MAINTENANCE PROJECT NO.			SHEET NO.
			1
STATE	DISTRICT	COUNTY	
TEXAS	PHARR	CAMERON, ETC	
CONTROL	SECTION	JOB	HIGHWAY
6443	44	001	IH 2,ETC

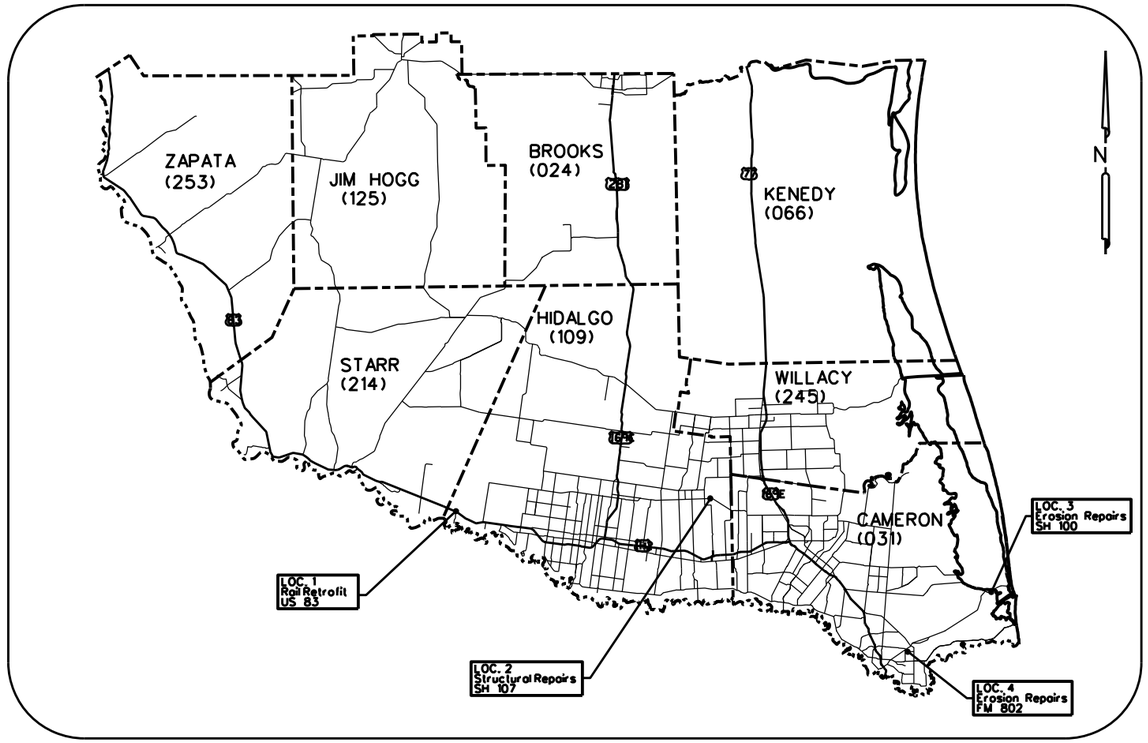
STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
BRIDGE PREVENTIVE MAINTENANCE CONTRACT

TYPE OF WORK:

FOR THE REPAIRS OF EXISTING BRIDGE RAIL, METAL BEAM GUARD FENCE, BRIDGE PILES, SLOPE PROTECTION, AND RIP RAP

PROJECT:	BPM 6443-44-001
COUNTY:	HIDALGO, ETC
HIGHWAY:	US 83, ETC
LIMITS OF WORK:	VARIOUS LOCATIONS IN HIDALGO AND CAMERON COUNTIES



INDEX OF SHEETS

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED PROFESSIONAL ENGINEER

•THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

Eugene Palacios ,P.E. 4/30/2024

Signature of Registrant & Date

REQUIRED SIGNS SHALL BE IN ACCORDANCE WITH BC (1)-14 THROUGH BC (12)-14 AND THE 'TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES'.

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND THE CONTRACT PROVISIONS.

FINAL PLANS

LETTING DATE: _____

CONTRACTOR : _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS COMPLETED & ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CHANGE ORDERS & SUPPLEMENTAL AGREEMENTS

ALL CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS SPECIFICATION AND CONTRACT. ALL PROPOSED CONSTRUCTION WAS COMPLETED UNLESS OTHERWISE NOTED.

_____
AREA ENGINEER DATE

APPROVED FOR LETTING: DATE: 4/30/2024

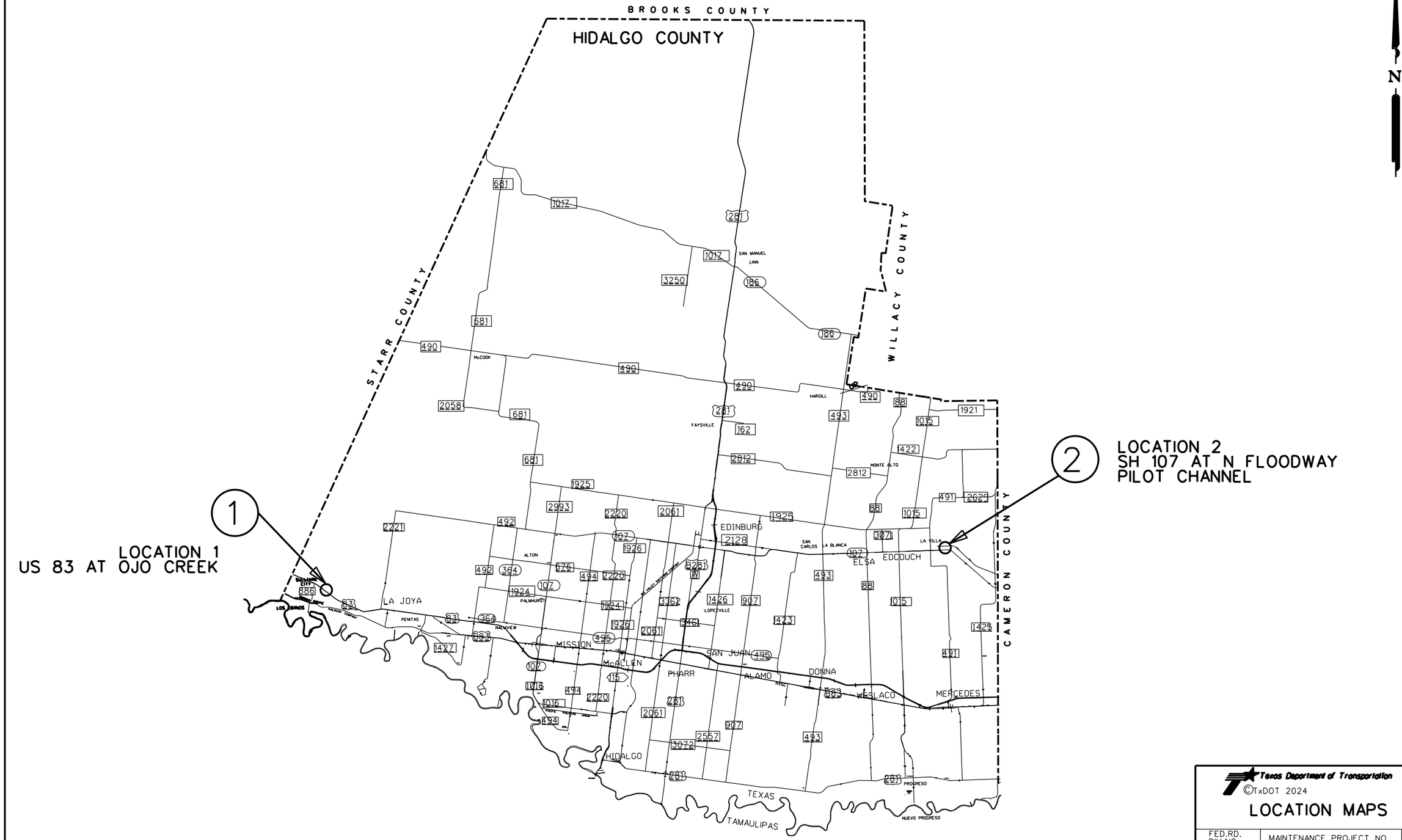
DocuSigned by: Pedro R. Alvarez EABA335C2DAA48C...
DISTRICT ENGINEER

SUBMITTED FOR LETTING: DATE: 4/30/2024

DocuSigned by: Eugene Palacios 8325CC1071A9427...
PROJECT ENGINEER

RECOMMENDED FOR LETTING: DATE: 4/30/2024

DocuSigned by: Juan A. Sustaita Jr E359B02C61B2488...
DIRECTOR OF MAINTENANCE



Texas Department of Transportation

LOCATION MAPS

FED.RD. DIV.NO.		MAINTENANCE PROJECT NO.	SHEET NO.
6		RMC 6443-44-001	2
STATE	DIST	COUNTY	HIGHWAY
TEXAS	21	HIDALGO, ETC	US 83, ETC

WILLACY COUNTY

CAMERON COUNTY

HIDALGO COUNTY

UNITED STATES

MEXICO

TEXAS

TAMAULIPAS

UP RR

RIO VALLEY RAILROAD

UNION PACIFIC RAILROAD

GRAND LAGUNA CANAL

P100

N

3 LOCATION 2
SH 100 AT
SHRMIP CHANNEL

4 LOCATION 4
FM 802 AT
DRAIN DITCH

Texas Department of Transportation

LOCATION MAPS

FED.RD. DIV.NO.	MAINTENANCE PROJECT NO.	SHEET NO.
6	RMC 6443-44-001	3

STATE	DIST	COUNTY	HIGHWAY
TEXAS	21	HIDALGO, ETC	US 83, ETC

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 6443-44-001 **DISTRICT** Pharr **COUNTY** Hidalgo
HIGHWAY IH0002

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**6443-44-001**			
		PROJECT ID		**A00197009**			
		COUNTY		**Hidalgo**			
		HIGHWAY		**IH0002**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	104-6009	REMOVING CONC (RIPRAP)	SY	16.000		16.000	
	104-6028	REMOVING CONC (MISC)	SY	17.000		17.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	158.000		158.000	
	420-6070	CL C CONC (PILE ENCASEMENT)	CY	8.000		8.000	
	420-6071	CL C CONC (COLLAR)	EA	1.000		1.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	14.000		14.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY	15.000		15.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	61.000		61.000	
	451-6024	RETROFIT RAIL (TY SSTR)	LF	570.000		570.000	
	472-6006	REMOV & RE - LAY PIPE (24 IN)	LF	8.000		8.000	
	496-6018	REMOVE STR (CONC)	EA	1.000		1.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	6.000		6.000	
	512-6014	PORT CTB (DES SOURCE)(SGL SLP)(TY 2)	LF	270.000		270.000	
	512-6026	PORT CTB (MOVE)(SGL SLP)(TY 2)	LF	810.000		810.000	
	512-6038	PORT CTB (STKPL)(SGL SLP)(TY 2)	LF	270.000		270.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	1,125.000		1,125.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	8.000		8.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	4.000		4.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	1,275.000		1,275.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	8.000		8.000	
	544-6004	GDRAIL END TRT(INST)(WOOD POST)(TY I)	EA	4.000		4.000	
	545-6002	CRASH CUSH ATTEN (DES SOURCE)	EA	1.000		1.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	3.000		3.000	
	545-6004	CRASH CUSH ATTEN (STKPL)	EA	1.000		1.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	8.000		8.000	
	658-6016	INSTL DEL ASSM (D-SW)SZ (BRF)GF1 (BI)	EA	12.000		12.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	24.000		24.000	
	760-6001	DITCH CLEANING AND RESHAPING (FOOT)	LF	29.000		29.000	
	784-6072	REP STL BRDG MEMB (WELD REPAIR)	EA	14.000		14.000	
	784-6192	REPAIR STEEL (CORROSION MITIGATION)	EA	41.000		41.000	
	7306-6002	BRIDGE SUBSTRUCTURE CLEANING (BENT)	EA	5.000		5.000	

2014 SPECS GENERAL NOTES:

****

General Requirements and Covenants to ITEMS 1 thru 9:

For all pits or quarries, comply with the "Texas Aggregate Quarry and Pit Safety Act."

Provide on a weekly basis a list of equipment, including idle equipment, utilized on the project that week.

The 1-800 call services for utility locations do not include TxDOT facilities. Contact the Pharr District Signal Section (956-702-6225) for coordination regarding TxDOT underground lines.

ITEM 2: Instructions to Bidders
Contractor questions on this project are to be addressed to the following individual(s):

Eugene Palacios, P.E., District Maintenance; Eugene.Palacios@txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individuals. Questions may also 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 web page 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.

Information found on TxDOT's FTP server will be considered for informational purposes only. Index of /pub/txdot-info/Pre-Letting Responses/Pharr District/21-Pharr District (Construction) (state.tx.us)

GENERAL
This contract will consist of 120 Working Days.

Each contract awarded by TxDOT stands on its own and as such, is separate from other contracts. A contractor awarded multiple contracts must be capable and sufficiently staffed to concurrently process any and all contracts at the same time.

The Contractor is to visit the site(s), make his/her own examination of the site(s) where work is to be performed. The Contractor shall carefully examine these specifications and secure from the state additional information that may be essential for a clear and full understanding of work.

ITEM 5: Control of the Work
The responsibility for the construction surveying on this contract will be in accordance with Article 5.9.3., "Method C."

ITEM 8: Prosecution and Progress
TxDOT is required to provide 10 working days advanced written notice of all proposed bridge widening, rehabilitation, or demolition work to the Texas Department of State Health Services (TDSHS) to allow them the opportunity to both verify information provided regarding asbestos containing materials and abatement and observe the demolition/renovation work. Considering that this notice will be provided TDSHS at the beginning of the project for all affected bridge work based on start and finish dates included in the Contractor's original submitted work schedule, any schedule changes proposed by the Contractor shall be submitted to TxDOT at least 15 days prior to the revised or original start date to accommodate the required coordination with TDSHS.

Working days will be computed and charged in accordance with Article 8.3.1.6. defined as follows:

Work and time charges will continue until the start of the bird nesting season. Upon the start of the bird nesting season, work and time charges will stop for a maximum period of 120-Working days for the bird nesting season delay to be completed. Time charges in accordance with Article 8.3.1.4. will resume at the end of the 120-day bird nesting season delay or earlier if mutually agreed in writing by the Engineer and Contractor.

Prepare progress schedules as a Bar Chart.

ITEM 432: Riprap
Provide Class "A" concrete minimum for riprap aprons placed around all box culvert and pipe safety end treatments. Provide ¼-inch thick dummy joints at least every 15-ft for riprap aprons placed around box and pipe culverts.

Do not use fiber reinforced concrete RIPRAP on side slopes equal to or steeper than 6:1 unless approved by the Engineer.

ITEM 502: Barricades, Signs, and Traffic Handling
From the beginning to the end of the project, all traffic control devices need to be in acceptable condition as per the Texas Quality Guidelines for Work Zone Traffic Control Devices.

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 "Safety Contingency" is not intended to be used in lieu of bid Items established by the contract.

Remove and dispose of all litter, debris, objectionable material, excess materials that accumulate at the base of all traffic control devices as directed by the Engineer.

ITEM 506: Temporary Erosion, Sedimentation, and Environmental Controls

The Contractor Force Account "Erosion Control Maintenance" that has been established for this project is intended to be utilized for work zone Best Management Practice (BMP) maintenance, to improve the effectiveness of the Environmental Controls that may need maintenance attention and/or require replacement while the project is still under the construction stage. These procedures will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent BMP management reviews on the project. The "Erosion Control Maintenance" is not intended to be used in lieu of bid Items established by the contract.

ITEM 512: Portable Traffic Barrier

Haul 270 LF concrete median barriers from the TxDOT office in Pharr, Texas to the project site to be used in conjunction with the suggested traffic control sheets as directed by the Engineer. If needed, modify the ends of the concrete median barriers where the temporary end treatment is attached to the concrete median barrier. Contractor is to provide PCTB reflectors and anchor materials as needed. Any needed PCTB reflectors and anchor materials will be subsidiary to Item 512.

Maintain the concrete median barrier in first class condition and, when no longer needed for traffic control, return the concrete median barriers to the TxDOT office in Pharr, Texas. Any concrete median barrier damaged beyond reasonable repair shall be replaced at the Contractor's expense.

During the various construction phases, provide drainage slots in every temporary concrete traffic barrier used for traffic control in order to handle temporary drainage. Provide any additional drainage measures needed as directed by the Engineer.

ITEM 540: Metal Beam Guard Fence

The optional terminal anchor post with the terminal connector will be required as shown on the Metal Beam Guard Fence Standard.

Galvanize the rail elements supplied for this project using a Type II Zinc Coating.

ITEM 542: Removing Metal Beam Guard Fence

Dispose all metal beam guard fence materials unless shown otherwise in the plans.

ITEM 544: Guardrail End Treatments

Label "end treatment type" on backside of unit at time of installation.

ITEM 658: Delineator and Object Marker Assemblies

Delineator assemblies shall be installed 8 feet from the edge of the shoulder unless restricted by some obstruction, in which case, the delineator assembly shall be placed between 2 and 8 feet from the edge of the shoulder.

Bi-directional object markers shall be in accordance with the D&OM standard sheets. The Contractor is directed to the standards when instructed where and how to install the object markers.

ITEM 760: Cleaning and Reshaping Ditches

Establish ditch grades between structures such that water falls toward natural cross drainage structures and no ponding occurs. Such controls will be maintained by tripod mounted level as directed. Excavation will be held to a minimum, no vertical slopes; taper down to the bottom of the ditch.

Correct areas that do not drain properly.

Do not disturb an apparatuses in the vicinity of the work area including culverts, fences, driveways, headwalls, safety end treatments, roadway surface shoulder, etc. Any and all damage resulting from the Contractor's operation will be repaired or replaced to pre-existing condition by the Contractor at Contractor's expense.

Work shall be conducted with a hydraulic excavator with a retractable, telescoping, rotatable boom attached to an interchangeable excavating or grinding bucket at least 36 IN wide. The entire excavating mechanism must be mounted on a platform that rotates on a turntable assembly.

All work shall be conducted from the top of the bank with an excavator in a manner that material shall not be double-handled in the ditch so that there is no discharge into the water. All other equipment used for the excavation or re-grading and brush removal would be placed only on the banks of the drainage ditch at each location.

Keep all traveled surfaces used in hauling operations, including all paved shoulders and roads, clear and free of dirt and/or mud at all times.

All excess material removed from the ditches during this contract will become property of the Contractor. The removal of any sediment/silt would need to go to a location in upland soils and disposed of in accordance with all local, state, and federal rules and regulations.

All excess material shall be disposed of within 7 calendar days of removal from existing location.

SUMMARY OF US 83 ITEMS									
LOCATION	432 6045	451 6024	512 6014	512 6026	512 6038	540 6001	540 6006	540 6016	542 6001
	RIPRAP (MOW STRIP)(4 IN)	RETROFIT RAIL (TY SSTR)	PORT CTB (DES SOURCE)(SGL SLP)(TY 2)	PORT CTB (MOVE)(SGL SLP)(TY 2)	PORT CTB (STKPL)(SGL SLP)(TY 2)	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	DOWNSTREAM ANCHOR TERMINAL SECTION	REMOVE METAL BEAM GUARD FENCE
	CY	LF	LF	LF	LF	LF	EA	EA	LF
US 83									
[illegible]	61	570	270	810	270	1125	8	4	1275
PROJECT TOTALS	**61**	**570**	**270**	**810**	**270**	**1125**	**8**	**4**	**1275**

SUMMARY OF US 83 ITEMS (CONTINUED)								
LOCATION	544 6003	544 6004	545 6002	545 6003	545 6004	658 6014	658 6016	658 6062
	GUARDRAIL END TREATMENT (REMOVE)	GDRAIL END TRT(INST)(WOOD POST)(TY I)	CRASH CUSH ATTEN (DES SOURCE)	CRASH CUSH ATTEN (MOVE & RESET)	CRASH CUSH ATTEN (STKPL)	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	INSTL DEL ASSM (D-SW)SZ (BRF)GF1 (BI)	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)
	EA	EA	EA	EA	EA	EA	EA	EA
US 83								
[illegible]	8	4	1	3	1	8	12	24
PROJECT TOTALS	**8**	**4**	**1**	**3**	**1**	**8**	**12**	**24**

US 83
OJO DE AGUA CREEK
BRIDGE RAIL
RETROFIT SUMMARY
OF ESTIMATED
QUANTITIES

QUANTITY SUMMARY SHEET

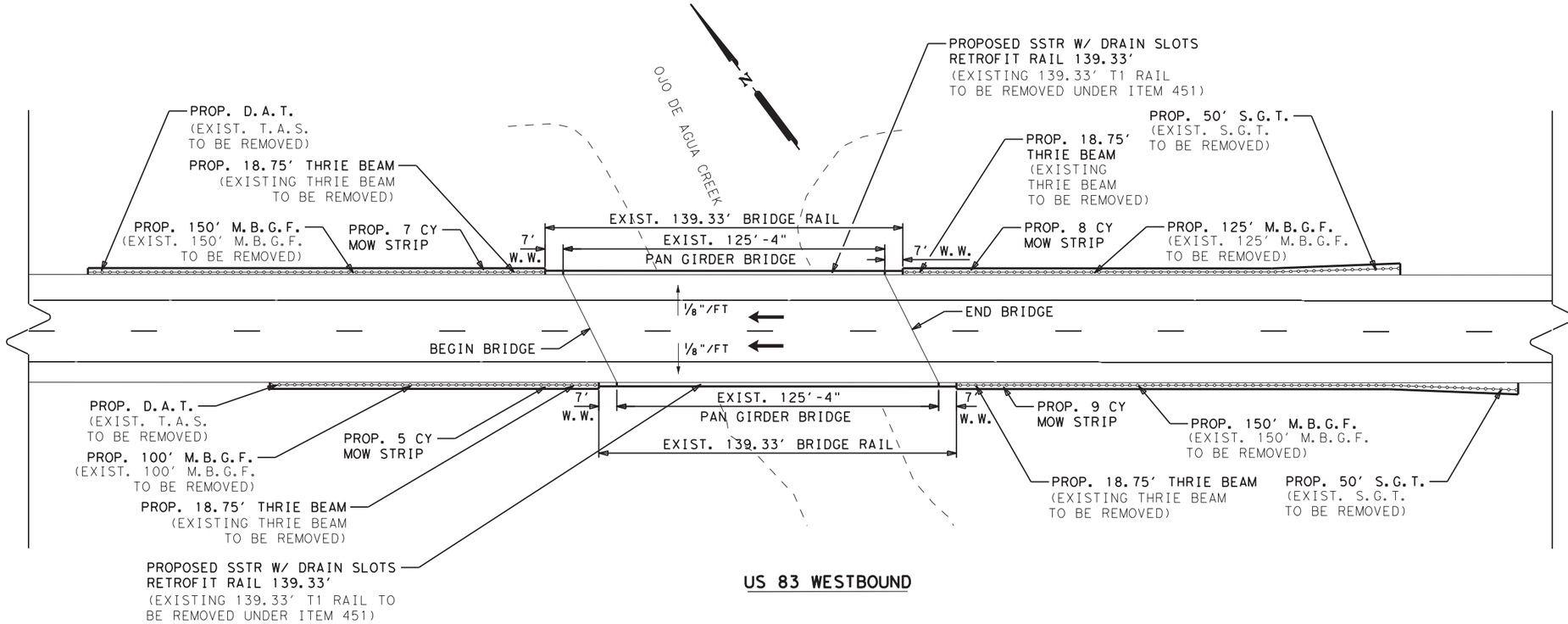
Texas Department of Transportation

US 83 AT OJO DE AGUA

ID 211090003902189 & 211090003902221

FED.RD. DIV.NO.	MAINTENANCE PROJECT NO.	SHEET NO.
6	RMC 6443-44-001	6

STATE	DIST	COUNTY	HIGHWAY
TEXAS	21	HIDALGO, ETC	US 83, ETC



US 83 WESTBOUND

LEGEND:

→ DIRECTION OF TRAFFIC FLOW

PROP. - PROPOSED

EXIST. - EXISTING

D.A.T. - DOWNSTREAM ANCHOR TERMINAL

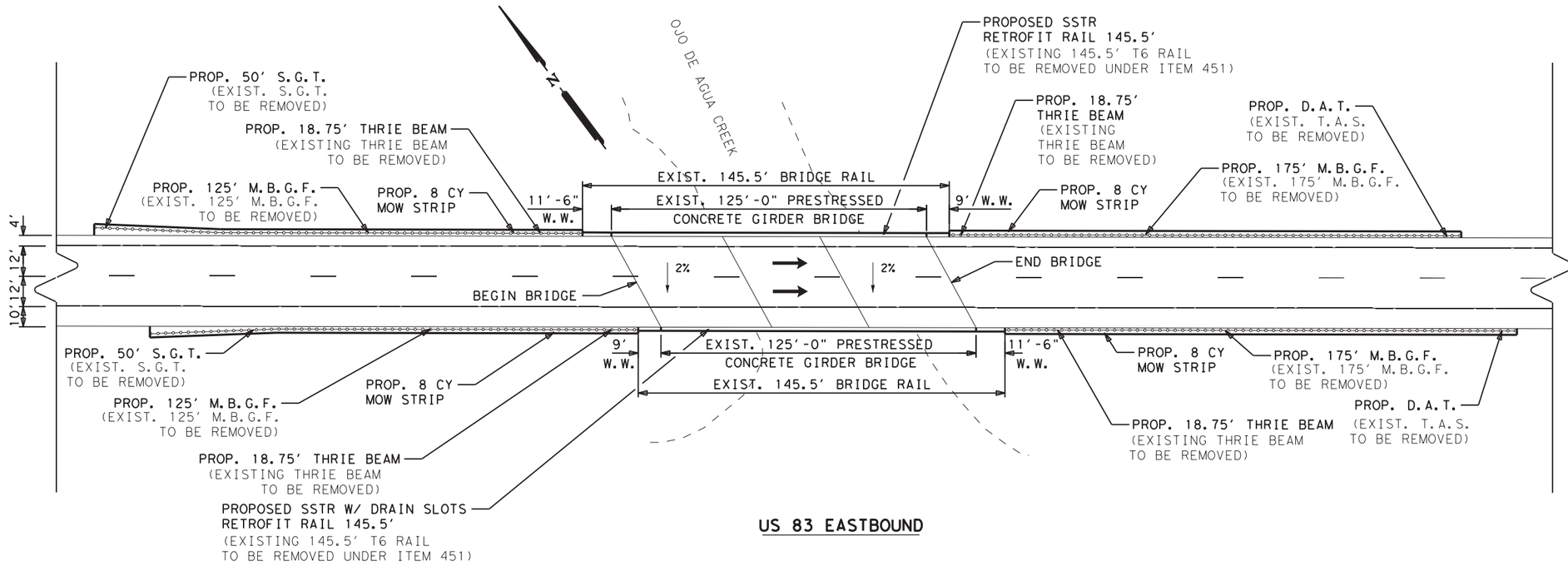
T.A.S. - TERMINAL ANCHOR SECTION

S.G.T. - SINGLE GUARDRAIL TERMINAL

W.W. - WINGWALL

NOTES:

1. SEE "TYPE SSTR" DETAILS SHEET FOR DETAILS NOT SHOWN HERE IN.
2. SEE "C-RAIL-R(MOD)" SHEET FOR SSTR RAIL RETROFIT DETAILS.
3. US83 WESTBOUND BRIDGE NBI: 109-0-0039-02-189
4. US83 EASTBOUND BRIDGE NBI: 109-0-0039-02-221



