FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
			1
STATE	STATE DIST.NO.	COUNTY	
TEXAS	22	LASALLE,ETC.	
CONT.	SECT.	JOB	HIGHWAY NO.
6417	14	001	VARIOUS

SHEET NO. | INDEX OF SHEETS | DESCRIPTION

SEE SHEET 2

STATE OF TEXAS
TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
HIGHWAY ROUTINE MAINTENANCE CONTRACT

PROJECT NO. RMC: 641714001
PROJECT LENGTH : VARIOUS
PROJECT LIMITS : VARIOUS
COUNTY : LA SALLE, ETC.
HIGHWAY : VARIOUS
RMC# 6417-14-001

FOR THE REPAIR OF MISCELLANEOUS CONCRETE

FINAL PLANS

Letting Date :
Work Began :
Date Accepted :
Contractor :
Total Cost :

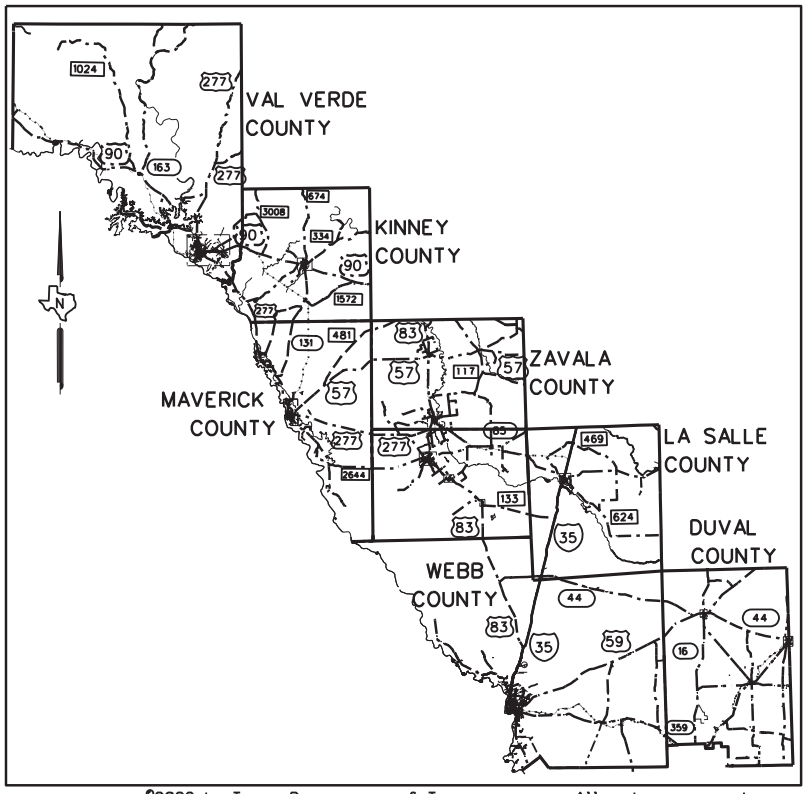
THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH A SINGLE ASTERISK(*) HAVE BEEN ISSUED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

DATE 12/19/2023

DocuSigned by:
Vanessa Rosales-Herrera
70CAB6EA8F3B42B...
VANESSA I ROSALES-HERRERA, P.E.

STATE OF TEXAS
VANESSA I ROSALES-HERRERA
103736
LICENSED
PROFESSIONAL ENGINEER

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

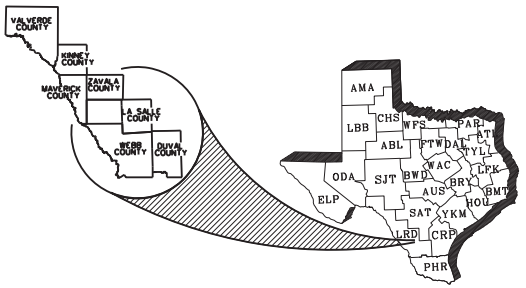


TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING: 12/19/2023

APPROVED FOR LETTING: 12/19/2023

DocuSigned by:
Vanessa Rosales-Herrera
70CAB6EA8F3B42B...
VANESSA I ROSALES-HERRERA, P.E.
DIRECTOR OF MAINTENANCE



EQUATIONS:	NONE
EXCEPTIONS:	NONE
RAILROAD CROSSINGS:	NONE

INDEX OF SHEETS

INDEX OF SHEETS

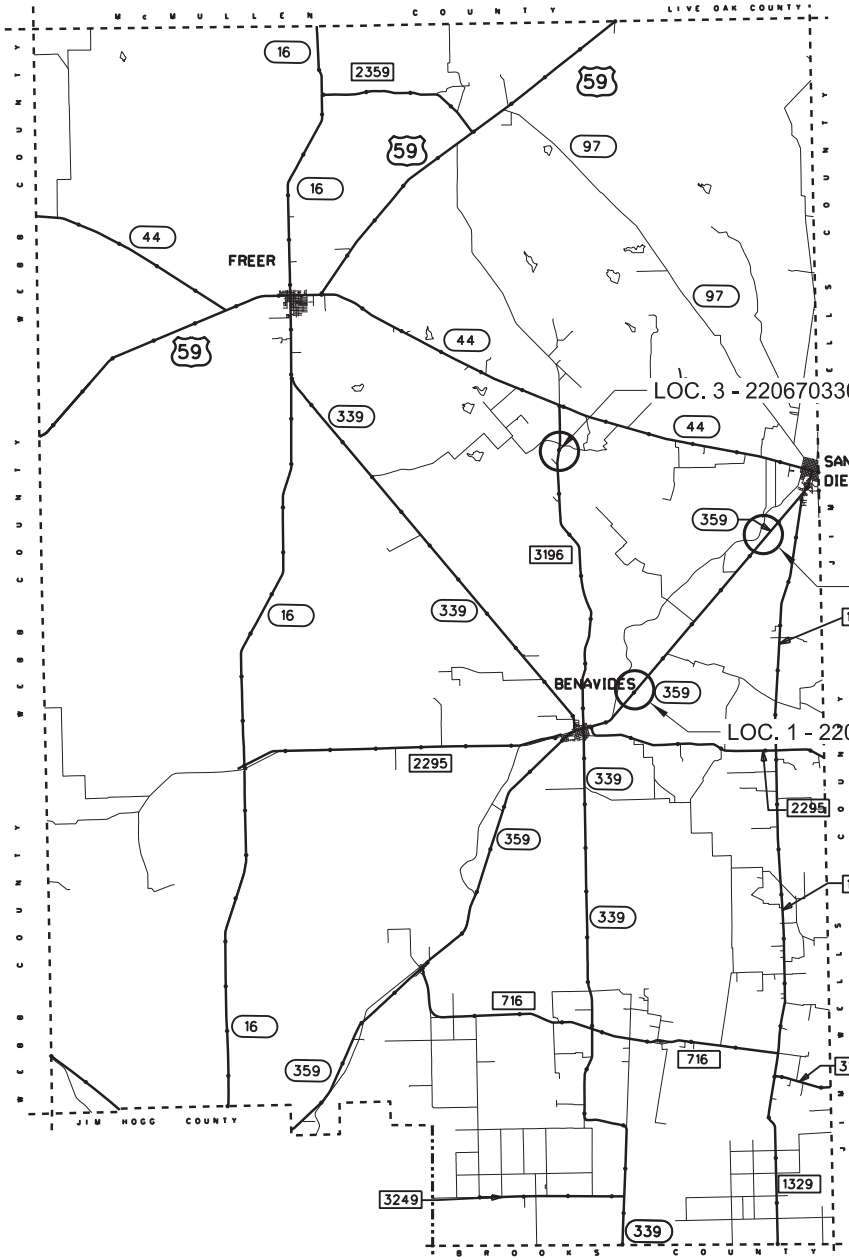
DN: OS	DW: OS	STATE	SHEET NUMBER	SHEET NO.
CK: VR	CK: VR	TEXAS	SHEET 1 OF 1	
FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.	6417	14	001	VARIOUS	2

COUNTY	LOCATION NUMBER	HWY	FEATURE CROSSED	PSN BRIDGE *	LONGITUDE	LATITUDE
Duval	1	SH 359	PIEDRAS PINTAS CREEK	220670008610025	-98.37792451	27.61531981
Duval	2	SH 359	DRAW	220670008610035	-98.27799409	27.71737885
Duval	3	FM 3196	ROSITA CREEK	220670330501001	-98.42296549	27.78231634
La Salle	4	IH 35 SB	FM 469	221420001708146	-99.19764201	28.57827092
La Salle	5	IH 35 NB	IH 35 C BUSINESS	221420001708243	-99.2376401	28.45074656
La Salle	6	IH 35 NB	IH 35 C BUSINESS	221420001801099	-99.25124021	28.41765511
La Salle	7	IH 35 SB	IH 35 C BUSINESS	221420001801100	-99.25144222	28.4176971
La Salle	8	IH 35 SB	2ND ELM CREEK	221420001802114	-99.28528165	28.27522507
La Salle	9	IH 35 NB	3RD ELM CREEK	221420001802118	-99.28681467	28.27025331
La Salle	10	IH 35 SB	SERVICE RD	221420001802131	-99.31595326	28.17784686
La Salle	11	FM 469	SALEM CREEK	221420143501003	-99.00010442	28.44711027
La Salle	12	FM 468	SAGE CREEK	221420154502005	-99.36913703	28.49407767
La Salle	13	FM 624	QUINTANA CREEK	221420237301019	-98.83814461	28.20208337
La Salle	14	IH 35 SB	3RD ELM CREEK	221420001802117	-99.28701668	28.27029131
La Salle	15	IH 35 SB	LAS RAICES CREEK	221420001802120	-99.292339	28.253653
La Salle	16	IH 35 SB	JABONCILLOS CREEK	221420001802136	-99.336768	28.099134
La Salle	17	FM 133	DRAW	221420023701011	-99.36569	28.288148
La Salle	18	IH 35 SB	SH 44	221420001802140	-99.350325	28.046153
La Salle	19	IH 35 EFR	3RD ELM CREEK	221420001802119	-99.28731	28.27037
La Salle	20	IH 35	DRAW	221420001802129	-99.300318	28.226923
La Salle	21	SH 97	MUSTANG CREEK	221420048301032	-99.229051	28.438676
La Salle	22	FM 133	2ND ELM CREEK	221420023701015	-99.303924	28.282254
La Salle	23	FM 133	W BR OF LAS RAICES CREEK	221420023701012	-99.347321	28.28536
La Salle	24	IH 35 WFR	2ND ELM CREEK	221420001802006	-99.28588	28.275695
La Salle	25	IH 35	CIBOLO CREEK BRANCH	221420001708145	-99.194829	28.587035
La Salle	26	IH 35 NB	NUECES RVR & TURNAROUND	221420001801097	-99.250885	28.427322
La Salle	27	SH 97	DRAW	221420048301030	-99.2313339	28.43772429
La Salle	28	SH 97	DRAW	221420048301011	-99.196025	28.44790556
La Salle	29	IH 35	CHUCARETO CREEK	221420001802014	-99.285465	28.275109
La Salle	30	IH 35	2ND RAICES CREEK	221420001802009	-99.292612	28.253678
La Salle	31	IH 35 SB	IH 35 C BUSINESS	221420001708244	-99.237752	28.450911
La Salle	32	IH 35	DRAW	221420001708151	-99.22436607	28.48908475
Kinney	33	US 90	DRAW	221360002304024	-100.1552207	29.23795665
Val Verde	34	US 90	E FORK SAN FELIPE CREEK	222330002301002	-100.88400000	29.36984
Val Verde	35	US 277	MAIL TRAIL CREEK	222330016004022	-100.75400000	29.98369
Val Verde	36	US 277	REDBLUFF CREEK	222330016005017	-100.80000000	29.81551
Webb	37	IH35 NBML	CARRIZITOS CREEK	222400001804066	-99.42321782	27.78710666
Webb	38	IH 35 NB	US 83	222400001805110	-99.43849637	27.75824384
Webb	39	SH 359	SAN JUANITO CREEK NO 1	222400008602007	-99.20964084	27.47662241
Webb	40/41	US 83 NB/SB	ESPEJO-MOLINA RD	222400003801083/082	-99.45975959	27.36313517
Webb	42	US 83 NB	US 83 (EAST OF IH 35)	CLOSING CONC. CUVLERT		
Zavala	43	FM 65	NUECES RIVER	222540065201011	-99.78426517	28.65409211

NOTE: SEE ADDITIONAL LOCATION MAPS MAVERICK, AND WEBB FOR CONCRETE REPAIRS.

PROJECT LOCATION REFERENCE

DN: SP	DW: SP	STATE	SHEET NUMBER				SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 1 OF 1				
FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	3
	22	LASALLE,ETC.	6417	14	001	VARIOUS	



LOC *	HWY	PSN *	TYPE	LENGTH (FT.)
1	SH 359	22-067-0-0086-10-025	SPAN	65'
2	SH 359	22-067-0-0086-10-035	SPAN	26'
3	FM 3196	22-067-0-3305-01-001	SPAN	270'

DUVAL COUNTY

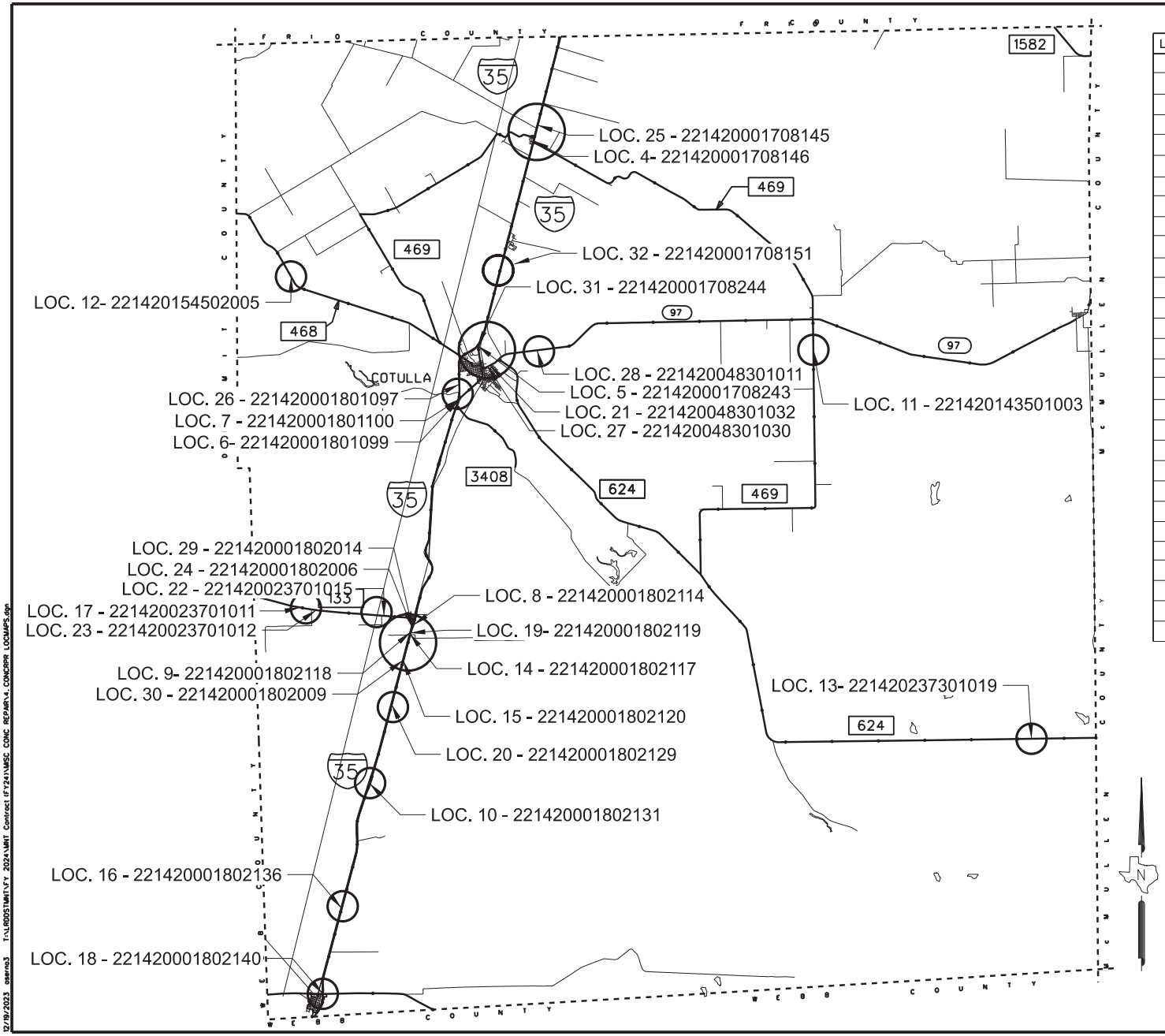
NOT TO SCALE

TEXAS DEPARTMENT OF TRANSPORTATION®

DUVAL COUNTY LOCATION MAP

DN: C.M.	CK: V.R.	DW: C.M.	CK: V.R.	STATE	SHEET NUMBER	SHEET NO.
				TEXAS	SHEET 1 OF 6	

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.	6417	14	001	VARIOUS	4



LOC •	HWY	PSN •	TYPE	LENGTH (FT.)
4	IH 35 SB	22-142-0-0017-08-146	SPAN	220'
5	IH 35 NB	22-142-0-0017-08-243	SPAN	220'
6	IH 35 NB	22-142-0-0018-01-099	SPAN	120'
7	IH 35 SB	22-142-0-0018-01-100	SPAN	120'
8	IH 35 SB	22-142-0-0018-02-114	SPAN	160'
9	IH 35 NB	22-142-0-0018-02-118	SPAN	260'
10	IH 35 SB	22-142-0-0018-02-131	SPAN	130'
11	FM 469	22-142-0-1435-01-003	SPAN	80'
12	FM 468	22-142-0-1545-02-005	SPAN	120'
13	FM 624	22-142-0-2373-01-019	SPAN	160'
14	IH 35 SB	22-142-0-0018-02-117	SPAN	260'
15	IH 35 SB	22-142-0-0018-02-120	SPAN	200'
16	IH 35 SB	22-142-0-0018-02-136	SPAN	160'
17	FM 133	22-142-0-0237-01-011	CULV	28'
18	IH 35 SB	22-142-0-0018-02-140	SPAN	175'
19	IH 35 EFR	22-142-0-0018-02-119	SPAN	260'
20	IH 35	22-142-0-0018-02-129	CULV	10'
21	SH 97	22-142-0-0483-01-032	SPAN	91'
22	FM 133	22-142-0-0237-01-015	SPAN	50'
23	FM 133	22-142-0-0237-01-012	SPAN	50'
24	IH 35 WFR	22-142-0-0018-02-006	SPAN	147'
25	IH 35	22-142-0-0017-08-145	CULV	93'
26	IH 35 NB	22-142-0-0018-01-097	SPAN	1270'
27	SH 97	22-142-0-0483-01-030	CULV	68'
28	SH 97	22-142-0-0483-01-011	CULV	34'
29	IH 35	22-142-0-0018-02-014	CULV	31'
30	IH 35	22-142-0-0018-02-009	CULV	89'
31	IH 35 SB	22-142-0-0017-08-244	SPAN	220'
32	IH 35	22-142-0-0017-08-151	CULV	34'

LA SALLE COUNTY

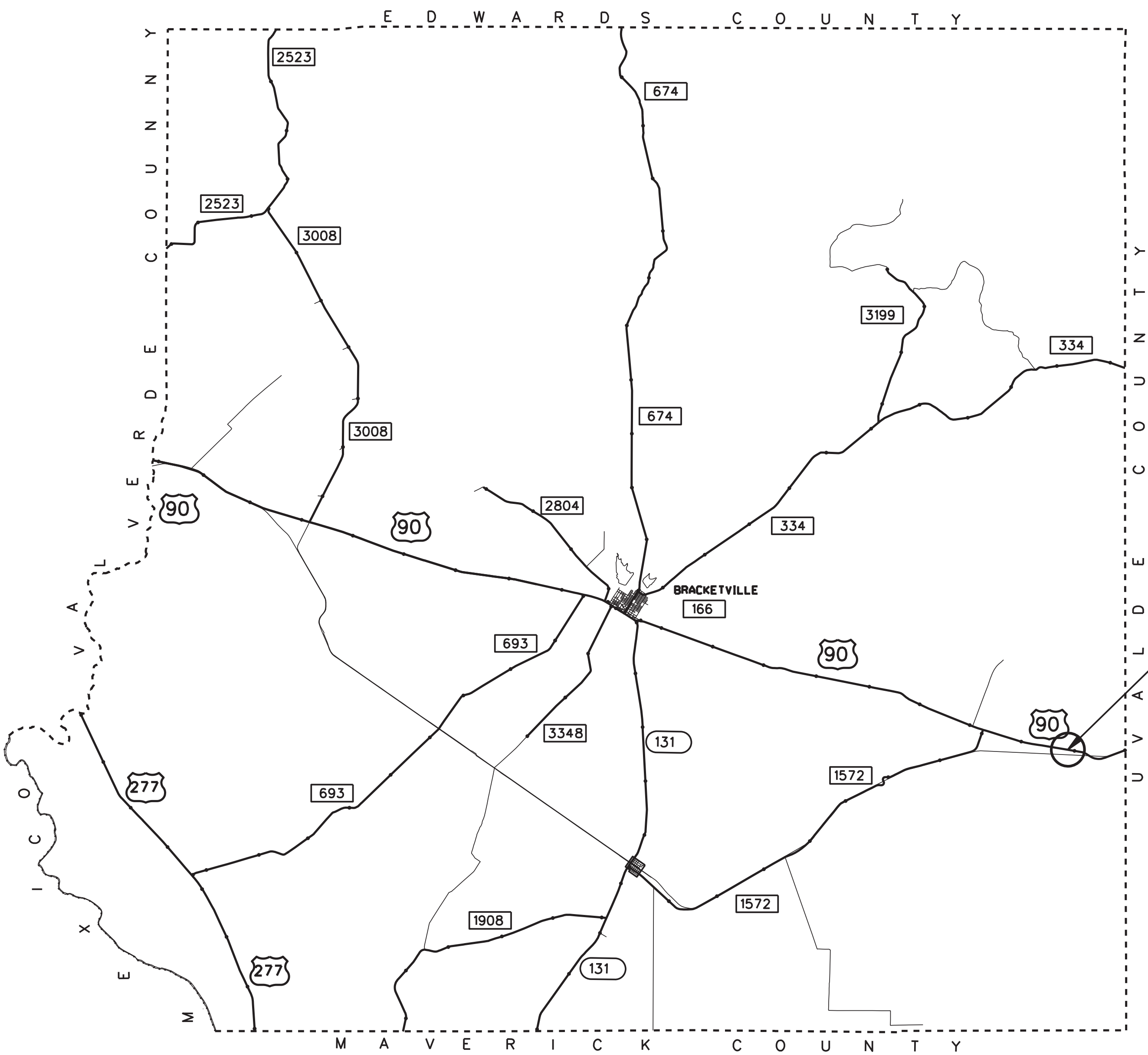
NOT TO SCALE

TEXAS DEPARTMENT OF TRANSPORTATION ®

LA SALLE COUNTY
LOCATION MAP

DN: C.M.	CK: V.R.	DW: C.M.	CK: V.R.	STATE	SHEET NUMBER	SHEET NO.
				TEXAS	SHEET 2 OF 6	
FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY		CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.		6417	14	001	VARIOUS	5

LOC *	HWY	PSN *	TYPE	LENGTH (FT.)
33	US 90	22-136-0-0023-04-024	CULV	23'



KINNEY COUNTY

NOT TO SCALE

TEXAS DEPARTMENT OF TRANSPORTATION ®
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KINNEY COUNTY
LOCATION MAP

DN: C.M.	DW: C.M.	STATE	SHEET NUMBER	SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 3 OF 6	

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	SHEET NO.
	22	LASALLE,ETC.	6417	14	001	VARIOUS	6

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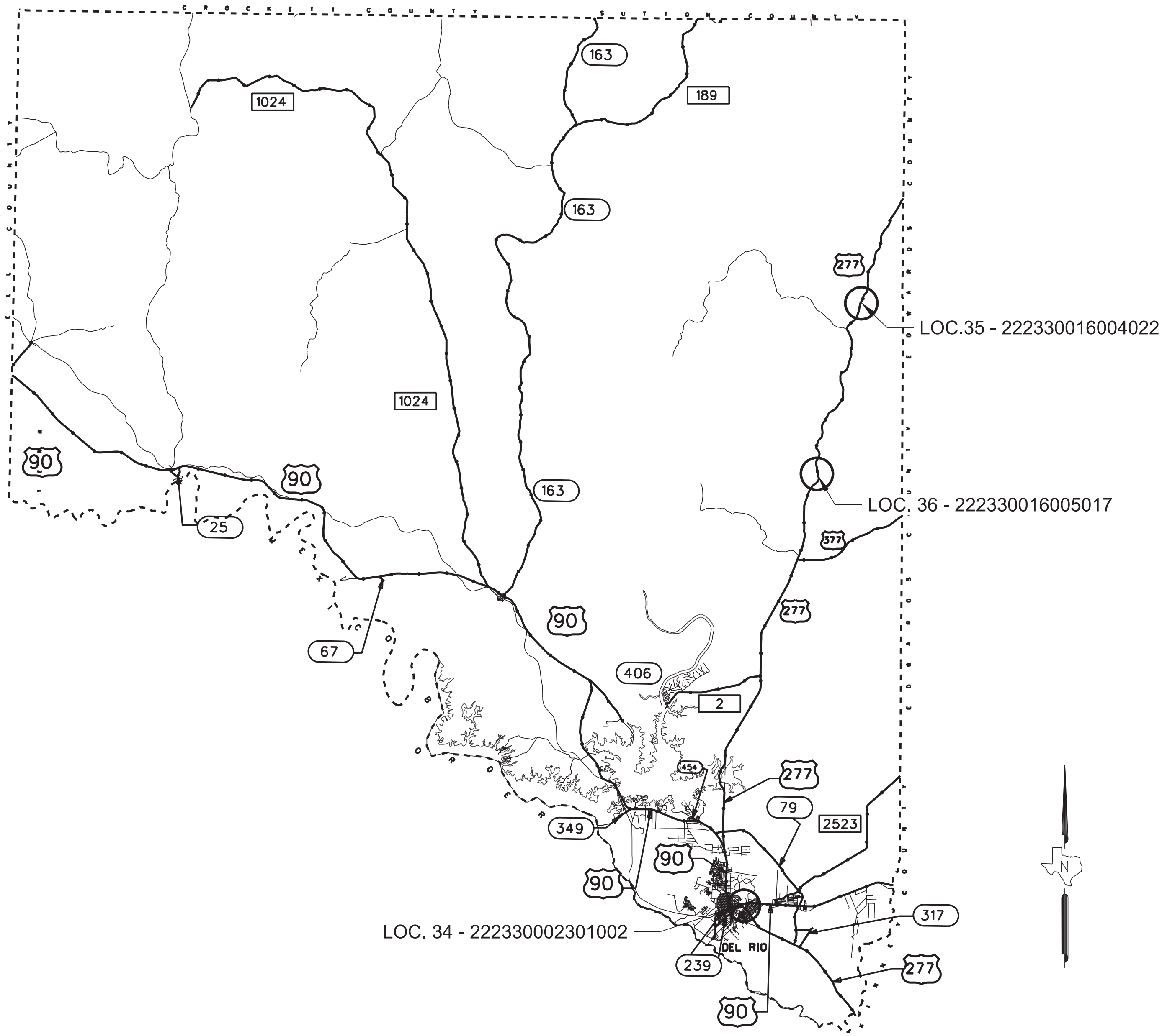


LOC #	HWY	PSN #	TYPE	LENGTH (FT.)
34	US 90	22-233-0-0023-01-002	SPAN	150'
35	US 277	22-233-0-0160-04-022	SPAN	800'
36	US 277	22-233-0-0160-05-017	SPAN	630'

VAL VERDE COUNTY

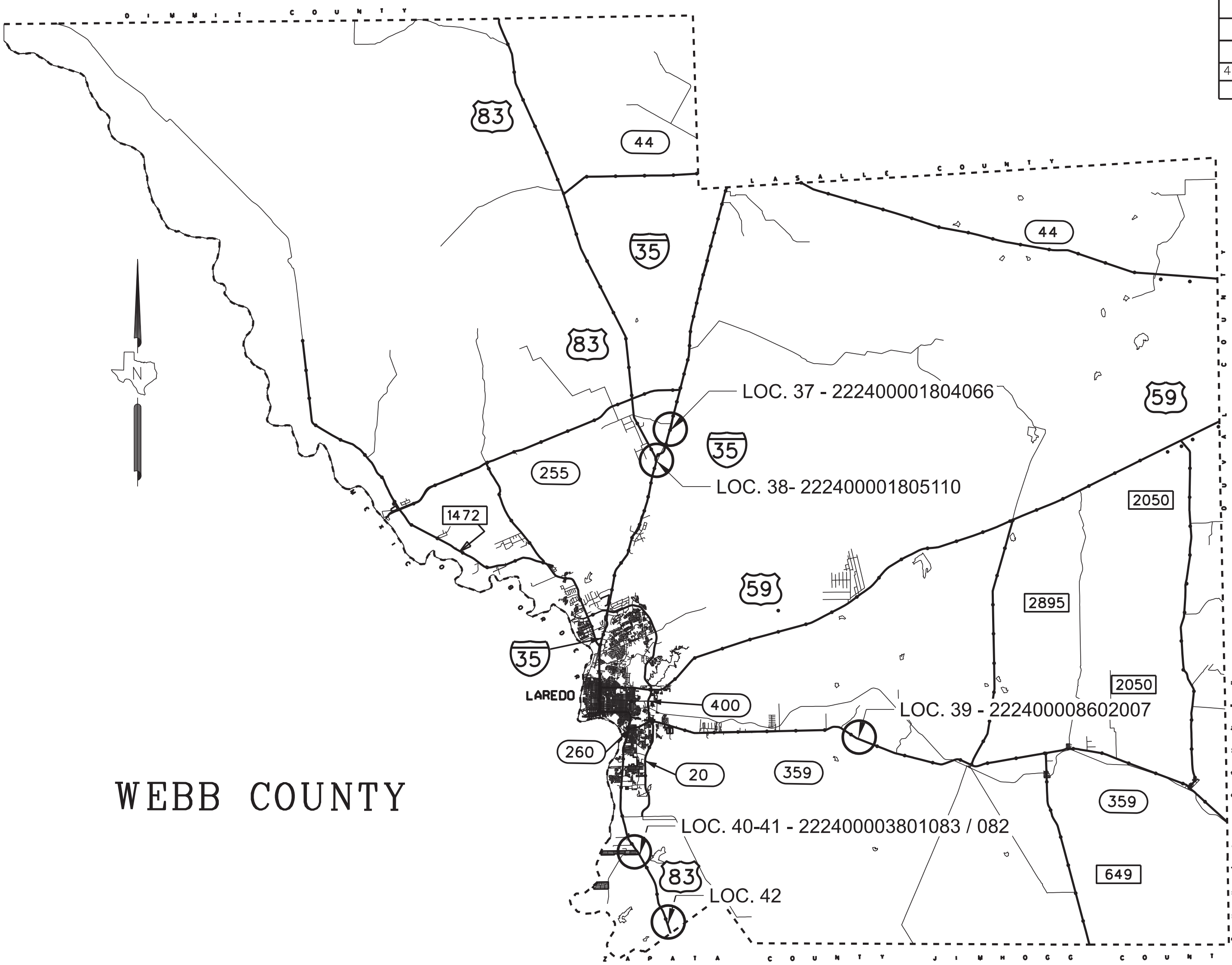
NOT TO SCALE

VAL VERDE COUNTY
LOCATION MAP

DN: C.M.		DW: C.M.	STATE	SHEET NUMBER				SHEET NO.
CK: V.R.		CK: V.R.	TEXAS	SHEET 4 OF 6				
FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.		
	22	LASALLE,ETC.	6417	14	001	VARIOUS		7

12/19/2023 oserno3 T:\LRDOSTMNT\FY 2024\MNT Contract (FY24)\MSC CONC REPAIR\4. CONCRPR LOCMAPS.dgn

LOC #	HWY	PSN #	TYPE	LENGTH (FT.)
37	IH35 NBML	22-240-0-0018-04-066	SPAN	128'
38	IH35 NB	22-240-0-0018-05-110	SPAN	120'
39	SH 359	22-240-0-0086-02-007	SPAN	22'
40/41	US 83	22-240-0-0038-01-083/082	SPAN	217'
42	US 83	CLOSING CONC CULVERT	CULV	-



WEBB COUNTY

NOT TO SCALE

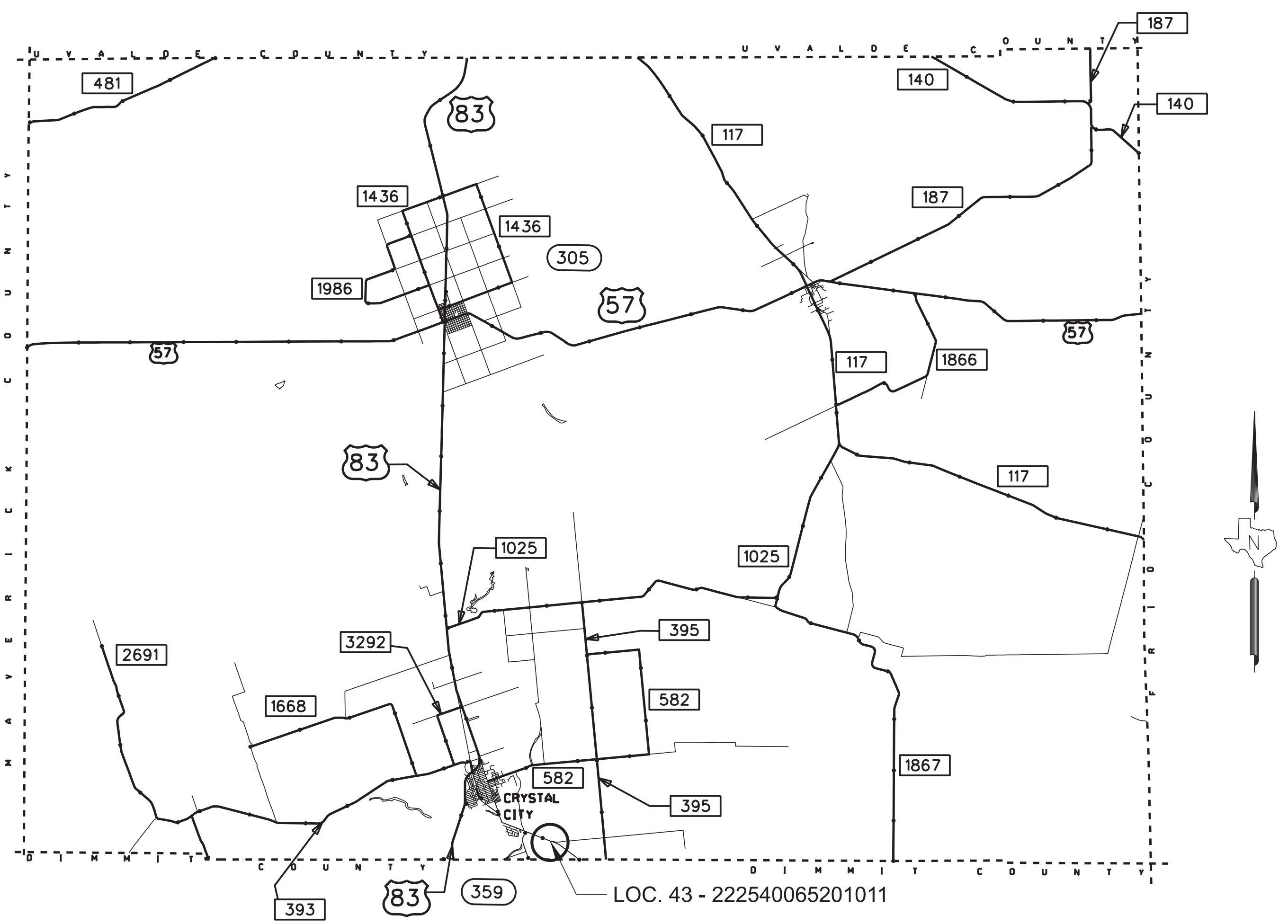
TEXAS DEPARTMENT OF TRANSPORTATION ®

WEBB COUNTY
LOCATION MAP

DN: C.M.	DW: C.M.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 5 OF 6			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	8

12/19/2023 oserno3 T:\LRDOSTMNT\FY 2024\MNT Contract (FY24)\MSC CONC REPAIR\4. CONCRPR LOCMAPS.dgn

LOC #	HWY	PSN #	TYPE	LENGTH (FT.)
43	FM 65	22-254-0-0652-01-011	SPAN	190'



ZAVALA COUNTY

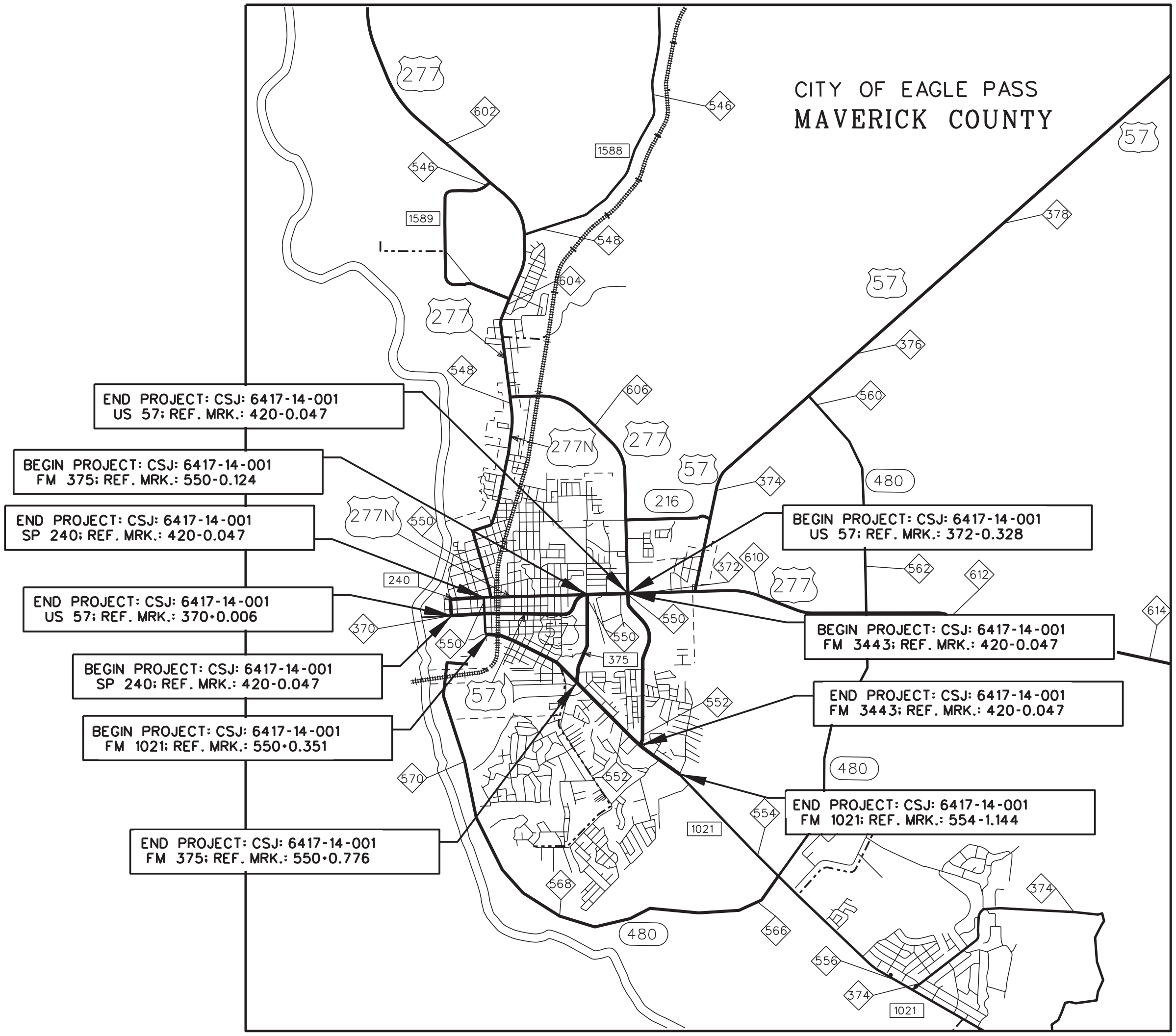
NOT TO SCALE

TEXAS DEPARTMENT OF TRANSPORTATION ®

ZAVALA COUNTY
LOCATION MAP

DN: C.M.	DW: C.M.	STATE	SHEET NUMBER		SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 6 OF 6		
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION / JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14 / 001	VARIOUS	9

12/19/2023 oserno3 T:\LRDOSTMNT\FY 2024\MNT Contract (FY24)\MSC CONC REPAIR\4. CONCRPR LOCMAPS.dgn

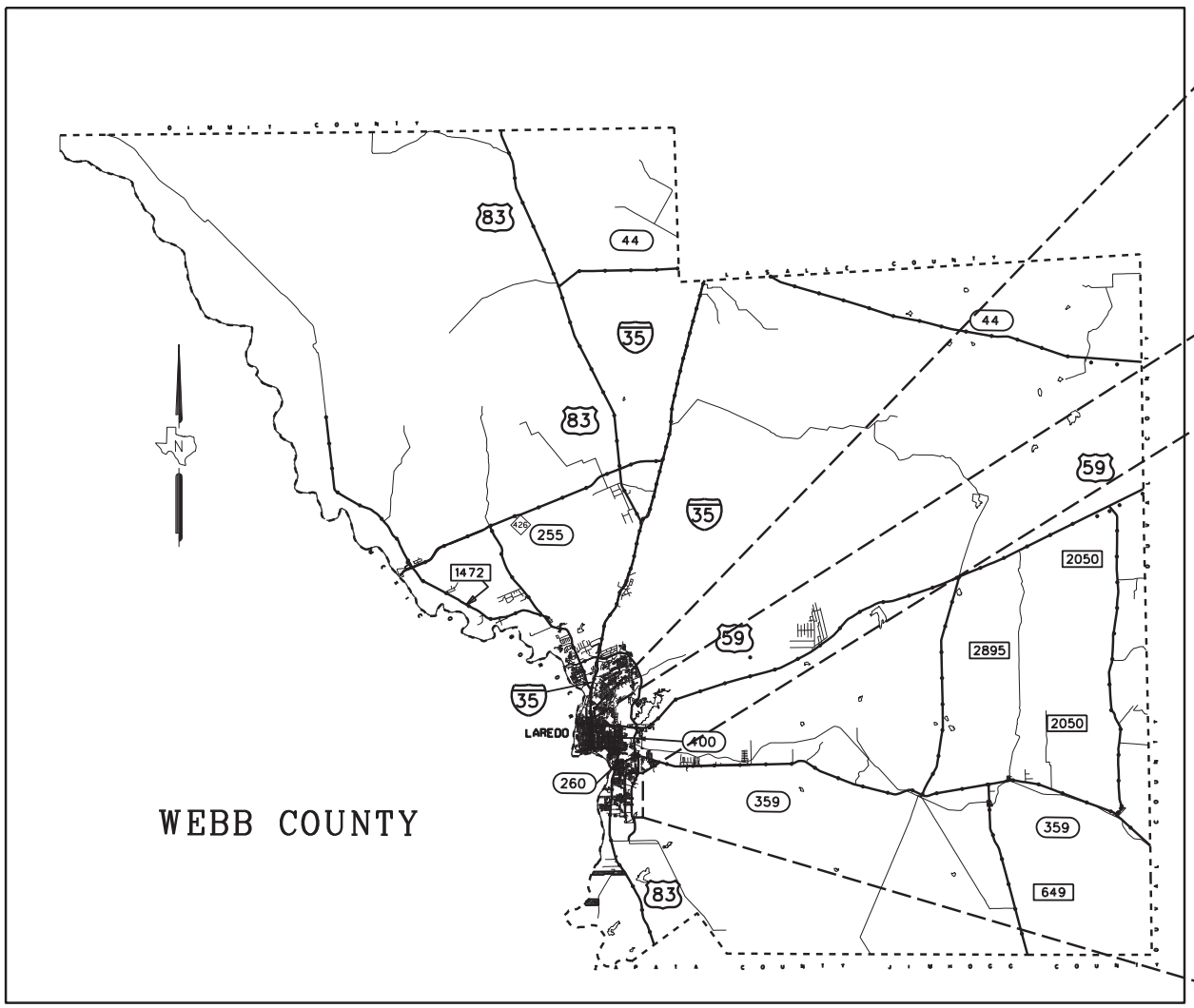


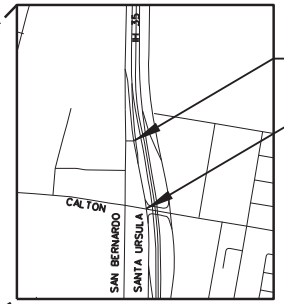
TEXAS DEPARTMENT OF TRANSPORTATION ®

MAVERICK COUNTY CONCRETE REPAIRS LOCATION MAP

DN: J.G.		DW: J.G.	STATE	SHEET NUMBER					SHEET NO.
CK: V.R.		CK: V.R.	TEXAS	SHEET 1 OF 2					
FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY		CONTROL	SECTION	JOB	HIGHWAY NO.		
	22	LASALLE,ETC.		6417	14	001	VARIOUS		10

12/19/2023 oserna3 T:\LRDOSTMNT\FY 2024\MNT Contract (FY24)\MSC CONC REPAIR\JG_10_CRCP_LAYOUTS_MAVERICK_VALVERDE.dgn





BEGIN PROJECT: CSJ: 6417-14-001
SANTA URSULA: REF. MRK.:3•0.21

END PROJECT: CSJ: 6417-14-001
SANTA URSULA: REF. MRK.:3•0.03

BEGIN PROJECT: CSJ: 6417-14-001
LOOP 20: REF. MRK.: 434•0.28

END PROJECT: CSJ: 6417-14-001
LOOP 20: REF. MRK.:436-0.25

TEXAS DEPARTMENT OF TRANSPORTATION®

LOCATION MAP
CONCRETE REPAIRS
WEBB COUNTY

DN: A.S.	DW: A.S.	STATE	SHEET NUMBER	SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 2 OF 2	

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
	22	LASALLE,ETC.	6417	14	001	VARIOUS

11

12/19/2023 asarmo3 T:\LRGDSTMNT\FY 2024\MNT Contract (FY'24)\MISC CONC REPAIR-JG. 10. CRCP_LAYOUTS_MAVERICK_VALVERDE.dgn

GENERAL NOTES:

The contract becomes effective upon issuance of the work authorization letter and covers a period of one hundred and eighty-two (182) working days.

This contract is for a Miscellaneous Concrete Repair in various counties: Duval, Kinney, La Salle, Maverick, Val Verde, Webb, and Zavala.

Contractor questions on this project are to be addressed to the following individual(s):

Vanessa Rosales-Herrera at vanessa.rosales@txdot.gov
Irazema Cavazos at irazema.cavazos@txdot.gov

Questions may be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following address:

https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

All contractor questions will be reviewed by the Engineer. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page.

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

SUPERVISION:

Report each day, prior to the beginning of work, to the Maintenance Section Supervisor (MSS). Discuss times, places, Contractor inspections, etc. prior to each day, or as directed by the Engineer.

For this project, the Maintenance Supervisors in charge are:

La Salle County
Pedro Garza
Pedro.garza@txdot.gov

Duval County
Servando Casas
servando.casas@txdot.gov

Project Number: RMC: 6417-14-001
County: La Salle, etc.
Highway: Various **Control:** 6417-14-001

Maverick County
Charles Fite
charles.fite@txdot.gov

Val Verde County
Francis Schell, Jr
francis.a.schell@txdot.gov

Webb County
Jose Magana
jose.magana@txdot.gov

Zavala County
Arnulfo Longoria, Jr.
arnulfo.longoria@txdot.gov

Kinney County
Brandon Baxter
brandon.baxter@txdot.gov

Employees are required to wear proper safety equipment. Contractor is responsible for supplying proper safety equipment for employees.

The Contractor is responsible that all material used in this contract be approved and certified by the Materials & Test Division. A listing of state approved material producers is available on the Department's website.

WORK PROSECUTION:

Prior to beginning work, attend a TxDOT arranged Pre-Construction meeting. The Pre-Construction meeting will consider the sequence of work, work locations, traffic control, plans, specifications, unusual conditions, and other pertinent items regarding the work. Written notification will be given advising of when operations may begin. The Contractor will be advised of the applicable number of days allowed to complete the work and the date when the time charges commence. Additional working days for any added work will be determined and allowed by the Engineer.

Designate an on-site representative who has full authority to make decisions with respect to the project. Coordinate all project issues with the Texas Department of Transportation (TxDOT) through the designated on-site representative.

Perform the required work according to the TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES (2014), TEXAS DEPARTMENT OF TRANSPORTATION CONCRETE REPAIR MANUAL (2017), manuals and applicable details, specifications, and special provisions noted in the plans. Have a copy of the standard specification manual at the work site at all times. Purchase standard specification books from the General Services Division, publications sales office at (512)302-0985.

Repair any damage caused by daily operations and restore the facility to serve the public in a timely manner, as directed, at no additional cost to TxDOT.

On a daily basis, clean up all work areas and remove all loose materials resulting from everyday operations before the work is suspended for the day. No loose material will remain at the worksite overnight. Legally dispose of all debris, including any waste material resulting from construction.

At the time of the pre-construction meeting submit a sequence of work that will be followed in order to complete the contract in the allocated time. Show a begin date and duration period in working days. Submit any changes to this sequence for approval.

The attention of prospective bidders is directed to ordinances and regulations of local, municipal, and county governments. The Contractor will procure all municipal, county, and federal government permits and licenses necessary to perform the work.

Leave the project site clean and neat in appearance upon completion and before final acceptance of the project.

ITEM 4 SCOPE OF WORK:

If agreed upon in writing by both parties to the Contract, the Contract may be extended for an additional period of time not to exceed the original Contract time period. The extended Contract shall be for the original bid quantities, terms and conditions plus any approved, applicable change orders.

When the Contract is extended by agreement, a performance and/or payment bond, if required shall be executed in the amount of the extension before the additional work begins.

ITEM 5 CONTROL OF THE WORK:

The Contractor shall maintain and preserve the integrity of all “existing survey markers” by avoiding the disturbance of such markers, which include all control points (horizontal and/or vertical), stakes, marks, and right-of-way markers. The Department will repair all Contractor disturbed control points, stakes, marks, and right-of-way markers. The cost for any and all repairs to the “existing survey markers” will be deducted from money due or to become due to the Contractor.

Prior to construction must call 811 to verify any utilities located within project limits. Contractor will also coordinate with utility owners listed below for any adjustments needed to sanitary sewer manholes, water valves, gas valve, telecommunication, or television manhole located within project limits. The utility company is responsible for any adjustment when necessary. The work should be performed in a manner as to not delay construction contractor work activity.

Project Number: RMC: 6417-14-001
County: La Salle, etc.
Highway: Various **Control:** 6417-14-001

Contractor will make necessary arrangements with the utility owner(s) when utility adjustments are required, as a result of construction activities.

ITEM 8 PROSECUTION AND PROGRESS:

Before starting work, provide a sequence of work and estimated progress schedule meeting the requirements of Section 8.5.2, “Progress Schedule.”

No closures will be allowed on the weekends which include the following holidays: January 1, the last Monday in May, July 4, the first Monday in September, the fourth Thursday in November, December 25 and Easter weekend.

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

ITEM 9 MEASURMENT AND PAYMENT:

Submit Material on hand (MOH) payment requests at least 5 working days prior to the end of the month for payment on that month's estimate. For out-of-town MOH submit requests at least 10 working days prior to the end of the month.

ITEM 104 REMOVING CONCRETE:

Remove existing hydraulic cement concrete from locations assigned on plans. Avoid damaging concrete that will remain in place. Saw-cut and remove the existing concrete to neat lines. Sawing of concrete is not paid for directly but is considered subsidiary to this item.

ITEM 132 EMBANKMENT:

The embankment material must be consistent and homogeneous, free from vegetation or other objectionable matter, reasonably free from lumps of earth and suitable for forming a stable embankment.

For fill sections from embankment finished grade line and below, to a depth of 4 feet:

Field compact density to ≥ 98% dry density.
Plasticity Index (PI) limit is: 5≤ PI ≤ 25.

Liquid limit ≤ 45

For all other fill sections, Plasticity Index (PI) limit is less than or equal to 30.

It is the Contractor's responsibility to advise the Engineer of the location of the source sufficiently in advance to avoid delay.

ITEM 361 REPAIR OF CONCRETE PAVEMENT

PROVIDE FAST TRACK CONCRETE TO ADHERE TO SPECIFICATIONS UNDER ITEM 360.4.11.5 "Open the pavement after the concrete has been cured for at least 8 hr. and attained a minimum compressive strength of 1,800 psi or a minimum flexural strength of 255 psi when tested in accordance with Section 360.4.11.4.1., "Strength Testing," or Section 360.4.11.4.2., "Maturity Method," unless otherwise directed. Cover the pavement with insulating blankets when the air temperature is below 65°F until the pavement is opened to traffic".

ITEM 421 HYDRAULIC CEMENT CONCRETE:

Sulfate resistant cement concrete shall be used in all situations for structural elements in contact with the natural ground. These include, but is not limited to, all reinforced concrete pipe, concrete box culverts, drill shafts, bridge columns, bridge abutments, wingwalls, approach slabs, inlets, manholes, junction boxes, ground boxes and all concrete riprap.

Air entrainment is not required. If concrete is supplied with air entrainment, the concrete must adhere to the requirements of item 421.4.2.4.

ITEM 429 CONCRETE STRUCTURE REPAIR:

Follow procedures as per the TXDOT Concrete Repair Manual for details and instructions for the removal, cleaning, forms, pouring and mixing new material curing and finish for the concrete repair.

Use following types of repair materials:

Use neat Type A (Rapid) or Type D (Standard) materials in horizontal or form-and-pour applications less than 3 in. thick and extended Type A or Type D for repairs exceeding 3 in. in depth. Type D repairs should be used in lieu of Type A when rapid strength gain is not necessary. Use Type B ultra-rapid hardening materials only if shown on the plans.

Project Number: RMC: 6417-14-001
County: La Salle, etc.
Highway: Various **Control:** 6417-14-001

Damage areas may include columns, bent caps, beams, decks, wingwalls and any other item that may include concrete repair work on a bridge structure. All labor, materials, and incidentals, including any necessary forming or the use of man-lifts, will be subsidiary to this item.

ITEM 500 MOBILIZATION:

"Materials-on-Hand" payments will not be considered in determining percentages used to compute mobilization payments.

ITEM 502 BARRICADE, SIGNS AND TRAFFIC HANDLING:

The traffic control plan provided is a suggested traffic control plan submitted for the Contractor's consideration. The Contractor will not implement any alternate traffic control plan unless written approval/notification has been granted by the Engineer. The Contractor may submit an alternate traffic control plan, signed and sealed by a practicing Professional Engineer in the State of Texas, for approval by the Engineer at least two (2) weeks prior to implementation. The alternate traffic control plan may be for the entire construction duration or for a specific construction phase.

The Contractor will furnish all traffic control and comply with the current Texas MUTCD, Traffic Control Plan (TCP), Barricades and Construction (BC), and Work Zone Standard (WZ) standards. Conduct construction operations so as to provide the least possible interference to traffic and to permit the continuous movement of traffic in all allowable directions at all times. Interruption of through traffic by construction operations will not be permitted unless specifically authorized by the Engineer. Clean up and remove from the work area all loose material resulting from contract operations at the end of each workday. Lane closures will be required for all cleaning and sealing joint operations.

The Contractor will designate an English-speaking employee, as the Contractor Responsible Person (CRP), on-call nights, and weekends (or any other time that work is not in progress) with a local address and telephone number for maintenance of signs and barricades. This employee will be located within one (1) hour of traveling time to the project site. Notify the Engineer in writing of the name, address and telephone number of this employee. Furnish this information to local law enforcement officials.

The time frame for the Contractor to provide properly maintained traffic control devices before they are considered to be in non-compliance with this Item, is 48

hours regardless of the days of the week involved after notification is done in writing by the Engineer.

When advanced warning flashing arrow panel(s) is/are specified, maintain one standby unit in good condition at the job site ready for immediate use is required.

Provide two-way radios in areas where flagmen do not have visual contact with one another or cannot communicate with one another.

Clean up and remove from the work area all loose material resulting from contract operations at the end of each workday. Lane closures will be required for all cleaning and sealing joint operations. Limit lane closures to a maximum of 2-miles. If more than one lane closure location is desired, provide a minimum of a 2-mile passing zone between locations. Provide a separate sign set up for each location.

Ensure equipment not in use, stockpile aggregate, and other working materials are:

At minimum of 30 feet from the edge of the travel lane;
Do not obstruct traffic or sight distance;
Do not interfere with the access from abutting property; or
Do not interfere with roadway drainage.

Erect signs in locations not obstructing the traveling public's view of the normal roadway signing or necessary sight distance at intersections and curves.

During the holiday time frame of December 21st through January 1st, every effort should be taken to ensure that all travel lanes remain open where possible.

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

ITEM 529 CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER:

Reinforcing bars will be used for this item.

Project Number: RMC: 6417-14-001
County: La Salle, etc.
Highway: Various **Control:** 6417-14-001

Curb will be doweled into the pavement structure unless otherwise directed. Doweling will not be paid for directly but will be subsidiary to Item 529.

ITEM 531 SIDEWALKS:

The location of curb ramps must be adjusted to ensure they meet TAS requirements.

Construct compliant curb ramps based upon referenced design criteria, Texas Accessibility Standards and TxDOT Pedestrian Facilities Standards.

Dowel cap or dowel gap for expansion space for expansion joints will be subsidiary to pertaining items.

ITEM 778 CONCRETE RAIL REPAIR:

Construct railing in accordance with details, alignment, and grade specified in the respective existing rail standards. Construct aesthetic details as per the standard sheets to match existing conditions. Do not place railing until falsework or formwork, if any, for the span has been released unless otherwise directed.

Ensure expansion joints in the railing will function properly before placing concrete.

ITEM 6001 – PORTABLE CHANGEABLE MESSAGE SIGN:

Provide one (1) electronic portable changeable message sign as required by the Engineer. Provide backups and keep operational and available on the jobsite at all times during traffic control operations. The electronic portable changeable message signs will be made available for utilization for the entire duration of the project, including all alternative locations.

ITEM 6185 TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER:

Provide one (1) Truck Mounted Attenuator for Stationary operations as required by the Engineer. Provide backup and keep operational and available on the jobsite at all times during traffic control operations.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 6417-14-001 **DISTRICT** Laredo **COUNTY** La Salle
HIGHWAY IH0035

			CONTROL SECTION JOB	**6417-14-001**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00190459**			
			COUNTY	**La Salle**			
			HIGHWAY	**IH0035**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	104-6021	REMOVING CONC (CURB)	LF	148.000		148.000	
	104-6028	REMOVING CONC (MISC)	SY	9.000		9.000	
	104-6036	REMOVING CONC (SIDEWALK OR RAMP)	SY	538.000		538.000	
	401-6001	FLOWABLE BACKFILL	CY	40.000		40.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	286.000		286.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	12.000		12.000	
	529-6002	CONC CURB (TY II)	LF	308.000		308.000	
	531-6001	CONC SIDEWALKS (4")	SY	536.000		536.000	
	531-6005	CURB RAMPS (TY 2)	EA	5.000		5.000	
	778-6001	CONCRETE RAIL REPAIR (IN-KIND)	LF	19.000		19.000	
	778-6076	CONCRETE RAIL REPLACEMENT (IN-KIND)	LF	8.000		8.000	
	780-6004	CONC CRCK REPR(DISCRETE)(ROUT AND SEAL)	LF	39.000		39.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	1.000		1.000	
	6185-6002	TMA (STATIONARY)	DAY	30.000		30.000	

SEQUENCE OF CONSTRUCTION

SUGGESTED SEQUENCE OF CONSTRUCTION

THE CONTRACTOR WILL PLACE ALL GENERAL PROJECT TRAFFIC CONTROL SIGNS, BARRICADES, AND CHANNELIZING DEVICES AS SHOWN IN THE TCP LAYOUTS INCLUDED IN THE PLANS, LATEST VERSION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TxMUTCD), BARRICADES AND CONSTRUCTION (BC) SHEETS, WORK ZONE STANDARD SHEETS, CONSTRUCTION STANDARD SHEETS, AND AS NOTED IN THE GENERAL NOTES. THE FOLLOWING BRIEFLY DESCRIBES THE SEQUENCE OF CONSTRUCTION UNLESS OTHERWISE SPECIFIED, ALL CONSTRUCTION IS TO BE PERFORMED OFF THE ROADWAY LIMITS USING APPROVED TCP STANDARDS.

NOTE: PRIOR TO PERFORMING ROADWAY IMPROVEMENTS OBTAIN APPROVAL FROM THE CORRESPONDING ENGINEER FOR LANE CLOSURE TIME FRAMES.

GENERAL SEQUENCE OF WORK:

PHASE I PEDESTRIAN IMPROVEMENTS.

PHASE II ROADWAY IMPROVEMENTS.

PHASE III BRIDGE IMPROVEMENTS.

PHASE IV PERFORM FINAL CLEAN UP.

PHASE I: PEDESTRIAN IMPROVEMENTS (SIDEWALK, CURB RAMPS, CURB & GUTTER REPAIRS):

1. PLACE APPLICABLE TRAFFIC CONTROL STANDARD AND DETAILS FOR PEDESTRIAN REPAIRS. (TCP SIDEWALK DETAIL, WZ (BTS-1,2)-13, TCP SERIES)
2. PERFORM SIDEWALK, PED RAMP, CURB & GUTTER REPAIRS.

