

CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

2012 ASPHALT OVERLAY (PKG 1)

PROJECT NO: 23-01269

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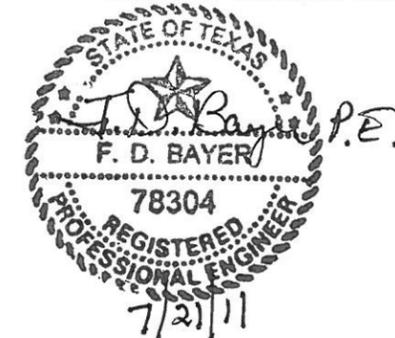
DIRECTOR OF PUBLIC WORKS
Majed A. Al-Ghafry

PROJECT MANAGER
Dean Bayer, P.E.

PROJECT ENGINEER
Dean Bayer, P.E.



CITY OF SAN ANTONIO
PAVEMENT ENGINEERING



DB/jr

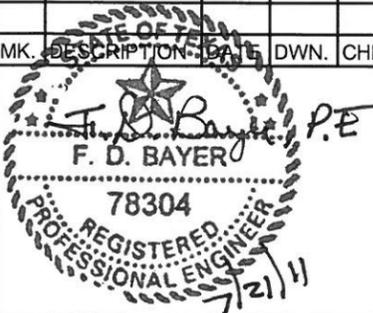
City General Notes

- 32. ALL CONCRETE SURFACES AND CONSTRUCTION JOINTS THAT WILL CONTACT THE PROPOSED H.M.A.C. SHALL BE PAINTED WITH A THIN UNIFORM COAT OF SS-1H TACK COAT. TACK COAT SHALL MEET THE REQUIREMENTS OF ITEM 203 AND SHALL BE AT NO DIRECT PAY.
- 33. AT INTERSECTIONS WITH SIDEWALKS, THE FOLLOWING GUIDELINES WILL BE USED FOR THE PLACEMENT OF CURB RAMPS;
 - ALL CURB RAMPS SHALL HAVE TRUNCATED DOMES INSTALLED.
 - DESIGN DECISIONS ON CURB RAMPS WILL BE MADE IN THE FIELD WITH THE CITY INSPECTOR.
 - TYPE I (1) SHALL BE PAID AS TWO (2) RAMPS
 - TYPE II, III, IV, & V (2, 3, 4, & 5) SHALL BE PAID AS ONE (1) RAMP AS PER CITY OF SAN ANTONIO STANDARD DETAILS. EACH CURB RAMP SHALL INCLUDE THE LANDING PLUS WINGS UP TO TWENTY-FOUR (24) FEET TOTAL LENGTH.

THE BID PRICE FOR THE CURB RAMPS SHALL INCLUDE ALL NECESSARY SUBSIDIARY WORK TO CONSTRUCT AND COMPLETE THE FOLLOWING:

 - SIDEWALK AND CURB DEMOLITION AND REMOVAL.
 - WHEN CURB RAMP LANDINGS PLUS WINGS TOTAL LENGTH EXCEEDS TWENTY-FOUR (24) L.F., ANY ADDITIONAL LENGTH OF WINGS REQUIRED TO ACHIEVE MINIMUM SLOPE SHALL BE PAID AS SIDEWALK ITEM 502.1.
 - DETECTABLE ADA APPROVED WARNINGS, SHALL BE CAST IN PLACE 24"X 60" MANUFACTURED BY ARMOR-TILE MODEL NUMBER 465C2460RD UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
 - NEW CURB INSTALLATION UP TO 24 L.F. THE ADDITIONAL CURB LENGTH ABOVE 24 FEET SHALL BE PAID AS CURB ITEM 501.
 - CONCRETE RETAINING WALL UP TO 6" HIGH AS NECESSARY. RETAINING WALLS EXCEEDING 6" WILL BE PAID AS SIDEWALK.
 - SIGN ADJUSTMENT.
 - IRRIGATION RELOCATION AS NECESSARY.
 - LANDSCAPE RELOCATION AS NECESSARY.
- 34. SOME STREETS MAY HAVE EXISTING SPEED HUMPS. ALL EXISTING SPEED HUMPS SHALL BE REPLACED IN ACCORDANCE WITH THE DETAILS IN THE PLANS.
- 35. UNLESS OTHERWISE NOTED, CONTRACTOR SHALL USE 64-22 ASPHALT MIX ON ALL PROJECTS AS NOTED IN REVISED SPECIFICATIONS 205.
- 36. USE VACUUM OR REGENERATIVE AIR SWEEPERS ONLY WHEN SWEEPING WORK AREA.
- 37. ALL ASPHALT CUTTINGS AND AGGREGATE SHALL BE CONFINED TO THE STREET SURFACE WHERE THEY SHALL BE SWEEPED UP AND REMOVED FROM THE RIGHT-OF-WAY BY THE END OF EACH WORK DAY.
- 38. ALL BASE FAILURE REPLACEMENTS SHALL BE MARKED AND APPROVED BY THE ENGINEER.
- 39. PAVEMENT CUTS SHALL BE PERFORMED BY EQUIPMENT APPROVED BY THE ENGINEER. IT SHALL NOT PRESENT A HAZARD TO TRAFFIC. ALL SAW CUTS SHALL BE FULL DEPTH SAWCUTS.
- 40. THE DEPTH OF PAVEMENT FOR ITEM 230 (BASE AND PAVEMENT) SHALL BE TO THE SPECIFIED DEPTH UNLESS DIRECTED OTHERWISE BY THE ENGINEER. PRIOR TO EXCAVATION, DESIGNATED BASE FAILURES SHALL BE CUT VERTICALLY FOR THE FULL DEPTH SPECIFIED WITH A ROCK SAW OR OTHER APPROVED EQUALLY CAPABLE EQUIPMENT. THE EDGES OF THE EXISTING ASPHALT WHICH ARE CUT BY THE ROCK SAW MUST BE VERTICAL, STRAIGHT, AND UNIFORM TO ENSURE THAT THE NEW ASPHALT ABUTS TO A SOLID, CLEAN VERTICAL SURFACE. ASPHALT TREATED BASE SHALL BE PLACED IN FOUR (4) INCH MAXIMUM LIFTS – COMPACT EACH LIFT AND DOCUMENT DENSITY READING. TOP MAT REQUIRES APPROVAL/ACCEPTANCE OF THE ENGINEER.
- 41. ALL DAILY BASE REPLACEMENTS SHALL BE PROPERLY EXCAVATED, BARRICADED, AND OPEN TO TRAFFIC THE SAME DAY. DO NOT EXCAVATE FOR BASE REPAIRS IF THE WORK CAN NOT BE COMPLETED THAT DAY.
- 42. PLACE FLEXIBLE BASE AS DIRECTED BY THE ENGINEER WHERE BASE FAILURE EXCAVATION NECESSITATES EXCEEDING THE SPECIFIED DEPTH FOR ITEM 230 (BASE AND PAVEMENT). (NO SEPARATE PAY ITEM)
- 43. ASPHALT TREATED "BASE AND PAVEMENT" MIXTURES SHALL BE AT A TEMPERATURE BETWEEN 225° F AND 350° F WHEN PLACED IN EXCAVATED CUTS. WHEN THE ASPHALT TEMPERATURES FALL BELOW 225° F, THE ASPHALT MUST BE DISCARDED AND PAYMENT WILL NOT BE MADE FOR THE DISCARDED MATERIAL.
- 44. FOR STREETS WITHOUT CURB AND GUTTER, THE CONTRACTOR SHALL INSTALL SHOULDER BACKING PER "SHOULDER BACKING DETAIL" PROVIDED ON MILLING DETAIL SHEET. (NO SEPARATE PAY ITEM)

- 45. MILLING OF ASPHALTIC PAVEMENT SHALL BE PERFORMED THROUGHOUT TURNOUTS AND CUL DE SACS WHICH ARE ADJACENT TO STREETS WHICH HAVE BEEN IDENTIFIED IN THE PLANS TO BE MILLED.
- 46. ACTUAL DEPTHS OF MILLING ALONG CURB LINES AND ON BRIDGE DECKS SHALL BE AS DIRECTED BY THE ENGINEER. CONCRETE BRIDGE DECKS SHALL NOT BE MILLED.
- 47. EACH STREET SHALL BE SEAL COATED IN ITS ENTIRETY, INCLUDING ADJACENT TURNOUTS AND CUL DE SACS, UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
- 48. TYPE "D" H.M.A.C. SHALL BE APPLIED AT AN AVERAGE RATE OF 190 LBS./S.Y. WITH A MINIMUM RATE OF 165 LBS./S.Y. A LEVEL UP H.M.A.C. COURSE MATERIAL MAY ALSO BE REQUIRED TO BE PLACED ON STREETS AT LOCATIONS AND DEPTHS AS DIRECTED BY THE ENGINEER TO REMOVE LOW SPOTS. THIS WORK WILL BE PAID BY THE S.Y. UNDER ITEM 205.4
- 49. TO DETERMINE THE S.Y. TO BE PAID ON EACH STREET. THE TICKET FOR THAT STREET SHOWING THE TONNAGE PLACED WILL BE CONVERTED TO A S.Y. AMOUNT BASED ON THE 190 LBS./S.Y. APPLICATION RATE WITH THE FOLLOWING EQUATION: (____ TONS x 2000/190). FOR EXAMPLE, IF 200 TONS WERE PLACED ON A STREET, THE PAY WOULD BE (200 TONS)(2000 LBS/TONS)(SY/190 LBS) = 2105.3 S.Y.
- 50. ALL QUANTITIES SHALL BE PRE-APPROVED BY THE ENGINEER.
- 51. CARE SHOULD BE TAKEN TO PREVENT MILLINGS FROM ENTERING INLETS AND STORM SEWERS. ALL MATERIAL ENTERING INLETS AND STORM SEWERS SHALL BE REMOVED BY THE CONTRACTOR AT NO ADDITIONAL COST.
- 52. WHEN THE CONTRACTOR PLACES A STOCKPILE OF HMAc MATERIAL ON SITE, THE MATERIAL SHALL BE USED PRIOR TO THE END OF THE WORK DAY. IF THE MATERIAL IS NOT USED, IT SHALL NOT BE USED ON ANY STREET.
- 53. ALL TRUCK TICKETS SHALL HAVE THE NAME OF THE STREET THE MATERIAL WAS PLACED ON.
- 54. WHEN A RUBBER ADDITIVE IS REQUIRED, THE ASPHALT BINDER SHALL MEET THE REQUIREMENTS OF PG 64-22 G.T.R. 10 AS SPECIFIED IN THE SPECIAL PROVISIONS OF THE SPECIFICATIONS.
- 55. THE CONTRACTOR SHALL VIDEO TAPE ALL PROJECTS PRIOR TO ANY CONSTRUCTION. A BACK UP COPY WILL BE SUBMITTED TO THE CITY OF SAN ANTONIO PAVEMENT ENGINEERING DIVISION BEFORE PROJECTS COMMENCE. ITEMS TO BE VIDEOTAPED NEED TO BE IDENTIFIED BY ADDRESS:
 - FENCES
 - MAILBOX FROM ALL SIDES
 - DRIVEWAY ENTRIES
 - CURBS, SIDEWALK, AND PEDESTRIAN WALKWAYS
 - ANY FORM OF LANDSCAPING ON RIGHT OF WAY (TREES, PLANTS, ETC.)
- 56. THE CONTRACTOR SHALL PROVIDE A SCHEDULE OF WORK FOR THE ENTIRE PROJECT WITHIN FOURTEEN (14) DAYS OF THE NOTICE TO PROCEED. THE CONTRACTOR SHALL NOT SCHEDULE MORE THAN A ONE WEEK GAP IN BASE REPAIR OR PAVING OPERATIONS WITHOUT PRIOR APPROVAL OR WEATHER LIMITATIONS.
- 57. THE CONTRACTOR SHALL UTILIZE AND MAINTAIN ITEM 1000-WEB PORTAL. PAYMENT IS SUBSIDIARY TO OTHER ITEMS.
- 58. ALL WORK TO BE PERFORMED ON THE DOWNTOWN STREETS SHALL BE PERFORMED BETWEEN THE HOURS OF 8:00 PM AND 6:00 AM.

MK.	DESCRIPTION	DATE	DWN.	CHK.
				
City of San Antonio				
Street Maintenance				
2012 Asphalt Overlay (Pkg 1) General Notes/Sheet Index				
JOB NO.:				SHEET
DATE:				3

2012 ASPHALT OVERLAY PACKAGE 1 BID ITEM SUMMARY

Item	Description	UNIT OF MEASURE	TOTAL APPROX. QUANTITIES	CD1	CD2	CD2	CD2	CD2	CD2	CD2	CD2	CD2	CD2	CD2	CD2
				25893	21993	15712	25871	21992	21986	16291	21979	16294	15138	16295	25868
				Stumberg	Bee St	Bernadine Dr	Caspian Bay	Coleman	E Carson	E Carson	Edgar Dr	Ervin	Excalibur	Frank	Gibbs St
				S Flores St	Ash	Diane Rd	Crestway Rd	N Walters St	Edgar	Hines	E Carson	IH 35 N Access Rd	Rat Bon Dr	Hood St	S Mittman St
				Dwyer Ave	N Walters St	Semlinger Rd	Chestnut Manor Dr	Ervin	Ervin	N Walters	IH 35 N Access Rd	Hood St	Fratt Rd	IH 35 N Access Rd	N Walters St
103.2A	Remove Concrete Curb	LF	493	16	12	16	16	16	24	24	16	16	9	16	16
103.2C	Remove Sidewalks and Driveways	SY	436	19	15	19	11	19	12	12	19	19	6	19	19
203.0	Tack Coat	GAL	772	25	22	25	25	25	25	25	25	25	25	25	25
205.4	Hot Mix Asphaltic Pavement Type D	SY	168,748	2,923	1,370	7,141	1,208	1,079	4,190	3,511	2,390	6,444	3,448	6,636	1,620
205.4B	Hot Mix Asphaltic Pavement Type D (level up)*	SY	16,803	292	137	714	121	108	419	277	239	644	345	664	162
208.2	Milling of Asphalt Pavement	CY	4,606	88	41	214	40	32	80	60	72	193	100	199	49
209.1	Concrete Pavement	SY	80	10	10	10	0	0	0	0	0	10	0	10	0
230.1	Replacing Base & Pvmnt With Type A Pvmnt (6" Compacted Depth)	SY	47,270	300	204	1975	450	200	360	702	537	2193	2816	1900	200
230.1A	Replacing Base & Pvmnt With ATB & Pvmnt (8" Compacted Depth)	SY	100	0	0	0	0	0	0	0	0	0	0	0	0
230.1B	Replacing Base & Pvmnt With Type A Pvmnt (12" Compacted Depth)	SY	100	0	0	0	0	0	0	0	0	0	0	0	0
250.	Seal Coat	SY	168,748	2923	1370	7141	1208	1079	4190	3511	2390	6444	3448	6636	1620
500.1	Concrete Curb	LF	499	16	17	16	16	16	24	24	16	16	9	16	16
502.1	Concrete Sidewalks	SY	308	11	9	11	11	11	12	12	11	11	6	11	11
502.1A	Handicamp Ramps (Type 1 thru 5)	EA	157	0	2	9	0	2	6	6	2	9	3	12	0
503.1	Concrete Driveway	SY	152	8	6	8	8	8	8	8	8	8	0	8	8
512.1	Adjusting Existing Manholes (Storm Sewer)	EA	16	1	1	1	0	1	0	0	1	1	0	1	1
512.1B	Adjusting AT&T Manholes	EA	8	1	0	1	0	0	0	0	0	0	0	1	0
515.1	Top Soil	CY	108	15	16	0	0	0	0	0	0	0	0	0	0
516.1	Sodding	SY	390	30	30	30	0	30	0	0	0	30	0	30	30
535.1	4" Wide Yellow Line	LF	23,100	1300	0	0	0	0	0	0	0	0	0	0	0
535.2	4" Wide White Line	LF	6,400	0	0	0	0	0	0	0	0	0	0	0	0
535.4	8" Solid White Line	LF	380	80	0	0	0	0	0	0	0	0	0	0	0
535.6	16" Wide White Line	LF	400	0	0	0	0	0	0	0	0	0	0	0	0
535.7	24" Wide White Line	LF	1,750	300	0	0	0	0	0	0	0	0	0	100	0
535.8	Right White Arrow	EA	8	4	0	0	0	0	0	0	0	0	0	0	0
535.9	Left White Arrow	EA	7	2	0	0	0	0	0	0	0	0	0	0	0
535.12	Word "ONLY"	EA	9	3	0	0	0	0	0	0	0	0	0	0	0
535.17	Bicycle Rider Symbol	EA	4	0	0	0	0	0	0	0	0	0	0	0	0
537.1	Traffic Button (Type W)	EA	60	60	0	0	0	0	0	0	0	0	0	0	0
537.2	Traffic Button (Type Y)	EA	60	60	0	0	0	0	0	0	0	0	0	0	0
537.6	Traffic Button (Type I-C)	EA	60	60	0	0	0	0	0	0	0	0	0	0	0
537.8	Traffic Button (Type II A-A)	EA	1,650	100	0	0	0	0	0	0	0	0	0	0	0
537.9	Pavement Marker (Type II C-R)	EA	0	0	0	0	0	0	0	0	0	0	0	0	0
799.	Speed Hump, Type II, Modular Rubber Cushions	EA	12	0	0	0	0	0	0	0	0	0	0	0	0
826.	Adjusting Existing Water Valve Boxes (SAWS)	EA	0	0	0	0	0	0	0	0	0	0	0	0	0
826.A	Valve Box Locate and Adjustments (SAWS)	EA	0	0	0	0	0	0	0	0	0	0	0	0	0
851.	Adjusting Existing Manholes (SAWS)	EA	0	0	0	0	0	0	0	0	0	0	0	0	0
851.A	Locating and Adjusting Existing Manholes (SAWS)	EA	0	0	0	0	0	0	0	0	0	0	0	0	0
SP100	Door Hangers	LS	1	0	0	0	0	0	0	0	0	0	0	0	0
SP2000	Railroad Insurance	LS	1	0	0	0	0	0	0	0	0	0	0	0	0

* ITEM 205.4B IS INDICATED ON THE PLANS FOR APPROXIMATE LEVEL UP QUANTITIES AND SHALL BE BID IN THE BID PROPOSAL AT A PRICE NOT TO EXCEED 10% MORE THAN THE PRICE OF ITEM 205.4

City of San Antonio
 Street Maintenance
 2012 Asphalt Overlay W/Rubber (Pkg 4)

JOB NO.:
 DATE:

SHEET
 7

2012 ASPHALT OVERLAY PACKAGE 1 BID ITEM SUMMARY

Item	Description	UNIT OF MEASURE	APPROX. QUANTITIES	CD2	CD2	CD2	CD2	CD2	CD2	CD2	CD4	CD4	CD4	CD4	CD5
				16297	21980	15686	15747	15746	21985	25865	17229	15517	15221	15504	15563
				Hines	Hood St	Hub Ave	Lakewood Dr	Lakewood Dr	Reno	W Boyer	Fenfield Ave	McArthur Ave	Questa Dr	W Mayfield	NW 25Th St
				IH 35 N Access Rd	Ash	Baxter	Leesburg	Dellhaven	N Walters St	IH 37 S	Holder Ave	Somerset Rd	Aragon Dr	New Laredo Hwy	W Martin St
				Dead End	N Walters St	Spriggsdale	Providence	Semlinger Dr	Ervin	S Hackberry St	Quintana Rd	Gracie St	Coconino Dr	Holder Ave	W Poplar St
103.2A	Remove Concrete Curb	LF	192	8	16	16	24	24	16	16	24	8	8	16	16
103.2C	Remove Sidewalks and Driveways	SY	151	4	19	8	12	12	19	19	12	4	4	19	19
203.0	Tack Coat	GAL	300	25	25	25	25	25	25	25	25	25	25	25	25
205.4	Hot Mix Asphaltic Pavement Type D	SY	59427	4,055	1,729	1,837	1,960	6,353	866	7,750	4,916	9,030	957	10,784	9,190
205.4B	Hot Mix Asphaltic Pavement Type D (level up)*	SY	5944	406	173	184	196	635	87	775	492	903	96	1,078	919
208.2	Milling of Asphalt Pavement	CY	1580	100	52	40	50	120	26	233	120	200	40	324	276
209.1	Concrete Pavement (Bus Pad)	SY	30	10	0	0	0	20	0	0	0	0	0	0	0
230.1	Replacing Base & Pvmt With Type A Pvmt (6" Compacted Depth)	SY	15679	608	310	200	200	1250	97	1500	1450	2740	87	2641.67	4595
230.1A	Replacing Base & Pvmt With ATB & Pvmt (8" Compacted Depth)	SY	50	0	0	0	0	0	0	0	0	0	0	50	0
230.1B	Replacing Base & Pvmt With Type A Pvmt (12" Compacted Depth)	SY	50	0	0	0	0	0	0	0	0	0	0	50	0
250.	Seal Coat	SY	59427	4055	1729	1837	1960	6353	866	7750	4916	9030	957	10784	9190
500.1	Concrete Curb	LF	193	8	17	16	24	24	16	16	24	8	8	16	16
502.1	Concrete Sidewalks	SY	113	4	11	8	12	12	11	11	12	4	4	11	11
502.1A	Handicamp Ramps (Type 1 thru 5)	EA	56	2	0	4	6	6	2	1	6	2	2	25	0
503.1	Concrete Driveway	SY	38	0	8	0	0	0	8	8	0	0	0	8	8
512.1	Adjusting Existing Manholes (Storm Sewer)	EA	5	0	1	0	0	0	1	1	0	0	0	1	1
512.1B	Adjusting AT&T Manholes	EA	3	0	0	0	0	0	1	1	0	0	0	1	0
515.1	Top Soil	CY	21	0	11	0	0	0	0	0	0	0	0	0	10
516.1	Sodding	SY	90	0	30	0	0	0	0	0	0	0	0	30	30
535.1	4" Wide Yellow Line	LF	5000	0	0	0	0	0	0	5000	0	0	0	0	0
535.2	4" Wide White Line	LF	3500	0	0	0	0	0	0	3500	0	0	0	0	0
535.4	8" Solid White Line	LF	200	0	0	0	0	0	0	200	0	0	0	0	0
535.6	16" Wide White Line	LF	300	0	0	0	0	0	0	300	0	0	0	0	0
535.7	24" Wide White Line	LF	400	0	0	0	0	0	0	400	0	0	0	0	0
535.8	Right White Arrow	EA	2	0	0	0	0	0	0	2	0	0	0	0	0
535.9	Left White Arrow	EA	3	0	0	0	0	0	0	3	0	0	0	0	0
535.12	Word "ONLY"	EA	4	0	0	0	0	0	0	4	0	0	0	0	0
535.17	Bicycle Rider Symbol	EA	0	0	0	0	0	0	0	0	0	0	0	0	0
537.1	Traffic Button (Type W)	EA	0	0	0	0	0	0	0	0	0	0	0	0	0
537.2	Traffic Button (Type Y)	EA	0	0	0	0	0	0	0	0	0	0	0	0	0
537.6	Traffic Button (Type I-C)	EA	0	0	0	0	0	0	0	0	0	0	0	0	0
537.8	Traffic Button (Type II A-A)	EA	300	0	0	0	0	0	0	300	0	0	0	0	0
537.9	Pavement Marker (Type II C-R)	EA	0	0	0	0	0	0	0	0	0	0	0	0	0
799.6	Speed Hump, Type II, Modular Rubber Cushions	EA	6	0	0	0	0	0	0	0	0	6	0	0	0
826.	Adjusting Existing Water Valve Boxes (SAWS)	EA	0	0	0	0	0	0	0	0	0	0	0	0	0
826.A	Valve Box Locate and Adjustments (SAWS)	EA	0	0	0	0	0	0	0	0	0	0	0	0	0
851.	Adjusting Existing Manholes (SAWS)	EA	0	0	0	0	0	0	0	0	0	0	0	0	0
851.A	Locating and Adjusting Existing Manholes (SAWS)	EA	0	0	0	0	0	0	0	0	0	0	0	0	0
SP100	Door Hangers	LS	0	0	0	0	0	0	0	0	0	0	0	0	0
SP2000	Railroad Insurance	LS	0	0	0	0	0	0	0	0	0	0	0	0	0

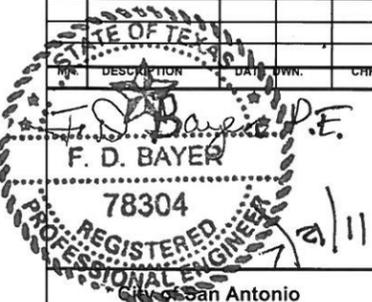
* ITEM 205.4B IS INDICATED ON THE PLANS FOR APPROXIMATE LEVEL UP QUANTITIES AND SHALL BE BID IN THE BID PROPOSAL AT A PRICE NOT TO EXCEED 10% MORE THAN THE PRICE OF ITEM 205.4

NO.	DESCRIPTION	DATE	OWN.	CHK.
	F. D. BAYER			
	78304			
REGISTERED PROFESSIONAL ENGINEER				
City of San Antonio				
Street Maintenance				
2012 Asphalt Overlay W/Rubber (Pkg 4)				
JOB NO.:				SHEET
DATE:				8

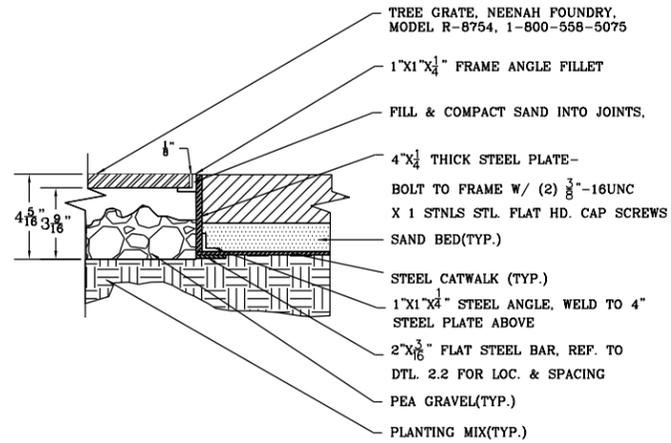
2012 ASPHALT OVERLAY PACKAGE 1 BID ITEM SUMMARY

Item	Description	UNIT OF MEASURE	APPROX. QUANTITIES	CD5	CD6	CD6	CD6	CD10	CD10	CD2,10				
				15048	17527	16442	16205	25977	18369	15364				
				Weir Ave	Bowen	Ridge Glade	Ridge Post	Five Oaks Dr	Krugerrand Dr	Northeast Pkwy				
				Dahlgreen Ave	Bowens Crossing	Ridge Branch	Ridge Path	Harry Wurzbach	N Loop 1604 E Access Rd	Austin Hwy				
				S Gen McMullen	Old Tezel Rd	Ridge Fern	Dead End	Wyndale	Henderson Pass	N Sunbelt Dr				
103.2A	Remove Concrete Curb	LF	104	8	16	16	16	16	16	16				
103.2C	Remove Sidewalks and Driveways	SY	96	4	19	8	19	19	19	8				
203.0	Tack Coat	GAL	175	25	25	25	25	25	25	25				
205.4	Hot Mix Asphaltic Pavement Type D	SY	67361	12,486	22,653	7,140	9,000	7,176	5,456	3,450				
205.4B	Hot Mix Asphaltic Pavement Type D (level up)*	SY	6737	1,249	2,265	714	900	718	546	345				
208.2	Milling of Asphalt Pavement	CY	1859	300	680	130	270	215	164	100				
209.1	Concrete Pavement (Bus Pad)	SY	0	0	0	0	0	0	0	0				
230.1	Replacing Base & Pvmnt With Type A Pvmnt (6" Compacted Depth)	SY	19754	2456	10120	1100	1400	1512.13	1906	1260				
230.1A	Replacing Base & Pvmnt With ATB & Pvmnt (8" Compacted Depth)	SY	50	50	0	0	0	0	0	0				
230.1B	Replacing Base & Pvmnt With Type A Pvmnt (12" Compacted Depth)	SY	50	50	0	0	0	0	0	0				
250.	Seal Coat	SY	67361	12486	22653	7140	9000	7176	5456	3450				
500.1	Concrete Curb	LF	104	8	16	16	16	16	16	16				
502.1	Concrete Sidewalks	SY	66	4	11	8	11	11	11	8				
502.1A	Handicamp Ramps (Type 1 thru 5)	EA	50	2	18	4	4	2	16	4				
503.1	Concrete Driveway	SY	30	0	8	0	8	8	8	0				
512.1	Adjusting Existing Manholes (Storm Sewer)	EA	3	0	1	0	1	1	0	0				
512.1B	Adjusting AT&T Manholes	EA	2	0	1	0	0	1	0	0				
515.1	Top Soil	CY	56	0	16	0	10	15	15	0				
516.1	Sodding	SY	90	0	0	0	30	30	30	0				
535.1	4" Wide Yellow Line	LF	16800	0	10000	0	0	4000	2800	0				
535.2	4" Wide White Line	LF	2900	0	100	0	0	0	2800	0				
535.4	8" Solid White Line	LF	100	0	100	0	0	0	0	0				
535.6	16" Wide White Line	LF	100	0	100	0	0	0	0	0				
535.7	24" Wide White Line	LF	950	0	400	0	0	300	250	0				
535.8	Right White Arrow	EA	2	0	2	0	0	0	0	0				
535.9	Left White Arrow	EA	2	0	2	0	0	0	0	0				
535.12	Word "ONLY"	EA	2	0	2	0	0	0	0	0				
535.17	Bicycle Rider Symbol	EA	4	0	0	0	0	0	4	0				
537.1	Traffic Button (Type W)	EA	0	0	0	0	0	0	0	0				
537.2	Traffic Button (Type Y)	EA	0	0	0	0	0	0	0	0				
537.6	Traffic Button (Type I-C)	EA	0	0	0	0	0	0	0	0				
537.8	Traffic Button (Type II A-A)	EA	1250	0	650	0	0	350	250	0				
537.9	Pavement Marker (Type II C-R)	EA	0	0	0	0	0	0	0	0				
799.6	Speed Hump, Type II, Modular Rubber Cushions	EA	6	6	0	0	0	0	0	0				
826.	Adjusting Existing Water Valve Boxes (SAWS)	EA	0	0	0	0	0	0	0	0				
826.A	Valve Box Locate and Adjustments (SAWS)	EA	0	0	0	0	0	0	0	0				
851.	Adjusting Existing Manholes (SAWS)	EA	0	0	0	0	0	0	0	0				
851.A	Locating and Adjusting Existing Manholes (SAWS)	EA	0	0	0	0	0	0	0	0				
SP100	Door Hangers	LS	0	0	0	0	0	0	0	0				
SP2000	Railroad Insurance	LS	0	0	0	0	0	0	0	0				

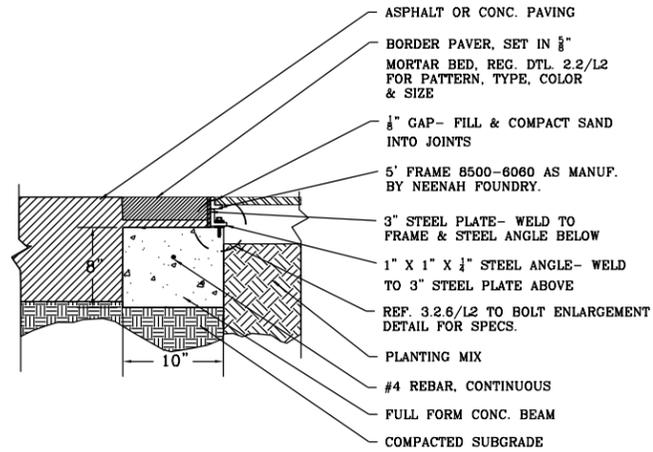
* ITEM 205.4B IS INDICATED ON THE PLANS FOR APROXIMATE LEVEL UP QUANTITIES AND SHALL BE BID IN THE BID PROPOSAL AT A PRICE NOT TO EXCEED 10% MORE THAN THE PRICE OF ITEM 205.4

STATE OF TEXAS	DESCRIPTION	DATE	WINN.	CHK.
				
F. D. BAYER REGISTERED PROFESSIONAL ENGINEER No. 78304 State of Texas San Antonio				
Street Maintenance 2012 Asphalt Overlay (Pkg 1)				
JOB NO.:				SHEET
DATE:				8A

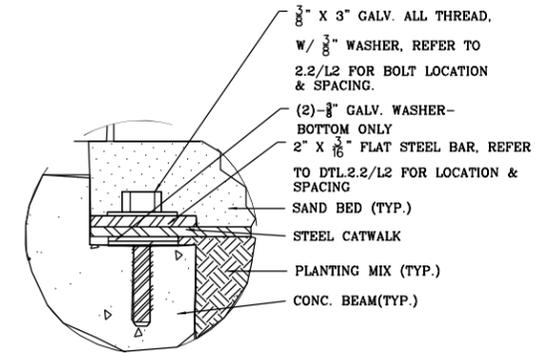
- NOTES:**
- 5' FRAME 8500-6060 AS MANUFACTURED BY NEENAH FOUNDRY.
 - REMOVE CROSSBAR FROM FRAME BEFORE INSTALLATION.



3.2.4 TREE GRATE/FRAME @ PAVERS
N. T. S.

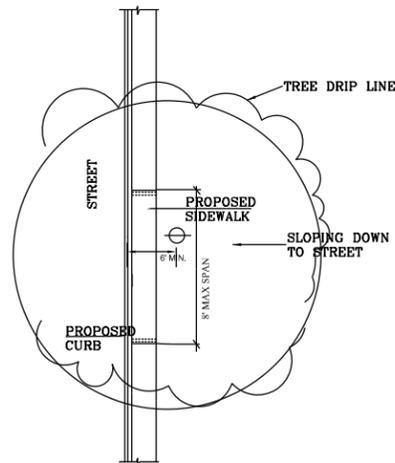


3.2.5 SECTION: PAVER @ TREE GRATE
N. T. S.



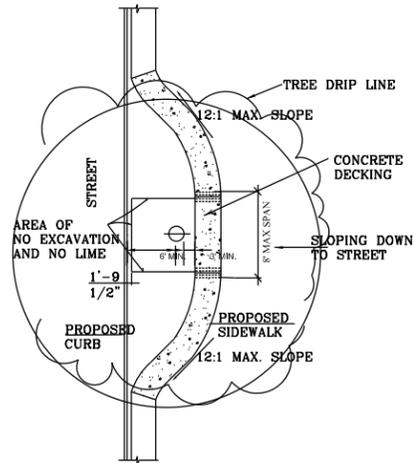
3.2.6 DETAIL: BOLT/CONC. CONNECTION
N. T. S.

AREA BENEATH PROPOSED SIDEWALKS IN THE DRIP LINE OF AN EXISTING TREE SHALL RECEIVE TREE VENTING AS PER OPTIONS ON THESE SHEETS.



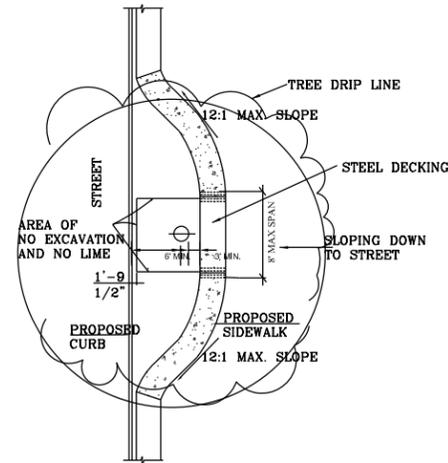
3.3 ELEVATED WALKWAY
N. T. S.

AREA BENEATH PROPOSED SIDEWALKS IN THE DRIP LINE OF AN EXISTING TREE SHALL RECEIVE TREE VENTING AS PER OPTIONS ON THESE SHEETS.



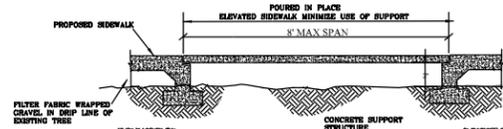
3.3.1 ELEVATED WALKWAY / CONCRETE DECKING
N. T. S.

AREA BENEATH PROPOSED SIDEWALKS IN THE DRIP LINE OF AN EXISTING TREE SHALL RECEIVE TREE VENTING AS PER OPTIONS ON THESE SHEETS.



3.3.2 ELEVATED WALKWAY / STEEL DECKING
N. T. S.

NOTE: DESIGN STEEL PLATE SUPPORT ACCORDING TO SPECIFIED WIDTH AND LENGTH.



3.3.4 ELEVATED WALKWAY SECTION
N. T. S.

NOTE: FOR THOSE TREES THAT DO NOT MEET THE TREE PRESERVATION ORDINANCE REQUIREMENTS PRESERVATION SHALL BE DETERMINED ON A CASE BY CASE BASIS

NOTE: FOR TREE AERATION SYSTEMS LOCATED UNDER A PRIVATE OR PUBLIC ROADWAY - THE PROJECT ENGINEER SHALL SUBMIT FOR APPROVAL, A PAVEMENT DESIGN SUPPORTED BY A GEOTECHNICAL REPORT THAT MEETS THE REQ. STRUCTURAL NUMBERS AND COMPACTION OF THE SUBGRADE, ABOVE THE PROPOSED SYSTEM OF TREE AERATION, IN ACCORDANCE WITH UDC 35-506(P) PAVEMENT STANDARDS, AND CITY OF SAN ANTONIO'S STANDARD SPECS. FOR PUBLIC WORKS CONSTRUCTION.

PREPARED BY: FERNANDEZ PRAZER WHITE & ASSOC. INC. & C. F. ZAVALA GROUP

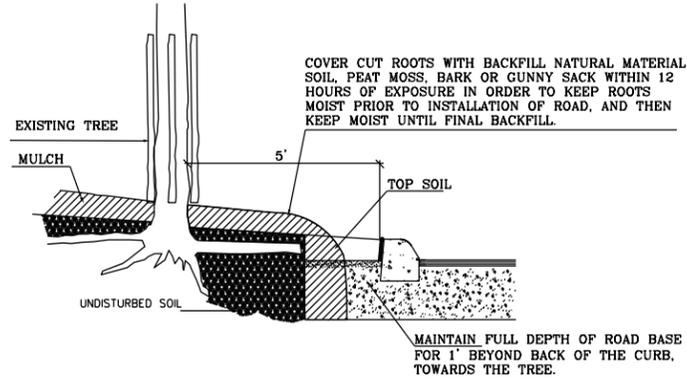
CITY OF SAN ANTONIO



DEPARTMENT OF PUBLIC WORKS

CITY OF SAN ANTONIO
TREE PROTECTION

DESIGNED: ABJR	FED. RD. DIV. NO.	STATE		SHT. NO.
CHECKED:		TEXAS		11
DRAWN: ABJR	STATE DIST. NO.	COUNTY	CONTROL SECT. NO.	JOB NO.
CHECKED:		BEXAR		

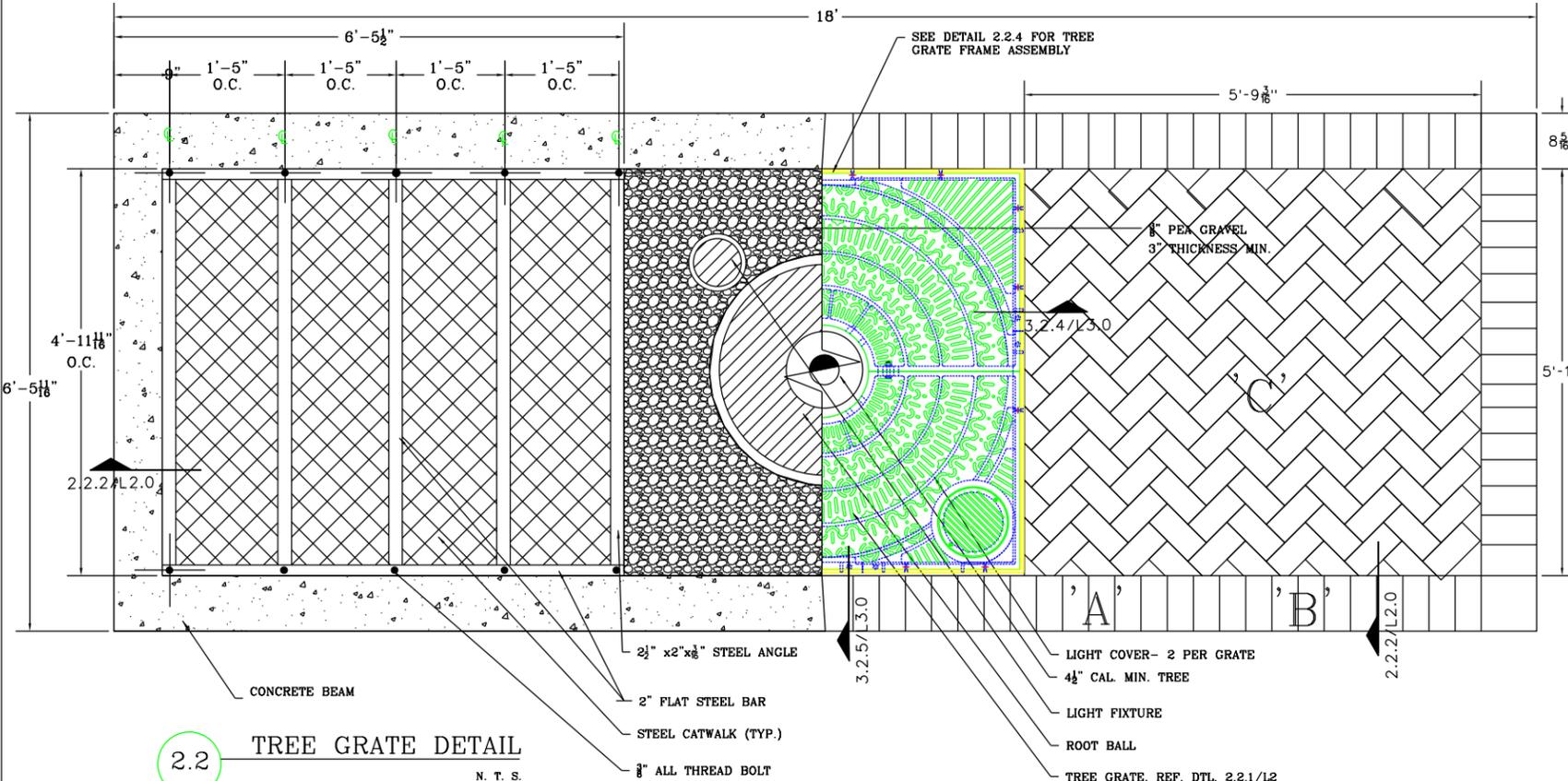


NOTE: ROOT ZONE OUTSIDE OF TREE PROTECTION BARRIER SHOULD BE COVERED AT ALL TIMES WITH 8" OF BARK MULCH THROUGHOUT THE CONSTRUCTION PHASE. EXISTING TREES SHOULD BE DEEP WATERED AS SPECIFIED IN ITEM 801 & 802

2.1 EXPOSED ROOT PROTECTION DETAIL

N. T. S.

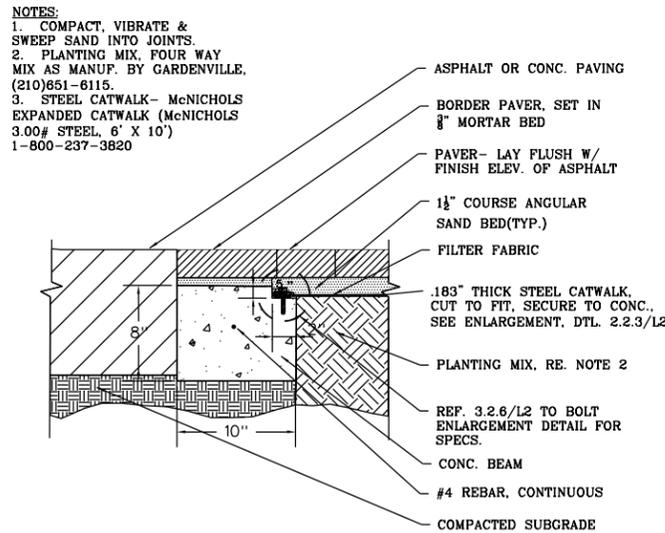
NOTE: FOR THOSE TREES THAT DO NOT MEET THE TREE PRESERVATION ORDINANCE REQUIREMENTS PRESERVATION SHALL BE DETERMINED ON A CASE BY CASE BASIS



2.2 TREE GRATE DETAIL

N. T. S.

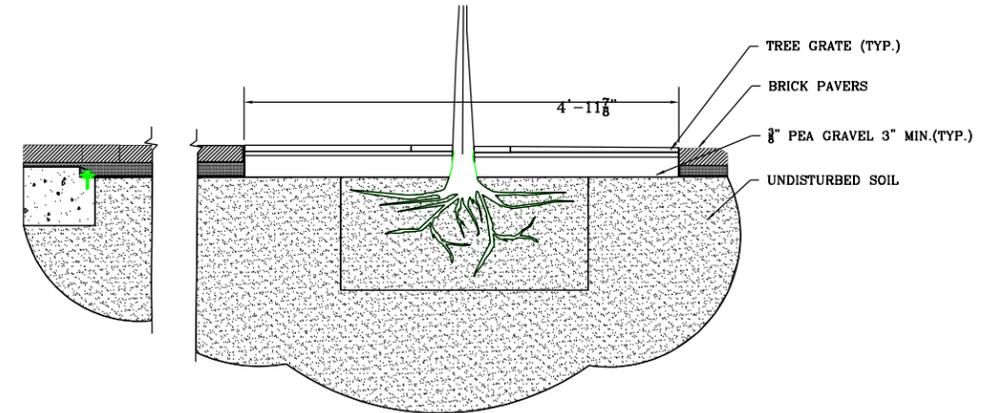
- NOTES:
- PAVER 'A': 8 5/8" x 23 3/8" THICKNESS CONC. PAVER (CITY STONE II) CASTSTONE COLOR, BY PAVESTONE. 1-800-580-PAVE.
 - PAVER 'B': 4 5/8" x 8 5/8" x 2 3/8" THICKNESS, PATTERN AS SHOWN ON PLAN, CONC. PAVER (HOLLAND STONE) CASTSTONE COLOR, MANUF. BY PAVESTONE.
 - PAVER 'C': 4 5/8" x 8 5/8" x 2 3/8" THICKNESS, 45° HERRINGBONE PATTERN, CONC. PAVER (HOLLAND STONE), ANTIQUE COLOR, MANUF. BY PAVESTONE.



2.2.2 SECTION: PAVER @ ASPHALT

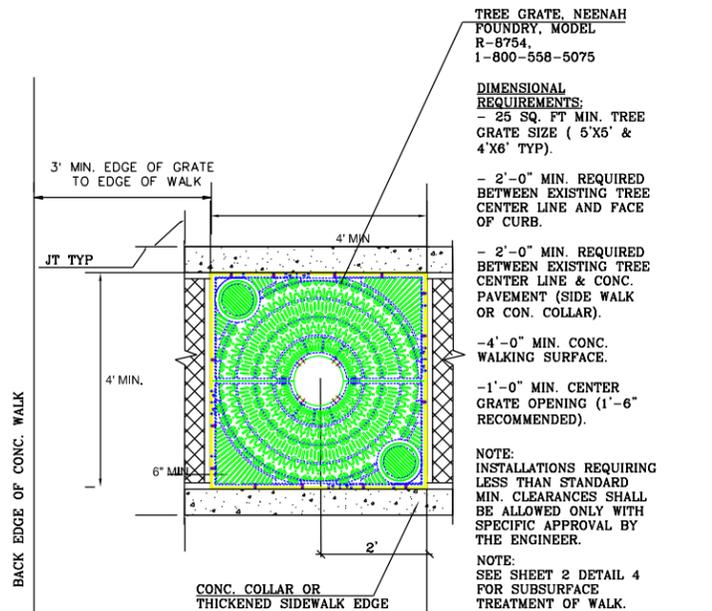
N. T. S.

- NOTES:
- COMPACT, VIBRATE & SWEEP SAND INTO JOINTS.
 - PLANTING MIX, POUR WAY MIX AS MANUF. BY GARDENVILLE, (210)851-6115.
 - STEEL CATWALK- McNICHOLS EXPANDED CATWALK (McNICHOLS 3.00# STEEL, 6' X 10') 1-800-237-3820



2.2.3 TREE WELL SECTION

N. T. S.



2.2.1 TREE GRATE PLAN VIEW

N. T. S.

TREE GRATE, NEENAH FOUNDRY, MODEL R-8754, 1-800-558-5075

DIMENSIONAL REQUIREMENTS:
- 25 SQ. FT. MIN. TREE GRATE SIZE (5'X5' & 4'X6' TYP.)

- 2'-0" MIN. REQUIRED BETWEEN EXISTING TREE CENTER LINE AND FACE OF CURB.

- 2'-0" MIN. REQUIRED BETWEEN EXISTING TREE CENTER LINE & CONC. PAVEMENT (SIDE WALK OR CON. COLLAR).

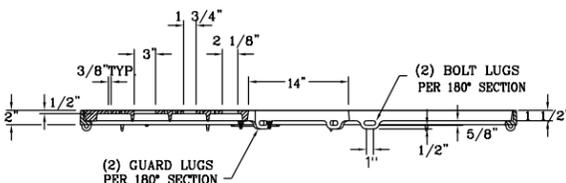
- 4'-0" MIN. CONC. WALKING SURFACE.

- 1'-0" MIN. CENTER GRATE OPENING (1'-6" RECOMMENDED).

NOTE: INSTALLATIONS REQUIRING LESS THAN STANDARD MIN. CLEARANCES SHALL BE ALLOWED ONLY WITH SPECIFIC APPROVAL BY THE ENGINEER.

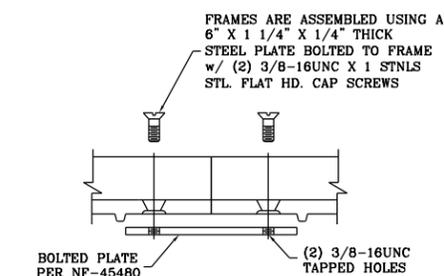
NOTE: SEE SHEET 2 DETAIL 4 FOR SUBSURFACE TREATMENT OF WALK.

NOTE: FOR THOSE TREES THAT DO NOT MEET THE TREE PRESERVATION ORDINANCE REQUIREMENTS PRESERVATION SHALL BE DETERMINED ON A CASE BY CASE BASIS



2.2.4 SECTION: TREE GRATE FRAME

N. T. S.



2.2.5 SECTION: GRATE FRAME ASSEMBLY

N. T. S.

PREPARED BY: FERNANDEZ FRAZER WHITE & ASSOC. INC. & C. F. ZAVALA GROUP

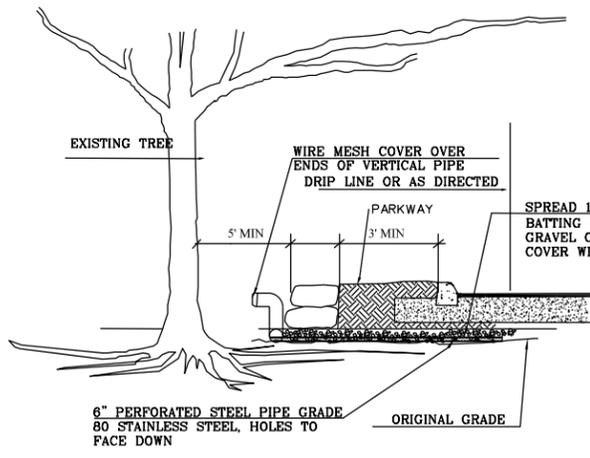
CITY OF SAN ANTONIO



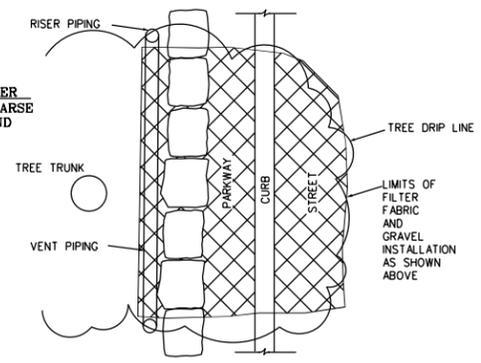
DEPARTMENT OF PUBLIC WORKS

CITY OF SAN ANTONIO
TREE PROTECTION DETAILS
TREE PRESERVATION

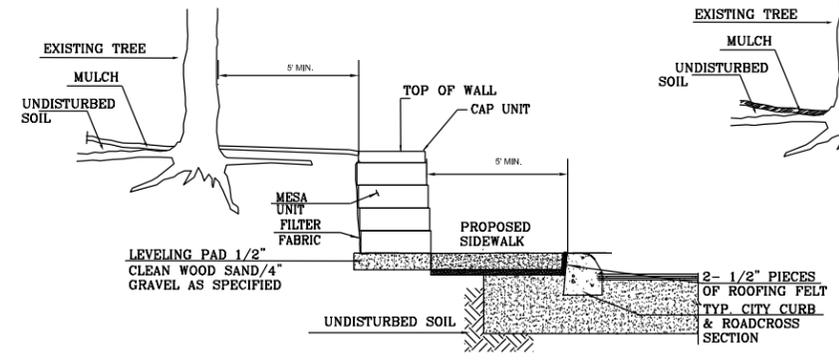
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CHECKED:		TEXAS		10
DRAWN:	STATE DIST. NO.	COUNTY	CONTROL NO.	SECT. NO.
CHECKED:		BEXAR		JOB NO.
				HIGHWAY NO.



4.2 TREE AERATION DETAIL B
N. T. S.

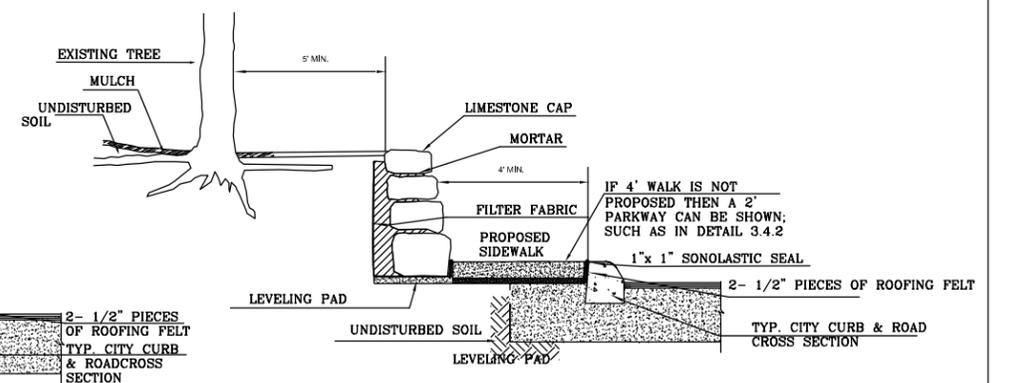


4.2.2 PLAN VIEW B
N. T. S.



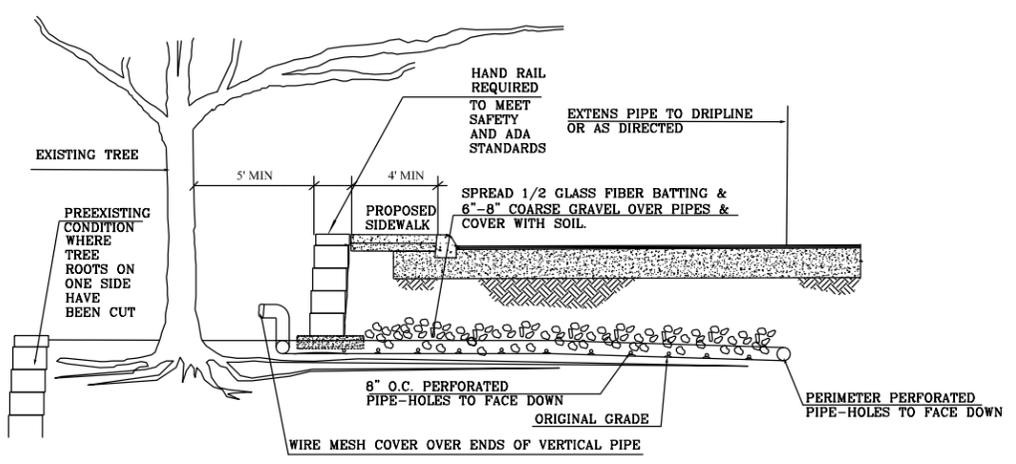
4.3 SEGMENTAL GRAVITY WALL
ADJACENT TO CURB
N. T. S.

