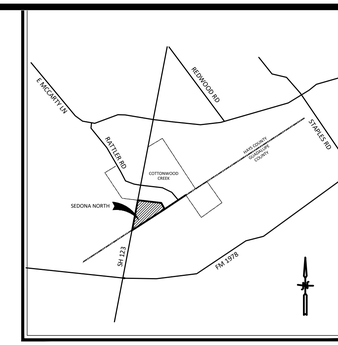
SEDONA NORTH SUBDIVISION

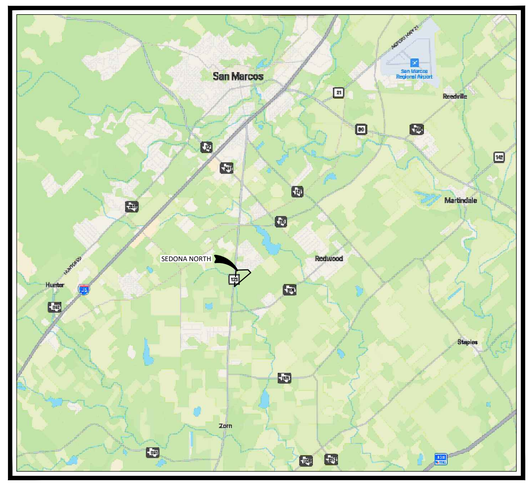
SAN MARCOS, TEXAS



LOCATION MAP

TXDOT DRIVEWAY CONNECTION PLANS

TXDOT PERMIT NO. _____



LOCATION MAP

Sheet List Table

Sheet Number	Sheet Title
1	COVER SHEET
2	DRIVEWAY LOCATION PLAN
3	SIGHT DISTANCE PLAN
4	EXISTING DRAINAGE AREA MAP
5	PROPOSED DRAINAGE AREA MAP
6	DRIVEWAY PLAN
7	CULVERT PLAN & PROFILE
8	DRIVEWAY DETAILS
9	PAVEMENT MARKING DETAILS
10	TRAFFIC CONTROL & SW3P DETAILS
11	DRAINAGE DETAILS

ENGINEER:
BAIN MEDINA BAIN, INC.
7073 SAN PEDRO AVE
SAN ANTONIO, TX 78216
PH: 210-494-7223

DEVELOPER/OWNER:
JLBC 710 INVESTMENTS, LLC
6504 W. COURTYARD DR.
AUSTIN, TX 78730
PH: 512-328-0860

TXDOT DRAINAGE NOTE:

DRAINAGE FOR THIS DEVELOPMENT HAS BEEN DESIGNED SUCH THAT THERE WILL BE NO ADVERSE IMPACTS ON THE CAPACITY, FUNCTION OR INTEGRITY OF TEXAS DEPARTMENT OF TRANSPORTATION RIGHT-OF-WAY DRAINAGE FACILITIES.

TxDOT ATLAS-14 PRECIPITATION VALUES WERE USED FOR THE TXDOT DRAINAGE CALCULATIONS.

REVISIONS:
10/31/23 - TXDOT COMMENTS

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
7073 San Pedro Avenue
San Antonio, Texas 78216
PH: 210-494-7223
TBPELS Registration No. F-1712

STATE OF TEXAS
HERMAN A. JARAMILLO
92841
REGISTERED PROFESSIONAL ENGINEER
10/31/23

COVER SHEET
for
SEDONA NORTH SUBDIVISION
TXDOT DRIVEWAY CONNECTION

JOB #: C-1576
DATE: 10/1/23
DESIGN: N. RAMONES
DRAWN: N. RAMONES
CHECKED: H. JARAMILLO
SHEET: 1 OF 11

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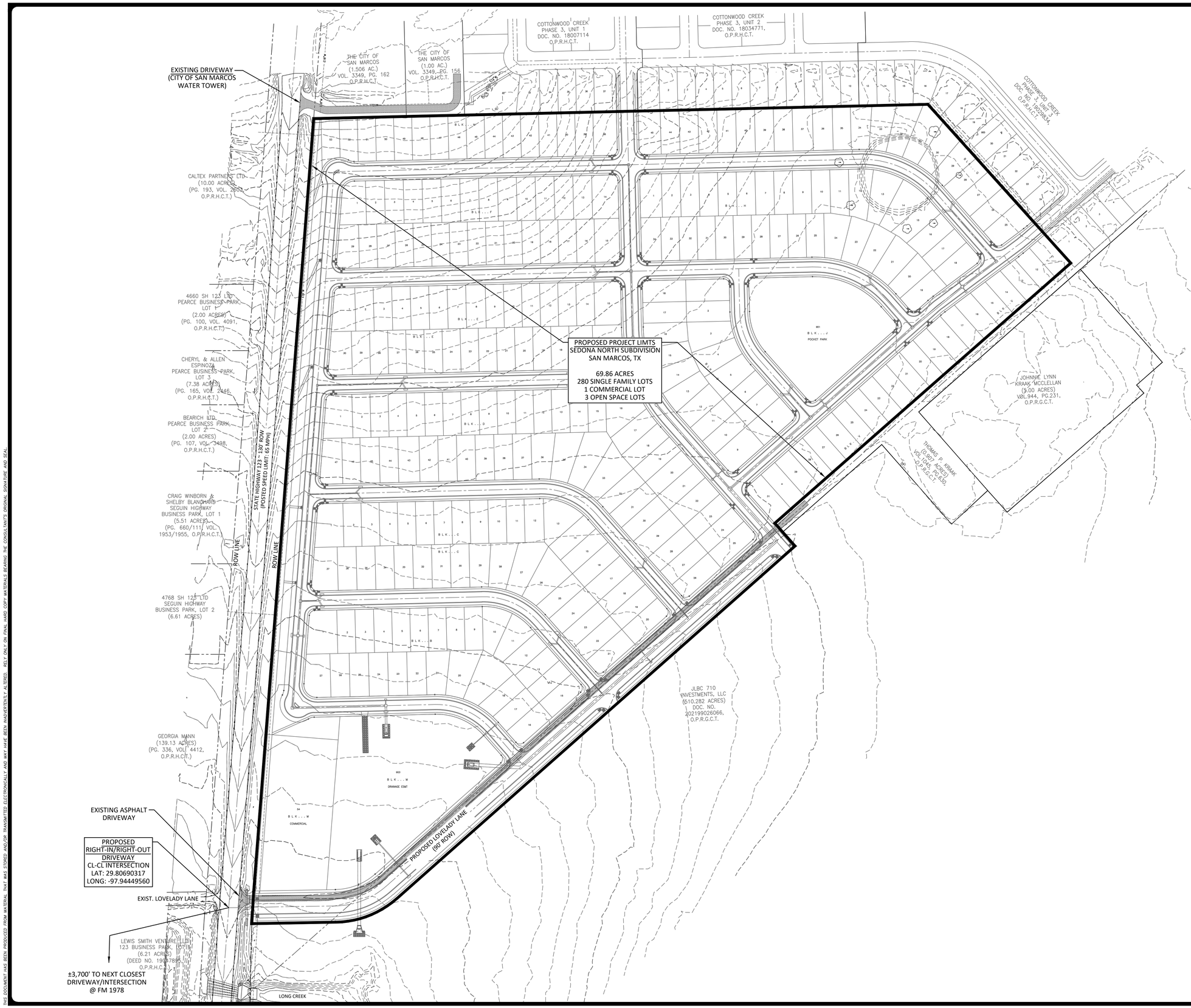

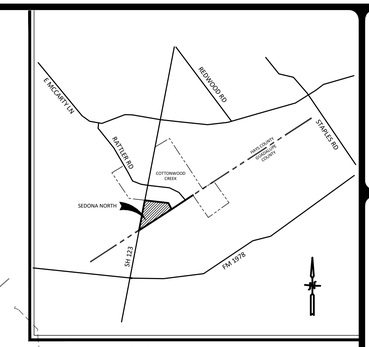

LOCATION MAP

REVISIONS:
10/31/23 - TXDOT COMMENTS

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
7073 San Pedro Avenue
San Antonio, Texas 78216
PH: 210-494-7223
TBPELS Registration No. F-1712