PHASE II ROADWAY IMPROVEMENTS:

1. PLACE APPLICABLE TRAFFIC CONTROL STANDARD FOR ROADWAY REPAIRS. (TCP SERIES)
2. PERFORM ROADWAY REPAIRS.

PHASE III BRIDGE IMPROVEMENTS:

1. PLACE APPLICABLE TRAFFIC CONTROL STANDARD FOR BRIDGE REPAIRS.
2. PERFORM BRIDGE IMPROVEMENTS.

PHASE IV PERFORM FINAL CLEAN UP:

1. UPON COMPLETION OF ALL CONSTRUCTION AND WITH THE APPROVAL OF THE ENGINEER, REMOVE AND RELOCATE THE MATERIAL AS DIRECTED BY THE ENGINEER. AFTER THIS TASK HAS BEEN COMPLETED, INITIATE PROJECT CLEAN-UP WITH THE APPROVAL OF THE ENGINEER.
2. REMOVAL OF TCP MAY INITIATE.

TCP SEQUENCE OF CONSTRUCTION

DN: S.P.	CK: R.C.	DW: S.P.	CK: R.C.	STATE	SHEET NUMBER			SHEET NO.
				TEXAS	SHEET 1 OF 1			
FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY		CONTROL	SECTION	JOB	HIGHWAY NO.	17
	22	VAR.		6417	14	001	VAR.	

TCP GENERAL NOTES

1. THIS IS A SUGGESTED TRAFFIC CONTROL PLAN. AN ALTERNATE TRAFFIC CONTROL PLAN, SIGNED AND SEALED BY A REGISTERED ENGINEER IN TEXAS, MAY BE SUBMITTED FOR REVIEW AND APPROVAL TO THE AREA ENGINEER.

2. REFER TO ITEM 8-PROSECUTION AND PROGRESS, PROJECT GENERAL NOTES, AND SEQUENCE OF WORK FOR ADDITIONAL INFORMATION REGARDING THE TRAFFIC CONTROL PLAN.

3. TAKE SPECIAL NOTICE OF THE REQUIREMENTS OF ITEM 7: "LEGAL RELATIONS AND RESPONSABILITIES" OF THE STANDARD SPECIFICATIONS.

4. USE ADDITIONAL BARRICADES AND SIGNS TO SAFELY GUIDE TRAFFIC AND PROTECT THE WORKERS IN THE IMMEDIATE VICINITY OF CONSTRUCTION OPERATIONS, AS DIRECTED BY THE ENGINEER. ADDITIONAL SIGNS, BARRICADES, ETC. (IF ANY), WILL BE SUBDSIDIARY TO ITEM 502 "BARRICADES, SIGNS, AND TRAFFIC HANDLING".

5. PLACE ALL BARRICADES AND SIGNS IN ACCORDANCE WITH THE LATEST VERSION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TxMUTCD), THE STATE STANDARD TRAFFIC CONTROL PLANS (TCP) SHEETS, THE BARRICADES, CONSTRUCTION (BC) SHEETS, AND THE TCP LAYOUT SHEETS INCLUDED IN THE PLANS. EXCEPT AS NOTED IN THE PLANS, ALL WORK AND MATERIALS REQUIRED FOR TRAFFIC HANDLING WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING".

6. ALL BARRICADES AND SIGNS WILL BE INSTALLED BY THE CONTRACTOR. AT ALL TIMES, THE CONTRACTOR WILL HAVE ENOUGH BARRICADES, CHANNELIZING DEVICES, AND SIGNS TO REPLACE THOSE DAMAGED.

7. REFER TO SEQUENCE OF WORK FOR CONSTRUCTION PHASING.

8. VERIFY THE LOCATIONS OF SIGNS, BARRICADES, AND CHANNELIZING DEVICES PRIOR TO THEIR PLACEMENT ALONG VERTICAL CURVES, HORIZONTAL CURVES, AND OTHER GEOMETRIC CONSTRAINTS TO ENSURE THEIR VISIBILITY TO ALL MOTORISTS. VARY THE SPACING OF SIGNS TO MEET TRAFFIC CONDITIONS OR AS DIRECTED BY THE ENGINEER AND ASSURE THAT ALL TRAFFIC CONTROL DEVICES AND PAVEMENT MARKINGS ARE KEPT IN A HIGHLY VISIBLE CONDITION (CLEAN, UPRIGHT, AND IN THEIR PROPER LOCATION).

9. MAINTAIN THE ROADWAY SURFACE WITHIN THE PROJECT LIMITS WHILE THE TRAFFIC CONTROL PLAN IS IN EFFECT.

10. DURING CONSTRUCTION OPERATIONS, COVER ALL EXISTING SIGNS THAT CONFLICT WITH THE TRAFFIC CONTROL PLAN AND UNCOVER THEM DURING NON-WORKING HOURS OR AS DIRECTED BY THE ENGINEER. PARTIAL COVERAGE OF THE SIGNS OR COVERAGE BY MATERIAL THAT DOES NOT COVER THE ENTIRE SIGNS FOR THE REQUIRED TIME IS NOT PERMITTED.

11. ALL CONSTRUCTION TRAFFIC WILL BE REGULATED SO AS TO CAUSE A MINIMUM OF INCONVENIENCE TO THE TRAVELING PUBLIC. AT TIMES WHEN IT IS NECESSARY FOR TRUCKS OR OTHER CONSTRUCTION EQUIPMENT TO STOP, UNLOAD, SET-UP, OR CROSS ROADWAYS UNDER TRAFFIC, WARNING SIGNS AND FLAGGERS WILL BE PROVIDED AS DEEMED NECESSARY TO ADEQUATELY PROTECT THE TRAVELING PUBLIC, AND AS DIRECTED BY THE ENGINEER. FURNISH FLAGGERS WITH TWO-WAY RADIOS OR OTHER ENGINEER APPROVED METHODS OF COMMUNICATION FOR HANDLING OF TRAFFIC.

12. USE FLASHING WARNING LIGHTS AND FLAGS TO CALL ATTENTION TO ADVANCED WARNING SIGNS. USE FLASHING LIGHTS TO MARK CHANNELIZING DEVICES AT NIGHT AS NEEDED. PROVIDE THE NECESSARY FLAGGERS AND APPROPIATE SIGNING (TO BE CONSIDERED SUBSIDIARY TO ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING") TO SAFELY GUIDE TRAFFIC THROUGH THE WORKING AREA.

13. DURING NON-WORKING HOURS, REMOVE ALL SIGNS, BARRICADES, AND CHANNELLING DEVICES NOT IN EFFECT FROM THE CONSTRUCTION SITE AND STORE OFF STATE RIGHT-OF-WAY OR AS DIRECTED BY THE ENGINEER.

14. MAINTAIN ALL EXISTING DRAINAGE CONDITIONS DURING ALL CONSTRUCTION PHASES.

15. WORK VEHICLES, AND ALL SIGNS, BARRICADES, AND CHANNELIZING DEVICES NOT IN USE, STOCKPILED MATERIAL, AND WASTE MATERIAL WILL BE PLACED AT A MINIMUM OF 30 FEET FROM THE OUTER EDGE OF THE NEAREST TRAVEL LANE OR AS DIRECTED BY THE ENGINEER.

16. UPON COMPLETION OF WORK, CLEAN THE PROJECT OF ALL CONSTRUCTION MATERIALS, HAVE ALL EXCESS DEBRIS BROOMED AND ALL LOCATIONS ADEQUATELY CLEANED TO A FINAL ACCEPTANCE BEFORE BARRICADES MAY BE REMOVED FROM THE PROJECT.

17. USE OF PORTABLE CHANGEABLE MESSAGE SIGNS AS ADVANCE NOTICE OF LANE CLOSURES WILL BE REQUIRED ONE WEEK BEFORE THE CLOSURES OR AS DIRECTED BY THE ENGINEER. FOR LOCATIONS THAT ARE ADJACENT TO EACH OTHER, A SINGLE SIGN IN ADVANCE OF THE ENTIRE WORK AREA IS ACCEPTABLE.

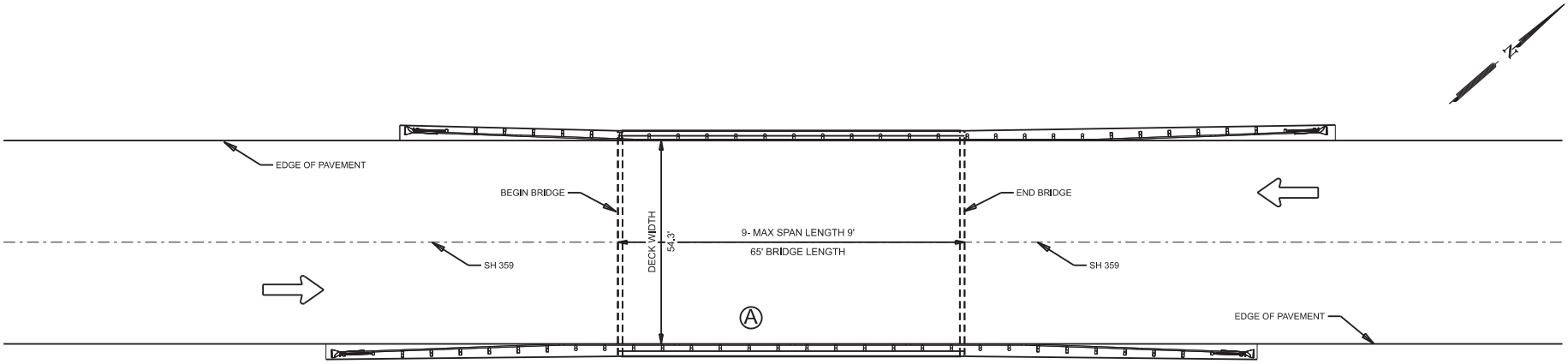
18. REFER TO BC(6)-21 PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) STANDARDS FOR A LISTING OF ABBREVIATED WORDS AND TWO-WORD PHRASES THAT ARE ACCEPTABLE FOR USE ON PCMS. SUBMIT THE SUGGESTED MESSAGE FOR THE BOARD TO THE ENGINEER FOR APPROVAL.

19. IF THE CONTRACTOR CHOOSES TO WORK MULTIPLE LOCATIONS IN URBAN/RURAL AREAS SIMULTANEOUSLY, WITH APPROVAL FROM THE ENGINEER, CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING ALL APPLICABLE TRAFFIC CONTROL DEVICES, INCLUDING PORTABLE CHANGEABLE MESSAGE BOARDS, AND TRUCK MOUNTED ATTENUATORS AT THEIR OWN EXPENSE.

20. PLACE THE TRAFFIC CONTORL DEVICES ONLY WHEN WORK IS ACTUALLY IN PROGRESS OR A DEFINITE NEED EXISTS.

TCP GENERAL NOTES

DN: S.P.	CK: R.C.	DW: S.P.	CK: R.C.	STATE	SHEET NUMBER			SHEET NO.
				TEXAS	SHEET 1 OF 1			
FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY		CONTROL	SECTION	JOB	HIGHWAY NO.	18
	22	VAR.		6417	14	001	VAR.	



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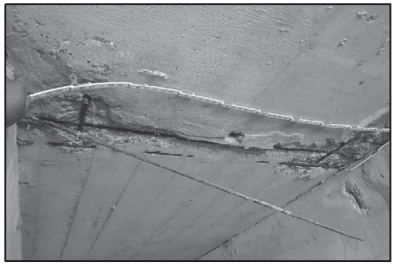
TRAVERSE AND VERTICAL CRACKING AT WIDENED JOINTS



SPALLS WITH EXPOSED CORRODED AND FRACTURED REINFORCING IN TOP SLAB SOFFIT AT WIDENED JOINTS OF BARREL 3, LOOKING SOUTH.

SUMMARY OF BRIDGES	
LOCATION 1	429
	6007
	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-067-0-0086-10-025	18
PROJECT TOTALS	18

LOCATION			
LAT.	27.61531981	LONG.	-98.37792451

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

FOLLOW PROCEDURES AS PER THE TXDOT CONCRETE REPAIR MANUAL FOR DETAILS AND INSTRUCTIONS REGARDING THE REMOVAL, CLEANING, FORMING, MIXING AND POURING, CURING AND FINISHING OF CONCRETE REPAIRS. THE METHOD OF CONCRETE STRUCTURE REPAIR WILL VARY BY EACH LOCATION. REFER TO CHAPTER 3 "REPAIR MATERIALS AND PROCEDURES"FOR REPAIR IDENTIFICATION AND PROCEDURES.

PROVIDE MATERIALS IN ACCORDANCE WITH THE DEPARTMENT'S CONCRETE REPAIR MANUAL. SELECT PRE-APPROVED MATERIAL MEETING THE REQUIREMENTS OF THE APPLICABLE DMS WHEN AVAILABLE.

STATE OF TEXAS
VANESSA I ROSALES-HERRERA
103736
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by VANESSA I ROSALES-HERRERA P.E. 103736 on
12/19/2023

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Vanessa Rosales-Herrera
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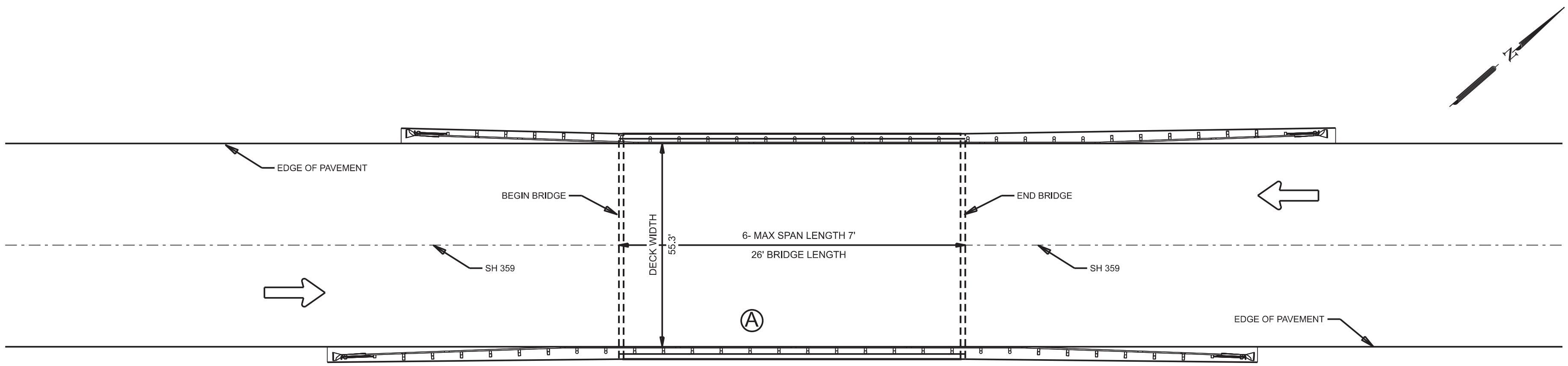
TEXAS DEPARTMENT OF TRANSPORTATION®

BRIDGE REPAIR
LAYOUT 1
US 359

DN: S.P.	CK: V.R.	DW: S.P.	CK: V.R.	STATE	SHEET NUMBER			SHEET NO.
				TEXAS	SHEET 1 OF 42			
FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY		CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.		6417	14	001	VARIOUS	19



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SPALLS WITH EXPOSED CORRODED REINFORCING IN TOP SLAB SOFFIT, SHOWN MOST SEVERE ON BARREL 3 FROM SW. CLEAN AND PATCH SPALL.

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 2	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-067-0-0086-10-035	8
PROJECT TOTALS	8

LOCATION			
LAT.	27.71737885	LONG.	-98.27799409

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

FOLLOW PROCEDURES AS PER THE TXDOT CONCRETE REPAIR MANUAL FOR DETAILS AND INSTRUCTIONS REGARDING THE REMOVAL, CLEANING, FORMING, MIXING AND POURING, CURING AND FINISHING OF CONCRETE REPAIRS. THE METHOD OF CONCRETE STRUCTURE REPAIR WILL VARY BY EACH LOCATION. REFER TO CHAPTER 3 "REPAIR MATERIALS AND PROCEDURES"FOR REPAIR IDENTIFICATION AND PROCEDURES.

PROVIDE MATERIALS IN ACCORDANCE WITH THE DEPARTMENT'S CONCRETE REPAIR MANUAL. SELECT PRE-APPROVED MATERIAL MEETING THE REQUIREMENTS OF THE APPLICABLE DMS WHEN AVAILABLE.

STATE OF TEXAS
VANESSA I ROSALES-HERRERA
103736
REGISTERED PROFESSIONAL ENGINEER

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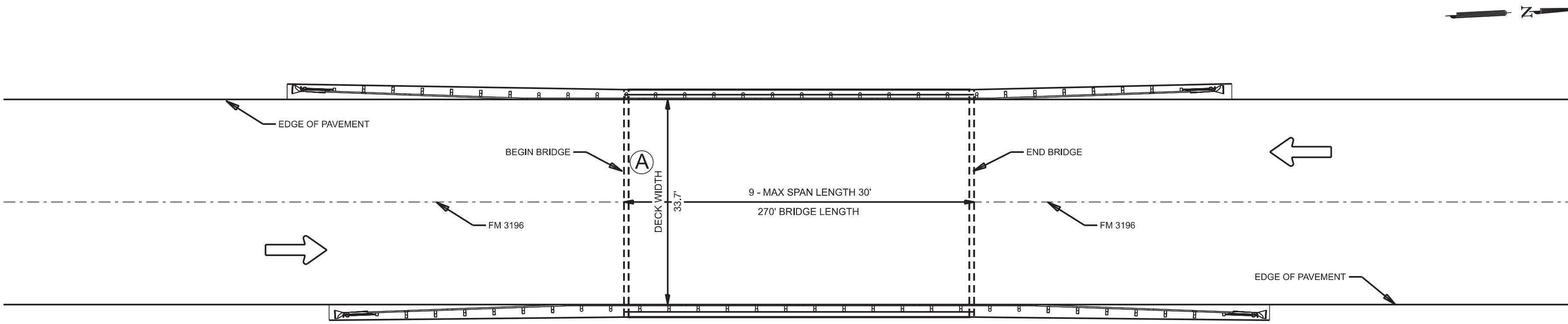
BRIDGE REPAIR
LAYOUT 2
US 359

DN: S.P.	DW: S.P.	STATE	SHEET NUMBER		SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 2 OF 42		
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
22	LASALLE,ETC.	6417	14	001	VARIOUS



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FRACTURE IN ABUTMENT RIPRAP NEAR CENTER LOOKING SOUTH.

8 LF APPROX.

SUMMARY OF BRIDGES	
LOCATION 3	780
	6004
	CONC CRCK REPR (DISCRETE) (ROUT AND SEAL)
	LF
PSN# 22-067-0-3305-01-001	8
PROJECT TOTALS	8

LOCATION			
LAT.	27.78231634	LONG.	-98.42296549

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

FOLLOW PROCEDURES AS PER THE TXDOT CONCRETE REPAIR MANUAL FOR DETAILS AND INSTRUCTIONS REGARDING THE REMOVAL, CLEANING, FORMING, MIXING AND POURING, CURING AND FINISHING OF CONCRETE REPAIRS. THE METHOD OF CONCRETE STRUCTURE REPAIR WILL VARY BY EACH LOCATION. REFER TO CHAPTER 3 "REPAIR MATERIALS AND PROCEDURES"FOR REPAIR IDENTIFICATION AND PROCEDURES.

PROVIDE MATERIALS IN ACCORDANCE WITH THE DEPARTMENT'S CONCRETE REPAIR MANUAL. SELECT PRE-APPROVED MATERIAL MEETING THE REQUIREMENTS OF THE APPLICABLE DMS WHEN AVAILABLE.

STATE OF TEXAS
VANESSA I ROSALES-HERRERA
103736
REGISTERED PROFESSIONAL ENGINEER

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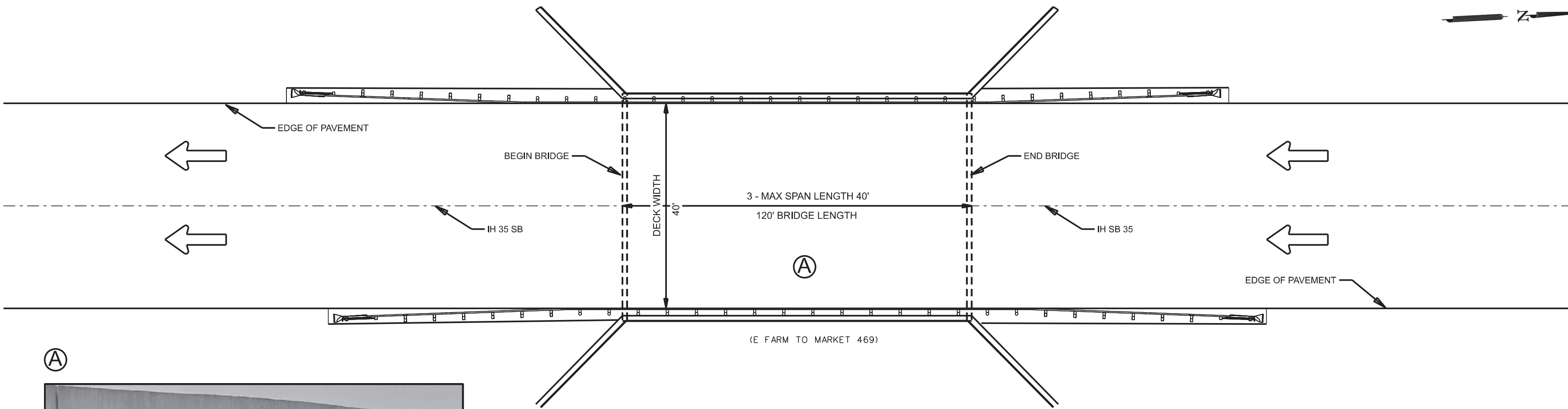
BRIDGE REPAIR
LAYOUT 3
FM 3196

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 3 OF 42			
FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
	22	LASALLE,ETC.	6417	14	001	VARIOUS

21

12/19/2023 oserno3 T:\LRDOSTMNT\FY 2024\MNT Contract (FY24)\MSC CONC REPAIR\5. Misc Conc Rep LAYOUTS.dgn



LOCATION			
LAT.	28.57827092	LONG.	-99.19764201

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 4	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0017-08-146	10
PROJECT TOTALS	10

A

BOTTOM OF SPAN HAS EXTENSIVE PATCHING AND SPALLING FROM OVER HEIGHT IMPACT

10 SF APPROX.

A

NOTES:

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STATE OF TEXAS
VANESSA I ROSALES-HERRERA
103736
REGISTERED PROFESSIONAL ENGINEER

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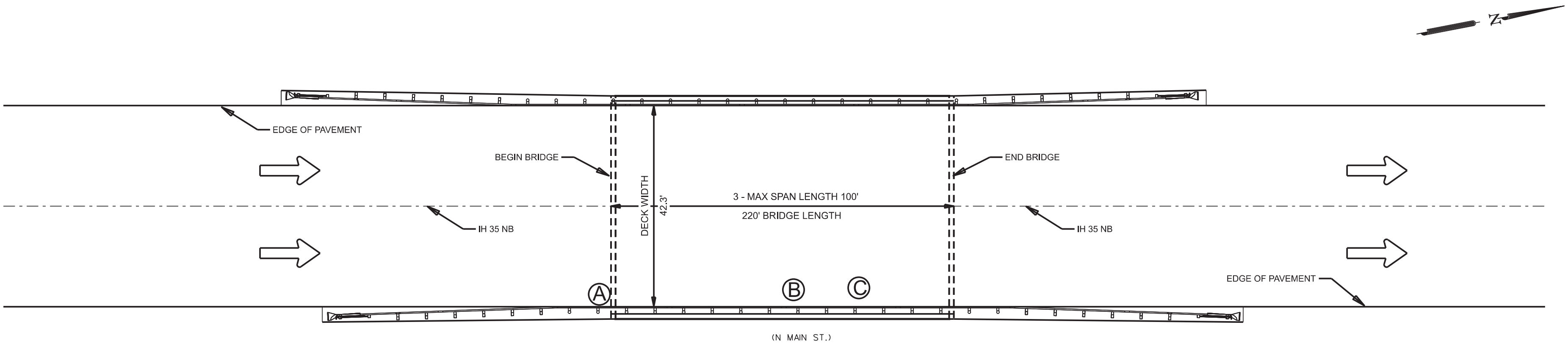
BRIDGE REPAIR
LAYOUT 4
IH 35 SB

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 4 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	22

12/19/2023 oserno3 T:\LRODSTMNT\FY 2024\MNT Contract (FY24)\MISC CONC REPAIR\5. Misc Conc Rep LAYOUTS.dgn



Ⓐ

TOP OF EAST RAILING HAS A SPALL WITH EXPOSED REINFORCING AT SOUTH BRIDGE END DUE IMPACT LOOKING WEST.

6'L X 2'H X 4"D APPROX.

Ⓑ

AREAS OF SPALLING IN EAST RAIL OVER SPAN 2 DUE TO IMPACT LOOKING EAST.

SUMMARY OF BRIDGES		
	778	778
	6001	6076
LOCATION 5	CONCRETE RAIL REPAIR (IN KIND)	CONCRETE RAIL REPLACEMENT (IN KIND)
	LF	LF
PSN# 22-142-0-0017-08-243	6	4
PROJECT TOTALS	6	4

NOTES:

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Ⓒ

AREAS OF SPALLING IN EAST RAIL OVER SPAN 1 DUE TO IMPACT LOOKING EAST.

LOCATION			
LAT.	28.45074715	LONG.	-99.23764111

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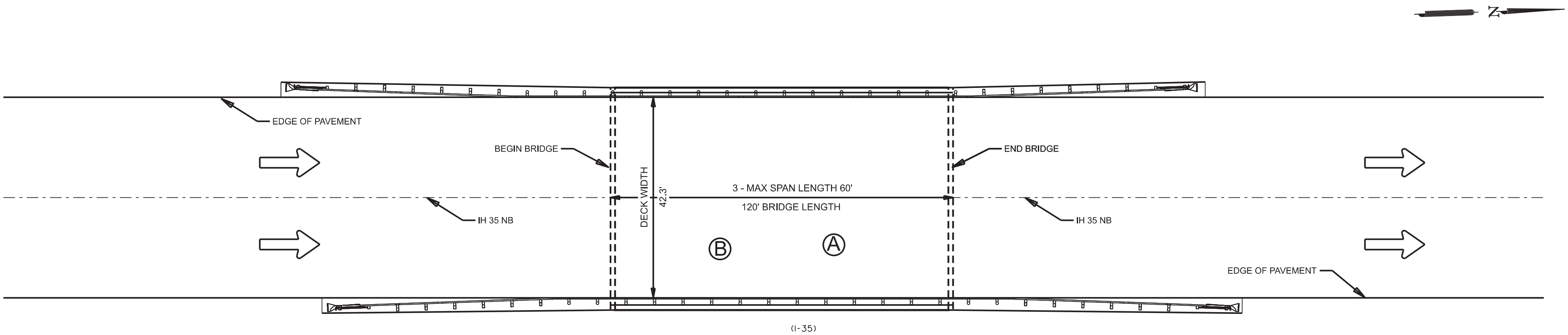
BRIDGE REPAIR
LAYOUT 5
IH 35 NB

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 5 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	23

12/19/2023 oserno3 T:\LRDOSTMNT\FY 2024\MNT Contract (FY24)\MSC CONC REPAIR\5. Misc Conc Rep LAYOUTS.dgn



Ⓐ

SPALL IN BEAM 2 OF SPAN 2 LOOKING SOUTH.

1 SF APPROX.

Ⓑ

SPALLS IN BEAMS 3-5 OF SPAN 2 LOOKING SOUTHWEST.

1 SF APPROX.

SUMMARY OF BRIDGES	
LOCATION 6	429
	6007
	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0018-01-099	2
PROJECT TOTALS	2

LOCATION			
LAT.	28.41765408	LONG.	-99.25123954

NOTES:

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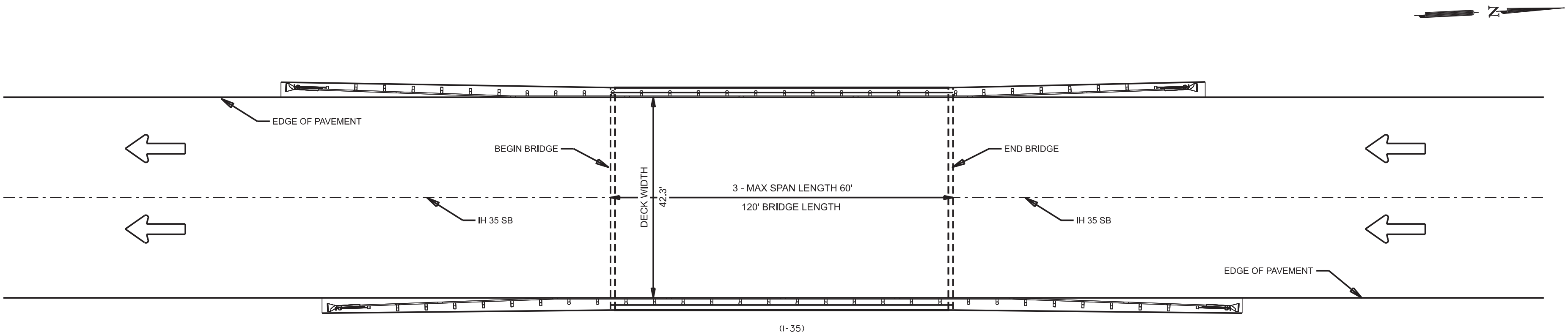
BRIDGE REPAIR
LAYOUT 6
IH 35 NB

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER		SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 6 OF 42		
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
22	LASALLE,ETC.	6417	14	001	VARIOUS

24



Ⓐ

IMPACT SPALLS TO WEST EXTERIOR BEAM OF CENTER SPAN LOOKING NORTH.

1 SF APPROX.

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 7	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0018-01-100	1
PROJECT TOTALS	1

LOCATION			
LAT.	28.41769887	LONG.	-99.25144893

NOTES:

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BRIDGE REPAIR
LAYOUT 7
IH 35 SB

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 7 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	25

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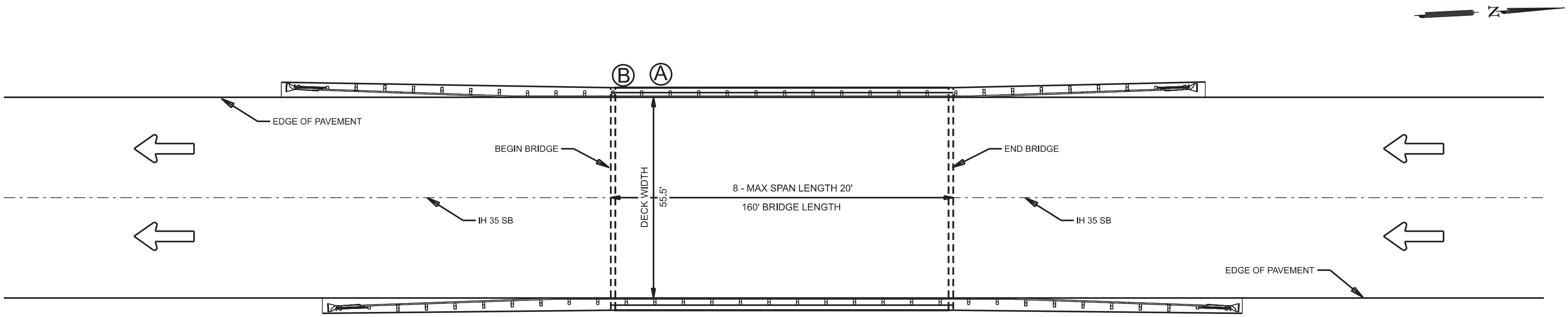

Ⓐ

IMPACT DAMAGE TO CONCRETE/ABUTMENT INTERFACE AREA, LOOKING EAST.

Ⓑ

IMPACT DAMAGE TO CONCRETE/ABUTMENT INTERFACE AREA.

SUMMARY OF BRIDGES		
LOCATION 8	778	778
	6076	6001
	CONCRETE RAIL REPLACEMENT (IN KIND)	CONCRETE RAIL REPAIR (IN-KIND)
	LF	LF
PSN# 22-142-0-0018-02-114	4	3
PROJECT TOTALS	4	3

PSN# 22-142-0-0018-02-115 NB

LOCATION			
LAT.	28.27522507	LONG.	-99.28528165

NOTES:

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BRIDGE REPAIR
LAYOUT 8
IH 35 SB

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER		SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 8 OF 42		
FED.RD. DIV.NO. / STATE DIST.NO. 22	COUNTY LASALLE,ETC.	CONTROL 6417	SECTION 14	JOB 001 / HIGHWAY NO. VARIOUS	26

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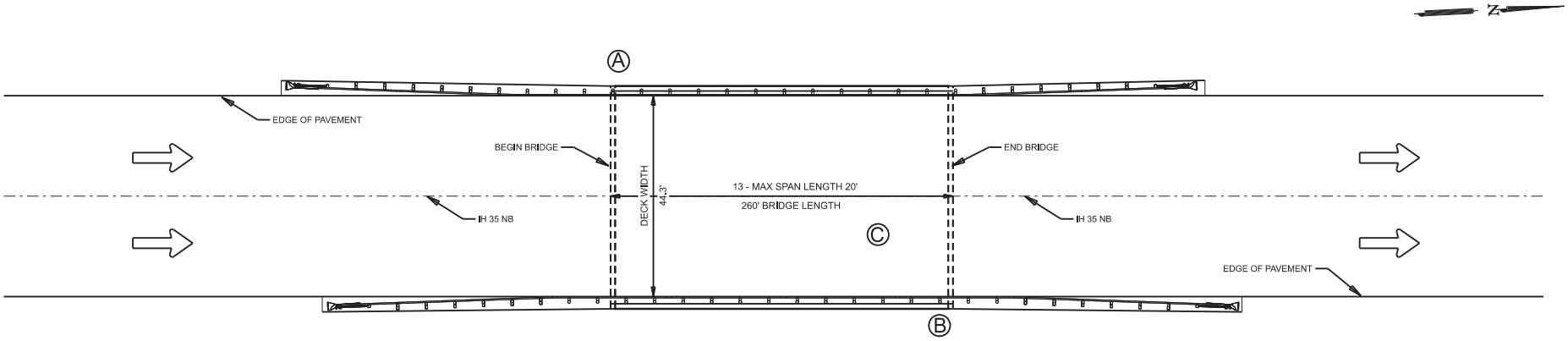
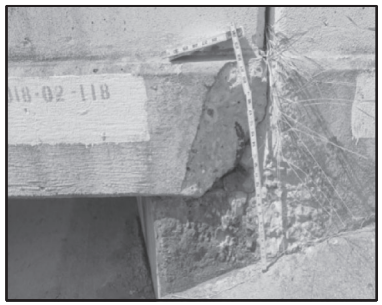


Ⓐ

SOUTHWEST CORNER SPALL LOOKING EAST.

2'X1.5'X1" APPROX.

Ⓑ



NORTHEAST CORNER SPALL WITH EXPOSED REINFORCING LOOKING WEST.

1.5 SF X 4" APPROX.

SUMMARY OF BRIDGES	
LOCATION 9	429
	6007
	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0018-02-118	14
PROJECT TOTALS	14

NOTES:

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Ⓒ

SPALL AT EAST SIDE OF NORTH FACE OF BENT 3 CAP LOOKING SOUTH.

5'X1.5'X2"D APPROX.

LOCATION			
LAT.	28.27025331	LONG.	-99.28681467

STATE OF TEXAS
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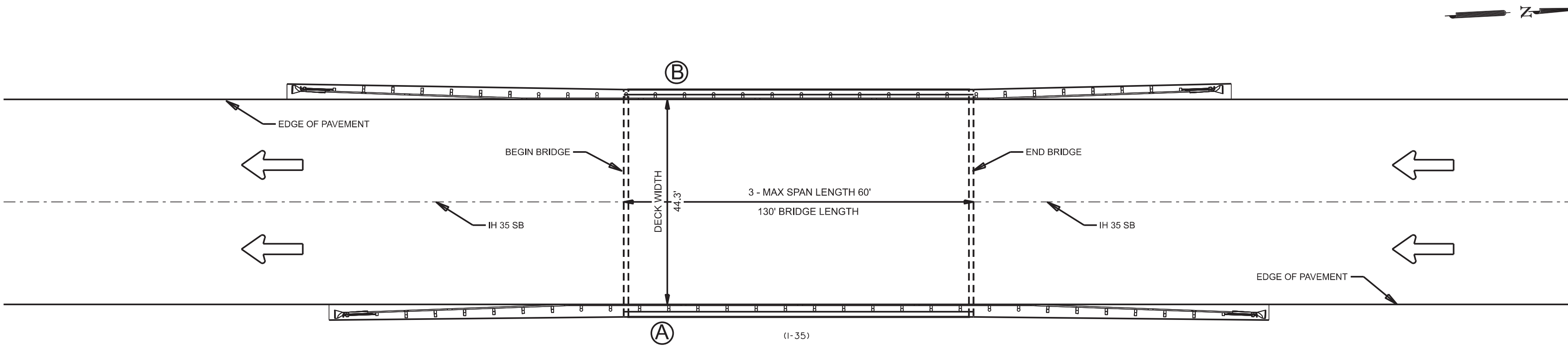
BRIDGE REPAIR
LAYOUT 9
IH 35 NB

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER	SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 9 OF 42	

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.	6417	14	001	VARIOUS	27



Ⓐ

SOUTHEAST APPROACH RAIL DAMAGE LOOKING WEST.

Ⓑ

EAST BRIDGE RAIL DAMAGE NEAR BENT 2 SPAN 2 LOOKING EAST.

SUMMARY OF BRIDGES	
LOCATION 10	778
	6001
	CONCRETE RAIL REPAIR (IN-KIND)
	LF
PSN# 22-142-0-0018-02-131	10
PROJECT TOTALS	10

LOCATION			
LAT.	28.17784272	LONG.	-99.31595728

NOTES:

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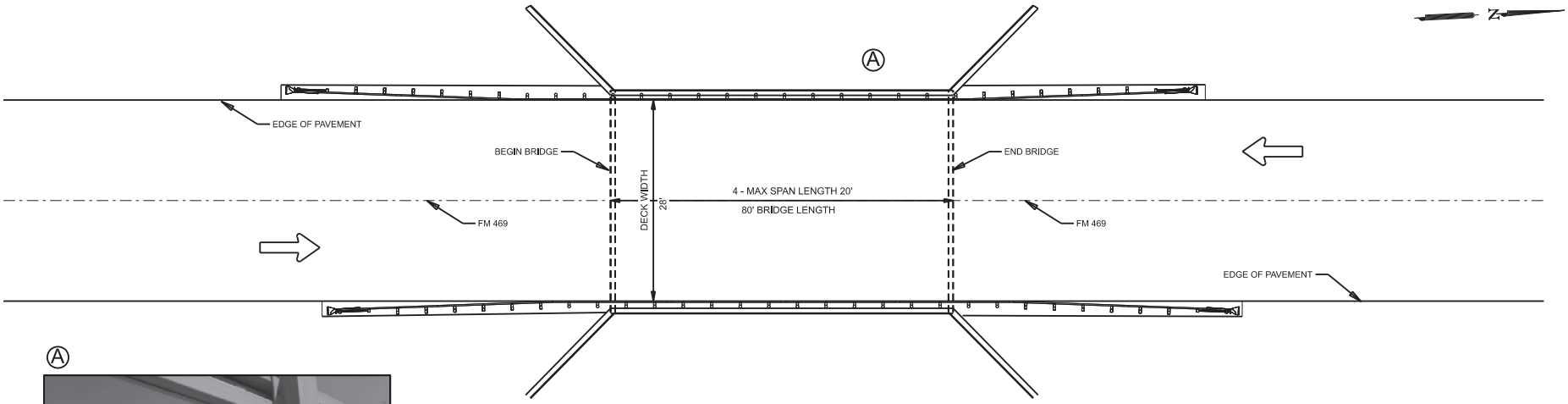
BRIDGE REPAIR
LAYOUT 10
IH 35 SB

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 10 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	28



Ⓐ

SOUTH SPAN, WEST EDGE OF DECK FRACTURE DUE TO VEHICLE IMPACT TO BRIDGE RAIL WIH SPALLS LOOKING SOUTHEAST.

3 SF APPROX.

SUMMARY OF BRIDGES	
LOCATION 11	429
	6007
	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-1435-01-003	3
PROJECT TOTALS	3

LOCATION			
LAT.	28.44711027	LONG.	-99.00010442

NOTES:

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BRIDGE REPAIR
LAYOUT 11
FM 469

DN: O.S.	CK: V.R.	DW: O.S.	CK: V.R.	STATE	SHEET NUMBER	SHEET NO.
				TEXAS	SHEET 11 OF 42	

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.	6417	14	001	VARIOUS	29

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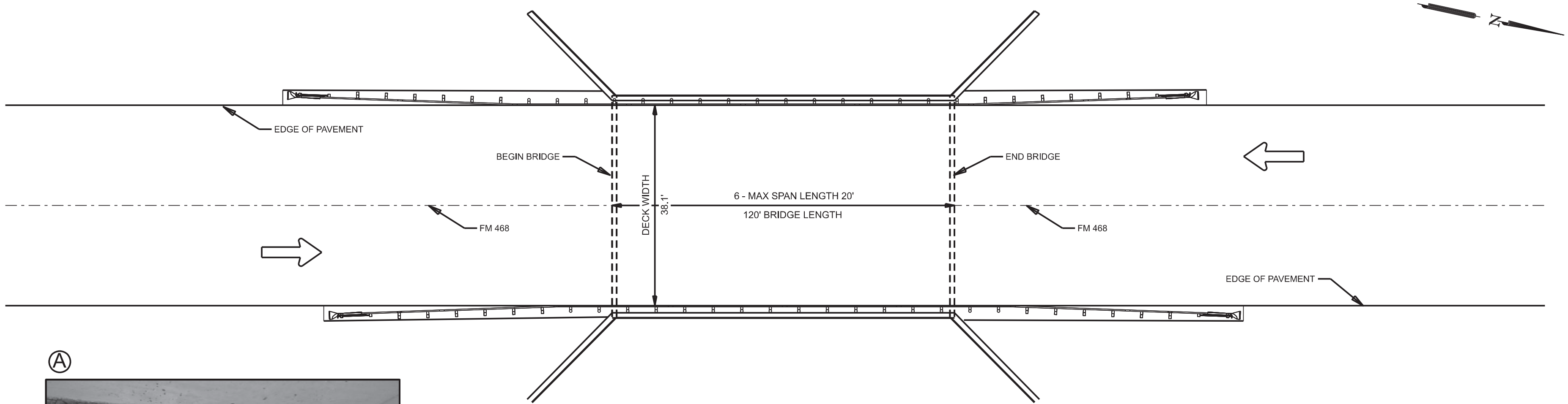

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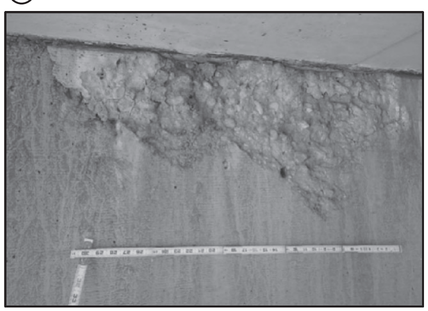

BENT 3 CAP HAS A SPALL OVER PILE 2 LOOKING NORTH.

32"W X 16"H X 2"D APPROX.

Ⓐ

BENT 3 CAP HAS A SPALL OVER PILE 2 LOOKING NORTH.

32"W X 16"H X 2"D APPROX.

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 12	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-1545-02-005	10
PROJECT TOTALS	10

LOCATION			
LAT.	28.49407767	LONG.	-99.36913703

NOTES:

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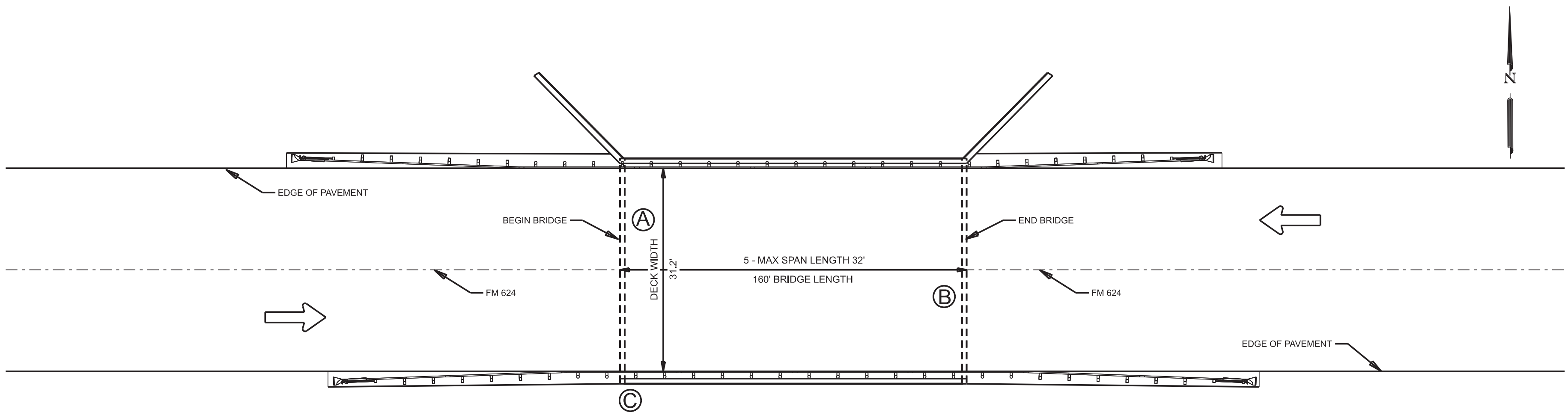
BRIDGE REPAIR
LAYOUT 12
FM 468

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 12 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	30



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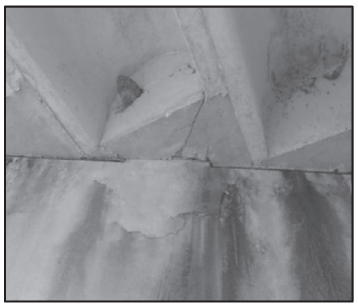

SEVERAL DIAPHRAGMS OVER INTERIOR BENTS HAVE CRACKING UP TO 1/8" WIDE LOOKING WEST.

B

SEVERAL DIAPHRAGMS OVER INTERIOR BENTS HAVE CRACKING UP TO 1/8" WIDE LOOKING EAST.

SUMMARY OF BRIDGES		
	429	780
	6007	6004
LOCATION 13	CONC STR REPAIR (VERTICAL & OVERHEAD)	CONC CRCK REPR (DISCRETE) (ROUT AND SEAL)
	SF	LF
PSN# 22-142-0-2373-01-019	4	6
PROJECT TOTALS	4	6

NOTES:

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C

IMPACT DAMAGE TO SOUTHWEST CORNER WINGWALL EXTENSION LOOKING NORTHEAST.

LOCATION			
LAT.	28.20208337	LONG.	-98.83814461

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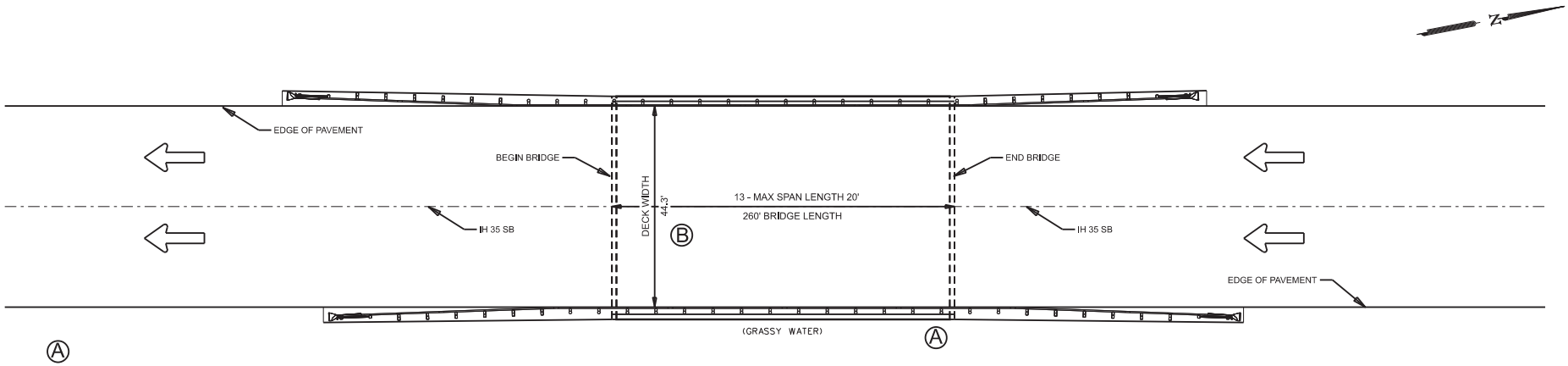
TEXAS DEPARTMENT OF TRANSPORTATION®

BRIDGE REPAIR
LAYOUT 13
FM 624

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER		SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 13 OF 42		
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
22	LASALLE,ETC.	6417	14	001	VARIOUS

31

12/19/2023 oserno3 T:\LRDOSTMNT\FY 2024\MNT Contract (FY24)\MSC CONC REPAIR\5. Misc Conc Rep LAYOUTS.dgn



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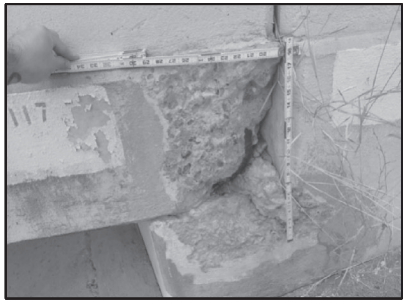

SPALL AT NORTHEAST CORNER (EAST FASCIA SPAN 1) LOOKING NORTHWEST.

Ⓑ

BENT 11 CAP SPALL LOOKING SOUTH.
1.5 SF X 2.5" D APPROX.

SUMMARY OF BRIDGES	
LOCATION 14	429
	6007
	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0018-02-117	6
PROJECT TOTALS	6

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

FOLLOW PROCEDURES AS PER THE TXDOT CONCRETE REPAIR MANUAL FOR DETAILS AND INSTRUCTIONS REGARDING THE REMOVAL, CLEANING, FORMING, MIXING AND POURING, CURING AND FINISHING OF CONCRETE REPAIRS. THE METHOD OF CONCRETE STRUCTURE REPAIR WILL VARY BY EACH LOCATION. REFER TO CHAPTER 3 "REPAIR MATERIALS AND PROCEDURES"FOR REPAIR IDENTIFICATION AND PROCEDURES.

PROVIDE MATERIALS IN ACCORDANCE WITH THE DEPARTMENT'S CONCRETE REPAIR MANUAL. SELECT PRE-APPROVED MATERIAL MEETING THE REQUIREMENTS OF THE APPLICABLE DMS WHEN AVAILABLE.

LOCATION			
LAT.	28.27029072	LONG.	-99.28701668

STATE OF TEXAS
VANESSA I ROSALES-HERRERA
103736
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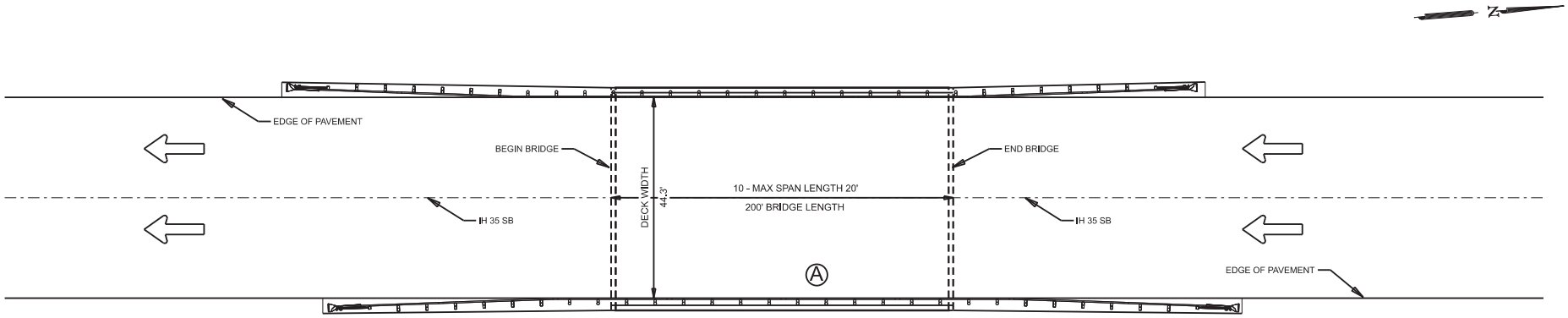
BRIDGE REPAIR
LAYOUT 14
IH 35 SB

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER	SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 14 OF 42	
FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.	6417	14	001	VARIOUS	32



Ⓐ

CORNER SPALL AT BENT 3 CAP LOOKING SOUTHWEST.

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 15	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0018-02-120	2
PROJECT TOTALS	2

LOCATION			
LAT.	28.25367210	LONG.	-99.29219777

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

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STATE OF TEXAS
VANESSA I ROSALES-HERRERA
103736
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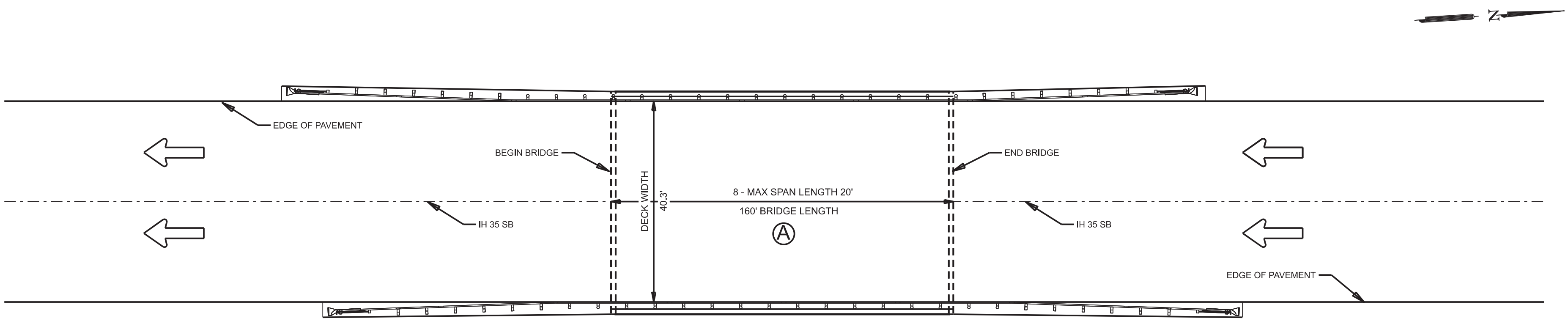
BRIDGE REPAIR LAYOUT 15 IH 35 SB

DN: O.S.	CK: V.R.	DW: O.S.	CK: V.R.	STATE	SHEET NUMBER	SHEET NO.
				TEXAS	SHEET 15 OF 42	

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.	6417	14	001	VARIOUS	33

12/19/2023 osarmo3 T:\LRODSTMNT\FY 2024\MNT Contract (FY24)\MISC CONC REPAIR\5_Misc Conc Rep LAYOUTS.dgn



Ⓐ

AREAS OF SPALLING AT NORTH FACE OF BENT 6 CAP LOOKING SOUTHWEST.

SUMMARY OF BRIDGES	
LOCATION 16	429
	6007
	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0018-02-136	6
PROJECT TOTALS	6

LOCATION			
LAT.	28.09947350	LONG.	-99.33676800

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

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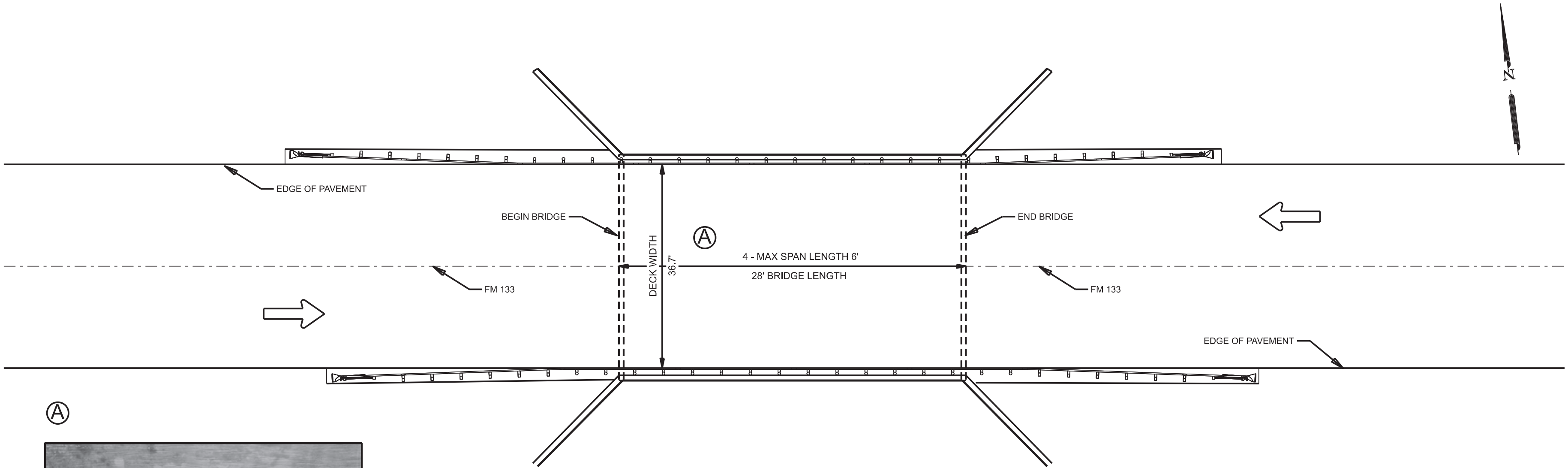
BRIDGE REPAIR
LAYOUT 16
IH 35 SB

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER		SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 16 OF 42		

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	SHEET NO.
	22	LASALLE,ETC.	6417	14	001	VARIOUS	34

12/19/2023 oserno3 T:\LRDOSTMNT\FY 2024\MNT Contract (FY24)\MISC CONC REPAIR\5. Misc Conc Rep LAYOUTS.dgn



A

SPALL WITH EXPOSED REBAR AND DELAMINATION ON BOTTOM OF TOP SLAB IN NORTH END OF WEST BARREL LOOKING SOUTH. (1.5' X 1.5')

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 17	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0237-01-011	3
PROJECT TOTALS	3

LOCATION			
LAT.	28.28815278	LONG.	-99.36568889

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

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BRIDGE REPAIR
LAYOUT 17
FM 133

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 17 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	35

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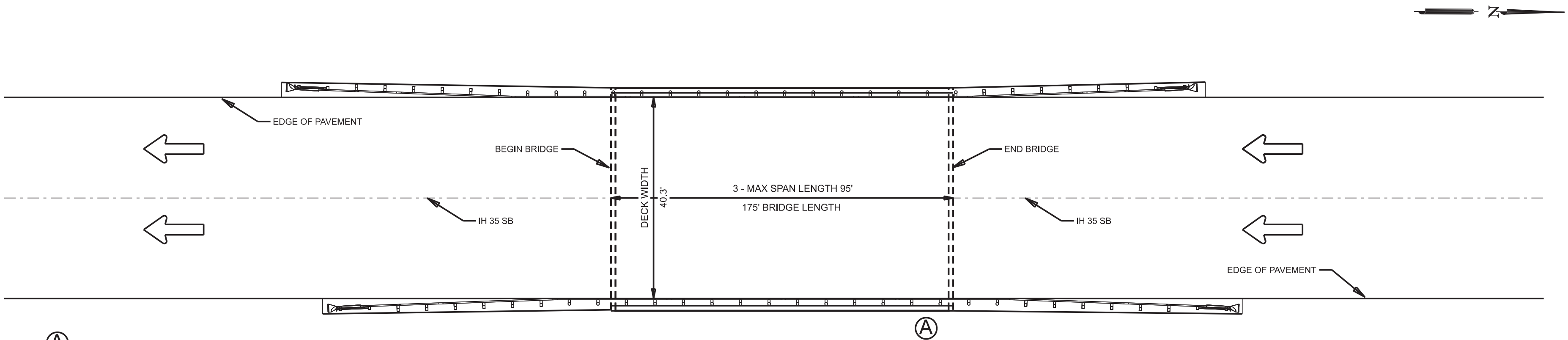

A

SPALL AT EAST END OF NORTH ABUTMENT CAP LOOKING NORTH.

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 18	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0018-02-140	1
PROJECT TOTALS	1

LOCATION			
LAT.	28.04615300	LONG.	-99.35032500

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

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STATE OF TEXAS
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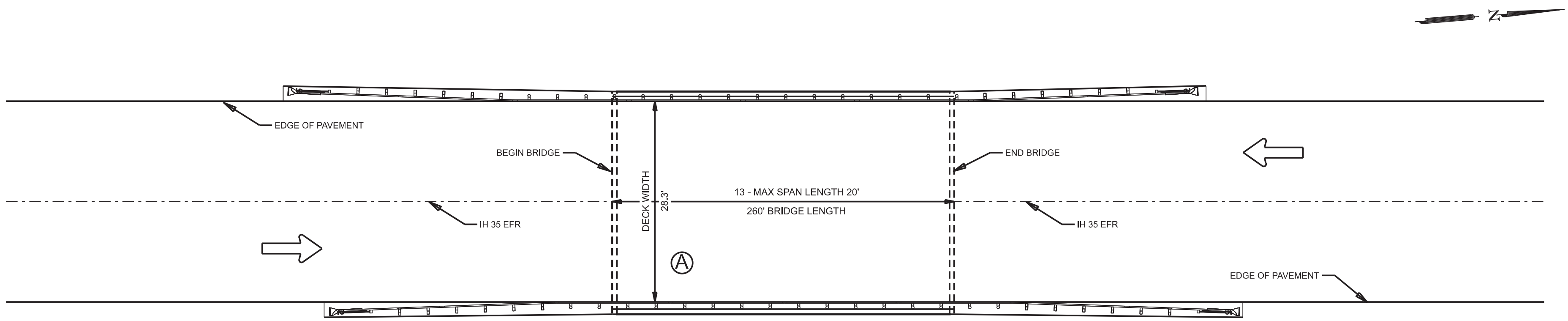
BRIDGE REPAIR
LAYOUT 18
IH 35 SB

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 18 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	36

12/19/2023 oserno3 T:\LRODSTMNT\FY 2024\MNT Contract (FY24)\MISC CONC REPAIR\5. Misc Conc Rep LAYOUTS.dgn



A

DELAMINATION AT BENT 12 LOOKING SOUTH 1.5' X 1.5' APPROX.

