FED. RD. DIV. NO.	PROJECT NUMBER		HIGHWAY NUMBER
6	F 2022(074)		IH 45
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	1

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

SEE SHEET 2
FOR INDEX OF SHEETS
AND SHEET 3 FOR
PROJECT LOCATION MAP

DESIGN SPEED: 55 MPH

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FINAL PLANS

PROJECT NUMBER: F 2022(074)

IH 45
LEON COUNTY, ETC.

TOTAL LENGTH OF PROJECT = 88,445.28 FT= 16.751 MILES, ETC.

FOR THE CONSTRUCTION OF AN OVERLAY

CONTRACTOR:

LETTING DATE:

DATE CONTRACTOR BEGAN WORK:

DATE WORK WAS COMPLETED:

DATE WORK WAS ACCEPTED:

FINAL CONTRACT COST: $

HIGHWAY	CONTROL NO.	LIMITS	2022/2042 ADT	REFERENCE MARKERS		TOTAL LENGTH (FT)	BRIDGE LENGTH (FT)	RDWY LENGTH (FT)
				BEGIN	END			
IH 45	0675-03-100	FROM: SH 7 TO: FREESTONE COUNTY LINE	37,600/51,300	RM 164+0.065 MI (MP 11.783)	RM 180+0.876 MI (MP 28.534)	88,445.28	0.00	88,445.28
IH 45	0675-02-095	FROM: FREESTONE COUNTY LINE TO: 0.2 MI N OF FREESTONE COUNTY LINE	37,600/51,300	RM 180+0.876 MI (MP 0.000)	RM 181+0.061 MI (MP 0.206)	1,087.68	0.00	1,087.68

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING: 9/1/2021
DocuSigned by:
59B67CE6AA5C43...
DESIGN MANAGER

RECOMMENDED FOR LETTING: 9/2/2021
DocuSigned by:
DAA3B06...
DIRECTOR OF TRANSPORTATION
PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: 9/2/2021
DocuSigned by:
60E5537715D24E...
DISTRICT ENGINEER

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014, AND SPECIFICATION ITEMS LISTED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT:

REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY, 2012)

NO EXCEPTIONS
NO EQUATIONS
1 RAILROAD CROSSING

REV DATE: 2-12-2015
CSJ: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\General\TITLE SHEET.dgn

INDEX OF SHEETS

SHEET NO.			DESCRIPTION
1	GENERAL		TITLE SHEET
2			INDEX OF SHEETS
3			PROJECT LOCATION MAP
4,4A-4G			TYPICAL SECTION
5,5A-5E			GENERAL NOTES
6,6A			ESTIMATE & QUANTITY SHEET
7-13			ROADWAY SUMMARY
14-15			PAVEMENT MARKING SUMMARY
16	TRAFFIC CONTROL		TREATMENT FOR VARIOUS EDGE CONDITIONS
17-28		~	BC(1)-21 THRU BC(12)-21
29		~	TCP(3-2)-13
30		~	TCP(3-3)-14
31		~	TCP(5-1)-18
32-36		~	TCP(6-1)-12 THRU TCP(6-5)-12
37		~	TCP(7-1)-13
38		~	TCP(S-4)-08A
39		~	TCP(S-5)-08
40-41		~	WZ-ITS(1)-19 THRU WZ-ITS(2)-19
42		~	WZ(STPM)-13
43		~	WZ(UL)-13
44		~	WZ(RS)-16
45	ROADWAY		HORIZONTAL CURVE DATA
46			VERTICAL CURVE DATA
47			HOT MIX LONGITUDINAL JOINT DETAILS
48			OMITTED
49-50			RAMP TIE-IN DETAIL
51			PLANING DETAILS AT IH 45 UNDERPASSES
52-55			BRIDGE TIE-IN DETAIL
56		~	TE (HMAC)-11
57-74	TRAFFIC ITEMS		STRIPING LAYOUT
75-76		~	FPM(1)-12 THRU FPM(2)-12
77		~	FPM(5)-19
78		~	RS(1)-13
79-82		~	D&OM(1)-20 THRU D&OM(4)-20
83	ENVIRONMENTAL	~	ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)
84	RAILROAD		RAILROAD EXHIBIT
85			RAILROAD SCOPE OF WORK
86-87		~	RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

STATE OF TEXAS
KEITH A. KOUBA
108695
LICENSED
PROFESSIONAL ENGINEER

Keith A. Kouba, P.E.

08/26/2021

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

PRINT DATE	REVISION DATE
8/26/2021	

Texas Department of Transportation
Bryan District

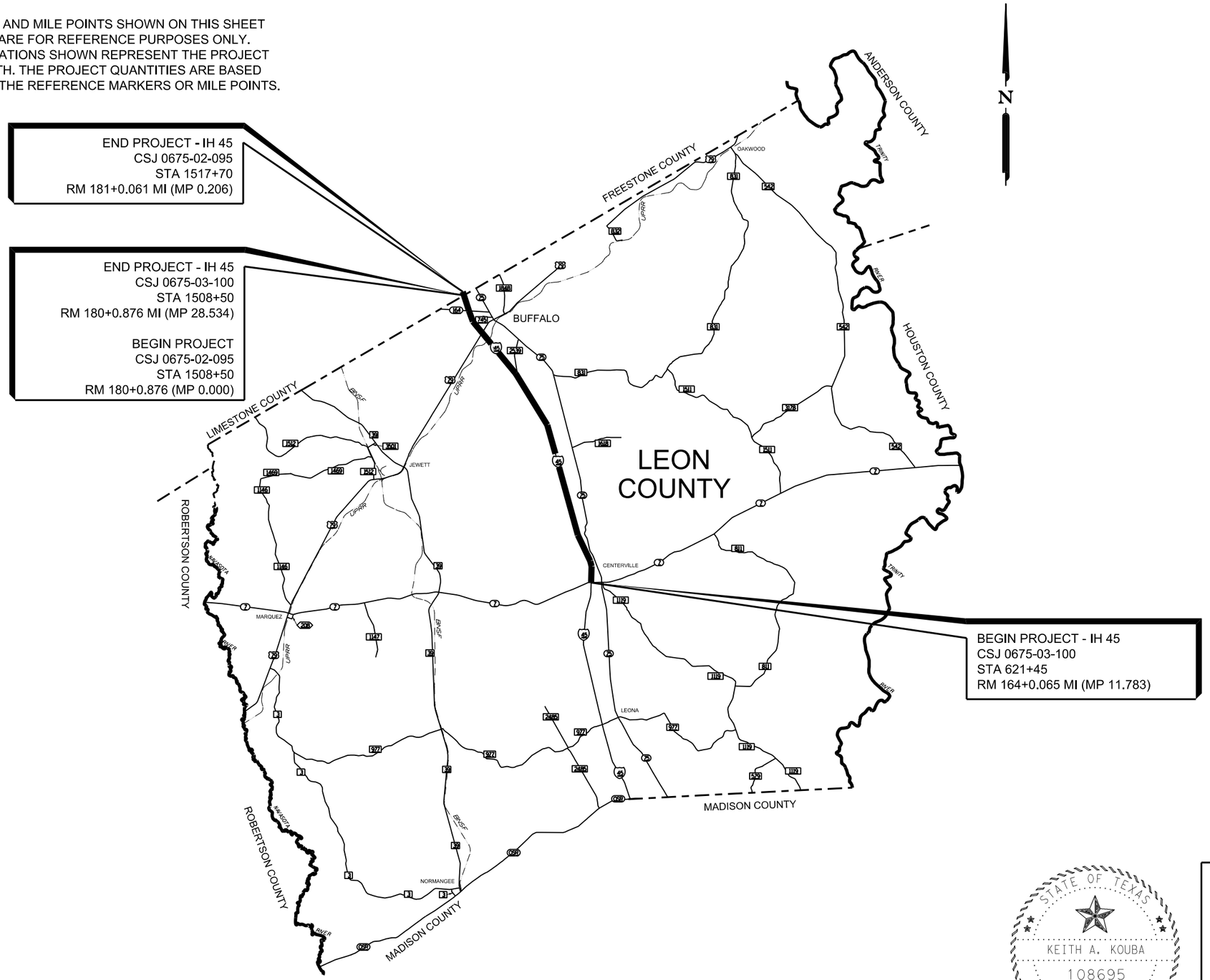
INDEX OF SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	2

REV DATE: 2-12-2015
CSJ: 0675-03-100
FILENAME: G:\067503\100\SHEETS\General\INDEX OF SHEETS.dgn

NOTE:
REFERENCE MARKERS AND MILE POINTS SHOWN ON THIS SHEET AND THE TITLE SHEET ARE FOR REFERENCE PURPOSES ONLY. THE PROJECT LIMIT STATIONS SHOWN REPRESENT THE PROJECT CONSTRUCTION LENGTH. THE PROJECT QUANTITIES ARE BASED ON THE STATION, NOT THE REFERENCE MARKERS OR MILE POINTS.



PRINT DATE	REVISION DATE
8/15/2021	

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PROJECT LOCATION MAP

STATE OF TEXAS
KEITH A. KOUBA
108695
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08/25/2021

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	3

REV DATE: 2-12-2015
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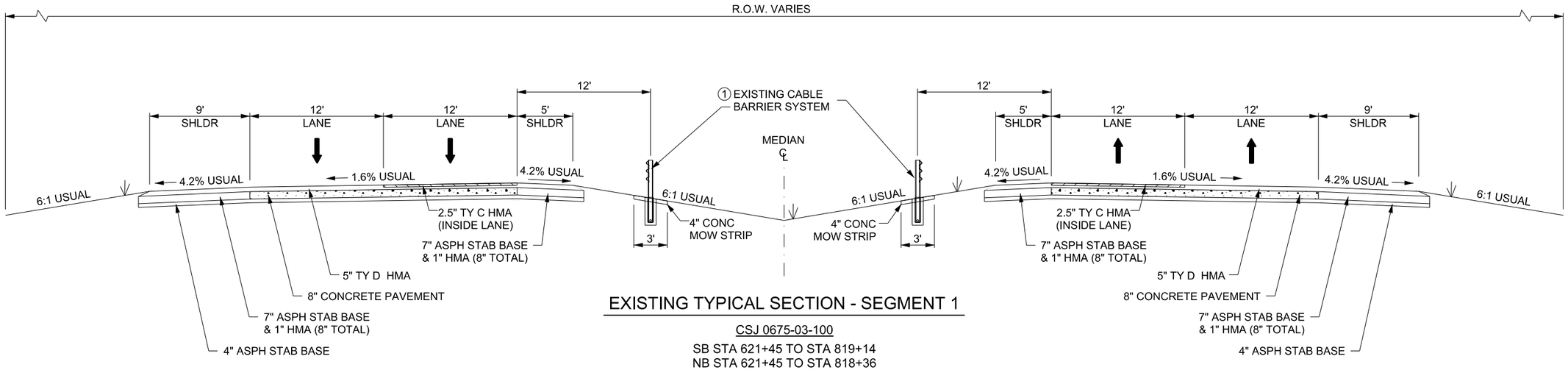
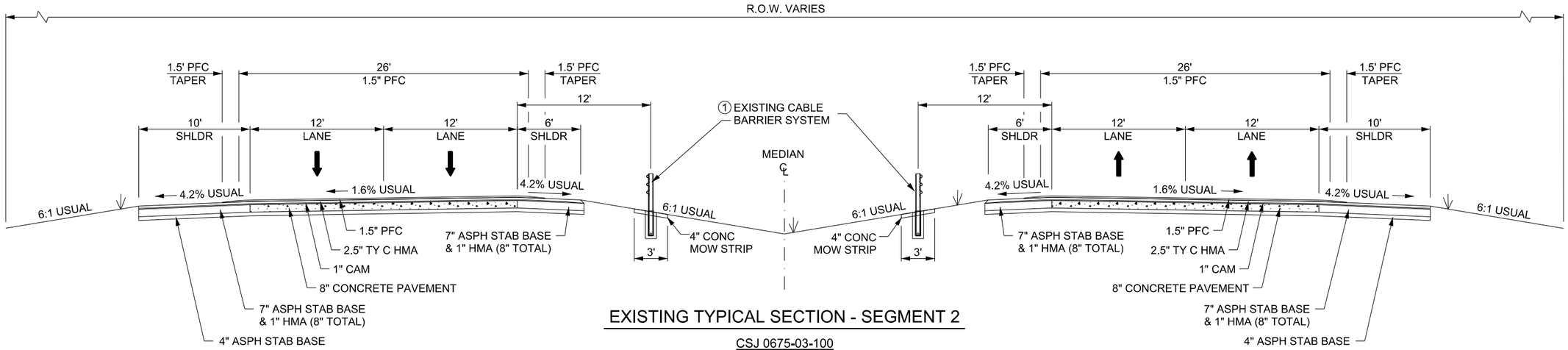


EXISTING TYPICAL SECTION - SEGMENT 1

CSJ 0675-03-100

SB STA 621+45 TO STA 819+14
NB STA 621+45 TO STA 818+36

SB STA 819+14 TO STA 826+49 (KEECHI CREEK BRIDGE & APPR SLABS)
NB STA 818+36 TO STA 825+71 (KEECHI CREEK BRIDGE & APPR SLABS)



EXISTING TYPICAL SECTION - SEGMENT 2

CSJ 0675-03-100

SB STA 826+49 TO STA 1209+85
NB STA 825+71 TO STA 1209+85

SB & NB STA 1209+85 TO STA 1213+25 (BLISS CREEK BRIDGE & APPR SLABS)

1 SEE "STRIPING LAYOUT" FOR APPROXIMATE SB & NB CABLE BARRIER LOCATIONS

Drawings Not To Scale

PRINT DATE	REVISION DATE
8/9/2021	

STATE OF TEXAS
KEITH A. KOUBA
108695
LICENSED
PROFESSIONAL ENGINEER

Keith A. Kouba, P.E.

08/09/2021

Texas Department of Transportation
Bryan District

TYPICAL SECTION (EXISTING)

SHEET 1 OF 8 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	4

REV DATE: 2-12-2015
CSJ: 0675-03-100

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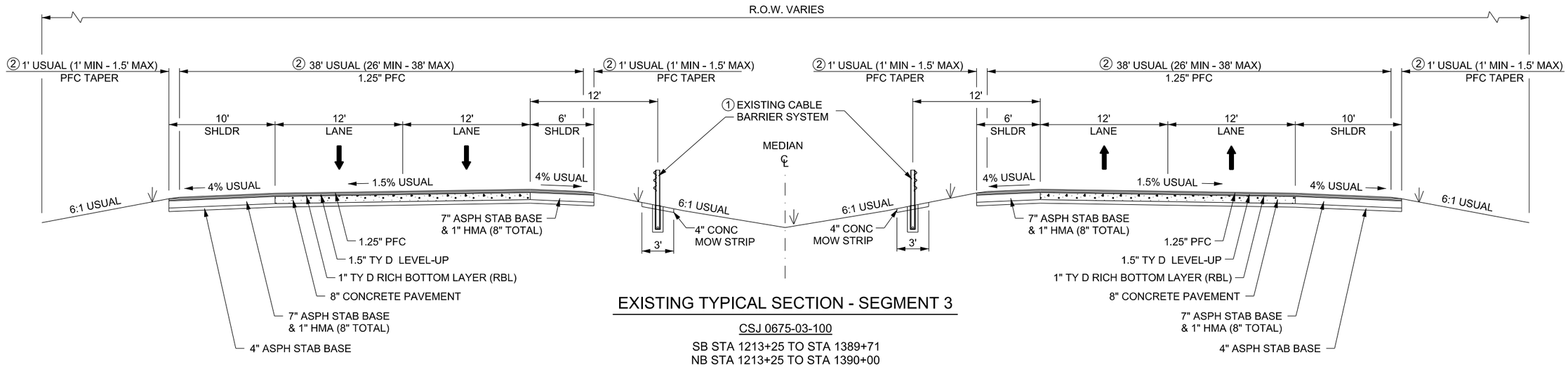


EXISTING TYPICAL SECTION - SEGMENT 3

CSJ 0675-03-100

SB STA 1213+25 TO STA 1389+71
NB STA 1213+25 TO STA 1390+00

SB STA 1389+71 TO STA 1392+06 (US 79 BRIDGE & APPR SLABS)
NB STA 1390+00 TO STA 1392+34 (US 79 BRIDGE & APPR SLABS)

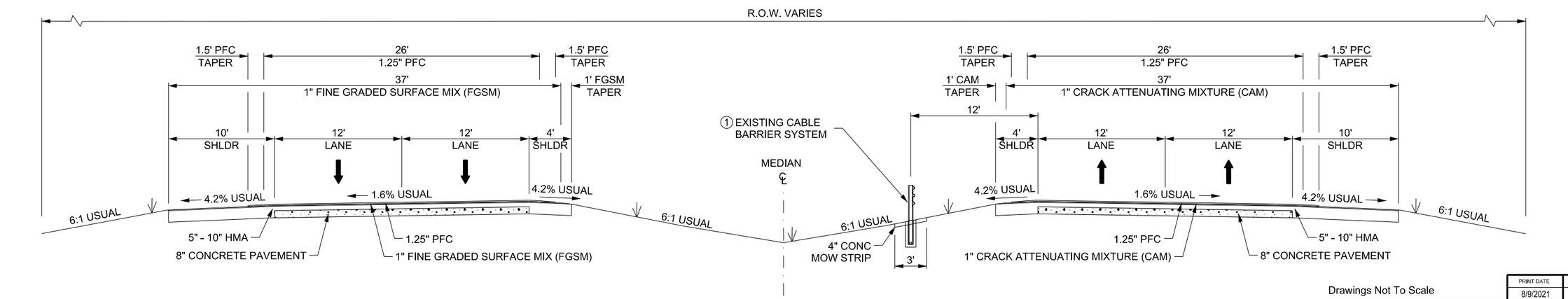
SB STA 1392+06 TO STA 1462+36
NB STA 1392+34 TO STA 1462+07

SB STA 1462+36 TO STA 1464+47 (SH 164 BRIDGE & APPR SLABS)
NB STA 1462+07 TO STA 1464+17 (SH 164 BRIDGE & APPR SLABS)

SB STA 1464+47 TO STA 1508+50
NB STA 1464+17 TO STA 1508+50

② 38' PFC CROWN & 1' PFC TAPERS FROM:
SB STA 1213+25 TO STA 1500+83
NB STA 1213+25 TO STA 1501+17

26' PFC CROWN & 1.5' PFC TAPERS FROM:
SB STA 1500+83 TO STA 1508+50
NB STA 1501+17 TO STA 1508+50



EXISTING TYPICAL SECTION - SEGMENT 3

CSJ 0675-02-095

SB STA 1508+50 TO STA 1517+70
NB STA 1508+50 TO STA 1517+70

① SEE "STRIPING LAYOUT" FOR APPROXIMATE
SB & NB CABLE BARRIER LOCATIONS

Drawings Not To Scale

PRINT DATE	REVISION DATE
8/9/2021	

STATE OF TEXAS
KEITH A. KOUBA
108695
LICENSED
PROFESSIONAL ENGINEER

Keith A. Kouba, P.E.

08/09/2021

Texas Department of Transportation
Bryan District

TYPICAL SECTION (EXISTING)

SHEET 2 OF 8 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	4A

REV DATE: 2-12-2015
CSJ: 0675-03-100

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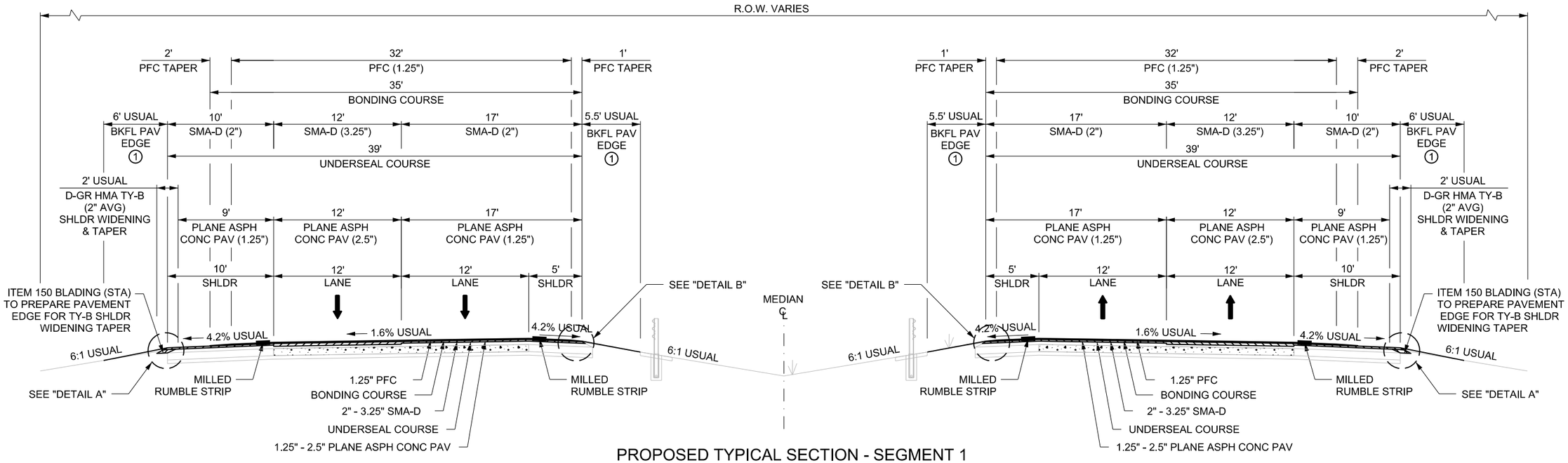


PROPOSED TYPICAL SECTION - SEGMENT 1

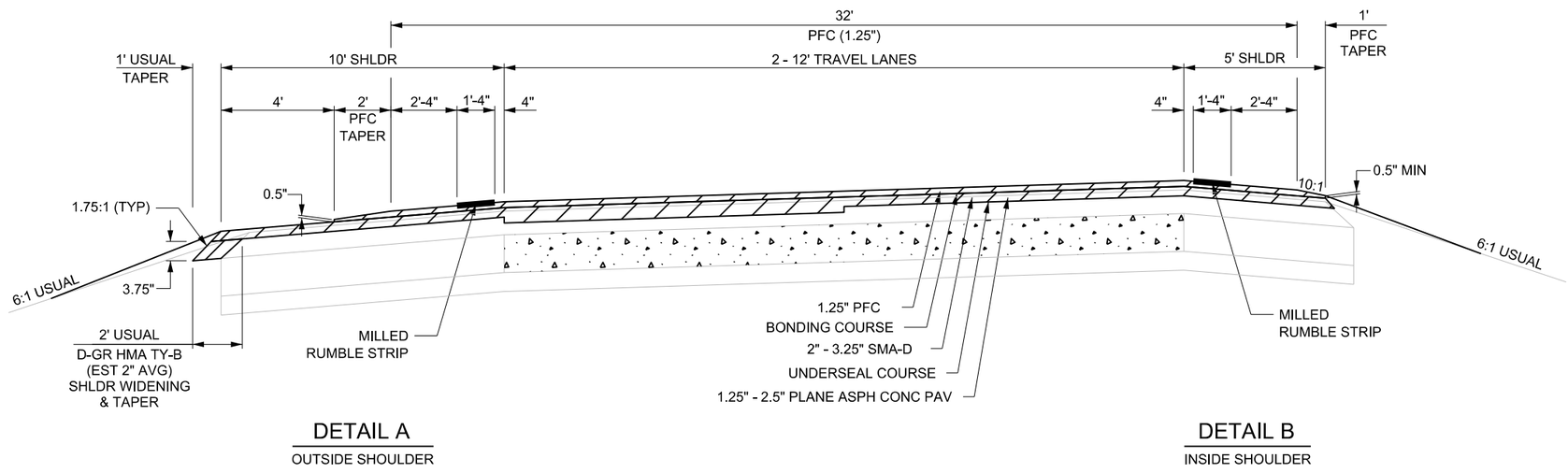
CSJ 0675-03-100

SB STA 621+45 TO STA 819+14
NB STA 621+45 TO STA 818+36

SB STA 819+14 TO STA 826+49 (NO PAVEMENT WORK - KEECHI CREEK BRIDGE & APPR SLABS)
NB STA 818+36 TO STA 825+71 (NO PAVEMENT WORK - KEECHI CREEK BRIDGE & APPR SLABS)

(1) ESTIMATED 5 CY/STA/SIDE

SEE "PLANING DETAILS AT IH 45 UNDERPASSES"
SEE "BRIDGE TIE-IN DETAIL" AT KEECHI CREEK BRIDGE



DETAIL A
OUTSIDE SHOULDER

DETAIL B
INSIDE SHOULDER

STATE OF TEXAS
KEITH A. KOUBA
108695
LICENSED
PROFESSIONAL ENGINEER

Keith A. Kouba, P.E.

08/25/2021

Drawings Not To Scale

PRINT DATE	REVISION DATE
8/25/2021	

Texas Department of Transportation
Bryan District

TYPICAL SECTION (PROPOSED)

SHEET 3 OF 8 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	4B

REV DATE: 2-12-2015
CSJ: 0675-03-100

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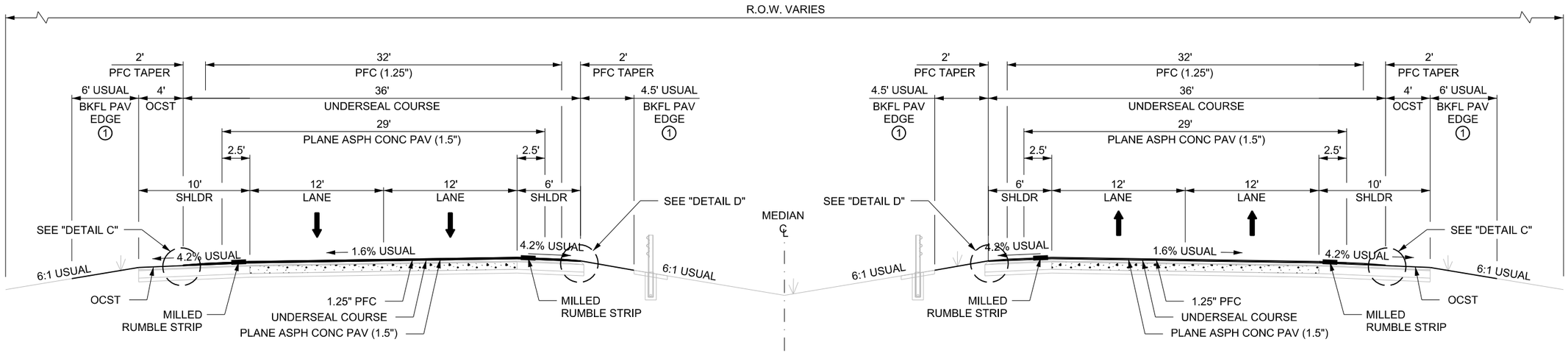


PROPOSED TYPICAL SECTION - SEGMENT 2

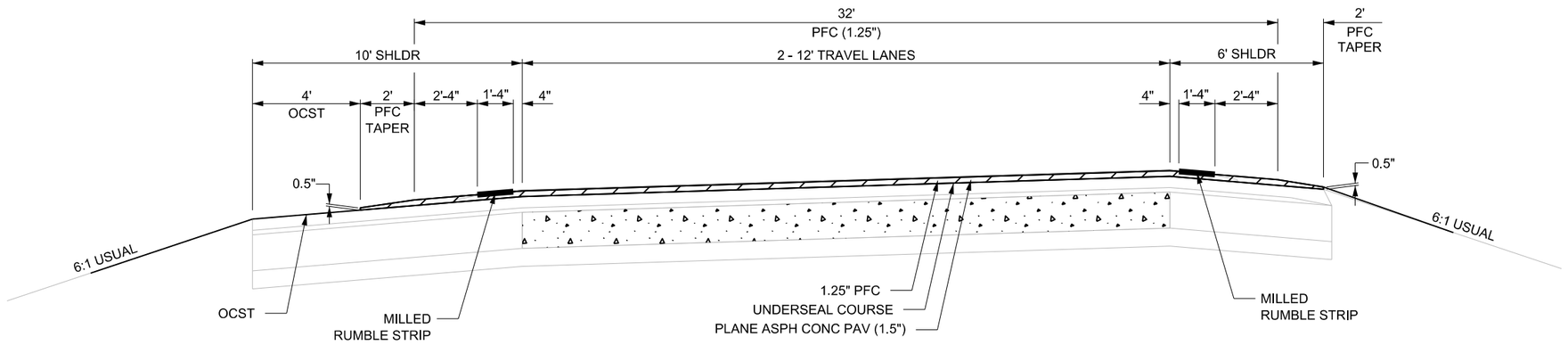
CSJ 0675-03-100

SB STA 826+49 TO STA 1209+85
NB STA 825+71 TO STA 1209+85

SB & NB STA 1209+85 TO STA 1213+25 (BLISS CREEK BRIDGE & APPR SLABS)

SEE "PLANING DETAILS AT IH 45 UNDERPASSES"
SEE "BRIDGE TIE-IN DETAIL" AT KEECHI CREEK BRIDGE AND BLISS CREEK BRIDGE

① ESTIMATED 5 CY/STA/SIDE



DETAIL C
OUTSIDE SHOULDER

DETAIL D
INSIDE SHOULDER

STATE OF TEXAS
KEITH A. KOUBA
108695
LICENSED
PROFESSIONAL ENGINEER

Keith A. Kouba, P.E.

08/25/2021

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PRINT DATE	REVISION DATE
8/25/2021	

Texas Department of Transportation
Bryan District

TYPICAL SECTION (PROPOSED)

SHEET 4 OF 8 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	4C

REV DATE: 2-12-2015
CSJ: 0675-03-100

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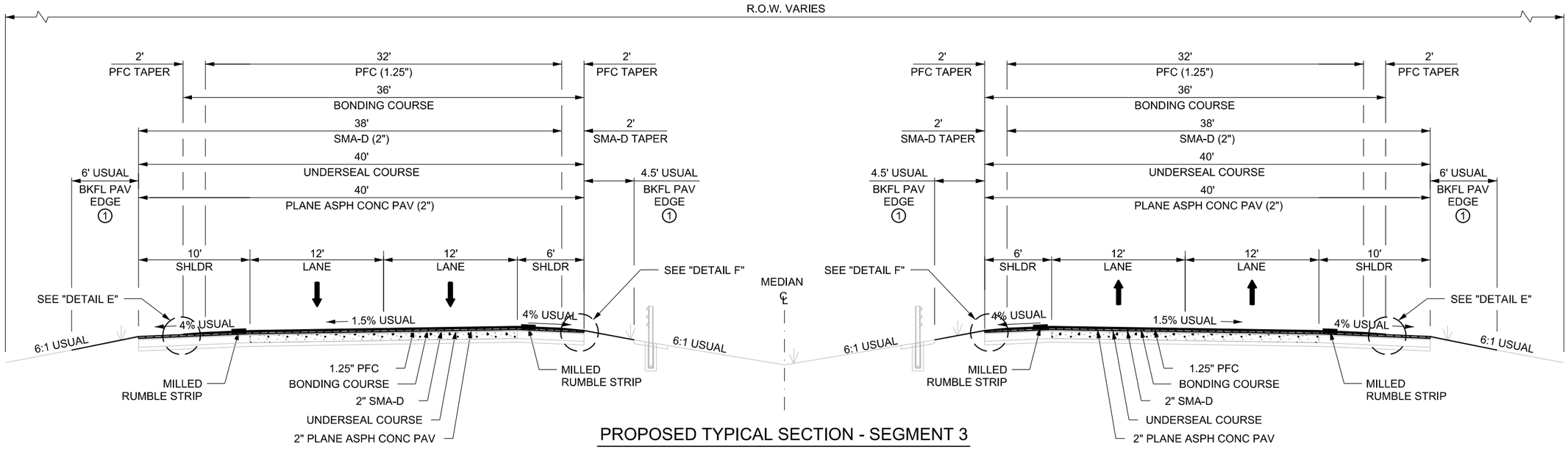


PROPOSED TYPICAL SECTION - SEGMENT 3

CSJ 0675-03-100

SB STA 1213+25 TO STA 1389+71
NB STA 1213+25 TO STA 1390+00

SB STA 1389+71 TO STA 1392+06 (NO PAVEMENT WORK - US 79 BRIDGE & APPR SLABS)
NB STA 1390+00 TO STA 1392+34 (NO PAVEMENT WORK - US 79 BRIDGE & APPR SLABS)

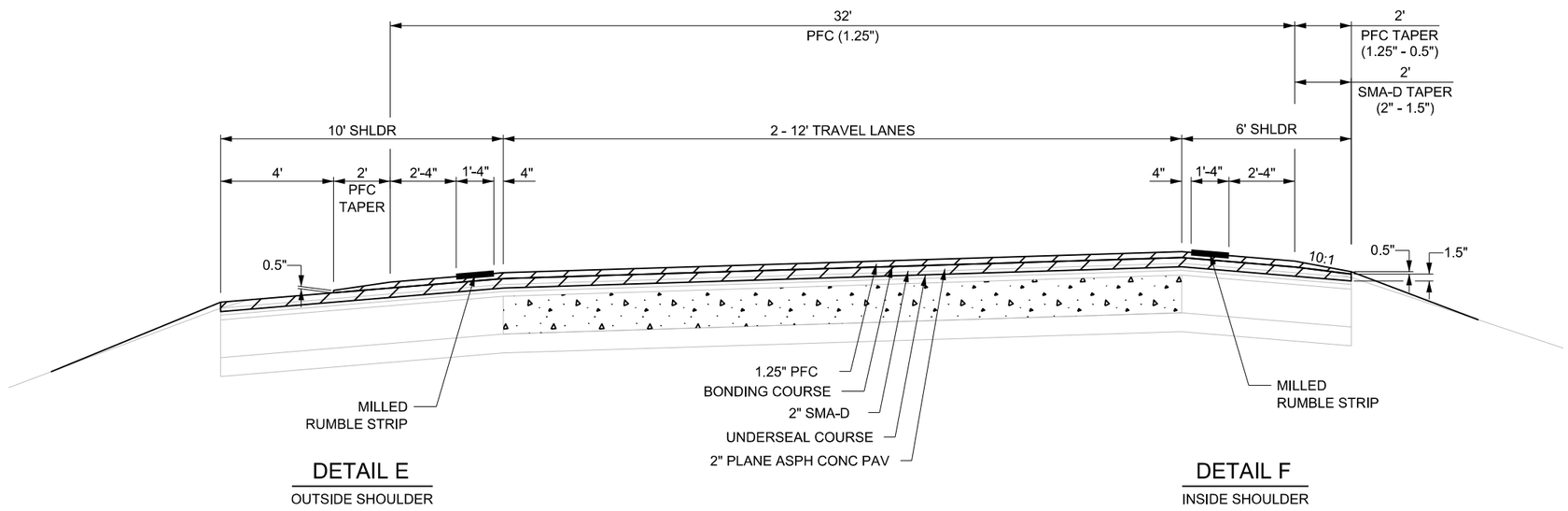
SB STA 1392+06 TO STA 1462+36
NB STA 1392+34 TO STA 1462+07

SB STA 1462+36 TO STA 1464+47 (NO PAVEMENT WORK - SH 164 BRIDGE & APPR SLABS)
NB STA 1462+07 TO STA 1464+17 (NO PAVEMENT WORK - SH 164 BRIDGE & APPR SLABS)

SB STA 1464+47 TO STA 1500+83
NB STA 1464+17 TO STA 1501+17

SEE "PLANING DETAILS AT IH 45 UNDERPASSES"
SEE "BRIDGE TIE-IN DETAIL" AT US 79 AND SH 164 BRIDGES

① ESTIMATED 5 CY/STA/SIDE



DETAIL E
OUTSIDE SHOULDER

DETAIL F
INSIDE SHOULDER

STATE OF TEXAS
KEITH A. KOUBA
108695
LICENSED
PROFESSIONAL ENGINEER

Keith A. Kouba, P.E.

08/25/2021

Drawings Not To Scale

PRINT DATE	REVISION DATE
8/25/2021	

Texas Department of Transportation
Bryan District

TYPICAL SECTION (PROPOSED)

SHEET 5 OF 8 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	4D

REV DATE: 2-12-2015
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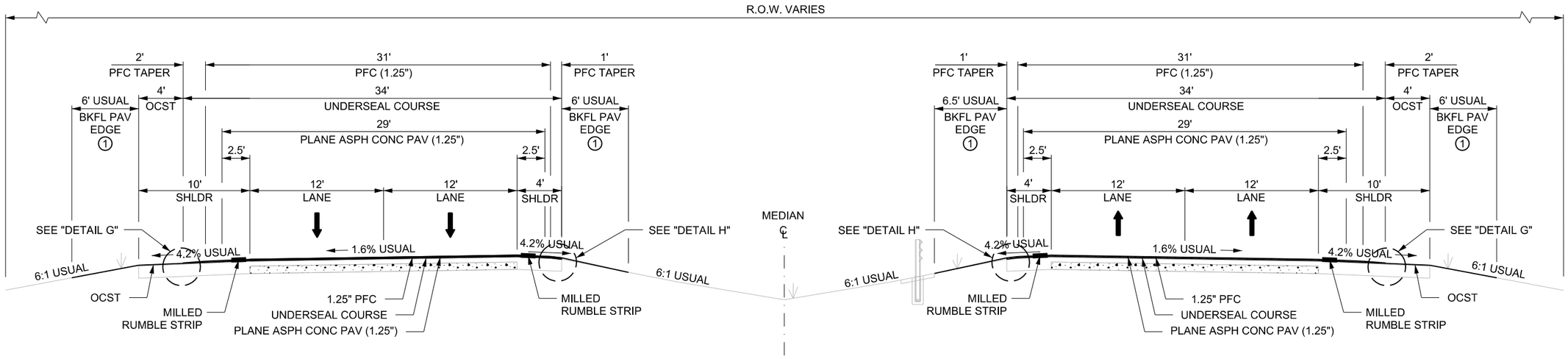


PROPOSED TYPICAL SECTION - SEGMENT 3

CSJ 0675-03-100

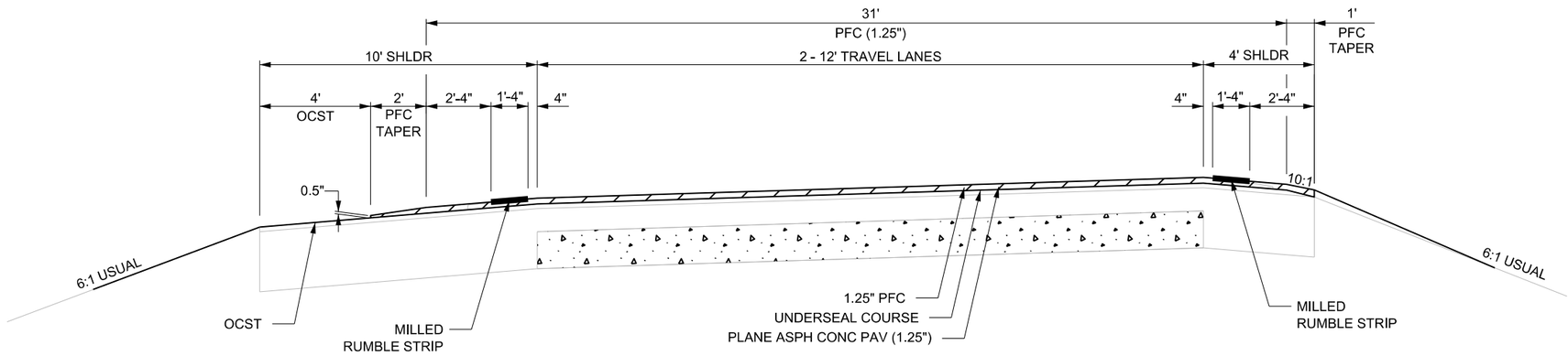
SB STA 1500+83 TO STA 1508+50
NB STA 1501+17 TO STA 1508+50

CSJ 0675-02-095

SB STA 1508+50 TO STA 1517+70
NB STA 1508+50 TO STA 1517+70

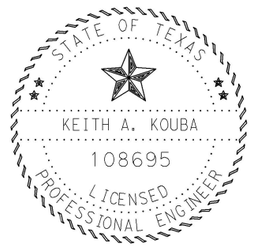
SEE "BRIDGE TIE-IN DETAIL" AT BUFFALO CREEK BRIDGE

① ESTIMATED 5 CY/STA/SIDE



DETAIL G
OUTSIDE SHOULDER

DETAIL H
INSIDE SHOULDER



08/25/2021

Drawings Not To Scale

PRINT DATE	REVISION DATE
8/25/2021	

Texas Department of Transportation
Bryan District

TYPICAL SECTION (PROPOSED)

SHEET 6 OF 8 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	4E

REV DATE: 2-12-2015
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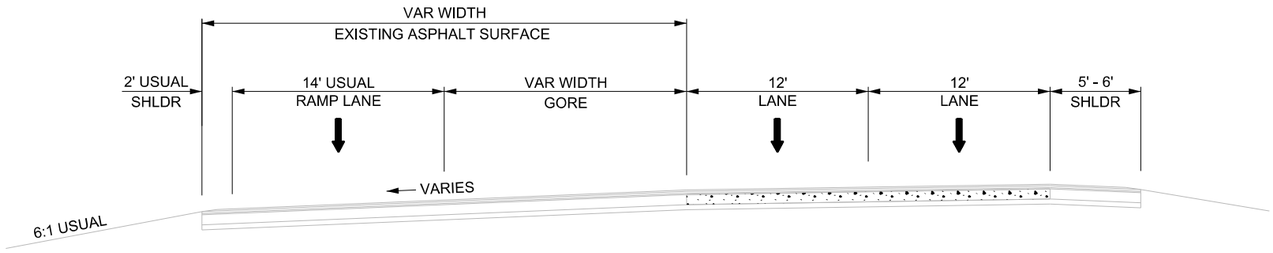
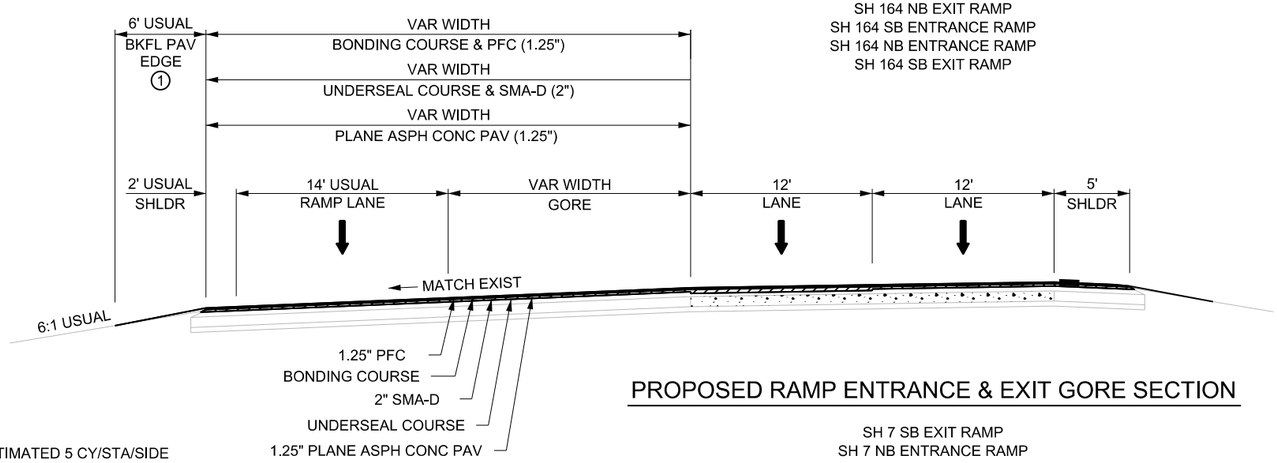


EXISTING RAMP ENTRANCE & EXIT GORE SECTION

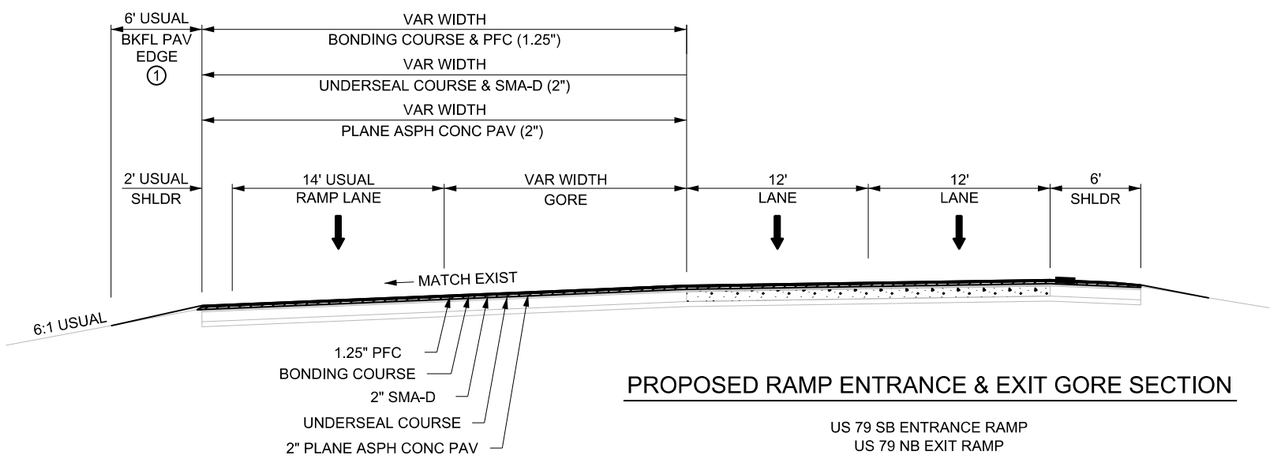
SH 7 SB EXIT RAMP
SH 7 NB ENTRANCE RAMP
US 79 SB ENTRANCE RAMP
US 79 NB EXIT RAMP
US 79 NB ENTRANCE RAMP
US 79 SB EXIT RAMP
SH 164 NB EXIT RAMP
SH 164 SB ENTRANCE RAMP
SH 164 NB ENTRANCE RAMP
SH 164 SB EXIT RAMP



① ESTIMATED 5 CY/STA/SIDE

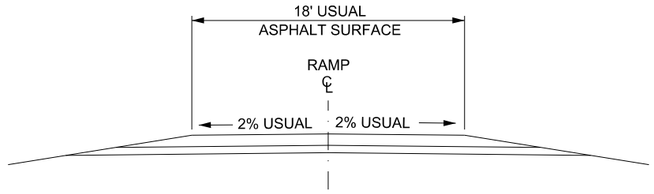
PROPOSED RAMP ENTRANCE & EXIT GORE SECTION

SH 7 SB EXIT RAMP
SH 7 NB ENTRANCE RAMP



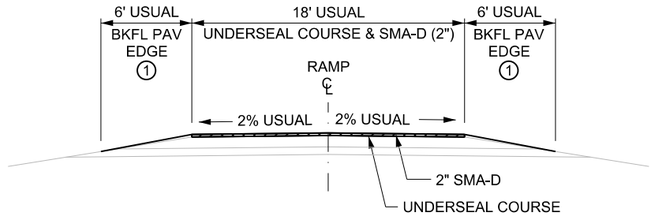
PROPOSED RAMP ENTRANCE & EXIT GORE SECTION

US 79 SB ENTRANCE RAMP
US 79 NB EXIT RAMP
US 79 NB ENTRANCE RAMP
US 79 SB EXIT RAMP
SH 164 NB EXIT RAMP
SH 164 SB ENTRANCE RAMP
SH 164 NB ENTRANCE RAMP
SH 164 SB EXIT RAMP



EXISTING RAMP SECTION

SH 7 SB EXIT RAMP (STA 622+50 TO STA 635+62 LT)
SH 7 NB ENTRANCE RAMP (STA 622+85 TO STA 630+33 RT)
US 79 NB EXIT RAMP (STA 1376+89 TO STA 1392+08 RT)
US 79 NB ENTRANCE RAMP (STA 1392+94 TO STA 1405+20 RT)
SH 164 NB EXIT RAMP (STA 1449+81 TO STA 1460+98 RT)
SH 164 SB ENTRANCE RAMP (STA 1452+40 TO STA 1465+16 LT)
SH 164 NB ENTRANCE RAMP (STA 1461+38 TO STA 1473+88 RT)
SH 164 SB EXIT RAMP (STA 1465+62 TO STA 1477+00 LT)

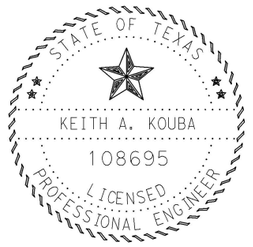


PROPOSED RAMP SECTION

SH 7 SB EXIT RAMP (STA 622+50 TO STA 635+62 LT)
SH 7 NB ENTRANCE RAMP (STA 622+85 TO STA 630+33 RT)
US 79 NB EXIT RAMP (STA 1376+89 TO STA 1392+08 RT)
US 79 NB ENTRANCE RAMP (STA 1392+94 TO STA 1405+20 RT)
SH 164 NB EXIT RAMP (STA 1449+81 TO STA 1460+98 RT)
SH 164 SB ENTRANCE RAMP (STA 1452+40 TO STA 1465+16 LT)
SH 164 NB ENTRANCE RAMP (STA 1461+38 TO STA 1473+88 RT)
SH 164 SB EXIT RAMP (STA 1465+62 TO STA 1477+00 LT)

Drawings Not To Scale

PRINT DATE	REVISION DATE
8/25/2021	



08/25/2021

Texas Department of Transportation
Bryan District

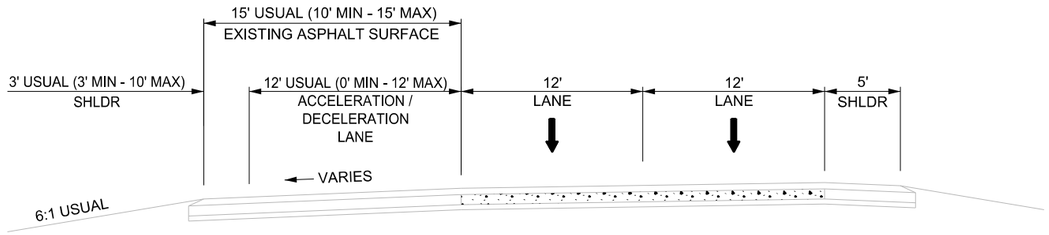
TYPICAL SECTION (RAMPS)

SHEET 7 OF 8 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	4F

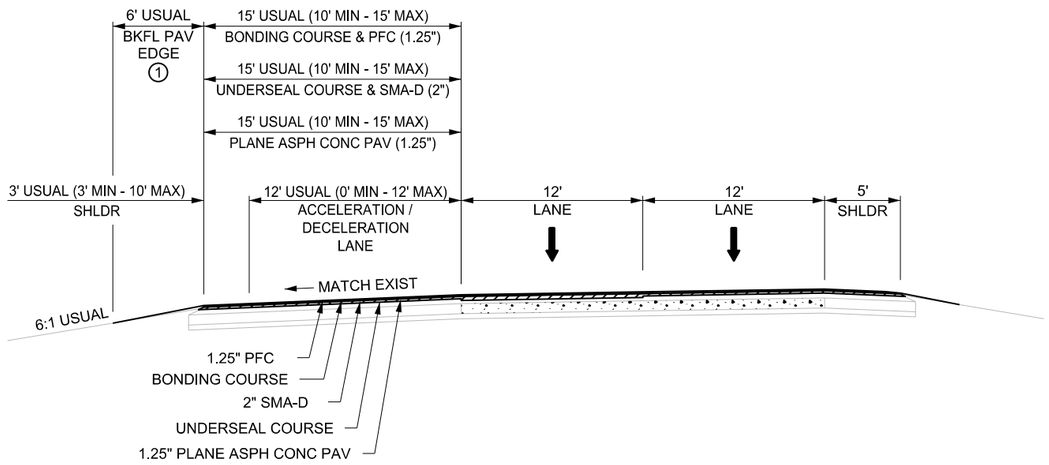
REV DATE: 2-12-2015
CSJ#: 0675-03-100
FILENAME: G:\0675\03\100\SHEETS\General\TYPICAL SECTION_KAK Revisions.dgn



EXISTING WEIGH STATION ACCELERATION / DECELERATION LANES

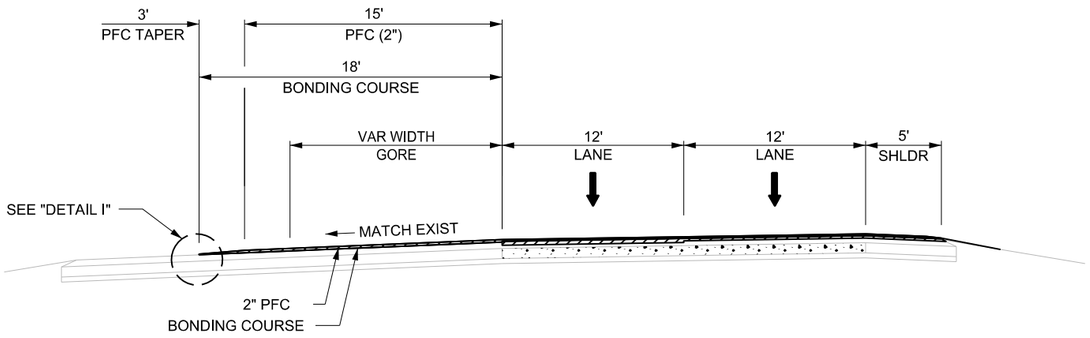
STA 679+69 TO STA 690+60 LT
STA 716+07 TO STA 727+19 LT

① ESTIMATED 5 CY/STA/SIDE



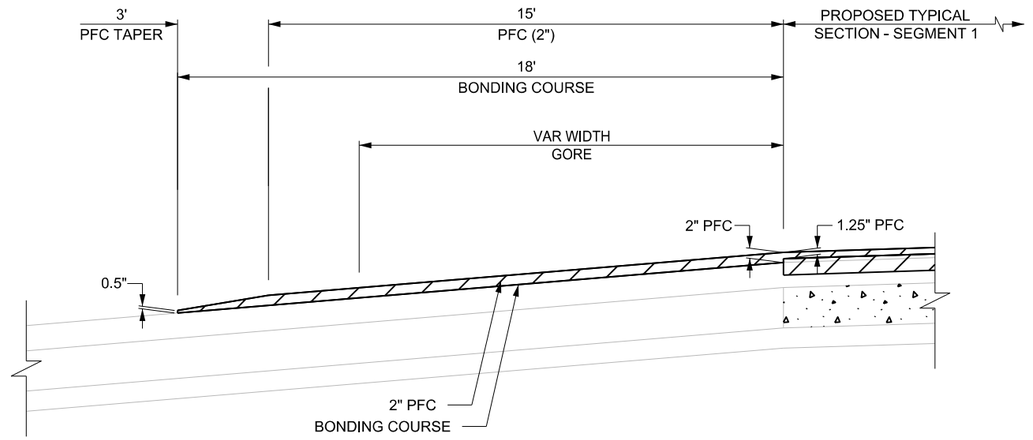
PROPOSED WEIGH STATION ACCELERATION / DECELERATION LANES

STA 679+69 TO STA 690+60 LT
STA 716+07 TO STA 727+19 LT



PROPOSED WEIGH STATION GORE SECTION

STA 690+60 TO STA 695+24 LT
STA 708+57 TO STA 716+07 LT



DETAIL I

Drawings Not To Scale

PRINT DATE	REVISION DATE
8/25/2021	

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Bryan District
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TYPICAL SECTION (WEIGH STATION)

SHEET 8 OF 8 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER		HIGHWAY NUMBER
6			IH 45
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	4G

STATE OF TEXAS
KEITH A. KOUBA
108695
LICENSED
PROFESSIONAL ENGINEER

08/25/2021

FILENAME: G:\0675\03\100\SHEETS\General\TYPICAL SECTION_KAK Revisions.dgn
REV DATE: 2-12-2015
CSJ: 0675-03-100

BASIS OF ESTIMATE (0675-03-100)					
ITEM	DESCRIPTION	COURSE	RATE	AMOUNT	QUANTITY
SEGMENT 1					
3085-6001	UNDERSEAL COURSE	BEFORE SMA -D	0.20 GAL/SY	176,970 SY	35,394 GAL
346-6014	STONE-MTRX-ASPH SAC-A SMA-D PG 76-22	OUTSIDE LNS 3.25”	357.5 LB/SY	51,814 SY	9,262 TON
346-6014	STONE-MTRX-ASPH SAC-A SMA-D PG 76-22	INSIDE LNS & SHLDRS 2”	220 LB/SY	125,157 SY	13,767 TON
3076-6001	D-GR HMA TY-B PG64-22	SHLDR WIDENING 2”	220 LB/SY	8,769 SY	965 TON
3084-6001	BONDING COURSE	BEFORE PFC	0.10 GAL/SY	156,537 SY	15,654 GAL
342-6002	PFC (ASPHALT) PG76-22 (1)	1.25”	7.32 LB/SY	156,537 SY	573 TON
342-6006	PFC (AGGREGATE) (PG76 MIX) SAC-A (1)	1.25”	108.93 LB/SY	156,537 SY	8,526 TON
SEGMENT 2					
3085-6001	UNDERSEAL COURSE	BEFORE PFC	0.20 GAL/SY	307,532 SY	61,506 GAL
346-6014	STONE-MTRX-ASPH SAC-A SMA-D PG 76-22	BRG TRANS	165 LB/SY (AVG)	5,332 SY	440 TON
342-6002	PFC (ASPHALT) PG76-22 (1)	1.25”	7.32 LB/SY	302,200 SY	1,106 TON
342-6006	PFC (AGGREGATE) (PG76 MIX) SAC-A (1)	1.25”	108.93 LB/SY	302,200 SY	16,459 TON
316-6017	ASPH (AC-20-5TR)	OCST OUTSIDE SHLDRS	0.36 GAL/SY	33,577 SY	12,088 GAL
316-6257	AGGR (TY-PL GR-4 SAC-B)	OCST OUTSIDE SHLDRS	1 CY/125 SY	33,577 SY	269 CY

(1) PFC estimated at 93 LB/SY/IN, consisting of 6.3% asphalt and 93.7% aggregate by weight.

