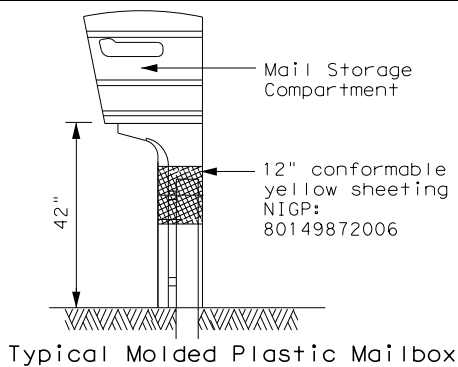


NOTES:

- Location numbers are provided by homeowner. Minimum size 1" height.
- Location number is typically placed on the mailbox in a contrasting color.
- Black numbers may be placed on the Type 2 object marker if the numbers cannot be placed on the mailbox.
- Alternatively, a green or blue plate with white numbers attached may be mounted below the object marker. Other contrasting color configuration, as approved, may be used.
- See 3 of 4 for Foundation details.
- See 4 of 4 for Hardware details.



TYPE 5



Texas Department of Transportation Maintenance Division Standard

MAILBOX MOUNTING AND ASSEMBLY

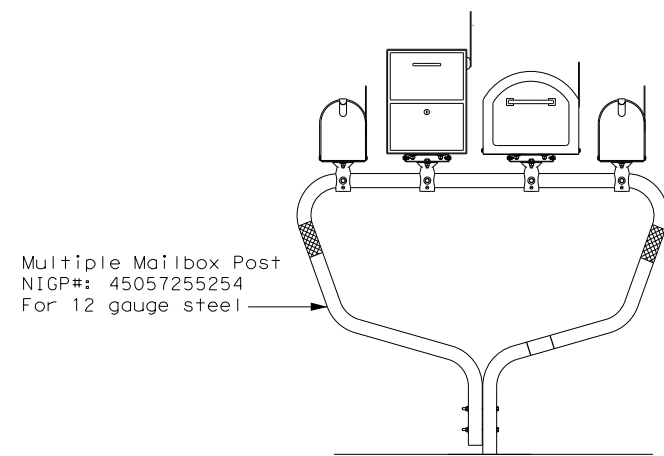
MB(1)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
2/2005	11/2009	4/2015	DIST	COUNTY
6/2005	1/2011		SAT	MEDINA
11/2006	7/2014			SHEET NO. 157

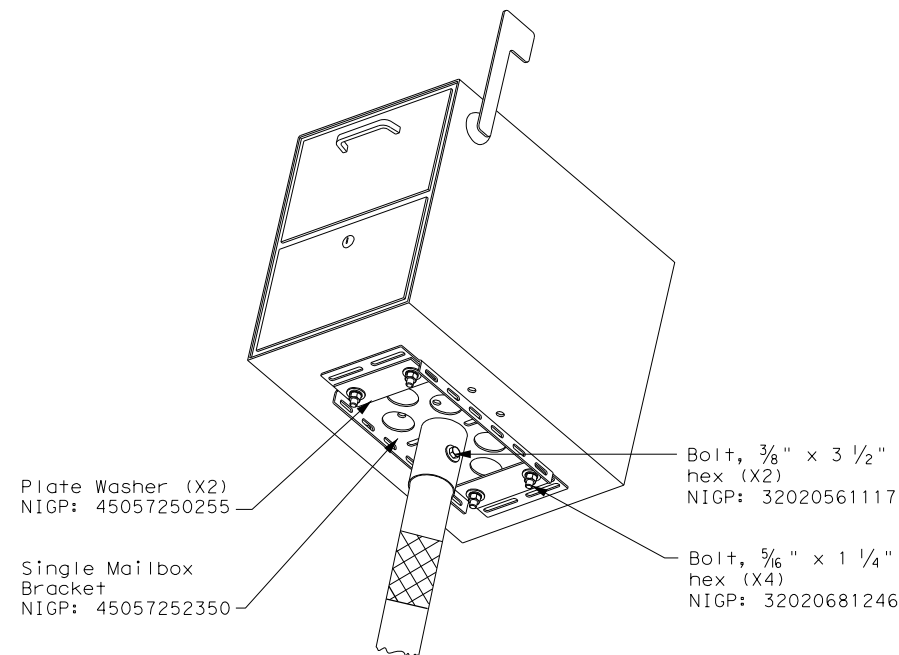
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/20/2022 3:36:19 PM
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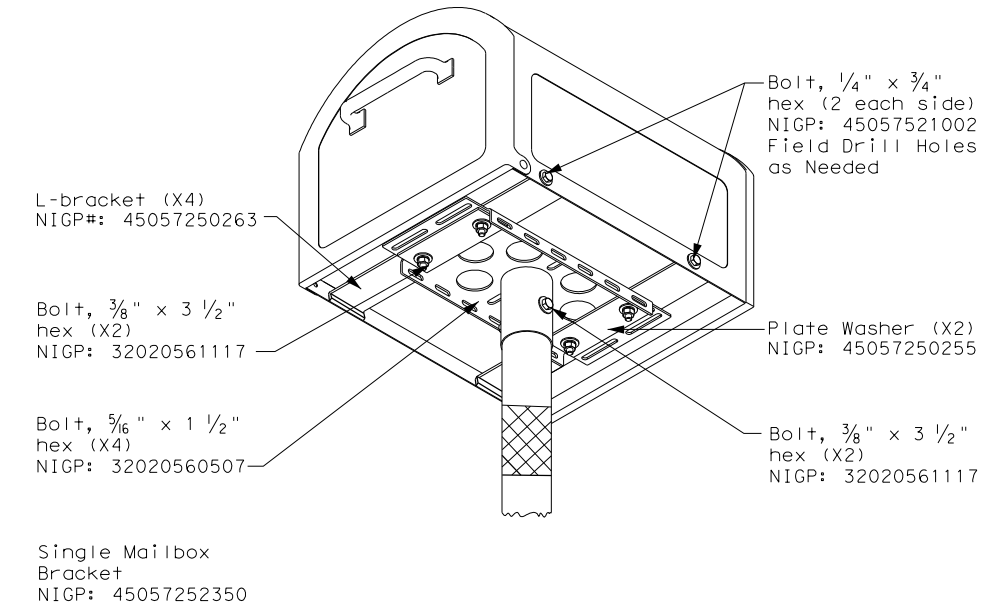
TYPE 1 - MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX

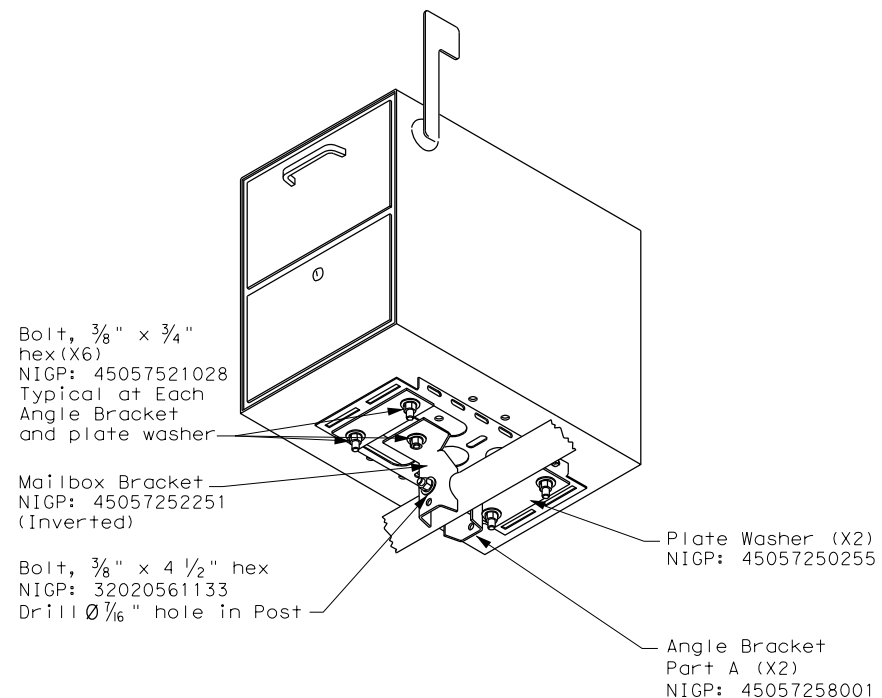


TYPE 2/4 - SINGLE XL MAILBOX

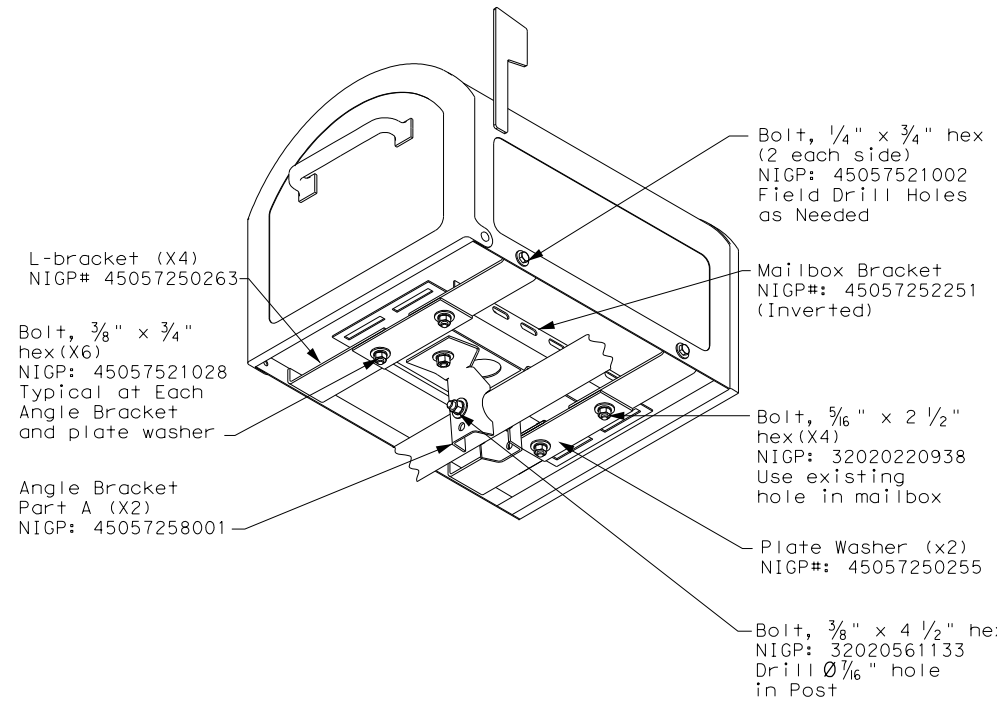


NOTE:
 Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

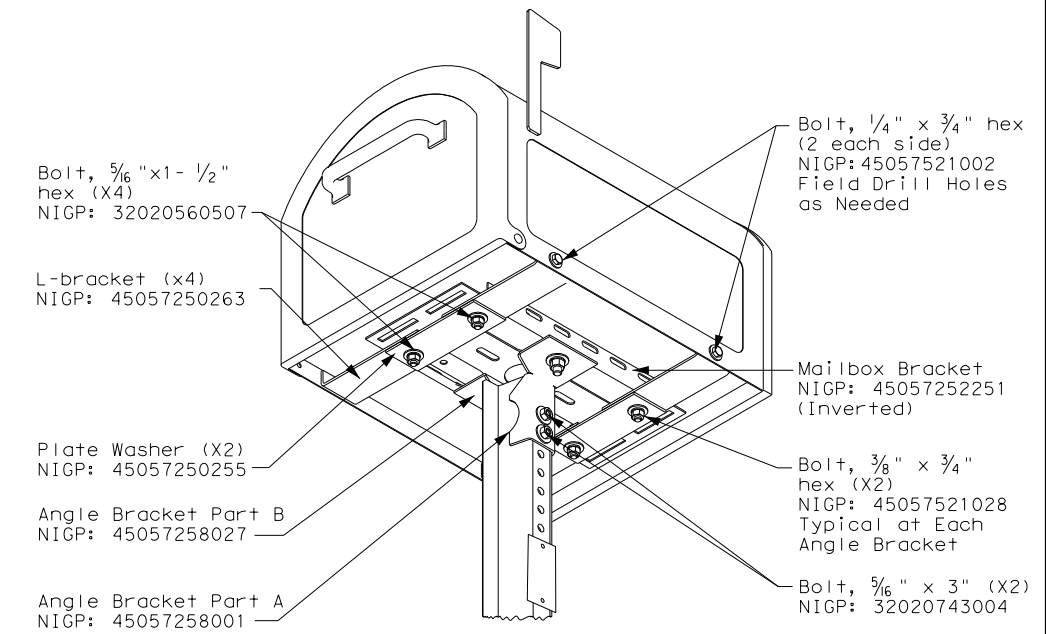
TYPE 1 MULTI - LOCKABLE ARCHITECTURAL (LA)



TYPE 1 MULTI - XL MAILBOX



TYPE 3 - XL MAILBOX MOUNTING



SHEET 2 OF 4

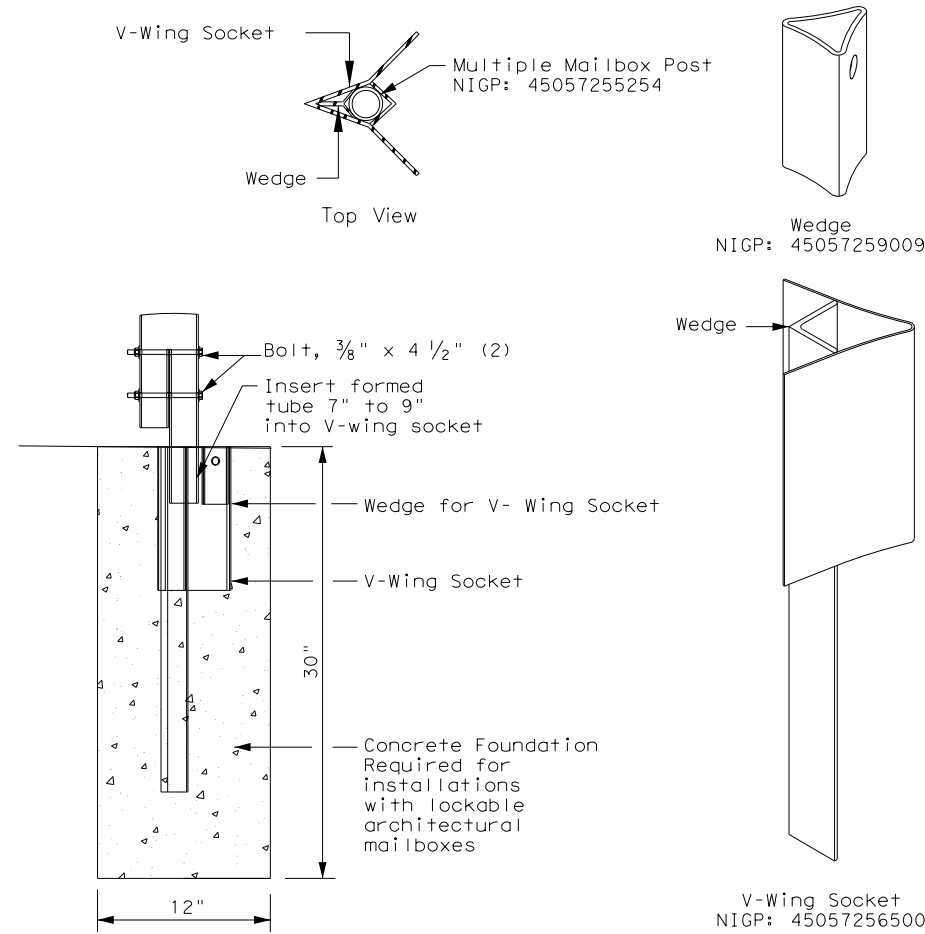
		Maintenance Division Standard	
<h2>XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY</h2> <h3>MB (2) - 21</h3>			
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT March 2004	CONT	SECT	JOB
2/2005	REVISIONS	2520	01
6/2005	11/2009	4/2015	016, ETC
11/2006	1/2011		FM 2200
	DIST	COUNTY	SHEET NO.
	SAT	MEDINA	158

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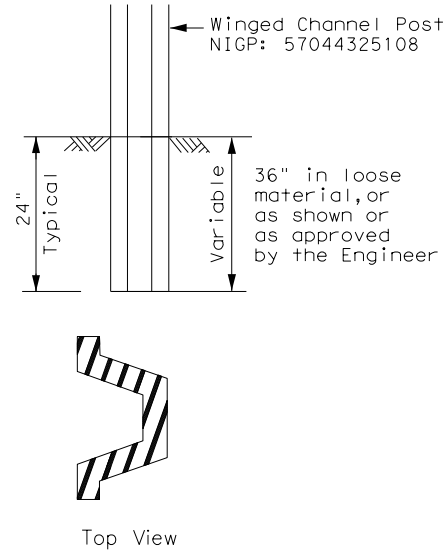
DATE: 12/20/2022 3:36:19 PM
 FILE: P:\117\99\04\Design\Civil\Standards\Roadway\mb-21(1).dgn

TYPE 1 - SUPPORT/FOUNDATION

Thin Wall Tube w/ V-LOC Anchorage



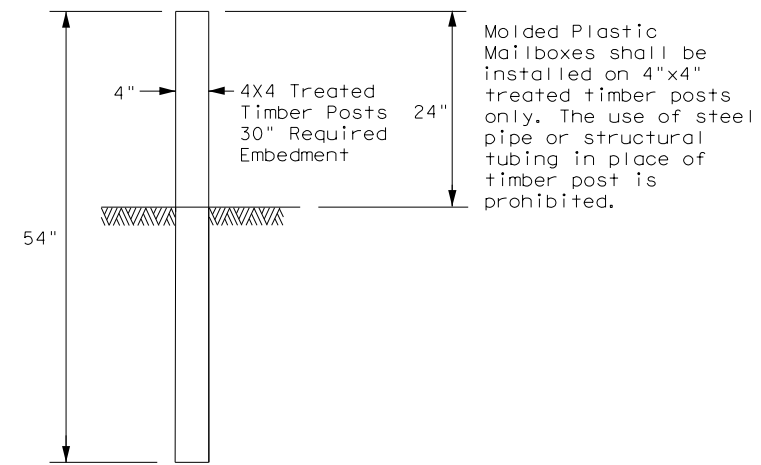
TYPE 3 - SUPPORT/FOUNDATION



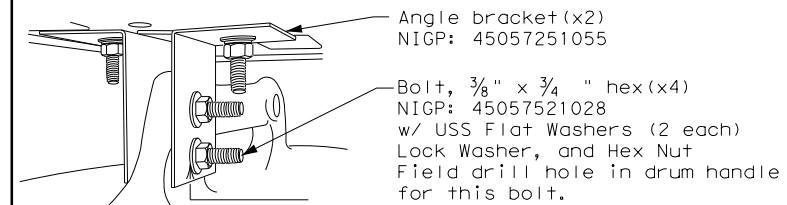
NOTES:

1. Attach Object Marker (OM) facing direction of traffic.
2. OM will also be required on opposite side if installed on a 2-Lane, 2-Way roadway.

TYPE 5 - SUPPORT/FOUNDATION



TYPE 6 - TEMPORARY MAILBOX SUPPORT



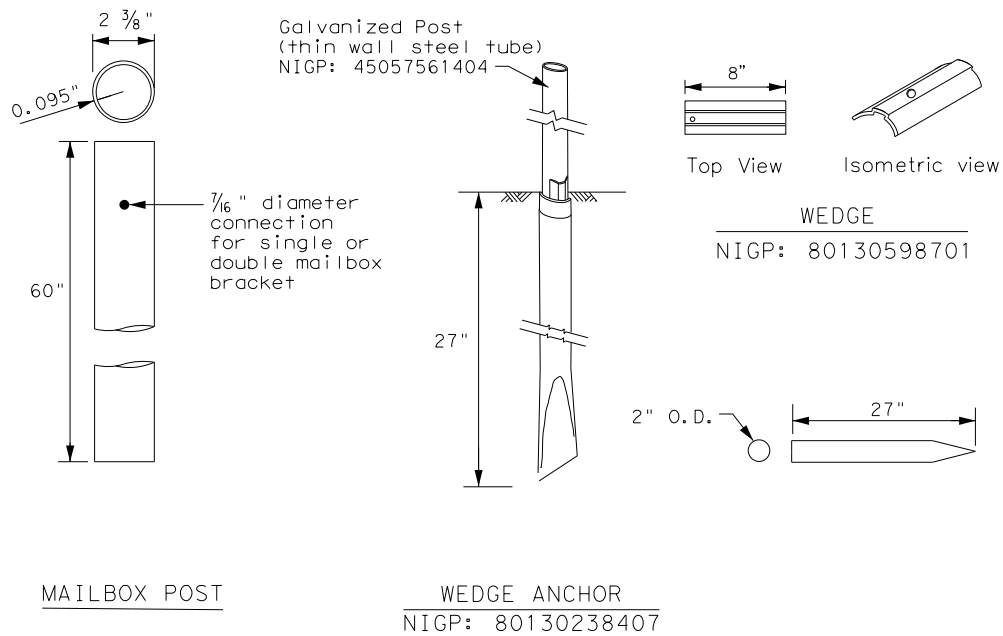
Plastic Drum NIGP: 55093383655
 Rubber Collar NIGP: 55093387102

NOTES:

1. Place on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
2. Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

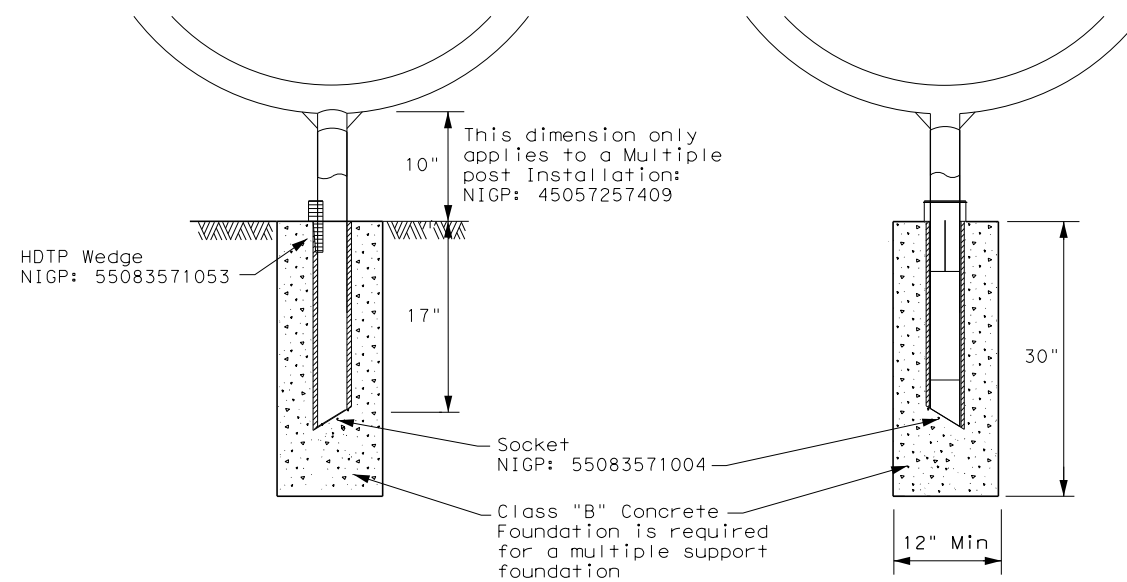
TYPE 2 - SUPPORT/FOUNDATION

Thin Wall Steel Tube w/Wedge Anchor System



TYPE 4 - SUPPORT/FOUNDATION

Whitecoated steel post NIGP: 45057561107
 Multiple post NIGP: 45057257409
 Recycled Rubber post (RR) NIGP: 45057561057



GENERAL NOTES:

1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition, only on Type 1, Type 2, and Type 4

SHEET 3 OF 4



MAILBOX SUPPORT AND FOUNDATION

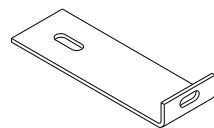
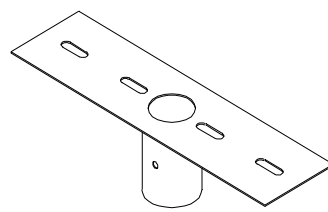
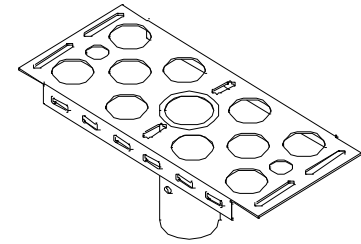
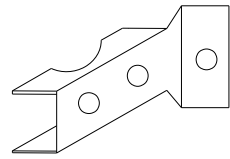
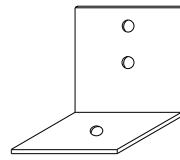
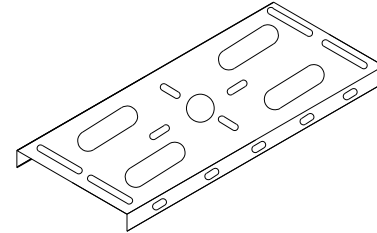
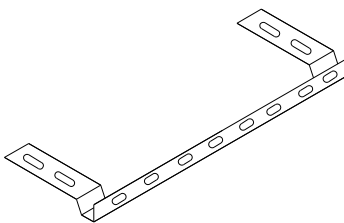
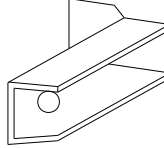
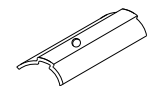

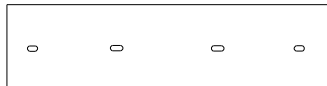
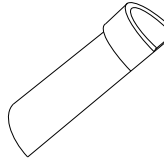
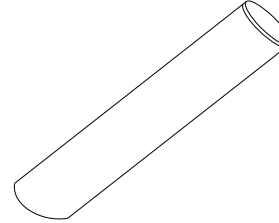

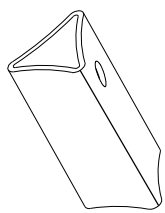
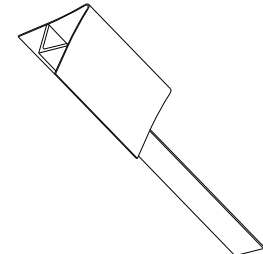
MB (3) - 21

FILE: MB-21.dgn	DN:	CK:	DW:	CK:
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
2/2005	REVISIONS	2520	01	016, ETC
6/2005	11/2009	4/2015		FM 2200
11/2006	1/2011			
	7/2014			
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	159	

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TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: SS, SM, MM	S, M, L, XL, or LA	SS, SM, or MM	Outside Position: S or M Inside Position: S, M, L, or XL
Mailbox Post NIGP #	45057255254 (Galvanized Multiple)	45057561404 (Thin Walled Gavanize)	57044325108 (Wing Channel Post)	45057561107 (Thin walled white powder coated) 45057561057 (Recycled Rubber Post: S or M only)	45057561107 (Thin Walled White Powder Coated)	45057257409 (White Powder Coated Multiple)
Post and Mailbox Hardware NIGP #	45057259009 (Wedge) 45057256500 (V-Wing Socket) 45057253002 (Bracket Extension) 45057252251 (Mailbox Bracket) 45057258001 (Part A Angle Bracket x2) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	80130598701 (Wedge) 80130238407 (Wedge Anchor) 45057253002 (Bracket Extension) 45057252343 (Double MB Bracket) 45057252350 (S. Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	45057541653 (Type 3 Double Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057253002 (Bracket Extension) 45057258001 (Part A Angle Bracket) 45057258027 (Part B Angle Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057252350 (Single Mailbox Bracket) 45057253002 (Bracket Extension) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252343 (Double Mount Bracket) 45057252251 (Mailbox Bracket x2)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252350 (Single Mount Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)
Foundation Used	Class B Concrete (Required for LA Mailboxes)	Class B Concrete (Required for LA Mailboxes)	None	Class B Concrete (not used with recycled rubber post, required for LA Mailboxes)	Class B Concrete (not required)	Class B Concrete

 NIGP: 45057250263 L-Bracket x4 for XL sized mailboxes	 NIGP: 45057252343 Double Mailbox Bracket For Type 2 and Type 4 double mount	 NIGP: 45057252350 Single Mailbox Bracket For Type 2 single and for Type 4 single and multi mount	 NIGP: 45057258001 Part "A" Angle Bracket For Type 1 multi (2 per mailbox) and Type 3 single and double
 NIGP: 45057251055 Type 6 Angle Bracket (2 per mailbox)	 NIGP: 45057252251 Mailbox Bracket For Type 1 multi and any double mount (use 2)	 NIGP: 45057253002 Bracket Extension Use 1 for a medium Mailbox Use 2 for a Large Mailbox	 NIGP: 45057258027 Part "B" Angle Bracket For Type 3 single and double
 NIGP: 80130598701 Wedge for Type 2	 NIGP: 45057250255 Plate Washer for Architecural and XL Mailboxes	 NIGP: 45057541653 Type 3 double mailbox bracket	 NIGP: 55083571053 Type 4 Mailbox Wedge
 NIGP: 55083571004 Type 4 Mailbox Socket	 NIGP: 80130238407 Type 2 Wedge Anchor	 NIGP: 45057259009 Wedge for Type 1 V-wing Socket	 NIGP: 45057256500 V-wing Socket for Type 1 Foundation

NIGP #	OBJECT MARKERS AND CONFORMABLE SHEETING
55008311759	Type 2 OM 4"x4" (3 Needed) for Type 3 Wing Channel Post
55008312906	Type 2 OM 6"x12" (1 needed) for Type 3 Wing Channel Post
80149872006	12" Conformable Reflective Yellow Sheeting for Flexible Posts

NOTES:

- Type 2 object marker in accordance with Traffic Engineering Standard Delineators & Object Markers.
- A light weight receptacle for newspaper delivery can be attached to mailbox posts if the receptacle does not touch the mailbox, present a hazard to traffic or delivery of the mail, extend beyond the front of the mailbox, or display advertising, except the publication title.

BID CODES FOR CONTRACTS
MB-(X) ASSM TY (XXX) (X)

Type of Mailbox _____

S = Single
D = Double
M = Multiple
MP = Molded Plastic


Type of Post _____

WC = Winged Channel Post
RR = Recycled Rubber
TWW = Thin Walled White Tubing
TWG = Thin Walled Galvanized Tubing
TIM = Timber

Type of Foundation _____

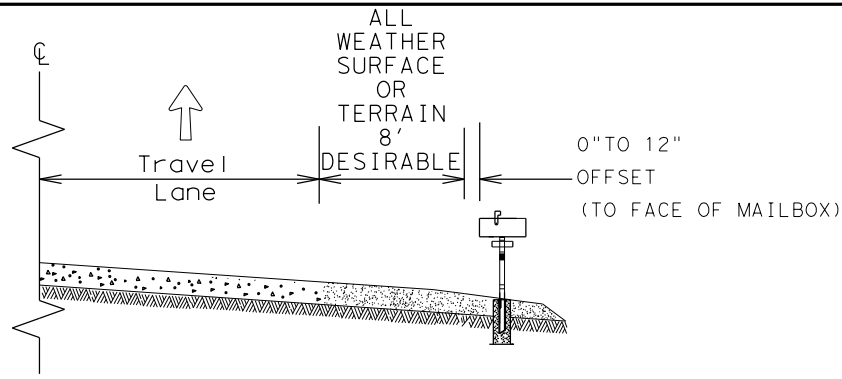
Ty 1 = V-Loc
Ty 2 = Wedge Anchor Steel System
Ty 3 = Winged Channel post
Ty 4 = Wedge Anchor Plastic System
Ty 5 = 4 X 4 Post

SHEET 4 OF 4

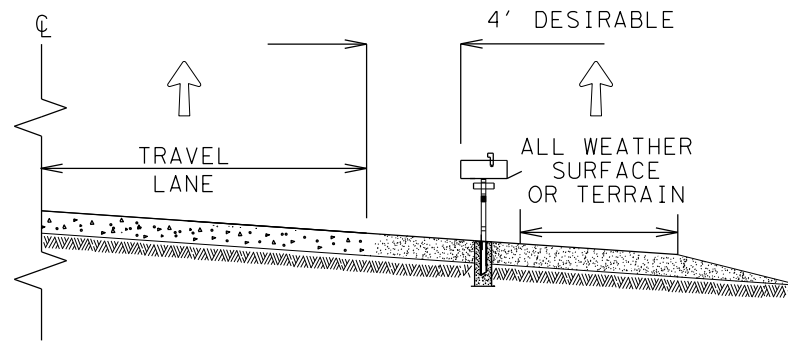
 Texas Department of Transportation		Maintenance Division Standard	
<h2 style="margin: 0;">NIGP PARTS LIST AND COMPATIBILITY</h2> <h3 style="margin: 0;">MB(4)-21</h3>			
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© TxDOT March 2004	CONT	SECT	JOB
2/2005	6/2005	11/2009	1/2011
4/2015	2520	01	016, ETC
REVISIONS	COUNT		HIGHWAY
	DIST		COUNTY
	SAT		SHEET NO.
			160

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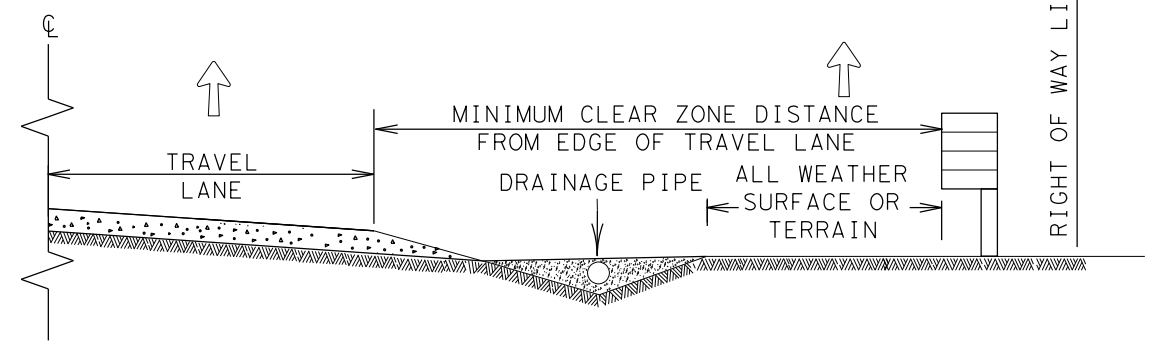
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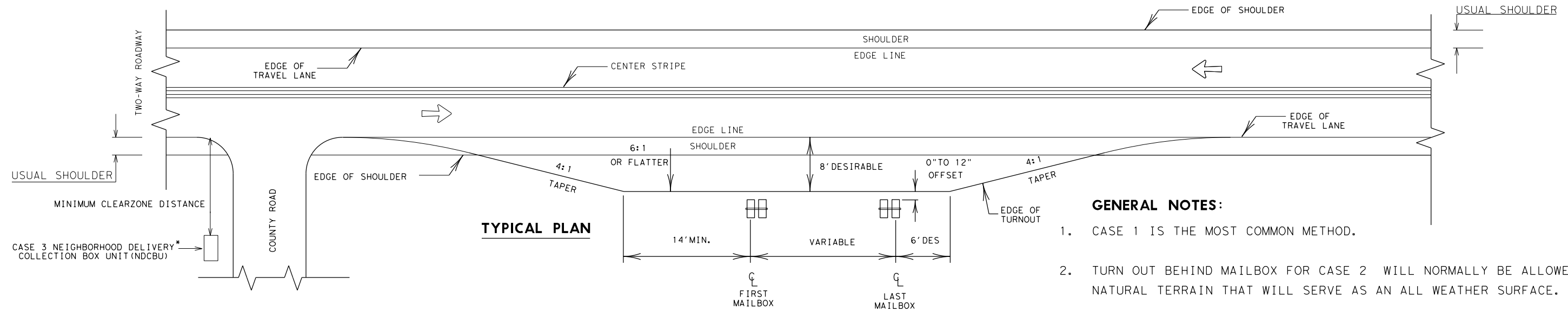
CASE 1. OFF TRAVEL WAY DELIVERY



CASE 2. BACK SIDE DELIVERY



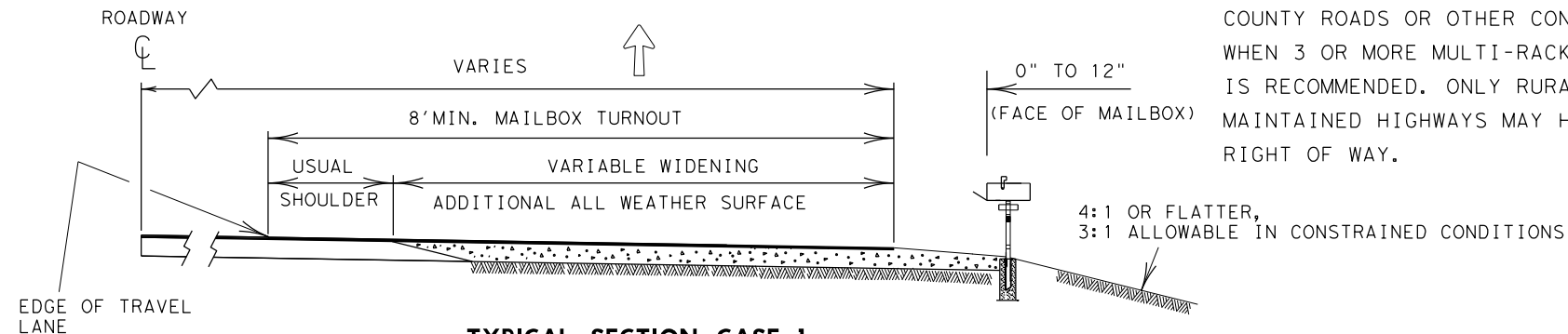
CASE 3. DELIVERY NEAR RIGHT OF WAY LINE



TYPICAL PLAN

GENERAL NOTES:

1. CASE 1 IS THE MOST COMMON METHOD.
2. TURN OUT BEHIND MAILBOX FOR CASE 2 WILL NORMALLY BE ALLOWED FOR NATURAL TERRAIN THAT WILL SERVE AS AN ALL WEATHER SURFACE.
3. ALL WEATHER DRIVEWAYS FOR CASE 3 MAILBOXES LOCATED AT THE RIGHT OF WAY LINE SHOULD NORMALLY BE PLACED IN CONJUNCTION WITH COUNTY ROADS OR OTHER CONNECTING COMMUNITY ROADS OR STREETS. WHEN 3 OR MORE MULTI-RACKS ARE ANTICIPATED, THE USE OF AN NDCBU IS RECOMMENDED. ONLY RURAL PATRONS LOCATED ON STATE MAINTAINED HIGHWAYS MAY HAVE A MAILBOX OR NDCBU SLOT ON TxDOT RIGHT OF WAY.



TYPICAL SECTION CASE 1

SHEET 1 OF 2



Guideline
MAILBOX SIDE ROAD PLACEMENT AND TURNOUTS

MBP(1)-22

FILE: MBP-22.DGN	DN: VS	CK:	DW: VS	CK:
© TxDOT OCTOBER 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
12/2012 5/2014	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	161	

* NDCBU MAY BE INSTALLED ON COUNTY ROAD ROW WITH APPROVAL OF COUNTY.

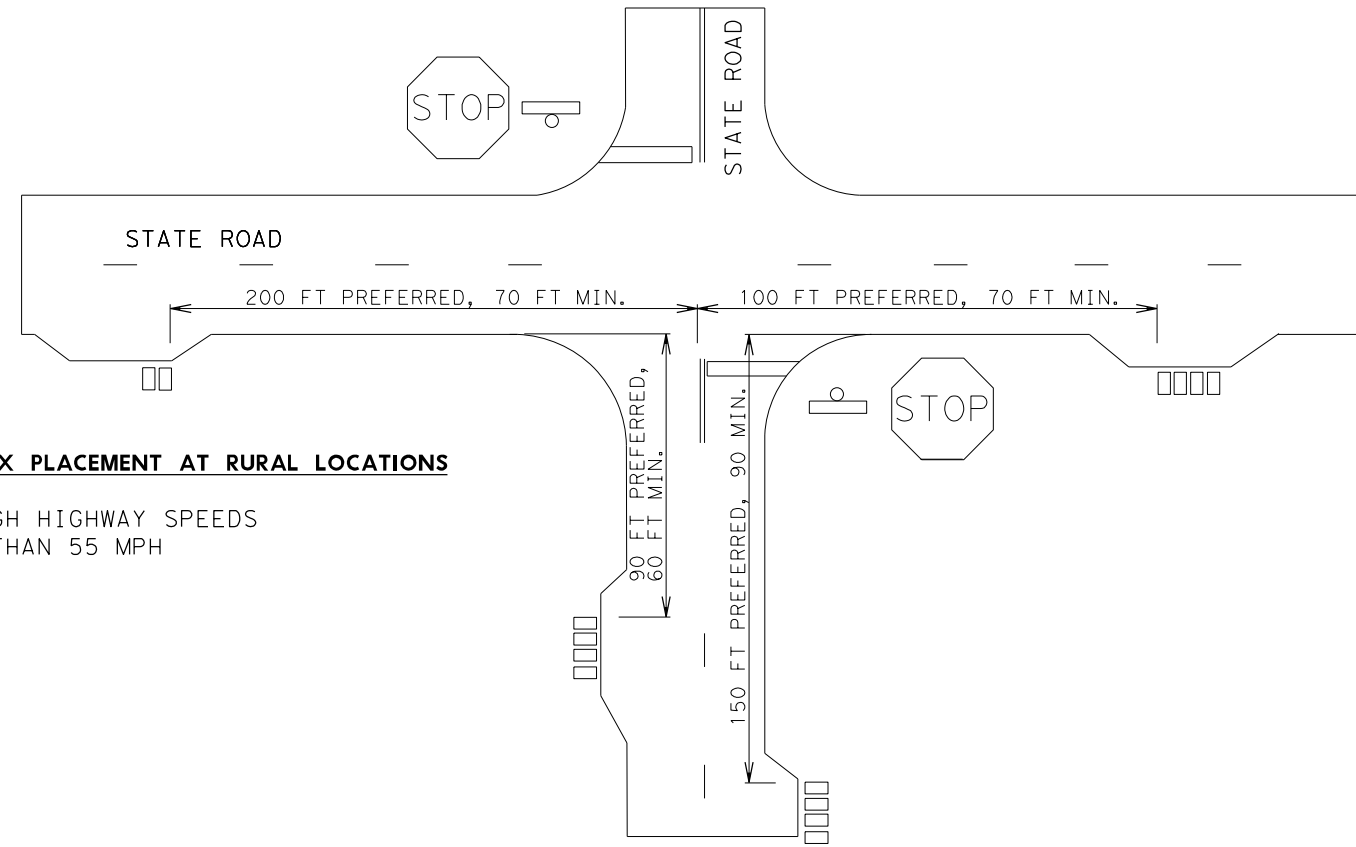
↑ MAIL DELIVERY VEHICLE TRAVEL DIRECTION

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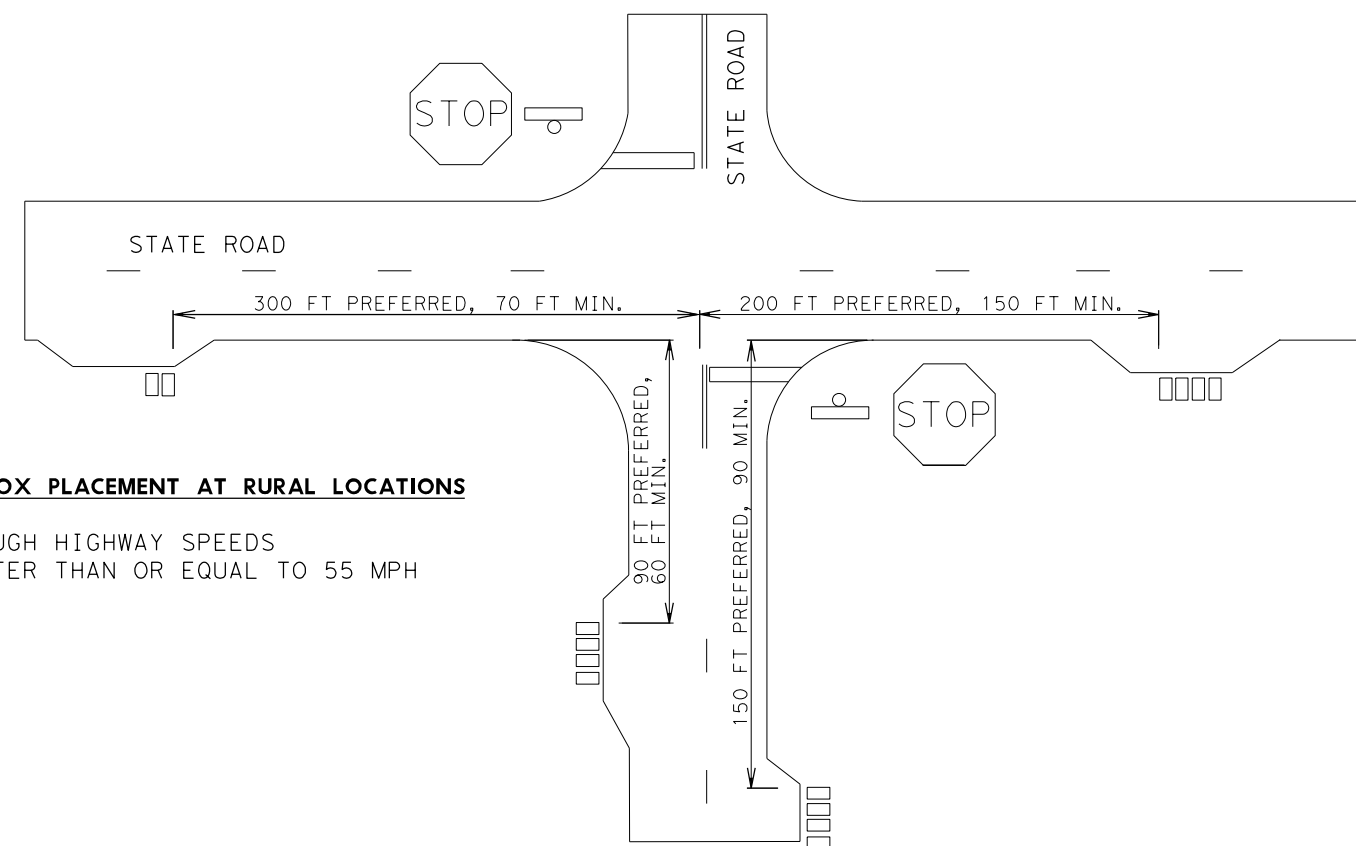
MAILBOX PLACEMENT AT RURAL LOCATIONS

THROUGH HIGHWAY SPEEDS
 LESS THAN 55 MPH

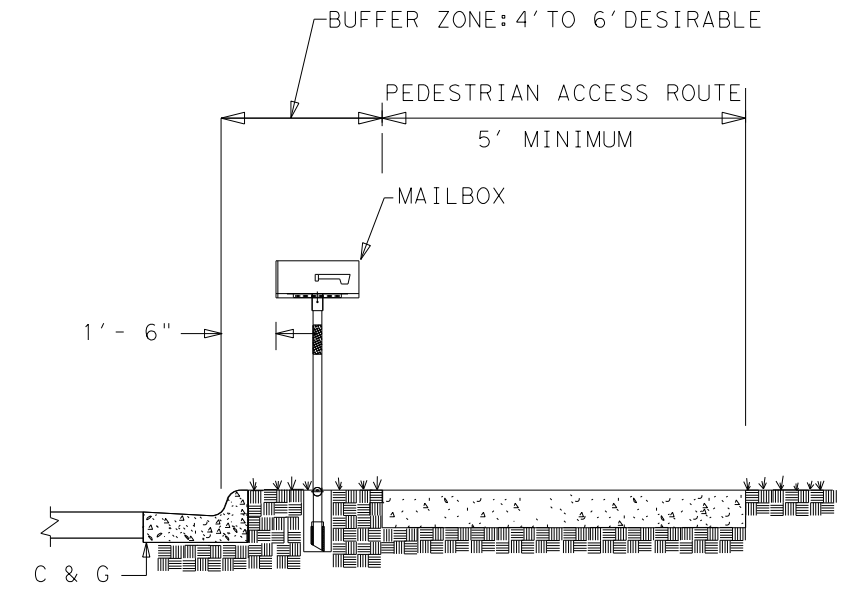


MAILBOX PLACEMENT AT RURAL LOCATIONS

THROUGH HIGHWAY SPEEDS
 GREATER THAN OR EQUAL TO 55 MPH



CURB AND GUTTER MAILBOX INSTALLATION



NOTES:

1. A NON-TRAVERSABLE SURFACE MUST BE INSTALLED NEAR THE MAILBOX (NATURAL VEGETATION OR OTHER) IN THE BUFFER ZONE. ALTERNATIVELY, A BASE WITH A MINIMUM HEIGHT OF 2.5 INCHES MAY BE INSTALLED SO THAT THE EDGE OF THE MAILBOX DOES NOT EXTEND OUT MORE THAN 4 INCHES HORIZONTALLY BEYOND THE BASE.
2. THE SIDEWALK WIDTH MAY BE REDUCED TO 4 FOOT FOR SHORT DISTANCES AROUND THE MAILBOX IF NEEDED.
3. MAINTAIN A MINIMUM OF 5 FEET BETWEEN OBSTRUCTIONS IN THE PEDESTRIAN ACCESS ROUTE.

SHEET 2 OF 2



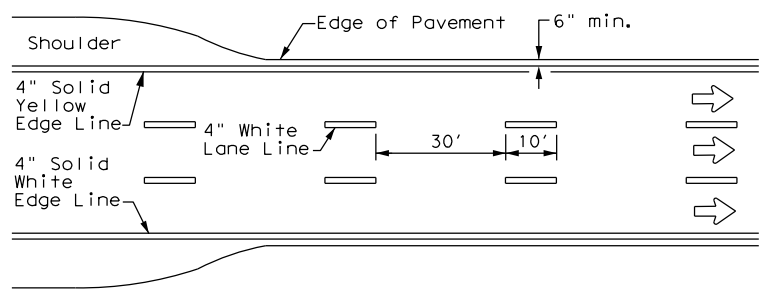
**MAILBOX PLACEMENT
 CURBS & INTERSECTIONS**

MBP(2)-22

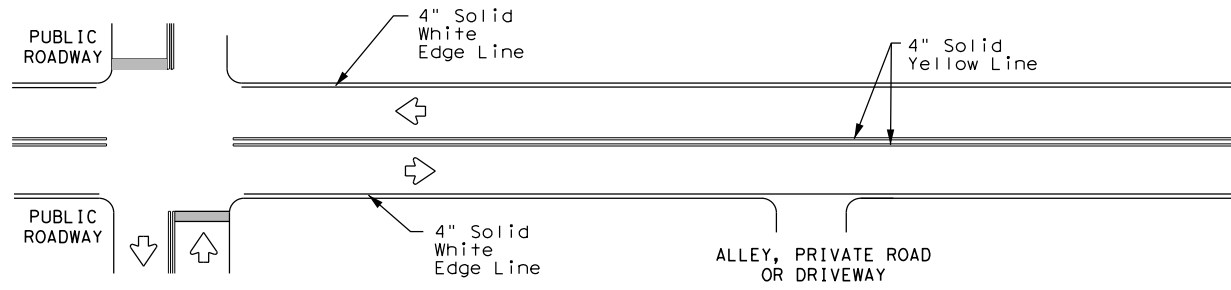
FILE: MBP-22.DGN	DN: VS	CK:	DW: VS	CK:
© TxDOT OCTOBER 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
12/2012	DIST	COUNTY	SHEET NO.	
5/2014	SAT	MEDINA	162	

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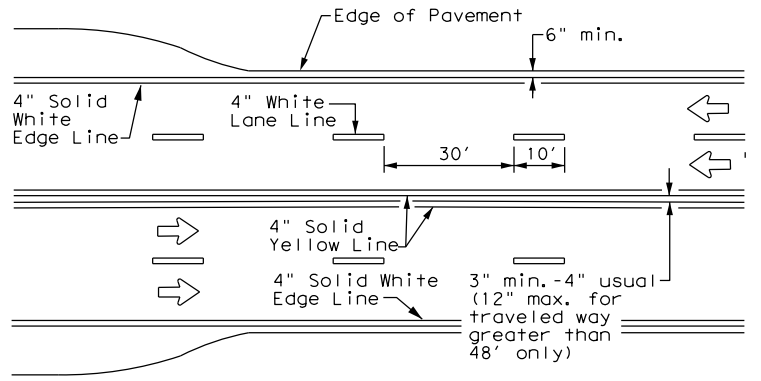
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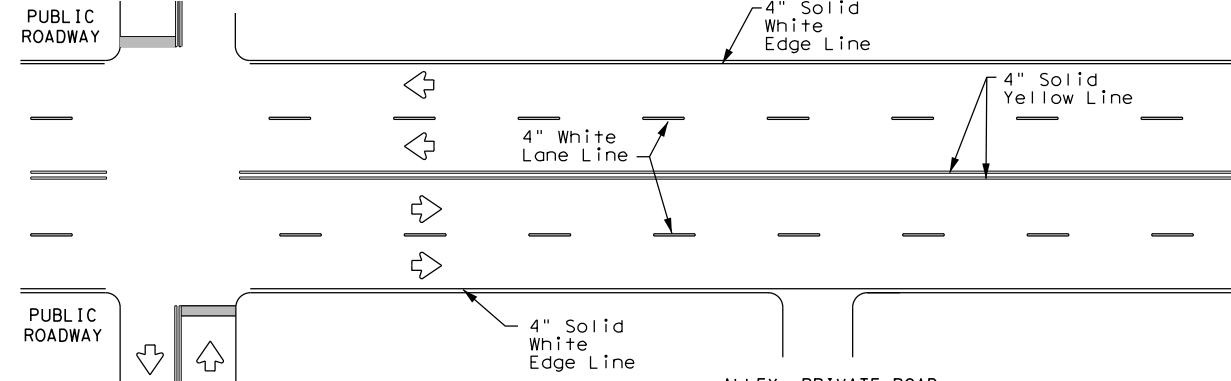
EDGE LINE AND LANE LINES
 ONE-WAY ROADWAY
 WITH OR WITHOUT SHOULDERS



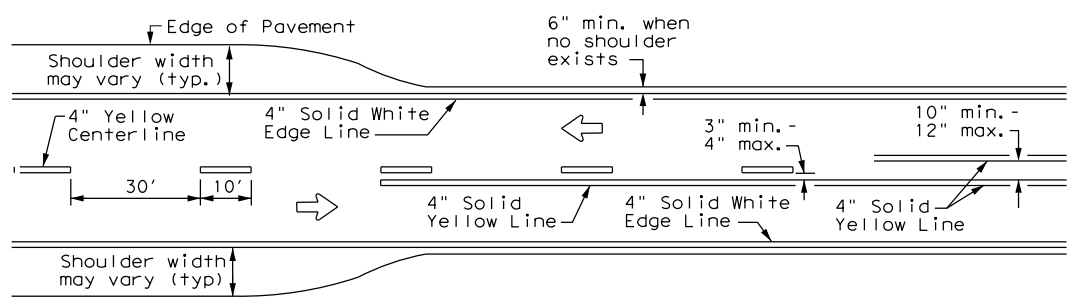
TYPICAL TWO-LANE, TWO-WAY PAVEMENT
 MARKINGS THROUGH INTERSECTIONS



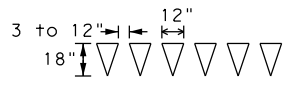
CENTERLINE AND LANE LINES
 FOUR LANE TWO-WAY ROADWAY
 WITH OR WITHOUT SHOULDERS



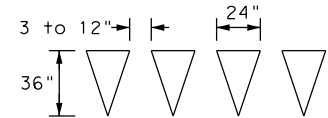
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
 MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY
 WITH OR WITHOUT SHOULDERS

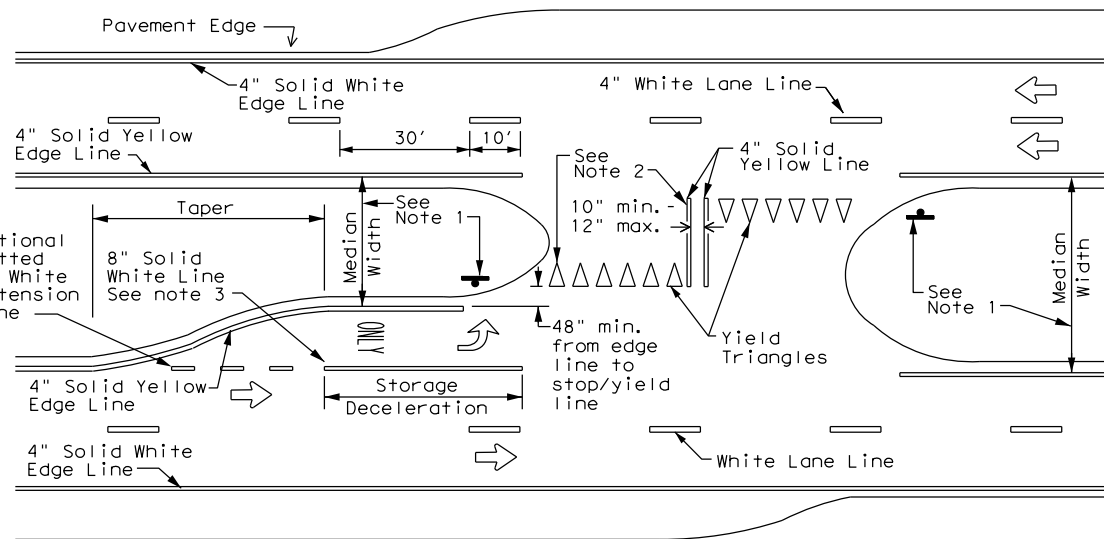


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

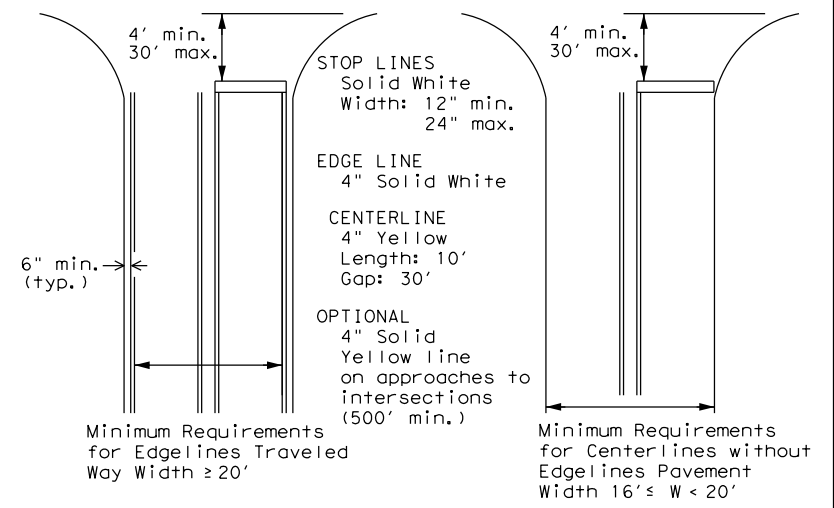
- Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.
- Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield triangles shall only be used with yield signs.
- Length of turn bays, including taper, deceleration, and storage lengths shall be as shown in the plans or as directed by the Engineer.

GENERAL NOTES

- Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
- The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

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

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



GUIDE FOR PLACEMENT OF STOP LINES,
 EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways



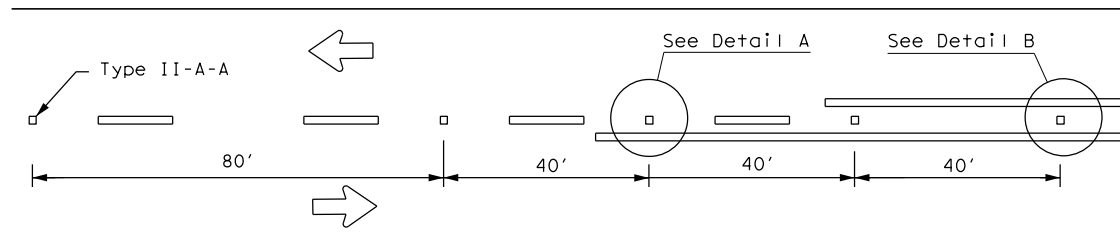
TYPICAL STANDARD
 PAVEMENT MARKINGS

PM(1)-20

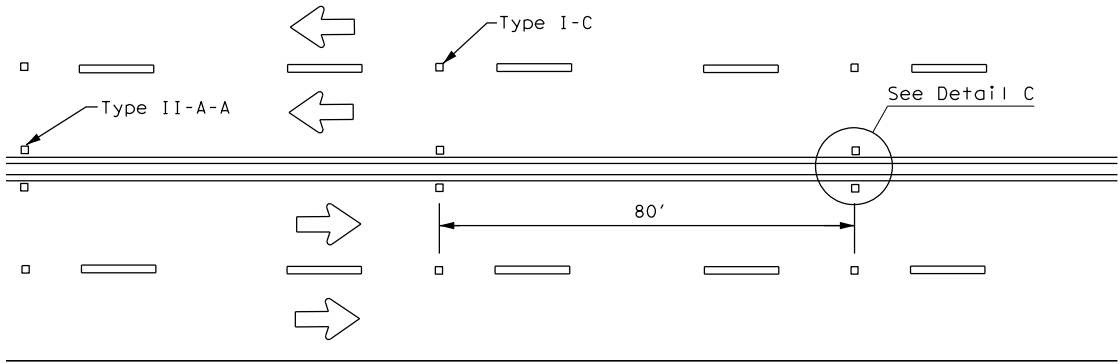
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© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
8-95 3-03 REVISIONS	2520	01	016, ETC	FM 2200
5-00 2-12	DIST	COUNTY	SHEET NO.	
8-00 6-20	SAT	MEDINA	163	

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

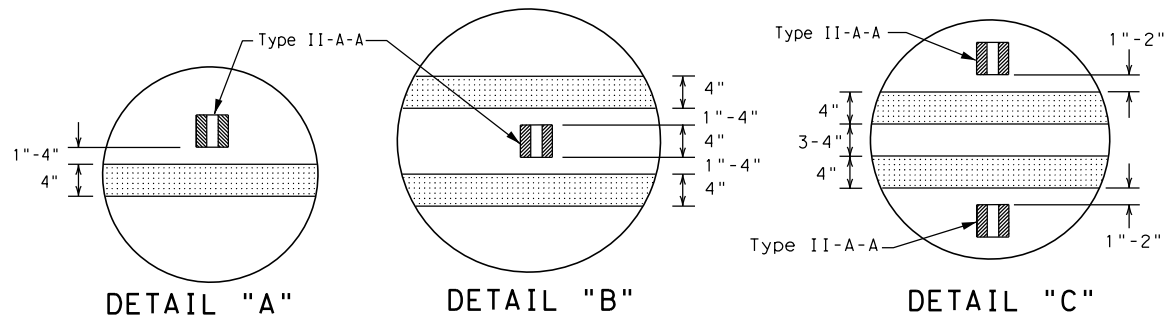
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.
 DATE: 12/20/2022 3:36:23 PM
 FILE: P:\11799\04\Design\Civil\Standards\PavementMarkers\pm2-20.dgn



CENTERLINE FOR ALL TWO LANE ROADWAYS



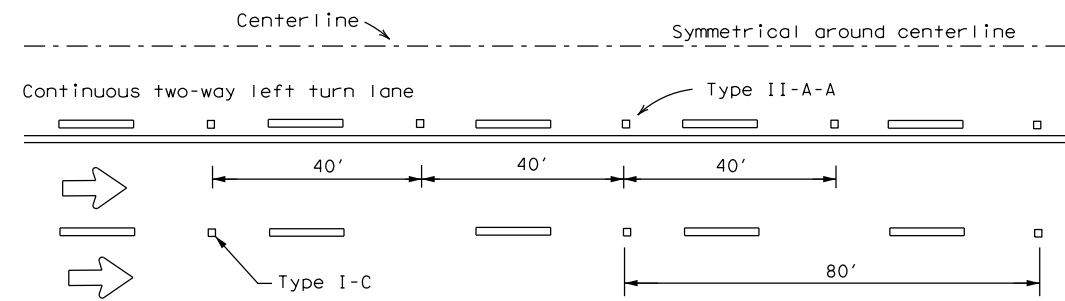
CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY HIGHWAYS



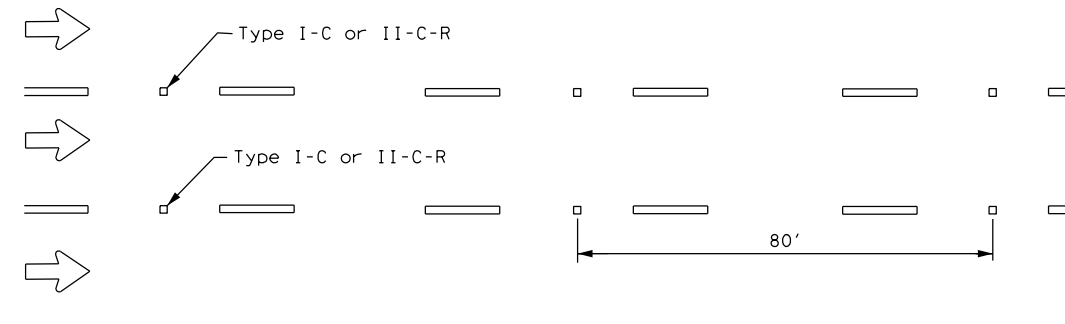
DETAIL "A"

DETAIL "B"

DETAIL "C"



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

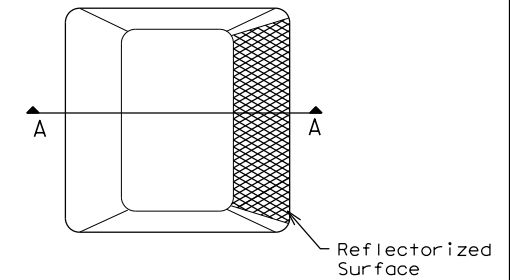


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

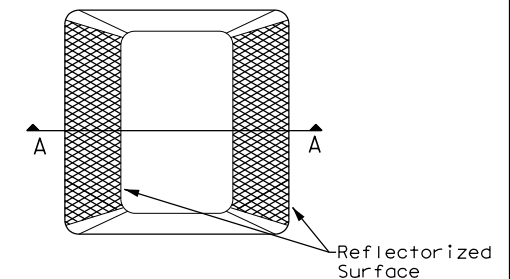
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

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

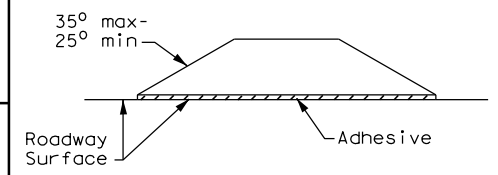
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

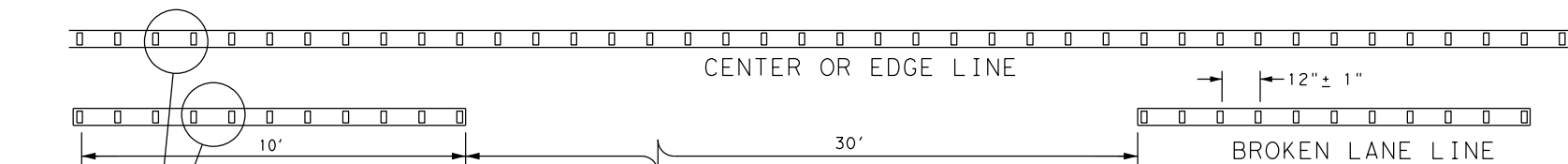


POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS PM(2) - 20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
4-92 2-10	2520	01	016, ETC	FM 2200
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	SAT	MEDINA		164

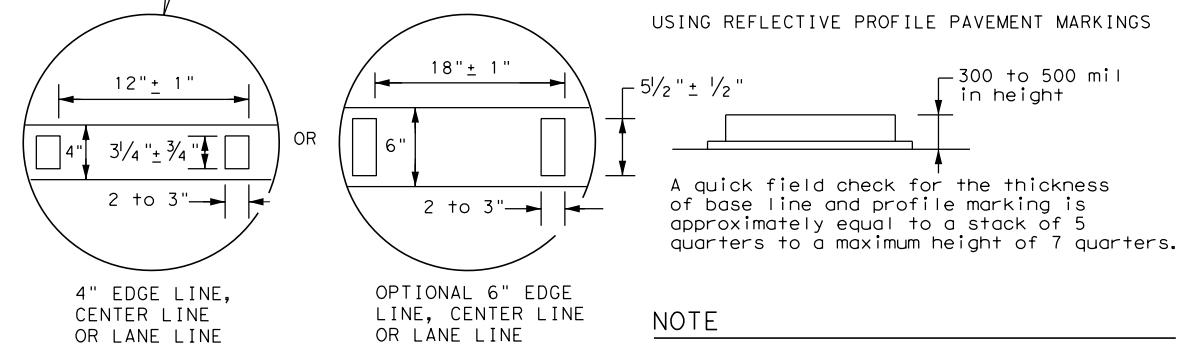
GENERAL NOTES

- All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
- On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

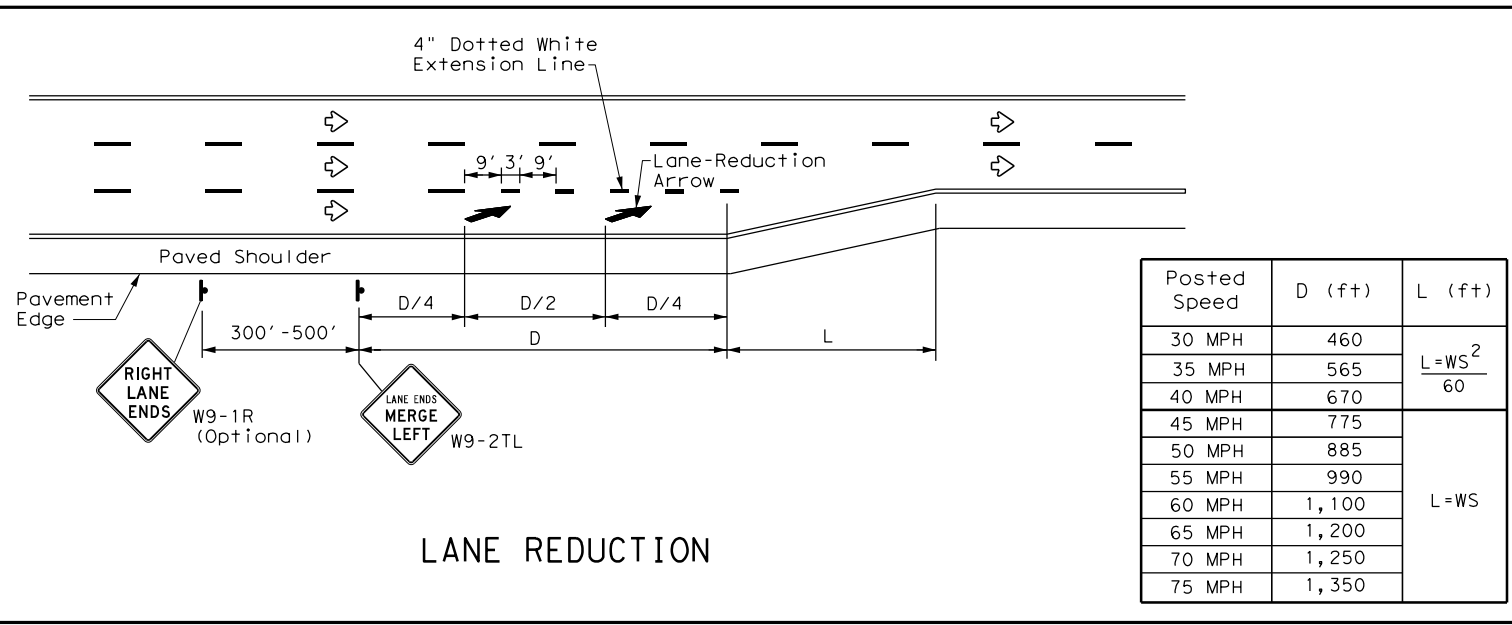


NOTE

Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

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DATE: 12/20/2022 3:36:25 PM
 FILE: P:\117\99\04\Des\gn\C:\I:\Standards\PavementMarkers\pm3-20.dgn



Posted Speed	D (ft)	L (ft)
30 MPH	460	$L = \frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	L = WS
45 MPH	775	
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

LANE REDUCTION

NOTES

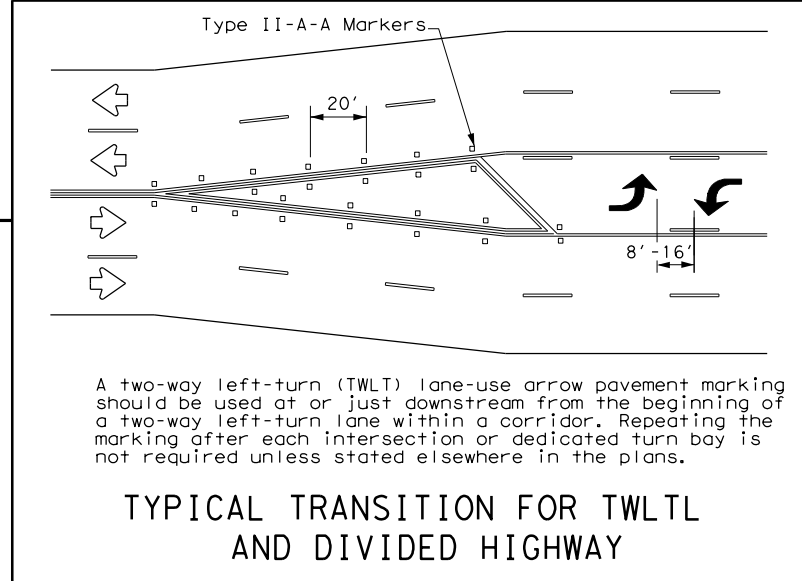
- Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
- On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
- 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.
- For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

GENERAL NOTES

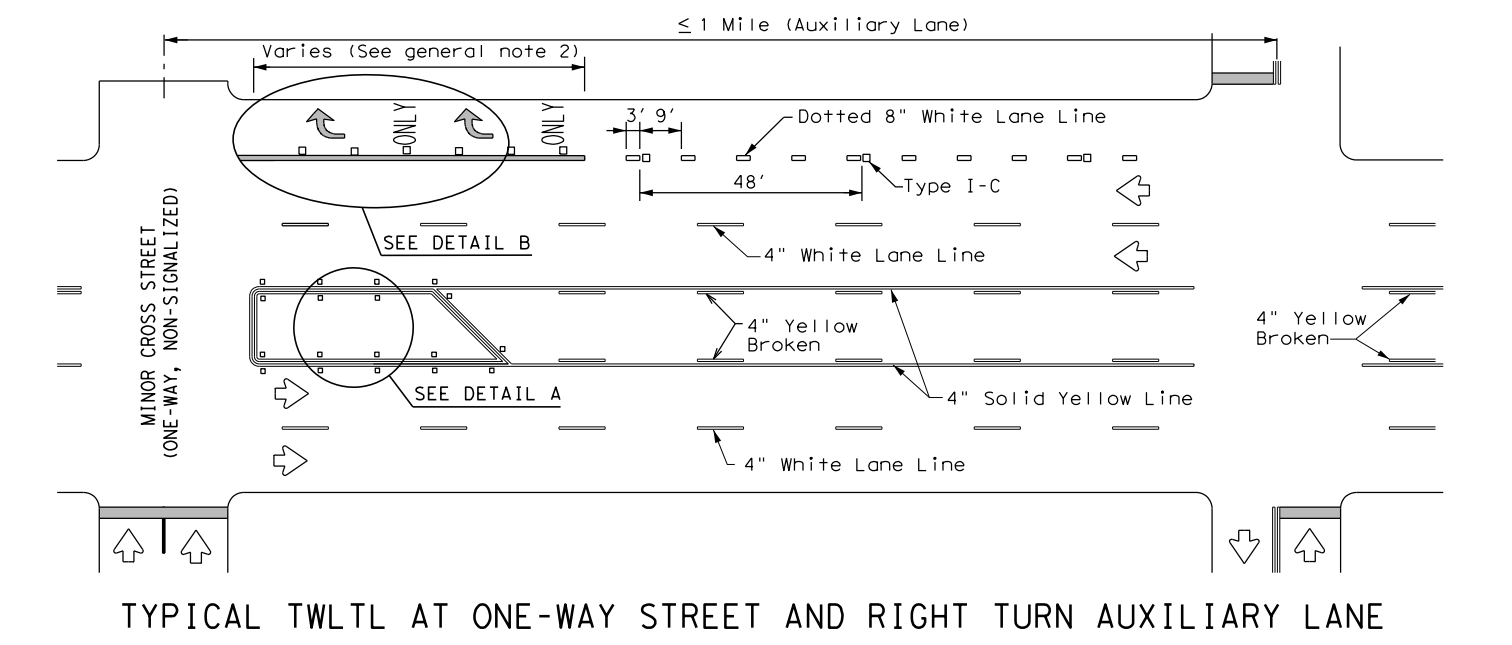
- Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
- 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.
- 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.
- Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

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

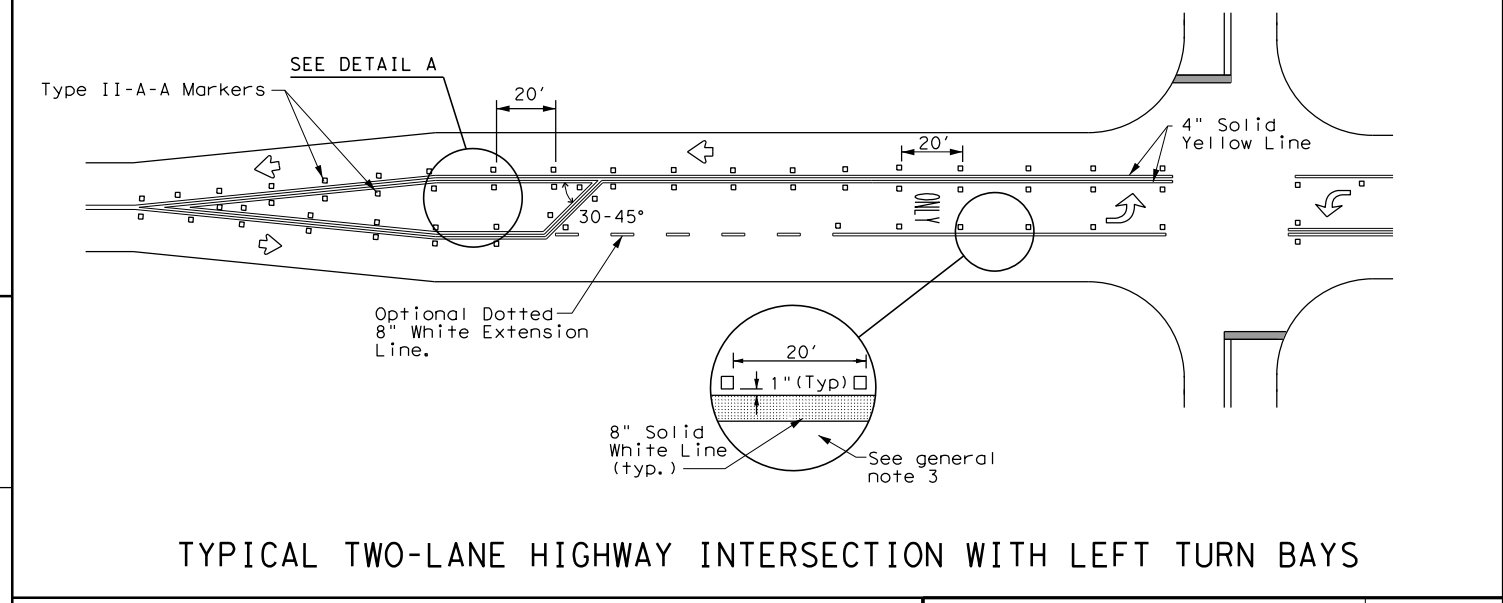
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



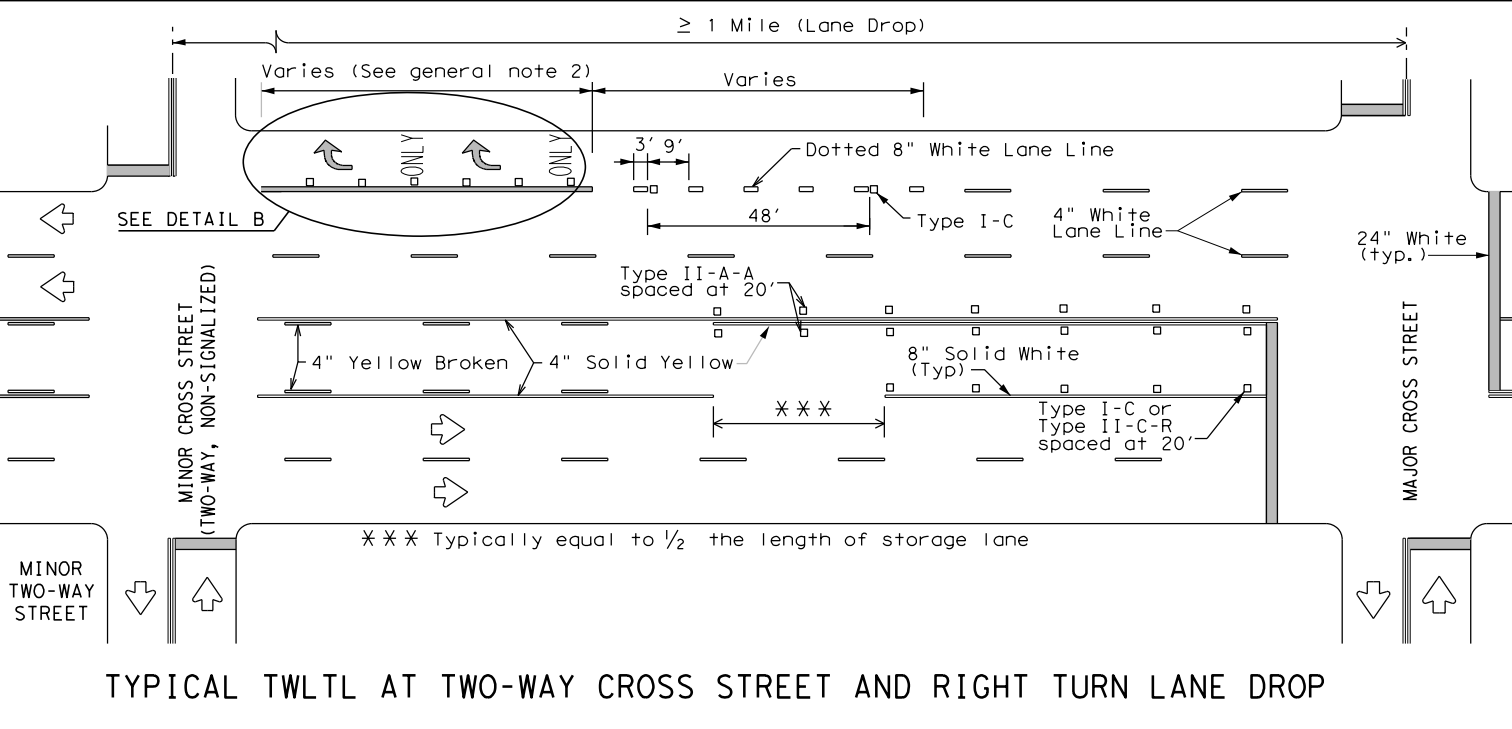
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY



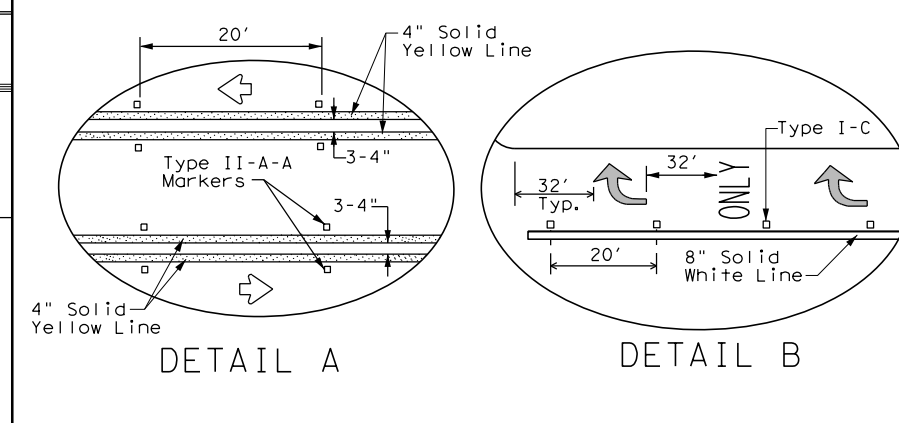
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



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



DETAIL A

DETAIL B

Texas Department of Transportation Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3) - 20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1998	CON:	SECT:	JOB:	HIGHWAY:
REVISIONS	2520	01	016, ETC	FM 2200
5-00 2-10	DIST:	COUNTY:	SHEET NO.:	
8-00 2-12	SAT	MEDINA	165	
3-03 6-20				

22C

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

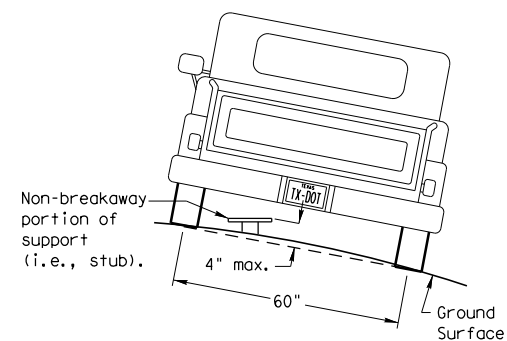
Post Type _____
 FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
 TWT = Thin-Walled Tubing (see SMD(TWT))
 10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
 S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2) _____

Anchor Type _____
 UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
 UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
 WS = Wedge Anchor Steel - (see SMD(TWT))
 WP = Wedge Anchor Plastic (see SMD(TWT))
 SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
 SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation
 P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
 T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
 U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
 IF REQUIRED
 1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
 BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
 WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
 EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

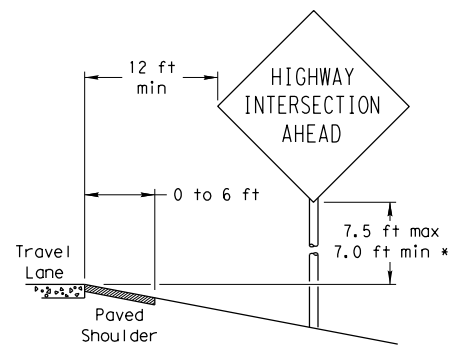
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

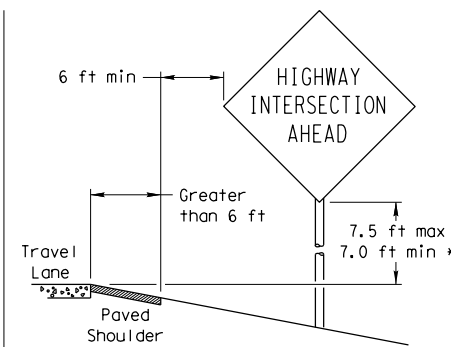
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

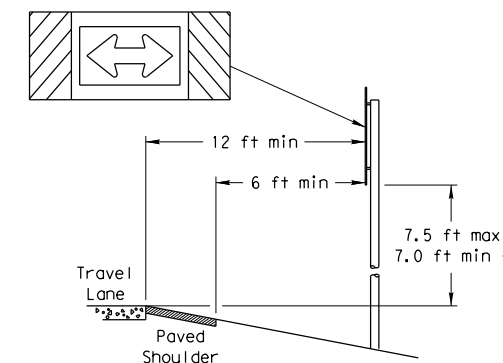
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



GREATER THAN 6 FT. WIDE

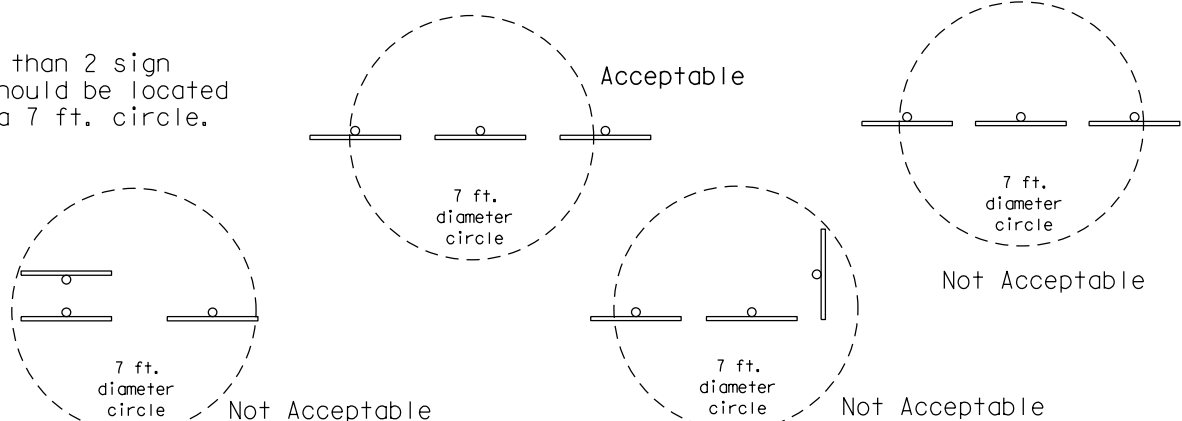
When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

T-INTERSECTION

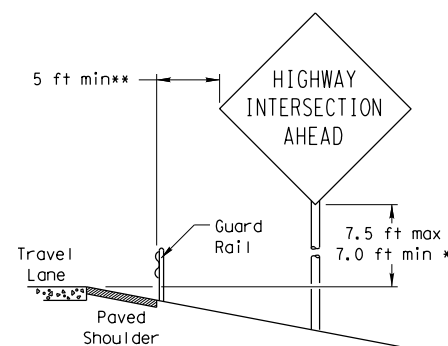


When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.

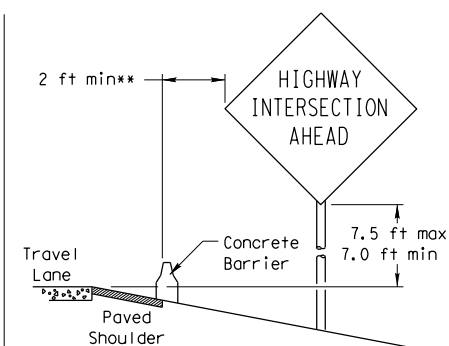
No more than 2 sign posts should be located within a 7 ft. circle.



BEHIND BARRIER

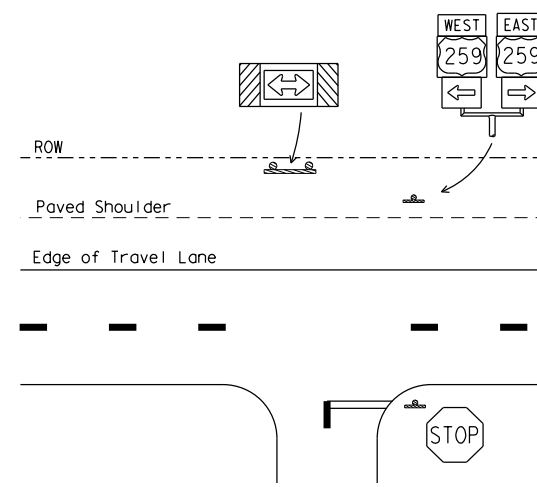


BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

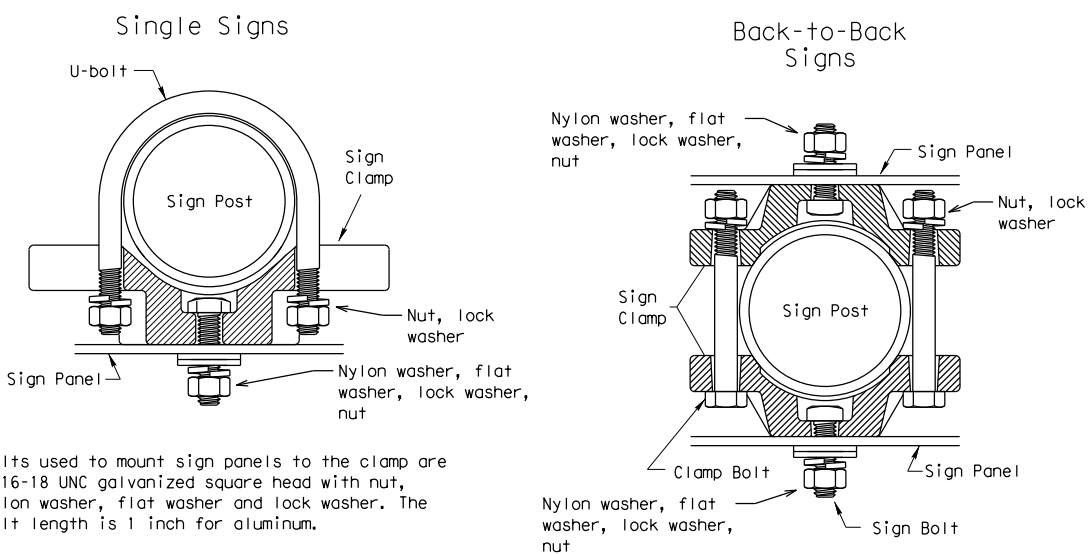
- (1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or
- (2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
<http://www.txdot.gov/publications/traffic.htm>

TYPICAL SIGN ATTACHMENT DETAIL



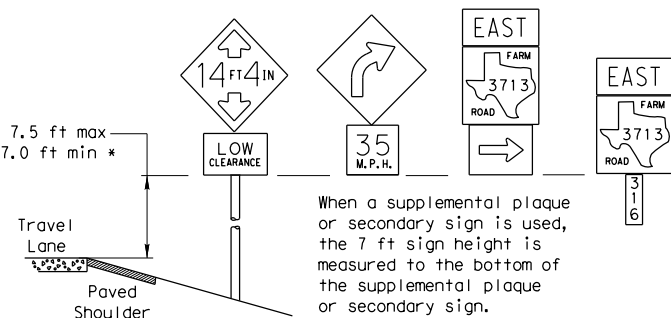
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

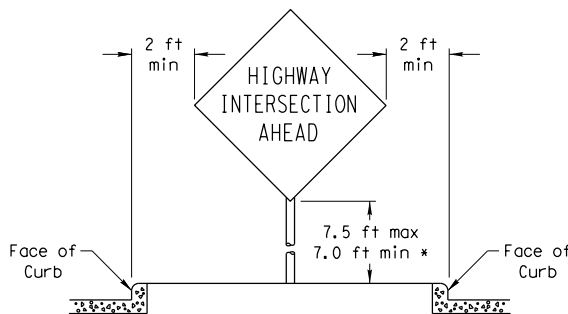
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES

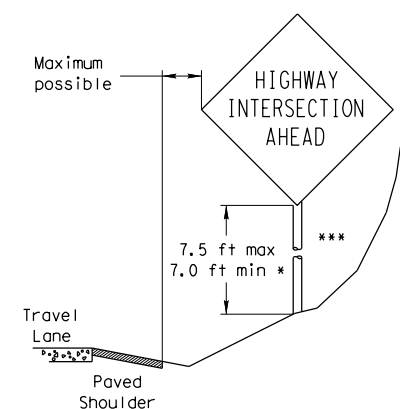


When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY (When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.



SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

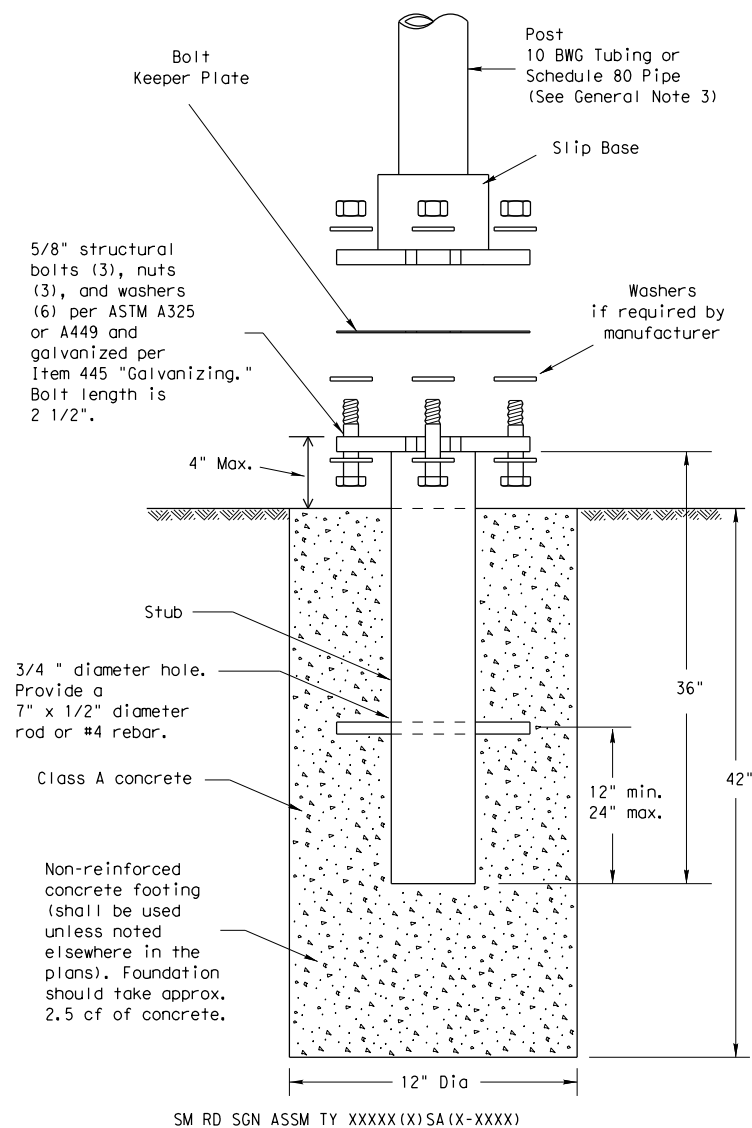
SMD(GEN)-08

© TxDOT July 2002	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	REVISIONS	CONT	SECT	JOB
		2520	01	016, ETC
		DIST	COUNTY	FM 2200
		SAT	MEDINA	SHEET NO. 166

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TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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:

- 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.
- 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
- 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>
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

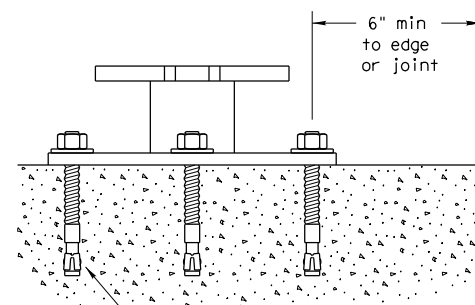
Foundation

- 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.
- 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.
- 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.
- Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
- The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support

- 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.
- 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



5/8" diameter Concrete Anchor - 8 places (embed a minimum of 5 1/2" and torque to min. of 50 ft-lbs). Anchor may be expansion or adhesive type.

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, "Epoxyes 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

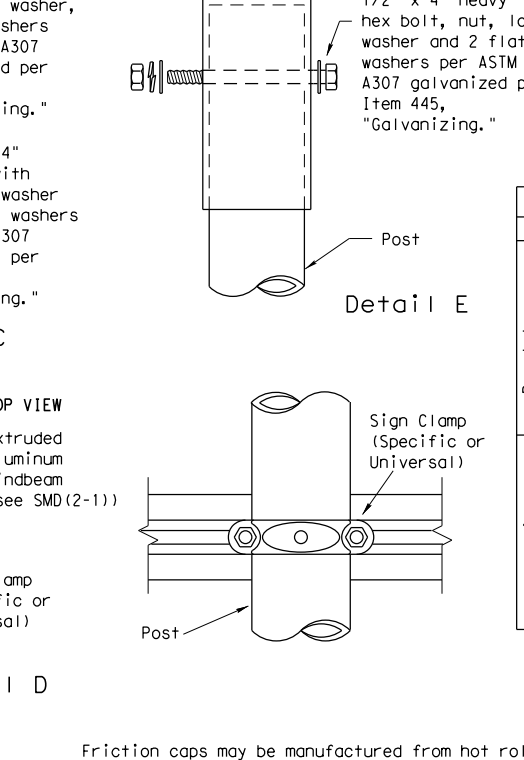
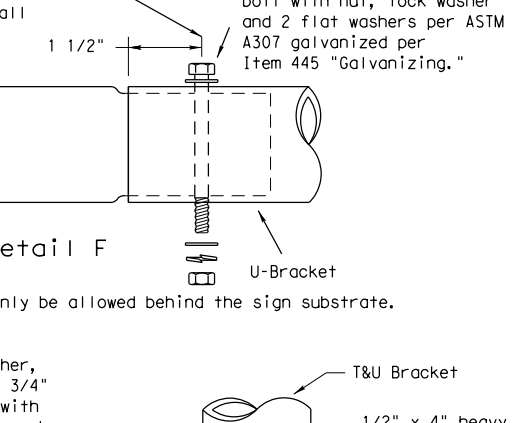
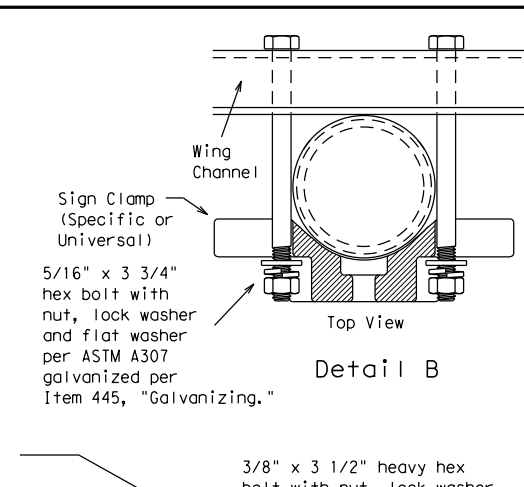
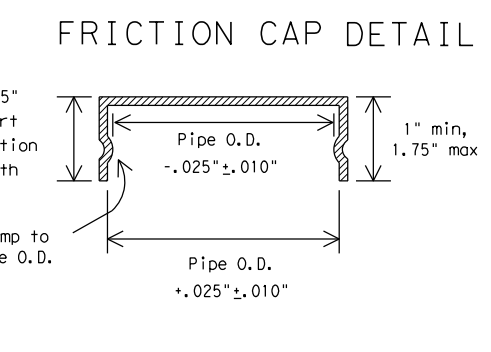
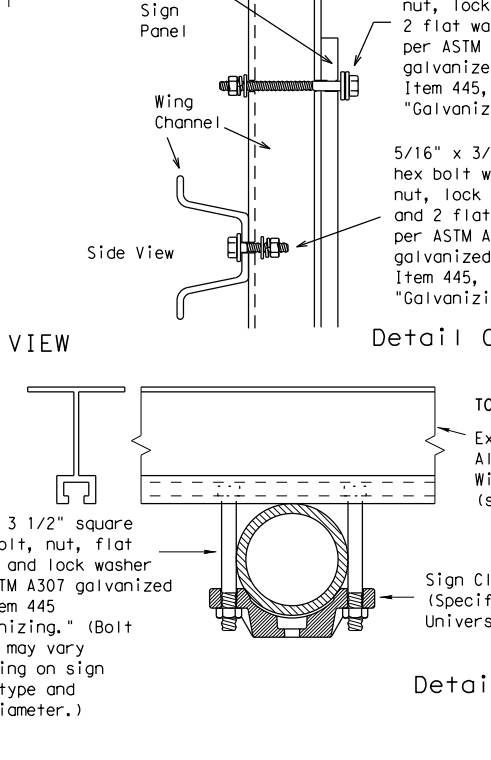
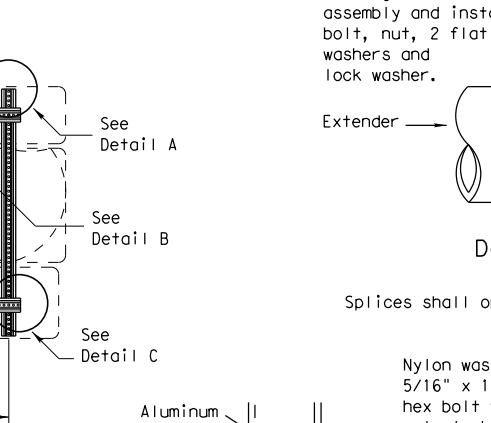
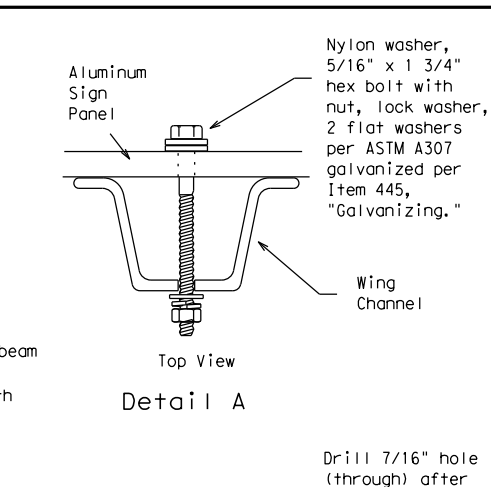
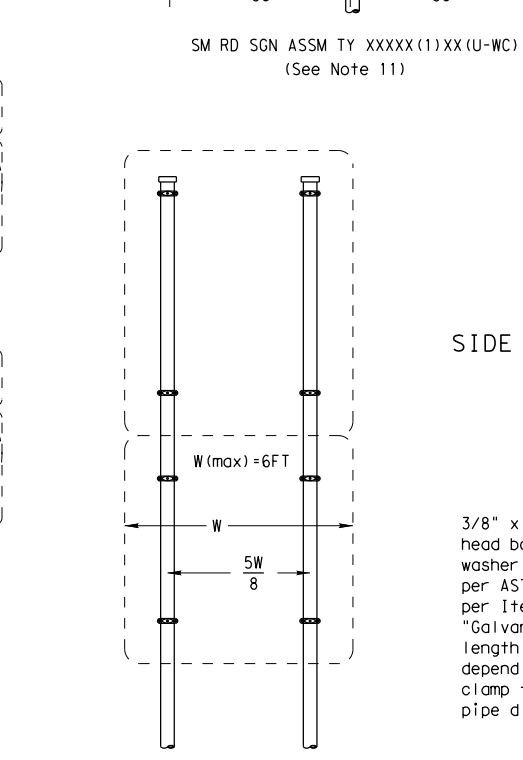
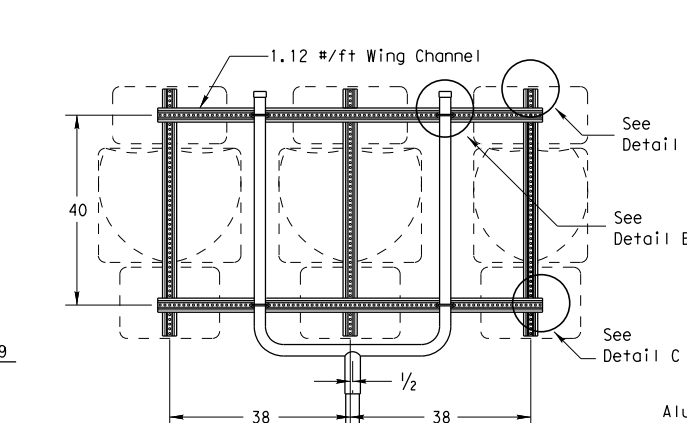
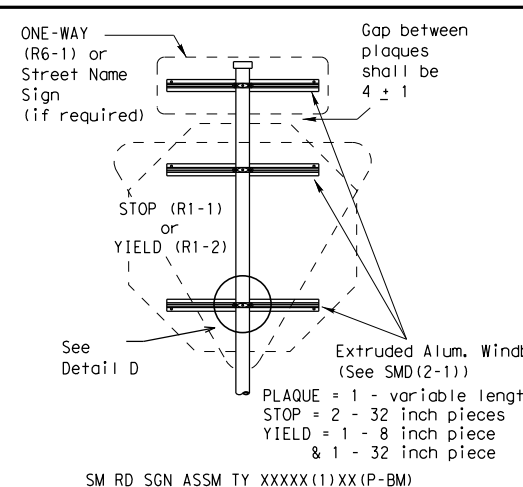
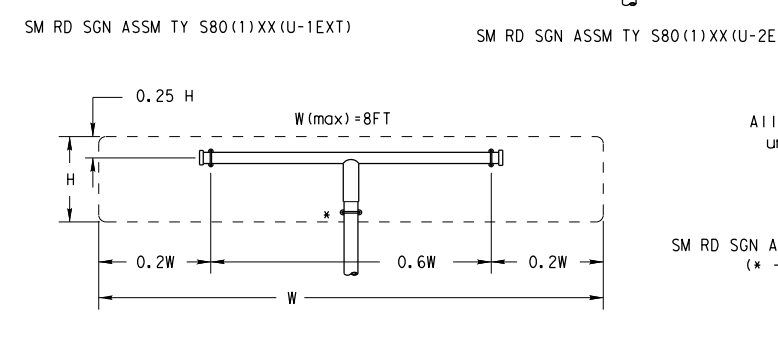
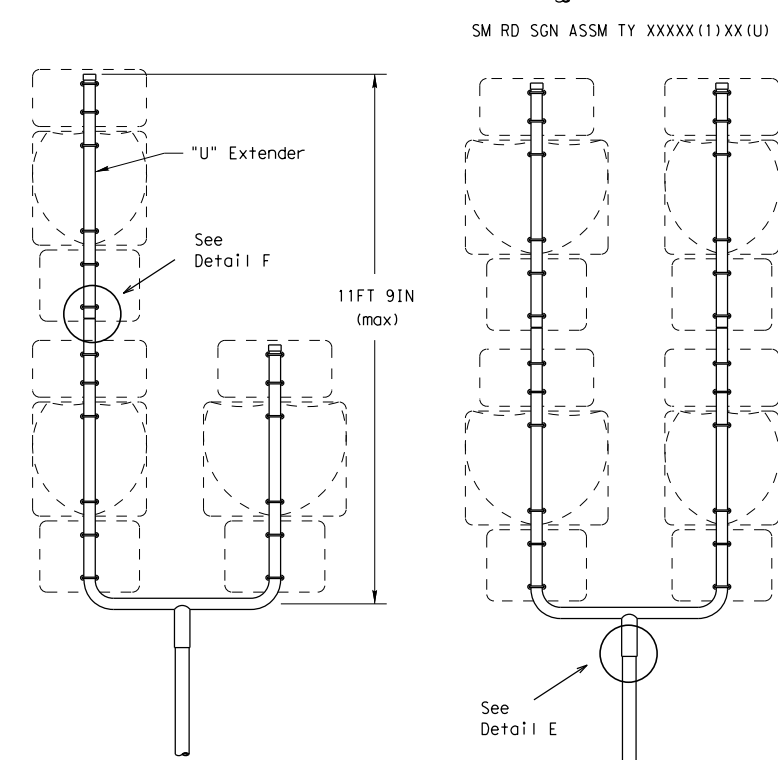
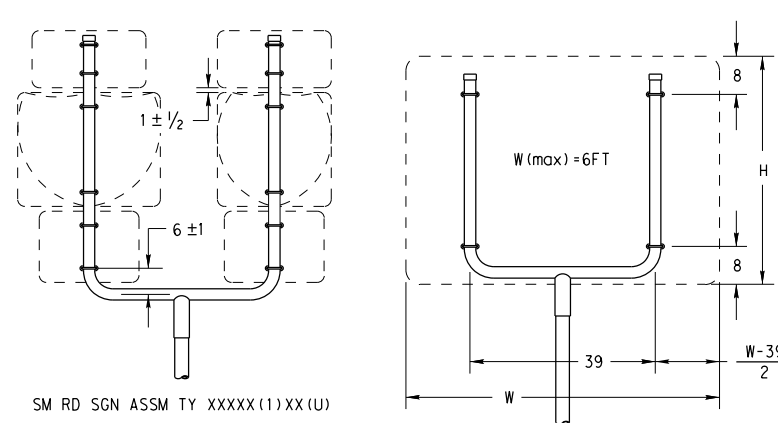
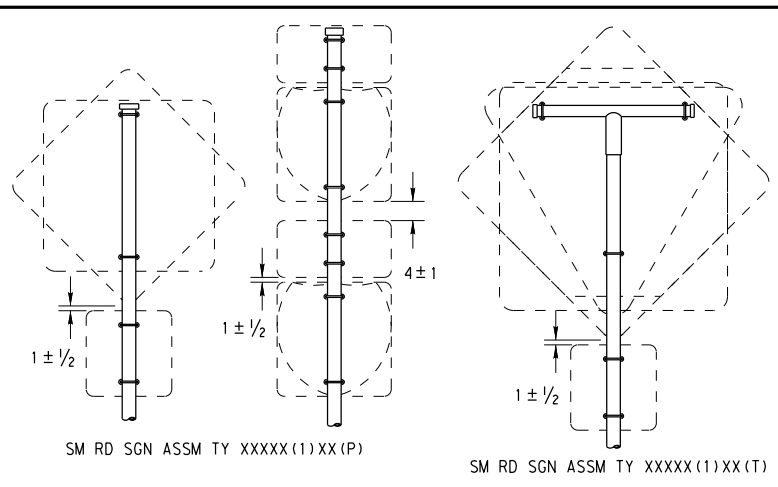
SIGN MOUNTING DETAILS
 SMALL ROADSIDE SIGNS
 TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

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	2520	01	016, ETC		FM 2200
	DIST		COUNTY		SHEET NO.
SAT		MEDINA		167	

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- GENERAL NOTES:
1. SIGN SUPPORT # OF POSTS MAX. SIGN AREA

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF
 2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
 3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
 4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
 5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
 6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
 7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
 8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
 9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
 10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
 11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
 12. Post open ends shall be fitted with Friction Caps.
 13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT		
SIGN DESCRIPTION	SUPPORT	
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
Warning	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	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)	

All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXX(1)XX(T) (* - See Note 12)

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.

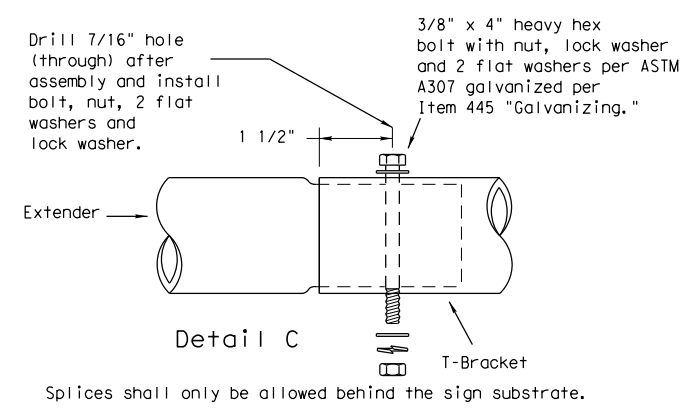
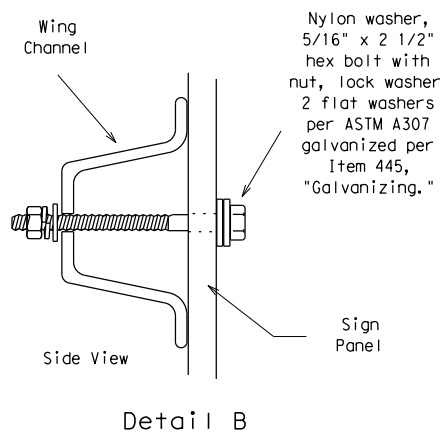
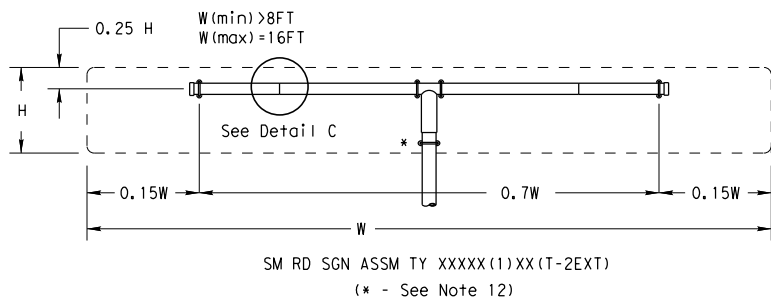
Texas Department of Transportation
 Traffic Operations Division

SIGN MOUNTING DETAILS
 SMALL ROADSIDE SIGNS
 TRIANGULAR SLIPBASE SYSTEM
 SMD(SLIP-2)-08

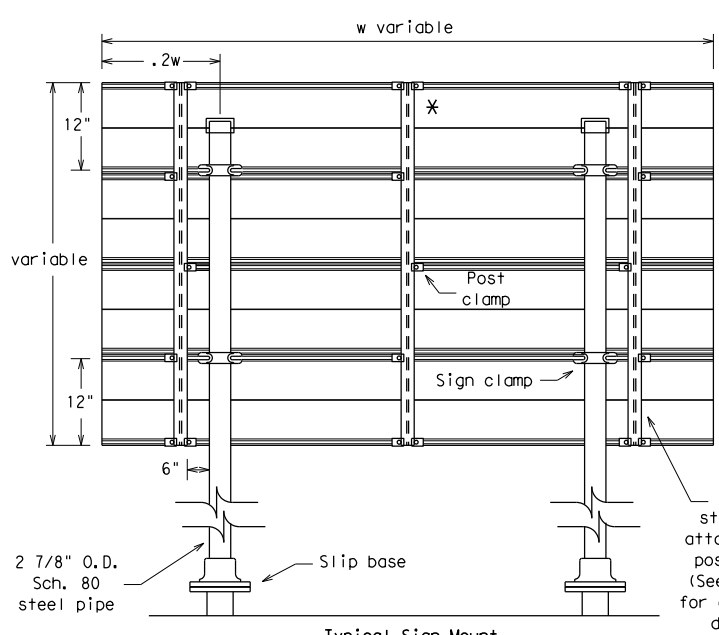
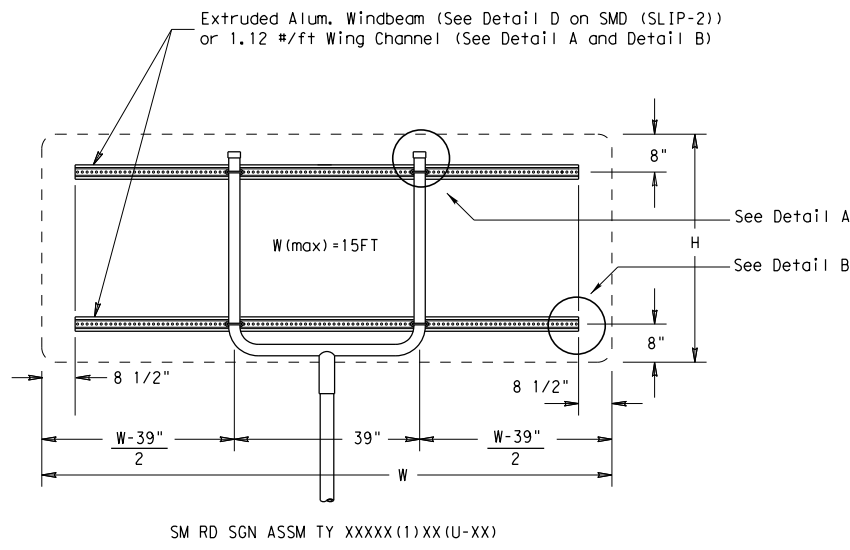
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		DIST	COUNTY	FM 2200
		SAT	MEDINA	SHEET NO. 168

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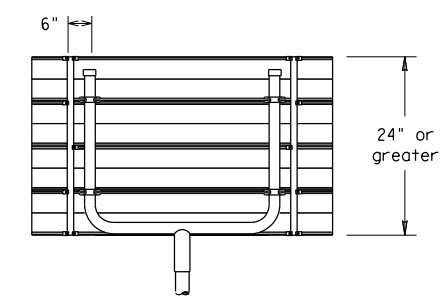
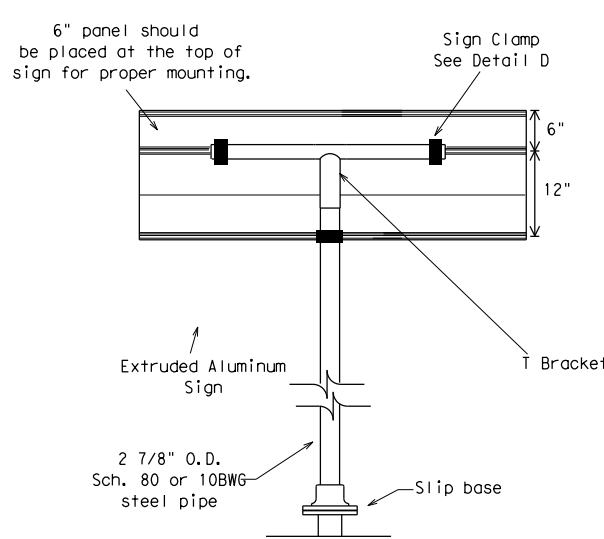
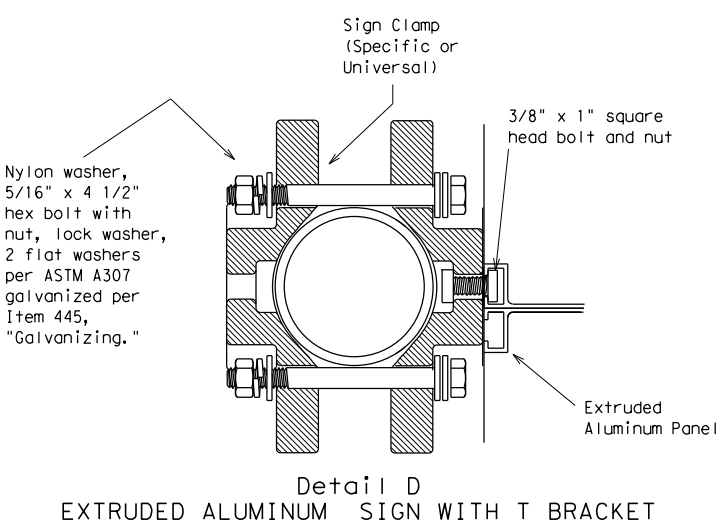
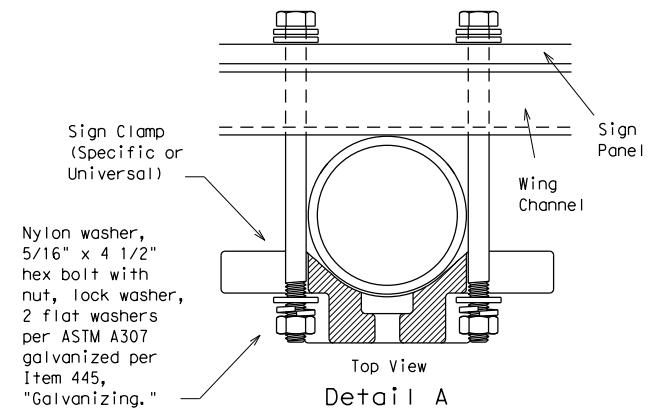
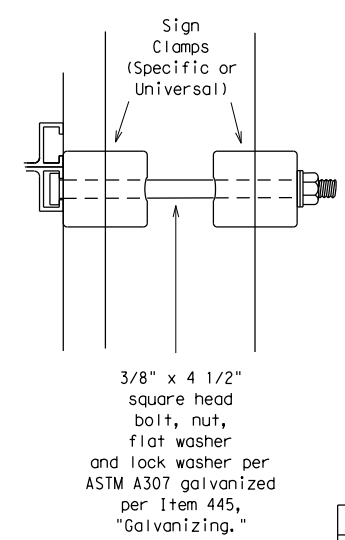
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Splices shall only be allowed behind the sign substrate.



* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.



Use Extruded Alum. Windbeam as stiffeners See SMD (2-1) for additional details
 See Detail E for clamp installation

GENERAL NOTES:

- | SIGN SUPPORT | # OF POSTS | MAX. SIGN AREA |
|--------------|------------|----------------|
| 10 BWG | 1 | 16 SF |
| 10 BWG | 2 | 32 SF |
| Sch 80 | 1 | 32 SF |
| Sch 80 | 2 | 64 SF |
- 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.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- 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.
- Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
- 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.
- 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.
- Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- 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."
- Sign blanks shall be the sizes and shapes shown on the plans.
- 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.
- 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)



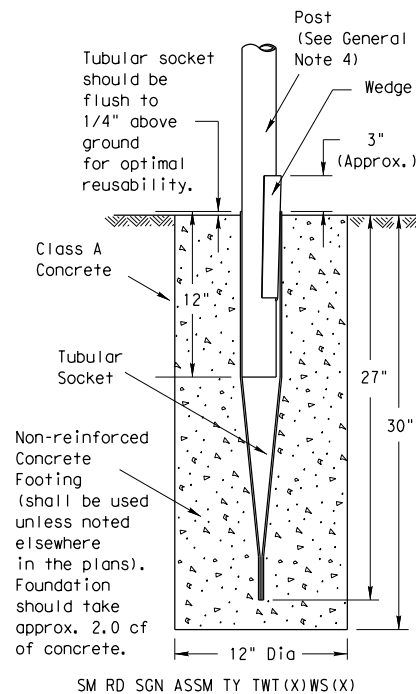
SIGN MOUNTING DETAILS
 SMALL ROADSIDE SIGNS
 TRIANGULAR SLIPBASE SYSTEM
 SMD(SLIP-3) -08

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		DIST	COUNTY		SHEET NO.
		SAT	MEDINA		169

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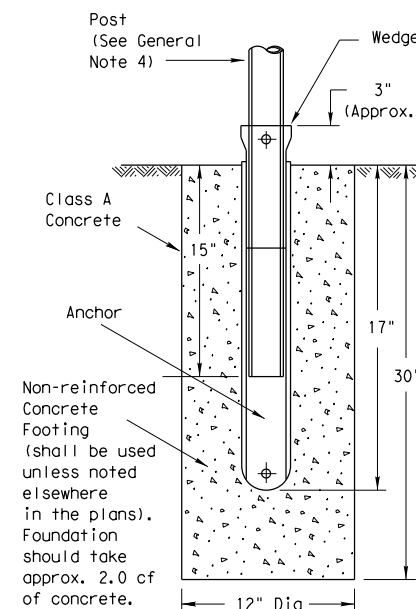
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Wedge Anchor Steel System



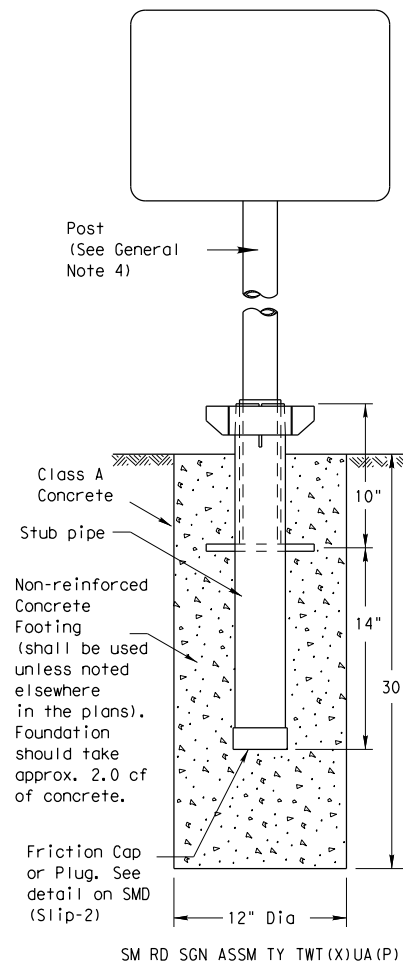
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

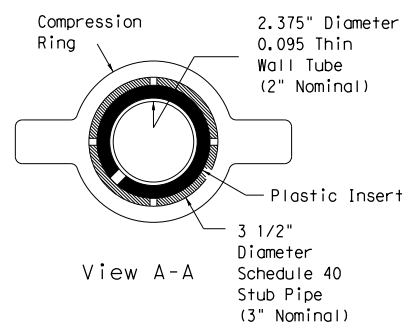
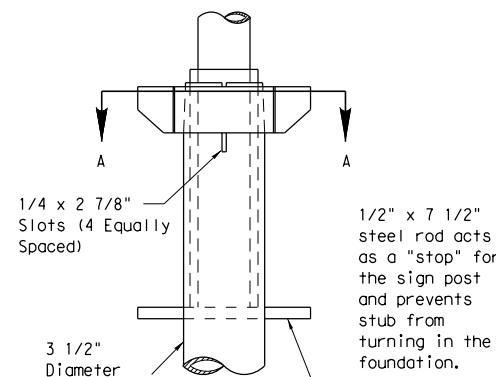


SMD RD SGN ASSM TY TWT(X)WP(X)

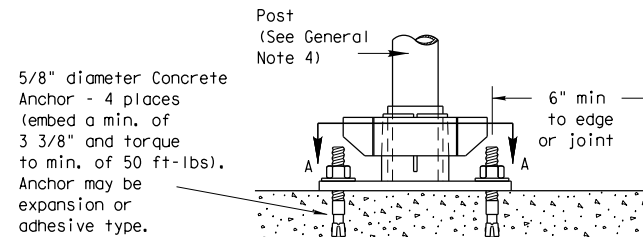
Universal Anchor System with Thin-Walled Tubing Post



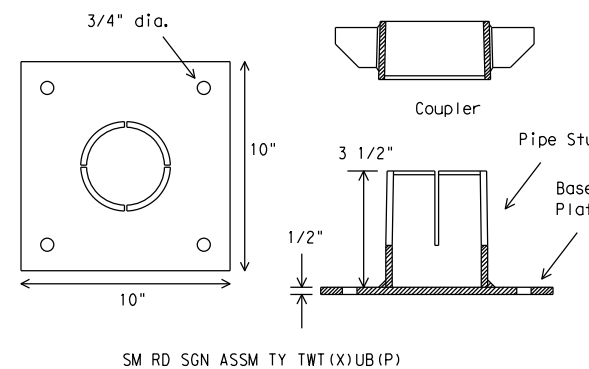
SM RD SGN ASSM TY TWT(X)UA(P)



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.

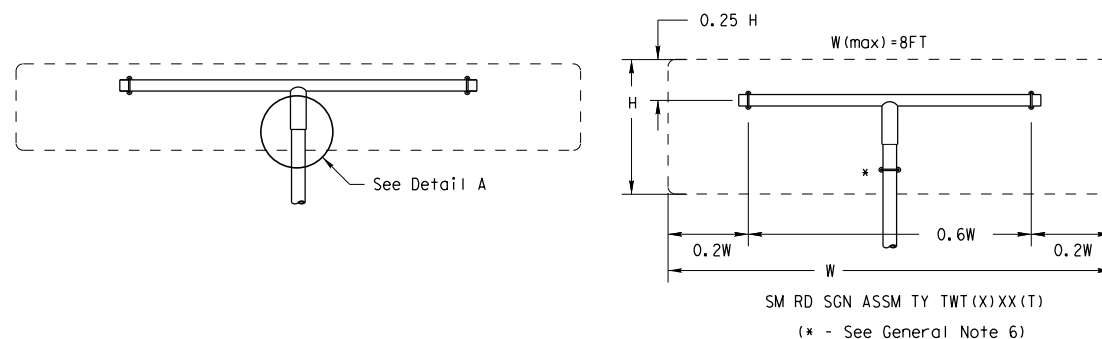


Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized 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, "Epoxy and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.