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 19	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0018-02-119	3
PROJECT TOTALS	3

LOCATION			
LAT.	28.27037000	LONG.	-99.28731000

NOTES:

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STATE OF TEXAS
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BRIDGE REPAIR
LAYOUT 19
IH 35 EFR

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 19 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	37

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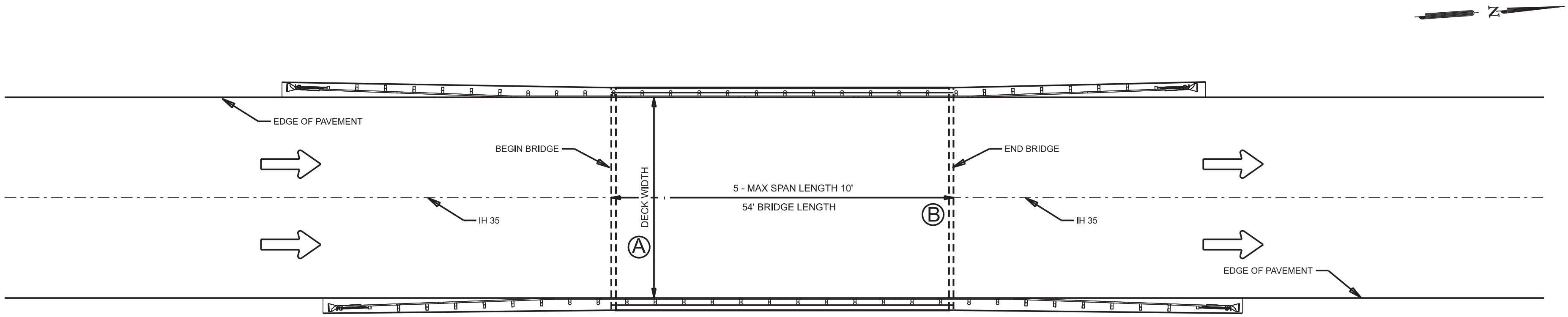

Ⓐ

MODERATE SPALL WITH EXPOSED AND CORROED REBAR IN SOFFIT OF TOP SLAB AT BARREL #5 (FROM NORTH).

Ⓑ

MODERATE SPALL WITH EXPOSED AND CORROED REBAR IN SOFFIT OF TOP SLAB AT BARREL #1 (FROM NORTH).

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 20	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0018-02-129	11
PROJECT TOTALS	11

LOCATION			
LAT.	28.22692300	LONG.	-99.30031800

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

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BRIDGE REPAIR
LAYOUT 20
IH 35

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 20 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	38

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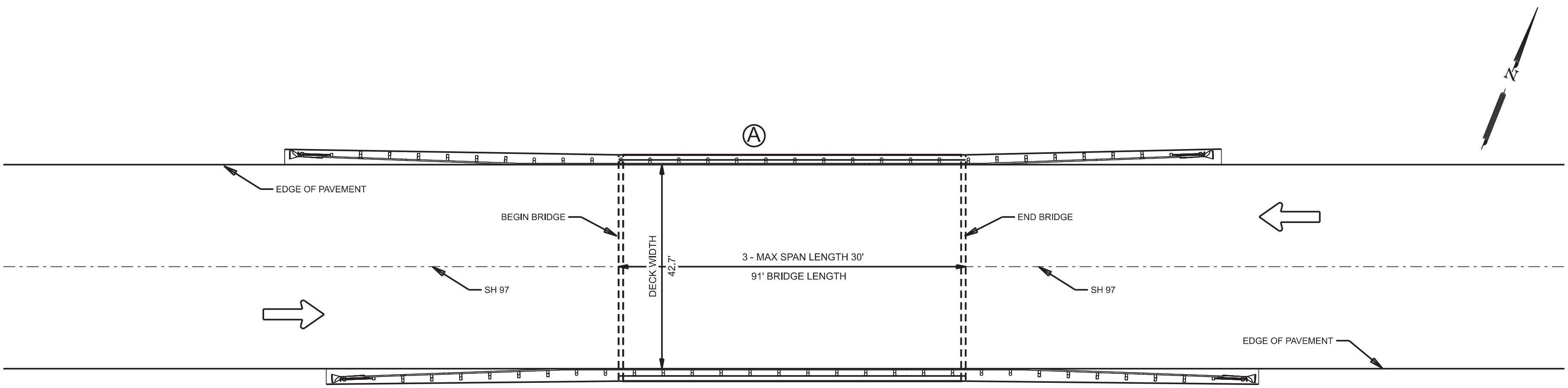

A

WIDESPREAD DELAMINATIONS AND COVER SPALLS ALONG EXTERIOR DECK FASCIA LOOKING SOUTHEAST.

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 21	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0483-01-032	1
PROJECT TOTALS	1

LOCATION			
LAT.	28.43867600	LONG.	-99.22905100

NOTES:

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STATE OF TEXAS
VANESSA I ROSALES-HERRERA
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BRIDGE REPAIR
LAYOUT 21
SH 97

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 21 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	39

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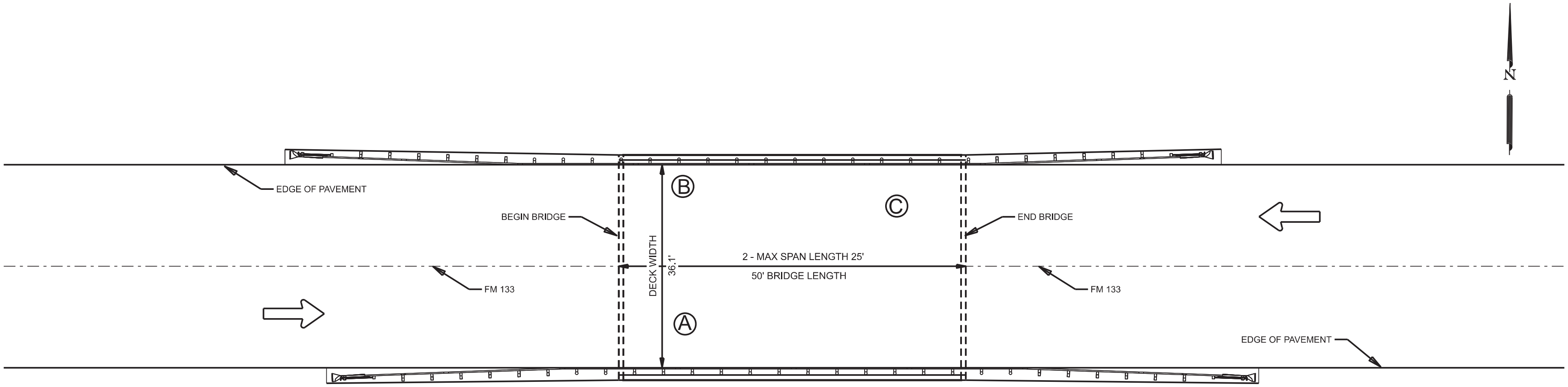

Ⓐ

SPALL IN DECK SOFFIT OF SPAN 1 OVER CENTER COLUMN AT BENT 2 LOOKING EAST.

18"W X 10" L X 1" D APPROX.

Ⓑ

DELAMINATION AT NORTH END OF WEST ABUTMENT CAP LOOKING NORTHWEST.

20" DIAMETER APPROX.

SUMMARY OF BRIDGES	
LOCATION 22	429
	6007
	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0237-01-015	12
PROJECT TOTALS	12

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

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Ⓒ

INTERIOR BENT CAP HAS DELAMINATIONS LOOKING NORTHEAST.

18-IN DIAMETER APPROX.

LOCATION			
LAT.	28.28225400	LONG.	-99.30392400

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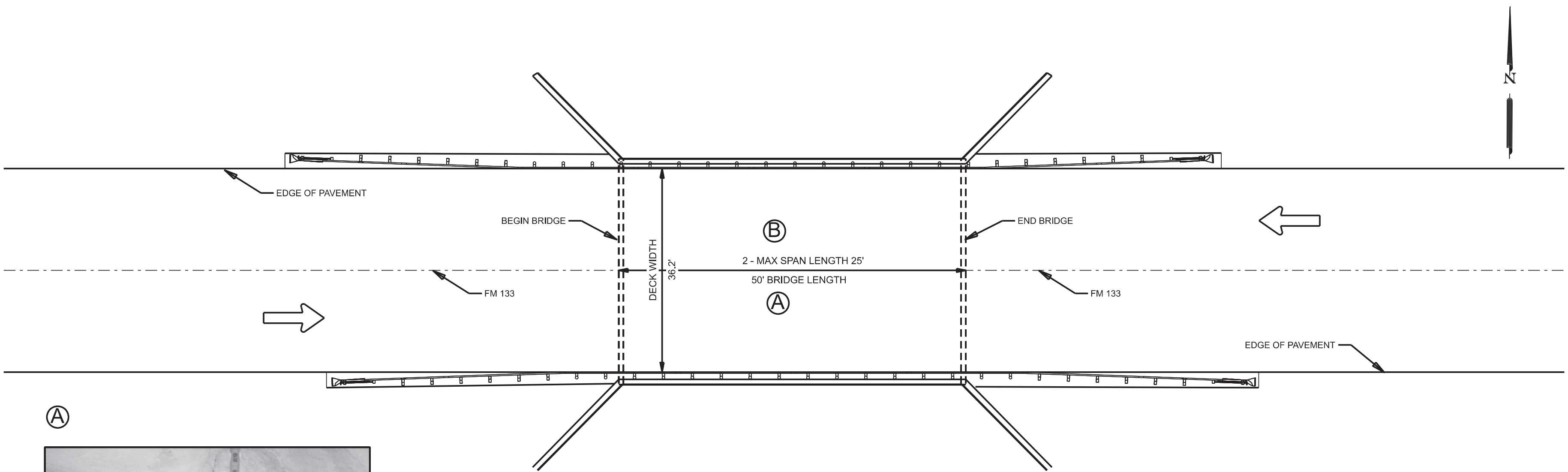
BRIDGE REPAIR
LAYOUT 22
FM 133

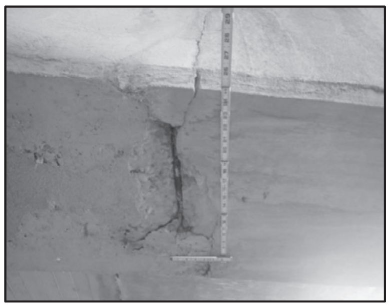
DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 22 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	40



SUMMARY OF BRIDGES		
LOCATION 23	429	780
	6007	6004
	CONC STR REPAIR (VERTICAL & OVERHEAD)	CONC CRCK REPAIR (DISCRETE) (ROUT AND SEAL)
	SF	LF
PSN# 22-142-0-0237-01-012	2	4
PROJECT TOTALS	2	4

LOCATION			
LAT.	28.28536000	LONG.	-99.34732100

Ⓐ



INTERIOR BENT CAP HAS A VERTICAL CRACK AT CONSTURCTION JOINT AND A SPALL WITH EXPOSED REINFORCING IN BENT CAP SOFFIT BETWEEN PILES 2 AND 3 LOOKING EAST.

Ⓑ

INTERIOR BENT CAP HAS A VERTICAL CRACK AT CONSTRUCTION JOINT AND A SPALL WITH EXPOSED REINFORCING IN BENT CAP SOFFIT BETWEEN PILES 2 AND 3 LOOKING EAST.

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

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PROVIDE MATERIALS IN ACCORDANCE WITH THE DEPARTMENT'S CONCRETE REPAIR MANUAL. SELECT PRE-APPROVED MATERIAL MEETING THE REQUIREMENTS OF THE APPLICABLE DMS WHEN AVAILABLE.

STATE OF TEXAS
VANESSA I ROSALES-HERRERA
103736
REGISTERED PROFESSIONAL ENGINEER

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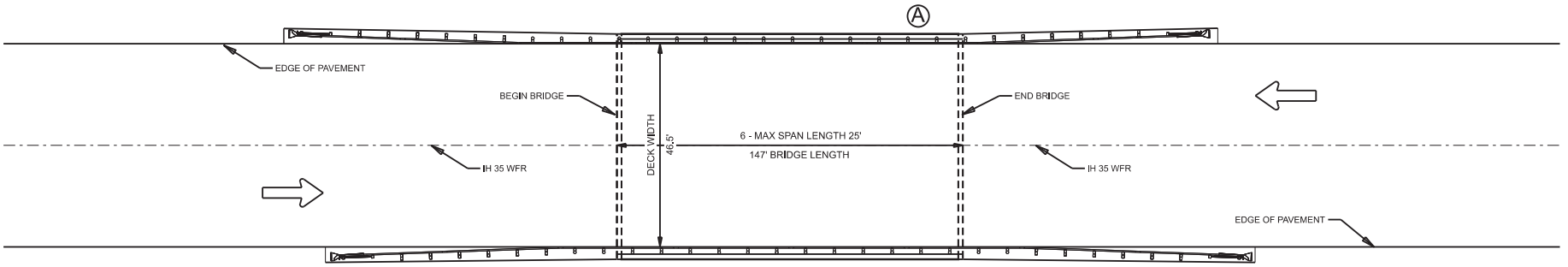
TEXAS DEPARTMENT OF TRANSPORTATION ®

BRIDGE REPAIR
LAYOUT 23
FM 133

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 23 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	41



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BENT 2 CORNER SPALL AT WEST END OF CAP LOOKING NORTH.

SUMMARY OF BRIDGES	
LOCATION 24	429
	6007
	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0018-02-006	3
PROJECT TOTALS	3

LOCATION			
LAT.	28.27569500	LONG.	-99.28588000

NOTES:

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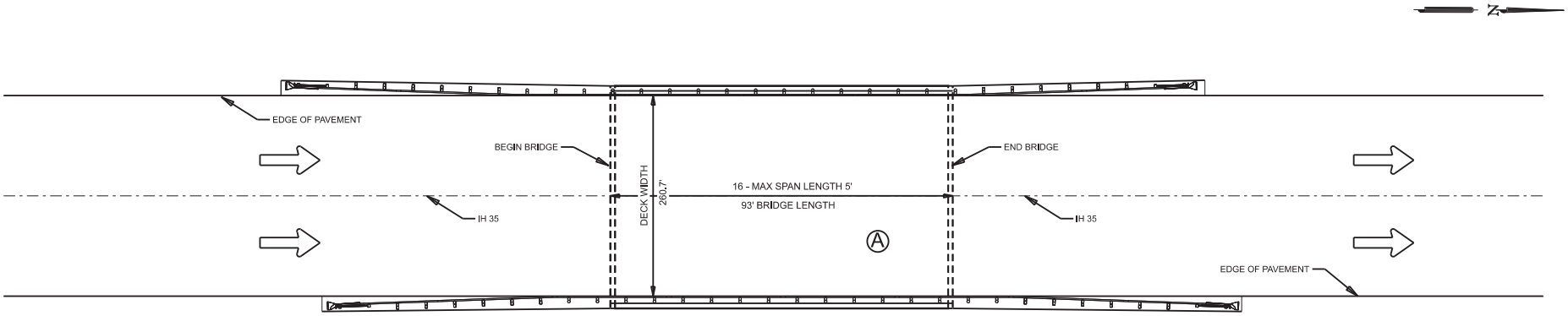
BRIDGE REPAIR
LAYOUT 24
IH 35 WFR

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER	SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 24 OF 42	

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.	6417	14	001	VARIOUS	42



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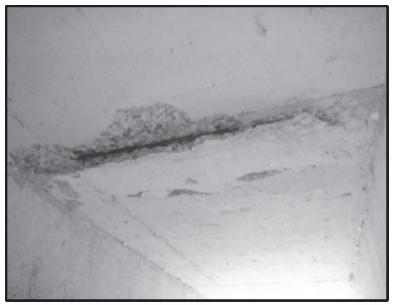

DELAMINATION AND SPALLS WITH EXPOSED REBAR ON BOTTOM OF TOP SLAB IN BARREL 2 FROM NORTH AT EAST END LOOKING NORTHEAST.

SUMMARY OF BRIDGES	
LOCATION 25	429
	6007
	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0017-08-145	8
PROJECT TOTALS	8

LOCATION			
LAT.	28.58703500	LONG.	-99.19482900

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

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BRIDGE REPAIR
LAYOUT 25
IH 35

DN: O.S.	CK: V.R.	DW: O.S.	CK: V.R.	STATE	SHEET NUMBER	SHEET NO.
				TEXAS	SHEET 25 OF 42	

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.	6417	14	001	VARIOUS	43

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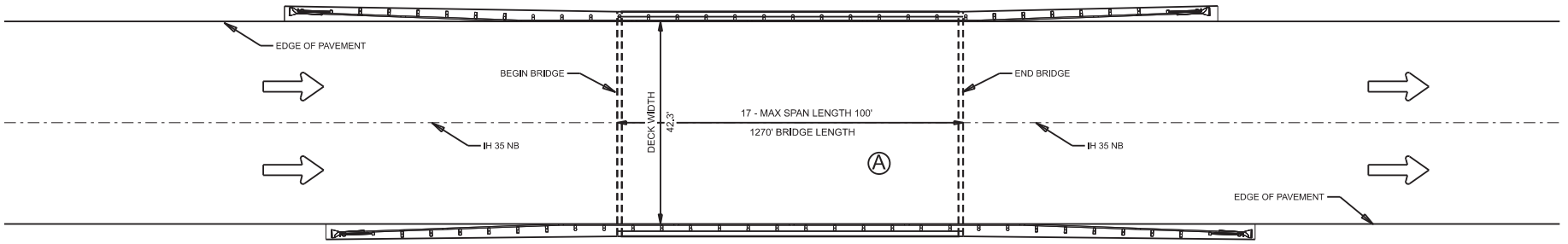

Ⓐ

BENT 15 SPAN 14 HAS AN AREA OF DELAMINATION UP TO 2SF WITH CRACKING UP TO 1/32-IN WIDE IN DECK SOFFIT BETWEEN BEAMS 2 AND 3 LOOKING SOUTHWEST.

SUMMARY OF BRIDGES		
LOCATION 26	429	CONC STR REPAIR (VERTICAL & OVERHEAD)
	6007	
	SF	
PSN# 22-142-0-0018-01-097	3	
PROJECT TOTALS	3	

LOCATION			
LAT.	28.42732200	LONG.	-99.25088500

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

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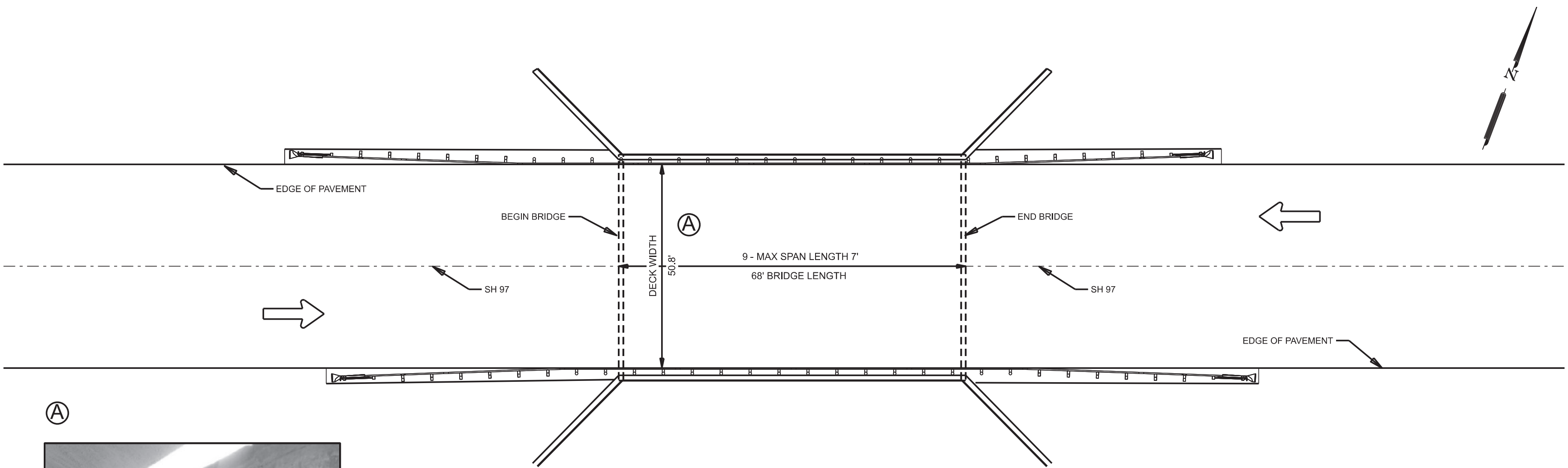
BRIDGE REPAIR
LAYOUT 26
IH 35 NB

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER	SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 26 OF 42	

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.	6417	14	001	VARIOUS	44



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SPALLS WITH EXPOSED REBAR ON BOTTOM OF SLAB UNDER DRAINAGE INLET IN BARREL 5 FROM SW NEAR SE END LOOKING NORTHWEST.

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 27	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0483-01-030	8
PROJECT TOTALS	8

LOCATION			
LAT.	28.43772429	LONG.	-99.23133390

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

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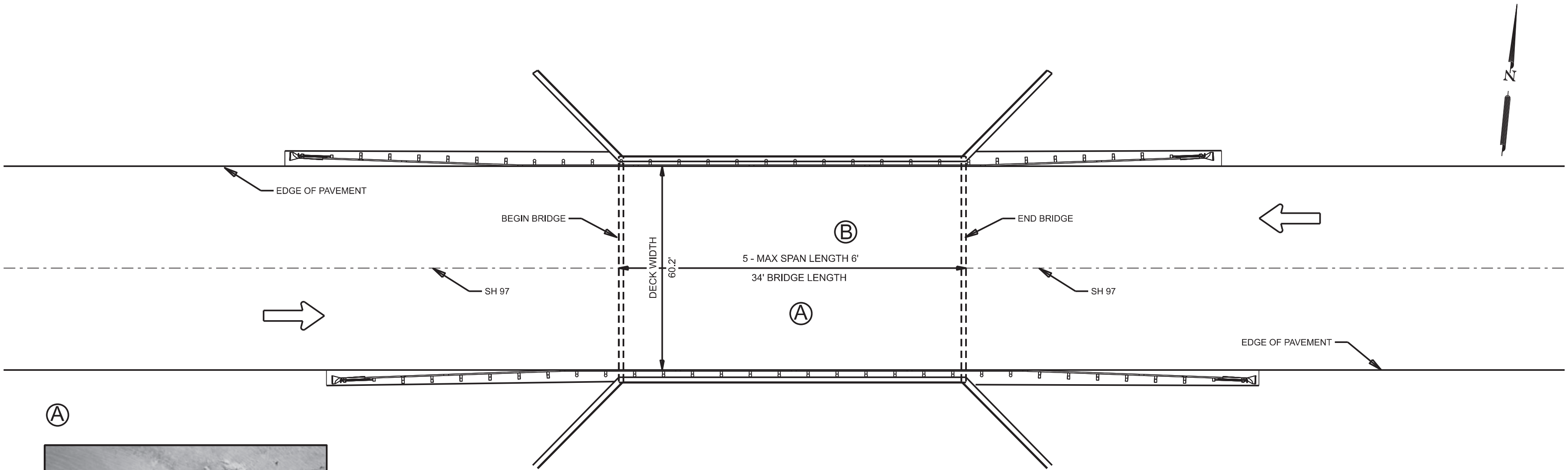
BRIDGE REPAIR
LAYOUT 27
SH 97

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER		SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 27 OF 42		
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
22	LASALLE,ETC.	6417	14	001	VARIOUS



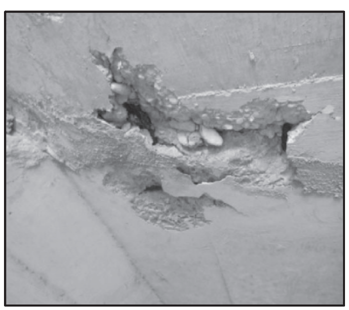
SUMMARY OF BRIDGES	
	429
	6007
LOCATION 28	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0483-01-011	4
PROJECT TOTALS	4

LOCATION			
LAT.	28.44790556	LONG.	-99.19602500

Ⓐ

PATCHED AREA WITH DELAMINATION ON BOTTOM OF TOP SLAB IN BARREL 2 FROM WEST LOOKING NORTHEAST.

Ⓑ



SPALLS AND DELAMINATION WITH EXPOSED REBAR ON BOTTOM OF TOP SLAB IN BARREL 2 FROM WEST AT NORTH WIDENING JOINT LOOKING SOUTHEST.

NOTES:

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BRIDGE REPAIR
LAYOUT 28
SH 97

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER	SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 28 OF 42	

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	SHEET NO.
	22	LASALLE,ETC.	6417	14	001	VARIOUS	46

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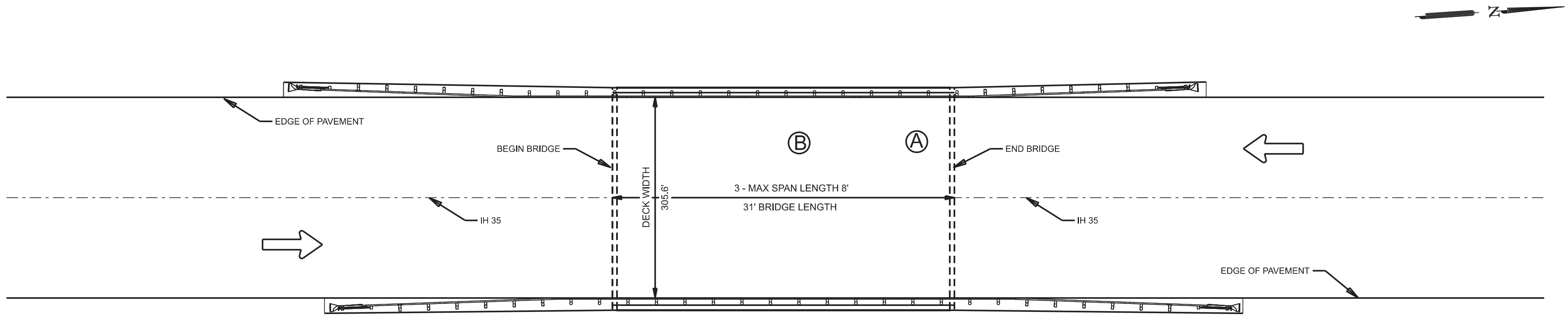

Ⓐ

SPALLS WITH EXPOSED AND CORRODED REBAR AT EAST END OF ORIGINAL WEST PORTION IN NORTH BARRELS LOOKING NORTHWEST.

Ⓑ

SPALL WITH EXPOSED REBAR ON BOTTOM OF TOP SLAB IN NORTH BARREL AT EAST END OF CULVERT LOOKING WEST.

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 29	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0018-02-014	10
PROJECT TOTALS	10

NOTES:

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LOCATION			
LAT.	28.27510900	LONG.	-99.28546500

STATE OF TEXAS
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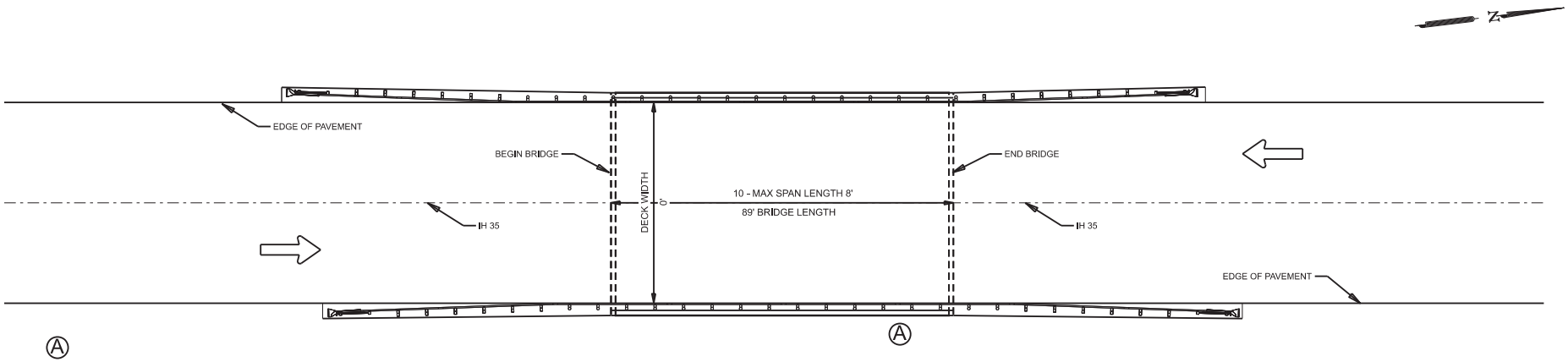
BRIDGE REPAIR
LAYOUT 29
IH 35

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 29 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	47



SPALL WITH EXPOSED REBAR AND DELAMINATION ON EAST HEADWALL LOOKING SOUTHWEST.

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 30	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-142-0-0018-02-009	5
PROJECT TOTALS	5

LOCATION			
LAT.	28.25367800	LONG.	-99.29261200

NOTES:

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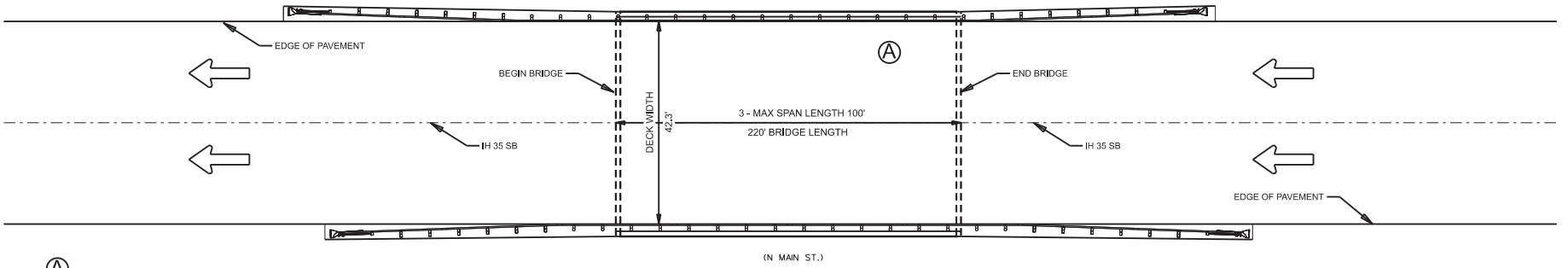
BRIDGE REPAIR
LAYOUT 30
IH 35

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER	SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 30 OF 42	

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.	6417	14	001	VARIOUS	48



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OVERHEIGHT SPALLS TO BEAMS 1-3 IN SPAN 2 LOOKING SOUTHEAST.

SUMMARY OF BRIDGES		
LOCATION 31	429	CONC STR REPAIR (VERTICAL & OVERHEAD)
	6007	
		SF
PSN# 22-142-0-0017-08-244	2	
PROJECT TOTALS	2	

LOCATION			
LAT.	28.45091386	LONG.	-99.23774677

NOTES:

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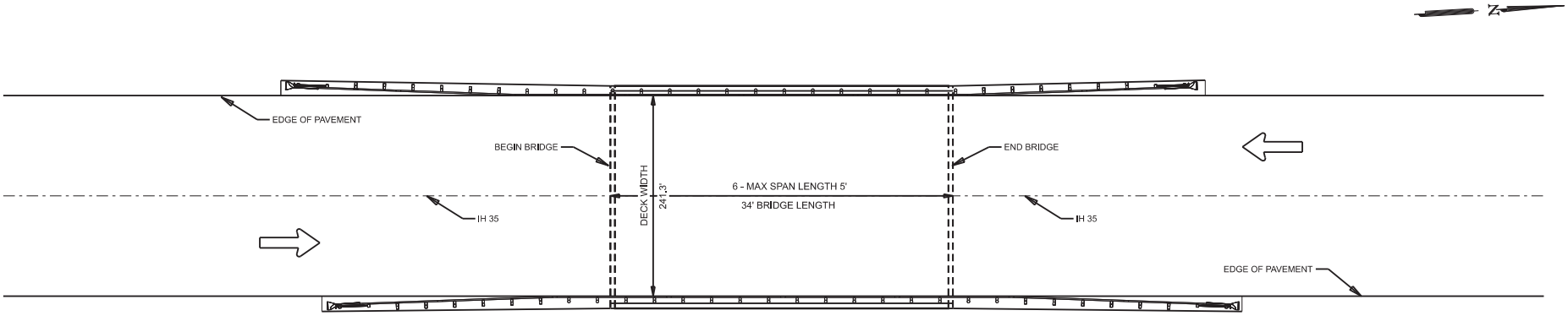
BRIDGE REPAIR
LAYOUT 31
IH 35 SB

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER	SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 31 OF 42	

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.	6417	14	001	VARIOUS	49



MODERATE SPALLS WITH EXPOSED STEEL AT EAST ENDS OF INTERIOR WALLS #3 - 5 (FROM NORTH).

SUMMARY OF BRIDGES		
LOCATION 32	429	CONC STR REPAIR (VERTICAL & OVERHEAD)
	6007	
	SF	
PSN# 22-142-0-0017-08-151	9	
PROJECT TOTALS	9	

LOCATION			
LAT.	28.48908475	LONG.	-99.22436607

NOTES:

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BRIDGE REPAIR LAYOUT 32 IH 35

DN: O.S.	CK: V.R.	DW: O.S.	CK: V.R.	STATE	SHEET NUMBER	SHEET NO.
				TEXAS	SHEET 32 OF 42	

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.	6417	14	001	VARIOUS	50

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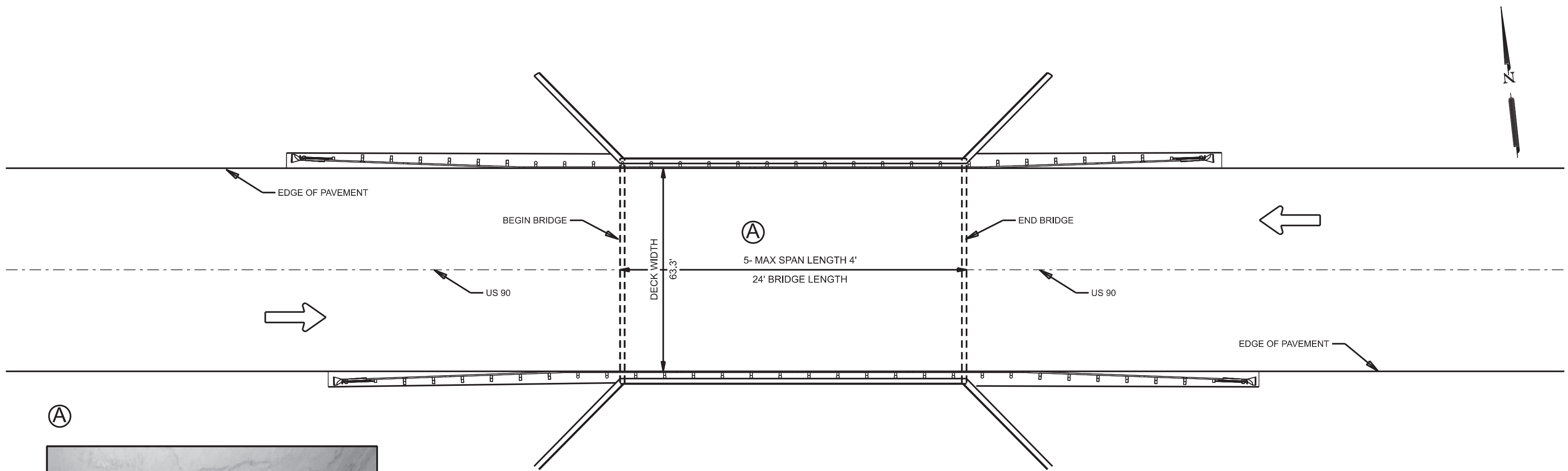

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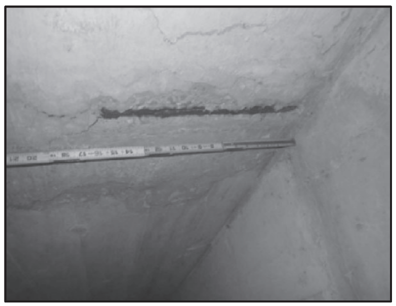

SPALLS WITH EXPOSED REINFORCING IN BOXES 1 - 3 ALONG NORTH WIDENING JOINT LOOKING SOUTH.

SUMMARY OF BRIDGES	
LOCATION 33	429
	6007
	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-136-0-0023-04-024	9
PROJECT TOTALS	9

LOCATION			
LAT.	29.23795665	LONG.	-100.15522070

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

FOLLOW PROCEDURES AS PER THE TXDOT CONCRETE REPAIR MANUAL FOR DETAILS AND INSTRUCTIONS REGARDING THE REMOVAL, CLEANING, FORMING, MIXING AND POURING, CURING AND FINISHING OF CONCRETE REPAIRS. THE METHOD OF CONCRETE STRUCTURE REPAIR WILL VARY BY EACH LOCATION. REFER TO CHAPTER 3 "REPAIR MATERIALS AND PROCEDURES"FOR REPAIR IDENTIFICATION AND PROCEDURES.

PROVIDE MATERIALS IN ACCORDANCE WITH THE DEPARTMENT'S CONCRETE REPAIR MANUAL. SELECT PRE-APPROVED MATERIAL MEETING THE REQUIREMENTS OF THE APPLICABLE DMS WHEN AVAILABLE.

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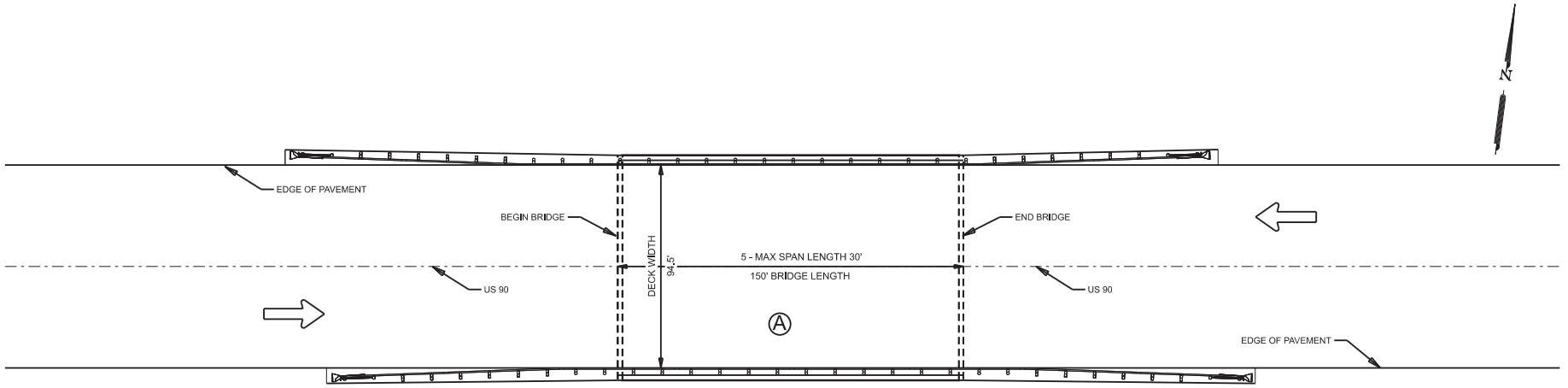
BRIDGE REPAIR
LAYOUT 33
US 90

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 33 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	51

12/19/2023 oserno3 T:\LRDOSTMNT\FY 2024\MNT Contract (FY24)\MSC CONC REPAIR\5. Misc Conc Rep LAYOUTS.dgn



Ⓐ

SPALL WITH EXPOSED REBAR ON BENT CAP 4 WEST FACE LOOKING EAST.

4 SF APPROX.

SUMMARY OF BRIDGES		
LOCATION 34	429	
	6007	
	CONC STR REPAIR (VERTICAL & OVERHEAD)	
	SF	
PSN# 22-233-0-0023-01-002	5	
PROJECT TOTALS	5	

LOCATION			
LAT.	29.36984000	LONG.	-100.88400000

NOTES:

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STATE OF TEXAS
VANESSA I ROSALES-HERRERA
103736
REGISTERED PROFESSIONAL ENGINEER

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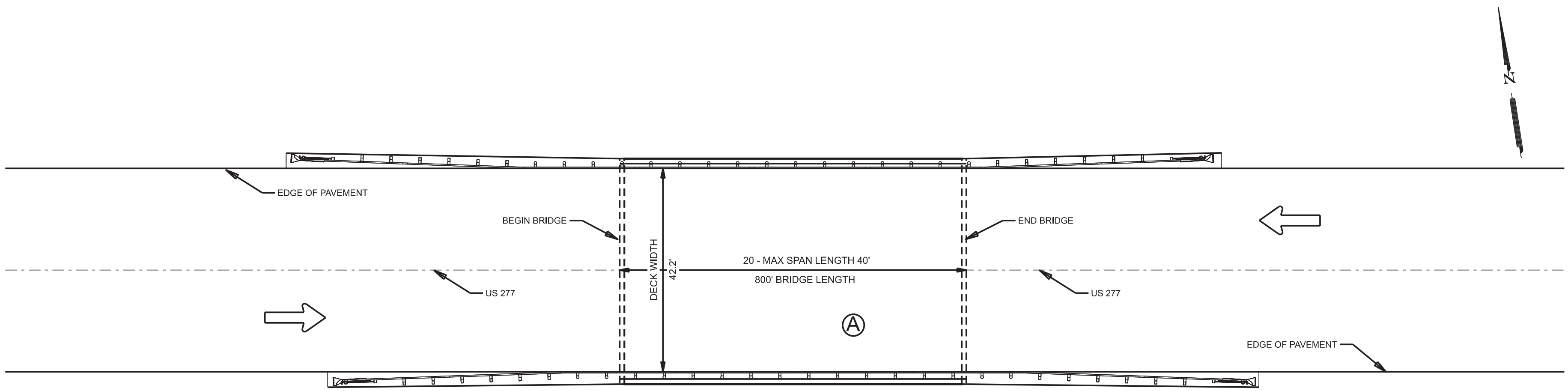
BRIDGE REPAIR
LAYOUT 34
US 90

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER	SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 34 OF 42	

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.	6417	14	001	VARIOUS	52



Ⓐ

SPALL WITH EXPOSED STEEL NEAR WEST END OF CAP AT BENT 19 (FROM SOUTH)

2' DIAMETER APPROX, 4 SF.

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 35	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-233-0-0160-04-022	4
PROJECT TOTALS	4

LOCATION			
LAT.	29.98369000	LONG.	-100.75400000

NOTES:

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BRIDGE REPAIR
LAYOUT 35
US 277

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 35 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	53

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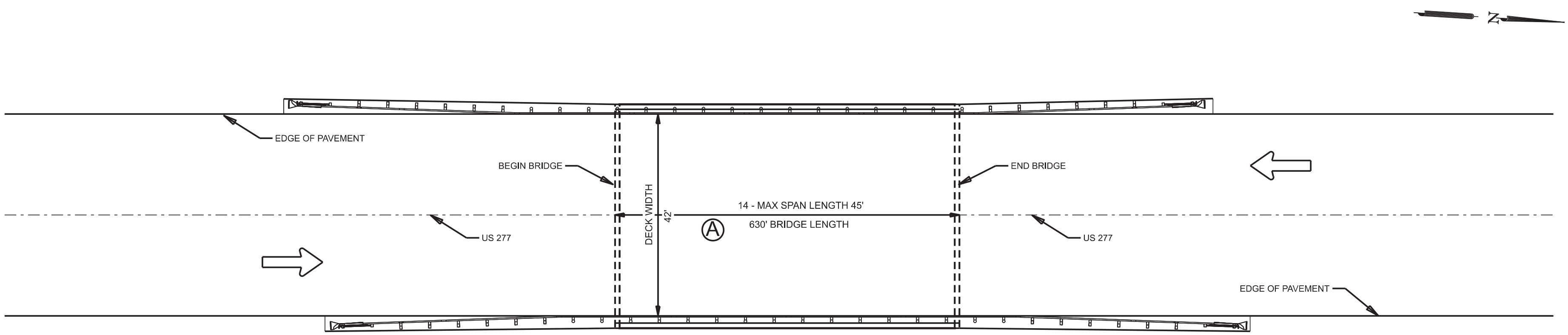

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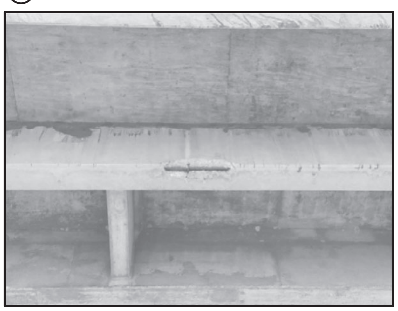
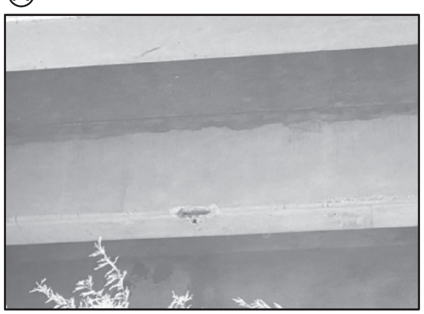


BEAM 2 (FROM WEST) IN SPAN 4 (FROM SOUTH) HAS~2' LONG SPALL WITH EXPOSED STEEL.

Ⓐ



~1' LONG SPALL WITH EXPOSED STEEL ON BEAM 2 (FROM EAST) IN SPAN 4 (FROM SOUTH).

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 36	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-233-0-0160-05-017	3
PROJECT TOTALS	3

LOCATION			
LAT.	29.81551000	LONG.	-100.80000000

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

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STATE OF TEXAS
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BRIDGE REPAIR
LAYOUT 36
US 277

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 36 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	54

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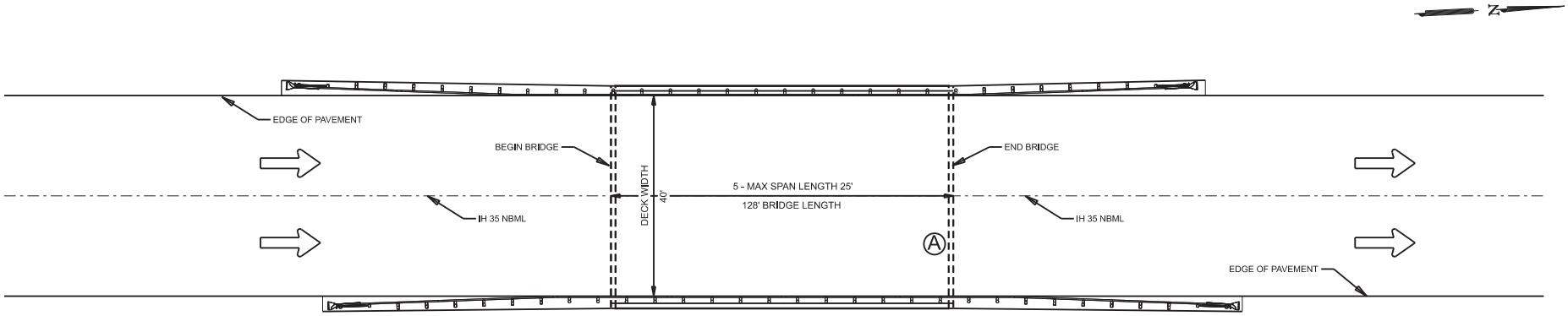

Ⓐ

SPALLING WITH EXPOSED REBAR NEAR EAST END OF NORTH ABUTMENT CAP.

2' X 8' APPROX.

SUMMARY OF BRIDGES	
LOCATION 37	429
	6007
	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-240-0-0018-04-066	16
PROJECT TOTALS	16

LOCATION			
LAT.	27.78710666	LONG.	-99.42321782

NOTES:

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BRIDGE REPAIR
LAYOUT 37
IH 35 NBML

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER	SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 37 OF 42	

FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.	6417	14	001	VARIOUS	55

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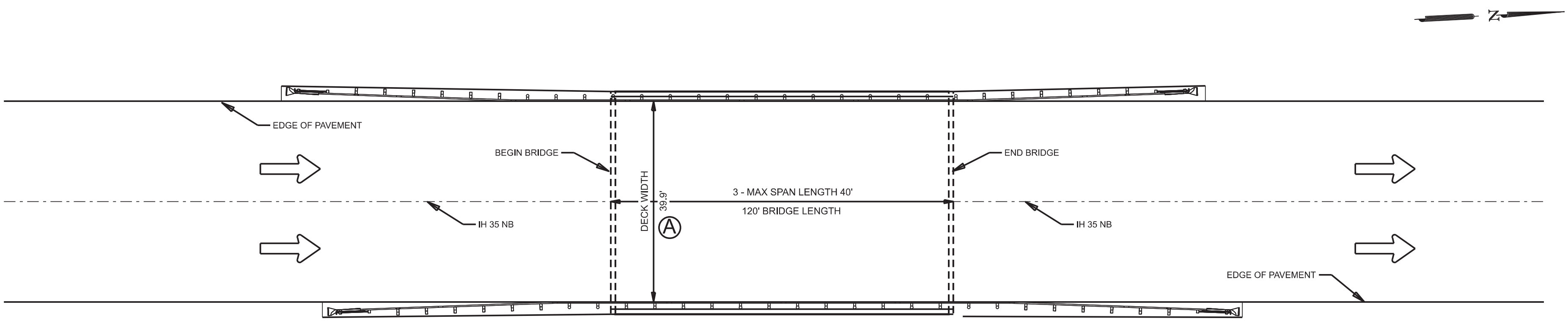

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FRACTURE AND BUCKLING OF SOUTH ABUTMENT RIP RAP.

20' APPROX.

SUMMARY OF BRIDGES

LOCATION 38	780	401
	6004	6001
	CONC CRCK REPR (DISCRETE) (ROUT AND SEAL)	FLOWABLE BACKFILL
	LF	CY
PSN# 22-240-0-0018-05-110	20	40
PROJECT TOTALS	20	40

LOCATION			
LAT.	27.75824384	LONG.	-99.43849637

NOTES:

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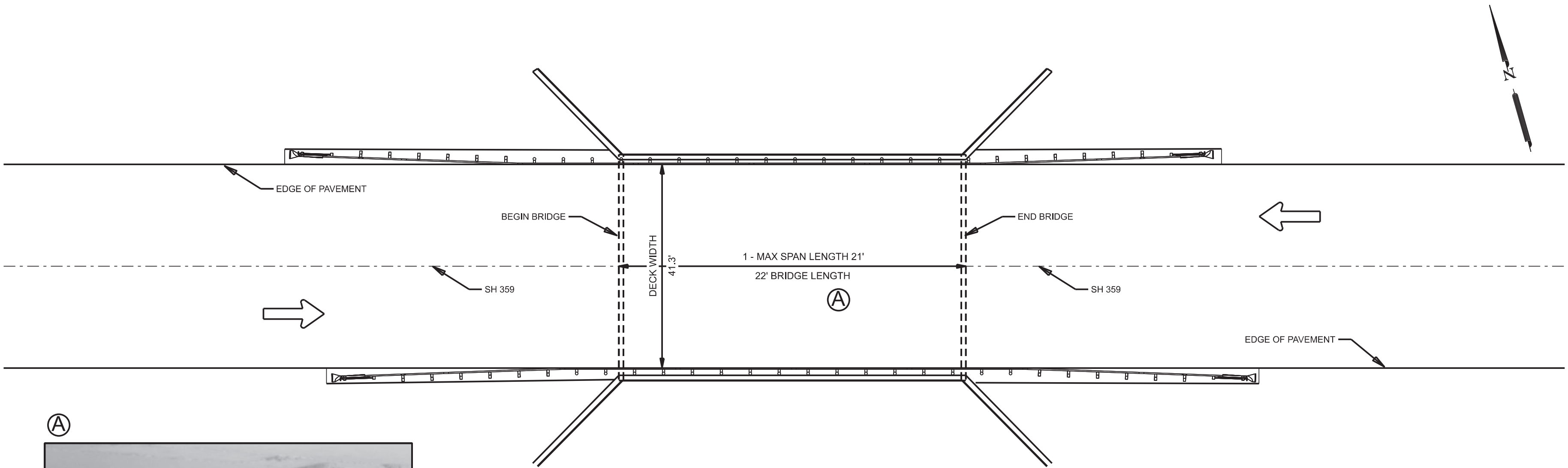
BRIDGE REPAIR
LAYOUT 38
IH 35 NB

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 38 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	56



A

SOFFIT OF ORIGINAL SLAB HAS SPALLING WITH EXPOSED REBAR ALONG SOUTH EDGE LOOKING NORTHEAST.

6 SF APPROX.

SUMMARY OF BRIDGES	429
	6007
LOCATION 39	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-240-0-0086-02-007	6
PROJECT TOTALS	6

LOCATION			
LAT.	27.47662241	LONG.	-99.20964084

NOTES:

THE CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE REPAIR.

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STATE OF TEXAS
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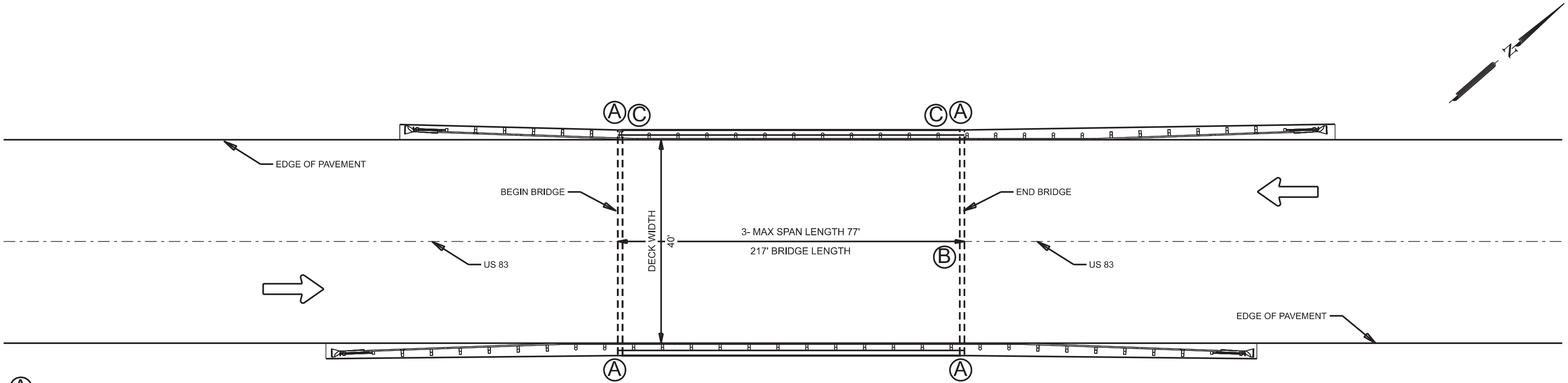
BRIDGE REPAIR
LAYOUT 39
SH 359

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 39 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	57



LOCATION			
LAT.	27.36313517	LONG.	-99.45975959

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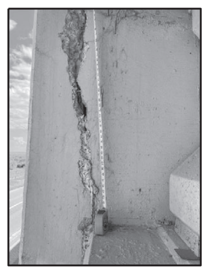

CRACKS AND SPALLS ON ALL FOUR ABUTMENT BACKWALL AND COPING

Ⓑ

SPALLING ON SOUTH ABUTMENT 0038-01-082

SUMMARY OF BRIDGES

LOCATION 40/41	104	429	780
	6028	6007	6004
	REMOVING CONC (MISC)	CONC STR REPAIR (VERTICAL & OVERHEAD)	CONC CRCK REPAIR (DISCRETE) (ROUT AND SEAL)
	SY	SF	LF
PSN# 22-240-0-0038-01-083	8	74	1
PSN# 22-240-0-0038-01-082			
PROJECT TOTALS	8	74	1

NOTES:

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REMOVE FAILING SEAL (PROVIDE CLEAN LINES)

IF THERE IS LOOSE MATERIAL, BREAK IT OFF AND THEN PROCESS WITH CONRETE REPAIRS.

Ⓒ

SPALLS ON CONCRETE COPING PANELS ON SE AND NE CORNERS

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BRIDGE REPAIR
LAYOUT 40/41
US 83 NB/SB

DN:		DW:		STATE	SHEET NUMBER			SHEET NO.
CK:	V.R.	CK:	V.R.	TEXAS	SHEET40 OF42			
FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY		CONTROL	SECTION	JOB	HIGHWAY NO.	
	22	LASALLE,ETC.		6417	14	001	VARIOUS	58

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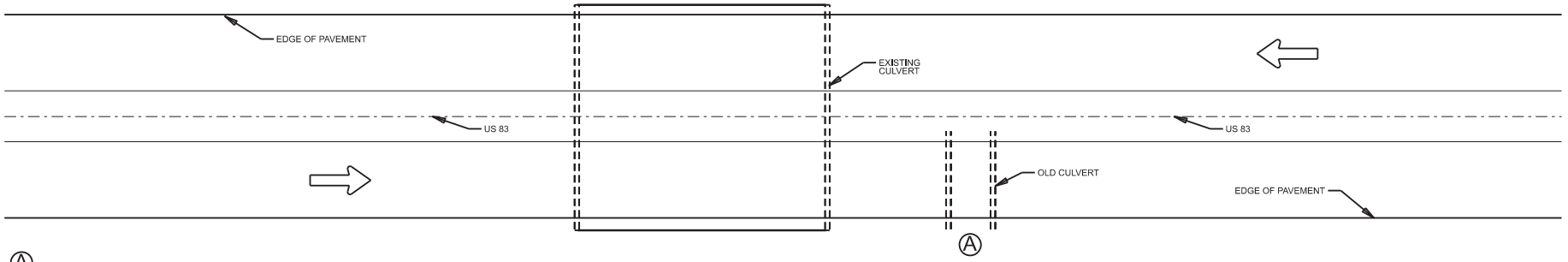

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COVER OLD CULVERT; NO LONGER IN USE.

SUMMARY OF BRIDGES		
	429	104
	6009	6028
LOCATION 42	CONC STR REPAIR (STANDARD)	REMOVAL CONC (MISC)
	SF	SY
CULVERT ON US 83 BETWEEN RM 734 TO RM 736	2	1
PROJECT TOTALS	2	1

LOCATION			
LAT.	27.292222	LONG.	-99.428333

NOTES:

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IF THERE IS LOOSE MATERIAL, BREAK IT OFF AND THEN PROCESS WITH CONRETE REPAIRS.

STATE OF TEXAS
VANESSA I ROSALES-HERRERA
103736
REGISTERED PROFESSIONAL ENGINEER

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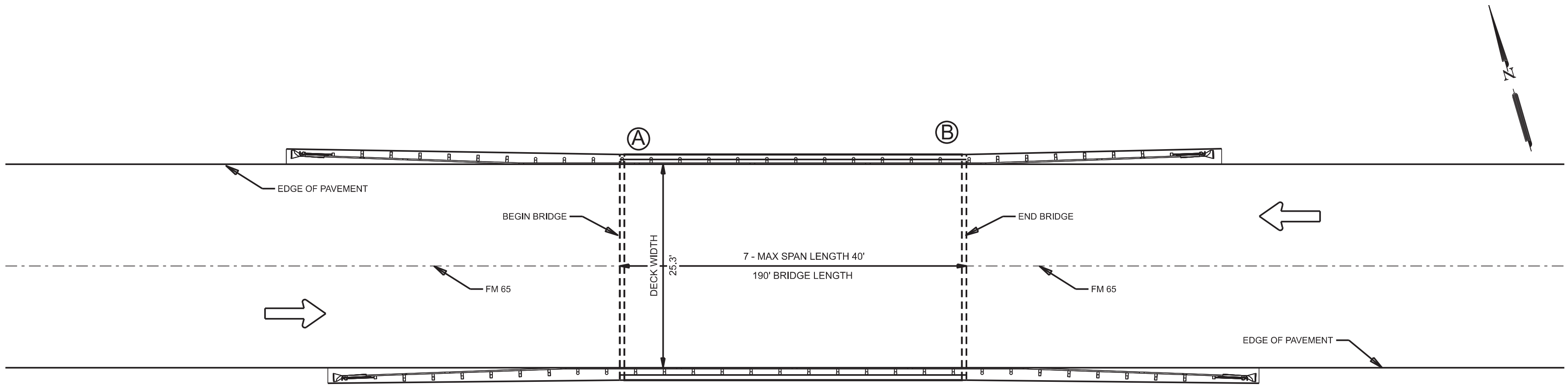
CONCRETE REPAIR
LAYOUT 42
US 83

DN:		DW:		STATE	SHEET NUMBER			SHEET NO.
CK: V.R.		CK: V.R.		TEXAS	SHEET 41 OF 42			
FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY		CONTROL	SECTION	JOB	HIGHWAY NO.	59
	22	LASALLE,ETC.		6417	14	001	VARIOUS	



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NORTH END OF CAP.

12" X 24" SPALLED AREA APPROX.

Ⓑ

NORTH END OF CAP.

16" X 18" SPALLED AREA APPROX.