US 83 EASTBOUND

STATE OF TEXAS
FRANCISCO J. CANTU
128657
LICENSED
PROFESSIONAL ENGINEER

11-14-2018

US 83
OJO DE AGUA CREEK BRIDGE RAIL RETORFIT LAYOUTS

NOT TO SCALE

BRIDGE RAIL RETROFIT LAYOUT

Texas Department of Transportation

US 83 AT OJO DE AGUA

ID 211090003902189 & 211090003902221

FED.RD. DIV.NO.	MAINTENANCE PROJECT NO.	SHEET NO.
6	RMC 6443-44-001	7

STATE	DIST	COUNTY	HIGHWAY
TEXAS	21	HIDALGO, ETC	US 83, ETC

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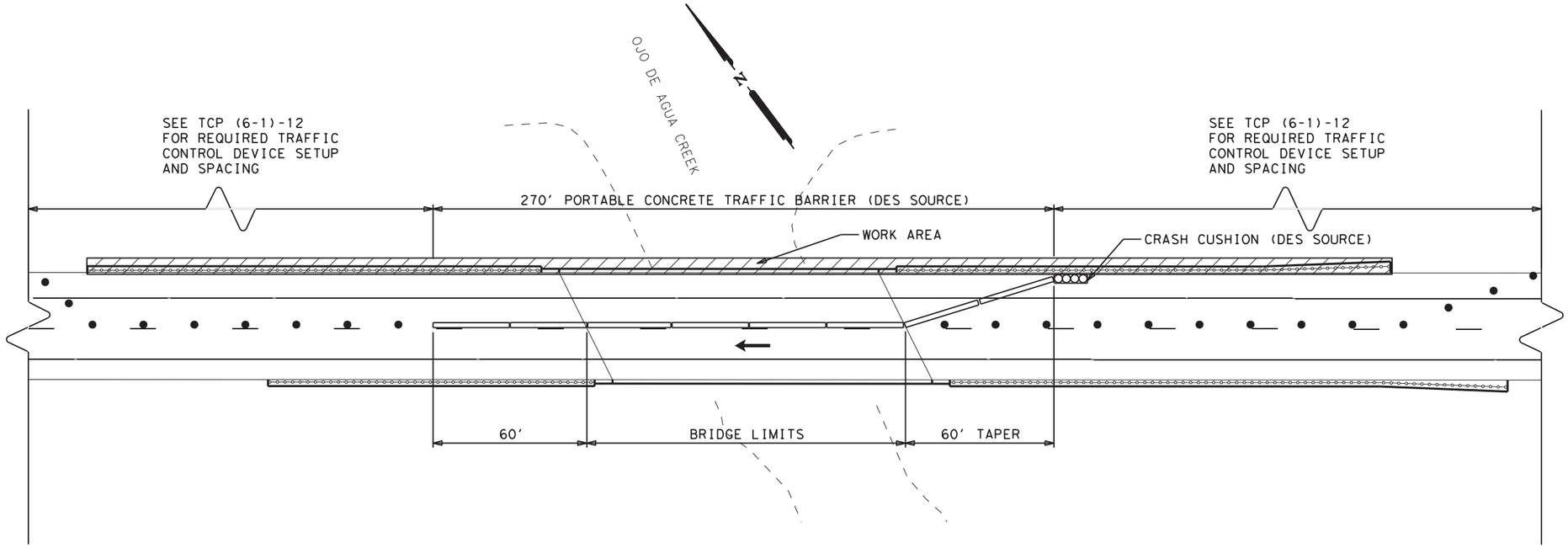


US 83 WESTBOUND (RIGHT SIDE WORK AREA)

LEGEND:

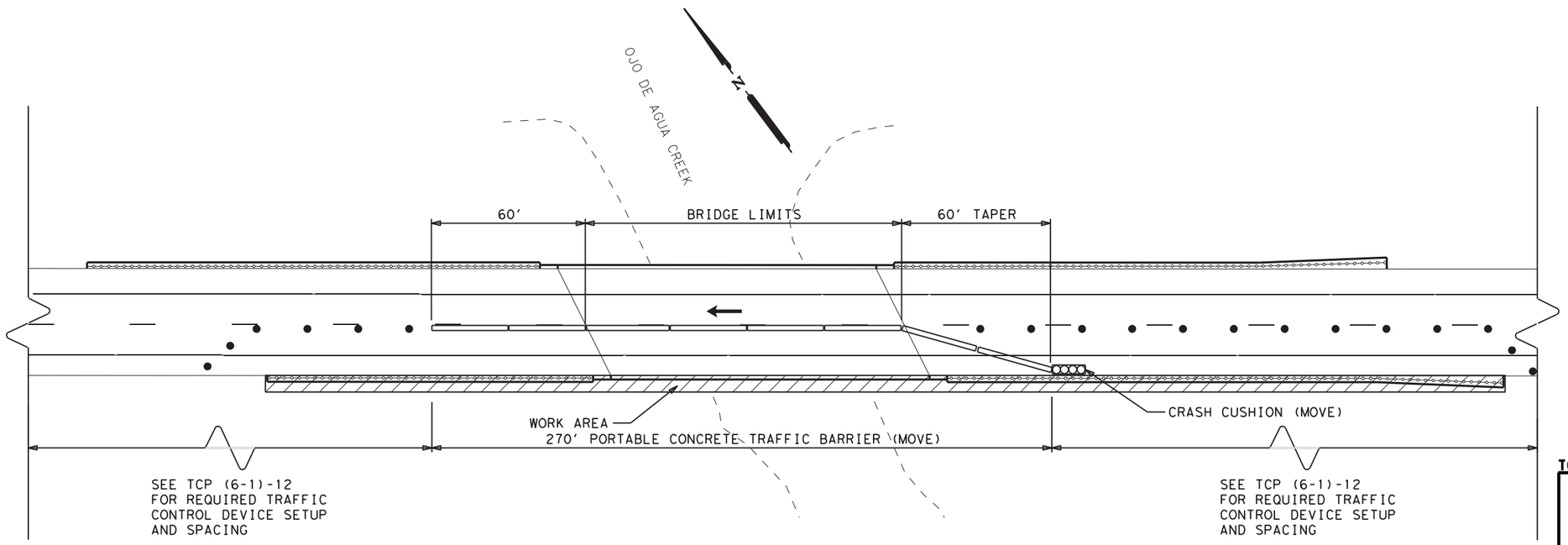
- DIRECTION OF TRAFFIC FLOW
- WORK AREA
- CHANNELIZING DEVICES

N.T.S. - NOT TO SCALE

M.B.G.F. - METAL BEAM GUARD FENCE

NOTES:

1. SEE BRIDGE RAIL RETROFIT LAYOUTS FOR MORE INFORMATION.
2. BRIDGE RAIL RETROFIT AND M.B.G.F. INSTALLATION SHOULD BE DONE ON US 83 WESTBOUND FIRST.
3. ONCE THE BRIDGE RAIL RETROFIT AND M.B.G.F. INSTALLATION IS COMPLETE ON US 83 WESTBOUND THE THE CONTRACTOR MAY PROCEED WITH US 83 EASTBOUND SSTR BRIDGE RAIL RETROFIT AND M.B.G.F. INSTALLATION.



US 83 WESTBOUND (LEFT SIDE WORK AREA)

STATE OF TEXAS
FRANCISCO J. CANTU
128657
LICENSED
PROFESSIONAL ENGINEER

02-27-2019

US 83
OJO DE AGUA CREEK
BRIDGE RAIL
RETROFITS TRAFFIC
CONTROL PLAN

TCP 1 OF 2

Texas Department of Transportation

US 83 AT OJO DE AGUA
ID 211090003902189 & 211090003902221

FED.RD. DIV.NO.	MAINTENANCE PROJECT NO.	SHEET NO.
6	RMC 6443-44-001	8

STATE	DIST	COUNTY	HIGHWAY
TEXAS	21	HIDALGO, ETC	US 83, ETC

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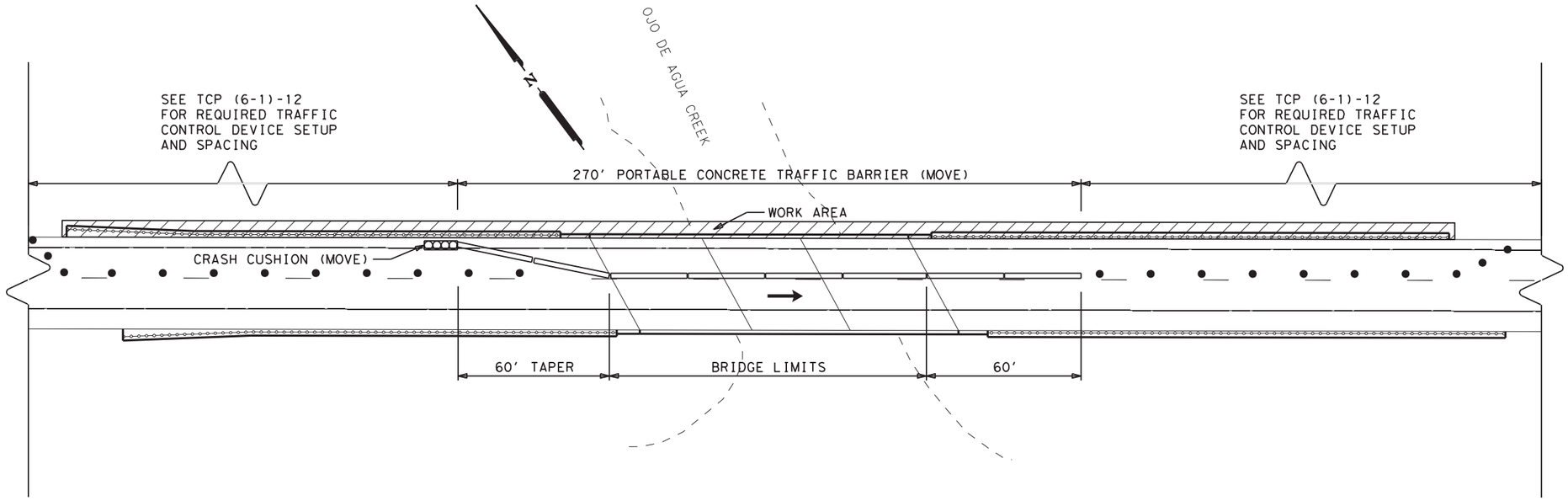
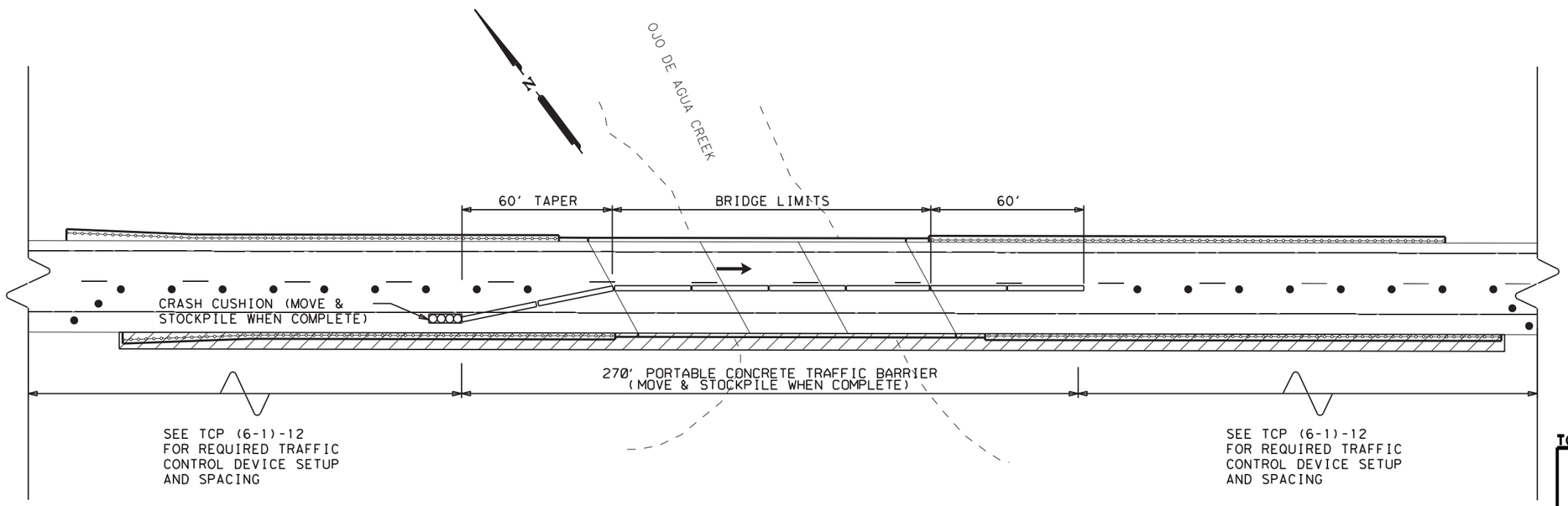


US 83 EASTBOUND (LEFT SIDE WORK AREA)



US 83 EASTBOUND (RIGHT SIDE WORK AREA)

LEGEND:

- DIRECTION OF TRAFFIC FLOW
- WORK AREA
- CHANNELIZING DEVICES
- N.T.S. - NOT TO SCALE
- M.B.G.F. - METAL BEAM GUARD FENCE

NOTES:

1. SEE BRIDGE RAIL RETROFIT LAYOUTS FOR MORE INFORMATION.
2. BRIDGE RAIL RETROFIT AND M.B.G.F. INSTALLATION SHOULD BE DONE ON US 83 WESTBOUND FIRST.
3. ONCE THE BRIDGE RAIL RETROFIT AND M.B.G.F. INSTALLATION IS COMPLETE ON US 83 WESTBOUND THE THE CONTRACTOR MAY PROCEED WITH US 83 EASTBOUND SSTR BRIDGE RAIL RETROFIT AND M.B.G.F. INSTALLATION.
4. ONCE WORK IS COMPLETE CRASH CUSHION AND BARRIER SHOULD BE STOCKPILED IN TXDOT PHARR HEADQUARTERS UNLESS OTHERWISE DIRECTED BY THE ENGINEER

STATE OF TEXAS
FRANCISCO J. CANTU
128657
LICENSED
PROFESSIONAL ENGINEER

02-27-2019

US 83
OJO DE AGUA CREEK BRIDGE RAIL RETROFITS TRAFFIC CONTROL PLAN

TCP 2 OF 2

Texas Department of Transportation

US 83 AT OJO DE AGUA

ID 211090003902189 & 211090003902221

FED.RD. DIV.NO.	MAINTENANCE PROJECT NO.	SHEET NO.
6	RMC 6443-44-001	9

STATE	DIST	COUNTY	HIGHWAY
TEXAS	21	HIDALGO, ETC	US 83, ETC

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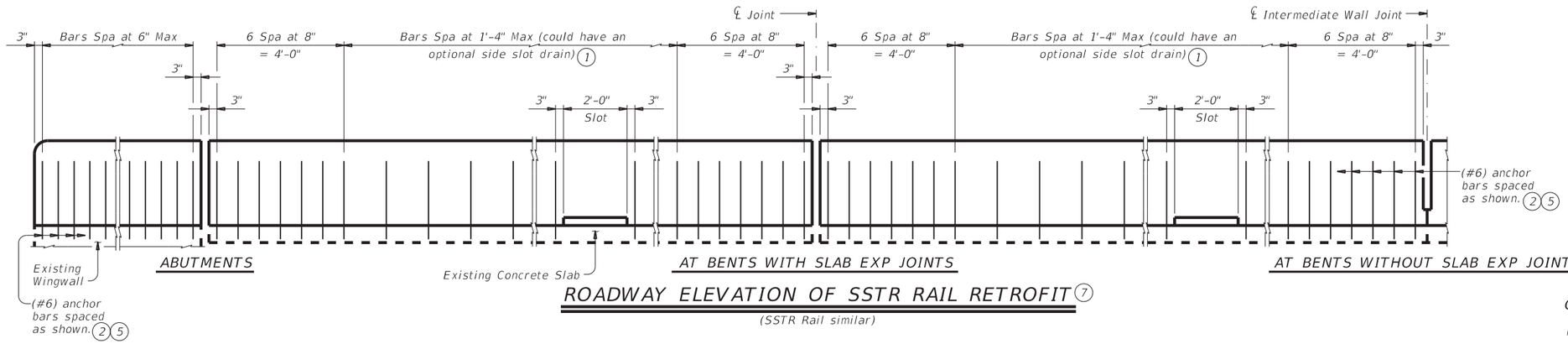

ROADWAY ELEVATION OF SSTR RAIL RETROFIT (7)

(SSTR Rail similar)

(1) When side slot drains are used, provide 8'-0" Min clear spacing between drain slots.

(2) Embed (#6) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 ¼". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. 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".

(5) See T551 or SSTR Rail Sections in "Rail Retrofit Section on Wingwalls using Epoxy Anchor Bars" and/or "Rail Retrofit Section on Concrete Slabs using Epoxy Anchor Bars".

(7) Showing spacing of (#6) anchor bar epoxy anchored in a rail retrofit condition. Secondary (#4) anchor bar epoxy anchored in a rail retrofit not shown for clarity. Reinforcing steel and terminal connections not shown for clarity. See appropriate rail standard for details and notes not shown.

(8) Place side slot drains as shown. See appropriate rail standard for side slot drains, except as noted.

CONSTRUCTION NOTES:

Field verify dimensions before commencing work and ordering materials.

By adding additional anchorage, welding can be performed at a minimum spacing of 3 ft between the cage and additional anchorage. By satisfying additional anchorage requirements slip forming is allowed. Do not weld to the required anchorage.

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.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if required elsewhere.

(#6) and (#4) anchor bars used for the epoxied anchorage system must not be epoxy coated within the required embedment.

GENERAL NOTES:

Use of these retrofit details will result in a railing acceptable for Test Level 3 regardless of the higher ratings that may be indicated on the rail standard.

Rail anchorage details shown on this guide may require modification for select structure types.

Removal and replacement of backfill, subgrade, and asphalt or concrete pavement necessary for this installation is considered subsidiary to the retrofit railing.

Payment for a rail retrofit will be as per Item 451, "Retrofit Railing". All details shown herein are subsidiary to rail retrofit. "Retrofit Rail (Ty SSTR)".

Reinforcing bar dimensions shown are out-to-out of bar.

STATE OF TEXAS
AGUSTIN RAMIREZ
96453
LICENSED
PROFESSIONAL ENGINEER

Agustin Ramirez, P.E.
11-14-2018

Texas Department of Transportation — Bridge Division Standard

RETROFIT CONCRETE BRIDGE RAIL (SSTR)

C-RAIL-R MOD 1 OF 3

US 83 AT OJO DE AGUA
ID 211090003902189 & 211090003902221

FILE: rlstd022-18.dgn			
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REVISIONS	6	RMC 6443-44-001	10
	STATE / DIST	COUNTY	HIGHWAY
	TEXAS / 21	HIDALGO, ETC	US 83, ETC

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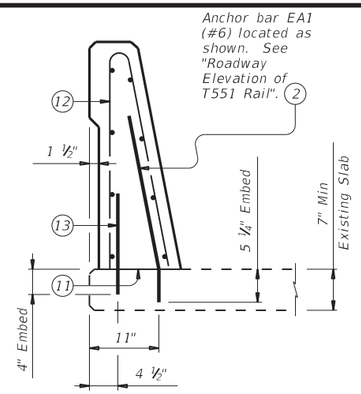
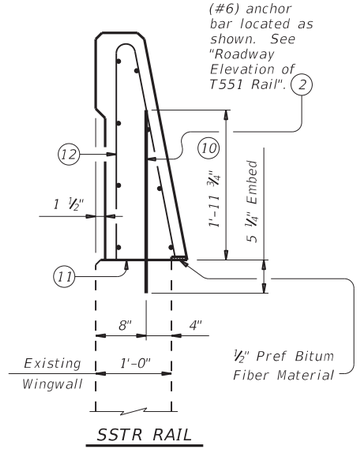


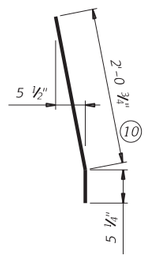
SSTR RAIL

RAIL RETROFIT SECTION USING EPOXY ANCHOR BARS (9)



SSTR RAIL

RAIL RETROFIT SECTION ON WINGWALLS USING EPOXY ANCHOR BARS (9)



ANCHOR BAR EA1 (#6)

(2) Embed (#6) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 ¼". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. 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".

(9) Showing location or locations of anchor bars in a rail retrofit condition. See appropriate rail standard for details and notes not shown.

(10) 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 shoulder width to a thickness of 2" or less at toe of rail.

(11) Do not cast rails or parapet walls on top of overlays/seal coats.

(12) See appropriate rail standard for reinforcing steel. Modify length of vertical reinforcing bars as required to fit existing structure. Longitudinal reinforcing bars may be removed only if their position puts them in conflict with un-removed portions of existing structure.

(13) Embed secondary (#4) anchor bars 1'-4" in length with a Type III Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 10 kips. 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". (#4) anchor bars spaced longitudinally along rail at 4 ft Max (Spaced 3" longitudinally from outside edge and edge of side slot drains).

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11-14-2018

Texas Department of Transportation | Bridge Division Standard

RETROFIT CONCRETE BRIDGE RAIL

(SSTR)

C-RAIL-R MOD 2 OF 3

Texas Department of Transportation
©TxDOT 2024

US 83 AT OJO DE AGUA
ID 211090003902189 & 211090003902221

FILE: rlstd022-18.dgn	FED.RD. DIV.NO.	MAINTENANCE PROJECT NO.	SHEET NO.
©TxDOT March 2018.	6	RMC 6443-44-001	11
REVISIONS	STATE	DIST	COUNTY	HIGHWAY
	TEXAS	21	HIDALGO, ETC	US 83, ETC

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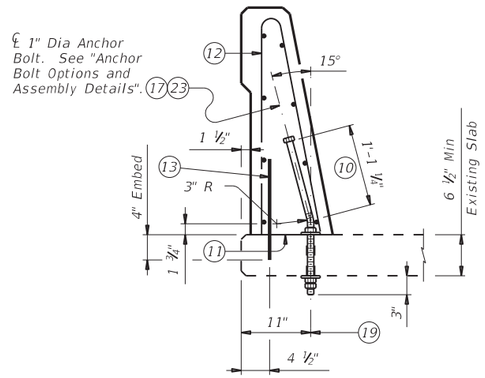
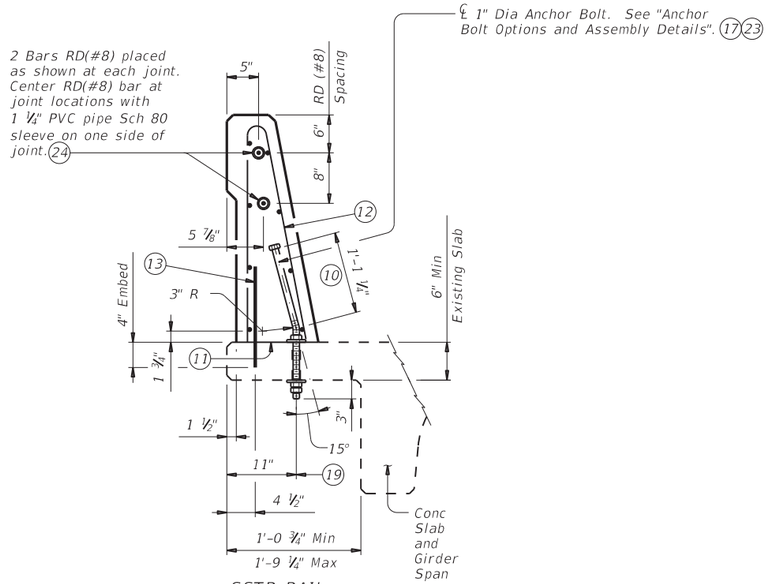


SSTR RAIL

RAIL RETROFIT SECTION USING ANCHOR BOLTS (20)



SSTR RAIL

RAIL RETROFIT ON CG (PAN FORM) SPANS (20)

(10) 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 shoulder width to a thickness of 2" or less at toe of rail.

(11) Do not cast rails or parapet walls on top of overlays/seal coats.

(12) See appropriate rail standard for reinforcing steel. Modify length of vertical reinforcing bars as required to fit existing structure. Longitudinal reinforcing bars may be removed only if their position puts them in conflict with un-removed portions of existing structure.

(13) Embed secondary (#4) anchor bars 1'-4" in length with a Type III Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 10 kips. 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". (#4) anchor bars spaced longitudinally along rail at 4 ft Max (Spaced 3" longitudinally from outside edge and edge of side slot drains).

(17) ℄ 1" Dia Anchor Bolt Spaced longitudinally along rail at 24" Max (Spaced 6" longitudinally from outside edge and edge of optional side slot drains, if required).

(19) ℄ 1 1/16" to 1 ⅛" Dia holes. Core drill holes through existing deck (percussion drilling not permitted). Concrete spalls in the bottom of the deck exceeding ½" from edge of holes will be patched in accordance with Item 429, "Concrete Structure Repair" at the Contractor's expense.

(20) Showing location of anchor bars and anchor bolts in a rail retrofit condition. See appropriate rail standard for details and notes not shown.

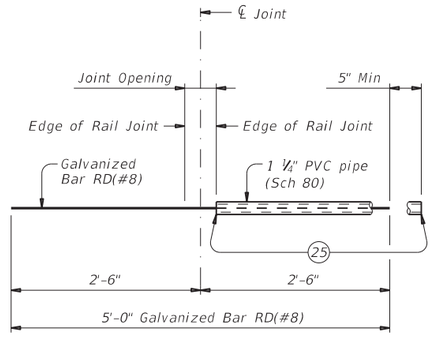
(21) ℄ 1" Dia ASTM F1554 Gr 55 Anchor Bolt or Threaded Rod. Nuts must conform to ASTM A563 requirements.

(22) Plate Washer ⅜ x 3 x 3 ASTM A36 with 1 1/16" Dia Hole centered.

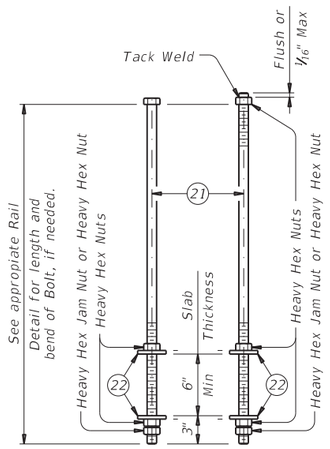
(23) Galvanize anchor bolts, nuts and plate washers.

(24) See "Bar RD(#8) Assembly Detail".

(25) Tape ends of 1 ¼" PVC pipe Sch 80 to prevent concrete or mortar from seeping in.