NOTE- THIS TYPE OF WALL CAN BE USED ON OTHER APPLICATIONS TREES CANNOT BE PRESERVED IF THEY ARE CLOSER THAN 5 FEET TO THE WALL

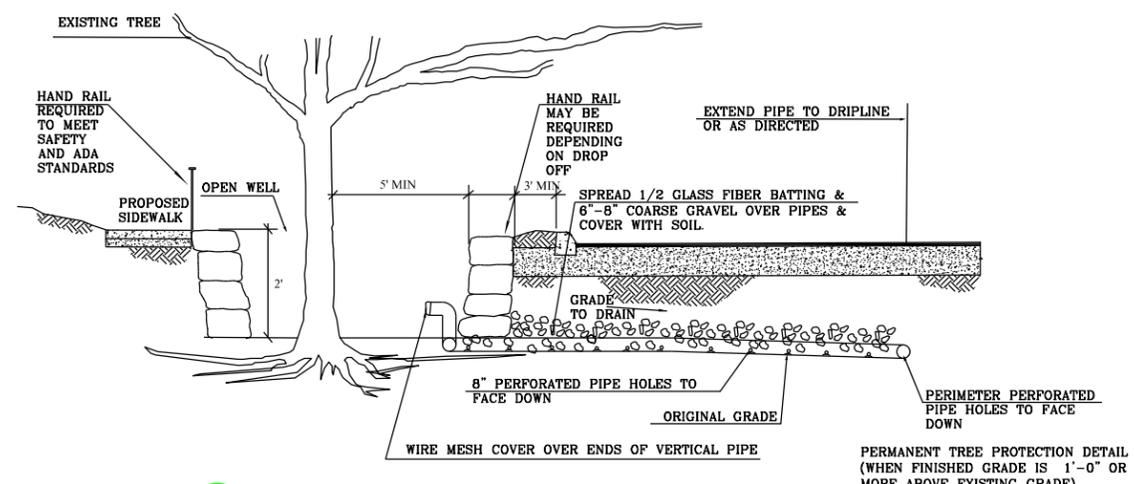


4.3.2 LIMESTONE BOULDER GRAVITY WALL
ADJACENT TO CURB
N. T. S.

NOTE- THIS TYPE OF WALL CAN BE USED ON OTHER APPLICATIONS TREES CANNOT BE PRESERVED IF THEY ARE CLOSER THAN 5 FEET TO THE WALL

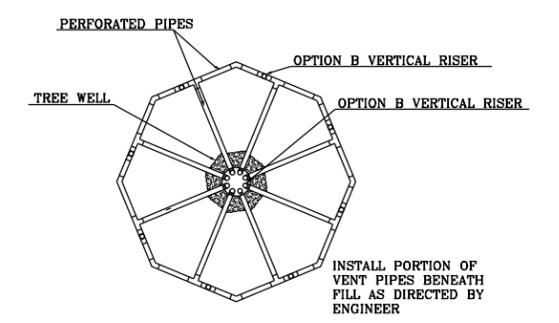


4.4 TREE AERATION DETAIL C
N. T. S.



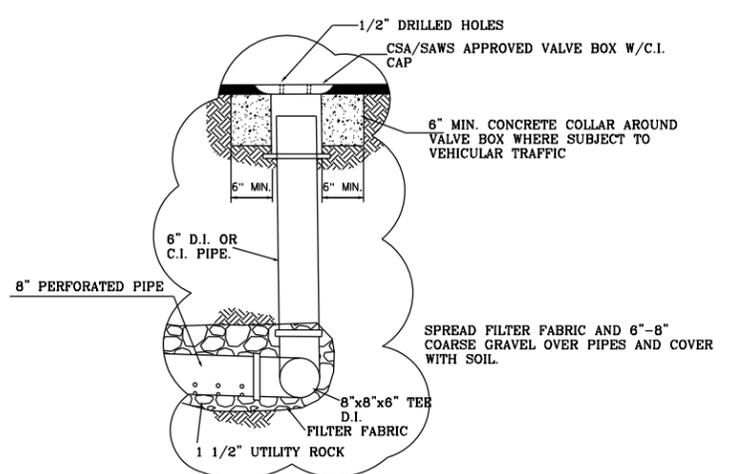
4.4.2 TREE AERATION DETAIL C
N. T. S.

NOTE: THIS AERATION SYSTEM CAN BE USED FOR NEW PROJECTS WHERE FILL IS OCCURRING SUCH AS PARKING LOTS OR CONSTRUCTION. DRAIN AWAY FROM EXISTING TREE.

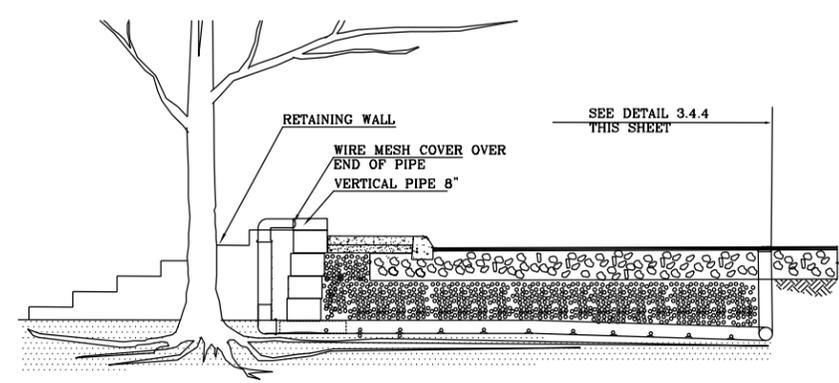


4.4.3 PLAN VIEW C
N. T. S.

PERMANENT TREE PROTECTION DETAIL (WHEN FINISHED GRADE IS 1'-0" OR MORE ABOVE EXISTING GRADE)
NOTE: WELL TO BE CONSTRUCTED OF STONE, BLOCK OR BRICK. IF BRICK IS USED, VERTICAL JOINTS LEFT OPEN FOR DRAINAGE 1/2" MAXIMUM INSIDE FACE OF WALL.

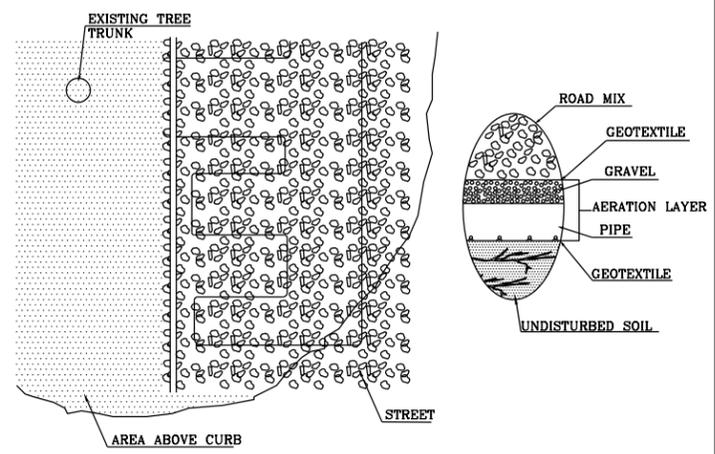


4.4.4 TREE AERATION SECTION C
N. T. S.



4.4.5 TREE AERATION DETAIL D
N. T. S.

NOTE: THIS AERATION SYSTEM CAN BE USED FOR NEW PROJECTS WHERE FILL IS OCCURRING SUCH AS PARKING LOTS OR ROADWAY CONSTRUCTION. DRAIN AWAY FROM EXISTING TREE.



4.4.1 TREE AERATION PLAN VIEW D
N. T. S.

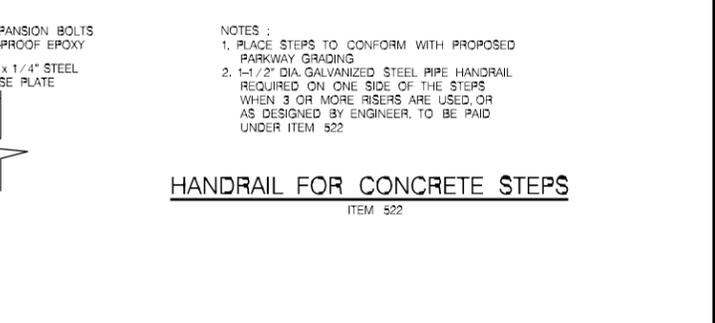
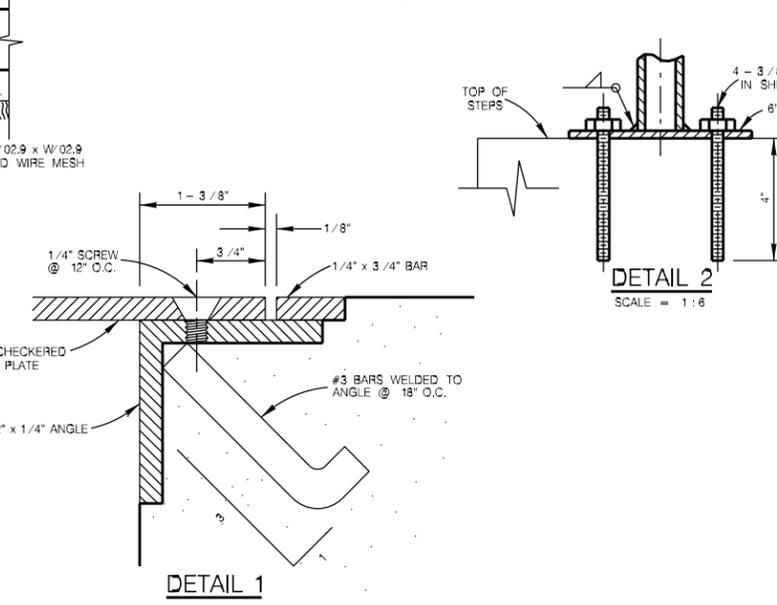
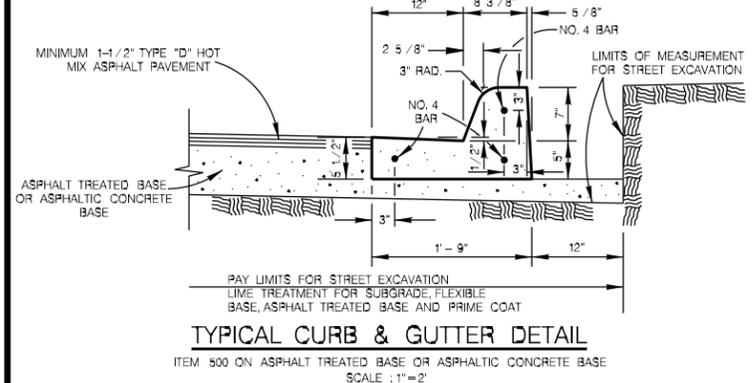
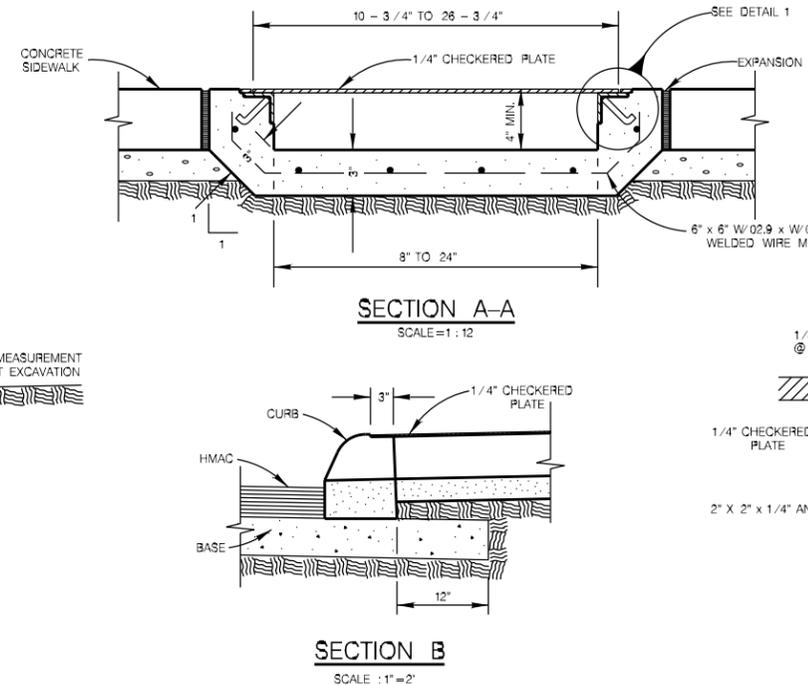
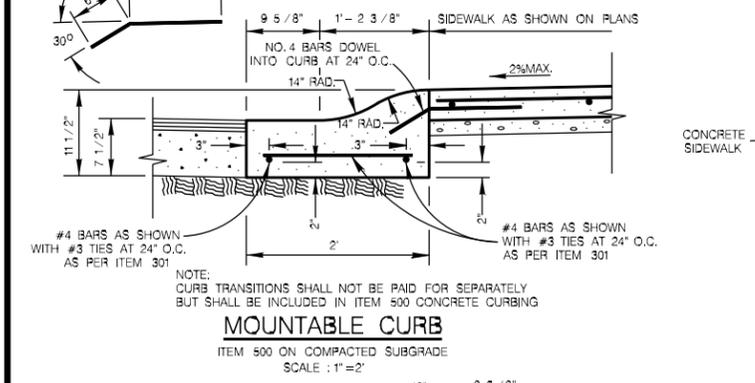
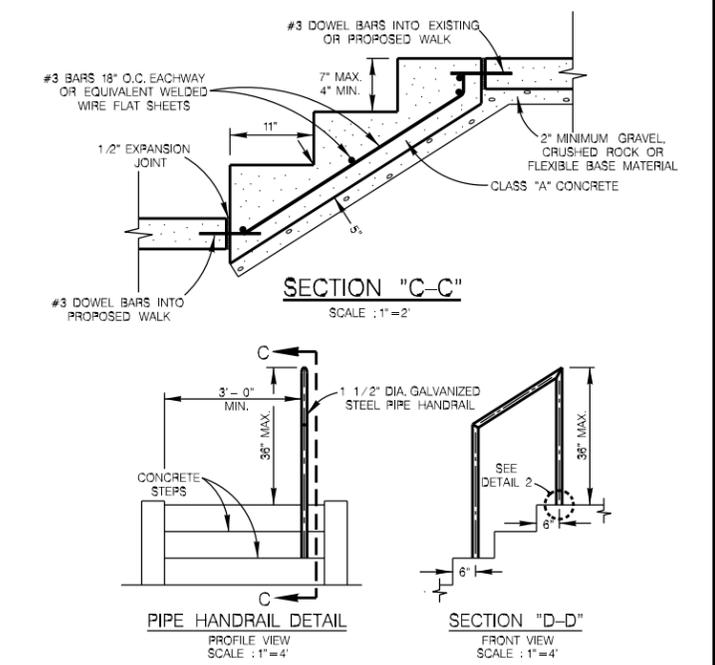
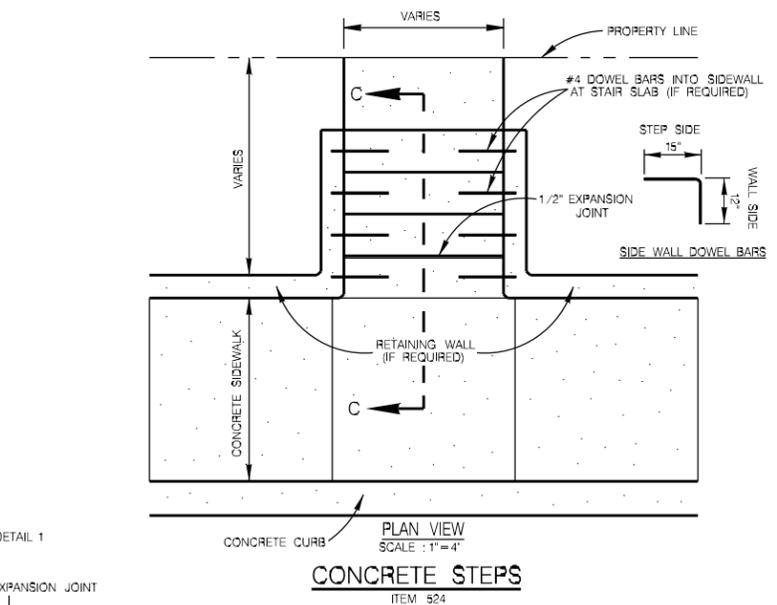
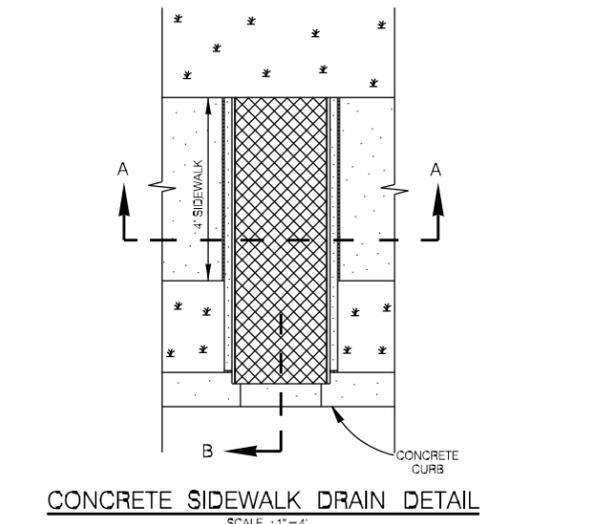
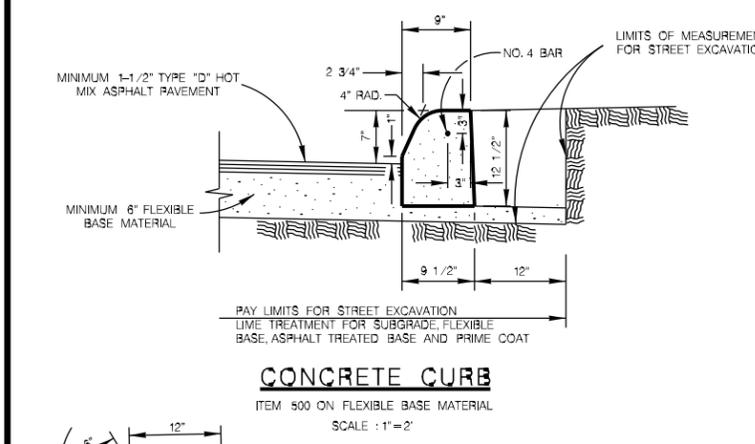
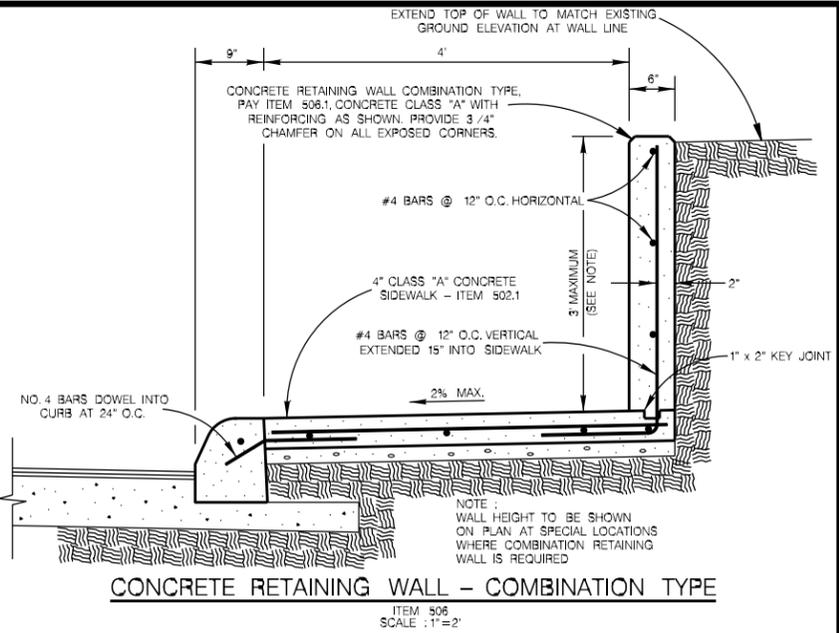
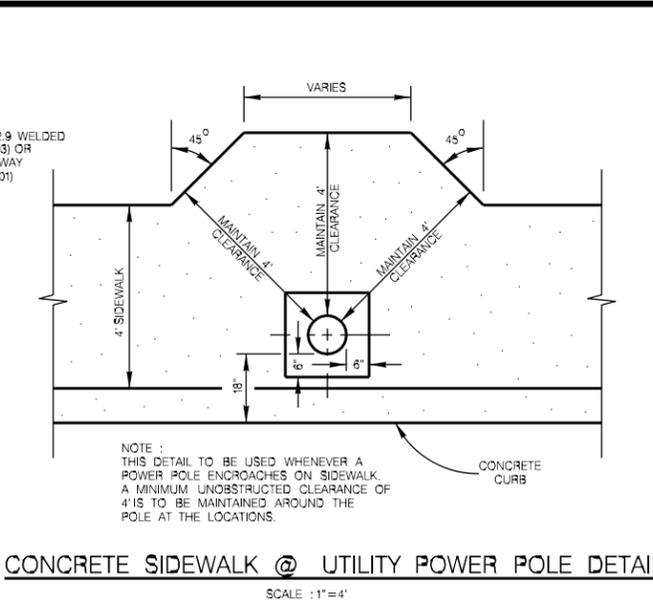
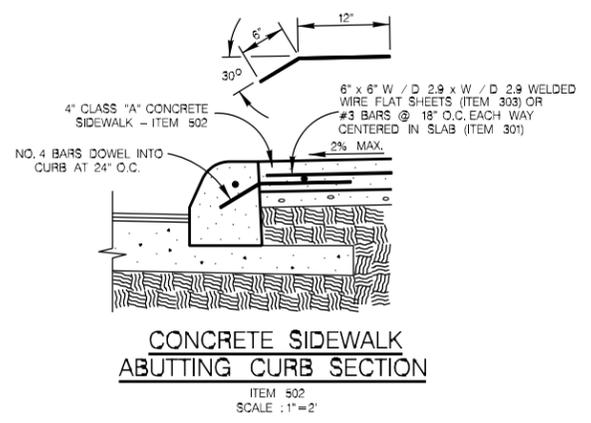
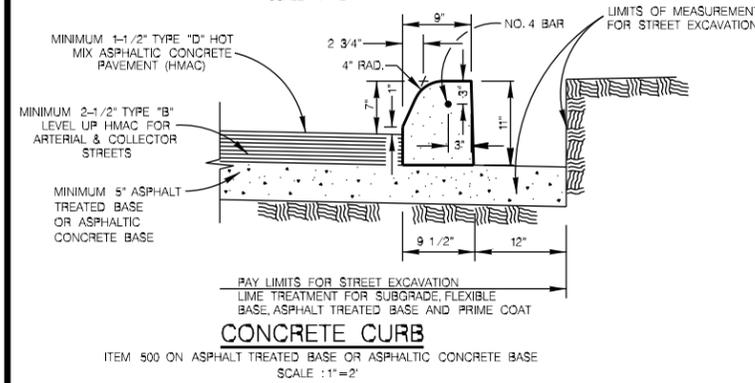
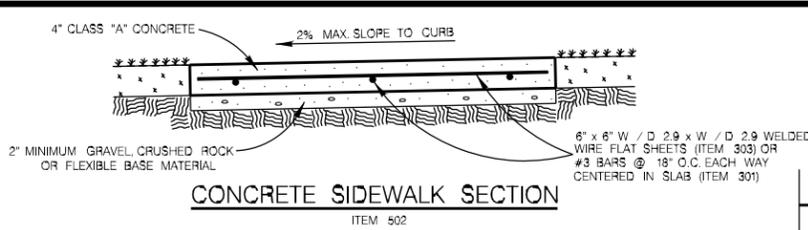
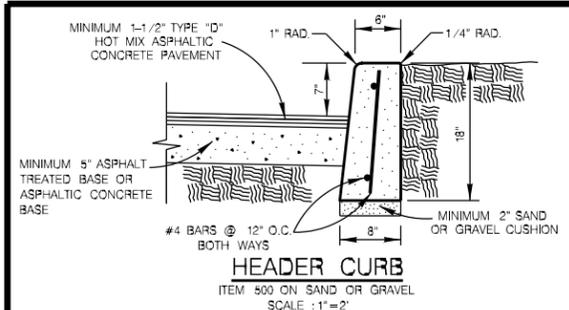
PREPARED BY: FERNANDEZ PRAZER WHITE & ASSOC. INC. & C. F. ZAVALA GROUP

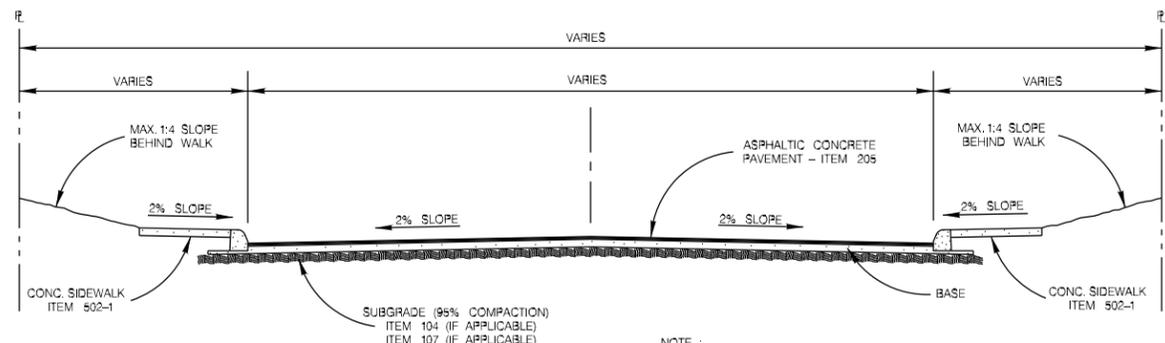
CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

CITY OF SAN ANTONIO
TREE PROTECTION DETAILS
TREE PRESERVATION

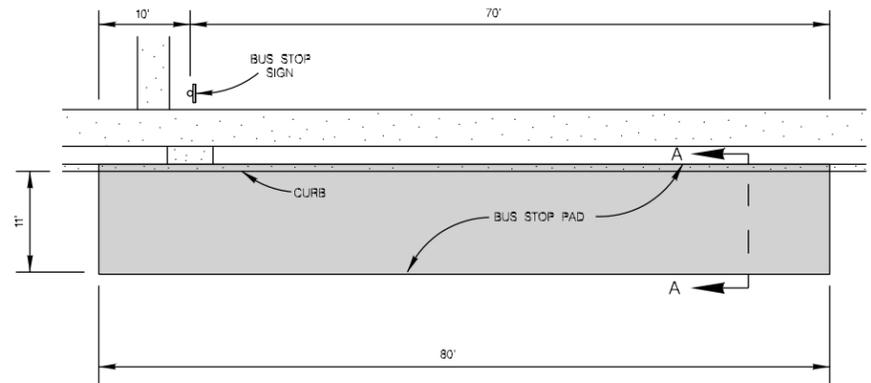
DESIGNED: AB/JR	FED. RD. DIV. NO.	STATE		SHT. NO.
CHECKED:	TEXAS			12
DRAWN:	STATE DIST. NO.	COUNTY NO.	CONTROL SECT. NO.	JOB NO.
CHECKED:	BEKAR			HIGHWAY NO.





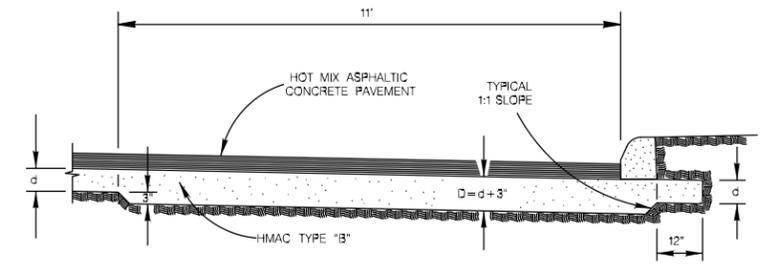
TYPICAL STREET SECTION
SCALE : 1"=8'

NOTE :
FOR STREETS OTHER THAN LOCAL TYPE "A" STREETS,
THE EDGE OF THE SIDEWALK MUST BE LOCATED A
MINIMUM OF TWO FEET AWAY FROM THE BACK OF
THE CURB.

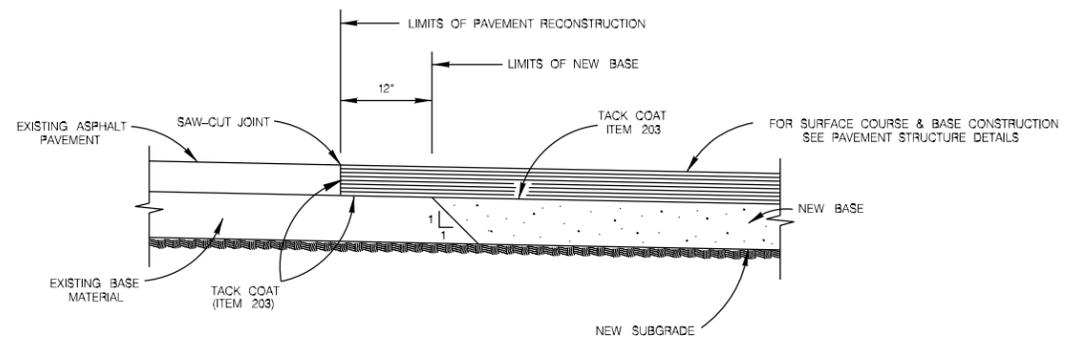


PLAN VIEW
SCALE : 1"=20'

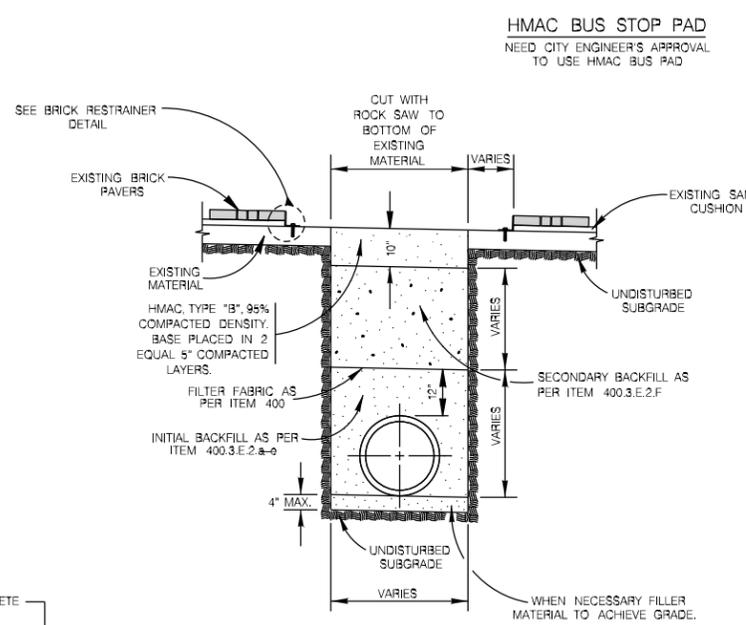
NOTES :
1. EXCAVATION FOR THICKENED PAVEMENT SECTION WILL BE PAID UNDER ITEM NO. 104 "STREET EXCAVATION".
2. BASE MATERIALS :
A) IF THE MEASUREMENT FOR THE HMAC MATERIAL IS PER TON, THICKENED PAVEMENT SECTION WILL BE PAID FOR UNDER ITEM NO. 205, TYPE "B" - PER TON.
B) IF THE MEASUREMENT FOR THE HMAC MATERIAL IS PER SQUARE YARD, NO EXTRA PAYMENT WILL BE MADE FOR THE THICKENED PAVEMENT.



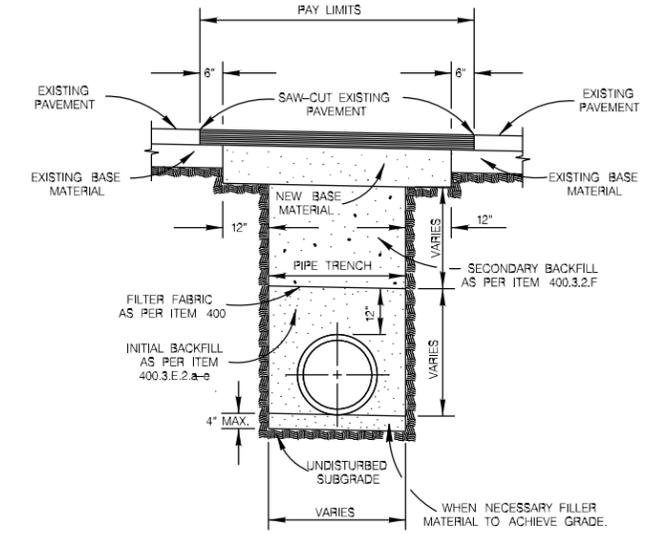
SECTION "A-A"
SCALE : 1"=4'



PAVEMENT JUNCTION DETAILS
SCALE : 1"=2'

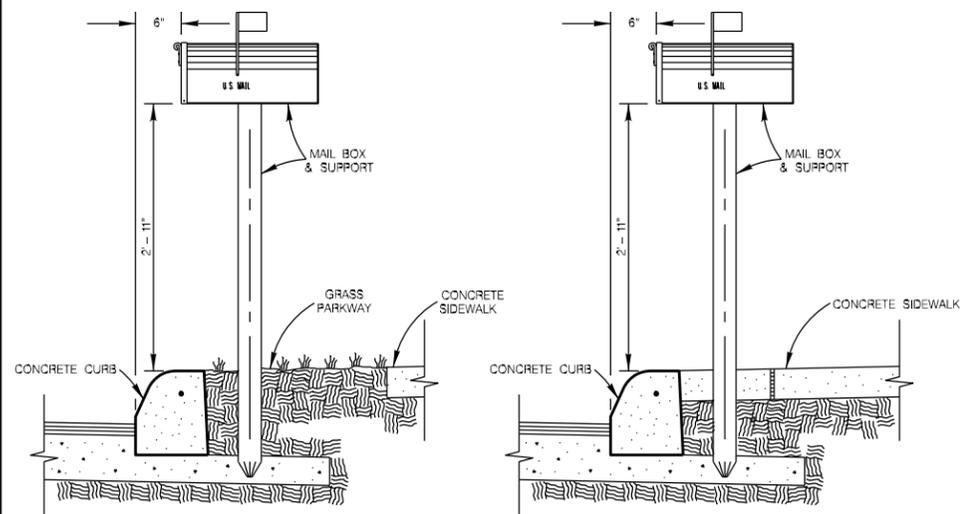


TYPICAL BASE REPLACEMENT FOR BRICK SURFACED STREET SECTION
ITEM 511.3
SCALE : 1"=4'

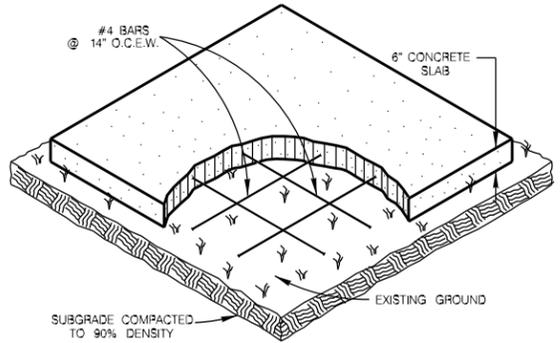


NOTES :
1. FOR LOCAL TYPE "A" & "B" STREETS (RESIDENTIAL) USE 6" ASPHALT CONCRETE BASE TYPE "B" WITH 1-1/2" TYPE "D" HOT MIX ASPHALTIC CONCRETE PAVEMENT.
2. FOR ARTERIAL & SECONDARY STREETS (COMMERCIAL) USE 12.5" TYPE "B" HOT MIX ASPHALTIC CONCRETE PAVEMENT LEVELING-UP COURSE & 1-1/2" TYPE "D" HOT MIX ASPHALTIC CONCRETE PAVEMENT SURFACE COURSE.

TYPICAL PAVEMENT REPLACEMENT
ITEM 511
SCALE : 1"=4'

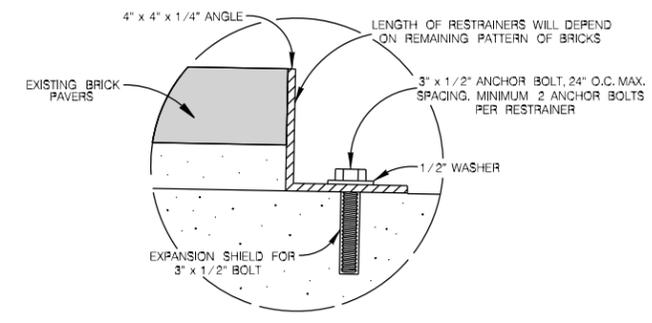


MAIL BOX LOCATION
ITEM 513.1



COMMUNITY MAIL BOX SLAB
ITEM 513.2
SCALE : 1"=4'

MAIL BOX PAD NOTES :
1. THE CONTRACTOR WILL CONSTRUCT SLABS FOR "TEMPORARY MAIL BOX COLLECTION PAD" FOR THE UNITED STATES POSTAL SERVICE WITH LOCATIONS AND SIZES SPECIFIED BY THE CITY ENGINEER DURING CONSTRUCTION.
2. THE CONSTRUCTION OF SLABS SHALL CONFORM TO ITEM 513 "REMOVING AND RELOCATING MAILBOXES".
3. PAYMENT WILL BE MADE UNDER ITEM 513.2 "COMMUNITY MAILBOX SLAB - PER SQUARE YARD".
4. UNIT PRICE WILL INCLUDE REMOVAL OF "TEMPORARY MAIL BOX COLLECTION PAD" SLABS AT THE END OF THE PROJECT. NO SEPARATE PAY ITEM.

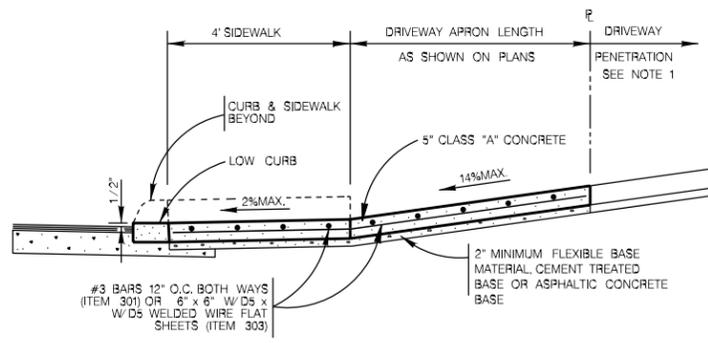


BRICK RESTRAINER DETAIL
SCALE : 1"=6'

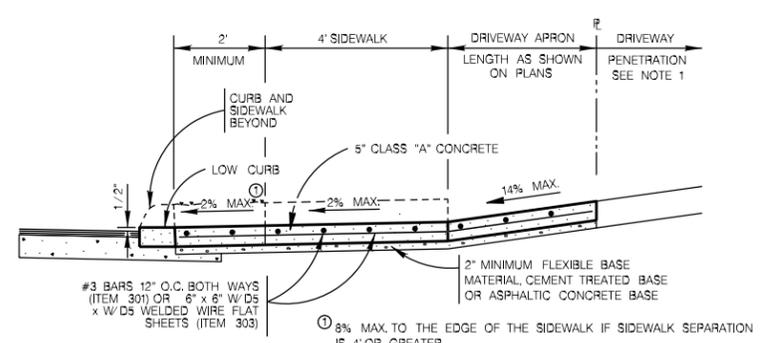
FEBRUARY 2010
CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

MISCELLANEOUS CONSTRUCTION STANDARDS II

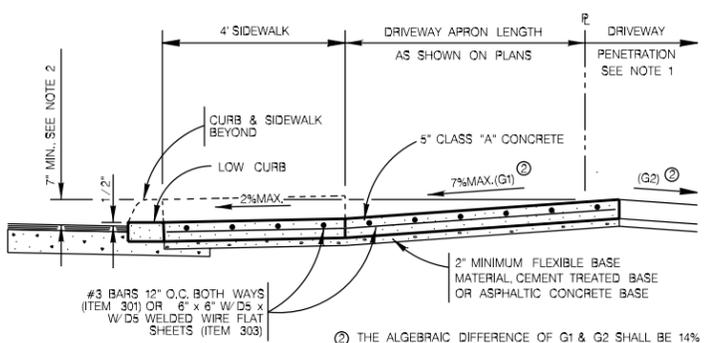
SUBMITTAL	PROJECT NO.:	DATE:
DRAWN BY: V. VASQUEZ	DESIGN BY:	CHECKED BY: S. HOSEINI, P.E.
SHEET NO. 14 OF 80		



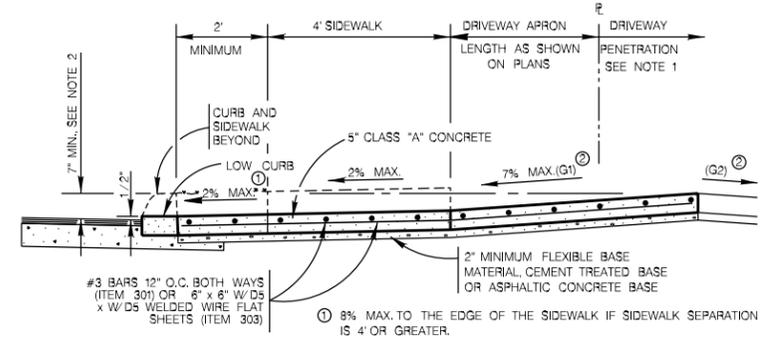
TYPICAL RESIDENTIAL DRIVEWAY SECTION
WITH SIDEWALK ABUTTING CURB
ITEM 503.1



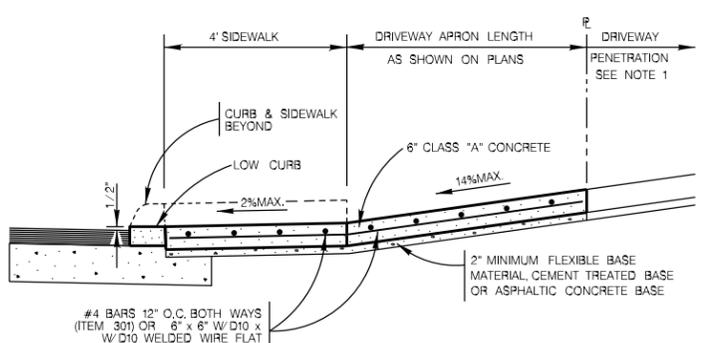
TYPICAL RESIDENTIAL DRIVEWAY SECTION
WITH SIDEWALK SEPARATED FROM CURB
ITEM 503.1



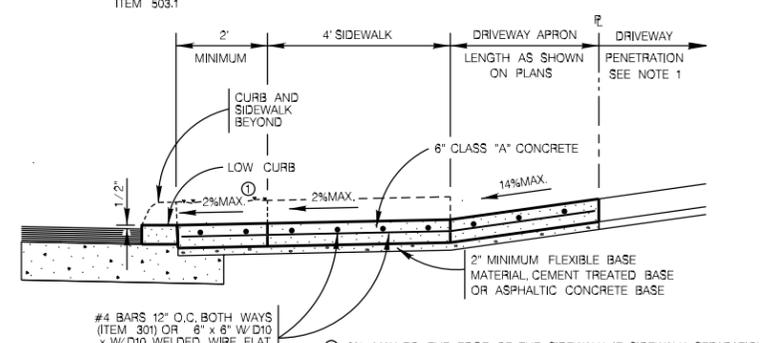
TYPICAL RESIDENTIAL DRIVEWAY SECTION
WHERE PROPERTY IS LOWER THAN STREET & SIDEWALK IS ABUTTING CURB
ITEM 503.1



TYPICAL RESIDENTIAL DRIVEWAY SECTION
WHERE PROPERTY IS LOWER THAN STREET & SIDEWALK IS SEPARATED FROM CURB
ITEM 503.1



TYPICAL COMMERCIAL DRIVEWAY SECTION
WITH SIDEWALK ABUTTING CURB
ITEM 503.2

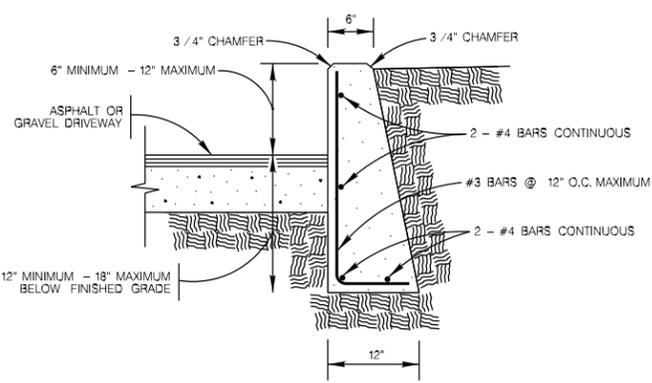


TYPICAL COMMERCIAL DRIVEWAY SECTION
WITH SIDEWALK SEPARATED FROM CURB
ITEM 503.2

CONCRETE DRIVEWAY NOTES

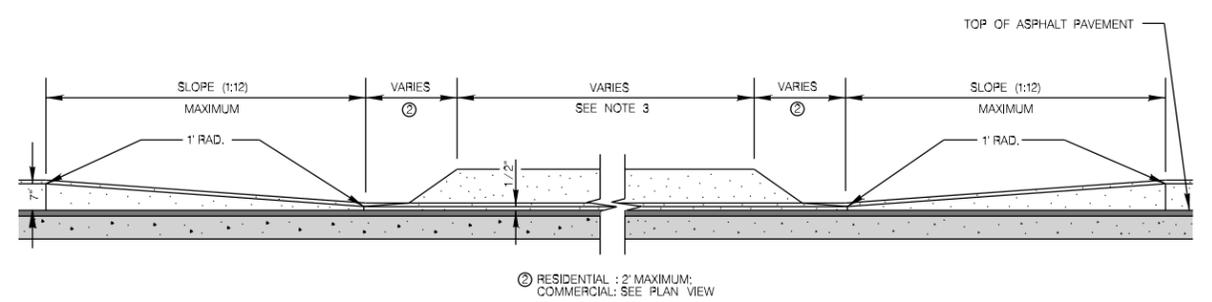
- DRIVEWAY PENETRATION REFERS TO A PORTION OF THE DRIVEWAY THAT MAY BE NECESSARY TO RECONSTRUCT WITHIN PRIVATE PROPERTY TO COMPLY WITH A MAXIMUM DRIVEWAY SLOPE. THIS PORTION OF THE DRIVEWAY SHALL BE PAID FOR UNDER THE FOLLOWING ITEMS AS MAY APPLY:
A.) CONCRETE DRIVEWAY PAID FOR UNDER ITEM NO. 503.1 OR 503.2
B.) ASPHALTIC CONCRETE DRIVEWAY PAID FOR UNDER ITEM NO. 503.4 AND SHALL INCLUDE A MINIMUM OF 1" ASPHALT TYPE 'D' & 6" FLEXIBLE BASE
C.) GRAVEL DRIVEWAY PAID FOR UNDER ITEM NO. 503.5 AND SHALL INCLUDE A MINIMUM OF 6" FLEXIBLE BASE
- 7" MINIMUM HEIGHT WILL NOT NECESSARILY OCCUR AT THE PROPERTY LINE. IT MAY OCCUR WITHIN THE RIGHT OF WAY OR WITHIN THE DRIVEWAY PENETRATION ON PRIVATE PROPERTY.
- THE PROPOSED DRIVEWAY SHOULD MATCH THE EXISTING WIDTH AT THE PROPERTY LINE BUT UNLESS AUTHORIZED BY THE CITY TRAFFIC ENGINEER, THE WIDTH SHALL BE WITHIN THE FOLLOWING VALUES:

TYPE	MINIMUM	MAXIMUM
RESIDENTIAL	10'	20'
COMMERCIAL - ONE WAY	12'	20'
COMMERCIAL - TWO WAY	24'	30'
- FOR LOCAL TYPE "A" STREETS, SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 4' AND IF SEPARATED FROM THE CURB, THE SIDEWALK SHALL BE LOCATED A MINIMUM OF 2' FROM THE BACK OF CURB.
- FOR OTHER THAN LOCAL TYPE "A" STREETS, THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 4' AND SEPARATED A MINIMUM OF 2' FROM THE BACK OF CURB OR, AS AN OPTION, THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 6' WHEN LOCATED AT THE BACK OF CURB.
- DUMMY JOINTS PARALLEL TO THE CURB SHALL BE PLACED WHERE THE SIDEWALK MEETS THE DRIVEWAY. DUMMY JOINTS PERPENDICULAR TO THE CURB AND WITHIN THE BOUNDARIES OF THE PARALLEL DUMMY JOINTS, SHALL BE PLACED AT INTERVALS EQUAL TO THE WIDTH OF THE SIDEWALK.
- A MINIMUM OF TWO ROUND AND SMOOTH DOWEL BARS 3/8" IN DIAMETER AND 18" IN LENGTH SHALL BE SPACED 18" APART AT EACH EXPANSION JOINT.
- SIDEWALK RAMP LENGTHS SHALL BE OF SUFFICIENT LENGTH TO MAINTAIN 8.33% (1:12) MAXIMUM SLOPE, WHERE SIDEWALKS CROSS DRIVEWAYS. SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2%.
- SIDEWALK RAMP SURFACE SHALL BE BRUSH FINISHED.

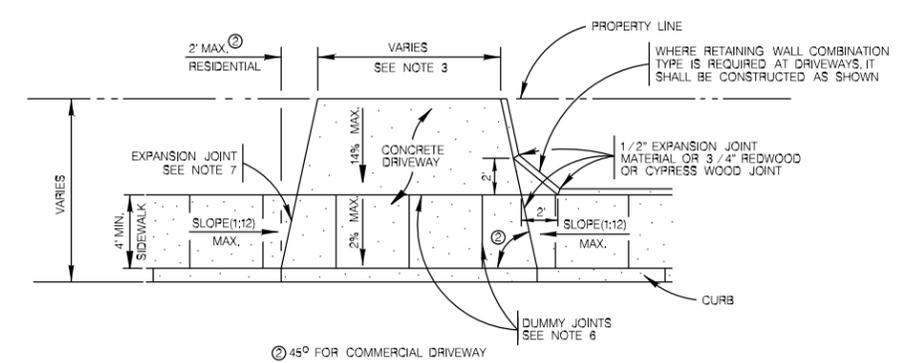


DRIVEWAY - CONCRETE RETAINING WALL
ON COMPACTED SUBGRADE
ITEM 307.1

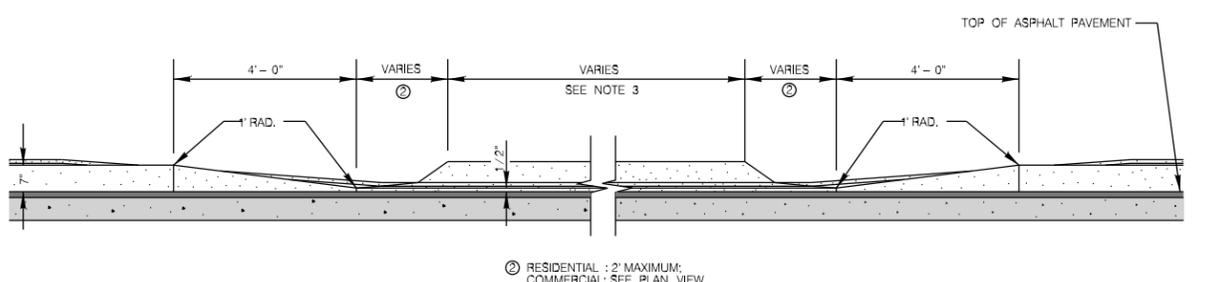
- NOTE:
- COST OF REINFORCEMENT TO BE INCLUDED IN UNIT COST OF ITEM 307.1.
 - CONCRETE RETAINING WALL COMBINATION TYPE SHALL BE USED FOR CONCRETE DRIVEWAYS.



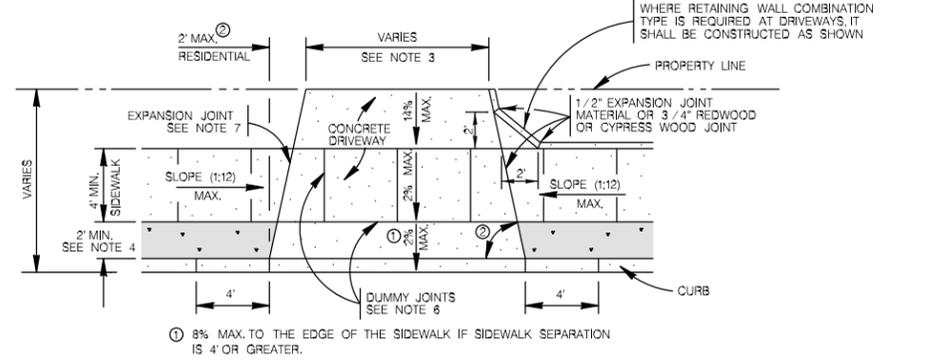
CURB PROFILE AT DRIVEWAY
WITH SIDEWALK ABUTTING CURB
RESIDENTIAL: 2" MAXIMUM;
COMMERCIAL: SEE PLAN VIEW



TYPICAL DRIVEWAY PLAN VIEW
WITH SIDEWALK ABUTTING CURB
45° FOR COMMERCIAL DRIVEWAY



CURB PROFILE AT DRIVEWAY
WITH SIDEWALK SEPARATED FROM CURB
RESIDENTIAL: 2" MAXIMUM;
COMMERCIAL: SEE PLAN VIEW



TYPICAL DRIVEWAY PLAN VIEW
WITH SIDEWALK SEPARATED FROM CURB
8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.
45° FOR COMMERCIAL DRIVEWAY

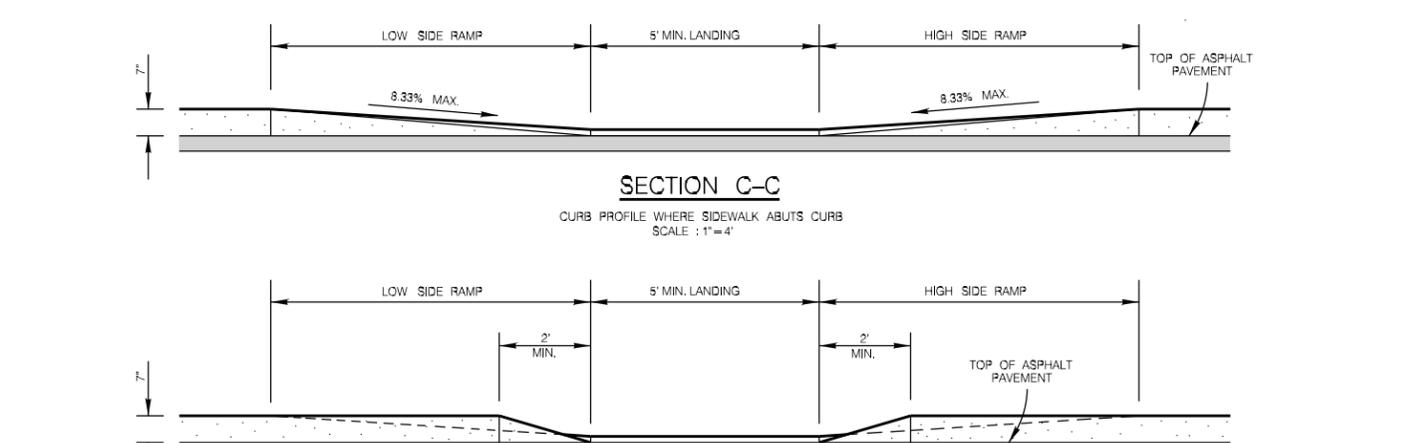
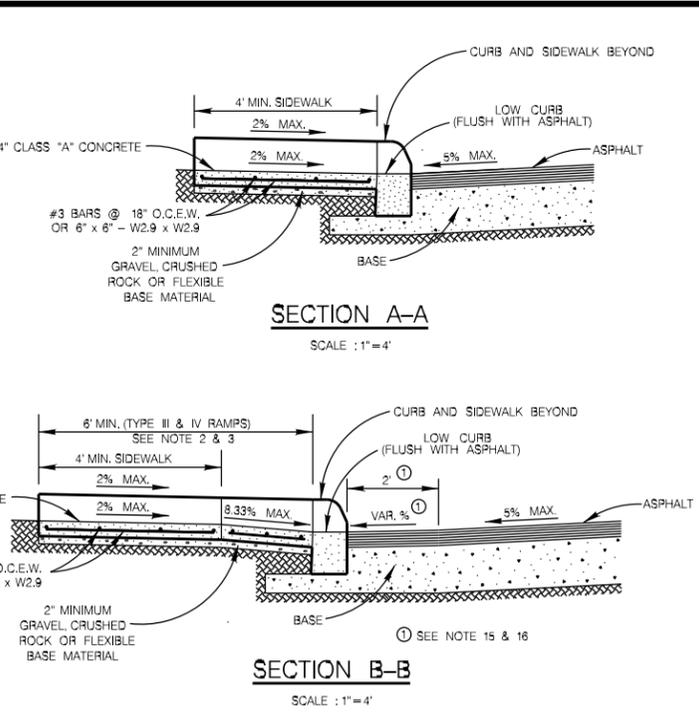
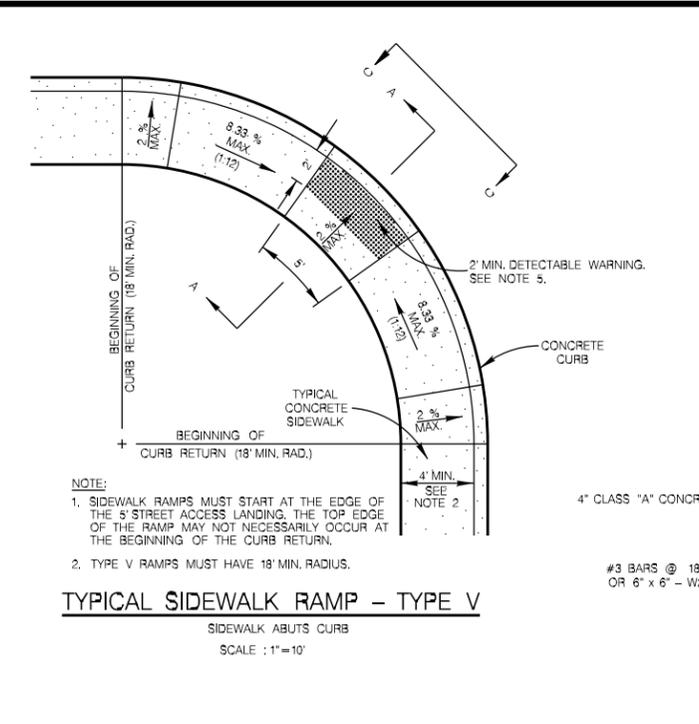
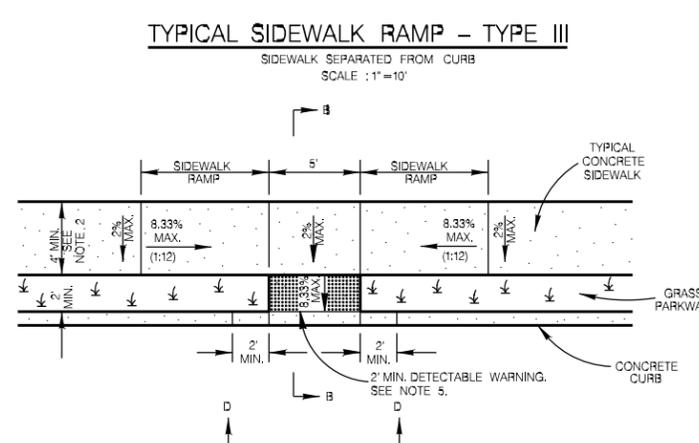
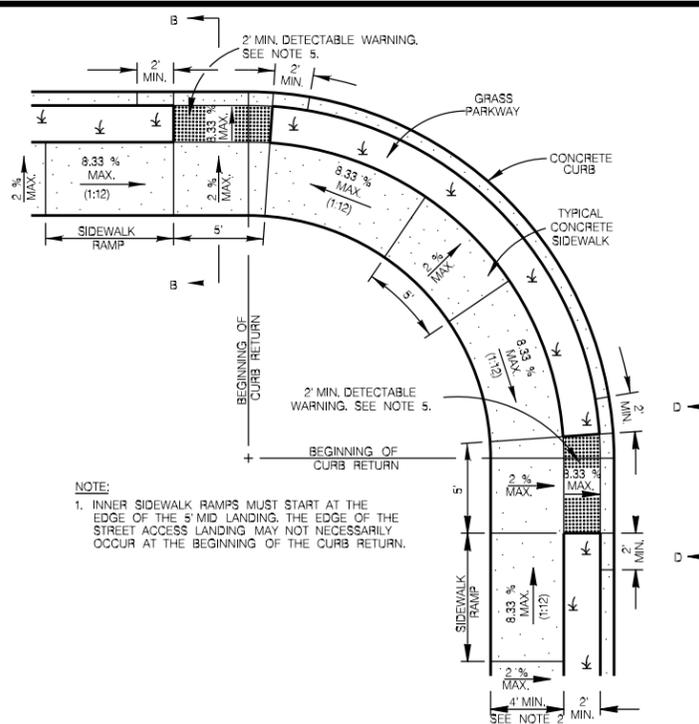
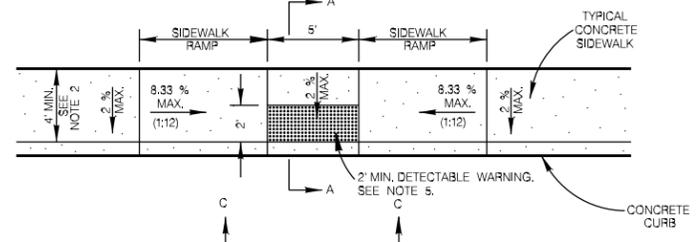
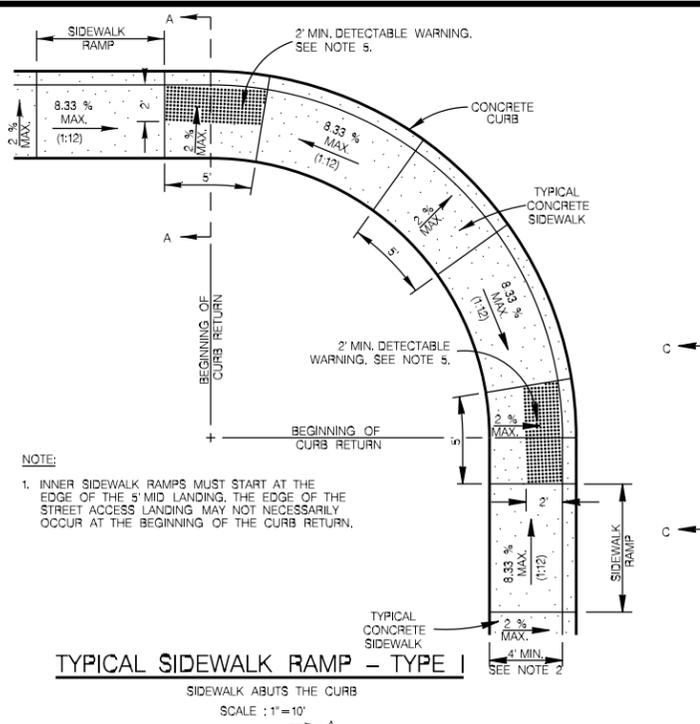
MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

CONCRETE DRIVEWAY STANDARDS

NO. SUBMITTAL	PROJECT NO.:	DATE:
DRAWN BY: V. VASQUEZ	DESIGN BY:	CHECKED BY: R.S. HOSSAINI, P.E.