SUMMARY OF BRIDGES	
	429
	6007
LOCATION 43	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
PSN# 22-254-0-0652-01-011	7
PROJECT TOTALS	7

LOCATION			
LAT.	28.65409211	LONG.	-99.78426517

NOTES:

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STATE OF TEXAS
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BRIDGE REPAIR
LAYOUT 43
FM 65

DN: O.S.	DW: O.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 42 OF 42			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	60

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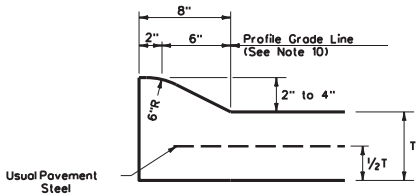
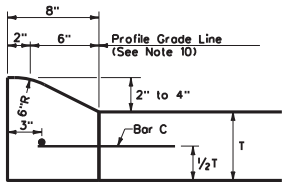
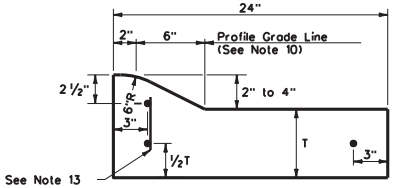
DATE:
FILE:



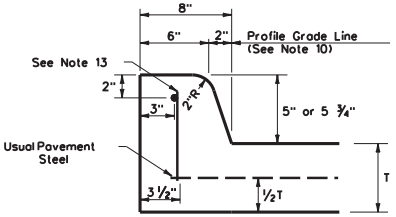
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



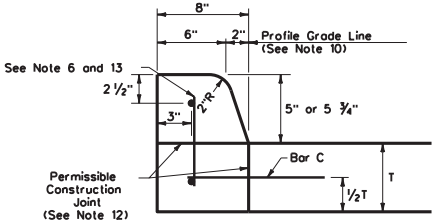
TYPE I CURB
2" - 4" HEIGHT



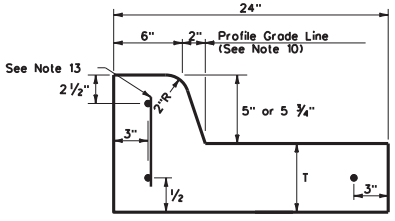
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



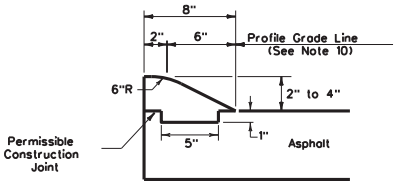
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



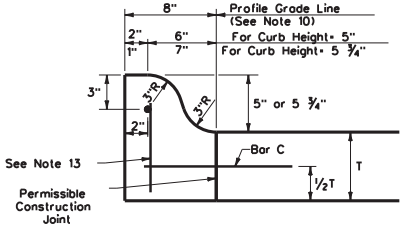
TYPE II CURB
5" - 5 ¾" HEIGHT



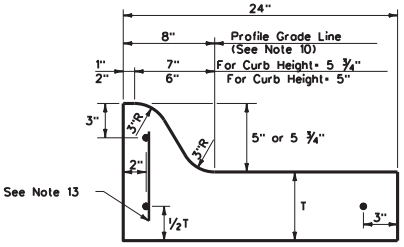
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



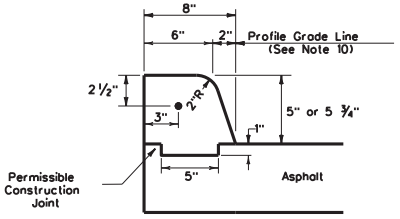
TYPE III CURB (KEYED)
2" - 4" HEIGHT



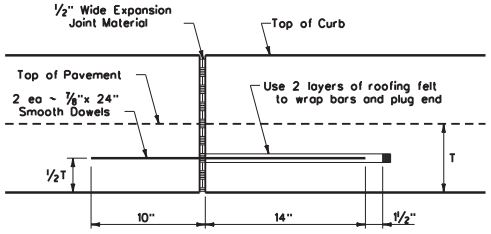
TYPE IIa CURB
5" - 5 ¾" HEIGHT



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

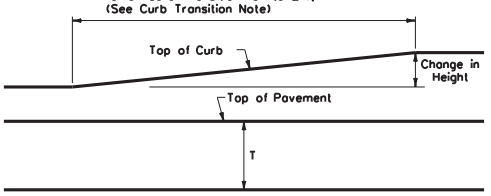


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

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

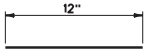


CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

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

BAR B



BAR C

Texas Department of Transportation

Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

CCCG-22

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: CS	CK: KM
©TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		61

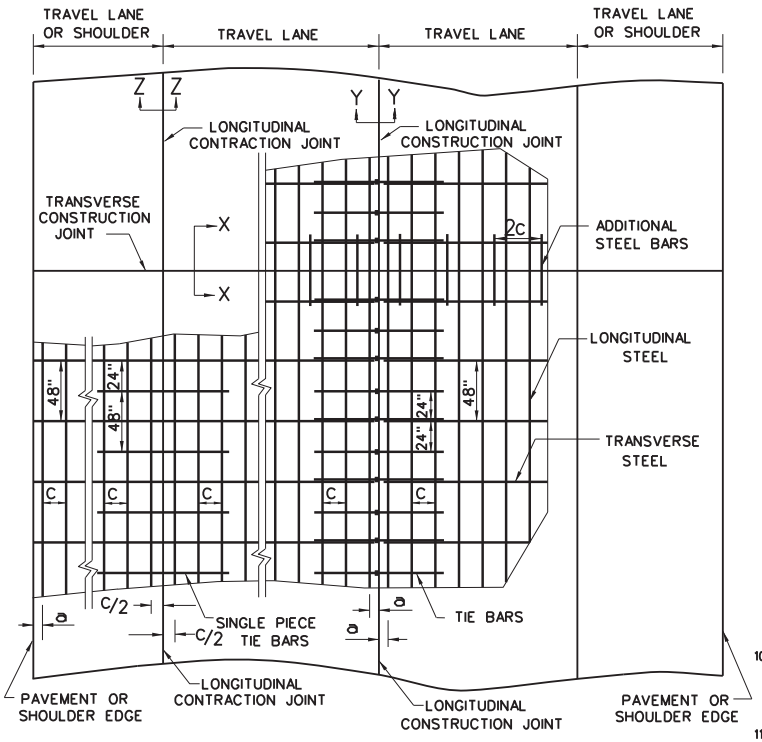
DATE:
FILE:

TABLE NO.1 LONGITUDINAL STEEL

SLAB THICKNESS AND BAR SIZE		REGULAR STEEL BARS	FIRST SPACING AT EDGE OR JOINT	ADDITIONAL STEEL BARS AT TRANSVERSE CONSTRUCTION JOINT (SECTION X-X)	
T (IN.)	BAR SIZE	SPACING c (IN.)	SPACING a (IN.)	SPACING 2 x c (IN.)	LENGTH L (IN.)
7.0	#5	6.5	3 TO 4	13	50
7.5	#5	6.0	3 TO 4	12	50
8.0	#6	9.0	3 TO 4	18	50
8.5	#6	8.5	3 TO 4	17	50
9.0	#6	8.0	3 TO 4	16	50
9.5	#6	7.5	3 TO 4	15	50
10.0	#6	7.0	3 TO 4	14	50
10.5	#6	6.75	3 TO 4	13.5	50
11.0	#6	6.5	3 TO 4	13	50
11.5	#6	6.25	3 TO 4	12.5	50
12.0	#6	6.0	3 TO 4	12	50
12.5	#6	5.75	3 TO 4	11.5	50
13.0	#6	5.5	3 TO 4	11	50

TABLE NO.2 TRANSVERSE STEEL AND TIE BARS

SLAB THICKNESS (IN.)	TRANSVERSE STEEL		TIE BARS AT LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z)		TIE BARS AT LONGITUDINAL CONSTRUCTION JOINT (SECTION Y-Y)	
	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)
7.0 - 7.5	#5	48	#5	48	#5	24
8.0 - 13.0	#5	48	#6	48	#6	24

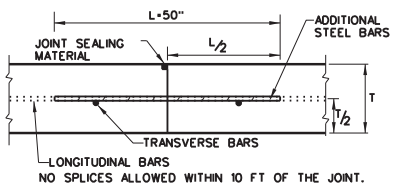


TYPICAL PAVEMENT LAYOUT

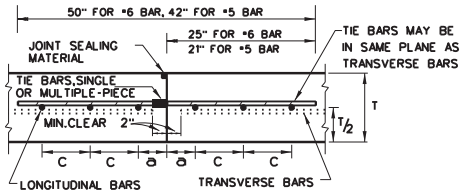
PLAN VIEW (NOT TO SCALE)

GENERAL NOTES

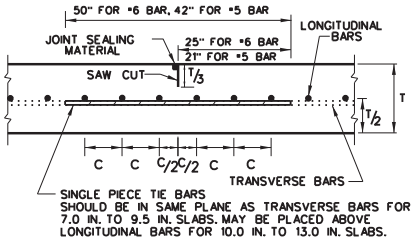
1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT ARE NOT COVERED BY THIS STANDARD.
2. USE COARSE AGGREGATES WITH A RATED COEFFICIENT OF THERMAL EXPANSION (CoTE) OF NOT MORE THAN 5.5 X 10 $^{-6}$ IN/IN/ °F AS LISTED IN THE CONCRETE RATED SOURCE QUALITY CATALOG (CRSQC).
3. ALL THE REINFORCING STEEL AND TIE BARS SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A 615 (GRADE 60) OR ASTM A 996 (GRADE 60) OR ABOVE. STEEL BAR SIZES AND SPACINGS SHALL CONFORM TO TABLE NO.1 AND TABLE NO.2.
4. STEEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1 IN. HORIZONTALLY AND +/- 0.5 IN. VERTICALLY. CALCULATED AVERAGE BAR SPACING (CONCRETE PLACEMENT WIDTH / NUMBER OF LONGITUDINAL BARS) SHALL CONFORM TO TABLE NO.1
5. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
6. THE SAW CUT DEPTH FOR THE LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z) SHALL BE ONE THIRD OF THE SLAB THICKNESS (T/3).
7. WHEN TYING CONCRETE GUTTER AT A LONGITUDINAL JOINT, THE TIE BAR LENGTH OR POSITION MAY BE ADJUSTED. PROVIDE 3 IN. OF CONCRETE COVER FROM THE BACK OF GUTTER TO THE END OF TIE BAR.
8. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN.10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
9. OMIT TIE BARS LOCATED WITHIN 18-IN. OF THE TRANSVERSE CONSTRUCTION JOINTS (SECTION X-X). USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL FORMED JOINTS.
10. LONGITUDINAL REINFORCING STEEL SPLICES SHALL BE A MINIMUM OF 25 IN. STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT.
11. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



TRANSVERSE CONSTRUCTION JOINT
SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT
SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT
SECTION Z - Z

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

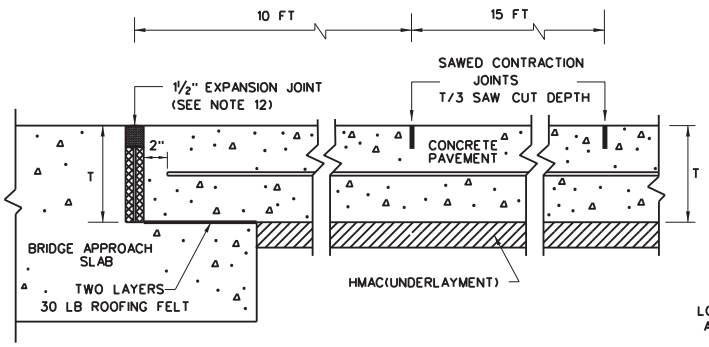
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

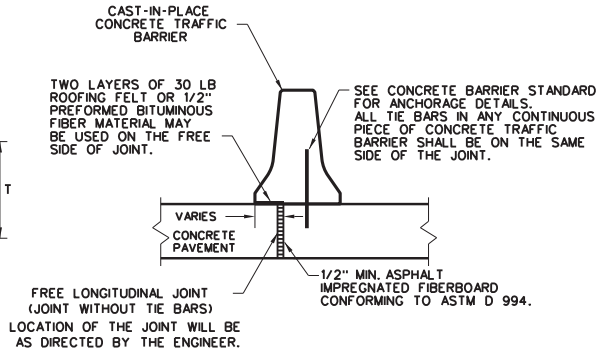
CRCP(1)-20

FILE: crcp120.dgn	DN: TxDOT	CK: KM	DW: AN	CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
10/10/2011 ADD CN #12 04/09/2013 REMOVE 5" AND 6.5" ADD CTE REQUIREMENTS	DIST	COUNTY		SHEET NO.
05/05/2017 CoTE AS RATED 4.3	22	LASALLE,ETC.		62

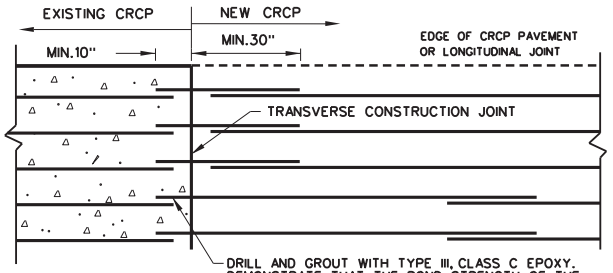
DATE:
FILE:



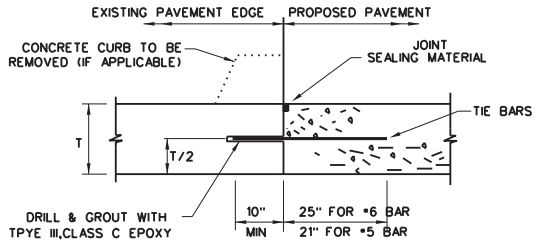
TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH



FREE LONGITUDINAL JOINT DETAIL

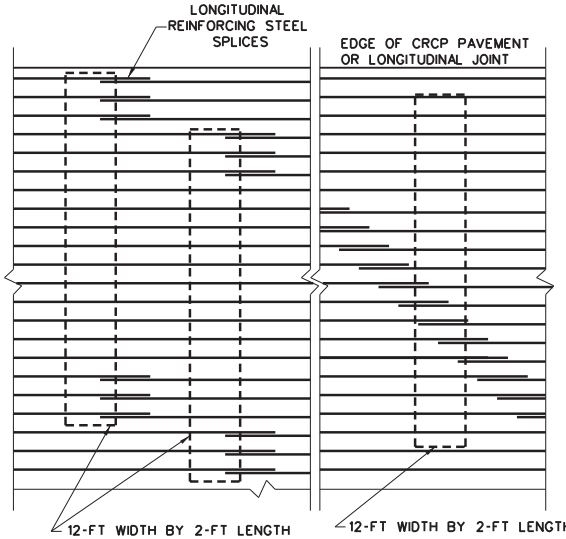


OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)



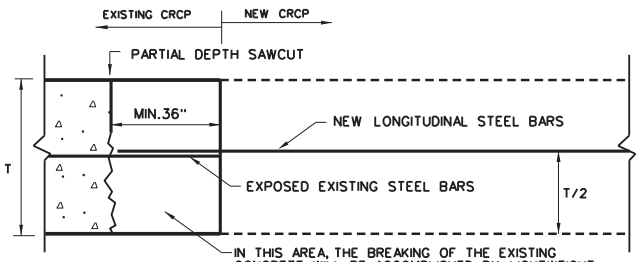
1. BEFORE WIDENING WORK, DEMONSTRATE THAT THE BOND STRENGTH OF THE EPOXY-GROUTED TIE BARS MEETS THE REQUIREMENTS OF PULL-OUT TEST SPECIFIED IN ITEM 361.
2. SPACE TIE BARS AT 24" SPACING. USE #6 TIE BARS FOR 8" AND THICKER SLABS, USE #5 TIE BARS FOR LESS THAN 8" THICK SLABS.

LONGITUDINAL WIDENING JOINT DETAIL



STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT. ANY OTHER LAP CONFIGURATION MEETING THIS REQUIREMENT WILL BE ALLOWED.

EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)



OPTION B: BREAKBACK AND LAP

TRANSVERSE TIE JOINT DETAIL
EXISTING CRCP TO NEW CRCP

SHEET 2 OF 2

Texas Department of Transportation

Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

CRCP(1)-20

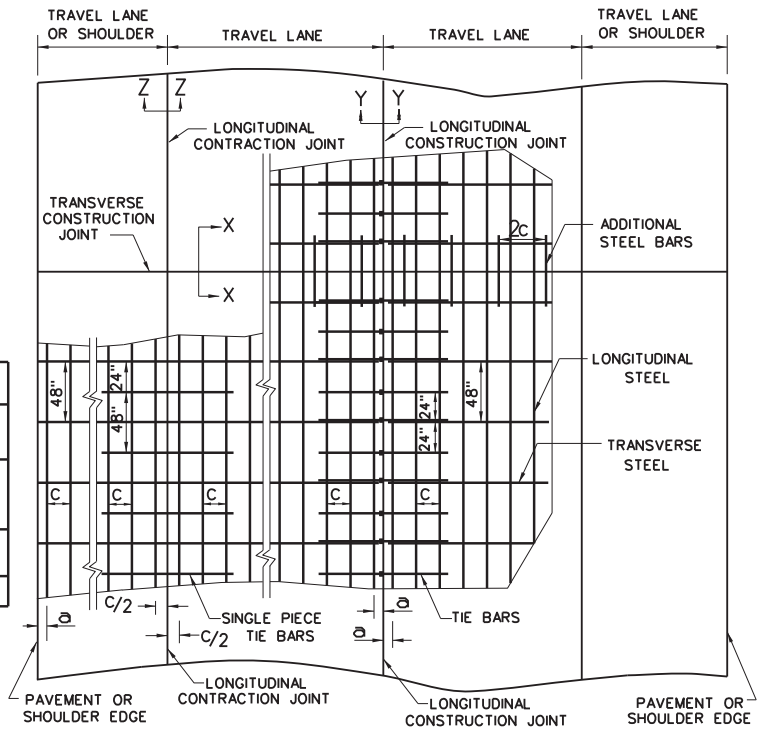
FILE: crcp120.dgn	DN: TxDOT	CK: KM	DW: AN	CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
03/16/2020 REMOVED TABLE 1A	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		63

DATE:
FILE:

TABLE NO.1 LONGITUDINAL STEEL					
SLAB THICKNESS AND BAR SIZE		FOR BOTH STEEL MATS		FOR TOP STEEL MAT ONLY	
		REGULAR STEEL BARS	FIRST SPACING AT EDGE OR JOINT	ADDITIONAL STEEL BARS AT TRANSVERSE CONSTRUCTION JOINT (SECTION X-X)	
T (IN.)	BAR SIZE	SPACING c (IN.)	SPACING a (IN.)	SPACING 2 x c (IN.)	LENGTH L (IN.)
14	#6	9.5	3 TO 4	19	50
15	#6	8.5	3 TO 4	17	50

TABLE NO.2 TRANSVERSE STEEL AND TIE BARS						
SLAB THICKNESS T (IN.)	FOR BOTH STEEL MATS		FOR LOWER STEEL MAT ONLY		FOR BOTH STEEL MATS	
	TRANSVERSE STEEL		TIE BARS AT LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z)		TIE BARS AT LONGITUDINAL CONSTRUCTION JOINT (SECTION Y-Y)	
	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)
14 - 15	#5	48	#6	48	#6	24

TABLE NO.3 TWO LAYER STEEL PLACEMENT HEIGHT OF STEEL MATS		
SLAB THICKNESS T (IN.)	LOWER STEEL MAT HEIGHT T1 (IN.)	TOP STEEL MAT HEIGHT T2 (IN.)
14	4.5	8.0
15	5.0	8.5

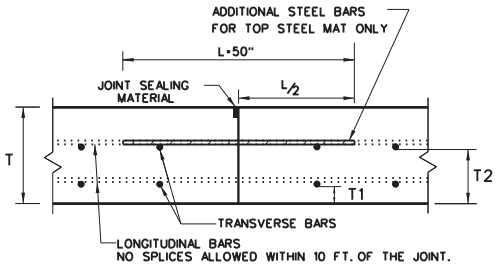


TYPICAL PAVEMENT LAYOUT

PLAN VIEW (NOT TO SCALE)

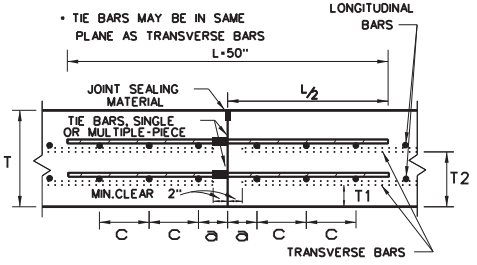
GENERAL NOTES

1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT ARE NOT COVERED BY THIS STANDARD.
2. USE COARSE AGGREGATES WITH A RATED COEFFICIENT OF THERMAL EXPANSION (CoTE) OF NOT MORE THAN 5.5 X 10 IN/IN/ F AS LISTED IN THE CONCRETE RATED SOURCE QUALITY CATALOG (CRSQC).
3. ALL THE REINFORCING STEEL AND TIE BARS SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A 615 (GRADE 60) OR ASTM A 996 (GRADE 60) OR ABOVE. STEEL BAR SIZES ANS SPACINGS SHALL CONFORM TO TABLE NO.1,TABLE NO.2 AND TABLE NO.3.
4. STEEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1 IN. HORIZONTALLY AND +/- 0.5 IN. VERTICALLY. CALCULATED AVERAGE BAR SPACING (CONCRETE PLACEMENT WIDTH / NUMBER OF LONGITUDINAL BARS) SHALL CONFORM TO TABLE NO.1.
5. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
6. THE SAW CUT DEPTH FOR THE LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z) SHALL BE ONE THIRD OF THE SLAB THICKNESS (T/3).
7. WHEN TYING CONCRETE GUTTER AT A LONGITUDINAL JOINT, THE TIE BAR LENGTH OR POSITION MAY BE ADJUSTED. PROVIDE 3 IN. OF CONCRETE COVER FROM THE BACK OF GUTTER TO THE END OF TIE BAR.
8. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN.10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
9. OMIT TIE BARS LOCATED WITHIN 18 IN. OF THE TRANSVERSE CONSTRUCTION JOINTS (SECTION X-X). USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL FORMED JOINTS.
10. LONGITUDINAL REINFORCING STEEL SPLICES SHALL BE A MINIMUM OF 25 IN. STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT.
11. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



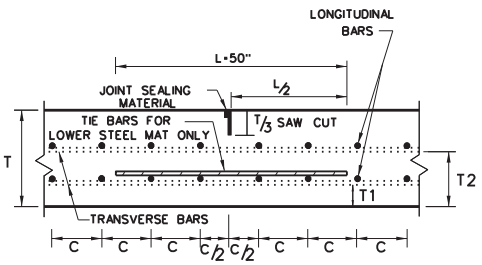
TRANSVERSE CONSTRUCTION JOINT

SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT

SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT

SECTION Z - Z

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

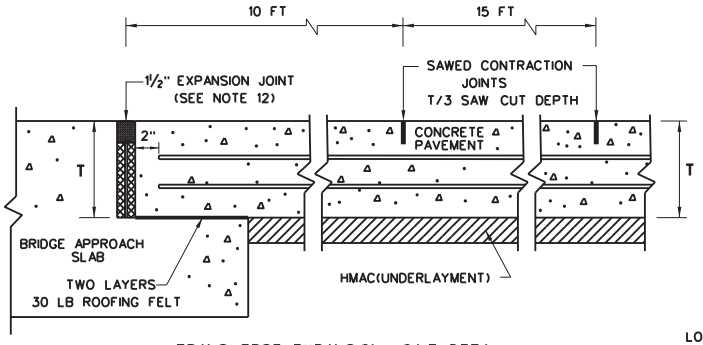
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

TWO LAYER STEEL BAR PLACEMENT T - 14 & 15 INCHES

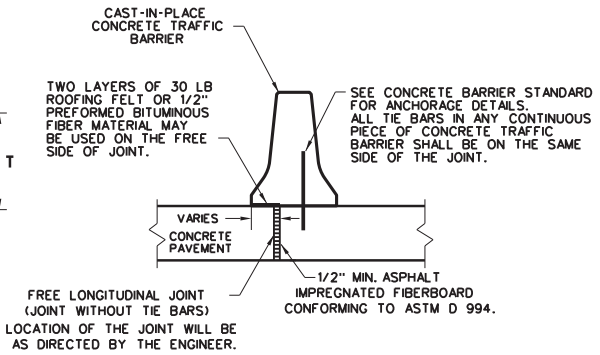
CRCP(2)-20

FILE: crcp220.dgn	DN: TxDOT	CK: KM	DW: AN	CK: VP
©TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 10/10/2011 ADD GN #12 04/09/2013 REMOVE 6" AND 6.5" ADD CTE REQUIREMENTS 04/19/2017 CoTE AS RATED 4.3	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		64

DATE:
FILE:

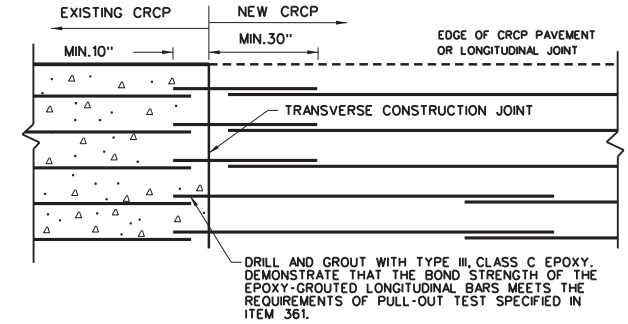


TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH

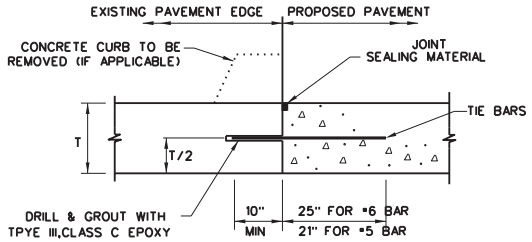


LOCATION OF THE JOINT WILL BE
AS DIRECTED BY THE ENGINEER.

FREE LONGITUDINAL JOINT DETAIL

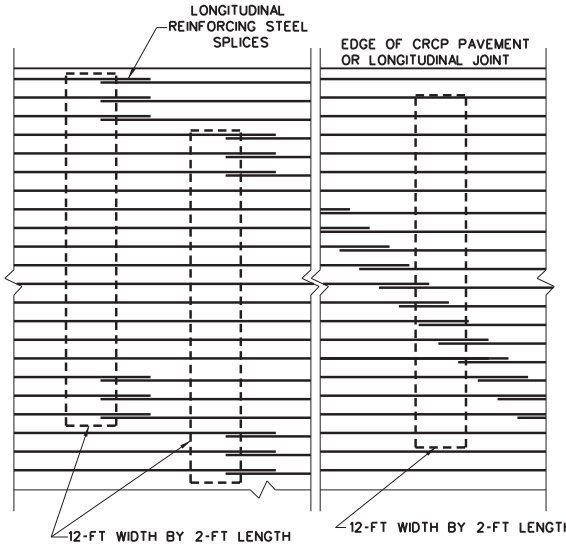


OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)



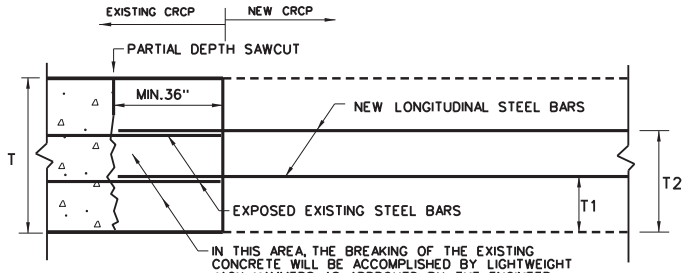
1.BEFORE WIDENING WORK, DEMONSTRATE THAT THE BOND STRENGTH OF THE EPOXY-GROUTED TIE BARS MEETS THE REQUIRMENTS OF PULL-OUT TEST SPECIFIED IN ITEM 361.
2.SPACE TIE BARS AT 24" SPACING. USE #6 TIE BARS FOR 8" AND THICKER SLABS, USE #5 TIE BARS FOR LESS THAN 8" THICK SLABS.

LONGITUDINAL WIDENING JOINT DETAIL



STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT. ANY OTHER LAP CONFIGURATION MEETING THIS REQUIREMENT WILL BE ALLOWED.

EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)



OPTION B: BREAKBACK AND LAP

TRANSVERSE TIE JOINT DETAIL
EXISTING CRCP TO NEW CRCP

Texas Department of Transportation
Design Division Standard

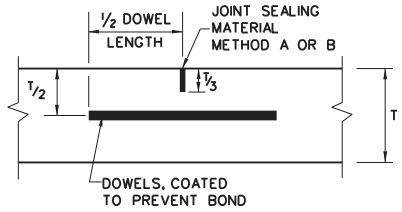
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

TWO LAYER STEEL BAR PLACEMENT
T - 14 & 15 INCHES

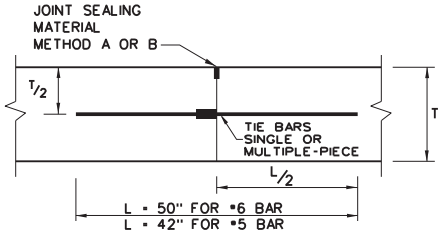
CRCP(2)-20

FILE: crcp220.dgn	DN: TxDOT	CK: KM	DW: AN	CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
03/16/2020 REMOVED TABLE 1A	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		65

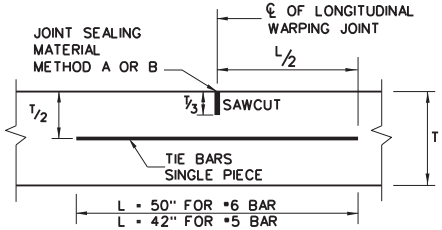
DATE:
FILE:



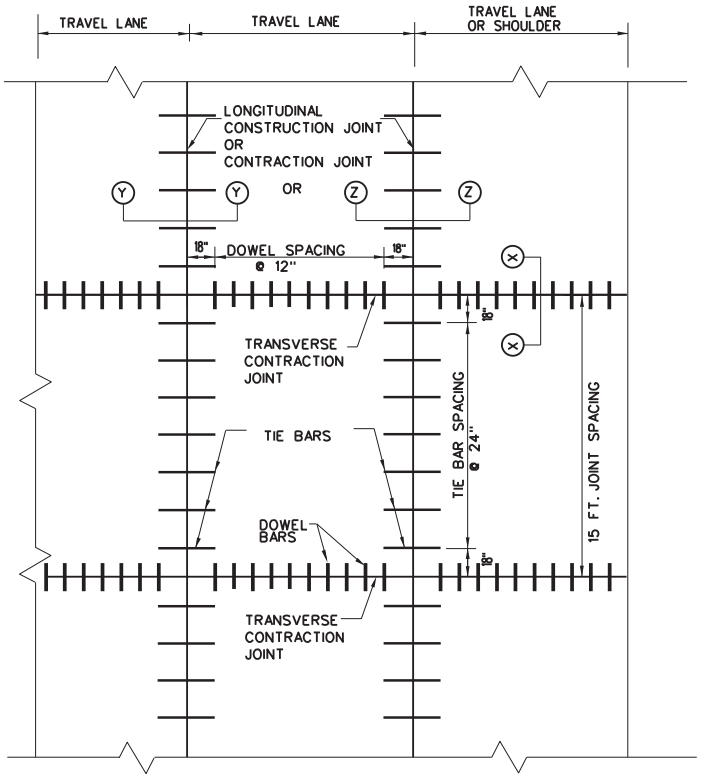
TRANSVERSE CONTRACTION JOINT
SECTION X-X



LONGITUDINAL CONSTRUCTION JOINT
SECTION Y-Y



LONGITUDINAL CONTRACTION JOINT
SECTION Z-Z



TYPICAL PAVEMENT LAYOUT
PLAN VIEW (NOT TO SCALE)

GENERAL NOTES

1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT ARE NOT COVERED BY THIS STANDARD.
2. FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND LOAD TRANSFER DEVICES REFER TO THE GOVERNING SPECIFICATION FOR "CONCRETE PAVEMENT".
3. THE SPACING BETWEEN TRANSVERSE CONTRACTION JOINTS SHALL BE 15 FT. UNLESS OTHERWISE SHOWN IN THE PLANS.
4. TRANSVERSE CONSTRUCTION JOINTS MAY BE FORMED BY USE OF METAL OR WOOD FORMS EQUAL IN DEPTH TO THE DEPTH OF PAVEMENT, OR BY METHODS APPROVED BY THE ENGINEER.
5. USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL THE FORMED JOINTS.
6. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
7. THE JOINT BETWEEN OUTSIDE LANE AND SHOULDER SHALL BE A LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z) UNLESS OTHERWISE SHOWN IN THE PLANS. THE SAW CUT DEPTH FOR THE LONGITUDIANL CONTRACTION JOINT (SECTION Z-Z) SHALL BE ONE THIRD OF THE SLABTHICKNESS (T/3).
8. WHEN TYING CONCRETE GUTTER AT A LONGITUDINAL JOINT, THE TIE BAR LENGTH OR POSITION MAY BE ADJUSTED. PROVIDE 3 IN. OF CONCRETE COVER FROM THE BACK OF GUTTER TO THE END OF TIE BAR.
9. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN. 10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
10. WHEN AN MONOLITHIIC CURB IS SPECIFIED, THE JOINT IN THE CURB SHALL COINCIDE WITH PAVEMENT JOINTS AND MAY BE FORMED BY ANY MEANS APPROVED BY THE ENGINEER.
11. DOWEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1/4 IN. HORIZONTALLY AND VERTICALLY UNLESS OTHERWISE SPECIFIED.WHERE DOWEL BAR BASKETS ARE USED, REMOVE THE SHIPPING WIRES.
12. THE DETAIL FOR JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."

TABLE NO.1 DOWELS (SMOOTH BARS)

SLAB THICKNESS T (IN.)	BAR DIA. AND LENGTH	AVERAGE SPACING (IN.)
6 to 7.5	1" X 18"	12
8 to 10	1 1/4" X 18"	12
>= 10.5	1 1/2" X 18"	12

TABLE NO.2 TIE BARS (DEFORMED BARS)

SLAB THICKNESS T (IN.)	BAR SIZE	AVERAGE SPACING (IN.)
6 to 7.5	#5	24
>= 8	#6	24

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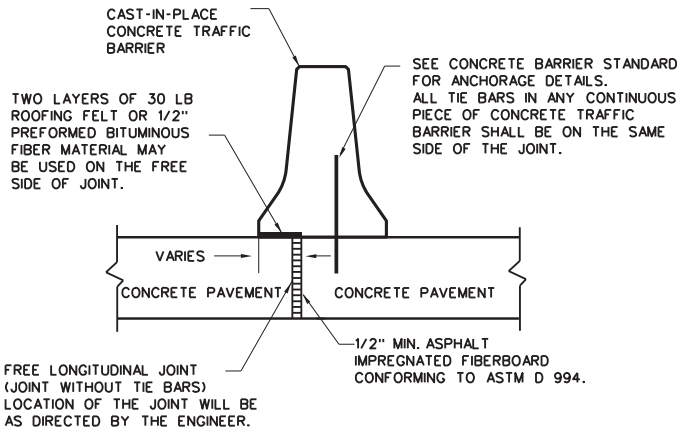
CONCRETE PAVEMENT DETAILS
CONTRACTION DESIGN
T-6 to 12 INCHES

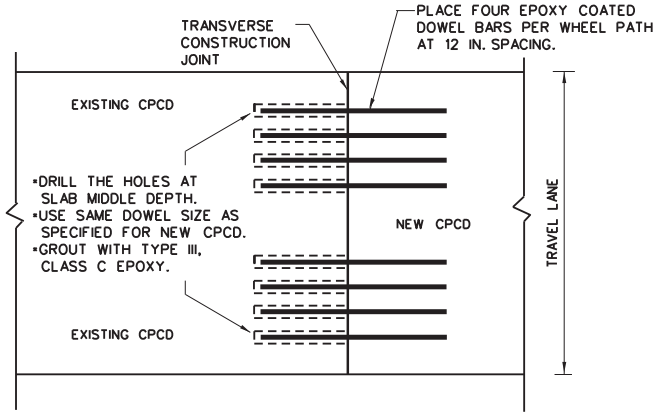
CPCD-14

FILE: cpcd14.dgn	DN: TxDOT	CK: HC	DW: HC	CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		66

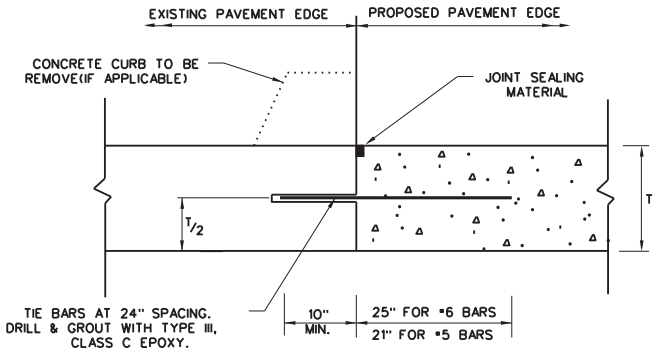
DATE:
FILE:



FREE LONGITUDINAL JOINT DETAIL

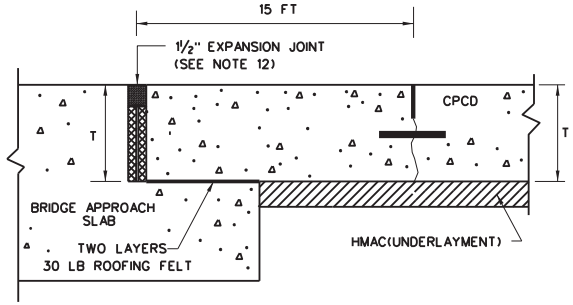


TRANSVERSE JOINT DETAIL
EXISTING CPCD TO NEW CPCD
PLAN VIEW (NOT TO SCALE)



1. BEFORE WIDENING WORK, DEMONSTRATE THAT THE BOND STRENGTH OF THE EPOXY-GROUTED TIE BARS MEETS THE REQUIREMENTS OF PULL-OUT TEST SPECIFIED IN ITEM 361.
2. SPACE TIE BARS AT 24" SPACING. USE #6 BARS FOR 8" AND THICKER SLABS, USE #5 BARS FOR LESS THAN 8" THICK SLABS.
3. THE TRANSVERSE JOINTS OF PROPOSED PAVEMENT SHALL COINCIDE WITH EXISTING PAVEMENT JOINTS UNLESS OTHERWISE SHOWN ON THE PLANS.

LONGITUDINAL WIDENING JOINT DETAIL



TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH

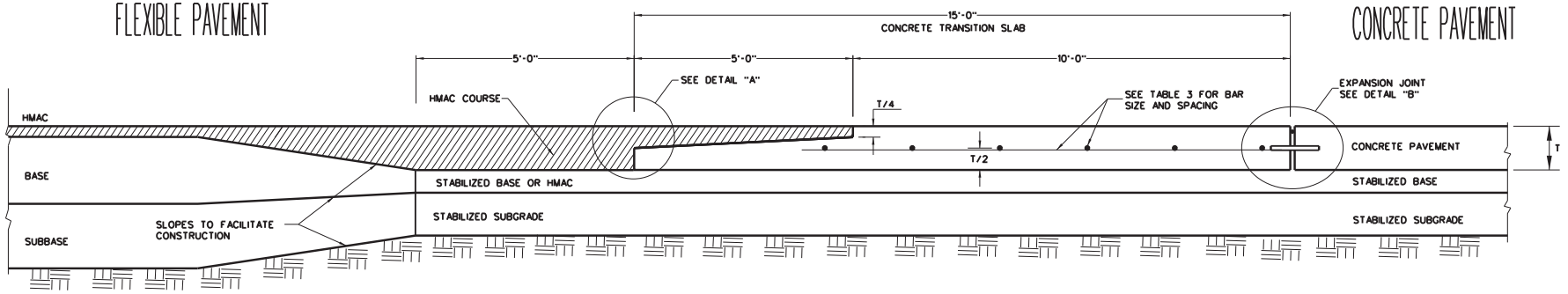
Texas Department of Transportation — Design Division Standard

CONCRETE PAVEMENT DETAILS
CONTRACTION DESIGN
T-6 to 12 INCHES

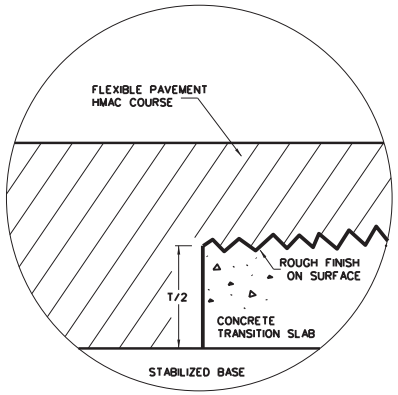
CPCD-14

FILE: cpcd14.dgn	DN: TxDOT	DW: HC	DW: HC	CK: AN
	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		67

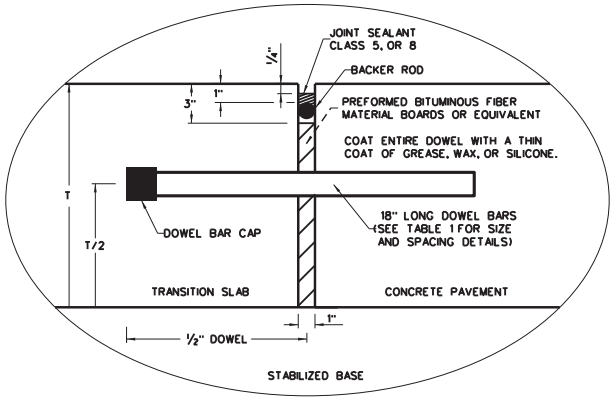
DATE:
FILE:



TYPICAL JUNCTION OF CONCRETE PAVEMENT WITH FLEXIBLE PAVEMENT
(NOT TO SCALE)



DETAIL "A"



DETAIL "B"

GENERAL NOTES

1. FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND LOAD TRANSFER DEVICES REFER TO THE GOVERNING SPECIFICATIONS FOR "CONCRETE PAVEMENT" AND "REINFORCING STEEL."
2. DETAILS FOR PAVEMENT WIDTH AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS.
3. MATCH THE LONGITUDINAL JOINTS OF THE CONCRETE TRANSITION SLAB WITH ADJOINING CONCRETE PAVEMENT. PROVIDE EQUIVALENT TIEBARS OR TRANSVERSE BARS AT THESE LONGITUDINAL JOINTS, SEE TABLE NO. 2.
4. REFER TO DMS-6310, "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
5. TRANSITION SLABS WILL BE PAID UNDER ITEM 360, "CONCRETE PAVEMENTS."

TABLE NO.1 DOWELS (SMOOTH BARS)

SLAB THICKNESS T (IN.)	BAR DIA. AND LENGTH	SPACING (IN.)
7 TO 7.5	1" X 18"	12
8 TO 10	1 1/4" X 18"	12
10 TO 13	1 1/2" X 18"	12

TABLE NO.2 TIE BARS (DEFORMED BARS)

SLAB THICKNESS T (IN.)	BAR SIZE	SPACING (IN.)
7 TO 7.5	#5	24
8 TO 13	#6	24

TABLE NO.3 TRANSITION SLAB STEEL (DEFORMED BARS)

SLAB THICKNESS T (IN.)	BAR SIZE	SPACING (IN.) TRANSVERSE DIRECTION	SPACING (IN.) LONGITUDINAL DIRECTION
7 TO 7.5	#5	24	12
8 TO 13	#6	24	12

ADJUST SPACING OF LONGITUDINAL BARS AS NEEDED TO ACCOMDATE DOWEL BAR SPACING.

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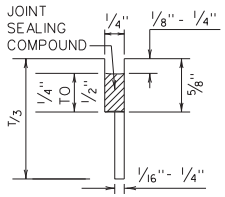
CONCRETE PAVEMENT DETAILS
TRANSITION SLAB
T-7 to 13 INCHES

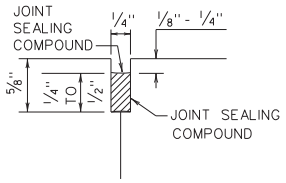
TRANS-20

FILE: transitslab20.dgn	DN: TxDOT	CK: TxDOT	DW: AN	CK: KM
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		68

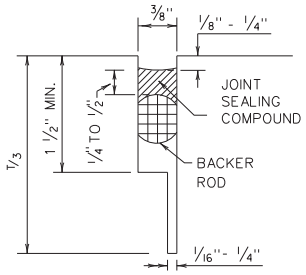
METHOD B: JOINT SEALING COMPOUND



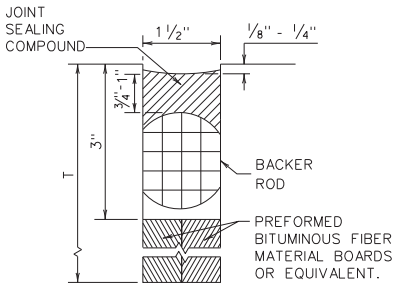
LONGITUDINAL SAWED CONTRACTION JOINT



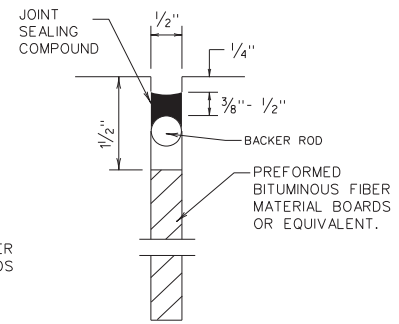
LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT

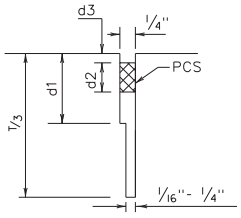


TRANSVERSE FORMED EXPANSION JOINT

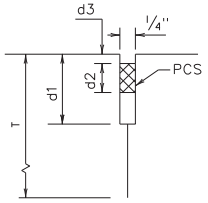


FORMED ISOLATION JOINT

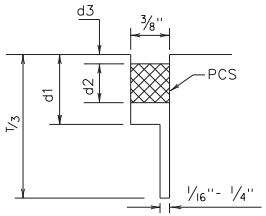
METHOD A: PREFORMED COMPRESSION SEALS (PCS)(DMS-6310 CLASS 6)



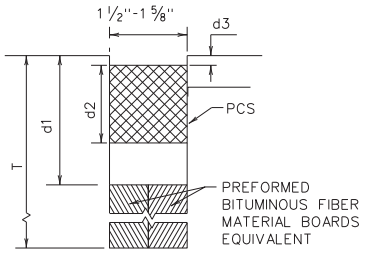
LONGITUDINAL SAWED CONTRACTION JOINT



LONGITUDINAL CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT



TRANSVERSE FORMED EXPANSION JOINT

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
2. THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
3. THE JOINT RESERVOIR FOR SEALANT OR PCS SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION JOINTS AND THE SAWED JOINTS.
4. DIMENSIONS d1, d2, AND d3 SHOWN IN METHOD A SHALL BE IN ACCORDANCE WITH THE PREFORMED COMPRESSION SEAL MANUFACTURER'S RECOMMENDATION.
5. REFER TO DMS-6310 "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
6. FOR SAWED LONGITUDINAL JOINT, LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT, USE JOINT SEALANT CLASS 5 OR 8 UNLESS OTHERWISE SHOWN ON THE PLAN OR APPROVED.
7. FOR TRANSVERSE SAWED CONTRACTION, TRANSVERSE FORMED EXPANSION JOINT, AND ISOLATION JOINT USE JOINT SEALANT CLASS 5 OR 8 AT NEW JOINTS. USE JOINT SEALANT CLASS 4,5,7,OR 8 FOR MAINTAINING EXISTING JOINTS.
8. THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 "CLEANING AND SEALING JOINTS" OR ITEM 713 "CLEANING AND SEALING JOINTS AND CRACKS (CONCRETE PAVEMENT)".
9. ISOLATION JOINTS ACCOMMODATE HORIZONTAL AND VERTICAL MOVEMENTS THAT OCCUR BETWEEN A PAVEMENT AND A STRUCTURE. ISOLATION JOINTS MAY BE USED FOR BRIDGE ABUTMENTS, INTERSECTIONS, CURB AND GUTTER, OLD AND NEW PAVEMENTS, OR AROUND DRAINAGE INLETS, MANHOLES, FOOTINGS AND LIGHTING STRUCTURES.

Texas Department of Transportation | Design Division Standard

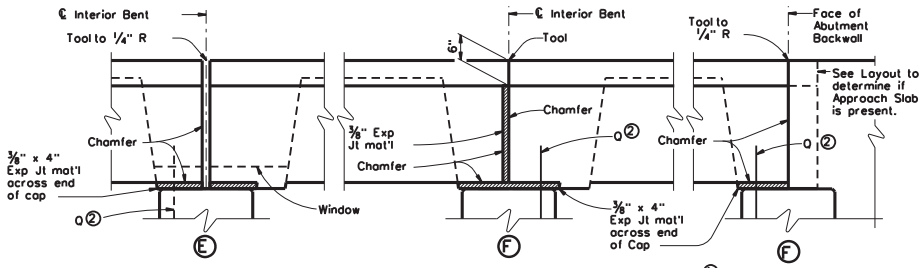
CONCRETE PAVING DETAILS

JOINT SEALS

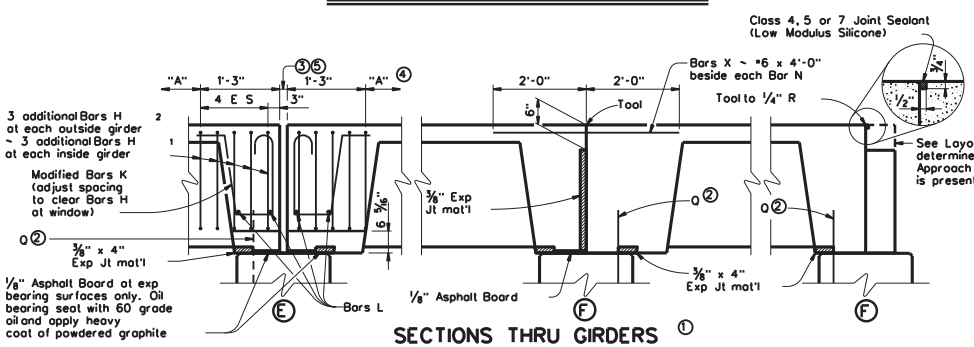
JS-14

FILE: js14.dgn	DN: TxDOT	DW: HC	DW: HC	CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		69

DATE:
FILE:

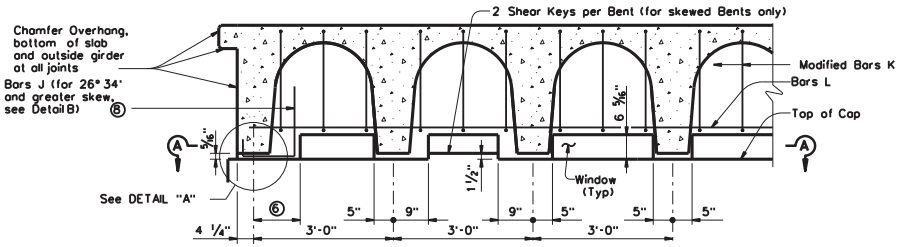


ELEVATION OF OUTSIDE GIRDERS ①



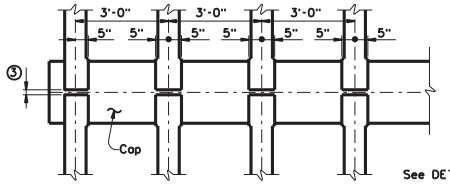
SECTIONS THRU GIRDERS ①

(Left side shows square and right side shows skewed condition)



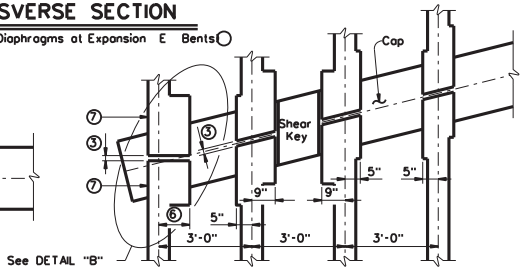
TRANSVERSE SECTION

(Showing Windows in End Diaphragms at Expansion E Bents)



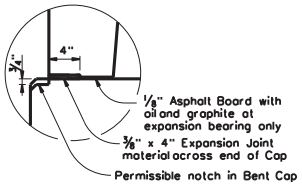
SECTION A-A

(Normal Bent)

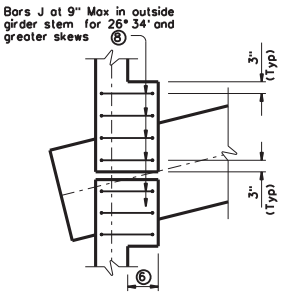


SECTION A-A

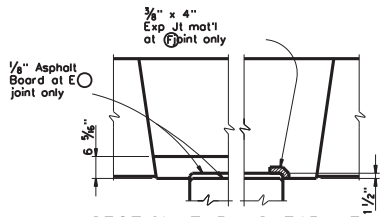
(Skewed Bent)



DETAIL "A"

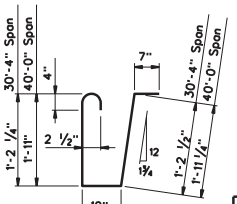


DETAIL "B"



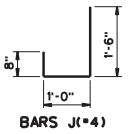
SECTION THRU SHEAR KEY

(Skewed Structures)



BARS K(#4)

(Mod for E end)



BARS J(#4)

① Joint conditions at E and F shall be as shown on the Layout. Typically, for structures 120' long and under, no Expansion Joint is needed. Structures over 120' shall have Expansion Joint, located no farther than two spans from each Abutment and at 160' maximum spacing for the remainder of the structure.

② Dowel Bars Q required at one side of cap only at Fixed Joint. May be required at Exp Joint, See General Notes.

③ See Armor Joint sheet or Sealed Expansion Joint sheet for joint details and openings

④ See Concrete Slab and Girder Spans.

⑤ Use styrofoam as fill for joint opening when casting adjacent span. Remove when concrete has set.

⑥ 5" usual ~ 12" for 26° 34' and greater skew at Interior Bents ~ outside Girders only

⑦ Showing end of outside stem for Spans with 1 3/4" Overhangs. For Spans with 7 3/4" and 1'-1 3/4" Overhangs, a breakback in outside stem will be required.

⑧ Adjustments in steel quantities do not include bars J required in outside stems at expansion bents. The number of bars J will vary with skew and overhang.

ADJUSTMENT IN REINFORCING STEEL QUANTITIES ⑧

Rdwy width	30'-4" & 40'-0" SPANS				30'-4" SPANS				40'-0" SPANS			
	F Cond		E Cond		E Cond		E Cond		E Cond		E Cond	
	Bars X		Mod Bars K		Bars H 1		Bars H 2		Bars H 1		Bars H 2	
	6.01 lb/bar		Ded 0.67 lb/bar		1.75 lb/bar		1.75lb/bar		2.29 lb/bar		2.29 lb/bar	
	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt	No.	Wt
24'	36	216	48	-32	42	74	12	21	42	96	12	27
28'	42	252	54	-36	48	84	12	21	48	110	12	27
30'	44	264	60	-40	54	95	12	21	54	124	12	27
38'	54	325	78	-52	72	126	12	21	72	165	12	27
44'	62	373	90	-60	84	147	12	21	84	192	12	27

Note: The above quantities are for the E or F Condition over one Bent, and are for information only.

GENERAL NOTES:

Where shown E on the layouts, provide diaphragm windows and Armor Joints or SEJ. Where shown on the layouts, Bars X shall be provided over the Bent.

If both ends of a span are shown on the layouts, Dowel Bars Q are required in one end of the span at each girder stem with no adjustment in reinforcing quantities for the added dowels.

No adjustment of the concrete pay quantities shown on the span details shall be made for the windows.

Cost of Drains shall be considered subsidiary to the Item 422, "Concrete Superstructures".

The type of expansion joint shall be as shown on the layout.

See railing details and standard CGRAD for rail anchorage.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

CONCRETE SLAB & GIRDER MISCELLANEOUS DETAILS

CG-MD

FILE: mcg01sts.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2005	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
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	22	LASALLE,ETC.		70

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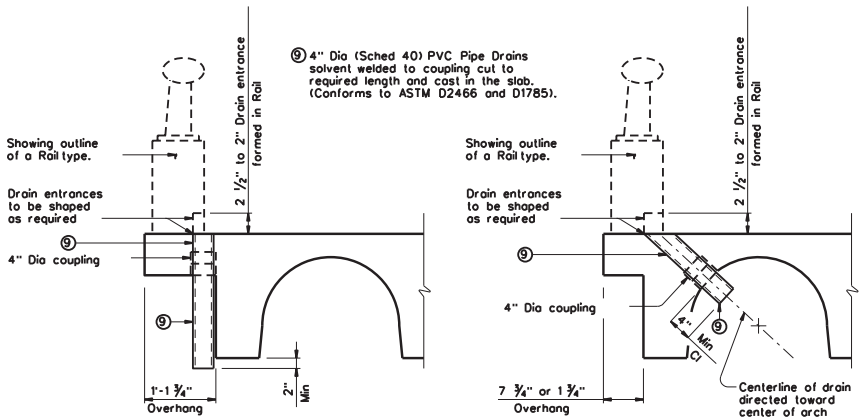
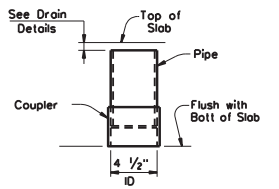


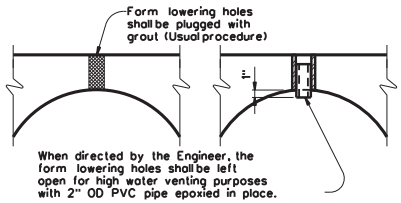
DRAIN DETAILS

NOTE: All drain pipe and fittings to be 4" diameter (Sch 40) PVC. Bend reinforcing steel to clear PVC 1". Drain length and location shall be as directed by the Engineer. No drains shall be permitted over roadways or railways, or within 10'-0" of Bent Caps. Variations of the above designs, as required for the type of rail used and it's location on the structure, shall be installed with the approval and direction of the Engineer. No water shall be discharged onto girders.

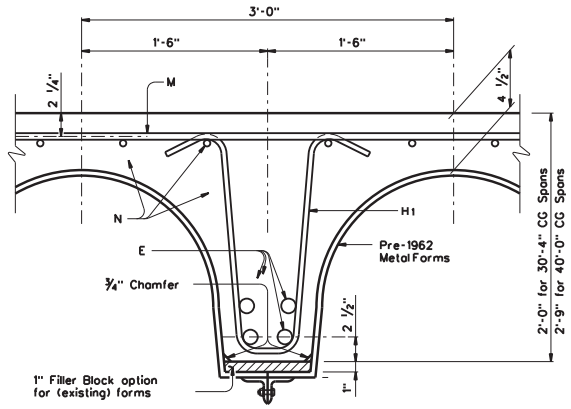


C.I.P. DRAIN DETAIL

NOTE: Roughen outside of PVC with coarse rasp or equal to ensure bond with cast-in-place concrete.