BAR RD(#8) ASSEMBLY DETAIL



ANCHOR BOLT OPTIONS AND ASSEMBLY DETAILS (23)

STATE OF TEXAS
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11-14-2018

Texas Department of Transportation

Bridge Division Standard

RETROFIT CONCRETE BRIDGE RAIL (SSTR)

C-RAIL-R MOD 3 OF 3

Texas Department of Transportation

US 83 AT OJO DE AGUA
ID 211090003902189 & 211090003902221

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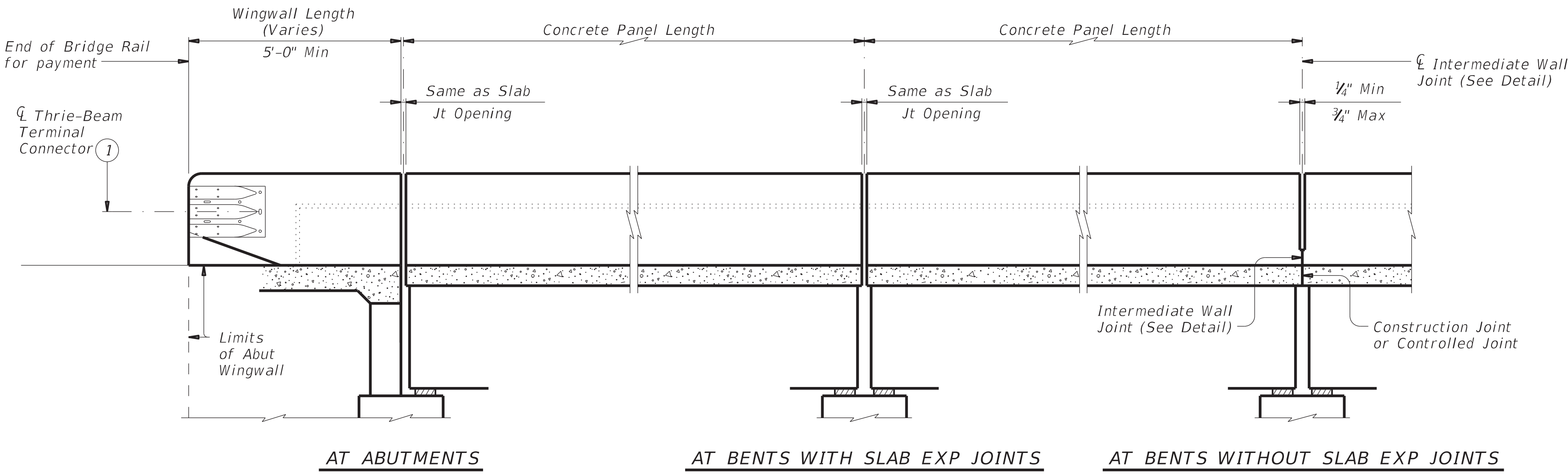
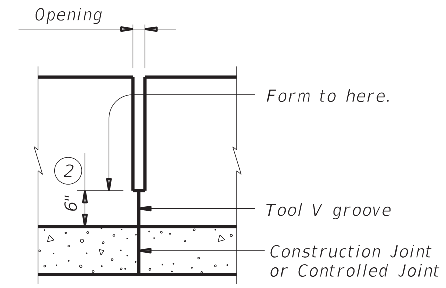
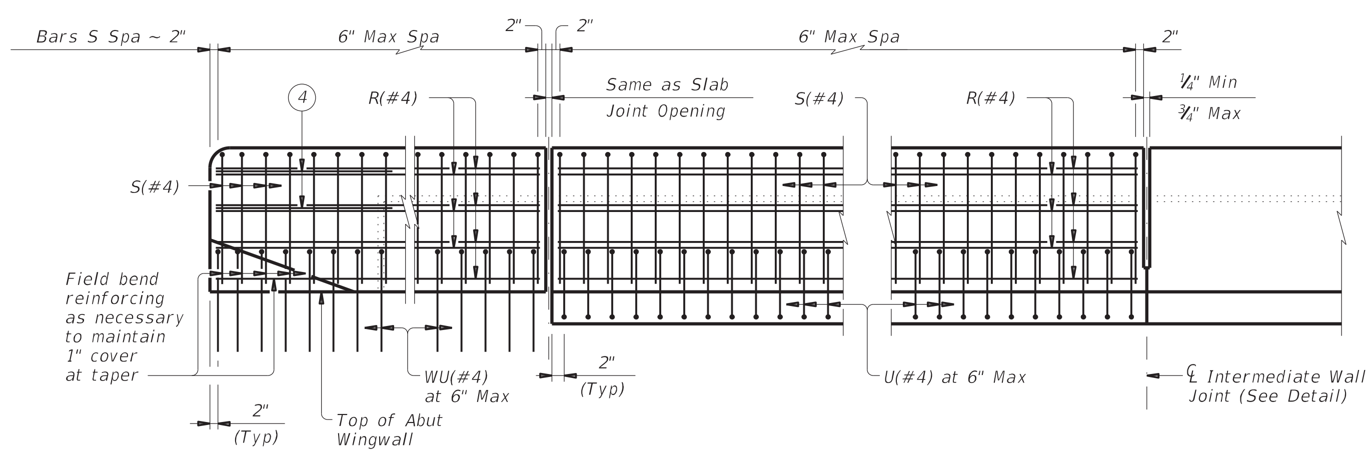


ROADWAY ELEVATION OF RAIL

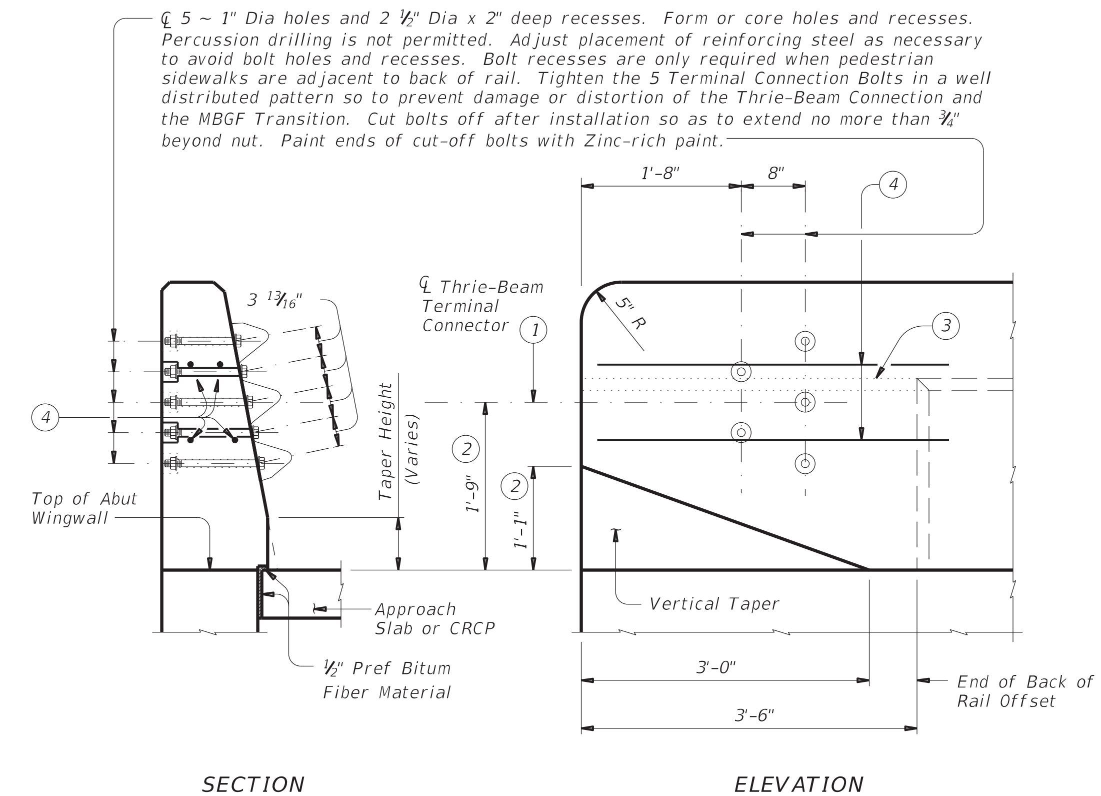


INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



TERMINAL CONNECTION DETAILS

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.

Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

SSTR 1 OF 2

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ID 211090003902189 & 211090003902221

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6	RMC 6443-44-001		13
STATE	DIST	COUNTY	HIGHWAY
TEXAS	21	HIDALGO, ETC	US 83, ETC

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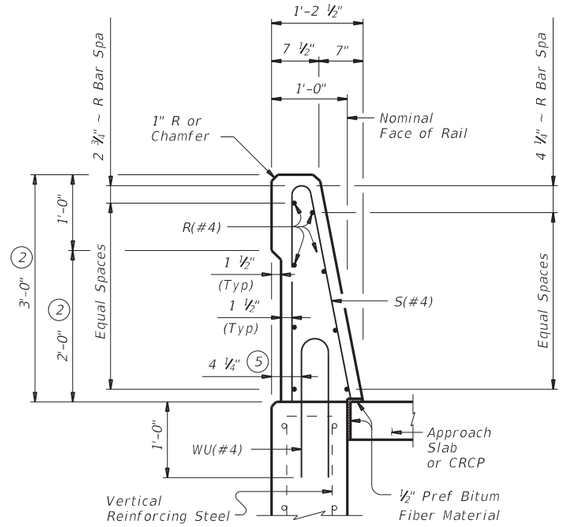
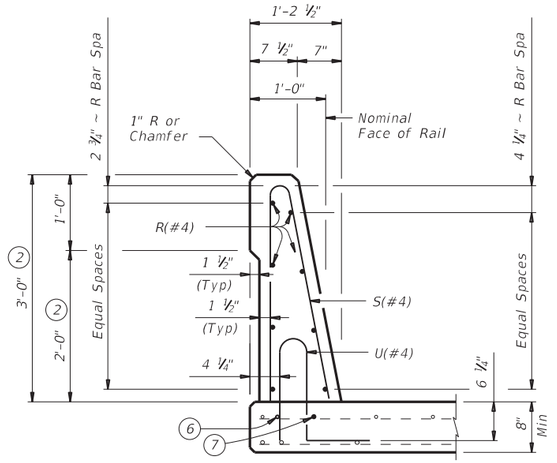


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



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 greator to side slot drain.

CONSTRUCTION NOTES:

This railing may be constructed with slip-forms 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 slip-form operations is acceptable. Welding can be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to U, WU and S bars 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.

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.

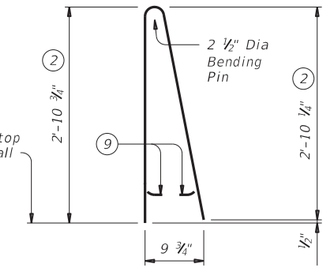
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

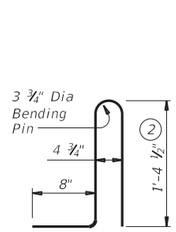
Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise.

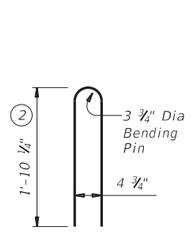
Reinforcing bar dimensions shown are out-to-out of bar.



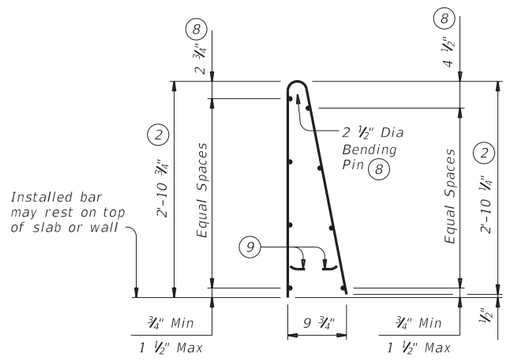
BARS S (#4)



BARS U (#4)

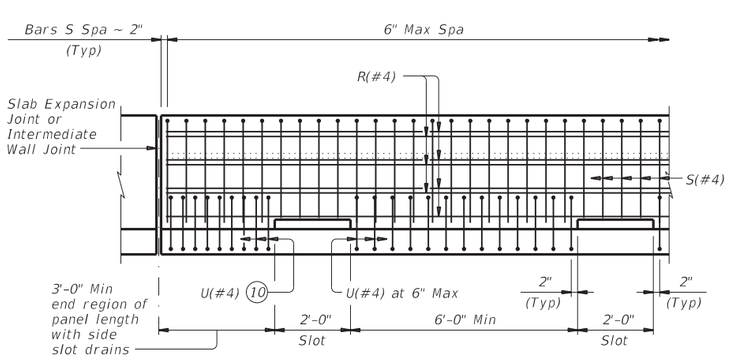


BARS WU (#4)



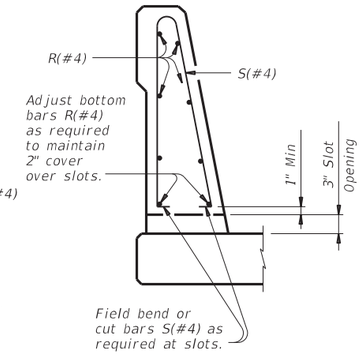
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

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.	



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

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

SSTR 2 OF 2

Texas Department of Transportation

US 83 AT OJO DE AGUA

ID 211090003902189 & 211090003902221

FED.RD. DIV.NO.	MAINTENANCE PROJECT NO.	SHEET NO.
6	RMC 6443-44-001	14
STATE / DIST	COUNTY	HIGHWAY
TEXAS / 21	HIDALGO, ETC	US 83, ETC

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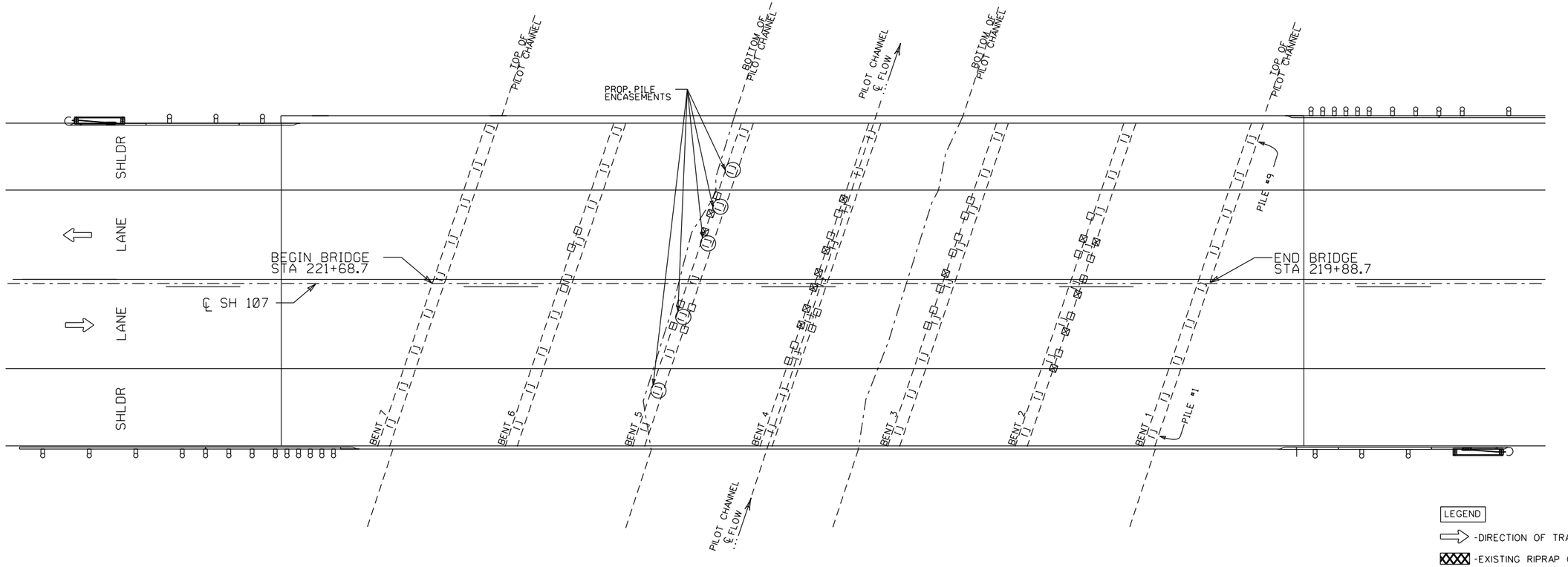
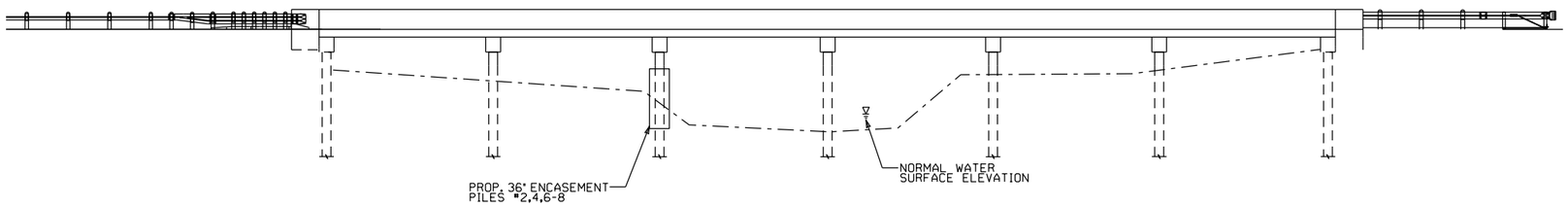


PLAN VIEW



ELEVATION VIEW

LEGEND

- -DIRECTION OF TRAFFIC
- -EXISTING RIPRAP (TO BE REMOVED)
- -EXIST. RIPRAP (TO REMAIN)
- -PROP RIPRAP
- FLOW -WATERFLOW
- -REP STL BRDG MEMB (WELD REPAIR)
- -REPAIR STEEL (CORROSION MITIGATION)
- -PROP PILE ENCASEMENT

ITEM CODE		DESCRIPTION	UNIT	TOTAL	
ITEM NO.	DESC. CODE			EST.	FINAL
420	6070	CL C CONC (PILE ENCASEMENT)	CY	8	
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	14	
784	6072	REP STL BRDG MEMB (WELD REPAIR)	EA	14	
784	6192	REPAIR STEEL (CORROSION MITIGATION)	EA	41	
7306	6002	BRIDGE SUBSTRUCTURE CLEANING (BENT)	EA	5	

ITEM 429 TO BE USED TO REPAIR CONCRETE SPALLS ON BENT 2 AND BENT 3

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED
PROFESSIONAL ENGINEER

4/30/2024

Eugene Palacios

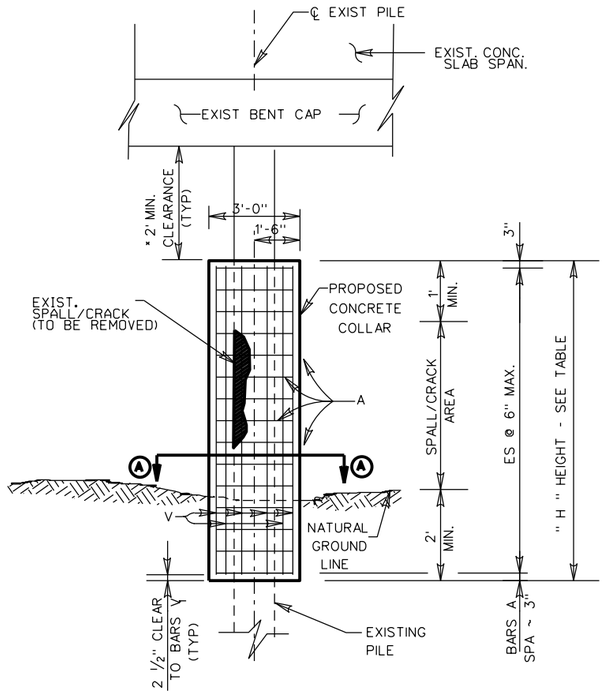
Texas Department of Transportation

SH 107 AT FLOODWAY

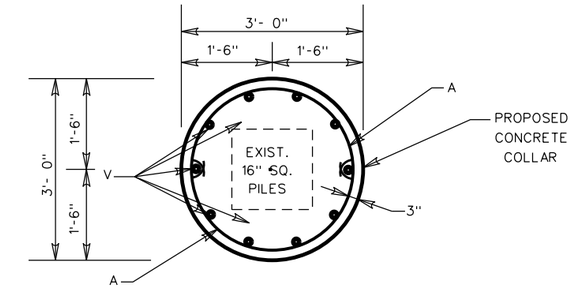
ID 211090034202001

FED.RD. DIV.NO.	MAINTENANCE PROJECT NO.	SHEET NO.
6	RMC 6443-44-001	15

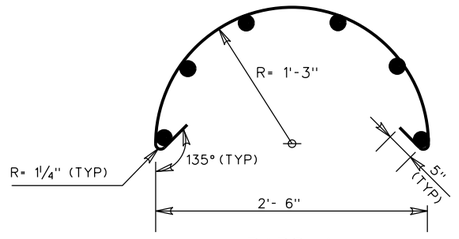
STATE	DIST	COUNTY	HIGHWAY
TEXAS	21	HIDALGO, ETC	US 83, ETC



TYPICAL CONCRETE PILE ENCASEMENT



SECTION A-A



BARS A

⊙ TABLE OF ESTIMATED QUANTITIES

HEIGHT "H"	CL "SS" CONC	℄ BARS V 10 - #9		℄ BARS A - #3 (L= 6'- 0")		℄ TOTAL WEIGHT OF STEEL
		LENGTH	WEIGHT	NUMBER OF	WEIGHT	
(FT)	(CY)	(FT)	(LBS)	BARS	(LBS)	(LBS)
8	1.6	7'-7"	258	32	72	330
9	1.8	8'-7"	292	36	81	373
10	2.0	9'-7"	326	40	90	419
11	2.2	10'-7"	360	44	99	459
12	2.4	11'-7"	394	48	108	502
13	2.6	12'-7"	428	52	117	545

℄ FOR CONTRACTORS INFORMATION ONLY.

⊙ QUANTITIES SHOWN ARE FOR ONE PILE ENCASEMENT OF THE SPECIFIED HEIGHT.

GENERAL NOTES

1. CONCRETE SHALL BE CLASS "SS", f'c = 3,600 psi.

2. REINFORCEMENT MAY BE GRADE 40.

3. QUANTITY BASED ON HEIGHT OF 8 FT USED FOR ESTIMATE PURPOSES. FIELD CONDITIONS WILL DICATE HEIGHT.

4. SOUND THE PERIMETER OF THE EXIST PILING AND REMOVE SPALLED CONCRETE. TREAT CORRODED REINFORCEMENT WITH CORROSION PROTECTION MEDIUM. REMOVE ALL LOOSE CONCRETE.

5. PLACE COLUMN FORM/SONO TUBE AND CAST CONCRETE 1' ABOVE CURRENT WATER ELEVATION, REMOVE WATER/MUCK OFF THE THE TOP OF CONCRETE SURFACE AND THEN FORM UP REST OF OF COLUMN AND CAST COLUMN ENCASEMENT TO ELEVATION MATCHING OTHER ENCASEMENTS.

6. CONTAIN AND DISPOSE OF THE THE WATER/MUCK DISPLACED BY THE CONCRETE THAT WAS DISPLACED BY THE CONCRETE. THIS WORK IS SUBSIDIARY TO ITEM 420.

7. WORK AREA SHALL BE DRY. WORK METHOD TO PROVIDE A DRY ENVIRONMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE CONSIDERED SUBSIDIARY TO ITEM 420, "CL C CONC (PILE ENCASEMENT)".

8. IF NEEDED, WATER IS TO BE DIVERTED AND STOPPED WHILE CONSTRUCTING THE PILE ENCASEMENT.

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED
PROFESSIONAL ENGINEER

4/30/2024

Eugene Palacios

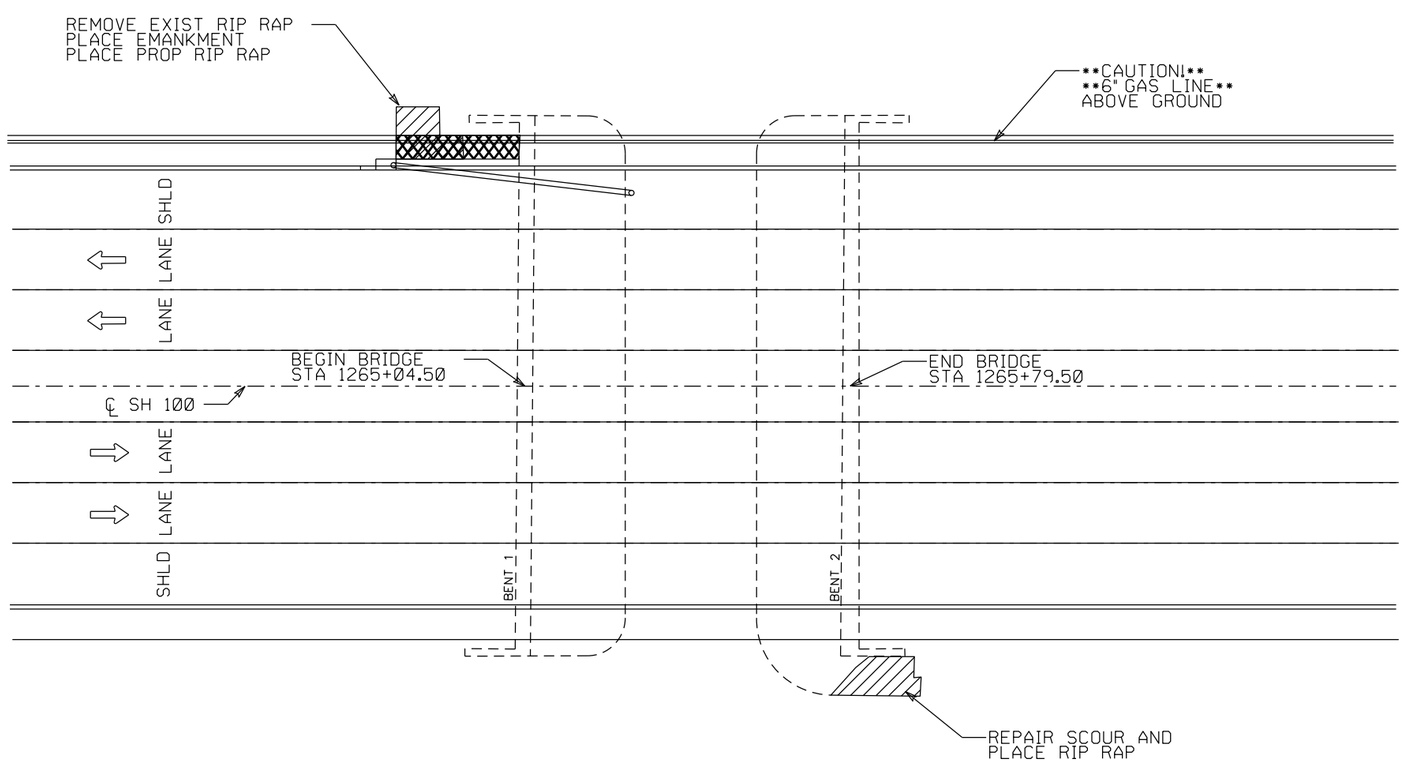
Texas Department of Transportation

SH 107 AT FLOODWAY

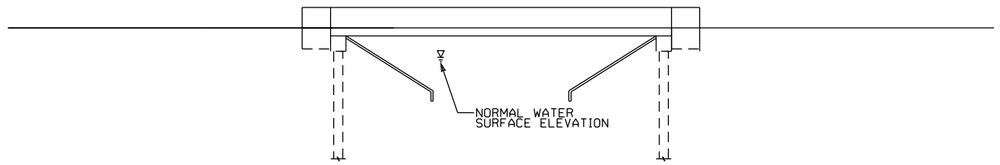
ID 211090034202001

FED.RD. DIV.NO.	MAINTENANCE PROJECT NO.	SHEET NO.
6	RMC 6443-44-001	16

STATE	DIST	COUNTY	HIGHWAY
TEXAS	21	HIDALGO, ETC	US 83, ETC

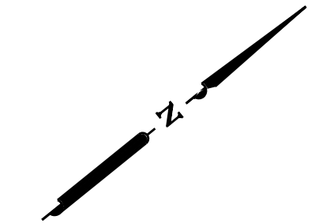


PLAN VIEW



ELEVATION VIEW

ITEM CODE		DESCRIPTION	UNIT	TOTAL	
ITEM NO.	DESC. CODE			EST.	FINAL
104	6009	REMOVING CONC (RIPRAP)	SY	16	
132	6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	23	
432	6001	RIPRAP (CONC)(4 IN)	CY	3	



LEGEND

-DIRECTION OF TRAFFIC

-EXISTING RIPRAP (TO BE REMOVED)

-EXIST. RIPRAP (TO REMAIN)

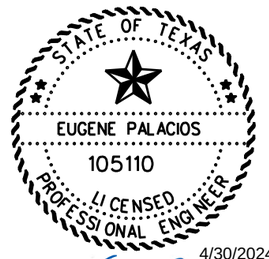
-PROP RIPRAP

FLOW -WATERFLOW

-REP STL BRDG MEMB (WELD REPAIR)

-REPAIR STEEL (CORROSION MITIGATION)