Sheet: 5
Highway: IH 45 Control: 0675-03-100, Etc.
County: Leon, Etc.

BASIS OF ESTIMATE (0675-03-100)					
ITEM	DESCRIPTION	COURSE	RATE	AMOUNT	QUANTITY
SEGMENT 3					
3085-6001	UNDERSEAL COURSE	BEFORE SMA-D	0.20 GAL/SY	280,668 SY	56,134 GAL
346-6014	STONE-MTRX-ASPH SAC-A SMA-D PG 76-22	2”	220 LB/SY	275,001 SY	30,250 TON
3084-6001	BONDING COURSE	BEFORE PFC	0.10 GAL/SY	221,032 SY	22,103 GAL
316-6017	ASPH (AC-20-5TR)	OCST OUTSIDE SHLDRS	0.36 GAL/SY	667 SY	240 GAL
316-6257	AGGR (TY-PL GR-4 SAC-B)	OCST OUTSIDE SHLDRS	1 CY/125 SY	667 SY	5 CY
342-6002	PFC (ASPHALT) PG76-22 (1)	1.25”	7.32 LB/SY	226,699 SY	830 TON
342-6006	PFC (AGGREGATE) (PG76 MIX) SAC-A (1)	1.25”	108.93 LB/SY	226,699 SY	12,347 TON

(1) PFC estimated at 93 LB/SY/IN, consisting of 6.3% asphalt and 93.7% aggregate by weight.

BASIS OF ESTIMATE (0675-02-095)					
ITEM	DESCRIPTION	COURSE	RATE	AMOUNT	QUANTITY
SEGMENT 3					
3085-6001	UNDERSEAL COURSE	BEFORE PFC	0.20 GAL/SY	7,236 SY	1,447 GAL
346-6014	STONE-MTRX-ASPH SAC-A SMA-D PG 76-22	BRG TRANS	165 LB/SY (AVG)	2,702 SY	223 TON
316-6017	ASPH (AC-20-5TR)	OCST OUTSIDE SHLDRS	0.36 GAL/SY	534 SY	192 GAL
316-6257	AGGR (TY-PL GR-4 SAC-B)	OCST OUTSIDE SHLDRS	1 CY/125 SY	534 SY	4 CY
342-6002	PFC (ASPHALT) PG76-22 (1)	1.25”	7.32 LB/SY	4,534 SY	17 TON
342-6006	PFC (AGGREGATE) (PG76 MIX) SAC-A (1)	1.25”	108.93 LB/SY	4,534 SY	247 TON

(1) PFC estimated at 93 LB/SY/IN, consisting of 6.3% asphalt and 93.7% aggregate by weight.

GENERAL:

Contractor questions on this project are to be addressed to the following individuals:
Jace Lee, P.E., A.E., Jace.Lee@txdot.gov
Matthew L. Hensarling, P.E., A.A.E., Matt.Hensarling@txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individuals.

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following address:
https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

All questions submitted that generate a response will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

ITEM 7 "LEGAL RELATIONS AND RESPONSIBILITIES"

State contract mowers will mow the right of way during the growing season. The Contractor will be notified by the Engineer one week in advance of the anticipated time when mowers will be in the limits of the project. Clean the right of way to such a condition that allows the mowing contractors to safely mow.

This project is on a hurricane evacuation route. Furnish at the pre-construction meeting a written plan outlining procedures to suspend work, secure the job site and safely handle traffic through and across the project in the event of a hurricane evacuation.

During the hurricane season (June 1 through November 30), do not close any travel lanes except when the Contractor can demonstrate that he can provide labor, equipment, material, work plan, and quality of work to satisfactorily return all lanes to an open, all-weather travel surface within three days of receiving written or verbal notice but no later than 3 days prior to hurricane landfall. Construction of temporary lanes to an all-weather surface will be paid in accordance with Article 9.7, "Payment for Extra Work and Force Account Method".

In addition to lane closures, cease work 3 days prior to hurricane landfall on or near the roadway that adversely impacts the flow of traffic and reduces the capacity of the highway during an evacuation. Prohibit the Contractor's, sub-contractors' or material suppliers' vehicles from entering or exiting the stream of traffic including material hauling and delivery, and mobilization or demobilization of equipment. When directed, this prohibition will include a reasonable time period for the evacuees to return to their point of origin.

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Highway: IH 45 **Control: 0675-03-100, Etc.**
County: Leon, Etc.

In the event of the declaration of a hurricane watch, warning, other severe weather warning or national or state emergency that requires the roadways in the vicinity be used as evacuation routes, cease all work that requires the Contractor's, sub-contractors' or material suppliers' vehicles to enter the stream of traffic on these primary or secondary evacuation routes. This work includes material hauling and delivery, and mobilization or demobilization of equipment.

The following roadways are recognized evacuation routes in the Bryan District:

Primary Evacuation Routes: IH 45, US 290, SH 6, SH 36.

Secondary Evacuation Routes: US 79, US 84, SH 7, SH 30, SH 21, SH 105.

Other routes may be designated.

No significant traffic generator events identified.

ITEM 8 "PROSECUTION AND PROGRESS"

At the end of each work day, remove all grade differentials transverse to the centerline.

At the end of each work day, provide 100 foot minimum grade tapers longitudinal to the centerline to transition differences in the profile grade line or roadway grade.

All travel lanes must be open to traffic at the end of each workday, unless otherwise approved by the Engineer.

Lane closures are not allowed after noon on Friday.

Schedule the work so that SMA or PFC is placed the same work day within the limits of all milled areas, unless otherwise approved by the Engineer.

Place work zone stripe by 1:00 PM Friday of each week to cover the work placed that week.

By noon of each Wednesday, provide the Engineer a written outline of the daily work schedule for the following week. Include in the outline the times and places for proposed traffic control changes, lane and shoulder closures, and moving operations or other operations that affect traffic on the roadway. Unless otherwise authorized by the Engineer, prosecute the work on this project in accordance with the following sequence of work:

1) Set Advance Signing and Barricades.

SEGMENT 1
From Begin Project (621+45 NB) to Keechi Creek Bridge (818+36 NB)
2) Inside Lane and Shoulder: Mill 1.25", Place Underseal Course, Place 2" SMA-D and Backfill Pavement Edge.
3) Outside Lane: Mill 2.5", Place Underseal Course, and Place 3.25" SMA-D in Two Lifts.
4) Outside Shoulder: Complete Pavement Edge Blading Work and Place TY-B HMA for Shoulder Widening.
5) Outside Shoulder: Mill 1.25", Place Underseal Course, Place 2" SMA-D, and Backfill Pavement Edge.
6) Complete Proposed Bridge Tie-In and Ramp Pavement Work.
7) Place Work Zone Pavement Markings.
8) Place Bonding Course and 1.25" PFC.
9) Place Work Zone Pavement Markings.

SEGMENT 2
From Keechi Creek Bridge (825+71 NB) to Bliss Creek Bridge (1209+85 NB)
10) Mill Existing 1.5" PFC, Place Underseal Course, Place 1.25" PFC, and Backfill Pavement Edges.
11) Complete Proposed Bridge Tie-In Pavement Work.
12) Place 4' One Course Surface Treatment (OCST) on Outside Shoulder.
13) Place Work Zone Pavement Markings.

SEGMENT 3
From Bliss Creek Bridge (1213+25 NB) to STA 1501+17 NB
14) Mill 2", Place Underseal Course, Place 2" SMA-D, and Backfill Pavement Edges.
15) Complete Proposed Bridge Tie-In and Ramp Pavement Work.
16) Place Work Zone Pavement Markings.
17) Place Bonding Course and 1.25" PFC.
18) Place Work Zone Pavement Markings.

SEGMENT 3
From STA 1501+17 NB to End Project (1517+70 NB)
19) Mill 1.25", Place Underseal Course, Place 1.25" PFC, and Backfill Pavement Edges.
20) Complete Proposed Bridge Tie-In Pavement Work.
21) Place 4' OCST on Outside Shoulder.
22) Place Work Zone Pavement Markings.

SEGMENT 1
From Keechi Creek Bridge (819+14 SB) to Begin Project (621+45 SB)
23) Inside Lane and Shoulder: Mill 1.25", Place Underseal Course, Place 2" SMA-D and Backfill Pavement Edge.
24) Outside Lane: Mill 2.5", Place Underseal Course, and Place 3.25" SMA-D in Two Lifts.
25) Outside Shoulder: Complete Pavement Edge Blading Work and Place TY-B HMA for Shoulder Widening.
26) Outside Shoulder: Mill 1.25", Place Underseal Course, Place 2" SMA-D, and Backfill Pavement Edge.
27) Complete Proposed Bridge Tie-In and Ramp Pavement Work.
28) Place Work Zone Pavement Markings.
29) Place Bonding Course and Place 1.25" PFC.
30) Place Work Zone Pavement Markings.

SEGMENT 3
From End Project (STA 1517+70 SB) to STA 1500+83 SB
31) Mill 1.25", Place Underseal Course, Place 1.25" PFC, and Backfill Pavement Edges.
32) Complete Proposed Bridge Tie-In Pavement Work.
33) Place 4' OCST on Outside Shoulder.
34) Place Work Zone Pavement Markings.

SEGMENT 3
From STA 1500+83 SB to Bliss Creek Bridge (1213+25 SB)
35) Mill 2", Place Underseal Course, Place 2" SMA-D, and Backfill Pavement Edges.
36) Complete Proposed Bridge Tie-In and Ramp Pavement Work.
37) Place Work Zone Pavement Markings.
38) Place Bonding Course and Place 1.25" PFC.
39) Place Work Zone Pavement Markings.

SEGMENT 2
From Bliss Creek Bridge (1209+85 SB) to Keechi Creek Bridge (826+49 SB)
40) Mill Existing 1.5" PFC, Place Underseal Course, Place 1.25" PFC, and Backfill Pavement Edges.
41) Complete Proposed Bridge Tie-In Pavement Work.
42) Place 4' One Course Surface Treatment (OCST) on Outside Shoulder.
43) Place Work Zone Pavement Markings.

44) Place Permanent Pavement Markings
45) Place Ramp Delineators.
46) Place Milled Rumble Strips.
47) Final Cleanup.

Some of these operations may be performed simultaneously.

Prepare Progress Schedule Bar Chart.

Work is allowed to be performed during the nighttime. Provide adequate lighting during nighttime operations and have light sources available and on-site prior to starting daytime operations which may extend into the night.

Equipment and material may be pre-staged at approved locations.

Enter and leave the work area with the flow of traffic. Do not use median crossovers.

The 60-day delayed start allowed after authorization under SP008-002 is for Contractor mobilization.

The road-user cost liquidated damages are $5,272.00 per day.

ITEM 134 "BACKFILLING PAVEMENT EDGES"

Furnish Type A or B material meeting one of the following requirements:
Item 247, Type D Grade 3;
Reclaimed Asphalt Pavement (RAP) with 95% of the RAP passing the 2 inch sieve.

Place emulsified asphalt (SS-1, CSS-1, or as approved by the Engineer) at an application rate of 0.15 gal/SY.

Place proposed pavement backfill on the same day that the SMA is placed. Areas to be backfilled that cannot be completed on the same day that SMA is placed for reasons beyond the contractor's control, shall require the TCP (5-1) standard.

ITEM 150 "BLADING"

Sprinkling and rolling which may be required during the operation of Item 150 will not be measured or paid for directly, but will be considered subsidiary to this item.

ITEM 301 "ASPHALT ANTISTRIPPING AGENT"

When the Contractor adds lime as an anti-stripping agent (or an equivalent anti-stripping agent) the lime or equivalent shall be added to the asphaltic concrete in the methods specified in this item unless otherwise approved by the Engineer. If an alternate method is proposed, the Engineer's approval will be based on test method Tex-242-F performed on the asphaltic concrete produced through the plant.

Sheet: 5C

Highway: IH 45 **Control: 0675-03-100, Etc.**
County: Leon, Etc.

ITEM 316 "SEAL COAT"

Remove vegetation and blade pavement edges.

Vehicles used to haul aggregate from the stockpile to the chip spreader will not be overloaded. Any damage to the roadway caused by the vehicles will be repaired by the Contractor at his expense and subsequent loads will be reduced so as not to cause further damage.

Transverse variance rates shall be used as directed. The nozzles outside the wheel paths will output up to 20% more asphalt by volume than the nozzles over the wheel paths.

The Contractor may be required to furnish and set string line to ensure straight and uniform alignment as directed by the Engineer. The Contractor may use other methods subject to approval of the Engineer.

Air and surface temperature for asphalt material application will be in accordance with the specification and the manufacturer's recommendation. However, the engineer may limit the use of an asphalt material due to the time of year.

ITEM 320 "EQUIPMENT FOR ASPHALT CONCRETE PAVEMENT"

Unless otherwise approved by the Engineer, provide a Material Transfer Device with remixing capabilities as specified in Item 320.2.3.3 Placement and Compaction Equipment for all asphaltic concrete pavement.

ITEM 342 "PERMEABLE FRICTION COURSE"

Use aggregate that meets the SAC requirement of class A.

Blending is not allowed.

Apply bonding course through a distributor spray bar in accordance with Article 316.3 Distributor. If residual from emulsion tack is not tacky, then the Engineer can require the use of PG binder.

No RAP or RAS is allowed.

ITEM 346 "STONE MATRIX ASPHALT"

Hamburg Wheel Test Requirements			
High-Temperature Binder Grade	**Test Method**	**Laboratory Mixture Design or Trial Batch**	**Production and Placement Test[1]**
		Minimum # of Passes @ 0.5" Rut Depth, Tested @122°F	**Minimum # of Passes @ 0.5" Rut Depth, Tested @122°F**
PG 64 or lower	Tex-242-F	7,000	7,000
PG 70	Tex-242-F	15,000	15,000
PG 76 or higher	Tex-242-F	20,000	20,000

[1]. The Engineer may accept if no more than 1of the 5 most recent Hamburg Wheel tests is below the specified number of passes and the failing test is no more than 2,000 passes below the specified number of passes.

Use aggregate that meets the SAC requirement of class A.

Add one (1.0) percent hydrated lime, commercial, or lime slurry lime, based on the total aggregate weight, as mix enhancer for all mixture types. Provide hydrated lime or commercial lime slurry in accordance with DMS-6350, "Lime and Lime Slurry". Add hydrated lime or commercial lime slurry in accordance with Item 301.4.2.

Apply tack coat through a distributor spray bar in accordance with Article 316.3 Distributor. If residual from emulsion tack is not tacky, then the Engineer can require the use of PG binder.

The Contractor may elect to design the mixture using a Texas Gyratory Compactor (TGC) or a Superpave Gyratory Compactor (SGC) for SMA-F only. Use the typical weight design example given in Tex-204-F, Part I, when using a TGC. Use a Texas Gyratory Compactor (TGC) calibrated in accordance with Tex-914-K when electing to design the mixture in accordance with Tex-204-F, Part I, for molding production samples.

No RAS allowed in surface courses or thin level-up courses.

ITEM 354 "PLANING AND TEXTURING PAVEMENT"

All reclaimed asphalt pavement (RAP) material generated on the project (Est 32,900 CY) which is not used for backfilling pavement edges or incorporated into the hot mix produced for the project remains property of the State and is to be stockpiled at SH 179 & IH 45 in Freestone County.

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Highway: IH 45 Control: 0675-03-100, Etc.
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Existing raised pavement markers in the proposed work area are to be removed prior to planing operations. This item will be considered subsidiary.

Construct a fine milling pattern by adjusting the speed of the drum and the machine, as approved by the Engineer.

ITEM 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING"

Removal of ground mounted temporary signs and supports as specified on standard sheet BC(5), shall include the immediate backfilling of support holes with Type B embankment material and the compaction of the backfill material.

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

Law enforcement assistance will be required for this project and is expected to be required for major traffic control changes and lane closures. Coordinate with local law enforcement and arrange for law enforcement as directed or agreed by the Engineer. Complete the weekly tracking form provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided.

ITEM 504 "FIELD OFFICE AND LABORATORY"

Furnish a Type D Structure (Asphalt Mix Control Laboratory).

ITEM 506 "TEMPORARY EROSION, SEDIMENTATION AND ENVIRONMENTAL CONTROLS"

It is not anticipated that any erosion control devices will be needed on this project. However, in the event that any devices are needed, payment for the work will be determined in accordance with Article 9.7, "Payment for Extra Work and Force Account Method".

ITEM 585 “RIDE QUALITY FOR PAVEMENT SURFACES”

Pay adjustment Schedule 1 will be used to evaluate ride quality of the travel lanes in accordance with Item 585, “Ride Quality for Pavement Surfaces.”

ITEM 662 “WORK ZONE PAVEMENT MARKINGS”

Paint and beads may be used for non-removable work zone pavement markings.

All striping limits must be approved by the Engineer before striping operations may begin.

ITEM 666 “REFLECTORIZED PAVEMENT MARKINGS”

Unless authorized by the Engineer, the Contractor will not place the pavement markings on the resurfaced roadway until it has cured for 3 days.

All striping limits must be approved by the Engineer before striping operations may begin.

Use an acrylic sealer on concrete pavement.

ITEM 672 “RAISED PAVEMENT MARKERS”

Use flexible bituminous adhesive for applications on all pavement types.

ITEM 3076 “DENSE-GRADED HOT-MIX ASPHALT”

Use a roadwidener or similar equipment as approved by the Engineer to place the TY-B HMA material in accordance with the proposed typical sections.

The TY-B HMA shoulder widening is considered a miscellaneous area and is not subject to in-place air void determination, thermal profiles testing, segregation (density profiles), or longitudinal joint density evaluations.

ITEM 6001 “PORTABLE CHANGEABLE MESSAGE SIGN”

Furnish, install, and operate up to 4 Portable Changeable Message Signs (PCMS) for this project. The signs can be used both on the project and within a ten (10) mile radius of the project. Locations, messages, and durations of use will be specified by the Engineer. The primary uses

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will be to inform the public of special events, lane and road closures, and changes in traffic control. Signs will be paid for only when used as directed by the Engineer.

ITEM 6302 “TEMPORARY QUEUE DETECTION SYSTEM”

Furnish, install, relocate, operate, service, and remove various components for one “Temporary Queue Detection System" for this project. The system shall be deployed as directed by the Engineer. Quantity estimated for 80 days of construction in northbound direction (one system) and then relocated for 80 days of construction in southbound direction (same system), for a total of 160 days.

ITEM 6185 “TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA)”

In addition to the shadow vehicles with truck mounted attenuator (TMA) that are specified as being required on the traffic control plan for this project,

provide three (3) (advance warning, shadow and trail) vehicles with TMA for TCP (3-2)-13 as detailed on General Note 4 of this standard sheet.
provide three (3) (advance warning, shadow and trail) vehicles with TMA for TCP (3-3)-14 as detailed on General Note 3 of this standard sheet.
provide one (1) shadow vehicle with TMA for TCP (5-1)-18 as detailed on General Note 1 of this standard sheet.
provide one (1) shadow vehicle with TMA for TCP (6-1)-12 as detailed on General Note 1 of this standard sheet.
provide one (1) shadow vehicle with TMA for TCP (6-2)-12 as detailed on General Note 1 of this standard sheet.
provide one (1) shadow vehicle with TMA for TCP (6-3)-12 as detailed on General Note 1 of this standard sheet.
provide two (2) shadow vehicles with TMA for TCP (6-4)-12 as detailed on General Note 1 of this standard sheet.
provide one (1) shadow vehicle with TMA for TCP (6-5)-12 as detailed on General Note 1 of this standard sheet.
provide one (1) shadow vehicle with TMA for TCP (S-4)-08A as detailed on General Note 4 of this standard sheet.
provide one (1) shadow vehicle with TMA for TCP (S-5)-08 as detailed on General Note 3 of this standard sheet.

Therefore, fifteen (15) total additional shadow vehicles with TMA will be required for this type of work. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

180 TMA (days) are provided in the project estimate for stationary operations.
114 TMA (days) are provided in the project estimate for mobile operations.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0675-03-100 **DISTRICT** Bryan **COUNTY** Freestone, Leon
HIGHWAY IH 45

ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL
	134-6004	BACKFILL (TY A OR B)	STA	1,866.330	
	150-6001	BLADING	STA	354.430	
	316-6017	ASPH (AC-20-5TR)	GAL	12,520.000	
	316-6257	AGGR(TY-PL GR-4 SAC-B)	CY	278.000	
	342-6002	PFC (ASPHALT) PG76-22	TON	2,526.000	
	342-6006	PFC-C (AGGREGATE)(PG76 MIX) SAC-A	TON	37,579.000	
	346-6014	STONE-MTRX-ASPH SMA-D SAC-A PG76-22	TON	53,942.000	
	354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY	14,254.000	
	354-6041	PLANE ASPH CONC PAV (1.5")	SY	243,439.000	
	354-6045	PLANE ASPH CONC PAV (2")	SY	245,466.000	
	354-6053	PLANE ASPH CONC PAV (1 1/4")	SY	120,497.000	
	354-6058	PLANE ASPH CONC PAV (0" TO 3-1/4")	SY	8,034.000	
	354-6064	PLANE ASPH CONC PAV (2 1/2")	SY	51,082.000	
	354-6077	PLANE ASPH CONC PAV (0" TO 3/4")	SY	900.000	
	354-6105	PLANE ASPH CONC PAV (2"-3 1/2")	SY	3,167.000	
	354-6133	PLANE ASPH CONC PAV (3 1/4")	SY	3,466.000	
	354-6154	PLANE ASPH CONC PAV (1 1/2" TO 3 1/2")	SY	1,156.000	
	500-6001	MOBILIZATION	LS	1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	18.000	
	533-6001	RUMBLE STRIPS (SHOULDER)	LF	347,969.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	281.000	
	658-6080	INSTL DEL ASSM (D-SW)SZ 1(WFLX)GND	EA	124.000	
	658-6086	INSTL DEL ASSM (D-SY)SZ 1(YFLX)GND	EA	118.000	
	658-6092	INSTL DEL ASSM (D-DW)SZ 1(WFLX)GND	EA	39.000	
	662-6001	WK ZN PAV MRK NON-REMOV (W)4"(BRK)	LF	130,530.000	
	662-6002	WK ZN PAV MRK NON-REMOV (W)4"(DOT)	LF	1,710.000	
	662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	556,593.000	
	662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	556,593.000	
	662-6071	WK ZN PAV MRK REMOV (W)8"(SLD)	LF	20,118.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	15,556.000	
	666-6006	REFL PAV MRK TY I (W)4"(DOT)(100MIL)	LF	570.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	8,596.000	
	666-6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	1,043.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	48.000	
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	2.000	
	666-6057	REFL PAV MRK TY I(W)(DBL ARROW)(100MIL)	EA	2.000	
	666-6075	REFL PAV MRK TY I (W)(NUMBER)(100MIL)	EA	4.000	
	666-6224	PAVEMENT SEALER 4"	LF	6,830.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	44,410.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	188,052.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	188,052.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0675-03-100 **DISTRICT** Bryan **COUNTY** Freestone, Leon
HIGHWAY IH 45

ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL
	672-6010	REFL PAV MRKR TY II-C-R	EA	2,702.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	6,830.000	
	678-6001	PAV SURF PREP FOR MRK (4")	LF	6,830.000	
	3076-6001	D-GR HMA TY-B PG64-22	TON	965.000	
	3084-6001	BONDING COURSE	GAL	37,757.000	
	3085-6001	UNDERSEAL COURSE	GAL	154,481.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	4.000	
	6185-6002	TMA (STATIONARY)	DAY	180.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	114.000	
	6302-6001	TEMP Q-DETECT (TY1) (1 SYS)	DAY	160.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000	

ROADWAY SUMMARY (NB & SB MAINLANES SEGMENT 1) 0675-03-100

COMMENTS	STA	STA	"L"	ITEM 354												ITEM 316		ITEM 3085		ITEM 346				ITEM 3084		ITEM 342		ITEM 134	ITEM 150
				"W"	"W" (OUTSIDE LN - SEG 1)	6053	6041	6077	6045	6064	6021	6058	6133	6154	6105	ASPH AGGR	6017 6257	"W"	6001 UNDERSEAL COURSE (1)	"W"	"W" (OUTSIDE LN - SEG 1)	6014 STONE-MTRX-ASPH SAC-A SMA-D PG 76-22 (1)	6014 STONE-MTRX-ASPH SAC-A SMA-D PG 76-22 (OUTSIDE LNS SEG 1) (1)	6001 BONDING COURSE "W"	6001 BONDING COURSE BEFORE ITEM 342 (PFC) (1)	ASPH AGGR "W"	6002 6006 PFC (1)	6004 BACKFILL (TY A OR B)	6001 BLADING
						PLANE ASPH CONC PAV										"W"	OCST (1)												
			LF	LF	LF	SY	SY	SY	SY	SY	SY	SY	SY	SY	SY	LF	SY	LF	SY	LF	LF	SY	SY		SY	LF	SY	STA	STA
NB MAINLANES																													
SEGMENT 1																													
SH 7 UNDERPASS TRANS / TIE-IN	621+45	625+45	400.00	26	12					167			844	578	100			39	1733	27	12	1200	533	35	1556	35	1556	4.00	4.00
MAINLANES	625+45	630+33	488.00	26	12	1410				651								39	2115	27	12	1464	651	35	1898	35	1898	4.88	4.88
MAINLANES / GORE SECTION	630+33	641+00	1067.00	26	12	3082				1423								39	4624	27	12	3201	1423	35	4149	35	4149	10.67	10.67
MAINLANES	641+00	815+36	17436.00	26	12	50371				23248								39	75556	27	12	52308	23248	35	67807	35	67807	174.36	174.36
KEECHI CREEK TRANS	815+36	818+36	300.00	40					444		889							40	1333	40		1333						3.00	
KEECHI CREEK BRIDGE	818+36	825+71	735.00																										
NB RAMPS																													
SH 7 ENT RAMP 200' TRANS / TIE-IN			200.00	18							400							18	400	18		400						2.00	
SH 7 ENT RAMP			649.00															18	1298	18		1298						6.49	
SH 7 ENT RAMP GORE AREA			1067.00	VAR		997												VAR	997	VAR		997		VAR	997	VAR	997		
SB MAINLANES																													
SEGMENT 1																													
SH 7 UNDERPASS TRANS / TIE-IN	621+45	625+45	400.00	26	12					167			844	578	100			39	1733	27	12	1200	533	35	1556	35	1556	4.00	4.00
MAINLANES	625+45	635+62	1017.00	26	12	2938				1356								39	4407	27	12	3051	1356	35	3955	35	3955	10.17	10.17
MAINLANES / GORE SECTION	635+62	641+00	538.00	26	12	1554				717								39	2331	27	12	1614	717	35	2092	35	2092	5.38	5.38
MAINLANES	641+00	679+69	3869.00	26	12	11177				5159								39	16766	27	12	11607	5159	35	15046	35	15046	38.69	38.69
BEGIN WEIGH STATION SECTION																													
MAINLANES / AUX LANE	679+69	690+60	1091.00	32	12	3879				1455								44	5334	32	12	3879	1455	44	5334	44	5334	10.91	
MAINLANES / GORE SECTION	690+60	695+24	464.00	17	12	876				619								29	1495	17	12	876	619	47	2423	47	2423	4.64	
MAINLANES	695+24	708+57	1333.00	26	12	3851				1777								39	5776	27	12	3999	1777	35	5184	35	5184	13.33	13.33
MAINLANES / GORE SECTION	708+57	716+07	750.00	17	12	1417				1000								29	2417	17	12	1417	1000	47	3917	47	3917	7.50	
MAINLANES / AUX LANE	716+07	727+19	1112.00	32	12	3954				1483								44	5436	32	12	3954	1483	44	5436	44	5436	11.12	
END WEIGH STATION SECTION																													
MAINLANES	727+19	816+14	8895.00	26	12	25697				11860								39	38545	27	12	26685	11860	35	34592	35	34592	88.95	88.95
KEECHI CREEK TRANS	816+14	819+14	300.00	40					444		889							40	1333	40		1333						3.00	
KEECHI CREEK BRIDGE	819+14	826+49	735.00																										
SB RAMPS																													
SH 7 EXIT RAMP 200' TRANS / TIE-IN			200.00	18							400							18	400	18		400						2.00	
SH 7 EXIT RAMP			1173.00															18	2346	18		2346						11.73	
SH 7 EXIT RAMP GORE AREA			391.00	VAR		595												VAR	595	VAR		595		VAR	595.00	VAR	595.00		
SHEET 1 TOTAL FOR SEGMENT 1:						111798	0	0	888	51082	2578	0	1688	1156	200		0		176970			125157	51814		156537		156537	416.82	354.43

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PRINT DATE	REVISION DATE
$DATE$	

Texas Department of Transportation
Bryan District

ROADWAY SUMMARY
(NB & SB MAINLNES
SEGMENT 1)

SHEET 1 OF 7 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	7

REV DATE: 2-12-2015
CSJ: 0675-03-100
FILENAME: $FILES

ROADWAY SUMMARY (NB & SB MAINLANES SEGMENT 2) 0675-03-100

COMMENTS	STA	STA	"L"	ITEM 354												ITEM 316		ITEM 3085		ITEM 346				ITEM 3084		ITEM 342		ITEM 134	ITEM 150
				"W"	"W" (OUTSIDE LN - SEG 1)	6053	6041	6077	6045	6064	6021	6058	6133	6154	6105	ASPH	6017	"W"	6001	"W"	"W" (OUTSIDE LN - SEG 1)	6014	6014	6001		ASPH	6002	6004	6001
						PLANE ASPH CONC PAV										AGGR	6257					STONE-MTRX-ASPH SAC-A SMA-D PG 76-22 (1)	STONE-MTRX-ASPH SAC-A SMA-D PG 76-22 (OUTSIDE LNS SEG 1) (1)	BONDING COURSE		AGGR	6006		
						(1.25")	(1.5")	(0" - 0.75")	(2")	(2.5")	(0"-2")	(0" - 3.25")	(3.25")	(1.5" - 3.5")	(2" - 3.5")	"W" (OUT SIDE SHLDR)	OCST (1)		UNDERSEAL COURSE (1)					"W"	BEFORE ITEM 342 (PFC) (1)	"W"	PFC (1)	BACKFILL (TY A OR B)	BLADING
			LF	LF	LF	SY	SY	SY	SY	SY	SY	SY	SY	SY	SY	LF	SY	LF	SY	LF	LF	SY	SY		SY	LF	SY	STA	STA
NB MAINLANES																													
SEGMENT 2																													
KEECHI CREEK BRIDGE	818+36	825+71	735.00																										
KEECHI CREEK TRANS	825+71	828+71	300.00	40								1333						40	1333	40		1333						3.00	
MAINLANES/ MILL EXIST 1.5" PFC	828+71	995+75	16704.00	29			53824									4	7424	36	66816							36	66816	167.04	
CR 314 UNDERPASS	995+75																												
MAINLANES/ MILL EXIST 1.5" PFC	995+75	1206+85	21110.00	29			68021									4	9382	36	84440							36	84440	211.10	
BLISS CREEK TRANS	1206+85	1209+85	300.00	40								1333						40	1333	40		1333						3.00	
BLISS CREEK BRIDGE	1209+85	1213+25	340.00																										
SB MAINLANES																													
SEGMENT 2																													
KEECHI CREEK BRIDGE	819+14	826+49	735.00																										
KEECHI CREEK TRANS	826+49	829+49	300.00	40								1333						40	1333	40		1333						3.00	
MAINLANES/ MILL EXIST 1.5" PFC	829+49	995+75	16626.00	29			53573									4	7389	36	66504							36	66504	166.26	
CR 314 UNDERPASS	995+75																												
MAINLANES/ MILL EXIST 1.5" PFC	995+75	1206+85	21110.00	29			68021									4	9382	36	84440							36	84440	211.10	
BLISS CREEK TRANS	1206+85	1209+85	300.00	40								1333						40	1333	40		1333						3.00	
BLISS CREEK BRIDGE	1209+85	1213+25	340.00																										
SHEET 2 TOTAL FOR NB & SB MAINLANES SEGMENT 2:						0	243439	0	0	0	0	5332	0	0	0		33577		307532			5332	0		0		302200	767.5	0

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REV DATE: 2-12-2015
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Texas Department of Transportation
Bryan District

ROADWAY SUMMARY (NB & SB MAINLNES SEGMENT 2)

SHEET 2 OF 7 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	8

ROADWAY SUMMARY (NB MAINLANES SEGMENT 3) 0675-03-100

COMMENTS	STA	STA	"L"	ITEM 354												ITEM 316		ITEM 3085		ITEM 346				ITEM 3084		ITEM 342		ITEM 134	ITEM 150
				"W"	"W" (OUTSIDE LN SEG 1)	6053	6041	6077	6045	6064	6021	6058	6133	6154	6105	ASPH AGGR	6017 6257	"W"	6001 UNDERSEAL COURSE (1)	"W"	"W" (OUTSIDE LN SEG 1)	6014 STONE-MTRX-ASPH SAC-A SMA-D PG 76-22 (1)	6014 STONE-MTRX-ASPH SAC-A SMA-D PG 76-22 (OUTSIDE LNS SEG 1) (1)	6001 BONDING COURSE "W"	6001 BONDING COURSE BEFORE ITEM 342 (PFC) (1)	ASPH AGGR "W"	6002 6006 PFC (1)	6004 BACKFILL (TY A OR B)	6001 BLADING
						PLANE ASPH CONC PAV										"W"	OCST (1)												
						(1.25")	(1.5")	(0" - 0.75")	(2")	(2.5")	(0"-2")	(0" - 3.25")	(3.25")	(1.5" - 3.5")	(2" - 3.5")														
			LF	LF	LF	SY	SY	SY	SY	SY	SY	SY	SY	SY	SY	LF	SY	LF	SY	LF	LF	SY	SY		SY	LF	SY	STA	STA
NB MAINLANES																													
SEGMENT 3																													
BLISS CREEK BRG	1209+85	1213+25	340.00																										
BLISS CREEK TRANS	1213+25	1216+25	300.00	40					444		889							40	1333	40		1333						3.00	
MAINLANES	1216+25	1362+28	14603.00	40					64902									40	64902	40		64902		36	58412	36	58412	146.03	
UPRR TRANSITION	1362+28	1363+53	125.00	40											556			40	556	40		556		36	500	36	500	1.25	
UPRR BRIDGE	1363+53	1365+53	200.00	40									889					40	889	40		889		36	800	36	800	2.00	
UPRR TRANSITION	1365+53	1366+78	125.00	40											556			40	556	40		556		36	500	36	500	1.25	
MAINLANES	1366+78	1373+06	628.00	40					2791									40	2791	40		2791		36	2512	36	2512	6.28	
MAINLANES / GORE SECTION	1373+06	1376+89	383.00	40					1702									40	1702	40		1702		36	1532	36	1532	3.83	
MAINLANES	1376+89	1387+00	1011.00	40					4493									40	4493	40		4493		36	4044	36	4044	10.11	
US 79 TRANSITION	1387+00	1390+00	300.00	40					444		889							40	1333	40		1333						3.00	
US 79 BRIDGE	1390+00	1392+34	234.00																										
US 79 TRANSITION	1392+34	1395+34	300.00	40					444		889							40	1333	40		1333						3.00	
MAINLANES	1395+34	1405+20	986.00	40					4382									40	4382	40		4382		36	3944	36	3944	9.86	
MAINLANES / GORE SECTION	1405+20	1415+00	980.00	40					4356									40	4356	40		4356		36	3920	36	3920	9.80	
MAINLANES	1415+00	1445+49	3049.00	40					13551									40	13551	40		13551		36	12196	36	12196	30.49	
MAINLANES / GORE SECTION	1445+49	1449+81	432.00	40					1920									40	1920	40		1920		36	1728	36	1728	4.32	
MAINLANES	1449+81	1459+07	926.00	40					4116									40	4116	40		4116		36	3704	36	3704	9.26	
SH 164 TRANSITION	1459+07	1462+07	300.00	40					444		889							40	1333	40		1333						3.00	
SH 164 BRIDGE	1462+07	1464+17	210.00																										
SH 164 TRANSITION	1464+17	1467+17	300.00	40					444		889							40	1333	40		1333						3.00	
MAINLANES	1467+17	1473+88	671.00	40					2982									40	2982	40		2982		36	2684	36	2684	6.71	
MAINLANES / GORE SECTION	1473+88	1478+10	422.00	40					1876									40	1876	40		1876		36	1688	36	1688	4.22	
MAINLANES	1478+10	1501+17	2307.00	40					10253									40	10253	40		10253		36	9228	36	9228	23.07	
MAINLANES	1501+17	1508+50	733.00	29		2362										4	326	34	2769							34	2769	7.33	
SHEET 3 TOTAL FOR NB MAINLANES SEGMENT 3:						2362	0	0	119544	0	4445	0	889	0	1112		326		128759			125990	0		107392		110161	290.81	0

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Texas Department of Transportation
Bryan District

ROADWAY SUMMARY (NB MAINLANES SEGMENT 3)

SHEET 3 OF 7 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	9

ROADWAY SUMMARY (NB RAMPS SEGMENT 3) 0675-03-100

COMMENTS	STA	STA	"L"	ITEM 354											ITEM 316		ITEM 3085		ITEM 346				ITEM 3084		ITEM 342		ITEM 134	ITEM 150
				"W"	"W" (OUTSIDE LN - SEG 1)	6053	6041	6077	6045	6064	6021	6058	6133	6154	6105	ASPH	6017	"W"	6001	"W"	"W" (OUTSIDE LN - SEG 1)	6014	6014	6001		ASPH	6002	6004	6001
						PLANE ASPH CONC PAV										AGGR	6257							BONDING COURSE		AGGR	6006		
						(1.25")	(1.5")	(0" - 0.75")	(2")	(2.5")	(0"-2")	(0" - 3.25")	(3.25")	(1.5" - 3.5")	(2" - 3.5")	"W"	OCST (1)		UNDERSEAL COURSE (1)			STONE-MTRX-ASPH SAC-A SMA-D PG 76-22 (1)	STONE-MTRX-ASPH SAC-A SMA-D PG 76-22 (OUTSIDE LNS SEG 1) (1)	"W"	BEFORE ITEM 342 (PFC) (1)	"W"	PFC (1)	BACKFILL (TY A OR B)	BLADING
			LF	LF	LF	SY	SY	SY	SY	SY	SY	SY	SY	SY	SY	LF	SY	LF	SY	LF	LF	SY	SY		SY	LF	SY	STA	STA
NORTHBOUND RAMPS																												
SEGMENT 3																												
US 79 EXIT RAMP GORE AREA			VAR	VAR					938								VAR	938	VAR		938		VAR	938	VAR	938		
US 79 EXIT RAMP 75' TAPER			75.00	18				150									18	150	18		150						0.75	
US 79 EXIT RAMP			1335.00														18	2670	18		2670						13.35	
US 79 EXIT RAMP 200' TAPER			200.00	VAR							786						VAR	786	VAR		786						2.00	
US 79 ENT RAMP 200' TAPER			200.00	18							400						18	400	18		400						2.00	
US 79 ENT RAMP			975.00														18	1950	18		1950						9.75	
US 79 ENT RAMP 75' TAPER			75.00	18				150									18	150	18		150						0.75	
US 79 ENT RAMP GORE AREA			VAR	VAR					938								VAR	938	VAR		938		VAR	938	VAR	938		
SH 164 EXIT RAMP GORE AREA			VAR	VAR					470								VAR	470	VAR		470		VAR	470.00	VAR	470		
SH 164 EXIT RAMP 75' TAPER			75.00	18				150									18	150	18		150						0.75	
SH 164 EXIT RAMP			967.00														18	1934	18		1934						9.67	
SH 164 EXIT RAMP 200' TAPER			200.00	18							400						18	400	18		400						2.00	
SH 164 ENT RAMP 200' TAPER			200.00	18							400						18	400	18		400						2.00	
SH 164 ENT RAMP			1135.00														18	2270	18		2270						11.35	
SH 164 ENT RAMP 75' TAPER			75.00	18				150									18	150	18		150						0.75	
SH 164 ENT RAMP GORE AREA			VAR	VAR					936								VAR	936	VAR		936		VAR	936	VAR	936		
SHEET 4 TOTAL FOR NB RAMPS SEGMENT 3:						0	0	600	3282	0	1986	0	0	0	0		0		14692			14692	0		3282		3282	55.12	0

(1) FOR CONTRACTOR'S INFORMATION ONLY.
REFER TO "BASIS OF ESTIMATE" FOR APPLICATION RATES AND QUANTITIES.

REV DATE: 2-12-2015
CSJ: 0675-03-100 FILENAME: $FILES

PRINT DATE	REVISION DATE
$DATE$	

Texas Department of Transportation
Bryan District

ROADWAY SUMMARY (NB RAMPS SEGMENT 3)

SHEET 4 OF 7 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45
STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.
CONTROL	SECTION	JOB / SHEET NO.
0675	03	100, ETC. / 10

ROADWAY SUMMARY (SB MAINLANES SEGMENT 3) 0675-03-100

COMMENTS	STA	STA	"L"	ITEM 354											ITEM 316		ITEM 3085		ITEM 346				ITEM 3084		ITEM 342		ITEM 134	ITEM 150
				"W"	"W" (OUTSIDE LN - SEG 1)	6053	6041	6077	6045	6064	6021	6058	6133	6154	6105	ASPH AGGR	6017 6257	"W"	6001 UNDERSEAL COURSE (1)	"W"	"W" (OUTSIDE LN - SEG 1)	6014 STONE-MTRX-ASPH SAC-A SMA-D PG 76-22 (1)	6014 STONE-MTRX-ASPH SAC-A SMA-D PG 76-22 (OUTSIDE LNS SEG 1) (1)	6001 BONDING COURSE "W"	6001 BONDING COURSE BEFORE ITEM 342 (PFC) (1)	ASPH AGGR "W"	6002 6006 PFC (1)	BACKFILL (TY A OR B)	BLADING
						PLANE ASPH CONC PAV										"W"	OCST (1)												
			LF	LF	LF	SY	SY	SY	SY	SY	SY	SY	SY	SY	SY	LF	SY	LF	SY	LF	LF	SY	SY		SY	LF	SY	STA	STA
SB MAINLANES																												
SEGMENT 3																												
BLISS CREEK BRG	1209+85	1213+25	340.00																									
BLISS CREEK TRANS	1213+25	1216+25	300.00	40					444		889							40	1333	40		1333						3.00	
MAINLANES	1216+25	1311+49	9524.00	40					42329									40	42329	40		42329		36	38096	36	38096	95.24	
MAINLANES / GORE SECTION	1311+49	1319+74	825.00	40					3667									40	3667	40		3667		36	3300	36	3300	8.25	
MAINLANES	1319+74	1362+20	4246.00	40					18871									40	18871	40		18871		36	16984	36	16984	42.46	
UPRR TRANSITION	1362+20	1363+45	125.00	40											556			40	556	40		556		36	500	36	500	1.25	
UPRR BRIDGE	1363+45	1365+45	200.00	40									889					40	889	40		889		36	800	36	800	2.00	
UPRR TRANSITION	1365+45	1366+70	125.00	40											556			40	556	40		556		36	500	36	500	1.25	
MAINLANES	1366+70	1386+71	2001.00	40					8893									40	8893	40		8893		36	8004	36	8004	20.01	
US 79 TRANSITION	1386+71	1389+71	300.00	40					444		889							40	1333	40		1333						3.00	
US 79 BRIDGE	1389+71	1392+06	235.00																									
US 79 TRANSITION	1392+06	1395+06	300.00	40					444		889							40	1333	40		1333						3.00	
MAINLANES	1395+06	1431+90	3684.00	40					16373									40	16373	40		16373		36	14736	36	14736	36.84	
MAINLANES / GORE SECTION	1431+90	1435+78	388.00	40					1724									40	1724	40		1724		36	1552	36	1552	3.88	
MAINLANES	1435+78	1445+49	971.00	40					4316									40	4316	40		4316		36	3884	36	3884	9.71	
MAINLANES / GORE SECTION	1445+49	1452+40	691.00	40					3071									40	3071	40		3071		36	2764	36	2764	6.91	
MAINLANES	1452+40	1459+36	696.00	40					3093									40	3093	40		3093		36	2784	36	2784	6.96	
SH 164 TRANSITION	1459+36	1462+36	300.00	40					444		889							40	1333	40		1333						3.00	
SH 164 BRIDGE	1462+36	1464+47	211.00																									
SH 164 TRANSITION	1464+47	1467+47	300.00	40					444		889							40	1333	40		1333						3.00	
MAINLANES	1467+47	1477+00	953.00	40					4236									40	4236	40		4236		36	3812	36	3812	9.53	
MAINLANES / GORE SECTION	1477+00	1481+49	449.00	40					1996									40	1996	40		1996		36	1796	36	1796	4.49	
MAINLANES	1481+49	1500+83	1934.00	40					8596									40	8596	40		8596		36	7736	36	7736	19.34	
MAINLANES	1500+83	1508+50	767.00	29		2471										4	341	34	2898							34	2898	7.67	
SHEET 5 TOTAL FOR SB MAINLANES SEGMENT 3:						2471	0	0	119385	0	4445	0	889	0	1112		341		128729			125831	0		107248		110146	290.79	0

(1) FOR CONTRACTOR'S INFORMATION ONLY.
REFER TO "BASIS OF ESTIMATE" FOR APPLICATION RATES AND QUANTITIES.

REV DATE: 2-12-2015
CSJ: 0675-03-100
FILENAME: $FILE$

PRINT DATE	REVISION DATE
$DATE$	

Texas Department of Transportation
Bryan District

ROADWAY SUMMARY
(SB MAINLANES
SEGMENT 3)

SHEET 5 OF 7 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	11

ROADWAY SUMMARY (SB RAMPS SEGMENT 3) 0675-03-100

COMMENTS	STA	STA	"L"	ITEM 354											ITEM 316		ITEM 3085		ITEM 346				ITEM 3084		ITEM 342		ITEM 134	ITEM 150
				"W"	"W" (OUTSIDE LN - SEG 1)	6053	6041	6077	6045	6064	6021	6058	6133	6154	6105	ASPH AGGR "W"	6017 6257 OCST (1)	"W"	6001 UNDERSEAL COURSE (1)	"W"	"W" (OUTSIDE LN - SEG 1)	6014 STONE-MTRX-ASPH SAC-A SMA-D PG 76-22 (1)	6014 STONE-MTRX-ASPH SAC-A SMA-D PG 76-22 (OUTSIDE LNS SEG 1) (1)	6001 BONDING COURSE "W"	6001 BONDING COURSE BEFORE ITEM 342 (PFC) (1)	ASPH AGGR "W"	6002 6006 PFC (1)	6004 BACKFILL (TY A OR B)	6001 BLADING
						PLANE ASPH CONC PAV																						
						(1.25")	(1.5")	(0" - 0.75")	(2")	(2.5")	(0"-2")	(0" - 3.25")	(3.25")	(1.5" - 3.5")	(2" - 3.5")														
			LF	LF	LF	SY	SY	SY	SY	SY	SY	SY	SY	SY	SY	LF	SY	LF	SY	LF	LF	SY	SY		SY	LF	SY	STA	STA
SB RAMPS																												
SEGMENT 3																												
US 79 ENT RAMP GORE AREA			825.00	VAR					777						401			VAR	1178	VAR		1178		VAR	1178	VAR	1178		
US 79 EXIT RAMP GORE AREA			388.00	VAR					221						342			VAR	563	VAR		563		VAR	563	VAR	563		
SH 164 ENT RAMP GORE AREA			691.00	VAR					881									VAR	881	VAR		881		VAR	881	VAR	881		
SH 164 ENT RAMP 75' TAPER			75.00	18				150										18	150	18		150						0.75	
SH 164 ENT RAMP			1157.00															18	2314	18		2314						11.57	
SH 164 ENT RAMP 200' TAPER			200.00	18							400							18	400	18		400						2.00	
SH 164 EXIT RAMP 200' TAPER			200.00	18							400							18	400	18		400						2.00	
SH 164 EXIT RAMP			982.00															18	1964	18		1964						9.82	
SH 164 EXIT RAMP 75' TAPER			75.00	18				150										18	150	18		150						0.75	
SH 164 EXIT RAMP GORE AREA			300.00	VAR					488									VAR	488	VAR		488		VAR	488.00	VAR	488.00		
SHEET 6 TOTAL FOR SB RAMPS SEGMENT 3:						0	0	300	2367	0	800	0	0	0	743		0		8488			8488	0		3110		3110	26.89	0
SHT 3 TOTAL(SEG3):						2362	0	0	119544	0	4445	0	889	0	1112		326		128759			125990	0		107392		110161	290.81	0
SHT 4 TOTAL(SEG3):						0	0	600	3282	0	1986	0	0	0	0		0		14692			14692	0		3282		3282	55.12	0
SHT 5 TOTAL(SEG3):						2471	0	0	119385	0	4445	0	889	0	1112		341		128729			125831	0		107248		110146	290.79	0
TOTAL FOR SEGMENT 3:						4833	0	900	244578	0	11676	0	1778	0	2967		667		280668			275001	0		221032		226699	663.61	0
SHT 1 TOTAL(SEG 1):						111798	0	0	888	51082	2578	0	1688	1156	200		0		176970			125157	51814		156537		156537	416.82	354.43
SHT 2 TOTAL(SEG 2):						0	243439	0	0	0	0	5332	0	0	0		33577		307532			5332	0		0		302200	767.5	0
PROJECT TOTALS (CSJ 0675-03-100):						116631	243439	900	245466	51082	14254	5332	3466	1156	3167		34244		765170			405490	51814		377569		685436	1847.93	354.43

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REV DATE: 2-12-2015
CSJ: 0675-03-100
FILENAME: $FILE$

PRINT DATE	REVISION DATE
$DATE$	

Texas Department of Transportation
Bryan District

ROADWAY SUMMARY (SB MAINLANES SEGMENT 3)

SHEET 6 OF 7 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	12

ROADWAY SUMMARY (NB & SB MAINLANES) 0675-02-095

COMMENTS	STA	STA	"L"	ITEM 354			ITEM 316		ITEM 3085		ITEM 346		ITEM 342		ITEM 134
				"W"	6053 PLANE ASPH CONC PAV (1.25")	6058 PLANE ASPH CONC PAV (0" - 3.25")	ASPH AGGR "W"	6017 6257 OCST (1)	"W"	6001 UNDERSEAL COURSE (1)	"W"	6014 STONE-MTRX-ASPH SAC-A SMA-D PG 76-22 (1)	ASPH AGGR "W"	6002 6006 PFC (1)	6004 BACKFILL (TY A OR B)
			LF	LF	SY	SY	LF	SY	LF	SY	LF	SY	LF	SY	STA
NB MAINLANES															
MAINLANES	1508+50	1514+50	600.00	29	1933		4	267	34	2267			34	2267	6.00
BUFFALO CREEK TRANS	1514+50	1517+70	320.00	38		1351			38	1351	38	1351			3.20
SB MAINLANES															
MAINLANES	1508+50	1514+50	600.00	29	1933		4	267	34	2267			34	2267	6.00
BUFFALO CREEK TRANS	1514+50	1517+70	320.00	38		1351			38	1351	38	1351			3.20
TOTAL FOR CSJ:0675-02-095					3866	2702		534		7236		2702		4534	18.4

(1) FOR CONTRACTOR'S INFORMATION ONLY.
REFER TO "BASIS OF ESTIMATE" FOR APPLICATION RATES AND QUANTITIES.

REV DATE: 2-12-2015
CSJ: 0675-03-100 FILENAME: $FILE$

PRINT DATE	REVISION DATE
$DATE$	

Texas Department of Transportation
Bryan District

ROADWAY SUMMARY
(NB & SB MAINLNES
0675-02-095)

SHEET 7 OF 7 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	13

SUMMARY OF PAVEMENT MARKINGS AND MARKERS

DESCRIPTION STATION			LENGTH	ITEM 662 (1)							ITEM 666										ITEM 666	ITEM 677	ITEM 678	ITEM 672		ITEM 533
				6109		6001	6004	6034	6002	6071	6006	6036	6054	6057	6075	6042	6048	6300	6303	6315	6224	6001	6001	6010		6001
				WK ZN PAV MRK							REFL PAV MRK TY I							RE PM W/RET TY I						REFL PAV MRKR		
				SHT TERM (TAB) TY W (CL)	SHT TERM (TAB) TY W (GORE	NON-REMOV (W) 4" (BRK) (2)	NON-REMOV (W) 4" (SLD) (2)	NON-REMOV (Y) 4" (SLD) (2)	NON-REMOV (W) 4" (DOT) (2)	NON-REMOV (W) 8" (SLD) (2)	(W)4" (DOT) (100 MIL)	(W)8" (SLD) (100 MIL)	(W) (ARROW) (100 MIL)	(W) (DBL ARROW) (100 MIL)	(W) (NUMBER) (100 MIL)	(W) 12" (SLD) (100 MIL)	(W) 24" (SLD) (100 MIL)	(W) 4" (BRK) (100 MIL)	(W) 4" (SLD) (100 MIL)	(Y) 4" (SLD) (100 MIL)	PAVEMENT SEALER 4"	ELIM EXT PAV MRK & MRKS (4")	PAV SURF PREP FOR MRK (4")	TY II-C-R 20' SP-8"	TY II-C-R (CL)	RUMBLE STRIPS (SHOULDER)
			FT	EA	EA	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA	LF
NORTHBOUND LANES																										
ROADWAY	621+45	- 630+33	888	67		666	2,664	2,664										222	888	888					11	1,776
SH 7 NB ENT RAMP	TIE-IN TO	630+33	849				1,698	1,698											849	849						
GORE/ROADWAY	630+33	- 641+00	1067	80	285	801	3,201	3,201		2,850		950						267	1,067	1,067			48	13	1,067
ROADWAY	641+00	- 1373+06	73206	5,490		54,906	219,618	219,618										18,302	73,206	73,206				915	146,412
GORE/ROADWAY	1373+06	- 1376+89	383	29	155	288	1,149	1,149		1,548		516				177		96	383	383			26	5	383
US 79 NB EXIT RAMP	TIE-IN TO	1376+89	1610				4,830	4,830				250	2	2	1		24		1,610	1,610				13	
US 79 NB ENT RAMP	TIE-IN TO	1405+20	1250				3,750	3,750											1,250	1,250					
ROADWAY	1376+89	- 1405+20	1250	94		939	3,750	3,750										313	1,250	1,250				16	2,500
GORE/RDWAY	1405+20	- 1415+00	980	74	188	735	2,940	2,940		1,884		628						245	980	980			31	12	980
ROADWAY	1415+00	- 1445+49	3049	229		2,286	9,147	9,147										762	3,049	3,049				38	6,098
GORE/RDWAY	1445+49	- 1449+81	432	32	144	324	1,296	1,296		1,440		480				170		108	432	432			24	5	432
SH 164 NB EXIT RAMP	TIE-IN TO	1449+81	1242				2,484	2,484							1				1,242	1,242				16	
SH 164 NB ENT RAMP	TIE-IN TO	1473+88	1410				2,820	2,820											1,410	1,410				18	
ROADWAY	1449+81	- 1473+88	2407	181		1,806	7,221	7,221										602	2,407	2,407				30	4,814
GORE/RDWAY	1473+88	- 1478+10	422	32	180	318	1,266	1,266		1,800		600						106	422	422			30	5	422
ROADWAY	1478+10	- 1508+49	3039	228		2,280	9,117	9,117										760	3,039	3,039				38	6,078
SOUTHBOUND LANES																										
ROADWAY	621+45	- 635+62	1417	106		1,062	4,251	4,251										354	1,417	1,417				18	2,834
SH 7 SB EXIT RAMP	TIE-IN TO	635+62	1373	103			2,746	2,746							1				1,373	1,373				17	
GORE/RDWAY	635+62	- 641+00	538	13	135	405	1,614	1,614		1,350		450				132	24	135	538	538			23	7	538
ROADWAY	641+00	- 679+69	3869	290		2,901	11,607	11,607										967	3,869	3,869				48	7,738
WEIGH STATION SECTION																										
ROADWAY	679+69	- 690+60	1091	82		819	3,273	3,273	810		270	140						273	1,091	1,091			23	14	2,182
GORE/RDWAY	690+60	- 695+24	464	12	234	348	1,392	1,392		2,340		780						116	464	464			40	6	464
ROADWAY	695+24	- 708+57	1333	100		999	3,999	3,999										333	1,333	1,333				17	2,666
GORE/RDWAY	708+57	- 715+07	650	16		489	1,950	1,950				1,500				290		163	650	650				8	650
ROADWAY	715+07	- 727+19	1212	91		909	3,636	3,636	900		300							303	1,212	1,212			25	15	2,424
ROADWAY	727+19	- 1311+49	58430	4,382		43,824	175,290	175,290										14,608	58,430	58,430				730	116,860
GORE/RDWAY	1311+49	- 1319+74	825	62	214	618	2,475	2,475		2,142		714						206	825	825			36	10	825
RDWAY	1319+74	- 1431+90	11216	841		8,412	33,648	33,648										2,804	11,216	11,216				140	22,432
GORE/RDWAY	1431+90	- 1435+78	388	29	115	291	1,164	1,164		1,146		382				108		97	388	388			19	5	388
ROADWAY	1435+78	- 1445+49	971	73		729	2,913	2,913										243	971	971				12	1,942
GORE/RDWAY	1445+49	- 1452+40	691	52	214	519	2,073	2,073		2,136		712						173	691	691			36	9	691
ROADWAY	1452+40	- 1477+00	2460	185		1,845	7,380	7,380										615	2,460	2,460				31	4,920
SH 164 SB ENT RAMP	TIE-IN TO	1452+40	1432	107			2,864	2,864											1,432	1,432				18	
SH 164 SB EXIT RAMP	TIE-IN TO	1477+00	1257	94			2,514	2,514							1				1,257	1,257				16	
GORE/RDWAY	1477+00	- 1481+49	449	34	148	336	1,347	1,347		1,482		494				166		112	449	449			25	6	449
ROADWAY	1481+49	- 1508+49	2700	203			8,100	8,100										675	2,700	2,700				34	5,400
KEECHI CREEK BRIDGES																					3,300	3,300	3,300			
BLISS CREEK BRIDGES																					1,530	1,530	1,530			
US 79 BRIDGES																					1,060	1,060	1,060			
SH 164 BRIDGES																					940	940	940			
PROJECT TOTALS FOR CSJ 0675-03-100:				15,421		129,855	551,187	551,187	1,710	20,118	570	8,596	2	2	4	1,043	48	43,960	186,250	186,250	6,830	6,830	6,830	2,679		344,365
																					BRIDGES					

(1) INCLUDES 3 APPLICATIONS ON IH 45 MAINLANES AND GORES (AFTER 2" MILL & INLAY, SMA-D AND PFC).
AND 2 APPLICATIONS ON THE RAMPS (AFTER SMA-D AND PFC).