10/31/23
STATE OF TEXAS
HERNAN A. JARAMILLO
92851
REGISTERED
PROFESSIONAL ENGINEER

DRIVEWAY LOCATION PLAN for SEDONA NORTH SUBDIVISION TXDOT DRIVEWAY CONNECTION

JOB #: C-1576
DATE: 10/1/23
DESIGN: N. RAMONES
DRAWN: N. RAMONES
CHECKED: H. JARAMILLO
SHEET: 2 OF 11

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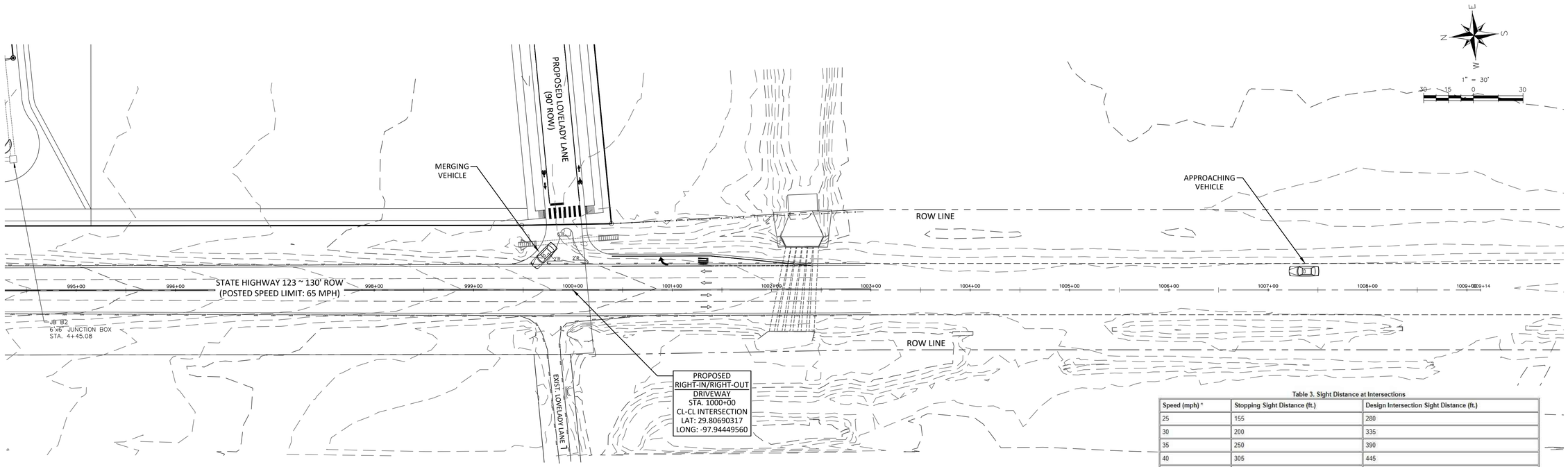
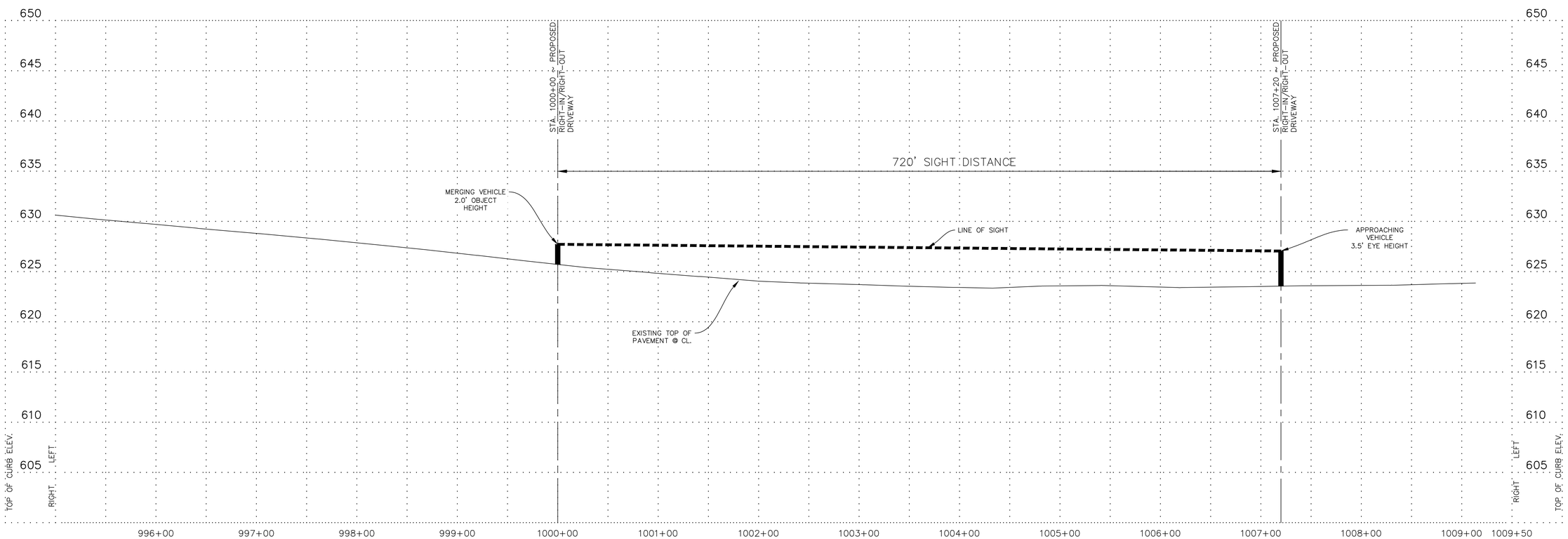


SH 123 – SIGHT DISTANCE

Table 3. Sight Distance at Intersections

Speed (mph) *	Stopping Sight Distance (ft.)	Design Intersection Sight Distance (ft.)
25	155	280
30	200	335
35	250	390
40	305	445
45	360	500
50	425	555
55	495	610
60	570	665
65	645	720

Source : *A Policy on Geometric Design of Highway and Streets*, 5th Edition, American Association of State Highway and Transportation Officials (AASHTO), 2004.



REVISIONS:
10/31/23 - TXDOT COMMENTS

BAIN MEDINA BAIN, INC.
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PH: 210-494-7223
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10/31/23

STATE OF TEXAS
HERMAN A. JARAMILLO
92861
REGISTERED
PROFESSIONAL ENGINEER

SIGHT DISTANCE PLAN
for
SEDONA NORTH SUBDIVISION
TXDOT DRIVEWAY CONNECTION

JOB #: C-1576
DATE: 10/1/23
DESIGN: N. RAMONES
DRAWN: N. RAMONES
CHECKED: H. JARAMILLO
SHEET: 3 OF 11

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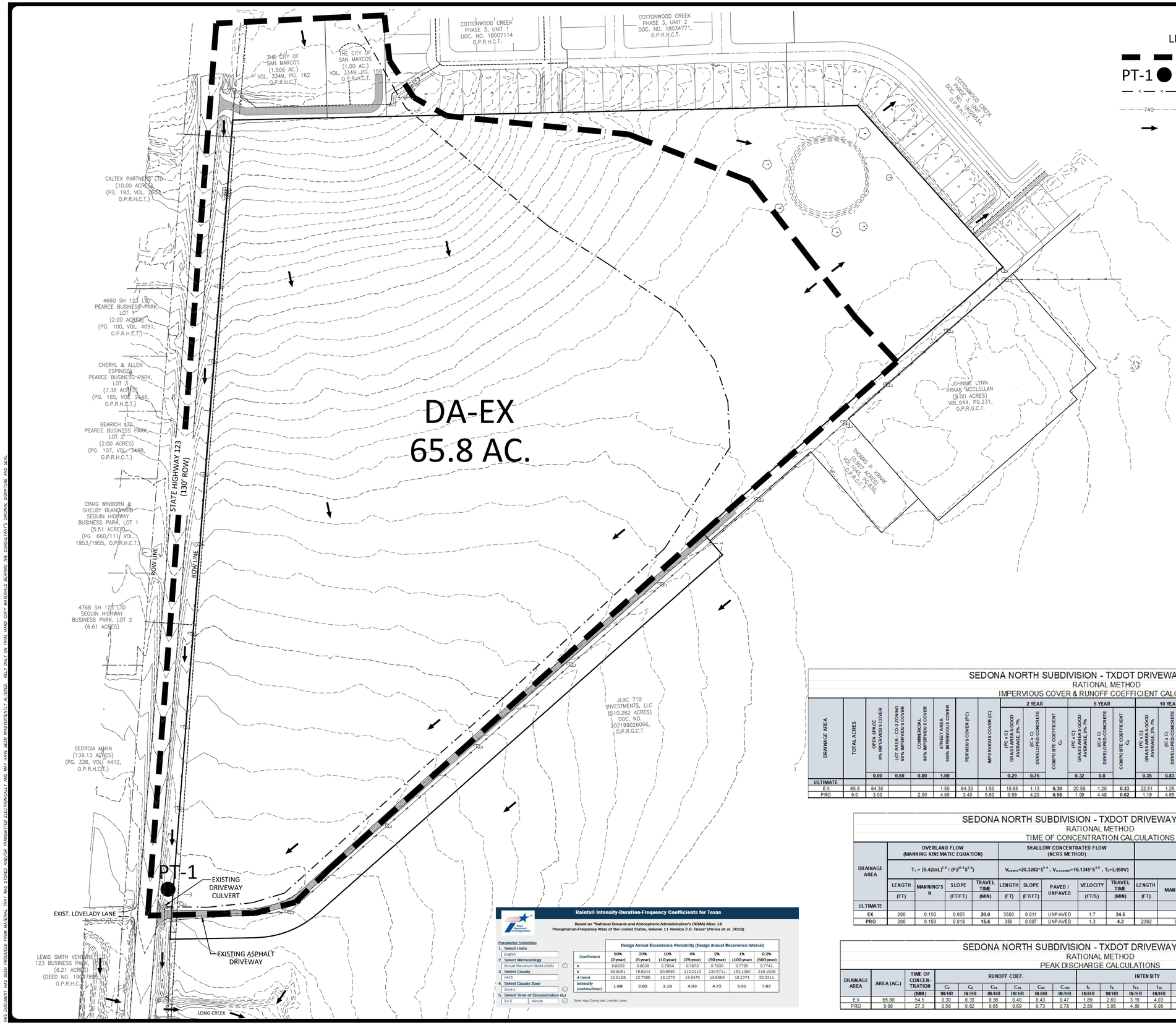

3.2.1.4: Rational Method

The Rational Method is based on the direct relationship between rainfall and runoff, and is expressed by the following equation:

$Q_p = CiA$ [Equation 3.1]

Where:

Q_p is defined as the peak runoff in cubic feet per second. Actually, Q_p is in units of acre-inches per hour. Since this rate of acre-in/hr differs from cubic feet per second by less than one (1) percent (1 acre-in/hr = 1.008 cfs), the more common units of cfs are used.

C is the composite coefficient of runoff representing the ratio of peak runoff rate "Q_p" to average rainfall intensity rate "i" for the soil types and land uses characteristic of the contributing drainage area. See Section 3.2.1.5 for determining the proper coefficient.

"i" is the average intensity of rainfall in inches per hour for a period of time equal to the time of concentration (T_c) for the drainage area to the design point under consideration.

"A" is the area in acres contributing runoff to the point of design.

The following basic assumptions are associated with the Rational Method:

a. The storm duration is equal to the time of concentration.

b. The computed peak rate of runoff at the design point is a function of the average rainfall rate over a duration equal to the time of concentration at that point.

c. The return period or frequency of the computed peak flow is the same as that for the design storm.

d. The necessary basin characteristics can be identified and the runoff coefficient does not vary during a storm.

e. Rainfall intensity is constant during the storm duration and spatially uniform for the area under analysis.

f. The maximum rate of discharge at the point of design will occur when the entire area above the point of design is contributing runoff.

Rainfall Intensity-Duration-Frequency Coefficients for Texas

Based on "National Oceanic and Atmospheric Administration's (NOAA) Atlas 14 Precipitation-Frequency Atlas of the United States, Volume 11 Version 2.0: Texas" (Perica et al. 2018)

Parameter Selection
1. Select Units: English
2. Select Methodology: Annual Maximum Series (AMS)
3. Select County: HAYS
4. Select County Zone: Zone-1
5. Select Time of Concentration (t_c): 54.5 Minute

Coefficient	50% (2-year)	20% (5-year)	10% (10-year)	4% (25-year)	2% (50-year)	1% (100-year)	0.2% (500-year)
	Design Annual Exceedance Probability (Design Annual Recurrence Interval)						
e	0.8209	0.8038	0.7954	0.7873	0.7830	0.7795	0.7741
b	59.8061	76.6244	90.9590	112.2113	130.5711	152.1280	216.1928
d (min)	12.8128	12.7586	13.1270	13.9470	14.8364	16.1074	20.2311
Intensity (inches/hour)	1.89	2.60	3.19	4.03	4.72	5.51	7.67

Note: Hays County has 1 rainfall zone.