SHEET NO. 15 OF 40



- GENERAL NOTES**
- WHEN POSSIBLE SIDEWALKS SHOULD BE PLACED NEXT TO THE PROPERTY LINE, ALLOWING A MINIMUM OF 1 FOOT BUFFER. DEVIATION OF THE PATHWAY FROM A STRAIGHT LINE IS ENCOURAGED TO AVOID TREES OR OTHER OBSTRUCTIONS.
 - FOR LOCAL TYPE "A" STREETS, SIDEWALKS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF 4' AND IF SEPARATED FROM THE CURB, THE SIDEWALK SHALL BE LOCATED A MINIMUM OF 2' FROM THE BACK OF CURB.
 - FOR OTHER THAN LOCAL TYPE "A" STREETS, SIDEWALKS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF 4' AND SEPARATED A MINIMUM OF 2' FROM THE BACK OF CURB OR AS AN OPTION, THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 6' WHEN LOCATED AT THE BACK OF CURB.
 - SIDEWALK RAMP LENGTHS PRESENTED IN TABLE 1 ARE GUIDELINES ONLY. SIDEWALK RAMP LENGTHS SHALL BE OF SUFFICIENT LENGTH TO MAINTAIN 8.33% (1:12) MAXIMUM SLOPE.
 - ALL CURB-RAMPS OR LANDINGS ABUTTING THE CROSSWALK SHALL HAVE A DETECTABLE WARNING 24 INCHES DEEP (IN THE DIRECTION OF PEDESTRIAN TRAVEL) AND EXTENDING THE FULL WIDTH OF THE CURB RAMP OR LANDING. THE DETECTABLE WARNING SHALL CONSIST OF RAISED TRUNCATED DOMES, ALIGNED IN A GRID PATTERN WITH A DIAMETER OF A NOMINAL 0.9 INCHES (23 MM) A HEIGHT OF NOMINAL 0.2 INCHES (5 MM) AND A CENTER-TO-CENTER SPACING OF NOMINAL 2.35 INCHES (60 MM). THE DETECTABLE WARNING SURFACE SHALL BE A CAST-IN-PLACE TILE CONFORMING TO THE CITY OF SAN ANTONIO STANDARD SPECIFICATIONS OR PAVERS CONFORMING TO TxDOT STANDARD PED-05, PEDESTRIAN FACILITIES.
 - DETECTABLE WARNINGS SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT. THE MATERIAL USED TO PROVIDE CONTRAST SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE.
 - SIDEWALK RAMP TYPE V SHALL BE USED ONLY WHERE THERE IS SIGNIFICANT RESTRICTION WITHIN THE PARKWAY TO CONSTRUCT TYPE I OR TYPE III RAMPS.
 - CONSTRUCTION OF ALL WHEELCHAIR RAMPS TO BE INCLUDED UNDER ITEMS "500 - CONCRETE CURB, GUTTER, AND CONCRETE CURB AND GUTTER" AND "/OR "502 - CONCRETE SIDEWALKS". RAMP SURFACE SHALL BE BRUSH FINISHED.
 - THESE DETAILS ARE FOR REFERENCE ONLY. ACTUAL LOCATIONS OF WHEELCHAIR RAMPS TO BE SHOWN ON CONSTRUCTION PLANS. CITY CONSTRUCTION INSPECTOR CAN ADJUST LOCATIONS FOR SAFETY OR UTILITY CLEARANCE.
 - SIDEWALKS LESS THAN 5 FEET IN WIDTH SHALL BE PROVIDED WITH A PASSING SPACE AT A MAXIMUM SPACING OF 200 FEET.
 - WHEELCHAIR RAMP SHALL BE CONSTRUCTED WITH 4" CLASS "A" CONCRETE AND 2" MINIMUM GRAVEL, CRUSHED ROCK OR FLEXIBLE BASE MATERIAL.
 - REINFORCING STEEL SHALL BE #3 BARS AT 18" O.C.E.W. OR 6" x 6" - W2.9 x W2.9 WIRE MESH.
 - SIDEWALK GRADES SHALL NOT EXCEED THE GRADE ESTABLISHED FOR THE ADJACENT ROADWAY, ANY SIDEWALK CONSTRUCTION THAT DEVIATES FROM THE NATURAL GRADE OF THE ROADWAY TO CREATE A GRADE STEEPER THAN THE EXISTING ROADWAY WILL REQUIRE RAMPS, HANDRAILS AND RESTING PLATFORMS TO BE CONSTRUCTED IN ACCORDANCE WITH ADA AND TAS STANDARDS.
 - SIDEWALK CROSS GRADE SHALL HAVE A MAXIMUM SLOPE OF 2%. LANDINGS SHALL HAVE A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.
 - THE CHANGE OF GRADE BETWEEN ADJACENT SURFACES SHALL BE LESS THAN 11%. THE CHANGE OF GRADE SHALL BE DEFINED AS THE ALGEBRAIC DIFFERENCE OF THE ADJACENT SURFACE SLOPES. IN THE CASE OF A STREET ACCESS RAMP DESIGNED AT A 8.33% MAXIMUM SLOPE, THE ADJACENT PAVEMENT CROSS SLOPE SHALL BE LESS THAN 2.67% (I.E. 8.33 - (-2.67) = 11). IN ADDITION, THE ADJACENT PAVEMENT CROSS SLOPE SHALL BE LESS THAN OR EQUAL TO 5%.
 - IF THE CHANGE OF GRADE BETWEEN ADJACENT SURFACES IS GREATER THAN OR EQUAL TO 11%, A LEVELING STRIP, 2 FEET IN LENGTH, SHALL BE PROVIDED TO TRANSITION THE ADJACENT SURFACES.
 - ADA COMPLIANCE IN ALTERATIONS INCLUDE ONLY THAT WORK WITHIN THE LIMITS, BOUNDARIES OR SCOPE OF A PLANNED PROJECT.

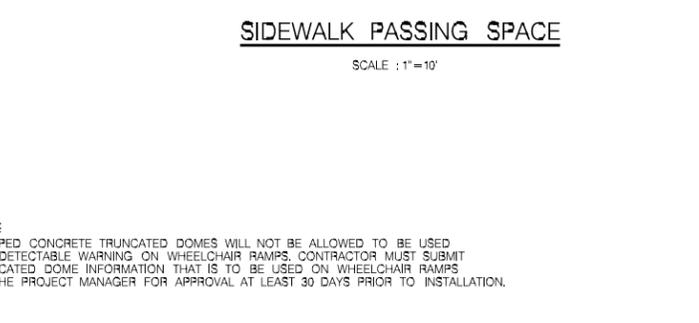
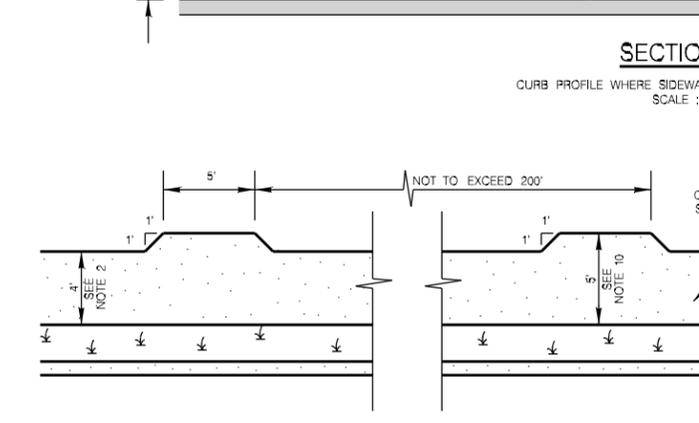
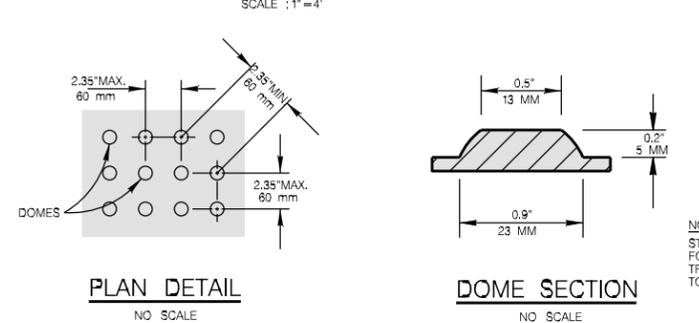
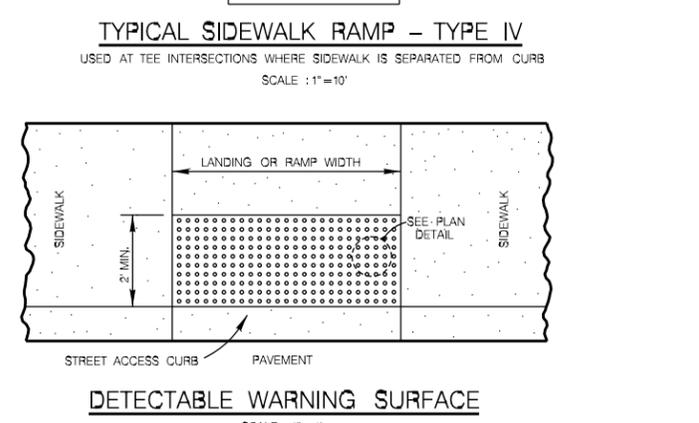


TABLE 1
(SEE NOTE 4)

GUTTER SLOPE	SIDEWALK RAMP LENGTH (1:12)	
	LOW SIDE	HIGH SIDE
1%	5'-6"	7'-2"
2%	5'-0"	8'-4"
3%	4'-6"	10'-0"
4%	4'-2"	12'-8"
5%	3'-10"	16'-8"

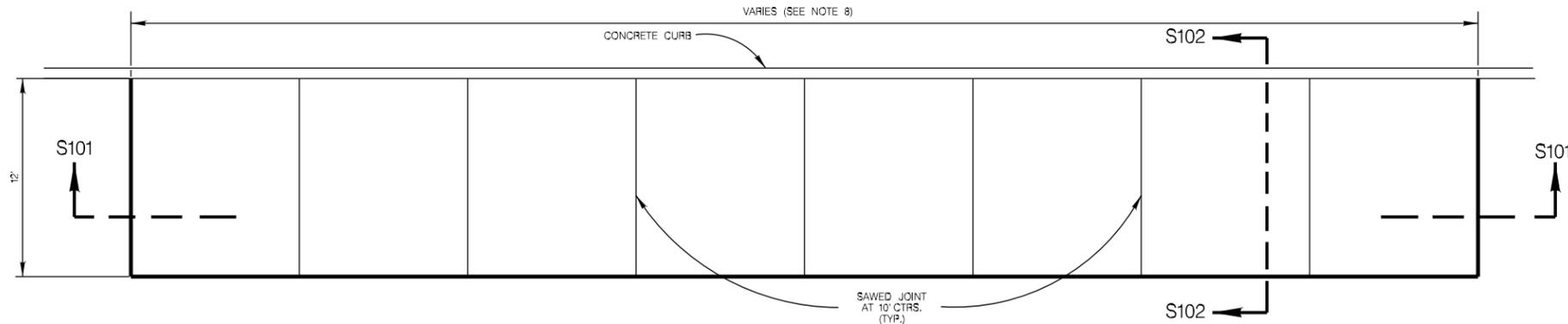
MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

WHEELCHAIR RAMP STANDARDS

DATE: _____
PROJECT NO.: _____
SUBMITTAL: _____
DRAWN BY: V. VAZQUEZ
DESIGN BY: _____
CHECKED BY: R. S. HOSSEINI, P.E.
SHEET NO. 16 OF 60

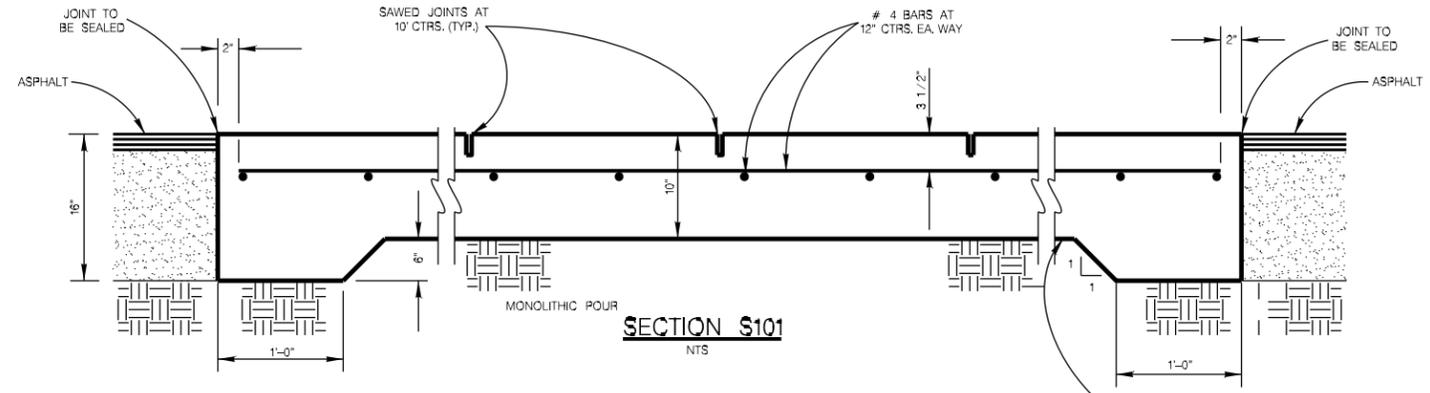
NOTE:
STAMPED CONCRETE TRUNCATED DOMES WILL NOT BE ALLOWED TO BE USED FOR DETECTABLE WARNING ON WHEELCHAIR RAMPS. CONTRACTOR MUST SUBMIT TRUNCATED DOME INFORMATION THAT IS TO BE USED ON WHEELCHAIR RAMPS TO THE PROJECT MANAGER FOR APPROVAL AT LEAST 30 DAYS PRIOR TO INSTALLATION.



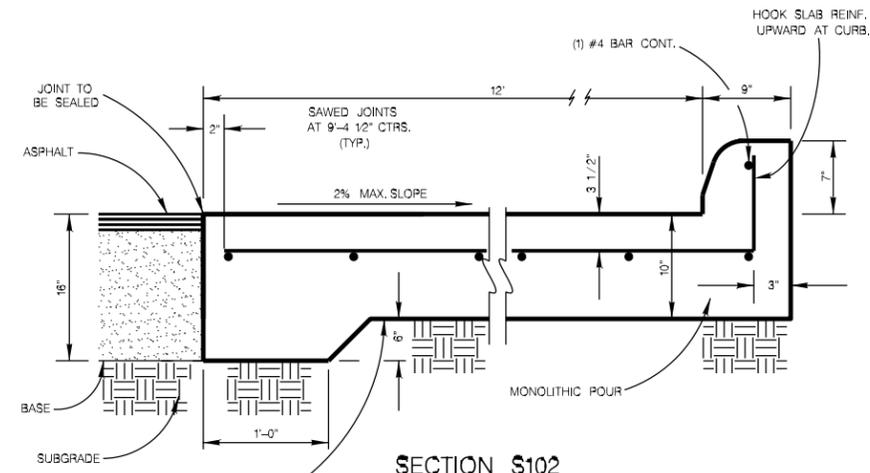
PLAN VIEW
NTS

GENERAL NOTES

1. ALL CONCRETE SHALL TEST 4,000 P.S.I. AT 28 DAYS.
2. BUS STOP CONCRETE PAD CONSTRUCTION SHALL BE PAID UNDER ITEM 209 AT THE UNIT PRICE BID, WHICH PRICE SHALL BE FULL COMPENSATION FOR ALL DEMOLITION, REMOVAL OF EXISTING CURB, EXCAVATION, HAULING, CRUSHED LIMESTONE, REINFORCING STEEL, CONCRETE CURB, JOINTS, AND INCIDENTALS NECESSARY TO COMPLETE THE WORK.
3. BUS PAD AND CURB SHALL BE MONOLITHICALLY POURED, ALL EXISTING CURBING SHALL BE REMOVED AND REPLACED AS PER STANDARD DETAILS.
4. THE CONTRACTOR SHALL CONSTRUCT AN EXPANSION JOINT MIDWAY IF THE "CONCRETE BUS STOP PAD" IS LONGER THAN 150 FEET. NO DIRECT PAYMENT SHALL BE MADE FOR CONSTRUCTION OF AN EXPANSION JOINT.
5. ACTUAL BUS PAD LENGTH AND WIDTH TO BE FIELD DETERMINED BY CITY ENGINEER OR HIS DESIGNATED REPRESENTATIVE.
6. DO NOT DRIVE ON PAD UNTIL CONCRETE HAS REACHED A STRENGTH OF 2,800 P.S.I.
7. BREAK TEST CYLINDERS AS FOLLOWS:
2 AT 3 DAYS
2 AT 7 DAYS
2 AT 28 DAYS
8. CONCRETE BUS PAD LENGTH (OR AS SHOWN ON THE PLANS):
30 M.P.H. - 100'
35 M.P.H. - 160'
40 M.P.H. - 160'
45 M.P.H. - 200'



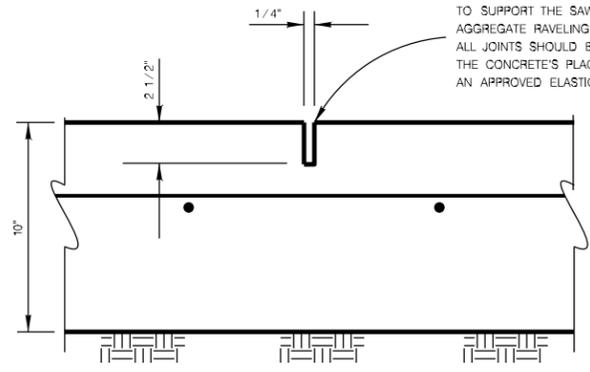
SECTION S101
NTS



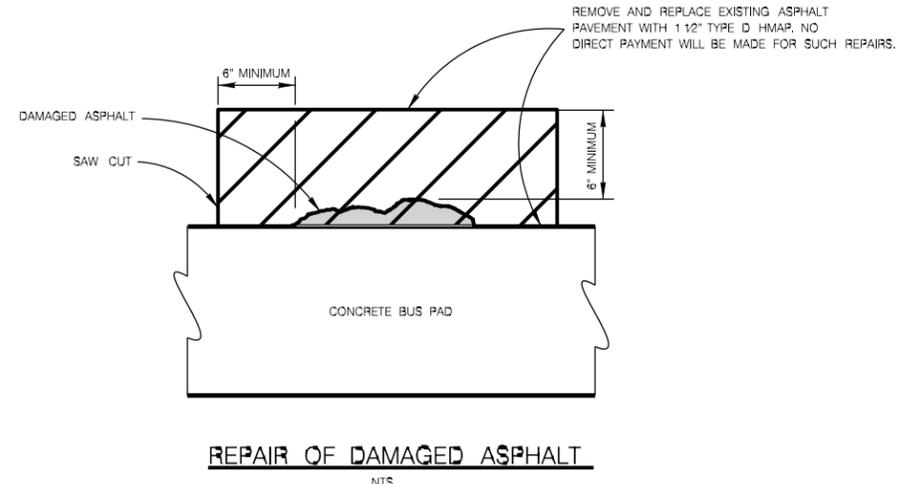
SECTION S102
NTS

SAWCUT AS SOON AS THE CONCRETE IS STRONG ENOUGH TO SUPPORT THE SAWING EQUIPMENT AND TO PREVENT AGGREGATE RAVELING DURING THE SAWING OPERATION. ALL JOINTS SHOULD BE SAW CUT WITHIN 12 HOURS OF THE CONCRETE'S PLACEMENT. JOINTS SHALL BE FILLED WITH AN APPROVED ELASTIC TYPE MATERIAL AFTER SAW CUTTING.

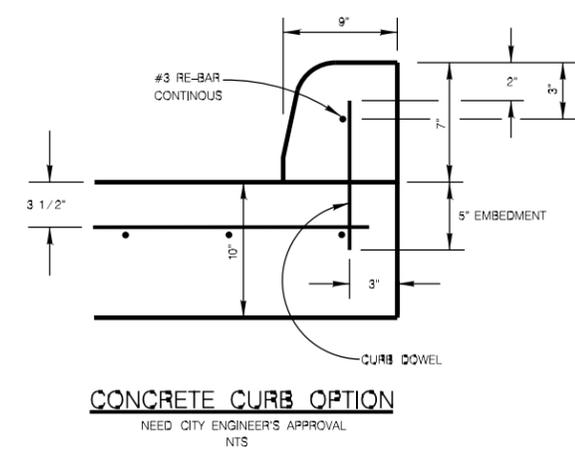
PROOFROLL EXISTING SUBGRADE WITH BACKHOE OR SIMILAR EQUIPMENT TO LOCATE POTENTIAL SOFT REGIONS OF SUBGRADE. REPLACE SOFT AREAS WITH 12" OF SUITABLE MATERIAL.



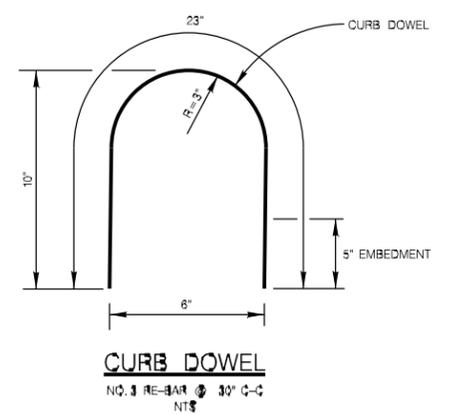
SAWED JOINT DETAIL
NTS



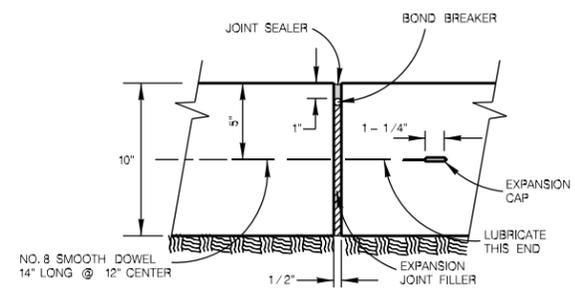
REPAIR OF DAMAGED ASPHALT
NTS



CONCRETE CURB OPTION
NEED CITY ENGINEER'S APPROVAL
NTS



CURB DOWEL
NO. 3 RE-BAR @ 30" C-C
NTS



EXPANSION JOINT DETAIL
SCALE: 1" = 1'

NOTE:
THE CONTRACTOR SHALL CONSTRUCT AN EXPANSION JOINT MIDWAY IF THE "CONCRETE BUS STOP PAD" IS LONGER THAN 150 FEET. NO DIRECT PAYMENT SHALL BE MADE FOR CONSTRUCTION OF AN EXPANSION JOINT.

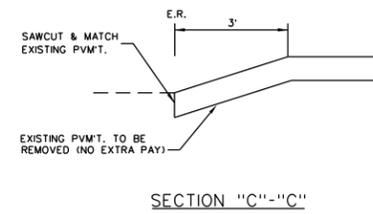
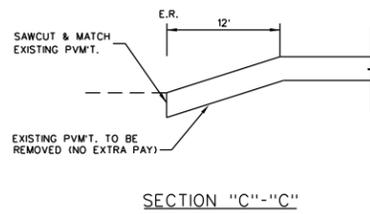
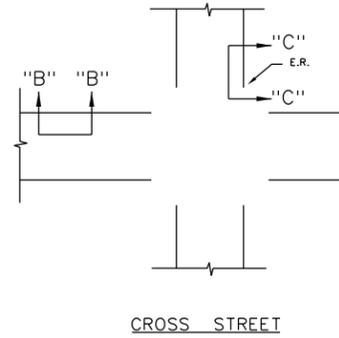
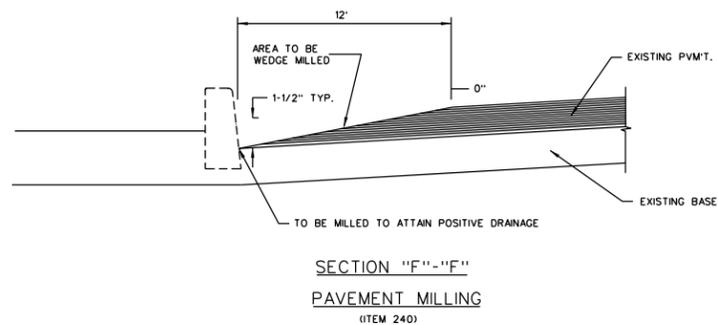
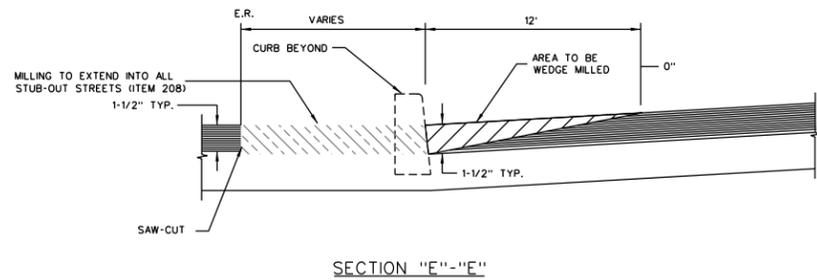
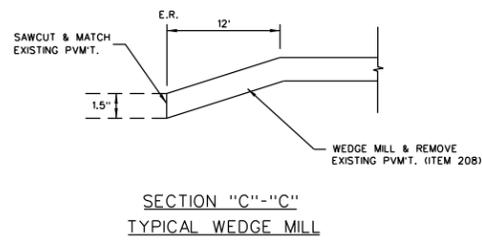
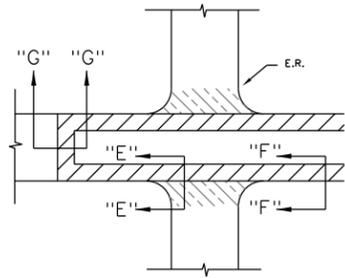
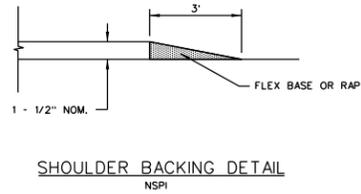
MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

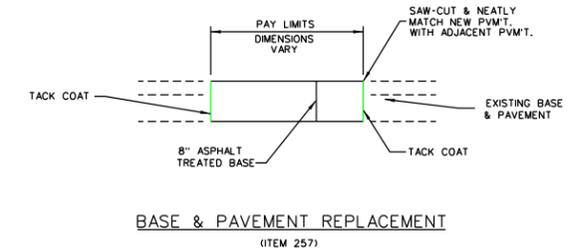
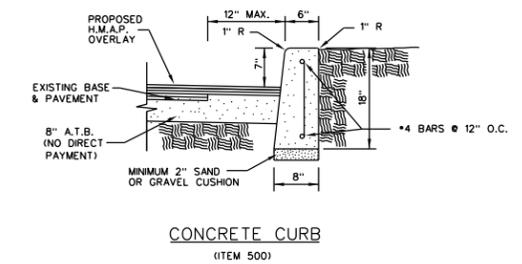
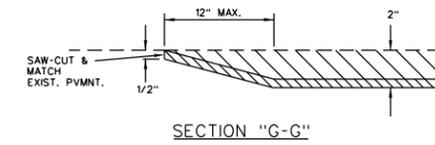
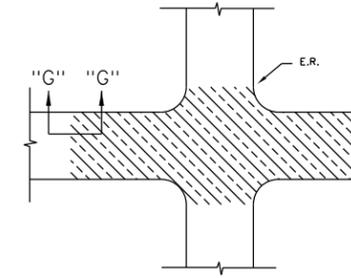
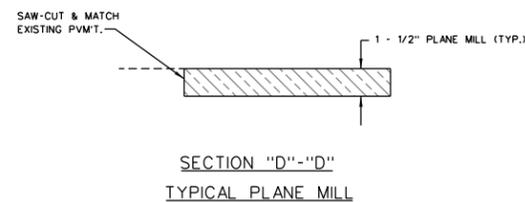
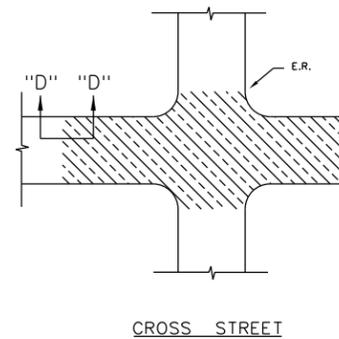
**CONCRETE
BUS STOP PAD**

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: V. VASQUEZ	DSGN. BY: L. MALTOS	CHKD. BY: R.S. HOSEINI, P.E.

SHEET NO.: 17 OF 40



TYPICAL BUTT JOINT



LEGEND

-  OVERLAY
-  WEDGE MILL (ITEM 208)
-  PLANE MILL (ITEM 208)

NOTES

1. FOR RECYCLE PROJECT, MILL DEPTH IS 1"
2. HOT PAVER LAID MICRO SURFACE MILL ONLY FOR DRAINAGE AND BUTT JOINTS.

CITY OF SAN ANTONIO, TEXAS
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

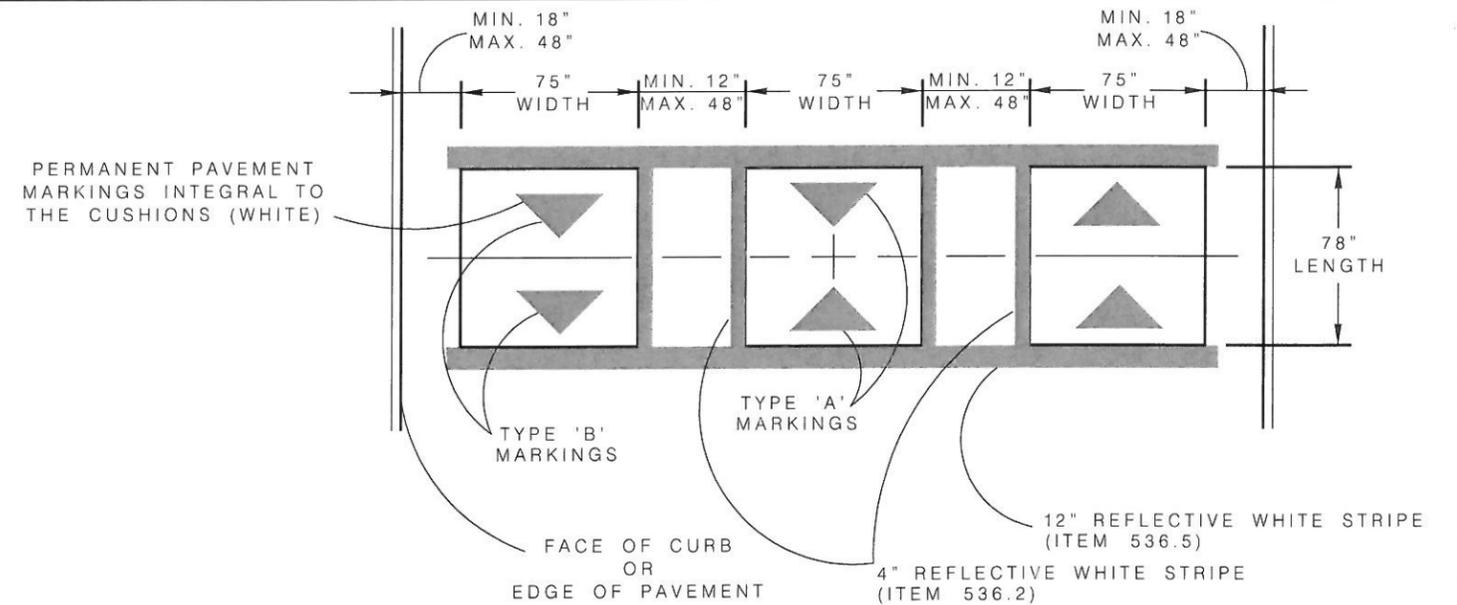
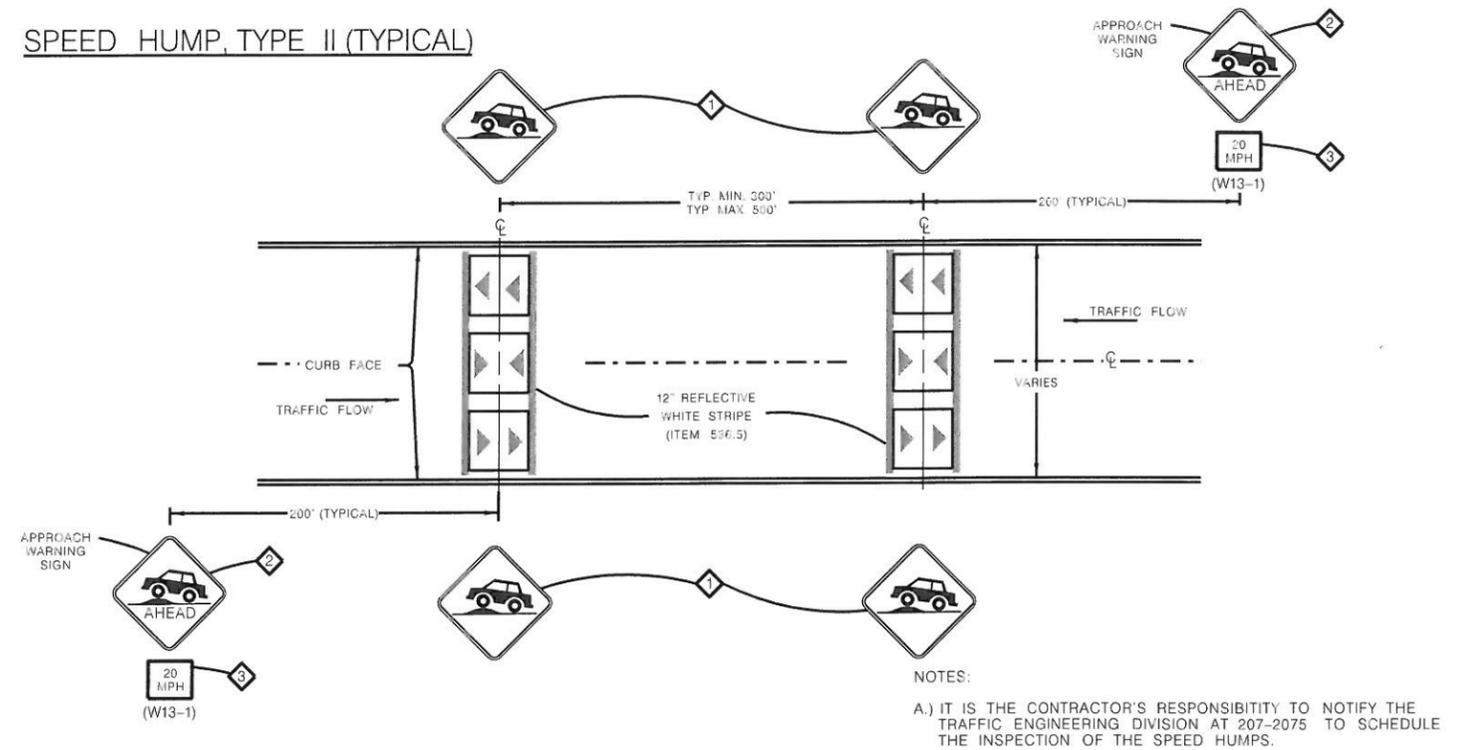
DETAIL SHEET

DRAWN BY:	DATE:	REVISIONS:	SCALE: SEE ABOVE
CHECKED BY:			DATE:
			SHEET: 18 OF 60

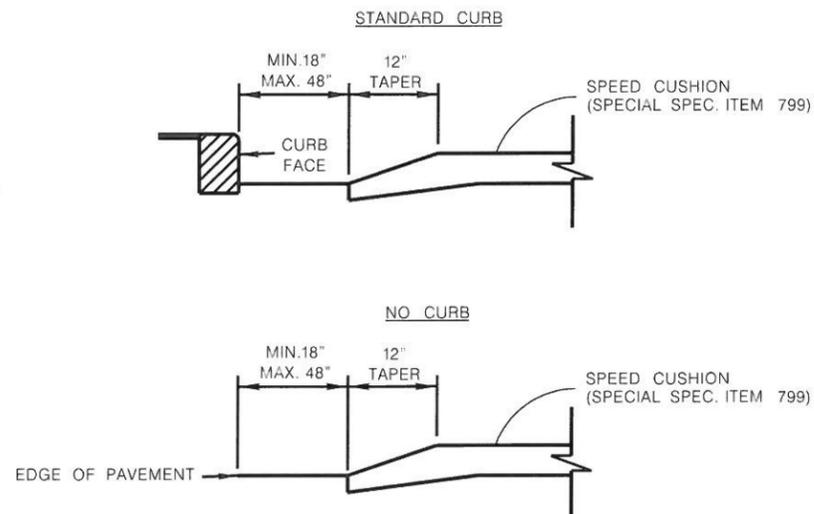
GENERAL NOTES

1. SPEED HUMPS WILL BE CONSTRUCTED AT LOCATIONS DESIGNATED BY THE TRAFFIC ENGINEERING DIVISION.
2. SPEED HUMPS, TYPE II SHALL BE COMPRISED OF MODULAR RUBBER CUSHIONS AS OUTLINED IN SPECIAL SPECIFICATION ITEM 799.
3. CONTRACTOR SHALL CONTACT THE CONSTRUCTION COORDINATOR AT 207-2075 BEFORE ANY STREET IS TEMPORARILY CLOSED FOR CONSTRUCTION.
4. THE DISTANCE BETWEEN SPEED HUMPS WILL BE DETERMINED BY THE TRAFFIC ENGINEERING DIVISION.
5. TRAFFIC ENGINEERING DIVISION WILL IDENTIFY THE LOCATIONS OF ALL SIGNS RELATED TO THE SPEED HUMPS.
6. NO PART OF A SPEED HUMP SHALL BE LOCATED IN FRONT OF A DRIVEWAY APPROACH, RATHER THEY SHOULD BE A MINIMUM OF 6 FEET FROM THE EDGE OF DRIVEWAY, WHEN PRACTICAL.
7. SEE TRAFFIC SIGN DETAILS FOR INFORMATION ON 1 2 3
8. SPEED HUMPS SHOULD BE PLACED AS CLOSE AS POSSIBLE TO PROPERTY LINES INSTEAD OF MID-LOT, WHERE PRACTICAL.
9. SPEED HUMPS SHOULD BE INSTALLED AT A RIGHT ANGLE TO THE CENTERLINE TANGENT OF THE ROADWAY.
10. TRAFFIC CONTROL CONSISTING OF SIGNS AND MARKINGS SHALL BE PROVIDED TO ADVISE ROADWAY USERS OF A SPEED HUMP'S PRESENCE AND TO GUIDE THERE SUBSEQUENT ACTIONS. TRAFFIC SIGNS AND PAVEMENT MARKINGS SHALL CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES(TMUTCD).
11. ALL SIGNS AND MARKINGS WILL BE PROVIDED AND INSTALLED BY THE CONTRACTOR AS PER ITEM 531, 533, 536.2, 536.5.
12. CONTRACTOR SHALL NOT OPEN SPEED HUMP TO TRAFFIC UNTIL ALL REQUIRED WARNING SIGNS AND MARKINGS ARE COMPLETE.
13. CONTRACTOR WILL MAINTAIN TEMPORARY MARKINGS UNTIL PERMANENT MARKINGS ARE INSTALLED.
14. CONTRACTOR WILL CHECK WITH TRAFFIC OPERATIONS FOR THE SPECIFICATIONS ON THE SIGN EMBLEM AND THE SPEED HUMP MARKINGS AT 207-3951.
15. CONTRACTOR SHALL COMPLETE THE CUSHION INSTALLATION TO FORM ONE COMPLETE HUMP BEFORE LEAVING THE JOBSITE.
16. CONTRACTOR SHALL WORK ONE HALF OF THE STREET AT A TIME AND MAINTAIN TWO-WAY TRAFFIC WITH CERTIFIED FLAGGERS.
17. ROADWAYS 36' WIDE OR WIDER, MINIMUM CURB TO CUSHION EDGE SHALL BE 48"

SPEED HUMP, TYPE II (TYPICAL)



EDGE DETAIL



PAVEMENT WIDTH (FT)	NO. OF CUSHIONS	GAP (IN)	CUSHION (IN)	GAP (IN)								
30	3	33.5	75	34	75	34	75	33.5	-	-	-	-
36	4	48	75	12	75	12	75	12	75	48	-	-
40	4	48	75	28	75	28	75	28	75	48	-	-
44	4	48	75	44	75	44	75	44	75	48	-	-

* REFER TO SHEET 2 OF 2 FOR ADDITIONAL STREET WIDTHS

CITY OF SAN ANTONIO, TEXAS DEPARTMENT OF PUBLIC WORKS TRAFFIC ENGINEERING DIVISION SPEED HUMP, TYPE II				1 of 2
No: 1 DATE: 12.5.02 REVISION: MARKINGS DRAWN: JB CHECKED: KB APPR: KB	No: 2 DATE: 2.21.03 REVISION: LOCATION DETAIL DRAWN: JB CHECKED: KB APPR: KB	No: 3 DATE: 8.26.03 REVISION: GENERAL NOTES DRAWN: JB CHECKED: KB APPR: KB	No: 4 DATE: 6.30.05 REVISION: DETAIL DRAWN: DH CHECKED: KB APPR: KB	No: 5 DATE: 3.22.11 REVISION: SPACING CHARTS DRAWN: GT CHECKED: KB APPR: KB
UPDATE BY: W. THORPE MAR 2011 APPR. BY: K. M. BUCKALEW JUN 2002 OSCHLBY: K. M. BUCKALEW JUN 2002 CHKD. BY: K. BUCKALEW MAR 2011		APPR. BY: J. M. BUCKALEW JUN 2002 TRAFFIC DESIGN ENGINEER APRR. BY: JUN 2002		REF. NO.: SCALE: NTS PLAN NO.: 19

TYPICAL INSTALLATION PROCEDURE FOR MODULAR RUBBER CUSHION

1. LAY OUT PIECES FOR THE CUSHION (REFER TO MODULAR RUBBER CUSHION SPEED HUMP MARKINGS SHEETS AND TO SPEED HUMP CUSHION SPACING CHART). PLACE THE ANGLE IRONS IN THE INDENTATION/GROOVE OF THE CUSHION. ALL JOINTS BETWEEN PIECES SHOULD BE TIGHTLY JOINED. THE ARROW MARKINGS ON THE RAMP PIECES SHOULD FACE THE CORRECT DIRECTION ON THE STREET (ARROWS POINT IN THE DIRECTION OF TRAFFIC)
2. SLIDE THE CORNER AND THE TWO CENTER RAMP PIECES OUT TO EXPOSE THE HOLES IN THE ANGLE IRONS.
3. DRILL THROUGH THE ANGLE IRON HOLES TO A DEPTH OF 4 INCHES INTO THE PAVEMENT.
4. BLOW ALL DEBRIS OUT OF HOLES.
5. INSERT TWO (2) PUMPS OF RESIN INTO EACH HOLE FOLLOWED BY A FLAT, TORQUE HEAD BOLT AND PLASTIC ANCHOR (ASSEMBLE THE BOLT AND ANCHOR AND HAMMER IN IMMEDIATELY AFTER PLACING RESIN BECAUSE THE RESIN WILL SET QUICKLY IN BOTH THE HOLE AND RESIN GUN - APPROX. 2-4 MINUTES)
6. USE IMPACT WRENCH TO DRILL BOLTS INTO THE ANGLE IRON. DO NOT OVER IMPACT BOLTS BECAUSE STRIPPING WILL OCCUR.
7. REPLACE CORNER PIECES AND TWO CENTER RAMP PIECES.
8. DRILL THE PAVEMENT APPROX. 7 INCHES THROUGH EACH OF THE HOLES IN THE CUSHION PIECES (4 INCHES INTO PAVEMENT).
9. BLOW ALL DEBRIS OUT OF HOLES.
10. INSERT TWO (2) PUMPS OF RESIN INTO EACH HOLE FOLLOWED BY A HEX HEAD BOLT, WASHER AND PLASTIC ANCHOR (ASSEMBLE THE WASHER, BOLT, AND ANCHOR THEN HAMMER IN THE HOLE IMMEDIATELY AFTER PLACING RESIN BECAUSE THE RESIN WILL SET QUICKLY IN BOTH THE HOLE AND RESIN GUN - APPROX. 2-4 MINUTES)
11. USE IMPACT WRENCH TO DRILL BOLTS INTO THE CUSHION PIECES. DO NOT OVER TIGHTEN BOLTS BECAUSE STRIPPING WILL OCCUR.
12. INSERT RUBBER PLUGS.
13. BOLT INSTALLATIONS SHALL BE VERIFIED BY THE INSPECTOR BEFORE THE RUBBER PLUGS ARE INSTALLED.

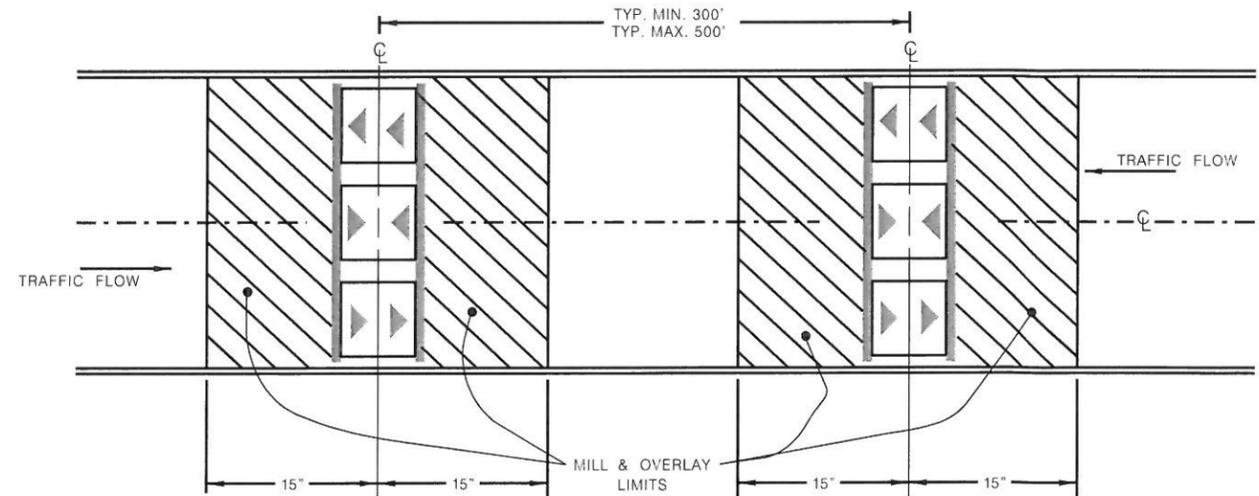
SPEED CUSHION SPACING

Pavement Width (ft)	Pavement Width (in)	No. of Cushions	Gap (in)	Cushion (in)	Gap (in)								
20	240	2	30	75	30	75	30						
21	252	2	34	75	34	75	34						
22	264	2	39	75	36	75	39						
23	276	2	45	75	36	75	45						
24	288	2	48	75	42	75	48						
25	300	2	51	75	48	75	51						
26	312	3	21.5	75	22	75	22	75	21.5				
27	324	3	24	75	25.5	75	25.5	75	24				
28	336	3	27.5	75	28	75	28	75	27.5				
29	348	3	30.5	75	31	75	31	75	30.5				
30	360	3	33.5	75	34	75	34	75	33.5				
31	372	3	37.5	75	36	75	36	75	37.5				
32	384	3	40.5	75	39	75	39	75	40.5				
33	396	3	42.5	75	43	75	43	75	42.5				
34	408	3	45.5	75	46	75	46	75	45.5				
35	420	3	48	75	49.5*	75	49.5*	75	48				
36	432	4	48	75	12	75	12	75	12	75	48		
37	444	4	48	75	16	75	16	75	16	75	48		
38	456	4	48	75	20	75	20	75	20	75	48		
39	468	4	48	75	24	75	24	75	24	75	48		
40	480	4	48	75	28	75	28	75	28	75	48		
41	492	4	48	75	32	75	32	75	32	75	48		
42	504	4	48	75	36	75	36	75	36	75	48		
43	516	4	48	75	40	75	40	75	40	75	48		
44	528	4	48	75	44	75	44	75	44	75	48		

* INDICATES THAT MEASUREMENTS ARE ABOVE MAX. SPACING

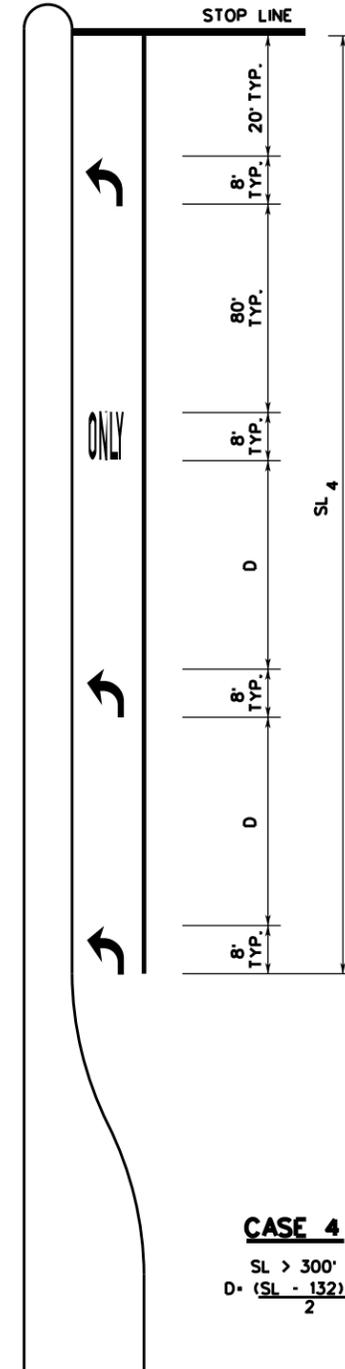
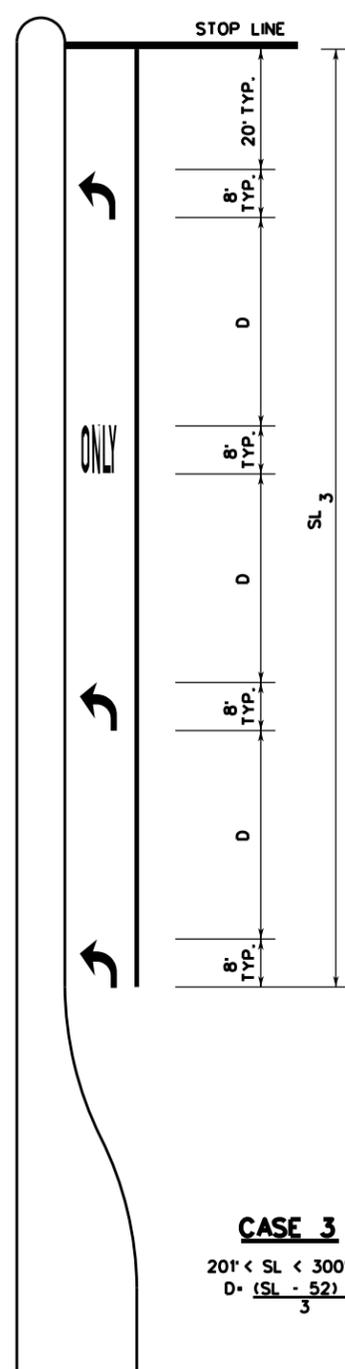
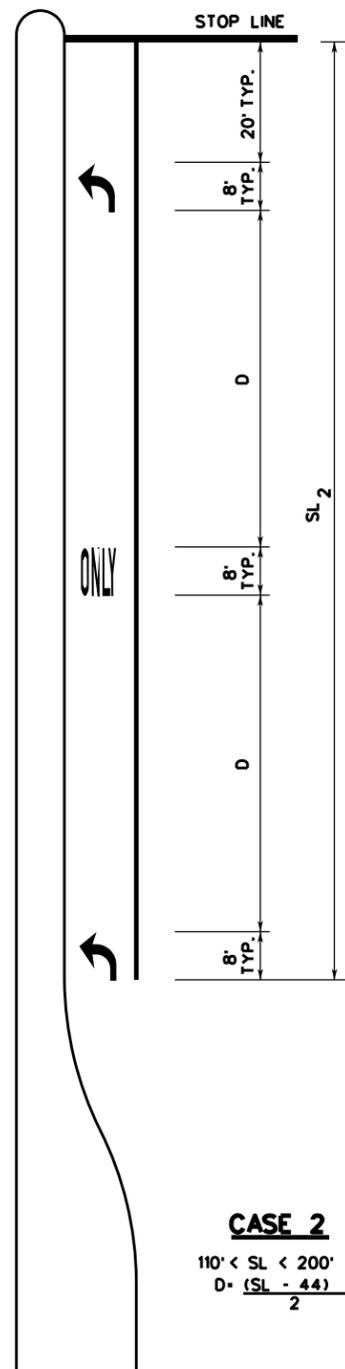
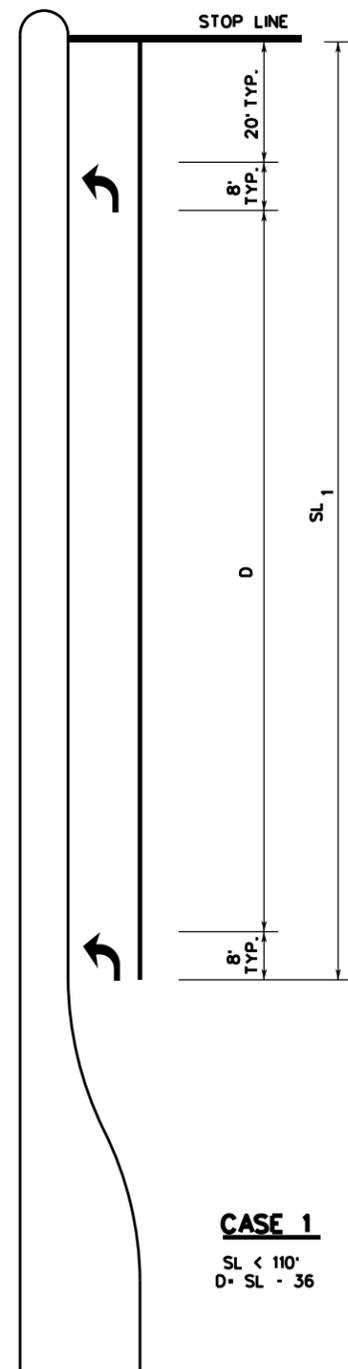
PROCEDURE FOR PICKING UP SPEED HUMP MATERIAL AT COSA FACILITY

1. THE SPEED HUMP MATERIAL WILL BE STORED AT THE TRAFFIC OPERATIONS FACILITY AT 223 S. CHERRY ST., SAN ANTONIO, TX 78203.
2. SPEED HUMP MATERIAL MAY ONLY BE COLLECTED DURING THE WEEKDAY BETWEEN THE HOURS OF 7:30AM AND 4:30PM.
3. CONTRACTOR WILL CONTACT SPEED HUMP COORDINATOR, KENNARD GIVENS AT 215-5127 AT LEAST 24 HOURS IN ADVANCE TO SCHEDULE A TIME TO PICK UP THE MATERIAL.
4. INSPECTOR MUST BE PRESENT WHEN MATERIAL IS COLLECTED.