FORM LOWERING HOLE TREATMENT



PRE-1962 METAL FORM OPTION

NOTE: Circa 1962, the design of pan girders was changed to increase the thickness of the top of the arch from 3 ½" to 4 ½". Pre-1962 metal forms may be used to construct the superstructure by dropping them down 1" with respect to the grade line and adding a 1" filler block (of wood, steel, neoprene, styrofoam, or other material approved by the Engineer) in the bottom of the girder stems. The concrete quantity required will be about the same as with the newer form dimensions. If the contractor wishes to lower the forms 1" and not use filler blocks, he may do so. However, measurement and payment for concrete quantity will be based on plan dimensions and the cage of reinforcement will be raised up and placed as shown above. If the contractor elects to use the latter method, the forming system will require modification to allow for a minimum of a 1" space between the ends of girders and diaphragms and bent caps where the girders and diaphragms drop below the top of the bent cap.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

CONCRETE SLAB & GIRDER MISCELLANEOUS DETAILS

CG-MD

FILE: mag01sts.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2005	CONT	SECT	JOB	HIGHWAY
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	22	LASALLE,ETC.		71

DATE: 12/19/2023
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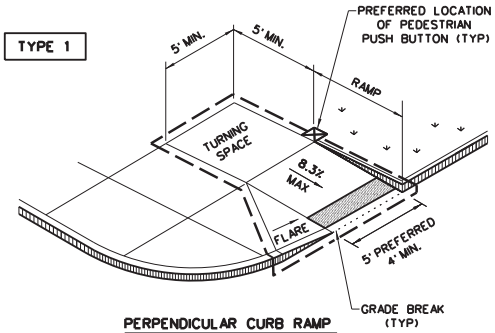
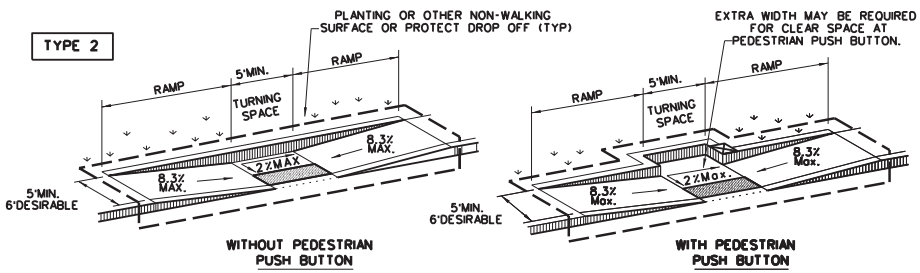
TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

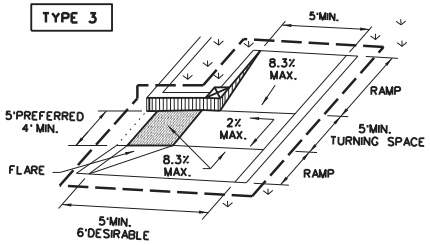


WITHOUT PEDESTRIAN PUSH BUTTON

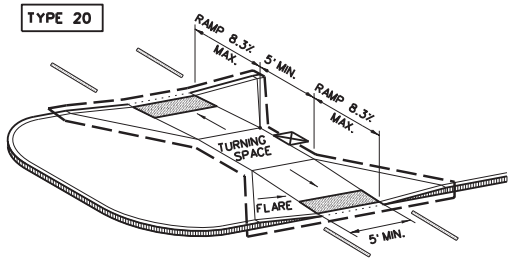
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

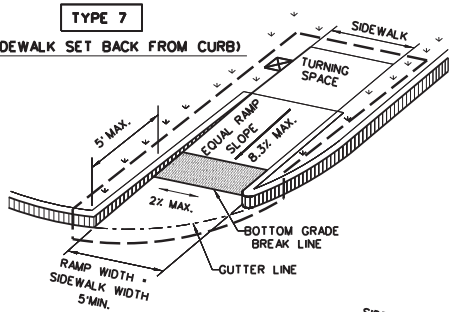


TYPE 20

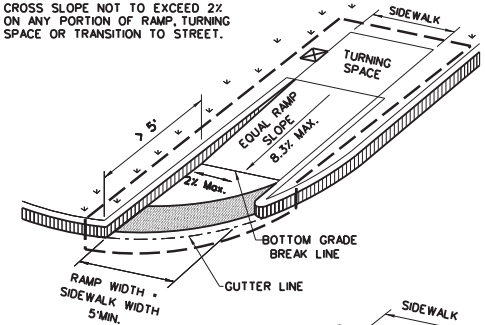


CURB RAMPS AT MEDIAN ISLANDS

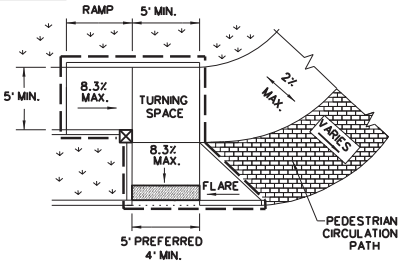
TYPE 7 (SIDEWALK SET BACK FROM CURB)



CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

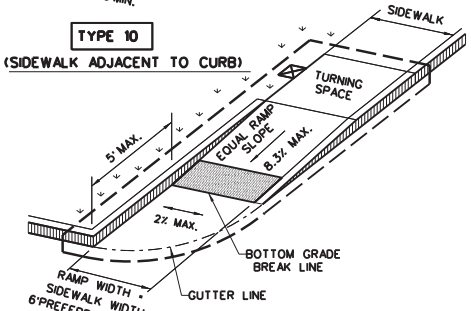


TYPE 6

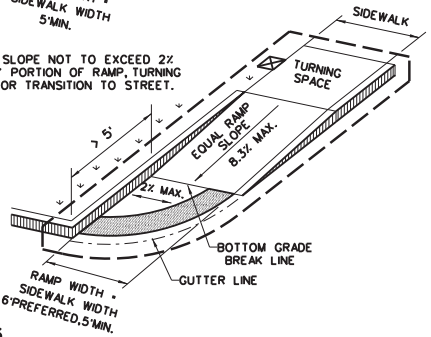


COMBINATION CURB RAMPS

TYPE 10 (SIDEWALK ADJACENT TO CURB)

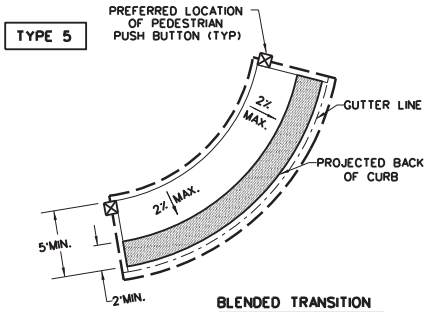


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

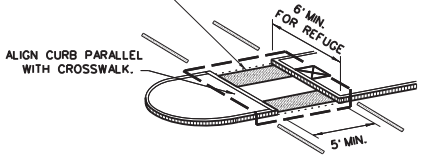
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

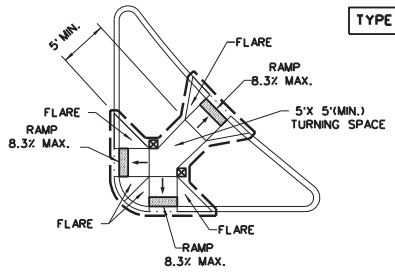
TYPE 21

INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.

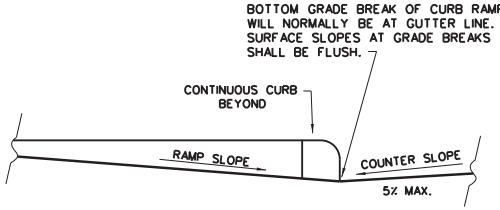


NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

SHEET 1 OF 4

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		72

DATE: 12/19/2023
FILE: T:\RDSTMNT\FY 2024\MNT Contract (FY24)\MISC CONC REPAIR\2023 MISC CONC STANDARDS\ped18.dgn

GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
5. Turning Spaces shall be 5'x 5' minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicable standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

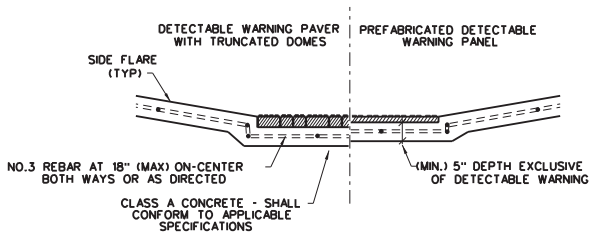
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

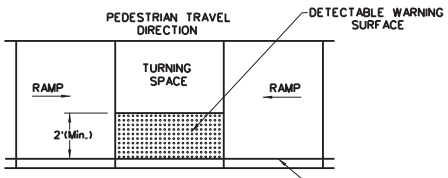
SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.

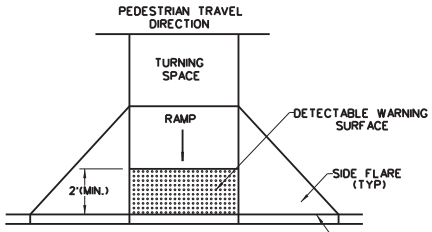


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

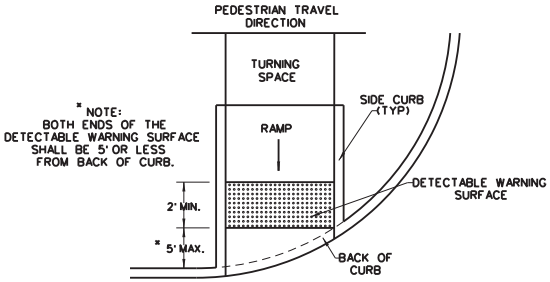
DETECTABLE WARNING SURFACE DETAILS



PARALLEL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.



PERPENDICULAR CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	6417	14	001		VARIOUS
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.
	22	LASALLE,ETC.			73

DATE: 12/19/2023
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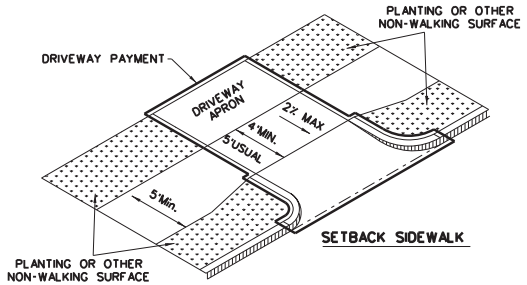
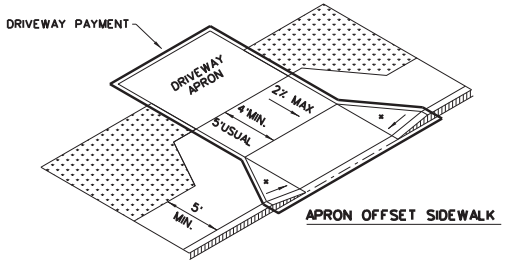
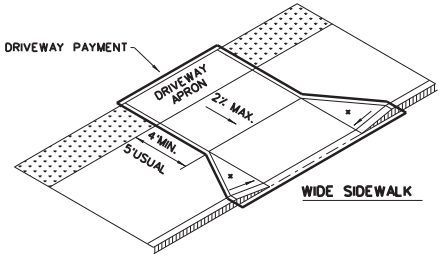
SIDEWALK TREATMENT AT DRIVEWAYS



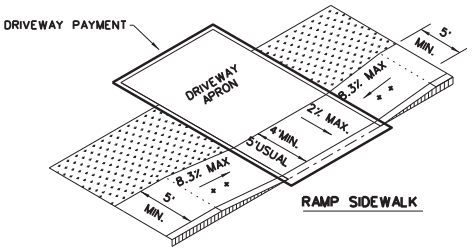
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

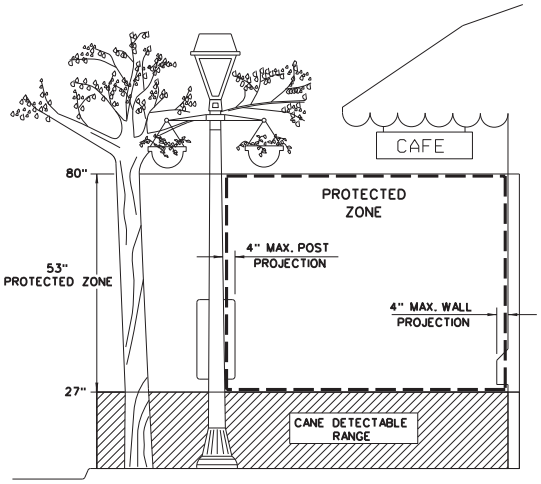


RAMP SIDEWALK

NOTES:

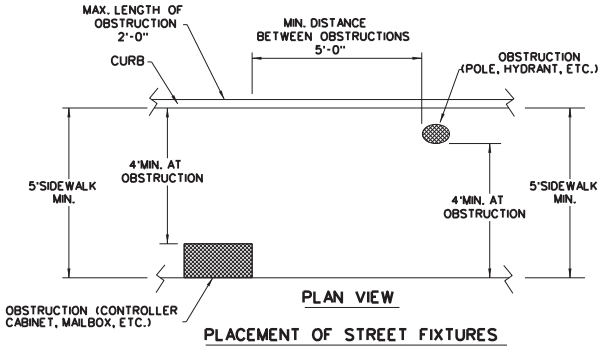
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.



PROTECTED ZONE

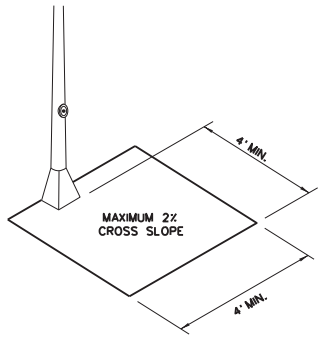
NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



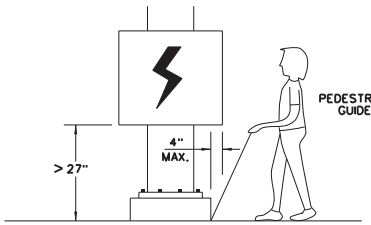
PLAN VIEW

PLACEMENT OF STREET FIXTURES

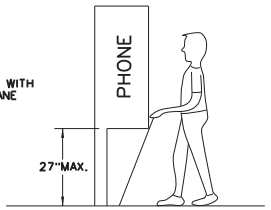
NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.



PROTRUDING OBJECTS OF A HEIGHT ≤27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE <80"

SHEET 3 OF 4

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

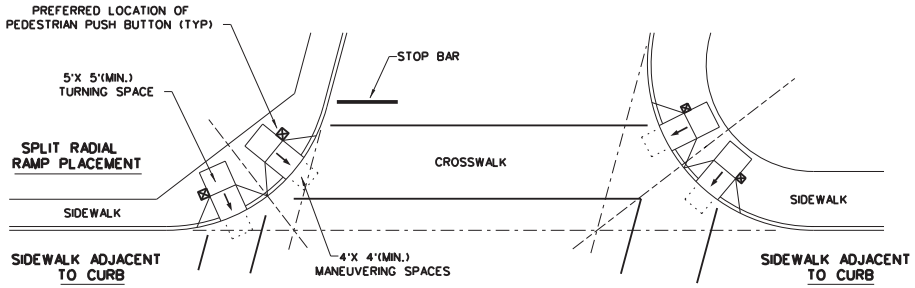
PED-18

FILE: ped18	DN: TxDOT	CK: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
REVISED 08,2005	DIST	COUNTY		SHEET NO.
REVISED 06,2012	22	LASALLE, ETC.		74
REVISED 01,2018				

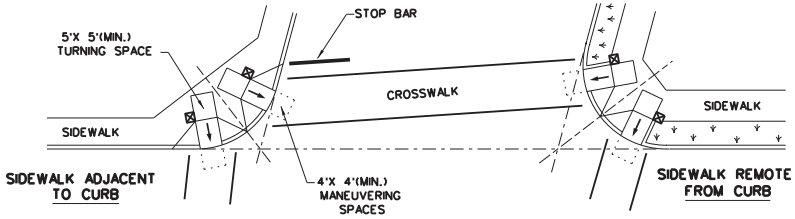
DATE: 12/19/2023
FILE: T:\LRDDSTMNT\FY 2024\MNT Contracts (FY24)\MISC CONC REPAIR\2023 MISC CONC STANDARDS\ped18.dgn

TYPICAL CROSSING LAYOUTS

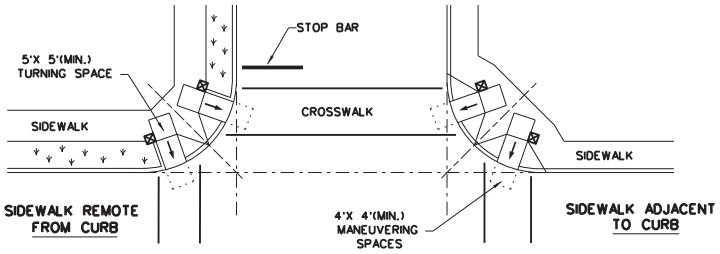
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



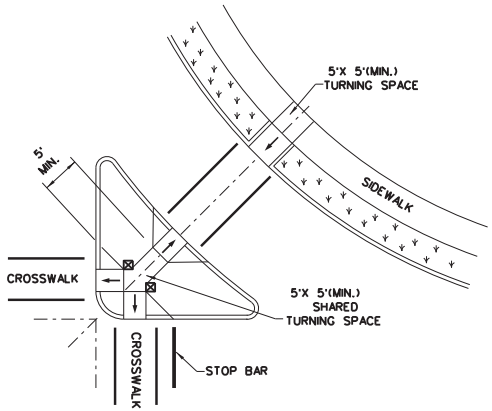
SKEWED INTERSECTION WITH "LARGE" RADIUS



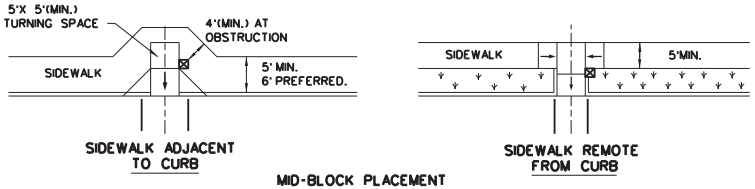
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ⊠

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		75

DATE: 12/19/2023 4:23:25 PM
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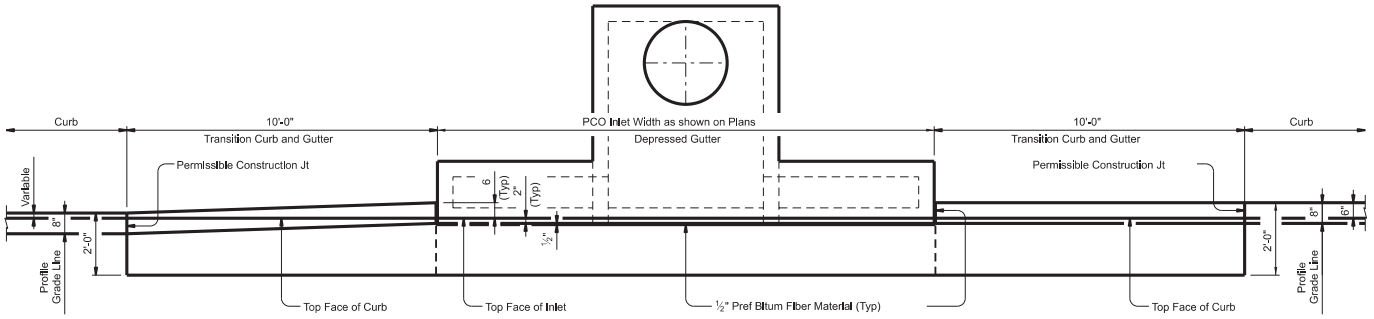
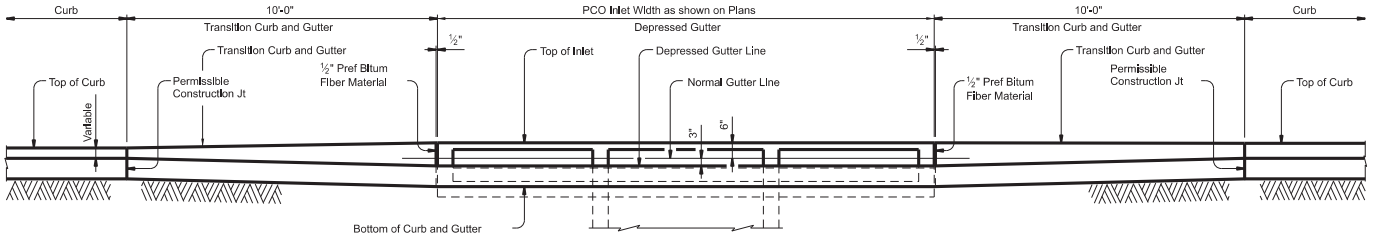


SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

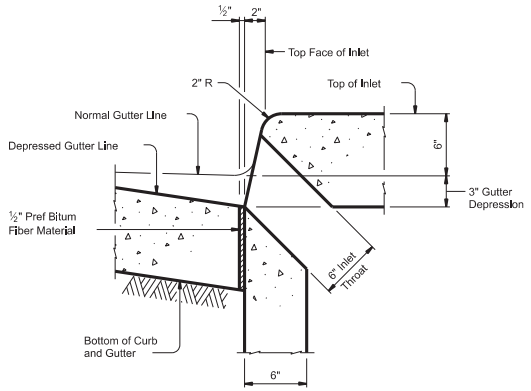
PLAN



SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

ELEVATION



SECTION AT GUTTER AND INLET

Reinforcing steel not shown for clarity.

CONSTRUCTION NOTES:
Align top face of curb with PCO Inlet as shown.

MATERIAL NOTES:
Provide ½" Preformed Bituminous Fiber Material.

GENERAL NOTES:
See Precast Curb Inlet Outside Roadway (PCO) standard for details and notes not shown.
See Concrete Curb and Curb and Gutter (CCCG-12) standard for details and notes not shown.
Curb and Gutter Transitions is paid for and in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
Preformed Bituminous Fiber Material is subsidiary to PCO Inlet.

Texas Department of Transportation

Bridge Division Standard

CURB AND GUTTER TRANSITION DETAILS FOR PCO INLET

CGT-PCO

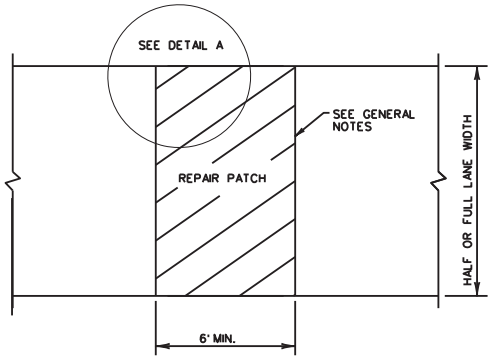
FILE: prestd13-20.dgn	DN: TxDOT	CK: AES	DW: JTR	CK: AES
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		76

DATE: 12/19/2023
FILE: T:\LRDDSTMNT\FY 2024\MNT Contracts (FY24)\MISC CONC REPAIR\2023 MISC CONC STANDARDS\repcp14.dgn

TABLE NO.1 STEEL BAR SIZE AND SPACING

TYPE PAVEMENT	SLAB THICKNESS AND BAR SIZE		LONGITUDINAL*		TRANSVERSE*	
			REGULAR BARS	TIEBARS	BARS	TIEBARS
	T (IN.)	BAR SIZE	SPACING (IN.)	SPACING (IN.)	SPACING (IN.)	SPACING (IN.)
CRCP	6.0	#5	7.5	7.5	24	24
	6.5		7.0	7.0		
	7.0		6.5	6.5		
	7.5		6.0	6.0		
	8.0	#6	9.0	9.0	24	24
	8.5		8.5	8.5		
	9.0		8.0	8.0		
	9.5		7.5	7.5		
	10.0		7.0	7.0		
	10.5		6.75	6.75		
	11.0		6.5	6.5		
	11.5		6.25	6.25		
	≥12.0		6.0	6.0		
JRCP	<8.0	#5	24.0	12.0	24	24
	≥8.0	#6	24.0	12.0	24	24
CPCD	<8.0	#5	NONE	12.0	NONE	24
	≥8.0	#6	NONE	12.0	NONE	24

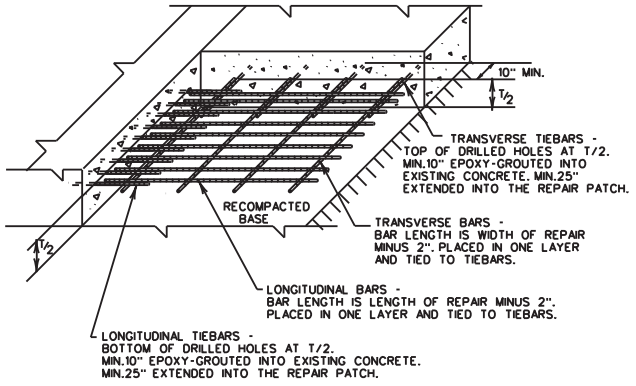
* USE 12" SPACING AS FIRST AND LAST SPACING AT END OR SIDE FOR ALL BARS.



PLAN VIEW

GENERAL NOTES

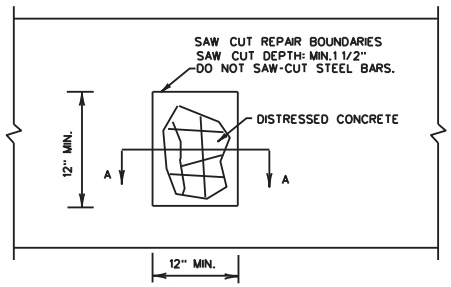
1. ITEM 361, "REPAIR OF CONCRETE PAVEMENT" SHALL GOVERN FOR THIS WORK.
2. MULTIPLE PIECE TIEBARS SHALL BE USED WHEN THE REPAIR AREA MUST BE PLACED IN TWO STAGES DUE TO SEQUENCE OF CONSTRUCTION.
3. FULL DEPTH SAW CUTS SHALL BE MADE AROUND THE PERIMETER OF THE AREA TO BE REPAIRED. THE CUT SHALL BE MADE AT A RIGHT ANGLE TO THE PAVEMENT EDGE AND TO THE CENTER LINE OF THE PAVEMENT.
4. AT LEAST ONE LONGITUDINAL FULL DEPTH SAW CUT SHALL BE AT AN EXISTING LONGITUDINAL JOINT.
5. ADDITIONAL SAW CUTS MAY BE REQUIRED WITHIN THE AREA OF THE REPAIR TO FACILITATE REMOVAL OF THE CONCRETE OR TO ALLEVIATE BINDING OF THE FULL DEPTH SAW CUT AT THE REPAIR EDGE.
6. THE SAW CUTS WHICH EXTEND OUTSIDE THE AREA OF THE REPAIR WILL BE CLEANED AND FILLED WITH A CEMENTITIOUS GROUT APPROVED BY THE ENGINEER.
7. EXISTING LONGITUDINAL AND TRANSVERSE JOINTS REMOVED DUE TO REPAIR OPERATION SHOULD BE RESTORED IN ACCORDANCE WITH STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



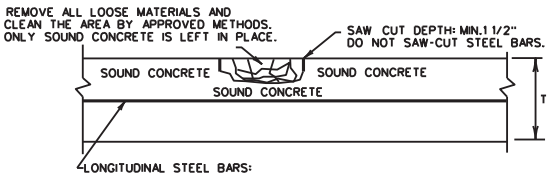
DETAIL A
GROUTED TIEBARS & REINFORCEMENT

GENERAL NOTES

1. ITEM 361, "REPAIR OF CONCRETE PAVEMENT" SHALL GOVERN FOR THIS WORK.
2. THE SAW CUTS WHICH EXTEND OUTSIDE THE AREA OF THE REPAIR WILL BE CLEANED AND FILLED WITH A CEMENTITIOUS GROUT APPROVED BY THE ENGINEER.
3. EXISTING LONGITUDINAL AND TRANSVERSE JOINTS REMOVED DUE TO REPAIR OPERATION SHOULD BE RESTORED IN ACCORDANCE WITH STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



PLAN VIEW



LONGITUDINAL STEEL BARS:

* REPAIR AREAS MAY BE ADJUSTED AFTER REMOVING DISTRESSED CONCRETE. SWITCH THE HALF-DEPTH REPAIR TO FULL-DEPTH REPAIR IF EXPOSED EXISTING LONGITUDINAL BARS ARE DEFICIENT, AS APPROVED. COMPENSATION WILL BE MADE FOR UNEXPECTED VOLUMES OF REPAIR AREAS OR CHANGES IN SCOPE OF WORK.
* INCREASE THE REPAIR AREA AND PERFORM A FULL-DEPTH REPAIR AS DIRECTED IF LONGITUDINAL STEEL BARS WERE DAMAGED BY THE REMOVAL OPERATIONS. NO ADDITIONAL COMPENSATION WILL BE MADE.

SECTION A-A

HALF-DEPTH REPAIR

FULL-DEPTH REPAIR OF CRCP, JRCP, AND CPCD

Texas Department of Transportation

Design Division Standard

REPAIR OF CONCRETE PAVEMENT

REPCP-14

FILE: repcp14.dgn	DN: TxDOT	DN: HC	DW: HC	CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		77

DATE: 12/19/2023
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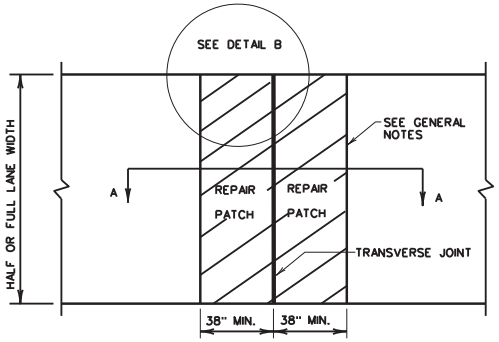
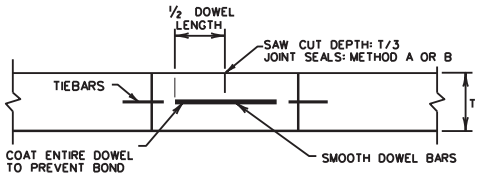
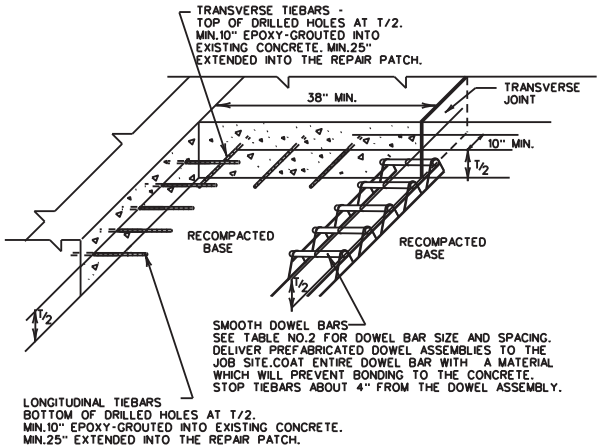


PLAN VIEW



SECTION A-A



DETAIL B
GROUTED TIEBARS & DOWELS

GENERAL NOTES

1. ITEM 361,"REPAIR OF CONCRETE PAVEMENT"SHALL GOVERN FOR THIS WORK.
2. MULTIPLE PIECE TIEBARS SHALL BE USED WHEN THE REPAIR AREA MUST BE PLACED IN TWO STAGES DUE TO SEQUENCE OF CONSTRUCTION.
3. FULL DEPTH SAW CUTS SHALL BE MADE AROUND THE PERIMETER OF THE AREA TO BE REPAIRED. THE CUT SHALL BE MADE AT A RIGHT ANGLE TO THE PAVEMENT EDGE AND TO THE CENTER LINE OF THE PAVEMENT.
4. AT LEAST ONE LONGITUDINAL FULL DEPTH SAW CUT SHALL BE AT AN EXISTING LONGITUDINAL JOINT.
5. ADDITIONAL SAW CUTS MAY BE REQUIRED WITHIN THE AREA OF THE REPAIR TO FACILITATE REMOVAL OF THE CONCRETE OR TO ALLEVIATE BINDING OF THE FULL DEPTH SAW CUT AT THE REPAIR EDGE.
6. THE SAW CUTS WHICH EXTEND OUTSIDE THE AREA OF THE REPAIR WILL BE CLEANED AND FILLED WITH A CEMENTITIOUS GROUT APPROVED BY THE ENGINEER.
7. EXISTING LONGITUDINAL AND TRANSVERSE JOINTS REMOVED DUE TO REPAIR OPERATION SHOULD BE RESTORED IN ACCORDANCE WITH STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."
8. DOWEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1/4 IN. HORIZONTALLY AND VERTICALLY UNLESS OTHERWISE SPECIFIED. WHERE DOWEL BAR BASKETS ARE USED, REMOVE THE SHIPPING WIRES.

TABLE NO. 2 DOWELS (SMOOTH BARS)

PAVEMENT THICKNESS (INCHES)	SIZE AND DIA.	LENGTH (IN.)	SPACING (IN.)
<10	#8 (1 IN.)	18.0	12.0
≥10	#10 (1 1/4 IN.)		

REPAIR OF TRANSVERSE JOINT OF CPCD

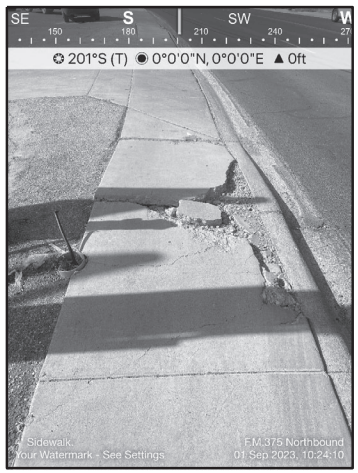
Texas Department of Transportation — Design Division Standard

REPAIR OF CONCRETE PAVEMENT

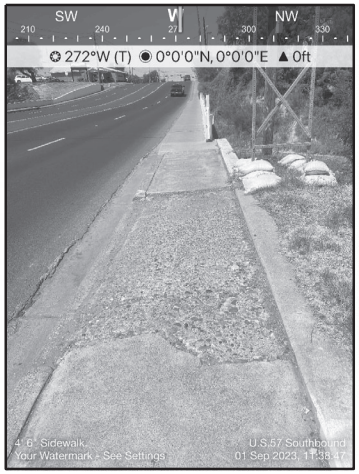
REPCP-14

FILE: repcp14.dgn	DN: TxDOT	DW: HC	DW: HC	CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		78

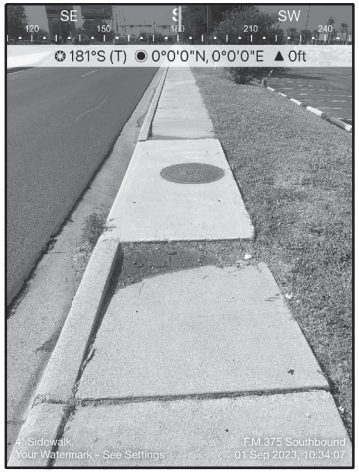
PROJECT LOCATION REFERENCE								
COUNTY	LOCATION	PROJECT CSJ	HIGHWAY	LENGTH FEET	LENGTH MILES	TYPE OF WORK	PROJECT LIMITS	REFERENCE MARKER
MAVERICK	1	6417-14-001	FM 375 SOUTH	80	0.015	CONCRETE SIDEWALK	FROM: .008 MIS OF US 57	550-0.124
			FM 375 NORTH	90	0.017		TO: 0.011 MIN OF FM 1021	550+0.776
	2	6417-14-001	FM 1021 SOUTH	100	0.019	CONCRETE SIDEWALK	FROM: 0.01 MIE OF S MONROE ST	550+0.351
			FM 1021 NORTH	110	0.021		TO: 0.091 MIS OF LA QUINTA	554-1.144
	3	6417-14-001	US 57	120	0.023	CONCRETE SIDEWALK	FROM: 0.009 MIW OF US277	372-0.328
							TO: 0.006 MIE OF SP240	370+0.006
	4	6417-14-001	SP 240 NORTH	30	0.015	CONCRETE SIDEWALK	FROM: .005 MIN OF US 57	368
			SP 240 SOUTH	40	0.017		TO: 0.006 MIW OF N.MONROE ST	368-0.499
	5	6417-14-001	FM 3443 SOUTH	60	0.019	CONCRETE SIDEWALK	FROM: 0.01 MIN OF FM1021	552+0.095
			FM 3443 NORTH	70	0.021		TO: 0.008 MIS OF US277	552-0.071



TYPICAL CONCRETE SIDEWALK REPAIRS



TYPICAL CONCRETE SIDEWALK REPAIRS



TYPICAL CONCRETE SIDEWALK REPAIRS

SUMMARY OF QUANTITIES		
	104	531
	6036	6001
CONCRETE REPAIR ALL LOCATIONS	REMOVING CONC (SIDEWALK OR RAMP)	CONC SIDEWALKS (4")
	SY	SY
PROJECT TOTALS	389	389

NOTES:

1. CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, AND OVERALL QUANTITIES. CONSULT WITH MAINTENANCE SECTION PERSONNEL BEFORE BEGINNING REPAIRS AND FOR VERIFICATION.

FOLLOW PROCEDURES AS PER TXDOT CONRETE REPAIR MANUAL FOR DETAILS AND INSTRUCTIONS REGARDING THE REMOVAL, CLEANING, FORMING, MIXING AND POURING, CURING AND FINISHING CONCRETE REPAIRS.THE METHOD OF CONCRETE STRUCTURE REPAIR WILL VARY BY EACH LOCATION. REFER TO CHAPTER 3: REPAIR MATERIALS AND PROCEDURES FOR REPAIR IDENTIFICATION AND PROCEDURES.

STATE OF TEXAS
VANESSA I ROSALES-HERRERA
103736
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by VANESSA I ROSALES-HERRERA P.E. 103736 on 12/19/2023

DocuSigned by:
Vanessa Rosales-Herrera
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TEXAS DEPARTMENT OF TRANSPORTATION ®

ROADWAY REPAIR LAYOUT LOCATION 1

DN: A.S.	CK: V.R.	DW: A.S.	CK: V.R.	STATE	SHEET NUMBER	SHEET NO.
				TEXAS	SHEET 1 OF 2	
FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY		CONTROL	SECTION	JOB	HIGHWAY NO.	79
	22	LASALLE,ETC.		6417	14	001	VARIOUS	

PROJECT LOCATION REFERENCE								
COUNTY	LOCATION	PROJECT CSJ	HIGHWAY	LENGTH		TYPE OF WORK	PROJECT LIMITS	REFERENCE MARKER
				FEET	MILES			
WEBB	1	6417-14-001	LOOP 20 (QUATRO VIENTOS)	40	0.008	CONCRETE SIDEWALK	FROM: WORMSER RD	434+0.40
							TO: CIELITO LINDO BLVD	436-0.48
	2	6417-14-001	IH 35 (SANTA URSULA AVE)	160	0.03	CONCRETE SIDEWALK	FROM: SANTA URSULA AVE TURN-AROUND	3+0.21
							TO: COLTON RD	3+0.03

TYPICAL CONCRETE SIDEWALK REPAIRS

TYPICAL CONCRETE SIDEWALK REPAIRS

SUMMARY OF QUANTITIES				
	104	531	529	531
	6036	6001	6002	6005
CONCRETE REPAIR LOCATIONS LOOP 20	REMOVING CONC (SIDEWALK OR RAMP)	CONC SIDEWALKS (4")	CONC CURB (TY II)	CURB RAMP (TY II)
	SY	SY	LF	EA
PROJECT TOTALS	122	120	160	1

NOTES:

1. CONTRACTOR IS TO CONFIRM THE DAMAGED CONCRETE AREA FOR LOCATION, SIZE, AND OVERALL QUANTITIES. CONSULT WITH MAINTENANCE SECTION PERSONNEL BEFORE BEGINNING REPAIRS AND FOR VERIFICATION.

FOLLOW PROCEDURES AS PER TXDOT CONRETE REPAIR MANUAL FOR DETAILS AND INSTRUCTIONS REGARDING THE REMOVAL, CLEANING, FORMING, MIXING AND POURING, CURING AND FINISHING CONCRETE REPAIRS. THE METHOD OF CONCRETE STRUCTURE REPAIR WILL VARY BY EACH LOCATION. REFER TO CHAPTER 3: REPAIR MATERIALS AND PROCEDURES FOR REPAIR IDENTIFICATION AND PROCEDURES.

STATE OF TEXAS
VANESSA I ROSALES-HERRERA
103736
REGISTERED PROFESSIONAL ENGINEER

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TYPICAL CONCRETE SIDEWALK REPAIRS

TEXAS DEPARTMENT OF TRANSPORTATION ®
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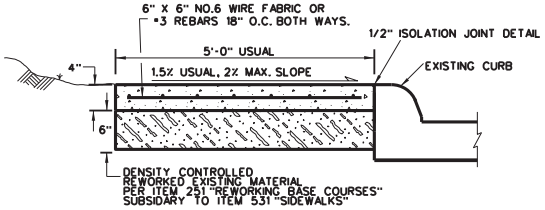
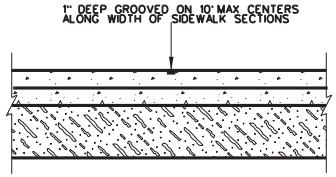
ROADWAY REPAIR LAYOUT
LOCATION 2

DN: A.S.	DW: A.S.	STATE	SHEET NUMBER			SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 2 OF 2			
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
22	LASALLE,ETC.	6417	14	001	VARIOUS	80

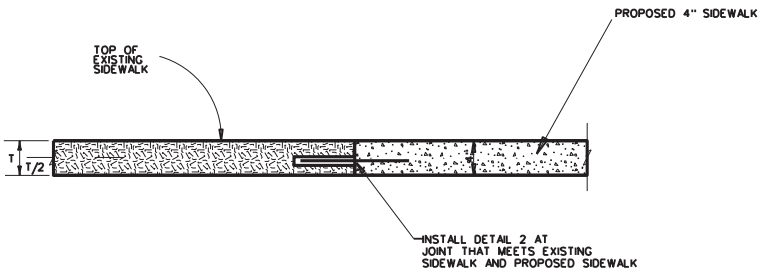
12/19/2023 oserno3 T:\LRDOSTMNT\FY 2024\MNT Contract (FY24)\MSC CONC REPAIR\10. CRCP_LAYOUTS_MAVERICK_VALVERDE.dgn



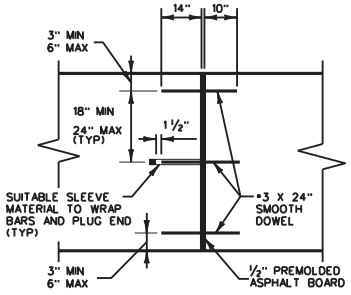
TYPICAL SIDEWALK SECTION (N.T.S.)



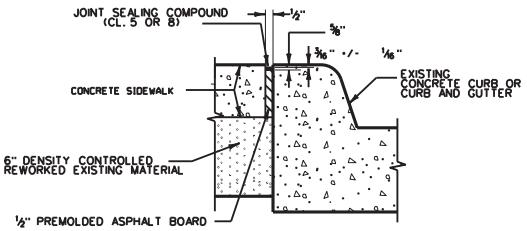
① CONTROL (CONTRACTION) JOINT (N.T.S.)



DETAIL FOR EXISTING AND PROPOSED SIDEWALK (N.T.S.)



② SIDEWALK TRANSVERSE (EXPANSION) JOINT (N.T.S.)



③ 1/2" ISOLATION JOINT (N.T.S.)
(SIDEWALK ADJACENT TO CURB)

GENERAL NOTES:

1. ALL EDGES SHOULD BE ROUNDED WITH 3/8" RADIUS.

2. ALL SIDEWALK JOINTING MATERIAL WILL BE SUBSIDARY TO ITEM 531 "SIDEWALKS".

3. PLACE SIDEWALK CONTROL (CONTRACTION)JOINT (DETAIL 1) AT A MAX SPACING OF 10 FT.

4. PLACE SIDEWALK TRANSVERSE EXPANSION JOINT (DETAIL 2) AT A MAX SPACING OF 40 FT TO COINCIDE WITH THE CURB AND SIDEWALK EXPANSION JOINTS.

5. PLACE 1/2" ISOLATION JOINT (DETAIL 3) WHERE SIDEWALKS ABUT BUILDINGS, CURBS, DRIVEWAYS, OR EXISITNG STRUCTURES.

6. TRANSVERSE (EXPANSION) JOINT (DETAIL 2) AND 1/2" ISOLATION JOINT (DETAIL 3), TO BE FILLED WITH CLASS 5 OR 8 SEALENT. SEE STANDARD "JS-14" FOR SPECIFICATIONS.

7. LONGITUDINAL SLOPE OF SIDEWALKS SHALL NOT EXCEED 5% EXCEPT IN CASES WHERE THE ADJACENT ROADWAY SLOPE EXCEEDS 5%, LONGITUDINAL SLOPE OF SIDEWALK MAY MATCH THAT OF ROADWAY.

8. ALL SAW CUT WORK WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO PERTAINING ITEMS OF WORK.

9. SLOPED SIDEWALK SECTIONS AT DRIVEWAYS WILL BE PAID AS SIDEWALKS.

STATE OF TEXAS
VANESSA IROSALES-HERRERA
103736
LICENSED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by VANESSA IROSALES-HERRERA P.E. 103736, on

12/19/2023

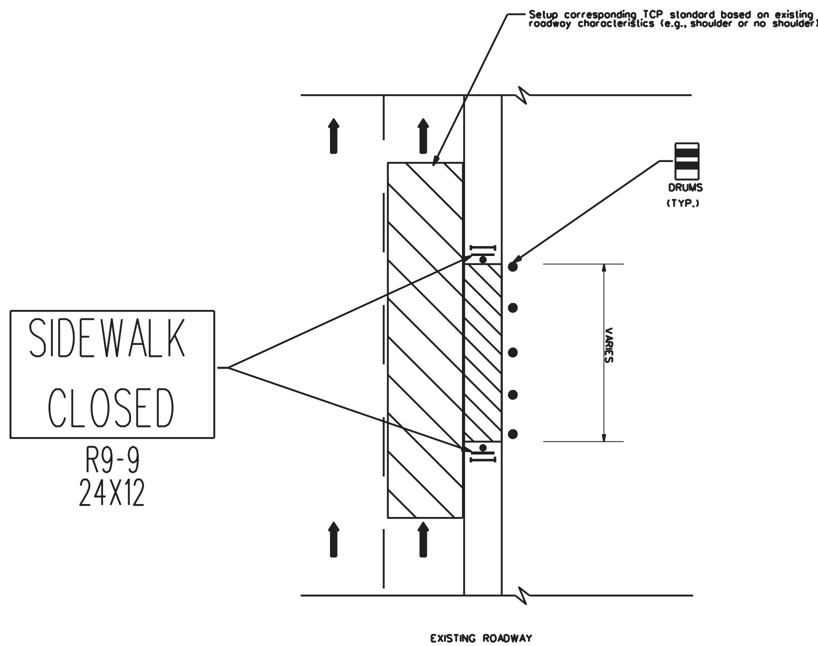
DocuSigned by:
Vanessa Rosales-Herrera
70CAB6EA8F3B42B...

NOT TO SCALE

TEXAS DEPARTMENT OF TRANSPORTATION®

CONSTRUCTION DETAILS

DN:		DW:		STATE	SHEET NUMBER			SHEET NO.
CK:	VR	CK:	VR	TEXAS				
FED.RD. DIV.NO.	STATE DIST.NO.	COUNTY		CONTROL	SECTION	JOB	HIGHWAY NO.	81
	22	LASALLE,ET		C6417	14	001	VAR	



1) BUILD SIDEWALK.(Refer to WZ(BTS-2)-13 for further guidance).

LEGEND

- ● - TYPICAL PLASTIC DRUM
- ├─┤ - DETECTABLE PEDESTRIAN BARRICADE
- ⬅ - DIRECTION OF TRAFFIC
- ▨ - WORK AREA
- SIGN

NOTES:

1. REFER TO BC(8) AND WZ(BTS-2) FOR DETECTABLE PEDESTRIAN BARRICADES DETAILS.

2. REFER TO BC STANDARDS FOR SIGN MOUNTING DETAILS.

The seal appearing on this document was authorized by VANESSA I ROSALES-HERRERA P.E. 103736 on 12/19/2023

DocuSigned by:
Vanessa Rosales-Herrera
70CAB6EA8F3B42B...

TEXAS DEPARTMENT OF TRANSPORTATION ®

TCP SIDEWALK DETAIL

DN:	DW:	STATE	SHEET NUMBER				SHEET NO.
CK: V.R.	CK: V.R.	TEXAS	SHEET 1 OF 1				
FED.RD. DIV.NO. / STATE DIST.NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.		
22	LASALLE,ETC.	6417	14	001	VARIOUS		82

Note: Bridge rail must be attached to a metal beam guard fence transition section (nested W-beam) which then attaches to a metal beam guard fence and extends along the embankment unless shown otherwise on the plans. See plan sheet for details and length for payment. A regular splice is used to join the approach guard fence transition to the bridge rail.

MBGF Transition ~ MBGF(T101)

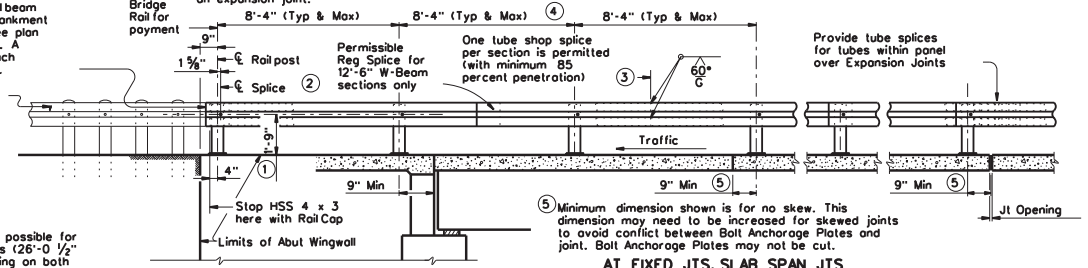
(1) Increase 2" for structures with overlay.

(2) Splice may be on either side of bridge rail post web.

(3) The weld may be square groove or single vee groove. Grind smooth.

(4) Maintain 8'-4" post spacing wherever possible for use with nominal 25' W-Beam sections (26'-0 ½" overall). Symmetry of the post spacing on both sides and along the structure is not necessary. The nominal 25' sections may also be maintained by introducing four post spaces at 6'-3" at areas of conflict. Two adjacent spaces of 8'-8" and 8'-0" each are also permissible.

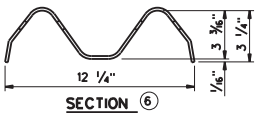
Note: Do not provide a tube splice in first section unless it crosses an expansion joint.



(5) Minimum dimension shown is for no skew. This dimension may need to be increased for skewed joints to avoid conflict between Bolt Anchorage Plates and joint. Bolt Anchorage Plates may not be cut.

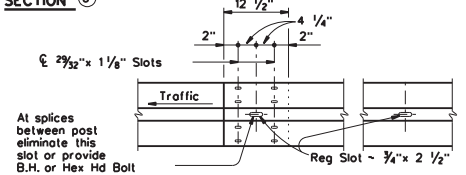
AT ABUTMENT BENTS | AT FIXED JTS, SLAB SPAN JTS AND CG (PAN FORM) JTS | AT EXPANSION JOINTS

ROADWAY ELEVATION OF RAIL



SECTION (6)

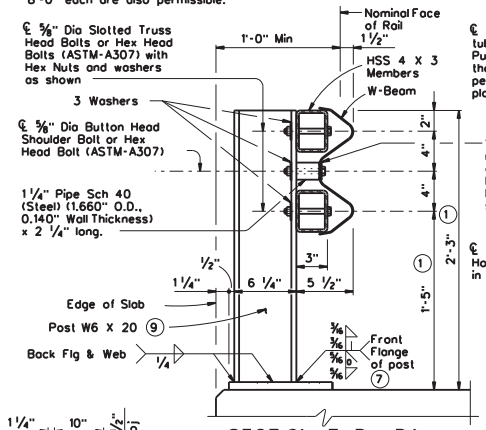
(6) Members are 12 Gage Steel Nom thickness = 0.1046" exclusive of protective coating. Actual section may vary slightly with the manufacturer and conforms to AASHTO M-180.



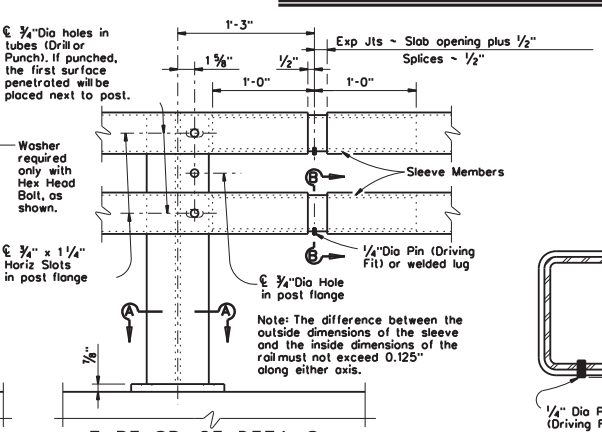
Note: Provide ⅝" Dia Button Head Shoulder Bolts or Hex Head Bolts (ASTM-A307) with Hex Nuts at all splice slots

SPLICE | POST CONN

W-BEAM DETAILS



SECTION THRU RAIL



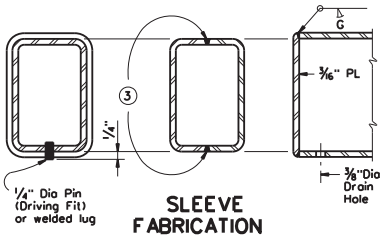
TUBE SPLICE DETAILS

Note: The difference between the outside dimensions of the sleeve and the inside dimensions of the rail must not exceed 0.125" along either axis.

TUBE & SLEEVE MEMBERS

Rail Member		Sleeve Thickness
Material	Thickness	Material ~ A36
A 500 Grade C	0.188"	0.188"
A 500 Grade B	0.250"	0.250"
A 500 Grade A or A 501	0.313"	0.250"

Note: Other sections of equal or greater strength are acceptable for sleeves.



SECTION B-B | SLEEVE FABRICATION OPTION | RAIL CAP

CONSTRUCTION NOTES:

Attach section lengths of HSS 4 x 3 members continuously to a minimum of three posts (except at abutments with expansion joints).

Face of rail and posts must be vertical transversely unless otherwise approved by the Engineer. Posts must be perpendicular to adjacent roadway grade. Use epoxy mortar under post base plates if gaps larger than 1/16" exist.

At expansion slots in W-beam rail, tighten bolts snugly.

For curved railing applications, fabricate the tubes and pipes when the radius is 600' or less and fabricate the W-beam to the radius when the radius is less than 150'. Submit shop drawings for approval when tubes are required to be fabricated to a radius.

MATERIAL NOTES:

Galvanize all steel components unless otherwise shown on plans.

Anchor bolts are ¾" Dia ASTM-A325 bolts or A449 heavy hex bolts (or A449 threaded rods with one lock welded heavy hex nut each) with one heavy hex nut and one 2" O.D. washer (0.153" Min thick) plus one 1 ½" O.D. hardened washer (0.122" Min thick) at each bolt. Optionally use rectangular ⅜ x 2 x 0'-3" ASTM-A36 plate with 13/16" Dia hole.

GENERAL NOTES:

This rail was evaluated based on the results of previous crash tests and approved for a NCHRP Report 350 TL-3 rating. The Metal Beam Guard Fence (T101) transition standard must be used regardless of the design speed.

This railing cannot be used on bridges with expansion joints providing more than 4" movement.

This rail requires a Min slab thickness of 8" and is not recommended for use with Box Beam or Double-T Structures with asphalt overlay.

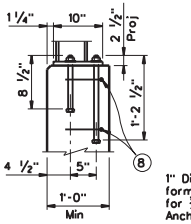
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

This rail is not recommended for use with more than 3 posts mounted on any of the following structures: cast-in-place retaining walls, Traffic Railing Foundations (TRF), or bridge abutment wingwalls.

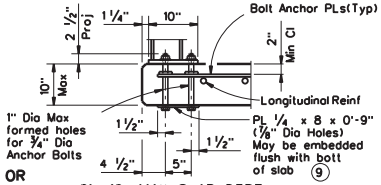
This standard, used in conjunction with the Rail Anchorage Curb (RAC) standard or the Rail Anchorage Curb Retrofit (RAC-R) standard, allows this rail to be mounted on box culverts.

For all rails, erection drawings showing section lengths, splice locations, rail post spacing and anchor bolt setting must be submitted to the Engineer for approval.

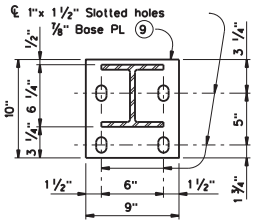
Average weight of railing with no overlay and with 0.25" tubes is 39 plf.



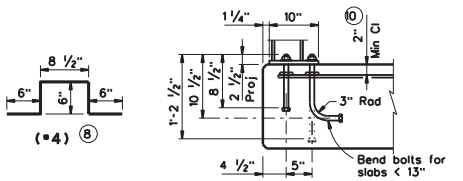
ON ABUT WINGWALL OR CIP RETAINING WALL



ON 10" MAX SLAB DEPTH



SECTION A-A



ON SLAB DEPTH GREATER THAN 10"

POST MOUNTING DETAILS

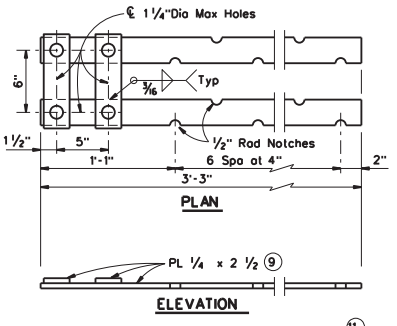
(7) In lieu of front Flg weld shown, a ⅜" fillet weld all around including edges of flange may be used.

(8) Adjust horizontal reinforcing as necessary and place two #4 bars around anchor bolts. These bars are to be considered subsidiary to Rail.

(9) All steel posts and plates are (ASTM-A36).

(10) Set plates under longitudinal reinforcing if necessary.

(11) Install one anchorage plate assembly in slab at each rail post. Do not galvanize or oil this assembly. Bolt Anchorage Plates may not be cut.



BOLT ANCHORAGE PLATES (11)

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.

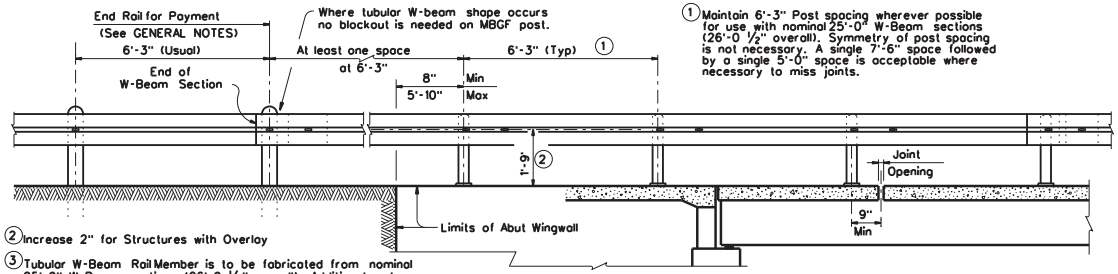
ACC: LEVELS DISPLAYED

Texas Department of Transportation
Bridge Division

TRAFFIC RAIL

TYPE T101

FILE: rlstd003.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT April 2009	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS	22			83
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	LASALLE,ETC.	6417	14	001	VARIOUS



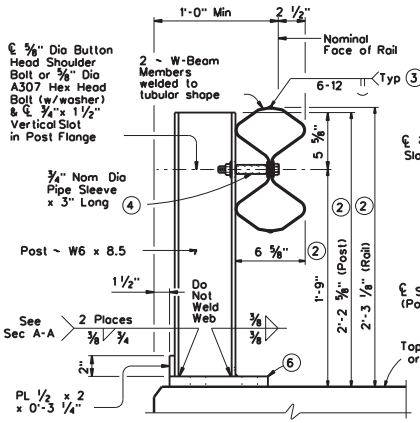
ROADWAY ELEVATION OF RAIL

(1) Maintain 6'-3" Post spacing wherever possible for use with nominal 25'-0" W-Beam sections (26'-0 1/2" overall). Symmetry of post spacing is not necessary. A single 7'-6" space followed by a single 5'-0" space is acceptable where necessary to miss joints.

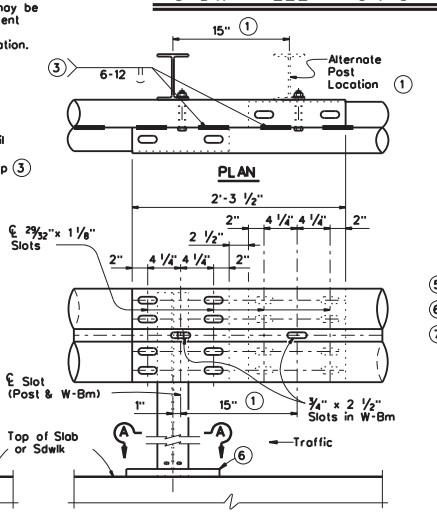
(2) Increase 2" for Structures with Overlay

(3) Tubular W-Beam Rail Member is to be fabricated from nominal 25'-0" W-Beam sections (26'-0 1/2" overall). Additional post mounting slots are to be made in each member 15" from the standard slots at 6'-3" centers. Top and bottom seams may be continuously welded with 80% penetration in lieu of intermittent welding shown. Welds must be chipped and cleaned and the complete 27'-3 1/2" tubular member galvanized after fabrication.

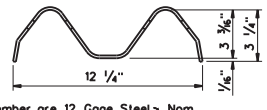
(4) See Section Thru Splice for Washers



SECTION THRU RAIL



TUBULAR W-BEAM SPLICE DETAILS



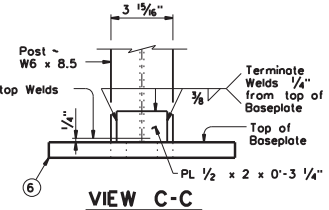
Member are 12 Gage Steel ~ Nom thickness = 0.1046" exclusive of protective coating. Actual section may vary slightly with the manufacturer.

W-BEAM SECTION

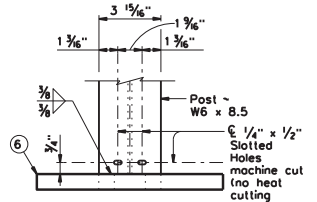
(5) PL 1/4 x 6 x 0'-8" (15/16" Dia Holes)

(6) PL 3/4 x 9 1/2 x 1'-0"

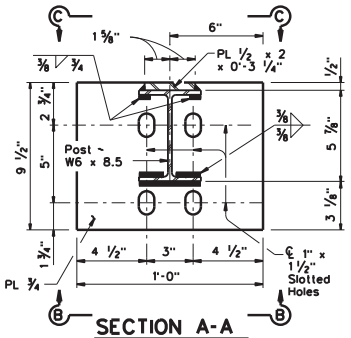
(7) 8 ~ 5/8" Splice nuts. Tack weld to bent sheet metal postioners as shown. Other suitable positioning methods or devices may be substituted. The complete splice must have 16 bolts. Each bolt will include a 1 3/4" x 3" x 3/16" plate washer or a 1 3/4" O.D. washer.



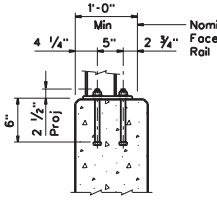
VIEW C-C
Showing Back of Post



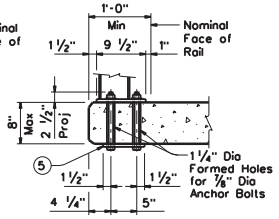
VIEW B-B
Showing Front of Post



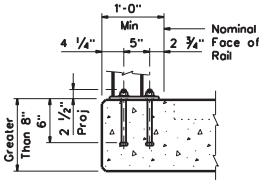
SECTION A-A



ON ABUT WINGWALL OR CIP RETAINING WALL

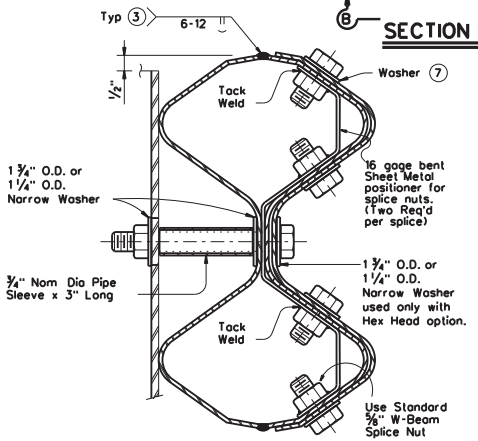


FOR 7" MIN TO 8" MAX CONC DEPTH



FOR CULVERTS OR SLABS GREATER THAN 8"

POST MOUNTING DETAILS



SECTION THRU SPLICE

CONSTRUCTION NOTES:

Tubular Rail Member must be extended and connected to at least the first soil embedded post at each end of the structure. More such posts must be used to utilize 25' standard sections. Approach guard fence posts must be spaced at 6'-3" adjacent to the Tubular Rail since its flexibility is similar to standard metal beam guard fence. Do not install additional posts at 3'-1 1/2" centers.