SEDONA NORTH SUBDIVISION - TXDOT DRIVEWAY CONNECTION
RATIONAL METHOD
IMPERVIOUS COVER & RUNOFF COEFFICIENT CALCULATIONS

DRAINAGE AREA	TOTAL ACRES	OPEN SPACE 0% IMPERVIOUS COVER	LOT AREA - CD-3 ZONING 60% IMPERVIOUS COVER	COMMERCIAL 80% IMPERVIOUS COVER	STREET AREA 100% IMPERVIOUS COVER	PERVIOUS COVER (PC)	IMPERVIOUS COVER (IC)	2 YEAR			5 YEAR			10 YEAR			25 YEAR			50 YEAR			100 YEAR		
								(PC x C) GRASS AREA S-0000 AVERAGE, 2%-7%	(IC x C) DEVELOPED-CONCRETE	COMPOSITE COEFFICIENT C_2	(PC x C) GRASS AREA S-0000 AVERAGE, 2%-7%	(IC x C) DEVELOPED-CONCRETE	COMPOSITE COEFFICIENT C_5	(PC x C) GRASS AREA S-0000 AVERAGE, 2%-7%	(IC x C) DEVELOPED-CONCRETE	COMPOSITE COEFFICIENT C_{10}	(PC x C) GRASS AREA S-0000 AVERAGE, 2%-7%	(IC x C) DEVELOPED-CONCRETE	COMPOSITE COEFFICIENT C_{25}	(PC x C) GRASS AREA S-0000 AVERAGE, 2%-7%	(IC x C) DEVELOPED-CONCRETE	COMPOSITE COEFFICIENT C_{50}	(PC x C) GRASS AREA S-0000 AVERAGE, 2%-7%	(IC x C) DEVELOPED-CONCRETE	COMPOSITE COEFFICIENT C_{100}
		0.00	0.60	0.80	1.00			0.29	0.75		0.32	0.8		0.35	0.83		0.39	0.88		0.42	0.92		0.46	0.97	
ULTIMATE																									
EX	65.8	64.30			1.50	64.30	1.50	18.65	1.13	**0.30**	20.58	1.20	**0.33**	22.51	1.25	**0.36**	25.08	1.32	**0.40**	27.01	1.38	**0.43**	29.58	1.46	**0.47**
PRO	9.0	3.00		2.00	4.00	3.40	5.60	0.99	4.20	**0.58**	1.09	4.48	**0.62**	1.19	4.65	**0.65**	1.33	4.93	**0.69**	1.43	5.15	**0.73**	1.56	5.43	**0.78**

SEDONA NORTH SUBDIVISION - TXDOT DRIVEWAY CONNECTION
RATIONAL METHOD
TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA	OVERLAND FLOW (MANNING KINEMATIC EQUATION)				SHALLOW CONCENTRATED FLOW (NCRS METHOD)					CHANNEL FLOW (MANNING EQUATION)					TIME OF CONCENTRATION (MIN)
	$T_t = \{0.42(nL)^{0.8} / (P2^{0.5} S^{0.4}\}$				$V_{paved}=20.3282*S^{0.5}$, $V_{unpaved}=16.1345*S^{0.5}$, $T_t=L/(60V)$					$T_t=L/(60V)$					
	LENGTH (FT)	MANNING'S N	SLOPE (FT/FT)	TRAVEL TIME (MIN)	LENGTH (FT)	SLOPE (FT/FT)	PAVED / UNPAVED	VELOCITY (FT/S)	TRAVEL TIME (MIN)	LENGTH (FT)	MANNING'S N	SLOPE (FT/FT)	VELOCITY (FT/S)	TRAVEL TIME (MIN)	
ULTIMATE															
EX	200	0.150	0.005	**20.0**	3500	0.011	UNPAVED	1.7	**34.5**						**54.5**
PRO	200	0.150	0.018	**15.6**	350	0.007	UNPAVED	1.3	**4.3**	2392	0.045	0.015	5.4	**7.4**	**27.3**

SEDONA NORTH SUBDIVISION - TXDOT DRIVEWAY CONNECTION
RATIONAL METHOD
PEAK DISCHARGE CALCULATIONS

DRAINAGE AREA	AREA (AC.)	TIME OF CONCEN-TRATION	RUNOFF COEF.						INTENSITY						FLOW					
		(MIN)	C_2	C_5	C_{10}	C_{25}	C_{50}	C_{100}	I_2	I_5	I_{10}	I_{25}	I_{50}	I_{100}	Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
			IN/HR	IN/HR	IN/HR	IN/HR	IN/HR	IN/HR	IN/HR	IN/HR	IN/HR	IN/HR	IN/HR	IN/HR	CFS	CFS	CFS	CFS	CFS	CFS
EX	65.80	54.5	0.30	0.33	0.36	0.40	0.43	0.47	1.89	2.60	3.19	4.03	4.72	5.51	37.4	56.6	75.8	106.4	134.0	171.0
PRO	9.00	27.3	0.58	0.62	0.65	0.69	0.73	0.78	2.89	3.95	4.80	6.00	6.98	8.05	15.0	22.0	28.0	37.5	45.9	56.3

REVISIONS:
10/31/23 - TXDOT COMMENTS

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
7073 San Pedro Avenue
San Antonio, Texas 78216
PH: 210-494-7223
TBPELS Registration No. F-1712

10/31/23

EXISTING DRAINAGE AREA MAP for SEDONA NORTH SUBDIVISION TXDOT DRIVEWAY CONNECTION

JOB #: C-1576
DATE: 10/1/23
DESIGN: N. RAMONES
DRAWN: N. RAMONES
CHECKED: H. JARAMILLO
SHEET: 4 OF 11

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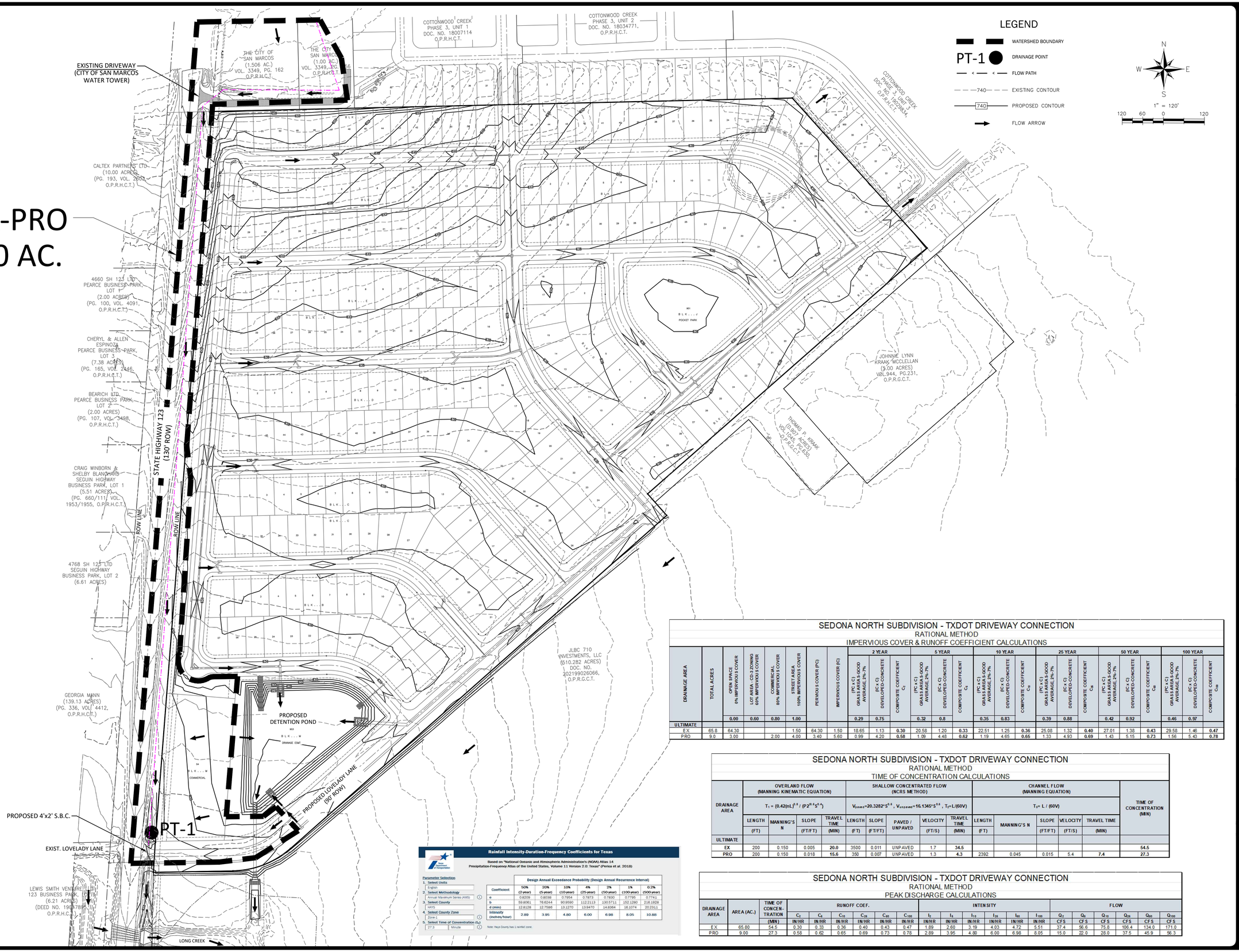

SEDONA NORTH SUBDIVISION - TXDOT DRIVEWAY CONNECTION
RATIONAL METHOD
IMPERVIOUS COVER & RUNOFF COEFFICIENT CALCULATIONS

DRAINAGE AREA	TOTAL ACRES	OPEN SPACE 0% IMPERVIOUS COVER	LOT AREA - CD-2 ZONING 60% IMPERVIOUS COVER	COMMERCIAL 80% IMPERVIOUS COVER	STREET AREA 100% IMPERVIOUS COVER	PERVIOUS COVER (PC)	IMPERVIOUS COVER (IC)	2 YEAR (PC x C) GRASS AREA 5-0CCID AVERAGE 2%-7%	2 YEAR (IC x C) DEVELOPED-CONCRETE	2 YEAR COMPOSITE COEFFICIENT C_2	5 YEAR (PC x C) GRASS AREA 5-0CCID AVERAGE 2%-7%	5 YEAR (IC x C) DEVELOPED-CONCRETE	5 YEAR COMPOSITE COEFFICIENT C_5	10 YEAR (PC x C) GRASS AREA 5-0CCID AVERAGE 2%-7%	10 YEAR (IC x C) DEVELOPED-CONCRETE	10 YEAR COMPOSITE COEFFICIENT C_{10}	25 YEAR (PC x C) GRASS AREA 5-0CCID AVERAGE 2%-7%	25 YEAR (IC x C) DEVELOPED-CONCRETE	25 YEAR COMPOSITE COEFFICIENT C_{25}	50 YEAR (PC x C) GRASS AREA 5-0CCID AVERAGE 2%-7%	50 YEAR (IC x C) DEVELOPED-CONCRETE	50 YEAR COMPOSITE COEFFICIENT C_{50}	100 YEAR (PC x C) GRASS AREA 5-0CCID AVERAGE 2%-7%	100 YEAR (IC x C) DEVELOPED-CONCRETE	100 YEAR COMPOSITE COEFFICIENT C_{100}
		0.00	0.60	0.80	1.00			0.29	0.75		0.32	0.8		0.35	0.83		0.39	0.88		0.42	0.92		0.46	0.97	
ULTIMATE																									
EX	65.8	64.30			1.50	64.30	1.50	18.65	1.13	**0.30**	20.58	1.20	**0.33**	22.51	1.25	**0.36**	25.08	1.32	**0.40**	27.01	1.38	**0.43**	29.58	1.46	**0.47**
PRO	9.0	3.00		2.00	4.00	3.40	5.60	0.99	4.20	**0.58**	1.09	4.48	**0.62**	1.19	4.65	**0.65**	1.33	4.93	**0.69**	1.43	5.15	**0.73**	1.56	5.43	**0.78**