MILL AND OVERLAY LIMITS

CITY OF SAN ANTONIO, TEXAS DEPARTMENT OF PUBLIC WORKS TRAFFIC ENGINEERING DIVISION SPEED HUMP, TYPE II				2 of 2
DRAWN BY: RC OSGL BY: _____ CHKD. BY: _____	MAY 2004 APPR. BY: _____ TRAFFIC DESIGN ENGINEER	REF. NO.: _____ SCALE: NTS	PLAN NO. 20	



KEY:

SL - STORAGE LENGTH (FEET)

D - DISTANCE BETWEEN ARROWS AND LEGENDS (FEET)

GENERAL NOTES:

1. THESE DETAILS ALSO APPLY TO RIGHT-TURN LANES.
2. FOR DUAL-TURN LANES, DIMENSIONS SHALL BE THE SAME FOR EACH LANE.
3. SL DIMENSION IS FROM STOP LINE TO END OF TURN LANE, WHICH DOES NOT INCLUDE TAPER LENGTH.
4. PAVEMENT ARROWS AND "ONLY" LEGEND MARKINGS ARE TYPICALLY USED AT SIGNALIZED INTERSECTIONS AND AT UNSIGNALIZED INTERSECTIONS WHERE A DEMONSTRATED NEED EXISTS.
5. MINIMUM SL = 110'. SL MAY BE LESS THAN 110 FEET AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

SEPTEMBER 2009

CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS

LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET

SHEET 1 OF 16

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.
		SHEET NO.: 21 OF 60

TRUCKS NEXT YIELD MERGE EXIT STOP ONLY

9.5' (±.5) 4" 7.5' (±.5) 4" 7.0' (±.5) 4" 8.0' (±.5) 4" 6.5' (±.5) 4" 6.5' (±.5) 4" 6.0' (±.5) 4"

8" 8" 8" 8" 8" 8" 8"

8.0' (±.5)

SCHOOL SIGNAL TURN LANE ENDS PED

9.5' (±.5) 4" 8.5' (±.5) 4" 6.5' (±.5) 4" 6.5' (±.5) 4" 7.5' (±.5) 4" 5.5' (±.5) 4"

8" 8" 8" 8" 8" 8" 8"

8.0' (±.5)

ZONE AHEAD RIGHT LEFT ROUTE X-ING

6.5' (±.5) 4" 8.0' (±.5) 4" 8.5' (±.5) 4" 6.5' (±.5) 4" 8.0' (±.5) 4" 8.0' (±.5) 4"

8" 8" 8" 8" 8" 8" 8"

8.0' (±.5)

1234567890 MPH BUS

6.0' (±.5) 4" 6.0' (±.5) 4"

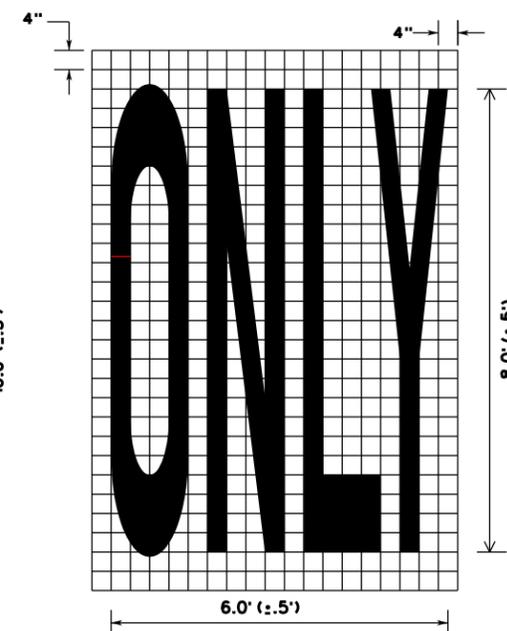
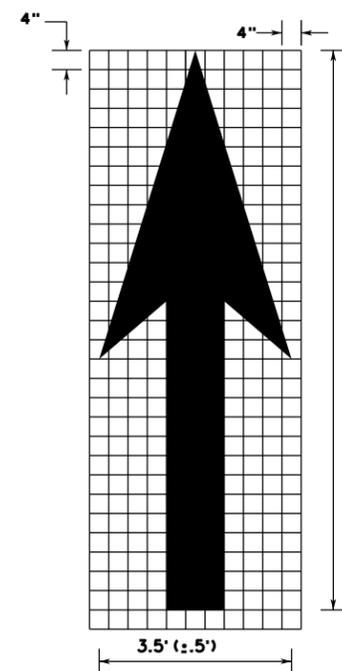
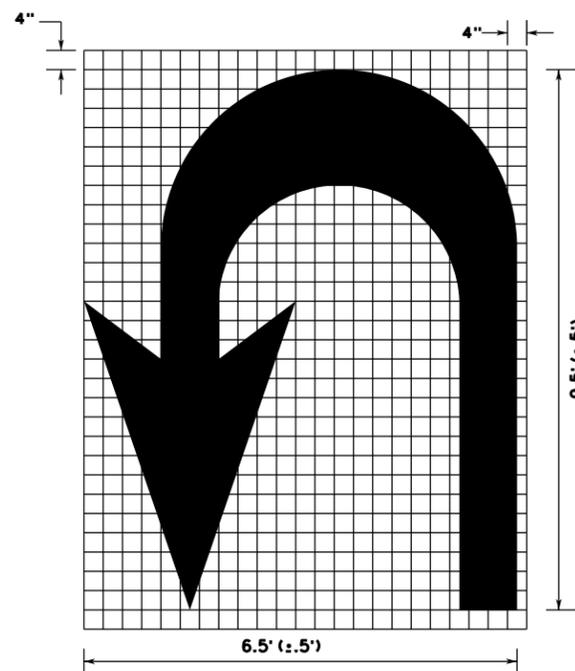
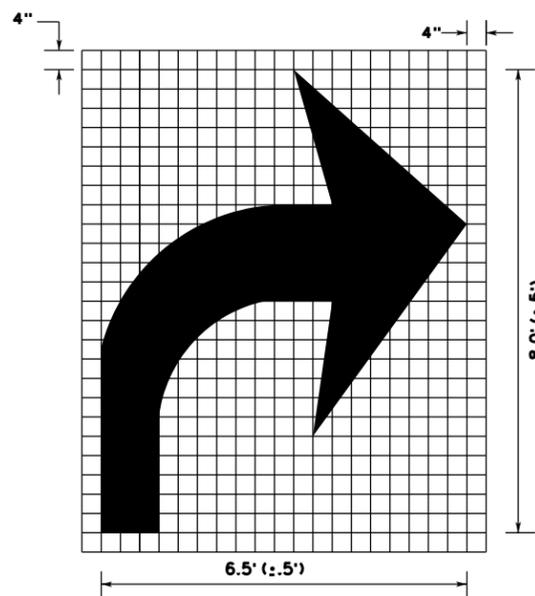
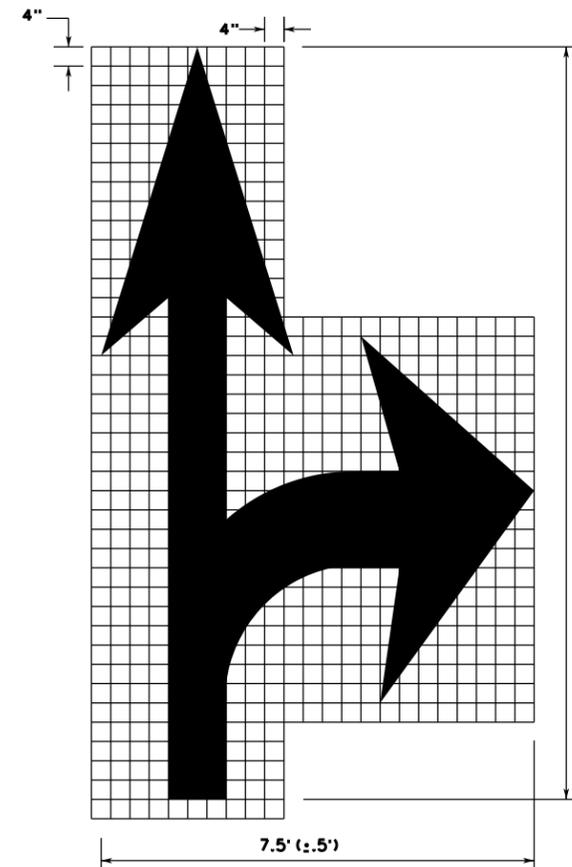
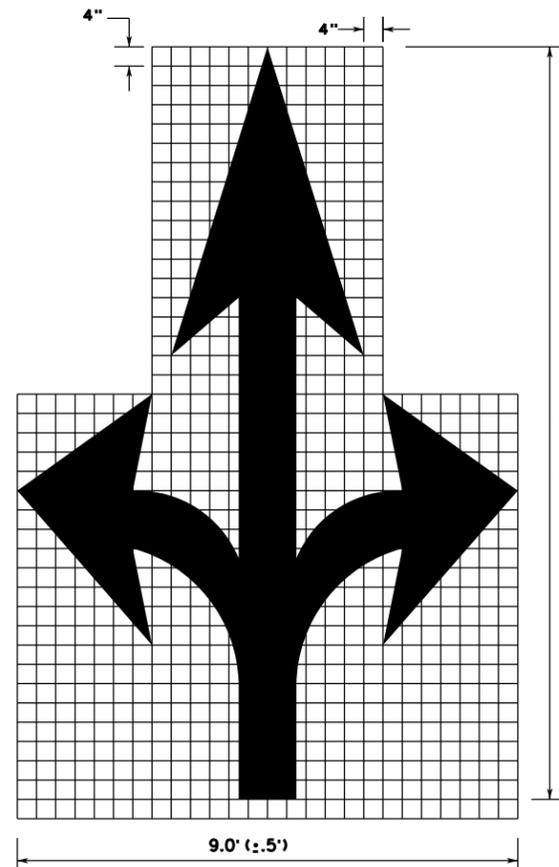
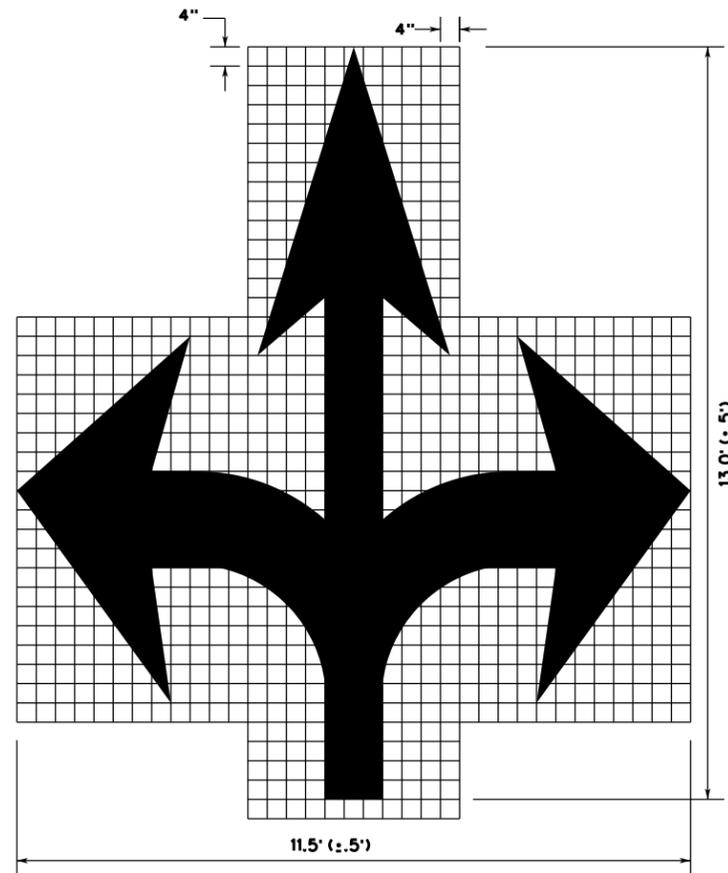
8" 8" 8"

SEPTEMBER 2009
 CITY OF SAN ANTONIO
 DEPARTMENT OF PUBLIC WORKS
 TRAFFIC ENGINEERING STANDARDS
 STANDARD PAVEMENT MARKINGS
 (WORDS)
 SHEET 2 OF 16

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.
		SHEET NO.: 22 OF 60

NOTES:

1. MINIMUM 8 FOOT WHITE MARKINGS SHALL BE USED, UNLESS OTHERWISE NOTED. IF MESSAGE CONSISTS OF MORE THAN ONE WORD, IT SHOULD BE PLACED WITH FIRST WORD NEAREST THE DRIVER.
2. THESE DETAILS ARE STANDARD SIZE FOR NORMAL INSTALLATION; SIZES MAY BE REDUCED APPROXIMATELY ONE-THIRD DEPENDING ON CONDITIONS.
3. THE LONGITUDINAL SPACE BETWEEN MARKINGS SHOULD BE 30 FEET.
4. MARKINGS CONSIDERED APPROPRIATE FOR USE WHEN WARRANTED INCLUDE THE FOLLOWING:
 - A. REGULATORY
 - STOP
 - RIGHT (LEFT) TURN ONLY
 - 25 MPH
 - SYMBOL ARROWS
 - B. WARNING
 - STOP AHEAD
 - SIGNAL AHEAD
 - SCHOOL
 - SCHOOL X-ING
 - PED X-ING
 - R X R (SEE RCPM DETAIL)
 - OTHER WORDS OR SYMBOLS MAY BE NECESSARY UNDER CERTAIN CONDITIONS
5. UNCONTROLLED USE OF PAVEMENT MARKINGS CAN RESULT IN DRIVER CONFUSION. WORD AND SYMBOL MARKINGS SHOULD BE NO MORE THAN THREE LINES.
6. THE WORD "STOP" SHALL NOT BE USED ON THE PAVEMENT UNLESS ACCOMPANIED BY A STOP LINE AND STOP SIGN. THE WORD "STOP" SHALL NOT BE PLACED ON THE PAVEMENT IN ADVANCE TO A STOP LINE, UNLESS EVERY VEHICLE IS REQUIRED TO STOP AT ALL TIMES.
7. PAVEMENT MARKINGS SHOULD GENERALLY BE NO MORE THAN ONE LANE IN WIDTH, WITH SCHOOL MESSAGES BEING THE EXCEPTION. FOR DETAILS OF SCHOOL AND SCHOOL CROSSING PAVEMENT MARKINGS, REFER TO PART VII OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".
8. SPACING BETWEEN LETTERS SHOULD BE APPROXIMATELY 4 INCHES. THE WIDTH OF LETTERS MAY VARY DEPENDING ON THE WIDTH OF THE TRAVEL LANES.
9. LANE-USE ARROW MARKINGS MAY BE USED TO CONVEY EITHER GUIDANCE OR MANDATORY MESSAGES. ARROWS USED TO CONVEY A MANDATORY MOVEMENT MUST BE ACCOMPANIED BY STANDARD SIGNS AND THE PAVEMENT MARKING WORD "ONLY".
10. PAVEMENT MARKINGS ARE TO BE LOCATED AS SPECIFIED ELSEWHERE IN THE PLANS.



SEPTEMBER 2009

CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

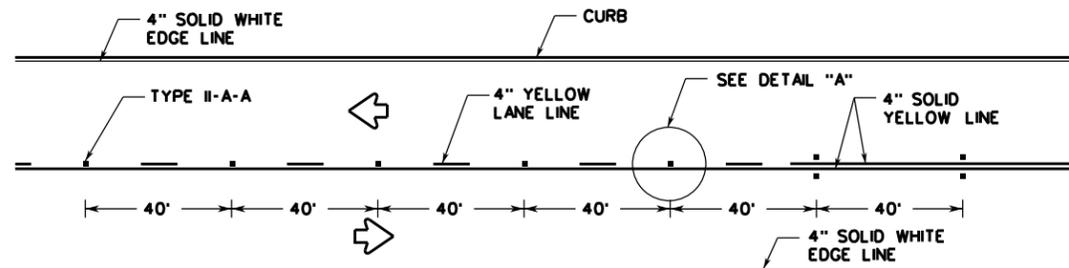
TRAFFIC ENGINEERING STANDARDS

STANDARD PAVEMENT MARKINGS
(ARROWS)

SHEET 3 OF 16

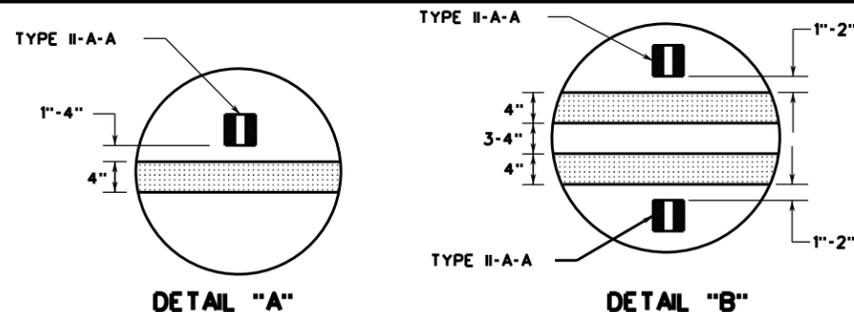
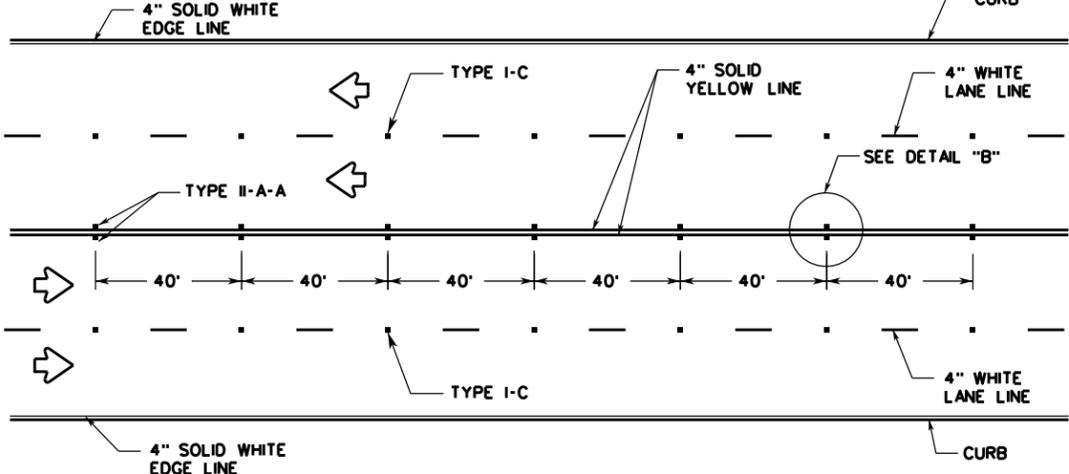
DATE:	PROJECT NO.:	% SUBMITTAL:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.

CENTERLINE & EDGE FOR ALL TWO LANE STREETS WITH PASSING ZONE

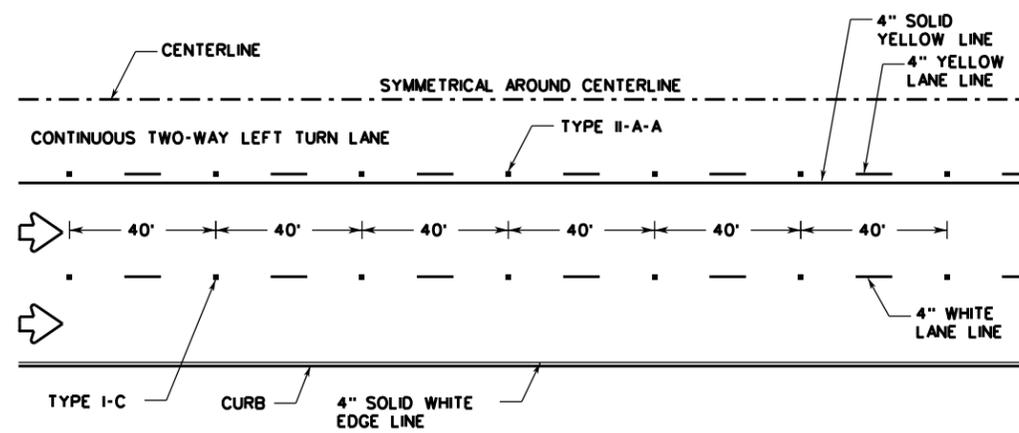


CENTERLINE, LANE LINES & EDGE LINES FOR FOUR LANE TWO-WAY STREETS

RAISED PAVEMENT MARKER TYPE I-C, CLEAR FACE TOWARD NORMAL TRAFFIC, SHALL BE PLACED ON 40-FOOT CENTERS.



CENTERLINE, LANE LINES, & EDGE LINES FOR TWO-WAY LEFT TURN LANE



LANE LINES & EDGE LINES FOR ONE-WAY MULTILANE STREET

RAISED PAVEMENT MARKERS TYPE II-C-R SHALL HAVE CLEAR FACE TOWARD NORMAL TRAFFIC AND RED FACE TOWARD WRONG-WAY TRAFFIC.

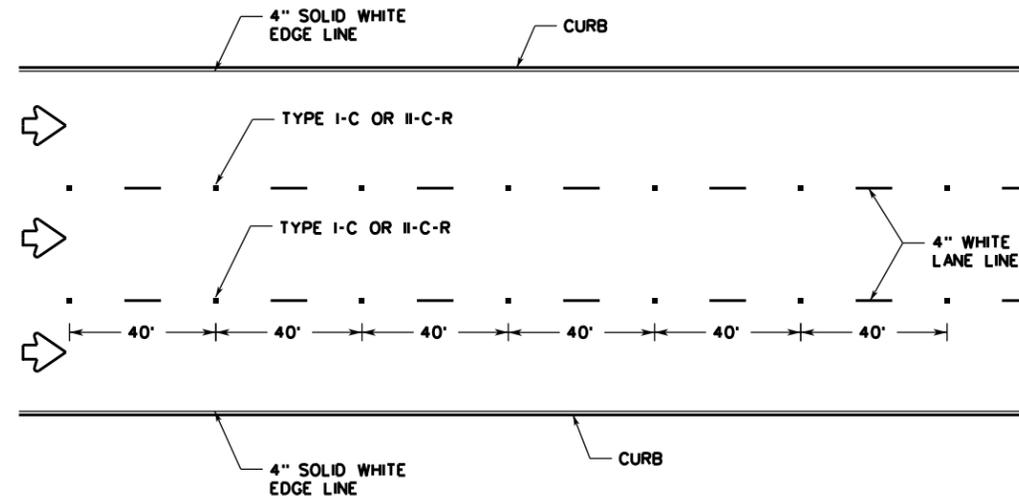


TABLE 1 - TYPICAL LENGTH (L)

POSTED SPEED	FORMULA
45	$L = \frac{WS^2}{60}$
≥45	$L = WS$

* 85TH PERCENTILE SPEED MAY BE USED ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT. CROSSHATCHING LENGTH SHOULD BE ROUNDED UP TO NEAREST 5 FOOT INCREMENT.

L = LENGTH OF CROSSHATCHING (FT)
W = WIDTH OF OFFSET (FT)
S = POSTED SPEED (MPH)

EXAMPLES:
AN 8 FOOT SHOULDER IN ADVANCE OF A BRIDGE REDUCES TO 4 FEET ON A 70 MPH ROADWAY. THE LENGTH OF THE CROSSHATCHING SHOULD BE:
 $L = 8 \times 70 = 560$ FT
A 4 FOOT SHOULDER IN ADVANCE OF A BRIDGE REDUCES TO 2 FEET ON A 40 MPH ROADWAY. THE LENGTH OF THE CROSSHATCHING SHOULD BE:
 $L = 4(40)^2 / 60 = 106.67$ FT ROUNDED TO 110 FT

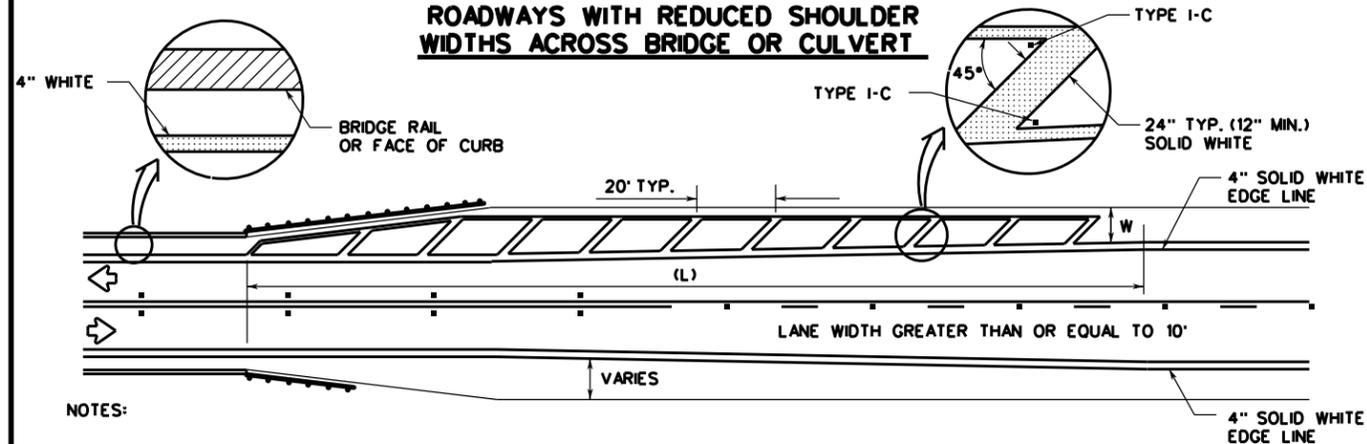
YIELD LINES



GENERAL NOTES:

1. EDGELINE ADJACENT TO CURB AND GUTTER IS NOT REQUIRED IN ALL CASES, HOWEVER SHALL BE PLACED AS DIRECTED BY CITY TRAFFIC ENGINEER.
2. THE TRAVELED WAY INCLUDES ONLY THAT PORTION OF THE ROADWAY USED FOR VEHICULAR TRAVEL AND NOT THE PARKING LANES, SIDEWALKS, BERMS AND SHOULDERS. THE TRAVELED WAYS SHALL BE MEASURED FROM THE INSIDE OF EDGELINE TO INSIDE OF EDGELINE OF A TWO LANE ROADWAY.
3. ALL RAISED PAVEMENT MARKERS PLACED IN BROKEN LINES SHALL BE PLACED IN LINE WITH AND MIDWAY BETWEEN THE STRIPES.
4. ON CONCRETE PAVEMENTS THE RAISED PAVEMENT MARKERS SHOULD BE PLACED TO ONE SIDE OF THE LONGITUDINAL JOINTS.
5. ALL PAVEMENT MARKING MATERIAL SHALL MEET THE REQUIRED MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS.
6. 4" SOLID WHITE EDGE LINES ARE OPTIONAL AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

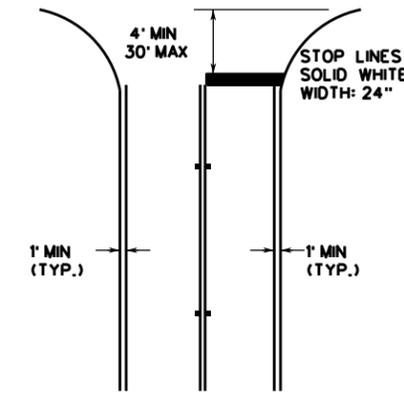
ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT



NOTES:

1. NO-PASSING ZONE ON BRIDGE APPROACH IS OPTIONAL BUT IF USED, IT SHALL BE A MINIMUM 500 FEET LONG.
2. FOR CROSSHATCHING LENGTH (L) SEE TABLE 1.
3. THE WIDTH OF THE OFFSET (W) AND THE REQUIRED CROSSHATCHING WIDTH IS THE FULL SHOULDER WIDTH IN ADVANCE OF THE BRIDGE.
4. THE CROSSHATCHING SHOULD BE REQUIRED IF THE SHOULDER WIDTH IN ADVANCE OF THE BRIDGE IS 4 FOOT OR WIDER AND ANY REDUCTION IN SHOULDER WIDTH ACROSS THE BRIDGE OCCURS.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE



SEPTEMBER 2009

CITY OF SAN ANTONIO

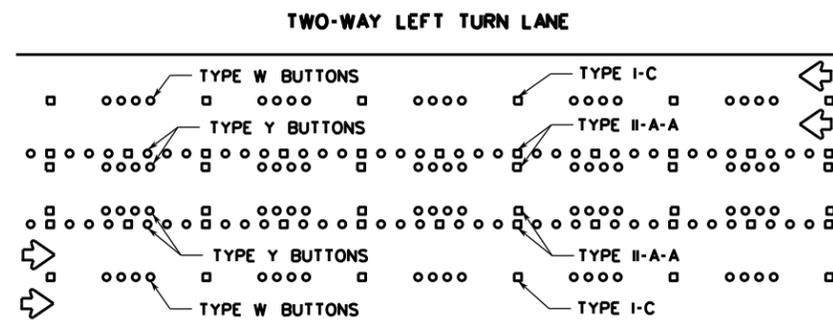
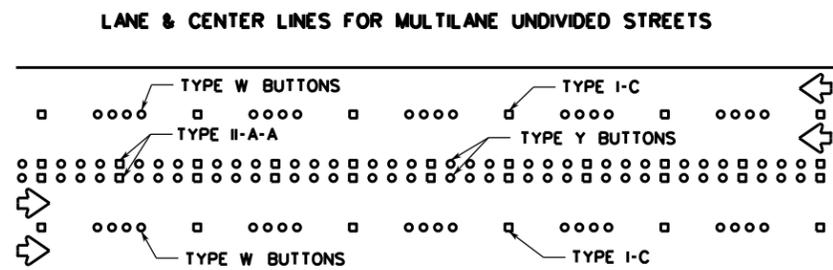
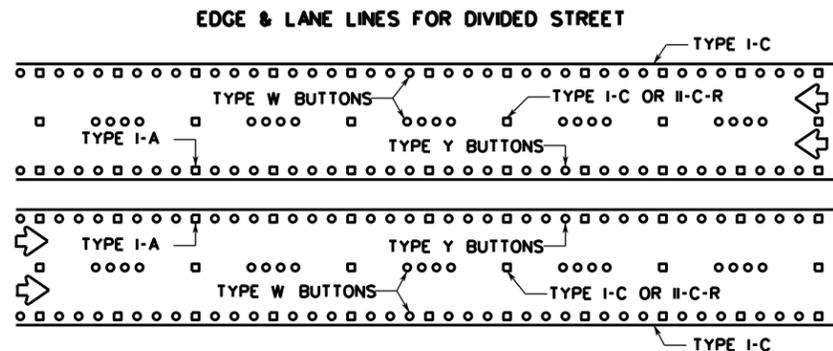
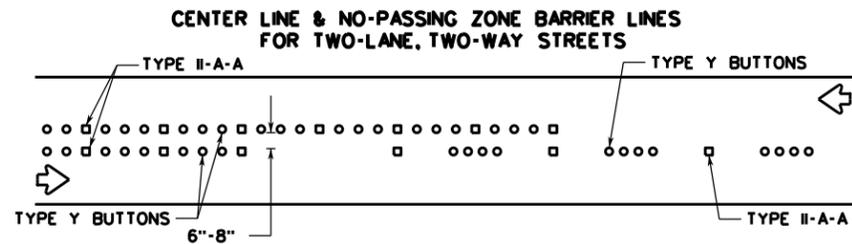
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS
STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE 1

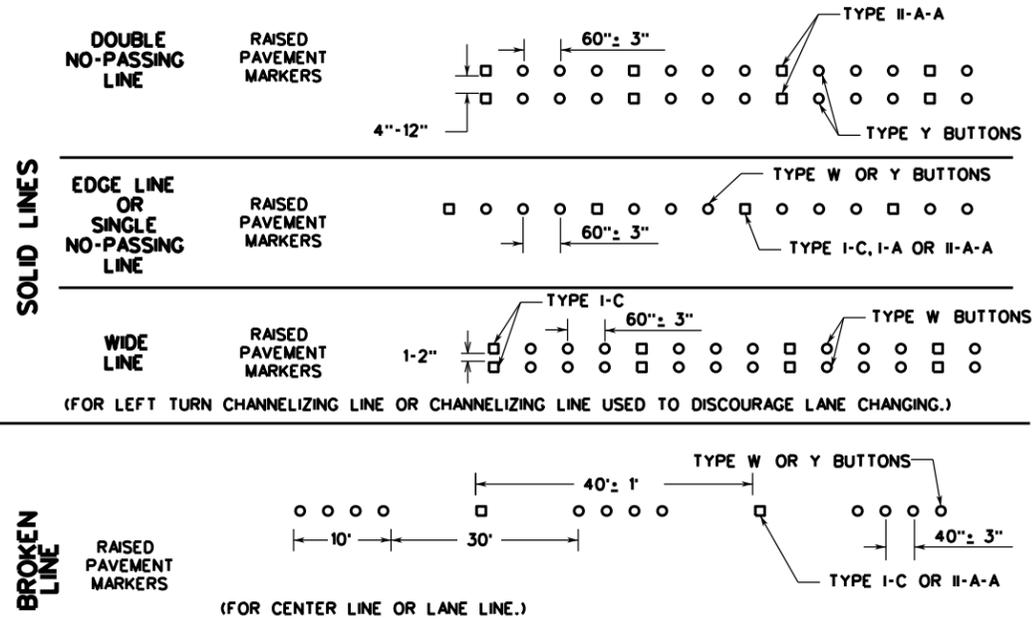
SHEET 4 OF 16

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.
		SHEET NO.: 24 OF 60

RAISED PAVEMENT MARKING PLACEMENT PATTERNS
PLACED W/ REFLECTION PAVEMENT MARKERS (OPTIONAL)

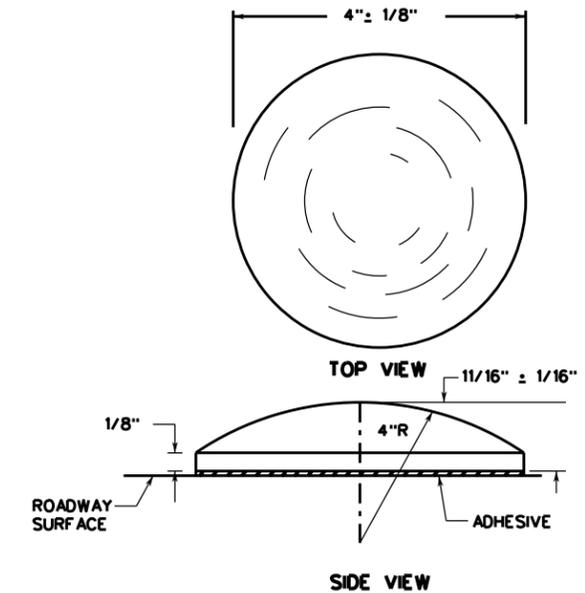


RAISED PAVEMENT MARKINGS PLACEMENT DETAILS
PLACED W/ REFLECTION PAVEMENT MARKERS (OPTIONAL)



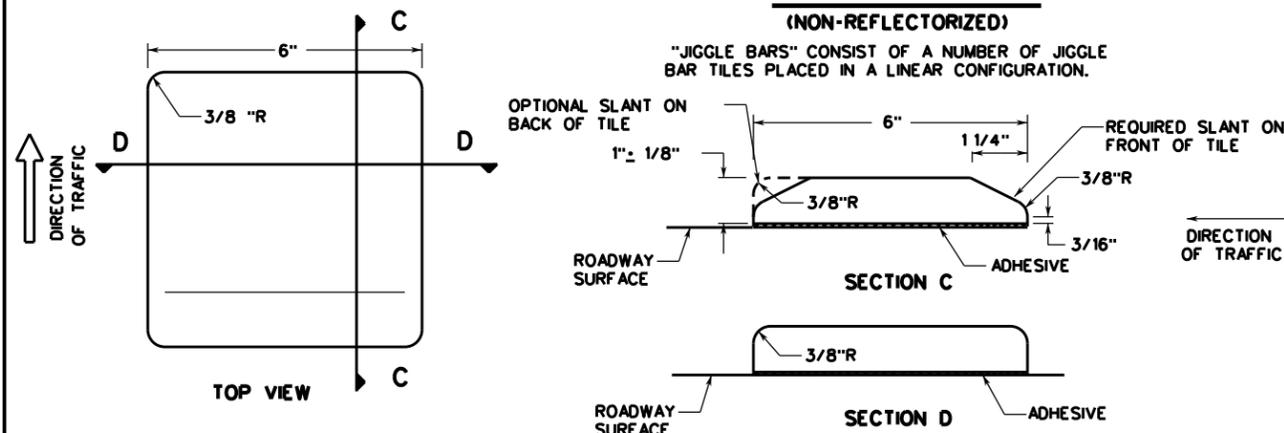
TRAFFIC BUTTONS (NON-REFLECTORIZED)

NOTE: MINIMUM AREA OF MARKERS SHALL BE NOT LESS THAN 12.5 SQUARE INCHES.



JIGGLE BAR TILES (NON-REFLECTORIZED)

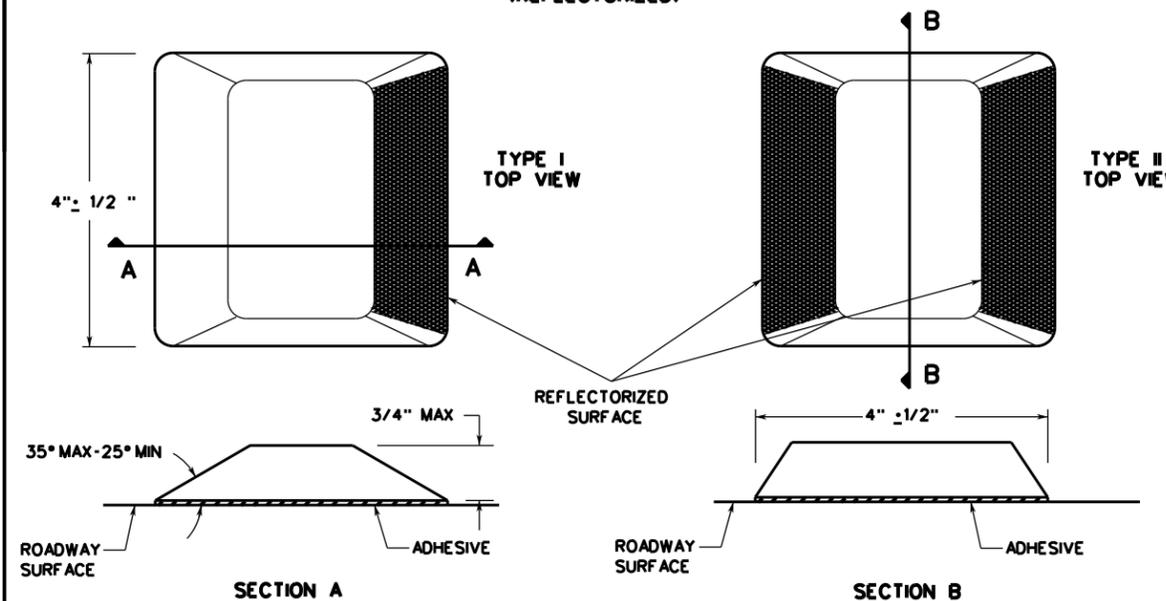
"JIGGLE BARS" CONSIST OF A NUMBER OF JIGGLE BAR TILES PLACED IN A LINEAR CONFIGURATION.



NOTES:

1. RAISED PAVEMENT MARKERS (RPMs) MAY CONSIST OF TRAFFIC BUTTONS, PAVEMENT MARKERS AND/OR JIGGLE BAR TILES. PAVEMENT SURFACE SHALL BE PREPARED AND CLEANED SUBJECT TO APPROVAL OF THE CITY TRAFFIC ENGINEER BEFORE ADHESIVE AND RPMs ARE PLACED.
2. JIGGLE BARS SHALL BE ORIENTED PERPENDICULAR TO ROADWAY. JIGGLE BARS SHALL ALSO BE PLACED AT SUCH OTHER LOCATIONS AS SHOWN IN PLANS OR AS DIRECTED BY THE CITY TRAFFIC ENGINEER.
3. MARKERS, BUTTONS AND JIGGLE BAR TILES SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY AND NOT INTENDED TO SPECIFY ANY PARTICULAR PRODUCT. ALL PAVEMENT MARKERS PROVIDED SHALL BE OF THE SAME MANUFACTURER.
4. ALL DIMENSIONS ARE $\pm 1/8"$ UNLESS OTHERWISE NOTED.
5. ALL PAVEMENT MARKING MATERIALS SHALL MEET MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS.
6. TRAFFIC BUTTONS AND JIGGLE BAR TILES ARE TO BE USED ONLY FOR TEMPORARY TRAFFIC CONTROL OR AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

RAISED PAVEMENT MARKERS (REFLECTORIZED)



SEPTEMBER 2009

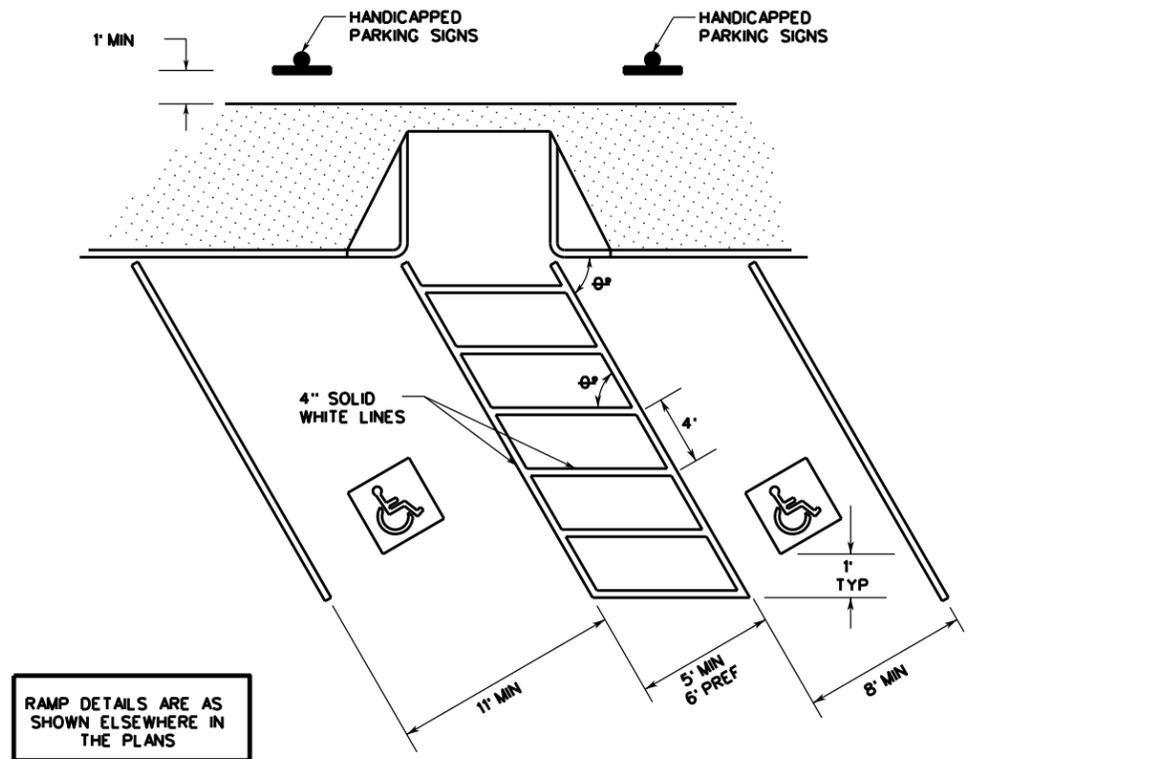
CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

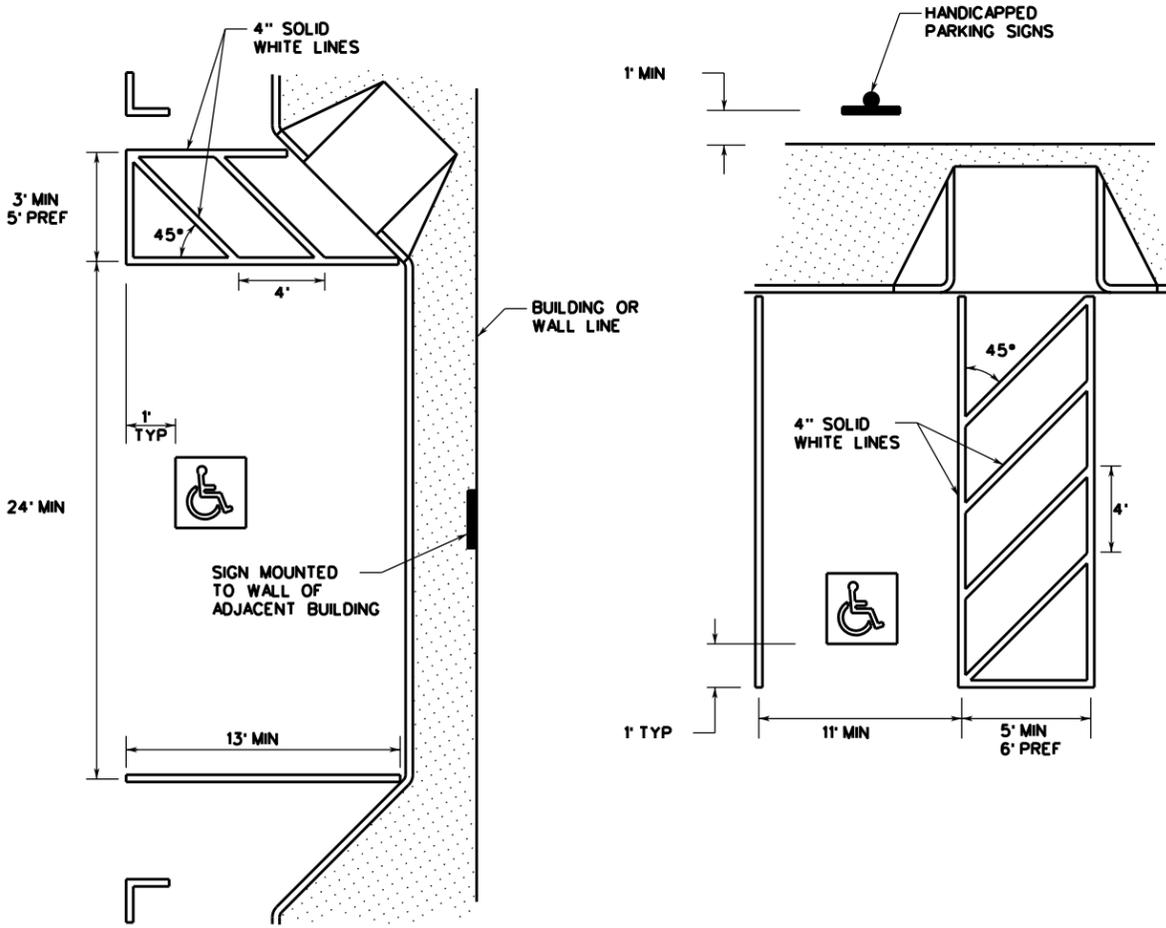
TRAFFIC ENGINEERING STANDARDS
RAISED PAVEMENT MARKERS, REFLECTIVE
PAVEMENT MARKERS, TRAFFIC BUTTONS &
JIGGLE BAR TILES 2
SHEET 5 OF 16

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.F.
		SHEET NO.: 25 OF 60

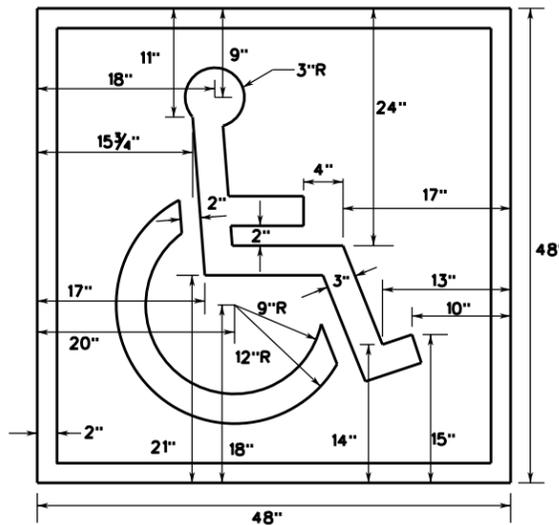
TYPICAL ACCESSIBLE PARKING SPACE DIMENSIONS



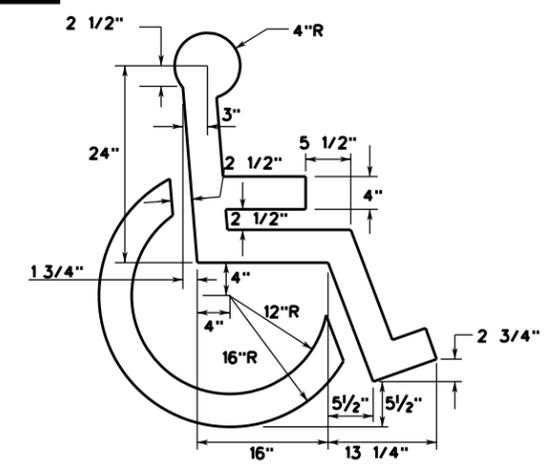
RAMP DETAILS ARE AS SHOWN ELSEWHERE IN THE PLANS



PAVEMENT MARKINGS



WITH BACKGROUND
 SYMBOL & BORDER: WHITE
 BACKGROUND: BLUE



SYMBOL ONLY
 SYMBOL: BLUE OR WHITE

NOTES:

1. ALL PARKING SPACE LIMIT LINES SHALL BE 4" SOLID WHITE LINES.
2. AISLE MARKINGS SHOWN ARE EXAMPLES ONLY. OTHER METHODS TO INDICATE A NO PARKING AREA ARE ACCEPTABLE. AISLE MARKINGS SHALL BE WHITE.
3. DIMENSIONS OF LIMIT LINES, AISLE MARKINGS, AND SYMBOL (WITH OR WITHOUT BACKGROUND) MAY VARY ± 10%.
4. PAVEMENT MARKING SYMBOLS (WITH BACKGROUND):
 - A) ARE REQUIRED UNLESS STATED ELSEWHERE IN THE PLANS,
 - B) SHOULD BE PLACED TOWARD THE FAR END OF THE PARKING SPACES SO AS TO BE VISIBLE TO MOTORISTS IN THE TRAVEL LANE,
 - C) MAY BE PAINTED OR PREFABRICATED MATERIAL, AND
 - D) SHALL BE 30"x30" MINIMUM.
5. WITH APPROVAL OF THE CITY TRAFFIC ENGINEER, PREFABRICATED PAVEMENT MARKING SYMBOLS WITH BACKGROUND OF OTHER DIMENSIONS EXCEEDING THE 30"x30" MINIMUM MAY BE USED. ALTERNATIVE DESIGNS SHALL INCLUDE A PROPORTION SIZED SYMBOL OF ACCESSIBILITY, AND SHALL CONFORM TO THE ILLUSTRATED COLORS FOR BACKGROUND, SYMBOL AND BORDER.
6. ALL SLOPE IN AND AROUND EXPECTED WHEEL CHAIR PATH SHALL NOT EXCEED 2% X-SLOPES.

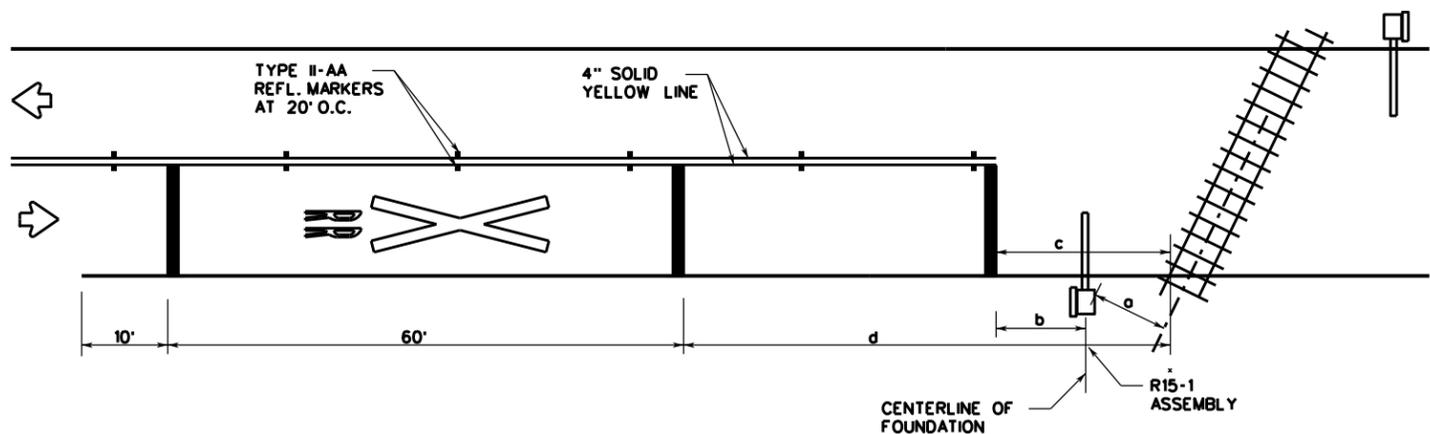
SEPTEMBER 2009
 CITY OF SAN ANTONIO
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TRAFFIC ENGINEERING STANDARDS
PAVEMENT MARKINGS FOR ACCESSIBLE PARKING
 SHEET 6 OF 16

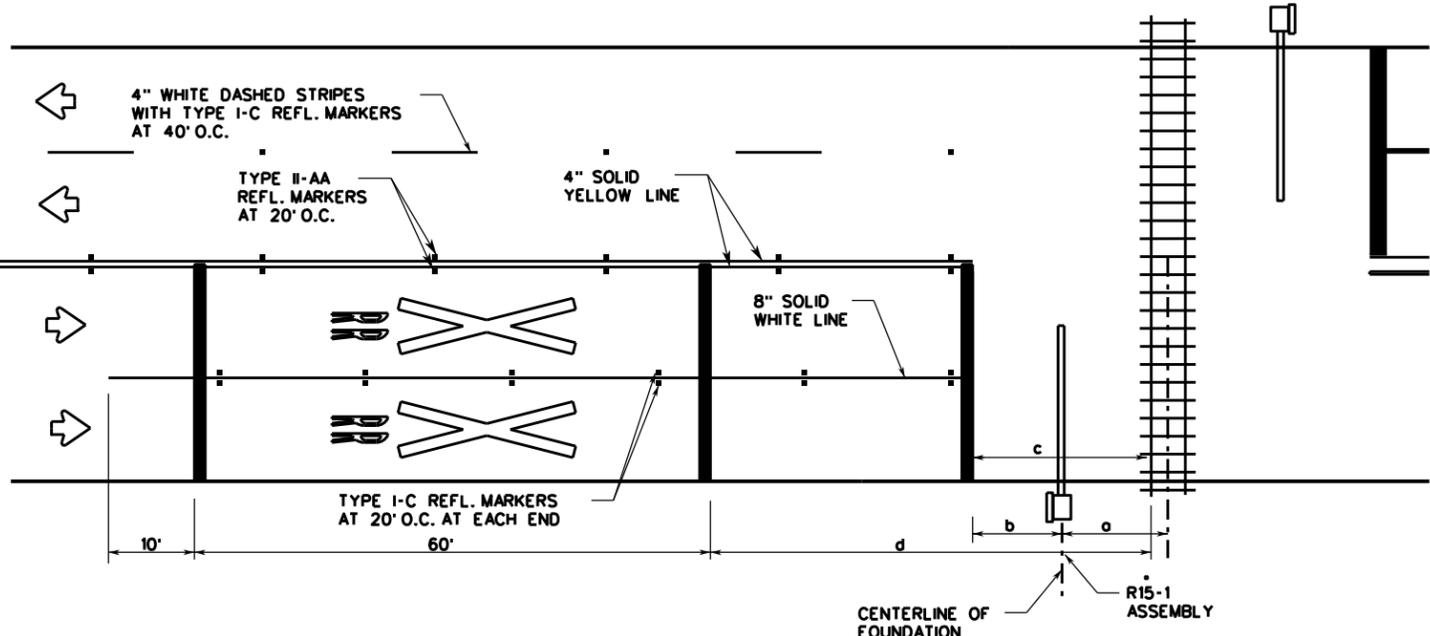
% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.