Rail must be extended across all fixed armor joints, slab span joints, or pan form joints with no change in post spacing or continuity. At expansion armor joints of 1 1/4" or less, the splice bolts nearest the joint and post mounting bolts at intervening post must be snugly tightened to allow for rail expansion. At expansion armor joints over 1 1/4", suitably longer splice holes must be provided.

Face of rail and posts must be vertical transversely unless otherwise approved by the Engineer. Posts must be perpendicular to adjacent roadway grade. Use epoxy mortar under post base plates if gaps larger than 1/16" exist.

MATERIAL NOTES:

All steel components except reinforcing must be galvanized unless otherwise shown in plans.

Anchor bolts must be 7/8" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer at each bolt (1 3/4" O.D. or 2" O.D. as directed by the Engineer). Clipped washers may be used as necessary. Threaded rods may be 0.781" minimum diameter with rolled threads. Nuts must conform to A563 requirements.

GENERAL NOTES:

This rail was evaluated based on the results of previous crash tests and approved for a NCHRP Report 350 TL-2 rating. The T6 rail is only approved for low speed use, design speeds of 45 mph and less.

This railing cannot be used on bridges with expansion joints providing more than 4" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Payment for this rail must be in increments of 25'.

Shop drawings to be submitted to the Engineer for approval are required only for the proposed rail splices at expansion joints greater than 1 1/4". For rails not requiring shop drawings, erection drawings showing splice locations must be submitted to the Engineer for approval.

Average weight of railing (6'-3" Post spacing and no Overlay) = 23 plf.

DESIGN/REPAIR CRITERIA

The posts of this rail are designed to break away on impact from an errant vehicle. The rail is designed to deflect approx. two to three feet as it contains and redirects the errant vehicle. This rail may not be installed on top of or behind curbs that project above finished grade.

Fully anchored guardfence must be attached to each end of rail.

Repairs to impact-damaged post/baseplate units are not permitted. All impact-damaged posts must be replaced with a new post/baseplate unit.

This railing is especially suitable for use on bridge width box culverts. The detail sheet titled "Box Culvert Mounting Details For Type T6 Rail, T6-CM" is then required, showing culvert curbs and wingwall modifications and additional reinforcing steel to be included as part of the railing for payment.

The use of this railing is restricted to design speeds of 45 mph or less and to horizontal curves with radius greater than 1000 feet.

LEVELS DISPLAYED
ACC:

Texas Department of Transportation
Bridge Division

TRAFFIC RAIL

TYPE T6

FILE: rlstd011.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT April 2009	DISTRICT	FEDERAL AID PROJECT		SHEET
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	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	LASALLE,ETC.	6417	14	001	VARIOUS

DATE: 12/19/2023 4:23:31 PM
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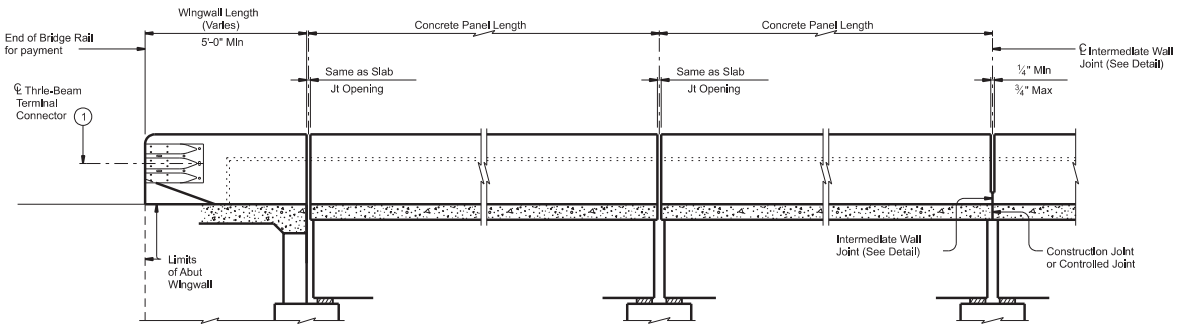
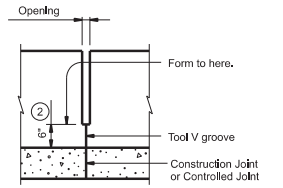


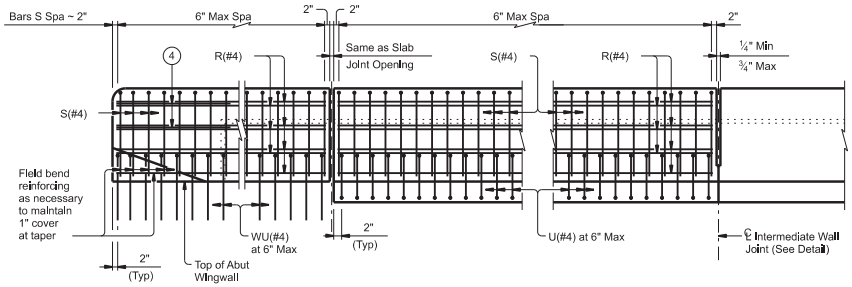
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

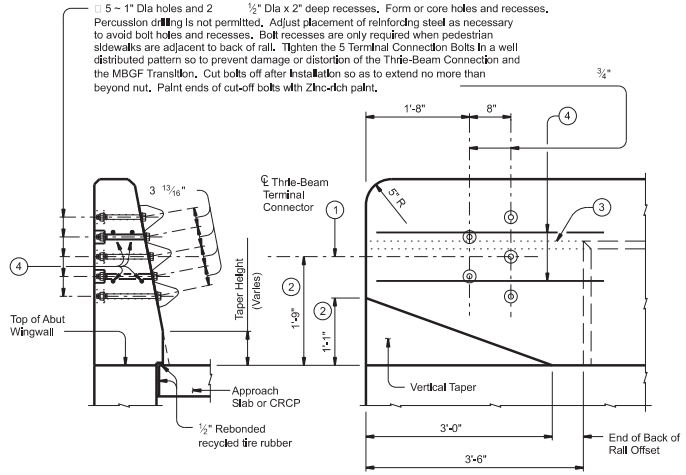


INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.

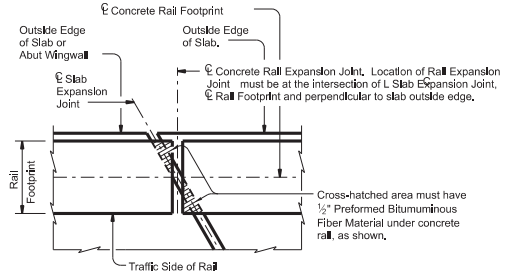


ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



SECTION | ELEVATION

TERMINAL CONNECTION DETAILS



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Increase 2" for structures with Overlay.
3. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
4. Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required.

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL
SINGLE SLOPE

TYPE SSTR

FILE: rlst014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		85

DATE: 12/19/2023 4:23:31 PM
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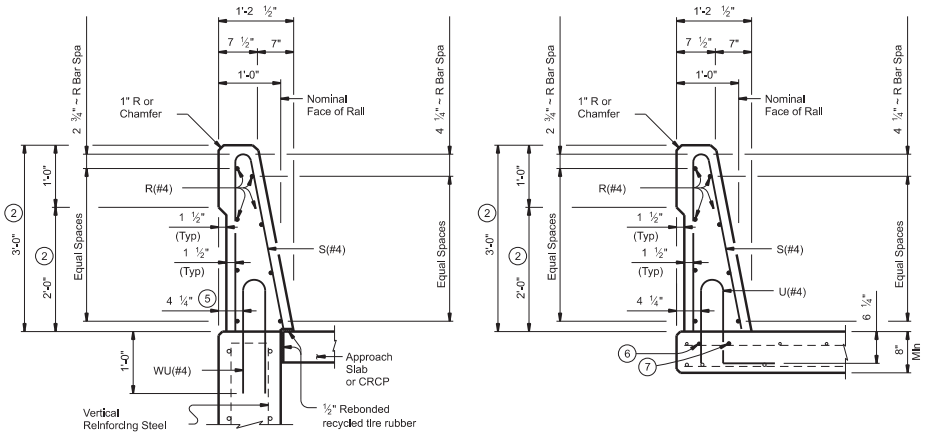


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

ON BRIDGE SLAB

SECTIONS THRU RAIL

(2) Increase 2" for structures with Overlay.

(5) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

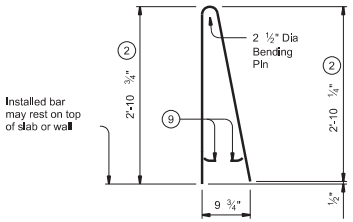
(6) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.

(7) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

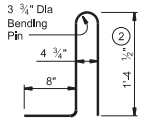
(8) No longitudinal wires may be within upper bend.

(9) Bend or cut as required to clear drain slots.

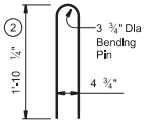
(10) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.



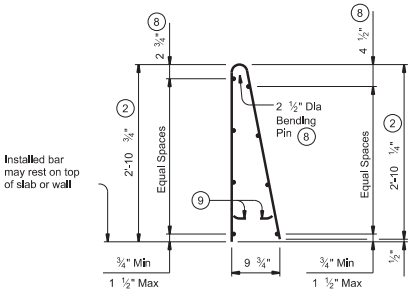
BARS S (#4)



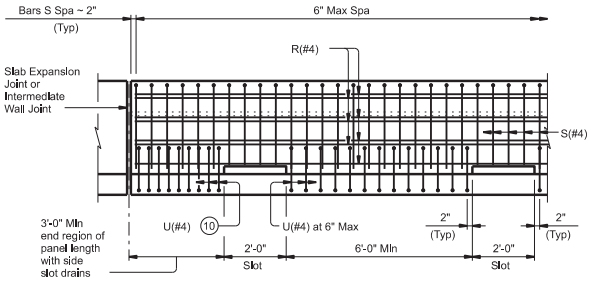
BARS U (#4)



BARS WU (#4)

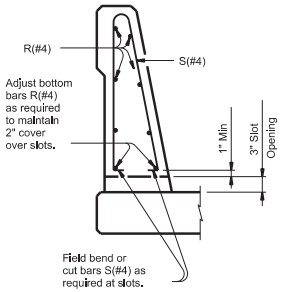


OPTIONAL WELDED WIRE REINFORCEMENT (WWR)



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



SECTION THRU OPTIONAL SIDE SLOT DRAIN

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
	No. of Wires	Spacing
Minimum	8	4"
Maximum	10	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a ⅜" width x ¼" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

The back of railing must be vertical unless otherwise shown in the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM A1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-4 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

Average weight of railing with no overlay is 376 plf.

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

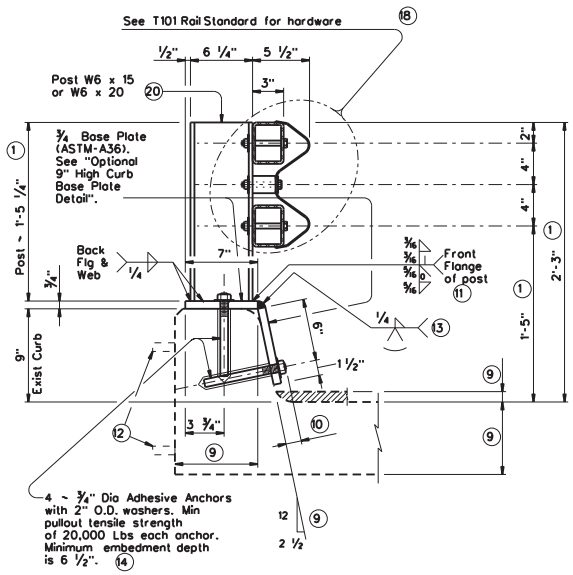
Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

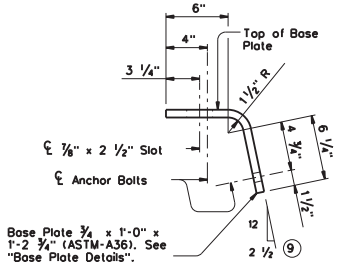
TYPE SSTR

FILE:	rlstd014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT	September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS		6417	14	001	VARIOUS
		DIST	COUNTY		SHEET NO.
		22	LASALLE,ETC.		86



SECTION A-A OF 9" HIGH CURBS

(Showing example of 8" Min width curb, wider curbs similar)



OPTIONAL 9" HIGH CURB BASE PLATE DETAIL

(Bend one piece base plate)

(1) Increase by amount of existing overlay/seal coat thickness, not to exceed 2". If thickness of existing overlay/seal coat is greater than 2" at toe of rail, taper overlay at a 1:10 or flatter slope over the shoulder width to a thickness of 2" or less at toe of rail.

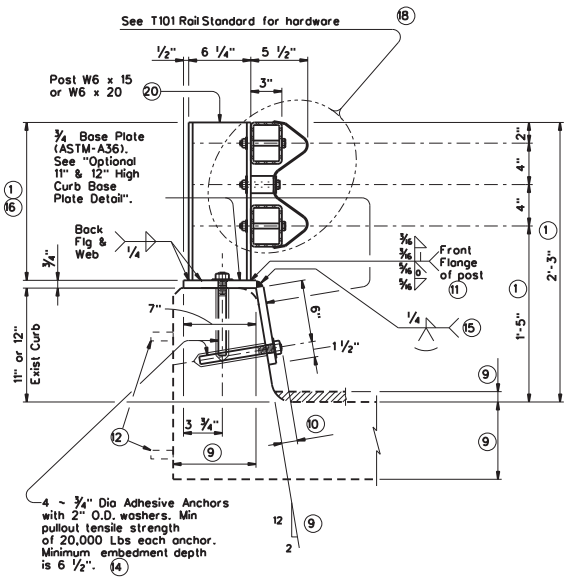
(9) See elsewhere in plans for dimensions (Curb width and height, slab and overlay thickness). Slope of curb may differ from what is shown. Adjust base plate as necessary to conform to curb face geometry.

(10) 1 ½" Bolt Projection (Typ).

(11) In lieu of front flange weld shown, a ⅜" fillet weld all around including edges of flange may be used.

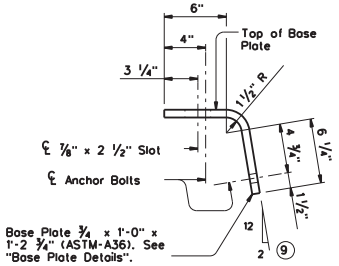
(12) Remove existing railing (including posts), cut and grind anchor bolts flush and paint ends with two coats of zinc-rich paint conforming to the Item "Galvanizing".

(13) Complete joint penetration weld. Optional one piece base plate may be used. See "Optional 9" High Curb Base Plate Detail".



SECTION A-A OF 11" & 12" HIGH CURBS

(Showing example of 8" Min width curb, wider curbs similar)



OPTIONAL 11" & 12" HIGH CURB BASE PLATE DETAIL

(Bend one piece base plate)

(14) Hole size, hole cleaning and other installation requirements must conform to manufacturer's instructions. Use a Type III Class C epoxy.

(15) Complete joint penetration weld. Optional one piece base plate may be used. See "Optional 11" & 12" High Curb Base Plate Detail".

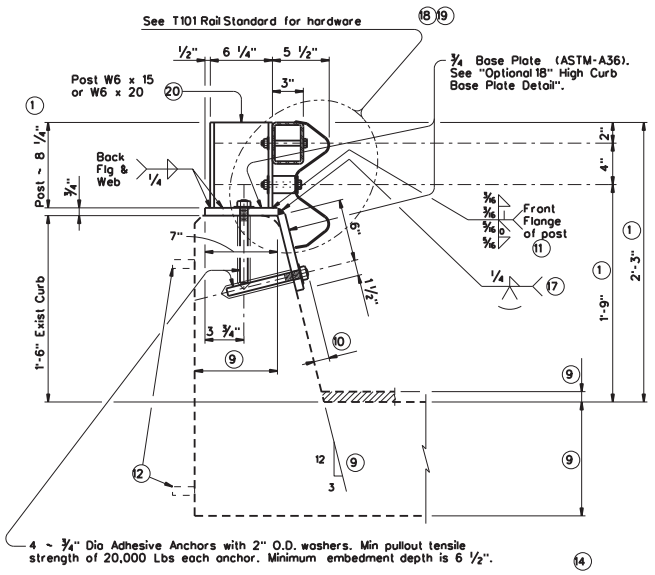
(16) On 11" Curbs, Posts are 1'-3 ¼". On 12" Curbs, Posts are 1'-2 ¼".

(17) Complete joint penetration weld. Optional one piece base plate may be used. See "Optional 18" High Curb Base Plate Detail".

(18) See T101 standard for details and notes not shown.

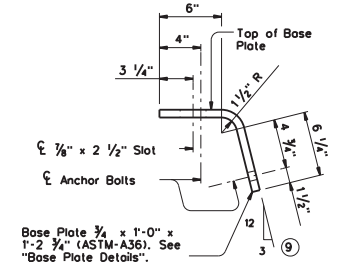
(19) This retrofit condition will only accommodate one top HSS 4 x 3 member under W-Beam.

(20) See T101 standard for post spacing, unless shown otherwise.



SECTION A-A OF 18" HIGH CURBS

(Showing example of 8" Min width curb, wider curbs similar)



OPTIONAL 18" HIGH CURB BASE PLATE DETAIL

(Bend one piece base plate)

LEVELS DISPLAYED
ACC:

SHEET 3 OF 3

Texas Department of Transportation
Bridge Division

RETROFIT GUIDE FOR T101 RAIL ON CURBS

(NOT TO BE USED AS A STANDARD)

TYPE T101RC

FILE: rlstd023.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2009	DISTRICT	FEDERAL AID PROJECT		SHEET
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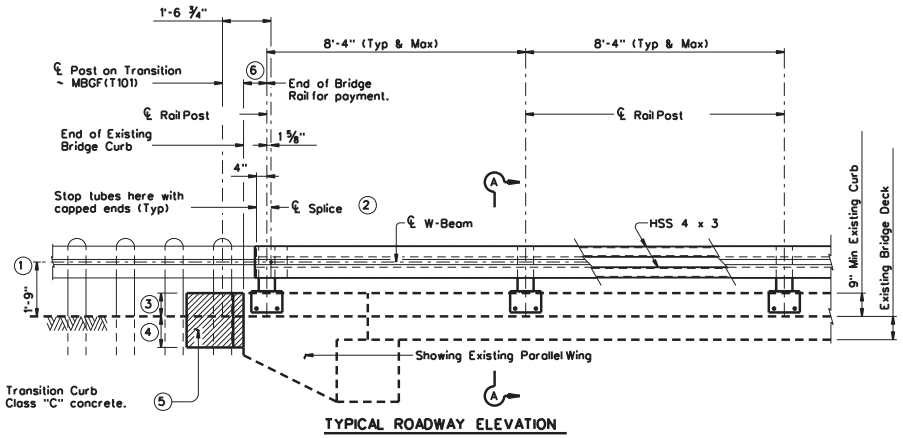
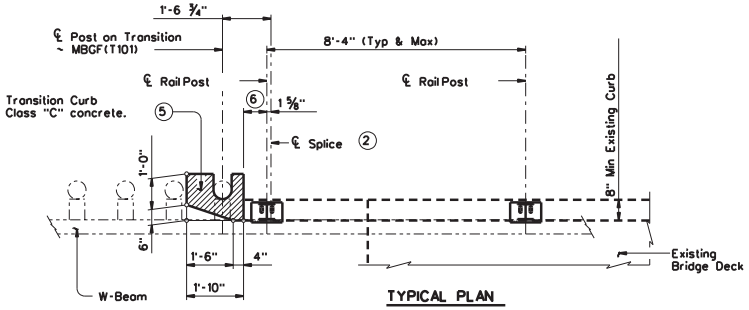
	LASALLE,ETC.	6417	14	001	VARIOUS



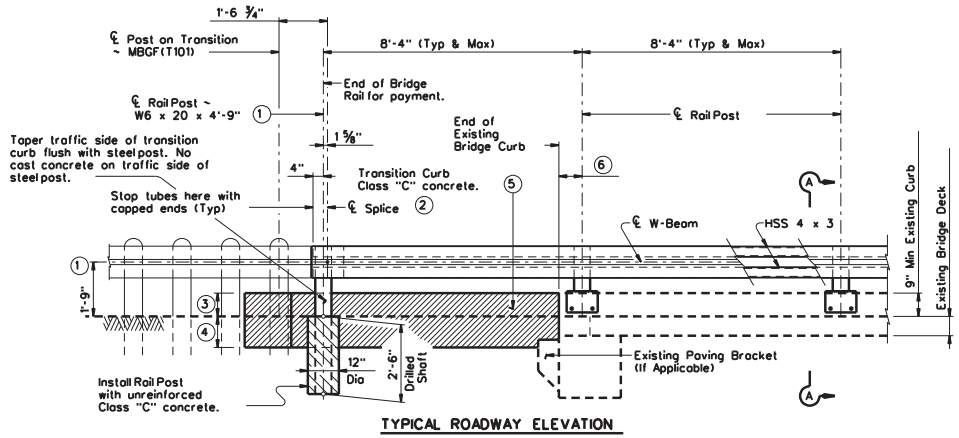
TYPICAL ROADWAY ELEVATION



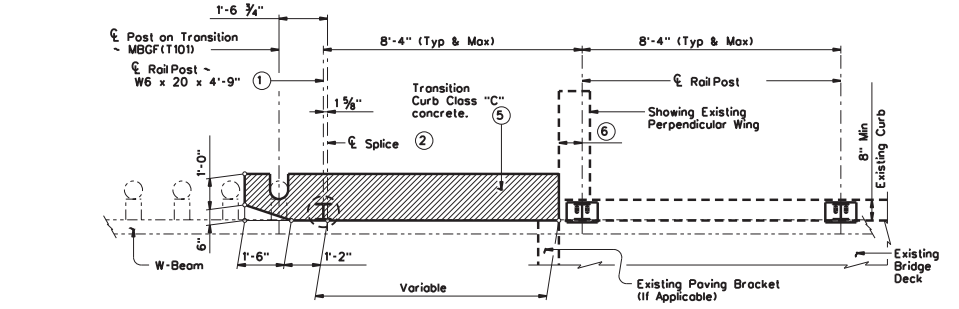
TYPICAL PLAN

EXAMPLE "A" RETROFIT WITH PARALLEL WING

(Showing 9" high and 8" wide curbs, higher and wider curbs similar)



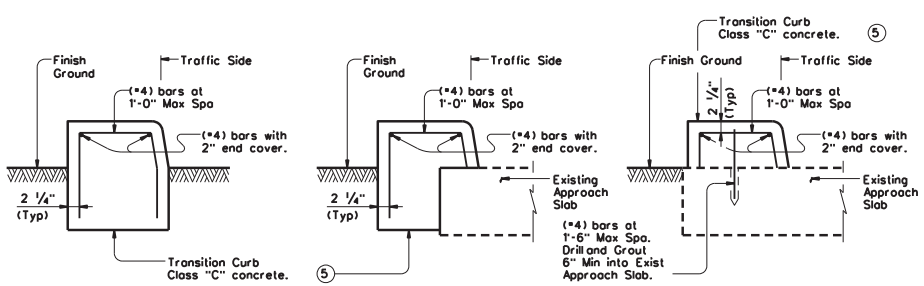
TYPICAL ROADWAY ELEVATION



TYPICAL PLAN

EXAMPLE "B" RETROFIT WITH PERPENDICULAR WING (7)

(Showing 9" high and 8" wide curbs, higher and wider curbs similar)



WITH NO APPROACH SLAB | WITH PARTIAL WIDTH APPROACH SLAB | WITH FULL OR ALMOST FULL WIDTH APPROACH SLAB

EXAMPLES OF TRANSITION CURB SECTIONS

(Reinforcement may be omitted for transition curbs less than 2 ft long).

(1) Increase by amount of existing overlay/seal coat thickness, not to exceed 2". If thickness of existing overlay/seal coat is greater than 2" at toe of rail, taper overlay at a 1:10 or flatter slope over the shoulder width to a thickness of 2" or less at toe of rail.

(2) Splice may be on either side of bridge rail post web.

(3) Match existing bridge curb height.

(4) Cast transition curb 1'-0" into soil or top of concrete approach slab.

(5) Match existing bridge curb face on traffic side of transition curb. Transition curb 6" x 1'-6" taper will remain vertical.

(6) Minimum distance from end of curb or open joint in curb to post centerline is existing curb height without overlay/seal coats, but not less than 9".

(7) Details similar to Example "A" may be used if no existing structure components (like Paving Brackets) interfere with or prevent locating first transition post at 1'-6 ¾" adjacent to first rail post splice on existing structure.

LEVELS DISPLAYED | ACC:

SHEET 1 OF 3

Texas Department of Transportation
Bridge Division

RETROFIT GUIDE FOR T101 RAIL ON CURBS

(NOT TO BE USED AS A STANDARD)

TYPE T101RC

FILE: rlstd023.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH	
©TxDOT April 2009	DISTRICT	FEDERAL AID PROJECT			SHEET
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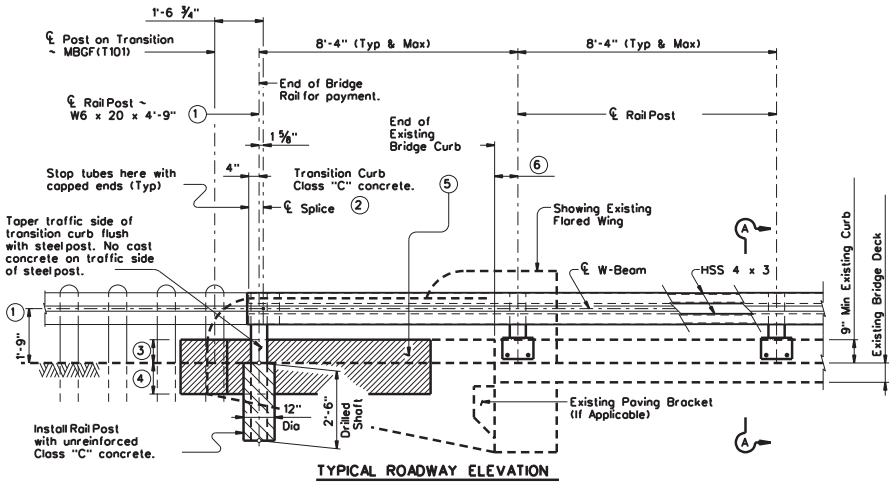
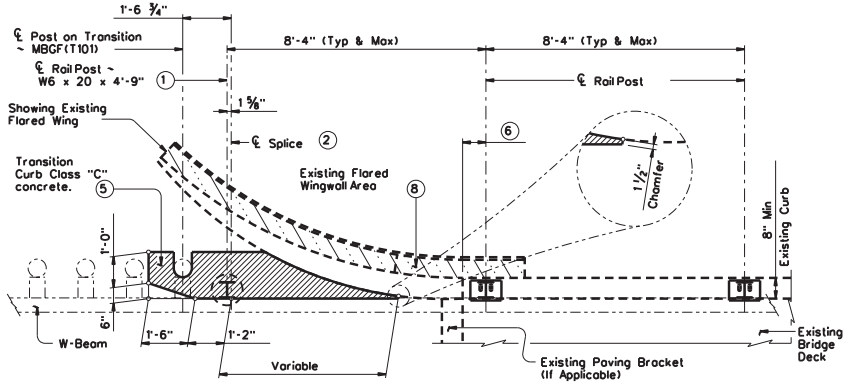
	LASALLE,ETC.		6417	14	001	VARIOUS



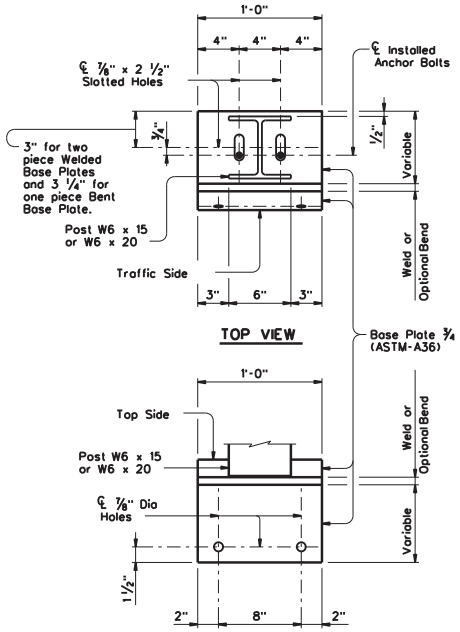
TYPICAL ROADWAY ELEVATION



TYPICAL PLAN

EXAMPLE "C" RETROFIT WITH FLARED WING

(Showing 9" high and 8" wide curbs, higher and wider curbs similar)



BASE PLATE DETAILS

(Base plate can be made out of one or two plates)

Notes: Bridge rail must be attached to the MBGF (T101) transition which then attaches to a metal beam guard fence and extends along the embankment. The splice joining the approach guard fence transition to the bridge rail requires 1'-6 ¾" post spacing.

Do not provide a tube splice in first section unless it crosses an expansion armor joint.

Maintain 8'-4" post spacing wherever possible for use with nominal 25' W-Beam sections (25'-0 1/2" overall). Symmetry of the post spacing on both sides and along the structure is not necessary. The nominal 25' sections may also be maintained by introducing four post spaces at 6'-3" at areas of conflict. Two adjacent spaces of 8'-8" and 8'-0" each are also permissible.

CONSTRUCTION NOTES:

Panel Lengths of tube members must be attached continuously to a minimum of three posts (except at abutments with expansion joints).

Rail Posts must be set perpendicular to adjacent roadway grade. Use epoxy mortar under post base plates if gaps larger than 1/16" exist.

At expansion slots in W-Beam rail, tighten bolts snugly.

MATERIAL NOTES:

All steel components except reinforcing must be galvanized unless otherwise shown in plans.

GENERAL NOTES:

A similar full-height railing (T101) has been evaluated to meet NCHRP Report 350 Test Level 3 (TL-3) criteria. This retrofit railing has been structurally evaluated to have strength equal to or exceeding that of the tested railing.

See Traffic Rail Type T101 standard for details and notes not shown herein. Using this sheet with the T101 standard, note that anchor bolts, bolt anchor plates, post base plate and post lengths are not used as shown on the T101 standard. This sheet replaces or omits some items on the T101 standard.

All bolts, nuts, washers, adhesive anchors, reinforcement, and transition curb concrete are considered as parts of the rail for payment.

Erection drawings showing panel lengths, splice locations, post spacing, anchor bolt locations and adhesive anchor test data to demonstrate pullout strength must be submitted to the Engineer for approval. Shop drawings will not be required.

Avg weight with no overlay increase and with 0.25" tubes:
38 plf (9", 11" & 12" Curbs)
23 plf (18" Curbs)

This sheet is to be used as a guide for preparing project-specific details to retrofit existing curbed structures with the T101 type of railing. Details with appropriate notes from this guide should be prepared for the specific application. Dimensions of existing slab thickness, curb widths, heights, etc., should be shown. Particular care should be taken in identifying the bridge abutment wingwall conditions and providing for proper reinforcement anchorage and approach guard fence post positioning. This sheet may not be used without modification. The details shown may need to be amended if the exact existing condition is not covered. In all cases, details and notes not required must be crossed out or eliminated, "(MOD)" added, the phrase "(Not to be used as a standard)" removed, and the sheet sealed and signed.

(1) Increase by amount of existing overlay/seal coat thickness, not to exceed 2". If thickness of existing overlay/seal coat is greater than 2" at toe of rail, taper overlay at a 1:10 or flatter slope over the shoulder width to a thickness of 2" or less at toe of rail.

(2) Splice may be on either side of bridge rail post web.

(3) Match existing bridge curb height.

(4) Cast transition curb 1'-0" into soil.

(5) Match existing bridge curb face on traffic side of transition curb. Transition curb 6" x 1'-6" taper will remain vertical.

(6) Minimum distance from end of curb or open joint in curb to post centerline is existing curb height without overlay/seal coats, but not less than 9".

(8) Remove all existing structure area from top of existing curb. Cut and grind all existing reinforcing extending from top of existing curb flush and paint ends with two coats of zinc-rich paint conforming to the Item "Galvanizing".

LEVELS DISPLAYED | ACC:

SHEET 2 OF 3

Texas Department of Transportation
Bridge Division

RETROFIT GUIDE FOR T101 RAIL ON CURBS

(NOT TO BE USED AS A STANDARD)

TYPE T101RC

FILE: rlstd023.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2009	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS	22			89
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	LASALLE,ETC.	6417	14	001	VARIOUS

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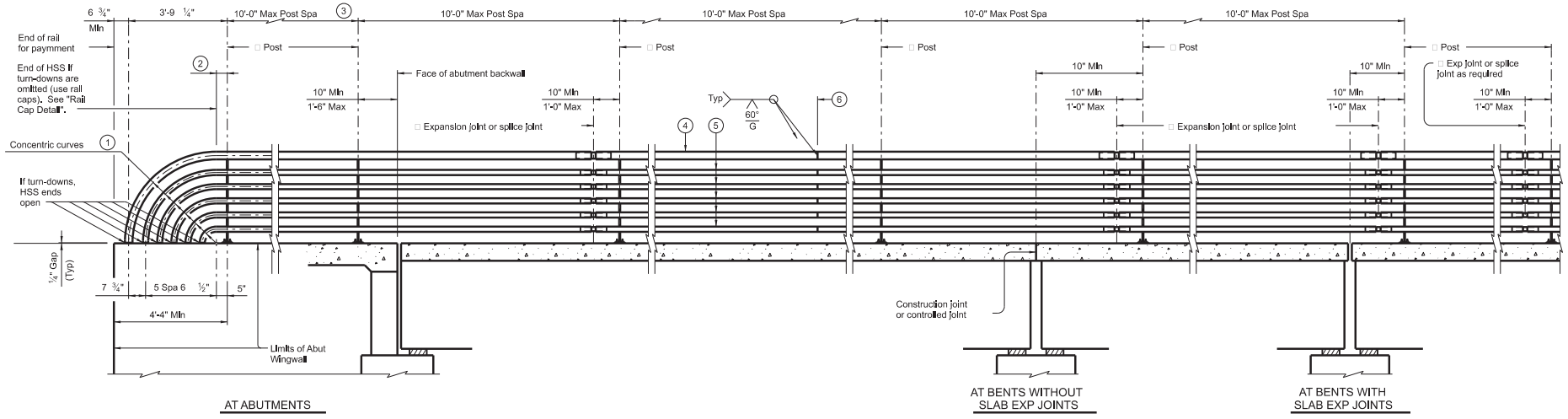
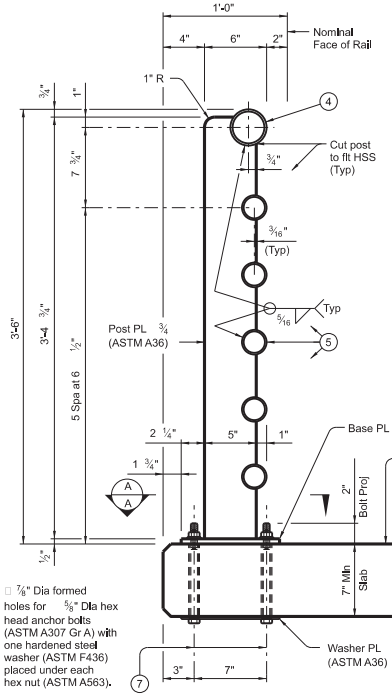


AT ABUTMENTS

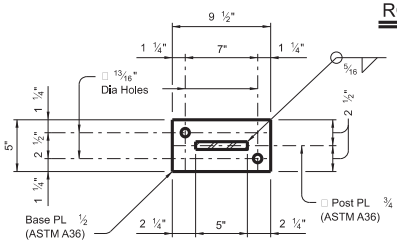
AT BENTS WITHOUT SLAB EXP JOINTS

AT BENTS WITH SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

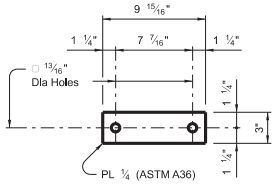


ON BRIDGE SLAB

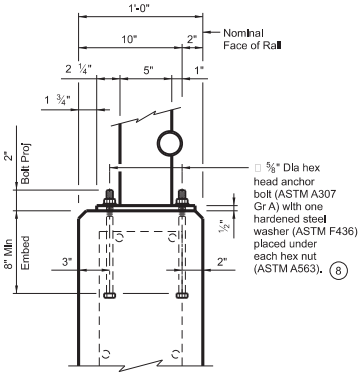


SECTION A-A

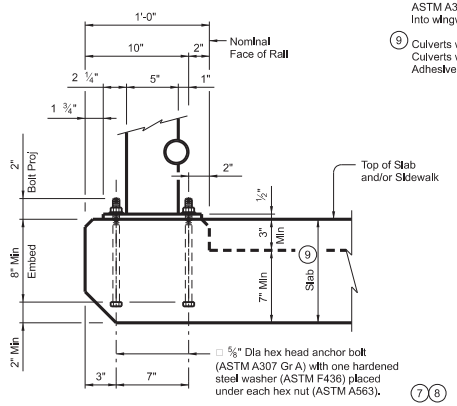
Showing base plate detail.



WASHER PLATE DETAIL



ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON CULVERTS WITH OR WITHOUT CURBS

Used with 1'-0" Min thick parallel wings on culverts.

SECTIONS THRU RAIL

1. Portion of railing with turn-downs to be used or omitted as indicated on Bridge Layout.
2. 10" Min ~ 1'-6" Max if turn-downs are omitted.
3. Min of 2 posts required on wingwall.
4. HSS 3.500 x 0.216 (Rail Member)
5. HSS 2.375 x 0.154 (Rail Member)
6. One shop splice per panel is permitted (with minimum 85 percent penetration). The weld may be square groove or single vee groove. Grind smooth.
7. At Contractor's option, adhesive anchors may be used. Adhesive anchors must be ASTM A307 Grade A fully threaded rods. Minimum adhesive anchor embedment depth is 5" into slabs or culverts without curbs. See "Material Notes" for adhesive anchor requirements. ⅝" Dia
8. At Contractor's option, adhesive anchors may be used. Adhesive anchors must be ASTM A307 Grade A fully threaded rods. Minimum adhesive anchor embedment depth is 7" into wingwalls or culverts with curbs. See "Material Notes" for adhesive anchor requirements. ⅝" Dia
9. Culverts without curbs for cast-in-place anchor bolts require a 10" Min slab thickness. Culverts with curbs for cast-in-place anchor bolts require a curb plus slab thickness of 10" Min. Adhesive anchors may be used with a 7" Min slab thickness or culverts with curbs.

Texas Department of Transportation

Bridge Division Standard

PEDESTRIAN RAIL

TYPE PR11

FILE: rlstd028-19.dgn	DN: TAR	CK: TBE	DW: JTR	CK: TAR
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		90

DATE: 12/19/2023 4:23:33 PM
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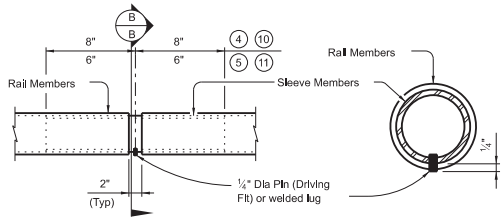
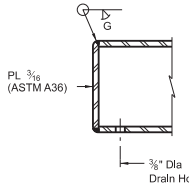


AT SPLICES OR EXP JTS

SECTION B-B

PIPE SPLICE DETAIL



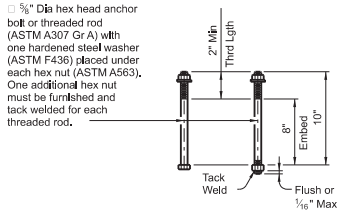
RAIL CAP DETAIL

(4) HSS 3.500 x 0.216 (Rail Member)

(5) HSS 2.375 x 0.154 (Rail Member)

(10) HSS 2.875 x 0.203 (Sleeve Member)

(11) HSS 1.900 x 0.145 (Sleeve Member)



CAST-IN-PLACE & FORMED HOLE ANCHOR BOLT OPTIONS

CONSTRUCTION NOTES:

Panel lengths of railing must be attached to a minimum of three posts except at abutment wingwalls.

At the Contractor's option anchor bolts may be an adhesive anchorage system. See "Material Notes".

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

Face of rail and posts must be vertical transversely unless otherwise approved. Posts must be perpendicular to adjacent roadway grade. Use Type VIII epoxy mortar under post base plates if gaps larger than 1/16" exist.

For curved railing applications, fabricate the HSS rail to the radius when the radius is 600' or less. Submit shop drawings for approval when tubes are required to be fabricated to a radius. Shop drawings must be submitted to the Engineer for approval.

Round or chamfer all exposed edges of steel components 1/16" by grinding prior to galvanizing.

MATERIAL NOTES:

Provide ASTM A500 Gr B, A1085 or A53 Gr B for all HSS.

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over galvanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel". Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.

Anchor bolts must be ⅝" Dia ASTM A307 Gr A with one hardened steel washer (ASTM F436) placed under each hex nut or ASTM A307 Gr A threaded rods with one tack welded hex nut each and with one hex nut with one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements.

Optional adhesive anchorage system must be ⅝" Dia ASTM A307 Gr A fully threaded rods with one hex nut and one hardened steel washer (ASTM F436). Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into slab, wingwalls, or culvert curbs using a Type III, Class C, D, E, or F anchor adhesive. Anchor adhesive chosen must be able to achieve a nominal bond strength in tension, Na, of a single anchor of 10 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

For all rails, submit erection drawings showing section lengths, splice locations, rail post spacing and anchor bolt setting for approval.

Average weight of railing is 30 plf.

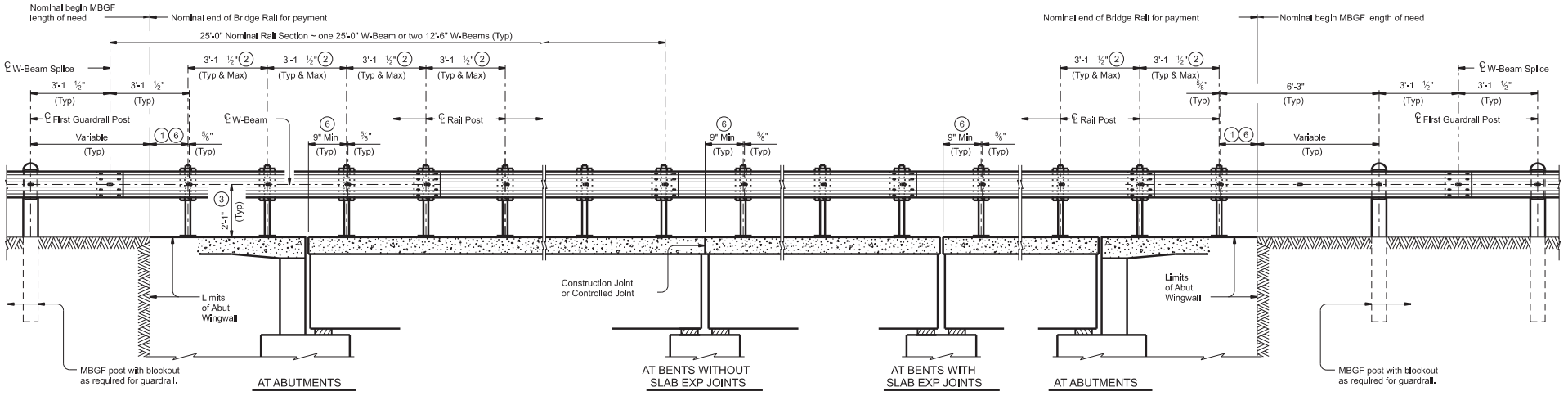
Texas Department of Transportation

Bridge Division Standard

PEDESTRIAN RAIL

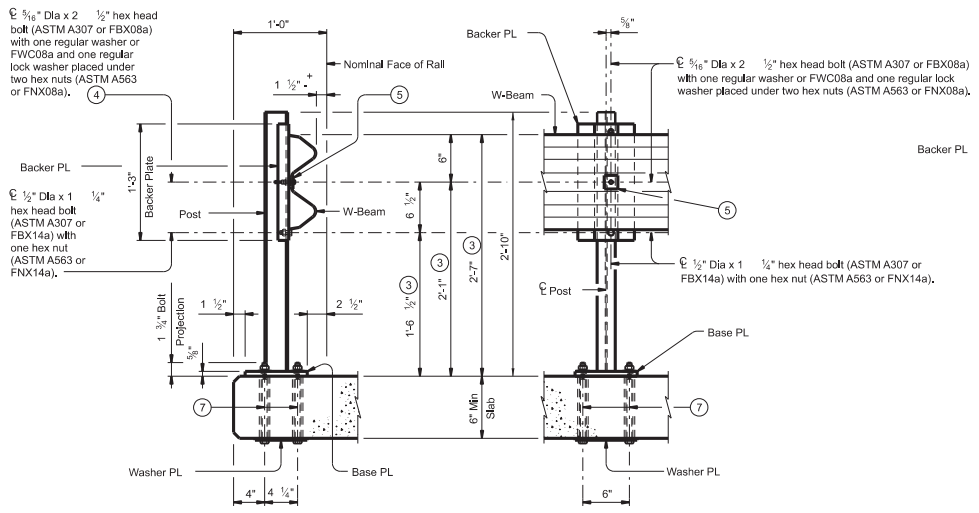
TYPE PR11

FILE: rlstd028-19.dgn	DN: TAR	CK: TBE	DW: JTR	CK: TAR
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		91



ROADWAY ELEVATION OF RAIL

Showing without overlay.

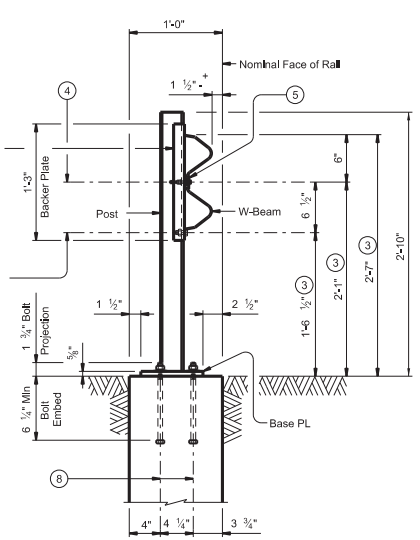


RAIL SECTION

TRAFFIC SIDE RAIL VIEW

RAIL DETAILS ON BRIDGE SLAB

Showing without overlay.



RAIL SECTION ON ABUTMENT WINGWALL

Showing without overlay.

1. 9" Min, 5'-9" Max
2. Maintain 3'-1 ½" Rail Post spacing wherever possible for use with nominal 25'-0" or 12'-6" W-Beam sections. Symmetry of post spacing on both sides and along the structure is not necessary.
3. Increase 2" for structures with overlay.
4. Tighten the first hex nut by hand until the top and bottom edges of the W-Beam engage the Backer Plate (Backer Plate should be snug against the post). Then tighten hex nut one revolution with wrench and secure with the second hex nut.
5. PL ⅛ x 1 ¾ x 1 ¾ with ⅜ Dia Hole centered in PL (ASTM A36). Square Guardrail Washer (FWR01).
6. The post nearest to a slab joint or end of structure may be shifted up to 9" in order to satisfy the minimum offset dimension. Drill a new ¾" Dia hole on the centerline of W-beam for shifted post. Paint hole with two coats of zinc-rich paint conforming to the Item "Galvanizing". All other posts must remain on the typical spacing.
7. □ ⅞" Dia formed holes for □ ⅝" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ATSM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod. See "Cast-In-Place & Formed Hole Anchor Bolt Options".
8. □ ⅝" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ATSM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod. See "Cast-In-Place & Formed Hole Anchor Bolt Options".

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

TYPE T631

FILE:	rlstd038-20.dgn	DN: TxDOT	CK: AES	DW: JTR	CK: AES
©TxDOT	September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS		6417	14	001	VARIOUS
07-20: Allowing 9'-4 ½" or 6'-3" W-Beam sections.		DIST	COUNTY		SHEET NO.
		22	LASALLE,ETC.		92

DATE: 12/19/2023 4:23:33 PM
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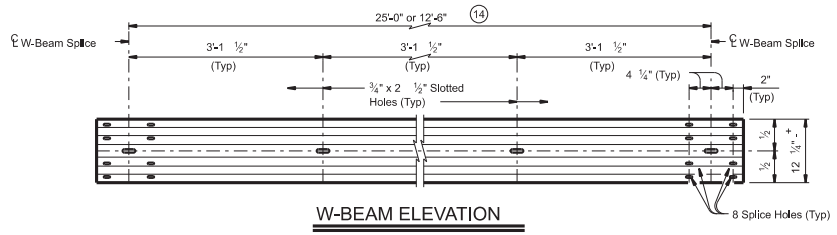
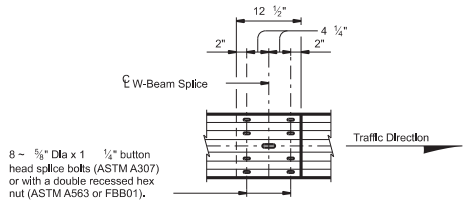
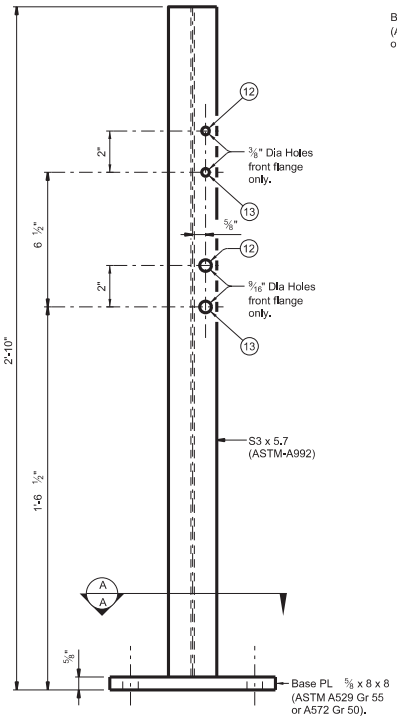


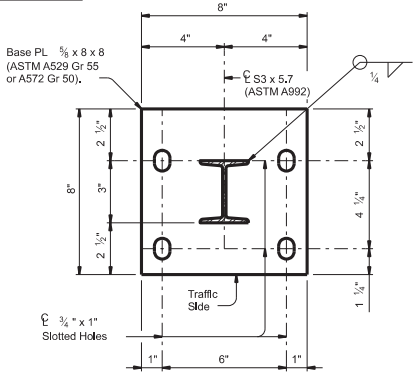
W-BEAM ELEVATION



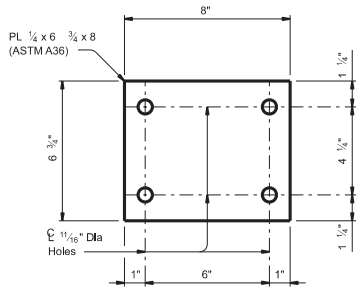
W-BEAM SPLICE ELEVATION



POST ELEVATION

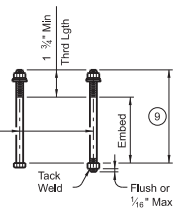


SECTION A-A



WASHER PLATE DETAIL

□ ⅝" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ATSM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod.



CAST-IN-PLACE & FORMED HOLE ANCHOR BOLT OPTIONS 10

9 See "Rail Details On Bridge Slab" and/or "Rail Section On Abutment Wingwall".

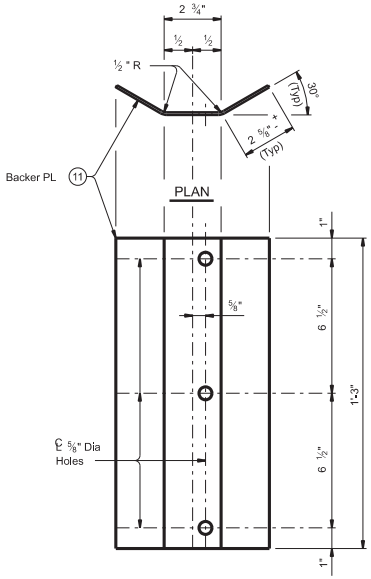
10 See "Material Notes" for anchor bolt Information.

11 Backer PL ⅛ x 8 x 1'-3" (ASTM A1011 CS or SS Gr 33, or A1008 CS or SS Gr 33 (11 Gage acceptable)).

12 Used for structures with overlay.

13 Used for structures without overlay.

14 At the nominal end of the bridge rail for payment, one 9'-4 ½" or 6'-3" W-beam section is permitted in order to achieve the required W-Beam splice location on the MBGF.



BACKER PLATE

MBGF AND END TREATMENT NOTES:
This traffic railing must be anchored by metal beam guard fence (MBGF) and guard fence end treatments. Determine MBGF length of need in accordance with the Roadway Design Manual, unless otherwise specified. The minimum MBGF length of need required for anchoring the railing is 25' of MBGF plus the appropriate end treatment.

CONSTRUCTION NOTES:
Face of rail post must be plumb unless otherwise approved by the Engineer. Post must be perpendicular to adjacent roadway grade. Use epoxy mortar under post base plates if gaps larger than 1/16" exist.
Fully anchored guardrail must be attached to each end of rail. A metal beam guard fence transition is not used with this rail.
At the Contractor's option anchor bolts may be an adhesive anchor system. See "Material Notes".
Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.
It is recommended to show a Rail Layout with rail posts and W-beam splices. Fabricator must submit erection drawings to the Engineer for approval.
Round or chamfer exposed edges of rail post and backer plate to approximately 1/16" by grinding.
Shop drawings are not required for this rail.

MATERIAL NOTES:
Galvanize all steel components.
Anchor bolts for base plate must be ⅝" Dia ASTM F3125 Gr A325 or A449 bolts (or ASTM A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements.
Optional adhesive anchorage system must be ⅝" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 ¾". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."
W-beam must 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" (Nominal) lengths and a single rail element of 9'-4 ½" or 6'-3" (Nominal) length.
W-Beam must have slotted holes at 3'-1 ½".
Some part numbers from the "Task Force 13" Guide to Standardized Highway Barrier Hardware have been furnished for quick reference.

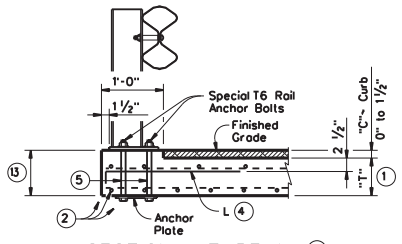
GENERAL NOTES:
This railing has been successfully evaluated by full-scale crash test to meet MASH TL-3 criteria. This railing can be used for speeds of 50 mph and greater.
This rail is designed to deflect approximately 4' to 4'-6" as it contains and redirects the errant vehicle. This rail may not be installed on top of or behind curbs that project above finished grade, on bridges with expansion joints providing more than 5" movement, on retaining walls, or on grade separations and interchanges.
Repairs to impact-damaged post and base plate unit are not permitted. Replace all impact-damaged posts with a new post and base plate unit.
Average weight of railing with no overlay: 20 plf total.

Texas Department of Transportation — Bridge Division Standard

TRAFFIC RAIL

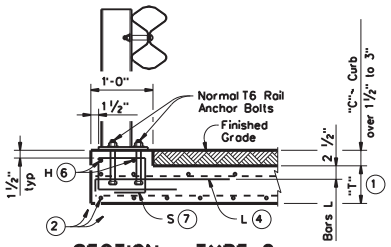
TYPE T631

FILE: rtst038-20.dgn	DN: TxDOT	CK: AES	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS 07-20: Allowing 9'-4 ½" or 6'-3" W-Beam sections.	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		93



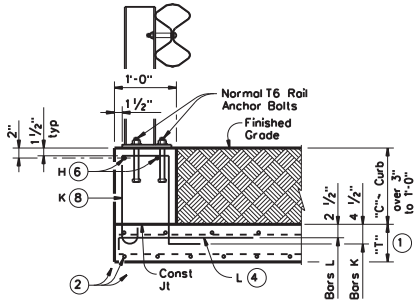
SECTION - TYPE 1 (3)

Used for curbs 1 1/2" and Less
(Showing "C"= 1 1/2")



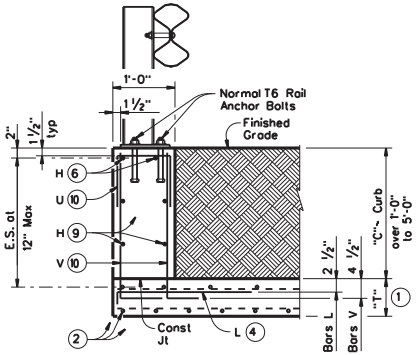
SECTION - TYPE 2

Used for curbs over 1 1/2" to 3"
(Showing "C"= 3")



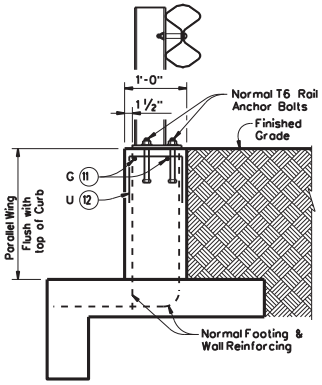
SECTION - TYPE 3

Used for curbs over 3" to 1'-0"
(Showing "C"= 1'-0")



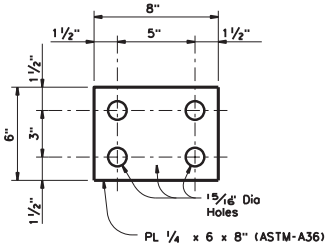
SECTION - TYPE 4

Used for Curbs over 1'-0" to 5'-0"
(Showing "C"= 2'-0")



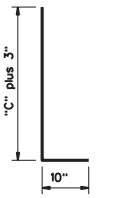
TYPICAL SECTION THRU PARALLEL WINGWALL

Use with all curb heights shown

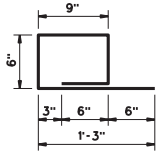


ANCHOR PLATE DETAILS

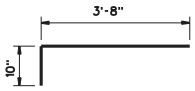
Used at TYPE 1 mountings



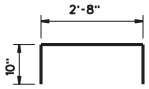
BARS V (#5) (10)
Spaced at 12" Max



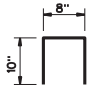
BARS S (#4) (7)
Spaced at 12" Max



BARS L (#5) (4)
Spaced at 12" Max



OPTIONAL BARS L (#5) (4) (12)
Spaced at 12" Max



BARS U (#4) (10)
Spaced at 12" Max

(1) "T" is equal to the culvert top slab thickness. For Precast Boxes with slabs less than 7", see SCP-MD Standard for additional details.

(2) Normal culvert slab bars adjusted as necessary to clear obstructions.

(3) Omit normal culvert curb bars K and H.

(4) Place bars L as shown. Tilt hook as necessary to maintain cover.

(5) 4 ~ 1 1/2" Dia formed holes for 7/8" Dia anchor bolts at each rail post.

(6) Place normal culvert curb bars H (#4) as shown. Adjust as necessary to clear obstructions.

(7) Omit normal culvert curb bars K. Place bars S as shown. Tilt bars S as necessary to maintain cover.

(8) Place normal culvert curb bars K spaced at 12" Max as shown. Tilt bars K as necessary to maintain cover. Refer to box culvert details sheets for bars K details.

(9) Additional bars H (#4) as required to maintain 12" Max Spa.

(10) At TYPE 4 mountings, replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.

(11) Adjust parallel wing bars G to positions shown.

(12) Optional bars L are to be used only for precast box culverts with 3'-0" closure pour.

(13) If "T" plus "C" is greater than 8", provide reinforcement per TYPE 1 mounting and anchor bolts per TYPE 2 mounting.

(14) Quantities shown are for contractor's information only. Quantities are per linear foot of curb length. The values for each section type in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES (14)

Curb Height "C"	Section Type	Conc (CY/LF)	Reinf Steel (Lb/LF)
1 1/2"	1	0.005	4.7
3"	2	0.009	8.4
6"	3	0.019	8.9
1'-0"	3	0.037	8.9
1'-6"	4	0.056	14.3
2'-0"	4	0.074	15.4
2'-6"	4	0.093	17.7
3'-0"	4	0.111	18.8
3'-6"	4	0.130	21.2
4'-0"	4	0.148	22.2
4'-6"	4	0.167	24.6
5'-0"	4	0.185	25.6

GENERAL NOTES:

The T6 rail was evaluated based on the results of previous crash tests and approved for a NCHRP Report 350 TL-2 rating. The T6 rail is only approved for low speed use, design speeds of 45 mph and less.

See Type T6 rail standard for notes and details not shown. These box culvert mounting details are not suitable for mounting other rail types.

Galvanize all steel components except reinforcing, unless otherwise shown on plans.

All reinforcing must be Grade 60. Adjust reinforcing as necessary to provide 1 1/4" cover.

All concrete must be of the same Class and strength as the box culvert top slab.

The Curb is considered part of the Box Culvert for payment.

For vehicle safety, the top of the curb shall be flush with the finished grade.

SPECIAL NOTE:

These details are for use with curbs that are 5'-0" tall and less only. Curb heights that are less than or greater than those shown will require special design.

The use of the T6 rail is restricted to design speeds of 45 mph or less.