SEDONA NORTH SUBDIVISION - TXDOT DRIVEWAY CONNECTION
RATIONAL METHOD
TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA	OVERLAND FLOW (MANNING KINEMATIC EQUATION)				SHALLOW CONCENTRATED FLOW (NCRS METHOD)					CHANNEL FLOW (MANNING EQUATION)					TIME OF CONCENTRATION (MIN)
	$T_1 = (0.42(nL)^{0.8} / (P2^{0.5} S^{0.4})$				$V_{paved}=20.3282*S^{0.5}$, $V_{unpaved}=16.1345*S^{0.5}$, T_2= L/(60V)					T_3= L / (60V)					
	LENGTH (FT)	MANNING'S N	SLOPE (FT/FT)	TRAVEL TIME (MIN)	LENGTH (FT)	SLOPE (FT/FT)	PAVED / UNPAVED	VELOCITY (FT/S)	TRAVEL TIME (MIN)	LENGTH (FT)	MANNING'S N	SLOPE (FT/FT)	VELOCITY (FT/S)	TRAVEL TIME (MIN)	
ULTIMATE															
EX	200	0.150	0.005	**20.0**	3500	0.011	UNPAVED	1.7	**34.5**						**54.5**
PRO	200	0.150	0.018	**15.6**	350	0.007	UNPAVED	1.3	**4.3**	2392	0.045	0.015	5.4	**7.4**	**27.3**

SEDONA NORTH SUBDIVISION - TXDOT DRIVEWAY CONNECTION
RATIONAL METHOD
PEAK DISCHARGE CALCULATIONS

DRAINAGE AREA	AREA (AC.)	TIME OF CONCEN-TRATION (MIN)	RUNOFF COEF. C_2 IN/HR	C_5 IN/HR	C_{10} IN/HR	C_{25} IN/HR	C_{50} IN/HR	C_{100} IN/HR	INTENSITY I_2 IN/HR	I_5 IN/HR	I_{10} IN/HR	I_{25} IN/HR	I_{50} IN/HR	I_{100} IN/HR	FLOW Q_2 CFS	Q_5 CFS	Q_{10} CFS	Q_{25} CFS	Q_{50} CFS	Q_{100} CFS
EX	65.80	54.5	0.30	0.33	0.36	0.40	0.43	0.47	1.89	2.60	3.19	4.03	4.72	5.51	37.4	56.6	75.8	106.4	134.0	171.0
PRO	9.00	27.3	0.58	0.62	0.65	0.69	0.73	0.78	2.89	3.95	4.80	6.00	6.98	8.05	15.0	22.0	28.0	37.5	45.9	56.3

Rainfall Intensity-Duration-Frequency Coefficients for Texas

Based on "National Oceanic and Atmospheric Administration's (NOAA) Atlas 14
Precipitation-Frequency Atlas of the United States, Volume 11 Version 2.0: Texas" (Perica et al. 2018)

Parameter Selection
1. Select Units: English
2. Select Methodology: Annual Maximum Series (AMS)
3. Select County: HAYS
4. Select County Zone: Zone 1
5. Select Time of Concentration (t_c): 27.3 Minute

Coefficient	50% (2-year)	20% (5-year)	10% (10-year)	4% (25-year)	2% (50-year)	1% (100-year)	0.2% (500-year)
e	0.8209	0.8038	0.7954	0.7873	0.7830	0.7795	0.7741
b	59.8061	76.6244	90.9590	112.2113	130.5711	152.1280	218.1928
d (min)	12.8128	12.7586	13.1270	13.9470	14.8364	16.1074	20.2311
Intensity (inches/hour)	2.89	3.95	4.80	6.00	6.98	8.05	10.88

Note: Hays County has 1 rainfall zone.

REVISIONS:
10/31/23 - TXDOT COMMENTS

BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
7073 San Pedro Avenue
San Antonio, Texas 78216
PH: 210-494-7223
TBPELS Registration No. F-1712

STATE OF TEXAS
HERNAN A. JARAMILLO
92851
REGISTERED PROFESSIONAL ENGINEER
10/31/23

PROPOSED DRAINAGE AREA MAP for SEDONA NORTH SUBDIVISION TXDOT DRIVEWAY CONNECTION

JOB #: C-1576
DATE: 10/1/23
DESIGN: N. RAMONES
DRAWN: N. RAMONES
CHECKED: H. JARAMILLO
SHEET: 5 OF 11

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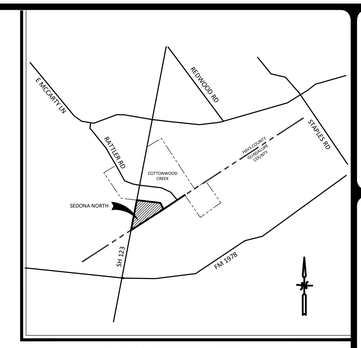
REVISIONS:
10/31/23 - TXDOT COMMENTS

CAUTION!!!

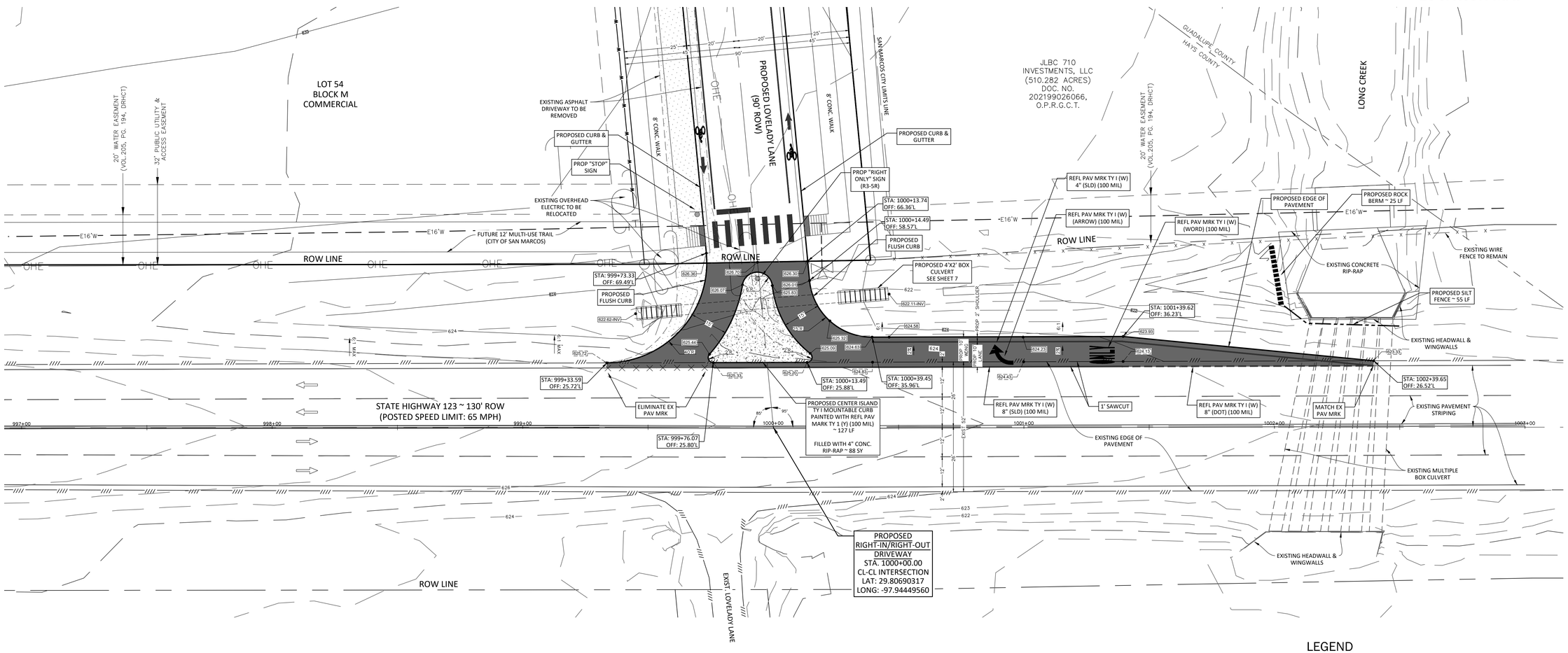
EXISTING UNDERGROUND & OVERHEAD UTILITIES. CONTRACTOR TO VERIFY DEPTH AND LOCATION PRIOR TO CONSTRUCTION & NOTIFY ENGINEER OF ANY DISCREPENCIES.

