

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	SUPPLEMENTAL INDEX OF SHEETS

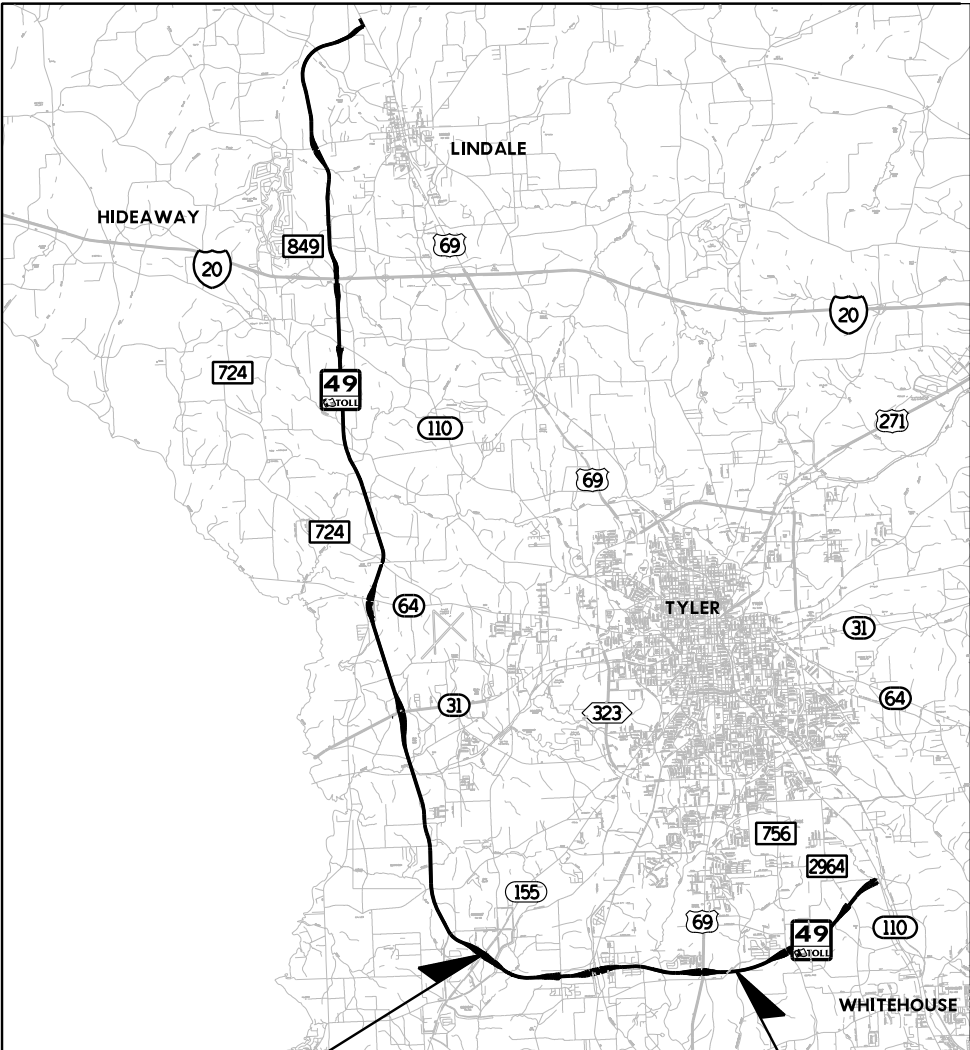
NET RMA  
NORTH EAST TEXAS REGIONAL MOBILITY AUTHORITY  
PLANS OF EXISTING  
TOLL ROAD

SMITH COUNTY  
TOLL 49 (SEGMENT 1) OVERLAY PROJECT

LIMITS: SH 155 TO SHACKLEFORD CREEK BRIDGE

NET LENGTH OF ROADWAY = 26,236.570 FT. = 4.969 MI.  
NET LENGTH OF BRIDGE = 4341.270 FT. = 0.822 MI.  
NET LENGTH OF PROJECT = 30,577.840 FT. = 5.791 MI.  
TOTAL PROJECT LENGTH = 30,577.840 FT. = 5.791 MI.

FOR THE MAINTENANCE OF AN EXISTING FACILITY CONSISTING OF ASPHALT OVERLAY, PAVEMENT MARKINGS AND GUARD FENCE REPLACEMENT.



SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 1, 2012)

BEGIN PROJECT

TOLL 49  
SEG 1  
STA 936+62.99

PROJECT LAYOUT  
N. T. S.

EXCEPTIONS: NONE  
EQUATIONS: 970+00 BK = 133+70 AH  
RR CROSSINGS: NONE

END PROJECT

TOLL 49  
SEG 2  
STA 406+10.83

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
6		1
STATE	LOCATION	COUNTY
TEXAS	TYLER	SMITH
CONT.	SECT.	JOB
		TOLL 49

DATE: 12/21/2021 4:46:52 PM  
FILE: d:\pw\_wor-k\atkrat\01\mccq2543\dms73683\Toll 49\_S1\_OVERLAY\_TITLE.dgn

DN: CK: DW: CK: CK:

PREPARED BY 12/21/2021  
*Shane J. Tully*  
SHANE J. TULLY, P.E.  
ATKINS PROJECT MANAGER

ATKINS 909 ESE LOOP 323,  
SUITE 520  
TYLER, TX 75701  
TBPE REG. # F-474

REVIEWED BY 1-3-2022  
*Mark McClanahan*  
NET RMA MAINTENANCE DIRECTOR

**NET RMA**  
North East Texas  
Regional Mobility Authority

SUBMITTED BY 1-3-2022  
*Glen S. Green, P.E.*  
NET RMA EXECUTIVE DIRECTOR

DATE: 12/21/2021 4:48:16 PM  
FILE: d:\pw\_work\atkrat\01\mcca2543\dms73683\Toll 49\_S1\_OVERLAY\_Index.dgn

Ckt
DW
Ckt
DW

SHEET NO.

DESCRIPTION

<u>GENERAL</u>	
1	TITLE SHEET
2	SUPPLEMENTAL INDEX OF SHEETS
3-4	PROJECT LAYOUTS
5	TYPICAL SECTION AND DETAILS
6	BASIS OF ESTIMATE
7-11	SUMMARY OF QUANTITIES
12, 12A-12G	GENERAL NOTES
<u>TRAFFIC CONTROL PLAN</u>	
13	TRAFFIC CONTROL PLAN NARRATIVE
14	JOINT LAYOUT AND STRIPING DETAIL
15	TRAFFIC CONTROL PLAN AT EXIT RAMPS
16-21	TRAFFIC CONTROL PLAN AT ENTRANCE RAMPS
<u>TRAFFIC CONTROL PLAN STANDARDS</u>	
22-33	BC (1-12)-21
34	TCP (1-1)-18
35	TCP (1-2)-18
36	TCP (1-3)-18
37	TCP (1-4)-18
38	TCP (1-5)-18
39	TCP (3-1)-13
40	TCP (3-3)-14
41	TCP (3-4)-13
42	TCP (5-1)-18
43	TCP (6-1)-12
44	TCP (6-3)-12
45	TCP (6-6)-12
46	TCP (7-1)-13
47	WZ (STPM)-13
48	WZ (RS)-16
<u>ROADWAY</u>	
49	HORIZONTAL ALIGNMENT DATA
50-75	OCST & STRIPING
<u>ROADWAY STANDARDS</u>	
76	BED-14
77	GF (31)-19
78-79	GF (31)TRTL3-20
80	GF (31)MS-19
81	SGT(12S)31-18
82	SGT(15)31-20
<u>PAVEMENT MARKING STANDARD DETAILS</u>	
83-85	PM(1-3)-20
86-88	RS(1,3,4)-13
89-90	D&OM(1-2)-20
91-92	D&OM(5-6)-20
93	D&OM(VIA)-20
94	FPM(1)-12

ATKINS

IBPE REG. # F-474

NET RMA

North East Texas  
Regional Mobility Authority

TOLL 49

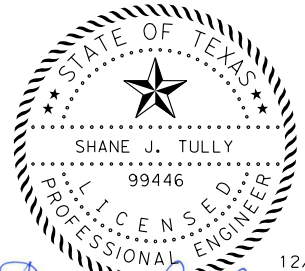
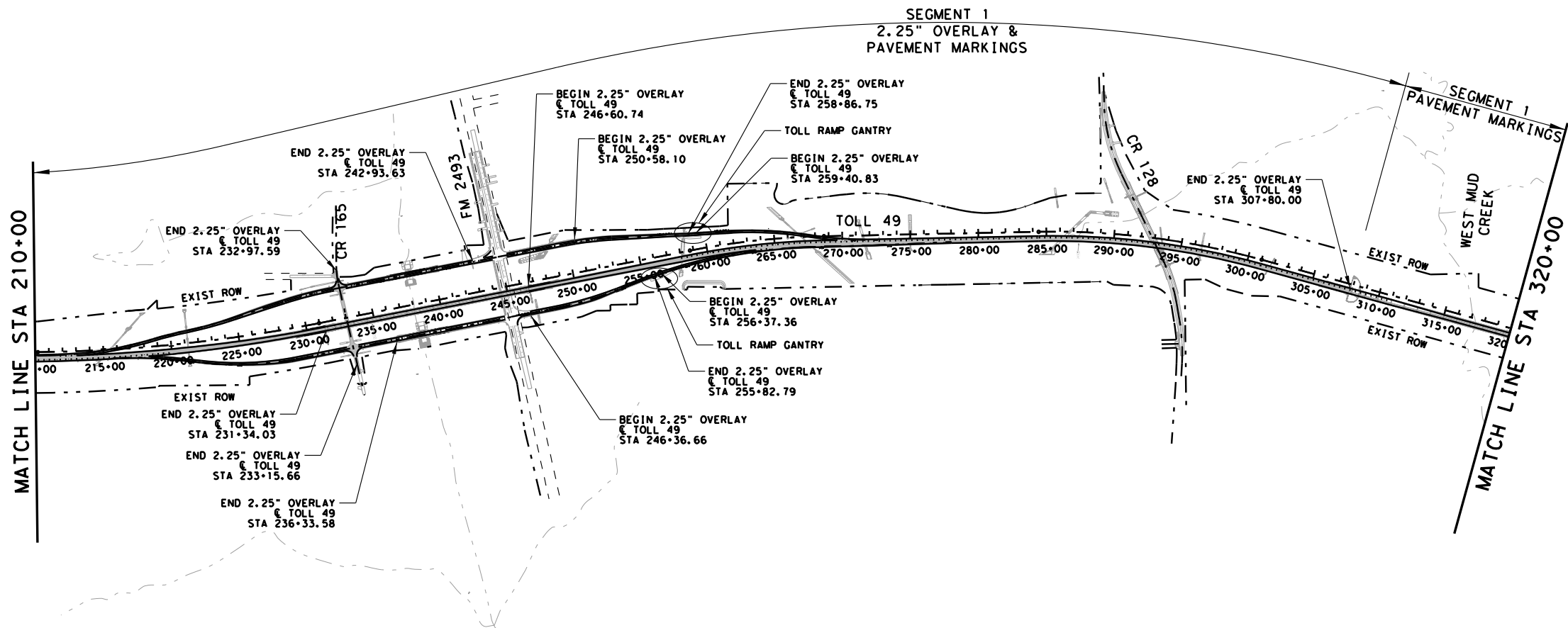
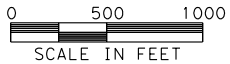
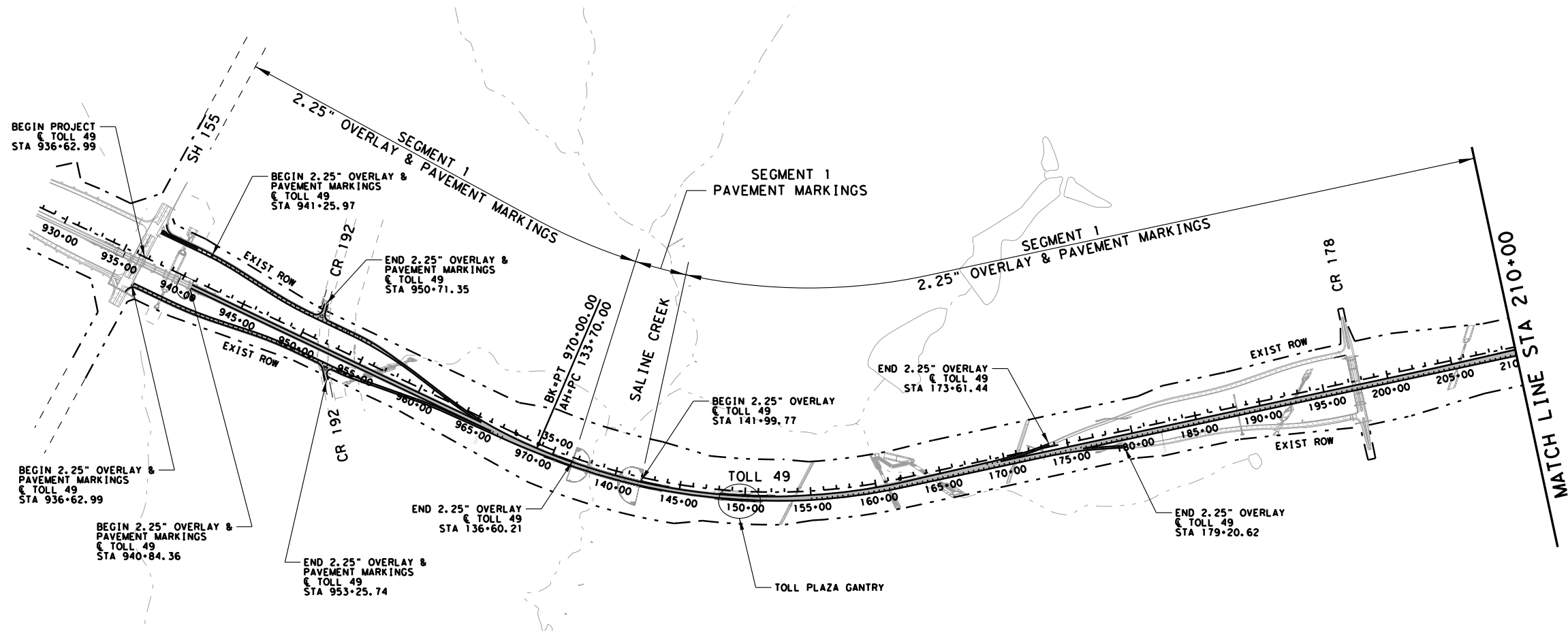
SUPPLEMENTAL  
INDEX OF SHEETS

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			2
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49



DATE: 12/21/2021 4:48:25 PM  
FILE: d:\pw\_wor-k\atknat\01\mccq2543\dms73683\To11 49\_S1\_OVERLAY\_PL\_01.dgn

DN: CK: DW: CK:



Shane J. Tully

**ATKINS**

TBPE REG. # F-474



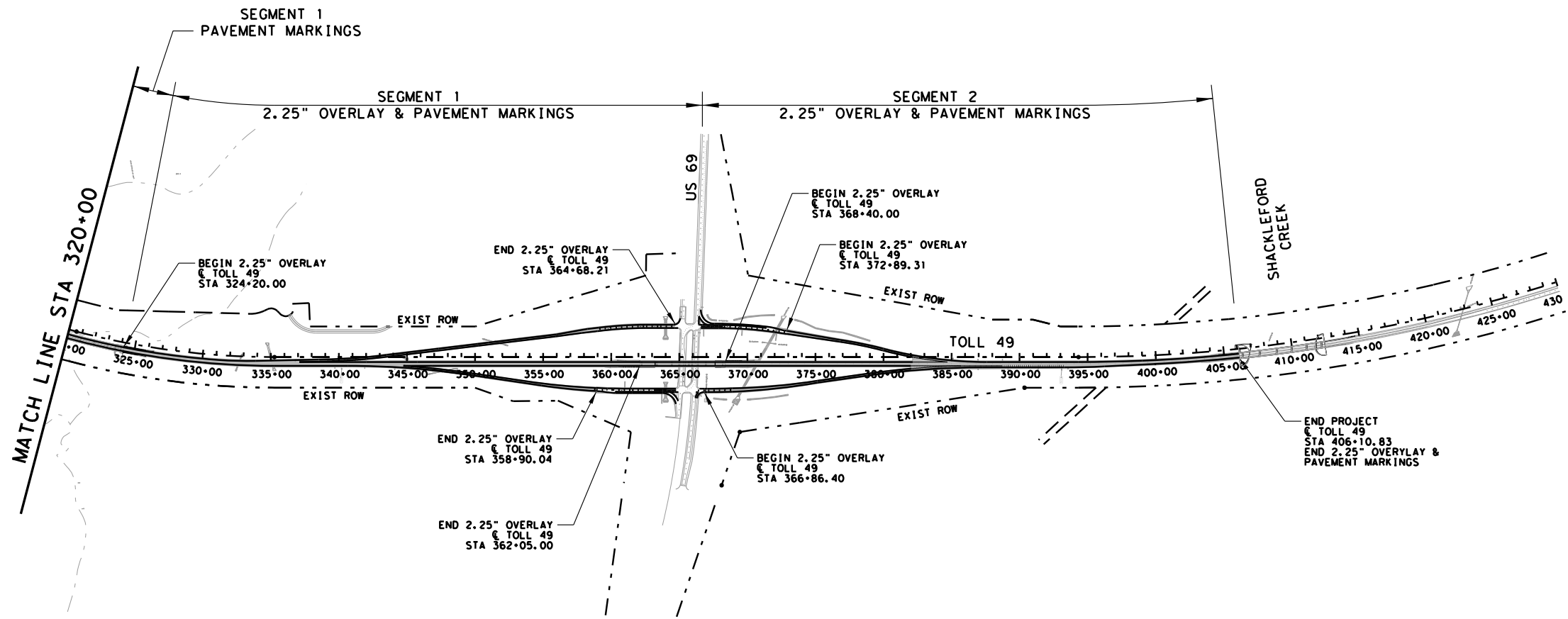
**TOLL 49**  
**SEGMENT 1**  
**PROJECT LAYOUT**  
**BEGIN TO 320+00**

SHEET 1 OF 2

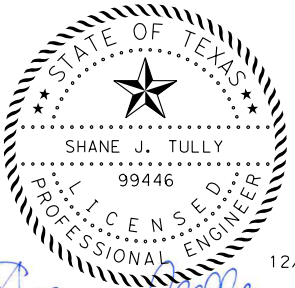
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			3
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/21/2021 4:48:35 PM  
FILE: d:\pw\_work\atkrat\01\mcca2543\dms73683\Toll 49\_S1\_OVERLAY\_PL\_02.dgn

DN: Ckt DW: Ckt



0 500 1000  
SCALE IN FEET



12/21/2021

**ATKINS**  
TBPE REG. # F-474

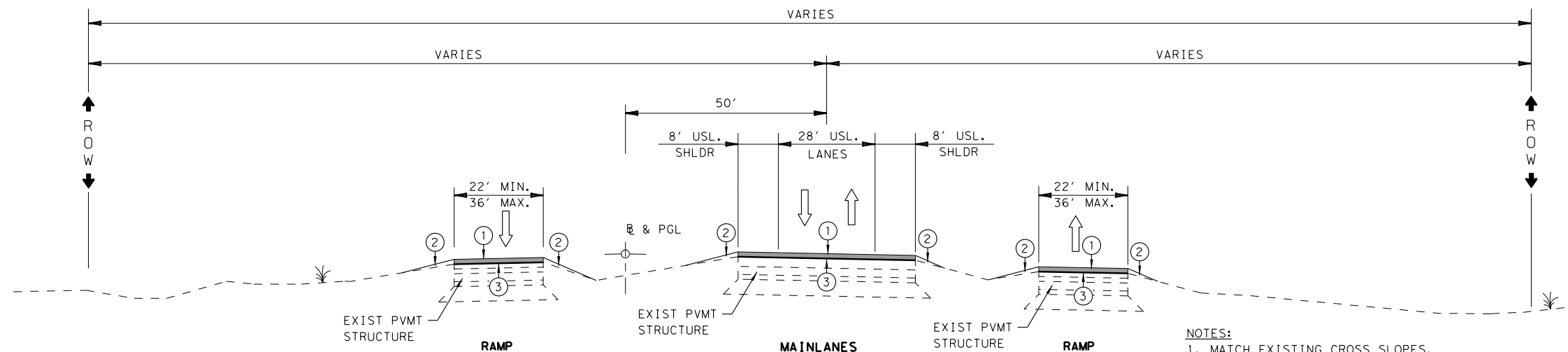


**TOLL 49**  
**SEGMENT 1**  
**PROJECT LAYOUT**  
**320+00 TO END**

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			4
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

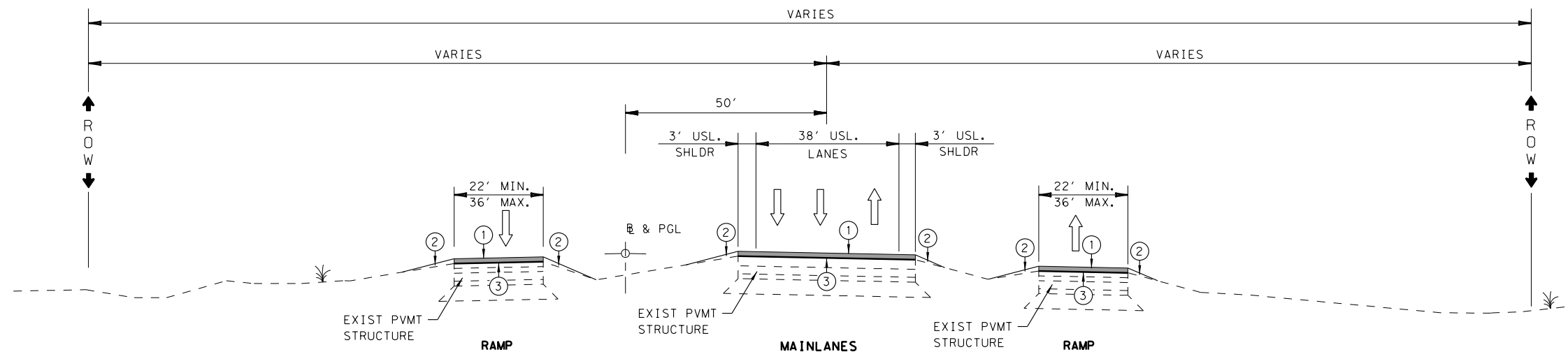
DATE: 12/21/2021 4:48:43 PM  
FILE: d:\pw\_wor-k\atkrat\01\mcoq2543\dms73683\Toll 49\_S1\_OVERLAY\_TYP\_01.dgn



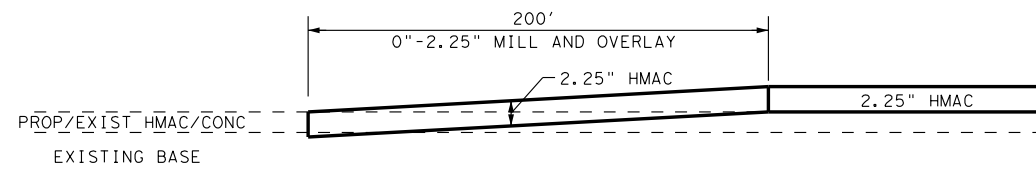
**TOLL 49 SECTION**  
NTS

- NOTES:**
1. MATCH EXISTING CROSS SLOPES.
  2. ALL OVERLAY CONSTRUCTION JOINTS SHALL BE OUTSIDE WHEEL PATHS AND EDGE LINES.
  3. REFER TO LAYOUTS FOR SPECIFIC WIDTHS AND LANE CONFIGURATIONS.
  4. SEE JOINT LAYOUT AND STRIPING DETAIL SHEET FOR LOCATION OF PAVEMENT JOINTS AND PAVEMENT MARKING INFORMATION.
  5. ALL MBGF REPLACED WITHIN THE PROJECT LIMITS ARE TO BE REPLACED WITH THE SAME LENGTH AS EXISTING CONDITIONS.
  6. RUMBLE STRIPS ARE TO BE INSTALLED IN THE CENTERLINE AND EDGE OF SHOULDER.
  7. ALL STRIPING NOT IDENTIFIED IN THE JOINT LAYOUT AND STRIPING DETAIL SHEET ARE TO BE PLACED IN THE SAME LOCATION AS THE EXISTING STRIPE.
  8. FOR CONTRACTOR INFORMATION ONLY, THE PAVEMENT BACKFILL EDGES ARE ESTIMATED AS 3'.

- LEGEND**
- ① 2.25" OVERLAY (SP-C SAC A PG 76-22)
  - ② BACKFILL EDGES (TY B)
  - ③ MEMBRANE UNDERSEAL

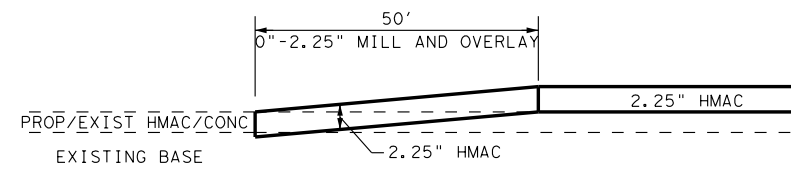


**TOLL 49 SUPER 2 SECTION**  
NTS



**200' PAVEMENT TRANSITION DETAIL**  
NTS

SEE ROADWAY PLAN SHEETS FOR LOCATIONS



**50' PAVEMENT TRANSITION DETAIL**  
NTS

SEE ROADWAY PLAN SHEETS FOR  
COUNTY ROAD LOCATIONS

**ATKINS**  
TBPE REG. # F-474



**TOLL 49**  
**TYPICAL SECTION**  
**AND DETAILS**

SHEET 1 OF 1			
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			5
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/21/2021 4:48:53 PM  
FILE: d:\pw\_work\atkrat\atms73683\Toll 49\_S1\_OVERLAY\_QTY\_06.dgn

DWG  
Cvt  
DWG  
Cvt  
Cvt

BASIS OF ESTIMATE							
ITEM		DESCRIPTION	RATE	AMOUNT	UNIT	QUANTITY	PAY UNIT
500	6001	MOBILIZATION			LS	1	LS
502	6001	BARRICADES, SIGNS AND TRAFFIC HANDLING			MO	2	MO
3002	6001	MEMBRANE UNDERSEAL	0.10 GAL/SY	202,648	SY	20,265	GAL
3077	6033	SP MIXES SP-C SAC-A PG76-22	110 LBS/IN/SY	202,648	SY	25,078	TON
3077	6044	SP MIXES SP-D PG 64-22 (LEVEL-UP)	110 LBS/IN/SY	*	*	1,000	TON

\* SPOT AREAS AS DIRECTED.

ATKINS

TBPE REG. # F-474

NET RMA

North East Texas  
Regional Mobility Authority

TOLL 49

BASIS OF ESTIMATE

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			6
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/21/2021 4:49:21 PM  
FILE: d:\pw\_work\atkrat\toll 49\_s1\_overlay\_qty\_01.dgn

Cut  
Ditch  
Cut  
Ditch

TABULATION OF SURFACE AREAS									
LOCATION	FROM	TO	LENGTH	134	164	168	354	3002	3077
				6002	6054	6001	6022	6001	6033
				BACKFILL (TY B)	BOND FBR MTRX SEED (PERM)(RURAL) (SAND)	VEGETATIVE WATERING	PLANE ASPH CONC PAV (0" TO 3")	[1] MEMBRANE UNDERSEAL	[1] SP MIXES SP-C SAC-A PG76-22
	STA	STA	FT	STA	SY	MG	SY	SY	SY
TOLL 49									
PLAN SHEET 1	936+62.99	946+00.00	937.01	19.2	1164	15	3867	8250	8250
PLAN SHEET 2	946+00.00	958+00.00	1200.00	36.0	2475	32	326	15759	15759
PLAN SHEET 3	958+00.00	970+00.00	1200.00	20.0	1346	17	677	9763	9763
PLAN SHEET 4	133+70.00	145+00.00	1130.00	5.9	134	2	2939	2952	2952
PLAN SHEET 5	145+00.00	157+00.00	1200.00	12.0	809	11	588	6270	6270
PLAN SHEET 6	157+00.00	169+00.00	1200.00	12.0	804	10		6725	6725
PLAN SHEET 7	169+00.00	181+00.00	1200.00	15.9	1064	14	997	7769	7769
PLAN SHEET 8	181+00.00	193+00.00	1200.00	12.0	800	10		5867	5867
PLAN SHEET 9	193+00.00	205+00.00	1200.00	12.0	800	10		5985	5985
PLAN SHEET 10	205+00.00	217+00.00	1200.00	14.4	958	12		7858	7858
PLAN SHEET 11	217+00.00	229+00.00	1200.00	33.6	2267	29	915	12639	12639
PLAN SHEET 12	229+00.00	241+00.00	1200.00	21.7	1659	22	4888	10928	10928
PLAN SHEET 13	241+00.00	253+00.00	1200.00	17.4	1005	13	5201	7412	7412
PLAN SHEET 14	253+00.00	265+00.00	1200.00	30.4	2036	26	3114	11748	11748
PLAN SHEET 15	265+00.00	277+00.00	1200.00	15.5	1034	13		8271	8271
PLAN SHEET 16	277+00.00	289+00.00	1200.00	12.0	798	10		5856	5856
PLAN SHEET 17	289+00.00	301+00.00	1200.00	12.0	793	10		5815	5815
PLAN SHEET 18	301+00.00	313+00.00	1200.00	6.8	320	4	2081	3324	3324
PLAN SHEET 19	313+00.00	325+00.00	1200.00	0.8			395	390	390
PLAN SHEET 20	325+00.00	337+00.00	1200.00	12.0	726	9	1690	6210	6210
PLAN SHEET 21	337+00.00	349+00.00	1200.00	21.2	1416	18		9792	9792
PLAN SHEET 22	349+00.00	361+00.00	1200.00	33.9	2190	28	2413	12128	12128
PLAN SHEET 23	361+00.00	373+00.00	1200.00	10.9	612	8	4370	6589	6589
PLAN SHEET 24	373+00.00	385+00.00	1200.00	30.1	2028	26	691	12455	12455
PLAN SHEET 25	385+00.00	397+00.00	1200.00	12.0	801	10		7330	7330
PLAN SHEET 26	397+00.00	406+10.83	910.83	9.1	446	6	2362	4565	4565
PROJECT TOTAL				438.8	28485	370	37,513	202,648	202,648

[1] QUANTITIES INCLUDED IN BASIS OF ESTIMATE.

SUMMARY OF PCMS AND TRUCK MOUNTED ATTENUATORS				
ITEM		DESCRIPTION	UNIT	QUANTITY
6001	6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	408
6185	6001	TMA (STATIONARY)	EA	2
6185	6005	TMA	DAY	60

\* 6 SIGNS FOR 68 DAYS EACH (INCLUDING 7 DAYS PRIOR TO CONSTRUCTION)  
\*\* 2 TMA's FOR 30 DAYS EACH

SUMMARY OF SIGNING & DELINEATORS				
LOCATION	FROM	TO	LENGTH	658
				6062
				INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)
	STA	STA	FT	EA
TOLL 49				
PLAN SHEET 1	936+62.99	946+00.00	937.01	8
PLAN SHEET 2	946+00.00	958+00.00	1200.00	
PLAN SHEET 3	958+00.00	970+00.00	1200.00	
PLAN SHEET 4	133+70.00	145+00.00	1130.00	16
PLAN SHEET 5	145+00.00	157+00.00	1200.00	9
PLAN SHEET 6	157+00.00	169+00.00	1200.00	
PLAN SHEET 7	169+00.00	181+00.00	1200.00	
PLAN SHEET 8	181+00.00	193+00.00	1200.00	
PLAN SHEET 9	193+00.00	205+00.00	1200.00	
PLAN SHEET 10	205+00.00	217+00.00	1200.00	
PLAN SHEET 11	217+00.00	229+00.00	1200.00	
PLAN SHEET 12	229+00.00	241+00.00	1200.00	19
PLAN SHEET 13	241+00.00	253+00.00	1200.00	9
PLAN SHEET 14	253+00.00	265+00.00	1200.00	9
PLAN SHEET 15	265+00.00	277+00.00	1200.00	
PLAN SHEET 16	277+00.00	289+00.00	1200.00	
PLAN SHEET 17	289+00.00	301+00.00	1200.00	
PLAN SHEET 18	301+00.00	313+00.00	1200.00	10
PLAN SHEET 19	313+00.00	325+00.00	1200.00	4
PLAN SHEET 20	325+00.00	337+00.00	1200.00	5
PLAN SHEET 21	337+00.00	349+00.00	1200.00	
PLAN SHEET 22	349+00.00	361+00.00	1200.00	
PLAN SHEET 23	361+00.00	373+00.00	1200.00	16
PLAN SHEET 24	373+00.00	385+00.00	1200.00	
PLAN SHEET 25	385+00.00	397+00.00	1200.00	
PLAN SHEET 26	397+00.00	406+10.83	910.83	8
PROJECT TOTAL				113

ATKINS

IBPE REG. # F-474

NET RMA

North East Texas  
Regional Mobility Authority

TOLL 49

QUANTITY SUMMARY

SHEET 1 OF 5

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			7
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/21/2021 4:49:29 PM  
FILE: d:\pw\_work\atkrat\01\mcca2543\dms73683\To11 49\_S1\_OVERLAY\_QTY\_05.dgn

Cut  
Ditch  
Cut  
Ditch

SUMMARY OF METAL BEAM GUARD FENCE & RUMBLE STRIPS													
LOCATION	FROM	TO	LENGTH	533	533	540	540	540	542	542	542	544	544
				6003	6004	6001	6005	6006	6001	6002	6004	6001	6003
				RUMBLE STRIPS (SHOULDER) ASPHALT	RUMBLE STRIPS (CENTERLINE) ASPHALT	MTL W-BEAM GD FEN (TIM POST)	TERMINAL ANCHOR SECTION	MTL BEAM GD FEN TRANS (THRIE-BEAM)	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	RM MTL BM GD FENCE TRANS (THRIE-BEAM)	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)
	STA	STA	FT	LF	LF	LF	EA	EA	LF	EA	EA	EA	EA
TOLL 49													
PLAN SHEET 1	936+62.99	946+00.00	937.01	1032	516	150		2	150		2	2	2
PLAN SHEET 2	946+00.00	958+00.00	1200.00	2400	1200								
PLAN SHEET 3	958+00.00	970+00.00	1200.00	2402	1202								
PLAN SHEET 4	133+70.00	145+00.00	1130.00	1194	597	500		4	500		4	4	4
PLAN SHEET 5	145+00.00	157+00.00	1200.00	2427	1213	450			450			4	4
PLAN SHEET 6	157+00.00	169+00.00	1200.00	2401	1205								
PLAN SHEET 7	169+00.00	181+00.00	1200.00	2398	1200								
PLAN SHEET 8	181+00.00	193+00.00	1200.00	2400	1200								
PLAN SHEET 9	193+00.00	205+00.00	1200.00	2400	1200								
PLAN SHEET 10	205+00.00	217+00.00	1200.00	2405	1203								
PLAN SHEET 11	217+00.00	229+00.00	1200.00	2348	1205								
PLAN SHEET 12	229+00.00	241+00.00	1200.00	470	235	850	2	2	850	2	2	4	4
PLAN SHEET 13	241+00.00	253+00.00	1200.00	2400	1280	250		2	250		2	2	2
PLAN SHEET 14	253+00.00	265+00.00	1200.00	2389	1194	450	2		450	2		2	2
PLAN SHEET 15	265+00.00	277+00.00	1200.00	2399	1197								
PLAN SHEET 16	277+00.00	289+00.00	1200.00	2392	1196								
PLAN SHEET 17	289+00.00	301+00.00	1200.00	2379	1189								
PLAN SHEET 18	301+00.00	313+00.00	1200.00	1360	680	250		2	250		2	2	2
PLAN SHEET 19	313+00.00	325+00.00	1200.00	162	81	125		2	125		2		
PLAN SHEET 20	325+00.00	337+00.00	1200.00	2418	1209	125			125			2	2
PLAN SHEET 21	337+00.00	349+00.00	1200.00	2402	1200								
PLAN SHEET 22	349+00.00	361+00.00	1200.00	2400	1200	43.3			43.3			2	2
PLAN SHEET 23	361+00.00	373+00.00	1200.00	1130	565	456.7		4	456.7		4	2	2
PLAN SHEET 24	373+00.00	385+00.00	1200.00	2404	1200								
PLAN SHEET 25	385+00.00	397+00.00	1200.00	2403	1201								
PLAN SHEET 26	397+00.00	406+10.83	910.83	1830	915	275		2	275		2	2	2
PROJECT TOTAL				52,745	26,483	3,925	4	20	3,925	4	20	28	28

ATKINS

IBPE REG. # F-474

NET RMA

North East Texas  
Regional Mobility Authority

TOLL 49

QUANTITY SUMMARY

SHEET 2 OF 5

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			8
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/21/2021 4:49:49 PM  
FILE: d:\pw\_work\atkrat\01\mcca2543\dms73683\To11 49\_S1\_OVERLAY\_QTY\_02.dgn

Cut  
Ditch  
Cut  
Ditch

TABULATION OF PAVEMENT MARKINGS															
LOCATION	FROM	TO	662	662	666	666	666	666	666	666	666	666	666	666	666
			6112	6113	6006	6036	6042	6048	6054	6057	6078	6102	6170	6171	6178
			WK ZN PAV MRK SHT TERM RMV (W)(4")	WK ZN PAV MRK SHT TERM RMV (Y)(4")	REFL PAV MRK TY I (W) 4" (DOT) (100 MIL)	REFL PAV MRK TY I (W) 8" (SLD) (100 MIL)	REFL PAV MRK TY I (W) 12" (SLD) (100 MIL)	REFL PAV MRK TY I (W) 24" (SLD) (100 MIL)	REFL PAV MRK TY I (W) (ARROW) (100 MIL)	REFL PAV MRK TY I (W) (DBL ARROW) (100 MIL)	REFL PAV MRK TY I (W) (WORD) (100 MIL)	REFL PAV MRK TY I (W) 36" (YLD TRI) (100 MIL)	REFL PAV MRK TY II (W) 4" (SLD)	REFL PAV MRK TY II (W) 6" (BRK)	REFL PAV MRK TY II (W) 8" (SLD)
	STA	STA	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	LF	LF	LF
TOLL 49															
PLAN SHEET 1	936+62.99	946+00.00	170	232		405		70	2		2	7	440	40	405
PLAN SHEET 2	946+00.00	958+00.00	197	540			189	32							
PLAN SHEET 3	958+00.00	970+00.00	12	541		1523									
PLAN SHEET 4	133+70.00	145+00.00		514									1091		
PLAN SHEET 5	145+00.00	157+00.00	23	546											
PLAN SHEET 6	157+00.00	169+00.00	140	542											
PLAN SHEET 7	169+00.00	181+00.00	143	540		618									
PLAN SHEET 8	181+00.00	193+00.00	135	540											
PLAN SHEET 9	193+00.00	205+00.00	135	540											
PLAN SHEET 10	205+00.00	217+00.00	150	542		320									
PLAN SHEET 11	217+00.00	229+00.00	58	542		217									
PLAN SHEET 12	229+00.00	241+00.00	250	540				92					2401	117	
PLAN SHEET 13	241+00.00	253+00.00	188	540				60					2268	266	
PLAN SHEET 14	253+00.00	265+00.00	78	538		596							110		
PLAN SHEET 15	265+00.00	277+00.00	135	538		234									
PLAN SHEET 16	277+00.00	289+00.00	135	538											
PLAN SHEET 17	289+00.00	301+00.00	134	535											
PLAN SHEET 18	301+00.00	313+00.00	113	540									1040	80	
PLAN SHEET 19	313+00.00	325+00.00		542									2246		
PLAN SHEET 20	325+00.00	337+00.00		544											
PLAN SHEET 21	337+00.00	349+00.00		540		1402									
PLAN SHEET 22	349+00.00	361+00.00	47	540		71			1		1		211	53	71
PLAN SHEET 23	361+00.00	373+00.00	146	540		1067		48	7	3	7	14	3013	182	1067
PLAN SHEET 24	373+00.00	385+00.00		540		1113									
PLAN SHEET 25	385+00.00	397+00.00		540	115	141	300								
PLAN SHEET 26	397+00.00	406+10.83		412											
PROJECT TOTAL			2,389	13,586	115	7,707	489	302	10	3	10	21	12,820	738	1,543

\* FOR USE AS A SEALER FOR TYPE I MARKINGS ON ALL CONCRETE SURFACES

ATKINS

TBPE REG. # F-474

NET RMA

North East Texas  
Regional Mobility Authority

TOLL 49

QUANTITY SUMMARY

SHEET 3 OF 5

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			9
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49



TABULATION OF PAVEMENT MARKINGS (CONT.)

LOCATION	FROM	TO	666	666	666	666	666	666	666	666	666	666	666	672	672	672
			6182	6184	6185	6192	6199	6207	6210	6303	6306	6315	6321	6007	6009	6010
			* REFL PAV MRK TY II (W) 24" (SLD)	* REFL PAV MRK TY II (W) (ARROW)	* REFL PAV MRK TY II (W) (DBL ARROW)	* REFL PAV MRK TY II (W) (WORD)	* REFL PAV MRK TY II (W) 36" (YLD TRI)	* REFL PAV MRK TY II (Y) 4" (SLD)	* REFL PAV MRK TY II (Y) 6" (SLD)	RE PM W/ RET REQ TY I (W) 4" (SLD) (100 MIL)	RE PM W/ RET REQ TY I (W) 6" (BRK) (100 MIL)	RE PM W/ RET REQ TY I (Y) 4" (SLD) (100 MIL)	RE PM W/ RET REQ TY I (Y) 6" (SLD) (100 MIL)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A	REFL PAV MRKR TY II-C-R
	STA	STA	LF	EA	EA	EA	EA	LF	LF	LF	LF	LF	LF	EA	EA	EA
TOLL 49																
PLAN SHEET 1	936+62.99	946+00.00	70	2		2	7	429		2941	384	1834	1032	17	52	19
PLAN SHEET 2	946+00.00	958+00.00								5101	437	2730	2400		120	22
PLAN SHEET 3	958+00.00	970+00.00								3222	30	814	2404	77	120	
PLAN SHEET 4	133+70.00	145+00.00							1091	2285			2285		114	
PLAN SHEET 5	145+00.00	157+00.00								2426	51		2426	3	121	
PLAN SHEET 6	157+00.00	169+00.00								2411	311		2409	136	114	
PLAN SHEET 7	169+00.00	181+00.00								2798	318	402	2400	31	120	
PLAN SHEET 8	181+00.00	193+00.00								2400	300		2400	15	120	
PLAN SHEET 9	193+00.00	205+00.00								2400	300		2400	15	120	
PLAN SHEET 10	205+00.00	217+00.00								2643	333	238	2405	17	120	
PLAN SHEET 11	217+00.00	229+00.00								4608	130	2194	2410	4	121	3
PLAN SHEET 12	229+00.00	241+00.00						466	1932	4884	557	3378	2402		120	28
PLAN SHEET 13	241+00.00	253+00.00	60					1002	1122	4650	419	2105	2401		120	21
PLAN SHEET 14	253+00.00	265+00.00						110		4366	203	1974	2388	40	120	
PLAN SHEET 15	265+00.00	277+00.00								2752	300	353	2393	27	120	
PLAN SHEET 16	277+00.00	289+00.00								2392	300		2391	15	120	
PLAN SHEET 17	289+00.00	301+00.00								2379	298		2377	15	119	
PLAN SHEET 18	301+00.00	313+00.00							1040	2400	250		2400	13	120	
PLAN SHEET 19	313+00.00	325+00.00							2246	2408			2408		120	
PLAN SHEET 20	325+00.00	337+00.00								2418			2418		121	
PLAN SHEET 21	337+00.00	349+00.00								3544		923	2400	70	120	
PLAN SHEET 22	349+00.00	361+00.00		1		1		210		4819	104	2416	2400	4	120	5
PLAN SHEET 23	361+00.00	373+00.00	48	7	3	7	14	1066	1270	5136	325	2062	2400	38	120	16
PLAN SHEET 24	373+00.00	385+00.00								4244		1839	2400	56	120	
PLAN SHEET 25	385+00.00	397+00.00								2403			2402	24	120	
PLAN SHEET 26	397+00.00	406+10.83								1853			1830		92	
PROJECT TOTAL			178	10	3	10	21	3,283	8,701	83,883	5,350	23,262	60,381	617	3,014	114

\* FOR USE AS A SEALER FOR TYPE I MARKINGS ON ALL CONCRETE SURFACES

DATE: 12/21/2021 4:49:58 PM  
FILE: d:\pw\_work\atkrat\01\mcca2543\dms73683\To11\_49\_S1\_OVERLAY\_QTY\_03.dgn

ATKINS

TBPE REG. # F-474

NET RMA

North East Texas  
Regional Mobility Authority

TOLL 49

QUANTITY SUMMARY

SHEET 4 OF 5

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			10
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/21/2021 4:50:21 PM  
FILE: d:\pwwork\atkrat\atms73683\Toll 49\_S1\_OVERLAY\_QTY\_04.dgn

Cut  
Ditch  
Cut  
Ditch

TABULATION OF PAVEMENT MARKINGS (CONT.)																	
LOCATION	FROM	TO	677	677	677	677	677	677	677	678	678	678	678	678	678	678	678
			6001	6003	6007	6008	6009	6012	6019	6001	6002	6004	6008	6009	6010	6016	6023
			ELIM EXT PAV MRK & MRKS (4")	ELIM EXT PAV MRK & MRKS (8")	ELIM EXT PAV MRK & MRKS (24")	ELIM EXT PAV MRK & MRKS (ARROW)	ELIM EXT PAV MRK & MRKS (DBL ARROW)	ELIM EXT PAV MRK & MRKS (WORD)	ELIM EXT PAV MRK & MRKS (36")(YLD TRI)	PAV SURF PREP FOR MRK (4")	PAV SURF PREP FOR MRK (6")	PAV SURF PREP FOR MRK (8")	PAV SURF PREP FOR MRK (24")	PAV SURF PREP FOR MRK (ARROW)	PAV SURF PREP FOR MRK (DBL ARROW)	PAV SURF PREP FOR MRK (WORD)	PAV SURF PREP FOR MRK (36")(YLD TRI)
	STA	STA	LF	LF	LF	EA	EA	EA	EA	LF	LF	LF	LF	EA	EA	EA	EA
TOLL 49																	
PLAN SHEET 1	936+62.99	946+00.00	869	405	70	2		2	7	869	40	405	70	2		2	7
PLAN SHEET 2	946+00.00	958+00.00															
PLAN SHEET 3	958+00.00	970+00.00															
PLAN SHEET 4	133+70.00	145+00.00	1091							1091	1091						
PLAN SHEET 5	145+00.00	157+00.00															
PLAN SHEET 6	157+00.00	169+00.00															
PLAN SHEET 7	169+00.00	181+00.00															
PLAN SHEET 8	181+00.00	193+00.00															
PLAN SHEET 9	193+00.00	205+00.00															
PLAN SHEET 10	205+00.00	217+00.00															
PLAN SHEET 11	217+00.00	229+00.00															
PLAN SHEET 12	229+00.00	241+00.00	2867							2867	2049						
PLAN SHEET 13	241+00.00	253+00.00	3270		60					3270	1388		60				
PLAN SHEET 14	253+00.00	265+00.00	220							220							
PLAN SHEET 15	265+00.00	277+00.00															
PLAN SHEET 16	277+00.00	289+00.00															
PLAN SHEET 17	289+00.00	301+00.00															
PLAN SHEET 18	301+00.00	313+00.00	1040							1040	1120						
PLAN SHEET 19	313+00.00	325+00.00	2246							2246	2246						
PLAN SHEET 20	325+00.00	337+00.00															
PLAN SHEET 21	337+00.00	349+00.00															
PLAN SHEET 22	349+00.00	361+00.00	421	71		1		1		421	53	71		1		1	
PLAN SHEET 23	361+00.00	373+00.00	4079	1067	48	7	3	7	14	4079	1452	1067	48	7	3	7	14
PLAN SHEET 24	373+00.00	385+00.00															
PLAN SHEET 25	385+00.00	397+00.00															
PLAN SHEET 26	397+00.00	406+10.83															
PROJECT TOTAL			16,103	1,543	178	10	3	10	21	16,103	9,439	1,543	178	10	3	10	21

ATKINS

TBPE REG. # F-474

NET RMA

North East Texas  
Regional Mobility Authority

TOLL 49

QUANTITY SUMMARY

SHEET 5 OF 5

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			11
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/21/2021 4:50:29 PM  
FILE: d:\pw\_work\atknrt\01\mccq2543\dms73683\Toll 49\_S1\_OVERLAY\_CN.dgn

CHK
DWG
CHK
DWG

County: Smith

Highway: Toll 49

GENERAL NOTES:

GENERAL

Remove all vegetation from pavement edges, intersections, and driveways prior to planing operations or ACP operations. This work will not be paid for directly, but will be subsidiary to the bid items of the Contract.

Upon completion of the work and before final acceptance, remove all foreign material, stains, and marks from concrete surfaces. Sandblast clean concrete surfaces as directed. Clean existing concrete structures that are marked or stained by the Contractor’s operations. This work will not be paid for directly, but will be subsidiary to the bid items of the Contract.

During final clean up, remove all foreign material that has accumulated at bridge abutments and bent caps as approved. All work and equipment involved in the removal of this material is subsidiary to the bid items of the Contract.

ITEM 8. PROSECUTION AND PROGRESS

Time shall be charged according to Article 8.3.1.5, “Calendar Day,” in TxDOT’s 2014 Standard Specifications. Work shall only occur between the hours of 9:00 p.m. and 6:30 a.m. During this time, full closures of Toll 49 are allowed within a single milestone’s limits. No work is permitted between the hours of 7:00 a.m. and 9:00 p.m. The grace period for a full nighttime closure ends at 7:00 a.m. each morning. Beginning at 7:01 a.m., the contractor will incur a \$500 late closure removal penalty that increases in \$500 increments each ½-hour until the closure is completely removed.

The three milestones and respective limits for this project are:

- Milestone 1: SH 155 to FM 2493 (ML STA 940+84.36 to ML STA 231+34.03)
- Milestone 2: FM 2493 to US 69 (ML STA 246+60.74 to ML STA 362+05.00)
- Milestone 3: US 69 to Shackleford Creek (ML STA 368+40.00 to ML STA 406+10.83)

The use of full closures within a milestone’s limits are intended to allow for expedited construction. Multiple milestones shall not be worked simultaneously. Moving from one milestone to the next is not permitted until 100% completion of the previous milestone.

100% completion of a milestone consists of all pay items associated with not needing to return to that milestone. This shall include, but is not limited to, the final surface, all permanent pavement marking elements, all MBGF elements and backfilling pavement edges.

The first full closure is allowed on Sunday, May 1, 2022 at 9:00 p.m. All milestones (i.e., the entire scope of the project) should be 100% complete by Friday, July 1, 2022 at 6:30 a.m. There will be no penalty for additional full closures within a milestone through Monday, July 11, 2022 at 6:30 a.m. If additional work remains on Monday, July 11, 2022 at 9:00 p.m. the contractor

County: Smith

Highway: Toll 49

shall be charged \$14,000 per day in liquidated damages. Additional work includes any corrective work required from failed QC/QA testing on all items.

The project includes a \$14,000 per day bonus for up to five days for finishing early.

- 100% completion by Thursday, June 30, 2022 at 6:30 a.m. = \$14,000 bonus;
- 100% completion by Wednesday, June 29, 2022 at 6:30 a.m. = \$28,000 bonus;
- 100% completion by Tuesday, June 28, 2022 at 6:30 a.m. = \$42,000 bonus;
- 100% completion by Monday, June 27, 2022 at 6:30 a.m. = \$56,000 bonus;
- 100% completion by Sunday, June 26, 2022 at 6:30 a.m. = \$70,000 bonus.

Work may be performed on any calendar-day night except those noted below:

- Sunday, May 29, 2022 from 9:00 p.m. to 6:30 a.m.
- Monday, May 30, 2022 from 9:00 p.m. to 6:30 a.m.
- Friday, July 1, 2022 from 9:00 p.m. to 6:30 a.m.
- Saturday, July 2, 2022 from 9:00 p.m. to 6:30 a.m.
- Sunday, July 3, 2022 from 9:00 p.m. to 6:30 a.m.
- Monday, July 4, 2022 from 9:00 p.m. to 6:30 a.m.

For contract time determination, the engineers assumed a 61-calendar day schedule between the first closure on the night of Sunday, May 1, 2022 and the targeted last full closure on the night of Thursday, June 30, 2022. For activity duration, the engineers assumed:

- Contractors would not work at least one day per week (8 nonwork days),
- Contractors would not work on Memorial Day (2 nonwork days),
- And the contractor would lose 9 days to rain within that span.

Portable changeable message boards (PCMBs) are required 7 calendar days prior to a milestone closure and must remain in place as part of the closure traffic control throughout the closure duration. Once construction begins, PCMBs shall display a message during daytime hours alerting motorists of the upcoming closure. During the nighttime closure, the message shall be modified alerting motorists of the full closure. The PCMB requirements for each closure are:

- SH 155 to FM 2493
  - 1 PCMB on Toll 49, ½-mile west of the Toll 49 EB/SH 155 Exit Ramp west of SH 155,
  - 2 PCMB on SH 155, each placed a ½-mile from Toll 49 (north and south respectively),
  - 2 PCMB on FM 2493, each placed a ½-mile from Toll 49 (north and south respectively),
  - 1 PCMB on Toll 49, ½-mile east of the Toll 49 WB/FM 2493 Exit Ramp east of FM 2493.

ATKINS

TBPE REG. # F-474

NET RMA

North East Texas  
Regional Mobility Authority

GENERAL NOTES

SHEET 1 OF 8

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			12
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/22/2021 3:32:03 PM  
FILE: c:\pw\_work\atknat\01\Toll15900\dms73683\Toll 49\_S1\_OVERLAY\_CN.dgn

CHK
DWG
CHK
DWG

County: Smith

Highway: Toll 49

- FM 2493 to US 69
  - 1 PCMB on Toll 49, ½-mile west of the Toll 49 EB/FM 2493 Exit Ramp west of FM 2493,
  - 2 PCMB on FM 2493, each placed a ½-mile from Toll 49 (north and south respectively),
  - 2 PCMB on US 69, each placed a ½-mile from Toll 49 (north and south respectively),
  - 1 PCMB on Toll 49, ½-mile east of the Toll 49 WB/US 69 Exit Ramp east of US 69.
- US 69 to Shackleford Creek Bridge
  - 1 PCMB on Toll 49, ½-mile west of the Toll 49 EB/US 69 Exit Ramp west of FM 2493,
  - 2 PCMB on US 69, each placed a ½-mile from Toll 49 (north and south respectively),
  - 2 PCMB on FM 756, each placed a ½-mile from Toll 49 (north and south respectively),
  - 1 PCMB on Toll 49, ½-mile east of the Toll 49 WB/FM 756 Exit Ramp east of FM 756.

Prepare the progress schedule as a bar chart. Clearly indicate the order of the milestones on the bar chart. The bar chart schedule must clearly indicate workdays and non-workdays. This bar chart schedule must be submitted at least 7-calendar days prior to the preconstruction meeting. The preconstruction meeting must be held by Friday, April 15, 2022.

ITEM 9. MEASUREMENT & PAYMENT

In accordance with Article 9.1., “Measurement of Quantities,” furnish the tare and maximum gross weights as well as the volume capacity of all vehicles, trucks, truck-tractors, trailers, semi-trailers, or combination of such vehicles used to deliver materials for this Contract. Also, furnish calculations supporting these weights and capacities. Provide all measurements required for pay a minimum of 2 days before the trucks are used.

ITEM 134. BACKFILLING PAVEMENT EDGES

Compact the backfill adjacent to the pavement edge with a pneumatic roller or other approved equipment. This rolling will not be paid for directly, but will be subsidiary to Item 134.

CONTRACTOR TO UTILIZE NETRMA BACKFILL STOCKPILE LOCATED AT TOLL 49 AND SH 110, APPROXIMATELY 3.7 MILES EAST OF END OF PROJECT.

After the application of fertilizer, apply an emulsified asphalt treatment, consisting of SS-1 asphalt at a rate of 0.3 gal. per sq. yd.

County: Smith

Highway: Toll 49

ITEM 164. SEED FOR EROSION CONTROL

Provide a Bonded Fiber Matrix that meets the current requirements of the Approved Products List for Item 169, “Soil Retention Blankets, Class 1, Ty D, Sprey Type Blanket”. Install according to manufacturer’s recommendations based on a slope steeper than 3:1 with sandy soils. This Item will be paid under Item 164.

ITEM 166. FERTILIZER

Place fertilizer at the rate of 1 lb. per 9 sq. yd. on areas prepared for seeding. This is subsidiary to Item 164.

ITEM 168. VEGETATIVE WATERING

Apply water to all newly placed seeded areas the same day of installation. Maintain the or seeded areas in a completely watered condition. Do not allow seeded areas to dry out so that water stress is evident.

ITEM 354. PLANING AND TEXTURING PAVEMENT

Overlay all planed areas by the end of each day unless otherwise approved. If unsuitable weather or other unexpected conditions do not allow planed areas to be overlaid, provide and maintain warning signs for overnight lane closures in accordance with the traffic control plan sheets until overlay operations are complete. All RAP generated from this project belongs to the NETRMA. Contractor will be required to deliver the RAP to the maintenance yard located on the NW corner of Toll 49 and SH 64. This work will not be paid for directly, but will be subsidiary to this item.

ITEM 502. BARRICADES, SIGNS, AND TRAFFIC HANDLING

The traffic control plan for this Contract consists of: the installation and maintenance of warning signs and other traffic control devices shown on the plans; specification data, which may be included in the general notes; applicable provisions of the Texas Manual on Uniform Traffic Control Devices (TMUTCD); traffic control plan sheets included on the plans; standard BC sheets; Compliant Work Zone Traffic Control Device List, and Item 502 of the standard specifications.

Use ground-mounted sign mounts with two posts for all temporary work zone signs unless otherwise directed.

Inspect and correct deficiencies each day throughout the duration of the Contract. In accordance with Article 502.4., “Payment,” no payment will be made for the month if the Contractor fails to provide or properly maintain signs and devices in compliance with Contract requirements. Temporary warning signs that are visible when conditions do not apply will be considered improper maintenance of signs.

Provide at least one employee on call nights and weekends (or any other time that work is not in progress) for maintenance of signs and traffic control devices. This employee must have an address and telephone number near the project, as approved. Notify the Engineer in writing of the name,

ATKINS

TBPE REG. # F-474

NETRMA

North East Texas  
Regional Mobility Authority

GENERAL NOTES

SHEET 2 OF 8

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			12A
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/22/2021 3:32:33 PM  
FILE: c:\pw\_work\atkrnt\Toll 49\_S1\_OVERLAY\_CN.dgn

DNF	CKT	DWG	CKT
-----	-----	-----	-----

**County:** Smith

**Highway:** Toll 49

address, and telephone number of this employee. The Engineer will furnish this information to local law enforcement officials.  
In addition to providing a Contractor’s Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 30 minutes.

Sign all roads intersecting the project in accordance with current BC standards.

Refer to the traffic control plan sheets for traffic handling through the work area. Contractor may vary the signing arrangement and spacing as necessary to fit field conditions; however, any proposed changes in the traffic control plan must be approved before implementation.

When the sequence of work is shown on the plans, the Contractor may submit an alternate proposal for approval. Submit in writing all proposed variations and revisions.

High-visibility safety apparel is required for workers in accordance with the General Notes on current BC standards.

Place and maintain signs, channelizing devices, and flaggers to direct and route traffic at any location and for any period of time as may be required or directed.

Erect R4-1 (Do Not Pass) and R4-2 (Pass With Care) signs to mark existing no-passing zones as directed.(These signs will not be required if these zones will not be eliminated during construction.)

Maintain existing roadside signs within this project’s limits during this Contract. In order to accommodate the grading or other operations, temporarily relocate these signs in accordance with the TMUTCD as directed. Use ground-mounted sign mounts with two posts for all relocated signs unless otherwise directed. This work will not be paid for directly,but will be subsidiary to Item 502.

Provide truck-mounted attenuators (TMA) as shown on the appropriate traffic control plan sheets. Provide a letter certifying that all TMA used on this project meet NCHRP 350 or AASHTO Manual for Assessing Safety Hardware (MASH) requirements.

Regulate all construction activities and equipment to minimize inconvenience to the traveling public. At points where it is necessary for trucks to stop, load, or unload, provide warning signs and flaggers to protect the traveling public.

Remove or clearly barricade all material stockpiles, equipment left overnight, or any obstruction within 30 ft. of a travelway as approved.

The Contractor Force Account “Safety Contingency” is intended to be used for work zone enhancements that could not be foreseen in the project planning and design stage for the purpose of improving the effectiveness of the Traffic Control Plan. 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.

Provide flaggers at county roads, commercial driveways, and other intersecting roadways deemed necessary by the Engineer to maintain control of the work zone during one-lane two-way

**County:** Smith

**Highway:** Toll 49

operations. Provide communication radios to each flagger in the work zone and the pilot vehicle operator.

U-turns on Toll 49 for trucks delivering any type of construction material (e.g., HMA, embankment, backfill) is not allowed.

Prior to beginning work, the Contractor and Engineer must agree on the allowable length of lane closure.

All work required by these general notes, except as provided for by Item 502, will not be paid for directly, but will be subsidiary to Item 502 unless otherwise shown on the plans.

**ITEM 506. TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS**

Provide the following Items for the SWP3 for this Contract as directed on a force account basis:

Temporary sediment control fence, seeding for erosion control, earthwork for erosion control, and vegetative watering.

**ITEM 533. MILLED RUMBLE STRIPS**

Provide traffic control for roadways with other lane configurations as directed.

Provide a sweeper that meets the requirements of Section 354.2.3.

**ITEM 540. METAL BEAM GUARD FENCE**

All work involved in placement of timber posts in soil cement riprap must be included in the price bid for Item 540.

Do not paint treated timber posts.

Use round wood posts on all metal beam guard fence except where steel posts are required in accordance with “Low Fill Culvert Post Mounting” details shown on standard sheet MBGF.

Prior to removal of existing MBGF and associated appurtenances, submit to the Engineer for approval a work plan, including a detailed timeline, outlining removal and reinstallation of safety features. It is the intent that the Contractor has the necessary materials and labor force available to reinstall the safety features prior to beginning the removal process.

Regardless of when the Contractor installs proposed MBGF, set the rail height to account for any subsequent surfacing work in order to be in accordance with standard MBGF upon completion of the Contract.

ATKINS

TBPE REG. # F-474

NET RMA

North East Texas  
Regional Mobility Authority

GENERAL NOTES

SHEET 3 OF 8

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			12B
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/21/2021 4:51:35 PM  
FILE: d:\pw\_work\atkrnt\01\mccq2543\dms73683\Toll 49\_S1\_OVERLAY\_CN.dgn

DNK  
CKT  
DWE  
CKT

County: Smith

Highway: Toll 49

When replacing guard rail, ensure that all segments of guard rail removed are replaced the same work day before opening to traffic.

The existing concrete mowstrip shall be re-used. Repair to the concrete mowstrip due to MBGF removal and replacement operations will not be paid.

ITEM 542. REMOVING METAL BEAM GUARD FENCE

The Engineer will determine the metal beam guard fence to be salvaged and location of stockpile sites.

All metal beam guard fence not designated for re-use will become the property of the Contractor. Dispose of fence as directed.

ITEM 585. RIDE QUALITY FOR PAVEMENT SURFACES

Unless otherwise noted below, TxDOT Item 585, “Ride Quality for Pavement Surfaces,” specifications apply.

Preconstruction ride quality data were collected on March 22, 2021. Table 1 provides the lane descriptions for the data collection. Table 2, Table 3, Table 4, and Table 5 provide the preconstruction IRI values averaged on 0.1-mi increments. These tables also provide notes on leave-outs.

Bridges shall not be overlaid and will be considered leave-outs in the post-construction ride quality analysis. 100 ft. lead-in and lead-out lengths are permissible on each end of the bridges. These areas shall be tested using a 10 ft. straight-edge as outlined in Test Type A of Item 585. 100 ft. lead-in and lead-out lengths are permissible at each end of the project. These areas shall be tested using a 10 ft. straight-edge as outlined in Test Type A of Item 585. Preconstruction .pro files are available upon request.

Table 1. Toll 49 Segment 1 Ride Quality Lane Descriptions

EB Mainlane and Passing Lane:	K2	Includes single lane and left (passing) lane in Super 2 locations
EB Right Lane:	K1	Includes right (slow) lane in Super 2 locations
WB Mainlane and Passing Lane:	K7	Includes single lane and left (passing) lane in Super 2 locations
WB Right Lane:	K6	Includes right (slow) lane in Super 2 locations

County: Smith

Highway: Toll 49

Table 2. Lane K2 Preconstruction Ride Quality

Toll 49 Segment 1 (K2) Eastbound Mainlane and Passing Lane						
Distance	Begin Station	End Station	IRI(L)	IRI(R)	Avg IRI	Notes
0.1	940+84.4	946+12.4	55.86	58.33	57	East end of SH 155 Overpass ends at STA 940+84.4
0.2	946+12.4	951+40.4	41.38	40.52	41	
0.3	951+40.4	956+68.4	94.91	90.59	93	
0.4	956+68.4	961+96.4	54.81	64.95	60	
0.5	961+96.4	967+24.4	106.24	91.94	99	BK PT STA 970+00 = AH PT STA 133+70
0.6	967+24.4	136+22.4	96.82	81.24	89	
0.7	136+22.4	141+50.4	180.47	183.78	182	
0.8	141+50.4	146+78.4	118.81	134.7	127	
0.9	146+78.4	152+06.4	103.31	112.08	108	East end of Saline Creek bridge approach slab at STA 142+00.00
1	152+06.4	157+34.4	96.4	101.23	99	
1.1	157+34.4	162+62.4	83.83	93.64	89	
1.2	162+62.4	167+90.4	79.96	97.47	89	
1.3	167+90.4	173+18.4	82.08	95.13	89	Begin EB passing lane near STA 155+00
1.4	173+18.4	178+46.4	96.79	86.45	92	
1.5	178+46.4	183+74.4	102.19	76.88	90	
1.6	183+74.4	189+02.4	97.36	82.26	90	
1.7	189+02.4	194+30.4	108.75	75.7	92	End EB passing lane near STA 220+00
1.8	194+30.4	199+58.4	119.39	102.93	111	
1.9	199+58.4	204+86.4	82.56	73.38	78	
2	204+86.4	210+14.4	90.81	70.48	81	
2.1	210+14.4	215+42.4	83.77	69.72	77	West end of CR 165/FM 2493 bridge approach slab at STA 231+34.00
2.2	215+42.4	220+70.4	92.33	72.21	82	
2.3	220+70.4	225+98.4	89.09	81.4	85	
2.4	225+98.4	231+26.4	88.88	95.51	92	
2.5	231+26.4	236+54.4	190.51	179.04	185	East end of CR 165/FM 2493 bridge approach slab at STA 246+61.00
2.6	236+54.4	241+82.4	135.91	144.25	140	
2.7	241+82.4	247+10.4	112.6	114.51	114	
2.8	247+10.4	252+38.4	81.83	108.66	95	
2.9	252+38.4	257+66.4	66.48	63.99	65	West end of Mud Creek bridge approach slab at STA 307+80.00
3	257+66.4	262+94.4	57.91	67.69	63	
3.1	262+94.4	268+22.4	76.55	69.88	73	
3.2	268+22.4	273+50.4	69.13	67.43	68	
3.3	273+50.4	278+78.4	91.02	87.07	89	East end of Mud Creek bridge approach slab at STA 324+20.00
3.4	278+78.4	284+06.4	93.03	67.53	80	
3.5	284+06.4	289+34.4	103.42	88.33	96	
3.6	289+34.4	294+62.4	73.4	64.55	69	
3.7	294+62.4	299+90.4	75.56	78.42	77	West end of US 69 bridge approach slab at STA 362+05.00
3.8	299+90.4	305+18.4	82.83	60.55	72	
3.9	305+18.4	310+46.4	147.25	141.36	144	
4	310+46.4	315+74.4	135.65	132.3	134	
4.1	315+74.4	321+02.4	119.12	112.68	116	
4.2	321+02.4	326+30.4	148.54	155.09	152	
4.3	326+30.4	331+58.4	73.69	75.41	75	
4.4	331+58.4	336+86.4	78.28	79.82	79	
4.5	336+86.4	342+14.4	102.9	97.79	100	
4.6	342+14.4	347+42.4	89.6	79.81	85	
4.7	347+42.4	352+70.4	93.97	86.64	90	
4.8	352+70.4	357+98.4	100.47	80.09	90	
4.8796	357+98.4	363+26.4	110.97	110.73	111	West end of US 69 bridge approach slab at STA 362+05.00

ATKINS

IBPE REG. # F-474

NET RMA

North East Texas  
Regional Mobility Authority

GENERAL NOTES

SHEET 4 OF 8

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			12C
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/21/2021 4:51:57 PM  
FILE: d:\pw\_work\atkrat\01\mccq2543\dms73683\Toll 49\_S1\_OVERLAY\_CN.dgn

County: Smith

Highway: Toll 49

Table 3. Lane K1 Preconstruction Ride Quality Data

Toll 49 Segment 1 Eastbound Slow Lane in Super 2

Distance	Begin Station	End Station	IRI(L)	IRI(R)	Avg IRI	Notes
0.1	155+00.	160+28.	148.33	82.7	116	
0.2	160+28.	165+56.	133.68	78.78	106	
0.3	165+56.	170+84.	134.42	65.08	100	
0.4	170+84.	176+12.	114.24	86.61	100	
0.5	176+12.	181+40.	81.17	76.14	79	
0.6	181+40.	186+68.	86.96	64.74	76	
0.7	186+68.	191+96.	102.28	77.18	90	
0.8	191+96.	197+24.	89.81	92.15	91	
0.9	197+24.	202+52.	109.02	83.39	96	
1	202+52.	207+80.	67.16	53.88	61	
1.1	207+80.	213+08.	64.03	60.52	62	
1.2	213+08.	218+36.	74.02	90.03	82	
1.2187	218+36.	223+64.	70.85	95.74	83	Skips for EB passing lane ends near STA 220+00

General Notes

Sheet I

County: Smith

Highway: Toll 49

Table 4. Lane K7 Preconstruction Ride Quality Data

Toll 49 Segment 1 Westbound Mainlane and Passing Lane

Distance	End Station	Begin Station	IRI(L)	IRI(R)	Avg IRI	Notes
0.1	362+05.	356+77.	106.35	109.31	108	West end of US 69 overpass ends at STA 362+05.00
0.2	356+77.	351+49.	78.23	66.45	72	
0.3	351+49.	346+21.	94.96	106.02	100	
0.4	346+21.	340+93.	97.8	86.65	92	East end of Mud Creek bridge approach slab at STA 324+20.00
0.5	340+93.	335+65.	85.35	88.3	87	
0.6	335+65.	330+37.	73.58	90.05	82	
0.7	330+37.	325+09.	97.48	84.4	91	
0.8	325+09.	319+81.	143.46	169.67	157	
0.9	319+81.	314+53.	115.86	117.42	117	Begin WB passing lane near STA 311+00 (on Mud Creek Bridge)
1	314+53.	309+25.	152.28	145.83	149	
1.1	309+25.	303+97.	111.74	141.42	127	West end of Mud Creek bridge approach slab at STA 307+80.00
1.2	303+97.	298+69.	97.21	100.37	99	
1.3	298+69.	293+41.	77.73	89.09	83	End WB passing lane near STA 258+10
1.4	293+41.	288+13.	67.43	102.08	85	
1.5	288+13.	282+85.	85.36	92.05	89	
1.6	282+85.	277+57.	95.99	106.72	101	
1.7	277+57.	272+29.	80.62	84.32	82	
1.8	272+29.	267+01.	70.21	80.97	76	
1.9	267+01.	261+73.	80.9	92.76	87	
2	261+73.	256+45.	93.09	79.26	86	
2.1	256+45.	251+17.	96.16	73.29	85	
2.2	251+17.	245+89.	109.95	124.39	117	East end of CR 165/FM 2493 bridge approach slab at STA 246+61.00
2.3	245+89.	240+61.	107.53	129.24	118	
2.4	240+61.	235+33.	126.41	140.45	133	West end of CR 165/FM 2493 bridge approach slab at STA 231+34.00
2.5	235+33.	230+05.	160.79	189.93	175	
2.6	230+05.	224+77.	89.96	89.41	90	
2.7	224+77.	219+49.	82.06	63.44	73	
2.8	219+49.	214+21.	97.8	84.46	91	
2.9	214+21.	208+93.	88.68	81.12	85	
3	208+93.	203+65.	91.84	69.62	81	
3.1	203+65.	198+37.	90.73	78.91	85	
3.2	198+37.	193+09.	141.38	90.74	116	
3.3	193+09.	187+81.	100.44	62.19	81	
3.4	187+81.	182+53.	90.75	50	70	East end of Saline Creek bridge approach slab at STA 142+00.00
3.5	182+53.	177+25.	96.89	61.15	79	
3.6	177+25.	171+97.	84.86	85.03	85	
3.7	171+97.	166+69.	87.74	96.73	92	
3.8	166+69.	161+41.	109.66	89.03	99	
3.9	161+41.	156+13.	103.05	83.04	93	
4	156+13.	150+85.	113.35	75.94	95	
4.1	150+85.	145+57.	113.76	115.06	114	
4.2	145+57.	140+29.	146.66	142.76	145	
4.3	140+29.	135+01.	156.74	160.58	159	
4.4	135+01.	966+03.	55.6	67.43	62	BK PT STA 970+00 = AH PT STA 133+70
4.5	966+03.	960+75.	71.14	70.81	71	
4.6	960+75.	955+47.	48.12	47.94	48	East end of SH 155 Overpass ends at STA 940+84.4
4.7	955+47.	950+19.	108.3	106.96	108	
4.8	950+19.	944+91.	41.63	45.13	43	
4.9	944+91.	939+63.	78.56	82.05	80	

General Notes

Sheet J

ATKINS

TBPE REG. # F-474

NET RMA

North East Texas  
Regional Mobility Authority

GENERAL NOTES

SHEET 5 OF 8

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			12D
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49



**County:** Smith

**Highway:** Toll 49

Table 5. Lane K6 Preconstruction Ride Quality Data

### Toll 49 Segment 1 Westbound Slow Lane in Super 2

Distance	Begin Station	End Station	IRI(L)	IRI(R)	Avg IRI	Notes
0.1	311+20.	305+92.	136.61	135	136	West end of Mud Creek bridge approach slab at STA 307+80.00
0.2	305+92.	300+64.	82.25	81.06	82	
0.3	300+64.	295+36.	80.69	50.05	65	
0.4	295+36.	290+08.	79.68	63.23	71	
0.5	290+08.	284+80.	98.33	88.55	93	
0.6	284+80.	279+52.	93.98	71.84	83	
0.7	279+52.	274+24.	80.04	68.39	74	
0.8	274+24.	268+96.	71.54	121.81	97	
0.9	268+96.	263+68.	107.69	112.26	110	
1	263+68.	258+40.	73.29	73.54	73	

Ride quality bonus/penalty payment for all travel lanes shall use the formulas shown in Table 6.