SHEET NO.: 26 OF 60

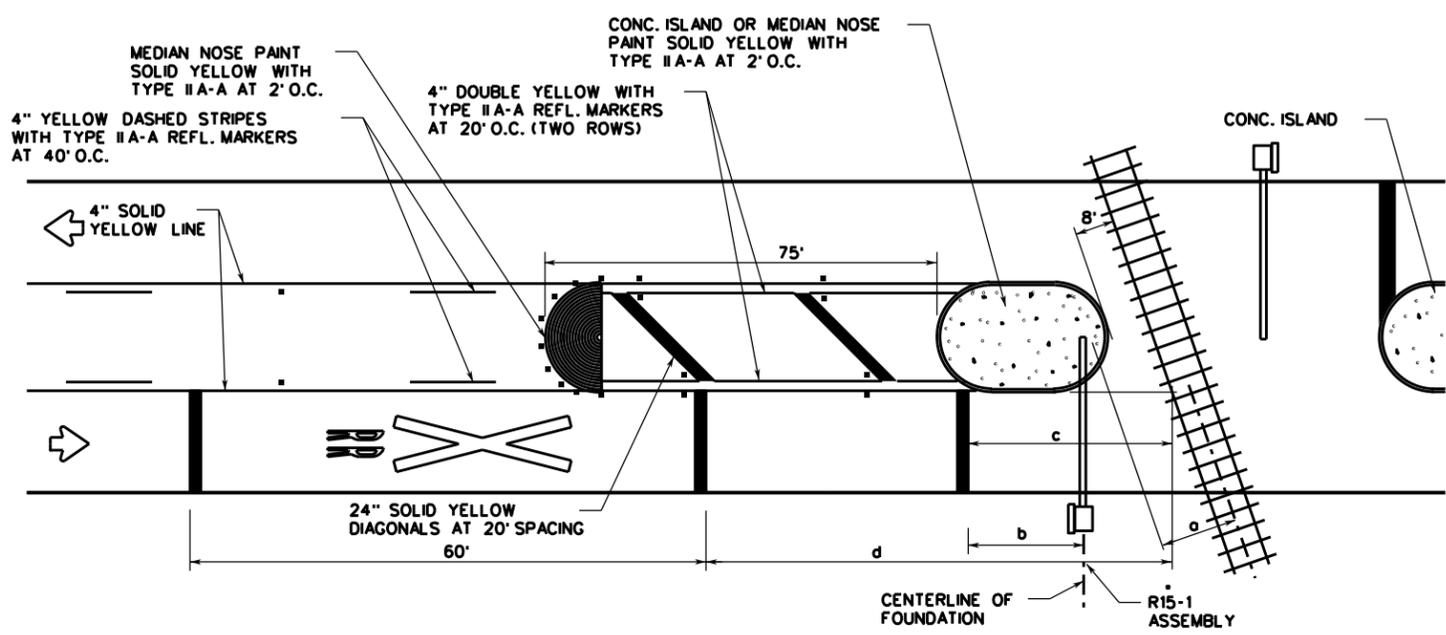
TWO LANE, TWO-WAY



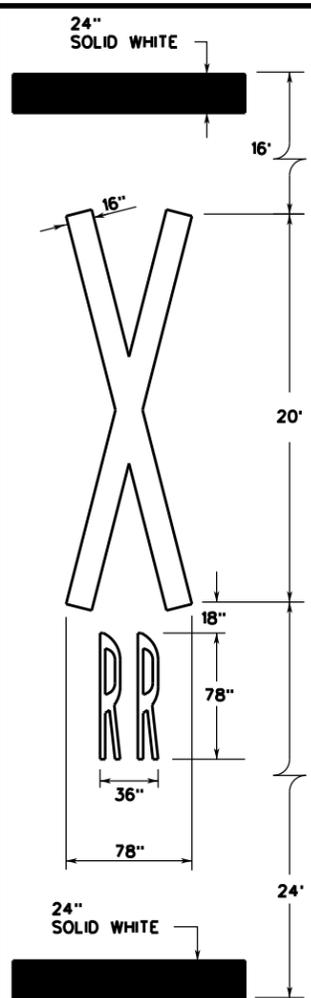
UNDIVIDED MULTILANE ROADWAY



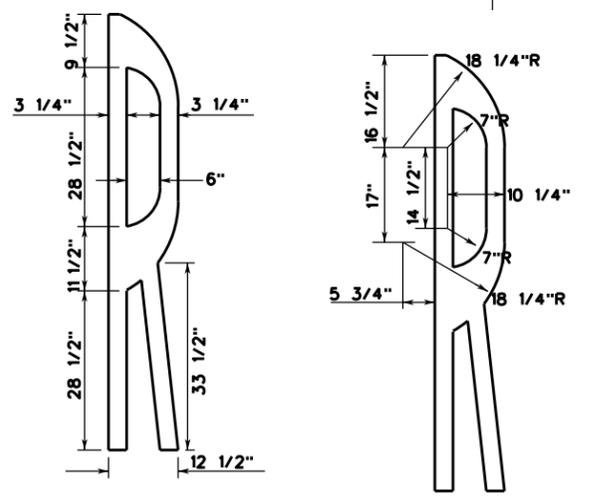
TWO-WAY LEFT-TURN LANE (TWLTL)



- o - 12 FEET MINIMUM, 15 FEET USUAL, IF ACTIVE WARNING DEVICES ARE PRESENT. DISTANCE "o" SHOULD BE MEASURED FROM THE CENTERLINE OF R15-1 ASSEMBLY TO THE CENTERLINE OF NEAREST TRACK.
 - b - STOP LINES SHOULD BE APPROXIMATELY 8 FEET IN ADVANCE OF ACTIVE WARNING DEVICES (TYPE A, E OR F). STOP LINE SHOULD BE APPROXIMATELY 15 FEET FROM NEAR RAIL IF ONLY PASSIVE DEVICES (R15-1, PLUS R15-2 WHEN APPLICABLE) ARE PRESENT.
 - c - 15 FEET DESIRABLE MINIMUM IF NO GATE OR SIGNAL IS PRESENT. R15-1 SHOULD BE PLACED BETWEEN STOP LINE AND RAILS WITH ADEQUATE DISTANCE PROVIDED FOR "o".
 - d**
- | APPROACH SPEED (MPH) | DESIRABLE PLACEMENT (FEET) |
|----------------------|----------------------------|
| 20 | 145 |
| 25 | 220 |
| 30 | 295 |
| 35 | 370 |
| 40 | 445 |
| 45 | 520 |
| 50 | 595 |
| 55 | 670 |
| 60 | 745 |
| 65 | 820 |
| 70 | 900 |
- * LOCAL CONDITIONS MAY REQUIRE ALTERNATE PLACEMENT LOCATIONS.



- NOTES:
- THE PAVEMENT MARKINGS ON AN APPROACH TO A RAILROAD GRADE CROSSING SHALL CONSIST OF:
 - A) THE RR X-ING SYMBOL,
 - B) THREE TRANSVERSE 24" LINES, AND
 - C) LANE LINES: A SOLID NO PASSING LINE FOR TWO-WAY TRAFFIC APPROACHES, OR SOLID LAND LINES FOR MULTILANE APPROACHES.
 - FOR BIDDING PURPOSES, THE RR X-ING SYMBOL WILL BE MEASURED AND PAID FOR AS FOR EACH LANE IN PLACE. THE TRANSVERSE MARKINGS AND LANE LINES WILL BE MEASURED AND PAID FOR BY THE LINEAL FOOT.
 - CENTERLINES SHALL BE YELLOW, OTHER MARKINGS SHALL BE WHITE.
 - APPROACH LANES LESS THAN 8 FOOT WIDTH SHALL NOT HAVE MARKINGS.
 - MARKINGS SHOULD NOT BE PLACED WHERE LESS THAN 110 FEET OF APPROACH ROADWAY IS AVAILABLE FOR PLACEMENT UNLESS DIRECTED BY CITY TRAFFIC ENGINEER.
 - RR X-ING SYMBOLS SHOULD BE PLACED APPROXIMATELY IN THE CENTER OF THE APPROACH LANE.
 - ALL TRANSVERSE MARKINGS, INCLUDING STOP LINES, SHALL BE PLACED AT RIGHT ANGLES TO THE CENTERLINE AND ACROSS ALL APPROACH LANES.
 - EXISTING NON-STANDARD MARKINGS SHALL BE REMOVED TO THE FULLEST EXTENT POSSIBLE SO AS NOT TO LEAVE A DISCERNABLE MARKING, BY ANY METHOD APPROVED BY THE CITY TRAFFIC ENGINEER. OVERPAINTING WILL NOT BE ALLOWED.
 - ADDITIONAL MARKINGS AND PLACEMENT DETAILS MAY BE FOUND IN THE TMUTCD, APPENDIX H.
 - THE CITY TRAFFIC ENGINEER MAY REQUIRE ADDITIONAL LONGITUDINAL MARKINGS IF THE DISTANCE BETWEEN THE STOP LINES IS GREATER THAN 80 FEET. MARKINGS ARE NOT REQUIRED ACROSS OR BETWEEN THE RAILS UNLESS SPECIFIED ELSEWHERE IN THE PLANS.



- R15-1 ASSEMBLY
- MAY CONSIST OF ONE OR MORE OF THE FOLLOWING:
- R15-1 CROSSBUCK SIGN
 - R15-2 MULTIPLE TRACK SIGN
 - TYPE A MAST FLASHERS
 - TYPE E CANTILEVERS
 - TYPE F GATES

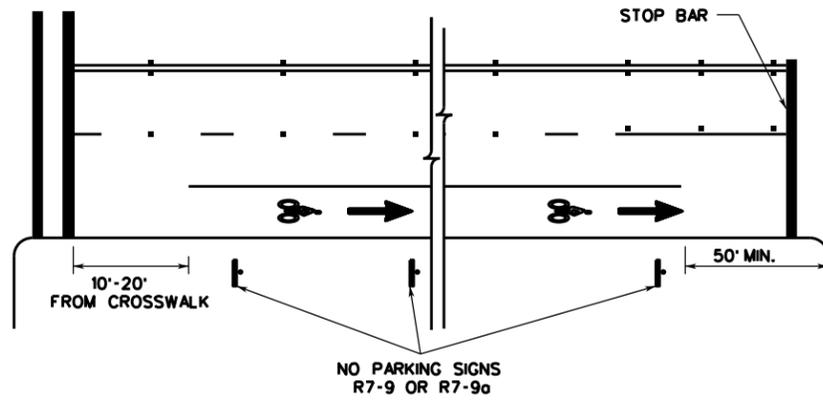
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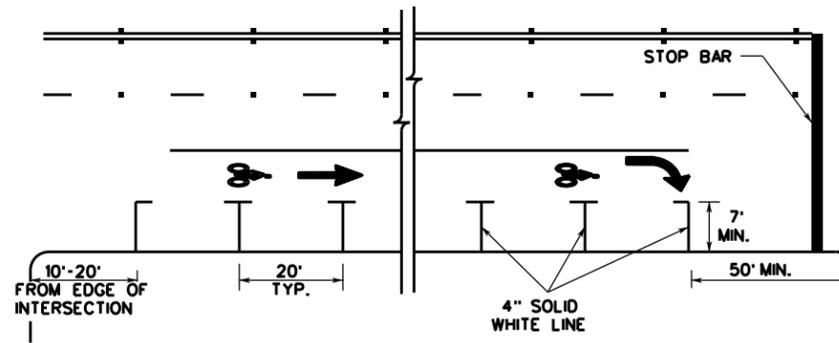
TRAFFIC ENGINEERING STANDARDS
RAILROAD CROSSING PAVEMENT
MARKING (RCPM) DETAILS
SHEET 7 OF 16

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.
		SHEET NO.: 27 OF 60

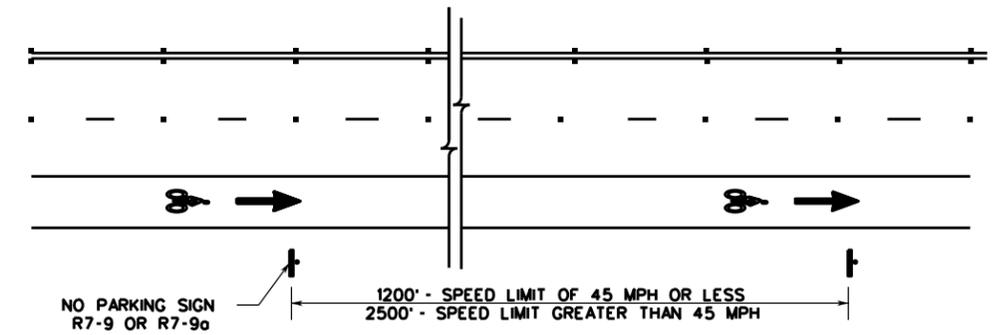
NO PARKING ALONG BICYCLE LANE



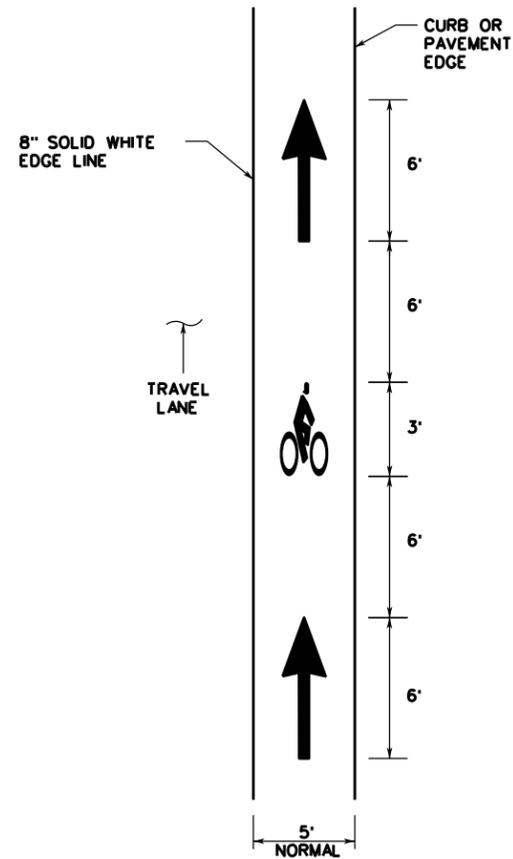
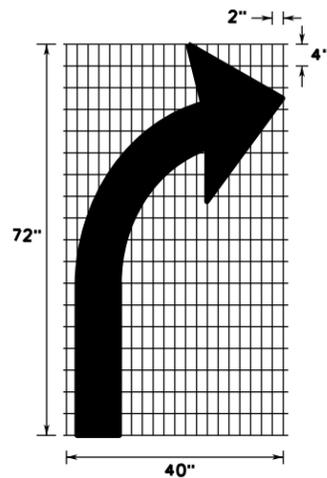
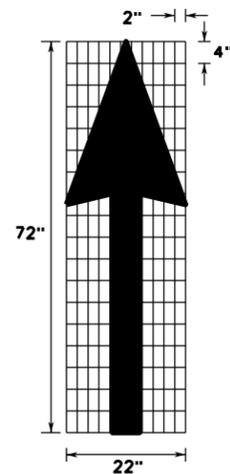
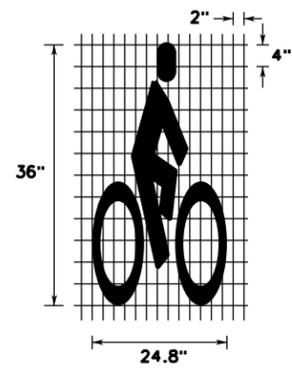
PARKING ALONG BICYCLE LANE



ROADWAYS WITH FEW INTERSECTIONS

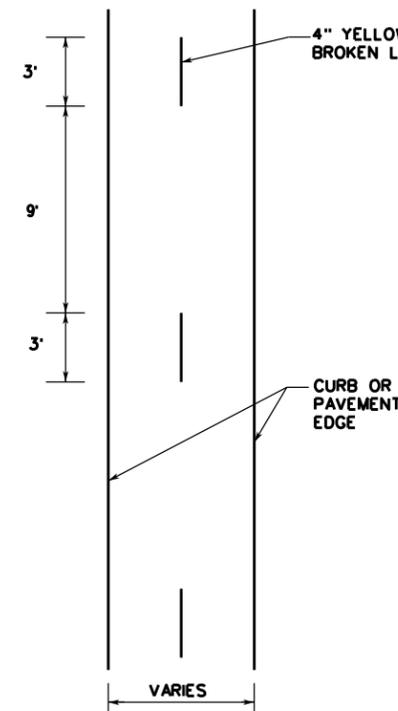


ADJACENT TO TRAVEL LANE

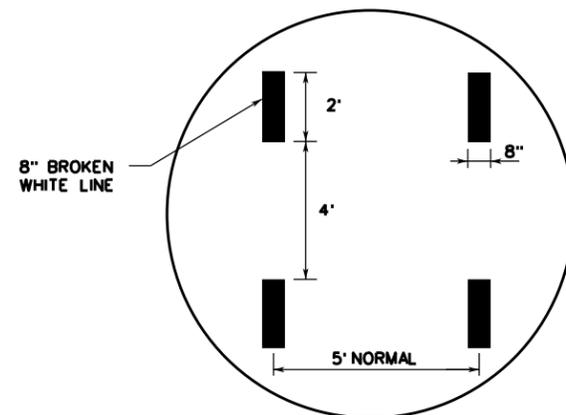


SHARED USE PATH

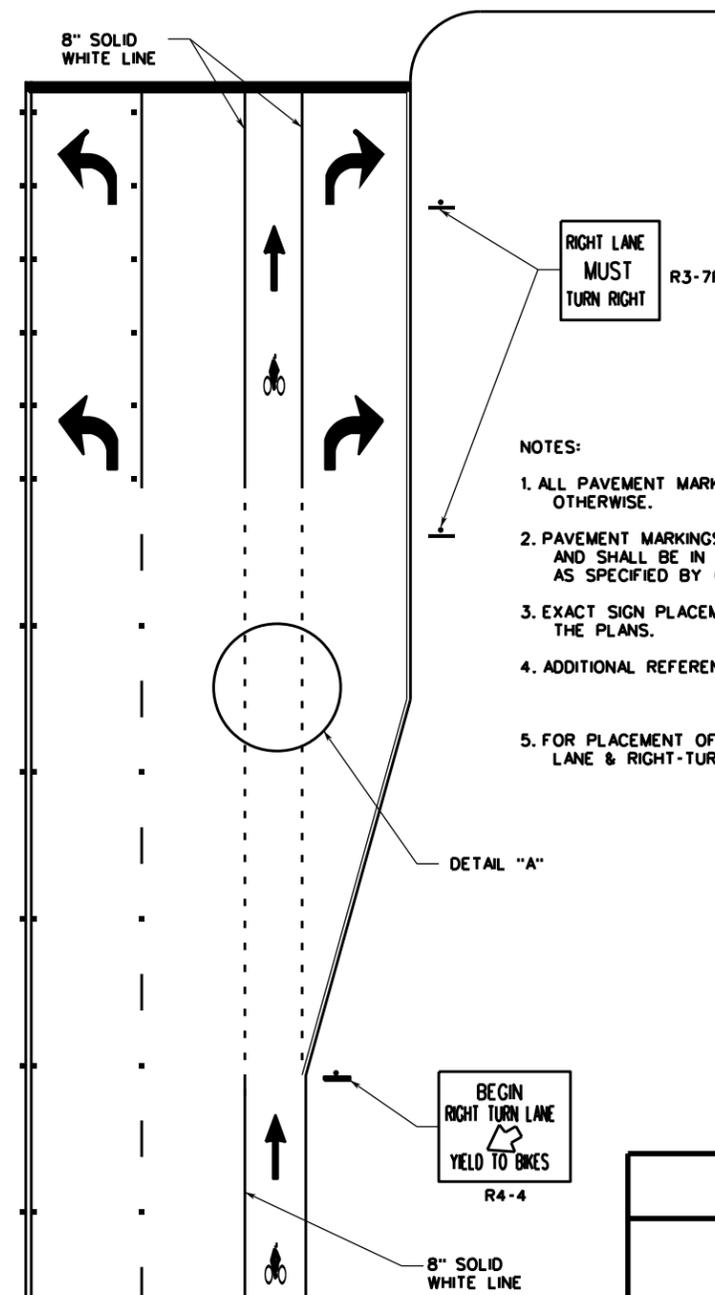
(SEPERATE FROM ROADWAY WITH NO MOTORIZED TRAFFIC)



DETAIL "A"



RIGHT-TURN LANE AT INTERSECTION



NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE WHITE EXCEPT WHEN NOTED OTHERWISE.
2. PAVEMENT MARKINGS SHALL BE OF THE MATERIALS SPECIFIED AND SHALL BE IN CONFORMANCE WITH MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS.
3. EXACT SIGN PLACEMENT AND DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.
4. ADDITIONAL REFERENCES: TMUTCD GUIDE FOR THE DEVELOPMENT OF BICYCLES FACILITIES, AASHTO, 1991.
5. FOR PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET.

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TRAFFIC ENGINEERING STANDARDS

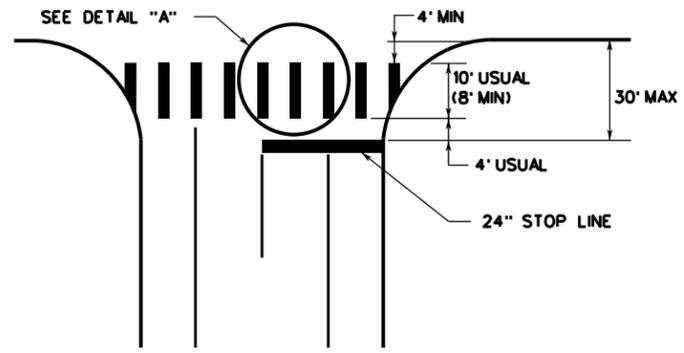
BICYCLE LANE

PAVEMENT MARKINGS

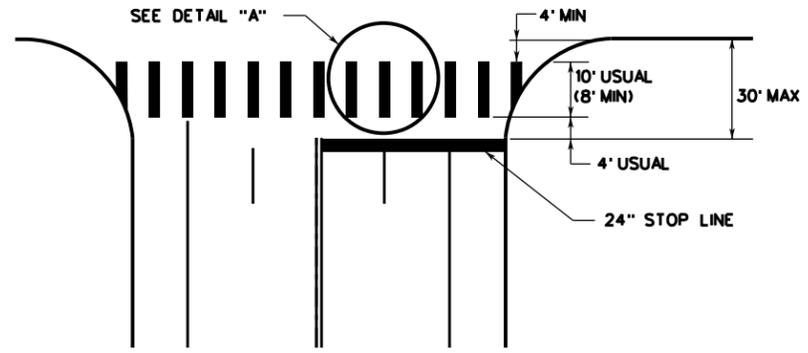
SHEET 8 OF 16

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.
		SHEET NO.: 28 OF 60

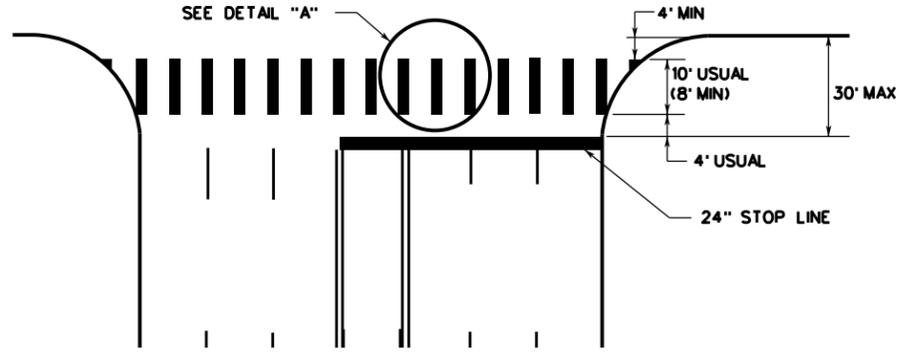
TWO LANES WITH SHOULDERS



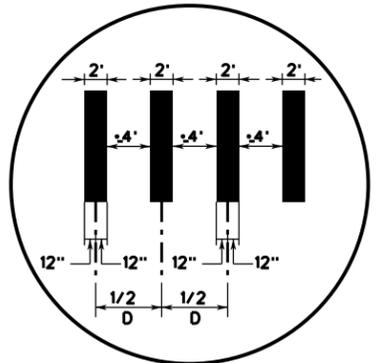
FOUR LANES WITH SHOULDERS



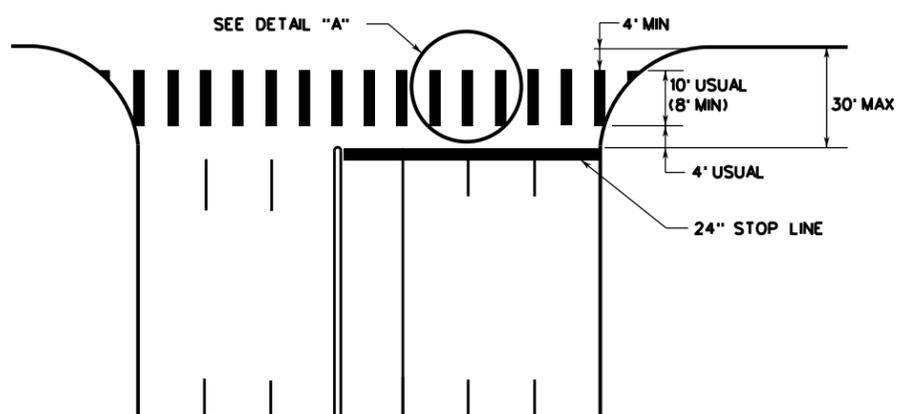
MULTI-LANES



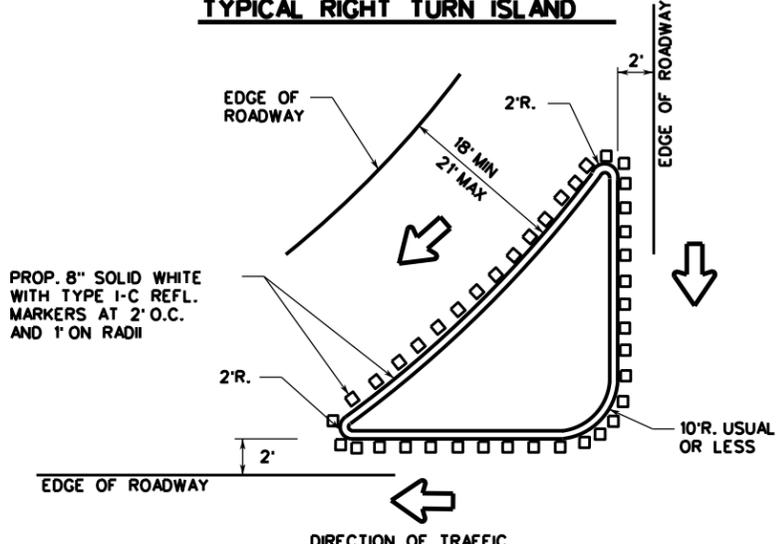
DETAIL "A"



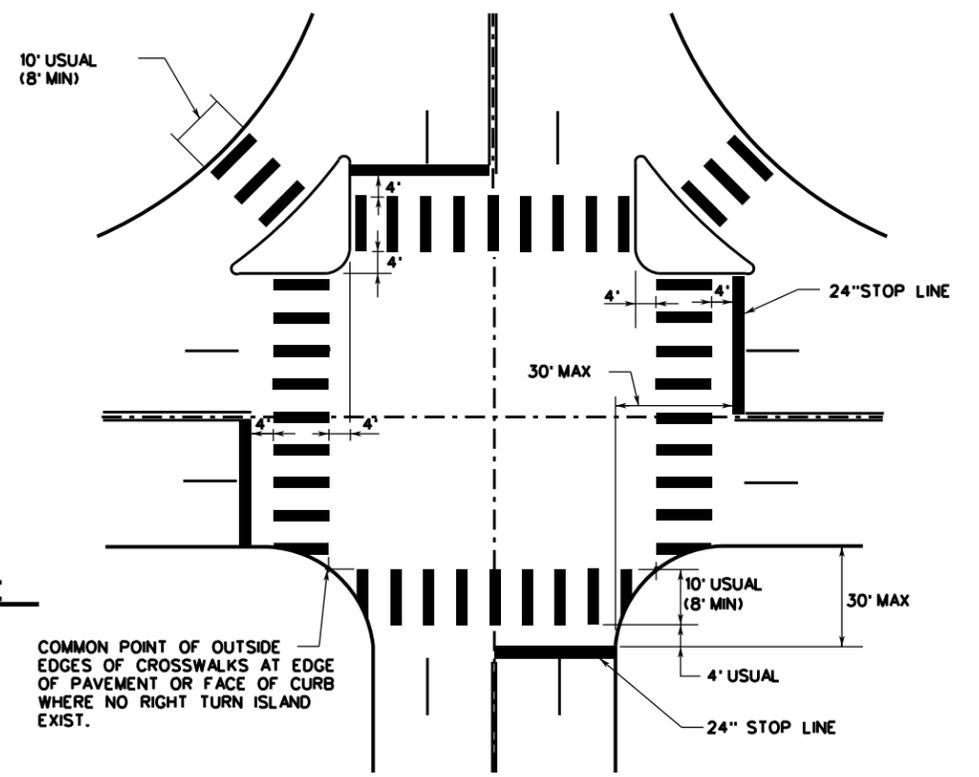
MULTI-LANE WITH MEDIAN



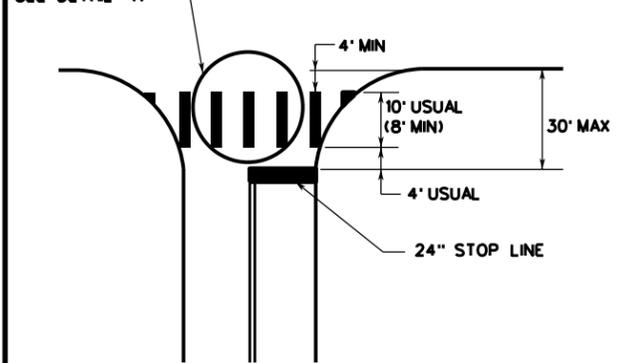
TYPICAL RIGHT TURN ISLAND



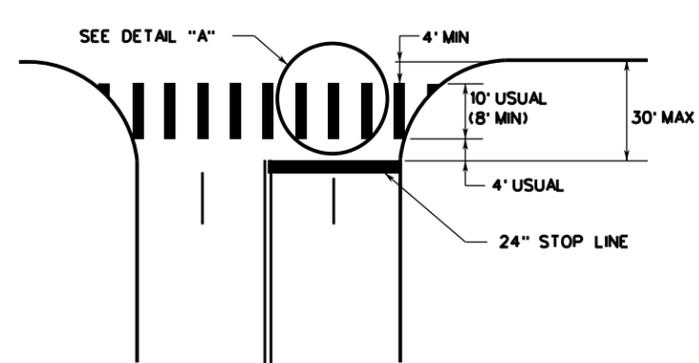
INTERSECTION WITH RIGHT-TURN ISLANDS



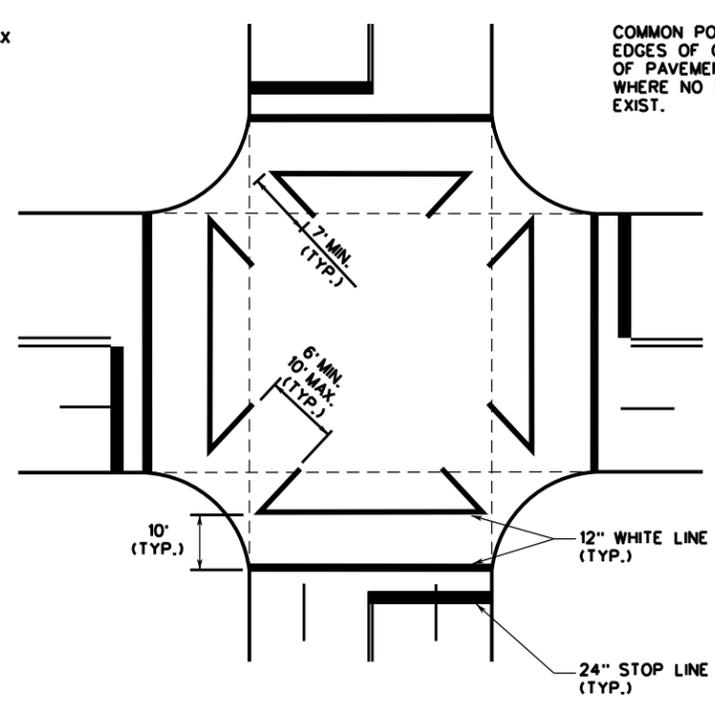
TWO LANES



FOUR LANES

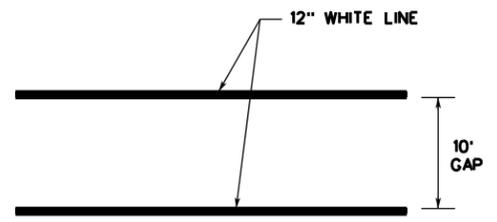


EXCLUSIVE PEDESTRIAN PHASE



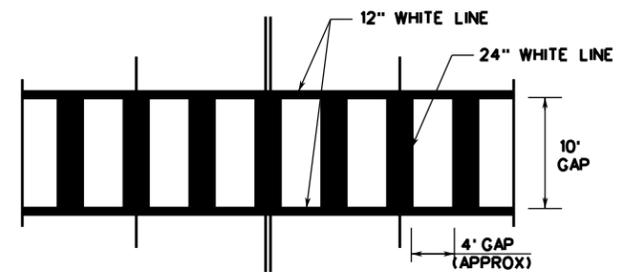
COMMON POINT OF OUTSIDE EDGES OF CROSSWALKS AT EDGE OF PAVEMENT OR FACE OF CURB WHERE NO RIGHT TURN ISLAND EXIST.

CENTRAL BUSINESS DISTRICT CROSSWALK DETAIL



HIGH VISIBILITY CROSSWALK DETAIL

TYPICALLY USED AT SIGNALIZED AND NON-SIGNALIZED MID-BLOCK CROSSINGS FOR COLLECTOR AND ARTERIAL ROADWAYS AND AT LOCATIONS REQUIRING EXTRA EMPHASIS.



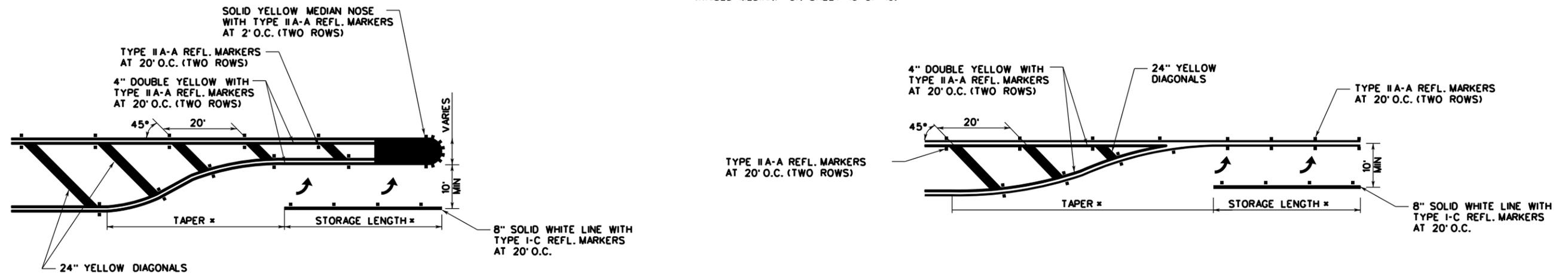
- NOTES:
- CROSSWALKS AND STOP LINES SHALL BE WHITE.
 - "D" IS EQUAL TO ONE HALF THE WIDTH OF TRAVEL LANE.

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 TRAFFIC ENGINEERING STANDARDS
 TYPICAL CROSSWALK DETAILS
 SHEET 9 OF 16

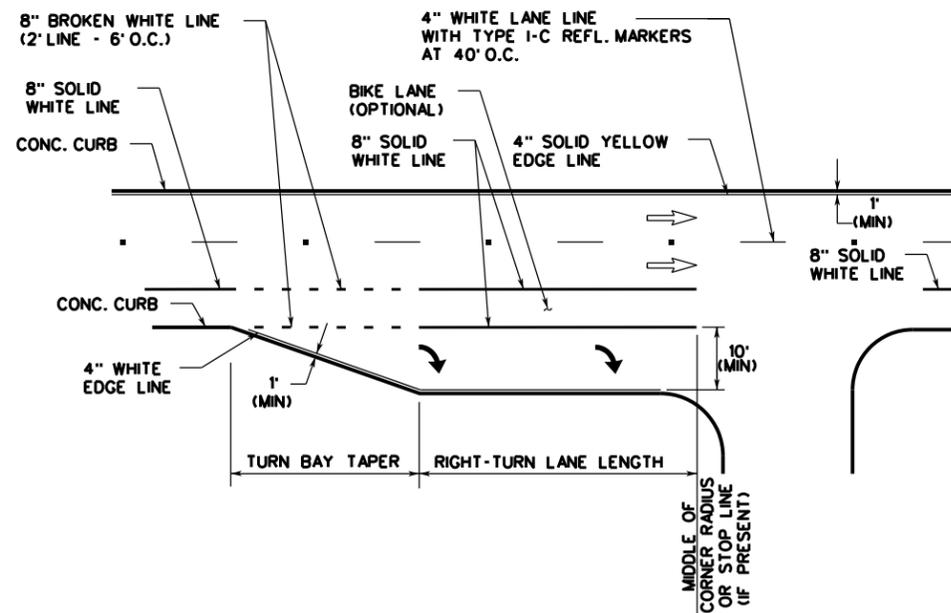
% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.
		SHEET NO.: 29 OF 60

PAINTED MEDIAN LEFT TURN BAY DETAILS

* - USE MINIMUM TURN BAY REVERSE CURVE TAPER LENGTH AND MINIMUM STORAGE LENGTH TABLES FOR "LEFT-TURN LANE (RAISED MEDIAN)" ON SHEET 10 OF 16.



UNSIGNALIZED RIGHT-TURN LANE



MINIMUM TURN BAY TAPER LENGTH		MINIMUM RIGHT-TURN LANE LENGTH	
POSTED SPEED (MPH)	LENGTH (FT)	POSTED SPEED (MPH)	LENGTH (FT)
30 OR LESS	90'	40 OR LESS	110'
35 OR MORE	120'	45 OR MORE	150'

NOTES:

1. THE POSTED SPEED LIMIT IS TYPICALLY EQUAL TO THE DESIGN SPEED MINUS 5 MPH.
2. THE DIMENSIONS GIVEN FOR DUAL LEFT (RAISED MEDIAN) IN THE MINIMUM LENGTH TABLES ON THIS SHEET ARE ALSO APPLICABLE FOR DUAL RIGHT-TURN LANES.
3. STORAGE LENGTHS LONGER THAN THE MINIMUMS LISTED ON THIS DRAWING MAY BE DETERMINED USING TRAFFIC ENGINEERING ANALYSIS OR APPROXIMATE CALCULATIONS.
4. FOR THE PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.
5. REFER TO APPLICABLE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKINGS.
6. REFER TO BICYCLE LANE PAVEMENT MARKINGS STANDARD FOR TYPE AND PLACEMENT.
7. 4" SOLID WHITE AND YELLOW EDGE LINES ARE OPTIONAL AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

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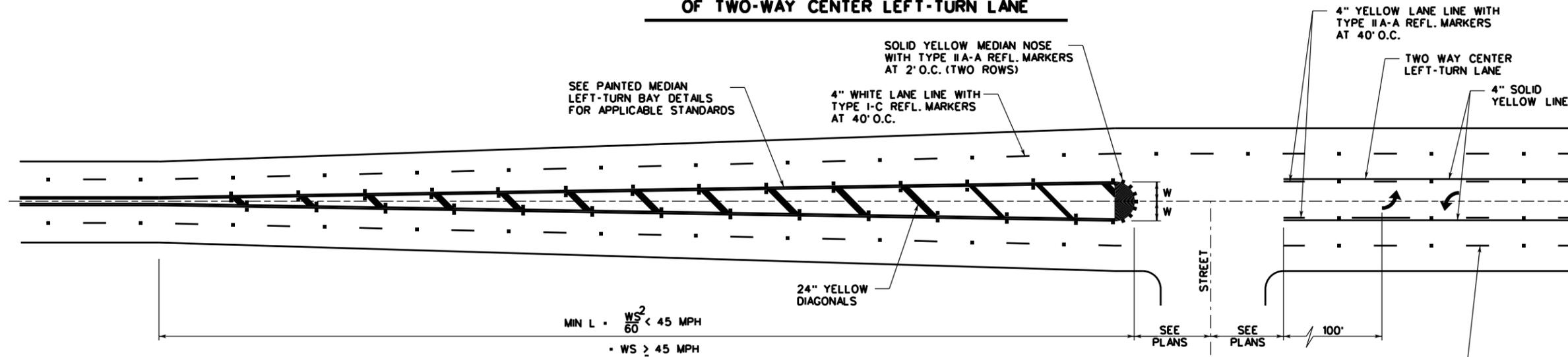
TRAFFIC ENGINEERING STANDARDS

LEFT-TURN LANE & RIGHT-TURN LANE
DESIGN WORKSHEET 2

SHEET 11 OF 16

% SUBMITTAL PROJECT NO.: DATE:
DRWN. BY: LAN DSGN. BY: C.B.V. CHKD. BY: M.E. SHEET NO.: 31 OF 60

TYPICAL TRANSITION AT BEGINNING AND END OF TWO-WAY CENTER LEFT-TURN LANE



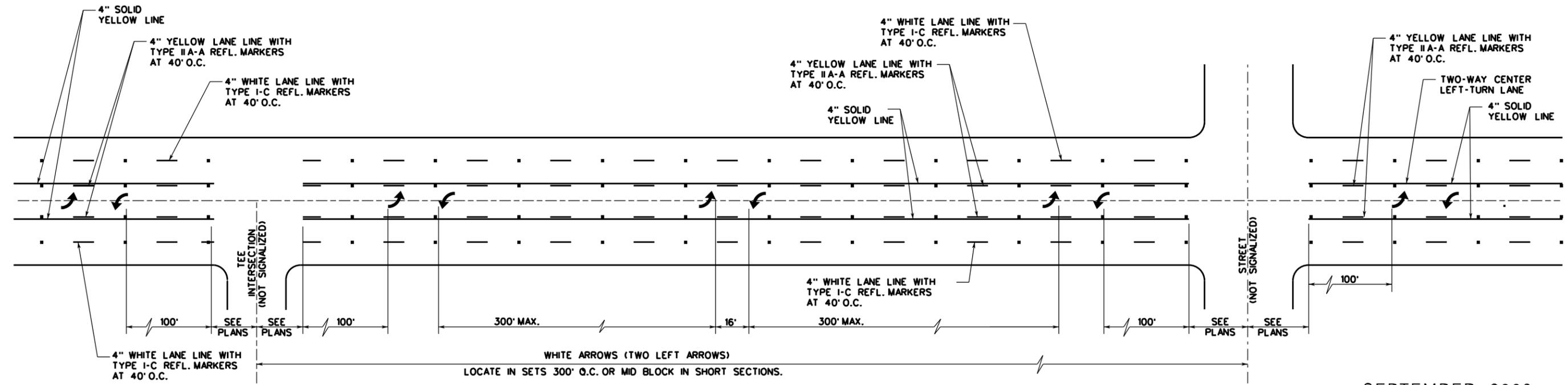
MIN L • $\frac{WS^2}{60} < 45$ MPH
 • WS \geq 45 MPH

W = WIDTH OF OFFSET (FT)
 S = POSTED SPEED (MPH)
 L = LENGTH OF CROSSHATCHING (FT)

LEGEND
 TYPICAL DETAIL
 (PLACE LEGENDS IN ACCORDANCE TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET)

- NOTE:**
1. REFLECTIVE RAISED PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS.
 2. SEE LEFT-TURN & RIGHT-TURN LANE DESIGN WORKSHEET FOR APPLICABLE INFORMATION.
 3. SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.

TWO-WAY LEFT-TURN LANE DETAILS NON-SIGNALIZED INTERSECTIONS



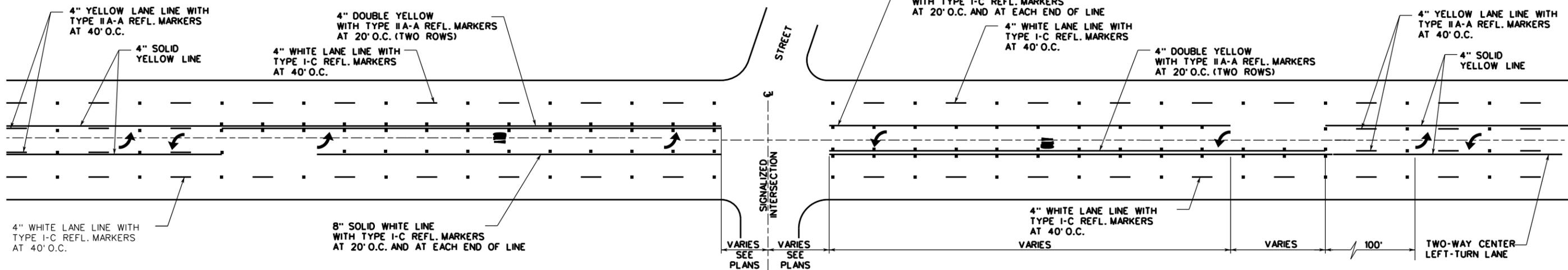
WHITE ARROWS (TWO LEFT ARROWS)
 LOCATE IN SETS 300' O.C. OR MID BLOCK IN SHORT SECTIONS.

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 TRAFFIC ENGINEERING STANDARDS
 TWO-WAY LEFT-TURN
 LANE DETAILS 1
 SHEET 12 OF 16

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.F.
SHEET NO.: 32 OF 60		

TYPICAL TWO-WAY LEFT-TURN LANE DETAILS

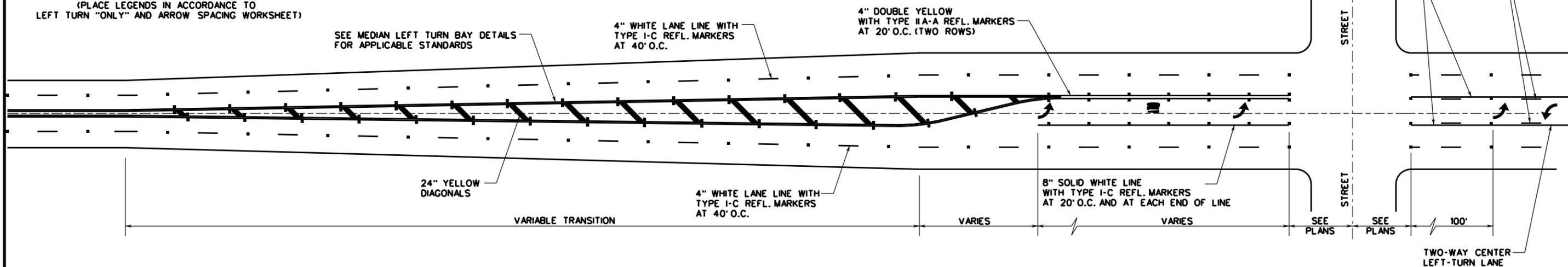
SIGNALIZED INTERSECTION



LEGEND
TYPICAL DETAIL

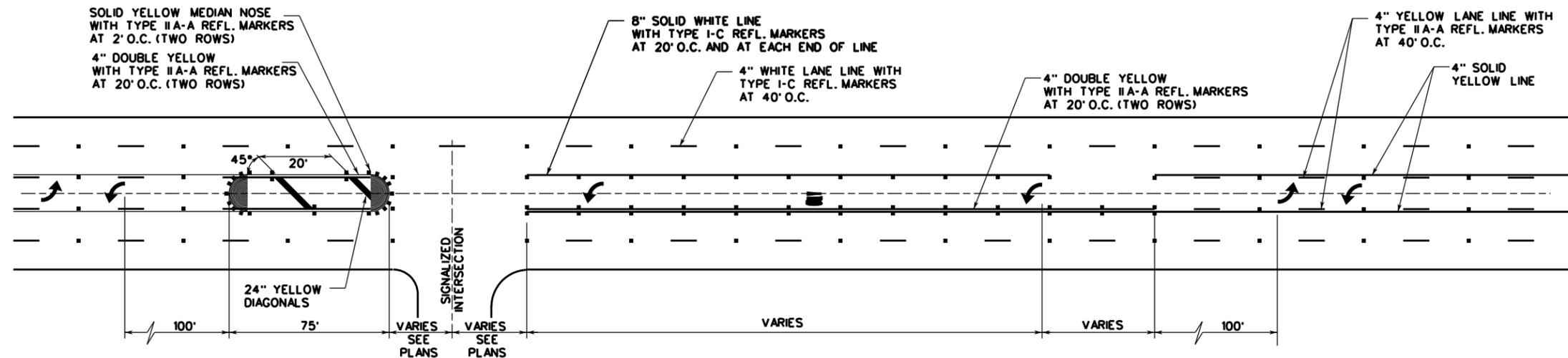
(PLACE LEGENDS IN ACCORDANCE TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET)

TYPICAL MEDIAN LEFT TURN BAY
SIGNALIZED AND NON-SIGNALIZED CROSS STREETS
AT BEGINNING AND END OF TWO-WAY CENTER LEFT-TURN LANE



TYPICAL TWO-WAY LEFT-TURN LANE DETAILS

SIGNALIZED TEE INTERSECTION



NOTE:

1. REFLECTIVE RAISED PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS.
2. SEE LEFT-TURN & RIGHT-TURN LANE DESIGN WORKSHEET FOR APPLICABLE INFORMATION.
3. SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.

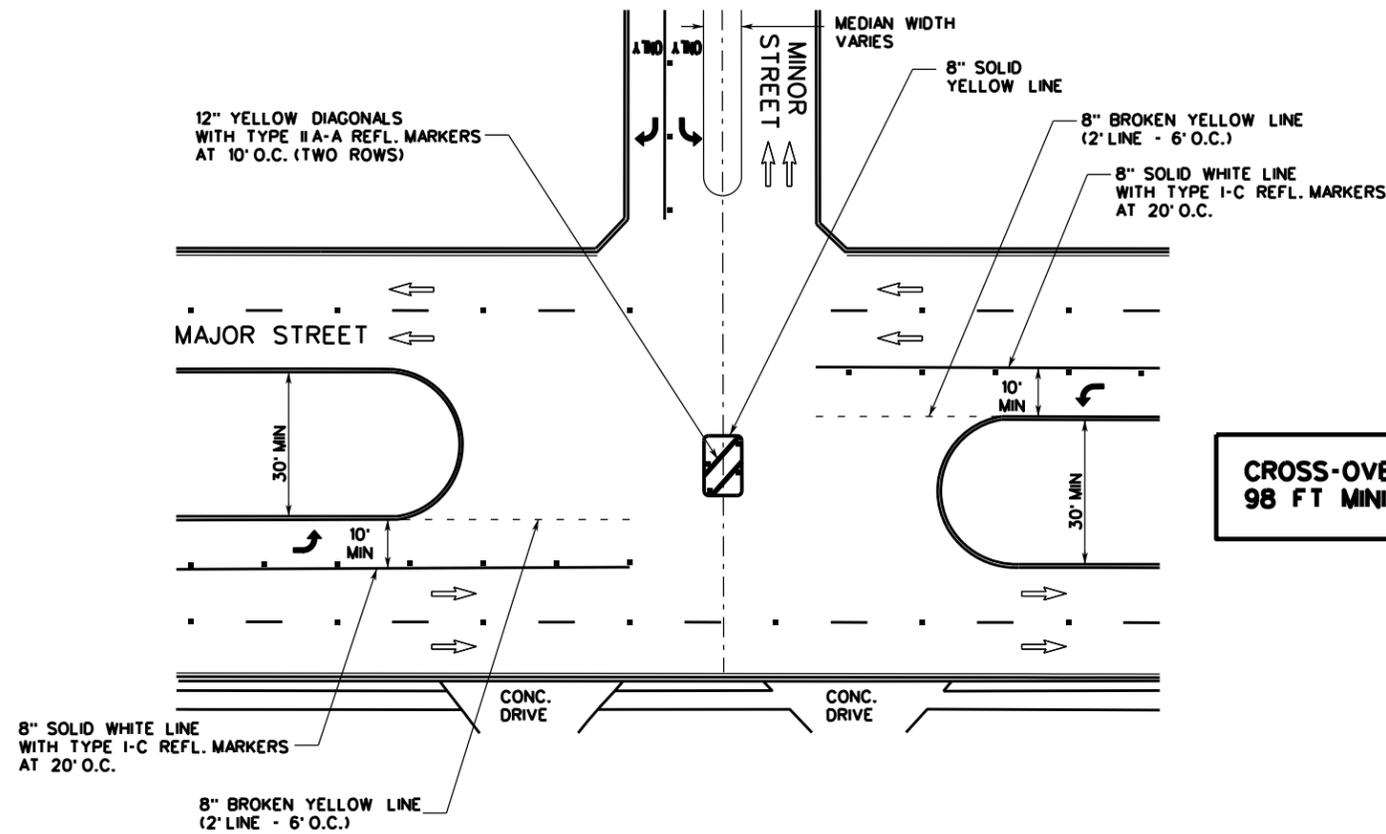
SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS
TWO-WAY LEFT-TURN
LANE DETAILS 2
SHEET 13 OF 16

DATE:	PROJECT NO.:	% SUBMITTAL:
DATE:	DRWN. BY: LAN	DSGN. BY: C.B.V.
DATE:	CHKD. BY: M.F.	SHEET NO.: 33 OF 60

**CROSS-OVER MEDIAN OPENING WITHOUT
TURN AROUND STRIPING "TEE" INTERSECTION**

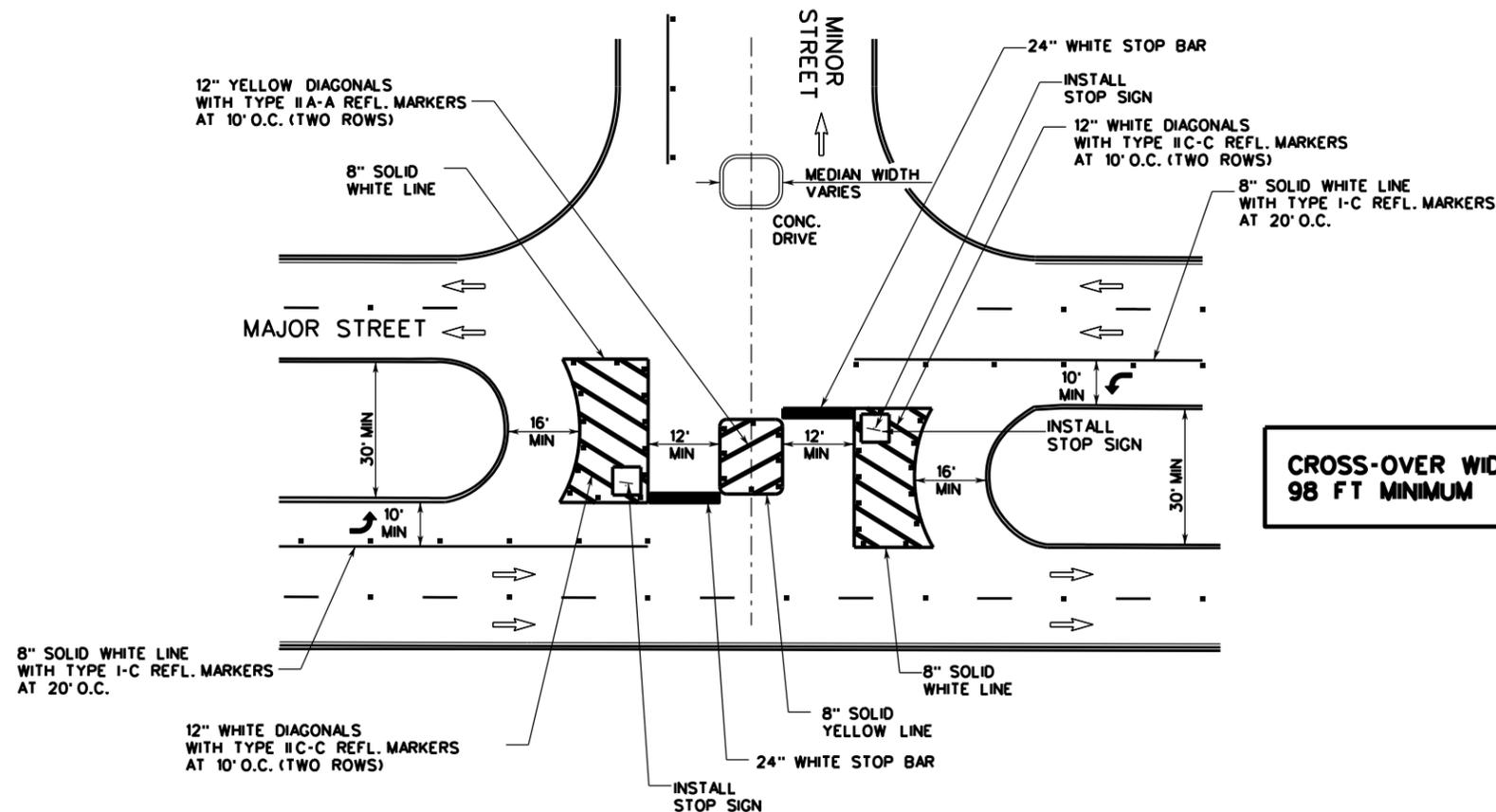


**CROSS-OVER WIDTH
98 FT MINIMUM**

NOTE:

1. REFER TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET.
2. SEE MISC. CROSS-OVER DETAIL FOR APPLICABLE INFORMATION.
3. ALL MEDIANS SHALL BE FIELD MEASURED TO DETERMINE THE LOCATION OF NECESSARY STRIPING, STOP BARS AND CENTERLINES SHALL BE PLACED WHEN THE MEDIAN WIDTH IS GREATER THAN 30 FT.
4. THE MEDIAN WIDTH IS DEFINED AS THE AREA BETWEEN TWO ROADWAYS OF A DIVIDED HIGHWAY MEASURED FROM EDGE OF TRAVELED WAY TO EDGE OF TRAVELED WAY. THE MEDIAN EXCLUDES TURN LANES.
5. THE MEDIAN WIDTH MIGHT BE DIFFERENT BETWEEN INTERSECTIONS, INTERCHANGES AND OF OPPOSITE APPROACHES OF THE SAME INTERSECTION.
6. THE NARROW MEDIAN WIDTH WILL BE THE CONTROLLING WIDTH TO DETERMINE IF MARKINGS ARE REQUIRED.