(2) THIS MATERIAL IS TO BE PLACED IN ALL APPLICATIONS AS SOON AS POSSIBLE, BUT NO LATER THAN 1 PM FRIDAY OF EACH WEEK.

SUMMARY OF DELINEATION

DESCRIPTION RAMPS	ITEM 658			
	6060	6080	6086	6092
		INSTL DEL ASSM		
	REMOVE DELIN & OBJECT MARKER ASSMS	(D-SW) SZ 1 (WFLX) GND	(D-SY) SZ 1 (YFLX) GND	(D-DW) SZ 1 (WFLX) GND
	EA	EA	EA	EA
SH 7 NB ENT RAMP	36	15	14	7
US 79 NB EXIT RAMP	48	22	22	4
US 79 NB ENT RAMP	21	13	8	
SH 164 NB EXIT RAMP	23	9	9	5
SH 164 NB ENT RAMP	38	16	16	6
SH 7 SB EXIT RAMP	35	15	15	5
SH 164 SB ENT RAMP	48	20	20	8
SH 164 SB EXIT RAMP	32	14	14	4
PROJECT TOTALS:	281	124	118	39

REV DATE: 2-12-2015
CSJ: 0675-03-100 FILENAME: $FILE$

PRINT DATE	REVISION DATE
$DATE$	

Texas Department of Transportation
Bryan District

PAVEMENT MARKING SUMMARY

SHEET 1 OF 2 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	14

SUMMARY OF PAVEMENT MARKINGS AND MARKERS

DESCRIPTION STATION			LENGTH	ITEM 662 (1)							ITEM 666										ITEM 672		ITEM 533
				6109		6001	6004	6034	6002	6071	6006	6036	6054	6057	6075	6042	6048	6300	6303	6315	6010		6001
				WK ZN PAV MRK							REFL PAV MRK TY I							RE PM W/RET TY I			REFL PAV MRKR		
				SHT TERM (TAB) TY W (CL)	SHT TERM (TAB) TY W (GORE	NON-REMOV (W) 4" (BRK) (2)	NON-REMOV (W) 4" (SLD) (2)	NON-REMOV (Y) 4" (SLD) (2)	NON-REMOV (W) 4" (DOT) (2)	NON-REMOV (W) 8" (SLD) (2)	(W)4" (DOT) (100 MIL)	(W)8" (SLD) (100 MIL)	(W) (ARROW) (100 MIL)	(W) (DBL ARROW) (100 MIL)	(W) (NUMBER) (100 MIL)	(W) 12" (SLD) (100 MIL)	(W) 24" (SLD) (100 MIL)	(W) 4" (BRK) (100 MIL)	(W) 4" (SLD) (100 MIL)	(Y) 4" (SLD) (100 MIL)	TY II-C-R 20' SP-8"	TY II-C-R (CL)	RUMBLE STRIPS (SHOULDER)
			FT	EA	EA	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	LF	LF	LF	LF	LF	EA	EA	LF
NORTHBOUND LANES																							
ROADWAY	1508+49	- 1517+50	901	68		675	2,703	2,703										225	901	901		11	1,802
SOUTHBOUND LANES																							
ROADWAY	1508+49	- 1517+50	901	68			2,703	2,703										225	901	901		11	1,802
SH 164 BRIDGES																							
PROJECT TOTALS FOR CSJ 0675-02-095:				135		675	5,406	5,406	0	0	0	0	0	0	0	0	0	450	1,802	1,802	23		3,604

(1) INCLUDES 3 APPLICATIONS ON IH 45 MAINLANES.

(2) THIS MATERIAL IS TO BE PLACED IN ALL APPLICATIONS AS SOON AS POSSIBLE, BUT NO LATER THAN 1 PM FRIDAY OF EACH WEEK.

REV DATE: 2-12-2015
CSJ: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Summaries\PAVEMENT MARKING SUMMARY.DGN

PRINT DATE	REVISION DATE
8/26/2021	

Texas Department of Transportation ©2021
Bryan District

PAVEMENT MARKING SUMMARY

SHEET 2 OF 2 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

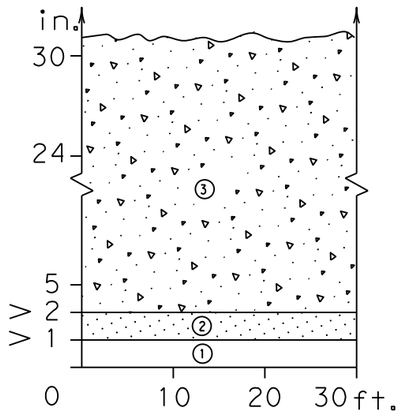
STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	15

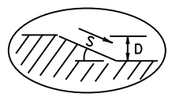
DATE:
FILE:

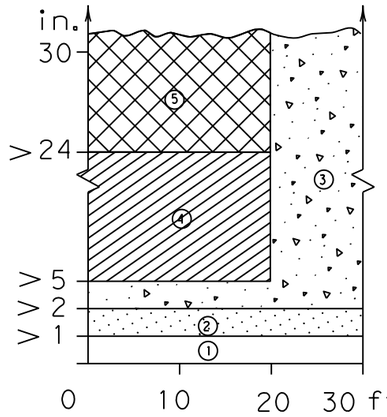
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet

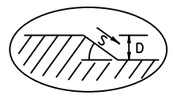


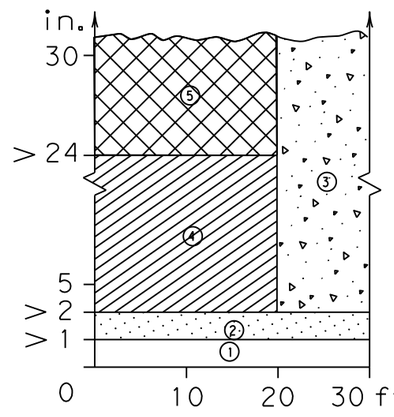
Edge Condition I
S = (3:1) (or flatter)



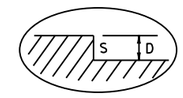


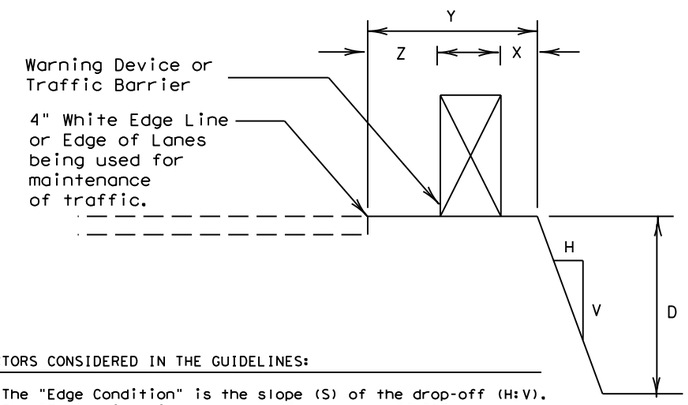
Edge Condition II
S = ((2.99):1) to (1:1)





Edge Condition III
S is steeper than (1:1)





FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.

5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Zone	Treatment Types Guidelines:
①	No treatment.
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a "Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW 8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge fill may be provided to change the edge slope to that of the preferable Edge Condition I.
⑤	Check indications (Figure-1) for positive barrier. Where positive barrier is not indicated, the treatment shown above for Zone- 4 may be used after consideration of other applicable factors.

Edge Condition Notes:

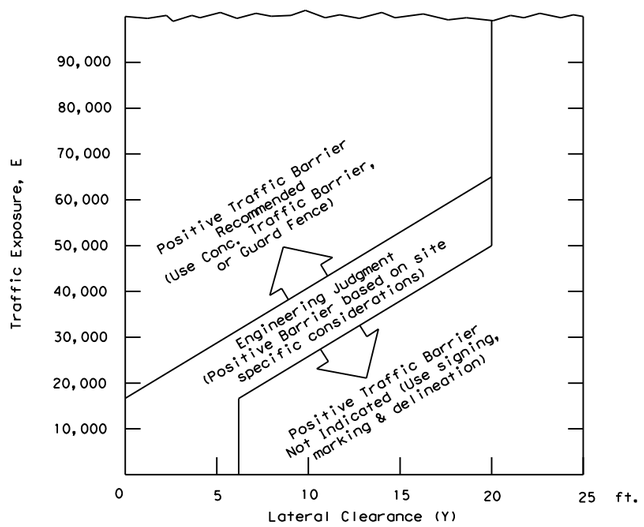
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differen-tial when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▨)

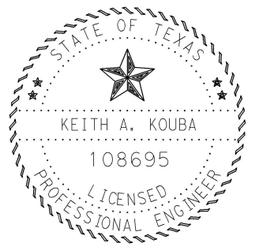


1 E = ADT x T
Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the dura-tion time in years of the dropoff condition.

2 Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.

3 An approved end treatment should be provided for any positive barrier end located within a lateral offset of 20 feet from the edge of the travel lane.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.



Dan A. Kouba, P.E.

08/04/2021

Texas Department of Transportation
Traffic Operations Division

TREATMENT FOR VARIOUS EDGE CONDITIONS

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

REVISIONS
03-01
08-01 correct typos

CONT	SECT	JOB	HIGHWAY
0675	03	100, ETC.	IH 45
DIST	COUNTY		SHEET NO.
BRYAN	LEON, ETC.		16

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

SHEET 1 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0675	03	100, ETC.	IH 45
	DIST	COUNTY		SHEET NO.
	BRYAN	LEON, ETC.		17

95

DATE: $DATE$ $TIME$
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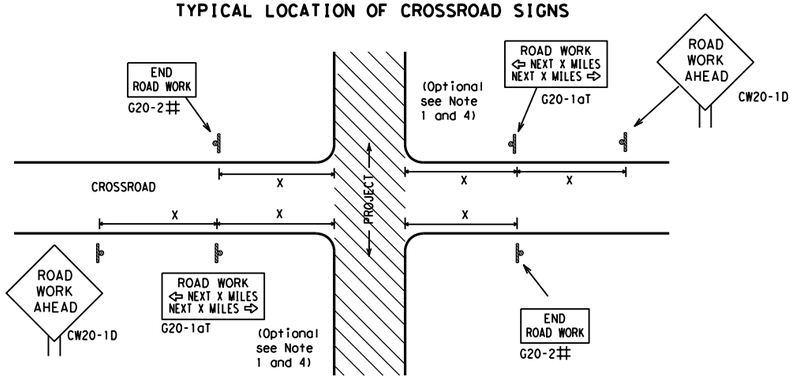
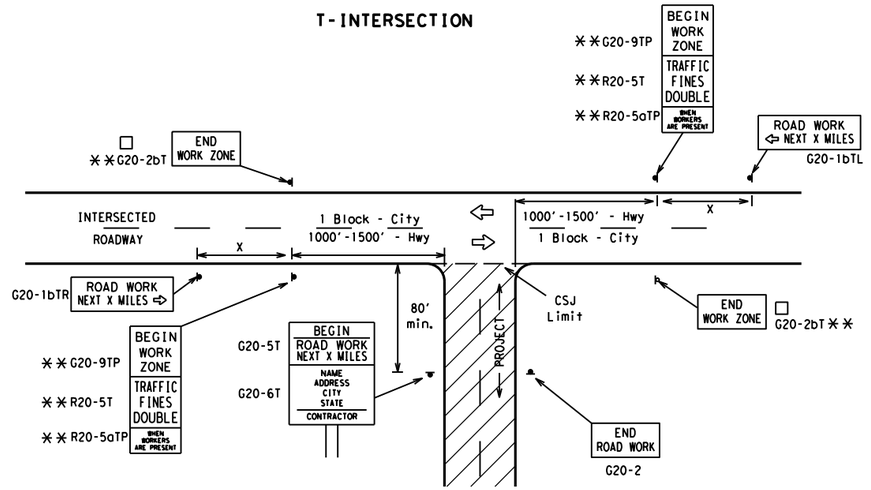
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

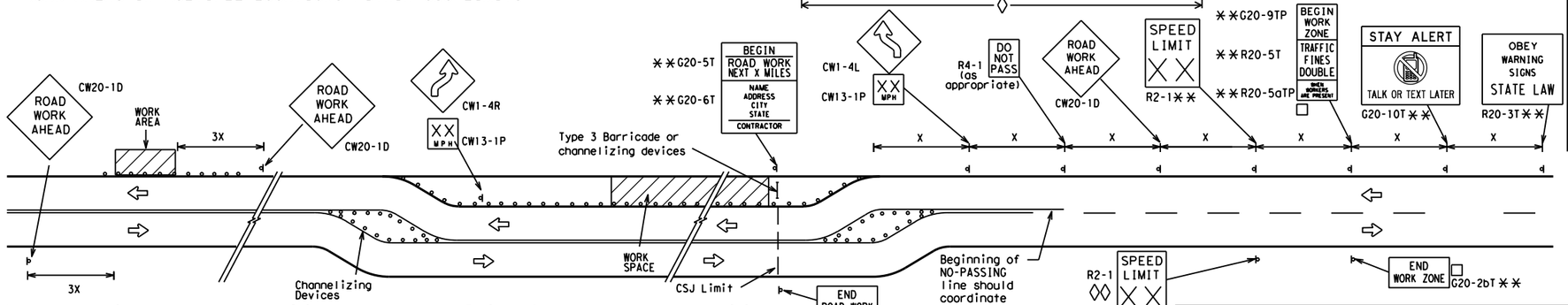
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

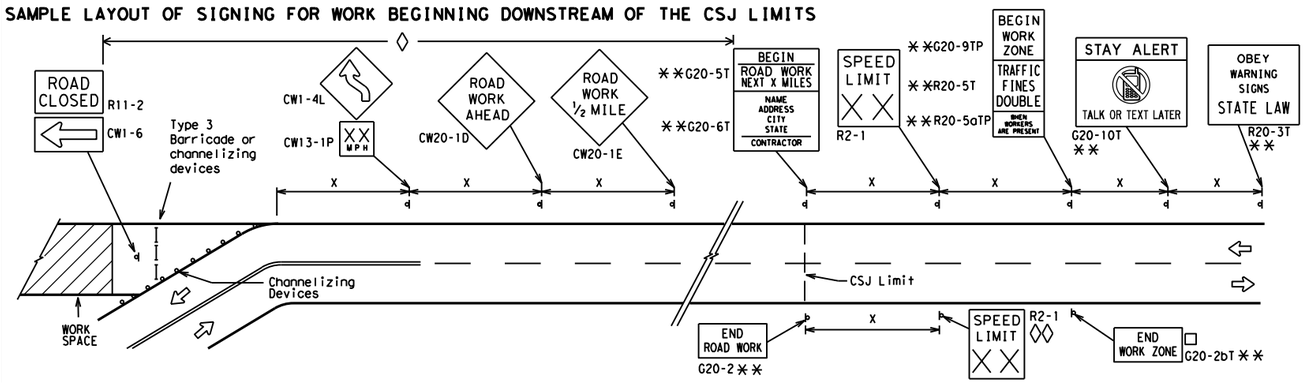
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRYAN	LEON, ETC.		18

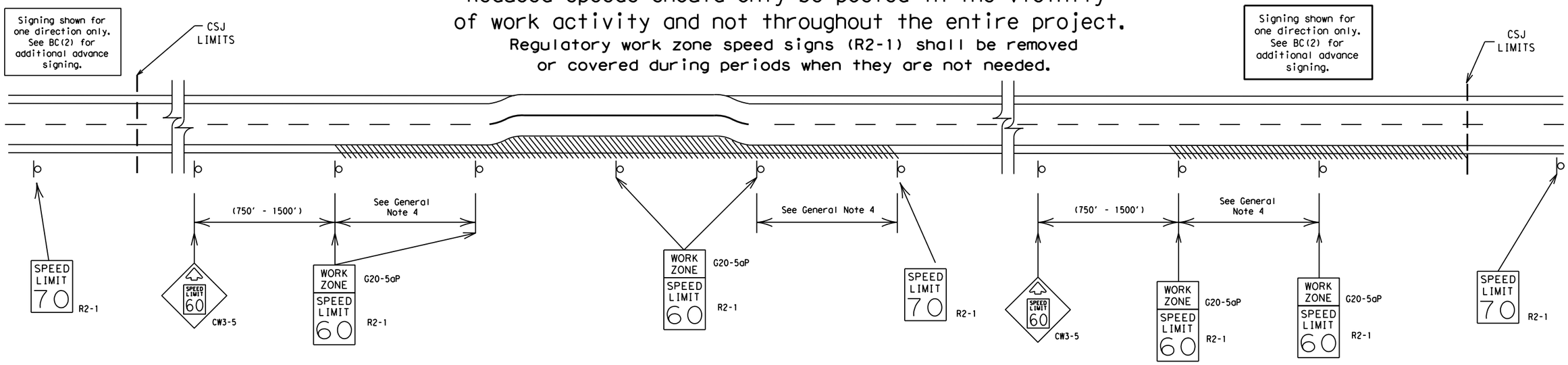
DATE: $DATE$ $TIME$
FILE: $FILE$

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

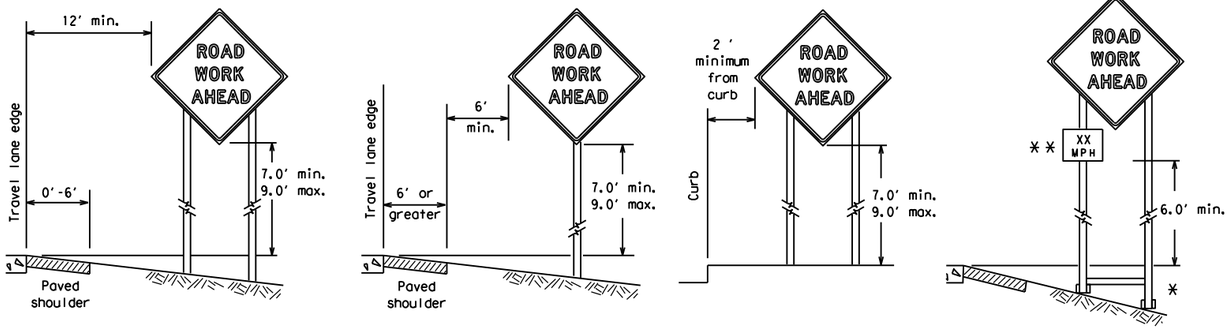
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRYAN	LEON, ETC.		19

DATE: $DATE$ $TIME$
FILE: $FILE$

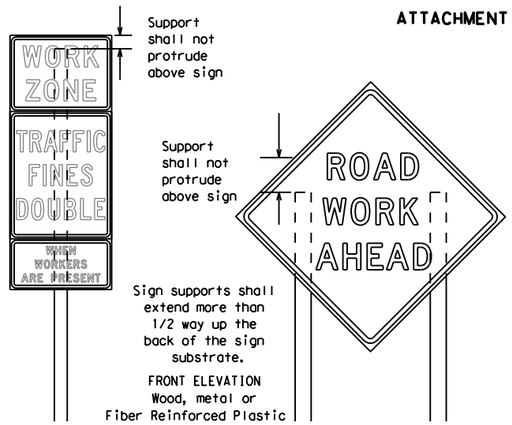
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

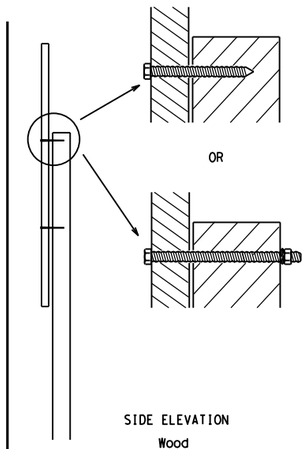


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





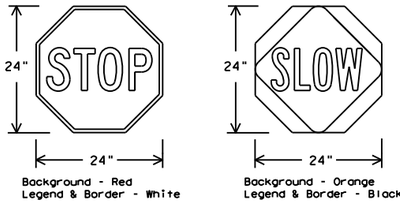
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

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



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

1. The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

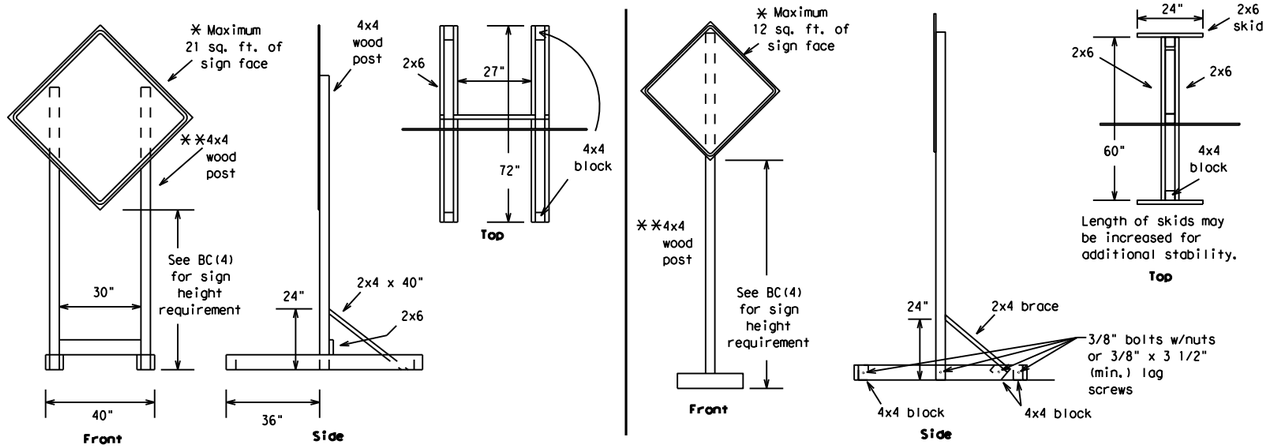
Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

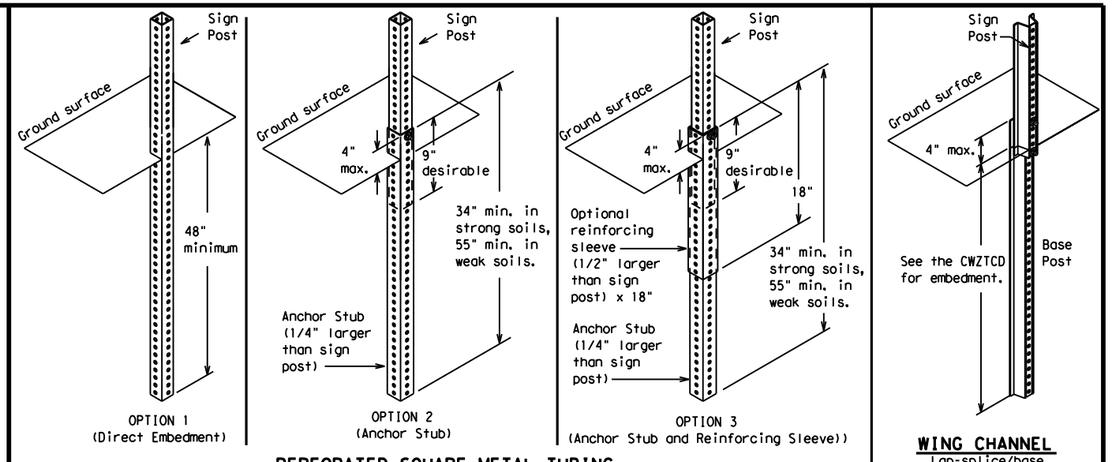
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRYAN	LEON, ETC.		20

DATE: $DATE$ $TIME$
FILE: $FILE$



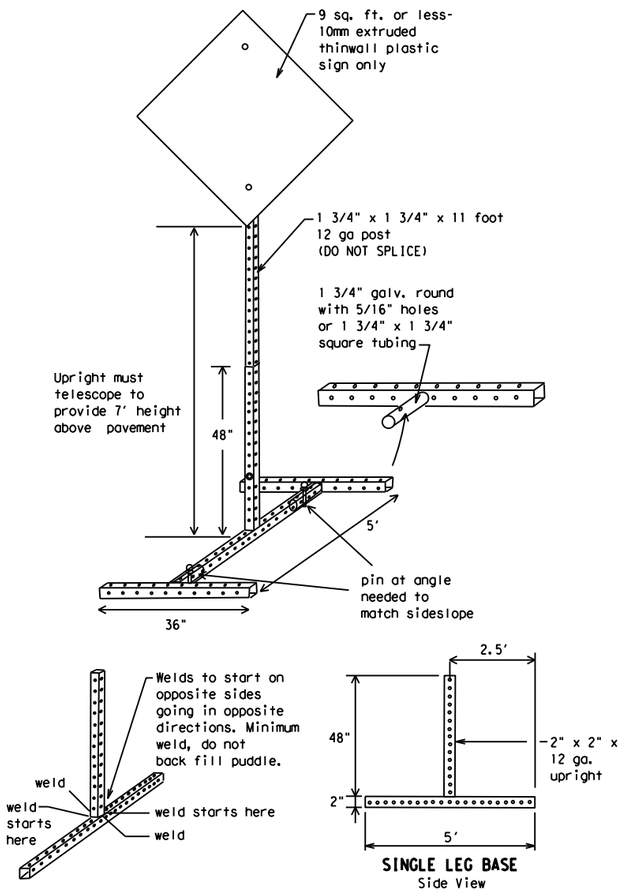
SKID MOUNTED WOOD SIGN SUPPORTS

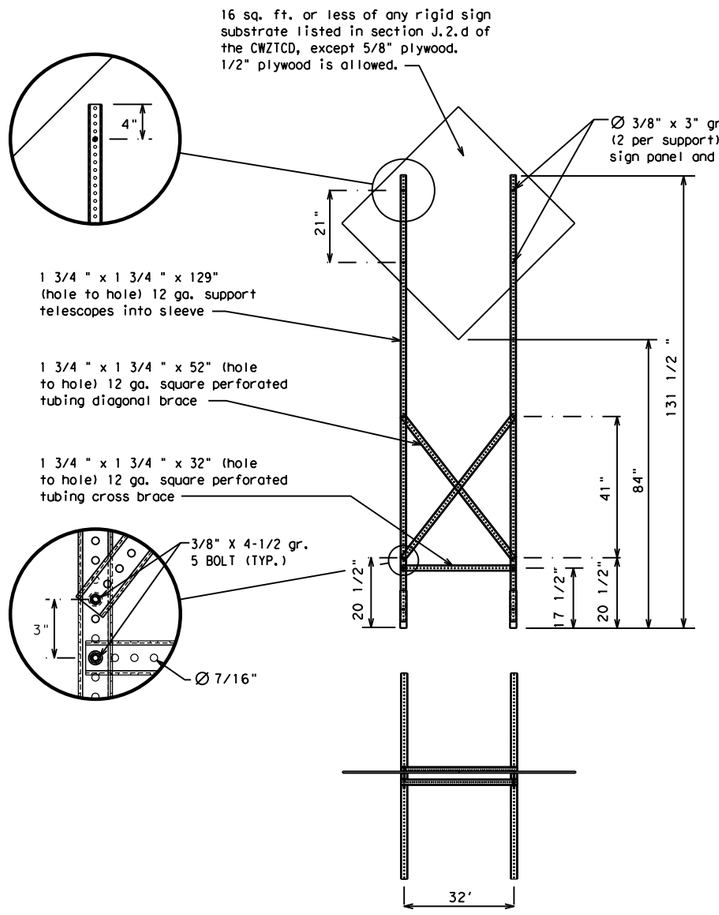
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

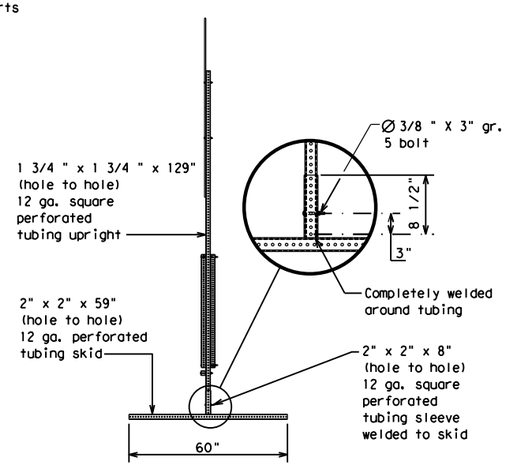


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRYAN	LEON, ETC.		21

DATE: $DATE$ $TIME$
FILE: $FILE$

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol"(CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

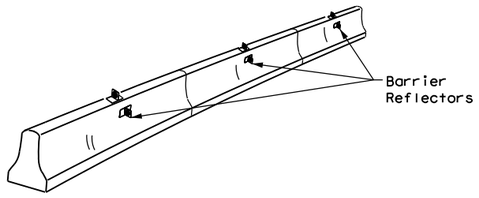
BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRYAN	LEON, ETC.		22

100

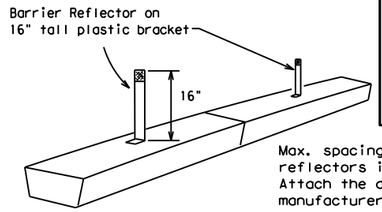
DATE: $DATE$ $TIME$
FILE: $FILE$

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



CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.

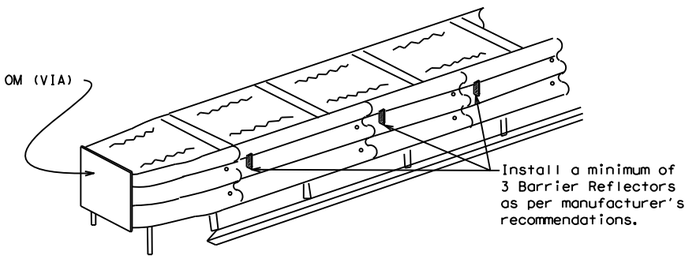


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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



DELINEATION OF END TREATMENTS

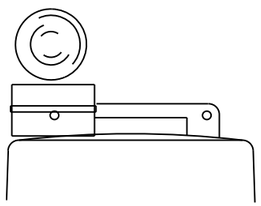
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

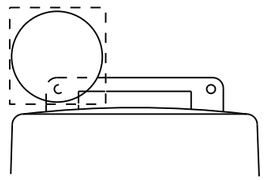
1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this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



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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

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



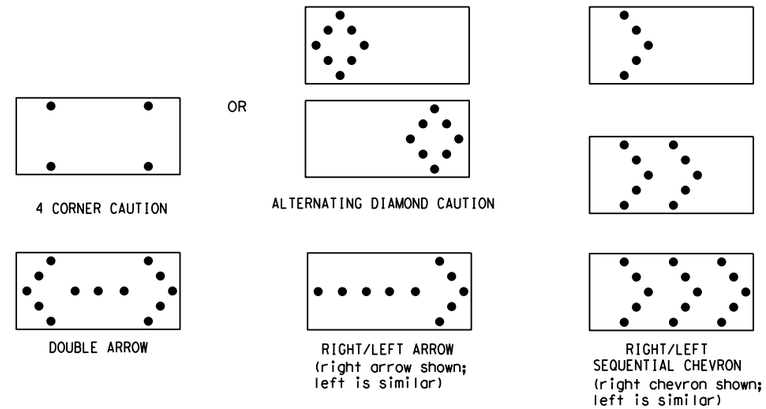
Warning reflector may be round or square.Must have a yellow reflective surface area of at least 30 square inches

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

SHEET 7 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRYAN	LEON, ETC.		23

101

DATE: $DATE$ $TIME$
FILE: $FILE$

GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

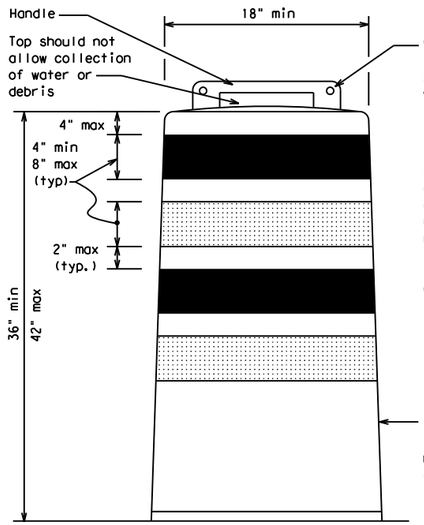
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

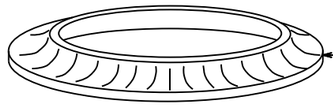
RETROREFLECTIVE SHEETING

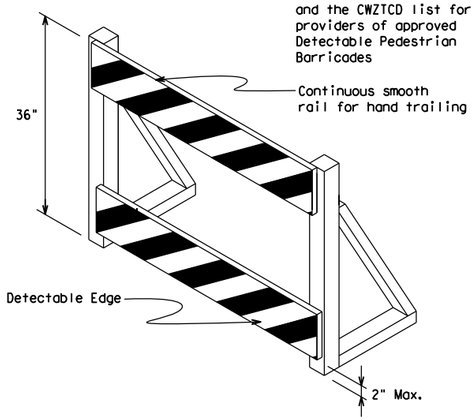
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

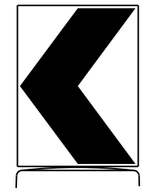




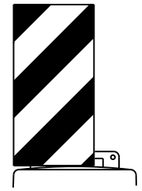


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	BRYAN	LEON, ETC.		24
7-13				

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DATE: $DATE$ $TIME$
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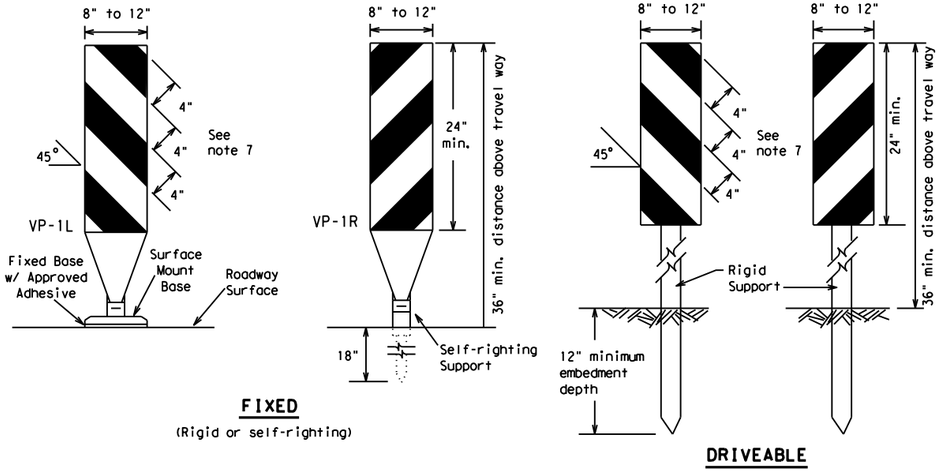
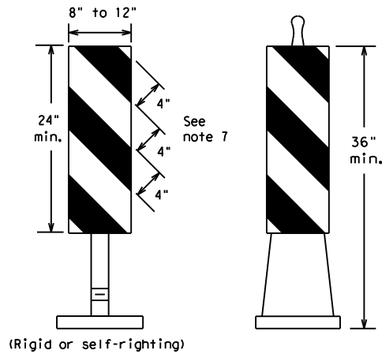


FIXED
(Rigid or self-righting)

DRIVEABLE

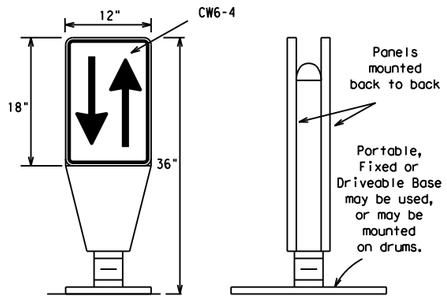


(Rigid or self-righting)

PORTABLE

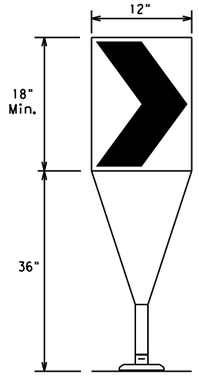
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



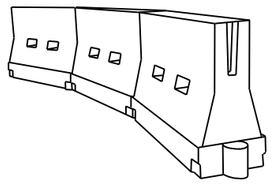
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0675	03	100, ETC.	IH 45
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRYAN	LEON, ETC.		25

DATE: $DATE$ $TIME$
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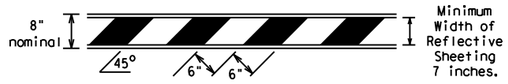
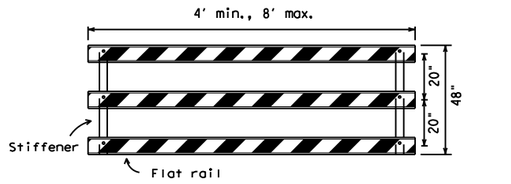
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



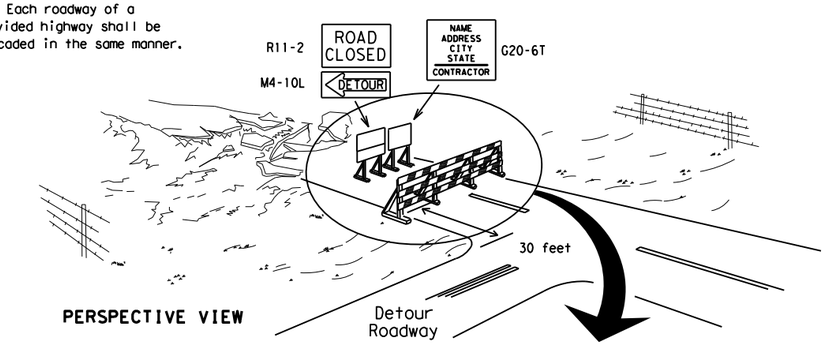
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

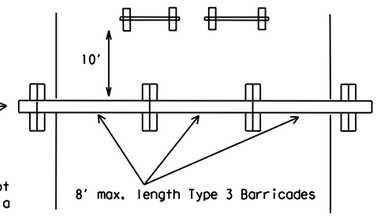
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

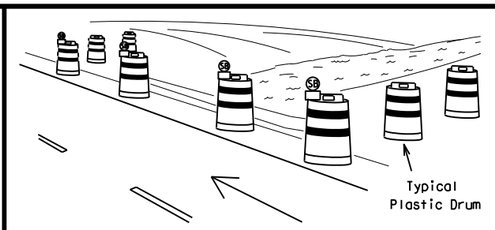
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

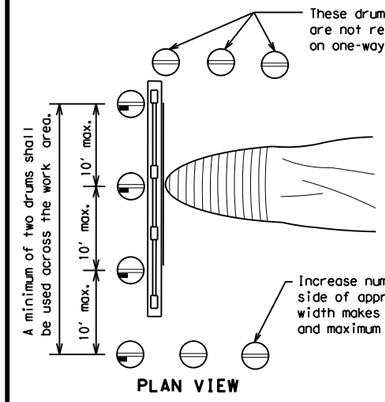
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

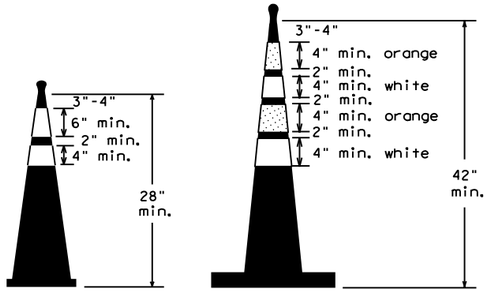
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

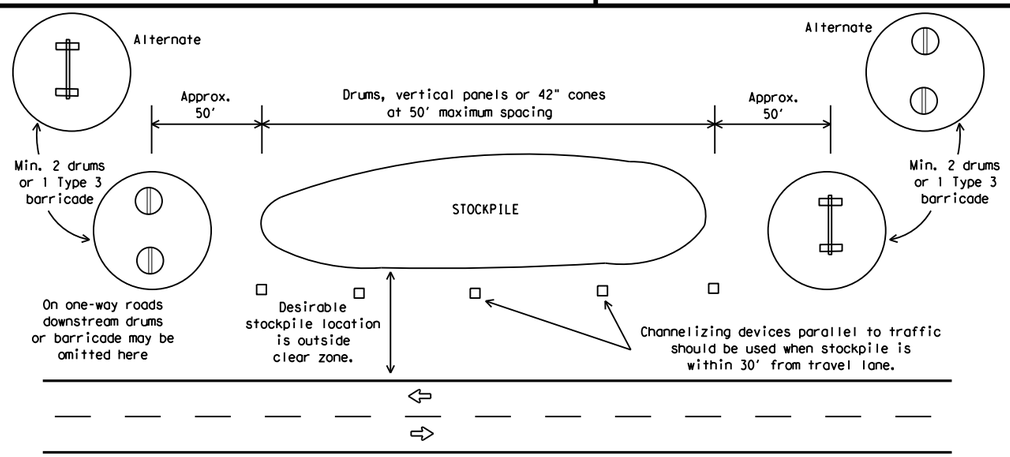
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

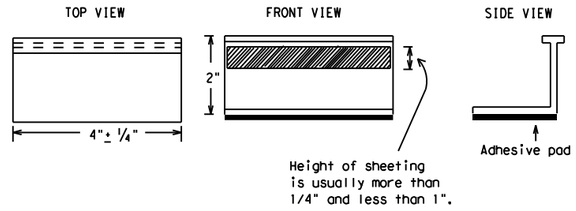
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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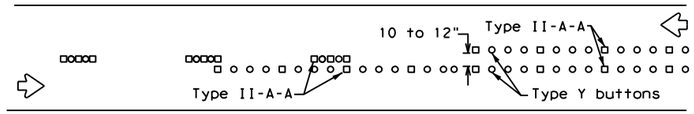
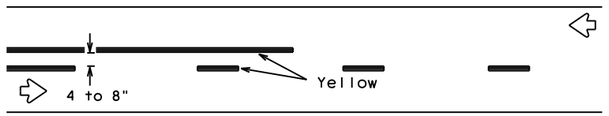
PAVEMENT MARKING PATTERNS

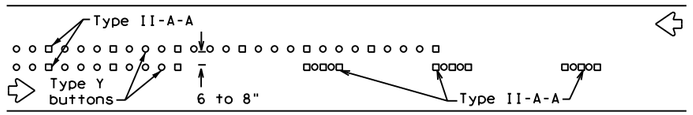
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



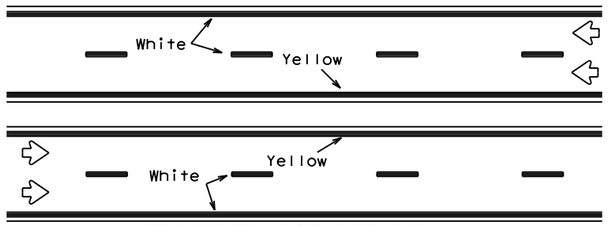
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



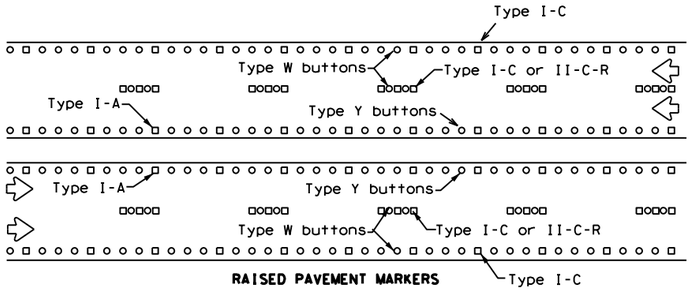
RAISED PAVEMENT MARKERS - PATTERN B

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

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



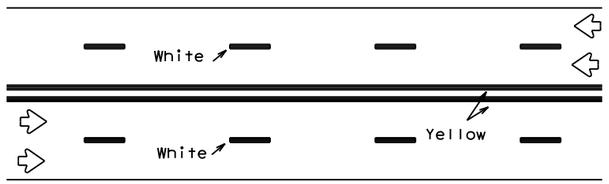
REFLECTORIZED PAVEMENT MARKINGS



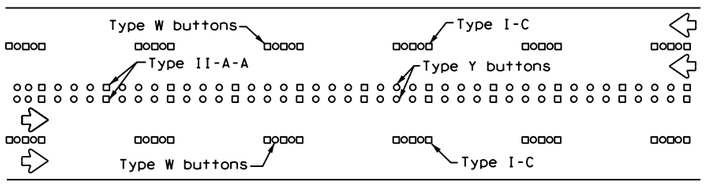
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



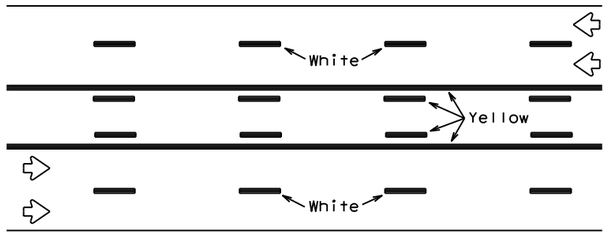
REFLECTORIZED PAVEMENT MARKINGS



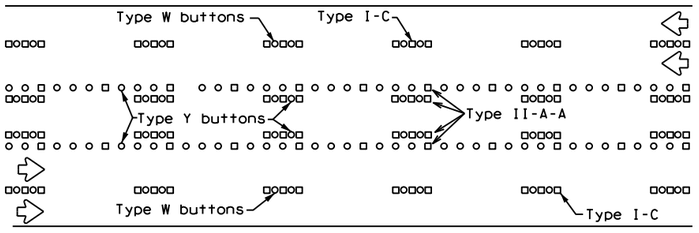
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

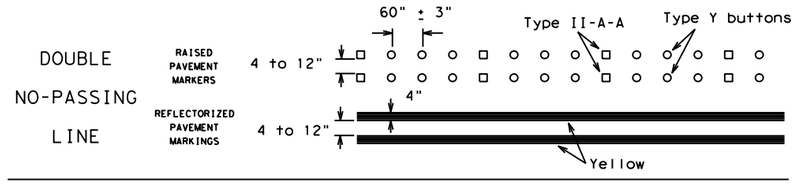
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

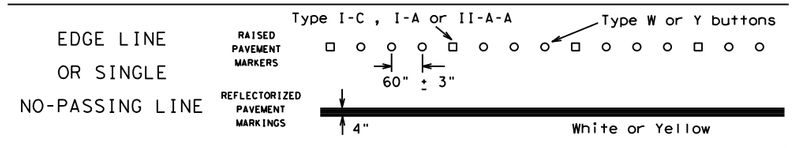
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

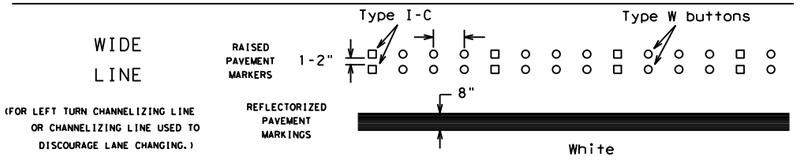


EDGE LINE OR SINGLE NO-PASSING LINE



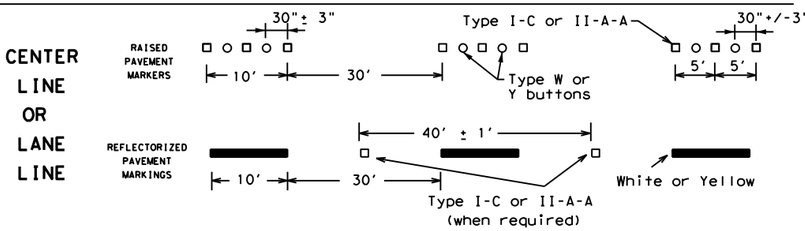
WIDE LINE

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

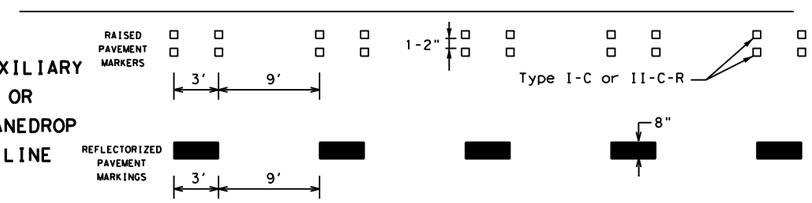


BROKEN LINES

CENTER LINE OR LANE LINE

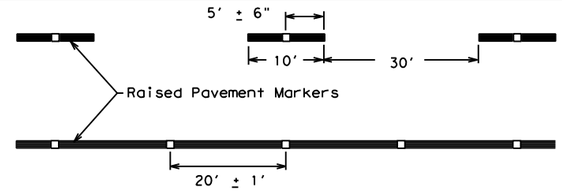


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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	BRYAN	LEON, ETC.		28

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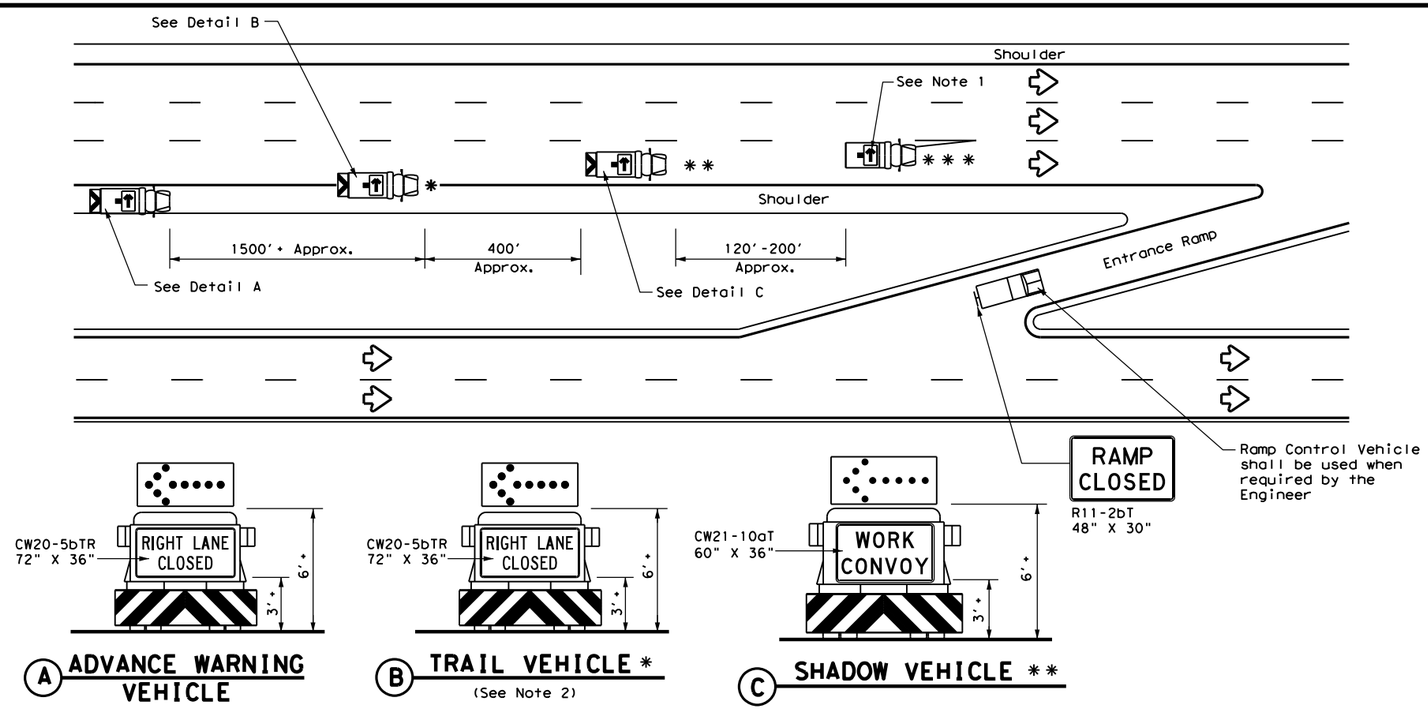
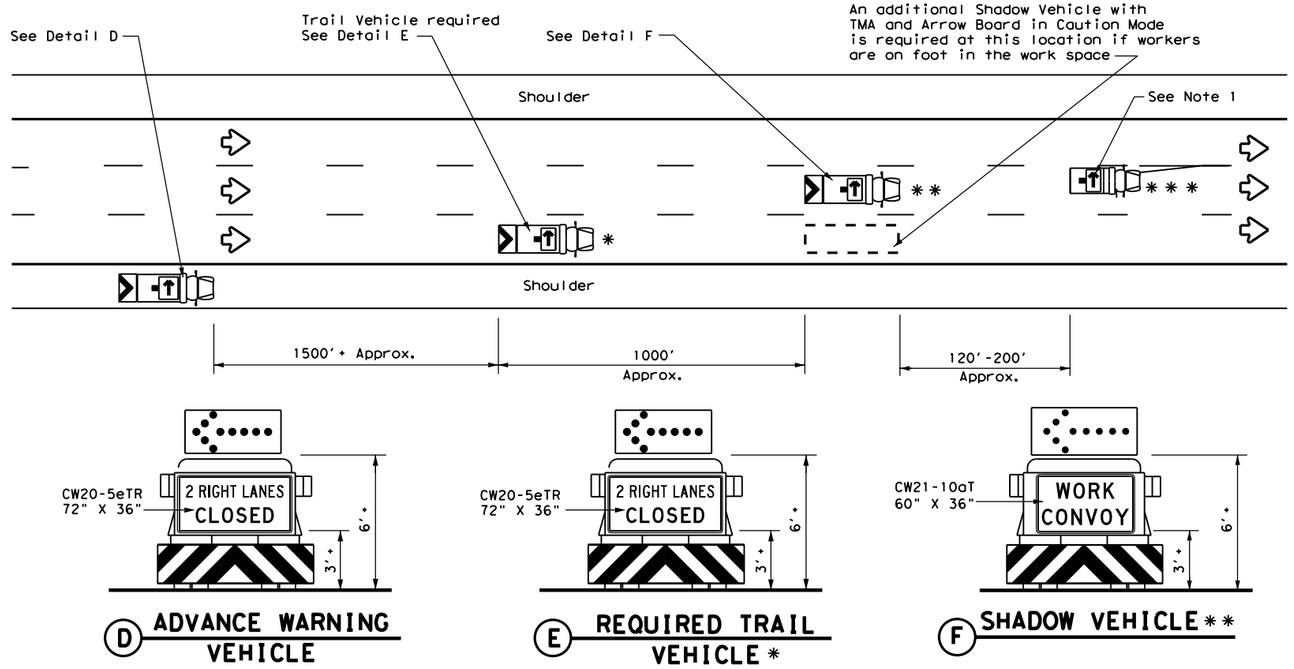


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



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

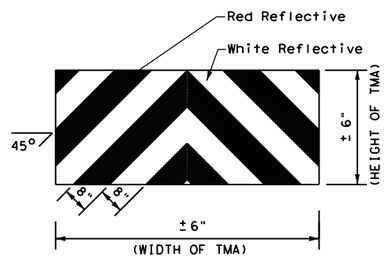
DATE: $DATE$ $TIME$
FILE: $FILE$

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

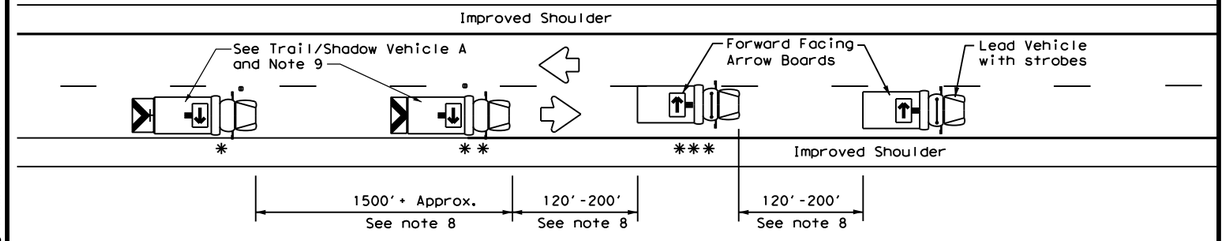
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