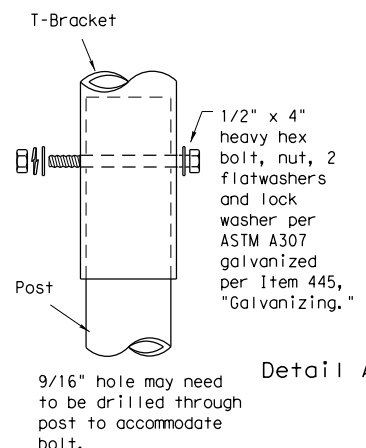


SM RD SGN ASSM TY TWT(X)UB(P)

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)



NOTE

The devices shall be installed per manufacturer's recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

- 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.
- 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.
- 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
- 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.
- Sign blanks shall be the sizes and shapes shown on the plans.
- Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- 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

- 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.
- 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.
- Insert tubular socket into concrete until top of socket is approximately 1/4" above the concrete footing.
- Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer.
- Attach the sign to the sign post.
- Insert the sign post into socket and align sign face with roadway.
- Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

- 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.
- Insert base post in hole to depths shown and backfill hole with concrete.
- 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.
- Attach the sign to the sign post.
- Install plastic insert around bottom of post.
- Insert sign post into base post. Lower until the post comes to rest on steel rod.
- Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
- Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.



SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST SMD(TWT) - 08

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	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	170	

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REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS					DELINEATORS				D & OM DESCRIPTIVE CODES	
DEVICE	SIZE 1	SIZE 2	SIZE 3	SIZE 4	DEVICE	SINGLE		DOUBLE		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
								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.					POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX	
					MOUNT TYPE	GND	GND, SRF	GND	GND, SRF	

OBJECT MARKERS									
DEVICE	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	
	SHEETING: Yellow-Type B _{FL} or C _{FL} Sheeting		SHEETING: Yellow - Type B or C Sheeting			SHEETING: Alternating acrylic black and retroreflective yellow - Type B _{FL} or C _{FL} Sheeting			SHEETING: Red -Type B _{FL} or C _{FL} Sheeting
	POST TYPE: TWT		POST TYPE: WC	POST TYPE: WC	POST TYPE: WFLX	POST TYPE: TWT			POST TYPE: TWT
	MOUNT TYPE: WAS, WAP		MOUNT TYPE: GND	MOUNT TYPE: GND	MOUNT TYPE: GND, SRF	MOUNT TYPE: WAS, WAP			MOUNT TYPE: 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)			CHEVRONS				ONE DIRECTION LARGE ARROW		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.
DEVICE	GF1	GF2	CTB	DEVICE				DEVICE	
SHEETING: Yellow, White, Red			SIZE (W x L) 18" x 24" (Conventional) 24" x 30" (Conventional Oversize) 30" x 36" (Expressway) 36" x 48" (Freeway)				SIZE (W x L) 48" x 24" (Conventional) 60" x 30" (Expressway & Freeway)		
NOTE: 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.			MOUNTING HEIGHT 4'-0" or 7'-0"				MOUNTING HEIGHT 7'-0"		
NOTE: 1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.			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).						

Texas Department of Transportation
 Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

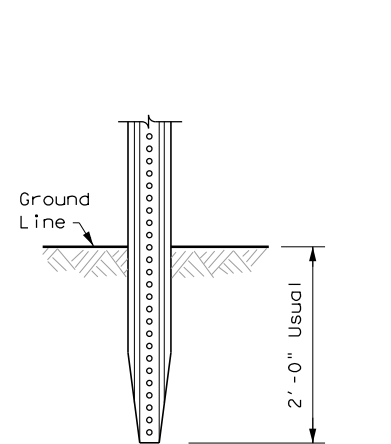
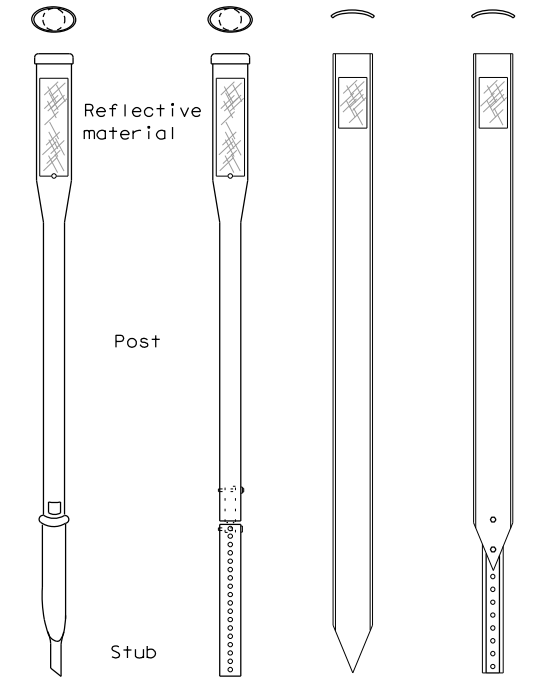
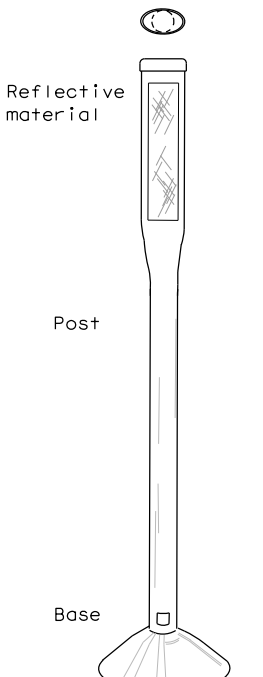
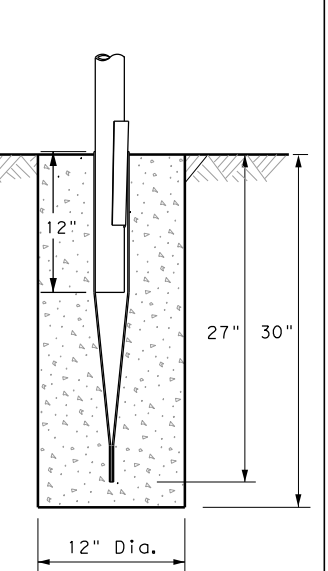
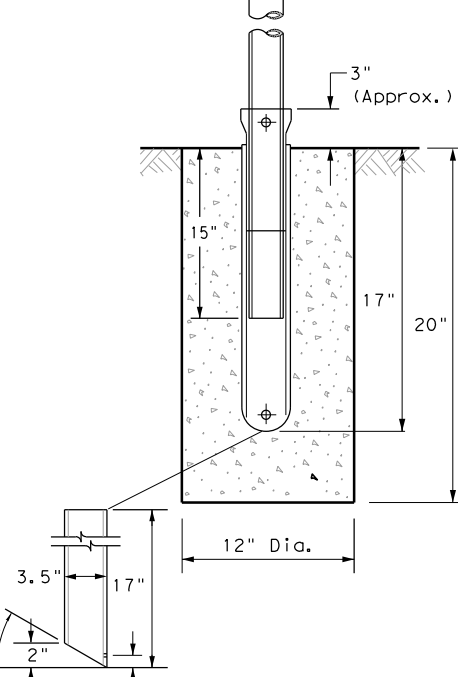
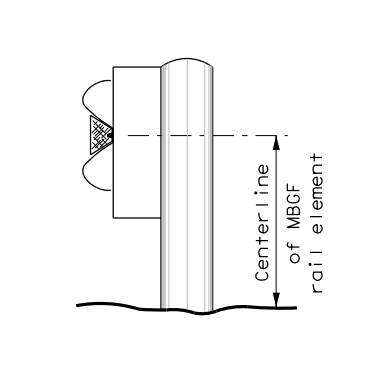
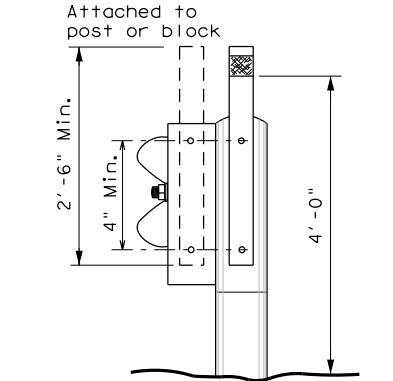
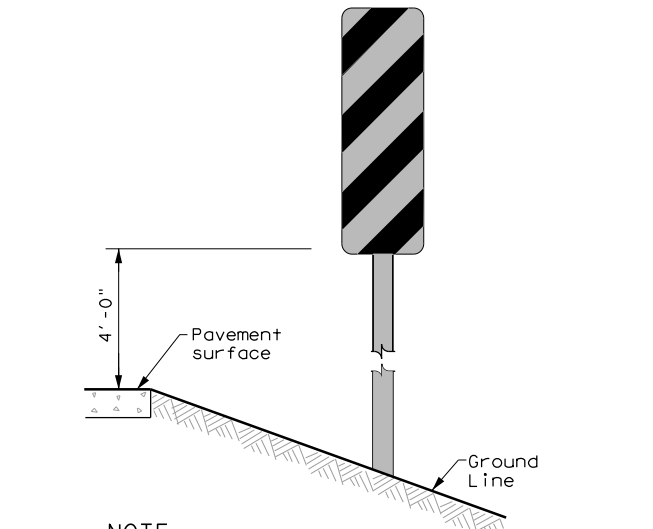
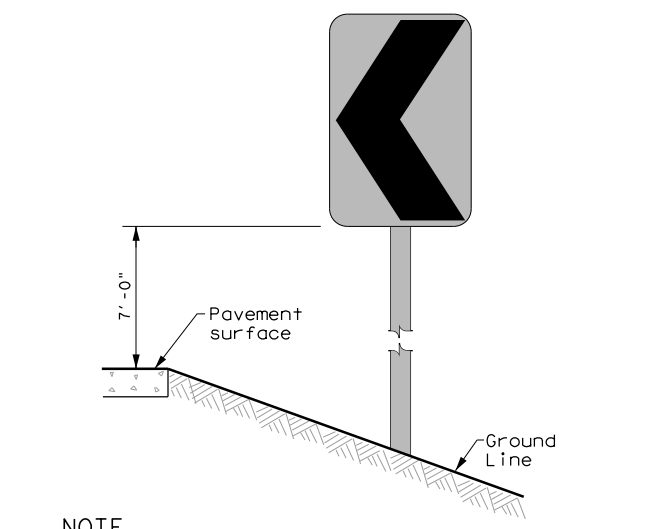
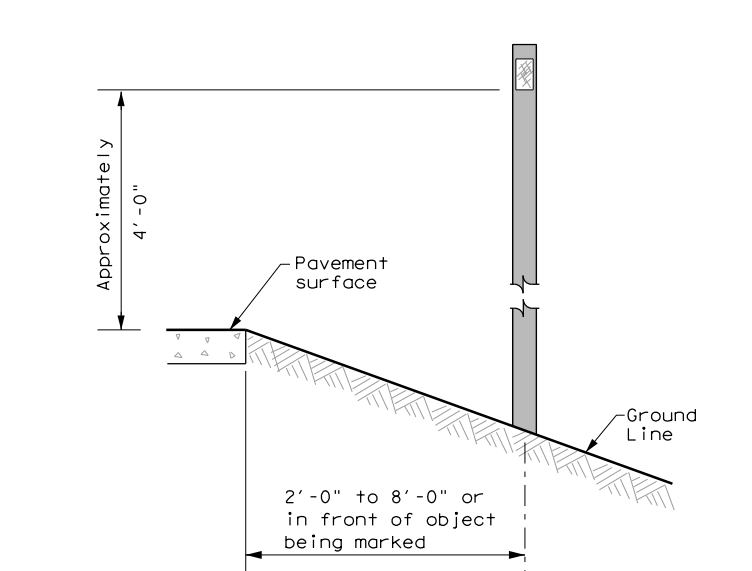
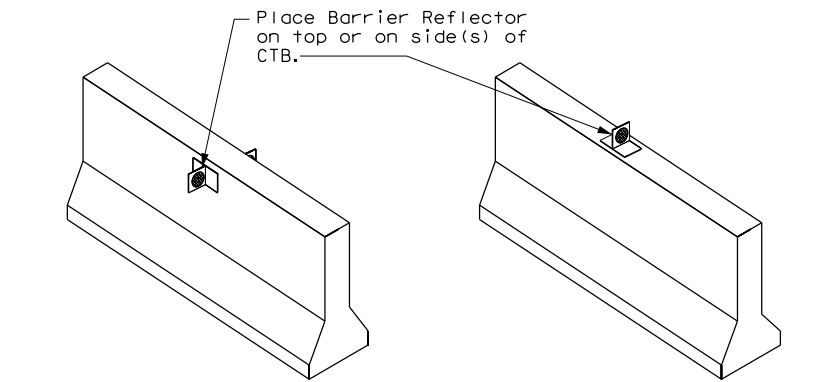

D & OM(1)-20

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© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
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10-09 3-15	DIST	COUNTY	SHEET NO.	
4-10 7-20	SAT	MEDINA	171	

20A

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POST TYPE AND SUPPORT FOUNDATION DETAILS				TYPE OF BARRIER MOUNTS																										
WING CHANNEL (WC)	FLEXIBLE POSTS (YFLX, WFLX)		WEDGE ANCHOR SYSTEMS		GUARD FENCE ATTACHMENT																									
GND	GND	SRF	WAS	WAP	GF 1																									
 <p style="text-align: center;">2'-0" Usual</p>	 <p style="text-align: center;">Post</p> <p style="text-align: center;">Stub</p>	 <p style="text-align: center;">Post</p> <p style="text-align: center;">Base</p>	 <p style="text-align: center;">12" Dia.</p> <p style="text-align: center;">27" 30"</p>	 <p style="text-align: center;">3" (Approx.)</p> <p style="text-align: center;">15" 17" 20"</p> <p style="text-align: center;">12" Dia.</p> <p style="text-align: center;">3.5" 17" 1" 2" 30°</p>	 <p style="text-align: center;">Centerline of MBCF rail element</p>	 <p style="text-align: center;">Attached to post or block</p> <p style="text-align: center;">2'-6" Min. 4" Min. 4'-0"</p>																								
	EMBEDDED		SURFACE MOUNT		STEEL																									
<p>NOTES</p> <ol style="list-style-type: none"> 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. 			<p>NOTES</p> <ol style="list-style-type: none"> 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. 			<p>NOTE</p> <ol style="list-style-type: none"> 1. Install per manufacturer's recommendations. 																								
<p>TYPES 1,3, AND 4 OBJECT MARKERS AND CHEVRONS</p>		<p>CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN</p>		<p>DELINEATORS AND TYPE 2 OBJECT MARKERS</p>																										
 <p style="text-align: center;">4'-0" 7'-0"</p> <p style="text-align: center;">Pavement surface Ground Line</p>		 <p style="text-align: center;">7'-0" 4'-0"</p> <p style="text-align: center;">Pavement surface Ground Line</p>		 <p style="text-align: center;">Approximately 4'-0"</p> <p style="text-align: center;">Pavement surface Ground Line</p> <p style="text-align: center;">2'-0" to 8'-0" or in front of object being marked</p>																										
<p>NOTE</p> <p>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)</p>		<p>NOTE</p> <p>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.</p>		<p>See general notes 1, 2 and 3.</p>																										
<p>CONCRETE TRAFFIC BARRIER (CTB)</p>																														
 <p style="text-align: center;">Place Barrier Reflector on top or on side(s) of CTB.</p>																														
<p>GENERAL NOTES</p> <ol style="list-style-type: none"> 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. 																														
 <p style="text-align: center;">Texas Department of Transportation</p> <p style="text-align: right;">Traffic Safety Division Standard</p>																														
<p>DELINEATOR & OBJECT MARKER INSTALLATION</p> <p>D & OM(2) - 20</p>																														
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FILE: dom2-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT																										
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4-10 7-20	SAT	MEDINA	172																											
<p>20B</p>																														

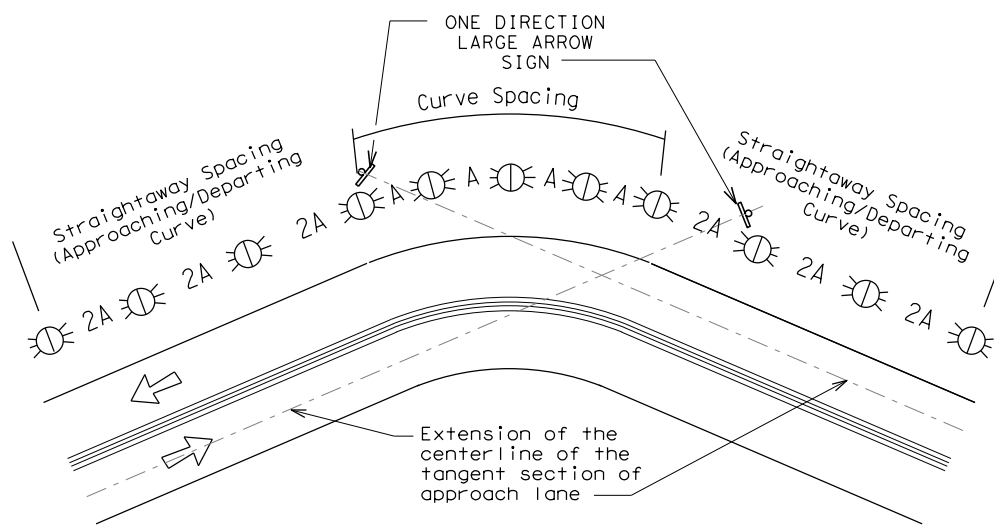
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MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

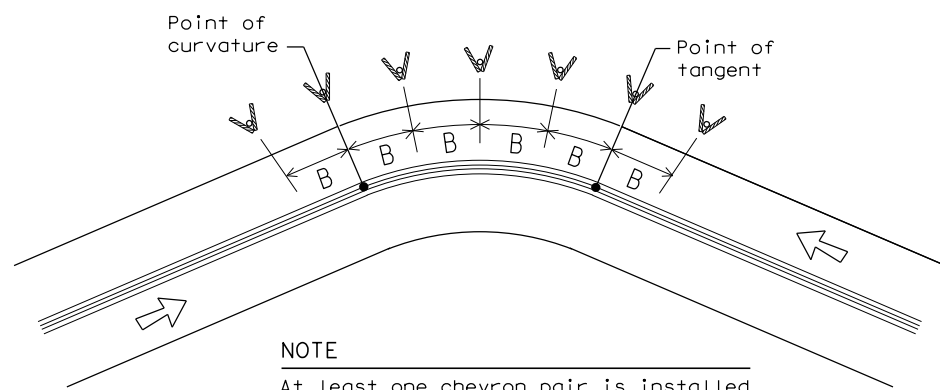
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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

- 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.
- Barrier reflectors may be used to replace required delineators.
- 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

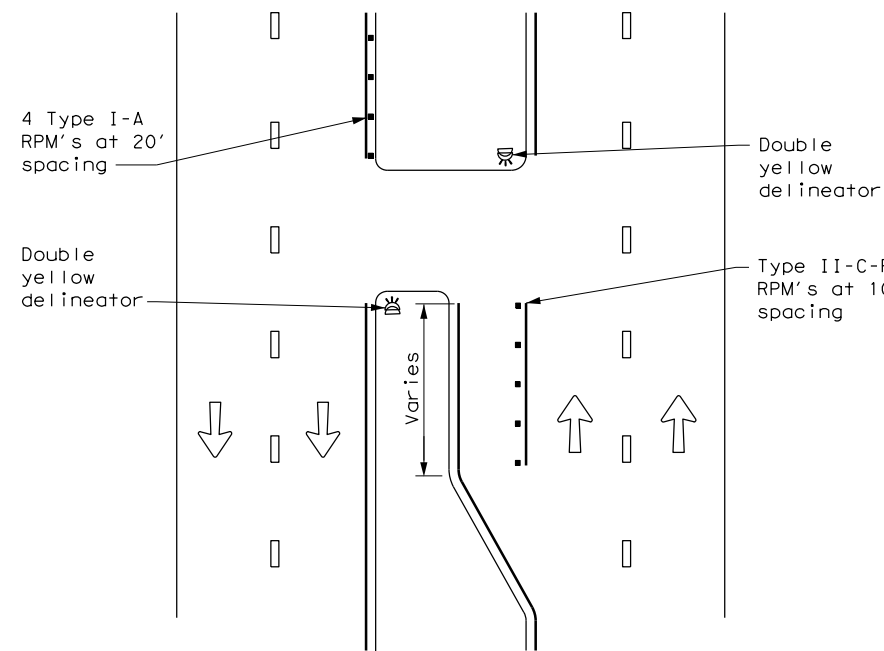
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3-15 8-15	DIST	COUNTY	SHEET NO.	
8-15 7-20	SAT	MEDINA	173	

20C

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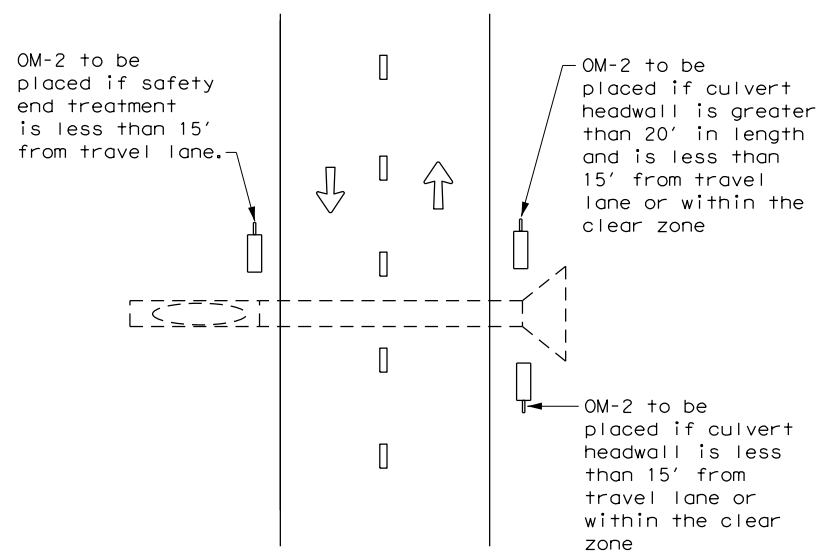
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CROSSOVERS



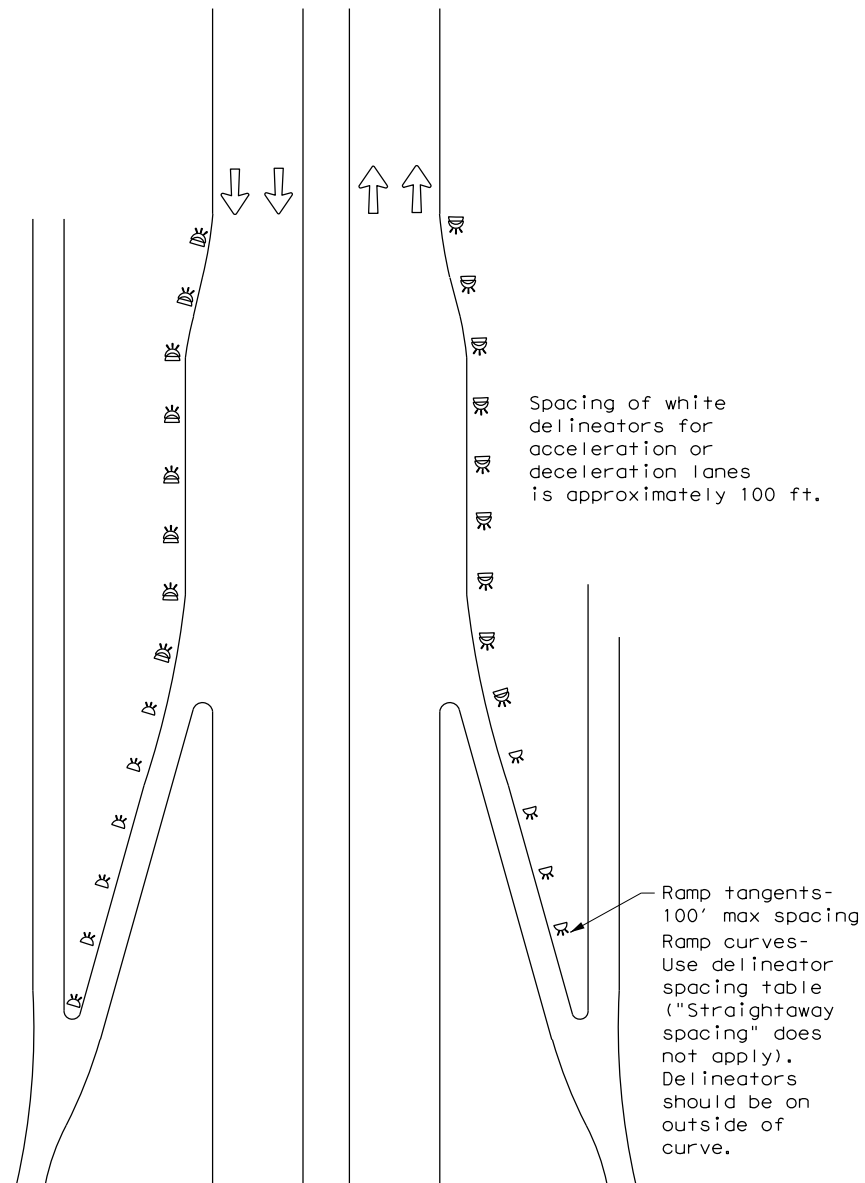
DETAIL 1

FOR CULVERTS WITHOUT MBGF



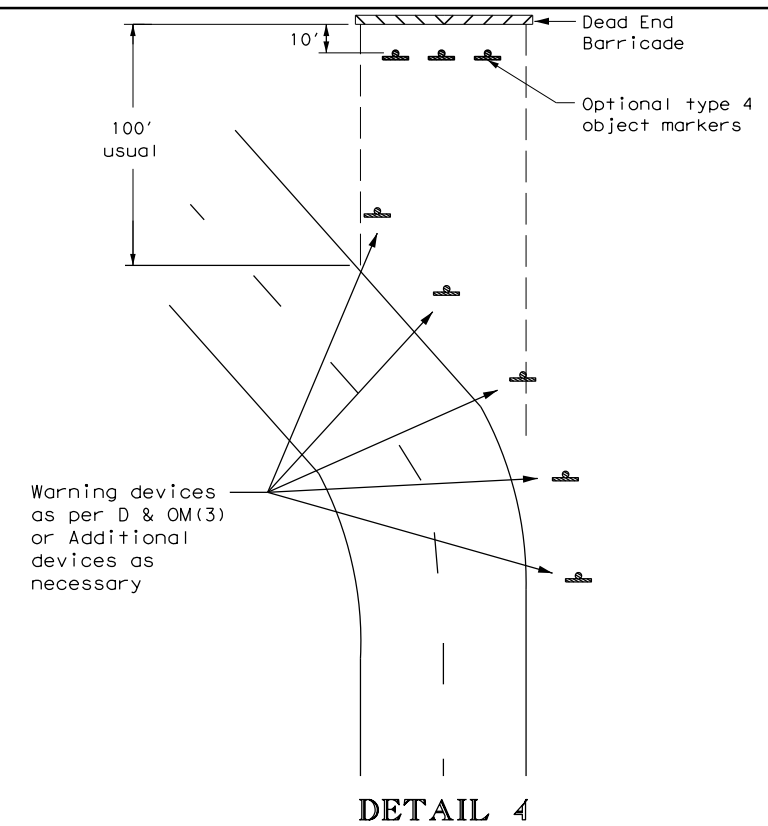
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



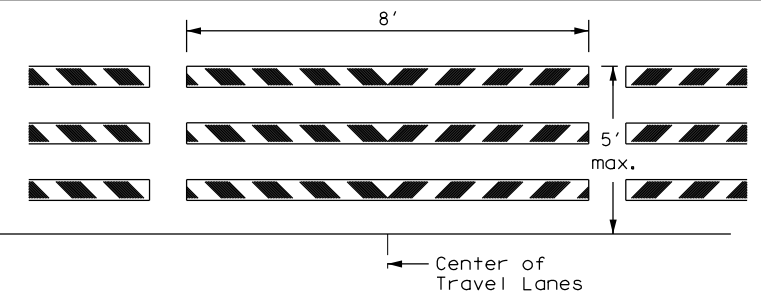
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

- Barricade striping shall be red and white reflective sheeting for all permanent road closures.
- Barricade striping is red and white sloping toward the center of the roadway.
- Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

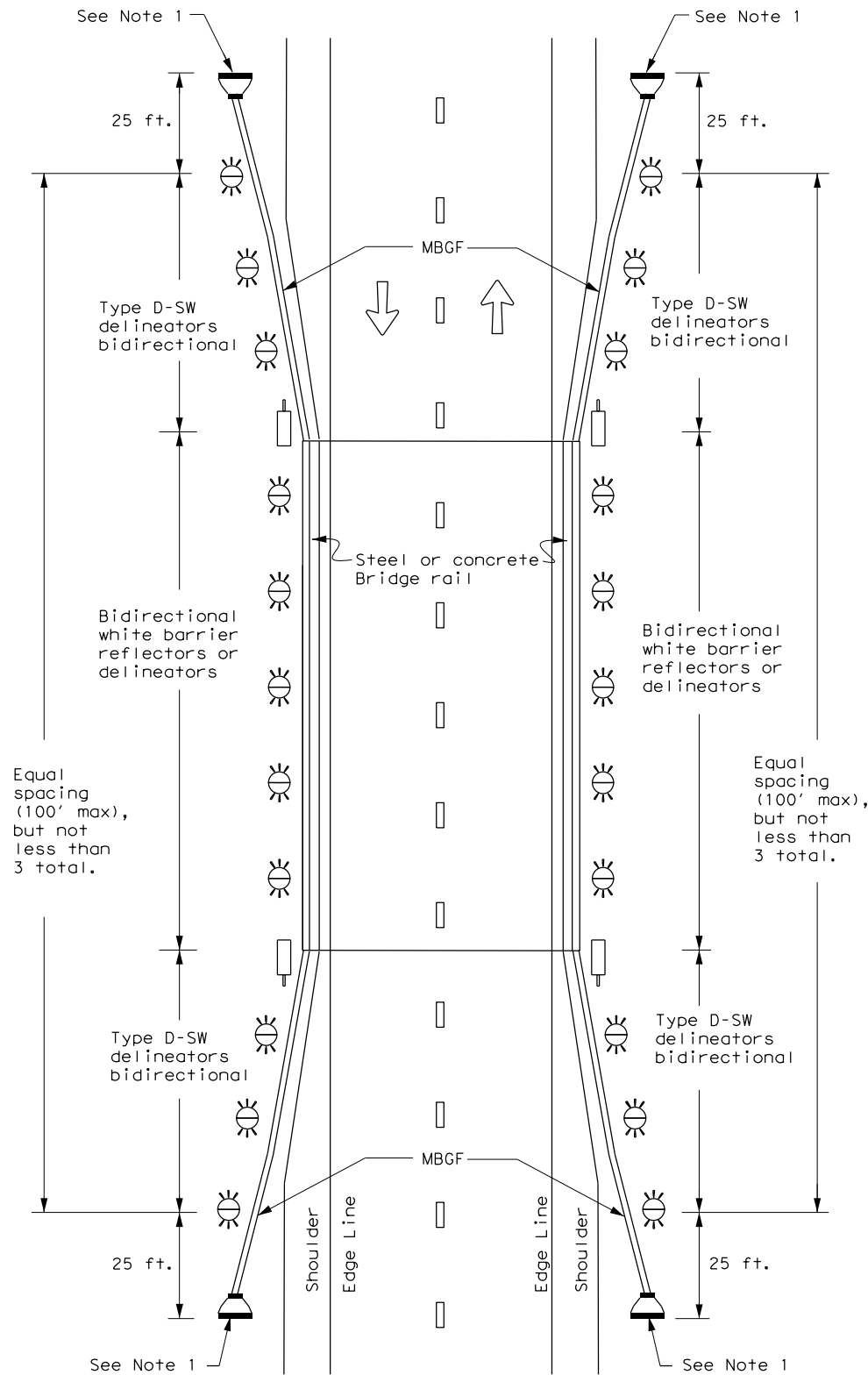


DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4) - 20

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3-15	DIST	COUNTY	SHEET NO.	
7-20	SAT	MEDINA	174	

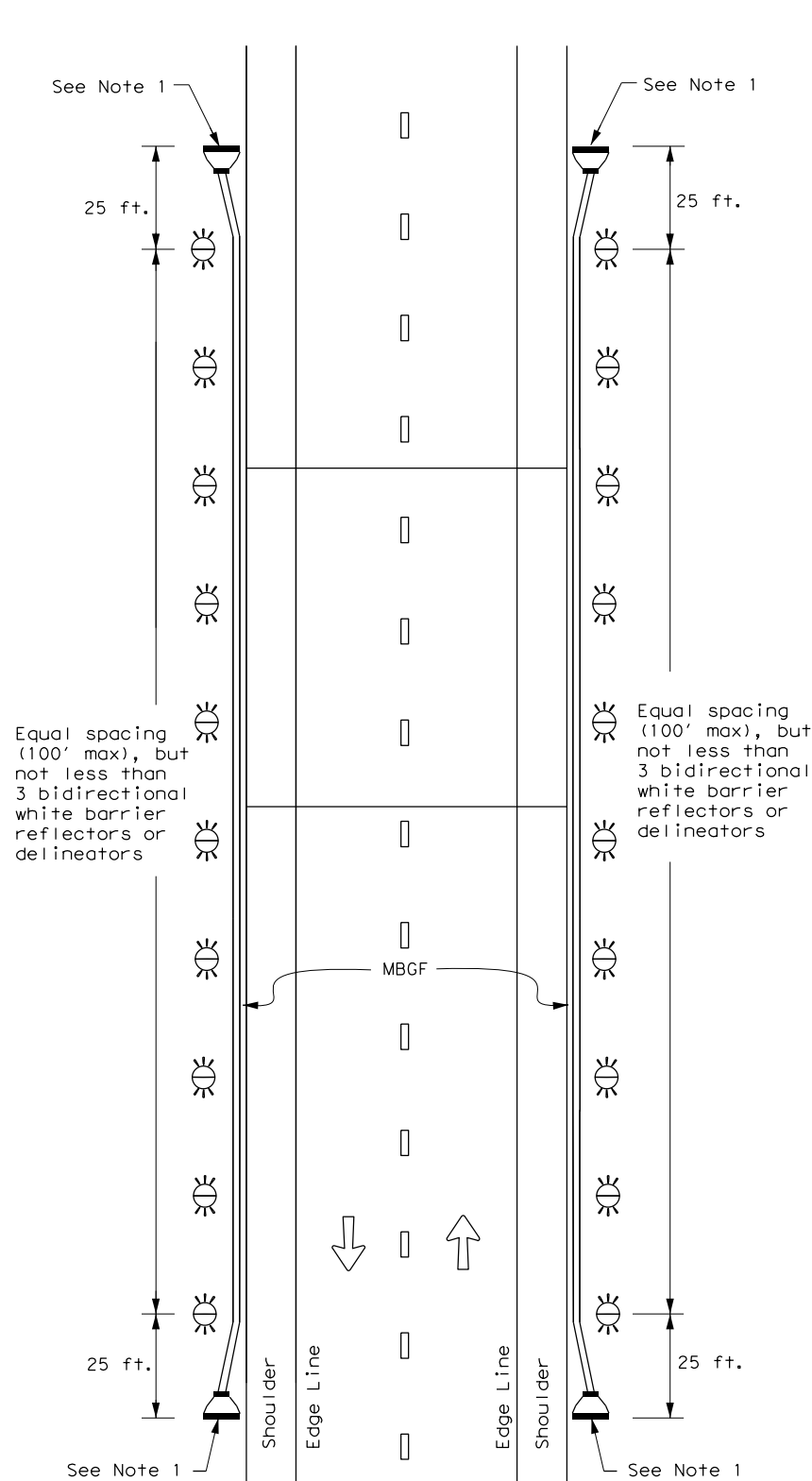
**TWO-WAY, TWO LANE ROADWAY
WITH REDUCED WIDTH APPROACH RAIL**



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

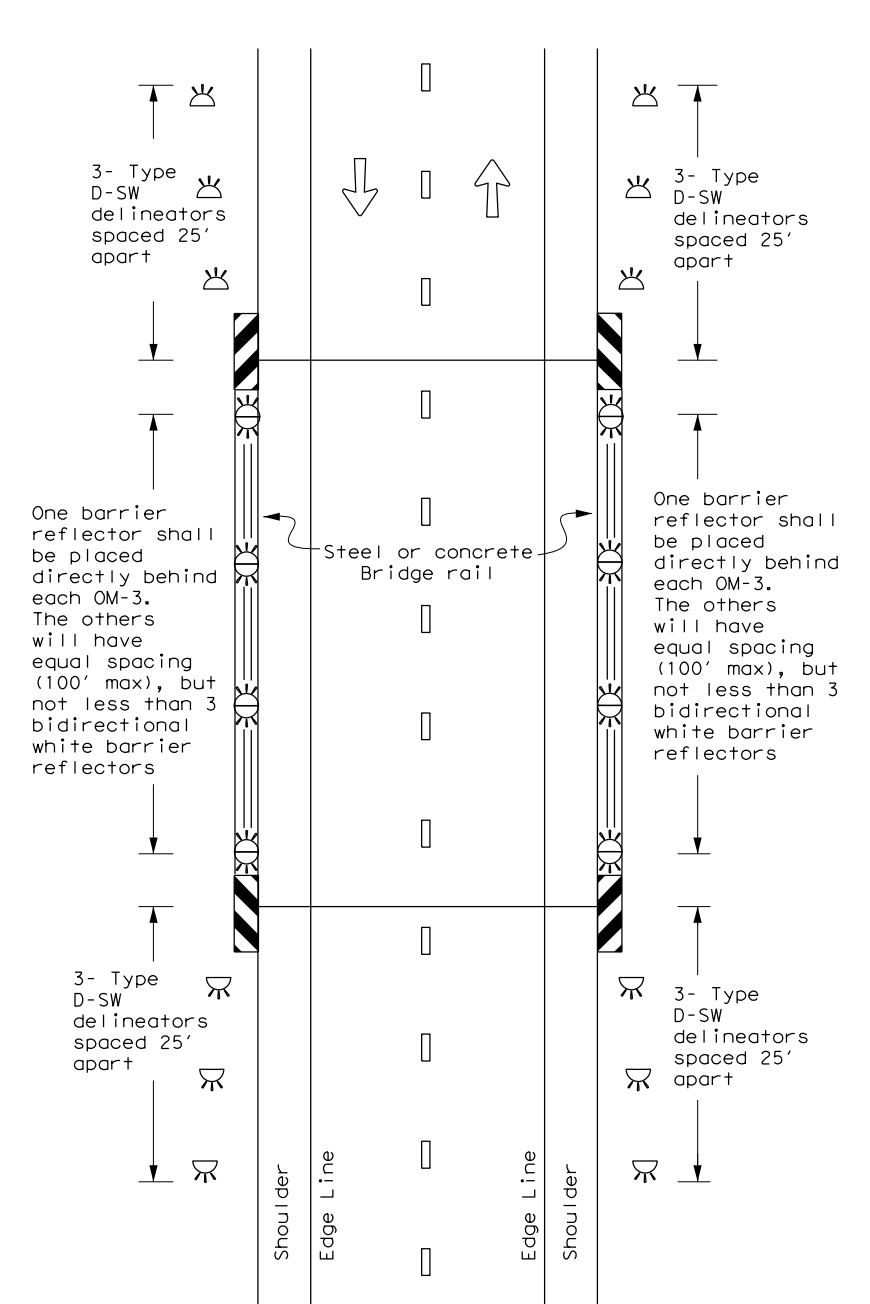
**TWO-WAY, TWO LANE ROADWAY
WITH METAL BEAM GUARD FENCE (MBGF)**



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

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



LEGEND

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



**DELINEATOR &
OBJECT MARKER
PLACEMENT DETAILS**

D & OM(5) - 20

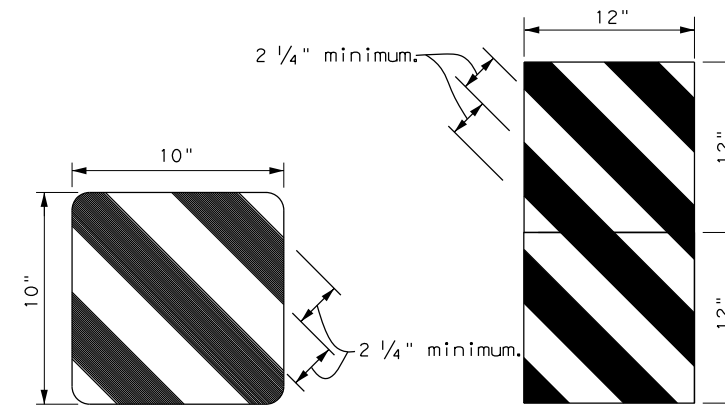
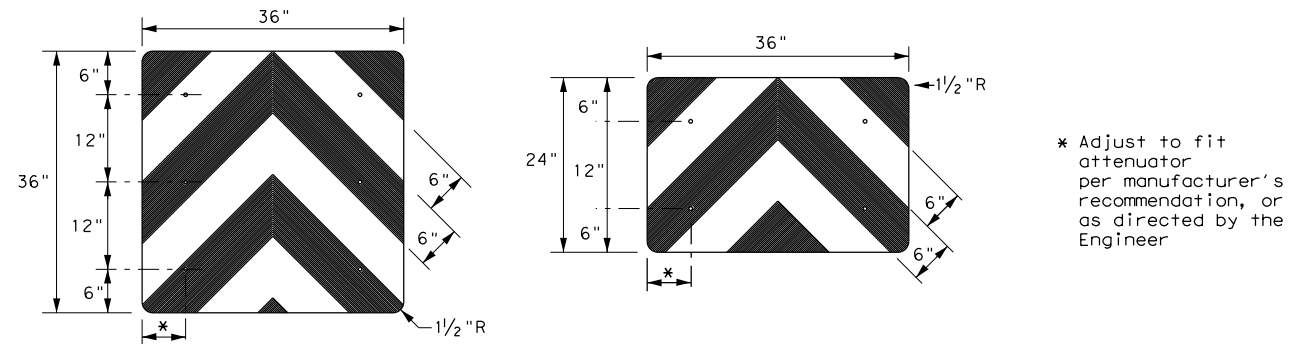
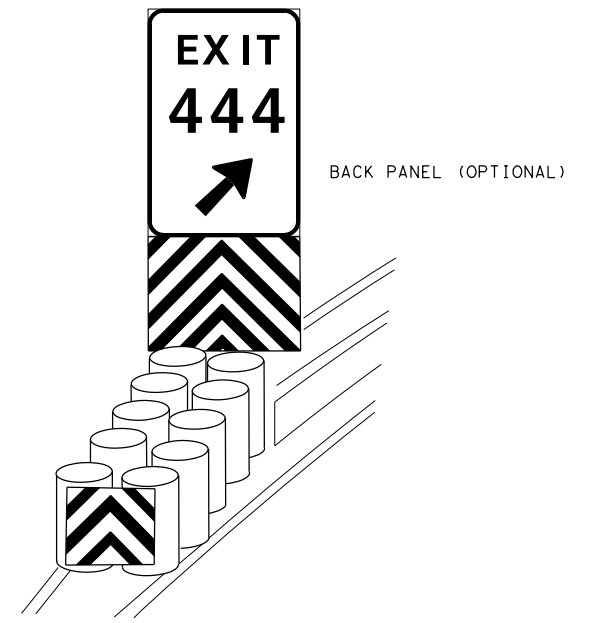
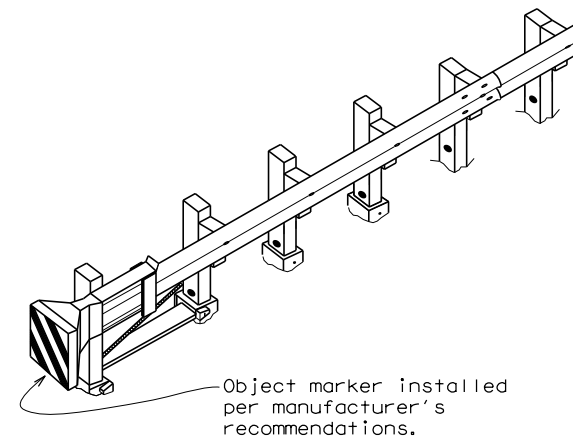
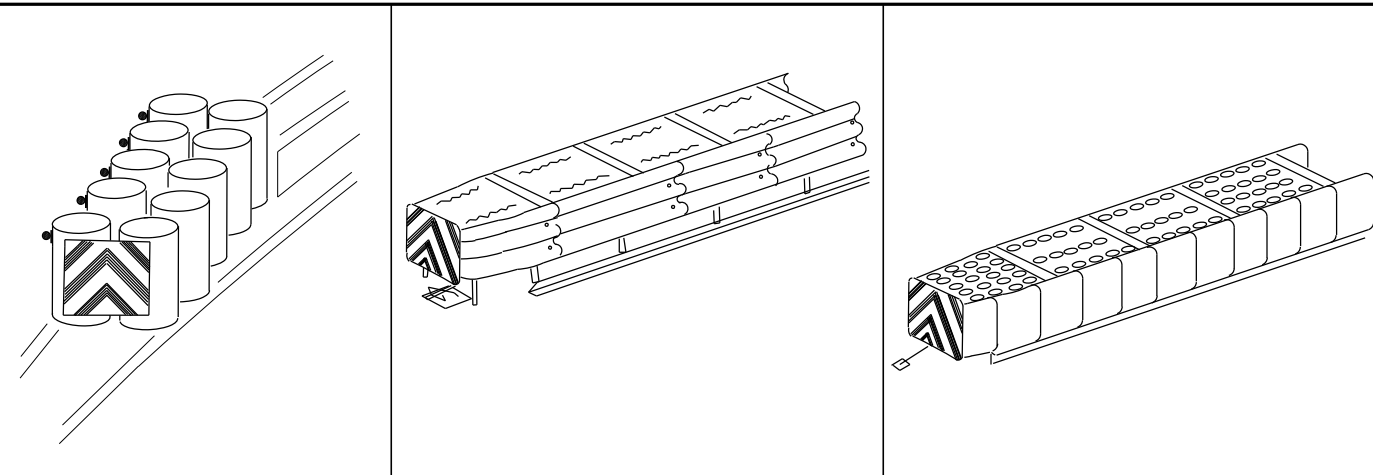
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7-20	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	175	

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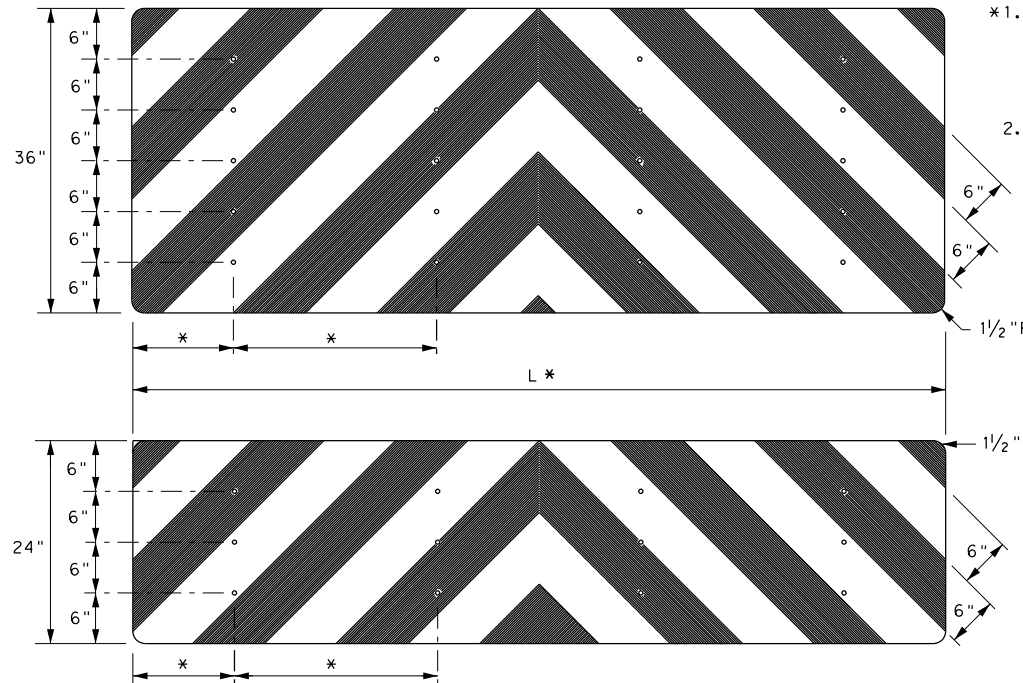
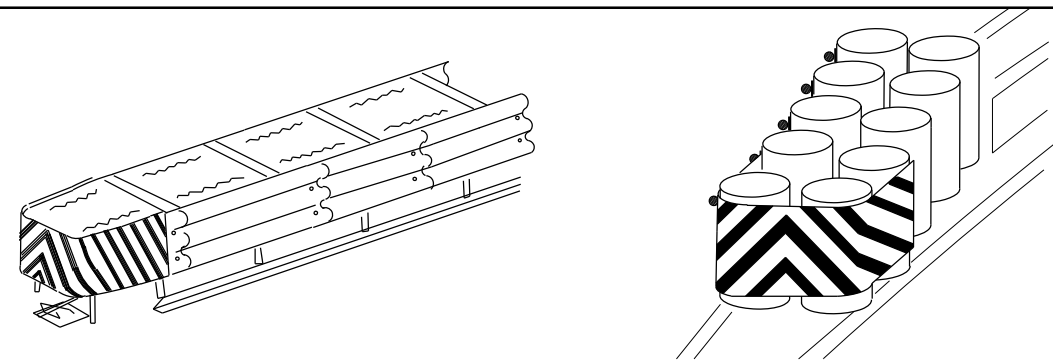
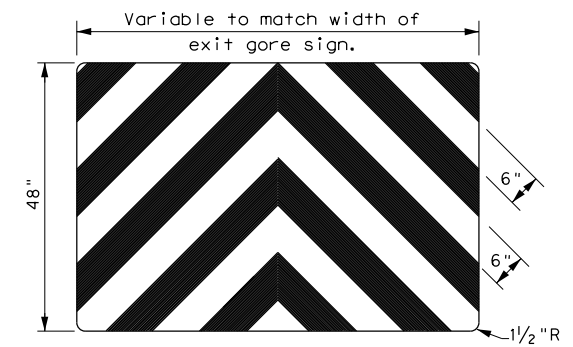
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OBJECT MARKERS SMALLER THAN 3 FT²



- NOTES**
1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturer's 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 1/4".
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.

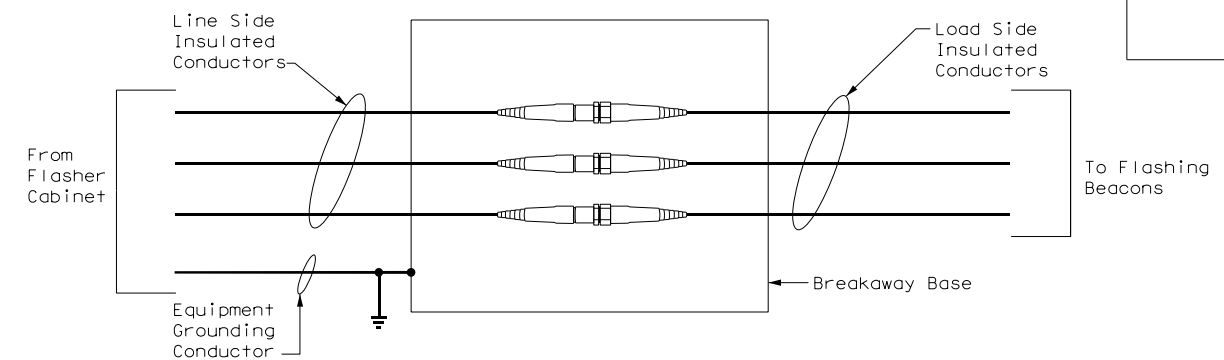
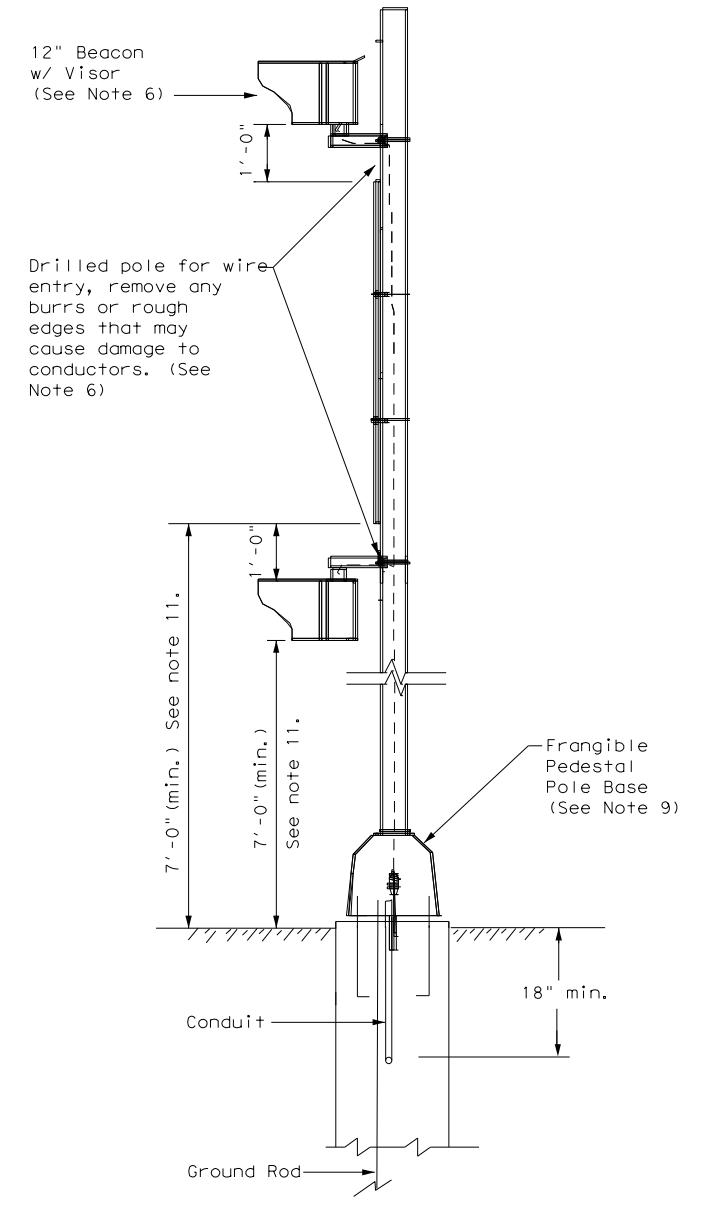
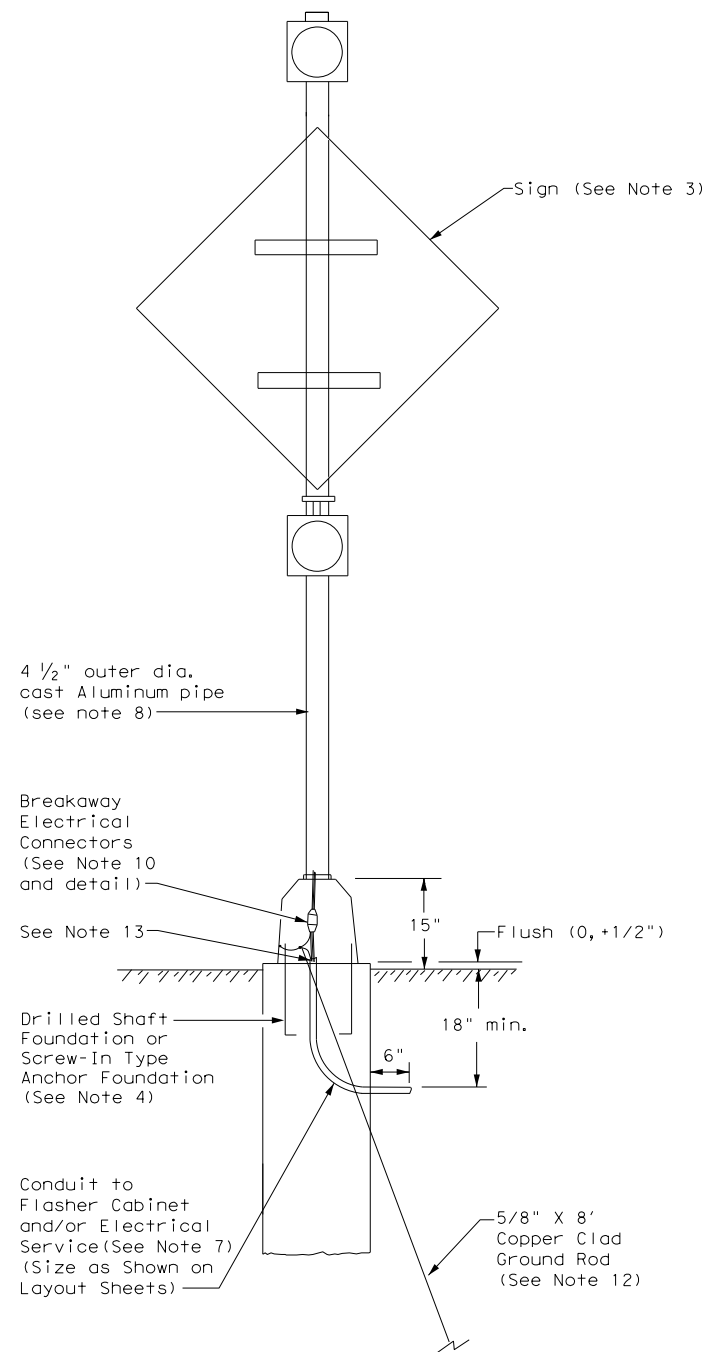
		Traffic Safety Division Standard	
DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS D & OM(VIA) - 20			
FILE: domvia20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT December 1989	CONT	SECT	JOB
REVISIONS		2520 01	016, ETC
4-92 8-04	DIST	COUNTY	SHEET NO.
8-95 3-15	SAT	MEDINA	176
4-98 7-20			
20G			

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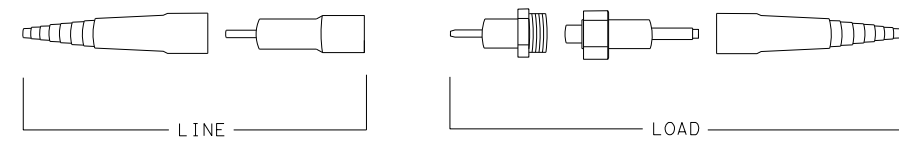
DATE: 12/20/2022 3:36:38 PM
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GENERAL NOTES:

1. Details show a typical warning sign with two flashing beacon heads, other arrangements are possible. When only one beacon is required, install the upper beacon.
2. See Item 685, "Roadside Flashing Beacon Assemblies" for further requirements.
3. See SMD standard sheets for lateral and vertical clearances and sign mounting details. Install signs as shown on the sign layout sheets.
4. Use either a Screw-In Type Anchor Foundation or a Drilled Shaft Foundation as shown elsewhere in the plans. When plans require a Drilled Shaft Foundation, see standard sheet TS-FD. Install the Screw-In Type Anchor Foundation as per manufacturer's recommendations. On a slope, install one edge at ground level. Screw-In/Drilled Shaft Foundation is subsidiary to Item 685. Installation of a ground rod is not required for solar powered flashing beacon assemblies.
5. When used, provide Screw-In Type Anchor Foundations as shown on TxDOT's Material Producer List (MPL) in the file "Highway Traffic Signals".
6. Install beacon heads as shown here, as shown elsewhere on the plans, or as directed. Use hardware specifically designed for mounting beacon heads on poles.
7. Conduit in foundation and within 6 in. of foundation is subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies."
8. Unless otherwise shown on the plans, pole shaft shall be one piece, Schedule 40 Aluminum pipe, ASTM B429 or B221 (Alloy 6061-T6 only). Aluminum conduit will not develop the necessary strength and will not be allowed.
9. Per manufacturer's recommendations, engage all threads on the pedestal pole base and pipe unless the pipe is fully seated into base. In high winds, use a pole and base collar assembly to add strength and prevent loosening of connection.
10. Provide single pole non-fused watertight breakaway electrical connectors for frangible pedestal pole bases, as shown on TxDOT's MPL in the file "Roadway Illumination and Electrical Supplies." Approved models are listed under Item 685. For ungrounded (hot) conductors, install a breakaway connector with a dummy fuse slug. For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).
11. Provide clearance as shown above the sidewalk or pavement grade at the edge of the road. When a bottom beacon is not used, mount the bottom of the sign at least 7 ft. above the sidewalk or pavement grade at the edge of the road.
12. Make connections to ground rods according to NEC. Ground rod clamps shall be listed for their intended purpose.
13. Ensure height of conduit and ground rod is below top of anchor bolts.



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS



**NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS
 EXPLODED VIEW**

		Traffic Operations Division Standard	
<h2>ROADSIDE FLASHING BEACON ASSEMBLY</h2>			
<h3>RFBA-13</h3>			
FILE: rfb-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT January 1992	CONT: 2520	SECT: 01	JOB: 016, ETC
REVISIONS		HIGHWAY: FM 2200	
5-93 12-04		DIST: SAT	COUNTY: MEDINA
10-93 3-13			SHEET NO.: 177
4-98			

Plotted on: 1/4/2023

Design File name: P:\117\99\04\Design\Civil\Traffic\1179904TSG00.dgn

- NOTES:
1. ALL DIMENSIONS SHOWN ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED).
 2. CONTRACTOR TO POTHOLE RRFB POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.
 3. LOCATION OF RRFB POLE AND ELECTRICAL SERVICE SHALL BE VERIFIED AND APPROVED BY TXDOT PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL SUPPLY AND INSTALL THE ADDRESS IN PERMANENT NUMBERS AND LETTERS TO THE STREET SIDE OF THE SERVICE ENCLOSURE. SAID ADDRESS SHALL ALSO BE RECORDED AND GIVEN TO THE TXDOT INSPECTOR FOR THEIR RECORDS.
 4. AN ADDITIONAL 2" SCHEDULE 80 PVC SHALL BE INSTALLED AT EACH POLE FOUNDATION STUBBED OUT 2' FROM THE FACE OF THE FOUNDATION. STUB OUTS SHALL BE APPROPRIATELY CAPPED BELOW GRADE FOR FUTURE USE.
 5. PED PUSH BUTTONS SHALL BE ACCESSIBLE AND NO MORE THAN 24" FROM LANDING AREA OR SIDEWALK FOR EACH INSTALLED PEDESTAL POLE.
 6. UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO COMMENCING EXCAVATION. ALL UTILITY LOCATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
 7. NEATLY CAP/COIL ALL WIRES AND CABLES IN GROUND BOX OR AT TERMINATION.
 8. PEDESTRIAN CROSSING FLASHING BEACON ASSEMBLY EQUIPMENT FURNISHED AND INSTALLED BY CONTRACTOR SHALL INCLUDE: PUSH BUTTON AND SIGN, PEDESTAL POLE AND FOUNDATION, CONTROL CABINET AND ASSOCIATED EQUIPMENT. SIGNS, CONDUIT, CONDUCTORS, GROUND BOXES, 12" YELLOW BEACONS, AND CABLING ARE TO BE PAID FOR SEPARATELY.
 9. SEE SIDEWALK CONSTRUCTION PLAN SHEETS FOR ADVANCED PEDESTRIAN WARNING SIGNS.
 10. PEDESTRIAN PUSH BUTTONS SHALL HAVE A LOCATOR TONE AND VOICE MESSAGE SPOKEN TWICE, SAYING "YELLOW LIGHTS ARE FLASHING" WHEN ACTIVATED.

PROPOSED SIGNS AND SIGNALS

S1-1 (36"X36") SW16-7PL (24"X12") 2-12" YELLOW BEACONS

S1

S1-1 (36"X36") SW16-7PR (24"X12") 2-12" YELLOW BEACONS

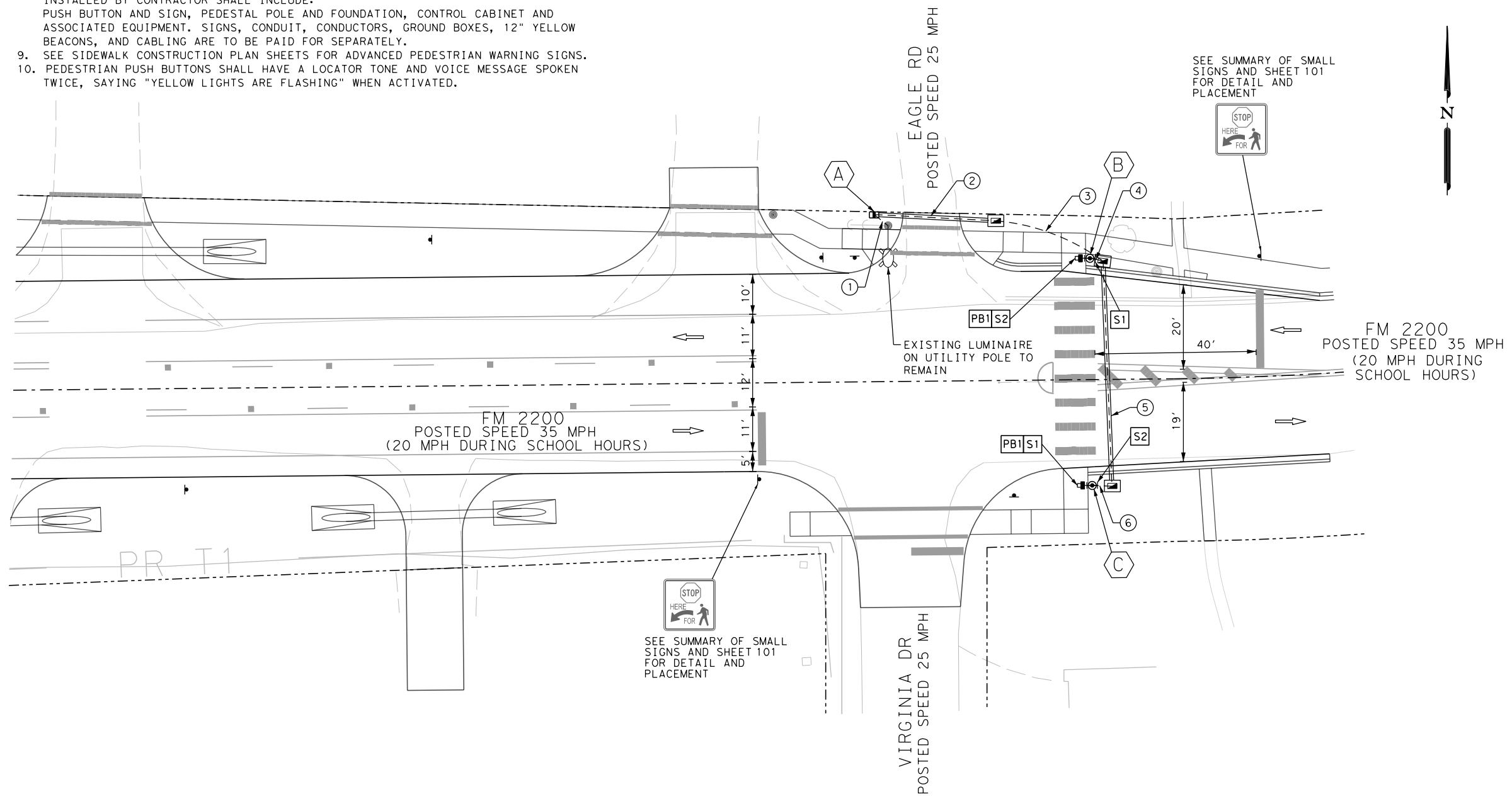
S2

R10-25 (9"X12")

PBI

LEGEND

SYMBOL	DESCRIPTION
	TRAFFIC FLOW
	CONDUIT (BORE)
	CONDUIT (TRENCH)
	PEDESTAL POLE ON FOUNDATION
	PED PUSH BUTTON
	POLE MOUNTED SIGN
	GROUND BOX (TYPE "D")
	ELECTRICAL SERVICE
	SIGN AND POST
	CABLE/CONDUIT RUN
	POLE OR EQUIPMENT IDENTIFIER



CAUTION:

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT UNDERGROUND UTILITIES INCLUDING GAS ARE KNOWN TO EXIST IN THE VICINITY OF THIS WORK. CONTRACTOR SHALL CALL FOR LOCATES PRIOR TO BEGINNING WORK AND SHALL EXERCISE CAUTION WHEN INSTALLING SIGNAL EQUIPMENT INCLUDING POLE FOUNDATIONS AND CONDUITS

CONTRACTOR SHALL CONTACT DIGTESS @ 1-800-DIG-TESS OR TEXAS-811 FOR UTILITY LOCATION AT LEAST 72 HOURS PRIOR TO BEGINNING CONSTRUCTION

DESIGN

STATE OF TEXAS
JUSTIN W. CLARK
118715
LICENSED PROFESSIONAL ENGINEER
1/4/2023
DATE

APPROVAL

STATE OF TEXAS
GILMER D. GASTON
80472
LICENSED PROFESSIONAL ENGINEER
4/2023
DATE

SCALE: PLAN 1" = 30'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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FM 2200

FLASHING BEACON PLAN

SHEET 1 OF 3

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	178

Plotted on: 1/4/2023

Design File name: P:\117\99\04\Design\Civil\Traffic\1179904\TSG01_CCS.dgn

POLE SCHEDULE					
	POLE		Ⓟ	Ⓢ	
	POLE TYPE (SMA/LMA/DMA/PED)		PED	PED	
	POLE HEIGHT (FEET)		16	16	
	FOUNDATION TYPE		24-A	24-A	
	FOUNDATION DEPTH (FEET)		6	6	
CABLE		CIRCUIT			
#6 BARE (SOLID)	BARE BOND GROUND		1	1	
7 COND. #12 AWG TYPE "A", STRANDED	FLASHING BEACONS	POLE B	2		
		POLE C		2	
2 COND. #14 AWG TYPE "C", STRANDED	PED. APS PUSHBUTTONS	POLE B	1		
		POLE C		1	

PROPOSED ELECTRICAL SERVICE DATA											
Electric Service ID	Electrical Service Description (see ED (4) - 03)	Service Conduit Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole / Amp	Two - Pole Contactor Amps	Panelbd / Load center Amp Rating	Circuit No.	Branch Ckt. Bkr. Pole / Amps	Branch Circuit Amps	KVA Load
FB-1	ELEC SERV TY D (120/240) 060(NS)AL(N)PS(U)	3"	3/#6	N/A	2P/60	N/A	100	A	1P/15	10	2.0

CONDUIT AND CONDUCTOR SCHEDULE										
	RUN NUMBER		01	02	03	04	05	06		
	CONDUIT SIZE IN INCHES		3	3	3	2	3	2		
	NUMBER OF CONDUITS		1	1	1	2	1	2		
	LENGTH OF RUN (FT)		10	35	35	10	60	10		
TRENCH (T)/BORE (B)/EXISTING (E)/AERIAL (A)		T	B	T	T	B	T			
CABLE	CIRCUIT	NUMBER OF CONDUCTORS								
#6 XHHW (SOLID)	120 POWER HOT	CABLES PULLED BY OTHERS	1	1	1					
	120 POWER COMMON		1	1	1					
#6 BARE (SOLID)	BARE BOND GROUND		1	1	2	1	2			
7 COND. #12 AWG TYPE "A", STRANDED	FLASHING BEACONS		POLE B							
			POLE C			1	1	1		
2 COND. #14 AWG TYPE "C", STRANDED	PED. APS PUSHBUTTONS	POLE B								
		POLE C			1	1	1			

ITEM	DESCRIPTION	UNIT	QTY
* 0416-6030	DRILL SHAFT (TRF SIG POLE) (24 IN)	LF	12
0618-6046	CONDT (PVC) (SCH 80) (2")	LF	44
0618-6053	CONDT (PVC) (SCH 80) (3")	LF	50
0618-6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	105
0620-6009	ELEC CONDR (NO. 6) BARE	LF	222
0620-6010	ELEC CONDR (NO. 6) INSULATED	LF	176
0624-6010	GROUND BOX TY D (162922)W/APRON	EA	3
0628-6120	ELC SRV TY D 120/240 060(NS)AL(N)PS(U)	EA	1
0636-6001	ALUMINUM SIGNS (TY A)	SF	46
0680-6001	INSTALL HWY TRF SIG (FLASH BEACON)	EA	1
0682-6003	VEH SIG SEC (12")LED(YEL)	EA	8
0684-6012	TRF SIG CBL (TY A) (12 AWG) (7 CONDR)	LF	176
0684-6080	TRF SIG CBL (TY C) (14 AWG) (2 CONDR)	LF	88
0685-6001	INSTALL RDS FLASH BEACON ASSEMBLY	EA	2
0688-6001	PED DETECT PUSH BUTTON (APS)	EA	2
0688-6003	PED DETECTOR CONTROLLER UNIT	EA	1

*FOR CONTRACTOR INFORMATION ONLY. ITEM SUBSIDIARY TO ROADSIDE FLASHING BEACON ASSEMBLY.

DESIGN



Justin W. Clark
JUSTIN W. CLARK, P.E.
DATE 1/4/2023

APPROVAL



Gilmer D. Gaston
GILMER D. GASTON, P.E.
DATE 1/4/2023

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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 FM 2200

CONDUIT AND CONDUCTOR SCHEDULE

SHEET 2 OF 3

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	179

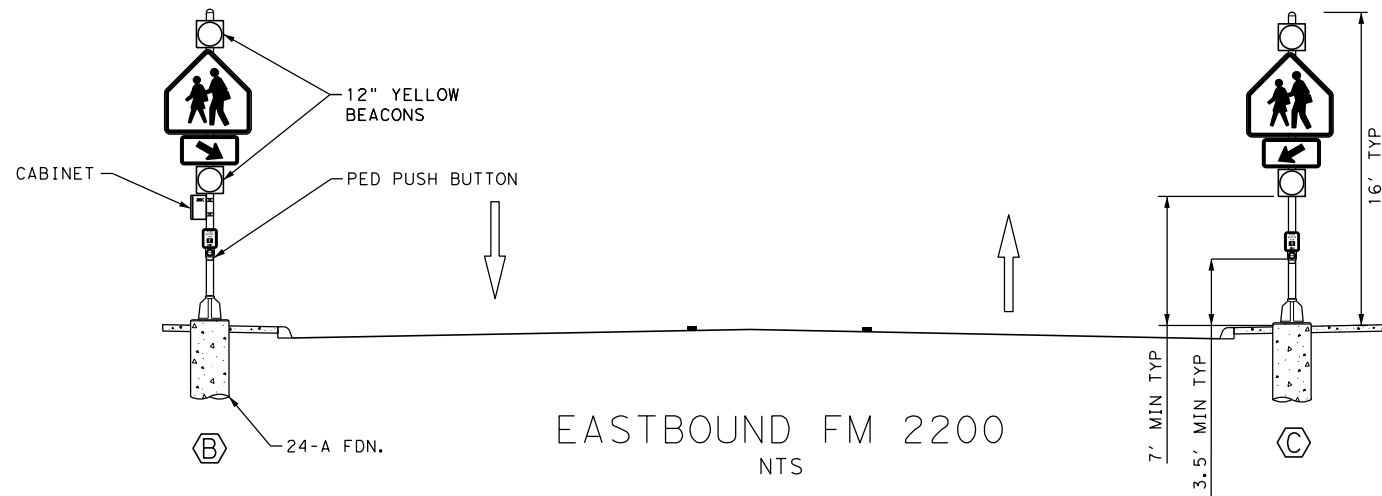
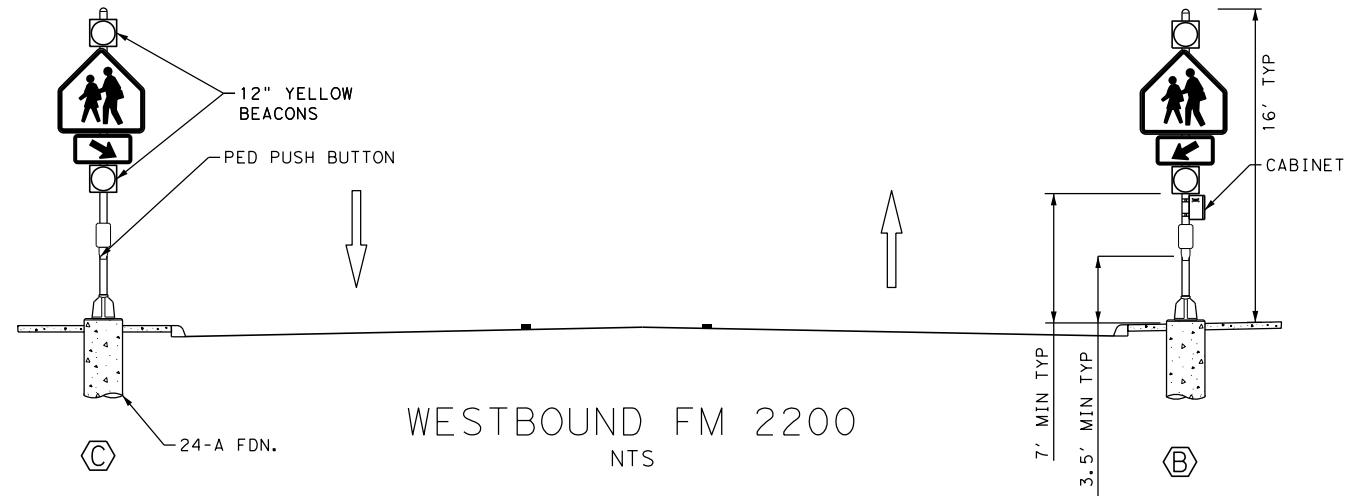
POLE & EQUIPMENT INFORMATION				
ID	DESCRIPTION/ATTACHMENTS	NORTHING	EASTING	FND. ELEV
Ⓟ	PROPOSED ENERGY METER WITH TxDOT TYPE D PEDESTAL SERVICE	N/A	N/A	N/A
Ⓢ	INSTALL AC POWERED PEDESTRIAN CROSSING FLASHING BEACON ASSEMBLY WITH CABINET AND CONTROLLER, 16 FT BRUSHED ALUMINUM PEDESTAL POLE ON 6 FT DRILLED SHAFT FOUNDATION (24-A), FOUR 12" YELLOW BEACONS, TWO S1-1 SIGNS, ONE PEDESTRIAN PUSH BUTTON W/R10-25 SIGN, ONE SW16-7PR, AND ONE SW16-7PL SIGN AS ILLUSTRATED.	13602374.9	1995016.6	FLUSH W/ LANDING
Ⓢ	INSTALL AC POWERED PEDESTRIAN CROSSING FLASHING BEACON ASSEMBLY, 16 FT BRUSHED ALUMINUM PEDESTAL POLE ON 6 FT DRILLED SHAFT FOUNDATION (24-A), FOUR 12" YELLOW BEACONS, TWO S1-1 SIGNS, ONE PEDESTRIAN PUSH BUTTON W/R10-25 SIGN, ONE SW16-7PR, AND ONE SW16-7PL SIGN AS ILLUSTRATED.	13602431.3	1995016.1	FLUSH W/ LANDING

SIGNS SHALL BE ATTACHED TO POLES AS SHOWN ON PLANS.

Plotted on: 1/4/2023

Design File name: P:\117\99\04\Design\Civil\Traffic\1179904TSIG02_ELEV.dgn

- NOTES:
1. ALL DIMENSIONS SHOWN ARE IN FEET UNLESS SPECIFIED OTHERWISE. (ALL EXISTING FEATURES ARE SHOWN SCREENED BACK i.e. FADED).
 2. CONTRACTOR SHALL POTHOLE PED POLE LOCATIONS NEAR UNDERGROUND UTILITIES PRIOR TO INSTALLING POLE FOUNDATION.



DESIGN

STATE OF TEXAS
 JUSTIN W. CLARK
 118715
 LICENSED PROFESSIONAL ENGINEER
 JUSTIN W. CLARK, P.E. 1/4/2023
 DATE

APPROVAL

STATE OF TEXAS
 GILMER D. GASTON
 80472
 LICENSED PROFESSIONAL ENGINEER
 GILMER D. GASTON, P.E. 1/4/2023
 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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FM 2200
ELEVATION VIEWS

SHEET 3 OF 3

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	180

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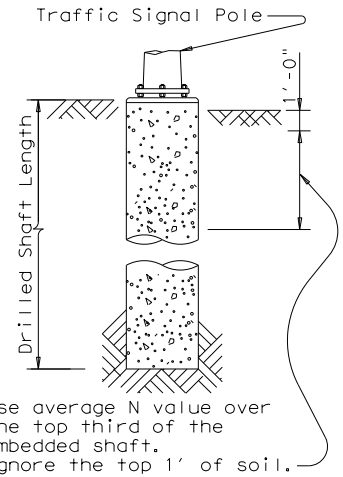
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FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft (4), (5), (6)			ANCHOR BOLT DESIGN (1)			FOUNDATION DESIGN LOAD (2)		TYPICAL APPLICATION	
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	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	3/4"	36	12 3/4"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 1/2"	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 3/4"	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 1/4"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

- NOTES:
- Anchor bolt design develops the foundation capacity given under Foundation Design Loads.
 - Foundation Design Loads are the allowable moments and shears at the base of the structure.
 - Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.
 - Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.
 - If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.
 - 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	
POLE B	10	24-A	1	6					
POLE C	10	24-A	1	6					
TOTAL DRILLED SHAFT LENGTHS				12					

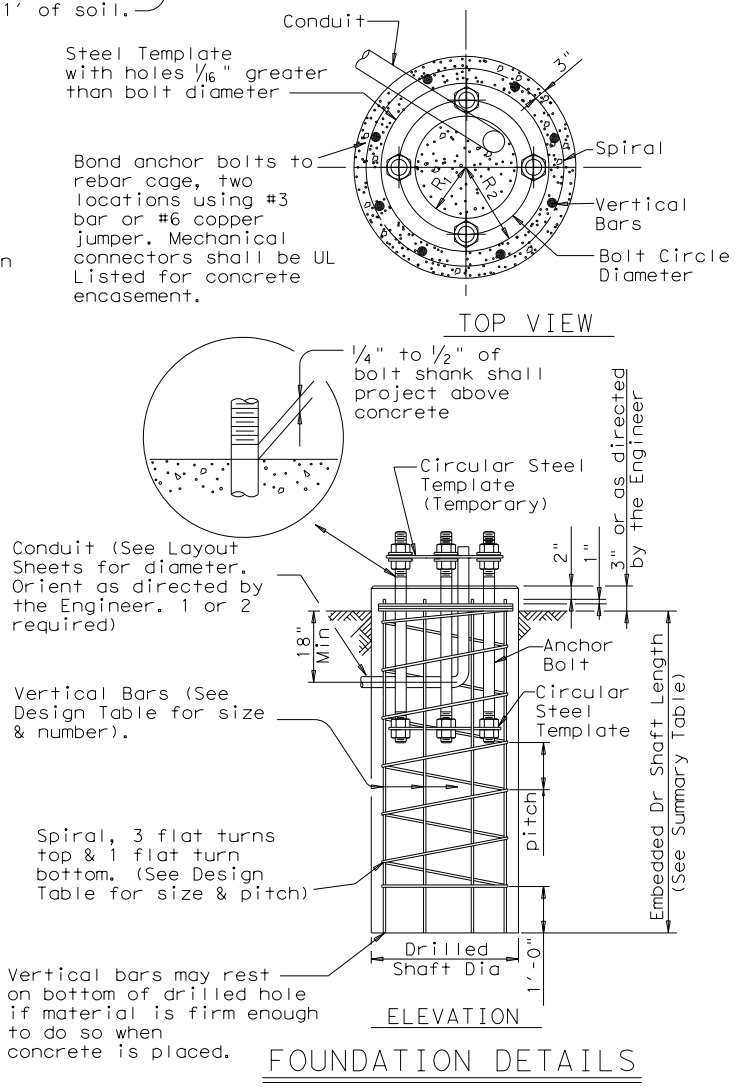
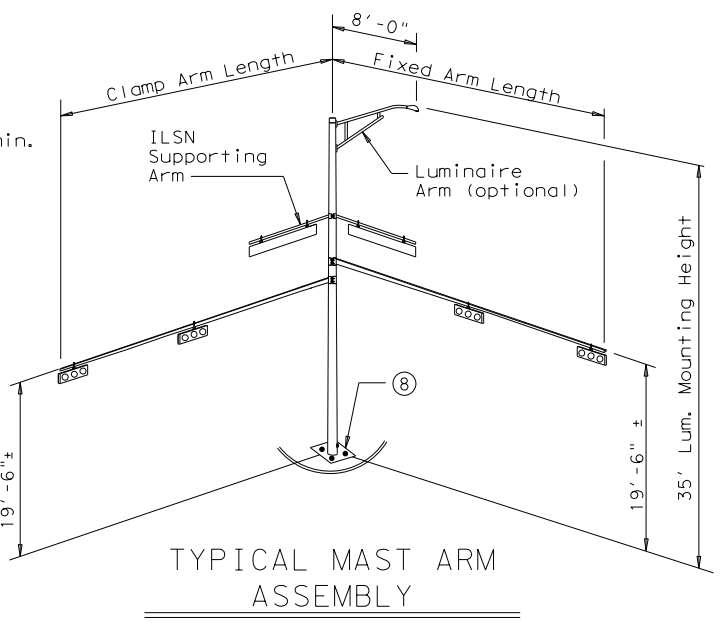
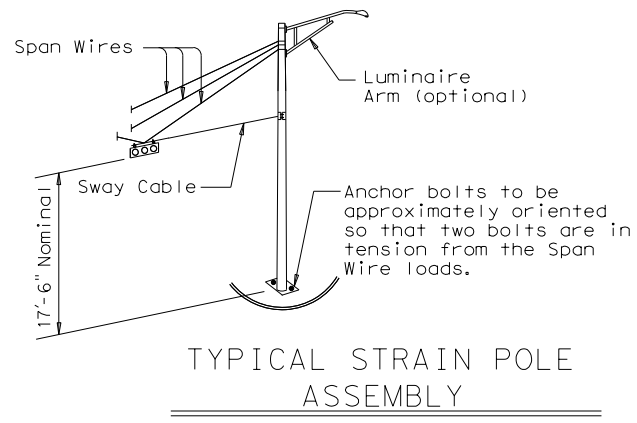
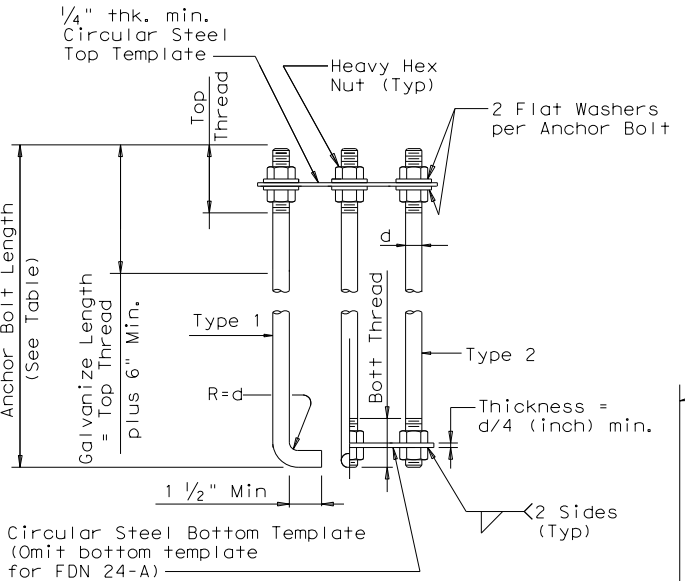
FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)					
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
28' X 28'					
32' X 28'					
			32' X 32'		
			36' X 36'		
100 MPH DESIGN WIND 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' X 24'		40' X 36'	
				44' X 36'	



ANCHOR BOLT & TEMPLATE SIZES						
BOLT DIA IN.	(7) BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
3/4"	1'-6"	3"	—	12 3/4"	7 1/8"	5 5/8"
1 1/2"	3'-4"	6"	4"	17"	10"	7"
1 3/4"	3'-10"	7"	4 1/2"	19"	11 1/4"	7 3/4"
2"	4'-3"	8"	5"	21"	12 1/2"	8 1/2"
2 1/4"	4'-9"	9"	5 1/2"	23"	13 3/4"	9 1/4"

(7) Min dimensions given, longer bolts are acceptable.

- EXAMPLE:
- For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
 - For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



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".

DESIGN

STATE OF TEXAS
 JUSTIN W. CLARK
 118715
 LICENSED PROFESSIONAL ENGINEER
 APPROVAL
 JUSTIN W. CLARK, P.E. 12/20/2022 DATE

STATE OF TEXAS
 GILMER D. GASTON
 80472
 LICENSED PROFESSIONAL ENGINEER
 APPROVAL
 GILMER D. GASTON, P.E. 12/20/2022 DATE

Texas Department of Transportation
 Traffic Operations Division

TRAFFIC SIGNAL
 POLE FOUNDATION

TS-FD-12

© TxDOT August 1995		DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB
REVISIONS		CONT	SECT	JOB	HIGHWAY
5-96		2520	01	016, ETC	FM 2200
11-99		DIST	COUNTY	SHEET NO.	
1-12		SAT	MEDINA	181	

GENERAL NOTES FOR ALL ELECTRICAL WORK

- The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.
- 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.
- Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is 1/2 in. or less in diameter.
- 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.
- 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.
- 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

- 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.
- Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.
- 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"


- 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.
- 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.
- 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.
- Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

- 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.
- 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.
- 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

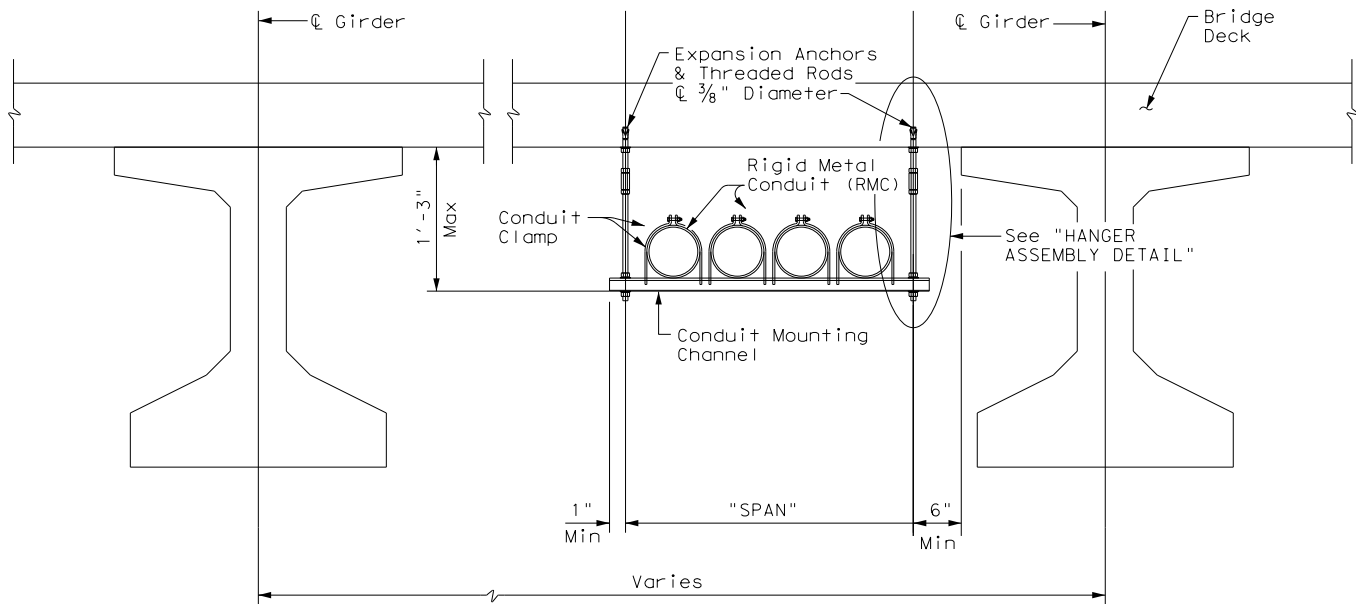
- Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures 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.
- 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.
- Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.
- 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.
- 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."
- Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.
- 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.
- 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.
- 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.
- 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.
- At all electrical services, install a 6 AWG solid copper grounding electrode conductor.
- 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).
- 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.
- 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.

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				Traffic Operations Division Standard	
<h2>ELECTRICAL DETAILS CONDUITS & NOTES</h2>					
<h3>ED(1) - 14</h3>					
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© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
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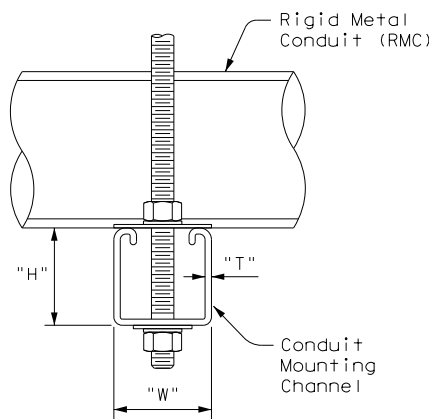
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CONDUIT HANGING DETAIL

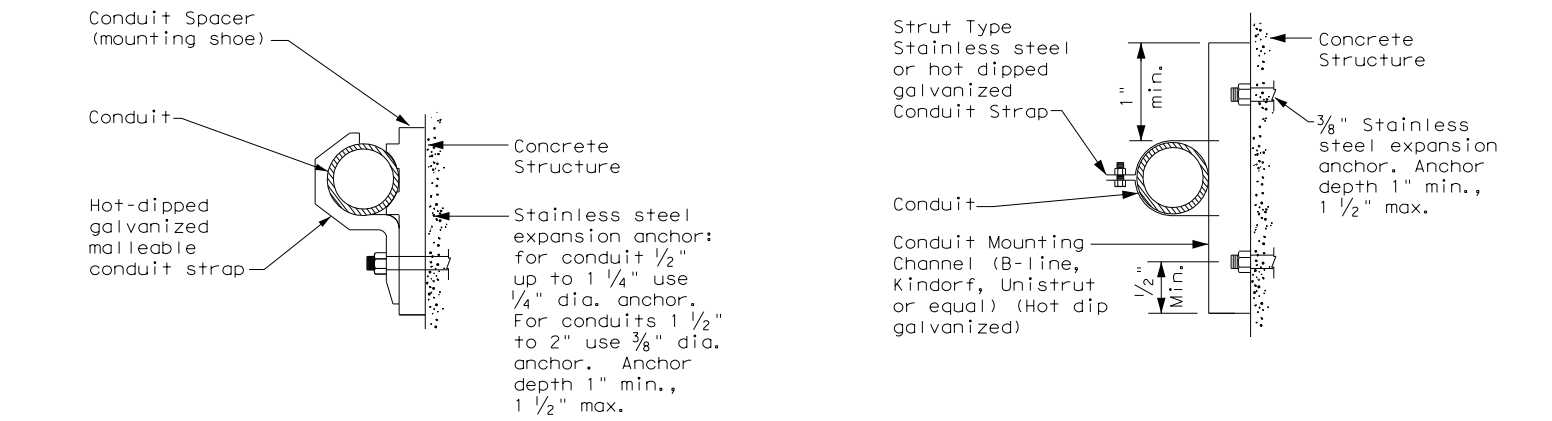
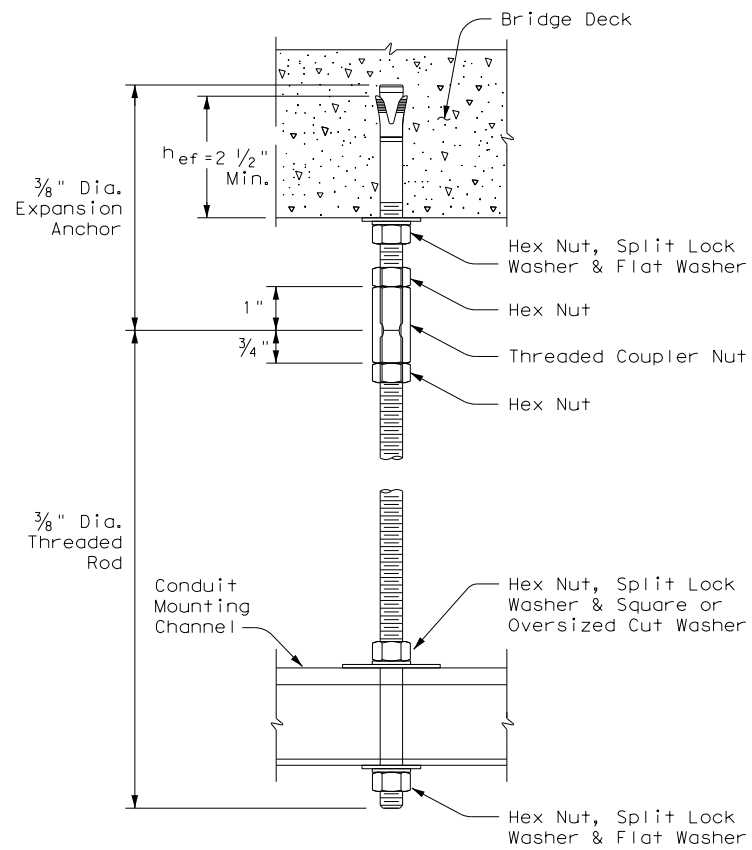
CONDUIT MOUNTING CHANNEL		
"SPAN"	"W" x "H"	"T"
less than 2'	1 5/8" x 1 3/8"	12 Ga.
2'-0" to 2'-6"	1 5/8" x 1 5/8"	12 Ga.
>2'-6" to 3'-0"	1 5/8" x 2 7/16"	12 Ga.

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



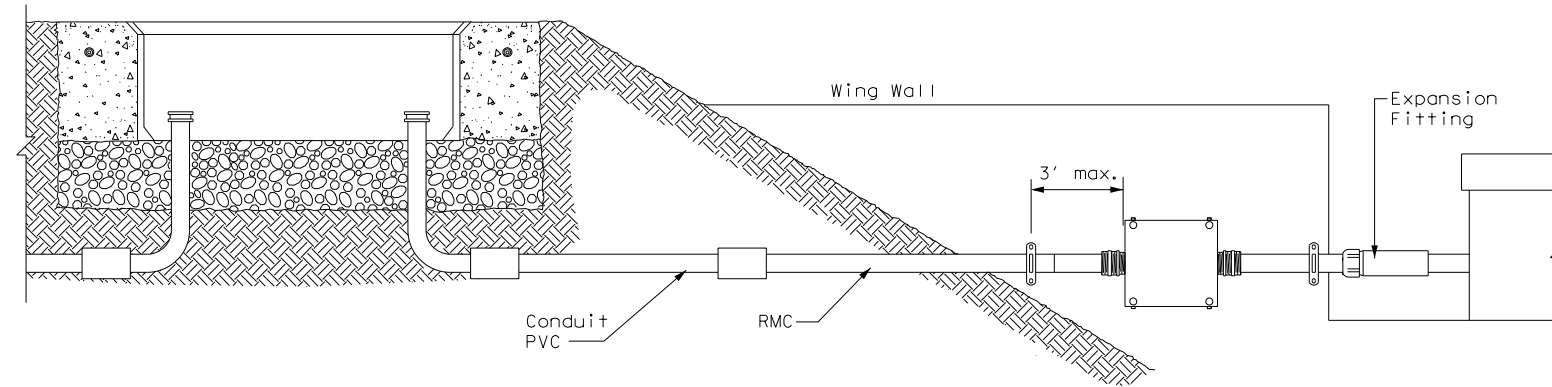
HANGER ASSEMBLY DETAIL

ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT



CONDUIT MOUNTING OPTIONS

Attachment to concrete surfaces
 See ED(1)B.2



TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

EXPANSION ANCHOR NOTES FOR BRIDGE DECK ATTACHMENT

1. Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). The chosen anchor product shall have a designated ICC-ES Evaluation Report number, and its approval status shall be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.
2. Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.
3. Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environment, both the anchor body and expansion wedge shall be stainless steel.
4. Install anchors as shown on the plans and in accordance with the anchor manufacturer's published installation instructions. Arrange a field demonstration test to evaluate the procedures and tools. The test shall be witnessed and approved by the Engineer prior to furnishing anchors on the structure.
5. Prior to hole drilling, use rebar locator to ensure clearing of existing deck strands or reinforcement. Install anchors to ensure a minimum effective embedment depth, (h_{ef}), as shown. Increase (h_{ef}) as needed to ensure sufficient thread length for proper torquing and tightening of anchors.
6. Use anchors of minimum 1600 Lbs tensile capacity (minimum of steel, concrete breakout, and concrete pullout strengths as determined by ACI 318 Appendix D) at the required minimum embedment depth (h_{ef}). No lateral loads shall be introduced after conduit installation.

		Traffic Operations Division Standard	
<h2>ELECTRICAL DETAILS CONDUIT SUPPORTS</h2>			
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		DIST	COUNTY
		SAT	MEDINA
			SHEET NO. 183

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.

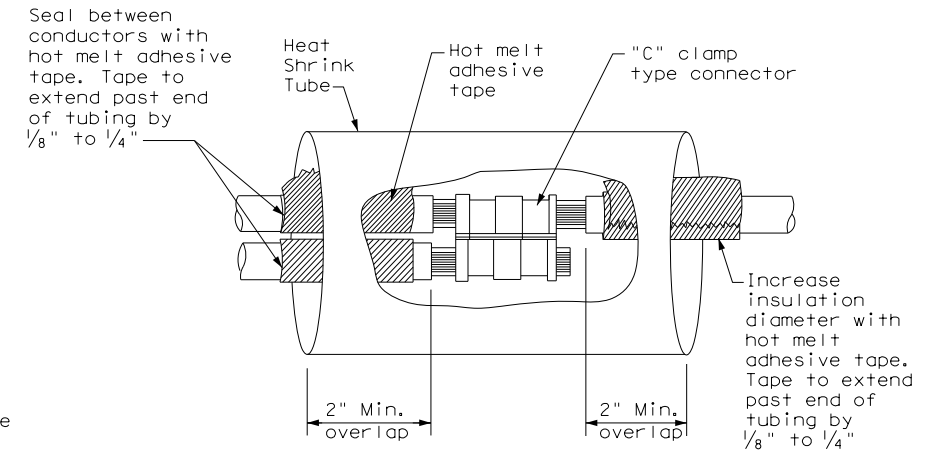
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

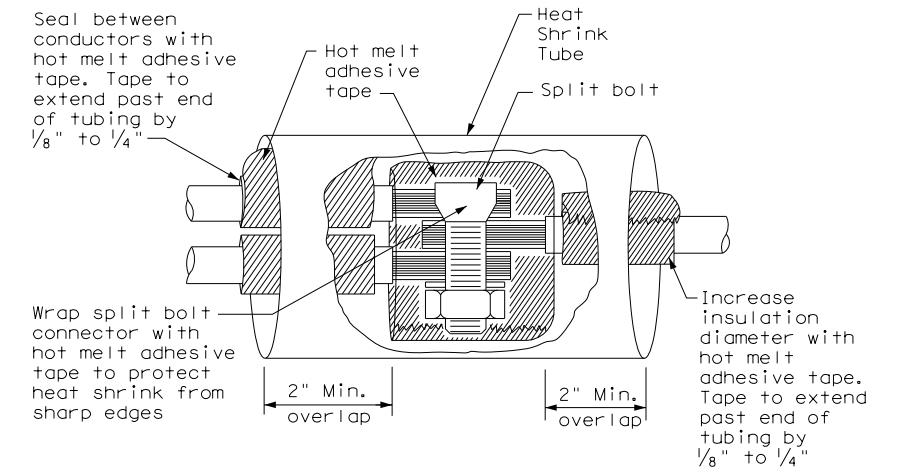
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

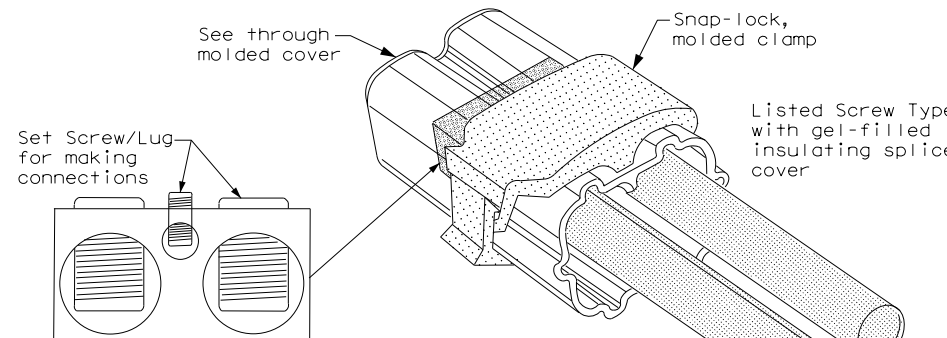
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, 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



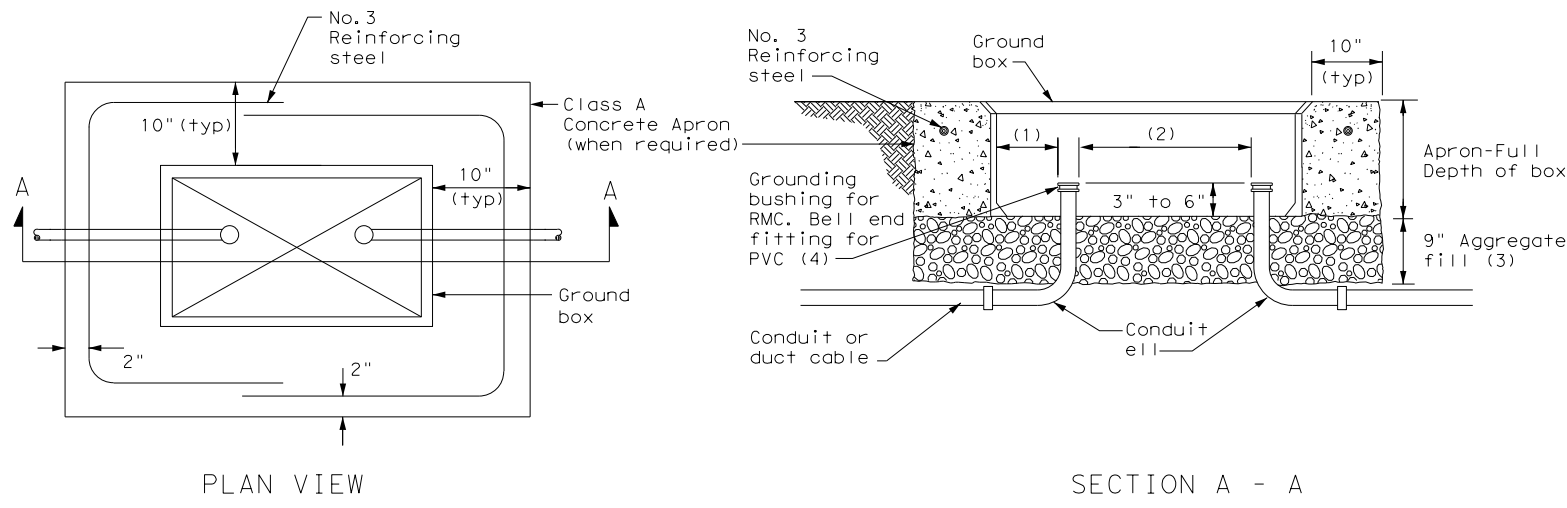
SPLICE OPTION 3
Listed Screw Type

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		Traffic Operations Division Standard		
<h2>ELECTRICAL DETAILS CONDUCTORS</h2> <h3>ED(3) - 14</h3>				
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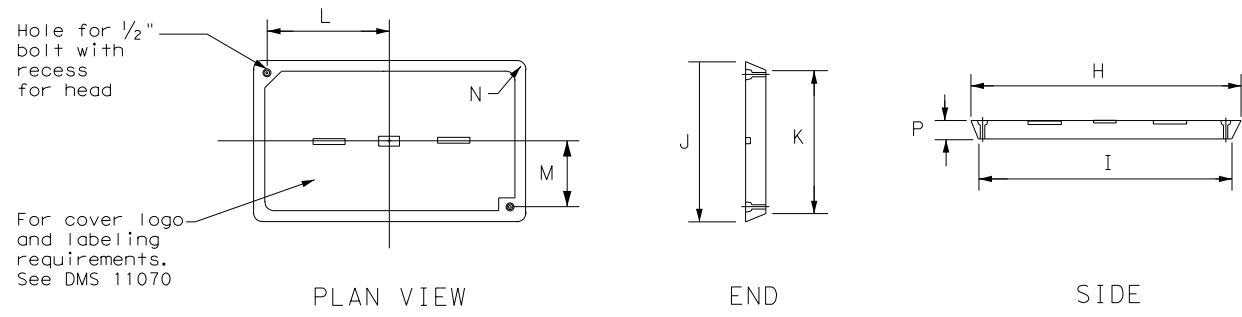


APRON FOR GROUND BOX

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

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



GROUND 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.

				Traffic Operations Division Standard	
<h2>ELECTRICAL DETAILS</h2> <h3>GROUND BOXES</h3> <h4>ED(4) - 14</h4>					
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		SAT:	MEDINA		185

ELECTRICAL SERVICES NOTES

- 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.
- 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.
- Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.
- Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.
- 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.
- 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.
- When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.
- 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.
- 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.
- Provide rigid metal conduit (RMC) for all conduits on service, except for the 1/2 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.
- 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.
- Ensure all mounting hardware and installation details of services conform to utility company specifications.
- 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 1/2 in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.
- 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 1/2 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.
- 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

- Provide threaded hub for all conduit entries into the top of enclosure.
- 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.
- 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.
- 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

- Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.
- 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.

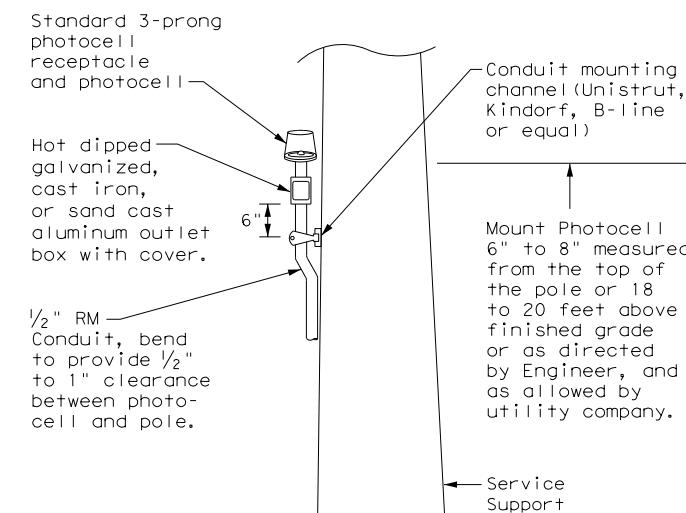
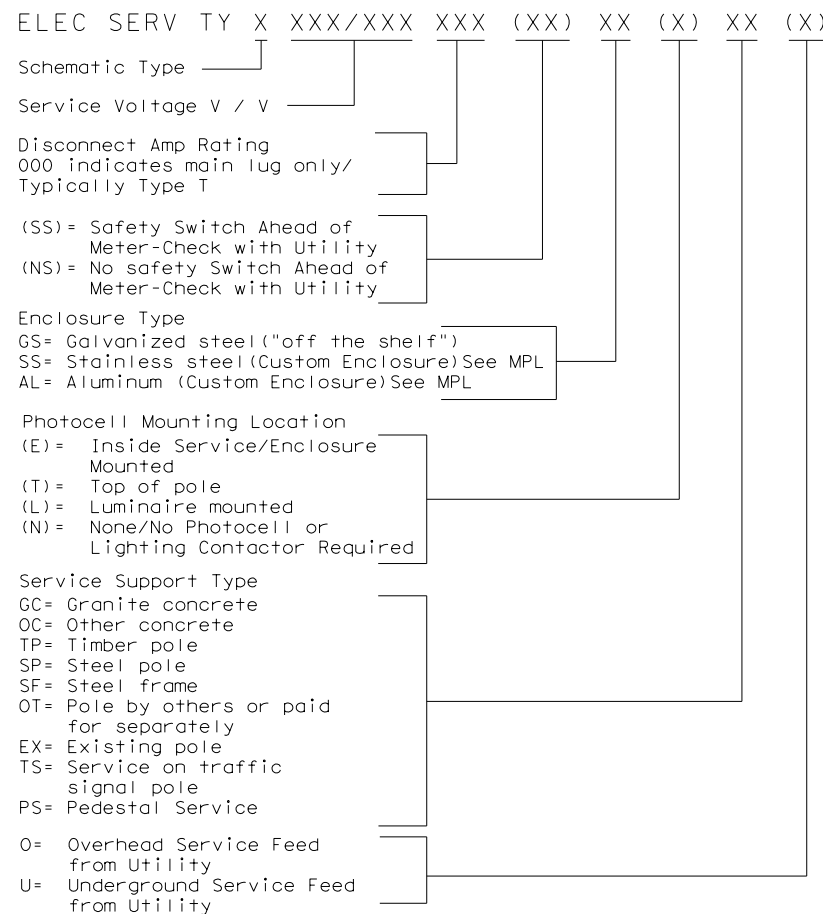
PHOTOELECTRIC CONTROL

- 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 *xS 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 1/4"	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 1/4"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

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

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

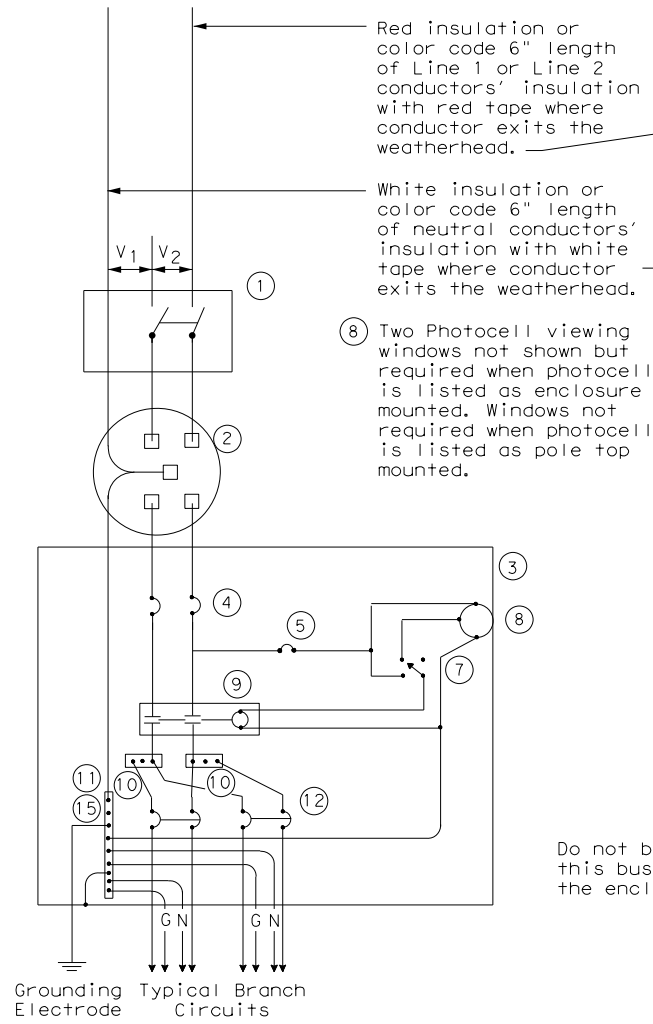
		Traffic Operations Division Standard	
<h2>ELECTRICAL DETAILS SERVICE NOTES & DATA</h2>			
<h3>ED(5) - 14</h3>			
FILE: ed5-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT October 2014	CONT	SECT	JOB
REVISIONS		2520 01	016, ETC
		FM 2200	
		DIST	COUNTY
		SAT	MEDINA
		SHEET NO. 186	

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SCHEMATIC TYPE A
THREE WIRE

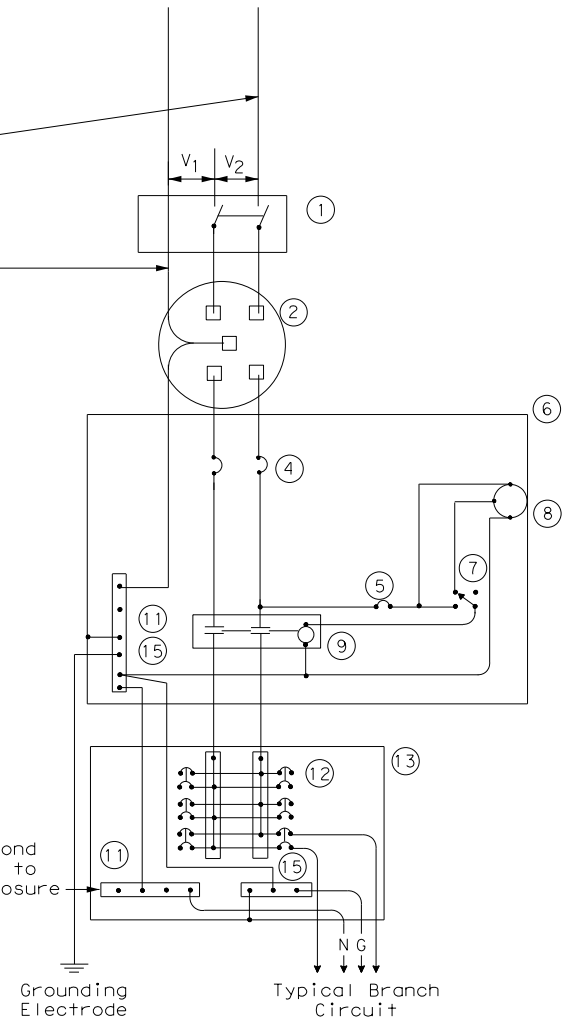
WIRING LEGEND	
————	Power Wiring
- - - - -	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

Red insulation or color code 6" length of Line 1 or Line 2 conductors' insulation with red tape where conductor exits the weatherhead.

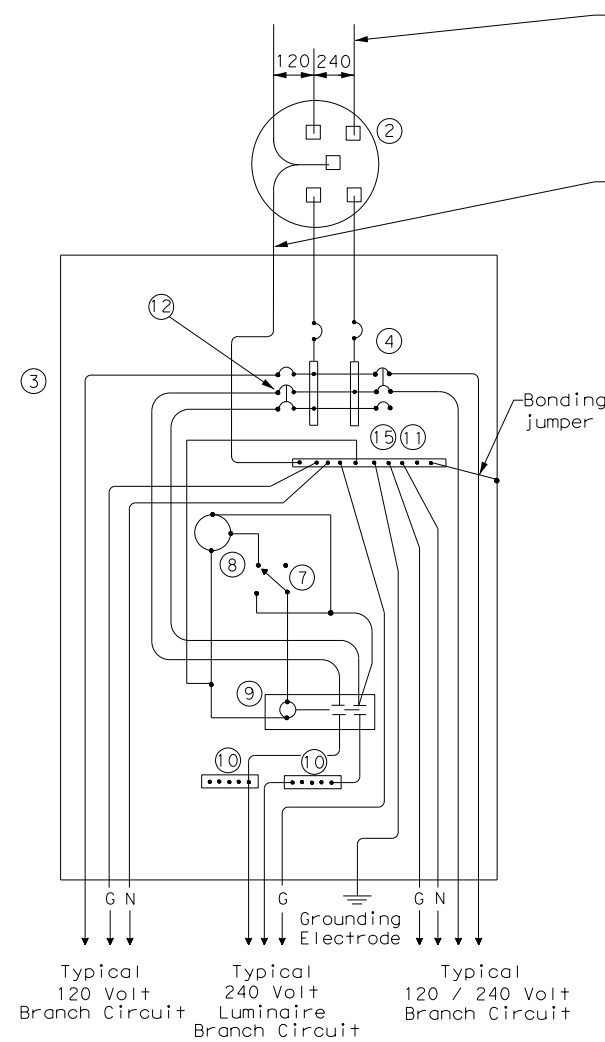
White insulation or color code 6" length of neutral conductors' insulation with white tape where conductor exits the weatherhead.

8 Two Photocell viewing windows not shown but required when photocell is listed as enclosure mounted. Windows not required when photocell is listed as pole top mounted.

Do not bond this bus to the enclosure



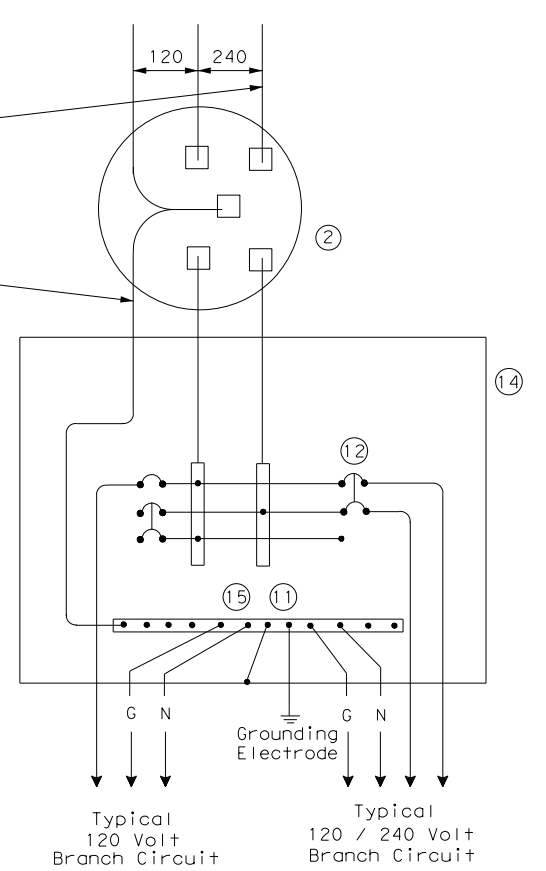
SCHEMATIC TYPE C
THREE WIRE



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

Red insulation or color code 6" length of Line 1 or Line 2 conductors' insulation with red tape where conductor exits the weatherhead.

White insulation or color code 6" length of neutral conductors' insulation with white tape where conductor exits the weatherhead.



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.

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

				Traffic Operations Division Standard	
ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES					
ED(6) - 14					
FILE:	ed6-14.dgn	DN:	TxDOT	CK:	TxDOT
© TxDOT	October 2014	CONT:	01	SECT:	016, ETC
REVISIONS		JOB:	HIGHWAY:		
		DIST:	COUNTY:	SHEET NO.	
		SAT:	MEDINA	187	

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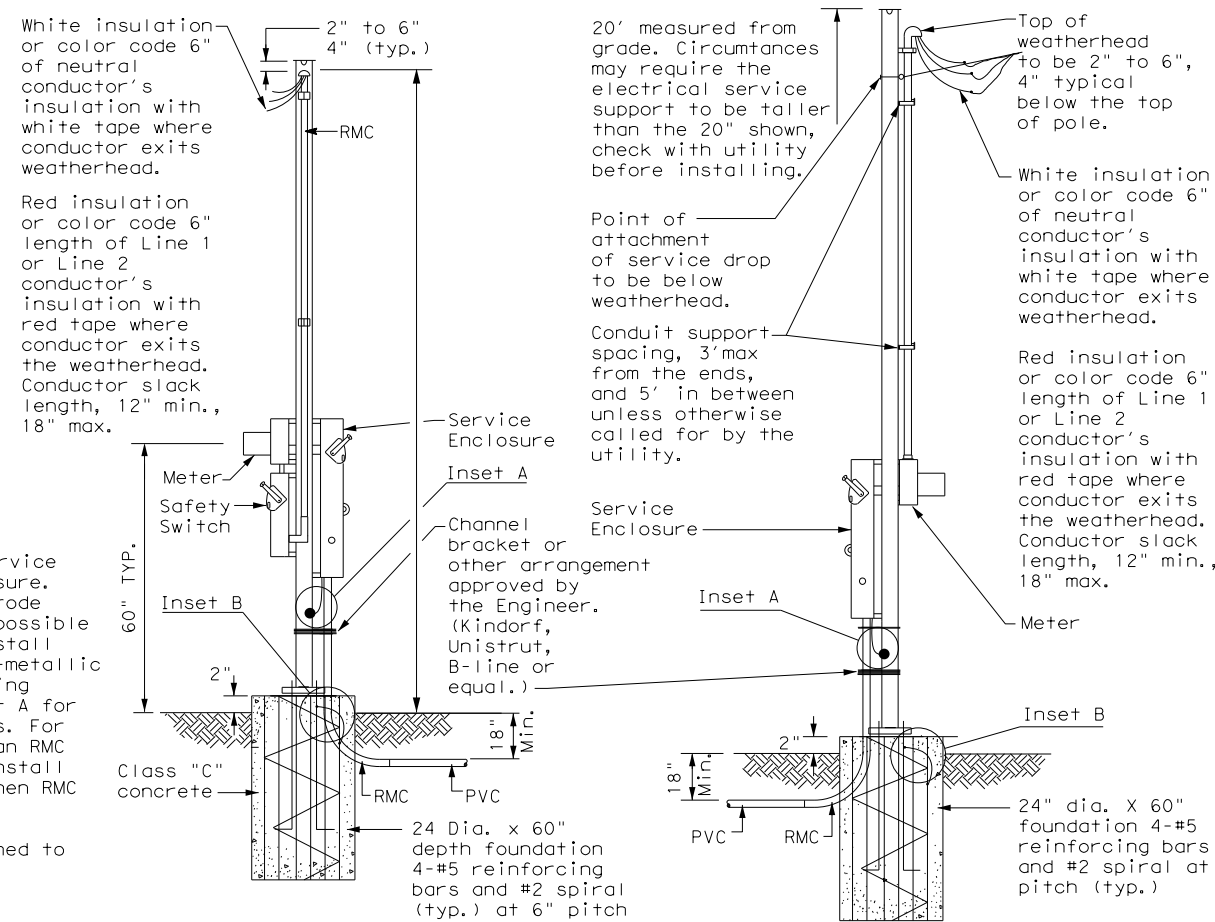
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SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

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 1/2 in. or 1 3/8 in. wide by 1 in. up to 3 3/4 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 3/4 in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized 3/4 in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 1/4 in. to 3 1/2 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 1/2 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 RMC 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 1/4" - 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.

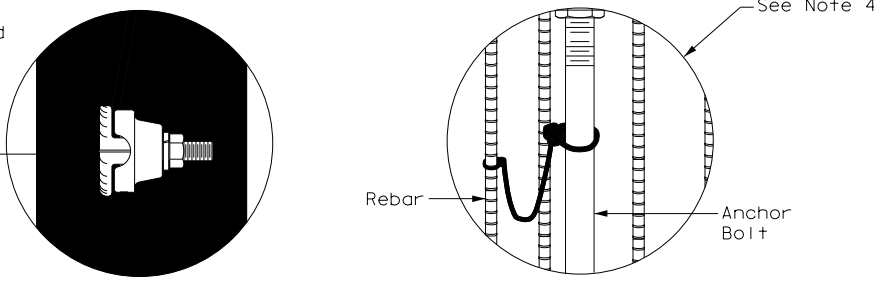
White insulation or color code 6" of neutral conductor's insulation with white tape where conductor exits weatherhead.

Red insulation or color code 6" length of Line 1 or Line 2 conductor's insulation with red tape where conductor exits the weatherhead. Conductor slack length, 12" min., 18" max.

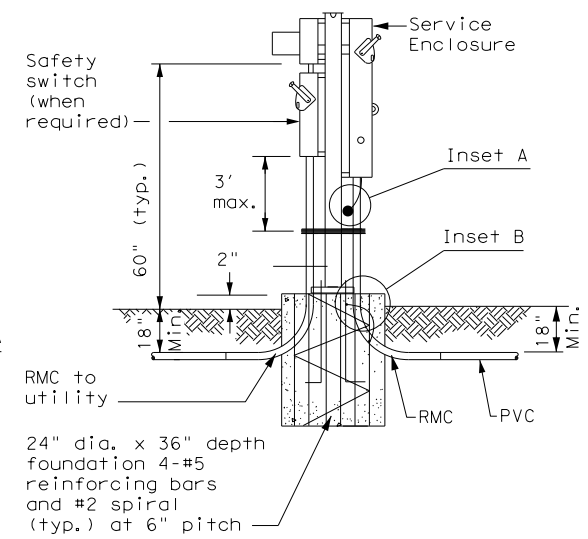


WITH SAFETY SWITCH
WITHOUT SAFETY SWITCH
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE

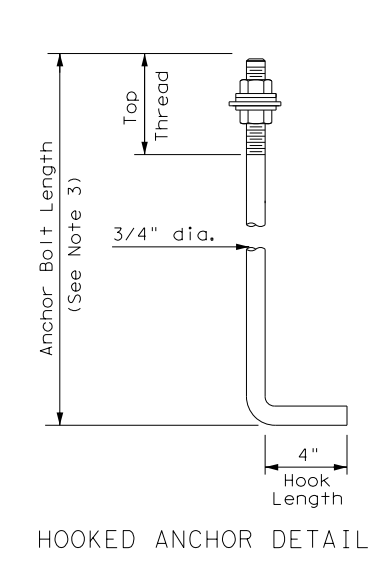
Drill, tap, and thread 1/2" X 13 UNC. Install tank ground fitting, connect electrical service grounding electrode conductor. See Note 7.