LEVELS DISPLAYED | ACC:

Texas Department of Transportation
Bridge Division

BOX CULVERT MOUNTING DETAILS FOR TYPE T6 RAIL
(CURBS 5'-0" TALL AND LESS ONLY)

T6-CM

FILE: rlstde22.dgn	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2010	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS	22			94
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	LASALLE,ETC.	6417	14	001	VARIOUS

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

10. 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

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
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9-07 8-14				
5-10 5-21	22	LASALLE,ETC.		95

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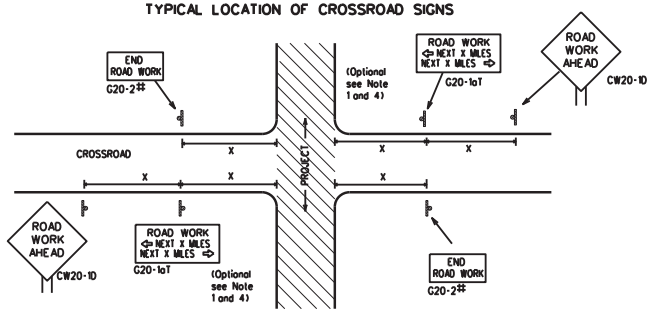
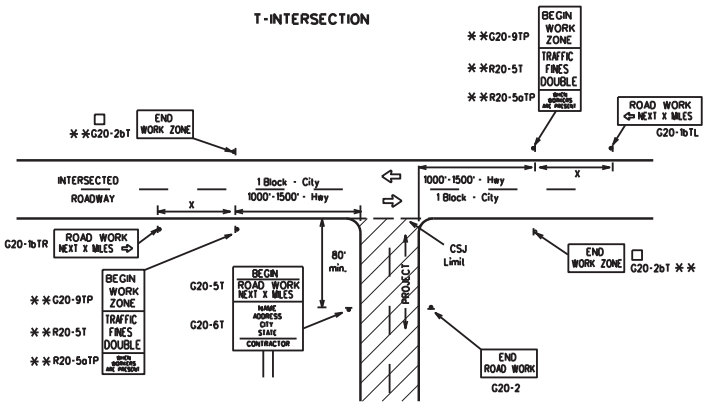
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING

1.5.6

SIZE

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

SPACING

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

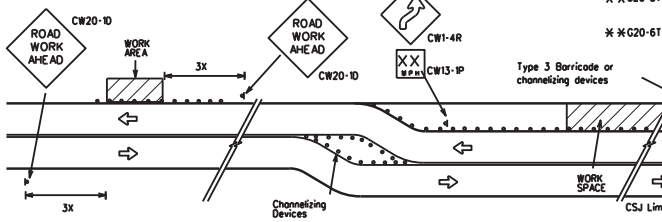
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

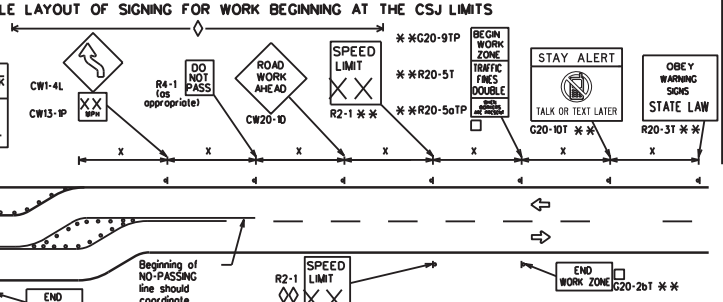
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

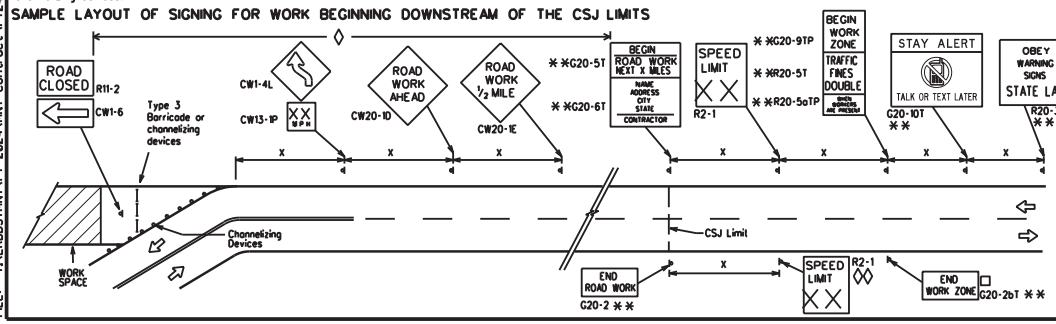


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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



NOTES

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

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

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

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

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

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

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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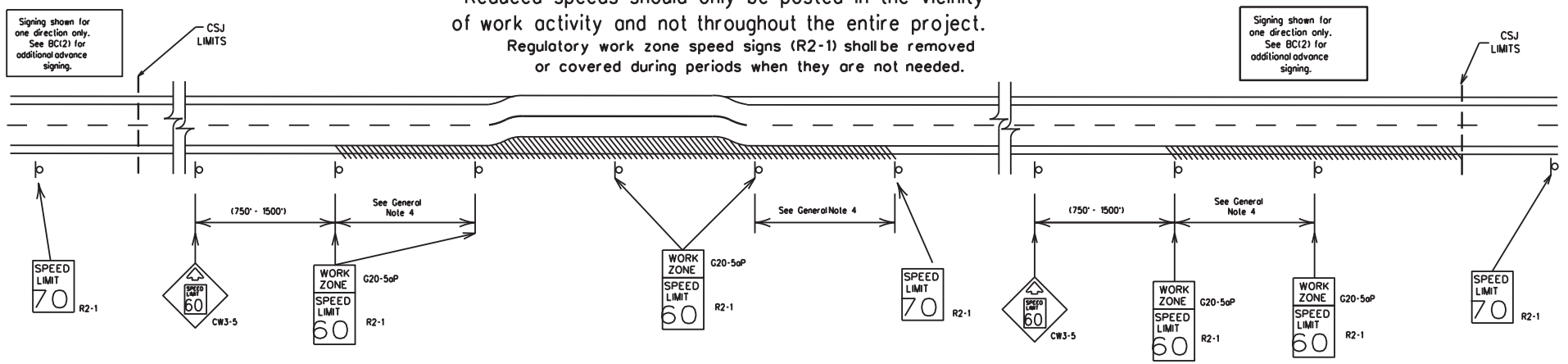
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

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BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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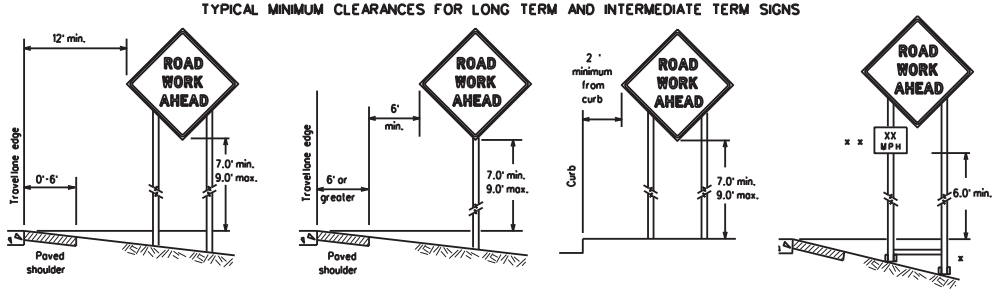
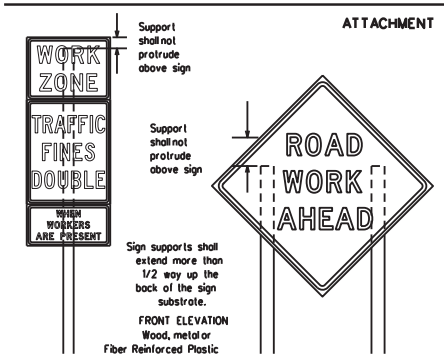
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



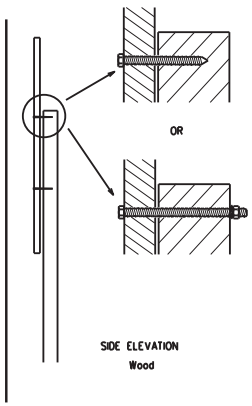
x When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

x x When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travellane. 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 spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

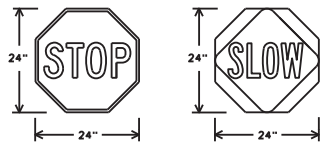


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

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BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	22	LASALLE,ETC.		98

98

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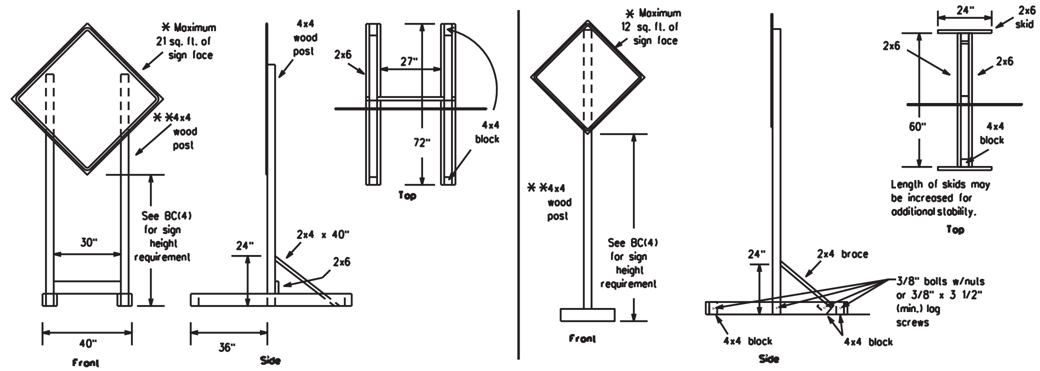
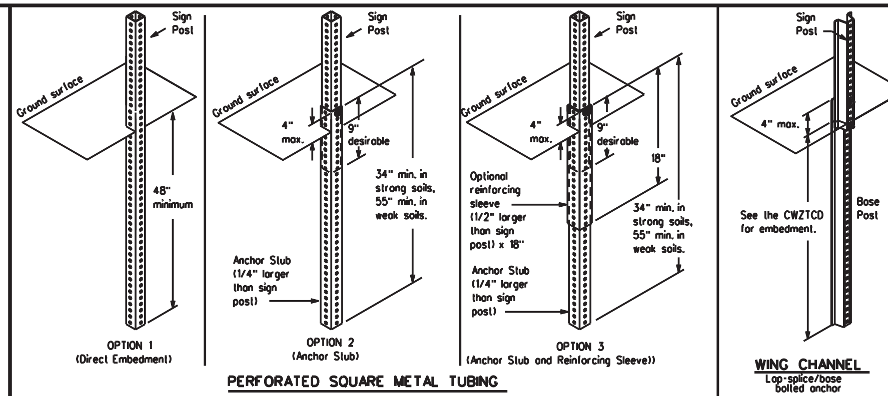


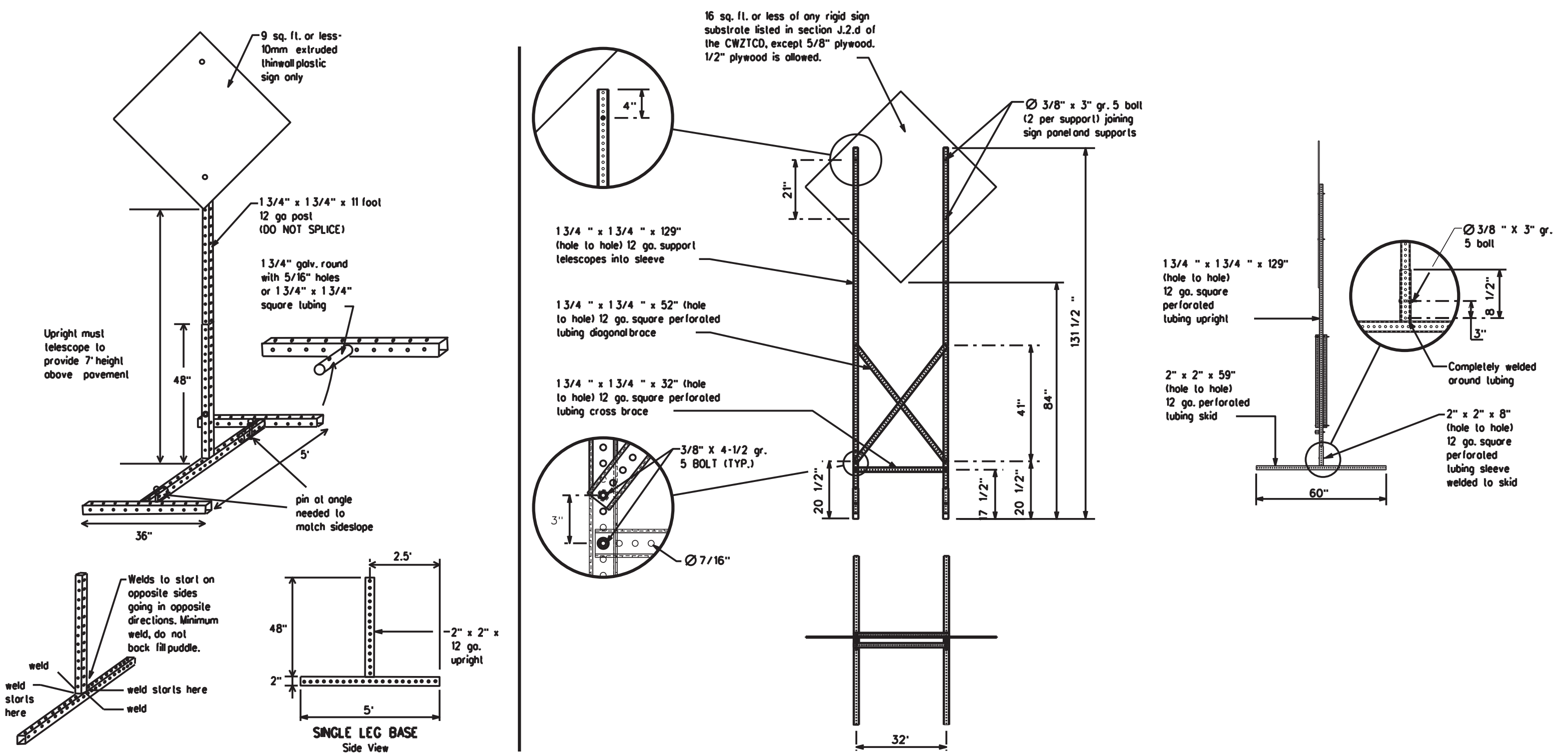
SKID MOUNTED WOOD SIGN SUPPORTS

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



GROUND MOUNTED SIGN SUPPORTS

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



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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 pointed while.

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

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BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS		6417	14	001	VARIOUS
9-07	8-14	DIST		COUNTY	SHEET NO.
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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *
XXXXXXXX BLVD CLOSED			

* 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		Location List	Warning List	x x Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

x x See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

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BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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REVISIONS	6417	14	001	VARIOUS
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	22	LASALLE,ETC.		100

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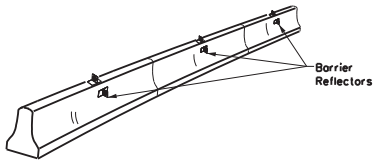
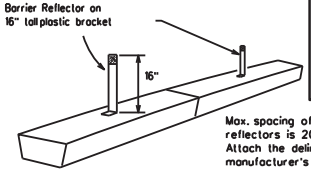
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

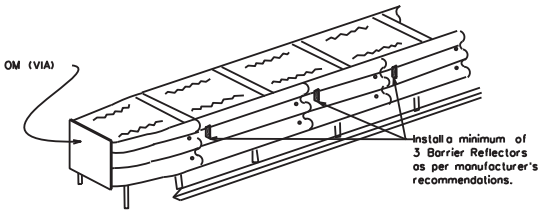


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

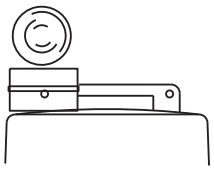


DELINEATION OF END TREATMENTS

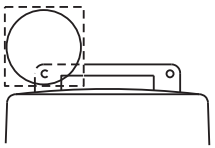
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the 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



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

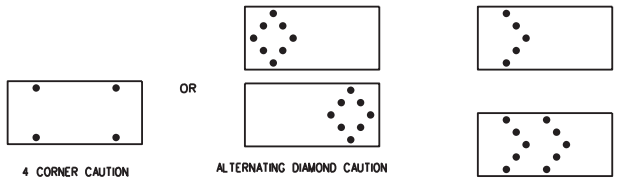
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



4 CORNER CAUTION

ALTERNATING DIAMOND CAUTION

DOUBLE ARROW

RIGHT/LEFT ARROW (right arrow shown; left is similar)

RIGHT/LEFT SEQUENTIAL CHEVRON (right chevron shown; left is similar)

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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	6417	14	001	VARIOUS
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

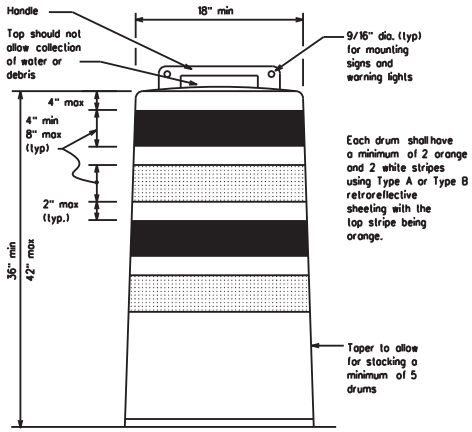
1. Plastic drums shall be a two-piece design: the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

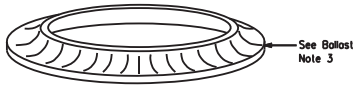
RETROREFLECTIVE SHEETING

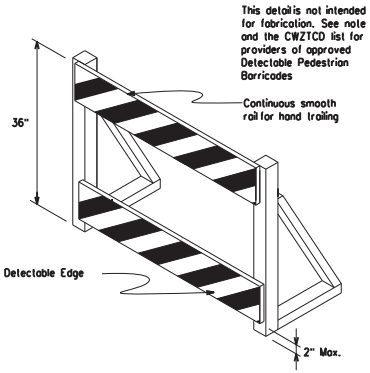
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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







DETECTABLE PEDESTRIAN BARRICADES

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

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

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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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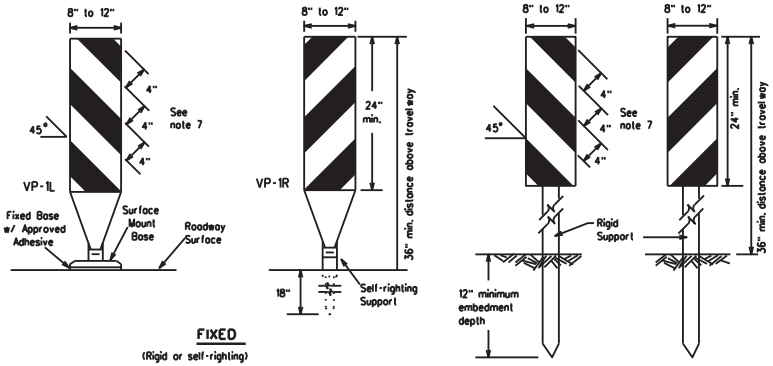
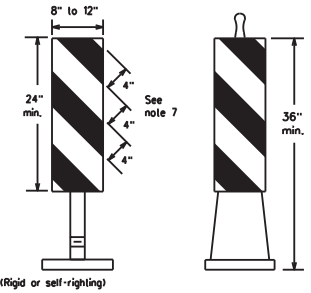
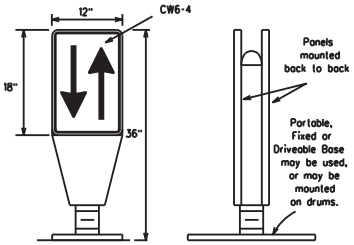




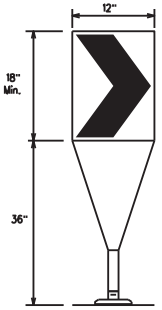
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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 or Type C conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

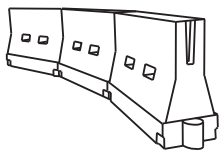


1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of 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 or Type C conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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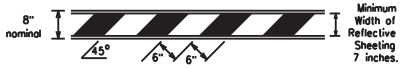
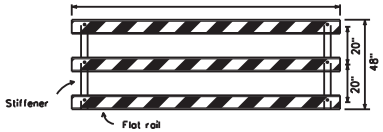
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



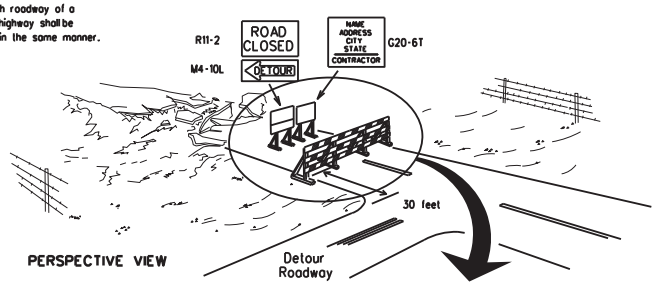
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

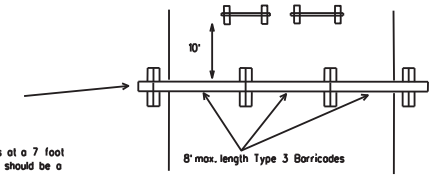
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

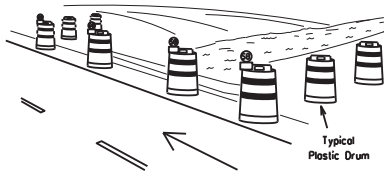
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

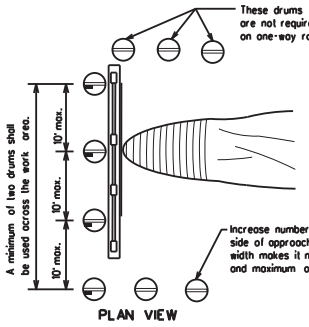
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

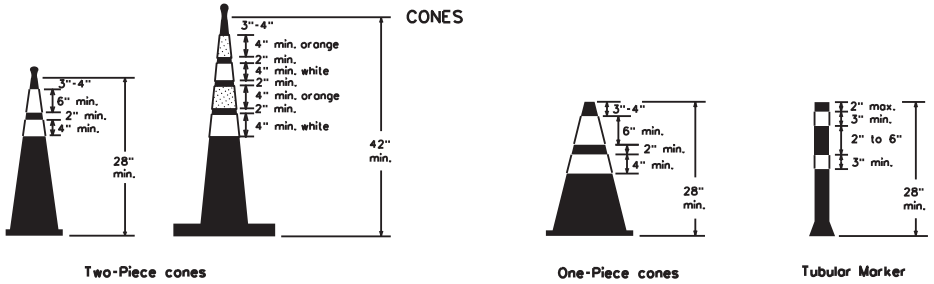
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

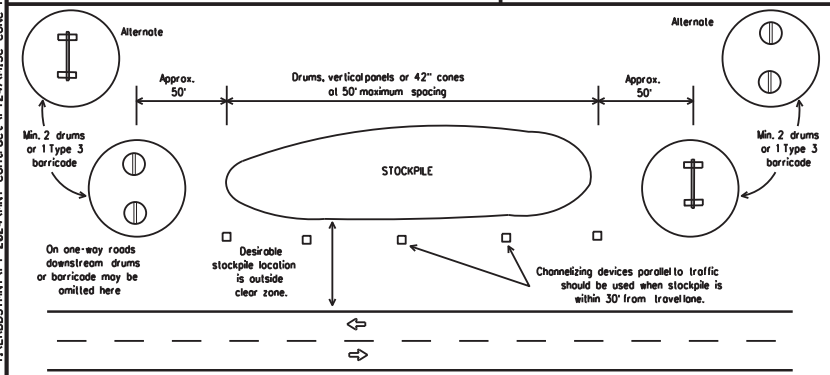
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones

One-Piece cones

Tubular Marker



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

28" Cones shall have a minimum weight of 9 1/2 lbs.

42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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

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7-13 5-21	22	LASALLE,ETC.		104

104

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

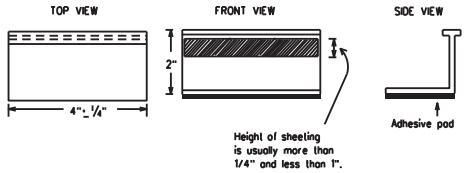
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21 1-02 7-13 11-02 8-14	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		105

105

DATE: 12/19/2023 4:23:36 PM
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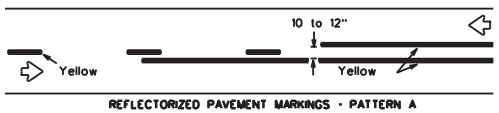
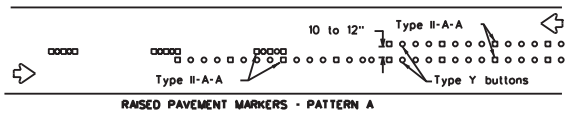
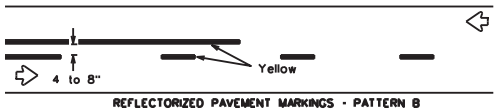
PAVEMENT MARKING PATTERNS



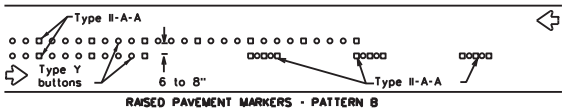
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



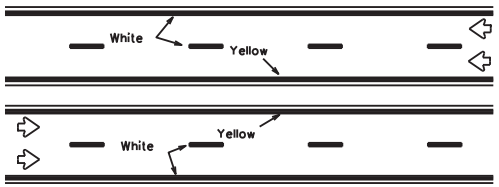
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



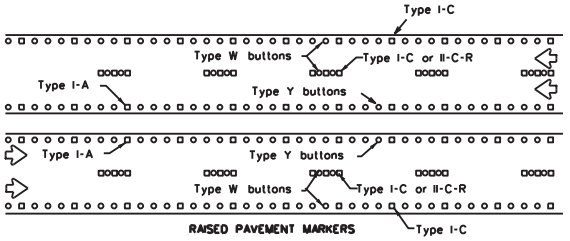
RAISED PAVEMENT MARKERS - PATTERN B

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

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



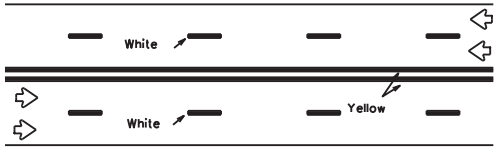
REFLECTORIZED PAVEMENT MARKINGS



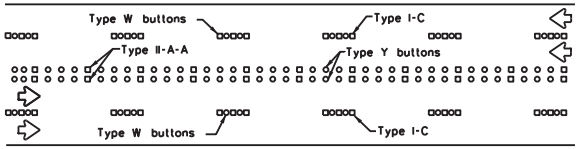
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



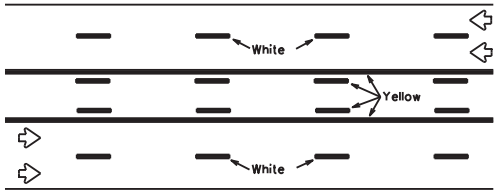
REFLECTORIZED PAVEMENT MARKINGS



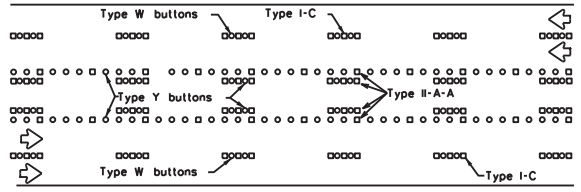
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

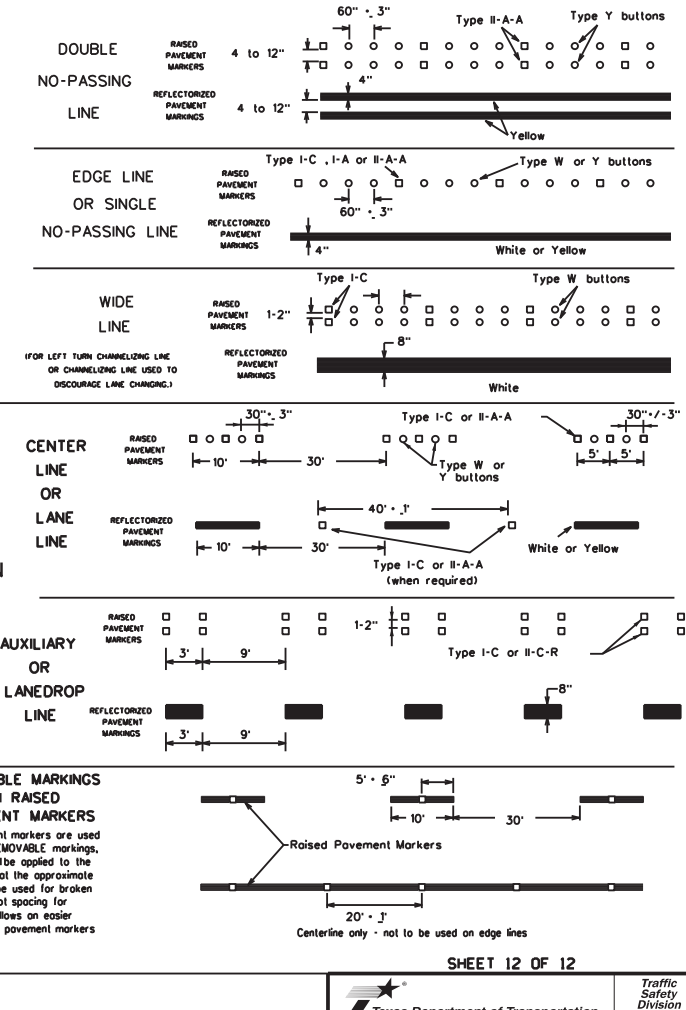


RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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

Centerline only - not to be used on edge lines

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		106

106

DATE: 12/19/2023 4:23:37 PM
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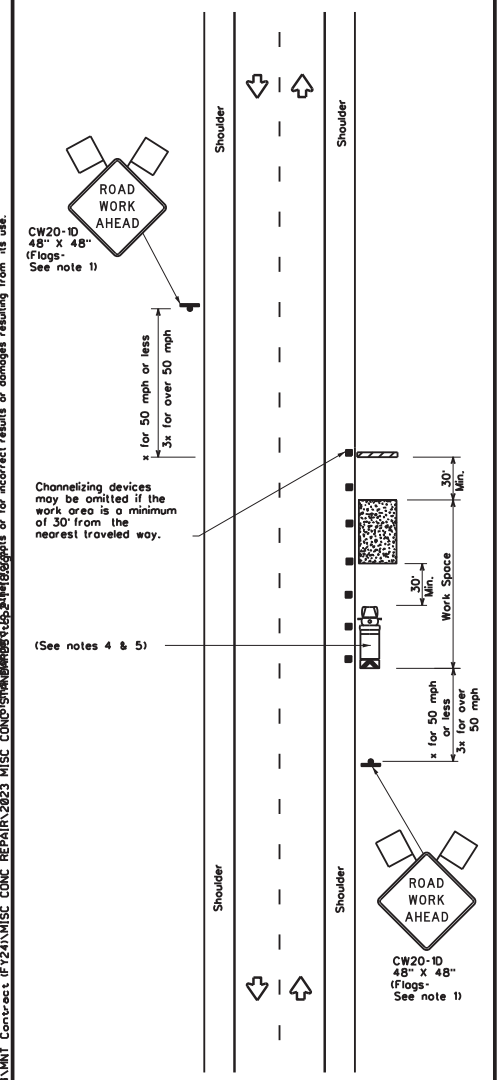
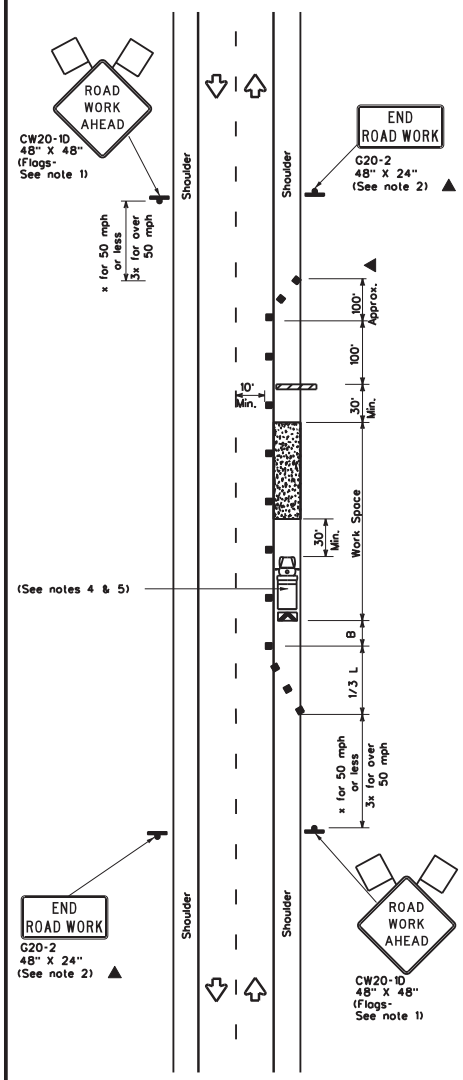


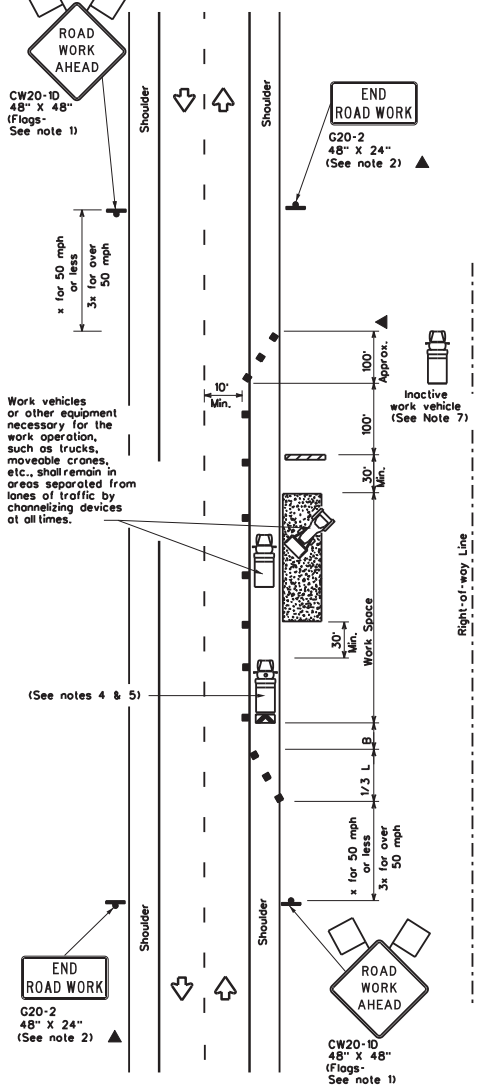
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

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 in the plans, or for routine maintenance work, when approved by the Engineer.
3. Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
4. 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.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
8. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12				
1-97 2-18	22	LASALLE,ETC.		107

161

DATE: 12/19/2023 4:23:37 PM
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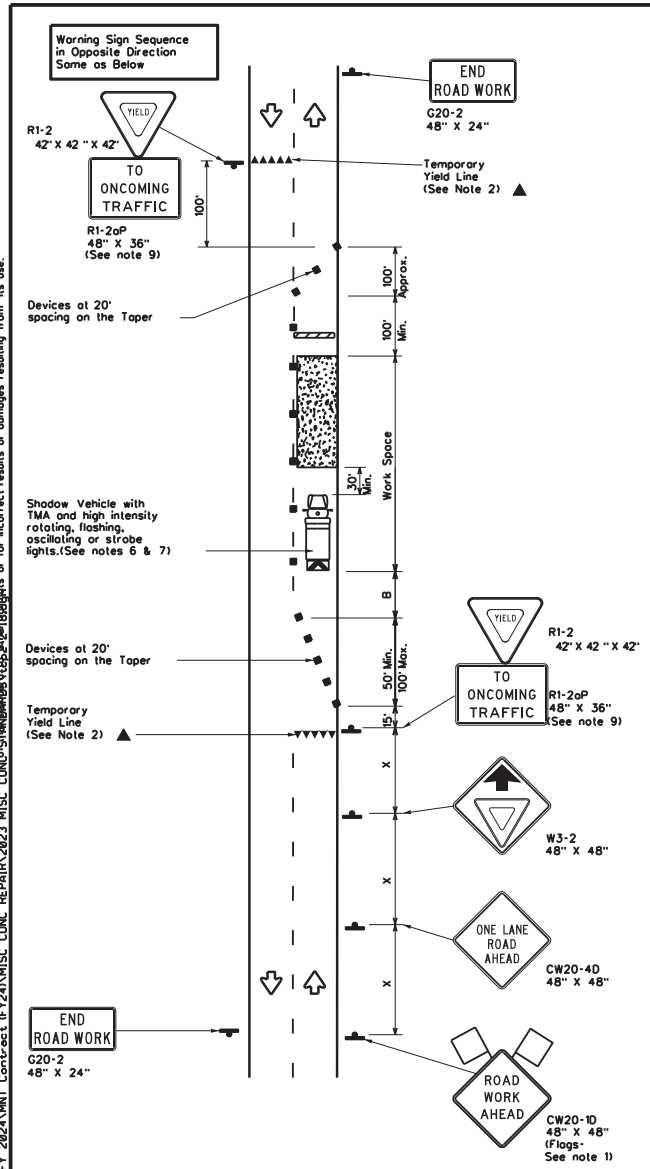
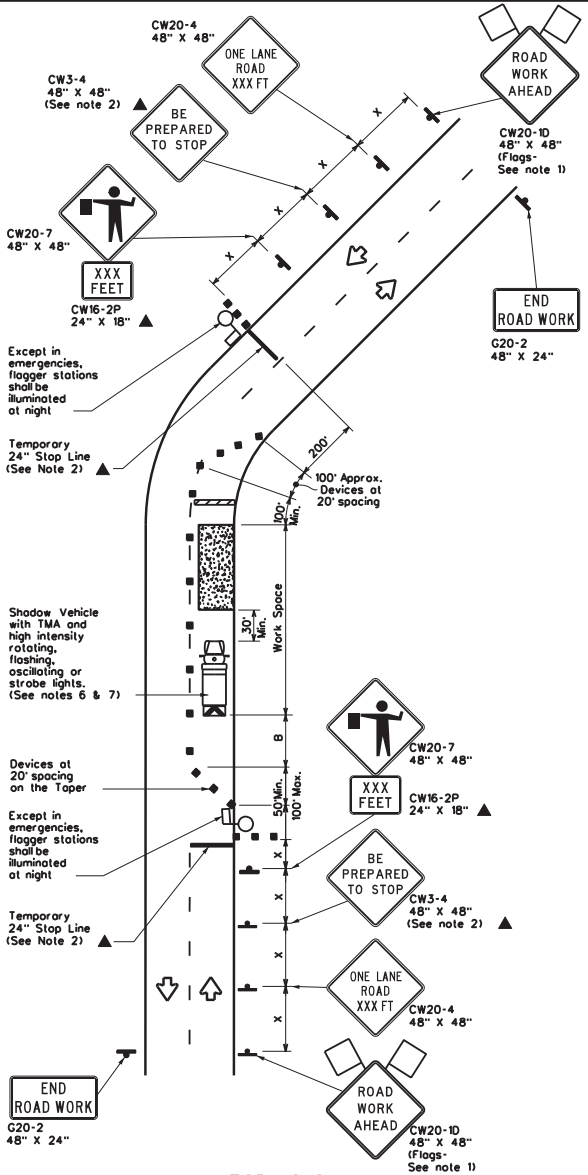


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths * * 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
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 CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
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 a wider work space.

TCP (2-2a)

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

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 / 1-97 2-12 / 4-98 2-18	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		108

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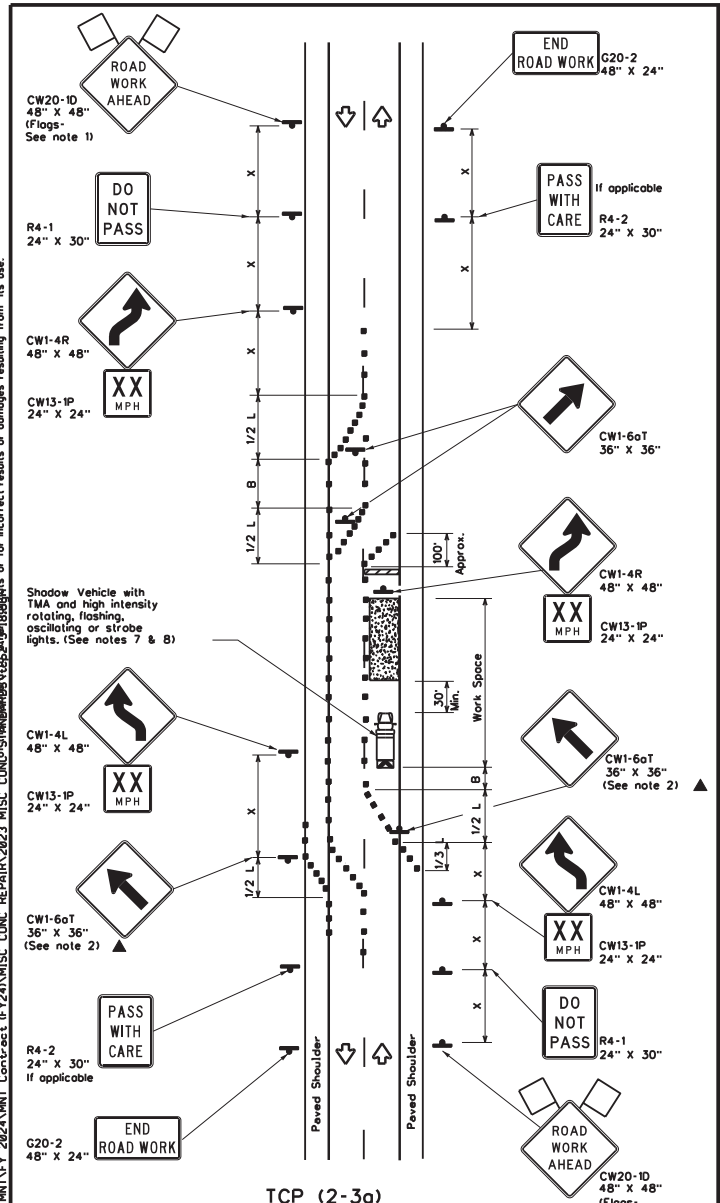
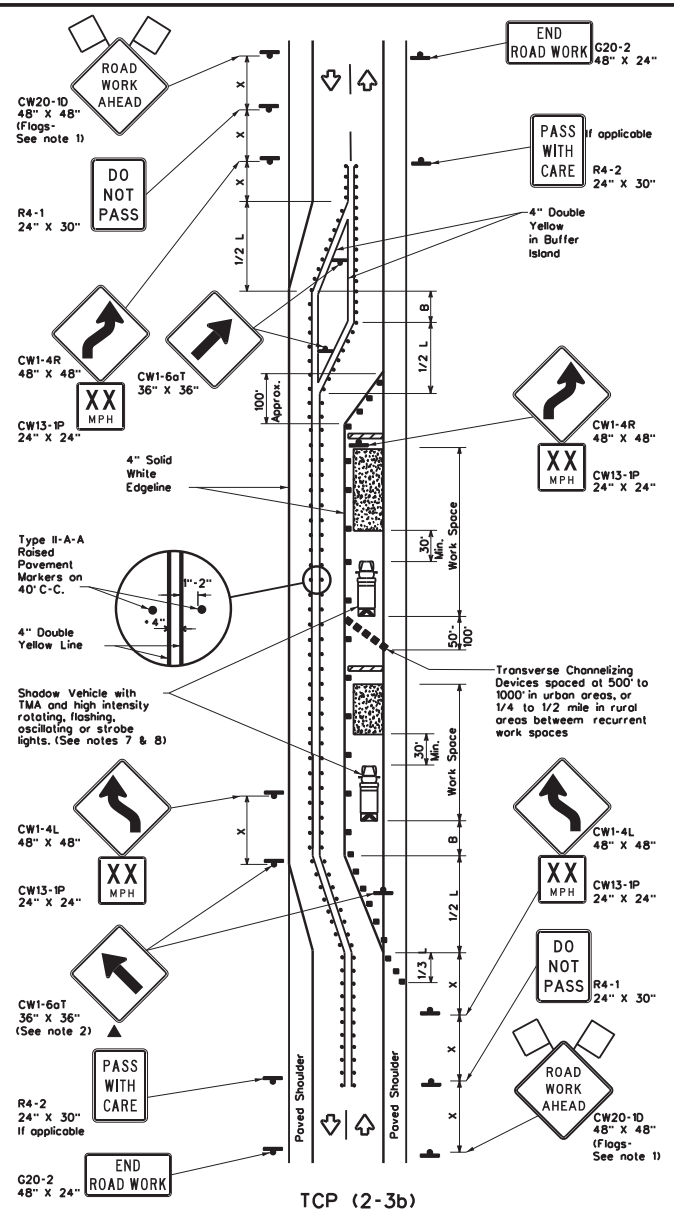


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Raised Pavement Markers Ty II-AA
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed 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'

x Conventional Roads Only

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
				TCP(2-3b)ONLY
			✓	✓

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. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. 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.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

9. Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	22	LASALLE,ETC.		109
4-98 2-18				

16.3

DATE: 12/19/2023 4:23:38 PM
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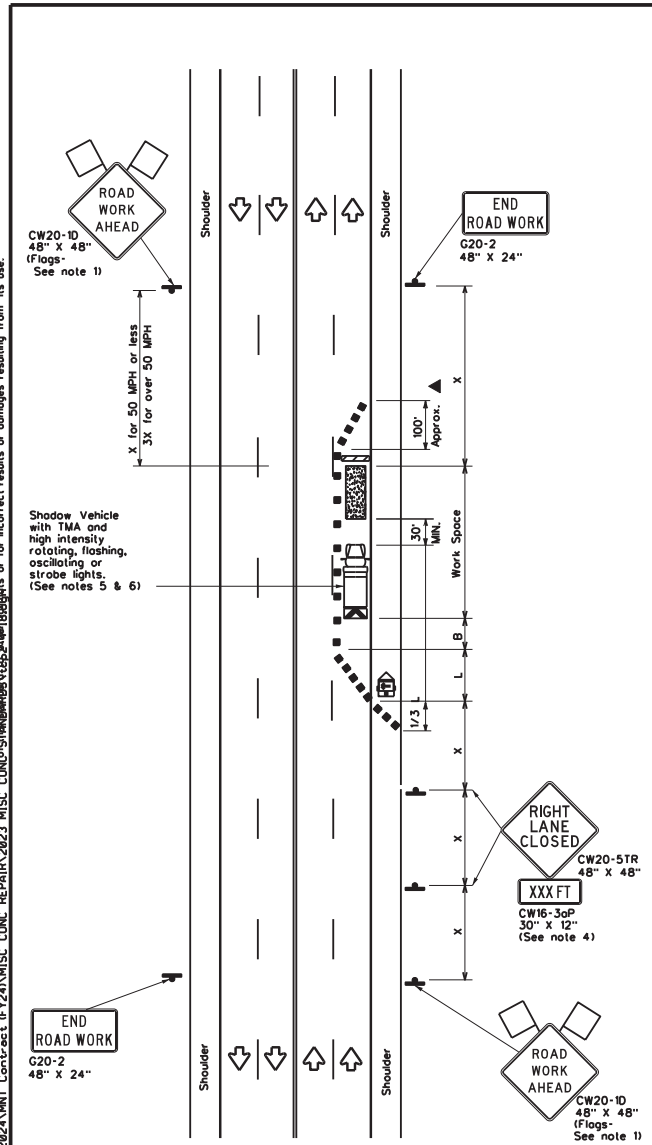
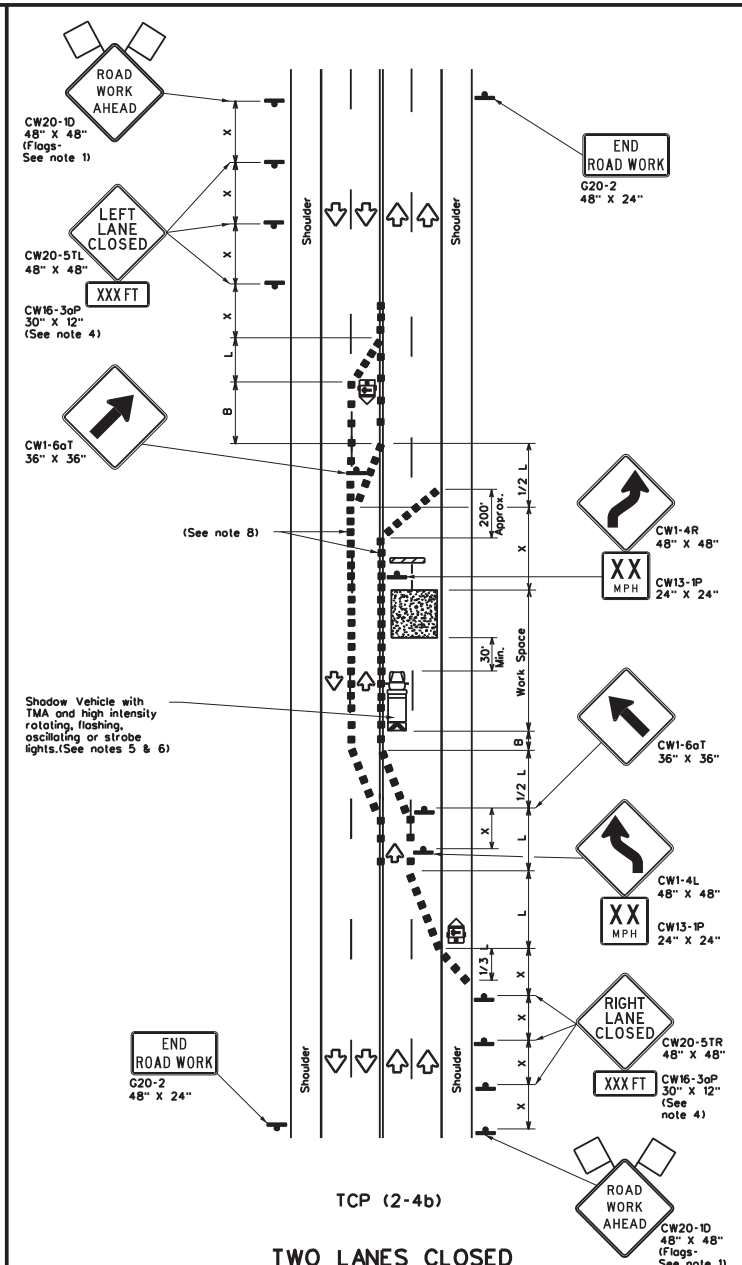


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

x Conventional Roads Only

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

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

GENERAL NOTES

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 downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
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 in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

7. 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 to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-4b)

8. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This lighter devices spacing is intended for the area 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(2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		110

164

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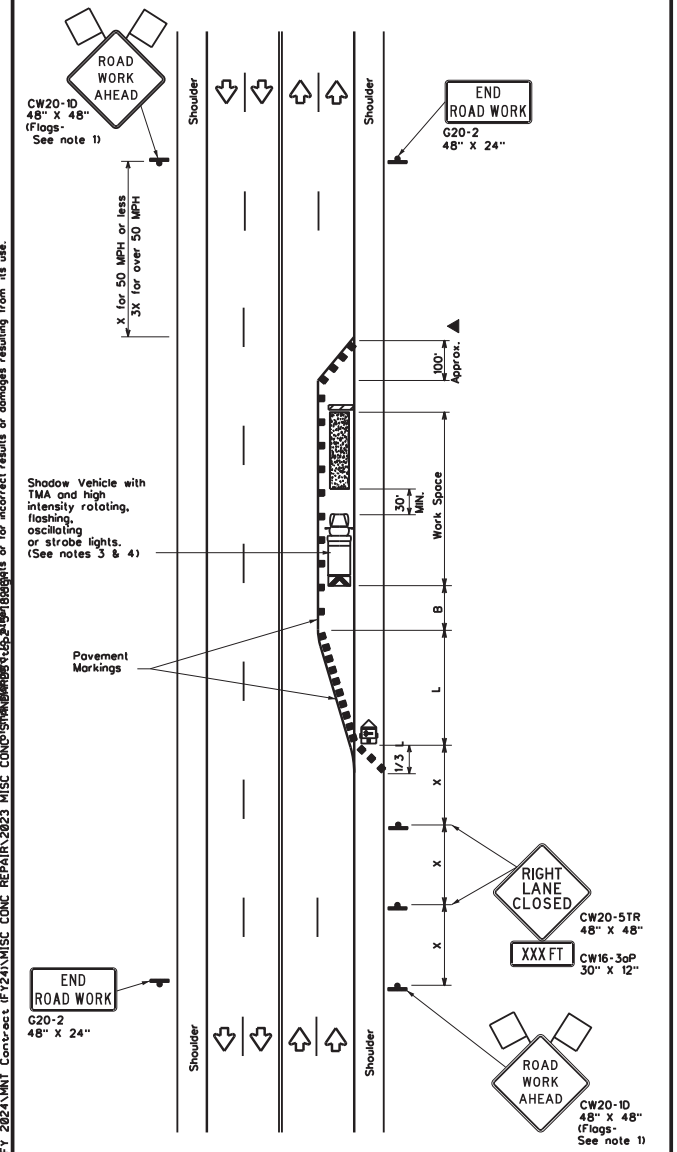
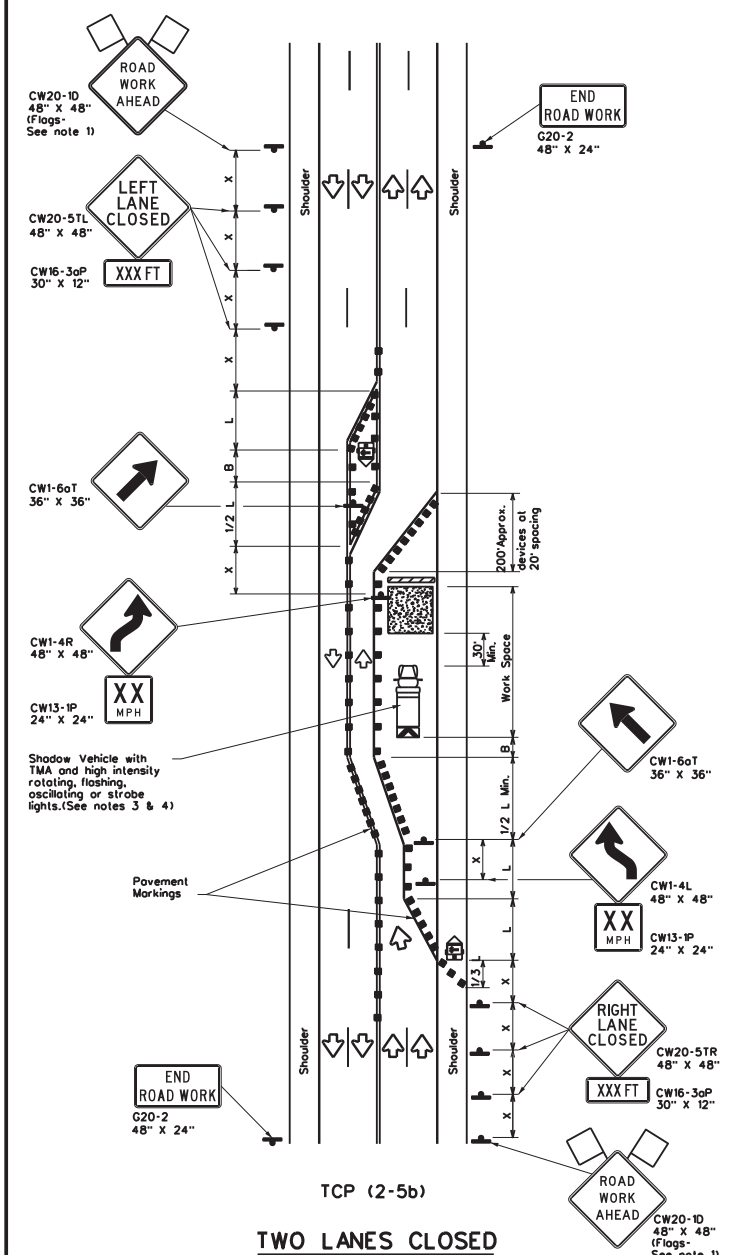


TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

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. 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 eposure 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 substitutued for the Shadow Vehicle and TMA.
4. 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.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

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

TCP (2-5b)

7. Conflicting pavement markings shall be removed for long-term projects.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

TCP(2-5)-18

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REVISIONS 8-95 2-12	6417	14	001	VARIOUS
1-97 3-03	DIST	COUNTY		SHEET NO.
4-98 2-18	22	LASALLE,ETC.		111

165

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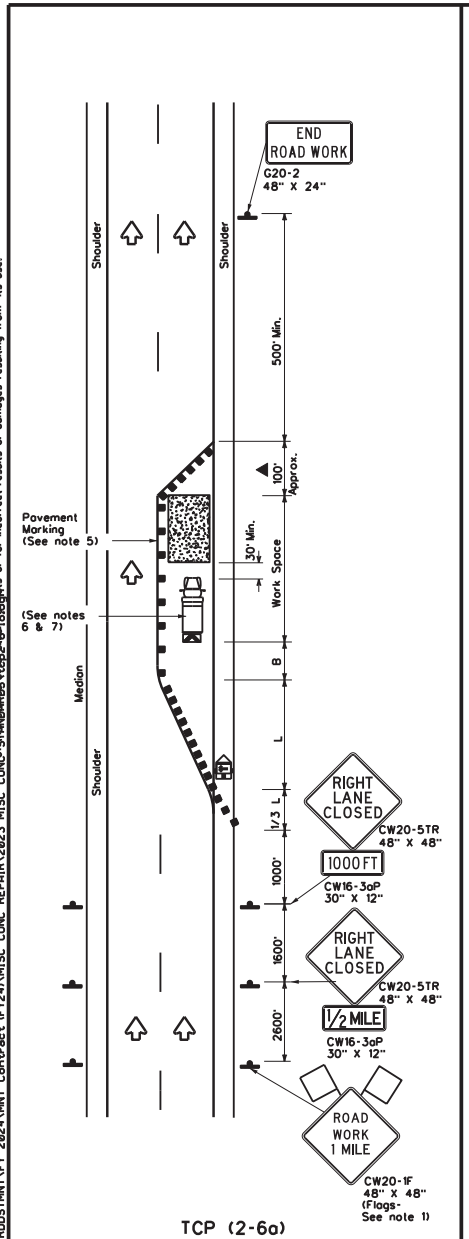
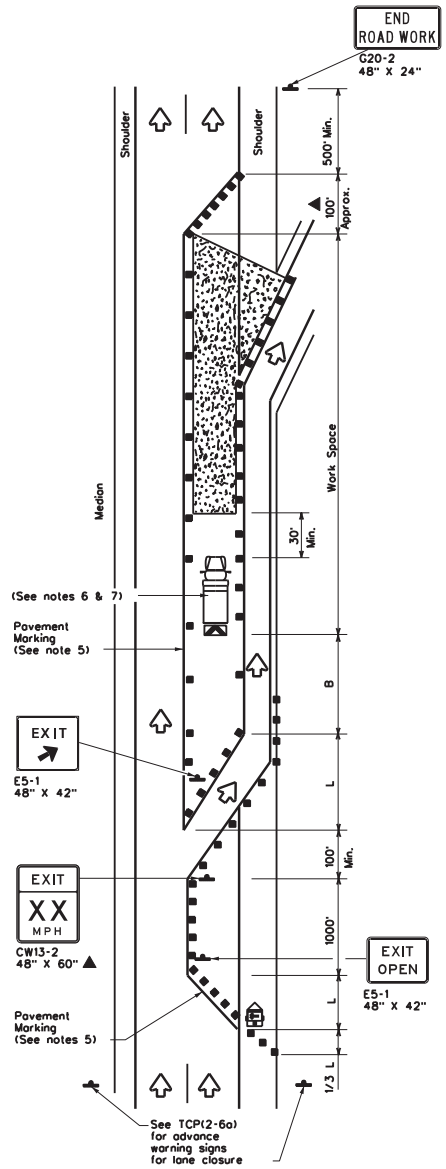


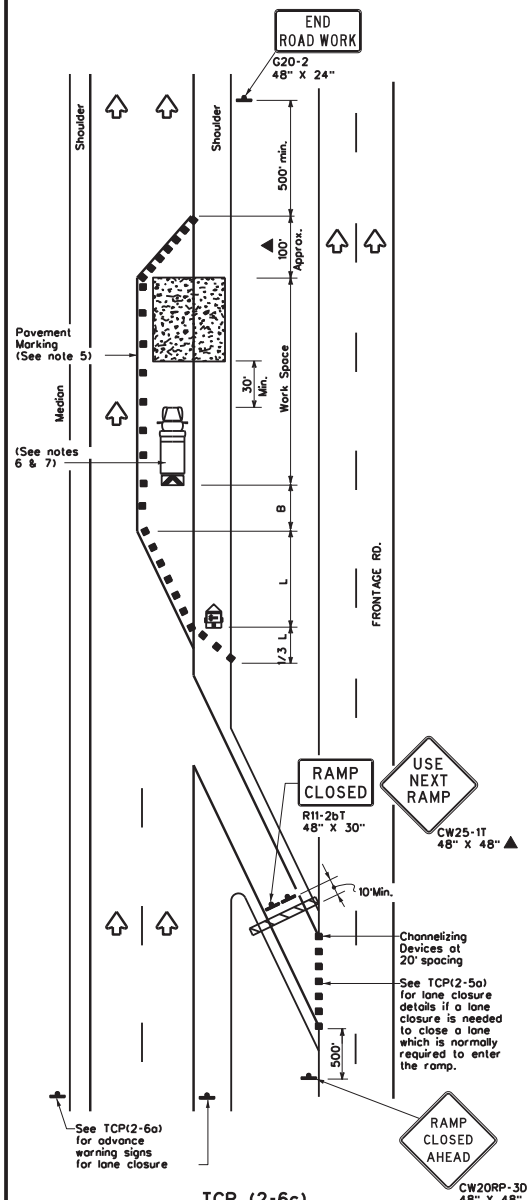
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

x Conventional Roads Only

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

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

GENERAL NOTES

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. 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.
4. Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on everyother channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
5. The placement of pavement markings may be omitted on intermediate-term stationary work zones with the approval of the Engineer.
6. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. 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.
7. 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.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

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REVISIONS		6417	14	001	VARIOUS
2-94 4-98		DIST	COUNTY		SHEET NO.
8-95 2-12		22	LASALLE,ETC.		112
1-97 2-18					

166

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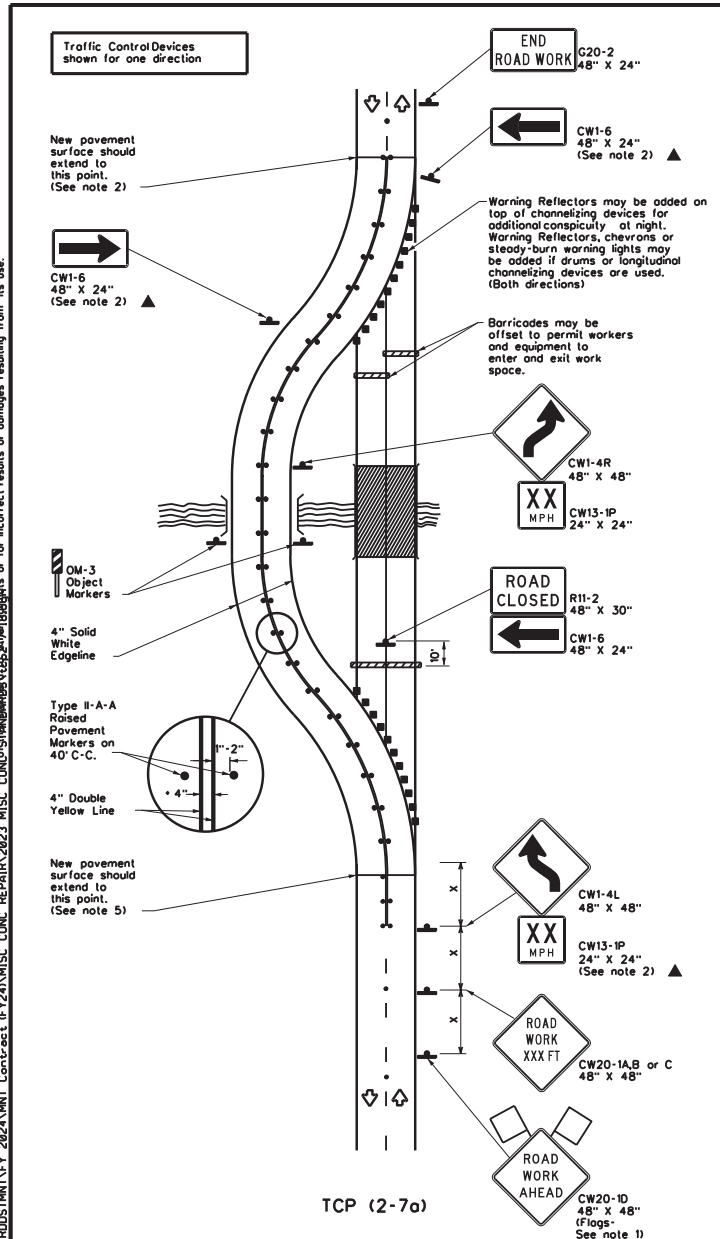
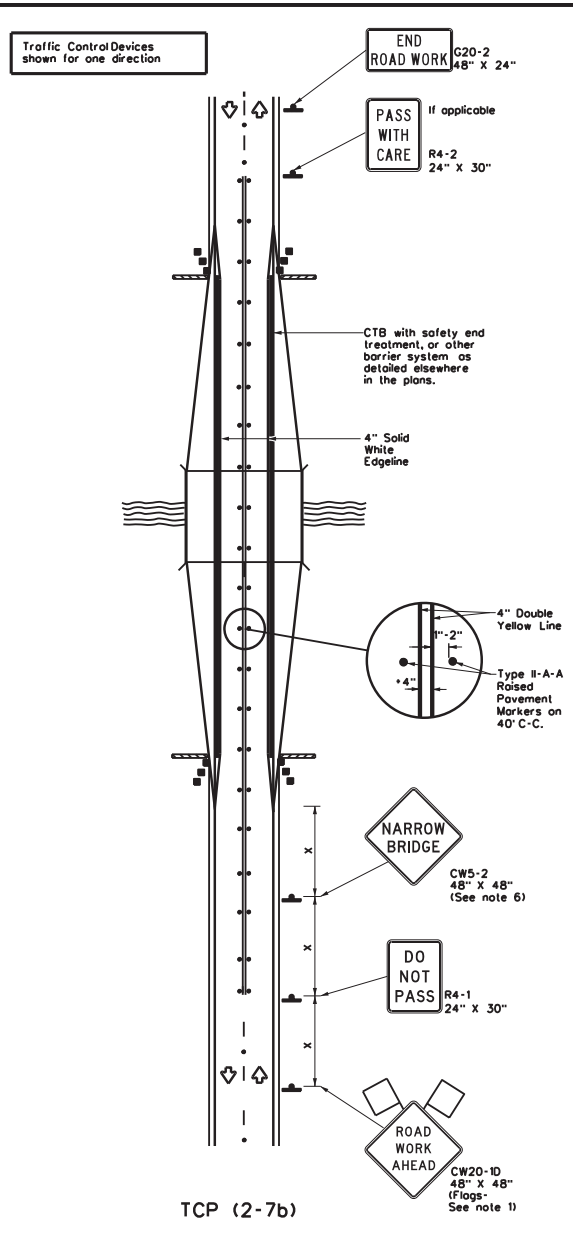


TCP (2-7a)

ROADWAY DIVERSION



TCP (2-7b)

BRIDGE WIDENING

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Raised Pavement Markers Ty II-AA
	Sign		Traffic Flow
	Flag		Flagger

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

* Conventional Roads Only

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

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

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.