*Table 6. Travel Lane Ride Quality Bonus/Penalty Structure*

Average IRI Range for 0.1-mi. section (in./mi.)	Pay Adjustment (\$/0.1-mi Section)
IRI < 25	3000
$25 \leq \text{IRI} < 35$	$-250 * (\text{IRI}) + 9250$
$35 \leq \text{IRI} < 45$	$-50 * (\text{IRI}) + 2250$
$45 \leq \text{IRI} < 55$	0
$55 \leq \text{IRI} < 65$	$-50 * (\text{IRI}) + 2700$
$65 \leq \text{IRI} < 80$	$-160 * (\text{IRI}) + 9740$
$80 \leq \text{IRI}$	*Deficient

\*All deficient sections require corrective work to bring the average IRI value below the deficient threshold (i.e., 80 in./mi.) unless the engineer decides to impose a \$6,000 per deficient section penalty. After performing corrective work, deficient sections shall be reprofiled to ensure ride quality is no longer deficient. The appropriate bonus/penalty shall be applied to the corrected surface. Corrective work shall be done at night and the appropriate liquidated damages shall be applied if the contract time has been exhausted.

## ITEM 658. DELINEATOR AND OBJECT MARKER ASSEMBLIES

Accept ownership of unsalvageable delineator and object marker assemblies and remove from the right of way.

## General Notes

Sheet K

**County:** Smith

**Highway:** Toll 49

## ITEM 662. WORK ZONE PAVEMENT MARKINGS

Furnish and place work zone pavement markings (short term)(tape) on center lines and lane lines in accordance with WZ(STPM), and provide warning signs in accordance with TCP (7-1). Place tape within 1 in. of the proper alignment as established by the Contractor and approved by the Engineer. Remove tape prior to placement of permanent markings. Tape removal will be subsidiary to Item 662. Tabs are not allowed.

Multiple Move-ins will be required to maintain adequate striping.

## ITEM 666. RETROREFLECTORIZED PAVEMENT MARKINGS

Place Type II Pavement Markings as a sealer for Type I Pavement Markings on bridge and concrete surfaces only. Place Type I Markings a minimum of seven (7) calendar days after placing Type II Markings.

Use the spray method for application of the thermoplastic compound for lane lines, barrier lines, edge lines and channelizing lines.

Extrude hot to the pavement surface thermoplastic compound for arrows, stop lines, yield triangles, transverse lines, crosswalk lines, words and symbols.

For lengths greater than 300-ft, provide guide markings that will not leave a permanent mark on the roadway. Have the guide marking material and equipment used for placement approved prior to use. Provide adequate notification for approval of the guide markings prior to placement of the permanent pavement markings.

Pilot guideline markings are required. Must provide a crew experienced in the work of installing pilot guideline markings and in the necessary traffic control. Supply all the equipment, personnel, traffic control, and materials necessary for the placement of pilot guideline markings as directed. All work will be in conformance with Part 6 of the TMUTCD.

Passing zones will not change and should match existing conditions.


Correct deficiencies in the alignment of pavement markings at Contractor's expense, as directed. Use a strip seal with aggregate and asphalt types and rates as directed to eliminate the deficient pavement markings.

### ITEM 672. RAISED PAVEMENT MARKERS

Provide dispensing equipment such that the bituminous material can be directly applied from the melting pot to the pavement surface without secondary handling. Dispensing material from the melting pot into a separate container and then to the pavement surface will not be permitted. Intermittent agitation of the bituminous material will be by a method approved by the Engineer

## General Notes

Sheet L

<h1 style="margin: 0;">ATKINS</h1> <p style="margin: 0; font-weight: normal;">TBPE REG. # F-474</p>			
			
<h2 style="margin: 0;">GENERAL NOTES</h2>			
SHEET 6 OF 8			
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			12E
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/21/2021 4:52:38 PM  
FILE: d:\pw\_work\atkrnt\01\mccq2543\dms73683\Toll 49\_S1\_OVERLAY\_CN.dgn

DNF  
Ckt  
DNF  
Ckt

County: Smith

Highway: Toll 49

to ensure even heat distribution and must be such that the adhesive is agitated at approved and consistent intervals.

ITEM 677. ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS

Furnish a high pressure water blasting system for removing paint, thermoplastic, epoxy and preformed tape material from the following surfaces without causing any grooves or trenching of the surface: asphalt, concrete, permeable friction course, grooved asphalt and grooved concrete.

Use a high pressure water blasting system that consists of a vacuum recovery system that must provide for a nearly dry surface eliminating the possibility of uncontained run-off blasting water or debris, or the need for any secondary clean-up vehicles or operations.

All components required for the complete operation of the water blasting system (ultra-high pressure pump, vacuum system, clean water supply, vacuum recovery storage, primary truck-mounted and optional secondary tractor-mounted blasting components) must be mounted and transported on a single, fully self-contained and supporting single truck chassis, thereby eliminating the need for any additional water, vacuum or other transport vehicles.

Multiple Move-ins will be required to maintain adequate striping.

ITEM 3077. SUPERPAVE MIXTURES

Paving and trucking operations shall be sequenced so that delivery trucks enter the workzone in the direction of paving and exit the workzone in the direction of paving. U-turns within the workzone to reach the paver or return to the plant are not allowed.

Source changes are not allowed without written approval by the Engineer.

Reclaimed Asphalt Pavement (RAP) is not allowed in the surface course. Reclaimed Asphalt Shingles (RAS) are not allowed in any course.

The surface course requires 100% Surface Aggregate Classification (SAC) Class A aggregate. Blending aggregates to meet Class A requirements is not allowed. Provide Class A coarse aggregate for the surface as listed in the TxDOT’s *Bituminous Rate Source Quality Catalog* (BRSQC).

PG76-22 asphalt binder is required in the surface course. Lower performance-grade substitute binders are not permitted in the surface course.

The surface course shall be placed using a spray paver application. This paver must be capable of constructing a spray paver applied tack coat. The tack coat shall be an emulsified membrane placed directly on the existing GR 4 surface treatment at a residual asphalt rate of between 0.08 gal/SY and 0.10 gal/SY.

County: Smith

Highway: Toll 49

Mineral Filler, Additives, and Compaction Aids require the Engineer’s approval before use. The need and benefits of using these materials should be clearly articulated in the bidder’s response or during the interview phase.

The surface course must have a minimum asphalt content at 50 gyrations of 5.0%. Certificates of Delivery for asphalt binder must be provided to the engineer to confirm asphalt content.

A Material Transfer Device (MTD) is required for surface paving operations. Windrow operations are not allowed.

The surface course shall be constructed with in-place air voids between 3.0% and 7.0%. Table 21 in TxDOT’s 2014 Standard Specifications is modified as shown below:

In-Place Air Voids	Placement Payment Adjustment Factor
< 1.0	Remove and Replace
1.1	0.440
1.2	0.470
1.3	0.500
1.4	0.530
1.5	0.560
1.6	0.590
1.7	0.620
1.8	0.650
1.9	0.680
2.0	0.710
2.1	0.740
2.2	0.770
2.3	0.800
2.4	0.830
2.5	0.860
2.6	0.890
2.7	0.920
2.8	0.950
2.9	0.980
3.0	1.000
3.1	1.000
3.2	1.000
3.3	1.000
3.4	1.000

ATKINS

TBPE REG. # F-474

NET RMA

North East Texas Regional Mobility Authority

GENERAL NOTES

SHEET 7 OF 8

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			12F
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/21/2021 4:52:58 PM  
FILE: d:\pw\_work\atkrat\01\mcca2543\dms73683\Toll 49\_S1\_OVERLAY\_CN.dgn

DWG	CHK
DWG	CHK
DWG	CHK

County: Smith

Highway: Toll 49

3.5	1.000
3.6	1.000
3.7	1.000

The current Table 21 in TxDOT’s Standard Specifications applies to in-place air voids greater than 3.7%.

Give the owner’s inspector at the spreading and finishing machine one weight ticket for each load of material. When directed, weigh asphaltic concrete loads on public scales to ensure the proper weight of material.

For materials paid for by the ton, provide a summary spreadsheet in accordance with Article 520.2, “Equipment,” in TxDOT’s 2014 Standard Specifications.

Use an electrical impedance (non-nuclear) measurement gauge to determine mat segregation and joint density for Part V and Part VIII of test procedure tex-207-F.

ITEM 6001. PORTABLE CHANGEABLE MESSAGE SIGN

Provide a non-erodible, stable surface to place the Portable Changeable Message Sign (PCMS) units adjacent to the roadway as directed. Payment for this surface is incidental to Item 6001.

ITEM 6185. TRUCK MOUNTED ATTENUATOR (TMA)

Shadow vehicles with truck mounted attenuator (TMA) are required on the traffic control plan and TCP standards for this project. The Contractor will be responsible for determining if one or more of these traffic control operations will be ongoing at the same time to determine the total number of TMAs needed for the project. Additional truck mounted attenuators (TMAs) may be required as deemed necessary by the Engineer.

ATKINS

TBPE REG. # F-474

NET RMA

North East Texas  
Regional Mobility Authority

GENERAL NOTES

SHEET 8 OF 8

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			12G
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/21/2021 4:53:17 PM  
FILE: d:\pw\_work\atkrat\01\mccq2543\dms74286\toll 49\_s1\_overlay\_tcp\_nar.dgn

DN  
CK  
DN  
CK

TRAFFIC CONTROL NARRATIVE

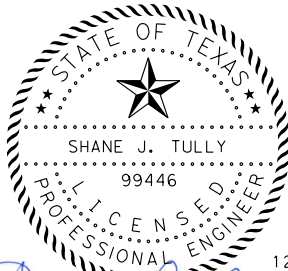
GENERAL

1. MAINTENANCE OF TRAFFIC AND TRAFFIC CONTROL MEASURES IMPLEMENTED DURING CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE REQUIREMENTS OF THE LATEST TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND THE LATEST TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) BC, WZ, AND TCP STANDARD DRAWINGS OF THE TRAFFIC ENGINEERING STANDARD SHEETS.
2. THE CONTRACTOR SHALL ENSURE THAT ALL IMPLEMENTED TRAFFIC CONTROL MEASURES ARE MAINTAINED IN A CLEAN AND FUNCTIONAL CONDITION AT ALL TIMES, INCLUDING MAINTENANCE DUE TO ACTS OF VANDALISM OR ACCIDENT. THE CONTRACTOR SHALL HAVE ADEQUATE REPLACEMENT TRAFFIC CONTROL DEVICES AVAILABLE AT ALL TIMES IN ORDER TO REPLACE THOSE DAMAGED WITHIN 24 HOURS OF NOTIFICATION.
3. ADVANCE WARNING SIGNS SHALL REMAIN IN PLACE THROUGHOUT THE DURATION OF THE PROJECT. THE CONTRACTOR SHALL ADJUST LOCATION OF SIGNS IN ACCORDANCE WITH APPLICABLE BC STANDARDS AND THE LATEST TMUTCD OR AS DIRECTED BY THE ENGINEER.
4. THE CONTRACTOR SHALL PROVIDE ANY ADDITIONAL SIGNS AND BARRICADES AS NECESSARY TO ADDRESS FIELD CONSTRUCTABILITY & VISIBILITY. THIS WORK SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.
5. THE CONTRACTOR SHALL COVER OR OTHERWISE REMOVE FROM VIEW OF THE TRAVELING PUBLIC EXISTING TRAFFIC SIGNS THAT CONFLICT WITH THE TRAFFIC CONTROL SIGNS OR THE INTENT OF THE TRAFFIC CONTROL PLANS. THIS WORK SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.
6. THE TRAFFIC CONTROL PLAN NARRATIVE AND TRAFFIC CONTROL LAYOUTS SERVE AS A GUIDE FOR SEQUENCING CONSTRUCTION AND THE SAFE HANDLING OF TRAFFIC DURING CONSTRUCTION OF THE PROPOSED IMPROVEMENTS AND DO NOT ATTEMPT TO ADDRESS EVERY ASPECT OF CONSTRUCTION THAT IS REQUIRED OR COULD BE ENCOUNTERED DURING EACH PHASE OF CONSTRUCTION. THE CONTRACTOR HAS SOLE RESPONSIBILITY OF CONSTRUCTING THE PROPOSED IMPROVEMENTS AND PROVIDING FOR THE SAFE HANDLING OF TRAFFIC DURING CONSTRUCTION.

TRAFFIC CONTROL PLAN

1. WORK SHALL ONLY OCCUR BETWEEN THE HOURS OF 9:00 P.M. AND 6:30 A.M. DURING THIS TIME, FULL CLOSURES OF TOLL 49 ARE ALLOWED WITHIN A SINGLE MILESTONE'S LIMITS. NO WORK IS PERMITTED BETWEEN THE HOURS OF 7:00 A.M. AND 9:00 P.M. THE GRACE PERIOD FOR A FULL NIGHTTIME CLOSURE ENDS AT 7:00 A.M. EACH MORNING. BEGINNING AT 7:01 A.M., THE CONTRACTOR WILL INCUR A \$500 LATE CLOSURE REMOVAL PENALTY THAT INCREASES IN \$500 INCREMENTS EACH 1/2-HOUR UNTIL THE CLOSURE IS COMPLETELY REMOVED.
2. THE THREE MILESTONES AND RESPECTIVE LIMITS FOR THIS PROJECT ARE:
  - MILESTONE 1: SH 155 TO FM 2493
  - MILESTONE 2: FM 2493 TO US 69
  - MILESTONE 3: US 69 TO SHACKLEFORD CREEK

THE USE OF FULL CLOSURES WITHIN A MILESTONE'S LIMITS ARE INTENDED TO ALLOW FOR EXPEDITED CONSTRUCTION. MULTIPLE MILESTONES SHALL NOT BE WORKED SIMULTANEOUSLY. MOVING FROM ONE MILESTONE TO THE NEXT IS NOT PERMITTED UNTIL 100% COMPLETION OF THE PREVIOUS MILESTONE.
3. 100% COMPLETION OF A MILESTONE CONSISTS OF ALL PAY ITEMS ASSOCIATED WITH NOT NEEDING TO RETURN TO THAT MILESTONE. THIS SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FINAL SURFACE, ALL PERMANENT PAVEMENT MARKING ELEMENTS, ALL MBGF ELEMENTS, BACKFILLING PAVEMENT EDGES, AND BRIDGE WASHING.
4. THE HMA SURFACE LAYDOWN OPERATION SHOULD BE SUCH THAT LONGITUDINAL JOINTS DO NOT FALL WITHIN THE WHEELPATHS OR THE MIDDLE OF THE LANES. WHEELPATHS SHALL BE DEFINED AS BEGINNING 1 FT. FROM THE TRAVEL SIDE OF THE PERMANENT PAVEMENT MARKINGS AND PROCEEDING FOR 3 FT. INTO THE TRAVELED AREA. TO ACHIEVE THIS, 8 FT. WIDE MAT CONSTRUCTION ON SHOULDERS WILL BE REQUIRED IN SOME AREAS. SEE TYPICAL JOINT LAYOUT AND STRIPING DETAIL SHEET FIGURE 1 FOR JOINT AND STRIPING CONFIGURATION WHEN TOLL 49 HAS ONE LANE IN EACH DIRECTION. IN THESE AREAS, 8 FT. MAT WIDTHS ARE REQUIRED FOR SHOULDER CONSTRUCTION. WHEN TOLL 49 HAS A SUPER 2 CONFIGURATION, SEE TYPICAL JOINT LAYOUT AND STRIPING DETAIL SHEET FIGURE 2.
5. 4 IN. WORK ZONE PAVEMENT MARKINGS (TAPE SHALL BE USED, TABS ARE NOT ALLOWED) ARE REQUIRED EACH NIGHT BEFORE OPENING THE ROADWAY TO TRAFFIC. THE TAPE MUST BE COMPLETELY REMOVED PRIOR TO PLACEMENT OF THE PERMANENT PAVEMENT MARKINGS. TEMPORARY MARKINGS SHALL NOT REMAIN IN PLACE LONGER THAN 14-DAYS. TEMPORARY EDGELINE MARKINGS ARE NOT REQUIRED.
6. EACH BRIDGE END WITHIN THE PROJECT REQUIRES A 2.25 IN. MILL AND FILL THROUGH THE CONCRETE MOWSTRIP LENGTH. BEYOND THIS LENGTH, A 200 FT. TAPER MILL IS REQUIRED TO RETURN TO THE EXISTING SURFACE. THIS SAME MILL AND FILL THROUGH THE CONCRETE MOWSTRIP LENGTH IS REQUIRED AT THE FM 2493 RAMP GANTRY LOCATIONS. TIE-IN LOCATIONS AT LOCATIONS WITHOUT MOWSTRIP ONLY REQUIRE THE TAPER MILL FROM 2.25 IN. TO 0 IN. MILLED AREAS ON MAINLANES SHALL BE PAVED BACK FLUSH WITH THE EXISTING SURFACE EACH NIGHT BEFORE OPENING THE ROADWAY TO TRAFFIC. MILLED SHOULDERS DO NOT HAVE TO BE PAVED PRIOR TO OPENING THE ROADWAY IF SHOULDER CLOSURES ARE IN-PLACE AND MAINTAINED.



**ATKINS**  
TBPE REG. # F-474

**NET RMA**  
North East Texas  
Regional Mobility Authority

TOLL 49  
TRAFFIC CONTROL PLAN  
NARRATIVE

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			13
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/21/2021 4:53:25 PM  
FILE: d:\pw\_work\atkrat\01\mccq2543\dms73683\To11 49\_S1\_OVERLAY\_DET\_01.dgn

DNt Ckt DWt Ckt

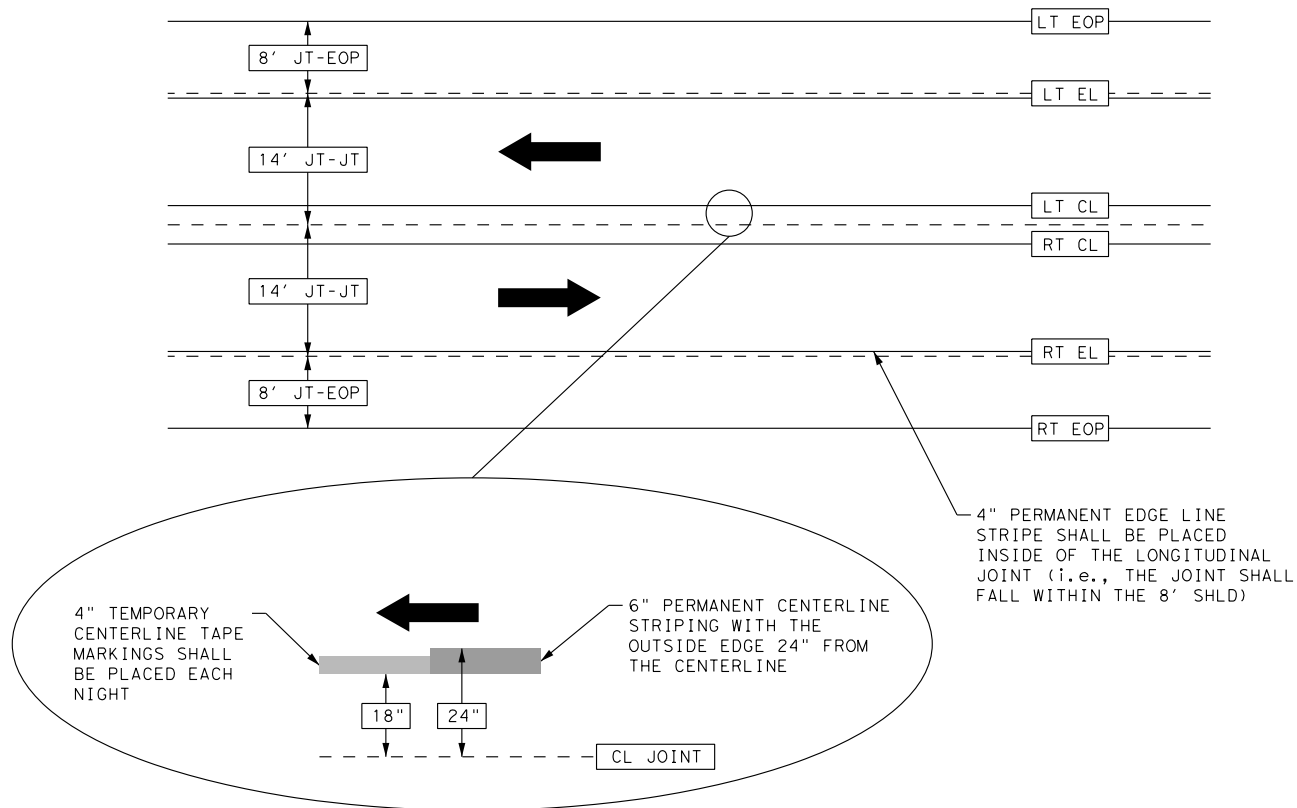


FIGURE 1 - TYPICAL JOINT-PAVEMENT MARKING CONFIGURATION  
NTS

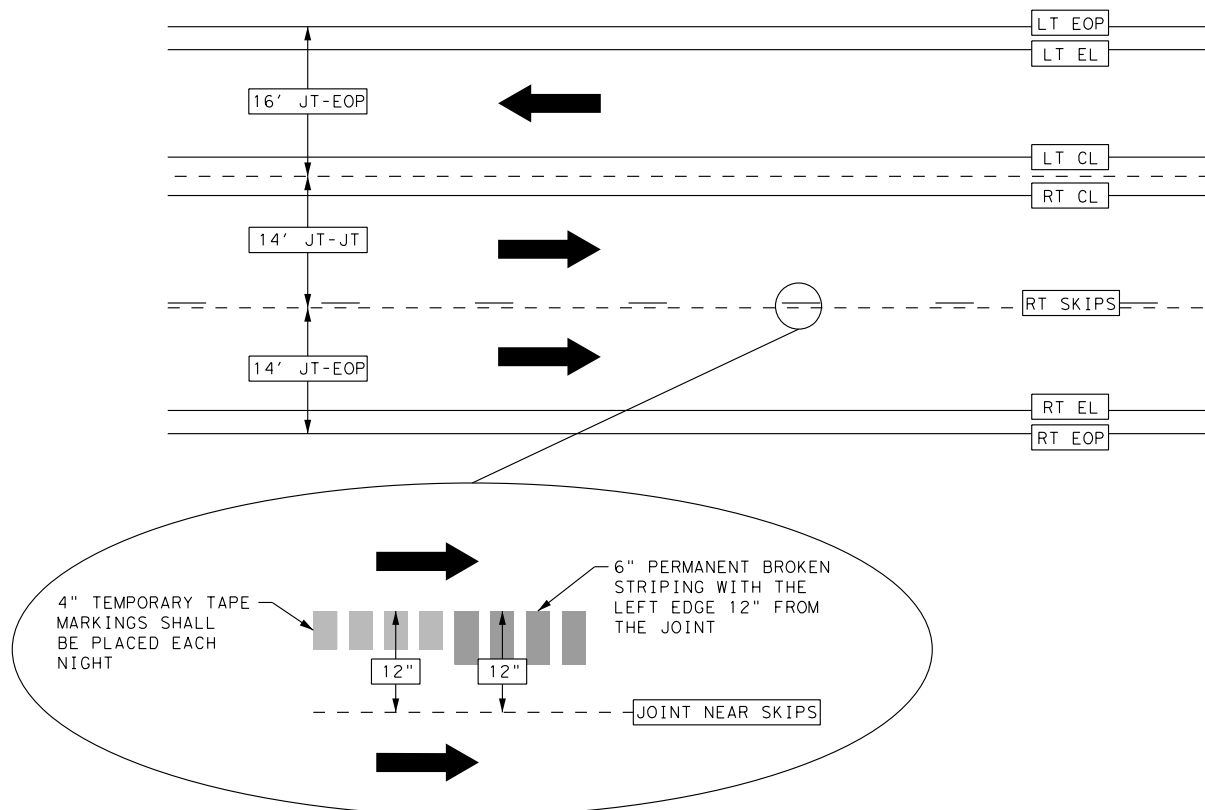


FIGURE 2 - JOINT-PAVEMENT MARKING CONFIGURATION FOR SUPER 2  
NTS

## LEGEND

EOP - EDGE OF PAVEMENT  
LT - LEFT  
RT - RIGHT  
JT - JOINT  
CL - CENTERLINE  
EL - EDGE LINE  
SKIPS - DASHED PAVEMENT MARKING  
- - - - PAVEMENT JOINT  
—— LANE LINE



12/21/2021

**ATKINS**

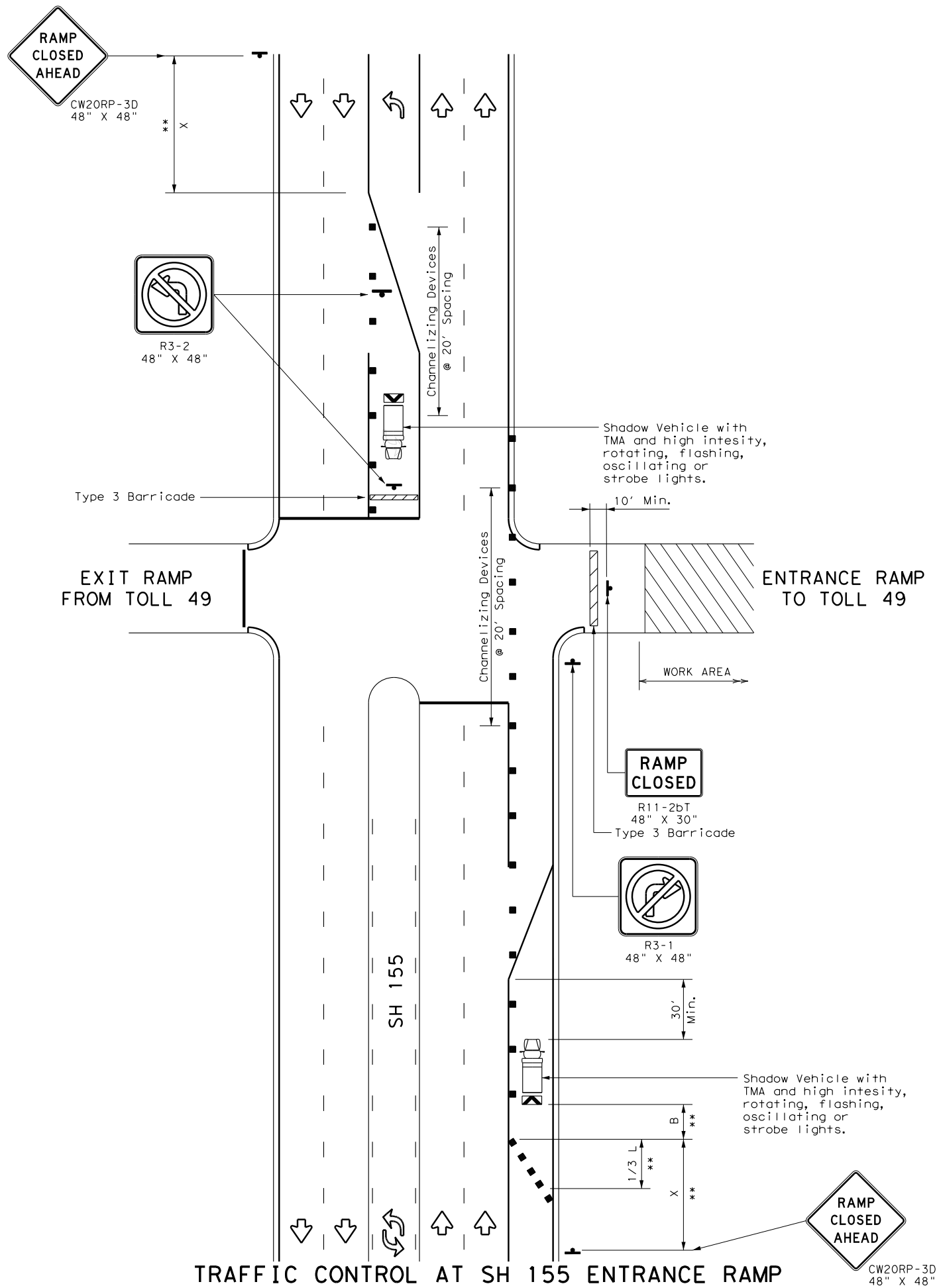
TBPE REG. # F-474



## TOLL 49 JOINT LAYOUT AND STRIPING DETAIL

N. T. S.		SHEET 1 OF 1	
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			14
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49





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

Posted Speed *	Formula	Minimum Desirable Taper Lengths * X			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
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)



**ATKINS**  
TBPE REG. # F-474



**TOLL 49**  
**TRAFFIC CONTROL PLAN**  
**AT ENTRANCE RAMPS**

N. T. S.		SHEET 1 OF 6	
FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.	
6		16	
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

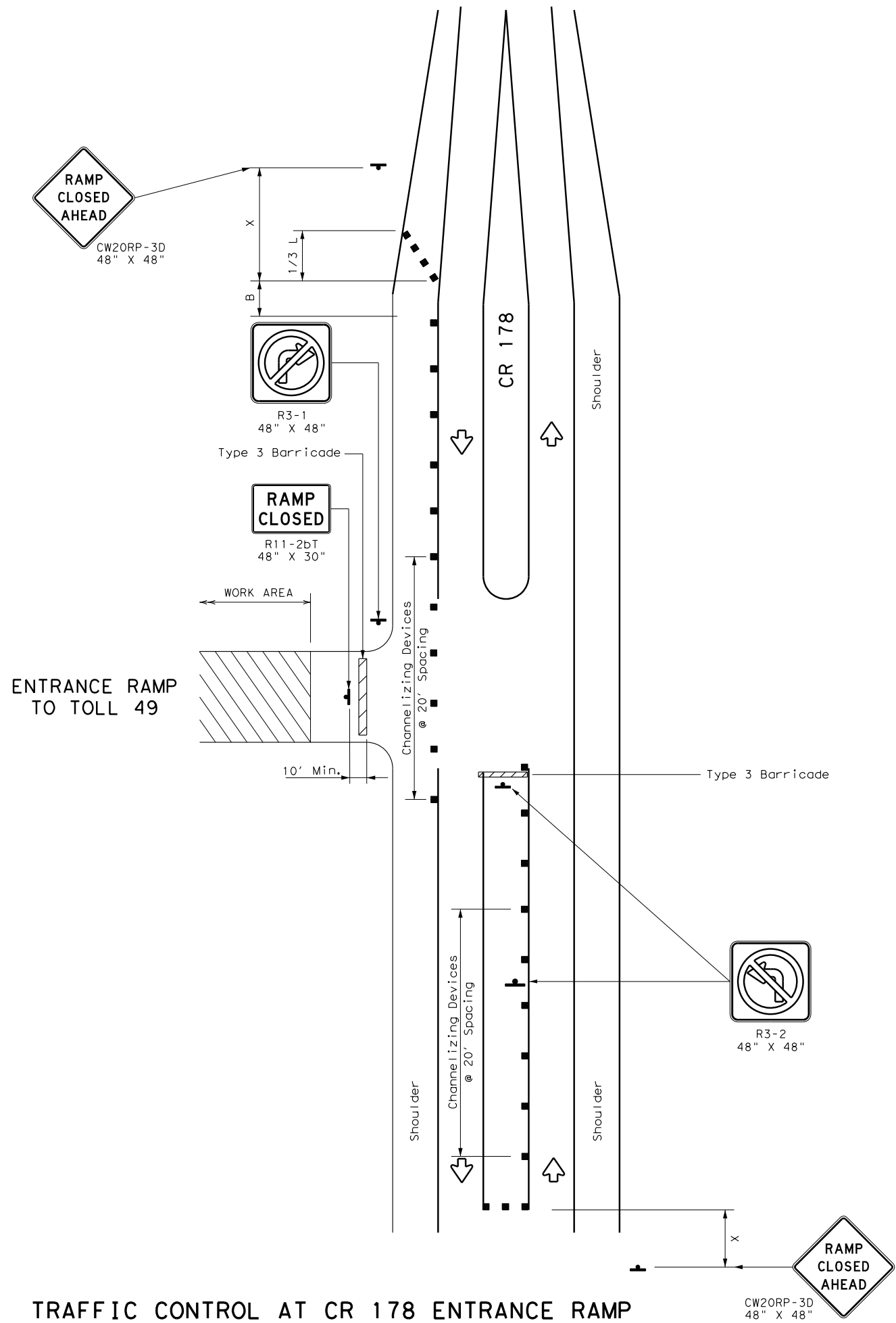
**GENERAL NOTES**

- 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.

See TCP(1-4)-18 for additional information and signage for right lane closure.



DATE: 12/21/2021 4:53:34 PM  
FILE: d:\pw\_work\atkrat\01\mcca2543\dms74286\toll 49\_s1\_overlay\_tcp\_detail01.dgn



TRAFFIC CONTROL AT CR 178 ENTRANCE RAMP

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
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)

#### GENERAL NOTES

- 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.

See TCP(1-1)-18, TCP(1-4)-18 or TCP(5-1)-18 for additional information and signage.



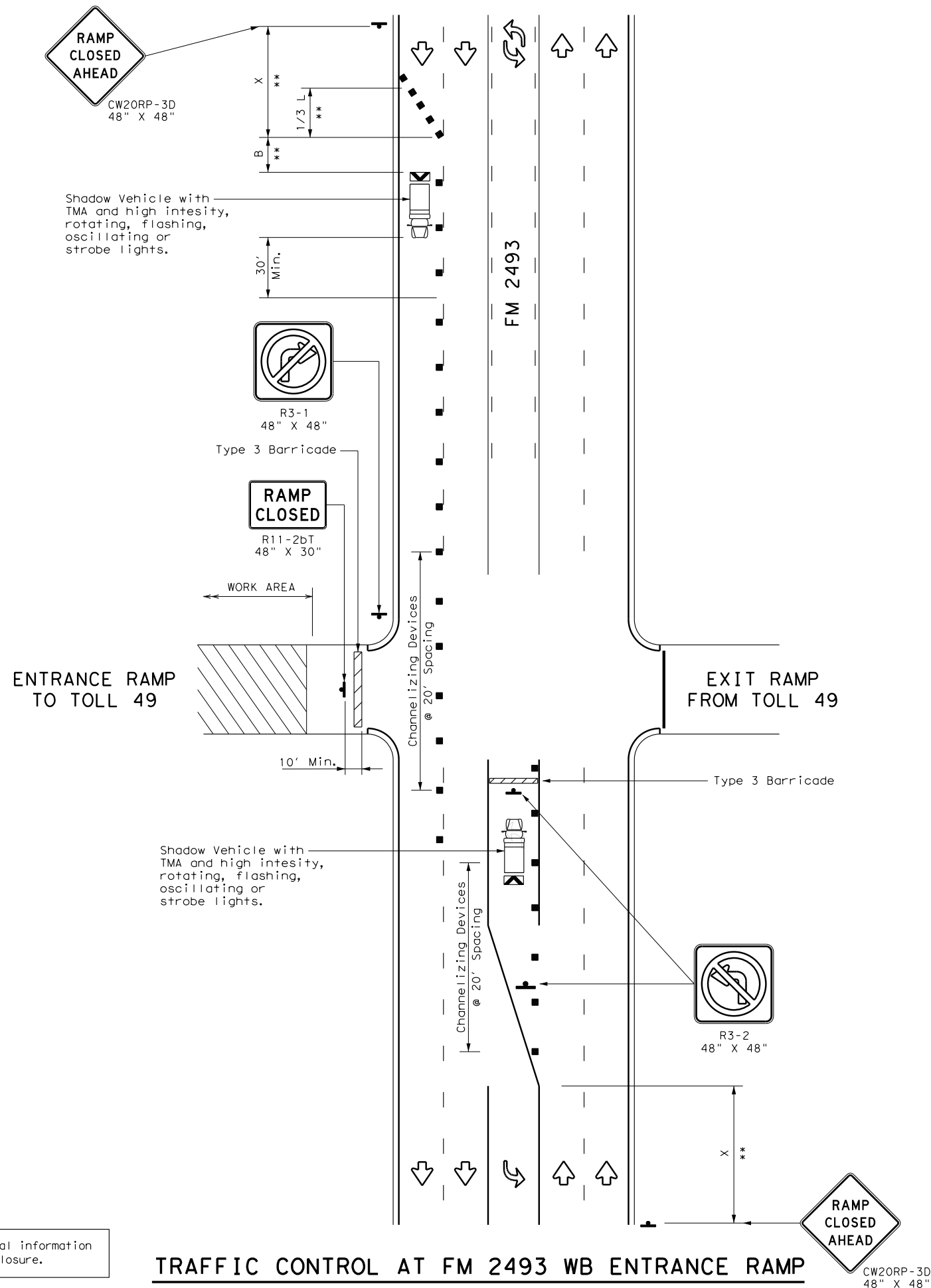
**ATKINS**  
TBPE REG. # F-474

**NET RMA**  
North East Texas  
Regional Mobility Authority

**TOLL 49**  
**TRAFFIC CONTROL PLAN**  
**AT ENTRANCE RAMPS**

N. T. S.		SHEET 2 OF 6	
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			17
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/21/2021 4:53:34 PM  
FILE: d:\pw\_work\atkrat\01\meca2543\dms74286\Toll 49\_S1\_OVERLAY\_TCP\_DETAIL01.dgn



See TCP(1-4)-18 for additional information and signage for right lane closure.

### TRAFFIC CONTROL AT FM 2493 WB ENTRANCE RAMP

CW20RP-3D  
48" X 48"

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
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)

#### GENERAL NOTES

- 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.

See TCP(1-1)-18, TCP(1-4)-18 or TCP(5-1)-18 for additional information and signage.



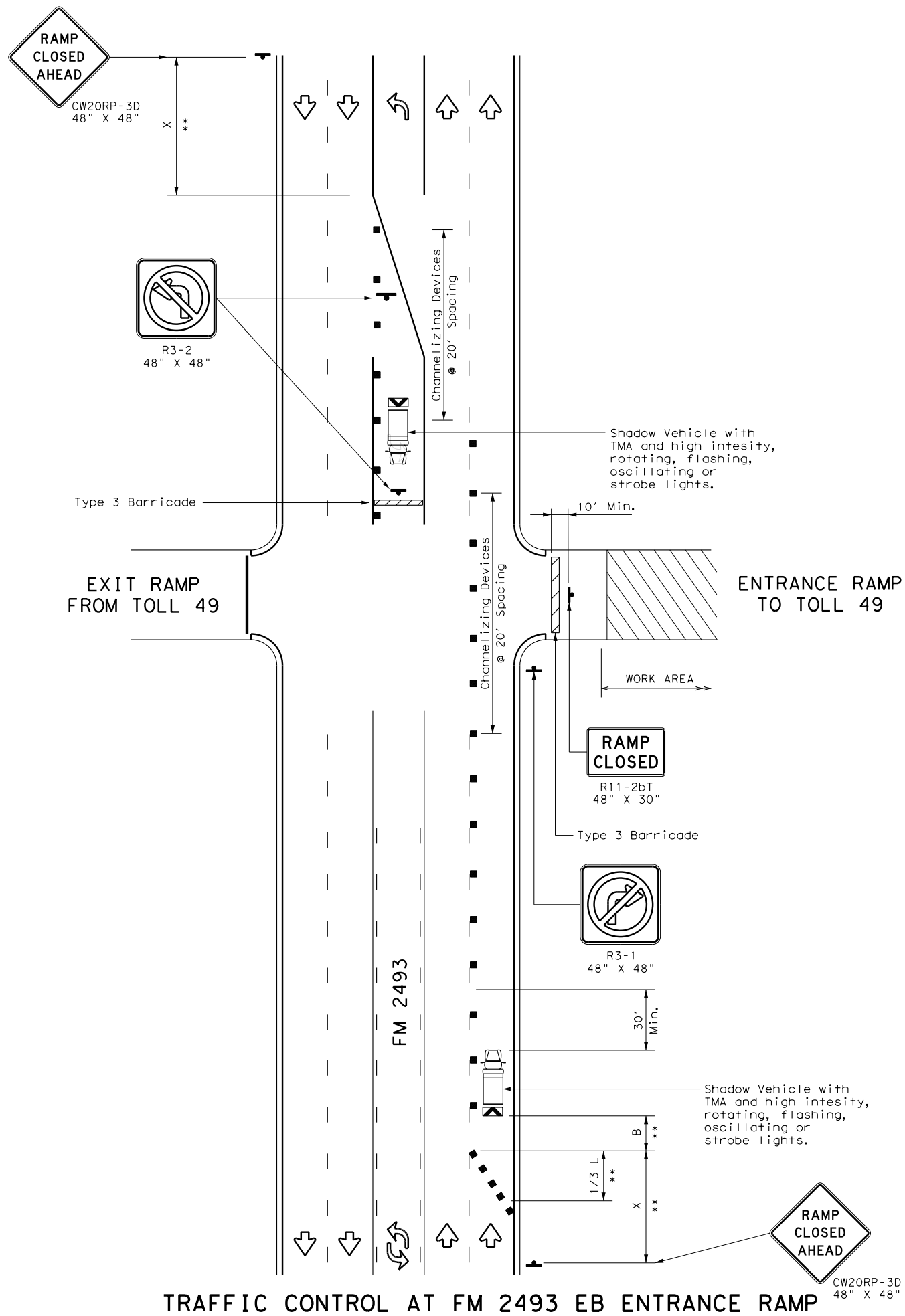
12/21/2021

**ATKINS**  
TBPE REG. # F-474

**NET RMA**  
North East Texas  
Regional Mobility Authority

### TOLL 49 TRAFFIC CONTROL PLAN AT ENTRANCE RAMPS

N. T. S.		SHEET 3 OF 6	
FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.	
6		18	
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49



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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
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)

#### GENERAL NOTES

- 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.

See TCP (1-1)-18, TCP (1-4)-18 or TCP (5-1)-18 for additional information and signage.



12/21/2021

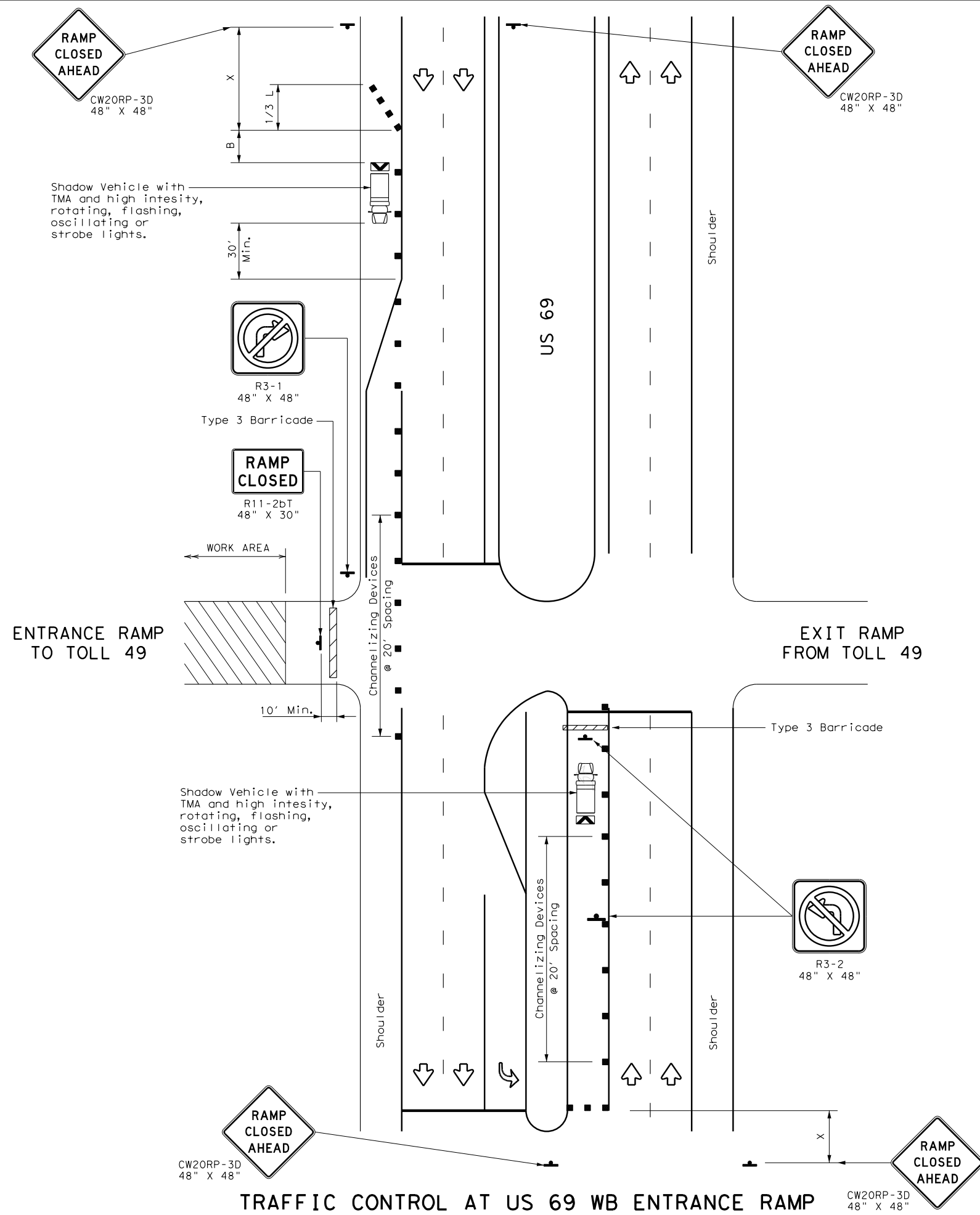
**ATKINS**  
TBPE REG. # F-474

**NET RMA**  
North East Texas  
Regional Mobility Authority

### TOLL 49 TRAFFIC CONTROL PLAN AT ENTRANCE RAMPS

N. T. S.		SHEET 4 OF 6	
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			19
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DATE: 12/21/2021 4:53:36 PM  
FILE: d:\pw\_wor-k\atkrat\01\meca2543\dms74286\Toll 49\_S1\_OVERLAY\_TCP\_DETAIL01.dgn



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

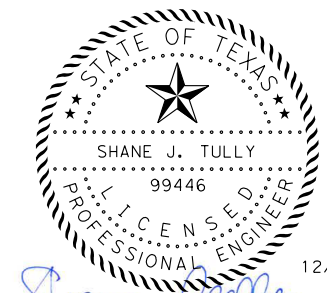
Posted Speed *	Formula	Minimum Desirable Taper Lengths * X			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
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  
\* X Taper lengths have been rounded off.  
L = Length of Taper (FT) W = Width of Offset (FT) S = Posted Speed (MPH)

#### GENERAL NOTES

- 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.

See TCP(1-1)-18, TCP(1-4)-18 or TCP(5-1)-18 for additional information and signage.



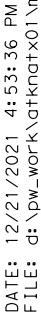
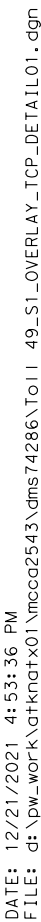
12/21/2021

**ATKINS**  
TBPE REG. # F-474

**NET RMA**  
North East Texas  
Regional Mobility Authority

### TOLL 49 TRAFFIC CONTROL PLAN AT ENTRANCE RAMPS

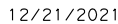
N. T. S.		SHEET 5 OF 6	
FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.	
6		20	
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49




Posted Speed X	Formula	Minimum Desirable Taper Lengths X X			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
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'

## GENERAL NOTES

- See TCP(1-1)-18, TCP(1-4)-18 or TCP(5-1)-18 for additional information and signage.



<h1 style="margin: 0;">ATKINS</h1> <p style="margin: 0; font-weight: normal;">TBPE REG. # F-474</p>			
 <p style="margin: 0;"><b>NET RMA</b>★</p> <p style="margin: 0;"><i>North East Texas Regional Mobility Authority</i></p>			
<h2 style="margin: 0;">TOLL 49</h2> <h3 style="margin: 20px 0 0 0;">TRAFFIC CONTROL PLAN AT ENTRANCE RAMPS</h3>			
N. T. S.		SHEET 6 OF 6	
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			21
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

DISCLAIMER: This standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:53:44 PM  
FILE: d:\pw\_work\atknat\01\mca02543\dms73722\bc-21.dgn

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

WORKER SAFETY NOTES:

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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						TOLL 49			
4-03	7-13	DIST	COUNTY			SHEET NO.			
9-07	8-14								
5-10	5-21								
			SMITH			22			

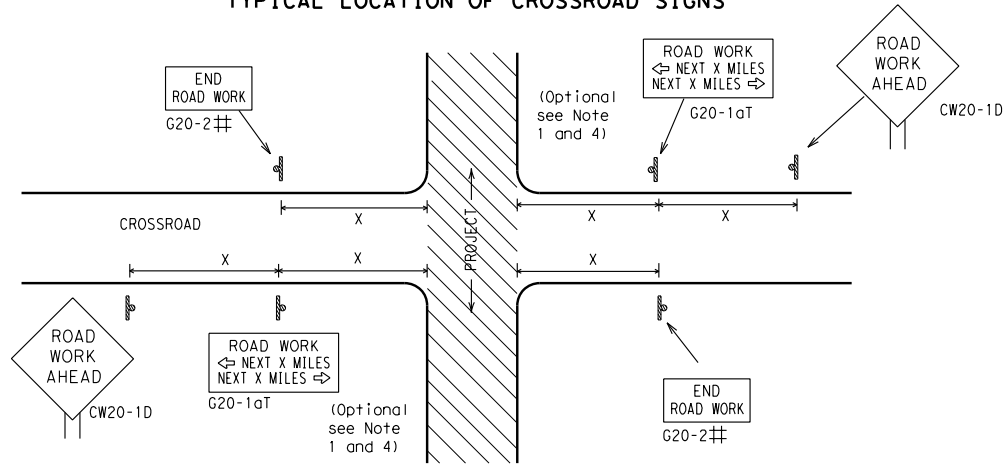
95



DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:53:44 PM  
FILE: d:\pw\_work\atknat\01\mcoq2543\dms73722\bc-21.dgn

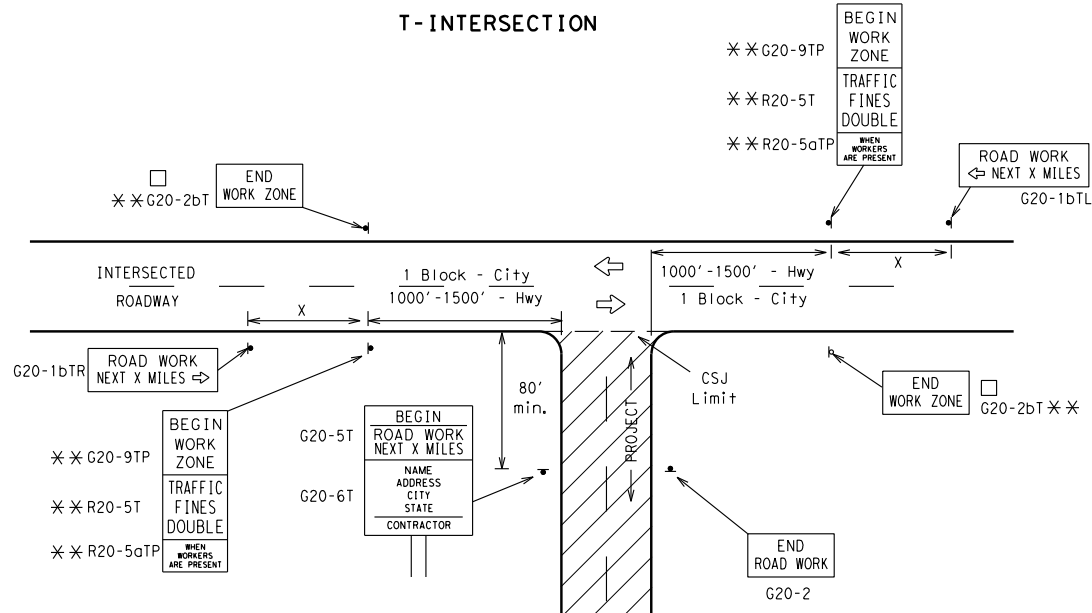
### TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

### T-INTERSECTION



### CSJ LIMITS AT T-INTERSECTION

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

### TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING<sup>1,5,6</sup>

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/ Freeway	Posted Speed MPH	Sign $\Delta$ Spacing "X" Feet (Apprx.)
CW20 <sup>4</sup>	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW25			50	400
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	55	500 <sup>2</sup>
			60	600 <sup>2</sup>
			65	700 <sup>2</sup>
			70	800 <sup>2</sup>
			75	900 <sup>2</sup>
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	80	1000 <sup>2</sup>
			*	* <sup>3</sup>

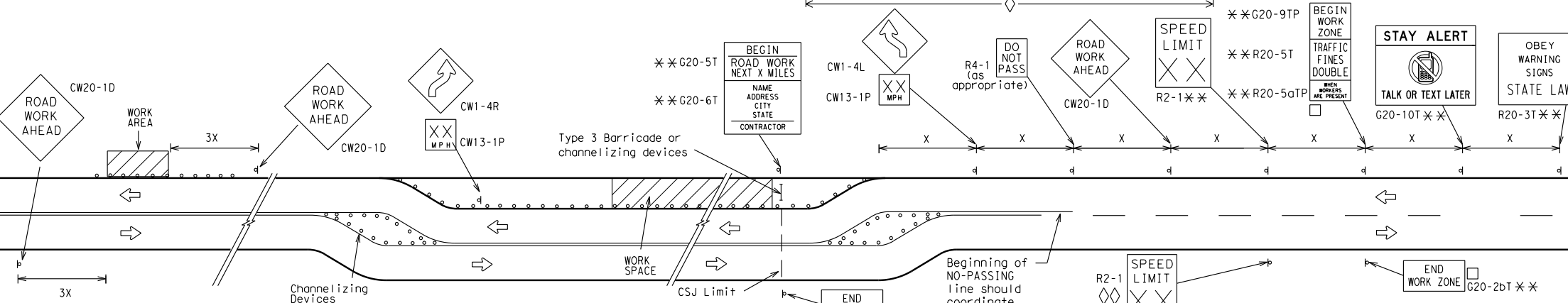
\* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

### GENERAL NOTES

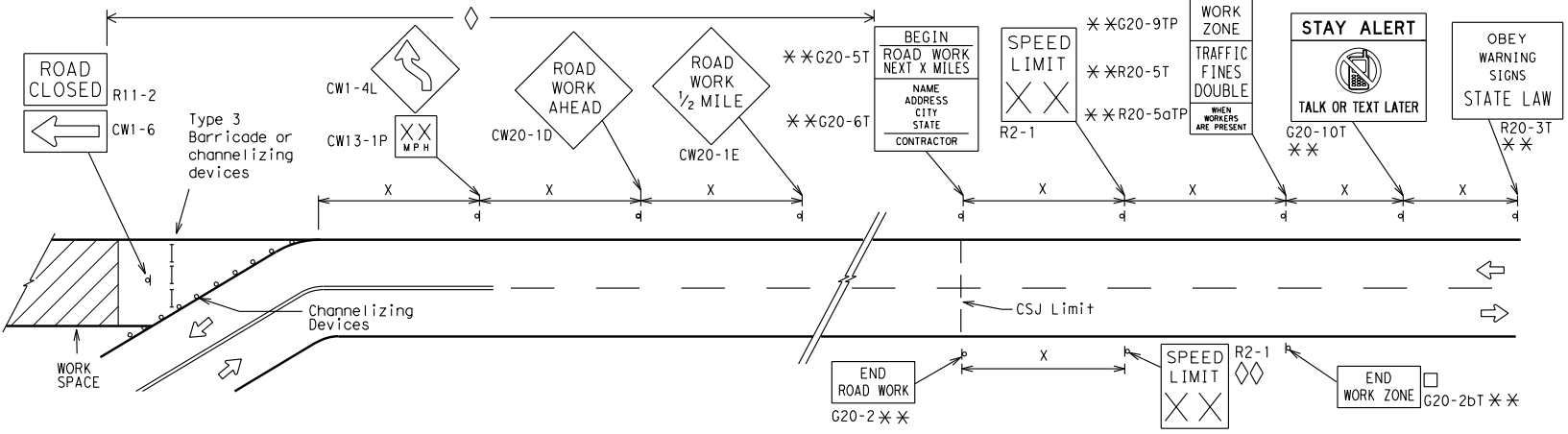
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be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

### WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

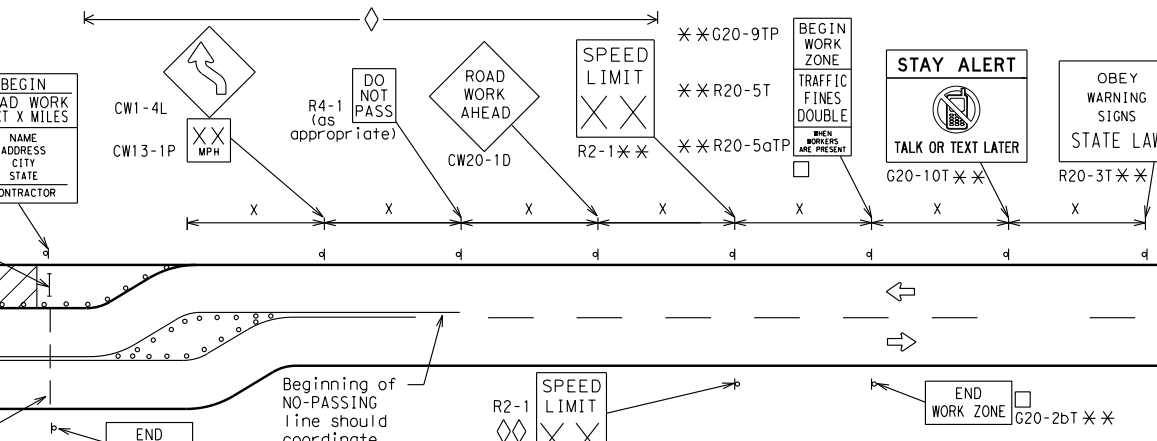


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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



### SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT 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.
- $\diamond$  Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
- $\diamond\diamond$  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.

SHEET 2 OF 12



## BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC (2) - 21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DN: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
9-07 8-14				
7-13 5-21				
	DIST	COUNTY		SHEET NO.
		SMITH		23



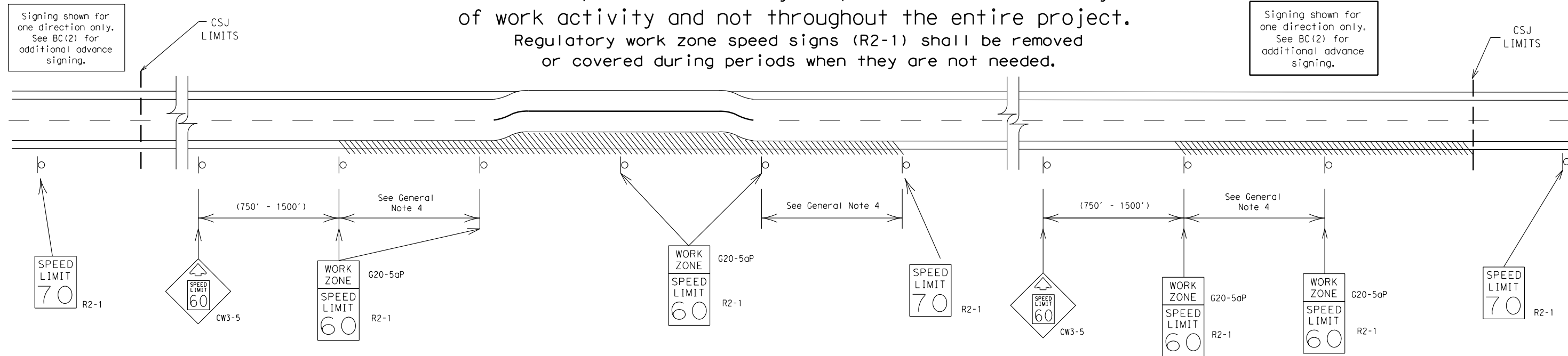
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:53:45 PM  
FILE: d:\pw\_work\atknat\01\mca2543\dms73722\bc-21.dgn

# TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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



## GUIDANCE FOR USE:

### LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

### SHORT TERM WORK ZONE SPEED LIMITS

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

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

## GENERAL NOTES

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

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

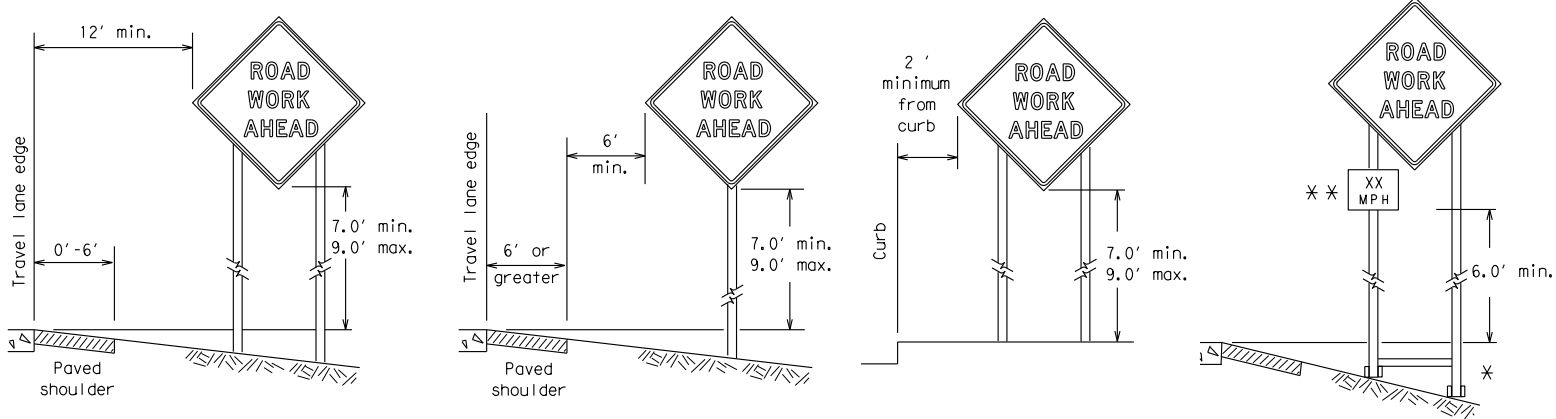
SHEET 3 OF 12

		Traffic Safety Division Standard	
<b>BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT</b>			
<b>BC (3) - 21</b>			
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT November 2002	CONT	SECT	JOB
REVISIONS		HIGHWAY	
9-07 8-14	DIST	COUNTY	TOLL 49
7-13 5-21	SMITH		SHEET NO. 24

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:53:46 PM  
FILE: d:\p\_wor-k\atknat\01\mca02543\dms73722\bc-21.dgn

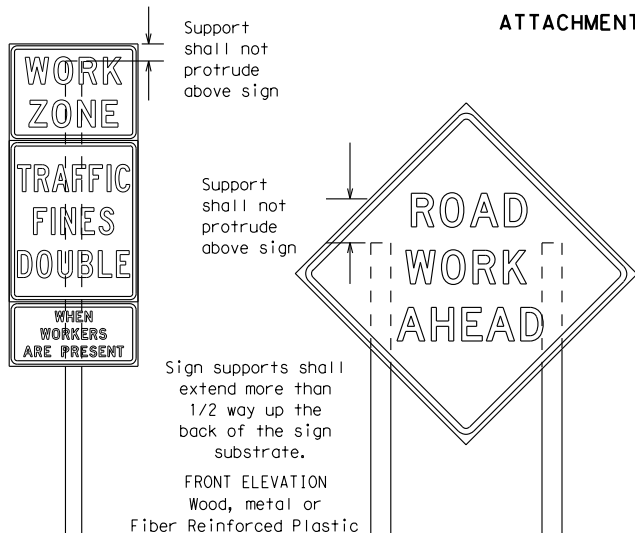
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



✱ 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.

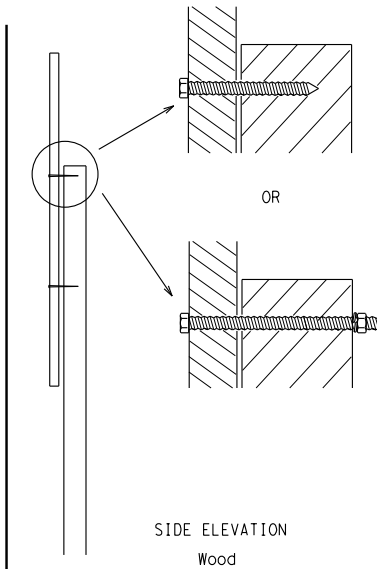
✱✱ When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



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

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.