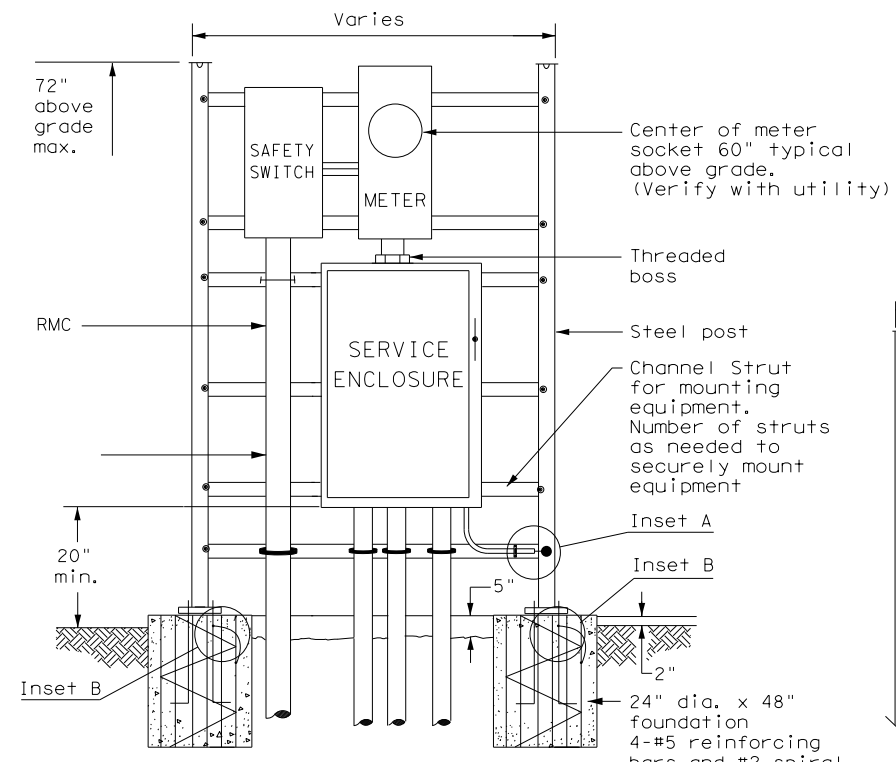
FRONT VIEW INSET A
INSET B



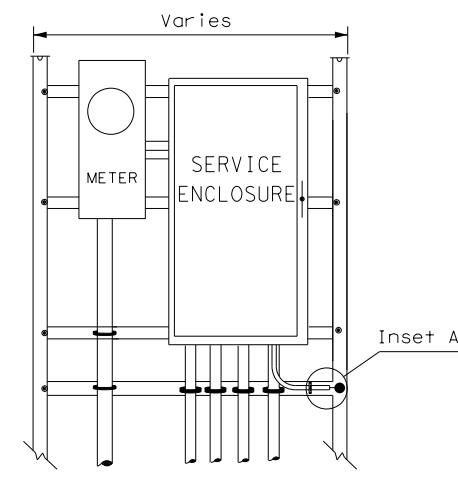
WITH SAFETY SWITCH
SERVICE SUPPORT TYPE SP (U) - UNDERGROUND SERVICE



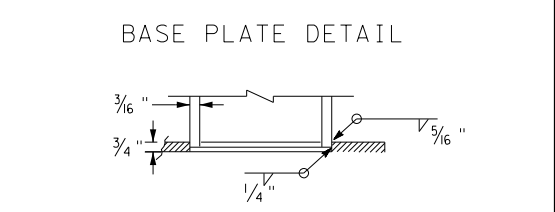
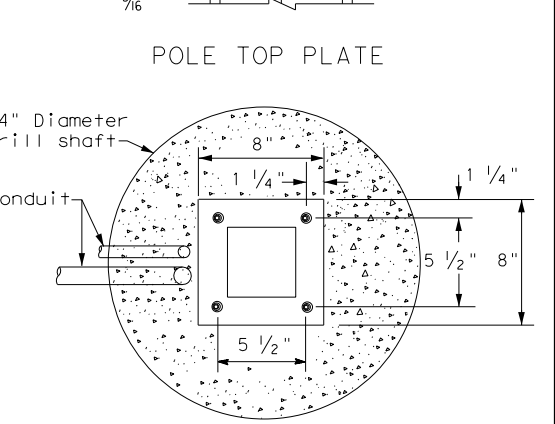
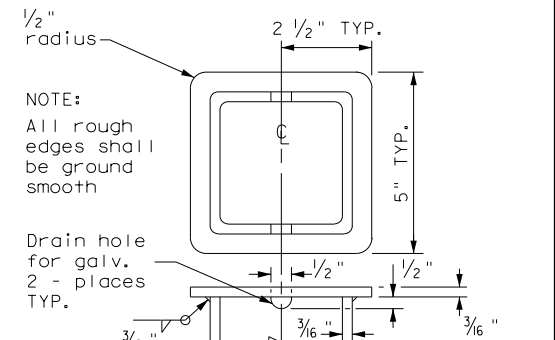
HOOKED ANCHOR DETAIL



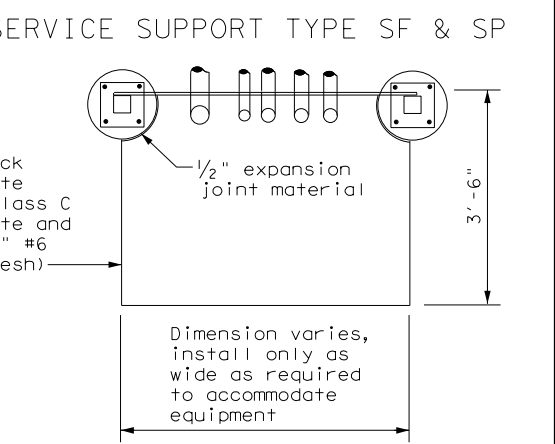
WITH SAFETY SWITCH
FRONT VIEW
SERVICE SUPPORT TYPE SF (U) - UNDERGROUND SERVICE



WITHOUT SAFETY SWITCH



BOTTOM OF POLE



TOP VIEW
SERVICE SUPPORT TY SF (O) & SF (U)

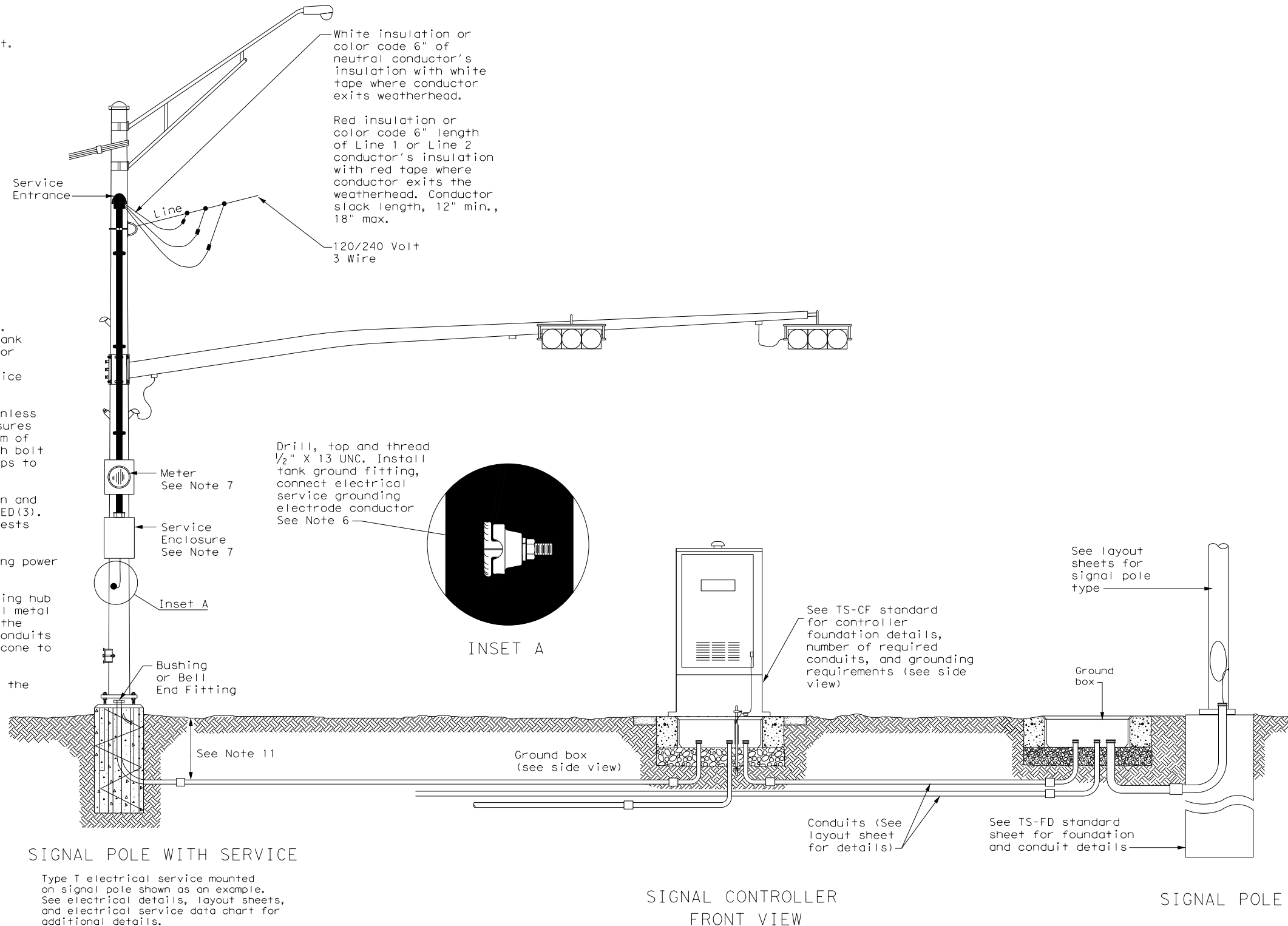


**ELECTRICAL DETAILS
SERVICE SUPPORT
TYPES SF & SP
ED(7) - 14**

FILE:	ed7-14.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
©TxDOT	October 2014	CON:	2520	SECT:	01	JOB:	016, ETC	FM:	2200
REVISIONS		DIST:	COUNTY	SHEET NO.					
		SAT:	MEDINA	188					

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 1/2 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 3/4 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".

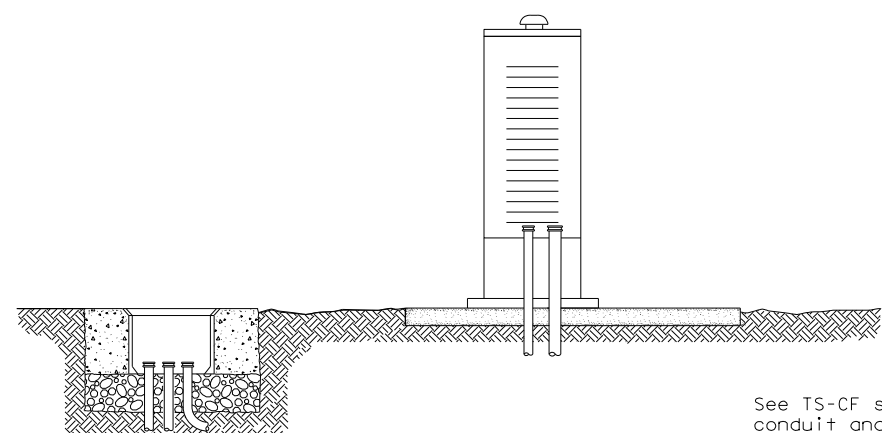


SIGNAL POLE WITH SERVICE

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.

SIGNAL CONTROLLER FRONT VIEW

SIGNAL POLE



SIGNAL CONTROLLER SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.

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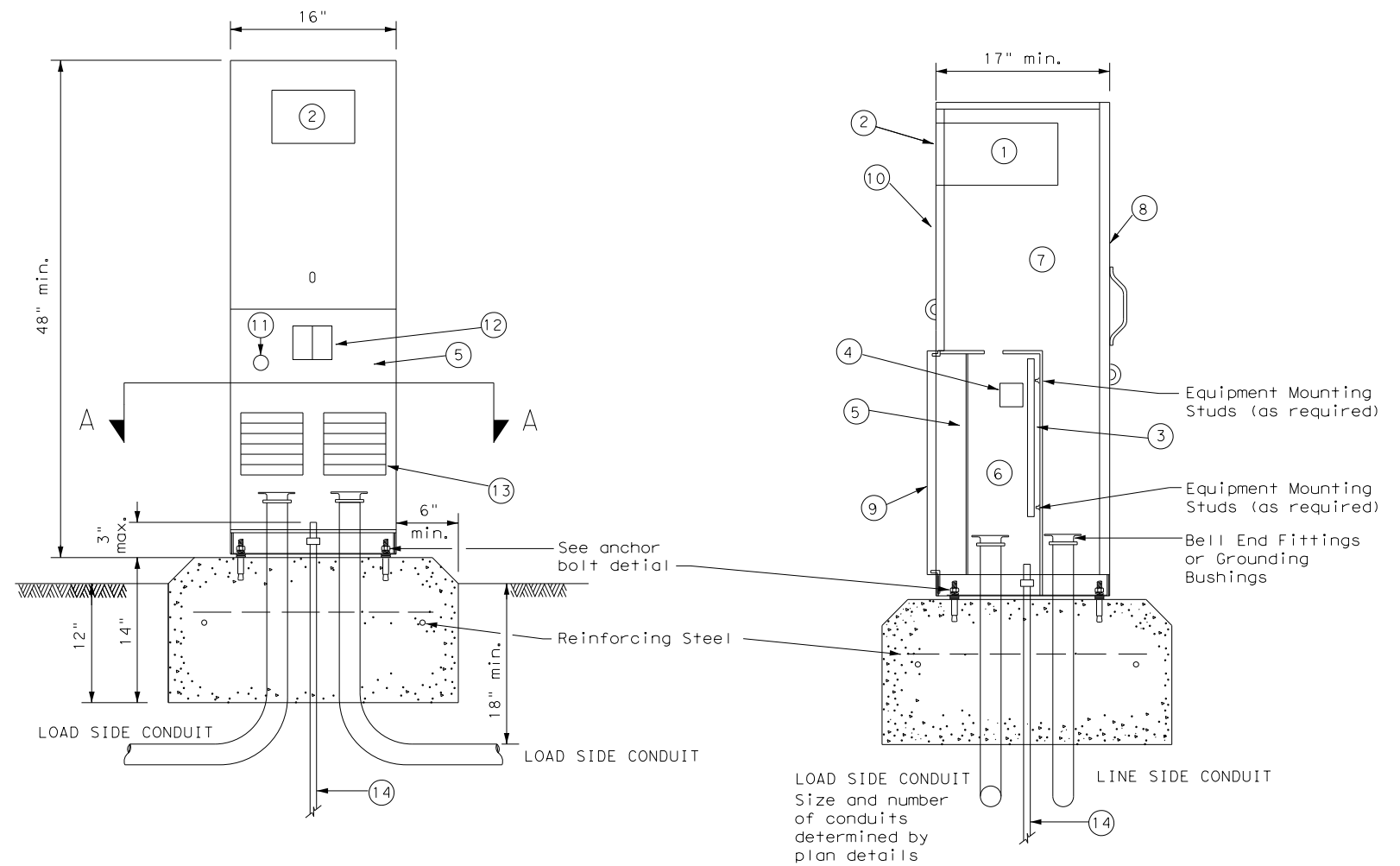
		Texas Department of Transportation		Traffic Operations Division Standard	
ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS					
ED(8) - 14					
FILE:	ed8-14.dgn	DN:	TxDOT	CK:	TxDOT
©	TxDOT	October	2014	CON:	2520
REVISIONS		SECT:	01	JOB:	016, ETC
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		DIST:		COUNTY:	
		SAT:		MEDINA	
				SHEET NO.:	189

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PEDESTAL SERVICE NOTES

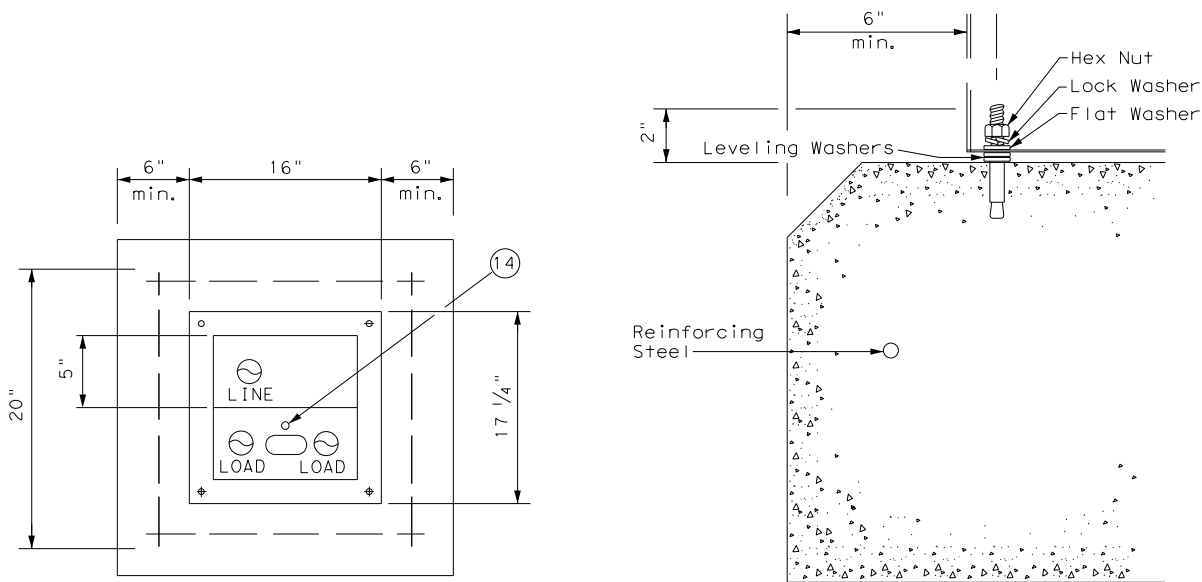
1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS)11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services." Provide pedestal electrical services as listed on the Material Producers list (MPL) on the 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 1/2 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 1/2 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 1/8 in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of 1/8 in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within 1/4 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'



**ELECTRICAL DETAILS
ELECTRICAL SERVICE SUPPORT
PEDESTAL SERVICE TYPE PS**

ED(9) - 14

FILE:	ed9-14.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY				
REVISIONS		2520	01	016, ETC	FM 2200				
		DIST	COUNTY		SHEET NO.				
		SAT	MEDINA		190				

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Drainage\1179904_DAW01.dgn

PROP DRAINAGE AREA COMPUTATIONS - RATIONAL METHOD										
AREA ID	AREA (AC)	COMPOSITE C-VALUE	CA	Tc (MIN)	I _r (IN/HR)	Q _r (CFS)	I _s (IN/HR)	Q _s (CFS)	I _m (IN/HR)	Q _m (CFS)
A-2	133.6	0.17	22.71	45.0	2.97	67.5	3.50	79.5	5.45	123.8
A-4	18.1	0.22	3.98	28.0	3.94	15.7	4.62	18.4	7.09	28.3

PROP DRAINAGE AREA COMPUTATIONS - HYDROGRAPH METHOD						
AREA ID	AREA (AC)	CN	LAG TIME (MIN)	Q _r (CFS)	Q _s (CFS)	Q _m (CFS)
A-3	454.1	53	53.3	140.6	245.7	771.0

ATLAS 14 RAINFALL DEPTHS	
STORM EVENT	24-HR RAINFALL DEPTH (IN)
2-YR	3.80
5-YR	5.05
10-YR	6.20
25-YR	7.91
50-YR	9.34
100-YR	11.00

SCALE: 1" = 500'

LEGEND

- RIGHT OF WAY
- DRAINAGE AREA BOUNDARY
- EXISTING 1' CONTOURS
- - - - - FLOW ARROW
- (X-X) INTERIOR DRAINAGE AREA

- NOTES:
- DRAINAGE AREAS DELINEATED USING USGS LIDAR DATA
 - RATIONAL FLOWS WERE CALCULATED BASED ON TXDOT INTENSITIES FROM ebd1kup-2019-vc6.2.10.x1sm
 - HEC-HMS VERSION 4.3 AND FREQUENCY STORM HYDROGRAPH METHOD USED TO CALCULATE FLOWS

DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 12/20/2022
 DATE
 LUKE REED, P.E.

APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER
 12/20/2022
 DATE
 JAMES A. LUTZ, P.E.

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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FM 2200

DRAINAGE AREA MAP

SHEET 1 OF 2

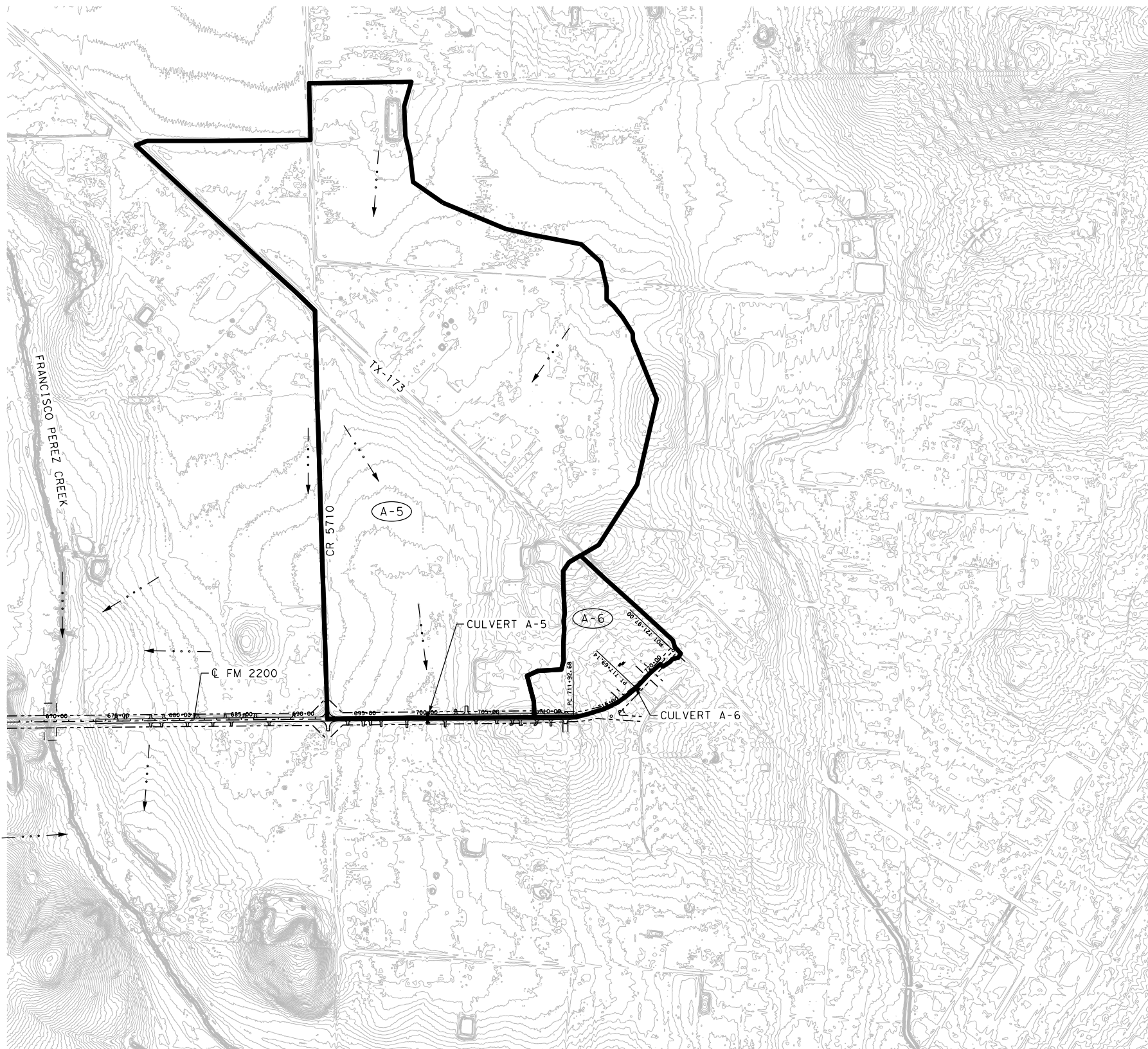
DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	191

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Drainage\1179904_DAM02.dgn

PROP DRAINAGE AREA COMPUTATIONS - HYDROGRAPH METHOD						
AREA ID	AREA (AC)	CN	LAG TIME (MIN)	Q _s (CFS)	Q _o (CFS)	Q ₁₀₀ (CFS)
A-5	254.8	82	78.1	273.2	352.7	648.0

PROP DRAINAGE AREA COMPUTATIONS - RATIONAL METHOD											
AREA ID	AREA (AC)	COMPOSITE C-VALUE	CA	T _c (MIN)	I _a (IN/HR)	Q _s (CFS)	I ₁₀₀ (IN/HR)	Q _o (CFS)	I ₁₀₀ (IN/HR)	Q ₁₀₀ (CFS)	
A-6	19.3	0.35	6.76	12.8	5.74	38.8	6.68	45.2	10.01	67.7	




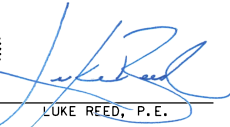
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SCALE: 1" = 500'

LEGEND

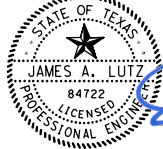
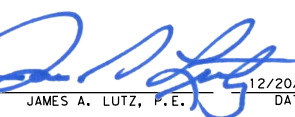
-----	RIGHT OF WAY
—————	DRAINAGE AREA BOUNDARY
—————	EXISTING 1' CONTOURS
- - - - ->	FLOW ARROW
(X-X)	INTERIOR DRAINAGE AREA

- NOTES:**
- DRAINAGE AREAS DELINEATED USING USGS LIDAR DATA
 - RATIONAL FLOWS WERE CALCULATED BASED ON TXDOT INTENSITIES FROM ebd1kup-2019-vc6.2.10.x1sm
 - HEC-HMS VERSION 4.3 AND FREQUENCY STORM HYDROGRAPH METHOD USED TO CALCULATE FLOWS

DESIGN



 LUKE REED, P.E. 12/20/2022
DATE

APPROVAL




 JAMES A. LUTZ, P.E. 12/20/2022
DATE

ATLAS 14 RAINFALL DEPTHS	
STORM EVENT	24-HR RAINFALL DEPTH (IN)
2-YR	3.80
5-YR	5.05
10-YR	6.20
25-YR	7.91
50-YR	9.34
100-YR	11.00

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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DRAINAGE AREA MAP

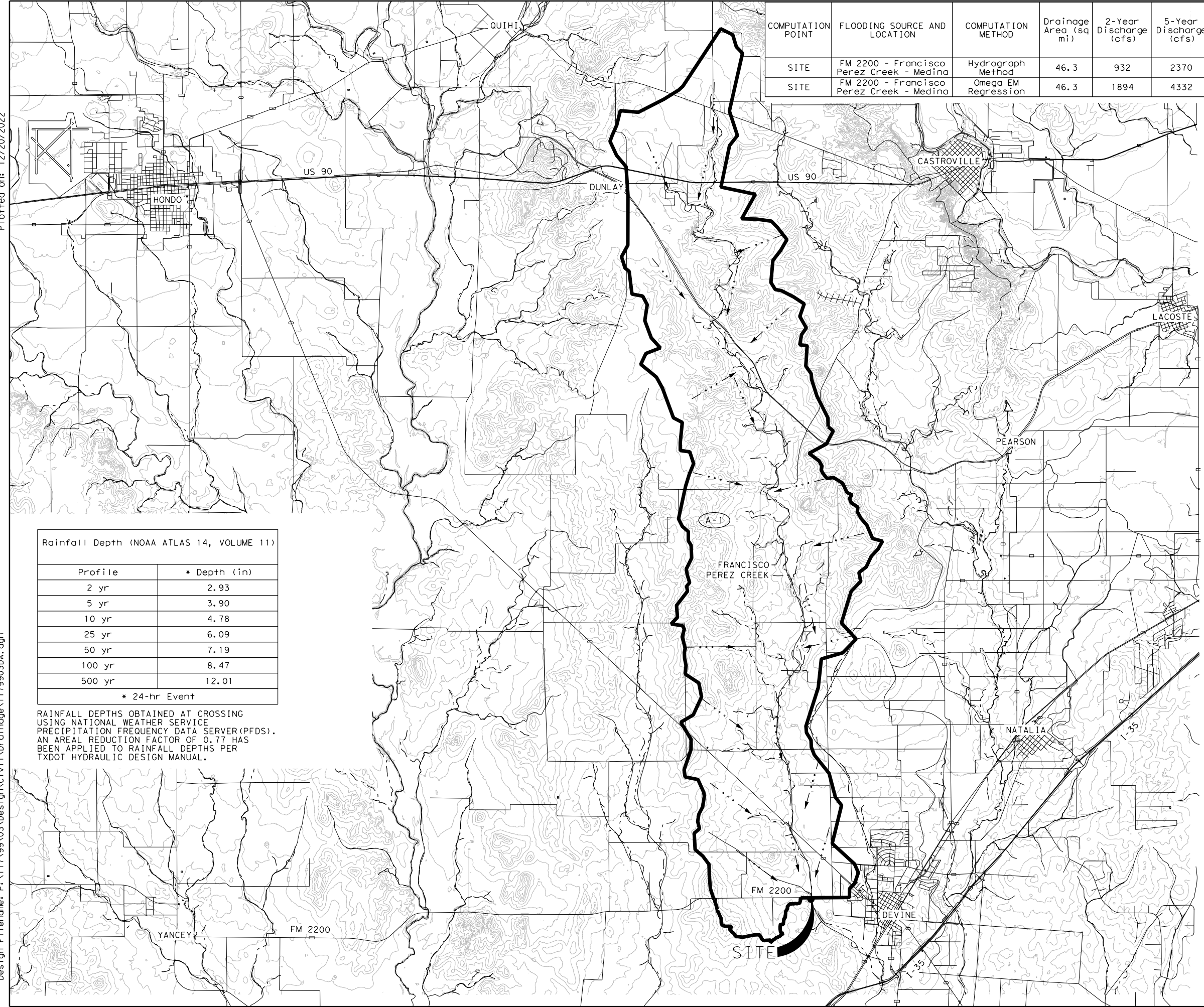
SHEET 2 OF 2

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	MEDINA	2520	01
			016, ETC	192

Plotted on: 12/20/2022

Design File name: P:\117\99\03\Design\Civil\Drainage\11799030A.dgn

COMPUTATION POINT	FLOODING SOURCE AND LOCATION	COMPUTATION METHOD	Drainage Area (sq mi)	2-Year Discharge (cfs)	5-Year Discharge (cfs)	10-Year Discharge (cfs)	25-Year Discharge (cfs)	50-Year Discharge (cfs)	100-Year Discharge (cfs)	500-Year Discharge (cfs)
SITE	FM 2200 - Francisco Perez Creek - Medina	Hydrograph Method	46.3	932	2370	4085	7122	9991	13494	23977
SITE	FM 2200 - Francisco Perez Creek - Medina	Omega EM Regression	46.3	1894	4332	6399	9746	12758	16366	27049



LEGEND

- STREAM
- DRAINAGE AREA BOUNDARY
- EXISTING 10' CONTOURS
- FLOW ARROW
- (X-X) INTERIOR DRAINAGE AREA

- NOTES:**
1. DRAINAGE AREAS DELINEATED USING USGS LIDAR DATA
 2. HEC-HMS VERSION 4.3 AND FREQUENCY STORM HYDROGRAPH METHOD USED TO CALCULATE FLOWS
 3. FLOWS WERE ALSO ESTIMATED USING OMEGA EM REGRESSION EQUATIONS. SEE SHEET 203 FOR CALCULATIONS.
 4. HYDROGRAPH METHOD WAS SELECTED AS THE PREFERRED METHOD.

Rainfall Depth (NOAA ATLAS 14, VOLUME 11)

Profile	* Depth (in)
2 yr	2.93
5 yr	3.90
10 yr	4.78
25 yr	6.09
50 yr	7.19
100 yr	8.47
500 yr	12.01

* 24-hr Event

RAINFALL DEPTHS OBTAINED AT CROSSING USING NATIONAL WEATHER SERVICE PRECIPITATION FREQUENCY DATA SERVER (PFDS). AN AREAL REDUCTION FACTOR OF 0.77 HAS BEEN APPLIED TO RAINFALL DEPTHS PER TXDOT HYDRAULIC DESIGN MANUAL.

DESIGN

LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

JAMES A. LUTZ, P.E. 12/20/2022 DATE

SCALE: 1" = 10,000'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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FM 2200 AT FRANCISCO PEREZ CREEK

DRAINAGE AREA MAP

DON:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	015	193

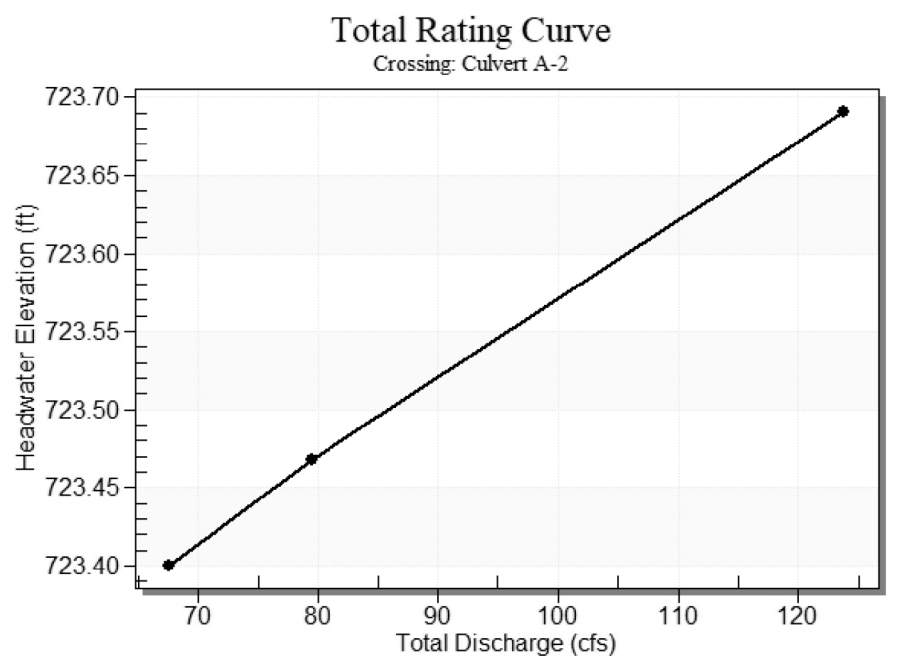
Plotted on: 12/20/2022

Design File Name: P:\117\99\04\Des\ign\Civil\Drainage\1179904_HDS_CULVA2-EXIST.dgn

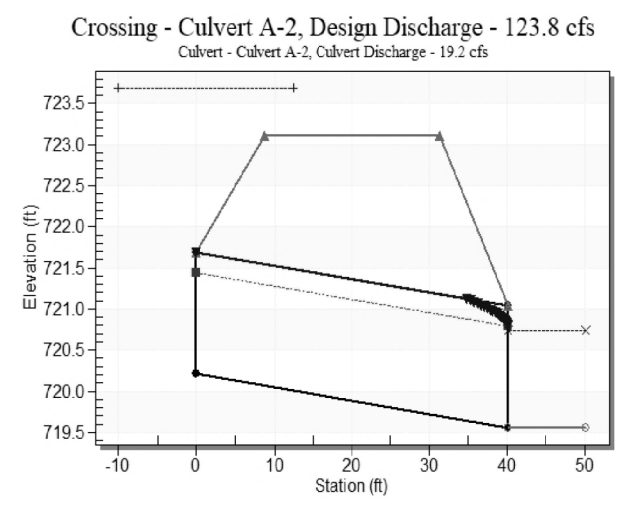
Table 1 - Summary of Culvert Flows at Crossing: Culvert A-2

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert A-2 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
723.40	5 year	67.50	18.25	49.25	5
723.47	10 year	79.50	18.47	60.86	3
723.69	100 year	123.80	19.19	104.56	3
722.77	Overtopping	16.05	16.05	0.00	Overtopping

Rating Curve Plot for Crossing: Culvert A-2



Water Surface Profile Plot for Culvert: Culvert A-2



Site Data - Culvert A-2

Site Data Option: Culvert Invert Data
 Inlet Station: 0.00 ft
 Inlet Elevation: 720.21 ft
 Outlet Station: 40.10 ft
 Outlet Elevation: 719.56 ft
 Number of Barrels: 1

Culvert Data Summary - Culvert A-2

Barrel Shape: Pipe Arch
 Barrel Span: 28.90 in
 Barrel Rise: 17.80 in
 Barrel Material: Steel or Aluminum
 Embedment: 0.00 in
 Barrel Manning's n: 0.0250
 Culvert Type: Straight
 Inlet Configuration: Mitered
 Inlet Depression: None

Tailwater Channel Data - Culvert A-2

Tailwater Channel Option: Trapezoidal Channel
 Bottom Width: 21.00 ft
 Side Slope (H:V): 10.00 (:1)
 Channel Slope: 0.0070
 Channel Manning's n: 0.0350
 Channel Invert Elevation: 719.56 ft

Roadway Data for Crossing: Culvert A-2

Roadway Profile Shape: Irregular Roadway Shape (coordina
 Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	723.11
1	25.14	722.99
2	54.72	722.77

Roadway Surface: Paved
 Roadway Top Width: 22.50 ft

Table 2 - Culvert Summary Table: Culvert A-2

Discharge Names	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)
5 year	67.50	18.25	723.40	2.965	3.190	7-M2c	1.483	1.206	1.206	0.851	7.252	2.690
10 year	79.50	18.47	723.47	3.011	3.256	7-M2c	1.483	1.213	1.213	0.929	7.307	2.825
100 year	123.80	19.19	723.69	3.168	3.482	7-M2c	1.483	1.235	1.235	1.175	7.492	3.218

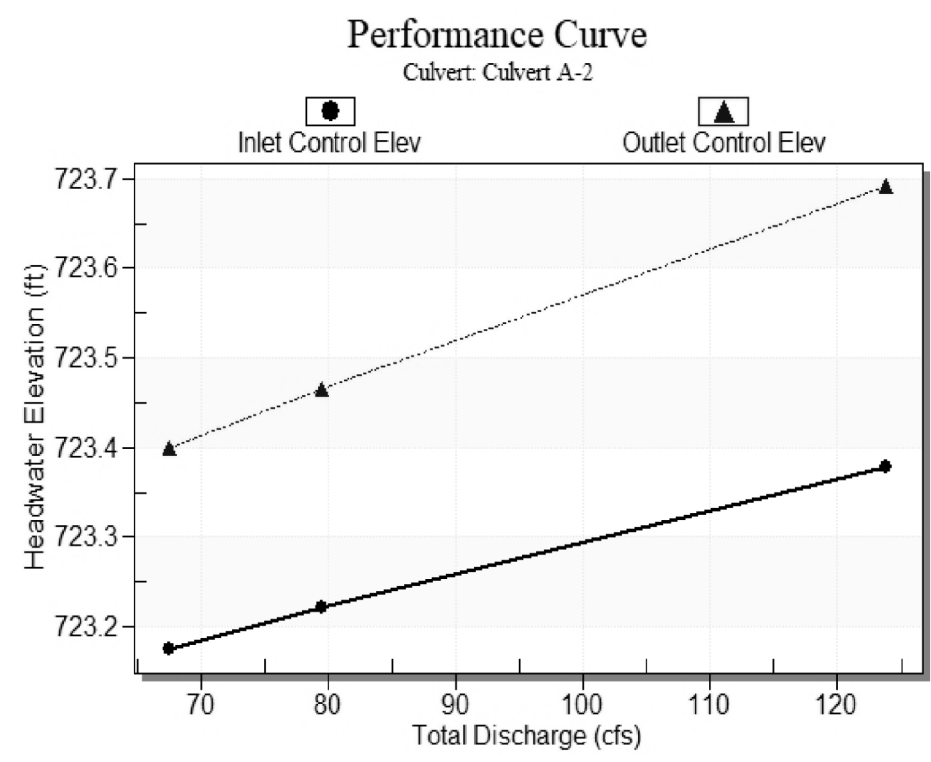
 Straight Culvert
 Inlet: Elevation (invert): 720.21 ft, Outlet Elevation (invert): 719.56 ft
 Culvert Length: 40.11 ft, Culvert Slope: 0.0162

Table 3 - Downstream Channel Rating Curve (Crossing: Culvert A-2)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
67.50	720.41	0.85	2.69	0.37	0.58
79.50	720.49	0.93	2.82	0.41	0.59
123.80	720.73	1.17	3.22	0.51	0.61

Crossing Discharge Data
 Discharge Selection Method: Recurrence

Culvert Performance Curve Plot: Culvert A-2



DESIGN

LUKE REED, P.E.
 12/20/2022
 DATE

APPROVAL

JAMES A. LUTZ, P.E.
 12/20/2022
 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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FM 2200
CULVERT A-2
EXIST HYDRAULIC
DATA SHEET
 STA 597+98

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	194

Plotted on: 12/20/2022

Design File Name: P:\117\99\04\Design\Civil\Drainage\1179904_HDS_CULVA2_PROP.dgn

Table 1 - Summary of Culvert Flows at Crossing: Culvert A-2

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert A-2 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
722.33	5 year	67.50	67.50	0.00	1
722.80	10 year	79.50	76.22	3.14	13
723.14	100 year	123.80	82.00	41.72	5
722.62	Overtopping	73.05	73.05	0.00	Overtopping

Rating Curve Plot for Crossing: Culvert A-2

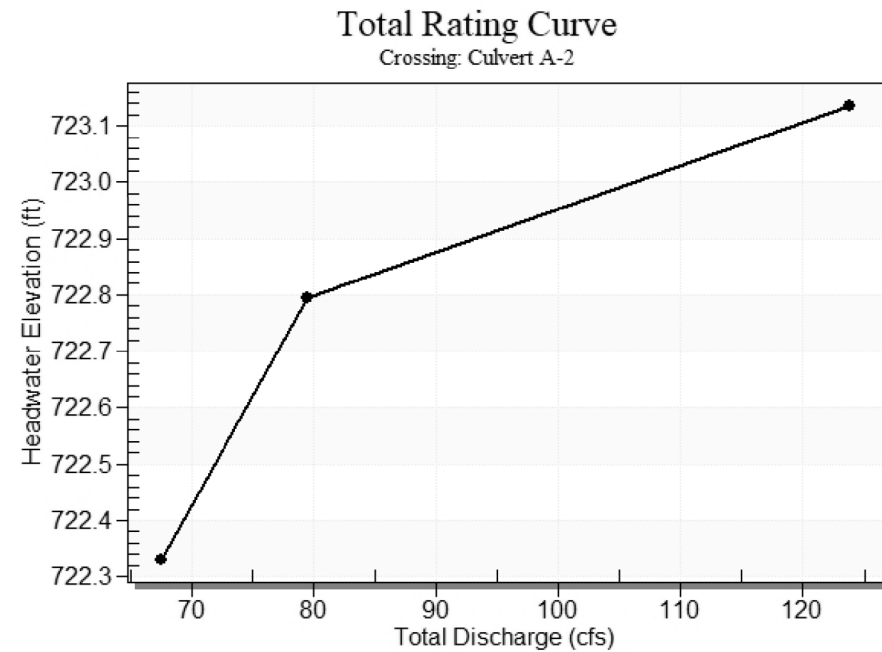


Table 2 - Culvert Summary Table: Culvert A-2

Discharge Names	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)
5 year	67.50	67.50	722.33	3.092	2.863	5-S2n	1.534	1.782	1.609	1.207	8.389	2.318
10 year	79.50	76.22	722.80	3.555	3.274	5-S2n	1.673	1.932	1.755	1.323	8.687	2.443
100 year	123.80	82.00	723.14	3.896	3.553	5-S2n	1.763	2.000	1.995	1.662	8.221	2.807

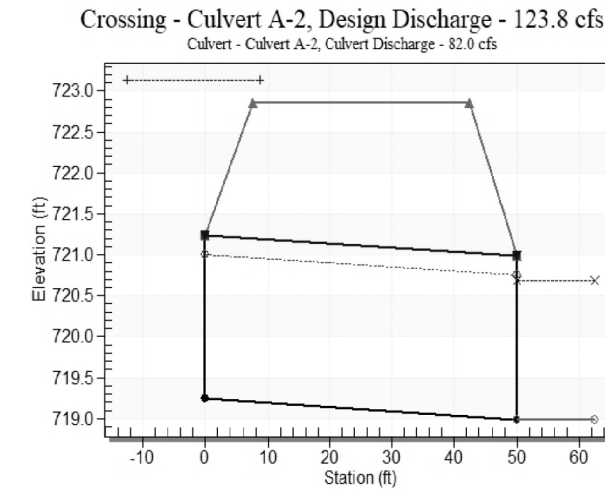
 Straight Culvert
 Inlet Elevation (invert): 719.24 ft, Outlet Elevation (invert): 718.99 ft
 Culvert Length: 50.00 ft, Culvert Slope: 0.0050

Table 3 - Downstream Channel Rating Curve (Crossing: Culvert A-2)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
67.50	720.20	1.21	2.32	0.23	0.41
79.50	720.31	1.32	2.44	0.25	0.41
123.80	720.68	1.69	2.81	0.32	0.43

Crossing Discharge Data
 Discharge Selection Method: Recurrence

Water Surface Profile Plot for Culvert: Culvert A-2



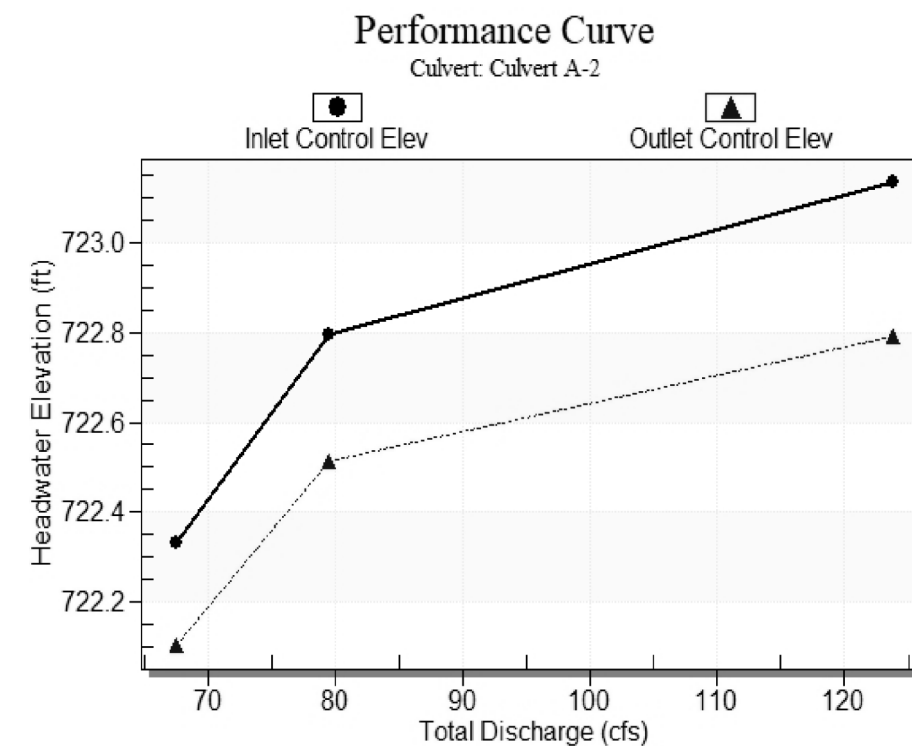
Site Data - Culvert A-2

Site Data Option: Culvert Invert Data
 Inlet Station: 0.00 ft
 Inlet Elevation: 719.24 ft
 Outlet Station: 50.00 ft
 Outlet Elevation: 718.99 ft
 Number of Barrels: 1

Culvert Data Summary - Culvert A-2

Barrel Shape: Concrete Box
 Barrel Span: 5.00 ft
 Barrel Rise: 2.00 ft
 Barrel Material: Concrete
 Embedment: 0.00 in
 Barrel Manning's n: 0.0120
 Culvert Type: Straight
 Inlet Configuration: Square Edge (30-75° flare) Wingwall
 Inlet Depression: None

Culvert Performance Curve Plot: Culvert A-2



Tailwater Channel Data - Culvert A-2

Tailwater Channel Option: Trapezoidal Channel
 Bottom Width: 19.30 ft
 Side Slope (H:V): 4.00 (1:1)
 Channel Slope: 0.0030
 Channel Manning's n: 0.0350
 Channel Invert Elevation: 718.99 ft

Roadway Data for Crossing: Culvert A-2

Roadway Profile Shape: Irregular Roadway Shape (coordina
 Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	722.86
1	15.13	722.79
2	54.74	722.62

 Roadway Surface: Paved
 Roadway Top Width: 35.00 ft

DESIGN

LUKE REED, P.E.
DATE: 12/20/2022

APPROVAL

JAMES A. LUTZ, P.E.
DATE: 12/20/2022

REV. NO.	DATE	DESCRIPTION	BY

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800

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FM 2200
CULVERT A-2
PROP HYDRAULIC
DATA SHEET
 STA 597+88

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	195

Plotted on: 12/20/2022

Design File Name: P:\117\99\04\Design\Civil\Drainage\1179904_HDS_CULVA3-EXIST.dgn

Table 1 - Summary of Culvert Flows at Crossing: Culvert A-3

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert A-3 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
667.04	5 year	140.60	55.03	85.23	9
667.24	10 year	245.70	57.98	187.45	6
667.88	100 year	771.00	67.33	703.42	3
666.44	Overtopping	43.50	43.50	0.00	Overtopping

Rating Curve Plot for Crossing: Culvert A-3

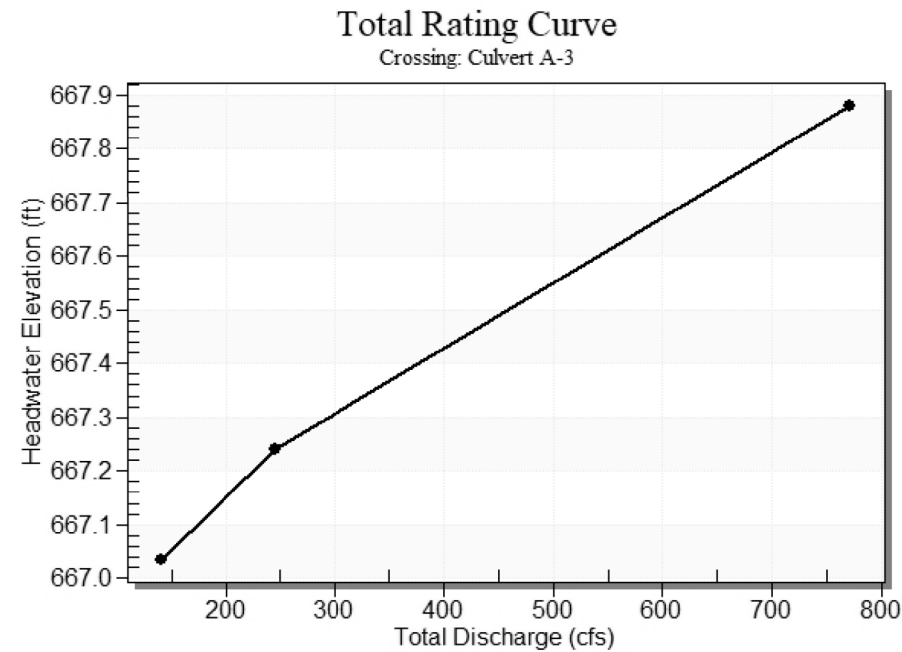


Table 2 - Culvert Summary Table: Culvert A-3

Discharge Names	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)
5 year	140.60	55.03	667.04	2.119	2.459	7-M2t	1.483	1.038	1.272	1.272	5.264	3.721
10 year	245.70	57.98	667.24	2.252	3.005	4-FFf	1.483	1.068	1.483	1.677	5.155	4.337
100 year	771.00	67.33	667.88	2.728	4.782	4-FFf	1.483	1.157	1.483	2.873	5.986	5.867

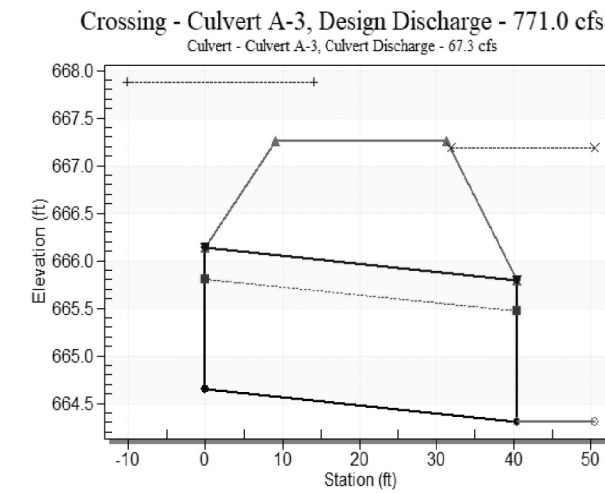
 Straight Culvert
 Inlet Elevation (invert): 664.65 ft, Outlet Elevation (invert): 664.31 ft
 Culvert Length: 40.40 ft, Culvert Slope: 0.0084

Table 3 - Downstream Channel Rating Curve (Crossing: Culvert A-3)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
140.60	665.58	1.27	3.72	0.71	0.69
245.70	665.99	1.68	4.34	0.94	0.72
771.00	667.18	2.87	5.87	1.61	0.78

Crossing Discharge Data
 Discharge Selection Method: Recurrence

Water Surface Profile Plot for Culvert: Culvert A-3



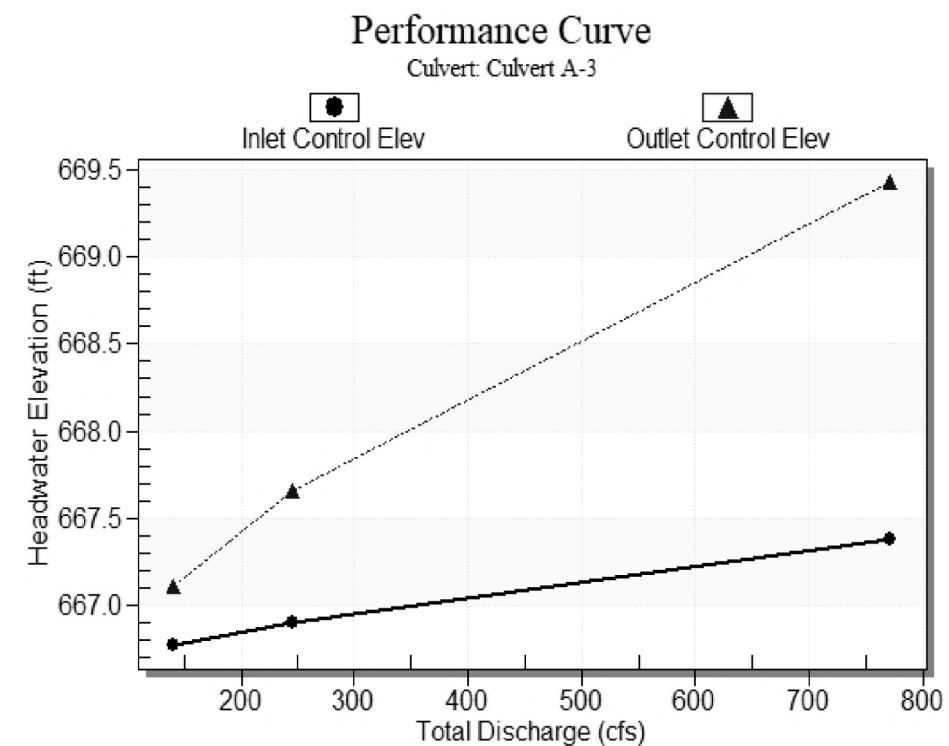
Site Data - Culvert A-3

Site Data Option: Culvert Invert Data
 Inlet Station: 0.00 ft
 Inlet Elevation: 664.65 ft
 Outlet Station: 40.40 ft
 Outlet Elevation: 664.31 ft
 Number of Barrels: 4

Culvert Data Summary - Culvert A-3

Barrel Shape: Pipe Arch
 Barrel Span: 28.90 in
 Barrel Rise: 17.80 in
 Barrel Material: Steel or Aluminum
 Embedment: 0.00 in
 Barrel Manning's n: 0.0250
 Culvert Type: Straight
 Inlet Configuration: Projecting
 Inlet Depression: None

Culvert Performance Curve Plot: Culvert A-3



Tailwater Channel Data - Culvert A-3

Tailwater Channel Option: Trapezoidal Channel
 Bottom Width: 17.00 ft
 Side Slope (H:V): 10.00 (1:1)
 Channel Slope: 0.0090
 Channel Manning's n: 0.0350
 Channel Invert Elevation: 664.31 ft

Roadway Data for Crossing: Culvert A-3

Roadway Profile Shape: Irregular Roadway Shape (coordina
 Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	667.26
1	20.88	667.18
2	49.22	667.00
3	209.70	666.44

 Roadway Surface: Paved
 Roadway Top Width: 22.30 ft

DESIGN

APPROVAL

REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800

Texas Department of Transportation
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FM 2200
CULVERT A-3
 EXIST HYDRAULIC
 DATA SHEET
 STA 639+96

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	196

Plotted on: 12/20/2022

Design File Name: P:\117\99\04\Design\Civil\Drainage\1179904_HDS_CULVA3_PROP.dgn

Table 1 - Summary of Culvert Flows at Crossing: Culvert A-3

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert A-3 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
666.02	5 year	140.60	140.60	0.00	1
666.59	10 year	245.70	182.89	62.45	8
667.34	100 year	771.00	227.56	543.21	4
666.06	Overtopping	144.11	144.11	0.00	Overtopping

Rating Curve Plot for Crossing: Culvert A-3

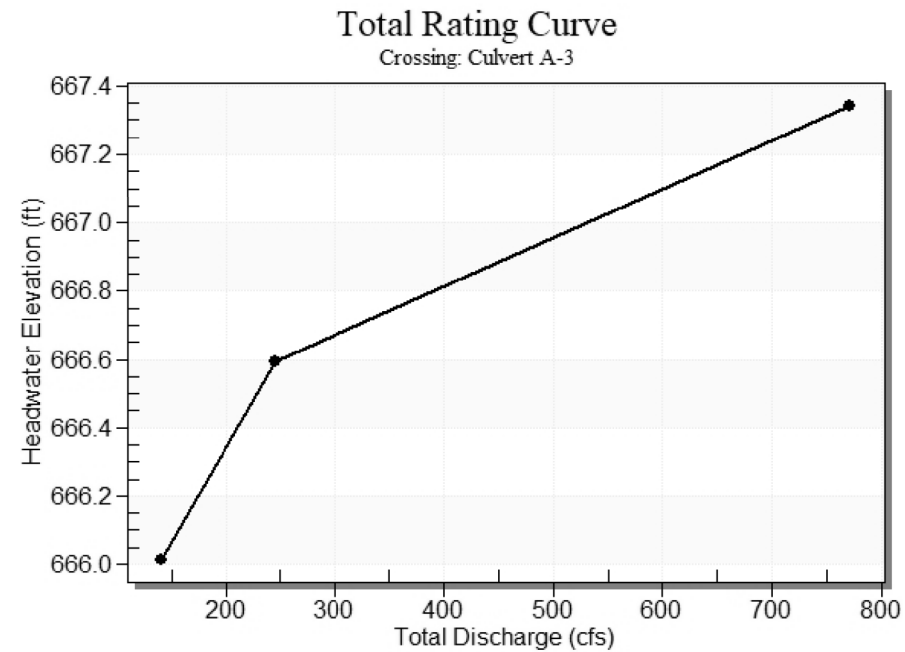


Table 2 - Culvert Summary Table: Culvert A-3

Discharge Names	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)
5 year	140.60	140.60	666.02	2.205	1.736	5-S2n	1.188	1.397	1.244	1.169	7.536	3.594
10 year	245.70	182.89	666.59	2.782	2.579	5-S2n	1.427	1.665	1.497	1.609	8.145	4.334
100 year	771.00	227.56	667.34	3.534	4.328	4-FFI	1.667	1.926	2.000	3.035	7.585	6.205

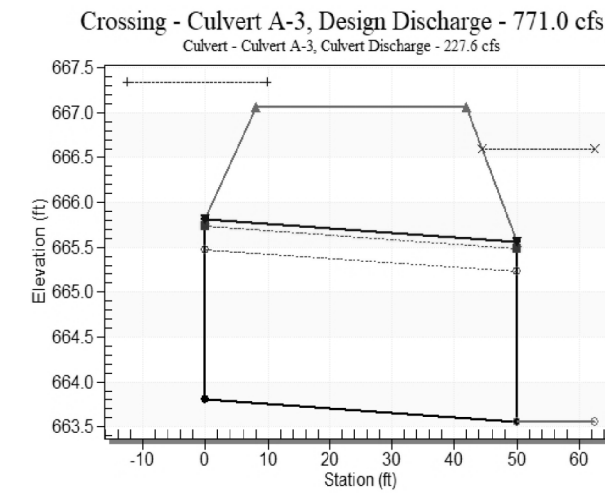
 Straight Culvert
 Inlet Elevation (invert): 663.81 ft, Outlet Elevation (invert): 663.56 ft
 Culvert Length: 50.00 ft, Culvert Slope: 0.0050

Table 3 - Downstream Channel Rating Curve (Crossing: Culvert A-3)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
140.60	664.73	1.17	3.59	0.51	0.63
245.70	665.17	1.61	4.33	0.70	0.65
771.00	666.60	3.04	6.20	1.33	0.71

Crossing Discharge Data
 Discharge Selection Method: Recurrence

Water Surface Profile Plot for Culvert: Culvert A-3



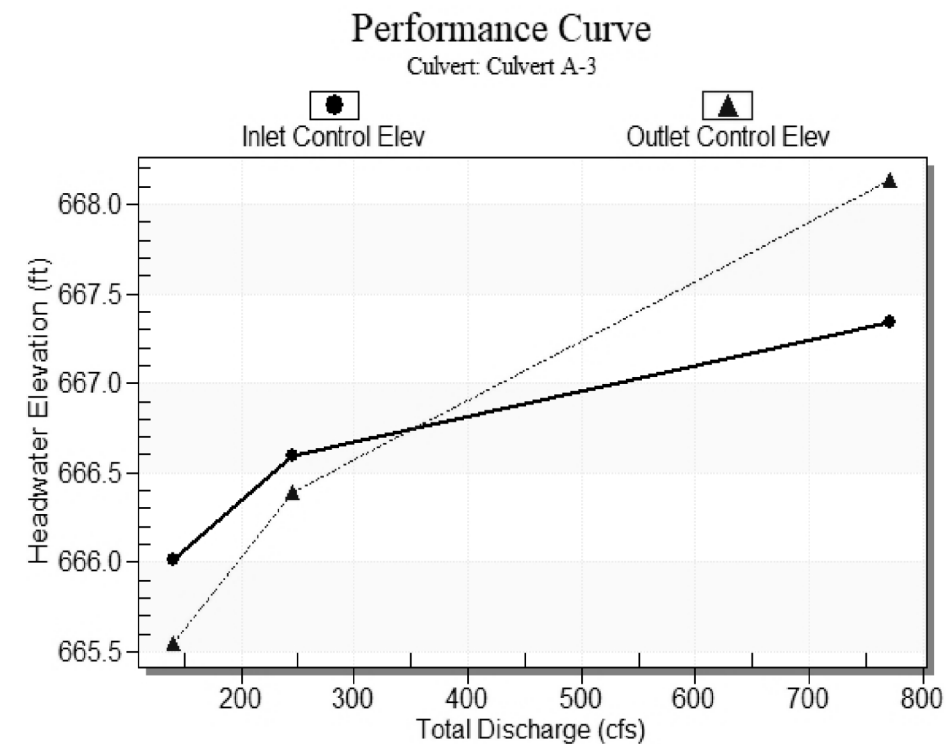
Site Data - Culvert A-3

Site Data Option: Culvert Invert Data
 Inlet Station: 0.00 ft
 Inlet Elevation: 663.81 ft
 Outlet Station: 50.00 ft
 Outlet Elevation: 663.56 ft
 Number of Barrels: 3

Culvert Data Summary - Culvert A-3

Barrel Shape: Concrete Box
 Barrel Span: 5.00 ft
 Barrel Rise: 2.00 ft
 Barrel Material: Concrete
 Embedment: 0.00 in
 Barrel Manning's n: 0.0120
 Culvert Type: Straight
 Inlet Configuration: Square Edge (30-75° flare) Wingwall
 Inlet Depression: None

Culvert Performance Curve Plot: Culvert A-3



Tailwater Channel Data - Culvert A-3

Tailwater Channel Option: Trapezoidal Channel
 Bottom Width: 28.80 ft
 Side Slope (H:V): 4.00 (1:1)
 Channel Slope: 0.0070
 Channel Manning's n: 0.0350
 Channel Invert Elevation: 663.56 ft

Roadway Data for Crossing: Culvert A-3

Roadway Profile Shape: Irregular Roadway Shape (coordina
 Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	667.06
1	20.88	666.88
2	49.22	666.62
3	209.70	666.06

 Roadway Surface: Paved
 Roadway Top Width: 34.00 ft

DESIGN

LUKE REED, P.E.

12/20/2022
DATE

APPROVAL

JAMES A. LUTZ, P.E.

12/20/2022
DATE

REV. NO.	DATE	DESCRIPTION	BY

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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FM 2200
**CULVERT A-3
 PROP HYDRAULIC
 DATA SHEET**
 STA 639+96

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	197

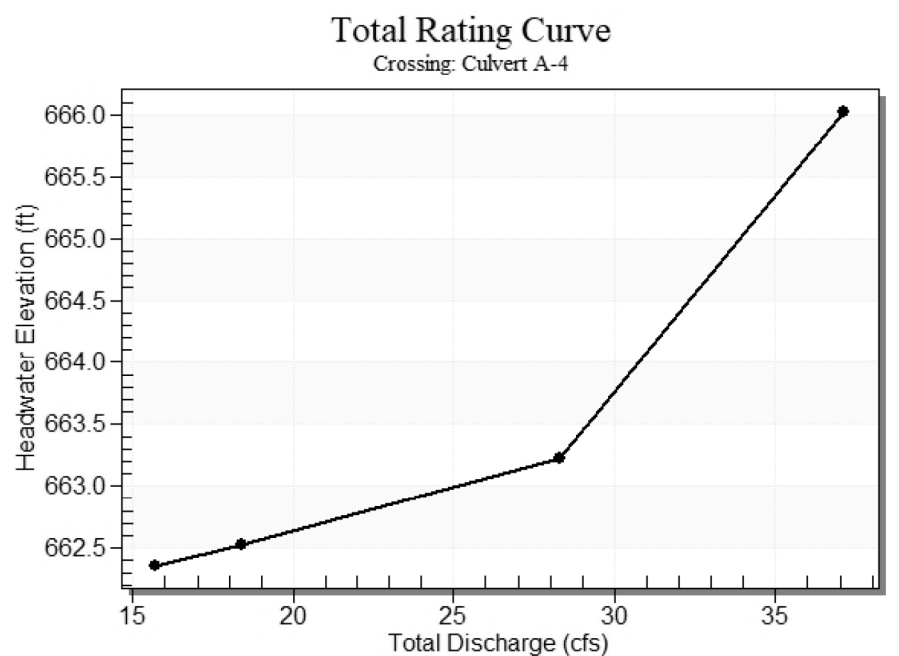
Plotted on: 12/20/2022

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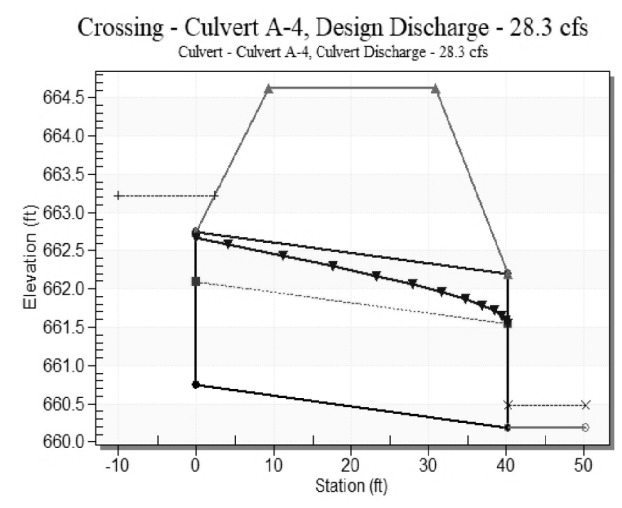
Table 1 - Summary of Culvert Flows at Crossing: Culvert A-4

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert A-4 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
662.36	5 year	15.70	15.70	0.00	1
662.53	10 year	18.40	18.40	0.00	1
663.22	100 year	28.30	28.30	0.00	1
664.40	Overtopping	37.11	37.11	0.00	Overtopping

Rating Curve Plot for Crossing: Culvert A-4



Water Surface Profile Plot for Culvert: Culvert A-4



Tailwater Channel Data - Culvert A-4

Tailwater Channel Option: Trapezoidal Channel
 Bottom Width: 39.10 ft
 Side Slope (H:V): 5.10 (1:1)
 Channel Slope: 0.0170
 Channel Manning's n: 0.0350
 Channel Invert Elevation: 660.19 ft

Roadway Data for Crossing: Culvert A-4

Roadway Profile Shape: Irregular Roadway Shape (coordina
 Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	664.63
1	40.02	664.40
2	72.88	664.57

 Roadway Surface: Paved
 Roadway Top Width: 21.60 ft

Site Data - Culvert A-4

Site Data Option: Culvert Invert Data
 Inlet Station: 0.00 ft
 Inlet Elevation: 660.74 ft
 Outlet Station: 40.20 ft
 Outlet Elevation: 660.19 ft
 Number of Barrels: 2

Culvert Data Summary - Culvert A-4

Barrel Shape: Circular
 Barrel Diameter: 2.00 ft
 Barrel Material: Corrugated Aluminum
 Embedment: 0.00 in
 Barrel Manning's n: 0.0310
 Culvert Type: Straight
 Inlet Configuration: Mitered to Conform to Slope
 Inlet Depression: None

Table 2 - Culvert Summary Table: Culvert A-4

Discharge Names	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)
5 year	15.70	15.70	662.36	1.493	1.622	2-M2c	1.208	0.997	0.997	0.206	5.017	1.897
10 year	18.40	18.40	662.53	1.640	1.790	2-M2c	1.352	1.081	1.081	0.227	5.313	2.017
100 year	28.30	28.30	663.22	2.256	2.478	7-M2c	2.000	1.351	1.351	0.263	6.264	2.381

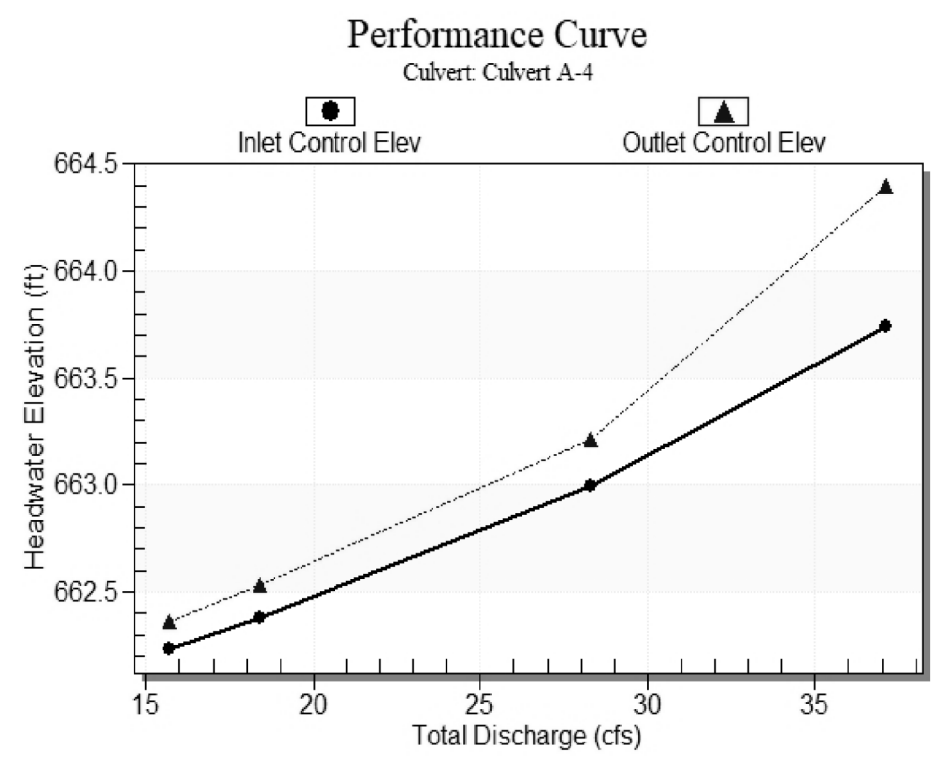
 Straight Culvert
 Inlet Elevation (invert): 660.74 ft, Outlet Elevation (invert): 660.19 ft
 Culvert Length: 40.20 ft, Culvert Slope: 0.0137

Table 3 - Downstream Channel Rating Curve (Crossing: Culvert A-4)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
15.70	660.40	0.21	1.90	0.22	0.75
18.40	660.42	0.23	2.02	0.24	0.76
28.30	660.48	0.29	2.38	0.31	0.79

Crossing Discharge Data
 Discharge Selection Method: Recurrence

Culvert Performance Curve Plot: Culvert A-4



DESIGN

LUKE REED, P.E.

12/20/2022
DATE

APPROVAL

JAMES A. LUTZ, P.E.

12/20/2022
DATE

REV. NO.	DATE	DESCRIPTION	BY

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800

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FM 2200
CULVERT A-4
EXIST HYDRAULIC
DATA SHEET
 STA 653+00

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	198

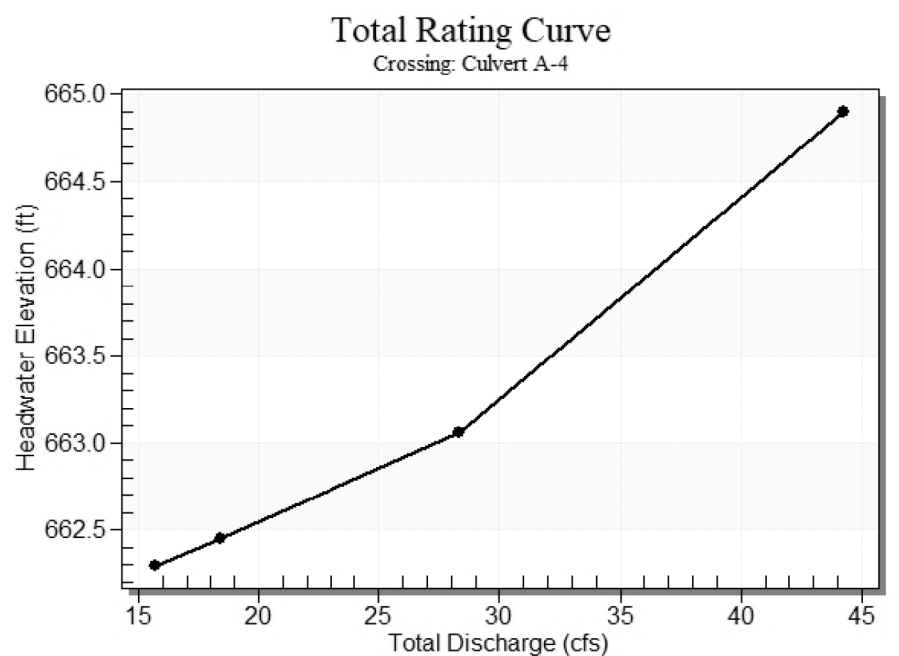
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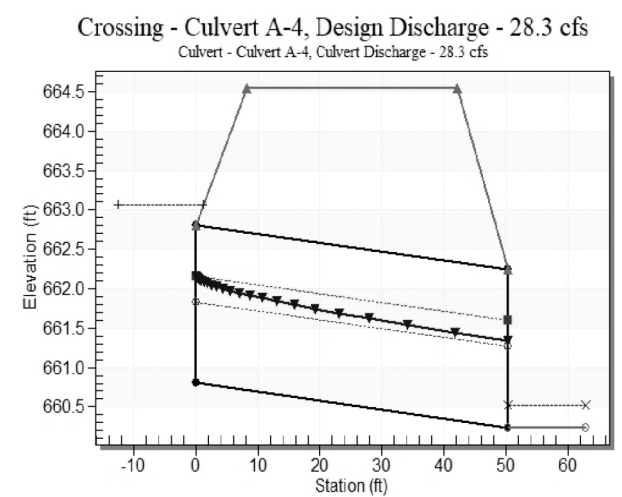
Table 1 - Summary of Culvert Flows at Crossing: Culvert A-4

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert A-4 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
662.30	5 year	15.70	15.70	0.00	1
662.45	10 year	18.40	18.40	0.00	1
663.06	100 year	28.30	28.30	0.00	1
664.56	Overtopping	44.24	44.24	0.00	Overtopping

Rating Curve Plot for Crossing: Culvert A-4



Water Surface Profile Plot for Culvert: Culvert A-4



Tailwater Channel Data - Culvert A-4

Tailwater Channel Option: Trapezoidal Channel
 Bottom Width: 39.10 ft
 Side Slope (H:V): 4.00 (1:1)
 Channel Slope: 0.0190
 Channel Manning's n: 0.0350
 Channel Invert Elevation: 660.24 ft

Roadway Data for Crossing: Culvert A-4

Roadway Profile Shape: Irregular Roadway Shape (coordina
 Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	664.55
1	40.02	664.56
2	72.88	664.57

 Roadway Surface: Paved
 Roadway Top Width: 34.00 ft

Site Data - Culvert A-4

Site Data Option: Culvert Invert Data
 Inlet Station: 0.00 ft
 Inlet Elevation: 660.81 ft
 Outlet Station: 50.20 ft
 Outlet Elevation: 660.24 ft
 Number of Barrels: 2

Culvert Data Summary - Culvert A-4

Barrel Shape: Circular
 Barrel Diameter: 2.00 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

DESIGN

 LUKE REED, P.E.
 12/20/2022
 DATE

APPROVAL

 JAMES A. LUTZ, P.E.
 12/20/2022
 DATE

Table 2 - Culvert Summary Table: Culvert A-4

Discharge Names	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)
5 year	15.70	15.70	662.30	1.489	0.643	1-S2n	0.732	0.997	0.775	0.200	6.744	1.971
10 year	18.40	18.40	662.45	1.637	0.807	1-S2n	0.798	1.081	0.847	0.219	7.020	2.097
100 year	28.30	28.30	663.06	2.253	1.483	5-S2n	1.021	1.351	1.092	0.264	7.808	2.478

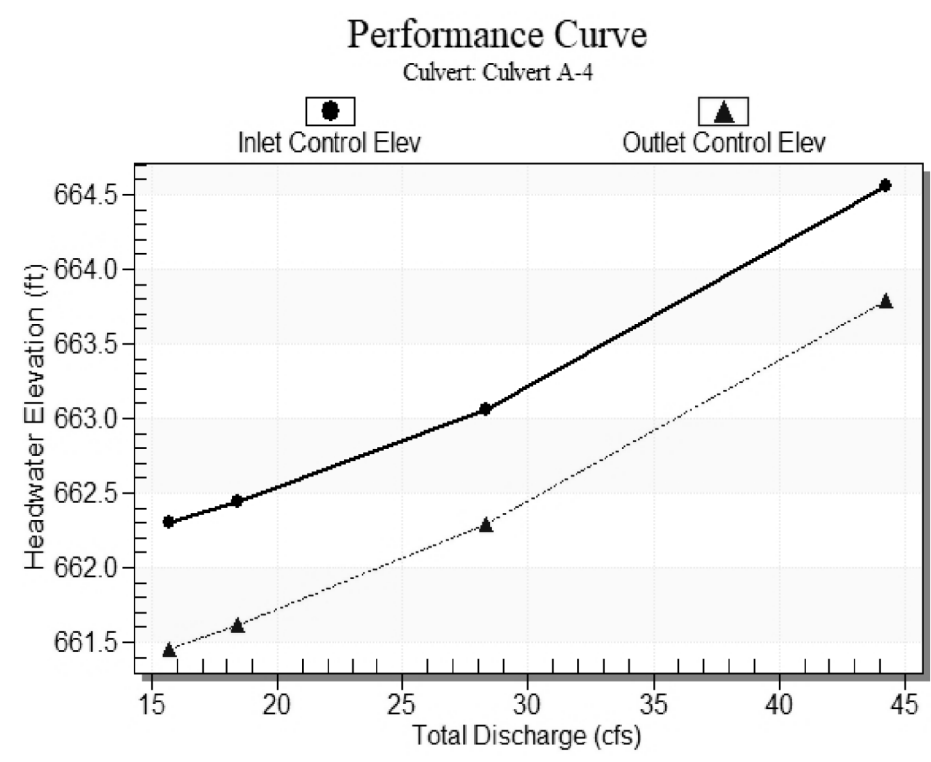
 Straight Culvert
 Inlet Elevation (invert): 660.81 ft, Outlet Elevation (invert): 660.24 ft
 Culvert Length: 50.20 ft, Culvert Slope: 0.0114

Table 3 - Downstream Channel Rating Curve (Crossing: Culvert A-4)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
15.70	660.44	0.20	1.97	0.24	0.79
18.40	660.46	0.22	2.10	0.26	0.80
28.30	660.52	0.28	2.48	0.34	0.83

Crossing Discharge Data
 Discharge Selection Method: Recurrence

Culvert Performance Curve Plot: Culvert A-4



REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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FM 2200
CULVERT A-4
PROP HYDRAULIC
DATA SHEET
 STA 653+00

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	199

Plotted on: 12/20/2022

Table 1 - Summary of Culvert Flows at Crossing: Culvert A-5

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert A-5 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
655.57	5 year	273.20	195.41	77.13	12
655.66	10 year	352.70	200.71	150.32	8
656.84	100 year	648.00	260.04	391.98	3
655.29	Overtopping	180.34	180.34	0.00	Overtopping

Rating Curve Plot for Crossing: Culvert A-5

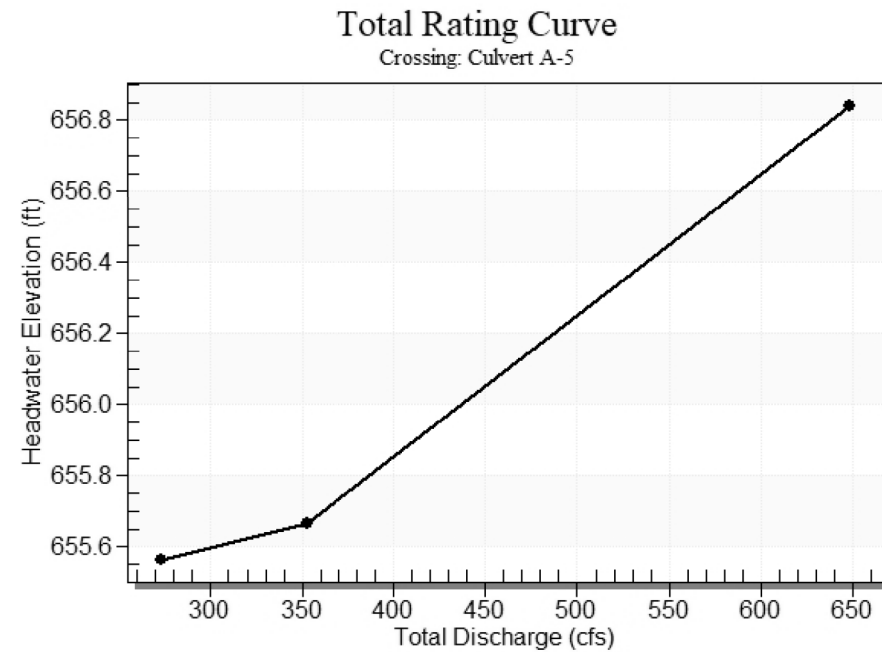


Table 2 - Culvert Summary Table: Culvert A-5

Discharge Names	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)
5 year	273.20	195.41	655.57	2.970	3.999	4-FFf	1.120	1.740	2.000	3.327	6.514	2.380
10 year	352.70	200.71	655.66	3.056	4.524	4-FFf	1.141	1.772	2.000	3.792	6.690	2.557
100 year	648.00	260.04	656.84	4.186	6.638	4-FFf	1.366	2.000	2.000	5.138	8.668	3.021

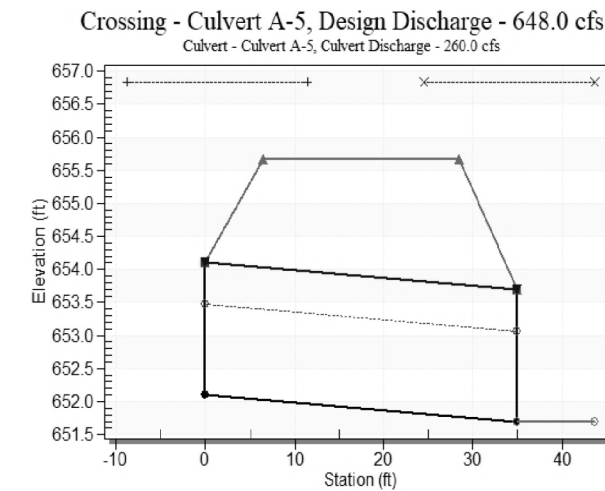
 Straight Culvert
 Inlet: Elevation (invert): 652.10 ft, Outlet Elevation (invert): 651.70 ft
 Culvert Length: 34.90 ft, Culvert Slope: 0.0115

Table 3 - Downstream Channel Rating Curve (Crossing: Culvert A-5)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
273.20	655.03	3.33	2.38	0.21	0.27
352.70	655.49	3.79	2.56	0.24	0.28
648.00	656.84	5.14	3.02	0.32	0.29

Crossing Discharge Data
 Discharge Selection Method: Recurrence

Water Surface Profile Plot for Culvert: Culvert A-5



Site Data - Culvert A-5

Site Data Option: Culvert Invert Data
 Inlet Station: 0.00 ft
 Inlet Elevation: 652.10 ft
 Outlet Station: 34.90 ft
 Outlet Elevation: 651.70 ft
 Number of Barrels: 3

Culvert Data Summary - Culvert A-5

Barrel Shape: Concrete Box
 Barrel Span: 5.00 ft
 Barrel Rise: 2.00 ft
 Barrel Material: Concrete
 Embedment: 0.00 in
 Barrel Manning's n: 0.0120
 Culvert Type: Straight
 Inlet Configuration: Square Edge (30-75° flare) Wingwall
 Inlet Depression: None

Tailwater Channel Data - Culvert A-5

Tailwater Channel Option: Trapezoidal Channel
 Bottom Width: 21.20 ft
 Side Slope (H:V): 4.00 (1:1)
 Channel Slope: 0.0010
 Channel Manning's n: 0.0350
 Channel Invert Elevation: 651.70 ft

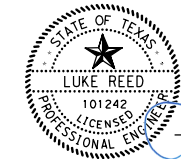
Roadway Data for Crossing: Culvert A-5

Roadway Profile Shape: Irregular Roadway Shape (coordinates)
 Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	655.66
1	100.00	655.29
2	282.50	655.39
3	370.00	655.54
4	481.00	655.88
5	600.00	655.90
6	680.00	656.26

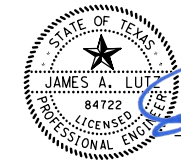
Roadway Surface: Paved
 Roadway Top Width: 21.90 ft

DESIGN



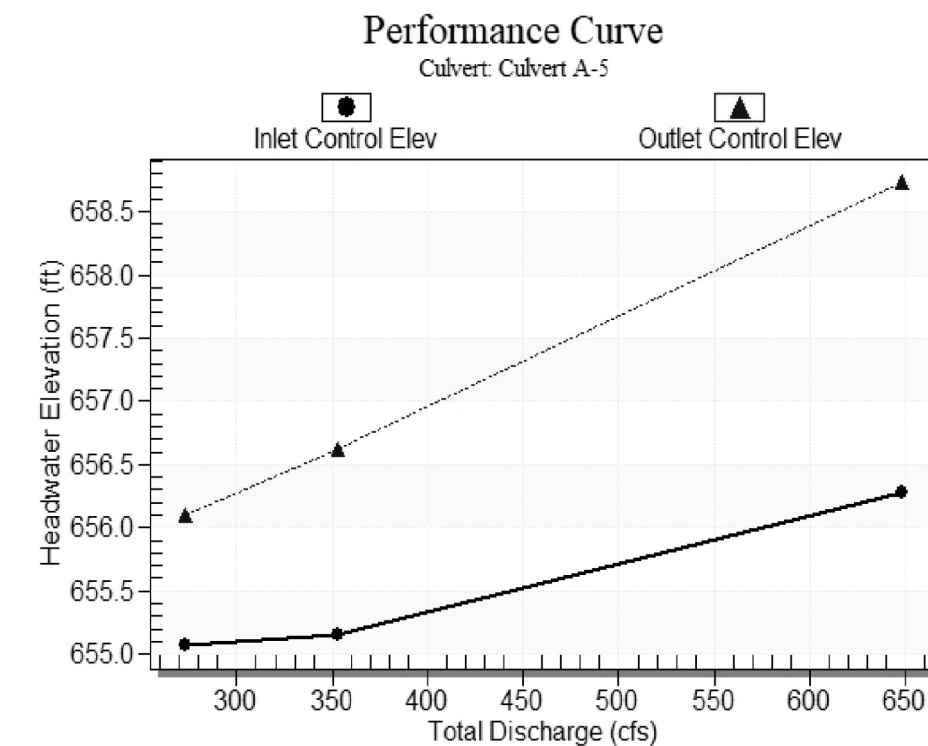
Signature of Luke Reed
 LUKE REED, P.E.
 DATE: 12/20/2022

APPROVAL



Signature of James A. Lutz
 JAMES A. LUTZ, P.E.
 DATE: 12/20/2022

Culvert Performance Curve Plot: Culvert A-5



REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800



FM 2200
CULVERT A-5
EXIST HYDRAULIC
DATA SHEET
 STA 700+11

CHK DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
	6	TEXAS	SEE TITLE SHEET	FM 2200		
CHK DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
	SAT	MEDINA	2520	01	016, ETC	200

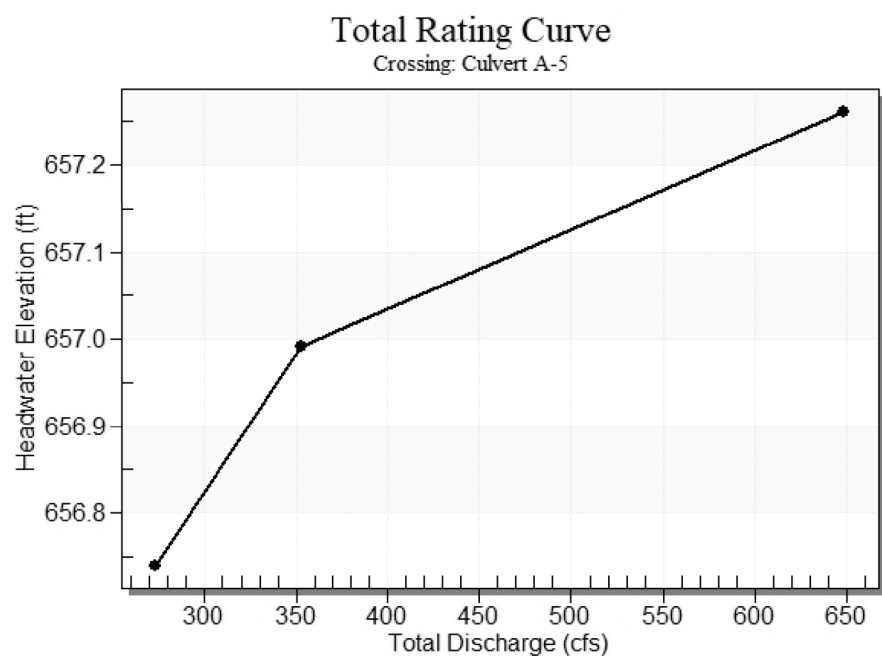
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Plotted on: 12/20/2022

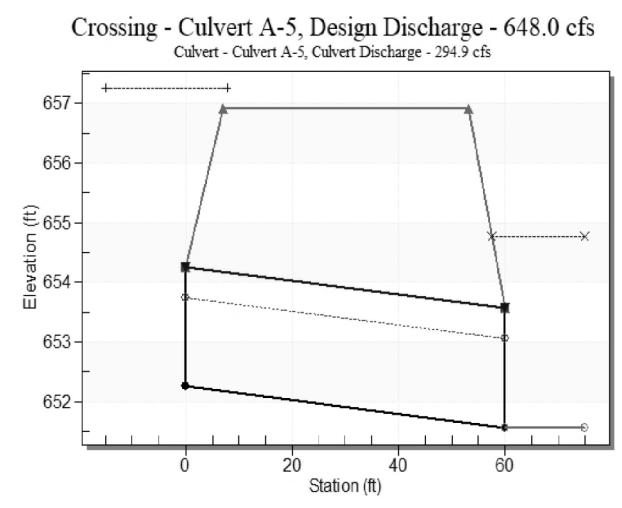
Table 1 - Summary of Culvert Flows at Crossing: Culvert A-5

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert A-5 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
656.74	5 year	273.20	273.20	0.00	1
656.99	10 year	352.70	283.86	67.93	9
657.26	100 year	648.00	294.89	351.74	4
656.76	Overtopping	274.03	274.03	0.00	Overtopping

Rating Curve Plot for Crossing: Culvert A-5



Water Surface Profile Plot for Culvert: Culvert A-5



Site Data - Culvert A-5

Site Data Option: Culvert Invert Data
 Inlet Station: 0.00 ft
 Inlet Elevation: 652.26 ft
 Outlet Station: 60.00 ft
 Outlet Elevation: 651.57 ft
 Number of Barrels: 3

Culvert Data Summary - Culvert A-5

Barrel Shape: Concrete Box
 Barrel Span: 5.00 ft
 Barrel Rise: 2.00 ft
 Barrel Material: Concrete
 Embedment: 0.00 in
 Barrel Manning's n: 0.0120
 Culvert Type: Straight
 Inlet Configuration: Square Edge (30-75° flare) Wingwall
 Inlet Depression: None

Tailwater Channel Data - Culvert A-5

Tailwater Channel Option: Trapezoidal Channel
 Bottom Width: 21.20 ft
 Side Slope (H:V): 4.00 (1:1)
 Channel Slope: 0.0065
 Channel Manning's n: 0.0350
 Channel Invert Elevation: 651.57 ft

Roadway Data for Crossing: Culvert A-5

Roadway Profile Shape: Irregular Roadway Shape (coordinates)
 Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	656.91
1	100.00	656.86
2	282.50	656.76
3	370.00	656.92
4	481.00	657.12
5	600.00	657.37
6	680.00	657.68

Roadway Surface: Paved
 Roadway Top Width: 46.20 ft

DESIGN

APPROVAL

Table 2 - Culvert Summary Table: Culvert A-5

Discharge Names	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)
5 year	273.20	273.20	656.74	4.480	3.641	5-S2n	1.412	2.000	1.633	2.022	11.151	4.612
10 year	352.70	283.86	656.99	4.731	4.125	4-FFf	1.451	2.000	654.260	2.323	9.462	4.980
100 year	648.00	294.89	657.26	5.001	5.203	4-FFf	1.491	2.000	2.000	3.204	9.830	5.945

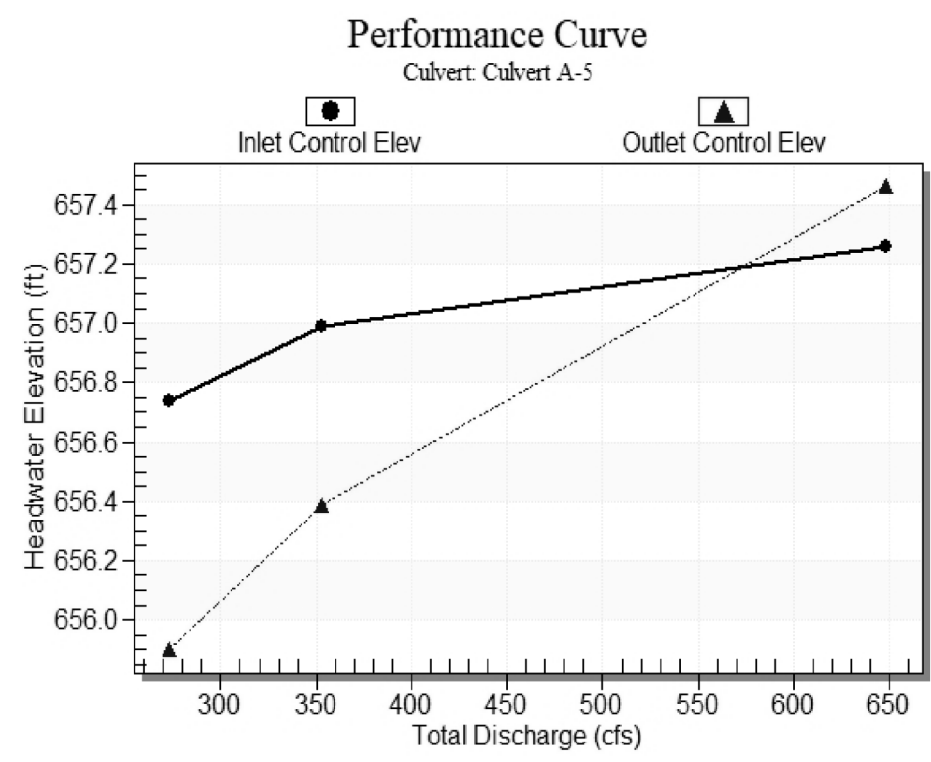
 Straight Culvert
 Inlet: Elevation (invert): 652.26 ft, Outlet Elevation (invert): 651.57 ft
 Culvert Length: 60.00 ft, Culvert Slope: 0.0115

Table 3 - Downstream Channel Rating Curve (Crossing: Culvert A-5)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
273.20	653.59	2.02	4.61	0.82	0.65
352.70	653.89	2.32	4.98	0.94	0.66
648.00	654.77	3.20	5.95	1.30	0.69

Crossing Discharge Data
 Discharge Selection Method: Recurrence

Culvert Performance Curve Plot: Culvert A-5



REV. NO.	DATE	DESCRIPTION	BY

Pape-Dawson Engineers
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800

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FM 2200
CULVERT A-5
PROP HYDRAULIC
DATA SHEET
 STA 700+11

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	201

Design File Name: P:\117\99\04\Des\ign\Civil\Drainage\1179904_HDS_CULVA5_PROP.dgn

Plotted on: 12/20/2022

Design File Name: P:\117\99\04\Design\Civil\Drainage\1179904_HDS_CULVA6-EXIST.dgn

Table 1 - Summary of Culvert Flows at Crossing: Culvert A-6

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert A-6 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
654.44	5 year	38.80	38.80	0.00	1
654.61	10 year	45.20	41.60	3.46	10
654.82	100 year	67.70	45.22	22.44	5
654.44	Overtopping	38.83	38.83	0.00	Overtopping

Rating Curve Plot for Crossing: Culvert A-6

Total Rating Curve
Crossing: Culvert A-6

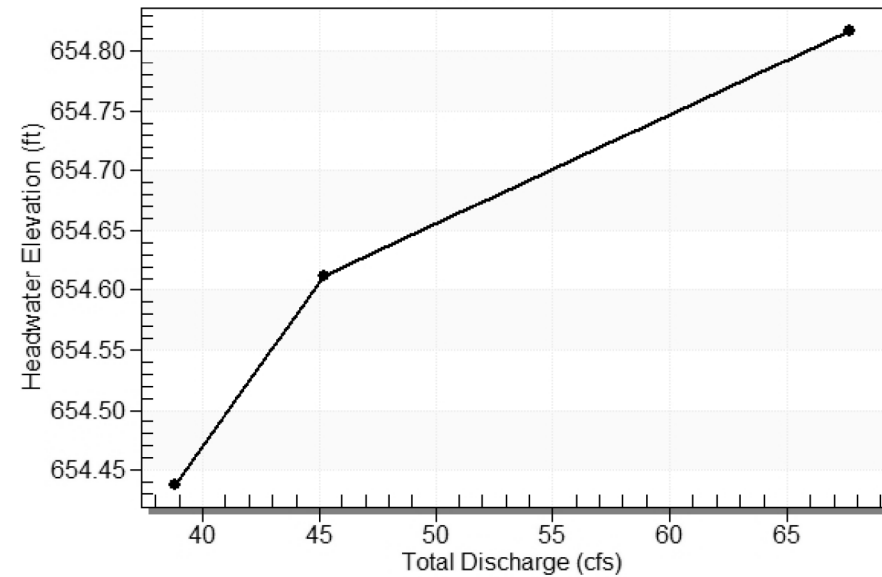


Table 2 - Culvert Summary Table: Culvert A-6

Discharge Names	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)
5 year	38.80	38.80	654.44	1.369	1.648	7-M2c	1.250	0.794	0.794	0.632	5.134	3.262
10 year	45.20	41.60	654.61	1.452	1.830	7-M2c	1.250	0.825	0.825	0.690	5.302	3.437
100 year	67.70	45.22	654.82	1.566	2.027	7-M2t	1.250	0.863	0.870	0.870	5.482	3.935

 Straight Culvert
 Inlet Elevation (invert): 652.79 ft, Outlet Elevation (invert): 652.55 ft
 Culvert Length: 41.10 ft, Culvert Slope: 0.0058

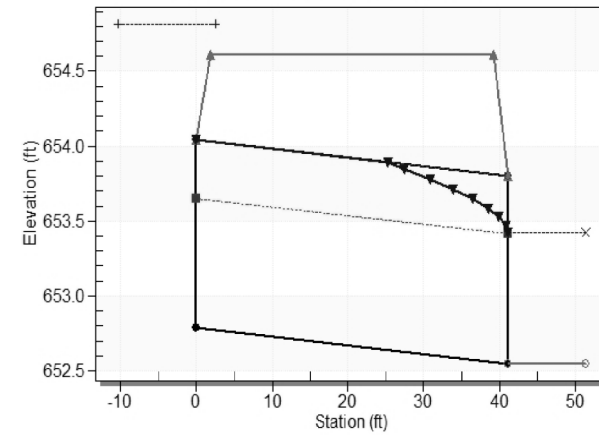
Table 3 - Downstream Channel Rating Curve (Crossing: Culvert A-6)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
38.80	653.18	0.63	3.26	0.51	0.77
45.20	653.24	0.69	3.44	0.56	0.78
67.70	653.42	0.87	3.94	0.71	0.81

Crossing Discharge Data
 Discharge Selection Method: Recurrence

Water Surface Profile Plot for Culvert: Culvert A-6

Crossing - Culvert A-6, Design Discharge - 67.7 cfs
 Culvert - Culvert A-6, Culvert Discharge - 45.2 cfs



Site Data - Culvert A-6

Site Data Option: Culvert Invert Data
 Inlet Station: 0.00 ft
 Inlet Elevation: 652.79 ft
 Outlet Station: 41.10 ft
 Outlet Elevation: 652.55 ft
 Number of Barrels: 6

Culvert Data Summary - Culvert A-6

Barrel Shape: Pipe Arch
 Barrel Span: 21.00 in
 Barrel Rise: 15.00 in
 Barrel Material: Steel or Aluminum
 Embedment: 0.00 in
 Barrel Manning's n: 0.0250
 Culvert Type: Straight
 Inlet Configuration: Headwall
 Inlet Depression: None

Tailwater Channel Data - Culvert A-6

Tailwater Channel Option: Trapezoidal Channel
 Bottom Width: 16.30 ft
 Side Slope (H:V): 4.00 (1:1)
 Channel Slope: 0.0130
 Channel Manning's n: 0.0350
 Channel Invert Elevation: 652.55 ft

Roadway Data for Crossing: Culvert A-6

Roadway Profile Shape: Irregular Roadway Shape (coordinates)
 Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	0.00	654.61
1	17.80	654.57
2	49.80	654.44

Roadway Surface: Paved
 Roadway Top Width: 37.30 ft

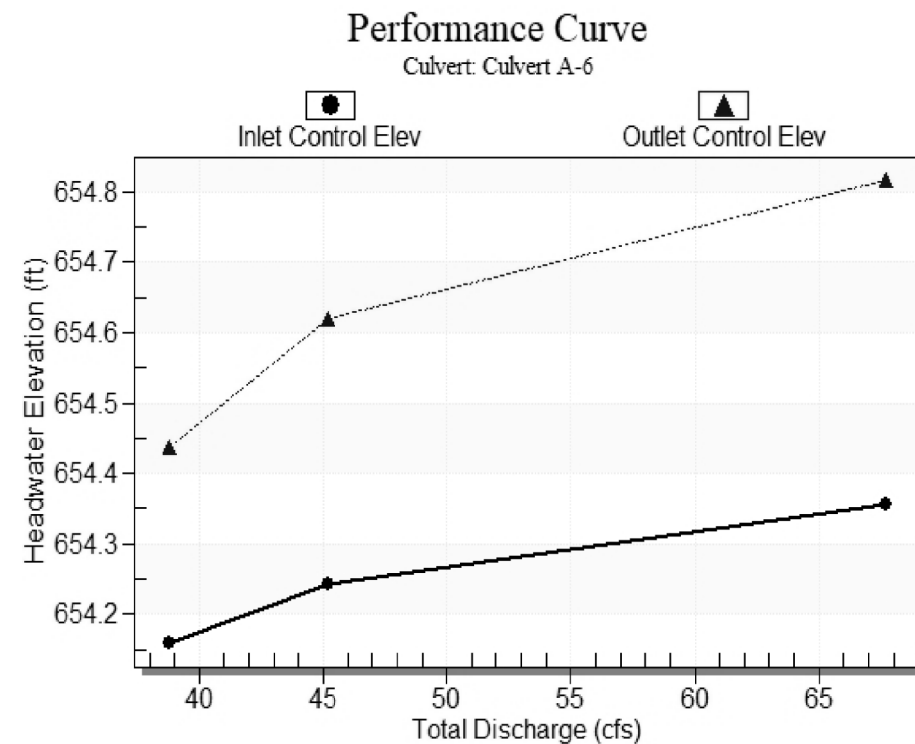
DESIGN

 LUKE REED, P.E.
 12/20/2022
 DATE

APPROVAL

 JAMES A. LUTZ, P.E.
 12/20/2022
 DATE

Culvert Performance Curve Plot: Culvert A-6



REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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FM 2200
CULVERT A-6
 EXIST HYDRAULIC
 DATA SHEET
 STA 717+76

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	202

Plotted on: 12/20/2022

Design File name: P:\117\99\03\Design\Civil\Drainage\1179903HYD501.dgn

COMPUTATION POINT	FLOODING SOURCE AND LOCATION	COMPUTATION METHOD	Drainage Area (sq mi)	2-Year Discharge (cfs)	5-Year Discharge (cfs)	10-Year Discharge (cfs)	25-Year Discharge (cfs)	50-Year Discharge (cfs)	100-Year Discharge (cfs)	500-Year Discharge (cfs)
SITE	FM 2200 - Francisco Perez Creek - Medina	Hydrograph Method	46.3	932	2370	4085	7122	9991	13494	23977
SITE	FM 2200 - Francisco Perez Creek - Medina	Omega EM Regression	46.3	1894	4332	6399	9746	12758	16366	27049

TIME OF CONCENTRATION USED IN NRCS UNIT HYDROGRAPH METHOD

Basin	A
Drainage Area (acres)	29613.8
Drainage Area (m ²)	46.3
Overland Flow Length	135
Shallow Flow Length	2,489
Channel Flow Length	116,215
Total Flow Length (ft)	118,839
Overland Flow High	1031.18
Overland Flow Low	1031.09
Change in Elevation (ft)	0.10
Shallow High	1031.09
Shallow Low	1021.03
Change in Elevation (ft)	10.06
Channel High	1021.03
Channel Low	638.39
Change in Elevation (ft)	382.64
Overland Flow Slope	0.001
Shallow Flow Slope	0.004
Channel Flow Slope	0.003
Total Length	118,839
Overland Flow Mannings N	0.060
2-yr, 24-hour Rainfall	3.81
Shallow Flow Cover	Unpaved
Shallow Flow Velocity (ft/s)	1.0
Manning's roughness coefficient	0.040
Hydraulic Radius	3.8
Channel Flow Velocity (ft/s)	5.2
Overland Flowtime (min)	20.6
Shallow flowtime (min)	40.5
Channel flowtime (min)	372.1
t _c calculations (min)	433.2
Lag time (min)	259.92
Lag time (hr)	4.33

NRCS UNIT HYDROGRAPH METHOD PARAMETERS

Hydrologic Element	Drainage Area (sq mi)	Lag Time (min)	CN
A-1	46.3	260	59

AREA WEIGHTED COMPOSITE CURVE NUMBER CALCULATED USING TXDOT HYDRAULIC DESIGN MANUAL. CLIMATIC ADJUSTMENT OF -10 HAS BEEN APPLIED.

Rainfall Depth (NOAA ATLAS 14, VOLUME 11) (in)							
Duration	2 yr	5 yr	10 yr	25 yr	50 yr	100 yr	500 yr
5-min	0.41	0.50	0.59	0.70	0.79	0.87	1.05
15-min	0.82	1.01	1.17	1.39	1.56	1.73	2.08
60-min	1.49	1.85	2.15	2.56	2.89	3.21	3.96
2-hr	1.81	2.31	2.74	3.35	3.83	4.34	5.64
3-hr	1.99	2.59	3.11	3.87	4.47	5.13	6.85
6-hr	2.31	3.05	3.72	4.70	5.51	6.39	8.86
12-hr	2.61	3.47	4.24	5.39	6.35	7.43	10.47
24-hr	2.93	3.90	4.78	6.09	7.19	8.47	12.01

RAINFALL DEPTHS OBTAINED AT CROSSING USING NATIONAL WEATHER SERVICE PRECIPITATION FREQUENCY DATA SERVER (PFDS). AN AREAL REDUCTION FACTOR OF 0.77 HAS BEEN APPLIED TO RAINFALL DEPTHS PER TXDOT HYDRAULIC DESIGN MANUAL.

OMEGA EM REGRESSION PARAMETERS


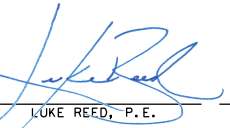
PARAMETER	VALUE
OmegaEM	0.192
Mean Annual Precipitation, P (in)	28
Main Channel Slope, S	0.003
Drainage Area (sq mi)	46.3

OMEGA EM REGRESSION FLOWS


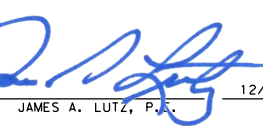
STORM EVENT	FLOW (CFS)
2-YR	1,894
5-YR	4,332
10-YR	6,399
25-YR	9,746
50-YR	12,758
100-YR	16,366
500-YR	27,049

NOTE:
HYDROGRAPH METHOD WAS SELECTED AS THE PREFERRED METHOD.

DESIGN



 LUKE REED, P.E. 12/20/2022
DATE

APPROVAL



 JAMES A. LUTZ, P.E. 12/20/2022
DATE

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200 AT FRANCISCO PEREZ CREEK

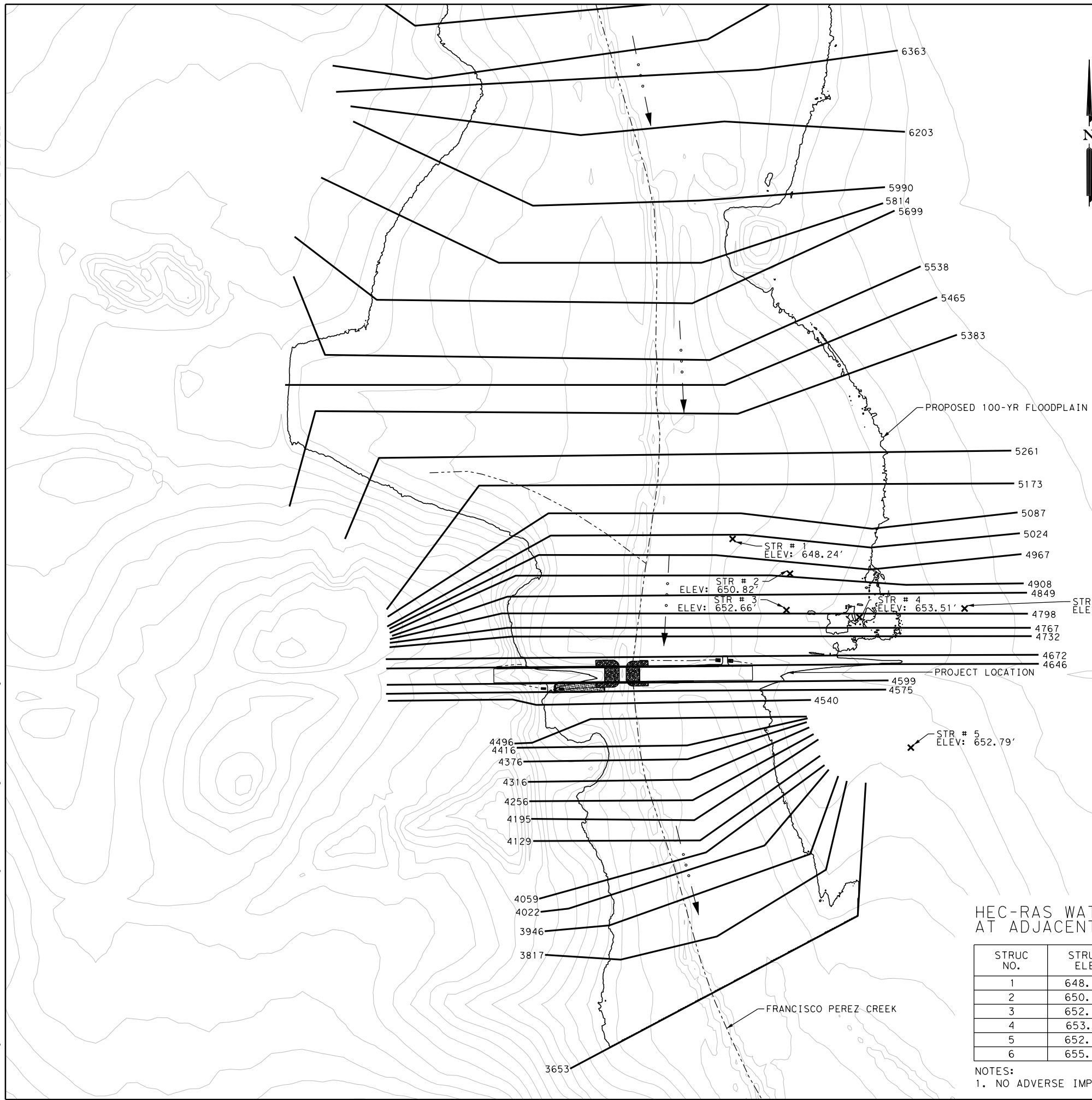
HYDROLOGY DATA SHEET

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	015	203

Plotted on: 12/20/2022

Design File name: P:\117\99\03\Design\Civil\Drainage\1179903\HDS01.dgn



MEDINA COUNTY FLOODPLAIN ADMIN CONTACTED
 DATE: 11/09/22
 HYDRAULIC METHOD
 WATER SURFACE ELEVATIONS COMPUTED USING
 HEC-RAS (V.5.0.7). THE PROJECT HEC-RAS MODEL
 WAS DEVELOPED USING SURVEYED CROSS-SECTIONS,
 USGS LIDAR, FIELD INVESTIGATION, AND
 PROPOSED ROADWAY & BRIDGE LAYOUT.
 FLOOD HAZARD AREA
 FRANCISCO PEREZ CREEK IS IDENTIFIED ON FEMA
 FIRM PANEL 48325C0670C, DATED 04/03/12
 AS A SPECIAL FLOOD HAZARD AREA WITH A
 ZONE AE DESIGNATION AT THE FM 2200 BRIDGE
 CROSSING. PROPOSED 100 YR FLOODPLAIN WAS
 GENERATED WITH HEC-RAS MAPPER AND IS
 SHOWN IN CROSS SECTION LAYOUT.

- NOTES:
1. PROP BRIDGE LOCATED AT RIVER
STATION 4623
 2. UPSTREAM CROSS SECTION LOCATED AT RIVER
STATION 4646
 3. DOWNSTREAM CROSS SECTION LOCATED AT
RIVER STATION 4599
 4. THE DOWNSTREAM WATER SURFACE ELEVATION WAS
BASED ON NORMAL DEPTH AT A CHANNEL SLOPE
OF 0.00248 FT/FT
 5. THE 10-YR STORM EVENT WAS SELECTED AS THE
DESIGN FLOOD. THE 100-YR STORM EVENT WAS
EVALUATED AS A CHECK FLOOD

LEGEND

- CROSS SECTIONS
- . . . —> FLOW ARROW
- EXISTING 2' CONTOURS
- - - - - STREAM C

DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 LUKE REED, P.E.
 12/20/2022
 DATE

APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER
 JAMES A. LUTZ, P.E.
 12/20/2022
 DATE

SCALE: 1" = 300'

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200 AT FRANCISCO PEREZ CREEK

HYDRAULIC DATA SHEET

SHEET 1 OF 7

HEC-RAS WATER SURFACE ELEVATIONS AT ADJACENT STRUCTURES

STRUC NO.	STRUC ELEV	100 YR WSE AT STRUCTURE	
		EXIST	PROP
1	648.24	652.87	652.72
2	650.82	652.79	652.63
3	652.66	652.75	652.59
4	653.51	652.74	652.58
5	652.79	-	-
6	655.97	-	-

- NOTES:
1. NO ADVERSE IMPACTS TO ADJACENT STRUCTURES.

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	015	204

Plotted on: 12/20/2022

Design File name: P:\117\99\03\Design\Civil\Drainage\1179903HDS02.dgn

HEC-RAS BRIDGE OUTPUT - EXIST

Plan: Existing River 1 Reach 1 RS: 4623 Profile: 10-yr

		Element	Inside BR US	Inside BR DS
E.G. US. (ft)	649.36			
W.S. US. (ft)	649.03	E.G. Elev (ft)	649.36	649.27
Q Total (cfs)	4085.00	W.S. Elev (ft)	649.03	648.95
Q Bridge (cfs)	3240.60	Crit W.S. (ft)	645.14	645.78
Q Weir (cfs)	844.41	Max Chl Dpth (ft)	13.93	12.88
Weir Sta Lft (ft)	810.20	Vel Total (ft/s)	5.74	6.24
Weir Sta Rgt (ft)	1155.99	Flow Area (sq ft)	712.16	654.36
Weir Submerg	0.00	Froude # Chl	0.30	0.34
Weir Max Depth (ft)	1.34	Specif Force (cu ft)	3675.49	3373.16
Min El Weir Flow (ft)	648.03	Hydr Depth (ft)	2.29	2.21
Min El Prs (ft)	648.30	W.P. Total (ft)	503.15	486.63
Delta EG (ft)	1.49	Conv. Total (cfs)		
Delta WS (ft)	3.14	Top Width (ft)	310.48	296.47
BR Open Area (sq ft)	468.28	Frctn Loss (ft)		
BR Open Vel (ft/s)	6.92	C & E Loss (ft)		
BR Sluice Coef	0.37	Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

Plan: Existing River 1 Reach 1 RS: 4623 Profile: 100-yr

		Element	Inside BR US	Inside BR DS
E.G. US. (ft)	652.65			
W.S. US. (ft)	652.34	E.G. Elev (ft)	652.65	652.54
Q Total (cfs)	13494.00	W.S. Elev (ft)	652.34	651.64
Q Bridge (cfs)	3034.11	Crit W.S. (ft)	650.80	650.78
Q Weir (cfs)	10459.89	Max Chl Dpth (ft)	17.24	15.57
Weir Sta Lft (ft)	129.02	Vel Total (ft/s)	5.47	7.09
Weir Sta Rgt (ft)	954.36	Flow Area (sq ft)	2467.66	1903.42
Weir Submerg	0.69	Froude # Chl	0.24	0.33
Weir Max Depth (ft)	4.63	Specif Force (cu ft)	10036.10	8790.57
Min El Weir Flow (ft)	648.03	Hydr Depth (ft)	3.16	2.82
Min El Prs (ft)	648.30	W.P. Total (ft)	975.92	868.01
Delta EG (ft)	0.52	Conv. Total (cfs)		
Delta WS (ft)	0.70	Top Width (ft)	780.89	674.83
BR Open Area (sq ft)	468.28	Frctn Loss (ft)		
BR Open Vel (ft/s)	6.48	C & E Loss (ft)		
BR Sluice Coef		Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

HEC-RAS BRIDGE OUTPUT - PROP


Plan: Prop River 1 Reach 1 RS: 4623 Profile: 10-yr

		Element	Inside BR US	Inside BR DS
E.G. US. (ft)	647.38			
W.S. US. (ft)	647.04	E.G. Elev (ft)	647.28	647.12
Q Total (cfs)	4085.00	W.S. Elev (ft)	646.60	646.42
Q Bridge (cfs)	4085.00	Crit W.S. (ft)	642.64	642.61
Q Weir (cfs)		Max Chl Dpth (ft)	11.49	11.37
Weir Sta Lft (ft)		Vel Total (ft/s)	6.57	6.73
Weir Sta Rgt (ft)		Flow Area (sq ft)	621.77	606.95
Weir Submerg		Froude # Chl	0.34	0.35
Weir Max Depth (ft)		Specif Force (cu ft)	3697.25	3618.89
Min El Weir Flow (ft)	648.32	Hydr Depth (ft)	7.10	7.02
Min El Prs (ft)	648.64	W.P. Total (ft)	133.41	146.30
Delta EG (ft)	0.39	Conv. Total (cfs)	73651.7	66531.2
Delta WS (ft)	0.50	Top Width (ft)	87.57	86.45
BR Open Area (sq ft)	749.47	Frctn Loss (ft)	0.14	0.01
BR Open Vel (ft/s)	6.73	C & E Loss (ft)	0.01	0.13
BR Sluice Coef		Shear Total (lb/sq ft)	0.90	0.98
BR Sel Method	Energy only	Power Total (lb/ft s)	5.88	6.57

Plan: Prop River 1 Reach 1 RS: 4623 Profile: 100-yr


		Element	Inside BR US	Inside BR DS
E.G. US. (ft)	652.51			
W.S. US. (ft)	652.14	E.G. Elev (ft)	652.51	652.51
Q Total (cfs)	13494.00	W.S. Elev (ft)	652.14	651.91
Q Bridge (cfs)	8651.53	Crit W.S. (ft)	651.98	651.91
Q Weir (cfs)	4842.47	Max Chl Dpth (ft)	17.03	16.86
Weir Sta Lft (ft)	143.30	Vel Total (ft/s)	7.88	8.49
Weir Sta Rgt (ft)	762.80	Flow Area (sq ft)	1711.96	1589.43
Weir Submerg	0.07	Froude # Chl	0.35	0.38
Weir Max Depth (ft)	4.19	Specif Force (cu ft)	11432.61	11343.20
Min El Weir Flow (ft)	648.32	Hydr Depth (ft)	3.08	3.10
Min El Prs (ft)	648.64	W.P. Total (ft)	804.84	778.06
Delta EG (ft)	2.39	Conv. Total (cfs)		
Delta WS (ft)	2.87	Top Width (ft)	555.52	513.54
BR Open Area (sq ft)	749.47	Frctn Loss (ft)		
BR Open Vel (ft/s)	11.54	C & E Loss (ft)		
BR Sluice Coef		Shear Total (lb/sq ft)		
BR Sel Method	Press/Weir	Power Total (lb/ft s)		

DESIGN



LUKE REED, P.E.

APPROVAL



JAMES A. LUTZ, P.E.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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 FM 2200 AT FRANCISCO
 PEREZ CREEK

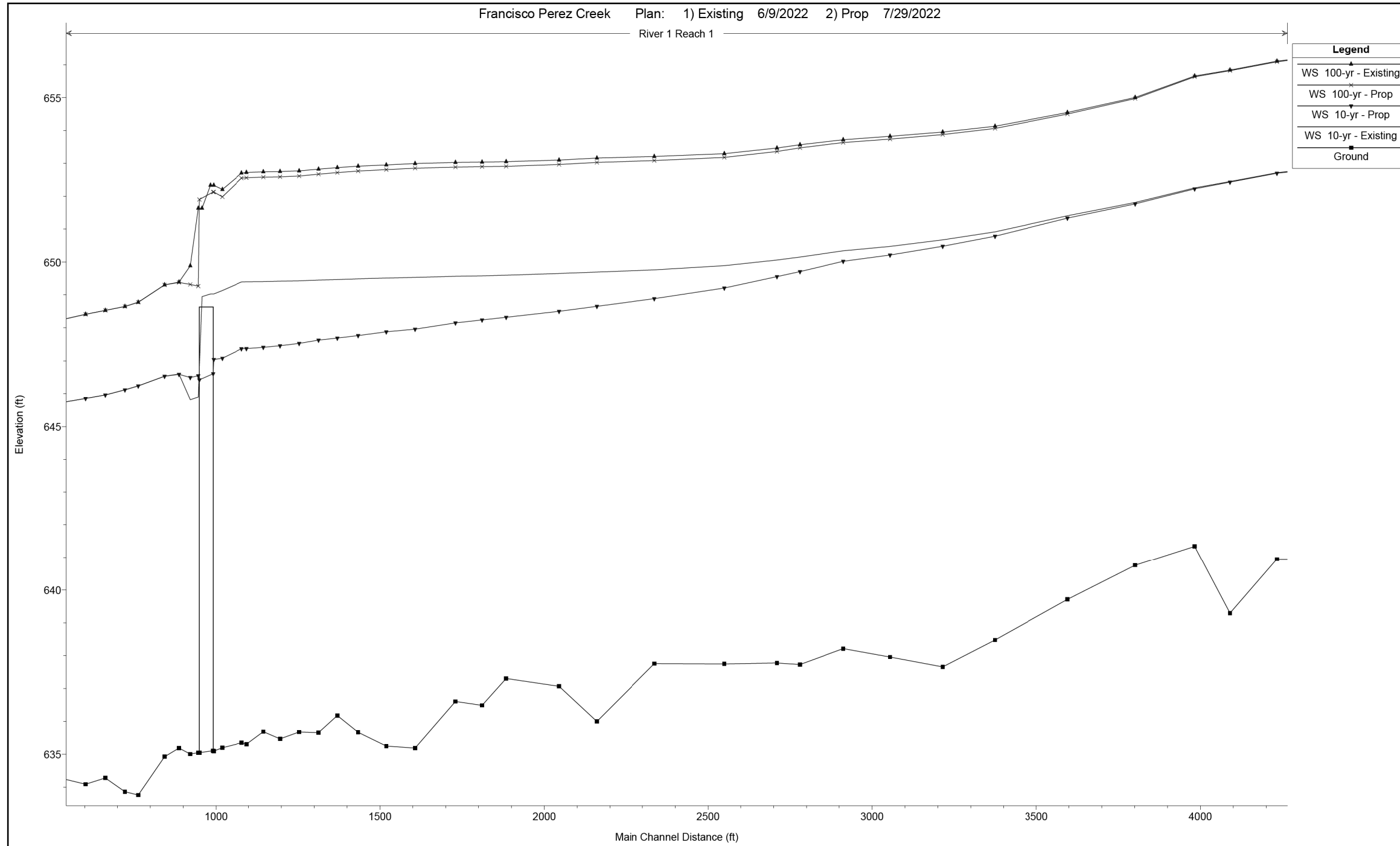
HYDRAULIC DATA SHEET

SHEET 2 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	015	205


Plotted on: 12/20/2022

Design File name: P:\117\99\03\Design\Civil\Drainage\1179903\HDS03.dgn



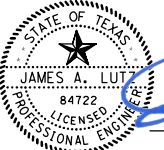
HEC-RAS PROFILE OUTPUT

DESIGN




 LUKE REED, P.E. 12/20/2022 DATE

APPROVAL



 JAMES A. LUTZ, P.E. 12/20/2022 DATE

REV. NO.	DATE	DESCRIPTION	BY




PAPE-DAWSON ENGINEERS

 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800


 Texas Department of Transportation

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 FM 2200 AT FRANCISCO PEREZ CREEK

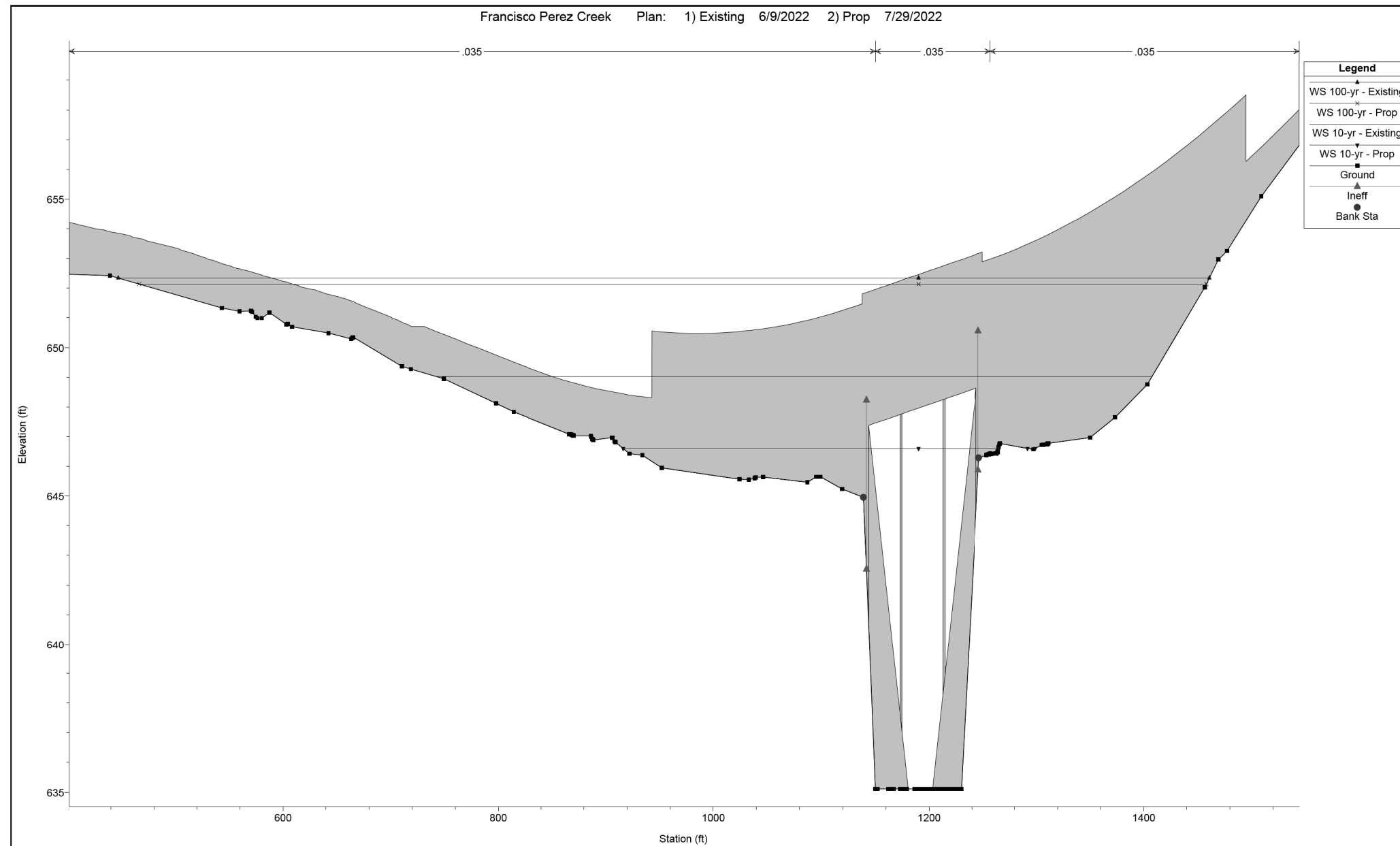
HYDRAULIC DATA SHEET

SHEET 3 OF 7

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
CHK DWG:	SAT	MEDINA	2520	01
			015	206

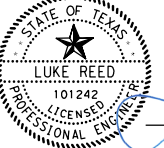
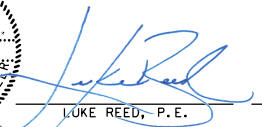
Plotted on: 12/20/2022

Design File name: P:\117\99\03\Design\Civil\Drainage\1179903\HDS04.dgn

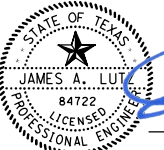
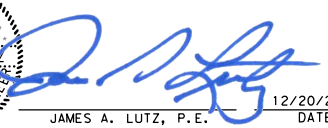


HEC-RAS CROSS SECTION OUTPUT


DESIGN



 LUKE REED, P. E. 12/20/2022
 DATE

APPROVAL



 JAMES A. LUTZ, P. E. 12/20/2022
 DATE

REV. NO.	DATE	DESCRIPTION	BY


 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800


 Texas Department of Transportation
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FM 2200 AT FRANCISCO PEREZ CREEK

HYDRAULIC DATA SHEET

SHEET 4 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	015	207

HEC-RAS OUTPUT


HEC-RAS Locations: User Defined

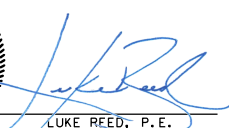
River	Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
River 1	Reach 1	9386	10-yr	Existing	4085.00	642.68	655.42		655.79	0.002519	5.97	1259.32	547.77	0.42
River 1	Reach 1	9386	10-yr	Prop	4085.00	642.68	655.42		655.79	0.002520	5.97	1259.12	547.74	0.42
River 1	Reach 1	9386	100-yr	Existing	13494.00	642.68	658.65		659.09	0.002225	7.43	3494.04	813.31	0.43
River 1	Reach 1	9386	100-yr	Prop	13494.00	642.68	658.65		659.08	0.002229	7.44	3491.71	813.23	0.43
River 1	Reach 1	6708	10-yr	Existing	4085.00	637.96	650.48		650.65	0.001254	4.44	1769.70	805.18	0.30
River 1	Reach 1	6708	10-yr	Prop	4085.00	637.96	650.21		650.43	0.001641	4.95	1564.32	758.10	0.34
River 1	Reach 1	6708	100-yr	Existing	13494.00	637.96	653.83		654.03	0.000976	5.08	5102.47	1159.27	0.28
River 1	Reach 1	6708	100-yr	Prop	13494.00	637.96	653.74		653.95	0.001027	5.18	5002.83	1152.75	0.28

Plotted on: 12/20/2022

Design File Name: P:\11799\03\Design\Civil\Drainage\1179903\HDS05.dgn

DESIGN

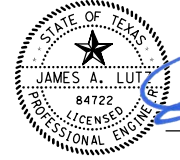


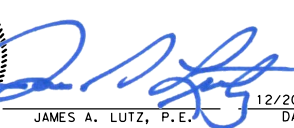


LUKE REED, P.E.