-PROP PILE ENCASEMENT



4/30/2024

Eugene Palacios

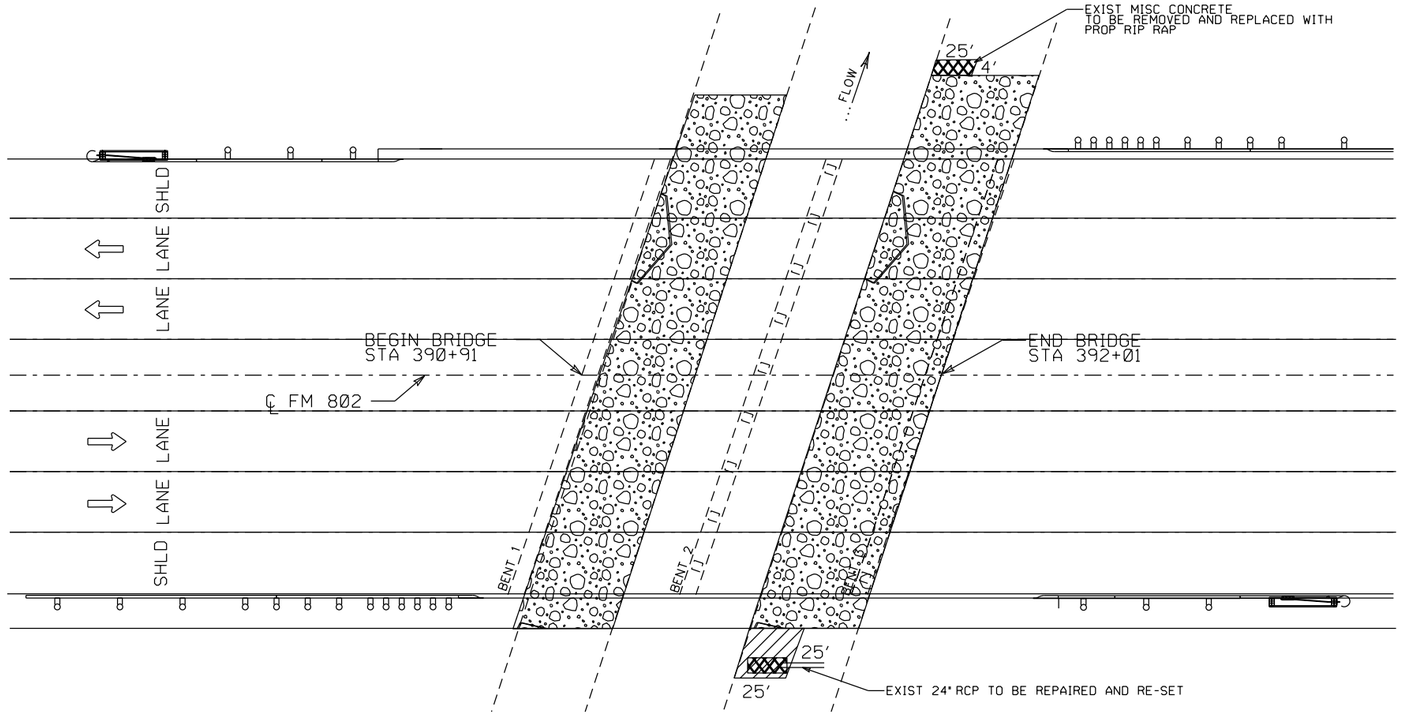
Texas Department of Transportation

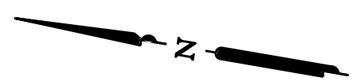
SH 100 @ SHRIMP CHANNEL

ID 210310033102006

FED.RD. DIV.NO.	MAINTENANCE PROJECT NO.	SHEET NO.
6	RMC 6443-44-001	17

STATE	DIST	COUNTY	HIGHWAY
TEXAS	21	HIDALGO, ETC	US 83, ETC

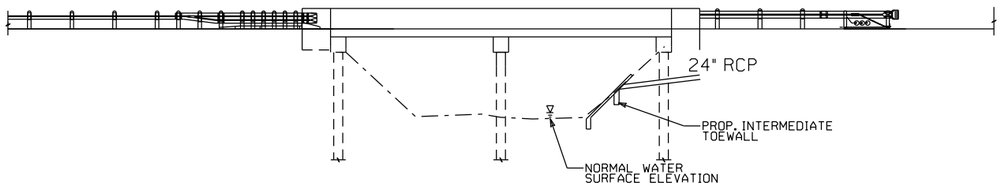




LEGEND

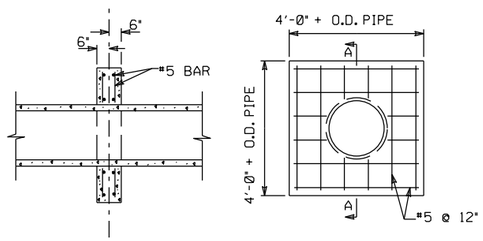
- -DIRECTION OF TRAFFIC
- -EXISTING RIPRAP (TO BE REMOVED)
- -EXIST. RIPRAP (TO REMAIN)
- -PROP RIPRAP
- FLOW -WATERFLOW
- -REP STL BRDG MEMB (WELD REPAIR)
- -REPAIR STEEL (CORROSION MITIGATION)
- -PROP PILE ENCASEMENT

PLAN VIEW

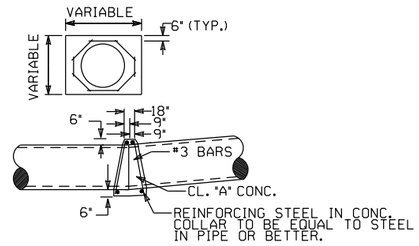


ELEVATION VIEW

ITEM CODE		DESCRIPTION	UNIT	TOTAL	
ITEM NO.	DESC. CODE			EST.	FINAL
104	6028	REMOVING CONC (MISC)	SY	17	
132	6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	135	
420	6071	CL C CONC (COLLAR)	EA	1	
432	6001	RIPRAP (CONC)(4 IN)	CY	12	
472	6006	REMOV & RE - LAY PIPE (24 IN)	LF	8	
496	6018	REMOVE STR (CONC)	EA	1	
760	6001	DITCH CLEANING AND RESHAPING (FOOT)	LF	29	



CONCRETE PIPE COLLAR N.T.S.



DETAIL FOR CONC. COLLARS
DRAINAGE STRUCTURES AND PIPE
SIPHONS (HORIZ. & VERT. BENDS)

STATE OF TEXAS
EUGENE PALACIOS
105110
LICENSED
PROFESSIONAL ENGINEER

4/30/2024

Eugene Palacios

Texas Department of Transportation

FM 802 AT DRAIN DITCH

ID 210310114003003

FED.RD. DIV.NO.	MAINTENANCE PROJECT NO.	SHEET NO.
6	RMC 6443-44-001	18

STATE	DIST	COUNTY	HIGHWAY
TEXAS	21	HIDALGO, ETC	US 83, ETC

DATE:
FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

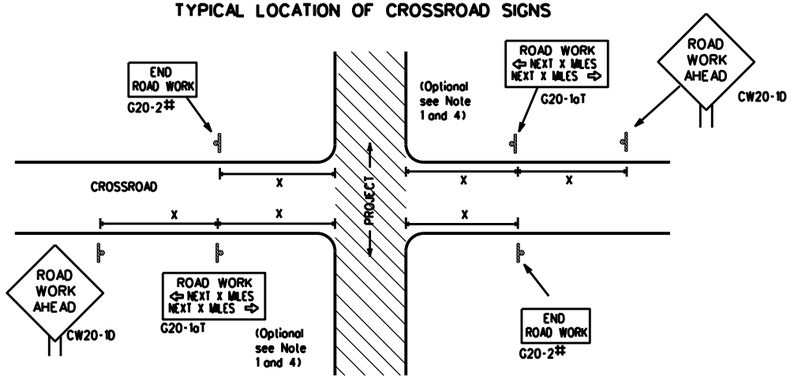
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6443	44	001	US 83, ETC
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	PHR	HIDALGO, ETC		19
5-10 5-21				

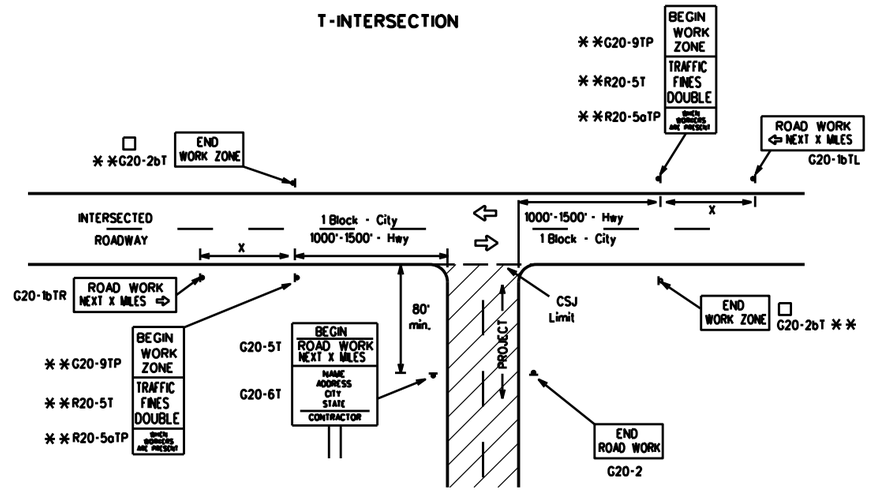
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

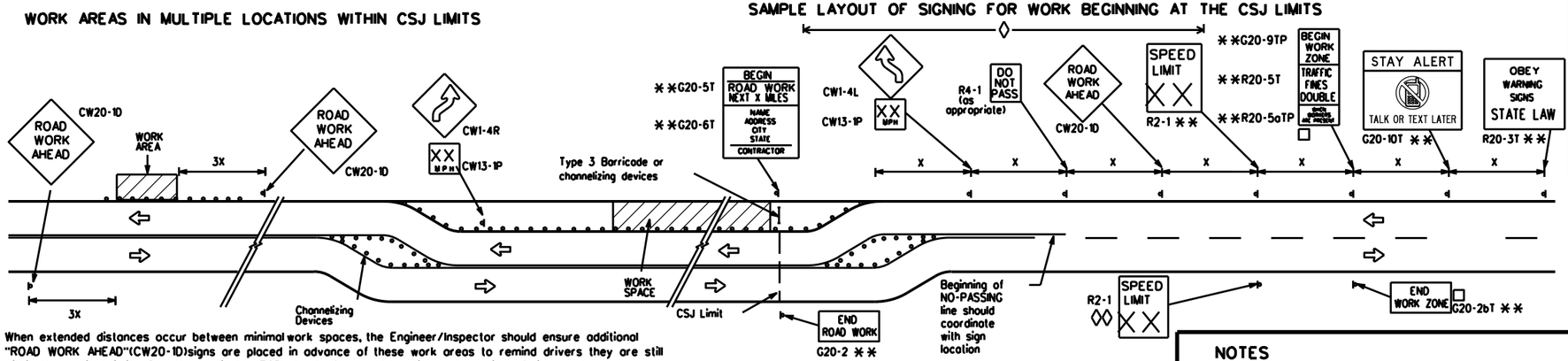
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

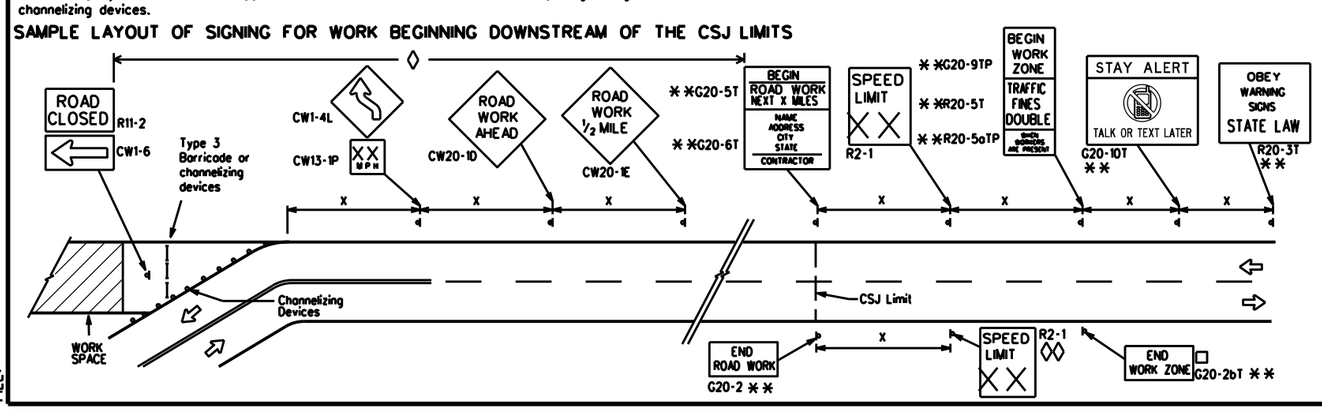
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may 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 DOWNSTREAM OF THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

NOTES

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

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

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

◊ 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.

SHEET 2 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6443	44	001	US 83, ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	HIDALGO, ETC		20

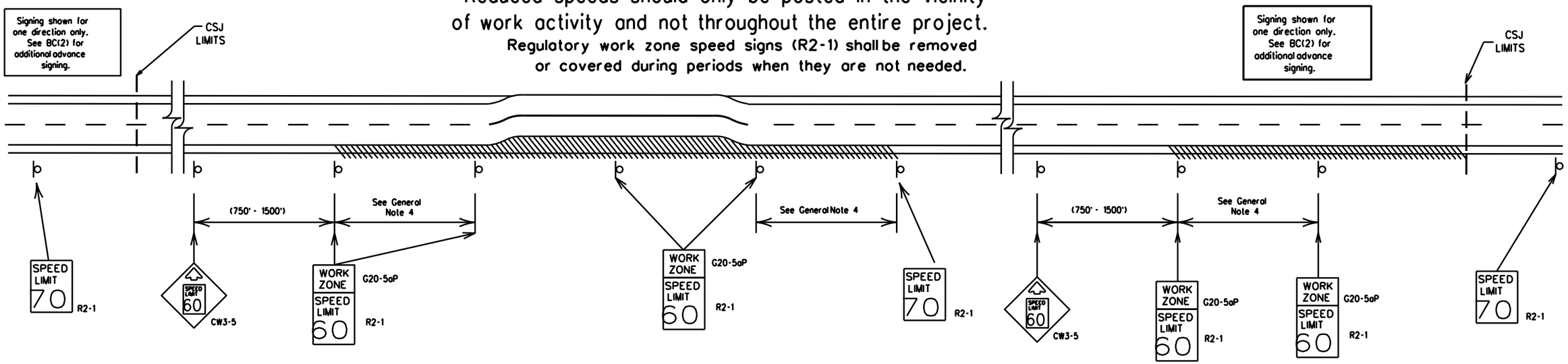
DATE:
FILE:

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

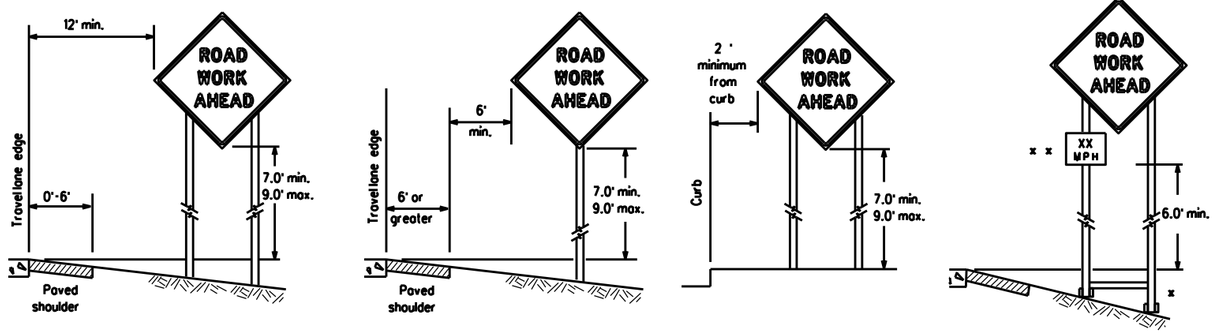
BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6443	44	001	US 83, ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	HIDALGO, ETC		21

DATE:
FILE:

DATE:
FILE:

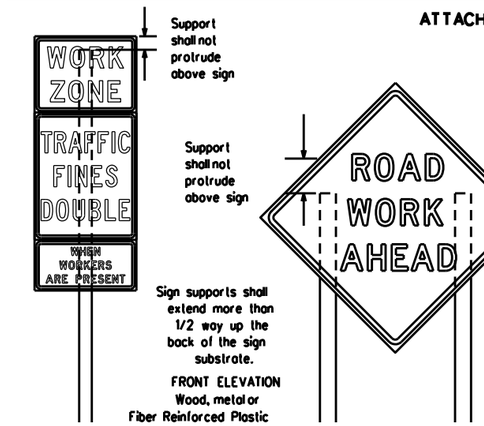
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



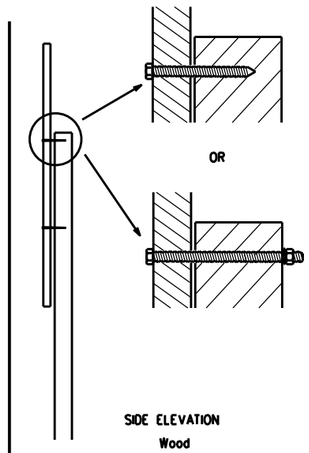
x When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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.

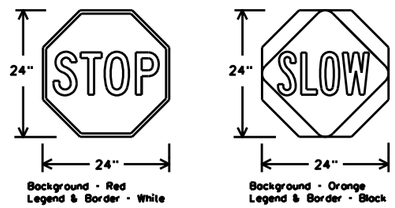


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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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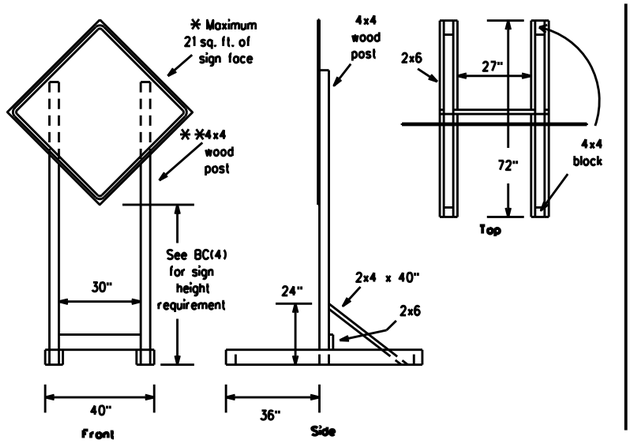
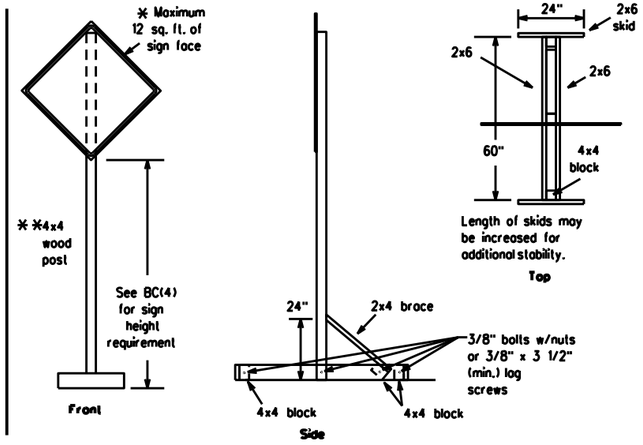
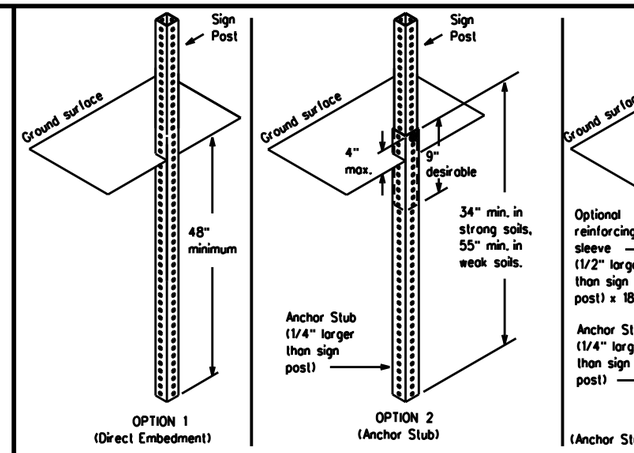


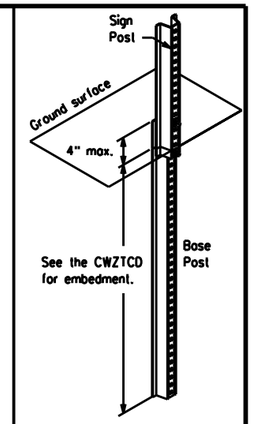


SKID MOUNTED WOOD SIGN SUPPORTS

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



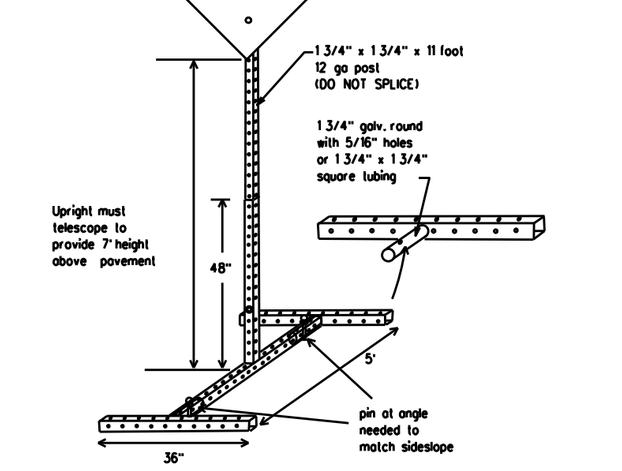
PERFORATED SQUARE METAL TUBING

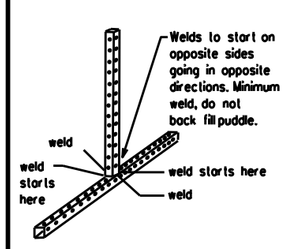


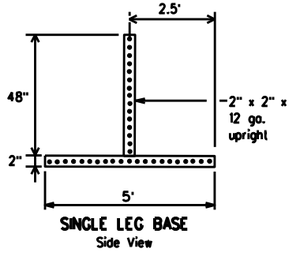
WING CHANNEL
Lap-splice/base bolted anchor

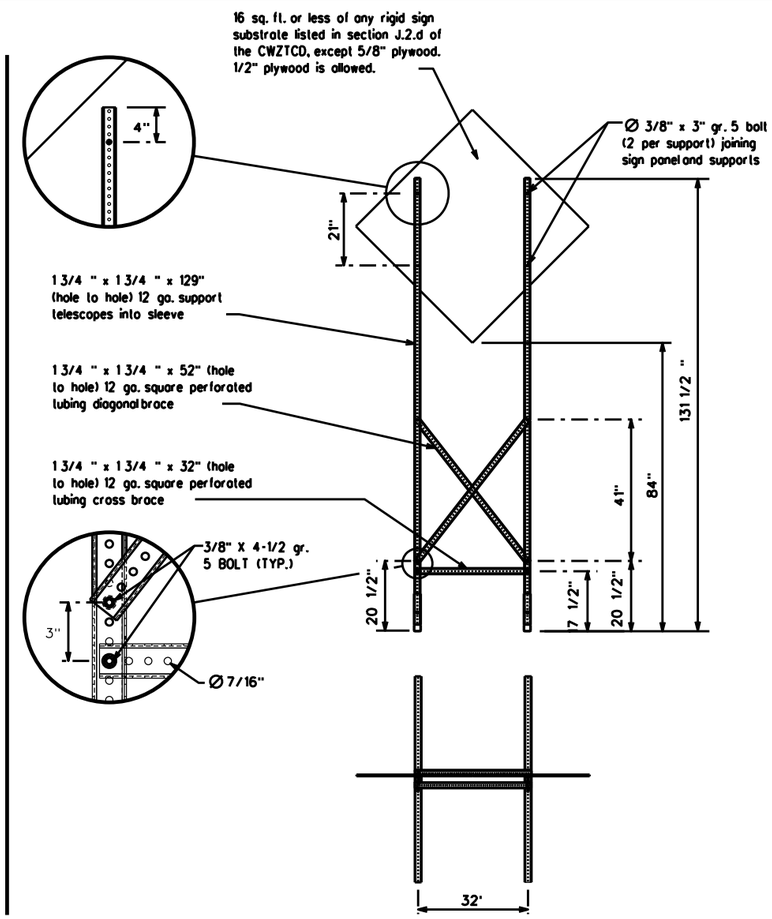
GROUND MOUNTED SIGN SUPPORTS

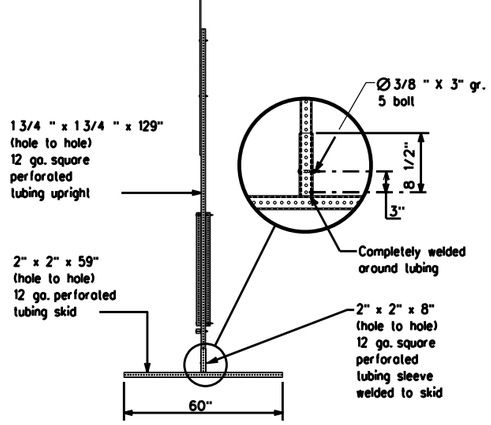
Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.











SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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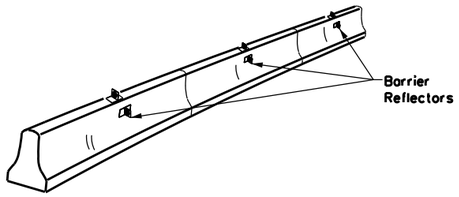
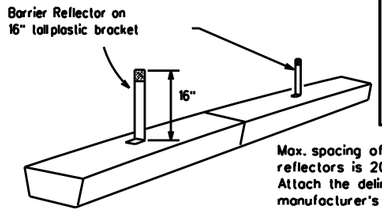
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



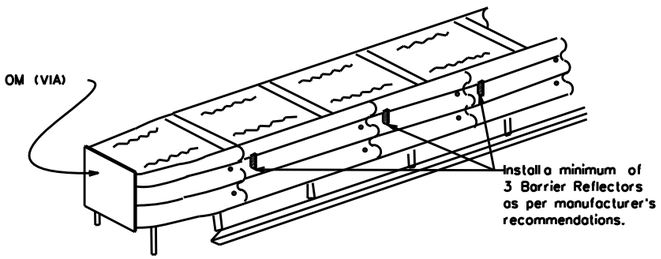
CONCRETE TRAFFIC BARRIER (CTB)

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)



DELINEATION OF END TREATMENTS

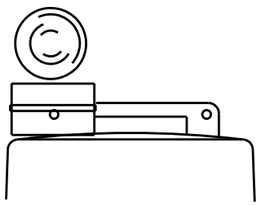
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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.

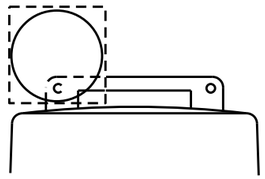
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

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

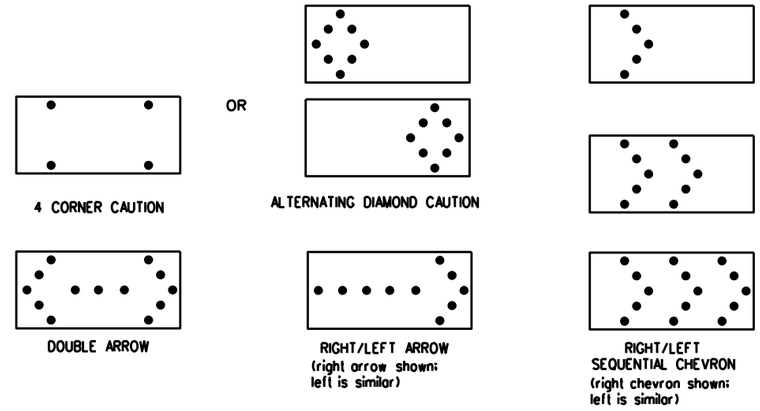
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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:



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

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

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is on 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
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6443	44	001	US 83, ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	HIDALGO, ETC		25

101

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DATE:
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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:

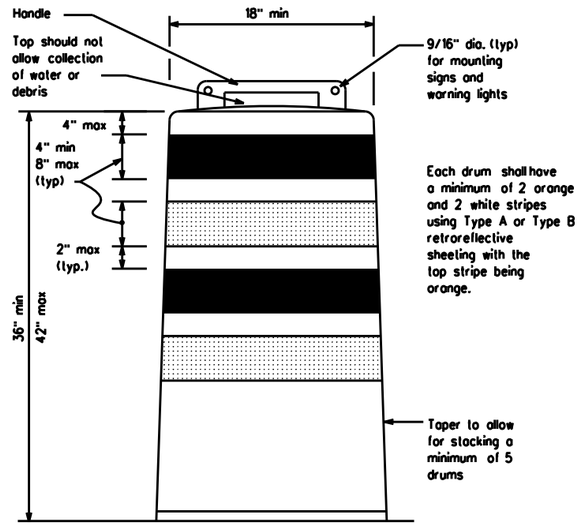
1. Plastic drums shall be a two-piece design: the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents 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.