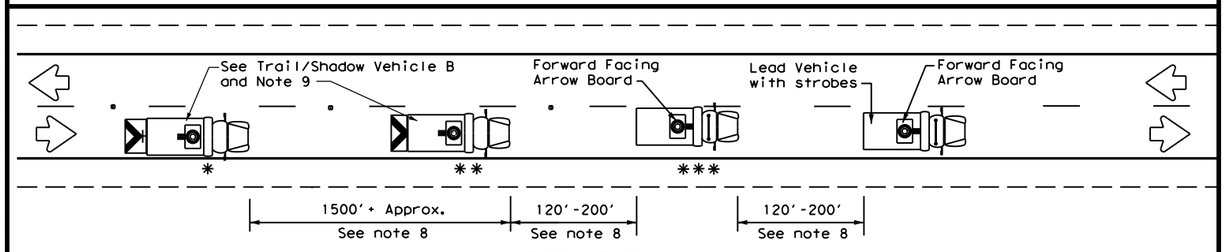
FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0675	03	100, ETC.	IH 45
	DIST	COUNTY		SHEET NO.
	BRYAN	LEON, ETC.		29

176



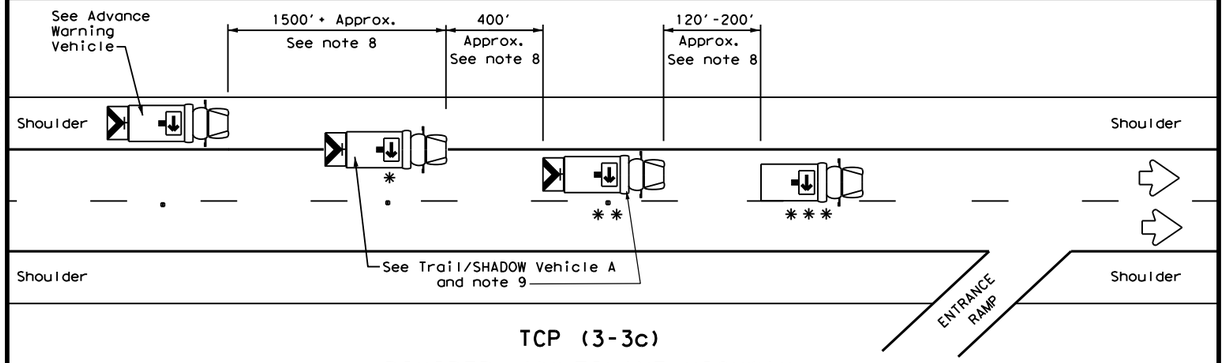
TCP (3-3a)

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



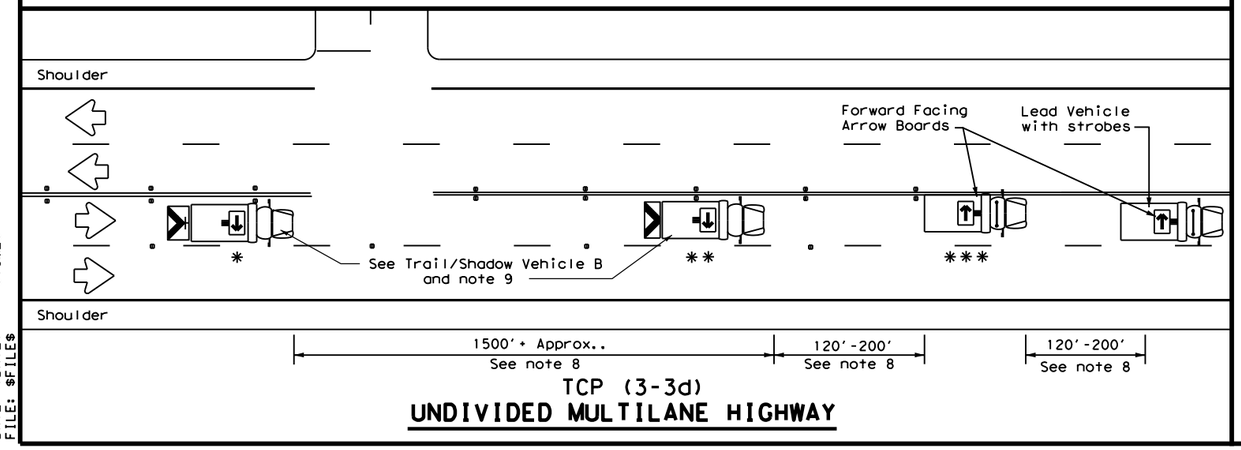
TCP (3-3b)

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



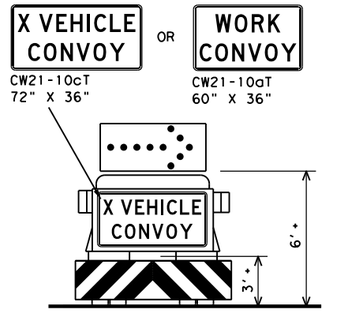
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



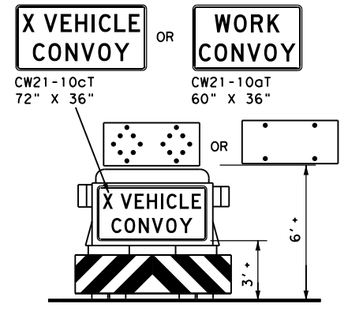
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



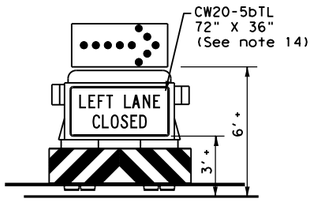
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

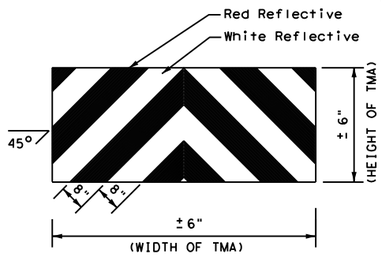


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

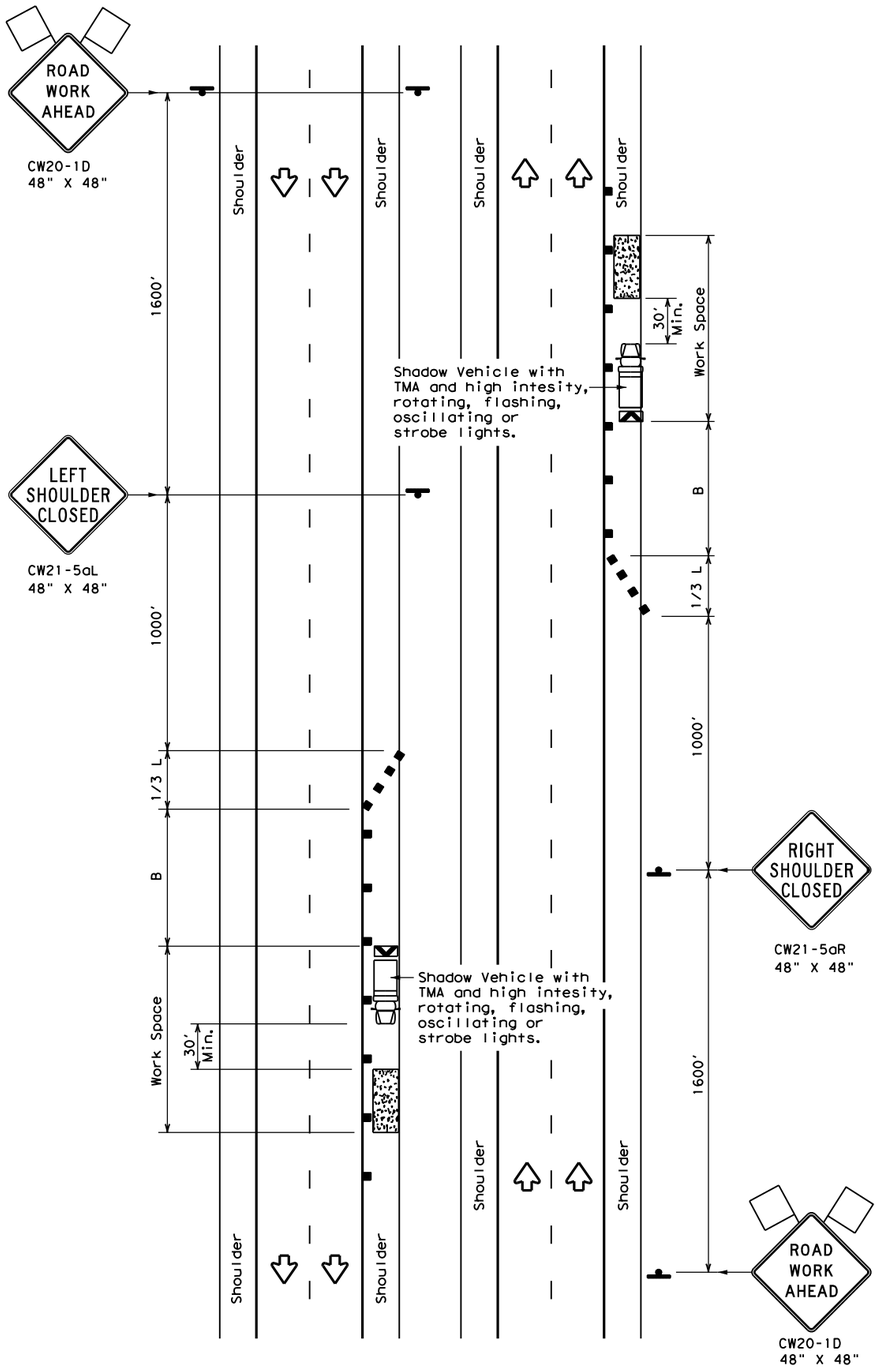
Texas Department of Transportation

Traffic Operations Division Standard

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

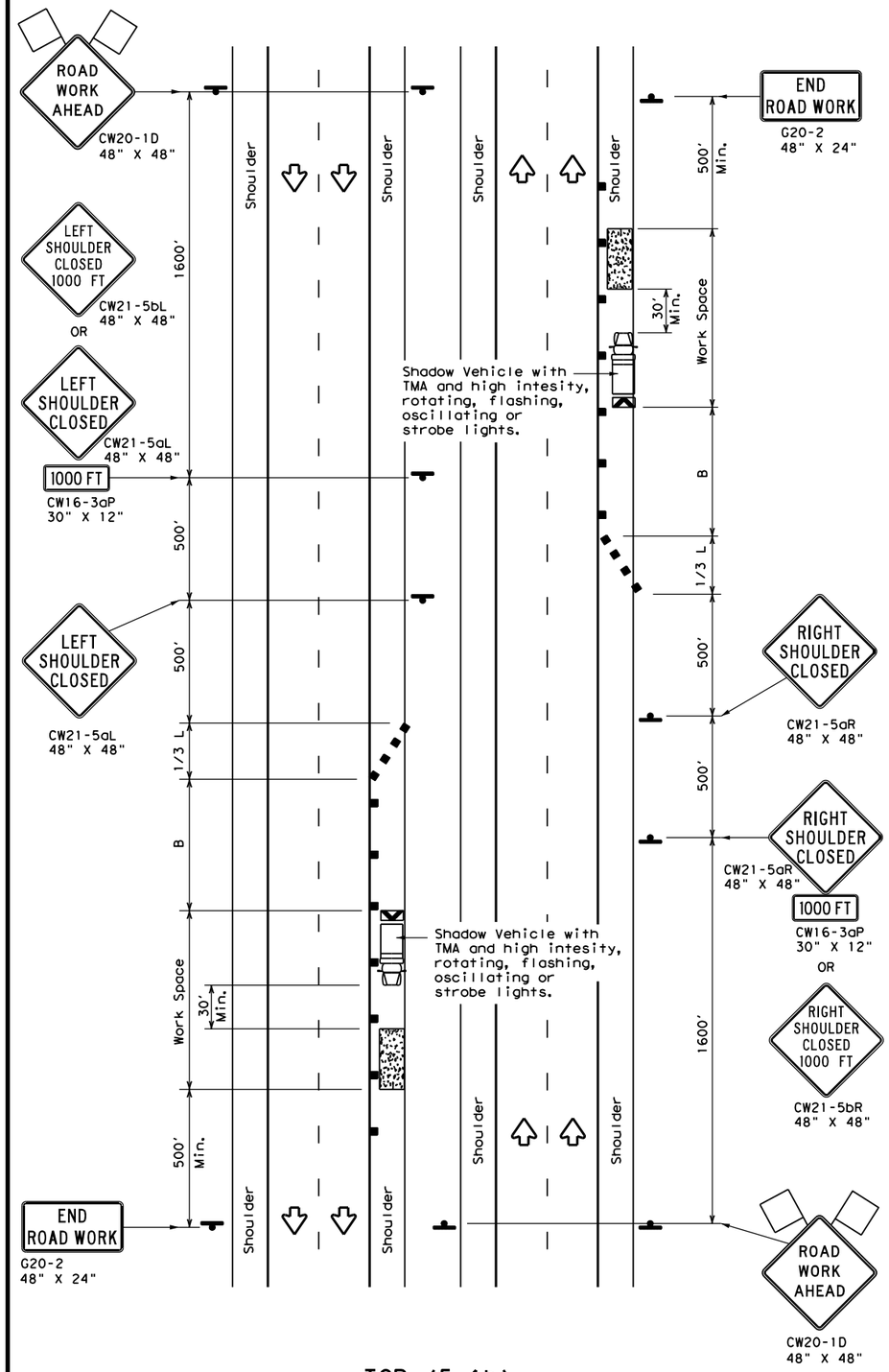
FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	BRYAN	LEON, ETC.		30
1-97 7-14				

$TIME$
DATE: $DATE$
FILE: $FILE$



TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	TCP(5-1a)	TCP(5-1b)	TCP(5-1b)	

GENERAL NOTES

1. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely effecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.
2. 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece cones.

Texas Department of Transportation

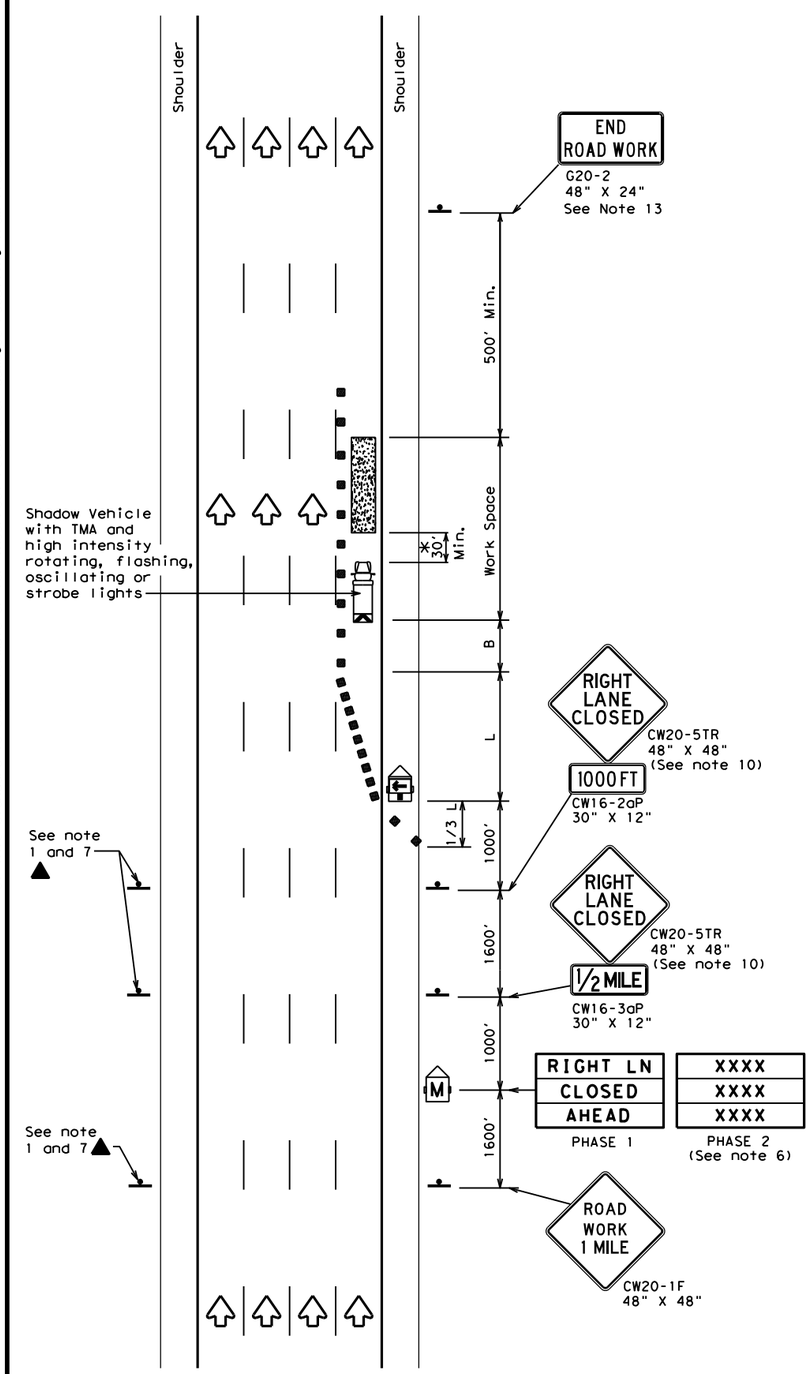
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

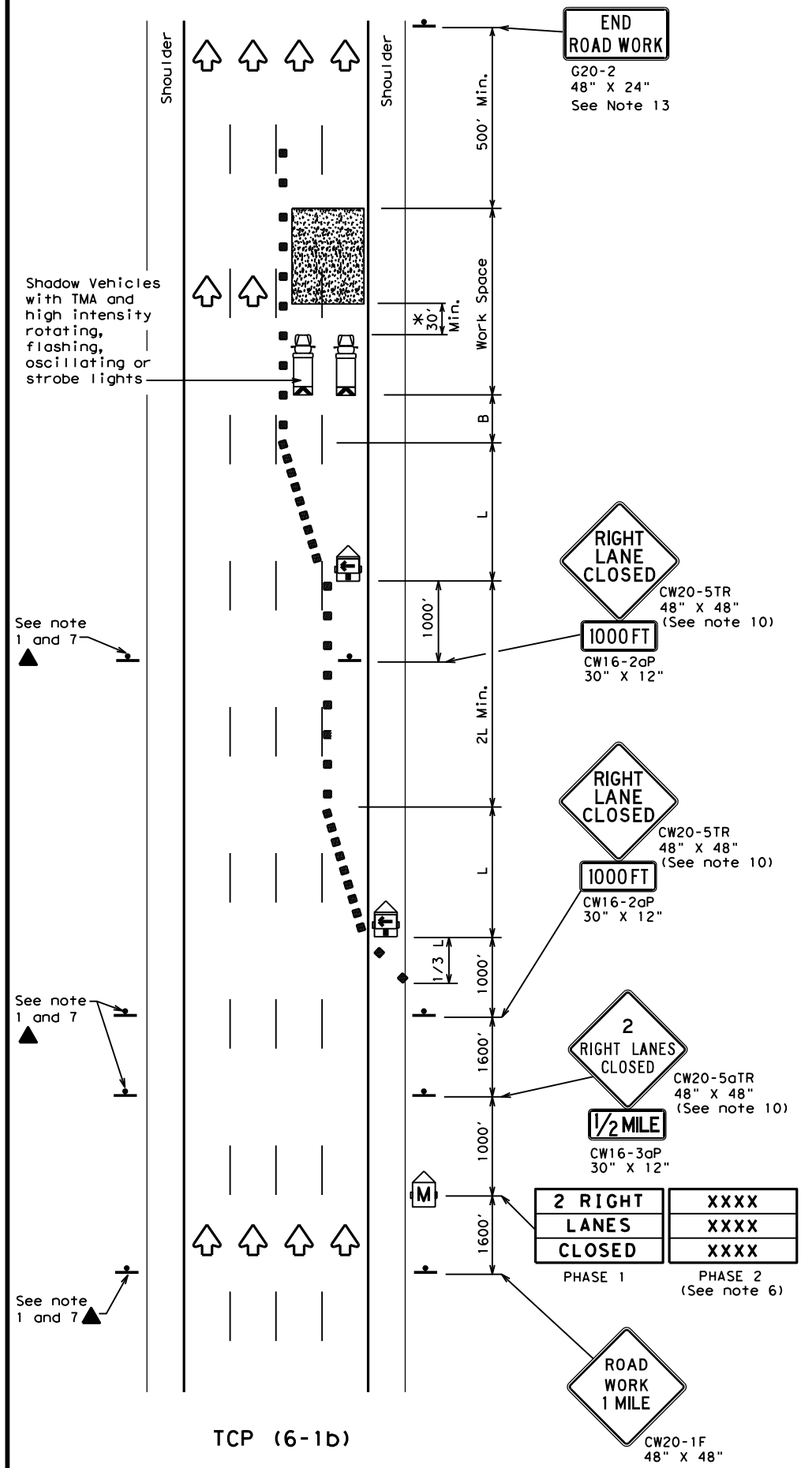
FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0675	03	100, ETC.	IH 45
	DIST	COUNTY		SHEET NO.
	BRY	LEON, ETC.		31

DATE: $DATE$ $TIME$
FILE: $FILE$



TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. Drums or 42"cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
3. All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
4. The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
5. Static message boards or changeable message signs stating the date and duration of ramp or freeway lane closures shall be placed a minimum of seven (7) calendar days in advance of the actual closure.
6. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.
7. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
8. The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the TMUTCD.
9. Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
10. Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
11. When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
12. For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
13. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

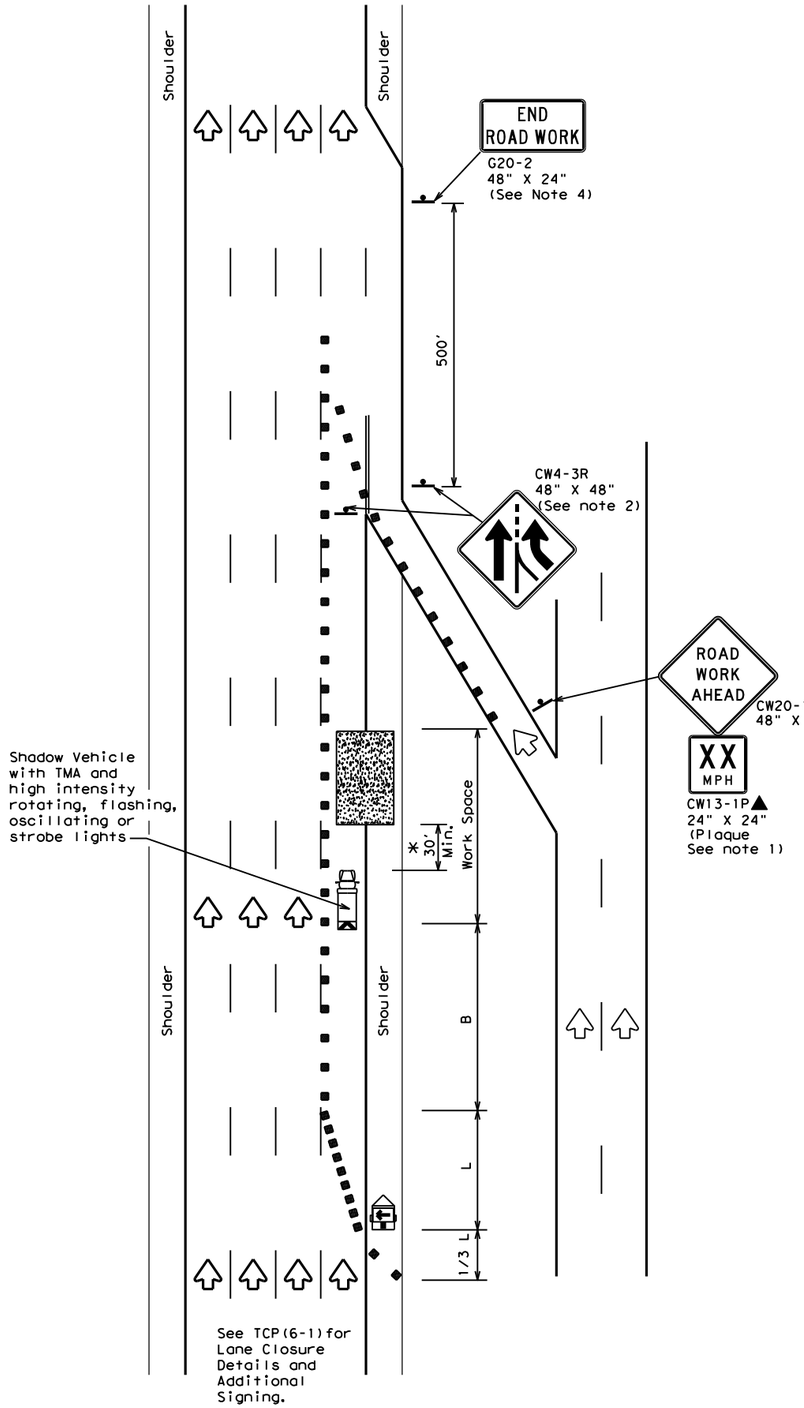
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

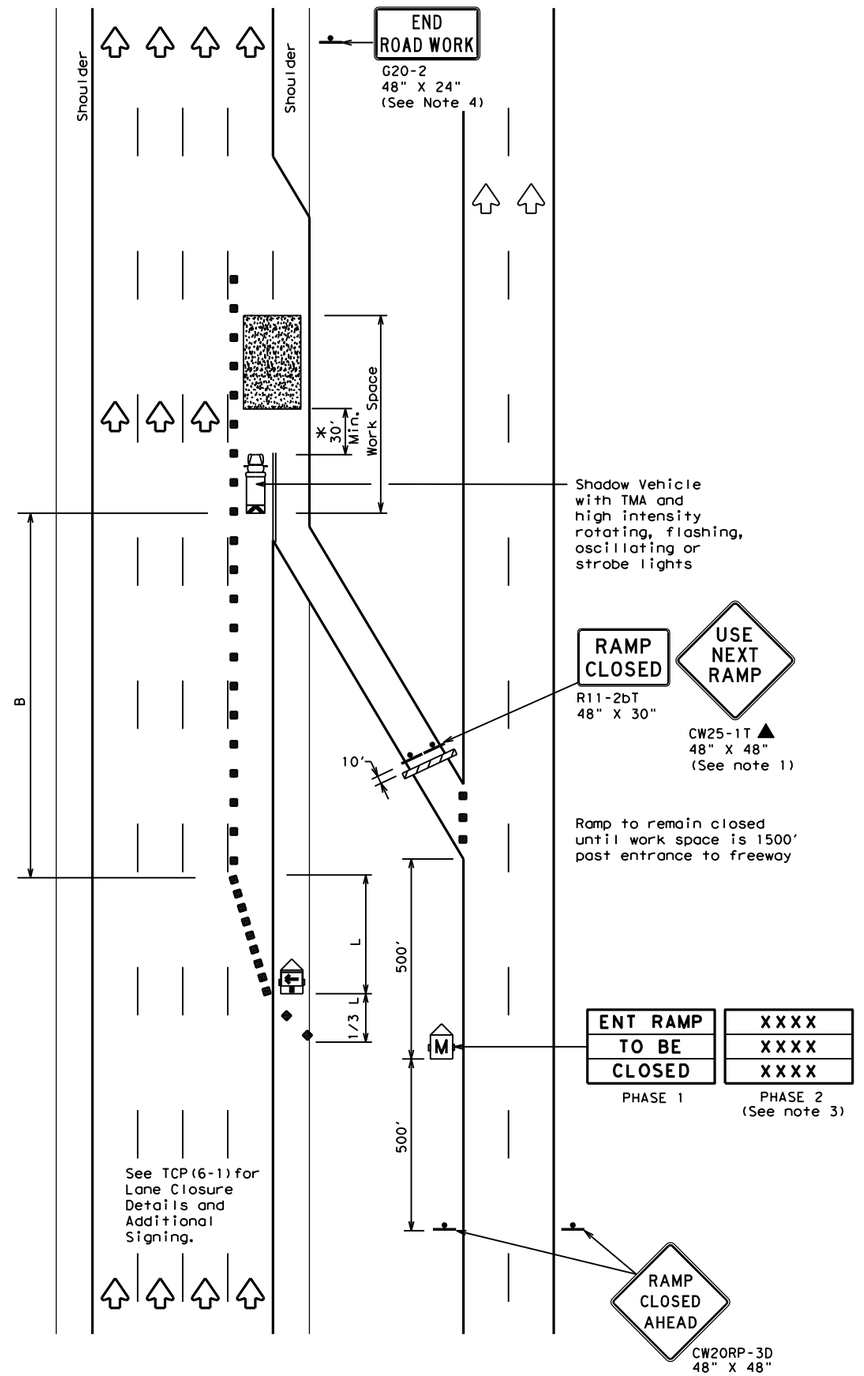
FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-12	0675	03	100, ETC.	IH 45
	DIST	COUNTY		SHEET NO.
	BRYAN	LEON, ETC.		32

DATE: $DATE$ $TIME$
FILE: $FILE$



TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP CLOSED

LEGEND

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

TYPICAL USAGE

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. ADDED LANE Symbol (CW4-3) sign may be omitted when sign between ramp and mainlane can be seen from both roadways.
3. See "Advance Notice List" on BC(6) for recommended date and time formatting options for PCMS Phase 2 message.
4. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

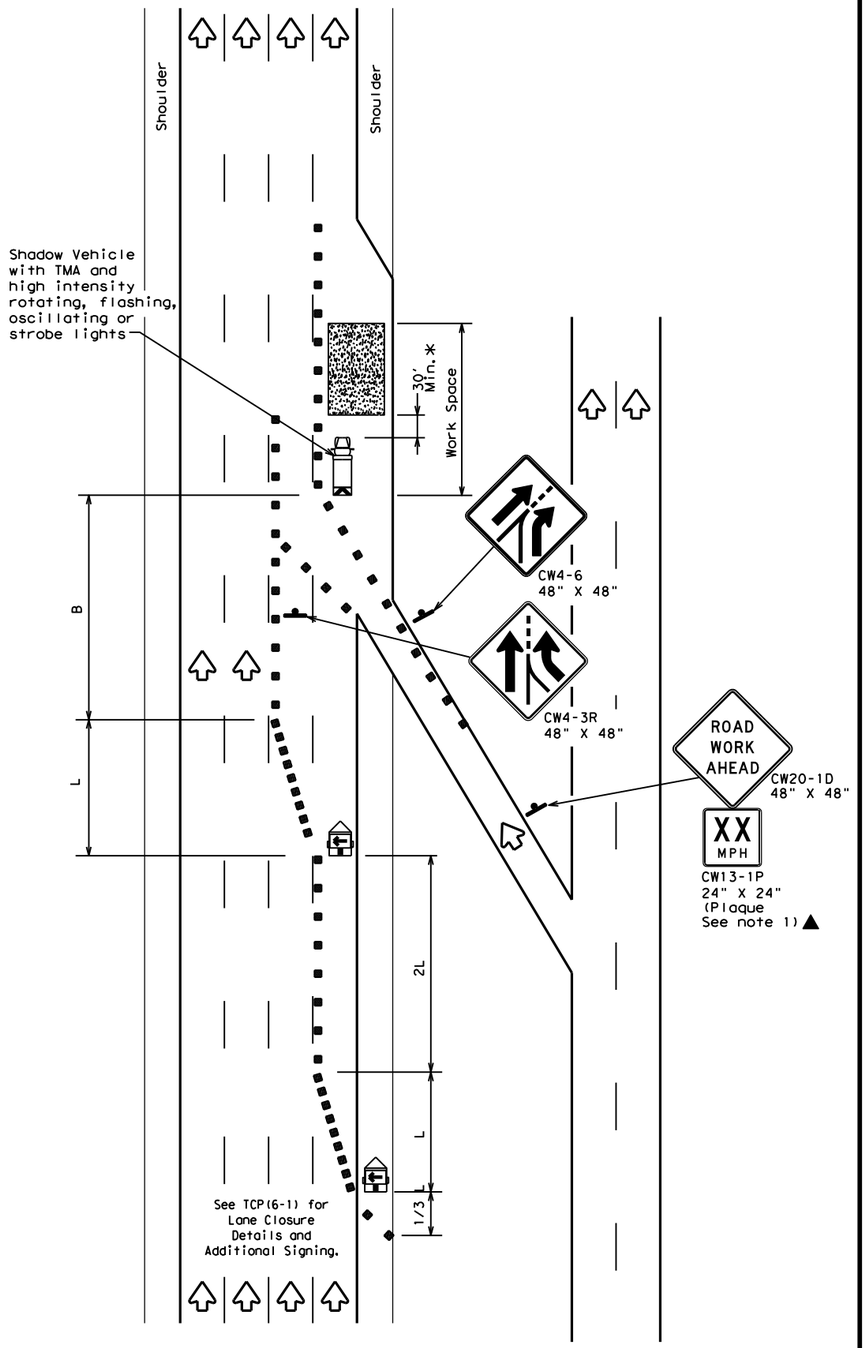
TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

TCP(6-2)-12

FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC	IH 45
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	BRYAN	LEON, ETC.		33

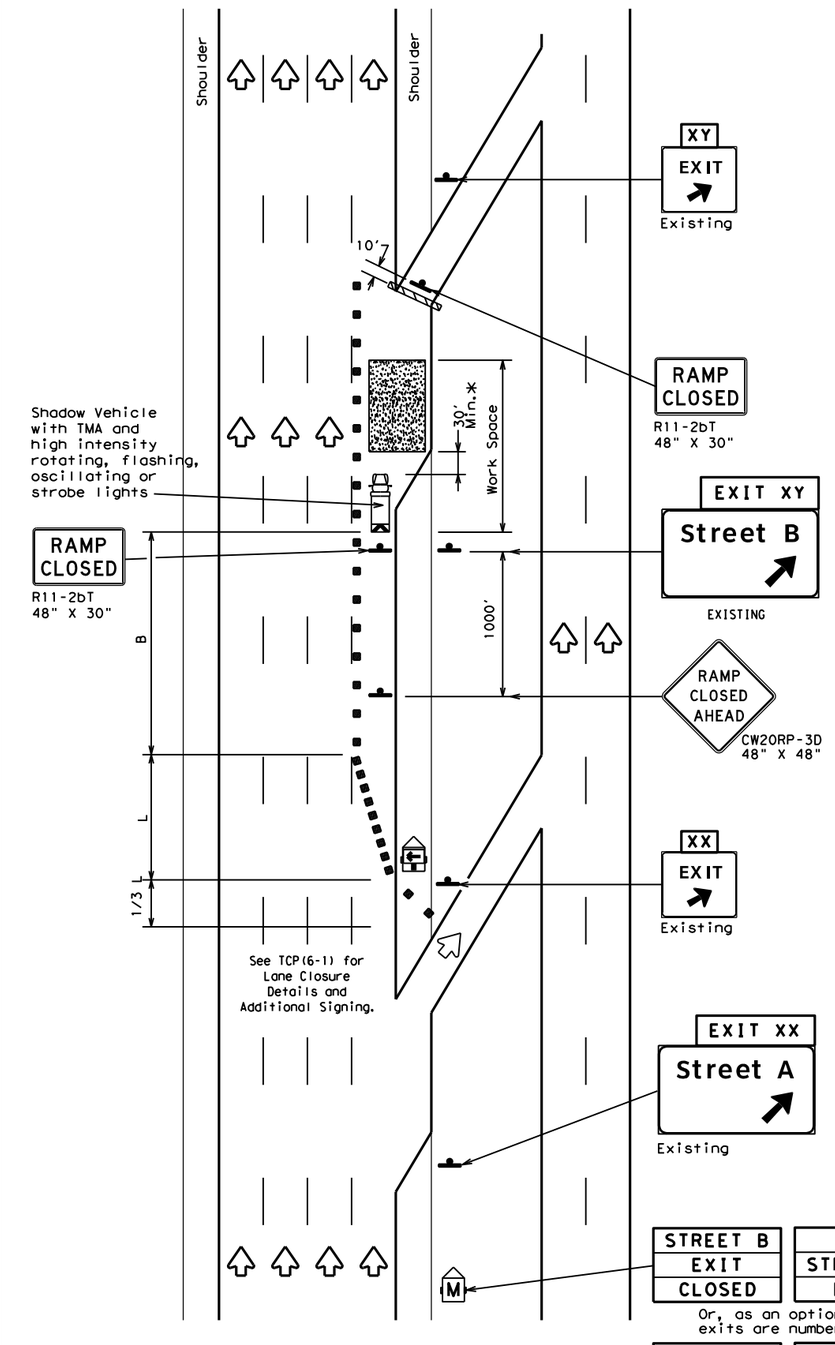
202

DATE: $DATE$ $TIME$
FILE: $FILE$



TCP (6-3a)

ENTRANCE RAMP OPEN



TCP (6-3b)

EXIT RAMP CLOSED

TRAFFIC EXITS PRIOR TO CLOSED RAMP

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

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

GENERAL NOTES:

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

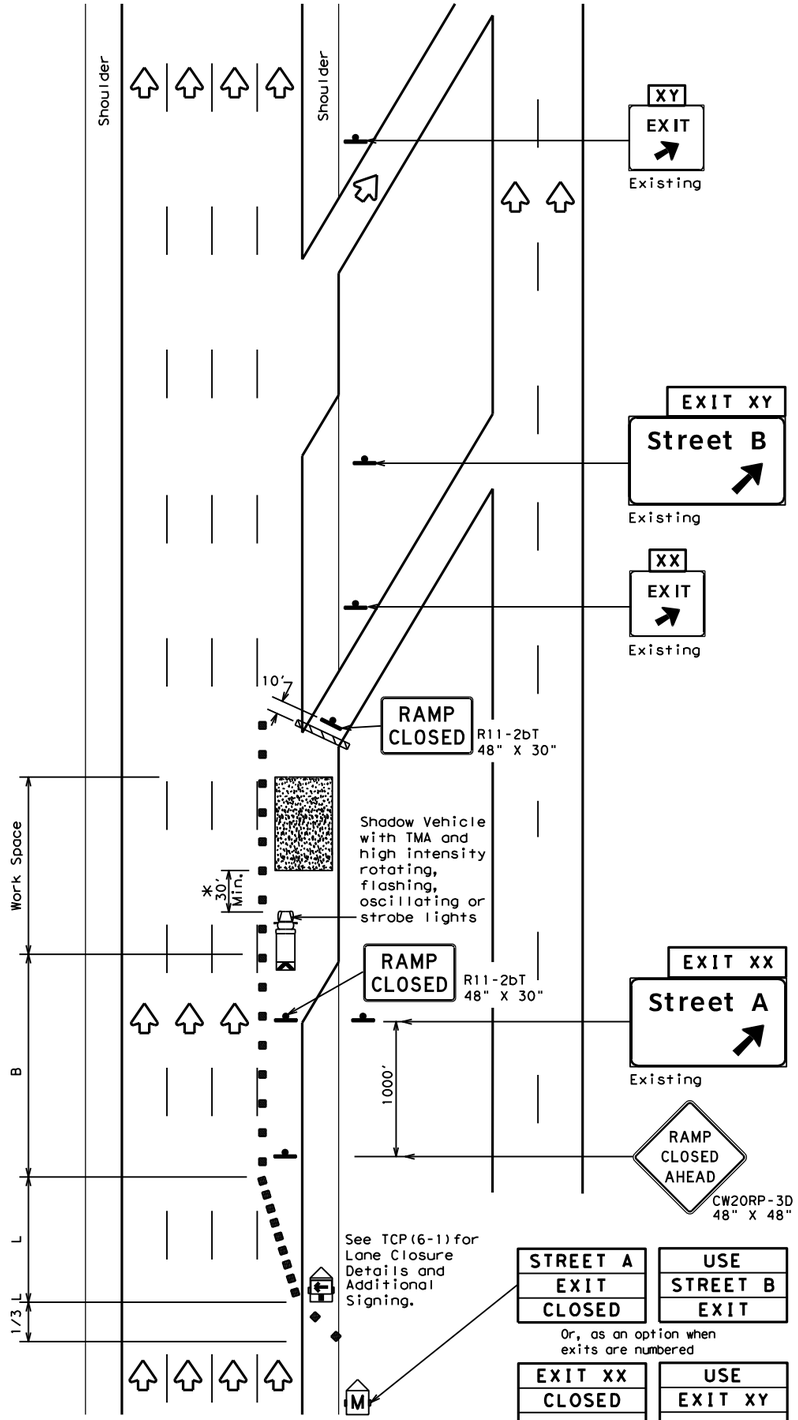
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND RAMP

TCP(6-3)-12

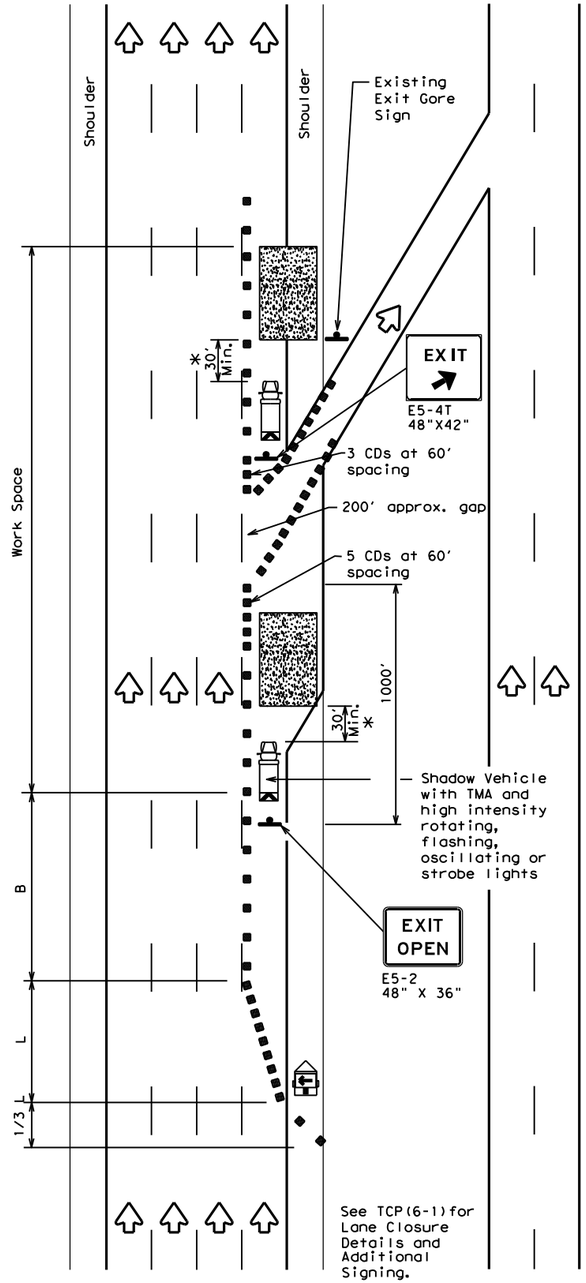
FILE: tcp6-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	BRYAN	LEON, ETC.		34

DATE: $DATE$ $TIME$
FILE: $FILE$



TCP (6-4a)

EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

LEGEND

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

TYPICAL USAGE

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC Standards for sign details.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

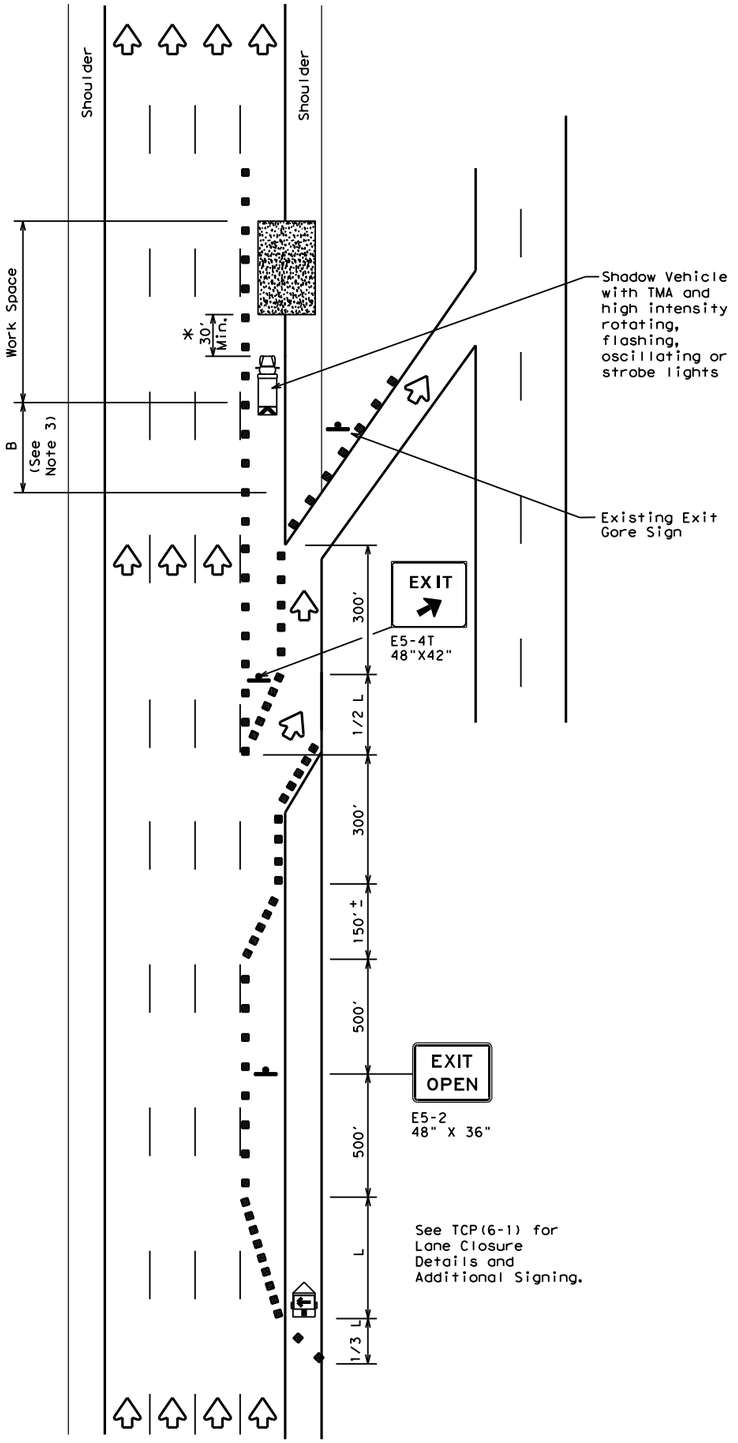
TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	BRYAN	LEON, ETC.		35

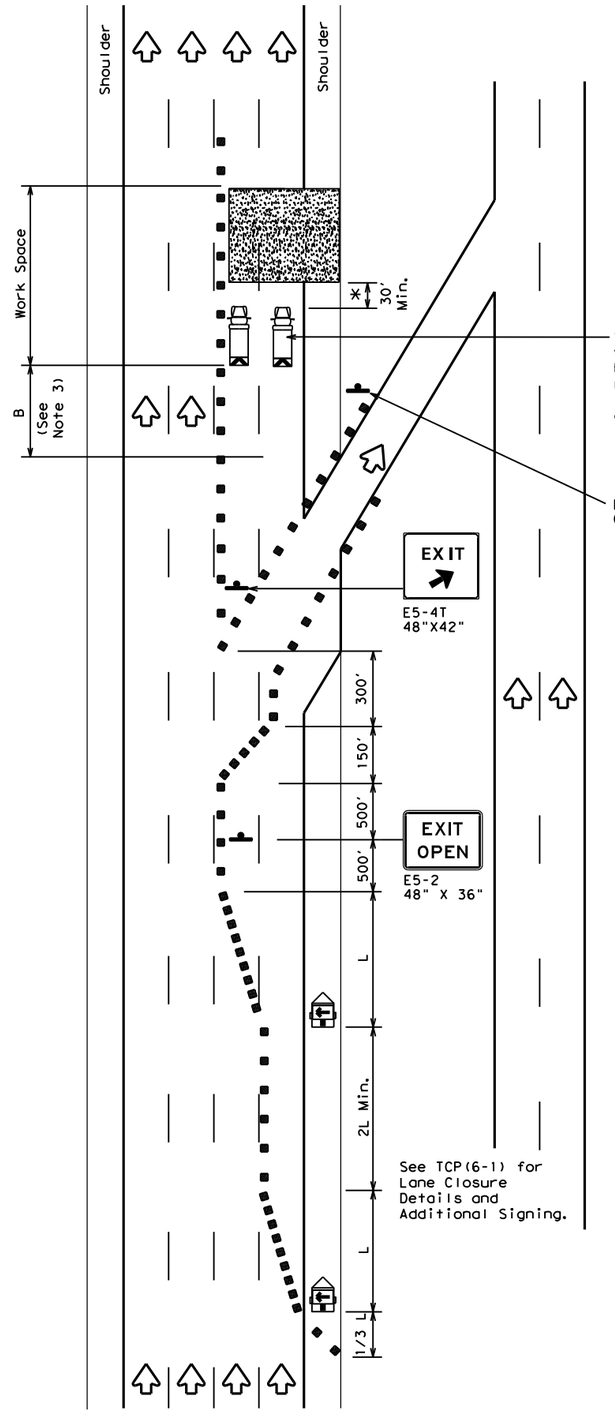
DATE: $DATE$ $TIME$
FILE: $FILE$

DATE: $DATE$ $TIME$
FILE: $FILE$



TCP (6-5a)

EXIT RAMP OPEN



TCP (6-5b)

EXIT RAMP OPEN
TWO LANE CLOSURE WITHIN 1500' PAST EXIT RAMP

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC standards for sign details.
3. If adequate longitudinal buffer length "B" does not exist between the work space and the exit ramp, consideration should be given to closing the ramp.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

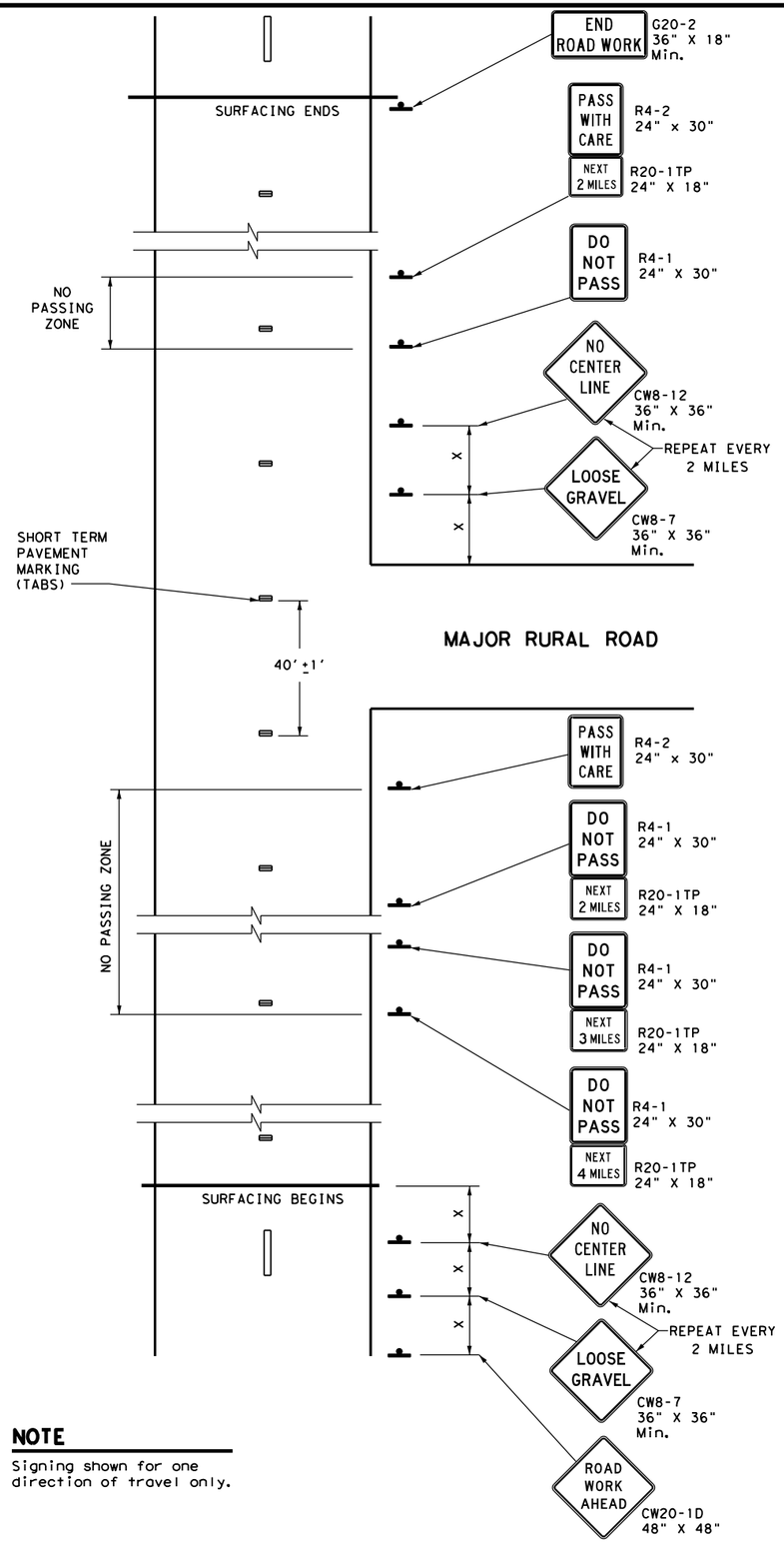
Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND EXIT RAMP

TCP(6-5)-12

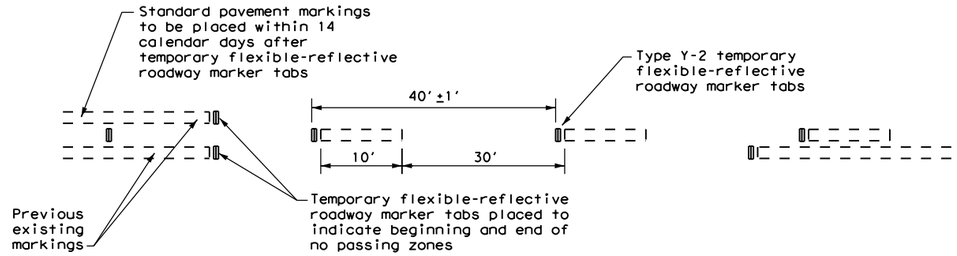
FILE: tcp6-5.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	BRYAN	LEON, ETC.		36



NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

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

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

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

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

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

"NO CENTER LINE" SIGN (CW8-12)

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

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

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

"LOOSE GRAVEL" SIGN (CW8-7)

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

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

PAVEMENT MARKINGS

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

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

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

COORDINATION OF SIGN LOCATIONS

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

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

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

* Conventional Roads Only

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Operations Division Standard

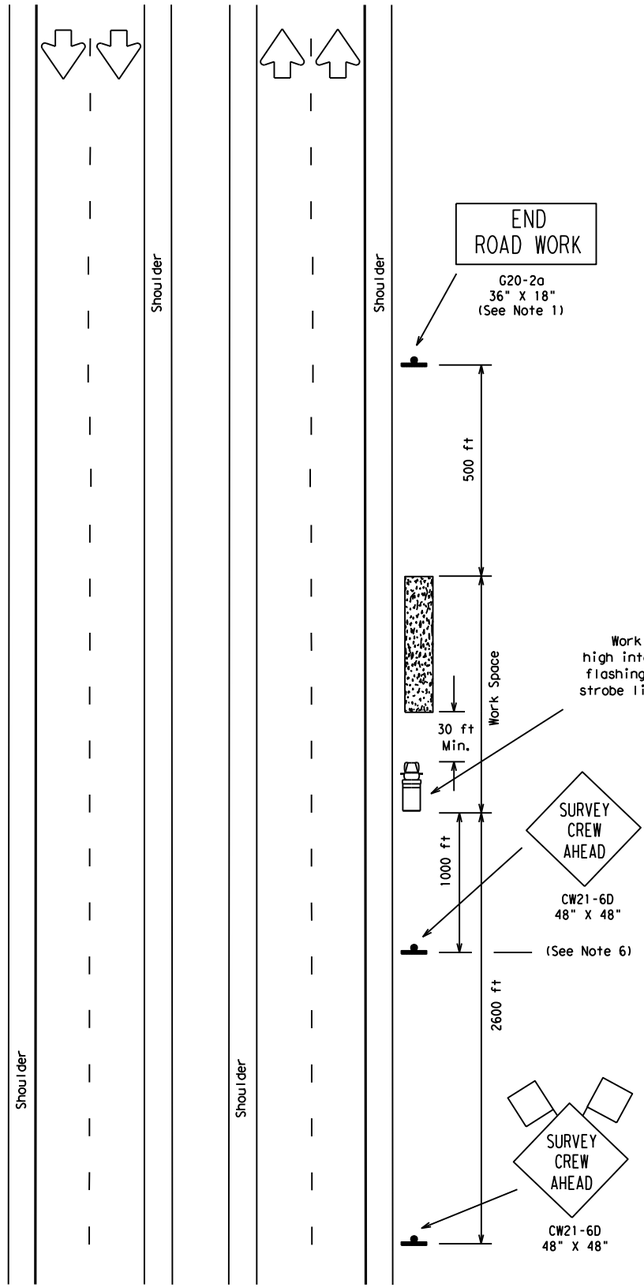
TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

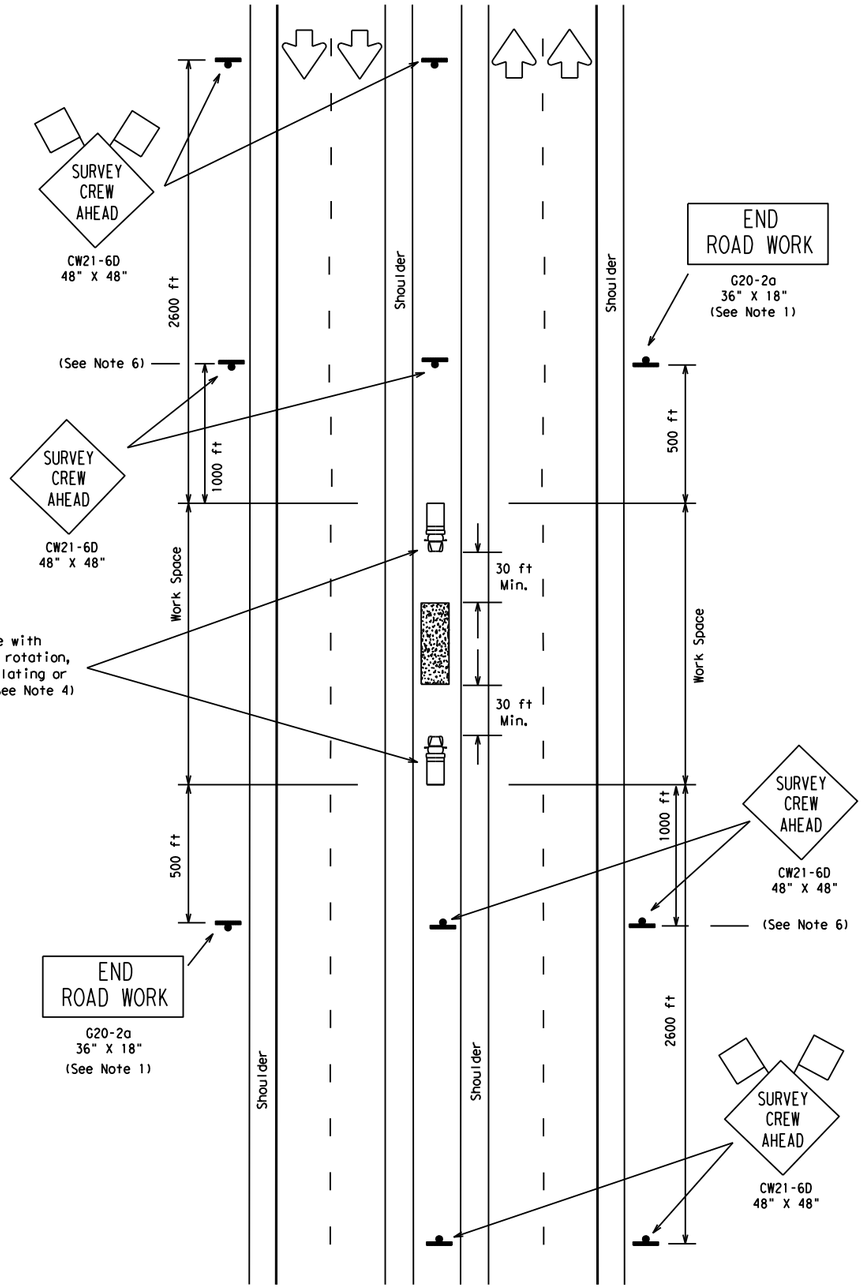
FILE:	tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	March 1991	CONT	SECT	JOB	HIGHWAY
REVISIONS		0675	03	100, ETC.	IH 45
4-92 4-98		DIST	COUNTY		SHEET NO.
1-97 7-13		BRYAN	LEON, ETC.		37

210

DATE: $DATE$ $TIME$
FILE: $FILE$



TCP (S-4a)
WORK OFF RIGHT SHOULDER
OF DIVIDED ROADWAYS



TCP (S-4b)
WORK IN MEDIAN
OF DIVIDED ROADWAYS

LEGEND

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

Posted Speed ✳	Formula	Minimum Desirable Taper Lengths ✳✳ 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'	90'
35		205'	225'	245'	35'	70'-90'	160'	120'
40		265'	295'	320'	40'	80'-100'	240'	155'
45	L=WS	450'	495'	540'	45'	90'-110'	320'	195'
50		500'	550'	600'	50'	100'-125'	400'	240'
55		550'	605'	660'	55'	110'-140'	500'	295'
60		600'	660'	720'	60'	120'-150'	600'	350'
65		650'	715'	780'	65'	130'-165'	700'	410'
70		700'	770'	840'	70'	140'-175'	800'	475'
75		750'	825'	900'	75'	150'-185'	900'	540'

✳ Conventional Roads Only

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

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

DEFINITIONS:
SHORT DURATION - work that occupies a location up to 1 hour.
SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

GENERAL NOTES:

1. The G20-2a "END ROAD WORK" sign may be omitted for short duration (less than 1 hour) work.
2. When median work is protected on one side by existing median barriers, signing and protection vehicle may be omitted for the protected direction only.
3. CW20-1D "ROAD WORK AHEAD" signs may be substituted for "SURVEY CREW AHEAD" signs.
1. 4. A Shadow Vehicle with a TMA and flashing warning lights/arrow panel in caution mode may be used in lieu of the Work Vehicle to protect the work space.
5. The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.
6. The CW21-6D "SURVEY CREW AHEAD" sign placed at 1000' ahead of the work space is optional, at the discretion of the Engineer. The signs shown at 2600' from the work space are required.
7. Cones may be placed at edge of pavement adjacent to the work space to enhance safety.