12/20/2022
DATE

APPROVAL






JAMES A. LUTZ, P.E.

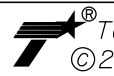
12/20/2022
DATE

REV. NO.	DATE	DESCRIPTION	BY



**Pape-Dawson
ENGINEERS**

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800



Texas Department of Transportation
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FM 2200 AT FRANCISCO
PEREZ CREEK

HYDRAULIC DATA SHEET

SHEET 5 OF 7

DGN:	FED. RD. DIV. NO.:	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	015	208

ITEM	DESCRIPTION	UNIT	QTY
0400-6005	CEM STABIL BKFL	CY	23
0459-6002	GABION MATTRESSES (GALV)	CY	12
0462-6006	CONC BOX CULV (5 FT X 2 FT)	LF	50
0467-6172	SET (TY 1) (S= 5 FT) (HW= 3 FT) (4:1) (C)	EA	2
0496-6004	REMOV STR (SET)	EA	2
0496-6007	REMOV STR (PIPE)	LF	41

PROPOSED DITCH			
PT	STA	OS	ELEV
PT01	597+55	100.7' LT	EXIST
PT02	598+11	49.4' LT	EXIST
PT03	598+04	38.6' LT	EXIST
PT04	597+93	38.6' LT	718.98
PT05	597+82	38.6' LT	718.98
PT06	597+67	38.6' LT	EXIST
PT07	597+58	63.0' LT	EXIST
PT08	597+43	98.6' LT	EXIST
PT09	597+50	90.5' LT	EXIST
PT10	597+70	69.3' LT	718.70
PT11	597+88	38.6' LT	718.98
PT12	597+74	71.5' LT	718.70
PT13	597+63	65.5' LT	718.70

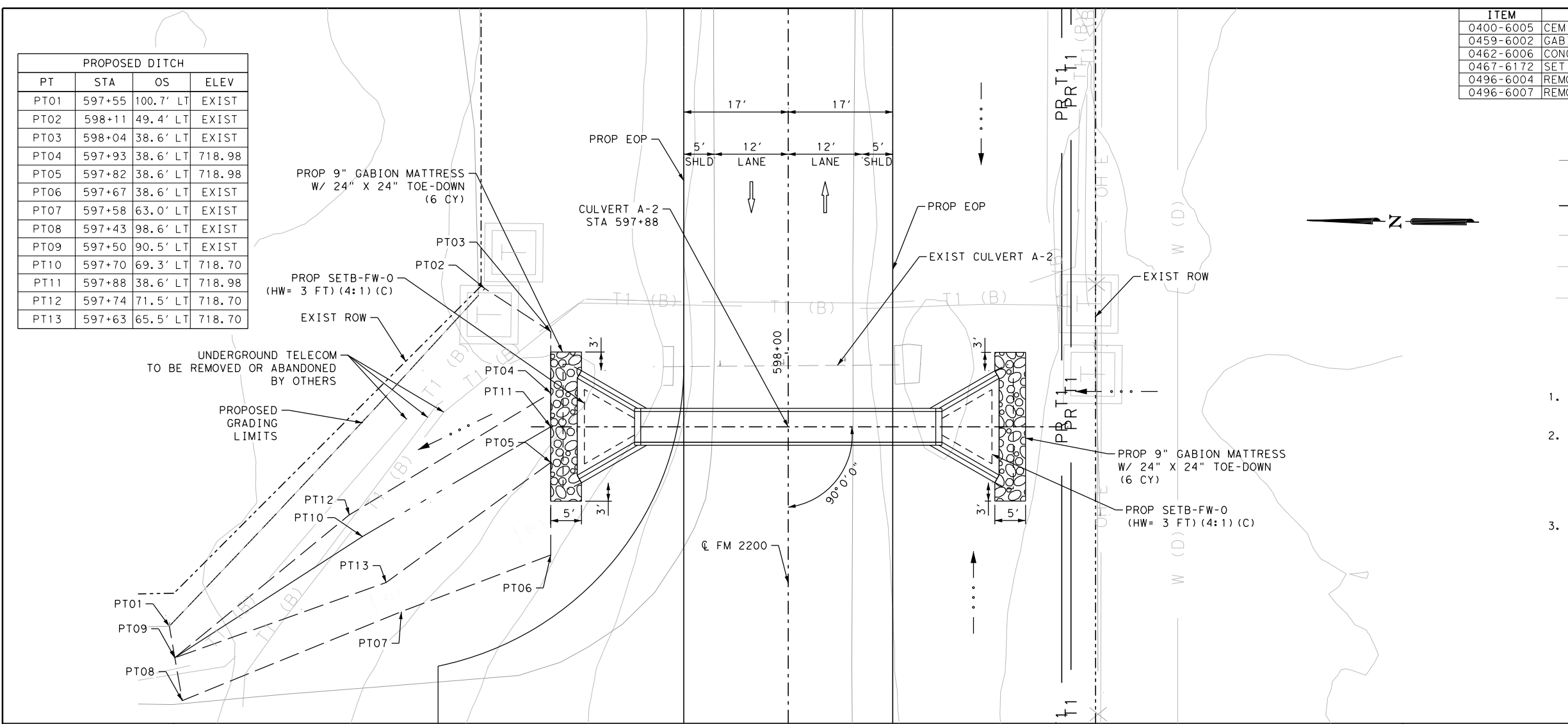
LEGEND

- — — — — EXISTING CONTOUR
- · · · — · · · FLOW ARROW
- - - - - RIGHT OF WAY
- OH E — MEDINA ELECTRIC OVERHEAD ELECTRIC
- T1 (X) — AT&T CONDUIT / FIBER OPTIC LINE
- W (X) — YANCEY WSC/ WATER LINE
- UTILITY POLE
- TELEPHONE PEDESTAL

NOTES

- ALL EXISTING FEATURES ARE SHOWN DASHED/ SCREENED BACK, i.e. FADED
- THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES INDICATED IN THE PLANS ARE TAKEN FROM THE BEST RECORDS AVAILABLE AND ARE NOT GUARANTEED TO BE ACCURATE. CONTRACTOR SHALL VERIFY ACTUAL LOCATION PRIOR TO CONSTRUCTION
- CUT AND RESTORE AT ALL PROPOSED CULVERT CROSSINGS. SEE DETAIL SHEET 229

Plotted on: 12/20/2022

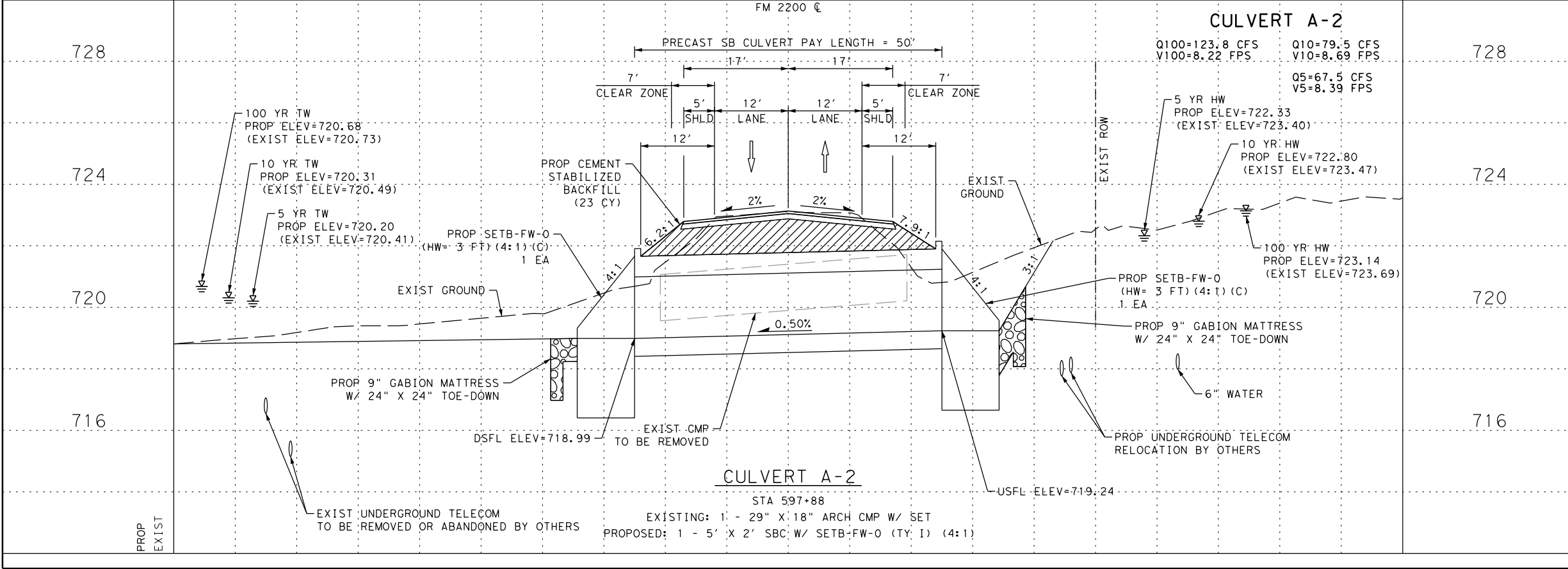


DESIGN

LUKE REED, P.E.

12/20/2022 DATE

Design File name: P:\117\99\04\Design\Civil\Drainage\1179904-CULVA2.dgn



APPROVAL

JAMES A. LUTZ, P.E.

12/20/2022 DATE

0 10 20

SCALE: PLAN 1" = 20' PROFILE 1" = 4'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
 ©2023

FM 2200
CULVERT A-2 LAYOUT
 STA 597+88

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 211

Plotted on: 12/20/2022

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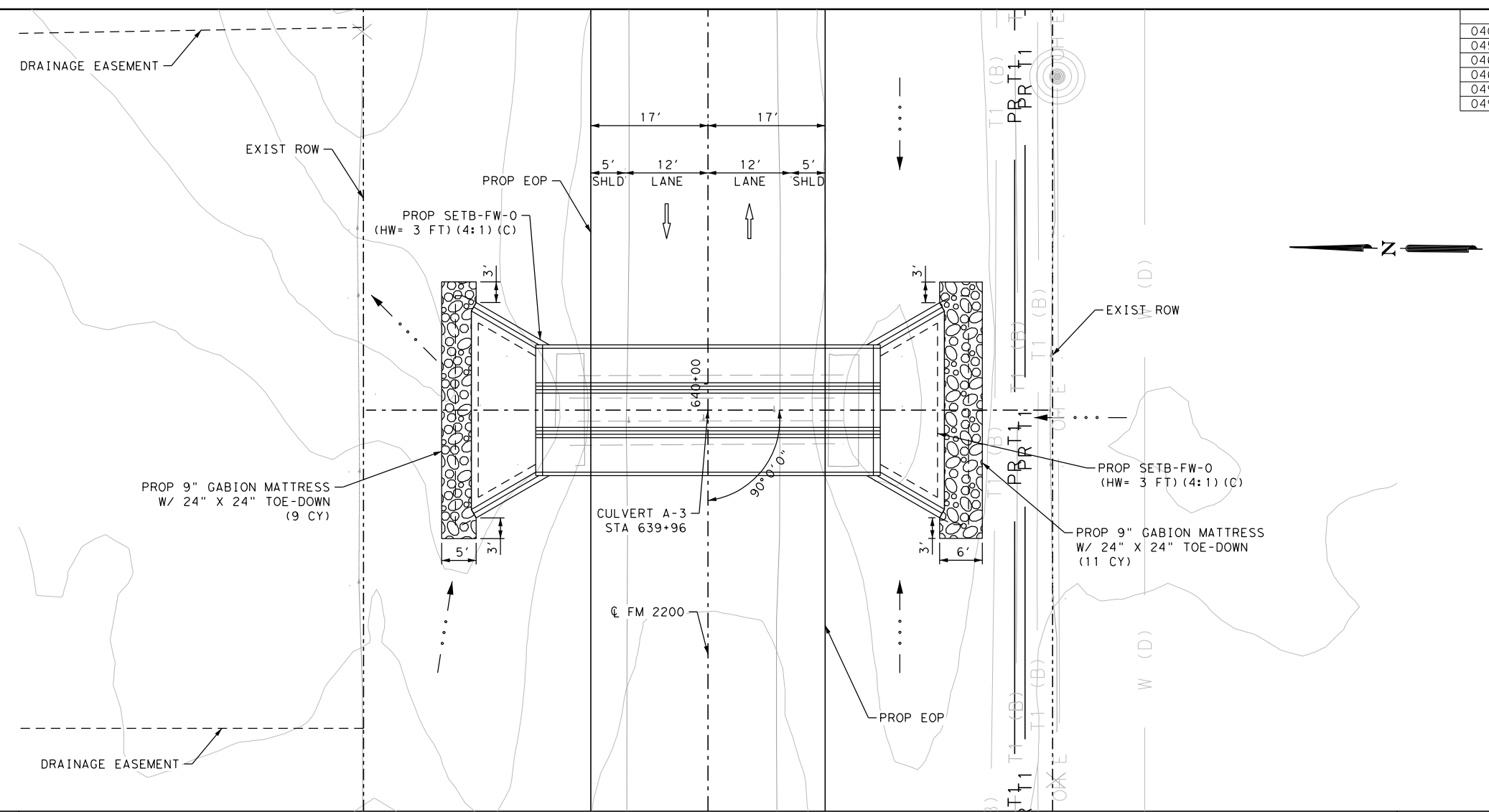
ITEM	DESCRIPTION	UNIT	QTY
0400-6005	CEM STABIL BKFL	CY	33
0459-6002	GABION MATTRESSES (GALV)	CY	20
0462-6006	CONC BOX CULV (5 FT X 2 FT)	LF	150
0467-6172	SET (TY 1) (S= 5 FT) (HW= 3 FT) (4:1) (C)	EA	6
0496-6004	REMOV STR (SET)	EA	8
0496-6007	REMOV STR (PIPE)	LF	164

LEGEND

- — — — — EXISTING CONTOUR
- · · · — · · · FLOW ARROW
- - - - - RIGHT OF WAY
- OH E — MEDINA ELECTRIC OVERHEAD ELECTRIC
- T1 (X) — AT&T CONDUIT / FIBER OPTIC LINE
- W (X) — YANCEY WSC/ WATER LINE
- UTILITY POLE
- TELEPHONE PEDESTAL

NOTES

1. ALL EXISTING FEATURES ARE SHOWN DASHED/ SCREENED BACK, i.e. FADED
2. THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES INDICATED IN THE PLANS ARE TAKEN FROM THE BEST RECORDS AVAILABLE AND ARE NOT GUARANTEED TO BE ACCURATE. CONTRACTOR SHALL VERIFY ACTUAL LOCATION PRIOR TO CONSTRUCTION
3. CUT AND RESTORE AT ALL PROPOSED CULVERT CROSSINGS. SEE DETAIL SHEET 229



DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER

LUKE REED, P.E.

12/20/2022
DATE

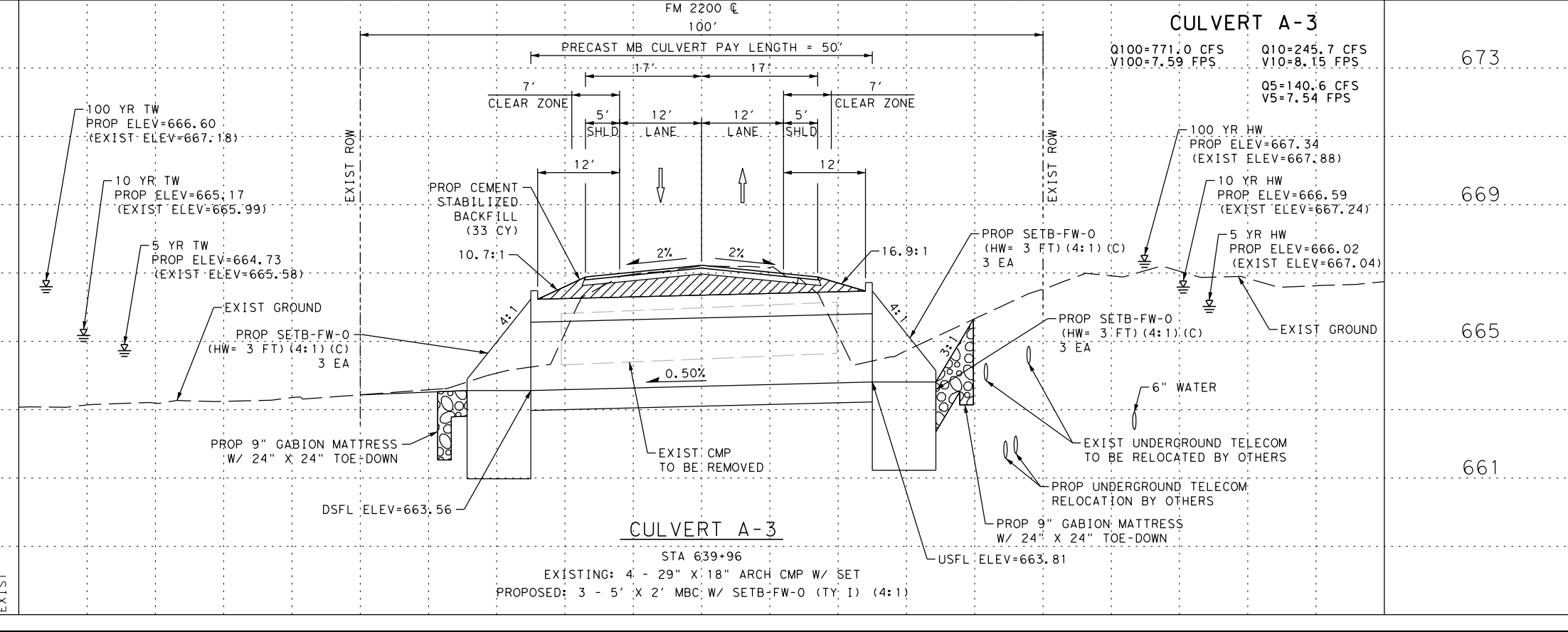
APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 84729
 LICENSED PROFESSIONAL ENGINEER

JAMES A. LUTZ, P.E.

12/20/2022
DATE

0 10 20
SCALE: PLAN 1" = 20' PROFILE 1" = 4'



PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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FM 2200
CULVERT A-3 LAYOUT
 STA 639+96

REV. NO.	DATE	DESCRIPTION	BY

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 212

Plotted on: 12/20/2022

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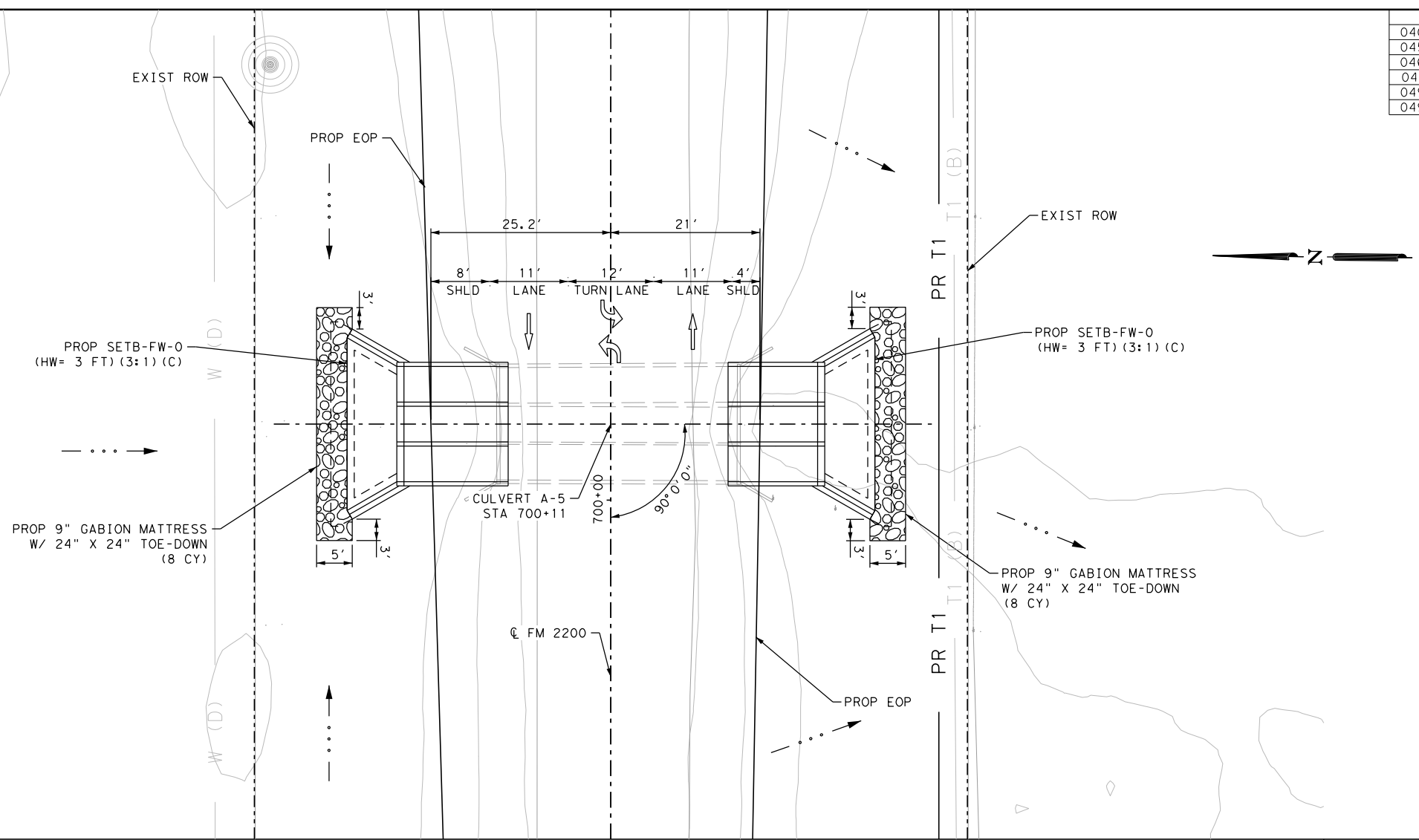
ITEM	DESCRIPTION	UNIT	QTY
0400-6005	CEM STABIL BKFL	CY	84
0459-6002	GABION MATTRESSES (GALV)	CY	16
0462-6050	CONC BOX CULV (5 FT X 2 FT) (EXTEND)	LF	90
0467-6171	SET (TY 1) (S= 5 FT) (HW= 3 FT) (3:1) (C)	EA	6
0496-6004	REMOV STR (SET)	EA	6
0496-6008	REMOV STR (BOX CULVERT)	LF	12

LEGEND

- — — — — EXISTING CONTOUR
- · · · — · · · FLOW ARROW
- - - - - RIGHT OF WAY
- OH E — MEDINA ELECTRIC OVERHEAD ELECTRIC
- T1 (X) — AT&T CONDUIT / FIBER OPTIC LINE
- W (X) — YANCEY WSC/ WATER LINE
- UTILITY POLE
- TELEPHONE PEDESTAL

NOTES

1. ALL EXISTING FEATURES ARE SHOWN DASHED/ SCREENED BACK, i.e. FADED
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3. CUT AND RESTORE AT ALL PROPOSED CULVERT CROSSINGS. SEE DETAIL SHEET 229

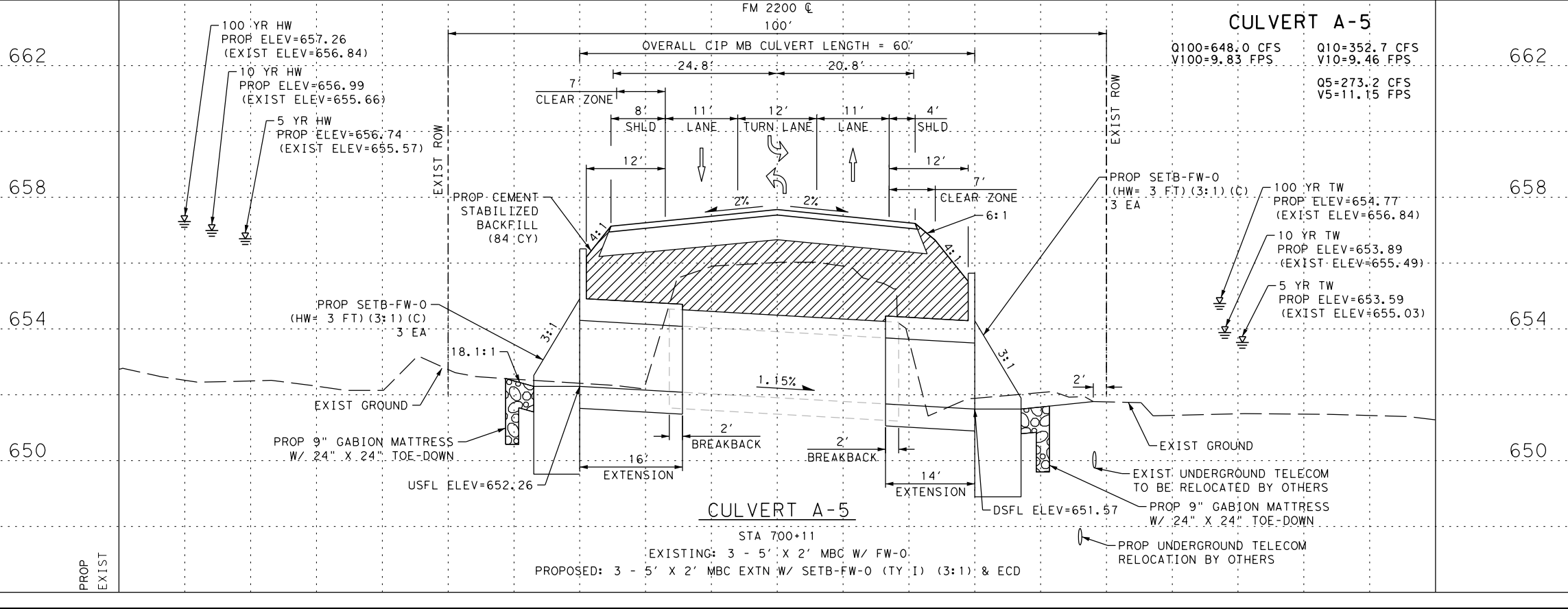
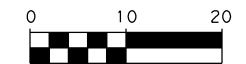


DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER
 JAMES A. LUTZ, P.E. 12/20/2022 DATE



REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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FM 2200
CULVERT A-5 LAYOUT
 STA 700+11

DGN:	FED. RD. DIV. NO.:	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.	COUNTY	CONT. NO. SECT. NO.	JOB NO. SHEET NO.
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 214

ITEM	DESCRIPTION	UNIT	QTY
0432-6002	RIPRAP (CONC) (5 IN)	CY	9
0480-6001	CLEAN EXIST CULVERTS	EA	6
0529-6016	CONC CURB (TY F1)	LF	21

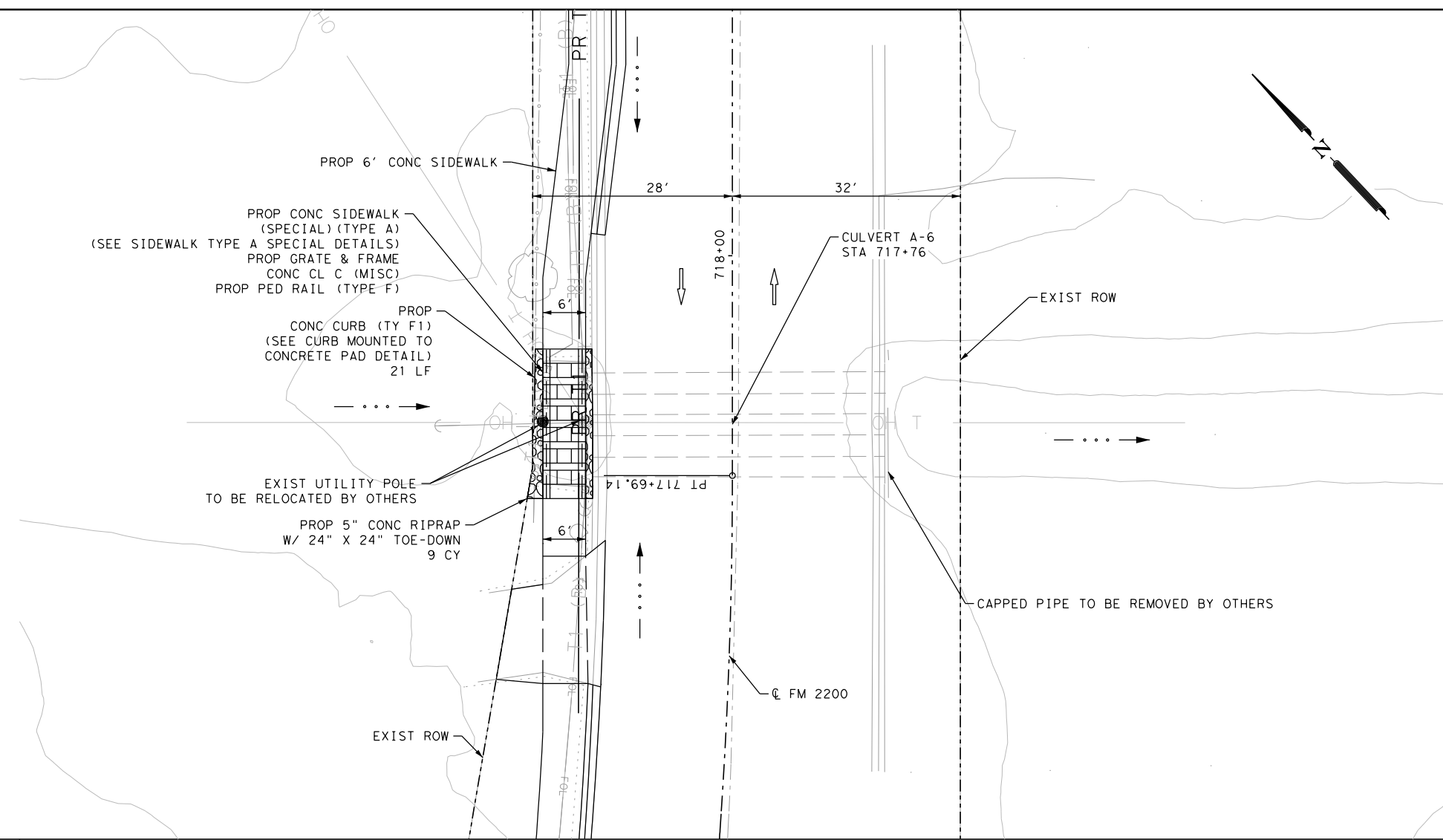
LEGEND

- EXISTING CONTOUR
- ···· → FLOW ARROW
- - - - - RIGHT OF WAY
- OH E — MEDINA ELECTRIC OVERHEAD ELECTRIC
- T1 (X) — AT&T CONDUIT / FIBER OPTIC LINE
- W (X) — YANCEY WSC/ WATER LINE
- UTILITY POLE
- TELEPHONE PEDESTAL

NOTES

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Plotted on: 12/20/2022



DESIGN

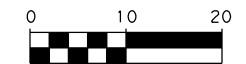


LUKE REED
LUKE REED, P.E.
12/20/2022
DATE

APPROVAL



JAMES A. LUTZ
JAMES A. LUTZ, P.E.
12/20/2022
DATE



SCALE: PLAN 1" = 20' PROFILE 1" = 4'

REV. NO.	DATE	DESCRIPTION	BY



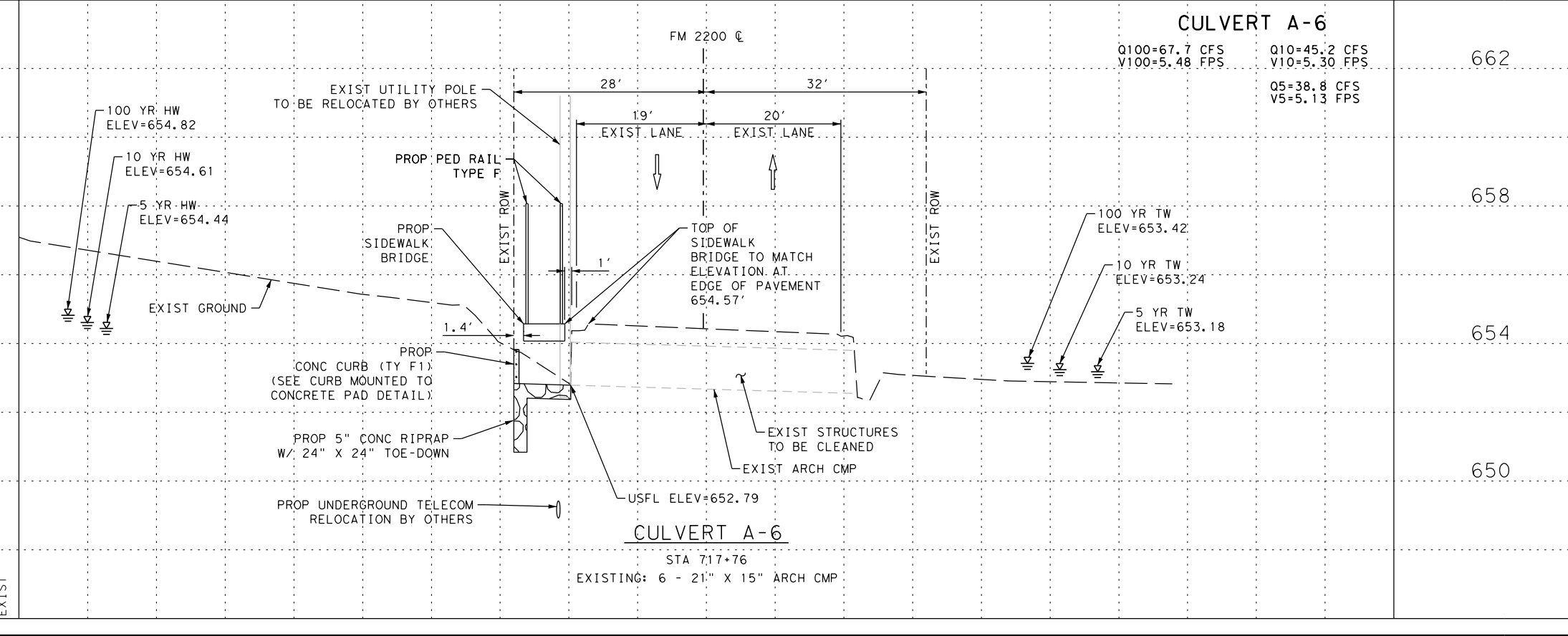
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
CULVERT A-6 LAYOUT
STA 717+76

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	215

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PROP
EXIST

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Drainage\1179904_DITCHDATA.dgn

DITCH D1 CALCULATIONS																			
UPSTREAM				DOWNSTREAM				BOTTOM WIDTH	LEFT SIDE SLOPE	RIGHT SIDE SLOPE	CHANNEL DEPTH	MANNING'S "n"	DESIGN FLOW (10-YR)	SLOPE	NORMAL DEPTH	FREEBOARD	VELOCITY	SHEAR STRESS	COMMENTS
STATION	OFFSET	LT/RT	FLOWLINE ELEVATION	STATION	OFFSET	LT/RT	FLOWLINE ELEVATION												
(ft)	(ft)		(ft)	(ft)	(ft)		(ft)	(ft)	x:1	x:1	(ft)	(cfs)	(ft/ft)	(ft)	(ft)	(f/s)	(lbs/ft ²)		
593+00	-33.00	LT	721.35	593+50	-33.00	LT	720.87	0.00	4.0	4.0	3.22	0.035	0.11	0.010	0.19	3.04	0.83	0.05	
593+50	-33.00	LT	720.87	594+00	-33.00	LT	720.54	0.00	4.0	4.0	2.85	0.035	0.23	0.007	0.26	2.59	0.86	0.05	
594+00	-33.00	LT	720.54	594+50	-33.00	LT	720.28	0.00	4.0	4.0	2.87	0.035	0.46	0.005	0.35	2.52	0.94	0.05	
594+50	-33.00	LT	720.28	595+00	-33.00	LT	720.02	0.00	4.0	4.0	2.39	0.035	0.68	0.005	0.41	1.98	1.04	0.06	
595+00	-33.00	LT	720.02	595+19	-33.00	LT	719.91	0.00	4.0	4.0	1.98	0.035	0.91	0.006	0.44	1.54	1.16	0.08	

DITCH D2 CALCULATIONS																			
UPSTREAM				DOWNSTREAM				BOTTOM WIDTH	LEFT SIDE SLOPE	RIGHT SIDE SLOPE	CHANNEL DEPTH	MANNING'S "n"	DESIGN FLOW (10-YR)	SLOPE	NORMAL DEPTH	FREEBOARD	VELOCITY	SHEAR STRESS	COMMENTS
STATION	OFFSET	LT/RT	FLOWLINE ELEVATION	STATION	OFFSET	LT/RT	FLOWLINE ELEVATION												
(ft)	(ft)		(ft)	(ft)	(ft)		(ft)	(ft)	x:1	x:1	(ft)	(cfs)	(ft/ft)	(ft)	(ft)	(f/s)	(lbs/ft ²)		
593+00	33.00	RT	722.44	593+50	33.00	RT	721.98	0.00	5.5	4.0	2.91	0.035	4.64	0.009	0.70	2.21	1.99	0.20	
593+50	33.00	RT	721.98	594+00	33.00	RT	720.54	0.00	5.5	4.0	2.89	0.035	9.28	0.029	0.73	2.16	3.63	0.64	
594+00	33.00	RT	720.54	594+50	33.00	RT	720.28	0.00	4.0	4.0	4.00	0.035	18.56	0.005	1.40	2.60	2.37	0.22	
594+50	33.00	RT	720.28	595+00	33.00	RT	720.02	0.00	4.0	4.0	4.00	0.035	27.84	0.005	1.63	2.37	2.62	0.26	
595+00	33.00	RT	720.02	595+50	33.00	RT	719.76	0.00	4.0	4.0	3.86	0.035	37.11	0.005	1.81	2.05	2.82	0.29	
595+50	33.00	RT	719.76	596+00	33.00	RT	719.55	0.00	4.0	4.0	3.64	0.035	46.39	0.004	2.05	1.59	2.75	0.26	
596+00	33.00	RT	719.55	596+50	33.00	RT	719.45	0.00	4.0	4.0	3.52	0.035	55.67	0.002	2.52	1.00	2.18	0.15	
596+50	33.00	RT	719.45	597+00	33.00	RT	719.35	0.00	4.1	4.1	3.31	0.035	64.95	0.002	2.65	0.66	2.25	0.16	
597+00	33.00	RT	719.35	597+40	33.00	RT	719.30	0.00	4.2	4.3	3.19	0.035	74.23	0.001	3.00	0.19	1.94	0.11	1

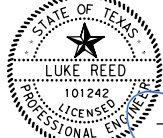
COMMENTS

1. LOW FREEBOARD DUE TO LOW NATURAL GROUND ELEVATION AT BACKSLOPE TIE IN.
2. STONE RIPRAP OR CONCRETE CHANNEL LINING REQUIRED DUE TO HIGH SHEAR STRESS.

NOTES

1. THE NEED FOR CHANNEL PROTECTION/LINING IS BASED ON A MAXIMUM SHEAR STRESS OF 1.00 LBS/FT² FOR RETARDANCE CLASS C VEGETATION LINED DITCHES.

DESIGN

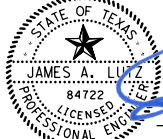


 LUKE REED, P.E.

 12/20/2022

 DATE

APPROVAL




 JAMES A. LUTZ, P.E.

 12/20/2022

 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY



PAPE-DAWSON ENGINEERS

 SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS

 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000

TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800


 Texas Department of Transportation

 © 2023

FM 2200

DITCH DATA SHEETS

 SHEET 1 OF 13

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	216

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Drainage\1179904_DITCHDATA.dgn

DITCH D4 CALCULATIONS																			
UPSTREAM				DOWNSTREAM				BOTTOM WIDTH	LEFT SIDE SLOPE	RIGHT SIDE SLOPE	CHANNEL DEPTH	MANNING'S "n"	DESIGN FLOW (10-YR)	SLOPE	NORMAL DEPTH	FREEBOARD	VELOCITY	SHEAR STRESS	COMMENTS
STATION	OFFSET	LT/RT	FLOWLINE ELEVATION	STATION	OFFSET	LT/RT	FLOWLINE ELEVATION												
(ft)	(ft)		(ft)	(ft)	(ft)		(ft)	(ft)	x:1	x:1	(ft)		(cfs)	(ft/ft)	(ft)	(ft)	(f/s)	(lbs/ft ²)	
621+00	-33.00	LT	683.24	621+50	-33.00	LT	682.48	0.00	4.0	4.0	2.42	0.035	8.67	0.015	0.86	1.56	2.93	0.40	
621+50	-33.00	LT	682.48	622+00	-33.00	LT	681.73	0.00	4.0	4.0	2.41	0.035	8.88	0.015	0.87	1.54	2.93	0.40	
622+00	-33.00	LT	681.73	622+50	-33.00	LT	680.98	0.00	4.0	4.0	2.49	0.035	9.08	0.015	0.88	1.61	2.95	0.40	
622+50	-33.00	LT	680.98	623+00	-33.00	LT	680.17	0.00	4.0	4.0	2.23	0.035	9.29	0.016	0.87	1.36	3.05	0.43	
623+00	-33.00	LT	680.17	623+50	-33.00	LT	679.34	0.00	4.0	4.0	2.43	0.035	9.50	0.017	0.88	1.55	3.09	0.44	
623+50	-33.00	LT	679.34	624+00	-33.00	LT	678.52	0.00	4.0	4.0	2.57	0.035	9.71	0.016	0.89	1.68	3.10	0.44	
624+00	-33.00	LT	678.52	624+50	-33.00	LT	677.72	0.00	4.0	4.0	2.89	0.035	9.92	0.016	0.90	1.99	3.09	0.43	
624+50	-33.00	LT	677.72	625+00	-33.00	LT	677.00	0.00	4.0	4.0	3.16	0.035	10.13	0.014	0.92	2.24	2.98	0.40	
625+00	-33.00	LT	677.00	625+50	-33.00	LT	676.28	0.00	4.0	4.0	3.50	0.035	10.34	0.014	0.93	2.57	3.00	0.40	
625+50	-33.00	LT	676.28	626+00	-36.00	LT	675.74	0.00	4.0	4.0	3.07	0.035	10.55	0.011	0.99	2.08	2.71	0.32	
626+00	-36.00	LT	675.74	626+50	-39.09	LT	674.92	0.00	4.2	4.3	2.90	0.035	10.75	0.016	0.90	2.00	3.13	0.45	
626+50	-39.09	LT	674.92	627+00	-39.19	LT	673.59	0.00	3.0	5.1	3.03	0.035	10.96	0.027	0.84	2.19	3.82	0.68	
627+00	-39.19	LT	673.59	627+50	-39.16	LT	672.51	0.00	3.0	4.4	3.88	0.035	11.17	0.022	0.92	2.96	3.62	0.59	
627+50	-39.16	LT	672.51	628+00	-37.17	LT	672.37	0.00	4.0	4.0	2.51	0.035	11.38	0.003	1.31	1.20	1.66	0.11	
628+00	-37.17	LT	672.37	628+50	-33.00	LT	672.16	0.00	4.0	4.0	2.61	0.035	11.58	0.004	1.22	1.39	1.94	0.16	
628+50	-33.00	LT	672.16	629+00	-33.00	LT	671.68	0.00	4.0	4.0	2.63	0.035	11.79	0.010	1.06	1.57	2.67	0.31	

COMMENTS

- 1. LOW FREEBOARD DUE TO LOW NATURAL GROUND ELEVATION AT BACKSLOPE TIE IN.
- 2. STONE RIPRAP OR CONCRETE CHANNEL LINING REQUIRED DUE TO HIGH SHEAR STRESS.

NOTES

- 1. THE NEED FOR CHANNEL PROTECTION/LINING IS BASED ON A MAXIMUM SHEAR STRESS OF 1.00 LBS/FT² FOR RETARDANCE CLASS C VEGETATION LINED DITCHES.

DITCH D5 CALCULATIONS																			
UPSTREAM				DOWNSTREAM				BOTTOM WIDTH	LEFT SIDE SLOPE	RIGHT SIDE SLOPE	CHANNEL DEPTH	MANNING'S "n"	DESIGN FLOW (10-YR)	SLOPE	NORMAL DEPTH	FREEBOARD	VELOCITY	SHEAR STRESS	COMMENTS
STATION	OFFSET	LT/RT	FLOWLINE ELEVATION	STATION	OFFSET	LT/RT	FLOWLINE ELEVATION												
(ft)	(ft)		(ft)	(ft)	(ft)		(ft)	(ft)	x:1	x:1	(ft)		(cfs)	(ft/ft)	(ft)	(ft)	(f/s)	(lbs/ft ²)	
636+20	-33.00	LT	666.05	636+50	-33.41	LT	665.78	0.00	4.0	4.0	2.73	0.035	0.09	0.009	0.17	2.56	0.77	0.05	
636+50	-33.41	LT	665.78	637+00	-34.10	LT	665.60	0.00	4.0	4.1	2.77	0.035	0.19	0.004	0.27	2.50	0.65	0.03	
637+00	-34.10	LT	665.60	637+50	-34.44	LT	665.47	0.00	4.3	4.5	2.97	0.035	0.50	0.003	0.39	2.58	0.73	0.03	
637+50	-34.44	LT	665.47	638+00	-33.12	LT	665.00	0.00	4.8	4.3	2.82	0.035	0.81	0.009	0.37	2.46	1.31	0.11	
638+00	-33.12	LT	665.00	638+50	-33.00	LT	664.80	0.00	4.1	4.5	3.27	0.035	1.13	0.004	0.50	2.77	1.05	0.06	
638+50	-33.00	LT	664.80	639+00	-33.00	LT	664.68	0.00	4.0	4.8	3.31	0.035	1.44	0.002	0.60	2.71	0.91	0.04	
639+00	-33.00	LT	664.68	639+40	-33.00	LT	663.35	0.00	4.0	5.3	3.01	0.035	1.75	0.033	0.39	2.63	2.54	0.39	

DESIGN

APPROVAL

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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FM 2200

DITCH DATA SHEETS

SHEET 5 OF 13

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHK	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.	COUNTY	CONT. NO. SECT. NO.	JOB NO. SHEET NO.
CHK	SAT	MEDINA	2520 01	016, ETC 220

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Drainage\1179904-DITCHDATA.dgn

DITCH D6 CALCULATIONS

Table with columns: STATION, OFFSET, LT/RT, FLOWLINE ELEVATION, DOWNSTREAM STATION, OFFSET, LT/RT, FLOWLINE ELEVATION, BOTTOM WIDTH, LEFT SIDE SLOPE, RIGHT SIDE SLOPE, CHANNEL DEPTH, MANNING'S 'n', DESIGN FLOW (10-YR), SLOPE, NORMAL DEPTH, FREEBOARD, VELOCITY, SHEAR STRESS, COMMENTS. Rows 640+60 to 651+50.

COMMENTS

- 1. LOW FREEBOARD DUE TO LOW NATURAL GROUND ELEVATION AT BACKSLOPE TIE IN.
2. STONE RIPRAP OR CONCRETE CHANNEL LINING REQUIRED DUE TO HIGH SHEAR STRESS.

NOTES

- 1. THE NEED FOR CHANNEL PROTECTION/LINING IS BASED ON A MAXIMUM SHEAR STRESS OF 1.00 LBS/FT2 FOR RETARDANCE CLASS C VEGETATION LINED DITCHES.

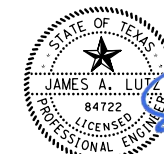
DESIGN



Signature of Luke Reed, P.E.

12/20/2022 DATE

APPROVAL



Signature of James A. Lutz, P.E.

12/20/2022 DATE

DITCH D7 CALCULATIONS

Table with columns: STATION, OFFSET, LT/RT, FLOWLINE ELEVATION, DOWNSTREAM STATION, OFFSET, LT/RT, FLOWLINE ELEVATION, BOTTOM WIDTH, LEFT SIDE SLOPE, RIGHT SIDE SLOPE, CHANNEL DEPTH, MANNING'S 'n', DESIGN FLOW (10-YR), SLOPE, NORMAL DEPTH, FREEBOARD, VELOCITY, SHEAR STRESS, COMMENTS. Rows 653+60 to 659+00.

NOT TO SCALE

Table with columns: REV. NO., DATE, DESCRIPTION, BY. Contains revision history.



San Antonio | Austin | Houston | Fort Worth | Dallas
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
DITCH DATA SHEETS

SHEET 6 OF 13

Table with columns: DGN#, FED. RD. DIV. NO., STATE, FEDERAL AID PROJECT NO., HIGHWAY NO., DIST., COUNTY, CONT. NO., SECT. NO., JOB NO., SHEET NO. Contains project details.

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Drainage\1179904_DITCHDATA.dgn

DITCH D8 CALCULATIONS																			
UPSTREAM				DOWNSTREAM				BOTTOM WIDTH	LEFT SIDE SLOPE	RIGHT SIDE SLOPE	CHANNEL DEPTH	MANNING'S "n"	DESIGN FLOW (10-YR)	SLOPE	NORMAL DEPTH	FREEBOARD	VELOCITY	SHEAR STRESS	COMMENTS
STATION	OFFSET	LT/RT	FLOWLINE ELEVATION	STATION	OFFSET	LT/RT	FLOWLINE ELEVATION												
(ft)	(ft)		(ft)	(ft)	(ft)		(ft)	(ft)	x:1	x:1	(ft)		(cfs)	(ft/ft)	(ft)	(ft)	(f/s)	(lbs/ft ²)	
657+20	-29.00	LT	668.12	657+50	-27.00	LT	668.44	0.00	3.0	4.0	1.01	0.035	1.00	0.011	0.43	0.58	1.54	0.14	
657+50	-27.00	LT	668.44	658+00	-27.00	LT	668.87	0.00	3.0	4.0	1.15	0.035	0.85	0.009	0.42	0.73	1.36	0.11	
658+00	-27.00	LT	668.87	658+50	-27.00	LT	669.14	0.00	3.0	4.0	1.58	0.035	0.60	0.005	0.41	1.18	1.05	0.07	
658+50	-27.00	LT	669.14	659+00	-27.00	LT	669.26	0.00	3.0	4.0	2.50	0.035	0.35	0.002	0.39	2.12	0.68	0.03	
659+00	-27.00	LT	669.26	659+20	-27.00	LT	669.27	0.00	3.0	4.0	2.50	0.035	0.10	0.000	0.32	2.18	0.27	0.00	

DITCH D9 CALCULATIONS																			
UPSTREAM				DOWNSTREAM				BOTTOM WIDTH	LEFT SIDE SLOPE	RIGHT SIDE SLOPE	CHANNEL DEPTH	MANNING'S "n"	DESIGN FLOW (10-YR)	SLOPE	NORMAL DEPTH	FREEBOARD	VELOCITY	SHEAR STRESS	COMMENTS
STATION	OFFSET	LT/RT	FLOWLINE ELEVATION	STATION	OFFSET	LT/RT	FLOWLINE ELEVATION												
(ft)	(ft)		(ft)	(ft)	(ft)		(ft)	(ft)	x:1	x:1	(ft)		(cfs)	(ft/ft)	(ft)	(ft)	(f/s)	(lbs/ft ²)	
659+20	27.00	RT	669.27	659+50	27.00	RT	669.22	0.00	4.0	3.0	2.50	0.035	0.07	0.002	0.23	2.28	0.38	0.01	
659+50	27.00	RT	669.22	660+00	27.00	RT	669.03	0.00	4.0	3.0	2.50	0.035	0.14	0.004	0.25	2.25	0.63	0.03	
660+00	27.00	RT	669.03	660+50	27.00	RT	668.68	0.00	4.0	3.0	2.50	0.035	0.36	0.007	0.32	2.18	1.02	0.07	
660+50	27.00	RT	668.68	661+00	27.00	RT	668.18	0.00	4.0	3.0	2.50	0.035	0.59	0.010	0.36	2.14	1.31	0.11	
661+00	27.00	RT	668.18	661+50	27.00	RT	667.52	0.00	4.0	3.0	2.50	0.035	0.82	0.013	0.38	2.12	1.58	0.15	
661+50	27.00	RT	667.52	662+00	27.00	RT	666.70	0.00	4.0	3.0	2.50	0.035	1.05	0.016	0.40	2.10	1.82	0.20	
662+00	27.00	RT	666.70	662+50	27.00	RT	665.73	0.00	4.0	3.0	2.50	0.035	1.27	0.019	0.42	2.08	2.04	0.24	
662+50	27.00	RT	665.73	663+00	27.00	RT	664.60	0.00	4.0	3.0	2.50	0.035	1.50	0.023	0.44	2.07	2.25	0.29	
663+00	27.00	RT	664.60	663+50	27.00	RT	663.32	0.00	4.0	3.0	2.50	0.035	1.73	0.026	0.45	2.05	2.44	0.34	
663+50	27.00	RT	663.32	664+00	27.00	RT	661.88	0.00	4.0	3.0	2.50	0.035	1.95	0.029	0.46	2.04	2.63	0.40	
664+00	27.00	RT	661.88	664+50	27.00	RT	660.29	0.00	4.0	3.0	2.44	0.035	2.18	0.032	0.47	1.97	2.81	0.45	
664+50	27.00	RT	660.29	665+00	27.00	RT	658.54	0.00	4.0	3.0	2.50	0.035	2.41	0.035	0.48	2.02	2.99	0.50	
665+00	27.00	RT	658.54	665+50	28.20	RT	657.50	0.00	4.0	3.0	2.50	0.035	2.64	0.021	0.49	2.01	3.10	0.31	
665+50	28.20	RT	657.50	665+80	24.00	RT	657.22	0.00	5.8	3.5	1.72	0.035	2.86	0.009	0.60	1.12	1.68	0.17	

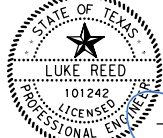
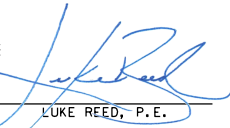
COMMENTS

1. LOW FREEBOARD DUE TO LOW NATURAL GROUND ELEVATION AT BACKSLOPE TIE IN.
2. STONE RIPRAP OR CONCRETE CHANNEL LINING REQUIRED DUE TO HIGH SHEAR STRESS.

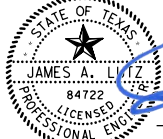
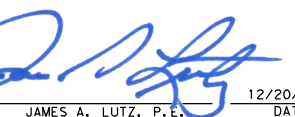
NOTES

1. THE NEED FOR CHANNEL PROTECTION/LINING IS BASED ON A MAXIMUM SHEAR STRESS OF 1.00 LBS/FT² FOR RETARDANCE CLASS C VEGETATION LINED DITCHES.

DESIGN



 LUKE REED, P.E. 12/20/2022
 DATE

APPROVAL



 JAMES A. LUTZ, P.E. 12/20/2022
 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200

DITCH DATA SHEETS

SHEET 7 OF 13

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	222

Plotted on: 12/20/2022

Design File Name: P:\117\99\04\Design\Civil\Drainage\1179904_DITCHDATA.dgn

DITCH D10 CALCULATIONS. Table with columns: STATION, OFFSET, LT/RT, FLOWLINE ELEVATION, STATION, OFFSET, LT/RT, FLOWLINE ELEVATION, BOTTOM WIDTH, LEFT SIDE SLOPE, RIGHT SIDE SLOPE, CHANNEL DEPTH, MANNING'S 'n', DESIGN FLOW (10-YR), SLOPE, NORMAL DEPTH, FREEBOARD, VELOCITY, SHEAR STRESS, COMMENTS.

- COMMENTS
1. LOW FREEBOARD DUE TO LOW NATURAL GROUND ELEVATION AT BACKSLOPE TIE IN.
2. STONE RIPRAP OR CONCRETE CHANNEL LINING REQUIRED DUE TO HIGH SHEAR STRESS.

NOTES
1. THE NEED FOR CHANNEL PROTECTION/LINING IS BASED ON A MAXIMUM SHEAR STRESS OF 1.00 LBS/FT2 FOR RETARDANCE CLASS C VEGETATION LINED DITCHES.

DITCH D11 CALCULATIONS. Table with columns: STATION, OFFSET, LT/RT, FLOWLINE ELEVATION, STATION, OFFSET, LT/RT, FLOWLINE ELEVATION, BOTTOM WIDTH, LEFT SIDE SLOPE, RIGHT SIDE SLOPE, CHANNEL DEPTH, MANNING'S 'n', DESIGN FLOW (10-YR), SLOPE, NORMAL DEPTH, FREEBOARD, VELOCITY, SHEAR STRESS, COMMENTS.

DESIGN and APPROVAL stamps. DESIGN stamp: LUKE REED, P.E. 12/20/2022. APPROVAL stamp: JAMES A. LUTZ, P.E. 12/20/2022.

NOT TO SCALE. Revision table with columns: REV. NO., DATE, DESCRIPTION, BY.

Pape-Dawson Engineers logo and address: SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS. 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000.

Texas Department of Transportation logo and project info: FM 2200, DITCH DATA SHEETS, SHEET 8 OF 13.

Summary table with columns: DGN#, FED. RD. DIV. NO., STATE, FEDERAL AID PROJECT NO., HIGHWAY NO., DIST., COUNTY, CONT. NO., SECT. NO., JOB NO., SHEET NO.

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Drainage\1179904_DITCHDATA.dgn

DITCH D11 CALCULATIONS																			
UPSTREAM				DOWNSTREAM				BOTTOM WIDTH	LEFT SIDE SLOPE	RIGHT SIDE SLOPE	CHANNEL DEPTH	MANNING'S "n"	DESIGN FLOW (10-YR)	SLOPE	NORMAL DEPTH	FREEBOARD	VELOCITY	SHEAR STRESS	COMMENTS
STATION	OFFSET	LT/RT	FLOWLINE ELEVATION	STATION	OFFSET	LT/RT	FLOWLINE ELEVATION												
(ft)	(ft)		(ft)	(ft)	(ft)		(ft)	(ft)	x:1	x:1	(ft)	(cfs)	(ft/ft)	(ft)	(ft)	(f/s)	(lbs/ft ²)		
684+00	-37.82	LT	654.59	684+50	-38.05	LT	654.67	0.00	3.0	3.7	3.11	0.035	54.11	0.002	2.80	0.31	2.07	0.13	1
684+50	-38.05	LT	654.67	685+00	-38.28	LT	654.75	0.00	3.0	3.8	3.36	0.035	50.59	0.002	2.71	0.65	2.03	0.13	
685+00	-38.28	LT	654.75	685+50	-37.52	LT	654.83	0.00	3.0	4.0	3.09	0.035	47.08	0.002	2.61	0.48	1.98	0.13	1
685+50	-37.52	LT	654.83	686+00	-36.64	LT	654.89	0.00	3.0	3.9	3.24	0.035	43.57	0.001	2.68	0.56	1.75	0.10	
686+00	-36.64	LT	654.89	686+50	-36.59	LT	654.95	0.00	4.0	3.8	2.99	0.035	40.05	0.001	2.48	0.51	1.67	0.09	
686+50	-36.59	LT	654.95	687+00	-36.54	LT	655.13	0.00	4.0	4.5	2.47	0.035	36.54	0.004	1.89	0.58	2.41	0.21	
687+00	-36.54	LT	655.13	687+50	-36.48	LT	655.31	0.00	4.0	4.8	2.40	0.035	33.03	0.004	1.80	0.60	2.34	0.20	
687+50	-36.48	LT	655.31	688+00	-36.43	LT	655.41	0.00	4.0	4.9	2.43	0.035	29.51	0.002	1.91	0.52	1.82	0.12	
688+00	-36.43	LT	655.41	688+50	-36.38	LT	655.46	0.00	4.0	5.2	2.56	0.035	26.00	0.001	2.05	0.51	1.35	0.06	
688+50	-36.38	LT	655.46	689+00	-36.33	LT	655.62	0.00	4.0	5.3	2.57	0.035	22.49	0.003	1.55	1.02	2.00	0.15	
689+00	-36.33	LT	655.62	689+50	-36.28	LT	655.79	0.00	4.0	5.7	2.43	0.035	18.97	0.003	1.42	1.01	1.95	0.15	
689+50	-36.28	LT	655.79	690+00	-33.15	LT	656.48	0.00	4.0	5.2	1.96	0.035	15.46	0.014	1.03	0.93	3.16	0.43	
690+00	-33.15	LT	656.48	690+50	-33.46	LT	656.51	0.00	10.9	6.5	1.35	0.035	11.95	0.001	1.32	0.03	0.79	0.02	1
690+50	-33.46	LT	656.51	691+00	-33.76	LT	656.75	0.00	9.4	6.9	0.90	0.035	8.43	0.005	0.80	0.09	1.59	0.12	1
691+00	-33.76	LT	656.75	691+50	-34.07	LT	657.50	0.00	45.7	8.3	0.35	0.035	4.92	0.015	0.34	0.01	1.59	0.16	1
691+50	-34.07	LT	657.50	691+70	-34.19	LT	657.80	0.00	15.8	15.2	0.32	0.035	1.41	0.015	0.26	0.06	1.33	0.12	1

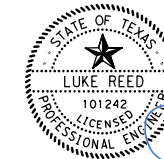
COMMENTS

1. LOW FREEBOARD DUE TO LOW NATURAL GROUND ELEVATION AT BACKSLOPE TIE IN.
2. STONE RIPRAP OR CONCRETE CHANNEL LINING REQUIRED DUE TO HIGH SHEAR STRESS.

NOTES

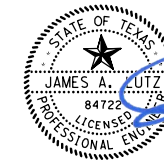
1. THE NEED FOR CHANNEL PROTECTION/LINING IS BASED ON A MAXIMUM SHEAR STRESS OF 1.00 LBS/FT² FOR RETARDANCE CLASS C VEGETATION LINED DITCHES.

DESIGN



Handwritten Signature
LUKE REED, P.E.
12/20/2022
DATE

APPROVAL



Handwritten Signature
JAMES A. LUTZ, P.E.
12/20/2022
DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200

DITCH DATA SHEETS

SHEET 9 OF 13

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 224

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Drainage\1179904_DITCHDATA.dgn

DITCH D12 CALCULATIONS

UPSTREAM				DOWNSTREAM				BOTTOM WIDTH	LEFT SIDE SLOPE	RIGHT SIDE SLOPE	CHANNEL DEPTH	MANNING'S "n"	DESIGN FLOW (10-YR)	SLOPE	NORMAL DEPTH	FREEBOARD	VELOCITY	SHEAR STRESS	COMMENTS
STATION	OFFSET	LT/RT	FLOWLINE ELEVATION	STATION	OFFSET	LT/RT	FLOWLINE ELEVATION												
(ft)	(ft)		(ft)	(ft)	(ft)		(ft)	(ft)	x:1	x:1	(ft)		(cfs)	(ft/ft)	(ft)	(ft)	(f/s)	(lbs/ft²)	
673+20	32.00	RT	646.02	673+50	30.20	RT	646.48	0.00	4.0	3.0	2.52	0.035	6.00	0.015	0.79	1.73	2.75	0.36	
673+50	30.20	RT	646.48	674+00	29.00	RT	647.23	0.00	4.0	4.0	2.92	0.035	5.87	0.015	0.75	2.17	2.64	0.34	
674+00	29.00	RT	647.23	674+50	29.00	RT	647.95	0.00	4.0	4.0	3.00	0.035	5.64	0.014	0.74	2.26	2.58	0.32	
674+50	29.00	RT	647.95	675+00	29.00	RT	648.59	0.00	4.0	4.0	3.00	0.035	5.42	0.013	0.75	2.26	2.44	0.29	
675+00	29.00	RT	648.59	675+50	32.91	RT	648.93	0.00	4.0	4.1	3.00	0.035	5.20	0.007	0.82	2.18	1.90	0.17	
675+50	32.91	RT	648.93	676+00	32.76	RT	649.27	0.00	5.0	4.0	2.54	0.035	4.97	0.007	0.78	1.76	1.84	0.16	
676+00	32.76	RT	649.27	676+50	32.61	RT	649.61	0.00	4.7	4.0	2.46	0.035	4.75	0.007	0.77	1.69	1.83	0.16	
676+50	32.61	RT	649.61	677+00	32.45	RT	649.95	0.00	4.4	4.0	2.28	0.035	4.52	0.007	0.77	1.51	1.82	0.16	
677+00	32.45	RT	649.95	677+50	32.30	RT	650.29	0.00	4.1	4.0	2.10	0.035	4.30	0.007	0.76	1.34	1.81	0.16	
677+50	32.30	RT	650.29	678+00	32.23	RT	650.75	0.00	4.0	4.0	1.86	0.035	4.08	0.009	0.71	1.15	2.01	0.20	
678+00	32.23	RT	650.75	678+50	32.15	RT	651.28	0.00	4.0	4.0	1.64	0.035	3.85	0.011	0.68	0.96	2.09	0.22	
678+50	32.15	RT	651.28	679+00	32.07	RT	651.80	0.00	4.0	4.0	1.94	0.035	3.63	0.010	0.67	1.27	2.04	0.21	
679+00	32.07	RT	651.80	679+50	31.99	RT	652.33	0.00	4.0	4.0	1.82	0.035	3.41	0.011	0.65	1.17	2.02	0.21	
679+50	31.99	RT	652.33	680+00	31.91	RT	652.85	0.00	4.0	4.0	1.86	0.035	3.18	0.010	0.64	1.23	1.97	0.20	
680+00	31.91	RT	652.85	680+50	31.89	RT	653.37	0.00	4.0	4.0	2.17	0.035	2.96	0.010	0.62	1.55	1.94	0.19	
680+50	31.89	RT	653.37	681+00	31.95	RT	653.85	0.00	4.0	4.4	2.39	0.035	2.74	0.010	0.61	1.79	1.85	0.18	
681+00	31.95	RT	653.85	681+50	31.88	RT	654.38	0.00	4.0	4.8	2.55	0.035	2.51	0.011	0.58	1.97	1.87	0.18	
681+50	31.88	RT	654.38	682+00	31.81	RT	654.90	0.00	4.0	5.3	2.48	0.035	2.29	0.010	0.56	1.92	1.82	0.18	
682+00	31.81	RT	654.90	682+50	31.74	RT	655.33	0.00	4.0	5.7	2.47	0.035	2.06	0.009	0.56	1.91	1.65	0.14	
682+50	31.74	RT	655.33	683+00	31.66	RT	655.65	0.00	4.0	6.3	2.19	0.035	1.84	0.006	0.57	1.63	1.44	0.11	
683+00	31.66	RT	655.65	683+50	31.59	RT	655.82	0.00	4.0	6.6	1.94	0.035	1.62	0.004	0.60	1.33	1.12	0.06	
683+50	31.59	RT	655.82	684+00	31.45	RT	655.90	0.00	4.0	6.9	1.78	0.035	1.39	0.002	0.67	1.11	0.78	0.03	
684+00	31.45	RT	655.90	684+50	31.08	RT	655.95	0.00	4.0	6.7	1.66	0.035	1.17	0.001	0.67	0.99	0.65	0.02	
684+50	31.08	RT	655.95	685+00	30.72	RT	655.99	0.00	4.0	6.1	1.80	0.035	0.95	0.001	0.65	1.15	0.56	0.02	
685+00	30.72	RT	655.99	685+50	30.35	RT	656.03	0.00	4.0	5.8	1.68	0.035	0.72	0.001	0.58	1.10	0.53	0.01	
685+50	30.35	RT	656.03	686+00	29.99	RT	656.07	0.00	4.0	5.8	1.25	0.035	0.50	0.001	0.51	0.73	0.47	0.01	
686+00	29.99	RT	656.07	686+50	29.62	RT	656.13	0.00	4.0	5.0	1.37	0.035	0.28	0.001	0.39	0.98	0.45	0.01	
686+50	29.62	RT	656.13	686+62	29.53	RT	656.45	0.00	4.0	4.5	1.40	0.035	0.05	0.028	0.11	1.29	1.01	0.09	

COMMENTS

1. LOW FREEBOARD DUE TO LOW NATURAL GROUND ELEVATION AT BACKSLOPE TIE IN.
2. STONE RIPRAP OR CONCRETE CHANNEL LINING REQUIRED DUE TO HIGH SHEAR STRESS.

NOTES

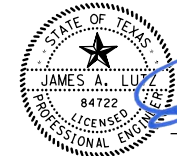
1. THE NEED FOR CHANNEL PROTECTION/LINING IS BASED ON A MAXIMUM SHEAR STRESS OF 1.00 LBS/FT² FOR RETARDANCE CLASS C VEGETATION LINED DITCHES.

DESIGN



[Signature]
LUKE REED, P.E.
12/20/2022
DATE

APPROVAL



[Signature]
JAMES A. LUTZ, P.E.
12/20/2022
DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800



FM 2200

DITCH DATA SHEETS

SHEET 10 OF 13

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	225

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\Drainage\1179904_DITCHDATA.dgn

DITCH D13 CALCULATIONS																			
UPSTREAM				DOWNSTREAM				BOTTOM WIDTH	LEFT SIDE SLOPE	RIGHT SIDE SLOPE	CHANNEL DEPTH	MANNING'S "n"	DESIGN FLOW (10-YR)	SLOPE	NORMAL DEPTH	FREEBOARD	VELOCITY	SHEAR STRESS	COMMENTS
STATION	OFFSET	LT/RT	FLOWLINE ELEVATION	STATION	OFFSET	LT/RT	FLOWLINE ELEVATION												
(ft)	(ft)		(ft)	(ft)	(ft)		(ft)	(ft)	x:1	x:1	(ft)		(cfs)	(ft/ft)	(ft)	(ft)	(f/s)	(lbs/ft ²)	
686+62	29.53	RT	656.45	687+00	29.26	RT	656.35	0.00	4.4	11.7	1.06	0.035	0.09	0.003	0.17	0.89	0.41	0.01	
687+00	29.26	RT	656.35	687+50	28.82	RT	656.23	0.00	4.3	5.3	1.25	0.035	0.19	0.003	0.27	0.98	0.55	0.02	
687+50	28.82	RT	656.23	688+00	29.21	RT	656.08	0.00	4.0	5.2	1.29	0.035	0.43	0.003	0.36	0.92	0.72	0.03	
688+00	29.21	RT	656.08	688+50	29.70	RT	655.92	0.00	4.0	4.9	1.34	0.035	0.68	0.003	0.42	0.92	0.85	0.04	
688+50	29.70	RT	655.92	689+00	30.19	RT	655.74	0.00	4.0	4.6	1.53	0.035	0.92	0.003	0.48	1.06	0.94	0.05	
689+00	30.19	RT	655.74	689+50	30.68	RT	655.57	0.00	4.0	4.3	1.64	0.035	1.17	0.003	0.53	1.11	1.01	0.06	
689+50	30.68	RT	655.57	690+00	31.17	RT	655.37	0.00	4.0	4.1	1.58	0.035	1.41	0.004	0.56	1.02	1.12	0.07	
690+00	31.17	RT	655.37	690+50	31.66	RT	655.20	0.00	4.0	4.0	1.80	0.035	1.66	0.003	0.61	1.19	1.10	0.06	
690+50	31.66	RT	655.20	691+00	32.15	RT	654.97	0.00	4.0	4.1	1.62	0.035	1.90	0.005	0.61	1.01	1.27	0.08	
691+00	32.15	RT	654.97	691+50	32.64	RT	654.70	0.00	4.0	4.3	1.61	0.035	2.15	0.005	0.61	1.00	1.39	0.10	
691+50	32.64	RT	654.70	692+00	33.13	RT	654.31	0.00	4.0	4.3	2.16	0.035	2.39	0.008	0.59	1.57	1.64	0.14	
692+00	33.13	RT	654.31	692+50	33.96	RT	653.82	0.00	4.0	4.1	3.53	0.035	2.64	0.010	0.60	2.93	1.84	0.18	
692+50	33.96	RT	653.82	693+00	34.51	RT	653.64	0.00	4.0	3.9	2.66	0.035	2.88	0.004	0.75	1.91	1.31	0.08	
693+00	34.51	RT	653.64	693+50	34.57	RT	653.44	0.00	4.2	4.3	2.14	0.035	3.13	0.004	0.74	1.41	1.35	0.09	
693+50	34.57	RT	653.44	694+00	34.33	RT	653.24	0.00	4.4	4.9	2.21	0.035	3.37	0.004	0.73	1.48	1.35	0.09	
694+00	34.33	RT	653.24	694+50	35.50	RT	653.04	0.00	4.5	5.3	1.94	0.035	3.62	0.004	0.74	1.21	1.37	0.09	
694+50	35.50	RT	653.04	695+00	36.27	RT	652.36	0.00	4.0	4.4	1.89	0.035	3.86	0.014	0.64	1.26	2.27	0.26	
695+00	36.27	RT	652.36	695+50	32.80	RT	652.20	0.00	4.0	3.6	2.22	0.035	4.10	0.003	0.89	1.33	1.37	0.09	
695+50	32.80	RT	652.20	696+00	39.25	RT	652.00	0.00	3.3	4.6	2.30	0.035	4.35	0.004	0.86	1.44	1.50	0.10	
696+00	39.25	RT	652.00	696+50	38.70	RT	651.50	0.00	4.0	3.7	2.14	0.035	4.59	0.010	0.75	1.39	2.15	0.22	
696+50	38.70	RT	651.50	697+00	39.67	RT	651.40	0.00	4.0	3.5	2.25	0.035	4.84	0.002	1.04	1.21	1.20	0.06	
697+00	39.67	RT	651.40	697+50	40.78	RT	651.30	0.00	4.1	3.5	1.92	0.035	5.08	0.002	1.05	0.87	1.21	0.06	
697+50	40.78	RT	651.30	698+00	41.66	RT	651.20	0.00	4.3	3.5	1.61	0.035	5.33	0.002	1.06	0.55	1.22	0.06	
698+00	41.66	RT	651.20	698+50	42.66	RT	651.10	0.00	4.0	3.7	1.62	0.035	5.57	0.002	1.08	0.54	1.23	0.07	
698+50	42.66	RT	651.10	698+87	39.26	RT	651.02	0.00	4.1	3.9	1.68	0.035	5.82	0.002	1.07	0.61	1.28	0.07	


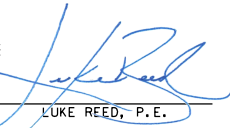
COMMENTS

1. LOW FREEBOARD DUE TO LOW NATURAL GROUND ELEVATION AT BACKSLOPE TIE IN.
2. STONE RIPRAP OR CONCRETE CHANNEL LINING REQUIRED DUE TO HIGH SHEAR STRESS.

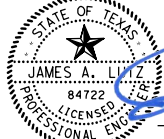
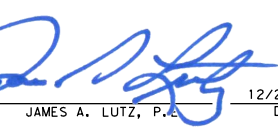
NOTES

1. THE NEED FOR CHANNEL PROTECTION/LINING IS BASED ON A MAXIMUM SHEAR STRESS OF 1.00 LBS/FT² FOR RETARDANCE CLASS C VEGETATION LINED DITCHES.

DESIGN



 LUKE REED, P.E. 12/20/2022
 DATE

APPROVAL



 JAMES A. LUTZ, P.E. 12/20/2022
 DATE

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800



FM 2200

DITCH DATA SHEETS

SHEET 11 OF 13

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	226

Plotted on: 12/20/2022

Design File name: P:\1179904\Design\Civil\Drainage\1179904_DITCHDATA.dgn

DITCH D14 CALCULATIONS table with columns: STATION, OFFSET, LT/RT, FLOWLINE ELEVATION, STATION, OFFSET, LT/RT, FLOWLINE ELEVATION, BOTTOM WIDTH, LEFT SIDE SLOPE, RIGHT SIDE SLOPE, CHANNEL DEPTH, MANNING'S 'n', DESIGN FLOW (10-YR), SLOPE, NORMAL DEPTH, FREEBOARD, VELOCITY, SHEAR STRESS, COMMENTS.

DITCH D15 CALCULATIONS table with columns: STATION, OFFSET, LT/RT, FLOWLINE ELEVATION, STATION, OFFSET, LT/RT, FLOWLINE ELEVATION, BOTTOM WIDTH, LEFT SIDE SLOPE, RIGHT SIDE SLOPE, CHANNEL DEPTH, MANNING'S 'n', DESIGN FLOW (10-YR), SLOPE, NORMAL DEPTH, FREEBOARD, VELOCITY, SHEAR STRESS, COMMENTS.

COMMENTS

- 1. LOW FREEBOARD DUE TO LOW NATURAL GROUND ELEVATION AT BACKSLOPE TIE IN.
2. STONE RIPRAP OR CONCRETE CHANNEL LINING REQUIRED DUE TO HIGH SHEAR STRESS.

NOTES

- 1. THE NEED FOR CHANNEL PROTECTION/LINING IS BASED ON A MAXIMUM SHEAR STRESS OF 1.00 LBS/FT2 FOR RETARDANCE CLASS C VEGETATION LINED DITCHES.

DESIGN

Professional Engineer seal for LUKE REED, P.E. with signature and date 12/20/2022.

APPROVAL

Professional Engineer seal for JAMES A. LUTZ, P.E. with signature and date 12/20/2022.

NOT TO SCALE

Professional Engineering Title Block containing Pape-Dawson Engineers logo, Texas Department of Transportation logo, project information (FM 2200, DITCH DATA SHEETS), and a revision table.

Revision table with columns: REV. NO., DATE, DESCRIPTION, BY. Contains one revision entry.

Project and Sheet Information table with columns: DGN, FED. RD. DIV. NO., STATE, FEDERAL AID PROJECT NO., HIGHWAY NO., DIST., COUNTY, CONT. NO., SECT. NO., JOB NO., SHEET NO.

Plotted on: 12/20/2022

DITCH D16 CALCULATIONS																			
UPSTREAM				DOWNSTREAM				BOTTOM WIDTH	LEFT SIDE SLOPE	RIGHT SIDE SLOPE	CHANNEL DEPTH	MANNING'S "n"	DESIGN FLOW (10-YR)	SLOPE	NORMAL DEPTH	FREEBOARD	VELOCITY	SHEAR STRESS	COMMENTS
STATION	OFFSET	LT/RT	FLOWLINE ELEVATION	STATION	OFFSET	LT/RT	FLOWLINE ELEVATION												
(ft)	(ft)		(ft)	(ft)	(ft)		(ft)	(ft)	x:1	x:1	(ft)	(cfs)	(ft/ft)	(ft)	(ft)	(f/s)	(lbs/ft ²)		
701+50	-43.53	LT	653.26	702+00	-41.46	LT	654.10	0.00	4.8	4.0	1.04	0.035	4.72	0.017	0.65	0.39	2.56	0.33	1
702+00	-41.46	LT	654.10	702+50	-39.43	LT	654.95	0.00	6.7	4.1	1.40	0.035	4.38	0.017	0.58	0.82	2.40	0.30	
702+50	-39.43	LT	654.95	703+00	-38.44	LT	655.72	0.00	2.8	4.0	3.10	0.035	4.03	0.015	0.69	2.41	2.52	0.32	
703+00	-38.44	LT	655.72	703+50	-37.49	LT	656.49	0.00	3.0	3.8	2.99	0.035	3.68	0.015	0.66	2.33	2.46	0.31	
703+50	-37.49	LT	656.49	704+00	-37.30	LT	658.22	0.00	3.1	3.4	3.13	0.035	3.33	0.035	0.56	2.57	3.29	0.58	
704+00	-37.30	LT	658.22	704+50	-37.61	LT	659.45	0.00	3.7	4.2	2.46	0.035	2.99	0.025	0.53	1.93	2.69	0.39	
704+50	-37.61	LT	659.45	705+00	-37.92	LT	660.28	0.00	3.9	4.6	2.30	0.035	2.64	0.017	0.53	1.77	2.22	0.27	
705+00	-37.92	LT	660.28	705+50	-37.32	LT	661.11	0.00	3.6	4.4	2.51	0.035	2.29	0.017	0.52	1.99	2.17	0.26	
705+50	-37.32	LT	661.11	706+00	-36.72	LT	662.00	0.00	3.7	4.0	2.59	0.035	1.94	0.018	0.48	2.11	2.15	0.26	
706+00	-36.72	LT	662.00	706+50	-34.52	LT	663.16	0.00	4.1	4.0	2.45	0.035	1.60	0.023	0.42	2.03	2.23	0.30	
706+50	-34.52	LT	663.16	707+00	-34.70	LT	663.57	0.00	5.9	4.0	1.88	0.035	1.25	0.008	0.43	1.45	1.36	0.11	
707+00	-34.70	LT	663.57	707+50	-34.88	LT	663.95	0.00	5.8	4.0	1.92	0.035	0.90	0.008	0.39	1.53	1.22	0.09	
707+50	-34.88	LT	663.95	708+00	-35.06	LT	664.33	0.00	6.0	4.3	1.83	0.035	0.56	0.008	0.32	1.51	1.07	0.07	
708+00	-35.06	LT	664.33	708+30	-35.17	LT	664.56	0.00	6.7	5.0	1.60	0.035	0.21	0.008	0.21	1.39	0.81	0.05	

COMMENTS

1. LOW FREEBOARD DUE TO LOW NATURAL GROUND ELEVATION AT BACKSLOPE TIE IN.
2. STONE RIPRAP OR CONCRETE CHANNEL LINING REQUIRED DUE TO HIGH SHEAR STRESS.


NOTES

1. THE NEED FOR CHANNEL PROTECTION/LINING IS BASED ON A MAXIMUM SHEAR STRESS OF 1.00 LBS/FT² FOR RETARDANCE CLASS C VEGETATION LINED DITCHES.

Design Filename: P:\11799\04\Design\Civil\Drainage\1179904_DITCHDATA.dgn

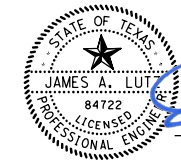
DITCH D17 CALCULATIONS																			
UPSTREAM				DOWNSTREAM				BOTTOM WIDTH	LEFT SIDE SLOPE	RIGHT SIDE SLOPE	CHANNEL DEPTH	MANNING'S "n"	DESIGN FLOW (10-YR)	SLOPE	NORMAL DEPTH	FREEBOARD	VELOCITY	SHEAR STRESS	COMMENTS
STATION	OFFSET	LT/RT	FLOWLINE ELEVATION	STATION	OFFSET	LT/RT	FLOWLINE ELEVATION												
(ft)	(ft)		(ft)	(ft)	(ft)		(ft)	(ft)	x:1	x:1	(ft)	(cfs)	(ft/ft)	(ft)	(ft)	(f/s)	(lbs/ft ²)		
708+50	33.33	RT	664.57	709+00	32.67	RT	663.68	0.00	7.9	3.9	1.44	0.035	0.17	0.018	0.16	1.28	1.06	0.09	
709+00	32.67	RT	663.68	709+50	32.00	RT	663.34	0.00	4.9	3.0	2.17	0.035	0.34	0.007	0.30	1.87	0.96	0.06	
709+50	32.00	RT	663.34	710+00	33.00	RT	662.54	0.00	4.6	3.0	2.19	0.035	0.68	0.016	0.34	1.85	1.60	0.16	
710+00	33.00	RT	662.54	710+50	31.00	RT	662.37	0.00	4.3	2.5	2.53	0.035	1.01	0.003	0.54	1.99	1.01	0.06	
710+50	31.00	RT	662.37	711+00	31.00	RT	661.83	0.00	4.3	3.0	2.08	0.035	1.35	0.011	0.47	1.61	1.65	0.15	
711+00	31.00	RT	661.83	711+46	30.00	RT	660.84	0.00	4.9	3.0	1.85	0.035	1.69	0.022	0.44	1.41	2.23	0.29	

DESIGN



LUKE REED, P.E.
DATE 12/20/2022

APPROVAL



JAMES A. LUTZ, P.E.
DATE 12/20/2022

DITCH D18 CALCULATIONS																			
UPSTREAM				DOWNSTREAM				BOTTOM WIDTH	LEFT SIDE SLOPE	RIGHT SIDE SLOPE	CHANNEL DEPTH	MANNING'S "n"	DESIGN FLOW (10-YR)	SLOPE	NORMAL DEPTH	FREEBOARD	VELOCITY	SHEAR STRESS	COMMENTS
STATION	OFFSET	LT/RT	FLOWLINE ELEVATION	STATION	OFFSET	LT/RT	FLOWLINE ELEVATION												
(ft)	(ft)		(ft)	(ft)	(ft)		(ft)	(ft)	x:1	x:1	(ft)	(cfs)	(ft/ft)	(ft)	(ft)	(f/s)	(lbs/ft ²)		
708+30	-35.17	LT	664.56	708+50	-34.97	LT	663.83	0.00	4.2	6.0	1.37	0.035	0.06	0.036	0.11	1.27	1.13	0.12	
708+50	-34.97	LT	663.83	709+00	-34.48	LT	663.46	0.00	3.5	3.8	2.08	0.035	0.13	0.007	0.21	1.87	0.79	0.05	
709+00	-34.48	LT	663.46	709+50	-33.99	LT	663.36	0.00	4.2	3.3	1.94	0.035	0.44	0.002	0.43	1.51	0.66	0.03	
709+50	-33.99	LT	663.36	710+00	-33.86	LT	663.25	0.00	4.1	3.4	1.75	0.035	0.76	0.002	0.51	1.24	0.78	0.03	
710+00	-33.86	LT	663.25	710+50	-33.93	LT	662.61	0.00	3.7	4.0	1.54	0.035	1.08	0.013	0.41	1.13	1.64	0.16	
710+50	-33.93	LT	662.61	711+00	-33.94	LT	661.84	0.00	2.7	4.0	1.56	0.035	1.39	0.015	0.46	1.10	1.93	0.21	

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



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FM 2200

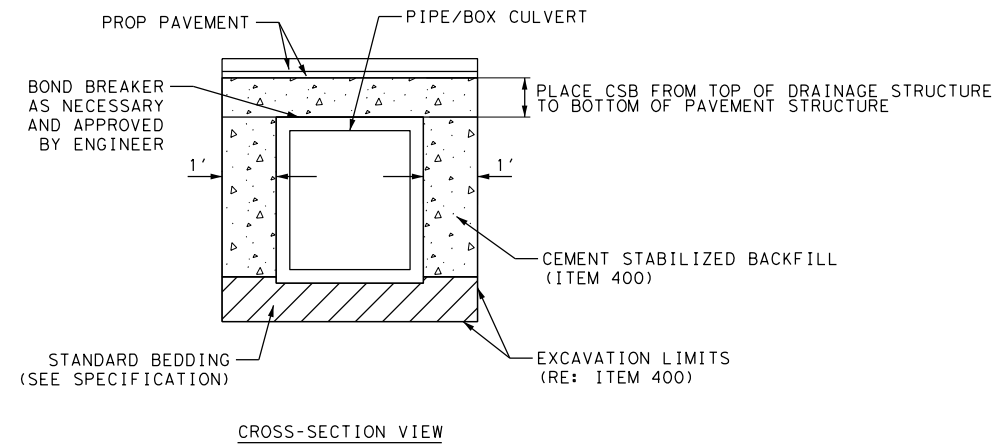
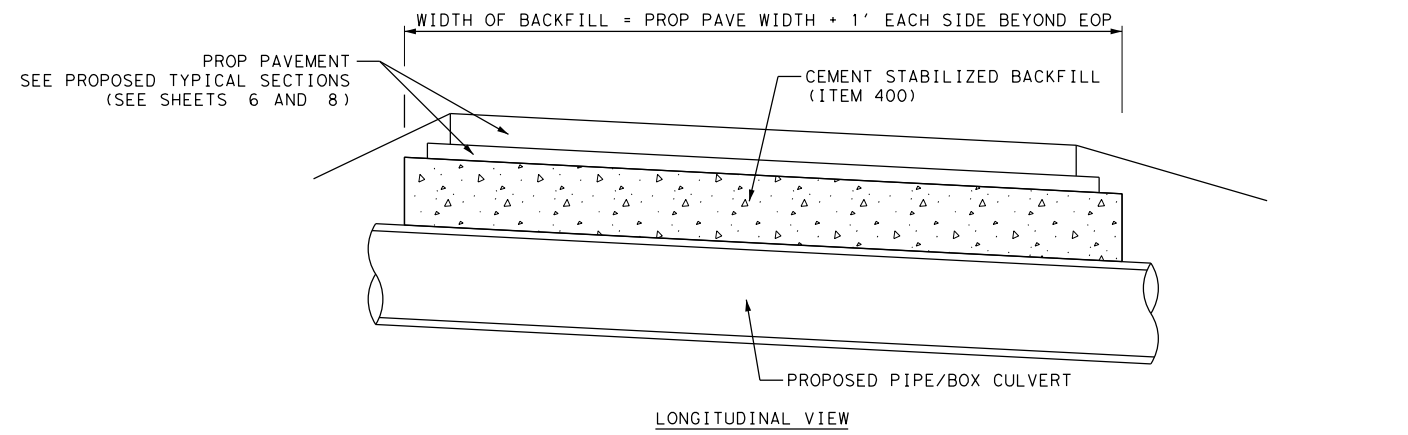
DITCH DATA SHEETS

SHEET 13 OF 13

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.
CHK DWG:	SAT	MEDINA	2520	01
			016, ETC	228

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Des\ign\Civil\Drainage\1179904_DRN_MISC01.dgn



CUT AND RESTORE PAVEMENT DETAIL

NOTE:
1. PAVEMENT REPLACEMENT PAID AS ITEM 400-6006, CUT AND RESTORE PAVEMENT (SY).

DESIGN

LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

JAMES A. LUTZ, P.E. 12/20/2022 DATE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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FM 2200
MISCELLANEOUS DRAINAGE DETAIL

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO.:	JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01	016, ETC 229

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Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°, 15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (CY) (2)	Class "C" Conc (Wingwall) (CY) (3)	Total Wingwall Area (SF)
STA 597+88 - Culvert A-2 (Lt)	1 ~ 5' x 2'	1.4'	SCP-5	SETB-FW-0	0°	4:1	8"	6"	0.250'	2.667'	9.333'	5.389'	10.777'	N/A	15.777'	1.0	0.1	3.9	N/A
STA 597+88 - Culvert A-2 (Rt)	1 ~ 5' x 2'	1.4'	SCP-5	SETB-FW-0	0°	4:1	8"	6"	0.250'	2.667'	9.333'	5.389'	10.777'	N/A	15.777'	1.0	0.1	3.9	N/A
STA 639+96 - Culvert A-3 (Lt)	3 ~ 5' x 2'	0.9'	SCP-5	SETB-FW-0	0°	4:1	8"	6"	0.250'	2.667'	9.333'	5.389'	10.777'	N/A	28.777'	2.7	0.2	4.8	N/A
STA 639+96 - Culvert A-3 (Rt)	3 ~ 5' x 2'	0.9'	SCP-5	SETB-FW-0	0°	4:1	8"	6"	0.250'	2.667'	9.333'	5.389'	10.777'	N/A	28.777'	2.7	0.2	4.8	N/A
STA 700+11 - Culvert A-5 (Lt)	3 ~ 5' x 2'	3.3'	MC-5-20	SETB-FW-0	0°	3:1	8"	7"	1.550'	3.958'	10.875'	6.279'	12.557'	N/A	28.724'	3.1	1.0	5.6	N/A
STA 700+11 - Culvert A-5 (Rt)	3 ~ 5' x 2'	3.3'	MC-5-20	SETB-FW-0	0°	3:1	8"	7"	1.500'	3.917'	10.750'	6.207'	12.413'	N/A	28.580'	3.0	1.0	5.5	N/A

NOTES:

Skew = 0° on SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standard sheets;
 30° maximum for safety end treatment

SL:1 = Horizontal : 1 Vertical

- Side slope at culvert for flared or straight wingwalls.
- Channel slope for parallel wingwalls.
- Slope must be 3:1 or flatter for safety end treatments.

T = Box culvert top slab thickness. Dimension can be found on the applicable box culvert standard sheet.

U = Box culvert wall thickness. Dimension can be found on the applicable box culvert standard sheet.

C = Curb height

See applicable wing or end treatment standard sheets for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.

Hw = Height of wingwall

A = Distance from face of curb to end of wingwall (not applicable to parallel or straight wingwalls)

B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.

Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)

Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
 Area for four wingwalls (two structure ends) if Both.

- Round the wall heights shown to the nearest foot for bidding purposes.
- Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class S concrete is required for the top slab of the culvert, also provide Class S concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.
- Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.
- Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

SPECIAL NOTE:

This sheet is a supplement to the box culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the box culvert wingwalls and safety end treatments.

An Excel 2010 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.



LUKE REED, P.E.
 12/20/2022
 DATE



JAMES A. LUTZ, P.E.
 12/20/2022
 DATE

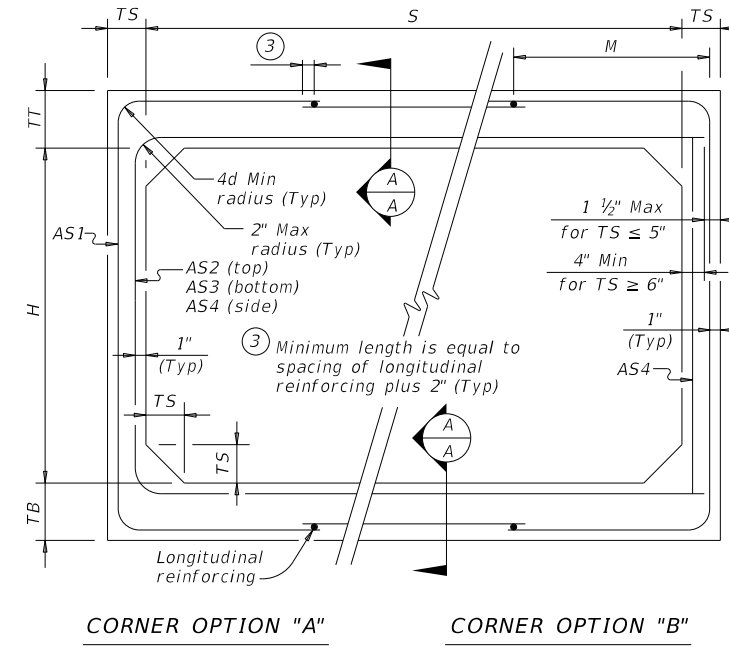
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BOX CULVERT SUPPLEMENT WINGS AND END TREATMENTS					
BCS					
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REVISIONS	2520	01	016, ETC	FM	2200
	DIST	COUNTY		SHEET NO.	
	SAT	MEDINA		230	

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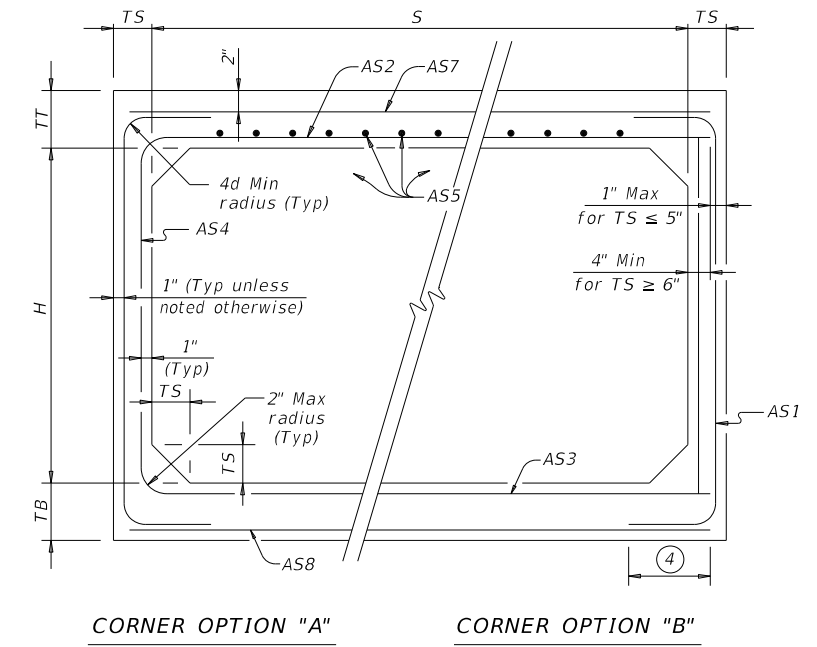
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BOX DATA

SECTION DIMENSIONS					Fill Height (ft.)	M (Min) (in.)	REINFORCING (sq. in. / ft.) ^②							① Lift Weight (tons)
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)			AS1	AS2	AS3	AS4	AS5	AS7	AS8	
5	2	8	7	6	< 2	-	0.19	0.27	0.18	0.14	0.19	0.17	6.0	
5	2	6	6	6	2 < 3	44	0.22	0.20	0.16	0.14	-	-	5.1	
5	2	6	6	6	3 - 5	44	0.16	0.14	0.14	0.14	-	-	5.1	
5	2	6	6	6	10	36	0.15	0.14	0.14	0.14	-	-	5.1	
5	2	6	6	6	15	36	0.20	0.18	0.18	0.14	-	-	5.1	
5	2	6	6	6	20	36	0.26	0.23	0.24	0.14	-	-	5.1	
5	2	6	6	6	25	36	0.33	0.29	0.29	0.14	-	-	5.1	
5	2	6	6	6	30	36	0.39	0.34	0.35	0.14	-	-	5.1	
5	3	8	7	6	< 2	-	0.19	0.31	0.21	0.14	0.19	0.17	6.6	
5	3	6	6	6	2 < 3	45	0.18	0.24	0.19	0.14	-	-	5.7	
5	3	6	6	6	3 - 5	36	0.14	0.17	0.16	0.14	-	-	5.7	
5	3	6	6	6	10	36	0.14	0.16	0.17	0.14	-	-	5.7	
5	3	6	6	6	15	35	0.16	0.21	0.22	0.14	-	-	5.7	
5	3	6	6	6	20	35	0.21	0.27	0.28	0.14	-	-	5.7	
5	3	6	6	6	25	35	0.26	0.34	0.34	0.14	-	-	5.7	
5	3	6	6	6	30	35	0.31	0.41	0.41	0.14	-	-	5.7	
5	4	8	7	6	< 2	-	0.19	0.33	0.24	0.14	0.19	0.17	7.2	
5	4	6	6	6	2 < 3	45	0.16	0.27	0.22	0.14	-	-	6.3	
5	4	6	6	6	3 - 5	45	0.14	0.19	0.18	0.14	-	-	6.3	
5	4	6	6	6	10	36	0.14	0.18	0.18	0.14	-	-	6.3	
5	4	6	6	6	15	35	0.14	0.23	0.24	0.14	-	-	6.3	
5	4	6	6	6	20	35	0.17	0.30	0.31	0.14	-	-	6.3	
5	4	6	6	6	25	35	0.21	0.37	0.38	0.14	-	-	6.3	
5	4	6	6	6	30	35	0.25	0.44	0.45	0.14	-	-	6.3	
5	5	8	7	6	< 2	-	0.19	0.35	0.26	0.14	0.19	0.17	7.8	
5	5	6	6	6	2 < 3	45	0.14	0.29	0.24	0.14	-	-	6.9	
5	5	6	6	6	3 - 5	45	0.14	0.21	0.20	0.14	-	-	6.9	
5	5	6	6	6	10	45	0.14	0.19	0.20	0.14	-	-	6.9	
5	5	6	6	6	15	36	0.14	0.24	0.25	0.14	-	-	6.9	
5	5	6	6	6	20	35	0.15	0.31	0.32	0.14	-	-	6.9	
5	5	6	6	6	25	35	0.18	0.38	0.39	0.14	-	-	6.9	
5	5	6	6	6	30	35	0.21	0.46	0.47	0.14	-	-	6.9	

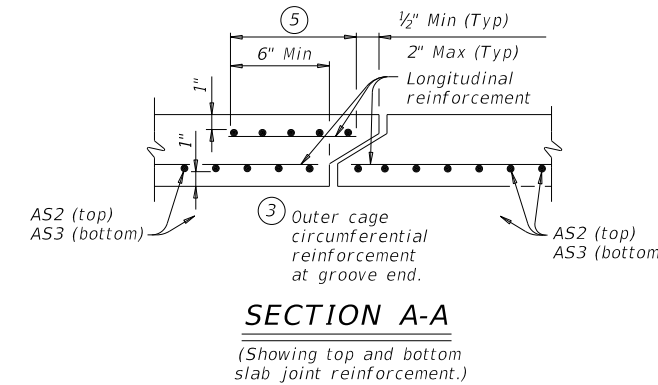


FILL HEIGHT 2 FT AND GREATER



FILL HEIGHT LESS THAN 2 FT

④ Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
 Provide Class H concrete (f'c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
 See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
 In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING



**SINGLE BOX CULVERTS
 PRECAST
 5'-0" SPAN**

SCP-5

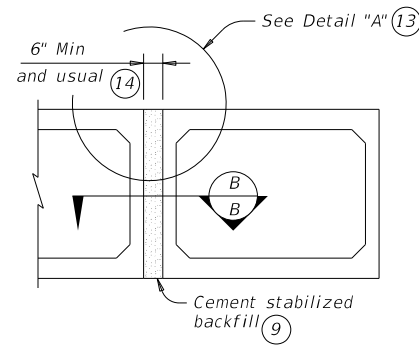
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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
DIST	COUNTY		SHEET NO.	
SAT	MEDINA		231	

① For box length = 8'-0"

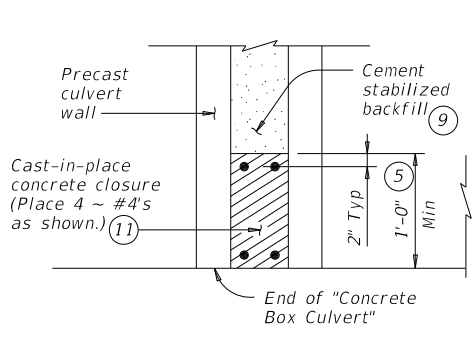
② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.

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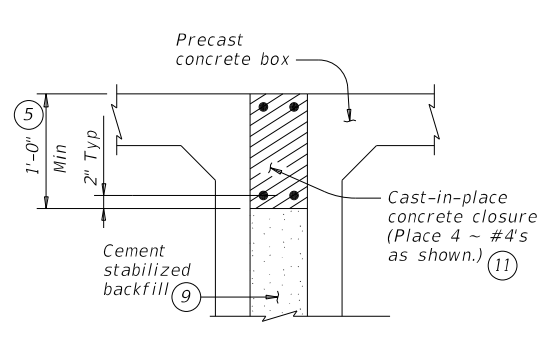
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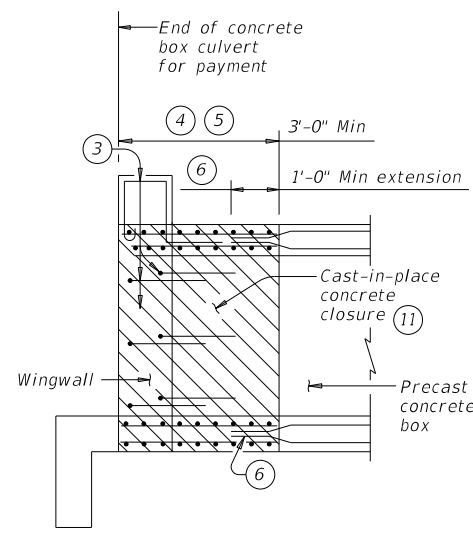
MULTIPLE UNIT PLACEMENT



SECTION B-B

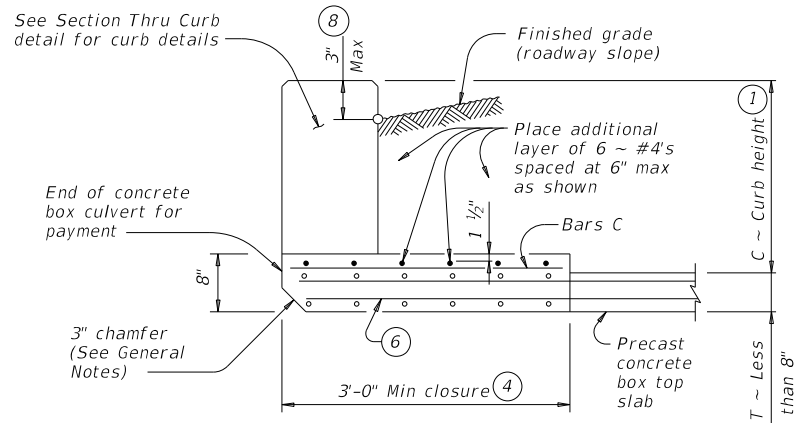


DETAIL "A"

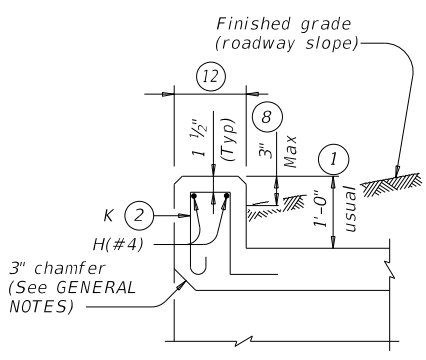


WINGWALL CONNECTION

(Also applies to safety end treatment.)

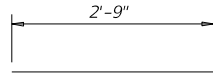


SECTION THRU TOP SLABS LESS THAN 8"

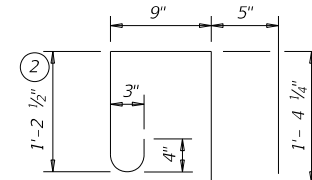


SECTION THRU CURB

QUANTITIES PER FOOT OF CURB (10)	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



BARS C (#4)
(Spa = 1'-0" Max)



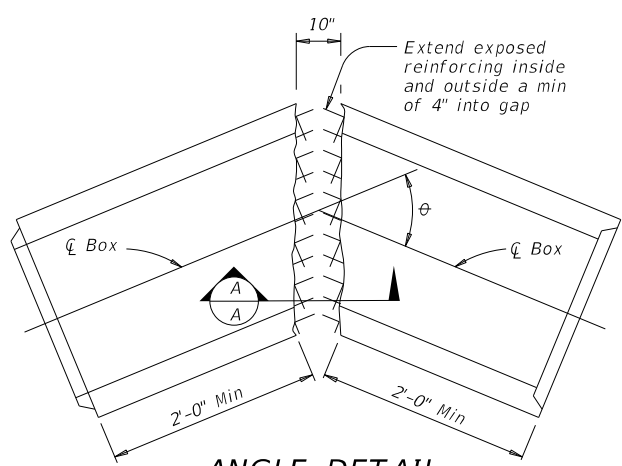
BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

- 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
- For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
- Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.
- Provide a 3'-0" Min cast-in-place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast-in-place closure flush with the inside and outside faces of the precast box section.
- For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'-0" Min cast-in-place closure in the top slab, bottom slab, and exterior wall. See Section B-B detail when interior walls are cast full length.
- Extend precast box reinforcing a minimum of 1'-0" into concrete closure (Typ).
- Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.
- For vehicle safety, the following requirements must be met:
 - For structures without bridge rail, construct curbs no more than 3" above finished grade.
 - For structures with bridge rail, construct curbs flush with finished grade. Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- Cement stabilized backfill between boxes is considered part of the box culvert for payment.
- All curb concrete and reinforcing is considered part of the box culvert for payment.
- Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.
- 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
- For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".
- This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

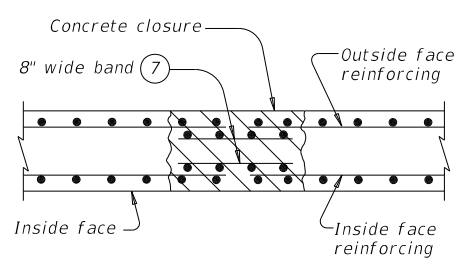
MATERIAL NOTES:
 Provide Grade 60 reinforcing steel.
 Provide ASTM A1064 welded wire reinforcement.
 Provide Class C concrete (f_c = 3,600 psi) for the closures.
 Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
 Any additional concrete required for the closures will be considered subsidiary to the box culvert.

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.
 Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

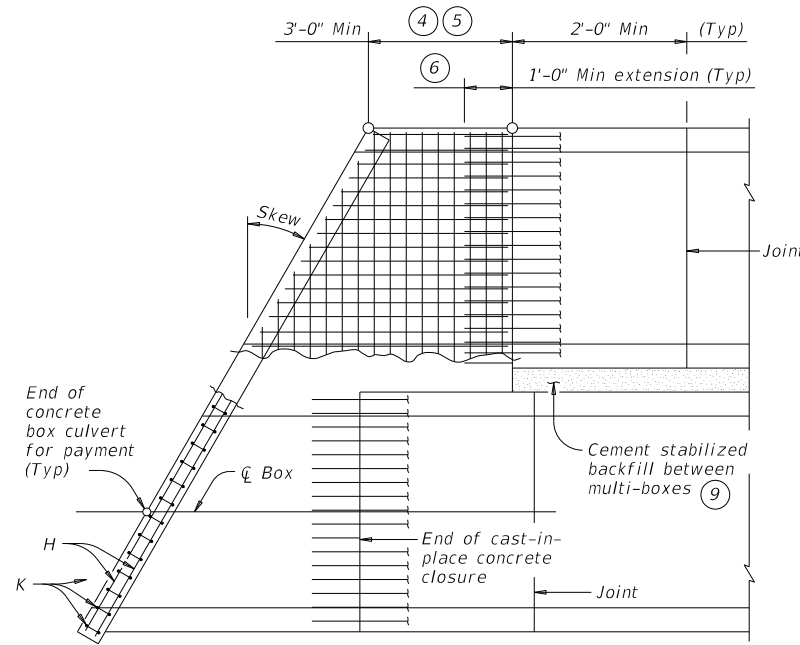
Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bars dimensions are out-to-out of bars.



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi-box placement.)

HL93 LOADING

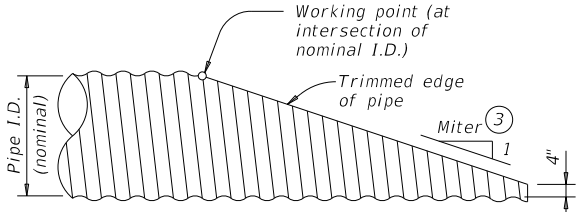
		Bridge Division Standard	
BOX CULVERTS PRECAST MISCELLANEOUS DETAILS			
SCP-MD			
FILE: scpmdsts-20.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT
©TxDOT February 2020	CONTRACT	SECTION	JOB
REVISIONS	2520	01	016, ETC
	DIST	COUNTY	SHEET NO.
	SAT	MEDINA	232

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CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS ① ②

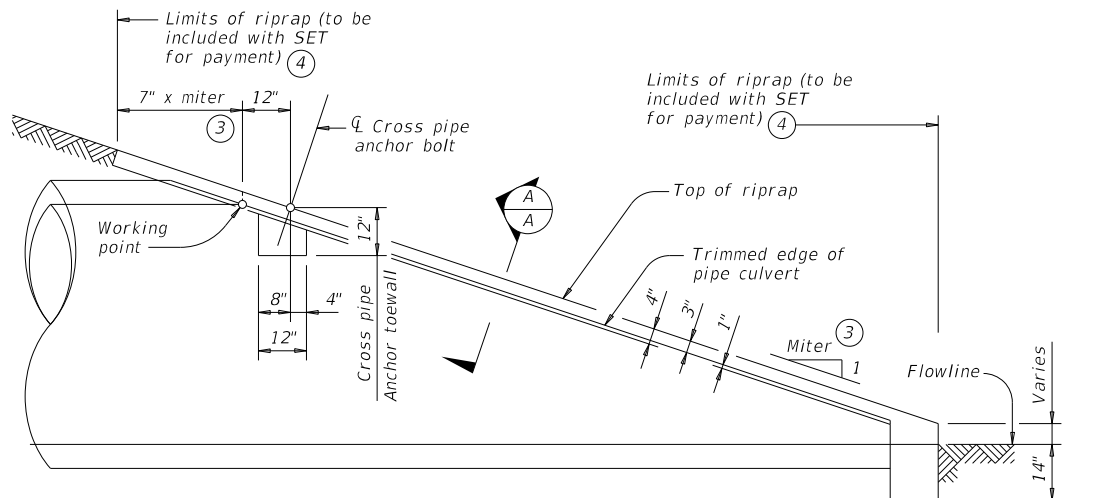
Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' - 7"	3' - 5"	N/A	N/A	N/A	5' - 10"	N/A	N/A	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	N/A	7' - 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	N/A	8' - 9"	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



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)

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

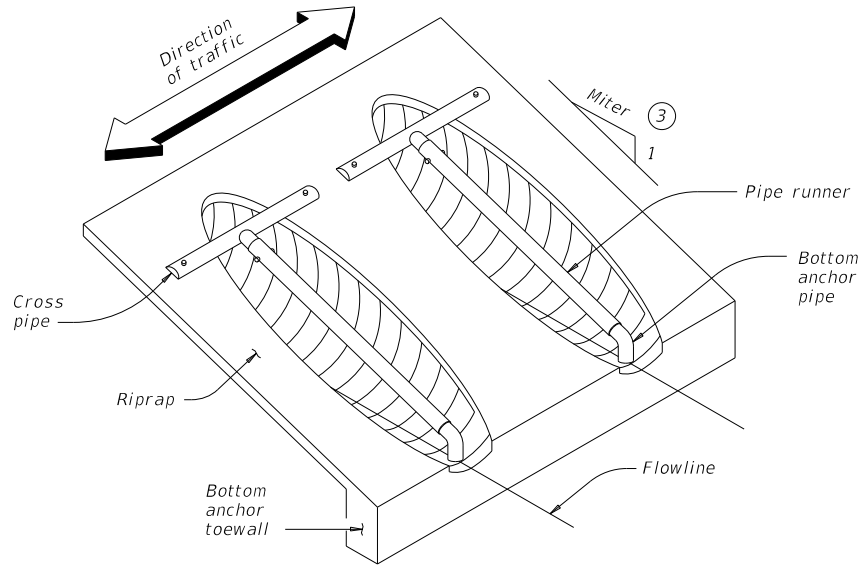
Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always 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



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

- 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.
- 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°.
- Miter = slope of mitered end of pipe culvert.
- Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".
- 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.

SHEET 1 OF 2

Bridge Division Standard

SAFETY END TREATMENT

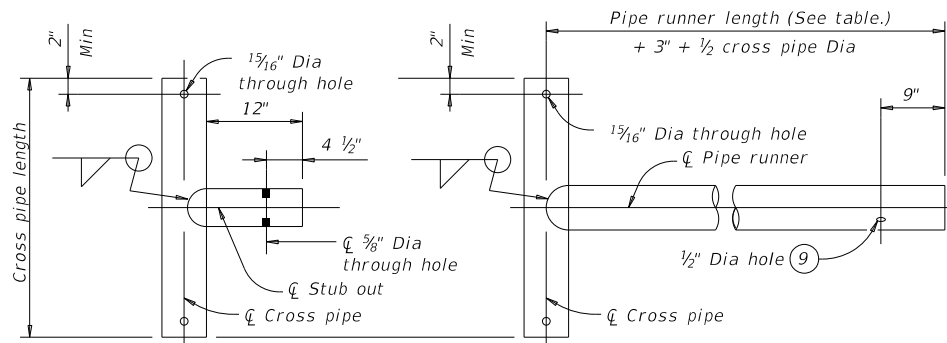
FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

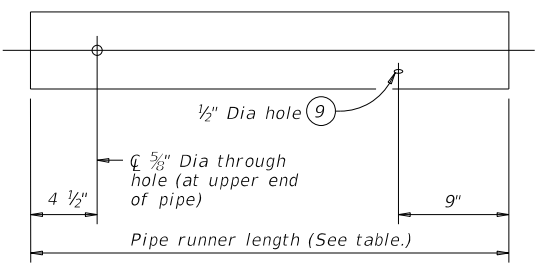
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©TxDOT February 2020	CONT SECT	JOB	HIGHWAY	
REVISIONS	2520 01	016, ETC	FM 2200	
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	233	

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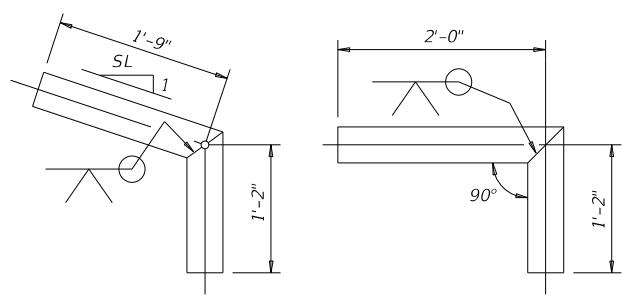


OPTION A1
 OPTION A2
CROSS PIPE AND CONNECTIONS DETAILS

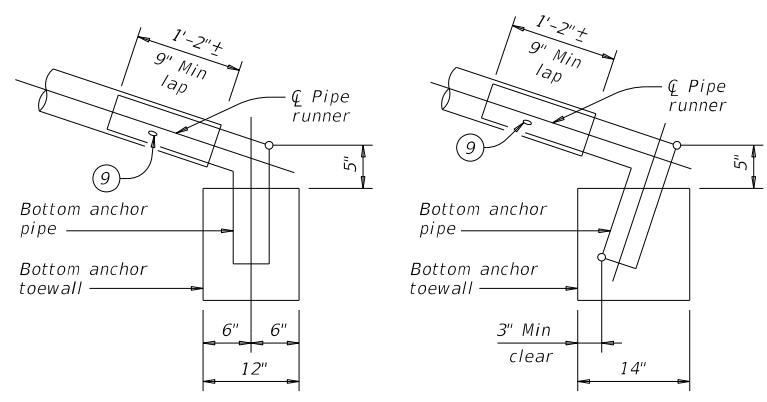


NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS



OPTION B1
 OPTION B2
BOTTOM ANCHOR PIPE DETAILS ⑩



OPTION B1
 OPTION B2
BOTTOM ANCHOR TOEWALL DETAILS

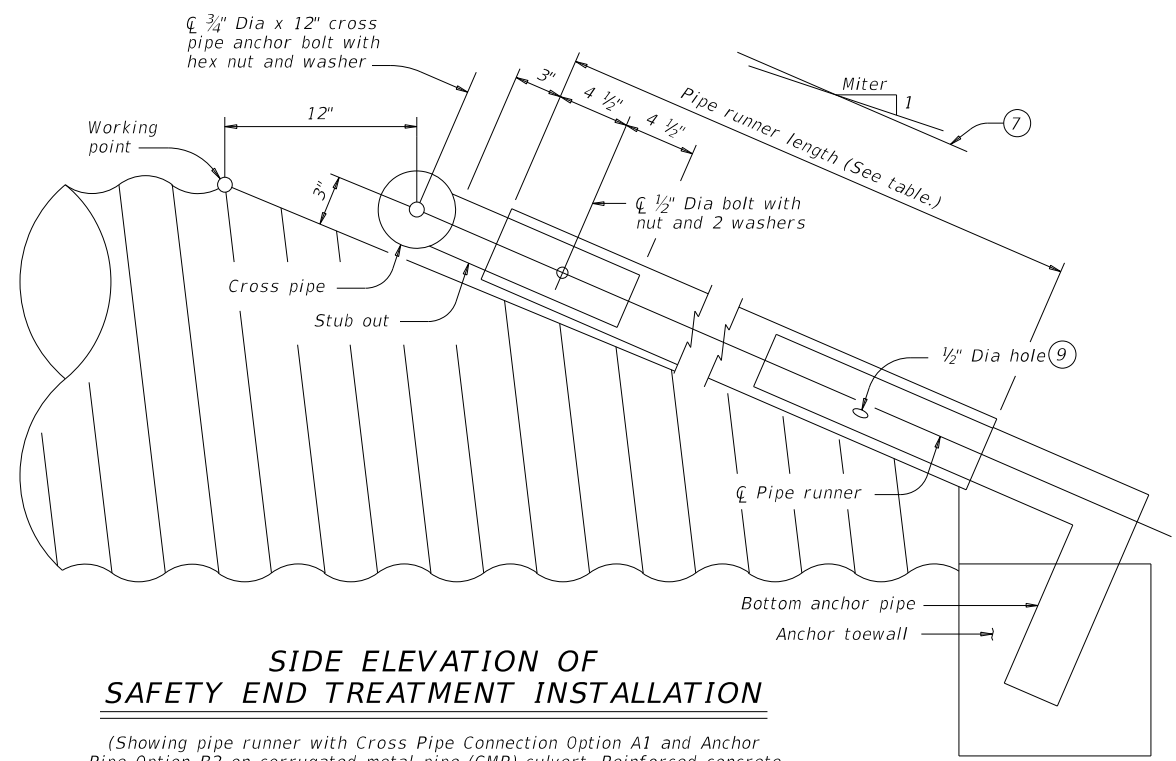
(Culvert and riprap not shown for clarity.)

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.

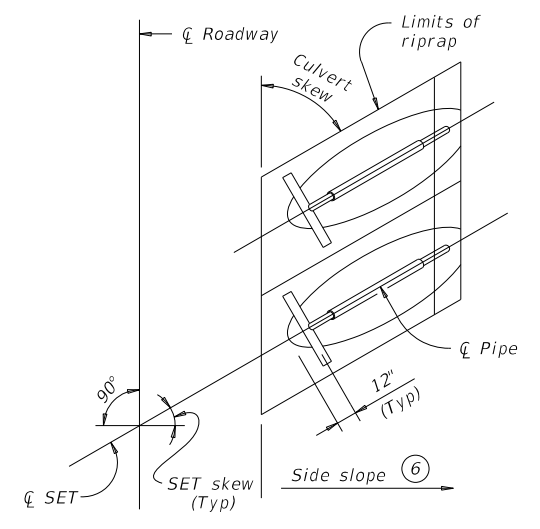
GENERAL NOTES:

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".

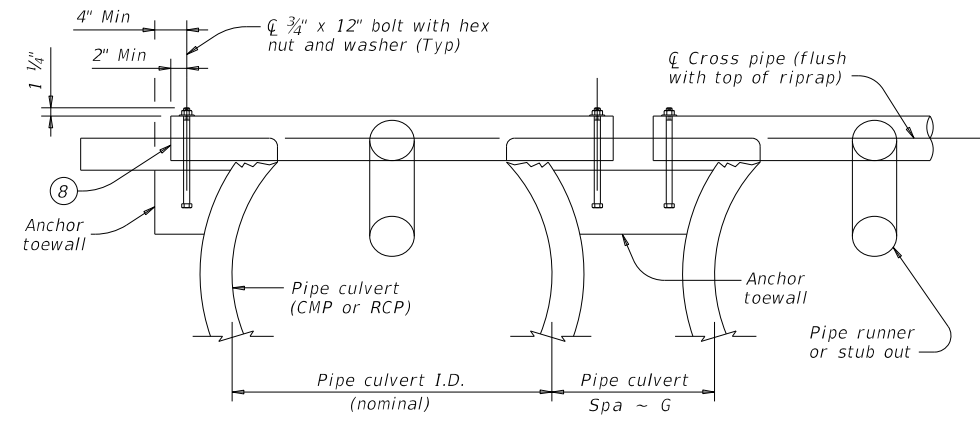


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

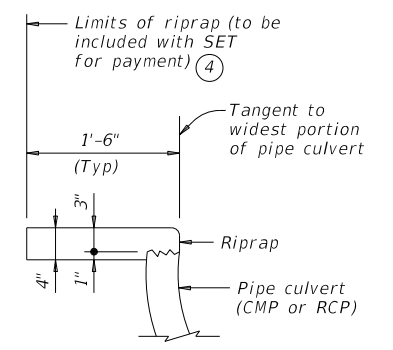
(Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity)



PLAN OF SKEWED INSTALLATION



SECTION A-A
 SHOWING CROSS PIPE AND ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT AND RIPRAP



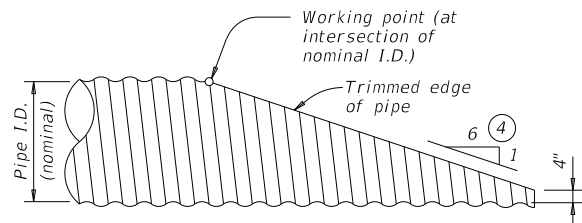
SAFETY END TREATMENT FOR 12" DIA TO 60" DIA PIPE CULVERTS TYPE II ~ CROSS DRAINAGE

SETP-CD

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	234	

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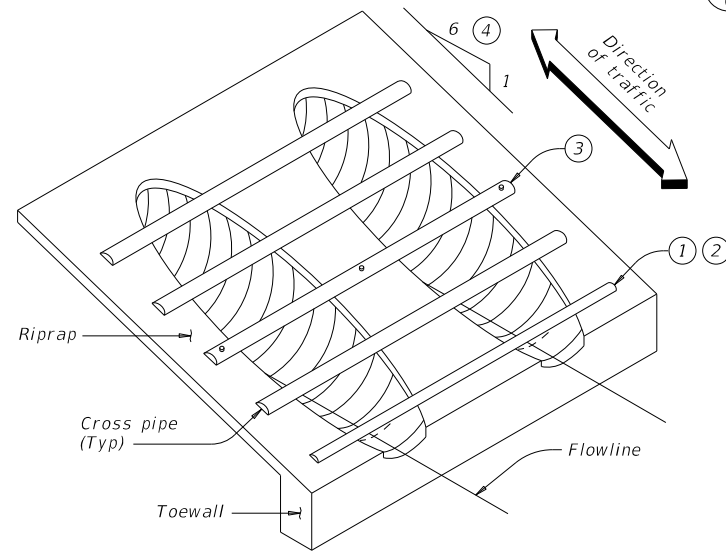
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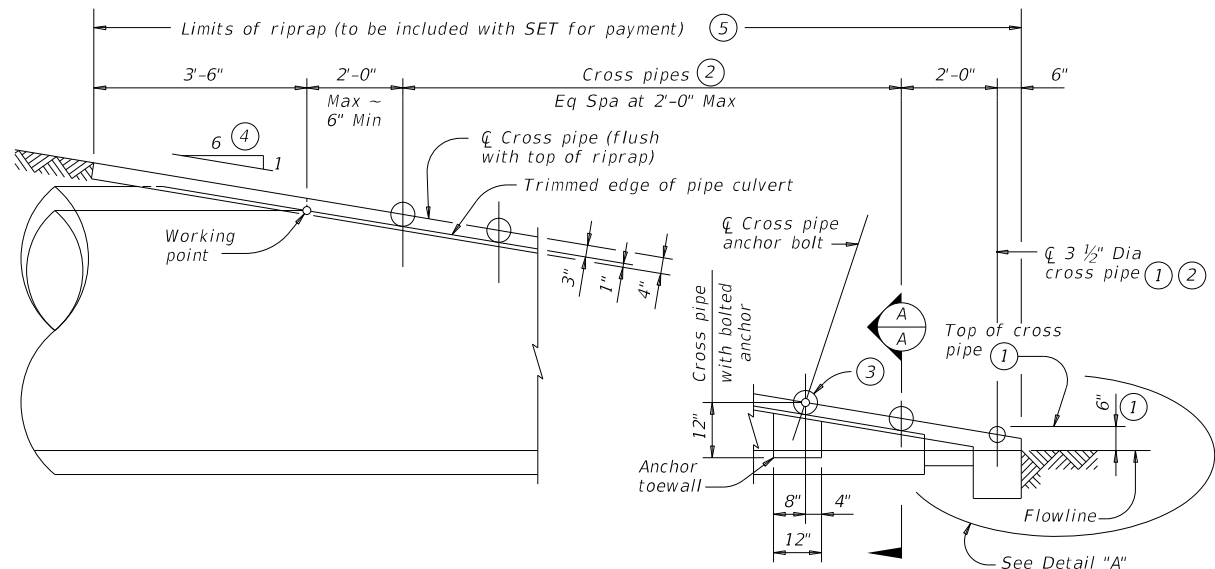
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert. Details at reinforced concrete pipe (RCP) culvert are similar.)