TCP (2-7a)

3. Raised pavement markers shall be placed 40 feet c-c on centerline throughout project.
4. Roadway diversion design requirements should be based on posted speed limit or prevailing speed.
5. New pavement surface should be extended across existing roadway edge to a point where existing pavement markings left in place during project do not conflict with construction area pavement marking.

TCP (2-7b)

6. The CW5-2 "Narrow Bridge" sign may be omitted if lane and shoulder widths are maintained.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN DIVERSIONS AND NARROW BRIDGES

TCP(2-7)-18

FILE: tcp2-7-18.dgn	DN:	CK:	DW:	CK:
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REVISIONS 8-95 3-03	6417	14	001	VARIOUS
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	22	LASALLE,ETC.		113

167

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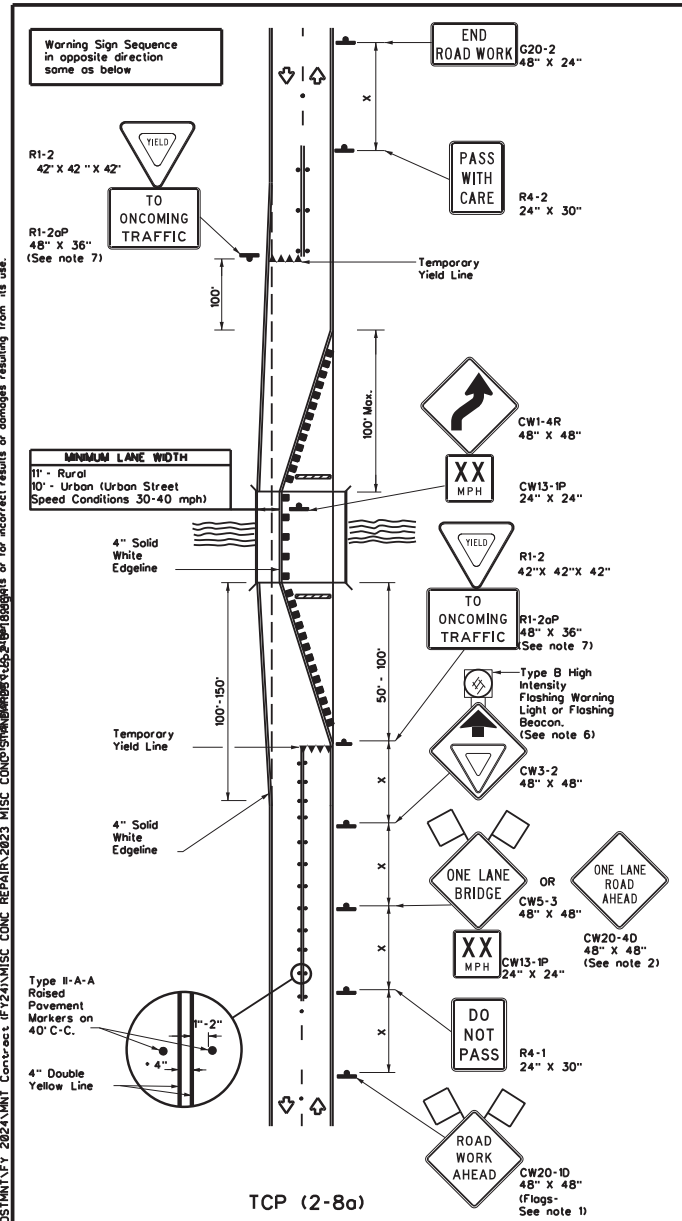
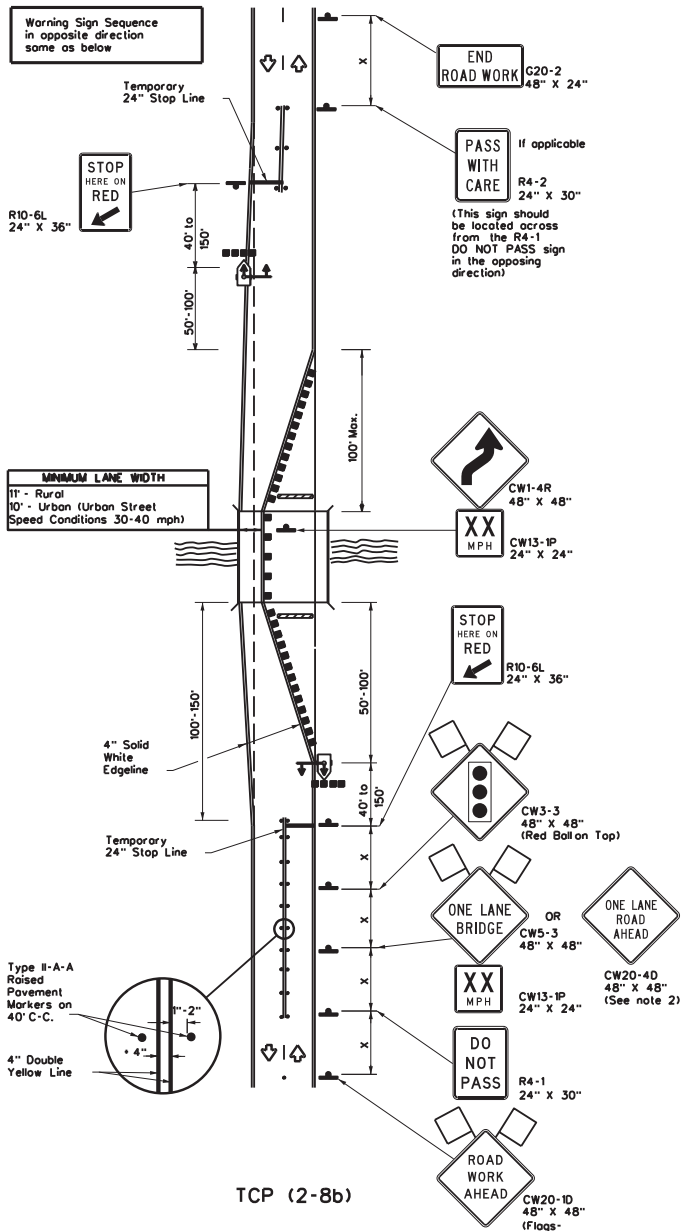


TCP (2-8a)

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



TCP (2-8b)

ONE LANE TWO-WAY
TRAFFIC CONTROL WITH TRAFFIC SIGNAL

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths * * 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
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. When this TCP is used at a location which does not involve a bridge, a 48" x 48" CW20-4D "ONE LANE ROAD AHEAD" signs should be used in lieu of the CW5-3 "ONE LANE BRIDGE" signs. The CW13-1P Advisory Speed Plaque is required with either warning sign.
3. Raised pavement markers shall be placed 40 feet c-c on centerline between DO NOT PASS signs and stop or yield lines.
4. For intermediate term situations, when it is not feasible to remove and restore pavement markings, the channelization must be made dominant by using a very close spacing. This is especially important in locations of conflicting information, such as where traffic is directed over a double yellow centerline. In such locations a maximum channelizing device spacing of 20 feet is recommended. The 20 foot channelizing device spacing recommendation is intended for the area of conflicting information and not the entire work zone.

TCP (2-8a)

5. Traffic control by CW3-2 "YIELD AHEAD" symbol signs for one lane two-way traffic control operations should be limited to work spaces less than 400 feet long and roadways with less than 2000 ADT. Otherwise, portable traffic signals should be used.
6. If power is available, a flashing beacon should be attached to the CW3-2 "YIELD AHEAD" symbol sign for emphasis.
7. The R1-2 "YIELD" and R1-2aP "TO ONCOMING TRAFFIC" signs and other regulatory signs shall be installed at 7 foot minimum mounting height.

TCP (2-8b)

8. A list of approved Portable Traffic Signals can be found in the "Compliant Work Zone Traffic Control Devices" list.
9. Portable traffic signals should be located to provide adequate stopping sight distance for approaching motorist (See table above).

Texas Department of Transportation

Traffic Operations Division Standard

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

TCP(2-8)-18

FILE: tcp2-8-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
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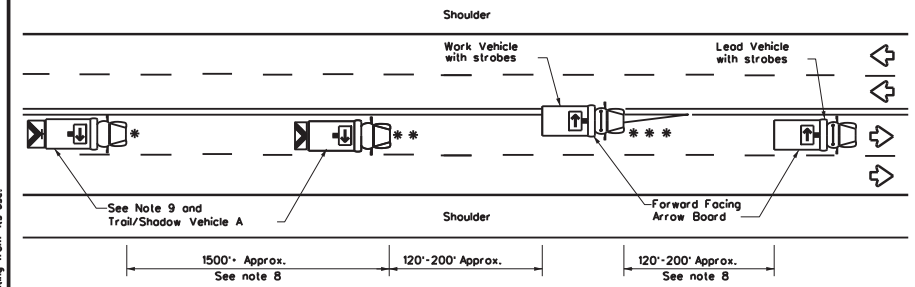
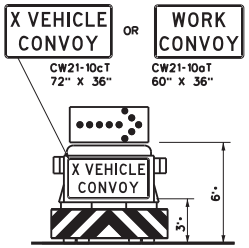
1-97 2-12	22	LASALLE,ETC.		114
4-98 2-18				

168



TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY

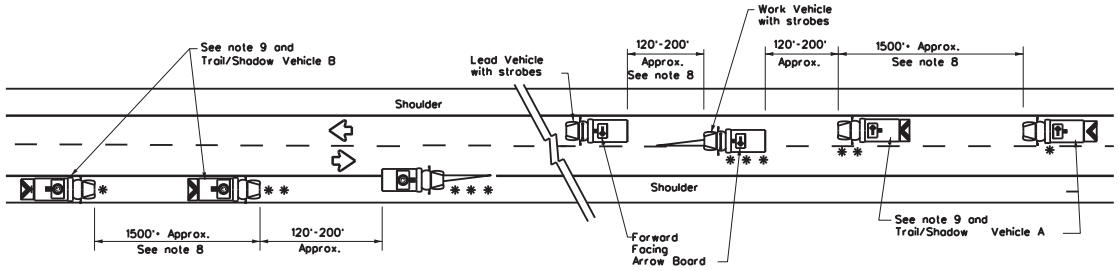


TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

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
✓				

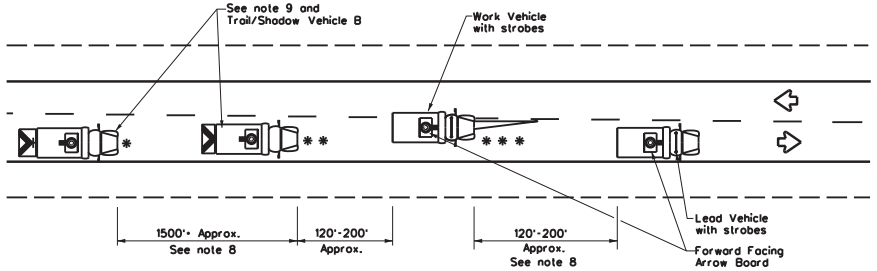


WORK ON SHOULDER

WORK ON TRAVEL LANE

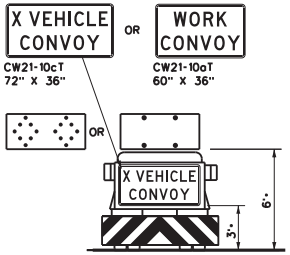
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS

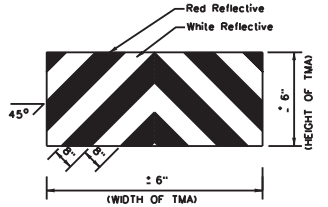


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in CAUTION display

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.



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 2-94 4-98 8-95 7-13 1-97	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		115

175

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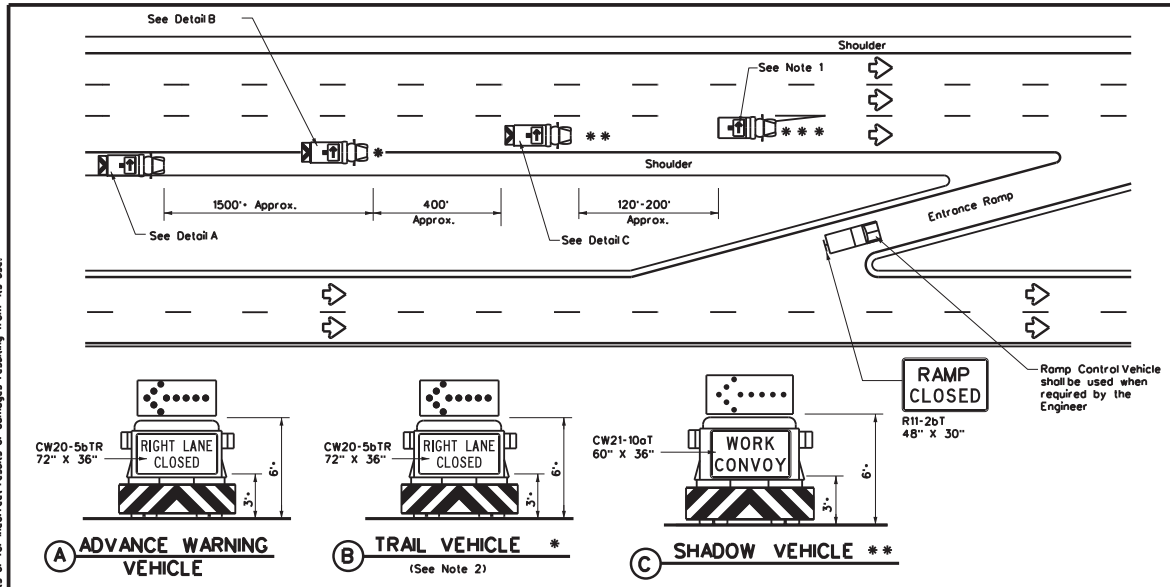
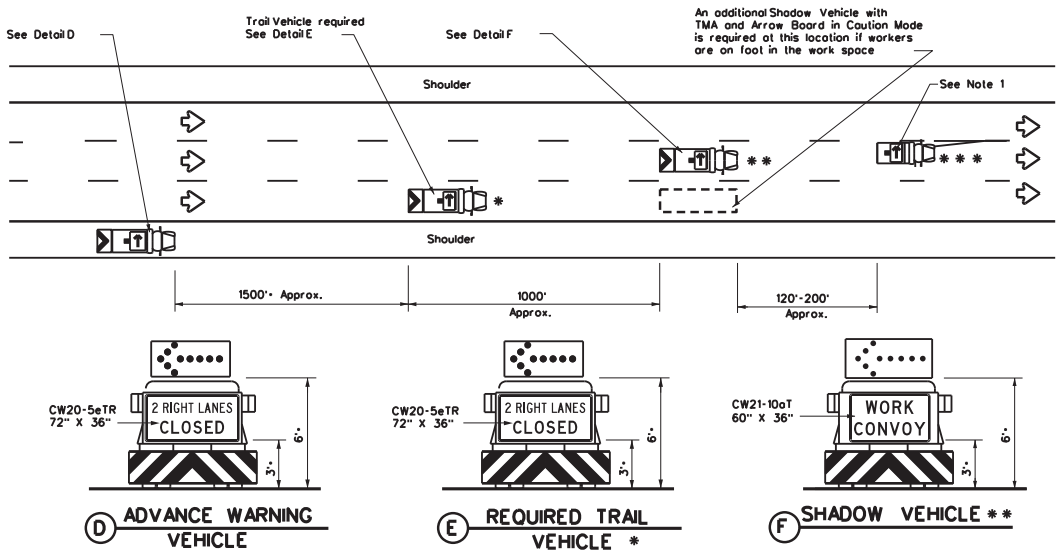


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



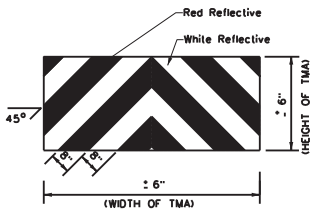
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

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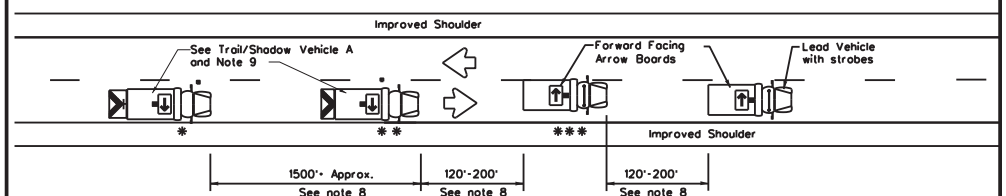
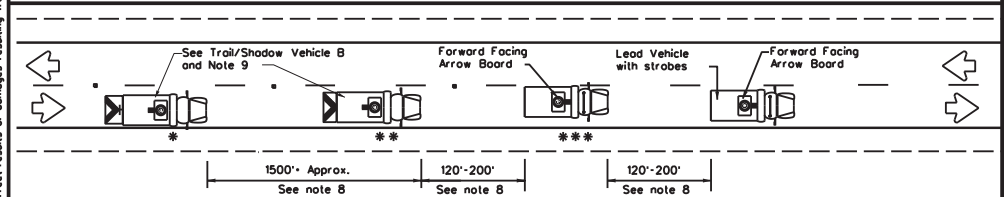
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	6417	14	001	VARIOUS
	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		116

176



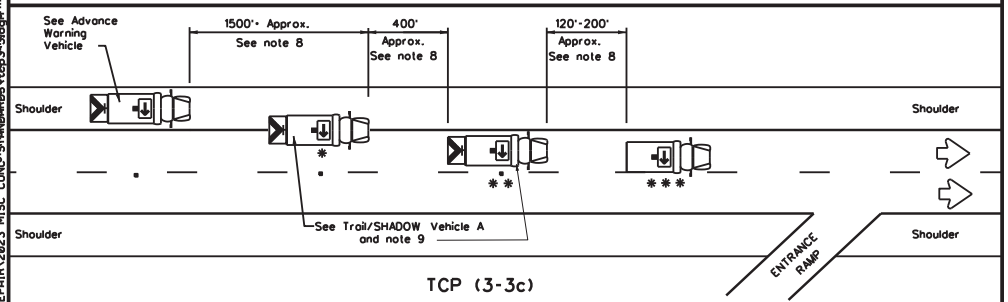
TCP (3-3a)

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



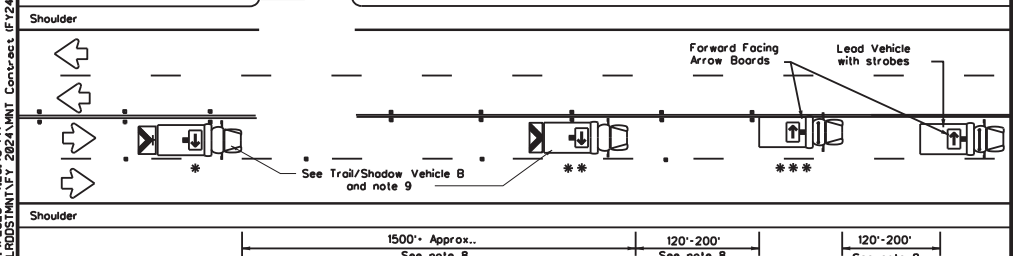
TCP (3-3b)

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



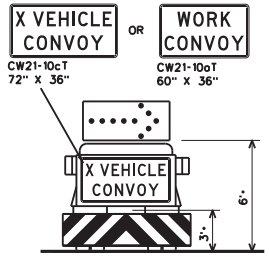
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



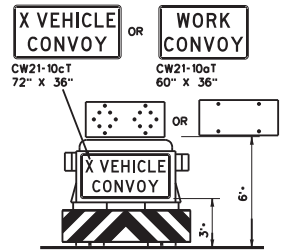
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



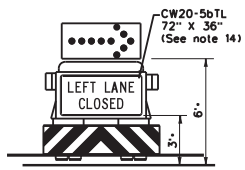
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

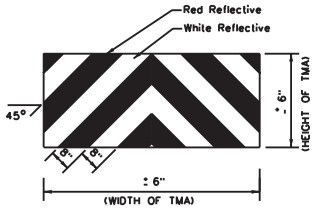


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

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

FILE:	tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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2-94 4-98		DIST	COUNTY		SHEET NO.
8-95 7-13		22	LASALLE,ETC.		117
1-97 7-14					

177

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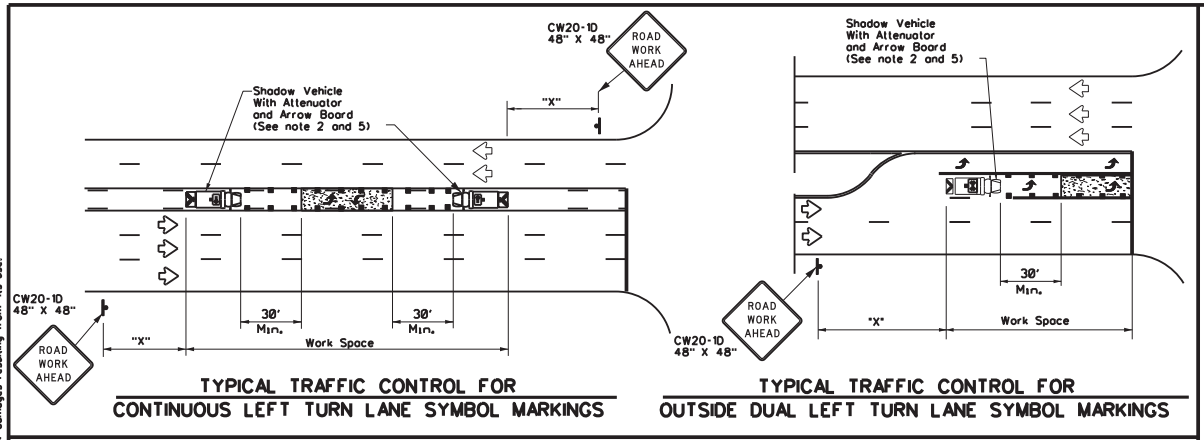
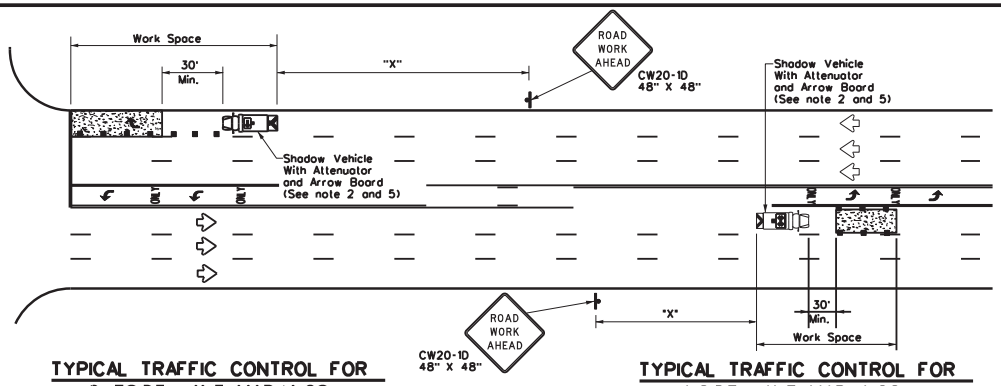


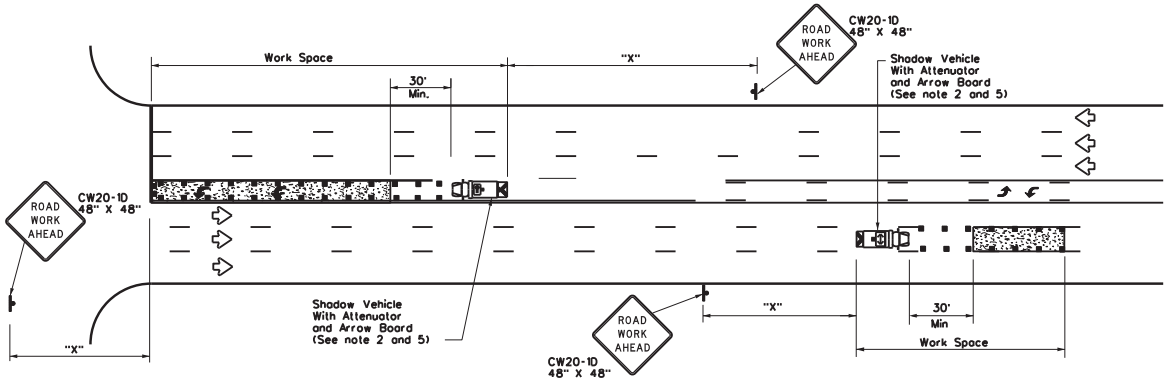
TYPICAL TRAFFIC CONTROL FOR
CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS

TYPICAL TRAFFIC CONTROL FOR
OUTSIDE DUAL LEFT TURN LANE SYMBOL MARKINGS



TYPICAL TRAFFIC CONTROL FOR
OUTSIDE LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
INSIDE LANE MARKINGS



TYPICAL TRAFFIC CONTROL FOR
LEFT TURN LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
CENTER LANE MARKINGS

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 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= WS²/60	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

x Conventional Roads Only

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

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

GENERAL NOTES

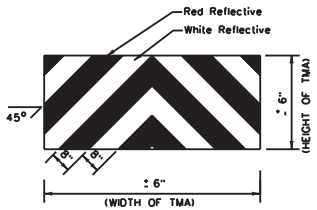
1. This traffic control plan is for use on conventional roads posted at 45 mph or less and is intended for mobile operations that move continuously or intermittently (stopping up to approximately 15 minutes) such as short-line striping and in-lane rumble strips. When activities are anticipated to take 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

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©TxDOT July, 2013	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		118

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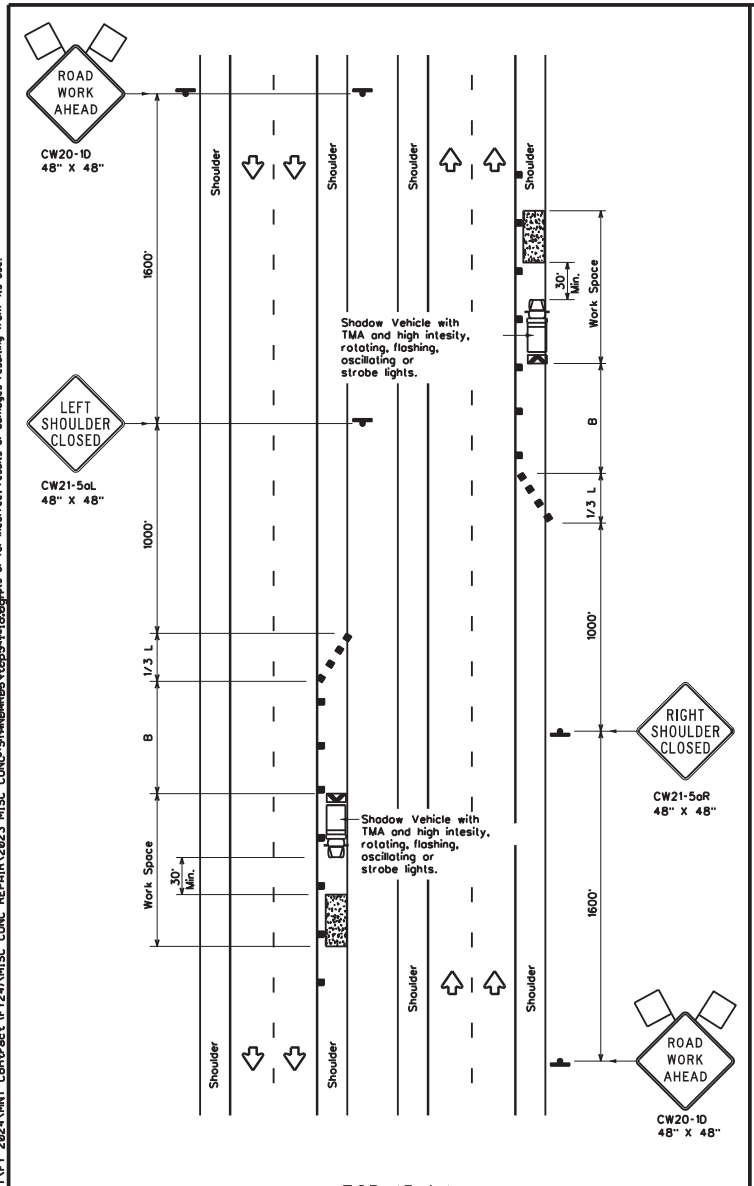
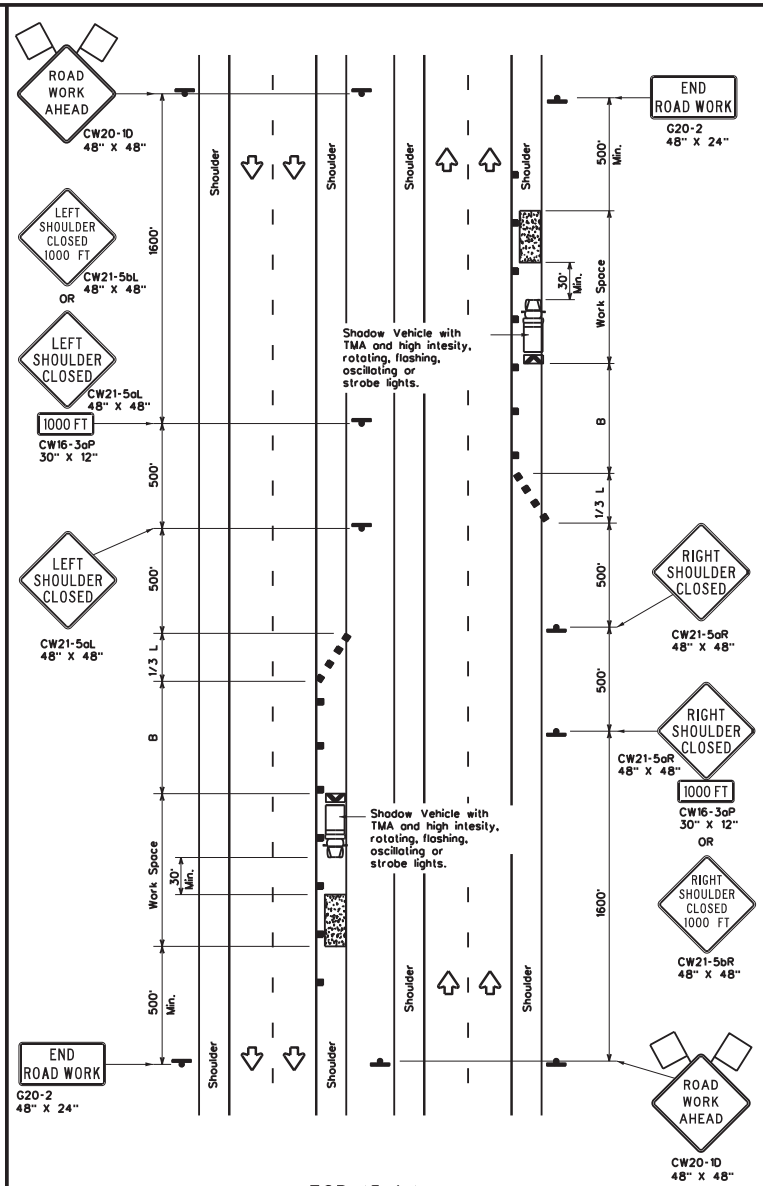


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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

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

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

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	22	LASALLE,ETC.		119

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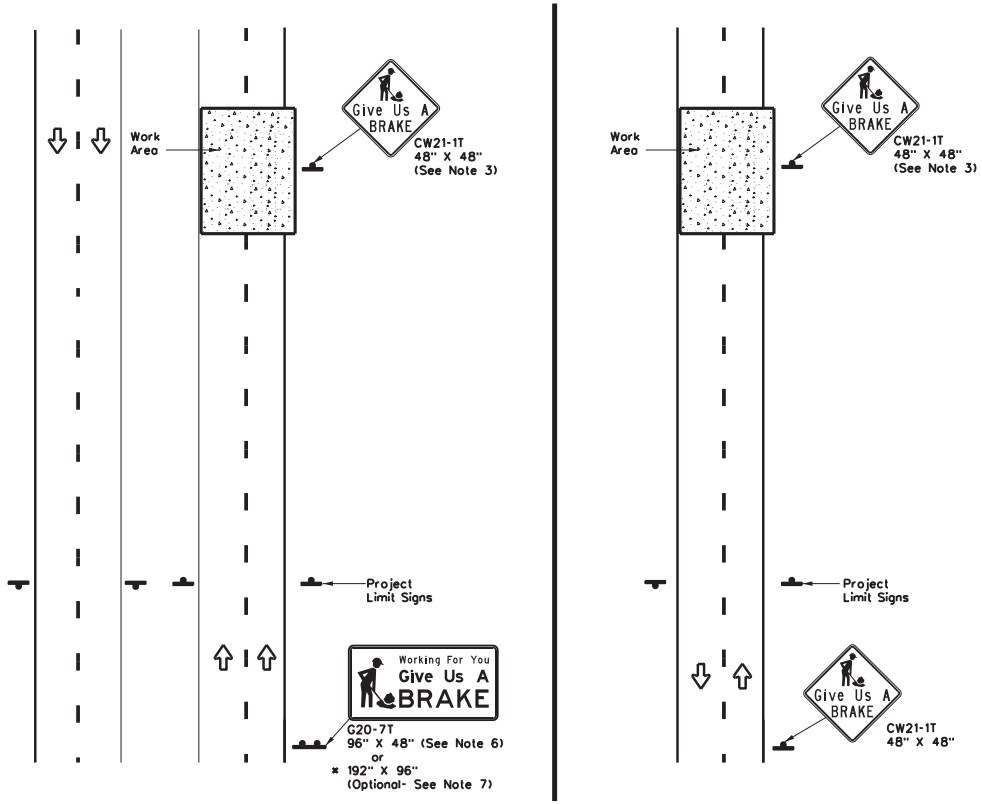

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL			DRILLED SHAFT 24" DIA. (LF)
						Size	(LF) ①	(LF) ②	
Orange	G20-7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

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8-96 3-03	22	LASALLE,ETC.		120

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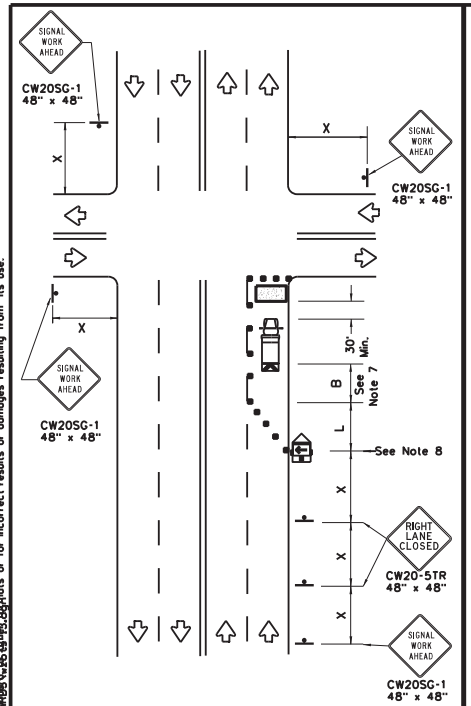
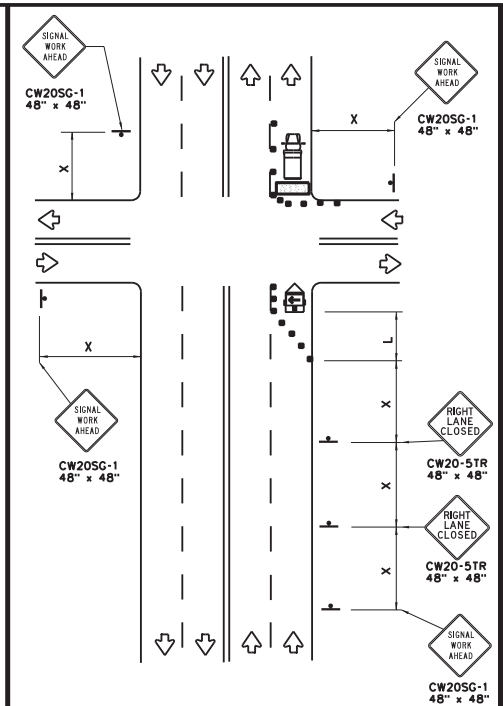


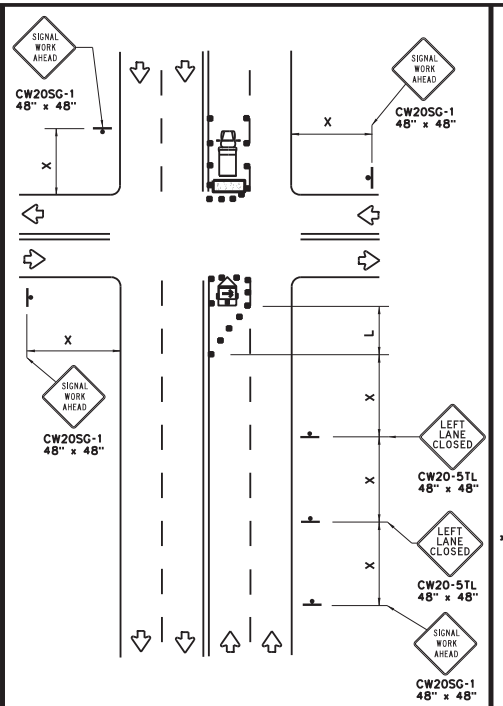
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



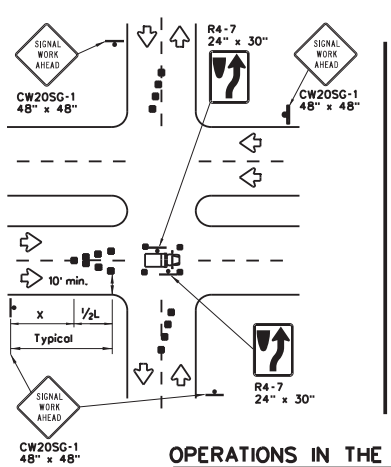
FAR SIDE RIGHT LANE CLOSURE

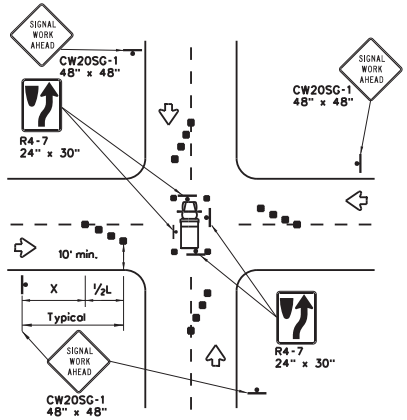
SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY





OPERATIONS IN THE INTERSECTION

SHORT DURATION

LEGEND

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

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

* Conventional Roads Only

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

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.

GENERAL NOTES

1. The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
2. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
3. Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
4. Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
5. High level warning devices (flag trees) may be used at corners of the vehicle.
6. When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
7. For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
8. The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
9. Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

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SHEET 1 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

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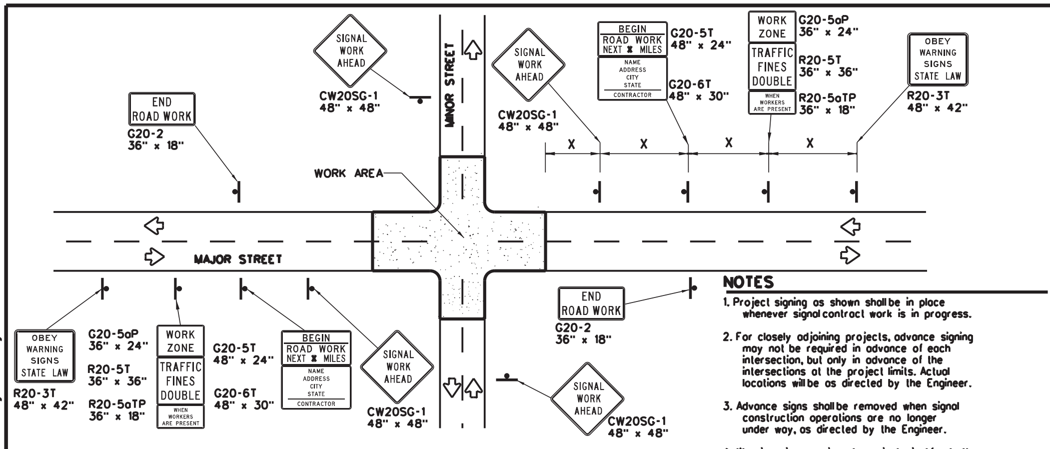


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

1. Project signing as shown shall be in place whenever signal contract work is in progress.
2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
4. Warning sign spacing shown is typical for both directions.
5. See the Table on sheet 1 of 2 for Typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
8. Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
9. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. 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, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

SIGN SUPPORT WEIGHTS

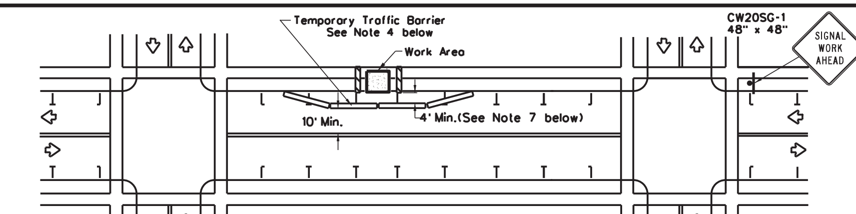
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

LEGEND	
(symbol)	Sign
(symbol)	Channelizing Devices
(symbol)	Type 3 Barricode

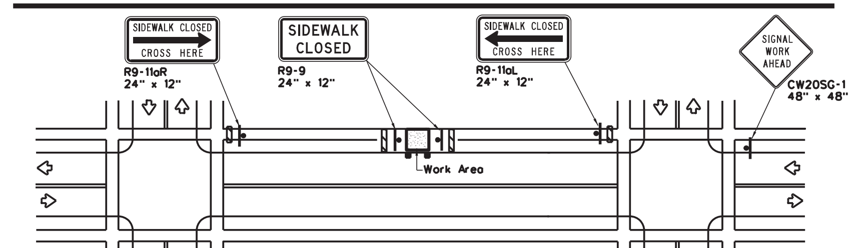
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

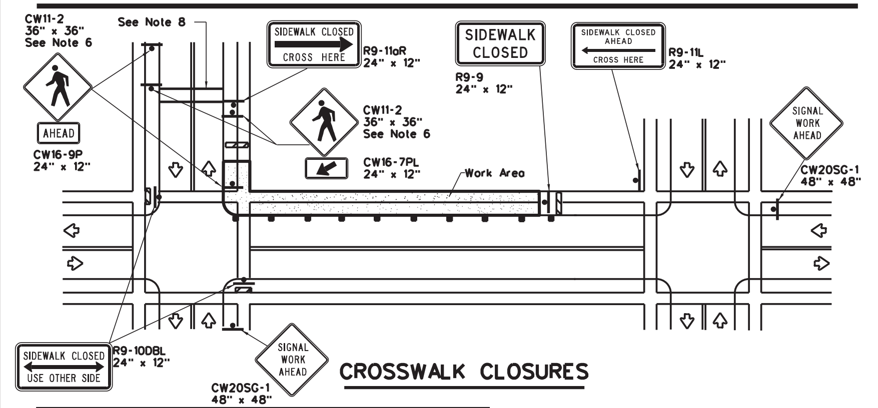
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
3. R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
5. Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practical.
8. Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
9. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

SHEET 2 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

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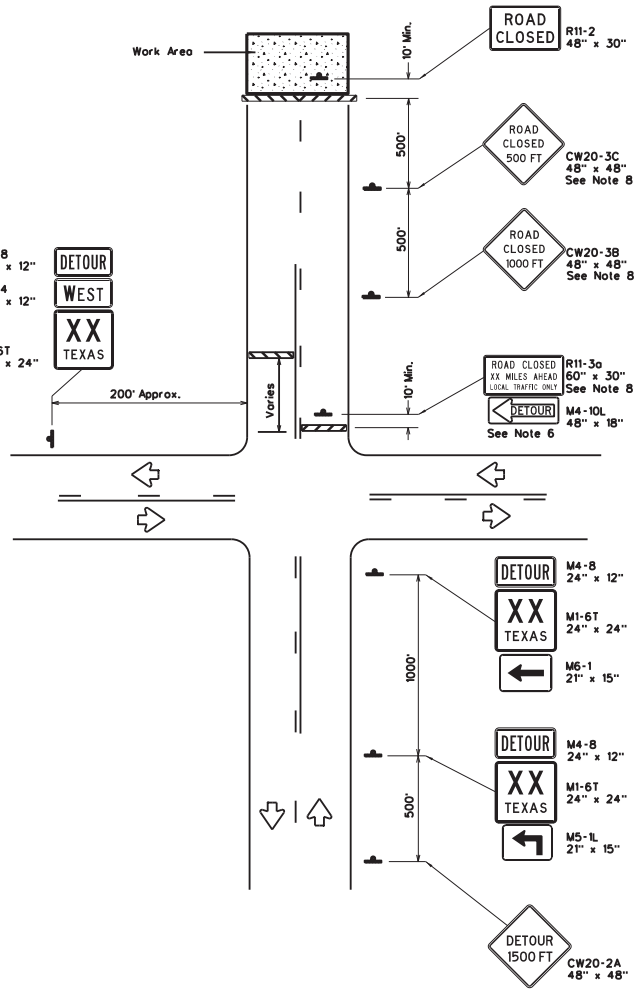
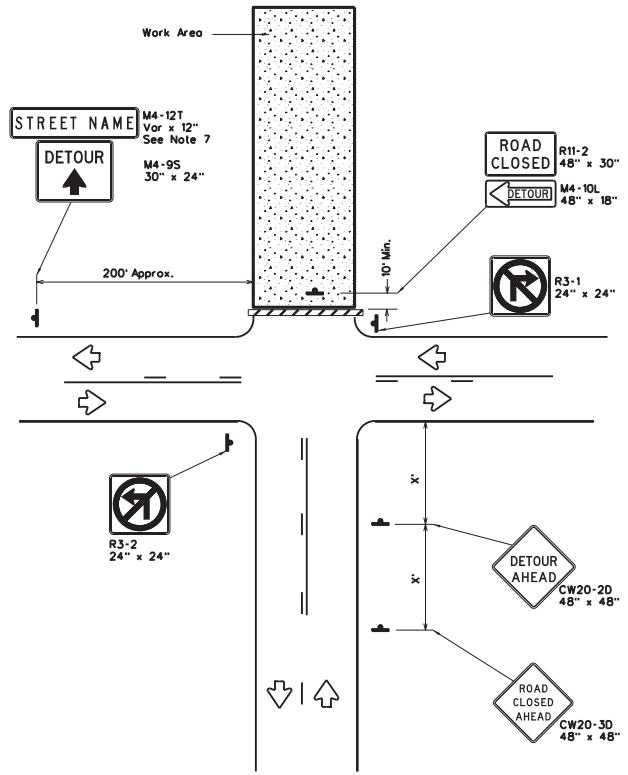


ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
	Type 3 Barricade
	Sign

Posted Speed x	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'

x Conventional Roads Only

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

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2-98 3-03	22	LASALLE,ETC.		123

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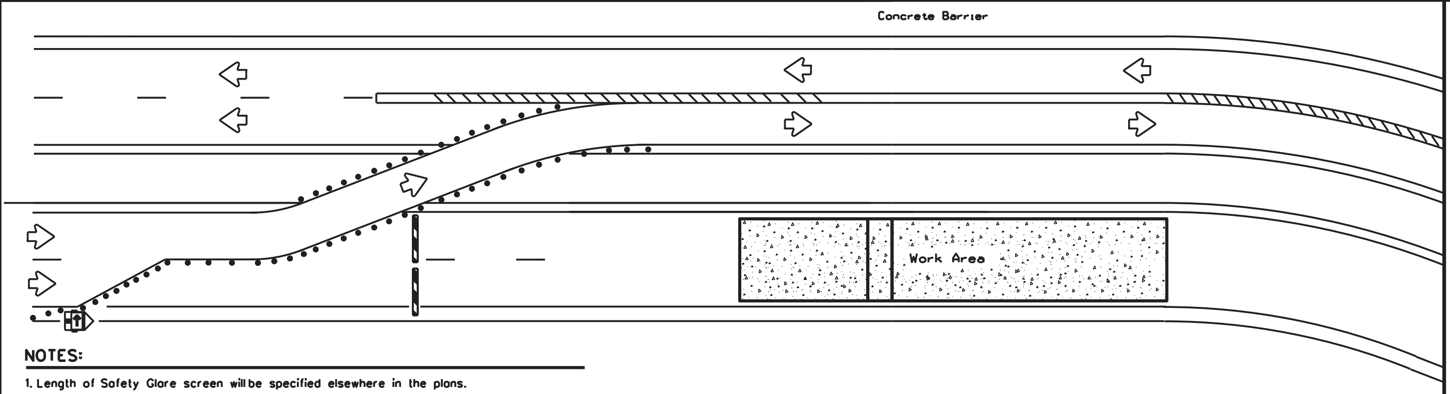


BARRIER DELINEATION WITH MODULAR GLARE SCREENS

NOTES:

1. Length of Safety Glare screen will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular safety glare screen units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one safety glare screen unit.
3. Screen Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one glare screen panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

LEGEND

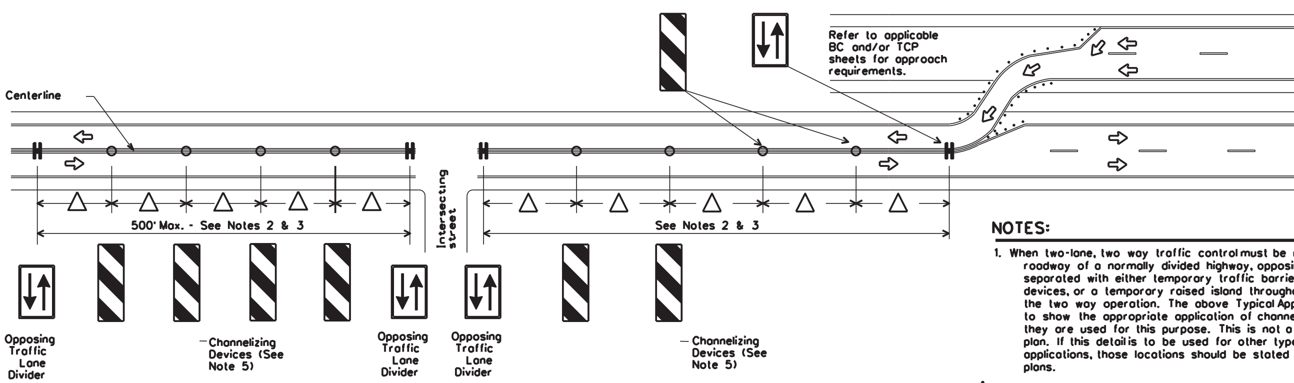
Symbol	Description
	Type 3 Barricade
• • •	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	Sign
\ \ \ \	Safety glare screen

DEPARTMENTAL MATERIAL SPECIFICATIONS

SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

Only pre-qualified products shall be used. A copy of the Compliant Work Zone Traffic Control Devices List" CWZTCD)describes pre-qualified products and their sources and may be found at the following web address:

http://www.txdot.gov/business/resources/producer-list.html



VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. △ Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100'.
3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-17

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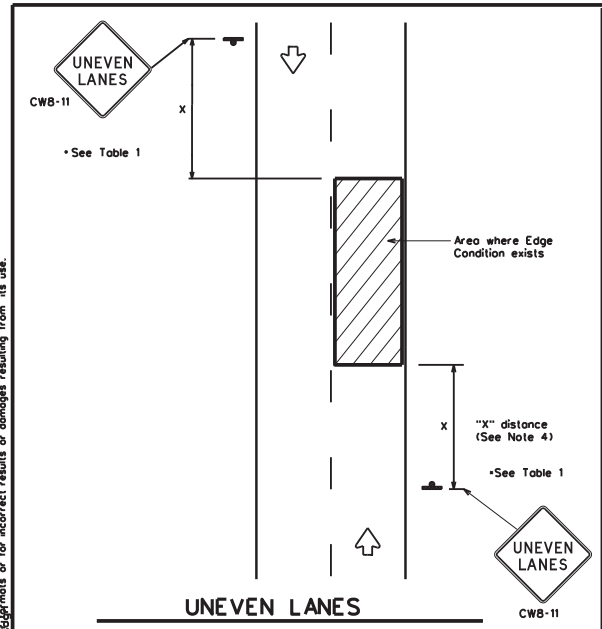
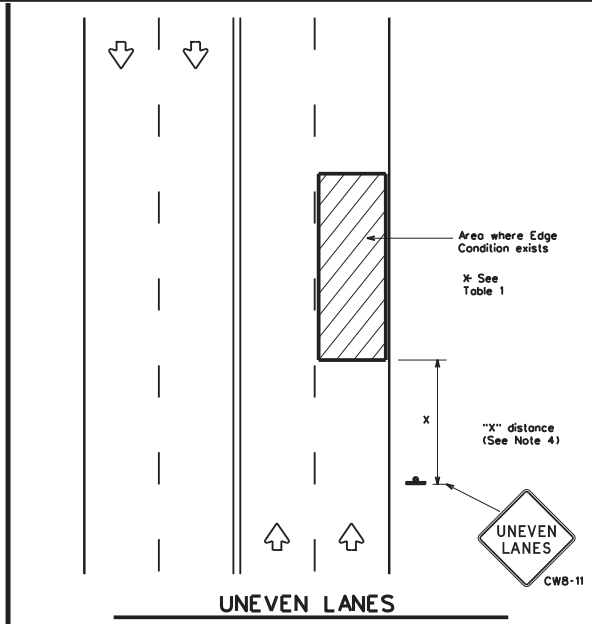
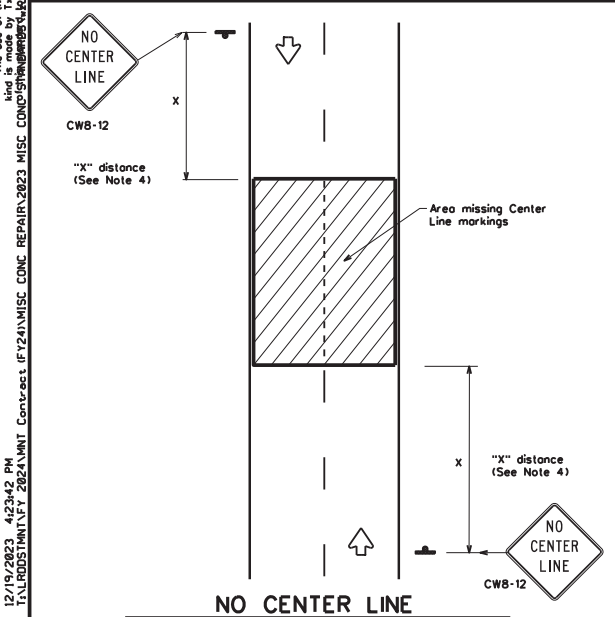


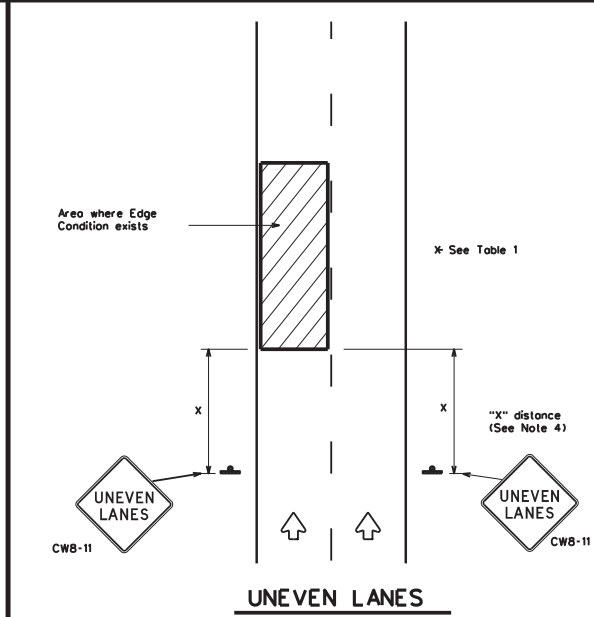
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

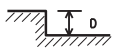
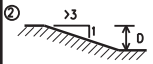
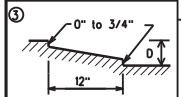
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

TABLE 1

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

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

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

Texas Department of Transportation — Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	22	LASALLE,ETC.		125

112

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:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000

2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.

3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.

4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required

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

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

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP* _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☐ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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

☐ No Action Required ☒ Required Action

Action No.

1.

2.

3.

4.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

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

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

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

☐ Yes ☒ No

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

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

☐ Yes ☒ No

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

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

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

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

☐ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	6417	14	001	VARIOUS
12-12-2011 IDS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	DIST	COUNTY		SHEET NO.
	22	LASALLE,ETC.		126