**CROSS-OVER MEDIAN OPENING WITH
TURN AROUND STRIPING "TEE" INTERSECTION**



**CROSS-OVER WIDTH
98 FT MINIMUM**

SEPTEMBER 2009

CITY OF SAN ANTONIO

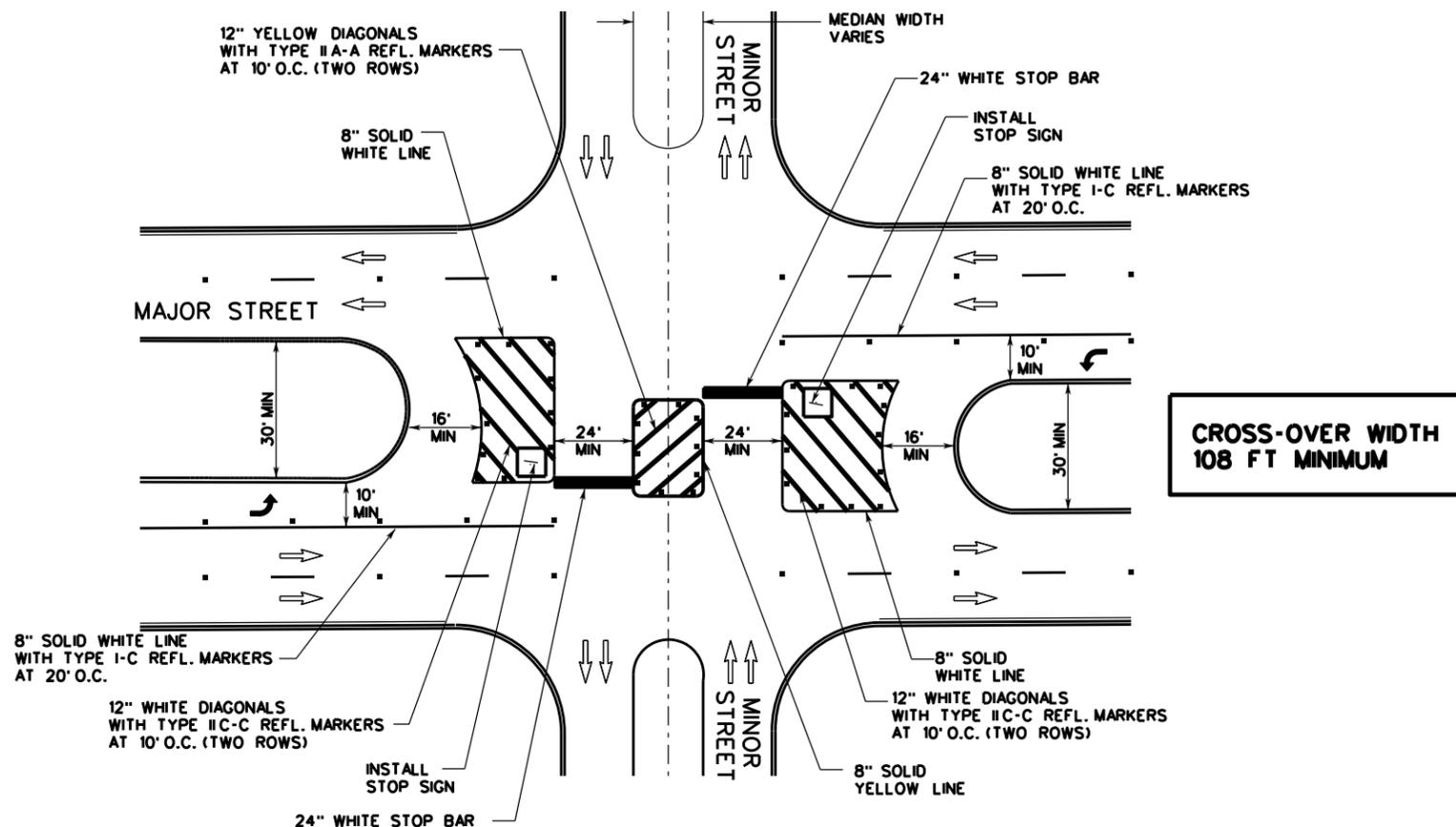
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS
STANDARD CROSS-OVER
MEDIAN OPENING 1

SHEET 14 OF 16

DRWN. BY: LAN	PROJECT NO.:	DATE:
DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: 34 OF 60

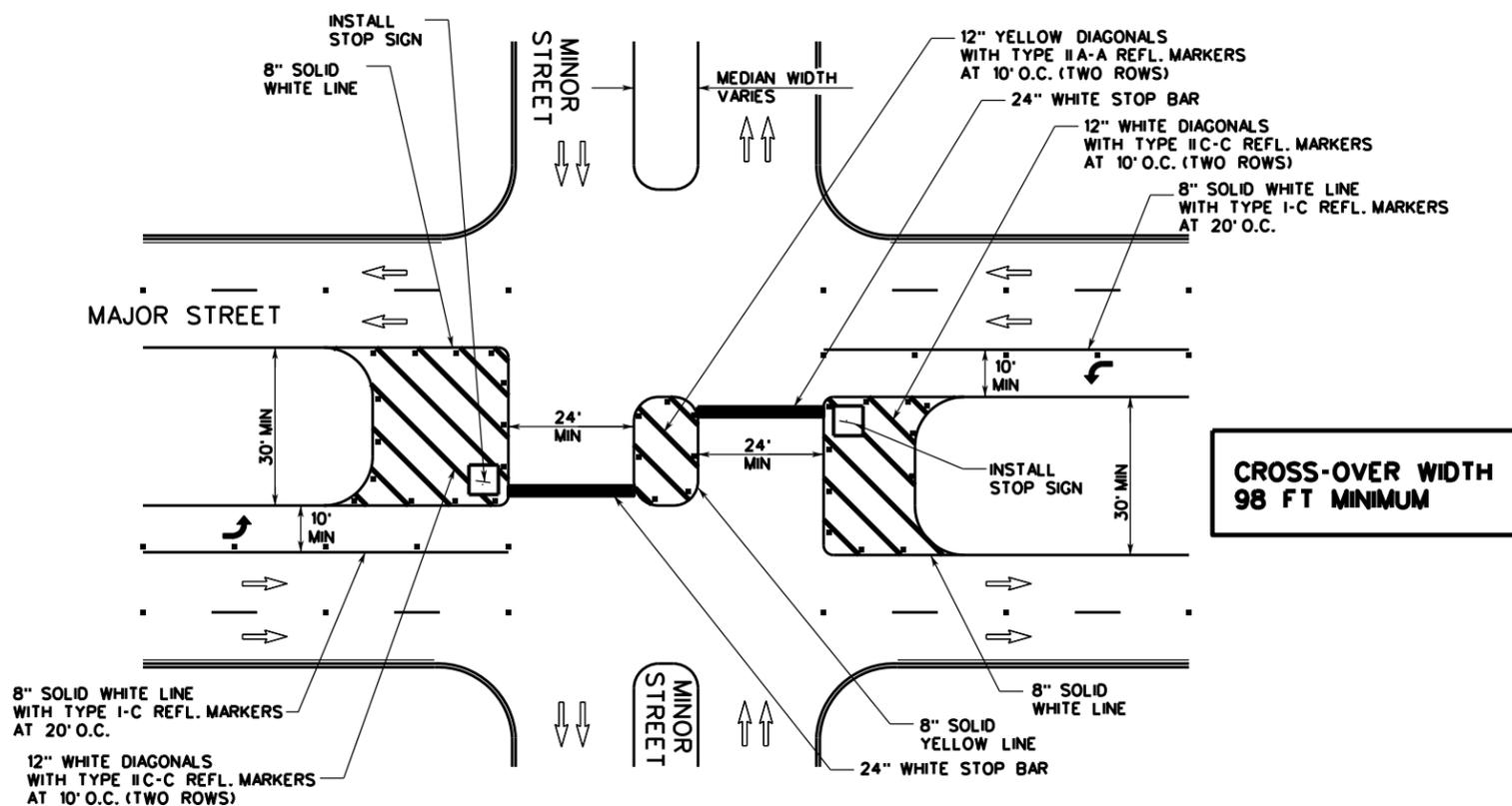
**CROSS-OVER MEDIAN OPENING WITH
TURN AROUND STRIPING FOUR-WAY INTERSECTION**



NOTE:

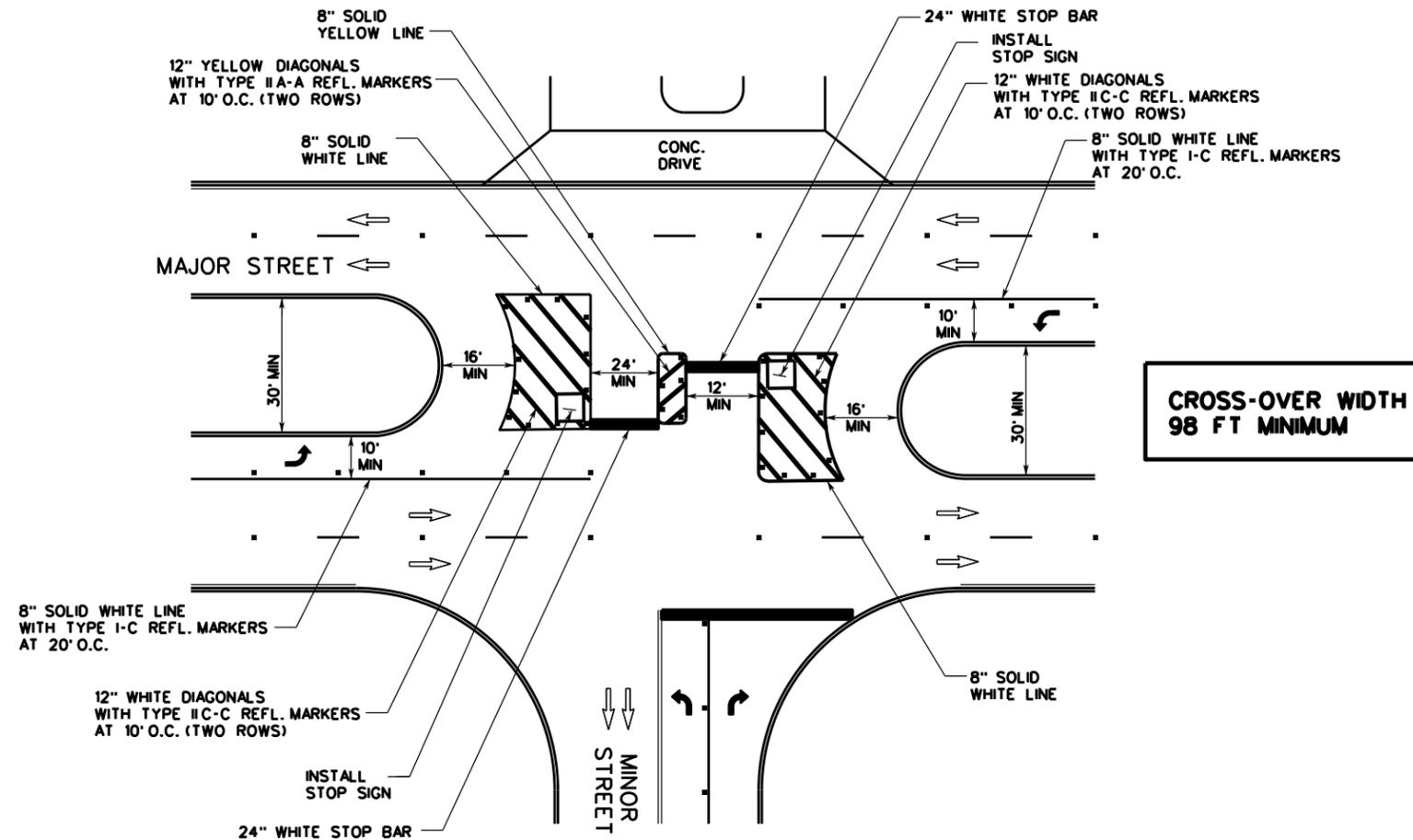
1. REFER TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET.
2. SEE MISC. CROSS-OVER DETAIL FOR APPLICABLE INFORMATION.
3. ALL MEDIANS SHALL BE FIELD MEASURED TO DETERMINE THE LOCATION OF NECESSARY STRIPING, STOP BARS AND CENTERLINES SHALL BE PLACED WHEN THE MEDIAN WIDTH IS GREATER THAN 30 FT.
4. THE MEDIAN WIDTH IS DEFINED AS THE AREA BETWEEN TWO ROADWAYS OF A DIVIDED HIGHWAY MEASURED FROM EDGE OF TRAVELED WAY TO EDGE OF TRAVELED WAY. THE MEDIAN EXCLUDES TURN LANES.
5. THE MEDIAN WIDTH MIGHT BE DIFFERENT BETWEEN INTERSECTIONS, INTERCHANGES AND OF OPPOSITE APPROACHES OF THE SAME INTERSECTION.
6. THE NARROW MEDIAN WIDTH WILL BE THE CONTROLLING WIDTH TO DETERMINE IF MARKINGS ARE REQUIRED.

**CROSS-OVER MEDIAN OPENING WITHOUT
TURN AROUND STRIPING FOUR-WAY INTERSECTION**



SEPTEMBER 2009			
CITY OF SAN ANTONIO			
DEPARTMENT OF PUBLIC WORKS			
TRAFFIC ENGINEERING STANDARDS			
STANDARD CROSS-OVER			
MEDIAN OPENING 2			
SHEET 15 OF 16			
100% SUBMITTAL	PROJECT NO.:	DATE:	
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: 35 OF 60

**CROSS-OVER MEDIAN OPENING WITH
TURN AROUND STRIPING "TEE" INTERSECTION**



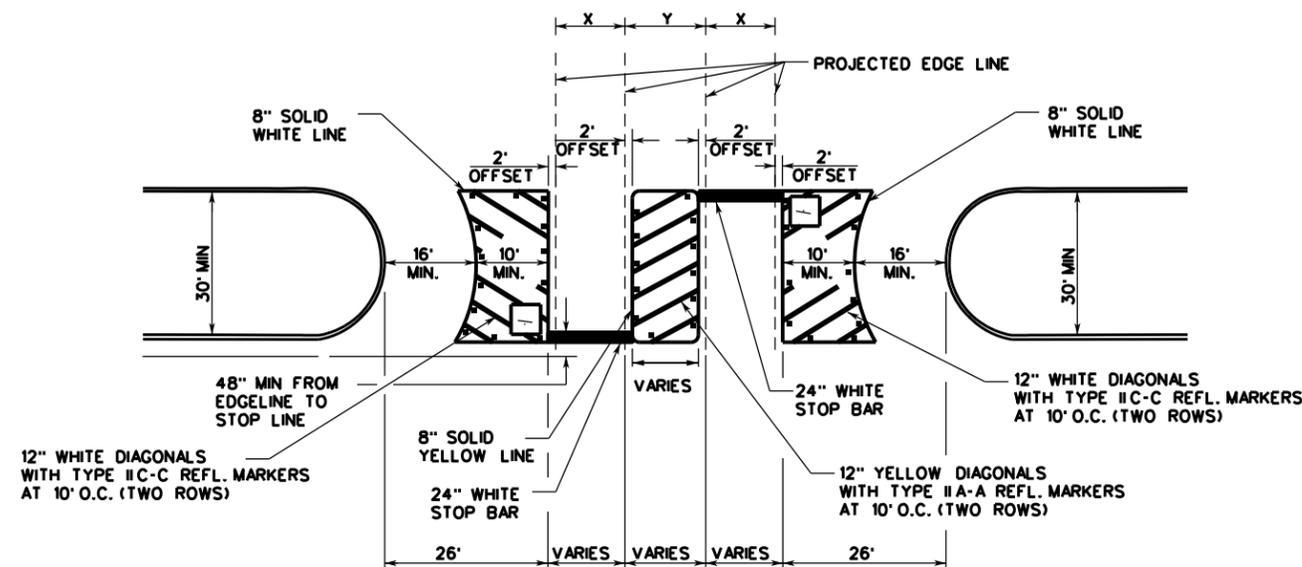
NOTE:

1. REFER TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET.
2. SEE MISC. CROSS-OVER DETAIL FOR APPLICABLE INFORMATION.
3. ALL MEDIANS SHALL BE FIELD MEASURED TO DETERMINE THE LOCATION OF NECESSARY STRIPING, STOP BARS AND CENTERLINES SHALL BE PLACED WHEN THE MEDIAN WIDTH IS GREATER THAN 30 FT.
4. THE MEDIAN WIDTH IS DEFINED AS THE AREA BETWEEN TWO ROADWAYS OF A DIVIDED HIGHWAY MEASURED FROM EDGE OF TRAVELED WAY TO EDGE OF TRAVELED WAY. THE MEDIAN EXCLUDES TURN LANES.
5. THE MEDIAN WIDTH MIGHT BE DIFFERENT BETWEEN INTERSECTIONS, INTERCHANGES AND OF OPPOSITE APPROACHES OF THE SAME INTERSECTION.
6. THE NARROW MEDIAN WIDTH WILL BE THE CONTROLLING WIDTH TO DETERMINE IF MARKINGS ARE REQUIRED.

**MISCELLANEOUS CROSS-OVER DETAIL WITH
TURN AROUND STRIPING**

NOTE:

1. X - ROADWAY WIDTH AND NUMBER OF LANES VARIES
2. Y - MEDIAN WIDTH VARIES



SEPTEMBER 2009

CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS

STANDARD CROSS-OVER

MEDIAN OPENING 3

SHEET 16 OF 16

DRWN. BY: LAN	PROJECT NO.:	DATE:
DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: 36 OF 60

TRAFFIC NOTES

TRENCHING / EXCAVATING

The following notes shall apply to excavations of trenches or pits that are located in the pavement or are within six (6) feet of the edge of roadway:

- 1.) Trench walls shall not be closer than three (3) feet from the edge of the traveled way at any stage of construction.
- 2.) Traffic control devices shall be in place before starting any excavation.
- 3.) Trenches or pits will not be permitted to be bridged by steel plates and open to traffic unless they are temporarily backfilled to finished street grade.
- 4.) For pits or trenches along or in a roadway that are going to be left open over night that are zero to fifty (0 - 50) feet in length, the following applies. GUARD RAIL OR CONCRETE BARRIER SHALL BE USED.
- 5.) For pits or trenches along or in roadway that are going to be left open over night and are longer than 50 feet in length. CONCRETE BARRIERS MUST BE USED.
- 6.) Plastic construction fencing shall be required for any trench or pit left open over night.
- 7.) When using any guardrail or concrete barrier, protected end must be used as per the TEXAS-M.U.T.C.D.
- 8.) For vertical drop-offs greater than two (2) feet along roadway, low profile concrete with appropriate end protection must be installed.
- 9.) All concrete barriers placed on City R.O.W shall be low profile. No high profile barriers will be allowed.

REFLECTIVE SHEETING

The reflectorized white and reflectorized orange stripes for channelizing devices such as barricade drums and vertical panels shall be constructed of reflective sheeting meeting the color and retro-reflectivity requirements of high intensity, unless otherwise specified in the plans.

MAINTENANCE

- 1.) All traffic signs shall be kept in proper position, clean and legible at all times. Damaged barricades, signs, and other traffic control devices shall be replaced without undue delay.
- 2.) To ensure adequate maintenance, a suitable schedule for inspection, cleaning, and replacement of barricades, lights, and signs shall be established.
- 3.) Special attention and necessary action shall be taken to see that weeds, trees, shrubbery and construction materials do not obscure the face of any sign or barricades.

TRAINING

Each person whose actions affect maintenance and construction zone safety, from the upper-level management personnel through construction and maintenance field personnel, should receive training appropriate to the job decision each individual is required to make. Only those individuals who are qualified by means of adequate training in safe traffic control practices and have a basic understanding of the principles established by applicable standards and regulations, including those of the TEXAS M.U.T.C.D. should supervise the selection, placement, and maintenance of traffic control devices in maintenance and construction areas.

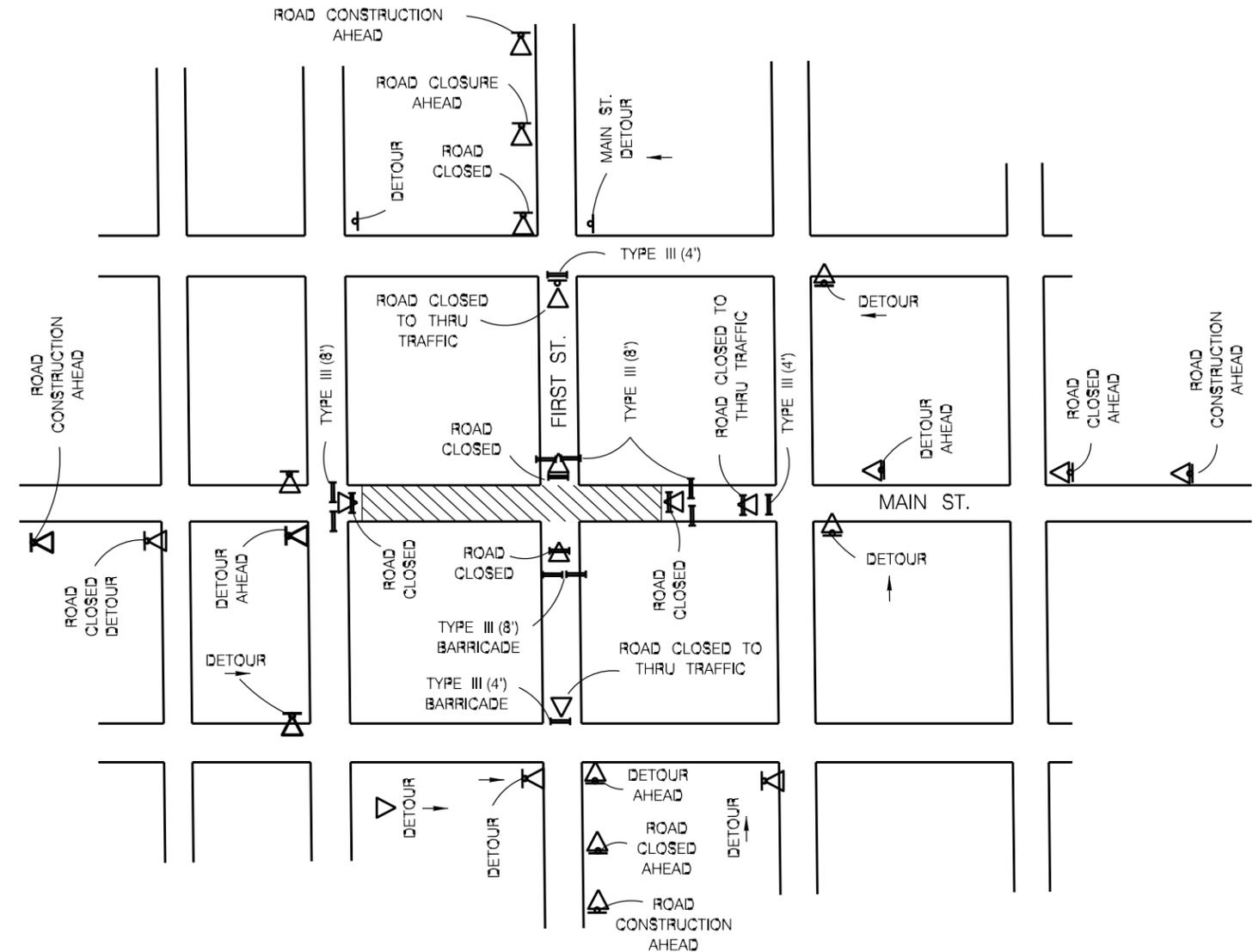
SPECIAL EVENTS BARRICADING

All Type I, (8') barricades used for special events (Dome, Runs, Walks, Parades etc.) shall be a minimum of 42" high and 96" wide. Any necessary signs will require proper sign stands.

USE OF CITY R.O.W.

The City of San Antonio reserves the right to allow contracting and barricading sub-contractors to use the City's R.O.W. The City also reserves the right to advise contractors and barricading sub-contractors to remove stored or unused traffic control devices from the City of San Antonio R.O.W. It is the barricading sub-contractor's responsibility to remove any traffic control device from City's R.O.W. when instructed to do so by a City representative.

CLOSURE DIAGRAMS



TYPICAL INTERSECTING STREET CLOSURE
FOR TWO LANE STREETS

NOTE:
ALL SIGNS WILL BE
MOUNTED ON SIGN
SUPPORTS ONLY

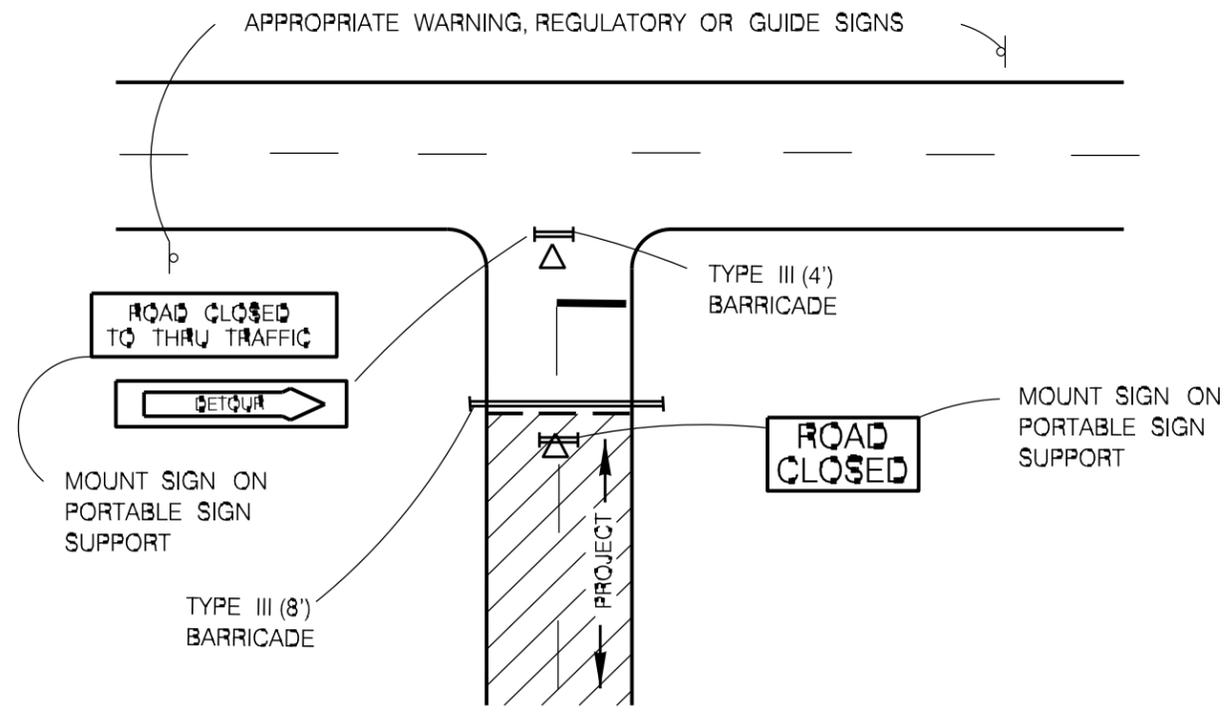
THE ORIGINAL OF THIS DRAWING WAS SIGNED AND SEALED BY JOHN D. FRIEBELE, #48394 ON 08-23-05 AND IS ON FILE WITH THE TRAFFIC ENGINEERING DIVISION OF THE PUBLIC WORKS DEPARTMENT, CITY OF SAN ANTONIO.

JUNE 2005

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

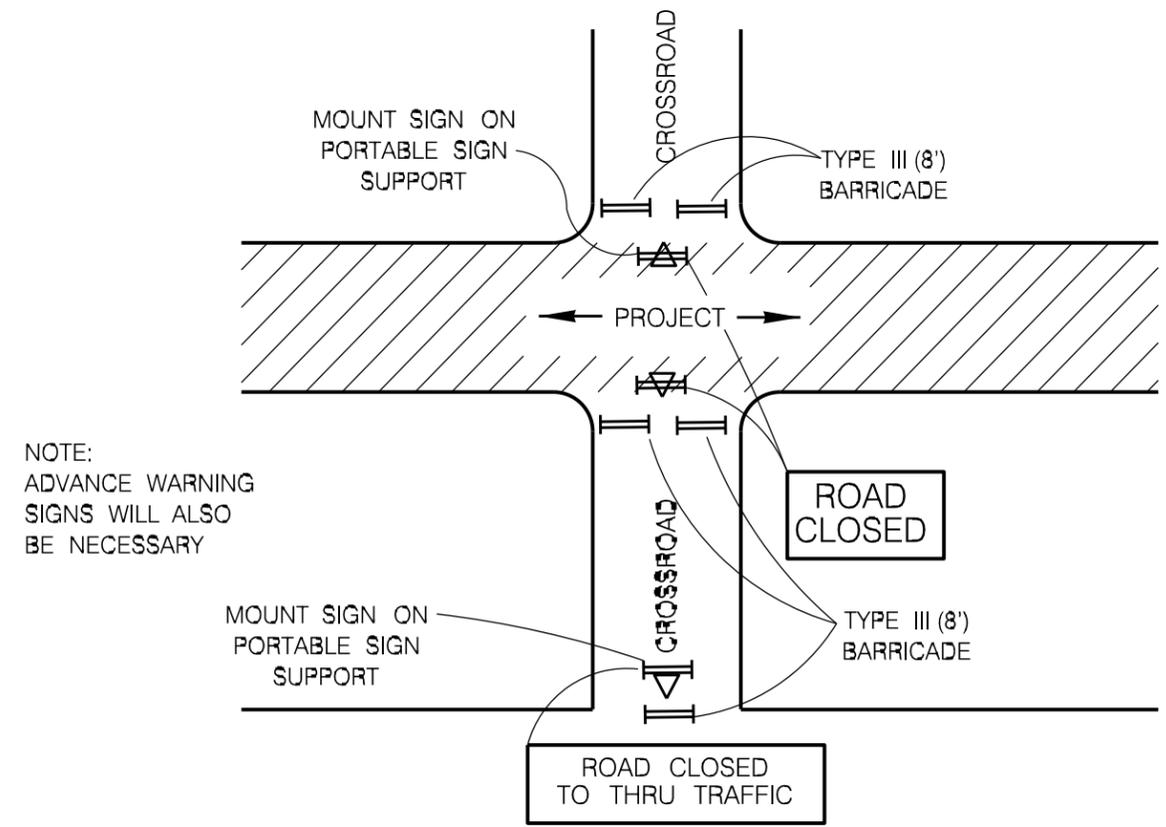
TRAFFIC STANDARDS
**BARRICADE AND CONSTRUCTION
STANDARDS**
SHEET 1 OF 4

<small>DATE:</small>	<small>PROJECT NO.:</small>	<small>DATE:</small>	<small>DATE:</small>
<small>DRWN. BY: A.F.G.</small>	<small>DSGN. BY: E.N.M.</small>	<small>CHKD. BY: J.D.F./E.N.M.</small>	<small>SHEET NO. 37 OF 80</small>



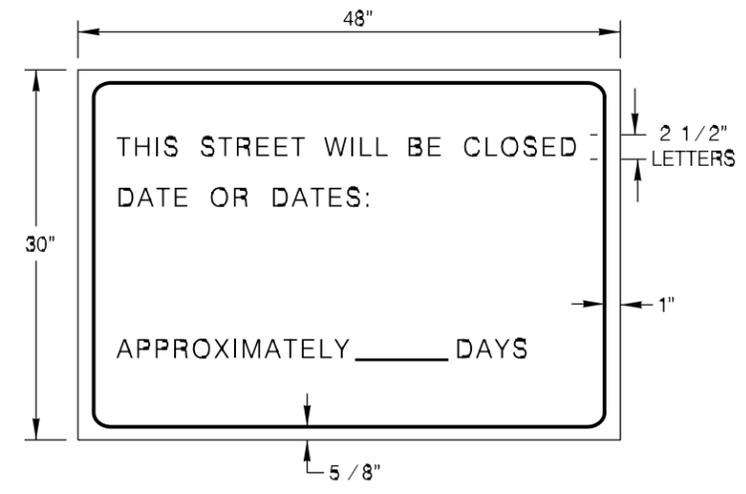
PROJECT LIMITS FOR CLOSED ROADWAY

BARRICADES SHALL BE ERECTED COMPLETELY ACROSS ROADWAY. CHANNELIZING DEVICES MAY BE DRUMS, VERTICAL PANELS OR CONES AS SPECIFIED IN THE PLANS

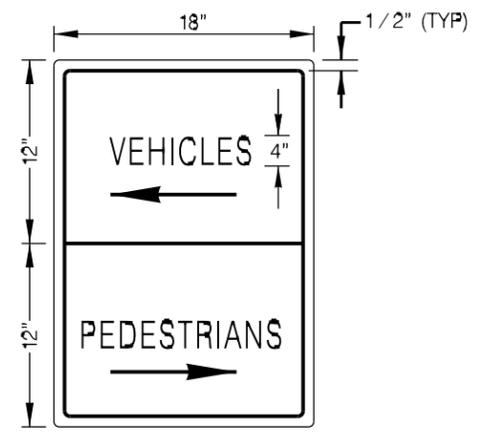


NOTE:
ADVANCE WARNING SIGNS WILL ALSO BE NECESSARY

CROSS STREET SIGNING AND BARRICADING TOTALLY CLOSED

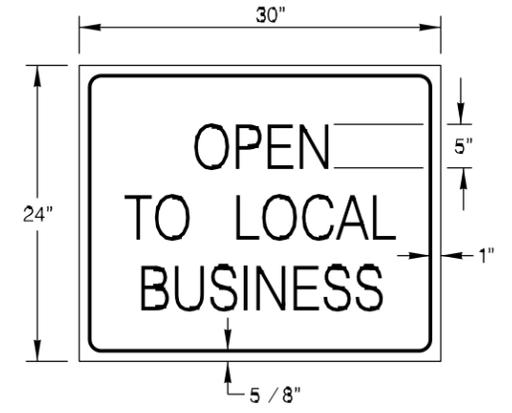


LETTERS- BLACK
BORDER- BLACK
BACKGROUND- ORANGE



LETTERS- BLACK
BORDER- BLACK
BACKGROUND- ORANGE
SPACING-3 SIGNS PER BLOCK

DIRECTION OF ARROWS ARE REVERSIBLE



LETTERS- WHITE
BORDER- WHITE
BACKGROUND- BLUE REFLECTIVE

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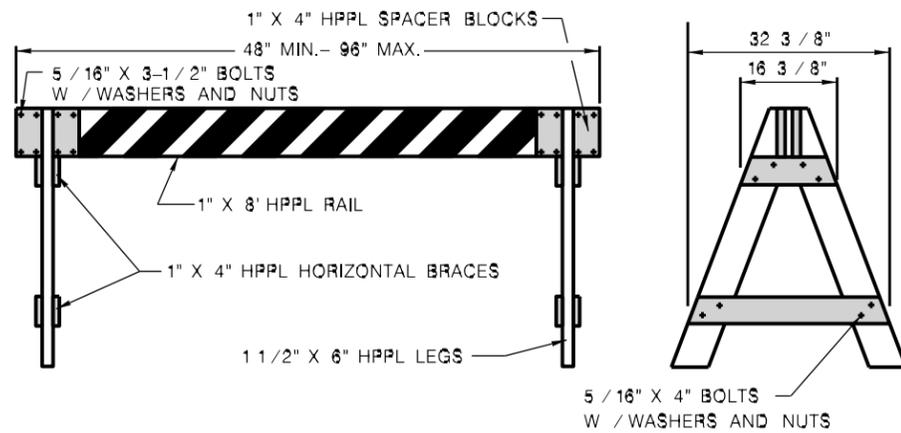
JUNE 2005

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC STANDARDS
BARRICADE AND CONSTRUCTION STANDARDS
SHEET 2 OF 4

DRAWN BY: A.F.G.	PROJECT NO.:	DATE:	SHEET NO. 38 OF 80
DESIGN BY: E.N.M.	CHKD. BY: J.D.F./E.N.M.		

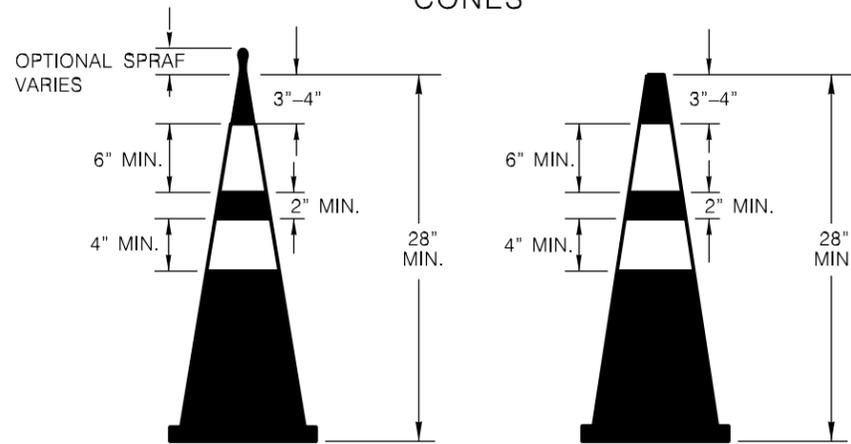
TYPE I BARRICADE



- 1.) Only the following Type I barricade shall be used in the City of San Antonio Right-Of-Way:
 - A. 1" x 8" plastic rail with 2" x 6" wooden legs.
 - B. 1" x 8" wooden rail with plastic legs.
 - C. 1" x 8" wooden rail with 2" x 6" wood legs.
 - D. No screws allowed for assembly of A-legs or rail.
 - E. Warning lights will be used as directed by the Traffic Engineer.
 - F. All Type I (4') barricades will be a minimum of 36" high and 60" wide. (For Construction Use Only)
 - G. All Type I (8') barricades with wooden legs shall be 2" X 6" wood only.
 - H. All Type I (4') barricades with wooden legs shall be 1" X 8" wood only.
- 2.) Type I Barricades shall not be used for partial and total street closures in construction work zones. Only Type III barricades shall be used for this purpose.
- 3.) Warning lights shall not be mounted on Type I barricades.

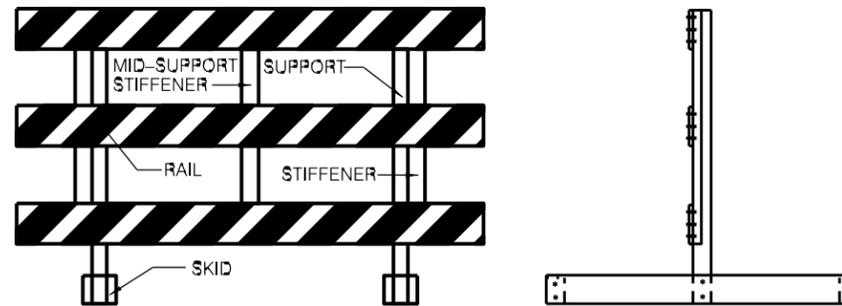
(See TxDOT BC-03 Sheets for specific construction information)

CONES



- 1.) Base for 28" high cones must weigh at least 9.5 lbs.
 - 2.) Night time cones must have reflective collars.
- (See TxDOT BC-03 Sheets for specific construction information)

Type III BARRICADE



- 1.) Only the following Type III barricade shall be used in the City of San Antonio Right-Of-Way.
 - A. Hollow polyvinyl or fiberglass tubing post with 1" X 8" wooden rails.
 - B. Hollow polyvinyl or fiberglass tubing post with plastic rails.
 - C. Skids must be wood or solid plastic only.
 - D. Warning lights shall not be mounted on Type III barricades.

(See TxDOT BC-03 Sheets for specific construction information)

TEMPORARY MARKINGS

- 1.) Solid double yellow painted lines shall be installed for temporary division of traffic or construction duration longer than five (5) days, with repainting to occur once monthly or at the discretion of the Traffic Engineer. (All cost of upkeep will be at the contractor's expense.)
- 2.) Solid double yellow tabs, or V/P panels shall be installed for temporary division of traffic for construction duration less than five (5) days, with re-tabbing to occur at the discretion of the Traffic Engineer. NAILS SHALL NOT BE USED TO FIX TABS TO CEMENT OR BASE (All cost of upkeep will be at the contractor's expense.)

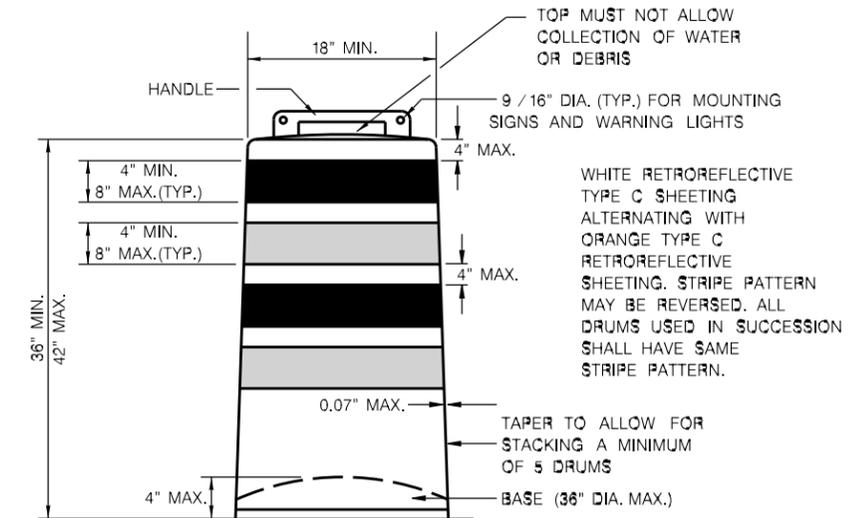
(See TxDOT BC-03 Sheets for specific construction information.)

TEMPORARY CONCRETE BARRIER

- 1.) All concrete barriers placed on City R.O.W. shall be low profile.
- 2.) No high profile barriers will be allowed.
- 3.) Reflectors will be required on each concrete barrier.

(See TxDOT BC-03 Sheets for specific construction information)

PLASTIC DRUMS



- 1.) 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).
- 2.) 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.
- 3.) The Engineer/Inspector shall provide written notice to the Contractor regarding the replacement of drums or other traffic control devices. The Contractor shall have a maximum of 24 hours to replace any plastic drums or other traffic control devices identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.
- 4.) Each drum must have a 40 lb. rubber or plastic snap on.
- 5.) No signs larger than 18" X 24" will be allowed to be mounted on plastic drums.
- 6.) No warning lights will be allowed to be mounted on plastic barrels.
- 7.) In lieu of a warning light, a yellow reflector will be acceptable.

(See TxDOT BC-03 Sheets for specific construction information)

JUNE 2005

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

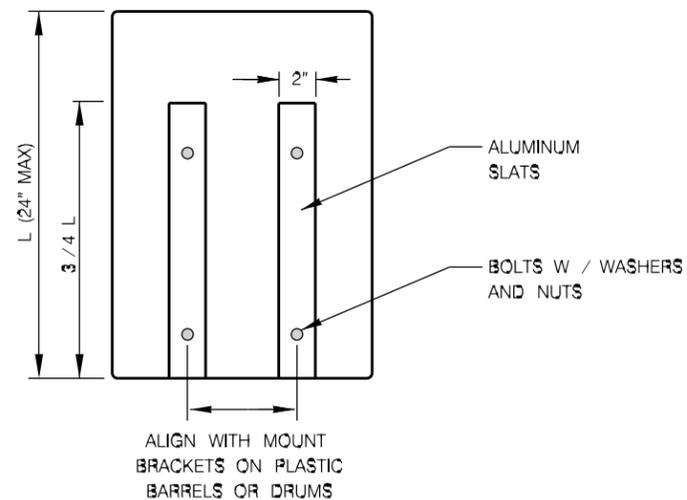
TRAFFIC STANDARDS
BARRICADE AND CONSTRUCTION
STANDARDS
SHEET 3 OF 4

THE ORIGINAL OF THIS DRAWING WAS SIGNED AND SEALED BY JOHN D. FRIEBELE, #46394 ON 06-20-05 AND IS ON FILE WITH THE TRAFFIC ENGINEERING DIVISION OF THE PUBLIC WORKS DEPARTMENT, CITY OF SAN ANTONIO.

DATE:	PROJECT NO.:	SUBMITTAL %:
SHEET NO. 39 OF 80	CHKD. BY: J.D.F./E.N.M.	DSGN. BY: E.N.M.
	DRWN. BY: A.F.G.	

SIGNS

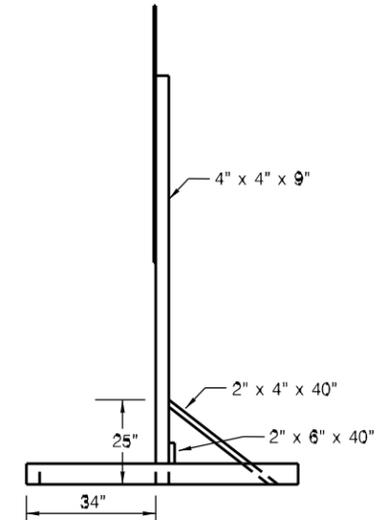
- 1.) A maximum of two signs can be mounted on any one Long / Intermediate Term Stationary Portable Sign Support.
- 2.) 48" X 48" signs shall be mounted separately on the Long / Intermediate Term Stationary Portable Sign Support.
- 3.) For Short Term Stationary Portable Sign Support the distance from the bottom of the vinyl sign to the existing ground must be one (1) foot.
- 4.) Long / Intermediate Term Stationary Portable Signs must be made of wood or plastic only.
- 5.) No signs shall be mounted to any Type I, Type III, or folding barricades.
- 6.) Signs shall be mounted only on TxDOT approved sign supports.
- 7.) Detour signs will be mounted on single "D" legs w / 7' clearance from the bottom of the sign.
- 8.) WORK DURATION TERMINOLOGY
 Long Term Stationary = occupies a location 3 or more days.
 Intermediate-Term Stationary = occupies a location for overnight to 3 days.
 Short Term Stationary = daylight work that occupies a location from 1 to 12 hours.
 Short Duration = occupies a location up to 1 hour.
- 9.) Signs shall adhere to the following requirements:
 - Signs placed on plastic barrels or drums shall be made of ABS plastic or plywood.
 - Signs placed on skids shall be made of plywood or aluminum.
 - Aluminum signs shall have a minimum thickness of 0.08".
 - Plywood signs shall have a minimum thickness of 1 / 2".
 - ABS Plastic signs shall have a minimum thickness of 0.13".
 Plastic signs cannot exceed 18" by 24" in size and shall be reinforced with 2" wide, 0.08" thick aluminum slats, as depicted below:



- No other material shall be accepted without the express written approval of the Traffic Engineer.

(See TxDOT BC-03 Sheets for specific construction information.)

LONG TERM / INTERMEDIATE TERM SIGN SUPPORT



- 1.) 48" X48" signs must be mounted independently.
- 2.) A maximum of two signs can be mounted on any one long term / intermediate sign support.
- 3.) Sand bag all sign supports.
- 4.) Distance from the bottom of the sign to the existing ground shall be 7'.
- 5.) Distance from the header barricade rail to the face of the sign panel shall be 2' min. and 10' max.
- 6.) Steel tripods shall not be allowed.

(See TxDOT BC-03 Sheets for specific construction information)

JUNE 2005

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

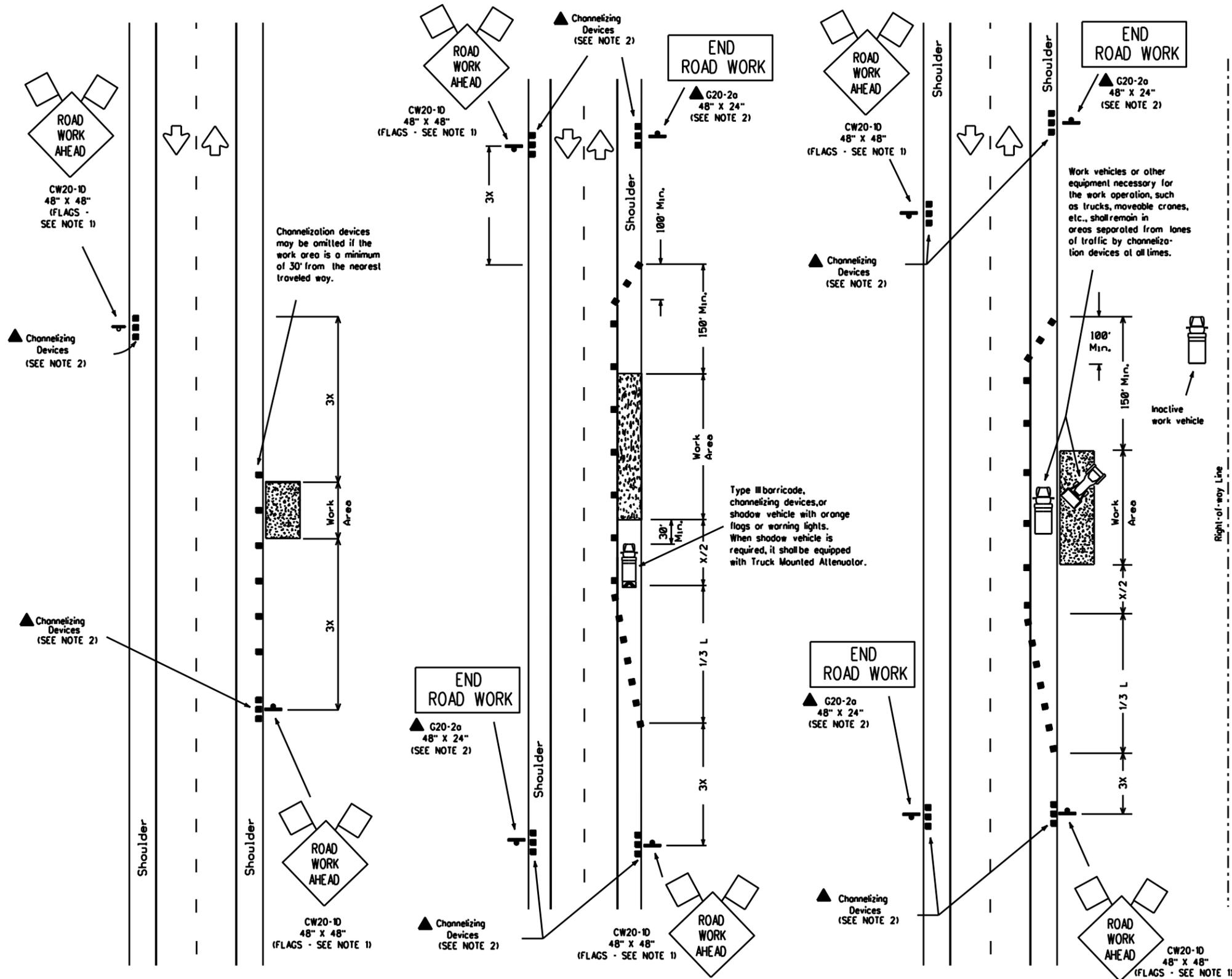
TRAFFIC STANDARDS
BARRICADE AND CONSTRUCTION
STANDARDS
SHEET 4 OF 4

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DATE:	PROJECT NO.:	DATE:
DRWN. BY: A.F.G.	DSGN. BY: E.N.M.	CHKD. BY: J.D.F./E.N.M.
SHEET NO.: 40		OF 80

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DATE:
FILE:



LEGEND

- Type III Barricade
- Channelizing Devices
- Flag
- Heavy Work Vehicle
- Truck Mounted Attenuator
- Trailer Mounted Flashing Arrow Panel
- Portable Changeable Message Sign
- Flagger
- Sign Post

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

\times Conventional Roads Only
 $\times \times$ 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:**
- Unless otherwise stated in the plans, flags attached to signs 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.
 - On high speed facilities advance warning signs should be installed approximately 3X from the work area or from the beginning of a lane or shoulder taper. On low speed facilities the advance warning signs should be placed based on the "X" minimum distance.
 - Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
 Traffic Operations Division - TE
 Texas Department of Transportation
 125 East 11th Street
 Austin, Texas 78701-2483
 Phone (512) 416-3335
 Fax (512) 416-3161
 E-mail TRF-STANDARD@mtaiga.dot.state.tx.us

The requirement for shadow vehicles will be listed in the project GENERAL NOTES, Item 502, Barricades, Signs and Traffic Handling.