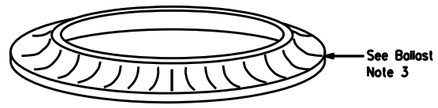
RETROREFLECTIVE SHEETING

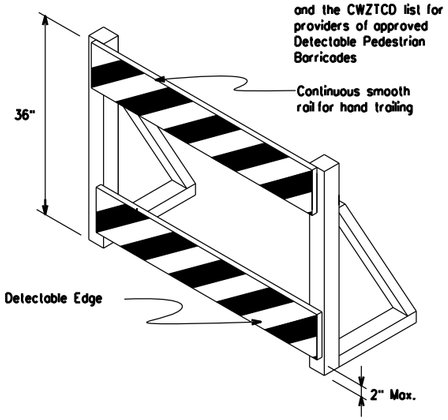
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall 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.

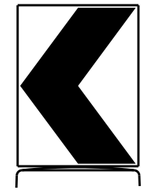




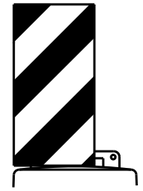


DETECTABLE PEDESTRIAN BARRICADES

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 travel way

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6443	44	001	US 83, ETC
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	PHR	HIDALGO, ETC		26
7-13				

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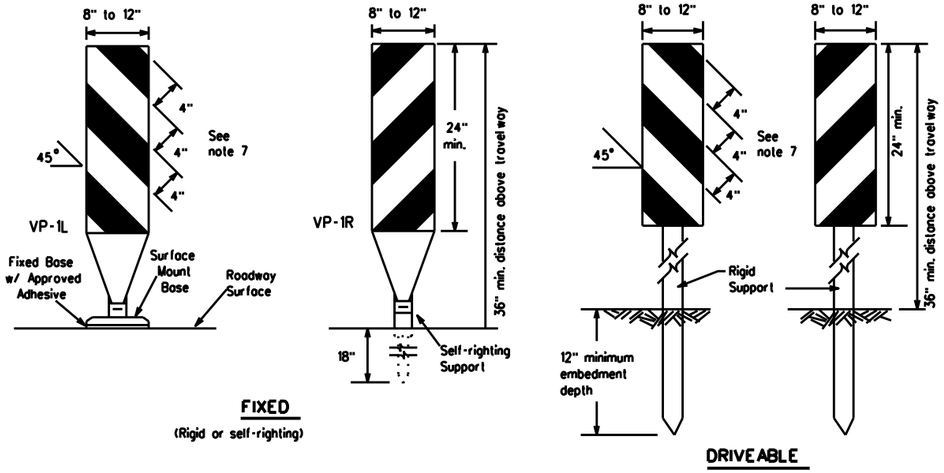
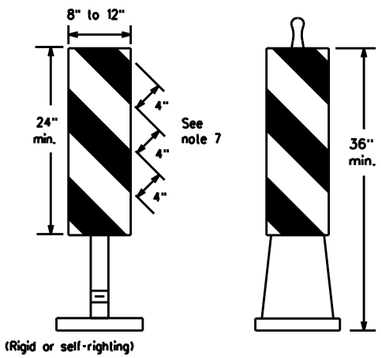


FIXED

(Rigid or self-righting)

DRIVEABLE

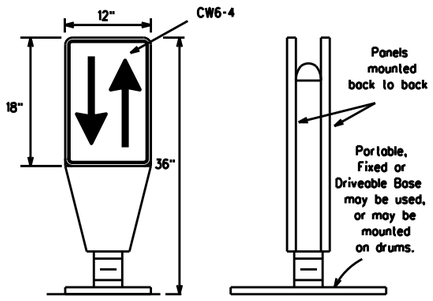


(Rigid or self-righting)

PORTABLE

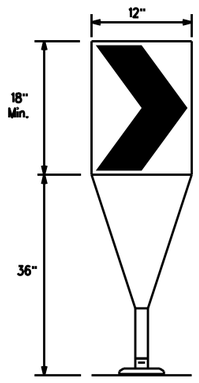
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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



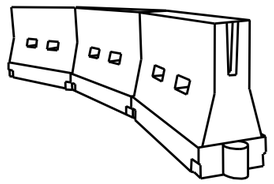
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B 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

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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9-07 8-14	DIST	COUNTY		SHEET NO.
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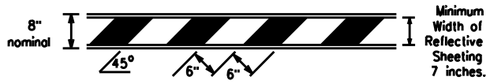
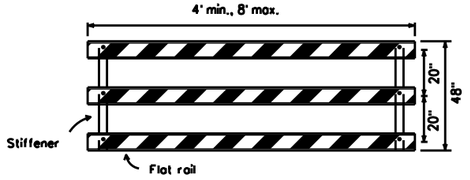
TYPE 3 BARRICADES

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.



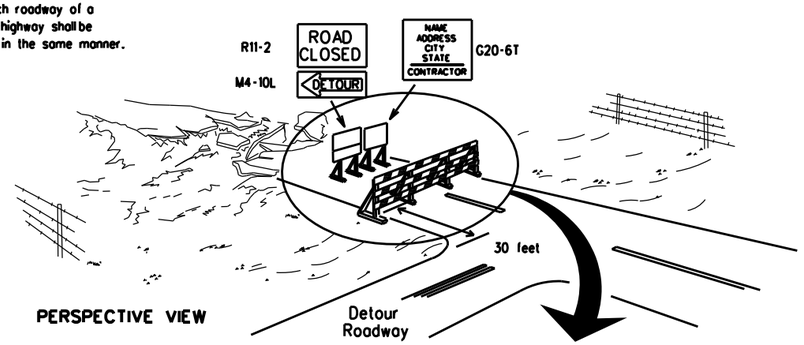
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

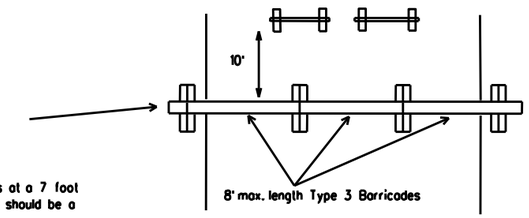
Each roadway of a divided highway shall be barricaded in the same manner.



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.

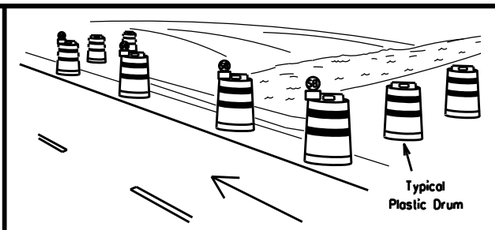
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

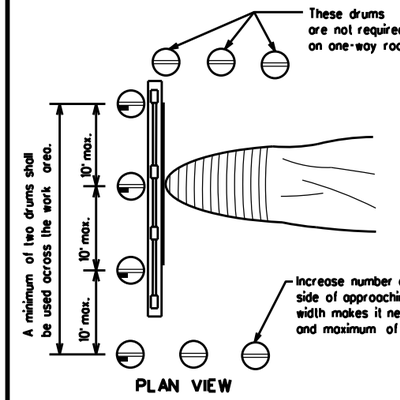
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

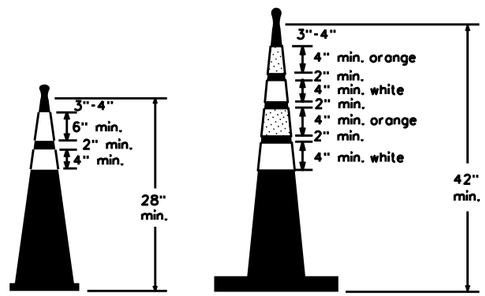
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



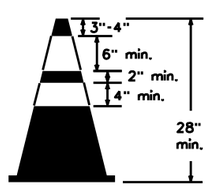
PLAN VIEW

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

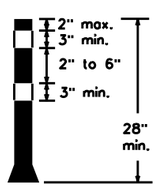
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



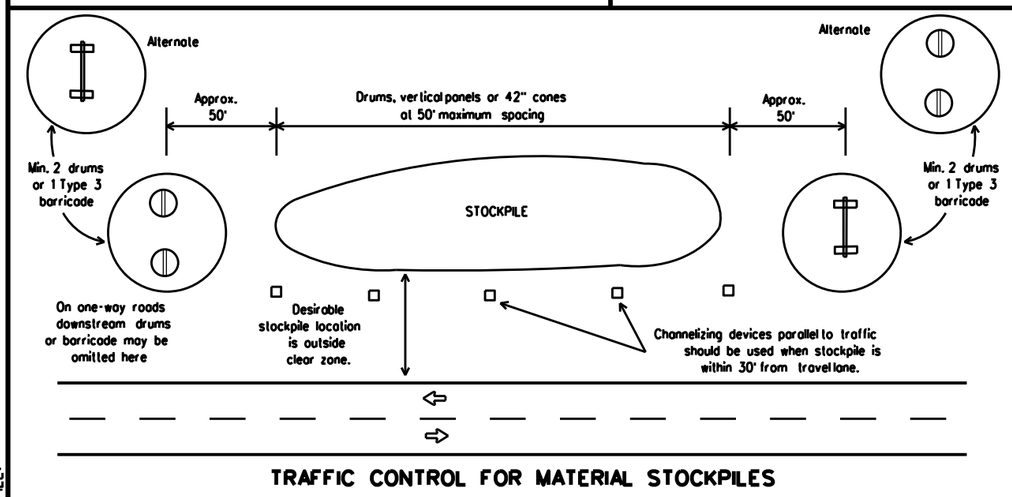
One-Piece cones



Tubular Marker

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

DATE:
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SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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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.

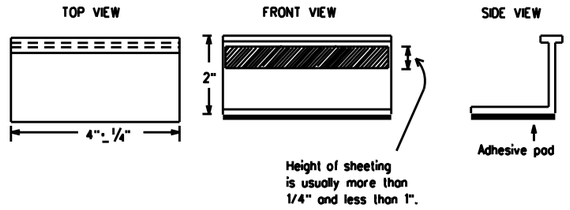
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

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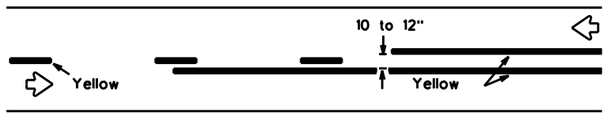
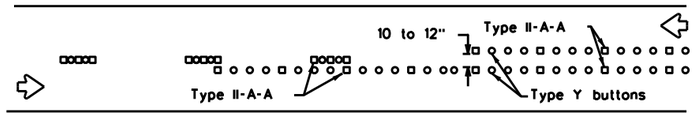
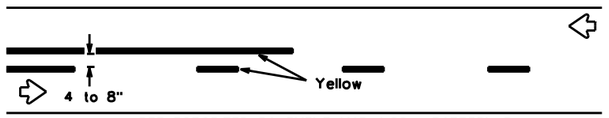
PAVEMENT MARKING PATTERNS



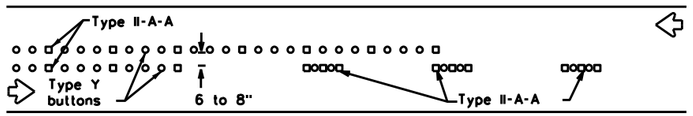
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



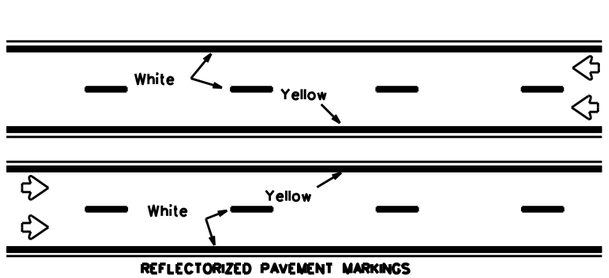
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



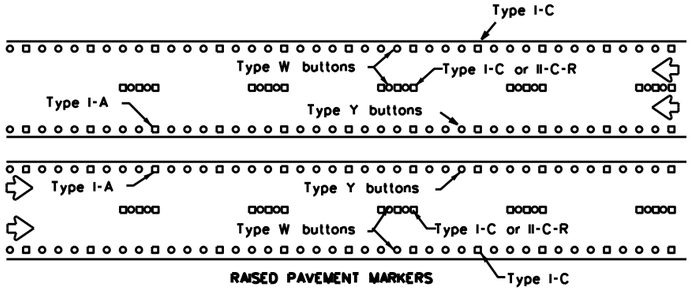
RAISED PAVEMENT MARKERS - PATTERN B

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

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



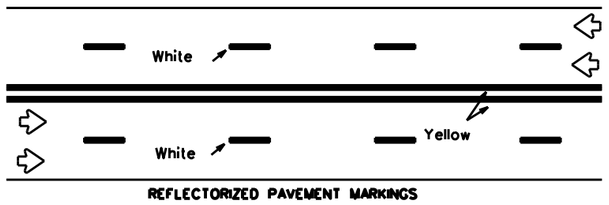
REFLECTORIZED PAVEMENT MARKINGS



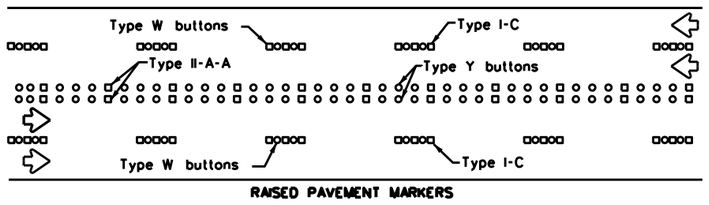
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



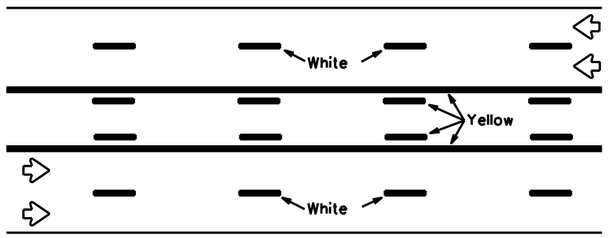
REFLECTORIZED PAVEMENT MARKINGS



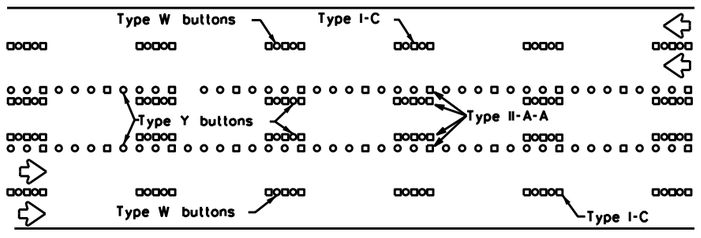
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

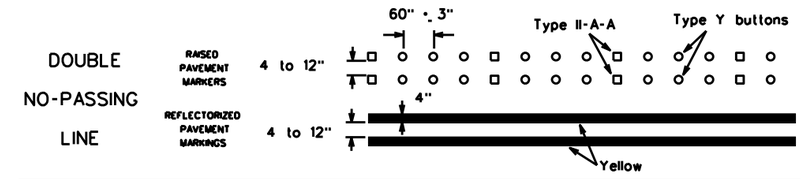
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

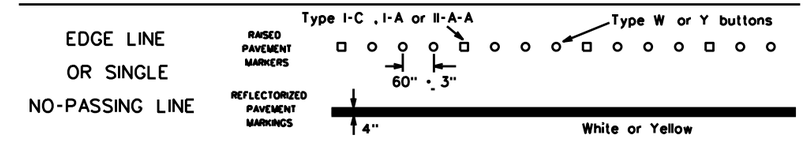
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

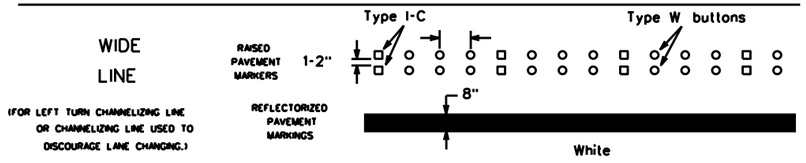


EDGE LINE OR SINGLE NO-PASSING LINE



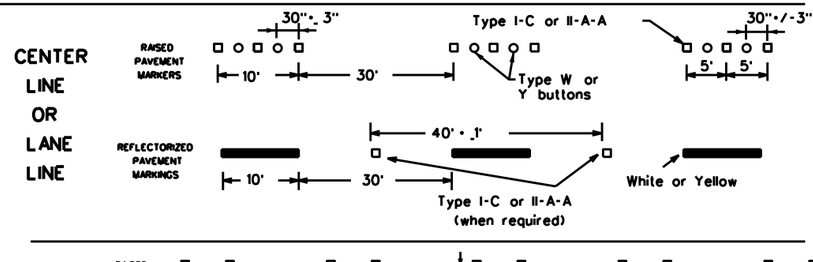
WIDE LINE

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

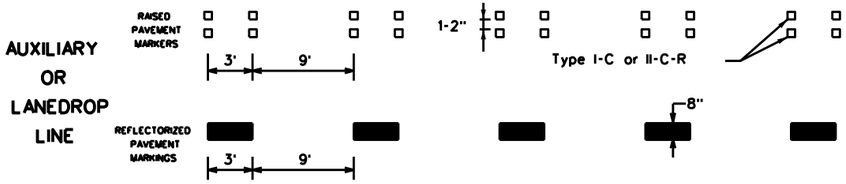


BROKEN LINES

CENTER LINE OR LANE LINE

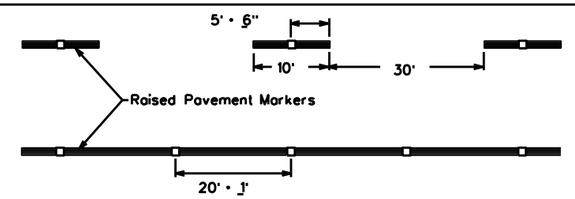


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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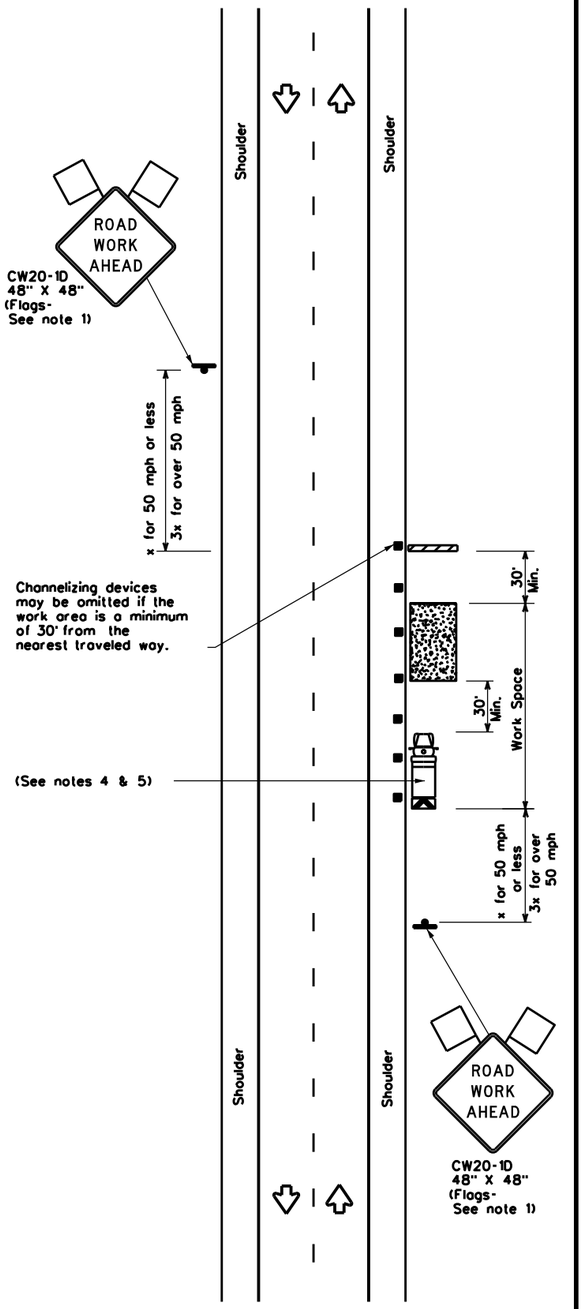
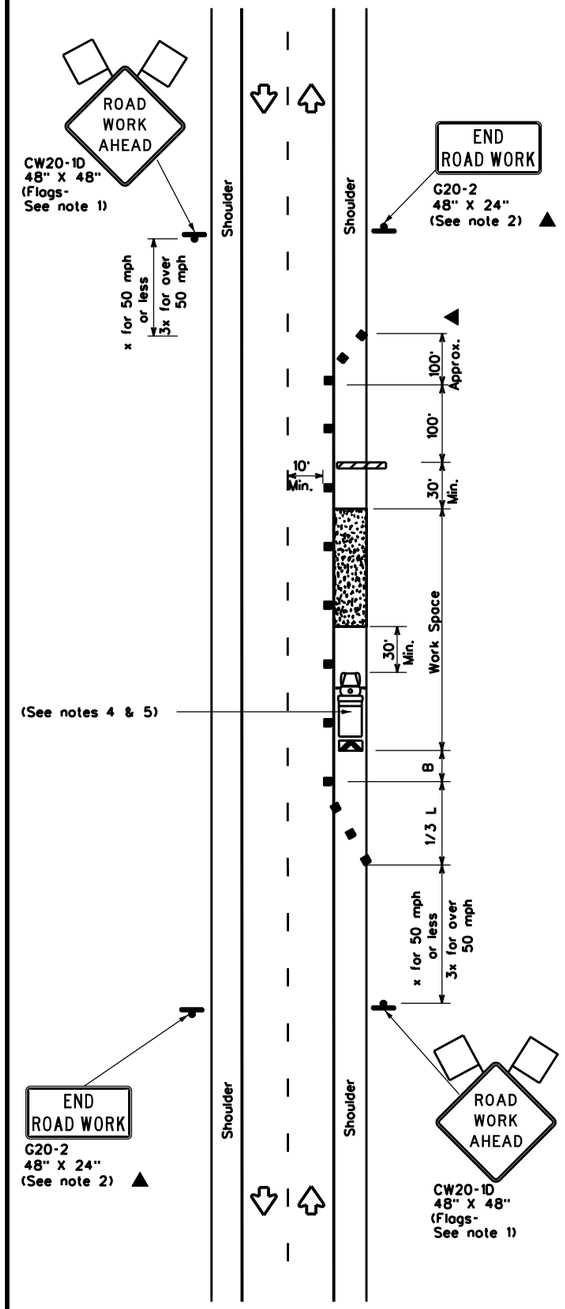


TCP (2-1a)

WORK SPACE NEAR SHOULDER

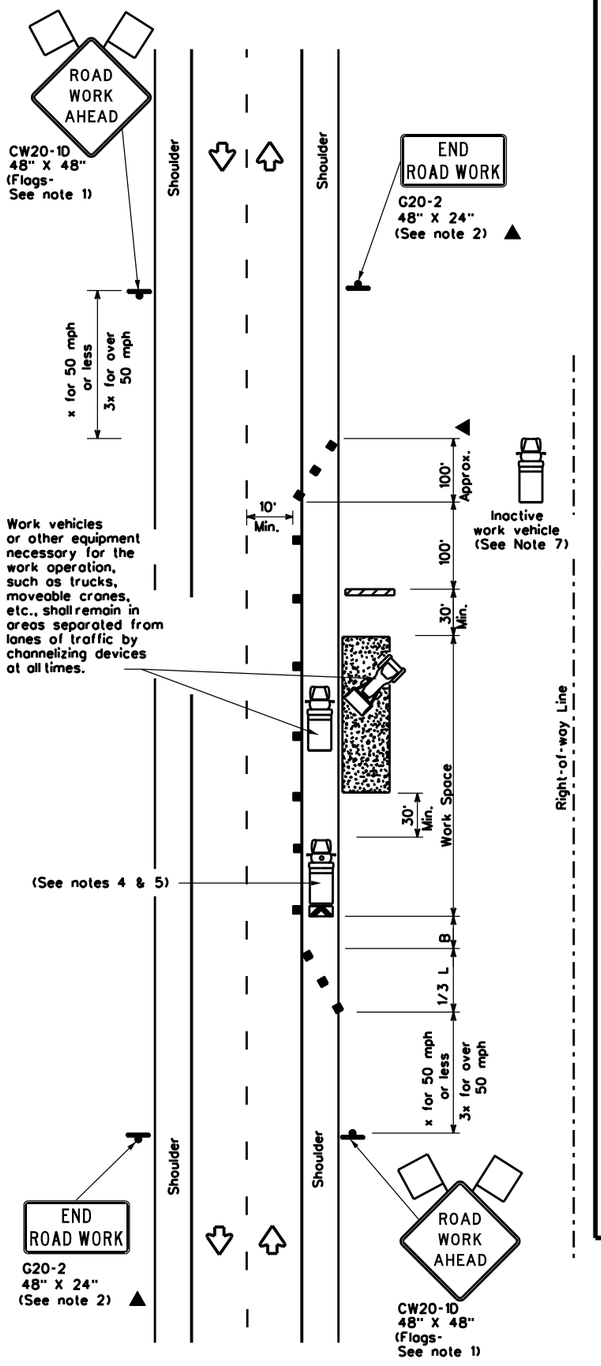
Conventional Roads



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.