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

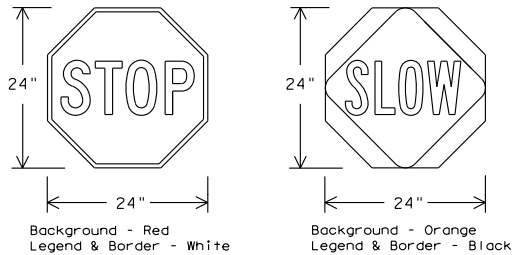
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not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

FLAGS ON SIGNS

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

STOP/SLOW PADDLES

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




SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B <sub>FL</sub> OR C <sub>FL</sub> SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

SHEET 4 OF 12

**Texas Department of Transportation**

**Traffic Safety Division Standard**

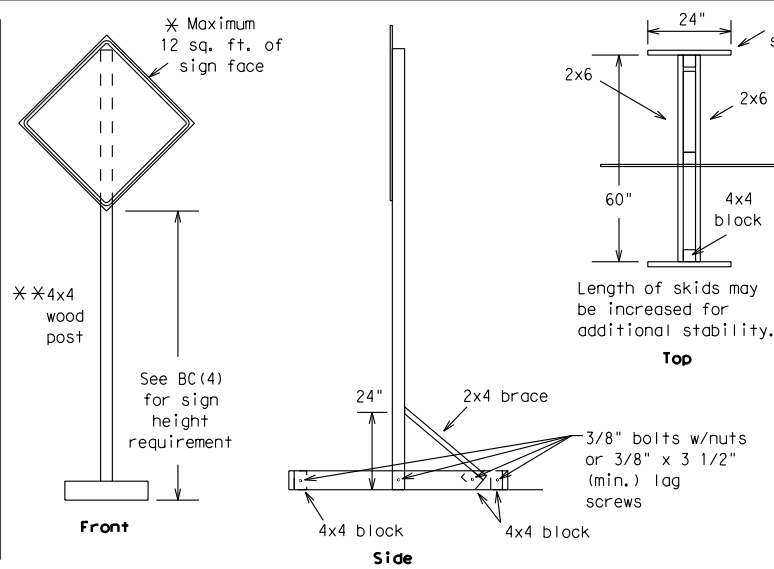
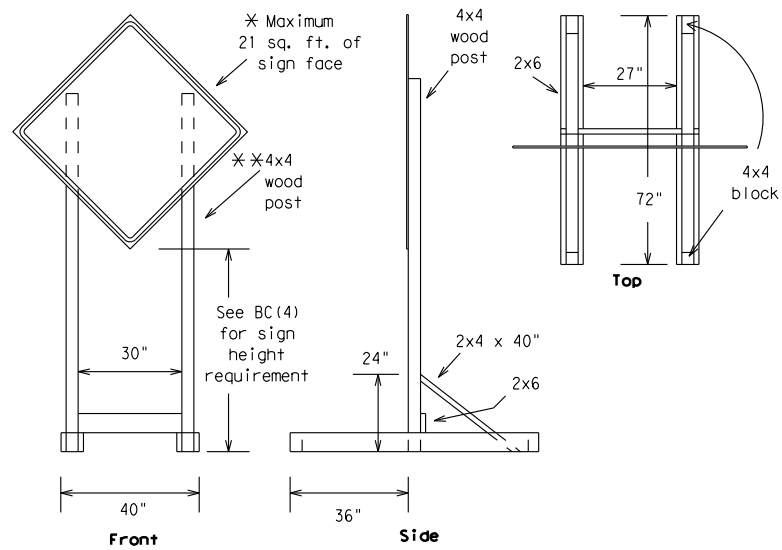
**BARRICADE AND CONSTRUCTION**  
**TEMPORARY SIGN NOTES**

**BC (4) -21**

FILE:	bc-21.dgn	DN:	TxDOT	CK:	TxDOT	DN:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB		HIGHWAY			
REVISIONS						TOLL		49	
9-07	8-14								
7-13	5-21	DIST		COUNTY		SHEET NO.			
				SMITH		25			

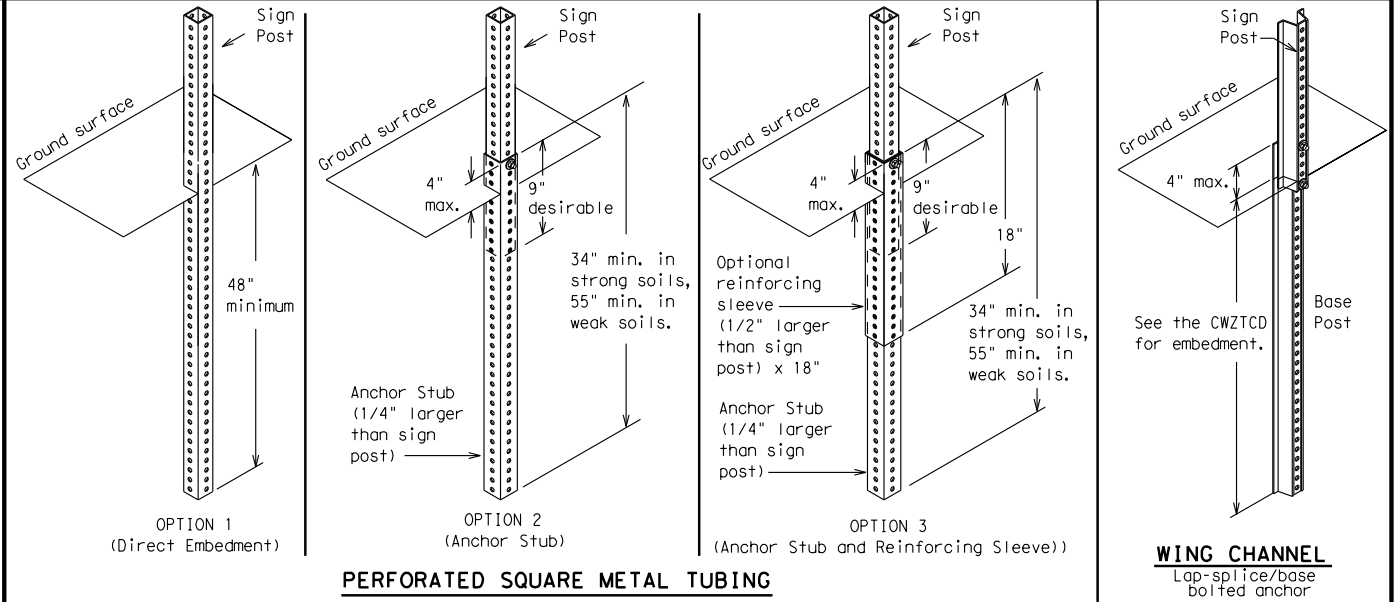
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:53:46 PM  
FILE: d:\pw\_work\atknat\01\meca2543\dms73722\bc-21.dgn



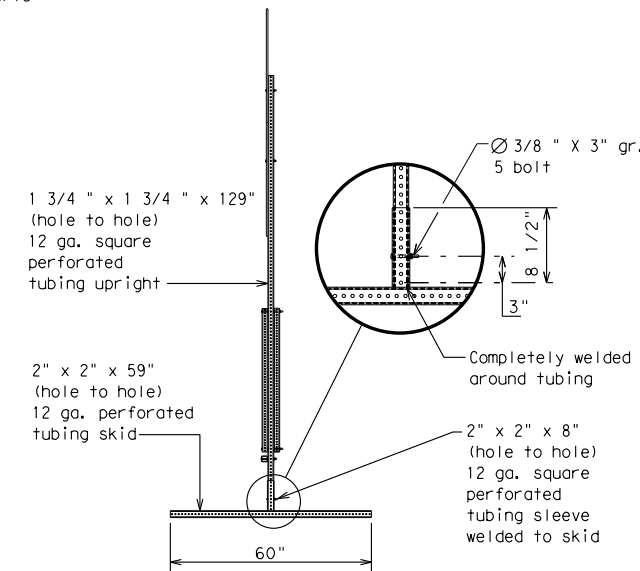
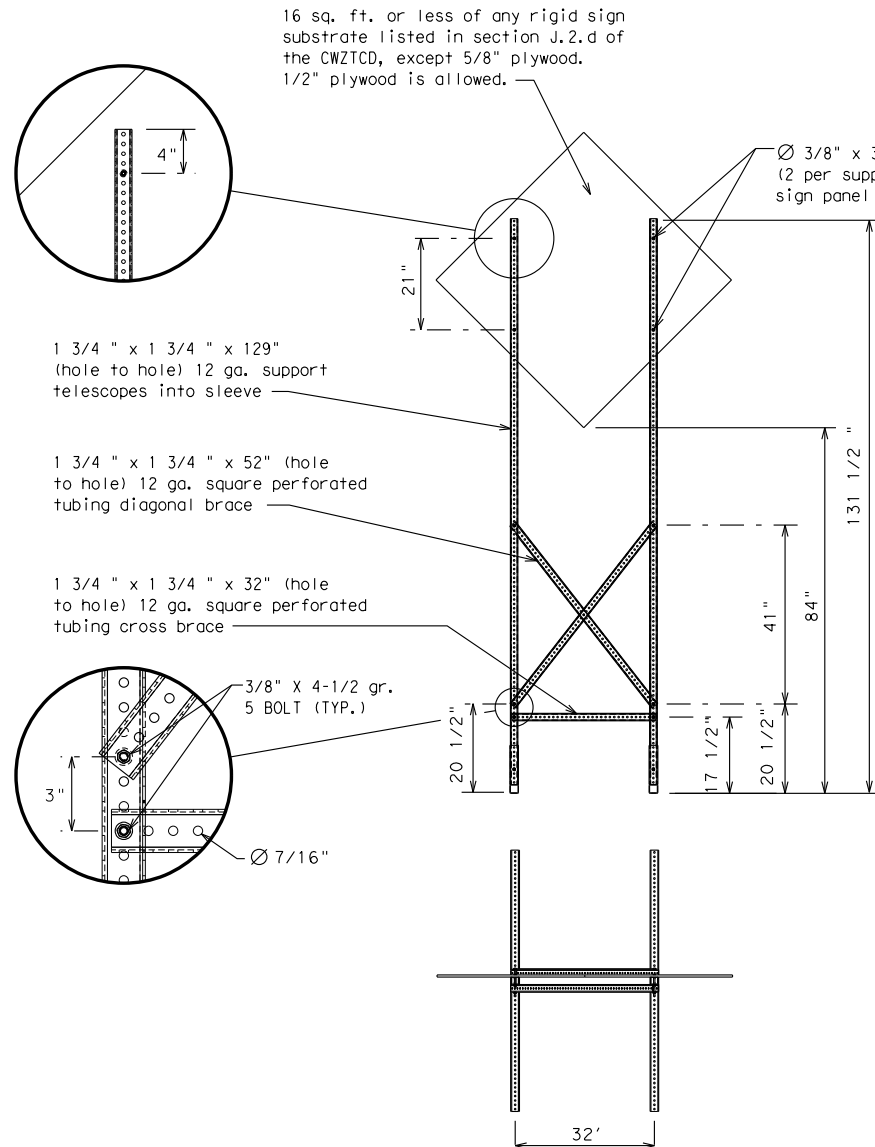
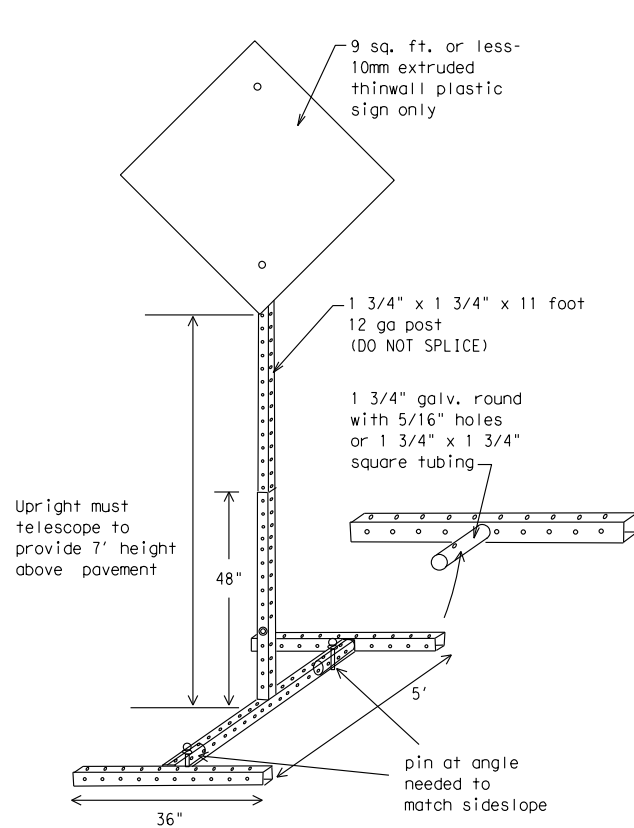
### SKID MOUNTED WOOD SIGN SUPPORTS

\* 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.



### 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.

SHEET 5 OF 12



### 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	TOLL	49		
9-07	8-14	DIST	COUNTY	SHEET NO.					
7-13	5-21		SMITH	26					

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:53:47 PM  
FILE: d:\pw-wor-k\atknat\01\mcoa2543\dms73722\bc-21.dgn

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

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

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

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

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

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

XXXXXXXX  
TO  
XXXXXXXX

US XXX  
TO  
FM XXXX

Warning List

SPEED  
LIMIT  
XX MPH

MAXIMUM  
SPEED  
XX MPH

MINIMUM  
SPEED  
XX MPH

ADVISORY  
SPEED  
XX MPH

RIGHT  
LANE  
EXIT

USE  
CAUTION

DRIVE  
SAFELY

DRIVE  
WITH  
CARE

\*\* Advance Notice List

TUE-FRI  
XX AM-  
X PM

APR XX-  
XX  
X PM-X AM

BEGINS  
MONDAY

BEGINS  
MAY XX

MAY X-X  
XX PM -  
XX AM

NEXT  
FRI-SUN

XX AM  
TO  
XX PM

NEXT  
TUE  
AUG XX

TONIGHT  
XX PM-  
XX AM

\*\* See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

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

FULL MATRIX PCMS SIGNS

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

WORDING ALTERNATIVES

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

SHEET 6 OF 12



Texas Department of Transportation

Traffic  
Safety  
Division  
Standard

BARRICADE AND CONSTRUCTION  
PORTABLE CHANGEABLE  
MESSAGE SIGN (PCMS)

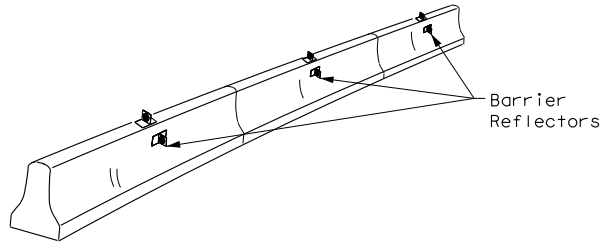
BC (6) - 21

FILE:	bc-21.dgn	DN:	TxDOT	CK:	TxDOT	DN:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
	REVISIONS				TOLL	49			
9-07	8-14								
7-13	5-21				COUNTY			SHEET NO.	
					SMITH			27	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

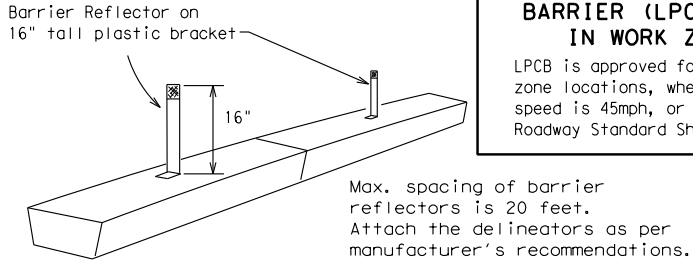
DATE: 12/21/2021 4:53:48 PM  
FILE: d:\pw-wor\atknat\01\meca2543\dms73722\bc-21.dgn

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

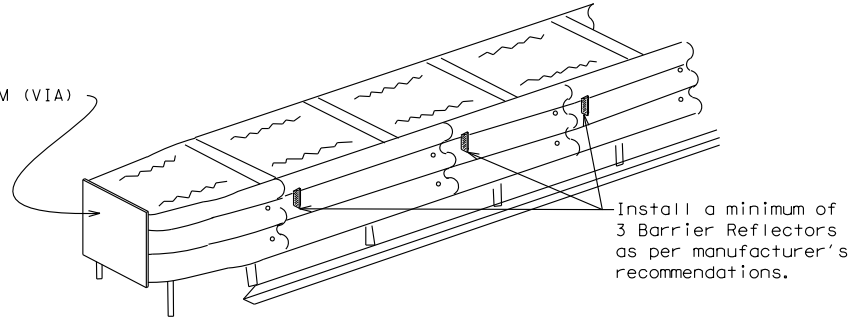


#### CONCRETE TRAFFIC BARRIER (CTB)

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



#### LOW PROFILE CONCRETE BARRIER (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 appropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

## BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

#### WARNING LIGHTS

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

#### WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

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

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

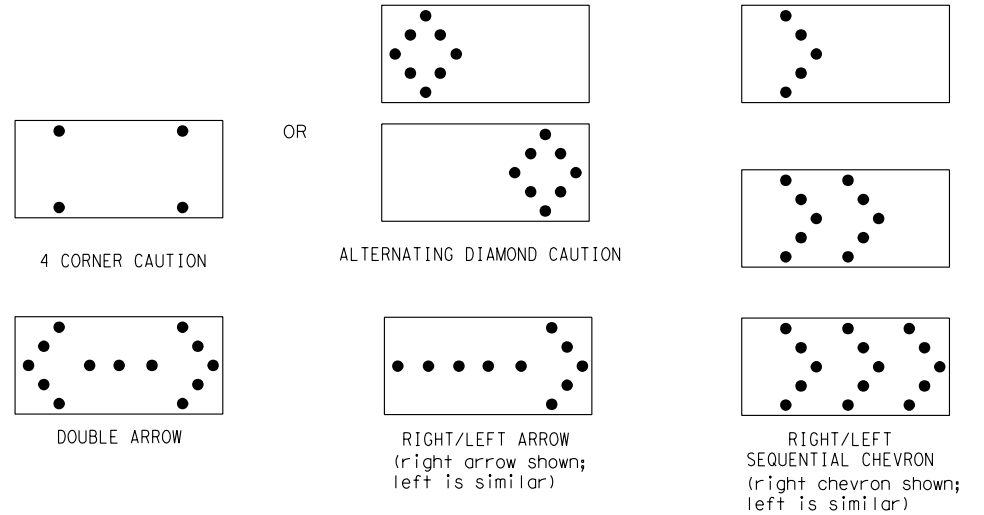
- A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
- The warning reflector shall be yellow in color and shall be manufactured using a sign substrate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

#### 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.

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

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



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

#### REQUIREMENTS

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

#### ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

## FLASHING ARROW BOARDS

SHEET 7 OF 12

#### TRUCK-MOUNTED ATTENUATORS

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

		<b>Traffic Safety Division Standard</b>	
<b>BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS &amp; ATTENUATOR</b>			
<b>BC (7) -21</b>			
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DN: TxDOT
© TxDOT November 2002	CONT	SECT	JOB
REVISIONS		HIGHWAY	
9-07 8-14	DIST		COUNTY
7-13 5-21	SMITH		SHEET NO.
		<b>28</b>	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:53:48 PM  
FILE: d:\pw\_wor-k\atknat\01\meca2543\dms73722\bc-21.dgn

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

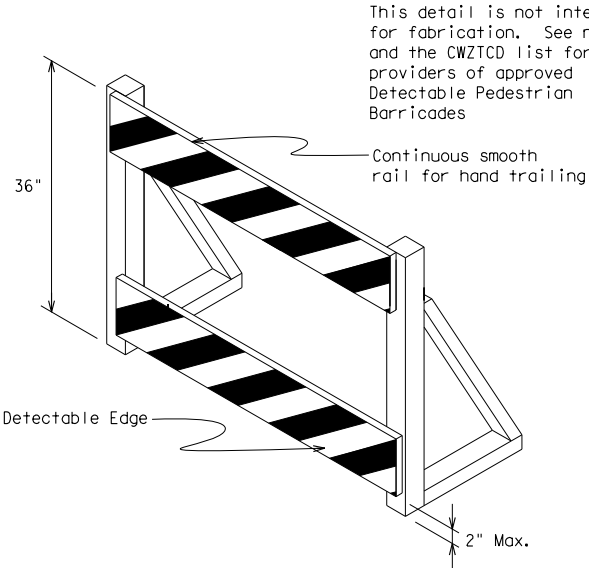
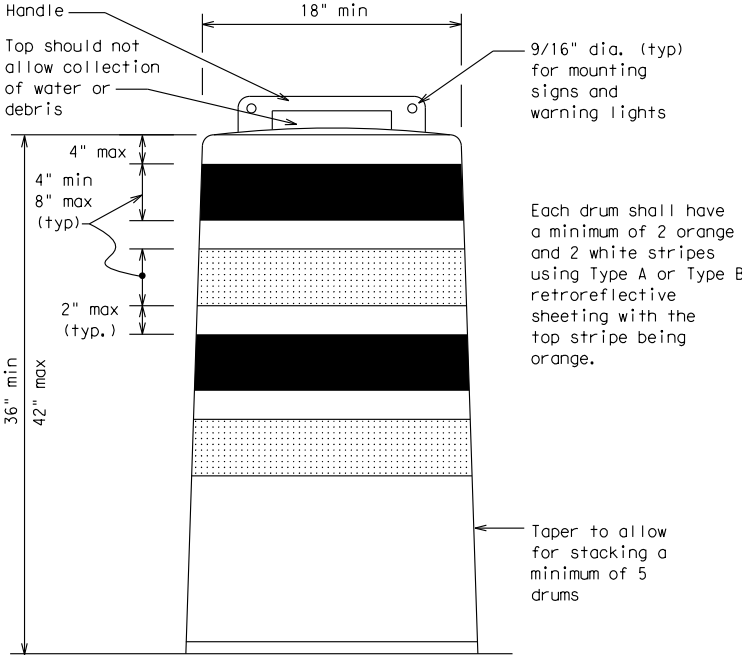
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

RETROREFLECTIVE SHEETING

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

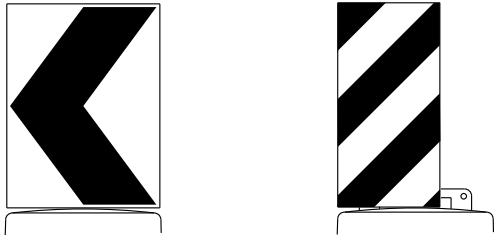
BALLAST

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



DETECTABLE PEDESTRIAN BARRICADES

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



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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

SHEET 8 OF 12



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

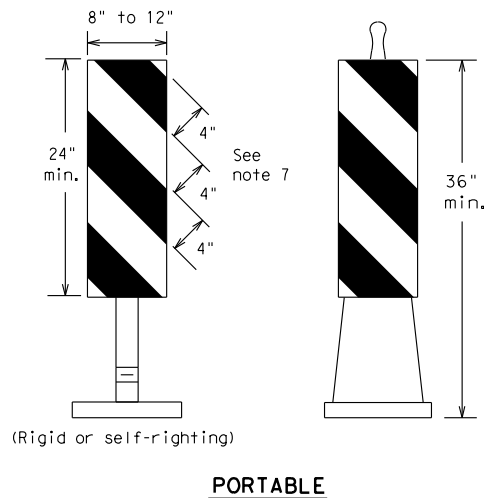
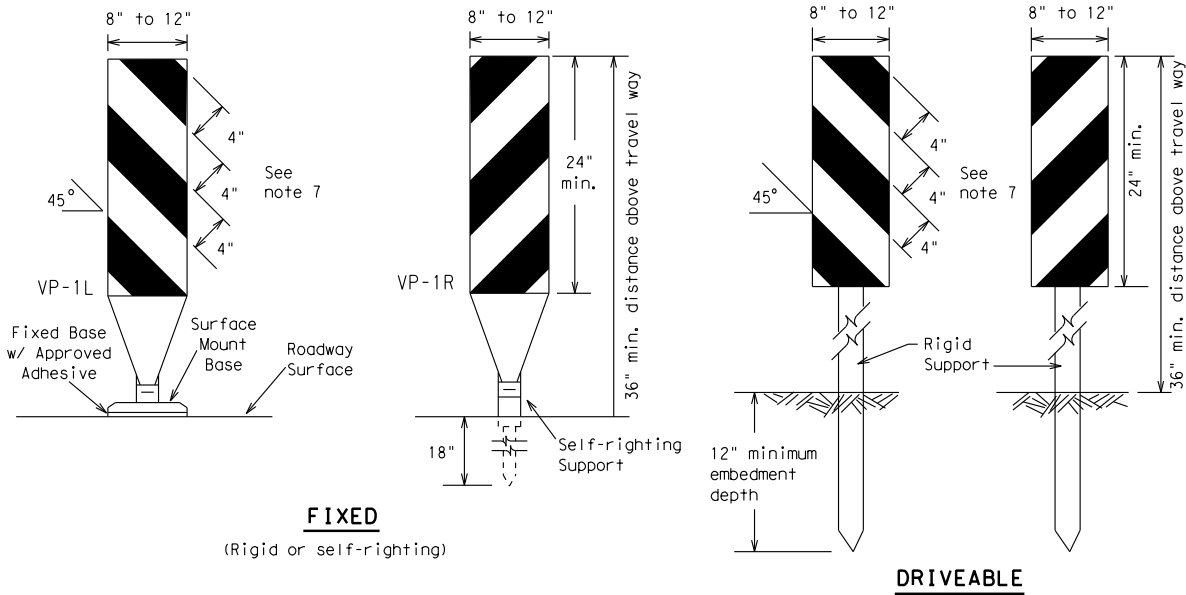
BC (8) - 21

FILE:	bc-21.dgn	DN:	TxDOT	CK:	TxDOT	DN:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS					TOLL	49			
4-03	8-14								
9-07	5-21	DIST		COUNTY			SHEET NO.		
7-13				SMITH			29		



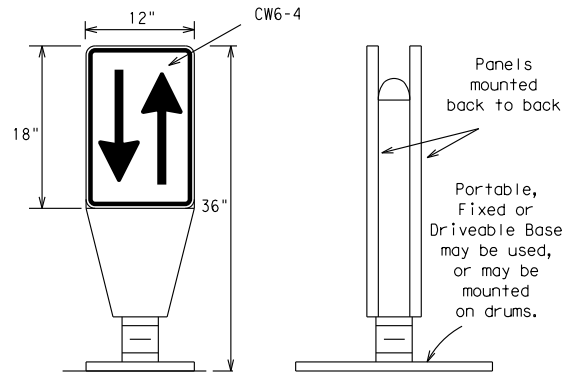
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:53:49 PM  
FILE: d:\pw\_wor-k\atknat\01\meca2543\dms73722\bc-21.dgn



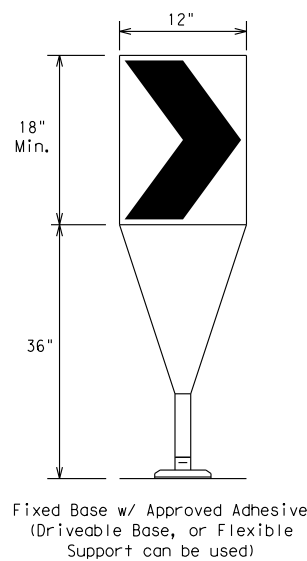
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



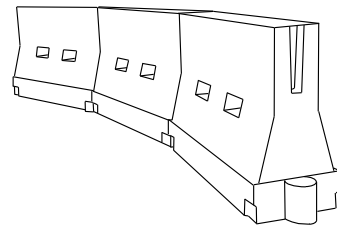
1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The 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<sub>FL</sub> or Type C<sub>FL</sub> conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

### OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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<sub>FL</sub> or Type C<sub>FL</sub> 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



### 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

### 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.

Posted Speed	Formula	Minimum Desirable Taper Lengths * *			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'
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

SHEET 9 OF 12



## BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

### BC (9) - 21

FILE:	bc-21.dgn	DN:	TxDOT	CK:	TxDOT	DN:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY	TOLL	49		
9-07	8-14								
7-13	5-21								
		DIST	COUNTY	SHEET NO.					
			SMITH	30					





DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:53:50 PM  
FILE: d:\pw\_work\atknat\01\mcoa2543\dms73722\bc-21.dgn

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.

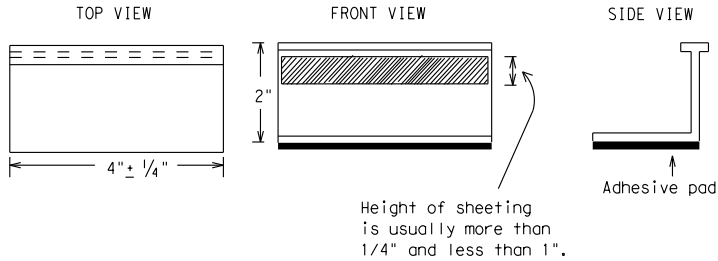
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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).

SHEET 11 OF 12



Texas Department of Transportation

Traffic  
Safety  
Division  
Standard

BARRICADE AND CONSTRUCTION  
PAVEMENT MARKINGS

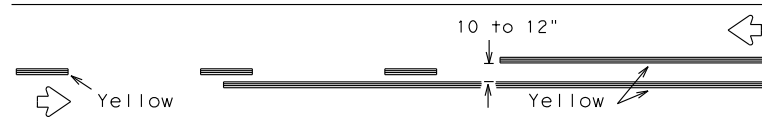
BC (11) - 21

FILE:	bc-21.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT	
© TxDOT	February 1998	CONT	SECT	JOB		HIGHWAY				
REVISIONS						TOLL 49				
2-98	9-07	5-21								
1-02	7-13			COUNTY		SHEET NO.				
11-02	8-14			SMITH		32				

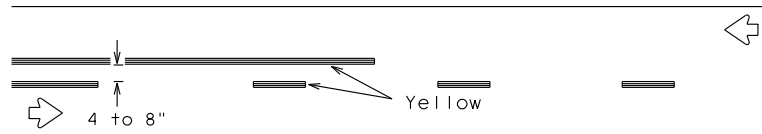
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:53:51 PM  
FILE: d:\pw\_wor-k\atknat\01\meca2543\dms73722\bc-21.dgn

## PAVEMENT MARKING PATTERNS

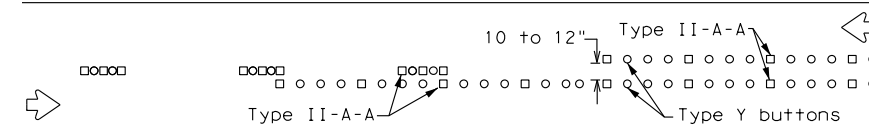


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

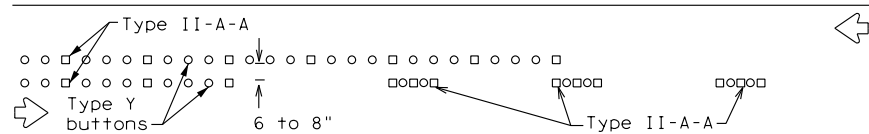


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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

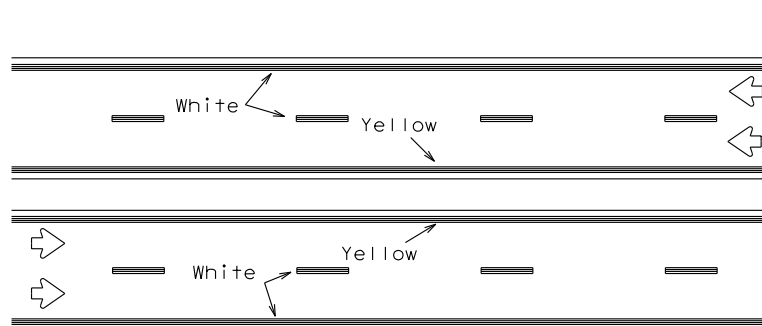


RAISED PAVEMENT MARKERS - PATTERN A



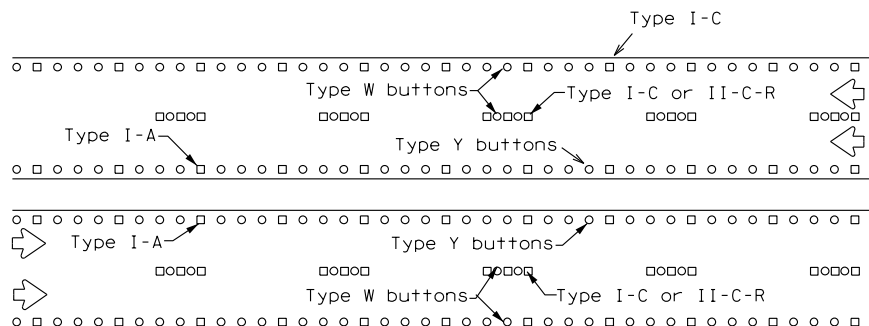
RAISED PAVEMENT MARKERS - PATTERN B

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



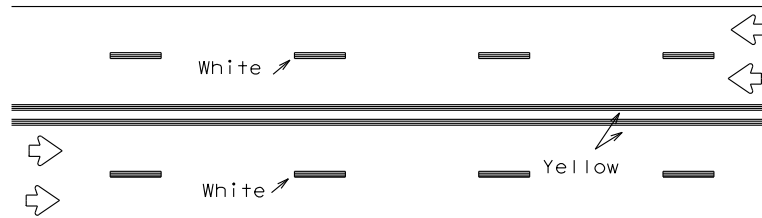
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



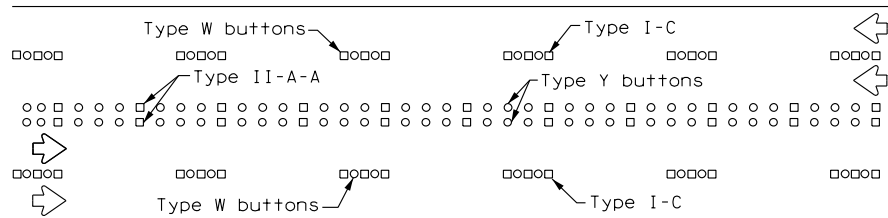
RAISED PAVEMENT MARKERS

## EDGE & LANE LINES FOR DIVIDED HIGHWAY



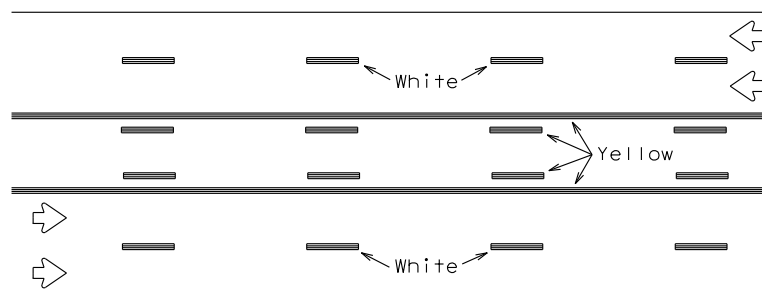
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



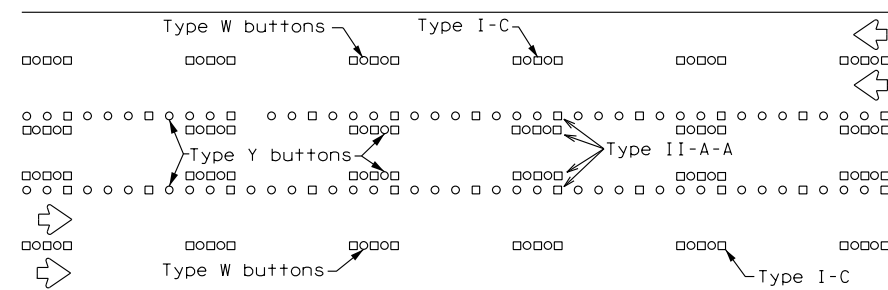
RAISED PAVEMENT MARKERS

## LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

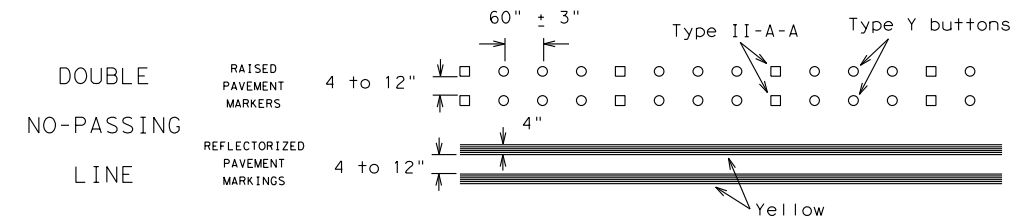
Prefabricated markings may be substituted for reflectORIZED pavement markings.



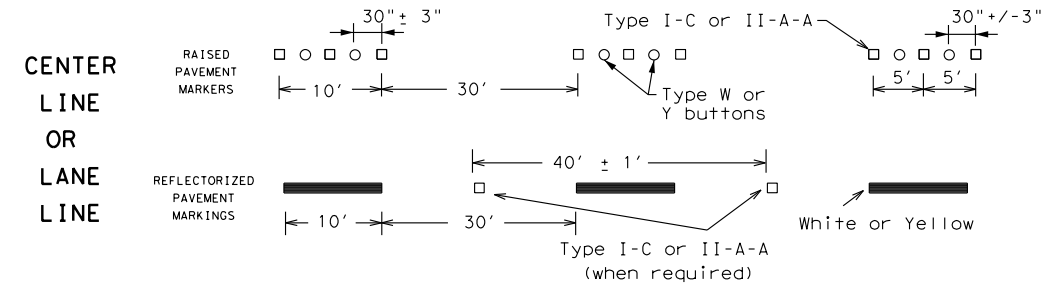
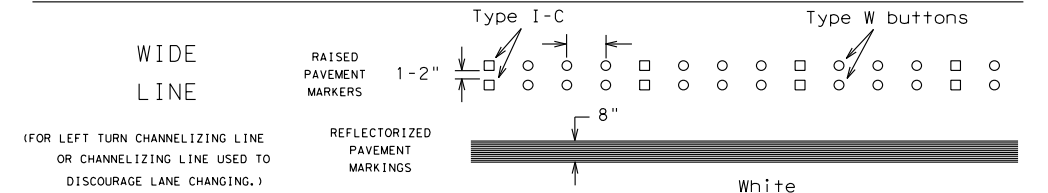
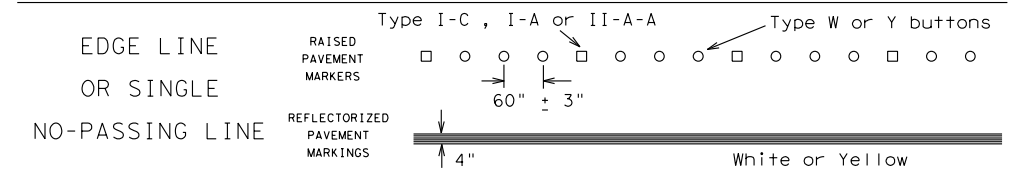
RAISED PAVEMENT MARKERS

## TWO-WAY LEFT TURN LANE

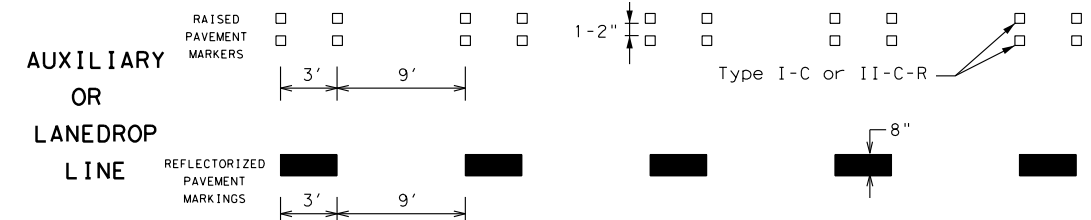
## STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



## SOLID LINES

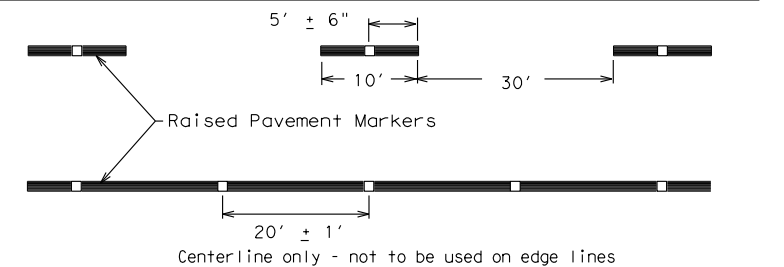


## BROKEN LINES



## REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



SHEET 12 OF 12



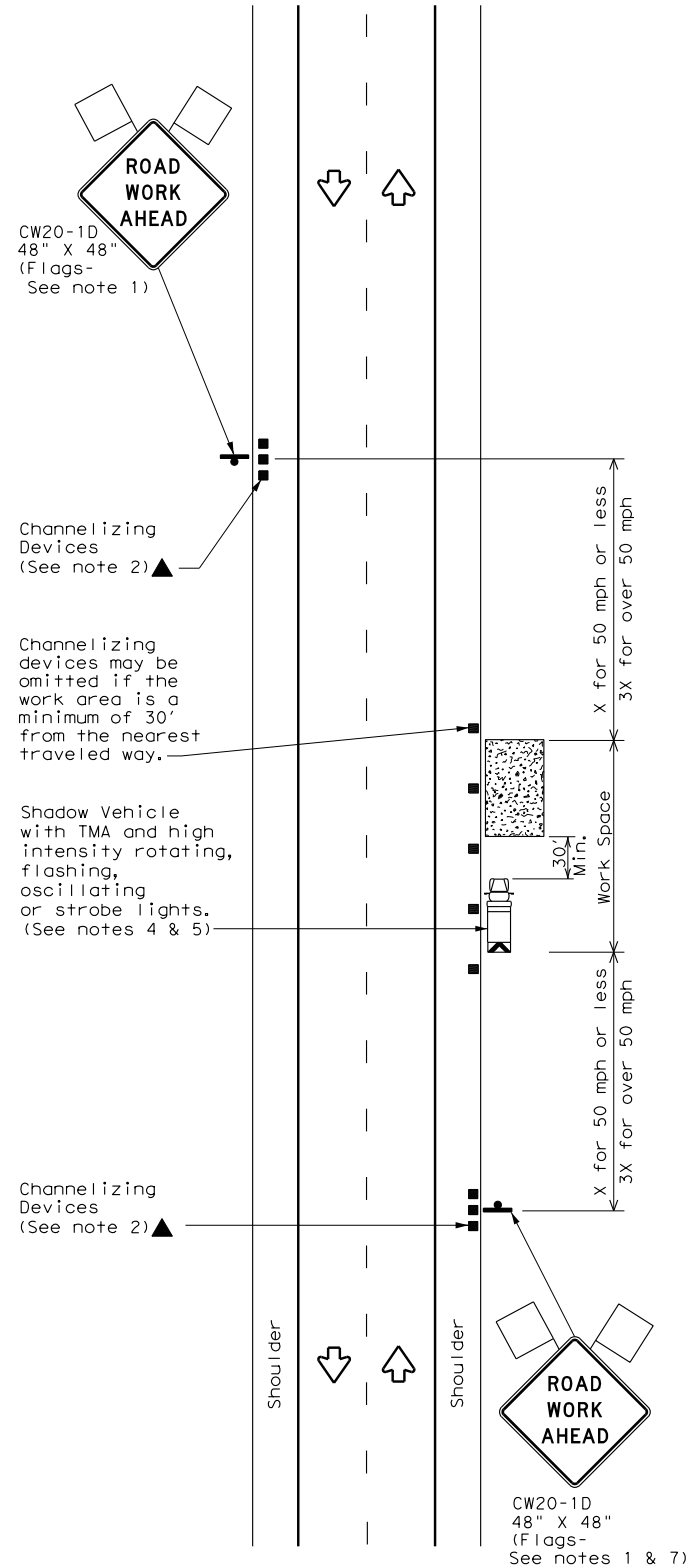
## BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS				
1-97 9-07 5-21				TOLL 49
2-98 7-13				
11-02 8-14				
	DIST	COUNTY	SHEET NO.	
		SMITH		33

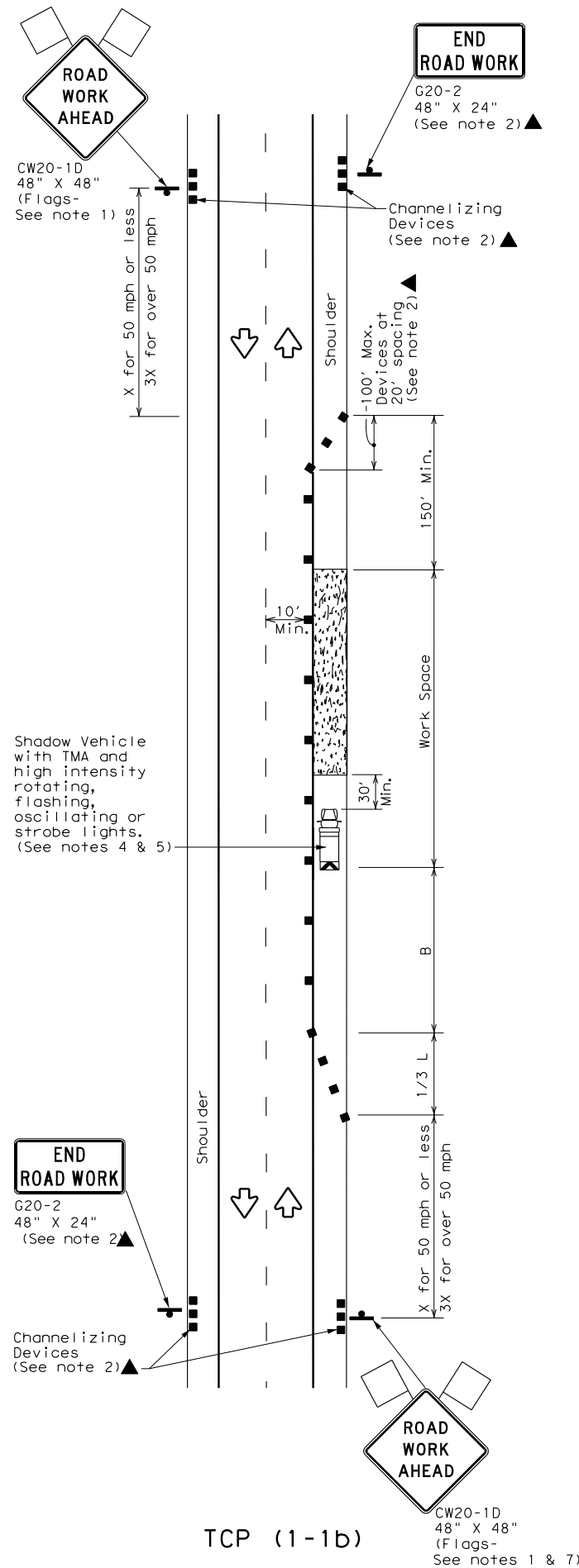
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:53:58 PM  
FILE: d:\pw\_work\atknat\01\mco2543\dms73722\tcp1-1-18.dgn



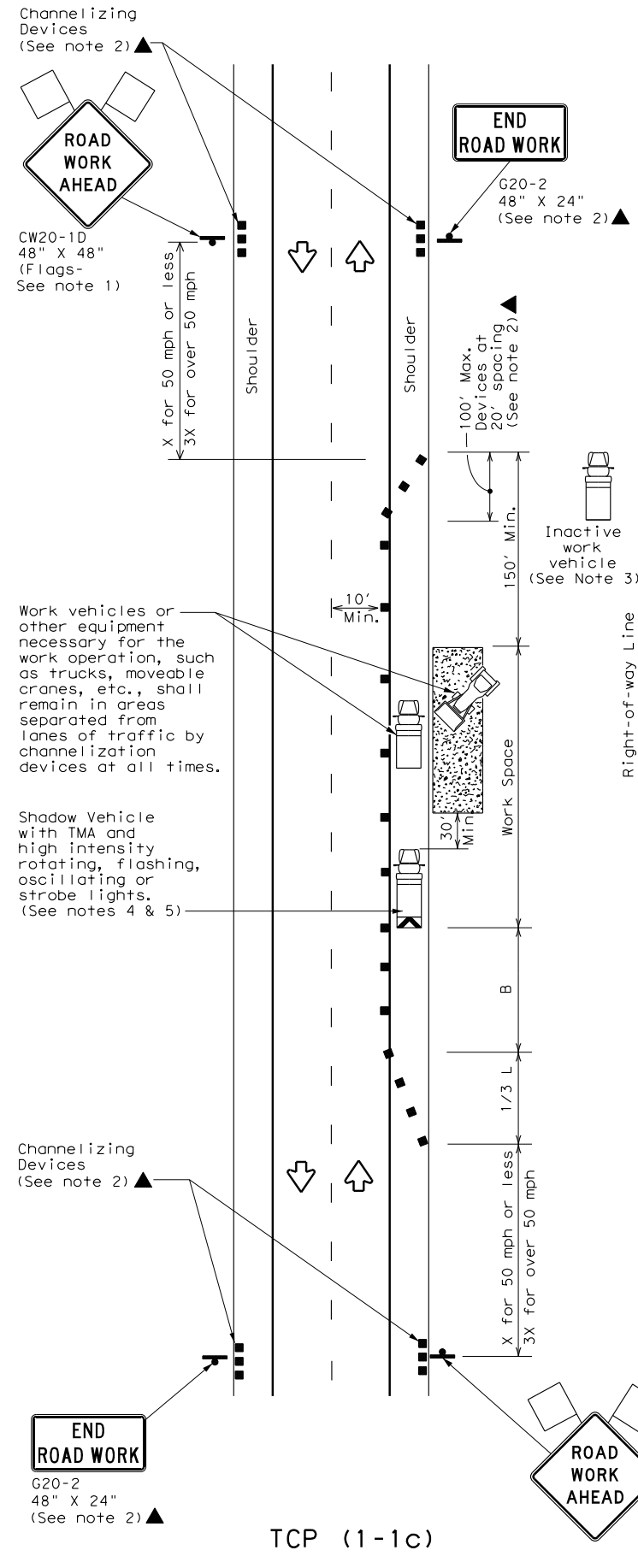
TCP (1-1a)

**WORK SPACE NEAR SHOULDER**  
Conventional Roads



TCP (1-1b)

**WORK SPACE ON SHOULDER**  
Conventional Roads



TCP (1-1c)

**WORK VEHICLES ON SHOULDER**  
Conventional Roads

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

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

\* Conventional Roads Only

\*\* Taper lengths have been rounded off.

L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

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

**GENERAL NOTES**

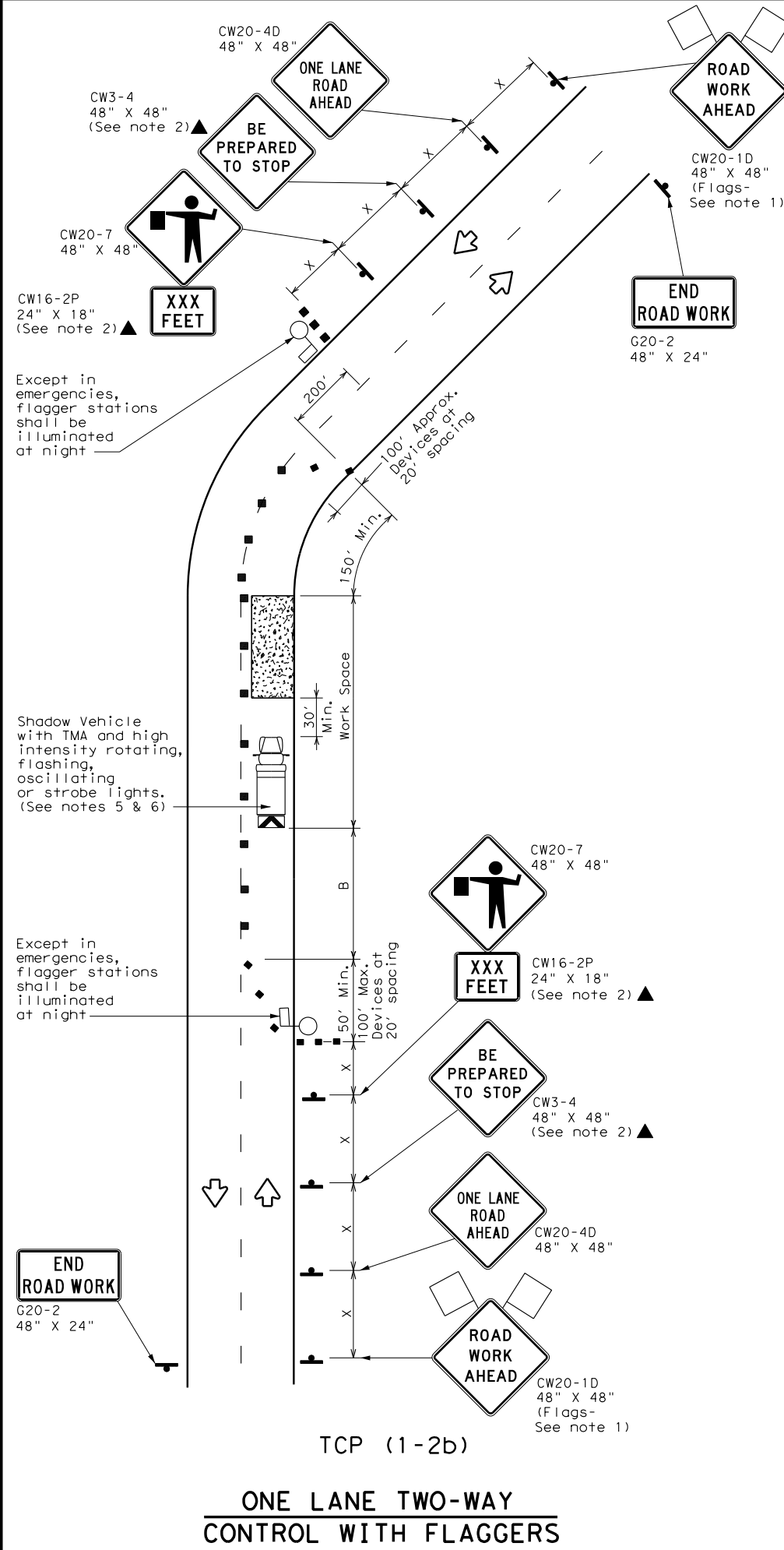
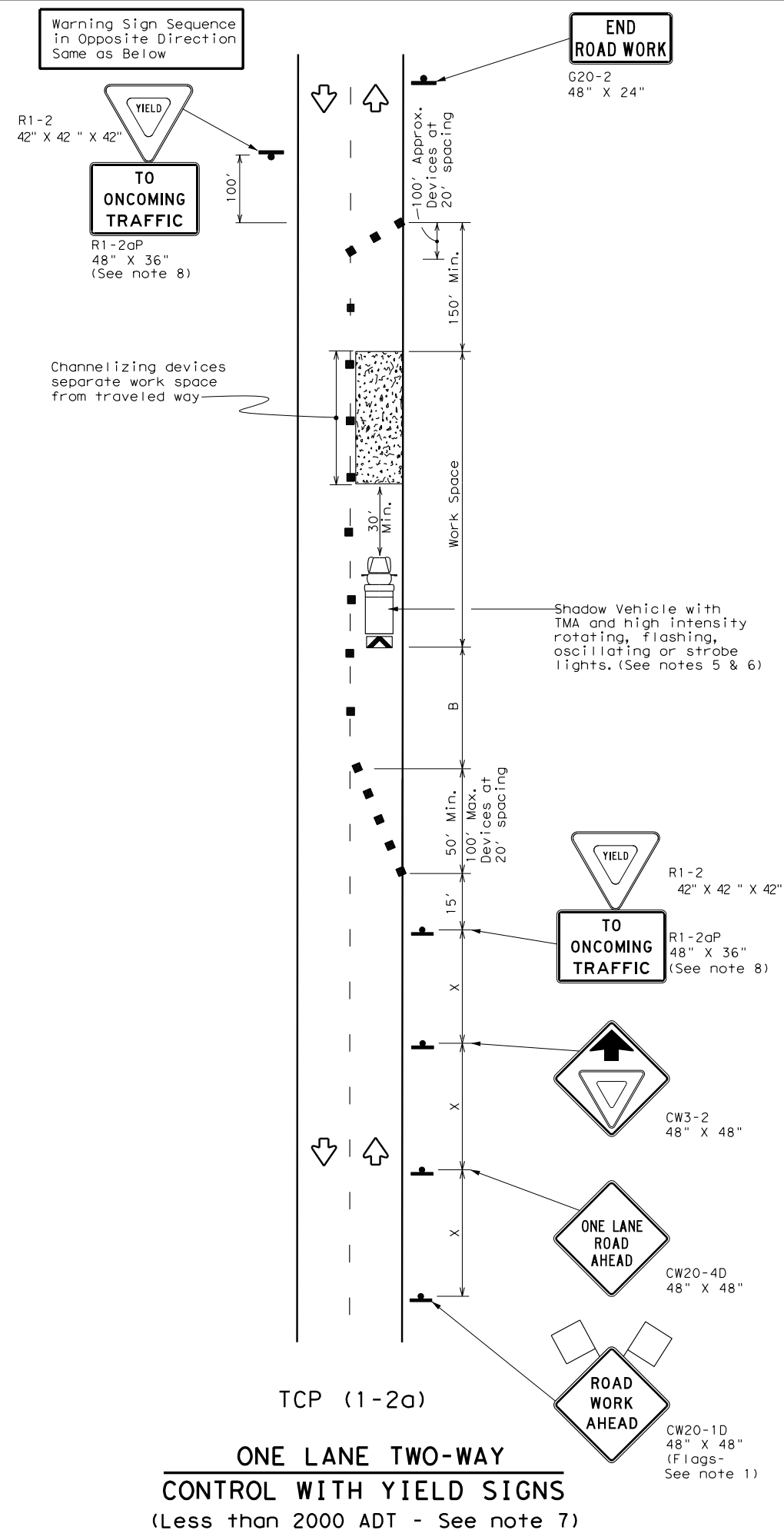
- Flags attached to signs where shown are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- Inactive work vehicles or other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











**TRAFFIC CONTROL PLAN  
CONVENTIONAL ROAD  
SHOULDER WORK**

**TCP (1-1) - 18**

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
2-94 4-98				
8-95 2-12				
1-97 2-18				
	DIST	COUNTY		SHEET NO.
		SMITH		34

DATE: 12/21/2021 4:54:04 PM  
FILE: d:\pw\_work\gtnatx01\mcoq2543\dms73722\tcol1-2-18.dan



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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

## GENERAL NOTES


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

## TCP (1-2a)

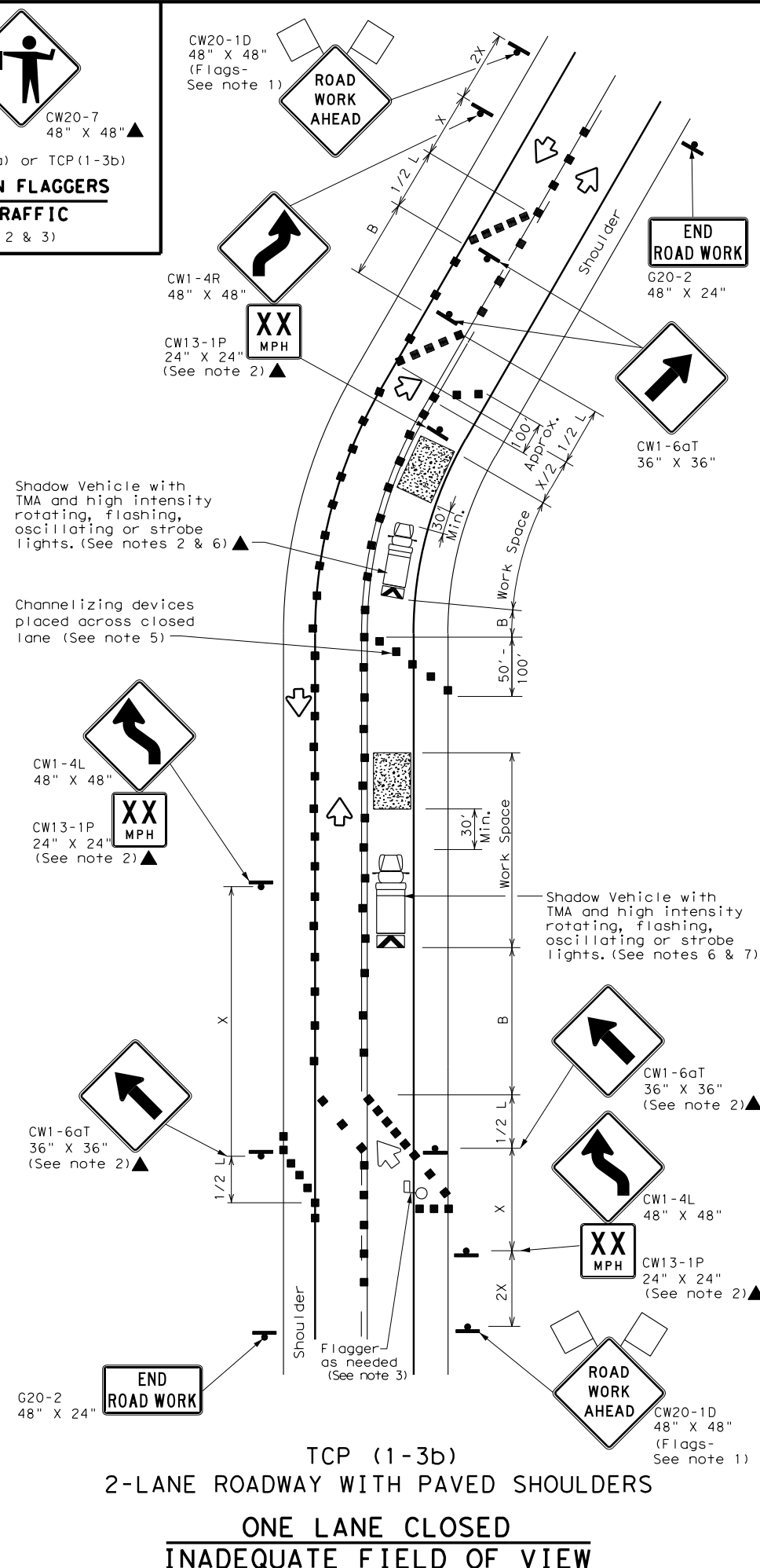
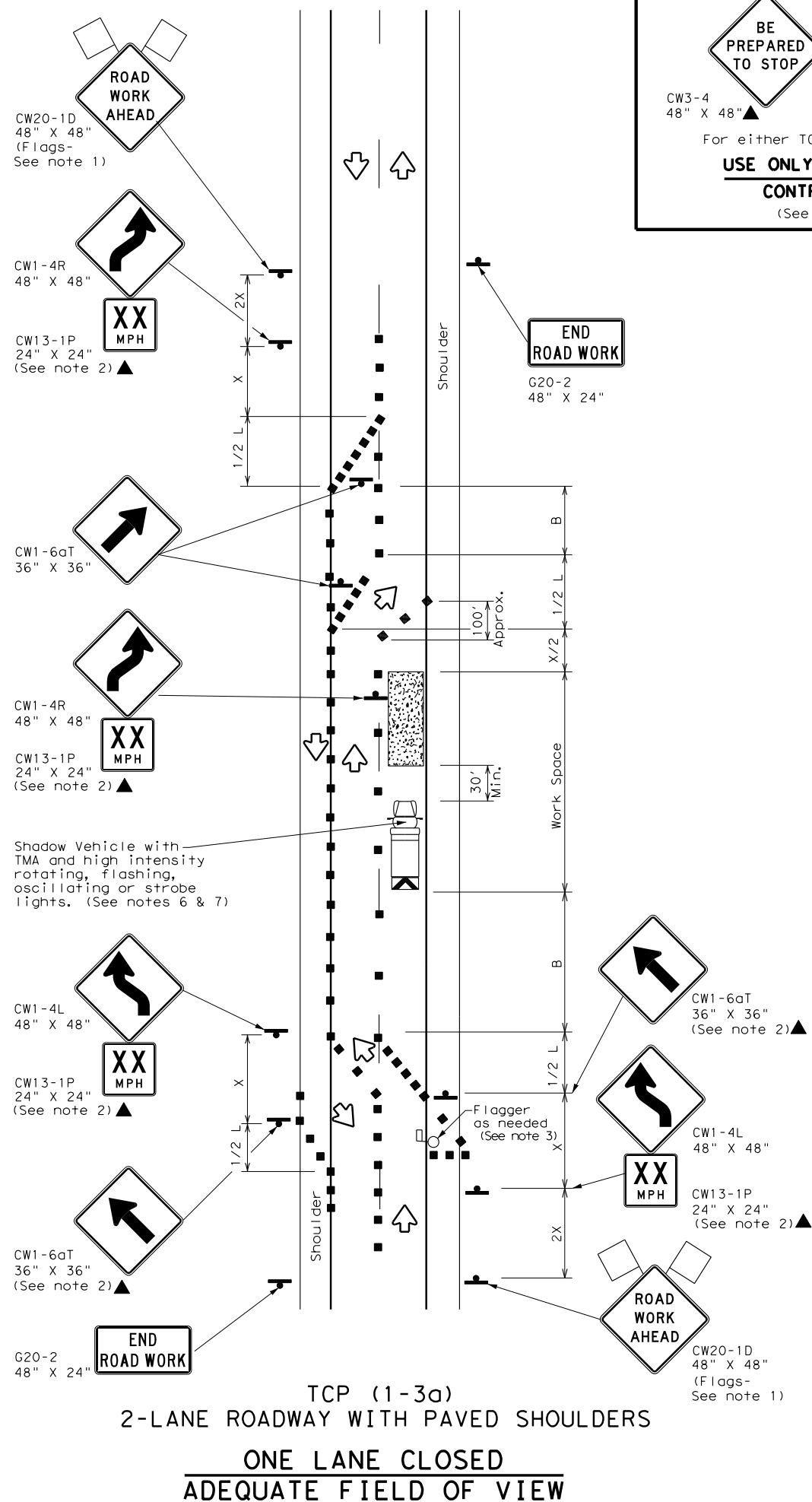
7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
8.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











TCP (1-2b)

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

 <p style="font-size: 1.2em; font-weight: bold; margin-top: 10px;">Texas Department of Transportation</p>	<p style="font-size: 0.8em; font-weight: bold; margin: 0;">Traffic Operations Division Standard</p>			
<h1 style="margin: 0;">TRAFFIC CONTROL PLAN</h1> <h2 style="margin: 0;">ONE-LANE TWO-WAY</h2> <h2 style="margin: 0;">TRAFFIC CONTROL</h2>				
<h1 style="margin: 0;">TCP (1-2) - 18</h1>				
FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
<div style="border: 1px solid black; padding: 5px; display: inline-block;">             © TxDOT    December 1985           </div>	CONT	SECT	JOB	HIGHWAY
REVISIONS  4-90    4-98 2-94    2-12 1-97    2-18				TOLL 49
	DIST	COUNTY		SHEET NO.
		SMITH		35

DATE: 12/21/2021 4:54:12 PM  
FILE: d:\pw\_work\gtnatx01\mcca2543\dms73722\rc01-3-18.dan



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


Posted Speed "X"	Formula	Minimum Desirable Taper Lengths "X"			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
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'	775'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

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

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

## GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
8. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

 <p><b>Texas Department of Transportation</b></p>	<p><b>Traffic Operations Division Standard</b></p>
--	--