1" = 20'

20 10 0 20



LOCATION MAP



NOTES:

1. ALL DISTURBED AREAS WILL REQUIRE THE PLACEMENT OF 4" TOPSOIL (ITEM 160), SEEDING (ITEM 164) AND SOIL RETENTION BLANKETS (ITEM 169) IN ACCORDANCE WITH TXDOT SPECIFICATIONS.
2. SEE SHEET 10 FOR TRAFFIC CONTROL PLAN DETAILS

LEGEND

740	EXISTING CONTOUR	OHE	EXISTING OVERHEAD ELECTRIC
740	PROPOSED CONTOUR		EASEMENT
	CENTERLINE	E16"W	EXISTING WATERLINE
	EXISTING EDGE OF PAVEMENT	W	PROPOSED WATERLINE
	RIGHT-OF-WAY		EXISTING FIRE HYDRANT
X	EXISTING WIRE FENCE		EXISTING POWERPOLE

*PROPOSED PAVEMENT SECTION:

- 1" TOM (ITEM 347)
- BONDING COURSE (ITEM 3066)
- 2.5" TYPE-D HMAC (ITEM 340)
- BONDING COURSE (ITEM 3066)
- 4" TYPE-B HMAC (ITEM 340)
- PRIME COAT (ITEM 310)
- 8" CRUSHED LIMESTONE BASE (ITEM 247)
- 8" LIME STABILIZED SUBGRADE (ITEM 260)

*REFER TO TXDOT SPECIFICATIONS

BAIN MEDINA BAIN, INC.
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San Antonio, Texas 78216
PH: 210-494-7223
TBPELS Registration No. F-1712

STATE OF TEXAS
HERNAN A. JARAMILLO
92851
REGISTERED PROFESSIONAL ENGINEER
10/31/23

DRIVEWAY PLAN for SEDONA NORTH SUBDIVISION TXDOT DRIVEWAY CONNECTION

JOB #: C-1576
DATE: 10/1/23
DESIGN: N. RAMONES
DRAWN: N. RAMONES
CHECKED: H. JARAMILLO
SHEET: 6 OF 11

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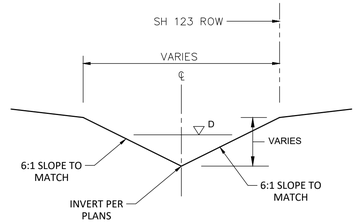
Date: Oct 31, 2023, 3:43pm User ID: nick File: Z:\C-1576 Bruce San Marcos Development\2_Design - Sedona North\Construction Documents\TXDOT-SEDONA NORTH-SITE PLAN.dwg

TRENCH EXCAVATION SAFETY PROTECTION:

CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL. REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES. THE CONTRACTOR'S IMPLEMENTATION OF THE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION, SAFETY PROTECTION THAT COMPLIES WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

LEGEND

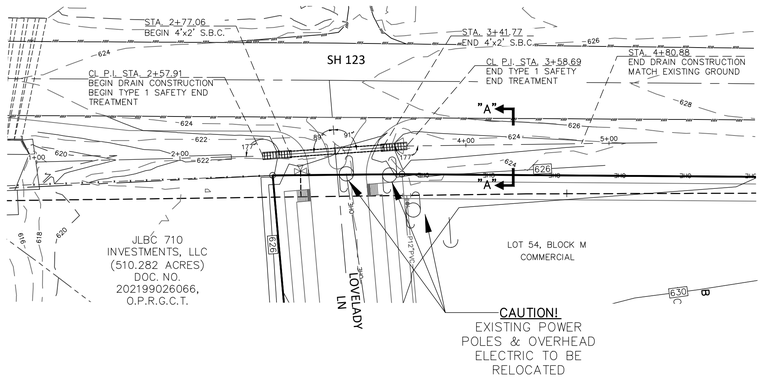
- FIRE HYDRANT
- EXISTING SANITARY SEWER MAIN — E8"SS
- PROPOSED SANITARY SEWER MAIN — P8"SS
- EXISTING WATER MAIN — E8"PVC
- PROPOSED WATER MAIN — P8"PVC
- SANITARY SEWER MANHOLE
- EXISTING CONTOUR — 980
- PROPOSED CONTOUR — 990

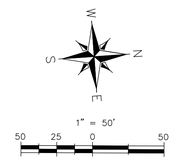


SECTION "A-A"

TYPICAL SECTION - NTS

TXDOT DRAINAGE CALCULATIONS	
Q25	= 37.5 CFS
SS	= 6:1
n	= 0.035
S	= 0.50%
D	= 1.58 FT
V	= 2.50 FPS
Q100	= 56.3 CFS
SS	= 6:1
n	= 0.035
S	= 0.50%
D	= 1.83 FT
V	= 2.80 FT/S

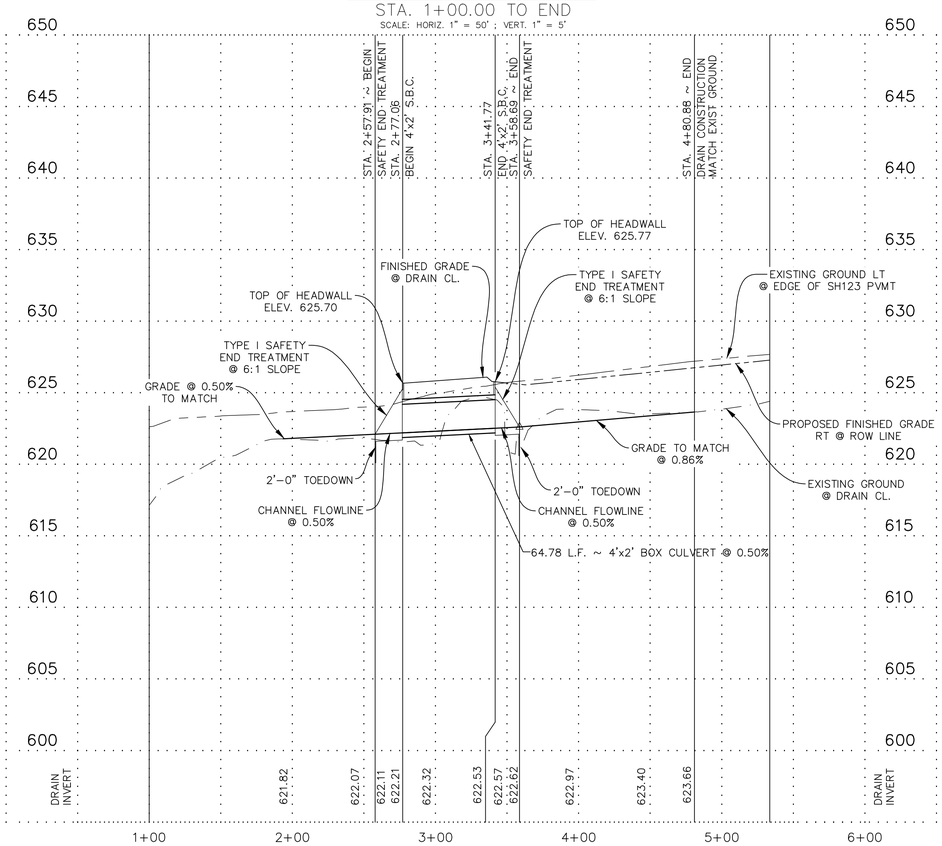




DRAIN-E

STA. 1+00.00 TO END

SCALE: HORIZ. 1" = 50' ; VERT. 1" = 5'

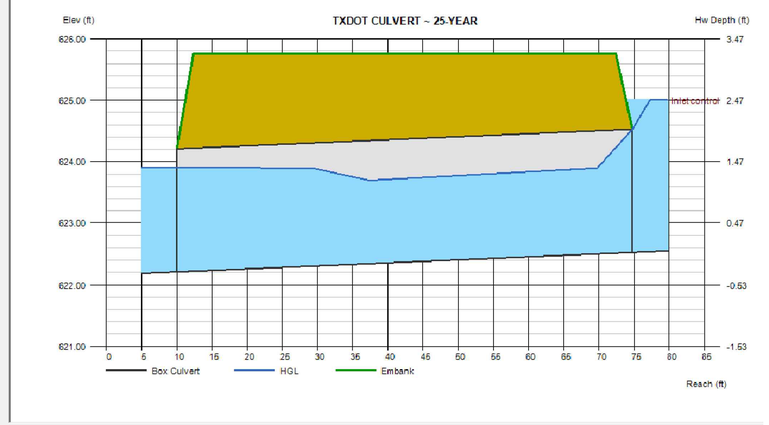


TXDOT CULVERT	
MAX ALLOWABLE HEADWATER ELEV:	625.77
25-YEAR HEADWATER ELEV:	625.00

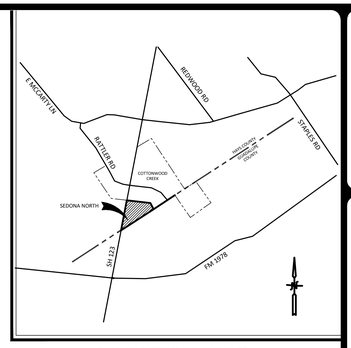
Section	Item	Input
Pipe	Inv Elev Dn =	622.21
	Length (ft) =	64.78
	Slope (%) =	0.49
	Inv Elev Up =	622.53
	Rise (in) =	24.0
	Shape =	Box
	Span (in) =	48.0
	No. Barrels =	1
	n-value =	0.013
	Culvert Type =	Flared Wingwalls
	Culvert Entrance =	90D and 15D wingwall flares
Embank	Top Elev =	625.77
	Top Width (ft) =	60.00
	Crest Len (ft) =	10.00
Calcs	Q Min (cfs) =	37.50
	Q Max (cfs) =	37.50
	Q Incr (cfs) =	1.00
	Tailwater (ft) =	(dc+D)/2

Clear Run

Plot | P-Curve | Diag. | TXDOT CULVERT ~ 25-YEAR



Q			Veloc		Depth		HGL			
Total	Pipe	Over	Dn	Up	Dn	Up	Dn	Up	Hw	Hw/D
(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(in)	(in)	(ft)	(ft)	(ft)	
37.50	37.50	0.00	5.52	6.70	20.39	16.78	623.91	623.93	625.00	1.24



LOCATION MAP

REVISIONS:
10/31/23 - TXDOT COMMENTS

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PH: 210-494-7223
TBPELS Registration No. F-1712

STATE OF TEXAS
HERNAN A. JARAMILLO
92851
REGISTERED PROFESSIONAL ENGINEER
10/31/23
Hernan A. Jaramillo, PE

CULVERT PLAN & PROFILE
for
SEDONA NORTH SUBDIVISION
TXDOT DRIVEWAY CONNECTION

JOB #: C-1576
DATE: 10/1/23
DESIGN: N. RAMONES
DRAWN: N. RAMONES
CHECKED: H. JARAMILLO
SHEET: 7 OF 11

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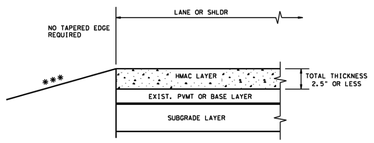
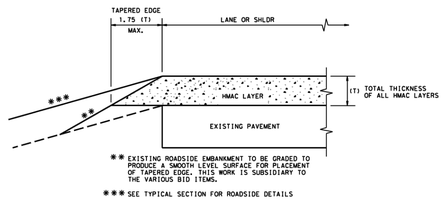
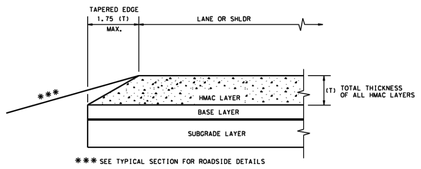


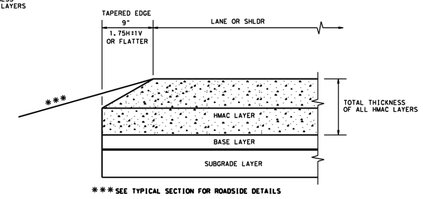
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY
WITH THICKNESS OF 2.5" OR LESS



CONDITION - 2
OVERLAY OF EXISTING PAVEMENT
HMAC THICKNESS 2.5" TO 5"



CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 2.5" TO 5"



CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 5" OR GREATER

(NOT TO SCALE)

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

Texas Department of Transportation — Design Division Standard

TAPERED EDGE DETAILS
HMAC PAVEMENT

TE(HMAC)-11

FILE:	tehmac11.dgn	DN: TxDOT	CK: RL	DW: KS	CK:
©TxDOT	January 2011	CONT	SECT	JOB	HIGHWAY
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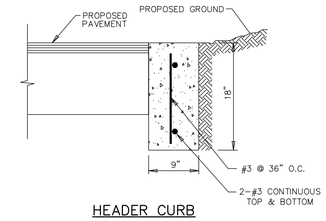
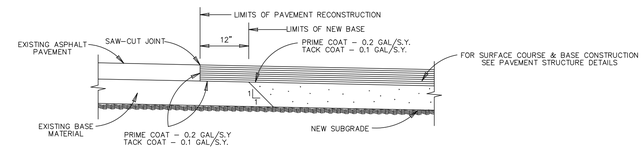
		DIST	COUNTY		SHEET NO.