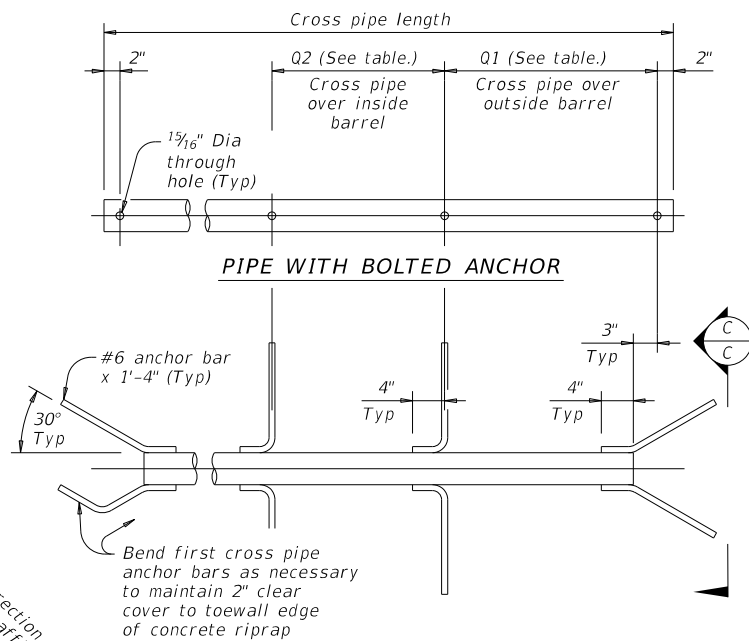


ISOMETRIC VIEW OF TYPICAL INSTALLATION

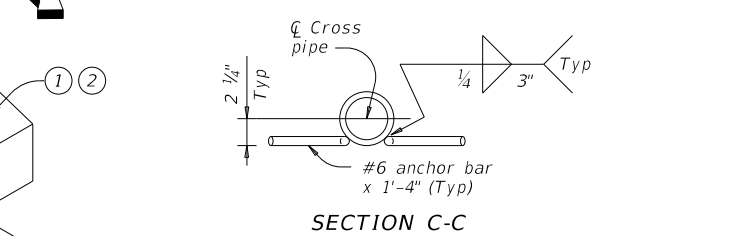


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

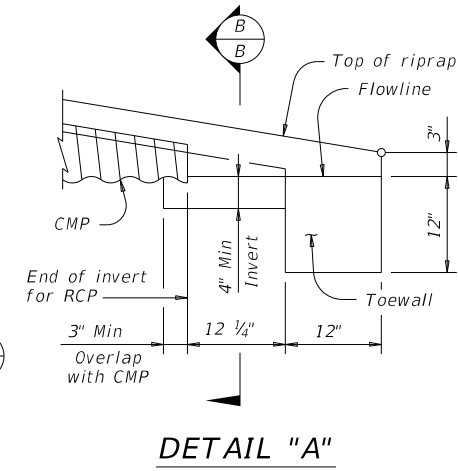
(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



PIPE WITH BOLTED ANCHOR

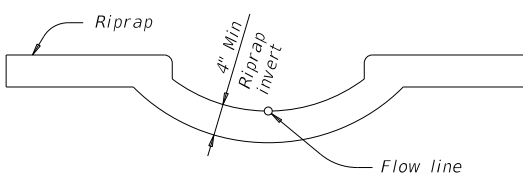


CROSS PIPE DETAILS



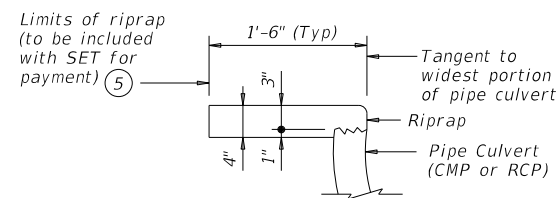
DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)

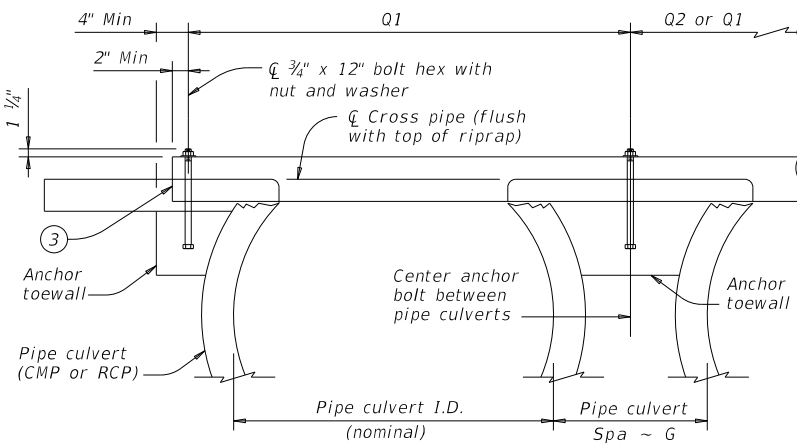


SECTION B-B

(Cross pipes not shown for clarity.)



SHOWING TYPICAL PIPE CULVERT AND RIPRAP



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"		
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"	3 or more pipe culverts	3 1/2" Std (4.000" O.D.)
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"		
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	2 or more pipe culverts	4" Std (4.500" O.D.)
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

- The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.
- Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1/2" standard pipe (4" O.D.) for the first bottom pipe.
- Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.
- Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.
- Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".
- Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise. Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52. Provide ASTM A307 bolts and nuts. Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981. Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes. Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap". Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

Texas Department of Transportation Bridge Division Standard

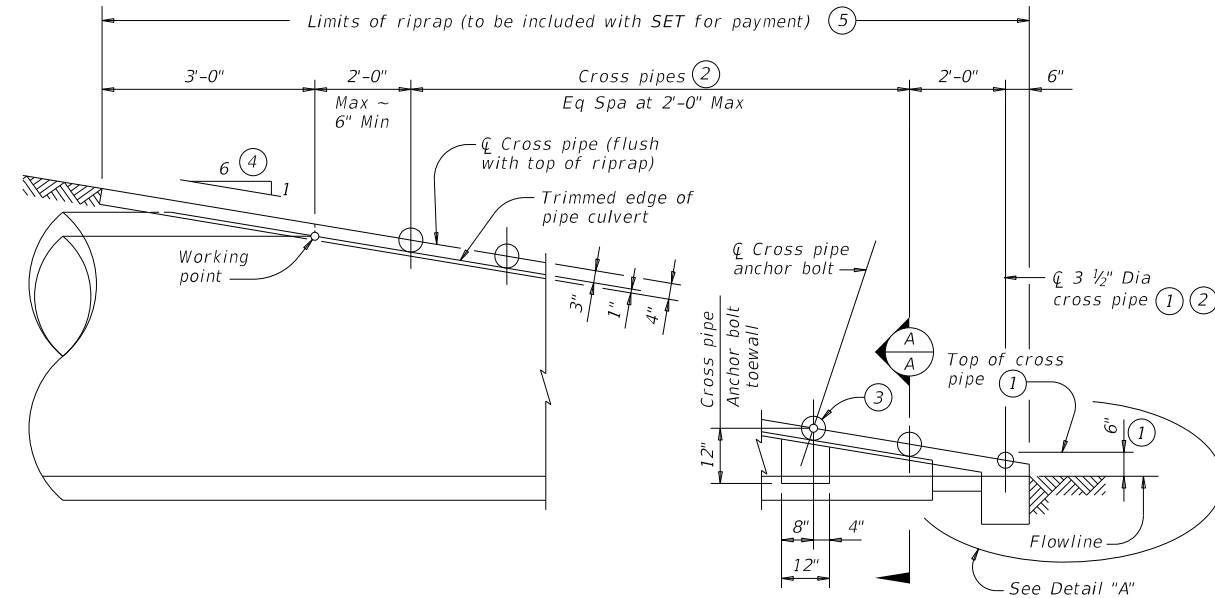
SAFETY END TREATMENT FOR 12" DIA TO 72" DIA PIPE CULVERTS TYPE II ~ PARALLEL DRAINAGE

SETP-PD

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©TxDOT February 2020	CONTRACT	SECTION	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	235	

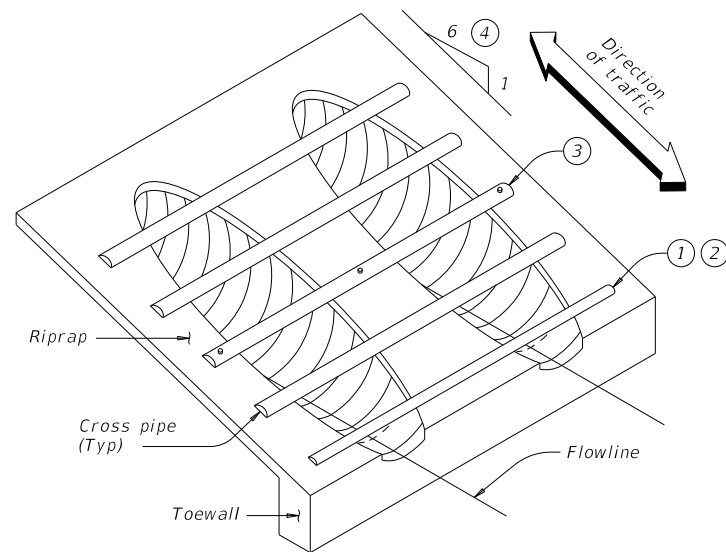
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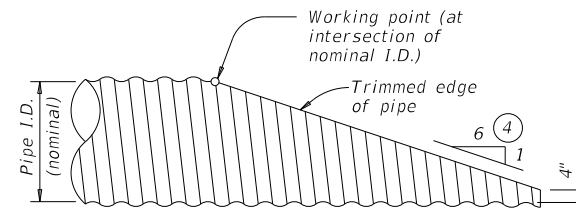


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(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



NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert. Details at reinforced concrete pipe (RCP) culvert are similar.)

CROSS PIPE LENGTHS AND REQUIRED PIPE SIZES ②

Corrugated Metal Pipe (CMP) Culverts									
Design	Conc Riprap (CY) ⑥	Pipe Culvert Span	Pipe Culvert Rise	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
1	0.6	17"	13"	1' - 0"	N/A	2' - 8"	2' - 5"	3 or more pipe culverts	3" Std (3.500" O.D.)
2	0.7	21"	15"	1' - 2"	N/A	3' - 1"	2' - 11"		3 1/2" Std (4.000" O.D.)
3	0.9	28"	20"	1' - 5"	N/A	3' - 9"	3' - 9"		4" Std (4.500" O.D.)
4	1.0	35"	24"	1' - 8"	4' - 4"	4' - 6"	4' - 7"	All pipe culverts	4" Std (4.500" O.D.)
5	1.2	42"	29"	1' - 11"	4' - 11"	5' - 2"	5' - 5"		
6	1.4	49"	33"	2' - 2"	5' - 6"	5' - 11"	6' - 3"	All pipe culverts	5" Std (5.563" O.D.)
7	1.6	57"	38"	2' - 5"	6' - 2"	6' - 8"	7' - 2"		
8	1.8	64"	43"	2' - 10"	6' - 9"	7' - 6"	8' - 2"		
9	1.9	71"	47"	3' - 2"	7' - 4"	8' - 3"	9' - 1"		

Reinforced Concrete Pipe (RCP) Culverts									
Design	Conc Riprap (CY) ⑥	Pipe Culvert Span	Pipe Culvert Rise	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
1	0.6	22"	13 1/2"	1' - 0"	N/A	3' - 1"	2' - 10"	3 or more pipe culverts	3" Std (3.500" O.D.)
2	0.7	26"	15 1/2"	1' - 2"	N/A	3' - 6"	3' - 4"		3 1/2" Std (4.000" O.D.)
3	0.9	28 1/2"	18"	1' - 5"	N/A	3' - 10"	3' - 9 1/2"		4" Std (4.500" O.D.)
4	1.0	36 1/4"	22 1/2"	1' - 8"	4' - 5"	4' - 7"	4' - 8 1/4"	All pipe culverts	4" Std (4.500" O.D.)
5	1.2	43 3/4"	26 5/8"	1' - 11"	5' - 1"	5' - 4"	5' - 6 3/4"		
6	1.4	51 1/8"	31 5/16"	2' - 2"	5' - 8"	6' - 1"	6' - 5 1/4"	All pipe culverts	5" Std (5.563" O.D.)
7	1.6	58 1/2"	36"	2' - 5"	6' - 4"	6' - 10"	7' - 3 1/2"		
8	1.8	65"	40"	2' - 10"	6' - 10"	7' - 7"	8' - 3"		
9	1.9	73"	45"	3' - 2"	7' - 6"	8' - 5"	9' - 3"		

- ① The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.
- ② Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.
- ③ Install the third Cross Pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.
- ④ Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.
- ⑤ Riprap placed beyond the limits shown will be paid as concrete riprap in accordance with Item 432, "Riprap".
- ⑥ Quantities shown are for one end of one pipe culvert. For multiple Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.
 Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
 Provide ASTM A307 bolts and nuts.
 Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

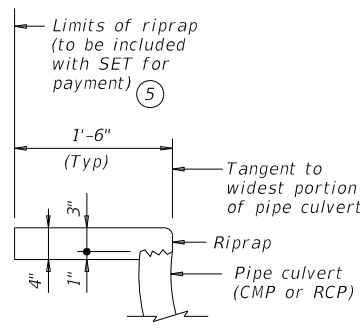
Pipe runners are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.
 Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Pipe Runners.
 Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".
 Payment for riprap and toewall is included in the price bid for each safety end treatment.

SHEET 1 OF 2

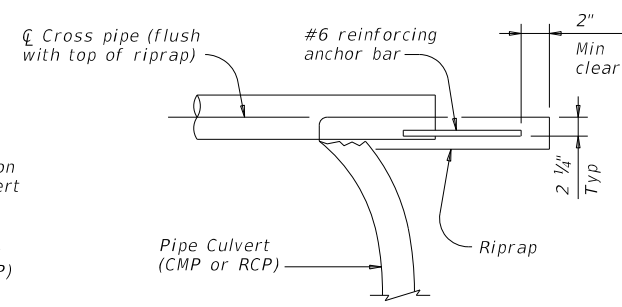
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SAFETY END TREATMENT FOR DESIGN 1 TO 9 ARCH PIPE CULVERTS TYPE II ~ PARALLEL DRAINAGE					
SETP-PD-A					
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DESIGNER:	February 2020	DW:	JRP	CR:	GAF
REVISIONS	2520 01	JOB	016, ETC	HIGHWAY	FM 2200
	SAT	COUNTY	MEDINA	SHEET NO.	236

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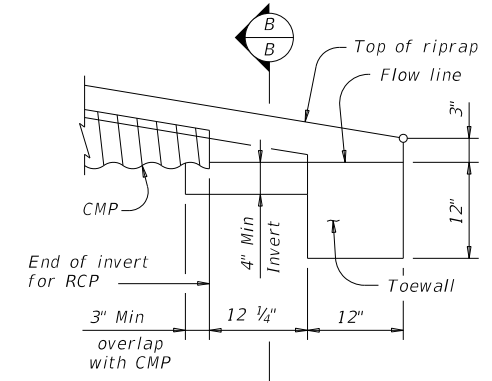
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SHOWING TYPICAL PIPE CULVERT AND RIPRAP

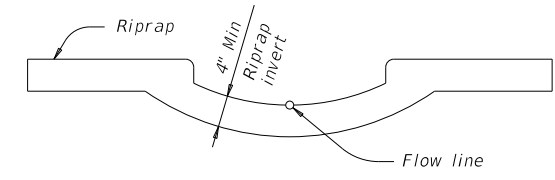


SHOWING CROSS PIPE WITH ANCHOR BAR



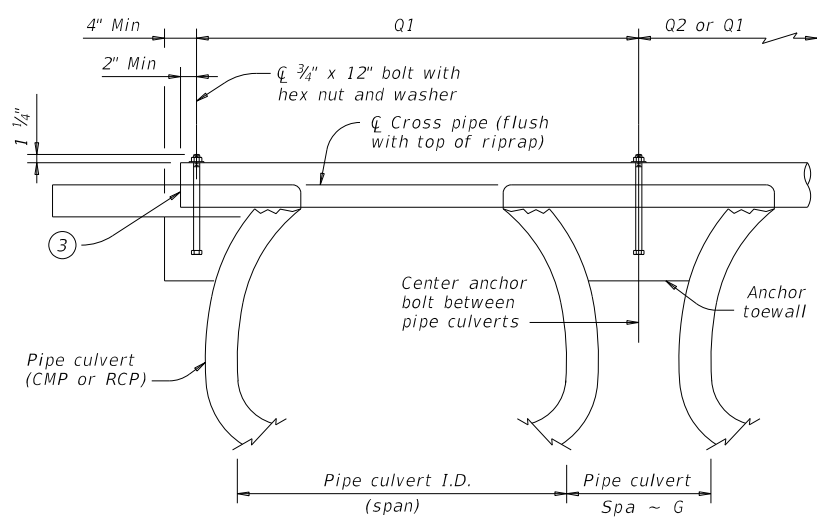
DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



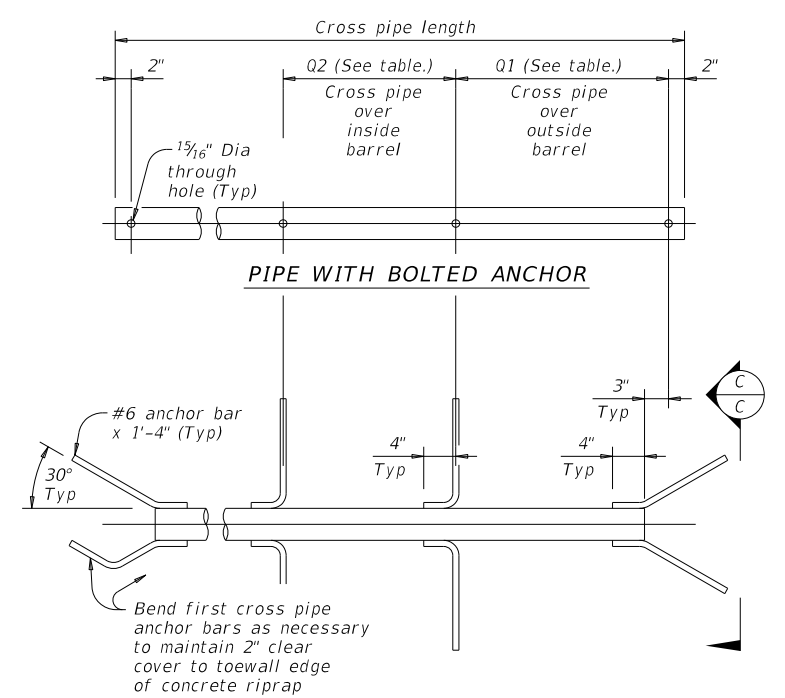
SECTION B-B

(Cross pipes not shown for clarity.)

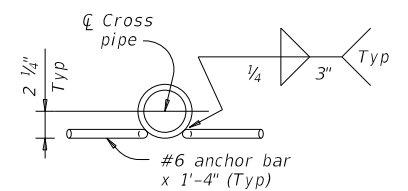


SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A



PIPE WITH ANCHOR BARS



SECTION C-C

CROSS PIPE DETAILS

SHEET 2 OF 2



SAFETY END TREATMENT FOR DESIGN 1 TO 9 ARCH PIPE CULVERTS TYPE II ~ PARALLEL DRAINAGE

SETP-PD-A

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	237	

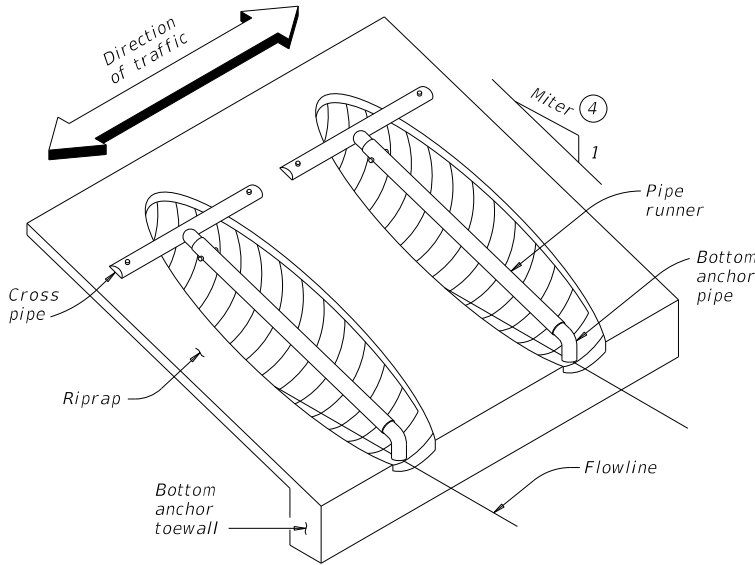
CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS ① ③

Corrugated Metal Pipe (CMP) Culverts

Design	Pipe Culvert Span	Pipe Culvert Rise	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	
1	17"	13"	1' - 0"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	21"	15"	1' - 2"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	28"	20"	1' - 5"	3' - 9"	N/A	N/A	3' - 5"	4' - 7"	N/A	N/A	4' - 11"	6' - 5"	N/A	N/A	7' - 11"	10' - 2"	
4	35"	24"	1' - 8"	4' - 4"	3' - 10"	4' - 0"	4' - 7"	6' - 0"	5' - 5"	5' - 8"	6' - 6"	8' - 4"	8' - 8"	9' - 1"	10' - 3"	12' - 11"	
5	42"	29"	1' - 11"	4' - 11"	5' - 1"	5' - 4"	6' - 1"	7' - 10"	7' - 2"	7' - 5"	8' - 6"	10' - 9"	11' - 2"	11' - 8"	13' - 2"	16' - 6"	
6	49"	33"	2' - 2"	5' - 6"	6' - 2"	6' - 5"	7' - 4"	N/A	8' - 6"	8' - 10"	10' - 0"	N/A	13' - 3"	13' - 9"	15' - 6"	N/A	
7	57"	38"	2' - 5"	6' - 2"	7' - 6"	7' - 9"	N/A	N/A	10' - 2"	10' - 7"	N/A	N/A	15' - 9"	16' - 4"	N/A	N/A	

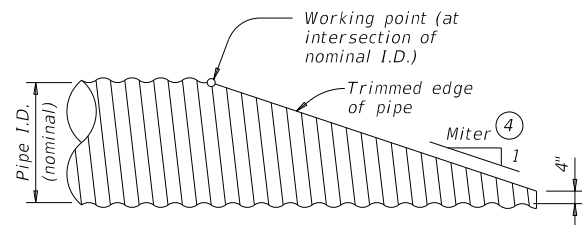
Reinforced Concrete Pipe (RCP) Culverts

Design	Pipe Culvert Span	Pipe Culvert Rise	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	
1	22"	13 1/2"	1' - 0"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	26"	15 1/2"	1' - 2"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	28 1/2"	18"	1' - 5"	3' - 9 1/2"	N/A	N/A	2' - 10"	3' - 10"	N/A	N/A	4' - 2"	5' - 5"	N/A	N/A	6' - 9"	8' - 9"	
4	36 1/4"	22 1/2"	1' - 8"	4' - 5 1/4"	3' - 5"	3' - 7"	4' - 2"	5' - 6"	4' - 11"	5' - 1"	5' - 11"	7' - 7"	7' - 11"	8' - 3"	9' - 5"	11' - 11"	
5	43 3/4"	26 5/8"	1' - 11"	4' - 0 3/4"	4' - 6"	4' - 8"	5' - 5"	6' - 11"	6' - 4"	6' - 7"	7' - 6"	9' - 7"	10' - 0"	10' - 5"	11' - 9"	14' - 10"	
6	51 1/8"	31 5/16"	2' - 2"	5' - 8"	5' - 9"	6' - 0"	6' - 10"	N/A	7' - 11"	8' - 3"	9' - 4"	N/A	12' - 4"	12' - 10"	14' - 6"	N/A	
7	58 1/2"	36"	2' - 5"	6' - 3 1/2"	6' - 11"	7' - 3"	N/A	N/A	9' - 6"	9' - 11"	N/A	N/A	14' - 9"	15' - 4"	N/A	N/A	



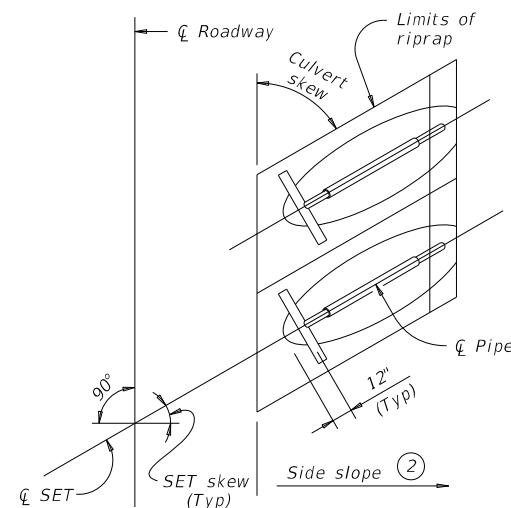
ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)



SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert. Details of reinforced concrete pipe (RCP) culvert are similar.)



PLAN OF SKEWED INSTALLATION

TYPICAL PIPE CULVERT MITERS ④

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

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"

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED ③

Design	Single Pipe Culvert	Multiple Pipe Culverts
1 and 2	Skews thru 45°	Skews thru 45°
3	Skews thru 35°	Skews thru 10°
4	Normal (no skew)	Always required
5 thru 7	Always required	Always required

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 that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

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.

Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Payment for riprap and toewall is included in the price bid for each safety end treatment.

SHEET 1 OF 3

Bridge Division Standard

SAFETY END TREATMENT
FOR DESIGN 1 TO 7
ARCH PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD-A

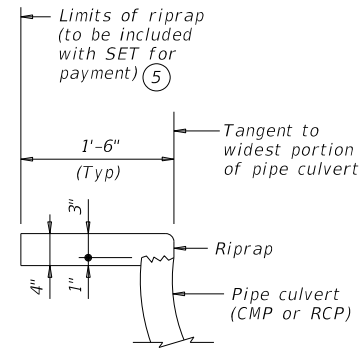
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©TxDOT February 2020	CONT: 2520	SECT: 01	JOB: 016, ETC	HIGHWAY: FM 2200
REVISIONS	DIST: SAT	COUNTY: MEDINA	SHEET NO: 238	

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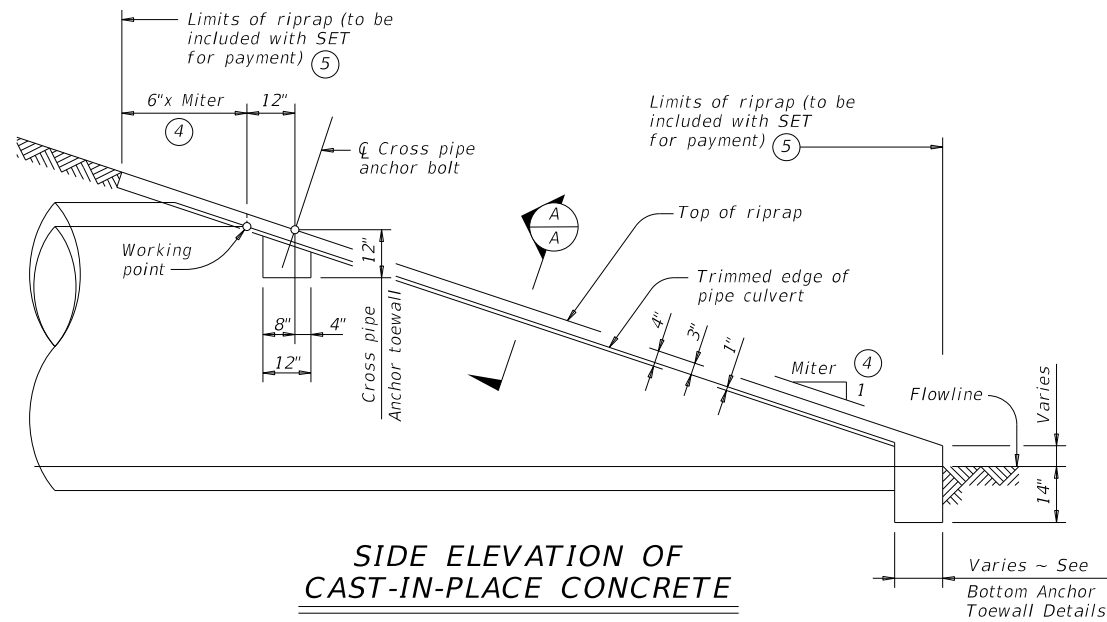
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SHOWING TYPICAL PIPE
 CULVERT AND RIPRAP

SECTION A-A



**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.)

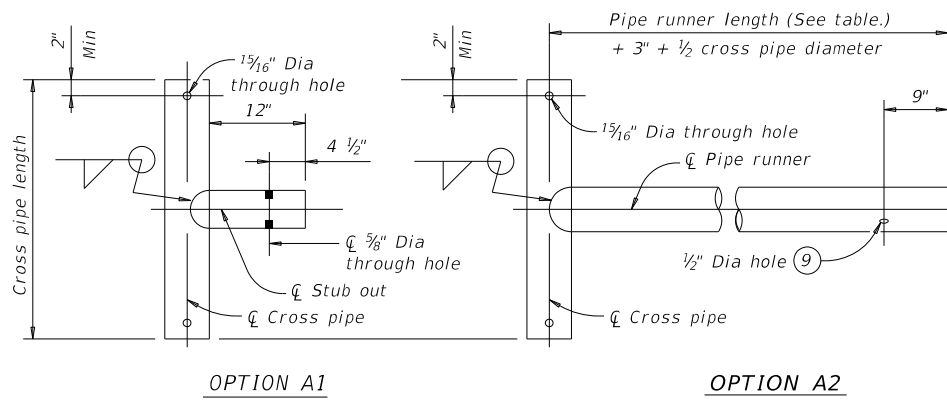
Design	ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) ⑥											
	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
1	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
2	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.8	1.0
3	0.6	0.6	0.7	0.8	0.7	0.7	0.8	0.9	0.9	1.0	1.0	1.2
4	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.0	1.1	1.1	1.2	1.4
5	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.2	1.3	1.3	1.4	1.7
6	0.9	1.0	1.0	N/A	1.1	1.1	1.2	N/A	1.4	1.5	1.6	N/A
7	1.0	1.1	N/A	N/A	1.3	1.3	N/A	N/A	1.7	1.7	N/A	N/A

- ④ Miter = slope of mitered end of pipe culvert.
- ⑤ Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".
- ⑥ Quantities shown are for one end of one pipe culvert. For multiple pipe culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

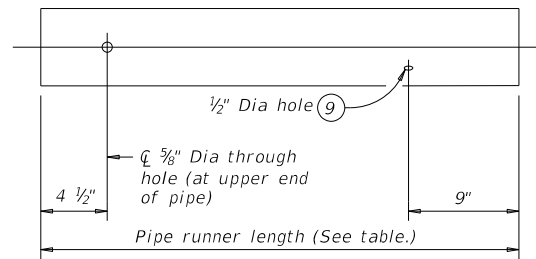
				Bridge Division Standard	
SAFETY END TREATMENT FOR DESIGN 1 TO 7 ARCH PIPE CULVERTS TYPE II ~ CROSS DRAINAGE					
SETP-CD-A					
FILE:	setpcase-20.dgn	DN:	GAF	CK:	CAT
©TxDOT	February 2020	SECT:	01	JOB:	016, ETC
REVISIONS		HIGHWAY:			FM 2200
		DIST:		COUNTY:	
		SAT:		MEDINA	SHEET NO. 239

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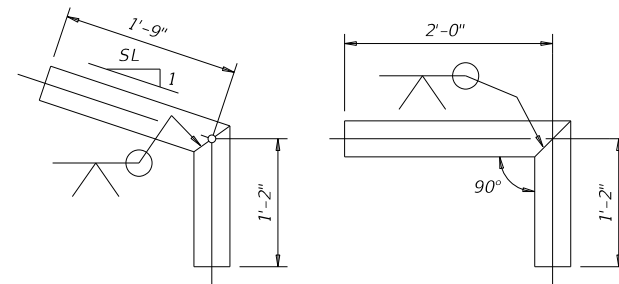


CROSS PIPE AND CONNECTIONS DETAILS

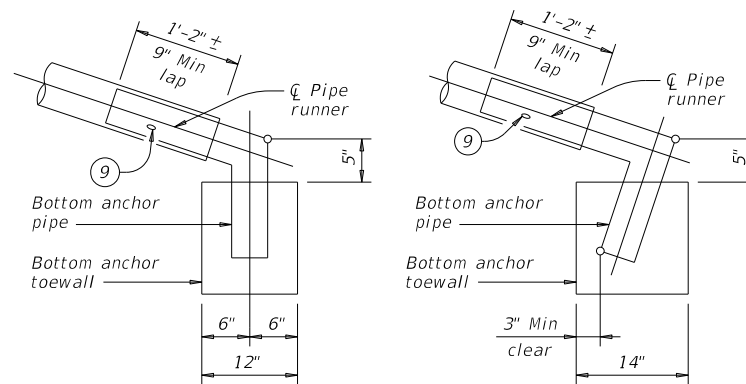


NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

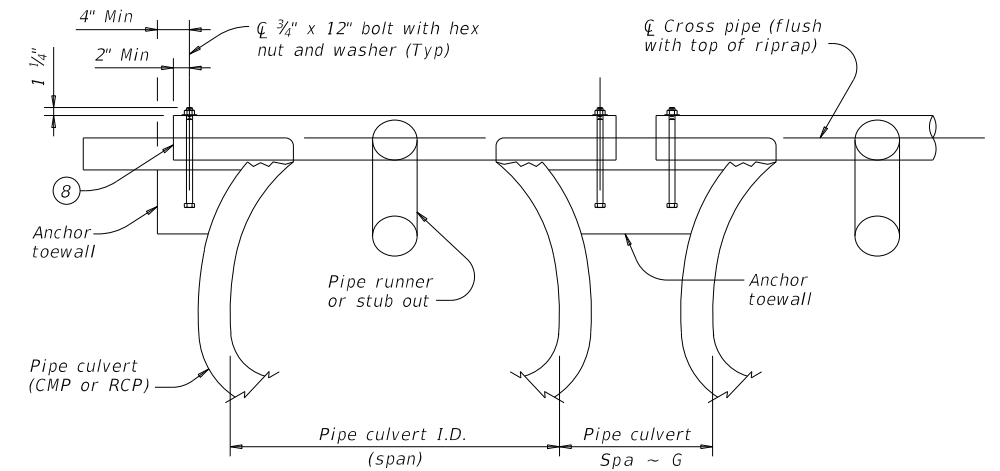


BOTTOM ANCHOR PIPE DETAILS



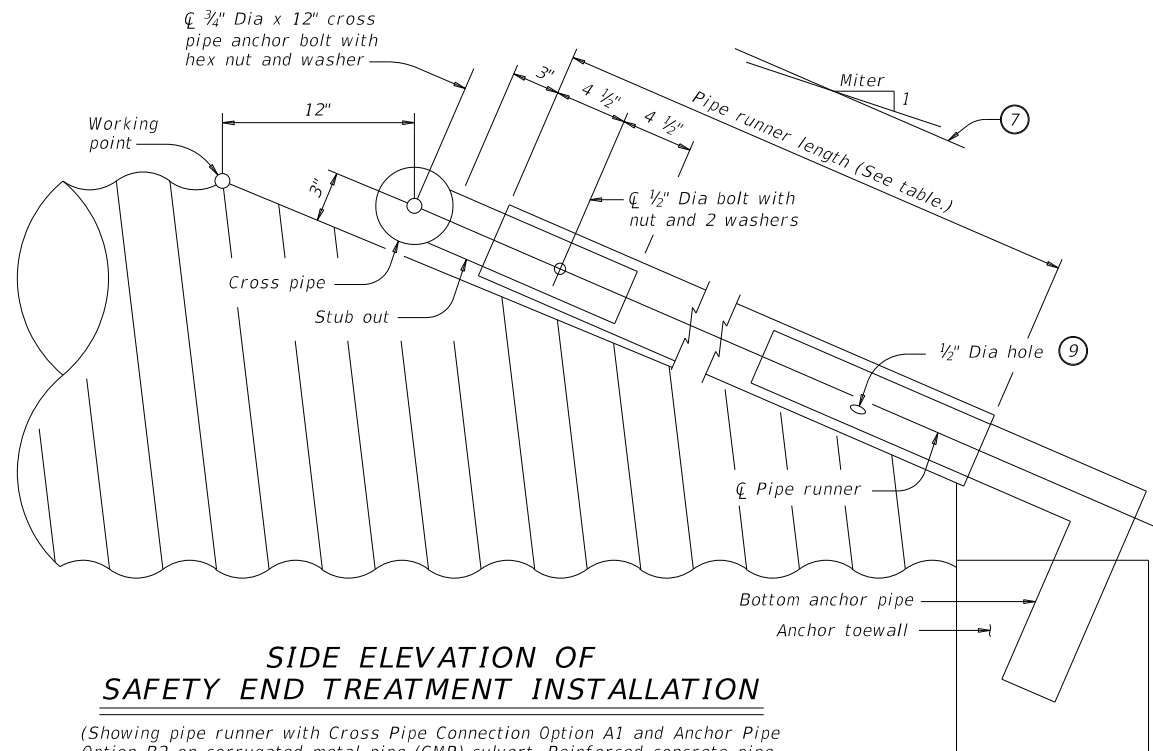
BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)



SHOWING CROSS PIPE AND ANCHOR TOEWALL

SECTION A-A



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 (RCP) culvert details are similar. Riprap not shown for clarity.)

- 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.

SHEET 3 OF 3

				Bridge Division Standard	
SAFETY END TREATMENT FOR DESIGN 1 TO 7 ARCH PIPE CULVERTS TYPE II ~ CROSS DRAINAGE					
SETP-CD-A					
FILE:	setpcae-20.dgn	DN:	GAF	CK:	CAT
©TxDOT	February 2020	CONTRACT:	2520	SECTION:	01
REVISIONS:		JOB:	016, ETC	HIGHWAY:	FM 2200
		DIST:	COUNTY	SHEET NO.:	
		SAT:	MEDINA		240

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TABLE OF DIMENSIONS AND REINFORCING STEEL (Wings for One Structure End)

Maximum Wingwall Height Hw (9)	Dimensions				Variable Reinforcing				Estimated Quantities (3)	
	W	X	Y	Z	Bars J1		Bars J2		Reinf (Lb/Ft)	Conc (CY/Ft)
					Size	Spa	Size	Spa		
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'-2"	1'-6"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721

TABLE OF WING WALL REINFORCING (Two-Wings)

Bar	Size	No.	Spa
D	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
R	#5	6	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)	2.45		
Conc (CY/Ft)	0.037		

TABLE OF ESTIMATED ANCHOR TOEWALL QUANTITIES

Bar	Size	No.	Spa
K	#4	~	1'-0"
N	#5	6	~
OL	#4	6	~
Reinf (Lb/Ft)	9.82		
Conc (CY/Ft)	0.074		

- Extend Bars P 3'-0" Min into bottom slab of box culvert.
- Adjust to fit as necessary to maintain 1 1/2" clear cover and 4" Min between bars.
- Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings multiply the tabulated values by Lw.
- Recommended values of slope are: 3:1, 4:1, and 6:1. Provide 3:1 or flatter slope.
- When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, extend construction joints or grooved joints, oriented in the direction of flow, across the full distance of the riprap, at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B is not required.
- At Contractor's option, end the culvert toewall flush with wingwall toewall. Adjust reinforcing as needed.
- 3" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to the Extend Curb Details (ECD) standard sheet.
- For vehicle safety, reduce curb heights, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.
- See Table of Maximum Wing Heights for various slopes. Height is limited based on a 33'-6" maximum safety pipe runner length.

TABLE OF MAXIMUM WING HEIGHTS (9)

Side Slope	Hw Max
3:1	11'-5"
4:1	8'-10"
6:1	6'-1"

WING DIMENSION CALCULATIONS:

$$Hw = H + T + C - 0.250' \quad (9)$$

$$A = (Hw - 0.333') (SL)$$

$$B = (A) (\tan 30^\circ)$$

$$Lw = (A) \div \cos 30^\circ$$

For cast-in-place culverts:
 Ltw = (N) (S) + (N + 1) (U)
 For precast culverts:
 Ltw = (N) (2U + S) + (N - 1) (0.500')

$$Lc = (Ltw) - (2U)$$

$$Atw = (Lc) + (2B)$$

$$\text{Total Wingwall Area (two wings ~ SF)} = (Hw + 0.333') (Lw)$$

$$Hw = \text{Height of wingwall (feet)}$$

$$Atw = \text{Anchor toewall length (feet)}$$

$$Lw = \text{Length of wingwall (feet)}$$

$$N = \text{Number of culvert barrels}$$

$$SL:1 = \text{Side slope ratio (horizontal : 1 vertical)}$$

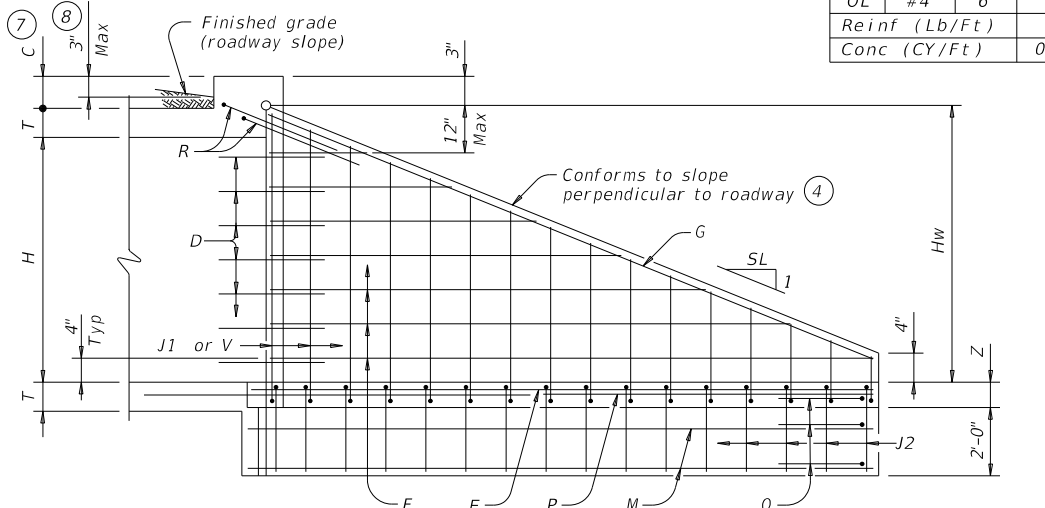
$$Ltw = \text{Culvert toewall length (feet)}$$

$$Lc = \text{Culvert curb between wings (feet)}$$

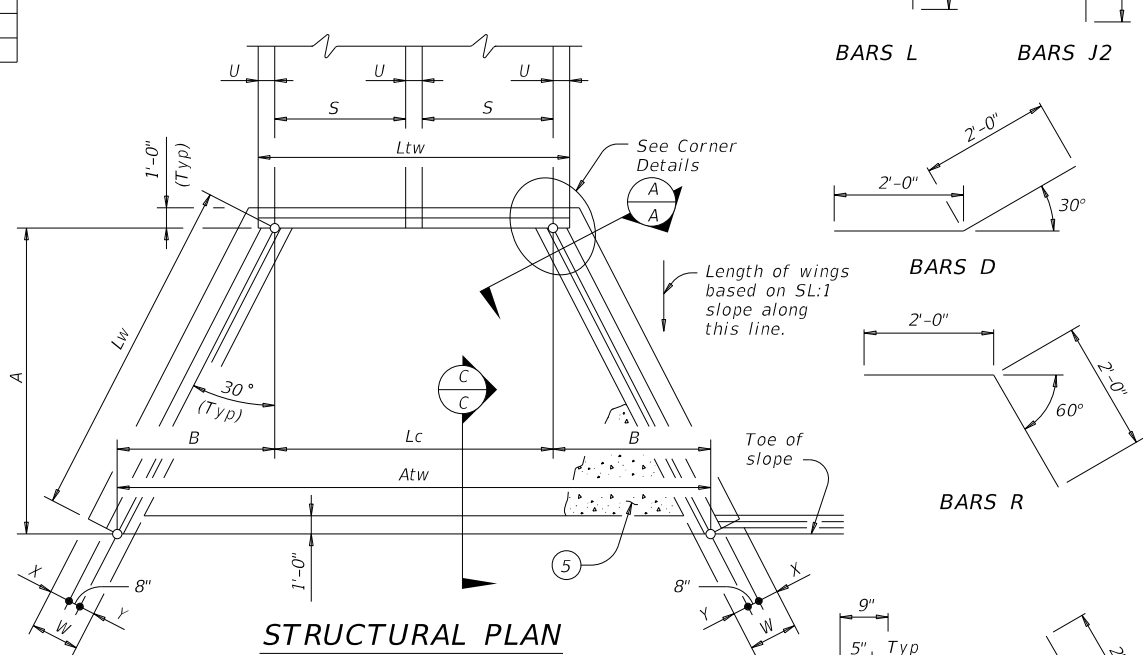
See applicable box culvert standard for H, S, T, and U values. See Table of Maximum Wall Heights for limits on Hw.

MATERIAL NOTES:
 Provide Grade 60 reinforcing steel.
 Provide galvanized reinforcing steel if required elsewhere in the plans. 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 Class "C" concrete ($f'c = 3,600$ psi).
 Adjust reinforcing as necessary to provide a minimum clear cover of 1 1/2".
 Provide pipe runners and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
 Provide ASTM A307 bolts and nuts.
 Provide ASTM A36 steel plates.
 Galvanize all steel components, except reinforcing unless required elsewhere in the plans, after fabrication.
 Repair galvanizing damaged during transport or construction in accordance with the Item 445, "Galvanizing".
 For optional adhesive anchors, install adhesive anchorages in accordance with the manufacturer's instructions including hole size, drilling equipment and method, hole cleaning equipment and method, mixing and dispensing adhesive, and anchor insertion. Do not alter the manufacturer's mixing nozzle or dispenser. Provide anchorage rods that are clean and free of grease, oil, or any other foreign material. Demonstrate hole cleaning method to the Engineer for approval and continue the approved process for all anchorage locations. Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

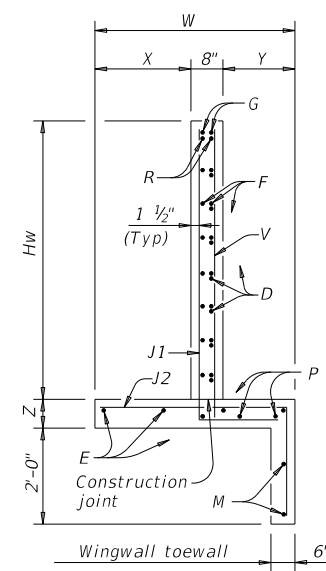
GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.
 Pipe runners are designed 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.
 When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
 All bolts, nuts, washers, brackets, angles, and pipe runners are considered parts of the safety end treatment for payment.
 The quantities for pipe runners, reinforcing steel, and concrete, resulting from the formulas given herein are for Contractor's information only.
 See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.



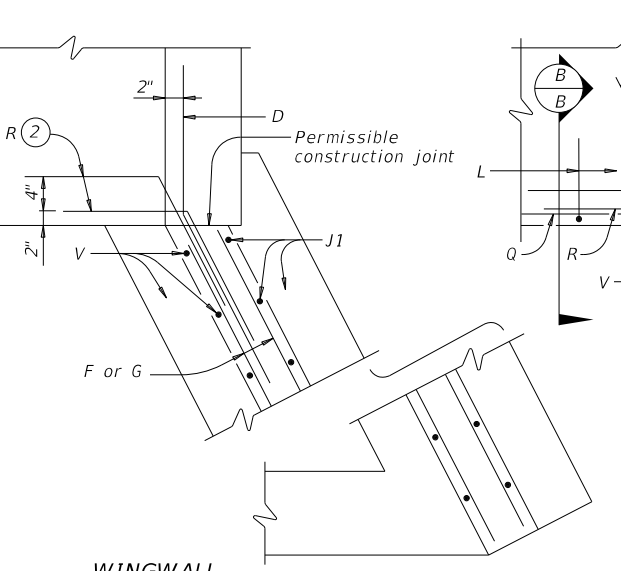
INSIDE ELEVATION OF WINGWALL
(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)



STRUCTURAL PLAN
(Showing dimensions.)

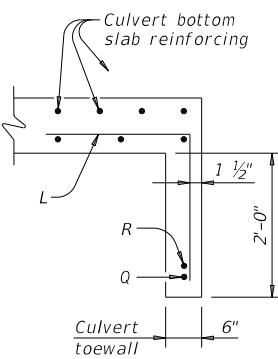
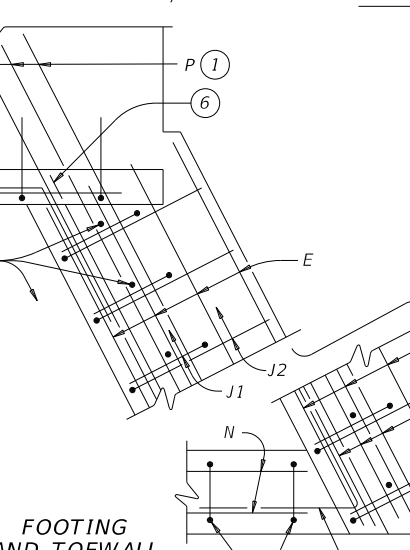


SECTION A-A

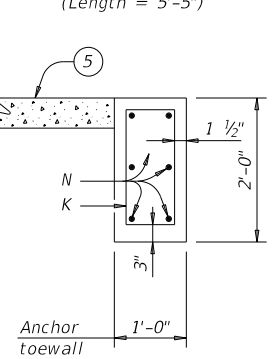


CORNER DETAILS
(Culvert and culvert toewall reinforcing not shown for clarity.)

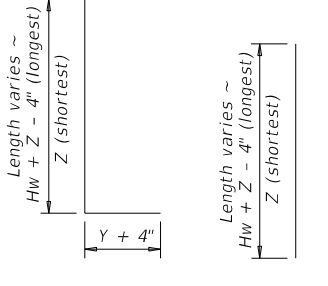
FOOTING AND TOEWALL



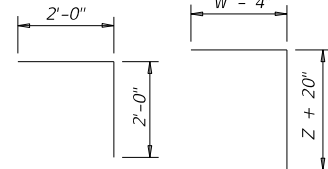
SECTION B-B (5)



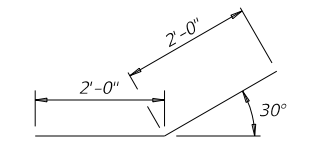
SECTION C-C



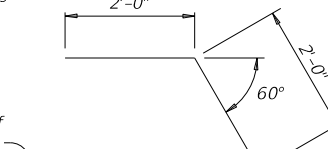
BARS J1 BARS V



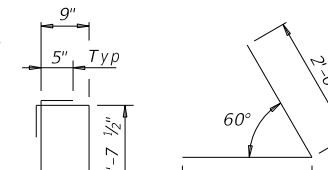
BARS L BARS J2



BARS D



BARS R



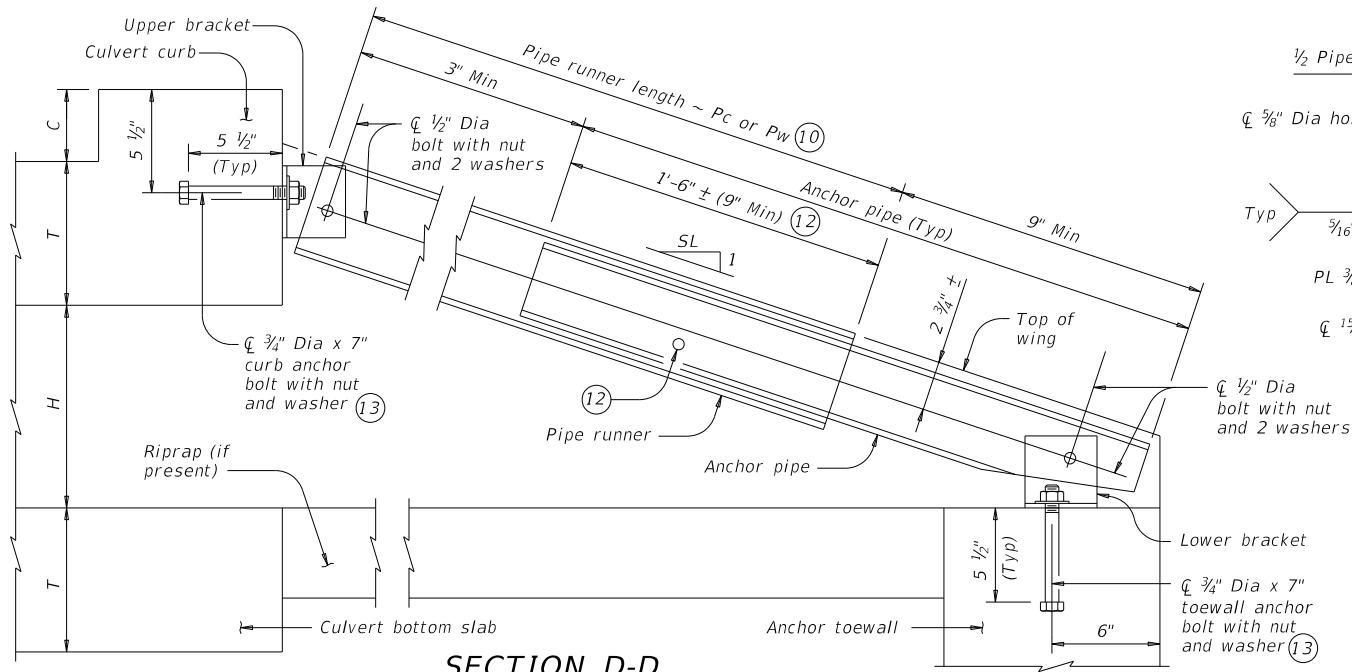
BARS K (Length = 5'-5") BARS OL

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

Texas Department of Transportation			Bridge Division Standard	
SAFETY END TREATMENT WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS TYPE I ~ CROSS DRAINAGE				
SETB-FW-0				
FILE: setb0se-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
REV: February 2020	CONTRACT: 2520 01	SECTION: 016, ETC	JOB: FM 2200	SHEET NO. 241
DIST: SAT	COUNTY: MEDINA			

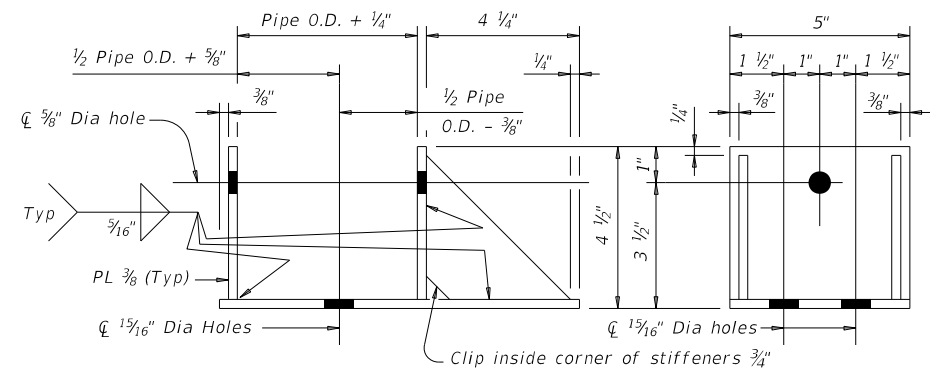
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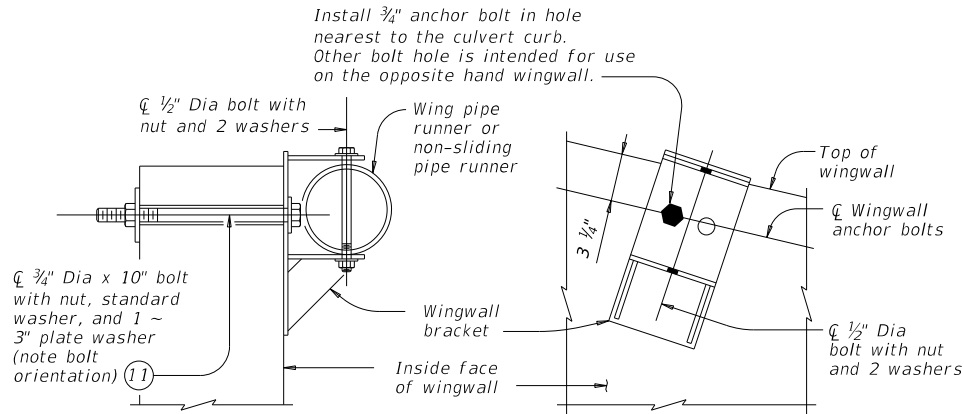
SECTION D-D

(Showing curb pipe runner. Except for upper bracket, wingwall pipe runners are similar.)



ELEVATION

SIDE VIEW



SECTION E-E

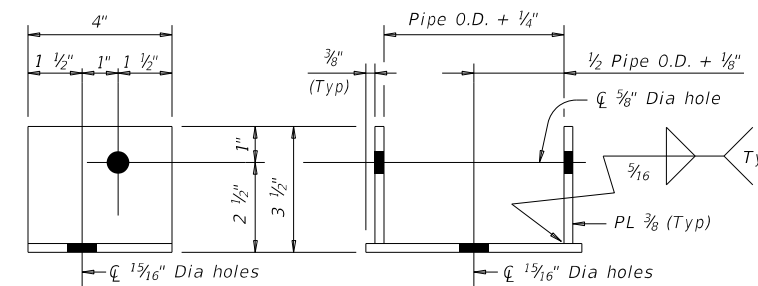
ELEVATION

(Showing installed bracket.)

(Showing installed bracket normal to wall. Pipe not shown for clarity.)

Note: Match wingwall bracket to the upper curb bracket size.

WINGWALL BRACKET DETAILS

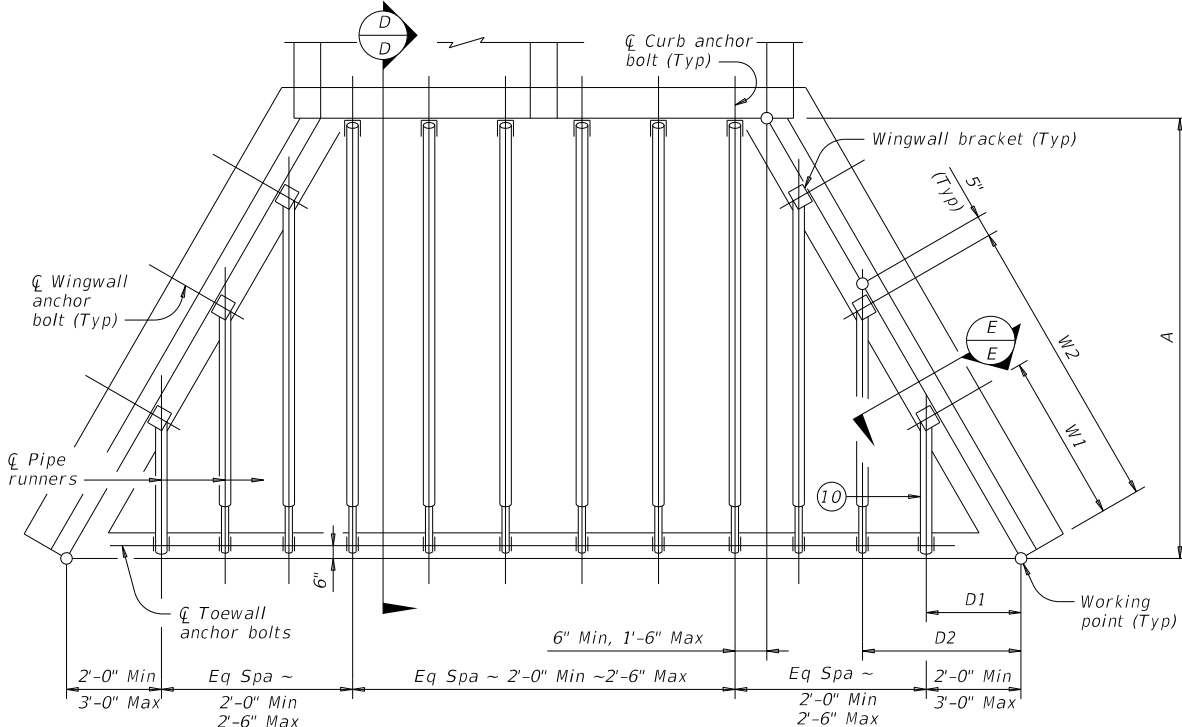


SIDE VIEW

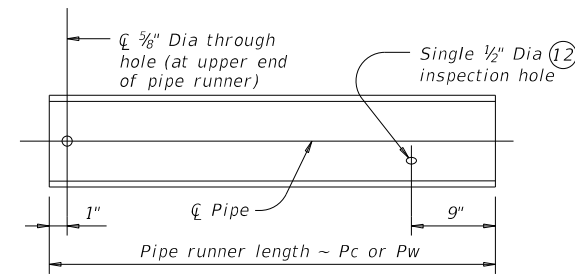
ELEVATION

Note: Match upper and lower brackets, except for the brackets used with non-sliding pipe runners, to the required pipe diameters as shown in the table.

UPPER AND LOWER BRACKET DETAILS

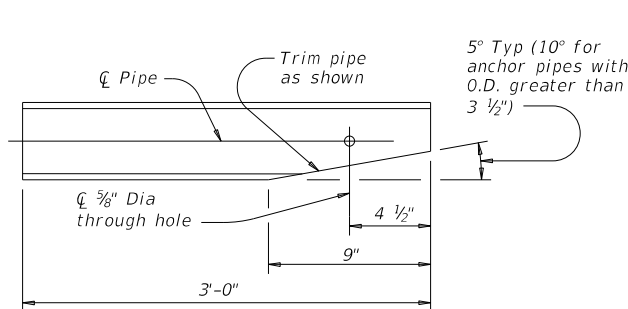


PIPE RUNNER PLAN

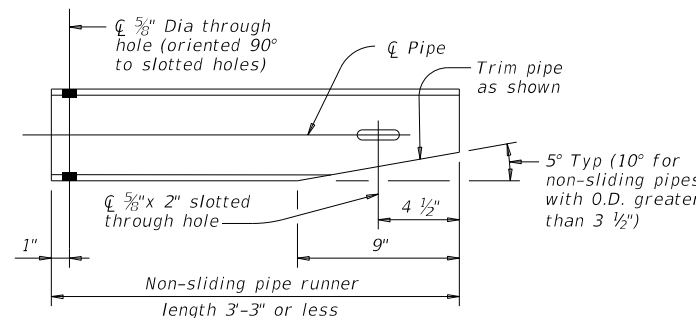


Note: Pipe diameter required for curb pipe runner is also used for wingwall pipe runner.

PIPE RUNNER DETAILS



ANCHOR PIPE DETAILS



Note: Pipe size is the same as required for curb pipe runner. Adjust the corresponding lower bracket accordingly.

NON-SLIDING PIPE RUNNER DETAILS

MAXIMUM PIPE RUNNER LENGTHS AND REQUIRED PIPE RUNNER SIZES

Maximum Pipe Runner Length (Pc or Pw)	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
9'-4"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'-0"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
33'-6"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"

- 10 If pipe runner length (Pw) is 1'-9" or less replace the normal pipe runner and anchor pipe with a single non-sliding pipe runner. See Non-Sliding Pipe Runner Details for additional information.
- 11 At Contractor's option, 7/8" diameter hole may be formed or cored drilled. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes.
- 12 After installation of pipe runner, use the 1/2" inspection hole to ensure that the lap of the anchor pipe with the pipe runner is adequate.
- 13 At Contractor's option, an adhesive anchor may be used. Provide 3/4" Dia adhesive anchors that meet the requirements of ASTM A307 Gr A fully threaded rods. Embed threaded rods into curb, wingwalls, and toewall using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 5 1/2". Provide anchor adhesive able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use.

PIPE RUNNER DIMENSION CALCULATIONS:

$Wn = (2.000)(Dn) - (0.416')$
 $Pwn = (Dn)(K2) - (2.063')$
 $Pw1 \text{ Non-Sliding Pipe Runner (If required)}$
 $= (D1)(K2) - (0.563')$
 $Pc = (A)(K1) - (1.688')$

Wn = Distance from working point to centerline anchor bolt measured along bottom inside face of wing (feet)
 Dn = Distance from working point to centerline pipe runner measured along outside face of anchor toewall (feet)
 Pw = Wingwall pipe runner length (feet)
 Pc = Curb pipe runner length (feet)
 K = Constant values for use in formulas
 Slope SL:1 K1 K2
 3:1 ~ 1.054 ~ 1.826
 4:1 ~ 1.031 ~ 1.785
 6:1 ~ 1.014 ~ 1.756
 n = Wing pipe runner number

Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS TYPE I ~ CROSS DRAINAGE

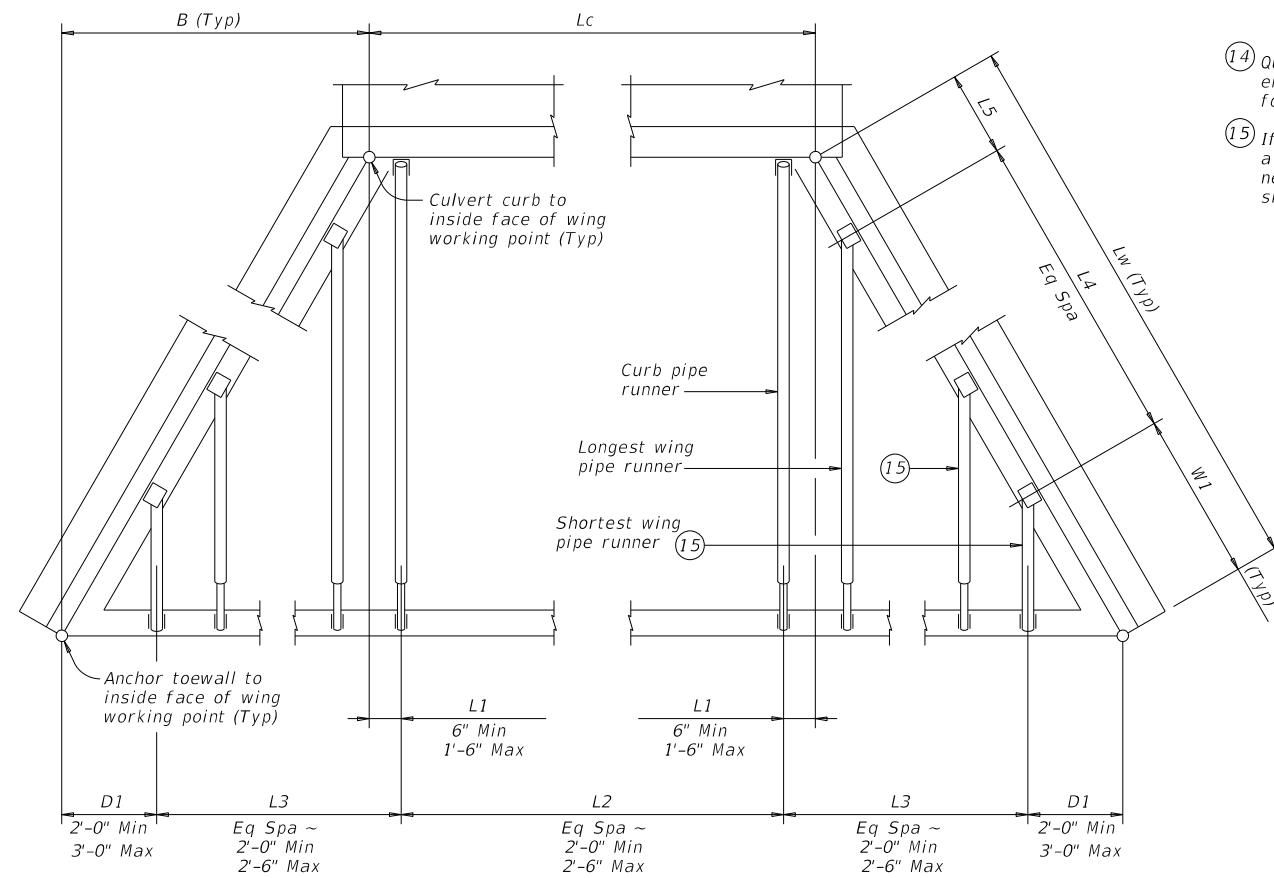
SETB-FW-0

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©TxDOT REVISIONS	2520	01	016, ETC	FM 2200
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	242	

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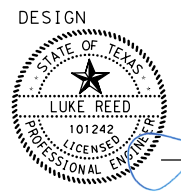
Culvert Station and/or Creek name followed by applicable end (Lt, Rt or Both) (14)	Lc (Ft)	L1 (Ft)	L2			D1 (Ft)	L3			W1 (Ft)	L4			L5 (Ft)	Curb Pipe Runner (Pc)		Longest Wing Pipe Runner (Pw) (Ft)	Shortest Wing Pipe Runner (Pw) (Ft)	Non-Sliding Wing Pipe Runner (if applicable) (Ft)	Curb, Wing, and/or Non-Sliding Pipe Runners		3'-0" Anchor Pipe	
			No. Spa	Spa at (Ft)	Overall Length (Ft)		No. Spa	Spa at (Ft)	Overall Length (Ft)		No. Spa	Spa at (Ft)	Overall Length (Ft)		No.	Length (Ft)				Size (3", 4" or 5")	Total Length (14) (Ft)	Size (2", 3" or 4")	Total Length (14) (Ft)
STA 597+88 - Culvert A-2 (Lt)	5.000'	1.500'	1	2.000'	2.000'	2.000'	2	2.444'	4.889'	3.583'	1	4.889'	4.889'	2.305'	2	7.938'	5.875'	N/A	3.000'	3"	33.625'	2"	12.000'
STA 597+88 - Culvert A-2 (Rt)	5.000'	1.500'	1	2.000'	2.000'	2.000'	2	2.444'	4.889'	3.583'	1	4.889'	4.889'	2.305'	2	7.938'	5.875'	N/A	3.000'	3"	33.625'	2"	12.000'
STA 639+96 - Culvert A-3 (Lt)	18.000'	1.000'	7	2.286'	16.000'	2.000'	2	2.194'	4.389'	3.583'	1	4.389'	4.389'	2.805'	8	7.938'	5.417'	N/A	3.000'	3"	80.333'	2"	30.000'
STA 639+96 - Culvert A-3 (Rt)	18.000'	1.000'	7	2.286'	16.000'	2.000'	2	2.194'	4.389'	3.583'	1	4.389'	4.389'	2.805'	8	7.938'	5.417'	N/A	3.000'	3"	80.333'	2"	30.000'
STA 700+11 - Culvert A-5 (Lt)	16.167'	0.500'	7	2.167'	15.167'	2.000'	2	2.389'	4.779'	3.583'	1	4.779'	4.779'	4.195'	8	9.771'	5.958'	N/A	3.083'	4"	96.250'	3"	30.000'
STA 700+11 - Culvert A-5 (Rt)	16.167'	0.500'	7	2.167'	15.167'	2.000'	2	2.353'	4.707'	3.583'	1	4.707'	4.707'	4.123'	8	9.646'	5.896'	N/A	3.083'	4"	95.125'	3"	30.000'



PIPE RUNNER LAYOUT

- (14) Quantities shown are for one structure end if Lt or Rt. Quantities shown are for two structure ends if Both.
- (15) If the outermost wing pipe runner is a non-sliding pipe runner, consider the next outermost wing pipe runner as the shortest.

SPECIAL NOTE:
 This tabular sheet is to be filled out by the culvert specifier and provides information for the construction details and quantities of pipe runners.
 An Excel 2010 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.
 Note that the tabular quantities are given for estimating purposes only. It is likely that these quantities will change due to field conditions. Therefore, all dimensions must be verified by the Contractor in the field prior to fabrication of the safety end treatment components.



DESIGN
 LUKE REED, P.E.
 12/20/2022 DATE



APPROVAL
 JAMES A. LUTZ, P.E.
 12/20/2022 DATE

Texas Department of Transportation
 Bridge Division Standard

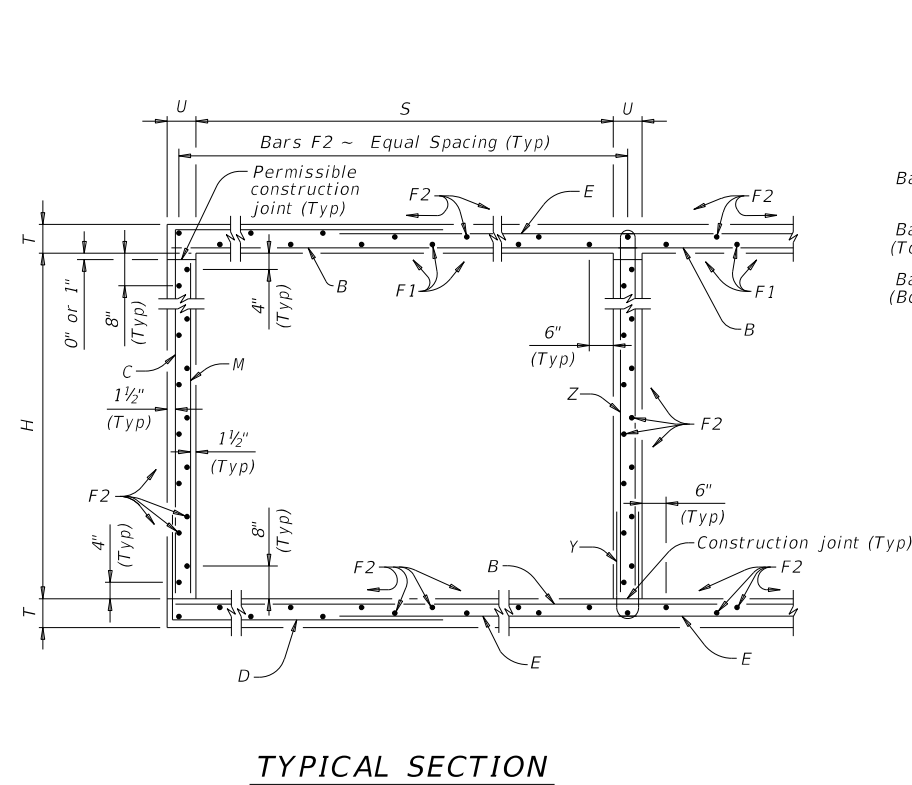
SAFETY END TREATMENT WITH FLARED WINGS
 FOR 0° SKEW BOX CULVERTS
 TYPE I ~ CROSS DRAINAGE

SETB-FW-0

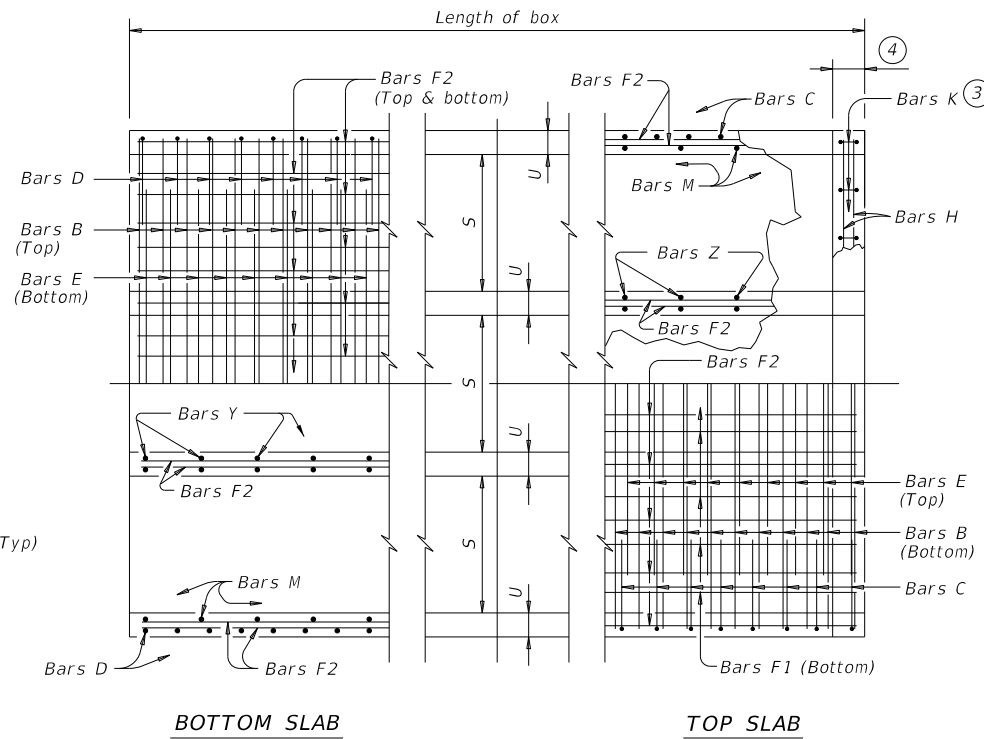
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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	243	

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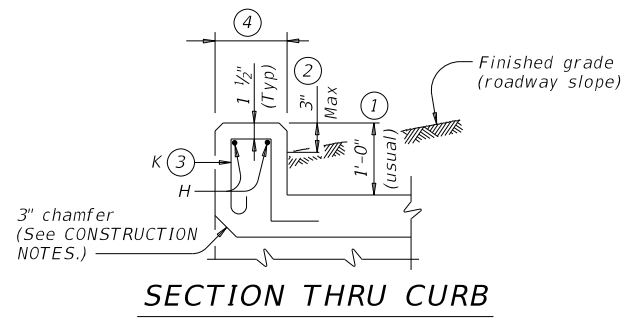
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TYPICAL SECTION

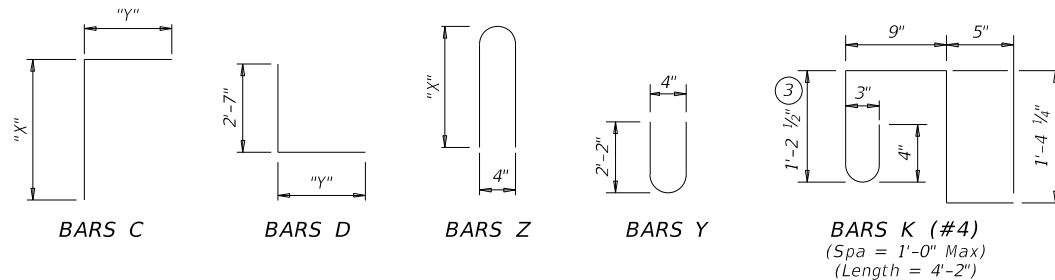


BOTTOM SLAB
 PART PLANS
 TOP SLAB



SECTION THRU CURB

TABLE OF BAR DIMENSIONS		
H	"X"	"Y"
2'-0"	2'-6 1/2"	3'-8 1/2"
3'-0"	3'-6 1/2"	3'-8 1/2"
4'-0"	4'-6 1/2"	3'-8 1/2"
5'-0"	5'-6 1/2"	3'-8 1/2"



- 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
- For vehicle safety, the following requirements must be met:
 - For structures without bridge rail, construct curbs no more than 3" above finished grade.
 - For structures with bridge rail, construct curbs flush with finished grade. Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
- 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR
 Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
 If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

- Do not use permanent forms.
- Chamfer the bottom edge of the top slab 3" at the entrance.
- Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed.

MATERIAL NOTES:

- Provide Grade 60 reinforcing steel.
- Provide galvanized reinforcing steel if required elsewhere in the plans.
- Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
 - culverts with overlay,
 - culverts with 1-to-2 course surface treatment, or
 - culverts with the top slab as the final riding surface.
- Provide bar laps, where required, as follows:
 - Uncoated or galvanized ~ #4 = 1'-8" Min
 - Uncoated or galvanized ~ #5 = 2'-1" Min
 - Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:

- Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
- See the Multiple Box Culverts Cast-In-Place Miscellaneous Detail (MC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bar dimensions shown are out-to-out of bar.



MULTIPLE BOX CULVERTS
 CAST-IN-PLACE
 5'-0" SPAN
 0' TO 20' FILL

MC-5-20

FILE: mc520ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	244	

DATE: 12/20/2022 3:43:39 PM
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NUMBER OF SPANS	SECTION DIMENSIONS				BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																												QUANTITIES																					
					Bars B				Bars C & D				Bars E			Bars F1 ~ #4			Bars F2 ~ #4			Bars M ~ #4			Bars Y & Z ~ #4				Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total																	
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Bars C		Bars D		No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	Bars Y		Bars Z		Length	Wt	No.	Wt	Conc (CY)	Ref (Lb)	Conc (CY)	Ref (Lb)	Conc (CY)
2	5'-0"	2'-0"	8"	7"	108	#5	9"	11'-6"	1,295	108	#5	9"	6'-3"	704	6'-4"	713	108	#5	9"	8'-8"	976	8	18"	39'-9"	212	38	18"	39'-9"	1,009	108	9"	2'-0"	144	54	9"	4'-7"	165	5'-3"	189	11'-6"	31	26	72	0.710	135.2	0.9	103	29.3	5,510					
3	5'-0"	2'-0"	8"	7"	108	#5	9"	17'-1"	1,924	108	#5	9"	6'-3"	704	6'-4"	713	108	#5	9"	14'-3"	1,605	12	18"	39'-9"	319	54	18"	39'-9"	1,434	108	9"	2'-0"	144	108	9"	4'-7"	331	5'-3"	379	17'-1"	46	38	106	1.029	188.8	1.3	152	42.4	7,705					
4	5'-0"	2'-0"	8"	7"	108	#5	9"	22'-8"	2,553	108	#5	9"	6'-3"	704	6'-4"	713	108	#5	9"	19'-10"	2,234	16	18"	39'-9"	425	70	18"	39'-9"	1,859	108	9"	2'-0"	144	162	9"	4'-7"	496	5'-3"	568	22'-8"	61	48	134	1.348	242.4	1.7	195	55.6	9,891					
5	5'-0"	2'-0"	8"	7"	108	#5	9"	28'-3"	3,182	108	#5	9"	6'-3"	704	6'-4"	713	108	#5	9"	25'-5"	2,863	20	18"	39'-9"	531	86	18"	39'-9"	2,284	108	9"	2'-0"	144	216	9"	4'-7"	661	5'-3"	758	28'-3"	75	60	167	1.667	296.0	2.1	242	68.8	12,082					
6	5'-0"	2'-0"	8"	7"	108	#5	9"	33'-10"	3,811	108	#5	9"	6'-3"	704	6'-4"	713	108	#5	9"	31'-0"	3,492	24	18"	39'-9"	637	102	18"	39'-9"	2,708	108	9"	2'-0"	144	270	9"	4'-7"	827	5'-3"	947	33'-10"	90	70	195	1.986	349.6	2.5	285	82.0	14,268					
2	5'-0"	3'-0"	8"	7"	108	#6	9"	11'-6"	1,865	108	#5	9"	7'-3"	817	6'-4"	713	108	#5	9"	8'-8"	976	8	18"	39'-9"	212	44	18"	39'-9"	1,168	108	9"	3'-0"	216	54	9"	4'-7"	165	7'-3"	262	11'-6"	31	26	72	0.775	159.9	0.9	103	31.9	6,497					
3	5'-0"	3'-0"	8"	7"	108	#6	9"	17'-1"	2,771	108	#5	9"	7'-3"	817	6'-4"	713	108	#5	9"	14'-3"	1,605	12	18"	39'-9"	319	62	18"	39'-9"	1,646	108	9"	3'-0"	216	108	9"	4'-7"	331	7'-3"	523	17'-1"	46	38	106	1.115	223.5	1.3	152	45.9	9,093					
4	5'-0"	3'-0"	8"	7"	108	#6	9"	22'-8"	3,677	108	#5	9"	7'-3"	817	6'-4"	713	108	#5	9"	19'-10"	2,234	16	18"	39'-9"	425	80	18"	39'-9"	2,124	108	9"	3'-0"	216	162	9"	4'-7"	496	7'-3"	785	22'-8"	61	48	134	1.456	287.2	1.7	195	59.9	11,682					
5	5'-0"	3'-0"	8"	7"	108	#6	9"	28'-3"	4,583	108	#5	9"	7'-3"	817	6'-4"	713	108	#5	9"	25'-5"	2,863	20	18"	39'-9"	531	98	18"	39'-9"	2,602	108	9"	3'-0"	216	216	9"	4'-7"	661	7'-3"	1,046	28'-3"	75	60	167	1.796	350.8	2.1	242	73.9	14,274					
6	5'-0"	3'-0"	8"	7"	108	#6	9"	33'-10"	5,488	108	#5	9"	7'-3"	817	6'-4"	713	108	#5	9"	31'-0"	3,492	24	18"	39'-9"	637	116	18"	39'-9"	3,080	108	9"	3'-0"	216	270	9"	4'-7"	827	7'-3"	1,308	33'-10"	90	70	195	2.137	414.5	2.5	285	88.0	16,863					
2	5'-0"	4'-0"	8"	7"	108	#6	9"	11'-6"	1,865	108	#5	9"	8'-3"	929	6'-4"	713	108	#5	9"	8'-8"	976	8	18"	39'-9"	212	44	18"	39'-9"	1,168	108	9"	4'-0"	289	54	9"	4'-7"	165	9'-3"	334	11'-6"	31	26	72	0.840	166.3	0.9	103	34.5	6,754					
3	5'-0"	4'-0"	8"	7"	108	#6	9"	17'-1"	2,771	108	#5	9"	8'-3"	929	6'-4"	713	108	#5	9"	14'-3"	1,605	12	18"	39'-9"	319	62	18"	39'-9"	1,646	108	9"	4'-0"	289	108	9"	4'-7"	331	9'-3"	667	17'-1"	46	38	106	1.202	231.8	1.3	152	49.4	9,422					
4	5'-0"	4'-0"	8"	7"	108	#6	9"	22'-8"	3,677	108	#5	9"	8'-3"	929	6'-4"	713	108	#5	9"	19'-10"	2,234	16	18"	39'-9"	425	80	18"	39'-9"	2,124	108	9"	4'-0"	289	162	9"	4'-7"	496	9'-3"	1,001	22'-8"	61	48	134	1.564	297.2	1.7	195	64.3	12,083					
5	5'-0"	4'-0"	8"	7"	108	#6	9"	28'-3"	4,583	108	#5	9"	8'-3"	929	6'-4"	713	108	#5	9"	25'-5"	2,863	20	18"	39'-9"	531	98	18"	39'-9"	2,602	108	9"	4'-0"	289	216	9"	4'-7"	661	9'-3"	1,335	28'-3"	75	60	167	1.926	362.7	2.1	242	79.1	14,748					
6	5'-0"	4'-0"	8"	7"	108	#6	9"	33'-10"	5,488	108	#5	9"	8'-3"	929	6'-4"	713	108	#5	9"	31'-0"	3,492	24	18"	39'-9"	637	116	18"	39'-9"	3,080	108	9"	4'-0"	289	270	9"	4'-7"	827	9'-3"	1,668	33'-10"	90	70	195	2.288	428.1	2.5	285	94.0	17,408					
2	5'-0"	5'-0"	8"	7"	108	#6	9"	11'-6"	1,865	108	#5	9"	9'-3"	1,042	6'-4"	713	108	#5	9"	8'-8"	976	8	18"	39'-9"	212	50	18"	39'-9"	1,328	108	9"	5'-0"	361	54	9"	4'-7"	165	11'-3"	406	11'-6"	31	26	72	0.904	176.7	0.9	103	37.0	7,171					
3	5'-0"	5'-0"	8"	7"	108	#6	9"	17'-1"	2,771	108	#5	9"	9'-3"	1,042	6'-4"	713	108	#5	9"	14'-3"	1,605	12	18"	39'-9"	319	70	18"	39'-9"	1,859	108	9"	5'-0"	361	108	9"	4'-7"	331	11'-3"	812	17'-1"	46	38	106	1.288	245.3	1.3	152	52.8	9,965					
4	5'-0"	5'-0"	8"	7"	108	#6	9"	22'-8"	3,677	108	#5	9"	9'-3"	1,042	6'-4"	713	108	#5	9"	19'-10"	2,234	16	18"	39'-9"	425	90	18"	39'-9"	2,390	108	9"	5'-0"	361	162	9"	4'-7"	496	11'-3"	1,217	22'-8"	61	48	134	1.672	313.9	1.7	195	68.6	12,750					
5	5'-0"	5'-0"	8"	7"	108	#6	9"	28'-3"	4,583	108	#5	9"	9'-3"	1,042	6'-4"	713	108	#5	9"	25'-5"	2,863	20	18"	39'-9"	531	110	18"	39'-9"	2,921	108	9"	5'-0"	361	216	9"	4'-7"	661	11'-3"	1,623	28'-3"	75	60	167	2.056	382.5	2.1	242	84.3	15,540					
6	5'-0"	5'-0"	8"	7"	108	#6	9"	33'-10"	5,488	108	#5	9"	9'-3"	1,042	6'-4"	713	108	#5	9"	31'-0"	3,492	24	18"	39'-9"	637	130	18"	39'-9"	3,452	108	9"	5'-0"	361	270	9"	4'-7"	827	11'-3"	2,029	33'-10"	90	70	195	2.439	451.0	2.5	285	100.1	18,326					



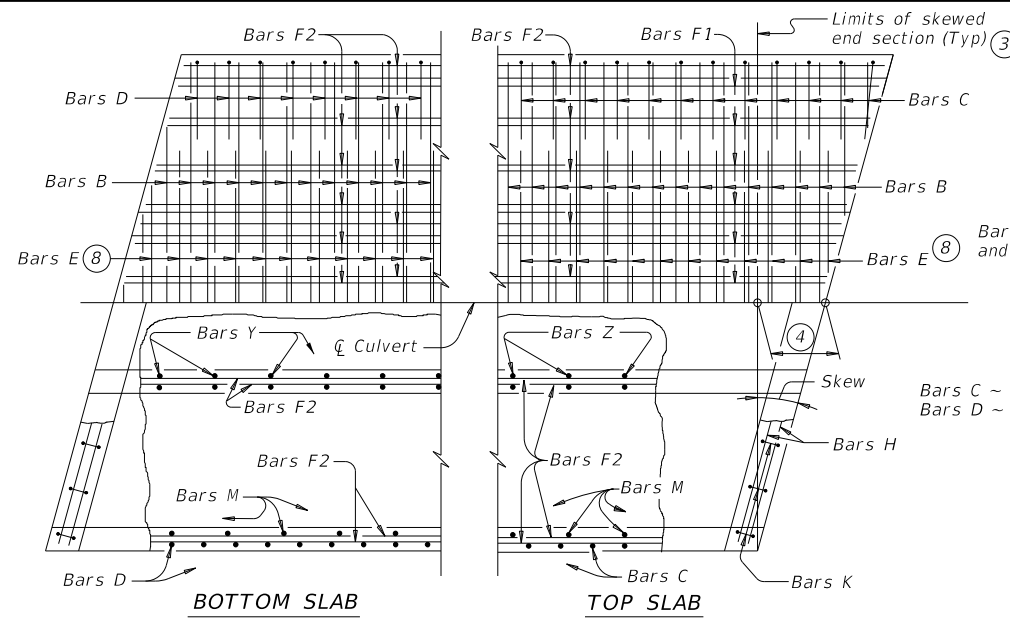
**MULTIPLE BOX CULVERTS
 CAST-IN-PLACE
 5'-0" SPAN
 0' TO 20' FILL**

MC-5-20

FILE: mc520ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
	2520	01	016, ETC	FM 2200
REVISIONS	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	245	

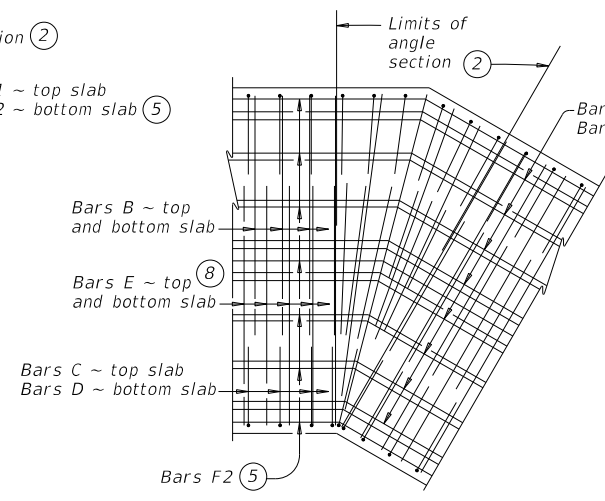
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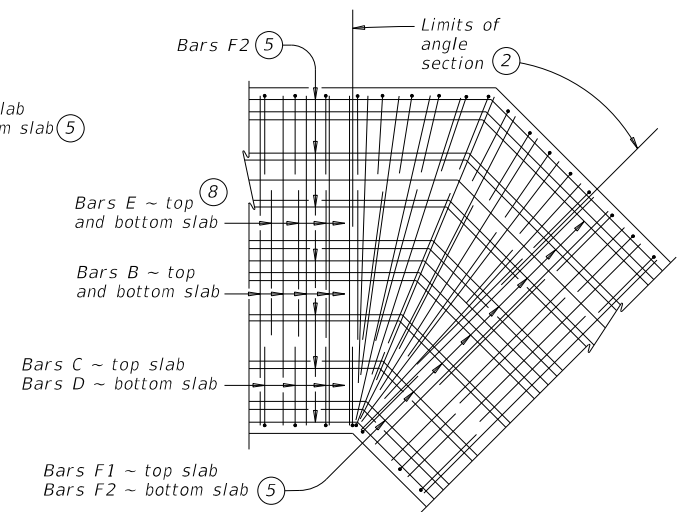


PLAN OF SKEWED ENDS ~ FROM 0° TO 15°

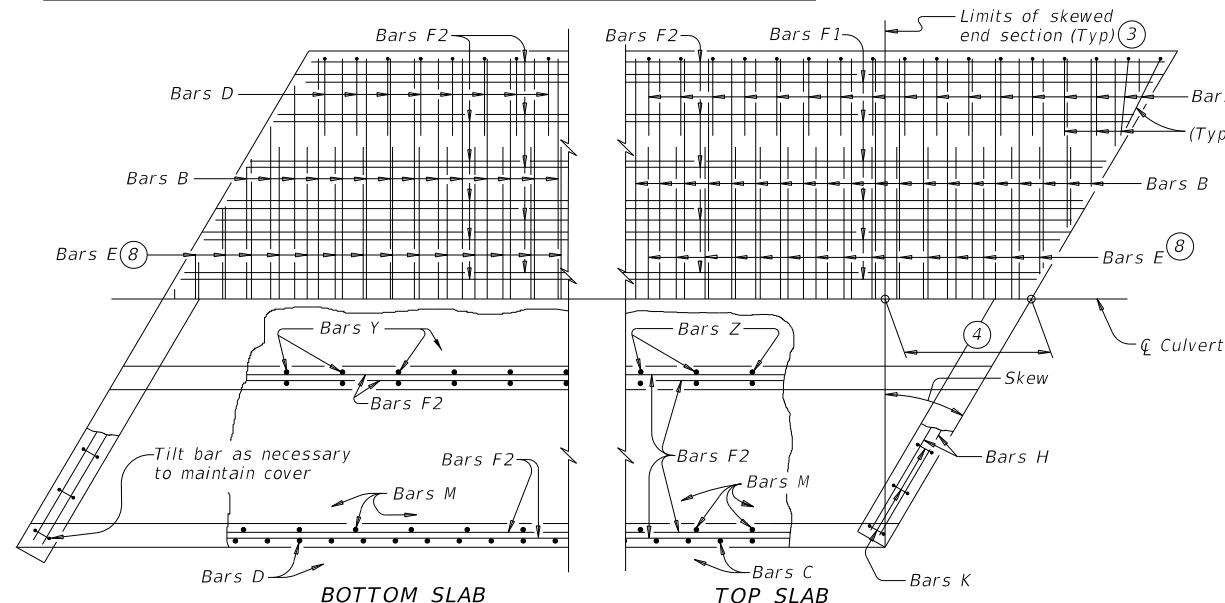
PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°



PLAN OF SKEWED ENDS ~ OVER 15° TO 30°

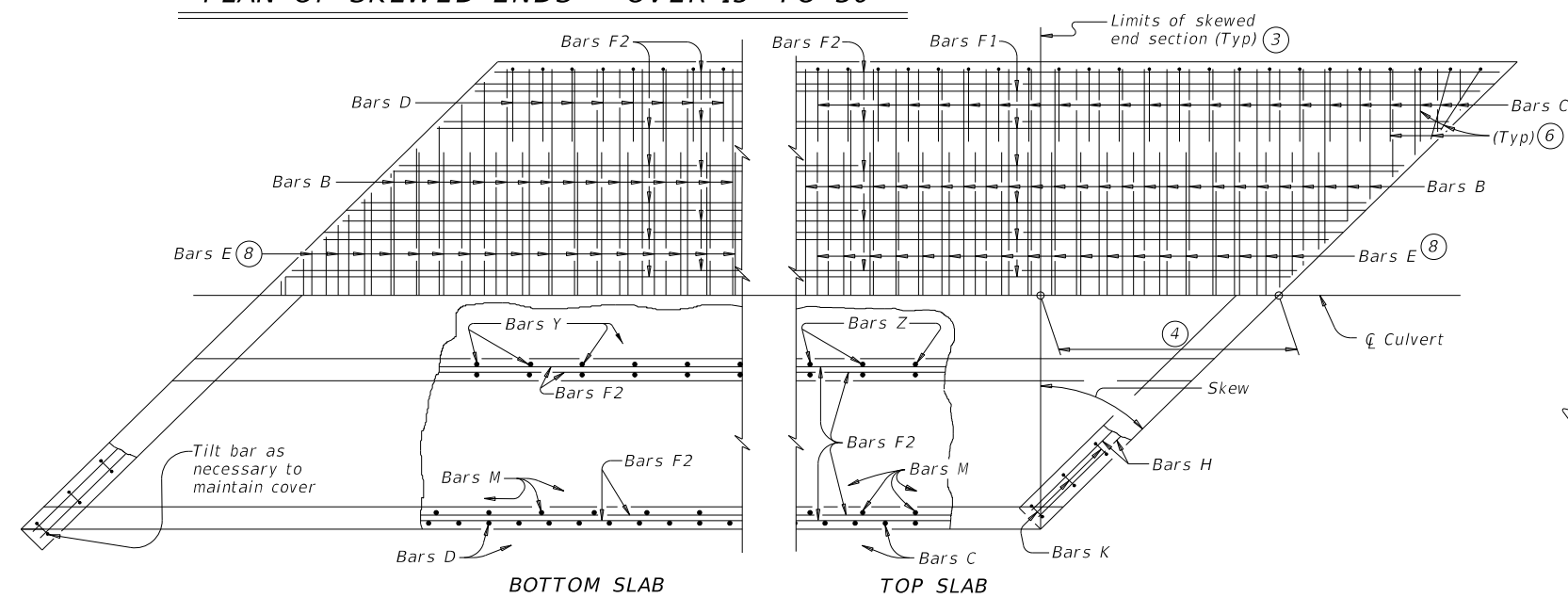
- ① For skewed box culverts with less than 2'-0" of fill, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension.
 For non-skewed box culverts with less than 2'-0" of fill and for skewed or non-skewed culverts with a fill depth of 2'-0" or greater, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension. Alternatively, if the box is non-skewed, embed #6 anchor bars with a Type III, Class C, D, E, or F anchor adhesive into the existing walls, top and bottom slab at 1'-6" center-to-center spacing. Minimum embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, N_{ba} , of 26.4 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing." Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.
 Break back wings and apron as necessary to install the extension. Clean and extend the exposed wingwall and apron reinforcing into the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, form horizontal and vertical transitions as directed by the Engineer. Match bottom slabs to maintain an uninterrupted flow line. Field bend existing and new reinforcing into transitions and maintain specified cover requirements. For top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface, adjust the "H" dimension to provide a smooth riding surface.
- ② When the spacing between Bars B or Bars E becomes less than half of the normal spacing, cut bars to avoid conflict.
- ③ The length of Bars B and Bars E will vary in the skewed end sections.
- ④ $[0.5 \times \text{overall width}] \times [\text{tangent of the skew angle}]$
- ⑤ Place Bars F1 and F2 continuously through the angle section. Bend Bars F1 and F2 to remain parallel to the walls of the box culvert.
- ⑥ When necessary to avoid conflict in acute corners, shorten the slab extension leg of Bars C and Bars D to a minimum of 1'-6" for skews of 30° thru 45°.
- ⑦ At the Contractor's option, for skews of 15° or less, place Bars B, C, D, and E parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B and Bars E shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets to accommodate the skew.
- ⑧ Extend Bars E as shown on the MC standard sheet for direct traffic culverts.

CONSTRUCTION NOTES:
 Do not use permanent forms.
 When required, lap Bars H 1'-8" for uncoated or galvanized bars.
 Provide a minimum of 1 1/2" clear cover.

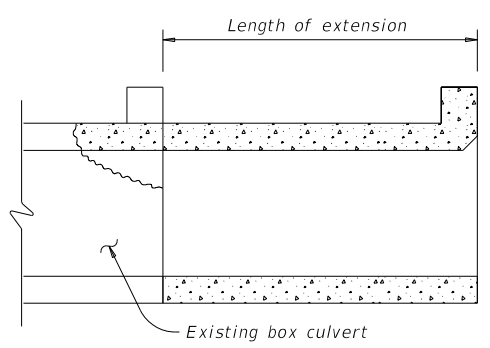
MATERIAL NOTES:
 Provide Grade 60 reinforcing steel.
 Provide galvanized reinforcing steel, if required elsewhere in the plans.
 Provide Class C concrete ($f'_c = 3,600$ psi) with these exceptions:
 provide Class S concrete ($f'_c = 4,000$ psi) for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 Refer to Multiple Box Culverts Cast-in-Place (MC) standard sheets for details of straight sections of culvert.
 For skewed sections and angle sections, refer to Multiple Box Culverts Cast-in-Place (MC) standard sheets for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown.
 For skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume, and reinforcing steel weight by dividing the values shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets by the cosine of the skew angle.

Cover dimensions are clear dimensions, unless noted otherwise.



PLAN OF SKEWED ENDS ~ OVER 30° TO 45°



LENGTHENING DETAIL

HL93 LOADING



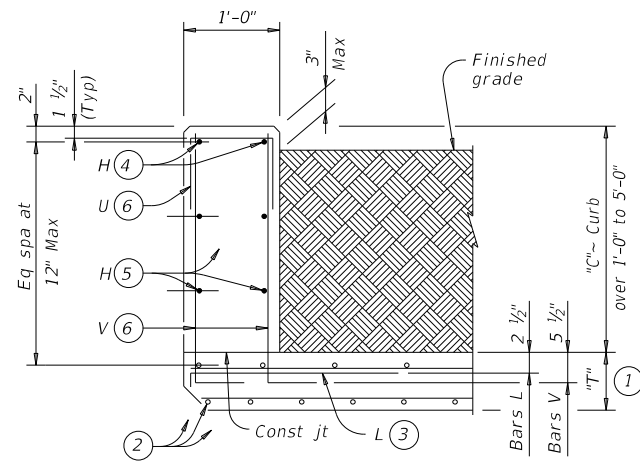
**MULTIPLE BOX CULVERTS
 CAST-IN-PLACE
 MISCELLANEOUS DETAILS**

MC-MD

FILE: mc-mdste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	246	

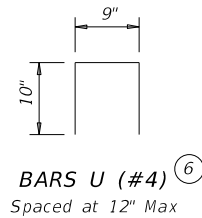
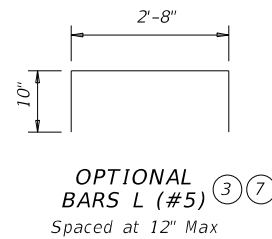
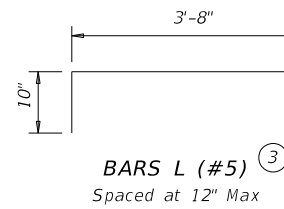
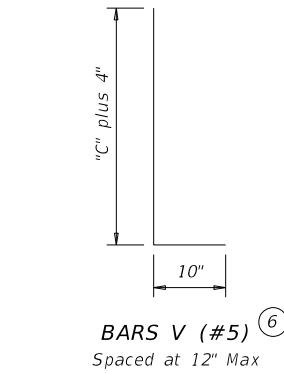
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TYPICAL SECTION

Used for curbs over 1'-0" to 5'-0"



- ① "T" is equal to the culvert top slab thickness. For precast boxes with slabs less than 8" thick, see SCP-MD standard for additional details.
- ② Adjust normal culvert slab bars as necessary to clear obstructions.
- ③ Place bars L as shown. Tilt hook as necessary to maintain cover.
- ④ Place normal culvert curb bars H(#4) as shown. Adjust as necessary to clear obstructions.
- ⑤ Additional bars H(#4) as required to maintain 12" Max spacing.
- ⑥ Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.
- ⑦ Optional bars L are to be used only for precast box culverts with 3'-0" closure pour.
- ⑧ Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES ^⑧		
Curb Height "C"	Conc (CY/LF)	Reinf Steel (Lb/LF)
1'-0"	0.037	10.4
1'-6"	0.056	14.5
2'-0"	0.074	15.6
2'-6"	0.093	18.0
3'-0"	0.111	19.0
3'-6"	0.130	21.3
4'-0"	0.148	22.4
4'-6"	0.167	24.8
5'-0"	0.185	25.9

CONSTRUCTION NOTES:
Adjust reinforcing steel as necessary to provide 1 1/4" cover.
For vehicle safety, top of the curb must not project more than 3" above the finished grade.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class "C" concrete (f'c = 3,600 psi) minimum for curbs.
Provide bar laps, where required, as follows:
• Uncoated or galvanized ~ #4 = 1'-8" Min

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
These extended curb details have sufficient strength to allow for future retrofit of Type T631 or T631LS railing. These details are suitable for use with PR11, PR22 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T631 or T631LS railing, use the T631-CM standard.
This Curb is considered as part of the Box Culvert for payment.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Bridge Division Standard

EXTENDED CURB DETAILS

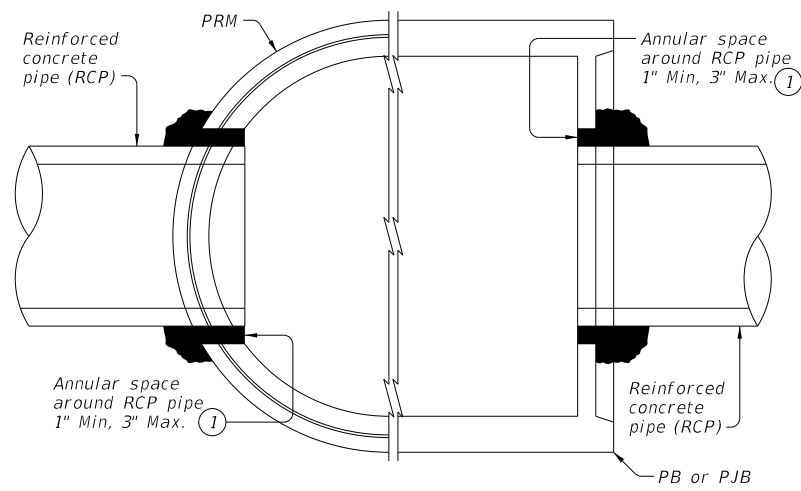
FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 5'-0" TALL

ECD

FILE: ecdside1-20.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	247	

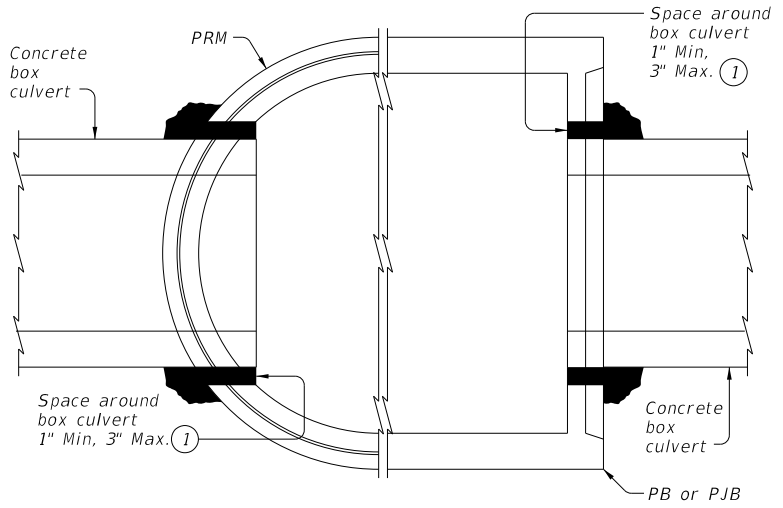
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/20/2022 4:17:27 PM
 FILE: P:\117\99\04\Des\ign\Civi\Standards\Drainage\pbgcstd1-20.dgn



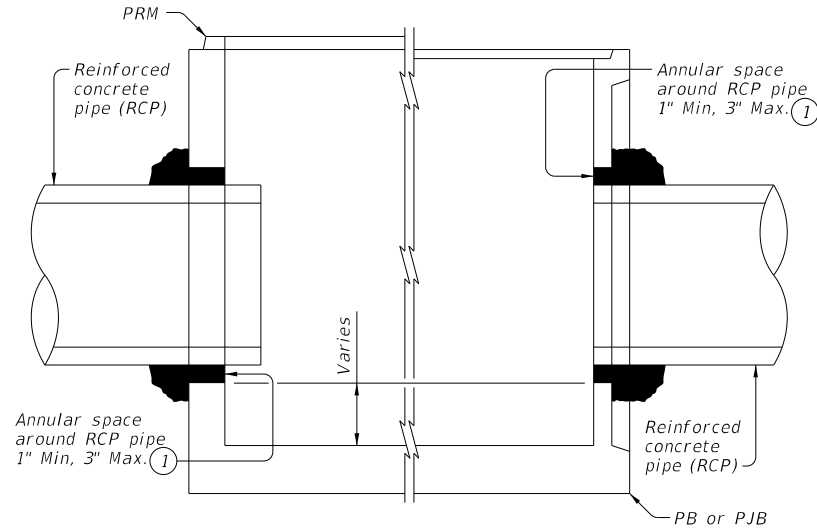
PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE
 PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF PLAN



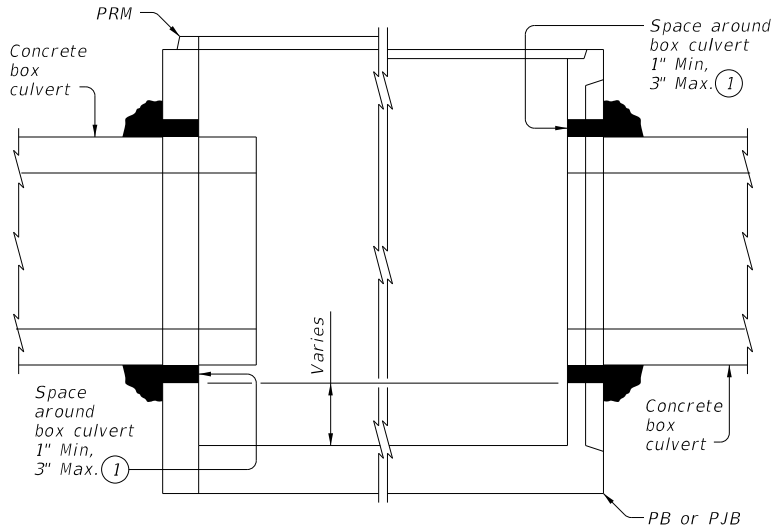
PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE
 PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF PLAN



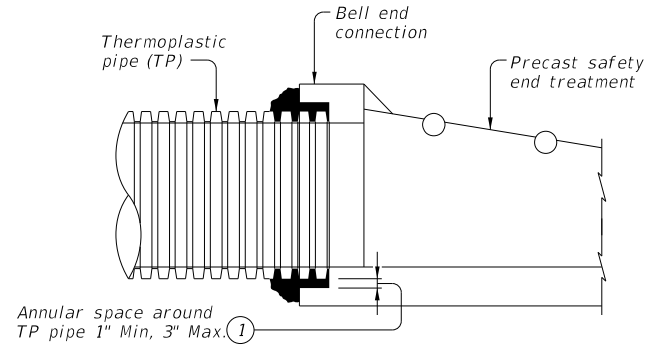
PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE
 PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF ELEVATION



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE
 PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF ELEVATION



TYPICAL PARTIAL ELEVATION OF PRECAST SAFETY END TREATMENTS

Showing square PSET for parallel drainage, cross drainage shown similar.

① Completely fill the void between the precast structure and the connecting pipe or box with cementitious grouts and mortars in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

DESIGN

APPROVAL

CONSTRUCTION NOTES:
 Do not grout rubber gasket joints without Manufacturer's recommendations.
 Do not use bricks, masonry blocks, native stone, or similar materials in conjunction with grouted connections when filling void spaces around pipes or box culverts.

MATERIAL NOTES:
 Provide grouted connections in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

GENERAL NOTES:
 See applicable standards for notes and details not shown:
 Precast Base (PB)
 Precast Junction Box (PJB)
 Precast Round Manhole (PRM)
 Precast Safety End Treatments C/D Square (PSET-SC)
 Precast Safety End Treatments P/D Square (PSET-SP)
 Provide Concrete Box Culverts in accordance with Item 462 "Concrete Box Culverts and Drains".
 Provide Reinforced Concrete Pipe (RCP) in accordance with Item 464 "Reinforced Concrete Pipe".
 Provide Thermoplastic Pipe (TP) in accordance with Special Specification Thermoplastic Pipe.
 Payment for grouted connections is considered subsidiary to other bid Items.

Texas Department of Transportation
 Bridge Division Standard

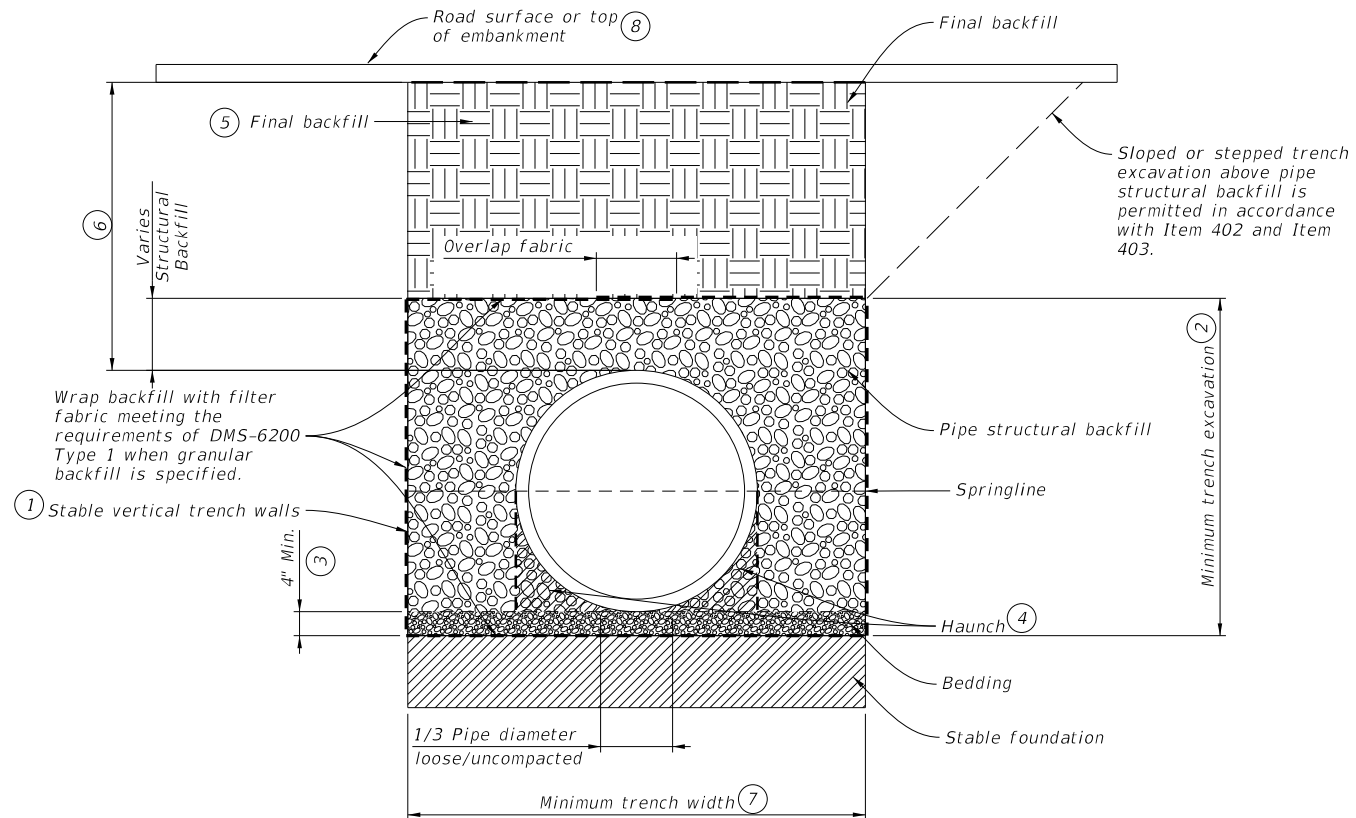
PIPE AND BOX GROUTED CONNECTIONS FOR PRECAST STRUCTURES

PBGC

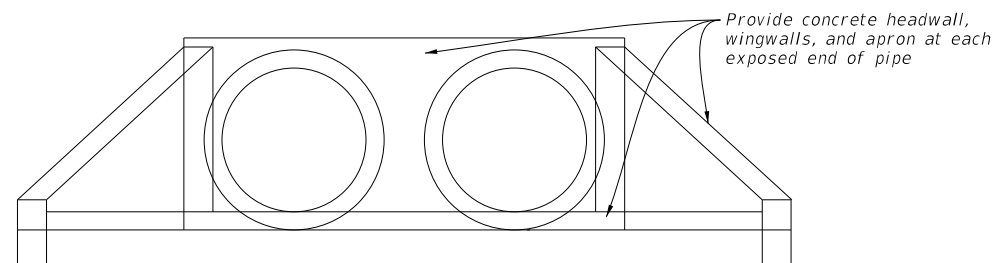
FILE: pbgcstd1-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
	DIST	COUNTY		SHEET NO.
	SAT	MEDINA		248

12/20/2022 3:43:45 PM
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Pipe Deduct From Fill	
Pipe Diameter (Inches)	Volume (CF/LF)
12	0.95
18	2.09
24	3.65
30	5.76
36	8.21
42	10.80
48	13.90



TRENCH AND BEDDING DIAGRAM



EXPOSED END OF PIPE PROTECTION

- ① Excavate to create vertical trench wall a minimum height extending 1' above the top of the pipe. The trench walls must be firm, stable material. If the trench walls slough or are unstable, widen or restore trench as directed.
- ② When placing pipe in an embankment, limit trench depth to 2' above pipe to ensure uniformity in compaction above pipe, unless otherwise allowed. See Item 402, "Trench Excavation Protection."
- ③ Minimum bedding thickness is 4" on a stable foundation. If foundation contains large rocks, increase minimum bedding thickness to 6". Do not compact the bedding directly under the pipe as shown.
- ④ Ensure backfill completely fills the void between the bedding and the pipe in the haunch zone. Compact backfill into haunch and between corrugations.
- ⑤ Backfill above structural backfill may be other embankment as shown on the plans.
- ⑥ See specifications for minimum cover required when subject to heavy earth-moving equipment.
- ⑦ See specifications for minimum trench width.
- ⑧ Perform mandrel testing in the presence of the Engineer prior to placing roadway surface.
- ⑨ Quantity to deduct for structural backfill measurement.

GENERAL NOTES:
 When flowable fill is used for pipe structural backfill, submit a plan to restrain pipe or a plan to install fill in lifts to maintain pipe line and grade.
 Pipe installation in accordance with this drawing is for dry/dewatered installation.
 Payment for excavation, shaping, bedding, structural backfill, final backfill, and concrete end treatments will be in accordance with applicable bid items.
 See Thermoplastic Pipe Culverts and Drains Specification and DMS-4710 for pipe requirements not repeated here.
 Approval by the Engineer is required when performing mandrel testing sooner than 30 days after completion of final backfill.

DESIGN

 LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

 JAMES A. LUTZ, P.E. 12/20/2022 DATE

NOTE TO DESIGNER:
 Designer to specify type of pipe structural backfill and final backfill.
 Designer to specify limitations, including maximum fill depth, on use of approved products.
 Designer to include trench excavation protection as required.
 Designer to confirm filter fabric shown in "TRENCH AND BEDDING DIAGRAM" is required, or remove as necessary.

				Bridge Division	
THERMOPLASTIC PIPE INSTALLATION					
FILE: WD-TPI-22.dgn	DN:	CK:	DW: SMG	CK:	
©TxDOT SEPTEMBER 2022	CONT SECT	JOB	HIGHWAY		
REVISIONS	2520 01	016, ETC	FM 2200		
	DIST	COUNTY	SHEET NO.		
	SAT	MEDINA	249		

Plotted on: 1/5/2023

Design Filename: 1179903_SEA_BRG01.dgn

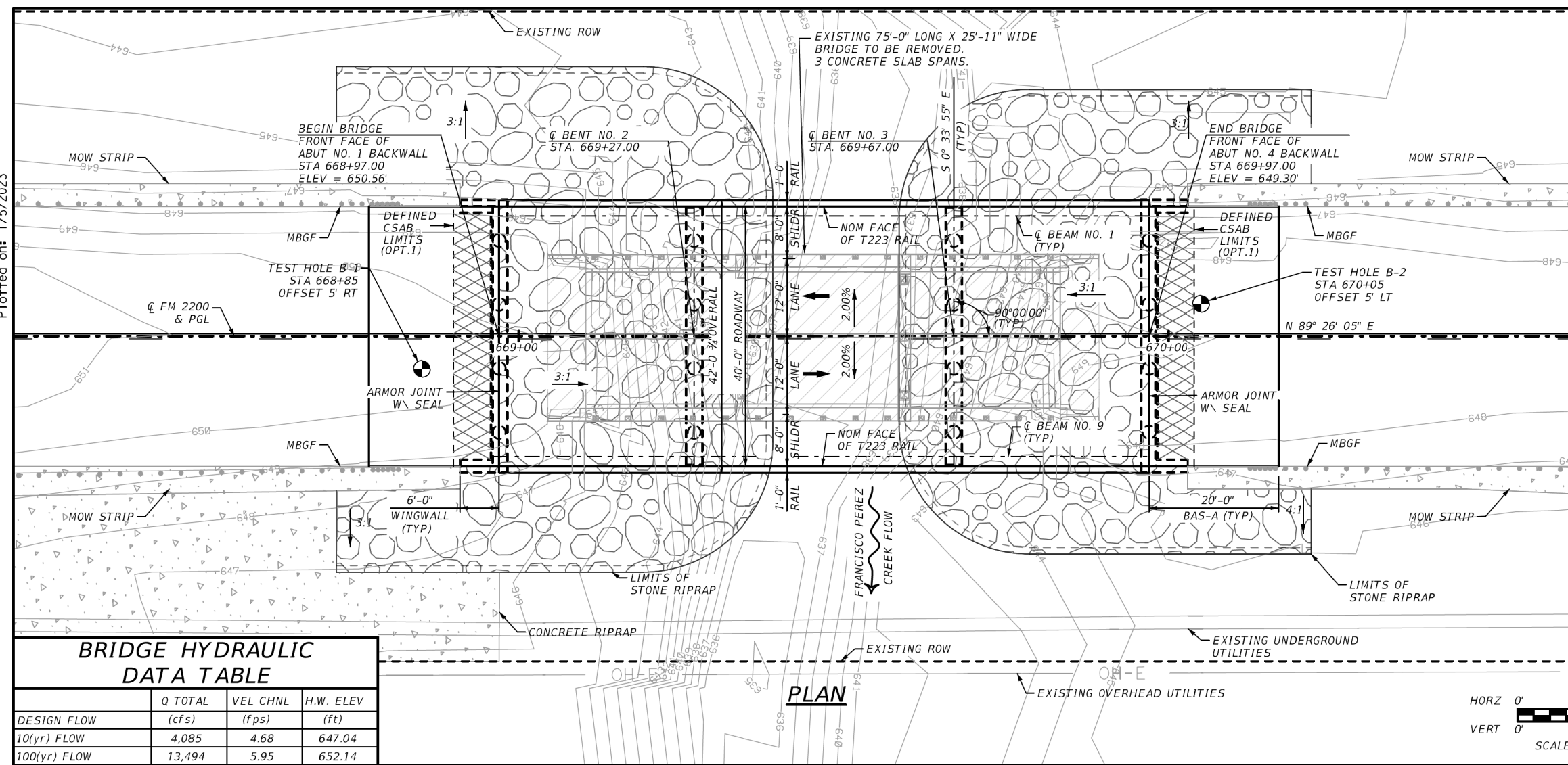
LEGEND:

- BOREHOLE
- EXISTING BRIDGE TO BE REMOVED

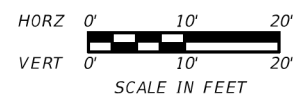


GENERAL NOTES:

- BRIDGE DESIGNED ACCORDING TO AASHTO LRFD BRIDGE SPECIFICATIONS 2020, 9TH EDITION AND TxDOT BRIDGE DESIGN MANUAL (NOV 2021).
- HORIZONTAL AND VERTICAL DIMENSIONS ARE SHOWN. LENGTHS MUST BE CORRECTED FOR GRADE OR CROSS SLOPE WHERE APPROPRIATE.
- CONTRACTOR TO VERIFY LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.
- THE "H" VALUES SHOWN ARE ESTIMATED COLUMN HEIGHTS. CONTRACTOR IS RESPONSIBLE FOR CALCULATING ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS.
- SEE TxDOT STONE RIPRAP (SRR) STANDARD FOR RIPRAP DETAILS.
- REMOVE EXISTING BRIDGE FOUNDATIONS 2' MINIMUM BELOW FINAL GRADE.
- BRIDGE NOT DESIGNED FOR FUTURE OVERLAY.
- SEE BRIDGE TYPICAL SECTION SHEET FOR TYPICAL SECTIONS.
- SEE TEST HOLE PROFILE SHEET FOR SOIL STRATA AND TCP TEST DATA.
- SAW CUT GROOVING OF BRIDGE DECK AND APPROACH SLAB REQUIRED.
- SPECIFIED DRILL SHAFT LENGTHS ARE MINIMUMS. SOIL CONDITIONS DIFFERING FROM TEST HOLE LOGS MAY NECESSITATE LONGER SHAFTS AS APPROVED BY THE ENGINEER.
- DRILL SHAFT HOLE STABILITY IS THE RESPONSIBILITY OF THE CONTRACTOR. GROUND WATER, CAVING SOILS, AND WATER BEARINGS SANDS MAY BE ENCOUNTERED. SEE ITEM 416 FOR CASING, CLASS SS CONCRETE AND SLURRY DISPLACEMENT PROVISIONS. ROTARY CASING INSTALLATION IS RECOMMENDED.
- DESIGN SPEED = 55 MPH
- FUNCTIONAL CLASS = RURAL MAJOR COLLECTOR
- ADT(2023) = 1300
- ADT(2043) = 1800
- EXISTING NBI = 15-163-0-2520-01-004

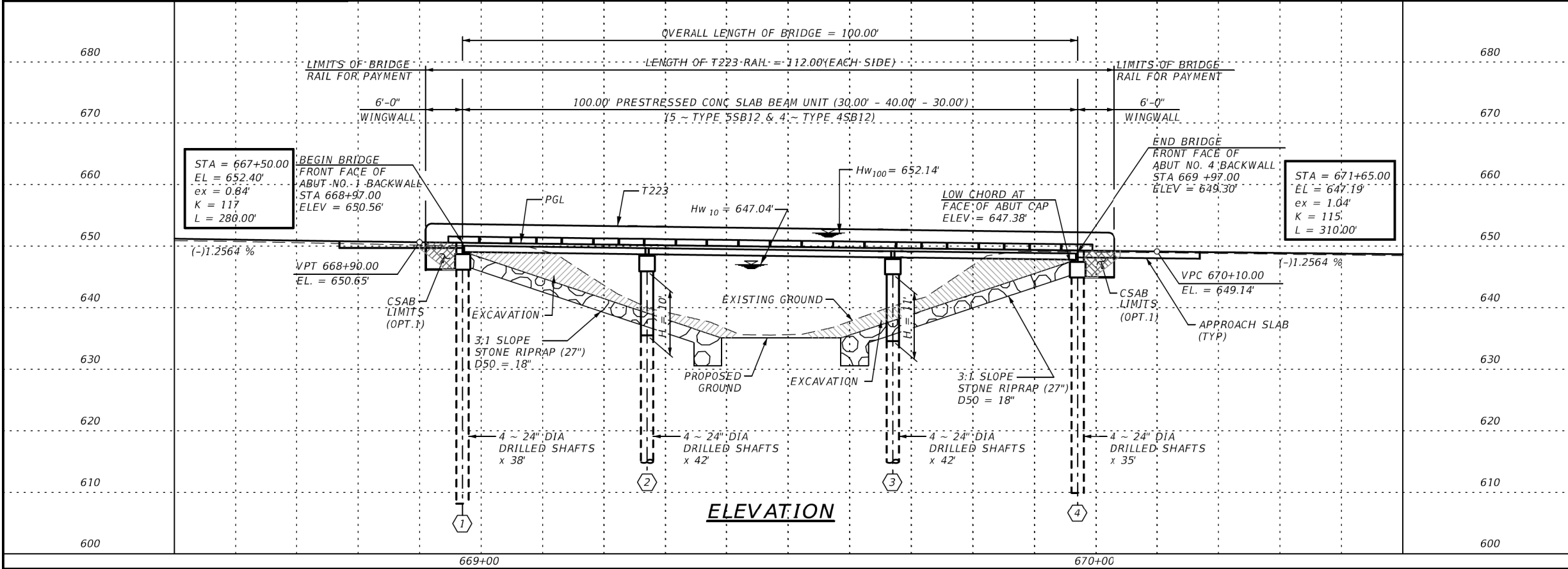


PLAN



BRIDGE HYDRAULIC DATA TABLE

	Q TOTAL (cfs)	VEL CHNL (fps)	H.W. ELEV (ft)
DESIGN FLOW			
10(yr) FLOW	4,085	4.68	647.04
100(yr) FLOW	13,494	5.95	652.14



ELEVATION



HL 93 LOADING
SUPERSTRUCTURE INV/OPR RATINGS: 1.23/1.59

REV. NO.	DATE	DESCRIPTION	BY



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BRIDGE LAYOUT

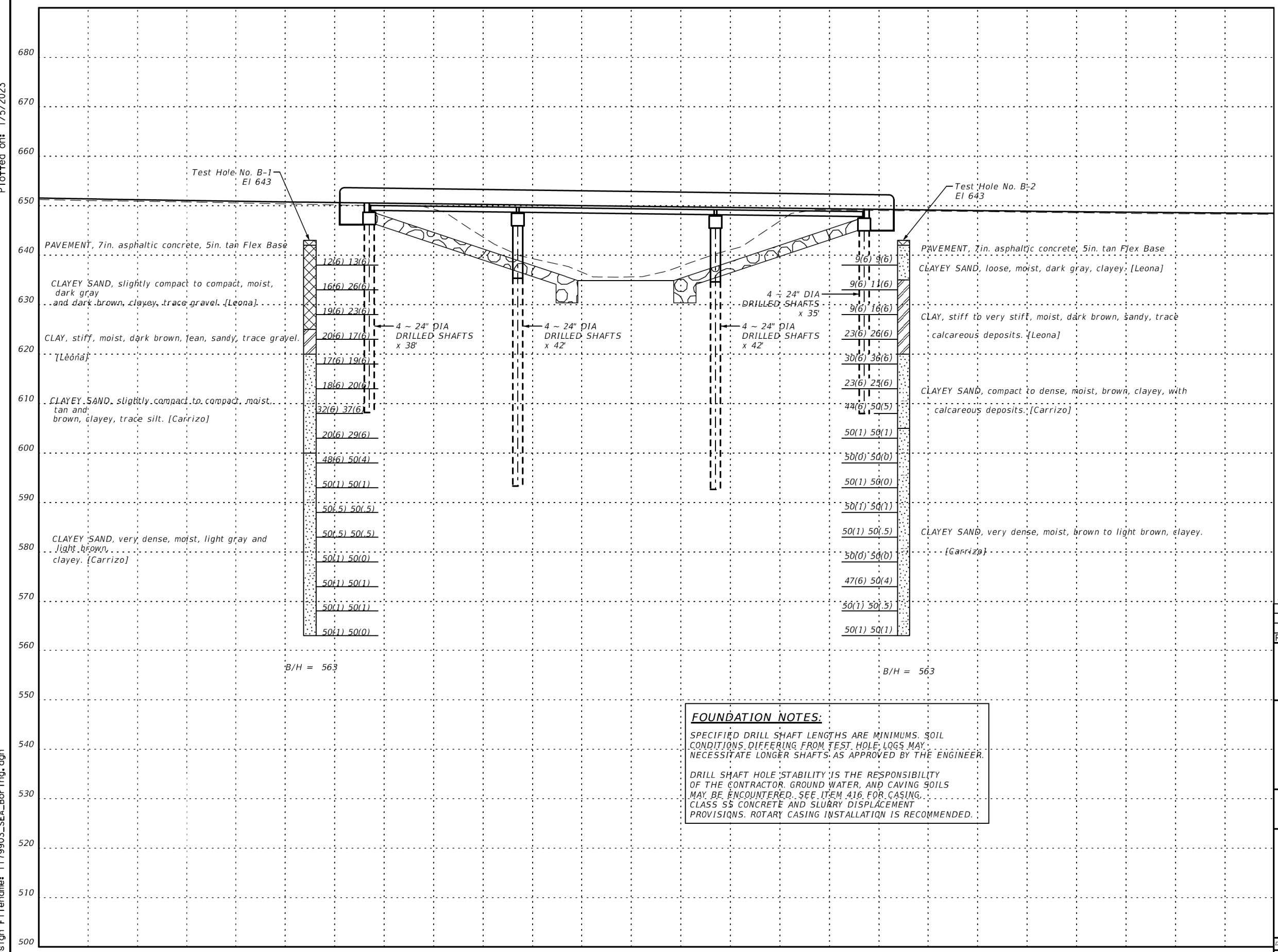
NBI NO. 15-163-0-2520-01-005
FM 2200 AT FRANCISCO PEREZ CREEK BRIDGE

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:
MAG	6	TEXAS	SEE TITLE SHEET	FM 2200
CHK:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:
FSB	SAT	MEDINA	2520	01
DWG:	JOB NO.:	SHEET NO.:		
EE	015	250		

Plotted on: 1/5/2023

Design Filename: 1179903_SEA_Bor Ing.dgn

SEE BRIDGE LAYOUT FOR VERTICAL CONTROL AND STRUCTURE DETAILS NOT SHOWN.