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECCESSARY PERIODS OF TIME ON THE ROAD SURFACE.

8-18-08 Revision
1 Corrected misspelling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

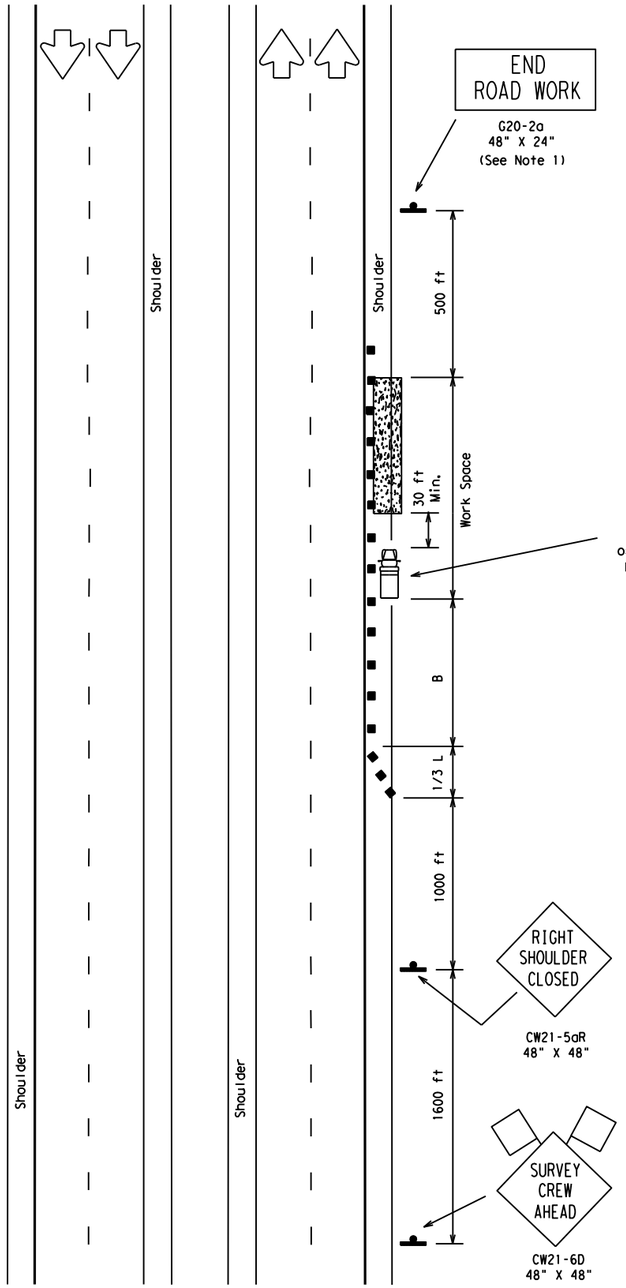
TCP(S-4)-08A

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

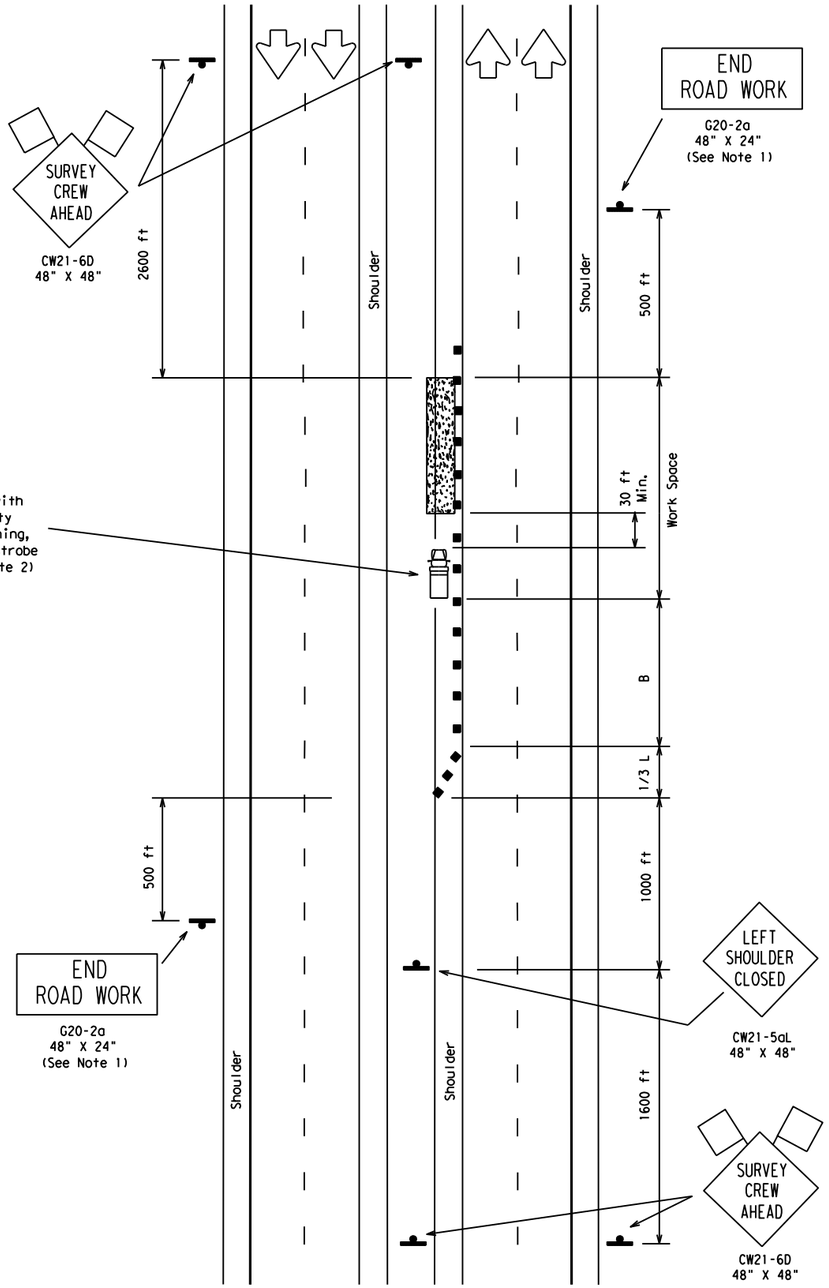
REVISIONS
8-08

CONT	SECT	JOB	HIGHWAY
0675	03	100, ETC.	IH 45
DIST	COUNTY		SHEET NO.
BRYAN	LEON, ETC.		38

DATE: $DATE$ $TIME$
FILE: $FILE$



TCP (S-5a)
WORK ON RIGHT SHOULDER
OF DIVIDED ROADWAYS



TCP (S-5b)
WORK ON MEDIAN SHOULDER
OF DIVIDED ROADWAYS

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECCESSARY PERIODS OF TIME ON THE ROAD SURFACE.

LEGEND

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

Posted Speed ✳	Formula	Minimum Desirable Taper Lengths ✳✳ 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'	90'
35		205'	225'	245'	35'	70'-90'	160'	120'
40		265'	295'	320'	40'	80'-100'	240'	155'
45	L=WS	450'	495'	540'	45'	90'-110'	320'	195'
50		500'	550'	600'	50'	100'-125'	400'	240'
55		550'	605'	660'	55'	110'-140'	500'	295'
60		600'	660'	720'	60'	120'-150'	600'	350'
65		650'	715'	780'	65'	130'-165'	700'	410'
70		700'	770'	840'	70'	140'-175'	800'	475'
75		750'	825'	900'	75'	150'-185'	900'	540'

✳ Conventional Roads Only

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

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

DEFINITIONS:
SHORT DURATION - work that occupies a location up to 1 hour.
SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

GENERAL NOTES:

1. The G20-2a "END ROAD WORK" sign may be omitted for short duration (less than 1 hour) work.
2. For short duration work, the Shadow Vehicle with TMA may be replaced by another Work Vehicle with high intensity rotating, flashing or strobe lights.
3. Shadow Vehicles with a TMA are desirable when workers or equipment are in the work space. When approved by the engineer, Type III barricades or other channelizing devices may be substituted for the Shadow Vehicle.
4. If shoulders are not present, the 1/3L shoulder taper is to be omitted and four channelizing devices shall be placed in front of the arrow panel, perpendicular to traffic.
5. CW20-1D "ROAD WORK AHEAD" signs may be substituted for CW21-6D "SURVEY CREW AHEAD" signs.
6. The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP(S-5)-08

REVISIONS

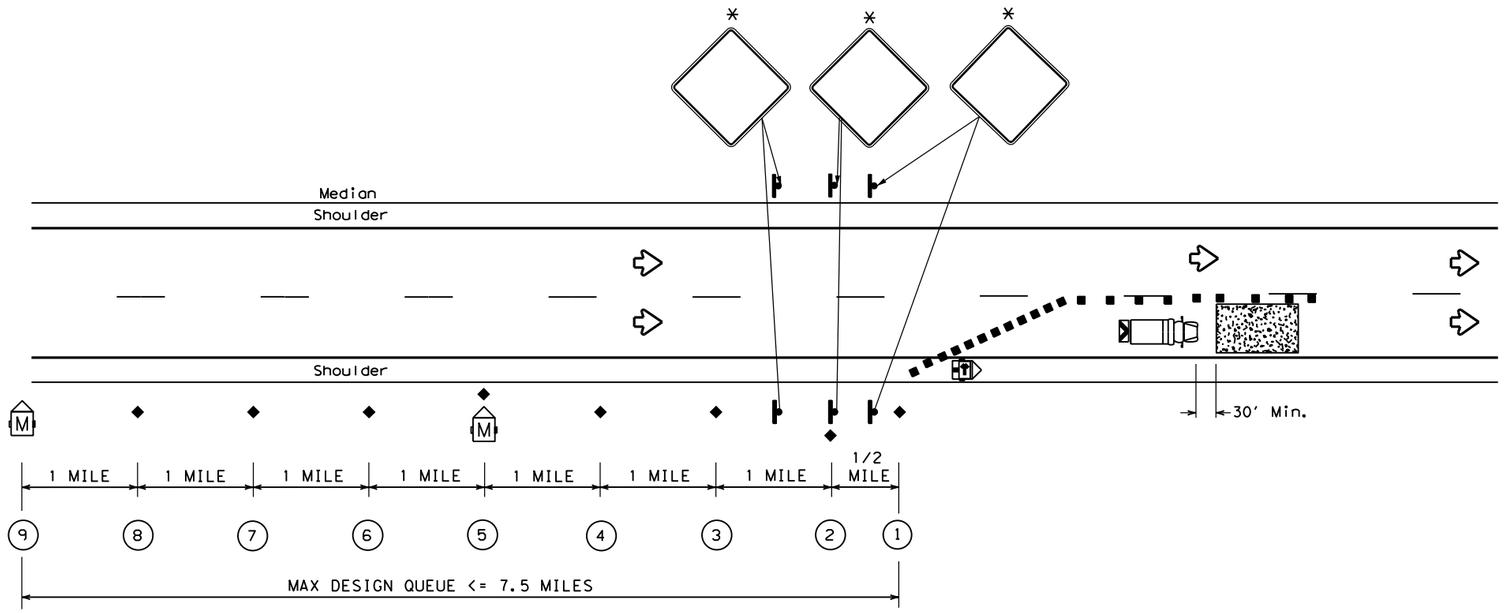
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0675	03	100, ETC.	IH 45
DIST	COUNTY		SHEET NO.
BRYAN	LEON, ETC.		39

DATE: $DATE$ $TIME$
FILE: $FILE$

* Signs are for illustrative purposes only. Signs type and placement will vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.

LEGEND			
	Work Area		Traffic Flow
	Sign		Portable Traffic Sensor
	Channelizing Devices		Truck Mounted Attenuator (TMA)
(1)	Location		Flag
	Heavy Work Vehicle		Trailer Mounted Flashing Arrow Board
(M)	Portable Changeable Message Sign (PCMS)		



Type I - QUEUE DETECTION SYSTEM

(Max Design Queue <= 7.5 Miles)

GENERAL NOTES

1. Unless project conditions and manufacturer's specifications dictate otherwise, the number of PCMS, static signs and spacing of sensors will be as shown in the plans.
2. Temporary Queue Detection System devices shall be operational only while work is actually in progress or a definite need exists.
3. Refer to TCP and BC Traffic Engineering Standard sheets for additional information regarding the type and placement of temporary traffic control devices.
4. The viewing angle of the sensors should not be blocked.
5. Sensor at location (1) may be mounted on the Flashing Arrow Board Trailer in the taper if spacing is adequate.
6. Pay item should be paid under Special Specification "Temporary Queue Detection System".
7. See Standard sheet WZ-ITS(2) for operational guidelines for PCMS messages.

SHEET 1 OF 2

Texas Department of Transportation

Traffic Safety Division Standard

TEMPORARY QUEUE DETECTION SYSTEM TYPE 1

(Queue <= 7.5 Miles)

WZ-ITS(1)-19

FILE: wz-its(1)-19.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
	DIST	COUNTY		SHEET NO.
	BRYAN	LEON, ETC.		40

DATE: $DATE$ $TIME$
FILE: $FILE$

DATE: $DATE$ $TIME$
FILE: $FILE$

OPERATIONAL GUIDELINES FOR PCMS MESSAGES

Message at (9)	Last 5 MIN Speed Averages V(MPH)				Message at (5)	Last 5 MIN Speed Averages V(MPH)			
	Sensor at (8)	Sensor at (7)	Sensor at (6)	Sensor at (5)		Sensor at (4)	Sensor at (3)	Sensor at (2)	Sensor at (1)
ROAD WORK AHEAD	> 45	> 45	> 45	> 45	ROAD WORK AHEAD	> 45	> 45	> 45	> 45
ROAD WORK AHEAD	> 45	> 45	> 45	> 45	SLOW TRAFFIC 3 MILES	> 45	> 45	> 45	25 < V < 45
ROAD WORK AHEAD	> 45	> 45	> 45	> 45	SLOW TRAFFIC 2 MILES	> 45	> 45	25 < V < 45	25 < V < 45
ROAD WORK AHEAD	> 45	> 45	> 45	> 45	SLOW TRAFFIC 1 MILE	> 45	25 < V < 45	25 < V < 45	25 < V < 45
ROAD WORK AHEAD	> 45	> 45	> 45	> 45	SLOW TRAFFIC AHEAD	25 < V < 45	25 < V < 45	25 < V < 45	25 < V < 45
SLOW TRAFFIC 3 MILES	> 45	> 45	> 45	25 < V < 45	SLOW TRAFFIC AHEAD	25 < V < 45	25 < V < 45	25 < V < 45	25 < V < 45
SLOW TRAFFIC 2 MILES	> 45	> 45	25 < V < 45	25 < V < 45	SLOW TRAFFIC AHEAD	25 < V < 45	25 < V < 45	25 < V < 45	25 < V < 45
SLOW TRAFFIC 1 MILE	> 45	25 < V < 45	25 < V < 45	25 < V < 45	SLOW TRAFFIC AHEAD	25 < V < 45	25 < V < 45	25 < V < 45	25 < V < 45
SLOW TRAFFIC AHEAD	25 < V < 45	25 < V < 45	25 < V < 45	25 < V < 45	SLOW TRAFFIC AHEAD	25 < V < 45	25 < V < 45	25 < V < 45	25 < V < 45
SLOW TRAFFIC AHEAD	> 25	> 25	> 25	> 25	STOPPED TRAFFIC 3 MILES	> 25	> 25	> 25	<= 25
SLOW TRAFFIC AHEAD	> 25	> 25	> 25	> 25	STOPPED TRAFFIC 2 MILES	> 25	> 25	<= 25	<= 25
SLOW TRAFFIC AHEAD	> 25	> 25	> 25	> 25	STOPPED TRAFFIC 1 MILE	> 25	<= 25	<= 25	<= 25
SLOW TRAFFIC AHEAD	> 25	> 25	> 25	> 25	STOPPED TRAFFIC AHEAD	<= 25	<= 25	<= 25	<= 25
STOPPED TRAFFIC 3 MILES	> 25	> 25	> 25	<= 25	STOPPED TRAFFIC AHEAD	<= 25	<= 25	<= 25	<= 25
STOPPED TRAFFIC 2 MILES	> 25	> 25	<= 25	<= 25	STOPPED TRAFFIC AHEAD	<= 25	<= 25	<= 25	<= 25
STOPPED TRAFFIC 1 MILE	> 25	<= 25	<= 25	<= 25	STOPPED TRAFFIC AHEAD	<= 25	<= 25	<= 25	<= 25
STOPPED TRAFFIC AHEAD	<= 25	<= 25	<= 25	<= 25	STOPPED TRAFFIC AHEAD	<= 25	<= 25	<= 25	<= 25

Texas Department of Transportation

Traffic Safety Division Standard

TEMPORARY QUEUE DETECTION SYSTEM TYPE 1

(Queue <= 7.5 Miles)

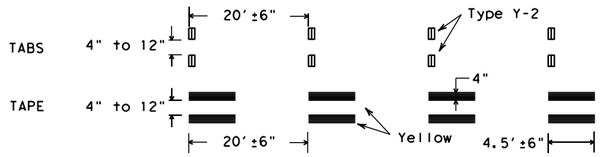
WZ-ITS(2)-19

FILE: wz-its(1)-19.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
	DIST	COUNTY		SHEET NO.
	BRYAN	LEON, ETC.		41

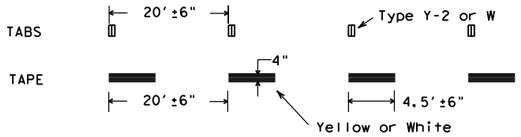
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

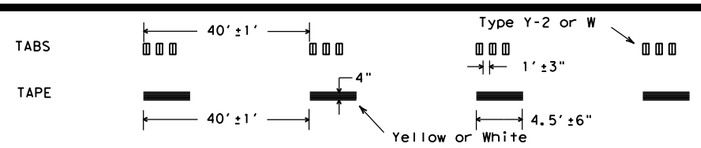


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



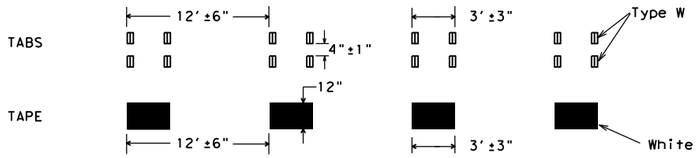
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

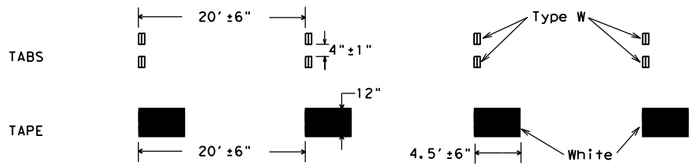


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



NOTES:

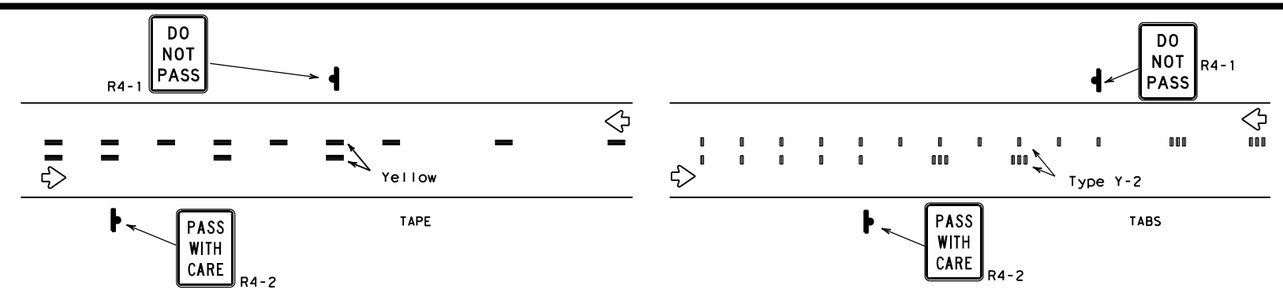
1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical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

TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

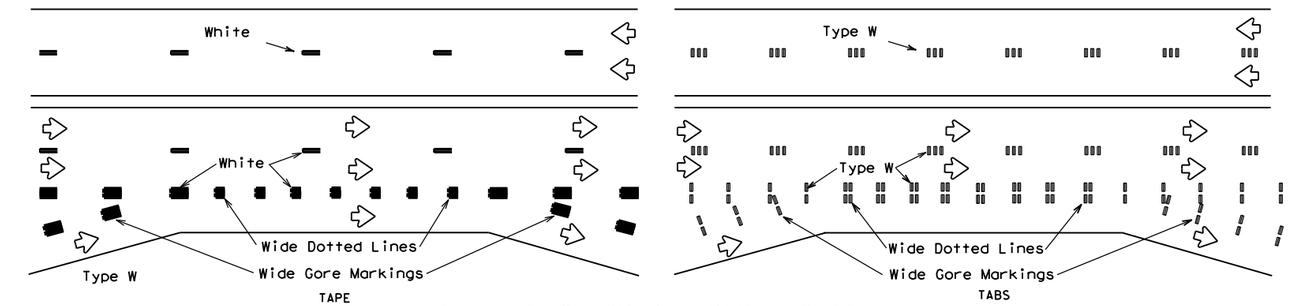
1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may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

DATE: $DATE$ $TIME$
FILE: $FILE$

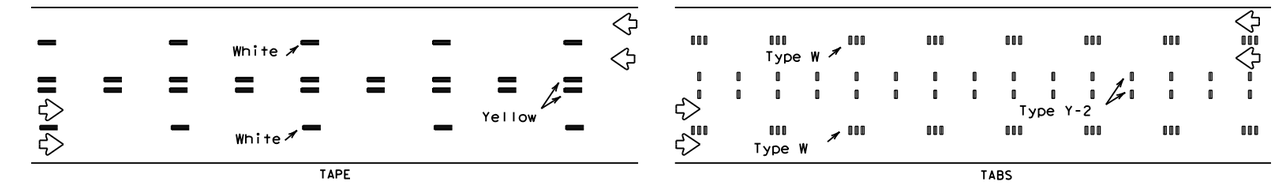
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



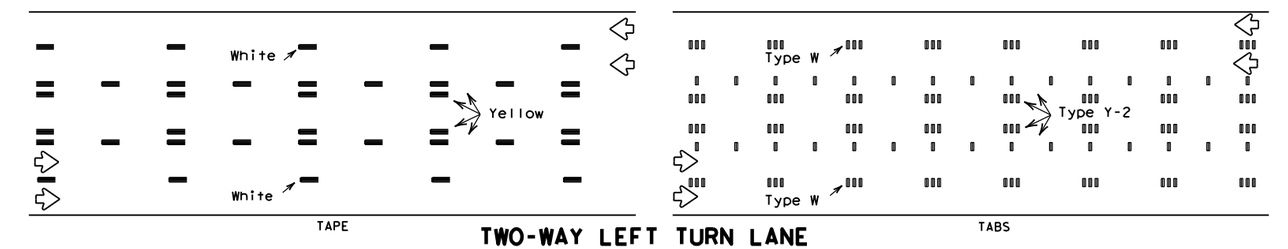
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



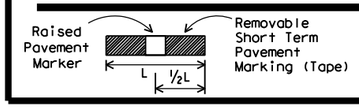
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
   http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

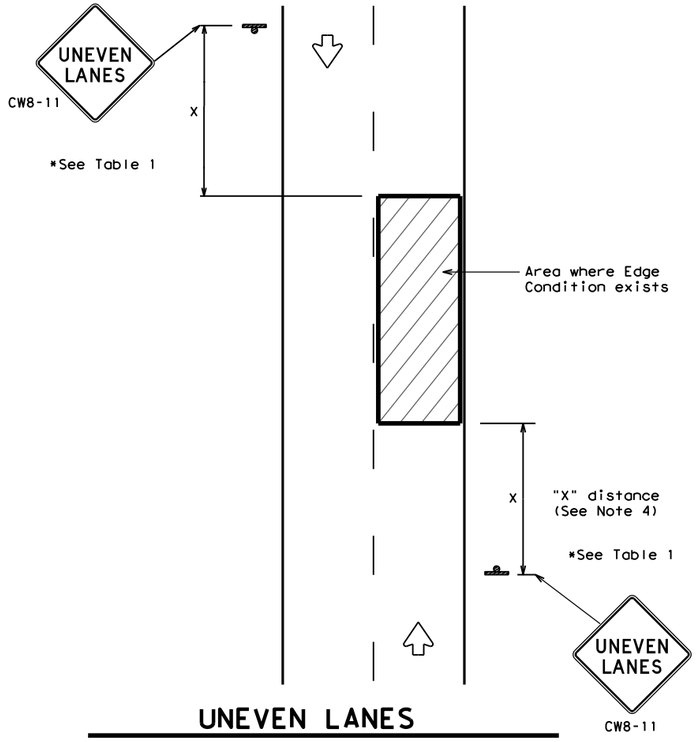
Texas Department of Transportation

Traffic Operations Division Standard

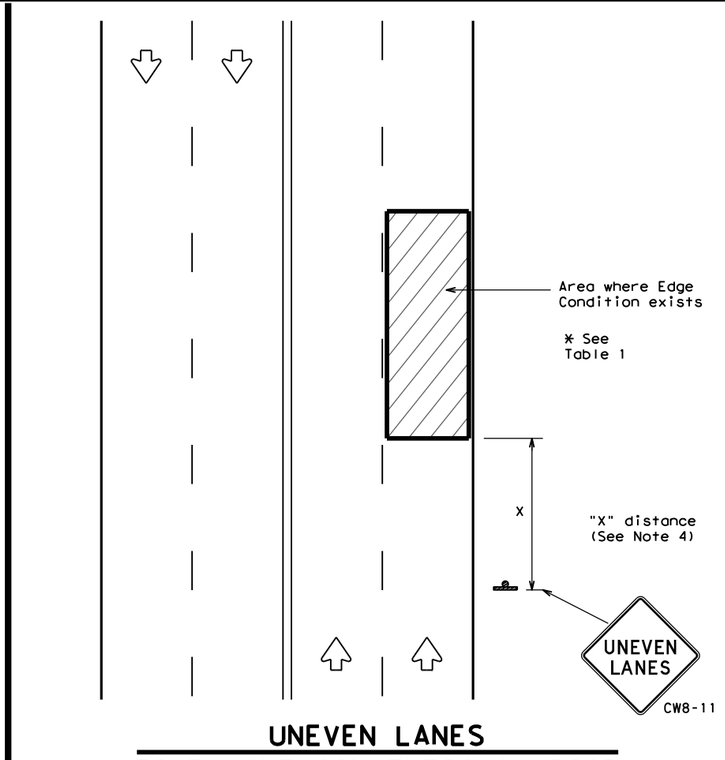
WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

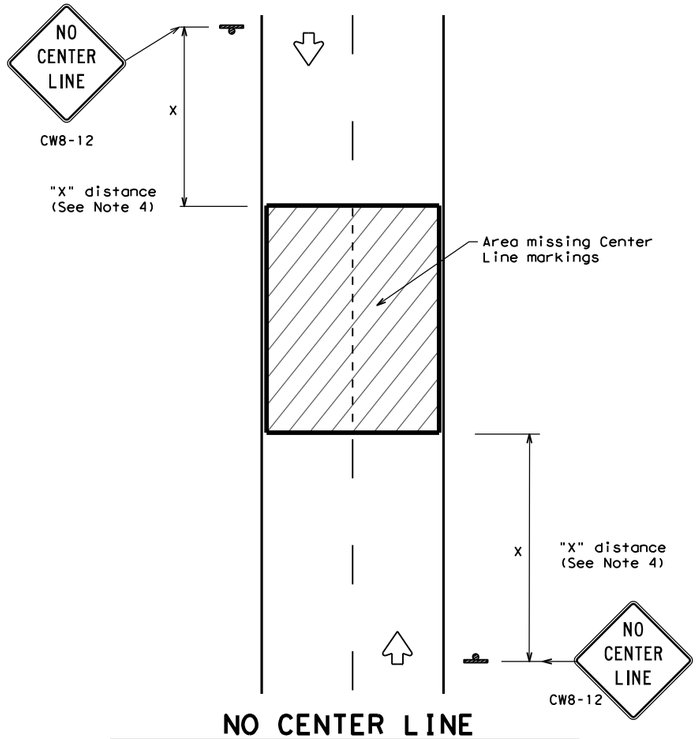
FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		0675	03	100, ETC.	IH 45
1-97		DIST	COUNTY		SHEET NO.
3-03		BRYAN	LEON, ETC.		42
7-13					



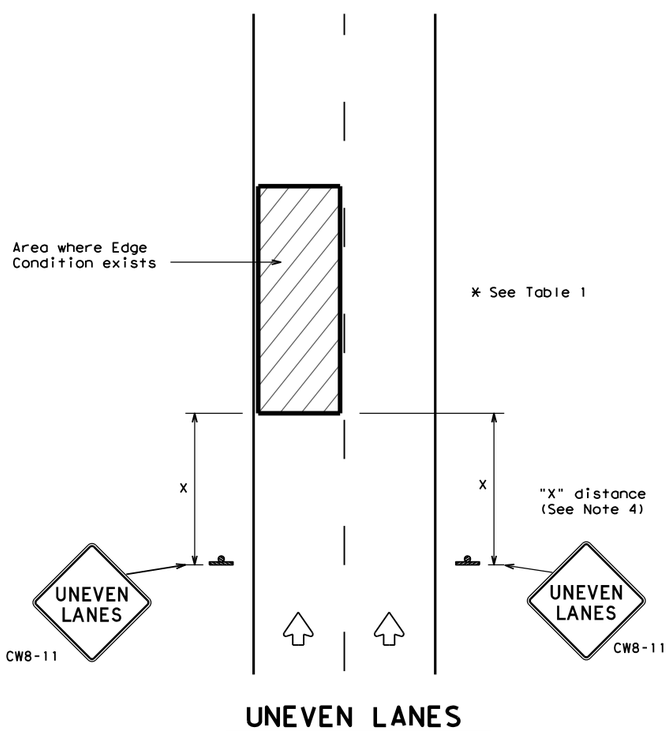
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

DATE: $DATE$ $TIME$
FILE: $FILE$

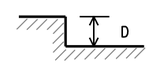
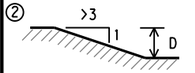
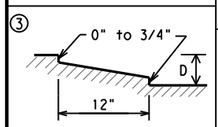
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

TABLE 1

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

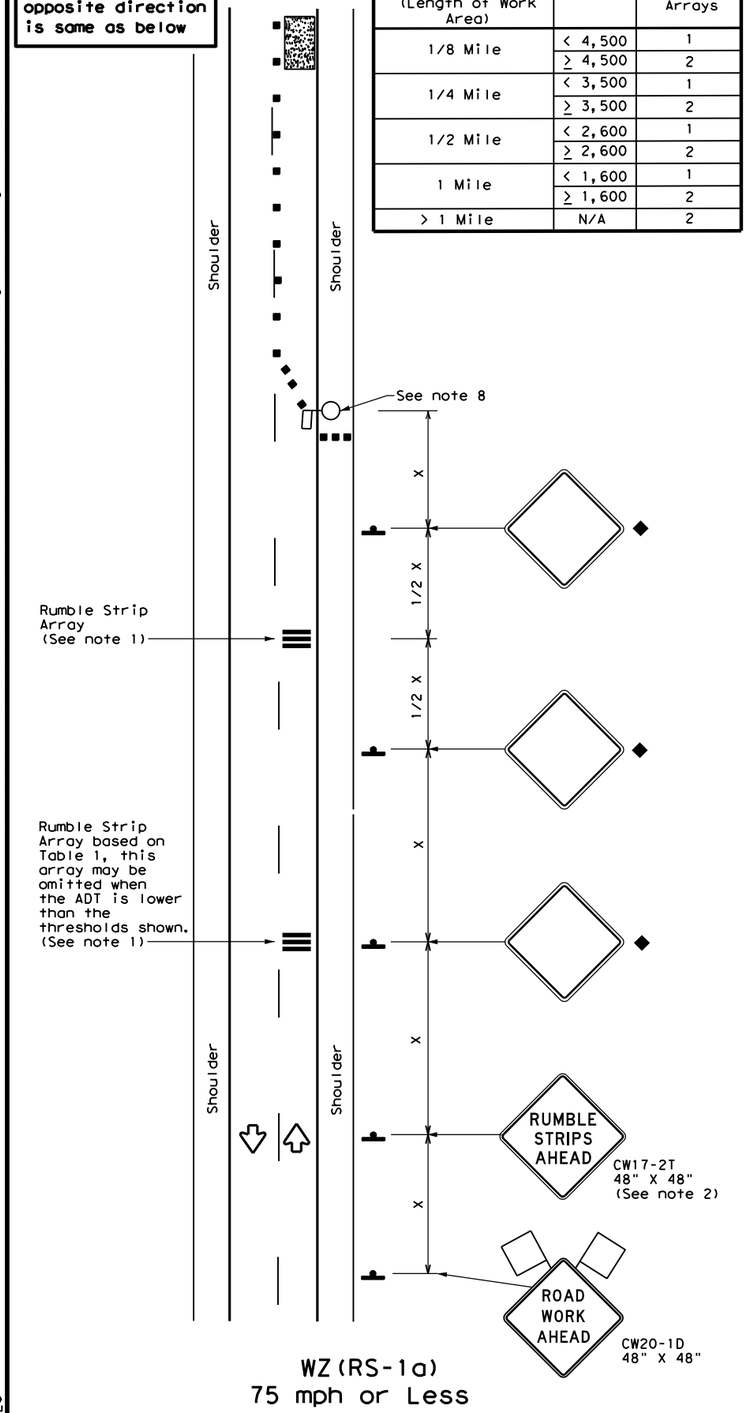
SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	BRYAN	LEON, ETC.		43

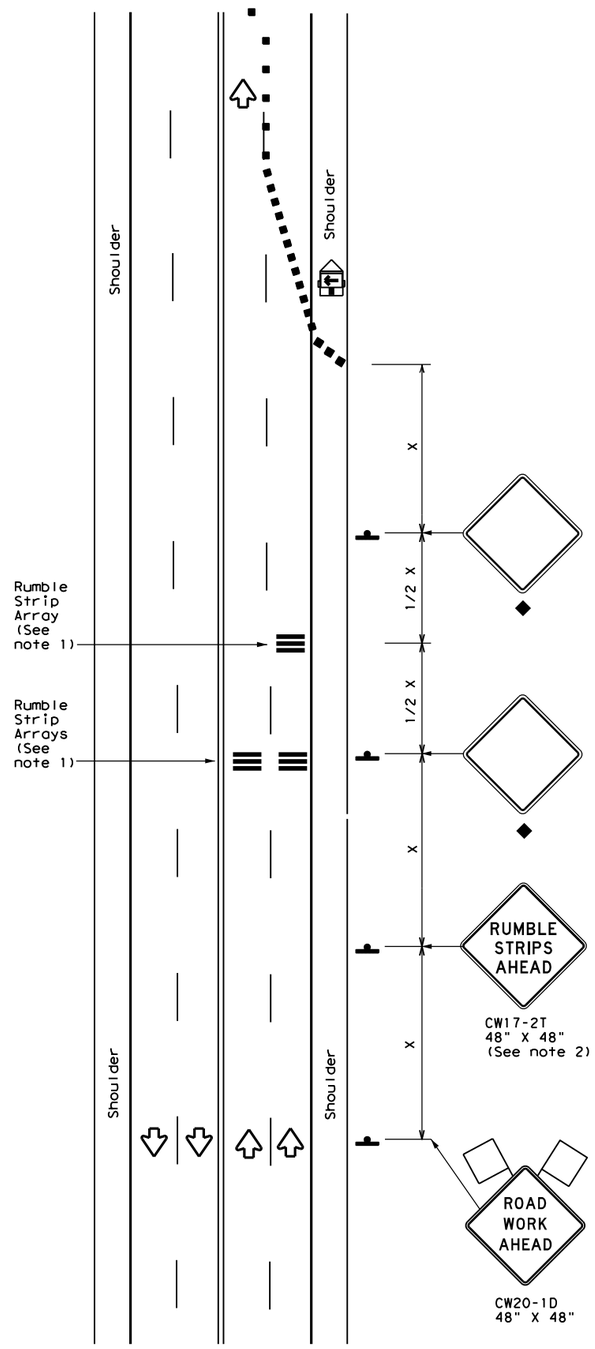
Warning sign and rumble strip sequence in opposite direction is same as below

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



WZ(RS-1a)
75 mph or Less

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)
75 mph or Less

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

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

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

* Conventional Roads Only

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

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

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

TABLE 2	
Speed	Approximate distance between strips in an Array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
> 55 MPH	20'

Texas Department of Transportation

Traffic Operations Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-16

FILE: wzrs16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
2-14	DIST	COUNTY		SHEET NO.
4-16	BRYAN	LEON, ETC.		44

DATE: $DATE$ $TIME$
FILE: $FILE$

EXISTING HORIZONTAL CURVE DATA FOR IH 45 SB & NB MAIN LANES										DESIGN SPEED (emax = 8%)
CURVE NO.	PC ②	PI ①	PT ②	DELTA ①	D ①	T (FT) ①	L (FT) ①	RADIUS (FT) ②	SUPERELEVATION RATE (%) ①	③
	BEGIN PROJECT STA 621+45									
1	659+26.82	673+71.09	687+56.21	28°17'38" LT	1°00'	1,444.27	2,829.39	5,730	2.8	55
2	755+39.58	760+73.80	766+04.86	10°39'10" RT	1°00'	534.22	1,065.28	5,730	2.8	55
3	1070+32.20	1078+45.10	1086+47.20	16°09'00" LT	1°00'	812.90	1,615.00	5,730	2.8	55
4	1239+94.50	1248+25.90	1256+54.50	8°18'00" LT	0°30'	831.40	1,660.00	11,459	RC ④	70
5	1423+62.03	1434+91.43	1445+92.03	17°41'00" RT	1°00'	1,129.40	2,230.00	5,730	2.8	55
	END PROJECT STA 1517+70									

① HORIZONTAL CURVE DATA FROM FEDERAL AID PROJECT NO. I-45-2(27)166, CONTROL 0675-03-005, DATED 1967

② CALCULATED VALUE

③ PER TXDOT ROADWAY DESIGN MANUAL (JULY 2020)

④ ADVERSE CROWN REMOVED, SUPERELEVATED AT NORMAL CROWN SLOPE.

REV DATE: 2-12-2015
CSJ: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Road\HORIZONTAL ALIGNMENT DATA_KAKRevisions.dgn

STATE OF TEXAS
KEITH A. KOUBA
108695
LICENSED
PROFESSIONAL ENGINEER

Keith A. Kouba, P.E.

08/15/2021

PRINT DATE	REVISION DATE
8/15/2021	

Texas Department of Transportation
Bryan District

HORIZONTAL CURVE DATA

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	45

EXISTING VERTICAL CURVE DATA FOR IH 45 SB & NB MAIN LANES										DESIGN SPEED ④
REMARKS	CURVE NO.	PI (STA)	ELEV	LENGTH	e (ft)	G1 (%)	G2 (%)	K	CREST/SAG	
		BEGIN PROJECT STA 621+45								
①	1	635+00	386.021	800	-1.03	0.489	-0.536	780	CREST	80
①	2	663+00	371.013	800	1.30	-0.536	0.764	615	SAG	80
②	3	690+00	391.641	800	-1.413	0.764	-0.649	566	CREST	80
②	4	710+99.66	378.014	800	2.083	-0.649	1.434	384	SAG	80
②	5	734+00	411.001	800	-3.045	1.434	-1.611	263	CREST	70
②	6	807+00	293.398	800	1.899	-1.611	0.288	421	SAG	80
②	7	840+00	302.902	800	1.214	0.288	1.502	659	SAG	80
②	8	876+00	356.974	800	-0.108	1.502	1.394	7407	CREST	80
②	9	904+00	396.005	800	-1.802	1.394	-0.408	444	CREST	80
②	10	953+00	376.013	800	1.368	-0.408	0.960	585	SAG	80
②	11	1001+00	422.093	800	-1.368	0.960	-0.408	585	CREST	80
②	12	1060+03.94	398.005	800	0.710	-0.408	0.302	1127	SAG	80
②	13	1087+47.2	405.988	800	-0.680	0.302	-0.382	1170	CREST	80
②	14	1125+00	391.652	800	-0.190	-0.382	-0.572	4211	CREST	80
②	15	1148+00	378.496	800	0.331	-0.572	-0.241	2417	SAG	80
②	16	1179+00	371.025	800	-0.652	-0.241	-0.893	1227	CREST	80
②	17	1207+00.45	346.017	800	1.555	-0.893	0.662	514	SAG	80
②	18	1248+00	373.156	800	-0.984	0.662	-0.322	813	CREST	80
②	19	1292+00	358.988	800	0.729	-0.322	0.407	1097	SAG	80
②	20	1374+50	392.566	1100	-2.217	0.407	-1.205	682	CREST	80
②	21	1409+00	350.994	1000	2.994	-1.205	1.190	418	SAG	80
②	22	1465+00	417.634	3000	-11.963	1.190	-2.000	940	CREST	80
③	23	5+00	317.064	800	1.628	-2.000	-0.372	491	SAG	80
		END PROJECT STA 1517+70								

← EQUATION: STA 1509+78.5 (BACK) = STA 0+00 (FWD)

① VERTICAL CURVE DATA FROM FEDERAL AID PROJECT NO. I-45-2(38)148, CONTROL 0675-03-002, DATED 1965
② VERTICAL CURVE DATA FROM FEDERAL AID PROJECT NO. I-45-2(27)166, CONTROL 0675-03-005, DATED 1967
③ VERTICAL CURVE DATA FROM FEDERAL AID PROJECT NO. I-45-2(42)182, CONTROL 0675-02-003, DATED 1967
④ PER TXDOT ROADWAY DESIGN MANUAL (JULY 2020)

REV DATE: 2-12-2015
CSJ: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Road\VERTICAL CURVE DATA_KAKRevisions.dgn

STATE OF TEXAS
KEITH A. KOUBA
108695
LICENSED
PROFESSIONAL ENGINEER

Dan A. Kouba, P.E.

08/15/2021

PRINT DATE	REVISION DATE
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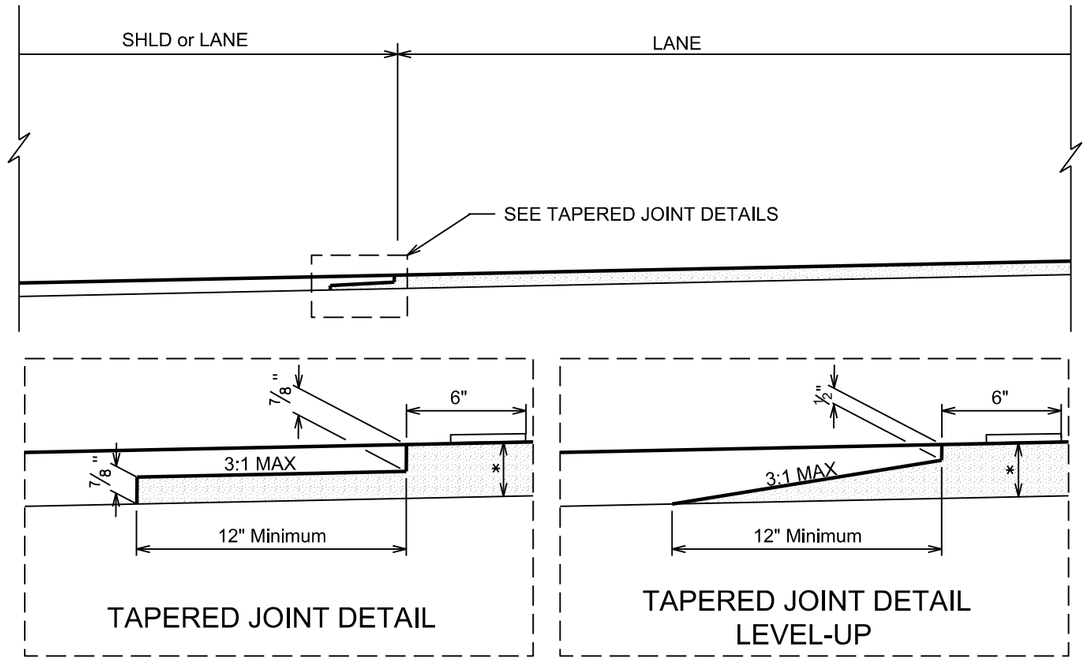
Texas Department of Transportation
Bryan District

VERTICAL CURVE DATA

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	46



* SEE TYPICAL SECTION FOR DEPTH AND TYPE OF HMA.

NOTES:

LONGITUDINAL JOINTS SHALL BE CONSTRUCTED BY TAPERING THE BITUMINOUS MAT. THE TAPERED PORTION SHALL EXTEND BEYOND THE NORMAL LANE WIDTH. THE TAPERED PORTION OF THE MAT SHALL BE CONSTRUCTED BY THE USE OF AN APPROVED STRIKE-OFF DEVICE THAT WILL PROVIDE A UNIFORM SLOPE AND WILL NOT RESTRICT THE MAIN SCREED. TACK COAT SHALL BE APPLIED TO THE IN-PLACE TAPER BEFORE THE ADJACENT MAT IS PLACED. FINAL DENSITY REQUIREMENTS FOR THE ENTIRE PAVEMENT, INCLUDING THE TAPER AREA, WILL REMAIN UNCHANGED. COMPACTION OF THE INITIAL TAPER SECTION WILL BE REQUIRED AS NEAR TO FINAL DENSITY AS POSSIBLE.