DATE:
FILE:



HEADER CURB
NOT TO SCALE



PAVEMENT JUNCTION DETAILS
NOT TO SCALE

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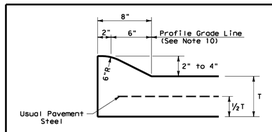
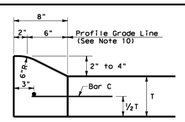
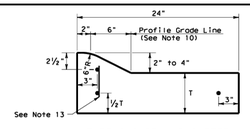


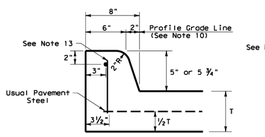
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



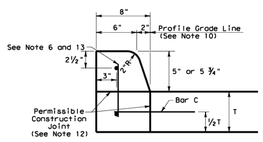
TYPE I CURB
2" - 4" HEIGHT



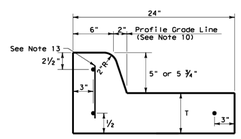
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



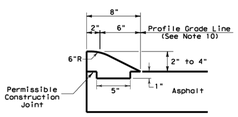
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



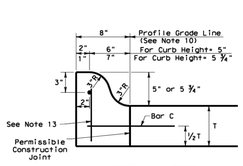
TYPE II CURB
5" - 5 ¾" HEIGHT



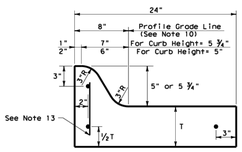
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



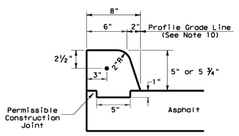
TYPE III CURB (KEYED)
2" - 4" HEIGHT



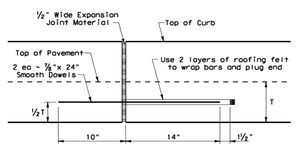
TYPE IIa CURB
5" - 5 ¾" HEIGHT



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

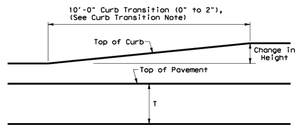


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

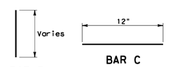
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans,or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

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



BAR B

BAR C

Texas Department of Transportation — Design Division Standard

CONCRETE CURB
AND
CURB AND GUTTER

CCCG-22

FILE:	cccg21.dgn	DN: TxDOT	CK: AN	DW: CS	CK: KM
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REVISIONS					
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REVISIONS:
10/31/23 - TXDOT COMMENTS

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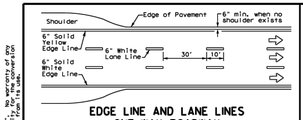
San Antonio, Texas 78216
PH: 210-494-7223
TBPELS Registration No. F-1712

STATE OF TEXAS
HERMAN A. JARAMILLO
92861
REGISTERED PROFESSIONAL ENGINEER
10/31/23

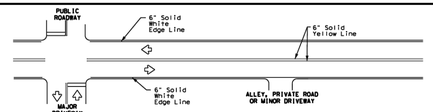
DRIVEWAY DETAILS for SEDONA NORTH SUBDIVISION TXDOT DRIVEWAY CONNECTION

JOB #:	C-1576
DATE:	10/1/23
DESIGN:	N. RAMONES
DRAWN:	N. RAMONES
CHECKED:	H. JARAMILLO
SHEET :	8 OF 11

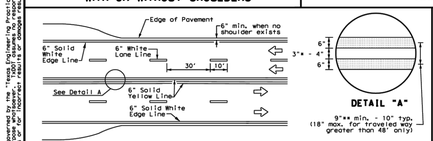
DATE: Oct 31, 2023, 3:11pm User ID: nicol File: Z:\C-1576 Bruce San Marcos Development\2_Design - Sedona North\Construction Documents\TXDOT-SEDONA NORTH-DETAILS.dwg

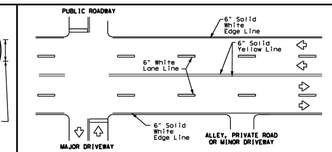


EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



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

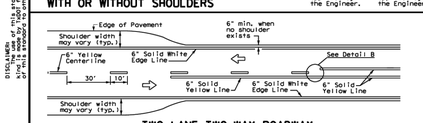




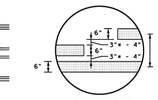
* 2" minimum for restripe projects when approved by the Engineer.
** 8" minimum for restripe projects when approved by the Engineer.

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

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

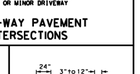


TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



DETAIL "B"

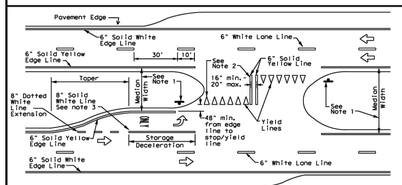
* 2" minimum for restripe projects when approved by the Engineer.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES

For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

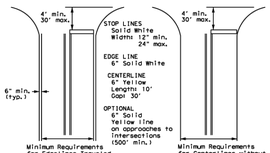
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

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

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



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE
Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation — Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

FILE:	pm1-22.dgn	DN:	CK:	DW:	CK:
©TxDOT	December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS					
11-78	8-00 6-20				
4-98	3-03 12-22	DIST		COUNTY	SHEET NO.
5-00	2-10				

FILE: pm1-22

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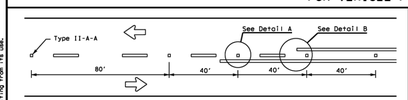
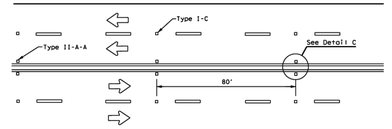
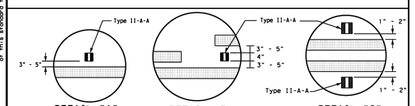
FILE:

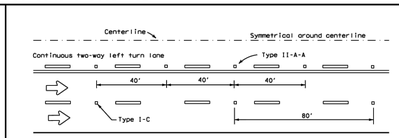


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

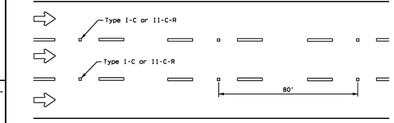


CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY ROADWAYS





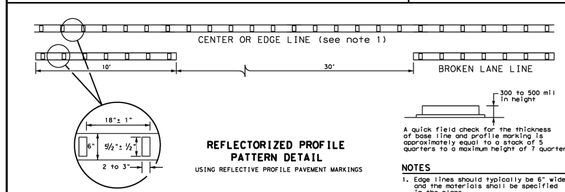
CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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

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

See Note 3.



REFLECTORIZED PROFILE
PATTERN DETAIL
USING REFLECTIVE PROFILE PAVEMENT MARKINGS

NOTES

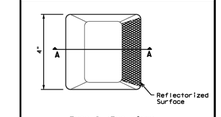
1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

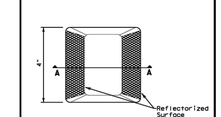
1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

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

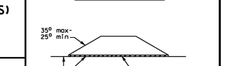
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation — Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS

PM(2)-22

FILE:	pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT	December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS					
4-17	8-00 6-20				
4-98	3-03 12-22	DIST		COUNTY	SHEET NO.
5-00	2-10 12-22				
8-00	2-12				

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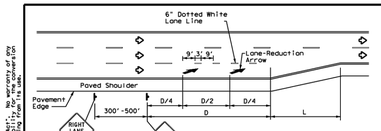


LANE REDUCTION

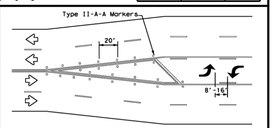
NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An additional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

ADVANCED WARNING SIGN DISTANCE (D)		
POSTED SPEED	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	
50 MPH	885	
55 MPH	990	L=WS
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

GENERAL NOTES

1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

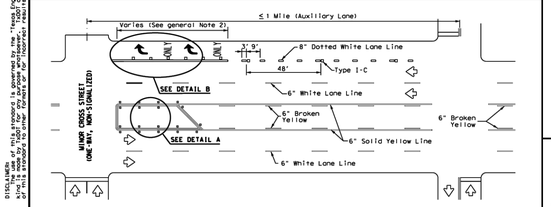


A two-way left-turn (TWLTL) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

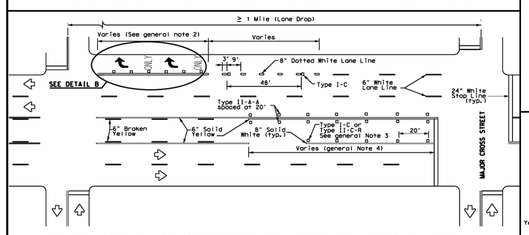
TYPICAL TRANSITION FOR TWLTL
AND DIVIDED HIGHWAY

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

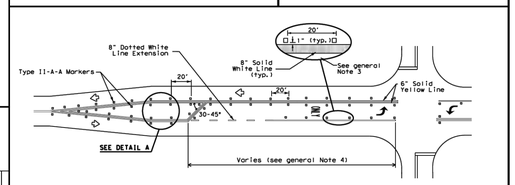
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



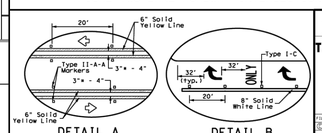
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



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



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



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

Texas Department of Transportation — Traffic Safety Division Standard

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

PM(3)-22

FILE:	pm3-22.dgn	DN:	CK:	DW:	CK:
©TxDOT	December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS					
4-98	3-03 6-20				
5-00	2-10 12-22	DIST		COUNTY	SHEET NO.
8-00	2-12				