# TRAFFIC CONTROL PLAN

# TRAFFIC SHIFTS ON

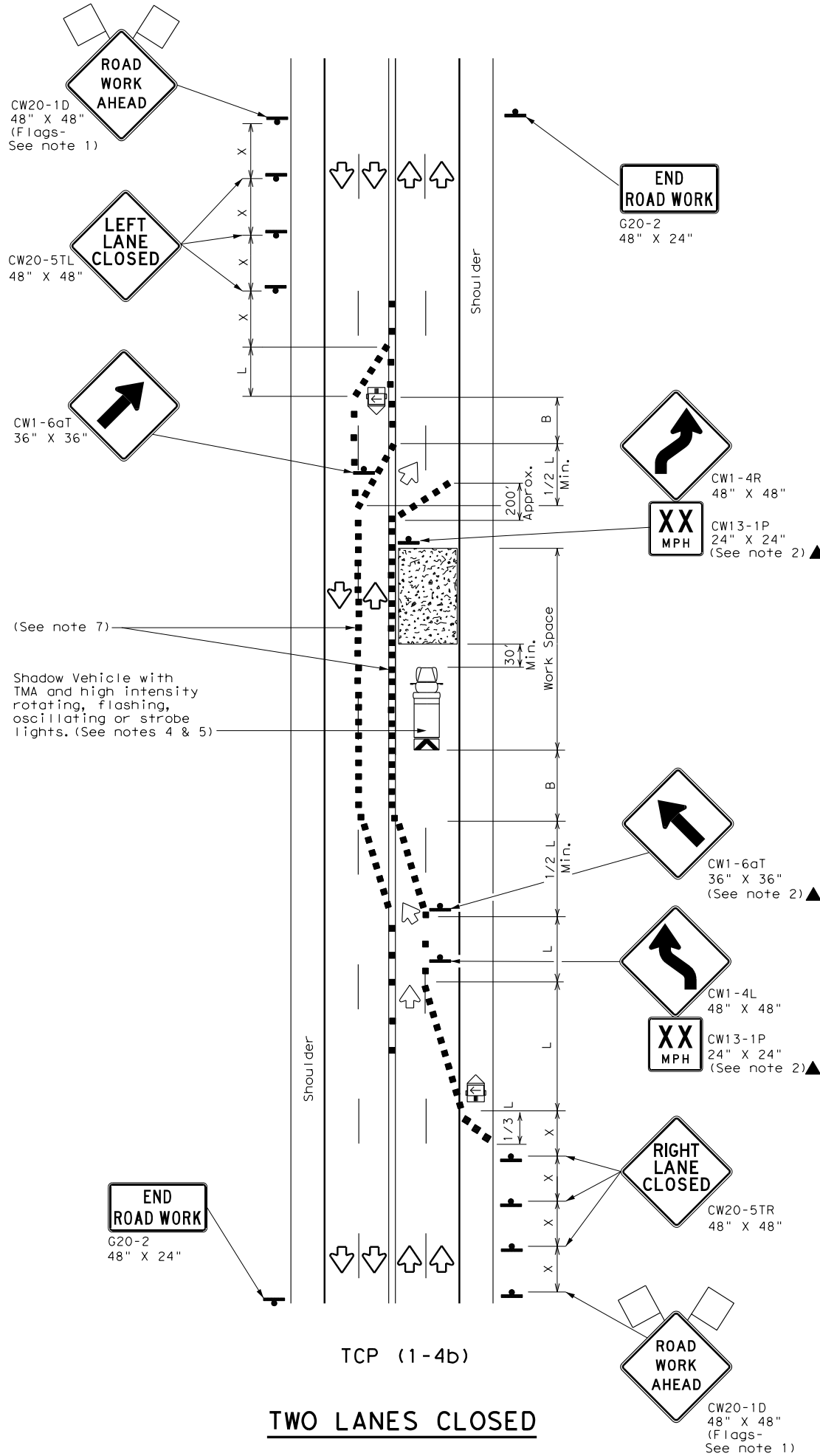
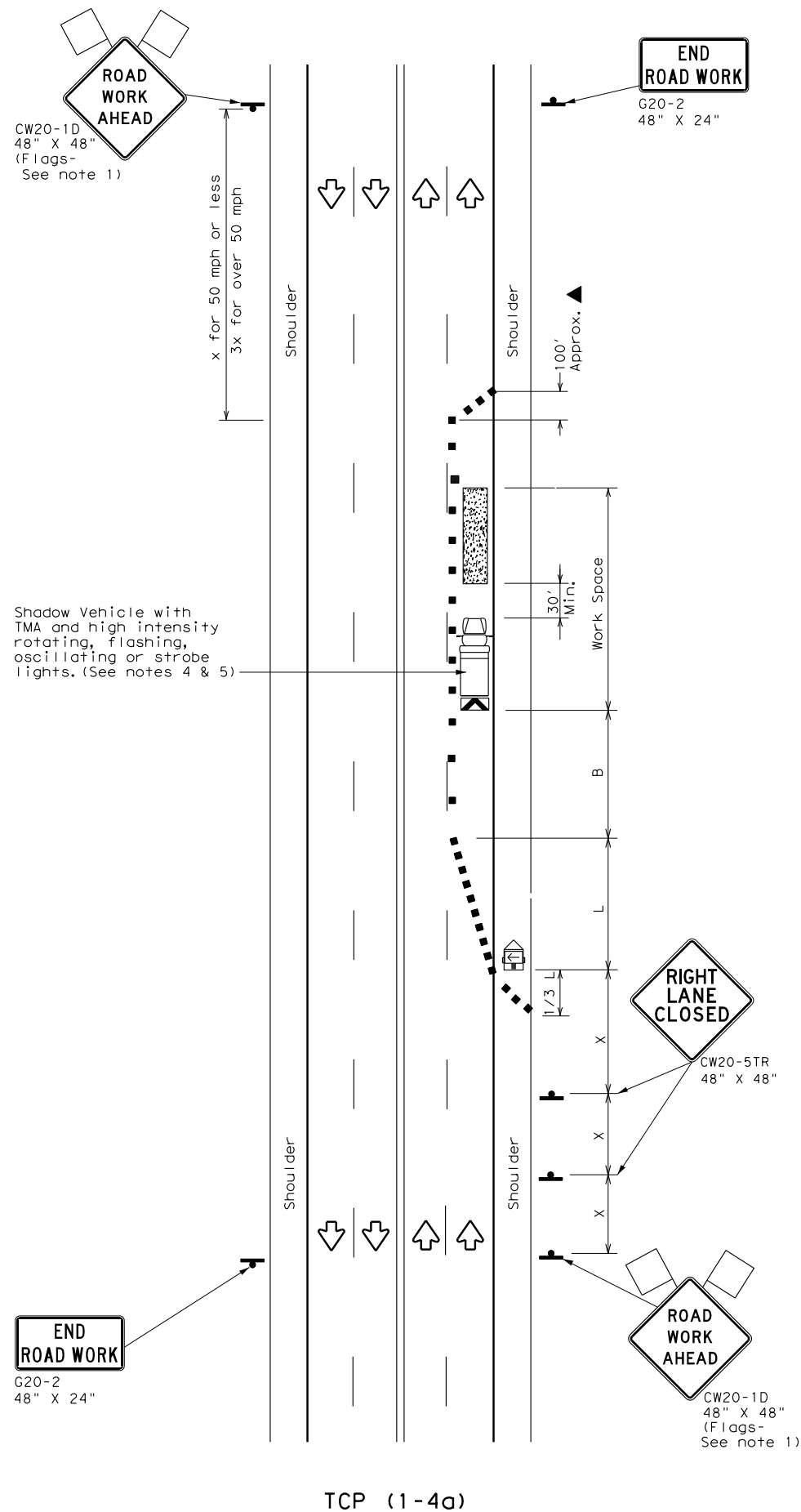
# TWO LANE ROADS

## TCP (1-3) - 18

FILE: tcp1-3-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18				TOLL 49
	DIST	COUNTY		SHEET NO.
		SMITH		36

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:54:19 PM  
FILE: d:\pw\_work\atknat\01\mco2543\dms73722\tcp1-4-18.dgn



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

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

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

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

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

- TCP (1-4a)**
- If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.
- TCP (1-4b)**
- Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

**Texas Department of Transportation**

**Traffic Operations Division Standard**

**TRAFFIC CONTROL PLAN**  
**LANE CLOSURES ON MULTILANE**  
**CONVENTIONAL ROADS**

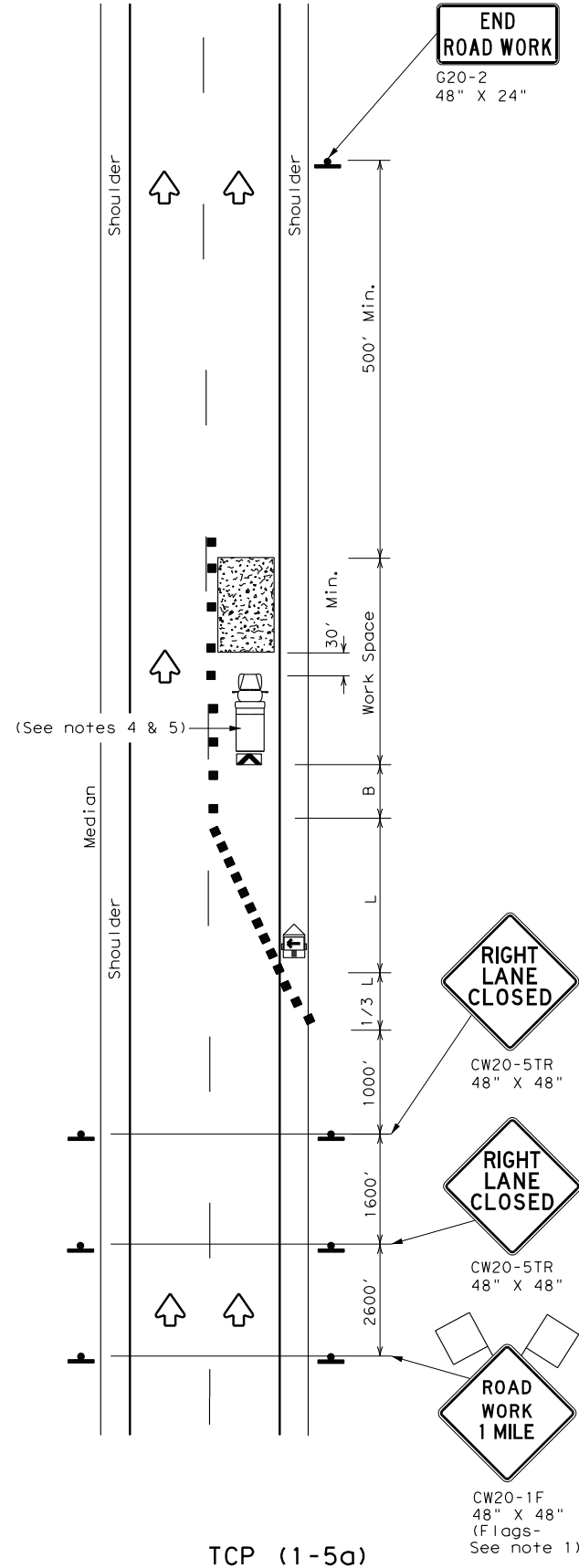
**TCP (1-4) - 18**

FILE:	tcp1-4-18.dgn	DN:		CK:		DW:		CK:	
© TxDOT	December 1985	CONT	SECT	JOB		HIGHWAY			
REVISIONS						TOLL 49			
2-94	4-98								
8-95	2-12								
1-97	2-18								
		DIST	COUNTY		SHEET NO.				
		SMITH				37			

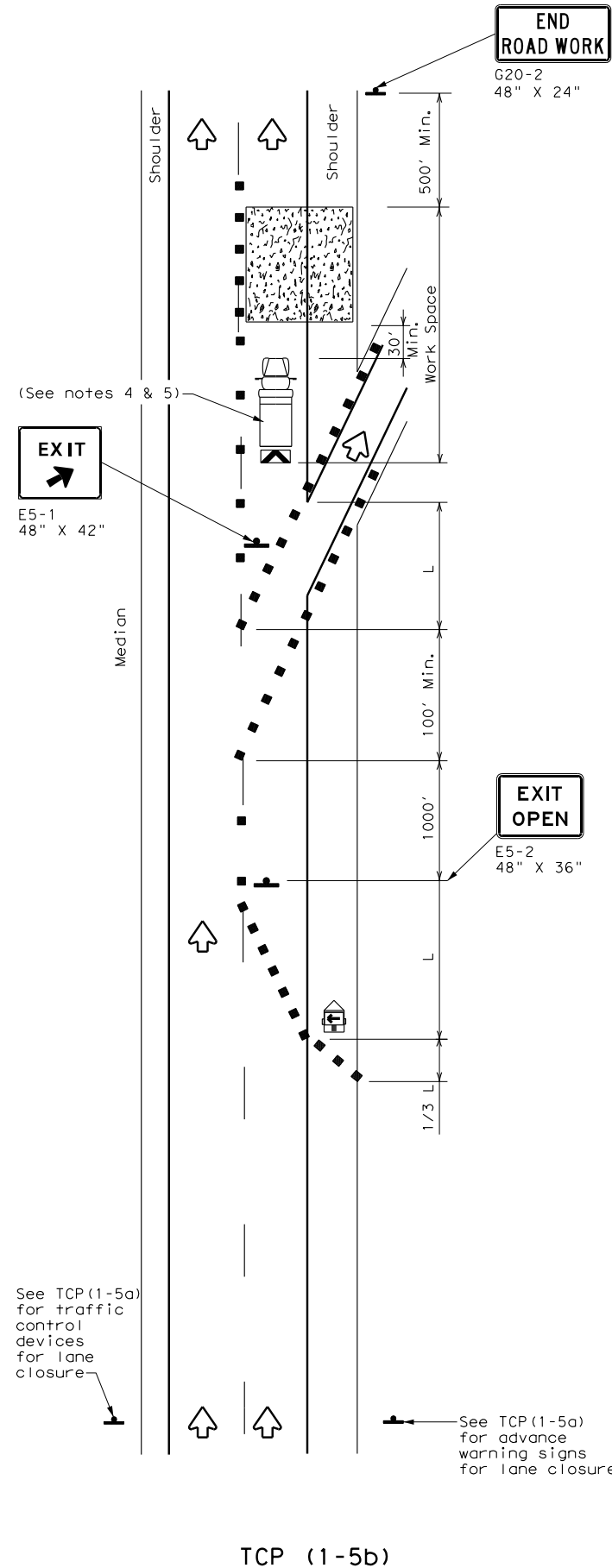


DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

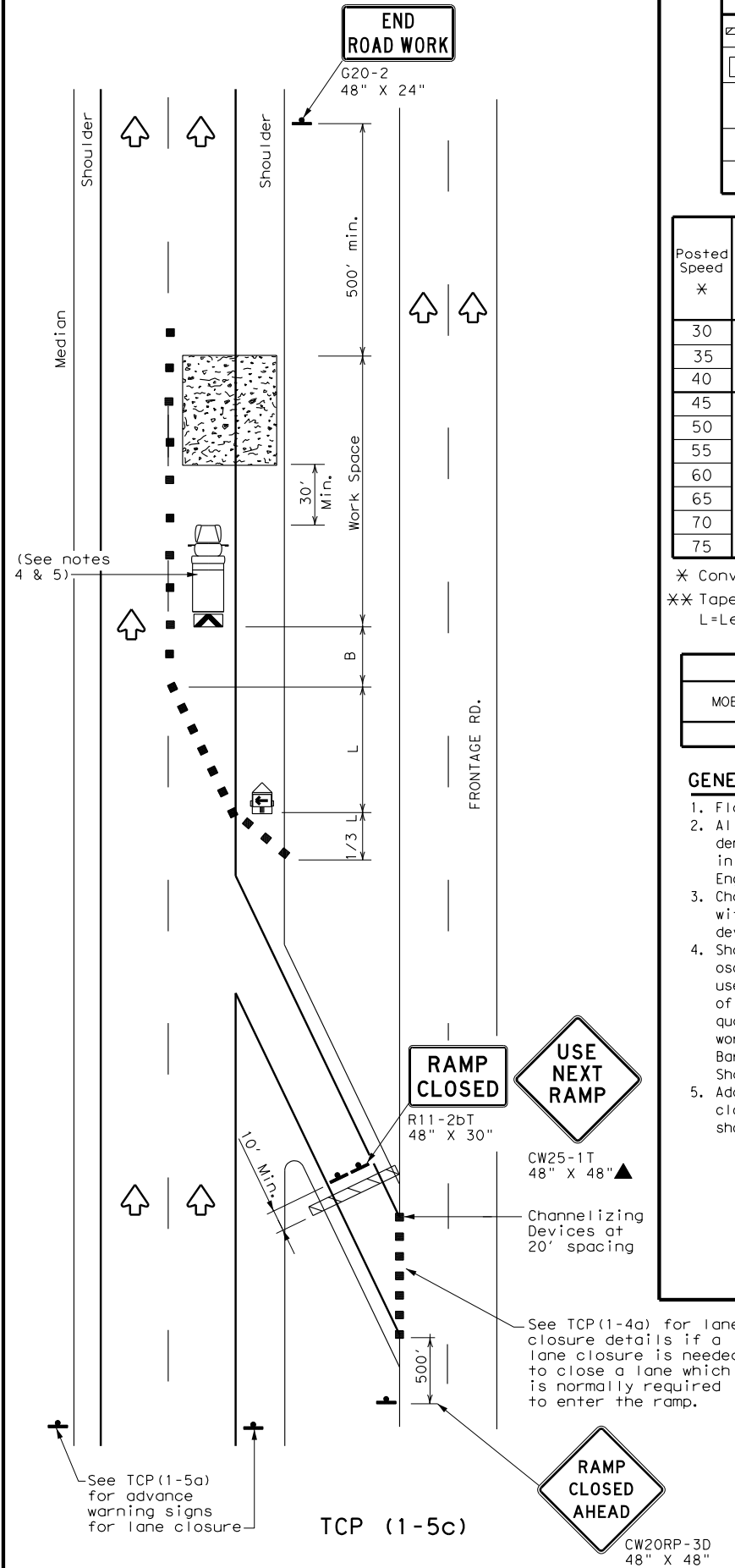
DATE: 12/21/2021 4:54:26 PM  
FILE: d:\pw\_work\atknat\01\mco2543\dms73722\tcp1-5-18.dgn



TCP (1-5a)  
**ONE LANE CLOSURE**



TCP (1-5b)  
**LANE CLOSURE NEAR EXIT RAMP**



TCP (1-5c)  
**LANE CLOSURE NEAR ENTRANCE RAMP**

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

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

\* Conventional Roads Only

\*\* Taper lengths have been rounded off.

L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

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

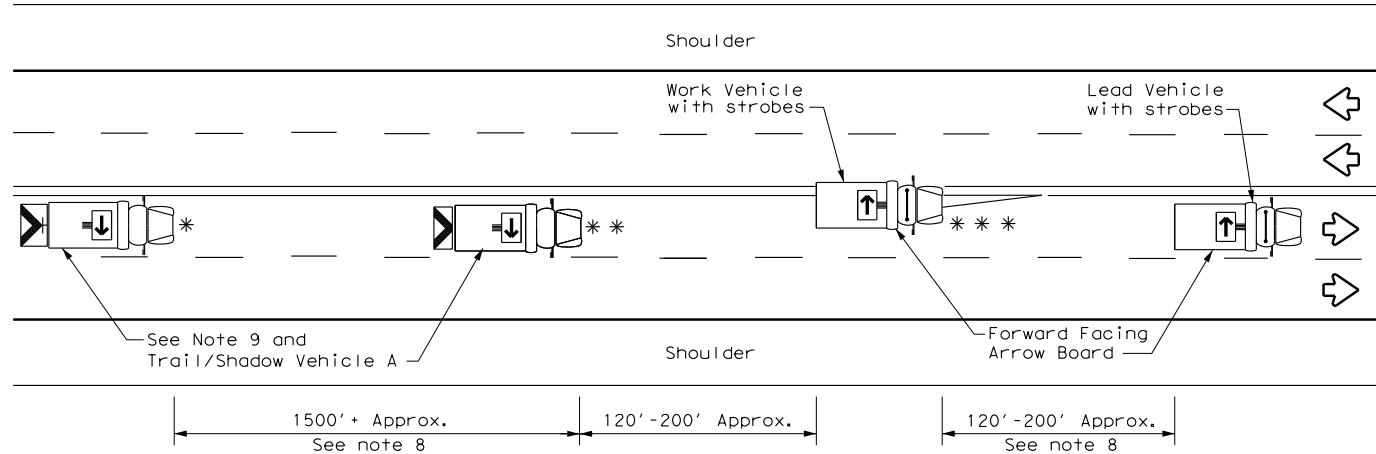
#### GENERAL NOTES

- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
- Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

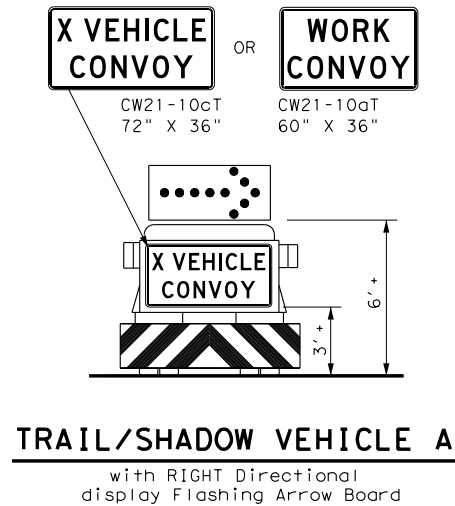
		Traffic Operations Division Standard			
<b>TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS</b>					
<b>TCP (1-5) - 18</b>					
FILE: tcp1-5-18.dgn	DN:	CK:	DW:		
© TxDOT February 2012	CONT	SECT	JOB		
2-18	DIST	COUNTY	SHEET NO.		
		SMITH	38		

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:54:32 PM  
FILE: d:\pw\_wor-k\atknat\01\meca2543\dms73722\tcp3-1.dgn



TCP (3-1a)  
UNDIVIDED MULTILANE ROADWAY

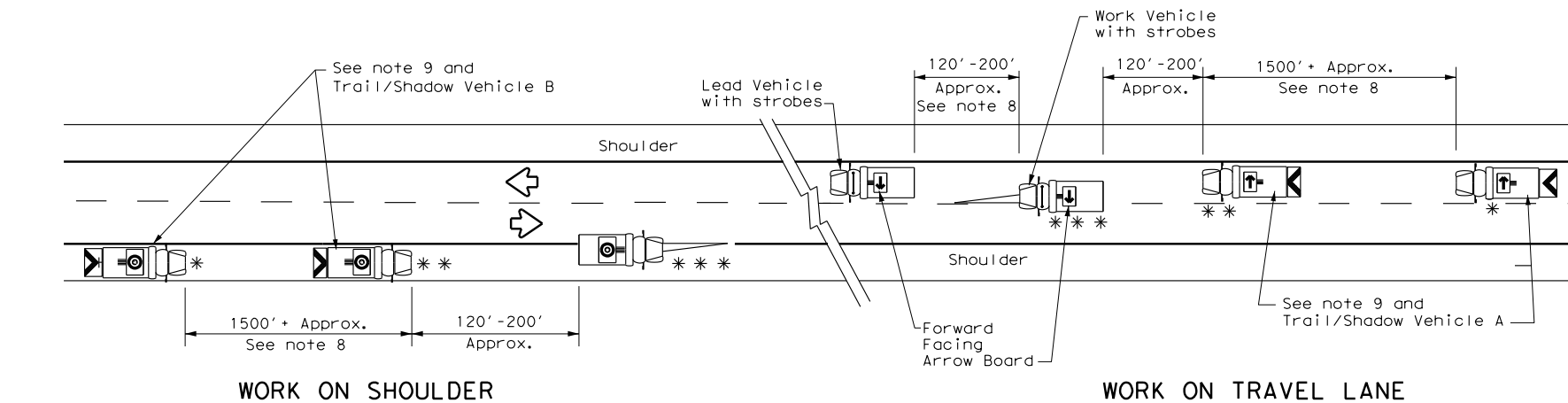


LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

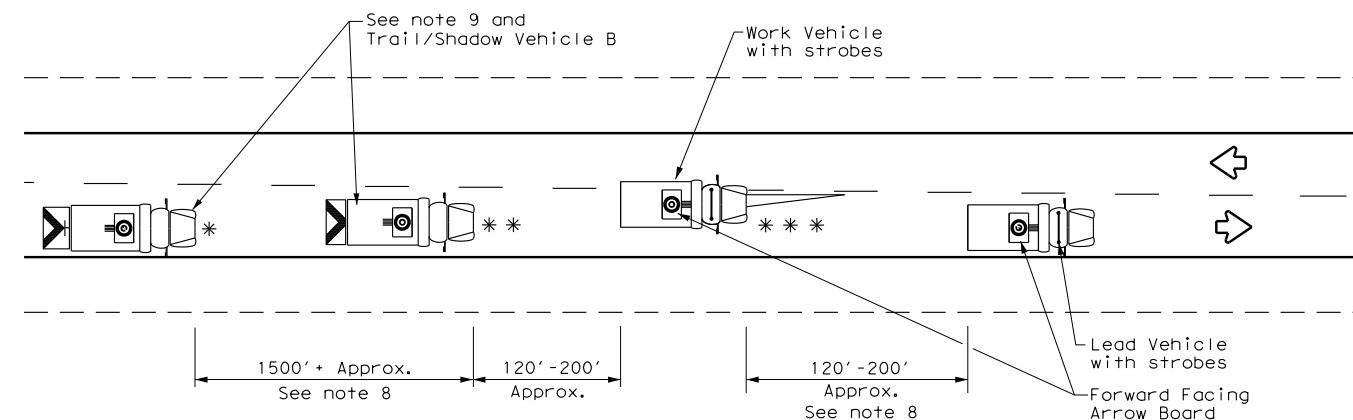
TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### GENERAL NOTES

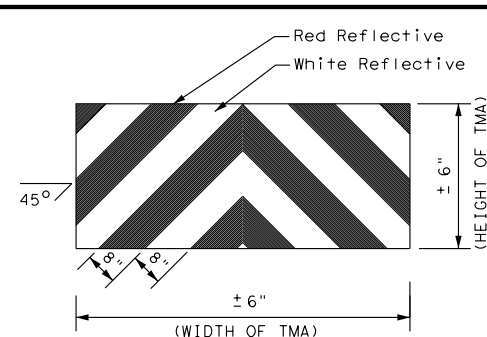
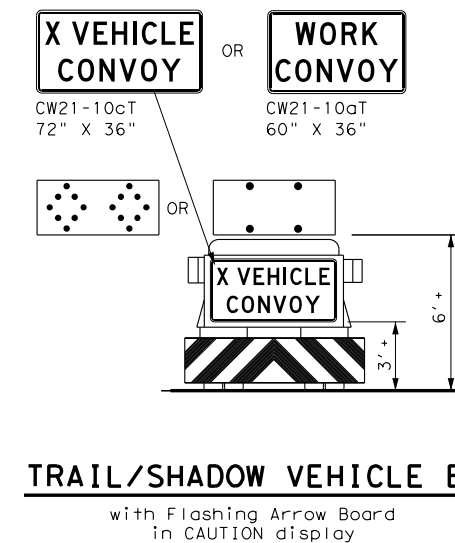
1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic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




TCP (3-1b)  
TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)  
TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



STRIPING FOR TMA



Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN

MOBILE OPERATIONS

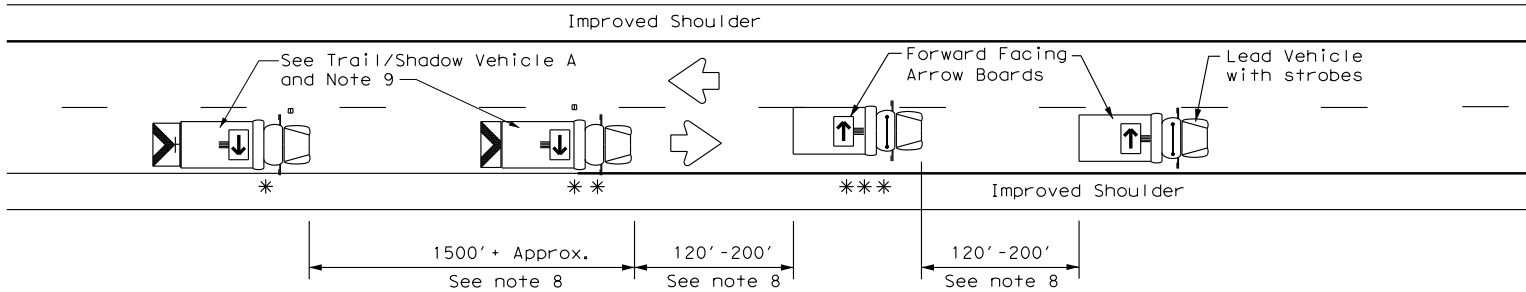
UNDIVIDED HIGHWAYS

TCP (3-1) - 13

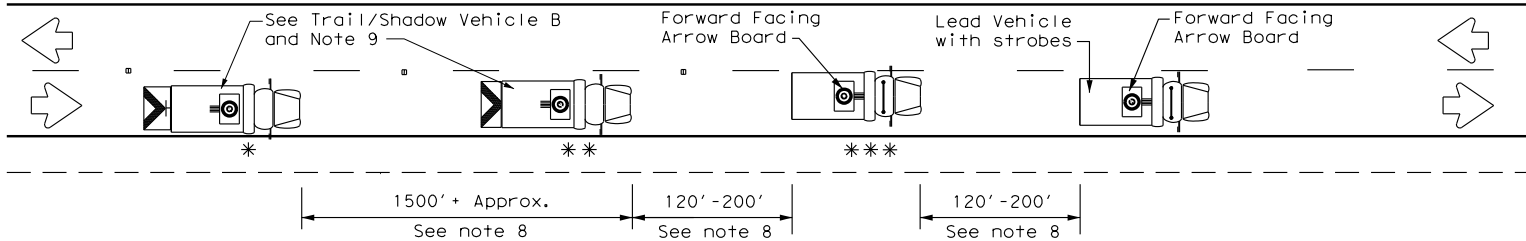
FILE:	tcp3-1.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	December 1985	CONT	SECT	JOB			HIGHWAY		
REVISIONS							TOLL 49		
2-94	4-98	DIST	COUNTY				SHEET NO.		
8-95	7-13		SMITH				39		
1-97									

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

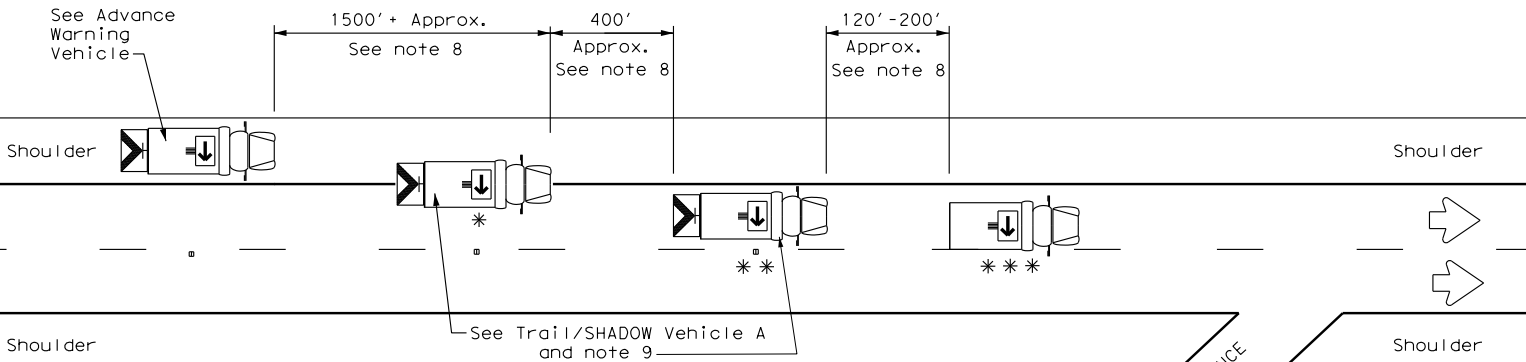
DATE: 12/21/2021 4:54:39 PM  
FILE: d:\pw-wor-k\atknat\01\mco2543\dms73722\tcp3-3.dgn



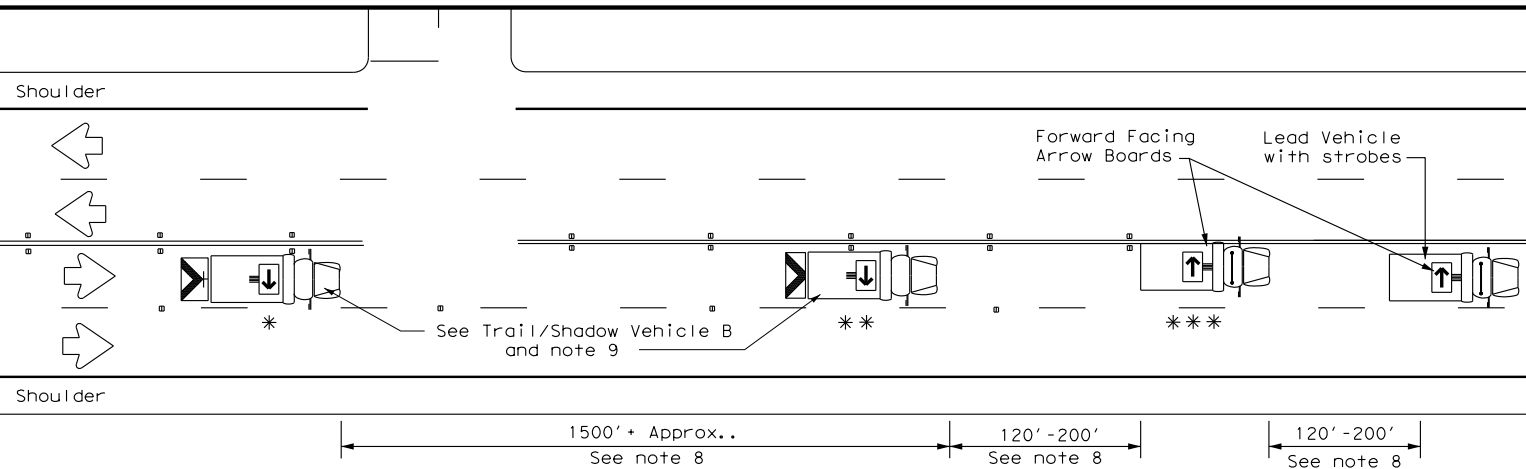
TCP (3-3a)  
**TWO LANE HIGHWAY WITH PAVED SHOULDERS**  
**(WORK ON TRAVEL LANE)**



TCP (3-3b)  
**TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS**  
**(WORK ON TRAVEL LANE)**

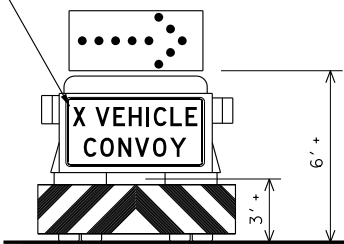


TCP (3-3c)  
**DIVIDED MULTILANE HIGHWAY**



TCP (3-3d)  
**UNDIVIDED MULTILANE HIGHWAY**

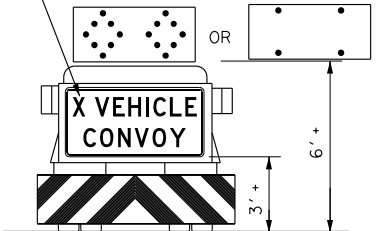
**X VEHICLE CONVOY** OR **WORK CONVOY**  
CW21-10cT 72" X 36" CW21-10aT 60" X 36"



**TRAIL/SHADOW VEHICLE A**

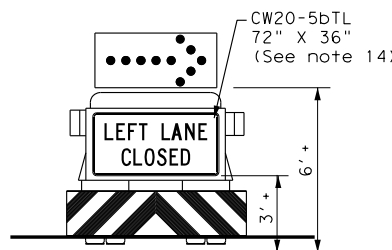
with RIGHT Directional display  
Flashing Arrow Board

**X VEHICLE CONVOY** OR **WORK CONVOY**  
CW21-10cT 72" X 36" CW21-10aT 60" X 36"

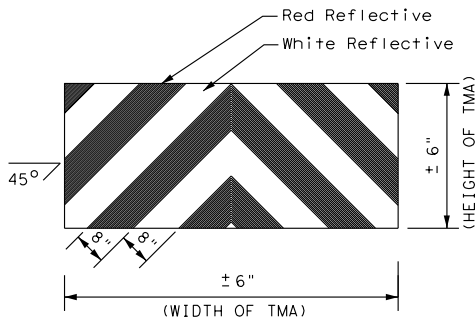


**TRAIL/SHADOW VEHICLE B**

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
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used 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**

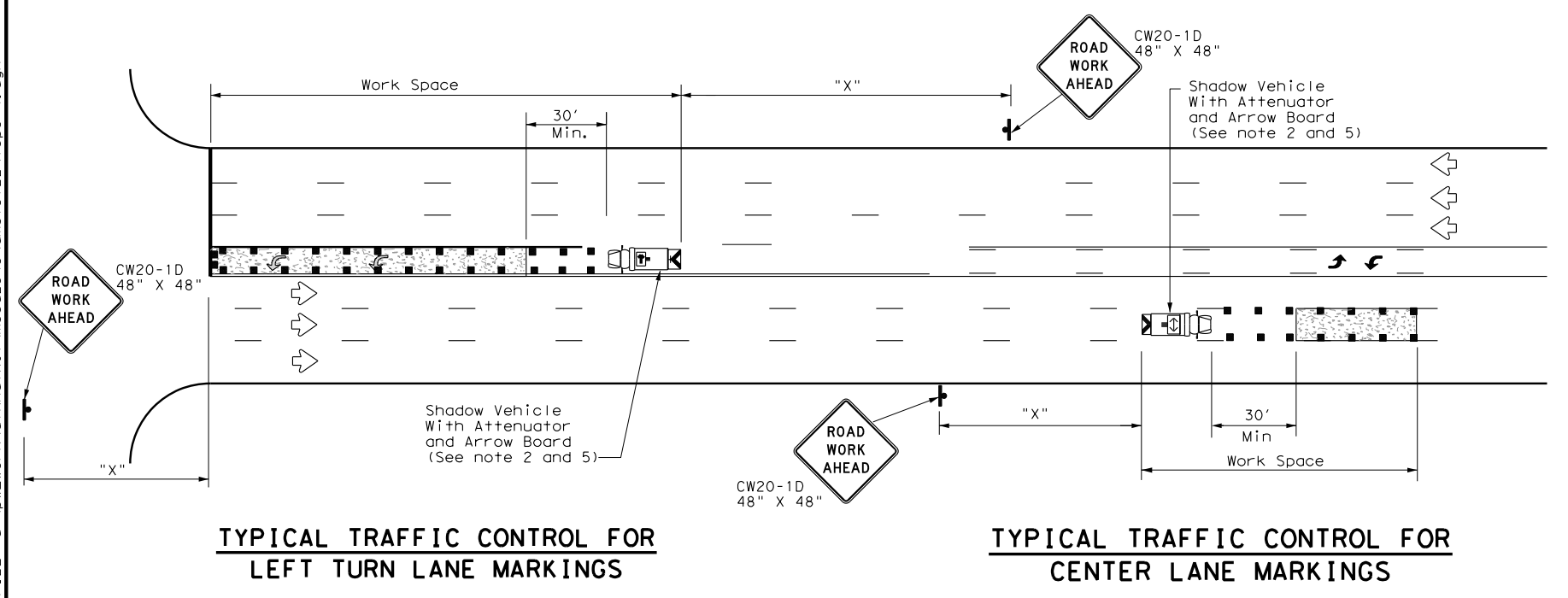
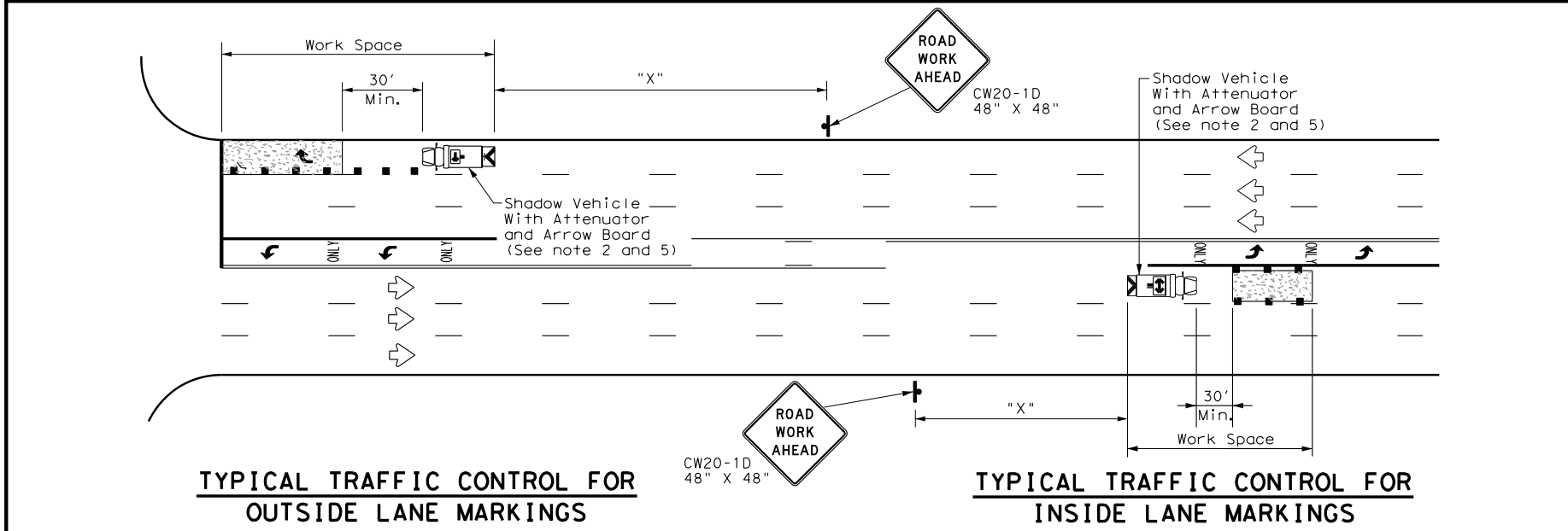
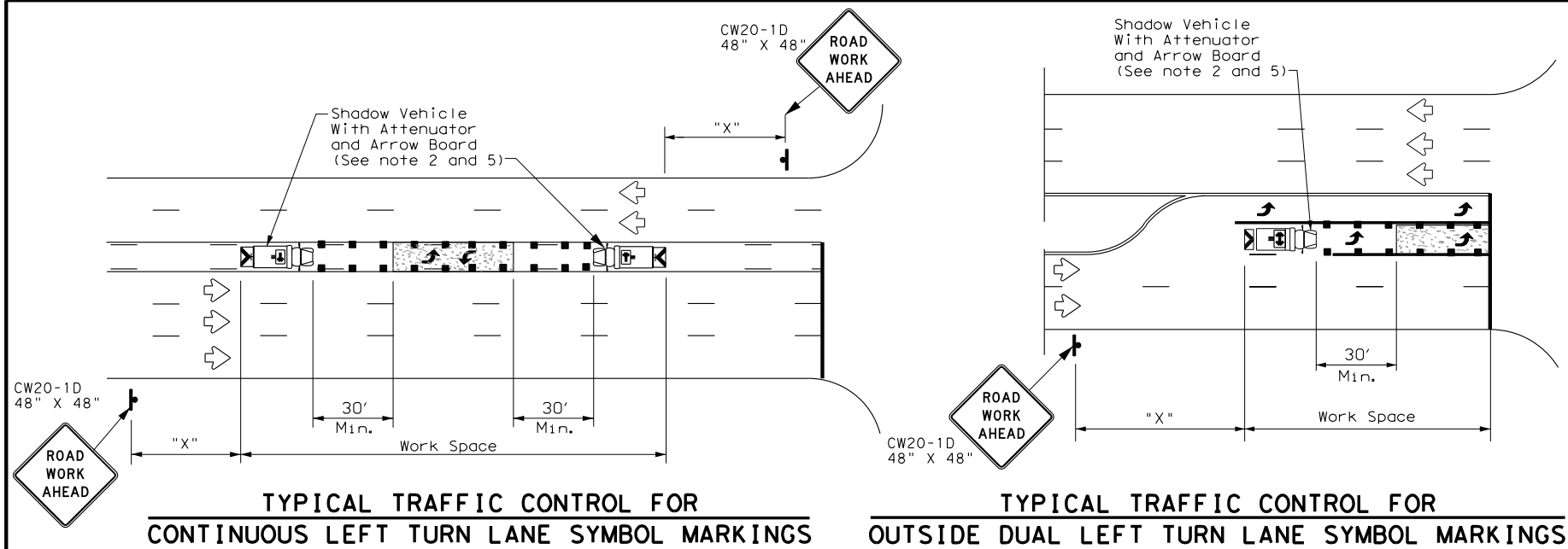
**Traffic Operations Division Standard**

## 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							TOLL 49		
2-94 4-98		DIST	COUNTY					SHEET NO.	
8-95 7-13			SMITH					40	
1-97 7-14									

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results resulting from its use.

DATE: 12/21/2021 4:54:45 PM  
FILE: d:\pw\_wor-k\atknat\01\mco2543\dms73722\tcp3-4.dgn



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

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

\* Conventional Roads Only

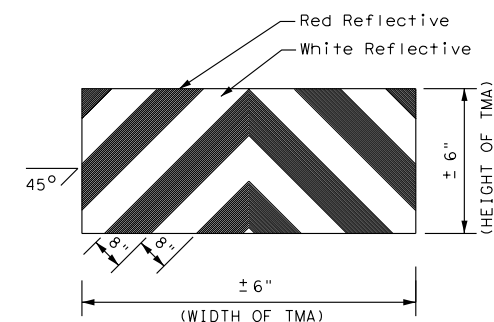
\*\* Taper lengths have been rounded off.

L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

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

#### GENERAL NOTES

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



STRIPING FOR TMA

**Texas Department of Transportation**

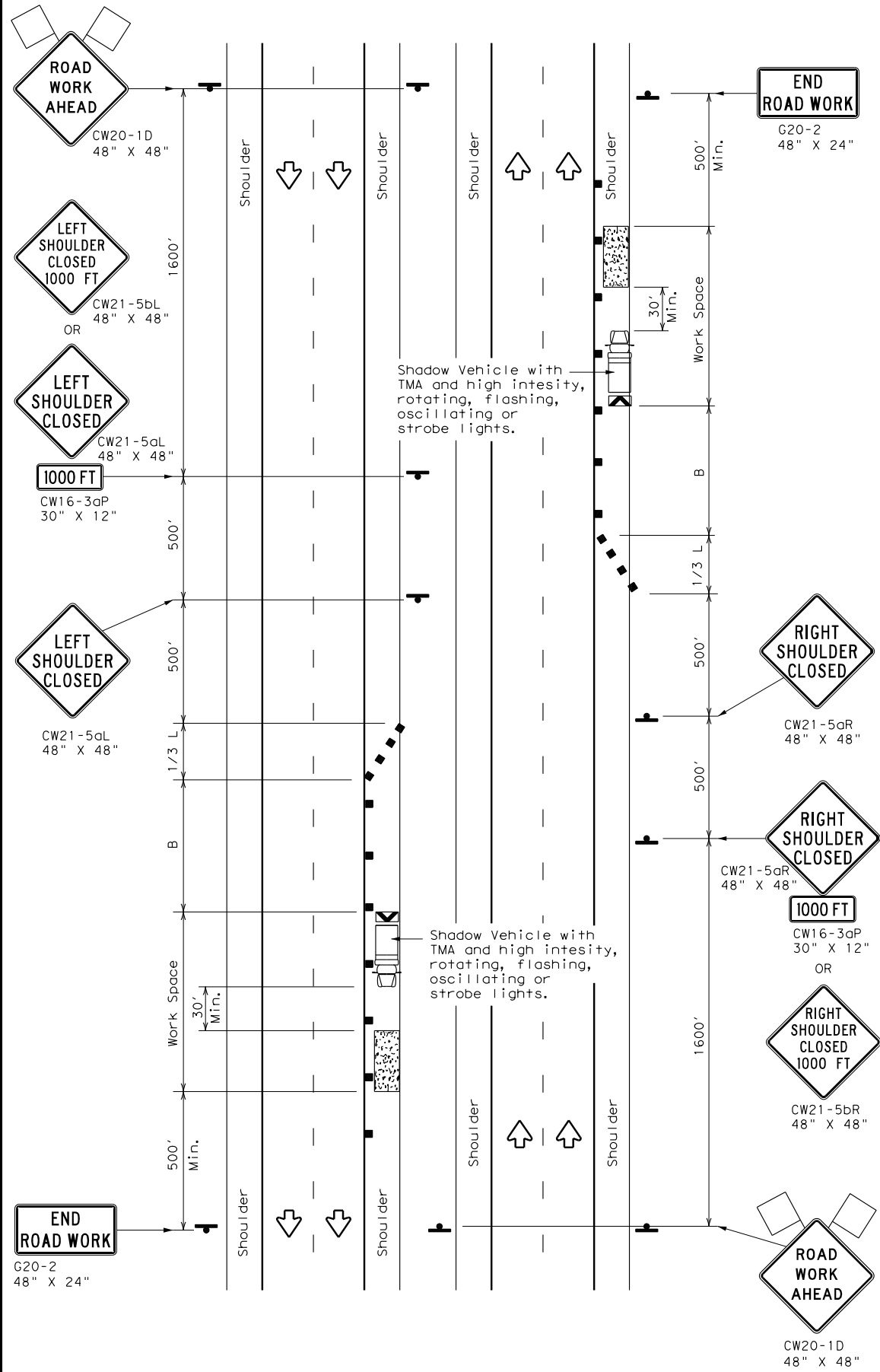
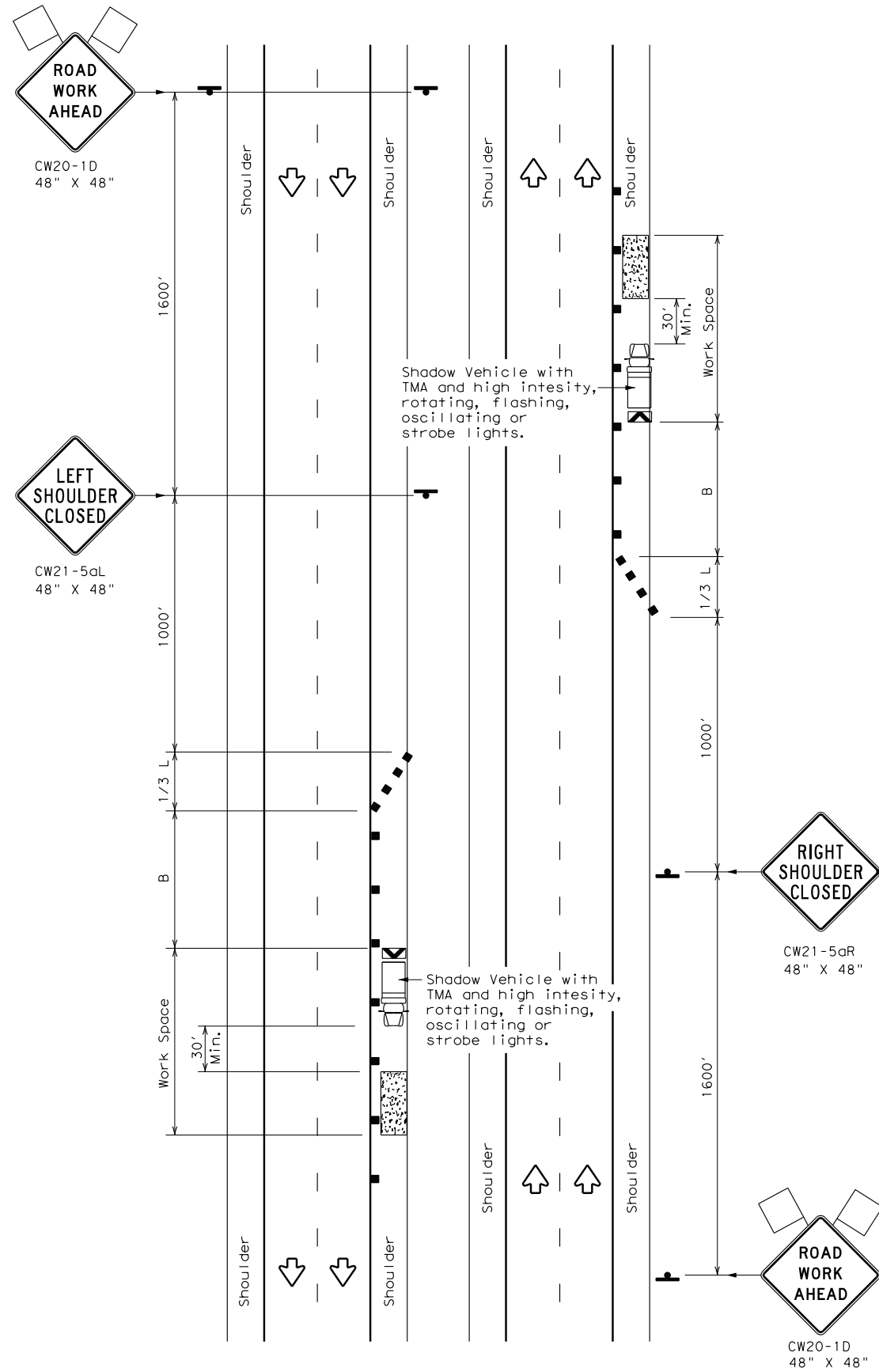
**Traffic Operations Division Standard**

**TRAFFIC CONTROL PLAN**  
**MOBILE OPERATIONS FOR**  
**ISOLATED WORK AREAS**  
**UNDIVIDED HIGHWAYS**  
**TCP(3-4)-13**

FILE:	tcp3-4.dgn	DN:	TxDOT	CK:	TxDOT	DN:	TxDOT	CK:	TxDOT
© TxDOT	July, 2013	CONT	SECT	JOB	HIGHWAY	TOLL	49		
REVISIONS		DIST	COUNTY	SHEET NO.					
			SMITH	41					

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:54:50 PM  
FILE: d:\pw\_work\atknat\01\mca02543\dms73722\tcp5-1-18.dgn



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

Posted Speed *	Formula	Minimum Desirable Taper Lengths * X			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	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
2-18	DIST	COUNTY	SHEET NO.	TOLL 49
		SMITH		42

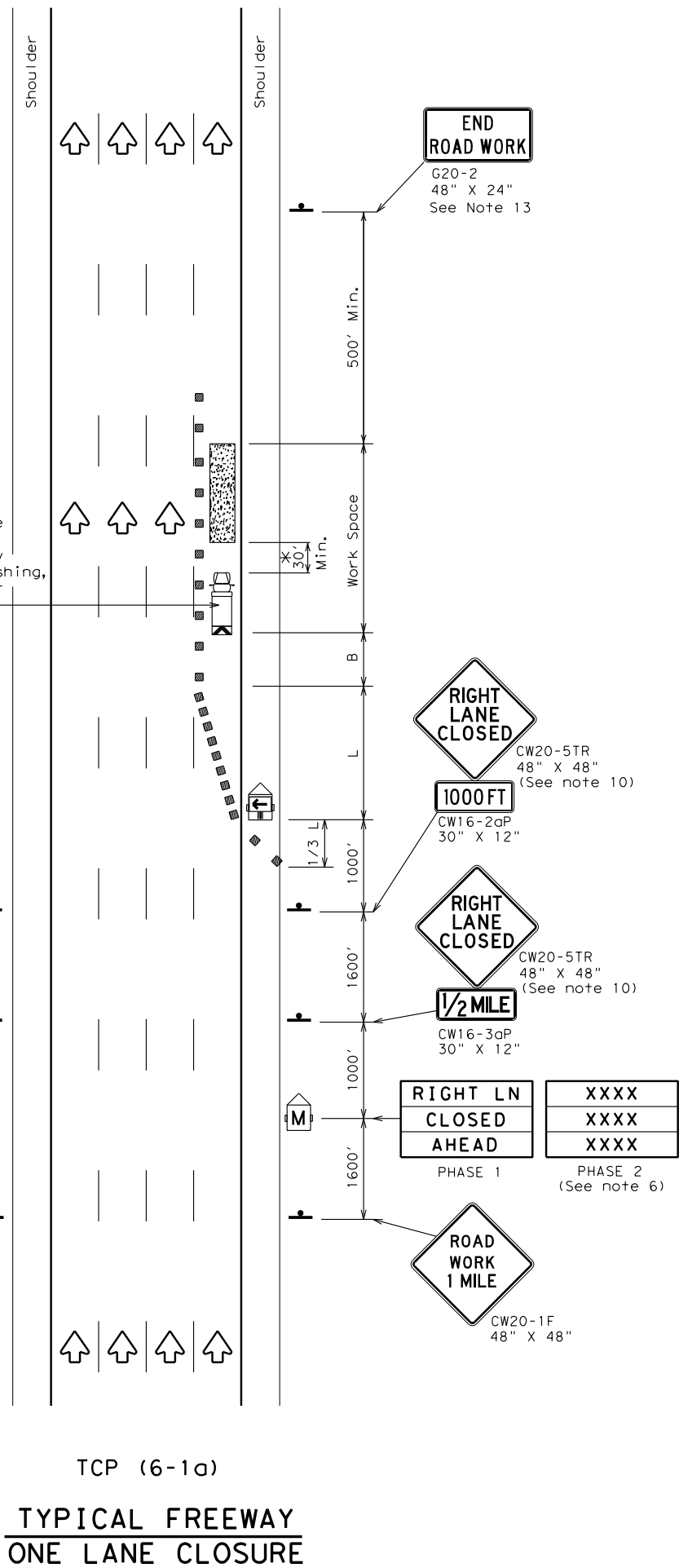
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:54:56 PM  
FILE: d:\pw\_work\atknat\01\mcca2543\dms73722\tcp6-1.dgn

Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights

See note 1 and 7

See note 1 and 7

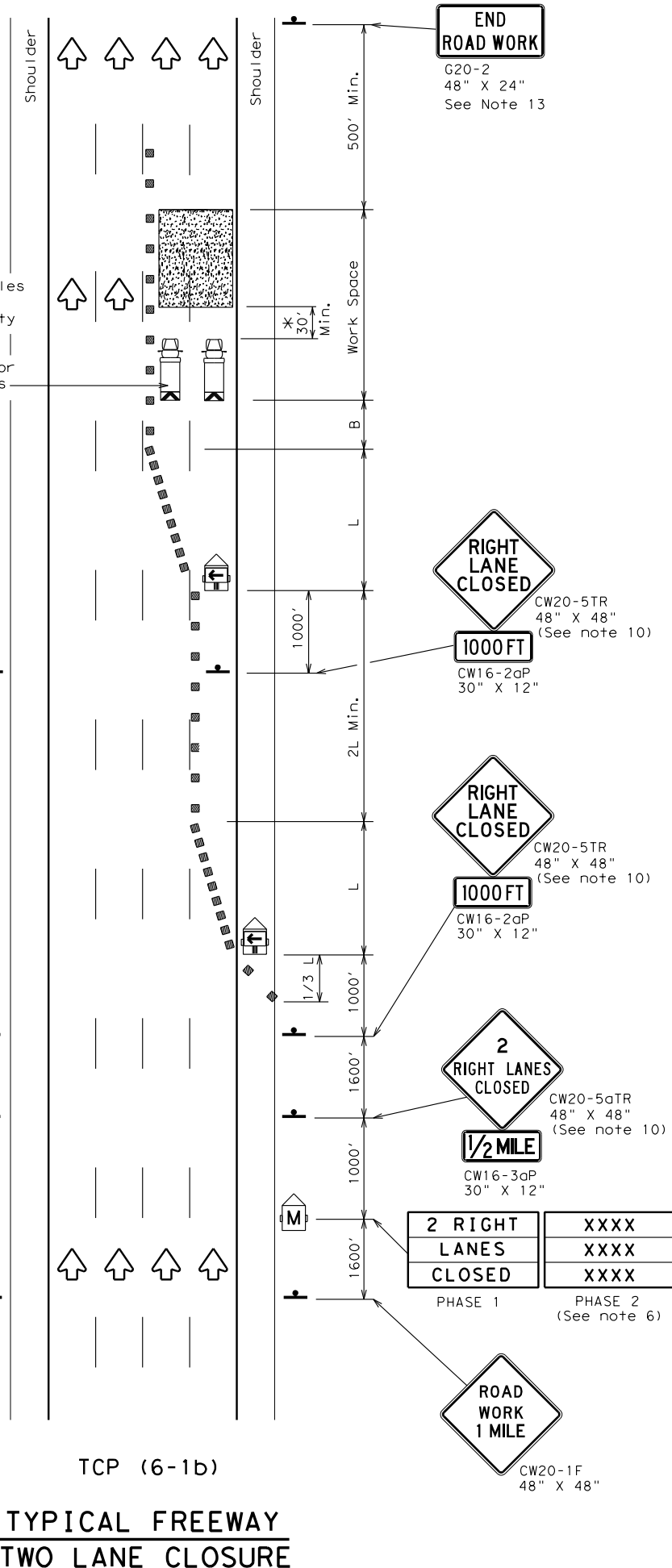


Shadow Vehicles with TMA and high intensity rotating, flashing, oscillating or strobe lights

See note 1 and 7

See note 1 and 7

See note 1 and 7



\* 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.

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "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

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- 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.
- All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
- The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
- 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.
- 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.
- Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
- 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.
- Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
- 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.
- 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.
- 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.
- The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

Texas Department of Transportation  
Traffic Operations Division Standard

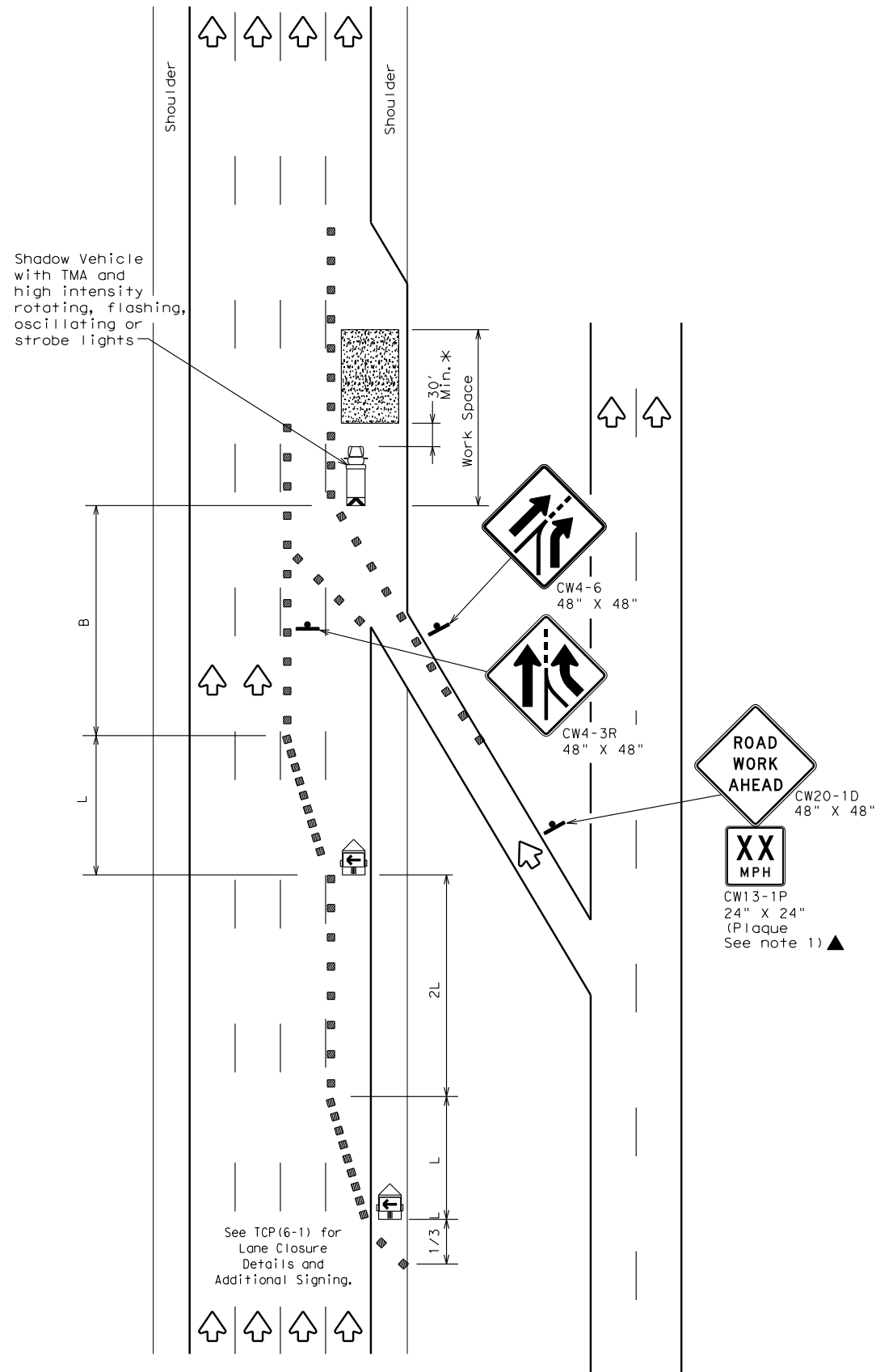
TRAFFIC CONTROL PLAN  
FREEWAY LANE CLOSURES

TCP (6-1) - 12

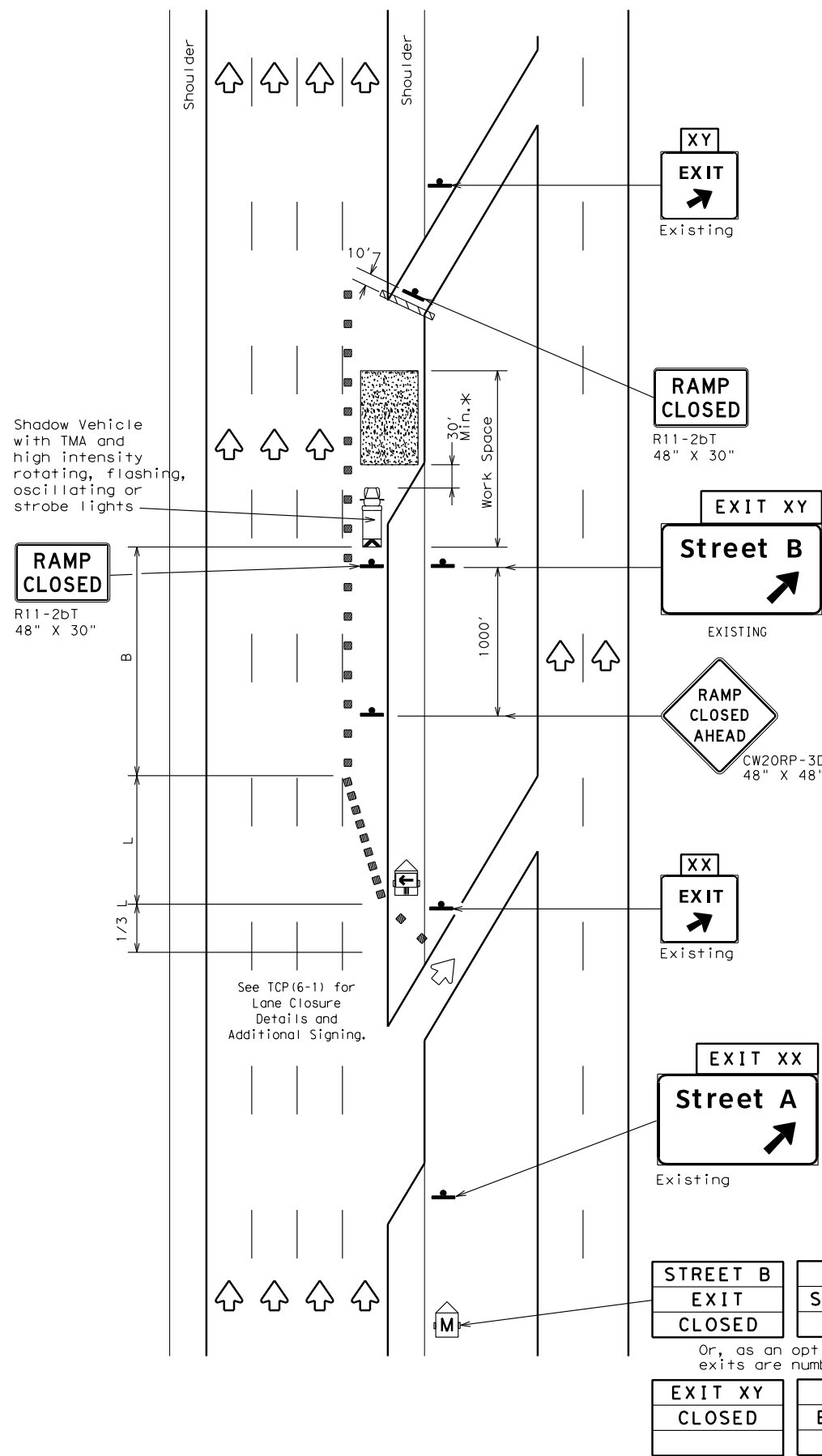
FILE:	tcp6-1.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
©TxDOT	February 1998	CONT	SECT	JOB	HIGHWAY				
8-12	REVISIONS								
		DIST		COUNTY				SHEET NO.	
				SMITH				43	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:55:01 PM  
FILE: d:\pw\_work\atknat\01\mcca2543\dms73722\tcp6-3.dgn



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		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'

XX 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:
- 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

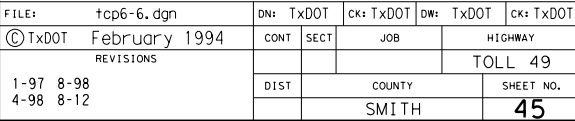
## TRAFFIC CONTROL PLAN WORK AREA BEYOND RAMP

TCP (6-3) - 12

FILE:	tcp6-3.dgn	DN:	TxDOT	CK:	TxDOT	OW:	TxDOT	CK:	TxDOT
©TxDOT	February 1994	CONT	SECT	JOB	HIGHWAY	TOLL 49			
REVISIONS									
1-97	8-98			DIST	COUNTY			SHEET NO.	
4-98	8-12					SMITH		44	

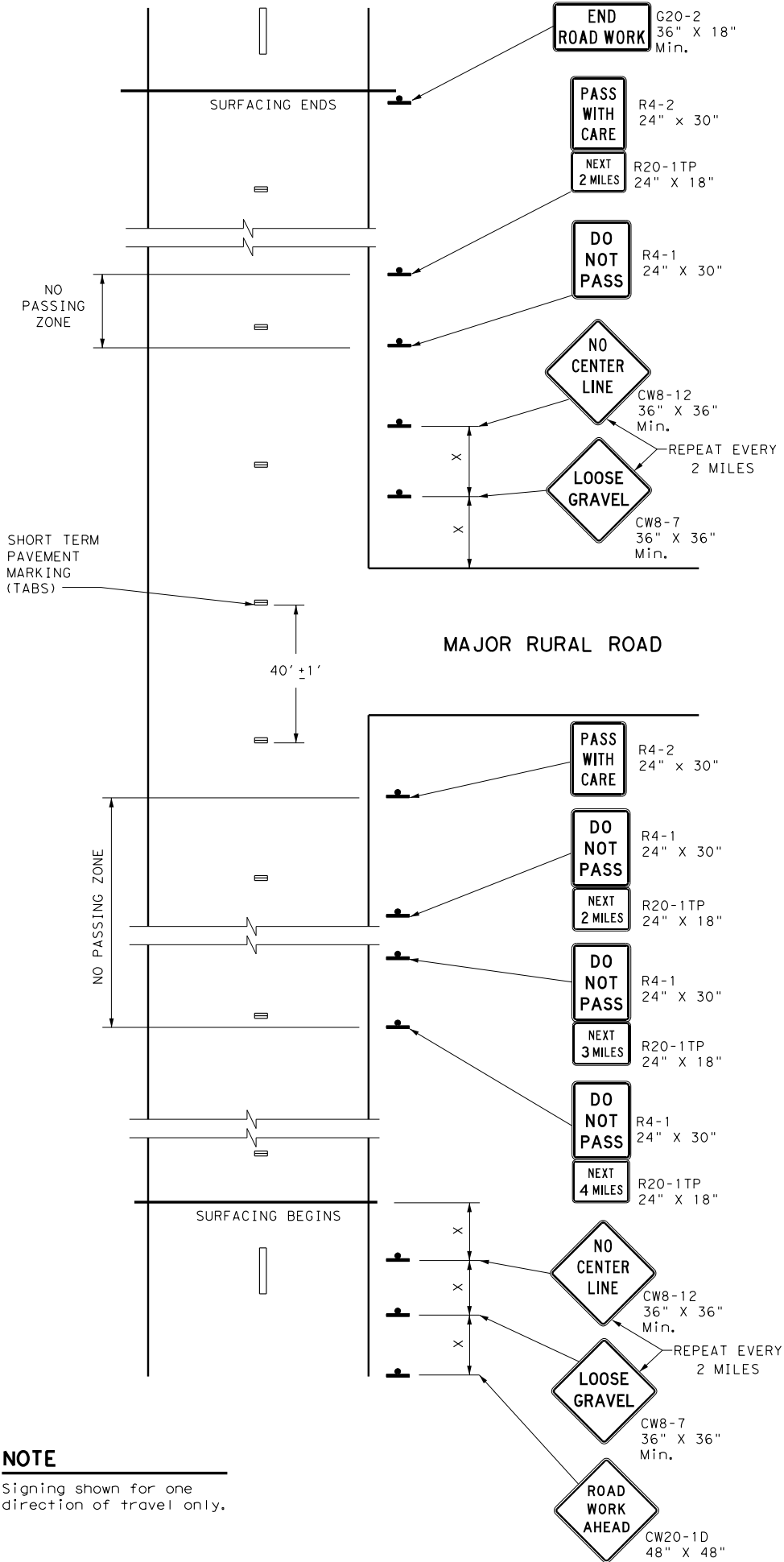


DATE: 12/21/2021 4:55:07 PM  
FILE: d:\pw\_work\atknatx01\mcca2543\dms73722\+cp6-6.dgn

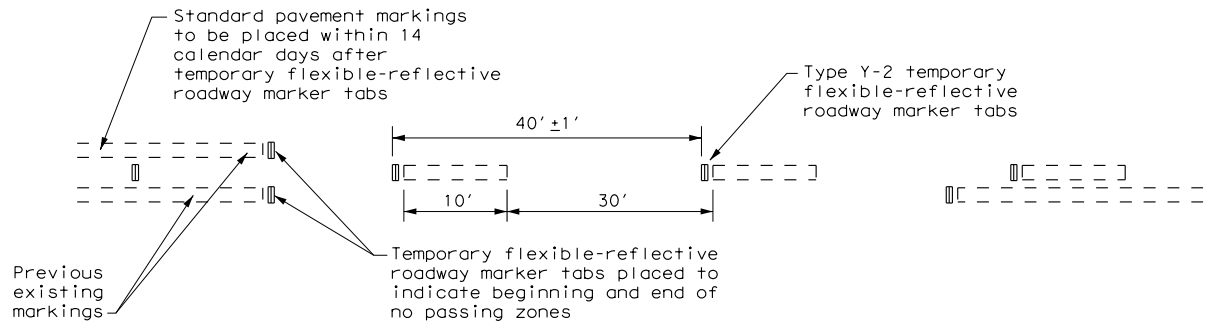


DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:55:12 PM  
FILE: d:\pw\_work\atknat\01\mcca2543\dms73722\tcp7-1.dgn



## 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

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

### "NO CENTER LINE" SIGN (CW8-12)

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

### "LOOSE GRAVEL" SIGN (CW8-7)

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

### PAVEMENT MARKINGS

- 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.
- Tabs shall not be used to simulate edge lines.
- Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

### COORDINATION OF SIGN LOCATIONS

- 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.
- 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

- 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.
- 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.
- 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.
- When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
- Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.