STATE OF TEXAS
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08/25/2021

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Bryan District

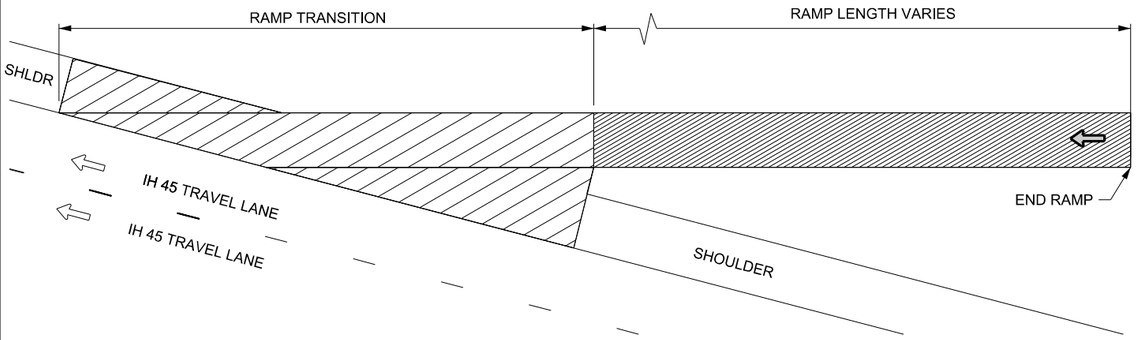
HOT MIX LONGITUDINAL JOINT DETAILS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	47

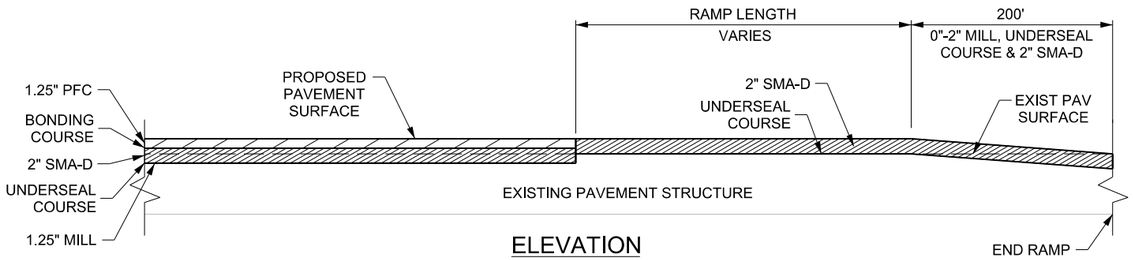
REV DATE: 2-12-2015
CS: 0675-03-100
FILENAME: $FILE$

ENTRANCE RAMPS



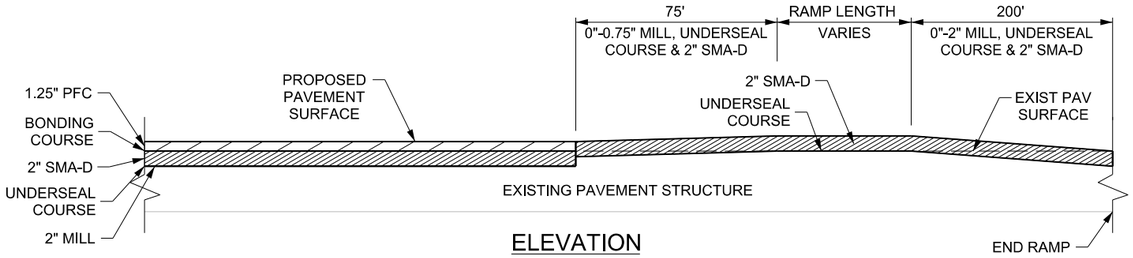
PLAN

SH 7 NB ENTRANCE RAMP
US 79 NB ENTRANCE RAMP
SH 164 SB ENTRANCE RAMP
SH 164 NB ENTRANCE RAMP



ELEVATION

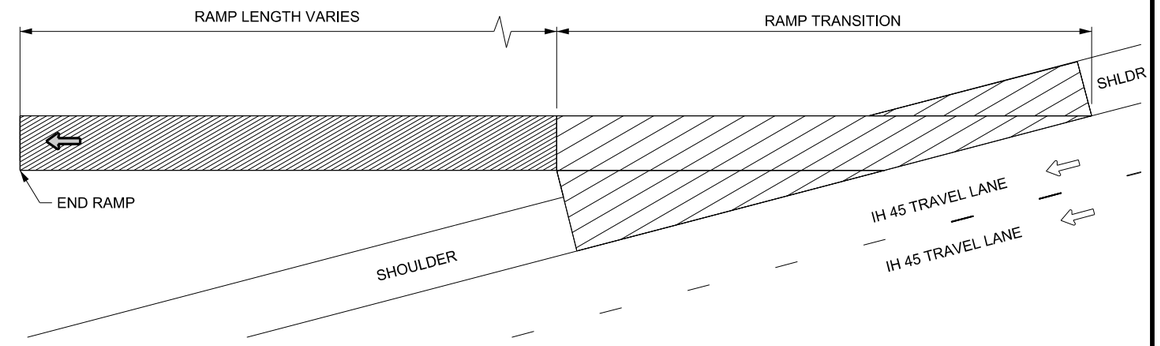
SH 7 NB ENTRANCE RAMP



ELEVATION

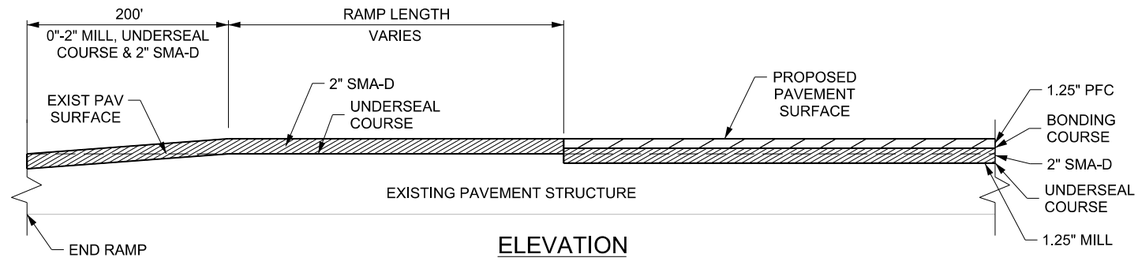
US 79 NB ENTRANCE RAMP
SH 164 SB ENTRANCE RAMP
SH 164 NB ENTRANCE RAMP

EXIT RAMPS



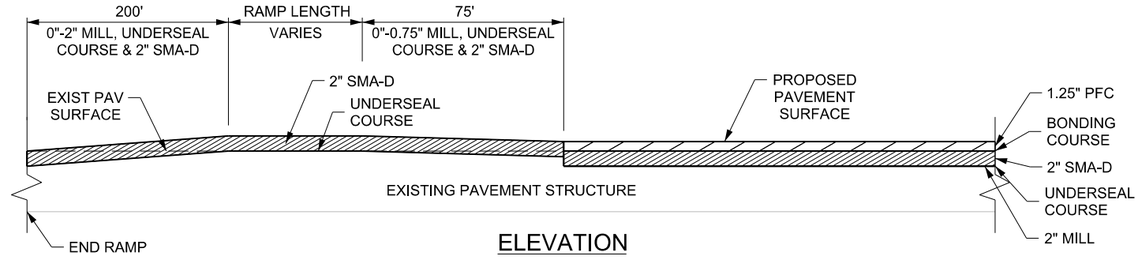
PLAN

SH 7 SB EXIT RAMP
US 79 NB EXIT RAMP
SH 164 NB EXIT RAMP
SH 164 SB EXIT RAMP



ELEVATION

SH 7 SB EXIT RAMP



ELEVATION

US 79 NB EXIT RAMP
SH 164 NB EXIT RAMP
SH 164 SB EXIT RAMP

UNDERSEAL COURSE & SMA-D

BONDING COURSE & PFC

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PRINT DATE	REVISION DATE
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RAMP TIE-IN DETAIL

SHEET 1 OF 2 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	49

STATE OF TEXAS
KEITH A. KOUBA
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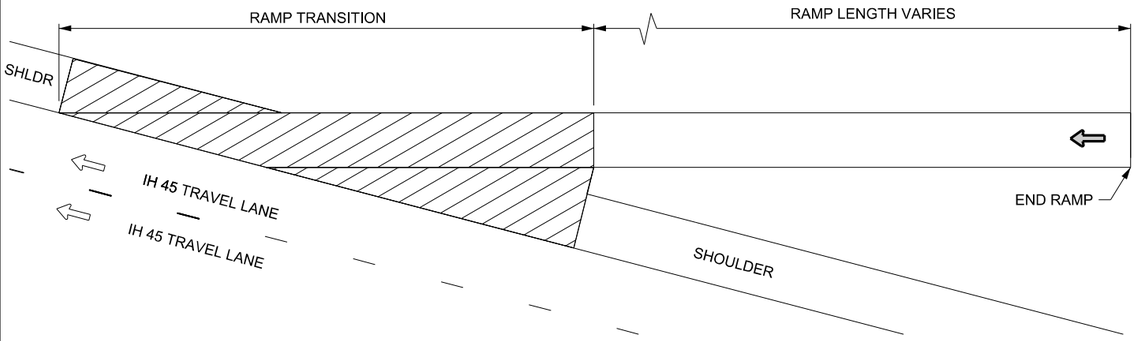
08/11/2021

REV DATE: 2-12-2015
CSJ: 0675-03-100

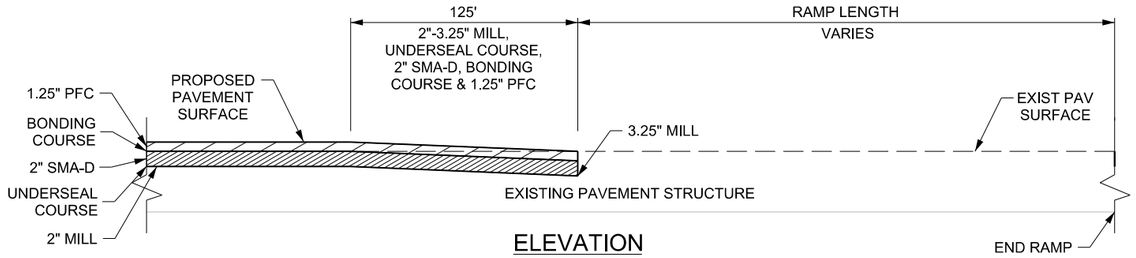
FILENAME: G:\0675\03\100\SHEETS\Road\RAMP TIE-IN DETAIL_KAKrevisions.dgn

ENTRANCE RAMP



PLAN

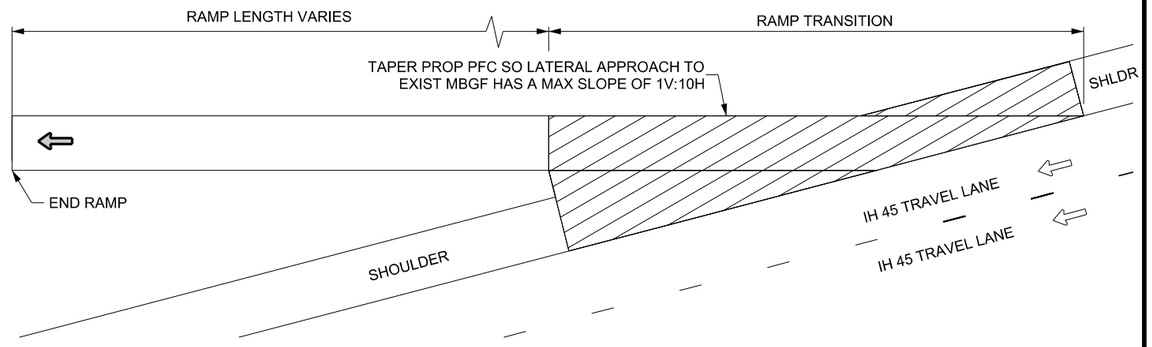
US 79 SB ENTRANCE RAMP



ELEVATION

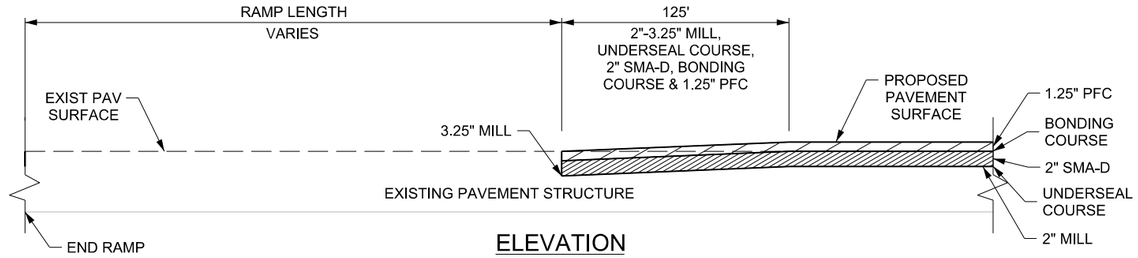
US 79 SB ENTRANCE RAMP

EXIT RAMP



PLAN

US 79 SB EXIT RAMP



ELEVATION

US 79 SB EXIT RAMP

UNDERSEAL COURSE & SMA-D

BONDING COURSE & PFC

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08/12/2021

Texas Department of Transportation
Bryan District

RAMP TIE-IN DETAIL

SHEET 2 OF 2 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	50

REV DATE: 2-12-2015
CSJ: 0675-03-100

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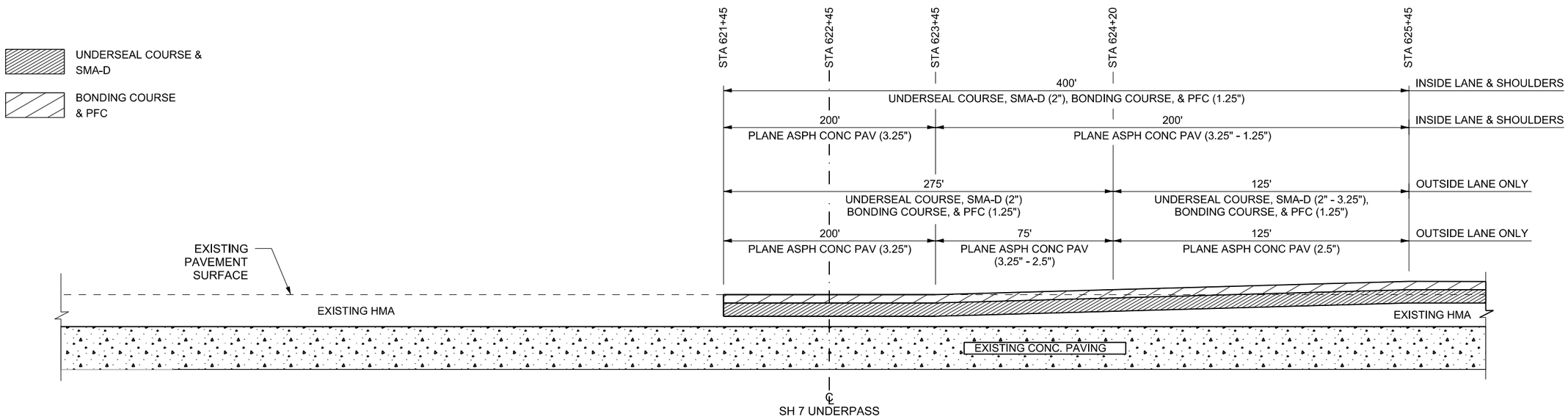
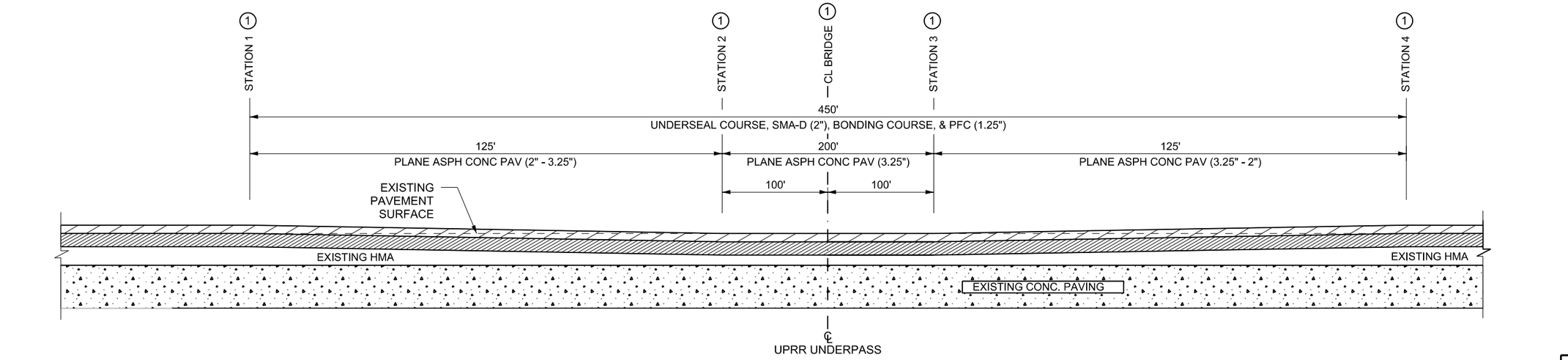


IH 45 PLANING DETAILS AT SH 7 UNDERPASS

SB STA 621+45 TO STA 625+45
NB STA 621+45 TO STA 625+45



IH 45 PLANING DETAILS AT UPRR UNDERPASS

SB STA 1362+20 TO STA 1366+70
NB STA 1362+28 TO STA 1366+78

① DESCRIPTION	STATION 1	STATION 2	CL BRIDGE	STATION 3	STATION 4
SB UPRR	1362+20	1363+45	1364+45	1365+45	1366+70
NB UPRR	1362+28	1363+53	1364+53	1365+53	1366+78

NOTE:

AT THE CR 314 UNDERPASS (STA 995+75), MILL THE EXISTING 1.5" PFC, PLACE AN UNDERSEAL COURSE, AND PLACE 1.25" PFC PER THE PROPOSED TYPICAL SECTION.

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8/12/2021	

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08/12/2021

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PLANING DETAILS AT IH 45 UNDERPASSES

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	51

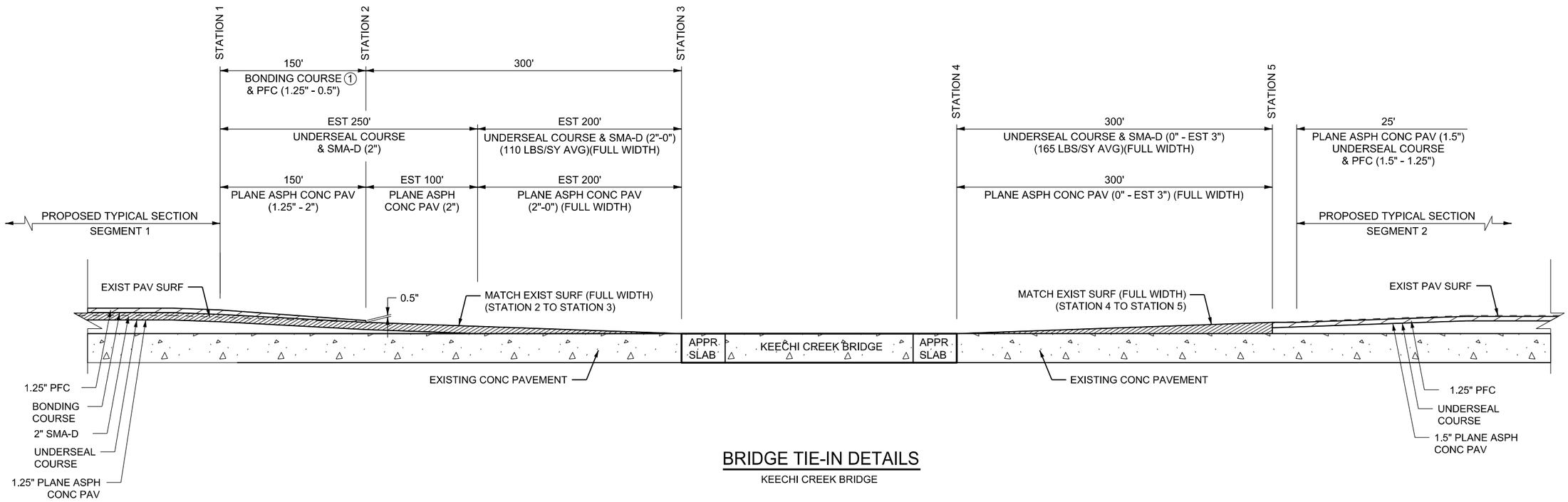
FILENAME: G:\0675\03\100\SHEETS\Road\PLANING DETAILS AT IH 45 UNDERPASSES_KAKRevisions.dgn
REV DATE: 2-12-2015
CSJ: 0675-03-100

LEGEND

UNDERSEAL COURSE & SMA-D

BONDING COURSE & PFC

EXISTING PAVEMENT SURFACE



BRIDGE TIE-IN DETAILS

KEECHI CREEK BRIDGE

DESCRIPTION	STATION 1	STATION 2	STATION 3	STATION 4	STATION 5
SB KEECHI CREEK BRIDGE	814+64	816+14	819+14	826+49	829+49
NB KEECHI CREEK BRIDGE	813+86	815+36	818+36	825+71	828+71

① BONDING COURSE APPLICATION RATE TO BE APPROVED BY THE DISTRICT PAVEMENT ENGINEER PRIOR TO PLACEMENT BENEATH THE LONGITUDINAL PFC TAPER.

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER

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08/21/2021

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PRINT DATE	REVISION DATE
8/21/2021	

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Bryan District

BRIDGE TIE-IN DETAIL (KEECHI CREEK BRIDGE)

SHEET 1 OF 4 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	52

REV DATE: 2-12-2015
CSJ: 0675-03-100

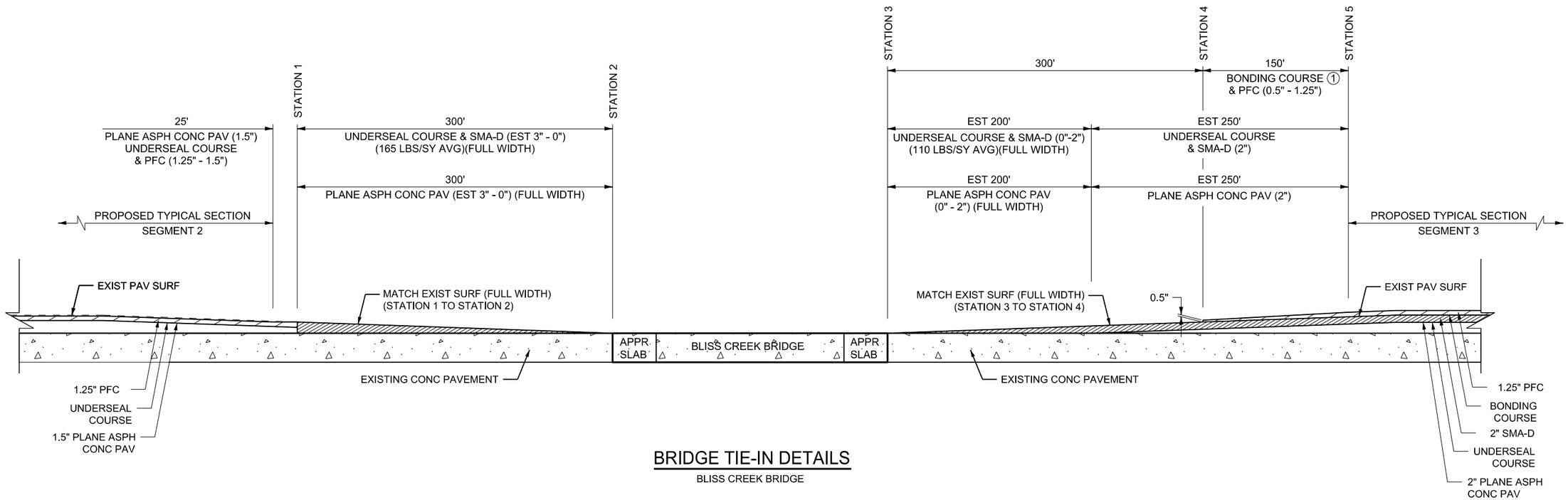
FILENAME: G:\0675\03\100\SHEETS\Road\TIE-IN AT BRIDGES (100)_KAKRevisions.dgn

LEGEND

UNDERSEAL COURSE & SMA-D

BONDING COURSE & PFC

EXISTING PAVEMENT SURFACE



BRIDGE TIE-IN DETAILS

BLISS CREEK BRIDGE

DESCRIPTION	STATION 1	STATION 2	STATION 3	STATION 4	STATION 5
SB BLISS CREEK BRIDGE	1206+85	1209+85	1213+25	1216+25	1217+75
NB BLISS CREEK BRIDGE	1206+85	1209+85	1213+25	1216+25	1217+75

① BONDING COURSE APPLICATION RATE TO BE APPROVED BY THE DISTRICT PAVEMENT ENGINEER PRIOR TO PLACEMENT BENEATH THE LONGITUDINAL PFC TAPER.

REV DATE: 2-12-2015
CSJ#: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Road\TIE-IN AT BRIDGES (100)_KAKRevisions.dgn

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BRIDGE TIE-IN DETAIL (BLISS CREEK BRIDGE)

SHEET 2 OF 4 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

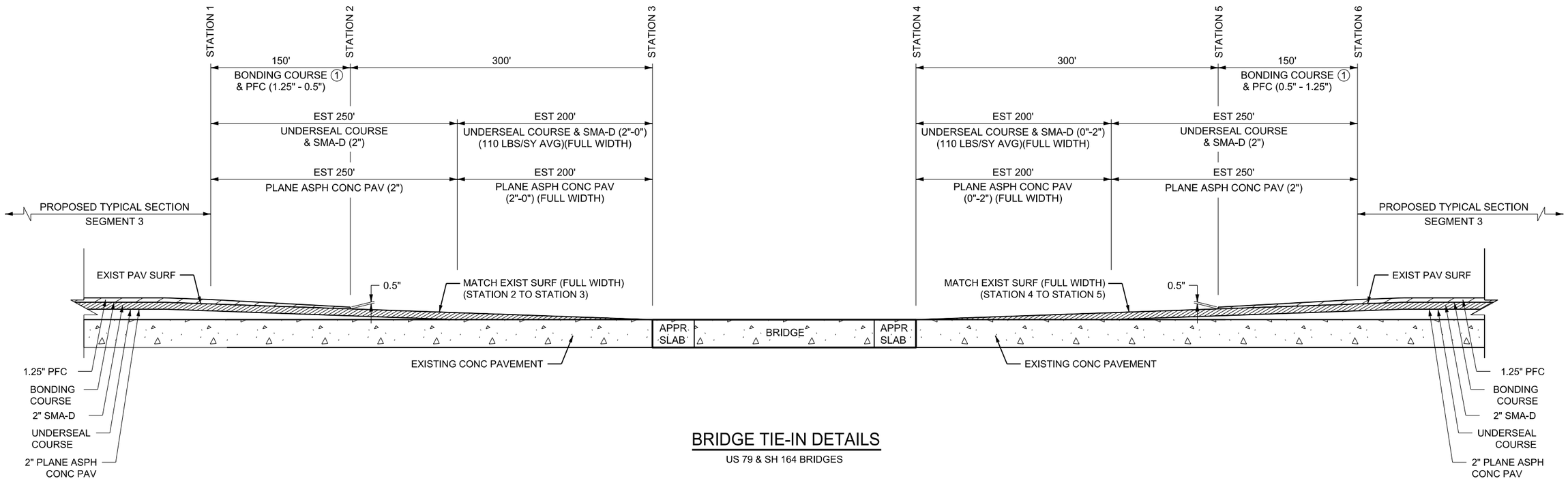
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	53

LEGEND

UNDERSEAL COURSE & SMA-D

BONDING COURSE & PFC

EXISTING PAVEMENT SURFACE



BRIDGE TIE-IN DETAILS

US 79 & SH 164 BRIDGES

DESCRIPTION	STATION 1	STATION 2	STATION 3	STATION 4	STATION 5	STATION 6
SB US 79 BRIDGE	1385+21	1386+71	1389+71	1392+06	1395+06	1396+56
NB US 79 BRIDGE	1385+50	1387+00	1390+00	1392+34	1395+34	1396+84
SB SH 164 BRIDGE	1457+86	1459+36	1462+36	1464+47	1467+47	1468+97
NB SH 164 BRIDGE	1457+57	1459+07	1462+07	1464+17	1467+17	1468+67

① BONDING COURSE APPLICATION RATE TO BE APPROVED BY THE DISTRICT PAVEMENT ENGINEER PRIOR TO PLACEMENT BENEATH THE LONGITUDINAL PFC TAPER.

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Bryan District

BRIDGE TIE-IN DETAIL (US 79 & SH 164 BRIDGES)

SHEET 3 OF 4 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	54

REV DATE: 2-12-2015
CSJ: 0675-03-100

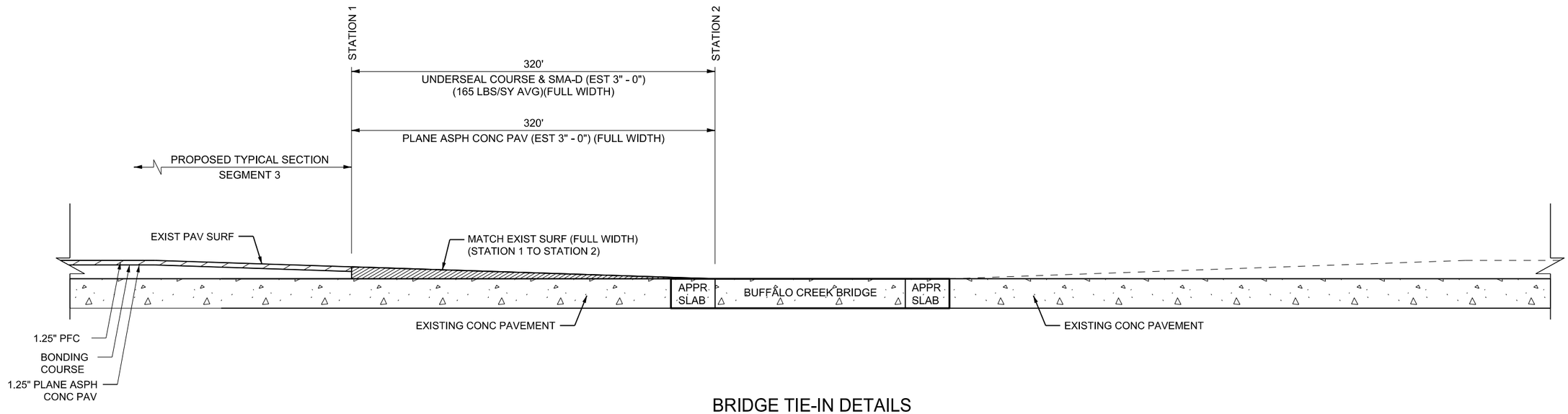
FILENAME: G:\067503\100\SHEETS\Road\TIE-IN AT BRIDGES (100)_KAKRevisions.dgn

LEGEND

UNDERSEAL COURSE & SMA-D

BONDING COURSE & PFC

EXISTING PAVEMENT SURFACE



BRIDGE TIE-IN DETAILS

BUFFALO CREEK BRIDGE

DESCRIPTION	STATION 1	STATION 2
SB BUFFALO CREEK BRIDGE	1514+50	1517+70
NB BUFFALO CREEK BRIDGE	1514+50	1517+70

REV DATE: 2-12-2015
CSJ: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Road\TIE-IN AT BRIDGES (100)_KAKRevisions.dgn

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8/21/2021	

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KEITH A. KOUBA
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08/21/2021

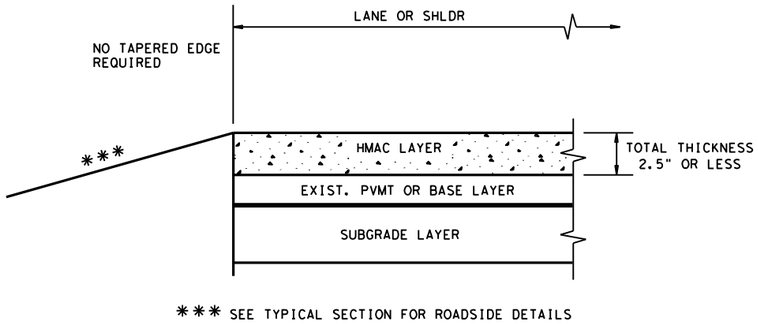
Texas Department of Transportation
Bryan District

BRIDGE TIE-IN DETAIL (BUFFALO CREEK BRIDGE) (END PROJECT)

SHEET 4 OF 4 SHEETS

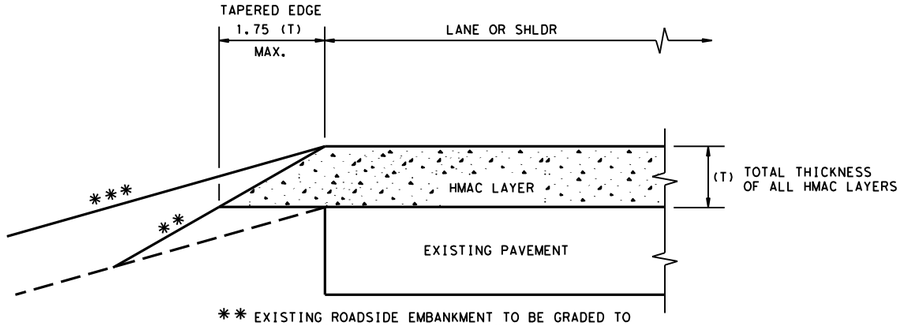
FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	55



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

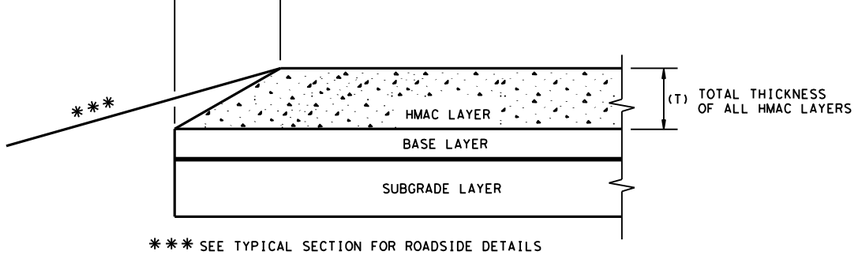
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY
WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

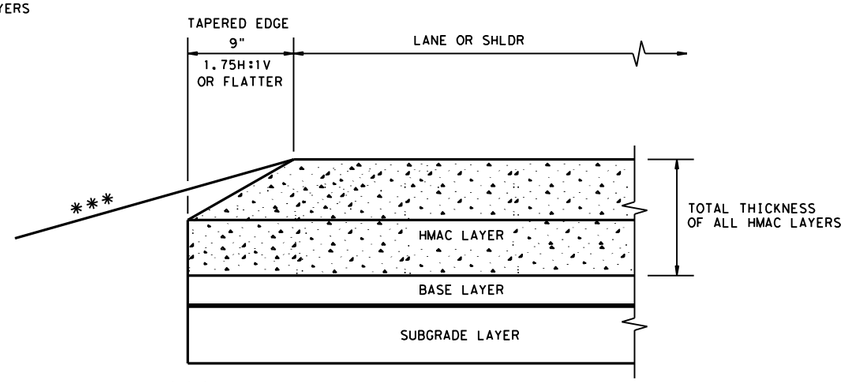
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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

GENERAL NOTES

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

(NOT TO SCALE)

Texas Department of Transportation

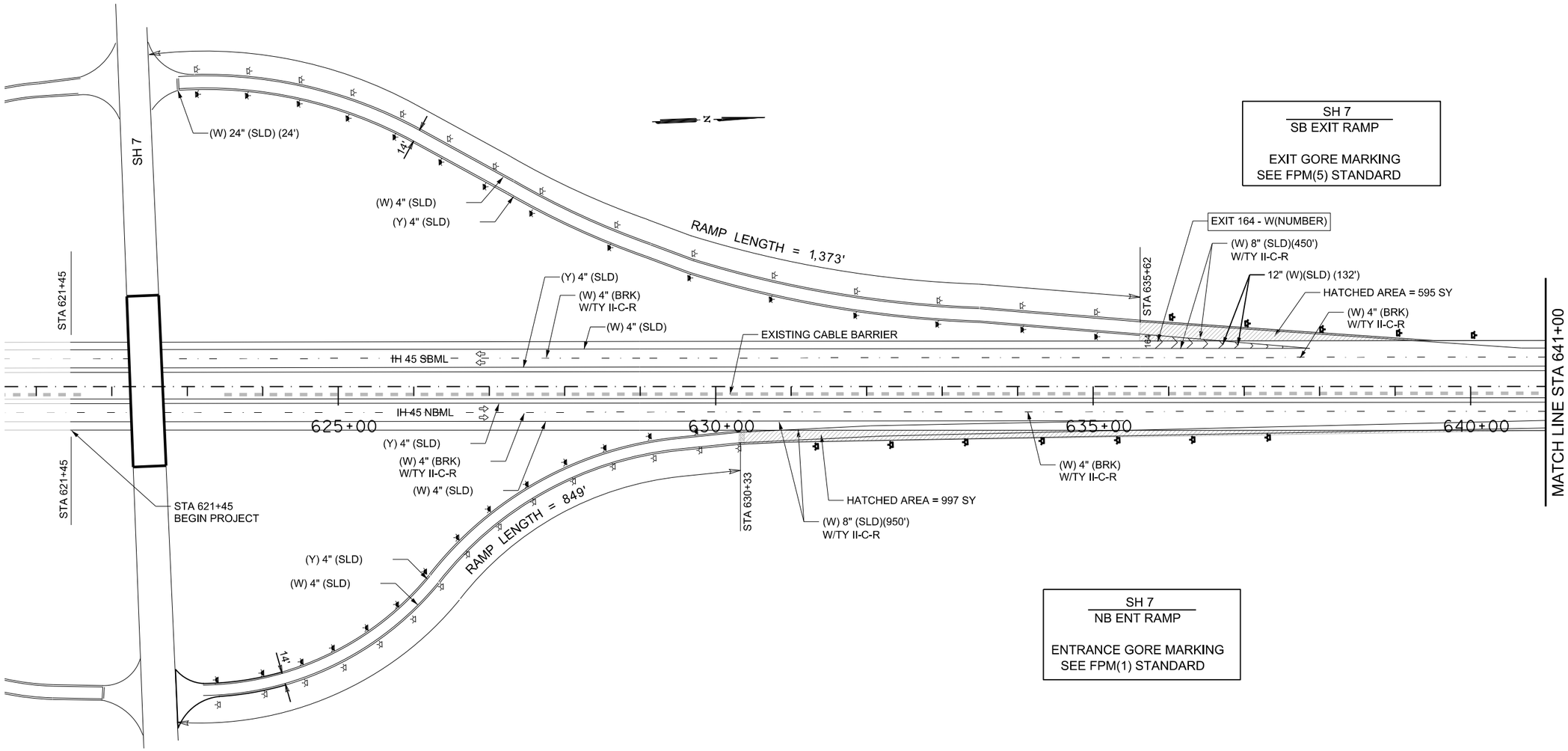
Design Division Standard

TAPERED EDGE DETAILS
HMAC PAVEMENT

TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:			
©TxDOT January 2011	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0675	03	100, ETC.		IH 45		
	DIST	COUNTY			SHEET NO.		
	BRYAN	LEON, ETC.			56		

DATE: $DATE$
FILE: $FILE$



SH 7
SB EXIT RAMP

EXIT GORE MARKING
SEE FPM(5) STANDARD

SH 7
NB ENT RAMP

ENTRANCE GORE MARKING
SEE FPM(1) STANDARD

REV DATE: 2-12-2015
CSJ: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_01 (SH 7 OVERPASS).dgn

Drawings Not To Scale

PRINT DATE	REVISION DATE
8/14/2021	

STATE OF TEXAS
KEITH A. KOUBA
108695
LICENSED
PROFESSIONAL ENGINEER

Keith A. Kouba, P.E.

08/14/2021

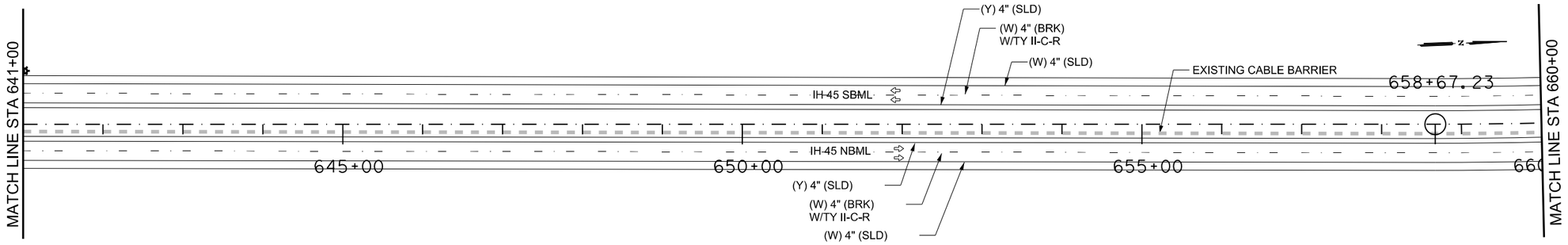
Texas Department of Transportation
Bryan District

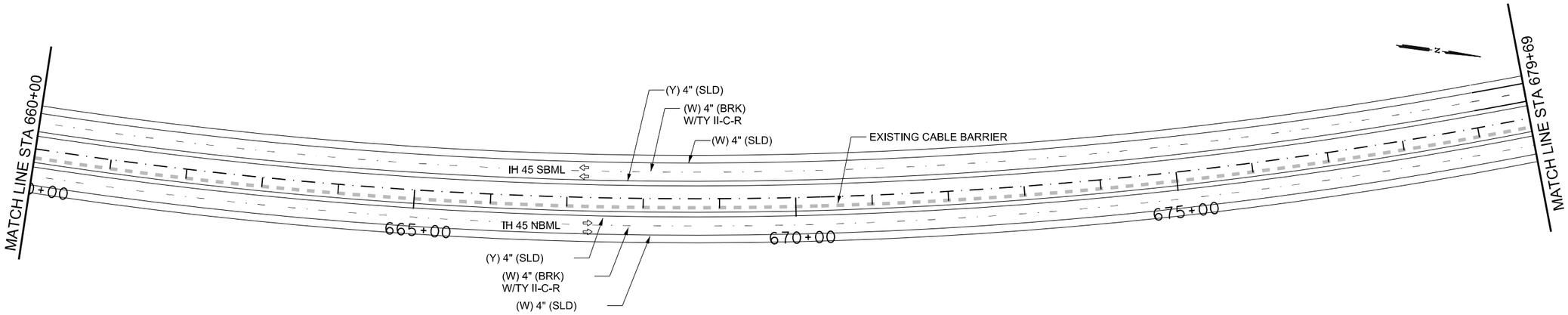
STRIPING LAYOUT (SH 7)

SHEET 1 OF 18 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	57





Drawings Not To Scale

PRINT DATE	REVISION DATE
8/14/2021	

STATE OF TEXAS
KEITH A. KOUBA
108695
LICENSED
PROFESSIONAL ENGINEER

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Texas Department of Transportation
Bryan District

STRIPING LAYOUT

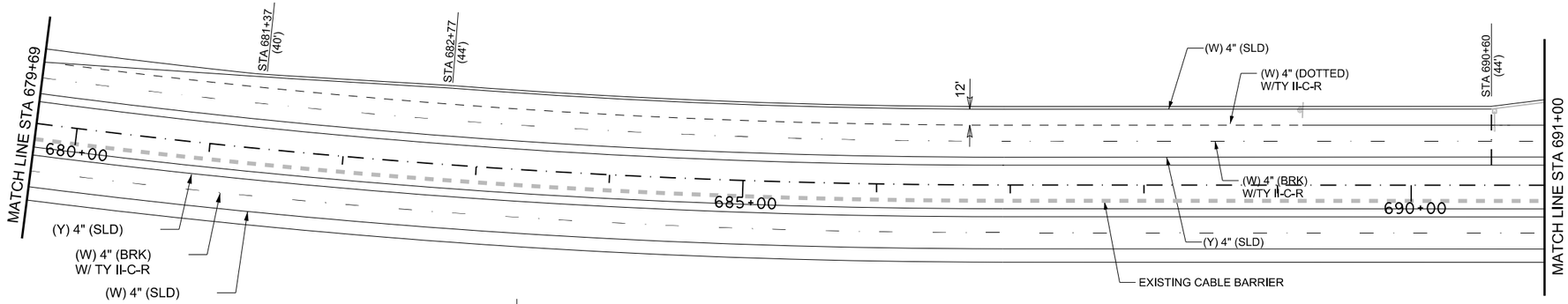
SHEET 2 OF 18 SHEETS

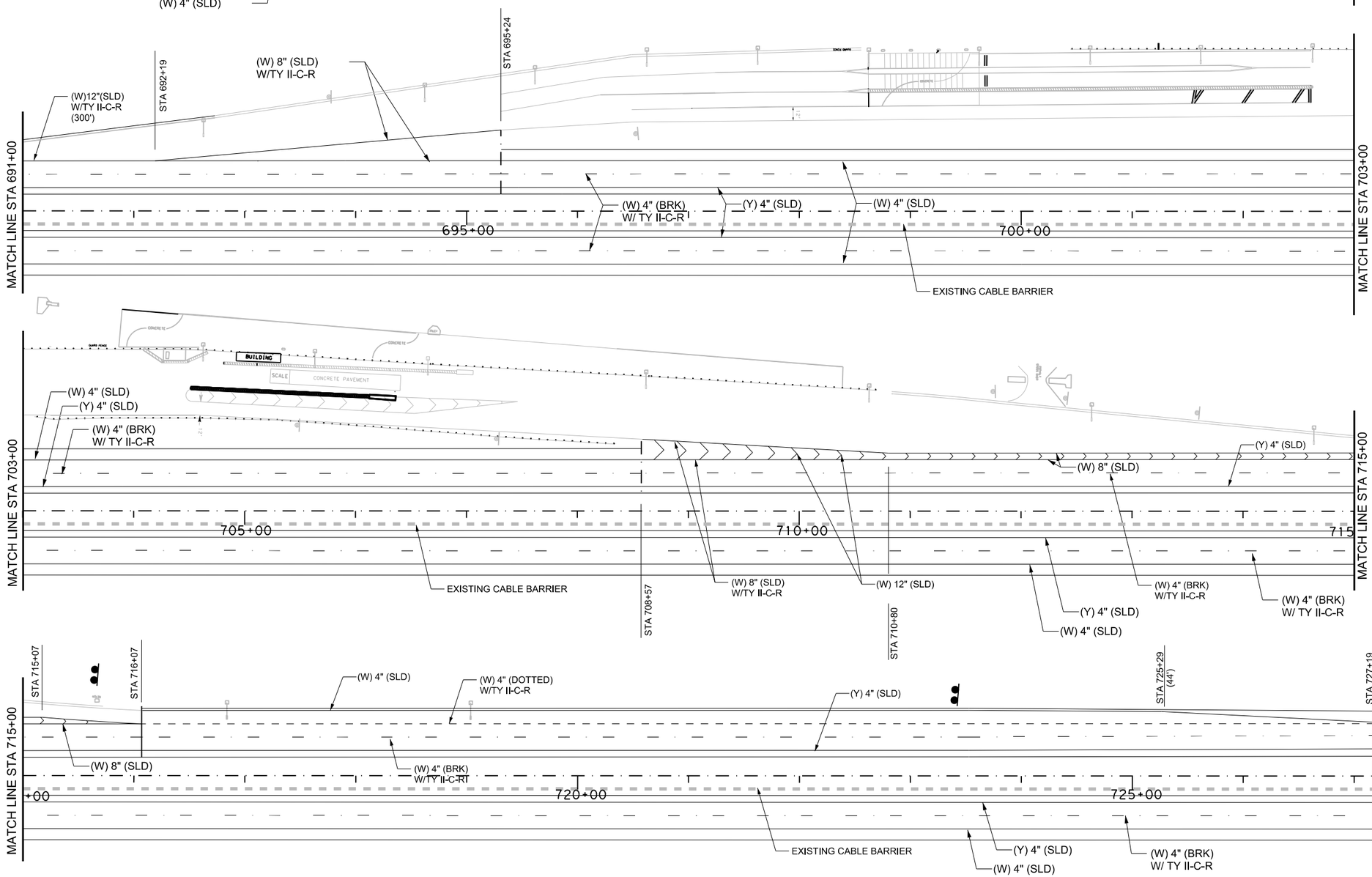
FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	58

REV DATE: 2-12-2015
CSJ#: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_02.dgn





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PRINT DATE	REVISION DATE
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STRIPING LAYOUT (WEIGH STATION)

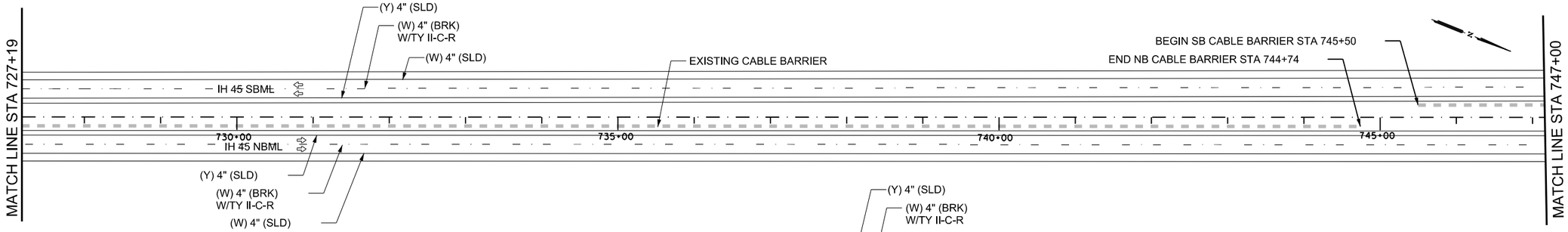
SHEET 3 OF 18 SHEETS

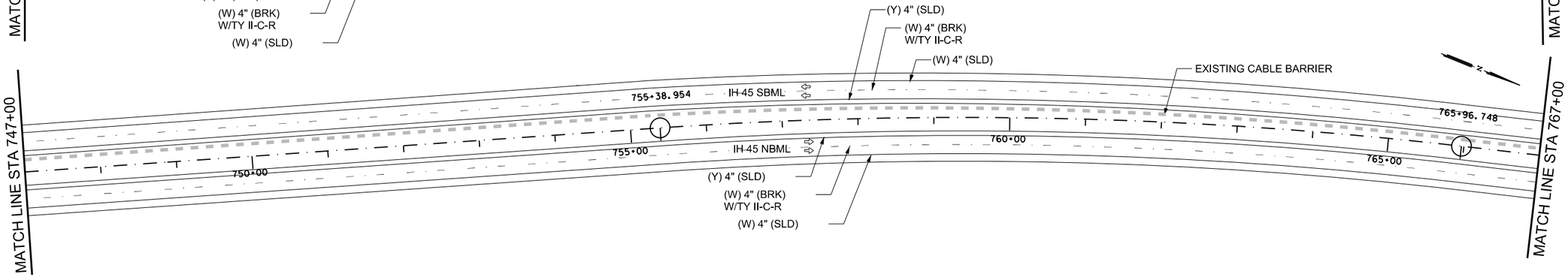
FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

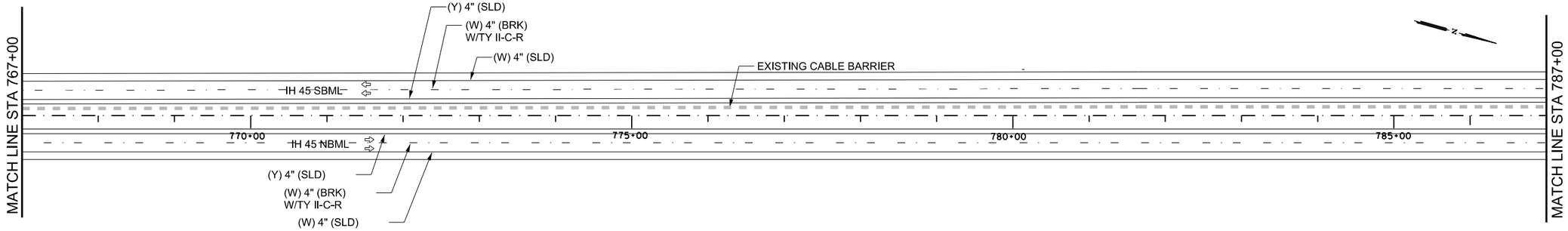
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	59

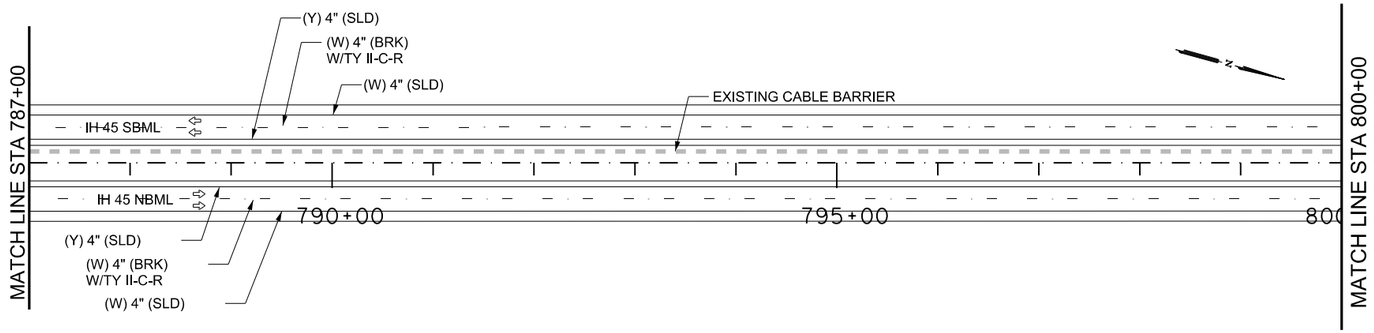
REV DATE: 2-12-2015
CSJ: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_03 (WEIGH STATION).DGN









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STRIPING LAYOUT

SHEET 4 OF 18 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	60

STATE OF TEXAS
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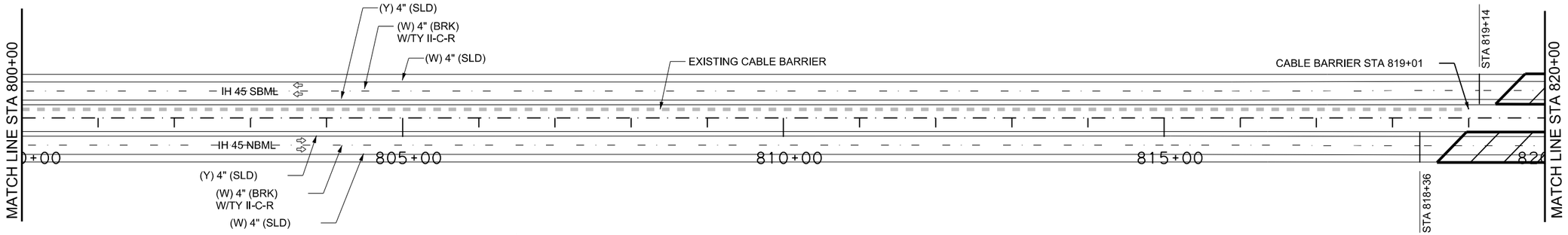
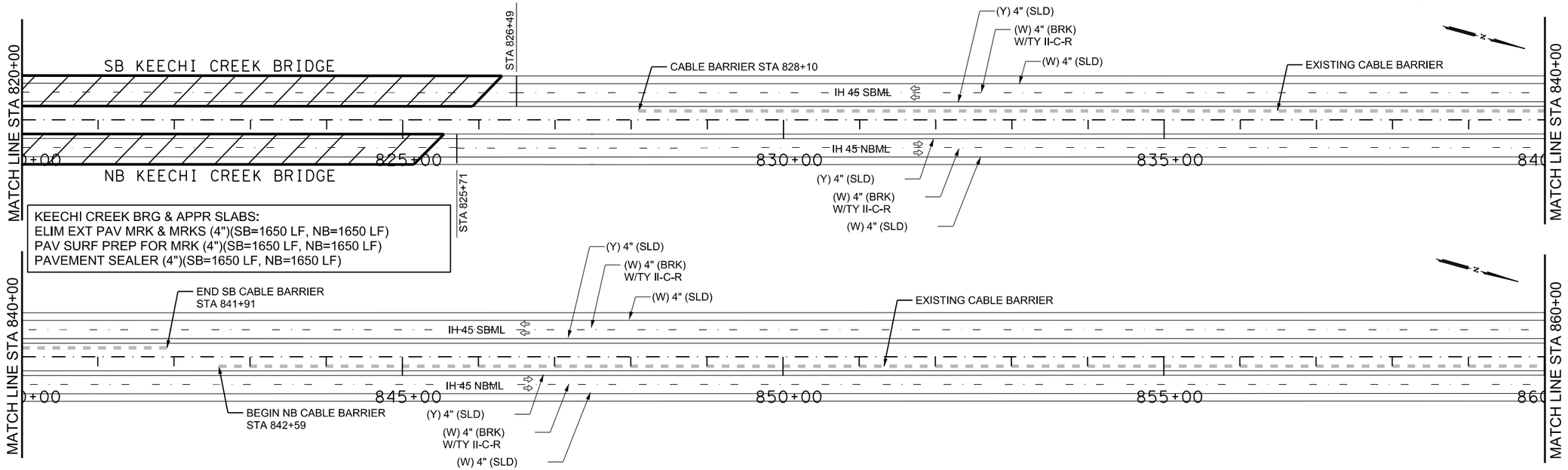
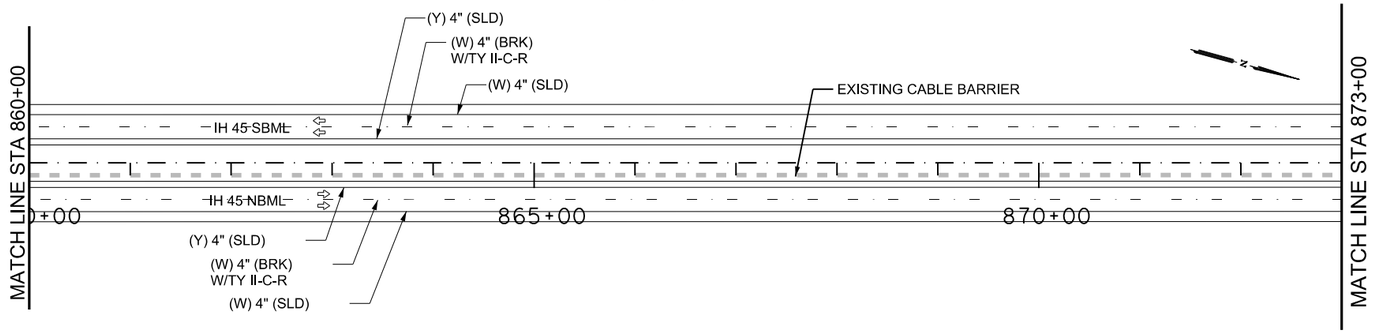
CSJ: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_04.dgn





KEECHI CREEK BRG & APPR SLABS:
ELIM EXT PAV MRK & MRKS (4")(SB=1650 LF, NB=1650 LF)
PAV SURF PREP FOR MRK (4")(SB=1650 LF, NB=1650 LF)
PAVEMENT SEALER (4")(SB=1650 LF, NB=1650 LF)



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Texas Department of Transportation
Bryan District

STRIPING LAYOUT

SHEET 5 OF 18 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45
STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.
CONTROL	SECTION	JOB / SHEET NO.
0675	03	100, ETC. / 61

STATE OF TEXAS
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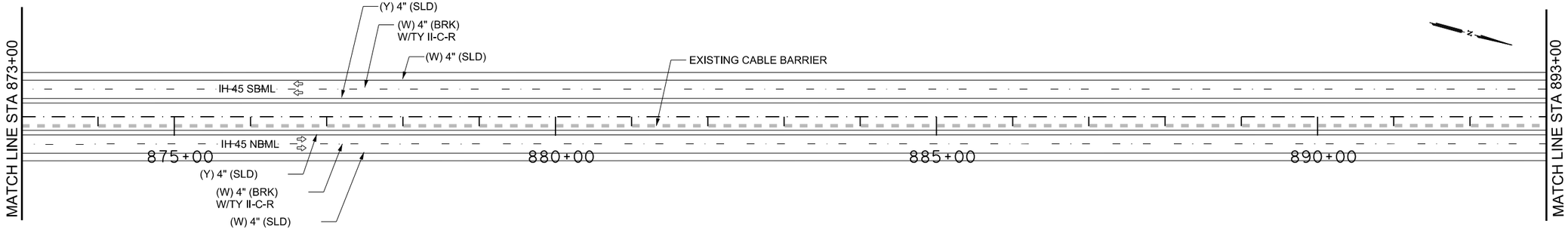
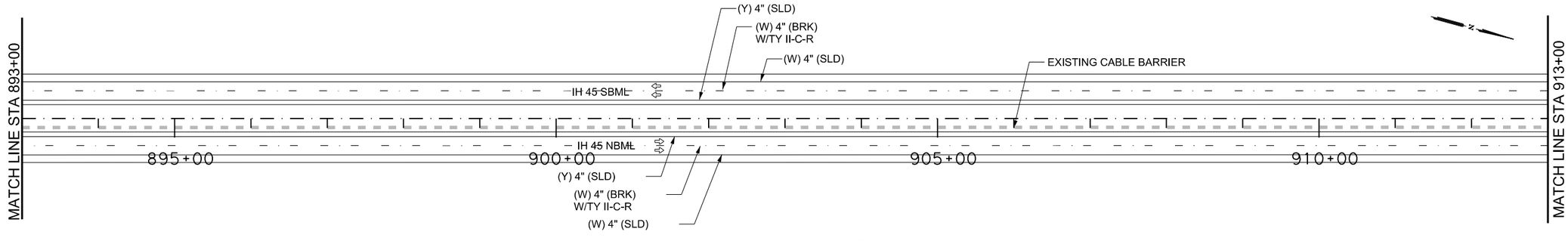
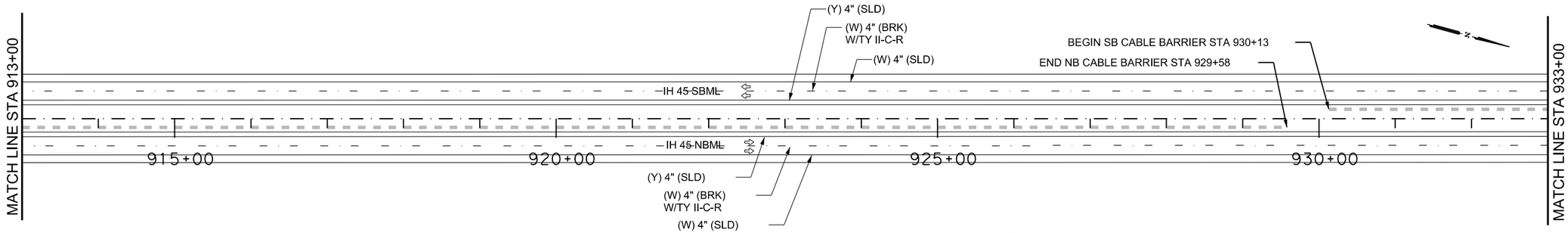
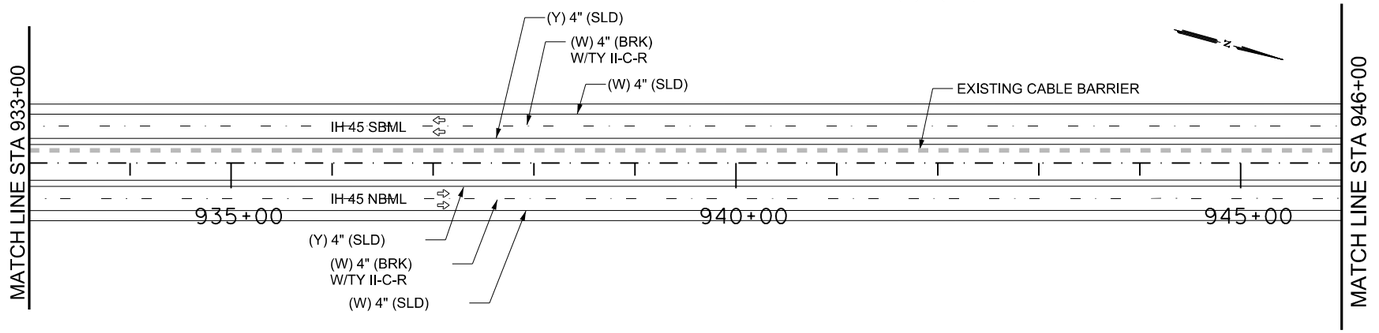
REV DATE: 2-12-2015
CSJ: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_05.dgn