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TEST HOLE PROFILE

FM 2200 AT FRANCISCO PEREZ CREEK BRIDGE

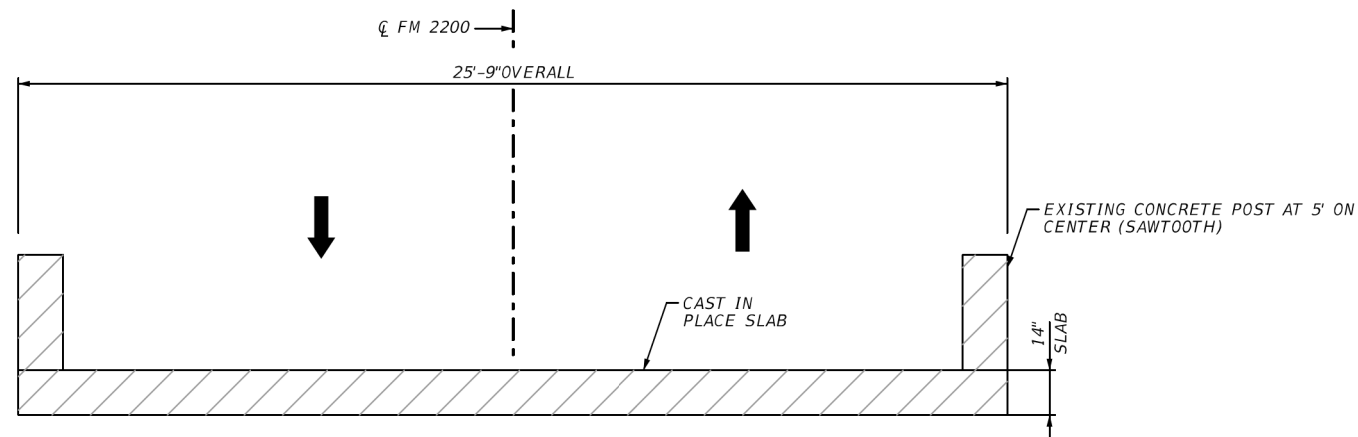
FOUNDATION NOTES:
SPECIFIED DRILL SHAFT LENGTHS ARE MINIMUMS. SOIL CONDITIONS DIFFERING FROM TEST HOLE LOGS MAY NECESSITATE LONGER SHAFTS, AS APPROVED BY THE ENGINEER.
DRILL SHAFT HOLE STABILITY IS THE RESPONSIBILITY OF THE CONTRACTOR. GROUND WATER, AND CAVING SOILS MAY BE ENCOUNTERED. SEE ITEM 416 FOR CASING, CLASS SS CONCRETE AND SLURRY DISPLACEMENT PROVISIONS. ROTARY CASING INSTALLATION IS RECOMMENDED.

DGN: MAG	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CHK DGN: FSB	6	TEXAS	SEE TITLE SHEET	FM 2200
DWG: EE	DIST.	COUNTY	CONT. NO.	SECT. NO.
CHK DWG: FSB	SAT	MEDINA	2520	01
			015	251

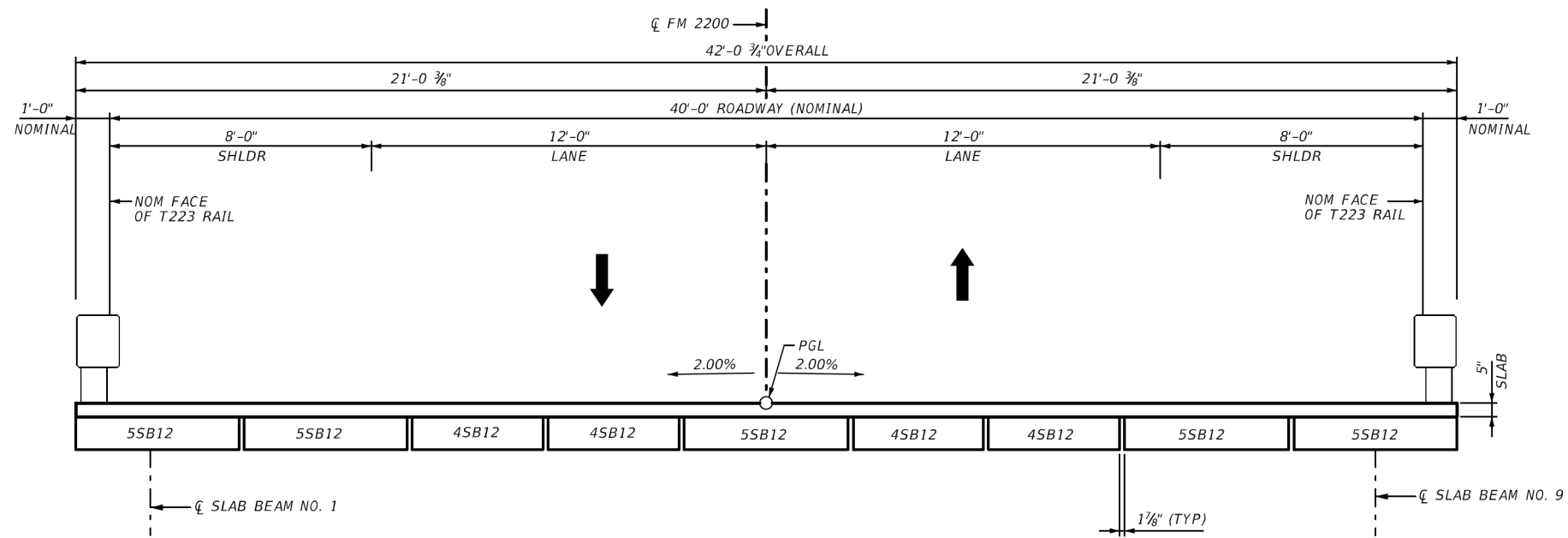
669+00

670+00

Plotted on: 1/5/2023



EXISTING TYPICAL SECTION
(TO BE REMOVED)



PROPOSED TYPICAL TRANSVERSE SECTION



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BRIDGE TYPICAL SECTION

FM 2200 AT FRANCISCO PEREZ CREEK BRIDGE

DGN:	MAG	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	FSB	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	EE	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
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Design Filename: 1179903_SEA_fyp.dgn

Plotted on: 2/7/2023

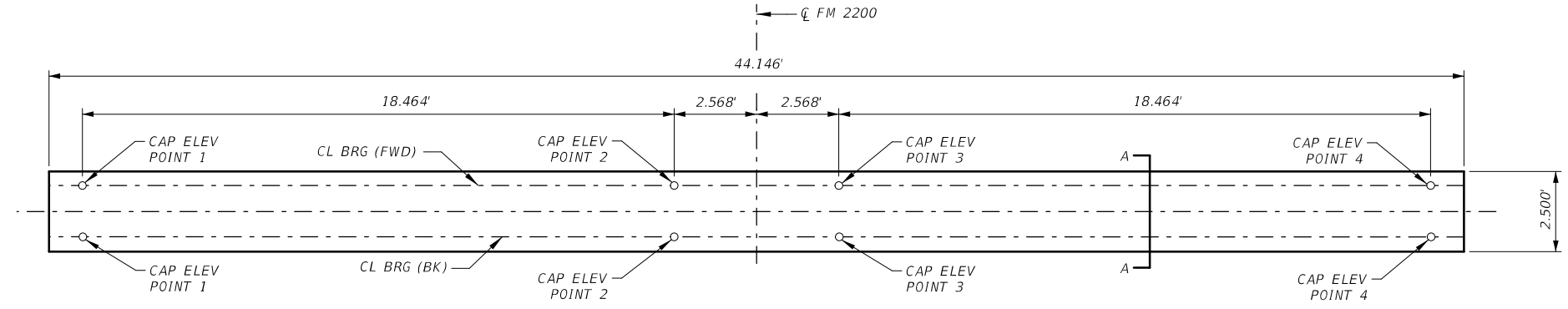
SUMMARY OF ESTIMATED QUANTITIES

BRIDGE ELEMENT	BASE BID													
	BID CODES	0400-6005	0416-6002	0420-6013	0420-6029	0420-6037	0422-6007	0422-6015	0425-6009	0425-6010	0432-6033	0450-6006	0454-6004	0496-6009
	BID ITEM DESCRIPTION	CEM STABIL BKFL	DRILL SHAFT (24 IN)	CL C CONC (ABUT) (CAP) (COLUMN)		REINF CONC SLAB (SLAB BEAM)	APPROACH SLAB	PRESTR CONC SLAB BEAM (4SB12) (5SB12)		RIPRAP STONE PROTECTION (27 IN)	RAIL (TY 2223)	ARMOR JOINT (SEALED)	REMOV STR (BRIDGE 0-99 FT LENGTH)	
	CY	LF	CY	CY	CY	SF	CY	LF	LF	CY	LF	LF	EA	
2 ~ ABUTMENTS	38	292	25.8				64.2			861				
2 ~ INTERIOR BENTS		336		20.8	9.8									
1 ~ 100.000' PRESTR CONC SLAB BEAM UNIT 1						4,207		394.00	492.50		224.0	76		
TOTAL	38	628	25.8	20.8	9.8	4,207	64.2	394.00	492.50	861	224.0	76	1	

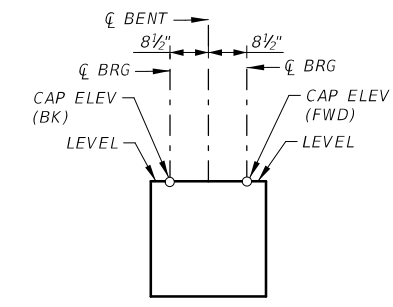
LOCATION	POINT 1	POINT 2	POINT 3	POINT 4
ABUT 1 (FWD)	648.445	648.814	648.814	648.445
BENT 2 (BK) (FWD)	648.086 648.005	648.455 648.374	648.455 648.374	648.086 648.005
BENT 3 (BK) (FWD)	647.520 647.565	647.889 647.933	647.889 647.933	647.520 647.565
ABUT 4 (BK)	647.205	647.574	647.574	647.205

① TOP OF CAP ELEVATIONS ARE BASED ON SECTION DEPTHS SHOWN ON SLAB BEAM UNIT SHEET.

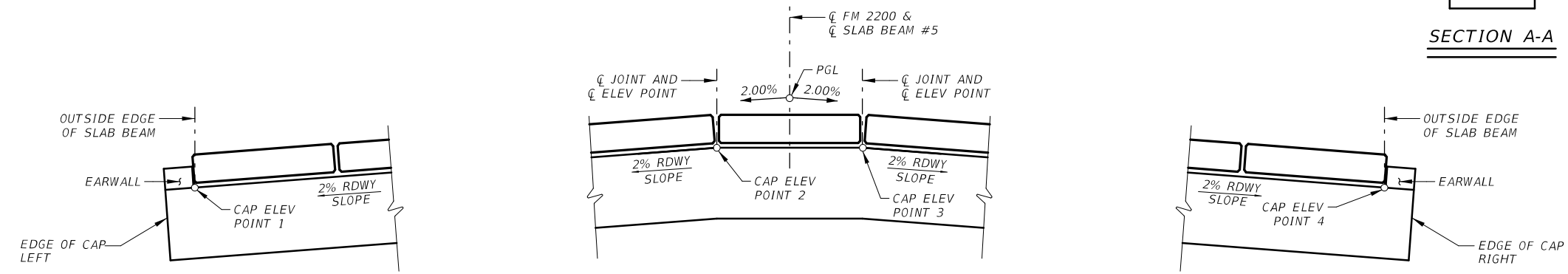
- ② REMOVAL OF APPURTENANCES, INCLUDING RIPRAP AND FLUMES, WILL BE SUBSIDIARY TO ITEM 496-BRIDGE REMOVAL.
- THIS ITEM MAY BE ALTERNATE BID AT THE QUANTITY SHOWN



PLAN - CAP ELEVATION POINTS
(LOOKING FORWARD STATION)



SECTION A-A



TRANSVERSE SECTION - CAP ELEVATION POINTS

2/7/2023

REV. NO.	DATE	DESCRIPTION	BY

SEA STRUCTURAL ENGINEERING ASSOCIATES
TEXAS REGISTERED ENGINEERING FIRM F-199

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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ESTIMATED QUANTITIES & CAP ELEVATIONS

FM 2200 AT FRANCISCO PEREZ CREEK BRIDGE

DGN: MAG	FED. RD. DIV. NO. 6	STATE TEXAS	FEDERAL AID PROJECT NO. SEE TITLE SHEET	HIGHWAY NO. FM 2200
CHK DGN: FSB	EE	DIST. SAT	COUNTY MEDINA	CONT. NO. 2520
			SECT. NO. 01	JOB NO. 015
				SHEET NO. 253

Design Filename: 1179903_SEA_EQ.dgn

Plotted on: 1/5/2023



GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2020, 9TH EDITION AND TxDOT BRIDGE DESIGN MANUAL (NOV 2021).

SEE STONE RIPRAP (SRR) STANDARD SHEET FOR RIPRAP ATTACHMENT DETAILS.

SEE RAILING STANDARDS FOR RAIL ANCHORAGE IN WINGWALLS.

FOR TOP OF CAP ELEVATIONS, AND DETAILS SEE ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEET.

SEE COMMON FOUNDATION DETAILS (FD) (MOD) STANDARD SHEET, FOR ALL FOUNDATION DETAILS AND NOTES NOT SHOWN.

SEE ARMOR JOINT DETAILS (AJ) SHEET FOR ALL JOINT DETAILS AND NOTES.

SEE BRIDGE LAYOUT FOR HEADER SLOPE AND FOUNDATION TYPE, SIZE AND LENGTH.

CALCULATED FOUNDATION LOAD = 55 TONS/SHAFT

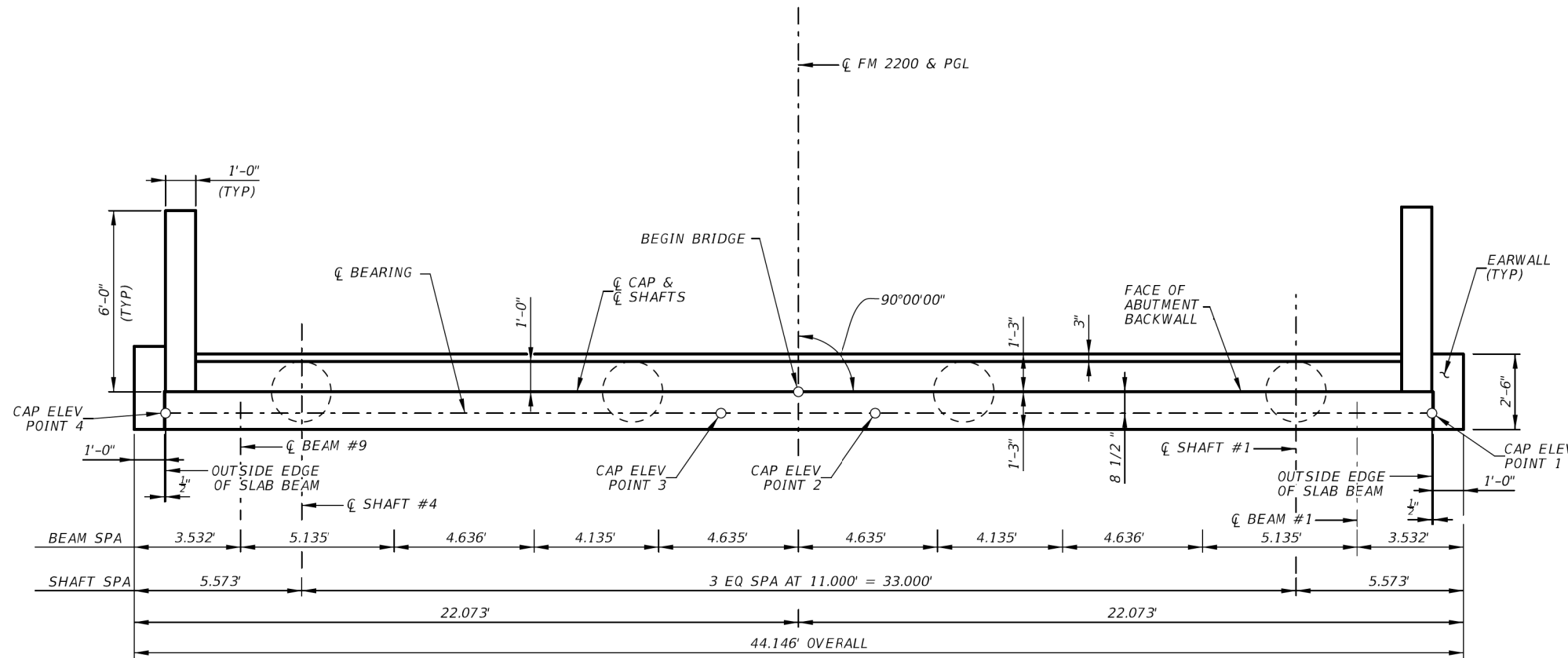
CHAMFER ALL EXPOSED EDGES $\frac{3}{4}$ " UNLESS NOTED OTHERWISE.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

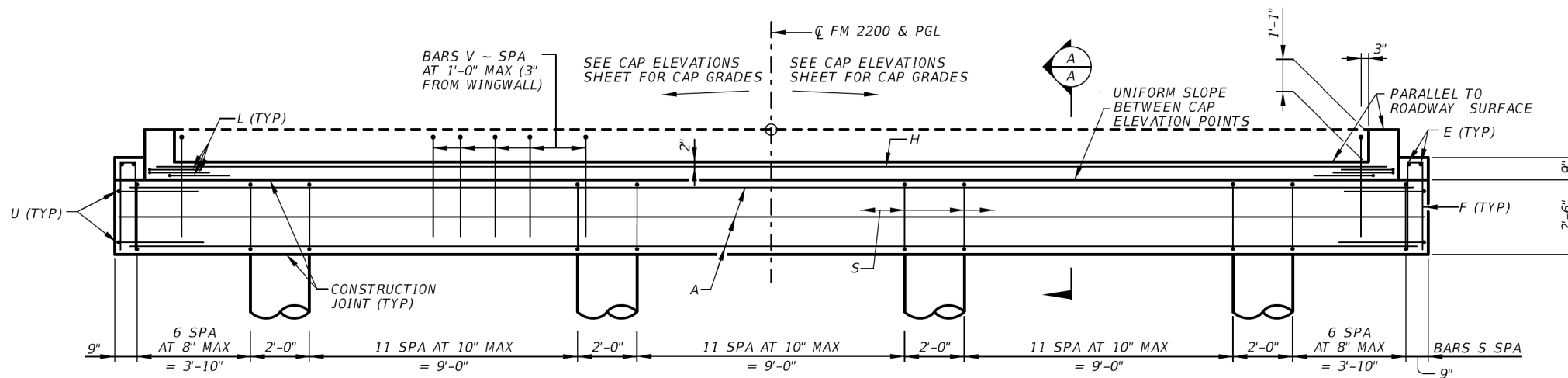
MATERIAL NOTES:

PROVIDE CLASS C CONCRETE ($f'_c = 3,600$ PSI).

PROVIDE GRADE 60 REINFORCING STEEL.



PLAN
(LOOKING BACK STATION)
FOR DIMENSIONS TO CAP ELEVATION POINTS, SEE ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEET.



ELEVATION

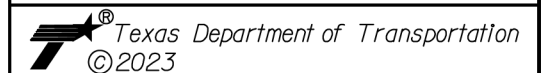


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REV. NO.	DATE	DESCRIPTION	BY



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ABUTMENT NO. 1

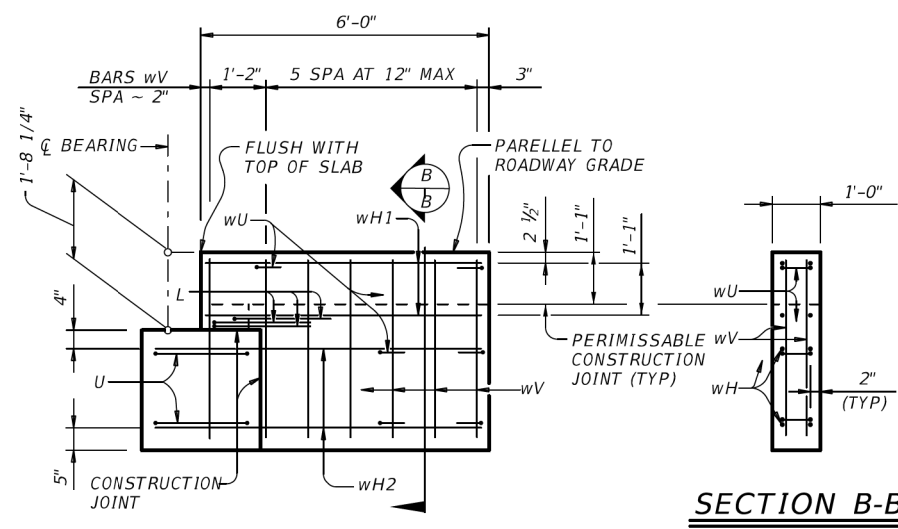
FM 2200 AT FRANCISCO PEREZ CREEK BRIDGE

SHEET 1 OF 2

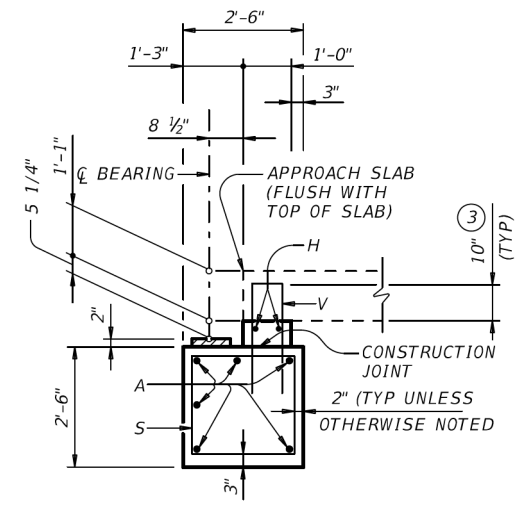
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
MAG	6	TEXAS	SEE TITLE SHEET	FM 2200		
CHK DGN:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
FSB	SAT	MEDINA	2520	01	015	254

Design Filename: 1179903_SEA-ABUT1.dgn

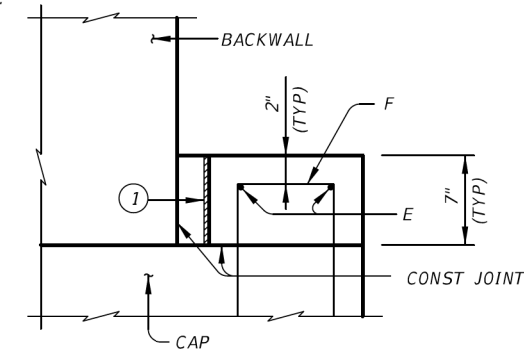
Plotted on: 1/5/2023



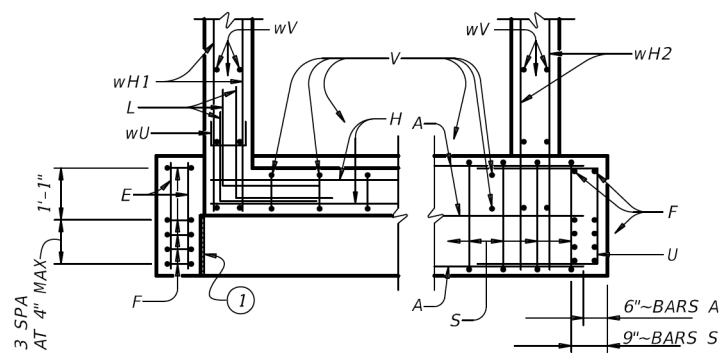
WINGWALL ELEVATION
(EARWALL NOT SHOWN FOR CLARITY.)



SECTION A-A
NOTE: AT CONTRACTOR'S OPTION, BACKWALL MAY BE CAST WITH APPROACH SLAB.



EARWALL ELEVATION DETAIL
(SLOPE TOP OF EARWALL AWAY FROM BEAMS)



BACKWALL CORNER DETAILS

TABLE OF ESTIMATED QUANTITIES				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	6	#11	43'-2"	1,376
E	4	#4	2'-2"	6
F	10	#4	6'-4"	42
H	2	#5	41'-9"	86
L	6	#6	4'-0"	36
S	50	#4	9'-4"	312
U	4	#6	7'-1"	43
V	43	#5	7'-4"	329
wH1	8	#6	5'-8"	68
wH2	8	#6	6'-11"	83
wU	12	#4	1'-8"	13
wV	28	#5	3'-10"	112
REINFORCING STEEL (4)			Lb	2,506
CLASS "C" CONCRETE (ABUT)			CY	12.9

(4) FOR CONTRACTORS INFORMATION ONLY.

NOTES:
1. FOR GENERAL AND MATERIAL NOTES, SEE ABUTMENT NO. 1 PLAN AND ELEVATION SHEETS.



HL 93 LOADING

REV. NO.	DATE	DESCRIPTION	BY



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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

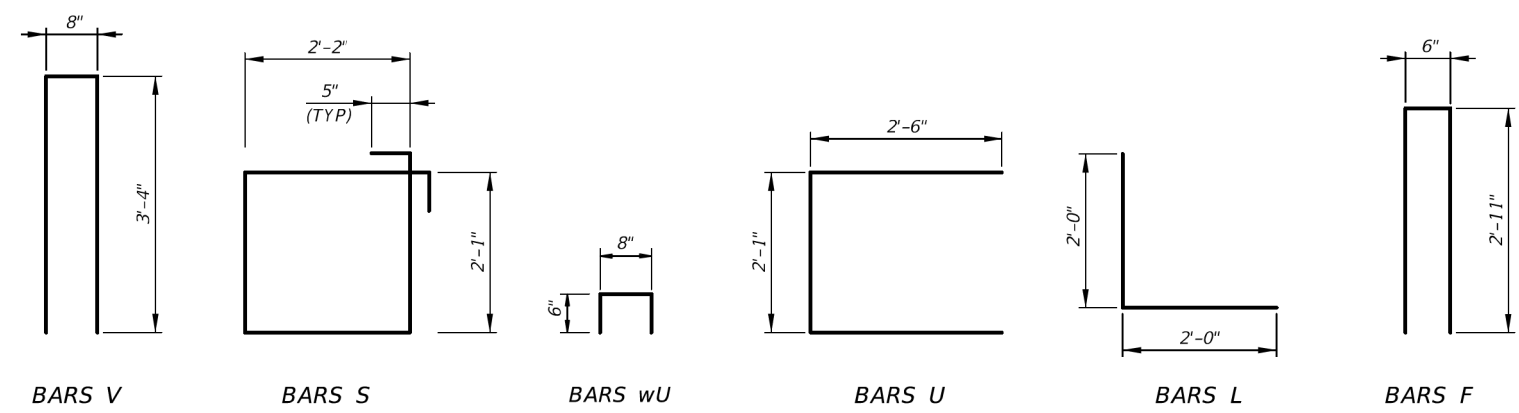


**ABUTMENT NO. 1
DETAILS**

FM 2200 AT FRANCISCO
PEREZ CREEK BRIDGE

SHEET 2 OF 2

- ① 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN SLAB BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM, FORM VERTICAL BETWEEN BOTTOM OF BOX AND TOP OF CAP. REMOVE FORMING MATERIAL AFTER CASTING EARWALL.
- ② CAST EARWALL IMMEDIATELY AFTER BEAMS ARE ERECTED IN FINAL POSITION.
- ③ INCREASE TO MAINTAIN 3" FROM FINISHED GRADE.



Design File name: 1179903_SEA_ABUT2.dgn

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
MAG	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
EE	SAT	MEDINA	2520	01	015	255

Plotted on: 1/5/2023



GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2020, 9TH EDITION AND TxDOT BRIDGE DESIGN MANUAL (NOV 2021).

SEE STONE RIPRAP (SRR) STANDARD SHEET FOR RIPRAP ATTACHMENT DETAILS.

SEE RAILING STANDARDS FOR RAIL ANCHORAGE IN WINGWALLS.

FOR TOP OF CAP ELEVATIONS, AND DETAILS SEE ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEET.

SEE COMMON FOUNDATION DETAILS (FD) (MOD) STANDARD SHEET, FOR ALL FOUNDATION DETAILS AND NOTES NOT SHOWN.

SEE ARMOR JOINT DETAILS (AJ) SHEET FOR ALL JOINT DETAILS AND NOTES.

SEE BRIDGE LAYOUT FOR HEADER SLOPE AND FOUNDATION TYPE, SIZE AND LENGTH.

CALCULATED FOUNDATION LOAD = 55 TONS/SHAFT

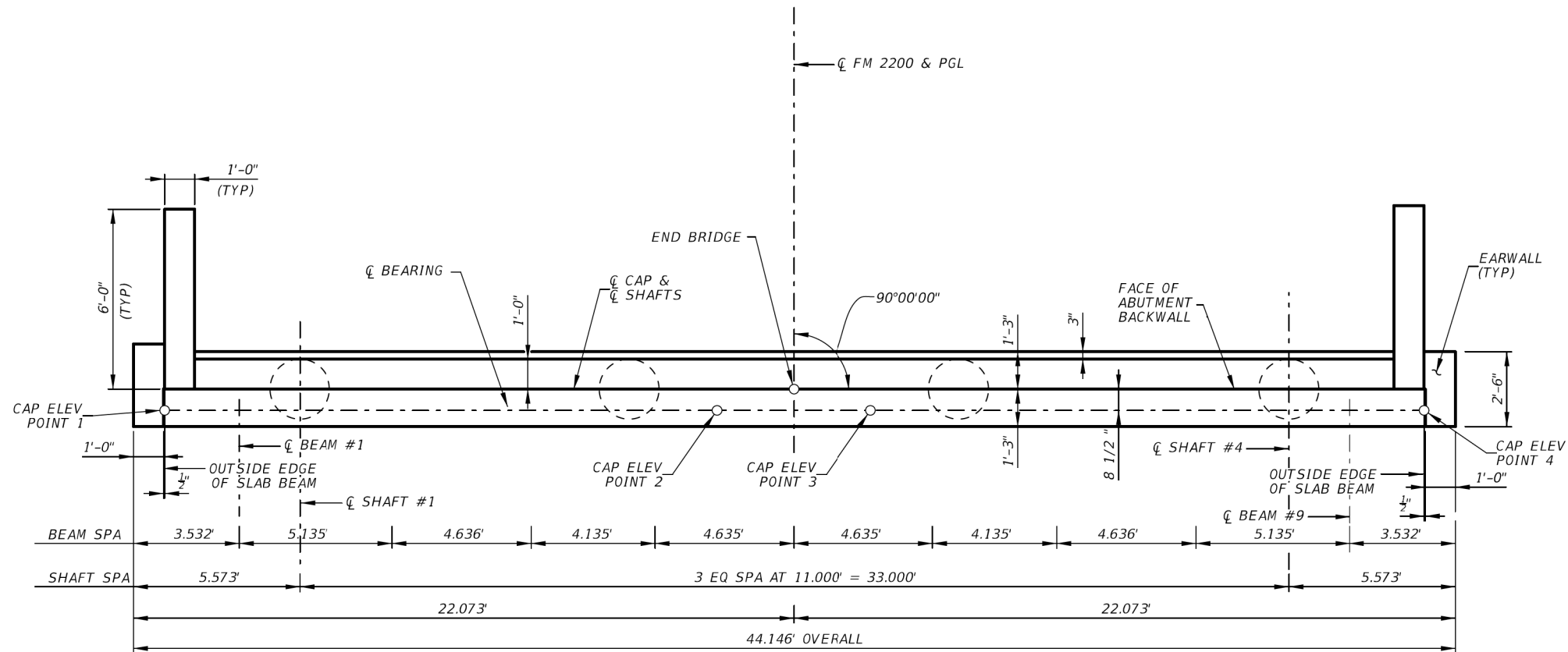
CHAMFER ALL EXPOSED EDGES 3/4" UNLESS NOTED OTHERWISE.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

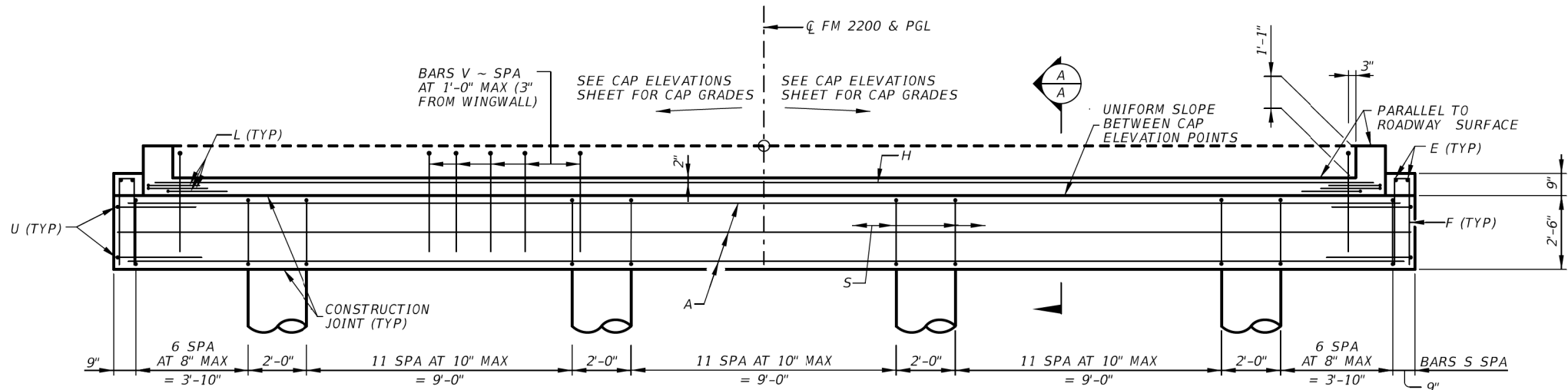
MATERIAL NOTES:

PROVIDE CLASS C CONCRETE (f'c = 3,600 PSI).

PROVIDE GRADE 60 REINFORCING STEEL.



PLAN
(LOOKING FORWARD STATION)
FOR DIMENSIONS TO CAP ELEVATION POINTS, SEE ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEET.



ELEVATION



HL 93 LOADING

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



ABUTMENT NO. 4

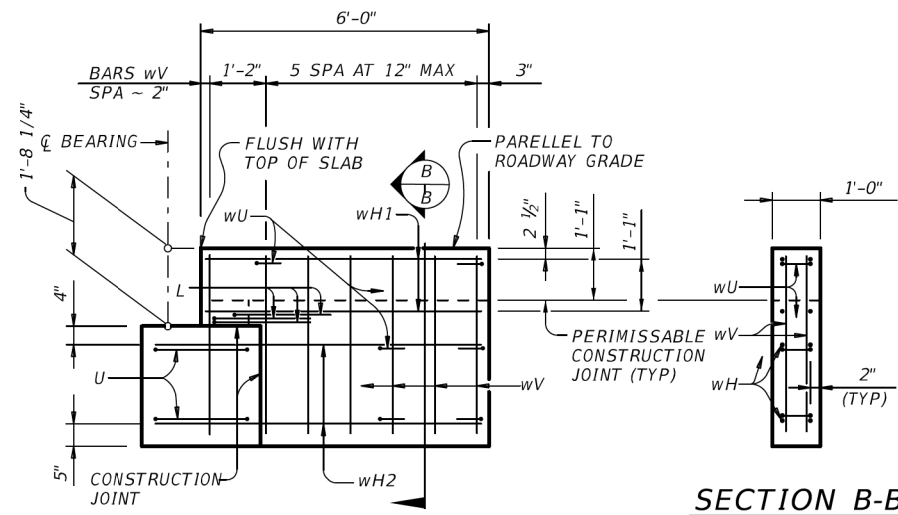
FM 2200 AT FRANCISCO PEREZ CREEK BRIDGE

SHEET 1 OF 2

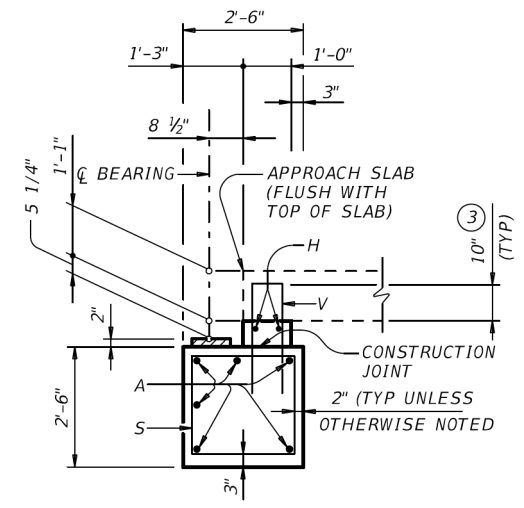
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
MAG	6	TEXAS	SEE TITLE SHEET	FM 2200		
CHK DGN:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
FSB	SAT	MEDINA	2520	01	015	256

Design Filename: 1179903_SEA_ABUT3.dgn

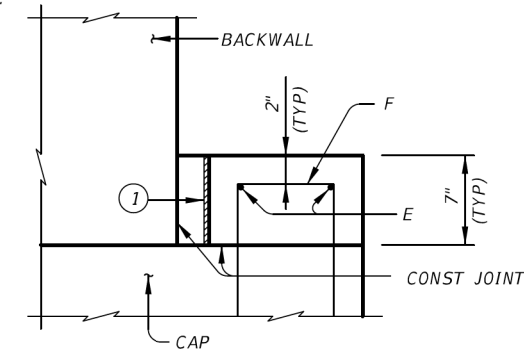
Plotted on: 1/5/2023



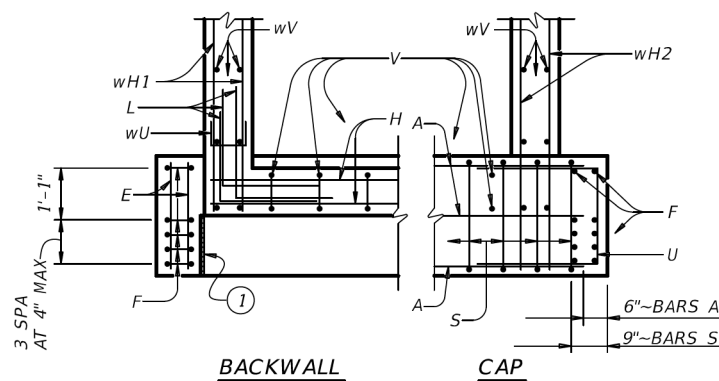
WINGWALL ELEVATION
(EARWALL NOT SHOWN FOR CLARITY.)



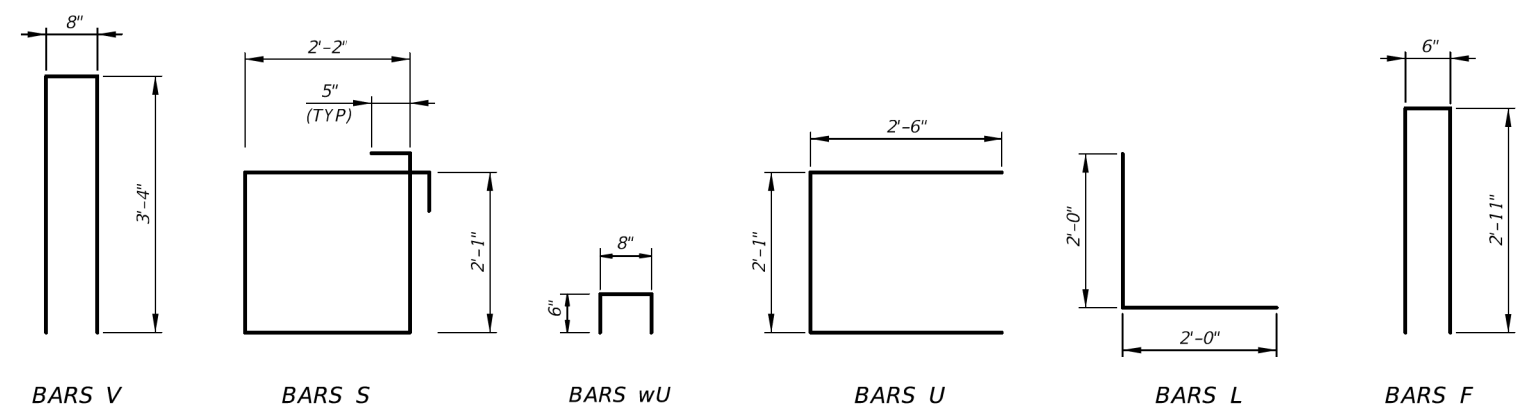
SECTION A-A
NOTE: AT CONTRACTOR'S OPTION, BACKWALL MAY BE CAST WITH APPROACH SLAB.



EARWALL ELEVATION DETAIL ①
(SLOPE TOP OF EARWALL AWAY FROM BEAMS)



CORNER DETAILS



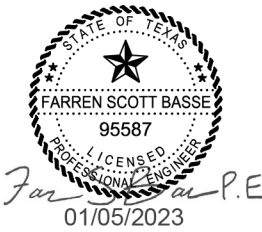
- ① 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN BOX BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM, FORM VERTICAL BETWEEN BOTTOM OF BOX AND TOP OF CAP. REMOVE FORMING MATERIAL AFTER CASTING EARWALL.
- ② CAST EARWALL IMMEDIATELY AFTER BEAMS ARE ERECTED IN FINAL POSITION.
- ③ INCREASE TO MAINTAIN 3" FROM FINISHED GRADE.

TABLE OF ESTIMATED QUANTITIES

BAR	NO.	SIZE	LENGTH	WEIGHT
A	6	#11	43'-2"	1,376
E	4	#4	2'-2"	6
F	10	#4	6'-4"	42
H	2	#5	41'-9"	86
L	6	#6	4'-0"	36
S	50	#4	9'-4"	312
U	4	#6	7'-1"	43
V	43	#5	7'-4"	329
wH1	8	#6	5'-8"	68
wH2	8	#6	6'-11"	83
wU	12	#4	1'-8"	13
wV	28	#5	3'-10"	112
REINFORCING STEEL (4)				Lb 2,506
CLASS "C" CONCRETE (ABUT)				CY 12.9

④ FOR CONTRACTORS INFORMATION ONLY.

NOTES:
1. FOR GENERAL AND MATERIAL NOTES, SEE ABUTMENT NO. 4 PLAN AND ELEVATION SHEETS.



HL 93 LOADING

REV. NO.	DATE	DESCRIPTION	BY



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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



**ABUTMENT NO. 4
DETAILS**

FM 2200 AT FRANCISCO
PEREZ CREEK BRIDGE

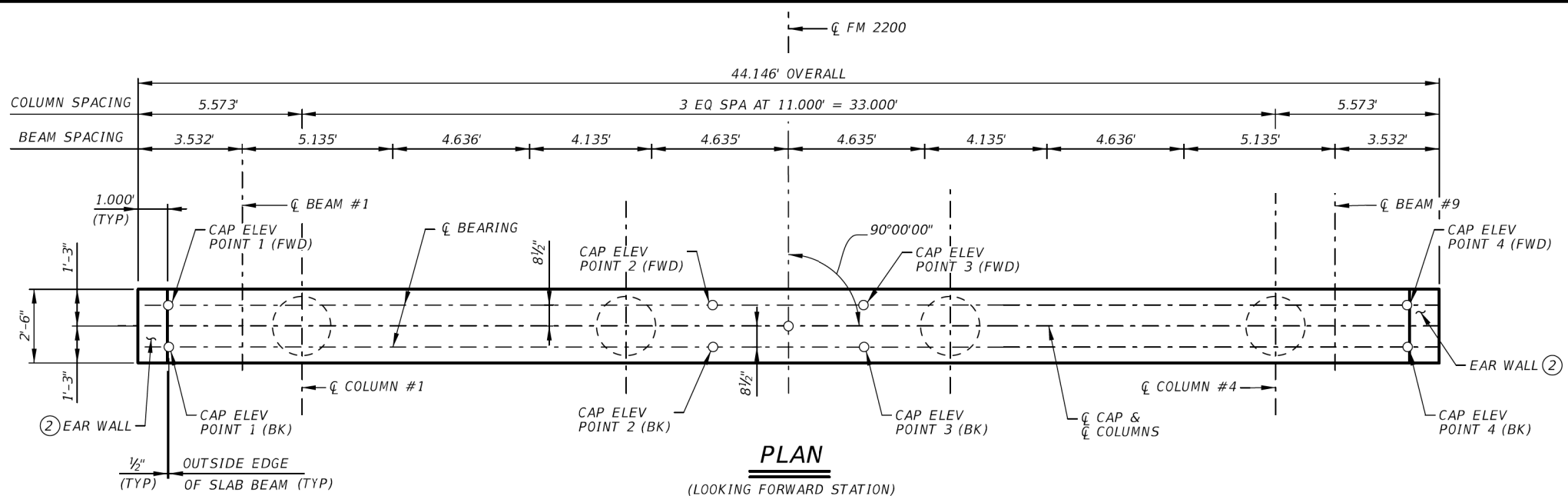
SHEET 2 OF 2

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
MAG	6	TEXAS	SEE TITLE SHEET	FM 2200		
CHK DGN:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
FSB	SAT	MEDINA	2520	01	015	257

Design File name: 1179903_SEA_ABUT4.dgn

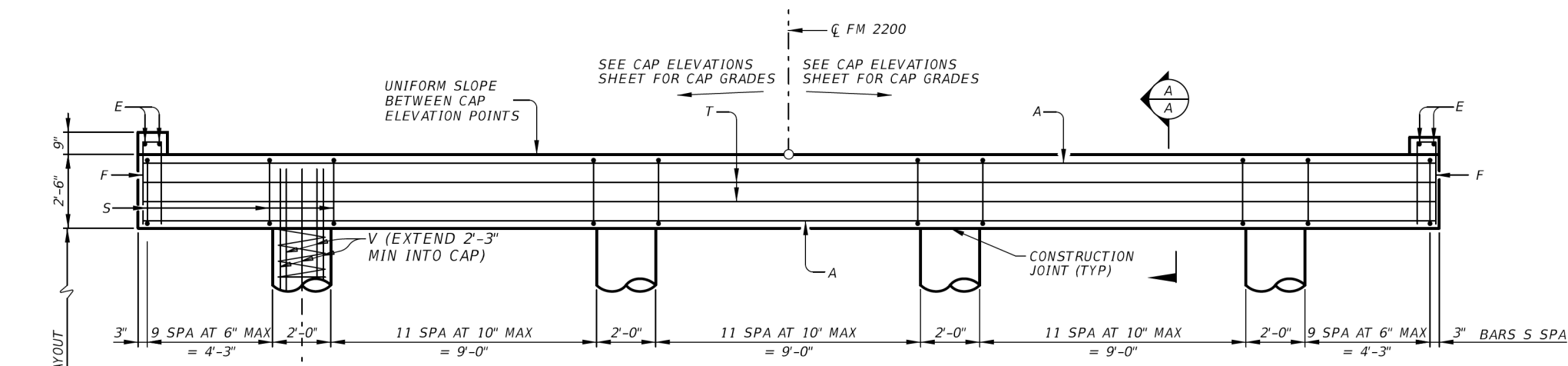
Plotted on: 1/5/2023

Design File name: 1179903_SEA_BENT.dgn

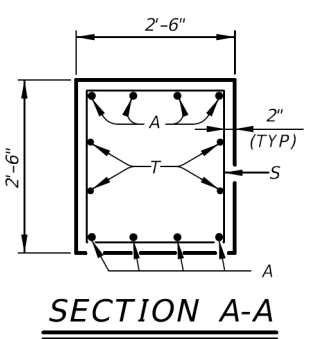


PLAN

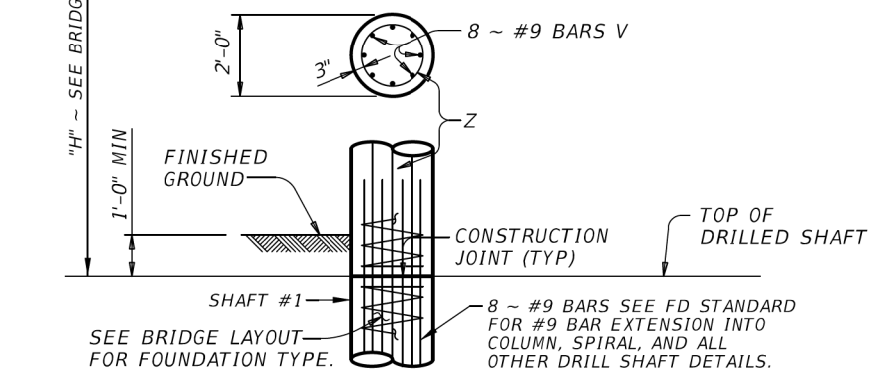
(LOOKING FORWARD STATION)
FOR DIMENSIONS TO CAP ELEVATION POINTS, SEE ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEET.



ELEVATION



SECTION A-A



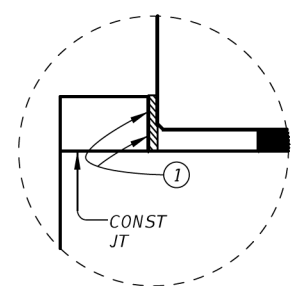
BARS S

BARS F

BARS Z

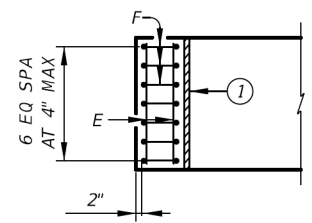
BENT	"H"	CLASS "C" CONC (CY)	BARS V 32 ~ #7	BARS Z 4 ~ #3
NO.	FT.		LENGTH ⁽⁵⁾ WEIGHT ⁽³⁾⁽⁶⁾	LENGTH ⁽⁵⁾ WEIGHT ⁽³⁾⁽⁶⁾
2	10	4.7	12'-3" 801	109'-2" 164
3	11	5.1	13'-3" 867	118'-8" 178

- (5) ADJUST BARS V LENGTH BY 1'-0" AND BARS Z LENGTH BY 9'-6" FOR EACH LINEAR FOOT OF VARIATION IN "H" VALUE.
- (6) ADJUST REINFORCING STEEL TOTAL BY 80 LBS AND CLASS "C" CONC. BY 0.47 CY FOR EACH LINEAR FOOT OF VARIATION IN "H" VALUE.



EARWALL ELEVATION

- (1) 1/2" PREFORMED BITUMINOUS FIBER MATERIAL BETWEEN SLAB BEAM AND EARWALL. BOND TO BEAM WITH AN APPROVED ADHESIVE. INSIDE FACE OF EARWALL TO BE CAST WITH VERTICAL SIDE OF BEAM, FORM VERTICAL BETWEEN BOTTOM OF SLAB BEAM AND TOP OF CAP. REMOVE FORMING MATERIAL AFTER CASTING EARWALL.
- (2) CAST EARWALL IMMEDIATELY AFTER BEAMS ARE ERECTED IN FINAL POSITION.



EARWALL PLAN

TABLE OF ESTIMATED QUANTITIES (4)

BAR	NO.	SIZE	LENGTH	WEIGHT	
A	8	#11	43'-9"	1,860	
E	4	#4	2'-2"	6	
F	14	#4	6'-6"	61	
S	56	#5	9'-8"	565	
T	4	#5	43'-9"	183	
REINFORCING STEEL (3)				Lb	2,675
CLASS "C" CONCRETE (BENT)				CY	10.4

- (3) FOR CONTRACTOR'S INFORMATION ONLY.
- (4) QUANTITIES SHOWN ARE FOR ONE BENT CAP ONLY.

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2020, 9TH EDITION AND TxDOT BRIDGE DESIGN MANUEAL (NOV 2021).

SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES NOT SHOWN.

SEE BRIDGE LAYOUT FOR FOUNDATION TYPE, SIZE AND LENGTH.

FOR TOP OF CAP ELEVATIONS, AND DETAILS SEE ESTIMATED QUANTITIES AND CAP ELEVATIONS SHEET.

CALCULATED FOUNDATION LOAD = 92 TONS/SHAFT

CHAMFER ALL EXPOSED EDGES 3/4" UNLESS NOTED OTHERWISE.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

MATERIAL NOTES:

PROVIDE CLASS C CONCRETE (f'c = 3,600 PSI).
PROVIDE GRADE 60 REINFORCING STEEL.



HL 93 LOADING

REV. NO.	DATE	DESCRIPTION	BY



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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



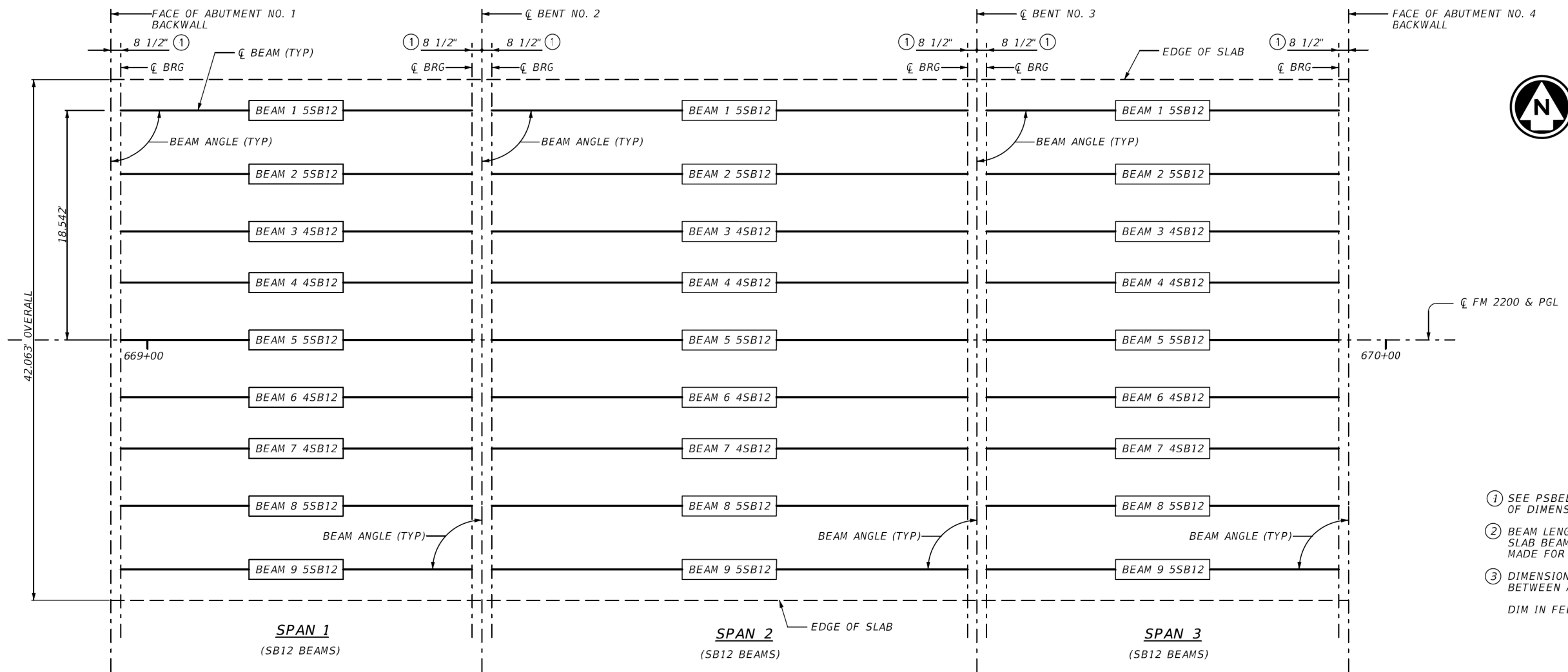
INTERIOR BENTS 2-3

FM 2200 AT FRANCISCO PEREZ CREEK BRIDGE

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
MAG	6	TEXAS	SEE TITLE SHEET	FM 2200		
CHK DGN:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
FSB	SAT	MEDINA	2520	01	015	258

Plotted on: 1/5/2023

Design Filename: 1179903_SEA_FRM1.dgn



- ① SEE PSBEB STANDARD FOR ORIENTATION OF DIMENSIONS.
- ② BEAM LENGTHS SHOWN ARE BOTTOM SLAB BEAM LENGTHS WITH ADJUSTMENTS MADE FOR BEAM SLOPE.
- ③ DIMENSIONS SHOWN REPRESENT SPACING BETWEEN ACTUAL BEAM CENTERLINES. DIM IN FEET UNLESS NOTED OTHERWISE.

BEAM LAYOUT

BENT REPORT

BEAM REPORT

ABUTMENT NO. 1 (S 0° 33' 55" E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 18.542 L

SPAN	BEAM	BEAM SPAC. (3)		BEAM ANGLE		
		(FACE OF BKWL)		D	M	S
SPAN 1	BEAM 1	0.000		90	00	00
	BEAM 2	5.135		90	00	00
	BEAM 3	4.636		90	00	00
	BEAM 4	4.135		90	00	00
	BEAM 5	4.635		90	00	00
	BEAM 6	4.635		90	00	00
	BEAM 7	4.135		90	00	00
	BEAM 8	4.636		90	00	00
	BEAM 9	5.135		90	00	00
TOTAL		37.083				

BENT NO. 2 (S 0° 33' 55" E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 18.542 L

SPAN	BEAM	BEAM SPAC. (3)		BEAM ANGLE		
		(C.L. BENT)		D	M	S
SPAN 2	BEAM 1	0.000		90	00	00
	BEAM 2	5.135		90	00	00
	BEAM 3	4.636		90	00	00
	BEAM 4	4.135		90	00	00
	BEAM 5	4.635		90	00	00
	BEAM 6	4.635		90	00	00
	BEAM 7	4.135		90	00	00
	BEAM 8	4.636		90	00	00
	BEAM 9	5.135		90	00	00
TOTAL		37.083				

BENT NO. 3 (S 0° 33' 55" E)
DISTANCE BETWEEN STATION LINE AND BEAM 1, 18.542 L

SPAN	BEAM	BEAM SPAC. (3)		BEAM ANGLE		
		(C.L. BENT)		D	M	S
SPAN 3	BEAM 1	0.000		90	00	00
	BEAM 2	5.135		90	00	00
	BEAM 3	4.636		90	00	00
	BEAM 4	4.135		90	00	00
	BEAM 5	4.635		90	00	00
	BEAM 6	4.635		90	00	00
	BEAM 7	4.135		90	00	00
	BEAM 8	4.636		90	00	00
	BEAM 9	5.135		90	00	00
TOTAL		37.083				

BEAM REPORT, SPAN 1

BEAM	HORIZONTAL DISTANCE		TRUE DISTANCE	BEAM
	C-C BENT	C-C BRG.		
BEAM 1	30.000	28.583	29.50	-0.0126
BEAM 2	30.000	28.583	29.50	-0.0126
BEAM 3	30.000	28.583	29.50	-0.0126
BEAM 4	30.000	28.583	29.50	-0.0126
BEAM 5	30.000	28.583	29.50	-0.0126
BEAM 6	30.000	28.583	29.50	-0.0126
BEAM 7	30.000	28.583	29.50	-0.0126
BEAM 8	30.000	28.583	29.50	-0.0126
BEAM 9	30.000	28.583	29.50	-0.0126

BEAM REPORT, SPAN 2

BEAM	HORIZONTAL DISTANCE		TRUE DISTANCE	BEAM
	C-C BENT	C-C BRG.		
BEAM 1	40.000	38.583	39.50	-0.0126
BEAM 2	40.000	38.583	39.50	-0.0126
BEAM 3	40.000	38.583	39.50	-0.0126
BEAM 4	40.000	38.583	39.50	-0.0126
BEAM 5	40.000	38.583	39.50	-0.0126
BEAM 6	40.000	38.583	39.50	-0.0126
BEAM 7	40.000	38.583	39.50	-0.0126
BEAM 8	40.000	38.583	39.50	-0.0126
BEAM 9	40.000	38.583	39.50	-0.0126

BEAM REPORT, SPAN 3

BEAM	HORIZONTAL DISTANCE		TRUE DISTANCE	BEAM
	C-C BENT	C-C BRG.		
BEAM 1	30.000	28.583	29.50	-0.0126
BEAM 2	30.000	28.583	29.50	-0.0126
BEAM 3	30.000	28.583	29.50	-0.0126
BEAM 4	30.000	28.583	29.50	-0.0126
BEAM 5	30.000	28.583	29.50	-0.0126
BEAM 6	30.000	28.583	29.50	-0.0126
BEAM 7	30.000	28.583	29.50	-0.0126
BEAM 8	30.000	28.583	29.50	-0.0126
BEAM 9	30.000	28.583	29.50	-0.0126



HL 93 LOADING

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



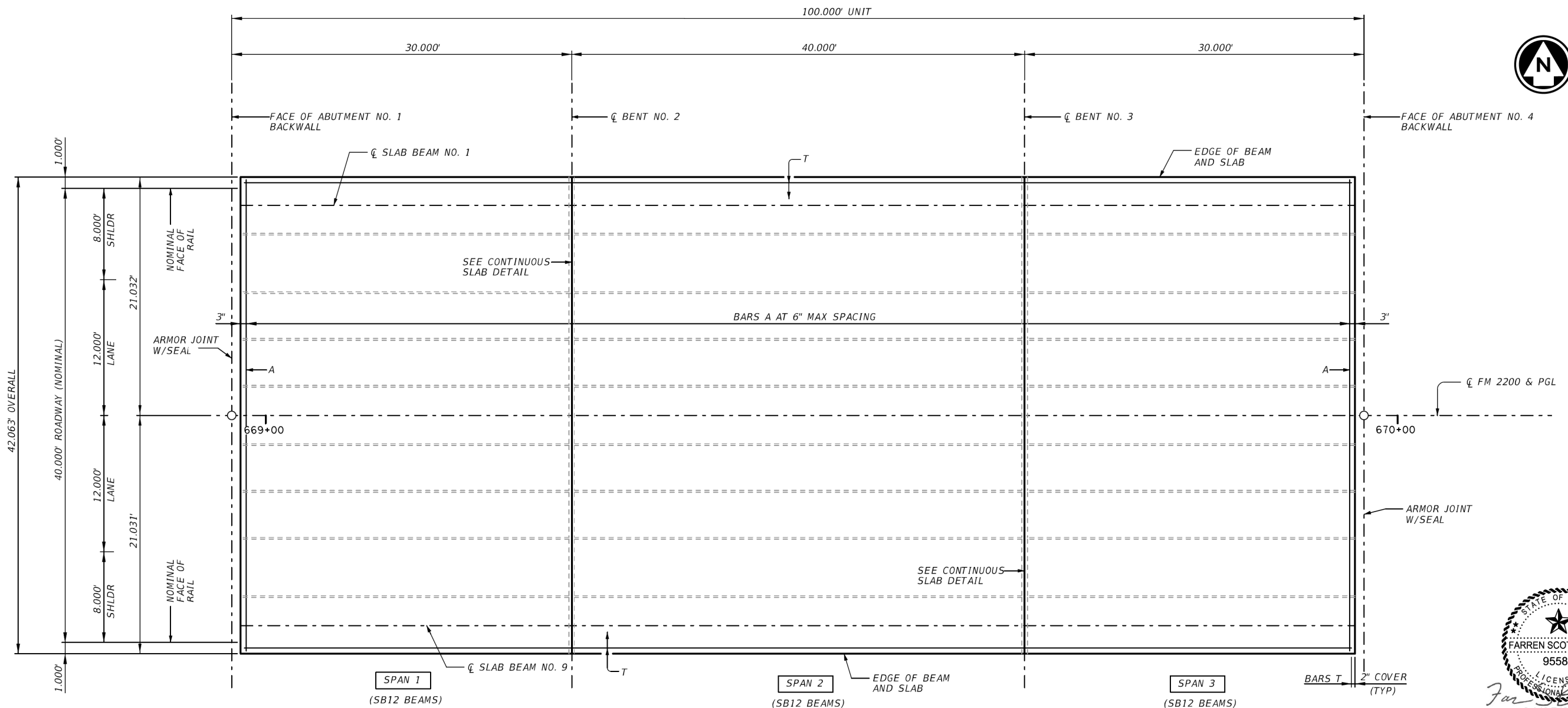
FRAMING PLAN

FM 2200 AT FRANCISCO PEREZ CREEK BRIDGE

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.			
MAG	6	TEXAS	SEE TITLE SHEET	FM 2200			
CHK DGN:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.	
FSB	EE	SAT	MEDINA	2520	01	015	259

Plotted on: 1/5/2023

Design File name: 1179903_SEA_PUG1.dgn



PLAN

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 2020, 9TH EDITION AND TxDOT BRIDGE DESIGN MANUAL (NOV 2021).

SEE SLAB BEAM RAIL ANCHORAGE DETAILS (PSBRA) STANDARD SHEET FOR RAIL ANCHORAGE DETAILS.

CHAMFER ALL EXPOSED EDGES 3/4" UNLESS NOTED OTHERWISE.

IT IS RECOMMENDED, WITH CROWN SLOPE, TO ERECT BEAMS ADJACENT TO CROWN POINT FIRST.

SEE ARMOR JOINT DETAILS (AJ) SHEET FOR ALL JOINT DETAILS AND NOTES.

COVER DIMENSION ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

MATERIAL NOTES:

PROVIDE CLASS 5 CONCRETE (F'C = 4,000 PSI)

PROVIDE GRADE 60 REINFORCING STEEL

PROVIDE BAR LAPS, WHERE REQUIRED, AS FOLLOWS:

UNCOATED-#4 = 1'-7"
#5 = 2'-0"

DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY SUBSTITUTED FOR BARS A OR T UNLESS NOTED OTHERWISE.

BAR TABLE

BAR	SIZE
A	#5
T	#4



HL 93 LOADING

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



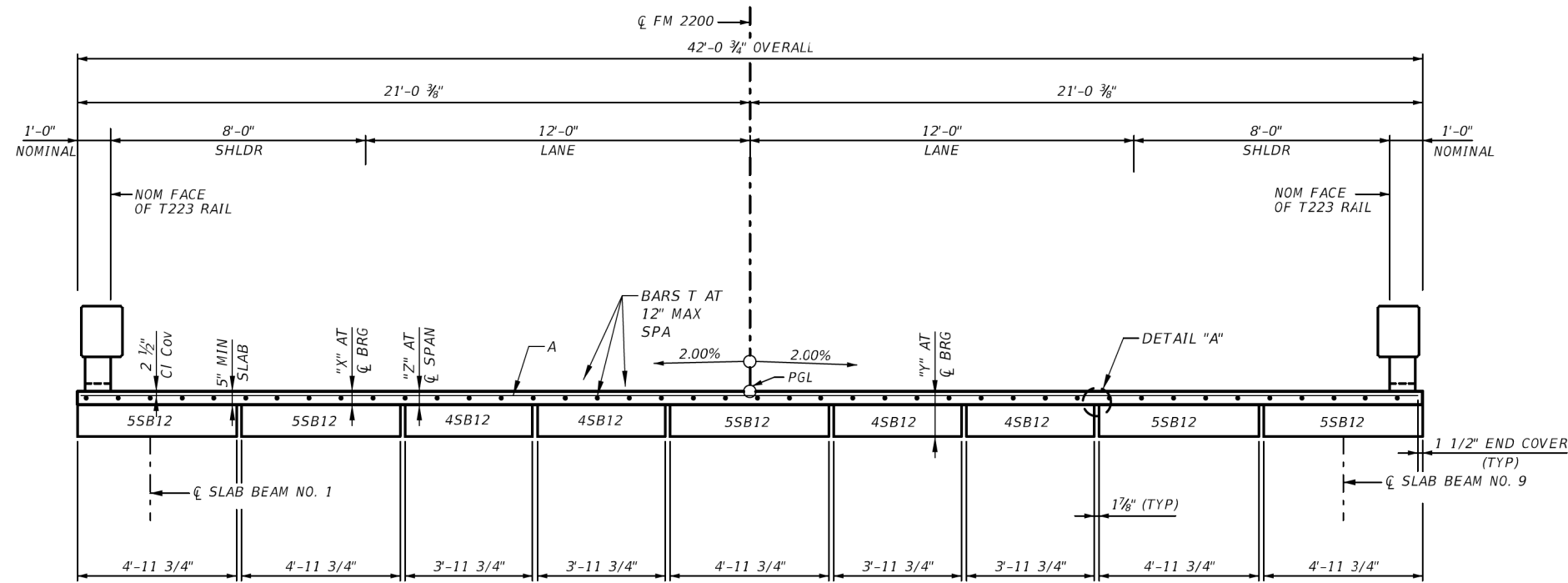
**100.00' PRESTR CONC
SLAB BEAM UNIT
(SPANS 1-3)**

FM 2200 AT FRANCISCO
PEREZ CREEK BRIDGE

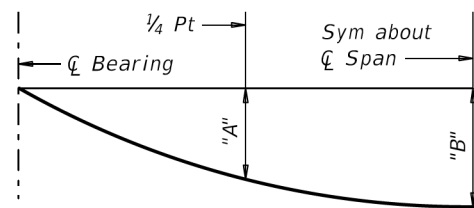
SHEET 1 OF 2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
MAG	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
EE	SAT	MEDINA	2520	01	015	260

Plotted on: 1/5/2023



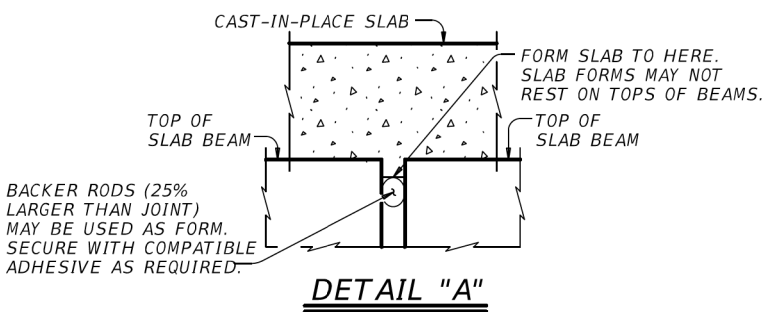
TYPICAL TRANSVERSE SECTION



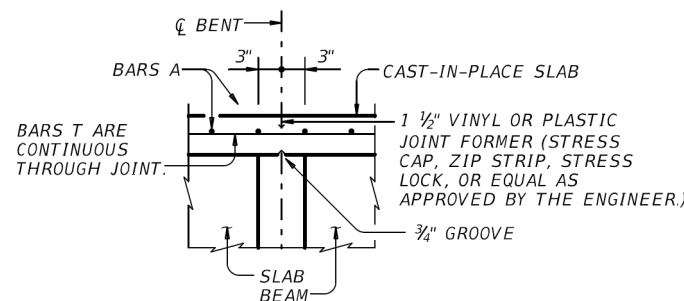
DEAD LOAD DEFLECTION DIAGRAM

NOTE: Deflections shown are due to concrete slab only ($E_c = 5,000$ ksi). Calculated deflections shown are theoretical and actual dimensions may vary. Adjust based on field verification.

SPAN NO.	BEAM NO.	DEAD LOAD DEFLECTION (FT)		SECTION DEPTHS	
		"A"	"B"	"X"	"Y"
1 & 3	1 & 9	0.007	0.010	6 1/4"	1'-6 1/4"
1 & 3	2,5, & 8	0.008	0.011	6 1/4"	1'-6 1/4"
1 & 3	3,4,6, & 7	0.008	0.011	6 1/4"	1'-6 1/4"
2	1 & 9	0.024	0.034	7"	1'-7"
2	2,5, & 8	0.024	0.034	7"	1'-7"
2	3,4,6, & 7	0.023	0.033	7"	1'-7"



DETAIL "A"



CONTINUOUS SLAB DETAIL

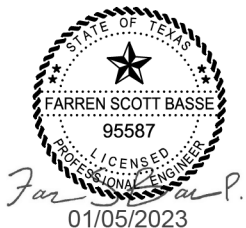
TABLE OF ESTIMATED QUANTITIES

SPAN	REINF CONC SLAB (SLAB BEAM)	PRESTR CONCRETE SLAB BEAM (TY 4SB12) (3)	PRESTR CONCRETE SLAB BEAM (TY 5SB12) (3)	TOTAL REINF STEEL (4) (5)
NO.	SF	LF	LF	LB
1	1,262	118.0	147.5	3,534
2	1,683	158.0	197.5	4,712
3	1,262	118.0	147.5	3,534

(3) LENGTH SHOWN IS BOTTOM OF BEAM FLANGE LENGTH WITH ADJUSTMENTS MADE FOR BEAM SLOPE. SEE BEAM LAYOUT FOR BEAM LENGTH.

(4) FOR CONTRACTORS INFORMATION ONLY.

(5) REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.8 LBS/SF.

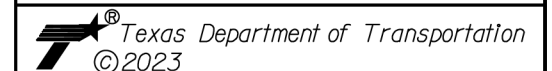


HL 93 LOADING

REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



100.00' PRESTR CONC
SLAB BEAM UNIT
(SPANS 1-3)

FM 2200 AT FRANCISCO
PEREZ CREEK BRIDGE

SHEET 2 OF 2

DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
MAG	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
FSB	SAT	MEDINA	2520	01	015	261

Design File name: 1179903_SEA_PUG2.dgn

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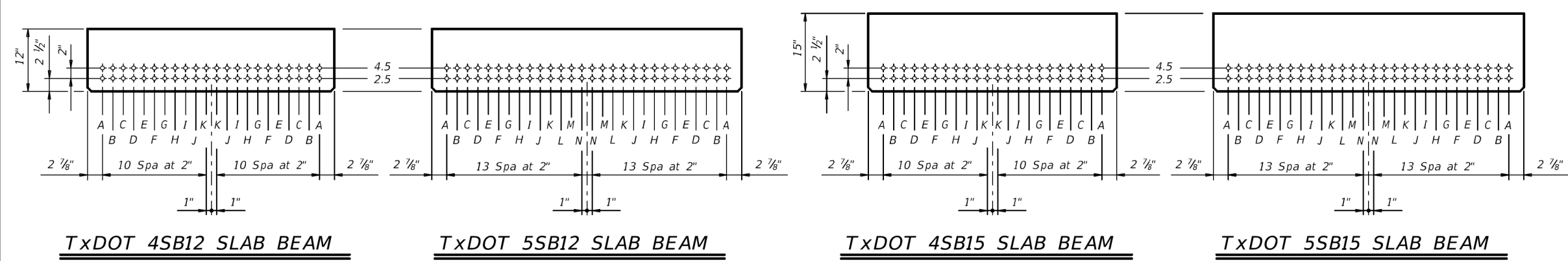
STRUCTURE	DESIGNED BEAMS (STRAIGHT STRANDS)															OPTIONAL DESIGN					LOAD RATING FACTORS			NON-STANDARD STRAND PATTERNS						
	SPAN NO.	BEAM NO.	BEAM TYPE	PRESTRESSING STRANDS					DEBONDED STRANDS PER ROW					CONCRETE		DESIGN LOAD COMP STRESS (TOP ϵ) (SERVICE I) fct (ksi)	DESIGN LOAD TENSILE STRESS (BOTT ϵ) (SERVICE III) fcb (ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR		STRENGTH I SERVICE III			PATTERN	STRAND ARRANGEMENT AT ϵ OF BEAM					
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" \bar{c} (in)	"e" END (in)	TOT NO. DEB	DIST FROM BOTTOM (in)	NO. OF STRANDS		NUMBER OF STRANDS DEBONDED TO (ft from end)					RELEASE STRGTH f'_{ci} (ksi)	MINIMUM 28 DAY COMP STRGTH f'_c (ksi)	②		Inv Opr Inv							
												TOTAL	DE-BONDED	3	6						9	12	15			Moment	Shear	Inv	Opr	Inv
FM 2200 AT FRANCISCO PEREZ CREEK	1 & 3	1,2,5,8,9	5SB12		10	0.6	270	3.50	3.50										4.000	5.000	1.301	-1.660	509	0.437	0.437	1.23	1.60	1.25		
		3,4,6,7	4SB12		8	0.6	270	3.50	3.50										4.000	5.000	1.328	-1.722	430	0.374	0.374					
	2	1,2,5,8,9	5SB12		18	0.6	270	3.50	3.50										4.000	5.000	2.275	-2.816	808	0.437	0.437	1.36	1.77	1.11		
		3,4,6,7	4SB12		16	0.6	270	3.50	3.50										4.000	5.000	2.292	-2.887	679	0.374	0.374					

① Based on the following allowable stresses (ksi):
 Compression = 0.65 f'_{ci}
 Tension = 0.24 $\sqrt{f'_{ci}}$
 Optional designs must likewise conform.

② Portion of full HL93.

DESIGN NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 Load rated using Load and Resistance Factor Rating according to AASHTO Manual for Bridge Evaluation.
 Prestress losses for the designed beams have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:
 Provide Class H concrete.
 Provide Grade 60 reinforcing steel.
 Use low relaxation strands, each pretensioned to 75 percent of fpu.
 Full-length debonded strands are not permitted in positions "A" and "B".
 Strand debonding must comply with Item 424.4.2.2.4.
 When shown on this sheet, the Fabricator has the option of furnishing either the designed beam or an approved optional beam design. All optional design submittals and shop drawings must be signed and dated by a Professional Engineer registered in the State of Texas.
 Locate strands for the designed beam as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5". Place strands within a row as follows:
 1) Locate a strand in each "A" position.
 2) Place strand symmetrically about vertical centerline of beam.
 3) Space strands as equally as possible across the entire width.
 Do not debond strands in position "A". Distribute debonded strands symmetrically about the vertical centerline. Increase debonded lengths working outward, with debonding staggered in each row.



HL93 LOADING

Texas Department of Transportation
 Bridge Division Standard

PRESTRESSED CONCRETE SLAB BEAM DESIGNS (NON-STANDARD SPANS)

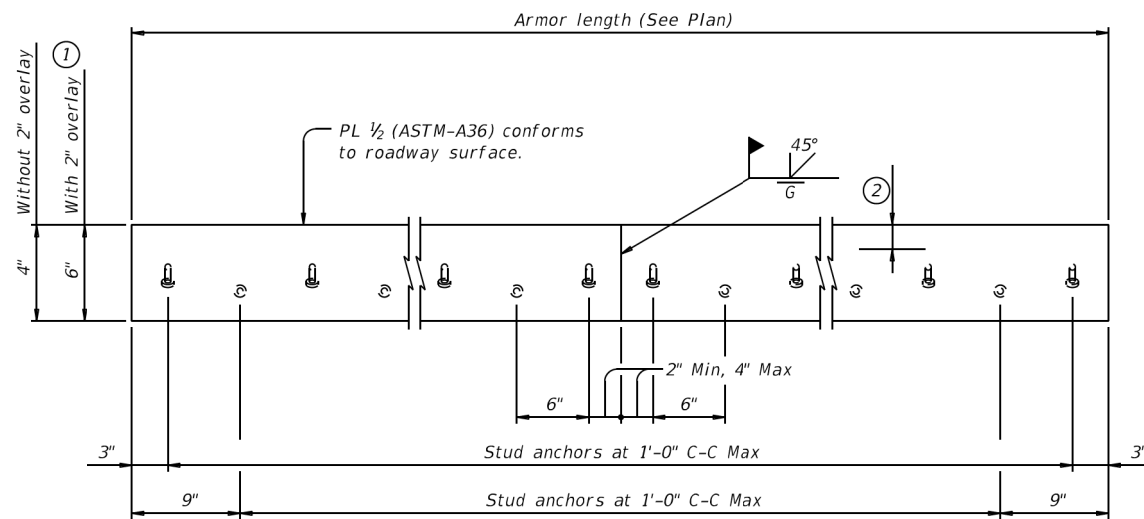
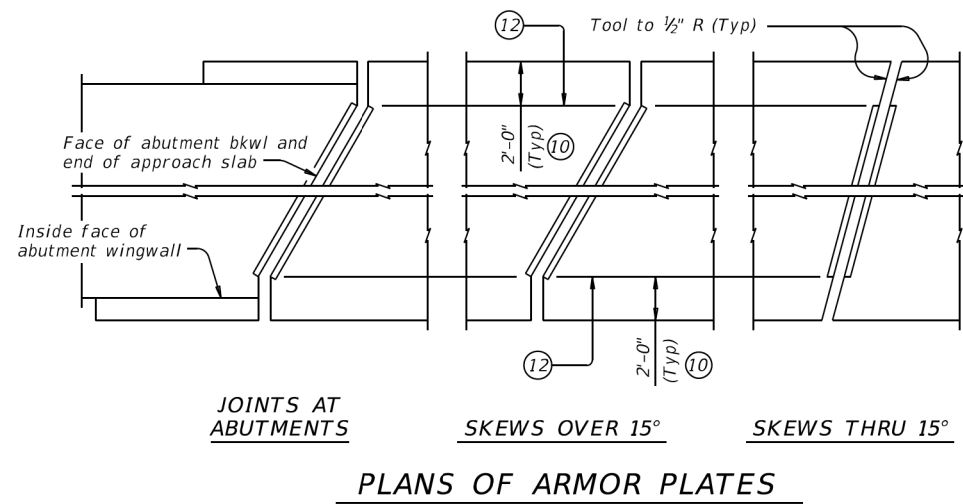
PSBND

FILE: psbsts05-22.dgn	ON: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	015	FM 2200
3-22: Added Load Rating.	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	262	

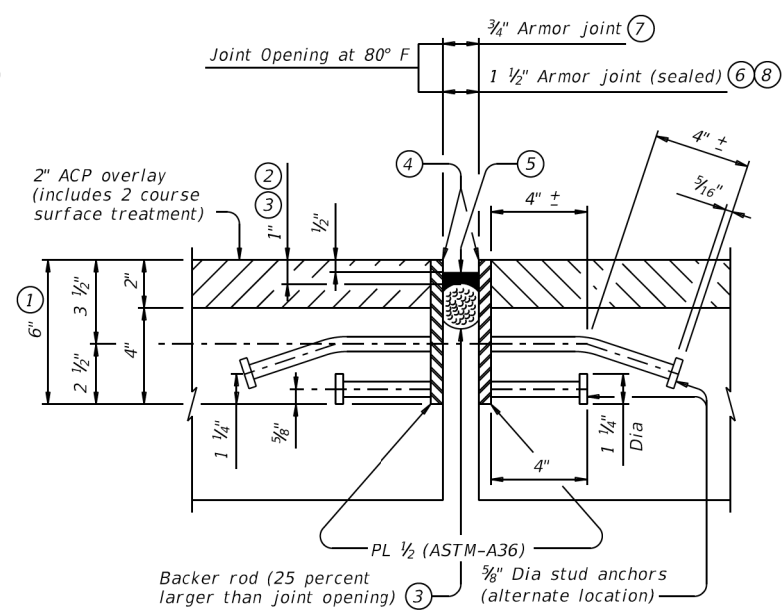
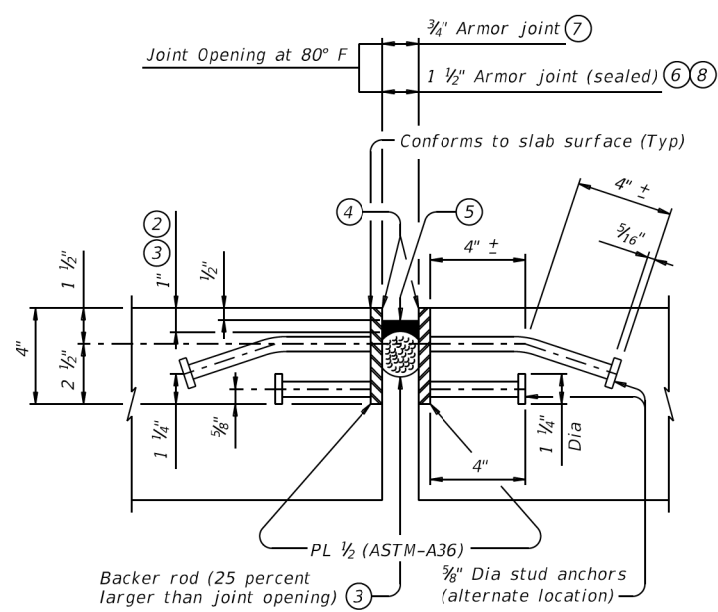
DATE: 1/5/2023
 FILE: 117903_SEA_PSND.dgn

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DATE: FILE:



- ① Adjust 6" plate height for overlay thicknesses other than the 2" shown. Adjust weight by 1.70 plf for each 1/2" variation in thickness.
- ② Do not paint top 1/2" of plate if using sealed armor joint.
- ③ Set top of backer rod 1" below top of armor plate. Backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- ④ Blast clean entire contact area between sealant and plate (SSPC-SP10) before installing sealant. Light brush blast and thoroughly clean all dust and debris from concrete surfaces in contact with joint sealant before application of silicone seal.
- ⑤ Use Class 7 joint sealant that conforms to DMS-6310.
- ⑥ Place sealant while ambient temperature is between 55°F and 80°F and is rising.
- ⑦ Armor joint does not include joint sealant or backer rod.
- ⑧ Armor joint (sealed) includes Class 7 joint sealant and backer rod.
- ⑨ Form vertical leg of seal as per the Manufacturer's recommendations. Use Class 4 joint sealant if Class 7 cannot be installed correctly. Install according to Manufacturer's recommendations.
- ⑩ Unless shown otherwise, terminate armor plate at slab break point if break is more than 2'-0" from slab edge.
- ⑪ See "Plans of Armor Plates".
- ⑫ At Fabricator's option, armor plate may extend up to 6" beyond this point for skews through 15°.
- ⑬ Align shipping angle perpendicular to joint.



FABRICATION NOTES:

Match mark corresponding plate sections and secure together for shipment with shipping angle. Do not use erection bolts. Ship armor joints in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for stage construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max. Weld studs in accordance with AWS D1.1. Use groove welds for all shop and field butt splices. Grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop. Paint the entire steel section, except as stated in Note 2, with System II or IV primer in accordance with Item 446 "Field Cleaning and Painting Steel." Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Items 446.4.7.3 and 446.4.7.4. Shop drawings for the fabrication of armor joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

Secure armor joints in position and place to proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for Armor Joint. Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

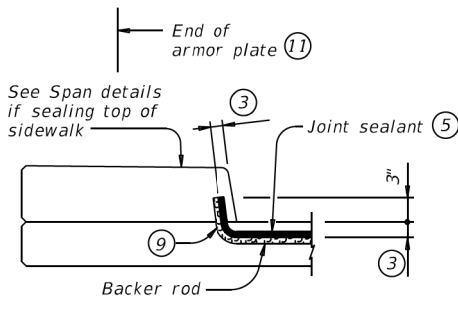
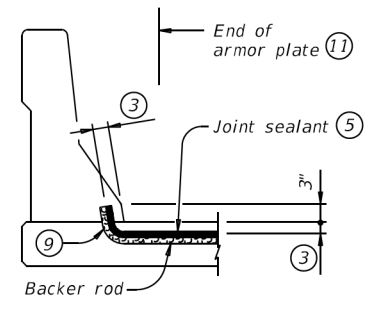
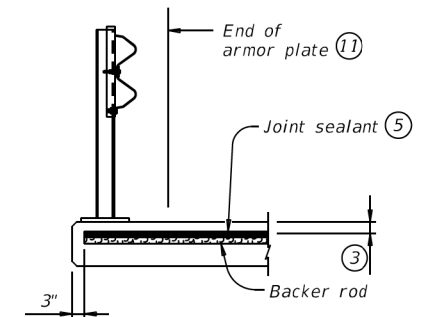
GENERAL NOTES:

Provide armor joints at locations shown on the plans. Provide the seal when "Armor Joint (Sealed)" is noted on the plans. These joint details accommodate a joint movement range of 1 3/8" (3/4" opening movement and 5/8" closure movement). Payment for armor joint, with or without seal, is based on length of armor plate.

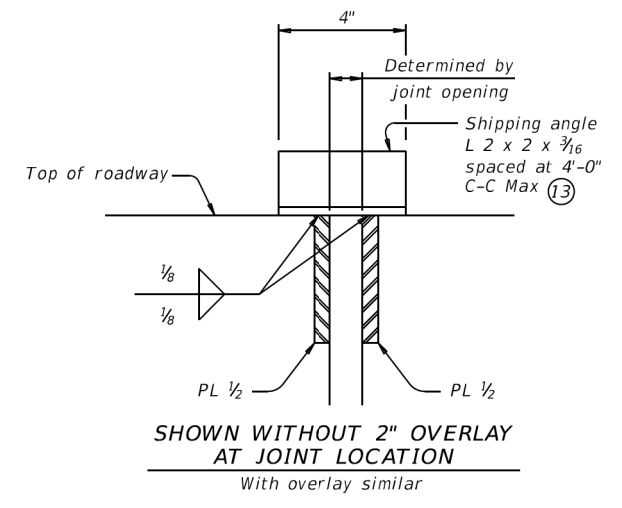
SHOWN WITHOUT 2" OVERLAY AT JOINT LOCATION

SHOWN WITH 2" OVERLAY AT JOINT LOCATION ①

ARMOR JOINT SECTIONS
Showing Armor Joint (Sealed)



JOINT SEALANT TERMINATION DETAILS
Armor joint (sealed) only. Armor plate is not shown for clarity.



SHIPPING ANGLE
An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.

WEIGHTS FOR ONE ARMOR JOINT (2 PLATES)	
WITHOUT OVERLAY	16.10 plf
WITH 2" OVERLAY ①	22.90 plf

Texas Department of Transportation Bridge Division Standard

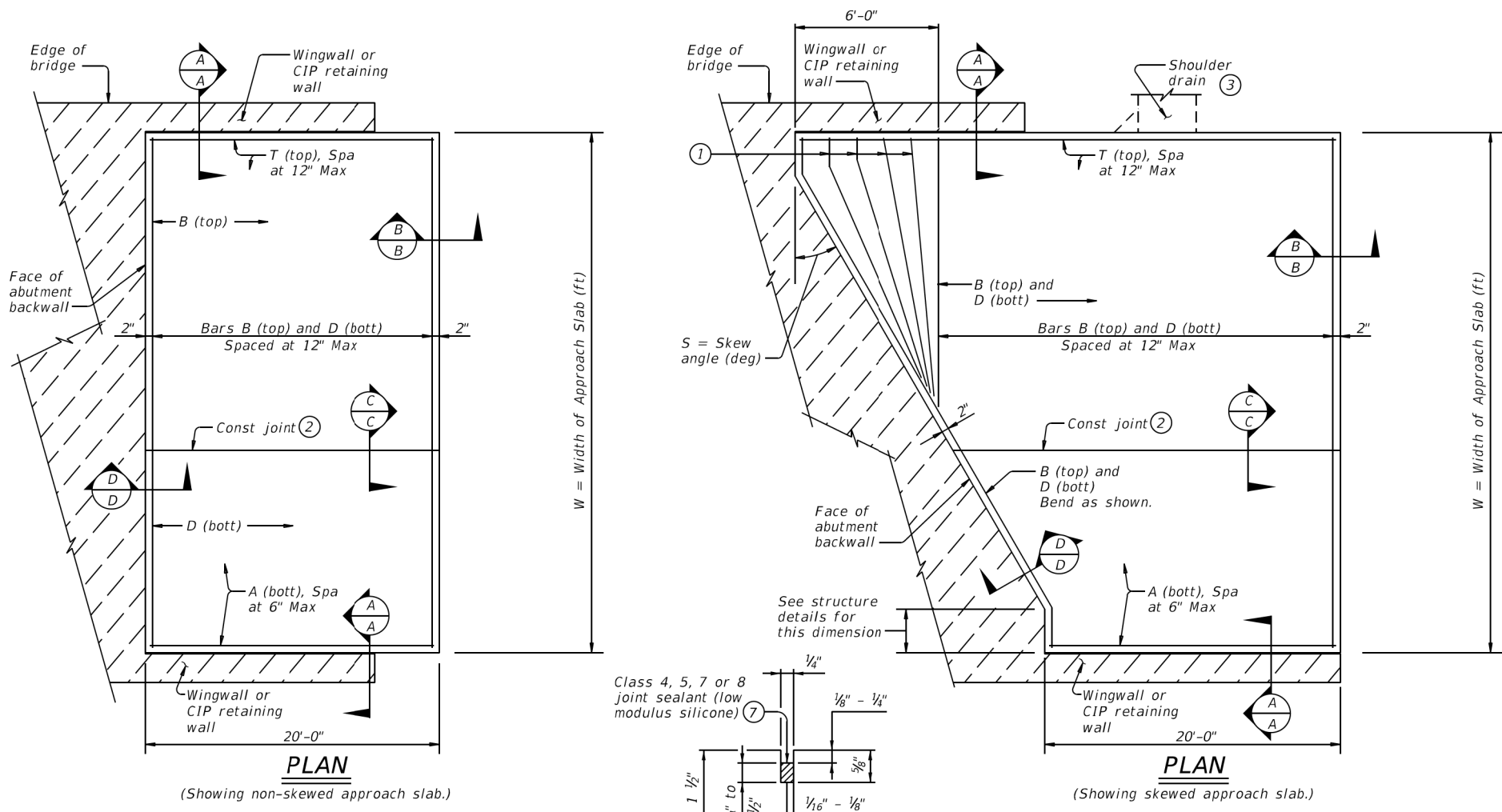
ARMOR JOINT DETAILS

AJ

FILE: ajstde01-19.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	015	FM 2200
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	263	

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DATE: 8/25/2022
FILE: basaste1-20.dgn

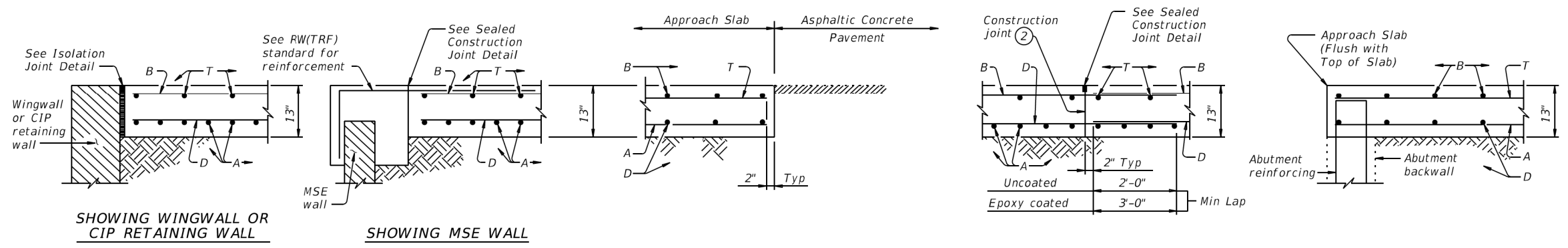


BAR TABLE	
BAR	SIZE
A	#8
B	#5
D	#5
T	#5

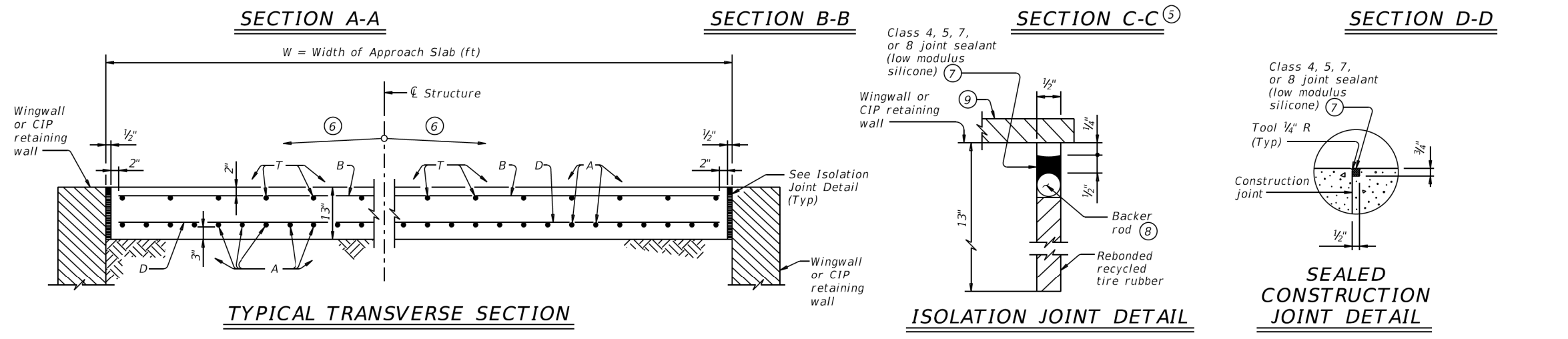
APPROXIMATE QUANTITIES ⁽⁴⁾	
Reinf steel weight = 8.5 Lbs/SF of Approach Slab	
Volume of Appr Slab Conc (CY) = 0.802W + 0.02W ² Tan S	
W = Width of Approach Slab (ft)	
S = Skew Angle (deg)	

- ① Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.
- ② Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.
- ③ See details elsewhere in plans for shoulder drain location and details.
- ④ For Contractor's information only. Quantities shown are for one approach slab.
- ⑤ Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.
- ⑥ See details elsewhere in plans for required cross-slope.
- ⑦ Place in accordance with Item 438.
- ⑧ Provide backer rod that is 25% larger than joint opening and compatible with the sealant.
- ⑨ If bridge rail is present at the wingwall or CIP retaining wall, place 1/2" rebonded recycled tire rubber between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.

LONGITUDINAL SAW CUT JOINT DETAIL



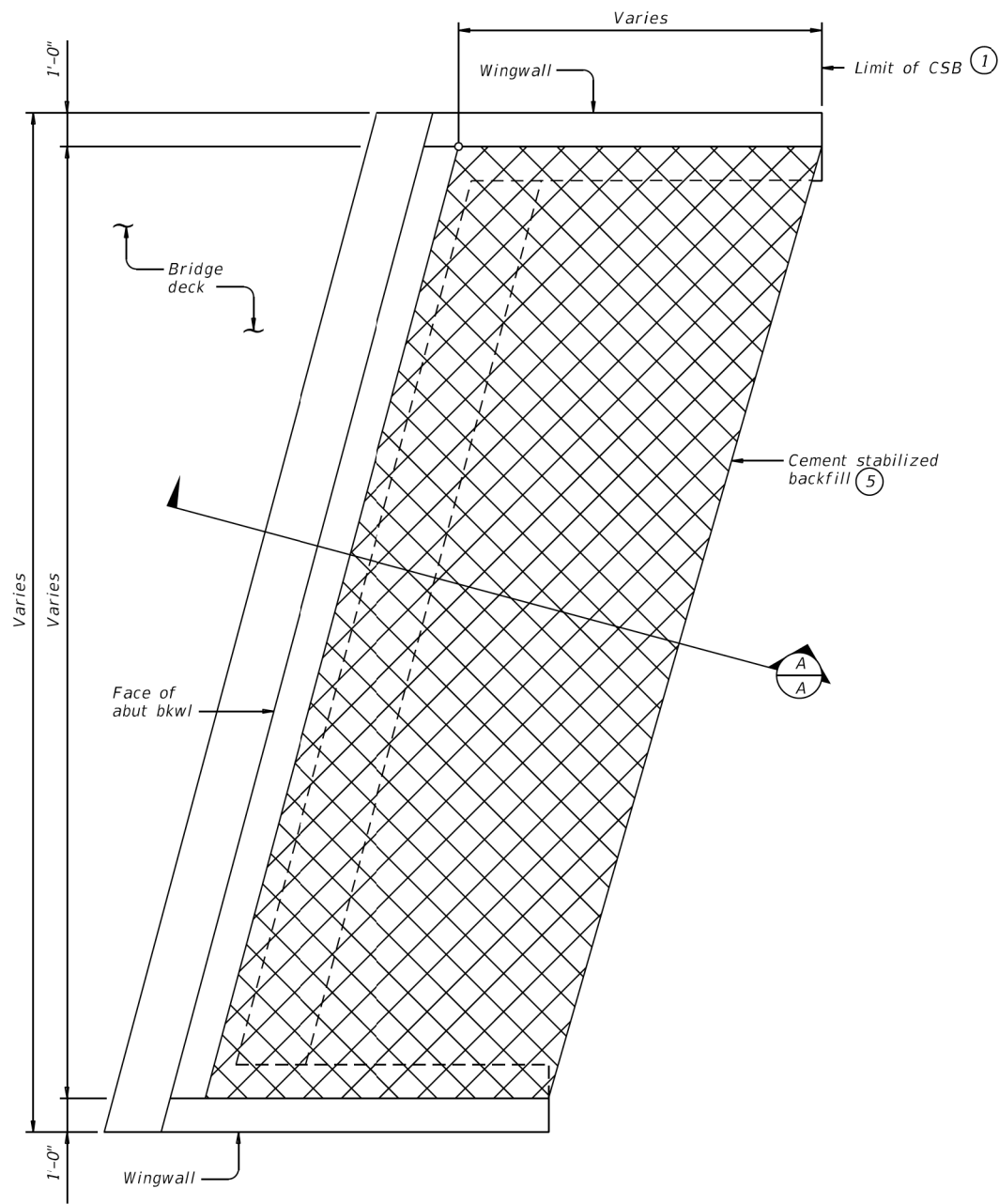
GENERAL NOTES:
 Construct approach slab in accordance with Item 422.
 Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.
 Provide Grade 60 reinforcing steel.
 Provide longitudinal joints as shown on the Longitudinal Saw Cut Joint Detail at lane lines and shoulders when width between longitudinal construction joints or edges of approach slab exceeds 16 feet. Saw cut joints within 24 hours of concrete placement to a depth of 1 1/2" and seal in accordance with Item 438. Alternately, provide a controlled joint consisting of 1 1/2" vinyl or plastic joint former (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)
 Provide rebonded recycled tire rubber joint filler that meets the requirements of DMS-6310. "Joint Sealants and Fillers."
 Construct the subgrade or subbase away from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.
 Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.
 Cure for 4 days using water or membrane curing per Item 422.
 All details shown herein are subsidiary to bridge approach slab.
 Cover dimensions are clear dimensions, unless noted otherwise.



		Bridge Division Standard	
BRIDGE APPROACH SLAB ASPHALTIC CONCRETE PAVEMENT			
BAS-A			
FILE: basaste1-20.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT
©TxDOT April 2019	CONT	SECT	JOB
REVISIONS	2520	01	015
02-20: Removed stress relieving pad.	DIST	COUNTY	SHEET NO.
SAT	MEDINA		264

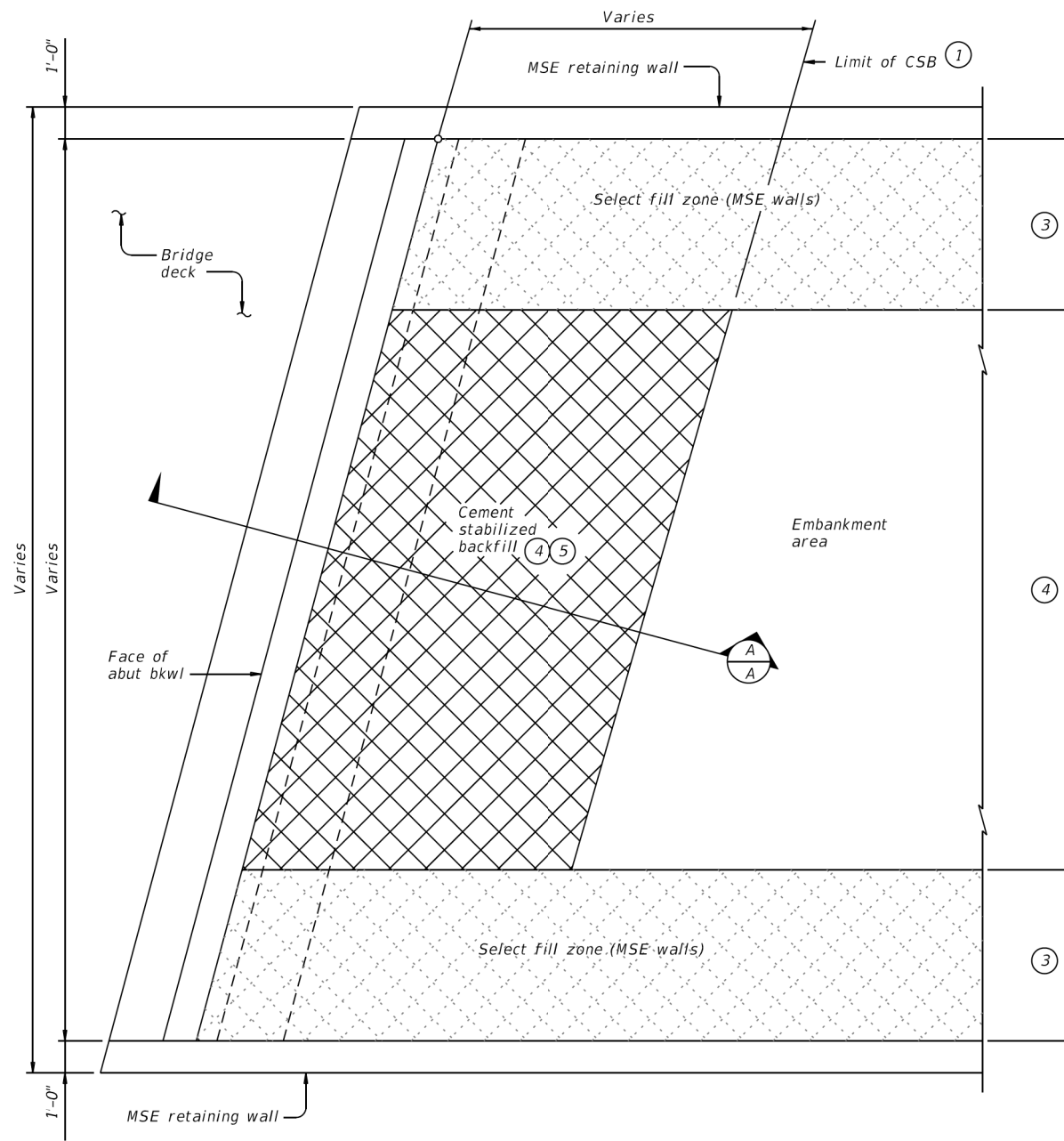
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DATE: 8/25/2022
FILE: csabste1-20 (1).dgn



OPTION 1 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.

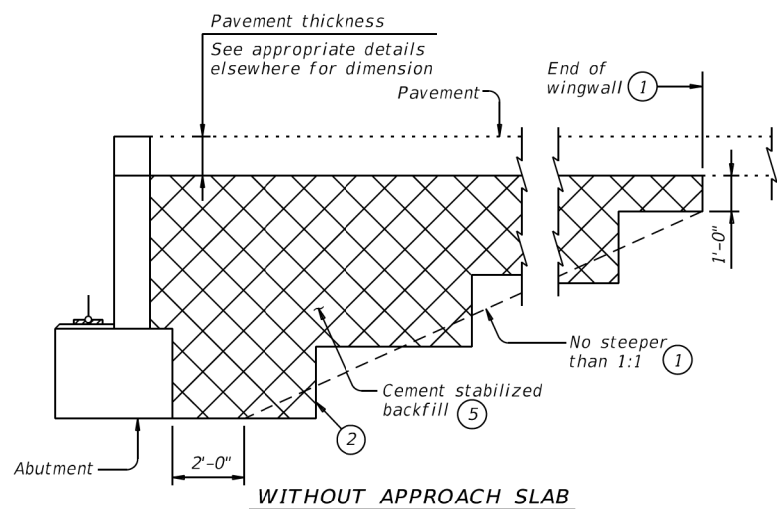


OPTION 1 ~ PLAN WITH MSE RETAINING WALLS

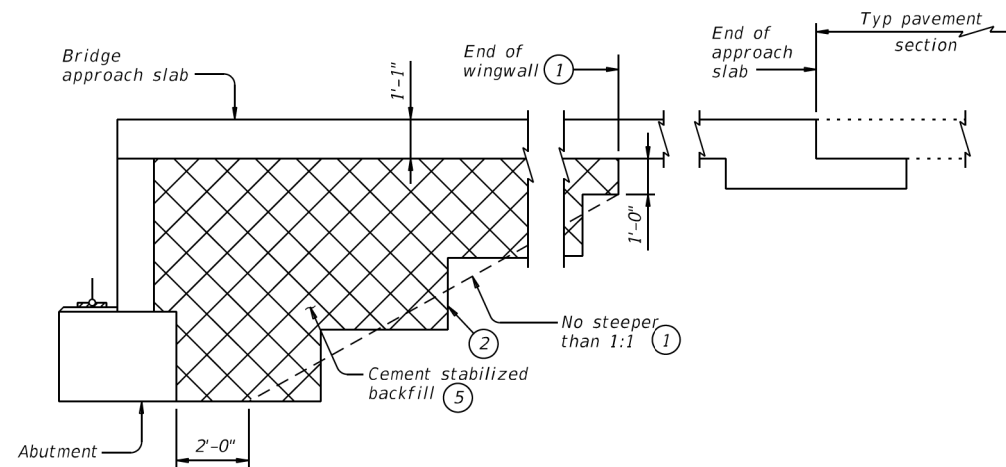
- ① Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.
- ② Bench backfill as shown with 12" (approximate) bench depths.
- ③ Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
- ④ When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.
- ⑤ If shown in the plans flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
 - a) If flowable backfill is to be placed over MSE backfill then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
 - b) Place flowable fill in lifts not exceeding 2 feet in height, place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).

GENERAL NOTES:

See the Bridge Layout for selected Option. Option 2 is intended for new construction requiring high plasticity embankment fill with a plasticity index (PI) greater than 30 or pavement built in poor native soil. Poor soils are defined as high plasticity clays or expansive clays. Option 1 is intended for construction only requiring PI controlled embankment fill or excavation in competent soils/rocks in order to construct the abutment. Provide Cement Stabilized Backfill (CSB) meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments. If required elsewhere in the plans, provide Flowable Backfill meeting the requirements of Item 401, "Flowable Backfill", to the limits shown at bridge abutments. Details are drawn showing left forward skew. See Bridge Layout for actual skew direction. These details do not apply when Concrete Block retaining walls are used in lieu of wingwalls.



WITHOUT APPROACH SLAB



WITH APPROACH SLAB
(Showing BAS-C, BAS-A similar.)

SECTION A-A

SHEET 1 OF 2



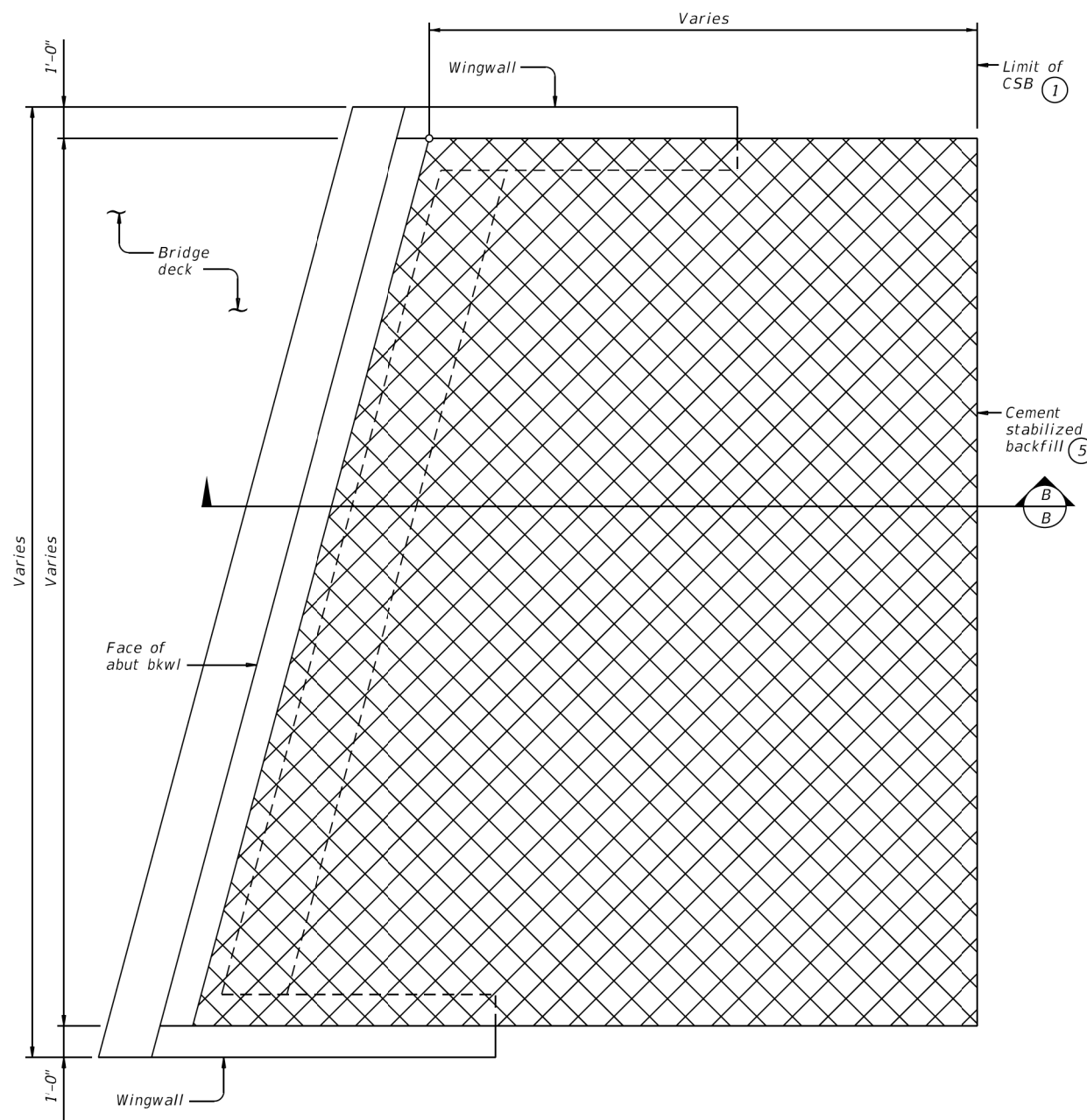
**CEMENT STABILIZED
ABUTMENT BACKFILL
BRIDGE ABUTMENT**

CSAB

FILE: csabste1-20.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	015	FM 220
02-20: Added Option 2.	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	265	

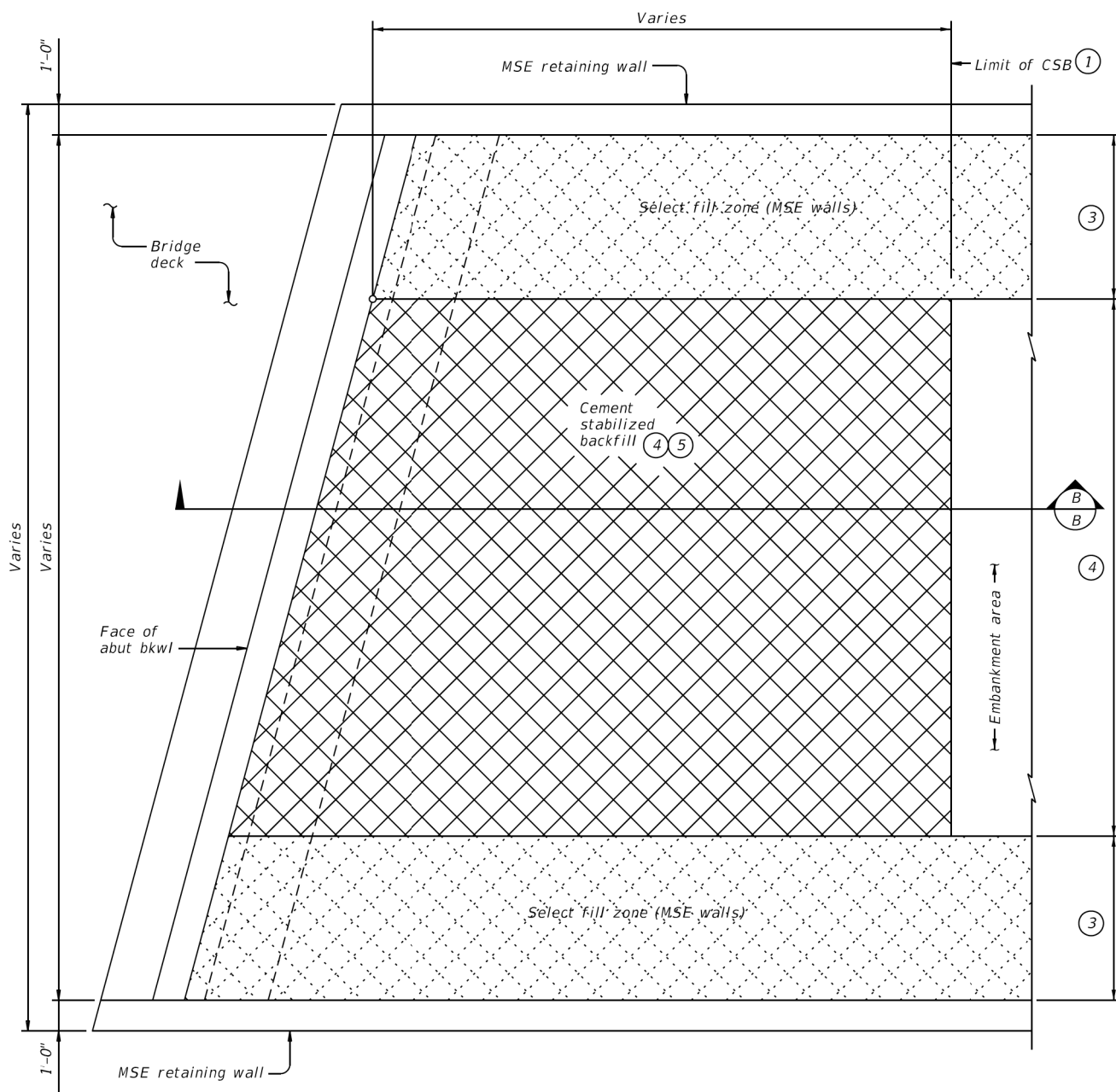
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DATE: 8/25/2022
FILE: csabste1-20 (1).dgn



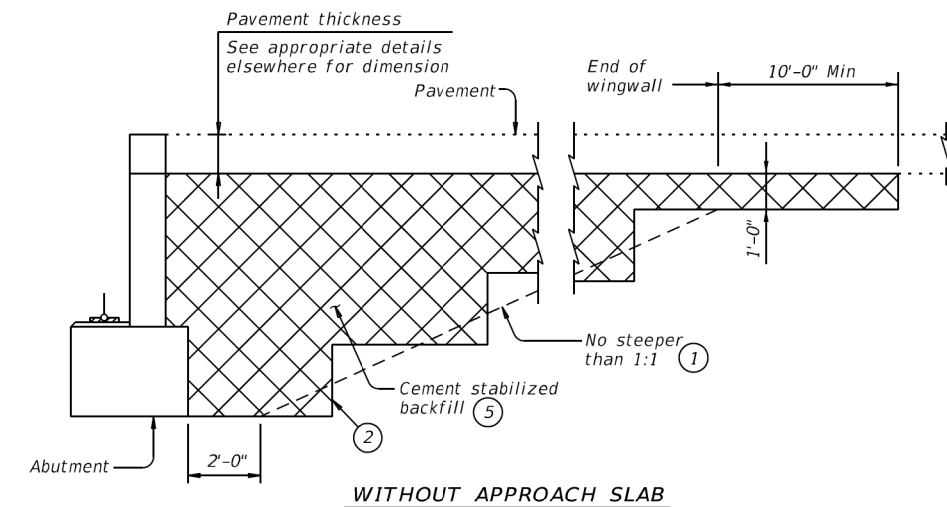
OPTION 2 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.

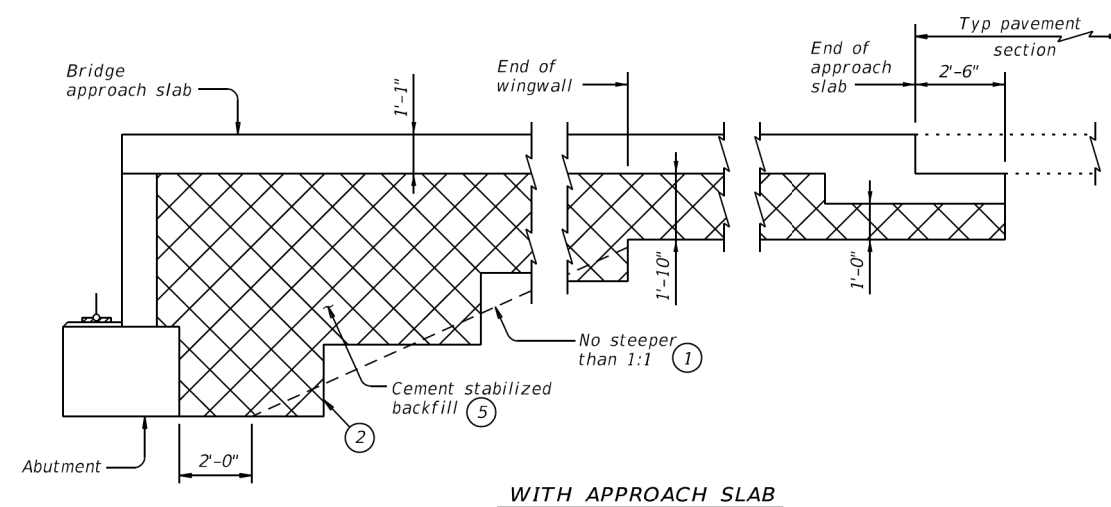


OPTION 2 ~ PLAN WITH MSE RETAINING WALLS

- ① Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.
- ② Bench backfill as shown with 12" (approximate) bench depths.
- ③ Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
- ④ When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.
- ⑤ If shown in the plans flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
 - a). If flowable backfill is to be placed over MSE backfill then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
 - b). Place flowable fill in lifts not exceeding 2 feet in height, place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).



WITHOUT APPROACH SLAB



SECTION B-B

WITH APPROACH SLAB
(Showing BAS-C, BAS-A similar.)

SHEET 2 OF 2

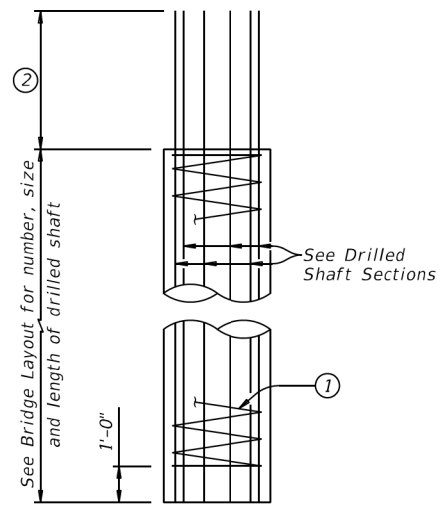


**CEMENT STABILIZED
ABUTMENT BACKFILL
BRIDGE ABUTMENT**

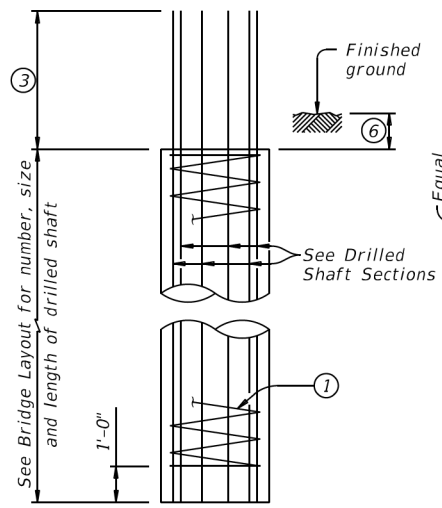
CSAB

FILE: csabste1-20.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	015	FM 220
02-20: Added Option 2.	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	266	

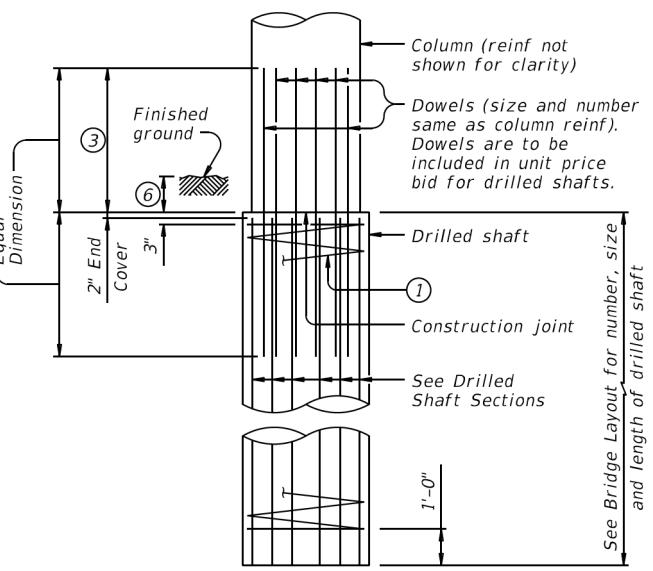
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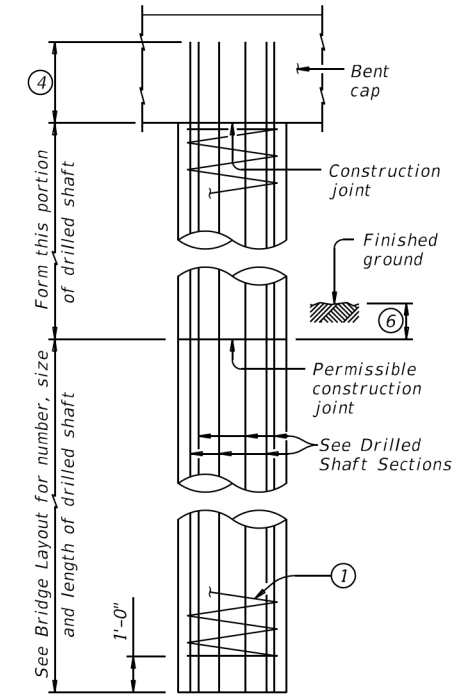
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



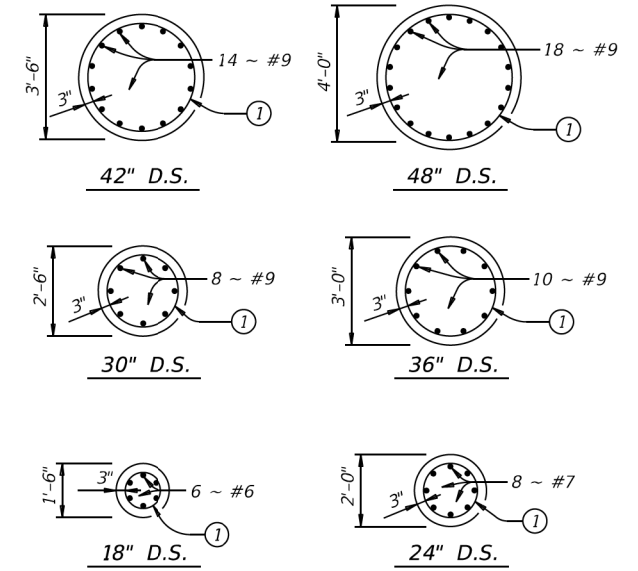
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL 5

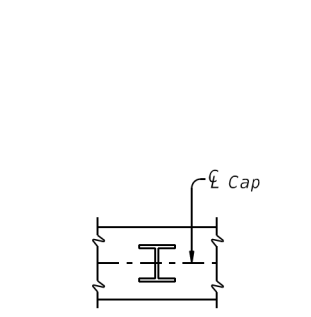


DRILLED SHAFT SECTIONS

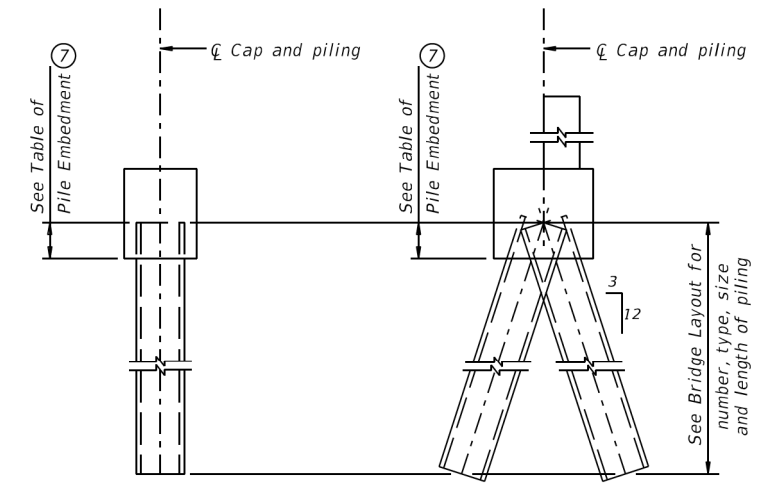
DRILLED SHAFT DETAILS

TABLE OF PILE EMBEDMENT	
Pile Type	Embedment Depth (Ft)
16" Sq Concrete 18" Sq Concrete HP14 Steel HP16 Steel	1'-0"
20" Sq Concrete 24" Sq Concrete HP18 Steel	1'-6"

See Prestressed Concrete Piling (CP) standard for additional details on concrete pile embedment.