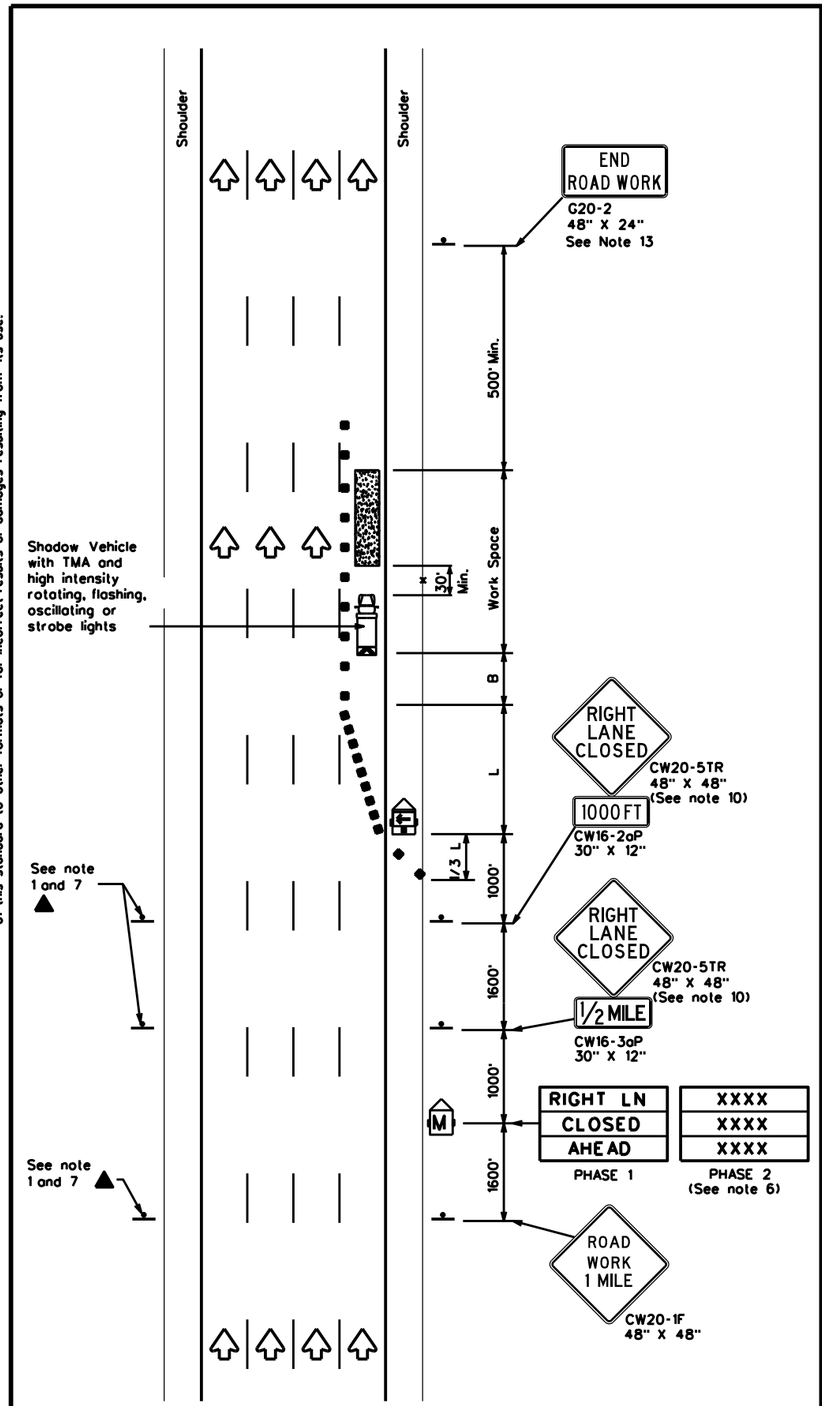
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

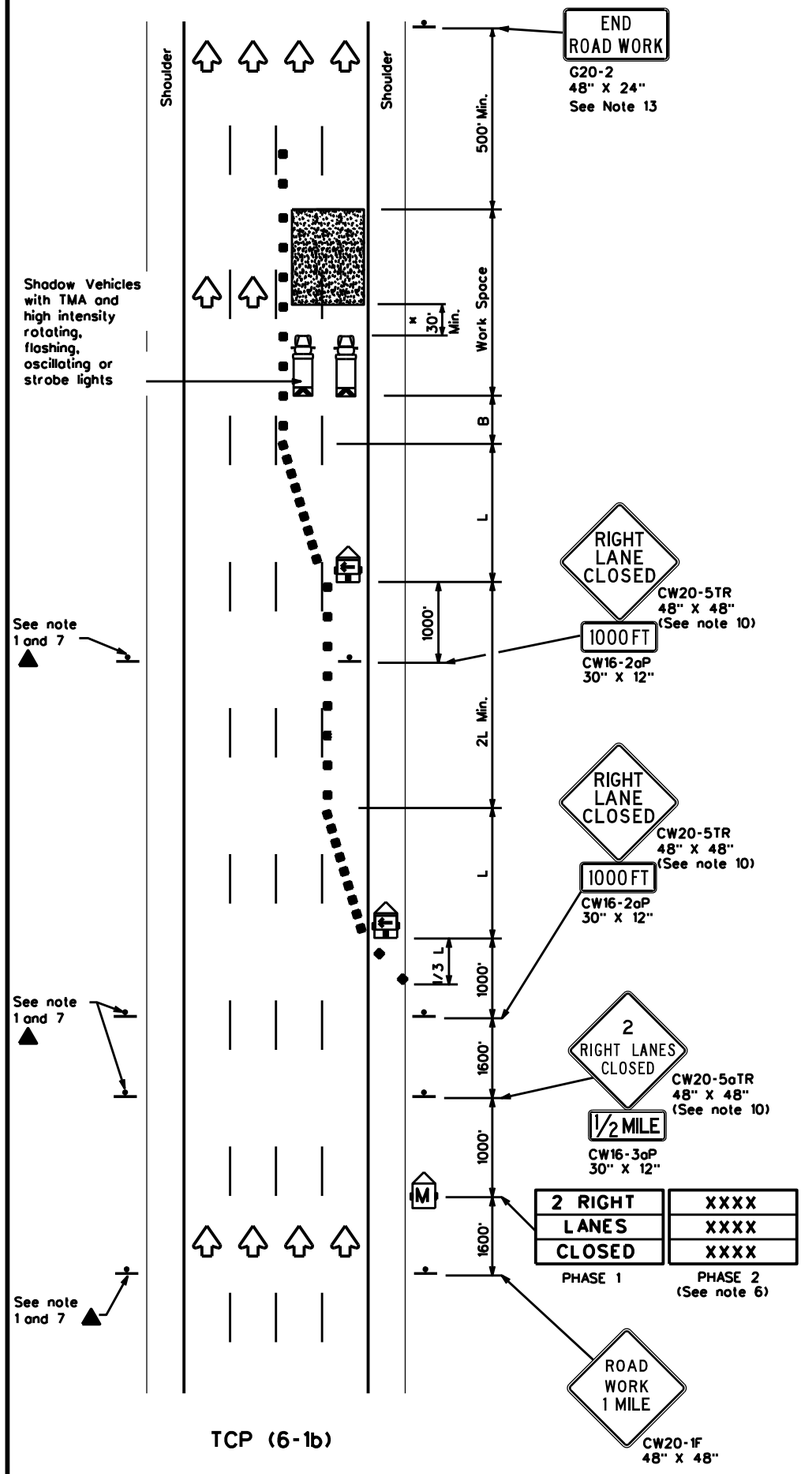
TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	6443	44	001	US 83, ETC
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	PHR	HIDALGO, ETC		31
1-97 2-18				



TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

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

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

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

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

GENERAL NOTES

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

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

Texas Department of Transportation
Traffic Operations Division Standard

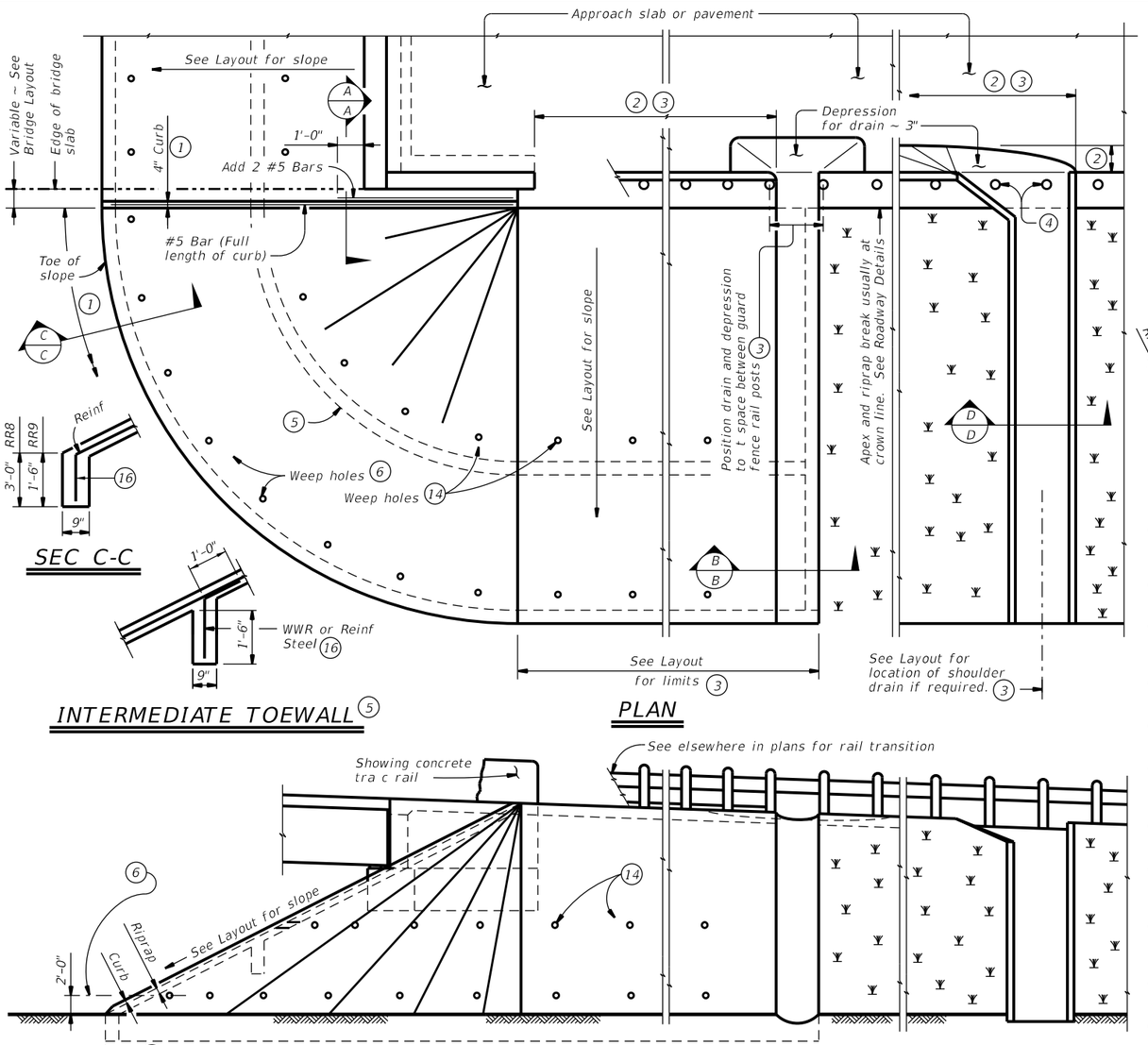
TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-12	6443	44	001	US 83, ETC
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO, ETC		32

DATE:
FILE:

DATE:
FILE:

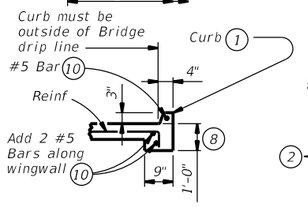


PLAN

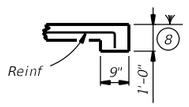
SEC C-C

INTERMEDIATE TOEWALL (5)

ELEVATION

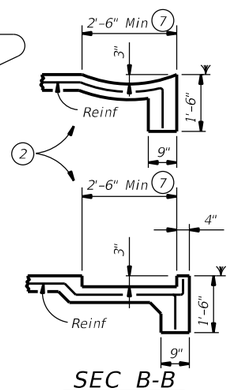


SEC A-A



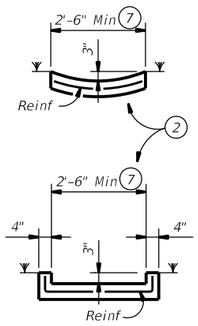
SEC B-B

(No drain)



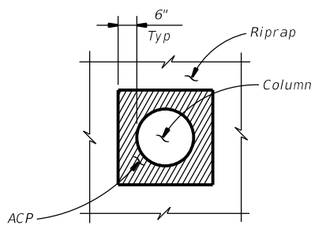
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

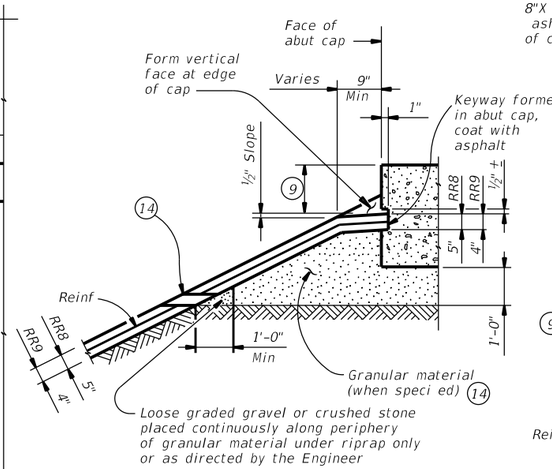
(Shoulder drain)



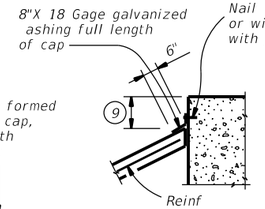
Riprap blockout to be lled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

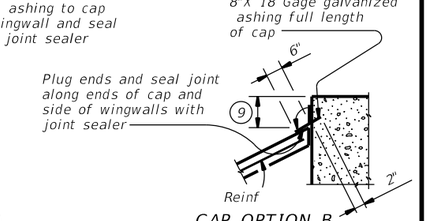
(As directed by the Engineer)



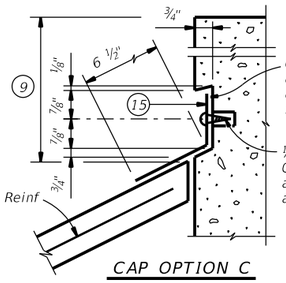
SHOWING KEYWAY OPTION



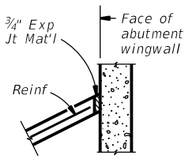
CAP OPTION A



CAP OPTION B



CAP OPTION C

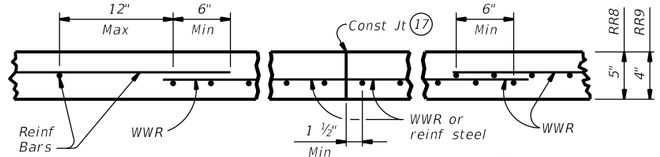


SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)

1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and con guration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the speci cations.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain con gurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modi ed if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic ber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is speci ed, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage Galv Sheet Metal
16. Provide WWR or #3 bars, with 1'-0" extension into slope.
17. WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing ber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic ber reinforcement.

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless speci ed elsewhere in the plans.

Optionally synthetic bers may be used if approved by the Engineer. Provide synthetic bers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, ashing, or other sealing material are subsidiary to the bid item "Riprap".

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

CRR

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6443	44	001	US 83, ETC
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO, ETC		33

FED. ROAD DIV. NO.	STATE	STATE PROJECT NO.	SHEET NO.
6	TEXAS	C 342-2-28	1
STATE DIST. NO.	COUNTY	STATE CONTROL NO.	HIGHWAY NO.
21	HIDALGO	342-2-28	SH-107

STATE OF TEXAS
STATE HIGHWAY DEPARTMENT

FINAL PLANS
NO FIELD CHANGES

703111

INDEX OF SHEETS

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

STATE PROJECT
C-342-2-28

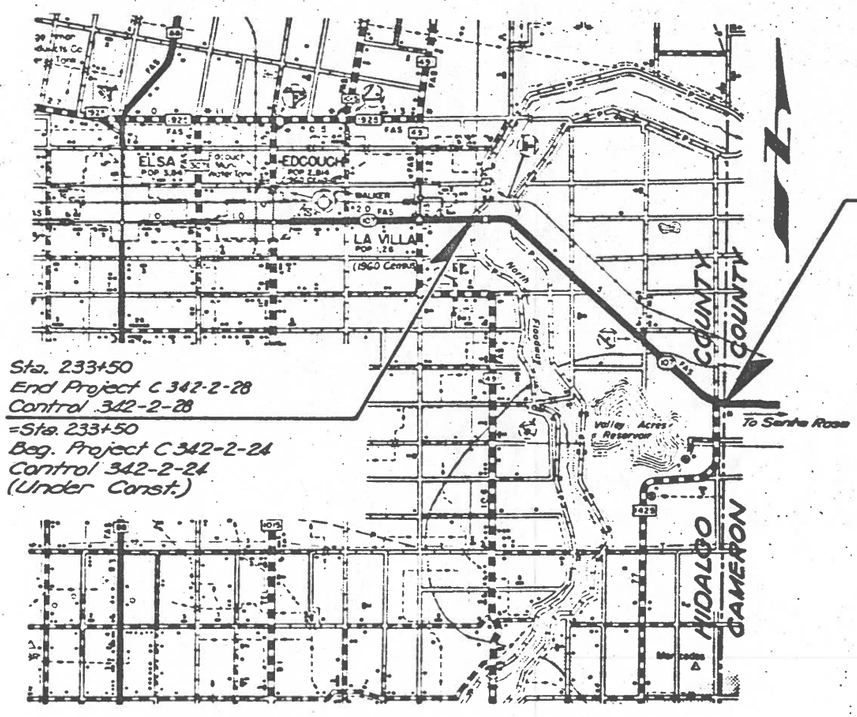
SCALES: PLAN: 1 IN. = 100 FT.
PROFILE: 1 IN. HOR. = 100 FT., 1 IN. VERT. = 10 FT.
CROSS-SECTIONS: 1 IN. HOR. AND VERT. = 5 FT.
OTHERS AS NOTED.

NET LENGTH OF PROJECT= 23,348.9 FT.=4.422 MI.

ROADWAY	23,168.9 FT. = 4.388 MI.
BRIDGES	180.0 FT. = 0.034 MI.
TOTAL	23,348.9 FT. = 4.422 MI.

HIDALGO COUNTY
S.H. 107

FROM CAMERON CO. LINE, WEST TO 0.7 MILE EAST OF LA VILLA
WIDENING & RECONSTR. OF GRADING, STRUCT., BASE AND SURFACING



Sta. 0+00
Begin Project C 342-2-28
Control 342-2-28
=Sta. 0+00
Project S G4(4)
Control 342-2-10
(Completed)

Sta. 233+50
End Project C 342-2-28
Control 342-2-28
=Sta. 233+50
Beg. Project C 342-2-24
Control 342-2-24
(Under Const.)

EQUATION:
Sta. 208+44.8 (Back) = Sta. 208+45.9 (Fwd.) = -1.1 Ft.

Specifications adopted by the State Highway Department of Texas, January 2, 1962 And Specification Items Listed and dated as follows shall govern on this project. Special Labor Provisions for the State Projects Adopted August 11, 1948
TRAFFIC, DETOURS, BARRICADES, ETC.
See General Notes and Item 7. 1(C) Barricades w/Signs G20-1, G20-2, G20-6, W13-4, W21-8 and R10-8 shall be erected at each end of the project. Class II Barricades with Sign W13-4 required at all County Roads.

CONVENTIONAL SIGNS
STATE OR NATIONAL LINE
CITY OR VILLAGE LINE
COUNTY LINE
BASE OR SURVEY LINE
RIGHT OF WAY LINE
RIGHT OF WAY MARKERS
FENCE LINE
RAILROAD
TRAVELLED WAY
CULVERT OR BRIDGE
POWER LINE
TELEGRAPH OR TELEPHONE

DELIVERY POINTS

LOCATION	RAILROAD
La Villa	S.P.R.R.
Santa Rosa	S.P.R.R.

The Contractor shall make his own investigations and arrangements for trackage facilities.

Layout Scale: 1 In = 5280 Ft.

STATE HIGHWAY DEPARTMENT

CORRECT: 8-13, 1969
L. E. Cannon
DIST. RESIDENT ENGINEER
8/14, 1969

APPROVED _____
CHIEF ENGINEER OF HIGHWAY DESIGN

J. C. Kemm
DIST. DESIGN ENGINEER
RECOMMENDED FOR APPROVAL 8-14, 1969
R. E. Stotzenberg
DISTRICT ENGINEER

District Office Copy

SUMMARY OF METAL BEAM GUARD FENCE

STATION	LOCATION	L.F. Est	L.F. Fin
195+10 to 198+85	E. Side E. Levee, Lt.	375.	425.
195+10 to 198+85	E. Side E. Levee, Rt.	375.	475.
	E. End of Prop. Bridge, Lt.	150.	150.
	E. End of Prop. Bridge, Rt.	150.	100.
	W. End of Prop. Bridge, Lt.	150.	150.
	W. End of Prop. Bridge, Rt.	150.	50.
	TOTAL	1350.	1350.

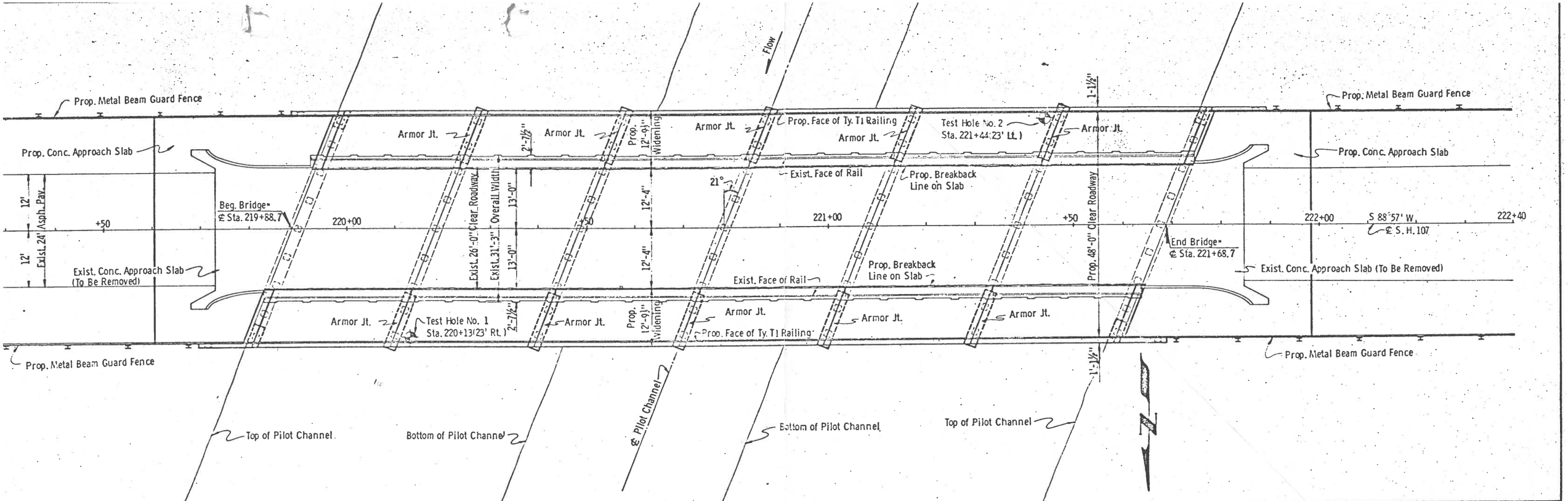
SUMMARY OF BRIDGES

PERM STRUCT NO.	LENGTH (FT)	STATION TO STATION	DESCRIPTION	UNCL. STRUCT. EXCAV. (BR) CY EST	UNCL. STRUCT. EXCAV. (BR) CY FIN	PRECAST CONC. PILING 16" SQ. LF EST	PRECAST CONC. PILING 16" SQ. LF FIN	CLASS "C" CONCRETE EXT. STRUCT ABUT CY EST	ABUT CY FIN	BENT CY EST	BENT CY FIN	SLAB CY EST	SLAB CY FIN	REINF. STEEL LB EST	REINF. STEEL LB FIN	STR. STEEL (SHOE AND ARMOR JOINT) LB EST	STR. STEEL (SHOE AND ARMOR JOINT) LB FIN	RAILING (TYPE I) LF EST	RAILING (TYPE I) LF FIN	TEMP. RAIL LF EST	TEMP. RAIL LF FIN	PILE CUT OFF LF	PILE CUT OFF LF FIN
	180.00	219+88.7 - 221+68.7	Widening of North Floodway Bridge - S.H. 107	28	28.	668	647.6	21.2	21.2	26.5	26.5	161.6	161.6	52,087.	52087.	2,060.	2060.	3960	396.	180.	180.		20.4

ESTIMATE AND QUANTITY SHEET
SHEET 2 OF 2 SHEETS

FED. RD. DIV. NO.	STATE	STATE PROJECT NO.		SHEET NO.
6	TEXAS	C 342-2-28		
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB
21	HIDALGO	342	2	

6



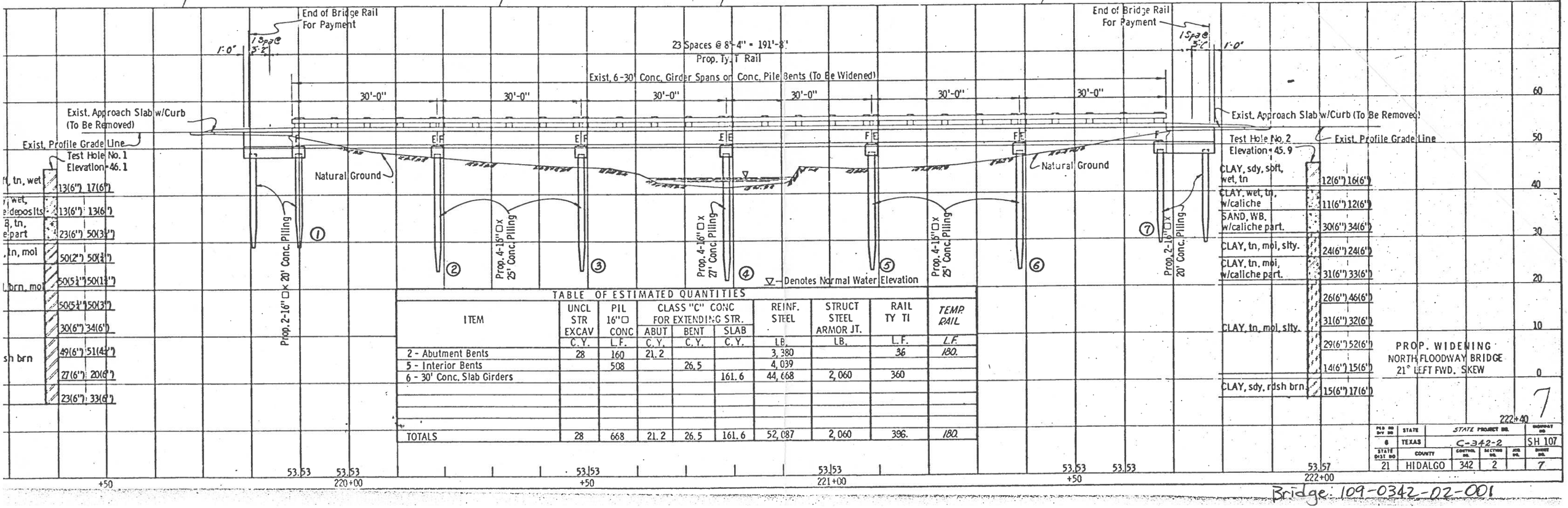


TABLE OF ESTIMATED QUANTITIES

ITEM	UNCL STR EXCAV	PIL 16"□ CONC	CLASS "C" CONC FOR EXTENDING STR.			REINF. STEEL	STRUCT STEEL ARMOR JT.	RAIL TY T1	TEMP. RAIL
			ABUT	BENT	SLAB				
	C.Y.	L.F.	C.Y.	C.Y.	C.Y.	LB.	LB.	L.F.	L.F.
2 - Abutment Bents	28	160	21.2			3,380		36	180.
5 - Interior Bents		508		26.5		4,039			
6 - 30' Conc. Slab Girders					161.6	44,668	2,060	360	
TOTALS	28	668	21.2	26.5	161.6	52,087	2,060	396.	180.

PROP. WIDENING
NORTH FLOODWAY BRIDGE
21° LEFT FWD. SKEW

7

FED. RD. DIV. NO.	STATE	STATE PROJECT NO.	HIGHWAY NO.
6	TEXAS	C-342-2	SH 107
STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
21	HIDALGO	342	2		7

Bridge: 109-0342-02-001

STATE DIST. NO.	COUNTY	STATE CONTROL NO.	HIGHWAY NO.
21	CAMERON	0331-02-038	SH100

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF [redacted] FINAL
STATE HIGHWAY IMPROVEMENT

FEDERAL-AID PROJECT.
BR 96 (792)
CSJ 0331-02-038
NET LENGTH OF PROJECT = 0.096 MI. = 512 FT.

ROADWAY	= 437 FT.	= 0.0828 MI.
BRIDGE	= 75 FT.	= 0.0142 MI.
TOTAL	= 512 FT.	= 0.096 MI.