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Bryan District

STRIPING LAYOUT

SHEET 6 OF 18 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	62

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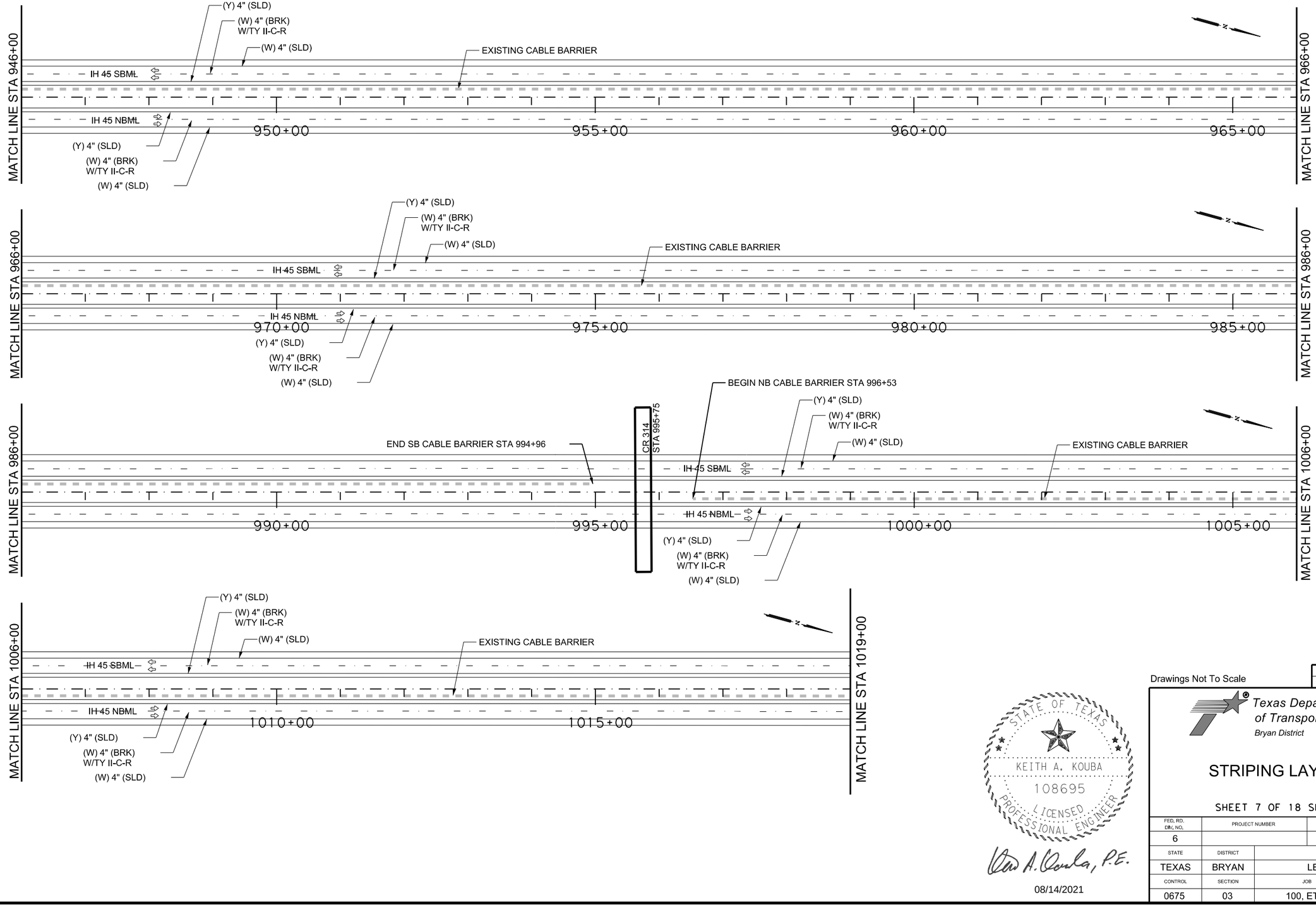
FILENAME: G:\0675\03\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_06.dgn



REV DATE: 2-12-2015
CSJ: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_07.dgn

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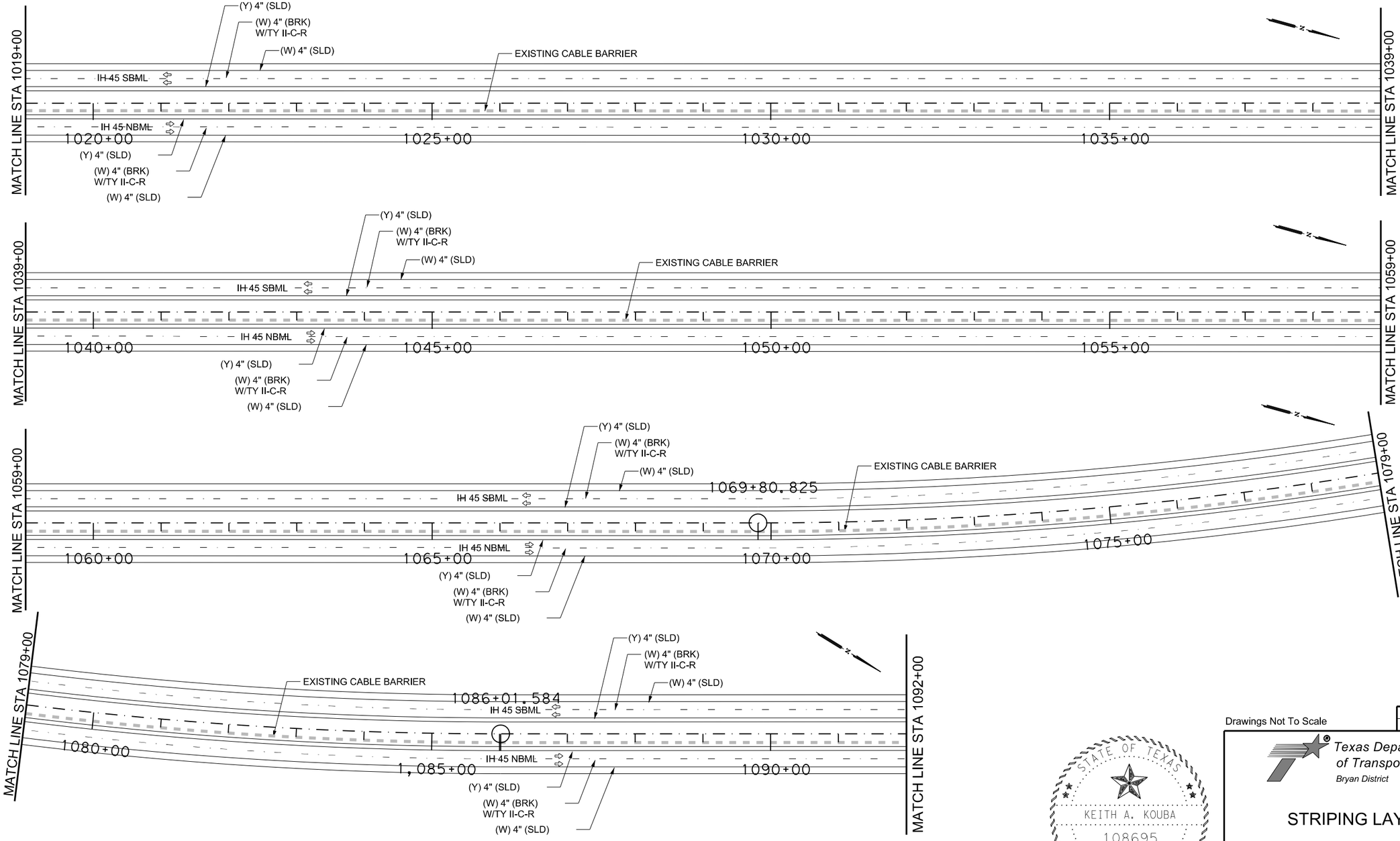
STRIPING LAYOUT

SHEET 7 OF 18 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	63



REV DATE: 2-12-2015
CSJ: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_08.dgn

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08/14/2021

Texas Department of Transportation
Bryan District

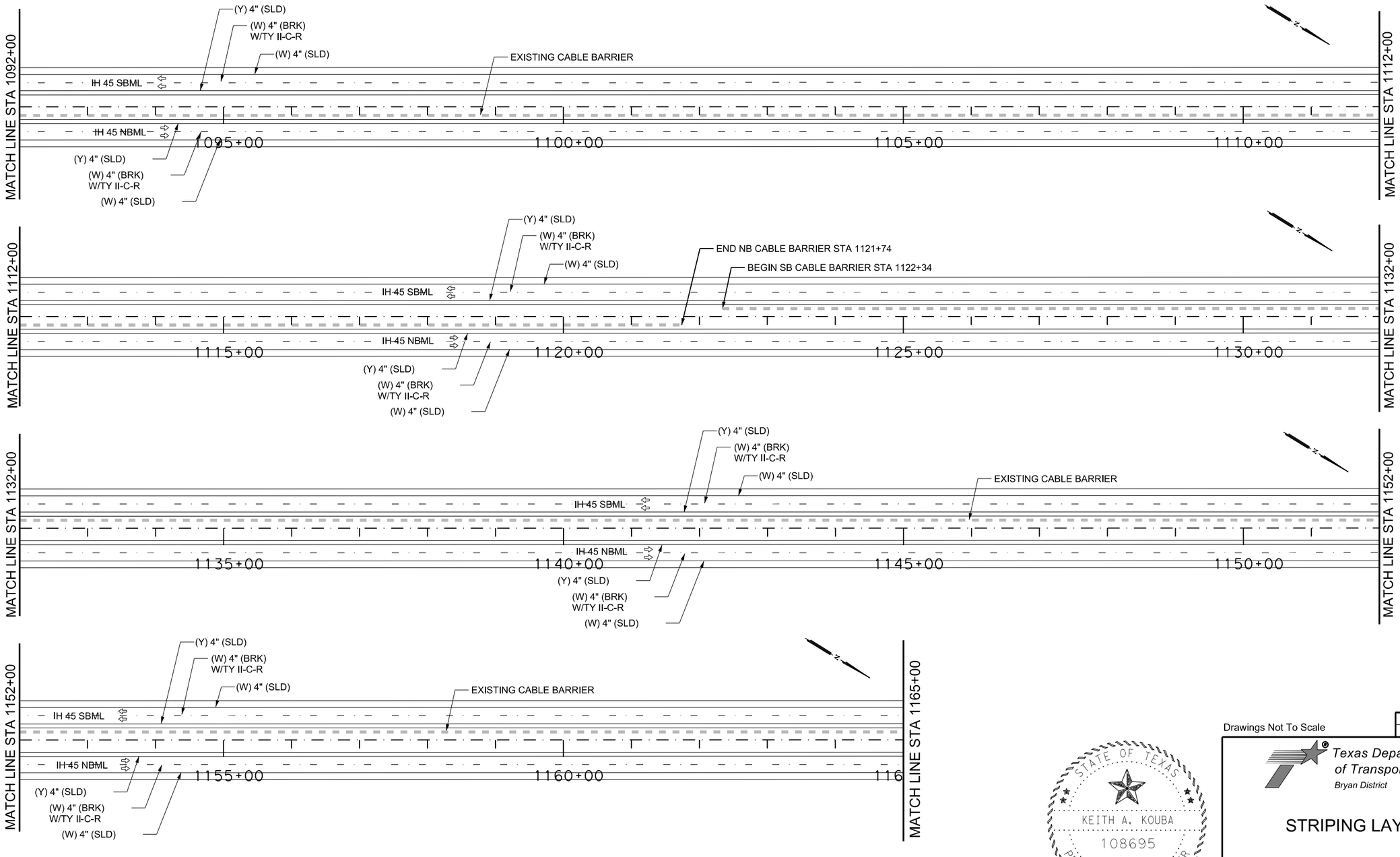
STRIPING LAYOUT

SHEET 8 OF 18 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	64



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STRIPING LAYOUT

SHEET 9 OF 18 SHEETS

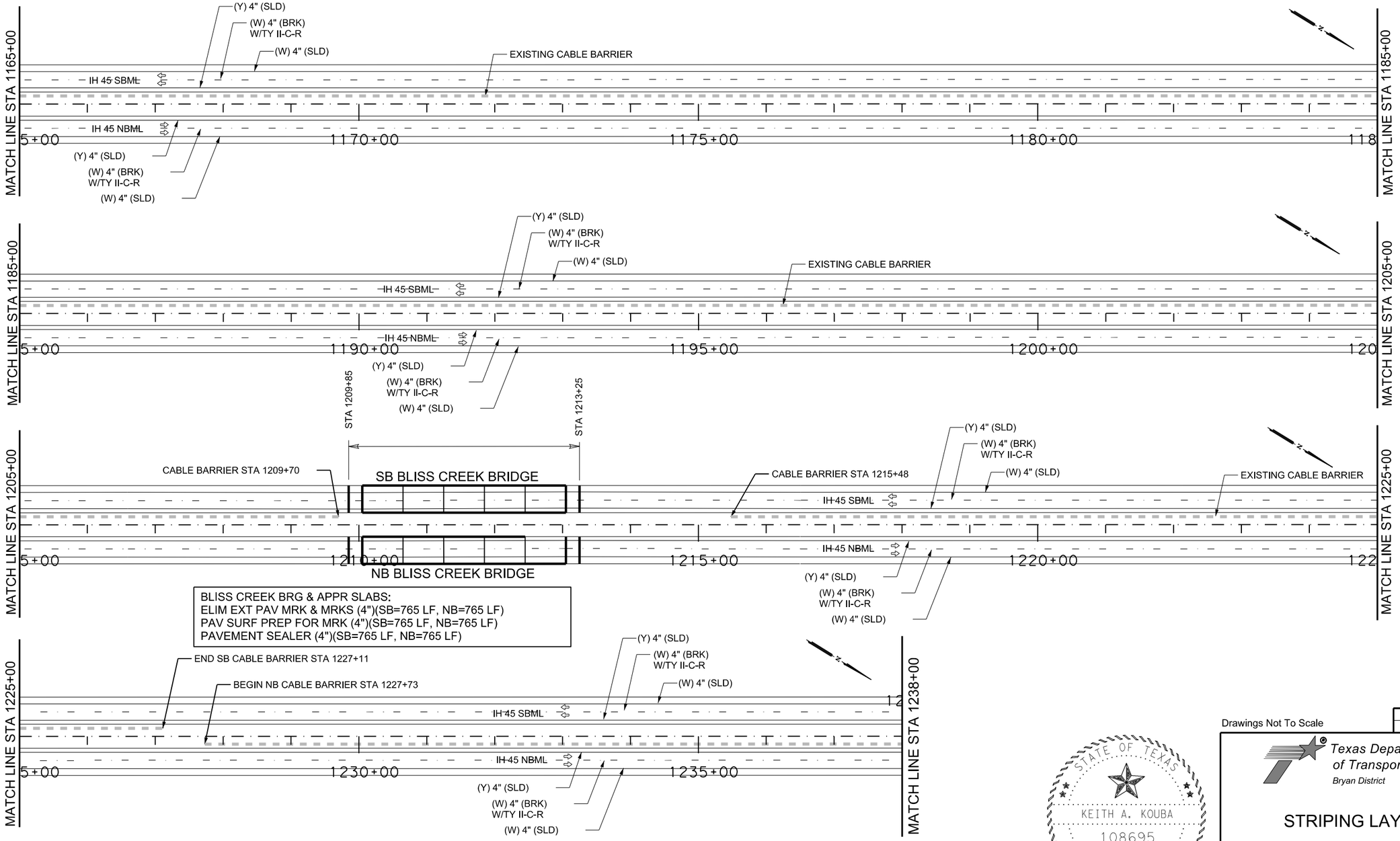
FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	65

REV DATE: 2-12-2015
CSJ: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_09.dgn



REV DATE: 2-12-2015
CSJ#: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_10.dgn

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SHEET 10 OF 18 SHEETS

STATE OF TEXAS
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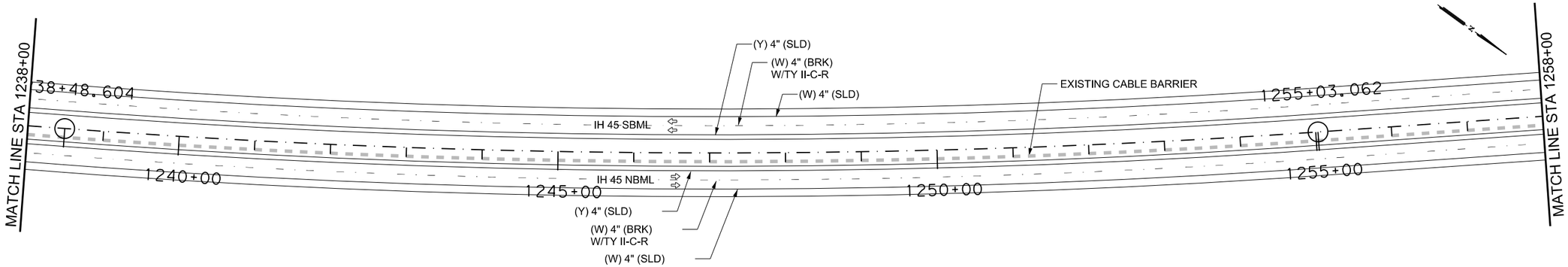
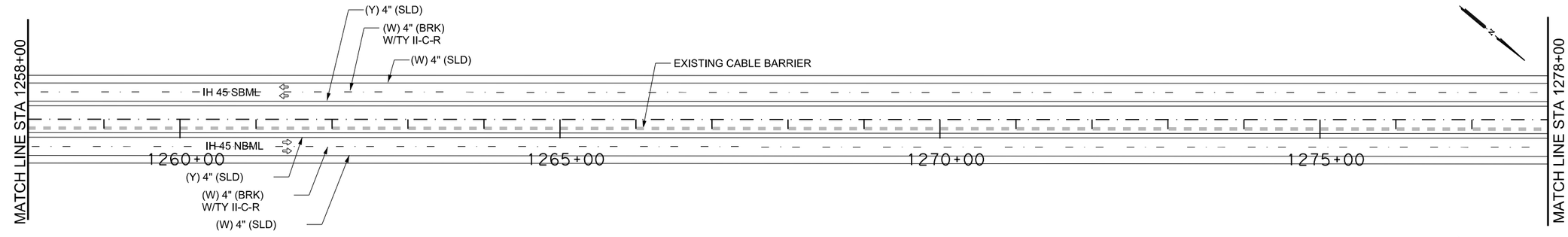
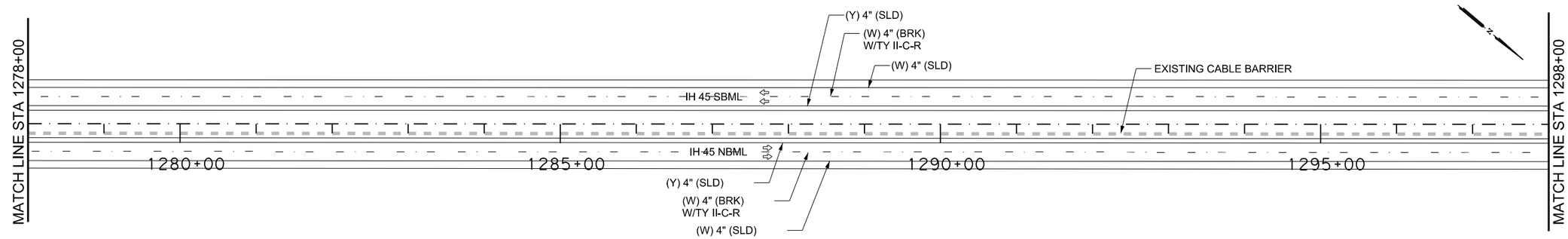
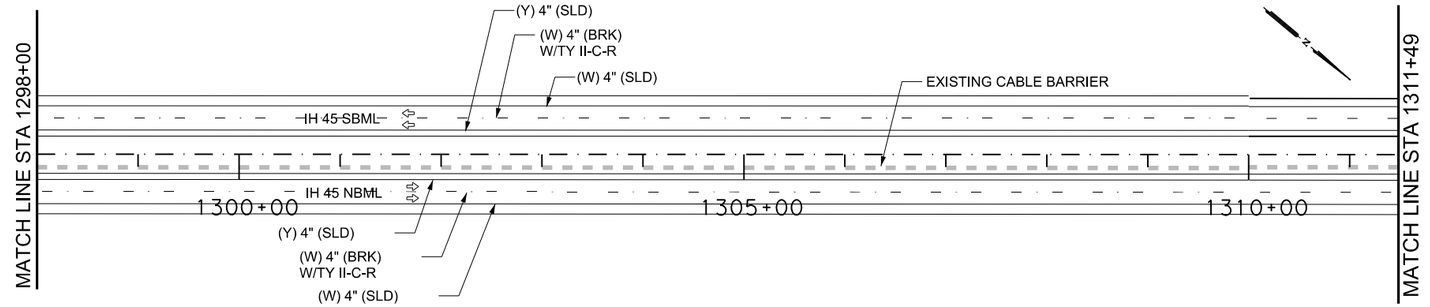
08/14/2021

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45
STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.
CONTROL	SECTION	JOB / SHEET NO.
0675	03	100, ETC. / 66









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Bryan District

STRIPING LAYOUT

SHEET 11 OF 18 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	67

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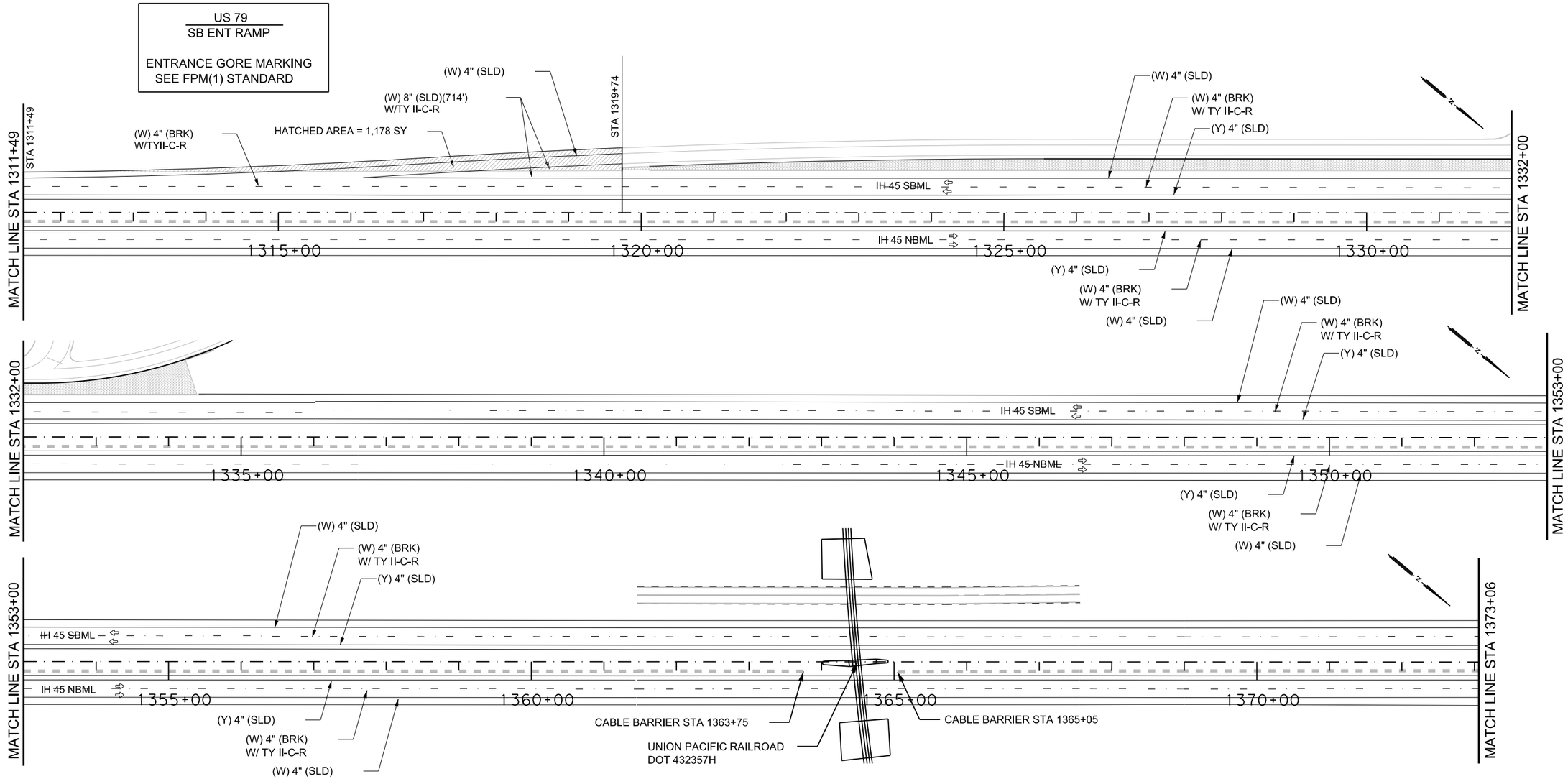
REV DATE: 2-12-2015
CSJs: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_11.dgn

US 79
SB ENT RAMP

ENTRANCE GORE MARKING
SEE FPM(1) STANDARD



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STATE OF TEXAS
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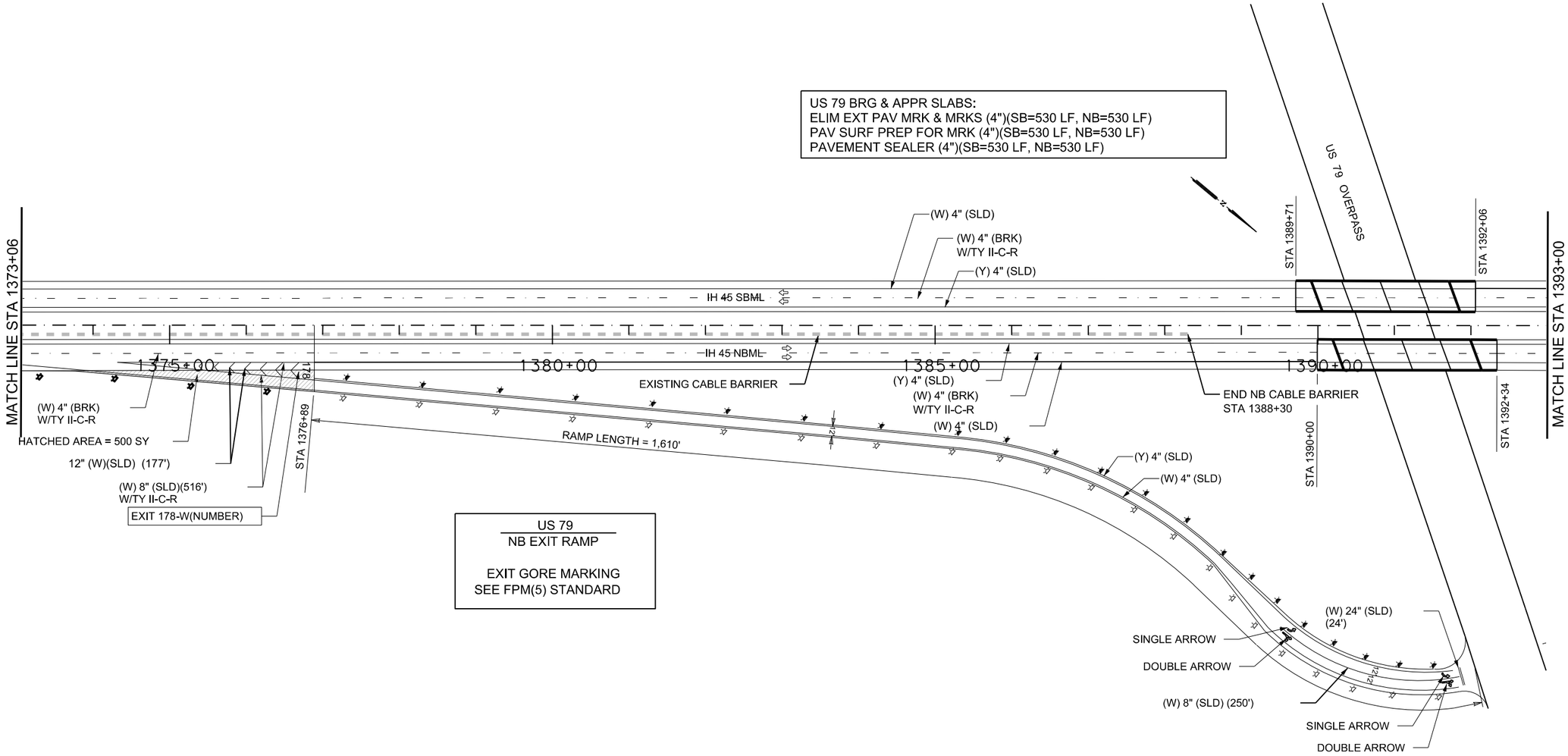
STRIPING LAYOUT

SHEET 12 OF 18 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45
STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.
CONTROL	SECTION	JOB / SHEET NO.
0675	03	100, ETC. / 68

REV DATE: 2-12-2015
CSJ: 0675-03-100
FILENAME: G:\0675\03\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_12.dgn

US 79 BRG & APPR SLABS:
ELIM EXT PAV MRK & MRKS (4")(SB=530 LF, NB=530 LF)
PAV SURF PREP FOR MRK (4")(SB=530 LF, NB=530 LF)
PAVEMENT SEALER (4")(SB=530 LF, NB=530 LF)



US 79
NB EXIT RAMP

EXIT GORE MARKING
SEE FPM(5) STANDARD

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PRINT DATE	REVISION DATE
8/14/2021	

STATE OF TEXAS
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STRIPING LAYOUT (US 79)

SHEET 13 OF 18 SHEETS

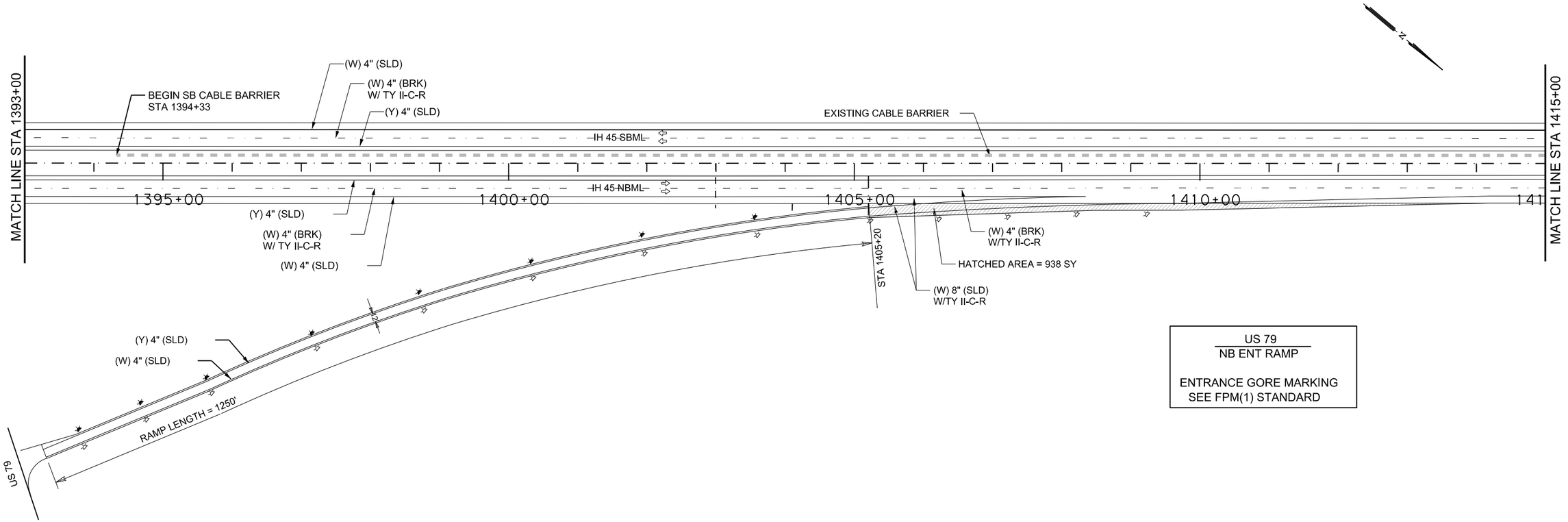
FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	69

REV DATE: 2-12-2015
CSJ: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_13 (US 79 OVERPASS).dgn



US 79
NB ENT RAMP

ENTRANCE GORE MARKING
SEE FPM(1) STANDARD

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STATE OF TEXAS
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STRIPING LAYOUT (US 79)

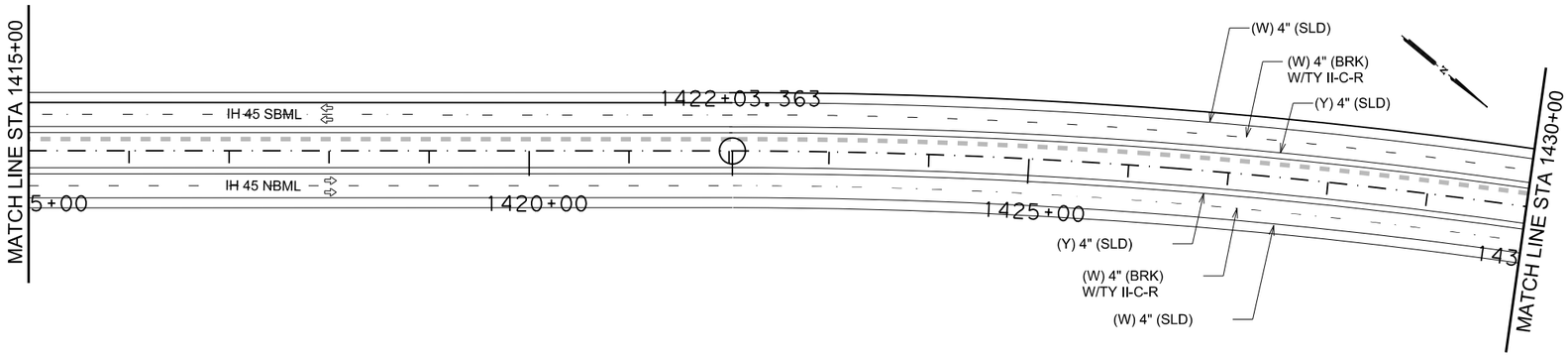
SHEET 14 OF 18 SHEETS

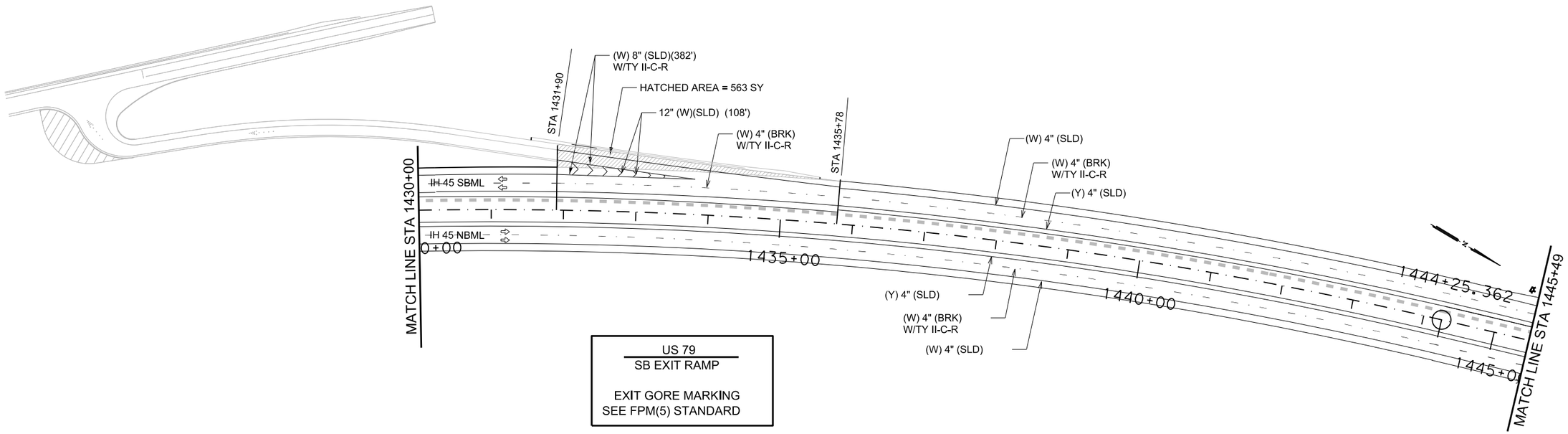
FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	70

REV DATE: 2-12-2015
CSJ: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_14 (US 79 OVERPASS).dgn





US 79
SB EXIT RAMP

EXIT GORE MARKING
SEE FPM(5) STANDARD

Drawings Not To Scale

PRINT DATE	REVISION DATE
8/14/2021	

STATE OF TEXAS
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Texas Department of Transportation
Bryan District

STRIPING LAYOUT

SHEET 15 OF 18 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

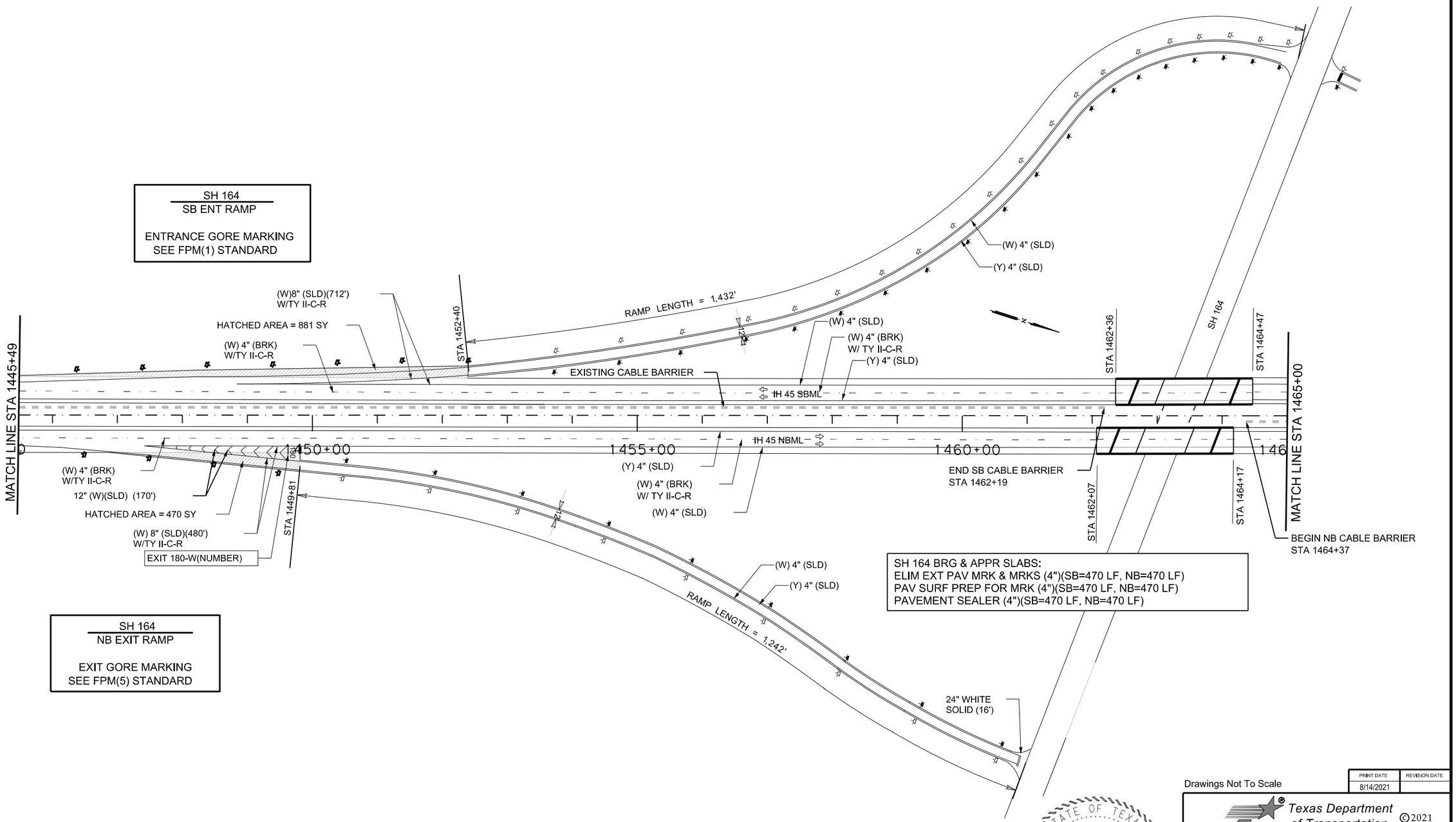
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	71

REV DATE: 2-12-2015
CSJ: 0675-03-100

FILENAME: G:\067503\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_15.dgn

SH 164
SB ENT RAMP

ENTRANCE GORE MARKING
SEE FPM(1) STANDARD



SH 164 BRG & APPR SLABS:
ELIM EXT PAV MRK & MRKS (4")(SB=470 LF, NB=470 LF)
PAV SURF PREP FOR MRK (4")(SB=470 LF, NB=470 LF)
PAVEMENT SEALER (4")(SB=470 LF, NB=470 LF)

SH 164
NB EXIT RAMP

EXIT GORE MARKING
SEE FPM(5) STANDARD

Drawings Not To Scale

PRINT DATE	REVISION DATE
8/14/2021	

STATE OF TEXAS
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08/14/2021

Texas Department of Transportation
Bryan District

STRIPING LAYOUT (SH 164)

SHEET 16 OF 18 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45
STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.
CONTROL	SECTION	JOB / SHEET NO.
0675	03	100, ETC. / 72

REV DATE: 2-12-2015
CSJ: 0675-03-100

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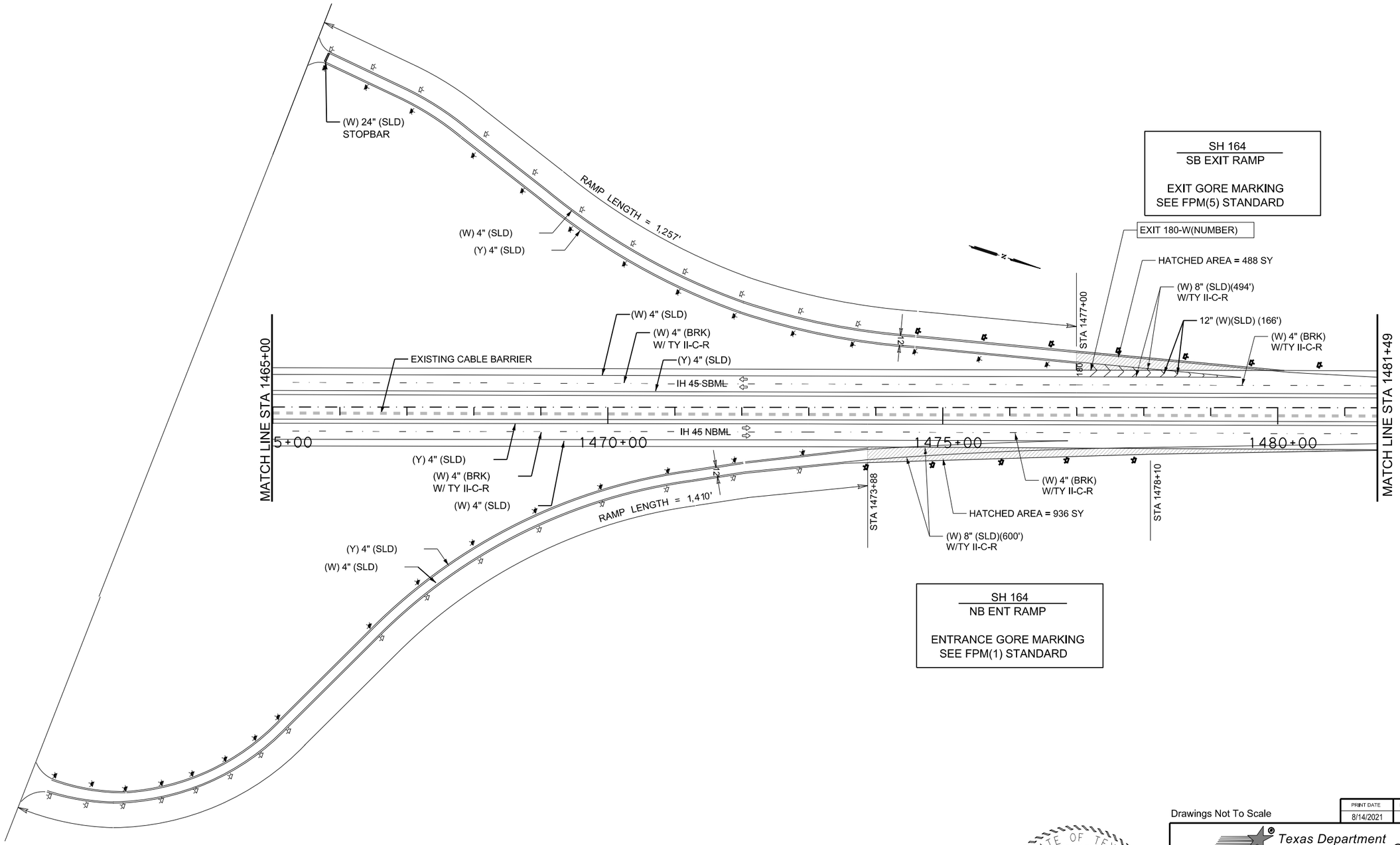

SH 164
SB EXIT RAMP

EXIT GORE MARKING
SEE FPM(5) STANDARD

SH 164
NB ENT RAMP

ENTRANCE GORE MARKING
SEE FPM(1) STANDARD

Drawings Not To Scale

PRINT DATE	REVISION DATE
8/14/2021	

STATE OF TEXAS
KEITH A. KOUBA
108695
LICENSED
PROFESSIONAL ENGINEER

08/14/2021

Texas Department of Transportation ©2021
Bryan District

STRIPING LAYOUT (SH 164)

SHEET 17 OF 18 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	73

REV DATE: 2-12-2015
CSJ: 0675-03-100

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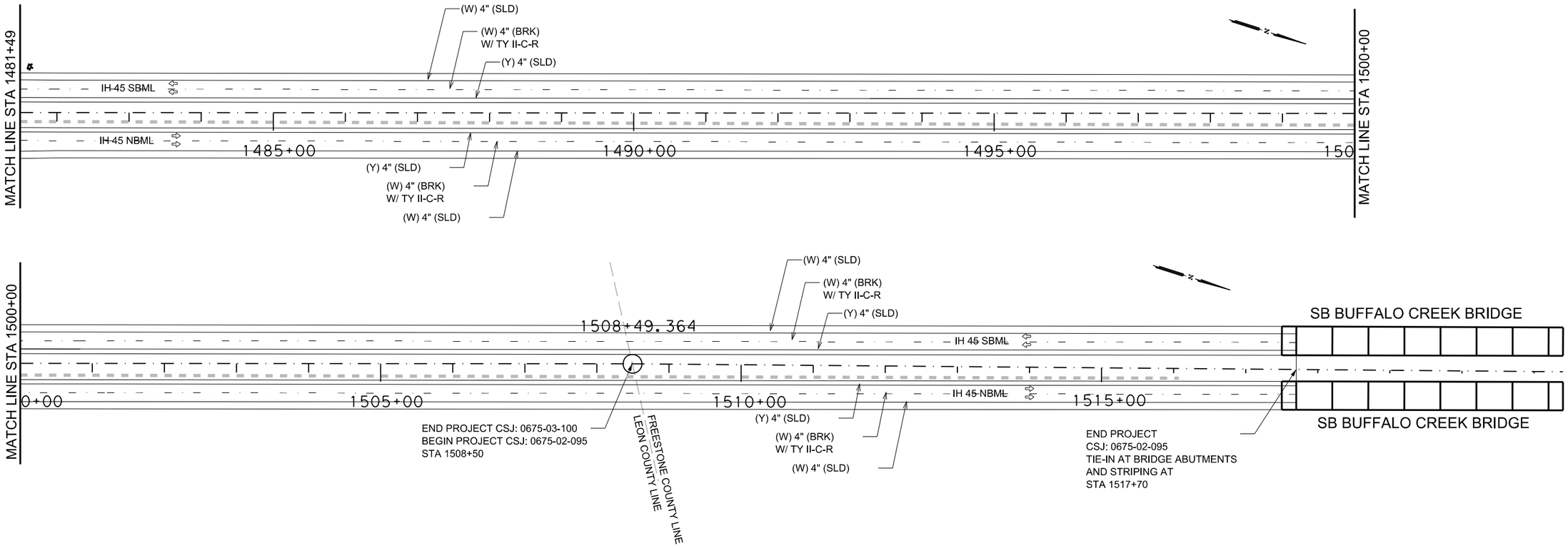


REV DATE: 2-12-2015
CSJ: 0675-03-100

FILENAME: G:\0675\03\100\SHEETS\Sign_Stripe\STRIPING LAYOUT_18.dgn

Drawings Not To Scale

PRINT DATE	REVISION DATE
8/14/2021	

STATE OF TEXAS
KEITH A. KOUBA
108695
LICENSED
PROFESSIONAL ENGINEER

Dan A. Kouba, P.E.

08/14/2021

Texas Department of Transportation
Bryan District

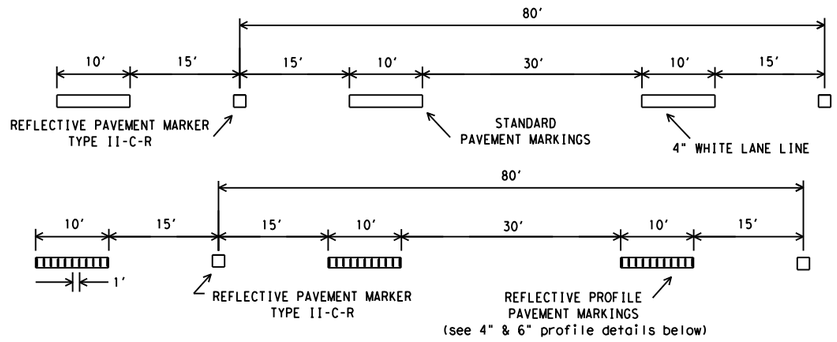
STRIPING LAYOUT

SHEET 18 OF 18 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

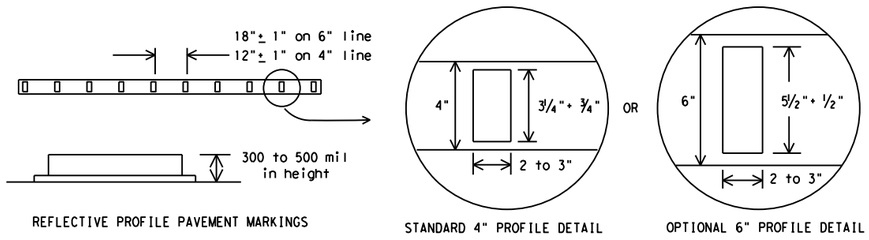
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	74



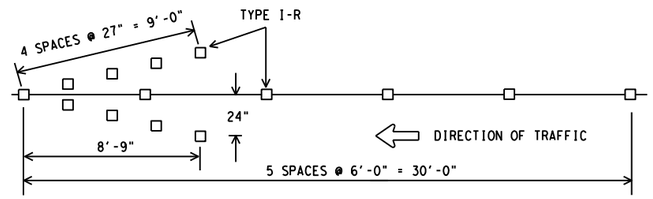
PAVEMENT MARKERS (REFL) TYPE II-C-R SHALL BE SPACED ON 80' CENTERS WITH THE CLEAR FACE TOWARD NORMAL TRAFFIC AND THE RED FACE TOWARD WRONG WAY TRAFFIC.

TRAFFIC LANE LINES PAVEMENT MARKING DETAILS

EDGELINES SHOULD TYPICALLY BE 4" WIDE AND THE MATERIALS SHALL BE AS SPECIFIED IN THE PLANS.
IF RAISED PROFILE PAVEMENT MARKINGS ARE USED SEE DETAILS BELOW.



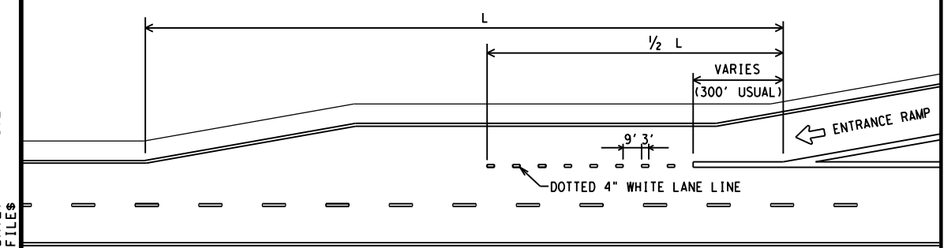
EDGELINE PAVEMENT MARKINGS



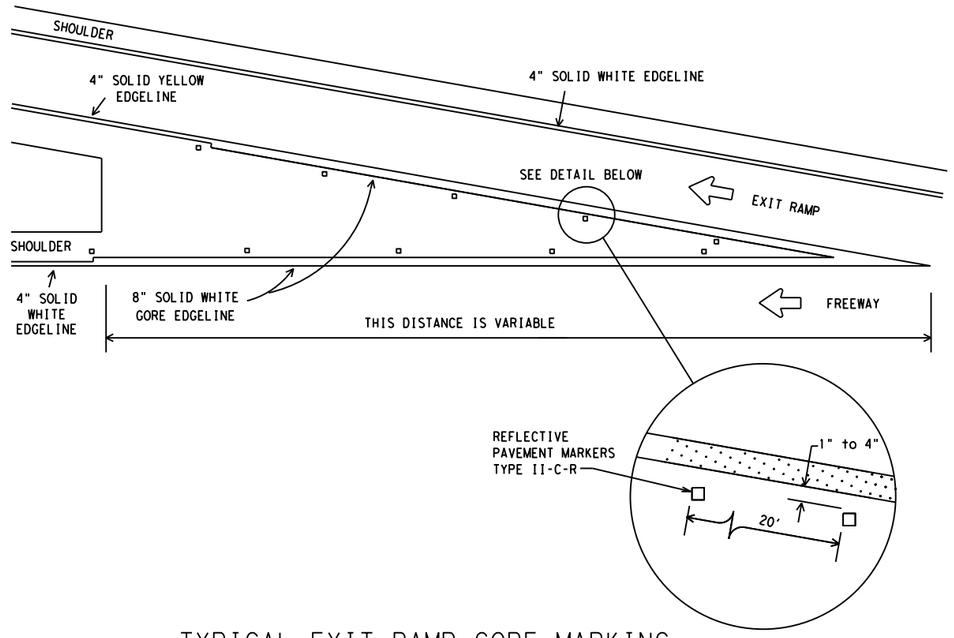
ALL RAISED MARKERS IN THE WRONG WAY ARROW SHALL BE TYPE I-R REFLECTORIZED PAVEMENT MARKERS WITH THE REFLECTORIZED SURFACE FACING THE WRONG WAY TRAFFIC. TYPE II-C-R SHALL NOT BE USED.