Traffic Operations Division Standard

## TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

### TCP (7-1) - 13

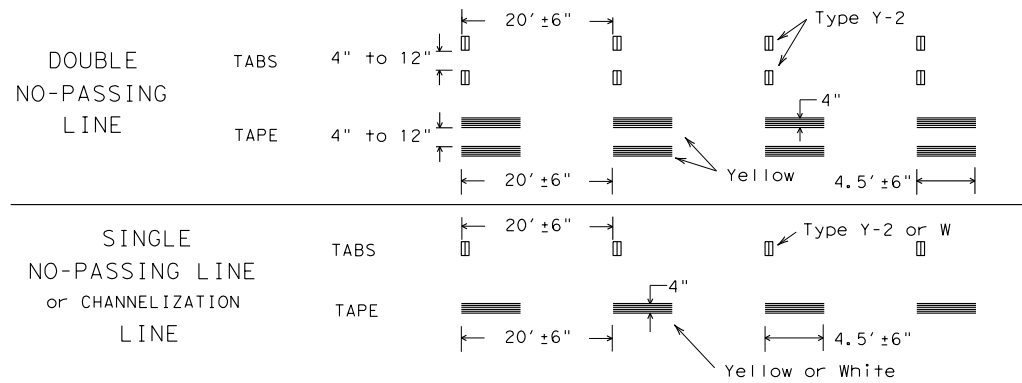
FILE:	tcp7-1.dgn	DN:	TxDOT	CK:	TxDOT	DN:	TxDOT	CK:	TxDOT
© TxDOT	March 1991	CONT	SECT	JOB	HIGHWAY				
REVISIONS									
4-92	4-98								
1-97	7-13								
		DIST		COUNTY				SHEET NO.	
				SMITH				46	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:55:18 PM  
FILE: d:\pw\_wor-k\atknat\01\mco2543\dms73722\wzstpm-13.dgn

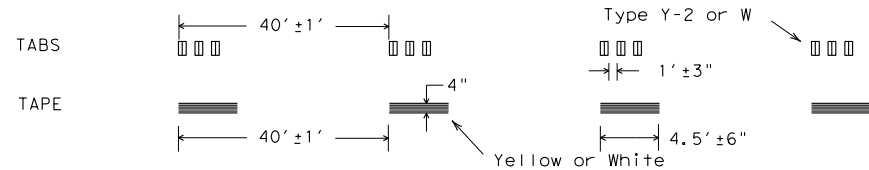
## WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

### SOLID LINES



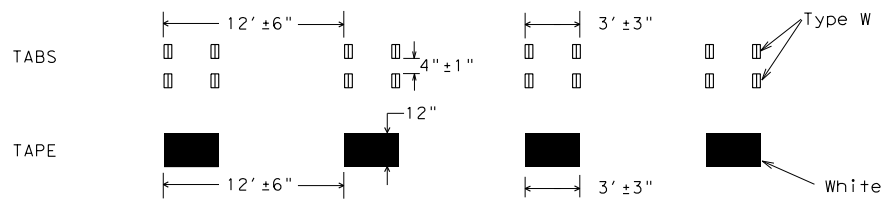
### BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

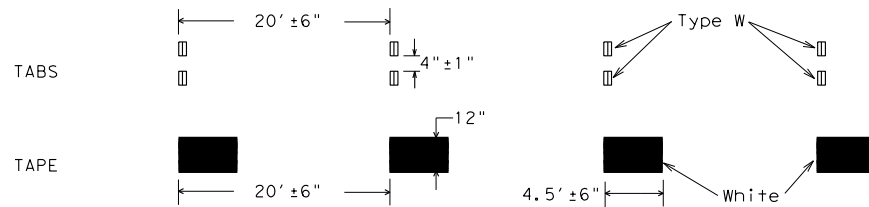


### WIDE DOTTED LINES

(FOR LANE DROP LINES)



### WIDE GORE MARKINGS



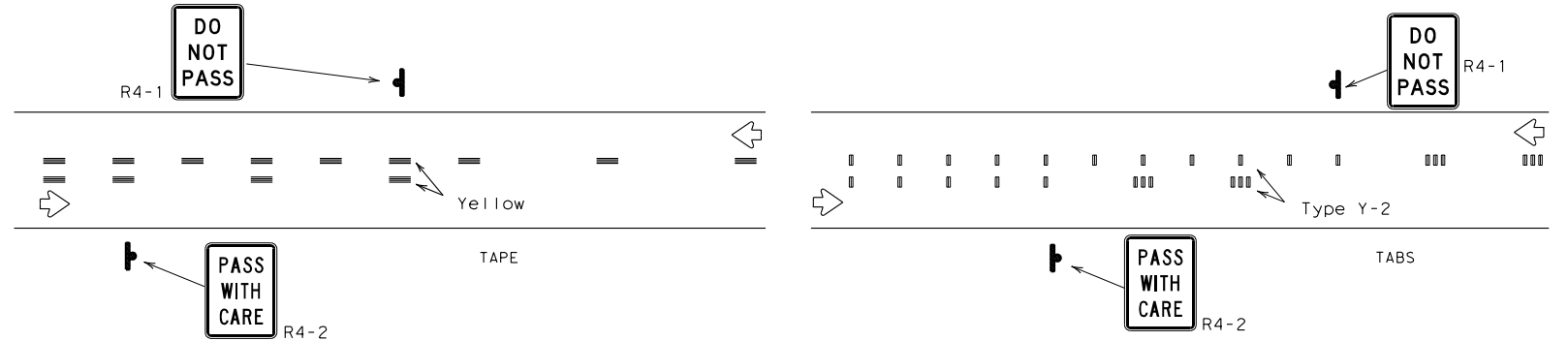
#### NOTES:

- Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
- Short term pavement markings shall NOT be used to simulate edge lines.
- 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.
- 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.
- 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.
- 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.
- 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).
- 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.

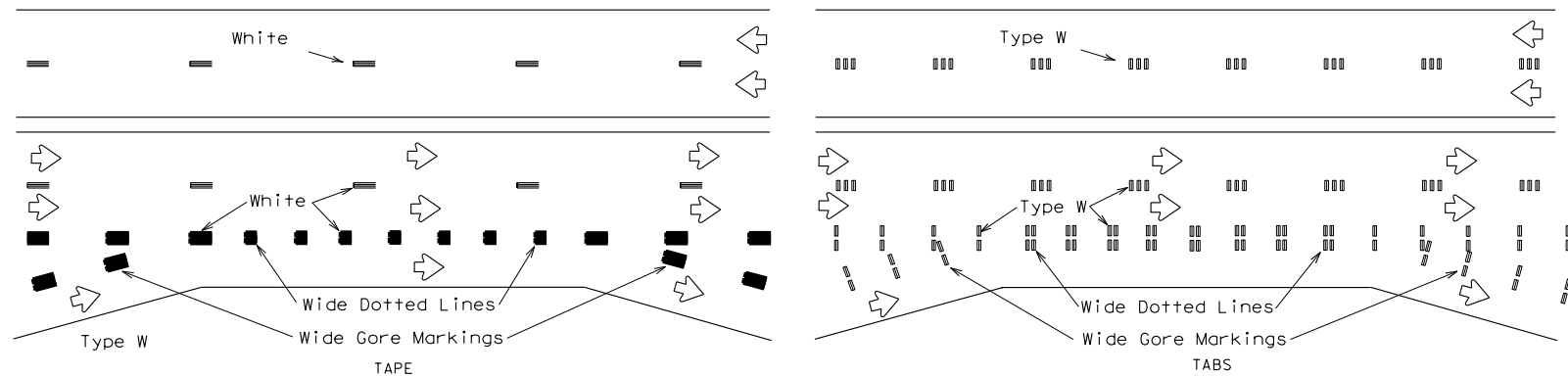
#### TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

- 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).
- Tabs shall meet requirements of Departmental Material Specification DMS-8242.
- 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.
- No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

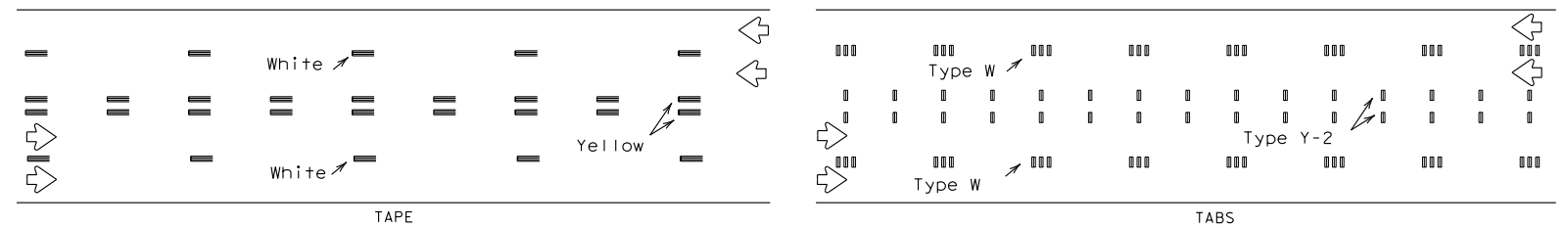
## WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



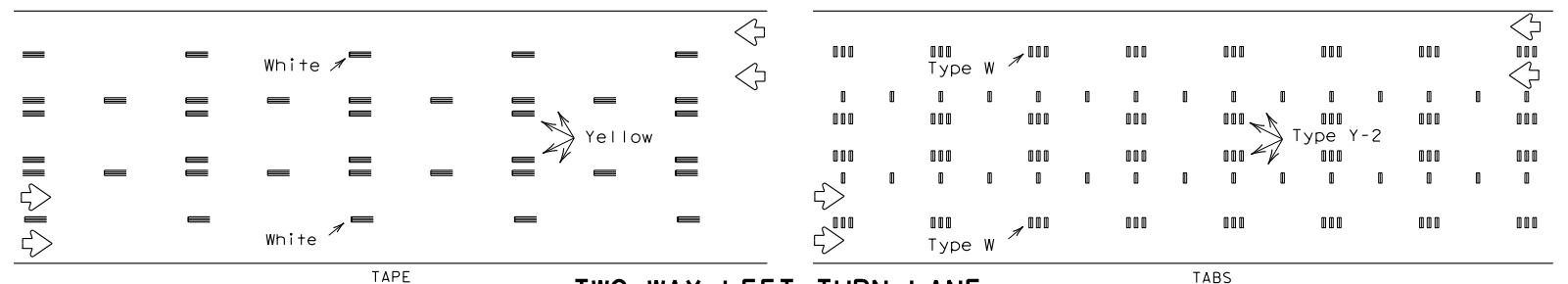
### CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



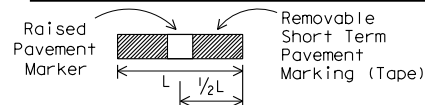
### LANE LINES FOR DIVIDED HIGHWAY



### LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



### TWO-WAY LEFT TURN LANE



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

#### PREFABRICATED PAVEMENT MARKINGS

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

#### RAISED PAVEMENT MARKERS

- 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)

- 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](http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm)



## WORK ZONE SHORT TERM PAVEMENT MARKINGS

### WZ (STPM) - 13

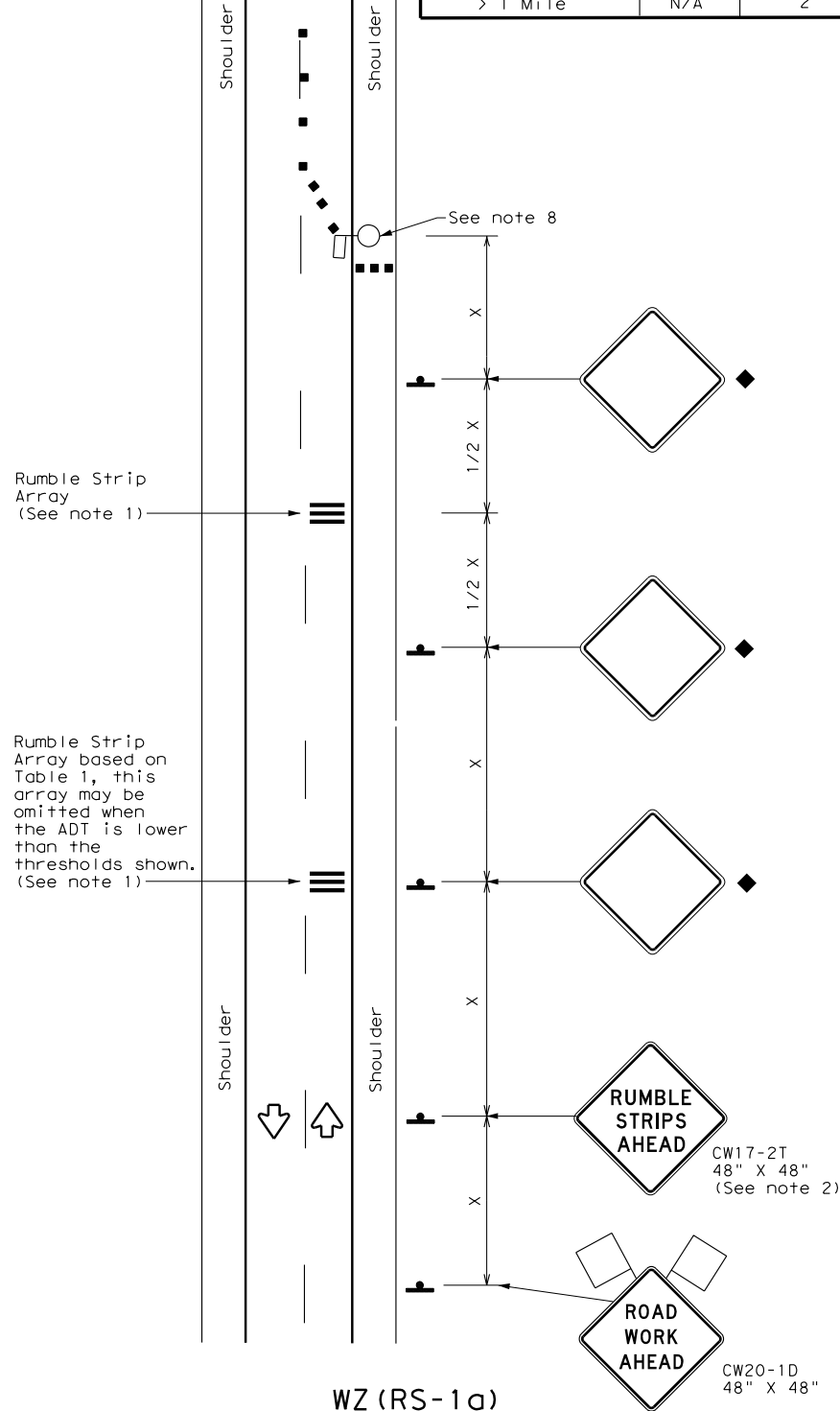
FILE:	wzstpm-13.dgn	DN:	TxDOT	CK:	TxDOT	DN:	TxDOT	CK:	TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY				
1-97	3-03								
7-13									
		DIST	COUNTY	SHEET NO.					
			SMITH	47					

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

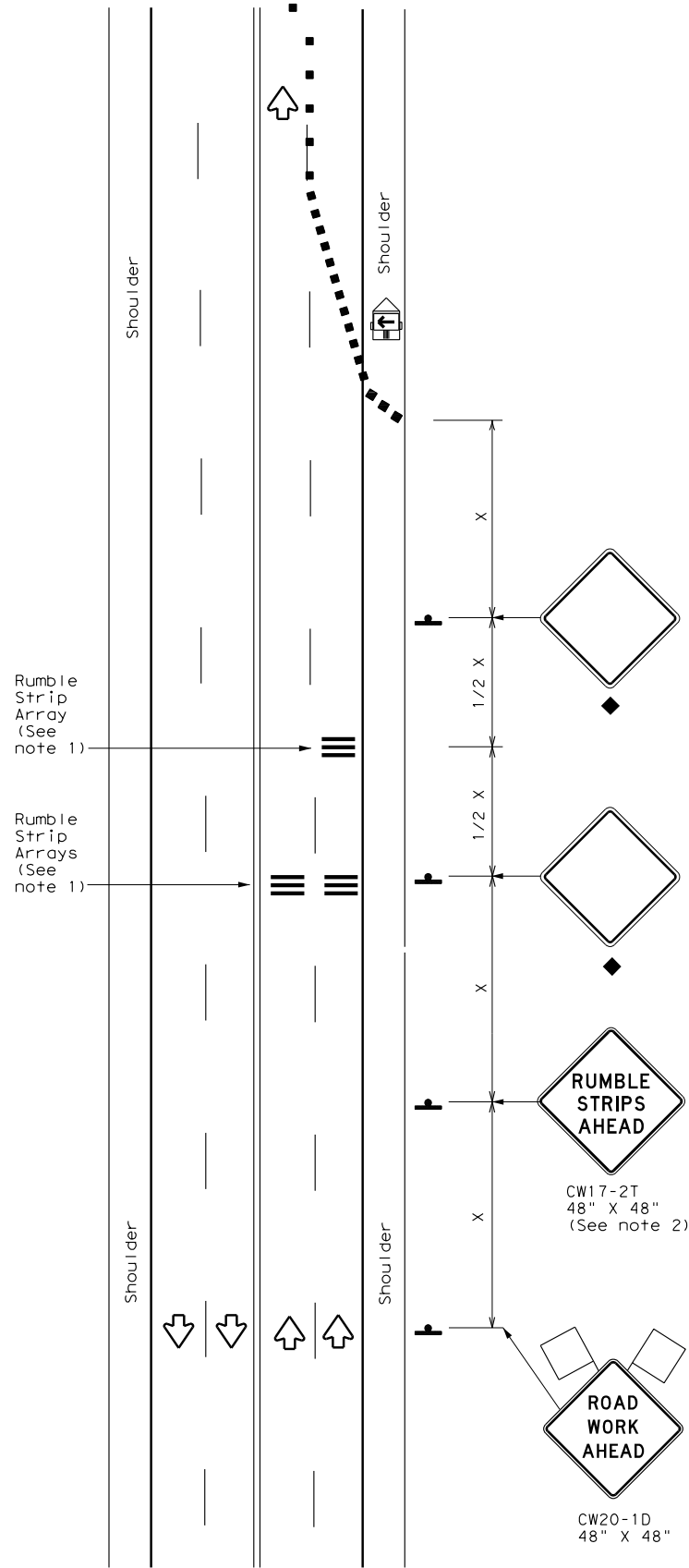
DATE: 12/21/2021 4:55:23 PM  
FILE: d:\pw\_wor-k\otknat\01\mcca2543\dms73722\wzrs16.dgn

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

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



RUMBLE STRIPS ON ONE-LANE  
TWO-WAY APPLICATION



RUMBLE STRIPS FOR LANE CLOSURE  
ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

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

LEGEND

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	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.

**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				TOLL 49
2-14			COUNTY	SHEET NO.
4-16			SMITH	48

DATE: 12/21/2021 4:55:29 PM  
FILE: d:\pw\_wor-k\atkrat\To11 49\_S1\_OVERLAY\_HD\_01.dgn

TOLL 49

Course from PT L49ML-15 to PC L49ML-16 S 54° 21' 29.01" E Dist 4,619.6628

Curve Data				
*-----*				
Curve L49ML-16				
P.I. Station	969+07.18	N	6,787,095.9080	E 2,932,340.3902
Delta	= 2° 19' 14.87"	(LT)		
Degree	= 1° 15' 00.00"			
Tangent	= 92.8445			
Length	= 185.6637			
Radius	= 4,583.6624			
External	= 0.9402			
Long Chord	= 185.6510			
Mid. Ord.	= 0.9400			
P.C. Station	968+14.34	N	6,787,150.0102	E 2,932,264.9378
P.T. Station	970+00.00	N	6,787,044.9056	E 2,932,417.9715
C.C.		N	6,790,875.0353	E 2,934,935.9206
Back	= S 54° 21' 29.01" E			
Ahead	= S 56° 40' 43.87" E			
Chord Bear	= S 55° 31' 06.44" E			

Equation: Sta 970+00.00 (BK) = Sta 133+70.00 (AH)      End Region 1  
Begin Region 2

Curve Data				
*-----*				
Curve L49ML-17				
P.I. Station	148+26.15	N	6,786,244.9974	E 2,933,634.7364
Delta	= 35° 14' 53.74"	(LT)		
Degree	= 1° 15' 00.00"			
Tangent	= 1,456.1490			
Length	= 2,819.8622			
Radius	= 4,583.6643			
External	= 225.7378			
Long Chord	= 2,775.6042			
Mid. Ord.	= 215.1424			
P.C. Station	133+70.00	N	6,787,044.9056	E 2,932,417.9715
P.T. Station	161+89.86	N	6,786,293.9651	E 2,935,090.0619
C.C.		N	6,790,875.0369	E 2,934,935.9216
Back	= S 56° 40' 43.87" E			
Ahead	= N 88° 04' 22.38" E			
Chord Bear	= S 74° 18' 10.74" E			

Course from PT L49ML-17 to PC L49ML-18 N 88° 04' 22.38" E Dist 4,828.2403

Curve Data				
*-----*				
Curve L49ML-18				
P.I. Station	220+61.38	N	6,786,491.4135	E 2,940,958.2581
Delta	= 10° 24' 14.71"	(LT)		
Degree	= 0° 30' 00.00"			
Tangent	= 1,043.2768			
Length	= 2,080.8171			
Radius	= 11,459.1559			
External	= 47.3936			
Long Chord	= 2,077.9595			
Mid. Ord.	= 47.1984			
P.C. Station	210+18.10	N	6,786,456.3300	E 2,939,915.5713
P.T. Station	230+98.92	N	6,786,714.2182	E 2,941,977.4659
C.C.		N	6,797,909.0047	E 2,939,530.2208
Back	= N 88° 04' 22.38" E			
Ahead	= N 77° 40' 07.67" E			
Chord Bear	= N 82° 52' 15.03" E			

Course from PT L49ML-18 to PC L49ML-19 N 77° 40' 07.67" E Dist 2,775.7276

Curve Data				
*-----*				
Curve L49ML-19				
P.I. Station	263+71.63	N	6,787,413.1472	E 2,945,174.6777
Delta	= 9° 54' 53.76"	(RT)		
Degree	= 1° 00' 00.00"			
Tangent	= 496.9876			
Length	= 991.4934			
Radius	= 5,729.5780			
External	= 21.5141			
Long Chord	= 990.2568			
Mid. Ord.	= 21.4336			
P.C. Station	258+74.65	N	6,787,307.0093	E 2,944,689.1559
P.T. Station	268+66.14	N	6,787,434.0998	E 2,945,671.2233
C.C.		N	6,781,709.6160	E 2,945,912.7785
Back	= N 77° 40' 07.67" E			
Ahead	= N 87° 35' 01.44" E			
Chord Bear	= N 82° 37' 34.56" E			

Course from PT L49ML-19 to PC L49ML-20 N 87° 35' 01.44" E Dist 1,576.9935

TOLL 49 (CONTINUED)

Curve Data				
*-----*				
Curve L49ML-20				
P.I. Station	292+77.66	N	6,787,535.7677	E 2,948,080.5958
Delta	= 16° 34' 26.10"	(RT)		
Degree	= 1° 00' 00.00"			
Tangent	= 834.5231			
Length	= 1,657.3915			
Radius	= 5,729.5780			
External	= 60.4559			
Long Chord	= 1,651.6190			
Mid. Ord.	= 59.8247			
P.C. Station	284+43.13	N	6,787,500.5848	E 2,947,246.8147
P.T. Station	301+00.53	N	6,787,331.6511	E 2,948,889.7715
C.C.		N	6,781,776.1010	E 2,947,488.3699
Back	= N 87° 35' 01.44" E			
Ahead	= S 75° 50' 32.47" E			
Chord Bear	= S 84° 07' 45.51" E			

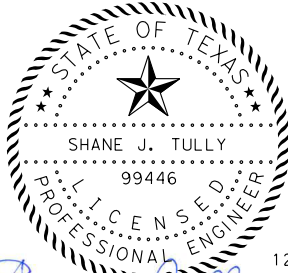
Course from PT L49ML-20 to PC L49ML-21 S 75° 50' 32.47" E Dist 1,955.7127

Curve Data				
*-----*				
Curve L49ML-21				
P.I. Station	327+95.47	N	6,786,672.4935	E 2,951,502.8576
Delta	= 14° 42' 12.04"	(LT)		
Degree	= 1° 00' 00.00"			
Tangent	= 739.2285			
Length	= 1,470.3344			
Radius	= 5,729.5780			
External	= 47.4907			
Long Chord	= 1,466.3032			
Mid. Ord.	= 47.1003			
P.C. Station	320+56.24	N	6,786,853.3020	E 2,950,786.0821
P.T. Station	335+26.57	N	6,786,679.5340	E 2,952,242.0525
C.C.		N	6,792,408.8521	E 2,952,187.4838
Back	= S 75° 50' 32.47" E			
Ahead	= N 89° 27' 15.49" E			
Chord Bear	= S 83° 11' 38.49" E			

Course from PT L49ML-21 to PC L49ML-22 N 89° 27' 15.49" E Dist 5,906.6294

Curve Data				
*-----*				
Curve L49ML-22				
P.I. Station	419+83.64	N	6,786,760.0795	E 2,960,698.7371
Delta	= 25° 05' 43.24"	(LT)		
Degree	= 0° 30' 00.00"			
Tangent	= 2,550.4387			
Length	= 5,019.0691			
Radius	= 11,459.1559			
External	= 280.3923			
Long Chord	= 4,979.0460			
Mid. Ord.	= 273.6953			
P.C. Station	394+33.20	N	6,786,735.7890	E 2,958,148.4140
P.T. Station	444+52.27	N	6,787,863.7350	E 2,962,998.0157
C.C.		N	6,798,194.4252	E 2,958,039.2764
Back	= N 89° 27' 15.49" E			
Ahead	= N 64° 21' 32.25" E			
Chord Bear	= N 76° 54' 23.87" E			

Course from PT L49ML-22 to PC L49ML-23 N 64° 21' 32.25" E Dist 6,447.7059



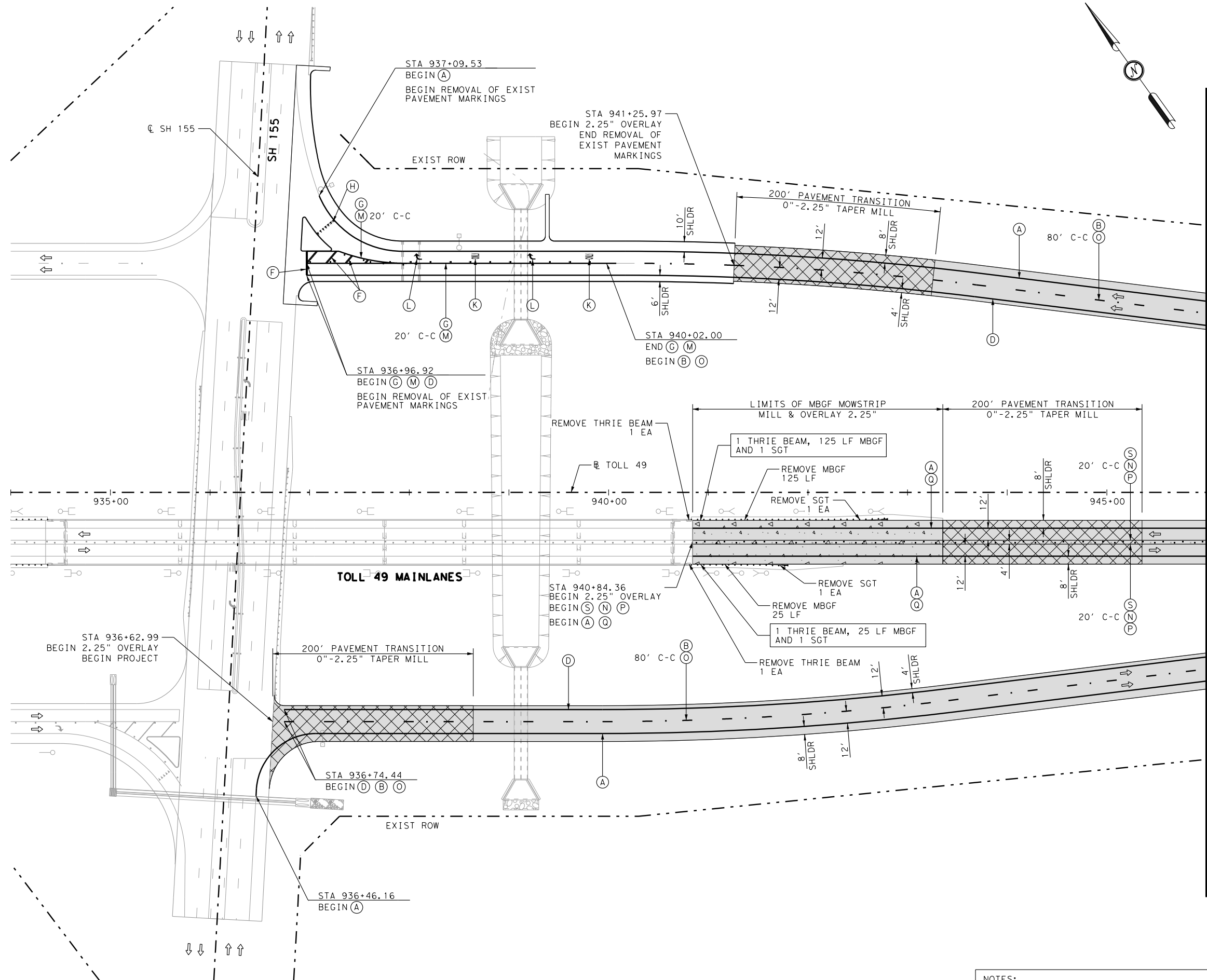
TOLL 49  
SEGMENT 1 OVERLAY  
HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1			
FED.RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			49
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

NOTE: ALIGNMENT DATA OBTAINED FROM TOLL 49  
SEGMENT ONE AS-BUILT PLANS.  
FOR INFORMATIONAL PURPOSES ONLY.

DATE: 12/21/2021 4:55:36 PM  
FILE: d:\pw\_wor-k\atkrat\01\mcca2543\dms73529\Toll 49\_S1\_OVERLAY\_01.dgn

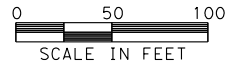
DN: Ckt DW: Ckt



### LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE



**ATKINS**  
TBPE REG. # F-474



**TOLL 49  
SEGMENT 1  
PAVING & STRIPING  
BEGIN TO STA 946+00**

SHEET 1 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			50
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

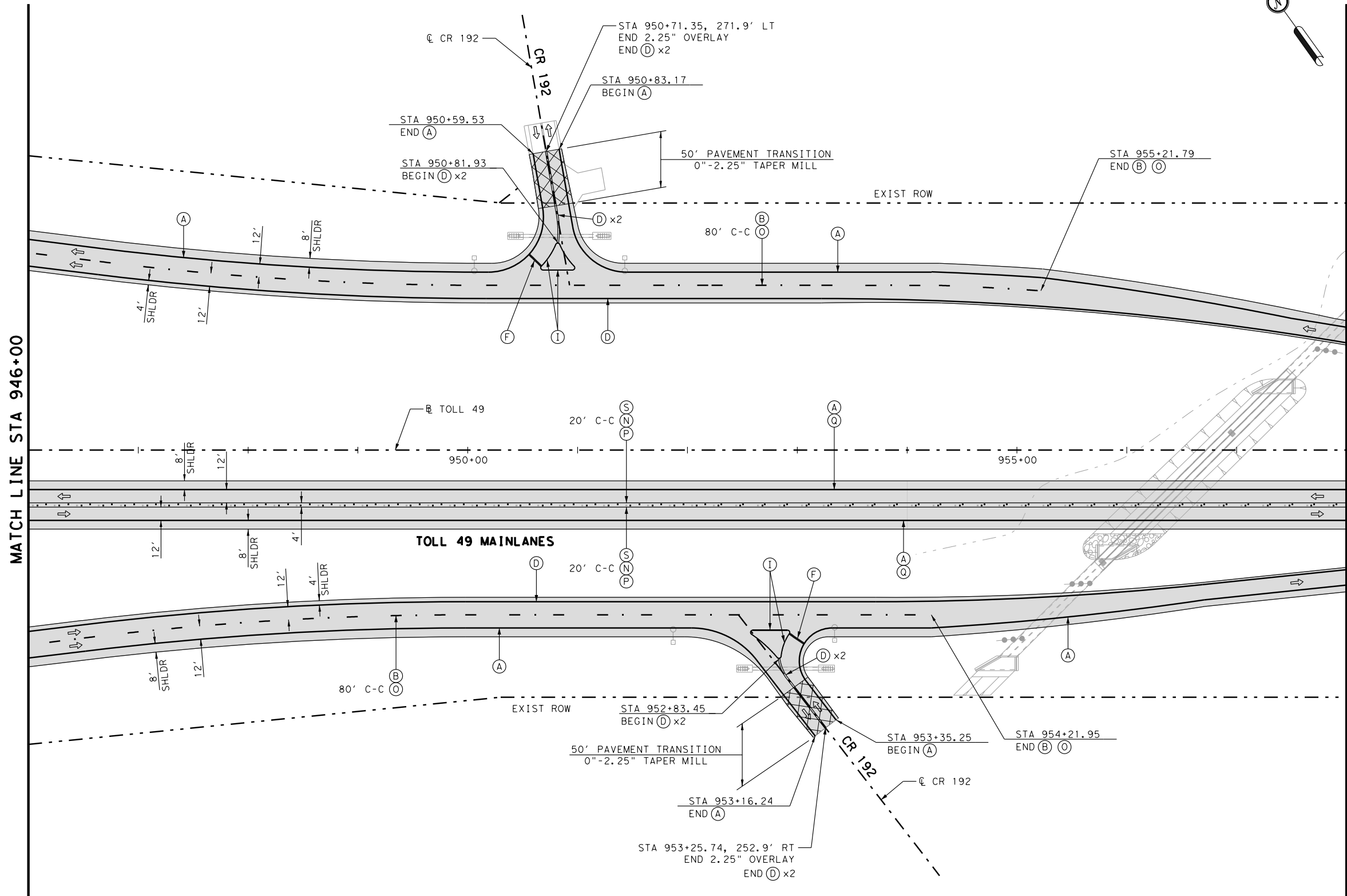
NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.



DATE: 12/21/2021 4:55:42 PM  
FILE: d:\pw\_work\atkrnt\01\mccq2543\dms73529\Toll 49\_S1\_OVERLAY\_02.dgn

DN: Ckt DW: Ckt

MATCH LINE STA 946+00



## LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100  
SCALE IN FEET



**ATKINS**  
TBPE REG. # F-474



**TOLL 49  
SEGMENT 1  
PAVING & STRIPING  
STA 946+00 TO STA 958+00**

SHEET 2 OF 26

FED. RD. DIV. NO. 6	PROJECT NO.		SHEET NO. 51
STATE TEXAS	LOC. TYLER	COUNTY SMITH	
CONT.	SECT.	JOB	HIGHWAY NO. TOLL 49

NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

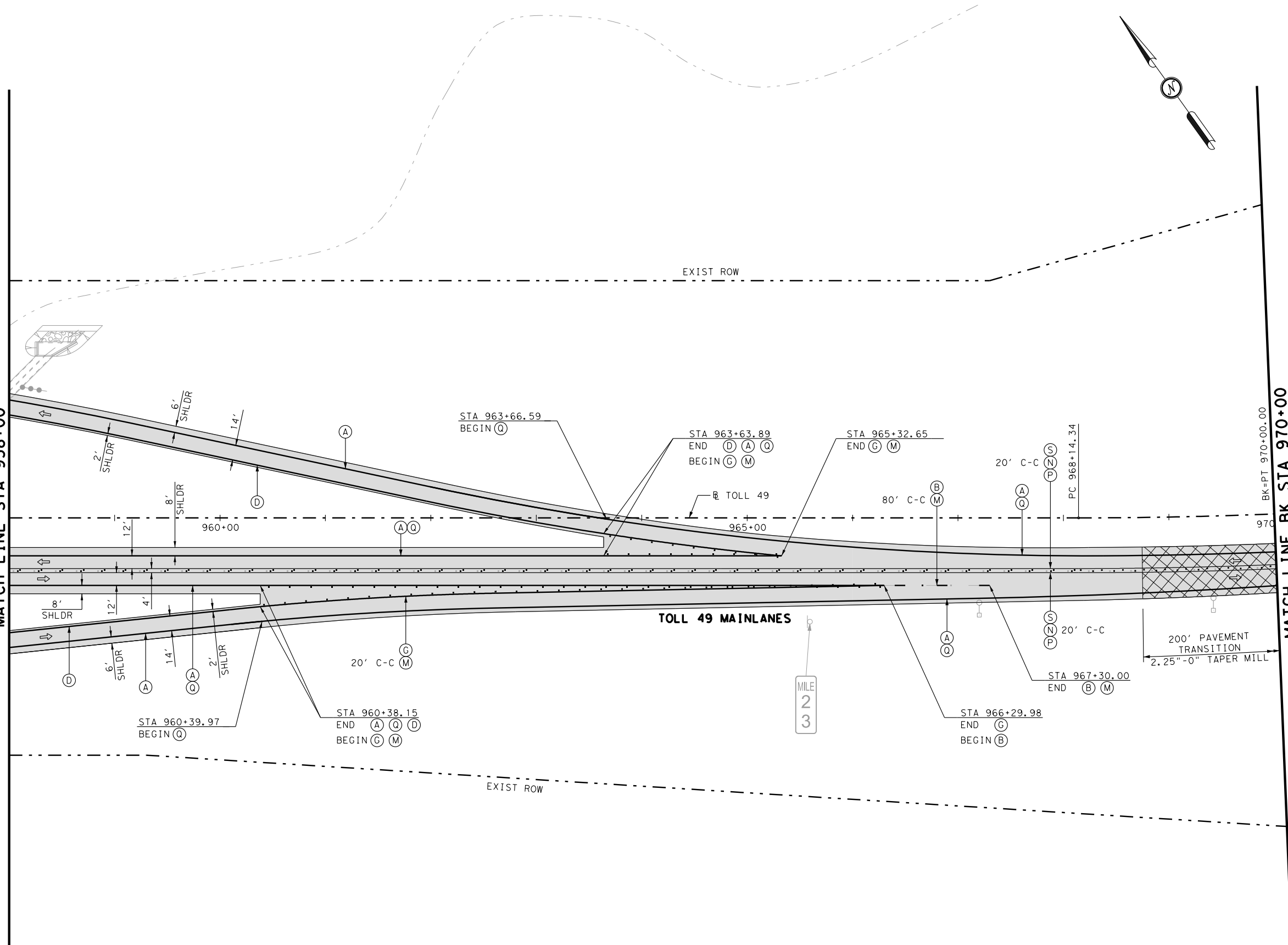


DATE: 12/21/2021 4:55:48 PM  
FILE: d:\pw\_work\atkrnt\01\mcca2543\dms73529\Toll 49\_S1\_OVERLAY\_03.dgn

DN:	CK:	DW:	CK:
-----	-----	-----	-----

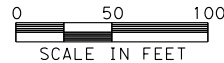
MATCH LINE STA 958+00

MATCH LINE BK STA 970+00  
MATCH LINE AH STA 133+70



LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY
- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE



12/21/2021

ATKINS

TBPE REG. # F-474



TOLL 49  
SEGMENT 1  
PAVING & STRIPING  
STA 958+00 TO BK STA 970+00  
AH STA 133+70

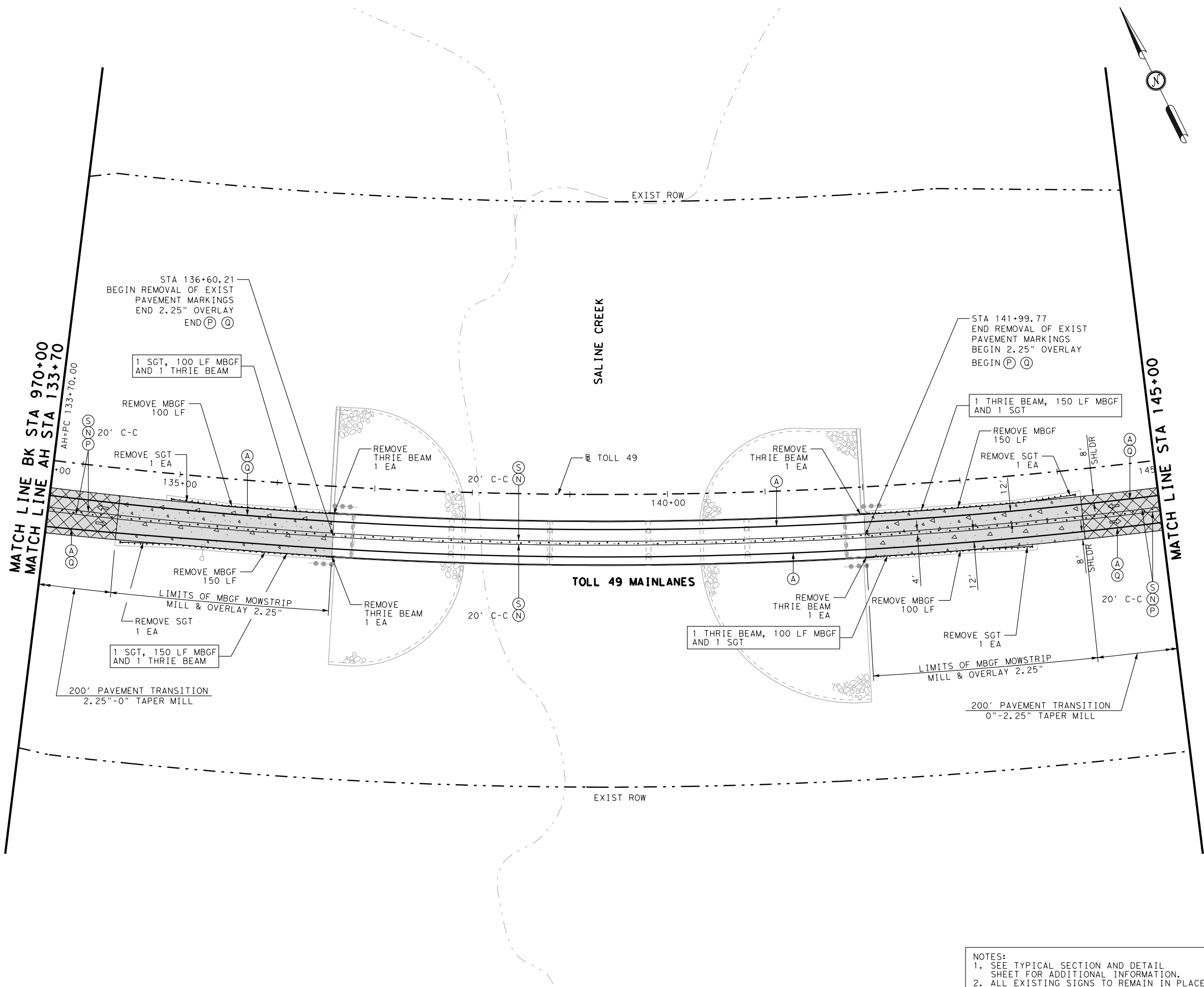
SHEET 3 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			52
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

- NOTES:
- SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.
  - ALL EXISTING SIGNS TO REMAIN IN PLACE.

DATE: 12/21/2021 4:55:54 PM  
FILE: d:\pw\_wor-k\atkrat\01\mccq2543\dms73529\To11 49\_S1\_OVERLAY\_04.dgn

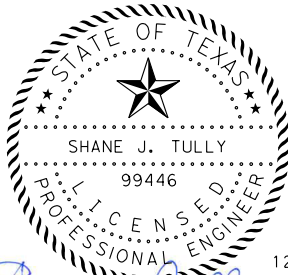
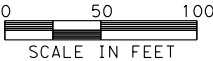
DN: Ckt: DW: Ckt: DN:



LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
  - (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
  - (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
  - (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
  - (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
  - (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
  - (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
  - (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
  - (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
  - (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
  - (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
  - (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
  - (M) REFL PAV MRKR TY I-C
  - (N) REFL PAV MRKR TY II-A-A
  - (O) REFL PAV MRKR TY II-C-R
  - (P) RUMBLE STRIPS (CENTERLINE)
  - (Q) RUMBLE STRIPS (SHOULDER)
  - (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
  - (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW  
EXISTING LIGHT POLE



12/21/2021

ATKINS

TBPE REG. # F-474



TOLL 49  
SEGMENT 1  
PAVING & STRIPING  
BK STA 970+00 TO STA 145+00  
AH STA 133+70

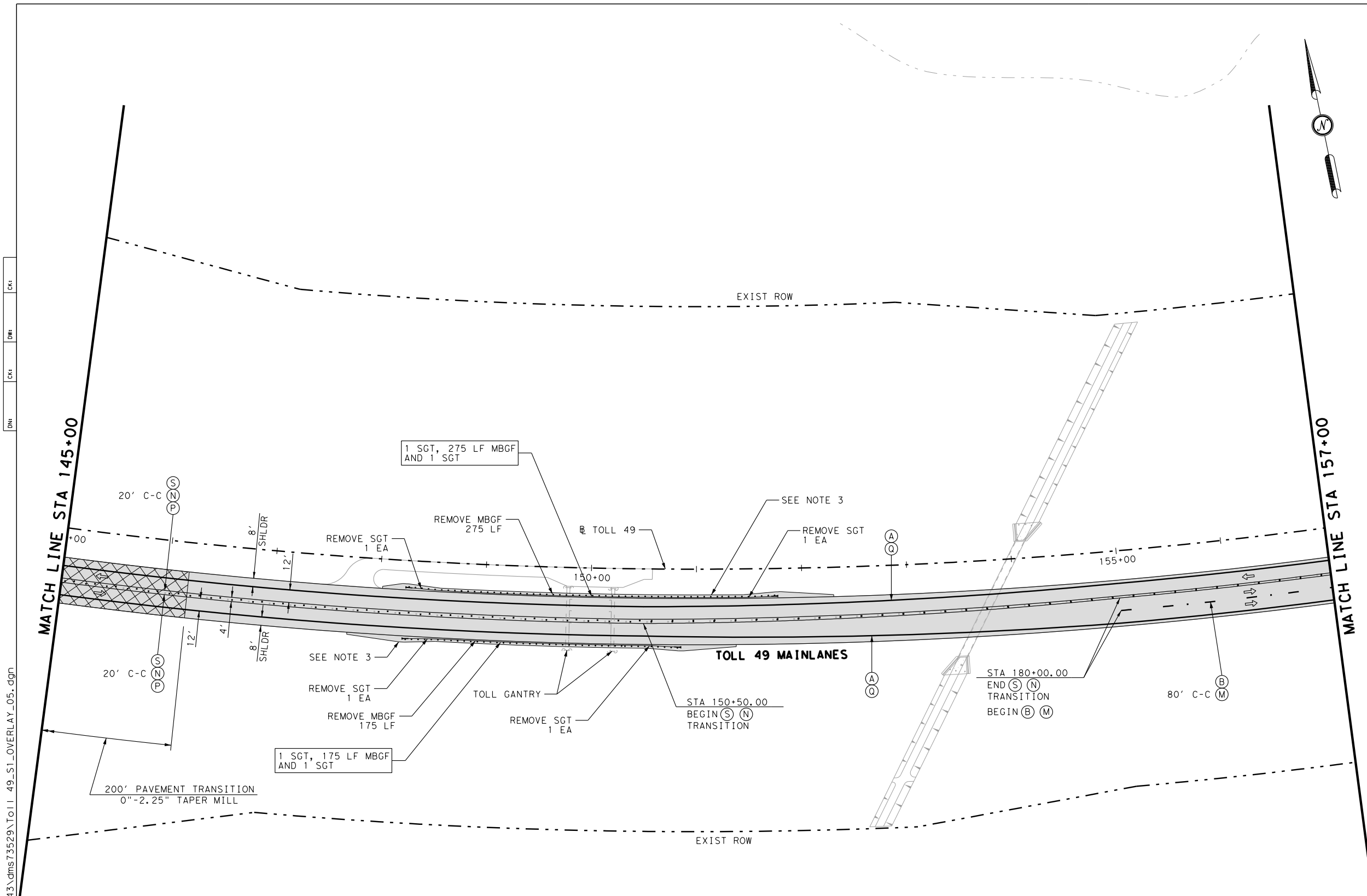
SHEET 4 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			53
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

DATE: 12/21/2021 4:55:59 PM  
FILE: d:\pw\_wor-k\atkrat\01\meca2543\dms73529\Toll 49\_S1\_OVERLAY\_05.dgn

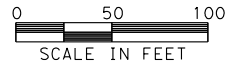
DN: Ck: DW: Ck: Ck:



LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE



ATKINS

TBPE REG. # F-474



TOLL 49  
SEGMENT 1  
PAVING & STRIPING  
STA 145+00 TO STA 157+00

SHEET 5 OF 26

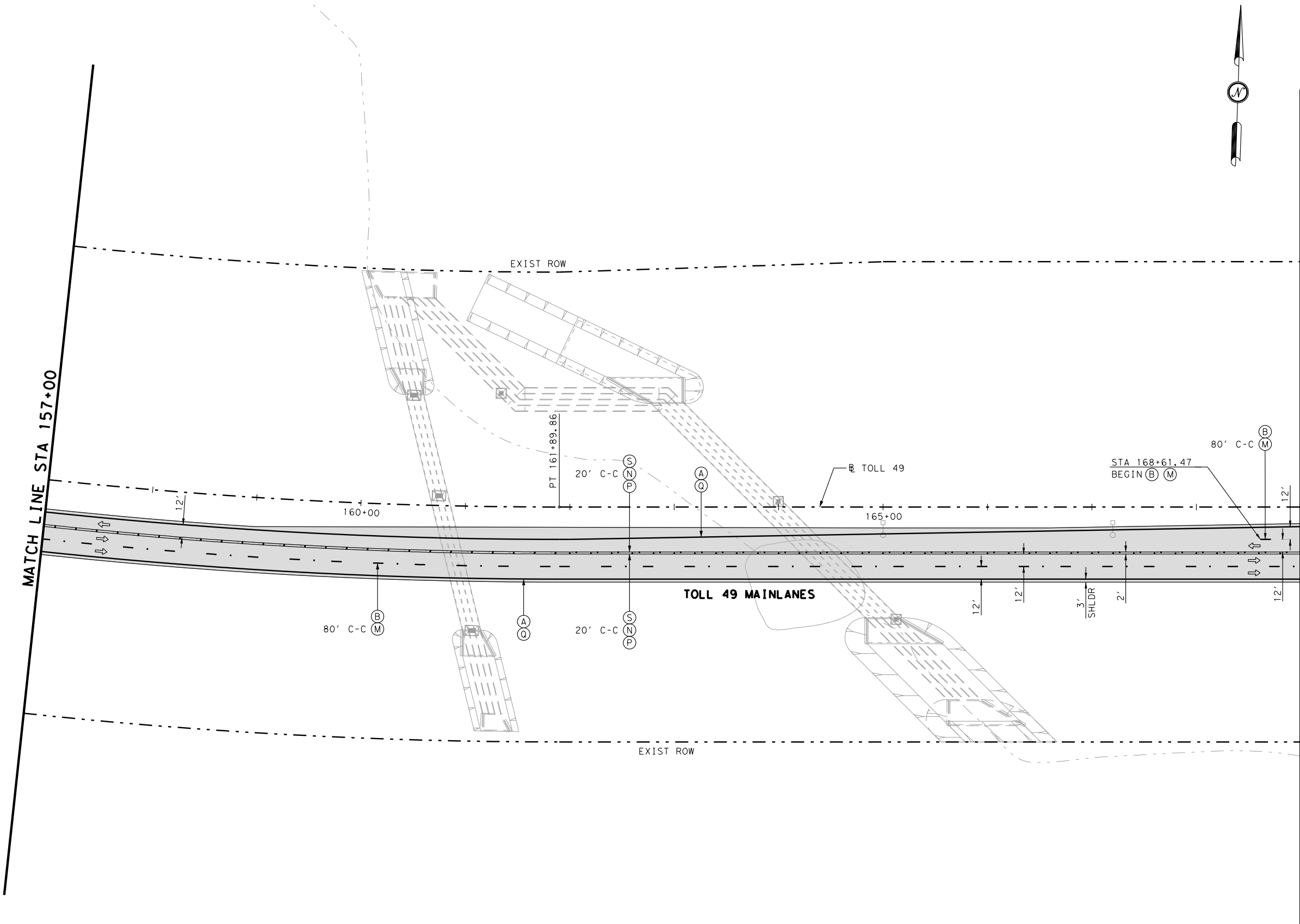
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			54
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

- NOTES:
- SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.
  - ALL EXISTING SIGNS TO REMAIN IN PLACE.
  - REMOVE EXISTING MBGF AND OVERLAY EXISTING MAINLANES AND MOWSTRIPS. INSTALL MBGF POSTS BY DRILLING OR OTHER METHOD APPROVED BY THE ENGINEER.
  - PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITIES BETWEEN STA 147+00 TO STA 153+00, CONTRACTOR TO COORDINATE WITH NETRMA REGARDING ADJUSTMENTS TO TOLL FACILITY FEATURES. THIS IS SUBSIDIARY TO ITEM 500.

DATE: 12/21/2021 4:56:05 PM  
FILE: d:\pw\_work\atkrat\01\mcca2543\dms73529\Toll 49\_S1\_OVERLAY\_06.dgn

DN: Ckt: DW: Ckt: Ckt:

MATCH LINE STA 157+00

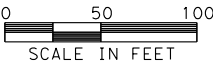


# LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)

- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE



**ATKINS**  
TBPE REG. # F-474



**TOLL 49  
SEGMENT 1  
PAVING & STRIPING  
STA 157+00 TO STA 169+00**

SHEET 6 OF 26

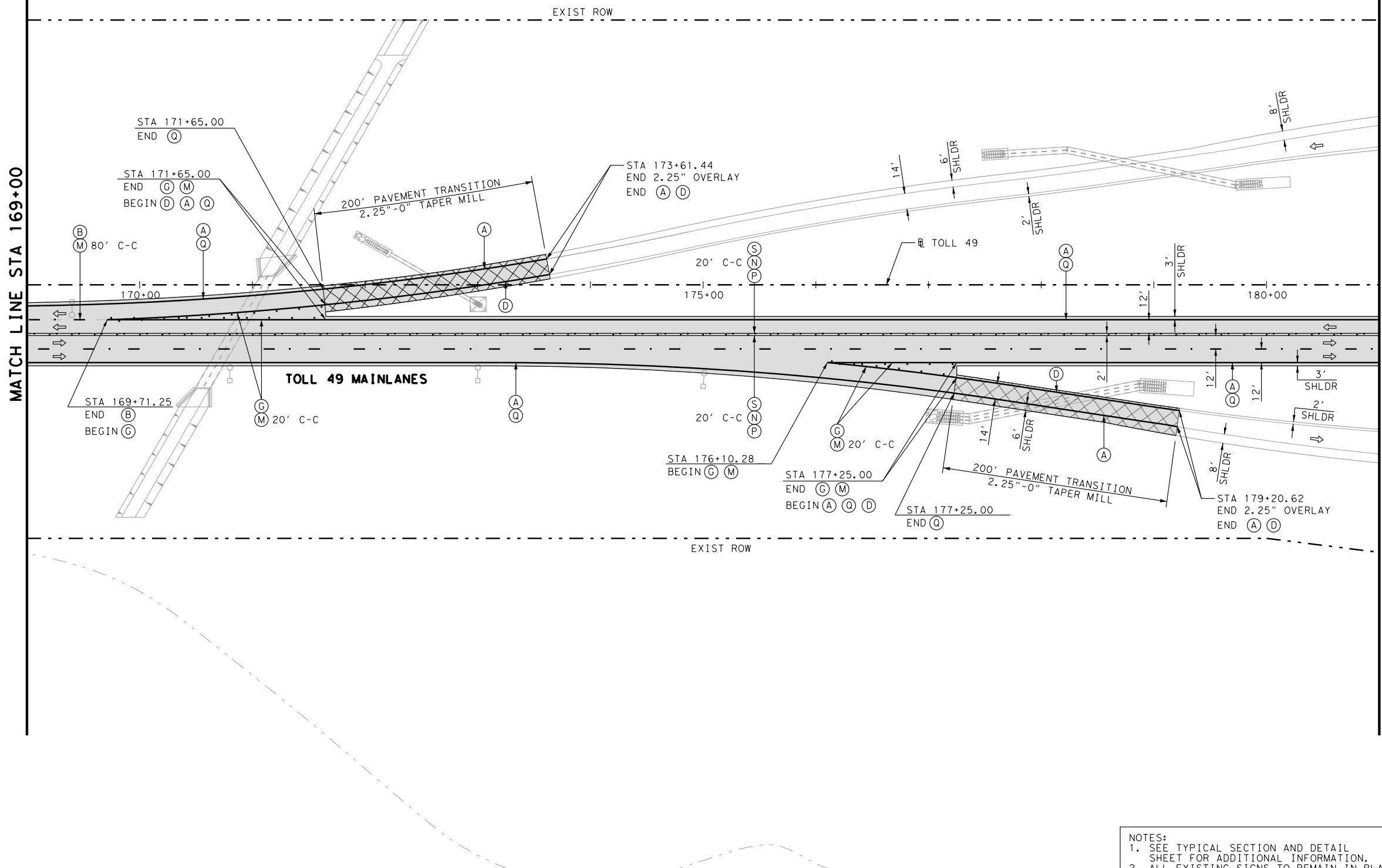
FED. RD. DIV. NO. 6	PROJECT NO.		SHEET NO. 55
STATE TEXAS	LOC. TYLER	COUNTY SMITH	
CONT.	SECT.	JOB	HIGHWAY NO. TOLL 49

- NOTES:
- SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.
  - ALL EXISTING SIGNS TO REMAIN IN PLACE.

DATE: 12/21/2021 4:56:11 PM  
FILE: d:\pw\_work\atkrnt\01\mccq2543\dms73529\Toll 49\_S1\_OVERLAY\_07.dgn

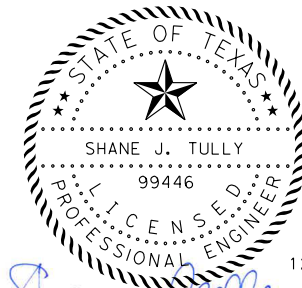
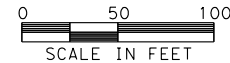
DN: Ckt: DW: Ckt: DN:

MATCH LINE STA 169+00



LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY
- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE



12/21/2021

**ATKINS**  
TBPE REG. # F-474



**TOLL 49**  
**SEGMENT 1**  
**PAVING & STRIPING**  
**STA 169+00 TO STA 181+00**

SHEET 7 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			56
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

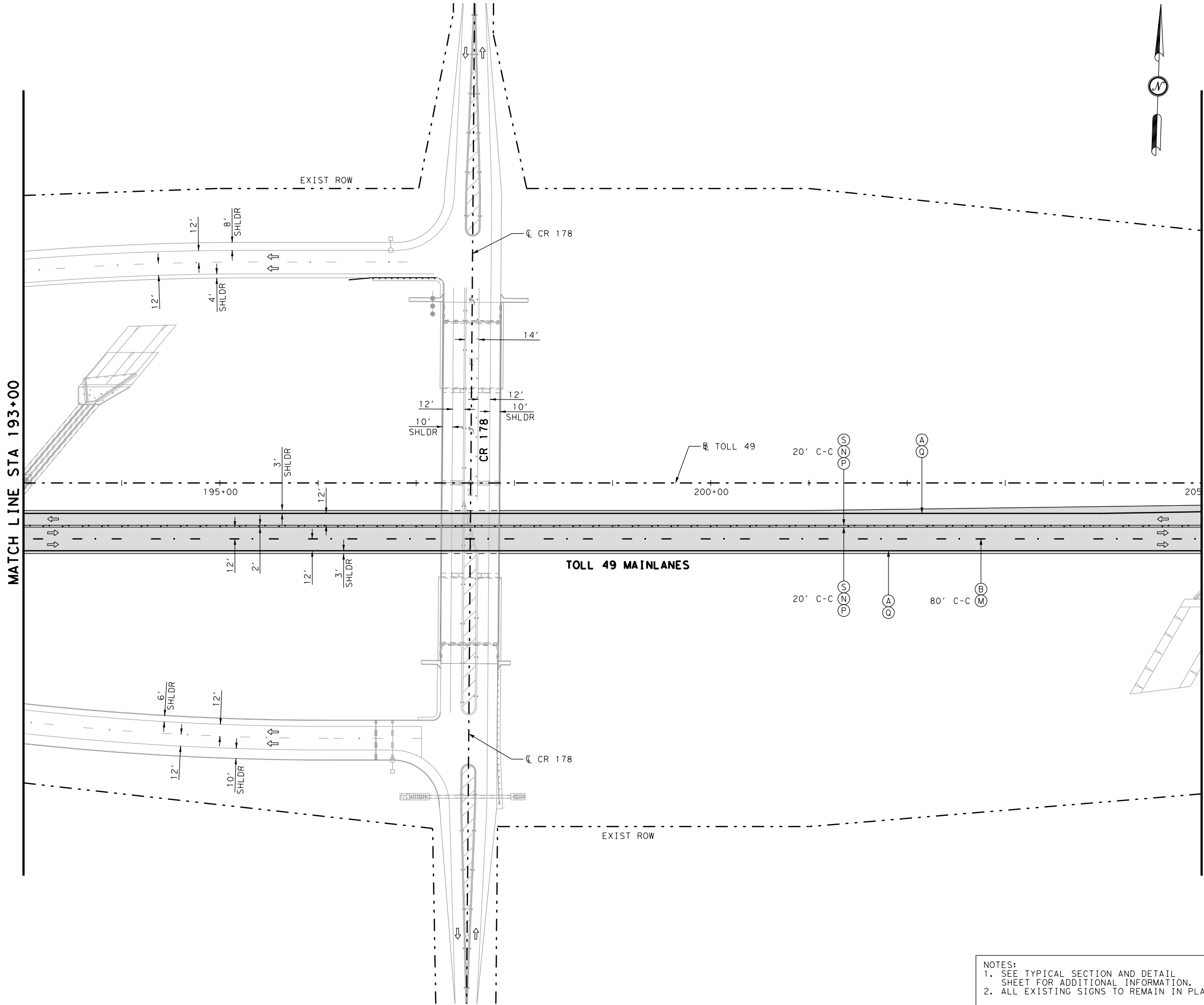




DATE: 12/21/2021 4:56:22 PM  
FILE: d:\pw\_work\atkrat\Toll 49\_S1\_OVERLAY\_09.dgn

DWG	CKT	CKT	CKT
-----	-----	-----	-----

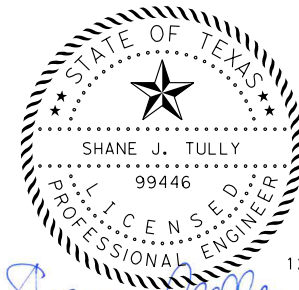
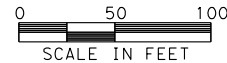
MATCH LINE STA 193+00



MATCH LINE STA 205+00

## LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY
- RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- REFL PAV MRK TY I (W) (WORD) (100MIL)
- REFL PAV MRK TY I (W) (ARROW) (100MIL)
- REFL PAV MRKR TY I-C
- REFL PAV MRKR TY II-A-A
- REFL PAV MRKR TY II-C-R
- RUMBLE STRIPS (CENTERLINE)
- RUMBLE STRIPS (SHOULDER)
- REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE



**ATKINS**

TBPE REG. # F-474



**TOLL 49**  
**SEGMENT 1**  
**PAVING & STRIPING**  
**STA 193+00 TO STA 205+00**

SHEET 9 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			58
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

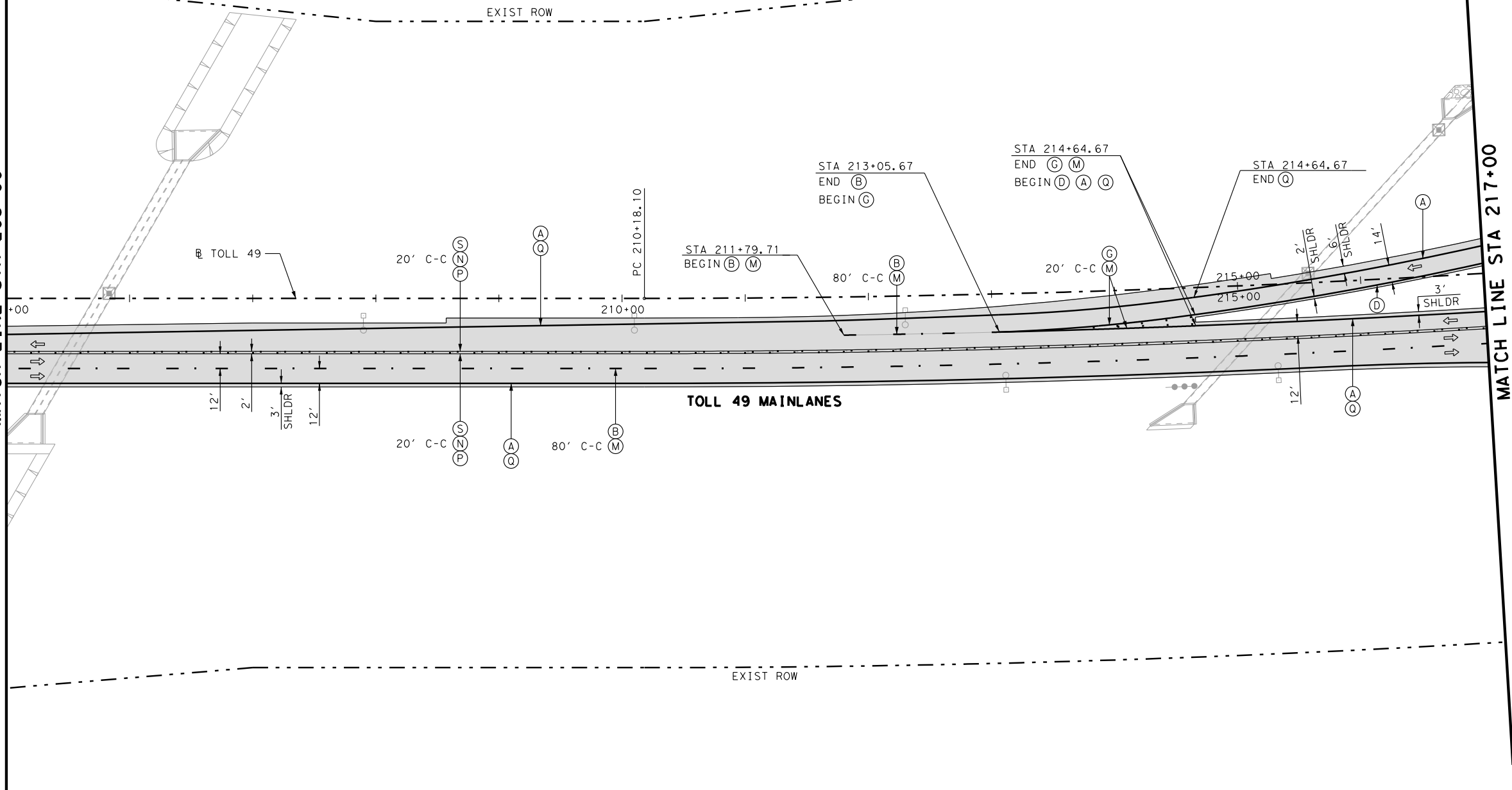
NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.