FILE: pm3-22

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REVISIONS:
10/31/23 - TXDOT COMMENTS

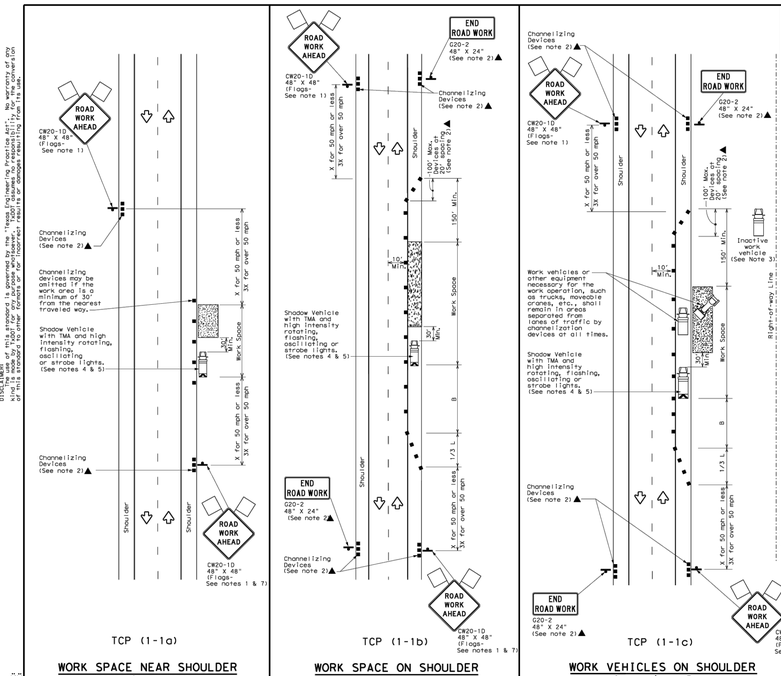
BAIN MEDINA BAIN, INC.
ENGINEERS & SURVEYORS
7073 San Pedro Avenue
San Antonio, Texas 78216
PH: 210-494-7223
TBPELS Registration No. F-1712

10/31/23
STATE OF TEXAS
HERMAN A. JARAMILLO
92851
REGISTERED
PROFESSIONAL ENGINEER
P.E.

PAVEMENT MARKING DETAILS
for
SEDONA NORTH SUBDIVISION
TXDOT DRIVEWAY CONNECTION

JOB #:	C-1576
DATE:	10/1/23
DESIGN:	N. RAMONES
DRAWN:	N. RAMONES
CHECKED:	H. JARAMILLO
SHEET:	9 OF 11

DATE: Oct 31, 2023, 3:11pm User ID: rmoir File: Z:\C-1576 Bruce San Marcos Development\2_Design - Sedona North\Construction Documents\TXDOT-SEDONA NORTH-DETAILS.dwg



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 ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Flag Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	L = WS²/60	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

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

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

GENERAL NOTES

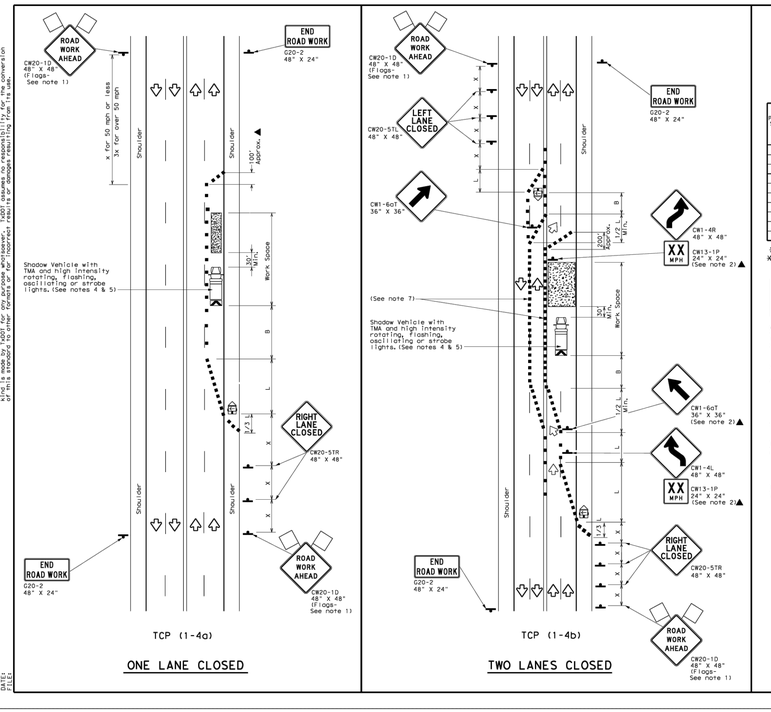
1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP(1-1)-18

FILE: tcp(1-1)-18.dgn | DN: TxDOT | CK: TxDOT | CW: TxDOT | CK: TxDOT
©TxDOT December 1995 | CONT: 0917 | SECT: | JOB: | HIGHWAY:
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18
DIST: | COUNTY: | SHEET NO.



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 ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Flag Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	L = WS²/60	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

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

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

GENERAL NOTES

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

TCP (1-4a)

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

TCP (1-4b)

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
LANE CLOSURES ON MULTILANE
CONVENTIONAL ROADS

TCP(1-4)-18

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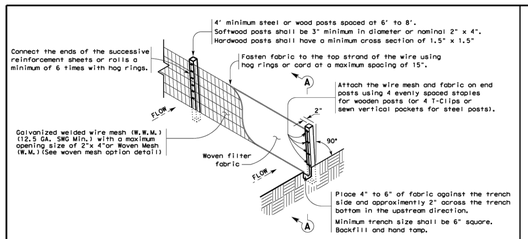
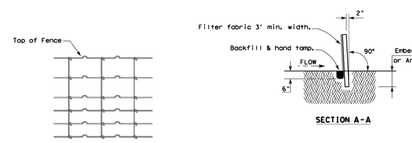




Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

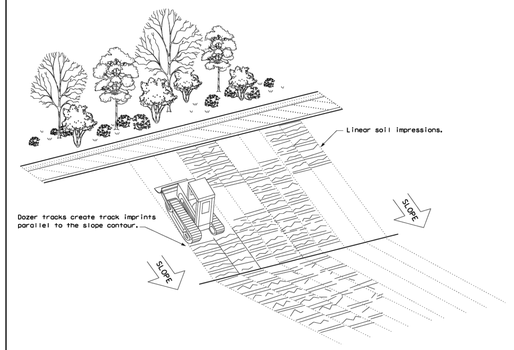
A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

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.



Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION,
SEDIMENT AND WATER
POLLUTION CONTROL MEASURES
FENCE & VERTICAL TRACKING

EC(1)-16

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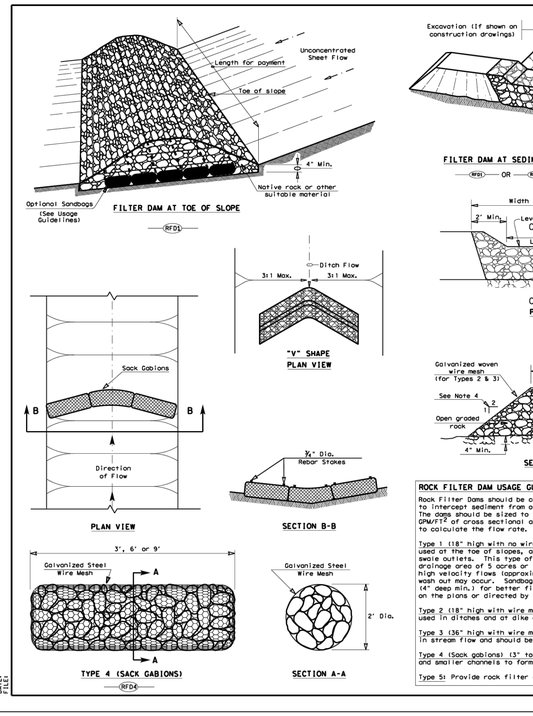

ROCK FILTER DAM USAGE GUIDELINES

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 (approximently 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 slopes:ions 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 ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ½".
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

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION,
SEDIMENT AND WATER
POLLUTION CONTROL MEASURES
ROCK FILTER DAMS

EC(2)-16

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10/31/23 - TXDOT COMMENTS

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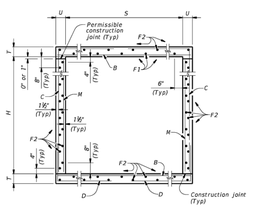
TBPELS Registration No. F-1712

10/31/23
STATE OF TEXAS
HERMAN A. JARAMILLO
92851
REGISTERED PROFESSIONAL ENGINEER

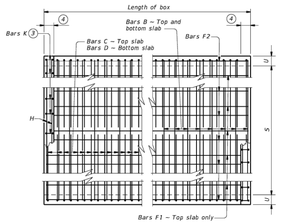
TRAFFIC CONTROL & SW3P DETAILS
for
SEDONA NORTH SUBDIVISION
TXDOT DRIVEWAY CONNECTION

JOB #: C-1576
DATE: 10/1/23
DESIGN: N. RAMONES
DRAWN: N. RAMONES
CHECKED: H. JARAMILLO
SHEET: 10 OF 11

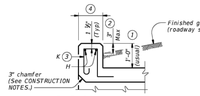
Date: Oct 31, 2023, 3:11pm User ID: Hector Paez Z:\C-1576 Brooke San Marcos Development\2_Design - Sedona North\Construction Documents\TXDOT-SEDONA NORTH-DETAILS.dwg



TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

1. 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.
2. 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.
3. 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.
4. 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).

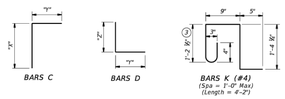
CONSTRUCTION NOTES:
Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

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

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-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.