CAMERON COUNTY
SH 100

AT: SHRIMP CHANNEL IN PORT ISABEL

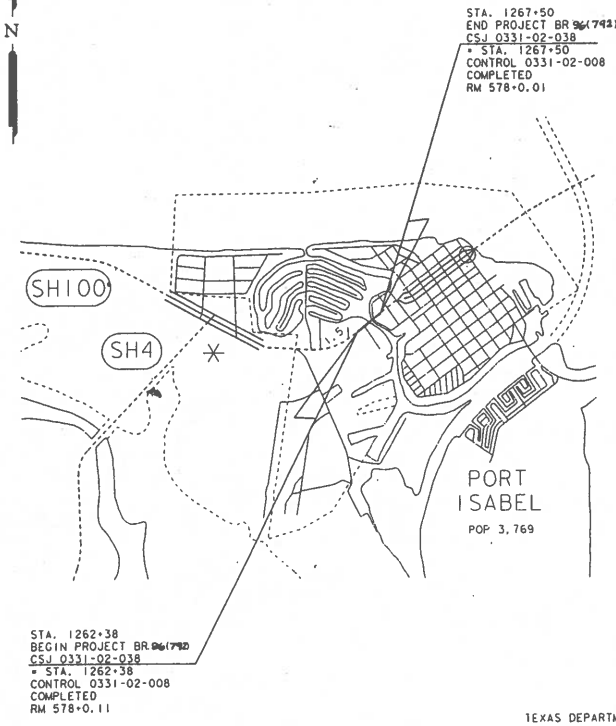
REPLACE STRUCTURE AND APPROACHES

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	PROJECT LAYOUT
3-4	TYPICAL SECTIONS
5-8	ESTIMATE & QUANTITIES
9-10	GENERAL NOTES AND SPECIFICATION DATA
11-14B	TRAFFIC CONTROL PLAN
15	BRIDGE TYP. SECT.
16	BRIDGE LAYOUT
17	PRESTRESSED CONCRETE BEAMS BX-Gp-LR (MOD)
18	PB-D-4-28 (MOD.)
19	PB-D-4-28 (MOD.)
20	PB-D-5-28 (MOD.)
21	PB-D-5-28 (MOD.)
22	SPAN DETAILS
23-24	ABUTMENT DETAILS
25	DRAINAGE AREA MAP & HYDRAULIC DETAILS
26	PLAN & PROFILE
27	UTILITY LAYOUT
28	DRAINAGE STRUCTURE DETAILS
29	RIP RAP & SHEET PILE DETAILS
30	SW3P
31	SIDEWALK DETAILS
32	WHEELCHAIR RAMP DETAILS
33	DRIVEWAY & TURNOUT DETAILS
34	SIGNING LAYOUT SHEET
35	SIGNING SUMMARY SHEET
36	PAVEMENT MARKING DETAILS

STANDARD SHEETS BELOW

37	R(1)-95
38-40,	W(1), W(2) & W(3)-95
41-43	SMD (1-1) THRU SMD (1-3)-95
44-52	BC (1) THRU BC (9) - 94
53-54	EC (1) AND EC (3) - 93
55-57	TCP (3-1) THRU (3-3) - 95
58	WZ (STPM) -92
59	RPM (1)-92
60	WZ (BD)-95
61	INLET TY "A"
62	CRR
63	CP-S
64	PEDESTRIAN RAILING TYPE PR1
65	PCTB (B)-94
66	WZ(CD)-94
67	CONCRETE CURB AND GUTTER DETAILS



STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

NAME Jody R. Ellington DATE 5-1-95

STATE OF TEXAS — JODY R. ELLINGTON — 33721 — REGISTERED PROFESSIONAL ENGINEER

CORRECT: 5-1 1995

Jody R. Ellington, P.E.
AREA ENGINEER

TEXAS DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR LETTING: 4/1 1996

Thomas E. Stevens, P.E.
DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

RECOMMENDED FOR LETTING: 4/1 1996

P.E.
DISTRICT ENGINEER

RECOMMENDED FOR APPROVAL:

RECOMMENDED FOR APPROVAL:

APPROVED FOR LETTING: 6-7-96

Richard Olsen, P.E.
FOR DIRECTOR, DESIGN DIVISION

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED:

DIVISION ADMINISTRATOR DATE

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION MARCH 1, 1993 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL AID CONSTRUCTION CONTRACTS (FHWA 1273, DECEMBER 1993)

DATE ACCEPTED

C:\DGN\SH100\TITLE.DGN

"FINAL PLANS"

FINAL CONTRACT PRICE 715,536.54
CONTRACTOR McALLEN CONTRACTING CO
CONTRACTOR ADDRESS McALLEN, TEXAS
DATE LET 7/10/96
DATE WORK BEGAN 10/1/96
DATE WORK COMPLETED [redacted] 2/15/97
APPROVED CHANGE ORDERS — NONE
DATE ACCEPTED [redacted] 2/15/97
DESIGN SPEED = 35 MPH
POSTED SPEED = 30 MPH

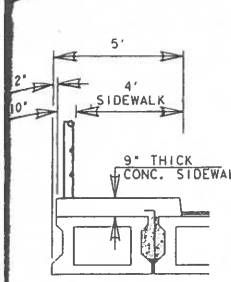
STATE OF TEXAS — ARNOLDO CORTEZ — 85116 — REGISTERED PROFESSIONAL ENGINEER

ALL CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS, SPECIFICATIONS, AND CONTRACT. ALL PROPOSED CONSTRUCTION WAS COMPLETED UNLESS OTHERWISE NOTED.

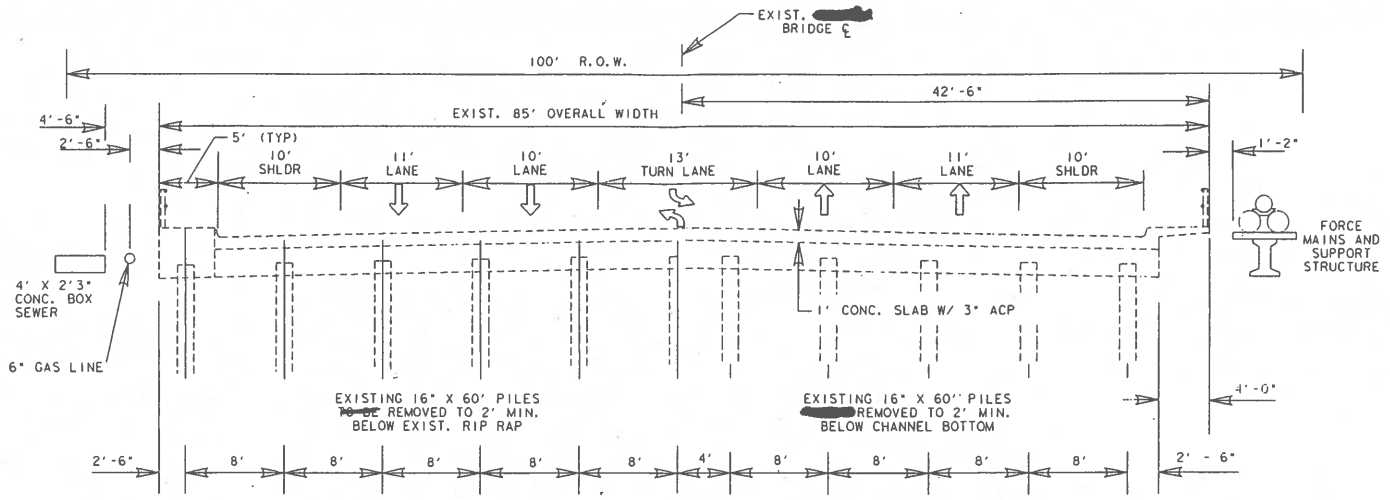
Arnold Cortez, P.E. — 1-22-98
AREA ENGINEER — DATE

PLANS APPROVED CITY OF PORT ISABEL

NAME — City Manager TITLE — 5/3/95 DATE

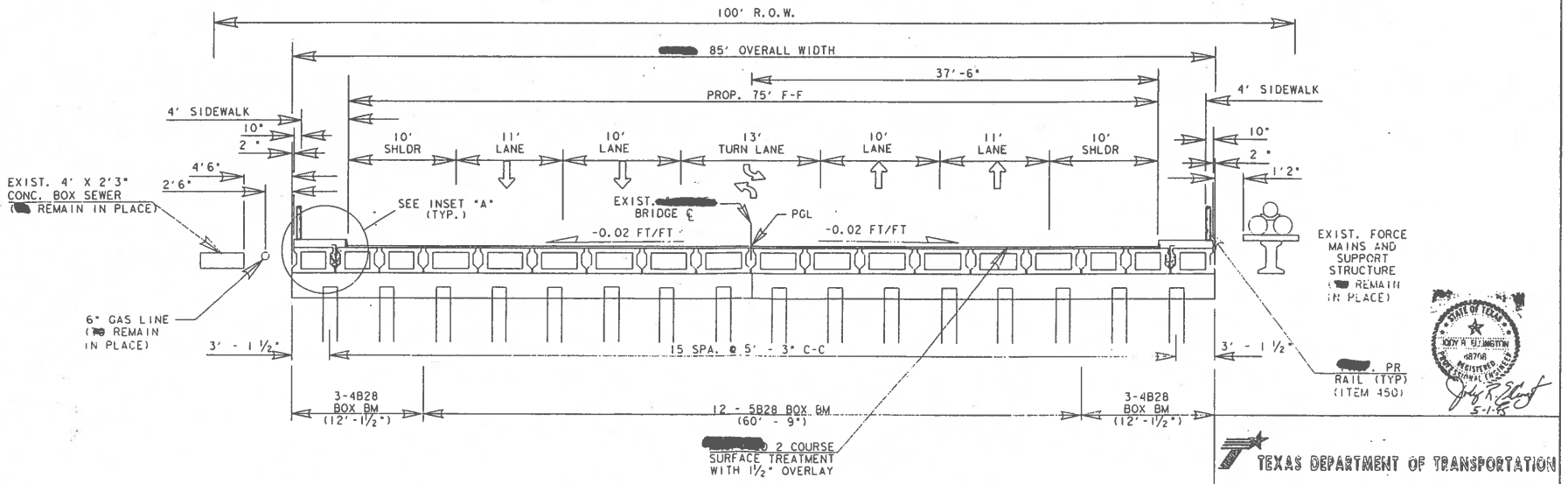


INSET "A"



AT ABUTMENT AT INTERIOR BENT

EXISTING TYPICAL SECTION



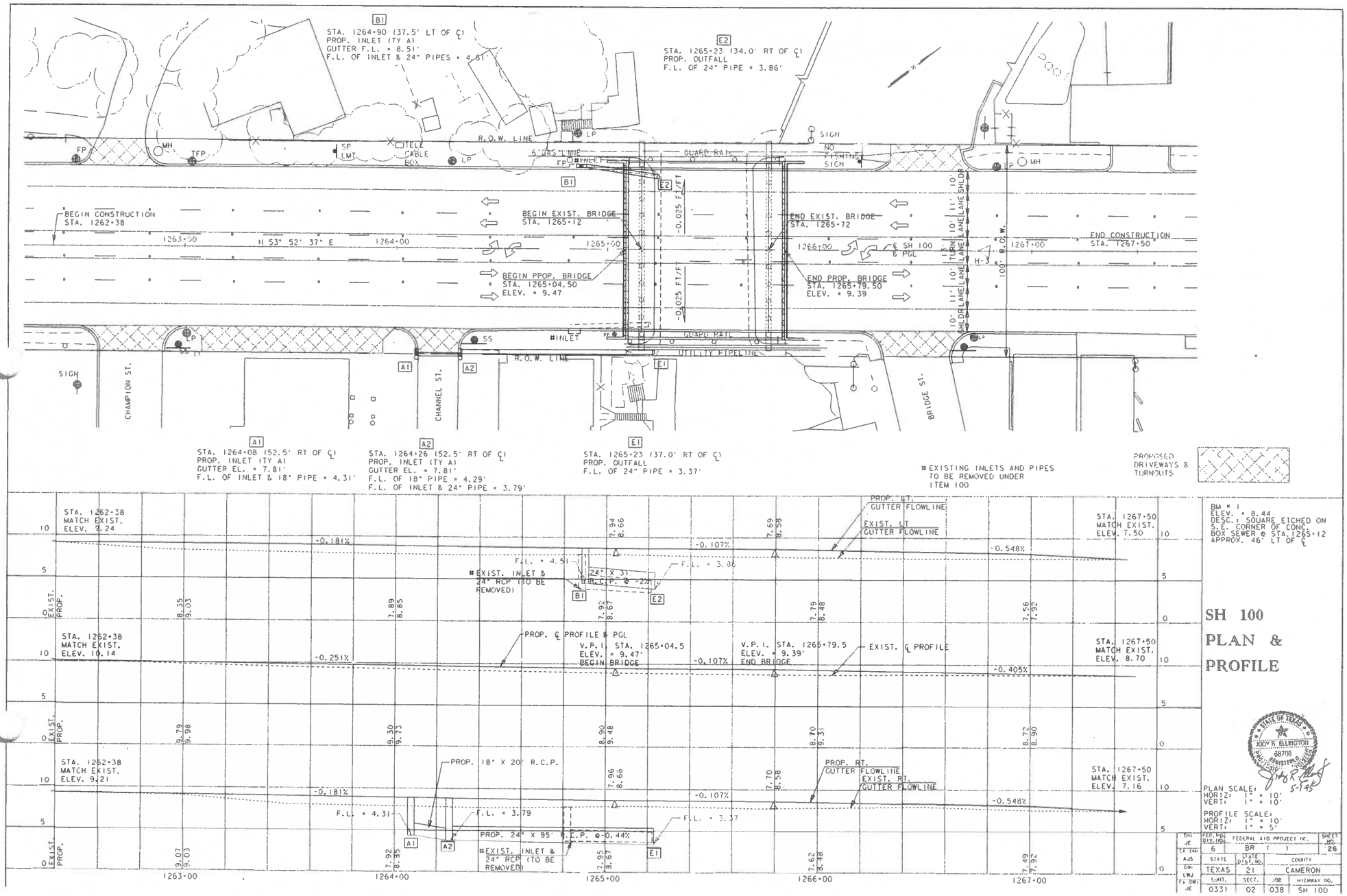
FINAL TYPICAL SECTION

TEXAS DEPARTMENT OF TRANSPORTATION

TYPICAL BRIDGE SECTIONS

SH 100 @ PORT ISABEL SHRIMP CHANNEL

DSN	JC	DRAWING	DATE	FED. DIST.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.
CK DSN	AJS	OR U-RAL 12 Sep. 1995		6	TEXAS	BR 196-7(7)	SH 100
DSN	LMJ			STATE DIST. NO.	COUNTY	CHECK	SHEET NO.



BM = 1
ELEV. = 8.44
DESC.: SQUARE EITCHED ON S.E. CORNER OF CONC. BOX SEWER @ STA. 1265+12 APPROX. 46' LT OF ℄

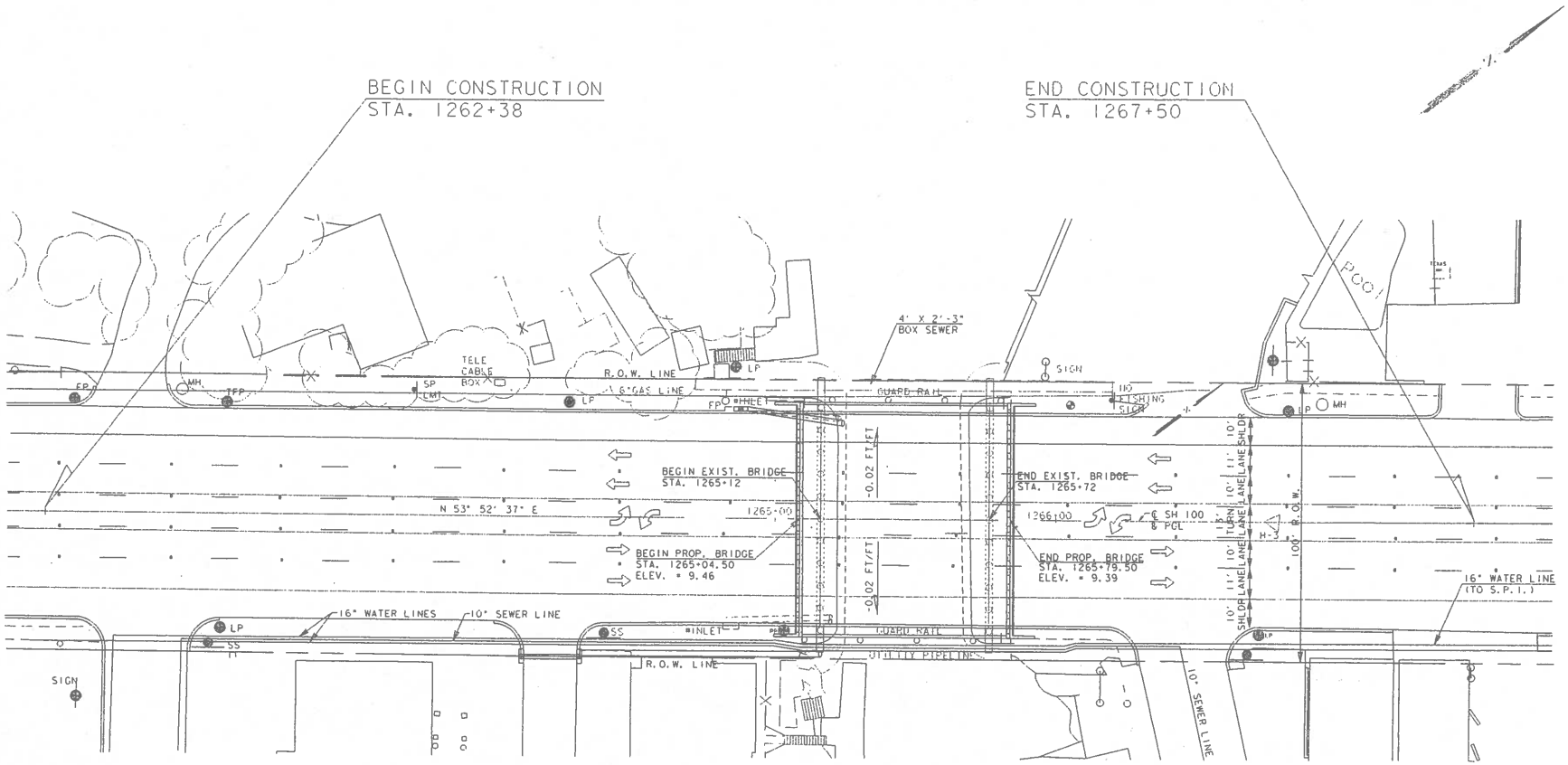
SH 100
PLAN & PROFILE

STATE OF TEXAS
JODY R. ELLINGTON
88700
REGISTERED
PROFESSIONAL ENGINEER
5-7-15

PLAN SCALE:
HORIZ: 1" = 10'
VERT: 1" = 10'

PROFILE SCALE:
HORIZ: 1" = 10'
VERT: 1" = 5'

DSN: JE	CK: JE	DW: LMJ	CK: JE	FED. RD. DIV. NO. 6	FEDERAL AID PROJECT NO. BR ( )	SHEET NO. 26
				STATE TEXAS	STATE DIST. NO. 21	COUNTY CAMERON
				CONT. 0331	SECT. 02	JOB 038	HIGHWAY NO. SH 100



NOTE:
CORDINATION BETWEEN THE CONTRACTOR AND CENTRAL POWER AND LIGHT CO. WILL BE NEEDED FOR THE TEMPORARY RELOCATION OF OVERHEAD POWER LINES.

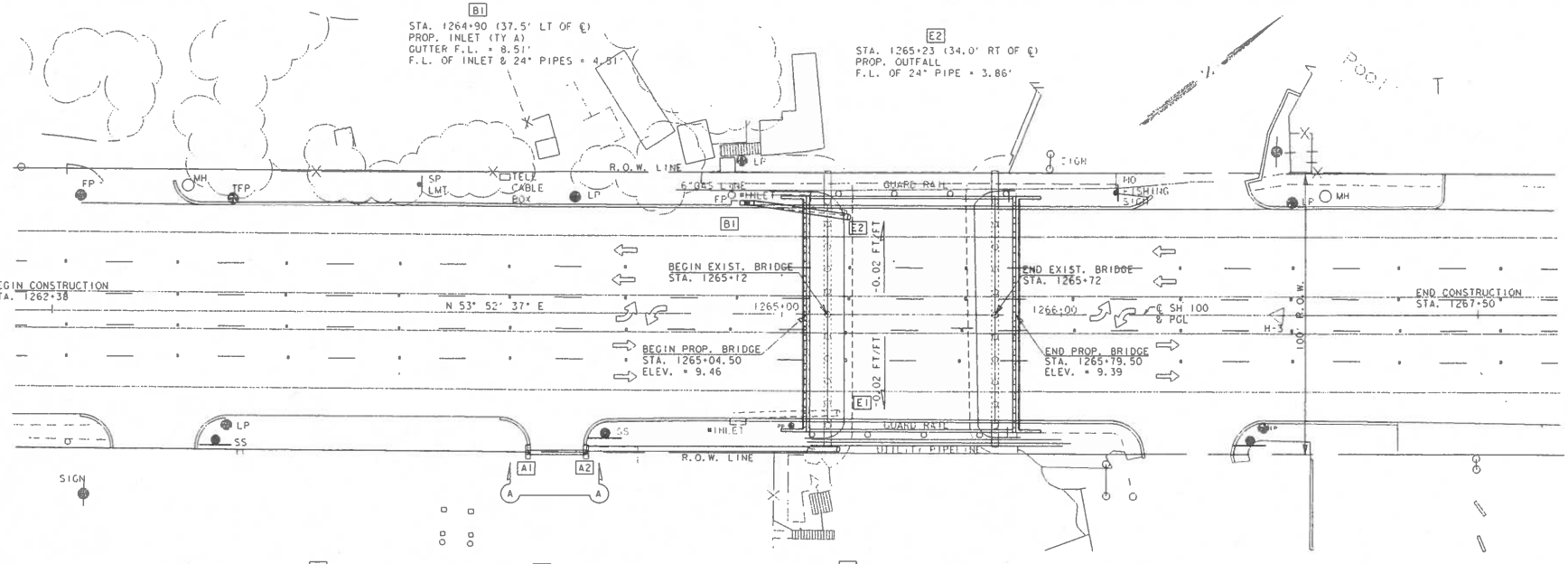
STATE OF TEXAS
JOHN R. ELLINGTON
68719
REGISTERED PROFESSIONAL ENGINEER
5-19-95

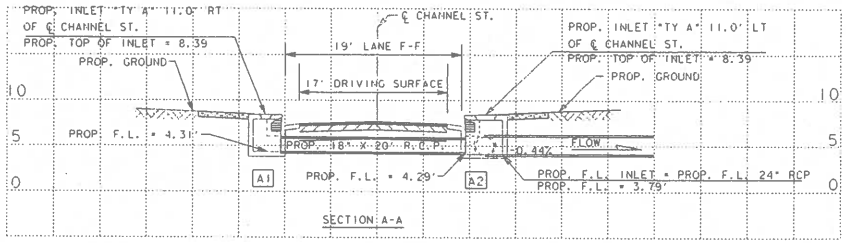
TEXAS DEPARTMENT OF TRANSPORTATION

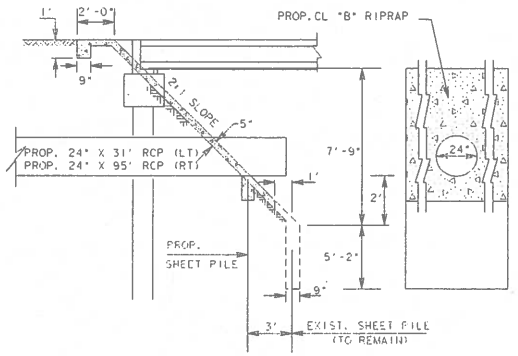
UTILITY LAYOUT

SH 100 @ PORT ISABEL SHRIMP CHANNEL

DSN: JE	DRAWING DATE: ORIGINAL (FEB. 1995)	FED. AID PROJ. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CK DSN: AJS		6	TEXAS	BR ( )			SH 100
DSN: LAJ		STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK DSN: JE		21	CAMERON	0331	02	038	27







STORM SEWER OUTFALL

NOTE :
SEE RIPRAP & SEWER OUTFALL SHEET FOR ADDITIONAL DETAILS

TEXAS DEPARTMENT OF TRANSPORTATION

DRAINAGE STRUCTURE DETAILS

SH 100 @ PORT ISABEL SHRIMP CHANNEL

DSN: JE	DRAWING	DATE	FED.ROAD DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CK: DMH: AJS	ORIGINAL	FEB 1986	6	TEXAS	BR ( )			SH 100
DSN: LMH			STATE DIST. NO.	COUNTY		TOWN'S NO.	SECTION NO.	JOB NO.	SHEET NO.
CK: DMH: JE			21	CAMERON	0331	02	038	28

ITEM 407	
SHEET PILING (TO BE INSTALLED) (SF)	
PHASE I	3240
PHASE II	3240
TOTAL	6480

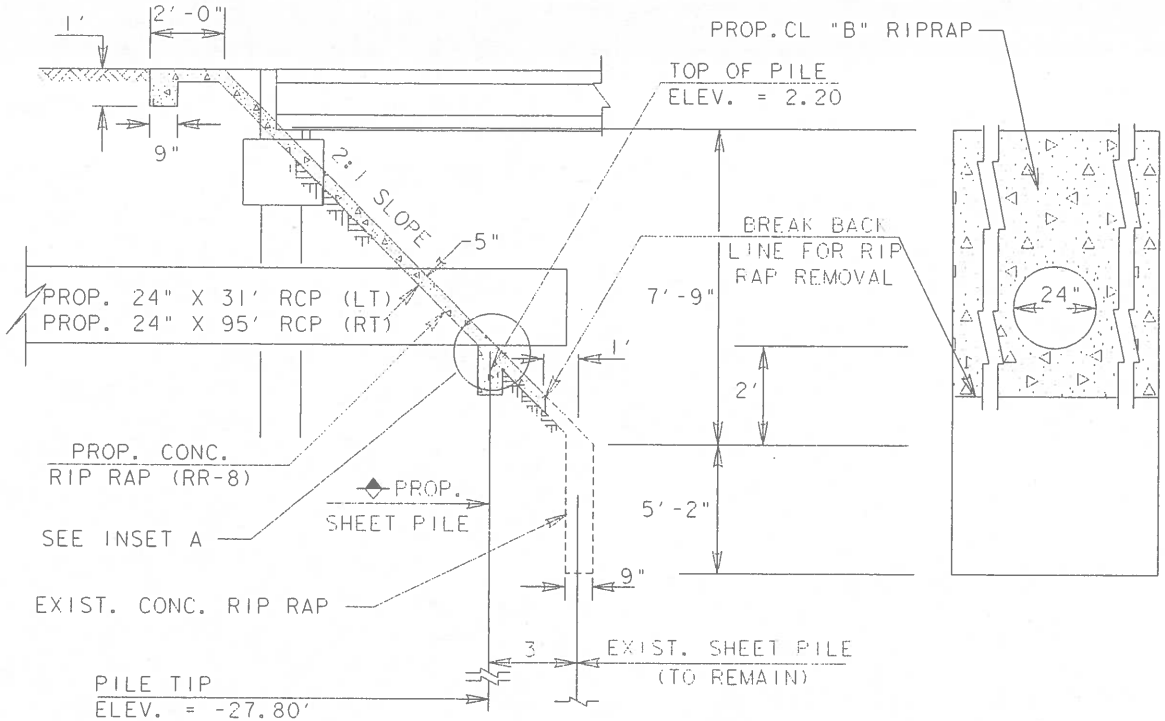
RIP RAP SUMMARY

ITEM 104	ITEM 432
TO BE REMOVED (SY)	TO BE CONSTRUCTED (CY)
PHASE I 198.5	PHASE I 38
PHASE II 198.5	PHASE II 38
TOTAL 397.0	TOTAL 76.0

CONSTRUCTION SEQUENCING

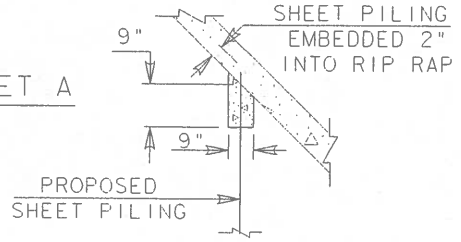
1. BREAK AND REMOVE CONC. RIP RAP 1' BEHIND EXISTING SHEET PILING. CLEAN & EXTEND EXIST. STEEL TO PROVIDE A MIN. 2' LAP W/ THE PROP. RIP RAP STEEL
2. INSTALL PROPOSED SHEET PILING 3' BEHIND EXISTING SHEET PILING, AND EMBED 2" INTO THE PROP. RIP RAP. (SEE INSET A)
3. INSTALL NEW RIPRAP REINF. SPLICE WITH EXIST. AND PLACE RIPRAP.

NOTE:
MINIMUM LAP LENGTH FOR REINFORCEMENT = 2' - 0"



◆ ALL SHEET PILING SHALL HAVE A MINIMUM SECTION MODULUS OF 5.0 CU. IN./LF, AND SHALL BE DRIVEN TO THE ELEVATIONS SHOWN. EXAMPLES OF ACCEPTABLE SHEET PILING ARE:
1. CASTEEL CS55
2. SAMPSON L65

INSET A



TEXAS DEPARTMENT OF TRANSPORTATION

RIP RAP & SHEET PILING DETAILS

SH 100 @ PORT ISABEL SHRIMP CHANNEL

DN: JE	DRAWING	DATE	FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT NO.	HIGHWAY NO.
CK: DN: AJS	ORIGINAL	FEB. 1995	6	TEXAS	BR ( )	SH 100
DW: LW			STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO. / JOB NO.	SHEET NO.
CK: DW: ME			21	CAMERON	0331 / 02 / 038	29

CAMERON STP2002(645)UM

FILE: FM802/802TITLE.DGN

COUNTY CAMERON PROJ. NO. STP 2002 (645) UM
HWY NO. FM 802 LETTING DATE
DATE ACCEPTED

INDEX OF SHEETS

SEE SHEET NO. 2

NO TDLR INSPECTION REQUIRED

STANDARD SHEETS 29-48, 62-71P, 87-94 PLUS SHEETS HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

5/3/02
DATE

Leo Morales Jr., P.E.
LEO MORALES JR., P.E.