DATE: 12/21/2021 4:56:28 PM  
FILE: d:\pw\_work\atkrnt\01\mccq2543\dms73529\Toll 49\_S1\_OVERLAY\_10.dgn

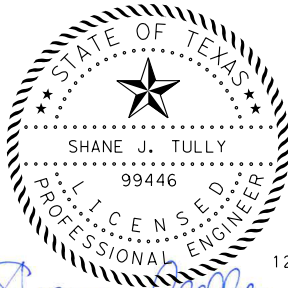
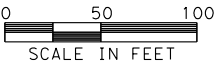
DN: CK: DW: CK:

MATCH LINE STA 205+00



### LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY
- A RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- B RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- C REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- D RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- E REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- F REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- G REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- H REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- I REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- J REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- K REFL PAV MRK TY I (W) (WORD) (100MIL)
- L REFL PAV MRK TY I (W) (ARROW) (100MIL)
- M REFL PAV MRKR TY I-C
- N REFL PAV MRKR TY II-A-A
- O REFL PAV MRKR TY II-C-R
- P RUMBLE STRIPS (CENTERLINE)
- Q RUMBLE STRIPS (SHOULDER)
- R REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- S RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE



**ATKINS**  
TBPE REG. # F-474



**TOLL 49**  
**SEGMENT 1**  
**PAVING & STRIPING**  
**STA 205+00 TO STA 217+00**

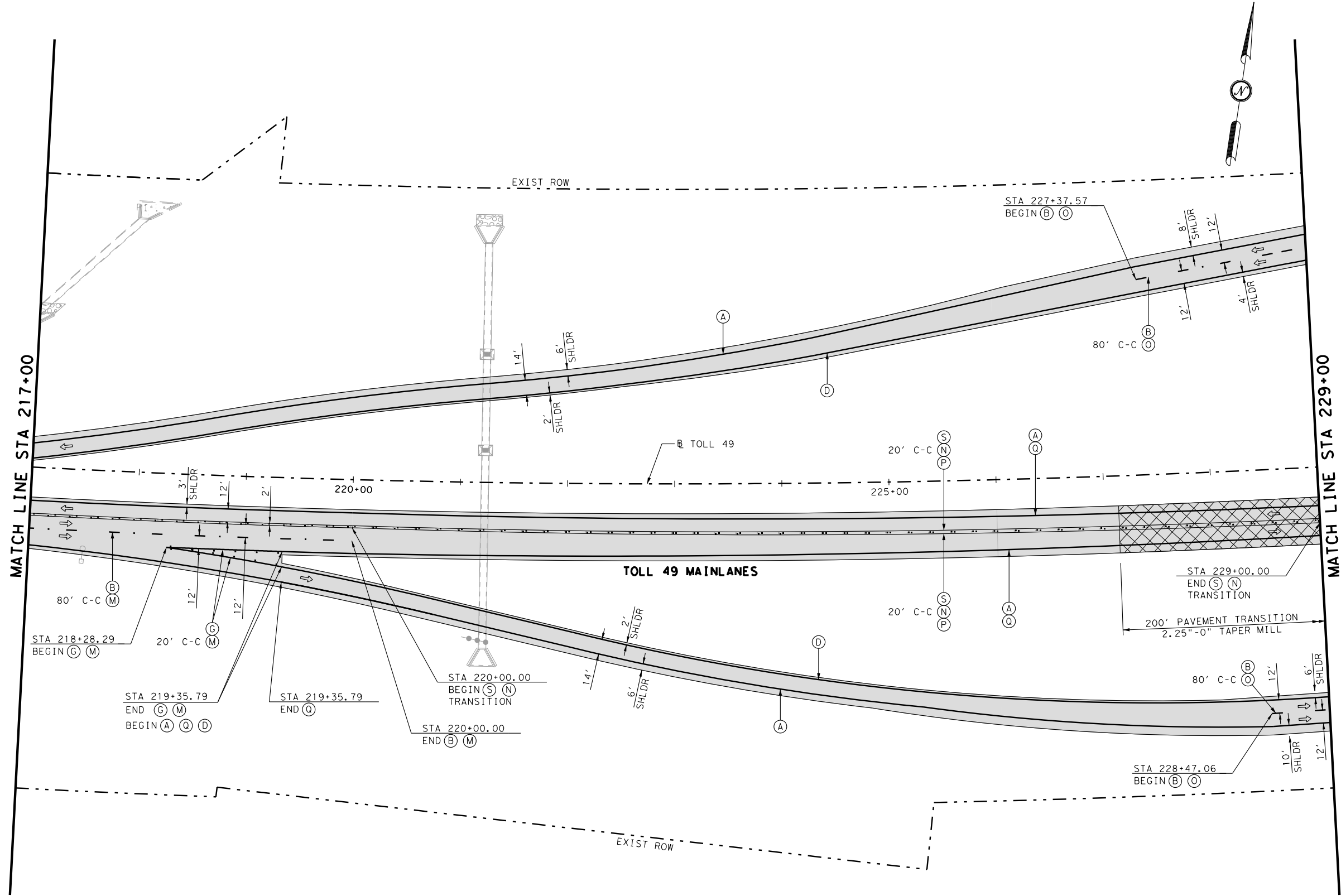
SHEET 10 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			59
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

DATE: 12/21/2021 5:07:35 PM  
FILE: d:\pw\_wor-k\atkrat\01\mcca2543\dms73529\Toll 49\_S1\_OVERLAY\_11.dgn

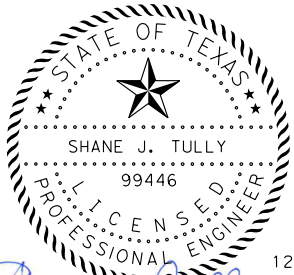
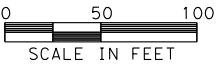
DN: Ckt: DW: Ckt:



# LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE



12/21/2021

**ATKINS**

TBPE REG. # F-474



**TOLL 49  
SEGMENT 1  
PAVING & STRIPING  
STA 217+00 TO STA 229+00**

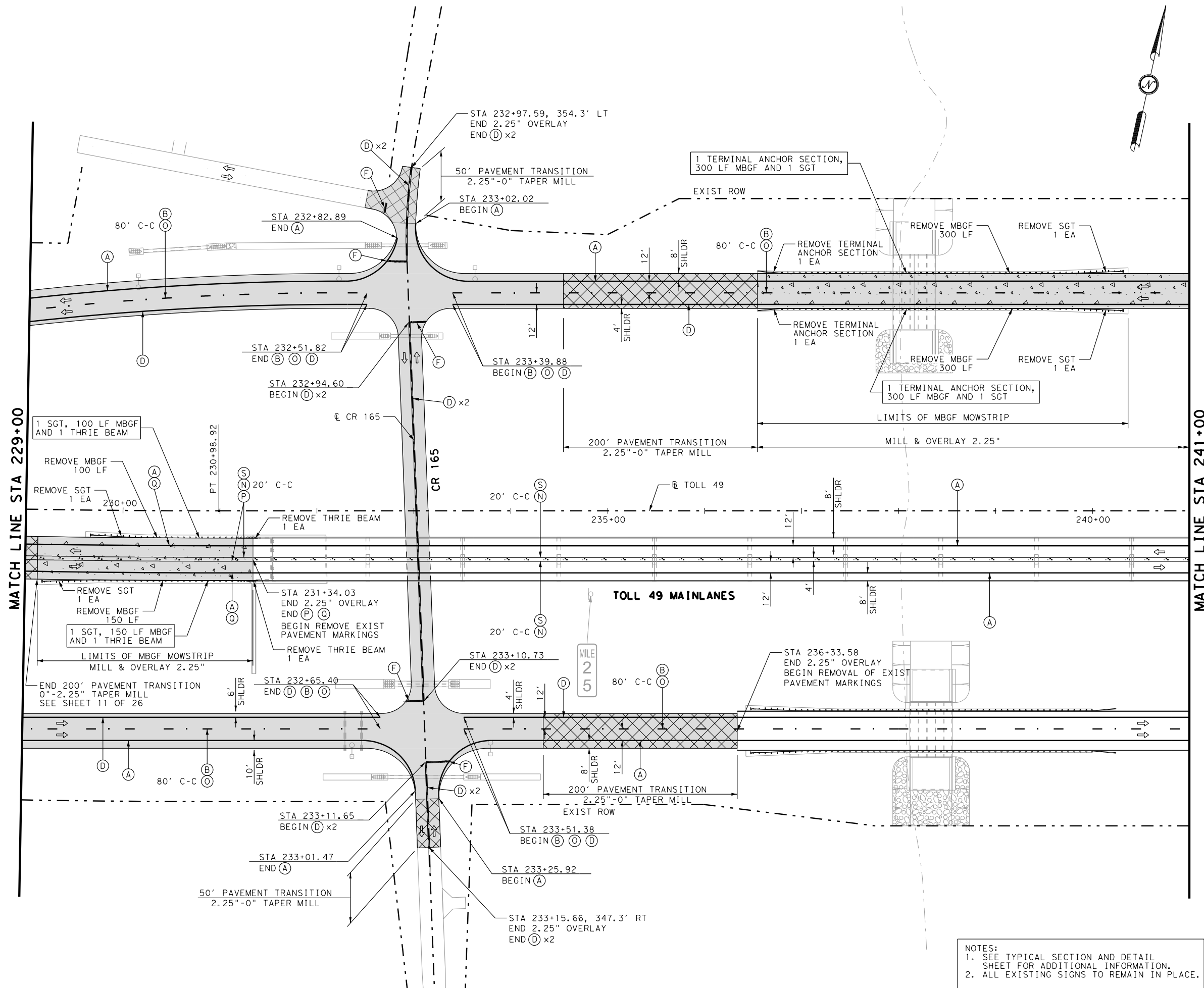
SHEET 11 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			60
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

DATE: 12/21/2021 4:56:40 PM  
FILE: d:\pw\_wor-k\atkrnt\01\mccq2543\dms73529\Toll 49\_S1\_OVERLAY\_12.dgn

DN: CK: DW: CK: DN:



# LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100  
SCALE IN FEET



**ATKINS**  
TBPE REG. # F-474



**TOLL 49  
SEGMENT 1  
PAVING & STRIPING  
STA 229+00 TO STA 241+00**

SHEET 12 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			61
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

DATE: 12/21/2021 4:56:45 PM  
FILE: d:\pw\_wor-k\atkrat\01\mccq2543\dms73529\Toll 49\_S1\_OVERLAY\_13.dgn

DN: Ckt DW: Ckt

MATCH LINE STA 241+00

MATCH LINE STA 253+00

## LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100  
SCALE IN FEET



**ATKINS**  
TBPE REG. # F-474

**NET RMA**  
North East Texas  
Regional Mobility Authority

**TOLL 49  
SEGMENT 1  
PAVING & STRIPING  
STA 241+00 TO STA 253+00**

SHEET 13 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			62
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.



DATE: 12/21/2021 4:56:51 PM  
FILE: d:\pw\_wor-k\atkrat\01\mccq2543\dms73529\To11 49\_S1\_OVERLAY\_14.dgn

Ckt  
DWT  
Ckt  
DWT

MATCH LINE STA 253+00

MATCH LINE STA 265+00

## LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100  
SCALE IN FEET



Shane J. Tully

**ATKINS**  
TBPE REG. # F-474



**TOLL 49  
SEGMENT 1  
PAVING & STRIPING  
STA 253+00 TO STA 265+00**

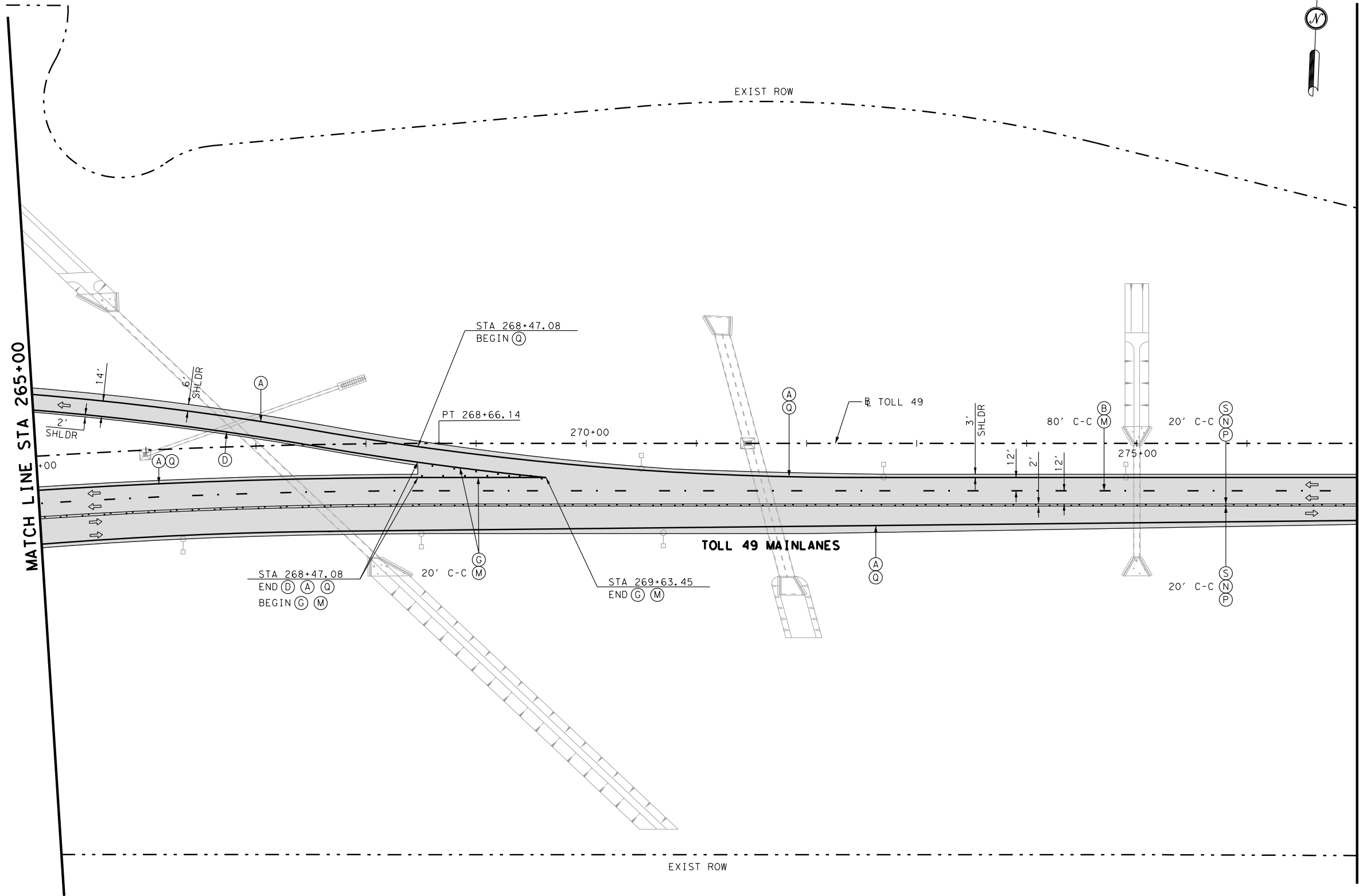
SHEET 14 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			63
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

DATE: 12/21/2021 4:56:57 PM  
FILE: d:\pw\_work\atkrnt\01\mccq2543\dms73529\Toll 49\_S1\_OVERLAY\_15.dgn

DN: Ckt: DW: Ckt: Ckt:

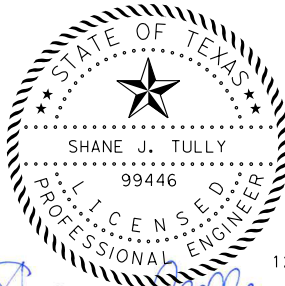


# LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100  
SCALE IN FEET



**ATKINS**  
TBPE REG. # F-474



**TOLL 49  
SEGMENT 1  
PAVING & STRIPING  
STA 265+00 TO STA 277+00**

SHEET 15 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			64
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

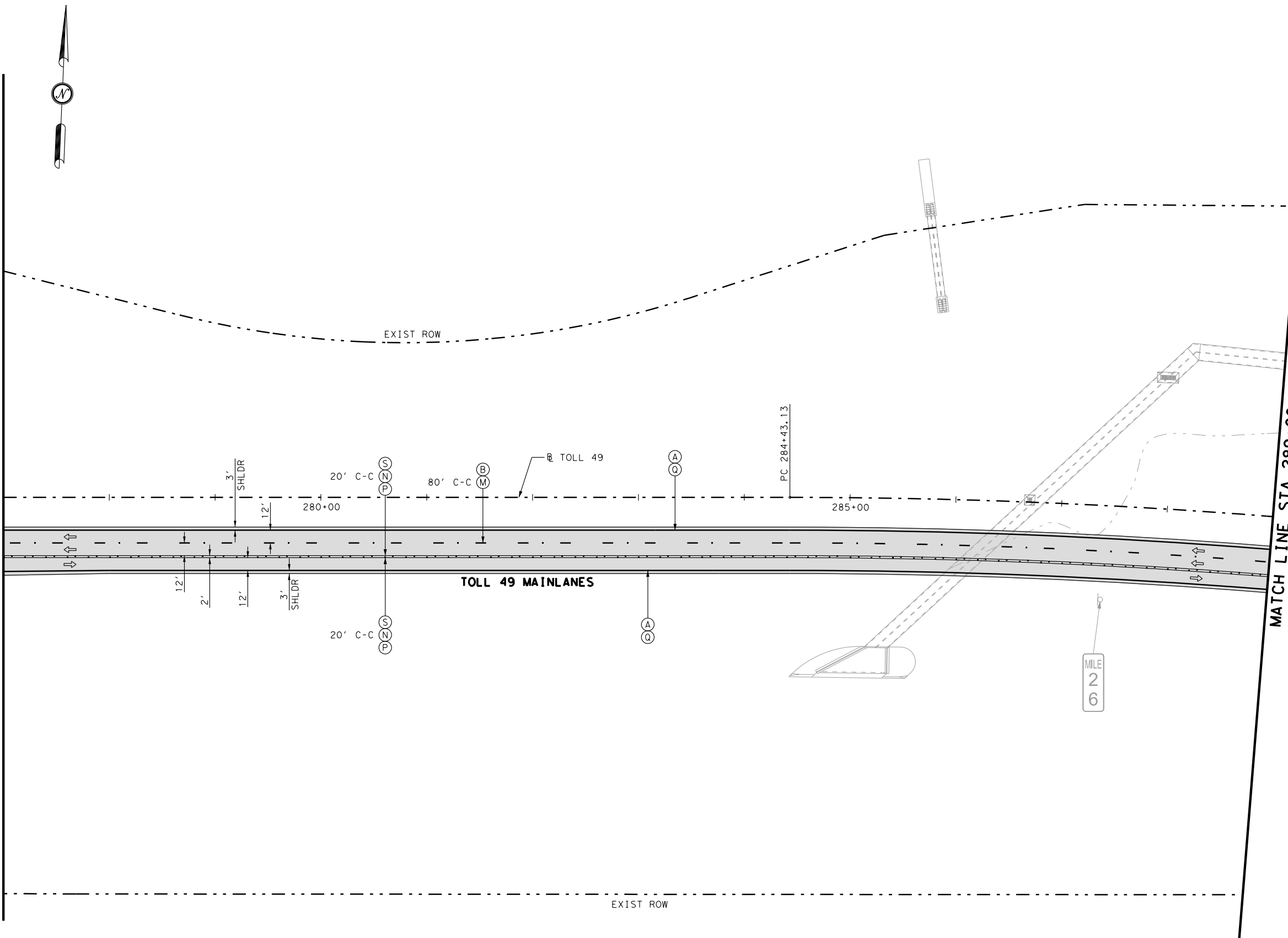
NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

DATE: 12/21/2021 4:57:03 PM  
FILE: d:\pw\_work\atkrat\atkrat\01\mccq2543\dms73529\Toll 49\_S1\_OVERLAY\_16.dgn

DN:	CK:	DW:	CK:
-----	-----	-----	-----

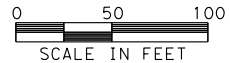
MATCH LINE STA 277+00

MATCH LINE STA 289+00



### LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY
- RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- REFL PAV MRK TY I (W) (WORD) (100MIL)
- REFL PAV MRK TY I (W) (ARROW) (100MIL)
- REFL PAV MRKR TY I-C
- REFL PAV MRKR TY II-A-A
- REFL PAV MRKR TY II-C-R
- RUMBLE STRIPS (CENTERLINE)
- RUMBLE STRIPS (SHOULDER)
- REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE



**ATKINS**  
TBPE REG. # F-474



**TOLL 49**  
**SEGMENT 1**  
**PAVING & STRIPING**  
**STA 277+00 TO STA 289+00**

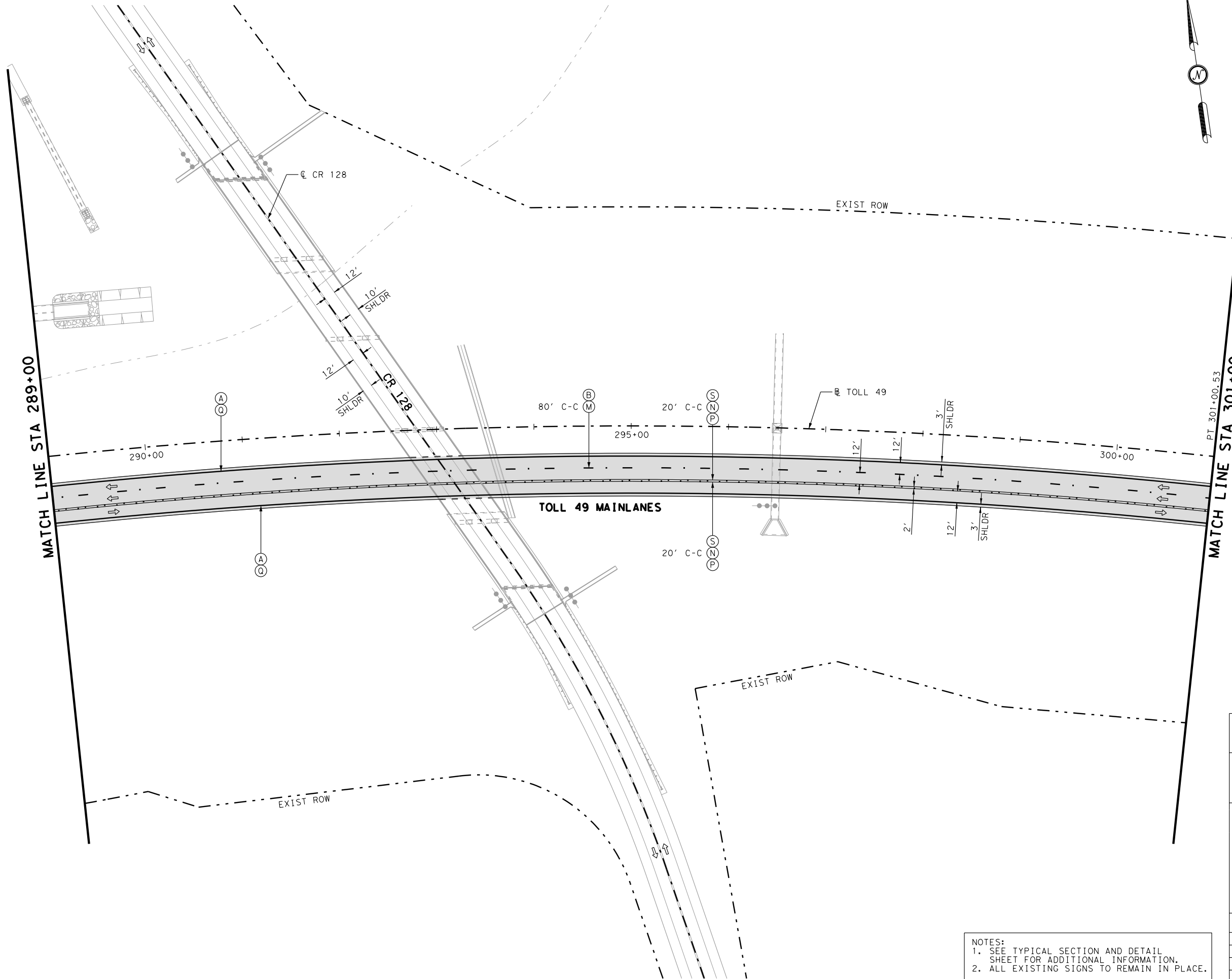
SHEET 16 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			65
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

DATE: 12/21/2021 4:57:08 PM  
FILE: d:\pw\_work\atkrat\01\mcca2543\dms73529\Toll 49\_S1\_OVERLAY\_17.dgn

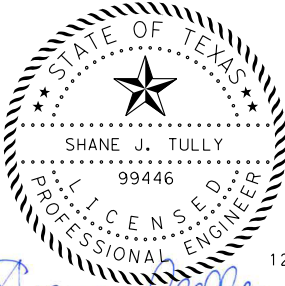
DN: Ck: DW: Ck: Ck:



LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY

- A RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- B RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- C REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- D RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- E REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- F REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- G REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- H REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- I REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- J REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- K REFL PAV MRK TY I (W) (WORD) (100MIL)
- L REFL PAV MRK TY I (W) (ARROW) (100MIL)
- M REFL PAV MRKR TY I-C
- N REFL PAV MRKR TY II-A-A
- O REFL PAV MRKR TY II-C-R
- P RUMBLE STRIPS (CENTERLINE)
- Q RUMBLE STRIPS (SHOULDER)
- R REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- S RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE



12/21/2021

ATKINS

TBPE REG. # F-474



TOLL 49  
SEGMENT 1  
PAVING & STRIPING  
STA 289+00 TO STA 301+00

SHEET 17 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			66
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

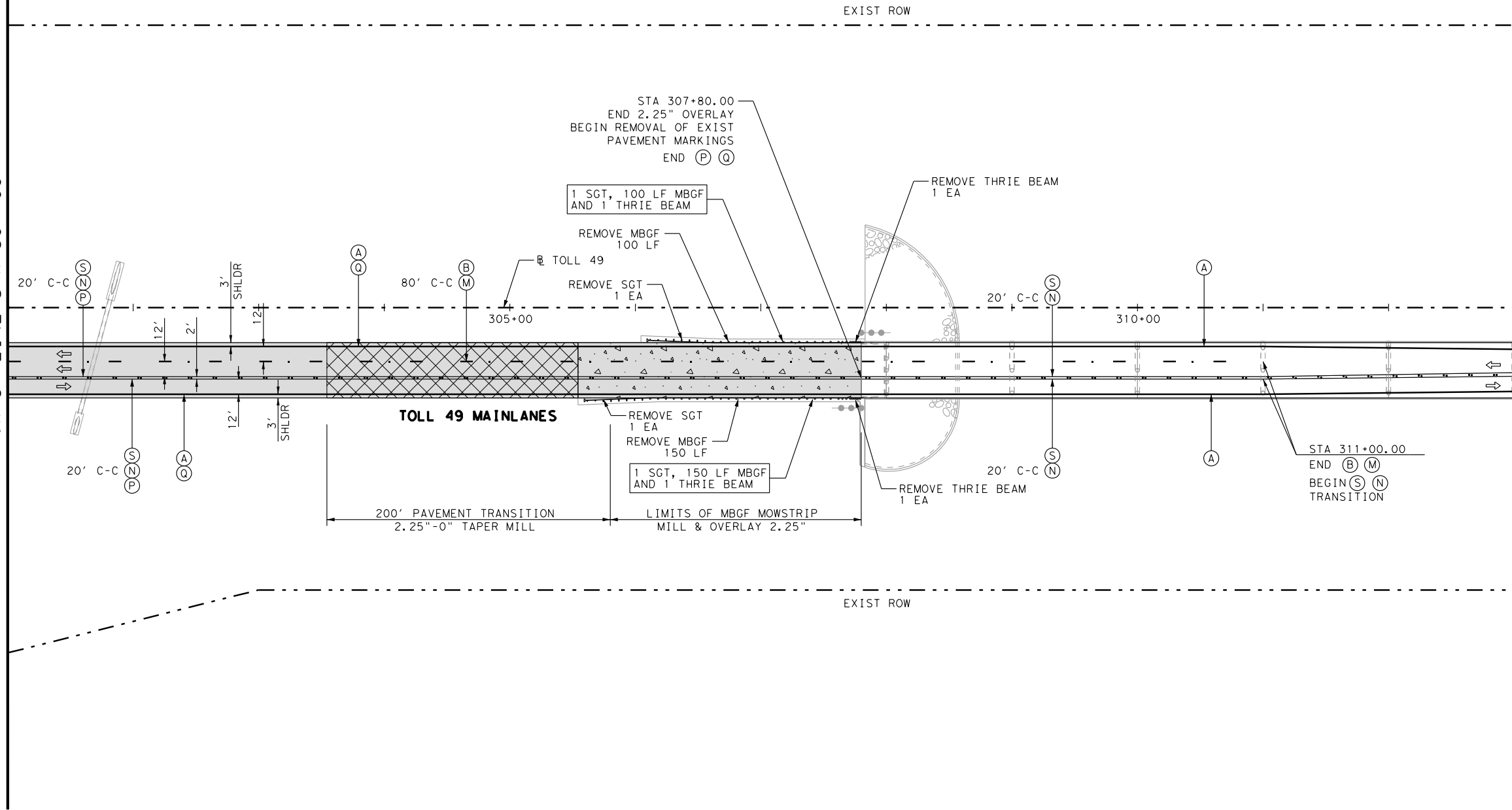


DATE: 12/21/2021 4:57:14 PM  
FILE: d:\pw\_work\atkrat\01\mccq2543\dms73529\Toll 49\_S1\_OVERLAY\_18.dgn

DN: Ck: DW: Ck: DN:

MATCH LINE STA 301+00

MATCH LINE STA 313+00



## LEGEND

- 2.25" SUPERPAVE OVERLAY
  - MILL AND OVERLAY 2.25"
  - TAPER MILL (SEE SHEET 5 FOR DETAILS)
  - PAVEMENT MARKINGS ONLY
- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100  
SCALE IN FEET



12/21/2021

# ATKINS

TBPE REG. # F-474



TOLL 49  
SEGMENT 1  
PAVING & STRIPING  
STA 301+00 TO STA 313+00

SHEET 18 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			67
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

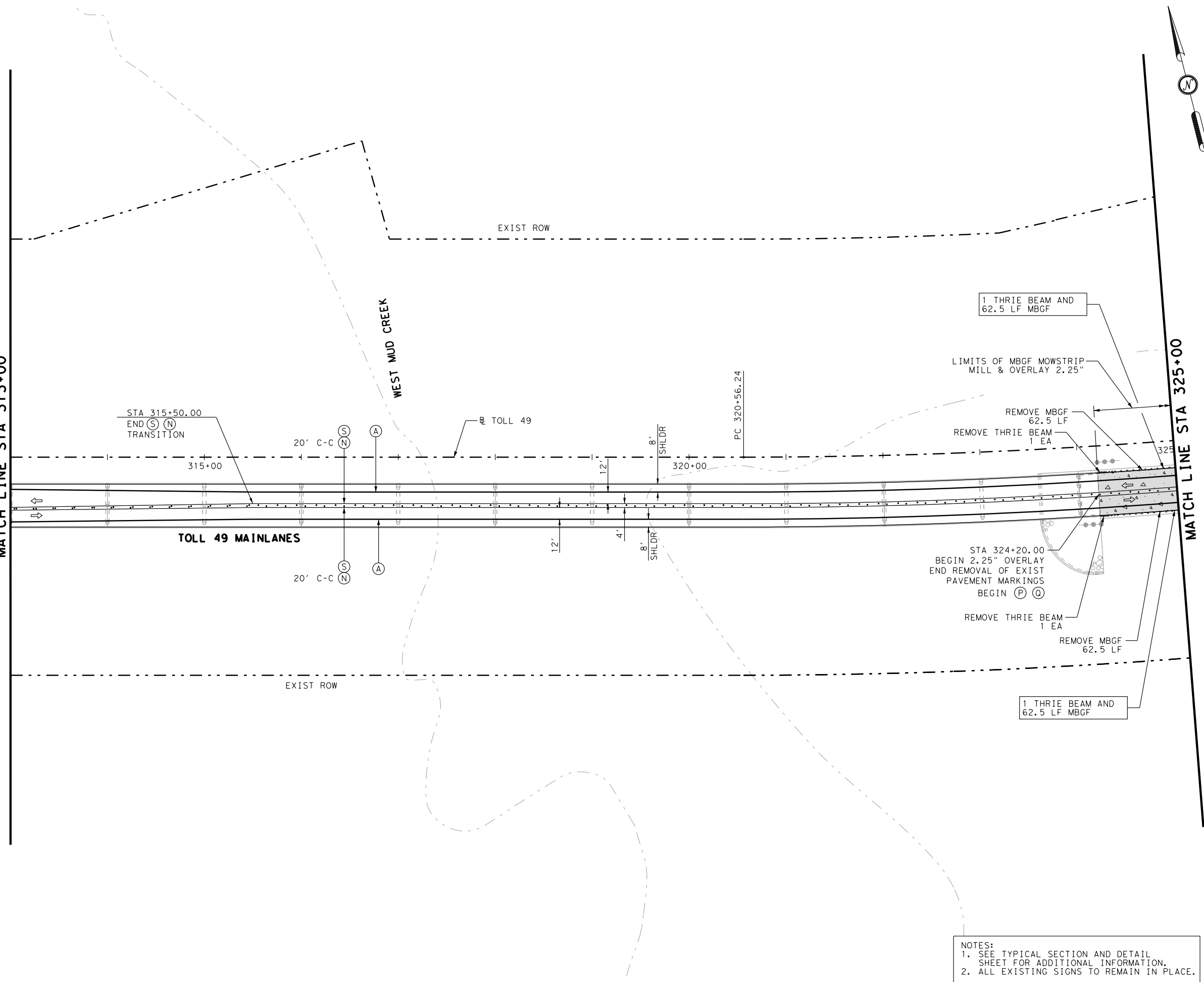
NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

DATE: 12/21/2021 4:57:21 PM  
FILE: d:\pw\_work\atkrat\01\mcca2543\dms73529\Toll 49\_S1\_OVERLAY\_19.dgn

DN: Ckt: DW: Ckt: Ckt:

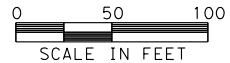
MATCH LINE STA 313+00

MATCH LINE STA 325+00



LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY
- RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- REFL PAV MRK TY I (W) (WORD) (100MIL)
- REFL PAV MRK TY I (W) (ARROW) (100MIL)
- REFL PAV MRKR TY I-C
- REFL PAV MRKR TY II-A-A
- REFL PAV MRKR TY II-C-R
- RUMBLE STRIPS (CENTERLINE)
- RUMBLE STRIPS (SHOULDER)
- REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE



ATKINS



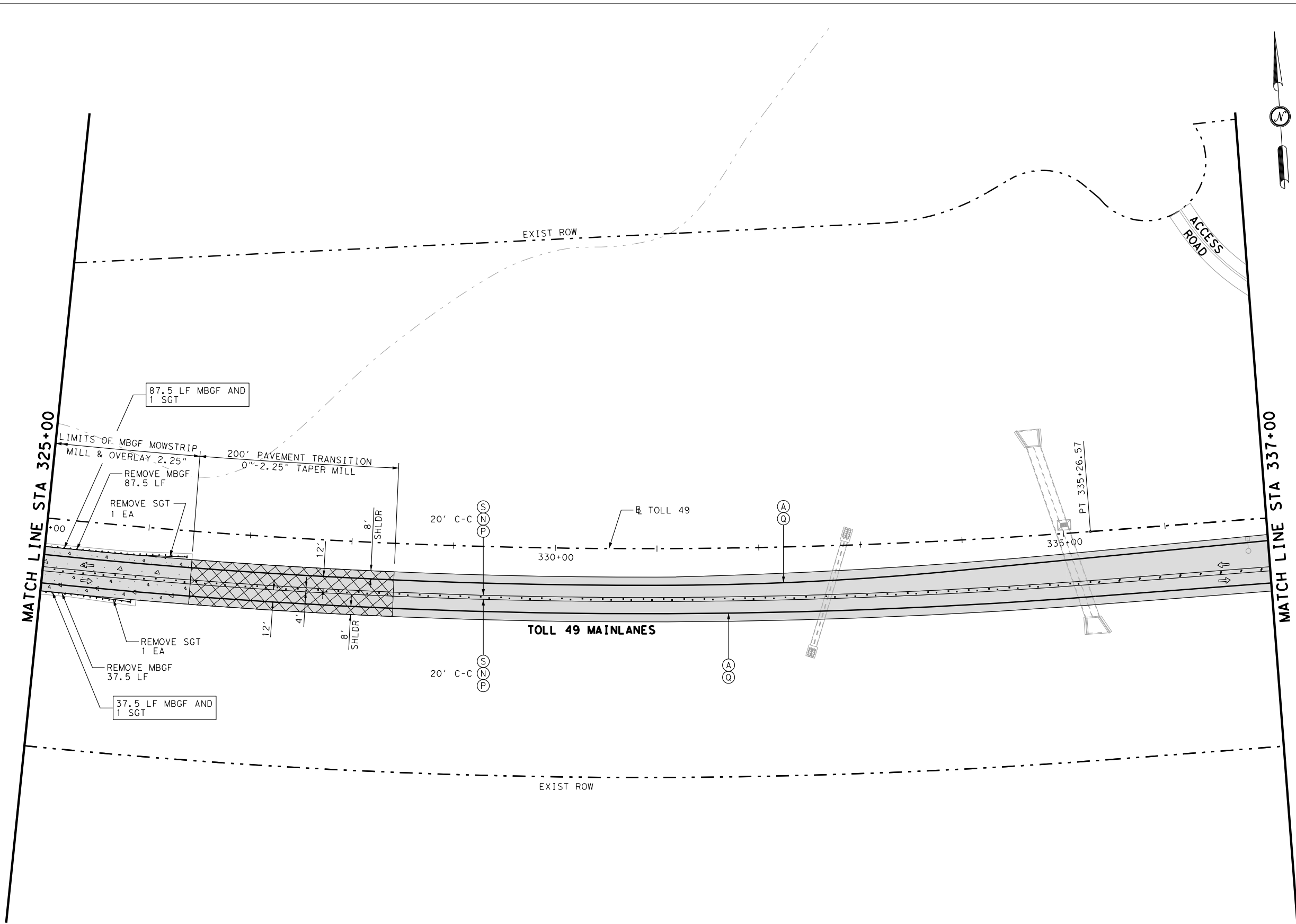
TOLL 49  
SEGMENT 1  
OCST & STRIPING  
STA 313+00 TO STA 325+00

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			68
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

DATE: 12/21/2021 4:57:27 PM  
FILE: d:\pw\_wor-k\atkrat\01\mccq2543\dms73529\Toll 49\_S1\_OVERLAY\_20.dgn

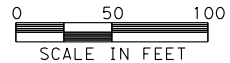
DN: Ckt: DW: Ckt: DN:



LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE



ATKINS

TBPE REG. # F-474



TOLL 49  
SEGMENT 1  
OCST & STRIPING  
STA 325+00 TO STA 337+00

SHEET 20 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			69
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

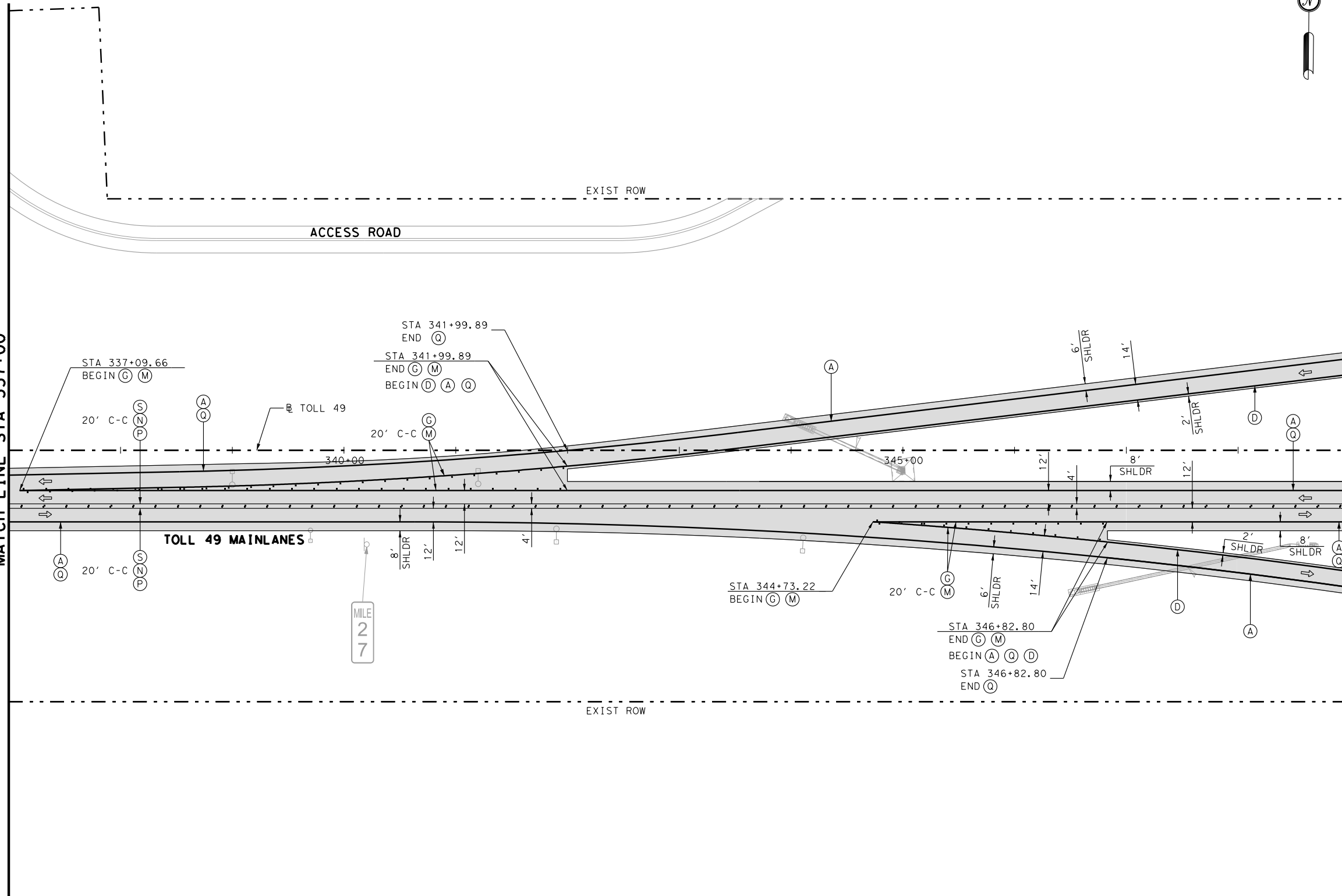
NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

DATE: 12/21/2021 4:57:32 PM  
FILE: d:\pw\_wor-k\atkrat\01\mcca2543\dms73529\To11 49\_S1\_OVERLAY\_21.dgn

DN: Ck: DW: Ck: DN:

MATCH LINE STA 337+00

MATCH LINE STA 349+00



## LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100  
SCALE IN FEET



12/21/2021

# ATKINS

TBPE REG. # F-474



**TOLL 49**  
**SEGMENT 1**  
**OCST & STRIPING**  
**STA 337+00 TO STA 349+00**

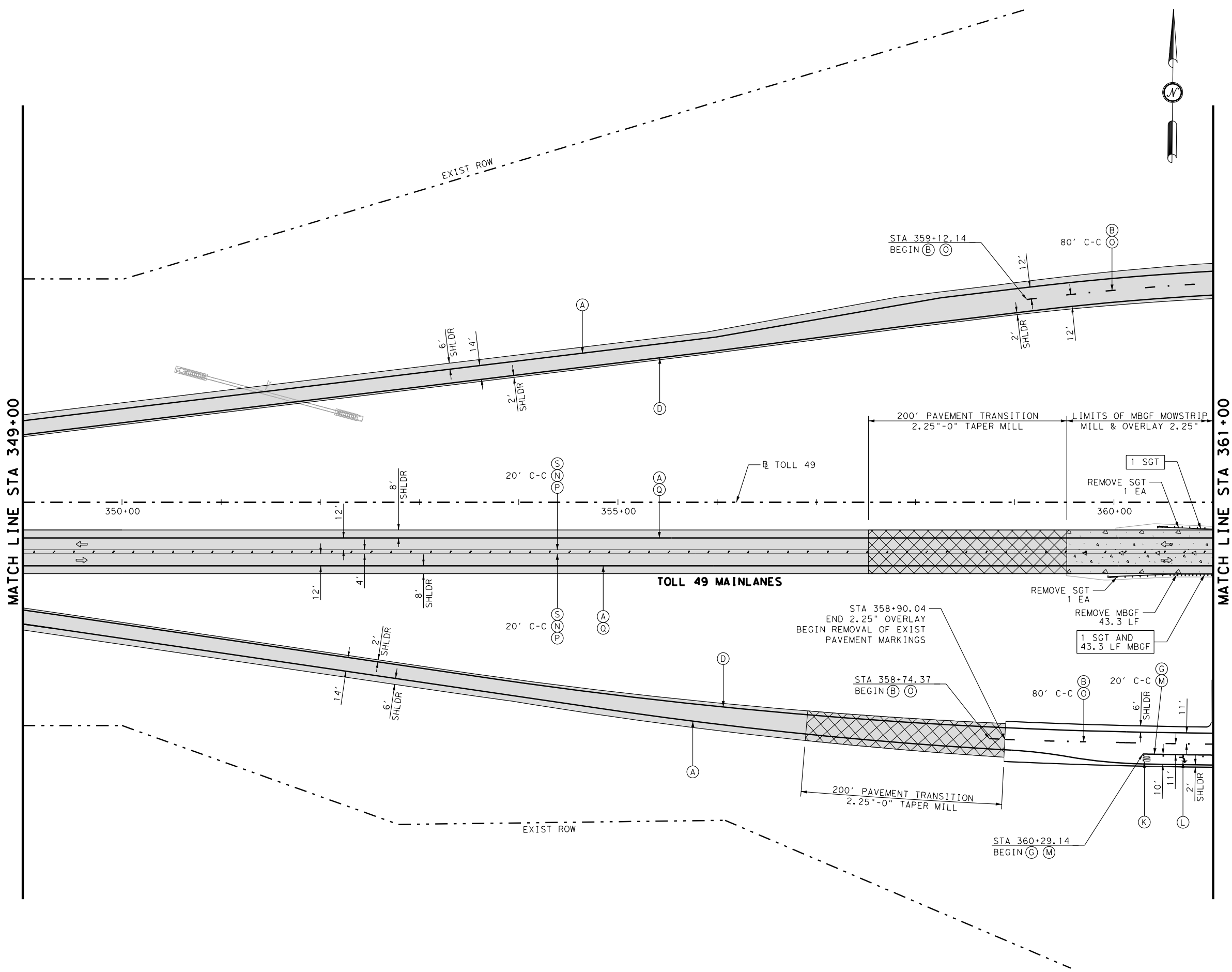
SHEET 21 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			70
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

DATE: 12/21/2021 4:57:38 PM  
FILE: d:\pw\_work\atkrnt\Toll 49\_S1\_OVERLAY\_22.dgn

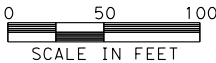
DNt	Ckt	DWt	Ckt
-----	-----	-----	-----



NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY
- RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- REFL PAV MRK TY I (W) (WORD) (100MIL)
- REFL PAV MRK TY I (W) (ARROW) (100MIL)
- REFL PAV MRKR TY I-C
- REFL PAV MRKR TY II-A-A
- REFL PAV MRKR TY II-C-R
- RUMBLE STRIPS (CENTERLINE)
- RUMBLE STRIPS (SHOULDER)
- REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE



**ATKINS**  
TBPE REG. # F-474



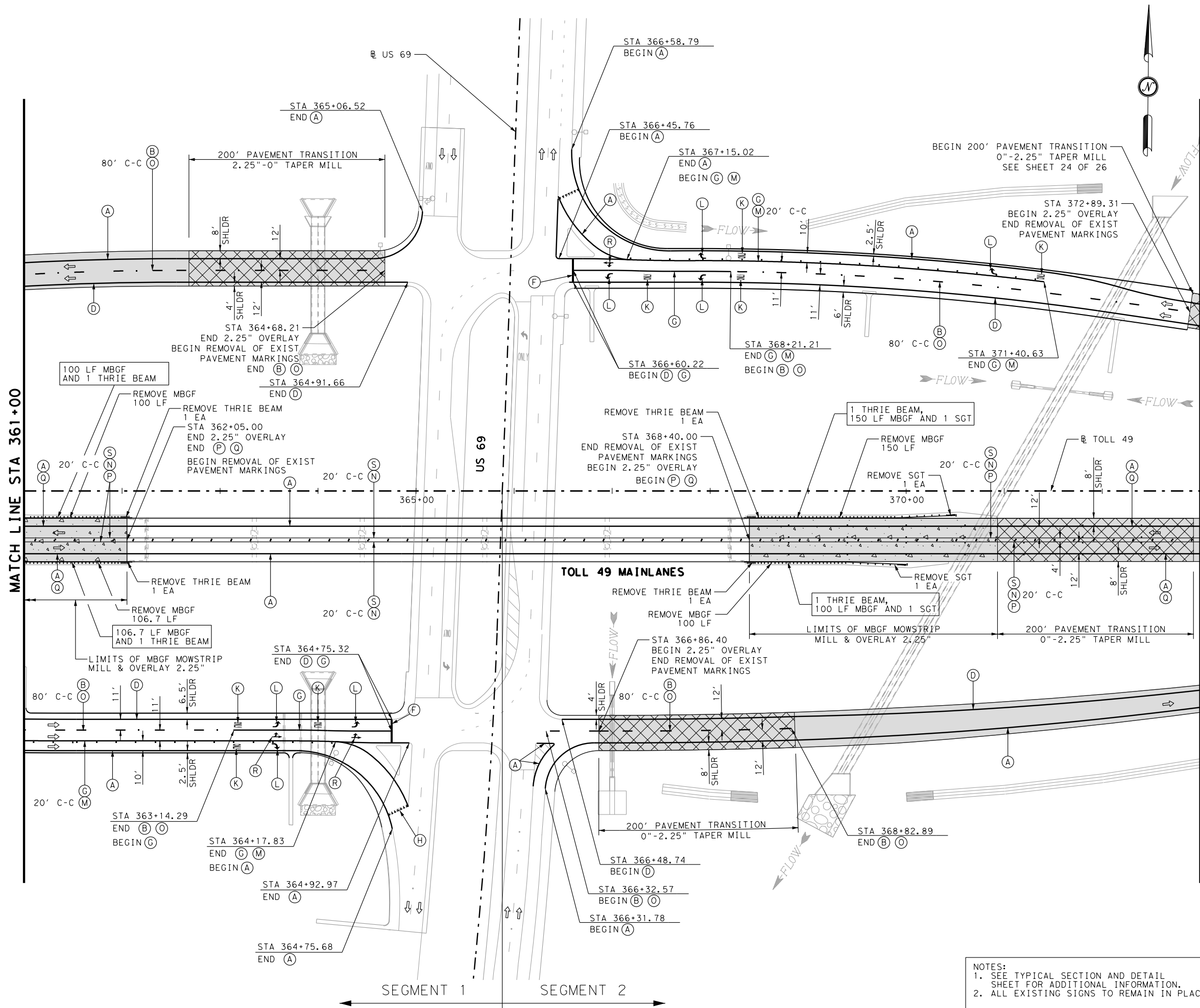
**TOLL 49**  
**SEGMENT 1**  
**OCST & STRIPING**  
**STA 349+00 TO STA 361+00**

SHEET 22 OF 26			
FED. RD. DIV. NO. 6	PROJECT NO.		SHEET NO. 71
STATE TEXAS	LOC. TYLER	COUNTY SMITH	
CONT.	SECT.	JOB	HIGHWAY NO. TOLL 49



DATE: 12/21/2021 4:57:44 PM  
FILE: d:\pw\_wor-k\atkrnt\01\mccq2543\dms73529\To11 49\_S1\_OVERLAY\_23.dgn

MATCH LINE STA 361+00

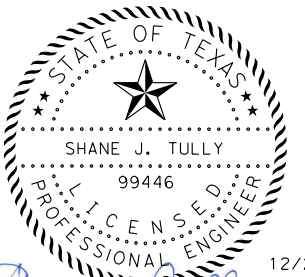


## LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE

0 50 100  
SCALE IN FEET



**ATKINS**  
TBPE REG. # F-474



**TOLL 49**  
**SEGMENT 1**  
**OCST & STRIPING**  
**STA 361+00 TO STA 373+00**

SHEET 23 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			72
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

DATE: 12/21/2021 4:57:50 PM  
FILE: d:\pw\_work\atkrat\01\mcca2543\dms73529\Toll 49\_S1\_OVERLAY\_24.dgn

DNt	CKt	DWt	CKt
-----	-----	-----	-----

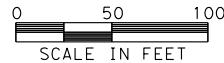
MATCH LINE STA 373+00

MATCH LINE STA 385+00

## LEGEND

	2.25" SUPERPAVE OVERLAY
	MILL AND OVERLAY 2.25"
	TAPER MILL (SEE SHEET 5 FOR DETAILS)
	PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)  
(B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)  
(C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)  
(D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)  
(E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)  
(F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)  
(G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)  
(H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)  
(I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)  
(J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)  
(K) REFL PAV MRK TY I (W) (WORD) (100MIL)  
(L) REFL PAV MRK TY I (W) (ARROW) (100MIL)  
(M) REFL PAV MRKR TY I-C  
(N) REFL PAV MRKR TY II-A-A  
(O) REFL PAV MRKR TY II-C-R  
(P) RUMBLE STRIPS (CENTERLINE)  
(Q) RUMBLE STRIPS (SHOULDER)  
(R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)  
(S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)  
↔ TRAFFIC FLOW ARROW  
○ EXISTING LIGHT POLE



# ATKINS

TBPE REG. # F-474



**TOLL 49**  
**SEGMENT 1**  
**OCST & STRIPING**  
**STA 373+00 TO STA 385+00**

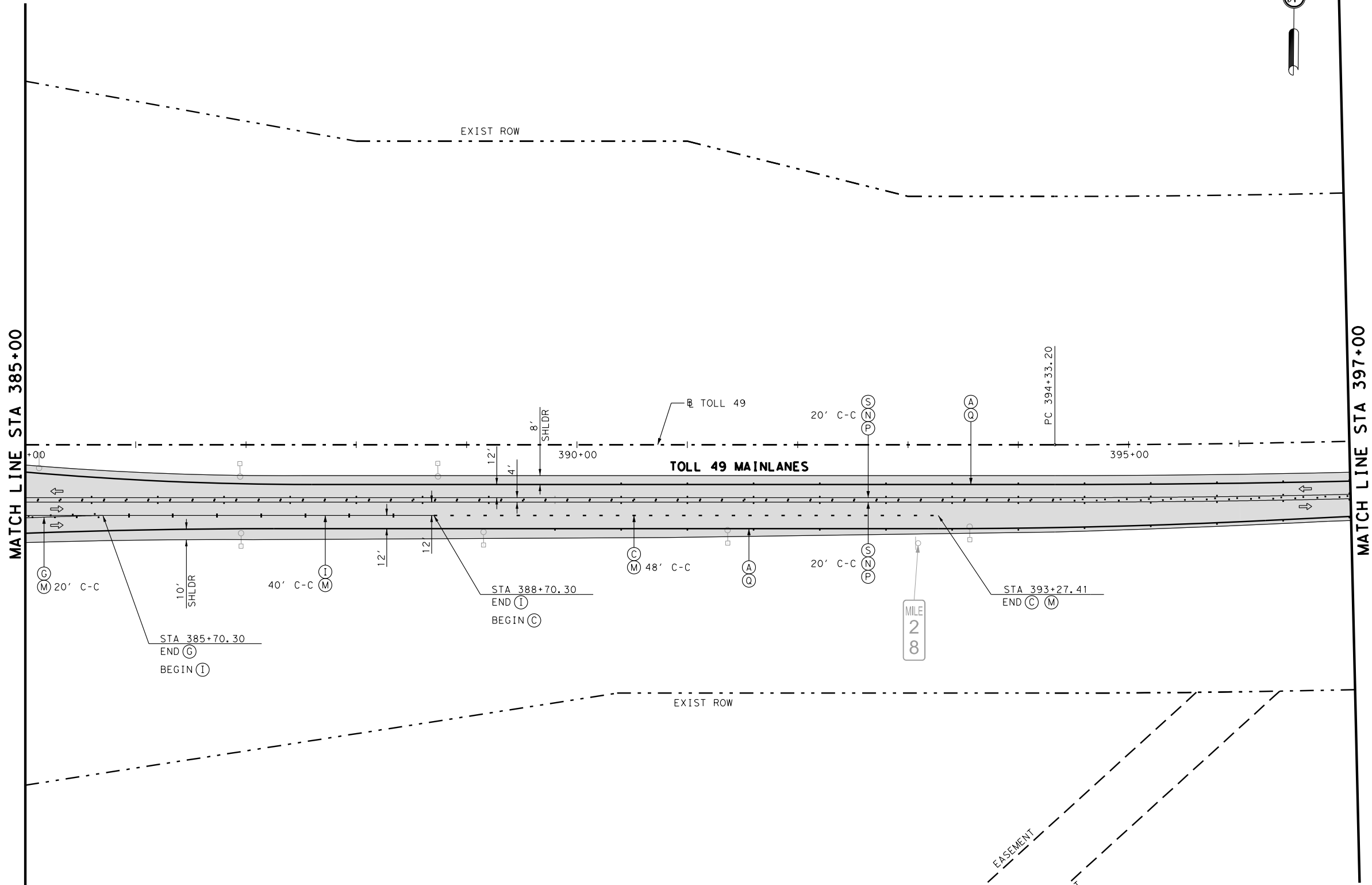
SHEET 24 OF 26

FED. RD. DIV. NO. 6	PROJECT NO.		SHEET NO. 73
STATE TEXAS	LOC. TYLER	COUNTY SMITH	
CONT.	SECT.	JOB	HIGHWAY NO. TOLL 49

- NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

DATE: 12/21/2021 4:57:56 PM  
FILE: d:\pw\_work\atkrnt\01\mcca2543\dms73529\Toll 49\_S1\_OVERLAY\_25.dgn

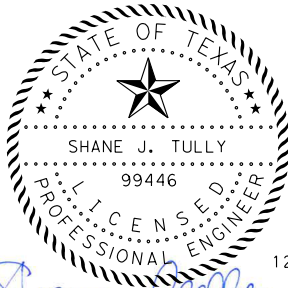
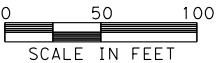
DN: Ckt: DW: Ckt: Ckt:



# LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY

- (A) RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- (B) RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- (C) REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- (D) RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- (E) REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- (F) REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- (G) REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- (H) REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- (I) REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- (J) REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- (K) REFL PAV MRK TY I (W) (WORD) (100MIL)
- (L) REFL PAV MRK TY I (W) (ARROW) (100MIL)
- (M) REFL PAV MRKR TY I-C
- (N) REFL PAV MRKR TY II-A-A
- (O) REFL PAV MRKR TY II-C-R
- (P) RUMBLE STRIPS (CENTERLINE)
- (Q) RUMBLE STRIPS (SHOULDER)
- (R) REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- (S) RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE



**ATKINS**  
TBPE REG. # F-474



**TOLL 49  
SEGMENT 1  
OCST & STRIPING  
STA 385+00 TO STA 397+00**

SHEET 25 OF 26

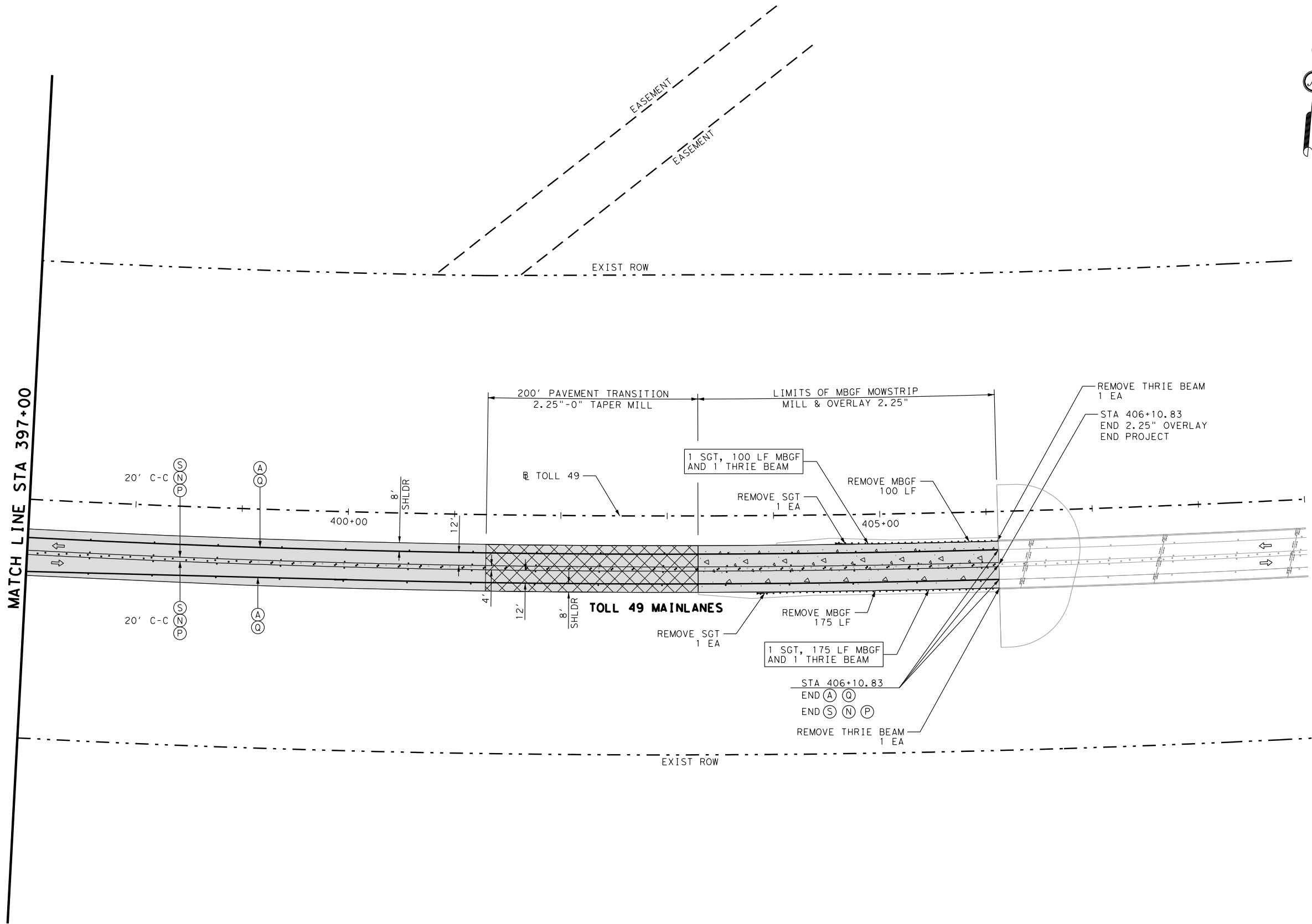
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			74
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.



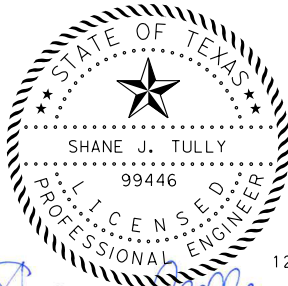
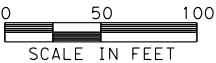
DATE: 12/21/2021 4:58:02 PM  
FILE: d:\pw\_work\atkrat\01\mcca2543\dms73529\To11 49\_S1\_OVERLAY\_26.dgn

DN: Ck: DW: Ck: Ck:



LEGEND

- 2.25" SUPERPAVE OVERLAY
- MILL AND OVERLAY 2.25"
- TAPER MILL (SEE SHEET 5 FOR DETAILS)
- PAVEMENT MARKINGS ONLY
- A RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
- B RE PM W/RET REQ TY I (W) 6" (BRK) (100MIL)
- C REFL PAV MRK TY I (W) 4" (DOT) (100MIL)
- D RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
- E REFL PAV MRK TY I (Y) 12" (SLD) (100MIL)
- F REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
- G REFL PAV MRK TY I (W) 8" (SLD) (100MIL)
- H REFL PAV MRK TY I (W) 36" (YLD TRI) (100MIL)
- I REFL PAV MRK TY I (W) 12" (SLD) (100MIL)
- J REFL PAV MRK TY I (W) 12" (BRK) (100MIL)
- K REFL PAV MRK TY I (W) (WORD) (100MIL)
- L REFL PAV MRK TY I (W) (ARROW) (100MIL)
- M REFL PAV MRKR TY I-C
- N REFL PAV MRKR TY II-A-A
- O REFL PAV MRKR TY II-C-R
- P RUMBLE STRIPS (CENTERLINE)
- Q RUMBLE STRIPS (SHOULDER)
- R REFL PAV MRK TY I (W) (DBL ARROW) (100MIL)
- S RE PM W/RET REQ TY I (Y) 6" (SLD) (100MIL)
- TRAFFIC FLOW ARROW
- EXISTING LIGHT POLE



ATKINS

TBPE REG. # F-474



TOLL 49  
SEGMENT 1  
OCST & STRIPING  
STA 397+00 TO END

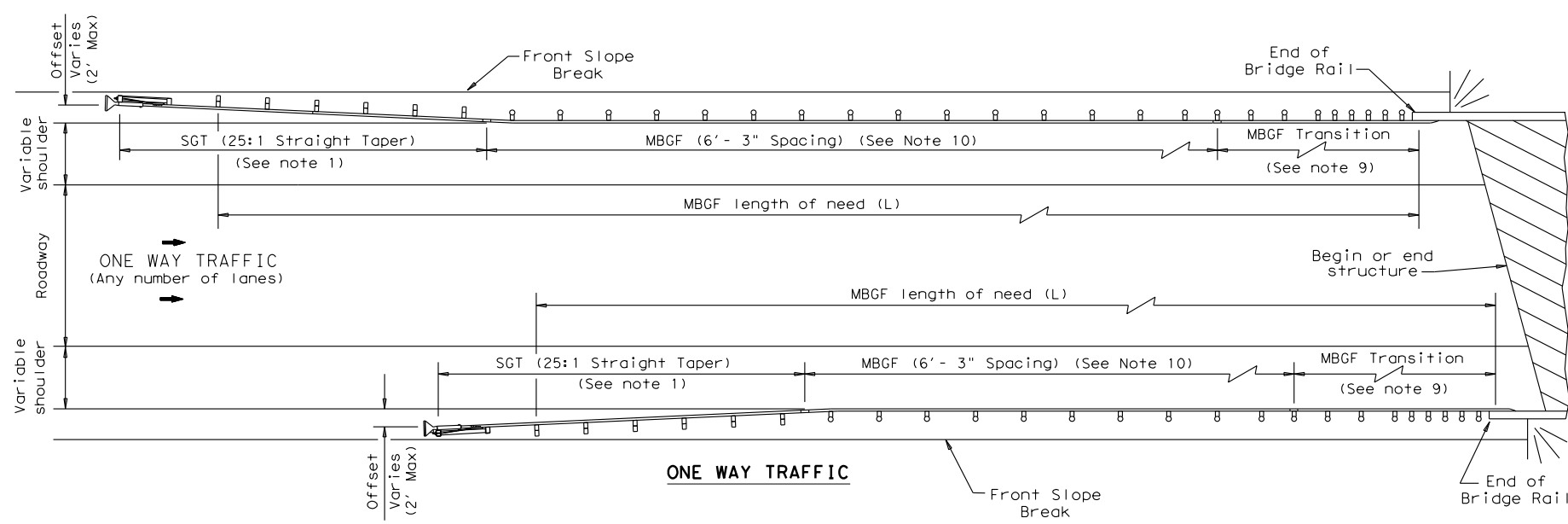
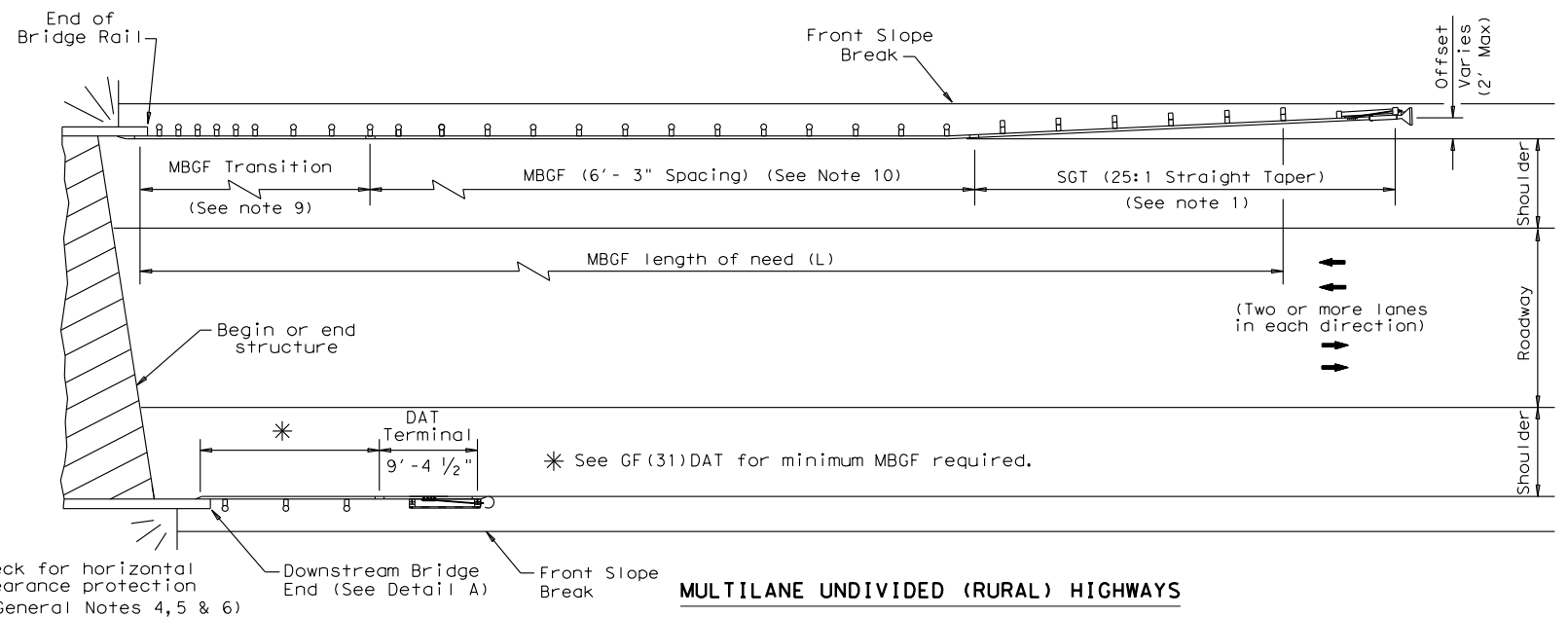
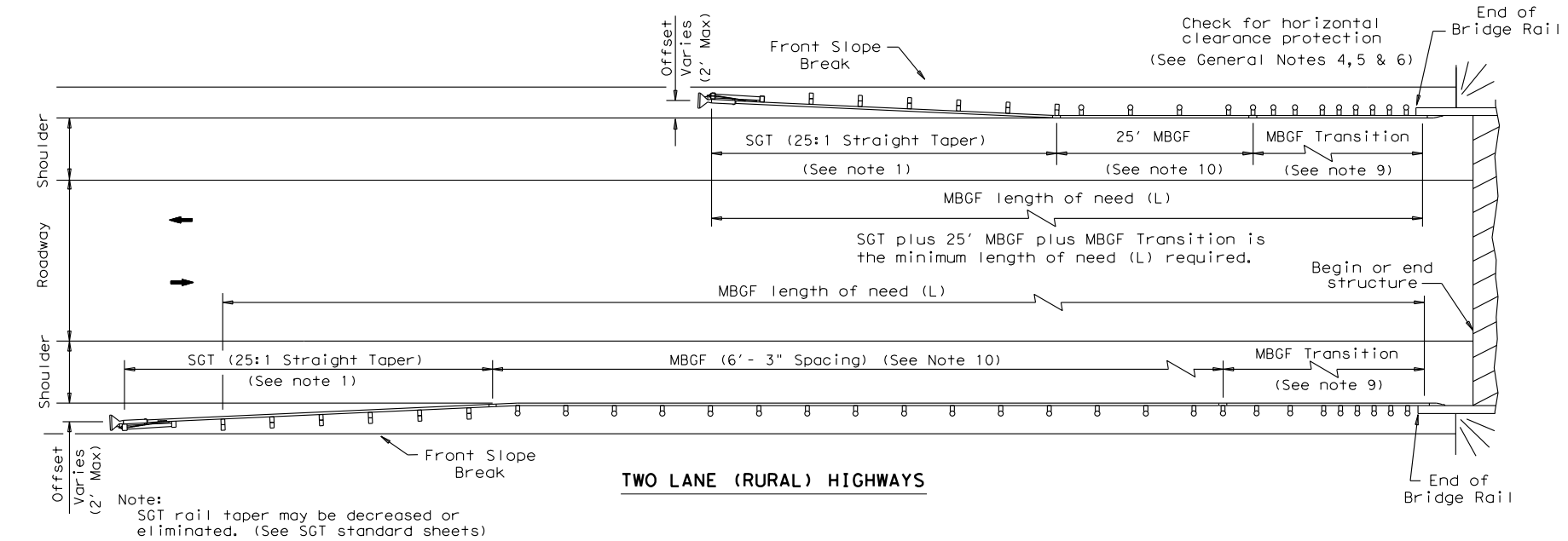
SHEET 26 OF 26

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			75
STATE	LOC.	COUNTY	
TEXAS	TYLER	SMITH	
CONT.	SECT.	JOB	HIGHWAY NO.
			TOLL 49

NOTES:  
1. SEE TYPICAL SECTION AND DETAIL SHEET FOR ADDITIONAL INFORMATION.  
2. ALL EXISTING SIGNS TO REMAIN IN PLACE.