REFLECTORIZED WRONG WAY ARROWS, NOT TO EXCEED TWO, MAY BE PLACED ON EXIT RAMPS.
LOCATION OF THE ARROWS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

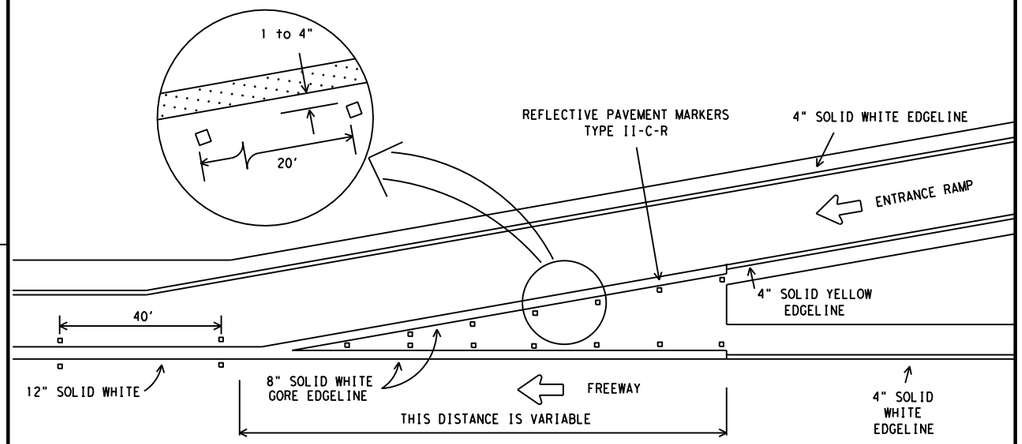
WRONG WAY ARROW DETAIL



PARALLEL ACCELERATION LANE

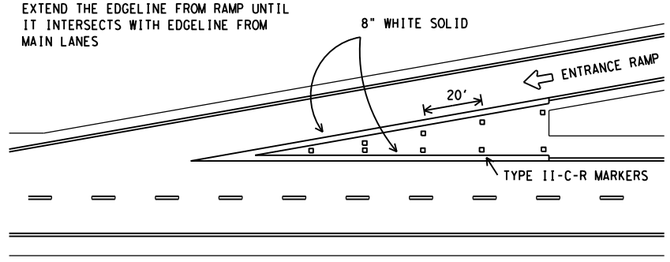


TYPICAL EXIT RAMP GORE MARKING



TYPICAL ENTRANCE RAMP GORE MARKING

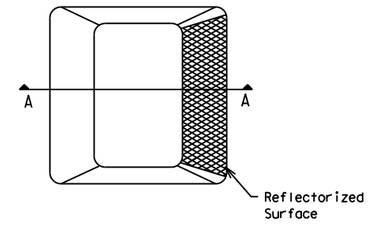
EXTEND THE EDGELINE FROM RAMP UNTIL IT INTERSECTS WITH EDGELINE FROM MAIN LANES



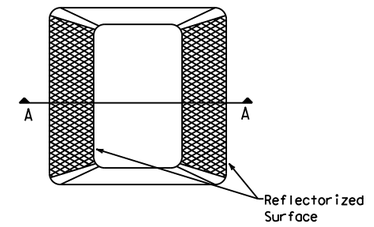
TAPERED ACCELERATION LANE

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

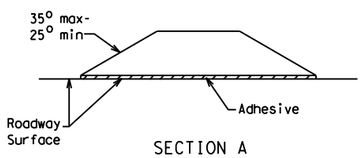
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS WITH RAISED PAVEMENT MARKERS

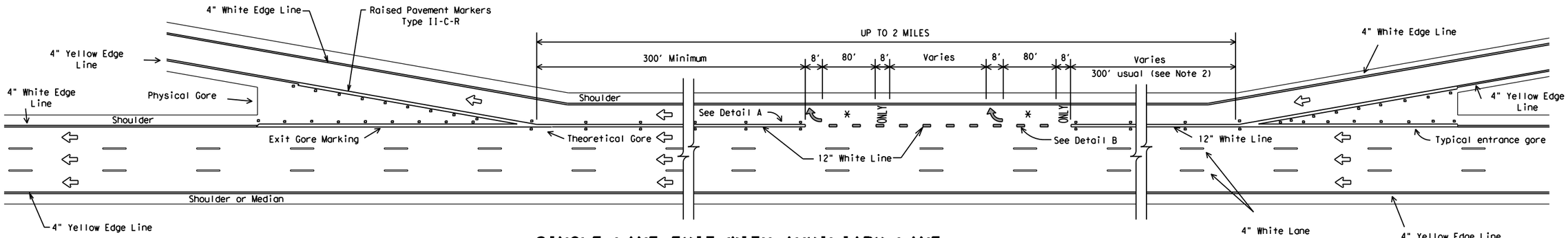
FPM(1)-12

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

REVISIONS		CONT	SECT	JOB	HIGHWAY
4-92	2-10	0675	03	100, ETC.	IH 45
5-00	2-12	DIST	COUNTY		SHEET NO.
8-00		BRYAN	LEON, ETC.		75
2-08					

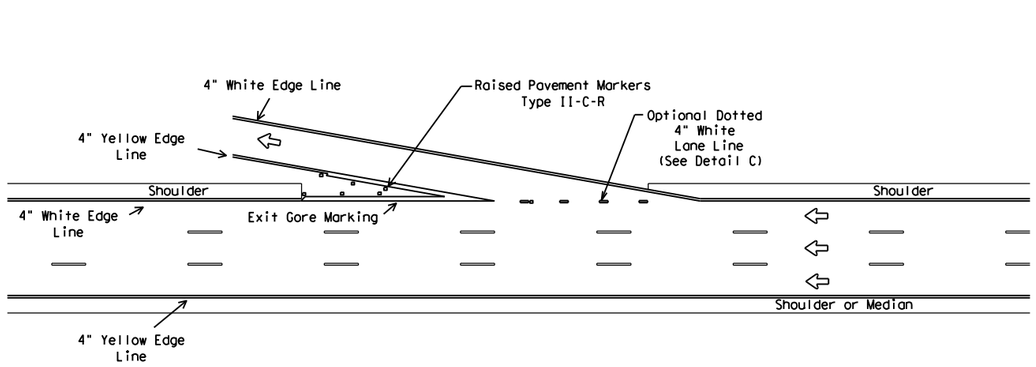
23A

DATE: $DATE$ FILE: $FILE$ $TIME$

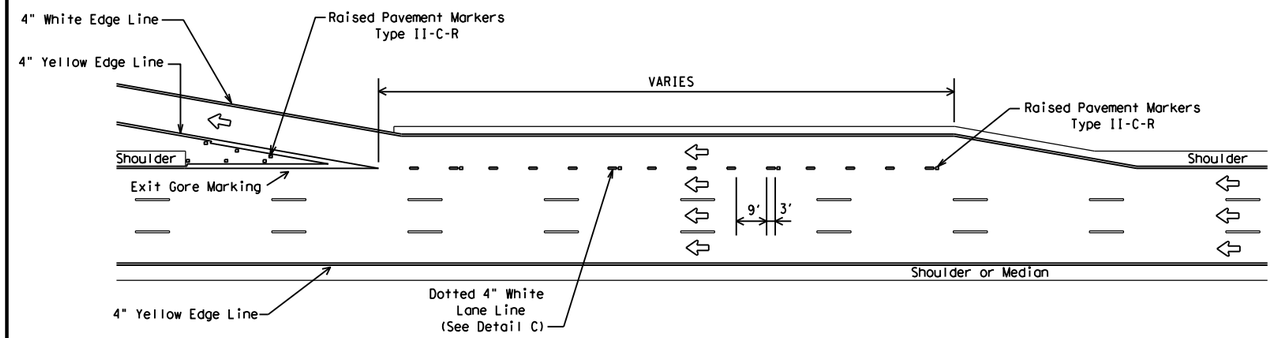


SINGLE LANE EXIT WITH AUXILIARY LANE

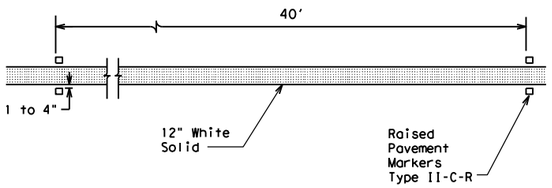
(See Note 2)



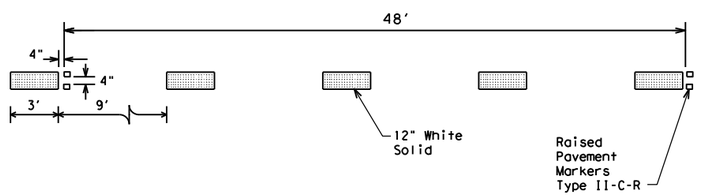
TAPERED DECELERATION LANE



PARALLEL DECELERATION LANE

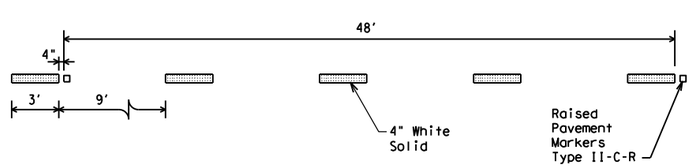


DETAIL A



DETAIL B

Wide (12") Dotted Lane Line (See Note 3)



DETAIL C

Normal (4") Dotted Lane Line (See Note 4)

GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") Dotted Lane Line (See Detail B) is used to separate a through lane from a lane drop at normal exit ramp and from an auxiliary lane between an entrance and exit ramp.
4. Normal (4") Dotted Lane Line (See Detail C) is used at parallel acceleration and deceleration lanes.

LEGEND	
⇦	Denotes direction of traffic.
↱	Pavement marking arrows (white)
✳	Arrow markings are optional, however "ONLY" is required if arrow is used

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

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

Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS ENTRANCE AND EXIT RAMPS

FPM(2)-12

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

REVISIONS
4-92 2-10
8-95 2-12
5-00
8-00

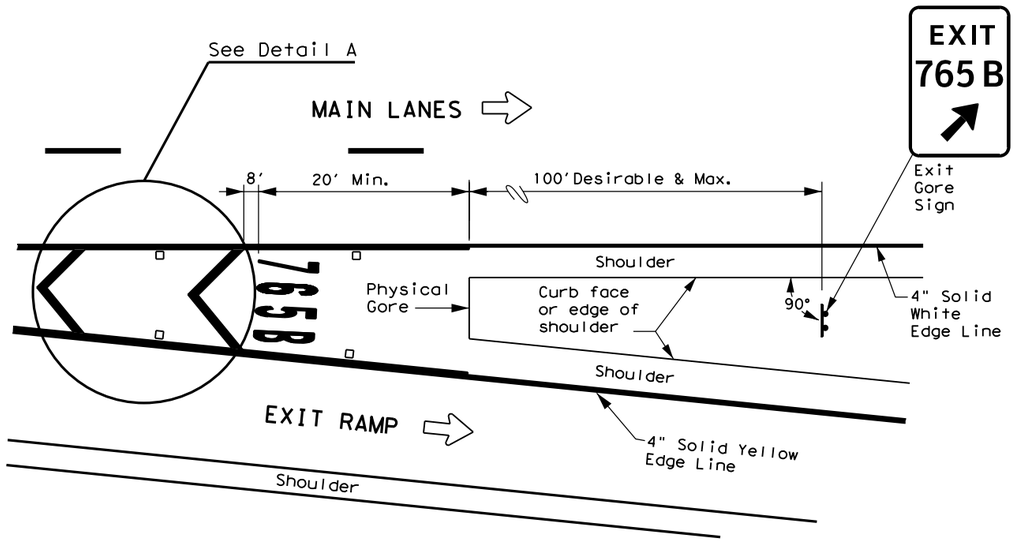
CONT	SECT	JOB	HIGHWAY
0675	03	100, ETC.	IH 45
DIST	COUNTY		SHEET NO.
BRYAN	LEON, ETC.		76

23B

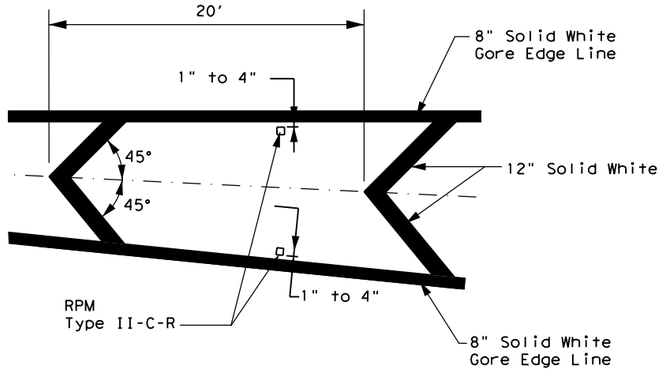
DATE: $DATE$ $TIME$
FILE: $FILE$

EXIT NUMBER PAVEMENT MARKING NOTES

1. Minimum 8 foot white markings should be used, unless otherwise noted.
2. Spacing between letters and numbers should be approximately 4 inches.
3. Pavement markings are to be located as specified elsewhere in the plans.
4. All pavement marking materials shall meet the required Departmental Material Specifications or as specified in these plans.
5. Numbers and Letters details can be found in the Standard Highway Design for Texas (SHSD) Chapter 12 at http://www.txdot.gov



MARKINGS WITH EXIT NUMBER



NOTES

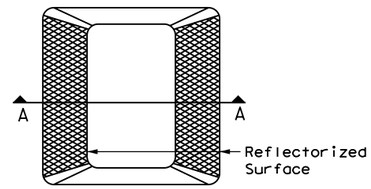
1. Raised pavement markers shall be centered between chevron or gore lines.
2. For more information, see Reflectorized Raised Pavement Marker Detail.

DETAIL A

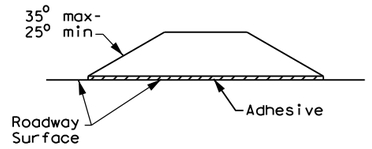
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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

LEGEND	
⇦	Traffic flow
▫	Reflectorized Raised Markers (RPM) Type II-C-R

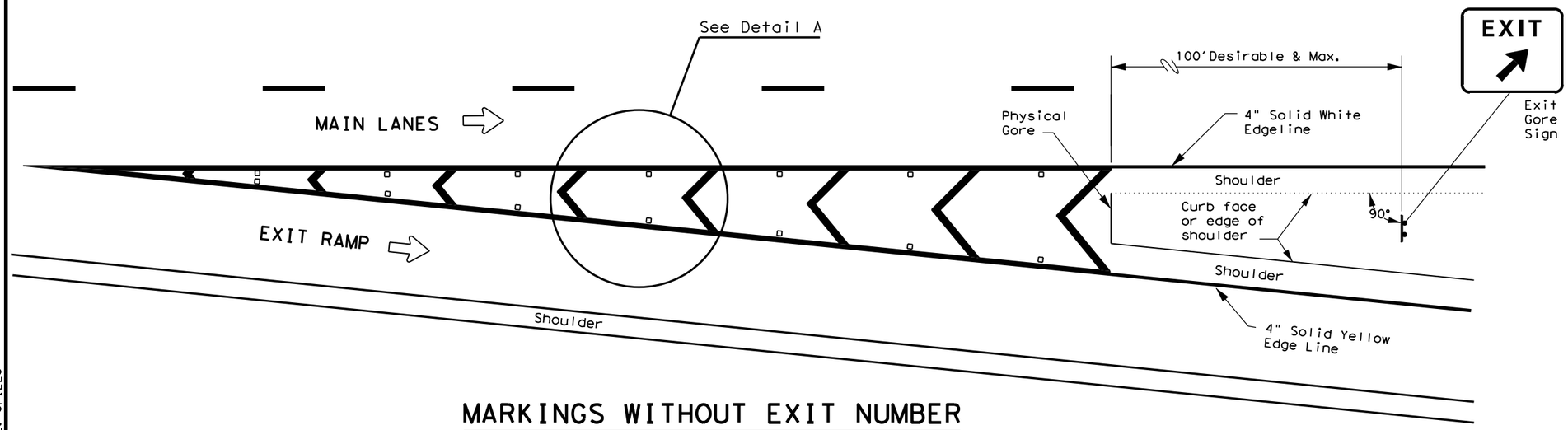


Type II (Top View)



SECTION A

REFLECTORIZED RAISED PAVEMENT MARKER (RPM)



MARKINGS WITHOUT EXIT NUMBER

Texas Department of Transportation

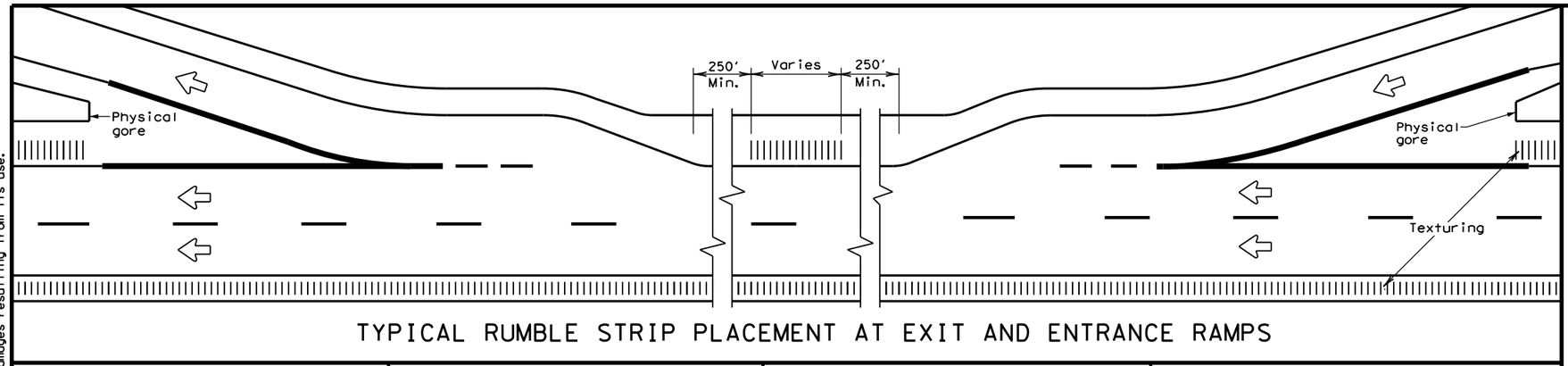
Traffic Safety Division Standard

EXIT GORE PAVEMENT MARKINGS

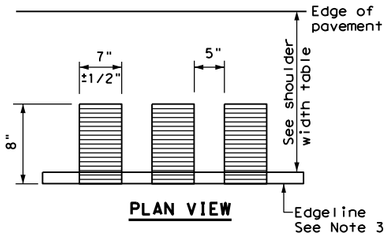
FPM(5)-19

FILE: fpm(5)-19.dgn	DN:	CK:	DW:	CK:
© TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
	DIST	COUNTY		SHEET NO.
	BRYAN	LEON, ETC.		77

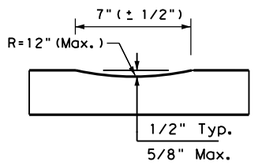
DATE: $DATE$ $TIME$
FILE: $FILE$



TYPICAL RUMBLE STRIP PLACEMENT AT EXIT AND ENTRANCE RAMPS

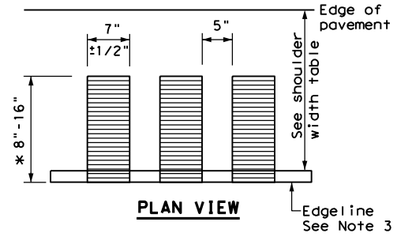


PLAN VIEW



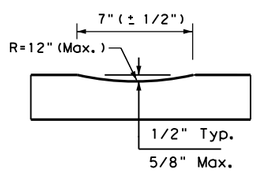
PROFILE VIEW
OPTION 1

CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)



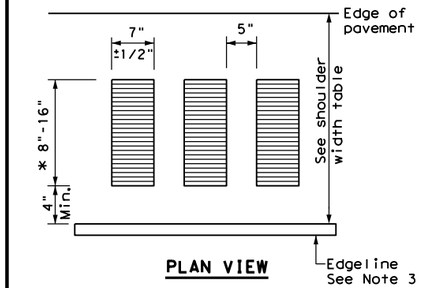
PLAN VIEW

* This distance may vary based on width of shoulder



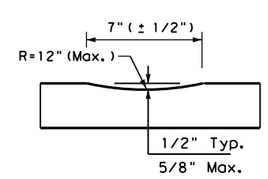
PROFILE VIEW
OPTION 2

CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)



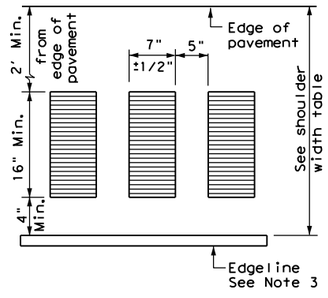
PLAN VIEW

* This distance may vary based on width of shoulder

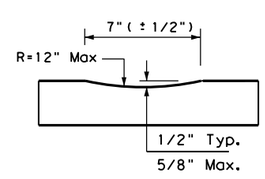


PROFILE VIEW
OPTION 3

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

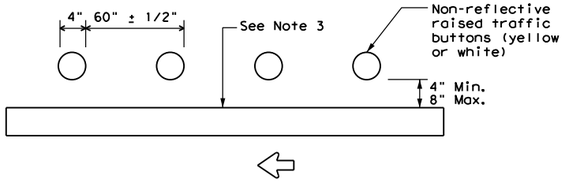


PLAN VIEW



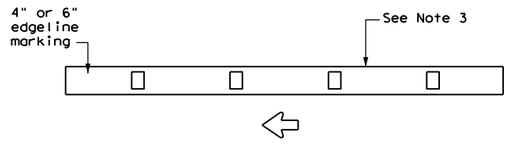
PROFILE VIEW
OPTION 4

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PLAN VIEW
OPTION 5

RAISED EDGELINE RUMBLE STRIPS



PLAN VIEW
OPTION 6

PROFILE EDGELINE MARKINGS

GENERAL NOTES

1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the table below for determining what options may be used for edgeline rumble strips.

WHEN INSTALLING MILLED DEPRESSION EDGELINE RUMBLE STRIPS:

5. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
6. Pavement markings can be applied over milled shoulder rumble strips to create an edgeline rumble stripe.
7. Breaks in edgeline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections and driveways with high usage of large trucks when installed on conventional highways.
8. Rumble strips shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
9. Consideration should be given to noise levels when edgeline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inches depth of milled rumble strip may be considered in these areas.
10. On roadways with high bicycle activity, consideration should be given before the installation of edgeline rumble strips. Things to consider include size of rumble strips, rumble strip material and location of rumble strips on the shoulder. If the designer determines that gaps are needed in the rumble strips due to bicycle use of the road, then follow the requirement shown in FHWA Technical Advisory T5040.39, or latest version. A detail of the spacing shall be included in the plans.

WHEN INSTALLING RAISED OR PROFILE EDGELINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edgeline when used as a rumble strip. The color of the button should match the color of the adjacent edgeline marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. Breaks in edgeline rumble strips using raised traffic buttons shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossing, intersections and driveways with high usage of large trucks when installed on conventional highways.
15. The minimum distance between the edgeline and the buttons should be used if the shoulder is less than 8 feet in width.
16. Raised profile thermoplastic markings used as edgelines may substitute for buttons.

SHOULDER WIDTH TABLE

EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5 OR 6	Option 1, 2, 3, 5 or 6	Option 2, 4, 5 OR 6

Texas Department of Transportation

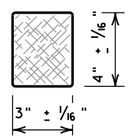
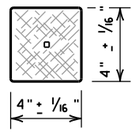
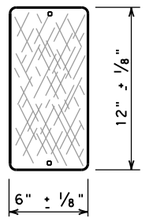
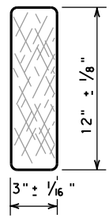
Traffic Operations Division Standard

EDGELINE RUMBLE STRIPS ON FREEWAYS AND DIVIDED HIGHWAYS
RS(1)-13

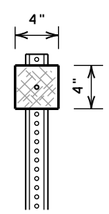
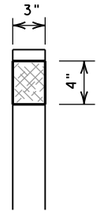
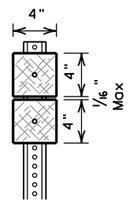
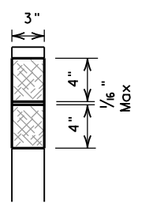
FILE: rs(1)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-10 10-13	0675	03	100, ETC.	IH 45
	DIST	COUNTY		SHEET NO.
	BRYAN	LEON, ETC.		78

DATE: $DATE$ $TIME$
FILE: $FILE$

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

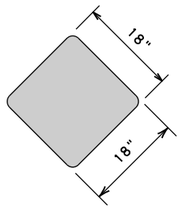
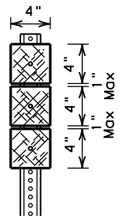
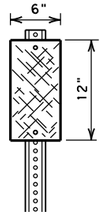
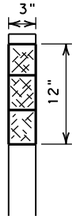
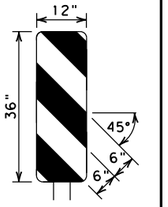
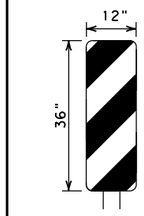
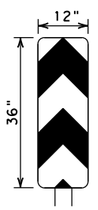
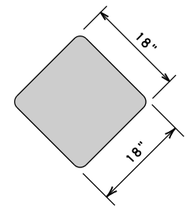
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

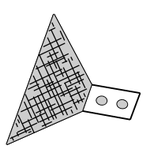
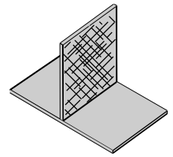
OBJECT MARKERS

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

DEPARTMENTAL MATERIAL SPECIFICATIONS

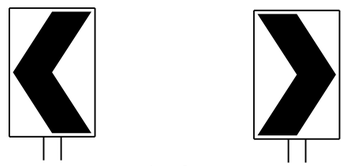
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE

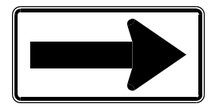


SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

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

ONE DIRECTION LARGE ARROW

DEVICE



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

NOTE:

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dam1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	BRYAN	LEON, ETC.		79

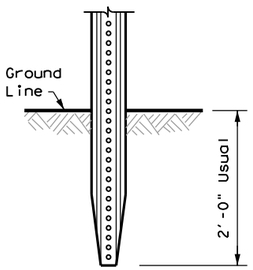
20A

DATE: $DATE$ $TIME$
FILE: $FILE$

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

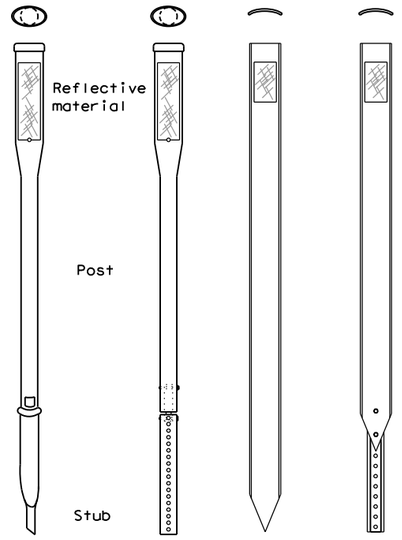


NOTES

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

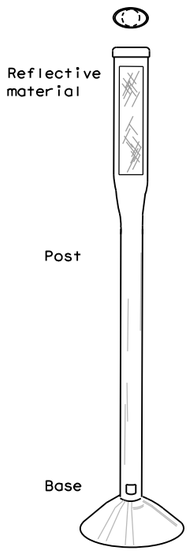
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



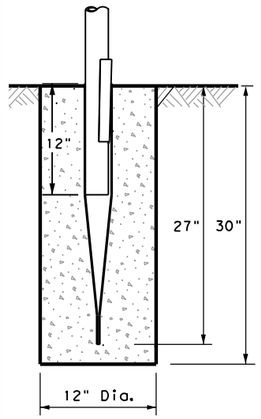
SURFACE MOUNT

NOTES

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

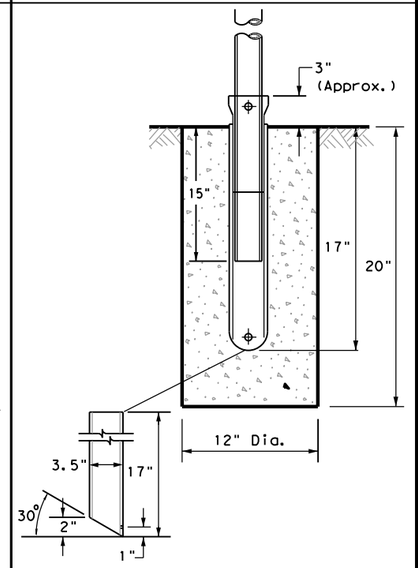
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

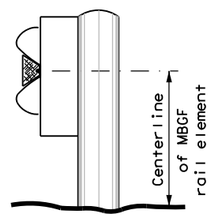
NOTE

1. Install per manufacturer's recommendations.

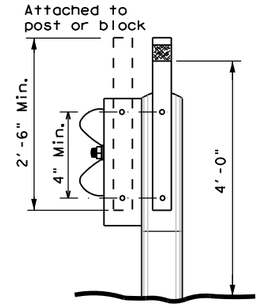
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

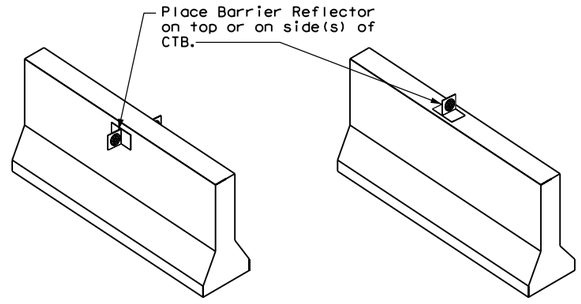
GF1



GF2



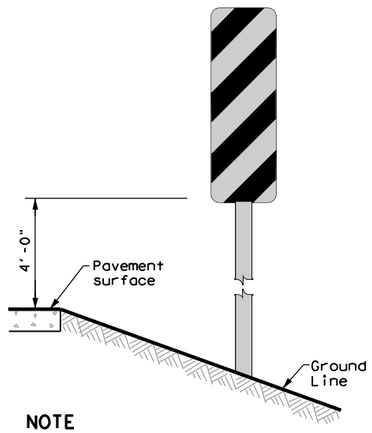
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

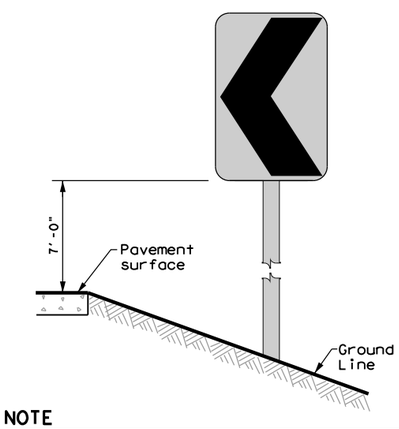
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

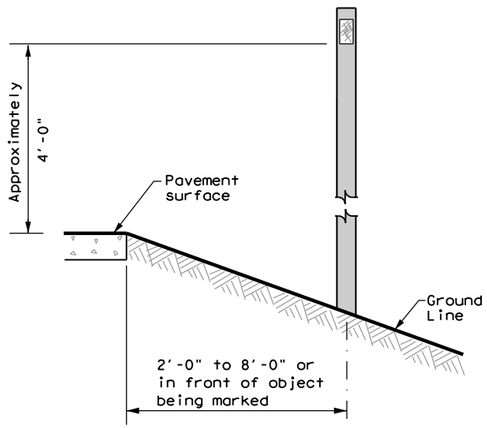
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	BRYAN	LEON, ETC.		80

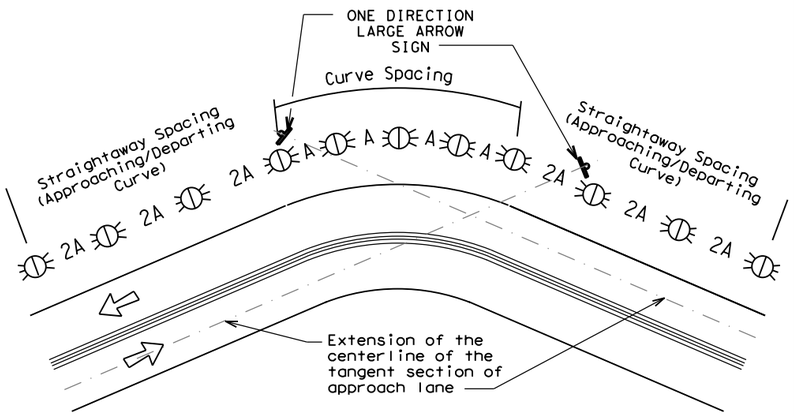
20B

DATE: $DATE$ $TIME$
FILE: $FILE$

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

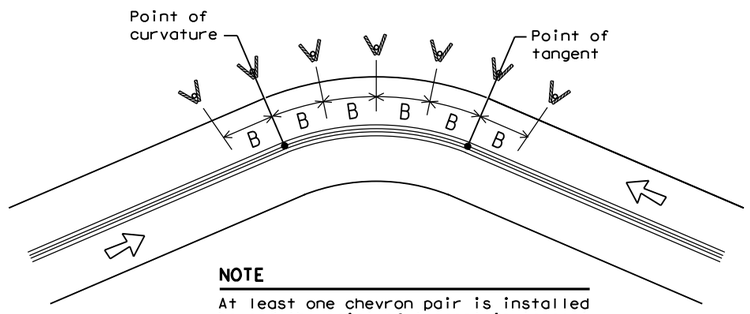
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

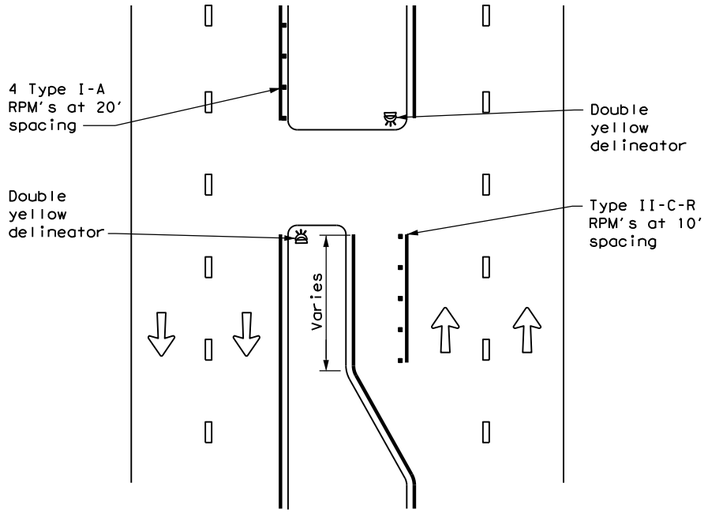
D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	BRYAN	LEON, ETC.		81

20C

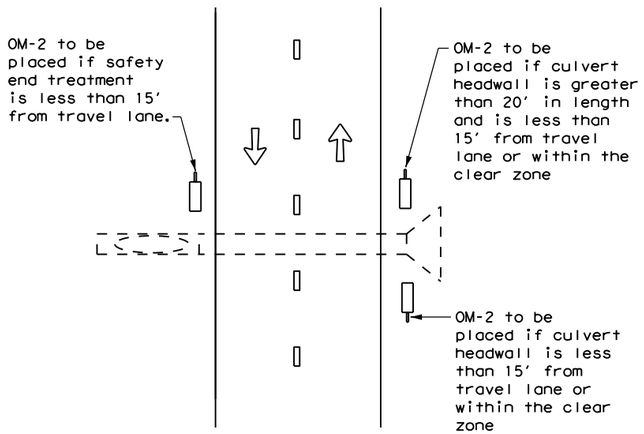
DATE: $DATE$ $TIME$
FILE: $FILE$

CROSSOVERS



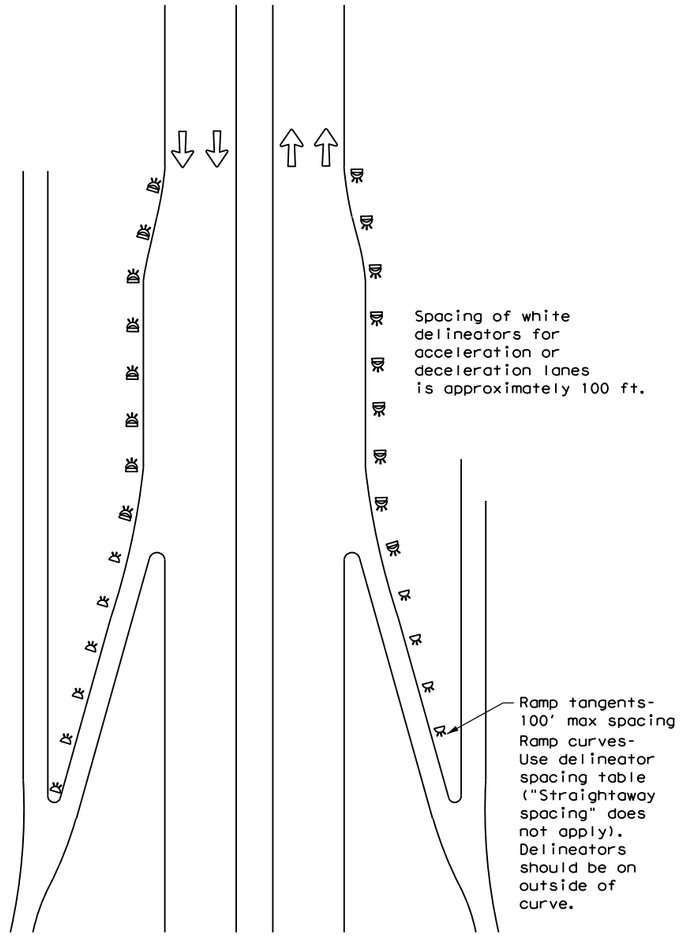
DETAIL 1

FOR CULVERTS WITHOUT MBGF



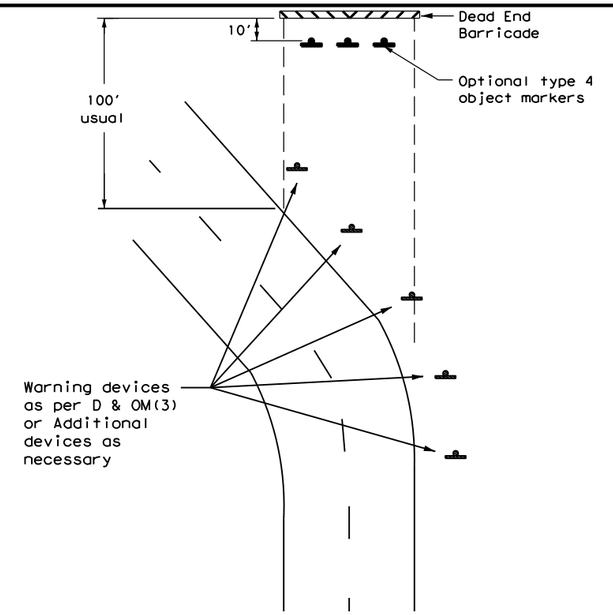
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



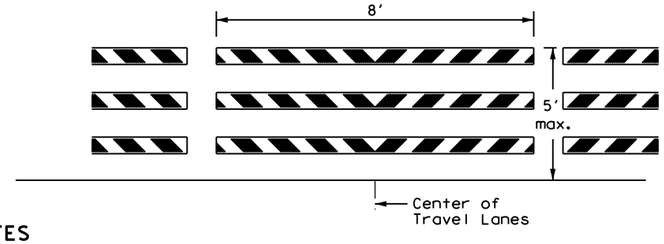
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 3-15 7-20	0675	03	100, ETC.	IH 45
	DIST	COUNTY		SHEET NO.
	BRYAN	LEON, ETC.		82

20D

DATE: $DATE$ $TIME$
FILE: $FILE$

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

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

☐ Required Action ☒ No Action Required

Action No.

Refer to 2014 TxDOT Standard Specification Items:
7.7.2 Texas Pollutant Discharge Elimination System (TPDES) Permits and Storm Water Pollution Prevention PLans (SWP3)
506 Temporary Erosion, Sedimentation and Environmental Controls
734 Litter Removal
735 Debris Removal
738 Cleaning and Sweeping Highways

II. WORK IN OR NEAR STREAMS, WATER BODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.
The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required

☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP#

Information regarding the USACE Nationwide Permit Program can be found at:
http://www.swf.usace.army.mil/Missions/Regulatory/Permitting/GeneralPermits.aspx

Refer to 2014 TxDOT Standard Specification Items:
7.7.3 Work in Waters of the United States
7.7.6 Project Specific Locations
496 Removing Structures
506 Temporary Erosion, Sedimentation and Environmental Controls
506.4.3.4 Restricted Activities and Required Precautions

III. CULTURAL RESOURCES

Refer to 2014 TxDOT Standard Specification Item 7.7.1 Cultural Resources, in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) immediately cease work in the vicinity and contact the Engineer.

☐ Required Action ☒ No Action Required

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.

☐ Required Action ☒ No Action Required

Refer to 2014 TxDOT Standard Specification Items:
160 Topsoil
161 Compost
162 Sodding for Erosion Control
164 Seeding for Erosion Control
166 Fertilizer
168 Vegetative Watering
169 Soil Retention Blankets
170 Irrigation System
180 Wildflower Seeding
192 Landscape Planting
193 Landscape Establishment
506 Temporary Erosion, Sedimentation, and Environmental Controls
730 Roadside Mowing
751 Landscape Maintenance
752 Tree and Brush Removal

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☒ Required Action ☐ No Action Required

Action No.

1. Do not kill snakes or other animals!

2. Do not destroy nests on structures within the project limits.

   Temporarily prevent the building of nests on any structures that require work within the project limits during the construction timeframe.

   This can be accomplished by application of bird repellant gel, netting, or removal by hand every 3-4 days.

   The nesting/breeding season for migratory birds is March 1 - September 1.

Under the Migratory Bird Treaty Act (MBTA), it is unlawful by any means or manner, to pursue, hunt, take, capture, [or] kill any migratory birds except as permitted by regulation (16 U.S.C. 703-704). Neither the statute nor its implementing regulations (Title 50, Code of Federal Regulations, Parts 10, 13, 21) exempt unintentional take of migratory birds. The unauthorized take (e.g. killing, capturing, or collecting) of migratory birds is a strict liability criminal offense that does not require knowledge or specific intent on the part of the offender. Even when engaged in an otherwise lawful activity for which the intent is not the killing of migratory birds, a violation may be committed.

3. If caves or sinkholes are discovered, cease work in the immediate area to verify the presence or absence of wildlife.

The Bryan District Environmental Section can be contacted at (979) 778-9766 to assist with the removal of wildlife that will not leave on their own with gentle persuasion.

Refer to 2014 TxDOT Standard Specification Item:
7.7.6 Project Specific Locations

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropiate for any hazardous materials used. Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the Engineerimmediately. The Contractor shall be responsiblefor the proper containment and cleanup of all product spills.

Contact the Engineer if any of the follwing are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

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

☐ Yes ☒ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

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

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discoverd on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ Required Action ☐ No Action Required

Action No.

1. The Clean Water Act, in part, requires that any spill of oil that could enter a waterway, as defined by the Act, and that violates applicable water quality standards or causes a film or sheen on water require reporting to the TCEQ and local authorities.
   Contact the Bryan District Enviromental Section at 979-778-9766.

   If potentially hazardous material and/or contaminated media (i.e. soil, groudwater, surface water, sediment, building materials) are unexpectedly encountered during construction, immediately cease work in the vicinity and contact the Engineer.

   Refer to 2014 TxDOT Standard Specification Items:
   6.10 Hazardous Materials
   7.12 Responsibility for Hazardous Materials

VII. OTHER ENVIRONMENTAL ISSUES

☐ Required Action ☒ No Action Required

Refer to 2014 TxDOT Standard Specification Items:
7.7.6 Project Specific Locations
751 Landscape Maintenance

Contacts:

Mr. John D. Moravec
Environmental Coordinator
Texas Department of Transportation
Bryan District
2591 N. Earl Rudder Freeway
Bryan, TX 77803
Phone: (979) 778-9766
Fax: (979) 778-9702
e-mail: John.Moravec@txdot.gov

PRINT DATE	REVISION DATE
$DATE$	02/12/2015

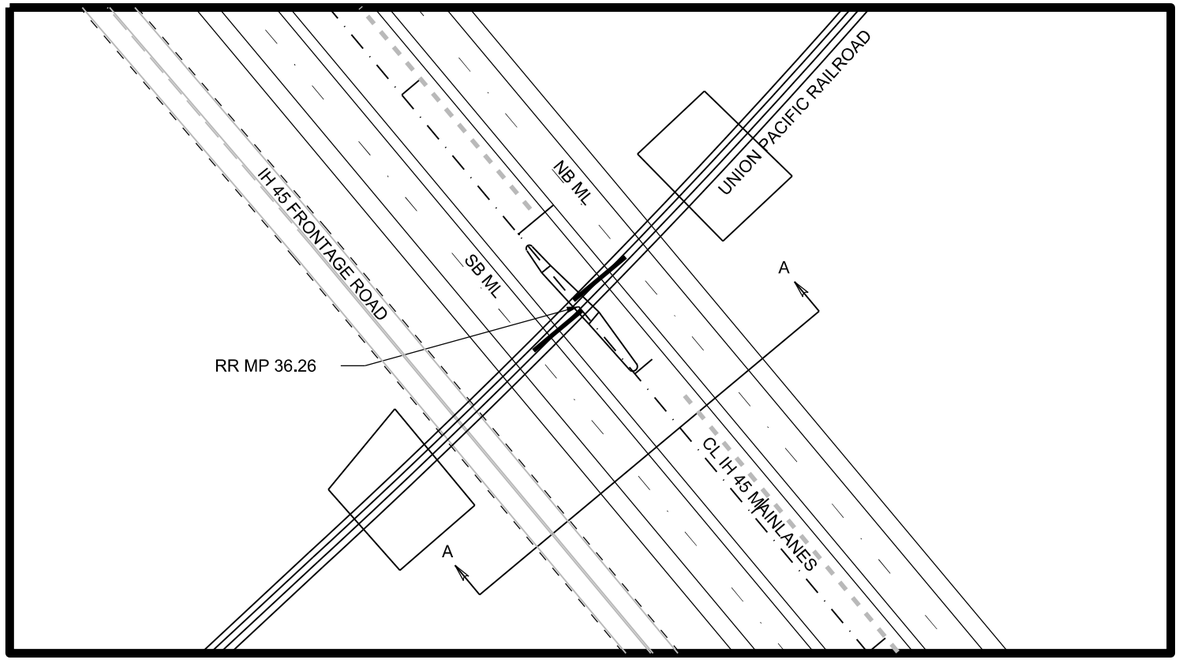
Texas Department of Transportation
Bryan District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

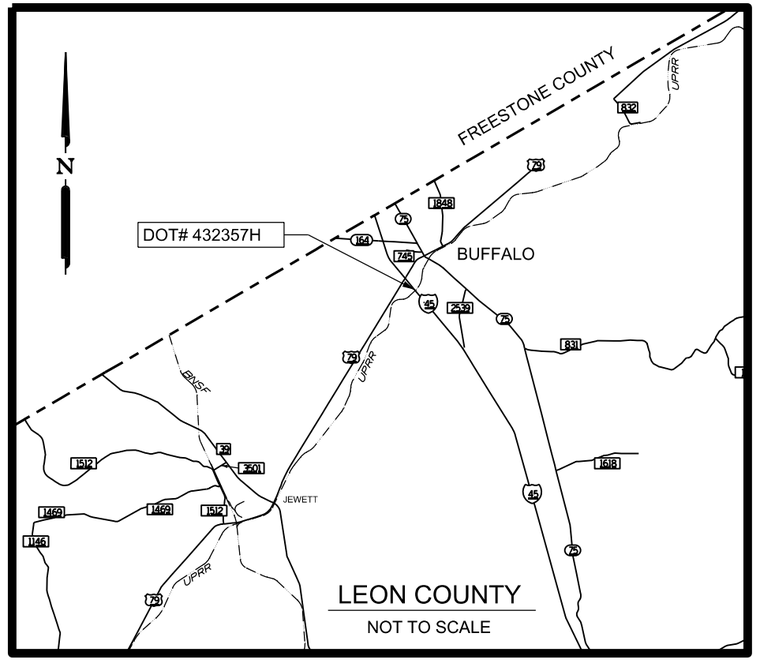
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	LEON, ETC.	
CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	83

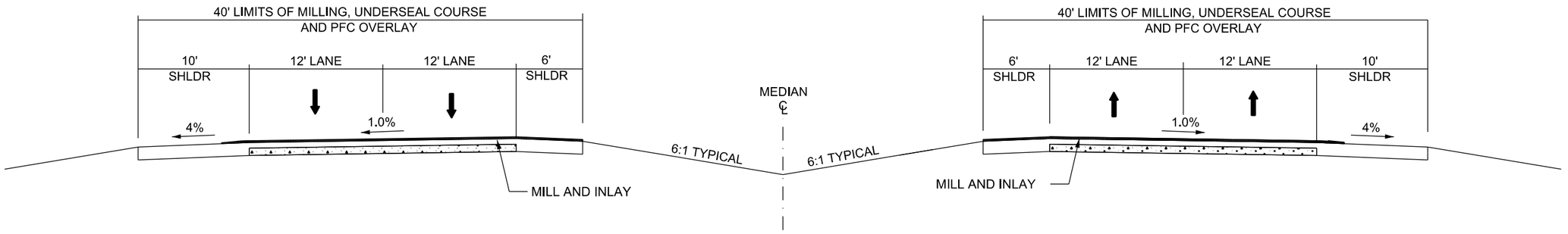
REV DATE: 2-12-2015
CSJ: 0675-03-100
FILENAME: $FILE$



LEON COUNTY

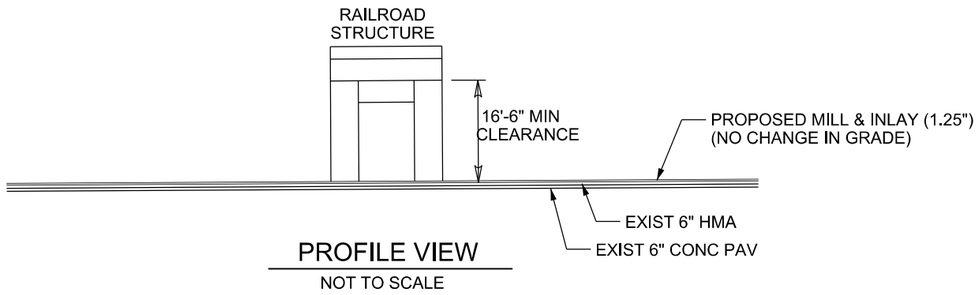
NOT TO SCALE





SECTION A-A
PROPOSED SECTION AT RAILROAD

NOT TO SCALE



PROFILE VIEW

NOT TO SCALE

PRINT DATE	REVISION DATE
$DATE$	

Texas Department of Transportation
Bryan District

RAILROAD EXHIBIT
DOT 432357H
IH 45 CSJ: 0675-03-100

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6		IH 45

STATE	DISTRICT	COUNTY
TEXAS	BRYAN	LEON, ETC.

CONTROL	SECTION	JOB	SHEET NO.
0675	03	100, ETC.	84

REV DATE: 2-12-2015
CSJ: 0675-03-100
FILENAME: $FILE$

DATE:
FILE:

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

DOT #: 432357H
Crossing Type: ** UNION PACIFIC RAILROAD UNDERPASS
RR Company Owning Track at Crossing: Union Pacific Railroad
Operating RR Company at Track: Union Pacific Railroad
RR MP: 36.26
RR Subdivision: Hearne
City: Buffalo
County: LEON
CSJ at this Crossing: 0675-03-100
Highway/Roadway name crossing the railroad: IH 45
# of regularly scheduled trains per day at this crossing: 10
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW:

Scope of Work at this Crossing to Be Performed by State Contractor:
MILL & OVERLAY

Scope of Work at this Crossing to Be Performed by Railroad Company:
NONE

** Choose: Highway Overpass, Highway Underpass, At Grade, Pedestrian, or Closed/Abandoned

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

III. FLAGGING

of Days of Railroad Flagging Expected: 0

On this project, night or weekend flagging is:

☐ Expected
☒ Not Expected

Flagging services will be provided by:

☐ Railroad Company: TxDOT will pay flagging invoices
☐ Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The railroad requires a 30 day notice if their flaggers are to be utilized. If contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:
N/A

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

On this project, construction work to be performed by a railroad company is:

☐ Required
☒ Not Required

Coordinate with TxDOT for any work to be performed by the railroad company. TxDOT must issue a work order for any work done by the rail road company prior to the work being performed.

V. RAILROAD INSURANCE REQUIREMENTS

Contractor shall provide the proper insurance as shown in the table below.

Insurance policies must be issued for and on behalf of the Railroad. Where more than one Railroad Company is operating on the same right of way or where several railroad companies are involved and operate on their own separate rights of way, provide separate insurance policies in the name of each Railroad Company.

No direct compensation will be made to the contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
Commercial General Liability	$2,000,000 / $2,000,000
Business Automobile	$2,000,000 combined single limit
Railroad Protective Liability	$2,000 / $6,000

VI. CONTRACTOR'S RIGHT-OF-ENTRY (ROE) AGREEMENT

On this project, an ROE agreement is:

☒ Not Required
☐ Required: TxDOT to assist in obtaining (see Item 5, Article 8.3)

With the following railroad companies: _____

☐ Required: Contractor to obtain (see Item 5, Article 8.4)

With the following railroad companies: _____

To view previously approved ROE agreement templates agreed upon between the State and railroad company, see:

http://www.txdot.gov/inside-txdot/division/traffic/samples.html

Approved ROE agreement templates are not to be modified by the Contractor.

Contractor shall not operate within railroad rights of way without an executed Construction & Maintenance agreement between the state and the railroad and an executed ROE agreement between the contractor and the railroad if required on project.

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

☒ Not Required
☐ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are required to maintain the same insurance coverage as required of the Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call Union Pacific Railroad Emergency Line
at 1-800-848-8715
Location: DOT 432357H
RR Milepost 36.26 Hearne Subdivision

Texas Department of Transportation
Traffic Operations Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
	DIST	COUNTY		SHEET NO.
	BRYAN	LEON, ETC.		85

PART 1 - GENERAL

1.01 DESCRIPTION

This project includes construction work within the Right-of-Way and/or properties of the Railroad Company and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right-of-Way or when impacting current or future Railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT Standard Specifications, Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

For purposes of this project, the Railroad Designated Representative is the person or persons designated by the Railroad Manager of Industry and Public Projects to handle specific tasks related to the project.

1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right-Of-Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right-Of-Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

1.03 PLANS / SPECIFICATIONS

TxDOT has received writtern Railroad approval of the plans and specifications for this project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad website or by contacting the Railroad Designated Representative.

PART 3 - CONSTRUCTION

3.01 GENERAL

A. Perform all work in compliance with all applicable Railroad, Federal Railroad Administration (FRA), and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of Railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.

B. Construction activities within 12 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 12 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.

C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.

D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with Railroad approval.

E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.

F. Railroad requirements do not allow work withing 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment. Additional allowances may be pursued as outlined in 3.02 and 3.03.

G. All permanent clearances shall be verified before project closing.

3.02 RAILROAD OPERATIONS

A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.

B. All railroad tracks within and adjacent to the Contract Site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. Railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.

C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:

1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a Railroad flag person will be required. At the direction of the Railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.

2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. Railroad flag persons will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

A. Do not perform any work within Railroad Right-of-Way without a valid executed Right of Entry Agreement if required on this project.

B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right-of-Way and observe the Railroad's rules and regulations with respect thereto.

C. Perform all work upon Railroad Right-of-Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.15 for railroad flagging requirements.

D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request:
1. Exactly what the work entails.
2. The days and hours that work will be performed.
3. The exact location of work, and proximity to the tracks.
4. The type of window requested and the amount of time requested.
5. The designated contact person.

Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.

E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

3.04 INSURANCE

Do not begin work upon or over Railroad Right-of-Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right-of-Entry Agreement", and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

3.05 RAILROAD SAFETY ORIENTATION

A. Complete the Railroad course "Orientation for Contractor's Safety", and maintain current registration prior to working on Railroad property. This orientation is available at www.contractororientation.com. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

"KCS/TEXMEX will not accept on-track safety training certificates from other railroads. Contractor's employees entering the KCS railroad shall hold current certificates at all times. The training can be had by contacting Larry Slater of TrackSense Inc. at 330-847-8661 or by email at lslater@neo.rr.com."

B. Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

3.06 COOPERATION

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right-of-Way in performing the work.

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

Abide by the following minimum temporary clearances during the course of construction:
A. 15' - 0" (BNSF), 14'-0" (KCS), and 12'-0" (UPRR) horizontal from centerline of track
B. 22' (KCS) and 21' - 6" (UPRR & BNSF) vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Operating Unit review and approval.

3.08 APPROVAL OF REDUCED CLEARANCES

A. Maintain minimum track clearances during construction as specified in Section 3.07.

B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.

C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

DATE: $DATE$ $TIME$
FILE: $FILE$

Texas Department of Transportation

Traffic Operations Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0675	03	100, ETC.	IH 45
	DIST	COUNTY		SHEET NO.
	BRYAN	LEON, ETC.		86

3.09 MAINTENANCE OF RAILROAD FACILITIES

A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right-of Way and repair any other damage to the property of the Railroad, or its tenants.

B. Perform all such maintenance and repair of damages due to the Contractors's operations at Contractor's expense.

C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the Project Site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
   1. Pre-construction meetings.
   2. Pile driving/drilling of caissons or drilled shafts.
   3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
   4. Erection of precast concrete or steel bridge superstructure.
   5. Placement of waterproofing (prior to placing ballast on bridge deck).
   6. Completion of the bridge structure.

B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.

C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.11 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad at expense of TxDOT to protect Railroad facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.

B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other Railroad facilities may be subject to settlement or movement.

C. During any clearing, grubbing, excavation or grading in proximity to Railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger Railroad facilities or operations.

D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, Railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.

E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.12 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOT. This work by the Railroad will be done by its own forces and it is not a part of the Work under this Contract.

3.13 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around Railroad facilities with the Railroad Designated Representative.

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".

B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

   UPRR 1-800-336-9193
   7:00 AM to 9:00 PM CST Monday-Friday except holidays,
   staffed 24 hrs/day for emergencies
   48 hrs notice required

   BNSF 1-800-533-2891
   24 hour number
   5 working days notice required

   KCS 1-800-344-8377
   Texas One Call, a 24 hour number
   48 hrs notice required, excluding weekends and holidays

   If a telecommunications system is buried anywhere on or near Railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near Railroad property. Refer to the project General Notes for additional information.

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor-assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of 1/4" vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.15 RAILROAD FLAGGING

Per the RIGHT OF ENTRY agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor work and at least 30 working days in advance of any Contractor work in which any person or equipment will be within 25 feet of nearest rail.

3.16 CLEANING OF RIGHT-OF-WAY

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

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