BARS C BARS D BARS K (#4) (Spa = 1'-0" Max) (Length = 4'-2")

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

SINGLE BOX CULVERTS
CAST-IN-PLACE
0' TO 30' FILL

SCC-3 & 4

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SECTION DIMENSIONS				FILL HEIGHT (5)	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																										QUANTITIES				
					Bars B				Bars C					Bars D						Bars M – #4			Bars F1 – #4 at 10" Spa			Bars F2 – #4 at 10" Spa			Bars H 4 – #4		Bars K	Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (lb)	Conc (CY)	Reinf (lb)	Conc (CY)	Reinf (lb)
3'-0"	2'-0"	8"	7"	30'	108	#5	9"	3'-11"	441	108	#4	9"	5'-4"	385	2'-6"	2'-10"	108	#4	9"	5'-1"	367	2'-10"	2'-3"	108	9"	2'-0"	144	3	39'-9"	80	19	39'-9"	505	3'-11"	10	10	28	0.292	48.1	0.3	38	12.0	1,960
3'-0"	3'-0"	8"	7"	30'	108	#5	9"	3'-11"	441	108	#4	9"	6'-4"	457	3'-6"	2'-10"	108	#4	9"	5'-1"	367	2'-10"	2'-3"	108	9"	3'-0"	216	3	39'-9"	80	23	39'-9"	611	3'-11"	10	10	28	0.335	54.3	0.3	38	13.7	2,210
4'-0"	2'-0"	8"	7"	30'	108	#5	9"	4'-11"	554	162	#4	6"	5'-8"	613	2'-6"	3'-2"	162	#4	6"	5'-5"	586	3'-2"	2'-3"	108	9"	2'-0"	144	3	39'-9"	80	21	39'-9"	558	4'-11"	13	12	33	0.342	63.4	0.4	46	14.1	2,581
4'-0"	3'-0"	8"	7"	30'	108	#5	9"	4'-11"	554	162	#4	6"	6'-8"	721	3'-6"	3'-2"	162	#4	6"	5'-5"	586	3'-2"	2'-3"	108	9"	3'-0"	216	3	39'-9"	80	25	39'-9"	664	4'-11"	13	12	33	0.385	70.5	0.4	46	15.8	2,867
4'-0"	4'-0"	8"	7"	30'	108	#5	9"	4'-11"	554	162	#4	6"	7'-8"	830	4'-6"	3'-2"	162	#4	6"	5'-5"	586	3'-2"	2'-3"	108	9"	4'-0"	289	3	39'-9"	80	25	39'-9"	664	4'-11"	13	12	33	0.428	75.1	0.4	46	17.5	3,049

5. For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

SINGLE BOX CULVERTS
CAST-IN-PLACE
0' TO 30' FILL

SCC-3 & 4

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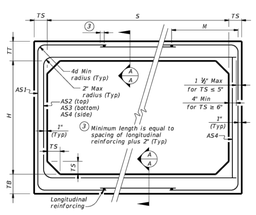
BOX DATA

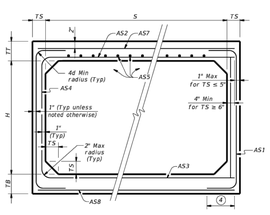
SECTION DIMENSIONS					Fill Height	H (Min)	REINFORCING (sq. in. / ft.) (2)						(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS8	(tons)
4	2	7.5	6	5	< 2		0.18	0.27	0.15	0.12	0.18	0.18	4.5
4	2	5	5	5	2 < 3	38	0.18	0.19	0.17	0.12	–	–	3.6
4	2	5	5	5	3 – 5	38	0.13	0.13	0.13	0.12	–	–	3.6
4	2	5	5	5	10	38	0.12	0.12	0.12	0.12	–	–	3.6
4	2	5	5	5	15	38	0.14	0.16	0.16	0.12	–	–	3.6
4	2	5	5	5	20	38	0.18	0.20	0.21	0.12	–	–	3.6
4	2	5	5	5	25	38	0.23	0.25	0.25	0.12	–	–	3.6
4	2	5	5	5	30	38	0.28	0.30	0.30	0.12	–	–	3.6
4	3	7.5	6	5	< 2	–	0.18	0.31	0.18	0.12	0.18	0.18	5.0
4	3	5	5	5	2 < 3	38	0.15	0.23	0.20	0.12	–	–	4.1
4	3	5	5	5	3 < 5	38	0.12	0.16	0.16	0.12	–	–	4.1
4	3	5	5	5	10	38	0.12	0.14	0.14	0.12	–	–	4.1
4	3	5	5	5	15	38	0.12	0.18	0.18	0.12	–	–	4.1
4	3	5	5	5	20	38	0.14	0.23	0.24	0.12	–	–	4.1
4	3	5	5	5	25	38	0.17	0.29	0.29	0.12	–	–	4.1
4	3	5	5	5	30	38	0.21	0.35	0.35	0.12	–	–	4.1
4	4	7.5	6	5	< 2	–	0.18	0.33	0.20	0.12	0.18	0.18	5.5
4	4	5	5	5	2 < 3	38	0.12	0.26	0.23	0.12	–	–	4.6
4	4	5	5	5	3 – 5	38	0.12	0.18	0.18	0.12	–	–	4.6
4	4	5	5	5	10	38	0.12	0.15	0.15	0.12	–	–	4.6
4	4	5	5	5	15	38	0.12	0.19	0.20	0.12	–	–	4.6
4	4	5	5	5	20	38	0.12	0.25	0.25	0.12	–	–	4.6
4	4	5	5	5	25	38	0.14	0.31	0.31	0.12	–	–	4.6
4	4	5	5	5	30	38	0.17	0.37	0.37	0.12	–	–	4.6

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.



CORNER OPTION "A" CORNER OPTION "B"

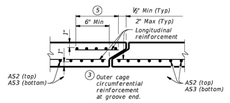
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

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 batten 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

Texas Department of Transportation — Bridge Division Standard

SINGLE BOX CULVERTS
PRECAST
4'-0" SPAN

SCP-4

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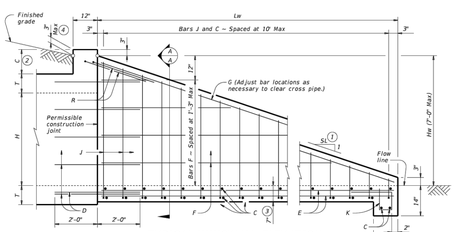
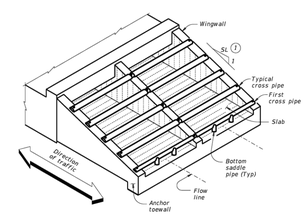


TYPICAL WINGWALL ELEVATION
(Cross pipes not shown for clarity.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION
(Showing bolted anchor option.)

WING DIMENSION CALCULATIONS:

Hw = H + T + C + 0.250'
Lw = (Hw – 0.333') (SL)

For cast-in-place culverts:
Atw = (N) (S) + (N + 1) (U)
For precast culverts:
Atw = (N) (2U + S) + (N – 1) (0.500')

Total Wingwall Area (SF)
= (0.5) (Hw + 0.333) (Lw) (N – 1)
Total Concrete Volume (CY)
= [(Wingwall Area) (0.583') + (Lw) (Atw) (0.583') + (Atw) (1.167') (1.167' – 0.583')] ÷ (27)

PIPE RUNNER DIMENSION CALCULATIONS:

Pipe Runner Length (feet)
= (Lw) (K1) = (1.3917)
Total Reinforcing (Lb)
= (1.55) [(Lw) (Atw) + (4.43) (Atw) + (K2) (Hw) (N + 1) (Lw)]

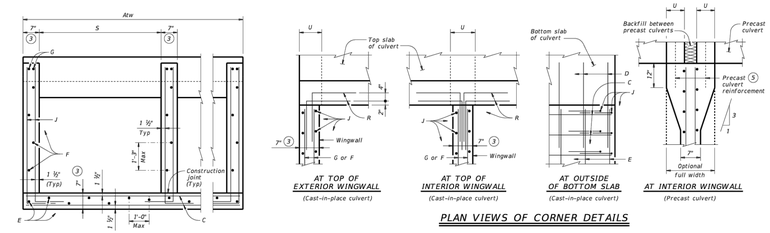
C = Height of curb above top of top slab (feet)
Hw = Height of wingwall (feet)
K = Coefficient value for use in formulas
Slope SL1 K
3:1 ~ 1.054 ~ 7.45
4:1 ~ 1.031 ~ 8.49
6:1 ~ 1.014 ~ 10.30
Atw = Anchor toewall length (feet)
Lw = Length of wingwall (feet)
N = Number of culvert barrels
SL1 = Side slope ratio (horizontal : 1 vertical)

See applicable box culvert standard for H, S, T, and U values.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Adjust reinforcing as necessary to provide a minimum clear cover of 1½".
Provide Class "C" concrete (f'c = 3,600 psi).
Provide pipe runners, cross pipes, and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, ASTM A53.
Provide ASTM A307 bolts.
Galvanize all steel components, except the concrete reinforcing, unless required elsewhere in the plans, after fabrication.
Repair galvanizing damaged during transport or construction in accordance with Item 445, "Galvanizing."

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 cross pipes.
Cross pipes are designed for a traversing load of 10,000 pounds at ground as recommended by Research Report 280-2F, "Safety Treatment of Roadway Parallel-Drainage Structures", Texas Transportation Institute, March 1981.
The quantities for concrete, reinforcing steel, and cross pipes 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.
Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the safety end treatments.

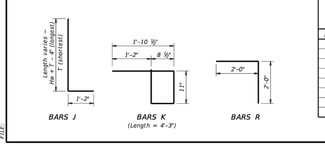
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing dimensions are out-to-out of bars.



SECTION A-A
(Showing typical wingwall and wing slab reinforcing. Pipe runners not shown for clarity.)

AT TOP OF EXTERIOR WINGWALL (Cast-in-place culvert)
AT TOP OF INTERIOR WINGWALL (Cast-in-place culvert)
AT OUTSIDE OF BOTTOM SLAB (Cast-in-place culvert)
AT INTERIOR WINGWALL (Precast culvert)

PLAN VIEWS OF CORNER DETAILS



BARS J BARS K (Length = 4'-3") BARS R

TABLE OF REINFORCING BAR SIZES AND SPACING

Bar	Size	Spacing
C	#4	10" Max
D	#4	Match F and E
E	#4	1'- 0" Max
F	#4	1'- 3" Max
G	#6	As shown
J	#4	10" Max
K	#4	1'- 0" Max
R	#4	As shown

1. Provide 6:1 or flatter slope.
2. 0" 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 Extended Curb Details the Extended Curb Details (ECD) standard sheet.
3. Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" Minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.
4. For vehicle safety, reduce height, 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.
5. For culverts with C = 0", the precast culvert reinforcing may extend 1'-0" minimum into wingwall. Wingwall bars D and R may be omitted. Otherwise, refer to the Wingwall Connection detail on the Box Culvert Precast Miscellaneous Details (SCP-MD) standard sheet.

Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT
FOR BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I – PARALLEL DRAINAGE

SETB-PD

FILE:	setbptxa-20.dgn	DN: CAP	CK: CAT	CW: TxDOT	CK: TxDOT
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10/31/23 - TXDOT COMMENTS

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10/31/23
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HERMAN A. JARAMILLO
92851
REGISTERED PROFESSIONAL ENGINEER

DRAINAGE DETAILS
for
SEDONA NORTH SUBDIVISION
TXDOT DRIVEWAY CONNECTION

JOB #: C-1576
DATE: 10/1/23
DESIGN: N. RAMONES
DRAWN: N. RAMONES
CHECKED: H. JARAMILLO
SHEET: 11 OF 11

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