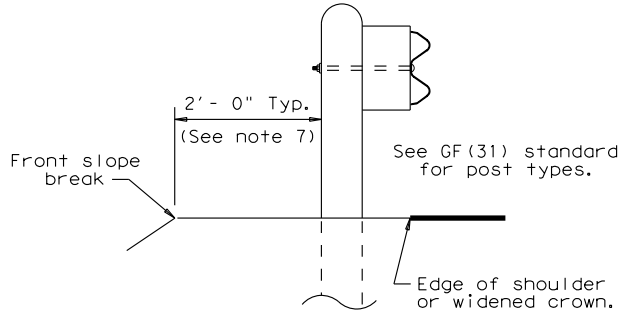
DISCLAIMER:  
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:58:07 PM  
FILE: d:\pw\_work\atknat\01\mcca2543\dms73721\bed14.dgn

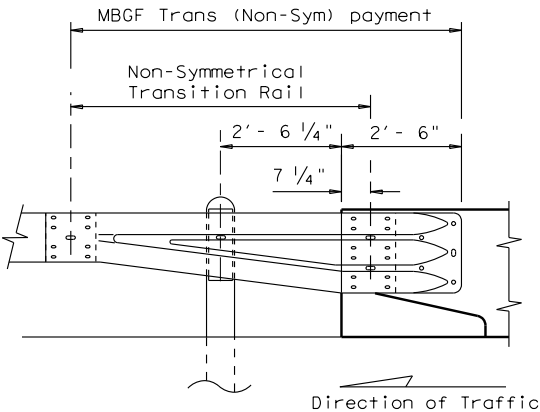


### GENERAL NOTES

1. For more detail: See GF(31), SGT( )31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'-0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. For restrictive bridge widths: The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft. "maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.




TYPICAL CROSS SECTION  
AT MBGF



Note:  
All rail elements shall be lapped in the direction of adjacent traffic.

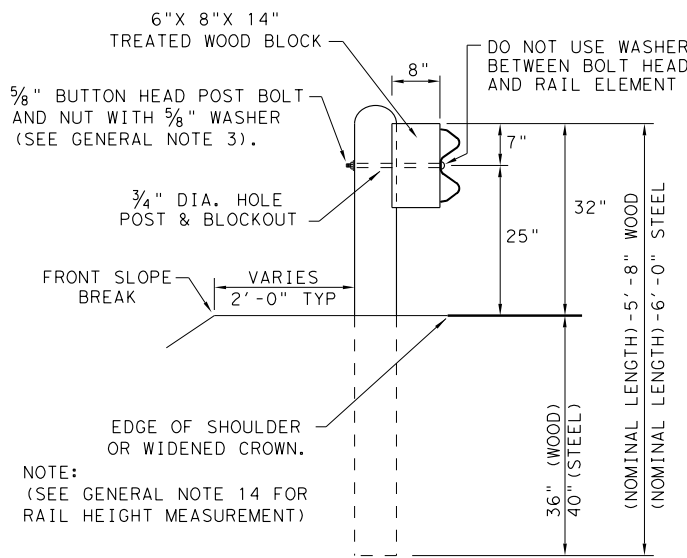
DETAIL A

Showing Downstream Rail Attachment

 <b>Texas Department of Transportation</b>					<b>Design Division Standard</b>	
<b>BRIDGE END DETAILS</b> <b>(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)</b> <b>BED-14</b>						
FILE: bed14.dgn	DN: TxDOT	CK: AM	DN: BD/VP	CK: CGL		
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY		
REVISIONS				TOLL 49		
REVISED APRIL 2014 SEE (MEMO 0414)	DIST	COUNTY	SHEET NO.			
			SMITH		76	

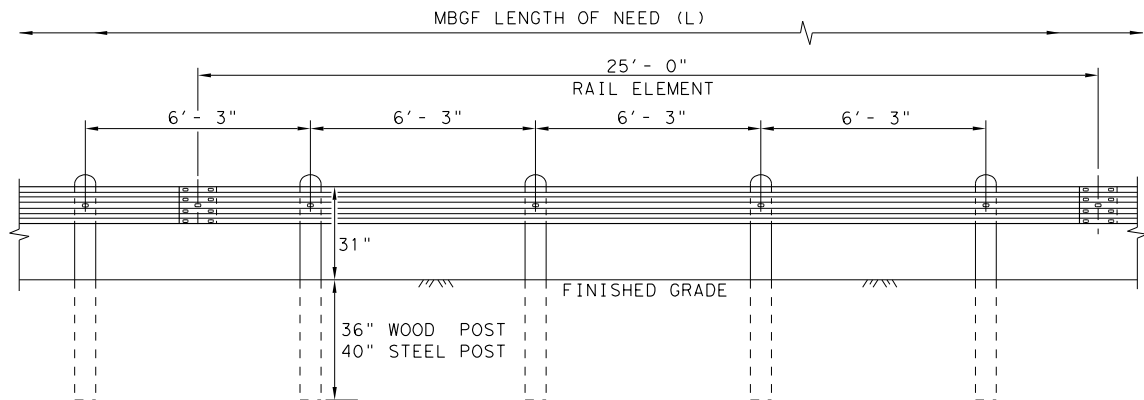
DISCLAIMER: THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TxDOT FOR ANY PURPOSE WHATSOEVER. TxDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE: 12/21/2021  
FILE: d:\pw\_wor\atknat\01\mco2543\dms73721\gf3119.dgn



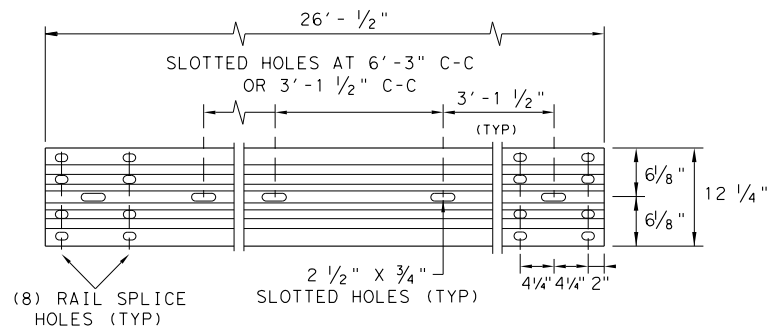
**TYPICAL POST PLACEMENT**

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



**ELEVATION MID-SPAN RAIL SPLICE**

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



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

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

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

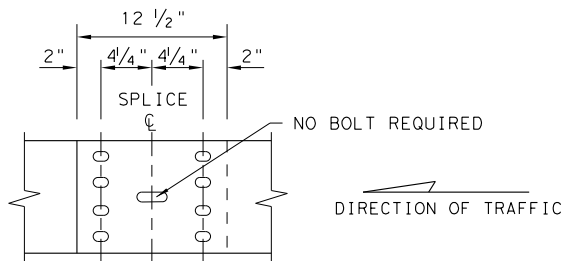
SPLICE BOLT LENGTH VARIES

FBB01 = 1 1/4"  
FBB02 = 2"

POST & BLOCK LENGTH  
FBB03 = 10"  
FBB04 = 18"

**BUTTON HEAD BOLT**

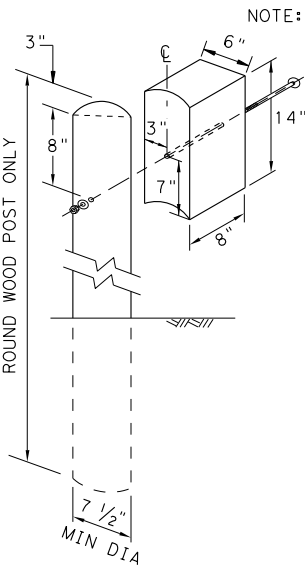
NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



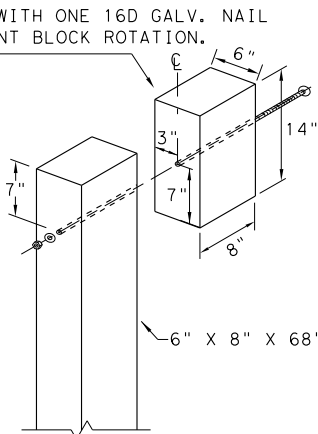
**MID-SPAN RAIL SPLICE DETAIL**

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

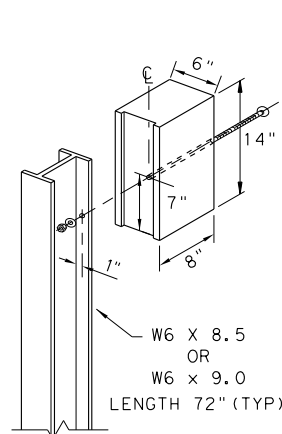
**WOOD BLOCK TO ROUND WOOD POST**



**WOOD BLOCK TO RECTANGULAR WOOD POST**



**ROUTED WOOD BLOCK TO I-BEAM STEEL POST**



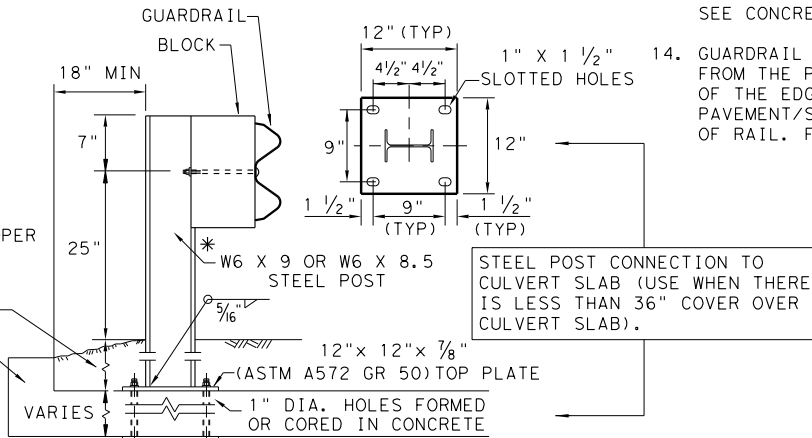
DIRECTION OF TRAFFIC

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

9" MIN. FILL DEPTH CULVERT SLAB

12" X 12" X 1/4" (ASTM A36) STEEL BOTTOM PLATE WITH 1" DIA. HOLES REQUIRED WITH BOLT-THROUGH INSTALLATION.

**LOW FILL CULVERT POST**



NOTE: TWO INSTALLATION OPTIONS.

1. **BOLT-THROUGH OPTION:** REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.

NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.


2. **EPOXY ANCHOR OPTION:** THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

**GENERAL NOTES**

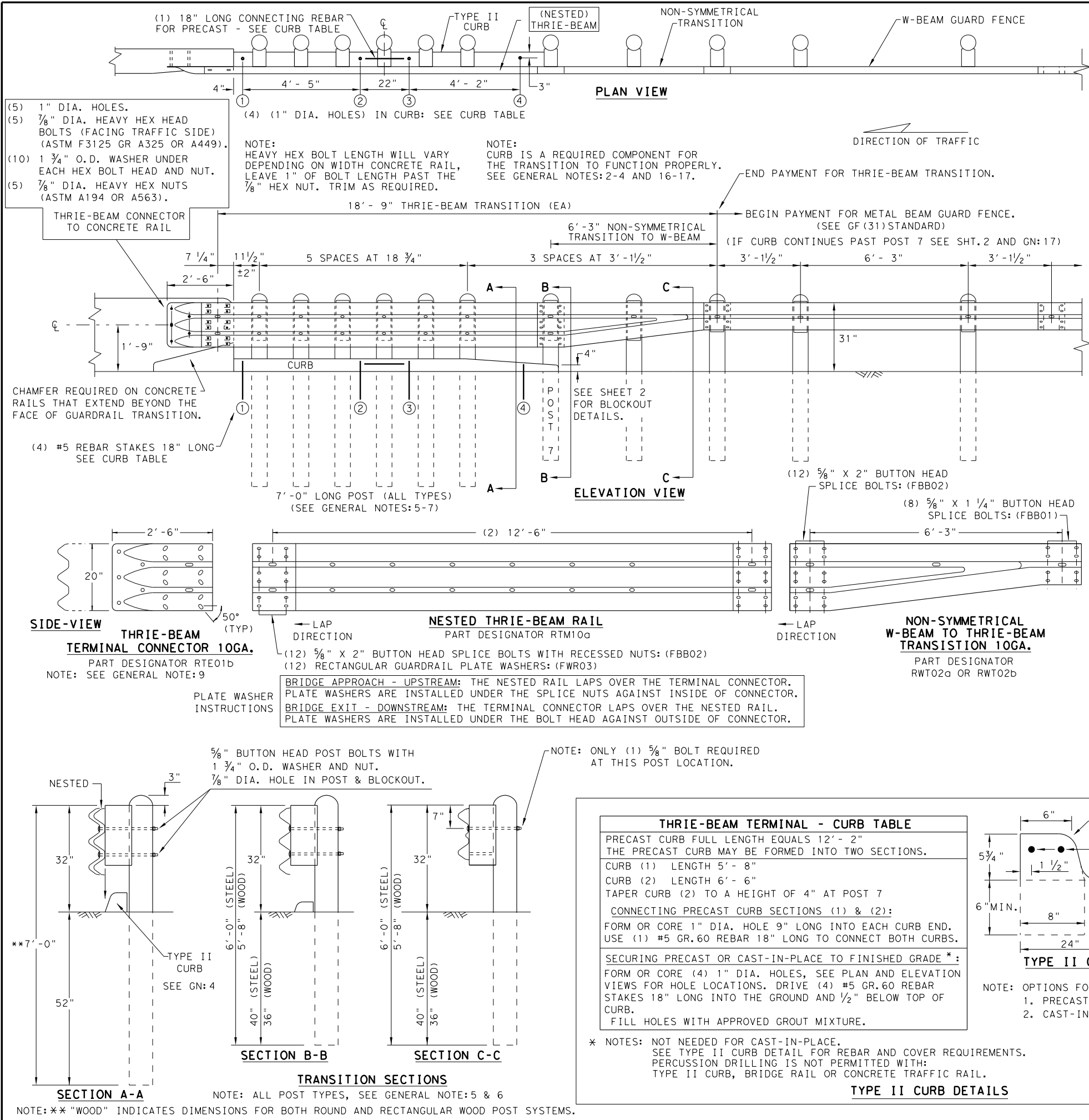
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS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

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

 <i>Texas Department of Transportation</i>				<i>Design Division Standard</i>	
METAL BEAM GUARD FENCE					
TL-3 MASH COMPLIANT					
GF (31) - 19					
FILE: gf3119.dgn		DN: TxDOT	CK: KM	DW: VP	CK: CGL/AO
© TxDOT: NOVEMBER 2019		CONT	SECT	JOB	HIGHWAY
REVISIONS					TOLL 49
		DIST	COUNTY		SHEET NO.
			SMITH		77

DISCLAIMER: THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE: 12/21/2021  
FILE: d:\pw\_wor-k\atknat\01\mcoq2543\dms73721\gf31tr+1320.dgn




GENERAL NOTES

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

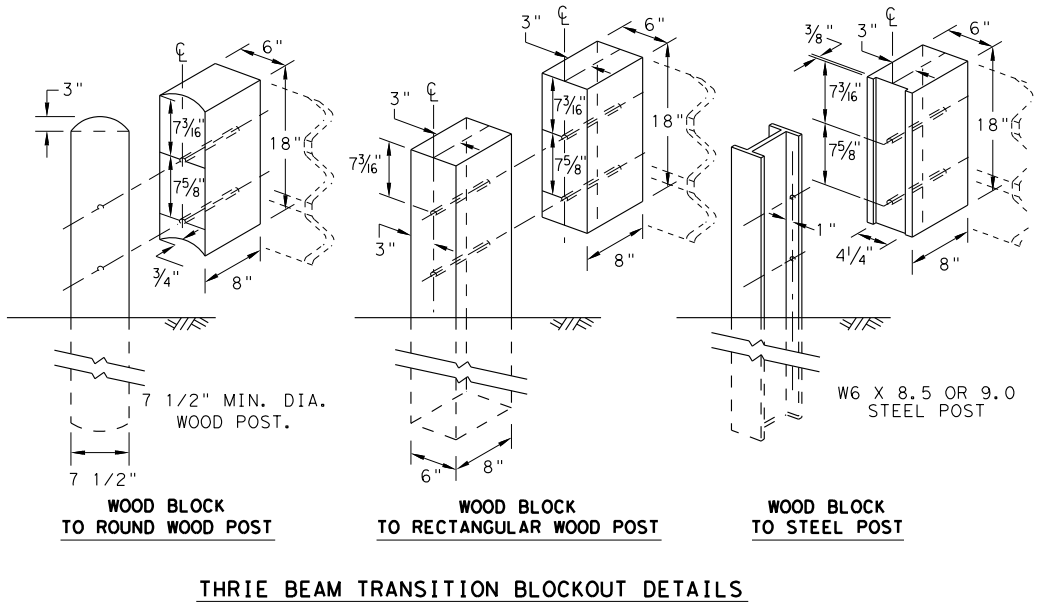
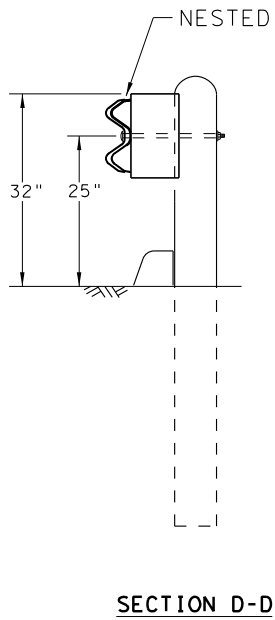
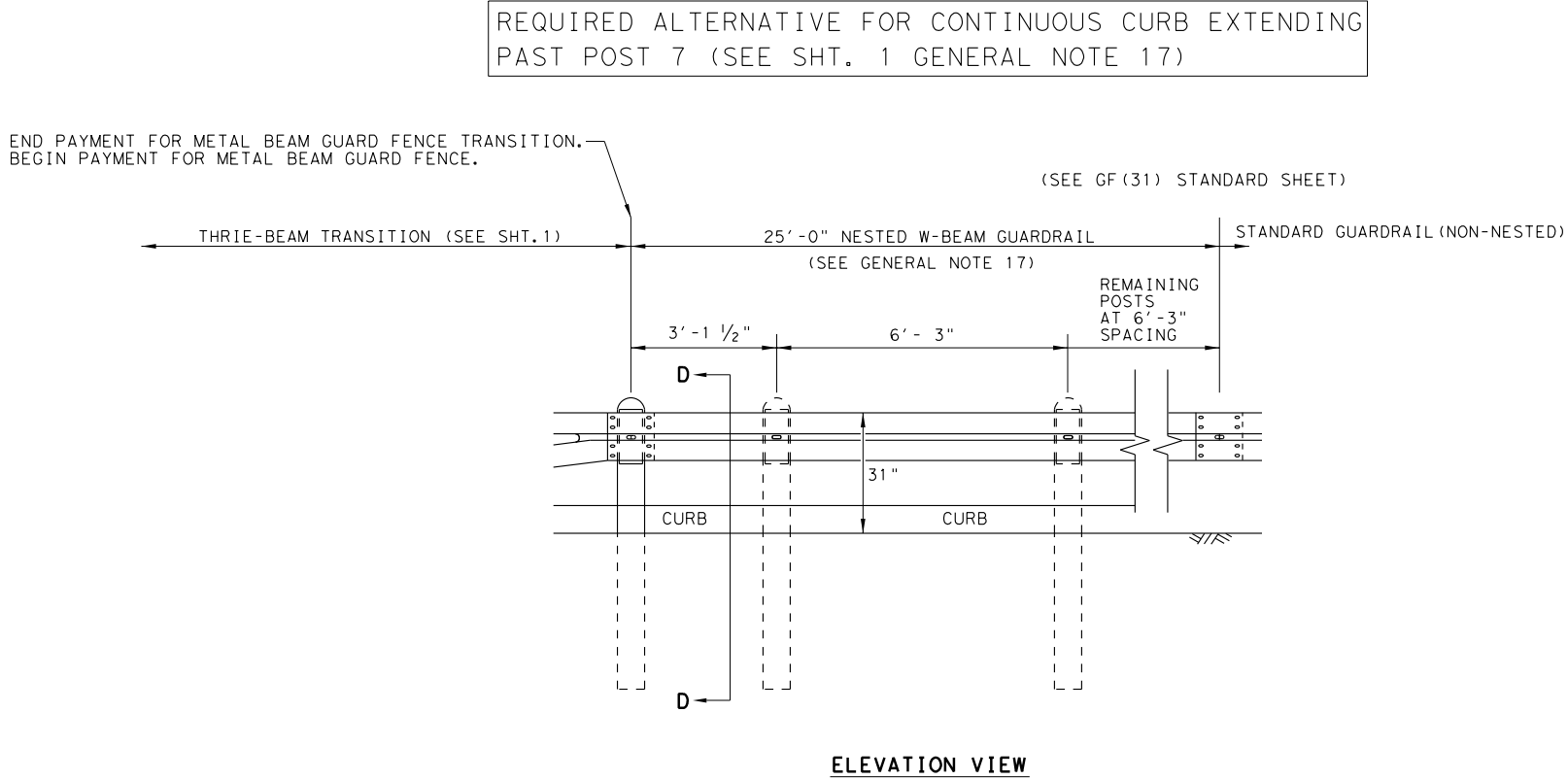
HIGH-SPEED TRANSITION

SHEET 1 OF 2

 Texas Department of Transportation		Design Division Standard	
METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT GF(31)TR TL3-20			
FILE: gf31tr+1320.dgn	DN: TxDOT	CK: KM	DW: VP
© TXDOT: NOVEMBER 2020	CONT	SECT	JOB
REVISIONS	DIST	COUNTY	SHEET NO.
		SMITH	78


DISCLAIMER: THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE: 12/21/2021  
FILE: d:\pw\_work\atknat\01\meca2543\dms73721\gf31trt1320.dgn



HIGH-SPEED TRANSITION

SHEET 2 OF 2



Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE

THRIE-BEAM TRANSITION

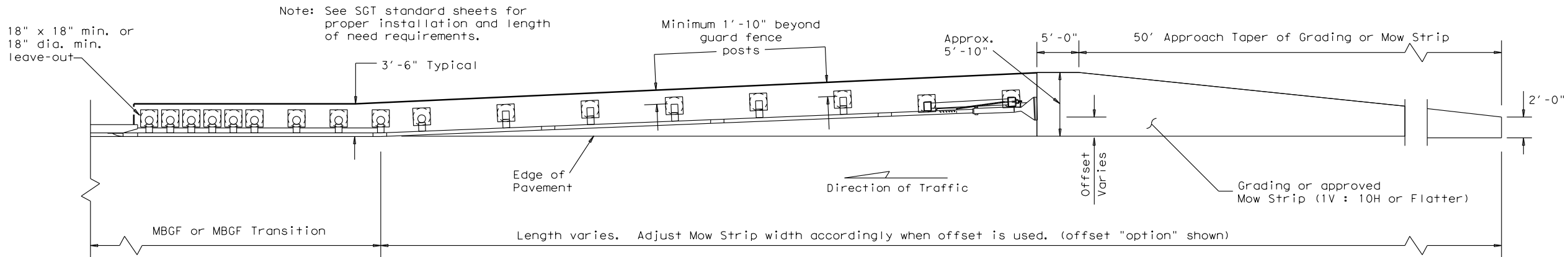
TL-3 MASH COMPLIANT

GF (31) TR TL3-20

FILE: gf31trt1320.dgn	DN:TXDOT	CK: KM	DW: KM	CK:CGL/AG
© TXDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
	DIST	COUNTY		SHEET NO.
		SMITH		79

DISCLAIMER: THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE: 12/21/2021  
FILE: d:\pw\_work\atknatx01\meca2543\dms73721\gf31ms19.dgn

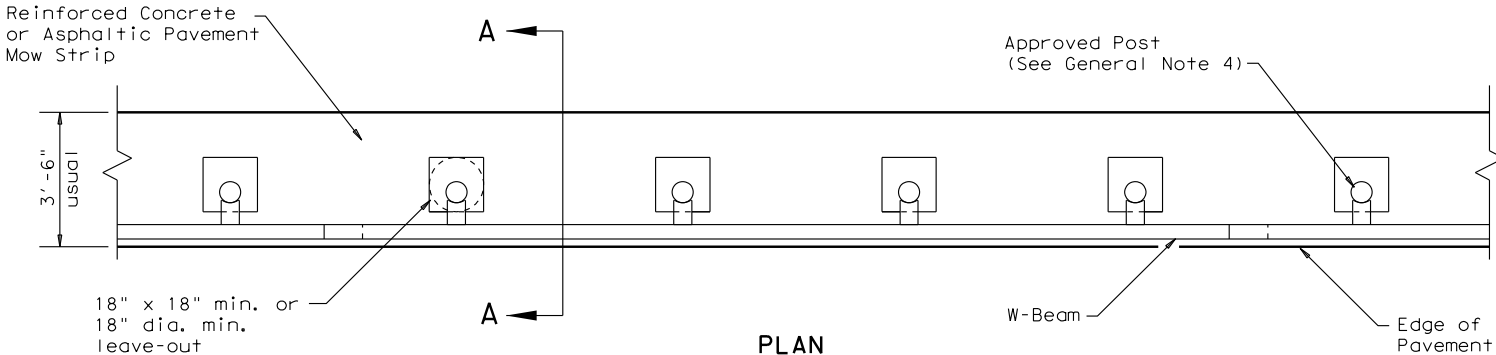


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS

Note: Site Condition(s)  
Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.  
Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

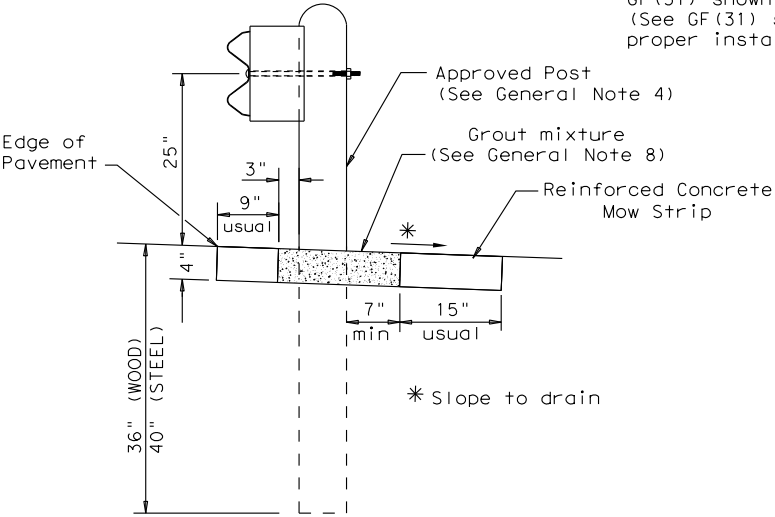
GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 1/2" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.



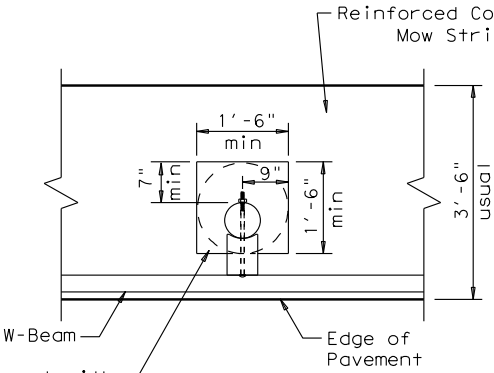
PLAN

GF(31) shown with Mow Strip  
(See GF(31) standard sheet for proper installation)



SECTION A-A

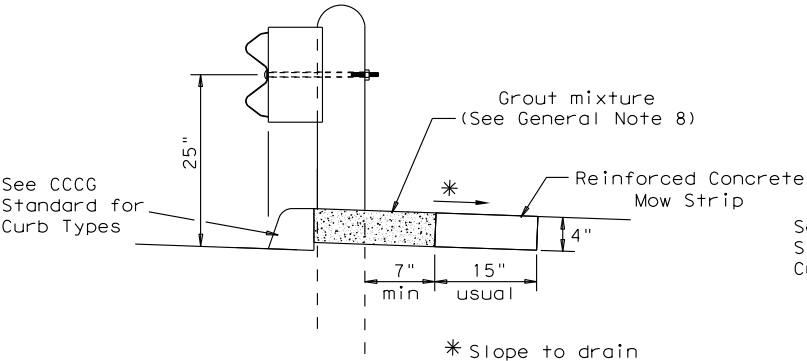
Typical



MOW STRIP DETAIL

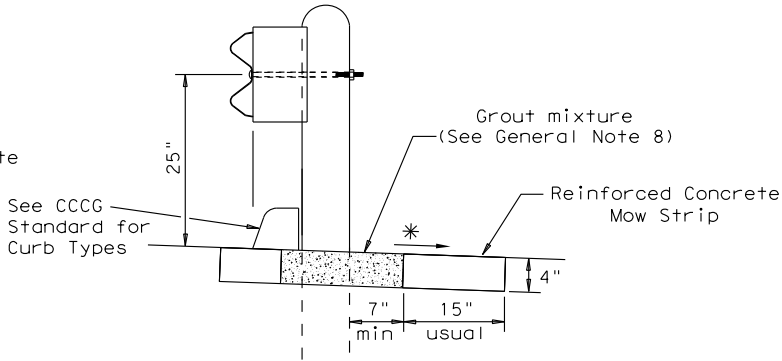
Reinforced Concrete Mow Strip  
with 18" x 18" Square or  
18" Dia. minimum leave-out.

Fill leave-out with  
Grout mixture  
(See General Note 8)



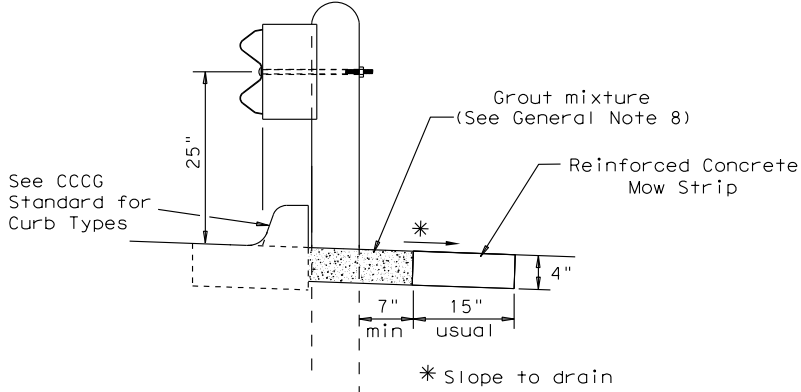
CURB OPTION (1)

This option will increase the post  
embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip

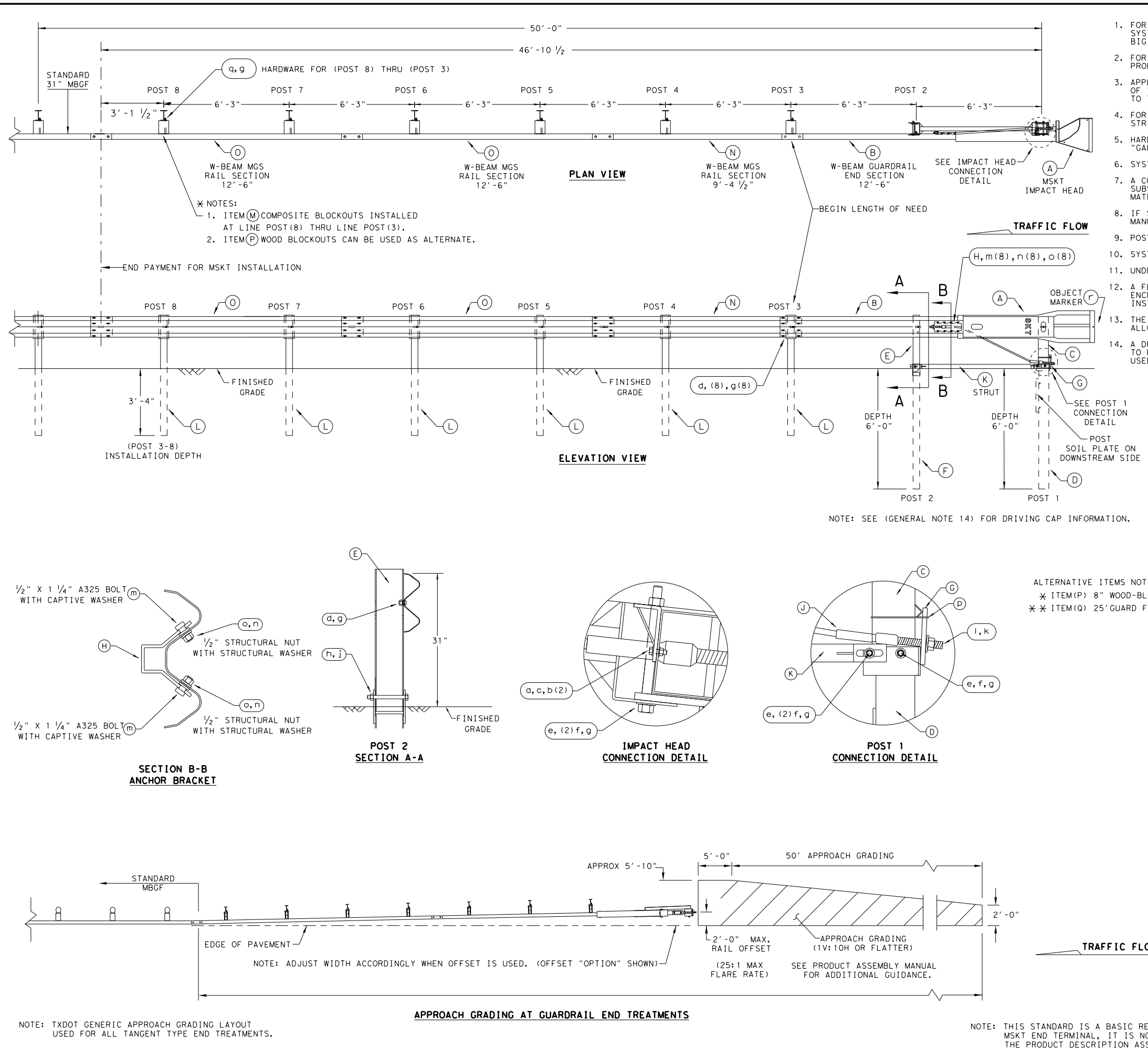


CURB OPTION (3)

				Design Division Standard	
METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT GF(31)MS-19					
FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
© TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS				TOLL 49	
		DIST	COUNTY	SHEET NO.	
		SMITH		80	


DISCLAIMER: THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE: 12/21/2021  
FILE: d:\pw\_wor-k\atknatx01\mccq2543\dms73721\sgt12s3118.dgn



- GENERAL NOTES**
- FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
  - FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE: MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION-062717).
  - APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
  - FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
  - HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
  - SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
  - A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
  - IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
  - POSTS SHALL NOT BE SET IN CONCRETE.
  - SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
  - UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
  - A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCRDACHING ON THE SHOULDER, THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
  - THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
  - A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Go.	SF1303
C	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
SMALL HARDWARE			
a	2	5/8" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/16" WASHER	W0516
c	2	5/16" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" Dia. H.G.R. NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
i	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 5/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

**Texas Department of Transportation**

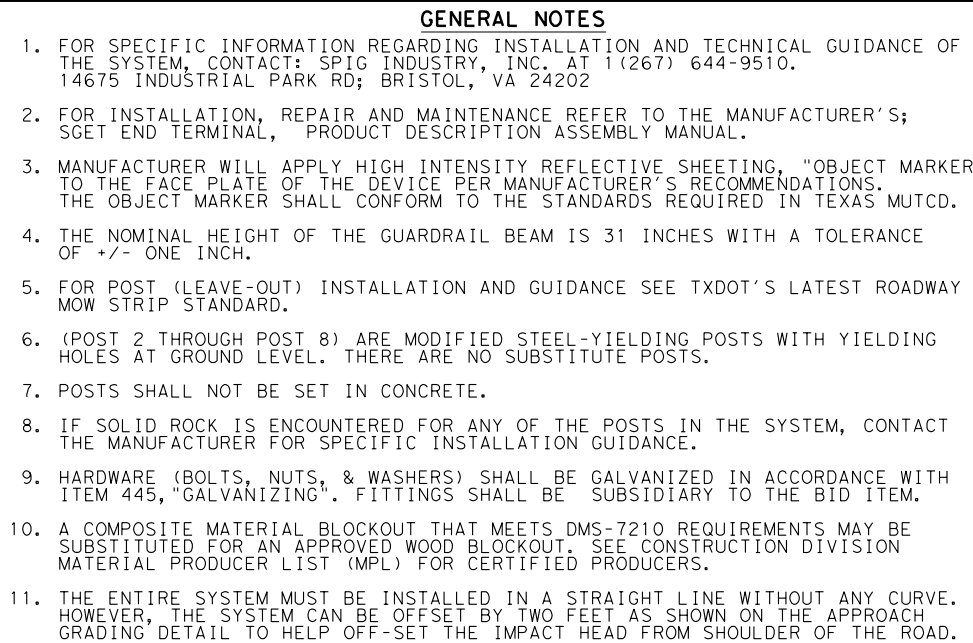
**Design Division Standard**

**SINGLE GUARDRAIL TERMINAL**  
**MSKT-MASH-TL-3**  
**SGT (12S) 31-18**

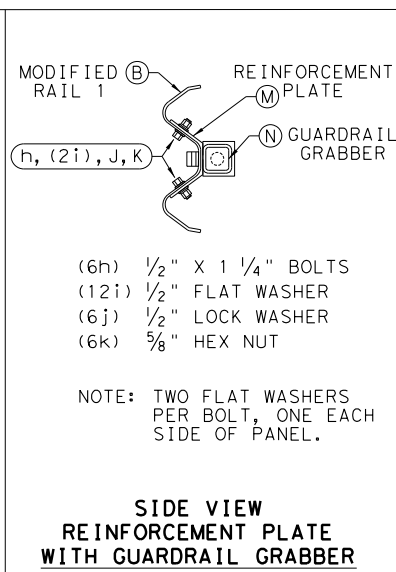
FILE: sgt12s3118.dgn	DN:TXDOT	CK:KM	DW:VP	CK:CL
© TXDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
	DIST		COUNTY	SHEET NO.
			SMITH	81



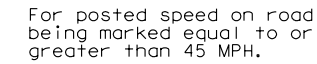
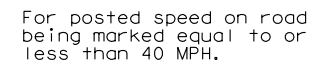
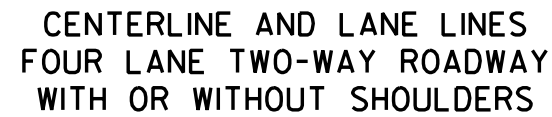
```
DATE: 12/21/2021
FILE: d:\pw-work\atknatx01\mcca2543\dms73721\sat153120.dan
```



SMALL HARDWARE			
a	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563DH HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M



DATE: 12/21/2021 4:58:42 PM  
FILE: d:\pw\_work\atknatx01\mccq2543\dms73723\pm1-20.dan

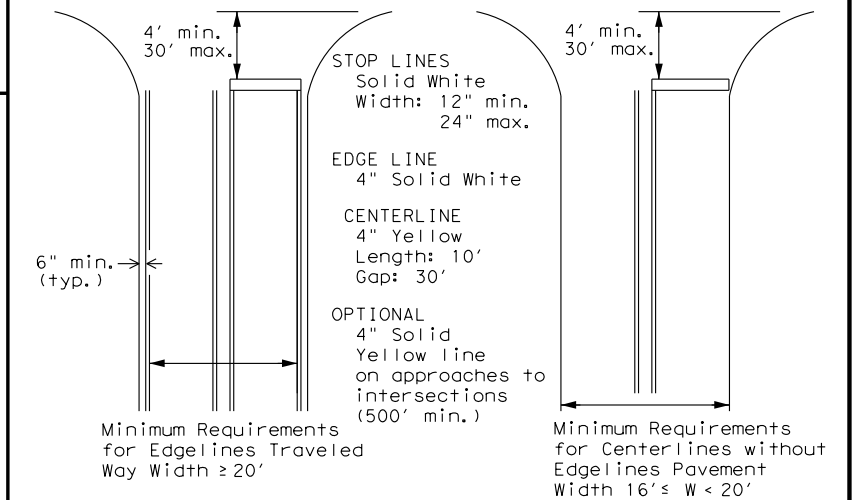


## YIELD LINES

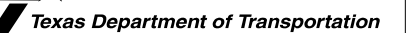
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling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

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

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



Based on Traveled Way and Pavement Widths  
for Undivided Highways



**Traffic  
Safety  
Division  
Standard**

## TYPICAL STANDARD PAVEMENT MARKINGS

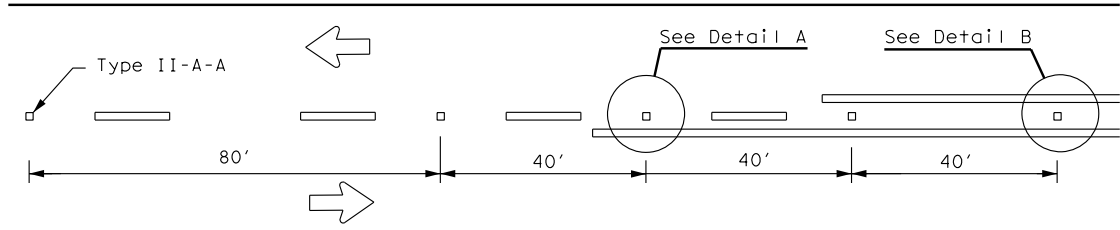
PM ( 1 ) - 20

FILE: pml -20. dgn			DN:		CK:		DW:		CK:	
Ⓢ TxDOT November 1978			CONT	SECT	JOB			HIGHWAY		
8-95	3-03	REVISTONS						TOLL 49		
5-00	2-12							SHEET NO.		
8-00	6-20				SMITH			83		

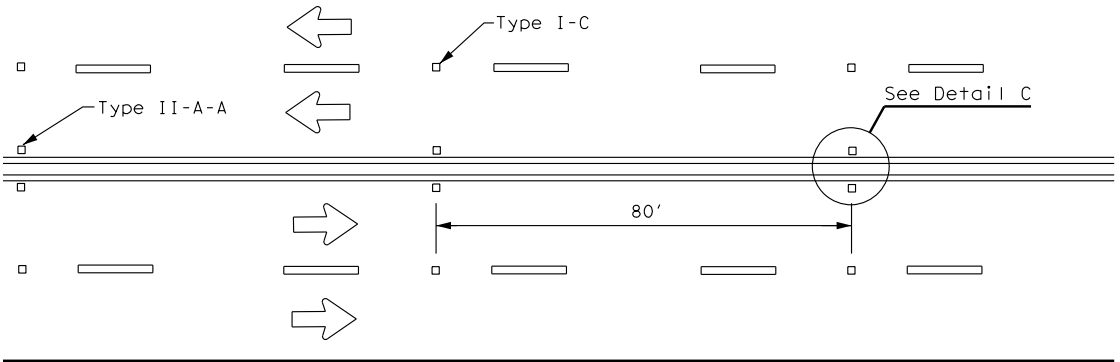
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:58:47 PM  
FILE: d:\pw\_wor\atknat\01\mco2543\dms73723\pm2-20.dgn

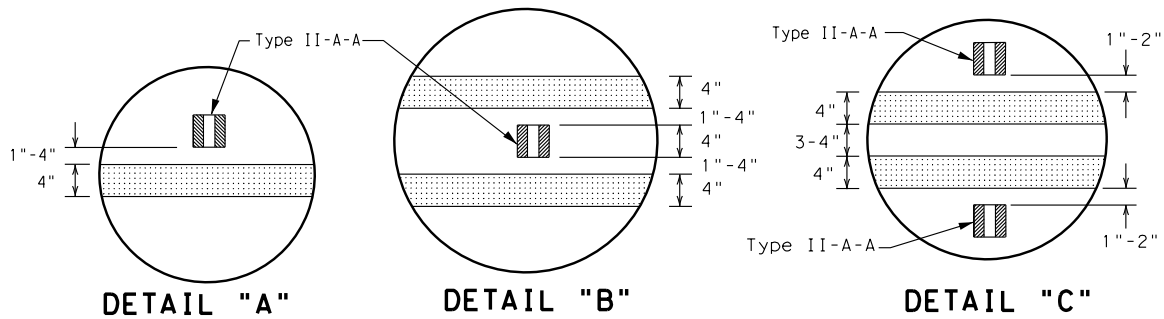
REFLECTIVE RAISED PAVEMENT MARKERS  
FOR VEHICLE POSITIONING GUIDANCE



CENTERLINE FOR ALL TWO LANE ROADWAYS



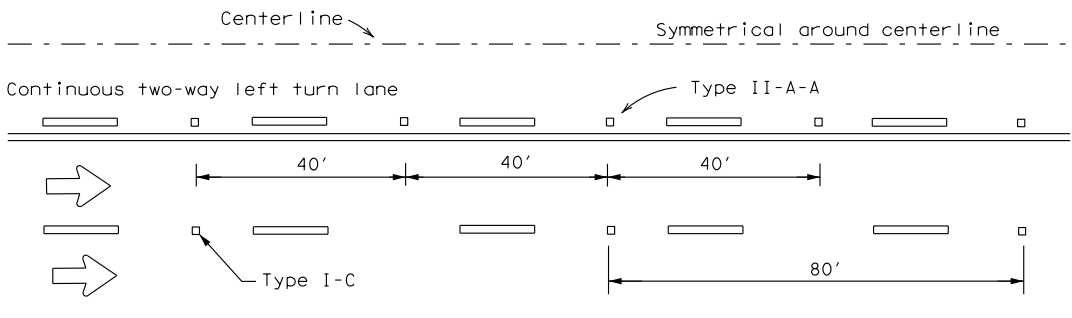
CENTERLINE & LANE LINES  
FOR FOUR LANE TWO-WAY HIGHWAYS



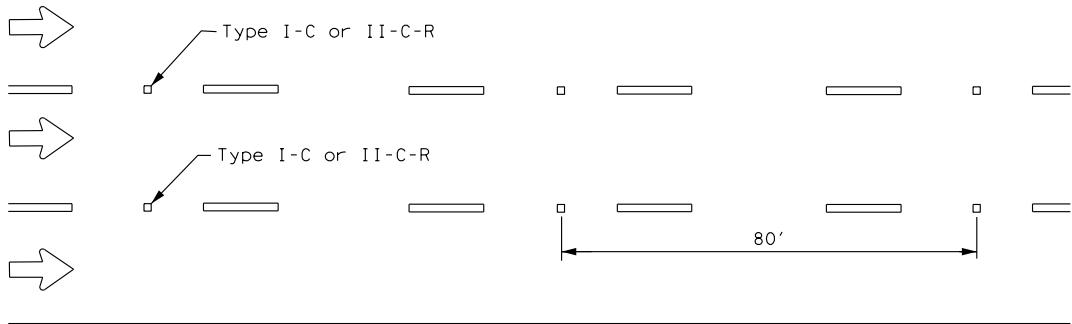
DETAIL "A"

DETAIL "B"

DETAIL "C"



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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

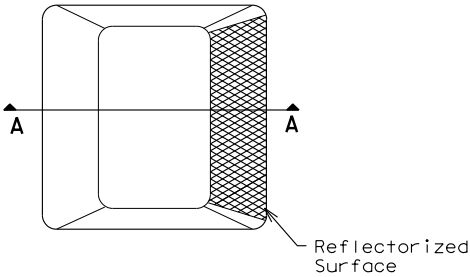
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

GENERAL NOTES

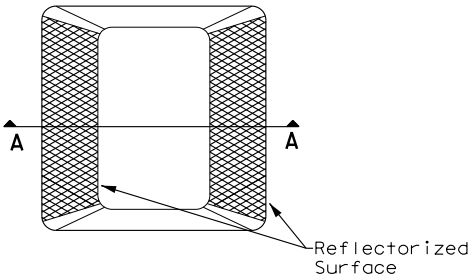
- All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
- On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

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

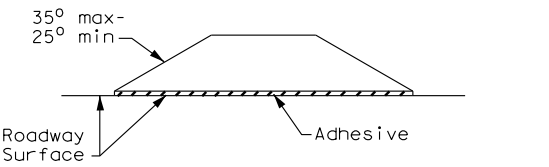
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



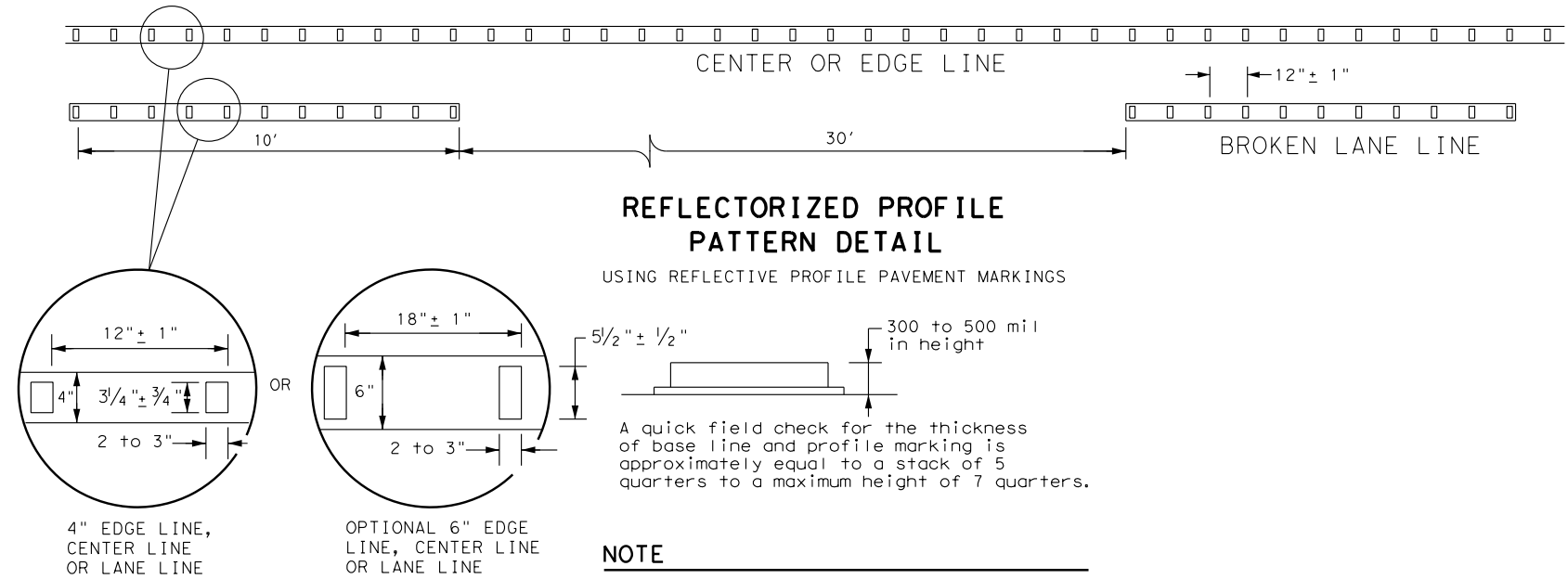
SECTION A

RAISED PAVEMENT MARKERS



POSITION GUIDANCE USING  
RAISED MARKERS  
RELECTORIZED PROFILE  
MARKINGS  
PM(2) - 20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
4-92 2-10 REVISIONS				TOLL 49
5-00 2-12	DIST		COUNTY	SHEET NO.
8-00 6-20			SMITH	84



REFLECTORIZED PROFILE  
PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

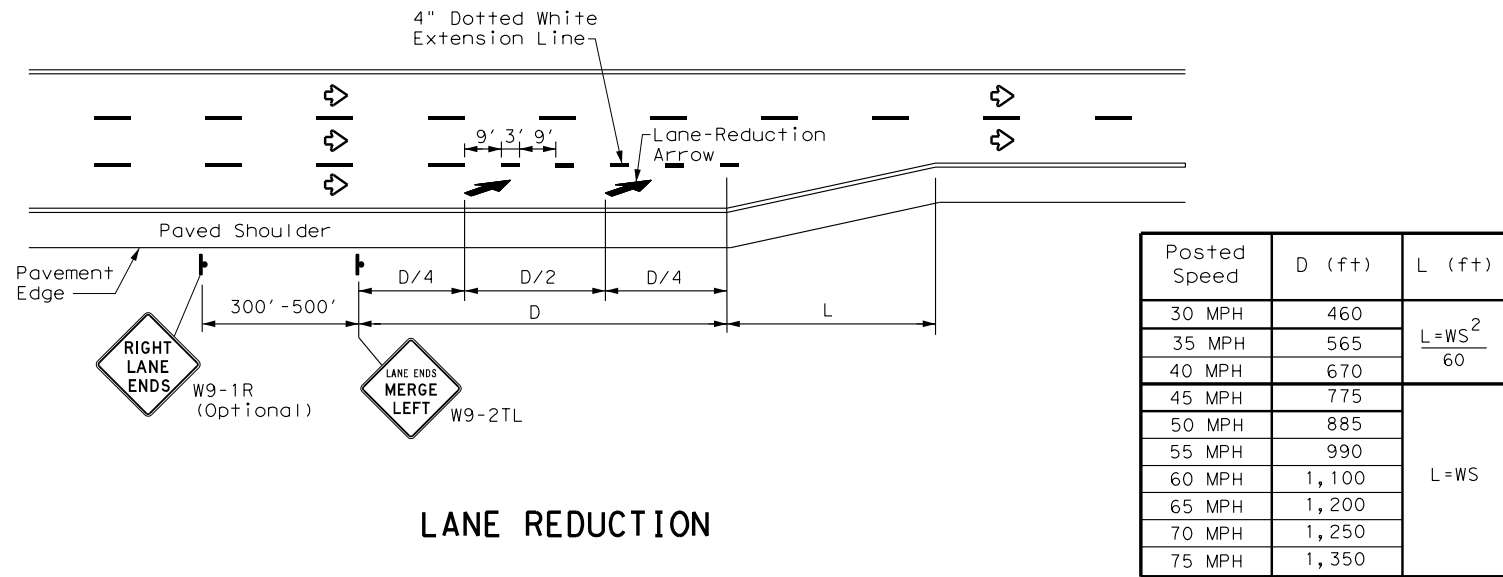
A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTE

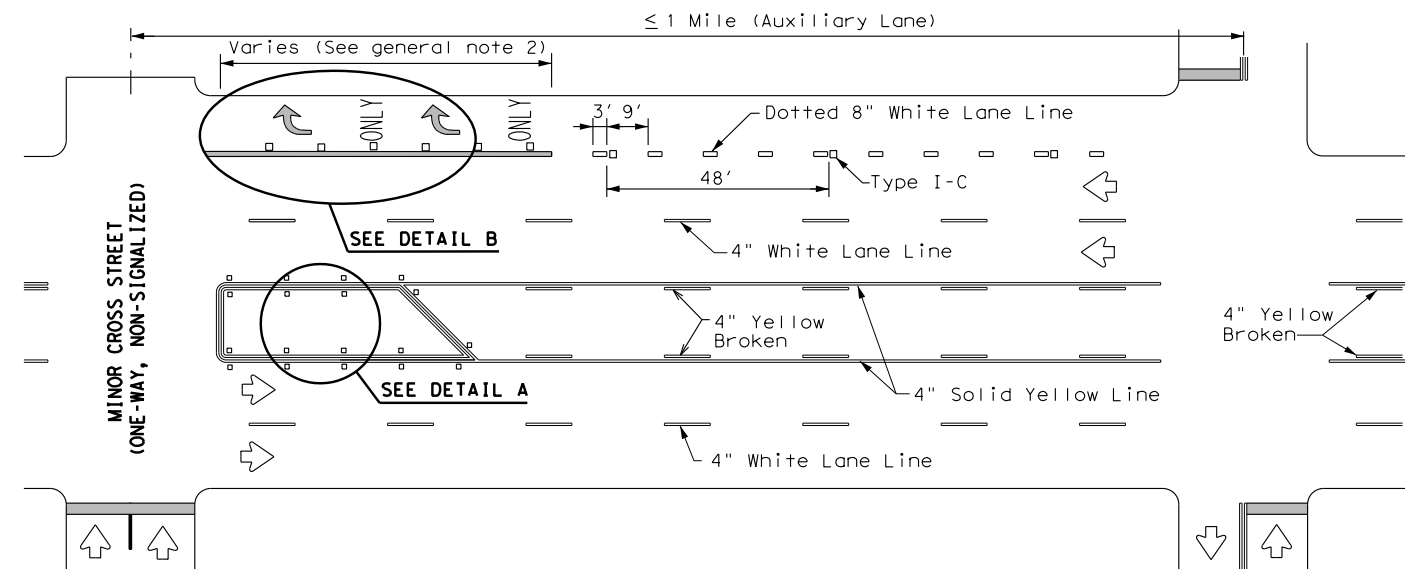
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

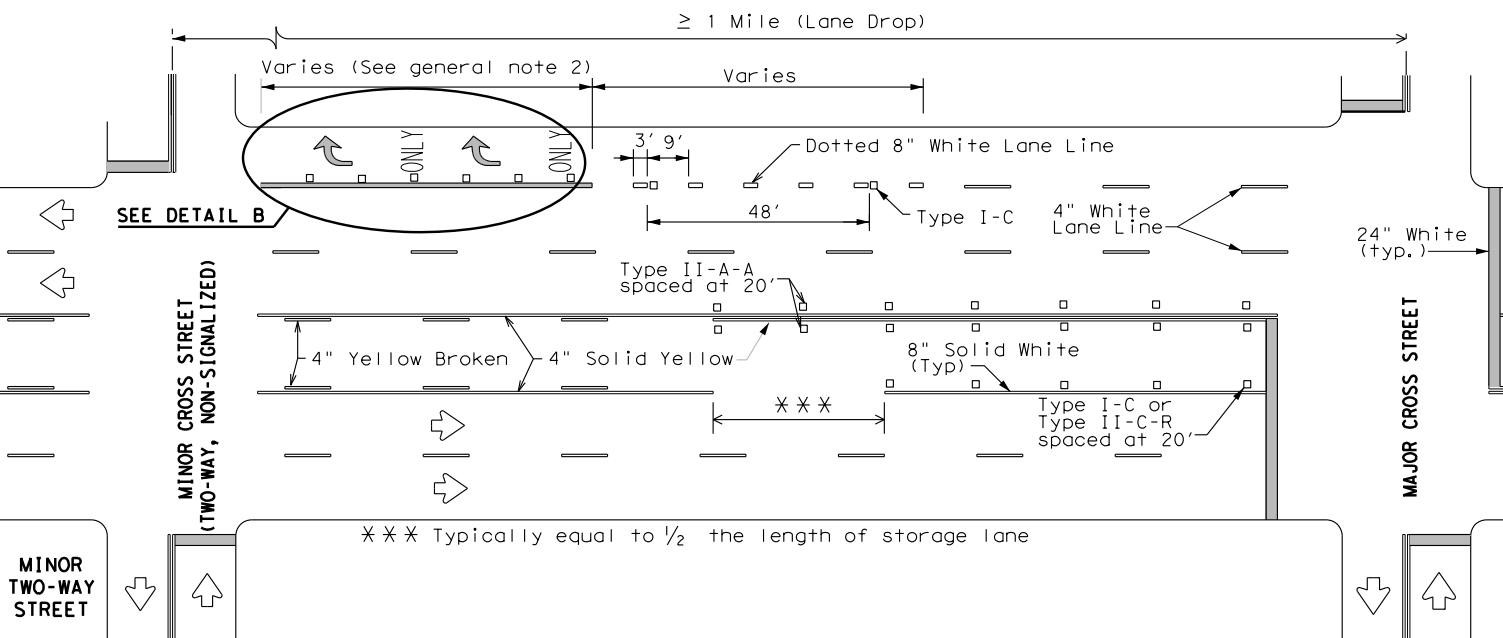
DATE: 12/21/2021 4:58:52 PM  
FILE: d:\pw\_wor-k\atknat\01\mco2543\dms73723\pm3-20.dgn



### LANE REDUCTION



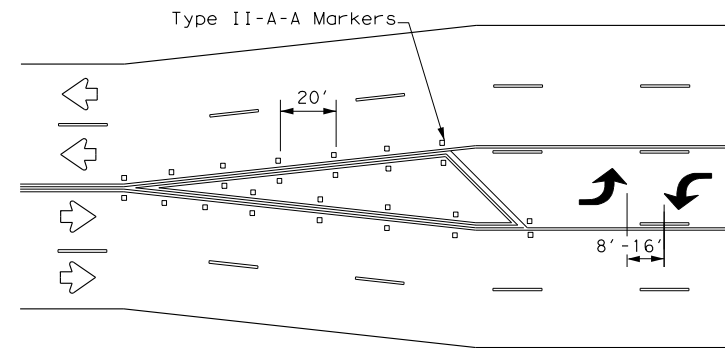
### TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



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

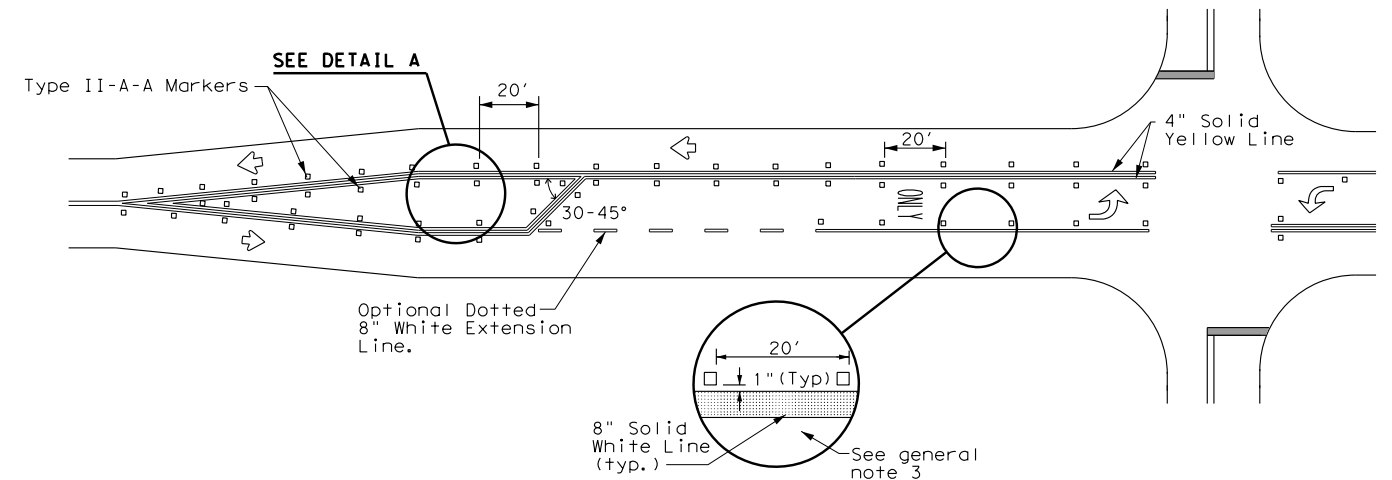
### NOTES

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

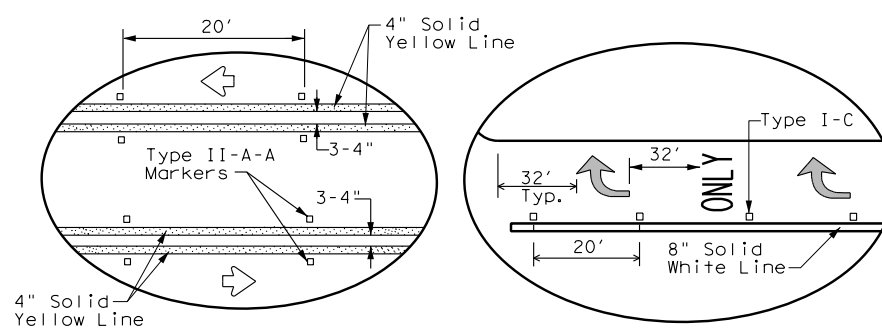


A two-way left-turn (TWLTL) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

### TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY



### TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



### DETAIL A

### DETAIL B

### GENERAL NOTES

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

### MATERIAL SPECIFICATIONS

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

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

**Texas Department of Transportation**

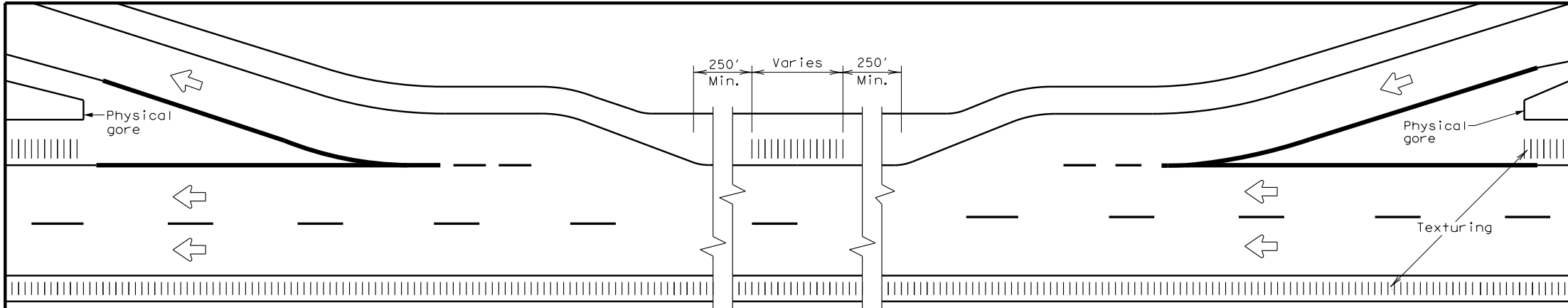
**Traffic Safety Division Standard**

**TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3) - 20**

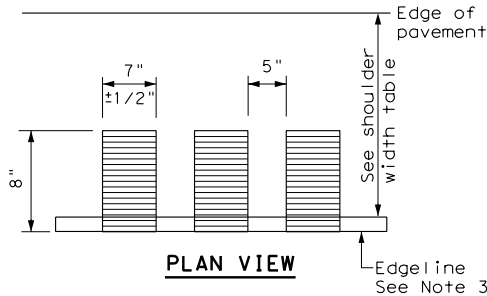
FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
5-00 2-10				
8-00 2-12				
3-03 6-20				
	DIST	COUNTY		SHEET NO.
		SMITH		85

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:58:58 PM  
FILE: d:\pw\_work\atknat\01\mco2543\dms73723\rs(1)-13.dgn

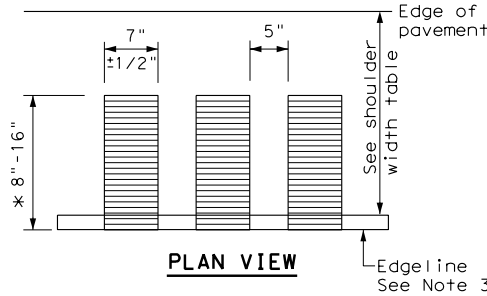
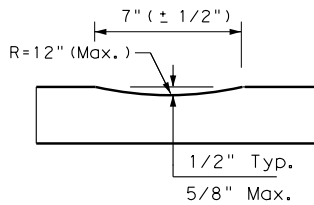


TYPICAL RUMBLE STRIP PLACEMENT AT EXIT AND ENTRANCE RAMPs



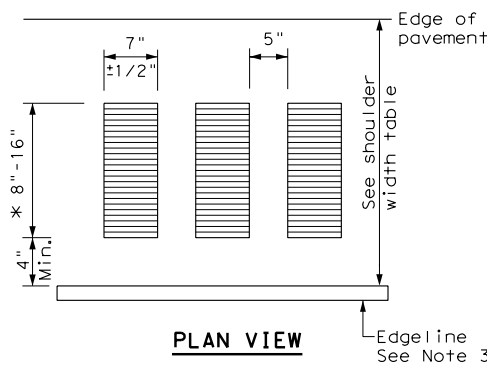
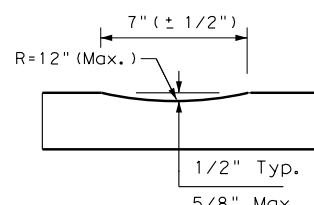
PROFILE VIEW  
OPTION 1

CONTINUOUS MILLED  
DEPRESSIONS  
(Rumble Strips)



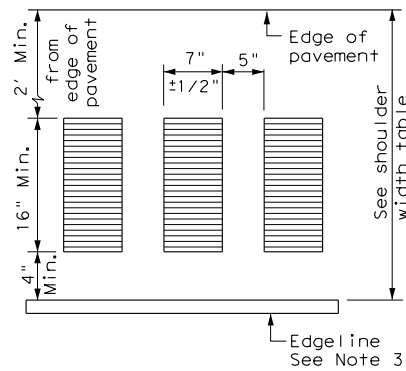
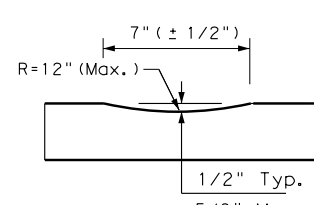
PROFILE VIEW  
OPTION 2

CONTINUOUS MILLED  
DEPRESSIONS  
(Rumble Strips)



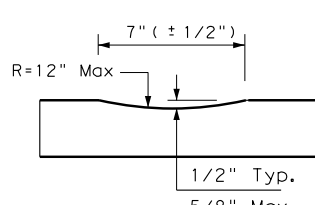
PROFILE VIEW  
OPTION 3

CONTINUOUS MILLED  
DEPRESSIONS  
(Rumble Strips)



PROFILE VIEW  
OPTION 4

CONTINUOUS MILLED  
DEPRESSIONS  
(Rumble Strips)



GENERAL NOTES

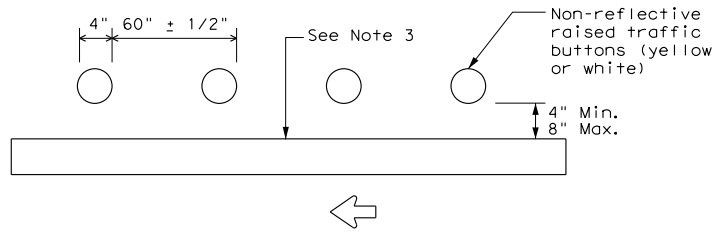
1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall 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.