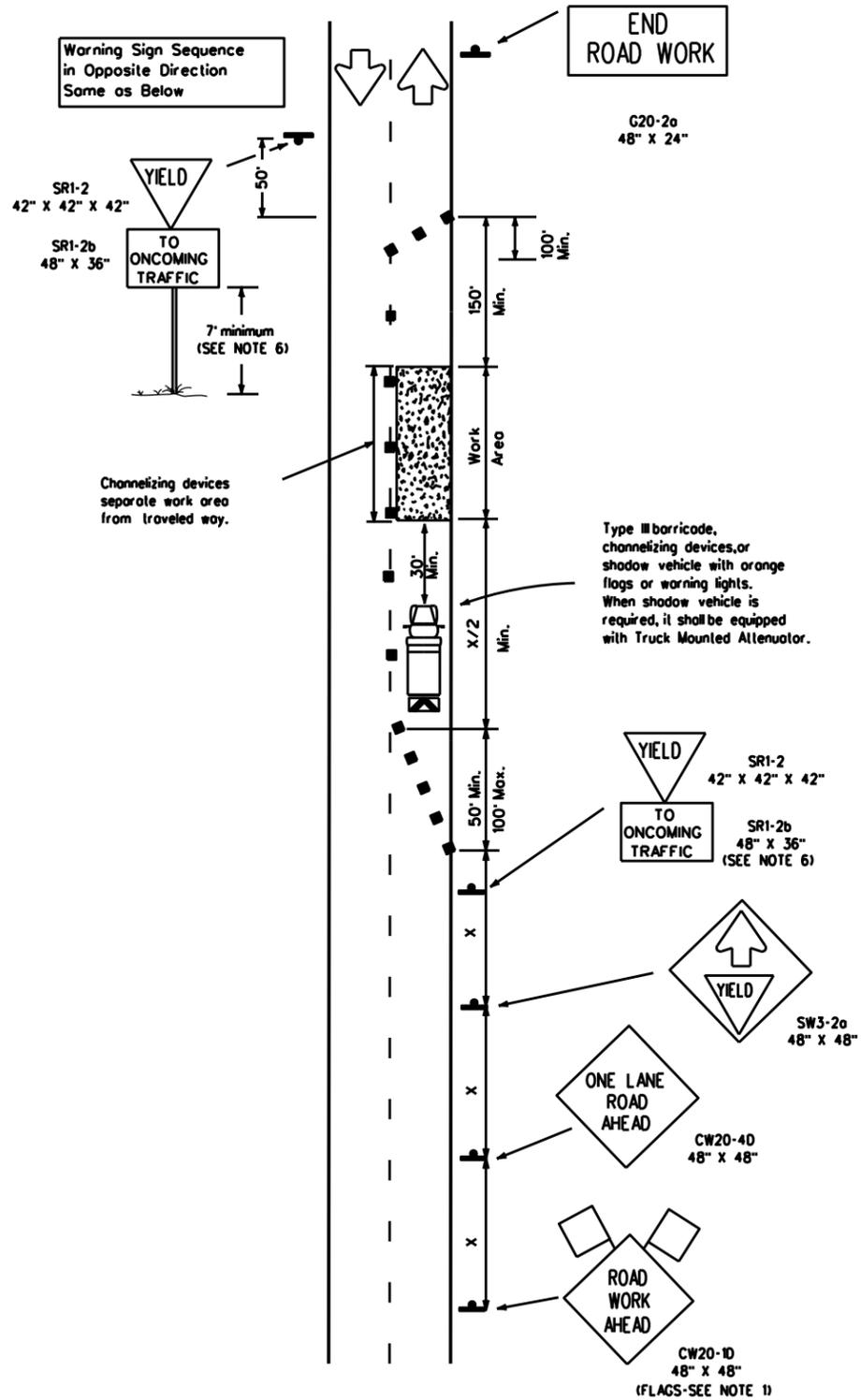


TRAFFIC CONTROL PLAN
TCP(1-1)-98

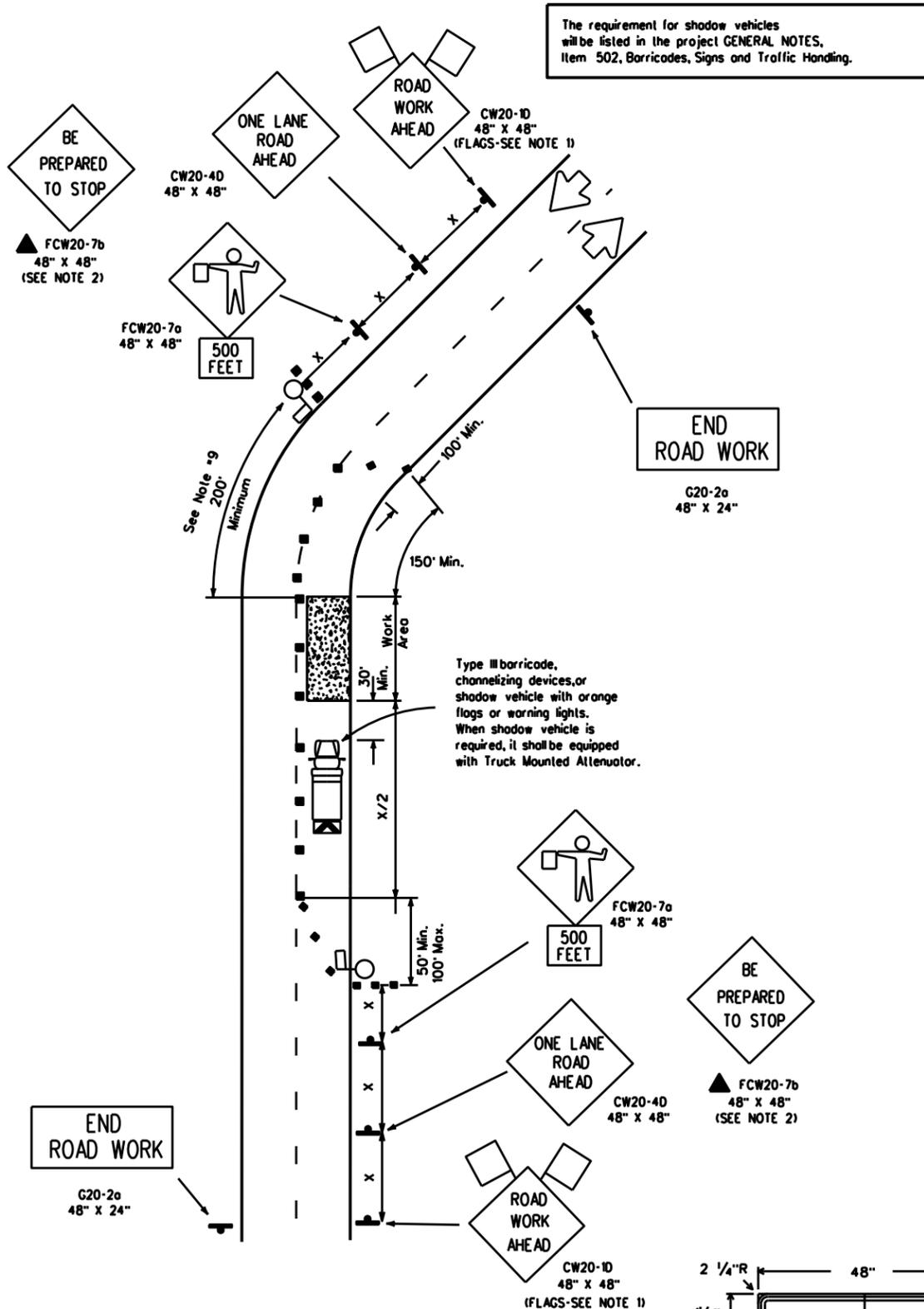
© TxDOT December 1985		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS		CONT	SECT	JOB	HIGHWAY
2-94					
8-95					
1-97					
4-98					
		DIST	COUNTY		SHEET NO.
				41	

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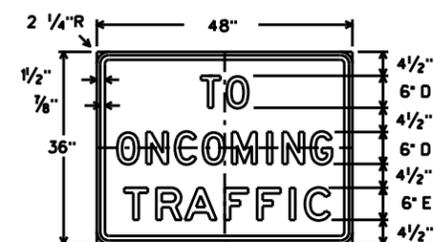
DATE:
FILE:



TCP (1-2a)
One Lane Closed
Adequate Field of View



TCP (1-2b)
One Lane Closed
Inadequate Field of View



SRI-2b
48" x 36"
Letters - Black
Background - White
Reflective

LEGEND

Type III Barricade

Channelizing Devices

Flag

Heavy Work Vehicle

Truck Mounted Attenuator

Trailer Mounted Flashing Arrow Panel

Portable Changeable Message Sign

Flagger

Sign Post

Posted Speed x	Formula	Minimum Desirable Taper Lengths x x			Suggested Maximum Spacing of Device		Minimum Sign Spacing x Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
30	L = WS ² / 60	150'	165'	180'	30'	60'-75'	120'
35		205'	225'	245'	35'	70'-90'	160'
40		265'	295'	320'	40'	80'-100'	240'
45	L + WS	450'	495'	540'	45'	90'-110'	320'
50		500'	550'	600'	50'	100'-125'	400'
55		550'	605'	660'	55'	110'-140'	500'
60		600'	660'	720'	60'	120'-150'	x 600'
65		650'	715'	780'	65'	130'-165'	x 700'
70	700'	770'	840'	70'	140'-175'	x 800'	

x Conventional Roads Only
 x x 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 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.
 - The BE PREPARED TO STOP sign may be installed after the ONE LANE ROAD AHEAD sign, but proper sign spacing shall be maintained.
 - ROAD WORK AHEAD sign may be repeated if the visibility of the work zone is less than 1500'.
TCP(1-2a)
 - YIELD sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work zones should be no longer than one half city block. In rural areas on roadways with less than 4000 ADT, work areas should be no longer than 400'.
 - YIELD TO ONCOMING TRAFFIC sign shall be placed on a support at a 7' minimum mounting height.
TCP(1-2b)
 - Flaggers should use two-way radios or other methods of communication to control traffic.
 - Length of work area should be based on the ability of flaggers to communicate.
 - Distance along curve of work area should be adequate length for motorists to identify and react to flagger signals.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
 Traffic Operations Division - TE
 Texas Department of Transportation
 125 East 11th Street
 Austin, Texas 78701-2483
 Phone (512) 416-3335
 Fax (512) 416-3981
 E-mail TRF-STANDARDS@mta.dot.state.tx.us

Texas Department of Transportation
 Traffic Operations Division

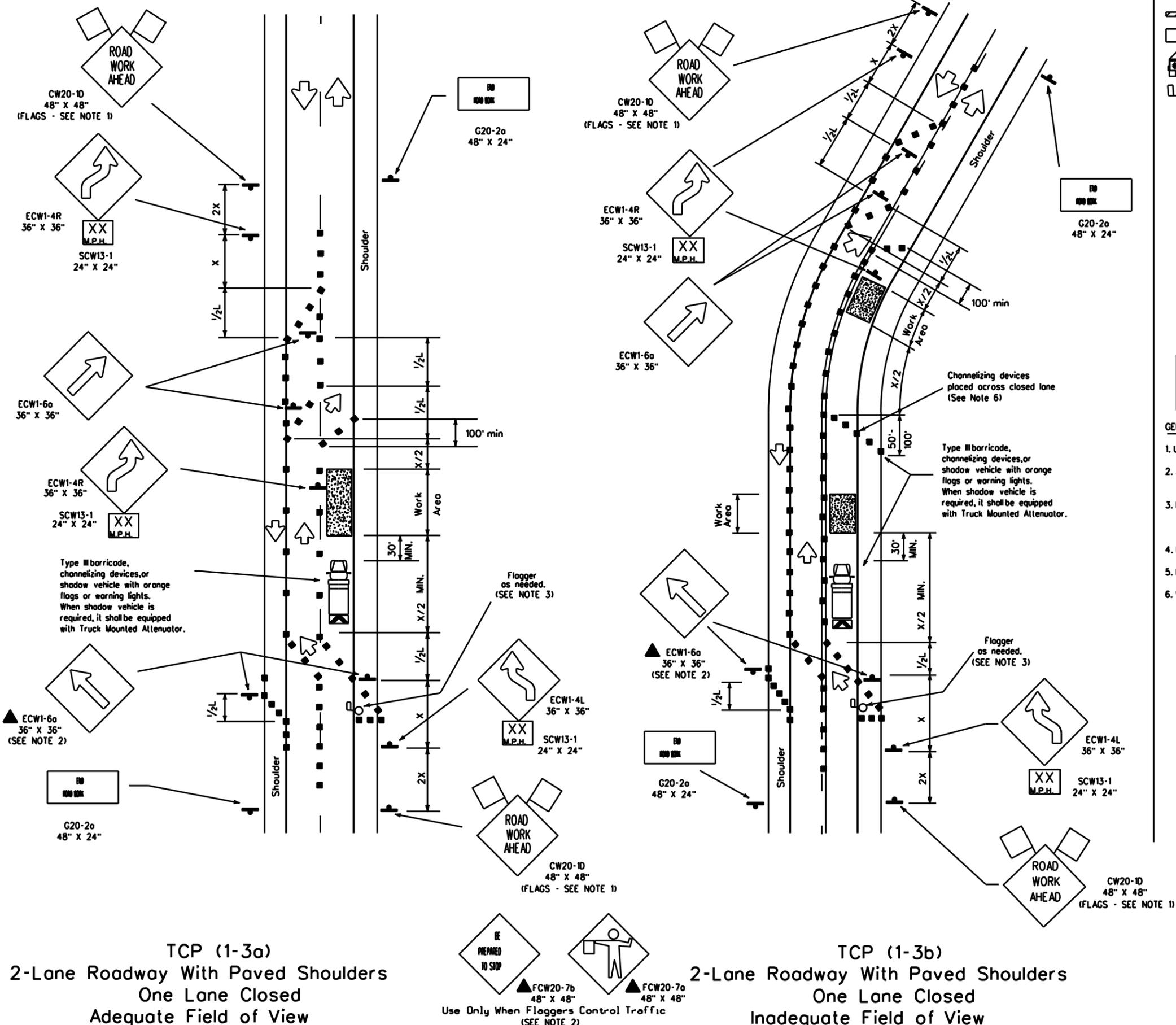
TRAFFIC CONTROL PLAN

TCP(1-2)-98

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REVISIONS	CONT	SECT	JOB	HIGHWAY
4-90				
2-94				
1-97				
4-98				
	DIST		COUNTY	SHEET NO.
				42

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DATE:
FILE:



TCP (1-3a)
2-Lane Roadway With Paved Shoulders
One Lane Closed
Adequate Field of View

BE PREPARED TO STOP
FCW20-7b 48" X 48"
FCW20-7a 48" X 48"
Use Only When Floggers Control Traffic (SEE NOTE 2)

TCP (1-3b)
2-Lane Roadway With Paved Shoulders
One Lane Closed
Inadequate Field of View

LEGEND

- Type III Barricade
- Channelizing Devices
- Flag
- Heavy Work Vehicle
- Truck Mounted Attenuator
- Trailer Mounted Flashing Arrow Panel
- Portable Changeable Message Sign
- Fogger
- Post

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

\times Conventional Roads Only
 $\times \times$ 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:
- Unless otherwise stated in the plans, flags attached to signs are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted by the triangle symbol may be omitted when stated elsewhere in the plans.
 - Fogger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safety control traffic. Additional floggers should be positioned at end of traffic queues unless 24" x 24" STOP/SLOW paddle is used.
 - DO NOT PASS, PASS WITH CARE, and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
 - ROAD WORK AHEAD sign may be repeated if the visibility of the work zone is less than 1500'.
 - When the work zone is made up of several work areas, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500' to 1000' in urban areas and every 1/4 to 1/2 mile in rural areas.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
 Traffic Operations Division - TE
 Texas Department of Transportation
 125 East 11th Street
 Austin, Texas 78701-2483
 Phone (512) 415-3335
 Fax (512) 415-3151
 E-mail TRF-STANDARD@mtgpa.dot.state.tx.us

The requirement for shadow vehicles will be listed in the project GENERAL NOTES, Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
 Traffic Operations Division

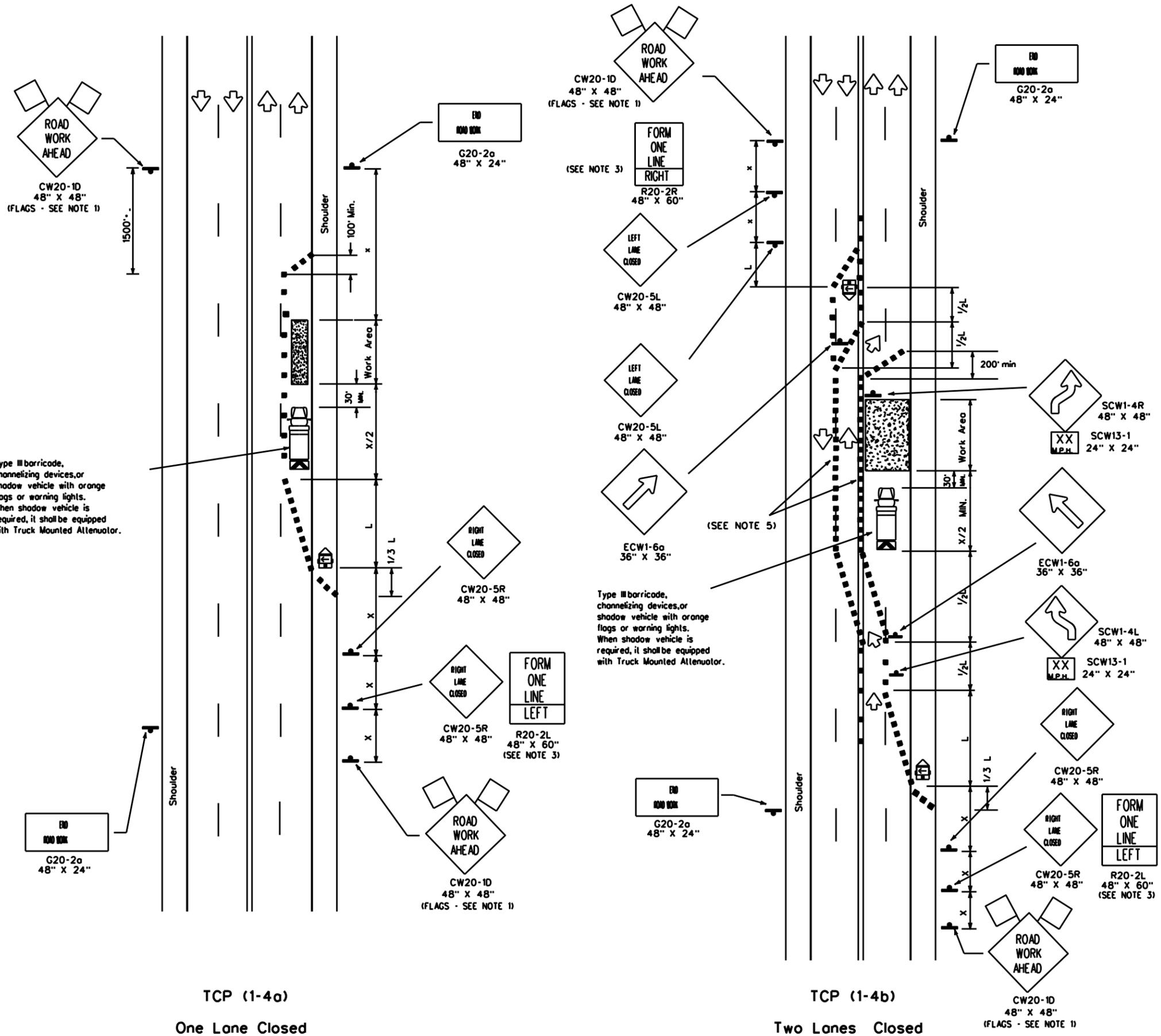
TRAFFIC CONTROL PLAN

TCP(1-3)-98

© TxDOT December 1985		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS		CONT	SECT	JOB	HIGHWAY
2-94					
8-95					
1-97					
4-98					
DIST		COUNTY		SHEET NO.	
				43	

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DATE:
FILE:



LEGEND

	Type III Barricade		Channelizing Devices		Flag
	Heavy Work Vehicle		Truck Mounted Attenuator		
	Trailer Mounted Flashing Arrow Panel		Portable Changeable Message Sign		
	Flagger		Post		

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

\times Conventional Roads Only
 $\times \times$ 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
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		

- GENERAL NOTES:**
- Unless otherwise stated in the plans, flags attached to the signs 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.
 - The FORM ONE LANE LEFT sign may be used following the RIGHT LANE CLOSED sign. Spacing distance between signs should be the minimum distance indicated.
 - ROAD WORK AHEAD sign may be repeated if the visibility of the work zone is less than 1500'.
 - If pavement markings are not removed and traffic is directed over a double yellow centerline, the maximum spacing of channelizing devices in a tangent section should be no greater than 10 feet.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
 Traffic Operations Division - TE
 Texas Department of Transportation
 125 East 11th Street
 Austin, Texas 78701-2483
 Phone (512) 416-3335
 Fax (512) 416-3161
 E-mail TRF-STANDARD@moiga.doi.state.tx.us

The requirement for shadow vehicles will be listed in the project GENERAL NOTES, Item 502, Barricades, Signs and Traffic Handling.

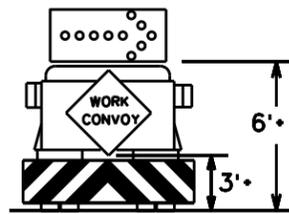


TRAFFIC CONTROL PLAN

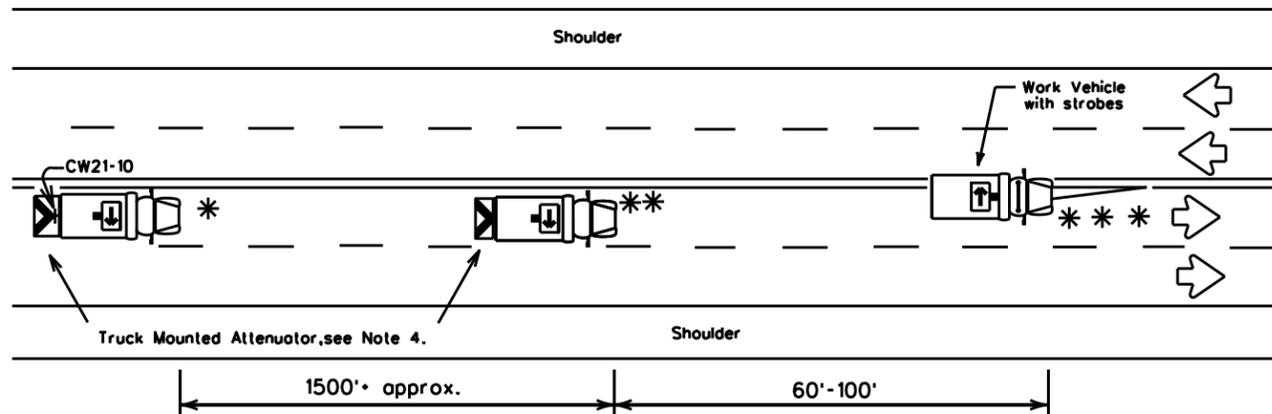
TCP(1-4)-98

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1-97		DIST	COUNTY	SHEET NO.
4-98				44

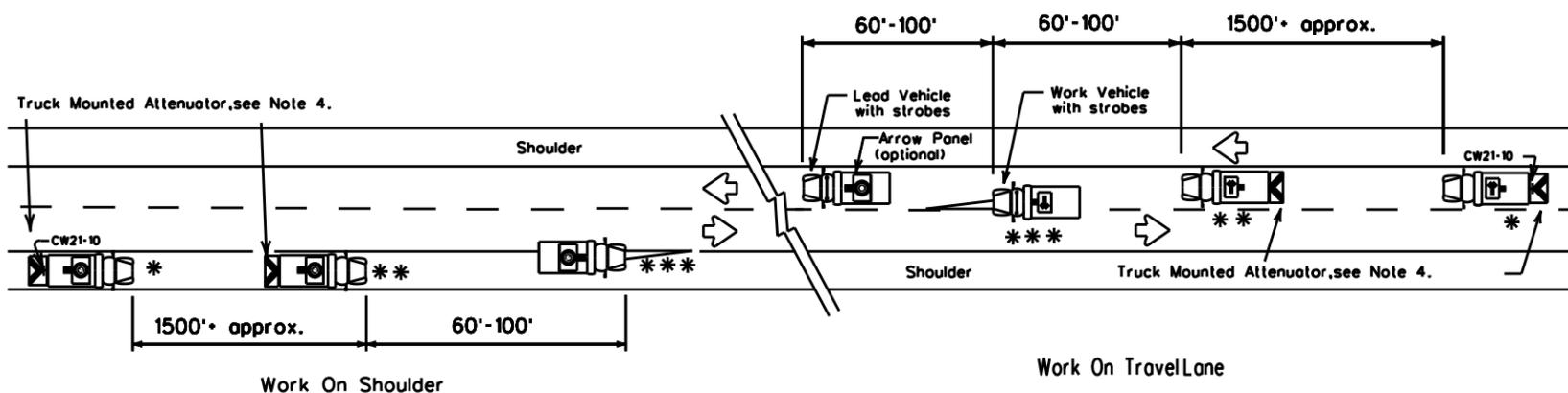
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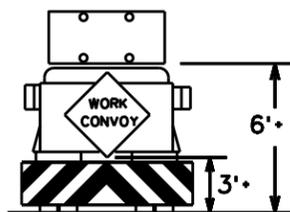
Typical Trail Vehicle with RIGHT Directional display Flashing Arrow Panel



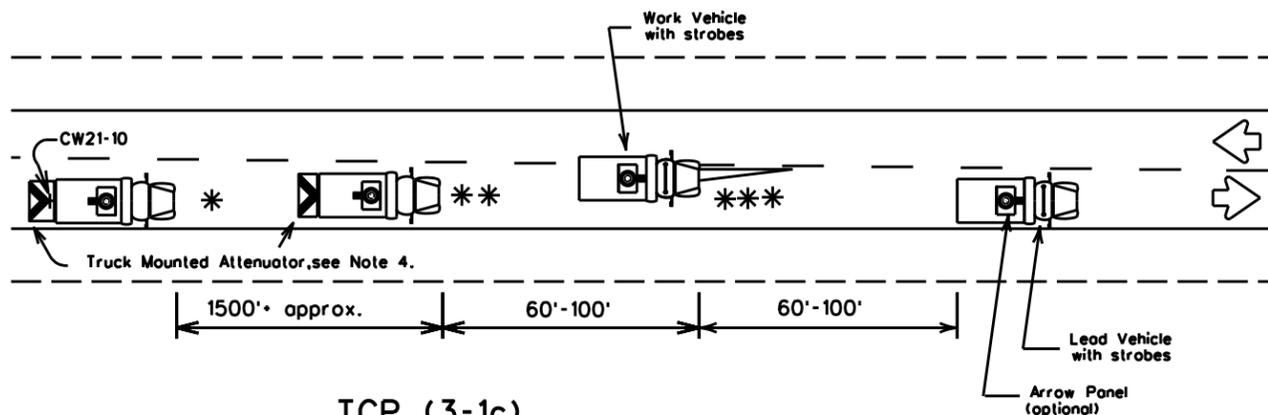
TCP (3-1a)
Undivided Multilane Roadway



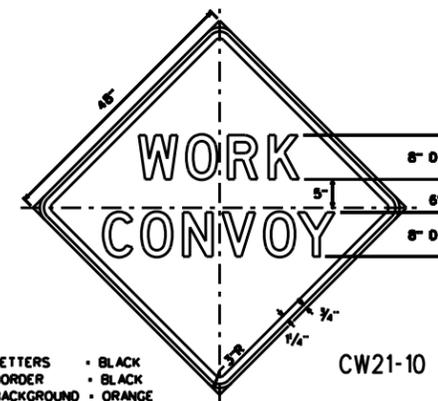
TCP (3-1b)
Two-Way Roadway With Paved Shoulders



Typical Trail Vehicle with (four corner flash) CAUTION display Flashing Arrow Panel



TCP (3-1c)
Two-Way Roadway Without Paved Shoulders



LETTERS - BLACK
BORDER - BLACK
BACKGROUND - ORANGE

Legend:

- * TRAIL VEHICLE
- ** SHADOW VEHICLE
- *** WORK VEHICLE
- Truck mounted attenuator
- HEAVY WORK VEHICLE

Arrow Panel Displays

- RIGHT Directional
- LEFT Directional
- RIGHT or LEFT Directional
- CAUTION mode

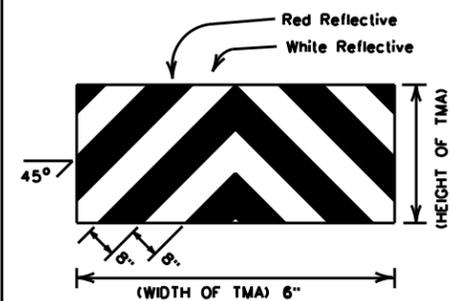
GENERAL NOTES:

1. TRAIL, SHADOW, LEAD, and work vehicles shall be equipped with arrow panels as illustrated. 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. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
3. The use of yellow rotating beacons or strobe lights on vehicles are required unless otherwise stated elsewhere in the plans.
4. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and the TRAIL VEHICLE are required.
5. Optional 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 D-9-8300, TYPE C.
6. Flashing Arrow Panels shall be Type B or Type C as per BC Standards. The panel operation shall be controlled from inside the vehicle.
7. Each vehicle shall have two-way radio communication capability.
8. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
9. Vehicle spacing between TRAIL VEHICLE and 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.

Only pre-qualified products shall be used. A list of component products and their sources may be obtained by writing or faxing:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mo@pe.dot.state.tx.us

Shadow and trail vehicle shall be equipped with Truck Mounted Attenuator.



OPTIONAL STRIPING FOR TMA

STRIPING FOR TMA WILL BE REQUIRED ON ALL PROJECTS AWARDED AFTER JANUARY 1, 2000

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
UNDIVIDED HIGHWAYS

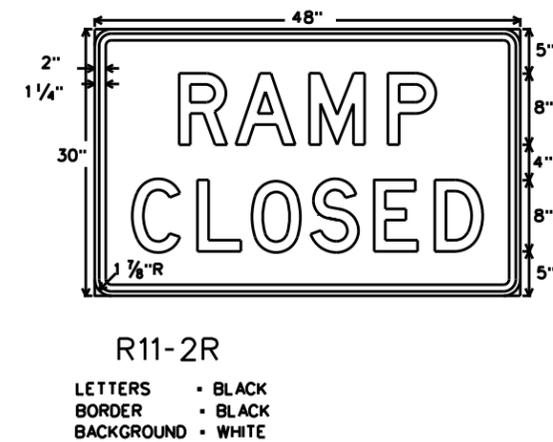
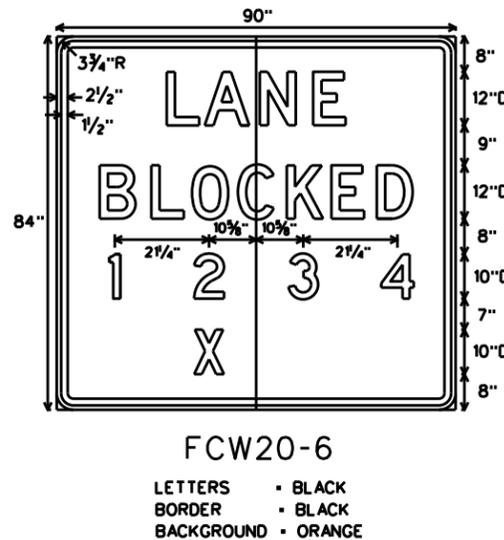
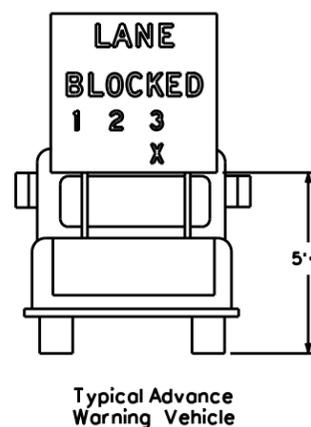
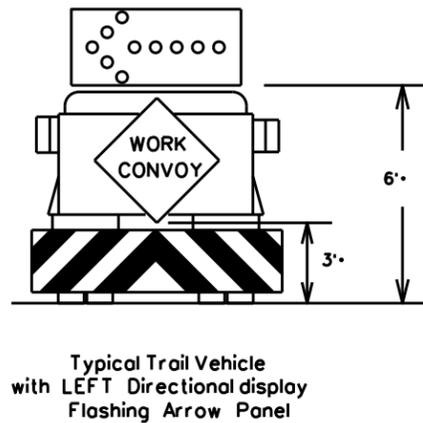
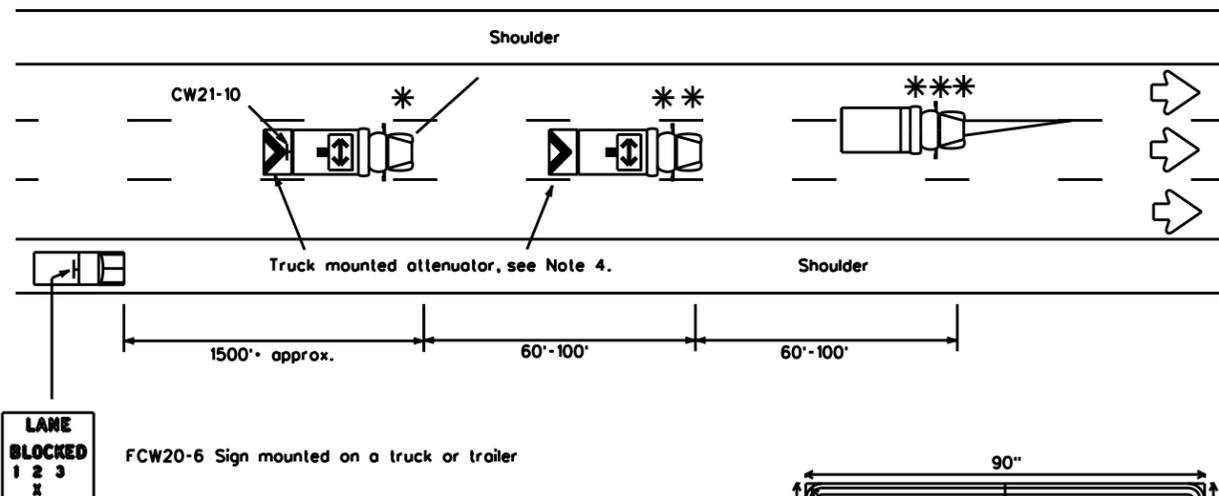
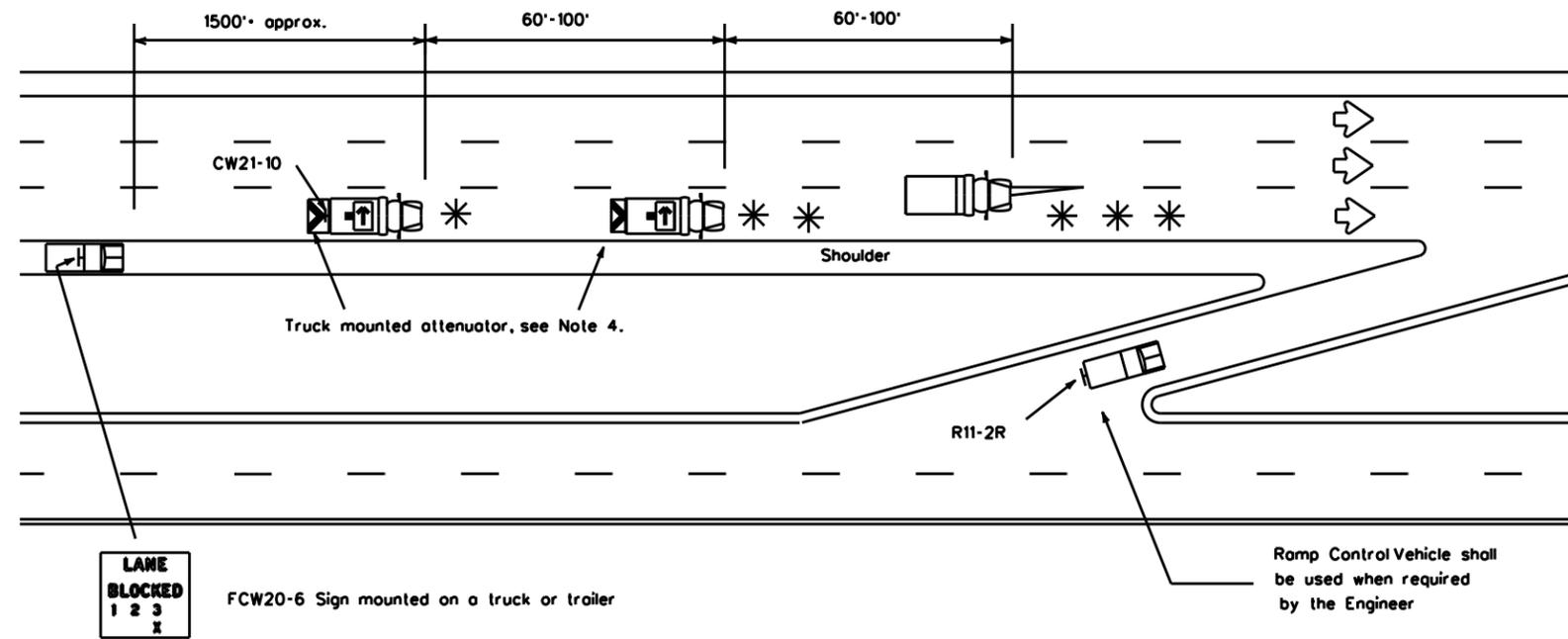
TCP(3-1)-98

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2-94	REVISIONS	CONT	SECT	JOB	HIGHWAY
8-95					
1-97					
4-98		DIST	COUNTY		SHEET NO.
					45

DATE:
FILE:

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Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mojge.dot.state.tx.us

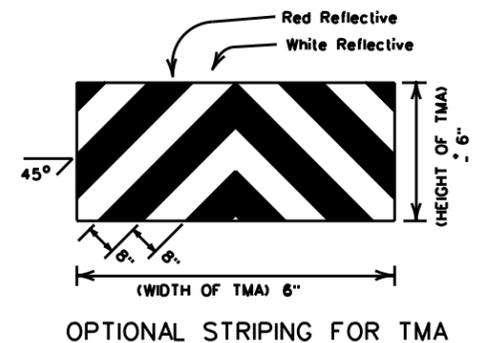
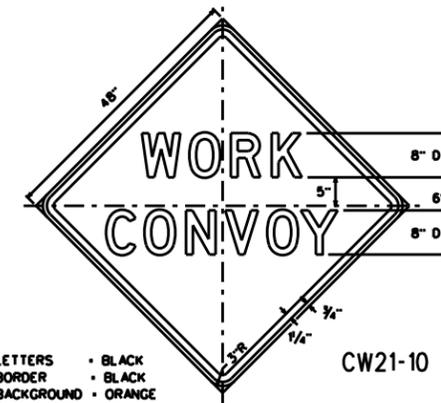
GENERAL NOTES:

1. TRAIL, SHADOW, LEAD, and work vehicles shall be equipped with arrow panels as illustrated. 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. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
3. The use of yellow rotating beacons or strobe lights on vehicles are required unless otherwise stated elsewhere in the plans.
4. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and the TRAIL VEHICLE are required.
5. Optional 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 D-9-8300, TYPE C.
6. Flashing Arrow Panels shall be Type B or Type C as per BC Standards. The panel operation shall be controlled from inside the vehicle.
7. Each vehicle shall have two-way radio communication capability.
8. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
9. Vehicle spacing between TRAIL VEHICLE and 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.
10. The LANE BLOCKED sign (FCW20-6) shall be used on divided highways and may be mounted on a truck or trailer. For divided highways with two lanes in each direction, the RIGHT or LEFT LANE CLOSED sign (CW20-5, 48" x 48") may be substituted for the LANE BLOCKED sign (FCW20-6).

Shadow and trail vehicle shall be equipped with Truck Mounted Attenuator.

Legend:

- * TRAIL VEHICLE
 - ** SHADOW VEHICLE
 - *** WORK VEHICLE
 - Truck mounted attenuator
 - HEAVY WORK VEHICLE
- Arrow Panel Displays
- RIGHT Directional
 - LEFT Directional
 - RIGHT or LEFT Directional
 - CAUTION mode



STRIPING FOR TMA WILL BE REQUIRED ON ALL PROJECTS AWARDED AFTER JANUARY 1, 2000

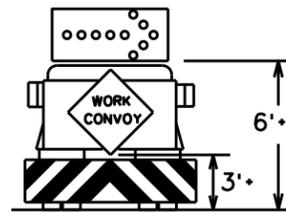
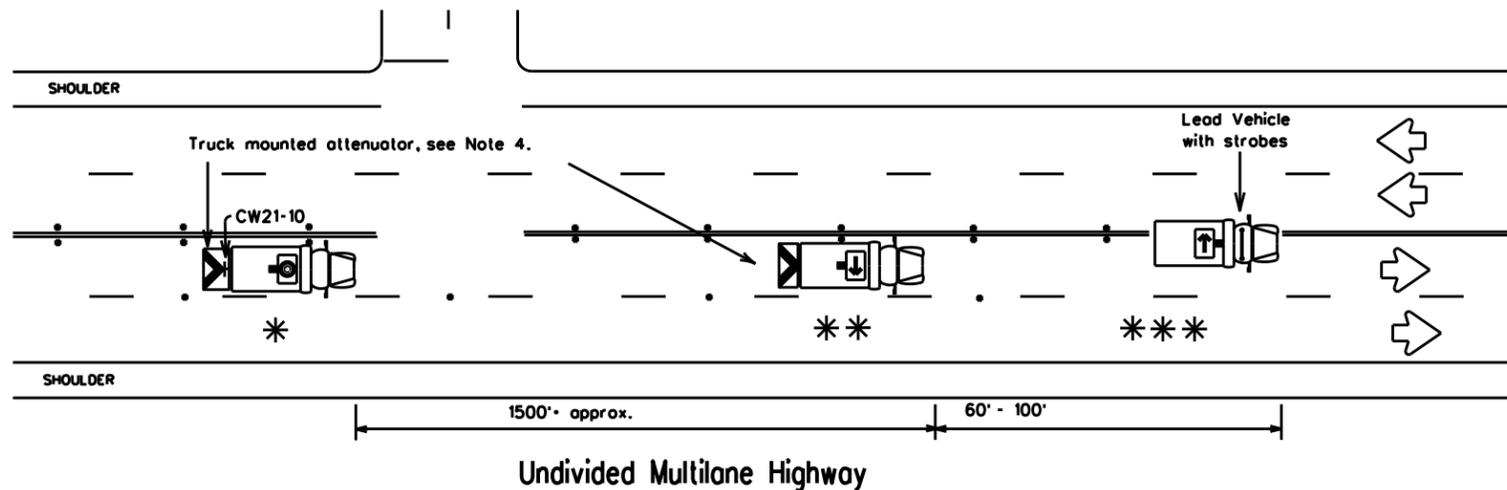
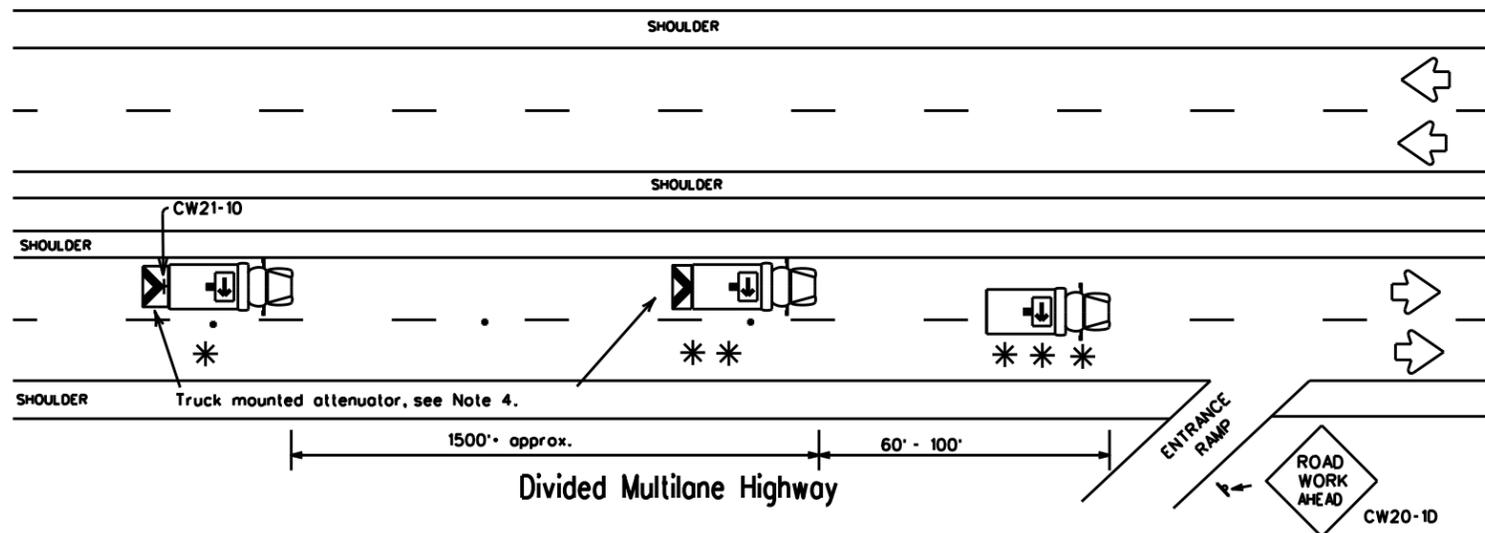
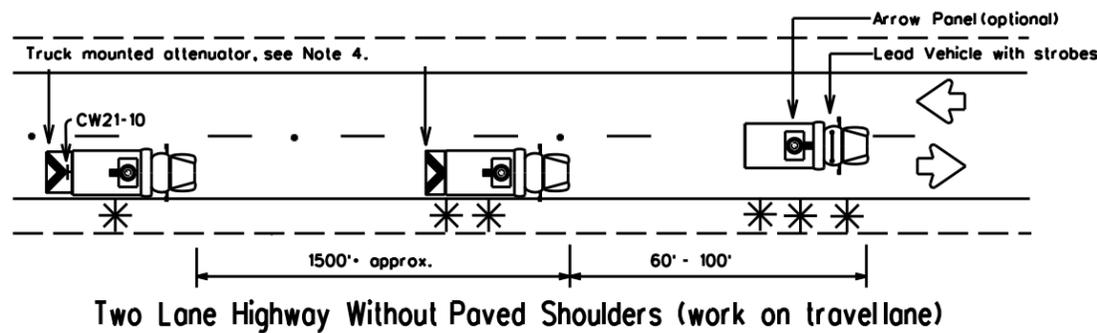
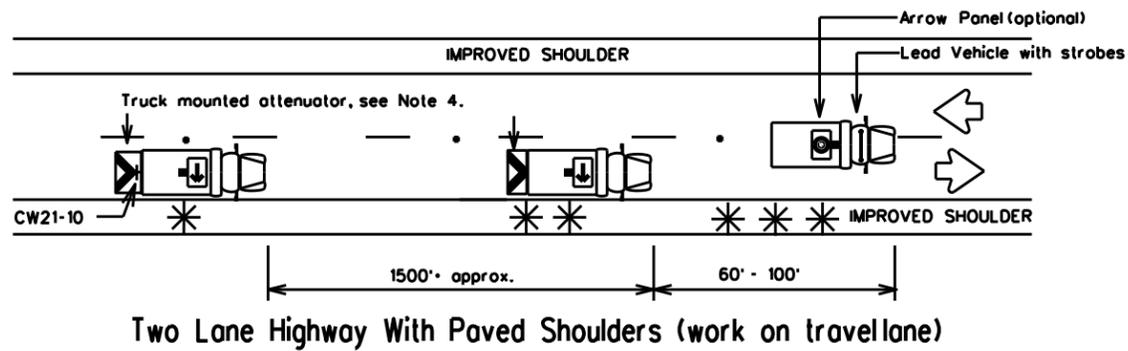
Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
DIVIDED HIGHWAYS
TCP(3-2)-98

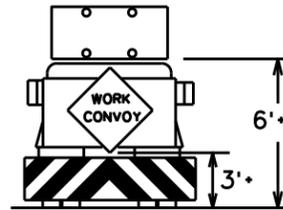
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2-94	REVISIONS	CONT	SECT	JOB	HIGHWAY
8-95					
1-97					
4-98		DIST	COUNTY		SHEET NO.
					46

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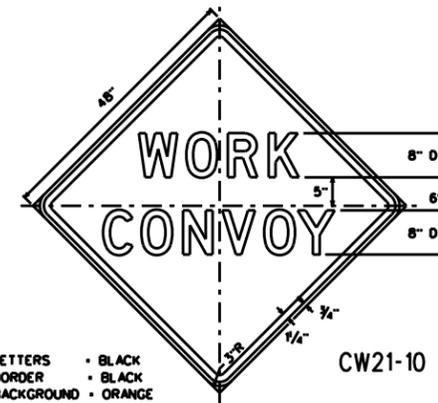
DATE:
FILE:



TYPICAL TRAIL VEHICLE
RIGHT Directional display
Flashing Arrow Panel



TYPICAL TRAIL VEHICLE
with (four corner flash)
CAUTION display
Flashing Arrow Panel



LETTERS - BLACK
BORDER - BLACK
BACKGROUND - ORANGE

Legend:

- * TRAIL VEHICLE
- ** SHADOW VEHICLE
- *** WORK VEHICLE
- Truck mounted attenuator
- HEAVY WORK VEHICLE

Arrow Panel Displays

- RIGHT Directional
- LEFT Directional
- RIGHT or LEFT Directional
- CAUTION mode

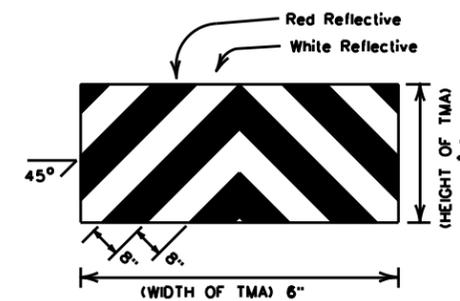
GENERAL NOTES:

1. TRAIL, SHADOW, LEAD, and work vehicles shall be equipped with arrow panels as illustrated. 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. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
3. The use of yellow rotating beacons or strobe lights on vehicles are required unless otherwise stated elsewhere in the plans.
4. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and the TRAIL VEHICLE are required.
5. Optional 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 D-9-8300, TYPE C.
6. Flashing Arrow Panels shall be Type B or Type C as per BC Standards. The panel operation shall be controlled from inside the vehicle.
7. Each vehicle shall have two-way radio communication capability.
8. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
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Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mta.dwt.state.tx.us

Shadow and trail vehicle shall be equipped with Truck Mounted Attenuator.



OPTIONAL STRIPING FOR TMA

STRIPING FOR TMA WILL BE REQUIRED ON ALL PROJECTS AWARDED AFTER JANUARY 1, 2000

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
RAISED PAVEMENT
MARKER INSTALLATION
TCP(3-3)-98

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2-94	CONT	SECT	JOB	HIGHWAY
8-95				
1-97	DIST	COUNTY		SHEET NO.
4-98				47

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Barricade and Construction (BC) Standard Sheets General Notes:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets", the TxDOT "Roadway Design Manual" or engineering judgment.
6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
10. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign 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.
11. Except for devices required by Note 10, 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 Apparel 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" 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.

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes prequalified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
 Traffic Operations Division - TE
 Phone (512) 416-3134

WEB ADDRESSES FOR REFERENCED DOCUMENTS

Compliant Work Zone Traffic Control Devices List (CWZTCD)
<http://www.txdot.gov/publications/traffic.htm>

Texas Manual on Uniform Traffic Control Devices (TMUTCD)
<http://www.txdot.gov/publications/traffic.htm>

Standard Highway Sign Designs for Texas (SHSD)
<http://www.txdot.gov/publications/traffic.htm>

Traffic Engineering Standard Sheets
<http://www.txdot.gov/business/disclaim.htm>

Material Producer List
<http://www.txdot.gov/business/producer-list.htm>

Departmental Material Specifications (DMS)
<http://www.txdot.gov/services/construction/material-specifications/>

Roadway Design Manual
<http://www.txdot.gov/services/general-services/manuals.htm>



**BARRICADE AND CONSTRUCTION
 GENERAL NOTES
 AND REQUIREMENTS**

1 of 12

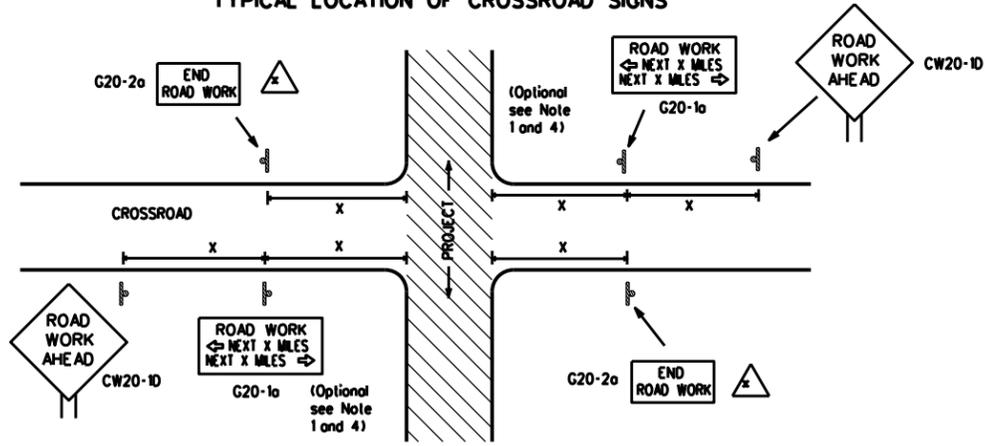
BC(1)-07

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4-03 9-07	REVISIONS		CONT	SECT
			JOB	HIGHWAY
		DIST	COUNTY	SHEET NO.
				49

DATE:
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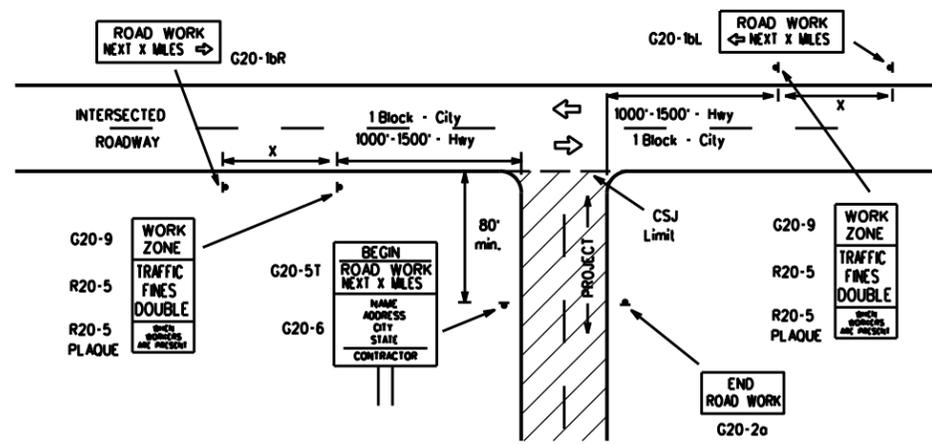
TYPICAL LOCATION OF CROSSROAD SIGNS



△ May be mounted on back of CW20-1D sign with approval of engineer. (See note 2 below)

- The typical minimum signing on a crossroad approach should be a CW20-1D ROAD WORK AHEAD sign and a G20-2a 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 (G20-2a) 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. 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 G20-1a 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 G20-6 "Contractor Name" sign behind the Type III Barricades for the road closure (see BC(10) also). The G20-1bL and G20-1bR signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING

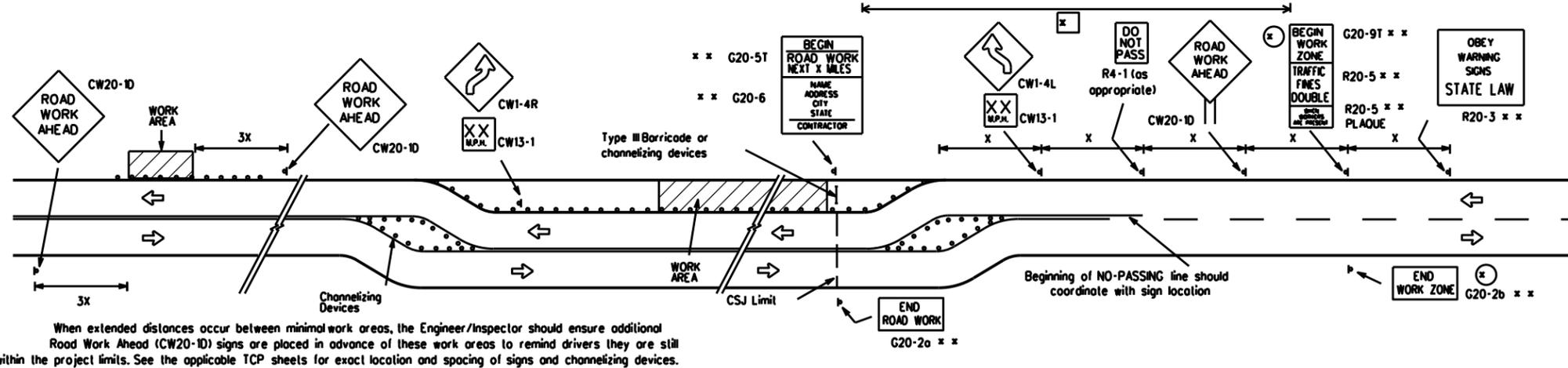
Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Spacing "x" (Feet Apprx.)
CW20, CW21, CW22, CW23, CW25	48" x 48"	48" x 48"	30	120
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	35	160
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	40	240
			45	320
			50	400
			55	500 ²
			60	600 ²
			65	700 ²
			70	800 ²
			75	900 ²
			80	1000 ²
			*	* ³

- * For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.
- △ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

General Notes:

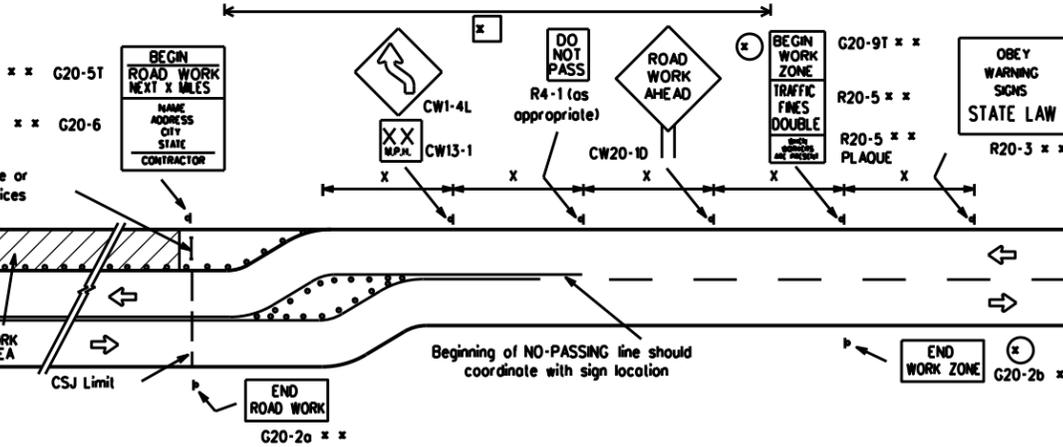
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" ROAD WORK AHEAD (CW20-1D) signs may be used on low volume crossroads at the discretion of the Engineer. 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

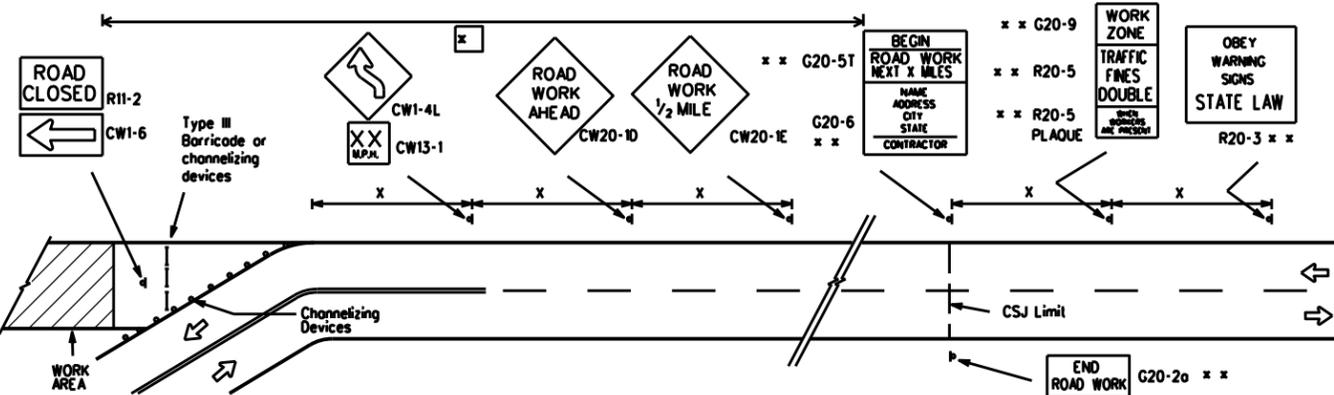


When extended distances occur between minimal work areas, the Engineer/Inspector should ensure additional Road Work Ahead (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing 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 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 G20-9T and G20-2b shall be used when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a work zone where traffic lines may double if workers are present.
- ** Required CSJ Limit signing. See Note 10 on BC(1).
- △ Area for placement of "ROAD WORK AHEAD" sign and other signs or devices as called for on the Traffic Control Plan.