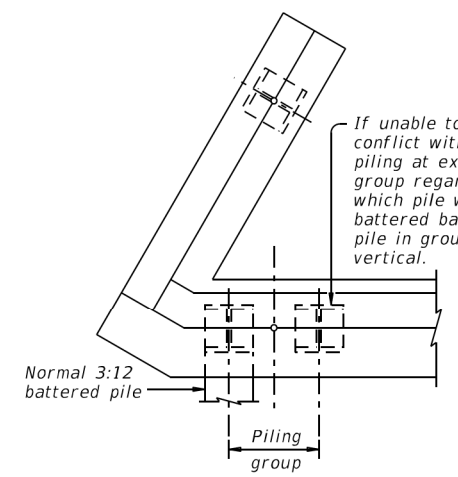


ORIENTATION OF STEEL H-PILING



VERTICAL PILE BATTERED PILE

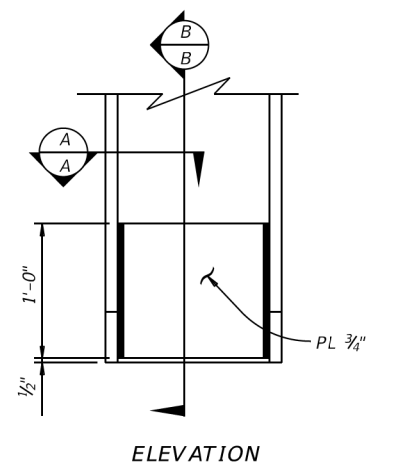
PILING DETAILS (Concrete or steel H)



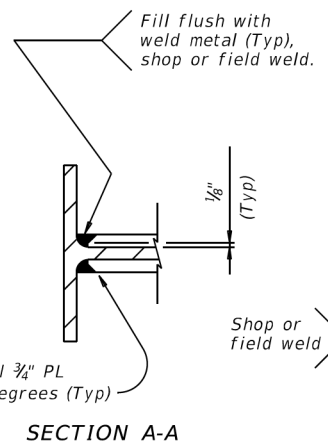
DETAIL "A"

(Showing plan view of a 30° skewed abutment)

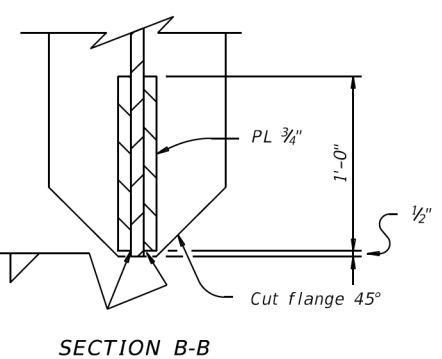
- 1 #3 spiral at 6" pitch (one and a half flat turns top and bottom).
- 2 Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-0"
#9 Bars = 2'-3"
- 3 Min lap with column reinf:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"
- 4 Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-3"
#9 Bars = 2'-9"
- 5 Drilled shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the drilled shaft diameter equals the column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.
- 6 1'-0" Min, unless shown otherwise on plans.
- 7 Or as shown on plans.



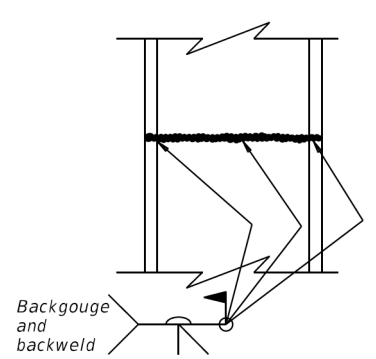
ELEVATION



SECTION A-A



SECTION B-B



SECTION THRU FLANGE OR WEB

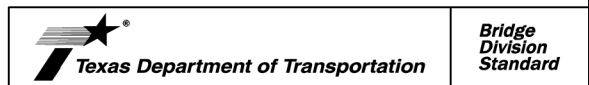
STEEL H-PILE TIP REINFORCEMENT

See Item 407 "Steel Piling" to determine when tip reinforcement is required and for options to the details shown.

STEEL H-PILE SPLICE DETAIL

Use when required.

SHEET 1 OF 2



COMMON FOUNDATION DETAILS

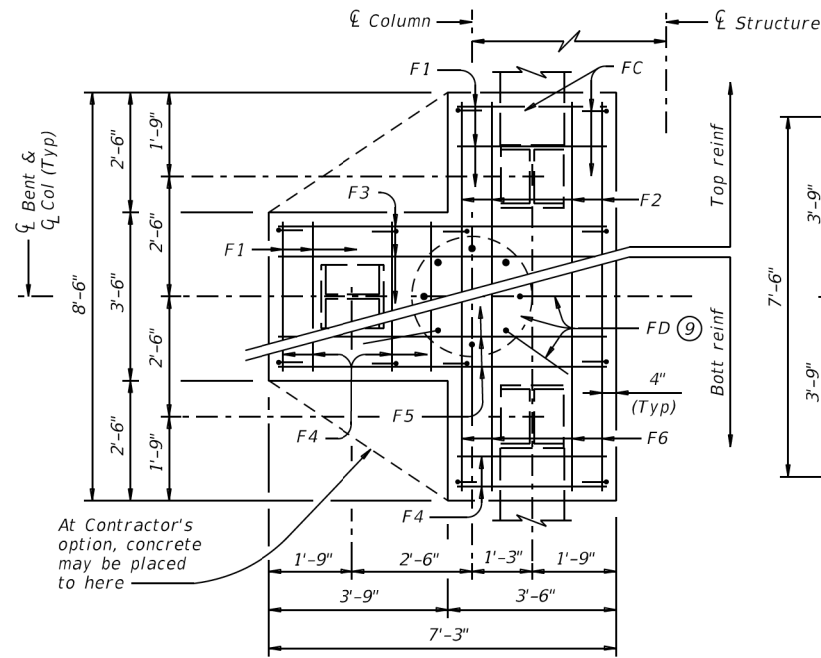
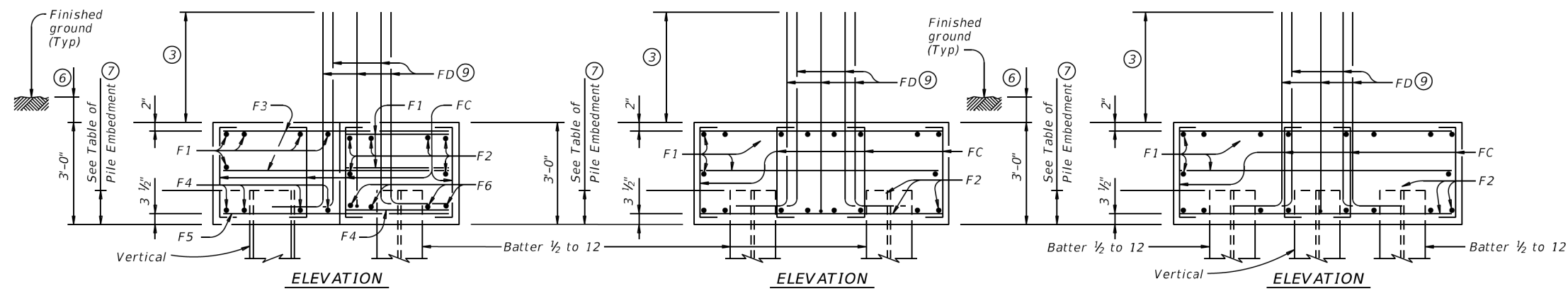
FD

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	015	FM 2200
01-20: Added #11 bars to the FD bars.	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	267	

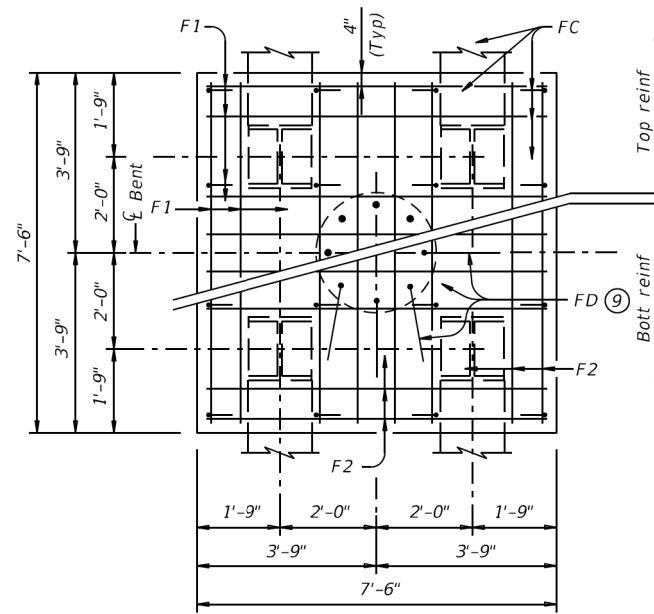
DATE: FILE:

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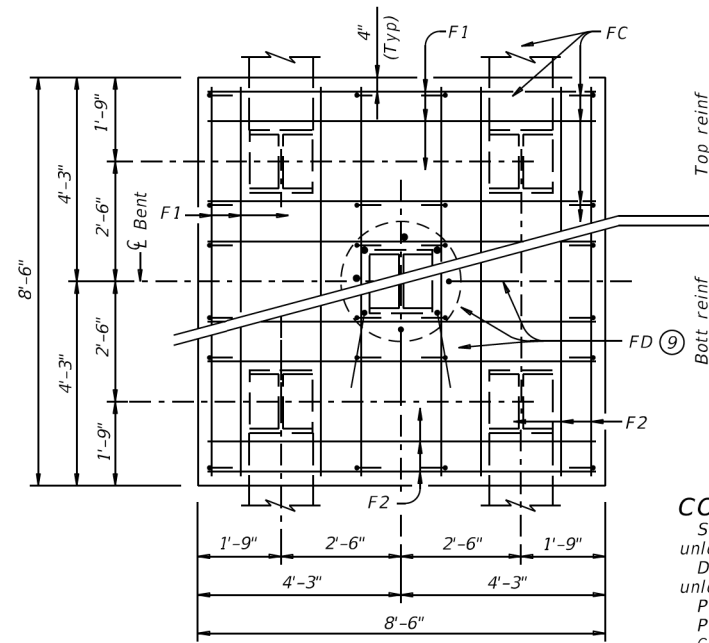
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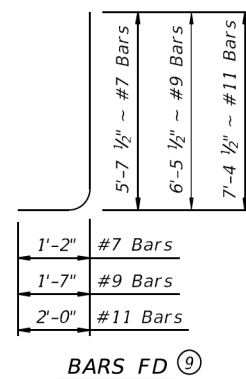
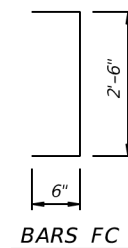
THREE PILE FOOTING^⑧
For 36" Dia and smaller columns.



FOUR PILE FOOTING^⑧
For 42" Dia and smaller columns.



FIVE PILE FOOTING^⑧
For 42" Dia and smaller columns.



- ③ Min lap with column reinforcing:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"
- ⑥ 1'-0" Min, unless shown otherwise on plans.
- ⑦ Or as shown on plans.
- ⑧ See Bridge Layout for type, size and length of piling.
- ⑨ Number and size of FD bars must match column reinforcing. Tie FD bars to the top of the bottom reinforcing mat.
- ⑩ Adjust FD quantity, size and weight as needed to match column reinforcing.

TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS

ONE 3 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	11	#4	3'- 2"	23
F2	6	#4	8'- 2"	33
F3	6	#4	6'- 11"	28
F4	8	#9	3'- 2"	86
F5	4	#9	6'- 11"	94
F6	4	#9	8'- 2"	111
FC	12	#4	3'- 6"	28
FD ^⑩	8	#9	8'- 1"	220
Reinforcing Steel			Lb	623
Class "C" Concrete			CY	4.8
ONE 4 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	7'- 2"	96
F2	16	#8	7'- 2"	306
FC	16	#4	3'- 6"	37
FD ^⑩	8	#9	8'- 1"	220
Reinforcing Steel			Lb	659
Class "C" Concrete			CY	6.3
ONE 5 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	8'- 2"	109
F2	16	#9	8'- 2"	444
FC	24	#4	3'- 6"	56
FD ^⑩	8	#9	8'- 1"	220
Reinforcing Steel			Lb	829
Class "C" Concrete			CY	8.0

CONSTRUCTION NOTES:

- See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise.
- Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile unless shown otherwise.
- Provide Class C Concrete ($f'_c = 3,600$ psi), unless shown otherwise.
- Provide Grade 60 reinforcing steel.
- Galvanize reinforcing if shown elsewhere in the plans.
- Provide bar laps for drilled shaft reinforcing, where required, as follows:
Uncoated or galvanized (#6) ~ 2'-6"
Uncoated or galvanized (#7) ~ 2'-11"
Uncoated or galvanized (#9) ~ 3'-9"

GENERAL NOTES:

- Designed according to AASHTO LRFD Bridge Design Specifications.
- Cover dimensions are clear dimensions, unless noted otherwise.
- Reinforcing bar dimensions shown are out-to-out of bar.

DESIGNER NOTES:

- Do not use the drilled shaft details shown on this standard for retaining wall, noise wall, barrier, or sign foundations without structural evaluation.
- Do not use the footings shown on this standard in direct contact with salt water or exposed to salt water spray.
- Maximum allowable pile loads for the footings shown are:
72 Tons/Pile with 24" Dia Columns
80 Tons/Pile with 30" Dia Columns
100 Tons/Pile with 36" Dia Columns
120 Tons/Pile with 42" Dia Columns

SHEET 2 OF 2



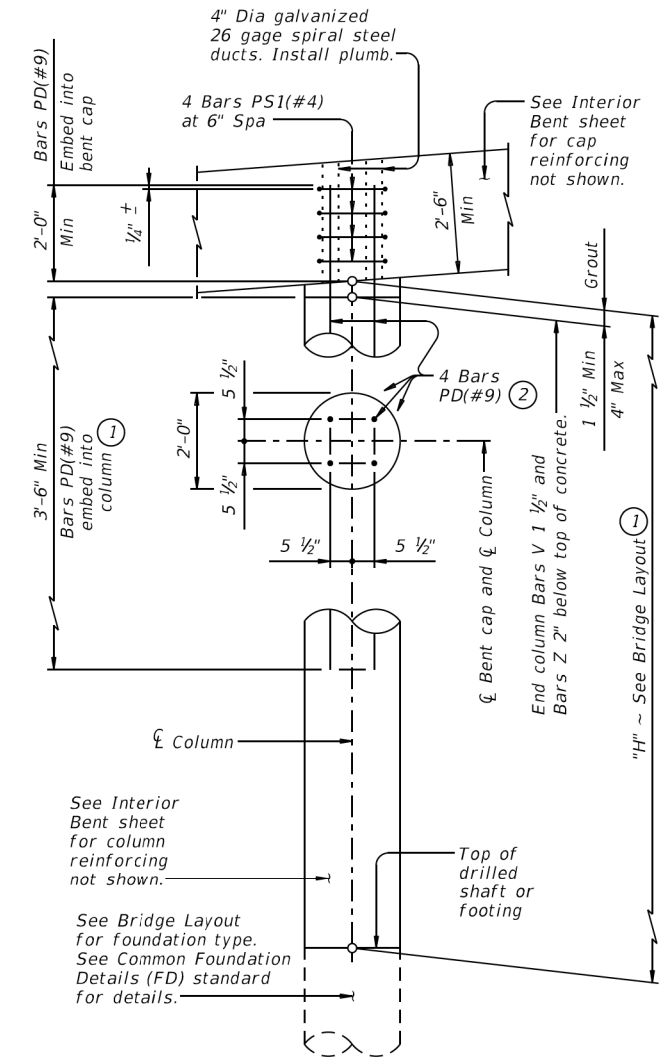
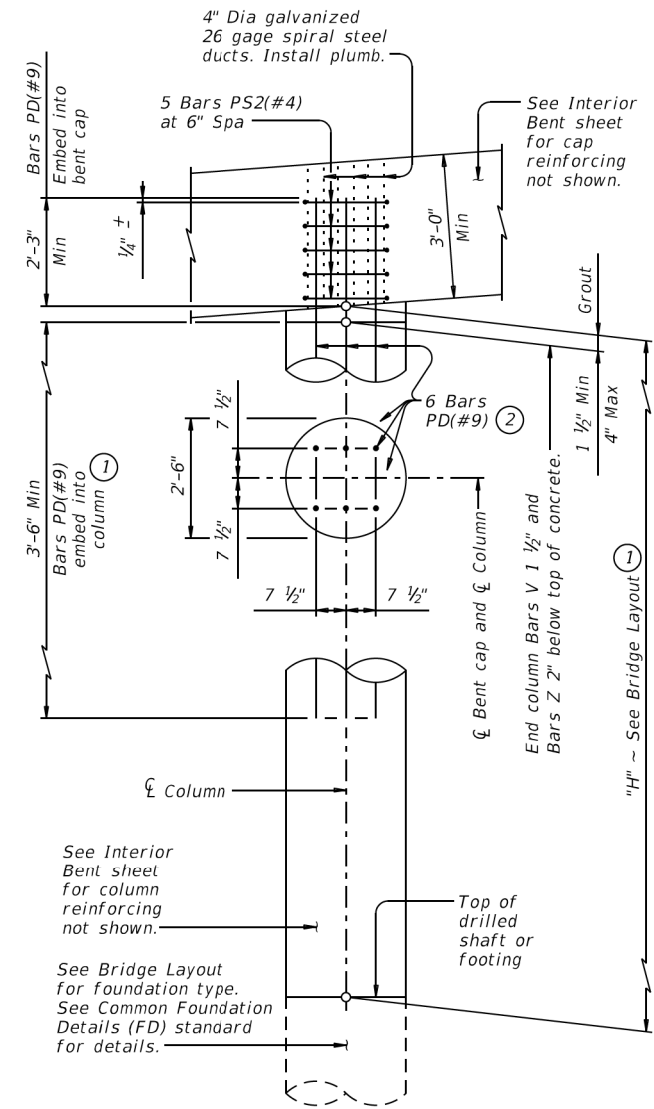
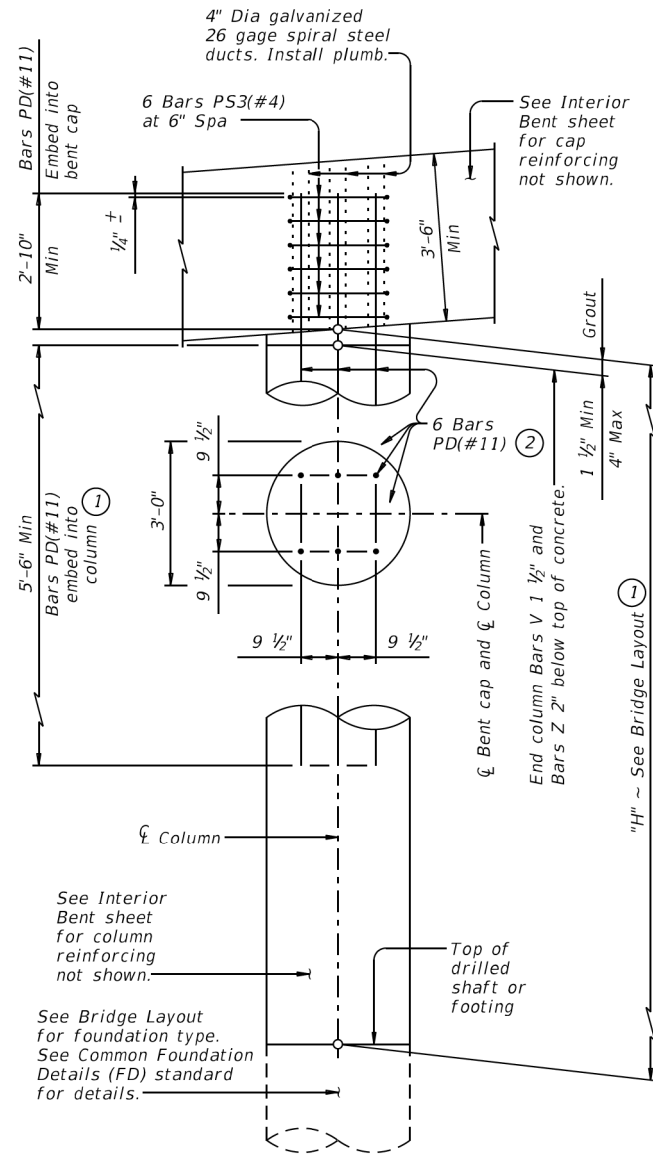
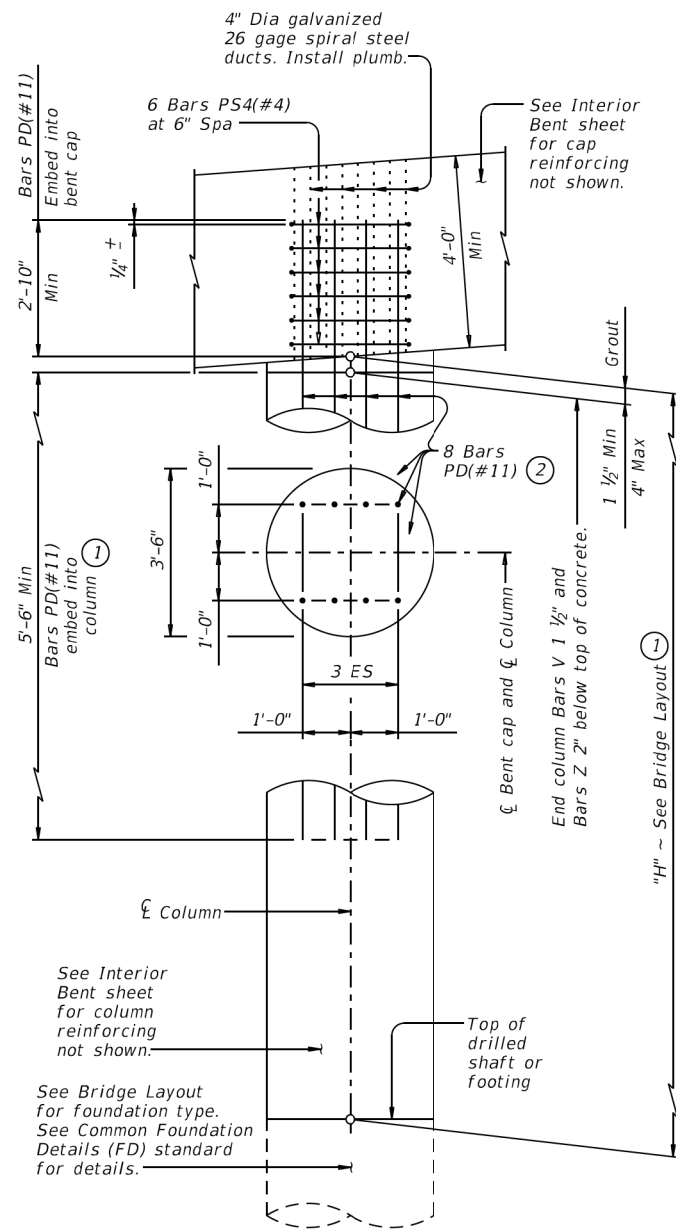
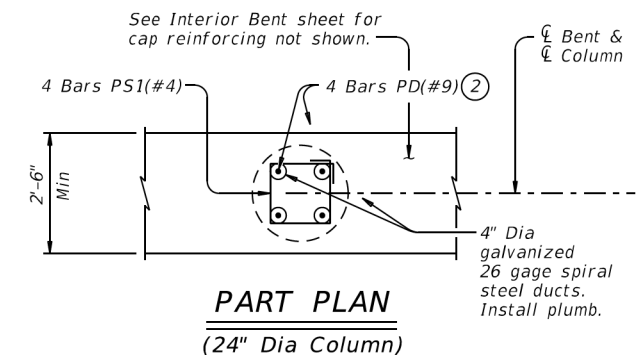
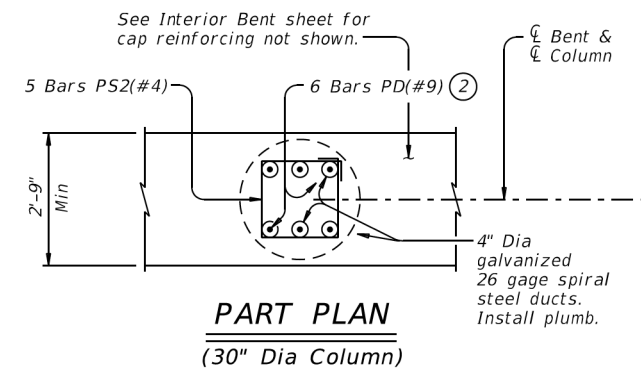
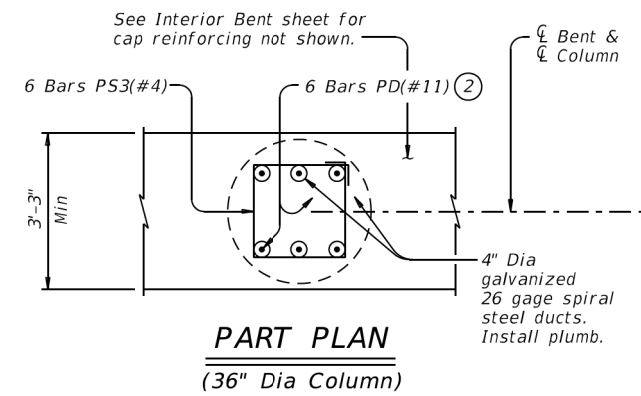
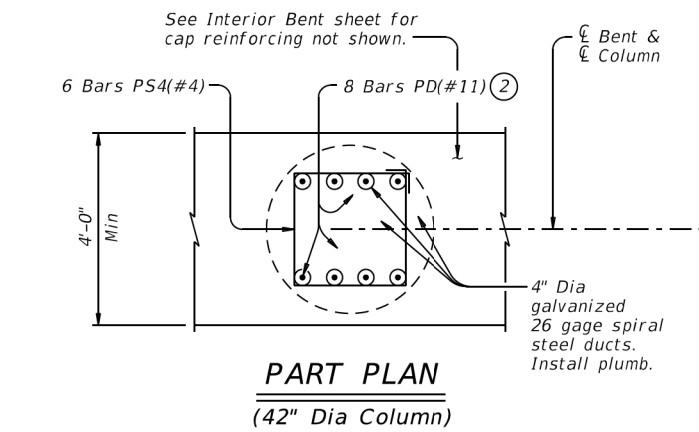
COMMON FOUNDATION DETAILS

FD

FILE: fdstd01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	015	FM 2200
01-20: Added #11 bars to the FD bars.	DIST	COUNTY	SHEET NO.	
SAT	MEDINA	268		

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DATE: 8/25/2022
FILE: pbcstd01-21.dgn



PS1	1'-4 1/4"	PS1	1'-4 1/4"
PS2	1'-8 1/4"	PS2	1'-8 1/4"
PS3	2'-0 1/4"	PS3	2'-0 1/4"
PS4	2'-5 1/4"	PS4	2'-5 1/4"
		(Typ)	5"

BARS PS (#4)

- (1) Bars PD may need to be embedded in footing or drilled shaft for short columns.
- (2) Location tolerance of dowels in columns/drilled shafts is 1/4" from plan location, transversely and longitudinally.

HL93 LOADING SHEET 1 OF 2

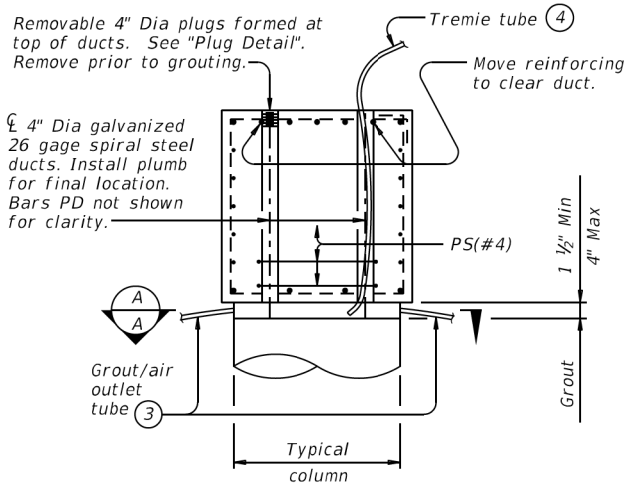


PRECAST CONCRETE BENT CAP OPTION FOR ROUND COLUMNS

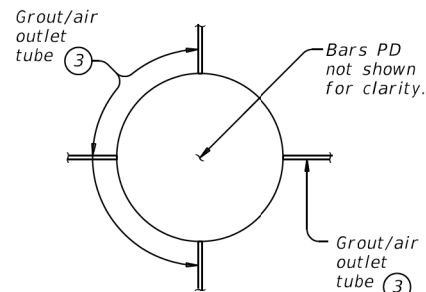
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FILE: pbcstd01-21.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	015	FM 220
12-21: General Notes	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	269	

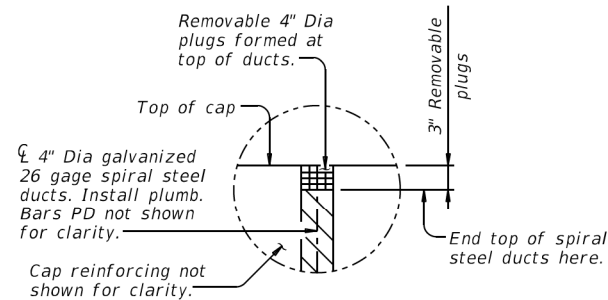
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TYPICAL SECTION THRU CAP
(Showing example of ducts and cap reinforcing.)

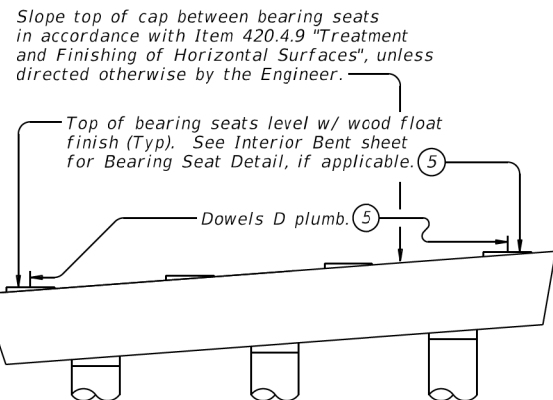


SECTION A-A



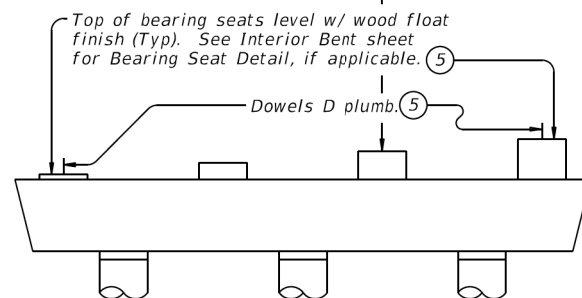
PLUG DETAIL

(Plug is used to keep concrete out of ducts during concrete placement. Remove prior to grouting)



CAP SET AT SLOPE

Reinforce bearing seats over 3" tall and slope top of cap between bearing seats in accordance with Item 420.4.9 "Treatment and Finishing of Horizontal Surfaces", unless directed otherwise by the Engineer.



CAP SET LEVEL

EXAMPLES OF PRECAST BENTS WITH DOWELS D

- (3) Provide at least 4 grout/air outlet tubes equally spaced around the perimeter of the column. Install at bottom of cap to avoid air entrapment. Seal off tubes sequentially when a steady flow of grout without air occurs. Secondary tubes to help drain water, located at top of column, may also be installed.
- (4) Continuous gravity-flow grouting through a tremie tube is recommended. With this method, lower a flexible tremie tube through one of the vertical ducts to the bottom of the bedding layer and fill the connection from the bottom upward with a continuous flow of grout. This method requires a sufficient amount of grout to be mixed prior to grouting and that the funnel connected to the tremie tube have adequate volume capacity (4 quarts Min is recommended). A valve may be used to stop the flow during grouting to allow refilling the funnel or to tamp the grout. The tube should remain within the grout and gradually withdrawn as the level of the grout rises in the ducts. It is critical to ensure a continuous flow of grout to avoid air entrapment. Alternative methods, including pressure grouting with low pressure pumps, may be used provided they are proved effective in providing void-free connections during the mock-up phase.
- (5) Unless otherwise shown.

CONSTRUCTION NOTES:

Cap Fabrication:

Construct and cure cap in accordance with Item 420, "Concrete Substructures". If fabricated at an offsite location, construct and cure cap in accordance with Item 424, "Precast Concrete Structural Members (Fabrication)". Secure ducts to prevent their movement during concrete placement. Location tolerance of ducts is 1/4" from plan location, transversely and longitudinally. Seal ducts to prevent intrusion of concrete.

Bearing seats may be precast with the cap. Bearing seats over 3" in height must be reinforced as per Item 420.4.9. Do not locate lift points at bearing seats if bearing seats are precast.

Cap concrete must achieve a compressive strength of 2,500 psi prior to lifting. Limit flexural stress in cap to 250 psi during handling and storage. Store and handle caps in accordance with Item 424, "Precast Concrete Structural Members (Fabrication)". Do not stack caps. Caps that become cracked or otherwise damaged may be rejected.

Cap-to-Column Connection:

Make a trial batch of grout using the same material, equipment and personnel to be used for actual grouting operations and grout a mock-up of the connection at least one week before grouting and in the presence of the Engineer. This mock-up test must demonstrate the reliability of the Contractor's grouting procedures to provide a connection free of voids. Field test the trial batch grout to the same level required for the actual grouting.

Caps may be placed on columns/drilled shafts after column/drilled shaft concrete has achieved a flexural stress of 355 psi (or 2,500 psi compressive strength). Use plastic shims or friction collars to support the cap at the proper elevation prior to grouting. Total area of plastic shims used on top of each column may not exceed 6 percent of the column area. Column/drilled shaft curing may be interrupted a maximum of 2 hours for placement of plastic shims or friction collars and cap placement.

Surfaces in contact with grout must be clean and in a saturated, surface-dry condition, immediately prior to grouting. Provide water tight forms. Fill the forms with water and drain just prior to grouting. Ponding or free-standing water is not permitted. Use compressed air to blow out excess water.

Mix grout in accordance with the manufacturer's directions. Evidence of frothing, foaming, or segregation is cause for rejection. Transport grout from mixer to final location by wheel barrow, bucket or pumping.

Perform sampling and testing of grout by trained personnel at the Contractor's expense and while witnessed by the Engineer. Grouted connections must be free of voids.

Trowel finish top surface of cap anchorage ducts flush with top of cap. Wet mat cure these locations for at least 48 hours. Recess lifting loops 1-inch minimum using exothermic cutting rods. Do not overheat or damage the surrounding concrete. Abrade the concrete surfaces of excavation and end of the lifting loop to remove all slag with a needle gun, steel brush, or other suitable means. Coat the inside of the recessed area, including the lifting loops, with 10 mils (minimum) of neat, Type VIII epoxy and patch the recess with epoxy mortar.

Friction collars may be removed, if used, and beams placed on the cap after the grout obtains a compressive strength of 2,500 psi. Subsequent loading can occur when the grout reaches its final required 28 day compressive strength.

MATERIAL NOTES:

Provide a pre-qualified grout from TxDOT's Material Producer List "Cementitious Grouts and Mortars for Miscellaneous Applications", conforming to DMS-4675.

Provide semi-rigid spirally crimped, corrugated duct of galvanized, cold rolled steel conforming to ASTM A653. Corrugations must have a minimum amplitude of 0.094".

Grout tubes and forms must be approved prior to grouting.

Provide Grade 60 reinforcing steel. Epoxy coat or galvanize all reinforcement if column reinforcement is epoxy coated or galvanized.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

The Contractor has the option to provide precast bent caps in accordance with the details shown. No additional payment will be made if the Contractor uses precast caps.

Submit shop drawings of precast caps for approval prior to construction. Indicate lifting attachments and locations on the shop drawings.

Precast Concrete Bent Cap Option shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

See Interior Bent sheet for details and notes not shown.

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

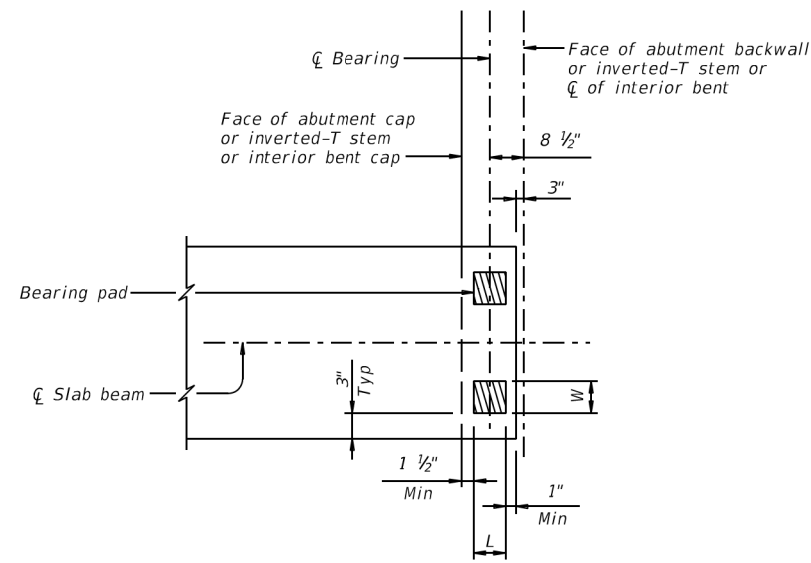


PRECAST CONCRETE BENT CAP OPTION FOR ROUND COLUMNS

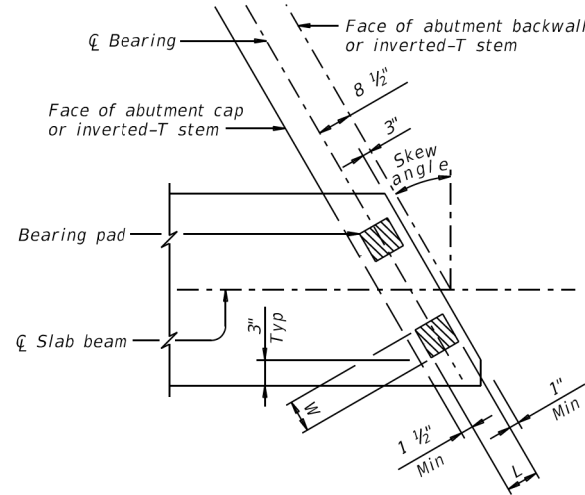
PBC-RC

FILE: pbcstd01-21.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-21: General Notes	2520	01	015	FM 220
DIST	COUNTY		SHEET NO.	
SAT	MEDINA		270	

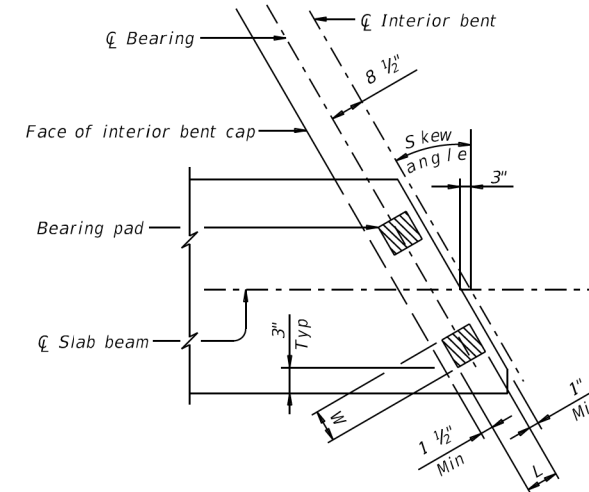
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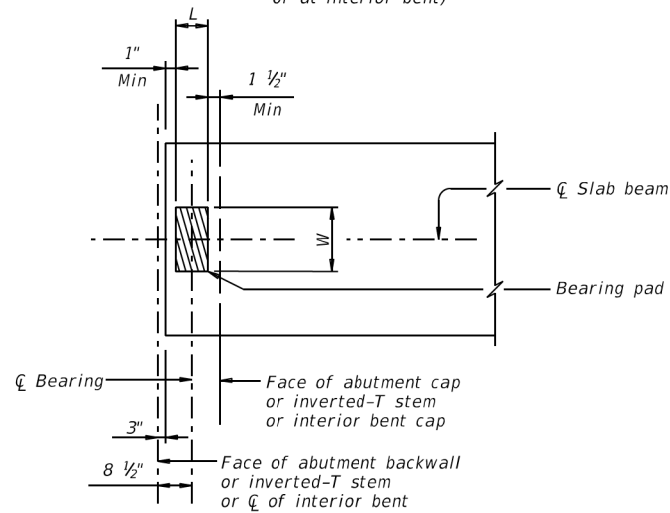
TWO-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



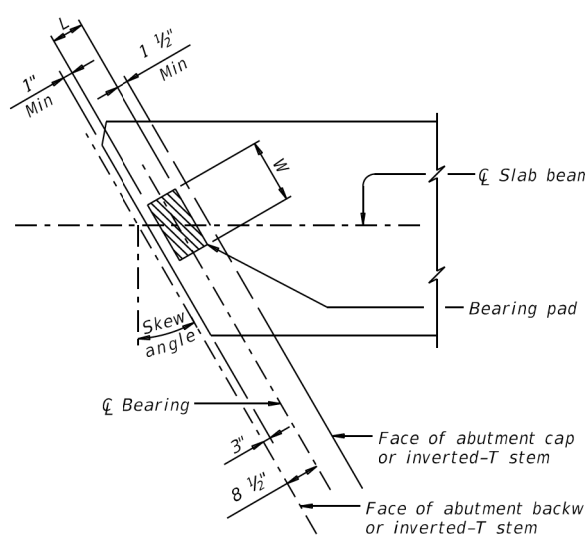
TWO-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



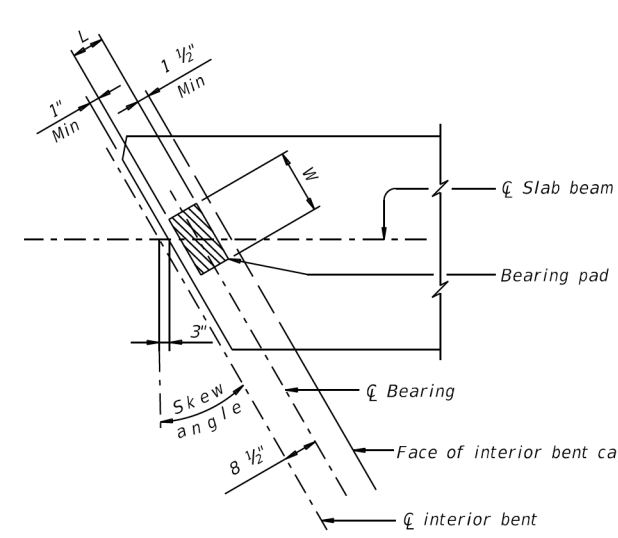
TWO-PAD DETAIL SKEW PLAN
(At interior bent)



ONE-PAD DETAIL PLAN
(At abutment or inverted-T cap or at interior bent)



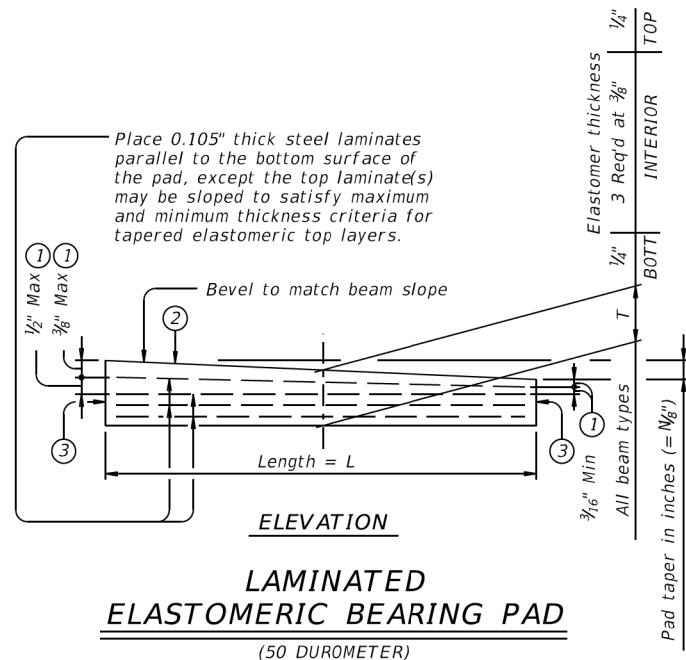
ONE-PAD DETAIL SKEW PLAN
(At abutment or inverted-T cap)



ONE-PAD DETAIL SKEW PLAN
(At interior bent)

ELASTOMERIC BEARING PAD PLACEMENT AND BEAM END DIAGRAMS

Place one bearing pad at forward station beam end.
Place two bearing pads at back station beam end.



- ① Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.
- ② Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in 1/8" increments) in this mark.
Examples: N=0, (for 0" taper)
N=1, (for 1/8" taper)
N=2, (for 1/4" taper)
(etc.)
Fabricated pad top surface slope must not vary from plan beam slope by more than $(\frac{0.0625"}{\text{Length}})$ 1N/IN.
- ③ Locate permanent mark here.

TABLE OF BEARING PAD DIMENSIONS (ALL PRESTR CONC SLAB BM TYPES)

One-Pad (Ty SB1-"N") ②			Two-Pad (Ty SB2-"N") ②		
W	L	T	W	L	T
14"	7"	2"	7"	7"	2"

Pad sizes shown are applicable for the following conditions:

- (1) All one, two and three span units where the minimum span length is not less than 25' and the maximum span is not more than 50'.
- (2) Skews less than or equal to 30°.

GENERAL NOTES:

These details accommodate skew angles up to 30°.

Shop drawings for approval are required.

A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.

Cost of furnishing and installing elastomeric bearings must be included in unit price bid for "Prestressed Concrete Slab Beams".

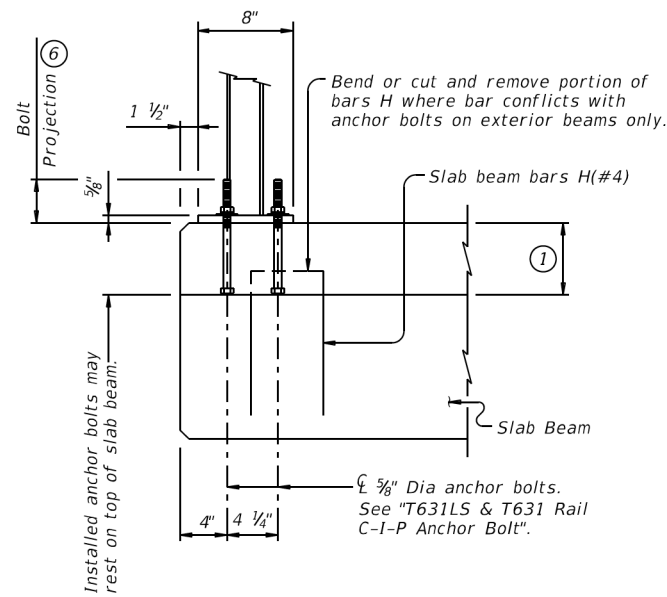
HL93 LOADING

		Bridge Division Standard	
ELASTOMERIC BEARING AND BEAM END DETAILS			
PRESTR CONCRETE SLAB BEAM			
PSBEB			
FILE: psbste06-17.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT
©TxDOT January 2017	CONT	SECT	JOB
REVISIONS	2520	01	015
	DIST	COUNTY	SHEET NO.
	SAT	MEDINA	271

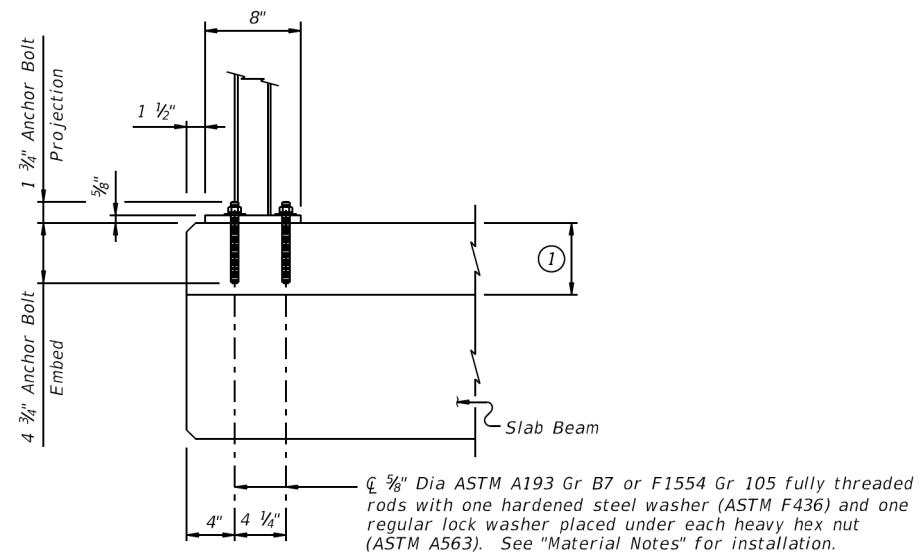
DATE: 8/25/2022
FILE: psbste06-17 (1).dgn

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DATE: 8/25/2022
 FILE: psbste07-18 (1).dgn

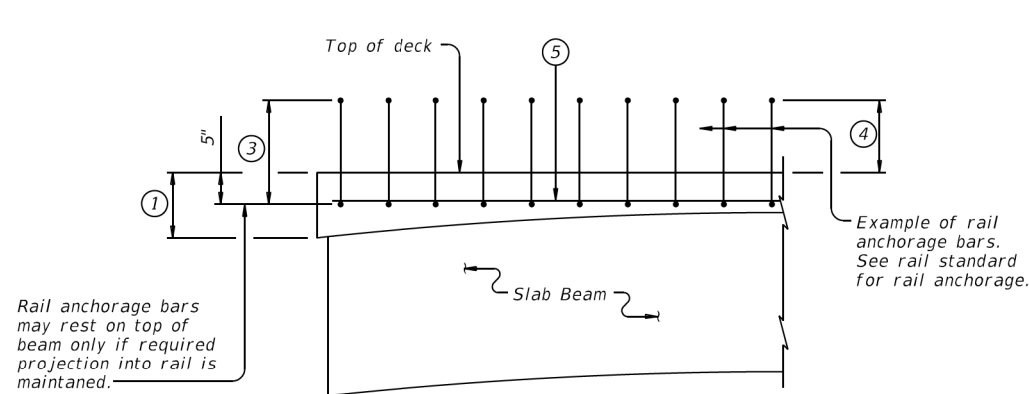


CAST-IN-PLACE ANCHORAGE OPTION

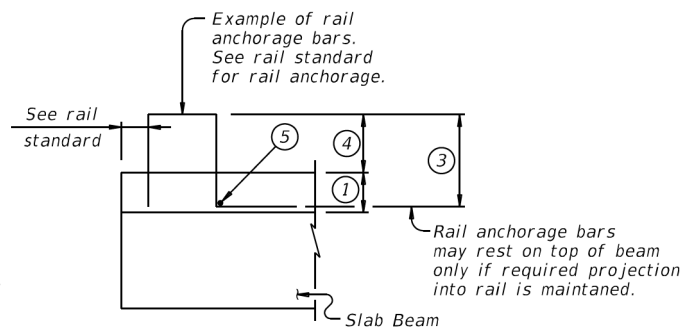


ADHESIVE ANCHORAGE OPTION

T631LS & T631 RAIL ANCHORAGE PLACEMENT ②⑦



PART SPAN ELEVATION

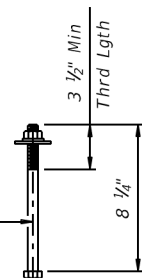


SECTION

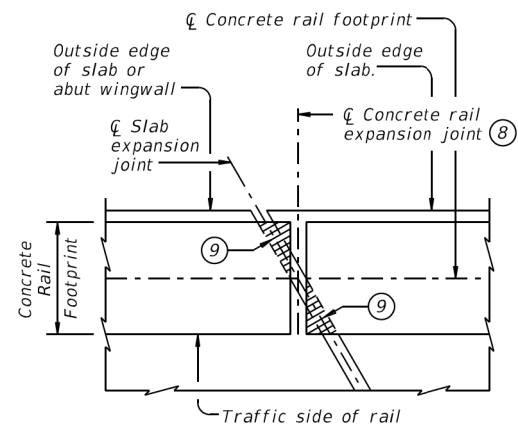
TYPICAL CONCRETE RAIL ANCHORAGE

(Showing typical concrete rail anchorage)

5/8" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563).



T631LS & T631 RAIL C-I-P ANCHOR BOLT



PLAN OF CONCRETE RAILS AT EXPANSION JOINTS

- ① Cast-in-place slab thickness varies due to beam camber (5" minimum).
- ② Replace cast-in-place anchor bolts shown on T631LS and T631 Rail standard with an adhesive anchor system or cast-in-place anchor bolts shown on this sheet.
- ③ Bar length shown on rail standard, minus 1 1/4". Adjust bar length for a raised sidewalk.
- ④ See rail standard for projection from finished grade or top of sidewalk.
- ⑤ Place additional (#5) longitudinal bar.
- ⑥ Excess bolt length has been provided to accommodate a variable slab thickness due to beam camber. If slab thickness on span details exceed 7", bolt length must be increased accordingly. After posts have been set and bolts tightened, bolt projection above nuts of more than 1/2" must be cut off and painted with two coats of zinc-rich paint conforming to the Item 445 "Galvanizing".
- ⑦ Distance from end of top outside edge of slab to center of first bolt group can not be less than 9", except: 15° Skew: 1'-0" (acute corner only)
30° Skew: 1'-3" (acute corner only)
- ⑧ Location of rail expansion joint must be at the intersection of centerline of slab expansion joint, centerline of rail footprint and perpendicular to slab outside edge.
- ⑨ Cross-hatched area must have 1/2" preformed bituminous fiber material under concrete rail, as shown.

CONSTRUCTION NOTES:

Rail anchorage bars may be field bent as required to clear rail reinforcing or provide minimum cover shown on standard rail detail sheets.
 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.

MATERIAL NOTES:

Galvanize all steel components of steel rail system.
 Provide Grade 60 reinforcing steel.
 Cast-in-place anchorage system for T631LS and T631 Rail must be 5/8" Dia heavy hex head anchor bolts (ASTM F3125 Gr 325 or A449) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed anchor bolts 4 1/2" minimum.
 Adhesive anchors for T631LS and T631 Rail must be 5/8" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 3/4". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 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."
 Epoxy coat or galvanize reinforcing steel shown on this standard if rail reinforcement is epoxy coated or galvanized.

GENERAL NOTES:

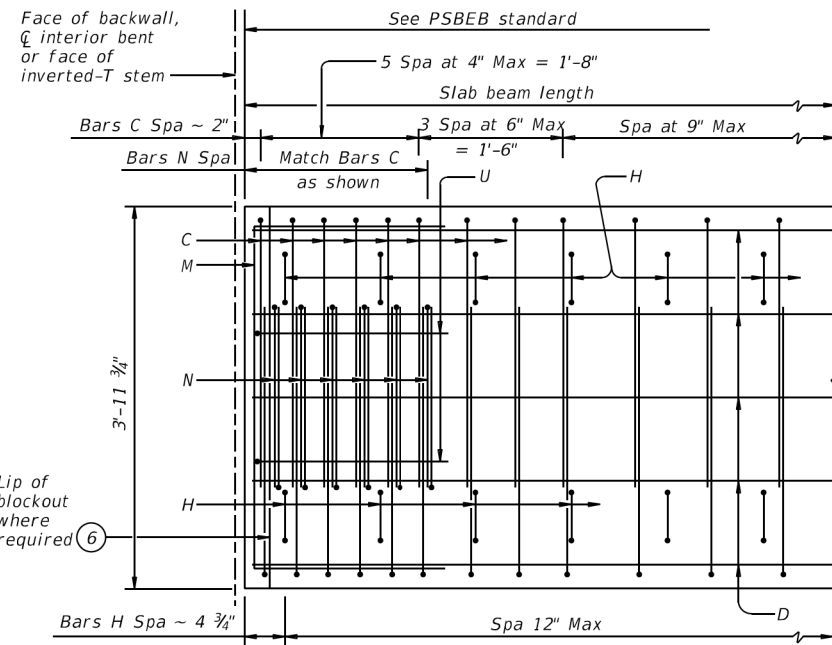
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
 This standard is for use with structures with a 5" minimum cast-in-place concrete slab.
 This standard may require modification for interior rails. This standard does not apply to median barriers.
 This standard does not provide details for Type T221P, T224, T80HT, T80SS, C412, PR11, PR22 and PR3 rails on slab beam bridges.
 See rail standards for approved speed restrictions, notes and details not shown.

Cover dimensions are clear dimensions, unless noted otherwise.

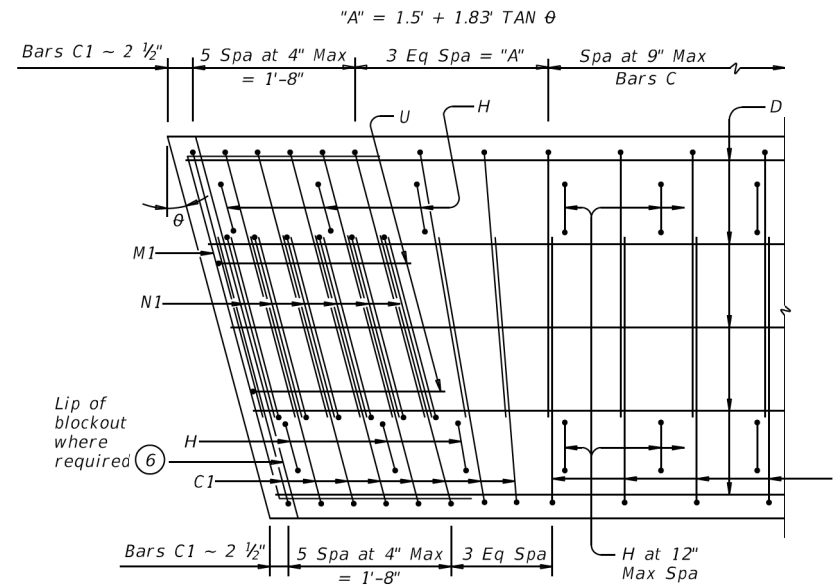
				Bridge Division Standard	
RAIL ANCHORAGE DETAILS					
PRESTR CONCRETE SLAB BEAMS					
PSBRA					
FILE: psbste07-18.dgn	DN: TxDOT	CK: TxDOT	OW: JTR	CK: JMH	
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY	
REVISIONS	2520	01	015	FM 220	
03-18: Updated adhesive anchor notes.	DIST	COUNTY	SHEET NO.		
	SAT	MEDINA	272		

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DATE: 8/25/2022
FILE: psbsts01-17.dgn

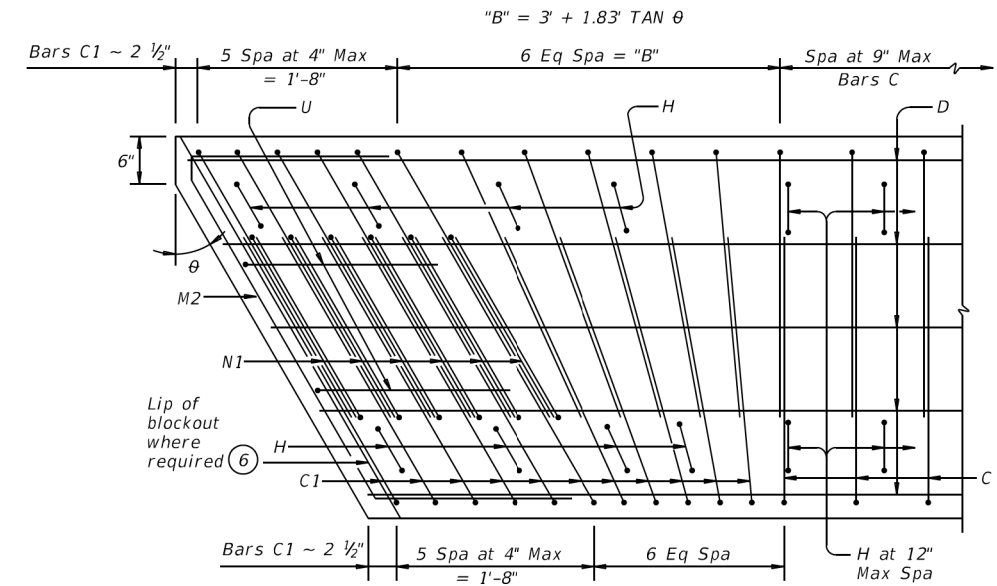


PART PLAN



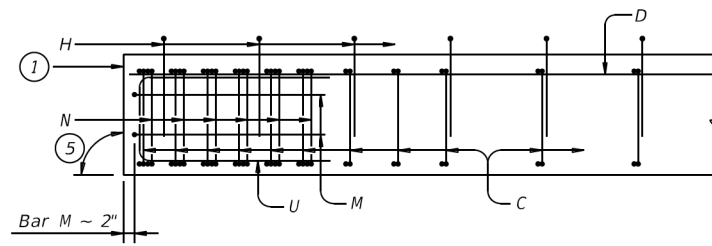
PART SKEW PLAN

(Showing θ over 0° to 15° Skew)

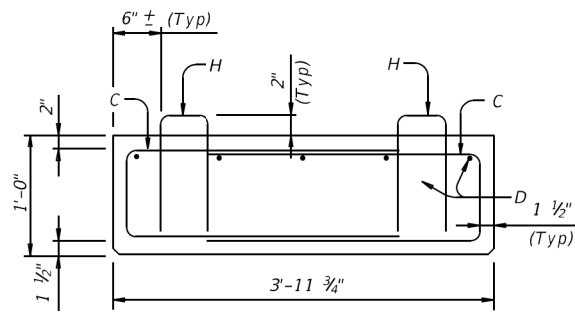


PART SKEW PLAN

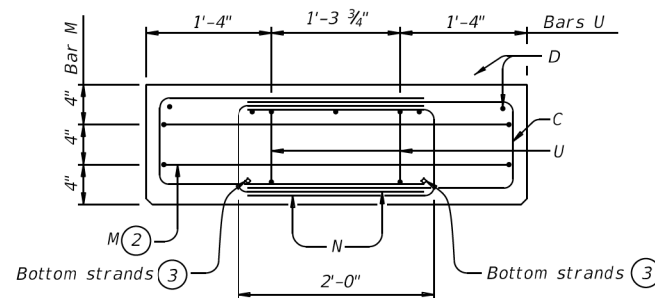
(Showing θ over 15° to 30° Skew)



ELEVATION

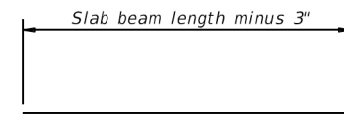


SECTION

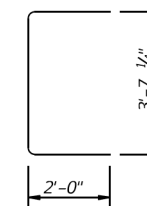


END MAT REINFORCING

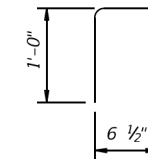
Bars H not shown for clarity.



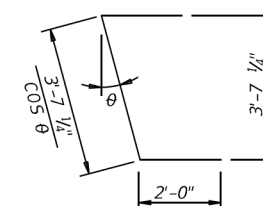
BARS D(#6)



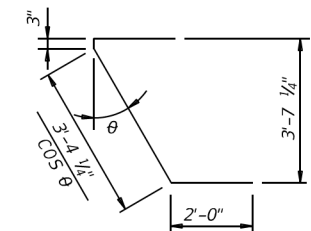
BARS M(#4)



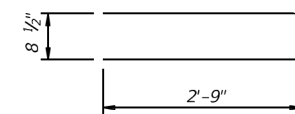
BARS H(#4)



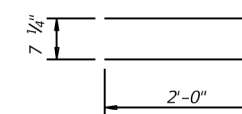
BARS M1(#4)



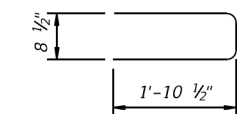
BARS M2(#4)



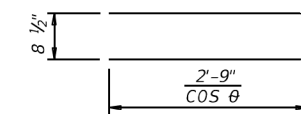
BARS C(#4)



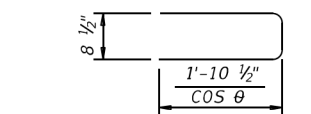
BARS U(#5)



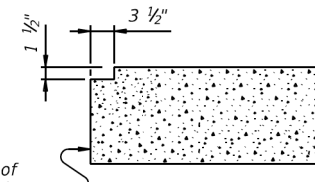
BARS N(#4)



BARS C1(#4)



BARS N1(#4)



ELEVATION OF BLOCKOUT ⑥

BEAM PROPERTIES

Area	in ²	573.0
Y top	in	6.00
Y bott	in	6.00
I	in ⁴	6,876
Weight ④	lb/ft	597

GENERAL NOTES:

- Designed according to AASHTO LRFD Bridge Design Specifications.
- Provide Class H concrete. Provide Class H (HPC) if shown elsewhere in the plans.
- Provide Grade 60 reinforcing steel.
- An equal area of welded wire reinforcement (WWR) (ASTM 1064) may be substituted for bars C and D if approved by the Engineer.
- These details can be used for any skew angle up to a maximum of 30 degrees.
- Chamfer all exposed corners 3/4" or round to a 3/4" radius.
- Details are drawn showing right forward skew. See Bridge Layout for actual direction.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING

Texas Department of Transportation
Bridge Division Standard

**PRESTRESSED CONCRETE
SLAB BEAM DETAILS**

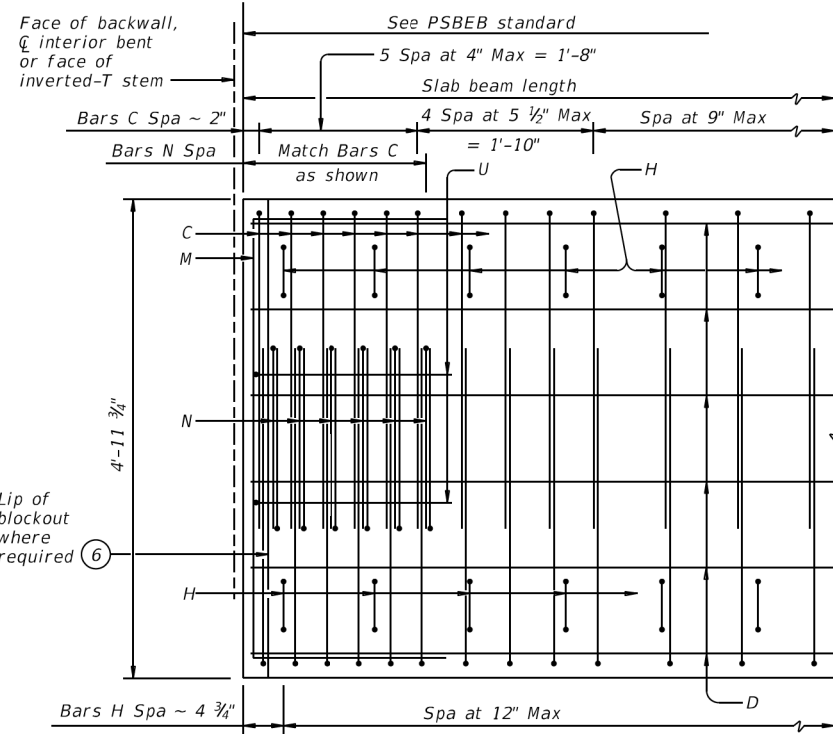
(TYPE 4SB12)

PSB-4SB12

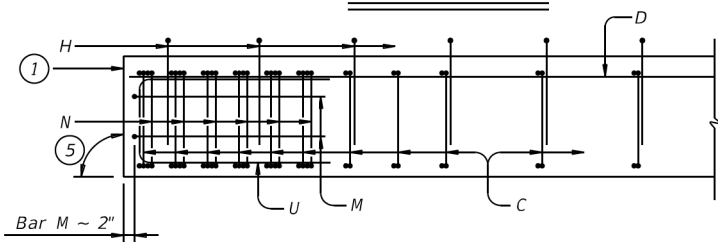
FILE: psbsts01-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	015	FM 220
DIST	COUNTY		SHEET NO.	
SAT	MEDINA		273	

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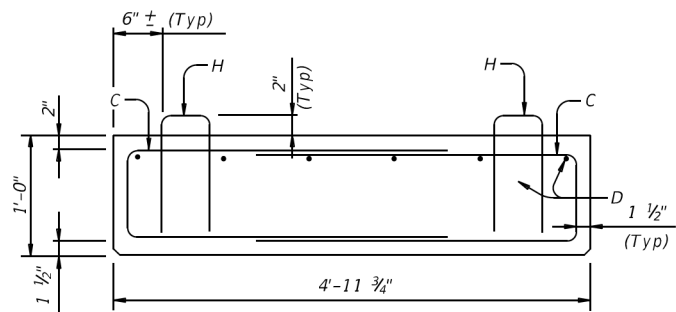
DATE: 8/25/2022
FILE: psbsts03-17.dgn



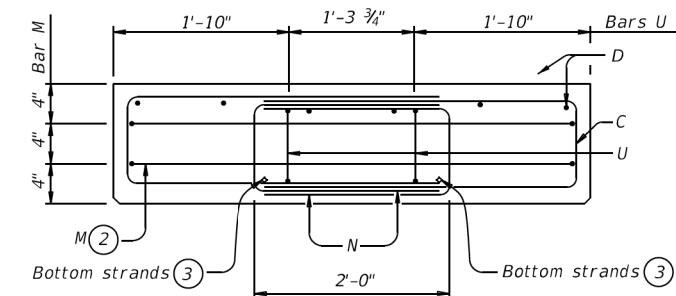
PART PLAN



ELEVATION

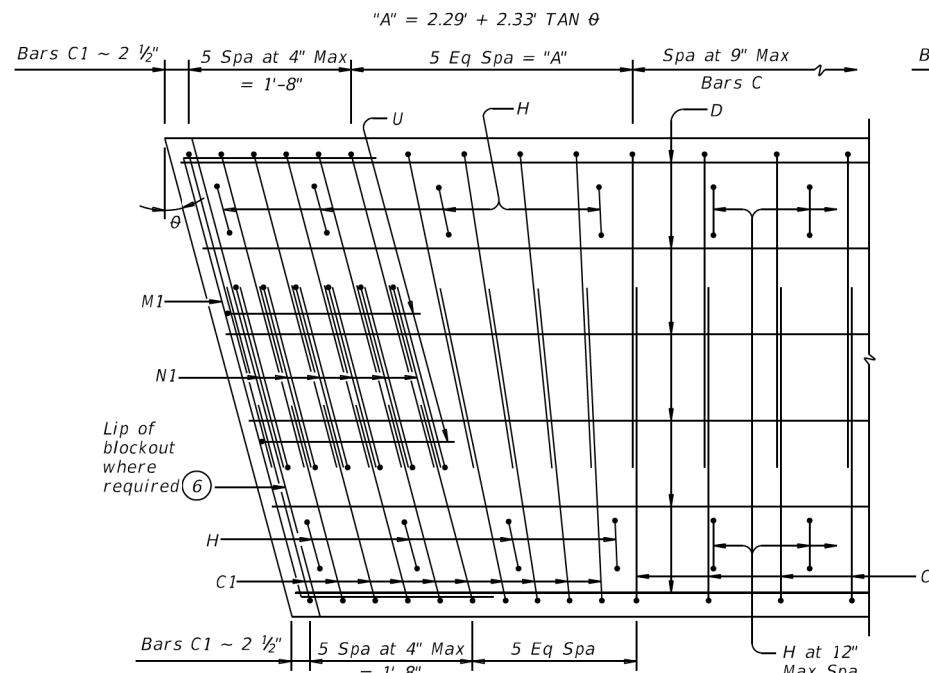


SECTION



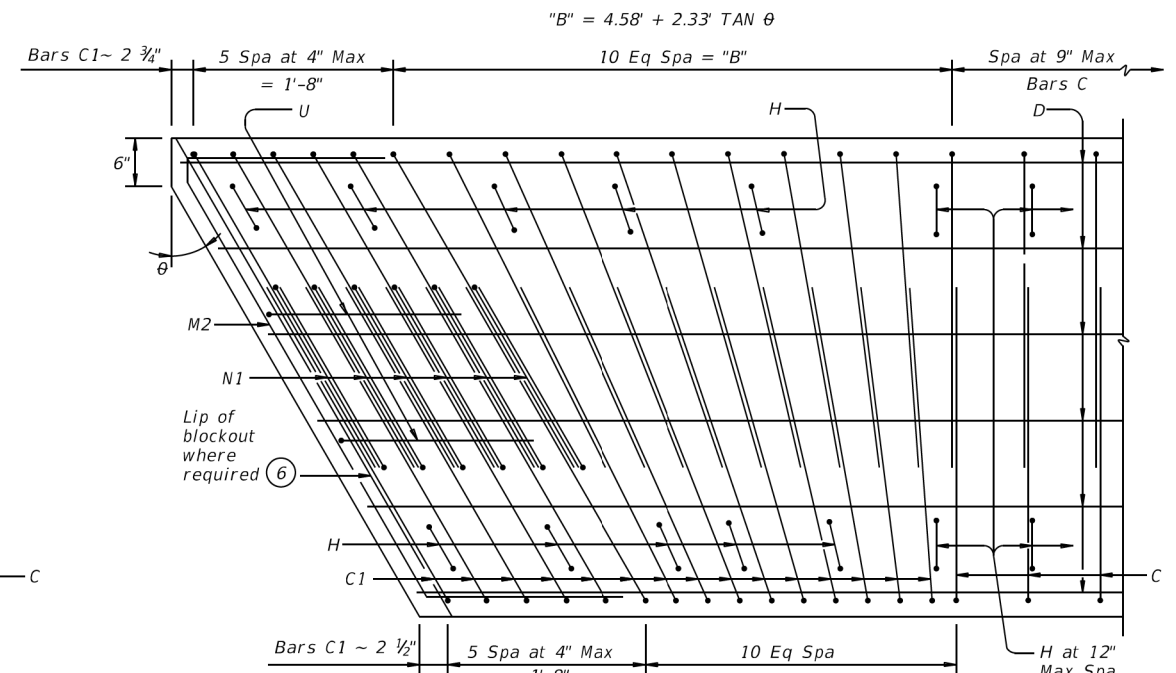
END MAT REINFORCING

Bars H not shown for clarity.



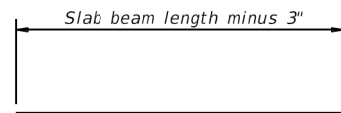
PART SKEW PLAN

(Showing θ over 0° to 15° Skew)



PART SKEW PLAN

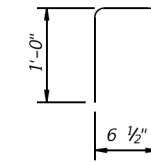
(Showing θ over 15° to 30° Skew)



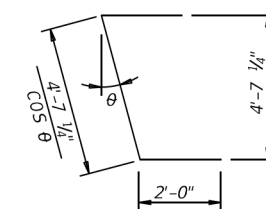
BARS D(#6)



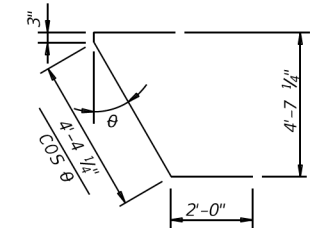
BARS M(#4)



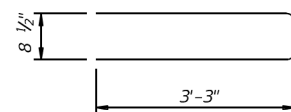
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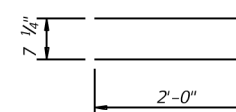
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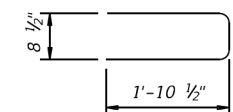
BARS M2(#4)



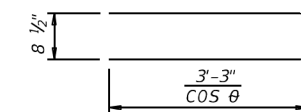
BARS C(#4)



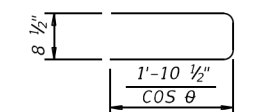
BARS U(#5)



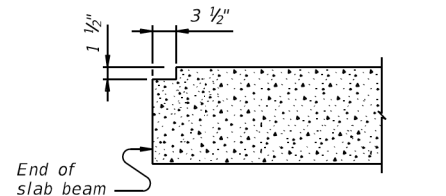
BARS N(#4)



BARS C1(#4)



BARS N1(#4)



ELEVATION OF BLOCKOUT (6)

BEAM PROPERTIES		
Area	in ²	717.0
Y top	in	6.00
Y bott	in	6.00
I	in ⁴	8,604
Weight (4)	lb/ft	747

GENERAL NOTES:

- Designed according to AASHTO LRFD Bridge Design Specifications. Provide Class H concrete. Provide Class H (HPC) if shown elsewhere in the plans.
- Provide Grade 60 reinforcing steel.
- An equal area of welded wire reinforcement (WWR) (ASTM 1064) may be substituted for bars C and D if approved by the Engineer.
- These details can be used for any skew angle up to a maximum of 30 degrees.
- Chamfer all exposed corners 3/4" or round to a 3/4" radius.
- Details are drawn showing right forward skew. See Bridge Layout for actual direction.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

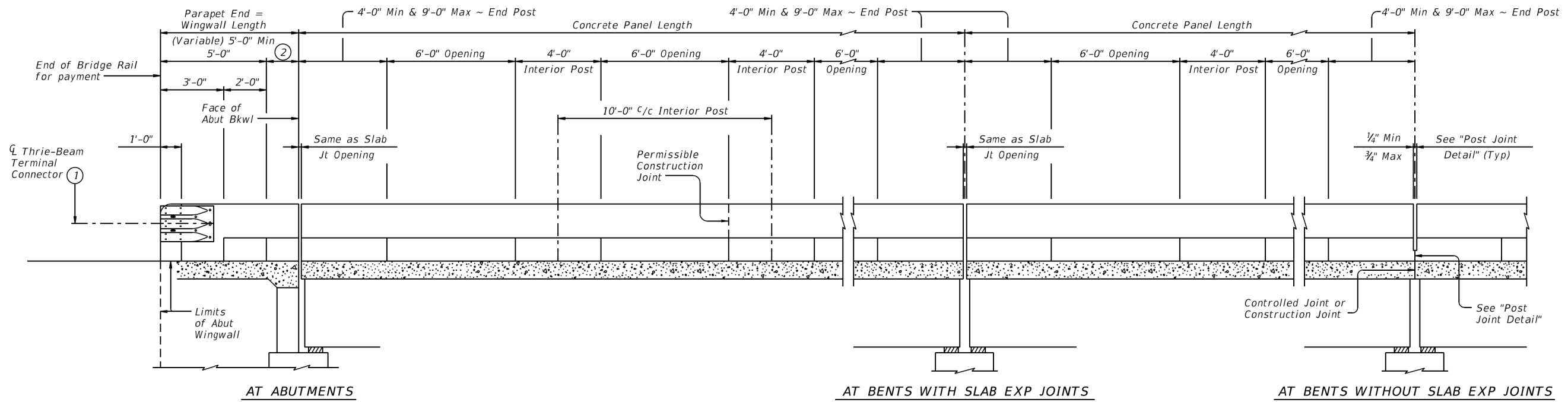
- (1) See End Mat Reinforcing detail.
- (2) Adjust bars M vertically to avoid strands.
- (3) See sheet PSBND or PSBSD for strand locations.
- (4) Assumes 150 pcf weight density of concrete.
- (5) 90° at conventional interior bents. End of beam must be vertical at abutment backwall and inverted-T stem.
- (6) Blockout required at armor joint (AJ) and sealed expansion joint (SEJ) locations to accommodate joint anchorage.

HL93 LOADING

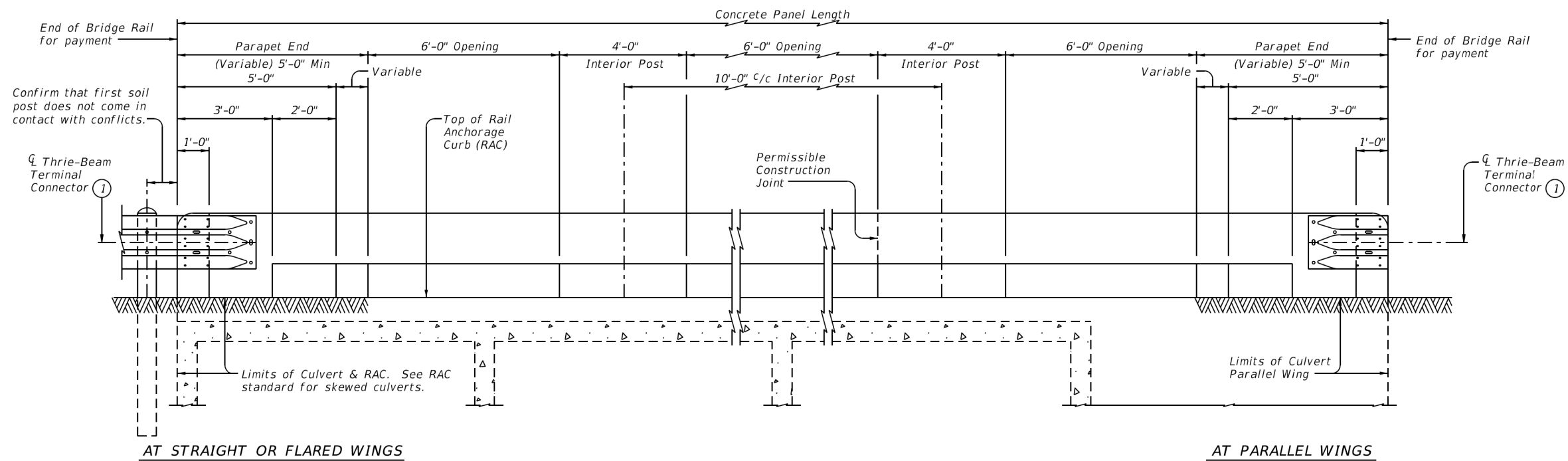
		Bridge Division Standard	
PRESTRESSED CONCRETE SLAB BEAM DETAILS (TYPE 5SB12) PSB-5SB12			
FILE: psbsts03-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
©TxDOT January 2017	CONT: 2520	SECT: 01	JOB: 015
REVISIONS	COUNTY: MEDINA		SHEET NO.: 274
HIGHWAY: FM 220			

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DATE: 8/25/2022
FILE: r1std005-19 (1).dgn



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)



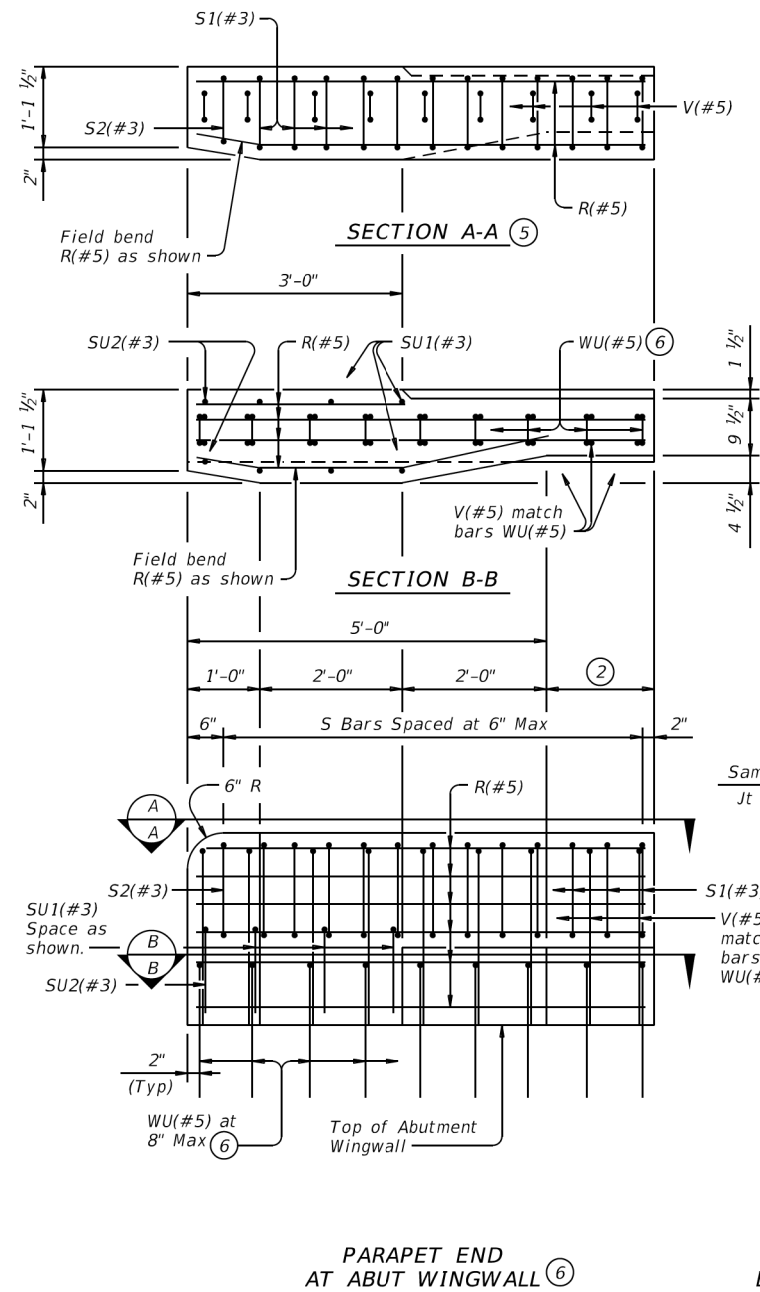
TRAFFIC RAIL

TYPE T223

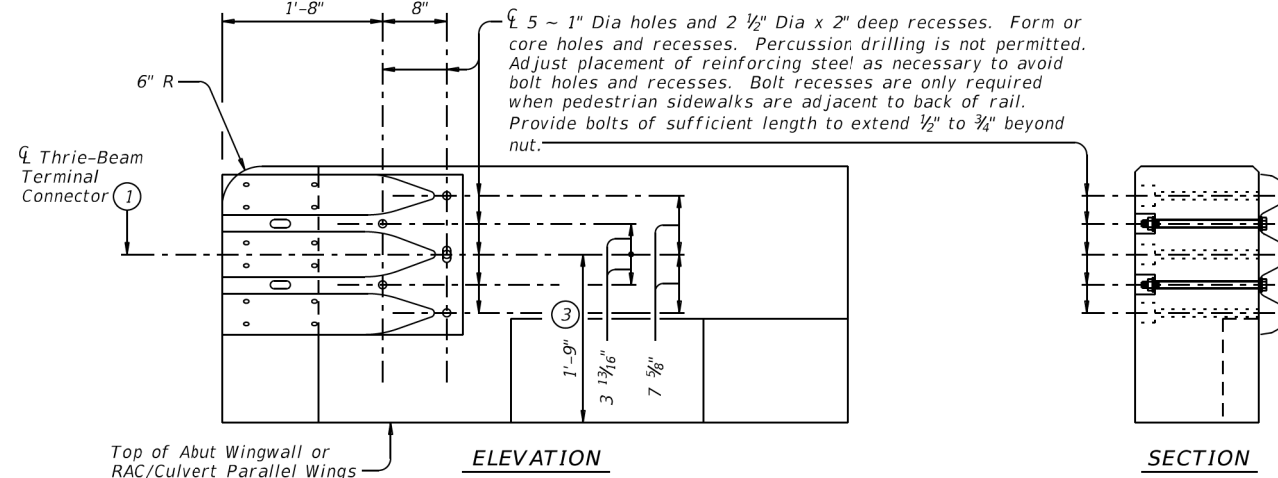
FILE: r1std005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	015	FM 220
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	275	

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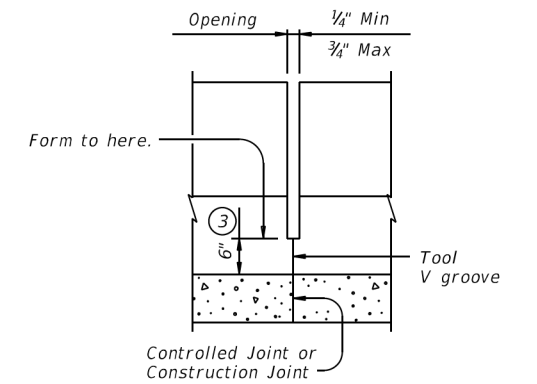
DATE: 8/25/2022
FILE: r1std005-19 (1).dgn



PARAPET END AT ABUT WINGWALL (6)

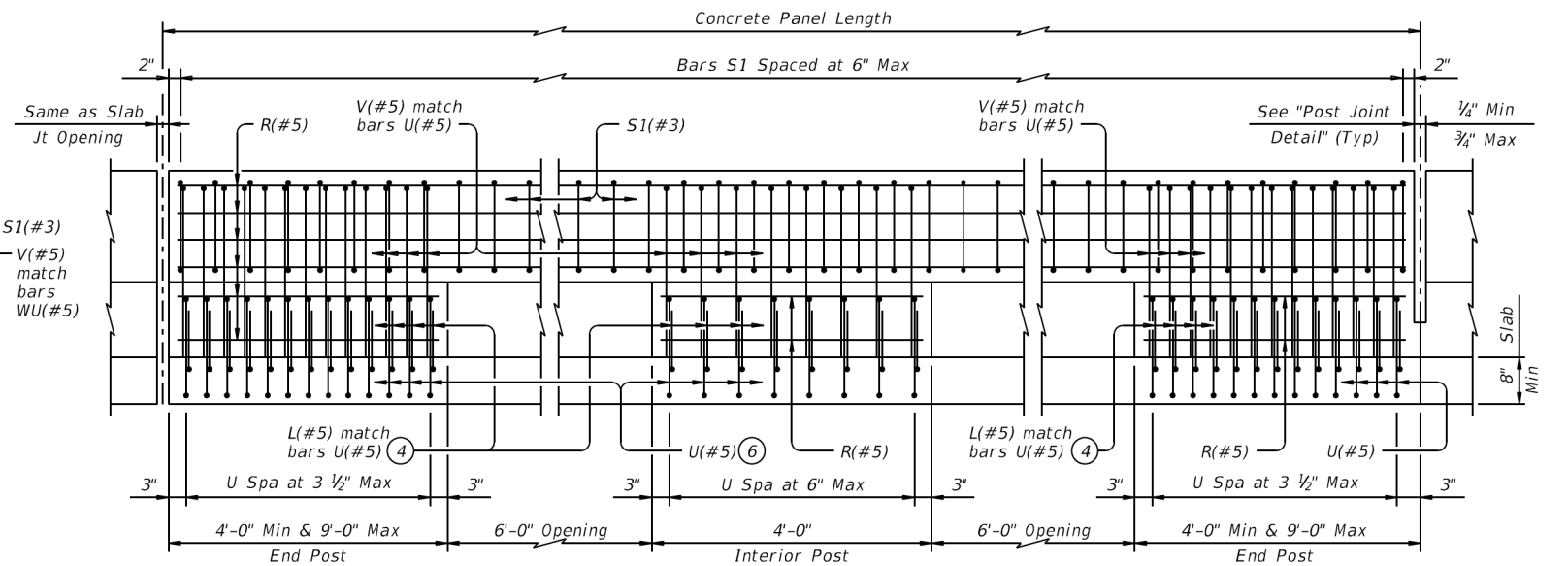


TERMINAL CONNECTION DETAILS



POST JOINT DETAIL

Provide at all interior bents without slab expansion joints.



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

Showing rail on slab. Rail on box culvert similar.

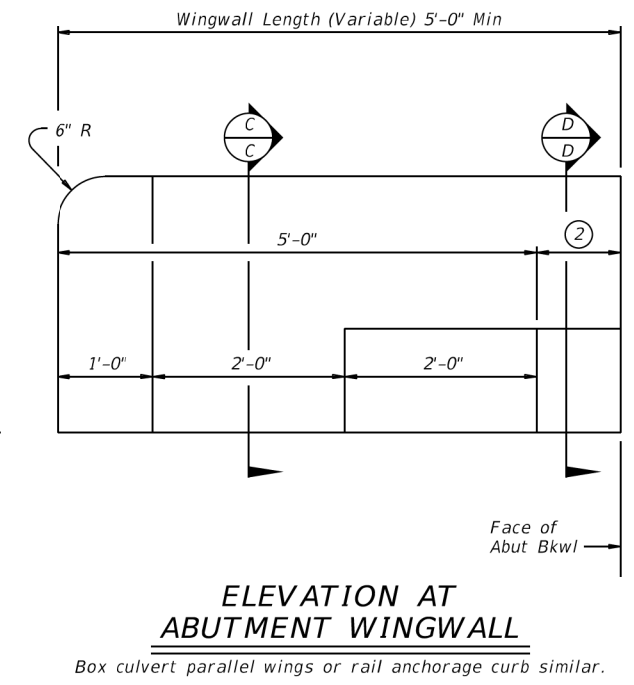
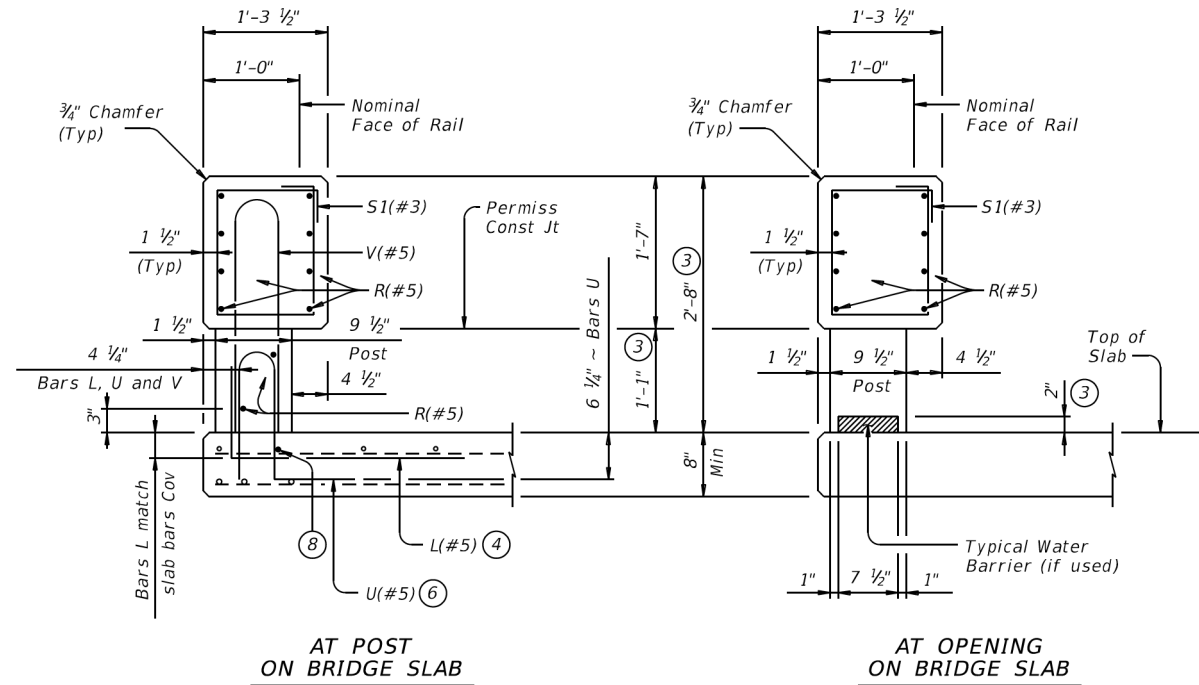
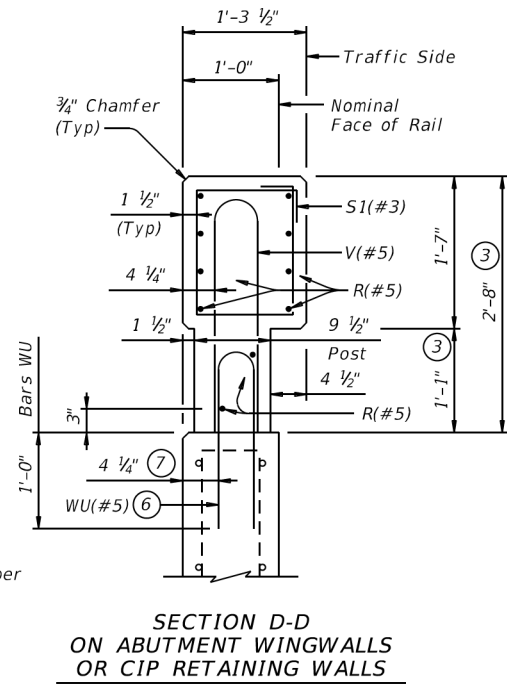
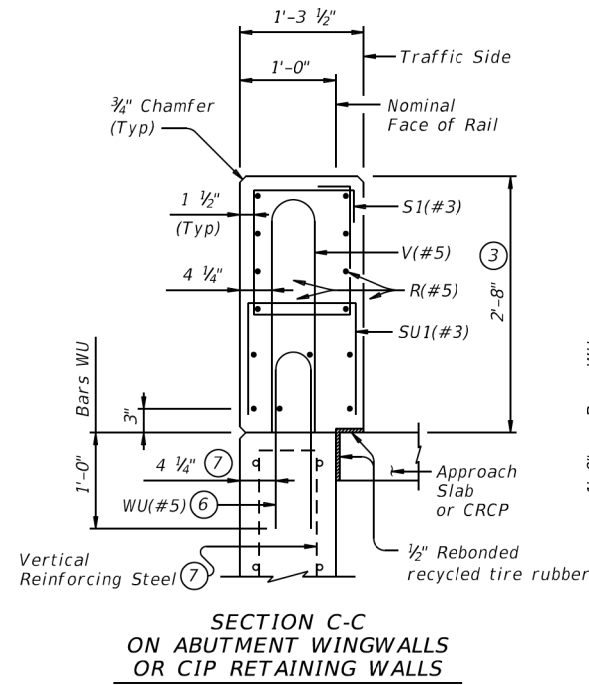
- (1) Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- (2) Wingwall Length minus 5'-0" (Varies)
- (3) Increase 2" 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 anchorage curb over culvert top slab. Use Bars WU(#5) in culvert parallel wings.

TRAFFIC RAIL

TYPE T223

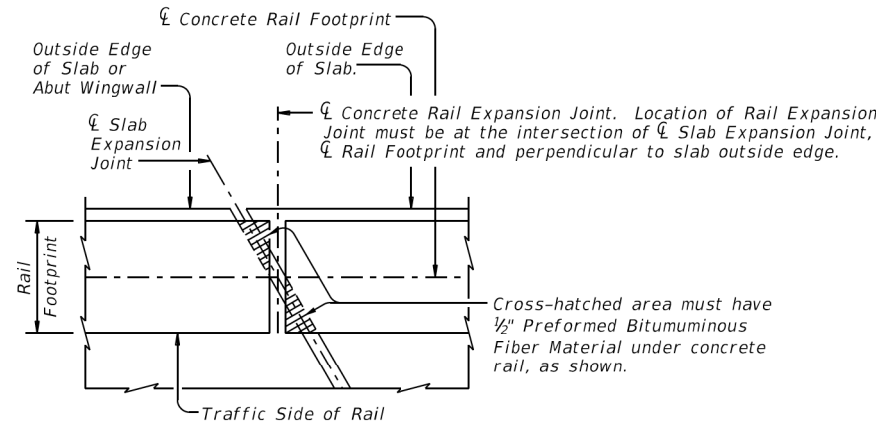
FILE: r1std005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	015	FM 220
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	276	

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SECTIONS THRU RAIL
Sections on box culverts similar.

- 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 1/4" above the roadway surface without overlay.



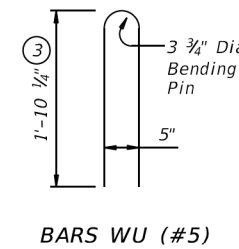
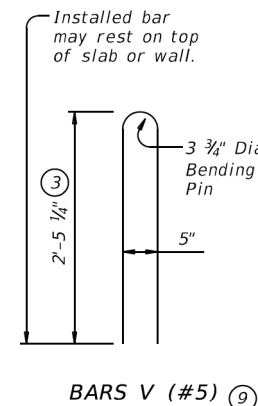
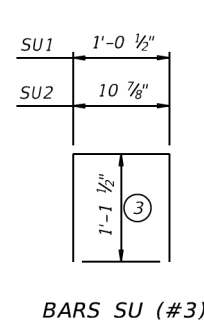
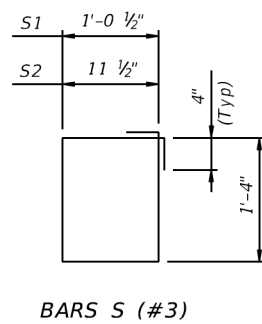
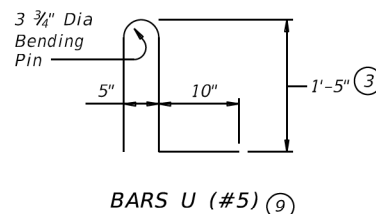
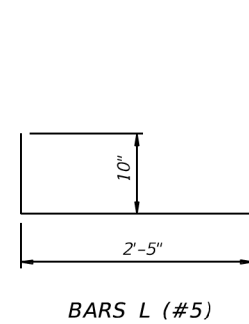
PLAN OF RAIL AT EXPANSION JOINTS
Example showing Slab Expansion Joints without breakbacks.

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.



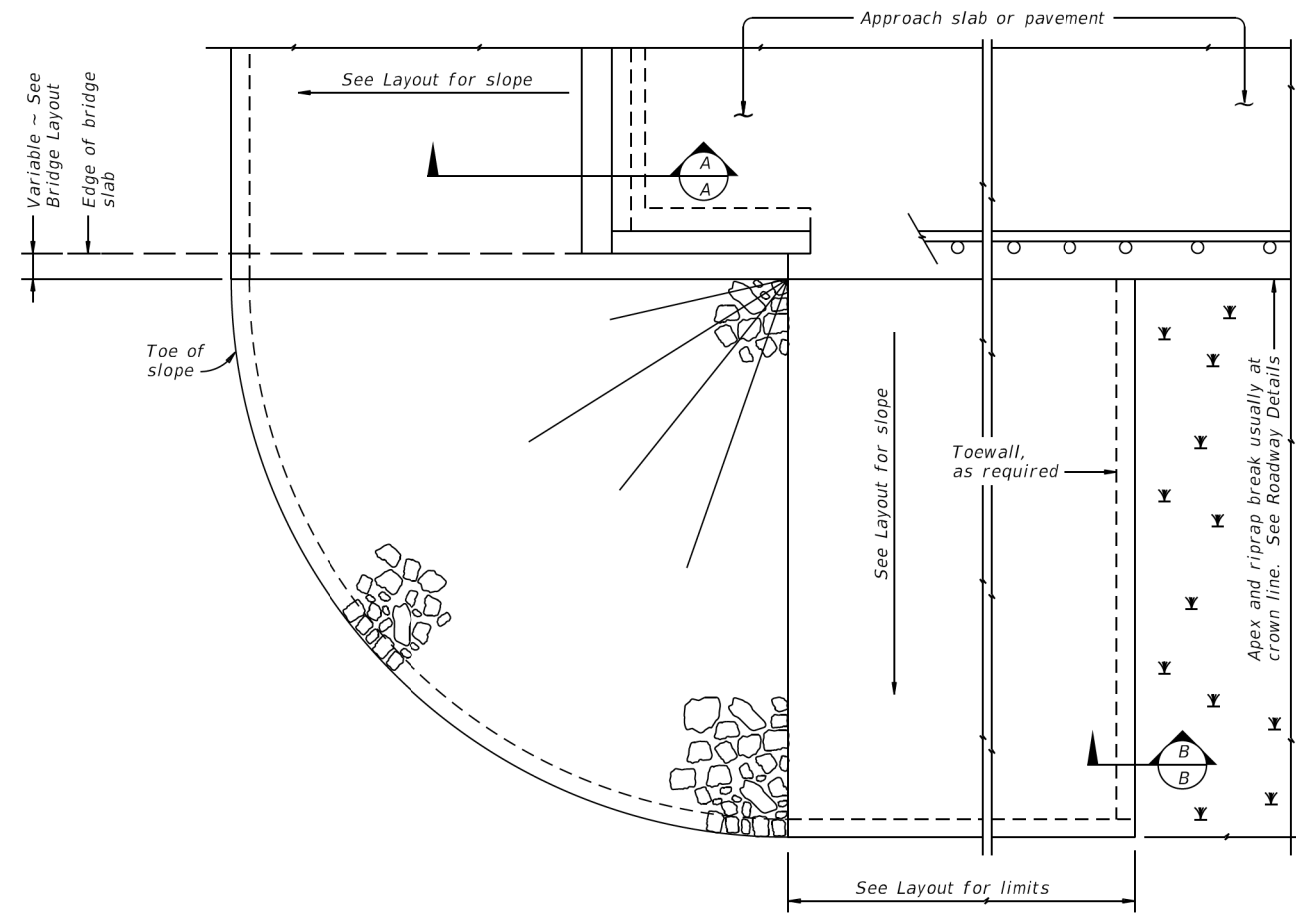
SHEET 3 OF 3

		Bridge Division Standard	
<h1>TRAFFIC RAIL</h1>			
<h2>TYPE T223</h2>			
FILE: r1std005-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONT	SECT	JOB
REVISIONS	2520	01	015
	DIST	COUNTY	SHEET NO.
	SAT	MEDINA	277

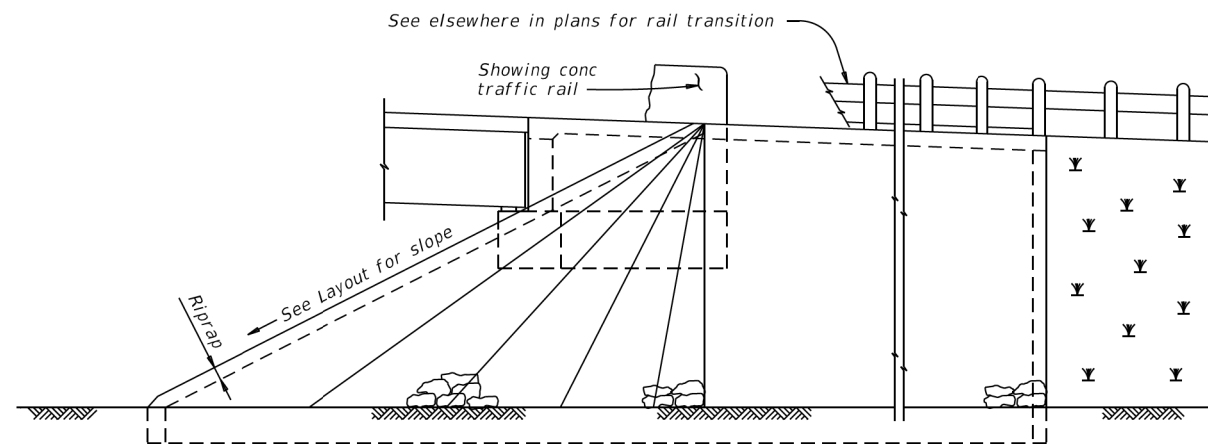
DATE: 8/25/2022
FILE: r1std005-19 (1).dgn

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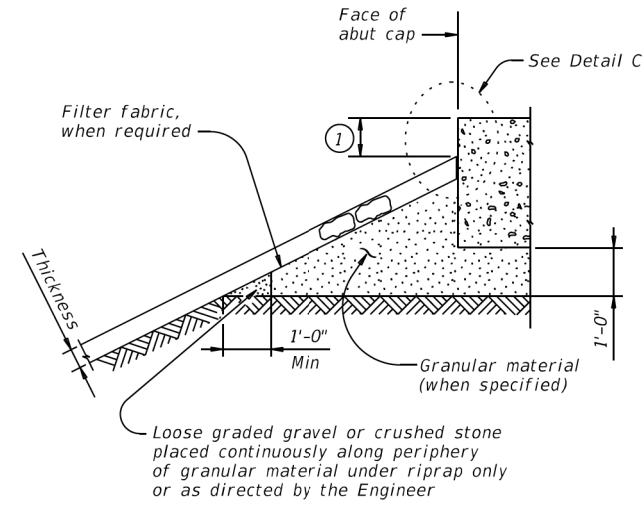
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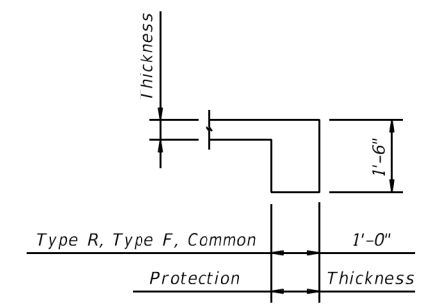
PLAN



ELEVATION

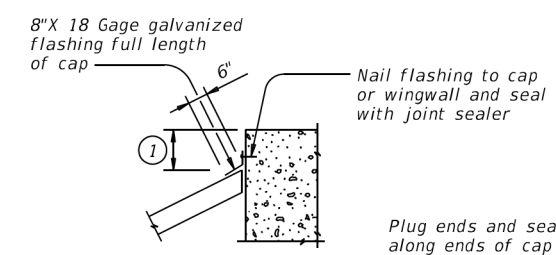


SECTION A-A AT CAP

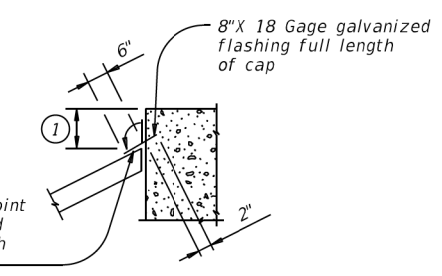


SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A



CAP OPTION B

DETAIL C

① Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

GENERAL NOTES:
Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
See elsewhere in plans for locations and details of shoulder drains.

SHEET 1 OF 2

		Bridge Division Standard	
<h2>STONE RIPRAP</h2>			
<h3>SRR</h3>			
FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH
©TxDOT April 2019	CONT	SECT	JOB
REVISIONS	2520	01	015
	DIST	COUNTY	SHEET NO.
	SAT	MEDINA	278

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DATE: 8/25/2022
FILE: srrstde1-19 (2).dgn

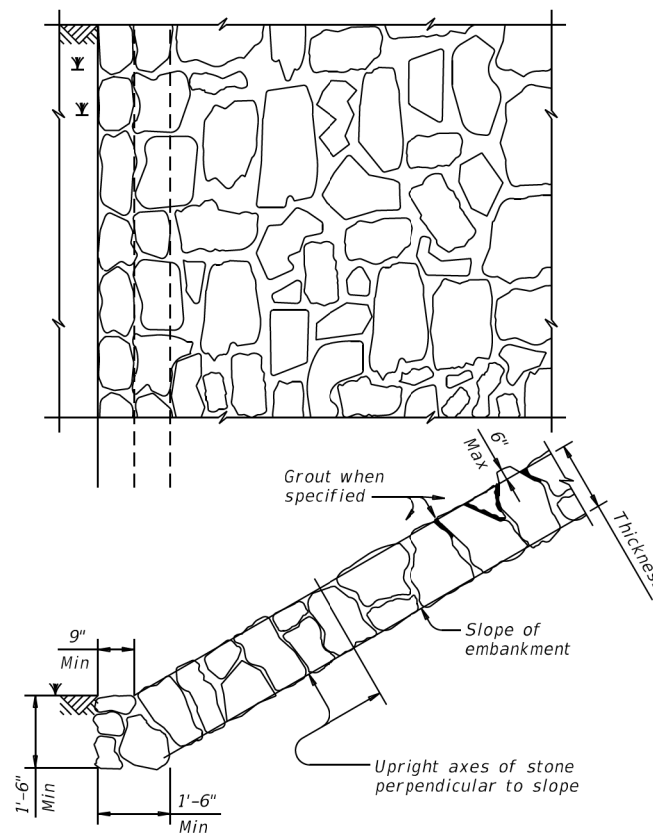


FIGURE 1 ~ TYPE R STONE RIPRAP
dry or grouted

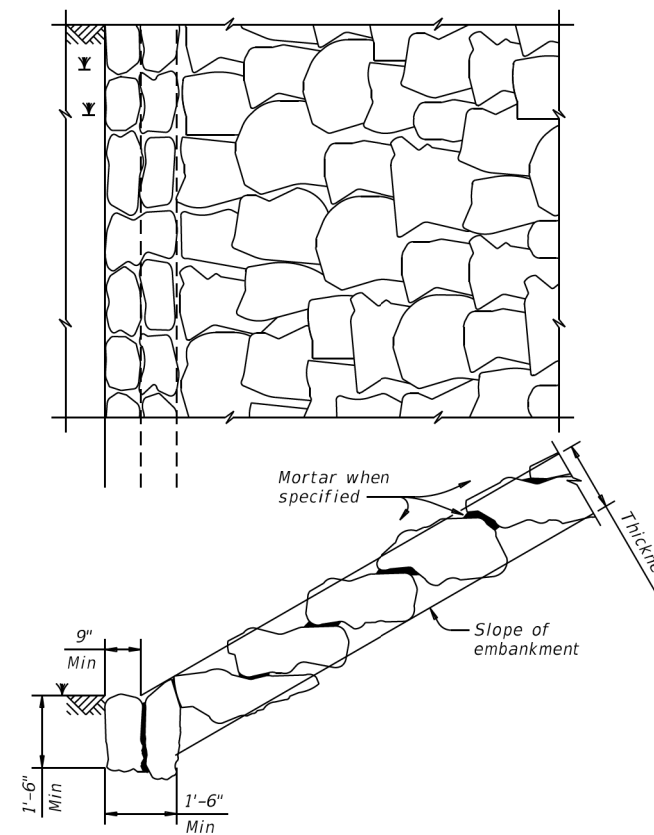


FIGURE 2 ~ TYPE F STONE RIPRAP
dry or mortared

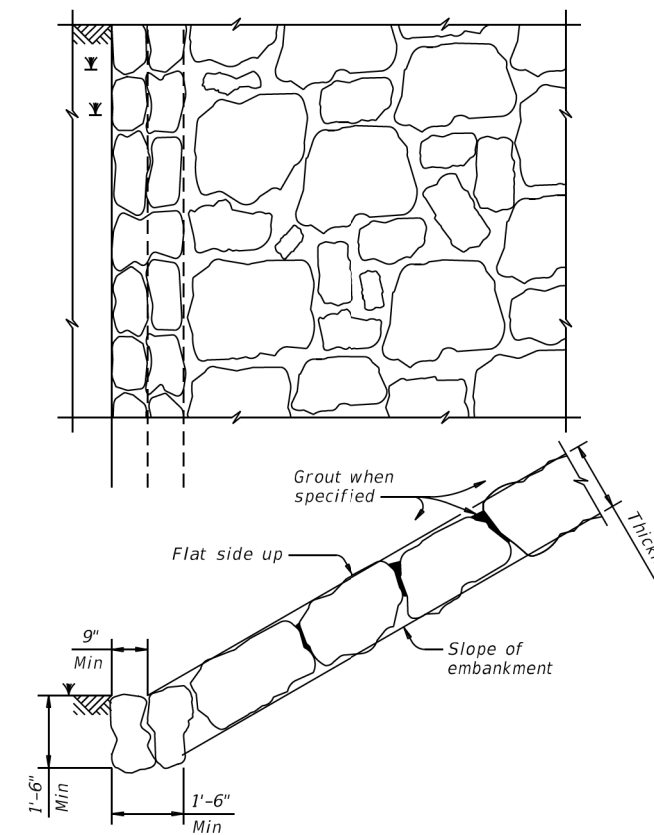


FIGURE 3 ~ TYPE F STONE RIPRAP
grouted

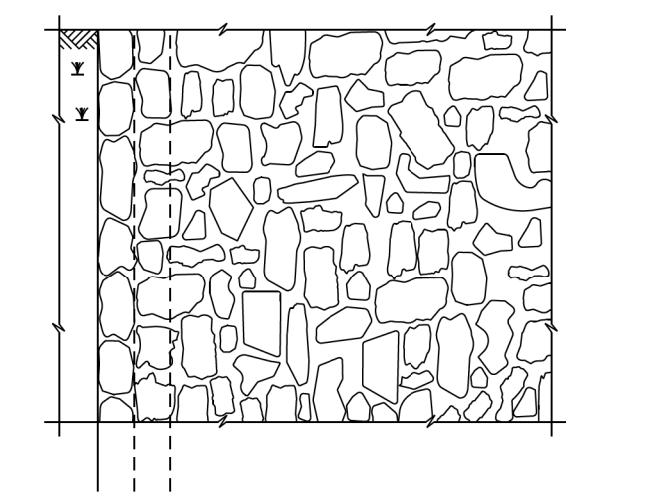


FIGURE 4 ~ COMMON STONE RIPRAP
dry or grouted

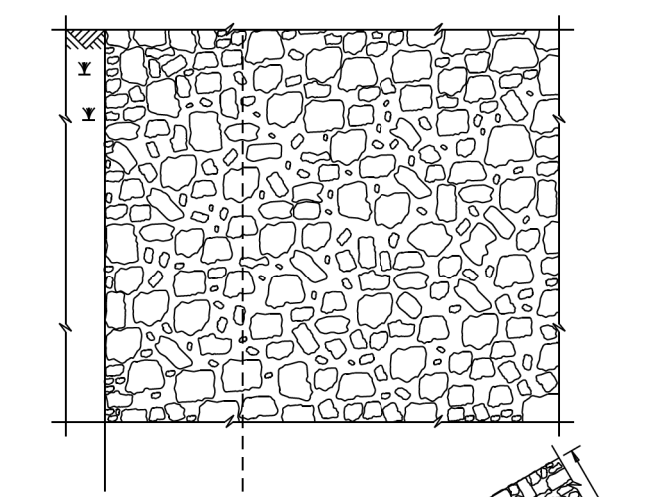
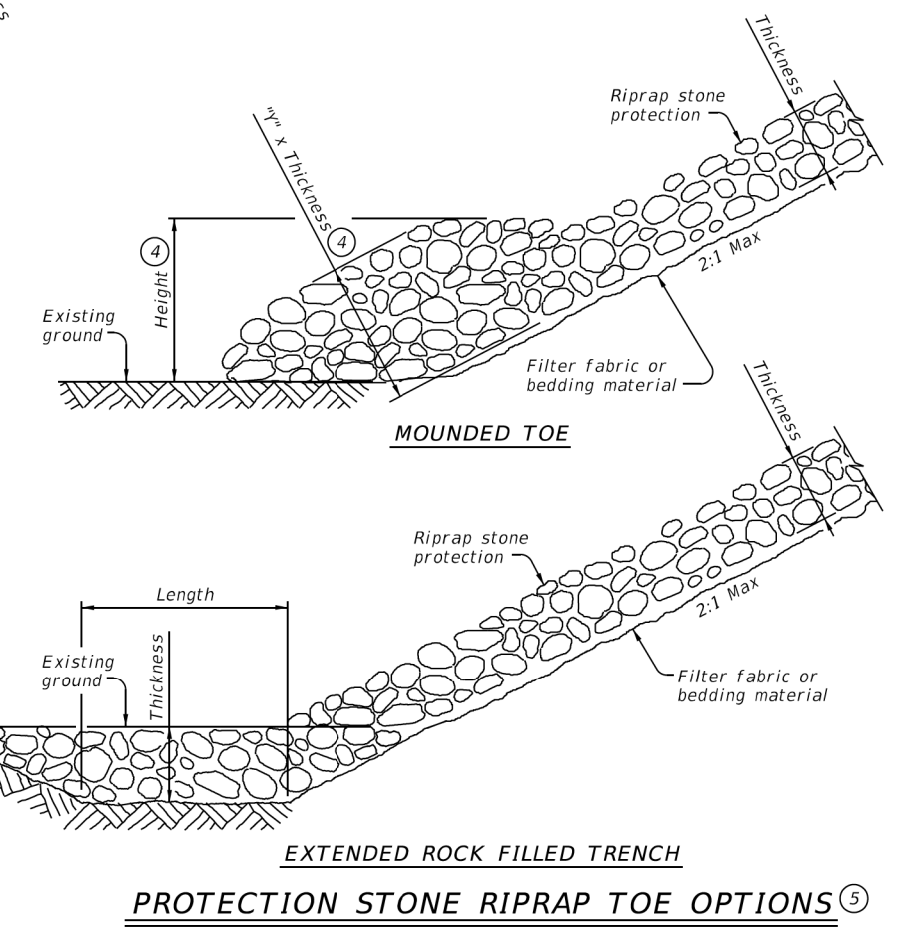


FIGURE 5 ~ PROTECTION STONE RIPRAP

- ② Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.
- ③ Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.
- ④ "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.
- ⑤ List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



PROTECTION STONE RIPRAP TOE OPTIONS

SHEET 2 OF 2






		Bridge Division Standard	
<h2>STONE RIPRAP</h2>			
<h3>SRR</h3>			
FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH
©TxDOT April 2019	CONT: 2520	SECT: 01	JOB: 015
REVISIONS:		DIST: SAT	COUNTY: MEDINA
			SHEET NO: 279

Plotted on: 12/20/2022

Design Filename: P:\117\99\04\Design\Civil\SW3P\1179904_SW3P01.dgn

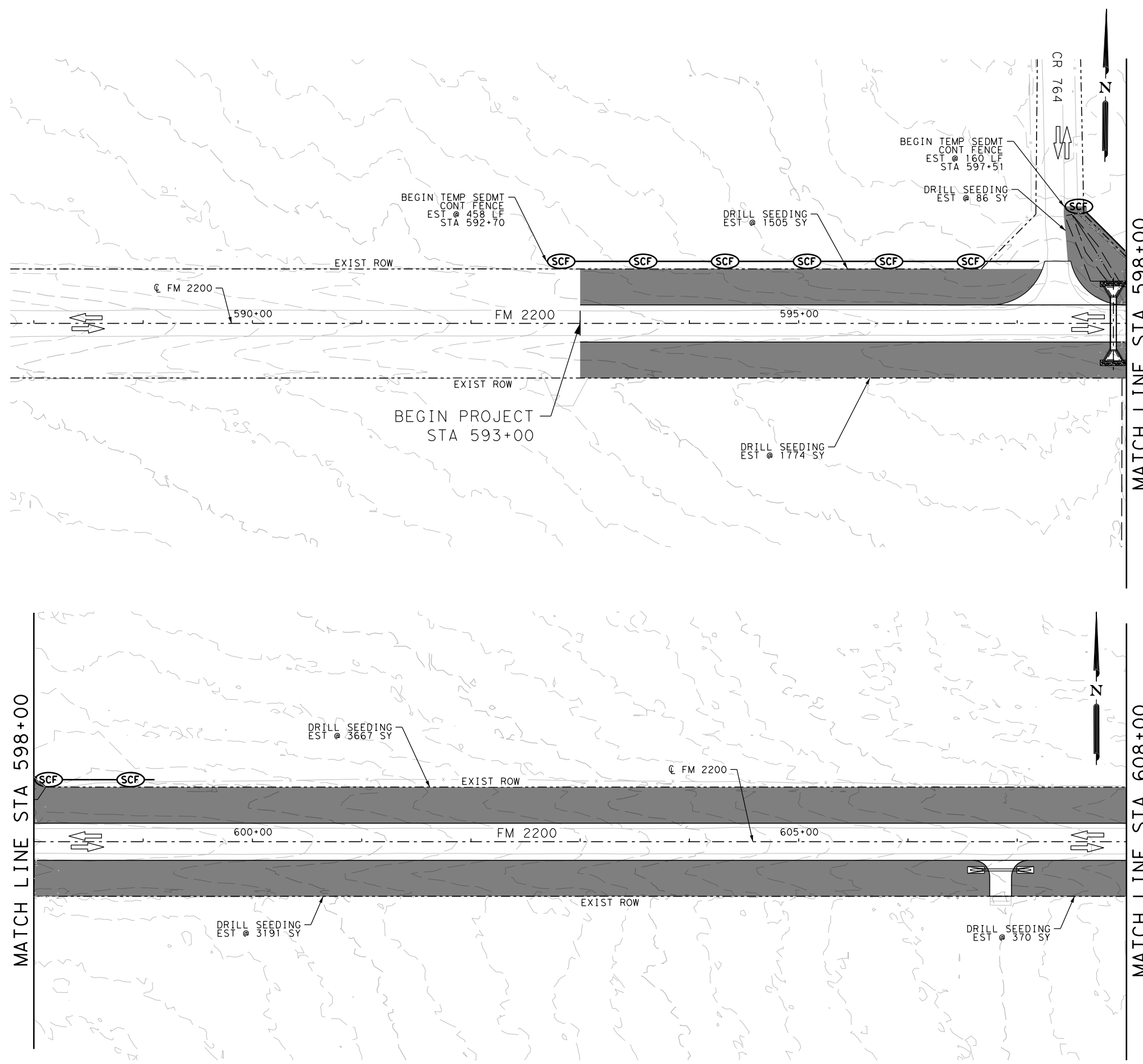
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0164-6021	CELL FBR MLCH SEED (PERM) (RURAL) (SANDY)	SY	10593
0164-6029	CELL FBR MLCH SEED (TEMP) (WARM)	SY	2648
0164-6031	CELL FBR MLCH SEED (TEMP) (COOL)	SY	2648
0168-6001	VEGETATIVE WATERING	MG	165
0506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	112
0506-6024	CONSTRUCTION EXITS (REMOVE)	SY	112
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	618
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	618

LEGEND

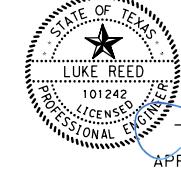
-  SEDIMENT CONTROL FENCE
-  DRILL SEEDING
-  EXIST RIGHT OF WAY
-  SOIL RETENTION BLANKETS (TY E)
-  BLOCK SODDING

- NOTES:**
- REFER TO TEMPORARY EROSION CONTROL MEASURE STANDARDS FOR MORE INFORMATION.
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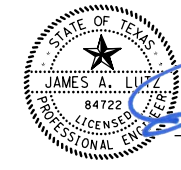


DESIGN



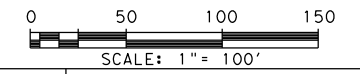
Luke Reed
LUKE REED, P.E.
APPROVAL

12/20/2022
DATE



James A. Lutz
JAMES A. LUTZ, P.E.
APPROVAL

12/20/2022
DATE



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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200

SW3P LAYOUTS

BEGIN PROJECT TO STA 608+00

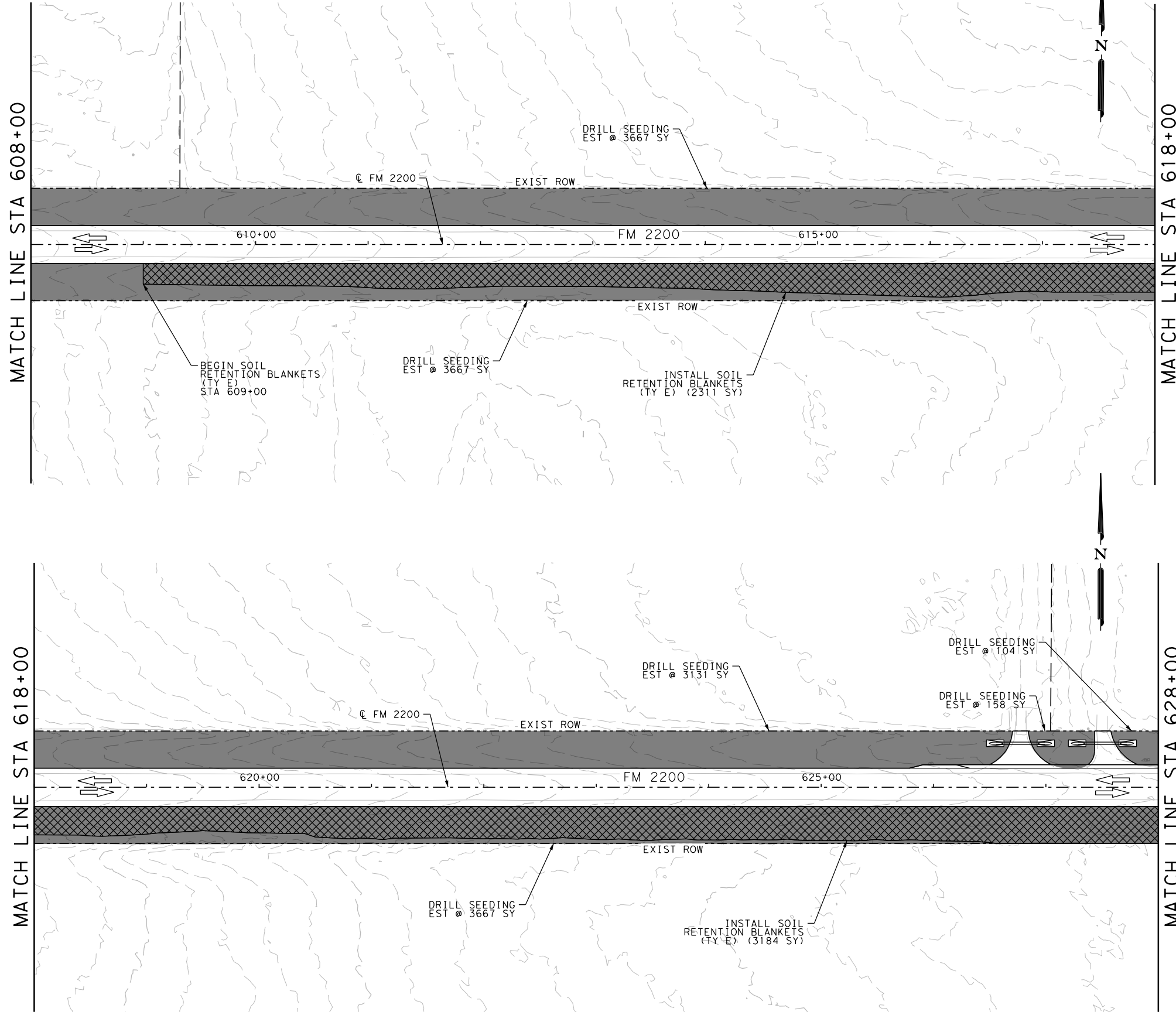
SHEET 1 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	280

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\SW3P\1179904_SW3P02.dgn

ITEM	DESCRIPTION	UNIT	QTY
0150-6002	BLADING	HR	40
0164-6021	CELL FBR MLCH SEED (PERM) (RURAL) (SANDY)	SY	14394
0164-6029	CELL FBR MLCH SEED (TEMP) (WARM)	SY	3599
0164-6031	CELL FBR MLCH SEED (TEMP) (COOL)	SY	3599
0168-6001	VEGETATIVE WATERING	MG	225
0169-6005	SOIL RETENTION BLANKETS (CL 2) (TY E)	SY	5495



LEGEND

- SEDIMENT CONTROL FENCE
- DRILL SEEDING
- EXIST RIGHT OF WAY
- SOIL RETENTION BLANKETS (TY E)
- BLOCK SODDING

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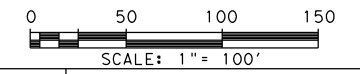
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DESIGN

LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

JAMES A. LUTZ, P.E. 12/20/2022 DATE



REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
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 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200
SW3P LAYOUTS
 STA 608+00 TO STA 628+00