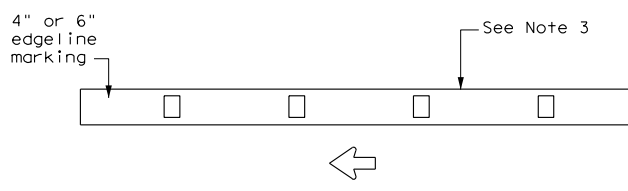
WHEN INSTALLING RAISED OR PROFILE EDGELINE RUMBLE STRIPS:

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.



PLAN VIEW  
OPTION 5


RAISED EDGELINE RUMBLE STRIPS



PLAN VIEW  
OPTION 6

PROFILE EDGELINE MARKINGS

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**

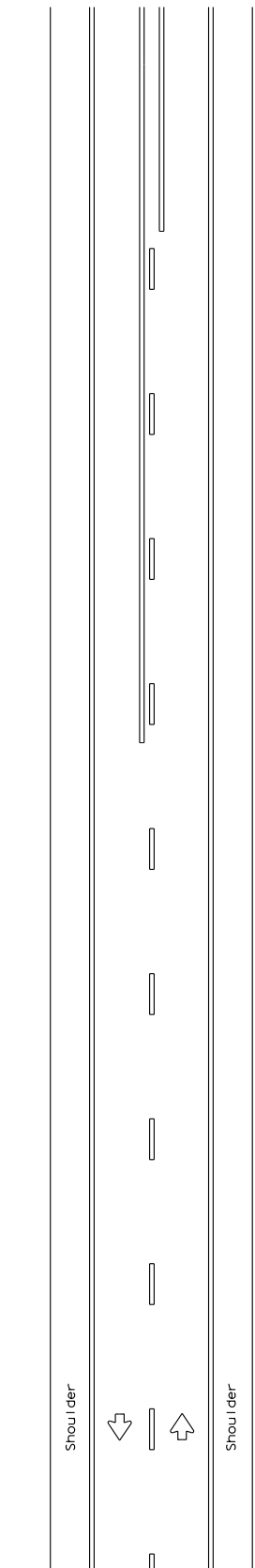
**Traffic Operations Division Standard**

**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
2-10				TOLL 49
10-13				
			COUNTY	SHEET NO.
			SMITH	86

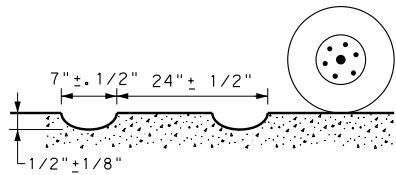
DISCLAIMER:  
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:59:03 PM  
FILE: d:\pw\_work\atknat\01\mco2543\dms73723\rs(3)-13.dgn

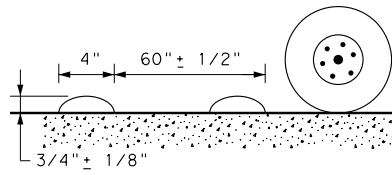


TWO LANE TWO-WAY  
ROADWAYS

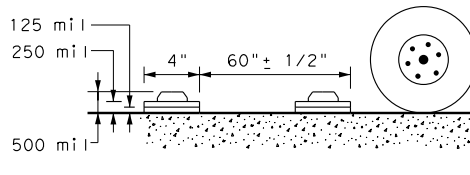
CENTERLINE RUMBLE STRIPS



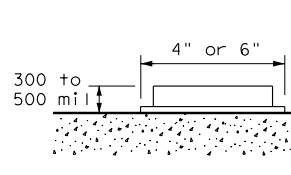
MILLED RUMBLE STRIPS



RAISED TRAFFIC BUTTONS

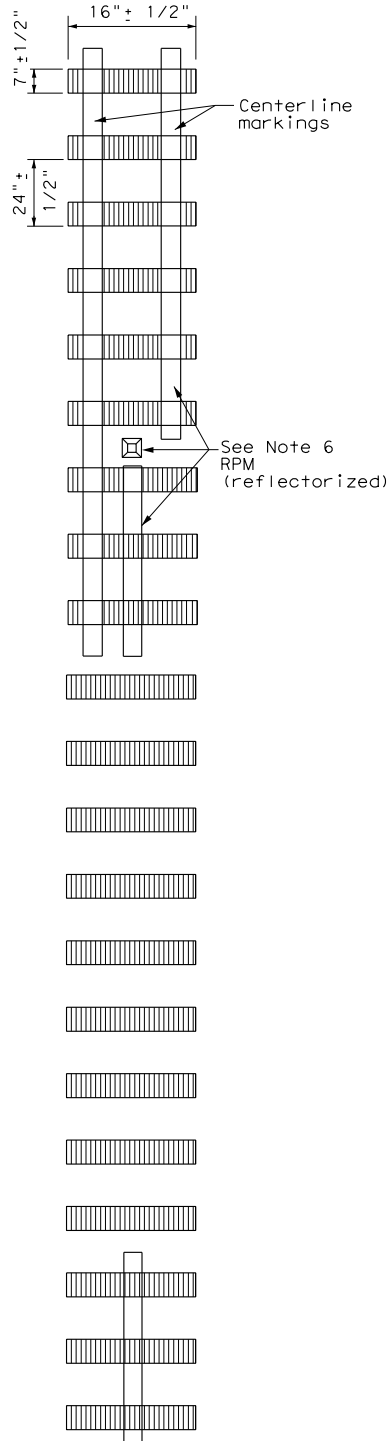


PREFORMED THERMOPLASTIC STRIPS



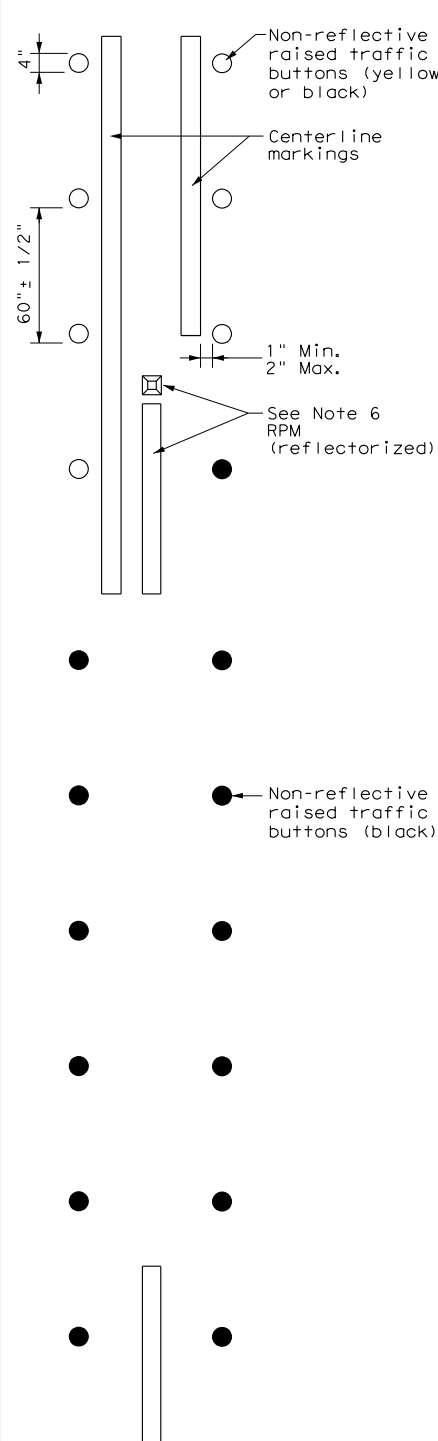
PROFILE MARKINGS

PROFILE VIEW



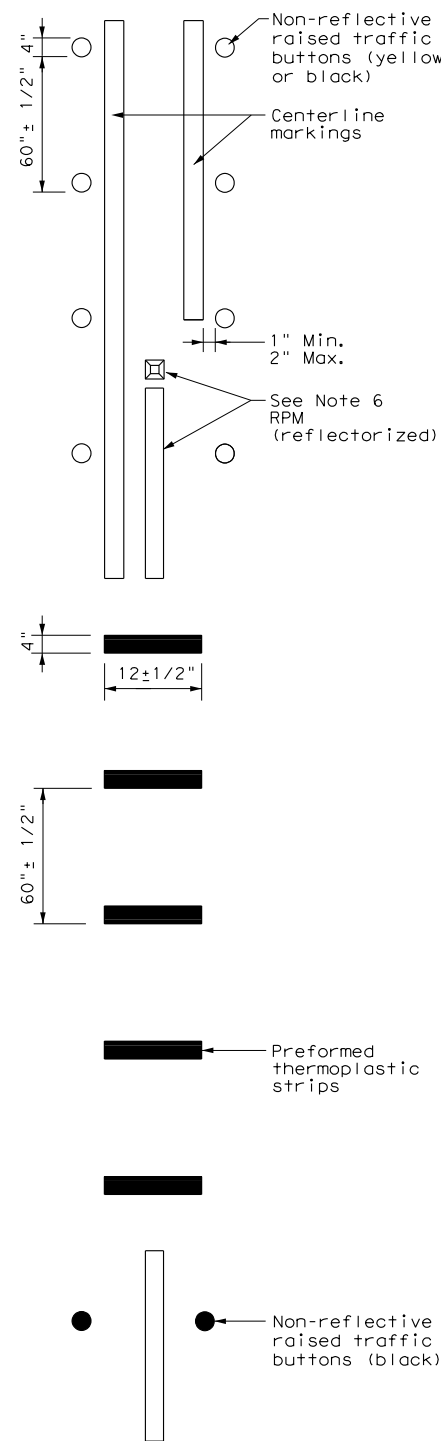
PLAN VIEW  
OPTION 1

MILLED CENTERLINE  
RUMBLE STRIPS



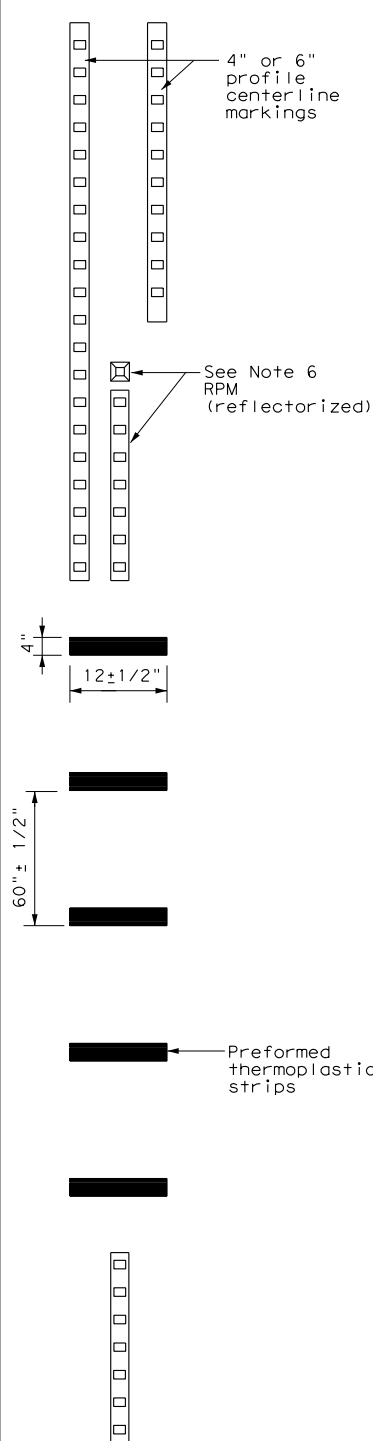
PLAN VIEW  
OPTION 2

RAISED CENTERLINE  
RUMBLE STRIPS



PLAN VIEW  
OPTION 3

RAISED CENTERLINE RUMBLE  
STRIPS AND PREFORMED  
THERMOPLASTIC STRIPS



PLAN VIEW  
OPTION 4

PROFILE CENTERLINE MARKINGS  
AND PREFORMED THERMOPLASTIC  
STRIPS

GENERAL NOTES

1. This standard sheet provides guidelines for installing centerline rumble strips on two-lane highways with or without shoulders.
2. Centerline and edgeline rumble strips or profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
3. 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.
4. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
5. Breaks in milled centerline 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.
6. Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, and dimensions pavement markings and profile markings.
7. Consideration should be given to noise levels when centerline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inch depth of milled rumble strip may be considered in these areas.
8. Pavement markings must be applied over milled centerline rumble strips.

WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

9. 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 manufacturer's recommendations.
10. When using non-reflective raised traffic buttons as a centerline rumble strip, the button shall be placed adjacent to the pavement marking delineating the centerline. The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
11. The color of the button should be yellow for a continuous no passing roadway. Black buttons should be used in areas where passing is allowed.

WHEN INSTALLING EDGELINE RUMBLE STRIPS WITH OR WITHOUT  
CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

12. See standard sheet RS(4).



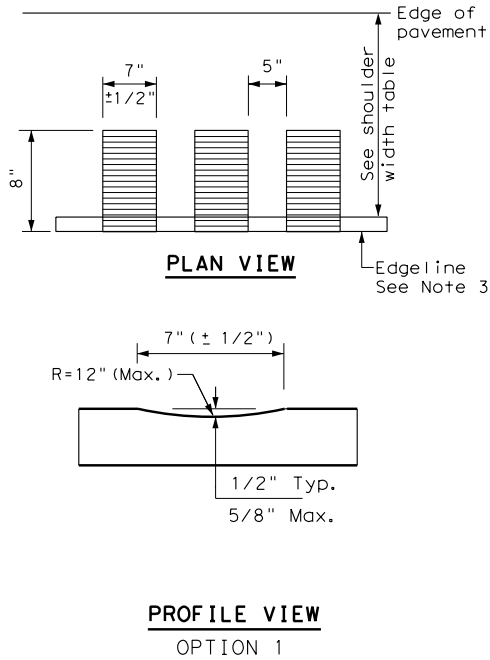
CENTERLINE RUMBLE  
STRIPS ON TWO LANE  
TWO-WAY HIGHWAYS

RS(3) - 13

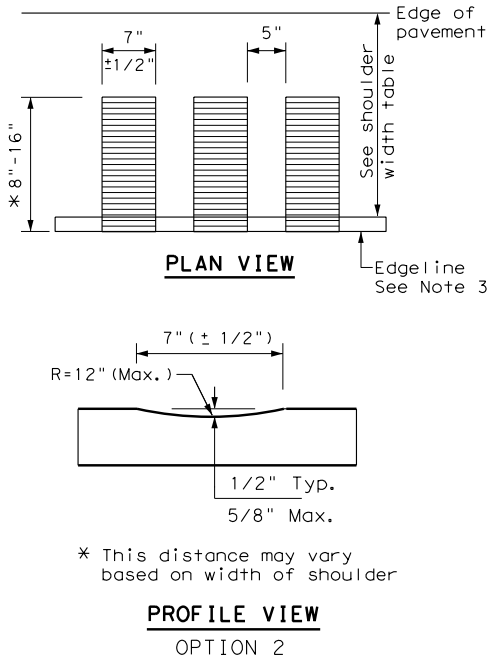
FILE:	rs(3)-13.dgn	DN: TxDOT	CK: TxDOT	DN: TxDOT	CK: TxDOT
© TxDOT	October 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS					TOLL 49
		DIST		COUNTY	SHEET NO.
				SMITH	87

DATE: 12/21/2021 4:59:09 PM  
FILE: d:\pw\_wor-k\atknatx01\mcoq2543\dms73723\rs(4)-13.dgn

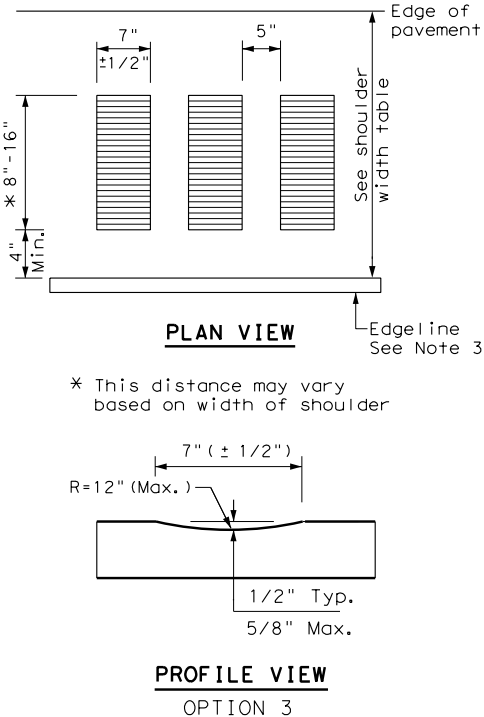
DISCLAIMER:  
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



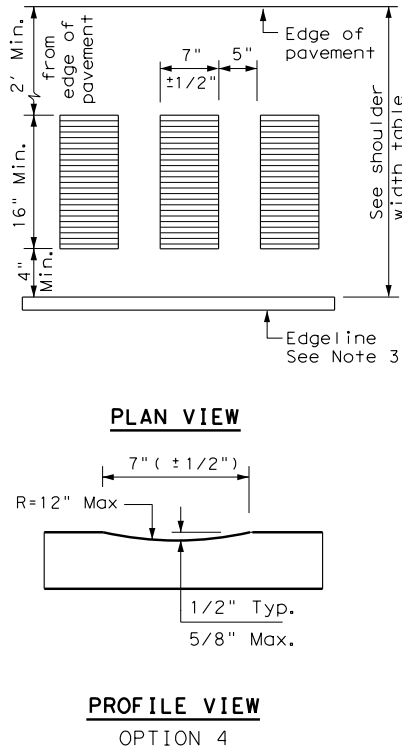
CONTINUOUS MILLED  
DEPRESSIONS  
(Rumble Strips)



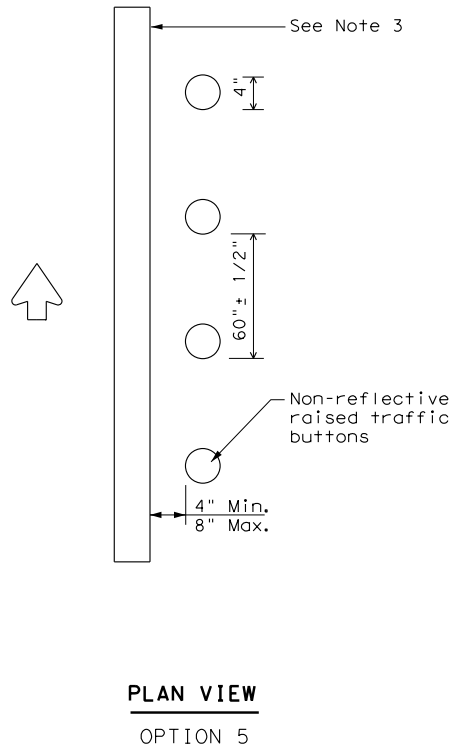
CONTINUOUS MILLED  
DEPRESSIONS  
(Rumble Strips)



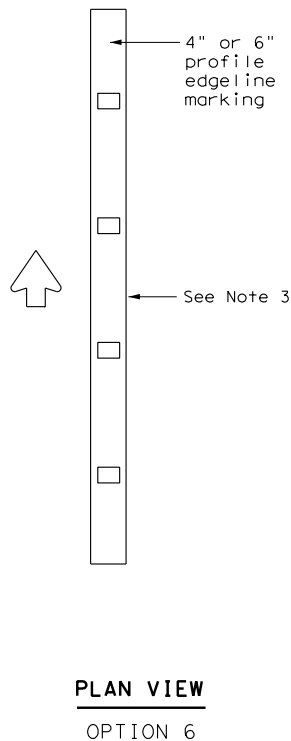
CONTINUOUS MILLED  
DEPRESSIONS  
(Rumble Strips)



CONTINUOUS MILLED  
DEPRESSIONS  
(Rumble Strips)



RAISED EDGE LINE  
RUMBLE STRIPS



PROFILE EDGE LINE  
MARKINGS

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

## GENERAL NOTES


- Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
- 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.
- Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
- See the table below for determining what options may be used for edgeline rumble strips.

## WHEN INSTALLING MILLED DEPRESSION EDGE LINE RUMBLE STRIPS:

- See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
- Pavement markings can be applied over milled shoulder rumble strips to create an edgeline rumble stripe.
- 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.
- Rumble strips shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
- 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.
- 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 EDGE LINE RUMBLE STRIPS:

- 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.
- 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.
- 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.
- 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.
- The minimum distance between the edgeline and the buttons should be used if the shoulder is less than 8 feet in width.
- Raised profile thermoplastic markings used as edgelines may substitute for buttons.

 <b>Texas Department of Transportation</b>	<b>Traffic Operations Division Standard</b>				
<b>EDGE LINE RUMBLE STRIPS ON UNDIVIDED OR TWO LANE HIGHWAYS RS(4)-13</b>					
FILE:	rs(4)-13.dgn	DN:	TxDOT	CK:	TxDOT
© TxDOT	October 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49	
		DIST	COUNTY		SHEET NO.
		SMITH		88	

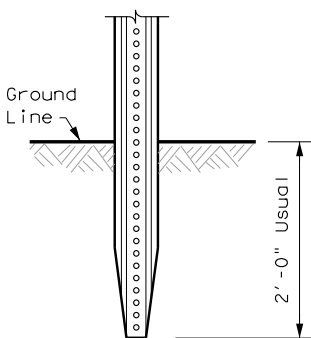
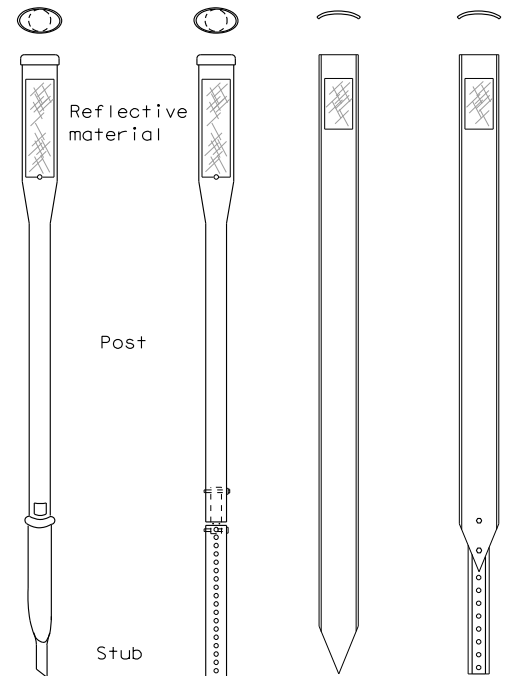
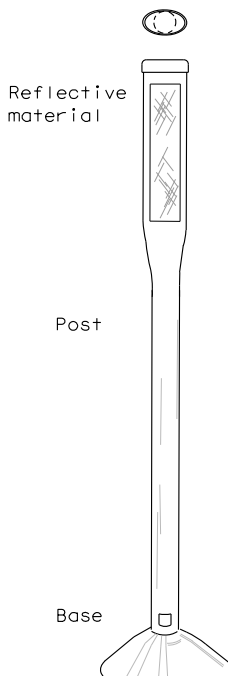
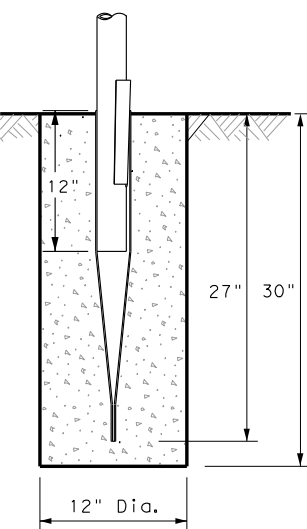
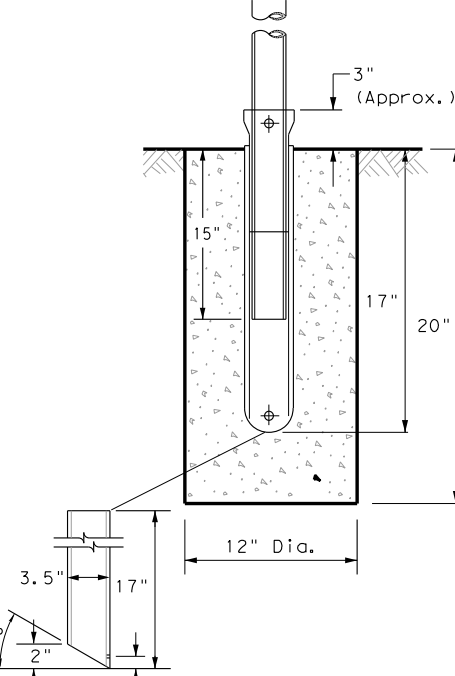
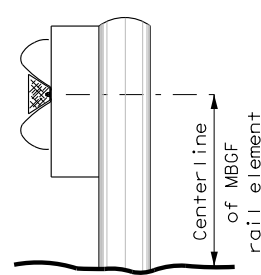
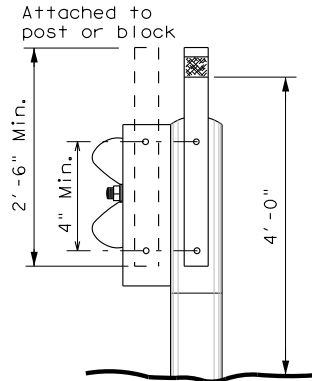
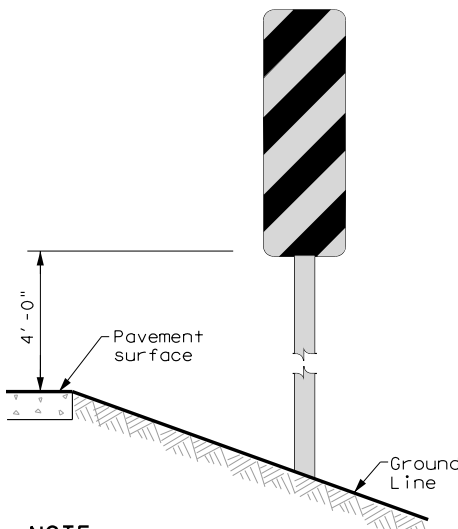
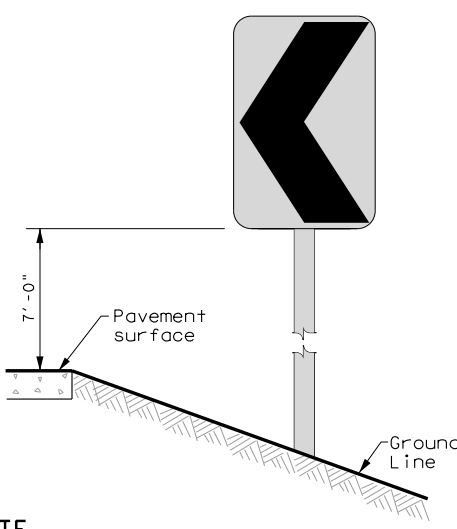
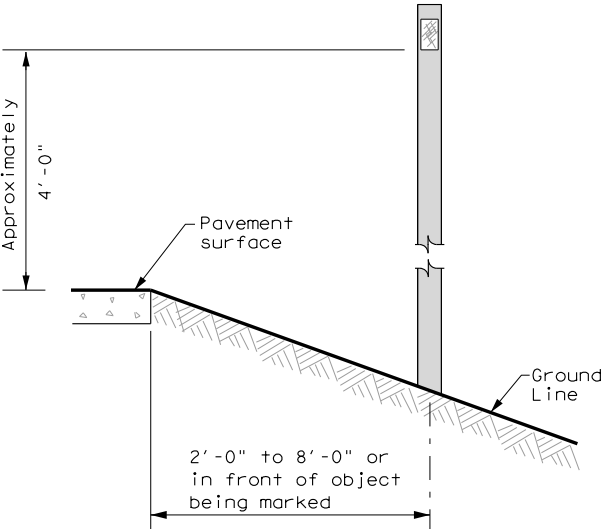
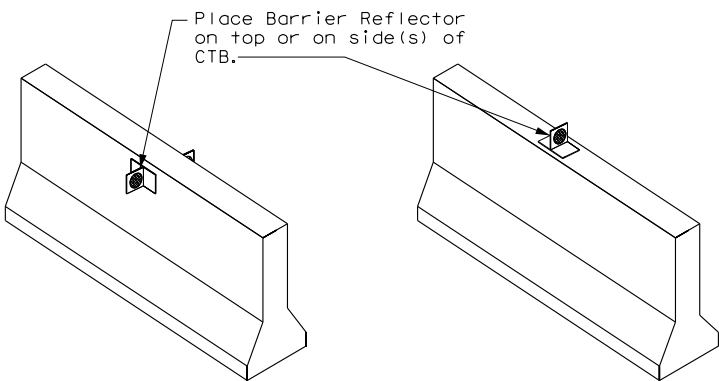



DATE: 12/21/2021 4:59:14 PM  
FILE: d:\pw\_wor\atknatx01\mcca2543\dms73723\dom1-20\_dan

20A

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

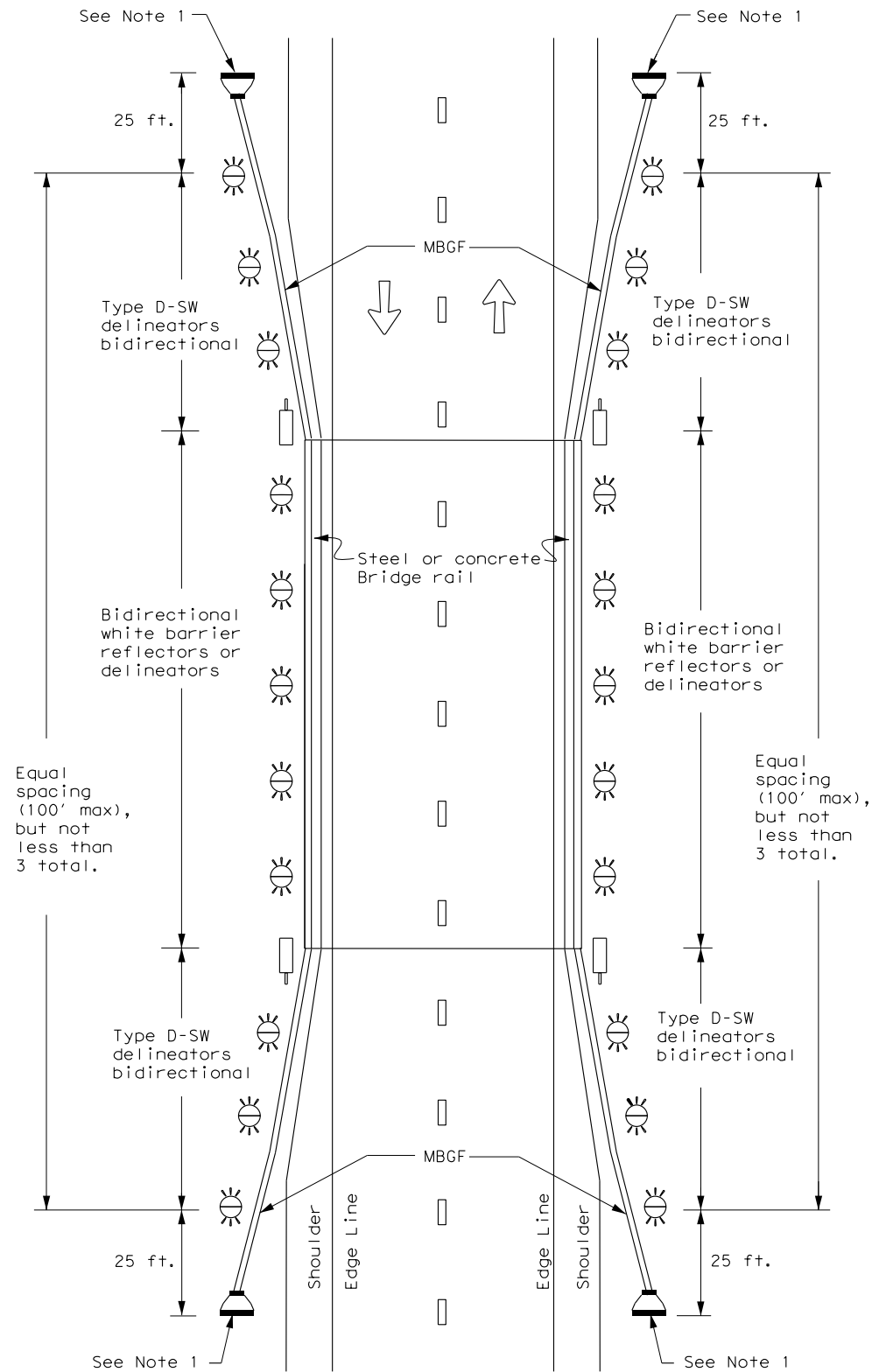
DATE: 12/21/2021 4:59:20 PM  
FILE: d:\pw\_wor-k\atknat\01\meca2543\dms73723\dom2-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS					TYPE OF BARRIER MOUNTS																											
WING CHANNEL (WC)	FLEXIBLE POSTS (YFLX, WFLX)		WEDGE ANCHOR SYSTEMS		GUARD FENCE ATTACHMENT																											
GND	GND	SRF	WAS	WAP	GF 1	GF 2																										
																																
<b>NOTES</b>  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.	<b>EMBEDDED</b>		<b>SURFACE MOUNT</b>	<b>STEEL</b>	<b>PLASTIC</b>																											
	<b>NOTES</b>  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.		<b>NOTE</b>  1. Install per manufacturer's recommendations.																													
TYPES 1,3, AND 4 OBJECT MARKERS AND CHEVRONS		CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN		DELINEATORS AND TYPE 2 OBJECT MARKERS		CONCRETE TRAFFIC BARRIER (CTB)																										
 <b>NOTE</b> 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)		 <b>NOTE</b> 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.		 See general notes 1, 2 and 3.																												
					<b>GENERAL NOTES</b>  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.																											
					 <b>DELINATOR &amp; OBJECT MARKER INSTALLATION</b> <b>D &amp; OM(2)-20</b>																											
					<table><tr><td>FILE: dom2-20.dgn</td><td>DN: TxDOT</td><td>CK: TxDOT</td><td>DN: TxDOT</td><td>CK: TxDOT</td></tr><tr><td>© TxDOT August 2004</td><td>CONT</td><td>SECT</td><td>JOB</td><td>HIGHWAY</td></tr><tr><td>REVISIONS</td><td></td><td></td><td></td><td>TOLL 49</td></tr><tr><td>10-09 3-15</td><td>DIST</td><td>COUNTY</td><td></td><td>SHEET NO.</td></tr><tr><td>4-10 7-20</td><td></td><td>SMITH</td><td></td><td>90</td></tr></table>		FILE: dom2-20.dgn	DN: TxDOT	CK: TxDOT	DN: TxDOT	CK: TxDOT	© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY	REVISIONS				TOLL 49	10-09 3-15	DIST	COUNTY		SHEET NO.	4-10 7-20		SMITH		90	
FILE: dom2-20.dgn	DN: TxDOT	CK: TxDOT	DN: TxDOT	CK: TxDOT																												
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY																												
REVISIONS				TOLL 49																												
10-09 3-15	DIST	COUNTY		SHEET NO.																												
4-10 7-20		SMITH		90																												
					20B																											

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:59:25 PM  
FILE: d:\pw\_wor-k\atknatx01\meca2543\dms73723\dom5-20.dgn

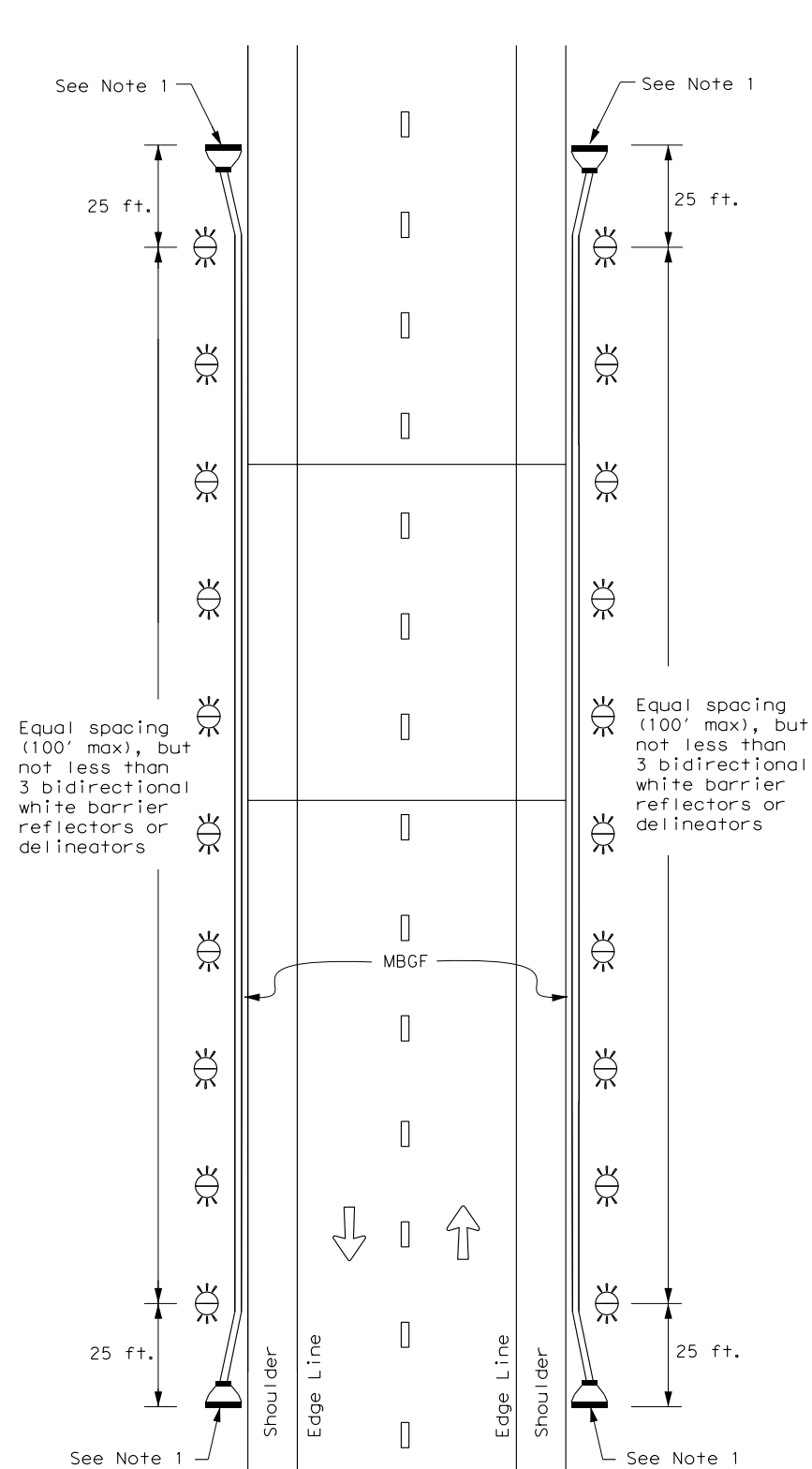
## TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



### NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

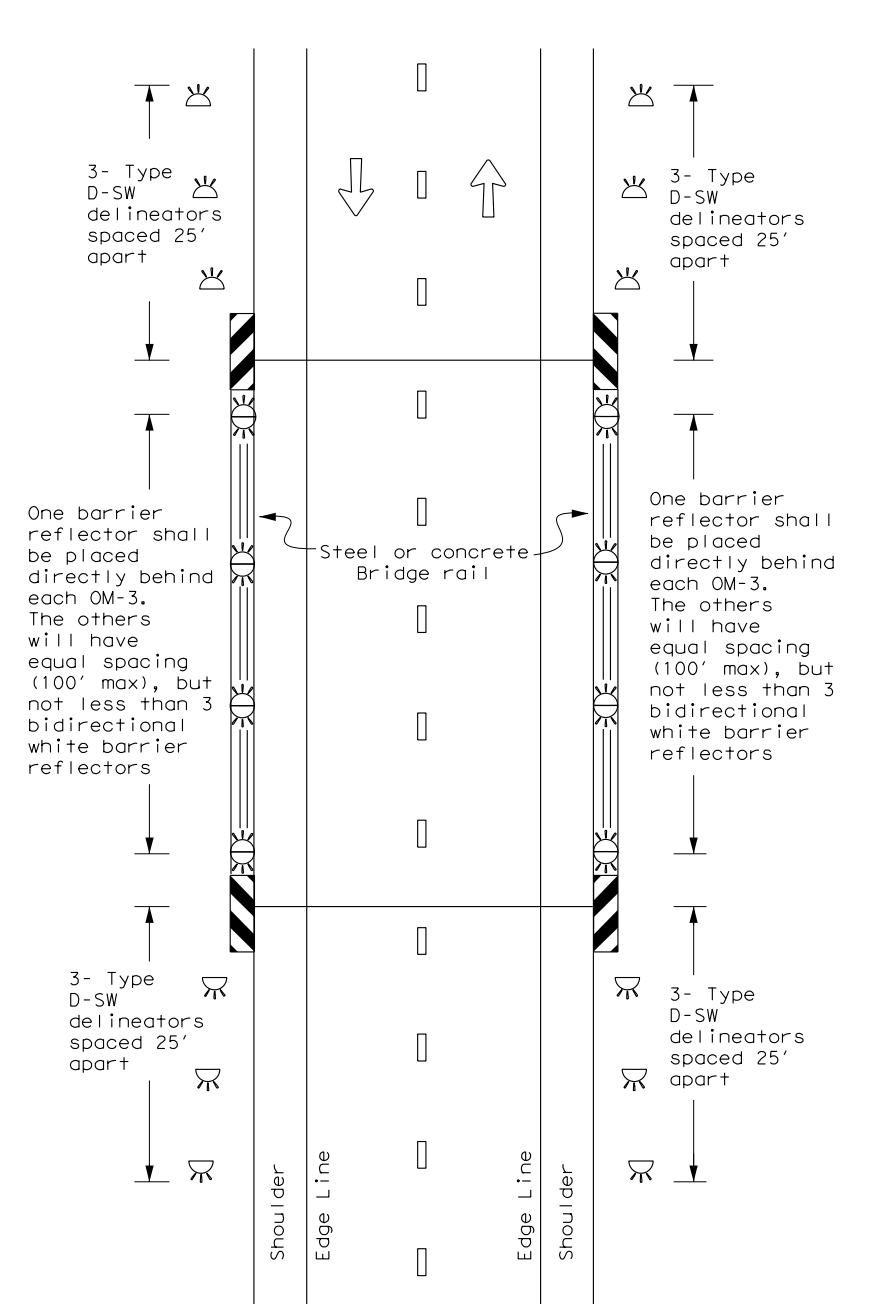
## TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



### NOTE:


1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

## TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



### LEGEND

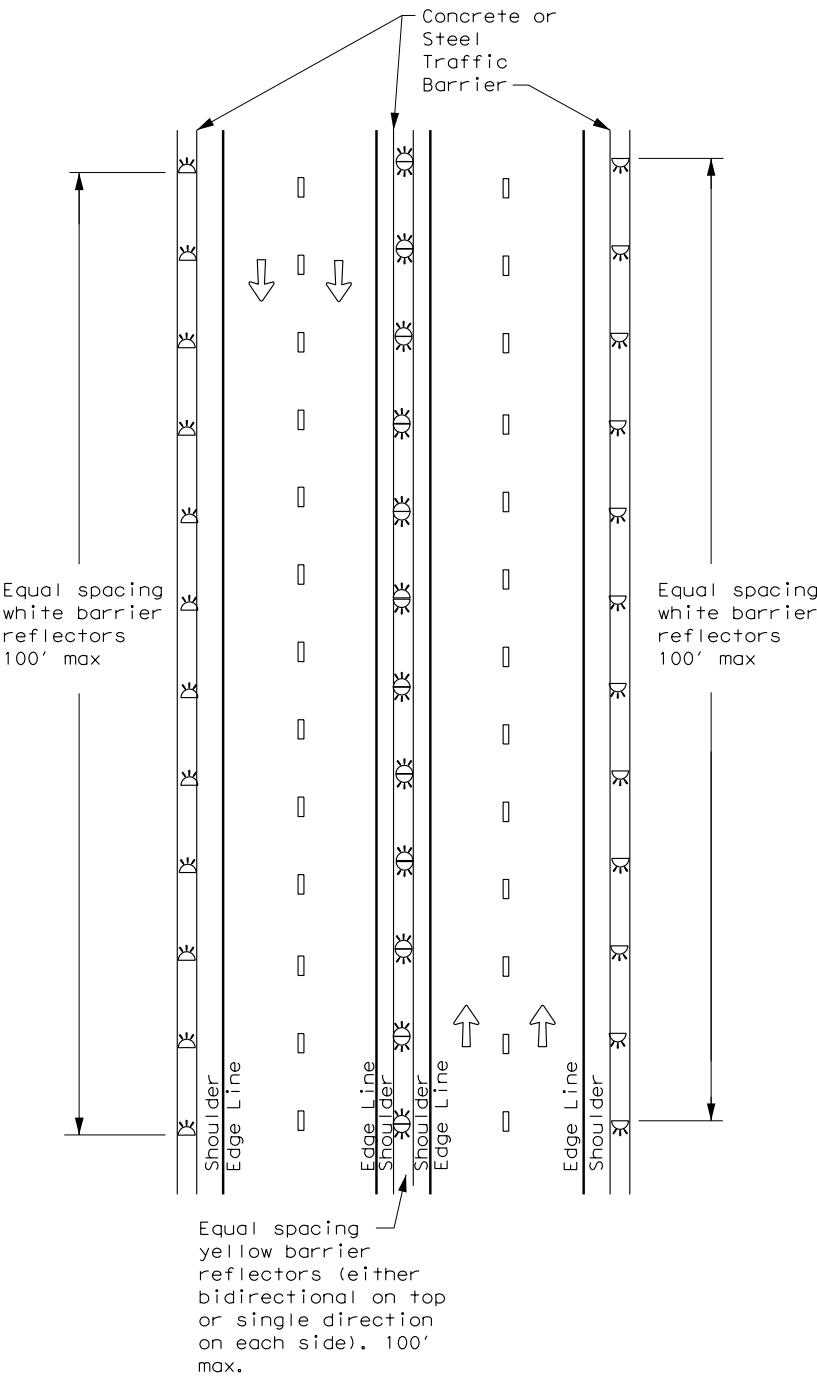
	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

 <b>Texas Department of Transportation</b>		<b>Traffic Safety Division Standard</b>	
<div>DEL INEATOR &amp; OBJECT MARKER PLACEMENT DETAILS</div> <div>D &amp; OM(5) -20</div>			
FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT August 2015	CONT	SECT	JOB
REVISIONS			HIGHWAY
7-20			TOLL 49
	DIST	COUNTY	SHEET NO.
		SMITH	91

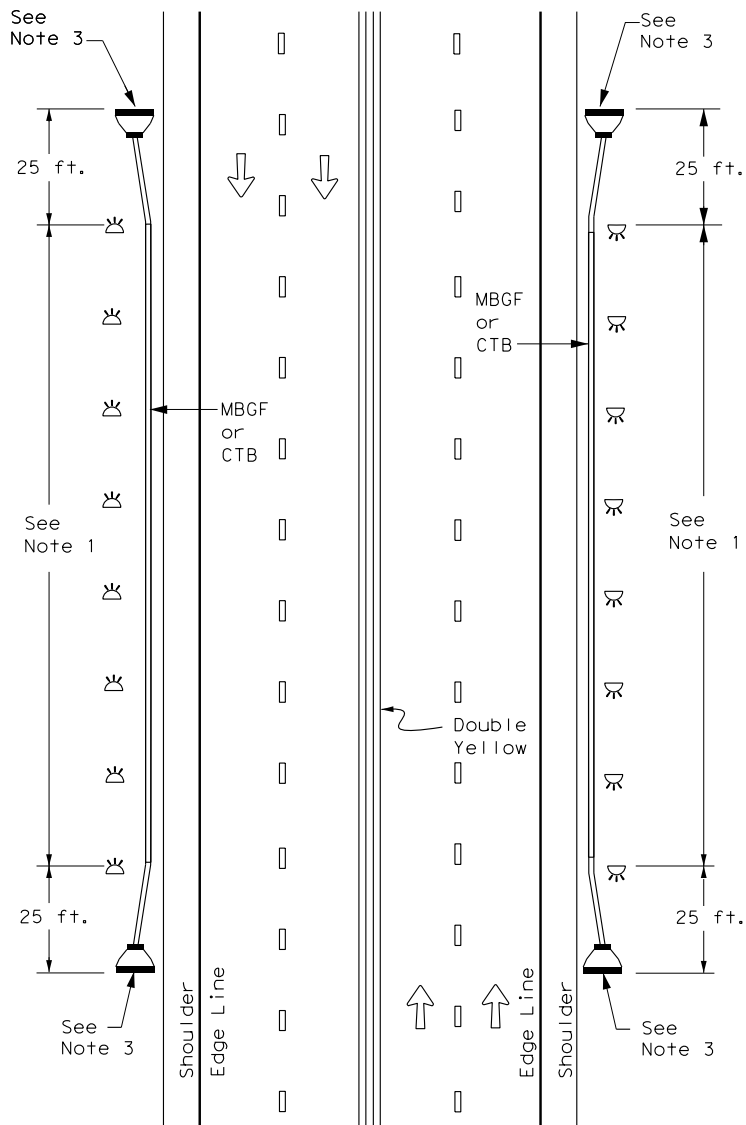
DISCLAIMER:  
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 12/21/2021 4:59:41 PM  
FILE: d:\pw\_work\atknat\01\meca2543\dms73723\dom6-20.dgn

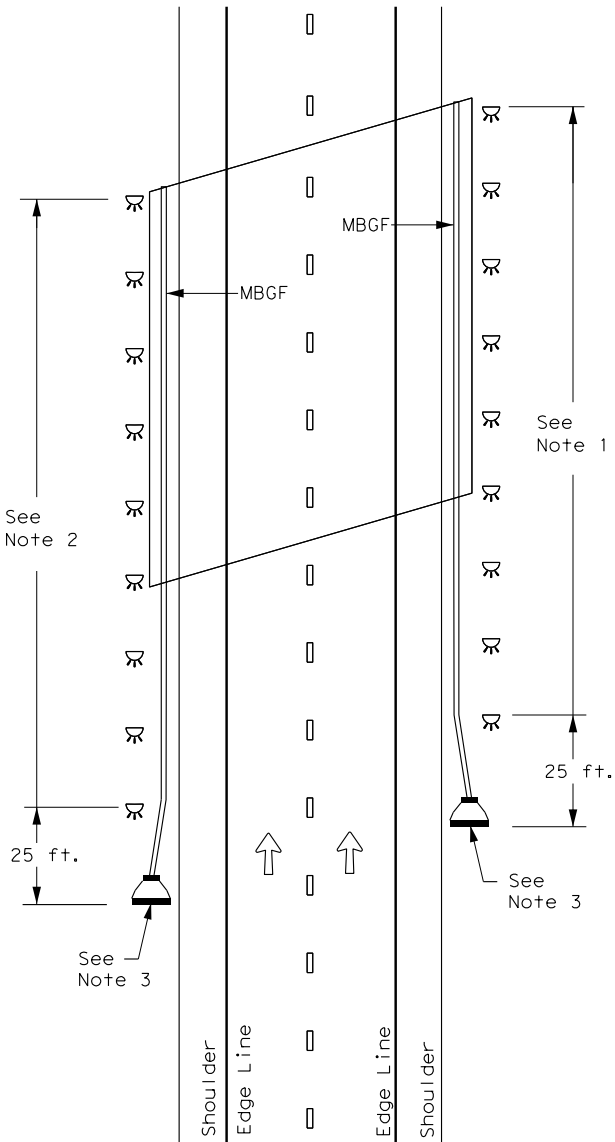
CONTINUOUS CONCRETE  
OR STEEL BARRIER



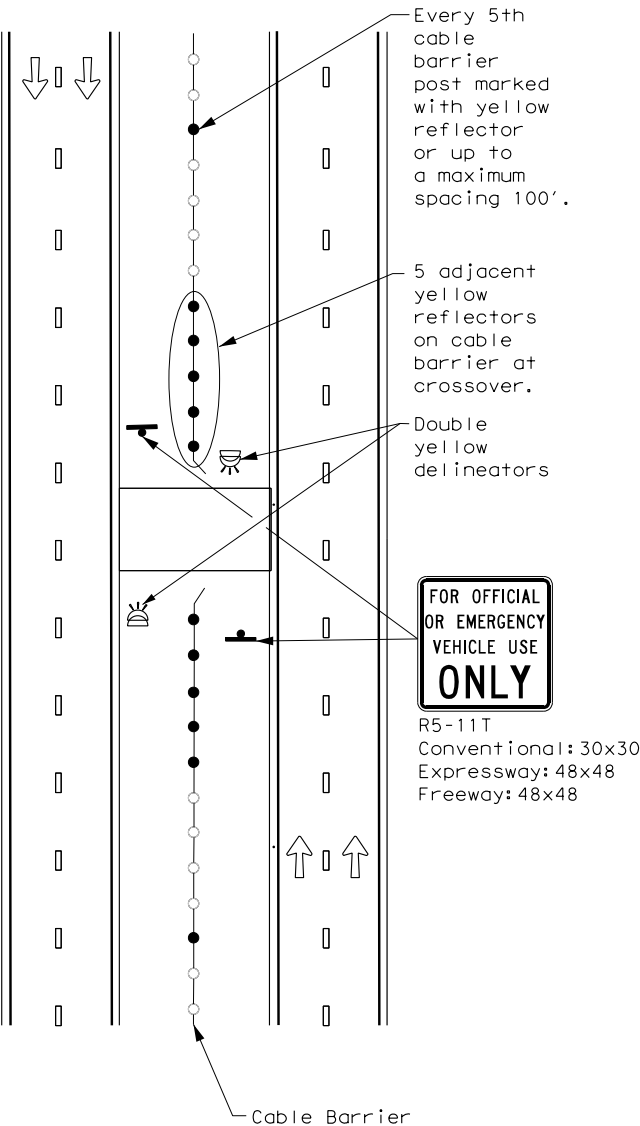
MULTI-LANE UNDIVIDED,  
TWO-WAY ROADWAY WITH  
METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH  
METAL BEAM GUARD  
FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100' max), but not less than 3 single directional white barrier reflectors or delineators. On Continuous Barrier, equal spacing (100' max.)
2. Equal spacing (100' max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow



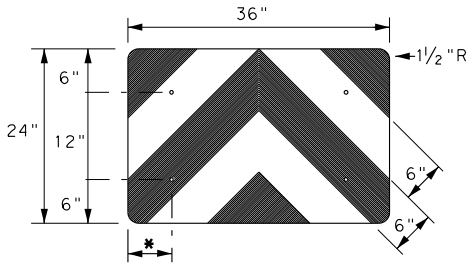
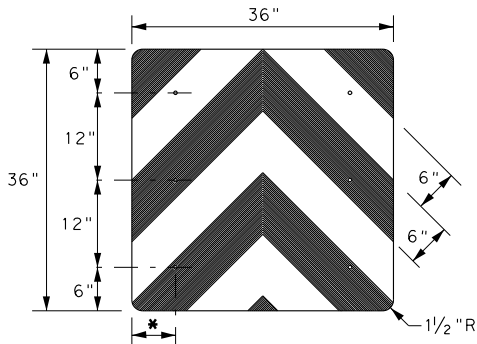
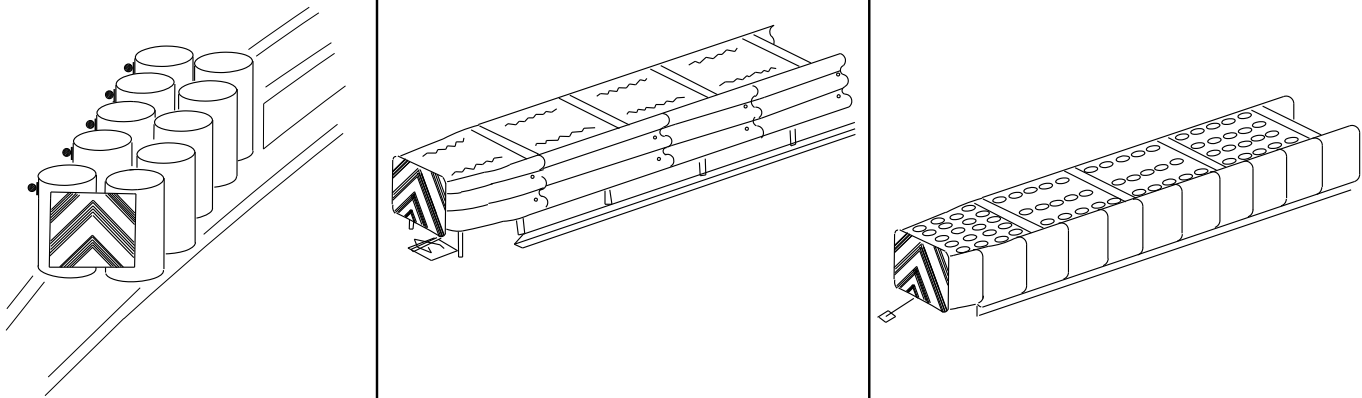
DELINEATOR &  
OBJECT MARKER  
PLACEMENT DETAILS

D & OM(6) -20

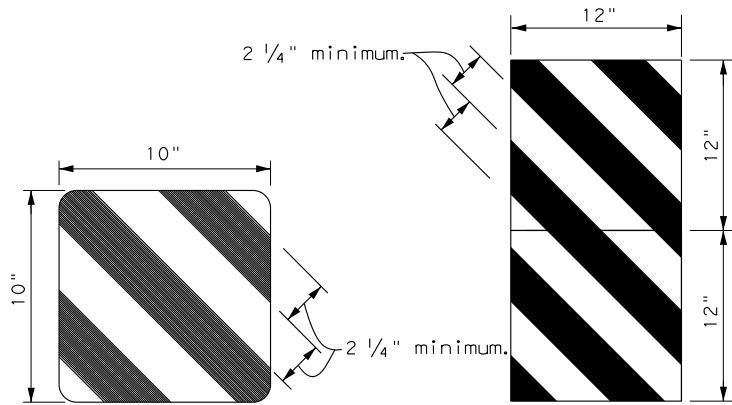
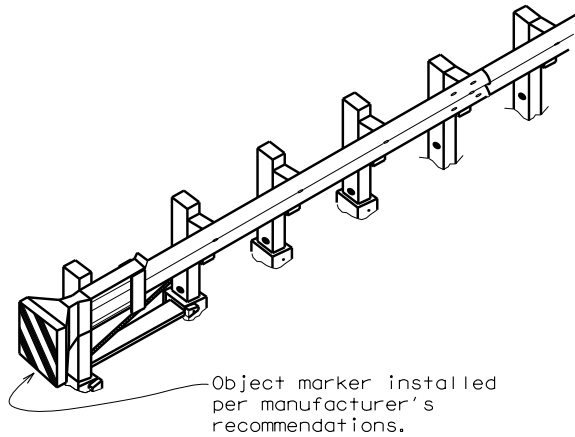
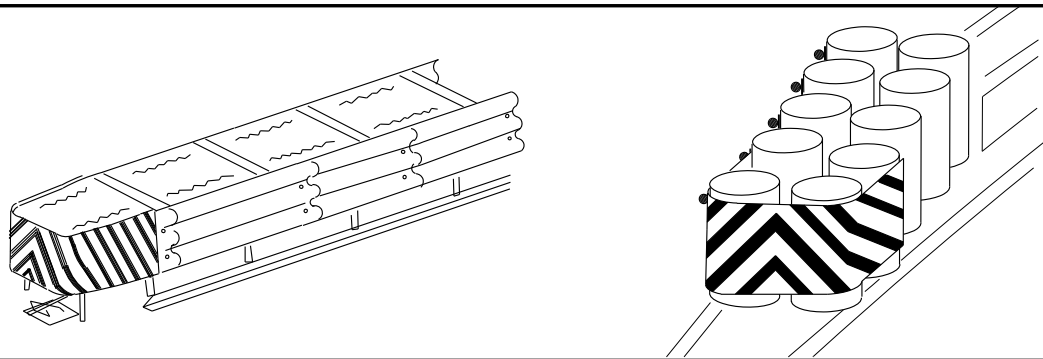
FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				TOLL 49
7-20	DIST	COUNTY	SHEET NO.	
		SMITH		92

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

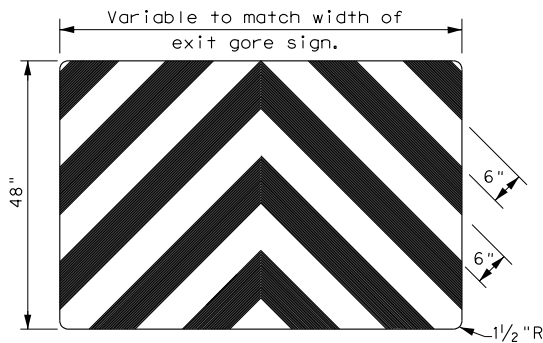
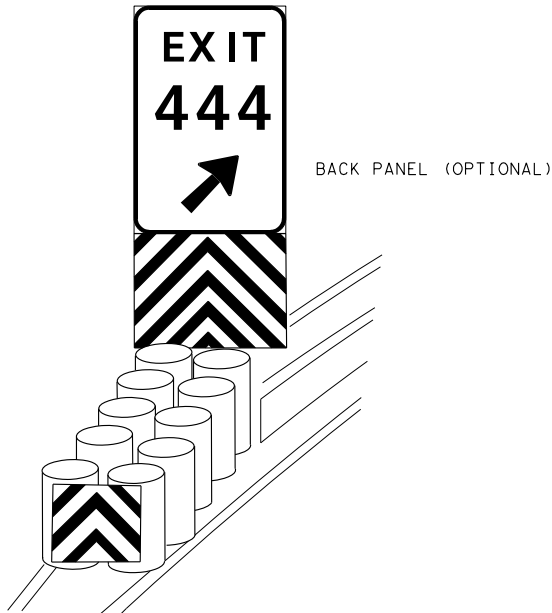
DATE: 12/21/2021 4:59:46 PM  
FILE: d:\pw\_work\atknat\01\meca2543\dms73723\domvia-20.dgn



\* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

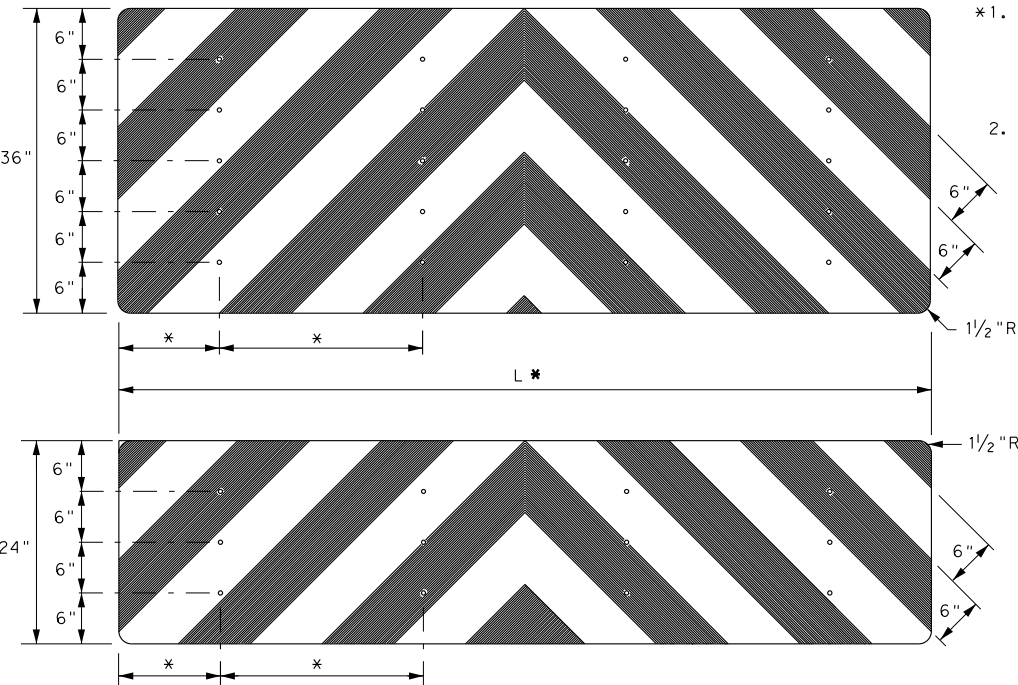


OBJECT MARKERS SMALLER THAN 3 FT<sup>2</sup>



#### NOTES

1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.
2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

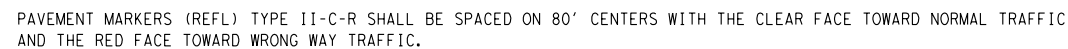


#### NOTES

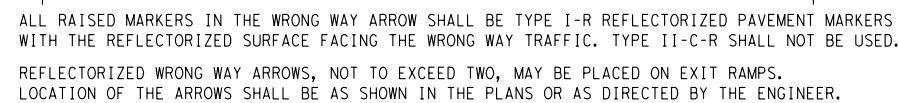
1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.
2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.
3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 1/4".
4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.
5. Object Marker at nose of attenuator is subsidiary to the attenuator.
6. See D & OM (1-4) for required barrier reflectors.

				Traffic Safety Division Standard	
DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS					
D & OM(VIA)-20					
FILE: domvia20.dgn	DN: TxDOT	CK: TxDOT	DN: TxDOT	CK: TxDOT	
© TxDOT December 1989	CONT	SECT	JOB	HIGHWAY	
REVISIONS			TOLL 49		
4-92 8-04	DIST		COUNTY	SHEET NO.	
8-95 3-15			SMITH	93	
4-98 7-20					
20G					

DATE: 12/21/2021 4:59:52 PM  
FILE: d:\pw\work\atknatx01\mcca2543\dms73723\fpml-12.dan



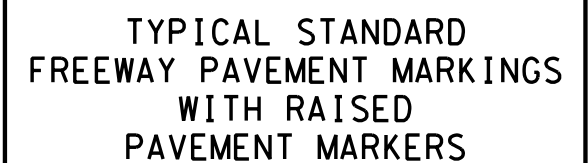
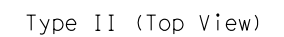
EDGELINES SHOULD TYPICALLY BE 4" WIDE AND THE MATERIALS SHALL BE AS SPECIFIED IN THE PLANS.  
IF RAISED PROFILE PAVEMENT MARKINGS ARE USED SEE DETAILS BELOW.



PARALLEL ACCELERATION LANE



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



FPM(1)-12

© TxDOT May 1974		DN: TXDOT		CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISONS		CONT	SECT	JOB		HIGHWAY
4-92	2-10					
5-00	2-12					TOLL 49
8-00		DIST	COUNTY			SHEET NO.
2-08			SMITH			94