LEGEND

- Sign
- Channelizing Devices
- I Type III Barricade
- X See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.



R20-3 Legend/Border - Black Background - White

Texas Department of Transportation
Traffic Operations Division

BARRICADE AND CONSTRUCTION PROJECT LIMIT STANDARD

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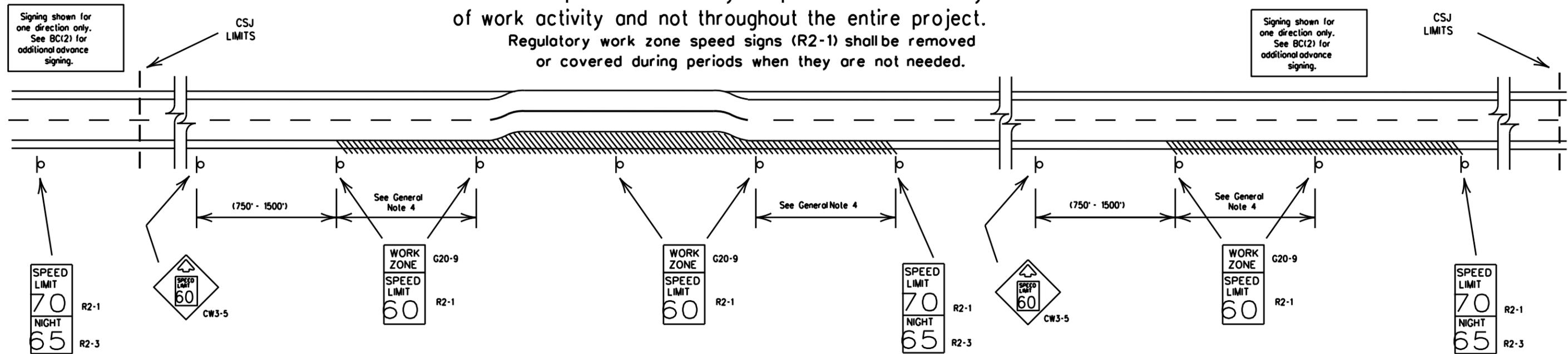
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DATE: FILE:

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present.

Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

- 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 should be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 15 feet of pavement edge or actually on the pavement.

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 CW3-5 sign, G20-9 plaque and the R2-1 and R2-3 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 otherwise noted.
- 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.

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BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT STANDARD

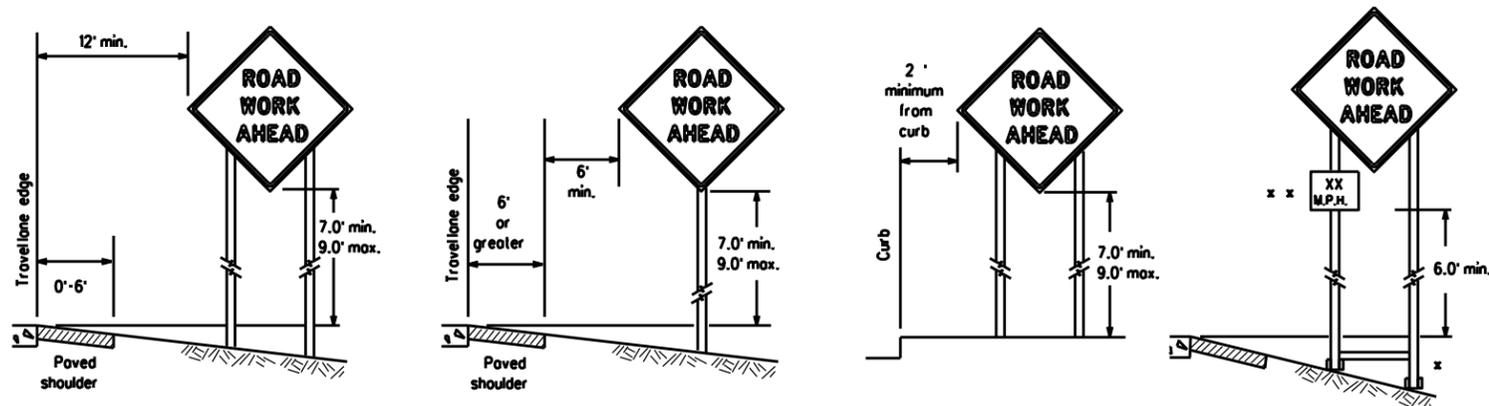
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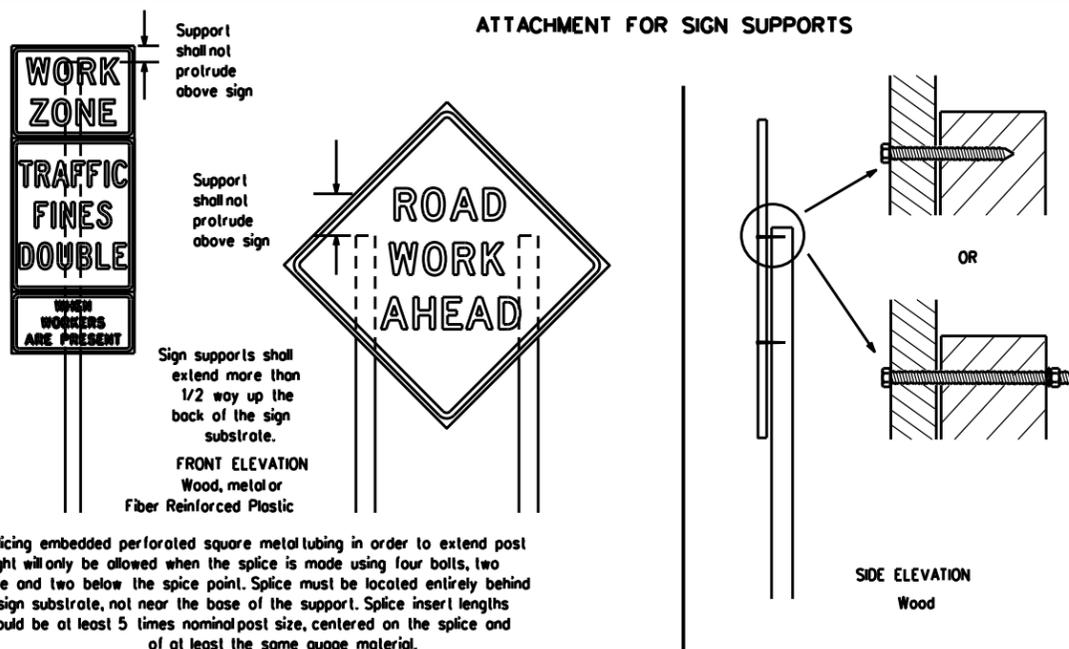
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



x 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.

x x 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



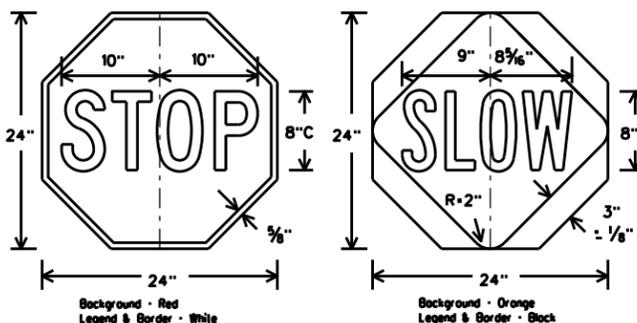
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Noils will 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.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24" as detailed below.
2. When used at night, the STOP/SLOW paddle shall be retroreflectORIZED.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
 2. Wooden sign posts shall be painted white.
 3. Barricades shall NOT be used as sign supports.
 4. Nails shall NOT be used to attach signs to any support.
 5. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
 6. 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.
 7. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD). 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.
 8. 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.
 9. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
 10. 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 Uniform Traffic Control Devices" Part 6)**
1. The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
 - a. Long-term stationary - work that occupies a location more than 3 days.
 - b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
 - c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
 - d. Short, duration - work that occupies a location up to 1 hour.
 - e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

1. The Engineer may allow the use of smaller size construction warning signs on secondary roads or city streets where speeds are low if the sign size is listed as an option on the "Typical Construction Warning Sign Size and Spacing" chart shown on BC(2).
2. The Contractor shall furnish the sign sizes shown in plans, the BC Sheets, the TCP sheets or as directed by the Engineer.

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting, meeting the requirements of DMS-8300 Type C (High Specific Intensity), shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type E (Fluorescent Prismatic), shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact.
6. Rubber (such as tire inner tubes) shall NOT be used for sandbags.
7. 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.
8. 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.
9. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.



BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES STANDARD

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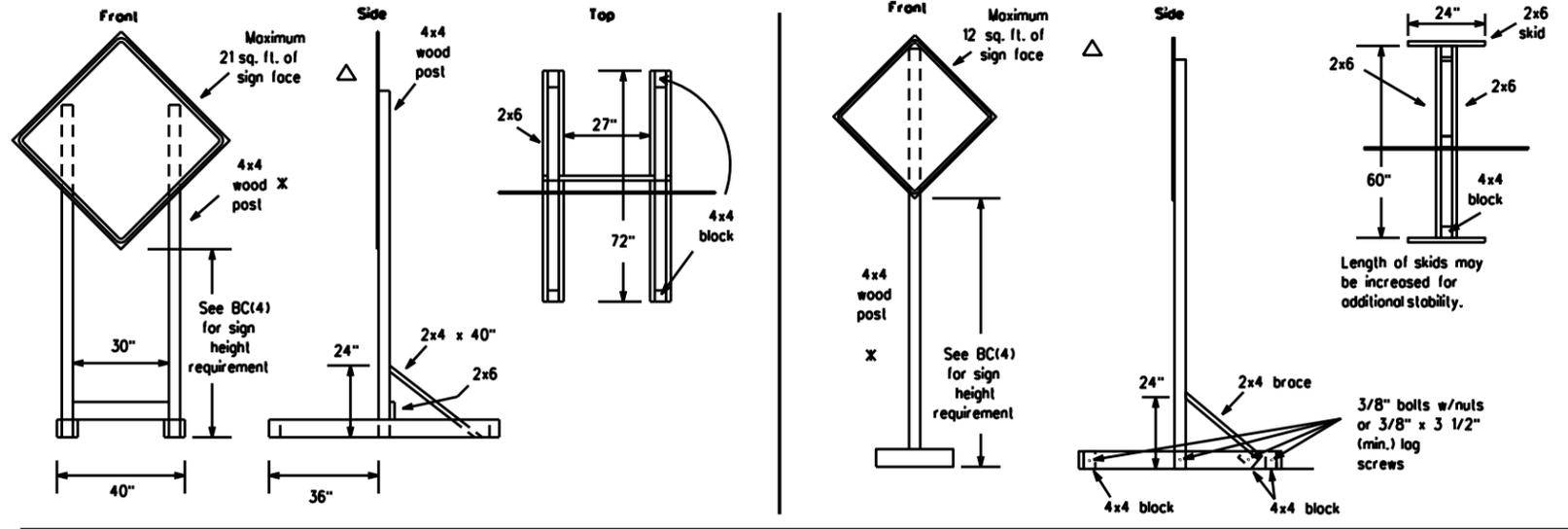
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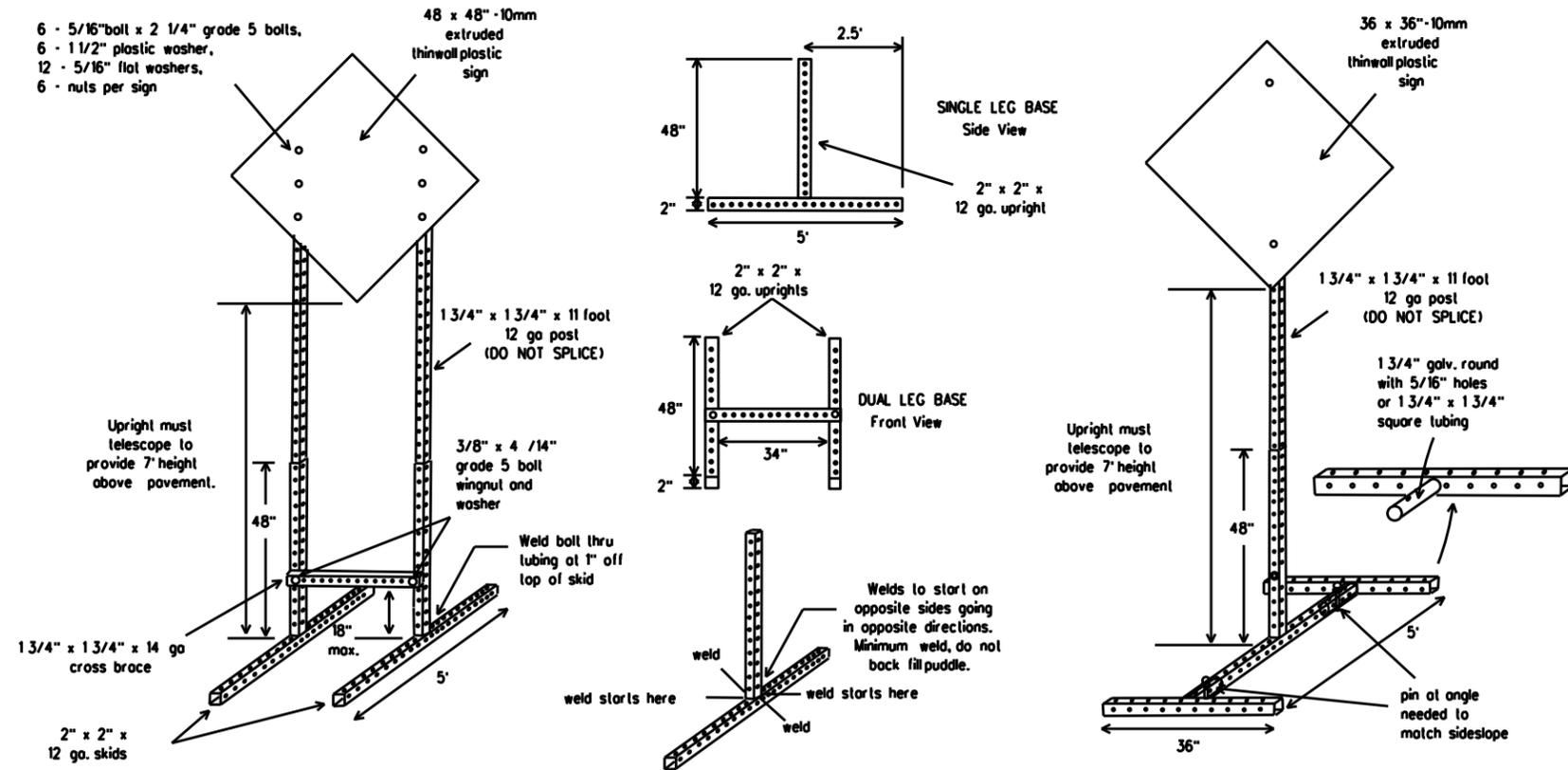
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SKID MOUNTED WOOD SIGN SUPPORTS

LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

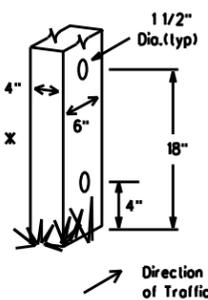


SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS



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)).



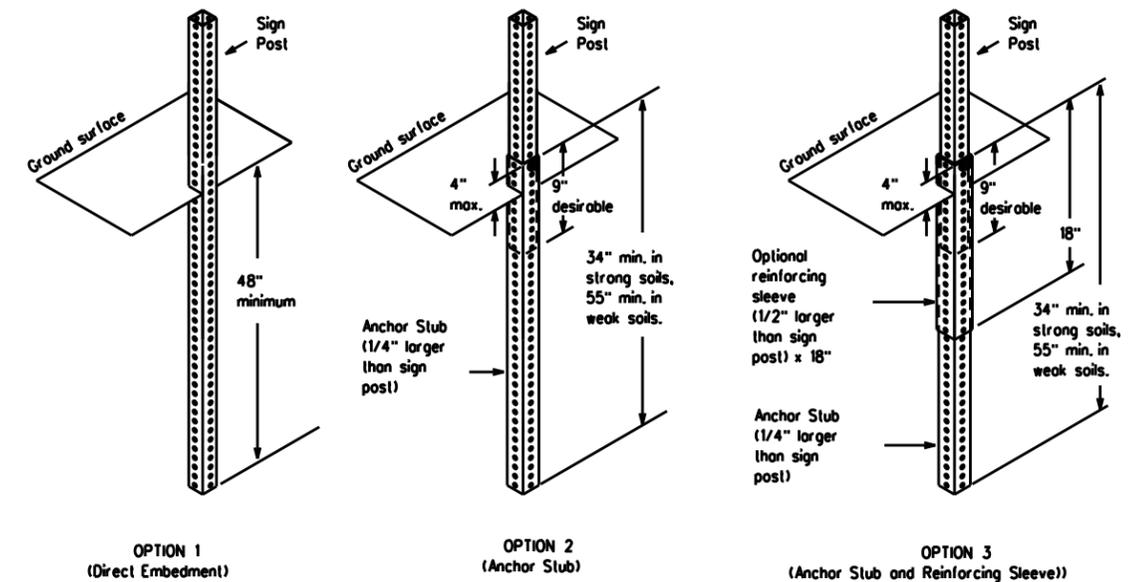
WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS

Nominal Post Size	Maximum No. of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Holes Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

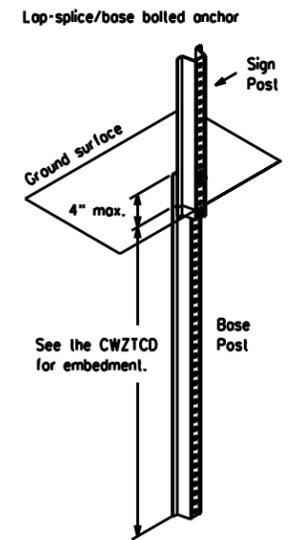
GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCO 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.

PERFORATED SQUARE METAL TUBING



WING CHANNEL



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" log screws must be used on every joint for final connection.
- More details of approved Long/Intermediate and Short Term supports can be found on the CWZTCO list. See BC(1) for website location.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCO 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."

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

△ See the CWZTCO 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 STANDARD

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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.
- 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 720 feet. 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.

Word or Phrase	Abb.	Word or Phrase	Abb.
Access Road	ACCS RD	Major	MAJ
Air Quality	AIR QULTY	Miles	MI
Alternate	ALT	Miles Per Hour	MPH
Avenue	AVE	Minor	MNR
Best Route	BEST RTE	Monday	MON
Boulevard	BLVD	Normal	NORM
Bridge	BRDG	North	N
Cannot	CANT	Northbound	(route) N
Center	CNTR	Parking	PKING
Construction Ahead	CONST AHEAD	Parking Lot	PRK LOT
Detour Route	DETOUR RTE	Road	RD
Do Not	DONT	Right Lane	RGT LN
East	E	Saturday	SAT
Eastbound	(route) E	Service Road	SERV RD
Emergency	EMER	Shoulder	SHLDR
Emergency Vehicle	EMER VEH	Slippery	SLIP
Entrance, Enter	ENT	South	S
Express Lanes	EXP LANE	Southbound	(route) S
Expressway	EXPWY	Speed	SPD
XXXX Feet	XXXX FT	Street	ST
Fog Ahead	FOG AHD	Sunday	SUN
Freeway	FRWY, FWY	Telephone	PHONE
Freeway Blocked	FRWY BLKD	Temporary	TEMP
Friday	FRI	Thursday	THURS
Hazardous Driving	HAZ DRIVING	To Downtown	TO DWNIN
Hazardous Material	HAZMAT	Traffic	TRAF
High-Occupancy Vehicle	HOV	Travelers	TRVLR
Highway	HWY	Tuesday	TUES
Hours	HR	Time Minutes	TIME MIN
Information	INF	Upper Level	UPPR LVL
It Is	ITS	Vehicle	VEH
Junction	JCT	Warning	WARN
Left	LFT	Wednesday	WED
Left Lane	LFT LN	Weight Limit	WT LIMIT
Lane Closed	LN CLSD	West	W
Lower Level	LOWR LVL	Westbound	(route) W
Maintenance	MAINT	Wet Pavement	WET PVMT
		Will Not	WONT

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

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.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE
ROAD CLOSED AT SH XXX
ROAD CLSD AT FM XXXX
RIGHT X LANES CLOSED
CENTER LANE CLOSED
NIGHT LANE CLOSURES
VARIOUS LANES CLOSED
EXIT CLOSED
MALL DRIVEWAY CLOSED
XXXXXXXXX BLVD CLOSED

Other Condition List

FRONTAGE ROAD CLOSED
SHOULDER CLOSED XXX FT
RIGHT LN CLOSED XXX FT
RIGHT X LANES OPEN
DAYTIME LANE CLOSURES
I-XX SOUTH EXIT CLOSED
EXIT XXX CLOSED X MILE
RIGHT LN TO BE CLOSED
X LANES CLOSED TUE - FRI
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.

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.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

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-XX 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.

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.

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 CW20-7a Flagger Symbol, 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 panel provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

Texas Department of Transportation
Traffic Operations Division

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) STANDARD

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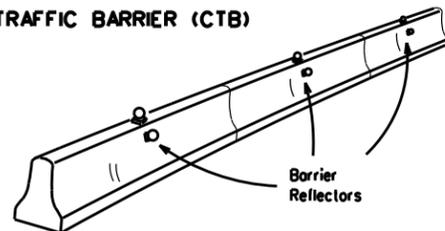
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BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

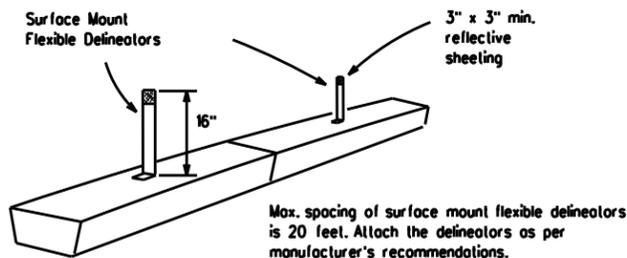
- Barrier Reflectors shall be prequalified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors (Type C Delineators) can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 502.

CONCRETE TRAFFIC BARRIER (CTB)

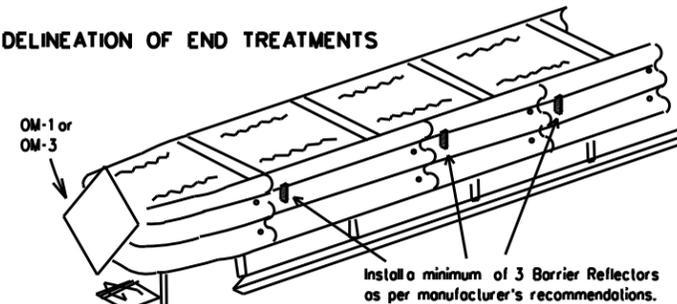


- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. 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. Yellow Barrier Reflectors shall be made with Type E Fluorescent Prismatic Yellow Retroreflective Sheeting. White reflectors shall be made with Type D White Prismatic sheeting.
- 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.

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS



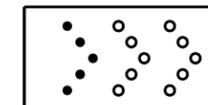
DELINEATION	APPROACHING TRAFFIC	
	BOTH SIDES	ONE SIDE
	OM-1	OM-3 or Vertical Panel

END TREATMENTS FOR CTB'S USED IN WORK ZONES

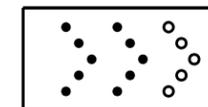
End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

TYPICAL FLASHING ARROW PANEL

Arrow Panels 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.

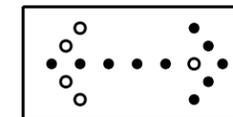


Sequential Chevron

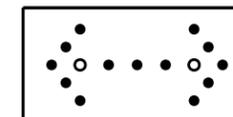


- The Flashing Arrow Panel should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
- Flashing Arrow Panels should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (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 Panel.
- The Flashing Arrow Panel should be able to display the following symbols:

Flashing RIGHT (LEFT) ARROW



Flashing DOUBLE ARROW



Flashing CAUTION

- The "CAUTION" display consists of four corner lamps flashing simultaneously.
- The straight line caution display is NOT ALLOWED.
- The Flashing Arrow Panel 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.

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

ATTENTION: Flashing Arrow Panels shall be equipped with automatic dimming devices.

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

- The Flashing Arrow Panel shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Panel SHALL NOT BE USED to laterally shift traffic.
- A full matrix PCMS may be used to simulate a Flashing Arrow Panel provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
- Minimum mounting height of trailer mounted arrow panels should be 7 feet from roadway to bottom of panel.

WARNING LIGHTS

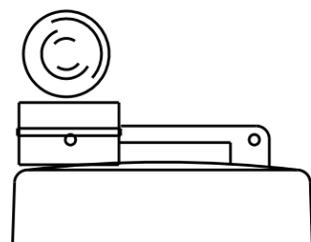
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet 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 E Sheeting (Fluorescent Prismatic) 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.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

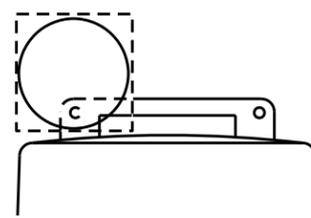
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing 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 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 D (Non-fluorescent Prismatic).
- 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.



Type C Warning Light or approved substitute mounted adjacent to the travelway.



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

TRUCK-MOUNTED ATTENUATORS

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the dates shown in the CWZTCD to ensure that the TMA meets the age requirements and the crashworthiness criteria established by the Federal Highway Administration (FHWA) for 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 approximately 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 on an extended distance from the TMA.



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

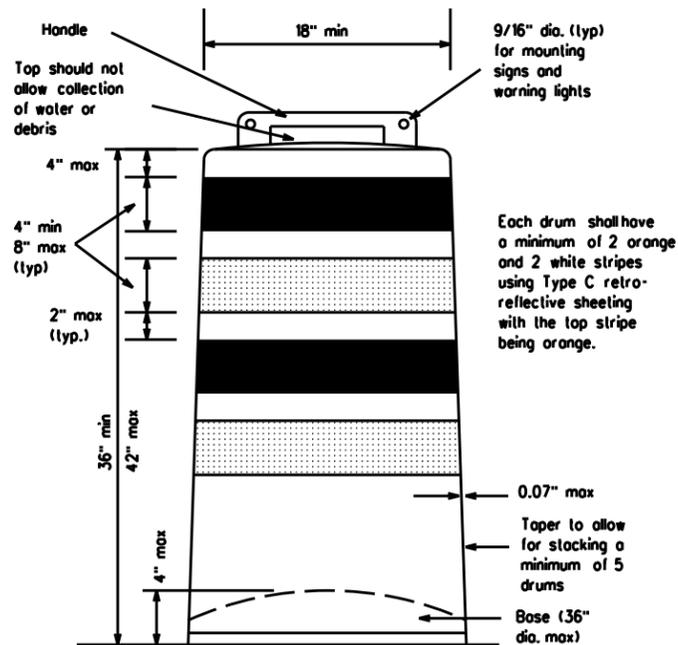
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GENERAL NOTES

- 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 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

Prequalified 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.

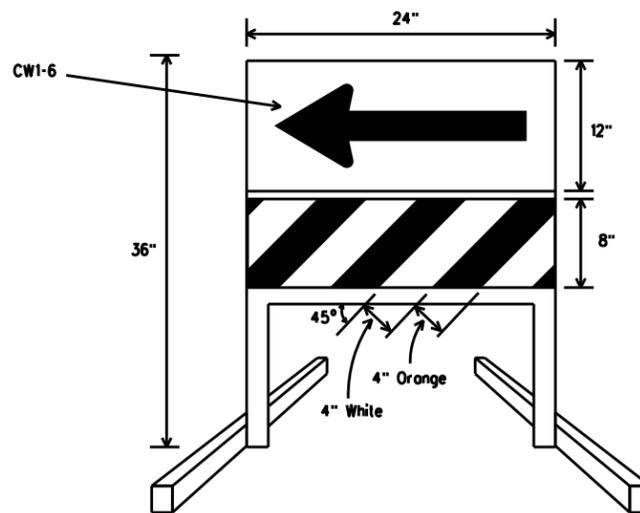
- Drum body shall have a minimum unballasted weight of 7.7 lbs. and maximum unballasted weight of 11 lbs. The wall of the drum body shall be a minimum of 0.07 inch in thickness. Weight of any drum supplied shall not vary more than 0.5 lb. from that of the prequalified sample.
- Drum and base shall be 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, "Flat Surface Reflective Sheeting." High Specific Intensity (Type C) retroreflective 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.
- 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.

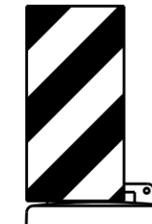


DIRECTION INDICATOR BARRICADE

- The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
- If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
- The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type E Fluorescent Prismatic Orange above a rail with Type C High Specific Intensity retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass.
- Double arrows on the Direction Indicator Barricade will not be allowed.
- Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.



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 E (Fluorescent Prismatic) 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 C (High Specific Intensity). 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.
- 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.



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES STANDARD

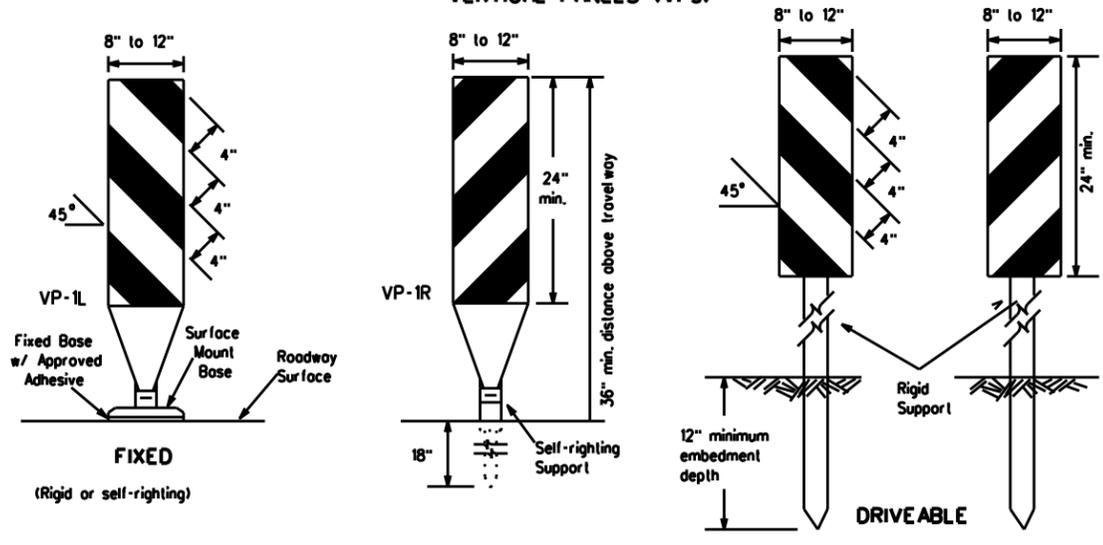
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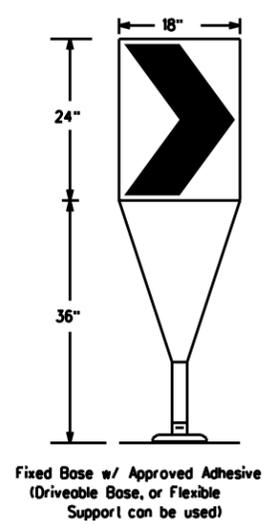
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		DIST	COUNTY	SHEET NO.	
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CHANNELIZING DEVICES

VERTICAL PANELS (VPs)



CHEVRONS



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

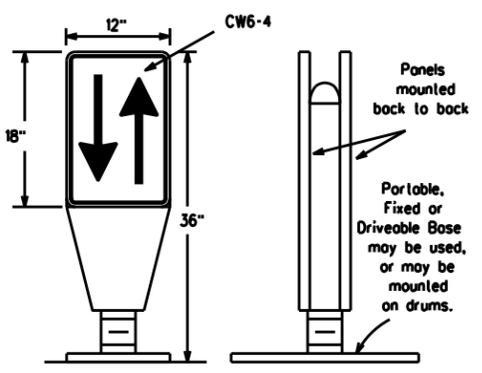
GENERAL NOTES:

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh approximately 35 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.
8. Examples on this sheet are commonly used channelizing devices in work zones. For other devices, refer to the CWZTCD.

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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

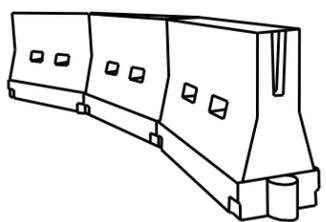


1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The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

Posted Speed	Formula	Minimum Desirable Taper Lengths x x			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = $\frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'
35		205'	225'	245'	35'	70'-90'
40		265'	295'	320'	40'	80'-100'
45	L = WS	450'	495'	540'	45'	90'-110'
50		500'	550'	600'	50'	100'-125'
55		550'	605'	660'	55'	110'-140'
60		600'	660'	720'	60'	120'-150'
65		650'	715'	780'	65'	130'-165'
70	700'	770'	840'	70'	140'-175'	
75	750'	825'	900'	75'	150'-185'	
80	800'	880'	960'	80'	160'-195'	

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

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



LONGITUDINAL CHANNELIZING DEVICES

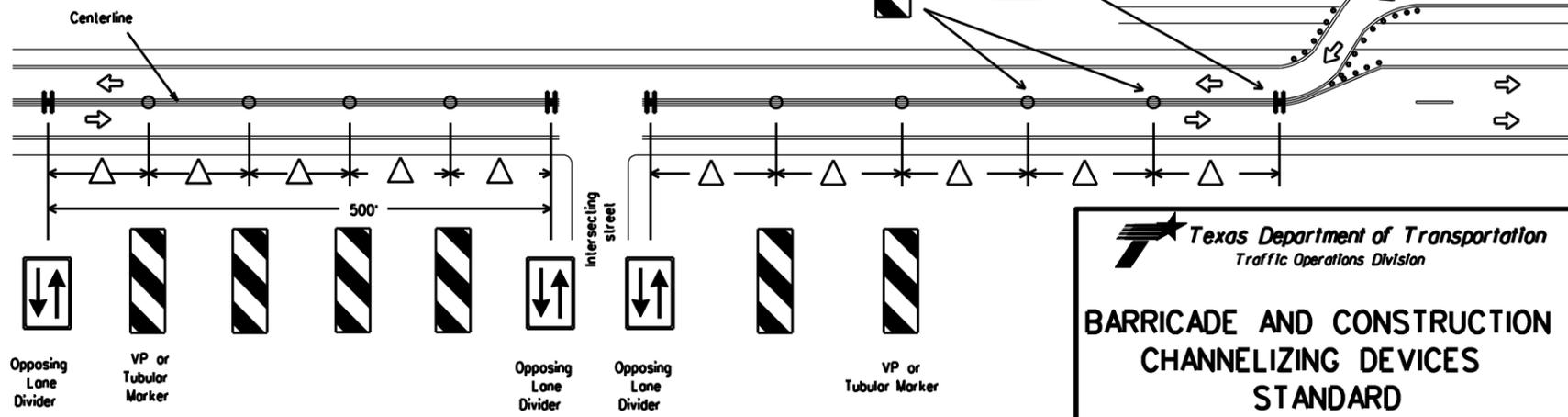
1. Longitudinal channelizing devices are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are designed to absorb impact and to dissipate energy.
2. Longitudinal channelizing devices may be used instead of a line of cones or drums.
3. Longitudinal channelizing devices shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Longitudinal channelizing devices should not be used to provide positive protection for obstacles, pedestrians or workers.
5. Longitudinal channelizing devices shall be retroreflective, or supplemented with retroreflective delineation as required for temporary barriers on BC(7)-07.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to 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 cones and the top of the unit shall be not less than 32 inches in height.

VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS SEPARATING TWO-WAY TRAFFIC (Typical application)



△ Spacing between the VP's or tubular markers shall not exceed 100 feet. On roadways with speeds less than 45 MPH, spacing between the tubular markers or VP's shall be as shown on the channelizing spacing table shown on this page. If the table shows spacing greater than 100 feet based on the roadway speed, then use a maximum of 100 feet spacing between the tubular markers or VP's. Every fifth channelizing device shall be an OTLD, except when the OTLD must be spaced closer to accommodate an intersection. Spacing between the OTLD shall not exceed 500 feet.

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES STANDARD

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				57

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TYPE III BARRICADES

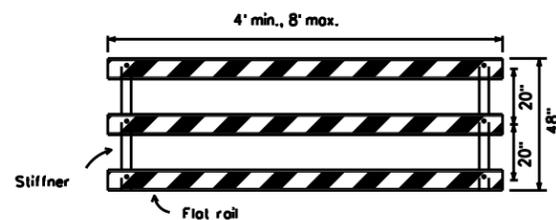
1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type III Barricades and a list of all materials used in the construction of Type III Barricades.
2. Type III Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades 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 stocked 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 C (High Specific Intensity) 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



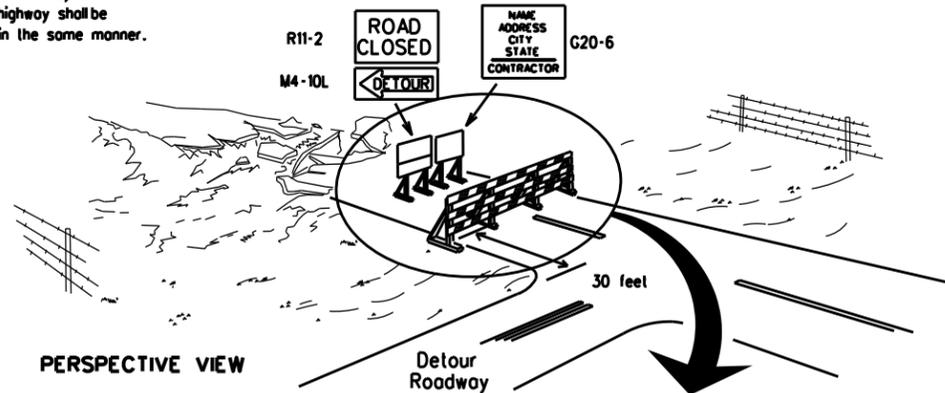
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



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

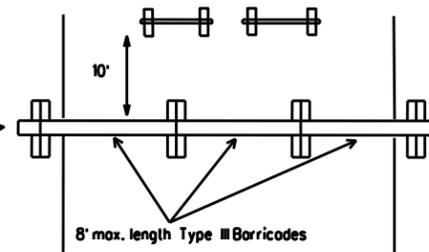
TYPE III BARRICADE (POST AND SKID) TYPICAL APPLICATION

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



PERSPECTIVE VIEW

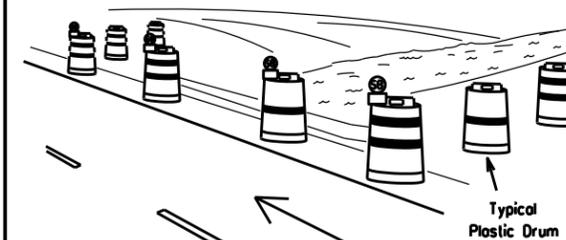
The three rails on Type III barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



PLAN VIEW

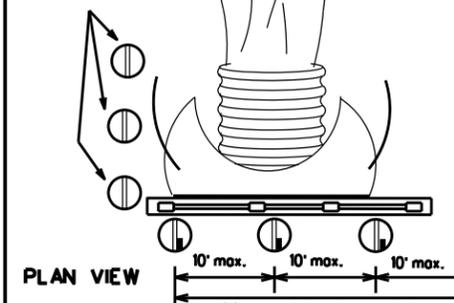
1. Signs should be mounted on independent supports of a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type III Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



PERSPECTIVE VIEW

These drums are not required on one-way roadway



PLAN VIEW

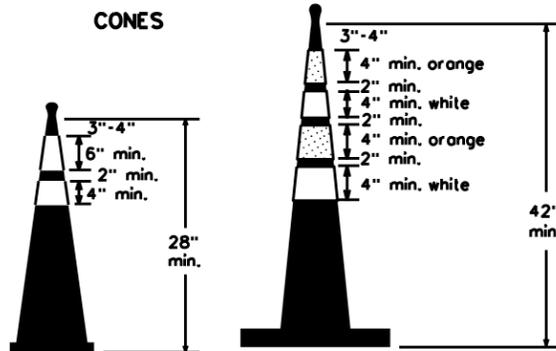
1. Where positive redirection capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder 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.

Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums)

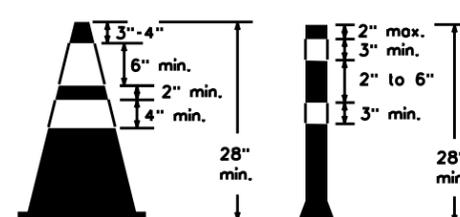
Legend

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

CONES

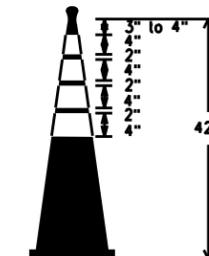


Two-Piece cones



One-Piece cones Tubular Marker

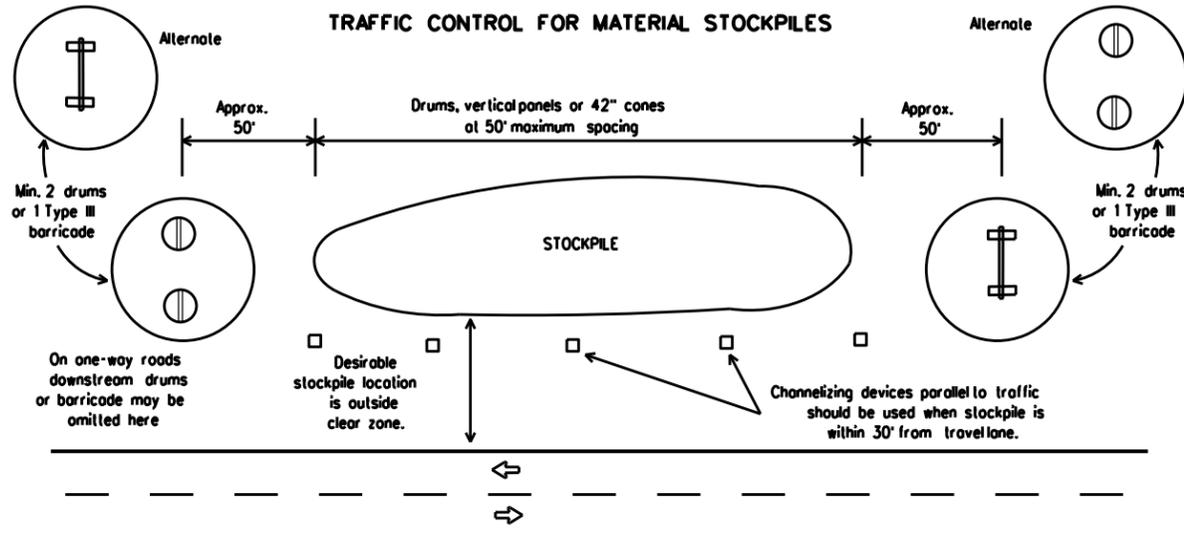
28" Cones shall have a minimum weight of 9 1/2 lbs.
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.



EDGELINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type C encapsulated bead (High Specific Intensity) conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

TRAFFIC CONTROL FOR MATERIAL STOCKPILES



1. Traffic cones and tubular markers shall be a minimum of 28 inches in height when used either on freeways or at nighttime.
2. Cones or tubular markers shall be predominantly orange, fluorescent red-orange, or fluorescent yellow-orange. They should be kept clean and bright for maximum visibility.
3. Cones used only for daytime operations do not require the reflectorized bands.
4. Cones and tubular markers used for nighttime operations shall be reflectorized. Reflectorized material shall have a smooth, sealed outer surface that displays the same approximate color during the day and night. The reflectorized bands shall be retroreflective Type C (High Specific Intensity) conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
5. When used at night, appropriate personnel shall ensure that cones and tubular markers remain in their proper location and in an upright position.
6. Reflectorization of 28" cones shall consist of a minimum 6 inch band placed at least 3 inches but not more than 4 inches from the top, supplemented by a minimum 4 inch band spaced a minimum of 2 inches below the 6 inch band.
7. Reflectorization of 42" cones shall be provided by alternating 4 to 6" orange and white stripes with orange on top.
8. Reflectorization of tubular markers shall be a minimum of two 3 inch bands placed a maximum of 2 inches from the top with a maximum of 6 inches between bands.
9. One-piece cones or tubular markers are generally suitable for temporary usage (up to 8 hours) with other channelization devices such as vertical panels, drums or two-piece cones for long term usage. Care should be taken to ensure they remain in their proper location and in an upright position.
10. Cones or tubular markers used on each project shall be of the same size and shape.
11. The handle may be designed as a hook or other shape, fabricated from non-rigid materials similar to the cone material, and may extend up to a maximum of 8 inches above the top of cone. Length of the handle shall not be considered with regard to the overall height of the cone.

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

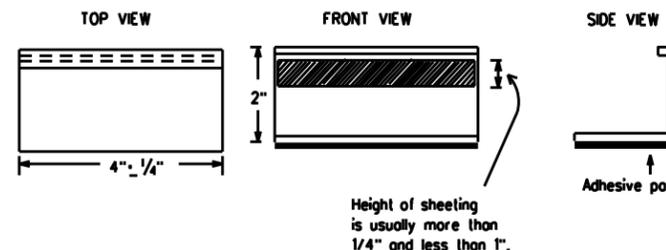
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

Raised Pavement Markers used as Guidemarks

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

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

DEPARTMENTAL MATERIAL SPECIFICATIONS

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

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

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BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS STANDARD

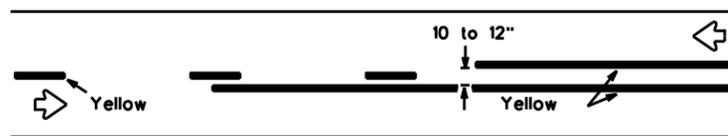
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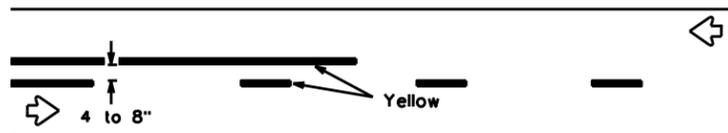
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PAVEMENT MARKING PATTERNS

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



REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

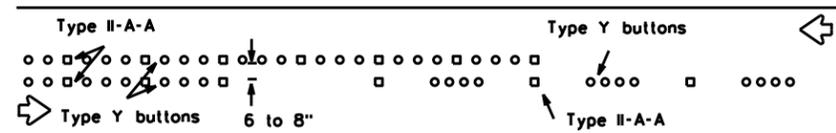


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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.

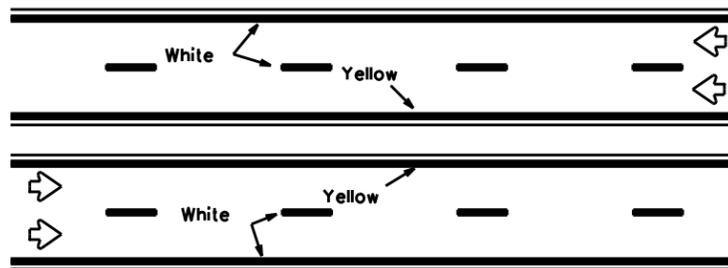


RAISED PAVEMENT MARKERS - PATTERN A



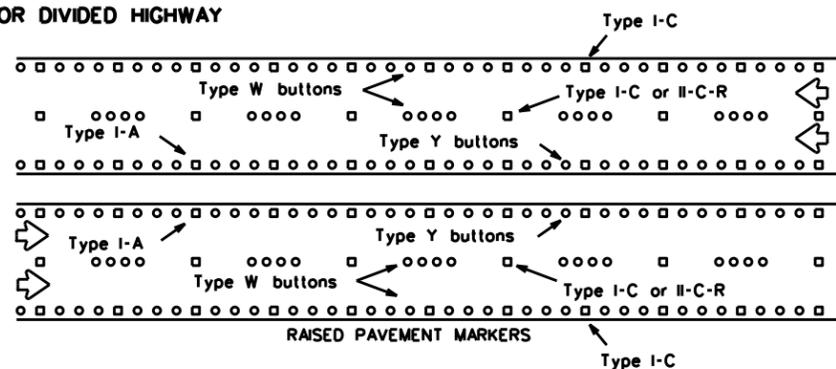
RAISED PAVEMENT MARKERS - PATTERN B

EDGE & LANE LINES FOR DIVIDED HIGHWAY



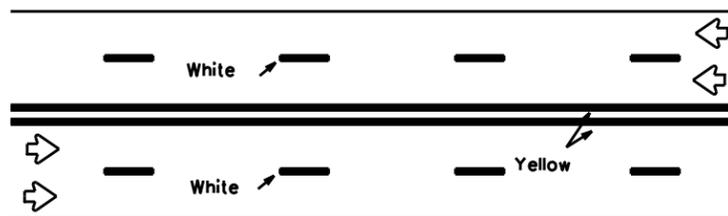
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



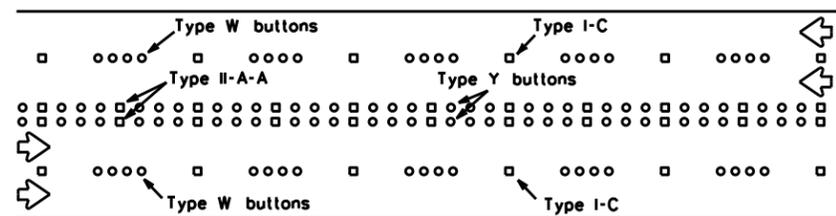
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



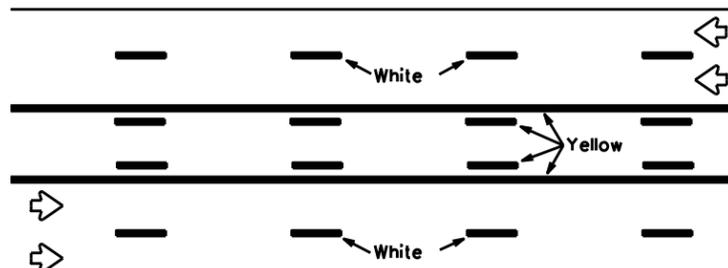
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



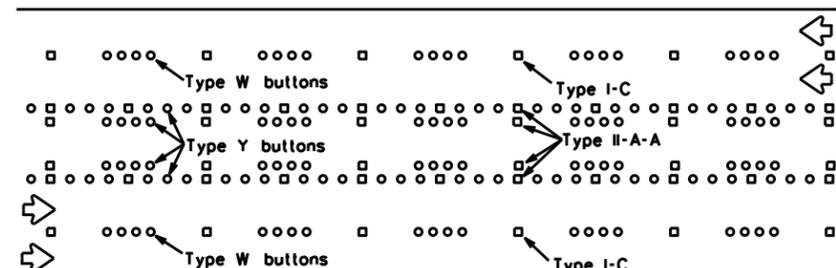
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE



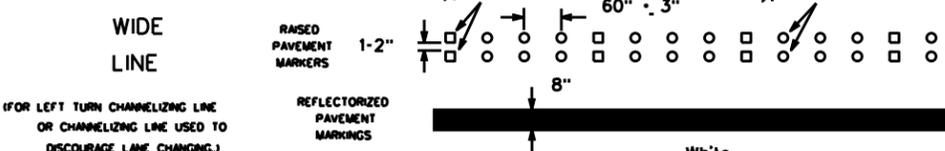
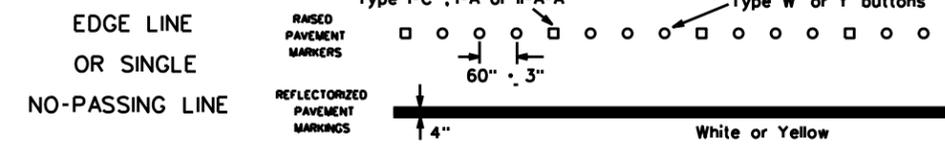
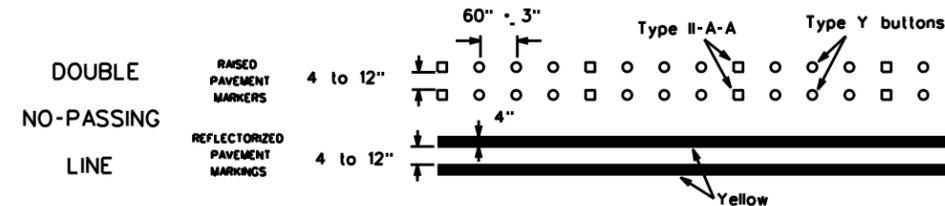
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



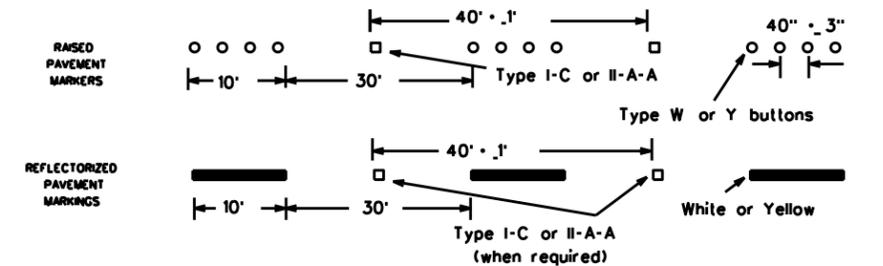
RAISED PAVEMENT MARKERS

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



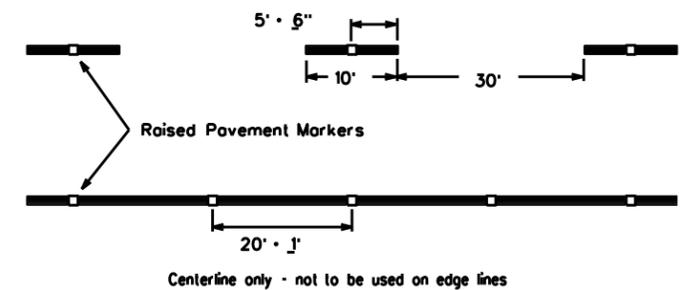
BROKEN LINE

(FOR CENTER LINE OR LANE LINE.)



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



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

Texas Department of Transportation
Traffic Operations Division

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS STANDARD

12 of 12

BC(12)-07

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1-97	REVISIONS	CONT	SECT	JOB
2-98				HIGHWAY
11-02		DIST	COUNTY	SHEET NO.
9-07				60

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