STATE OF TEXAS — LEO MORALES, JR. — 26812 — REGISTERED PROFESSIONAL ENGINEER

STANDARD SHEETS 130A – 170B PLUS SHEETS HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

5-3-02
DATE

Jesus S. Leal P.E.
JESUS S. LEAL., P.E.

STATE OF TEXAS — JESUS S. LEAL — 73994 — REGISTERED PROFESSIONAL ENGINEER

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

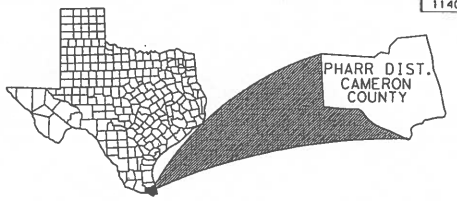
PROJECT NO.			SHEET NO.
STP 2002 (645) UM			1
STATE	STATE DIST. NO.	COUNTY	
TEXAS	21	CAMERON	
CONT.	SECT.	JOB	HIGHWAY NO.
1140	03	015	FM 802
		ETC.	ETC.

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

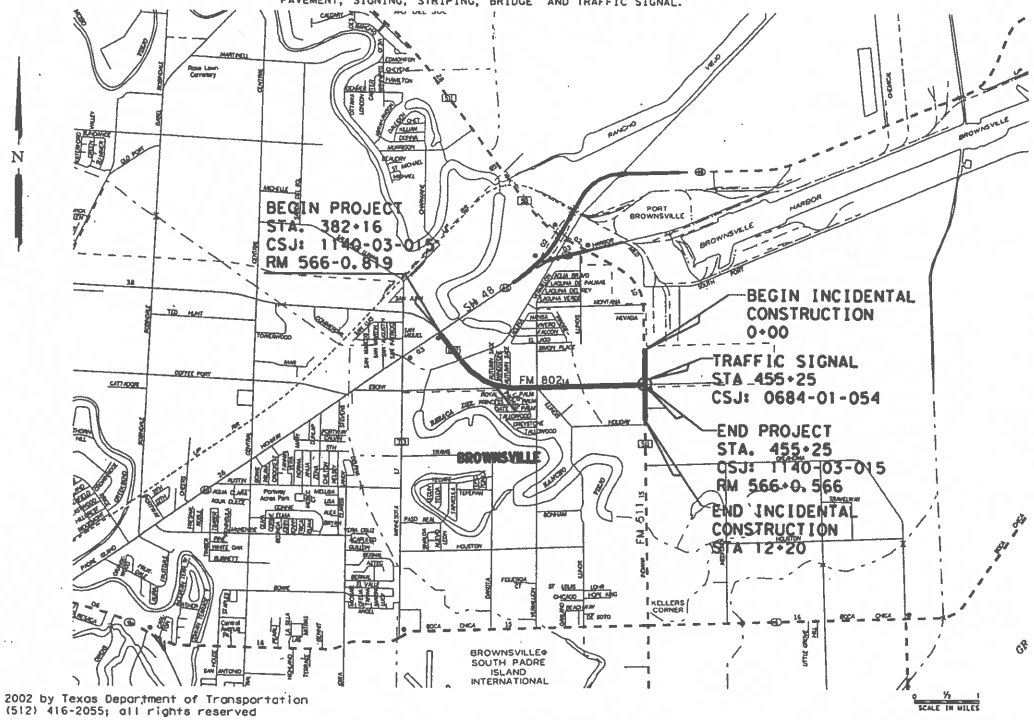
CSJ: 1140-03-015 - NET LENGTH OF PROJECT = 1.384 MILES
CSJ: 0684-01-054 - NET LENGTH OF PROJECT = 0.10 MILES

CAMERON COUNTY
FM 802

LIMITS: FROM: SH 48
TO: FM 511



CONSTRUCTION OF REHABILITATION AND WIDENING OF EXISTING ROAD, CONSISTING OF: SHOULDER WIDENING, GRADING, LIME TREAT. SUBGRADE, FLEXBASE, ASPH. CONC., PAVEMENT, SIGNING, STRIPING, BRIDGE AND TRAFFIC SIGNAL.



SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION ON MARCH 1, 1993 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT. REQUIRED CONTRACT PROVISIONS FOR FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, DECEMBER 1993)

PROJECT DATA

DESIGN SPEED: 45 MPH

EXCEPTION: NONE

EQUATION: NONE

RAILROAD CROSSING: NONE

FINAL PLAN DATA :

FINAL CONTRACT PRICE: _____
CONTRACTORS NAME: _____
CONTRACTORS ADDRESS: _____
LETTING DATE: _____
DATE WORK BEGAN: _____
DATE WORK COMPLETED: _____
DATE OF ACCEPTANCE: _____

CHANGE ORDERS & SUPP. AGREEMENTS :

LOCAL ENTITIES

CITY OF BROWNSVILLE
PLANS APPROVED : DATE : 4-25-02
Ernesto Hinojosa — City Eng
NAME TITLE

COUNTY OF CAMERON
PLANS APPROVED : DATE : 5-1-02
Juan A. Bernal — County Engineer
NAME TITLE

CAMERON COUNTY DRAINAGE DISTRICT NO. 1
PLANS APPROVED : DATE : 4/22/02
Sal F — Gen. Mgr.
NAME TITLE

BROWNSVILLE IRRIGATION AND DRAINAGE DISTRICT
PLANS APPROVED : DATE :
Jorge Bermudez — 5-1-02
NAME TITLE — Contract Manager

PLANS APPROVED : DATE :
NAME TITLE

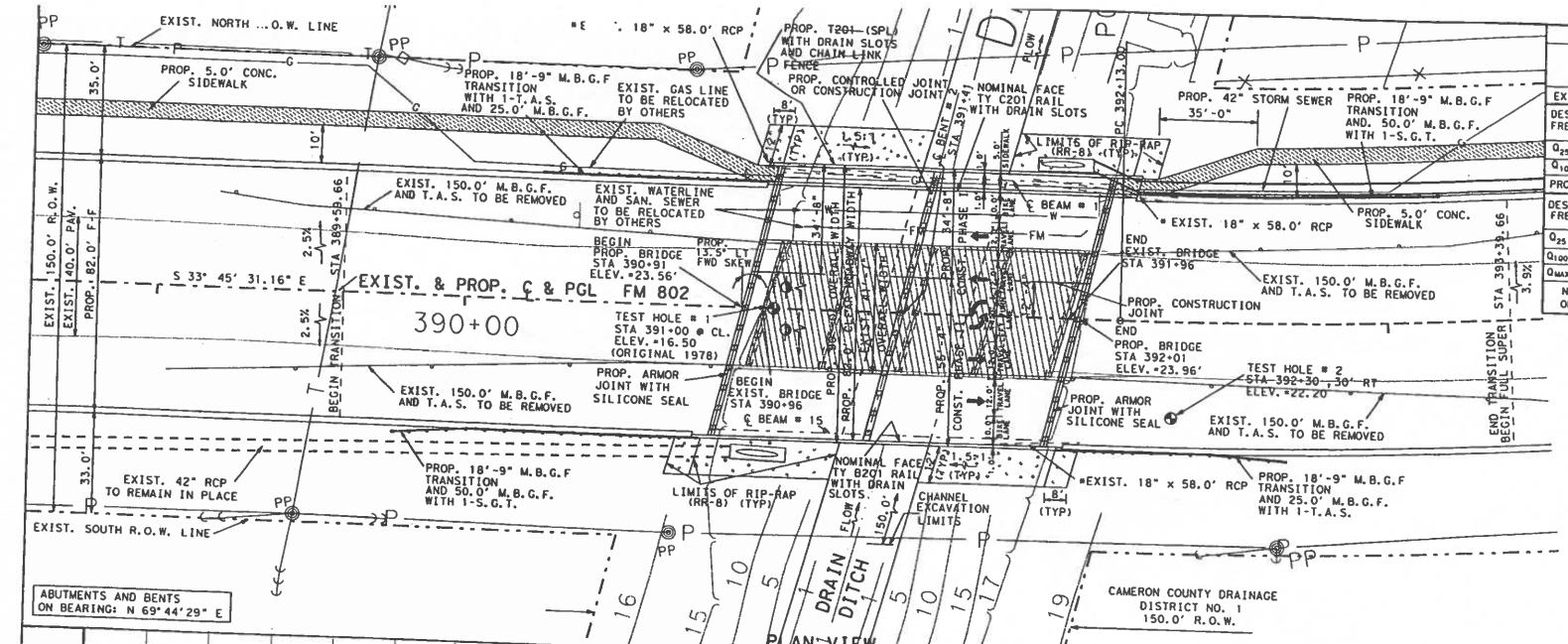
TEXAS DEPARTMENT OF TRANSPORTATION

RECOMMEND FOR LETTING : 5/2/02
DISTRICT ENGINEER

SUBMITTED FOR LETTING : 5/1/02
DISTRICT DESIGN ENGINEER

APPROVED FOR LETTING :
DIRECTOR, TRAFFIC OPERATIONS DIVISION

APPROVED FOR LETTING : 6-21-02
DIRECTOR, DESIGN DIVISION



HYDRAULIC DATA - ANALYSIS PERFORMED UNDER HEC-RAS

HYDRAULIC DATA

DRAIN DITCH BRIDGE-HYDRAULIC SUMMARY

EXISTING CONDITION

DESIGN FREQ.	Q (CFS)	n CHANNEL	n BANK	CHANNEL SLOPE (FT/FT)	HW (FT)	TW (FT)	$V_{APPROACH}$ AVG/MAX (FT/S)	$V_{THRU\ BRI}$ AVG/MA (FT/S)
Q_{25}	1585.0	0.035	0.065	0.0002	12.88	12.84	2.61/3.15	2.69/2.7
Q_{100}	1929.0	0.035	0.065	0.0002	14.15	14.11	2.69/3.38	2.86/2.8

PROPOSED CONDITION

DESIGN FREQ.	Q (CFS)	n CHANNEL	n BANK	CHANNEL SLOPE (FT/FT)	HW (FT)	TW (FT)	$V_{APPROACH}$ AVG/MAX (FT/S)	$V_{THRU\ BRI}$ AVG/MA (FT/S)
Q_{25}	1585.0	0.035	0.065	0.0002	12.87	12.72	2.47/2.98	2.06/2.5
Q_{100}	1929.0	0.035	0.065	0.0002	14.14	13.99	2.63/3.18	2.12/2.7
$Q_{MAX.}$	3700.0	0.035	0.065	0.0002	19.03	18.95	3.23/4.01	3.05/3.9

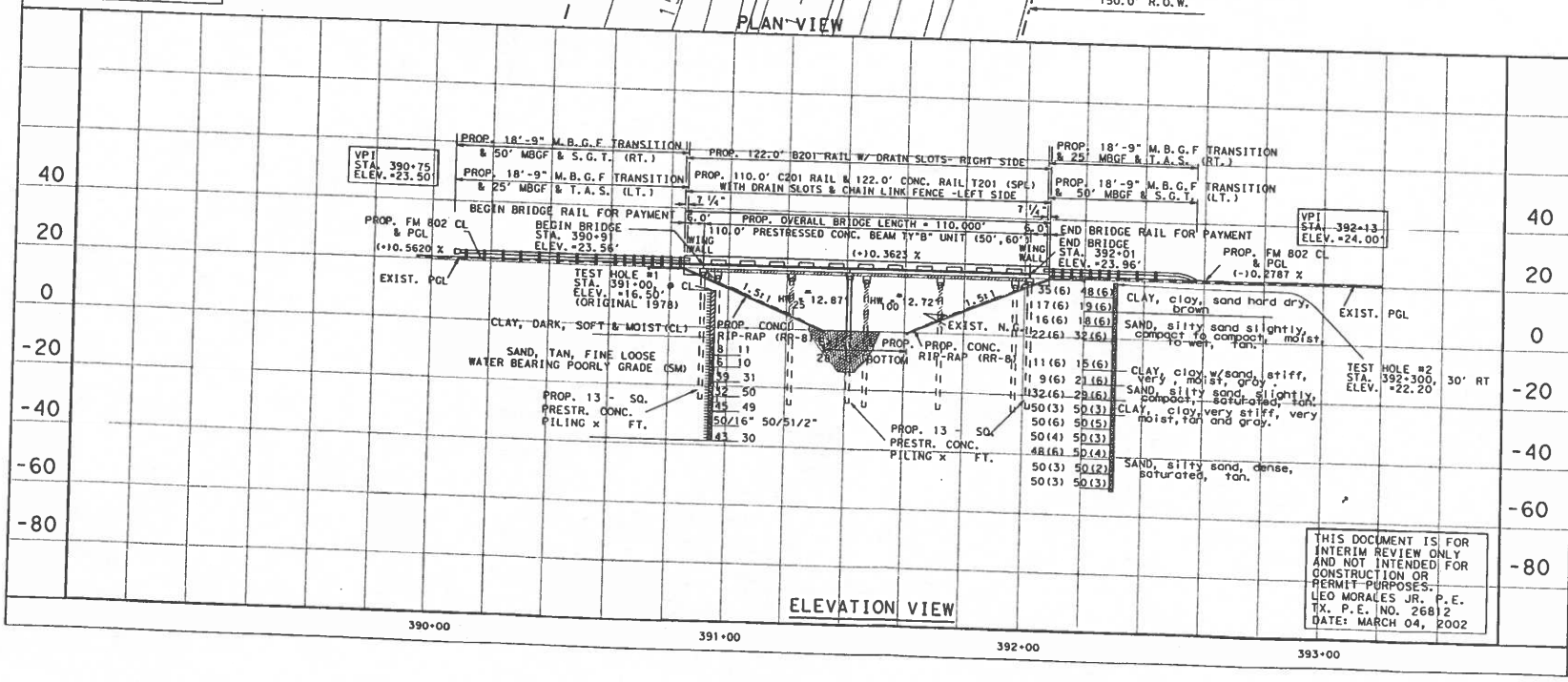
NOTE: HYDRAULIC DATA WAS REFERENCED FROM THE 1990 US CORPS OF ENGINEERS FEASIBILTY REPORT FOR CAMERON COUNTY, TEXAS.

HORIZONTAL CURVE DATA:

PI STATION	= 402+51.33
DELTA	= 57° 03' 46.46" (LT
DEGREE OF CURVE	= 3° 00' 00.00"
TANGENT	= 1,038.33
LENGTH	= 1,902.10
RADIUS	= 1,909.86
PC STATION	= 392+13.00
PT STATION	= 411+15.10
e= 3.9%	

NOTE:
THE BRIDGE IS IN A PARABOLIC SUPERELEVATION TRANSITION FROM A 2.5% TO 3.9%

2.5 % 2.5 %
STA 389+59.66
3.9 %
STA 393+39.66



* TO BE REMOVED AND PAID UNDER ITEM 496.

BENCH MARK DATA
B.M. # 3
ELEV. = 20.96
STA. 394+00, 71.0' RT.
NO. 5 IRON ROD W/ ALUMINUM DISK SET IN CONCRETE

DESIGN DATA
FUNC. CLASS : ARTERIAL
ADT (2003) : 9,400
ADT (2023) : 16,400
DESIGN SPEED : 45 MPH
DESIGN LOAD: HS20(AASHTO 1996 SPECS.)

PERMANENT STRUCTURE NUMBER
EXIST.= NBI #: 1140-03-002
PROP. NBI #: 1140-03-003

GENERAL NOTES
1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS ON THE FIELD PRIOR TO CONSTRUCTION AND ORDERING OF MATERIALS.
2. TEST HOLE # 2 WAS PROVIDED BY RABA KISTNER ON JAN. 25, 2002.
3. REFERENCE CSJ: 1140-03-011

LEGEND
-PROPOSED RIP RAP
-EXIST. BRIDGE TO BE REMOVED UNDER ITEM 496. EXIST. FOUNDATION TO BE REMOVED TO 2 FEET MIN. BELOW PROP. NATURAL GROUND.
-CHANNEL EXCAVATION
-PROP. SIDEWALK
-SCOUR ENVELOPE

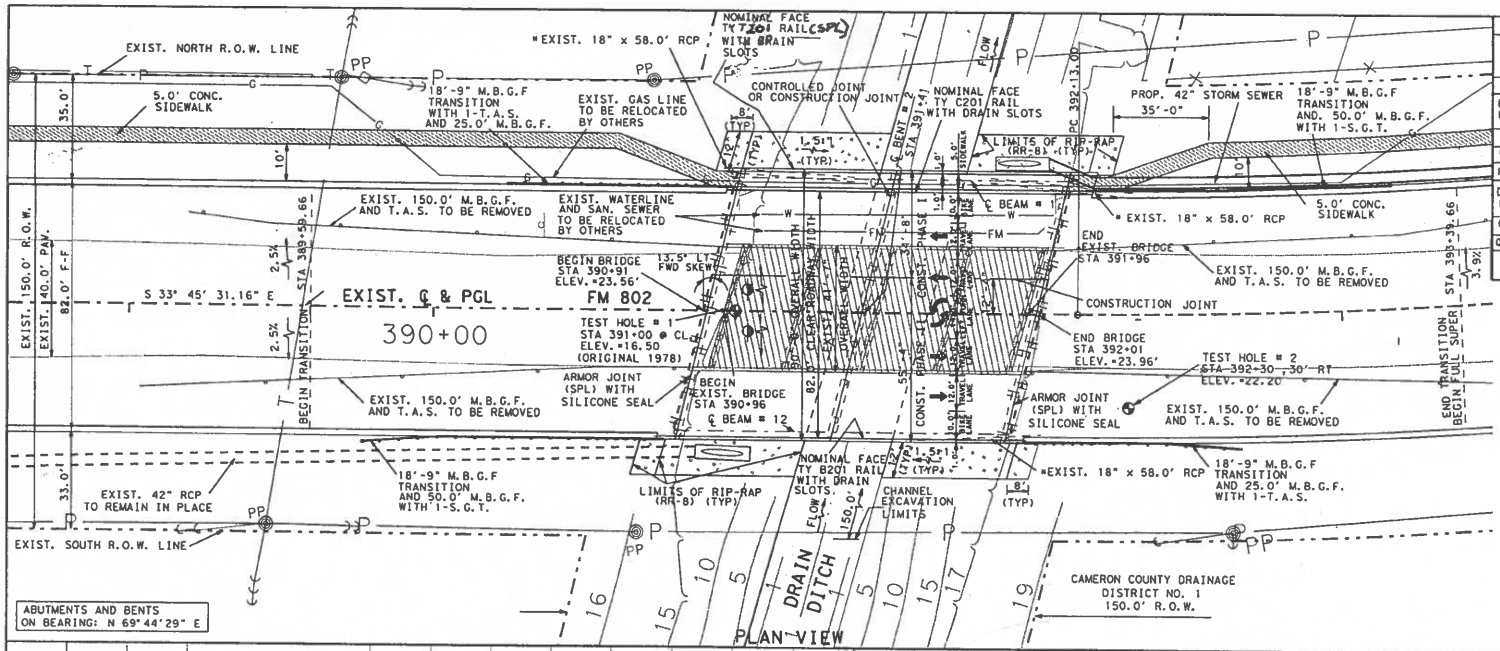
SCALE
HORIZ. 1": 40'- VERT: 1": 40' BRIDGELAYOUT.DGN

THIS DOCUMENT IS FOR INTERIM REVIEW ONLY AND NOT INTENDED FOR CONSTRUCTION OR PERMIT PURPOSES.
LEO MORALES JR. P.E.
TX. P.E. NO. 26812
DATE: MARCH 04, 2002

Texas Department of Transportation

LAYOUT CAMERON COUNTY DRAINAGE DISTRICT NO.1 DRAIN DITCH BRIDGE REPLACEMENT

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	STP 2002 (645) UM		92
STATE	DIST.	COUNTY	
TEXAS	PHARR	CAMERON	
CONT.	SECT.	JOB	HIGHWAY NO.
1140	03	015,ETC	FM 802, ETC.



HYDRAULIC DATA - ANALYSIS PERFORMED UNDER HEC-RAS

HYDRAULIC DATA

DRAIN DITCH BRIDGE-HYDRAULIC SUMMARY

EXISTING CONDITION

DESIGN FREQ.	Q (CFS)	n CHANNEL	n BANK	CHANNEL SLOPE (FT/FT)	HW (FT)	TW (FT)	$V_{APPROACH}$ AVG/MAX (FT/S)	$V_{THRU\ BRIDGE}$ AVG/MAX (FT/S)
Q_{25}	1585.0	0.035	0.065	0.0002	12.88	12.84	2.61/3.15	2.69/2.70
Q_{100}	1929.0	0.035	0.065	0.0002	14.15	14.11	2.69/3.38	2.86/2.87

PROPOSED CONDITION

DESIGN FREQ.	Q (CFS)	n CHANNEL	n BANK	CHANNEL SLOPE (FT/FT)	HW (FT)	TW (FT)	$V_{APPROACH}$ AVG/MAX (FT/S)	$V_{THRU\ BRIDGE}$ AVG/MAX (FT/S)
Q_{25}	1585.0	0.035	0.065	0.0002	12.87	12.72	2.47/2.98	2.06/2.54
Q_{100}	1929.0	0.035	0.065	0.0002	14.14	13.99	2.63/3.18	2.12/2.70

NOTE: HYDRAULIC DATA WAS REFERENCED FROM THE 1990 US CORPS OF ENGINEERS FEASIBILITY REPORT FOR CAMERON COUNTY, TEXAS.

HORIZONTAL CURVE DATA:

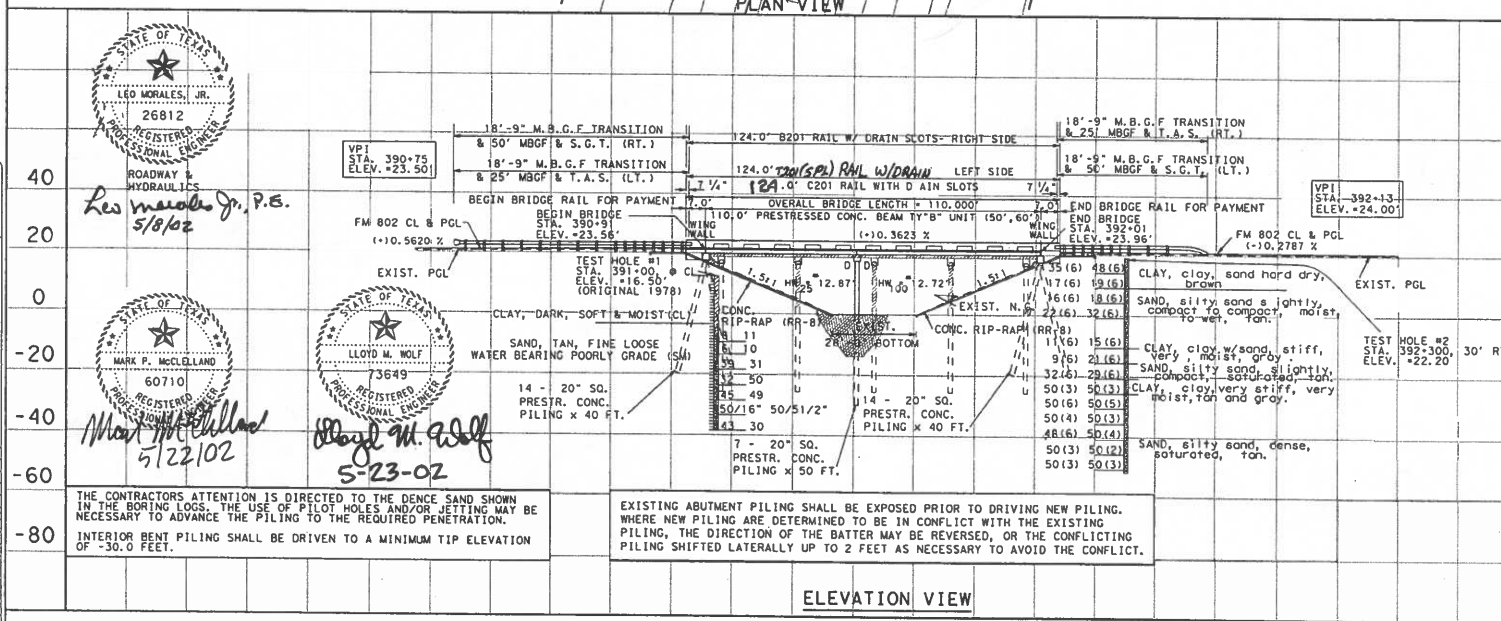
PI STATION	= 402+51.33
DELTA	= 57° 03' 46.46" (LT)
DEGREE OF CURVE	= 3° 00' 00.00"
TANGENT	= 1,038.33
LENGTH	= 1,902.10
RADIUS	= 1,909.86
PC STATION	= 392+13.00
PT STATION	= 411+15.10
e= 3.9%	

NOTE:
THE BRIDGE IS IN A PARABOLIC SUPERELEVATION TRANSITION FROM A 2.5% TO 3.9%

2.5 % 2.5 %
STA 389+59.66

3.9 %
STA 393+39.66

* TO BE REMOVED AND PAID UNDER ITEM 496.



THE CONTRACTORS ATTENTION IS DIRECTED TO THE DENCE SAND SHOWN IN THE BORING LOGS. THE USE OF PILOT HOLES AND/OR JETTING MAY BE NECESSARY TO ADVANCE THE PILING TO THE REQUIRED PENETRATION.

INTERIOR BENT PILING SHALL BE DRIVEN TO A MINIMUM TIP ELEVATION OF -30.0 FEET.

EXISTING ABUTMENT PILING SHALL BE EXPOSED PRIOR TO DRIVING NEW PILING. WHERE NEW PILING ARE DETERMINED TO BE IN CONFLICT WITH THE EXISTING PILING, THE DIRECTION OF THE BATTER MAY BE REVERSED, OR THE CONFLICTING PILING SHIFTED LATERALLY UP TO 2 FEET AS NECESSARY TO AVOID THE CONFLICT.

LEO MORALES, JR. 26812 REGISTERED PROFESSIONAL ENGINEER
ROADWAY & HYDRAULICS
Leo Morales Jr., P.E. 5/8/02

MARK P. McCLELLAND 60710 REGISTERED PROFESSIONAL ENGINEER
Mark McClelland 5/22/02

LLOYD M. WOLF 73649 REGISTERED PROFESSIONAL ENGINEER
Lloyd M. Wolf 5-23-02

DN: ERI
CK: RNP
DW:
CK:

IL 2002 NODE:
DATE:
FILE: b2511y01.dgn

ACTIVE FILE LEVELS STORED

BENCH MARK DATA
B.M. = 3
ELEV. = 20.96
STA. 394+00, 71.0' RT.
NO. 5 IRON ROD W/ ALUMINUM DISK SET IN CONCRETE

DESIGN DATA
FUNC. CLASS : ARTERIAL
ADT (2003) : 9,400
ADT (2023) : 16,400
DESIGN SPEED : 45 MPH
DESIGN LOAD: HS20(AASHTO 1996 SPECS.)

PERMANENT STRUCTURE NUMBER
EXIST. NBI #: 1140-03-002
NBI #: 1140-03-003

GENERAL NOTES
1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS ON THE FIELD PRIOR TO CONSTRUCTION AND ORDERING OF MATERIALS.
2. TEST HOLE # 2 WAS PROVIDED BY RABA KISTNER ON JAN. 25, 2002.
3. REFERENCE CSJ: 1140-03-011

LEGEND
- RIP RAP
- -EXIST. BRIDGE TO BE REMOVED UNDER ITEM 496. EXIST. FOUNDATION TO BE REMOVED TO 2 FEET MIN. BELOW NATURAL GROUND.
- -CHANNEL EXCAVATION
- -SIDEWALK
- -SCOUR ENVELOPE

SCALE

BRIDGELAYOUT.DGN

Texas Department of Transportation
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LAYOUT CAMERON COUNTY DRAINAGE DISTRICT NO.1 DRAIN DITCH BRIDGE REPLACEMENT

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	STP 2002 (645) UM	95
STATE	DIST.	COUNTY
TEXAS	PHARR	CAMERON
CONT.	SECT.	JOB / HIGHWAY NO.
1140	03	015, ETC / FM 802, ETC.