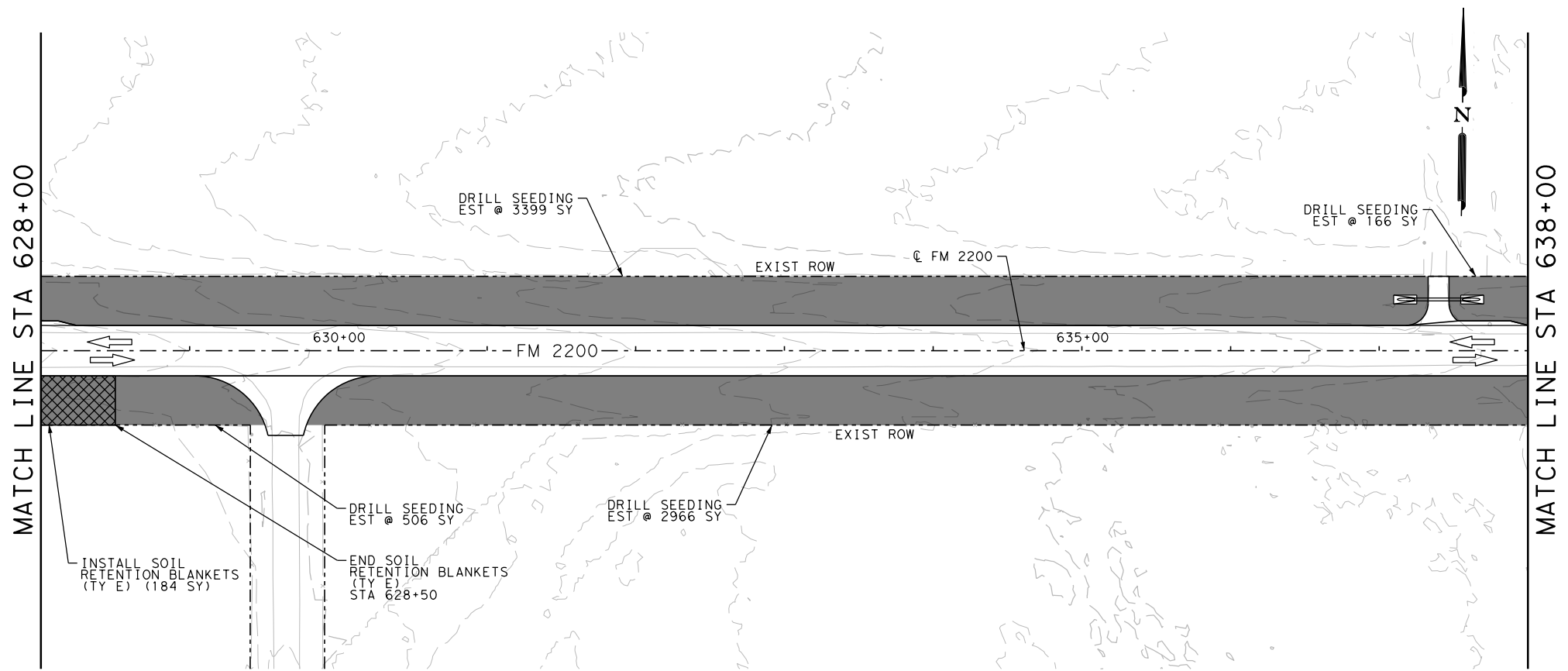
SHEET 2 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	281

Plotted on: 12/20/2022

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0164-6029	CELL FBR MLCH SEED (TEMP) (WARM)	SY	3493
0164-6031	CELL FBR MLCH SEED (TEMP) (COOL)	SY	3493
0168-6001	VEGETATIVE WATERING	MG	218
0169-6005	SOIL RETENTION BLANKETS (CL 2) (TY E)	SY	184
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	102
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	102

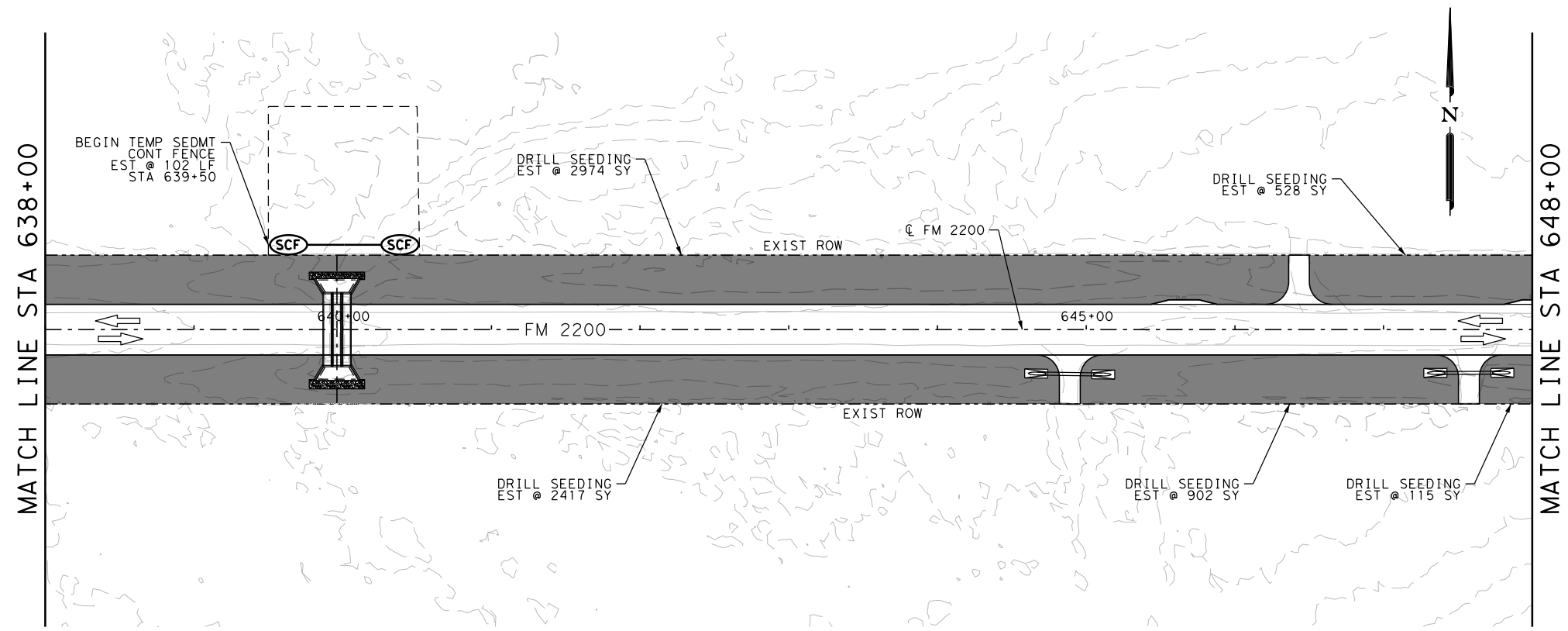


LEGEND

- (SCF) SEDIMENT CONTROL FENCE
- DRILL SEEDING
- EXIST RIGHT OF WAY
- SOIL RETENTION BLANKETS (TY E)
- BLOCK SODDING

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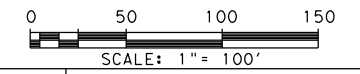


DESIGN

STATE OF TEXAS
 LUKE REED
 101242
 LICENSED PROFESSIONAL ENGINEER
 LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

STATE OF TEXAS
 JAMES A. LUTZ
 84722
 LICENSED PROFESSIONAL ENGINEER
 JAMES A. LUTZ, P.E. 12/20/2022 DATE



REV. NO.	DATE	DESCRIPTION	BY

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 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation
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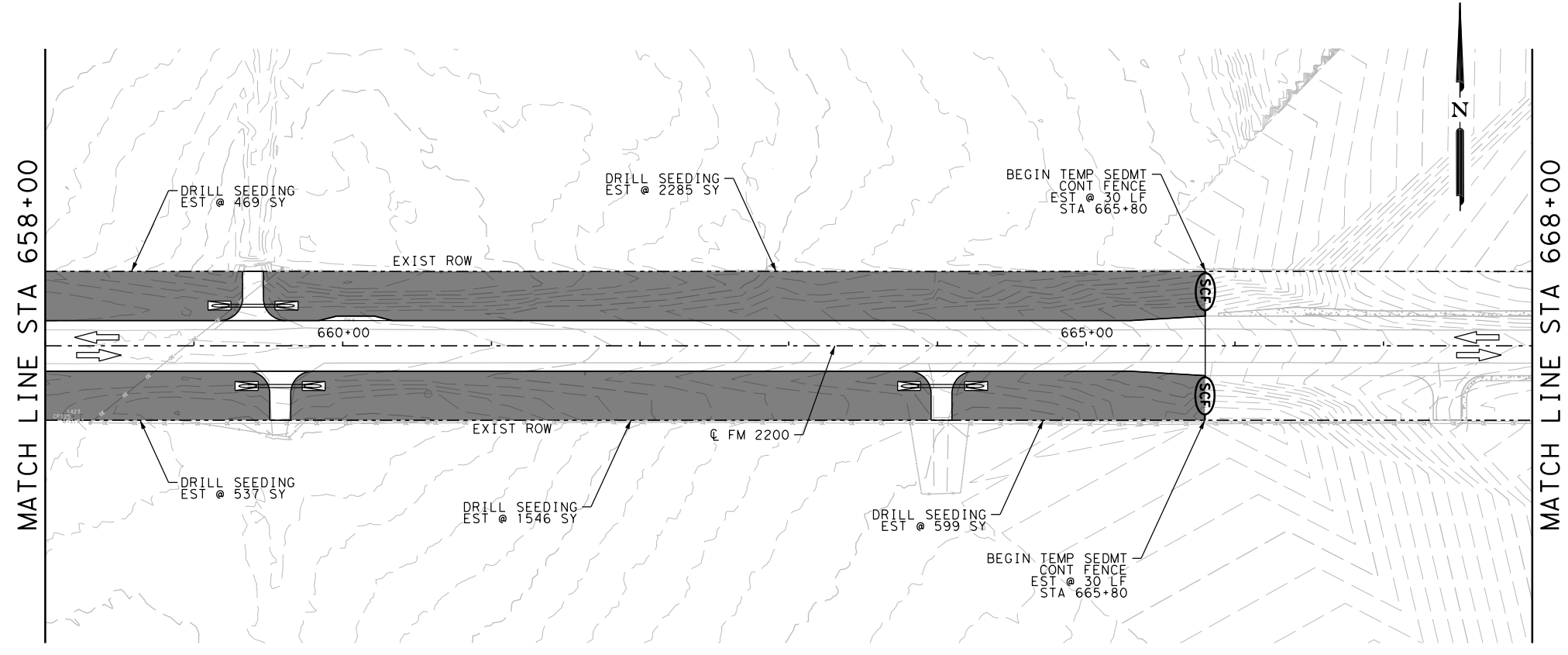
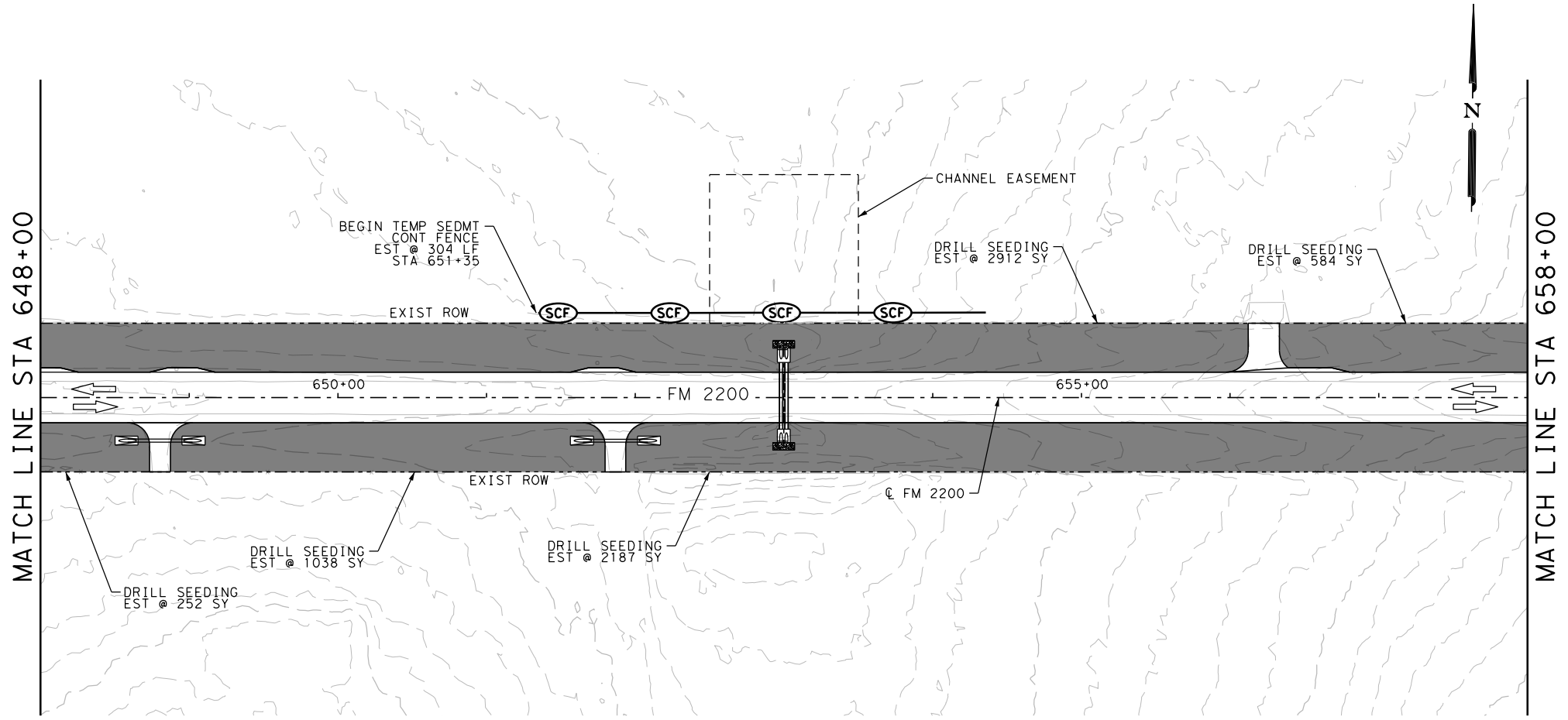
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SW3P LAYOUTS
 STA 628+00 TO STA 648+00
 SHEET 3 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	282

Plotted on: 12/20/2022

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0164-6029	CELL FBR MLCH SEED (TEMP) (WARM)	SY	3102
0164-6031	CELL FBR MLCH SEED (TEMP) (COOL)	SY	3102
0168-6001	VEGETATIVE WATERING	MG	194
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	364
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	364



LEGEND

SEDIMENT CONTROL FENCE
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 EXIST RIGHT OF WAY
 SOIL RETENTION BLANKETS (TY E)
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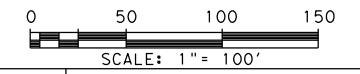
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DESIGN

LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

JAMES A. LUTZ, P.E. 12/20/2022 DATE



REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

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 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200

SW3P LAYOUTS

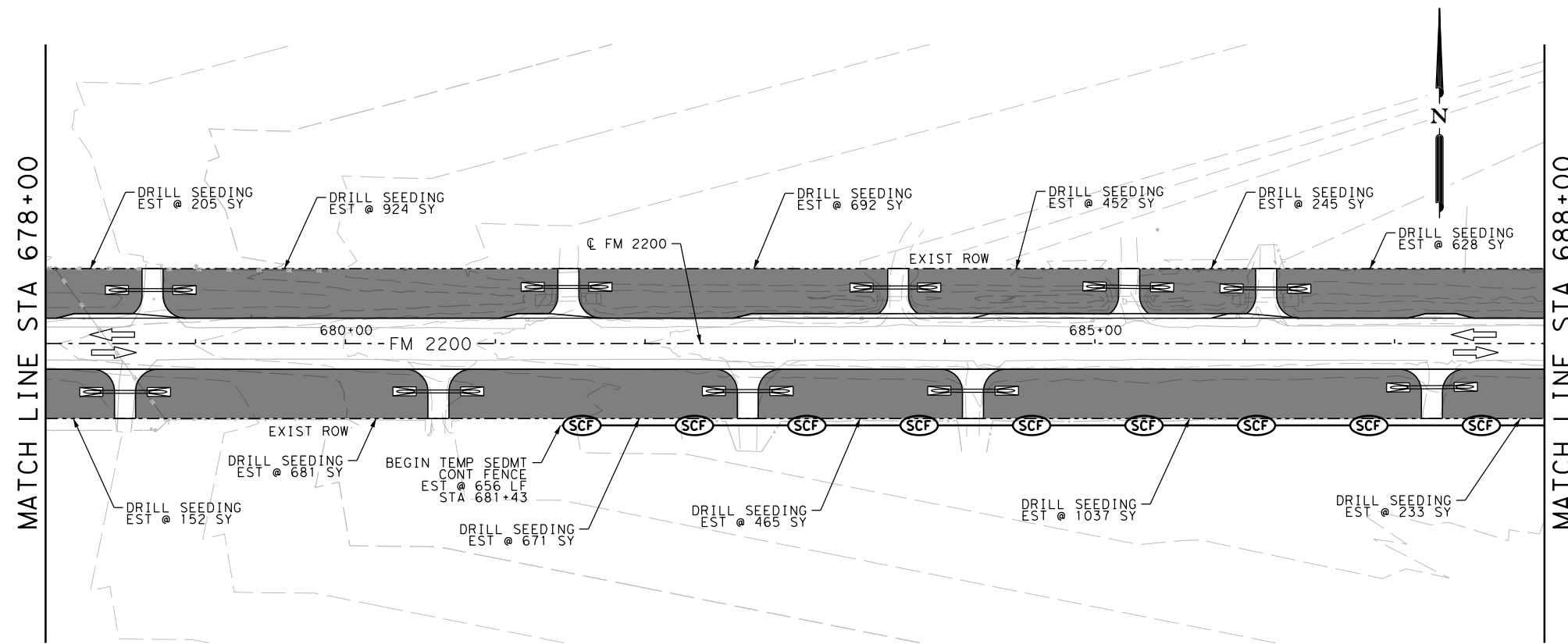
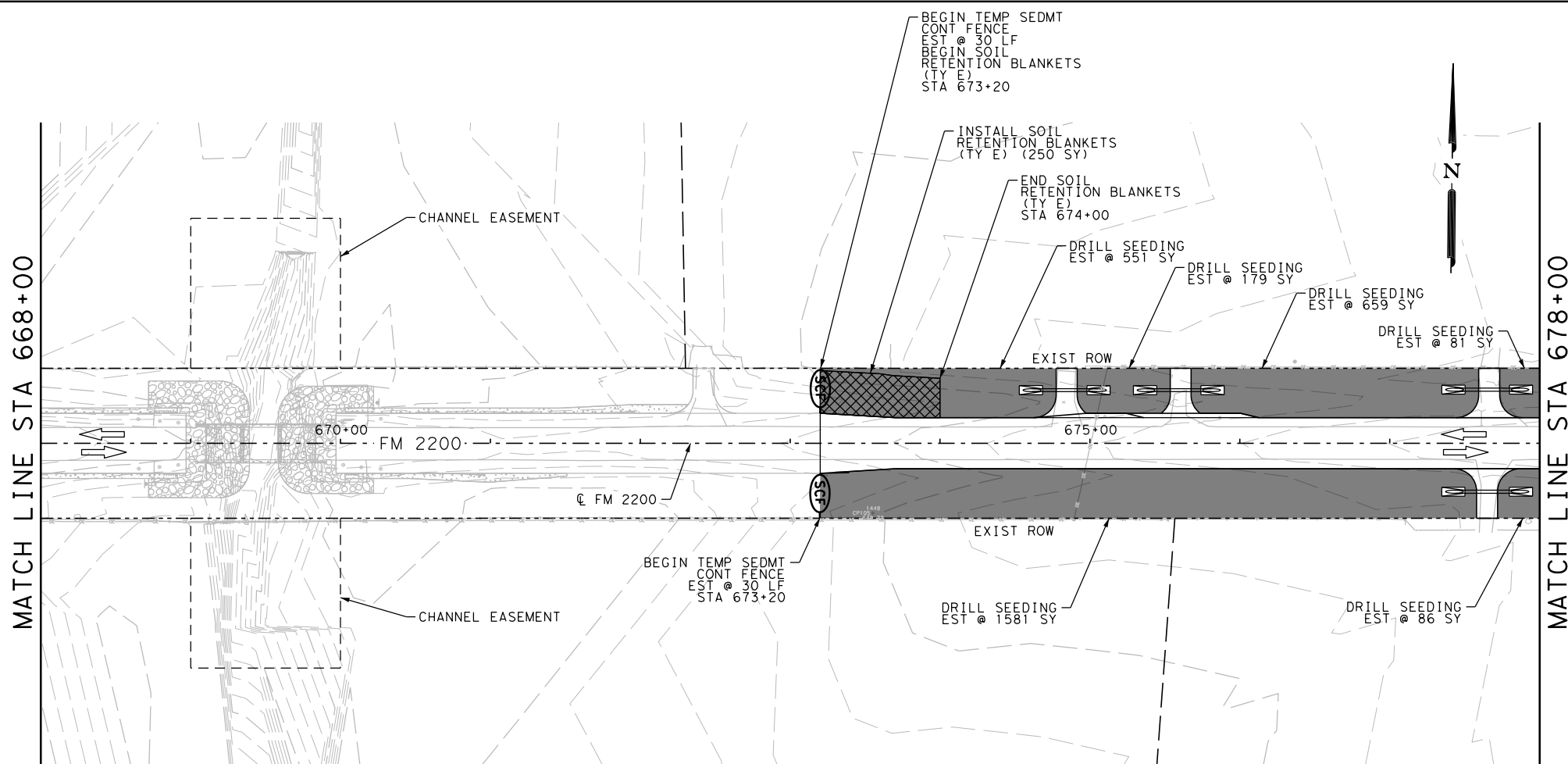
STA 648+00 TO STA 668+00

SHEET 4 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	283

Plotted on: 12/20/2022

Design File name: P:\117\99\04\Design\Civil\SW3P\1179904_SW3P05.dgn



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0164-6021	CELL FBR MLCH SEED (PERM) (RURAL) (SANDY)	SY	9522
0164-6029	CELL FBR MLCH SEED (TEMP) (WARM)	SY	2381
0164-6031	CELL FBR MLCH SEED (TEMP) (COOL)	SY	2381
0168-6001	VEGETATIVE WATERING	MG	149
0169-6005	SOIL RETENTION BLANKETS (CL 2) (TY E)	SY	250
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	716
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	716

LEGEND

SEDIMENT CONTROL FENCE
 SOIL RETENTION BLANKETS (TY E)
 DRILL SEEDING
 EXIST RIGHT OF WAY
 BLOCK SODDING

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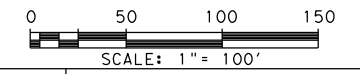
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DESIGN

LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

JAMES A. LUTZ, P.E. 12/20/2022 DATE



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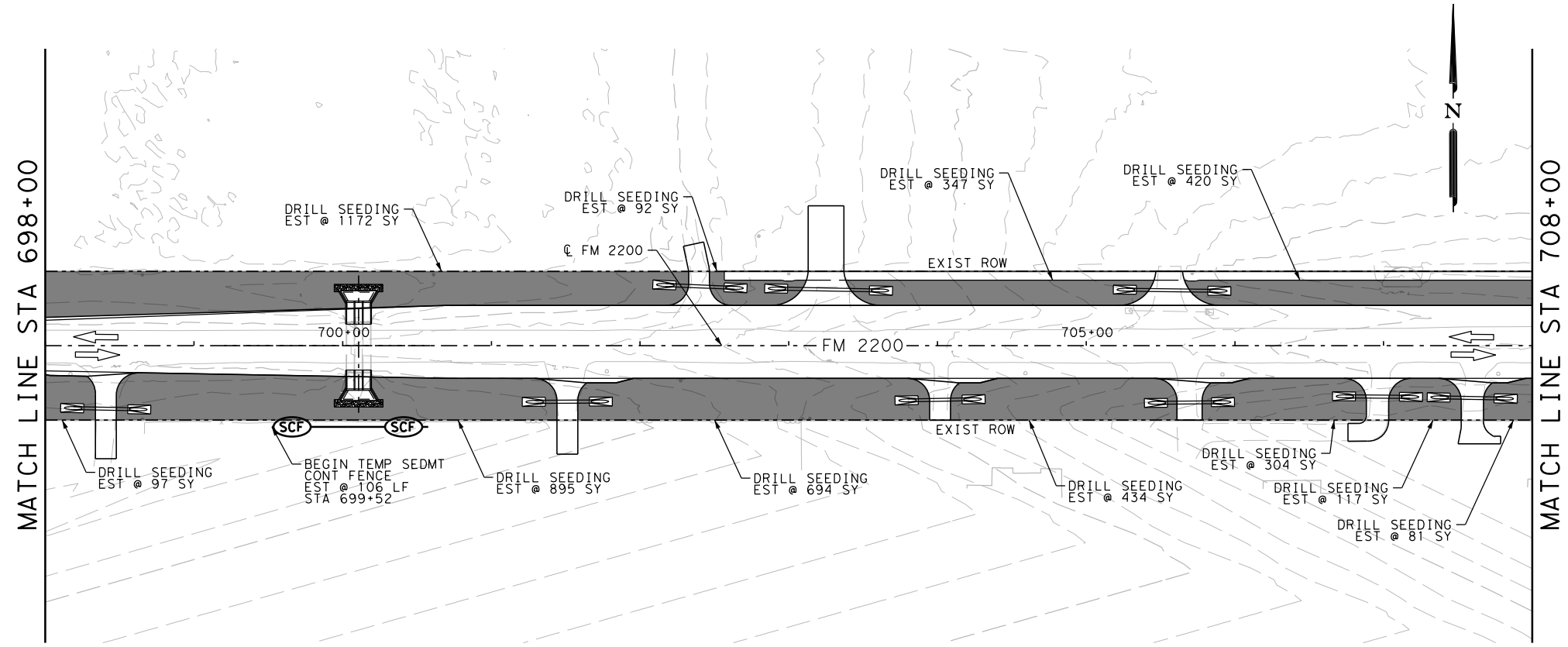
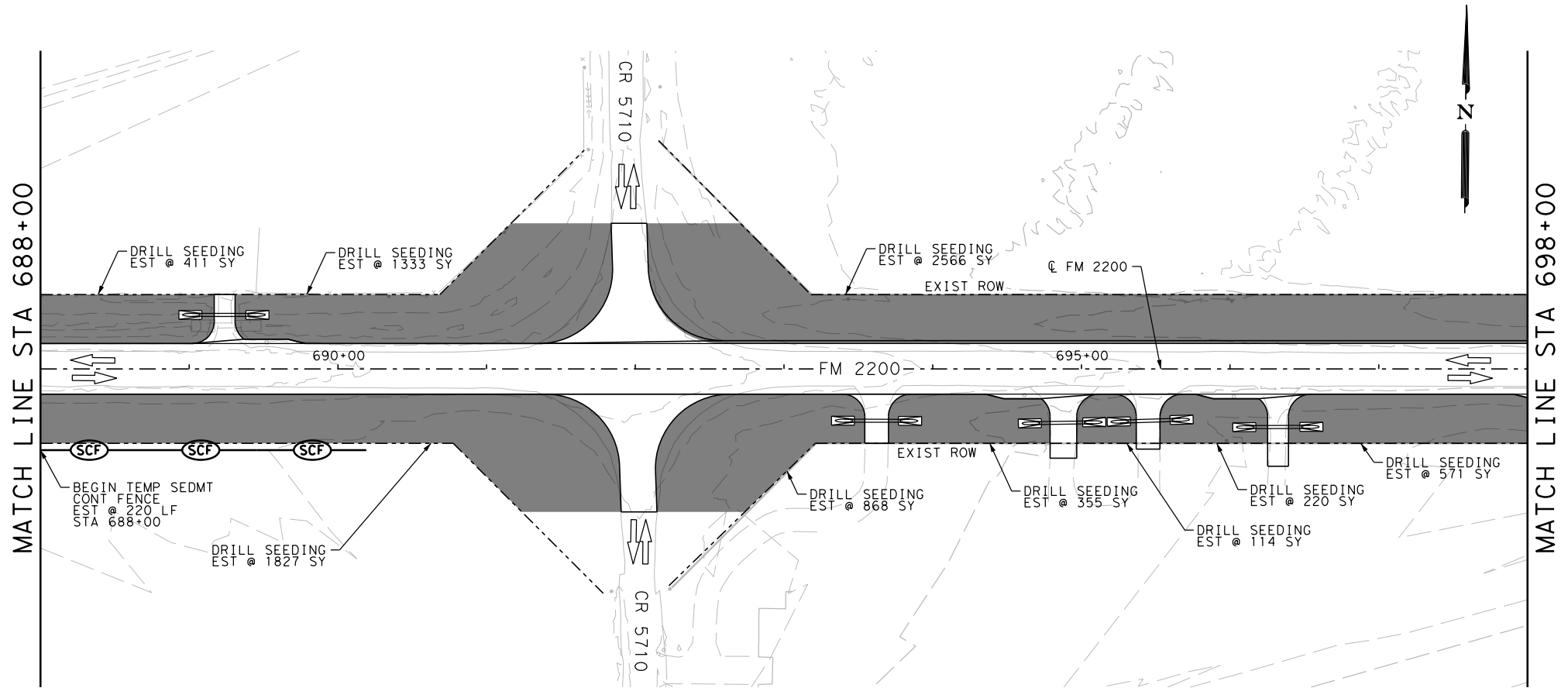
FM 2200
SW3P LAYOUTS
 STA 668+00 TO STA 688+00
 SHEET 5 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	284

Plotted on: 12/20/2022

Design File name: P:\11799\04\Design\Civil\SW3P\1179904_SW3P06.dgn

ITEM	DESCRIPTION	UNIT	QTY
0150-6002	BLADING	HR	40
0164-6021	CELL FBR MLCH SEED (PERM) (RURAL) (SANDY)	SY	12918
0164-6029	CELL FBR MLCH SEED (TEMP) (WARM)	SY	3230
0164-6031	CELL FBR MLCH SEED (TEMP) (COOL)	SY	3230
0168-6001	VEGETATIVE WATERING	MG	202
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	326
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	326



LEGEND

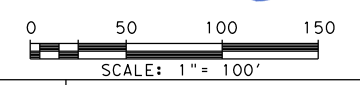
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- DRILL SEEDING
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- BLOCK SODDING

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DESIGN

APPROVAL



REV. NO.	DATE	DESCRIPTION	BY



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 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800

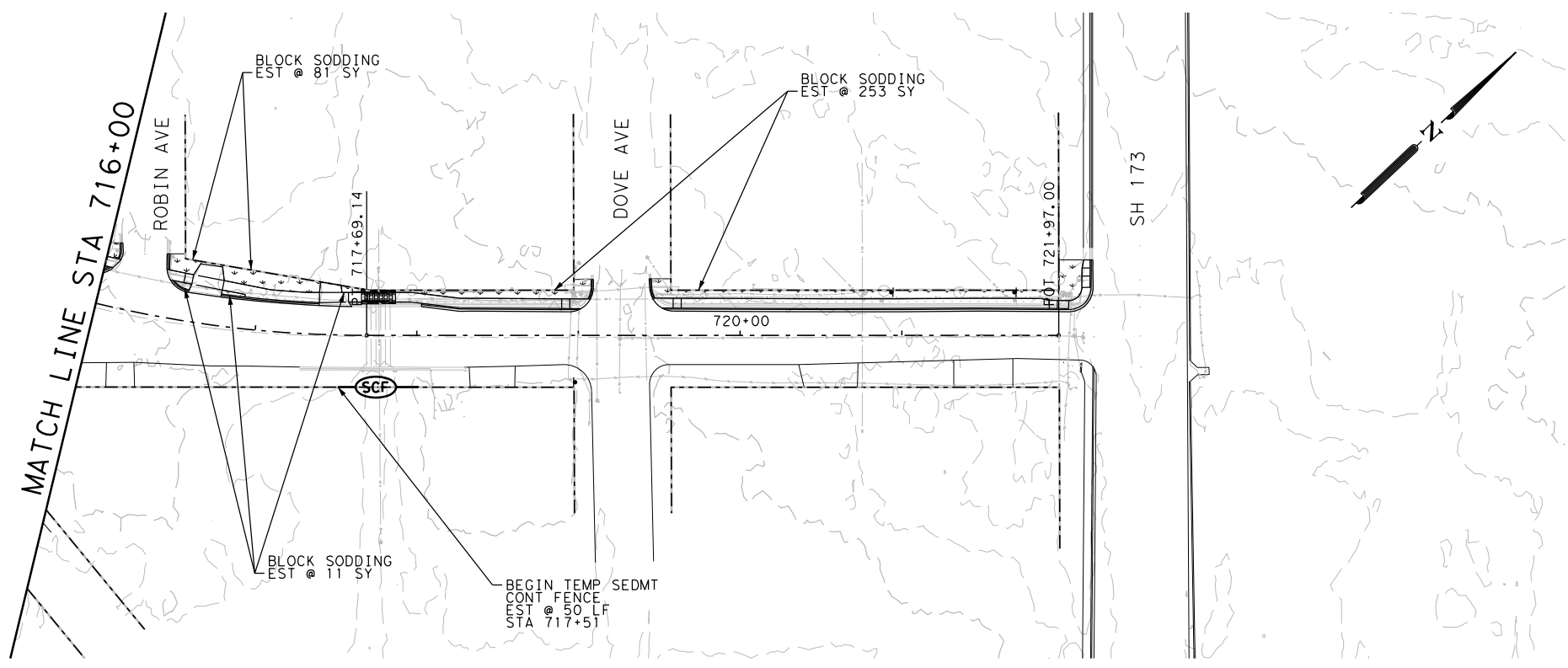
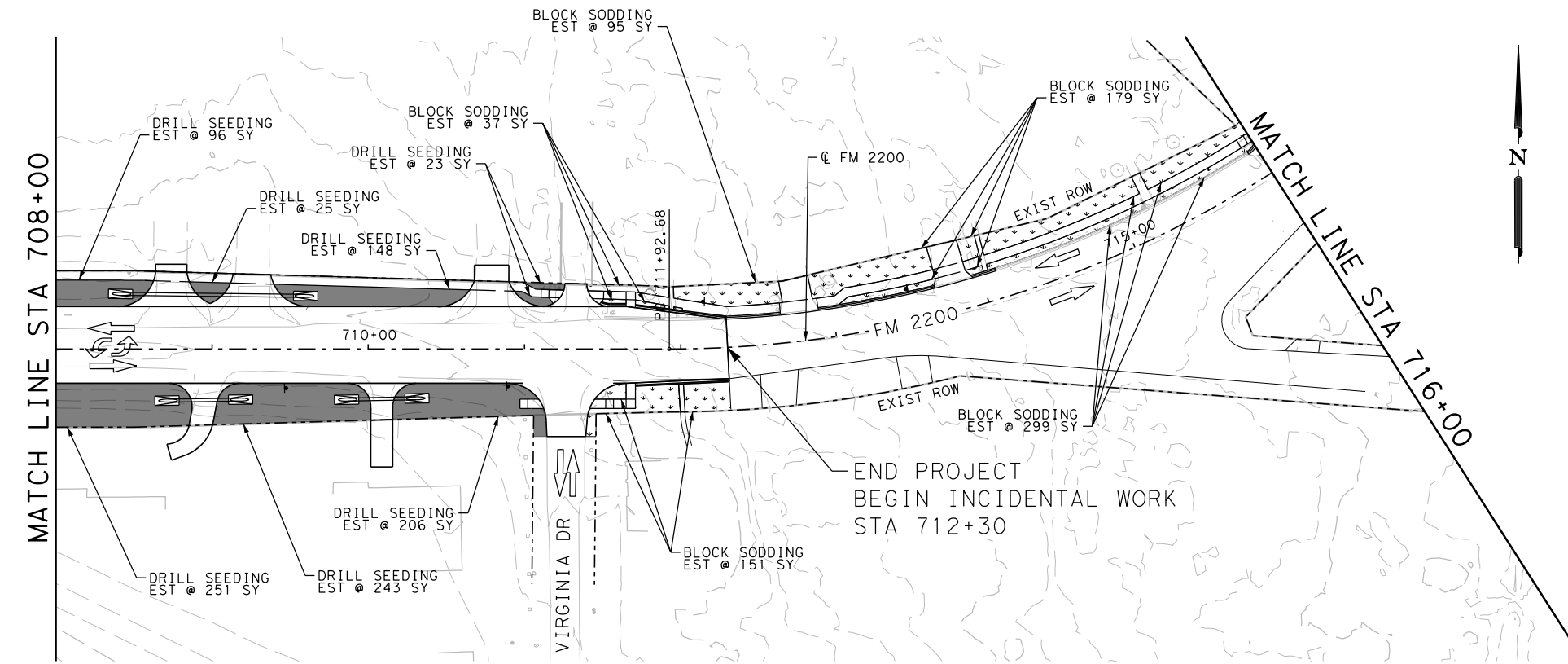


FM 2200
SW3P LAYOUTS
 STA 688+00 TO STA 708+00
 SHEET 6 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	285

Plotted on: 12/20/2022

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ITEM	DESCRIPTION	UNIT	QTY
0150-6002	BLADING	HR	24
0161-6017	COMPOST MANUF TOPSOIL (BIP) (4")	SY	1106
0162-6002	BLOCK SODDING	SY	1106
0164-6021	CELL FBR MLCH SEED (TEMP) (RURAL) (SANDY)	SY	992
0164-6029	CELL FBR MLCH SEED (TEMP) (WARM)	SY	248
0164-6031	CELL FBR MLCH SEED (TEMP) (COOL)	SY	248
0168-6001	VEGETATIVE WATERING	MG	33
0506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	112
0506-6024	CONSTRUCTION EXITS (REMOVE)	SY	112
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	50
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	50

LEGEND

SEDIMENT CONTROL FENCE
 DRILL SEEDING
 EXIST RIGHT OF WAY
 SOIL RETENTION BLANKETS (TY E)
 BLOCK SODDING

- NOTES:**
- REFER TO TEMPORARY EROSION CONTROL MEASURE STANDARDS FOR MORE INFORMATION.
 - SW3P CONTROL MEASURES INSTALLED DURING CONSTRUCTION ARE TO REMAIN IN PLACE UNTIL GRASS COVER IS ACHIEVED OR AS APPROVED BY THE ENGINEER.
 - SW3P CONTROL MAY NEED TO BE MODIFIED IN THE FIELD TO ACCOMPLISH THE DESIRED AFFECT. ALL MODIFICATIONS ARE TO BE NOTED ON THIS SHEET AND SIGNED BY THE RESPONSIBLE PARTY.
 - ALL SW3P CONTROLS ARE TO BE MAINTAINED AND IN WORKING CONDITION AT ALL TIMES.
 - CONSTRUCTION EXIT LOCATIONS TO BE DETERMINED IN THE FIELD BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.

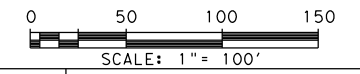
TEMPORARY SEDIMENT CONTROL FENCE SHOULD BE PLACED ON CONSTRUCTION EASEMENT LIMIT LINE WHENEVER PRESENT. IF NO CONSTRUCTION EASEMENT EXISTS IN AREA THEN PLACE ON RIGHT-OF-WAY LINE. TEMPORARY SEDIMENT CONTROL FENCE IS PURPOSELY SHOWN OFF-SET FROM SAID LINES FOR VISUAL CLARITY.

DESIGN

LUKE REED, P.E. 12/20/2022 DATE

APPROVAL

JAMES A. LUTZ, P.E. 12/20/2022 DATE



REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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FM 2200

SW3P LAYOUTS

STA 708+00 TO END PROJECT

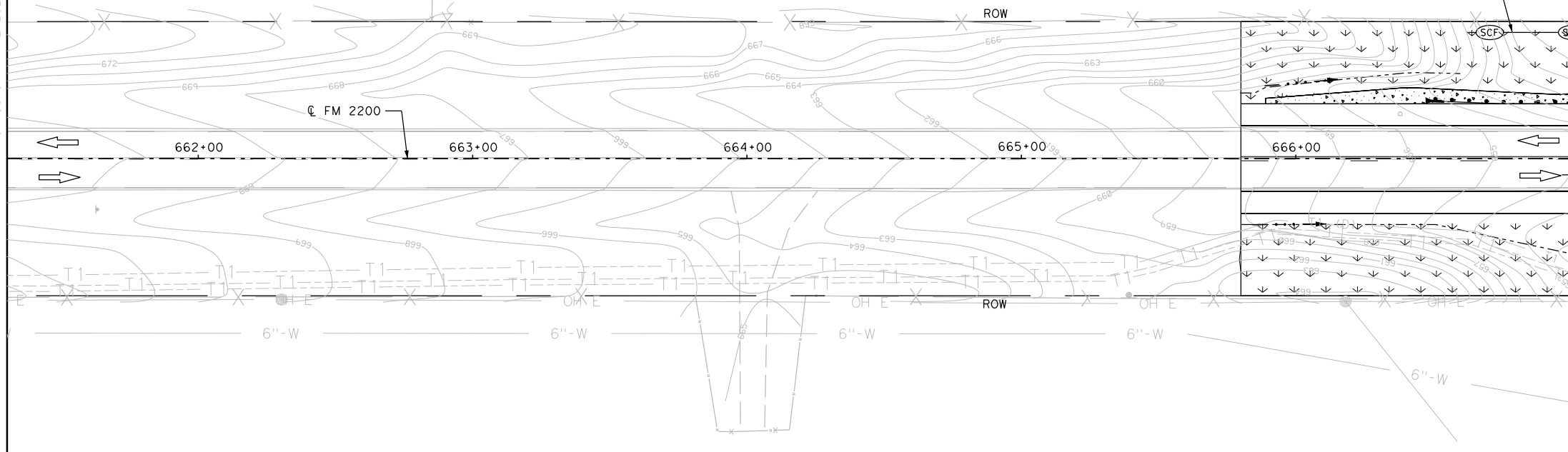
SHEET 7 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	286

Plotted on: 1/12/2023

Design File name: P:\11799\03\Design\Civil\SW3P\1179903sw3p01.dgn

ITEM	DESCRIPTION	UNIT	QTY
0150-6002	BLADING	HR	8
0160-6005	FURNISHING AND PLACING TOPSOIL	CY	62
0164-6021	CELL FBR MLCH SEED (PERM) (RURAL) (SANDY)	SY	2515
0164-6029	CELL FBR MLCH SEED (TEMP) (WARM)	SY	629
0164-6031	CELL FBR MLCH SEED (TEMP) (COOL)	SY	629
0168-6001	VEGETATIVE WATERING	MG	39
0169-6006	SOIL RETENTION BLANKETS (CL 2) (TY F)	SY	1283
0506-6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF	90
0506-6011	ROCK FILTER DAMS (REMOVE)	LF	90
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1034
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1034

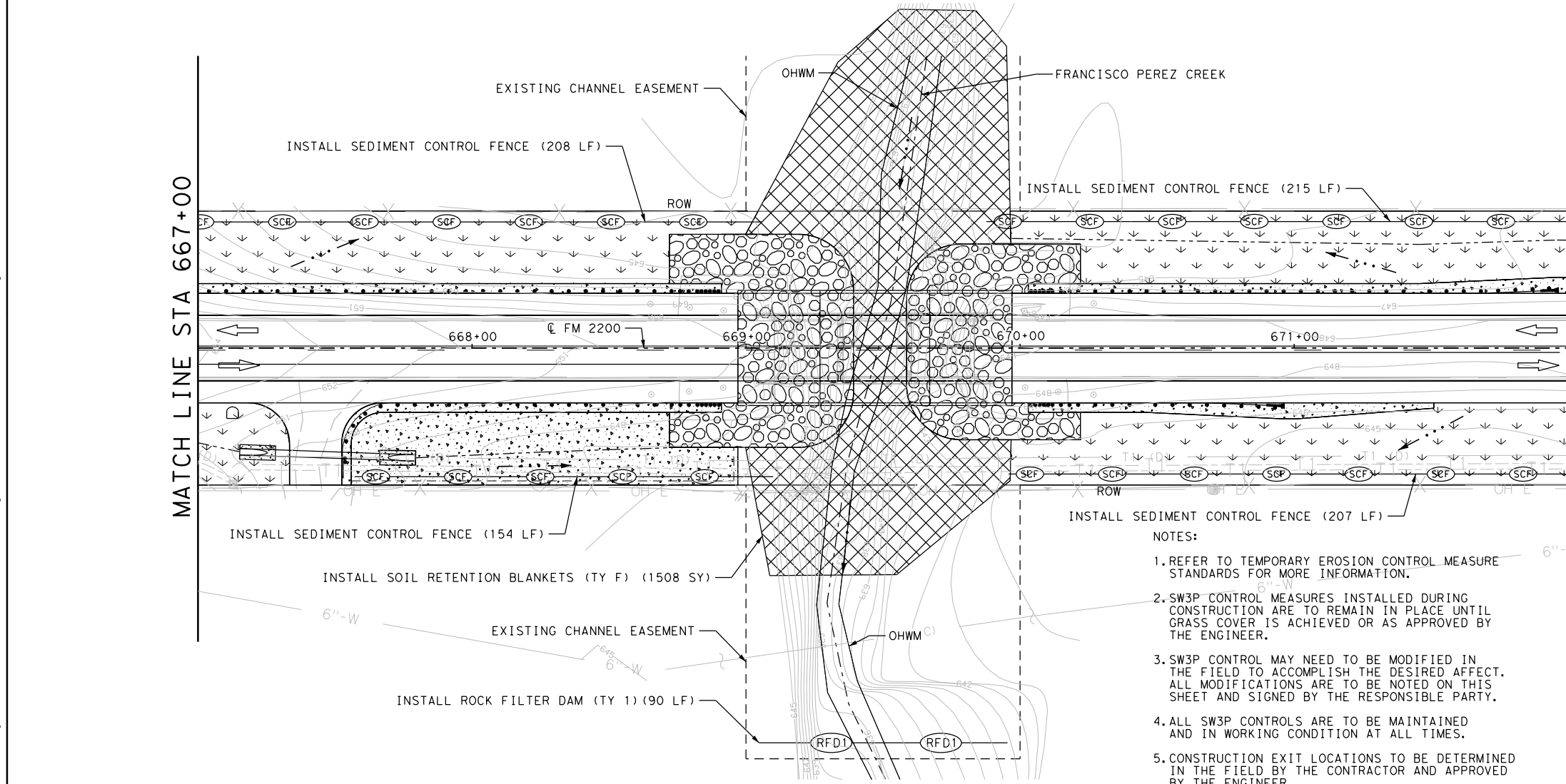


MATCH LINE STA 667+00

TEMPORARY SEDIMENT CONTROL FENCE SHOULD BE PLACED ON CONSTRUCTION EASEMENT LIMIT LINE WHENEVER PRESENT. IF NO CONSTRUCTION EASEMENT EXISTS IN AREA THEN PLACE ON RIGHT-OF-WAY LINE. TEMPORARY SEDIMENT CONTROL FENCE IS PURPOSELY SHOWN OFF-SET FROM SAID LINES FOR VISUAL CLARITY.

SW3P LEGEND

- ROCK FILTER DAM (TY 1)
- SEDIMENT CONTROL FENCE
- FLOW ARROW
- SEEDING
- SOIL RETENTION BLANKET (TY F)



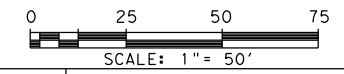
MATCH LINE STA 672+00

DESIGN

LUKE REED, P.E. 1/12/2023 DATE

APPROVAL

JAMES A. LUTZ, P.E. 1/12/2023 DATE



- NOTES:
- REFER TO TEMPORARY EROSION CONTROL MEASURE STANDARDS FOR MORE INFORMATION.
 - SW3P CONTROL MEASURES INSTALLED DURING CONSTRUCTION ARE TO REMAIN IN PLACE UNTIL GRASS COVER IS ACHIEVED OR AS APPROVED BY THE ENGINEER.
 - SW3P CONTROL MAY NEED TO BE MODIFIED IN THE FIELD TO ACCOMPLISH THE DESIRED AFFECT. ALL MODIFICATIONS ARE TO BE NOTED ON THIS SHEET AND SIGNED BY THE RESPONSIBLE PARTY.
 - ALL SW3P CONTROLS ARE TO BE MAINTAINED AND IN WORKING CONDITION AT ALL TIMES.
 - CONSTRUCTION EXIT LOCATIONS TO BE DETERMINED IN THE FIELD BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

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FM 2200 AT FRANCISCO PEREZ CREEK

SW3P LAYOUT

BEGIN TO STA 672+00

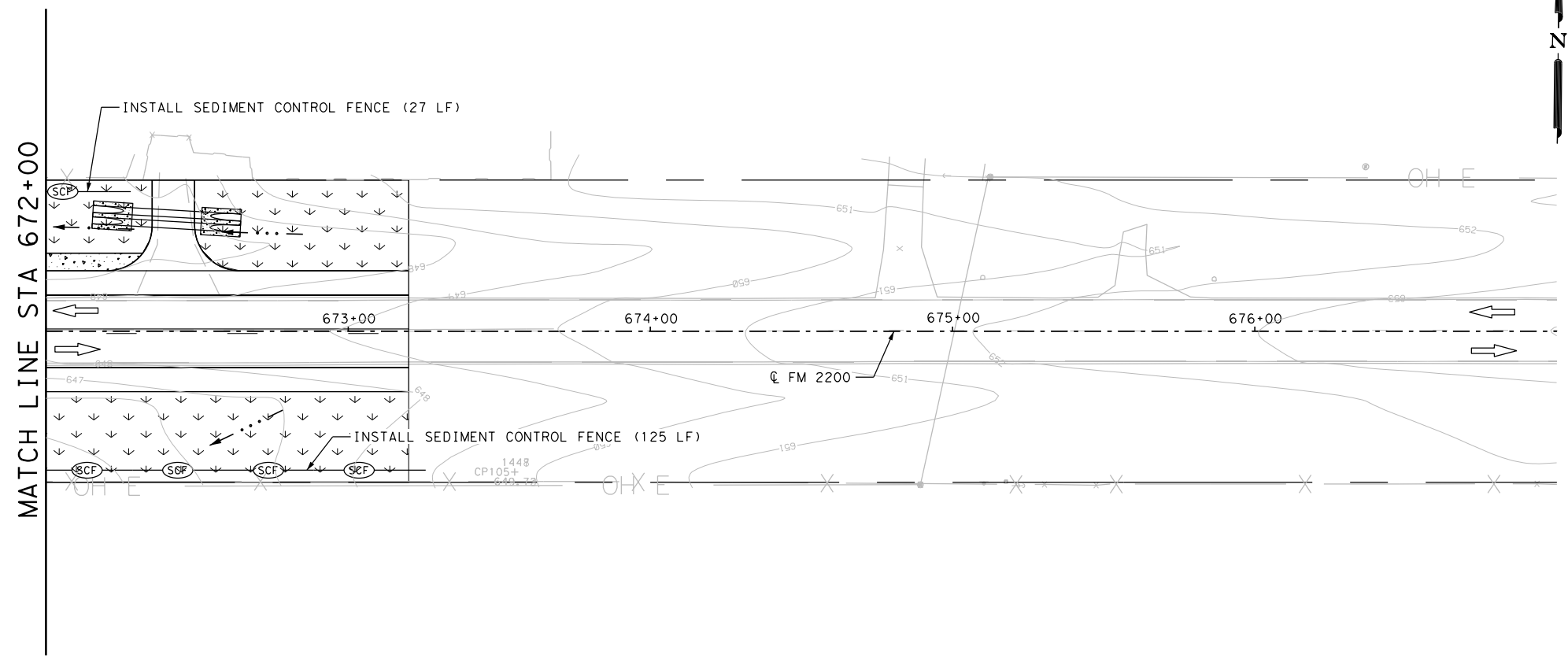
SHEET 1 OF 2

CHK	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
CHK	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
DWG:	SAT	MEDINA	2520	01	015	287

Plotted on: 1/12/2023

Design File name: P:\117\99\03\Design\Civil\SW3P\1179903sw3p02.dgn

ITEM	DESCRIPTION	UNIT	QTY
0150-6002	BLADING	HR	8
0164-6021	CELL FBR MLCH SEED (PERM) (RURAL) (SANDY)	SY	724
0164-6029	CELL FBR MLCH SEED (TEMP) (WARM)	SY	181
0164-6031	CELL FBR MLCH SEED (TEMP) (COOL)	SY	181
0168-6001	VEGETATIVE WATERING	MG	11
0506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	151
0506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	151



TEMPORARY SEDIMENT CONTROL FENCE SHOULD BE PLACED ON CONSTRUCTION EASEMENT LIMIT LINE WHENEVER PRESENT. IF NO CONSTRUCTION EASEMENT EXISTS IN AREA THEN PLACE ON RIGHT-OF-WAY LINE. TEMPORARY SEDIMENT CONTROL FENCE IS PURPOSELY SHOWN OFF-SET FROM SAID LINES FOR VISUAL CLARITY.

SW3P LEGEND

- RFD1 ROCK FILTER DAM (TY 1)
- SCF SEDIMENT CONTROL FENCE
- FLOW ARROW
- SEEDING
- SOIL RETENTION BLANKET (TY F)

DESIGN

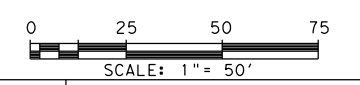
LUKE REED, P.E.

 1/12/2023 DATE

APPROVAL

JAMES A. LUTZ, P.E.

 1/12/2023 DATE



REV. NO.	DATE	DESCRIPTION	BY



SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1002800



FM 2200 AT FRANCISCO PEREZ CREEK

SW3P LAYOUT

STA 672+00 TO END

SHEET 2 OF 2

NOTES:

1. REFER TO TEMPORARY EROSION CONTROL MEASURE STANDARDS FOR MORE INFORMATION.
2. SW3P CONTROL MEASURES INSTALLED DURING CONSTRUCTION ARE TO REMAIN IN PLACE UNTIL GRASS COVER IS ACHIEVED OR AS APPROVED BY THE ENGINEER.
3. SW3P CONTROL MAY NEED TO BE MODIFIED IN THE FIELD TO ACCOMPLISH THE DESIRED AFFECT. ALL MODIFICATIONS ARE TO BE NOTED ON THIS SHEET AND SIGNED BY THE RESPONSIBLE PARTY.
4. ALL SW3P CONTROLS ARE TO BE MAINTAINED AND IN WORKING CONDITION AT ALL TIMES.
5. CONSTRUCTION EXIT LOCATIONS TO BE DETERMINED IN THE FIELD BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.

CHK	DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
		6	TEXAS	SEE TITLE SHEET	FM 2200		
CHK	DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
		SAT	MEDINA	2520	01	015	288

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept in the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION WIDENING AND BRIDGE REPLACEMENT

1.1 PROJECT CONTROL SECTION JOB (CSJ):
2520-01-016, ETC.

1.2 PROJECT LIMITS:

From: VIRGINIA DR

To: CR 764 (HUNTZER LN)

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 29.1445657° N, (Long) 98.9561383° W

END: (Lat) 29.1464524° N, (Long) 98.9152223° W

1.4 TOTAL PROJECT AREA (Acres): 28 AC

1.5 TOTAL AREA TO BE DISTURBED (Acres): 25.6 AC

1.6 NATURE OF CONSTRUCTION ACTIVITY:

WIDENING LANES, CONSTRUCTING PAVED SHOULDERS, CONSTRUCTING SIDEWALK, AND REPLACEMENT OF BRIDGE AND APPROACHES

1.7 MAJOR SOIL TYPES:

Soil Type	Description
LEONA FORMATION SOILS	DARK GREY AND DARK BROWN, SLIGHTLY COMPACT TO COMPACT, CLAYEY SANDS
CARRIZO SAND	STIFF TO VERY STIFF LEAN CLAY

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

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

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

Type	Sheet #s

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

1.9 CONSTRUCTION ACTIVITIES:

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

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

1.10 POTENTIAL POLLUTANTS AND SOURCES:

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

1.11 RECEIVING WATERS:

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

Tributaries	Classified Waterbody
FRANCISCO PEREZ CREEK	

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

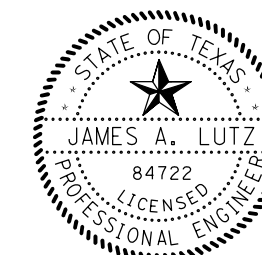
- Development of plans and specifications
- Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- Post Construction Site Notice
- Submit NOI/CSN to local MS4
- Perform SWP3 inspections
- Maintain SWP3 records and update to reflect daily operations
- Complete and submit Notice of Termination to TCEQ
- Maintain SWP3 records for 3 years
- Other: _____
- Other: _____
- Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

- Day To Day Operational Control
- Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- Post Construction Site Notice
- Submit NOI/CSN to local MS4
- Maintain schedule of major construction activities
- Install, maintain and modify BMPs
- Complete and submit Notice of Termination to TCEQ
- Maintain SWP3 records for 3 years
- Other: _____
- Other: _____
- Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity



James A. Lutz, P.E.
Signature of Registrant & Date
2/7/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

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Sheet 1 of 2

FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
6	SEE TITLE SHEET			289
STATE	STATE DIST.	COUNTY		
TEXAS	SAT	MEDINA		
CONT.	SECT.	JOB	HIGHWAY NO.	
2520	01	016, ETC	FM 2200	

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

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

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

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- Protection of Existing Vegetation
- Vegetated Buffer Zones
- Soil Retention Blankets
- Geotextiles
- Mulching/ Hydromulching
- Soil Surface Treatments
- Temporary Seeding
- Permanent Planting, Sodding or Seeding
- Biodegradable Erosion Control Logs
- Rock Filter Dams/ Rock Check Dams
- Vertical Tracking
- Interceptor Swale
- Riprap
- Diversion Dike
- Temporary Pipe Slope Drain
- Embankment for Erosion Control
- Paved Flumes
- Other: GABION MATTRESS
- Other: _____
- Other: _____
- Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- Biodegradable Erosion Control Logs
- Dewatering Controls
- Inlet Protection
- Rock Filter Dams/ Rock Check Dams
- Sandbag Berms
- Sediment Control Fence
- Stabilized Construction Exit
- Floating Turbidity Barrier
- Vegetated Buffer Zones
- Vegetated Filter Strips
- Other: _____
- Other: _____
- Other: _____
- Other: _____

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

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- Sediment Trap
 - Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
 - 3,600 cubic feet of storage per acre drained
- Sedimentation Basin
 - Not required (<10 acres disturbed)
 - Required (>10 acres) and implemented.
 - Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
 - 3,600 cubic feet of storage per acre drained
- Required (>10 acres), but not feasible due to:
 - Available area/Site geometry
 - Site slope/Drainage patterns
 - Site soils/Geotechnical factors
 - Public safety
 - Other: _____

2.3 PERMANENT CONTROLS:

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

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
RIPRAP (STONE PROTECTION)	AT FRANCISCO PEREZ CREEK	
RIPRAP (CONC)	667+73	669+00
SOIL RETENTION BLANKETS	SEE SW3P LAYOUTS	
SEEDING	BEGIN PROJECT	END PROJECT
BLOCK SODDING	VIRGINIA DR	SH 173

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- Excess dirt/mud on road removed daily
- Haul roads dampened for dust control
- Loaded haul trucks to be covered with tarpaulin
- Stabilized construction exit
- Other: _____
- Other: _____
- Other: _____
- Other: _____

2.5 POLLUTION PREVENTION MEASURES:

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

2.6 VEGETATED BUFFER ZONES:

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

Type	Stationing	
	From	To

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

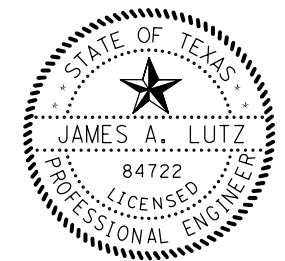
- Fire hydrant flushings
- Irrigation drainage
- Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- Potable water sources
- Springs
- Uncontaminated groundwater
- Water used to wash vehicles or control dust
- Other allowable non-stormwater discharges as allowed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

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.



[Signature], P.E.
Signature of Registrant & Date

2/7/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

© 2023 Sheet 2 of 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		290
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	MEDINA	
CONT.	SECT.	JOB	HI GHWAY NO.
2520	01	016, ETC	FM 2200

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) 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.

No Action Required Required Action

Action No.

- Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
- Comply with the Storm Water Pollution Prevention Plan (SW3P) and revise when necessary to control pollution or required by the Engineer.
- Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
- When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
- NOI required: Yes No

Note: If amount of soil disturbance changes, permit requirements may change.

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

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

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

- No Permit Required
 Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required
 Nationwide Permit 14 - PCN Required
 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 (BMPs) planned to control erosion, sedimentation and post-project total suspended solids (TSS).

- Francisco Perez Creek. STA 668+97
-
-
-

401 Best Management Practices: (Not applicable if no USACE permit)

Erosion	Sedimentation	Post-Construction TSS
<input checked="" type="checkbox"/> Temporary Vegetation	<input checked="" type="checkbox"/> Silt Fence	<input type="checkbox"/> Vegetative Filter Strips
<input type="checkbox"/> Blankets/Matting	<input type="checkbox"/> Rock Berm	<input type="checkbox"/> Retention/Irrigation Systems
<input type="checkbox"/> Mulch	<input type="checkbox"/> Triangular Filter Dike	<input type="checkbox"/> Extended Detention Basin
<input type="checkbox"/> Sodding	<input type="checkbox"/> Sand Bag Berm	<input type="checkbox"/> Constructed Wetlands
<input type="checkbox"/> Interceptor Swale	<input type="checkbox"/> Straw Bale Dike	<input type="checkbox"/> Wet Basin
<input type="checkbox"/> Diversion Dike	<input type="checkbox"/> Brush Berms	<input type="checkbox"/> Erosion Control Compost
<input type="checkbox"/> Erosion Control Compost	<input type="checkbox"/> Erosion Control Compost	<input type="checkbox"/> Mulch Filter Berm and Socks
<input type="checkbox"/> Mulch Filter Berm and Socks	<input type="checkbox"/> Mulch Filter Berm and Socks	<input type="checkbox"/> Compost Filter Berm and Socks
<input type="checkbox"/> Compost Filter Berm and Socks	<input type="checkbox"/> Compost Filter Berm and Socks	<input checked="" type="checkbox"/> Vegetation Lined Ditches
	<input type="checkbox"/> Stone Outlet Sediment Traps	<input type="checkbox"/> Sand Filter Systems
	<input type="checkbox"/> Sediment Basins	<input type="checkbox"/> Sedimentation Chambers
		<input type="checkbox"/> 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.

-
-
-
-

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.

-
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-
-

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

No Action Required Required Action

Action No.

- MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

- See Item 5 in General Notes.

3.

4.

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

Hazardous Materials or Contamination Issues Specific to this Project:

No Action Required Required Action

Action No.

-
-
-

Does the project involve the demolition of a span bridge?

Yes No (No further action required)

If "Yes", a pre-demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridges(s) on the project to assist with the notification.

VII. OTHER ENVIRONMENTAL ISSUES

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

No Action Required Required Action

Action No.

-
-
-



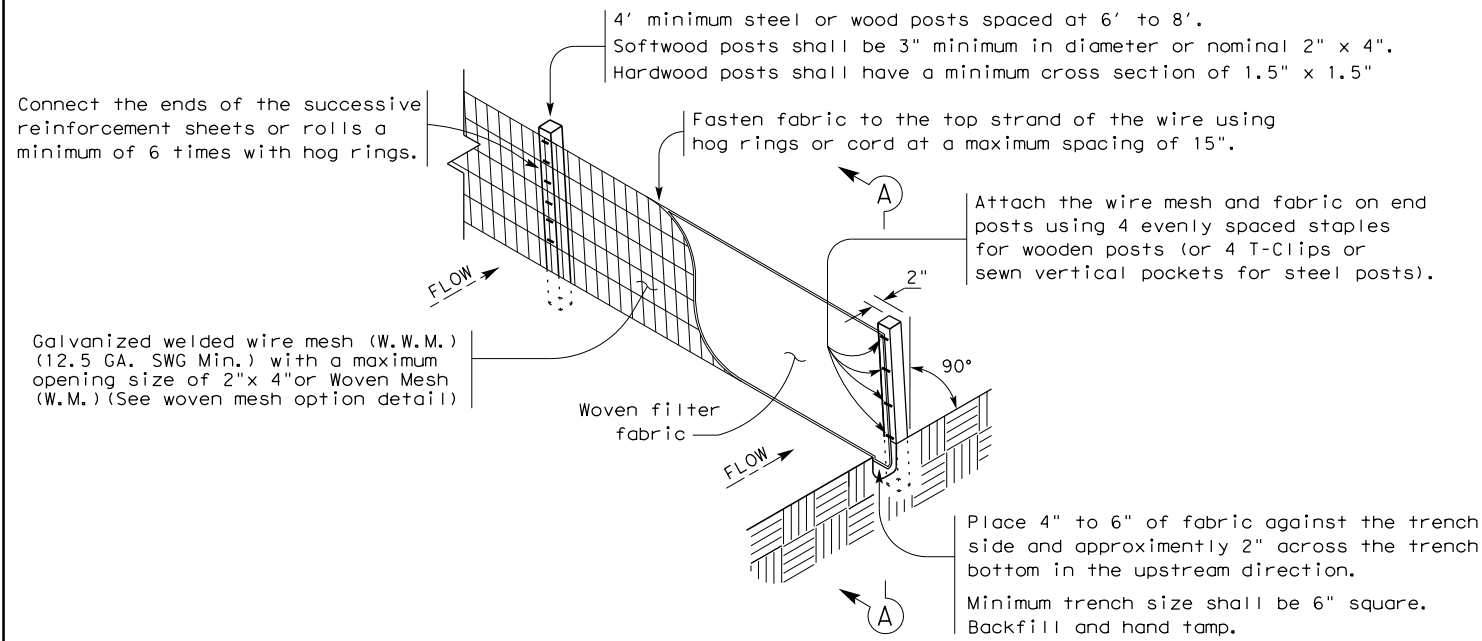
ENVIRONMENTAL PERMITS,
ISSUES AND COMMITMENTS

EPIC

FILE: epic_2015-10-09_SAT.dgn	DN: TxDOT	CK: TxDOT	DW: BW	CK: GAG
© TxDOT OCTOBER 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	2520	01	016, ETC	FM 2200
	DIST	COUNTY	SHEET NO.	
	SAT	MEDINA	291	

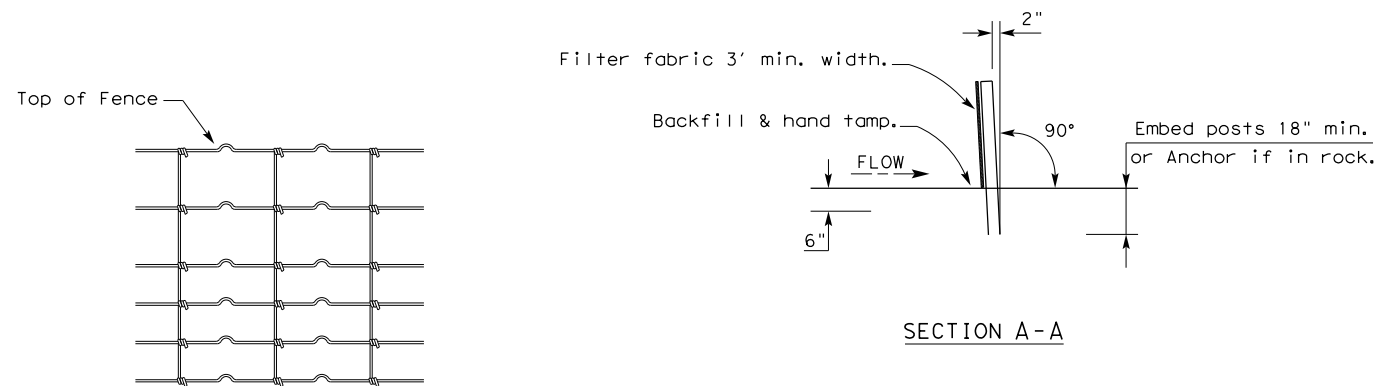
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10/20/2022
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TEMPORARY SEDIMENT CONTROL FENCE

SCF



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/FT². Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

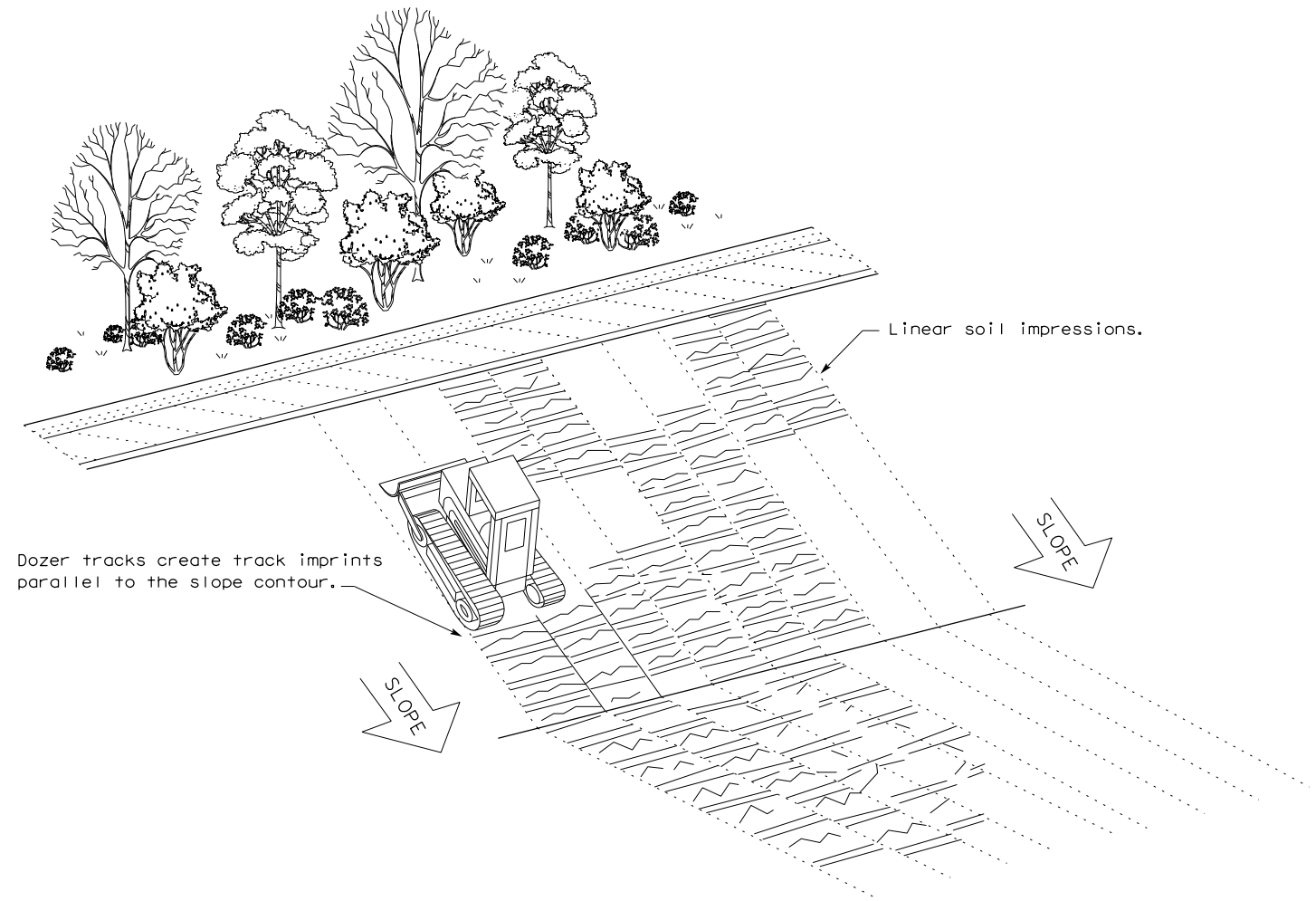
LEGEND

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 continuous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.

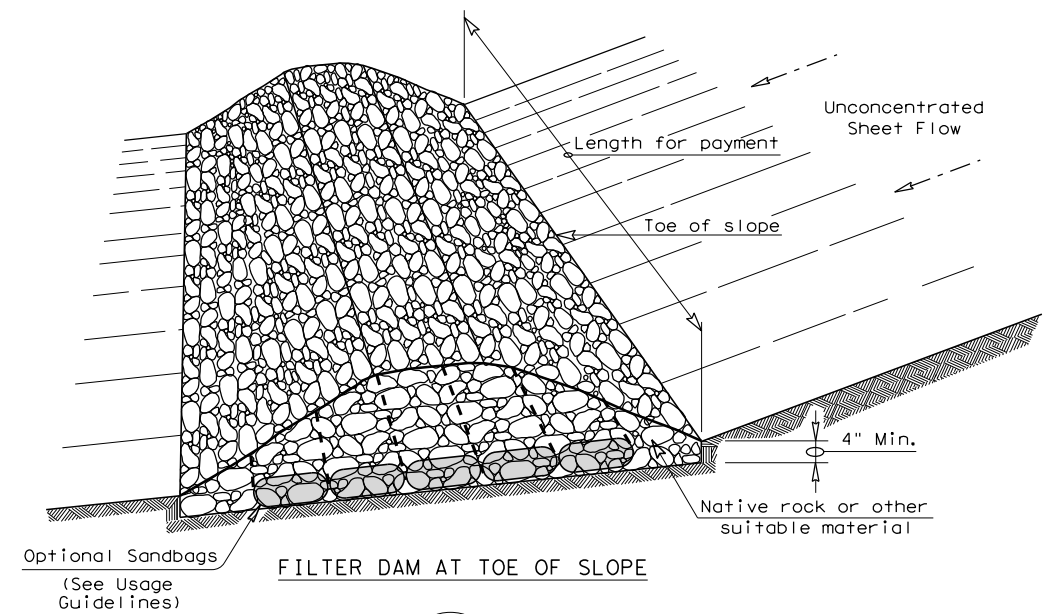


VERTICAL TRACKING

				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	2520	01	016, ETC	FM 2200	
	DIST	COUNTY		SHEET NO.	
	SAT	MEDINA		292	

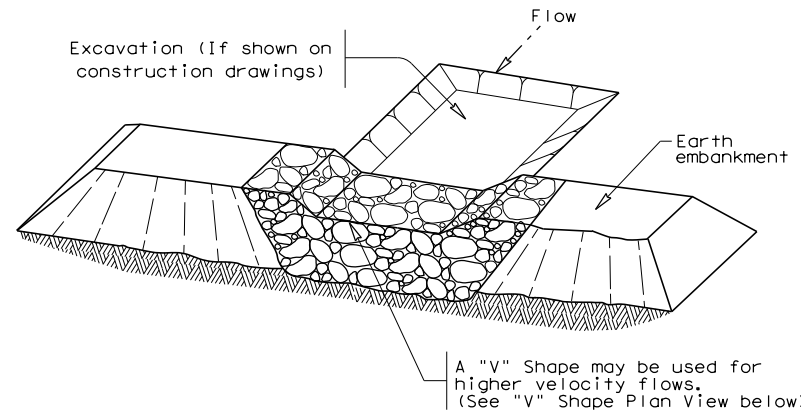
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/20/2022
 FILE: P:\1117\99\04\Design\Civil\Standards\SW3P\ec216.dgn



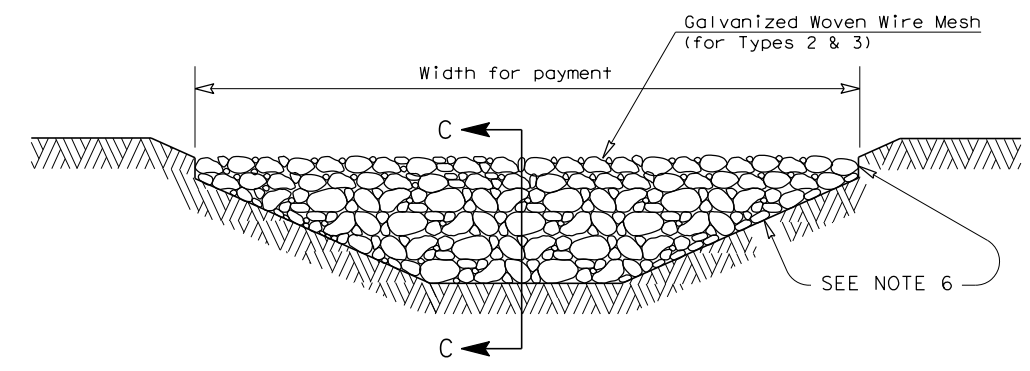
FILTER DAM AT TOE OF SLOPE

RFD1



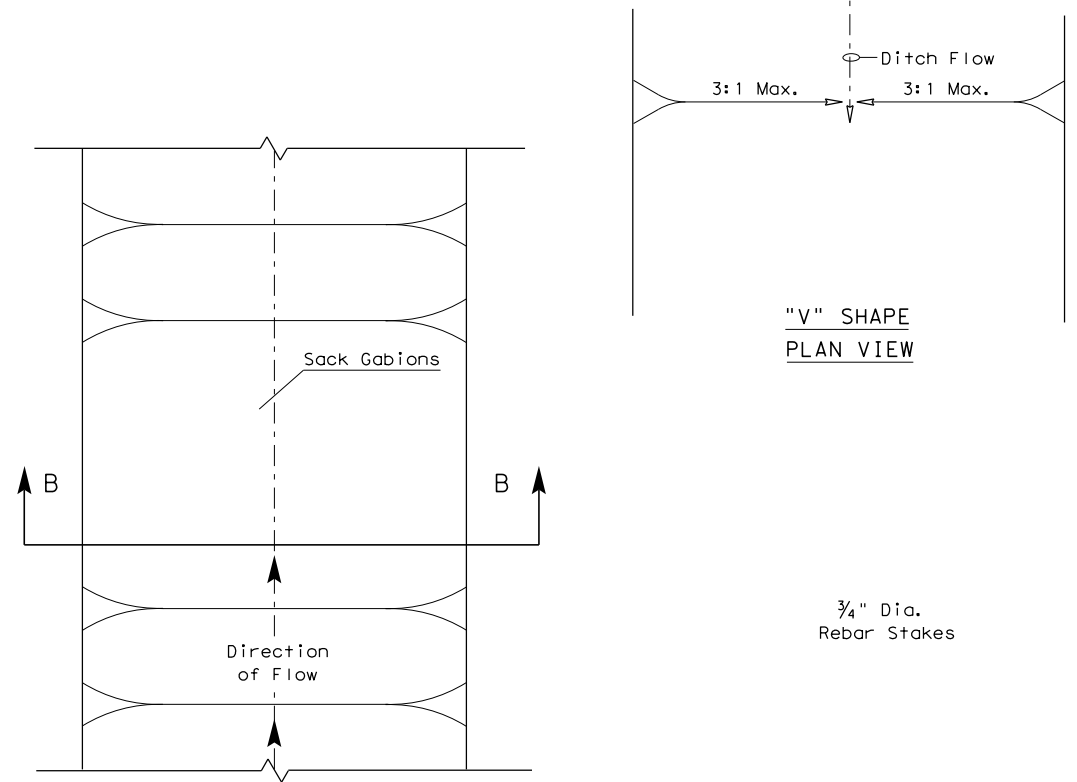
FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2



FILTER DAM AT CHANNEL SECTIONS

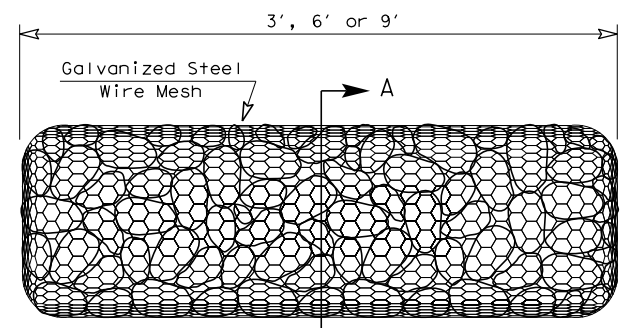
RFD1 OR RFD2 OR RFD3



"V" SHAPE PLAN VIEW

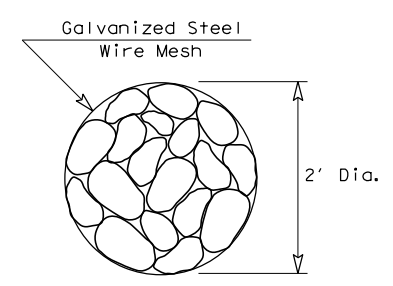
PLAN VIEW

SECTION B-B

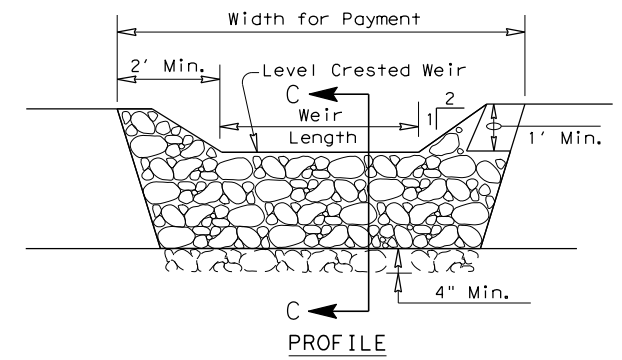


TYPE 4 (SACK GABIONS)

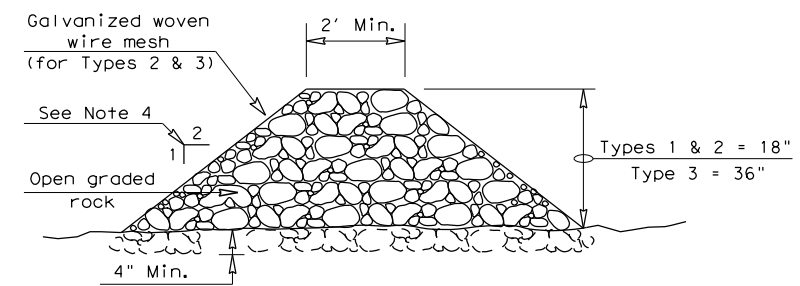
RFD4



SECTION A-A



PROFILE



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT² of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximately 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

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

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

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

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

GENERAL NOTES

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

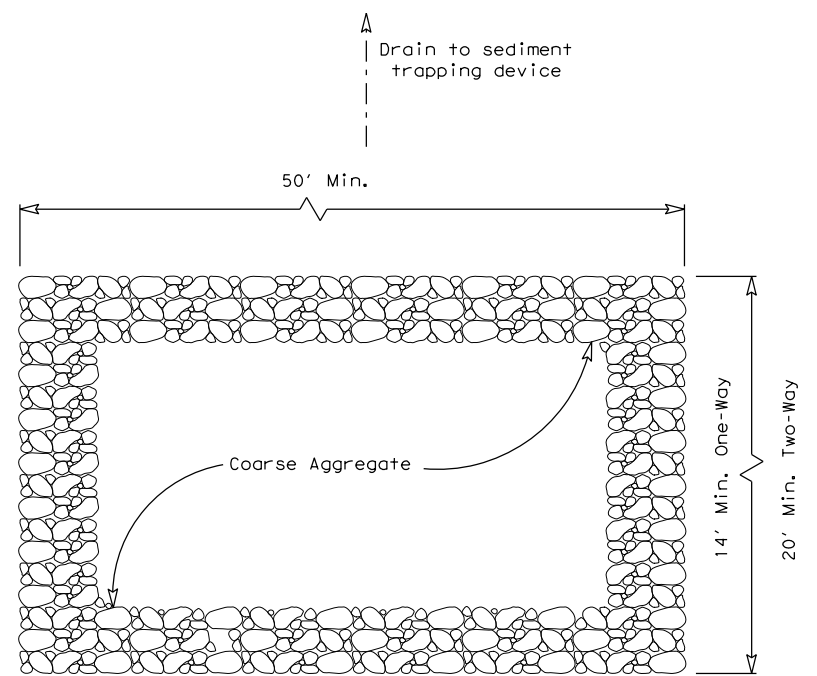
PLAN SHEET LEGEND

- Type 1 Rock Filter Dam — RFD1
- Type 2 Rock Filter Dam — RFD2
- Type 3 Rock Filter Dam — RFD3
- Type 4 Rock Filter Dam — RFD4

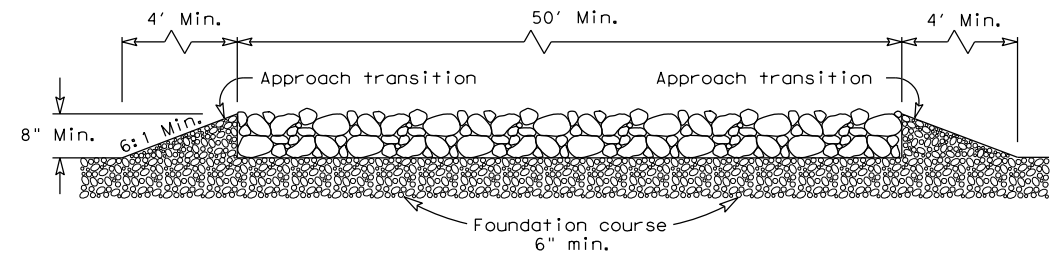
		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES ROCK FILTER DAMS EC (2) - 16			
FILE: ec216	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2016	CONT	SECT	JOB
REVISIONS	2520	01	016, ETC
	DIST	COUNTY	SHEET NO.
	SAT	MEDINA	293

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DATE: 12/20/2022
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PLAN VIEW

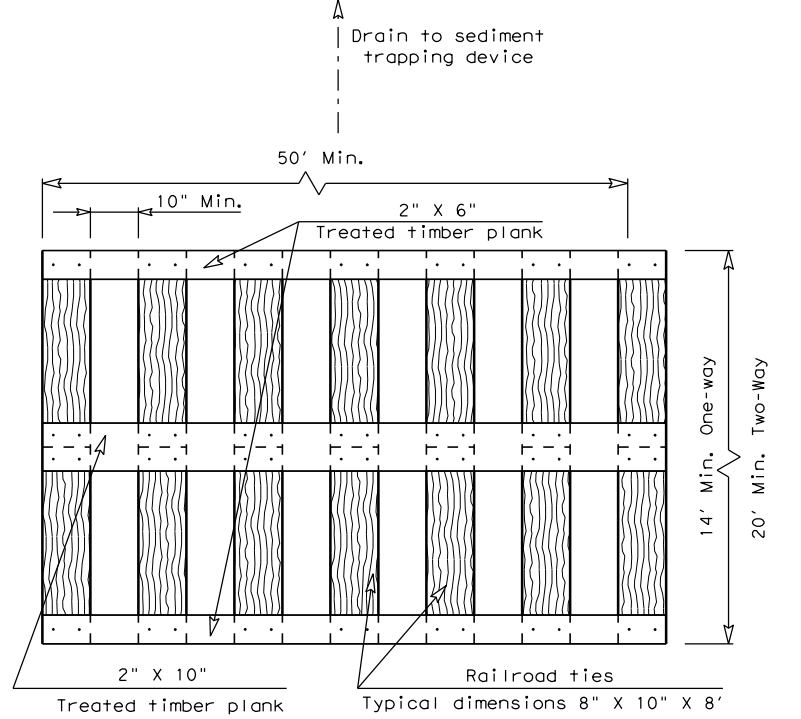


ELEVATION VIEW

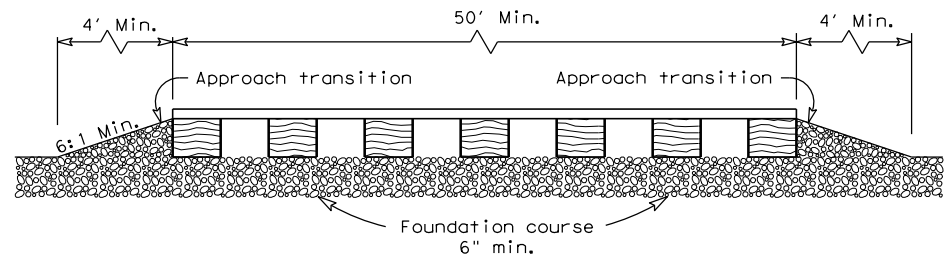
CONSTRUCTION EXIT (TYPE 1)
 ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

- The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
- The coarse aggregate should be open graded with a size of 4" to 8".
- The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
- The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materials approved by the Engineer.
- The construction exit shall be graded to allow drainage to a sediment trapping device.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.
- 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.



PLAN VIEW

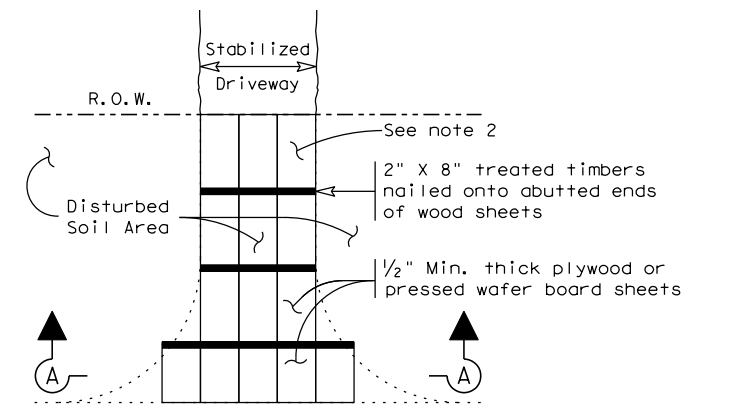


ELEVATION VIEW

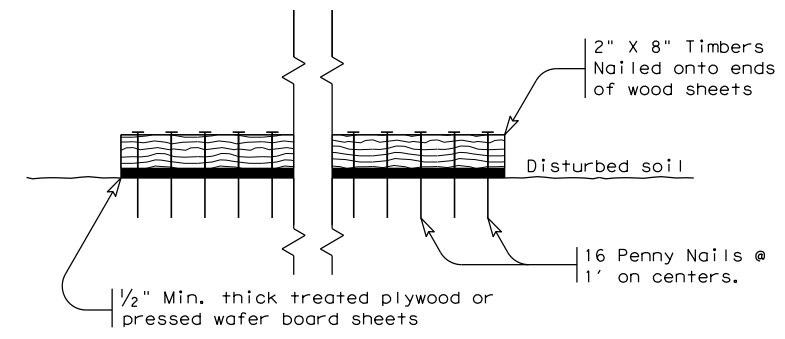
CONSTRUCTION EXIT (TYPE 2)
 TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

- The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
- The treated timber planks shall be attached to the railroad ties with 1/2" x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
- The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
- The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
- The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
- The construction exit should be graded to allow drainage to a sediment trapping device.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.
- 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.



PLAN VIEW



SECTION A-A
 CONSTRUCTION EXIT (TYPE 3)
 SHORT TERM

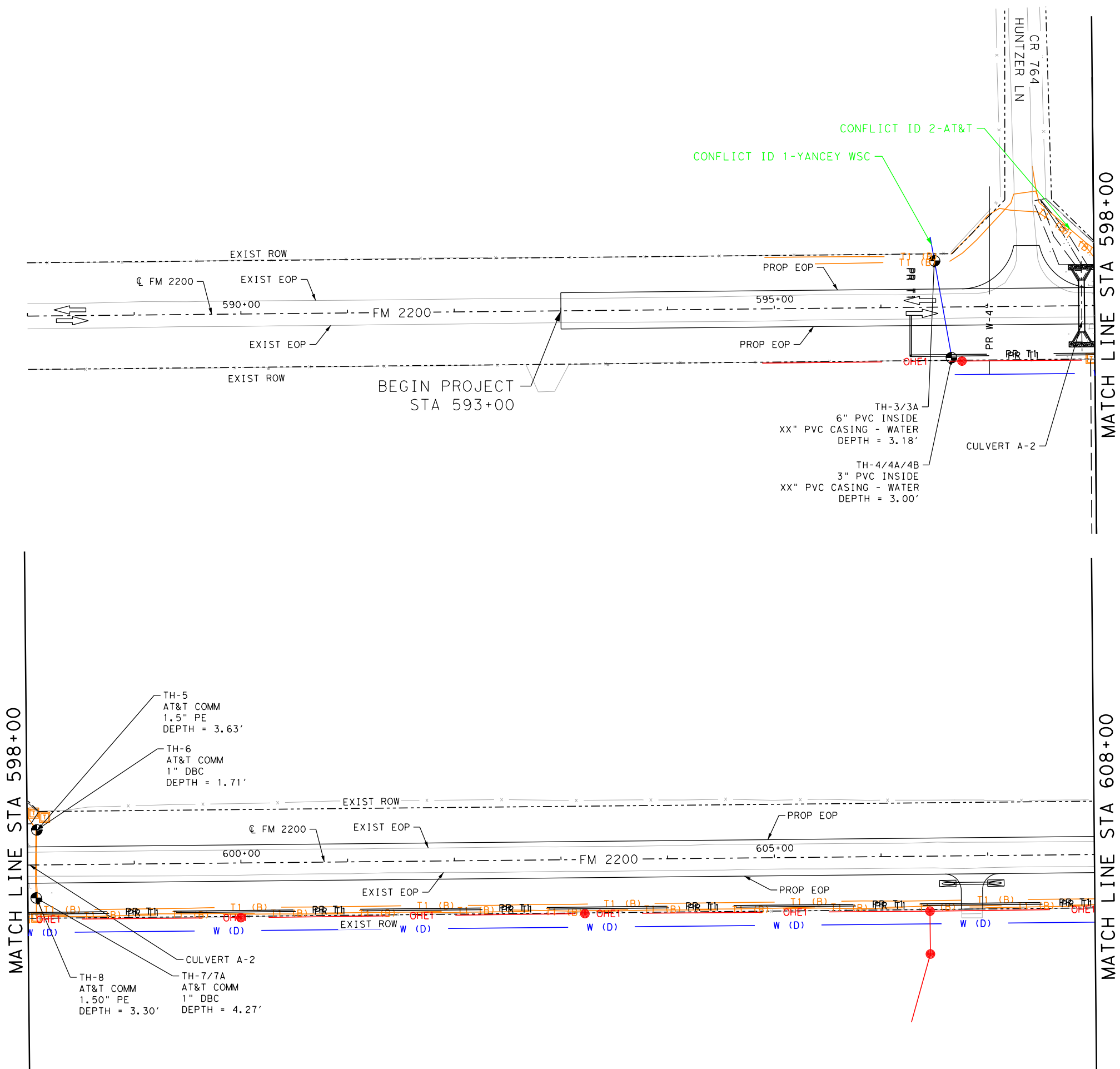
GENERAL NOTES (TYPE 3)

- The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
- 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.
- The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.

		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES CONSTRUCTION EXITS EC(3)-16			
FILE: ec316	DN: TxDOT	CK: KM	DW: VP
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REVISIONS	2520	01	016, ETC
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Plotted on: 12/23/2022

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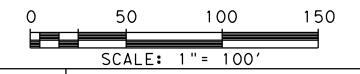
LEGEND

- OHE 1 — MEDINA ELEC CO-OP
- OHE 2 — AEP
- T1 (X) — AT&T
- OHT 1 — SPECTRUM
- OHT 2 — DEVINE ISD
- T3 (X) — DEVINE ISD
- W (D) — YANCEY WSC
- SS (C) — CITY OF DEVINE
- G (D) — WEST TEXAS GAS
- UTILITY POLE
- T TELEPHONE PEDESTAL
- CONFLICT ID XX UTILITY IN CONFLICT
- CONFLICT ID XX UTILITY CONFLICT RESOLVED
- CONFLICT AREA
- SUE QL-A LOCATION

NOTES
 CONTRACTOR TO FIELD VERIFY EXISTING UTILITIES PRIOR TO CONSTRUCTION. UTILITIES ARE SHOWN BASED ON LEVEL (X) B, C/D SUE AND DRAWN WITH BEST RECORDS AVAILABLE DURING DESIGN.
 PROPOSED UTILITIES COMPLETED BY OTHERS.

KEVIN LARNEY, P.E.
12/23/2022

JAMES A. LUTZ, P.E.
12/23/2022



REV. NO.	DATE	DESCRIPTION	BY			
 SAN ANTONIO AUSTIN HOUSTON FORT WORTH DALLAS 2000 NW LOOP 410 SAN ANTONIO, TX 78213 210.375.9000 TEXAS ENGINEERING FIRM #470 TEXAS SURVEYING FIRM #10028800						
 ©2023						
FM 2200 UTILITY LAYOUT BEGIN PROJECT TO STA 608+00 SHEET 1 OF 7						
DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
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CHK DWG:	SAT	MEDINA	2520	01	016, ETC	295

Plotted on: 12/20/2022

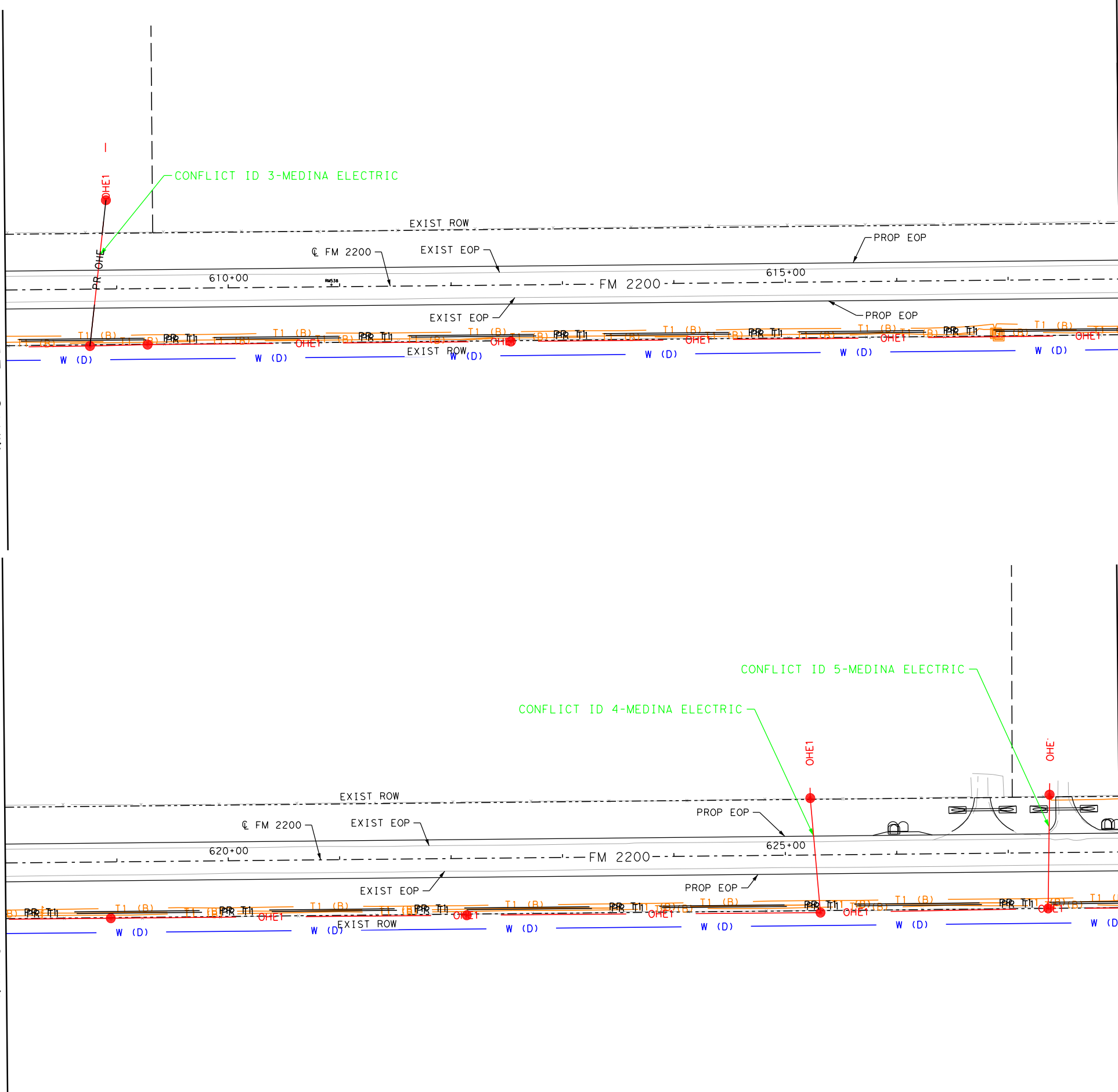
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MATCH LINE STA 608+00

MATCH LINE STA 618+00

MATCH LINE STA 618+00

MATCH LINE STA 628+00



LEGEND

- OHE 1 — MEDINA ELEC CO-OP
- OHE 2 — AEP
- T1 (X) — AT&T
- OHT 1 — SPECTRUM
- OHT 2 — DEVINE ISD
- T3 (X) — DEVINE ISD
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- CONFLICT ID XX UTILITY IN CONFLICT
- CONFLICT ID XX UTILITY CONFLICT RESOLVED
- CONFLICT AREA
- SUE QL-A LOCATION

NOTES

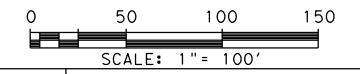
CONTRACTOR TO FIELD VERIFY EXISTING UTILITIES PRIOR TO CONSTRUCTION. UTILITIES ARE SHOWN BASED ON LEVEL (X) B, C/D SUE AND DRAWN WITH BEST RECORDS AVAILABLE DURING DESIGN.
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Kevin Larney
KEVIN LARNEY, P.E. 12/20/2022
DATE



James A. Lutz
JAMES A. LUTZ, P.E. 12/20/2022
DATE



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FM 2200 UTILITY LAYOUT STA 608+00 TO STA 628+00 SHEET 2 OF 7			
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CHK DGN:	6	TEXAS	SEE TITLE SHEET
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO. JOB NO. SHEET NO.
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Plotted on: 12/20/2022

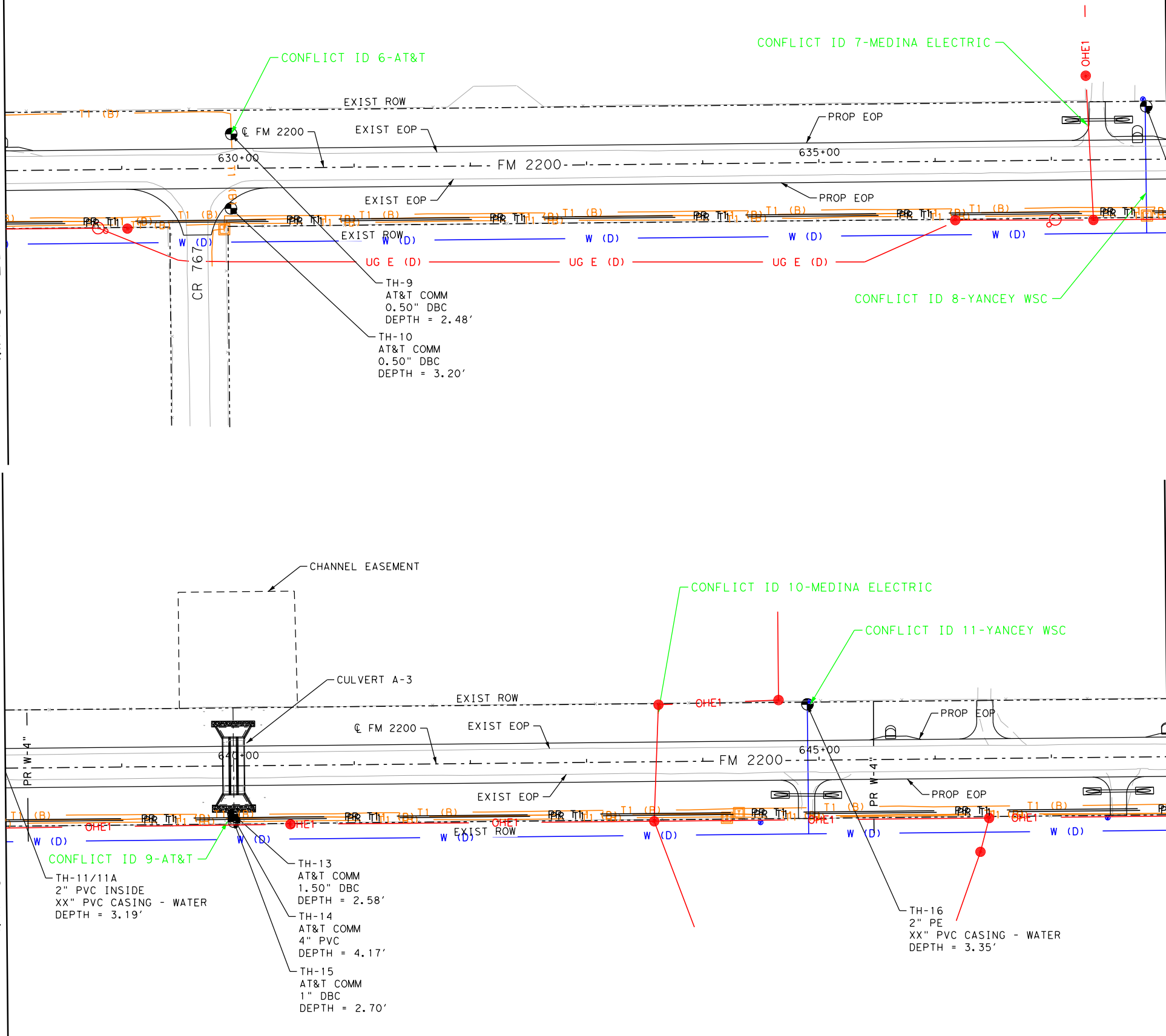
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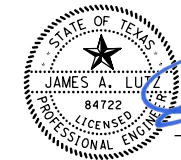
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- T1 (X) — AT&T
- OHT 1 — SPECTRUM
- OHT 2 — DEVINE ISD
- W (D) — YANCEY WSC
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- UTILITY POLE
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- CONFLICT ID XX UTILITY IN CONFLICT
- CONFLICT ID XX UTILITY CONFLICT RESOLVED
- CONFLICT AREA
- SUE QL-A LOCATION

NOTES

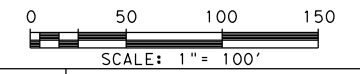
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Kevin Larney
KEVIN LARNEY, P.E. 12/20/2022
DATE



James A. Lutz
JAMES A. LUTZ, P.E. 12/20/2022
DATE



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2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



FM 2200

UTILITY LAYOUT

628+00 TO STA 648+00

SHEET 3 OF 7

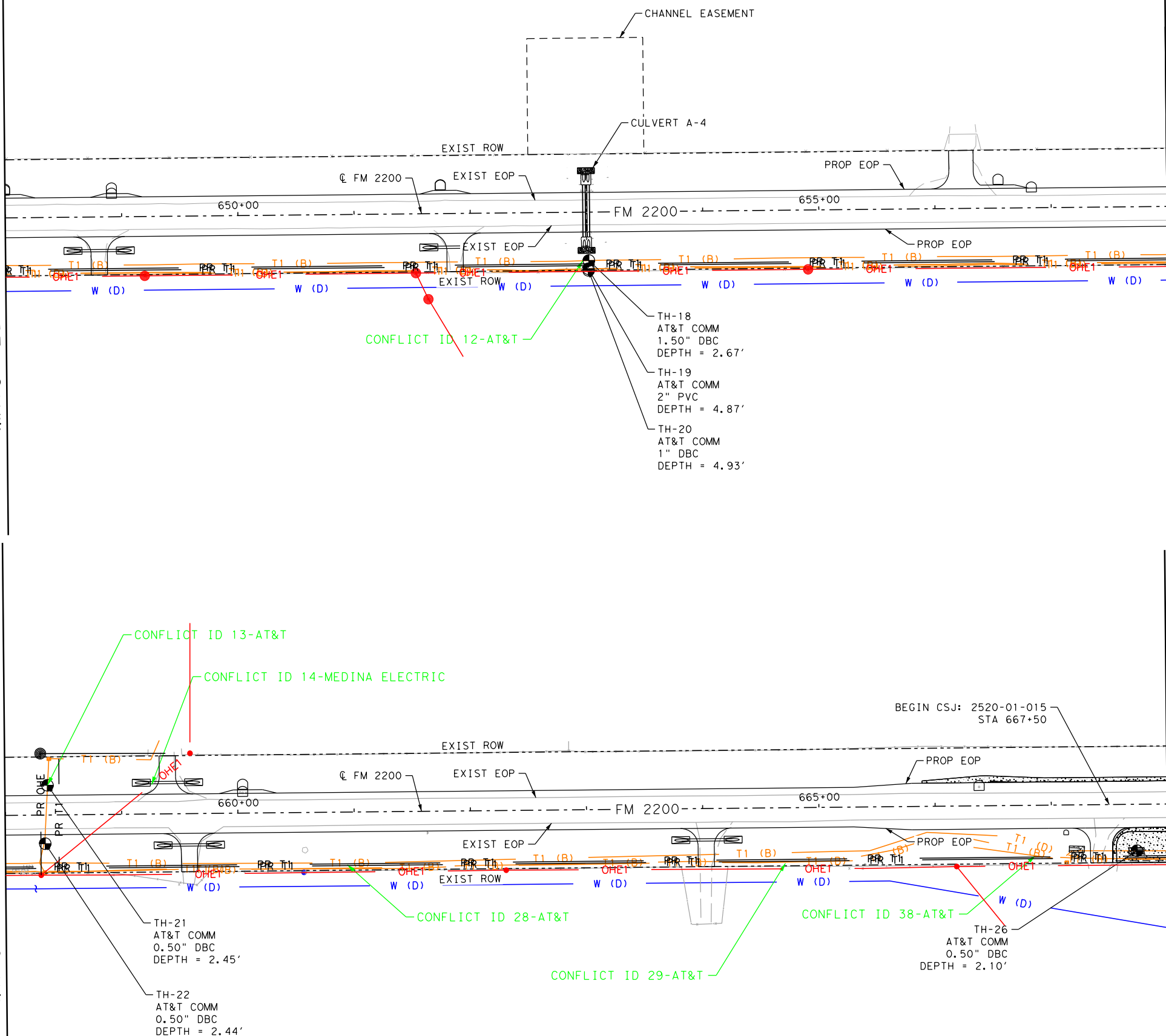
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CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	297

MATCH LINE STA 648+00

MATCH LINE STA 658+00

MATCH LINE STA 658+00

MATCH LINE STA 668+00



LEGEND

- OHE 1 MEDINA ELEC CO-OP
- OHE 2 AEP
- T1 (X) AT&T
- OHT 1 SPECTRUM
- OHT 2 DEVINE ISD
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- CONFLICT AREA
- ⊙ SUE QL-A LOCATION

NOTES

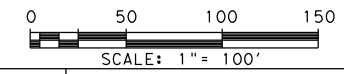
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Kevin Larney
 KEVIN LARNEY, P.E. 1/12/2023
 DATE



James A. Lutz
 JAMES A. LUTZ, P.E. 1/12/2023
 DATE



REV. NO.	DATE	DESCRIPTION	BY

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
 2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
 TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

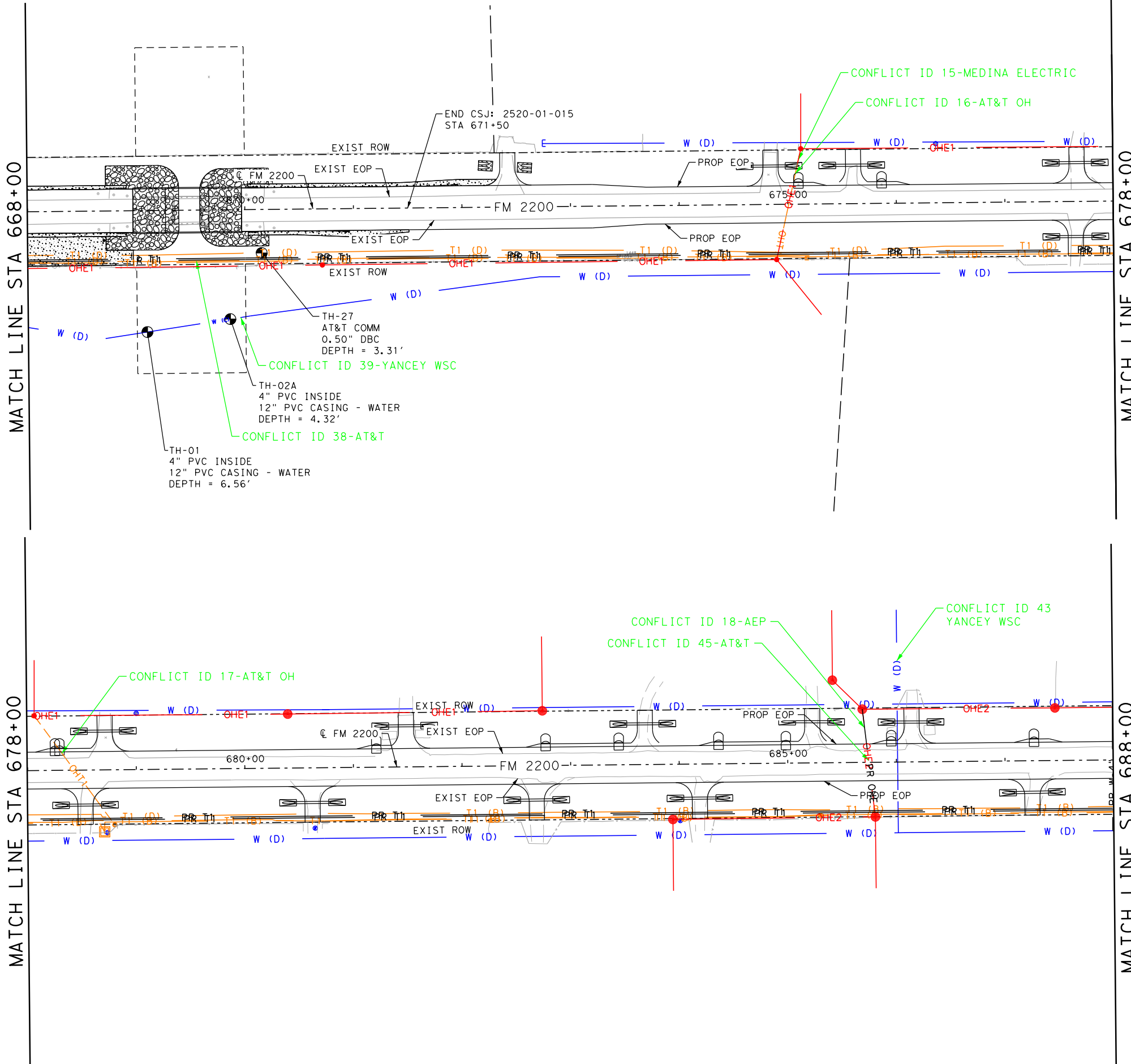
Texas Department of Transportation
 © 2023

FM 2200
UTILITY LAYOUT
 STA 648+00 TO STA 668+00
 SHEET 4 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	298

Plotted on: 1/12/2023

Design File name: P:\117\99\04\Design\Civil\Utility\1179904_UTIL05.dgn



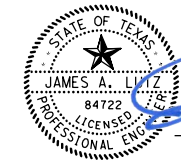
LEGEND

	OHE 1	MEDINA ELEC CO-OP
	OHE 2	AEP
	T1 (X)	AT&T
	OHT 1	AT&T
	OHT 2	SPECTRUM
	T3 (X)	DEVINE ISD
	W (D)	YANCEY WSC
	SS (C)	CITY OF DEVINE
	G (D)	WEST TEXAS GAS
		UTILITY POLE
		TELEPHONE PEDESTAL
	CONFLICT ID XX	UTILITY IN CONFLICT
	CONFLICT ID XX	UTILITY CONFLICT RESOLVED
		CONFLICT AREA
		SUE QL-A LOCATION

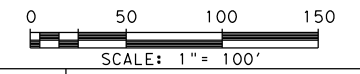
NOTES
 CONTRACTOR TO FIELD VERIFY EXISTING UTILITIES PRIOR TO CONSTRUCTION. UTILITIES ARE SHOWN BASED ON LEVEL (X) B, C/D SUE AND DRAWN WITH BEST RECORDS AVAILABLE DURING DESIGN.
 PROPOSED UTILITIES COMPLETED BY OTHERS.



Kevin Larney
 KEVIN LARNEY, P.E. 1/12/2023
 DATE



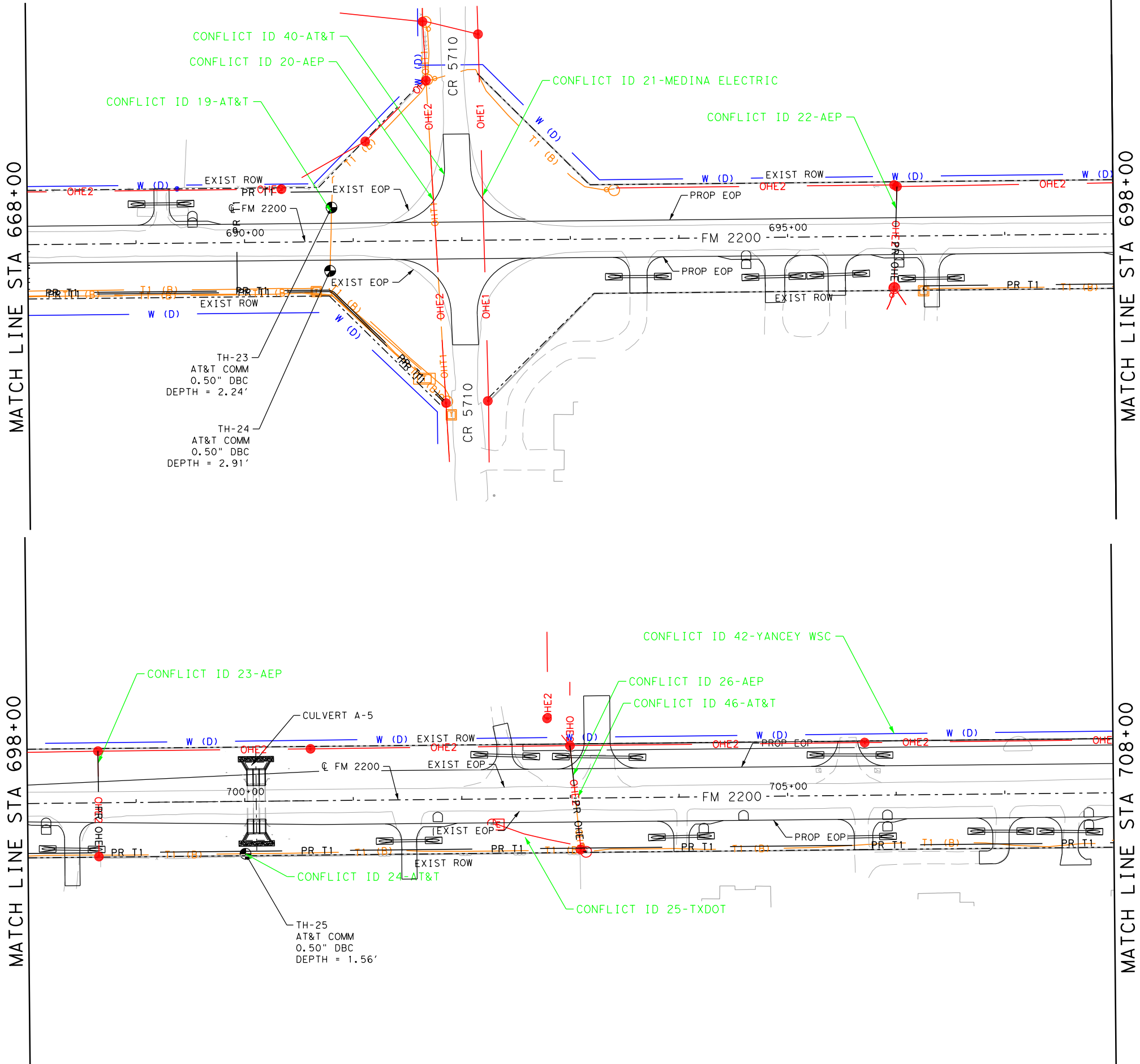
James A. Lutz
 JAMES A. LUTZ, P.E. 1/12/2023
 DATE



REV. NO.	DATE	DESCRIPTION	BY			
 SAN ANTONIO AUSTIN HOUSTON FORT WORTH DALLAS 2000 NW LOOP 410 SAN ANTONIO, TX 78213 210.375.9000 TEXAS ENGINEERING FIRM #470 TEXAS SURVEYING FIRM #10028800						
 ©2023						
FM 2200 UTILITY LAYOUT STA 668+00 TO STA 688+00 SHEET 5 OF 7						
DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:	HIGHWAY NO.:		
CHK DGN:	6	TEXAS	SEE TITLE SHEET	FM 2200		
DWG:	DIST.:	COUNTY:	CONT. NO.:	SECT. NO.:	JOB NO.:	SHEET NO.:
CHK DWG:	SAT	MEDINA	2520	01	016, ETC	299

Plotted on: 12/20/2022

Design Filename: P:\117\99\04\Design\Civil\Utility\1179904_UTIL06.dgn



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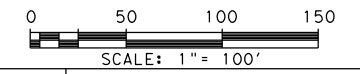
- OHE 1 — MEDINA ELEC CO-OP
- OHE 2 — AEP
- T1 (X) — AT&T
- OHT 1 — SPECTRUM
- OHT 2 — DEVINE ISD
- W (D) — YANCEY WSC
- SS (C) — CITY OF DEVINE
- G (D) — WEST TEXAS GAS
- UTILITY POLE
- TELEPHONE PEDESTAL
- CONFLICT ID XX UTILITY IN CONFLICT
- CONFLICT ID XX UTILITY CONFLICT RESOLVED
- CONFLICT AREA
- ☉ SUE QL-A LOCATION

NOTES

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 PROPOSED UTILITIES COMPLETED BY OTHERS.

KEVIN LARNEY, P.E.
DATE: 12/20/2022

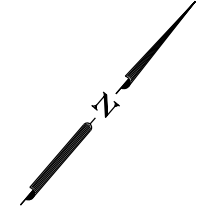
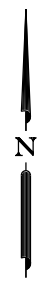
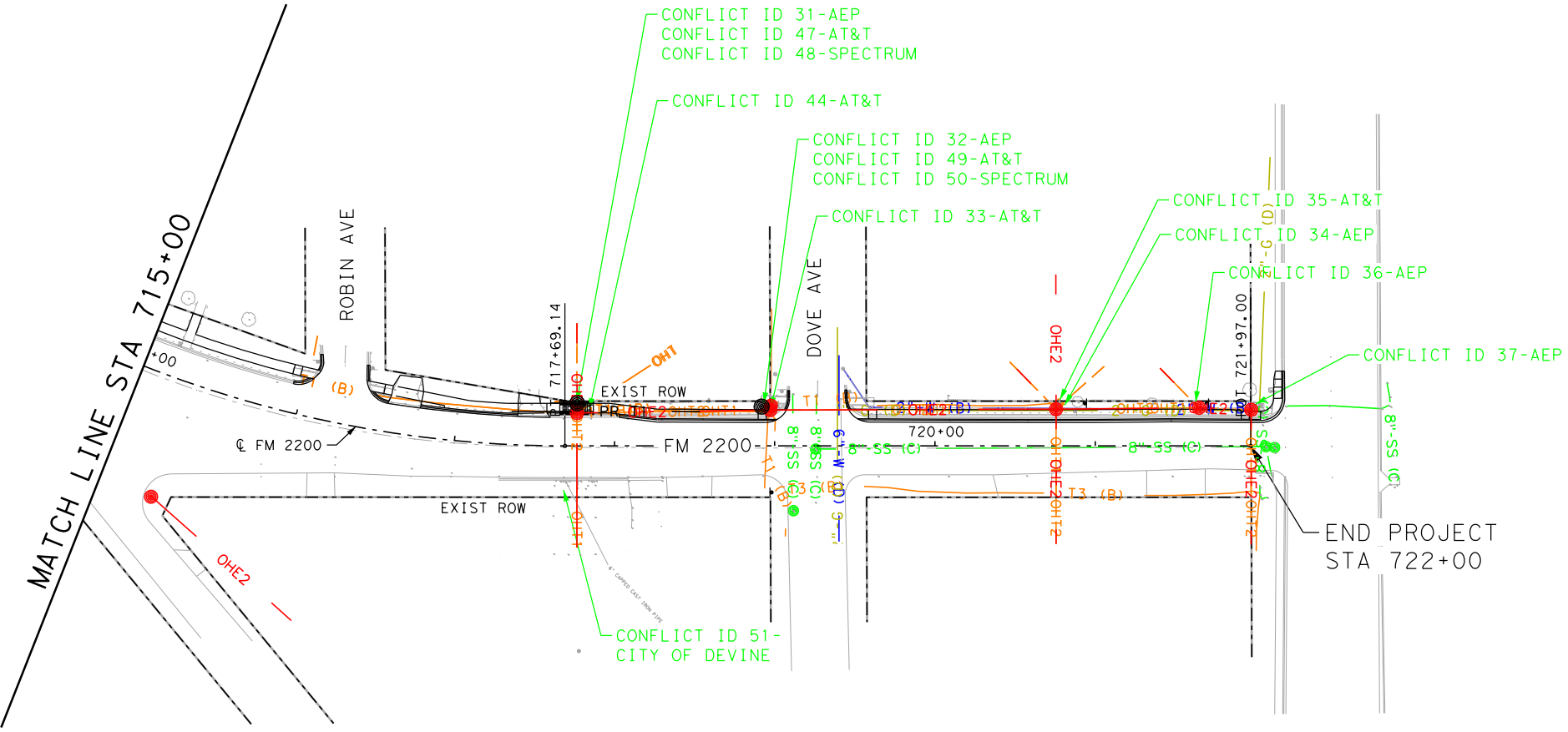
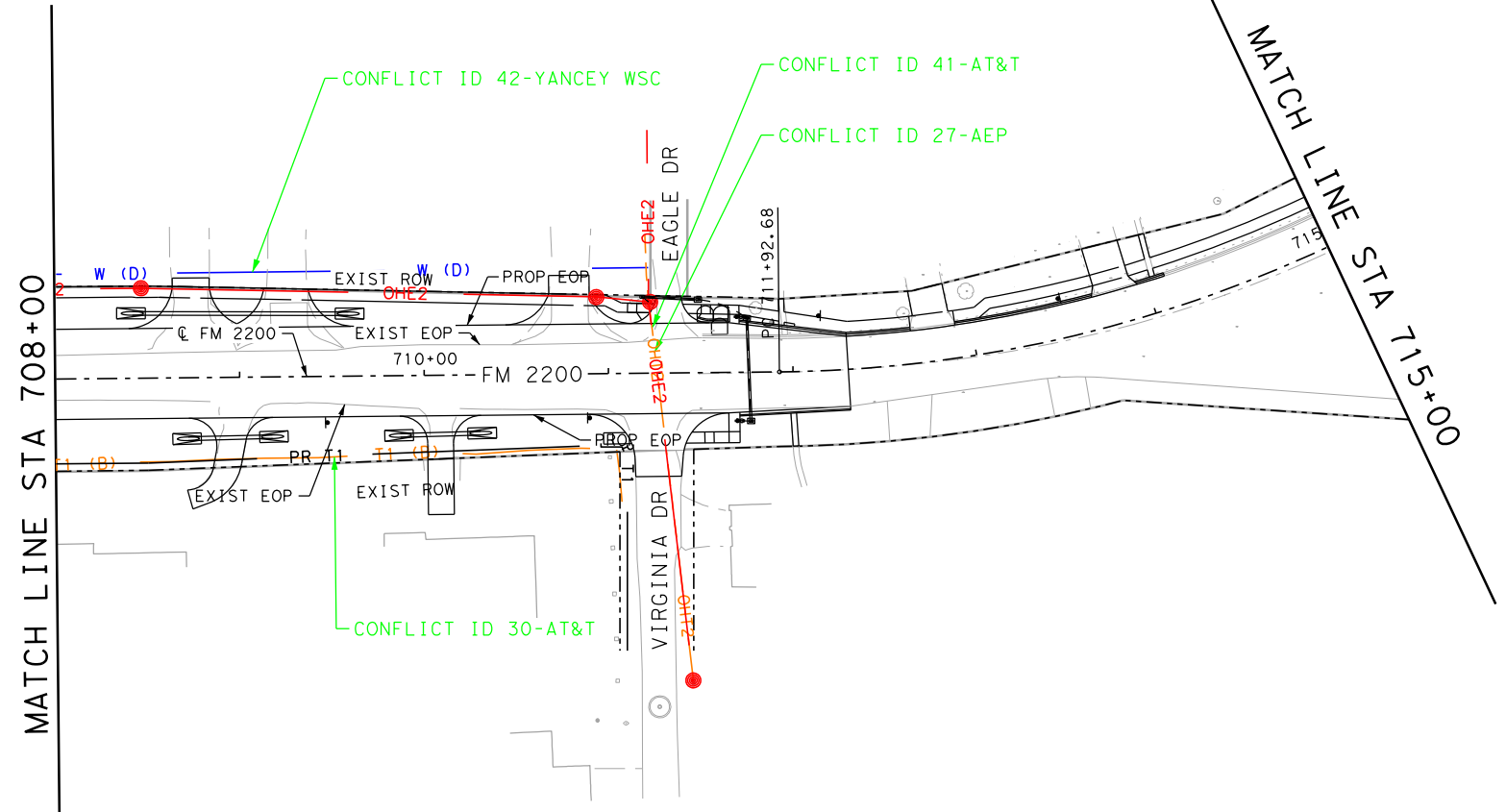
JAMES A. LUTZ, P.E.
DATE: 12/20/2022



REV. NO.	DATE	DESCRIPTION	BY
 SAN ANTONIO AUSTIN HOUSTON FORT WORTH DALLAS 2000 NW LOOP 410 SAN ANTONIO, TX 78213 210.375.9000 TEXAS ENGINEERING FIRM #470 TEXAS SURVEYING FIRM #10028800			
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FM 2200 UTILITY LAYOUT STA 668+00 TO STA 708+00 SHEET 6 OF 7			
DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO. JOB NO. SHEET NO.
CHK DWG:	SAT	MEDINA	2520 01 016, ETC 300

Plotted on: 12/20/2022

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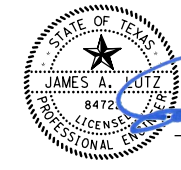
- OHE 1 — MEDINA ELEC CO-OP
- OHE 2 — AEP
- T1 (X) — AT&T
- OHT 1 — SPECTRUM
- OHT 2 — DEVINE ISD
- W (D) — YANCEY WSC
- SS (C) — CITY OF DEVINE
- G (D) — WEST TEXAS GAS
- UTILITY POLE
- T TELEPHONE PEDESTAL
- CONFLICT ID XX UTILITY IN CONFLICT
- CONFLICT ID XX UTILITY CONFLICT RESOLVED
- CONFLICT AREA
- ◐ SUE QL-A LOCATION

NOTES

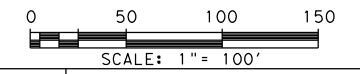
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PROPOSED UTILITIES COMPLETED BY OTHERS.



Kevin Larney
KEVIN LARNEY, P.E. 12/20/2022
DATE



James A. Lutz
JAMES A. LUTZ, P.E. 12/20/2022
DATE



REV. NO.	DATE	DESCRIPTION	BY
 SAN ANTONIO AUSTIN HOUSTON FORT WORTH DALLAS 2000 NW LOOP 410 SAN ANTONIO, TX 78213 210.375.9000 TEXAS ENGINEERING FIRM #470 TEXAS SURVEYING FIRM #10028800			
 © 2023 FM 2200 UTILITY LAYOUT 708+00 TO STA END PROJECT SHEET 7 OF 7			
DGN:	FED. RD. DIV. NO.:	STATE:	FEDERAL AID PROJECT NO.:
CHK DGN:	6	TEXAS	SEE TITLE SHEET
DWG:	DIST.:	COUNTY:	CONT. NO. SECT. NO. JOB NO. SHEET NO.:
CHK DWG:	SAT	MEDINA	2520 01 016, ETC 301